



Wood Buffalo Environmental Association

MAY 2015 MONTHLY REPORT

CONTINUOUS MONITORING
June 29, 2015

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



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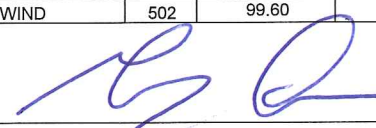
WOOD BUFFALO ENVIRONMENTAL ASSOCIATION
MONTHLY AIR MONITORING SUMMARY
for AMD SECTION III.B.1(c)

MAY 2015
page 1 of 2
prepared 24Jun15 00:10

APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	5	2015					
254465-00-00							
149968-00-01							
48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
224816-00-03	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
189942-00-02	SO2(ppm)	1	100.00	0.053	0	0.006	0
206355-00-00	SO2(ppm)	2	99.73	0.047	0	0.008	0
46586-00-00	SO2(ppm)	4	100.00	0.045	0	0.008	0
216466-00-04	SO2(ppm)	5	99.87	0.074	0	0.020	0
137467-00-00	SO2(ppm)	6	99.46	0.007	0	0.002	0
20809-01-00	SO2(ppm)	7	99.87	0.013	0	0.003	0
241311-00-00	SO2(ppm)	8	100.00	0.005	0	0.001	0
094-02-00	SO2(ppm)	11	98.52	0.060	0	0.008	0
305529-00-00	SO2(ppm)	11	98.52	0.060	0	0.008	0
026-02-00	SO2(ppm)	12	100.00	0.023	0	0.003	0
228044-00-00	SO2(ppm)	12	100.00	0.023	0	0.003	0
73203-01-00	SO2(ppm)	13	99.87	0.049	0	0.007	0
	SO2(ppm)	14	100.00	0.005	0	0.001	0
	SO2(ppm)	15	100.00	0.027	0	0.005	0
	SO2(ppm)	16	100.00	0.015	0	0.003	0
	SO2(ppm)	17	100.00	0.012	0	0.003	0
	SO2(ppm)	19	100.00	0.027	0	0.002	0
	SO2(ppm)	502	93.01	0.008	0	0.002	0
	H2S(ppm)	2	100.00	0.003	0	0.001	0
	H2S(ppm)	4	100.00	0.004	0	0.001	0
	H2S(ppm)	5	100.00	0.003	0	0.001	0
	H2S(ppm)	11	98.92	0.021	1	0.002	0
	H2S(ppm)	17	99.06	0.001	0	0.000	0
	H2S(ppm)	19	99.87	0.002	0	0.000	0
	H2S(ppm)	502	99.19	0.003	0	0.001	0
	TRS(ppm)	1	100.00	0.003	0	0.001	0
	TRS(ppm)	6	99.46	0.001	0	0.000	0
	TRS(ppm)	7	99.87	0.001	0	0.000	0
	TRS(ppm)	9	99.73	0.002	0	0.000	0
	TRS(ppm)	12	100.00	0.002	0	0.000	0
	TRS(ppm)	13	99.73	0.002	0	0.001	0
	TRS(ppm)	14	100.00	0.004	0	0.000	0
	TRS(ppm)	15	100.00	0.001	0	0.000	0
	THC(ppm)	1	97.58	2.4	-	1.9	-
	THC(ppm)	2	99.73	3.9	-	2.4	-
	THC(ppm)	4	100.00	3.5	-	2.5	-
	THC(ppm)	5	99.87	4.4	-	2.6	-
	THC(ppm)	6	93.41	2.1	-	1.9	-
	THC(ppm)	7	99.87	2.3	-	1.9	-
	THC(ppm)	9	100.00	3.5	-	2.4	-
	THC(ppm)	11	98.66	4.1	-	2.6	-
	THC(ppm)	12	100.00	5.6	-	2.9	-
	THC(ppm)	13	99.06	3.1	-	2.3	-
	THC(ppm)	14	99.73	3.3	-	2.1	-
	THC(ppm)	15	99.73	3.6	-	2.5	-
	THC(ppm)	16	100.00	3.5	-	2.8	-
	THC(ppm)	17	100.00	7.0	-	2.2	-
	THC(ppm)	19	100.00	3.0	-	2.2	-
	O3(ppm)	1	100.00	0.068	0	0.049	-
	O3(ppm)	6	99.46	0.060	0	0.045	-

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189942-00-02						NO. READINGS > REGULATION	
206355-00-00							
46586-00-00							
216466-00-04	O3(ppm)	7	99.87	0.064	0	0.045	-
137467-00-00	O3(ppm)	8	100.00	0.065	0	0.053	-
20809-01-00	O3(ppm)	13	99.60	0.056	0	0.036	-
241311-00-02	O3(ppm)	14	100.00	0.061	0	0.052	-
094-02-00	O3(ppm)	17	100.00	0.068	0	0.053	-
305529-00-00	NO2(ppm)	1	100.00	0.028	0	0.007	-
026-02-00	NO2(ppm)	6	99.46	0.015	0	0.004	-
228044-00-00	NO2(ppm)	7	99.73	0.024	0	0.007	-
73203-01-00	NO2(ppm)	8	100.00	0.008	0	0.003	-
	NO2(ppm)	12	100.00	0.053	0	0.017	-
	NO2(ppm)	13	99.87	0.048	0	0.010	-
	NO2(ppm)	14	100.00	0.017	0	0.002	-
	NO2(ppm)	15	100.00	0.044	0	0.009	-
	NO2(ppm)	16	100.00	0.039	0	0.014	-
	NO2(ppm)	17	99.73	0.028	0	0.005	-
	NO2(ppm)	19	96.64	0.032	0	0.006	-
	NO2(ppm)	502	100.00	0.019	0	0.004	-
	CO(ppm)	7	100.00	0.6	-	0.2	0
	NH3(ppm)	1	95.30	0	-	0	0
	NH3(ppm)	6	93.68	13	-	2	0
	PM2.5(ug/m ³)	1	99.87	133.2	-	37.5	1
	PM2.5(ug/m ³)	6	99.33	145.4	-	31.8	1
	PM2.5(ug/m ³)	7	99.33	144.7	-	38.8	2
	PM2.5(ug/m ³)	8	98.66	121.4	-	28.9	0
	PM2.5(ug/m ³)	12	95.30	740	-	70.2	4
	PM2.5(ug/m ³)	13	99.87	103.8	-	32.5	1
	PM2.5(ug/m ³)	14	99.73	174.9	-	27.3	0
	PM2.5(ug/m ³)	15	99.06	187.3	-	36.8	1
	PM2.5(ug/m ³)	16	97.58	217	-	44.8	4
	PM2.5(ug/m ³)	17	99.73	214.2	-	26.9	0
	WIND	1	99.33	-	-	-	-
	WIND	2	100.00	-	-	-	-
	WIND	4	99.87	-	-	-	-
	WIND	5	98.79	-	-	-	-
	WIND	6	100.00	-	-	-	-
	WIND	7	100.00	-	-	-	-
	WIND	8	100.00	-	-	-	-
	WIND	9	99.87	-	-	-	-
	WIND	11	100.00	-	-	-	-
	WIND	12	99.06	-	-	-	-
	WIND	13	99.19	-	-	-	-
	WIND	14	98.52	-	-	-	-
	WIND	15	100.00	-	-	-	-
	WIND	16	99.46	-	-	-	-
	WIND	17	99.19	-	-	-	-
	WIND	19	99.06	-	-	-	-
	WIND	502	99.60	-	-	-	-
							
SIGNATURE OF ASSOCIATION REPRESENTATIVE				FOR ALBERTA ENVIRONMENT USE ONLY			



June 29, 2015

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

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

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

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

www.wbea.org

Enclosed is the May 2015 ambient air quality monitoring report for the continuous ambient air quality monitoring stations of the Wood Buffalo Environmental Association regional air quality monitoring network.

The continuous ambient air quality monitoring network stations are:

AMS 1 - Fort McKay – Bertha Ganter
AMS 2 - Mildred Lake
AMS 3 - Lower Camp B (meteorology)
AMS 4 - Buffalo Viewpoint
AMS 5 - Mannix
AMS 6 - Patricia McInnes
AMS 7 - Athabasca Valley
AMS 8 - Fort Chipewyan
AMS 9 - Barge Landing
AMS 11 - Lower Camp (air quality)
AMS 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 502 - ConocoPhillips Surmont

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

Member	EPEA Approval No.
Athabasca Oil Corporation	289664-00-00
Brion Energy	254465-00-00
Canadian Natural Resources Ltd.	149968-00-01
Cenovus Energy	48522-01-00
Connacher Oil and Gas Ltd.	240008-00-03



ConocoPhillips Canada 48263-00-00

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

Aboriginal Communities

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

Government and Non-Industrial Organizations

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

Figure 1 shows the location of the air monitoring stations and forest health passive towers in the WBEA network.

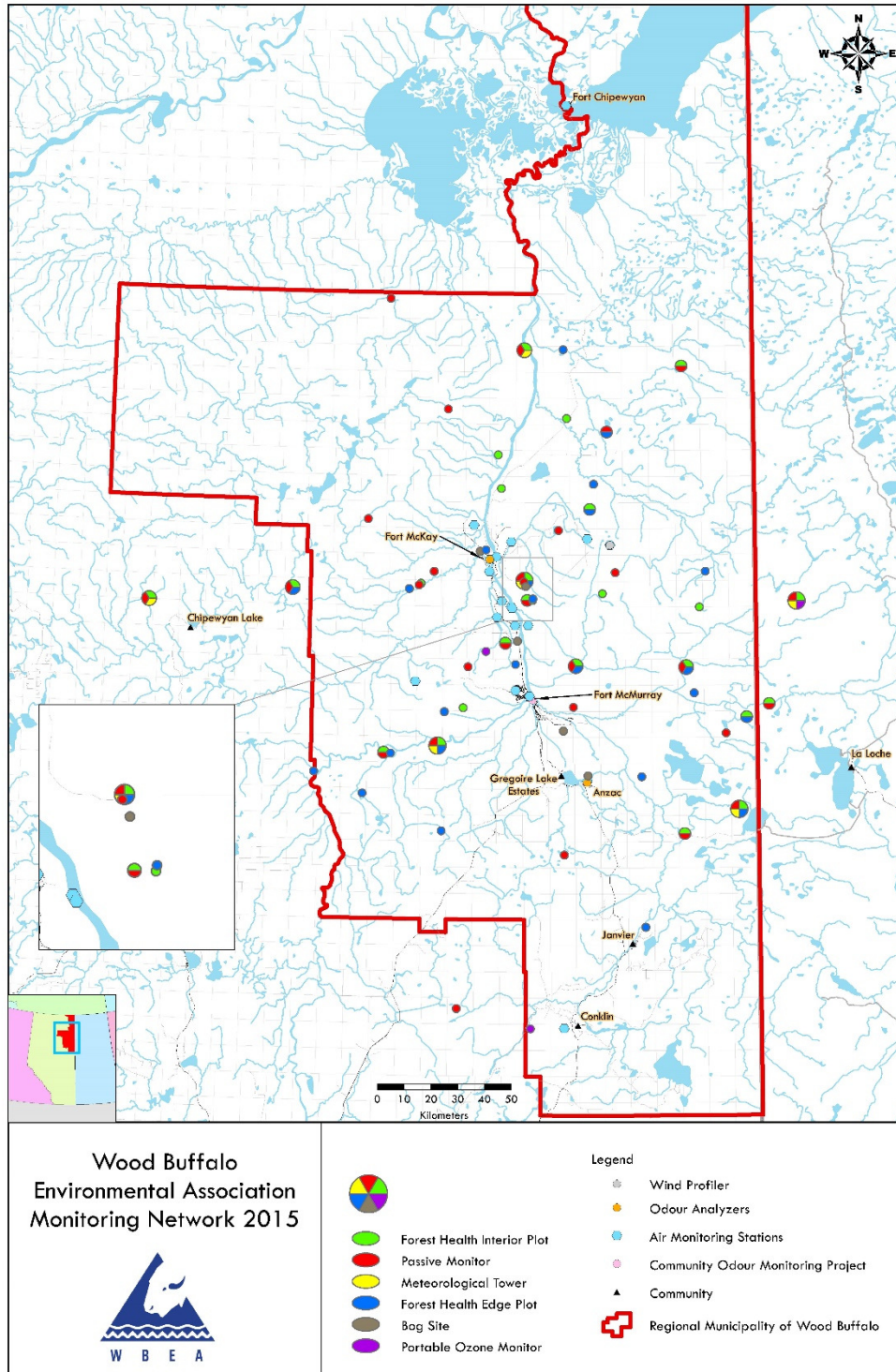


Figure 1 Map of WBEA Air Monitoring Network.

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

1.0 Concentrations in Excess of Alberta Ambient Air Quality Objectives

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

There were 16 ambient ground level concentrations of Particulate Matter (PM_{2.5}) in excess of the PM_{2.5} 24-hour air quality objective reported to the Energy and Environmental Response Centre in real time. After data processing to account for valid analyzer response and correction, there were 14 concentrations in excess of the 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 due to excessive loading and foreign material in the sample chamber from wild fires.

There was 1 H₂S ambient ground level concentration in excess of the 1-hour H₂S air quality objective reported to the Energy and Environmental Response Centre in real time.

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

<u>Site</u>	<u>parameter</u>	<u>date/time</u>	<u>concentration (ppb or ug/m³ for PM_{2.5})</u>				<u>status*</u>
			<u>reference</u>	<u>period</u>	<u>reported</u>	<u>final</u>	
AMS 11 Lower Camp	H ₂ S	07May15:05:00	297975	1-hour	21	21	exc
AMS 1 Fort McKay	PM _{2.5}	31May15:24:00	298989	24-hour	37	38	exc
AMS 6 Patricia McInnes	PM _{2.5}	31May15:24:00	298990	24-hour	32	32	exc
AMS 7 Athabasca Valley	PM _{2.5}	25May15:24:00	298728	24-hour	38	39	exc
AMS 7 Athabasca Valley	PM _{2.5}	31May15:24:00	298991	24-hour	35	35	exc
AMS 12 Millennium Mine	PM _{2.5}	22May15:24:00	298591	24-hour	70	70	exc
AMS 12 Millennium Mine	PM _{2.5}	23May15:24:00	298620	24-hour	82	26	nae
AMS 12 Millennium Mine	PM _{2.5}	24May15:24:00	298648	24-hour	151	46	exc
AMS 12 Millennium Mine	PM _{2.5}	27May15:24:00	298850	24-hour	56	57	exc
AMS 12 Millennium Mine	PM _{2.5}	30May15:24:00	298965	24-hour	58	59	exc
AMS 12 Millennium Mine	PM _{2.5}	31May15:24:00	298992	24-hour	35	-	nae
AMS 13 Fort McKay - South	PM _{2.5}	31May15:24:00	298993	24-hour	33	33	exc

AMS 15 CNRL Horizon	PM _{2.5}	31May15:24:00	298994	24-hour	36	37	exc
AMS 16 Shell Muskeg River	PM _{2.5}	22May15:24:00	298592	24-hour	45	45	exc
AMS 16 Shell Muskeg River	PM _{2.5}	24May15:24:00	298649	24-hour	36	36	exc
AMS 16 Shell Muskeg River	PM _{2.5}	25May15:24:00	298729	24-hour	36	34	exc
AMS 16 Shell Muskeg River	PM _{2.5}	31May15:24:00	298995	24-hour	40	40	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.

1.1 Data Processing and Validation

Concentrations reported in near real-time were raw values. The final values were determined after processing of data for reporting. For all parameters except PM_{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 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.

1.2 Revisions to CASA Data Warehouse

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

2.0 Operational Status

2.1 Continuous Monitoring

In May 2015, there were no incidents resulting in compliance monitoring instruments operating less than 90 % of the time.

In May 2015, there was one incident of a monitoring instrument not required for air quality compliance operating less than 90% of the time. The normal operation of solar radiation sensor at the Fort Chipewyan air monitoring station (AMS 8) was interrupted for 150 hours due to wiring issues. The sensor wiring will be replaced during the July 2015 calibration and maintenance visit to Fort Chipewyan.

2.2 Intermittent Monitoring

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

3.0 Monitoring Notes

General Network Notes

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- Bertha Ganter

The NH₃ analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily spans and routine monthly multipoint calibrations. Additional time for stabilization after exposure to high concentrations of NH₃ gas is an inherent behavior in the NH₃ analyzer operations resulting from the properties of the NH₃ gas. Data for 1 hour following the daily spans have been reported as invalid for a total of 35 hours this month.

Maintenance to the sample inlet, flow audits and zero reference checks on May 19 interrupted the normal operations of the PM_{2.5} analyzer for 1 hour.

Maintenance and recalibration of the THC analyzer on May 18 interrupted the normal operations of the analyzer for 18 hours.

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

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

Station 2, Mildred Lake

Maintenance and cleaning of the sample manifold on May 19 affected the normal operations of the H₂S and SO₂ analyzers for 2 hours.

Station 3, Lower Camp B - Meteorology

Freezing temperatures and ice buildup on all meteorological sensors at the tower on May 5 resulted in 7 to 8 hours of invalid data.

Excessive noise in the output signal of the 167 m elevation wind sensors resulted in 4 hours of downtime this month.

Station 4, Buffalo Viewpoint

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

Station 5, Mannix

Maintenance and cleaning of the sample manifold on May 13 affected the normal operations of the SO₂ and THC analyzers for 1 hour.

Freezing temperatures and ice buildup on all meteorological sensors at the tower on May 5 and 6 resulted in 6 to 9 hours of invalid data.

Station 6, Patricia McInnes

A power outage at the station on May 7 affected the normal operation of all air quality analyzers for 3 hours.

Maintenance and cleaning of the sample manifold on May 20 affected the normal operations of the SO₂, THC, TRS, O₃ and NO₂ analyzers for 1 hour.

Maintenance to the sample inlet, flow audits and zero reference checks on May 20 interrupted the normal operations of the PM_{2.5} analyzer for 2 hours.

There were two issues associated with operation of the NH₃ analyzer resulting in 44 hours of invalid data. The NH₃ analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily span and routine monthly multipoint calibration periods. Additional time for stabilization after exposure to high concentrations of the NH₃ gas is an inherent behavior in the NH₃ analyzer operations resulting from the properties of the NH₃ gas. Data for 1 to 3 hours following the daily spans have been reported as invalid for 43 hours this

month. The NH₃ analyzer experienced a single episode of excessive baseline drift on May 19, resulting in 1 hour of invalid data.

There were two issues associated with operation of the THC analyzer resulting in 45 hours of invalid data. Maintenance and replacement of sample actuator and subsequent re-calibration between May 30 and 31 interrupted the normal operations of the THC analyzer for 29 hours. The analyzer experienced five episodes of excessive noise in the output signal resulting in an additional 16 hours of invalid data.

Station 7, Athabasca Valley

Maintenance and cleaning of the sample manifold on May 14 affected the normal operations of all air quality analyzers for 1 hour.

Maintenance to the sample inlet, flow audits and zero reference checks on May 15 interrupted the normal operations of the PM_{2.5} analyzer for 2 hours.

Replacement and re-calibration of the PM_{2.5} analyzer on May 28 interrupted the normal operations of the analyzer for 3 hours.

Station operator activities on May 15 affected the normal operation of the NO₂ analyzers for 2 hours.

Station 8, Fort Chipewyan

Maintenance to the sample inlet, flow audits and zero reference checks on May 6 interrupted the normal operations of the PM_{2.5} analyzer for 10 hours.

The solar radiation sensor experienced multiple episodes of interferences on its sensor surface. This resulted in inconsistent measurements. Data for these periods were flagged, resulting in 150 hours of invalid data.

Station 9, Barge Landing

Maintenance and cleaning of the sample manifold on May 14 affected the normal operations of the TRS analyzer for 1 hour.

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

Station 11, Lower Camp

A power interruption at the station on May 1 affected the normal operations of all air quality analyzers for 8 to 9 hours.

Maintenance and cleaning of the sample manifold on May 28 affected the normal operations of the SO₂ and THC analyzers for 2 hours.

Station 12, Millennium Mine

The continuous PM_{2.5} analyzer measured higher than normal particulate matter in the region as a result of the wild fires, which interrupted the normal operations of PM_{2.5} analyzer for 35 hours this reporting period.

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

Station 13, Fort McKay South

Station operator activities on May 7 affected the normal operations of the TRS and O₃ analyzer for 1 hour.

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

Installation of a pressure gauge and replacement of the zero air system on May 11 and 29 interrupted the normal operations of the THC analyzer for 6 hours.

Maintenance on the daily zero and span systems and confirmation of analyzers responses on May 28 interrupted the normal operations of air quality analyzers for 1 hour.

Flat-lines in the output signals of the wind sensor resulted in 6 hours of invalid data this reporting period.

Station 14, Anzac

Depletion and replacement of the carrier gas cylinder at the station on May 15 affected the normal operations of the THC analyzer for 3 hours.

Maintenance to the sample inlet, flow audits and zero reference checks on May 27 interrupted the normal operations of the PM_{2.5} analyzer for 2 hours.

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

Station 15, CNRL Horizon

The PM_{2.5} analyzer experienced a single episode of baseline drift on May 3, resulting in 5 hour of invalid data.

Depletion and replacement of the fuel gas cylinder at the station on May 12 affected the normal operations of the THC analyzer for 2 hours.

Maintenance to the sample inlet, flow audits, zero reference checks and sample pump repair on May 14 interrupted the normal operations of the PM_{2.5} analyzer for 2 hours.

Station 16, Shell Muskeg River

Maintenance to the sample inlet, flow audits and zero reference checks on May 6 and 25 interrupted the normal operations of the PM_{2.5} analyzer for 7 hours.

Repairs to sample filter tape rolls in the PM_{2.5} analyzer on May 26 interrupted the normal operations of the analyzer for 11 hours.

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

Station 17, Wapasu

Maintenance to the sample inlet, flow audits and zero reference checks on May 20 interrupted the normal operations of the PM_{2.5} analyzer for 2 hours.

Maintenance on the in-situ calibrator and confirmation of gas-phase titration points on the NO₂ analyzer for O₃ calibration points on May 20 interrupted the normal operations of the NO₂ analyzer for 2 hours.

The H₂S analyzer experienced multiple episodes of intermittent unstable operations this reporting period resulting in 7 hours of invalid data.

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

Station 19, Firebag

Station operator activities on May 26 affected the normal operation of the H₂S analyzers for 1 hour.

Maintenance and re-calibration of the NO₂ analyzer on May 26 affected the normal operations of the analyzer for 25 hours.

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

Station 502, ConocoPhillips Surrmont

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

The H₂S and SO₂ analyzer experienced several episodes of excessive baseline drifts resulting in 3 and 52 hours of invalid data, respectively.

Maintenance and cleaning of the sample manifold on May 26 affected the normal operations of the H₂S analyzer for 3 hours.

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

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

Yours sincerely,

Wood Buffalo Environmental Association

Sanjay Prasad
Air Quality Scientist



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 1
BERTHA GANTER FORT MCKAY
MAY 2015

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

June 29, 2015



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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	707	37	37	100.00	53	0	6	0
TRS(ppb) Average	709	35	35	100.00	3	0	1	0
THC(ppm) Average	682	44	62	97.58	2.4	-	1.9	-
NMHC(ppm) Average	682	44	62	97.58	0.077	-	0.005	-
CH4(ppm) Average	682	44	62	97.58	2.4	-	1.9	-
O3 (ppb) Average	710	34	34	100.00	68	0	49	-
NO2 (ppb) Average	707	37	37	100.00	28	0	7	-
NO (ppb) Average	707	37	37	100.00	51	-	5	-
NOX (ppb) Average	707	37	37	100.00	70	-	9	-
NH3 (ppb) Average	662	47	82	95.30	0	0	0	-
PM2.5 (ug/m3) Average	743	0	1	99.87	133.2	-	37.5	1
Wind Speed 10 m (km/h) Average	739	0	5	99.33	20	-	11	-
Wind Direction 10 m (deg) Average	739	0	5	99.33	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	29.8	-	19.4	-
Temperature 10 m (C) Average	744	0	0	100.00	28	-	20.0	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	89	-
Precipitation (mm) Total	744	0	0	100.00	2.8	-	15.2	-
Surface Wetness (% of range) Average	744	0	0	100.00	82	-	23	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	876	-	347	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	1.6	4	-	0	0	0	0	1	5	53
TRS (ppb) Average	709	0.5	0	-	0	0	0	0	0	1	3
THC (ppm) Average	682	1.88	0.1	-	1.8	1.8	1.8	1.9	1.9	2	2.4
NMHC(ppm) Average	682	0.001	0.005	-	0	0	0	0	0	0	0.077
CH4(ppm) Average	682	1.88	0.1	-	1.8	1.8	1.8	1.9	1.9	2	2.4
O3 (ppb) Average	710	35.8	14	-	4	17	26	35	47	55	68
NO2 (ppb) Average	707	4.4	4	-	0	1	1	3	6	11	28
NO (ppb) Average	707	1	3	-	0	0	0	0	1	2	51
NOX (ppb) Average	707	5.4	7	-	0	1	1	3	7	13	70
NH3 (ppb) Average	662	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	743	10.39	13.3	-	0.8	2.4	3.9	6.5	12.1	20.4	133.2
Wind Speed 10 m (km/h) Average	739	6.7	3	-	0	3	4	6	9	12	20
Wind Direction 10 m (deg) Average	739	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	11.1	8.6	-	-5.4	0.3	4.1	10.4	17.2	23.5	29.8
Temperature 10 m (C) Average	744	11.61	7.8	-	-3.9	1.4	5	10.9	17.5	22.8	28
Relative Humidity (%) Average	744	48.4	25	-	10	16	27	45	69	83	98
Precipitation (mm) Total	744	-	-	28.45	0	0	0	0	0	0	2.8
Surface Wetness (% of range) Average	744	1.7	8	-	0	0	0	0	0	3	82
Global Solar Radiation (W/m2) Average	744	272	300	-	0	0	0	117	536	763	876

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NMHC, CH4, THC	18 May 2015 18:00	19 May 2015 11:00	18	Maintenance - analyzer left in maintenance mode after cal
NH3	01 May 2015 06:00	31 May 2015 07:00	35	Stabilization after daily span
PM2.5	19 May 2015 13:00	19 May 2015 13:00	1	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	05 May 2015 18:00	05 May 2015 19:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	05 May 2015 21:00	05 May 2015 22:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed, Wind Direction	09 May 2015 05:00	09 May 2015 05:00	1	Flat line in sensor output signal - Sensor frozen



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 53 ppb on May 27 09:00	Maximum Daily Average: 6.5 ppb on May 29
Minimum Value: 0 ppb on May 1 05:00	Hours of Data: 707
Maximum Diurnal Average: 4.5 ppb at hour 10	Hours of Missing Data: 37
Monthly Average: 1.6 ppb	Hours of Calibration: 37
Minimum Daily Average: 0.0 ppb on May 28	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.2 ppb at hour 5	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 5 P ₉₉ = 19	

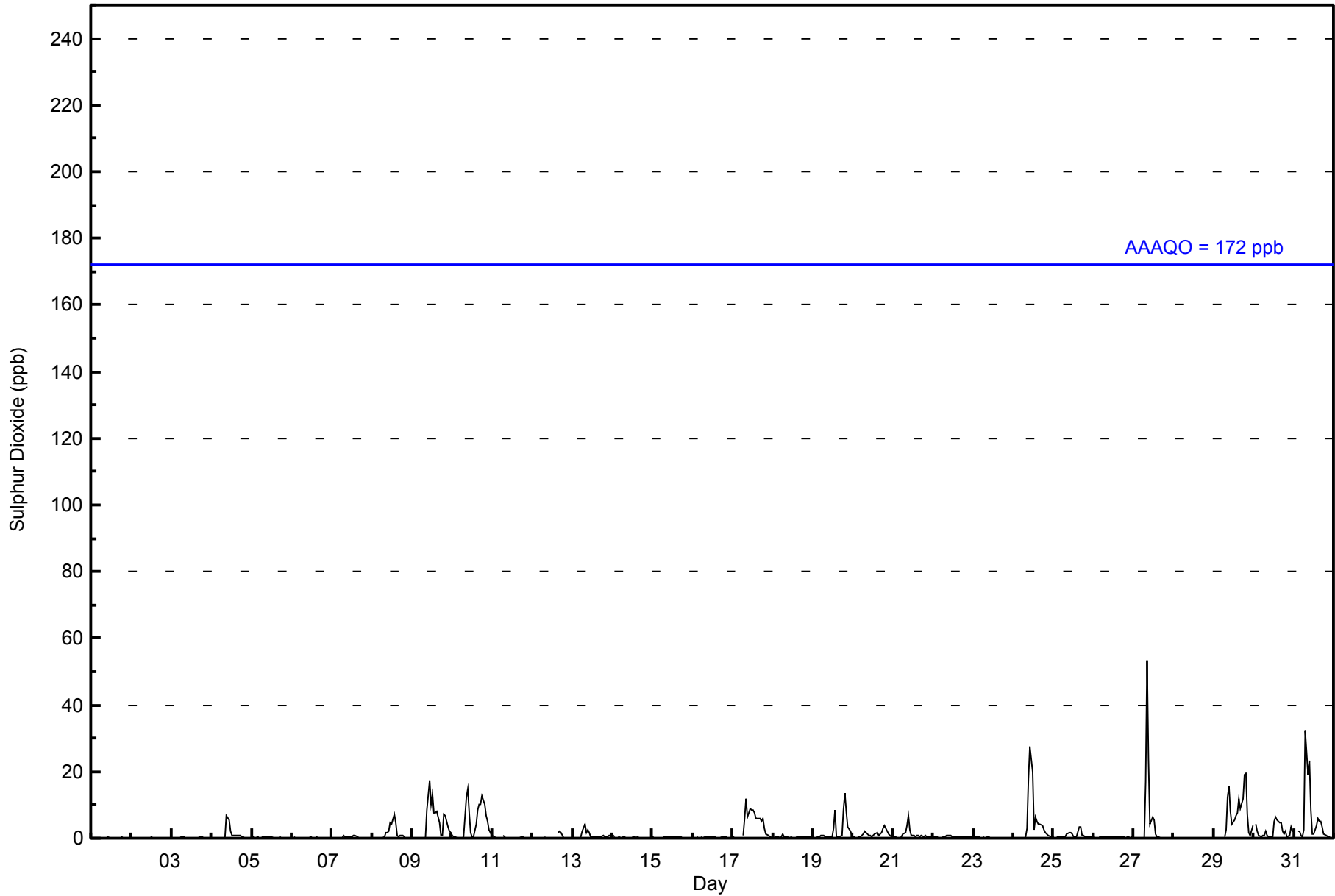
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
4-May	0	0	0	0	Z	0	0	0	0	7	5	2	1	1	1	1	1	1	0	0	0	0	0	0	0.9	7
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-May	0	Z	0	0	0	0	0	1	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0.2	1
8-May	0	0	Z	0	0	0	0	0	2	2	2	5	4	7	5	1	1	1	1	0	0	0	0	0	1.3	7
9-May	0	0	0	Z	0	0	0	0	0	9	18	10	13	8	8	8	5	1	1	7	7	3	2	2	4.4	18
10-May	1	0	0	0	Z	0	0	0	12	15	8	2	1	1	4	9	10	10	13	10	7	5	3	2	4.9	15
11-May	1	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
12-May	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	2	2	2	1	0	0	0	0	0	--	2
13-May	0	Z	0	0	0	1	2	4	2	3	2	1	1	1	1	1	0	0	1	0	0	0	1	1	0.9	4
14-May	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
15-May	1	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
16-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
17-May	0	0	0	0	0	Z	1	6	12	7	9	9	9	8	6	6	6	5	6	3	1	1	0	0	4.1	12
18-May	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1
19-May	1	Z	1	0	1	1	1	1	1	0	0	0	3	9	0	0	1	1	8	14	8	3	2	1	2.4	14
20-May	0	0	Z	0	0	1	1	2	2	1	1	1	1	1	2	1	1	2	3	4	2	1	1	0	1.2	4
21-May	0	0	0	Z	0	0	1	2	4	7	3	1	1	1	1	1	1	1	1	1	1	1	0	0	1.1	7
22-May	0	0	0	0	Z	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
23-May	0	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
24-May	Z	0	0	0	0	0	0	0	3	18	28	20	3	6	5	4	4	4	3	2	1	1	1	1	4.5	28
25-May	0	Z	0	0	0	0	1	1	1	2	2	1	0	1	1	3	4	1	1	0	0	0	0	0	0.9	4
26-May	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-May	0	0	0	Z	0	0	0	17	53	24	4	6	5	1	0	0	0	0	0	0	0	0	0	0	4.9	53
28-May	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
29-May	0	0	0	0	0	Z	0	3	12	16	8	4	5	7	8	12	9	12	19	20	7	2	1	4	6.5	20
30-May	Z	4	2	1	1	1	1	2	1	0	0	1	5	6	5	5	5	2	1	2	0	1	4	2	2.3	6
31-May	2	Z	2	2	1	1	2	32	19	23	8	1	1	4	6	5	5	3	1	1	0	0	0	0	5.3	32
	0.4	0.3	0.3	0.3	0.2	0.3	0.5	2.4	4.1	4.5	3.3	2.2	1.9	2.1	1.8	1.9	1.8	1.6	2.0	2.1	1.2	0.7	0.5	0.5	Diurnal Average	
	2	4	2	2	1	1	2	32	53	24	28	20	13	9	8	12	10	12	19	20	8	5	4	4	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	685	96.89	96.89
11 - 20	17	2.40	99.29
21 - 60	5	0.71	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	62	84	35	22	29	24	10	50	109	86	34	39	17	25	26	28	680
11 - 20	0	0	0	0	1	1	0	3	10	2	0	0	0	0	0	0	17
21 - 60	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	5
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	84	35	22	30	25	11	55	120	89	34	39	17	25	26	28	702

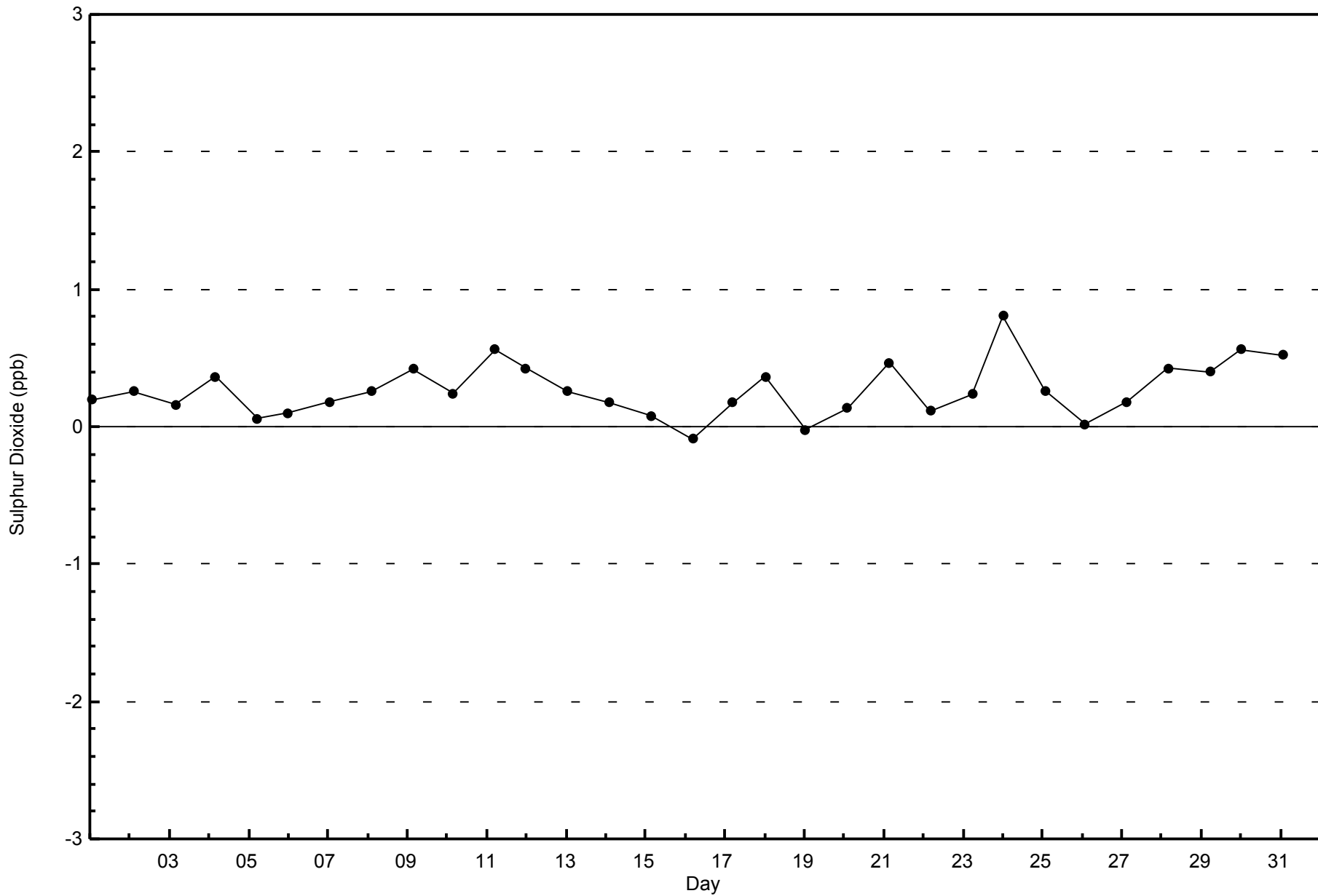
Total Number of Valid Hours: 702

Total Number of Hours: 744



WBEA
Zero Responses

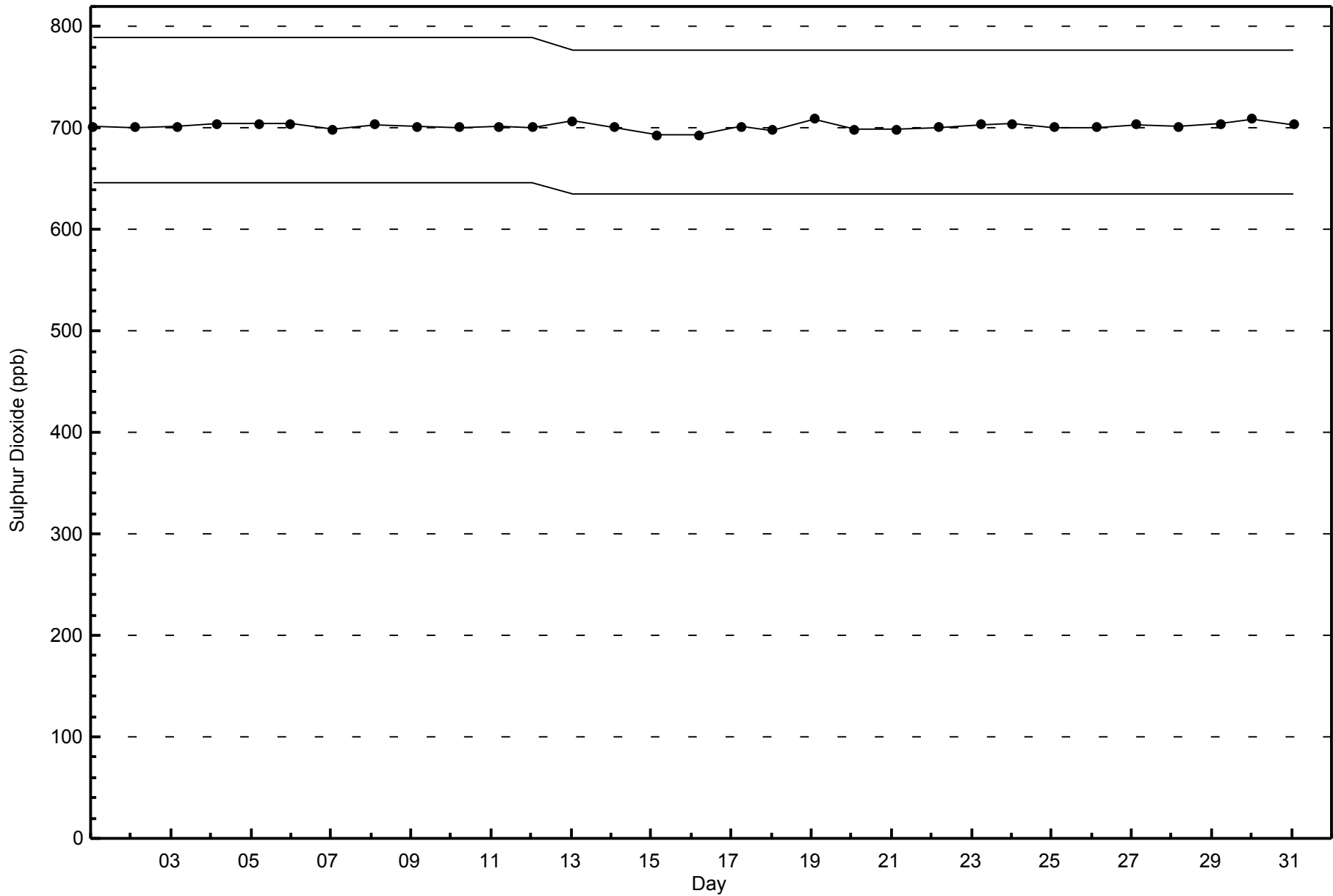
Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort McKay - Bertha Ganter - May 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 3 ppb on May 27 09:00	Maximum Daily Average: 0.8 ppb on May 31		Hours of Data:	709
Minimum Value: 0 ppb on May 8 02:00	Minimum Daily Average: 0.3 ppb on May 28		Hours of Missing Data:	35
Maximum Diurnal Average: 0.7 ppb at hour 8	Minimum Diurnal Average: 0.4 ppb at hour 15		Hours of Calibration:	35
Monthly Average: 0.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 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-May	0	0	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
2-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1
3-May	1	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
4-May	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
5-May	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	0.4	0
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
7-May	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	0.4	1
8-May	0	0	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
9-May	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1
10-May	1	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.5	1
11-May	0	0	0	1	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.4	1
12-May	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	0.5	1
13-May	0	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1
14-May	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
15-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1
16-May	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
17-May	0	0	0	0	0	0	Z	1	1	0	0	1	1	1	0	0	1	1	1	1	1	0	0	0	1	0.5	1
18-May	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	0.5	1
19-May	1	0	Z	0	1	1	1	1	0	0	C	C	C	C	0	0	0	0	0	0	1	1	1	1	1	0.5	1
20-May	1	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1
21-May	0	0	0	0	Z	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
22-May	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
23-May	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	0.4	0
24-May	0	Z	0	1	0	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0.6	2
25-May	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0.6	1
26-May	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
27-May	0	0	0	0	Z	1	1	2	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	3
28-May	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
29-May	0	0	0	0	0	0	Z	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	0	1	1	0.6	1
30-May	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.6	1
31-May	1	1	Z	1	1	0	0	2	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.8	2

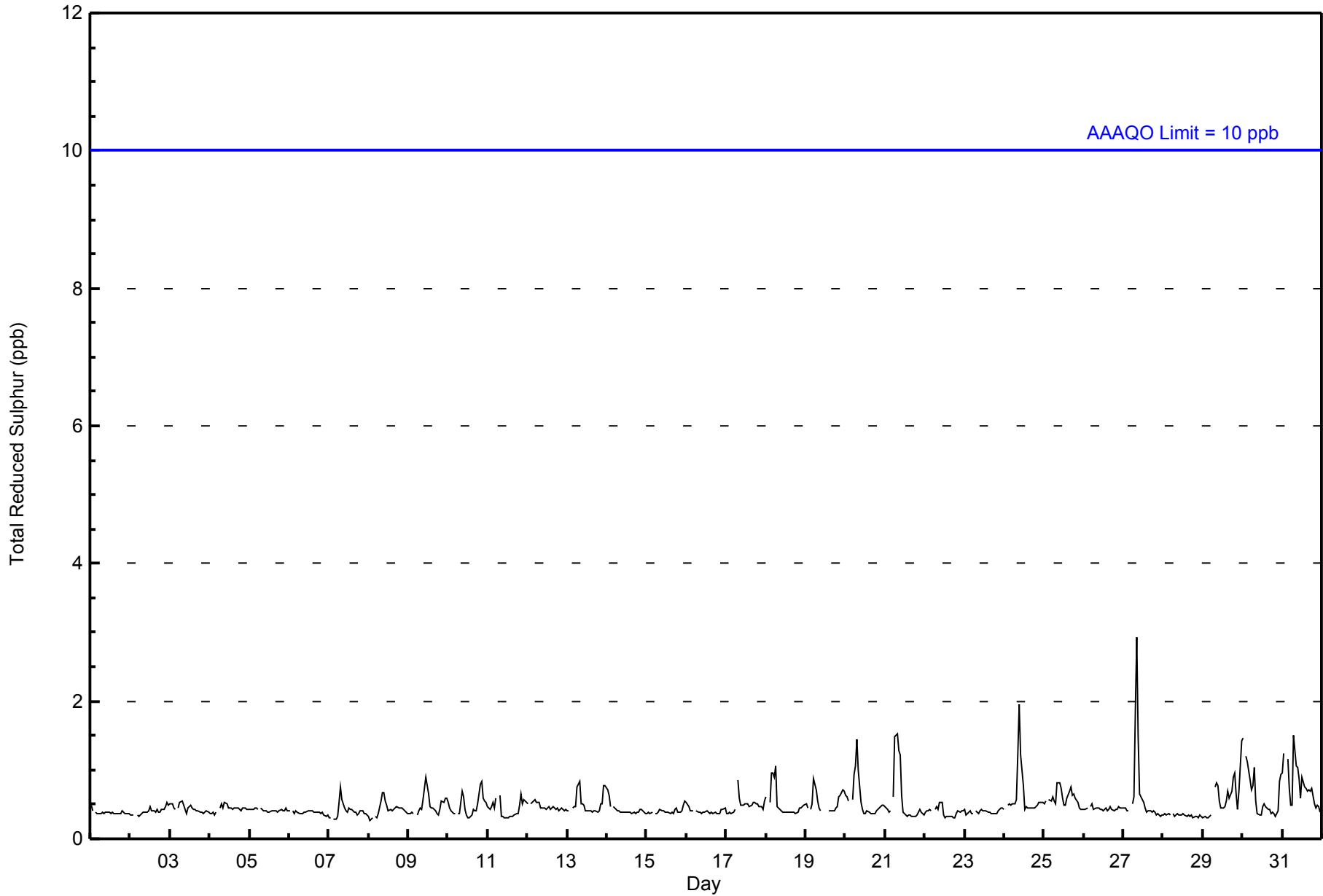
0.5	0.5	0.4	0.5	0.5	0.5	0.6	0.7	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.5	Diurnal Average		
1	1	1	1	1	1	1	2	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum	

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

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
Frequency Distribution

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	62	84	35	22	30	25	11	53	121	90	33	37	19	25	27	30	704
3 - 4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	84	35	22	30	25	11	54	121	90	33	37	19	25	27	30	705

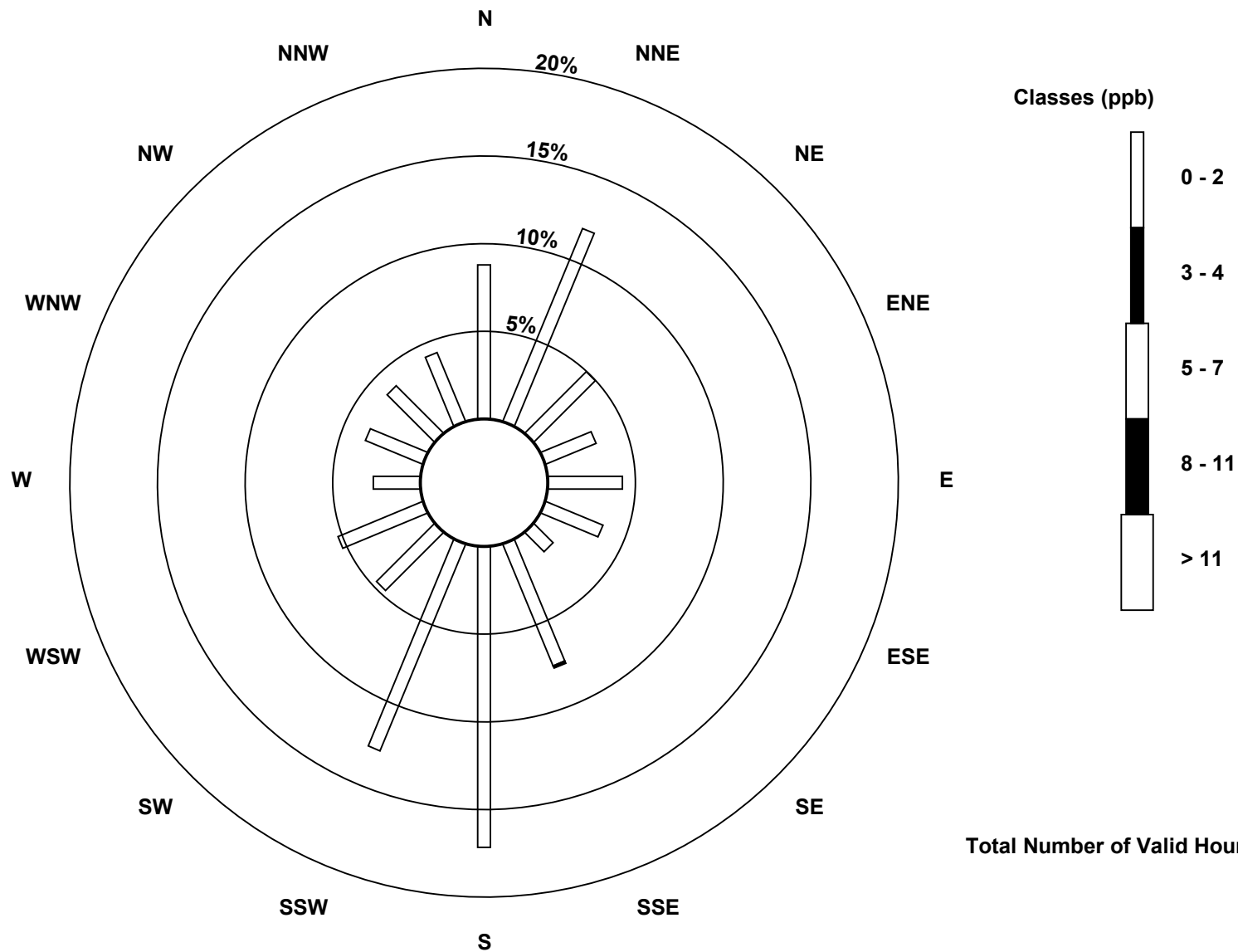
Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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

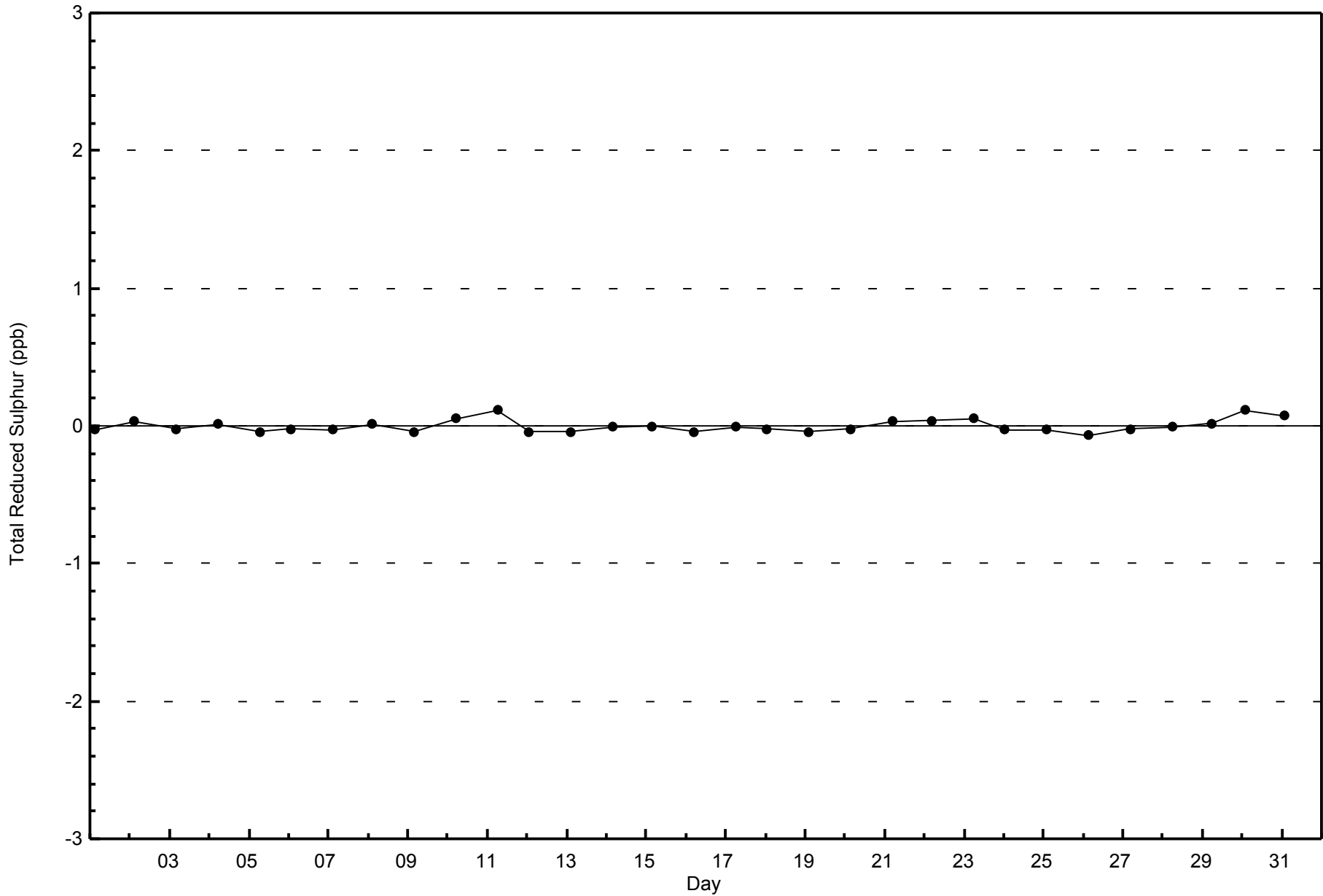


Total Number of Valid Hours: 705



WBEA
Zero Responses

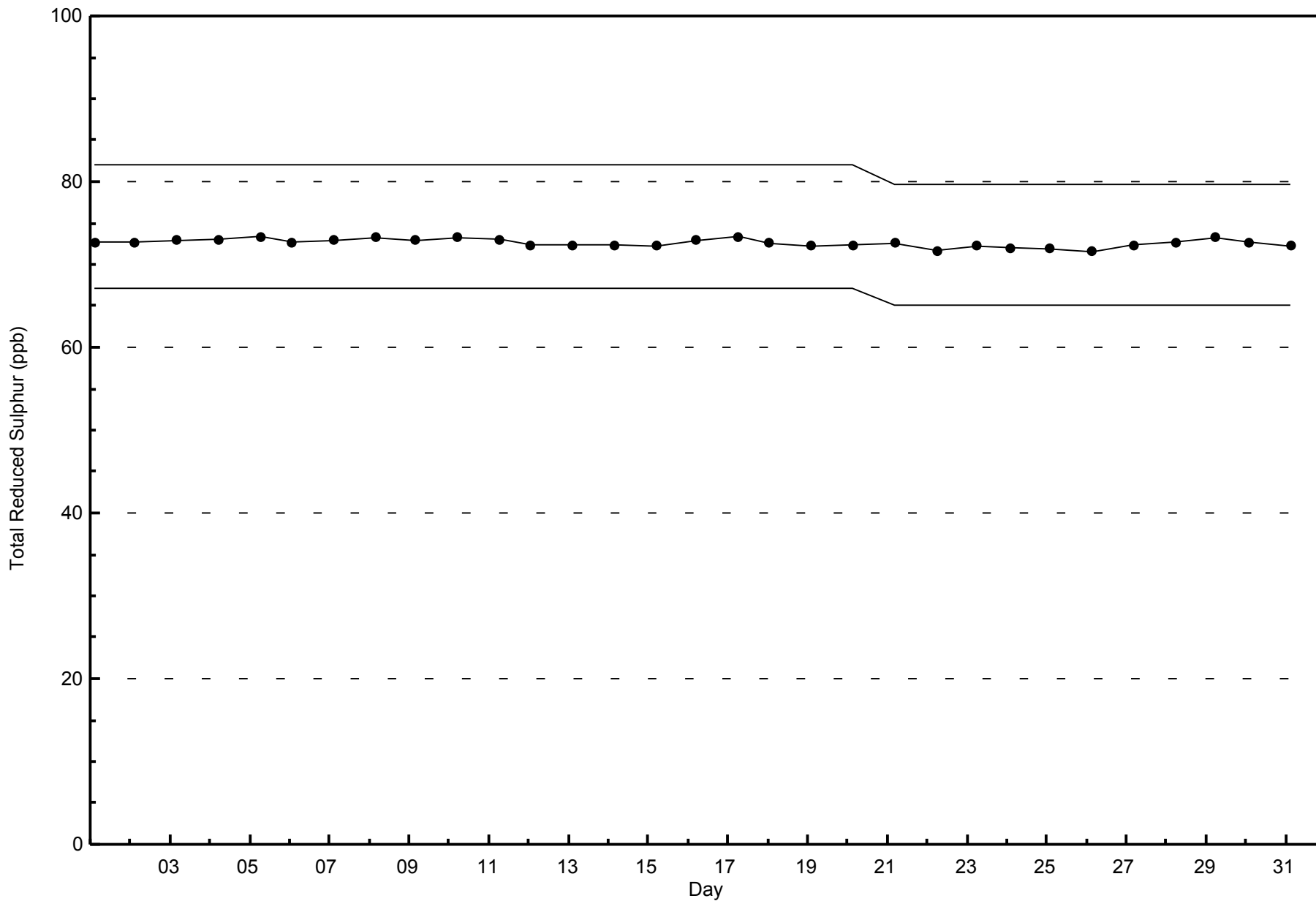
Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - May 2015





WBEA
Span Responses

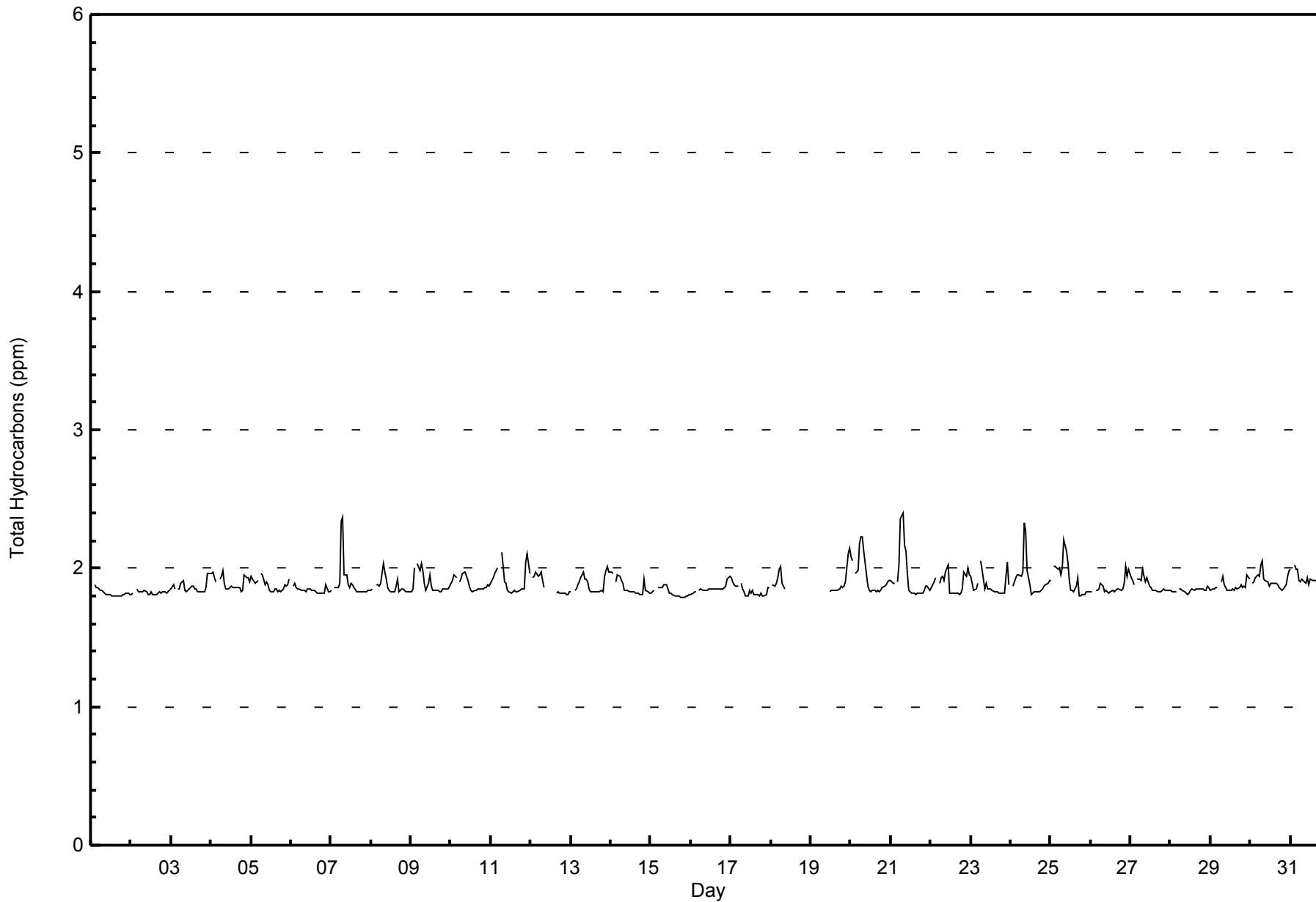
Total Reduced Sulphur (TRS) - ppb
Fort McKay - Bertha Ganter - May 2015





WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	659	96.63	96.63
2.1 - 3.0	23	3.37	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 744



WBEA
Frequency Distribution

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	62	82	35	22	30	25	10	48	108	76	26	35	16	25	26	28	654
2.1 - 3.0	0	2	0	0	0	0	1	6	8	2	2	1	1	0	0	0	23
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	62	84	35	22	30	25	11	54	116	78	28	36	17	25	26	28	677

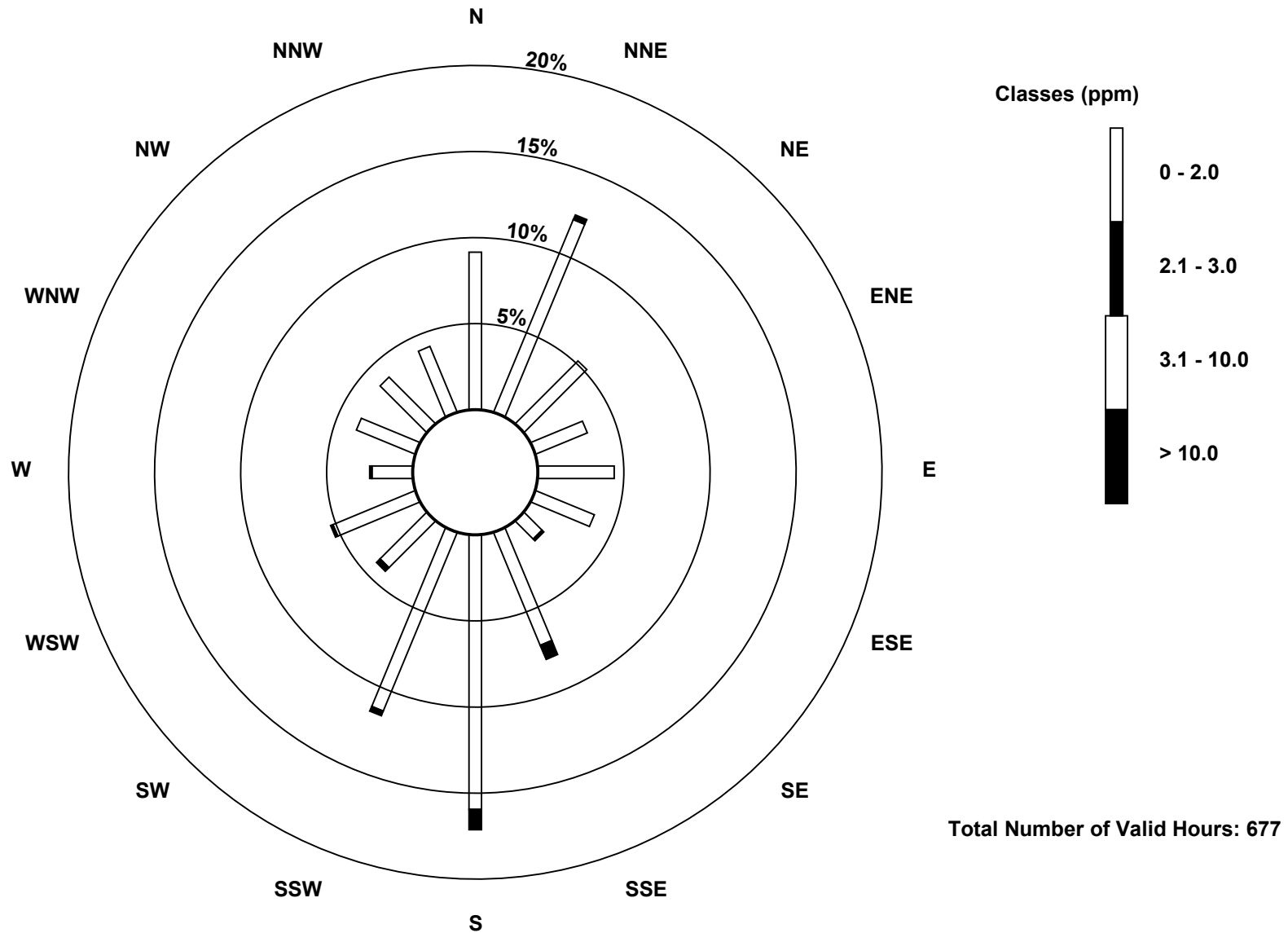
Total Number of Valid Hours: 677

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

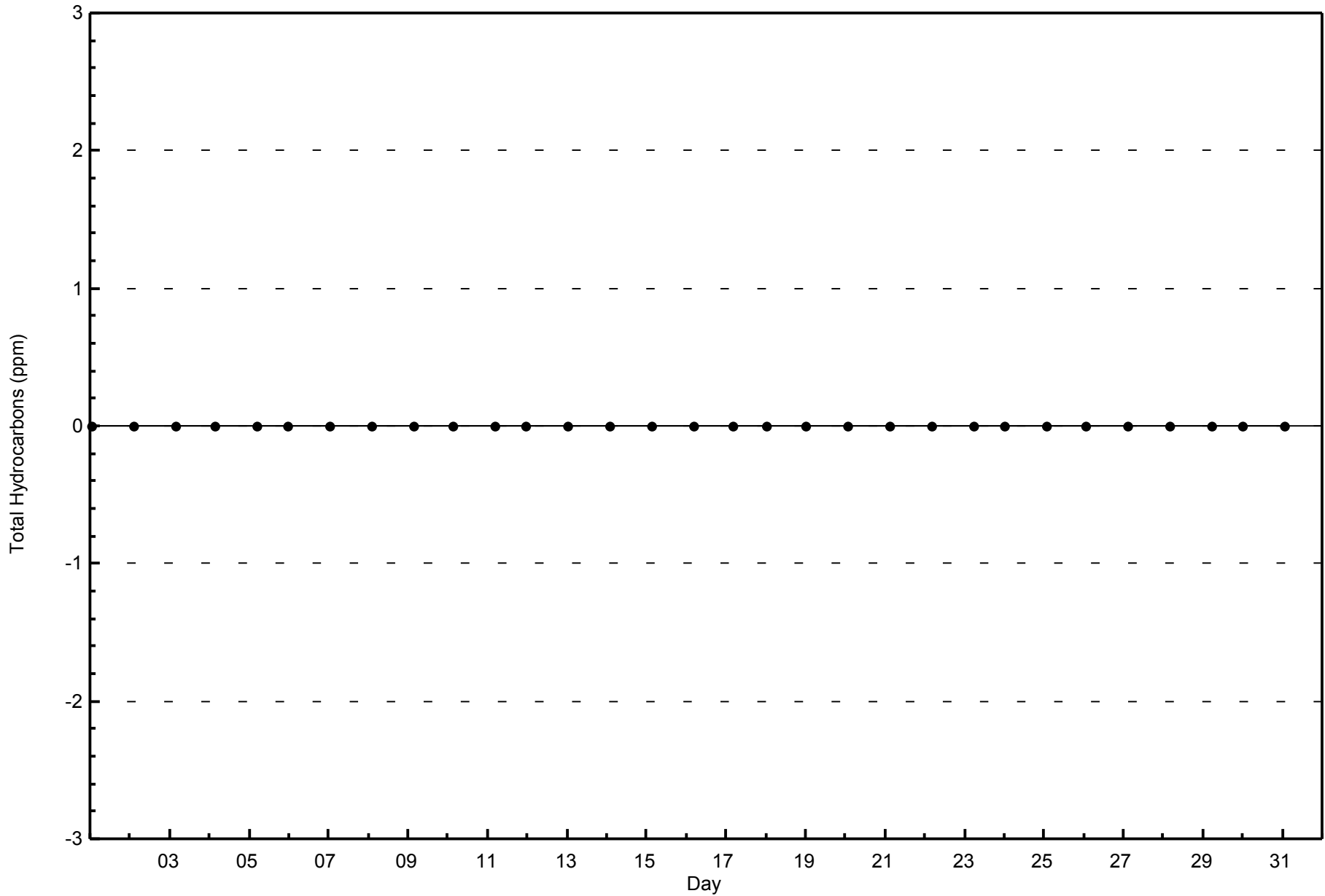
Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

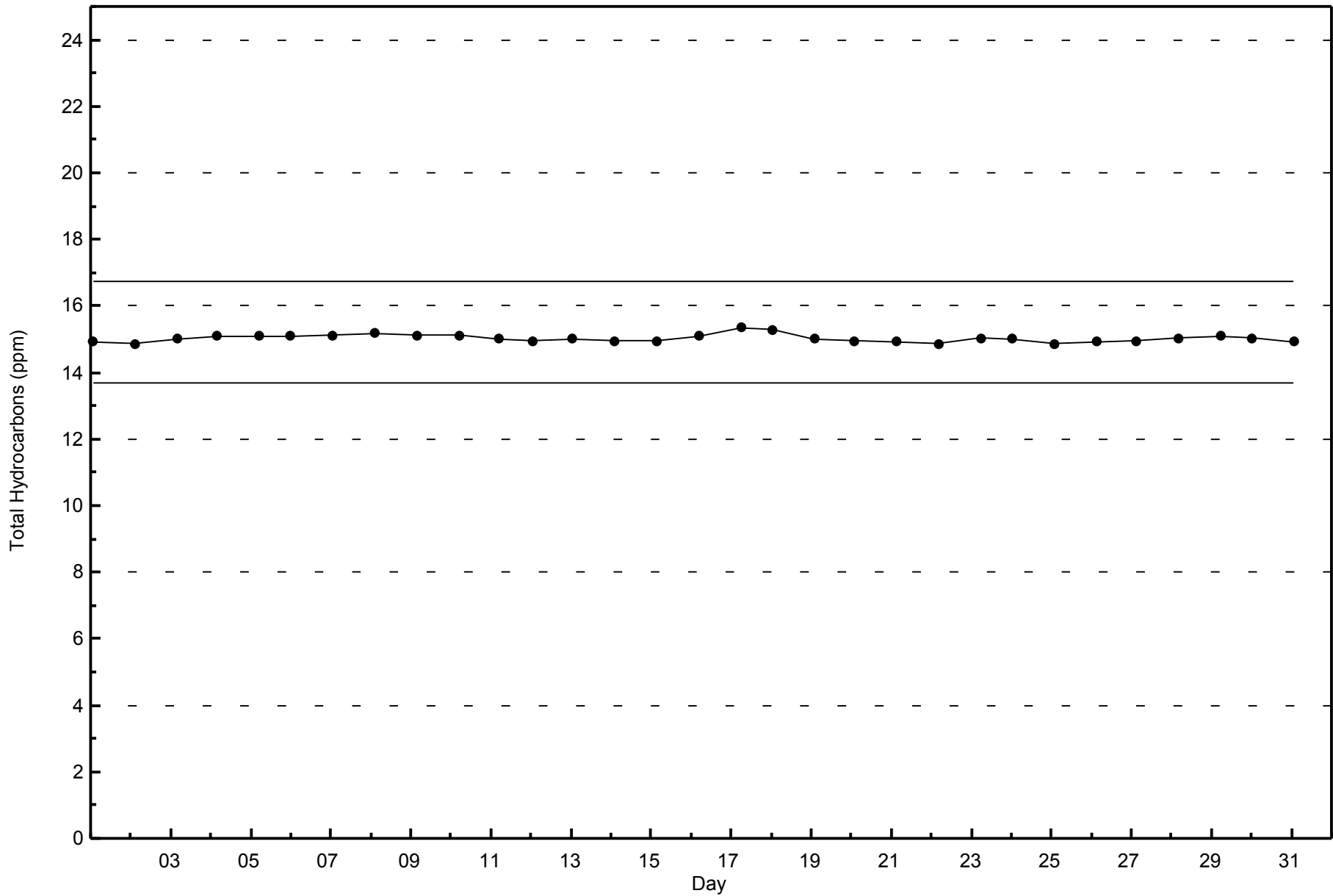
Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - May 2015





WBEA
Span Responses

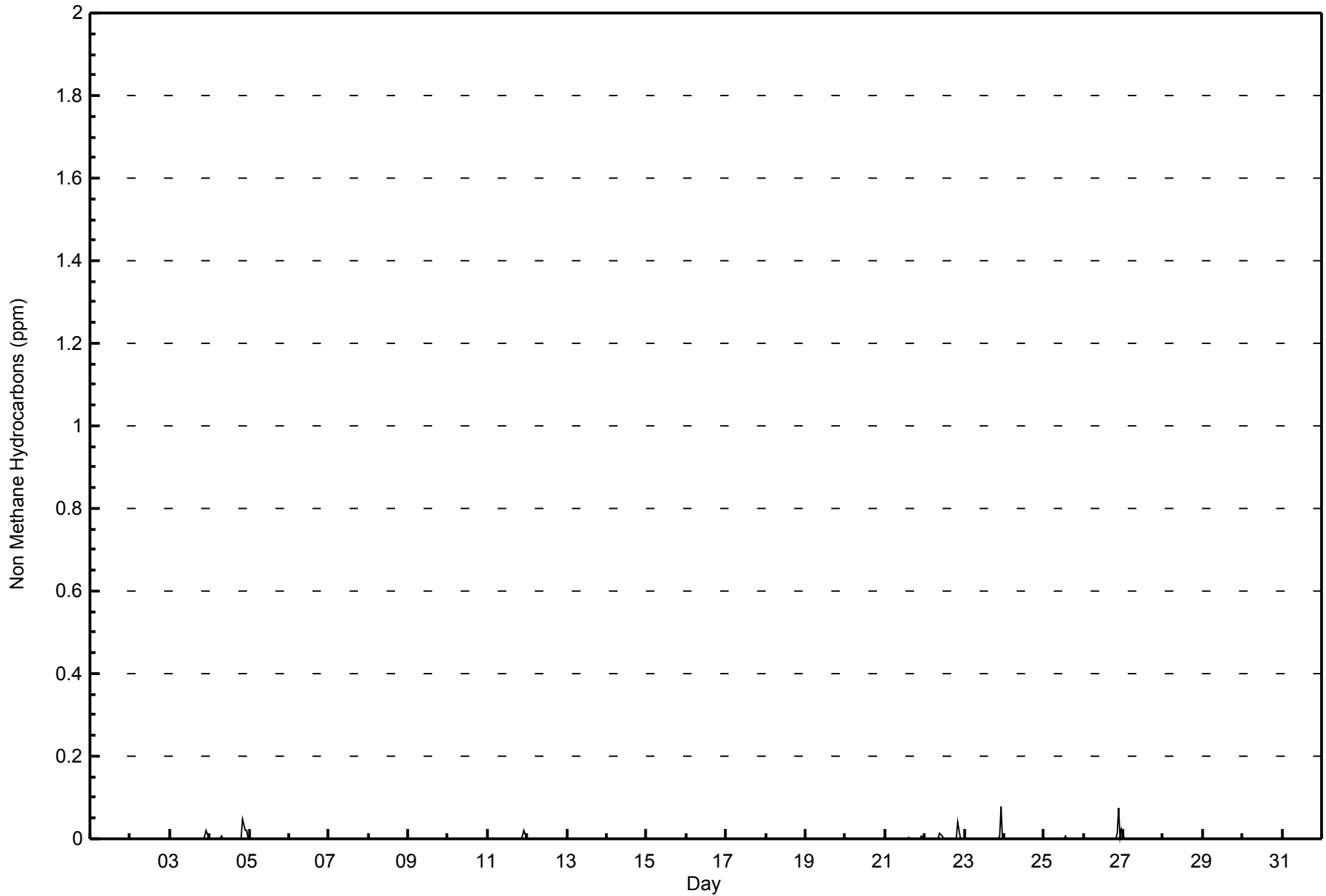
Total Hydrocarbons (THC) - ppm
Fort McKay - Bertha Ganter - May 2015





WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	665	97.51	97.51
0.006 - 0.05	15	2.20	99.71
0.06 - 0.1	2	0.29	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 744



WBEA
Frequency Distribution

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	62	80	28	21	29	25	11	53	116	78	28	36	17	23	26	27	660
0.006 - 0.05	0	4	6	1	1	0	0	1	0	0	0	0	0	2	0	0	15
0.06 - 0.1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	84	35	22	30	25	11	54	116	78	28	36	17	25	26	28	677

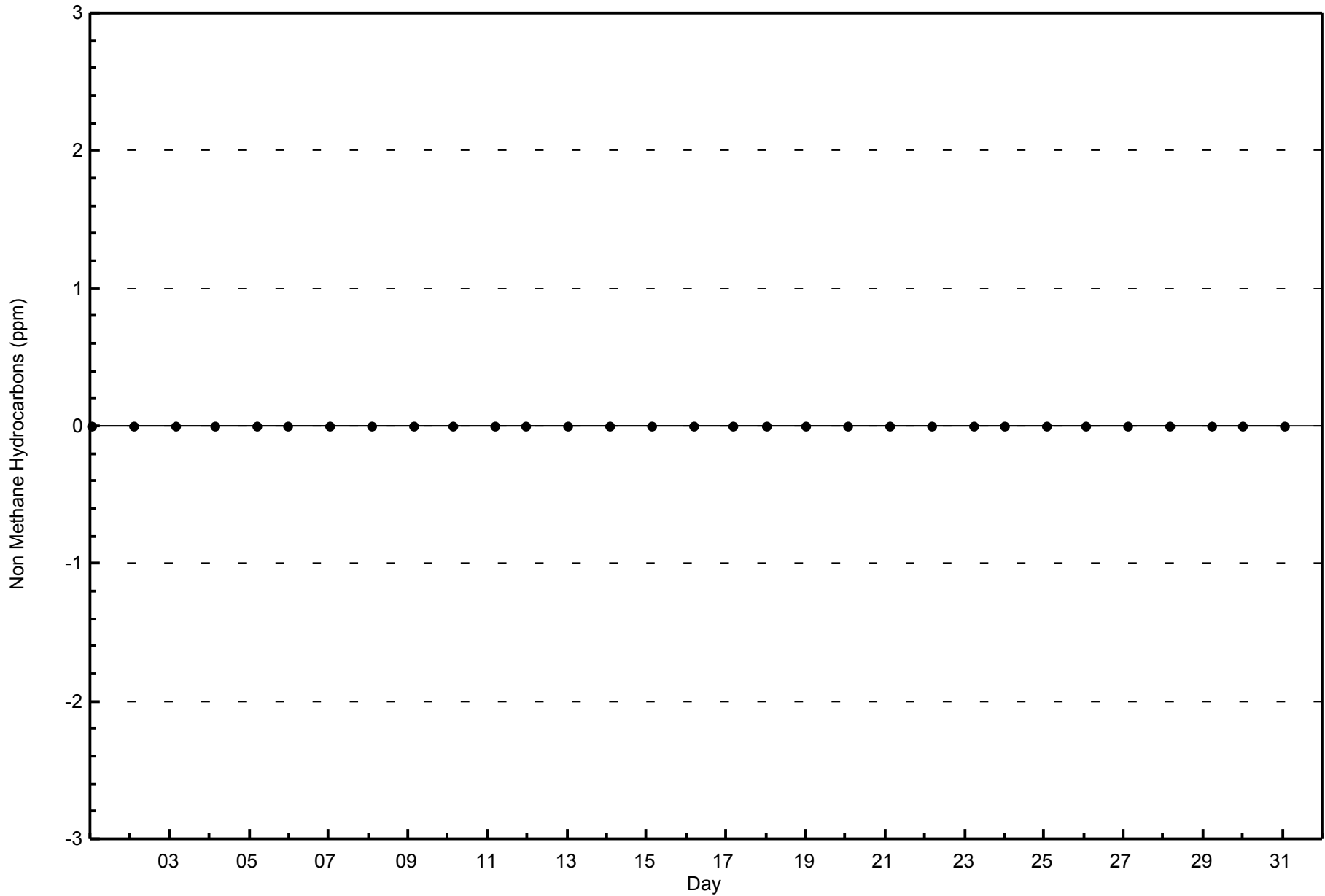
Total Number of Valid Hours: 677

Total Number of Hours: 744



WBEA
Zero Responses

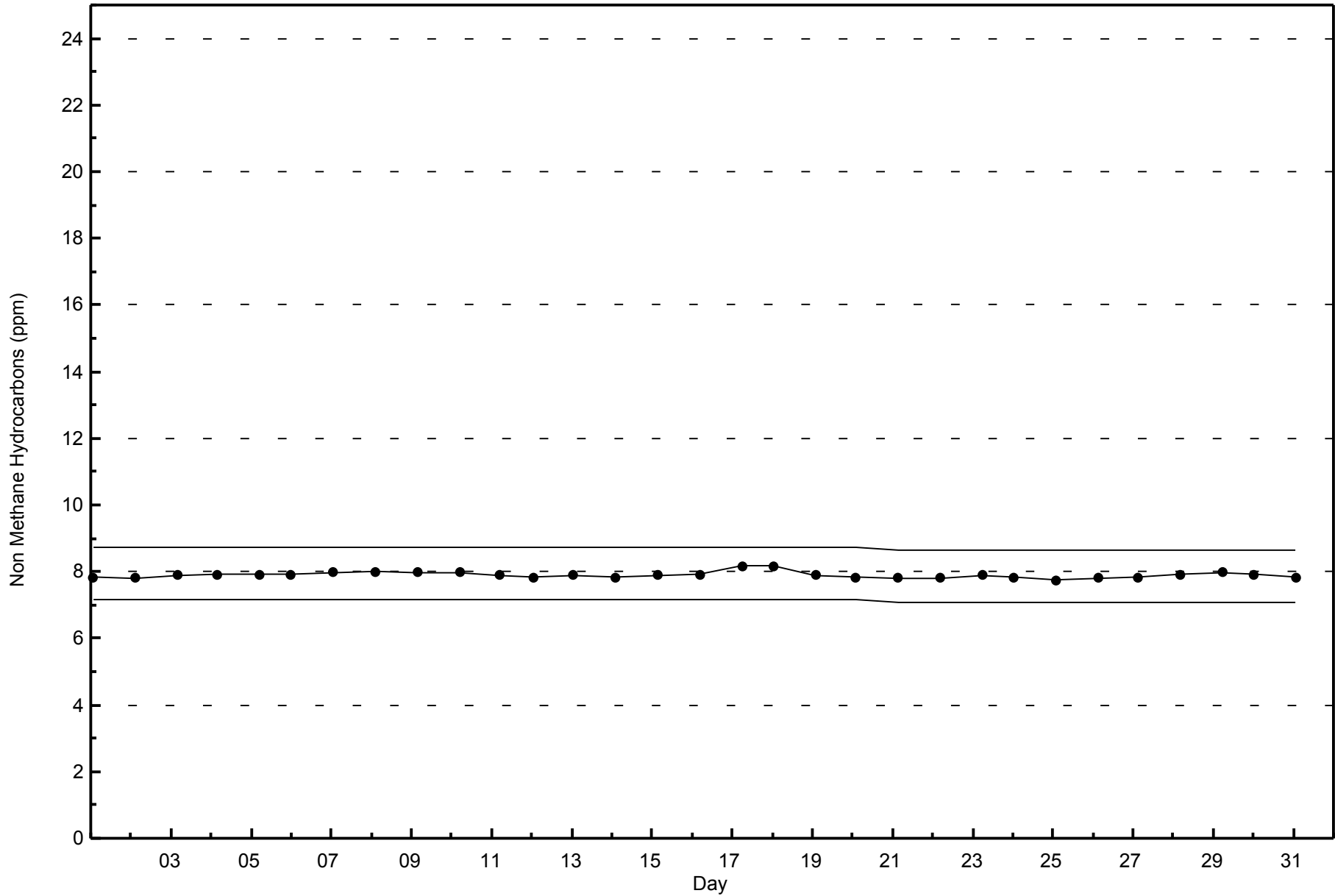
Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - May 2015





WBEA
Span Responses

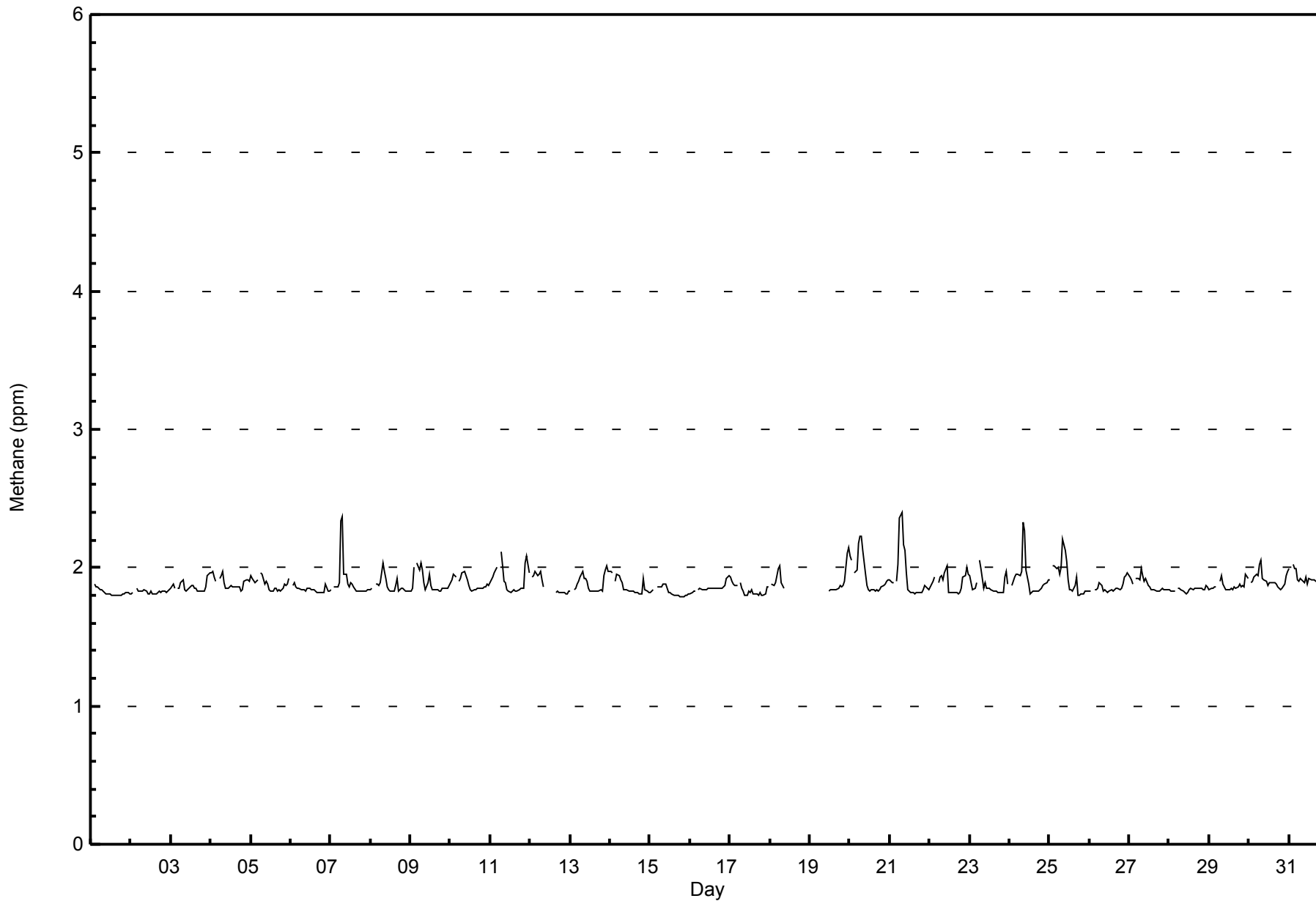
Non Methane Hydrocarbons (NMHC) - ppm
Fort McKay - Bertha Ganter - May 2015





WBEA
Hourly Averages

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - May 2015





WBEA
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	659	96.63	96.63
2.1 - 3.0	23	3.37	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 744



WBEA
Frequency Distribution

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	62	82	35	22	30	25	10	48	108	76	26	35	16	25	26	28	654
2.1 - 3.0	0	2	0	0	0	0	1	6	8	2	2	1	1	0	0	0	23
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	62	84	35	22	30	25	11	54	116	78	28	36	17	25	26	28	677

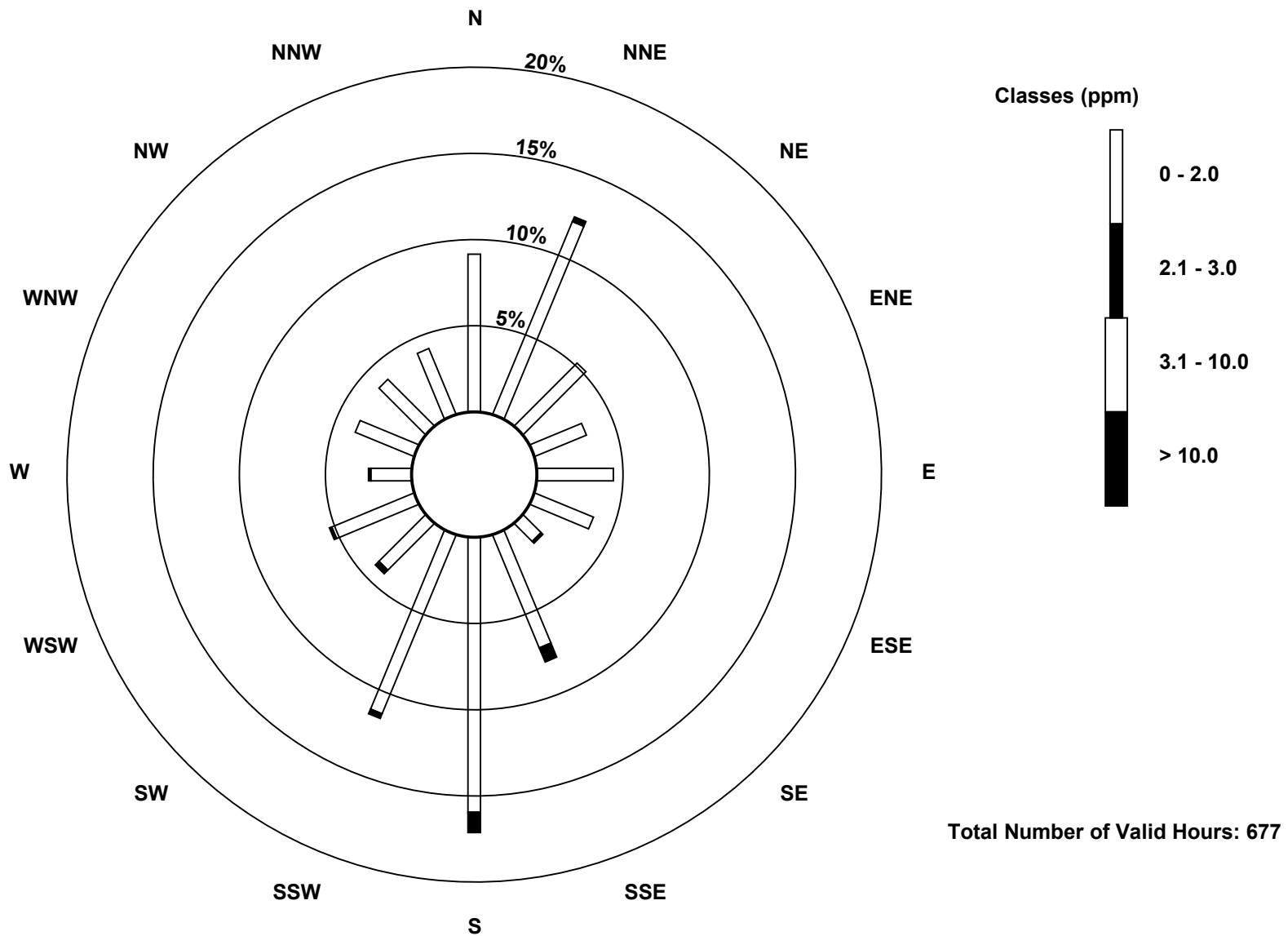
Total Number of Valid Hours: 677

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

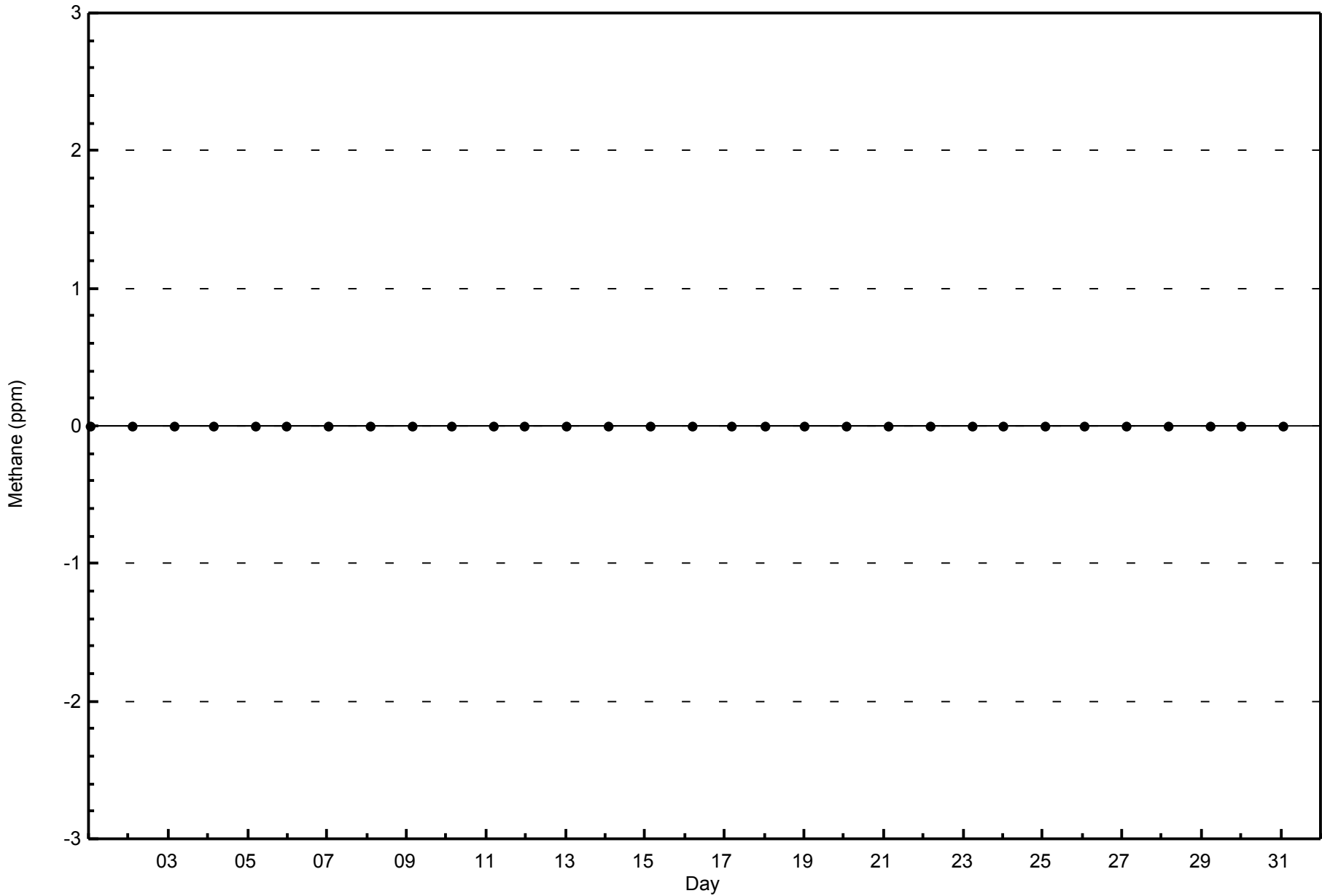
Methane (CH₄) - ppm
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

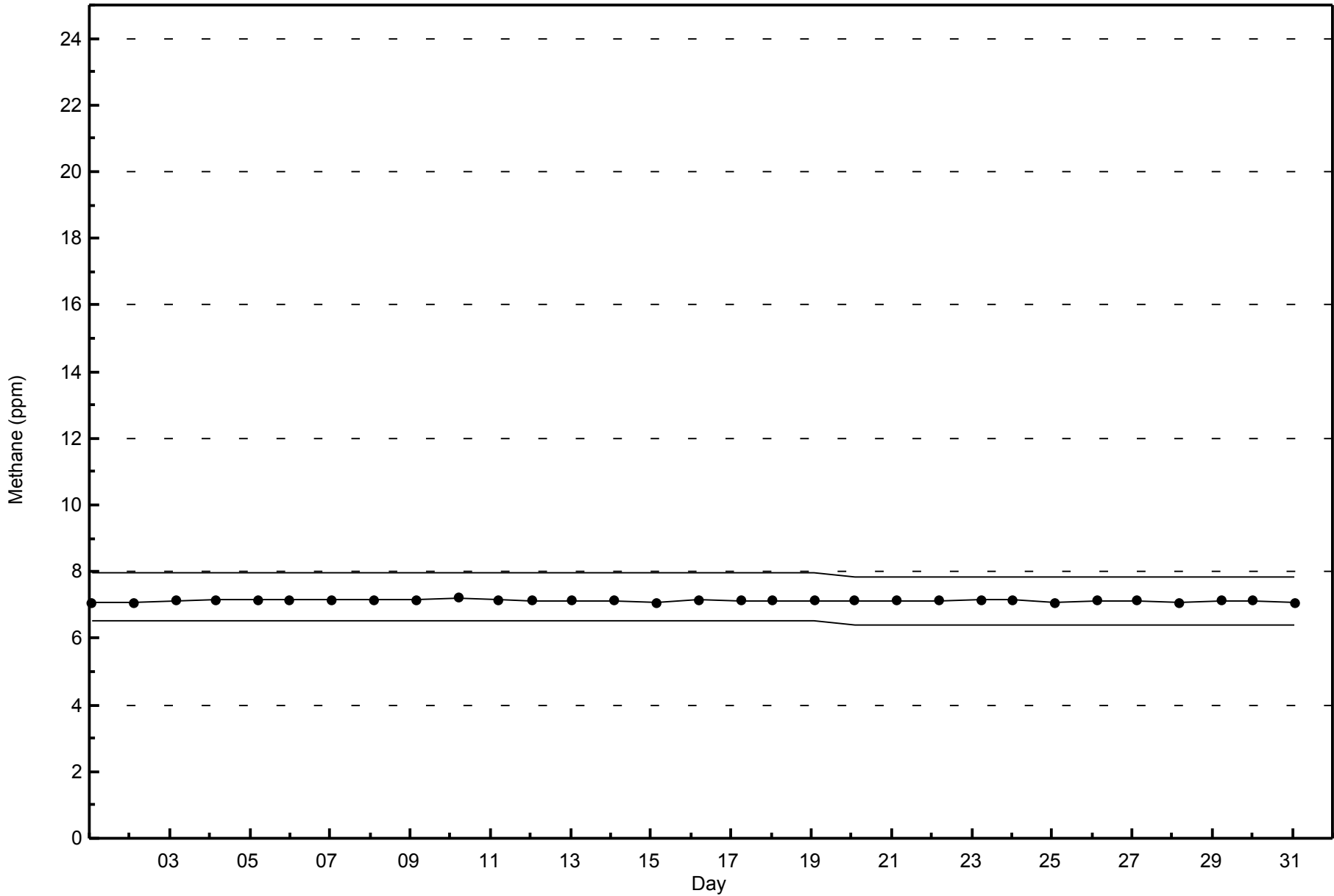
Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - May 2015





WBEA
Span Responses

Methane (CH₄) - ppm
Fort McKay - Bertha Ganter - May 2015



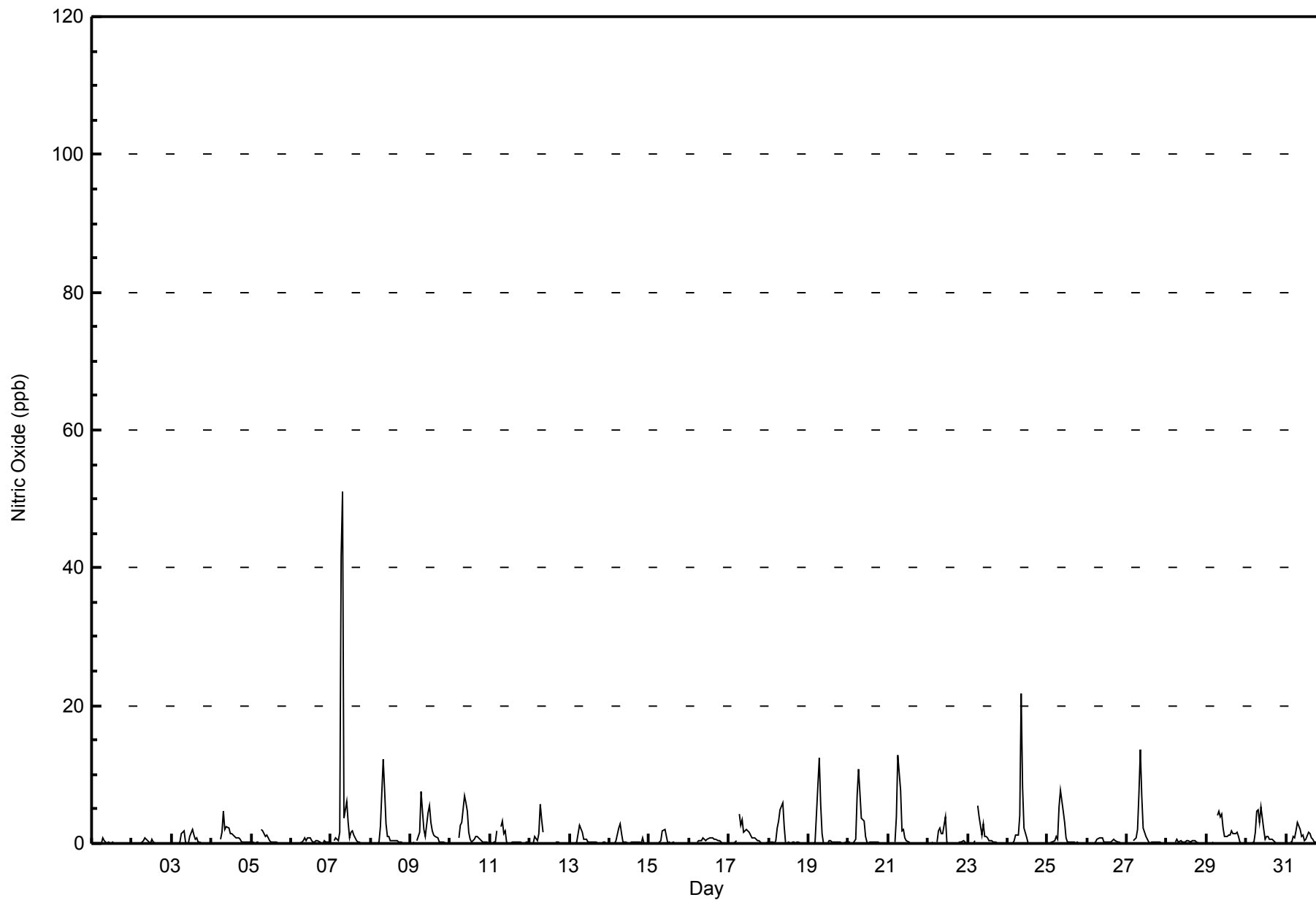


Maximum Value: 51 ppb on May 7 08:00																	Maximum Daily Average: 5.0 ppb on May 7																	Hours in Service: 744														
Minimum Value: 0 ppb on May 6 04:00																	Minimum Daily Average: 0.2 ppb on May 2																	Hours of Data: 707														
Maximum Diurnal Average: 5.0 ppb at hour 8																	Minimum Diurnal Average: 0.1 ppb at hour 2																	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 = 12																	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-May	8	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	8																						
2-May	0	0	Z	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
3-May	0	0	0	Z	0	0	1	2	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	0.4	2																							
4-May	0	0	0	0	Z	1	2	5	2	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0.9	5																							
5-May	0	0	0	0	0	Z	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																							
6-May	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																							
7-May	0	Z	0	1	0	2	42	51	4	6	3	1	2	2	1	0	0	0	0	0	0	0	0	5.0	51																							
8-May	0	0	Z	0	0	0	3	12	8	3	1	1	0	0	0	0	0	0	0	0	0	0	0	1.3	12																							
9-May	0	0	0	Z	0	2	7	5	2	1	4	5	3	2	1	1	1	0	0	0	0	0	0	1.6	7																							
10-May	0	0	0	0	Z	1	3	3	7	6	5	2	1	0	1	1	1	1	1	0	0	0	0	1.4	7																							
11-May	0	0	0	0	2	Z	2	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3																							
12-May	Z	0	0	1	0	1	6	3	2	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	6																							
13-May	0	Z	0	0	0	2	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3																							
14-May	0	0	Z	0	0	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	3																							
15-May	0	0	0	Z	0	0	0	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																							
16-May	0	0	0	0	Z	0	0	0	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1																							
17-May	0	0	0	0	0	Z	4	3	3	2	2	2	2	1	1	1	1	0	0	0	0	0	0	1.0	4																							
18-May	Z	0	0	0	0	2	3	5	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	6																							
19-May	0	Z	0	0	0	4	12	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	12																							
20-May	0	0	Z	0	1	7	11	7	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1.5	11																							
21-May	0	0	0	Z	0	4	13	8	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1.3	13																							
22-May	0	0	0	0	Z	0	2	2	1	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4																							
23-May	0	0	0	0	0	Z	6	4	1	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0.8	6																							
24-May	Z	0	0	0	0	1	1	4	22	8	2	1	0	0	0	0	0	0	0	0	0	0	0	1.8	22																							
25-May	0	Z	0	0	0	1	1	5	8	5	3	1	0	0	0	0	0	0	0	0	0	0	0	1.1	8																							
26-May	0	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1																							
27-May	0	0	0	Z	0	1	2	7	14	7	2	1	1	0	0	0	0	0	0	0	0	0	0	1.6	14																							
28-May	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
29-May	0	0	0	0	0	Z	4	5	4	4	2	1	1	1	1	2	1	1	2	1	0	0	0	1.4	5																							
30-May	Z	0	0	0	0	2	5	5	3	5	2	1	1	1	1	1	0	0	0	0	0	0	0	1.2	5																							
31-May	0	Z	0	0	1	1	2	3	2	1	1	0	1	2	1	1	1	0	0	0	0	0	0	0.8	3																							
																								0.4	0.1	0.1	0.1	0.4	1.3	4.5	5.0	3.3	2.4	1.4	0.7	0.6	0.5	0.4	0.4	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	Diurnal Average
																								8	0	0	1	2	7	42	51	22	8	5	5	3	2	1	2	1	1	1	2	1	1	0	0	Diurnal Maximum
Z - zerospan C - Calibration																																																



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	704	99.58	99.58
21 - 40	1	0.14	99.72
11 - 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
Frequency Distribution

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

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	62	84	35	22	30	25	10	54	119	89	34	39	17	25	26	28	699
21 - 40	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
11 - 80	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	84	35	22	30	25	11	55	120	89	34	39	17	25	26	28	702

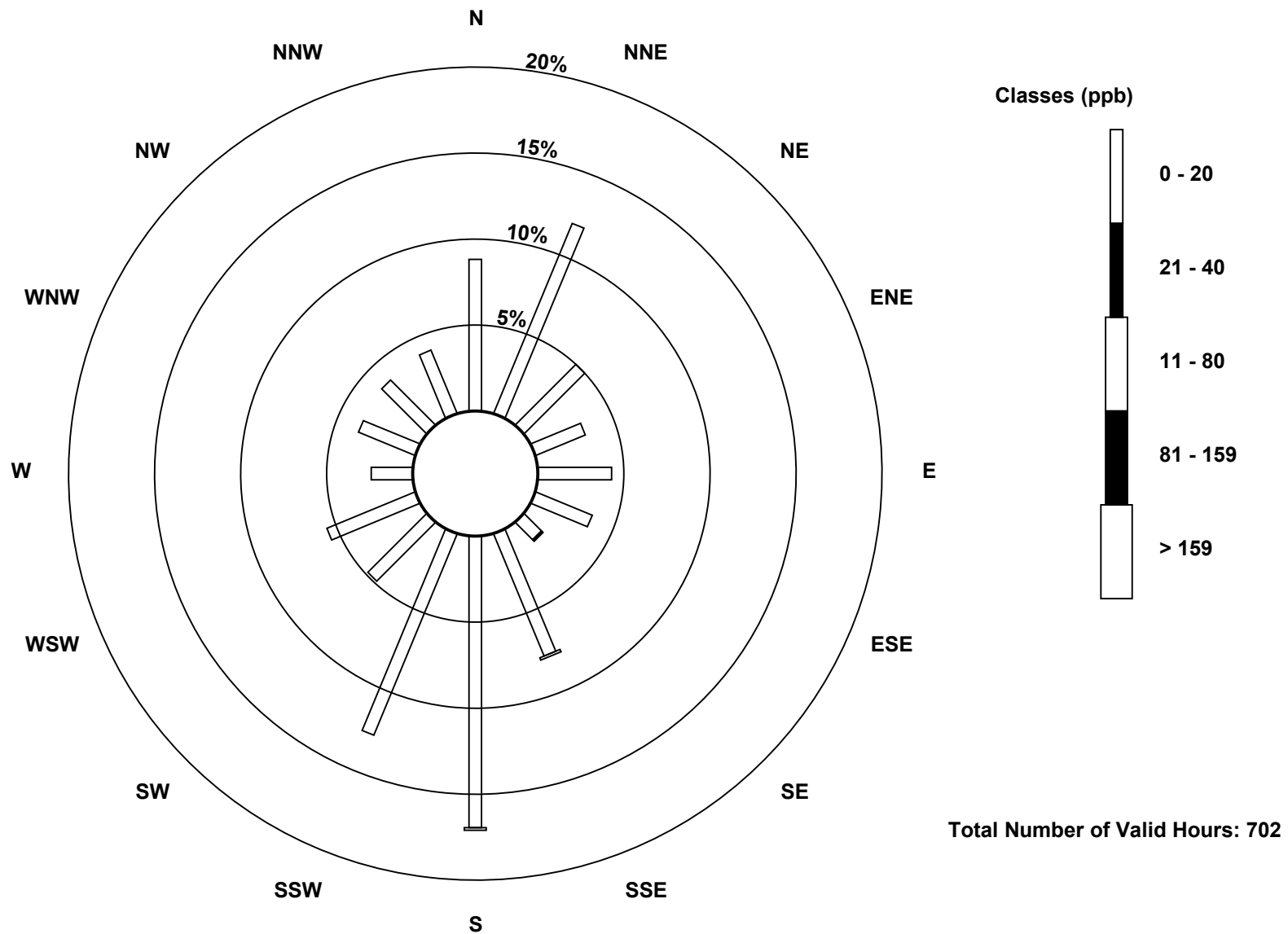
Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

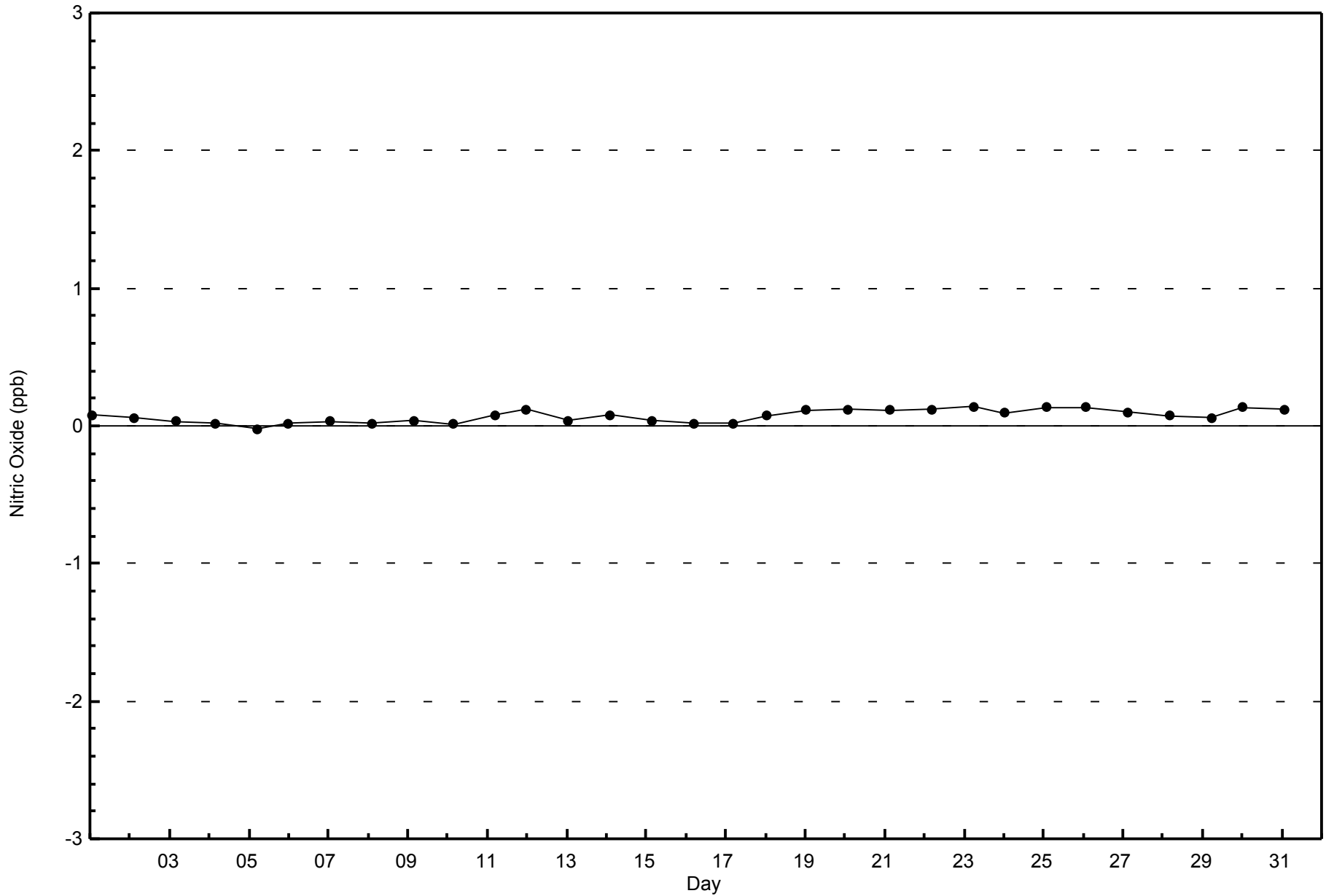
Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

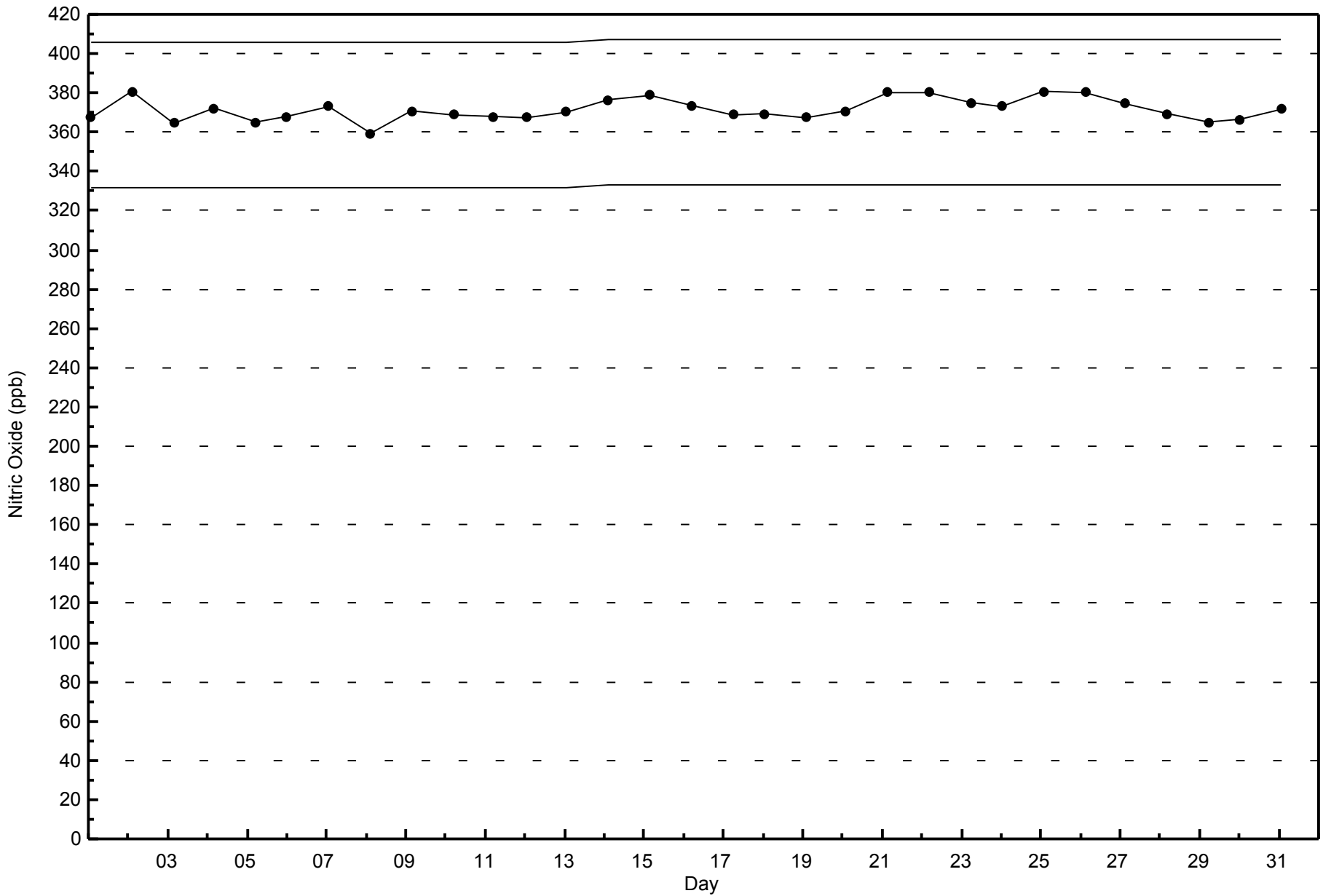
Nitric Oxide (NO) - ppb
Fort McKay - Bertha Ganter - May 2015





WBEA
Span Responses

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Fort McKay - Bertha Ganter - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 28 ppb on May 24 09:00	Maximum Daily Average: 6.8 ppb on May 10		Hours of Data:	707
Minimum Value: 0 ppb on May 16 01:00	Minimum Daily Average: 1.2 ppb on May 28		Hours of Missing Data:	37
Maximum Diurnal Average: 8.4 ppb at hour 8	Minimum Diurnal Average: 1.9 ppb at hour 15		Hours of Calibration:	37
Monthly Average: 4.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 3 Q ₃ = 6 P ₉₀ = 11 P ₉₉ = 22		Percent Operational Time:	100.0

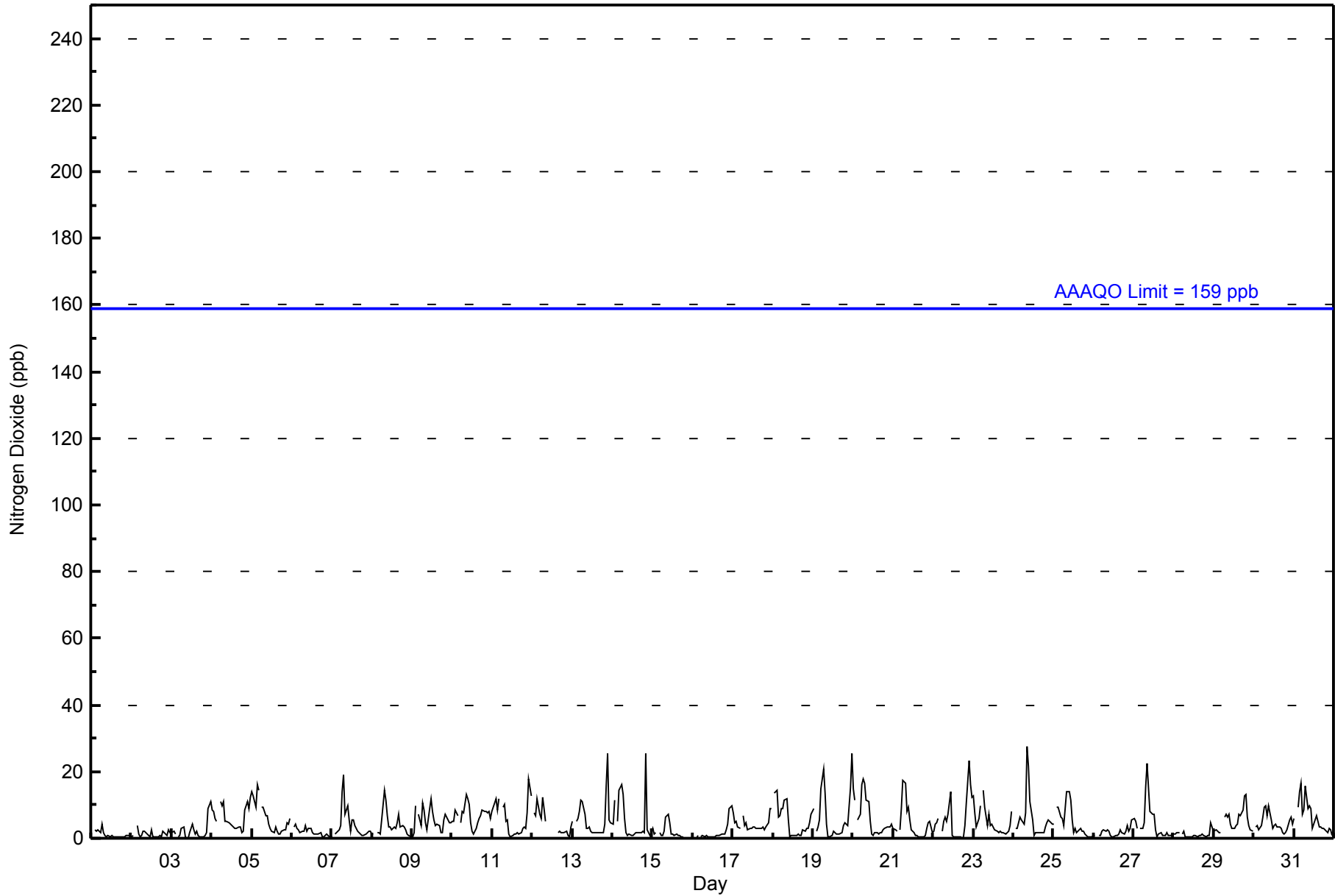
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	27	Z	3	2	3	2	4	2	1	1	1	1	1	1	1	1	0	0	1	0	0	1	1	1	2.2	27																							
2-May	1	1	Z	4	1	1	1	2	2	1	1	0	2	1	0	0	1	1	1	2	1	1	3	2	1.3	4																							
3-May	2	2	1	Z	0	1	3	3	0	0	0	2	4	3	1	2	1	0	0	0	1	2	9	11	2.1	11																							
4-May	8	8	6	5	Z	11	10	11	5	5	4	4	3	3	3	3	3	4	2	2	9	11	9	12	6.2	12																							
5-May	14	13	9	16	14	Z	9	9	7	7	4	3	2	2	4	2	1	1	2	3	3	5	4	6	6.1	16																							
6-May	Z	3	4	3	2	2	2	4	2	3	3	2	1	1	1	1	2	1	1	1	1	1	1	1	1.9	4																							
7-May	0	Z	1	2	2	4	14	19	7	10	6	2	5	5	4	2	2	1	1	1	1	2	2	2	4.2	19																							
8-May	1	1	Z	2	2	1	5	15	12	7	4	4	2	3	3	5	7	4	4	4	3	1	1	0	3.9	15																							
9-May	0	2	10	Z	7	4	11	9	5	3	9	12	8	5	4	4	4	2	2	5	7	6	5	5	5.5	12																							
10-May	5	5	9	7	Z	5	8	8	13	12	10	5	2	1	3	5	6	7	8	8	8	8	8	6	6.8	13																							
11-May	8	11	12	8	12	Z	9	10	5	5	1	0	1	1	1	2	1	2	3	3	3	8	18	13	6.0	18																							
12-May	Z	8	7	12	7	6	12	9	5	C	C	C	C	C	C	2	2	2	2	2	2	1	1	3	--	12																							
13-May	5	Z	5	6	8	11	11	7	3	3	3	2	2	2	2	2	2	2	2	4	16	25	6	5	5.7	25																							
14-May	4	12	Z	5	15	16	13	6	2	1	1	1	1	1	2	2	2	2	2	2	26	3	1	2	5.2	26																							
15-May	3	1	2	Z	2	1	1	2	6	7	5	1	1	1	1	1	1	1	1	0	0	0	0	0	1.6	7																							
16-May	0	0	0	1	Z	0	1	0	1	1	0	1	1	1	1	1	1	1	1	1	2	4	9	10	1.6	10																							
17-May	8	5	5	4	3	Z	7	4	5	2	3	3	4	3	3	3	3	3	4	3	3	5	9	9	4.3	9																							
18-May	Z	14	14	6	7	9	9	11	12	6	0	1	1	1	1	1	1	1	2	2	3	3	5	7	5.1	14																							
19-May	9	Z	2	3	5	15	21	14	4	1	0	1	2	2	1	1	1	2	4	5	4	4	15	26	6.2	26																							
20-May	15	11	Z	5	7	16	18	16	12	11	5	1	1	2	2	1	2	2	3	3	3	3	4	4	6.4	18																							
21-May	3	3	2	Z	3	9	17	16	8	10	6	3	2	1	1	1	1	1	1	1	3	5	5	2	4.3	17																							
22-May	2	4	5	6	Z	2	5	6	5	7	14	1	1	1	0	0	0	0	0	4	11	24	16	12	5.5	24																							
23-May	13	8	3	6	10	Z	14	9	4	7	4	4	3	3	2	2	2	2	2	1	2	2	4	8	5.0	14																							
24-May	Z	3	3	5	7	5	4	8	28	21	11	6	1	2	2	2	2	2	2	4	5	6	5	4	5.8	28																							
25-May	4	Z	9	9	7	6	4	9	14	14	12	5	2	3	2	3	3	2	2	1	1	1	0	1	4.9	14																							
26-May	1	1	Z	1	1	2	3	2	2	2	1	1	1	1	1	1	3	2	1	2	4	2	3	5	1.8	5																							
27-May	6	5	3	Z	3	3	5	15	23	15	8	7	7	3	1	1	2	1	1	1	2	1	1	1	5.0	23																							
28-May	1	1	2	2	Z	1	2	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	5	4	1.2	5																							
29-May	2	2	2	2	2	Z	6	7	7	7	4	3	3	4	4	7	7	9	13	13	7	4	3	2	5.2	13																							
30-May	Z	4	4	3	4	7	10	10	7	10	6	3	4	4	4	3	3	2	1	2	3	6	6	4	4.6	10																							
31-May	6	Z	9	14	17	7	8	16	9	10	9	3	4	7	5	4	3	3	3	2	2	3	2	1	6.4	17																							
																								5.7	5.0	5.1	5.3	5.7	5.6	8.0	8.4	6.9	6.3	4.6	2.7	2.5	2.2	1.9	2.1	2.2	1.9	2.2	2.7	4.3	4.7	5.1	5.4	Diurnal Average	
																								27	14	14	16	17	16	21	19	28	21	14	12	8	7	5	7	7	9	13	13	26	25	18	26	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	698	98.73	98.73
21 - 40	9	1.27	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	61	84	35	22	30	25	10	54	117	89	32	38	17	25	26	28	693
21 - 40	1	0	0	0	0	0	1	1	3	0	2	1	0	0	0	0	9
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	84	35	22	30	25	11	55	120	89	34	39	17	25	26	28	702

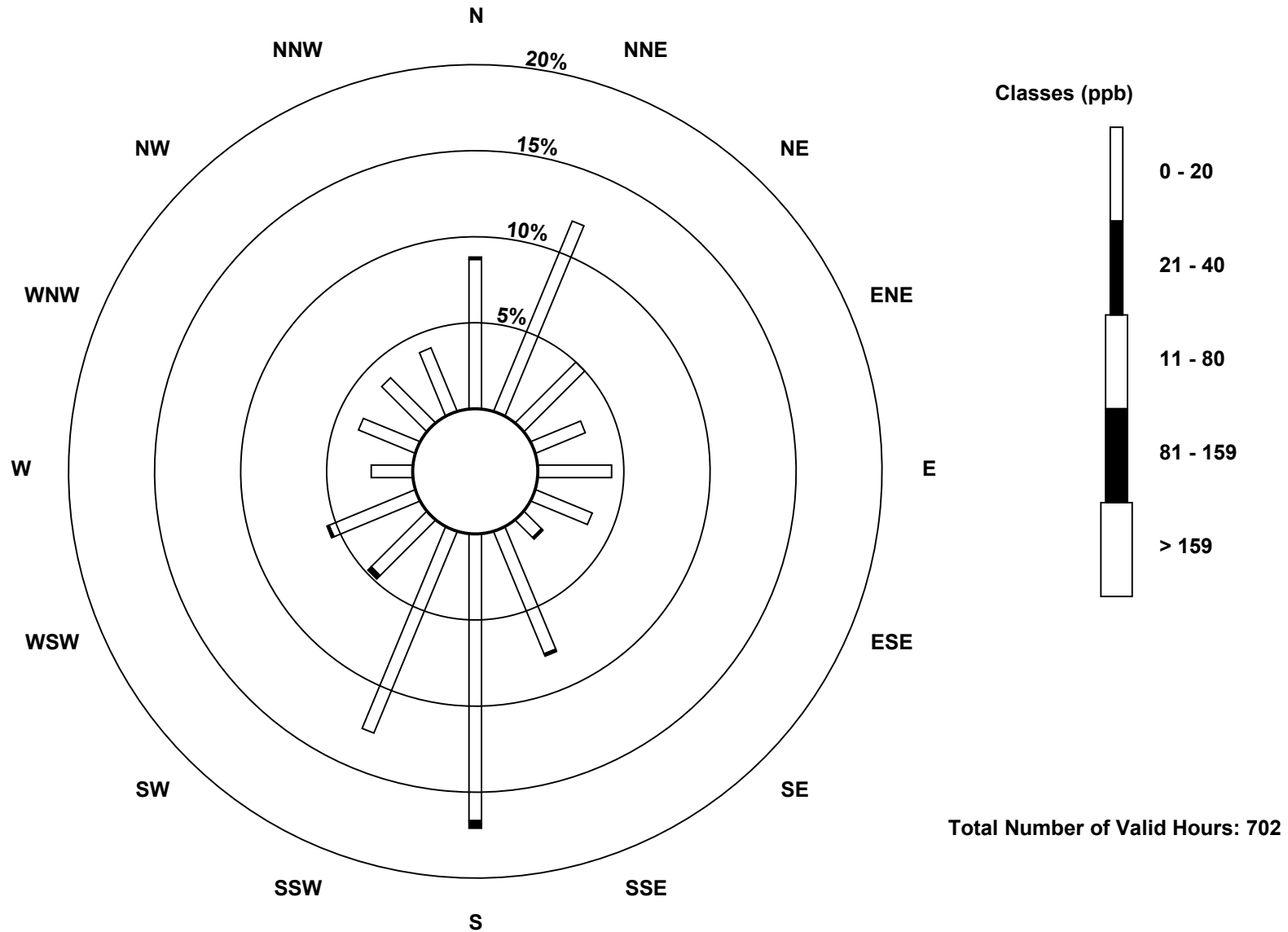
Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

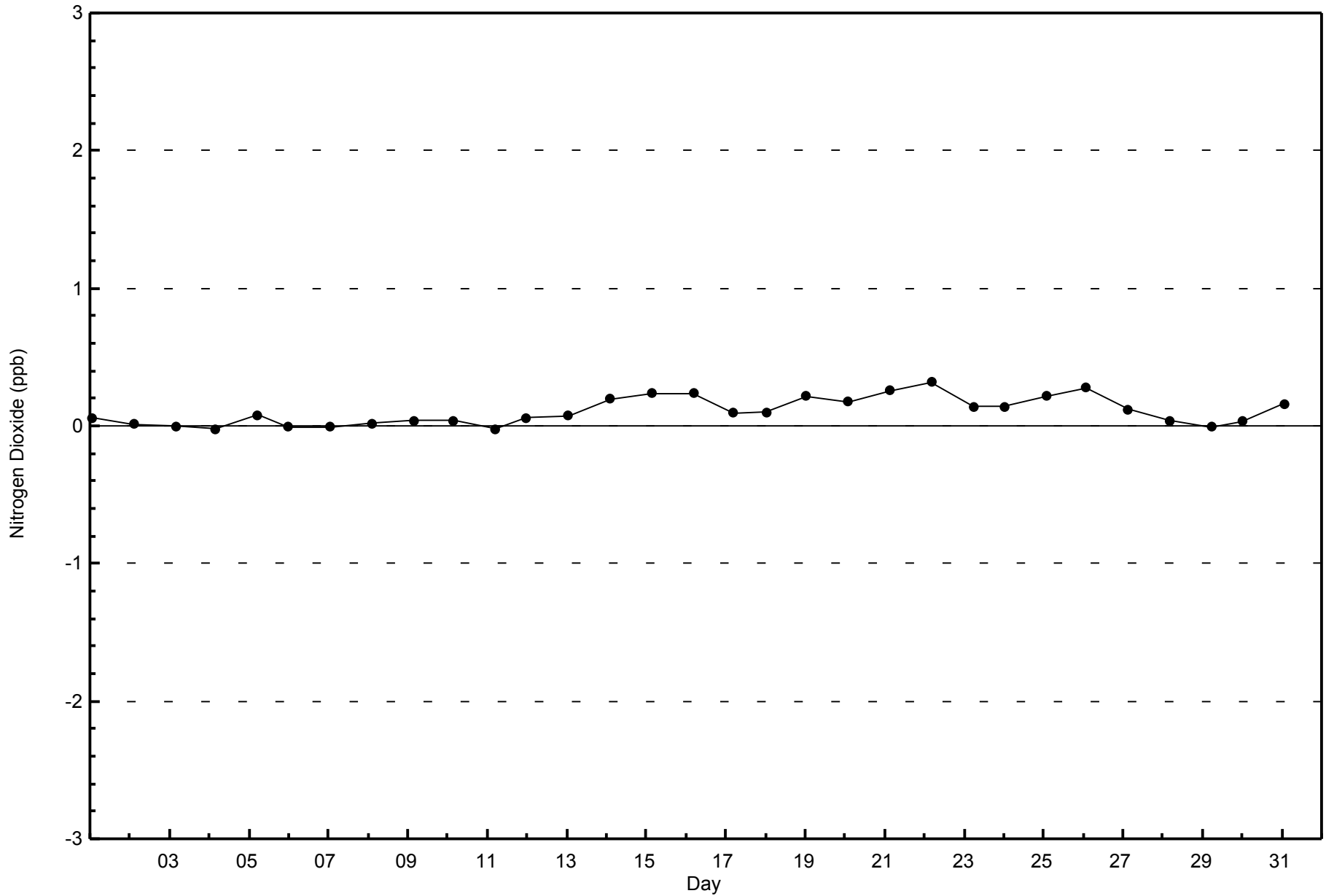
Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

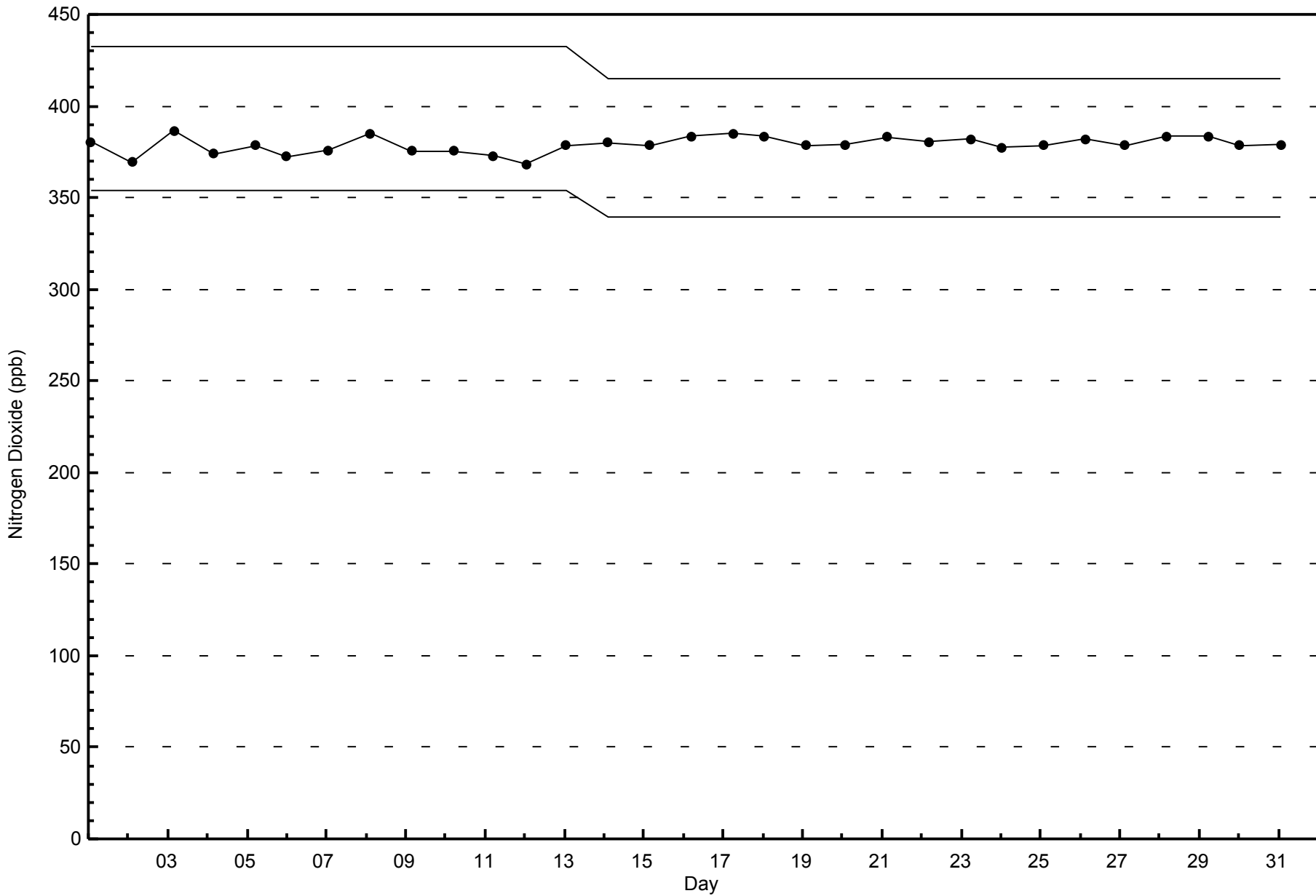
Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - May 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Fort McKay - Bertha Ganter - May 2015



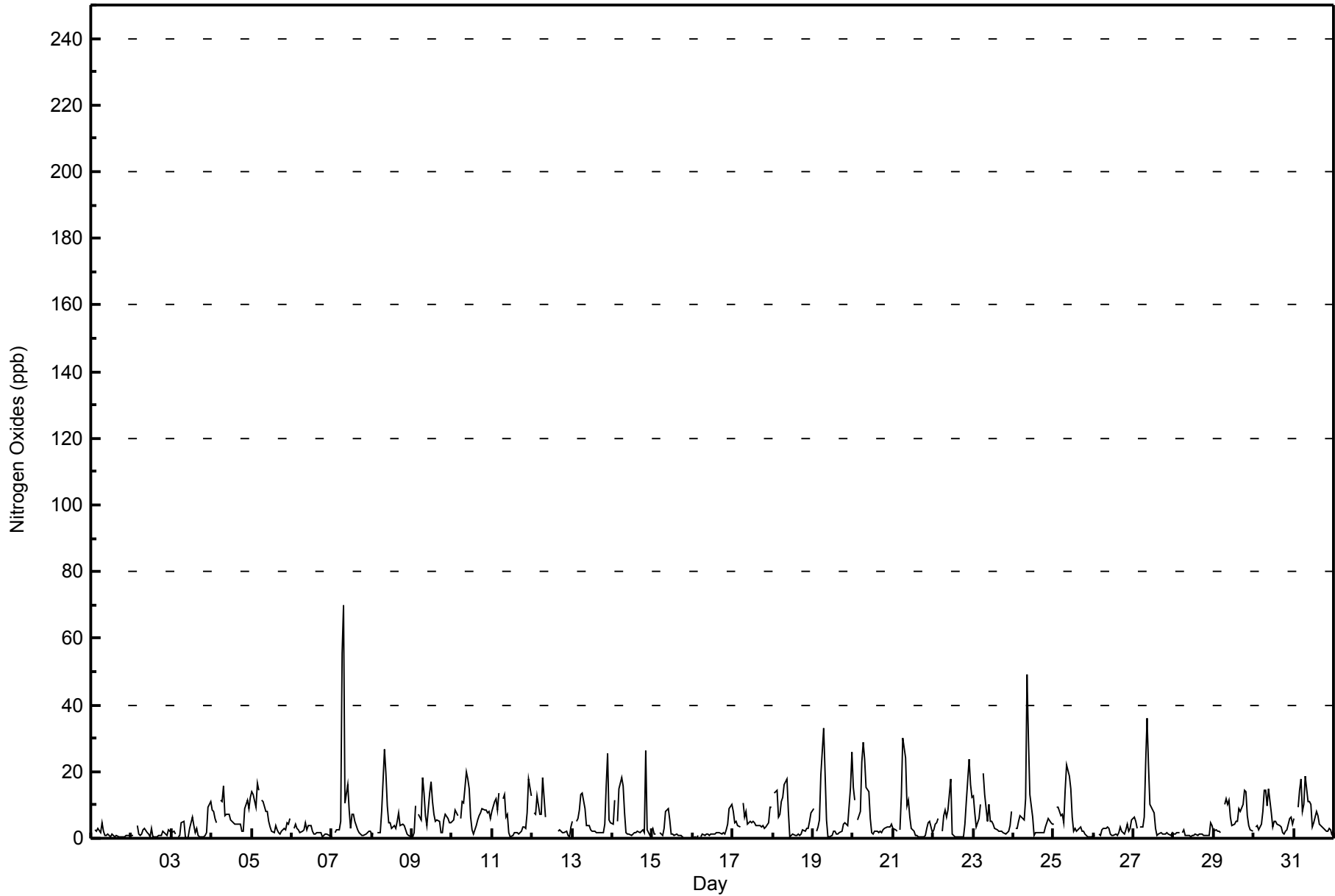


Maximum Value: 70 ppb on May 7 08:00														Maximum Daily Average: 9.2 ppb on May 7														Hours in Service: 744			
Minimum Value: 0 ppb on May 16 03:00														Minimum Daily Average: 1.4 ppb on May 28														Hours of Data: 707			
Maximum Diurnal Average: 13.4 ppb at hour 8														Minimum Diurnal Average: 2.2 ppb at hour 18														Hours of Missing Data: 37			
Monthly Average: 5.4 ppb														Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 3 Q ₃ = 7 P ₉₀ = 13 P ₉₉ = 29														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-May	34	Z	3	2	3	2	5	2	1	1	1	1	1	1	1	0	0	1	0	0	1	1	1	1	2.7	34					
2-May	1	1	Z	4	1	1	1	2	3	2	1	1	3	1	0	1	1	1	1	2	1	1	3	2	1.5	4					
3-May	2	2	1	Z	0	1	4	5	0	0	0	3	6	4	2	3	1	1	0	0	1	2	9	11	2.6	11					
4-May	8	8	6	5	Z	12	11	16	7	7	7	6	5	5	4	4	4	4	2	2	9	11	9	12	7.1	16					
5-May	14	13	9	16	14	Z	11	11	8	8	5	3	2	2	4	2	2	1	2	3	3	5	4	6	6.5	16					
6-May	Z	3	4	3	2	2	2	3	5	3	4	4	2	1	1	2	2	2	1	1	1	1	1	0	2.1	5					
7-May	0	Z	2	3	3	5	56	70	11	16	9	3	7	7	5	3	2	1	1	1	1	2	2	2	9.2	70					
8-May	1	1	Z	2	2	2	8	27	19	10	5	5	3	4	3	5	7	4	4	4	3	1	1	0	5.2	27					
9-May	0	1	10	Z	7	6	18	13	7	4	13	17	11	7	5	5	5	2	2	6	7	6	5	5	7.1	18					
10-May	5	5	9	7	Z	6	11	11	20	18	15	6	3	1	4	6	7	8	9	8	8	8	8	6	8.1	20					
11-May	8	11	12	8	14	Z	12	13	6	7	2	0	1	2	2	2	1	2	3	3	3	8	18	13	6.6	18					
12-May	Z	8	7	13	7	7	18	12	6	C	C	C	C	C	C	2	2	2	2	2	2	1	1	3	--	18					
13-May	5	Z	5	6	8	13	14	9	4	4	4	2	2	2	2	2	2	2	2	4	16	26	6	5	6.1	26					
14-May	4	11	Z	5	15	18	16	8	2	1	1	1	1	2	2	2	2	2	2	2	26	2	1	2	5.6	26					
15-May	3	1	1	Z	2	1	1	3	8	9	5	1	1	1	1	1	1	1	1	0	0	0	0	0	1.9	9					
16-May	0	0	0	1	Z	1	1	1	1	1	1	1	1	1	2	2	2	1	2	1	3	4	9	10	2.0	10					
17-May	8	5	5	4	3	Z	11	7	8	4	5	5	5	4	4	4	3	4	3	4	3	4	5	9	5.3	11					
18-May	Z	14	15	6	7	11	12	16	18	8	1	1	1	1	1	1	1	1	3	2	3	3	5	7	6.0	18					
19-May	9	Z	2	3	6	19	33	19	5	1	0	1	2	2	1	1	2	2	4	5	4	4	15	26	7.3	33					
20-May	15	11	Z	5	8	23	29	24	15	14	6	2	1	2	2	2	2	2	3	3	3	3	4	4	8.0	29					
21-May	3	3	2	Z	3	13	30	24	10	12	6	3	2	1	1	1	1	0	1	1	3	5	5	2	5.7	30					
22-May	2	4	5	6	Z	2	7	9	6	9	18	1	1	1	0	0	0	0	4	11	24	16	12	6.1	24						
23-May	13	8	3	6	10	Z	20	13	5	10	5	5	4	3	3	2	2	2	2	1	2	2	4	8	5.8	20					
24-May	Z	3	3	5	7	6	5	12	49	30	13	6	1	2	2	2	2	2	2	4	5	6	5	4	7.6	49					
25-May	4	Z	9	10	7	7	5	14	22	19	15	6	2	3	2	3	3	2	2	1	1	1	0	1	6.0	22					
26-May	1	1	Z	1	1	3	3	3	3	3	1	1	1	1	1	2	3	2	1	2	4	2	3	5	2.1	5					
27-May	6	5	3	Z	3	4	7	22	36	22	10	8	8	3	1	1	2	1	1	1	2	1	1	2	6.5	36					
28-May	1	1	2	2	Z	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	4	1.4	5					
29-May	2	3	2	2	2	Z	10	12	10	12	6	4	4	5	5	9	8	10	15	14	7	4	3	2	6.5	15					
30-May	Z	3	4	3	4	8	14	14	10	15	8	3	5	5	4	4	3	2	1	2	3	6	6	4	5.8	15					
31-May	6	Z	9	14	18	8	10	19	11	11	10	3	5	8	7	4	4	3	3	2	2	3	3	1	7.1	19					
6.1														5.1														Diurnal Average			
34														14														Diurnal Maximum			
Z - zerospan														C - Calibration																	



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	687	97.17	97.17
21 - 40	17	2.40	99.58
41 - 80	3	0.42	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	61	84	35	22	30	25	9	51	111	88	32	38	17	25	26	28	682
21 - 40	1	0	0	0	0	0	1	3	8	1	2	1	0	0	0	0	17
11 - 80	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	84	35	22	30	25	11	55	120	89	34	39	17	25	26	28	702

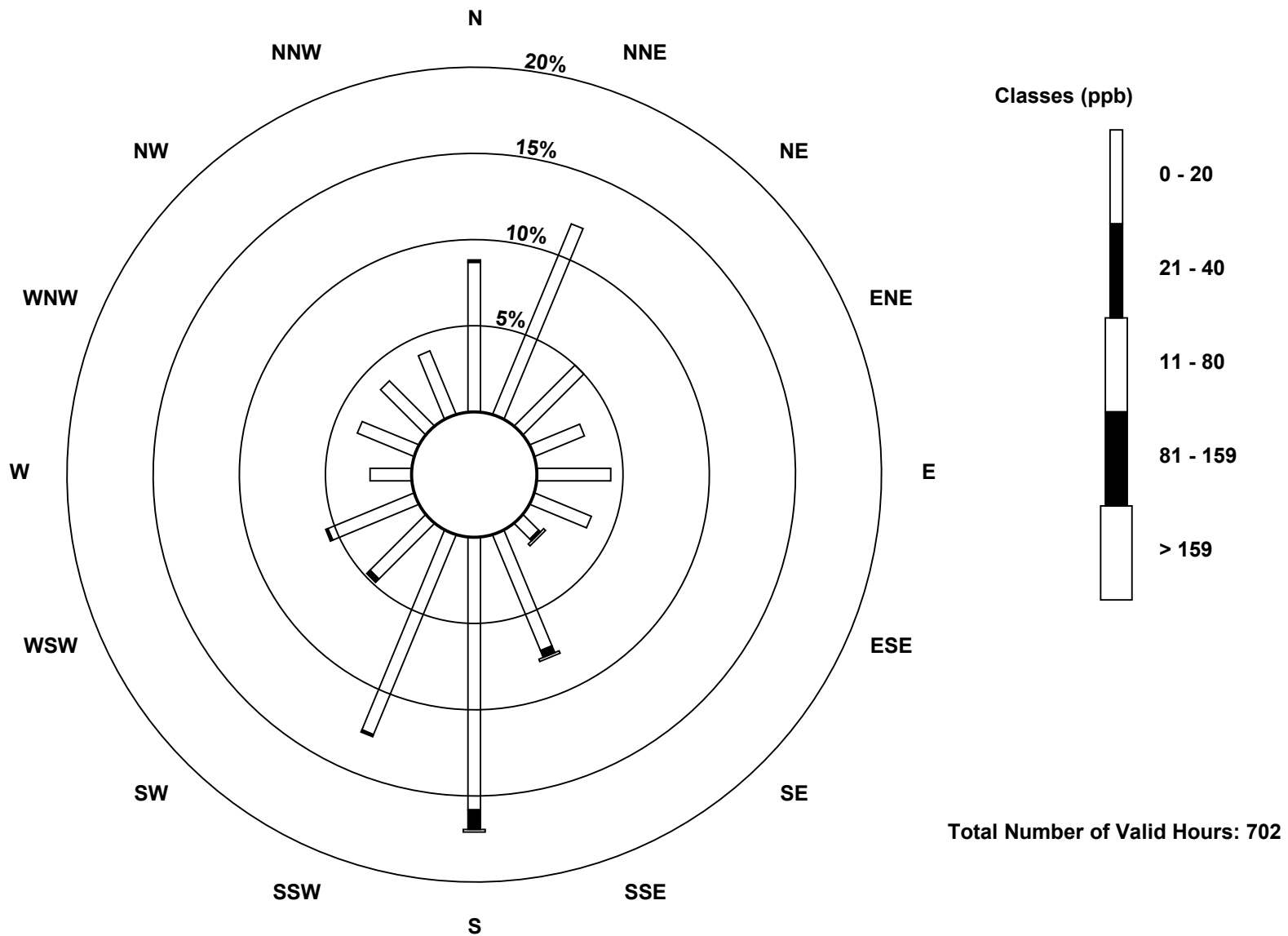
Total Number of Valid Hours: 702

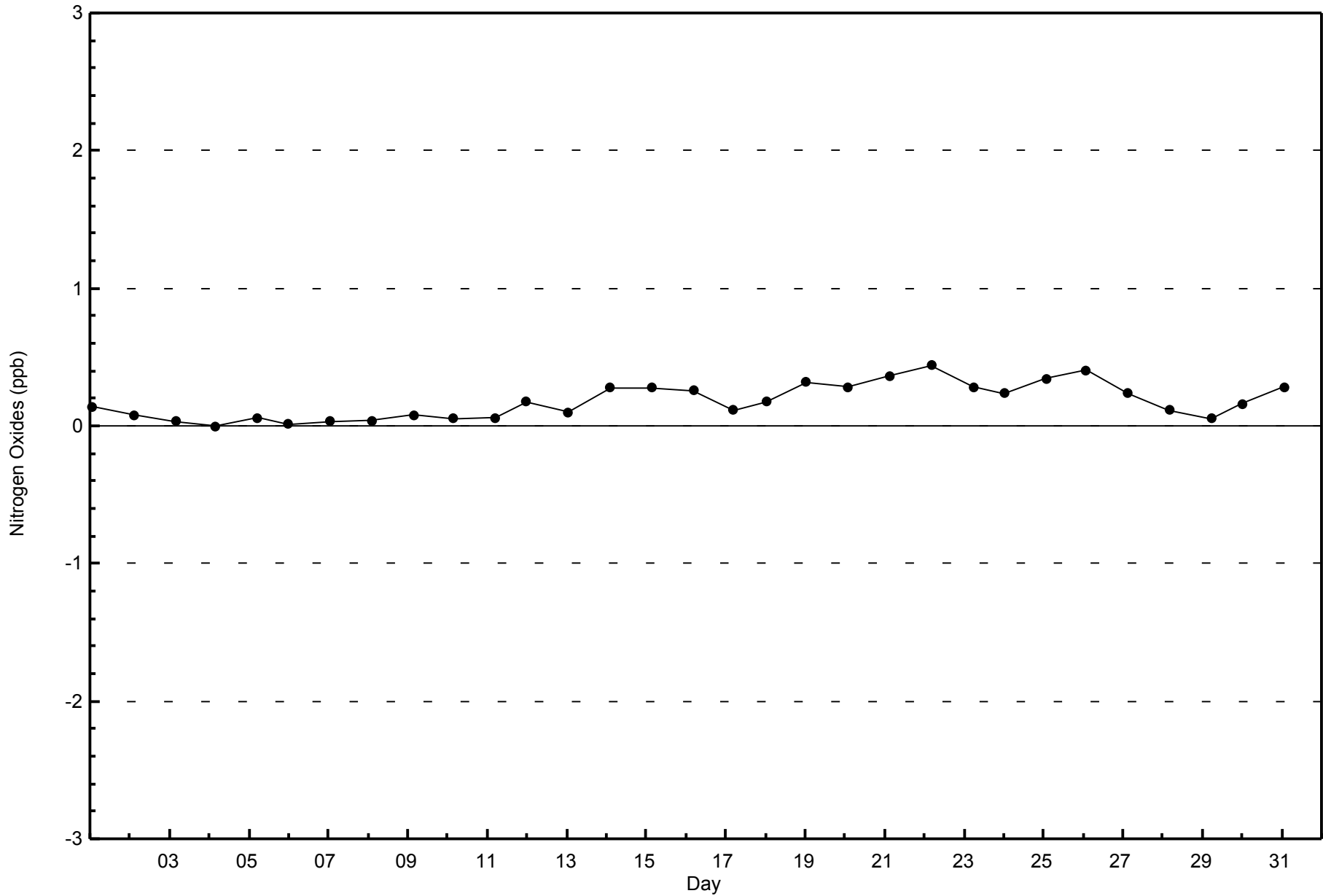
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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

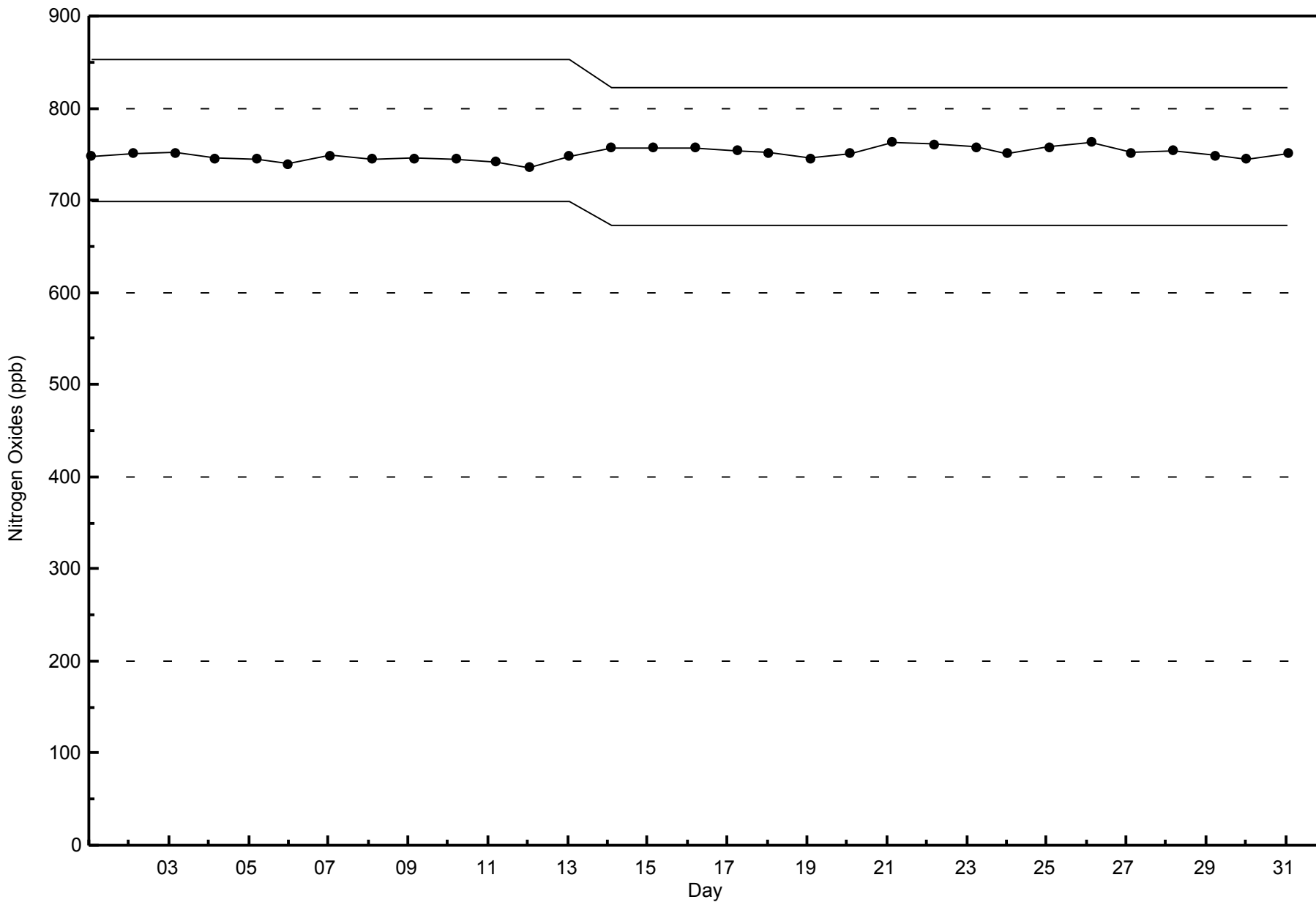






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort McKay - Bertha Ganter - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Fort McKay - Bertha Ganter - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 68 ppb on May 24 18:00	Maximum Daily Average: 49.3 ppb on May 15		Hours of Data:	710
Minimum Value: 4 ppb on May 7 03:00	Minimum Daily Average: 22.0 ppb on May 3		Hours of Missing Data:	34
Maximum Diurnal Average: 48.5 ppb at hour 17	Minimum Diurnal Average: 18.5 ppb at hour 5		Hours of Calibration:	34
Monthly Average: 35.8 ppb	Percentiles: P ₁ = 9 P ₁₀ = 17 Q ₁ = 26 Median = 35 Q ₃ = 47 P ₉₀ = 55 P ₉₉ = 64		Percent Operational Time:	100.0

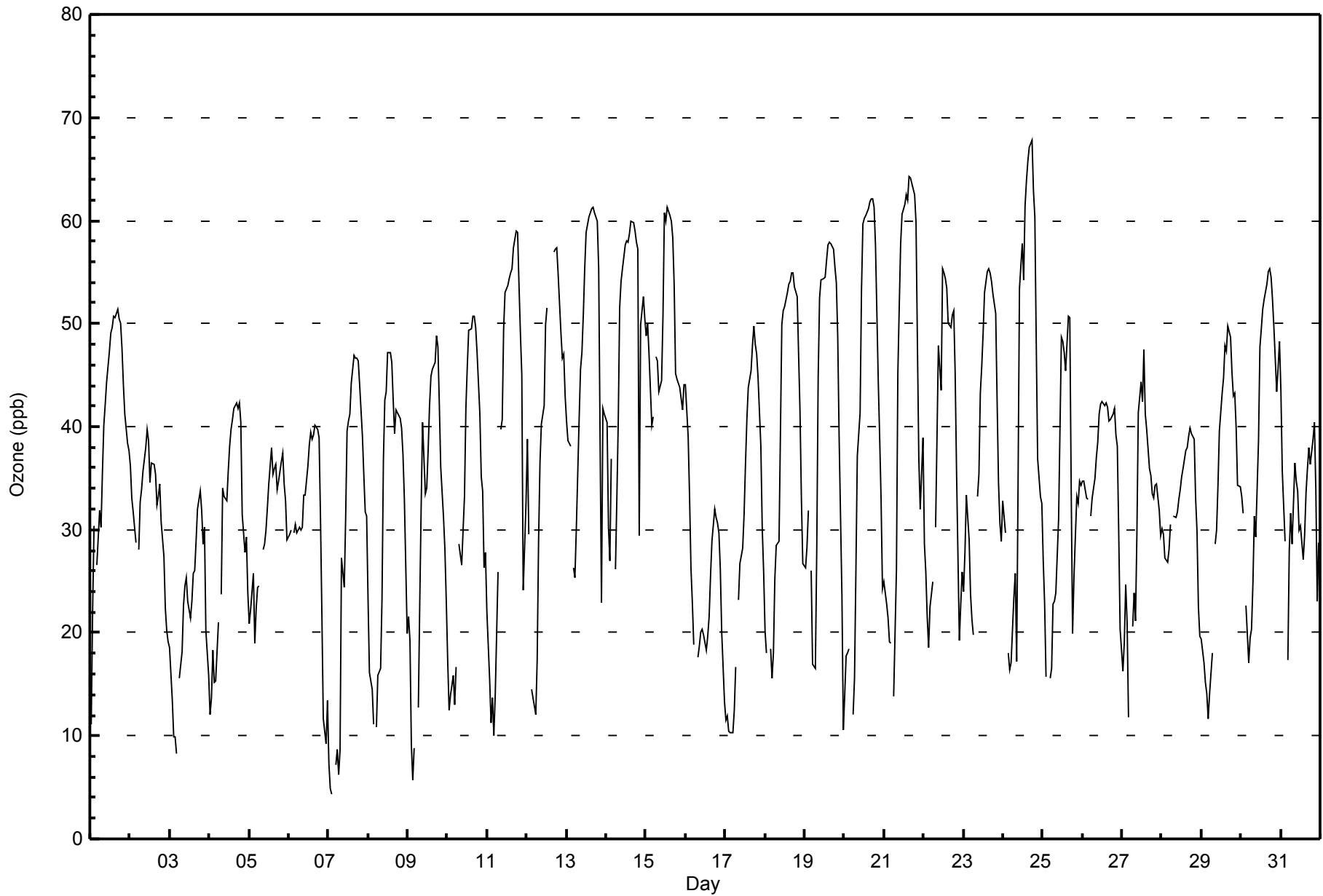
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	11	22	30	Z	27	32	30	35	40	42	44	47	49	50	51	51	51	50	50	48	44	41	38	38	40.1	51																							
2-May	36	33	32	29	Z	28	33	34	36	38	40	39	35	36	36	35	32	33	34	31	27	22	20	19	32.1	40																							
3-May	19	13	10	10	8	Z	16	18	23	25	25	23	21	23	26	26	29	32	34	32	29	30	20	16	22.0	34																							
4-May	12	14	18	15	15	21	Z	24	34	33	33	36	38	40	41	42	42	42	42	40	32	28	29	24	30.2	42																							
5-May	21	22	26	19	22	24	Z	24	Z	28	29	30	32	34	38	35	36	36	34	35	37	37	34	33	29	30.3	38																						
6-May	30	30	Z	30	31	30	30	30	30	33	33	36	38	39	39	39	40	40	39	31	22	12	9	13	30.6	40																							
7-May	7	5	4	Z	7	9	6	9	27	24	31	40	41	41	44	47	47	47	46	44	39	35	32	31	28.9	47																							
8-May	23	16	14	11	Z	11	16	17	23	37	43	43	47	47	46	43	39	42	41	41	40	37	33	20	31.8	47																							
9-May	22	19	9	6	9	Z	13	23	32	40	34	34	38	42	45	46	46	49	48	42	36	31	28	23	31.0	49																							
10-May	17	13	14	16	13	17	Z	29	27	30	33	42	46	49	50	51	51	50	47	41	35	34	26	28	32.9	51																							
11-May	22	15	11	14	10	14	26	Z	40	41	49	53	54	54	55	55	57	59	59	54	49	45	24	32	38.8	59																							
12-May	39	30	Z	15	13	12	17	29	37	40	42	50	52	C	C	C	57	57	57	55	49	47	47	43	39.3	57																							
13-May	40	39	38	Z	26	25	30	41	46	47	51	55	59	60	61	61	61	61	60	55	39	23	42	41	46.2	61																							
14-May	40	30	27	37	Z	26	33	40	52	54	55	58	58	58	59	60	60	59	58	57	29	50	53	50	48.0	60																							
15-May	49	50	47	40	41	Z	47	46	43	44	51	61	60	61	61	60	58	54	45	45	44	43	42	44	49.3	61																							
16-May	44	39	33	26	23	19	Z	18	19	20	20	20	18	20	22	25	29	32	31	31	30	26	20	13	25.1	44																							
17-May	11	12	10	10	10	12	17	Z	23	27	28	32	36	41	44	45	48	50	48	47	45	38	30	26	30.0	50																							
18-May	20	18	Z	18	16	18	25	29	29	39	50	51	52	53	54	54	55	55	54	53	47	41	33	27	38.7	55																							
19-May	26	28	32	Z	26	17	17	28	45	53	54	54	55	56	58	58	58	57	55	54	49	39	24	11	41.4	58																							
20-May	14	18	18	18	Z	12	16	26	37	41	53	60	60	60	61	62	62	62	61	58	44	39	33	24	40.9	62																							
21-May	25	23	21	19	19	Z	14	26	45	52	58	61	62	63	62	64	64	64	62	60	48	37	32	39	44.3	64																							
22-May	29	26	22	19	22	25	Z	30	39	48	44	55	55	54	53	50	50	51	51	45	36	19	23	26	37.9	55																							
23-May	24	28	33	29	24	21	20	Z	33	35	43	46	49	53	55	55	55	54	53	51	43	35	31	29	39.1	55																							
24-May	33	30	Z	18	16	17	23	26	17	35	53	58	54	61	64	66	67	68	63	60	48	37	33	33	42.6	68																							
25-May	27	23	16	Z	16	16	23	23	24	31	40	49	48	47	45	51	51	34	20	26	33	32	35	34	32.3	51																							
26-May	35	35	33	33	Z	31	33	35	37	38	41	42	42	42	42	42	40	41	41	42	39	38	30	20	37.1	42																							
27-May	16	19	25	21	12	Z	21	24	21	30	41	44	43	47	41	40	36	35	34	33	34	34	32	29	31.0	47																							
28-May	30	30	27	27	28	30	Z	31	31	32	33	34	35	36	38	38	39	40	39	39	33	30	23	20	32.3	40																							
29-May	19	17	15	14	12	14	18	Z	29	30	34	40	43	45	48	47	50	49	45	43	43	40	34	34	33.2	50																							
30-May	33	32	Z	23	17	19	20	25	31	29	39	48	50	51	52	54	55	55	55	52	50	43	46	48	40.3	55																							
31-May	44	36	29	Z	17	28	32	29	37	35	34	30	30	27	30	34	36	38	36	39	40	34	23	29	32.4	44																							
																								26.4	24.6	22.9	20.7	18.5	20.4	23.0	27.8	32.7	36.5	40.7	44.2	45.2	46.6	47.2	47.9	48.5	48.1	46.6	44.6	39.1	34.7	30.9	28.8	Diurnal Average	
																								49	50	47	40	41	32	47	46	52	54	58	61	62	63	64	66	67	68	63	60	50	50	53	50	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - May 2015





WBEA

Cumulative Frequency Distribution

Ozone (O₃) - ppb

Fort McKay - Bertha Ganter - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	116	16.34	16.34
21 - 50	471	66.34	82.68
51 - 82	123	17.32	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	9	15	1	1	0	1	1	3	9	15	8	9	8	14	10	11	115
21 - 50	52	63	34	20	24	15	9	37	74	51	20	20	9	7	16	16	467
51 - 82	0	6	0	1	6	9	1	13	36	25	8	11	2	3	0	2	123
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	84	35	22	30	25	11	53	119	91	36	40	19	24	26	29	705

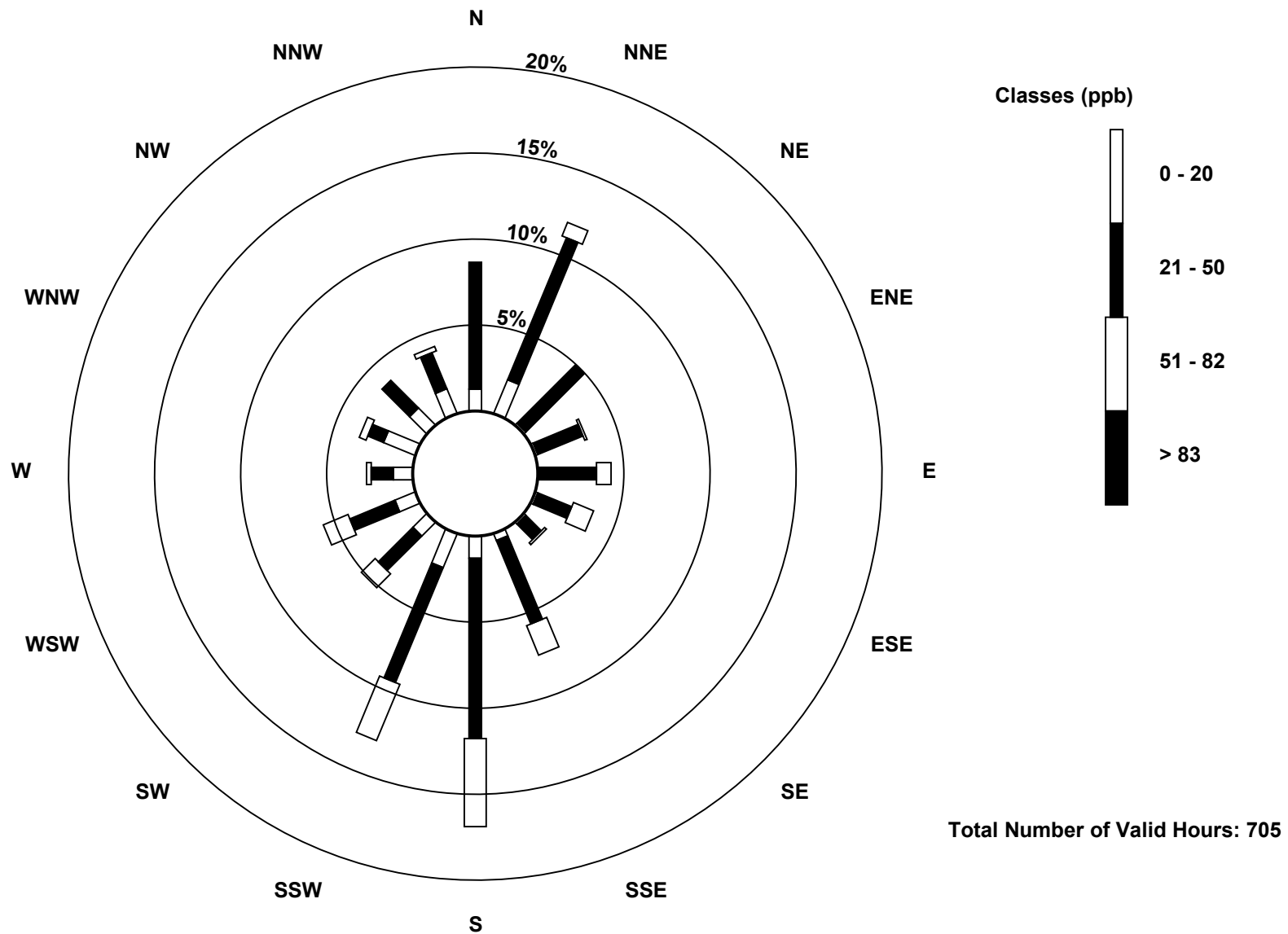
Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

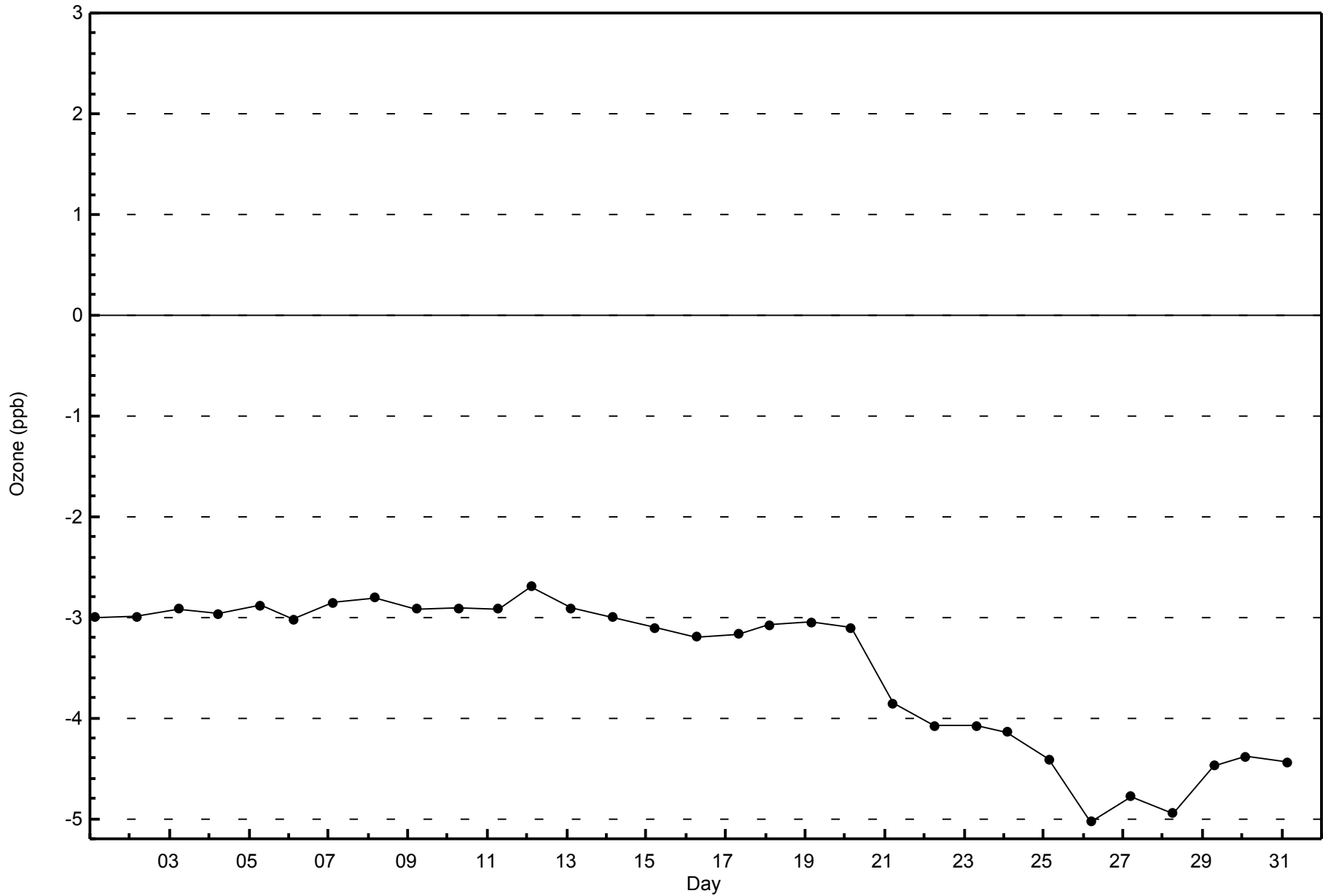
Ozone (O₃) - ppb
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Zero Responses

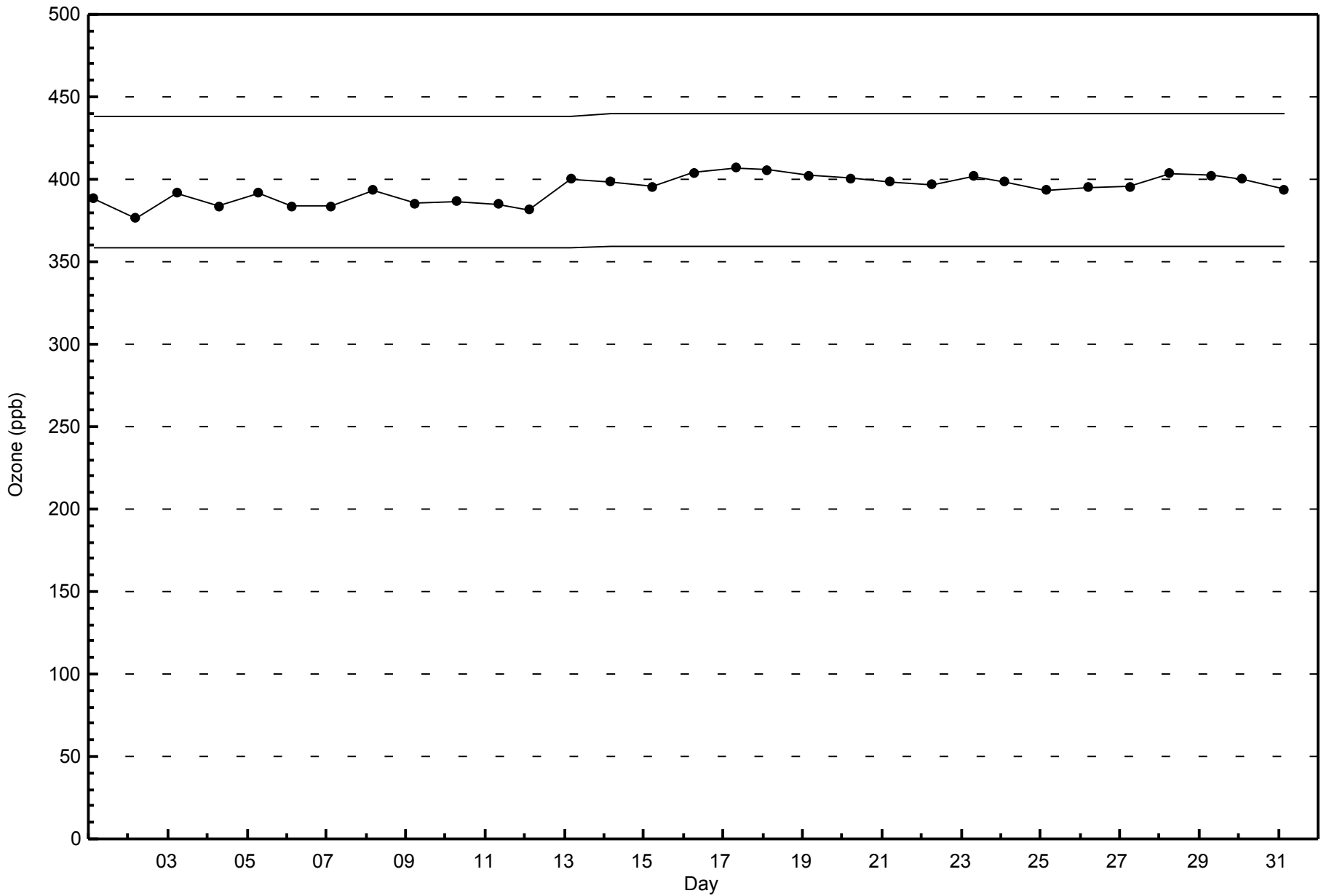
Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - May 2015





WBEA
Span Responses

Ozone (O₃) - ppb
Fort McKay - Bertha Ganter - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

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

Fort McKay - Bertha Ganter - May 2015

Number of Exceedences (AAAQO): 24-hr: 1	Hours in Service: 744
Maximum Value: 133.2 µg/m ³ on May 31 04:00	Maximum Daily Average: 37.5 µg/m ³ on May 31
Minimum Value: 0.8 µg/m ³ on May 1 18:00	Hours of Data: 743
Maximum Diurnal Average: 15.7 µg/m ³ at hour 1	Hours of Missing Data: 1
Monthly Average: 10.39 µg/m ³	Hours of Calibration: 0
Minimum Daily Average: 1.7 µg/m ³ on May 3	Percent Operational Time: 99.9
Minimum Diurnal Average: 6.4 µg/m ³ at hour 15	
Percentiles: P ₁ = 0.9 P ₁₀ = 2.4 Q ₁ = 3.9 Median = 6.5 Q ₃ = 12.1 P ₉₀ = 20.4 P ₉₉ = 83.4	

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-May	7.8	5.8	5.1	4.2	3.4	2.7	2.7	1.7	1.3	1.2	1.2	0.8	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.9	0.8	1.3	1.0	1.3	2.1	7.8																						
2-May	1.8	2.0	2.0	2.1	2.5	2.4	2.4	2.2	2.3	2.0	2.1	1.6	1.9	1.3	1.2	1.2	1.2	1.1	1.1	1.2	1.7	1.8	1.6	1.4	1.7	2.5																						
3-May	1.3	1.4	1.9	1.8	1.7	1.8	2.0	2.0	1.5	1.2	1.1	1.4	1.8	1.6	1.4	1.1	0.9	0.9	1.1	1.3	1.9	2.0	2.9	3.6	1.7	3.6																						
4-May	3.2	3.4	3.8	3.8	4.1	4.1	3.8	4.9	3.5	3.1	3.1	3.2	3.3	2.7	2.9	3.8	4.1	4.7	4.1	4.8	5.6	6.5	6.2	5.0	4.1	6.5																						
5-May	5.1	6.0	5.1	5.0	4.5	4.4	4.4	5.6	6.2	4.2	5.1	4.2	3.9	3.3	4.2	4.1	3.4	3.2	3.9	3.8	3.7	4.3	4.5	4.0	4.4	6.2																						
6-May	4.2	4.3	4.5	4.3	4.2	3.3	3.1	2.9	2.8	2.9	3.0	2.7	2.2	2.0	2.3	1.9	1.8	1.8	2.0	2.3	2.4	2.8	3.5	2.8	2.9	4.5																						
7-May	3.7	4.6	4.5	4.4	4.1	5.2	9.4	10.2	3.8	3.3	2.7	2.1	2.8	3.0	2.9	2.6	2.6	2.8	2.9	3.2	4.4	5.4	7.0	6.5	4.4	10.2																						
8-May	5.1	4.8	5.4	5.4	5.5	5.0	5.0	5.4	4.3	3.5	3.2	3.1	3.0	3.4	3.7	5.2	5.7	6.5	7.1	8.4	8.4	7.2	5.7	5.1	5.2	8.4																						
9-May	6.1	8.3	8.8	7.9	6.2	6.2	6.8	5.9	3.7	3.2	4.4	6.9	5.4	4.3	4.5	4.6	4.7	3.4	5.0	6.6	9.0	8.5	8.9	11.4	6.3	11.4																						
10-May	11.6	11.8	11.6	10.4	10.1	8.1	5.8	4.8	5.0	5.1	4.8	4.2	3.2	3.3	4.0	4.6	6.0	7.0	8.5	10.2	15.6	16.7	17.2	13.0	8.4	17.2																						
11-May	13.2	19.0	14.3	14.3	13.6	13.8	12.7	8.6	5.6	5.9	3.6	3.3	4.0	4.9	5.8	6.7	7.4	8.6	10.3	15.4	15.5	17.4	18.6	13.0	10.6	19.0																						
12-May	9.5	11.2	12.2	12.2	12.2	13.0	10.8	8.6	6.1	5.7	5.6	4.3	4.8	5.9	5.6	6.9	8.8	7.9	8.3	12.1	10.4	6.7	5.8	6.6	8.4	13.0																						
13-May	7.1	7.1	7.3	8.0	9.0	11.7	11.6	13.4	10.7	10.0	9.8	8.3	7.7	8.0	8.5	8.9	9.3	9.4	9.5	9.7	24.1	29.5	19.8	18.2	11.5	29.5																						
14-May	17.4	15.3	15.7	13.5	15.3	17.6	14.9	14.2	10.5	9.1	8.6	8.9	9.1	10.2	9.8	10.1	10.0	10.2	9.4	8.5	21.5	9.6	9.5	8.9	12.0	21.5																						
15-May	8.7	8.4	8.9	9.5	9.6	11.6	8.4	7.7	8.2	10.5	8.7	6.1	6.0	5.6	5.3	5.5	5.9	10.7	9.5	13.3	6.2	7.5	5.8	4.3	8.0	13.3																						
16-May	4.2	3.9	4.0	4.1	3.8	5.5	8.3	5.3	3.7	4.1	3.4	3.6	3.8	4.2	3.9	5.0	3.7	2.3	2.7	3.2	4.2	4.3	6.2	6.9	4.3	8.3																						
17-May	5.7	6.0	6.1	5.6	5.4	7.0	7.0	3.9	2.9	2.6	2.2	2.5	2.4	2.7	2.9	3.2	4.0	3.9	3.7	6.5	12.5	9.7	10.5	11.3	5.4	12.5																						
18-May	12.7	14.1	11.6	10.4	11.7	13.3	11.6	6.5	5.7	4.9	2.7	2.9	3.1	3.1	3.0	3.1	3.1	3.6	5.9	7.2	9.0	21.6	44.6	35.3	10.4	44.6																						
19-May	10.3	11.1	6.9	8.2	10.1	13.8	13.8	11.5	6.2	3.5	3.1	3.9	M	5.7	5.5	7.0	7.3	7.6	11.1	15.9	11.7	21.1	36.2	46.2	12.1	46.2																						
20-May	37.3	26.5	25.2	17.3	17.1	31.8	29.1	25.1	21.7	15.3	11.5	7.0	8.6	9.6	9.1	8.7	9.0	10.8	10.4	12.9	19.8	18.5	17.0	18.6	17.4	37.3																						
21-May	13.6	12.6	11.3	11.3	12.1	22.6	29.6	26.1	23.7	22.4	19.0	12.6	12.6	7.2	6.2	5.6	4.8	4.8	5.6	7.9	17.1	95.5	26.4	9.4	17.5	95.5																						
22-May	13.6	14.3	12.8	12.2	10.7	10.7	11.7	16.9	13.0	14.2	22.7	12.9	12.2	10.9	8.8	9.5	16.5	9.5	10.3	13.1	52.4	17.5	30.8	64.3	17.6	64.3																						
23-May	17.6	12.7	12.6	16.5	15.1	24.7	30.4	17.3	18.2	10.6	8.2	6.6	10.3	5.7	6.7	7.5	7.9	10.4	7.8	8.0	8.9	11.9	40.2	14.6	13.8	40.2																						
24-May	60.0	30.6	29.4	19.7	21.9	21.3	20.6	19.3	31.2	30.1	17.4	13.5	9.6	11.2	12.0	16.2	15.7	16.2	19.1	27.0	30.5	26.9	46.3	28.2	23.9	60.0																						
25-May	76.1	28.6	26.9	27.5	33.8	31.3	26.1	24.9	35.1	33.9	36.3	30.8	31.5	41.1	21.2	18.8	19.5	15.9	17.1	15.0	12.6	12.8	10.3	8.2	26.5	76.1																						
26-May	6.6	5.4	5.5	5.1	4.6	5.0	4.4	4.6	5.8	4.5	3.7	3.7	4.1	4.3	4.6	7.5	5.6	4.8	4.7	5.2	7.4	6.3	5.7	6.0	5.2	7.5																						
27-May	5.9	6.0	5.3	5.0	5.0	5.5	5.8	14.3	25.6	25.0	27.4	20.5	17.9	12.6	11.3	8.2	6.4	6.2	5.7	5.7	6.2	4.0	3.9	3.1	10.1	27.4																						
28-May	2.9	3.0	3.5	3.8	3.4	3.6	3.2	2.4	2.5	2.5	2.4	2.4	2.3	2.3	2.7	3.8	3.7	3.4	4.2	3.5	4.6	4.5	6.5	6.0	3.5	6.5																						
29-May	4.9	4.6	4.8	4.5	4.2	4.5	4.3	4.5	6.1	9.5	5.4	4.0	3.6	4.9	5.5	6.4	6.7	9.1	10.7	12.6	20.0	16.5	14.2	16.2	7.8	20.0																						
30-May	11.7	9.4	9.1	9.4	10.5	10.6	9.8	11.5	13.1	11.7	9.4	9.6	12.6	10.7	11.4	10.7	12.3	12.3	14.5	14.7	23.2	25.8	52.8	89.3	17.3	89.3																						
31-May	98.3	123.3	130.6	133.2	101.3	65.2	28.3	13.4	17.1	17.6	18.6	15.3	16.7	22.9	19.2	14.5	13.1	10.9	10.2	8.3	5.8	5.8	6.0	4.7	37.5	133.2																						
																								15.7	13.7	13.4	12.9	12.2	12.5	11.2	9.9	9.9	9.1	8.4	6.9	7.0	7.1	6.4	6.6	6.8	6.8	7.3	8.7	12.2	13.9	15.3	15.3	Diurnal Average
																								98.3	123.3	130.6	133.2	101.3	65.2	30.4	26.1	35.1	33.9	36.3	30.8	31.5	41.1	21.2	18.8	19.5	16.2	19.1	27.0	52.4	95.5	52.8	89.3	Diurnal Maximum

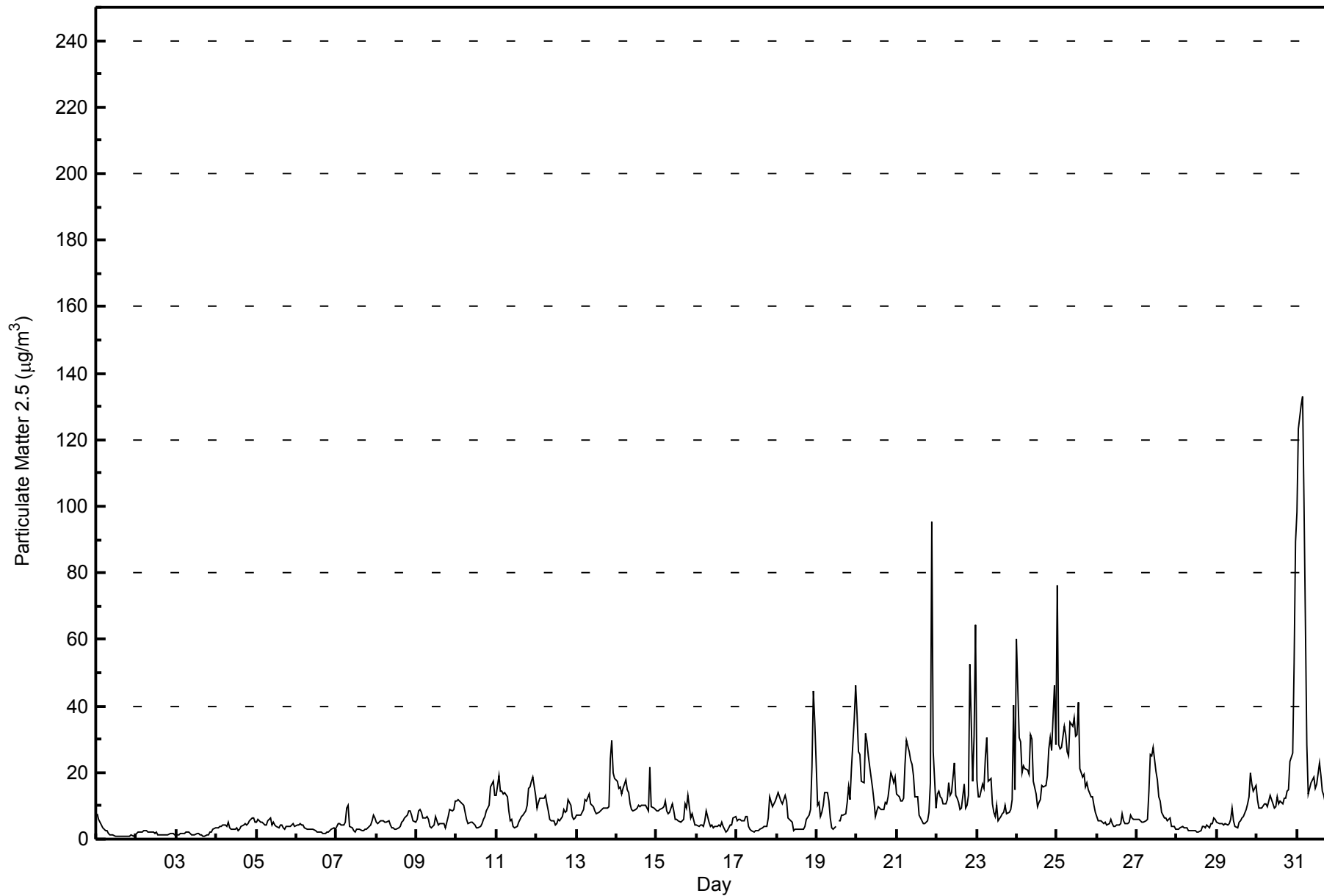
M - Maintenance

Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - May 2015





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	292	39.30	39.30
6 - 15	318	42.80	82.10
16 - 25	68	9.15	91.25
26 - 80	46	6.19	97.44
> 81.0	7	0.94	98.38

Total Number of Valid Hours: 743

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	37	53	23	16	19	14	4	18	20	19	10	10	5	10	16	14	288
6 - 15	22	28	9	3	8	11	3	25	83	52	17	20	8	10	6	12	317
16 - 25	5	6	0	2	2	0	3	7	9	17	6	4	3	1	1	2	68
26 - 80	2	1	2	1	1	0	1	5	10	6	2	3	1	4	4	3	46
> 81.0	0	0	0	0	0	0	0	2	2	2	1	0	0	0	0	0	7
Totals	66	88	34	22	30	25	11	57	124	96	36	37	17	25	27	31	726

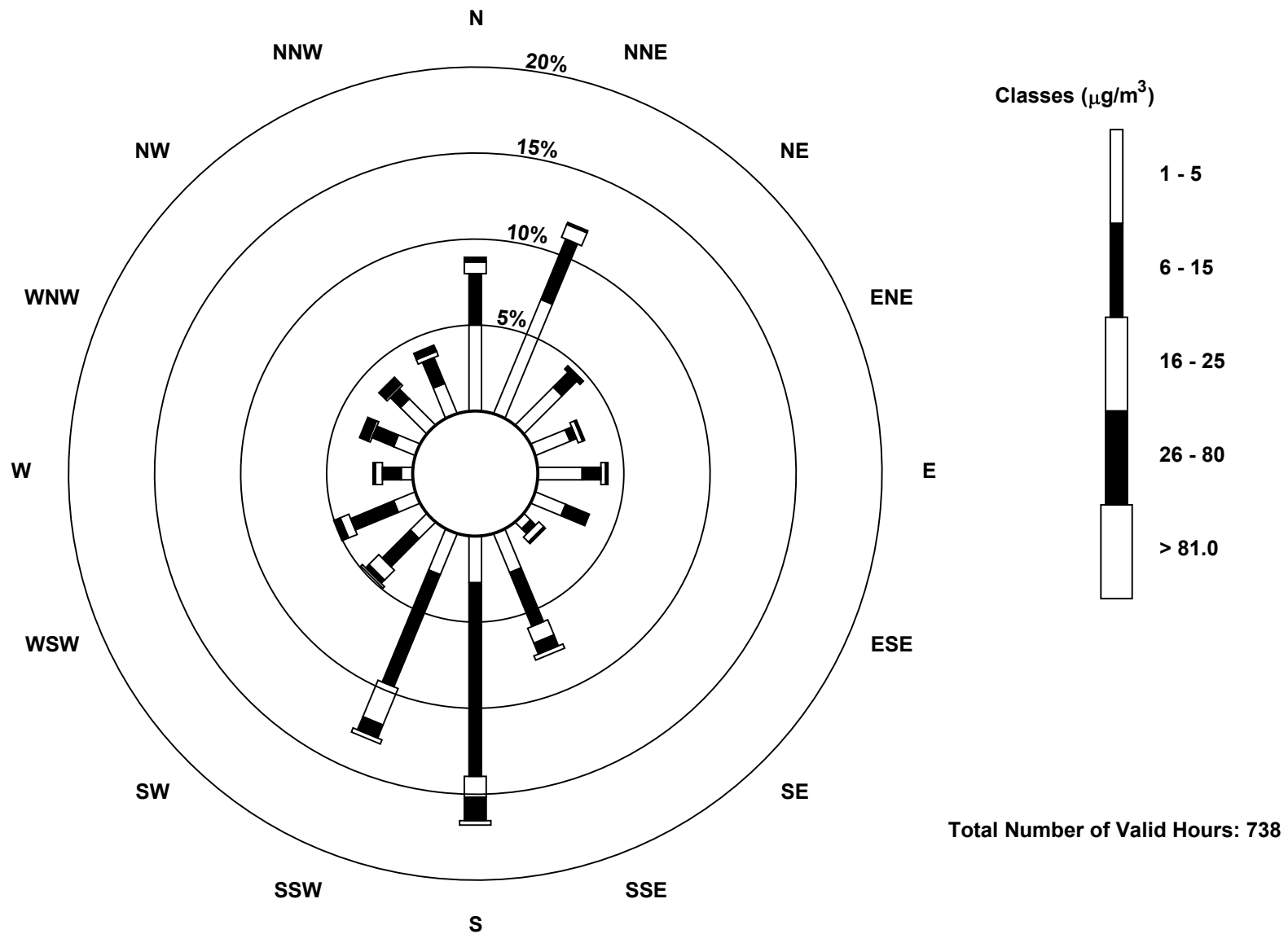
Total Number of Valid Hours: 738

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

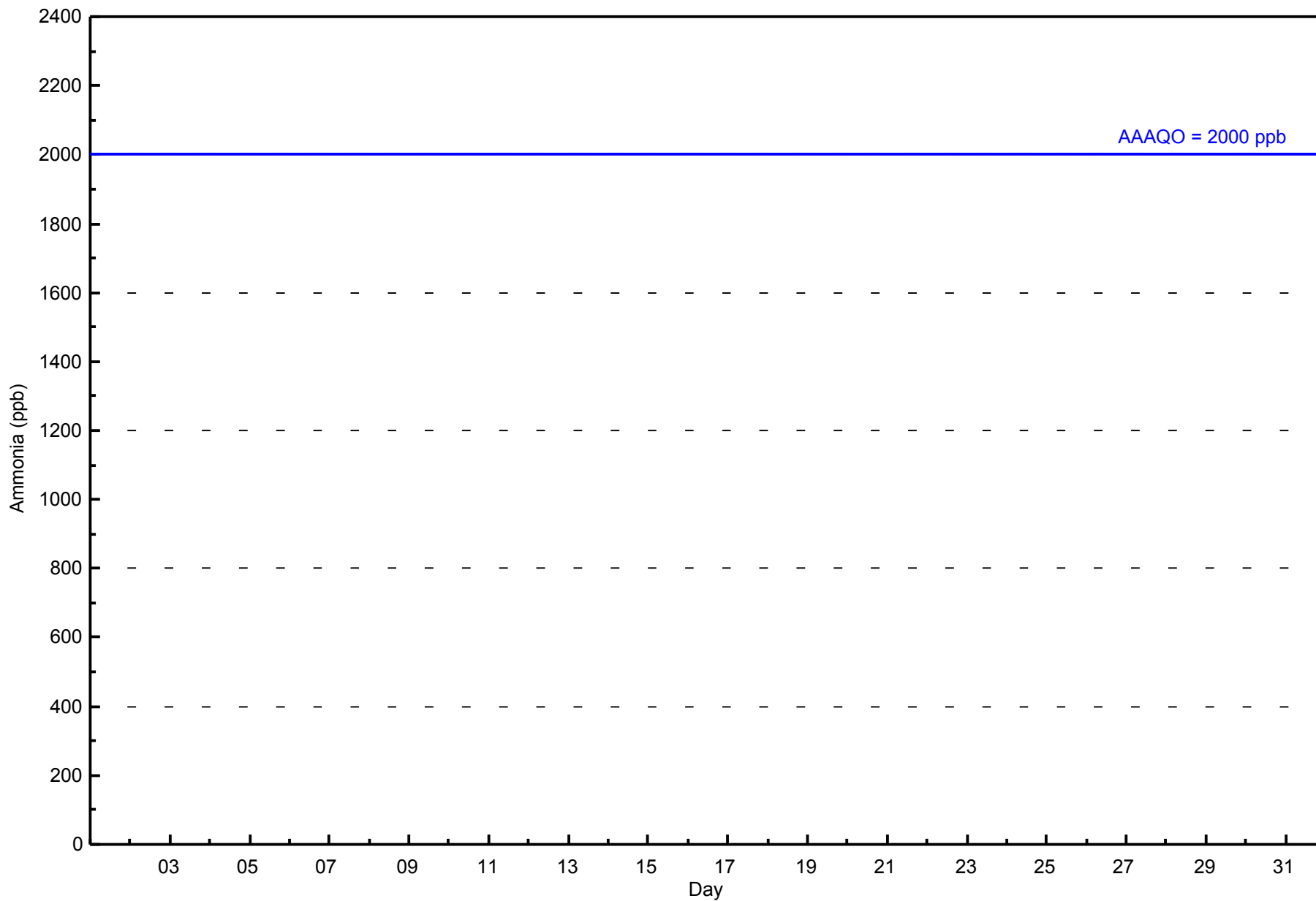
Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay - Bertha Ganter (AMS 1)





WBEA
Hourly Averages

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - May 2015





WBEA

Cumulative Frequency Distribution

Ammonia (NH₃) - ppb

Fort McKay - Bertha Ganter - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	662	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: 662

Total Number of Hours: 744



WBEA
Frequency Distribution

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	61	77	34	21	26	25	11	49	111	78	33	38	16	22	25	30	657
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	61	77	34	21	26	25	11	49	111	78	33	38	16	22	25	30	657

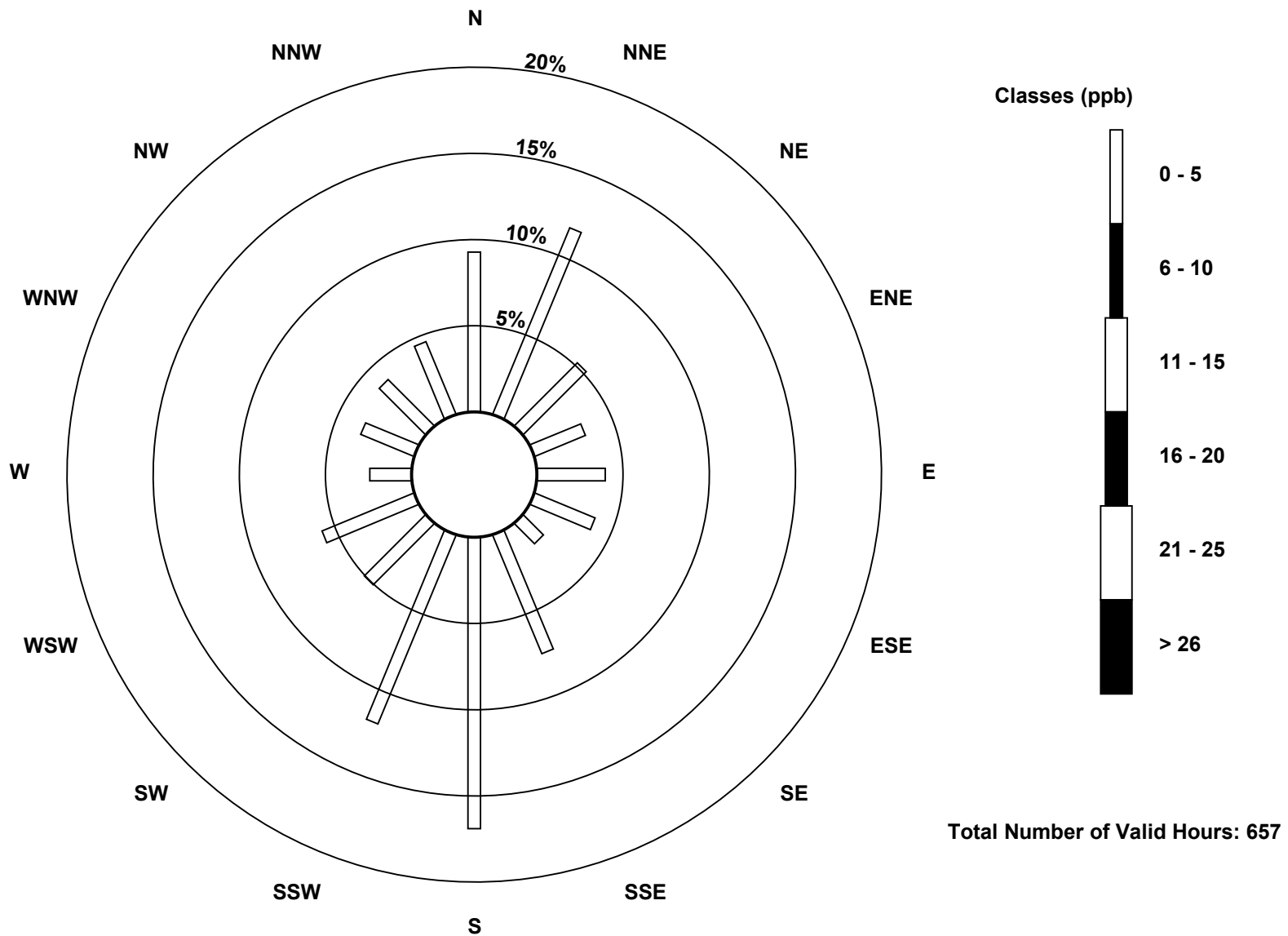
Total Number of Valid Hours: 657

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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



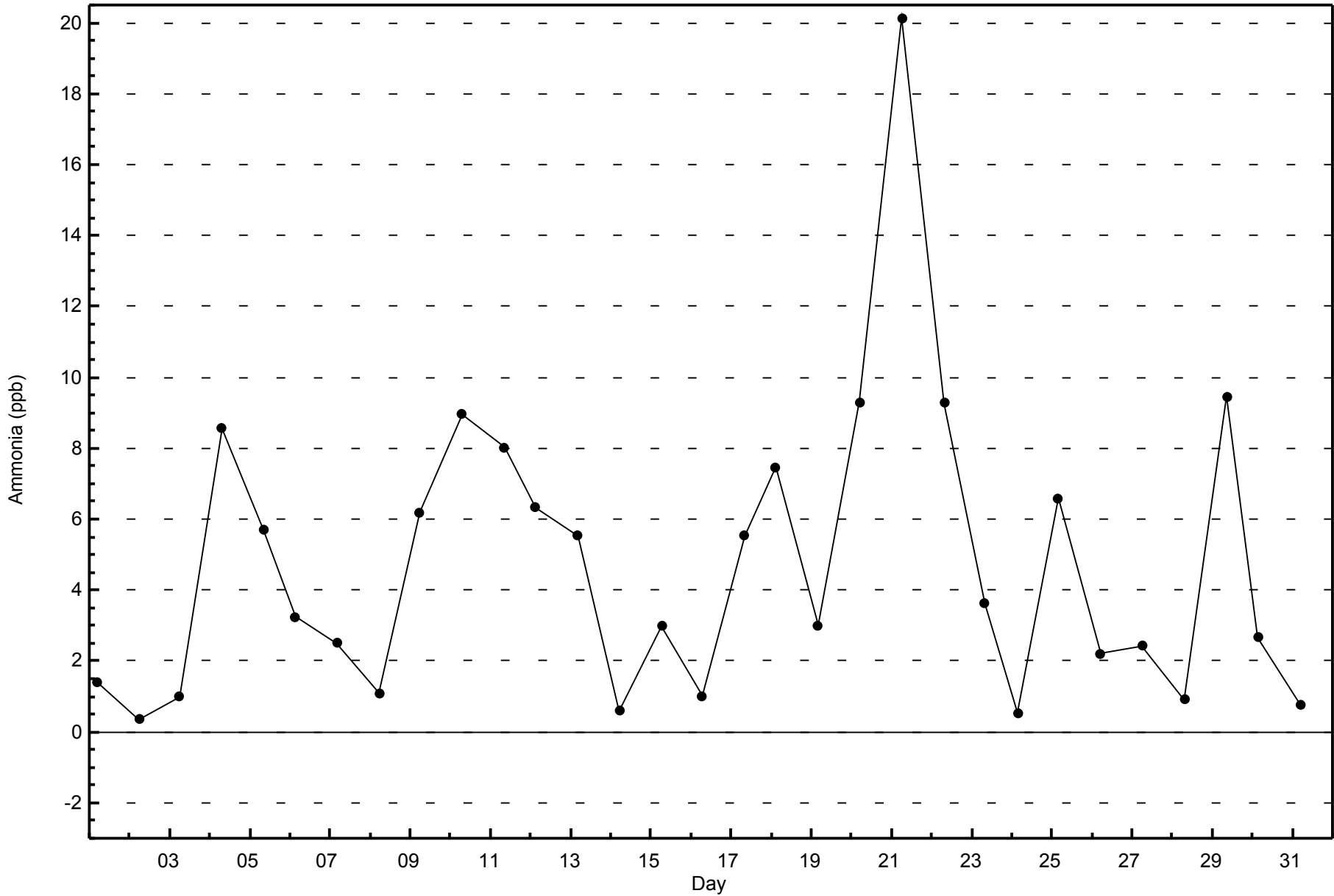


WBEA

Zero Responses

Ammonia (NH₃) - ppb

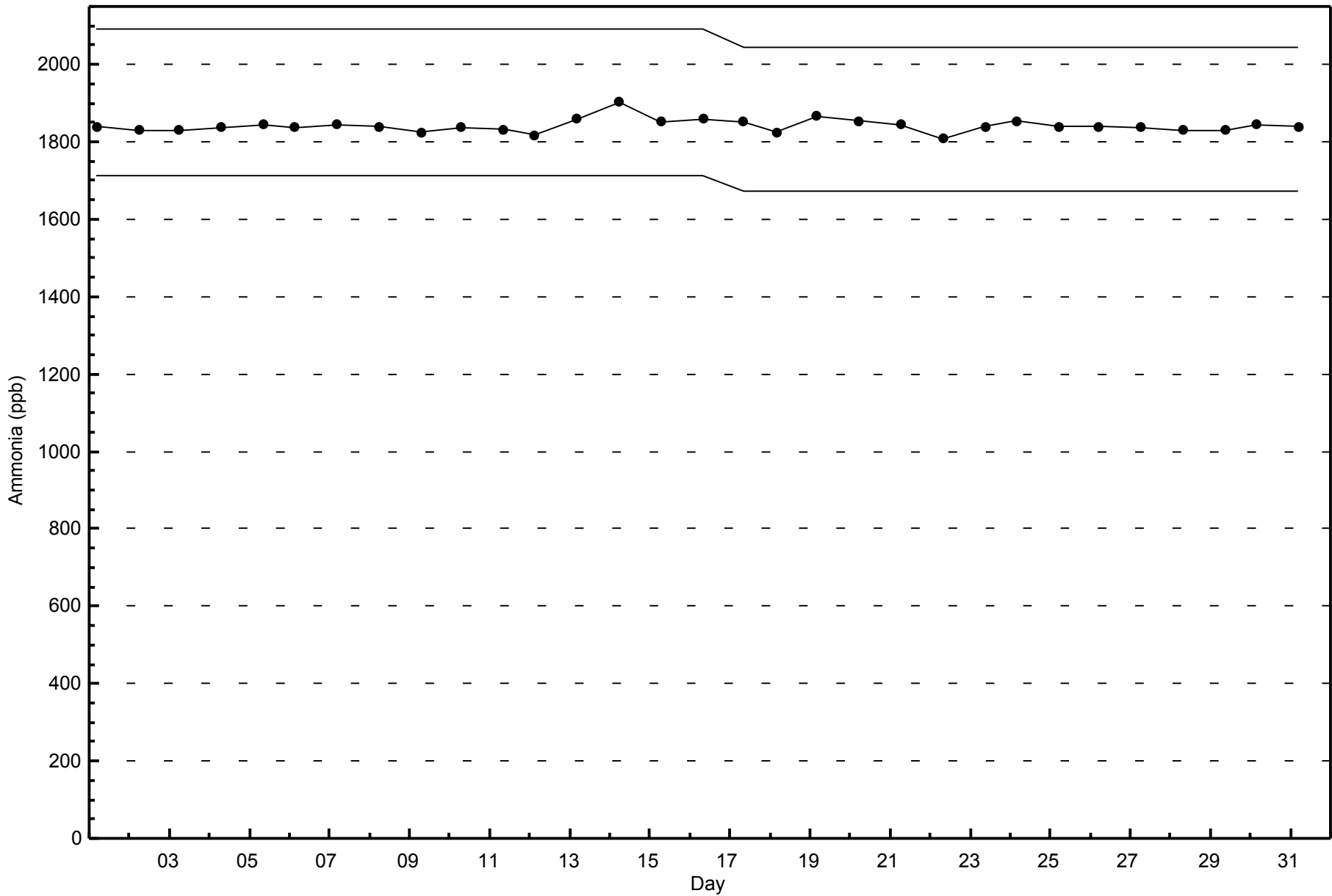
Fort McKay - Bertha Ganter - May 2015





WBEA
Span Responses

Ammonia (NH₃) - ppb
Fort McKay - Bertha Ganter - May 2015



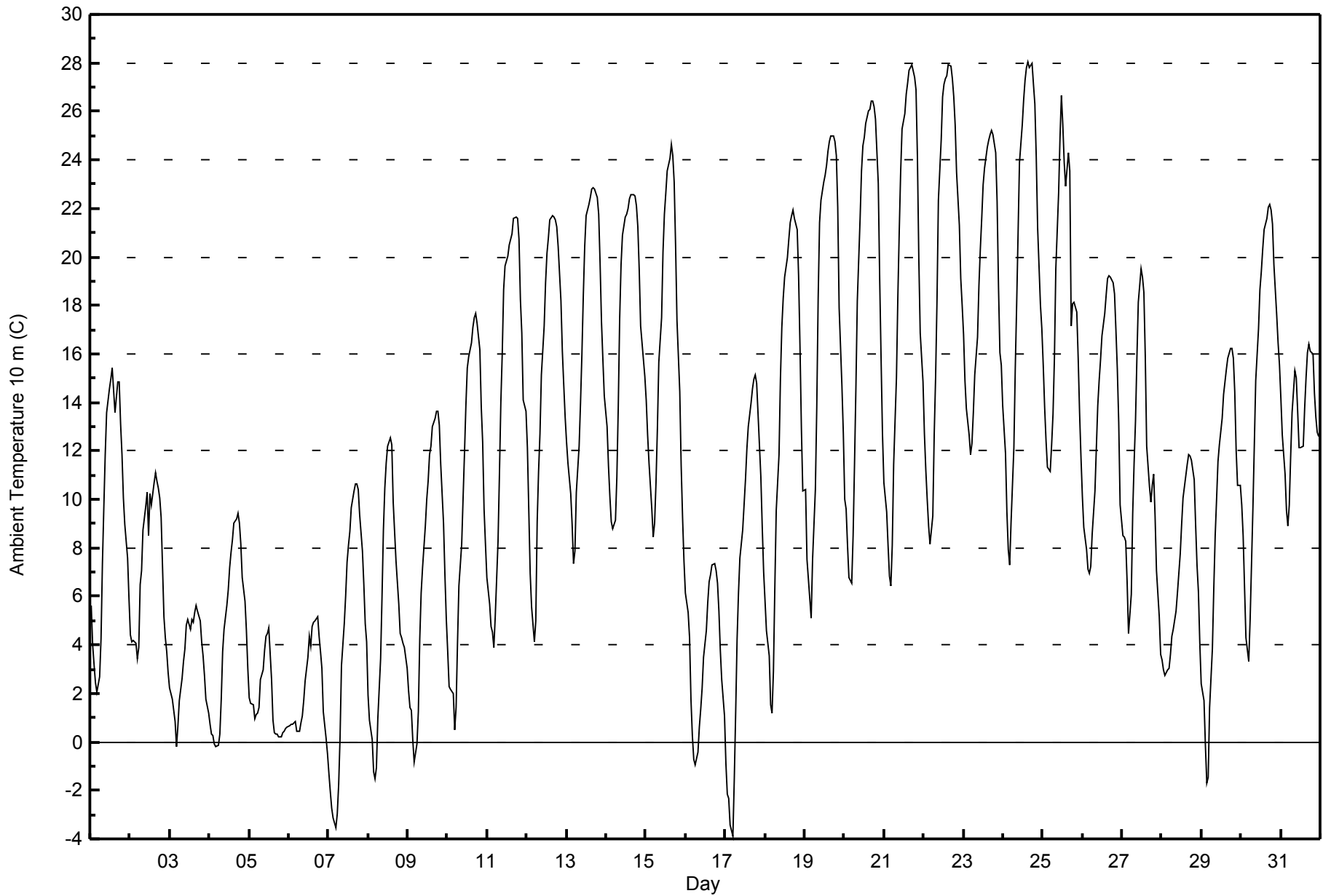


Maximum Value: 28.0 C on May 24 16:00		Maximum Daily Average: 20.0 C on May 22		Hours in Service: 744																																													
Minimum Value: -3.9 C on May 17 05:00		Minimum Daily Average: 1.6 C on May 5		Hours of Data: 744																																													
Maximum Diurnal Average: 17.1 C at hour 17		Minimum Diurnal Average: 3.7 C at hour 5		Hours of Missing Data: 0																																													
Monthly Average: 11.61 C		Percentiles: P ₁ = -2.2 P ₁₀ = 1.4 Q ₁ = 5.0 Median = 10.9 Q ₃ = 17.5 P ₉₀ = 22.8 P ₉₉ = 27.8		Hours of Calibration: 0																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	5.6	4.0	3.2	2.5	2.1	2.7	4.3	7.3	9.6	11.8	13.6	14.5	15.0	15.4	14.5	13.6	14.8	14.8	13.1	11.8	10.0	9.0	7.6	5.9	9.4	15.4																							
2-May	4.4	4.1	4.2	4.1	3.4	3.9	6.5	7.1	8.7	9.7	10.3	8.5	10.2	9.8	10.7	11.1	10.7	10.4	10.1	9.3	5.2	4.3	3.7	2.9	7.2	11.1																							
3-May	2.2	1.8	1.3	0.8	-0.2	0.7	1.7	2.6	3.3	3.8	4.8	5.0	4.6	5.1	4.9	5.4	5.6	5.4	5.0	4.1	3.5	2.8	1.8	1.2	3.2	5.6																							
4-May	0.7	0.3	0.3	-0.1	-0.2	-0.1	0.3	1.8	3.7	4.7	5.6	6.3	7.2	7.8	8.3	9.0	9.2	9.5	9.0	8.2	6.8	5.8	4.6	3.0	4.7	9.5																							
5-May	1.8	1.6	1.5	1.0	1.1	1.2	1.4	2.5	3.0	3.8	4.4	4.4	4.7	2.6	0.9	0.4	0.3	0.3	0.2	0.2	0.4	0.4	0.5	0.6	1.6	4.7																							
6-May	0.7	0.7	0.7	0.8	0.8	0.4	0.5	0.8	1.0	1.7	2.5	3.5	4.3	3.9	4.8	4.9	5.0	5.2	4.3	3.7	3.0	1.2	0.1	-0.5	2.3	5.2																							
7-May	-1.3	-2.0	-2.8	-3.2	-3.5	-3.0	-1.7	0.2	3.2	4.9	6.0	7.4	8.1	8.7	9.7	10.3	10.6	10.6	10.4	9.4	7.9	6.5	4.9	4.1	4.4	10.6																							
8-May	2.0	0.9	0.1	-1.2	-1.5	-1.0	1.0	3.4	5.9	8.7	10.4	11.5	12.2	12.6	12.3	9.9	8.7	7.5	5.7	4.5	4.3	4.1	3.9	3.1	5.4	12.6																							
9-May	2.1	1.4	1.3	0.1	-0.8	-0.1	1.2	4.2	6.1	7.2	8.9	10.0	10.8	11.8	12.2	13.0	13.3	13.6	13.6	13.1	11.4	9.0	6.9	5.0	7.3	13.6																							
10-May	3.7	2.3	2.2	2.0	0.5	1.4	4.0	6.5	8.1	10.1	11.9	13.9	15.4	15.9	16.5	17.1	17.5	17.7	17.2	16.1	13.8	12.4	9.6	8.2	10.2	17.7																							
11-May	6.8	5.7	4.7	4.5	3.9	5.2	8.3	11.0	14.0	16.0	18.6	19.6	20.1	20.5	20.7	21.0	21.6	21.6	21.6	20.7	18.3	16.8	14.1	13.6	14.5	21.6																							
12-May	12.1	9.5	7.0	5.6	4.1	5.0	9.1	11.2	12.7	15.1	17.2	19.0	20.1	20.8	21.5	21.7	21.6	21.5	21.2	20.4	18.2	16.1	14.7	13.4	15.0	21.7																							
13-May	12.4	11.5	10.3	9.0	7.3	7.9	10.3	12.2	14.0	16.0	18.4	20.4	21.7	22.2	22.5	22.8	22.9	22.8	22.5	21.8	19.8	17.3	15.7	14.3	16.5	22.9																							
14-May	13.0	11.4	10.1	9.1	8.8	9.1	10.9	13.8	17.4	19.7	20.9	21.6	21.8	22.0	22.4	22.6	22.5	22.5	22.1	21.3	19.5	17.2	15.8	15.1	17.1	22.6																							
15-May	14.1	12.7	11.5	9.6	8.5	9.0	10.7	12.9	15.6	17.5	20.2	21.8	22.6	23.5	24.0	24.6	24.2	23.1	20.5	17.4	14.5	11.4	9.2	7.5	16.1	24.6																							
16-May	6.1	5.3	4.3	1.8	0.3	-0.7	-0.9	-0.4	0.6	1.4	2.2	3.5	4.6	5.7	6.6	6.9	7.3	7.3	7.1	6.5	5.4	3.8	2.5	1.1	3.7	7.3																							
17-May	-0.9	-2.1	-2.4	-3.4	-3.9	-1.5	1.2	4.3	6.1	7.6	8.7	9.8	10.8	12.1	13.0	14.0	14.5	15.0	15.2	14.8	13.5	10.9	8.8	7.0	7.2	15.2																							
18-May	5.8	4.6	3.6	1.5	1.2	2.9	6.4	9.5	11.9	15.0	17.1	18.3	19.2	20.0	20.7	21.4	21.7	21.9	21.6	21.1	19.2	16.3	12.9	10.3	13.5	21.9																							
19-May	10.4	7.5	6.7	5.9	5.1	7.6	10.4	13.8	18.3	21.4	22.4	23.1	23.3	23.8	24.4	24.8	25.0	25.0	24.7	24.2	22.0	17.9	14.7	12.7	17.3	25.0																							
20-May	10.0	9.6	8.1	6.8	6.5	8.5	11.5	14.6	18.2	21.6	23.5	24.6	24.9	25.5	26.0	26.1	26.4	26.4	26.2	25.7	23.0	19.1	15.8	12.7	18.4	26.4																							
21-May	10.7	9.5	8.1	6.8	6.4	8.1	11.5	15.0	18.4	21.1	23.5	25.3	25.9	26.7	27.2	27.7	27.8	27.9	27.4	26.9	24.1	19.9	16.9	14.9	19.1	27.9																							
22-May	12.7	11.2	10.0	8.9	8.2	9.3	12.7	15.0	18.2	22.3	24.8	26.6	27.1	27.4	27.5	27.9	27.9	27.4	26.6	25.5	23.5	21.3	19.1	18.0	20.0	27.9																							
23-May	16.8	14.9	13.8	12.6	11.8	12.3	13.6	15.1	16.7	18.8	20.3	21.6	23.0	23.7	24.5	24.8	25.1	25.2	25.0	24.3	22.3	18.8	16.1	15.5	19.0	25.2																							
24-May	13.9	11.9	9.5	7.9	7.3	9.1	12.1	15.4	18.1	21.0	23.9	25.4	26.5	27.3	27.8	28.0	27.8	28.0	27.1	26.3	24.1	21.2	18.0	17.0	19.8	28.0																							
25-May	15.5	13.8	12.4	11.3	11.1	12.3	13.5	15.8	19.5	22.6	24.9	26.7	25.4	23.9	22.9	24.3	23.5	17.1	18.1	18.1	17.8	15.8	13.5	11.7	18.0	26.7																							
26-May	10.1	8.8	7.9	7.1	7.0	7.2	8.6	10.3	12.1	13.9	14.9	15.7	16.8	17.6	18.4	19.1	19.2	19.2	18.9	18.4	17.0	15.4	13.2	9.8	13.6	19.2																							
27-May	8.5	8.4	8.3	6.6	4.5	6.1	9.4	11.5	13.3	15.8	18.1	19.5	19.2	18.6	15.9	12.2	10.5	9.9	10.6	11.0	9.3	7.1	5.1	3.6	11.0	19.5																							
28-May	3.4	3.0	2.7	2.9	3.0	3.6	4.4	4.6	5.4	6.2	6.9	7.7	8.9	10.1	11.0	11.4	11.8	11.8	11.6	10.8	9.0	7.3	6.2	4.1	7.0	11.8																							
29-May	2.4	1.7	-0.2	-1.7	-1.5	1.4	3.8	6.3	8.5	10.0	11.5	12.3	13.3	14.3	14.9	15.4	15.8	16.2	16.2	15.8	14.5	12.0	10.6	10.6	9.3	16.2																							
30-May	9.8	8.5	6.4	4.3	3.3	5.1	7.4	9.7	12.3	14.9	17.0	18.7	19.4	20.3	21.2	21.6	22.0	22.2	22.0	21.3	19.7	17.6	16.5	15.5	14.9	22.2																							
31-May	14.2	12.7	11.0	9.6	8.9	9.8	11.8	13.6	15.3	15.0	13.6	12.1	12.1	12.2	13.8	15.0	16.0	16.4	16.1	16.0	14.4	13.4	12.8	12.6	13.3	16.4																							
																								7.4	6.3	5.4	4.3	3.7	4.6	6.6	8.8	10.9	12.9	14.4	15.4	16.1	16.5	16.8	17.0	17.1	16.9	16.5	15.8	14.0	12.0	10.2	8.9	Diurnal Average	
																								16.8	14.9	13.8	12.6	11.8	12.3	13.6	15.8	19.5	22.6	24.9	26.7	27.1	27.4	27.8	28.0	27.9	28.0	27.4	26.9	24.1	21.3	19.1	18.0		Diurnal Maximum



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	29	3.90	3.90
0 - 10	308	41.40	45.30
10 - 20	269	36.16	81.45
> 20	138	18.55	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

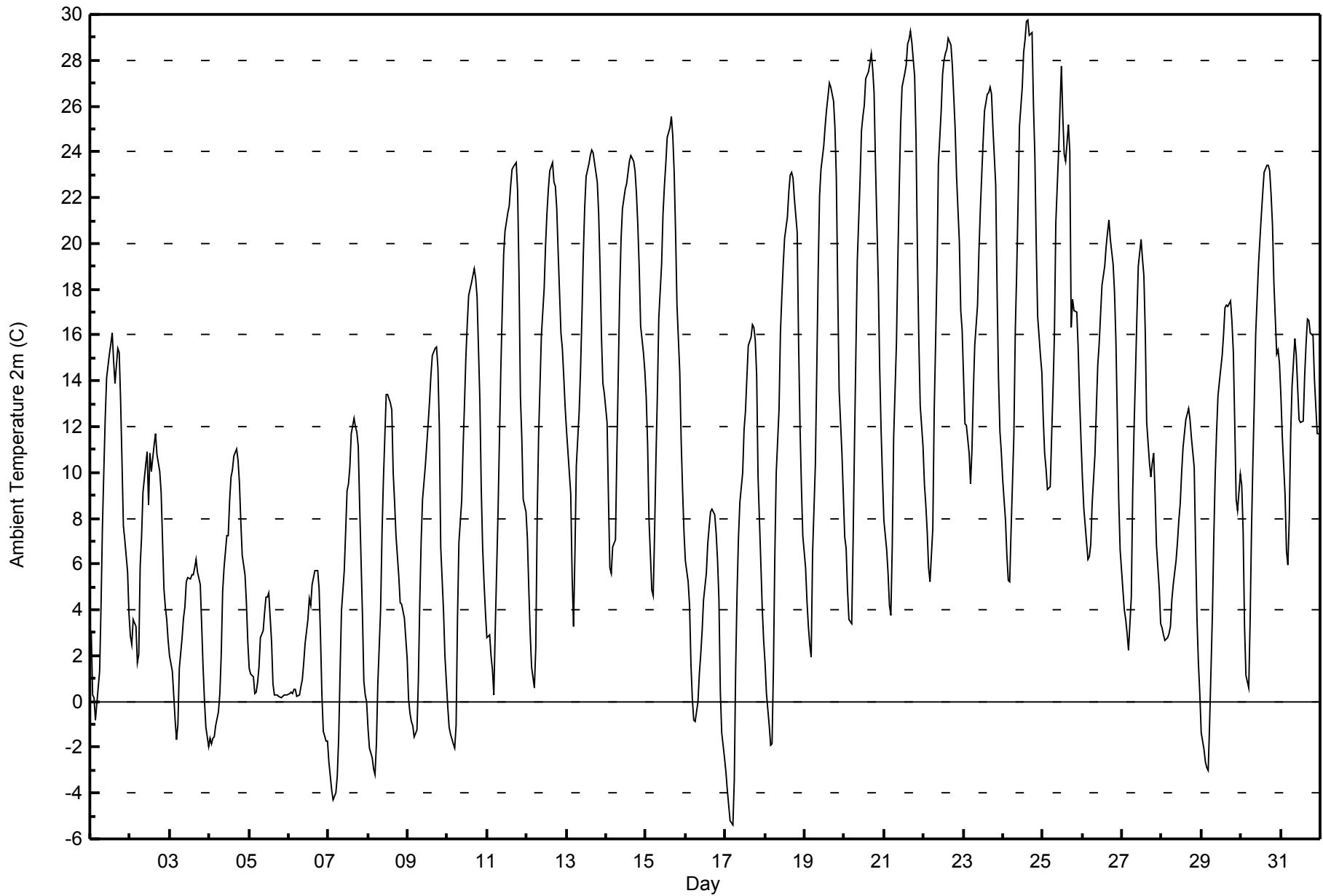


Maximum Value: 29.8 C on May 24 16:00		Maximum Daily Average: 19.4 C on May 22		Hours in Service: 744																																												
Minimum Value: -5.4 C on May 17 05:00		Minimum Daily Average: 1.5 C on May 5		Hours of Data: 744																																												
Maximum Diurnal Average: 18.3 C at hour 16		Minimum Diurnal Average: 1.6 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 11.10 C		Percentiles: P ₁ = -3.5 P ₁₀ = 0.3 Q ₁ = 4.1 Median = 10.4 Q ₃ = 17.2 P ₉₀ = 23.5 P ₉₉ = 28.8		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	3.1	0.3	0.2	-0.8	-0.1	1.3	4.1	7.6	10.0	12.4	14.2	15.2	15.6	16.1	14.9	13.9	15.4	15.2	13.1	10.5	7.7	7.1	5.7	3.8	8.6	16.1																						
2-May	2.9	2.5	3.6	3.3	1.7	2.1	5.9	7.2	9.2	10.4	10.9	8.6	10.9	10.1	11.2	11.7	10.8	10.4	10.0	9.1	4.9	4.1	3.6	2.7	7.0	11.7																						
3-May	2.0	1.3	0.3	-0.8	-1.7	-1.0	1.5	2.8	3.7	4.1	5.2	5.4	5.4	5.5	5.5	5.8	6.2	5.7	5.1	3.3	1.5	0.0	-1.1	-2.0	2.7	6.2																						
4-May	-1.6	-1.8	-1.6	-1.6	-1.1	-0.5	0.4	2.0	4.8	5.8	7.3	7.3	8.8	9.8	10.1	10.7	11.0	10.5	9.6	7.8	6.4	5.5	4.3	2.6	4.9	11.0																						
5-May	1.4	1.2	1.1	0.3	0.4	0.8	1.5	2.8	3.1	3.9	4.5	4.6	4.7	2.6	0.8	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.3	1.5	4.7																						
6-May	0.4	0.4	0.3	0.5	0.5	0.2	0.3	0.7	1.0	1.7	2.5	3.6	4.5	4.2	5.1	5.4	5.7	5.7	4.9	2.9	0.3	-1.3	-1.7	-1.7	1.9	5.7																						
7-May	-2.6	-3.3	-3.8	-4.3	-4.0	-3.2	-1.6	1.3	3.9	5.7	7.4	9.2	9.5	10.2	11.7	12.4	12.0	11.8	11.1	8.6	3.8	0.9	0.3	0.0	4.0	12.4																						
8-May	-1.2	-2.1	-2.4	-3.0	-3.2	-1.9	0.8	4.0	7.3	9.7	11.5	13.4	13.4	13.0	12.7	10.0	8.7	7.3	5.5	4.3	4.2	3.9	3.6	1.9	5.1	13.4																						
9-May	0.1	-0.5	-0.9	-1.1	-1.5	-1.3	0.9	4.3	7.0	8.8	10.3	11.2	12.1	13.1	14.3	15.1	15.4	15.5	14.6	12.0	6.7	3.9	2.0	0.9	6.8	15.5																						
10-May	-0.2	-1.1	-1.4	-1.8	-2.1	-1.1	3.6	7.0	8.8	11.1	13.0	15.0	16.5	17.7	18.3	18.6	18.9	18.5	17.7	13.2	9.3	6.7	5.1	3.9	9.0	18.9																						
11-May	2.8	2.9	2.0	1.4	0.3	3.2	8.3	11.5	14.5	17.1	19.5	20.5	21.3	21.7	22.5	23.2	23.3	23.5	22.3	18.7	13.3	11.5	8.8	8.3	13.4	23.5																						
12-May	7.1	4.9	3.0	1.5	0.6	2.3	8.0	11.6	13.8	16.0	18.0	19.9	21.3	22.4	23.1	23.5	22.7	22.5	21.5	19.6	16.1	15.4	14.2	12.9	14.3	23.5																						
13-May	11.8	10.9	9.1	5.5	3.3	6.5	10.3	12.6	14.5	16.8	19.5	21.6	22.9	23.5	23.8	24.1	24.0	23.6	22.7	21.3	18.9	15.9	13.9	13.4	16.3	24.1																						
14-May	12.2	8.8	5.8	5.6	6.7	7.1	10.9	14.2	17.8	20.2	21.5	22.4	22.6	23.1	23.6	23.9	23.6	23.2	22.2	20.8	18.9	16.4	15.2	14.4	16.7	23.9																						
15-May	13.3	11.2	7.9	4.9	4.6	7.4	10.7	13.5	16.8	19.1	21.3	22.5	23.5	24.6	25.0	25.5	24.7	23.1	20.5	17.3	14.4	11.4	9.2	7.4	15.8	25.5																						
16-May	6.1	5.2	4.2	1.7	0.1	-0.8	-0.9	0.0	1.2	2.1	3.1	4.4	5.6	6.9	7.6	8.3	8.4	8.2	7.4	6.2	4.5	0.5	-1.4	-2.5	3.6	8.4																						
17-May	-3.1	-3.9	-4.5	-5.2	-5.4	-3.5	1.5	4.8	7.2	8.7	10.0	11.9	12.7	14.1	15.5	15.9	16.4	16.4	15.8	14.2	9.8	6.0	4.1	2.7	6.8	16.4																						
18-May	1.7	0.4	-1.0	-1.9	-1.9	1.4	6.4	10.0	12.8	16.1	17.7	19.1	20.2	21.2	22.3	23.0	23.1	22.8	21.9	20.5	15.7	12.1	9.4	7.2	12.5	23.1																						
19-May	5.8	4.4	3.3	2.5	1.9	6.5	10.4	14.5	18.8	22.1	23.2	24.3	25.1	25.8	26.4	27.0	26.8	26.2	25.0	22.9	18.0	13.6	10.9	9.0	16.4	27.0																						
20-May	7.2	6.7	4.9	3.6	3.4	7.0	11.4	15.3	19.2	22.8	25.0	25.5	26.1	27.2	27.5	27.8	28.3	27.6	26.6	23.5	18.4	14.6	11.9	9.8	17.5	28.3																						
21-May	7.9	6.6	5.6	4.2	3.8	6.8	11.5	15.6	19.3	22.4	25.2	26.8	27.4	27.8	28.7	28.9	29.3	28.8	27.3	24.6	19.6	15.8	12.9	11.2	18.3	29.3																						
22-May	9.5	8.6	7.4	5.8	5.3	7.6	12.7	15.7	18.9	23.5	25.8	27.4	28.0	28.3	28.5	28.9	28.6	27.8	26.4	25.0	22.9	20.1	17.1	16.2	19.4	28.9																						
23-May	14.1	12.1	12.0	10.9	9.5	10.9	13.5	15.5	17.3	19.6	21.5	23.0	24.5	25.8	26.5	26.6	26.8	26.5	25.1	22.6	17.9	14.1	11.8	10.9	18.3	26.8																						
24-May	9.7	7.9	6.4	5.3	5.2	7.5	11.6	16.2	18.7	21.8	25.1	26.8	28.3	28.9	29.7	29.8	29.1	29.2	26.1	23.9	19.9	16.8	15.1	14.4	18.9	29.8																						
25-May	12.3	10.9	10.2	9.3	9.4	11.6	13.6	16.1	20.9	24.0	26.0	27.7	25.6	23.9	23.6	25.2	24.0	16.3	17.5	17.1	17.0	15.4	13.2	11.4	17.6	27.7																						
26-May	9.8	8.5	6.9	6.2	6.3	6.9	8.7	10.8	12.8	14.7	15.6	16.9	18.1	19.0	19.9	20.5	21.1	20.2	19.1	17.9	15.7	12.3	8.8	6.6	13.5	21.1																						
27-May	4.9	4.0	3.6	2.9	2.3	4.6	9.1	12.0	14.3	16.8	19.0	20.2	19.3	18.6	16.1	12.2	10.4	9.8	10.4	10.9	9.1	6.8	4.9	3.4	10.2	20.2																						
28-May	3.2	2.9	2.7	2.8	2.9	3.3	4.4	5.1	6.1	7.0	7.9	8.7	10.0	11.1	12.3	12.5	12.8	12.3	11.5	10.2	6.7	3.6	1.7	0.3	6.8	12.8																						
29-May	-1.3	-2.1	-2.7	-2.9	-3.0	-1.0	3.7	7.1	9.8	11.7	13.4	14.0	15.1	16.0	17.2	17.3	17.2	17.5	16.6	15.2	12.1	8.8	8.3	9.9	9.1	17.5																						
30-May	9.4	7.4	3.3	1.1	0.6	3.5	7.5	10.6	13.2	16.1	19.0	20.2	21.2	22.2	23.1	23.4	23.4	23.2	22.1	20.8	18.3	15.2	15.4	14.8	14.8	23.4																						
31-May	13.3	11.6	9.0	6.6	5.9	8.0	11.7	13.8	15.8	15.1	13.7	12.3	12.2	12.2	14.2	15.6	16.7	16.6	16.1	15.9	14.1	12.9	11.7	11.7	12.8	16.7																						
																								5.2	4.1	3.0	2.0	1.6	3.3	6.5	9.2	11.7	13.8	15.4	16.4	17.2	17.6	18.1	18.3	18.2	17.6	16.6	14.9	11.8	9.4	7.7	6.6	Diurnal Average
																								14.1	12.1	12.0	10.9	9.5	11.6	13.6	16.2	20.9	24.0	26.0	27.7	28.3	28.9	29.7	29.8	29.3	29.2	27.3	25.0	22.9	20.1	17.1	16.2	Diurnal Maximum



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	61	8.20	8.20
0 - 10	298	40.05	48.25
10 - 20	244	32.80	81.05
> 20	141	18.95	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

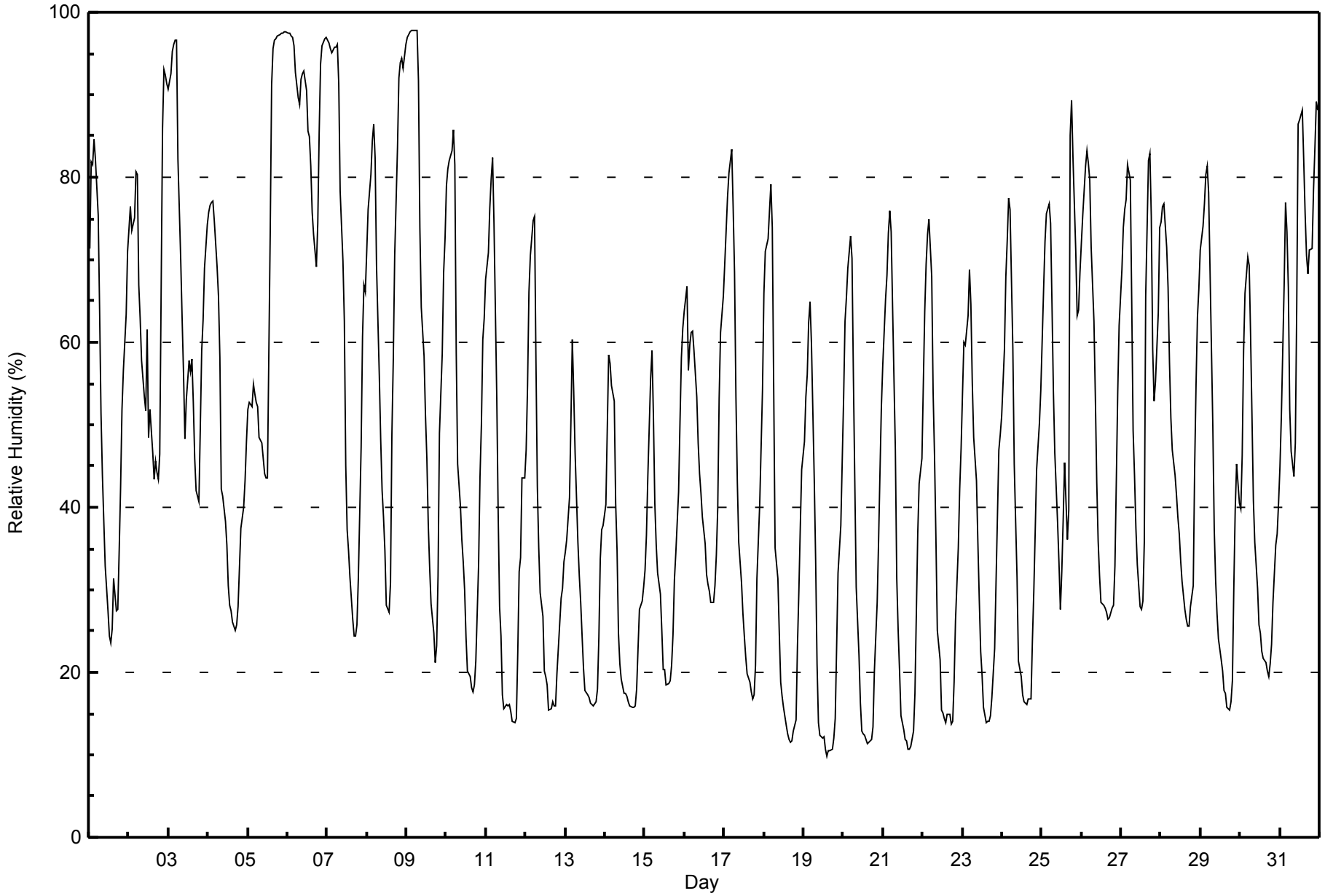


Maximum Value: 98 % on May 9 06:00																		Maximum Daily Average: 89.0 % on May 6																		Hours in Service: 744								
Minimum Value: 10 % on May 19 15:00																		Minimum Daily Average: 29.6 % on May 19																		Hours of Data: 744								
Maximum Diurnal Average: 76.5 % at hour 5																		Minimum Diurnal Average: 29.9 % at hour 15																		Hours of Missing Data: 0								
Monthly Average: 48.4 %																		Percentiles: P ₁ = 11 P ₁₀ = 16 Q ₁ = 27 Median = 45 Q ₃ = 69 P ₉₀ = 83 P ₉₉ = 98																		Hours of Calibration: 0								
																																				Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																				
1-May	71	82	81	85	82	75	64	51	44	38	33	27	24	24	25	31	28	28	35	42	52	57	63	71	50.6	85																		
2-May	74	76	74	75	81	80	67	63	58	53	52	62	48	52	47	43	46	44	43	46	86	93	92	91	64.4	93																		
3-May	91	93	95	96	97	97	82	70	63	56	48	53	58	57	58	53	46	42	41	50	59	63	69	74	67.0	97																		
4-May	76	77	77	77	75	69	66	58	42	41	38	35	31	28	27	26	25	26	28	33	37	40	43	48	46.8	77																		
5-May	52	53	52	55	54	53	52	48	48	46	44	44	44	73	91	96	97	97	97	97	98	98	98	98	70.1	98																		
6-May	98	97	97	97	96	93	90	89	92	93	93	90	86	85	81	76	73	69	74	85	94	96	97	97	89.0	98																		
7-May	97	96	96	95	96	96	96	91	78	70	63	45	37	35	32	26	24	24	26	31	47	61	67	66	62.3	97																		
8-May	71	76	80	84	86	82	69	56	48	42	39	35	28	27	31	49	58	70	84	92	94	94	93	96	66.1	96																		
9-May	97	97	98	98	98	98	98	92	74	64	58	51	46	38	33	28	25	21	23	32	49	59	69	73	63.2	98																		
10-May	79	81	82	83	86	81	59	45	40	36	33	30	24	20	20	18	18	18	21	33	44	50	60	63	46.9	86																		
11-May	68	71	76	80	82	74	53	39	28	24	17	16	16	16	15	14	14	14	22	32	34	44	44	44	37.9	82																		
12-May	47	55	66	71	75	75	58	43	35	30	27	20	19	18	15	16	16	16	16	20	26	29	30	33	35.6	75																		
13-May	35	36	41	50	60	54	47	36	32	28	24	21	18	17	17	16	16	16	16	18	24	34	37	38	30.5	60																		
14-May	40	50	58	57	55	53	41	35	25	21	19	18	17	17	16	16	16	16	16	18	23	28	29	30	29.7	58																		
15-May	32	37	44	56	59	51	40	35	32	29	25	20	20	18	19	19	21	25	31	34	42	50	58	62	35.8	62																		
16-May	64	67	57	60	61	61	59	53	48	44	42	39	36	32	31	30	28	28	31	34	40	53	61	66	46.8	67																		
17-May	69	74	78	81	83	76	69	53	43	36	31	27	24	22	20	19	18	17	17	21	31	40	47	54	43.8	83																		
18-May	66	71	72	76	79	74	55	35	31	25	19	17	16	14	12	12	12	12	13	14	23	30	37	45	35.8	79																		
19-May	48	53	56	62	65	60	43	34	21	14	12	12	12	11	10	10	10	11	12	14	23	32	38	46	29.6	65																		
20-May	53	63	65	69	73	70	56	43	30	22	16	13	13	12	11	12	12	12	13	20	29	36	44	52	35.0	73																		
21-May	57	65	68	73	76	73	64	47	31	25	20	15	13	12	12	11	11	11	13	18	27	37	43	46	36.2	76																		
22-May	55	64	69	73	75	68	54	46	36	25	22	15	15	14	14	15	15	14	14	19	26	35	42	47	36.4	75																		
23-May	54	60	60	63	69	65	55	48	43	36	29	23	20	16	14	14	14	15	17	23	31	39	47	49	37.6	69																		
24-May	51	59	68	72	77	76	59	45	38	32	21	19	17	16	16	16	17	17	24	30	37	45	50	54	40.0	77																		
25-May	60	66	72	76	77	74	65	54	47	38	33	28	32	38	45	36	40	85	89	82	71	63	64	68	58.5	89																		
26-May	72	75	81	83	82	80	71	63	53	43	36	32	29	28	28	27	26	27	28	28	33	43	54	62	49.3	83																		
27-May	69	74	76	77	82	80	65	49	44	37	33	28	28	29	36	66	82	83	75	59	53	55	64	74	59.0	83																		
28-May	75	76	77	71	67	58	51	47	44	42	39	37	34	31	28	27	26	26	28	30	45	55	63	66	47.5	77																		
29-May	71	74	77	80	81	78	59	50	37	31	27	24	22	20	18	18	16	15	16	19	30	40	45	41	41.3	81																		
30-May	40	46	59	66	70	69	61	51	41	36	30	26	25	23	22	21	20	19	21	23	28	35	37	40	37.9	70																		
31-May	45	51	67	77	73	67	52	47	44	48	64	86	87	88	82	76	70	68	71	71	78	84	89	88	69.8	89																		
																		63.7	68.2	71.6	74.8	76.5	72.9	61.9	52.2	44.2	38.9	35.1	32.5	30.2	30.0	29.9	30.2	30.3	31.8	33.8	37.5	45.6	51.8	57.3	60.7	Diurnal Average		
																		98	97	98	98	98	98	98	92	92	93	93	90	87	88	91	96	97	97	97	97	97	98	98	98	98	Diurnal Maximum	



WBEA
Hourly Averages

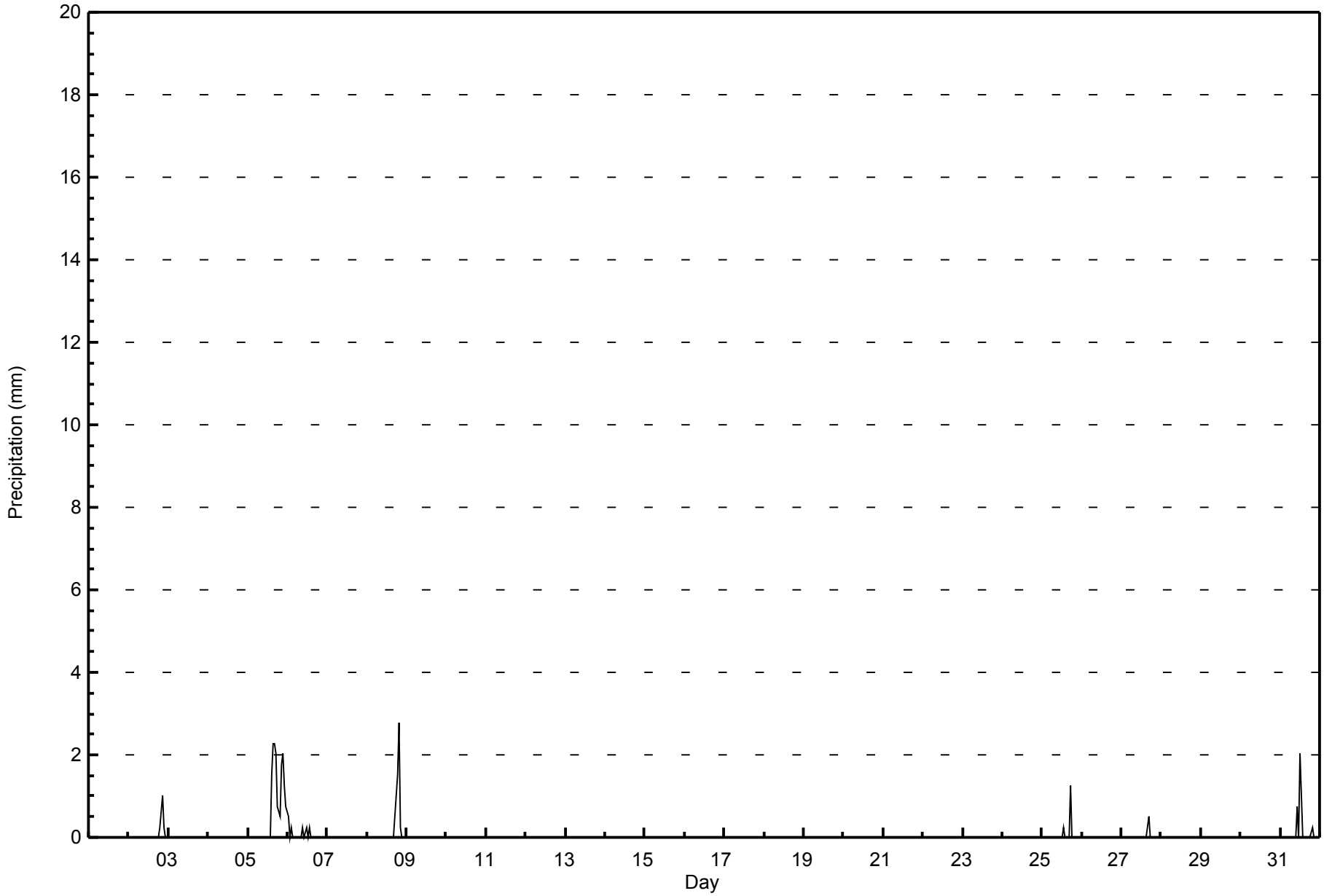
Relative Humidity (RH) - %
Fort McKay - Bertha Ganter - May 2015





Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Fort McKay - Bertha Ganter - May 2015





WBEA
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort McKay - Bertha Ganter - May 2015

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	725	97.45	97.45
0.4 - 0.5	4	0.54	97.98
0.6 - 0.7	0	0.00	97.98
0.8 - 1.4	6	0.81	98.79
1.5 - 10	9	1.21	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

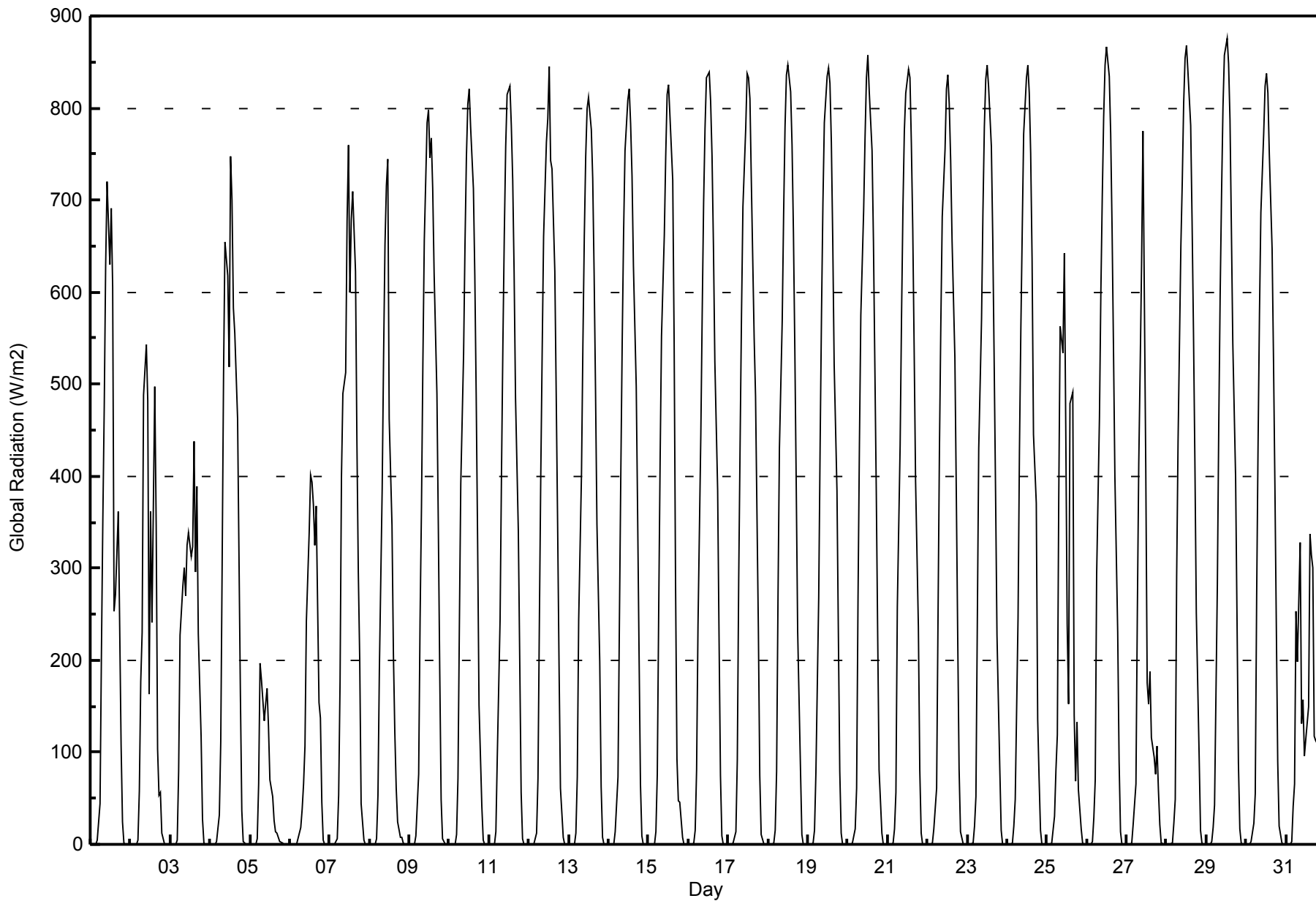


Maximum Value: 876 W/m2 on May 29 13:00		Maximum Daily Average: 347.4 W/m2 on May 28		Hours in Service: 744																							
Minimum Value: 0 W/m2 on May 1 02:00		Minimum Daily Average: 50.8 W/m2 on May 5		Hours of Data: 744																							
Maximum Diurnal Average: 679.6 W/m2 at hour 12		Minimum Diurnal Average: 0.0 W/m2 at hour 1		Hours of Missing Data: 0																							
Monthly Average: 272.0 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 117 Q ₃ = 536 P ₉₀ = 763 P ₉₉ = 842		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-May	0	0	0	0	5	45	209	354	476	628	720	629	691	605	253	272	361	236	108	25	1	0	0	0	234.1	720	
2-May	0	0	0	0	4	58	177	231	489	543	481	164	362	242	497	346	104	53	57	12	0	0	0	0	159.2	543	
3-May	0	0	0	0	5	80	227	280	300	270	325	339	312	323	437	297	389	229	118	27	2	0	0	0	165.1	437	
4-May	0	0	0	0	3	32	111	305	511	655	618	519	748	700	582	556	462	312	162	36	3	0	0	0	263.1	748	
5-May	0	0	0	0	6	66	196	178	135	152	170	129	70	52	25	14	13	7	3	2	0	0	0	0	50.8	196	
6-May	0	0	0	0	0	5	19	37	66	107	243	339	402	393	370	324	368	153	137	46	5	0	0	0	125.6	402	
7-May	0	0	0	0	6	53	177	400	489	512	677	759	600	678	709	622	438	296	201	44	4	0	0	0	277.7	759	
8-May	0	0	0	0	6	53	189	386	530	651	715	744	463	346	207	123	62	25	8	7	1	0	0	0	188.2	744	
9-May	0	0	0	0	9	76	244	366	524	656	783	798	746	767	712	620	490	346	189	49	6	0	0	0	307.6	798	
10-May	0	0	0	0	11	71	237	392	532	652	746	804	821	779	712	618	486	328	150	41	5	0	0	0	307.7	821	
11-May	0	0	0	0	14	95	245	403	543	662	759	815	824	781	722	620	485	340	200	56	7	0	0	0	315.4	824	
12-May	0	0	0	0	12	72	245	403	537	660	763	788	846	743	734	622	487	347	196	61	7	0	0	0	313.5	846	
13-May	0	0	0	0	13	73	243	403	543	660	748	800	811	776	723	620	493	349	198	62	8	0	0	0	313.6	811	
14-May	0	0	0	0	14	73	241	400	546	665	754	809	820	783	727	628	498	357	208	66	9	0	0	0	316.6	820	
15-May	0	0	0	0	14	77	253	414	552	662	748	815	826	791	721	545	285	93	48	46	7	0	0	0	287.4	826	
16-May	0	0	0	1	15	80	237	443	578	698	778	833	839	807	747	649	525	384	224	74	9	0	0	0	330.1	839	
17-May	0	0	0	1	14	91	288	436	576	692	778	837	833	810	719	550	487	360	235	75	10	0	0	0	324.7	837	
18-May	0	0	0	1	15	80	269	430	568	685	779	836	847	818	760	663	535	388	233	82	11	0	0	0	333.3	847	
19-May	0	0	0	1	16	78	269	434	577	697	784	835	843	826	762	656	522	384	228	79	12	0	0	0	333.5	843	
20-May	0	0	0	1	16	61	267	434	576	688	767	833	857	818	754	654	518	384	229	81	13	0	0	0	331.3	857	
21-May	0	0	0	1	17	57	259	434	574	691	775	817	842	832	761	668	537	395	236	81	12	0	0	0	332.9	842	
22-May	0	0	0	1	17	60	247	429	567	682	755	821	837	803	742	655	529	384	229	83	13	0	0	0	327.4	837	
23-May	0	0	0	2	20	52	243	430	570	687	780	832	846	823	757	657	523	381	227	83	15	1	0	0	330.4	846	
24-May	0	0	0	2	20	49	245	426	560	668	772	833	846	817	751	636	445	371	135	72	15	1	0	0	319.3	846	
25-May	0	0	0	2	30	81	119	375	564	533	643	454	240	152	479	492	140	69	132	60	17	1	0	0	190.9	643	
26-May	0	0	0	3	28	70	293	464	600	704	790	847	866	834	773	668	539	400	230	90	14	1	0	0	342.2	866	
27-May	0	0	0	2	21	65	253	413	518	628	776	408	175	152	188	115	95	76	107	59	22	1	0	0	169.8	776	
28-May	0	0	0	1	22	48	292	438	650	721	805	854	868	841	781	676	555	415	252	98	15	1	0	0	347.4	868	
29-May	0	0	0	3	19	43	283	457	598	708	801	858	876	848	788	668	545	398	245	88	17	1	0	0	343.5	876	
30-May	0	0	0	3	22	54	269	435	577	687	772	823	837	817	751	646	526	388	238	91	20	2	0	0	331.6	837	
31-May	0	0	0	3	40	65	254	199	329	132	157	96	114	149	338	314	300	117	113	107	16	1	0	0	118.5	338	
		0.0	0.0	0.0	1.0	14.7	63.4	229.0	375.2	508.2	594.8	676.2	679.6	674.5	642.2	612.4	522.4	411.1	282.7	170.3	60.8	9.6	0.4	0.0	0.0	Diurnal Average	
		0	0	0	3	40	95	293	464	650	721	805	858	876	848	788	676	555	415	252	107	22	2	0	0	Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	282	37.90	37.90
21 - 100	79	10.62	48.52
101 - 300	96	12.90	61.42
301 - 600	128	17.20	78.63
601 - 900	159	21.37	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 20 km/h on May 15 20:00	Maximum Daily Speed Average: 10.4 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 5 20:00	Minimum Daily Speed Average: 0.4 km/h on May 8	Hours of Data: 739
Maximum Diurnal Speed Average: 3.3 km/h at hour 10	Minimum Diurnal Speed Average: 0.6 km/h at hour 6	Hours of Missing Data: 5
Monthly Average Velocity: 0.9 km/h 149.6 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 6 Q ₃ = 9 P ₉₀ = 12 P ₉₉ = 17	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-May	SW4	SSW3	SW6	WSW4	SSW6	SSW6	SSW7	SSW7	W9	SW8	SW11	W9WSW11	WSW11	WSW8	WNW9	W7	NW8	WSW4	WSW2	NW5	NW3	WNW4	WNW6	WSW5.5	WSW11	
2-May	NW4	NW5	NW5	NW4	NW2	N2	N6	NNE7	NNE9	NE9	NNE10	N7	ENE7	NNW9	NNW8	N7	N7	NNE8	NNE8	N8	NNW12	NNE6	NNE7	NNE7	N6.1	NNW12
3-May	NNE5	N4	NNW3	NNW4	N4	NNW5	NW6	W4	NW7	NNW7	NW10	N7	E8	NE8	NE9	NE8	NE10	NNE11	NNE7	NNE4	E3	NE3	NNE4	N3	N4.7	NNE11
4-May	NNW3	NNW3	NNW2	N4	N5	NNE3	N4	NNE4	E6	S5	ESE7	ENE3	ESE6	ESE7	E5	ESE6	E7	NE5	E8	ENE6	NE7	NE8	NE7	NNE7	ENE3.7	E8
5-May	NNE7	NNE5	NNE5	NNE5	NE5	NNE8	N8	NNE7	NNE9	NNE8	NNE10	NNE11	NNE9	NE9	NE7	ENE7	ENE6	AF	AF	ENE0	AF	AF	N5	N6	NNE6.5	NNE11
6-May	N8	N7	N6	NNE8	NNE8	N10	N9	N8	N9	NNE9	NNE9	NE9	NE8	ENE10	ENE8	E9	E10	ESE8	ESE10	ESE3	NNW1	W3	WNW4	WNW2	NE5.3	ESE10
7-May	WNW2	WSW3	WSW2	SSW2	SW3	SSW2	S4	SSE6	S8	S6	SSE8	E9	E8	E8	ESE8	ESE9	E8	ESE6	E8	ESE6	NE3	SSW2	SW3	SE3.4	E9	
8-May	NW2	NW3	NW2	W2	WNW3	NW3	S3	S6	SSE7	S6	S7	SSE10	SSE6	SSW3	N6	NNW14	NNW12	NE6	NE7	NE6	SE5	SE5	S3	NNW4	ESE0.4	NNW14
9-May	NNW5	N4	NNW1	N3	AF	N4	NNE2	E3	SE4	SSE8	SSE7	SSW6	S7	SW6	SSE9	SSE8	SSE7	SSE7	S6	SSW5	S2	W2	NW1	NNW3	S2.4	SSE9
10-May	WNW4	NNW4	NNE6	NNE4	NNW3	NNW3	N3	E4	E4	ESE5	ESE5	E6	SE3	ESE7	SE7	S6	SSW6	SW5	SSW3	WSW1	SW1	SW2	SW3	SSW3	SE1.1	ESE7
11-May	SSW4	SSW2	SSW2	SW2	W3	SSW5	S6	S9	SSW8	S10	WSW4	WSW3	SSW9	SSW8	S10	SSE9	ESE7	ESE7	ESE2	S2	N3	NNE4	N3	NE4	S3.3	S10
12-May	NNE4	NNE5	NNW2	NW3	NW3	WNW2	ESE1	SSE3	S4	SSE4	SSW2	SW4	SSW3	SSE6	S6	S9	S11	S11	S10	SSE7	SE8	S11	S12	SSE12	S4.3	SSE12
13-May	S11	S11	SSE7	SSE3	S3	S6	S10	S12	SSW13	S14	S11	S11	S12	S16	S15	S14	S14	S12	S11	SSW8	SSW7	S6	SSW7	SSW8	S10.0	S16
14-May	SSW8	SSW5	SSW4	SSW5	SSW6	SSW6	SSW6	S8WSW10	WSW9	SW12WSW11	SSW14	S16	S14	SSW12	SSW12	SSW12	SSW12	SSW12	SSW8	SW8	SW7	SW9	WSW7	SSW8.7	S16	
15-May	WSW6	SW5	S3	WSW2	SSW4	SSW5	SSW6	SSW4	S8	SSE13	SSW9WSW10	WSW10	WNW9	WSW9	W8	WNW7	NNW5	NNE14	N20	NNE17	N19	N19	N17	N20	NW3.0	N20
16-May	NNE16	N13	NNE18	NNE15	NNE14	NNE15	NNE13	NNE15	NE12	NNE13	NNE13	NNE13	NNE12	ENE12	NE11	E12	NE10	ENE9	ENE8	NE6	NNE5	N4	N4	NW3	NNE10.4	NNE18
17-May	WNW3	WNW3	WNW3	W3	W3	WSW1	SSE6	S12	S14	S12	S12	SSE12	S13	S12	SSE12	SSE11	SSE12	SSE9	S10	S6	S4	S4	S4	S5	S6.9	S14
18-May	S4	SSW3	NW1	W3	SSW3	SSW5	S8	SSW9	S9	SSW8	SW10	SW9	SW9	SSW12	SSW10	SSW8	S8	SSW9	S8	SSW6	SW5	WSW4	SSW3	SSE2	SSW6.2	SSW12
19-May	WSW2	SW3	SSW4	SSW4	SSW3	SSW6	S8	S9	SW8	WSW8	SW8	SSW5	S12	SSE12	S11	SSE10	S11	S10	S8	S5	SW4	W3	W2	WSW2	SSW5.9	SSE12
20-May	SW3	SSW4	SW3	SW3	SSW4	SSW5	S6	SSE10	S10	SSE11	S10	SSW10	SSW12	S10	SSW9	S8	SSE6	S6	S6	SSE3	W2	WSW2	W3	WSW3	S5.5	SSW12
21-May	W3	SW4	WSW3	W3	WSW3	S5	S6	S9	S11	SSE10	SSE10	S12	S13	SW10	SSW7	WSW6	SW4	WSW3	SW3	SSW2	WSW4	SW4	WNW1	WSW2	SSW4.8	S13
22-May	WSW3	SW2	WSW3	SSW3	S2	WSW3	S3	SSE5	S4	E6	ENE7	NNE12	NNE12	NNE11	NNE10	NNE12	NNE12	NNE11	NNE12	NE7	NE6	N5	N7	N6	NNE4.5	NNE12
23-May	N6	N5	N7	N6	N5	N5	NNE6	NNE6	NNE6	ENE7	E8	E8	E6	ESE8	ESE6	E7	ESE6	ESE5	ESE4	E3	NNE3	NNW2	NNW3	NNW3	NE3.7	E8
24-May	NNW3	NW2	WNW3	WNW2	SW4	S3	SSE2	SE4	SE3	S6	SSE5	S6	SSE7	E7	ESE6	ENE6	E6	SE4	E3	E4	NW1	WNW3	NNW3	NW2	SE1.6	SSE7
25-May	NW2	WNW3	WSW3	WSW2	SW1	SSW3	SSW5	SSW6	SSE7	SSE8	S9	S6	ENE4	SSE5	S5	SSW9	NNW8	NNW9	NW4	N8	N11	N12	N14	N11	NW0.6	N14
26-May	N8	NNE6	NNE4	N6	N7	N7	N8	NNE6	NNE8	NNE8	NE10	ENE9	ENE7	NE6	ENE6	ENE6	ESE8	E8	E6	ENE5	NE4	NE3	NW2	WNW3	NE5.3	NE10
27-May	NNW3	SSW1	SW4	W2	WNW4	NW2	NNE2	S4	SSE6	SE4	NE4	NNE5	N7	NNE10	NNE18	N12	N11	N8	N8	NNE13	NNE15	NNE13	NNE13	N12	NNE5.8	NNE18
28-May	N10	N10	N8	NNE9	NNE9	NNE9	NNE9	NNE12	NNE11	NNE10	NNE11	NE10	NE10	NE9	NE8	NE8	NE8	NNE8	NNE9	N7	NNW5	N3	SW2	W3	NNE7.6	NNE12
29-May	WNW3	WSW3	WNW3	WNW4	NW2	NW2	SSW2	SSE7	SSE10	SSE11	SE9	SSE7	S6	SSE6	SSE8	S9	S9	S8	S7	SSW6	SSW4	SSW5	SSW5	S12	S4.8	S12
30-May	SSW14	S6	NNE2	WNW3	WSW3	SSW4	S7	SSE8	SSW8	S8	SSE10	S12	S13	S10	SSE11	SSE11	S11	S11	S11	SSE8	SSE6	S6	SSW8	SSW8	S7.8	SSW14
31-May	SSW7	S6	S4	SSE4	SSE4	S2	S6	S8	S9	SSW7	SSW12	S4	SSW8	SSW10	S11	S10	S9	S10	S7	S10	S7	SSW4	WSW1	WNW5	S6.5	SSW12

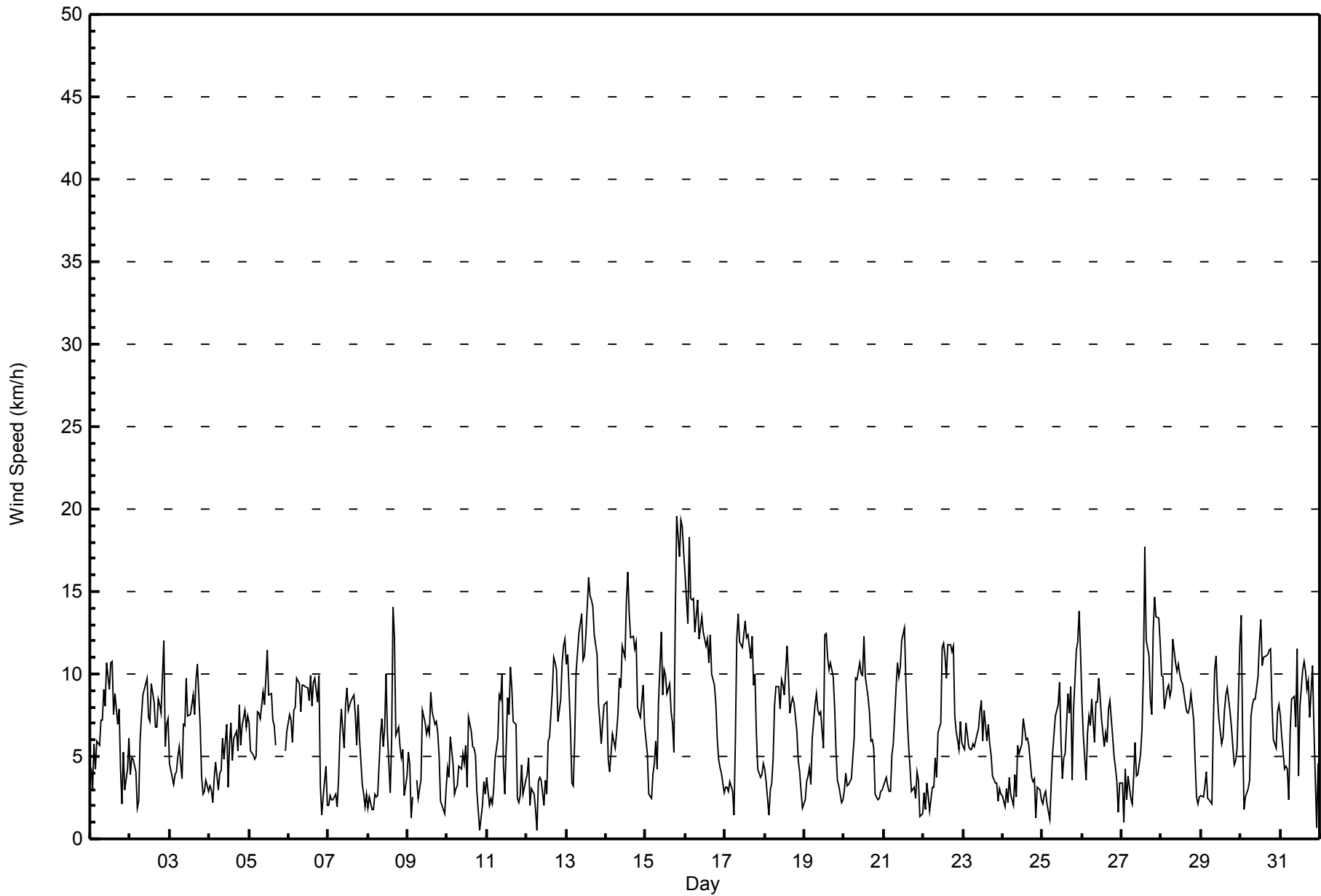
NW1.5	NW1.1	NW1.4	NW1.7	NW1.1	NW0.6	SSE0.9	SSE2.8	S2.9	SSE3.3	SSE2.6	SSE1.7	SSE3.1	SSE3.2	SE3.2	SE2.9	SE2.6	SE2.2	SE2.4	E1.2	NNE1.1	N1.2	NNW1.4	NW1.5	Diurnal Average
NNE16	N13	NNE18	NNE15	NNE14	NNE15	NNE13	NNE15	S14	S14	NNE13	NNE13	SSW14	S16	NNE18	S14	S14	S12	NNE14	N20	NNE17	N19	N19	N17	Diurnal Maximum

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	293	39.65	39.65
6 - 11	367	49.66	89.31
12 - 19	78	10.55	99.86
20 - 28	1	0.14	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 739

Total Number of Hours: 744



WBEA
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	20	21	7	5	8	7	8	11	25	45	22	29	15	22	25	23	293
6 - 11	37	44	27	16	21	18	3	40	78	40	13	13	4	4	4	5	367
12 - 19	8	24	1	1	1	0	0	6	22	11	1	0	0	0	0	3	78
20 - 28	1	0	0	0	0	0	0	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	66	89	35	22	30	25	11	57	125	96	36	42	19	26	29	31	739

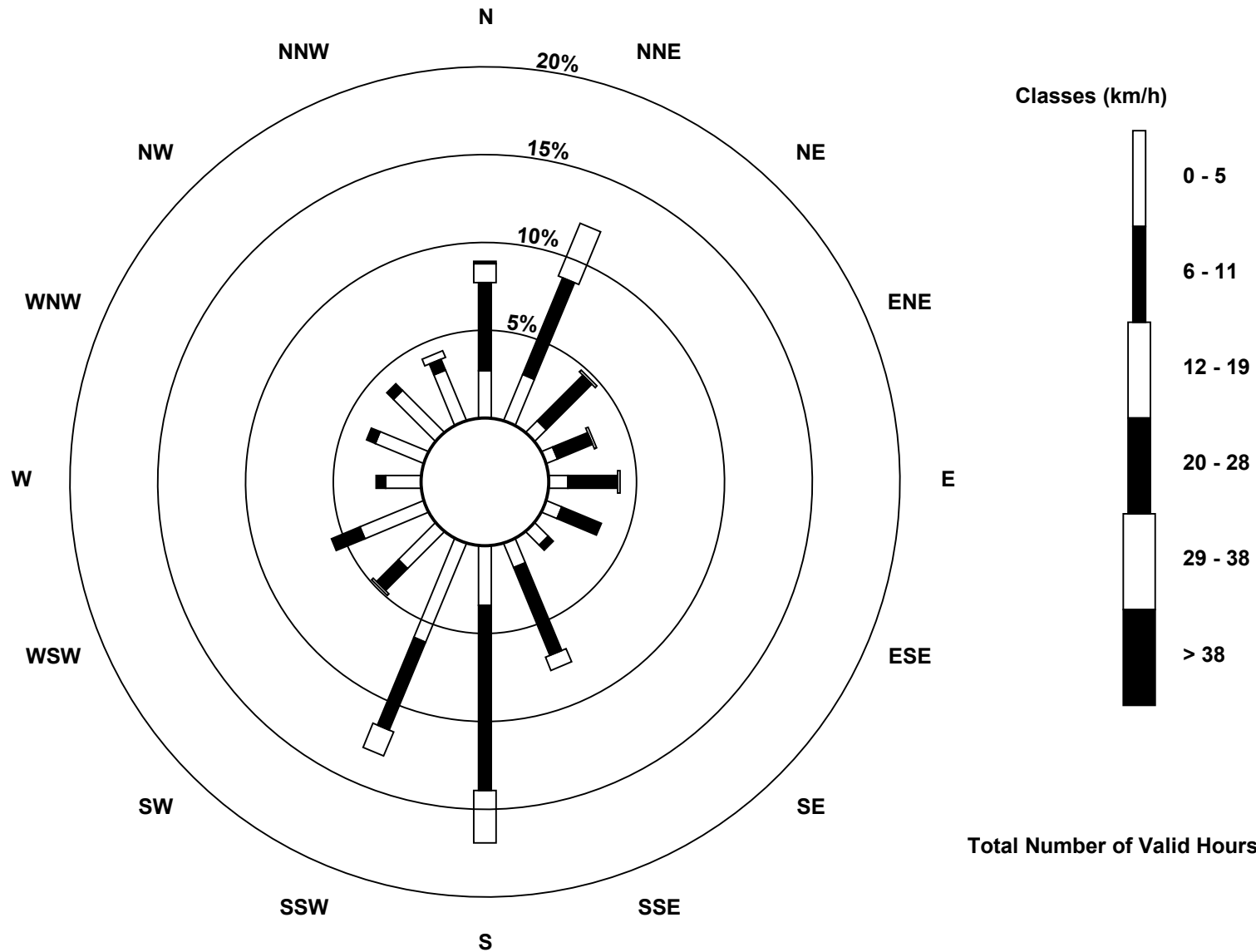
Total Number of Valid Hours: 739

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Fort McKay - Bertha Ganter - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on May 15 20:00																	Hours in Service: 744 Hours of Data: 739 Hours of Missing Data: 5 Hours of Calibration: 0 Percent Operational Time: 99.3								
Minimum Value: 0 km/h on May 7 03:00																									
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-May	2	1	2	1	2	2	2	2	4	3	4	3	5	4	4	5	4	3	4	2	3	2	1	2	5
2-May	2	2	2	1	1	1	3	3	3	4	4	2	3	5	3	4	4	4	3	5	5	2	2	3	5
3-May	2	1	1	1	1	1	2	2	3	2	4	3	3	4	4	3	4	4	3	2	1	1	1	1	4
4-May	1	1	1	1	1	1	1	2	2	3	3	3	4	3	3	3	3	2	3	2	3	3	3	2	4
5-May	2	2	2	2	2	3	3	2	3	3	4	4	4	4	3	3	2	AF	AF	1	AF	AF	2	2	4
6-May	2	2	1	2	2	2	3	2	3	3	3	4	3	5	3	4	4	3	3	1	1	1	1	2	5
7-May	1	1	0	1	1	1	1	2	3	2	2	3	3	3	4	4	3	3	2	1	1	1	1	1	4
8-May	1	1	1	1	1	1	2	2	2	2	3	3	3	2	6	4	4	3	3	2	1	2	3	1	6
9-May	1	1	2	1	AF	1	1	1	1	2	3	2	3	3	3	3	3	2	2	2	1	1	1	1	3
10-May	1	1	2	1	1	1	1	2	2	2	2	2	3	3	3	3	3	2	2	1	1	1	1	1	3
11-May	1	1	1	1	1	1	1	2	2	3	3	2	4	4	3	4	3	3	2	1	2	1	1	1	4
12-May	1	1	1	1	1	1	1	2	2	2	2	2	3	4	4	4	4	3	3	2	4	3	3	2	4
13-May	3	2	2	1	1	1	2	3	3	3	4	3	5	5	5	4	4	3	3	2	2	1	1	1	5
14-May	1	2	1	1	2	2	1	2	3	4	4	5	5	4	5	4	4	4	3	3	2	2	3	3	5
15-May	2	1	1	1	1	2	2	2	3	2	5	5	5	4	4	4	4	5	6	8	6	7	7	7	8
16-May	6	6	7	6	5	6	5	6	5	5	5	5	5	5	5	5	4	4	4	3	2	1	1	1	7
17-May	1	1	1	1	1	1	2	3	3	3	4	4	4	4	3	3	3	2	3	2	1	1	1	1	4
18-May	1	1	1	1	1	2	2	2	2	3	4	4	4	4	4	3	4	3	2	1	1	1	1	1	4
19-May	1	1	1	1	1	1	1	2	3	3	3	4	4	3	3	3	3	3	2	1	1	1	1	1	4
20-May	1	2	1	1	1	1	1	2	1	2	3	4	4	4	4	4	3	3	2	1	2	1	1	1	4
21-May	1	1	1	1	1	2	1	2	2	2	2	5	4	4	5	3	3	3	2	1	1	1	2	1	5
22-May	1	1	1	2	1	2	1	1	1	2	3	5	5	5	5	5	5	5	4	3	3	2	2	2	5
23-May	1	1	2	1	1	2	2	2	2	3	3	3	3	3	3	3	2	2	2	1	0	1	1	1	3
24-May	1	1	1	1	1	1	1	1	1	2	2	2	2	3	4	3	2	2	1	1	1	1	1	2	4
25-May	2	1	1	1	1	1	1	2	1	2	2	3	3	2	2	2	8	5	2	2	4	4	5	5	8
26-May	3	3	1	2	2	2	3	3	3	4	4	4	4	3	3	3	3	3	2	3	2	1	2	1	4
27-May	1	1	1	1	1	1	1	2	2	2	2	3	2	5	7	5	4	3	3	7	6	5	5	5	7
28-May	3	4	3	3	4	4	4	5	4	4	4	4	4	4	4	4	4	3	3	3	1	1	1	1	5
29-May	1	2	1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	2	2	2	1	1	1	4	4
30-May	3	3	1	1	1	1	2	2	3	2	3	4	4	4	4	4	4	3	3	2	2	1	2	2	4
31-May	2	1	1	1	1	2	3	3	3	3	4	2	3	2	3	3	3	2	4	3	2	2	1	3	4
																	Diurnal Maximum								
AF - Analyzer Failure																									



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

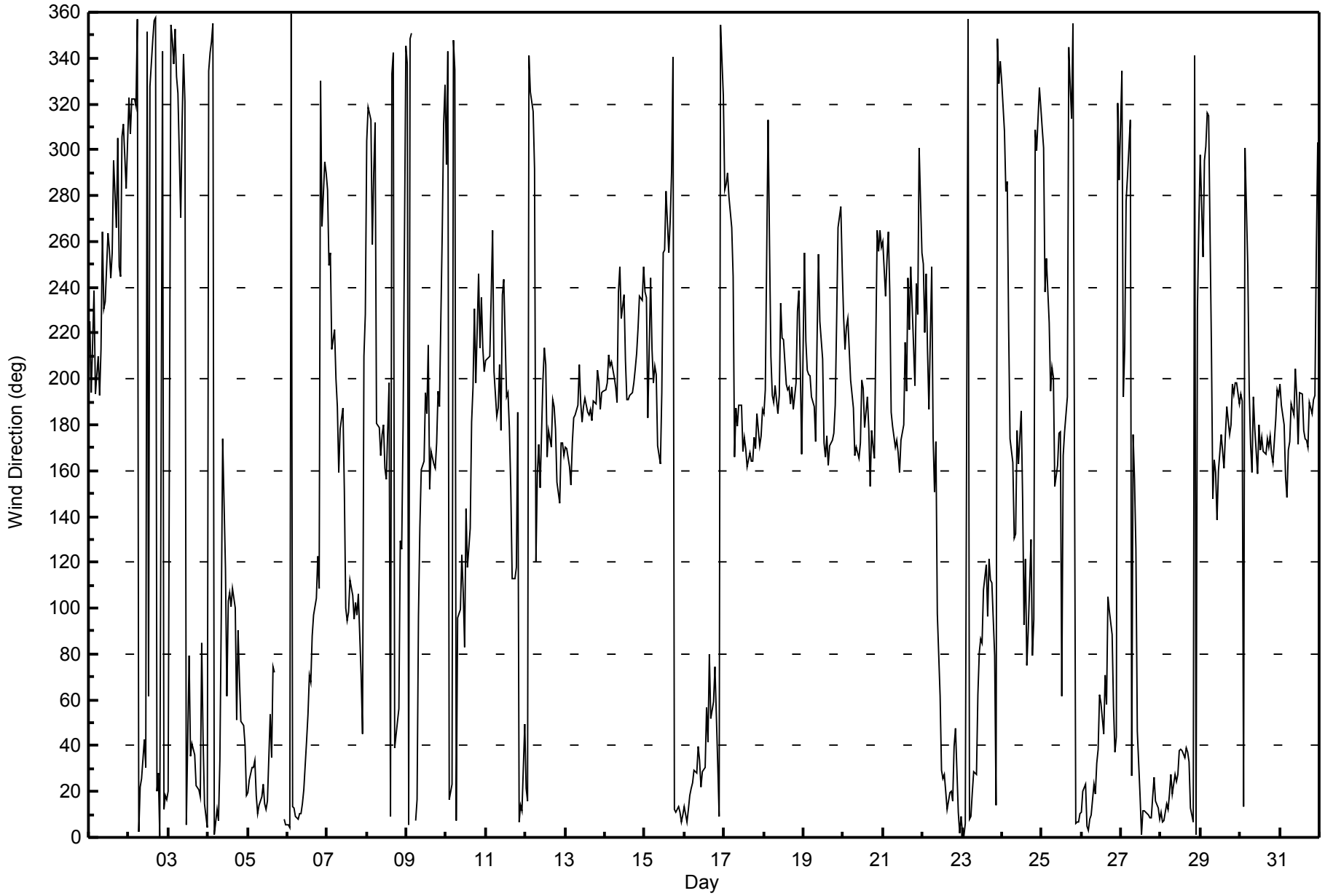
Fort McKay - Bertha Ganter - May 2015

Direction of Maximum Speed: 11 deg on May 15 20:00																				Hours in Service: 744							
Direction of Maximum Daily Speed Average: 31.3 deg on May 16																				Hours of Data: 739							
Direction of Minimum Speed: 68 deg on May 5 20:00										Direction of Minimum Daily Speed Average: 0.4 deg on May 8										Hours of Missing Data: 5							
Monthly Average Direction: 223.7 deg																								Percent Operational Time: 99.3			
Day	Hourly Period Ending At (MST)																								Daily Average		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	225	194	215	239	193	210	193	213	264	231	234	264	256	244	255	295	266	305	249	245	306	311	283	303	250.2		
2-May	323	307	322	322	319	357	2	22	25	43	30	351	61	328	348	356	357	20	28	1	343	12	18	16	4.4		
3-May	20	354	348	337	352	332	325	270	312	342	321	6	79	35	41	38	36	23	21	18	85	43	15	4	9.2		
4-May	335	342	347	355	1	12	8	33	97	174	117	61	103	107	101	109	100	51	90	69	50	49	40	19	64.1		
5-May	19	25	30	30	34	19	10	14	18	23	15	12	16	53	35	75	72	AF	AF	68	AF	AF	8	5	25.3		
6-May	6	4	359	13	13	9	8	11	11	14	21	42	54	71	68	88	97	105	122	109	330	266	295	290	36.5		
7-May	282	250	255	213	222	200	188	160	178	188	151	100	95	98	112	105	95	103	97	106	71	45	210	228	128.1		
8-May	304	319	313	259	290	312	181	179	166	176	180	161	156	198	9	333	343	39	50	56	129	126	179	345	106.4		
9-May	337	6	348	351	AF	7	16	97	136	160	164	194	185	215	152	168	163	161	172	195	188	264	311	328	171.8		
10-May	293	343	17	23	348	335	7	96	99	123	107	83	143	117	135	181	196	231	198	246	214	235	214	203	127.4		
11-May	208	209	210	236	265	203	183	187	206	178	237	243	192	194	178	153	113	113	118	186	7	14	11	50	180.8		
12-May	21	16	341	325	317	292	120	159	171	152	200	214	206	166	178	170	191	188	178	155	146	172	172	167	174.2		
13-May	170	169	161	154	172	183	184	188	207	190	181	188	191	186	184	187	182	190	189	204	199	187	194	194	186.3		
14-May	195	198	211	206	207	201	196	190	238	249	226	237	208	191	191	193	194	198	205	211	222	236	235	249	210.6		
15-May	238	236	183	244	213	198	206	202	171	163	194	255	256	282	255	269	291	340	12	11	13	11	7	10	315.0		
16-May	13	7	12	18	21	24	29	28	40	33	22	28	30	57	42	80	52	59	75	53	32	9	355	323	31.3		
17-May	283	285	290	280	266	245	166	187	179	188	189	168	174	170	162	168	164	164	174	170	185	171	175	187	180.0		
18-May	185	195	313	259	210	193	190	197	185	193	233	218	217	198	195	197	189	196	187	198	229	239	206	167	202.4		
19-May	255	216	204	202	201	192	188	173	216	254	225	209	172	166	175	162	171	173	176	189	225	266	275	248	191.8		
20-May	227	213	223	226	199	194	187	167	170	166	172	200	196	179	192	178	153	178	171	166	265	256	265	258	187.8		
21-May	260	236	252	264	238	186	179	170	173	168	159	174	180	216	195	244	221	249	215	197	241	228	301	255	197.4		
22-May	250	220	246	212	187	249	174	151	172	98	62	29	25	28	20	12	19	20	16	40	48	11	2	9	27.2		
23-May	2	0	6	357	8	9	19	29	27	62	81	87	85	108	119	97	122	112	111	79	14	348	329	339	52.7		
24-May	330	308	282	286	222	174	163	130	132	177	163	186	148	93	121	75	90	130	79	95	309	300	327	318	135.1		
25-May	310	301	238	252	225	195	205	201	153	162	176	177	62	167	177	192	345	328	314	355	6	6	7	10	324.7		
26-May	11	20	23	5	3	8	9	23	19	32	38	63	59	45	71	58	105	99	88	57	37	44	320	287	38.9		
27-May	334	192	214	278	289	313	27	175	156	126	46	18	1	12	12	11	9	8	8	18	26	16	13	8	12.6		
28-May	11	7	7	14	12	19	28	19	28	24	28	38	38	38	35	39	37	33	13	7	341	1	231	268	21.4		
29-May	298	253	296	302	316	315	213	148	165	159	138	160	176	168	161	176	188	176	180	198	193	198	198	189	180.2		
30-May	194	190	14	301	249	195	172	159	192	178	158	180	169	174	168	167	174	170	175	167	164	182	195	193	177.6		
31-May	197	188	180	157	148	169	173	189	184	204	192	172	194	193	178	174	173	170	190	185	191	193	255	303	184.9		
307.4	309.5	322.3	324.9	316.4	310.6	167.4	159.2	169.0	160.1	159.2	154.0	155.9	151.4	144.5	141.4	134.1	131.8	130.8	94.7	17.5	358.4	330.9	324.3				
Diurnal Average																											
AF - Analyzer Failure																											
All monthly, daily, and diurnal averages have been calculated using vector methods																											



WBEA
Hourly Averages

Wind Direction (WD) - deg
Fort McKay - Bertha Ganter - May 2015





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Fort McKay - Bertha Ganter - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 103 deg on May 12 07:00			Hours of Data:	739
Minimum Value: 9 deg on May 19 22:00			Hours of Missing Data:	5
			Hours of Calibration:	0
			Percent Operational Time:	99.3
Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 22 Median = 33 Q ₃ = 47 P ₉₀ = 59 P ₉₉ = 88				

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	30	32	17	34	16	23	14	40	42	44	38	49	46	41	53	52	50	42	76	55	20	60	25	17	76
2-May	50	28	24	29	74	50	21	38	44	46	45	28	55	33	40	51	54	33	36	36	27	29	34	27	74
3-May	32	25	18	17	21	17	27	60	34	40	31	51	45	47	42	51	43	34	36	32	40	41	20	24	60
4-May	17	18	34	24	24	56	28	50	44	74	37	90	71	59	69	64	55	55	30	41	49	51	47	28	90
5-May	29	37	36	37	44	34	31	31	30	35	33	28	44	43	44	37	42	AF	AF	26	AF	AF	22	22	44
6-May	22	22	18	25	23	21	25	24	24	31	31	43	44	40	43	41	38	25	17	20	56	17	9	56	56
7-May	32	15	17	32	31	37	25	18	37	48	30	31	45	38	50	44	45	55	29	19	28	29	67	49	67
8-May	31	37	46	81	25	37	47	28	25	42	34	25	48	82	74	23	24	43	44	40	23	21	79	39	82
9-May	18	22	62	41	AF	18	50	53	48	21	36	56	58	59	37	50	45	24	31	15	24	22	44	42	62
10-May	34	36	29	22	66	27	35	42	58	57	62	51	94	46	53	69	59	47	54	73	80	42	27	15	94
11-May	28	40	25	32	18	18	17	17	31	28	79	87	54	53	31	39	39	34	80	36	56	17	66	33	87
12-May	22	20	52	37	28	46	103	47	54	76	99	78	92	61	73	38	25	21	20	14	16	17	15	14	103
13-May	14	13	18	22	14	13	16	17	23	23	25	32	44	21	22	24	18	22	18	16	19	20	13	14	44
14-May	12	15	23	17	16	20	17	26	33	48	36	43	32	21	29	29	25	22	18	18	20	18	23	37	48
15-May	28	25	54	41	22	36	31	56	29	16	53	47	53	59	50	58	55	65	32	32	31	30	30	29	65
16-May	28	30	30	34	34	35	44	38	44	44	39	43	48	49	50	39	47	48	45	45	39	17	12	35	50
17-May	17	22	22	10	12	52	24	22	22	29	28	31	22	21	16	20	16	21	15	18	17	17	14	18	52
18-May	14	13	56	24	28	17	17	20	24	48	47	36	60	29	43	47	50	35	23	14	16	14	26	59	60
19-May	31	17	12	21	15	16	14	14	42	49	50	73	26	21	28	24	26	20	16	15	24	9	31	29	73
20-May	35	34	25	17	19	14	20	12	13	16	33	34	32	43	38	59	64	48	22	26	26	18	17	35	64
21-May	35	38	19	11	22	16	20	15	15	16	18	36	31	50	64	73	65	70	64	41	18	25	75	78	78
22-May	45	70	52	54	61	33	47	16	36	49	54	40	42	48	51	42	41	38	36	52	49	38	21	25	70
23-May	21	23	23	22	19	28	34	46	46	57	49	40	65	39	56	51	44	56	39	24	18	50	32	15	65
24-May	15	27	23	37	16	35	69	35	76	33	56	39	37	57	66	49	41	56	35	19	72	27	59	61	76
25-May	63	36	44	54	84	40	24	23	17	17	18	53	83	46	50	22	92	28	40	21	27	29	27	31	92
26-May	35	35	31	25	25	25	35	48	40	55	43	54	70	68	59	66	42	38	41	54	42	38	57	30	70
27-May	32	92	17	60	21	41	61	61	32	62	75	63	29	35	32	34	31	32	30	33	41	35	31	31	92
28-May	34	30	32	33	35	43	46	40	45	43	47	47	54	50	55	51	55	44	36	34	16	50	55	45	55
29-May	24	54	37	21	28	19	73	25	22	18	35	44	64	70	42	35	24	26	22	16	20	18	13	17	73
30-May	17	16	71	46	18	27	20	18	31	31	28	32	22	36	30	24	24	24	19	15	18	14	14	17	71
31-May	15	12	12	12	23	48	24	23	25	21	21	29	17	17	20	17	21	19	26	16	39	37	70	36	70
Diurnal Maximum																									

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	May 12, 2015	Last Calibration	April 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	14:10
Gas Cert Reference	SA140071A	Station temp.	21 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26-Sep-17
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
ZAG Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-689	-689
Analyzer IP address	192.168.1.43		Lamp voltage	738	731
Calculated slope	0.978800	0.992526	Chamber temp	43.3	43.2
Calculated intercept	0.782398	2.061264	Pressure	717.3	725.2
Analyzer Background	42.8	42.8	Flow	0.501	0.504
Analyzer Coefficient	0.802	0.802	Intensity	35600	35700

Analyzer make Thermo 43C Analyzer serial # 509110888

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	0.0	----
as found span	5500	78.1	710.0	714.7	0.993
calibrator zero	5500	0.0	0.0	0.0	----
high point	5500	78.1	710.0	714.7	0.993
second point	5500	43.8	398.2	397.4	1.002
third point	5500	21.9	199.1	196.7	1.012
as left zero	5500	0.0	0.0	0.7	----
as left span	5500	78.1	710.0	714.5	0.994
Average Correction Factor					1.003

Corrected As found 714.7 Previous response 724.6 % change 1.4%

Notes:

No adjustments or maintenance performed.

Calibration Performed By:

Michael Martineau



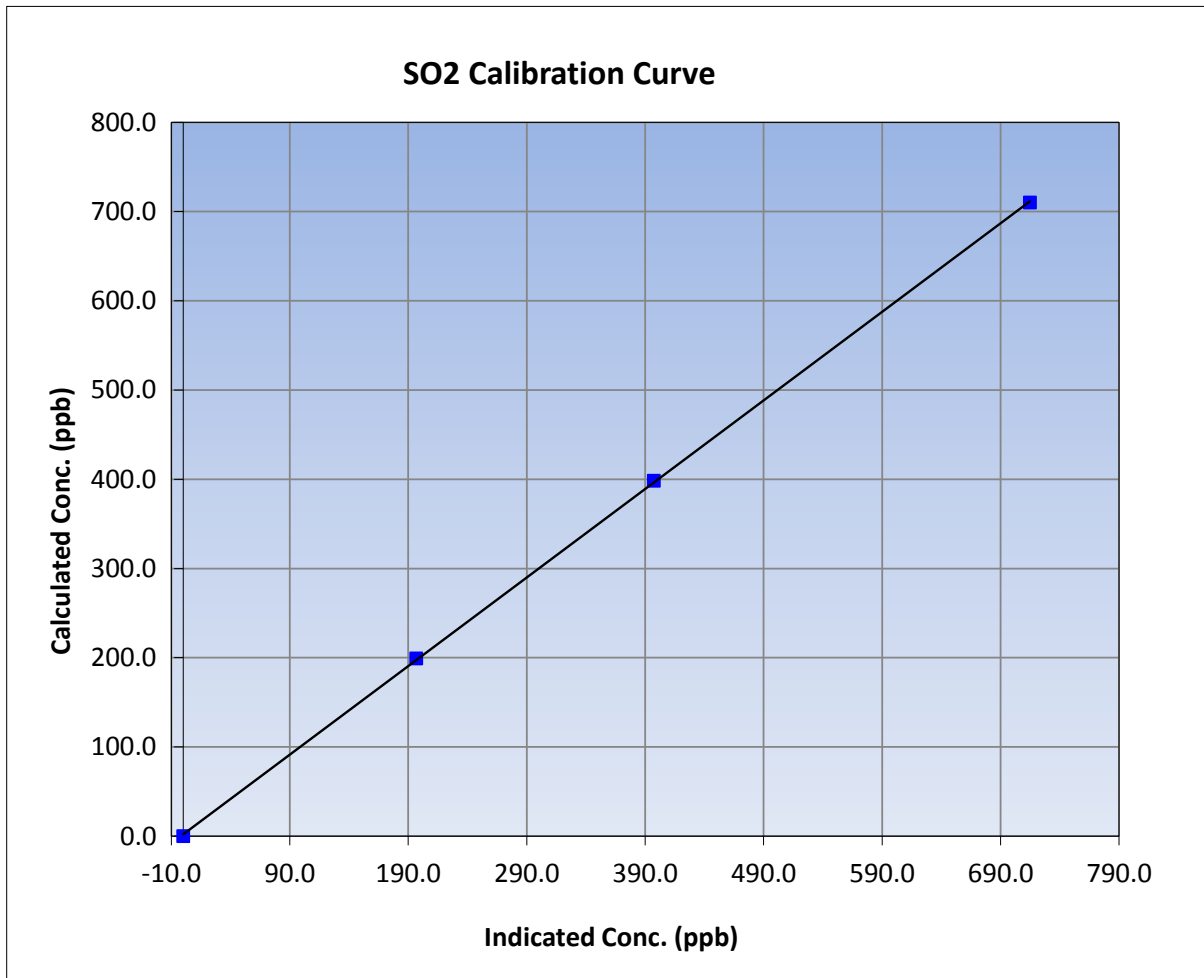
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 12, 2015	Previous Calibration	April 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	14:10
Analyzer make	Thermo 43C	Analyzer serial #	509110888

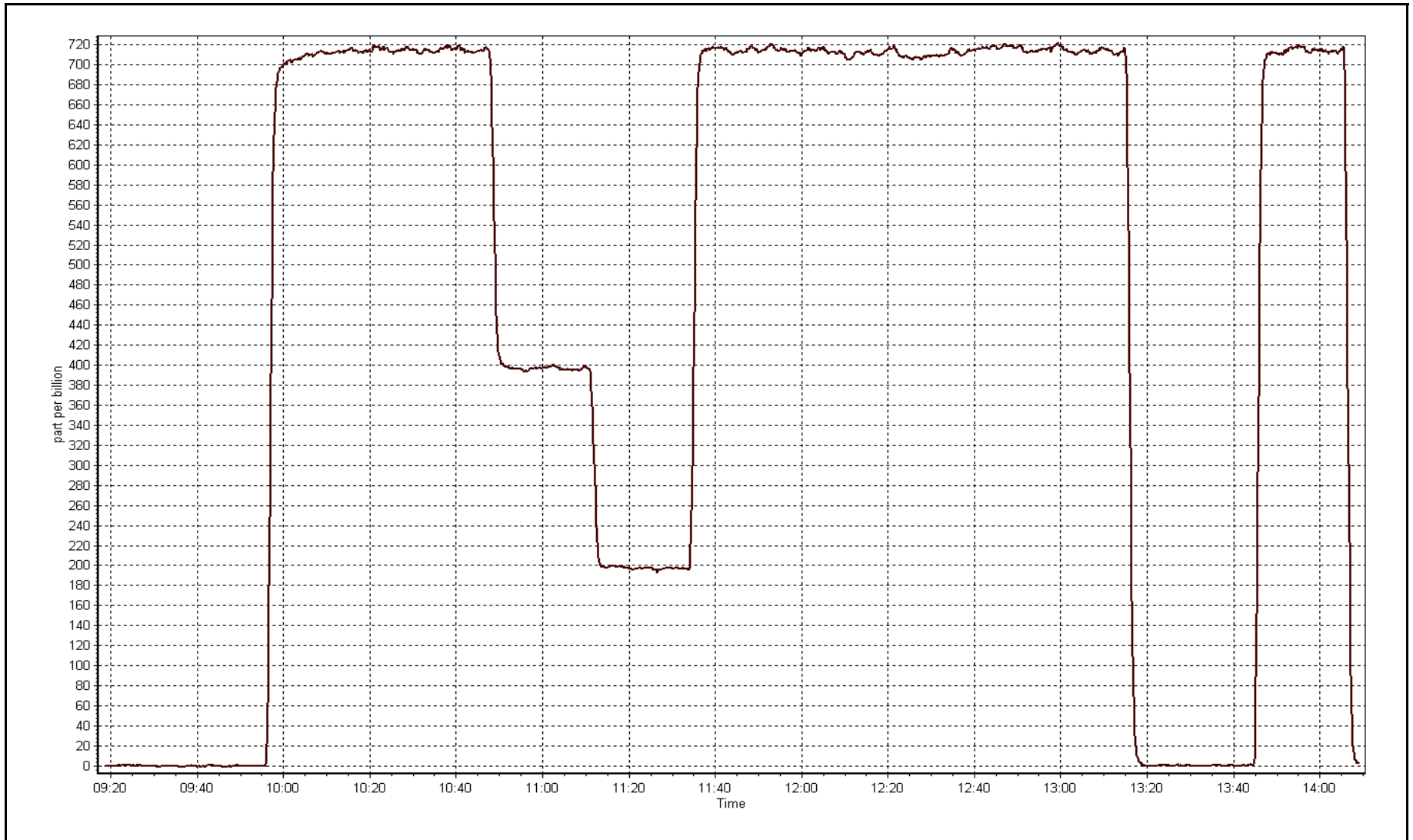
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999955
710.0	714.7	0.9934		
398.2	397.4	1.0020	Slope	0.992526
199.1	196.7	1.0121		
			Intercept	2.061264



SO2 Calibration Plot

Date: May 12, 2015





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	May 19, 2015	Last Calibration	April 20, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	13:00
Gas Cert Reference	LL27480	Station temp.	21 Deg C
Cal Gas Concentration	10.6 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
Dil air Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
SO2 gas concentration	50 ppm	SO2 gas cert/exp	SA140071A 26/Sep/17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-859	-859
Analyzer IP address	192.168.1.42		Lamp voltage	1167	1164
Calculated slope	1.006947	1.014866	Chamber temp	45	45
Calculated intercept	0.009589	0.208176	Pressure	666.9	674.8
Analyzer Background	1.63	1.63	Flow	0.410	0.415
Analyzer Coefficient	0.976	0.976	Intensity	80	80
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153461	
Converter make/model	CDN-101		Converter serial #	305	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6500	0.0	0.0	-0.1	----
as found span	6500	46.0	75.0	73.8	1.017
SO2 scrubber check	5500	21.9	199.1	0.4	----
calibrator zero	6500	0.0	0.0	-0.1	----
high point	6500	46.0	75.0	73.8	1.017
second point	6500	24.6	40.1	39.4	1.019
third point	6500	12.3	20.1	19.3	1.037
as left zero	6500	0.0	0.0	0.1	----
as left span	6500	46.0	75.0	74.0	1.014
Average Correction Factor					1.025

Corrected As found	73.8	Previous response	74.5	% change	0.9%
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Notes:

scrubber check done between as found zero and span.

Calibration Performed By:

Michael Martineau



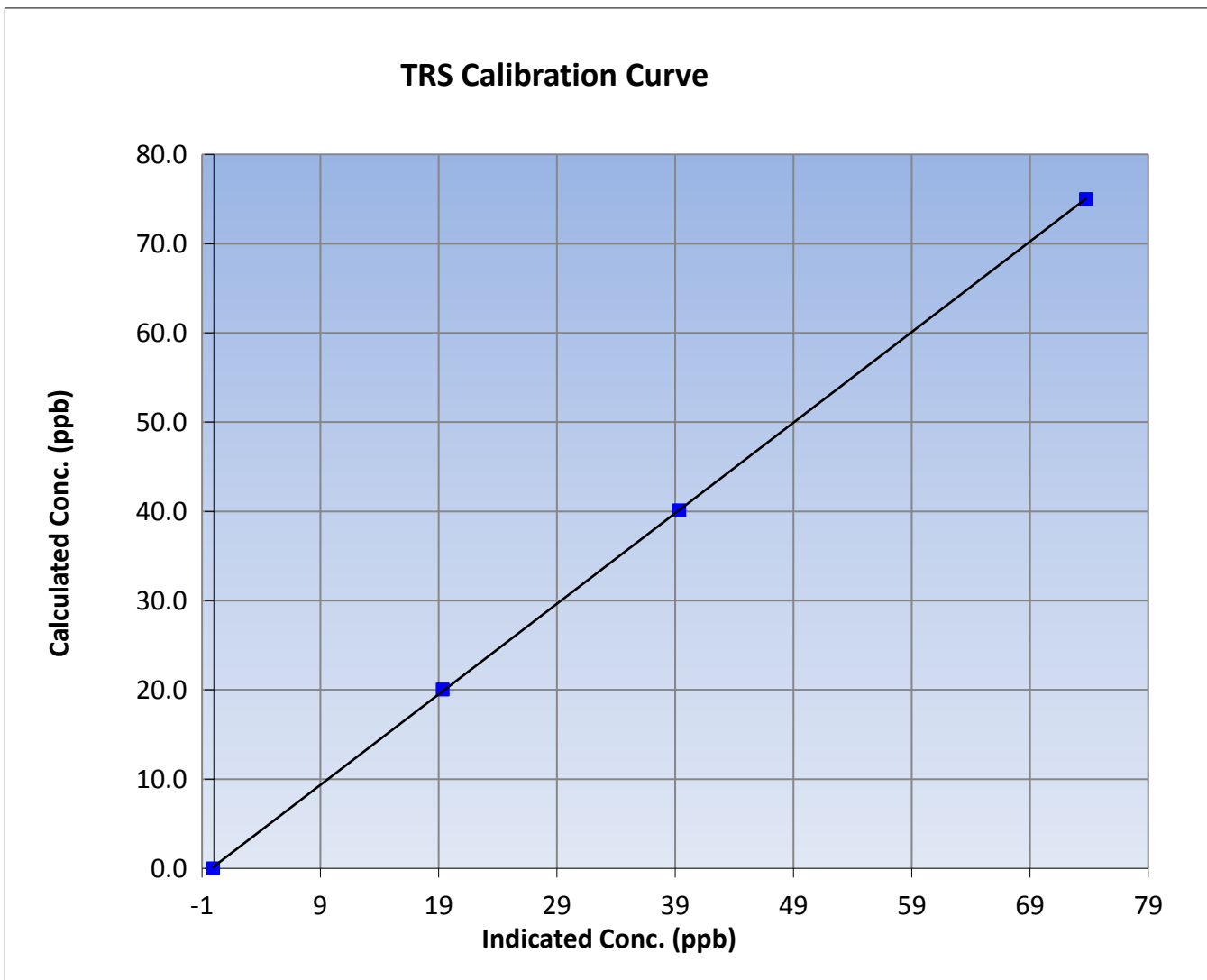
Wood Buffalo Environmental Association TRS Calibration Report

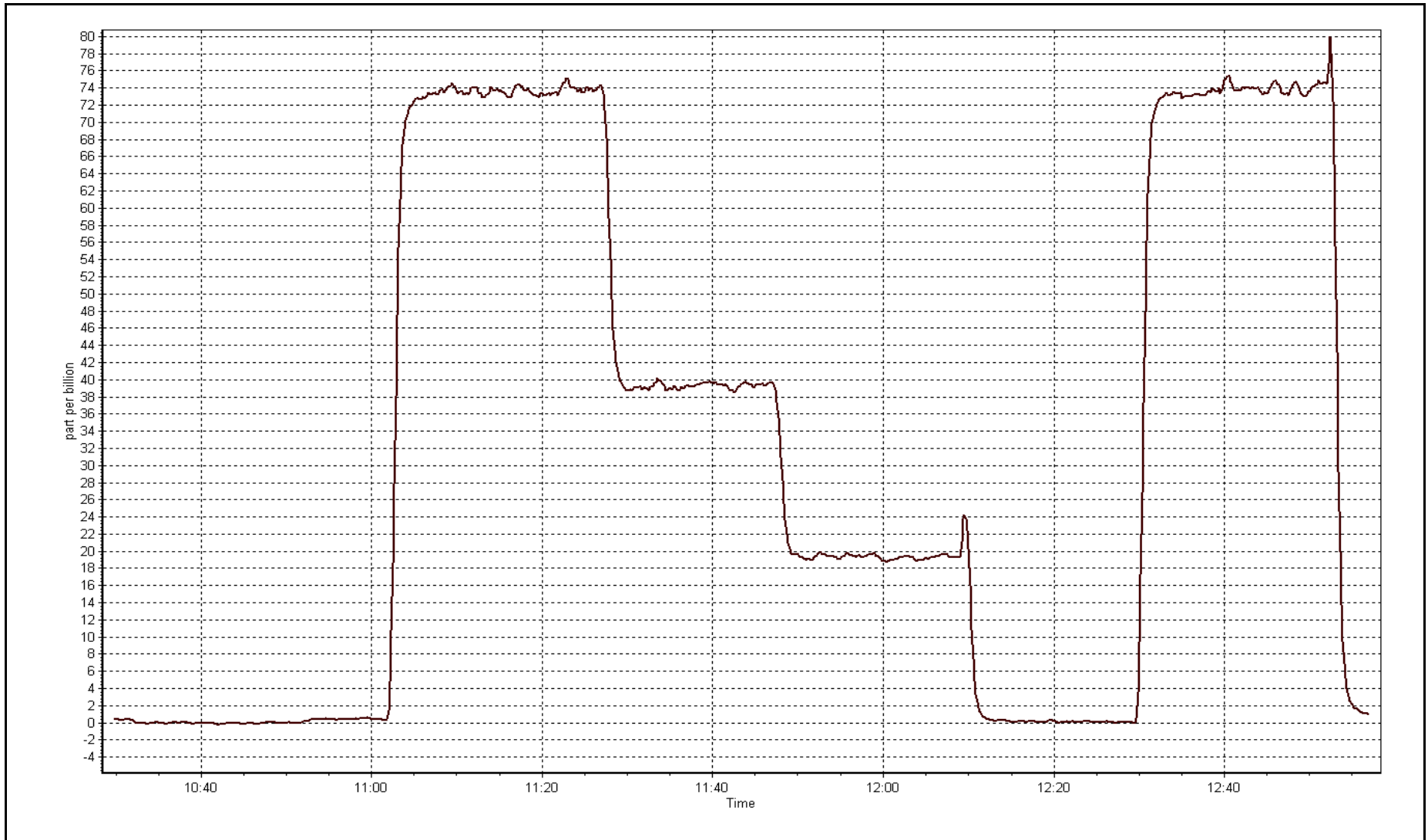
Station Information

Calibration Date	May 19, 2015	Previous Calibration	April 20, 2015
Station Name	AMS 1	Station Number	AMS 1
Start Time (MST)	10:30	End Time (MST)	13:00
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999976
75.0	73.8	1.0172		
40.1	39.4	1.0192	Slope	1.014866
20.1	19.3	1.0371		
			Intercept	0.208176







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	May-12-15	Last Calibration	April-13-15
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	14:10
Gas Cert Reference	SA140071A	Cal Gas Expiry Date	September-26-17
CH4 Cal Gas Conc.	499.0 ppm	CH4 Equiv Conc.	1054.5 ppm
C3H8 Cal Gas Conc.	202.0 ppm	Station temp.	Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	74.8	75.0
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.995876	0.995995	Carrier Pressure	40.4	40.4
THC Calc intercept	0.026031	0.067537	Fuel Pressure	42.2	42.2
NMHC Calc slope	1.006363	1.000677	Air Pressure	32.2	32.3
NMHC Calc intercept	0.000497	0.026011			

Analyzer make Thermo 55i Analyzer serial # 1331259520

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	----
as found span	5500	78.1	14.97	15.02	0.997
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	14.97	15.02	0.997
second point	5500	43.8	8.40	8.29	1.013
third point	5500	21.9	4.20	4.10	1.024
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	78.1	14.97	14.91	1.004
Average Correction Factor					1.011

Corrected As found 15.02 Previous response 15.01 % change -0.1%

Notes:

No adjustments or maintenance performed.

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	5500	0	0.00	0.00	----
as found span	5500	78.1	7.89	7.88	1.001
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	7.89	7.88	1.001
second point	5500	43.8	4.42	4.36	1.015
third point	5500	21.9	2.21	2.17	1.019
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	78.1	7.89	7.81	1.010
Average Correction Factor					1.012

Corrected As found 7.88 Previous response 7.84 % change -0.5%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	78.1	7.09	7.14	0.992
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	7.09	7.14	0.992
second point	5500	43.8	3.97	3.93	1.011
third point	5500	21.9	1.99	1.94	1.024
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	78.1	7.09	7.10	0.998
Average Correction Factor					

Corrected As found 7.14 Previous response 7.17 % change 0.5%



Wood Buffalo Environmental Association

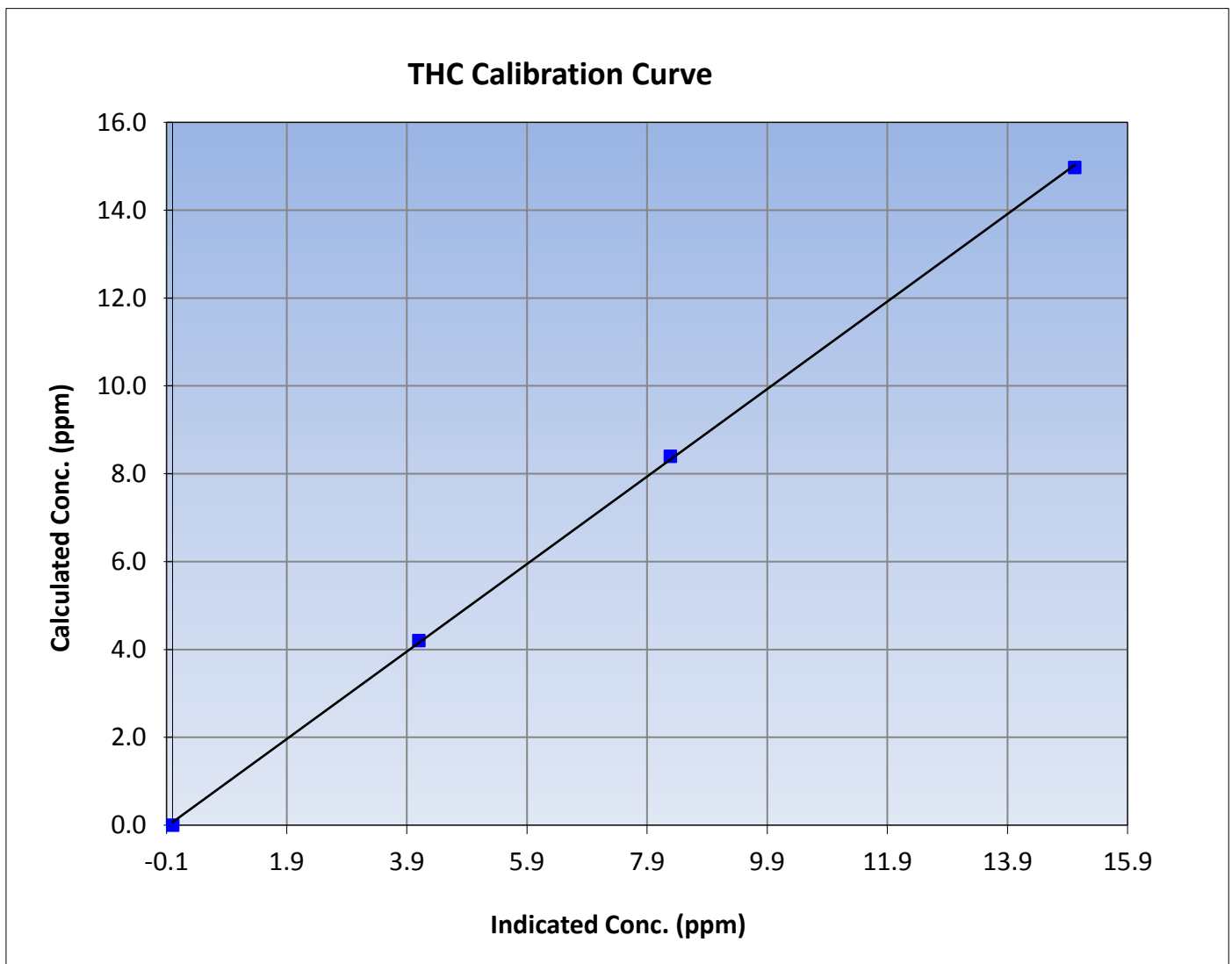
THC Calibration Summary

Station Information

Calibration Date	May 12, 2015	Previous Calibration	April 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	14:10
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999877
14.97	15.02	0.9969		
8.40	8.29	1.0130	Slope	0.995995
4.20	4.10	1.0241		
			Intercept	0.067537





Wood Buffalo Environmental Association

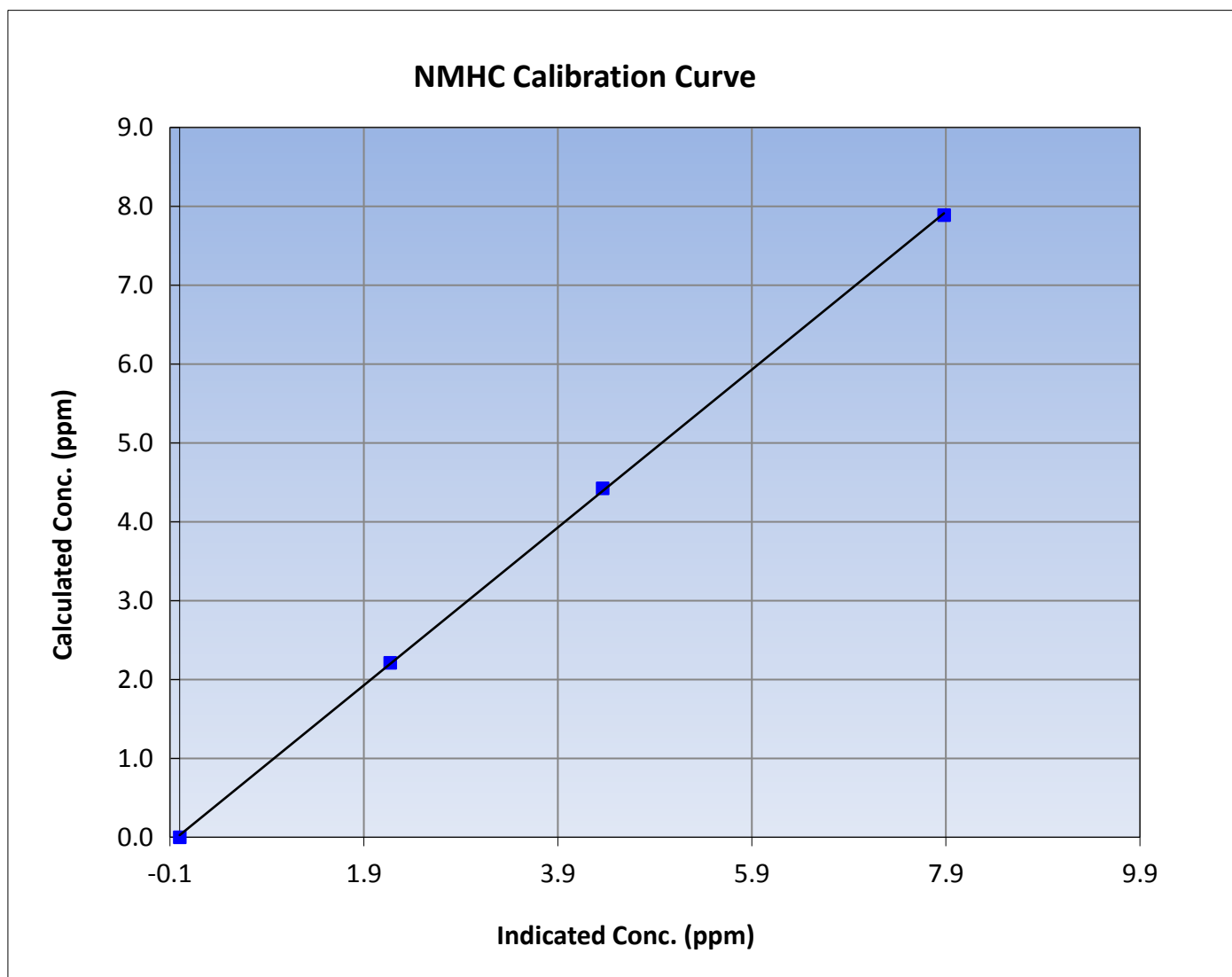
NMHC Calibration Summary

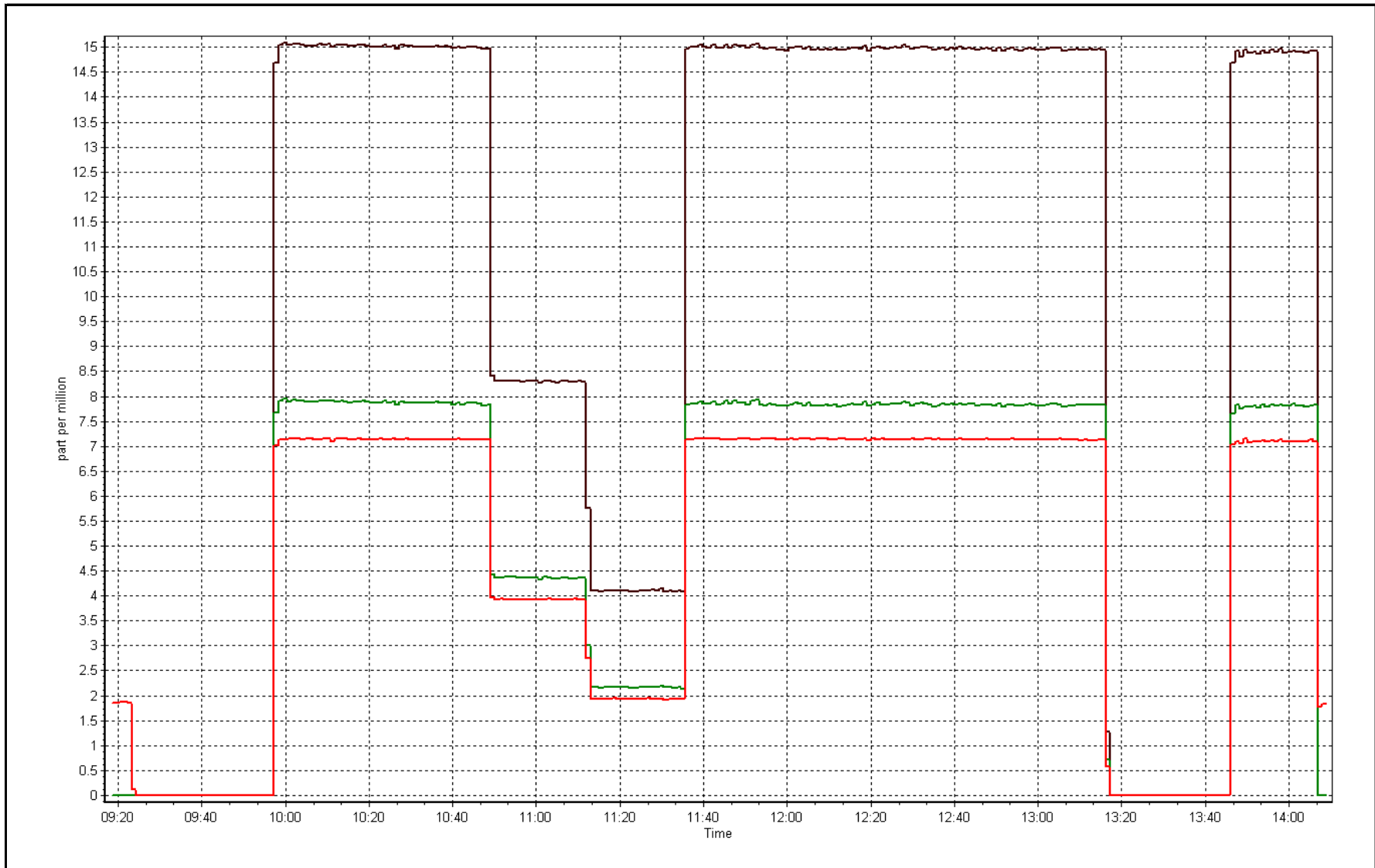
Station Information

Calibration Date	May 12, 2015	Previous Calibration	April 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	14:10
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999922
7.89	7.88	1.0010		
4.42	4.36	1.0146	Slope	1.000677
2.21	2.17	1.0193		
			Intercept	0.026011







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	May-18-15	Last Calibration	May-12-15
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Other: Pump/actuator replacemnet		
Start Time (MST)	11:30	End Time (MST)	16:30
Gas Cert Reference	SA140071A	Cal Gas Expiry Date	September-26-17
CH4 Cal Gas Conc.	499.0 ppm	CH4 Equiv Conc.	1054.5 ppm
C3H8 Cal Gas Conc.	202.0 ppm	Station temp.	20 Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.2
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.995995	0.997990	Carrier Pressure	40.4	40.4
THC Calc intercept	0.067537	0.053869	Fuel Pressure	42.2	42.2
NMHC Calc slope	1.000677	0.999405	Air Pressure	32.3	32.3
NMHC Calc intercept	0.026011	0.020598			

Analyzer make Thermo 55i Analyzer serial # 1331259520

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	----
as found span	5500	78.1	14.97	15.04	0.996
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	14.97	14.99	0.999
second point	5500	43.8	8.40	8.31	1.011
third point	5500	21.9	4.20	4.11	1.022
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	78.1	14.97	14.97	1.000
Average Correction Factor					1.010

Corrected As found 15.04 Previous response 14.97 % change -0.5%

Notes:

Replaced actuator and recalibrated instruemnt.

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	78.1	7.89	8.18	0.964
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	7.89	7.89	1.000
second point	5500	43.8	4.42	4.38	1.010
third point	5500	21.9	2.21	2.18	1.015
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	78.1	7.89	7.87	1.002
Average Correction Factor					1.008

Corrected As found 8.18 Previous response 7.86 % change -4.0%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	78.1	7.09	6.85	1.034
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	7.09	7.10	0.998
second point	5500	43.8	3.97	3.93	1.011
third point	5500	21.9	1.99	1.93	1.029
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	78.1	7.09	7.10	0.998
Average Correction Factor					1.013

Corrected As found 6.85 Previous response 7.11 % change 3.8%



Wood Buffalo Environmental Association

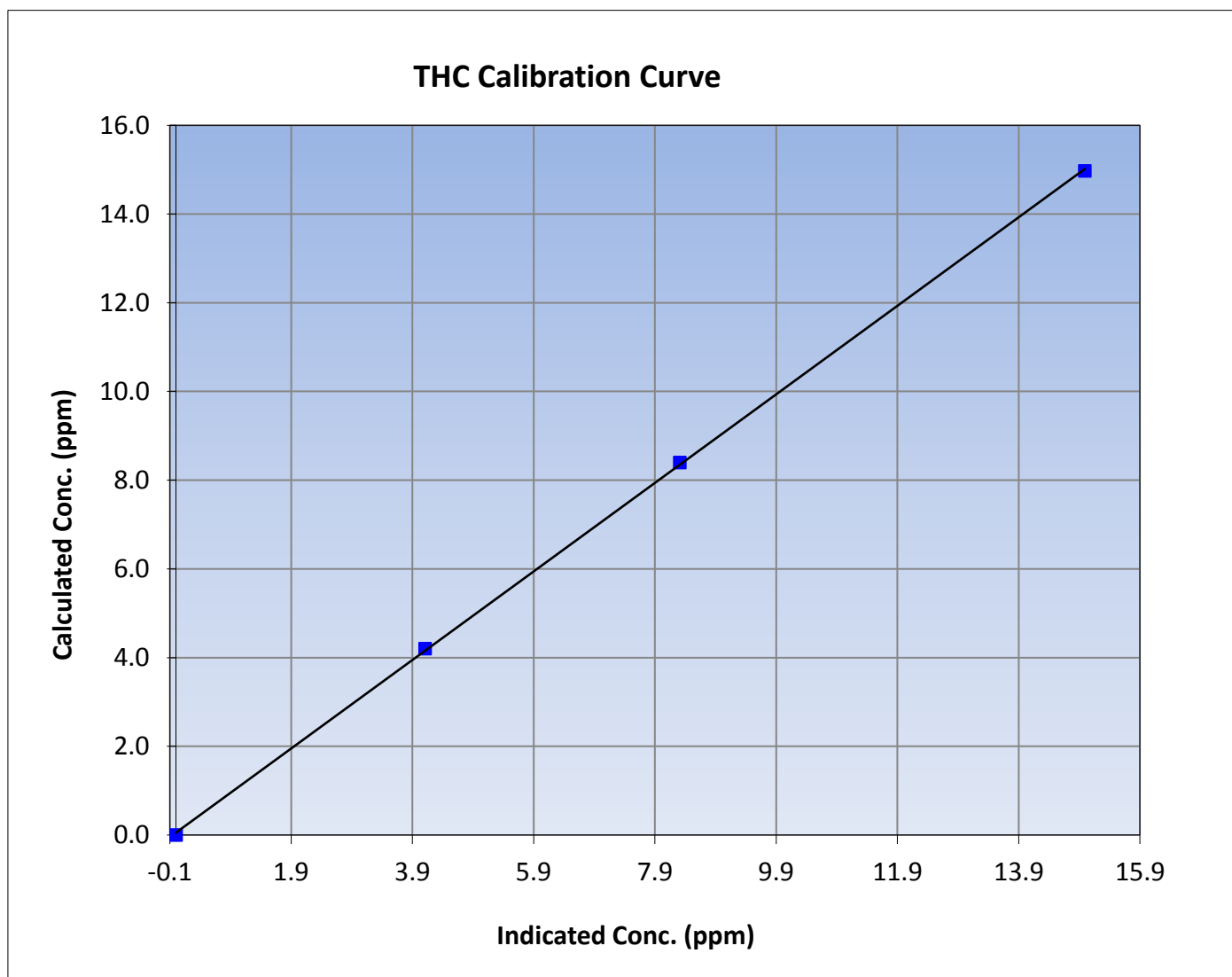
THC Calibration Summary

Station Information

Calibration Date	May 18, 2015	Previous Calibration	May 12, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	11:30	End Time (MST)	16:30
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999927
14.97	14.99	0.9989		
8.40	8.31	1.0105	Slope	0.997990
4.20	4.11	1.0216		
			Intercept	0.053869





Wood Buffalo Environmental Association

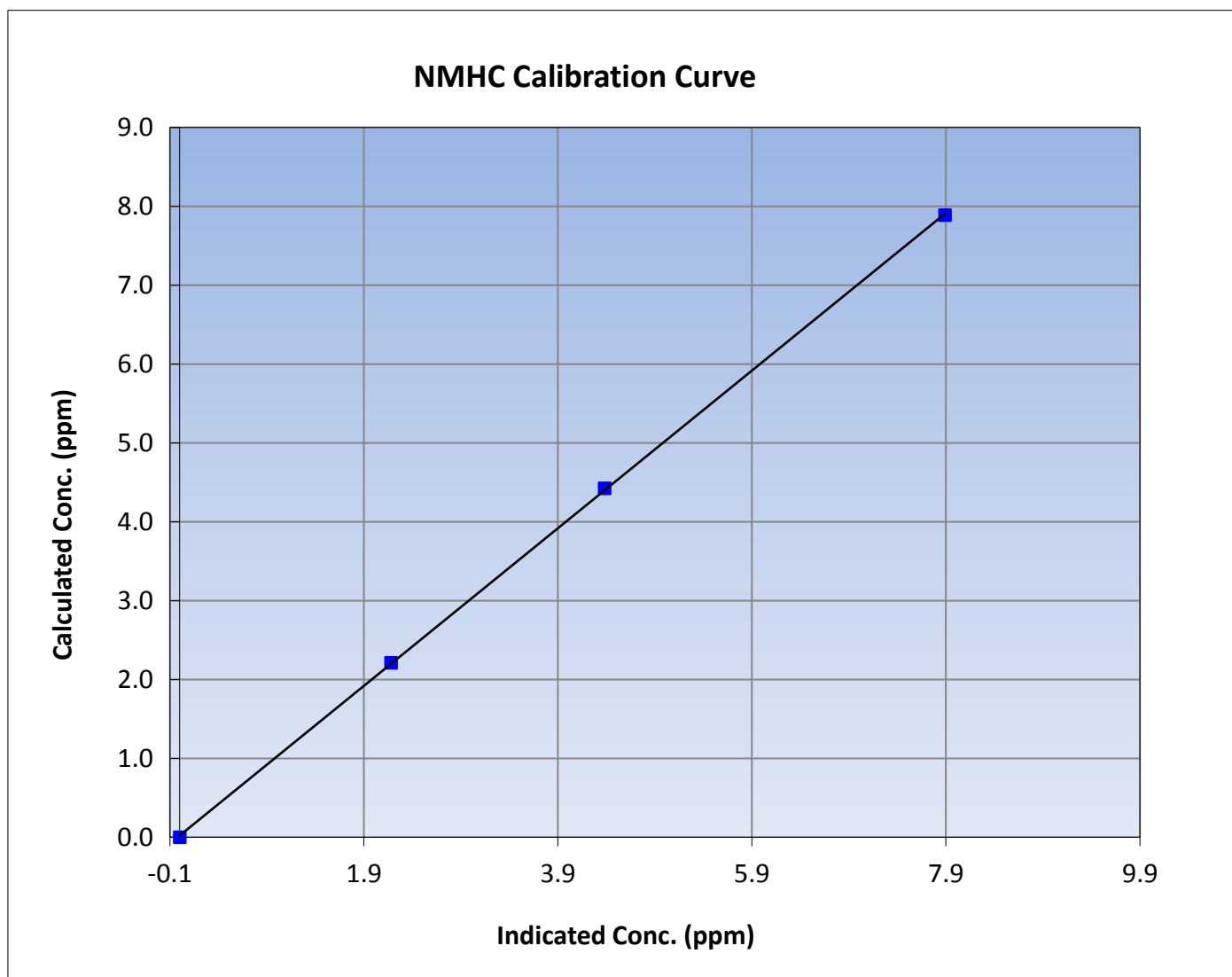
NMHC Calibration Summary

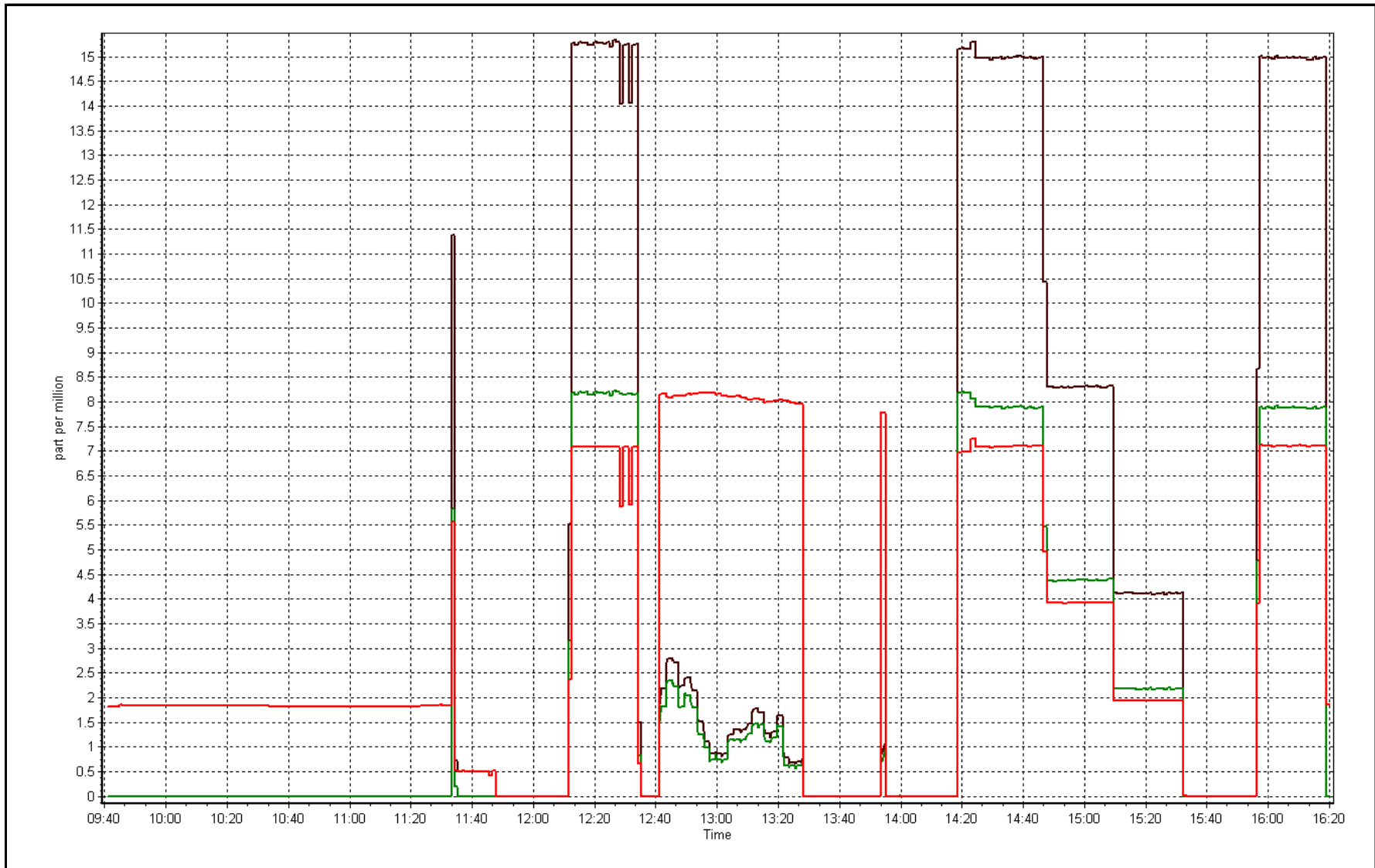
Station Information

Calibration Date	May 18, 2015	Previous Calibration	May 12, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	11:30	End Time (MST)	16:30
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999954
7.89	7.89	0.9998		
4.42	4.38	1.0100	Slope	0.999405
2.21	2.18	1.0146		
			Intercept	0.020598







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 12, 2015	Previous Calibration	April 14, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	13:20	End Time (MST)	16:05
NO2 GPT Ref date	May-12-15	Transfer Standard	N/A
Calibrator Make/Model	SABIO 4010	Station temp.	21 Deg C
ZAG make/model	Teledyne API 701	Serial Number	1730512
DACS make/model	Campbell Scientific CR3000	Serial Number	587
		Serial Number	2582

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.2	27.9
Analyzer IP address	192.168.1.48		Lamp temp.	53.5	53.5
Calculated slope	0.990955	0.993217	Pressure	697.6	702.9
Calculated intercept	-0.460525	2.253988	Flow cell A	0.597	0.596
Analyzer Background	-0.3	-0.3	Flow cell B	0.591	0.591
Analyzer Coefficient	0.958	1.001	Cell A Intensity	79000	78500
			Cell B Intensity	73600	73200
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	-1.3	----
as found span	5000	0.98	398.8	381.5	1.045
calibrator zero	5500	0.00	0.0	-1.3	----
high point	5000	0.98	398.8	399.6	0.998
second point	5000	0.56	204.4	203.6	1.004
third point	5000	0.34	105.1	102.2	1.029
as left zero	5500	0.00	0.0	-0.7	----
as left span	5000	0.98	389.3	400.2	0.973
Average Correction Factor					1.010

Corrected As found	382.8	Previous response	402.9	% change	5.2%
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Notes:

Adjusted span after as founds.

Calibration Performed By:

Michael Martineau



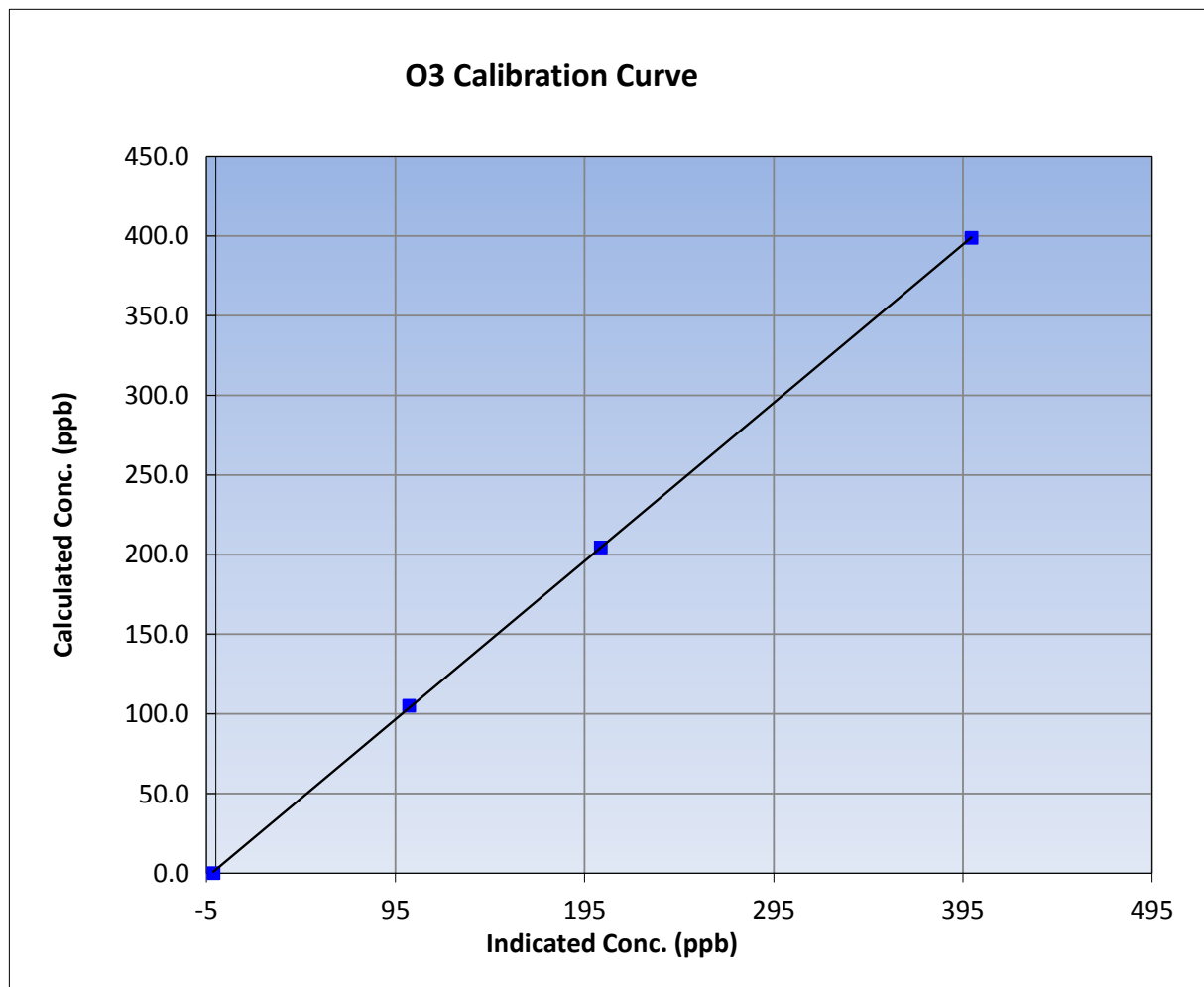
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	May-12-15	Previous Calibration	April 14, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:20	End Time (MST)	16:05
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

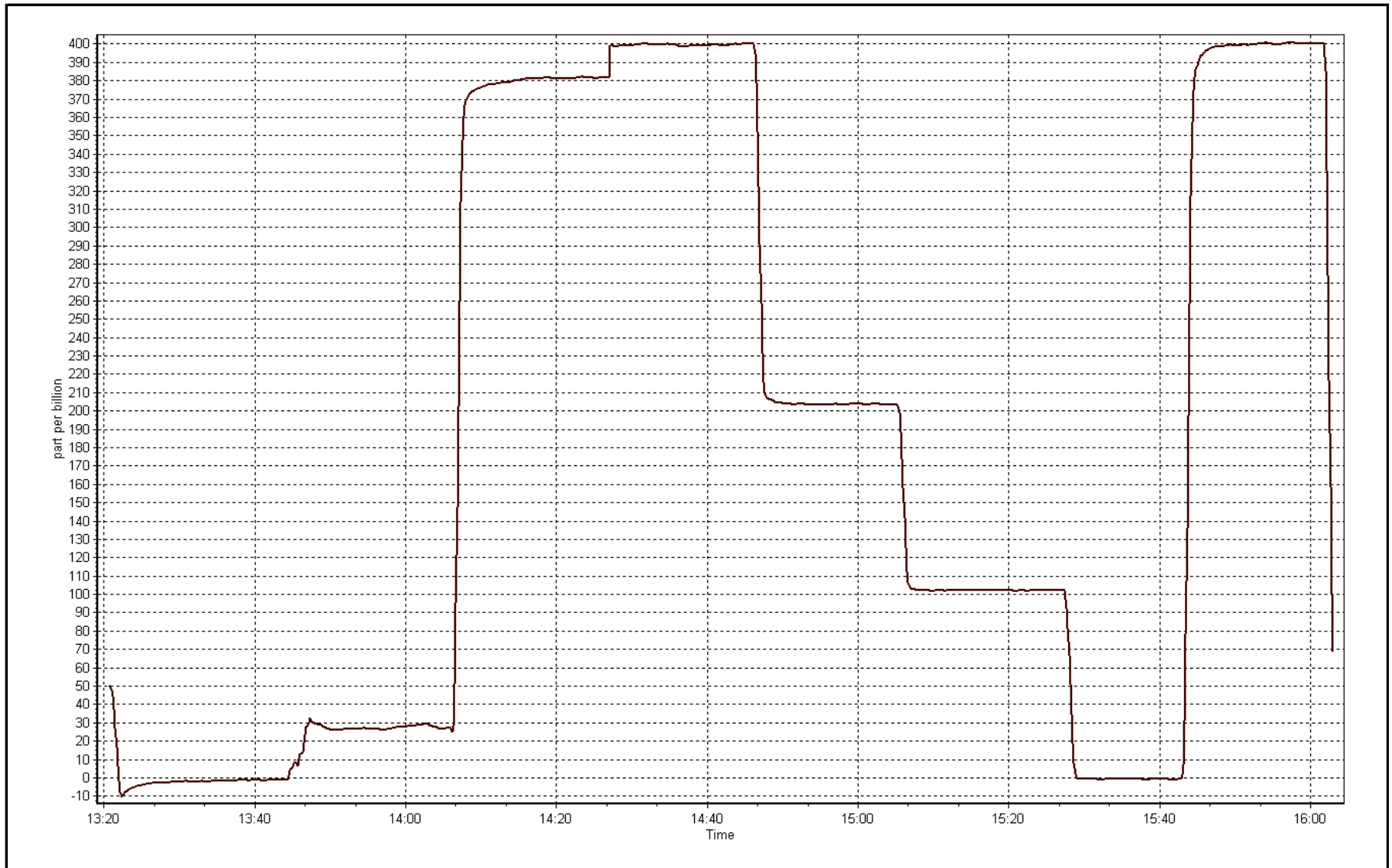
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.3	----	Correlation Coefficient	0.999966
398.8	399.6	0.9981		
204.4	203.6	1.0039	Slope	0.993217
105.1	102.2	1.0288		
			Intercept	2.253988



O3 Calibration Plot

Date: May 12, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 12, 2015	Previous Calibration	April 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	13:45
NO Cal Gas Conc	52.8 ppm	Gas Cert Reference	SA140071A
NOx Cal Gas Conc	52.8 ppm	Cal Gas Expiry Date	September 26, 2017
Calibrator	Sabio 4010	Serial Number	1730512
Zero air Generator	Teledyne API T701	Serial Number	587

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2582
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.000077	0.997480	1.007800
	Data Offset	1.203457	1.191311	1.231383
Current Calibration	Data Slope	0.999935	0.997718	1.006465
	Data Offset	2.327244	2.393719	1.401515

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153357
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.839		0.857	
NOx coefficient	0.995		0.996	
NO2 coefficient	1.000		1.000	
NO bkgrnd	6.0		6.1	
NOx bkgrnd	6.1		6.2	
Chamber Temp	50.3	Deg C	50.2	Deg C
Moly Temp	325	Deg C	324.5	Deg C
PMT voltage	-849.5	V	-850.3	V
PMT Temp	-3	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	206.1	mmHg	208.4	mmHg
R Cell Press Nox	206.1	mmHg	208.7	mmHg
NO sample flow	0.476	lpm	0.464	lpm
Nox sample Flow	0.473	lpm	0.465	lpm

Notes:

Adjusted span after as founds.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 12, 2015

Station Number:

AMS 1

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as found span	5500	78.1	749.8	749.8	0.0	733.8	736.6	-2.8	1.0218	1.0179
calibrator zero	5500	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
high point	5500	78.1	749.8	749.8	0.0	749.0	750.6	-1.6	1.0010	0.9989
second point	5500	43.8	420.5	420.5	0.0	416.5	417.5	-1.0	1.0097	1.0073
third point	5500	21.9	210.2	210.2	0.0	205.8	206.0	-0.3	1.0216	1.0204
as left zero	5500	0.0	0.0	0.0	0.0	0.2	0.1	0.2	----	----
as left span	5500	78.1	749.8	351.0	398.8	747.2	369.4	377.8	1.0034	0.9501
Average Correction Factor									1.0108	1.0089

Corrected As found

NO_x= 733.8

NO= 736.6

Percent Change

NO_x= 2.0%

NO= 1.9%

Previous Response

NO_x= 748.5

NO= 750.5

GPT Calibration Data

Dilution Flow

5500

ccm

Source Gas Flow

78.10

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	351.0	398.8	746.5	351.0	395.5	0.9903	1.0000	1.0084	99.2%
2nd NO2 (200)	----	545.5	204.4	746.8	545.5	201.3	0.9900	1.0000	1.0153	98.5%
3rd NO2 (100)	----	644.7	105.1	746.1	644.7	101.4	0.9908	1.0000	1.0367	96.5%
4th NO2 (0)	749.8	----	-2.4	747.5	749.8	-2.4	0.9890	1.0000	N/A	----
Average Correction Factor							0.9900	1.0000	1.0201	98.0%

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

NO_x Calibration Summary

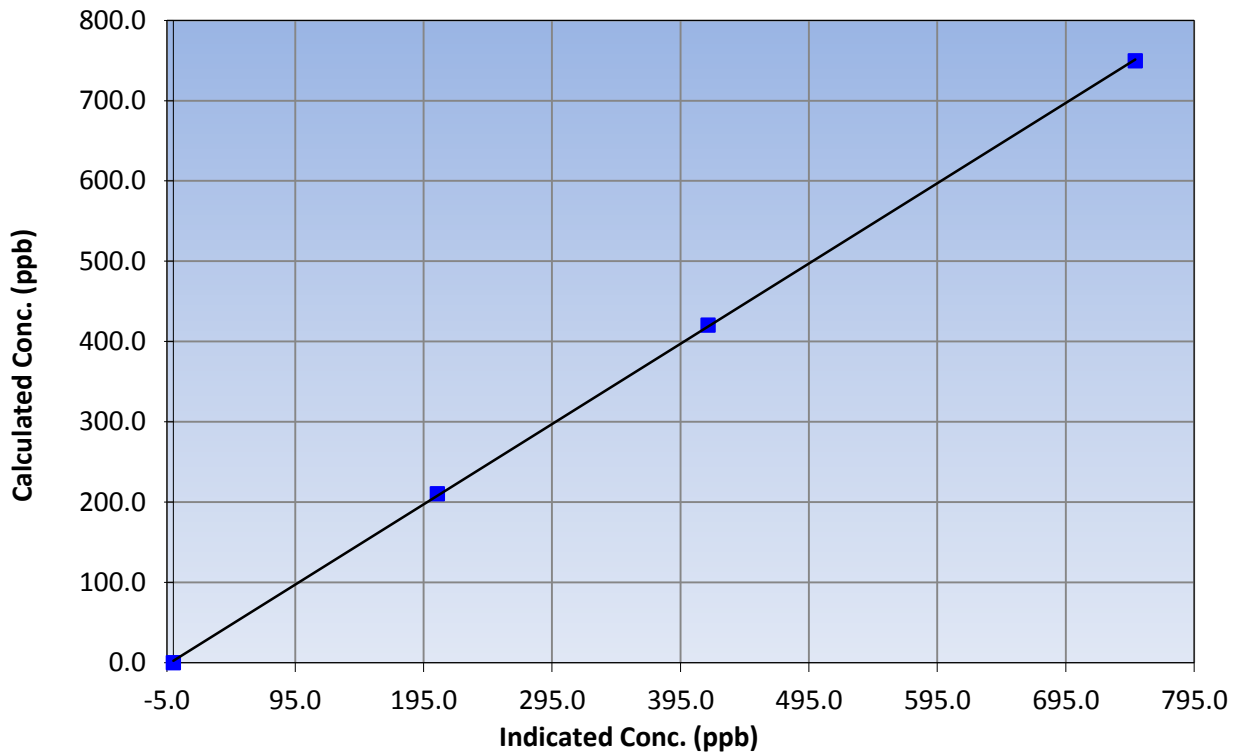
Station Information

Calibration Date	May 12, 2015	Previous Calibration	April 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	13:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999950
749.8	749.0	1.0010		
420.5	416.5	1.0097	Slope	0.999935
210.2	205.8	1.0216		
			Intercept	2.327244

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

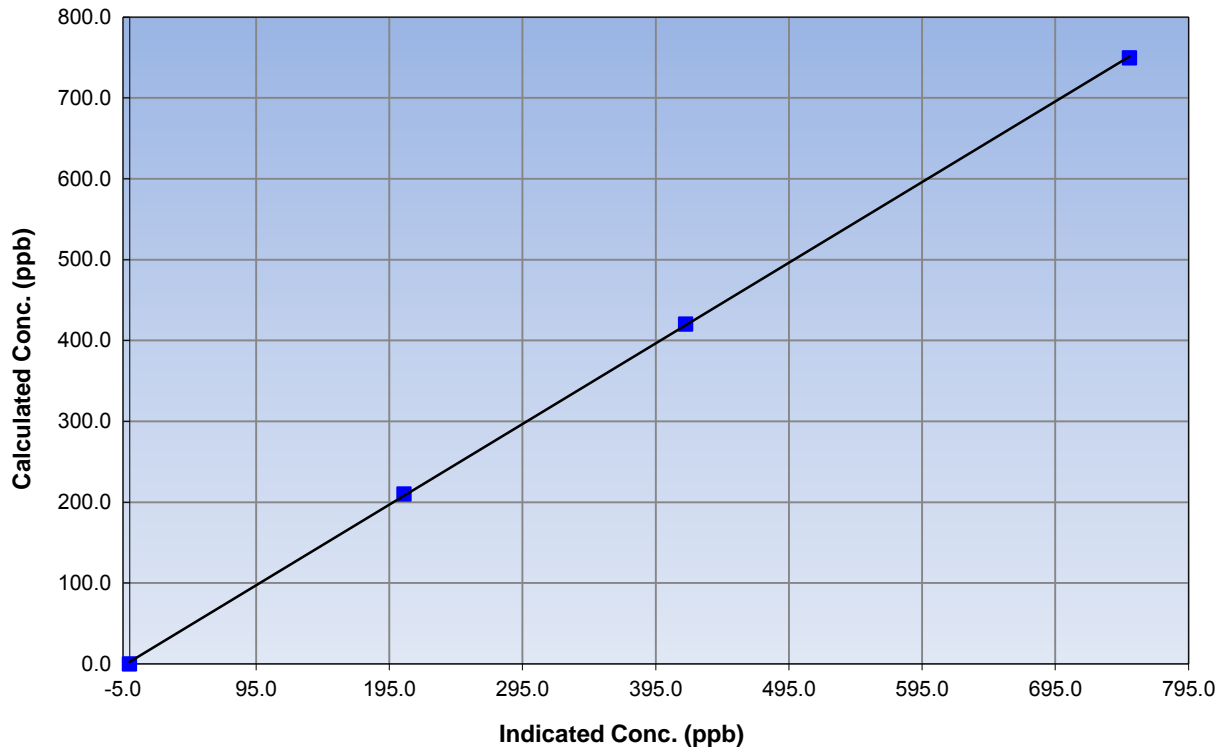
Station Information

Calibration Date	May 12, 2015	Previous Calibration	April 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	13:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999949
749.8	750.6	0.9989		
420.5	417.5	1.0073	Slope	0.997718
210.2	206.0	1.0204		
			Intercept	2.393719

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

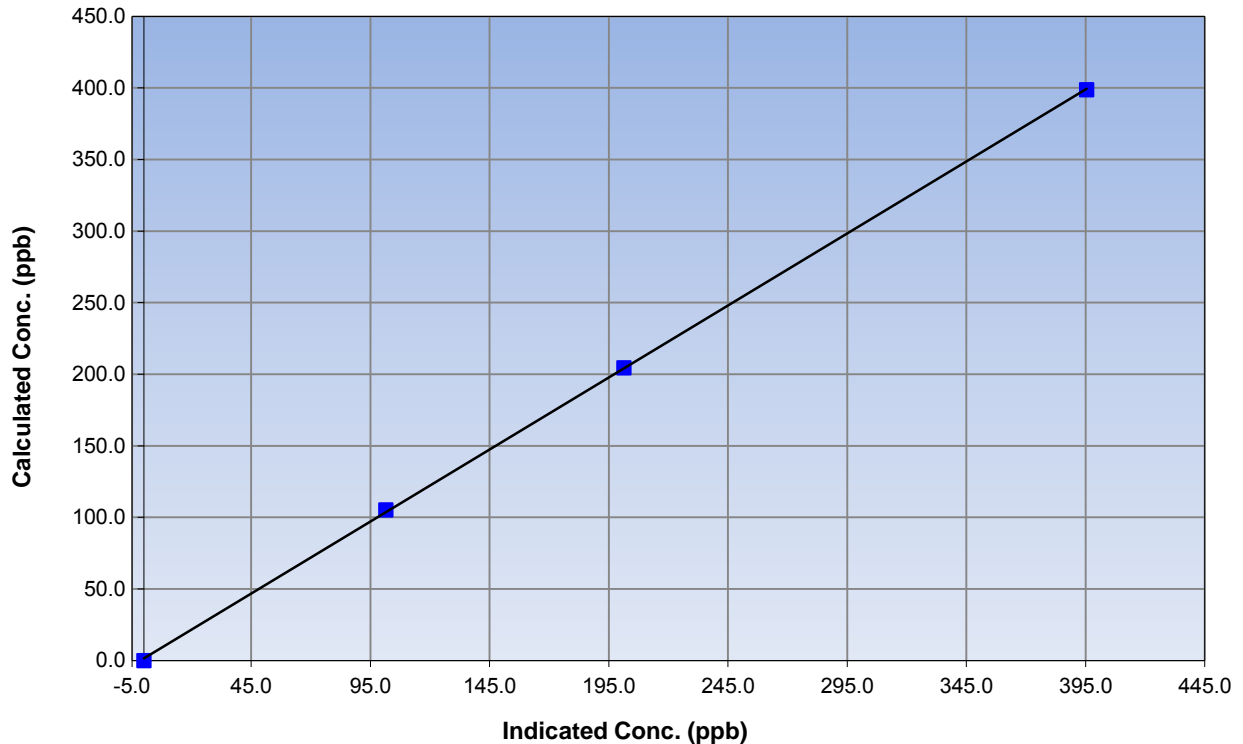
Station Information

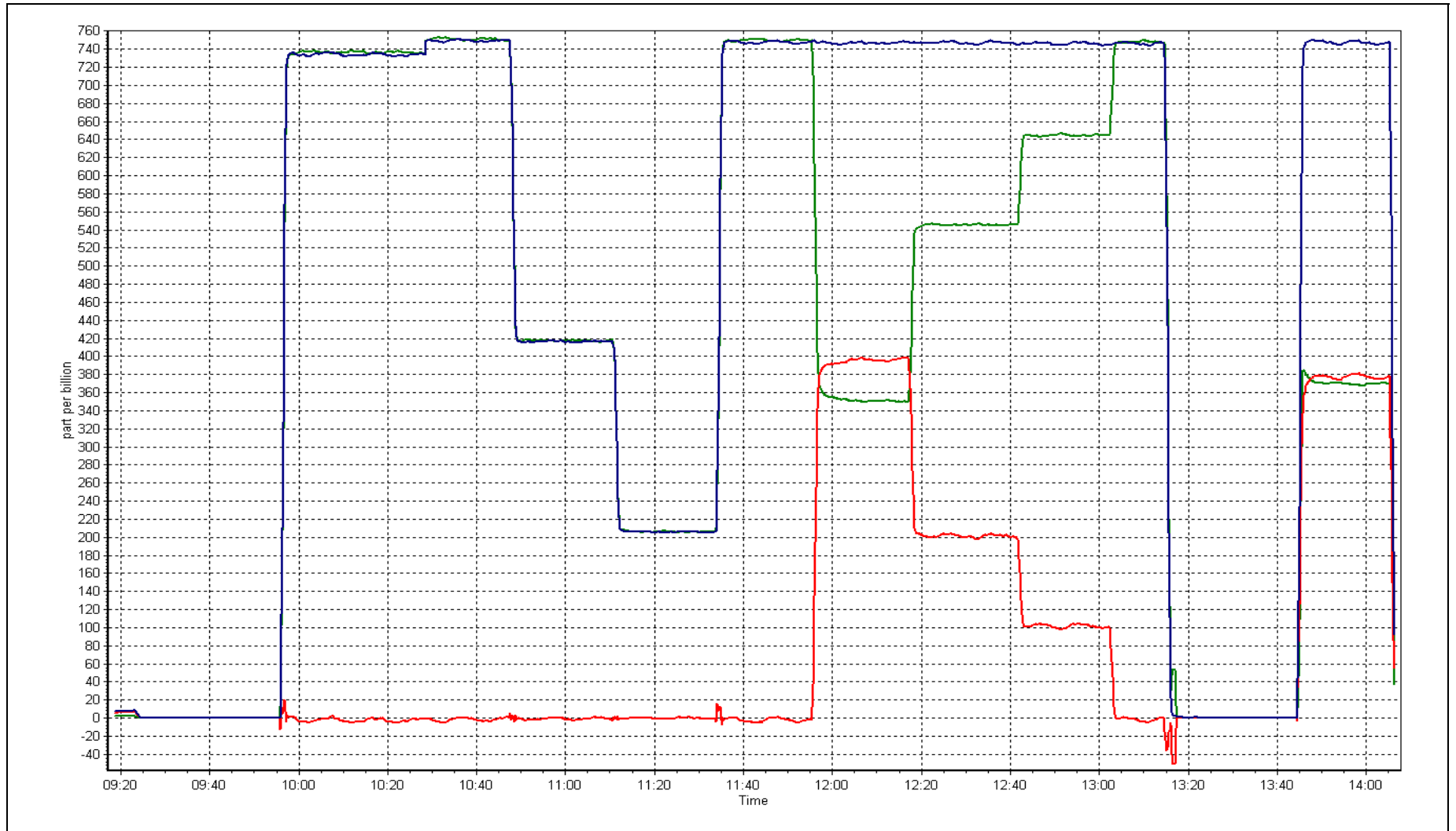
Calibration Date	May 12, 2015	Previous Calibration	April 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	13:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999939
398.8	395.5	1.0084		
204.4	201.3	1.0153	Slope	1.006465
105.1	101.4	1.0367		
			Intercept	1.401515

NO₂ Calibration Curve







Wood Buffalo Environmental Association

N_t-NO_x-NH₃ Calibration Report

Station Information

Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
NOX Calibration Date	May 12, 2015	NOX Previous Cal Date	April 13, 2015
NH3 Calibration Date	May 15, 2015	NH3 Previous Cal Date	April 14, 2015
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	14:25
Barometric Pressure	n/a mmHg	Station Temperature	21.0 Deg C
Calibrator	Sabio 4010	Serial Number	14300410
NH3 Cal Gas Conc	192 ppm	NH3 Expiry Date / SN	March 3, 2012 LL156612
NOx Cal Gas Conc	52.8 ppm	NO Expiry Date / SN	September 26, 2017 SA140071A
NO Cal Gas Conc	52.8 ppm		

DACs Information

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

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	1.001248	0.993969	0.994293	0.997856	1.011102
	Data Offset	-11.177751	-12.057179	0.721904	-0.280430	1.298297
Cal Stats After	Data Slope	1.005172	0.996862	0.998279	0.998976	1.002395
	Data Offset	-2.481245	-3.369441	2.009014	2.256454	-2.656652
IP address		192.168.1.17				

Analyzer Information

Analyzer make/model API T201 Analyzer serial # 152
 Converter API 501 NH# Converter serial # 147

Test Point	before		after	
NH3 Conc range	2500	ppb	2500	ppb
NOX Conc range	1000	ppb	1000	ppb
NO BKG	-0.1	ppb	-0.1	ppb
NOx BKG	0.0	ppb	0.0	ppb
Nt BKG	0.1		0.1	
NO coefficient	1.109		1.124	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.190		1.210	
NH3 coefficient	0.880		0.895	
Nt coefficient	1.189		1.220	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	315.4	Deg C	315.9	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	84.0	ccm	84.0	ccm
R Cell Press	4.5	mmHg	4.6	mmHg
PMT Voltage	645.0	v	644.0	v
Sample Flow 1 NO	507.0	ccm	518.0	ccm
Sample Flow 2 Nox	502.0	ccm	523.0	ccm
Sample Flow 3 Nt	536.0	ccm	553.0	ccm

Notes:

Adjusted NO/Nox/Nt span after as founds. Adjusted NH3 converter factor during NH3 cal. NH3 cal from 09:50-14:00 MST May 15, 2015.



Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date:

May 15, 2015

Station Number:

AMS 1

NH₃ 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	0.1	0.3	-0.2	----	----
as found NO	5500	78.1	749.8	749.8	----	745.0	748.8	-3.8	1.006	----
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.4	0.4	-0.7	----	----
high NO point	5500	78.1	749.8	749.8	----	753.0	750.9	2.1	0.996	----
NO/O ₃ point	5500	78.1	749.8	749.8	----	755.8	751.4	4.3	0.992	----
as found NH ₃	6500	67.7	1999.8	NA	1999.8	2020.0	17.0	2000.0	0.990	1.000
first NH ₃	6500	67.7	1999.8	NA	1999.8	2005.5	17.0	1988.5	0.997	1.006
second NH ₃	6500	33.9	1001.4	NA	1001.4	1015.7	10.1	1005.6	0.986	0.996
third NH ₃	6500	17.0	502.2	NA	502.2	507.0	5.2	501.8	0.990	1.001
Average Correction Factor									0.9939	1.0007

NH₃ Corrected As Found
 Nt Corrected As Found
 NO_x Corrected As Found

NH₃ = 2000.2 ppb
 Nt = 744.9 ppb
 NO_x = 748.5 ppb

Previous Response
 Previous Response
 Previous Response

NH₃ = 2008.4 ppb
 Nt = 766.4 ppb
 NO_x = 753.3 ppb

NH₃ percent change 0.4%
 Nt percent change 2.9%
 NO_x percent change 0.6%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date:

May 12, 2015

Station Number:

AMS 1

NO_x / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.4	0.1	-0.4	----	----
as found span	5500	78.1	749.8	749.8	749.8	738.1	739.7	728.9	1.0159	1.0137
calibrator zero	5500	0.0	0.0	0.0	0.0	0.4	0.1	-0.4	----	----
high point	5500	78.1	749.8	749.8	749.8	750.9	750.0	753.0	0.9985	0.9997
second point	5500	43.8	420.5	420.5	420.5	416.8	416.5	416.9	1.0088	1.0096
third point	5500	21.9	210.2	210.2	210.2	206.8	206.3	205.4	1.0166	1.0193
as left zero	5500	0.0	0.0	0.0	0.0	0.9	1.1	2.4	----	----
as left span	5500	78.1	749.8	353.0	749.8	751.3	369.9	754.6	0.9979	0.9544
Average Correction Factor									1.0080	1.0095

	<u>Nt</u>	<u>NOx</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	729.3	737.7	739.6	396.6
Previous Response	766.4	753.3	741.5	391.2
Percent Change	5.1%	2.1%	0.3%	-1.4%

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 78.10 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO ₂ conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated NO ₂ conc (ppb)	NO _x Correction factor	NO Correction factor	NO ₂ Correction factor	Converter Efficiency
Cal zero			0.0			1.6			----	
1st NO ₂ (300)	----	353.0	396.8	751.1	353.0	398.1	1.0981	1.0000	0.9967	100.3%
2nd NO ₂ (200)	----	547.3	202.5	752.0	547.3	204.7	1.0967	1.0000	0.9892	101.1%
3rd NO ₂ (100)	----	649.5	100.3	753.7	649.5	104.2	1.0943	1.0000	0.9629	103.8%
4th NO ₂ (0)	749.8	----	1.6	751.4	749.8	1.6	1.0976	1.0000	----	----
Average Correction Factor							1.0967	1.0000	0.9829	101.8%

Calibration Performed By: Michael Martineau



Wood Buffalo Environmental Association

NH3 Calibration Summary

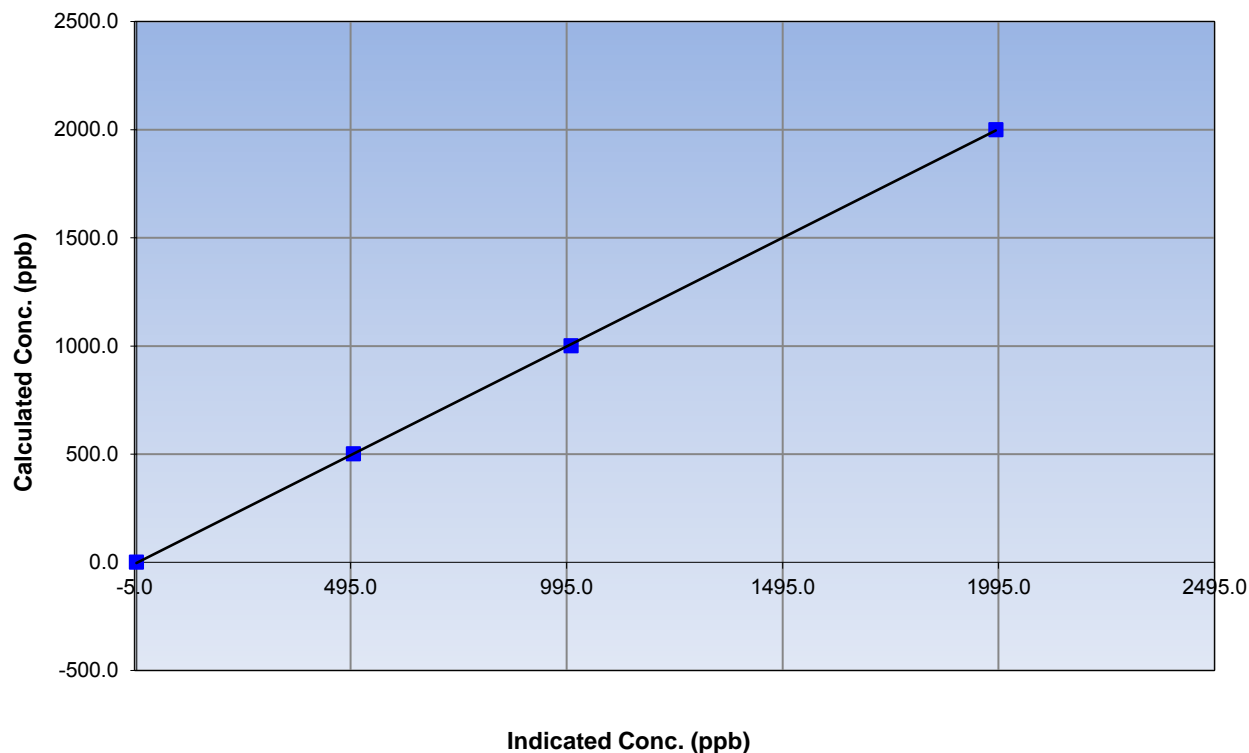
Station Information

Calibration Date	May 15, 2015	Previous Calibration	April 13, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	14:25
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	-0.7	----	Correlation Coefficient	0.999968
1999.8	1988.5	1.0057		
1001.4	1005.6	0.9958	Slope	1.005172
502.2	501.8	1.0008		
			Intercept	-2.481245

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

Station Information

Calibration Date
 Station Number
 Start Time (MST)
 Analyzer make

May 15, 2015
Bertha Ganter - Fort McKay
9:25
API T201

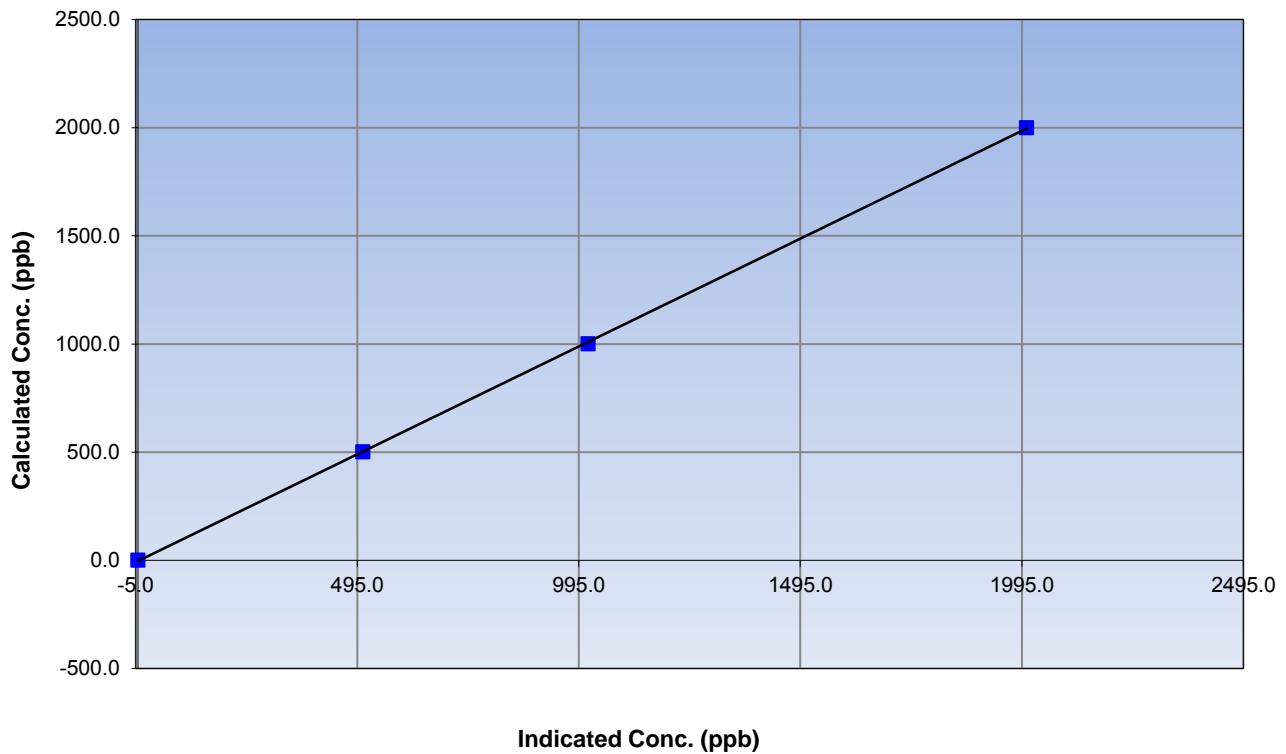
Previous Calibration
 Station Number
 End Time (MST)
 Analyzer serial #

April 13, 2015
AMS 1
14:25
152

Nt (NH₃) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999959
1999.8	2005.5	0.9971		
1001.4	1015.7	0.9859	Slope	0.996862
502.2	507.0	0.9904		
			Intercept	-3.369441

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

Station Information

Calibration Date
Station Number
Start Time (MST)
Analyzer make

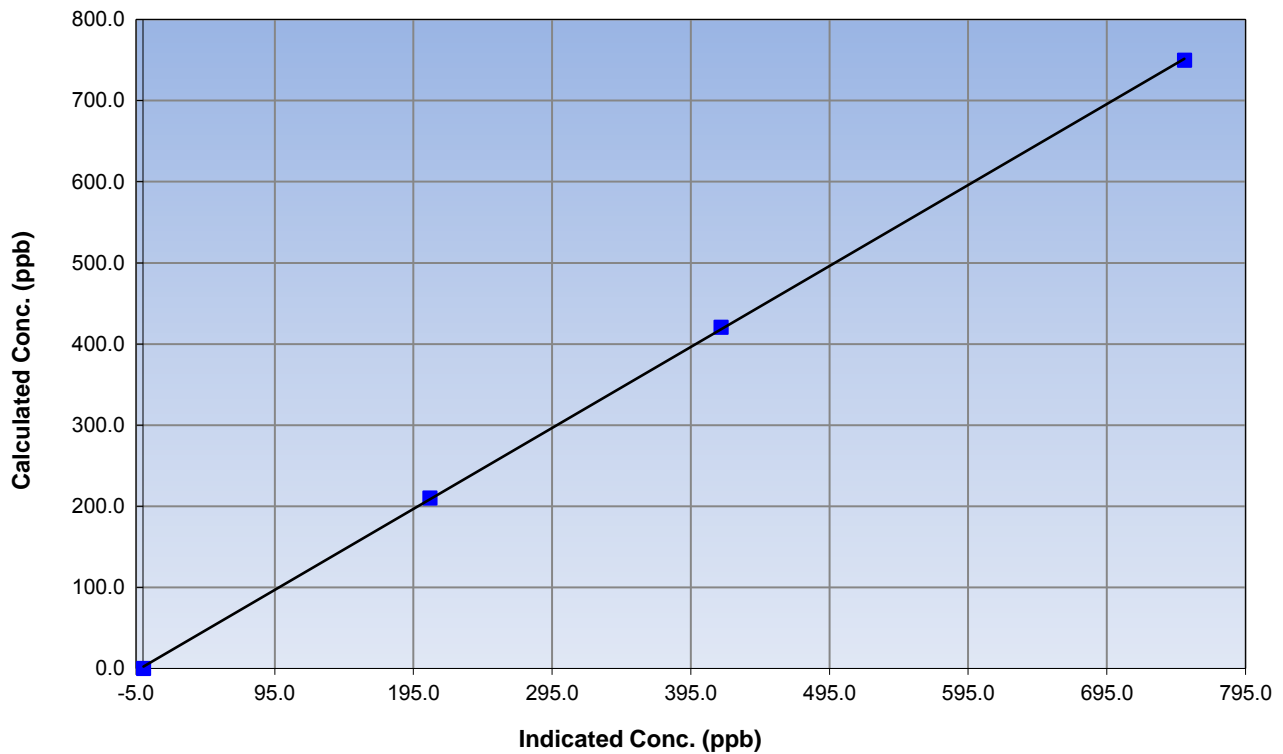
May 12, 2015	Previous Calibration
Bertha Ganter - Fort McKay	Station Number
9:25	End Time (MST)
API T201	Analyzer serial #

April 13, 2015
AMS 1
14:25
152

NO_x Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999942
749.8	750.9	0.9985		
420.5	416.8	1.0088	Slope	0.998279
210.2	206.8	1.0166		
			Intercept	2.009014

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

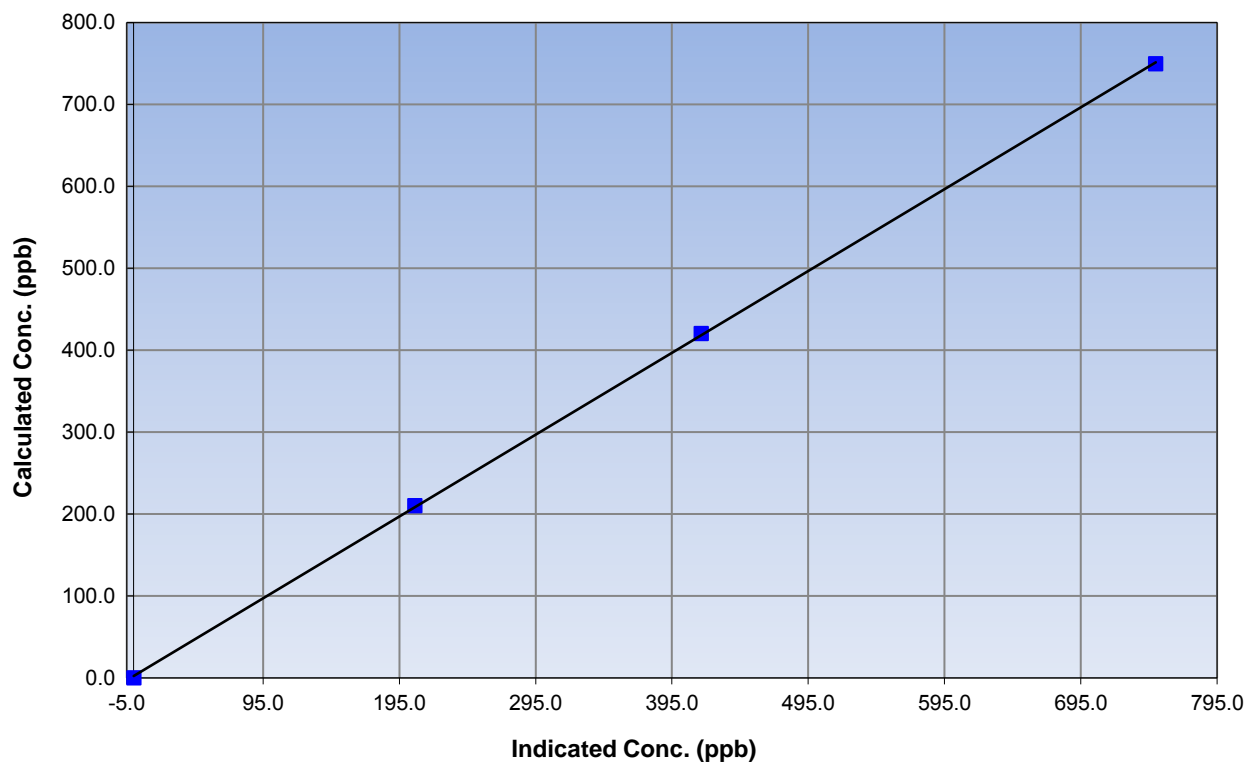
Station Information

Calibration Date	May 12, 2015	Previous Calibration	April 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	14:25
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999945
749.8	750.0	0.9997		
420.5	416.5	1.0096	Slope	0.998976
210.2	206.3	1.0193		
			Intercept	2.256454

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

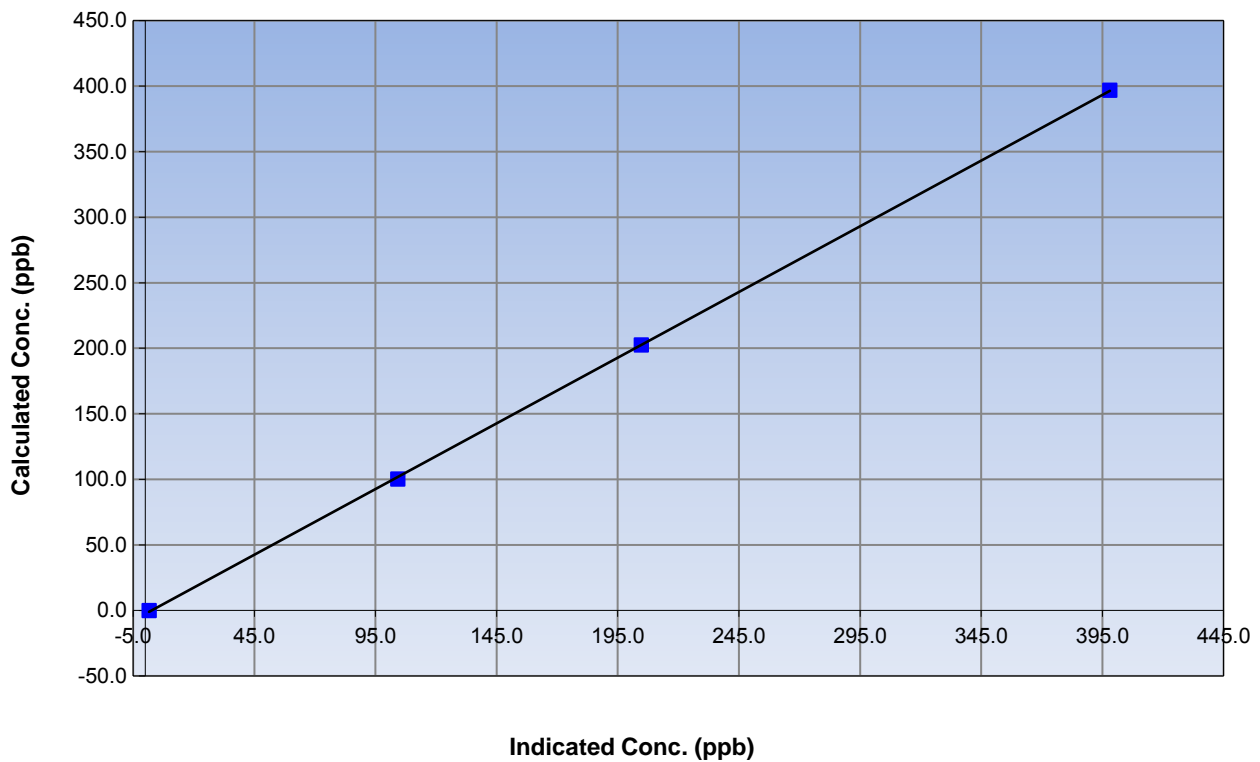
Station Information

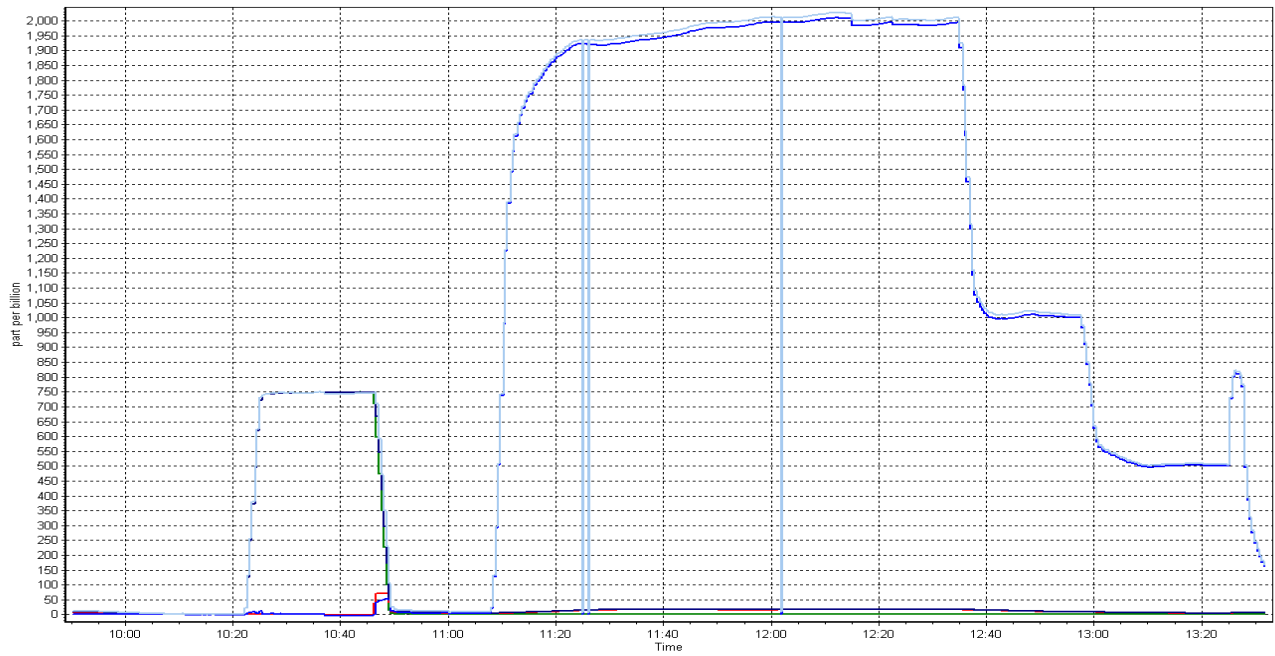
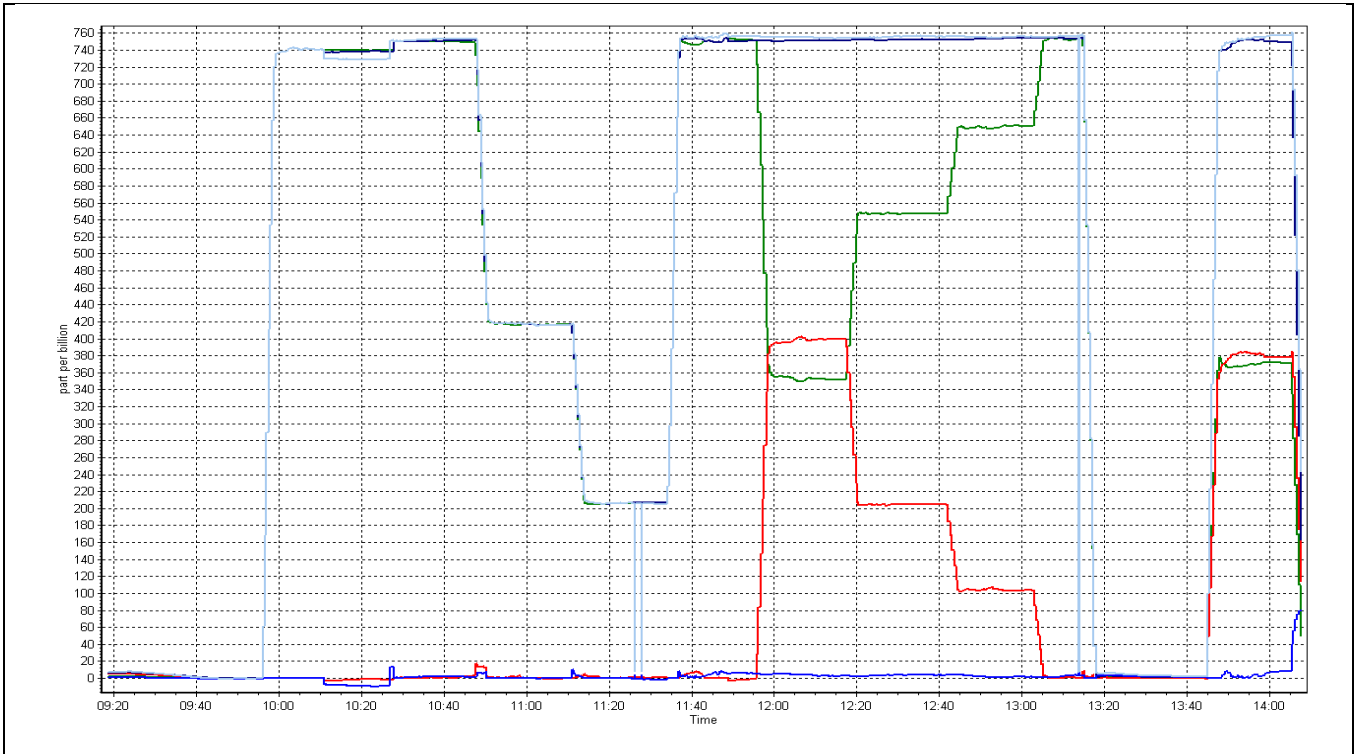
Calibration Date	May 12, 2015	Previous Calibration	April 13, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	14:25
Analyzer make	API T201	Analyzer serial #	152

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.6	----	Correlation Coefficient	0.999959
396.8	398.1	0.9967		
202.5	204.7	0.9892	Slope	1.002395
100.3	104.2	0.9629		
			Intercept	-2.656652

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	<u>May 19, 2015</u>	Previous Calibration:	<u>April 20, 2015</u>
Station Name:	<u>Bertha Ganter</u>	Station Number:	<u>AMS 1</u>
Start Time (MST):	<u>12:10</u>	End Time (MST):	<u>12:30</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>1019</u>

SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number:	<u>E-803</u>
Source SN:	<u>4173</u>
HEPA PN:	<u>12144</u>
Time Correct (MST):	<u>Yes</u>
Parameters Checked:	<u>T1, T2, T2,T4, P3, Main Flow, Beta, Neph</u>

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	23.3	24.5	1.2	
T2	22.0	na	na	
T3	22.0	na	na	
T4	22.0	na	na	
RH (%)	16.0	na	na	

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	989	991.0	2.0	989

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1000	0	1000	1000

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	216		218
Neph	0.7		-0.5
C14	8.8		14.7
Indicated Concentration (ug/m3)	0.4	NO	-0.4
Offset 1	215.7		215.7
Offset 2	34.2		34.2

Leak Check (Quarterly)

Leak Check Date:	not performed	Previous Leak Check Date:	April 20, 2015
------------------	---------------	---------------------------	----------------

Measured

Difference LPM (Limit +/- 0.42 LPM)

Flow without adaptor (LPM):	16.89	
Flow with adaptor [turn off pump first](LPM):	16.80	0.09

Mass Foil Calibration (Annually)

Foil Calibration Date:	not performed	Previous Foil Calibration:	n/a
Zeroed?:			
Foil Mass:			
Previous Correction Factor:			<u>Mass foil set S/N:</u>
New Correction Factor:			

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

changed out cyclone head.

Calibration Performed By: Michael Martineau



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 2
MILDRED LAKE
MAY 2015**

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

June 29, 2015



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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	35	37	99.73	47	0	8	0
H2S (ppb) Average	709	35	35	100.00	3	0	1	0
THC (ppm) Average	707	35	37	99.73	3.9	-	2.4	-
Temperature (C) Average	744	0	0	100.00	28.6	-	20.1	-
Relative Humidity (%) Average	744	0	0	100.00	100	-	91	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	31	-	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 - MILDRED LAKE (AMS 2)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	2.5	5	-	0	0	1	1	2	7	47
H2S (ppb) Average	709	0.4	0	-	0	0	0	0	0	1	3
THC (ppm) Average	707	2.24	0.2	-	2	2.1	2.1	2.1	2.3	2.6	3.9
Temperature 2 m (C) Average	744	11.72	7.8	-	-3.4	1.6	5.4	11.1	17.2	23.3	28.6
Relative Humidity (%) Average	744	47.2	23	-	12	18	30	45	63	79	100
Wind Speed 10 m (km/h) Average	744	8.7	5	-	1	4	5	8	11	15	31
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	19 May 2015 11:00	19 May 2015 12:00	2	Maintenance - sample manifold cleaning
THC	19 May 2015 11:00	19 May 2015 12:00	2	Maintenance - sample manifold cleaning



Summary of Hour Averages

Mildred Lake - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 47 ppb on May 27 11:00	Maximum Daily Average: 8.4 ppb on May 27		Hours of Data:	707
Minimum Value: 0 ppb on May 26 11:00	Minimum Daily Average: 0.3 ppb on May 26		Hours of Missing Data:	37
Maximum Diurnal Average: 5.0 ppb at hour 9	Minimum Diurnal Average: 0.8 ppb at hour 22		Hours of Calibration:	35
Monthly Average: 2.5 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 7 P ₉₉ = 26		Percent Operational Time:	99.7

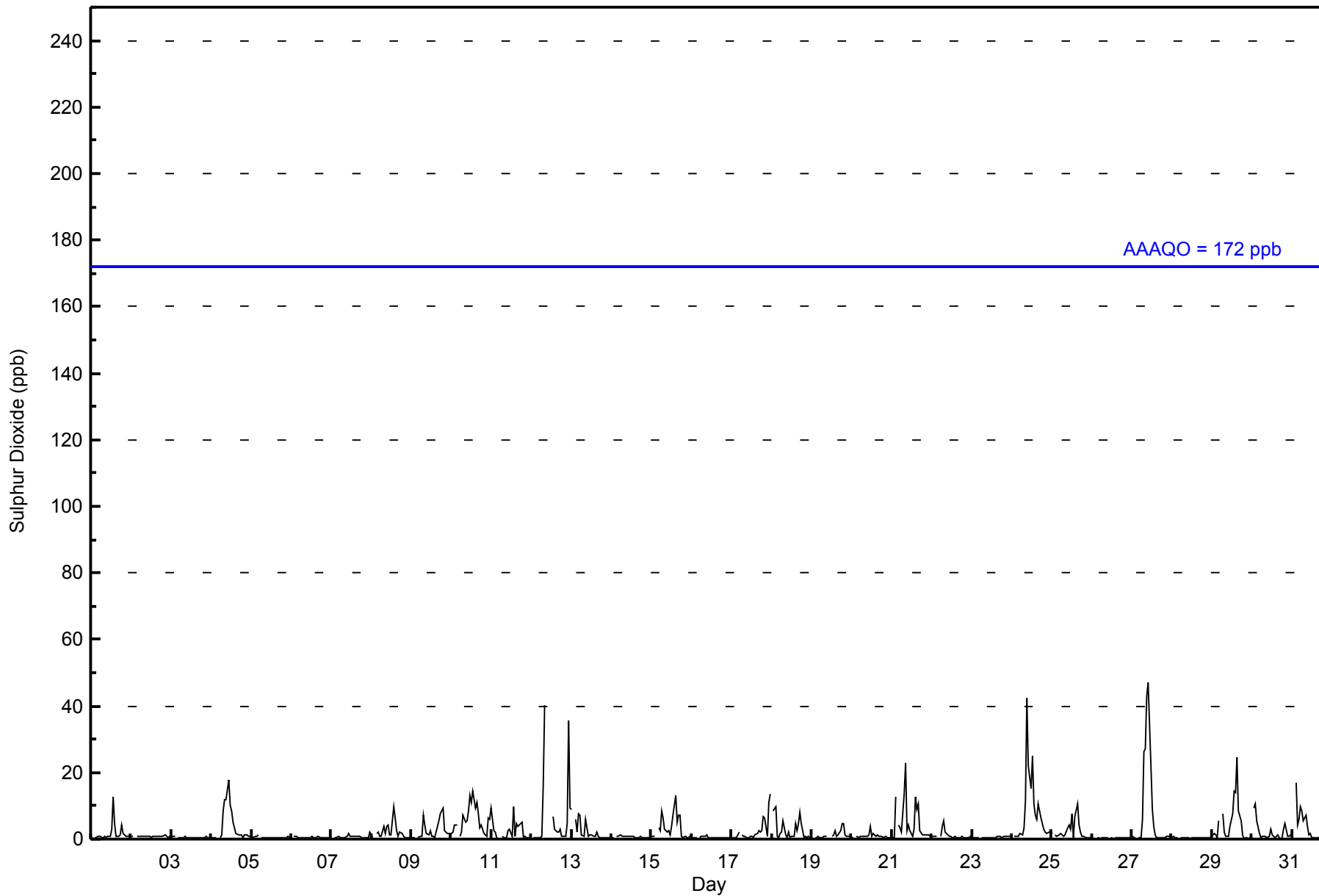
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	1	Z	1	1	1	1	1	1	1	1	1	1	3	13	5	1	1	1	4	2	1	1	1	1	1.7	13																						
2-May	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1																						
3-May	1	1	1	Z	0	0	0	1	1	1	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0.5	1																						
4-May	0	0	1	0	Z	1	1	9	12	12	18	10	8	5	3	2	1	1	1	1	1	1	1	1	3.9	18																						
5-May	1	1	1	1	1	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0.5	1																						
6-May	Z	1	1	1	1	0	0	1	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0.5	1																						
7-May	0	Z	0	0	1	0	0	0	1	1	2	1	1	1	1	1	1	1	0	1	1	0	1	2	0.7	2																						
8-May	1	1	Z	1	2	1	1	4	2	4	4	1	1	10	6	3	1	2	2	1	1	0	0	0	2.2	10																						
9-May	0	0	1	Z	1	1	1	7	4	2	1	3	1	1	1	2	6	7	9	9	3	2	2	2	2.8	9																						
10-May	2	2	4	4	Z	1	2	7	5	6	8	13	11	14	9	11	8	4	4	2	1	1	6	6	5.7	14																						
11-May	9	3	2	0	0	Z	1	0	0	0	3	3	1	10	1	5	4	5	5	1	1	0	1	1	2.4	10																						
12-May	Z	0	0	0	0	1	1	16	40	C	C	C	C	7	3	2	2	3	1	1	1	5	36	9	6.8	40																						
13-May	9	Z	6	2	8	7	1	1	6	3	1	1	1	1	1	2	1	1	1	1	1	1	0	1	2.4	9																						
14-May	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	0	0.7	1																						
15-May	1	1	1	Z	4	3	8	6	3	2	2	1	4	7	13	5	7	7	1	1	1	0	0	1	3.4	13																						
16-May	1	1	0	1	Z	1	1	1	1	1	1	1	0	1	0	1	1	0	0	1	1	1	1	1	0.6	1																						
17-May	0	0	0	1	2	Z	1	1	1	0	1	1	1	1	1	2	2	2	2	7	7	1	11	13	2.5	13																						
18-May	Z	8	10	1	0	2	2	5	1	0	2	0	1	1	5	3	5	8	5	1	1	0	1	1	2.7	10																						
19-May	1	Z	1	1	1	1	1	1	1	1	M	M	1	1	3	1	1	2	5	5	1	1	1	1	1.3	5																						
20-May	1	1	Z	1	1	1	1	1	1	1	1	4	1	2	1	1	1	1	1	1	1	1	1	1	0.9	4																						
21-May	1	0	13	Z	4	3	2	13	23	2	4	3	1	3	13	9	10	2	1	1	1	1	1	1	4.9	23																						
22-May	1	1	1	1	Z	1	4	5	2	2	1	1	1	1	1	0	1	1	1	0	0	0	1	1	1.1	5																						
23-May	1	1	1	1	1	Z	0	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1																						
24-May	Z	1	1	1	1	2	1	3	11	42	22	15	25	10	7	6	11	6	5	3	2	2	2	3	7.9	42																						
25-May	2	Z	1	1	1	1	1	1	1	3	4	3	8	0	7	11	4	2	1	1	0	0	0	0	2.4	11																						
26-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
27-May	1	0	0	Z	0	0	6	26	27	43	47	22	9	4	1	1	0	1	0	1	1	1	1	0	8.4	47																						
28-May	1	1	1	0	Z	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	1																						
29-May	1	2	1	0	6	Z	8	2	1	1	1	4	8	15	14	25	8	6	1	0	0	0	0	1	4.5	25																						
30-May	Z	9	10	5	2	0	1	1	1	0	1	3	1	1	1	1	0	0	0	3	5	1	1	1	2.1	10																						
31-May	2	Z	17	4	6	10	8	5	7	4	1	2	0	0	1	1	1	1	0	0	0	0	0	1	3.1	17																						
																								1.4	1.4	2.8	1.2	1.7	1.5	1.9	3.9	5.0	4.5	4.5	3.3	3.0	3.6	3.2	3.2	2.6	2.2	1.7	1.4	1.1	0.8	2.4	1.6	Diurnal Average
																								9	9	17	5	8	10	8	26	40	43	47	22	25	15	14	25	11	8	9	9	7	5	36	13	Diurnal Maximum

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	673	95.19	95.19
11 - 20	22	3.11	98.30
21 - 60	12	1.70	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	61	121	46	23	25	20	21	58	76	89	56	31	11	12	9	14	673
11 - 20	0	0	0	0	1	0	7	2	1	3	5	2	1	0	0	0	22
21 - 60	0	0	0	0	0	0	2	4	2	2	0	2	0	0	0	0	12
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	121	46	23	26	20	30	64	79	94	61	35	12	12	9	14	707

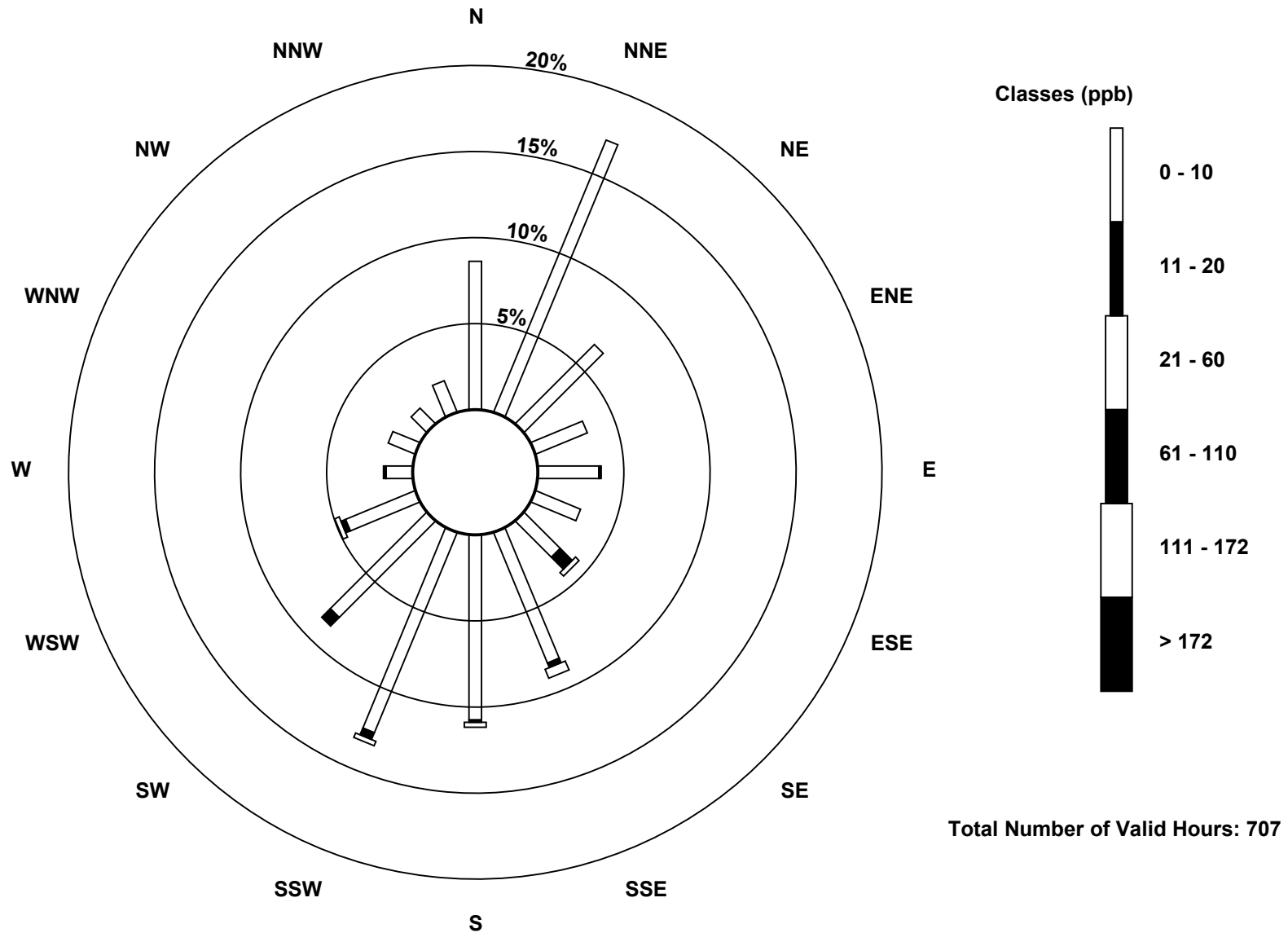
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

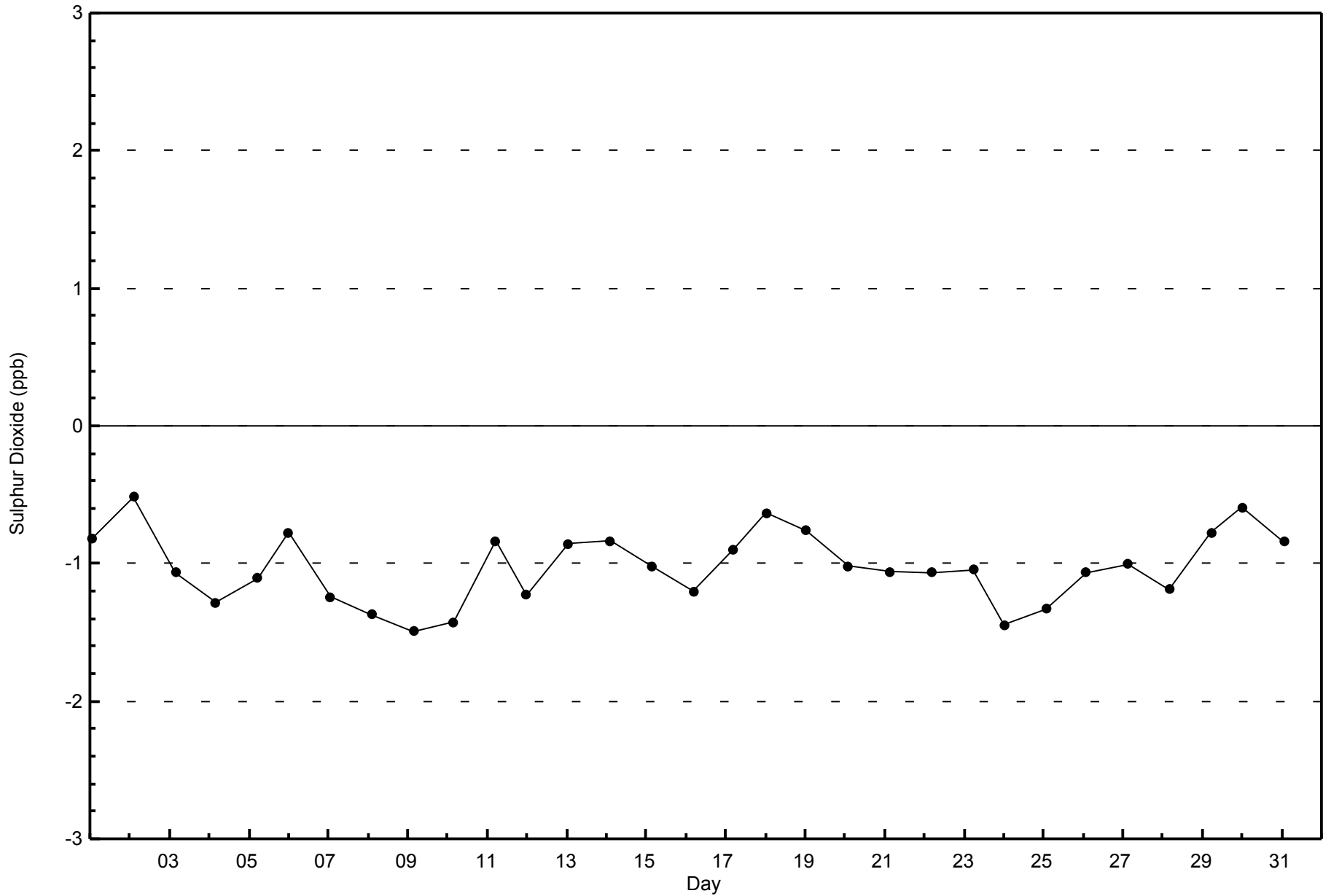
Sulphur Dioxide (SO₂) - ppb
Mildred Lake (AMS 2)





WBEA
Zero Responses

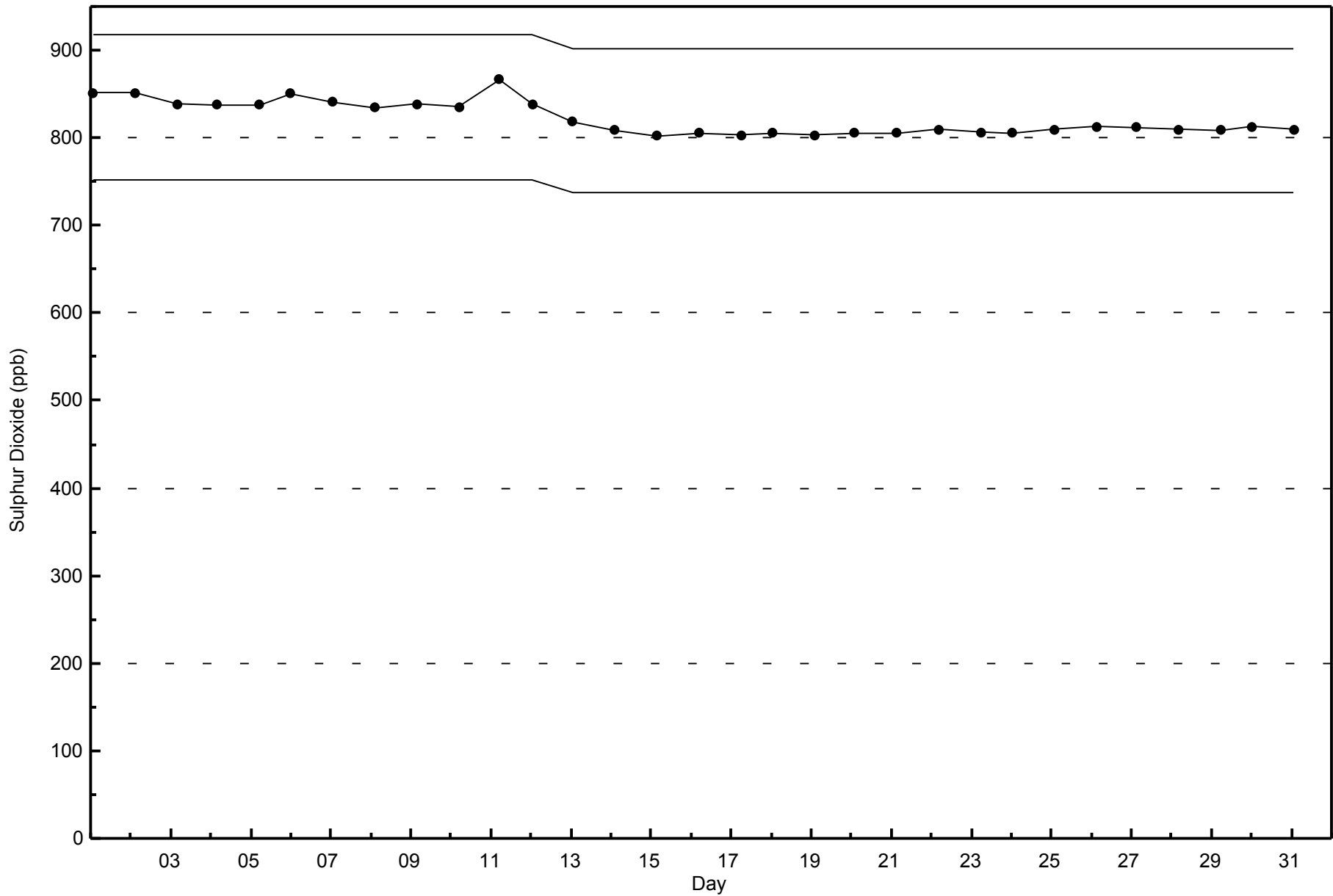
Sulphur Dioxide (SO₂) - ppb
Mildred Lake - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Mildred Lake - May 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 3 ppb on May 27 10:00	Maximum Daily Average: 0.9 ppb on May 31		Hours of Data:	709
Minimum Value: 0 ppb on May 22 16:00	Minimum Daily Average: 0.2 ppb on May 28		Hours of Missing Data:	35
Maximum Diurnal Average: 0.8 ppb at hour 6	Minimum Diurnal Average: 0.2 ppb at hour 19		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 = 1 P ₉₉ = 3		Percent Operational Time:	100.0

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

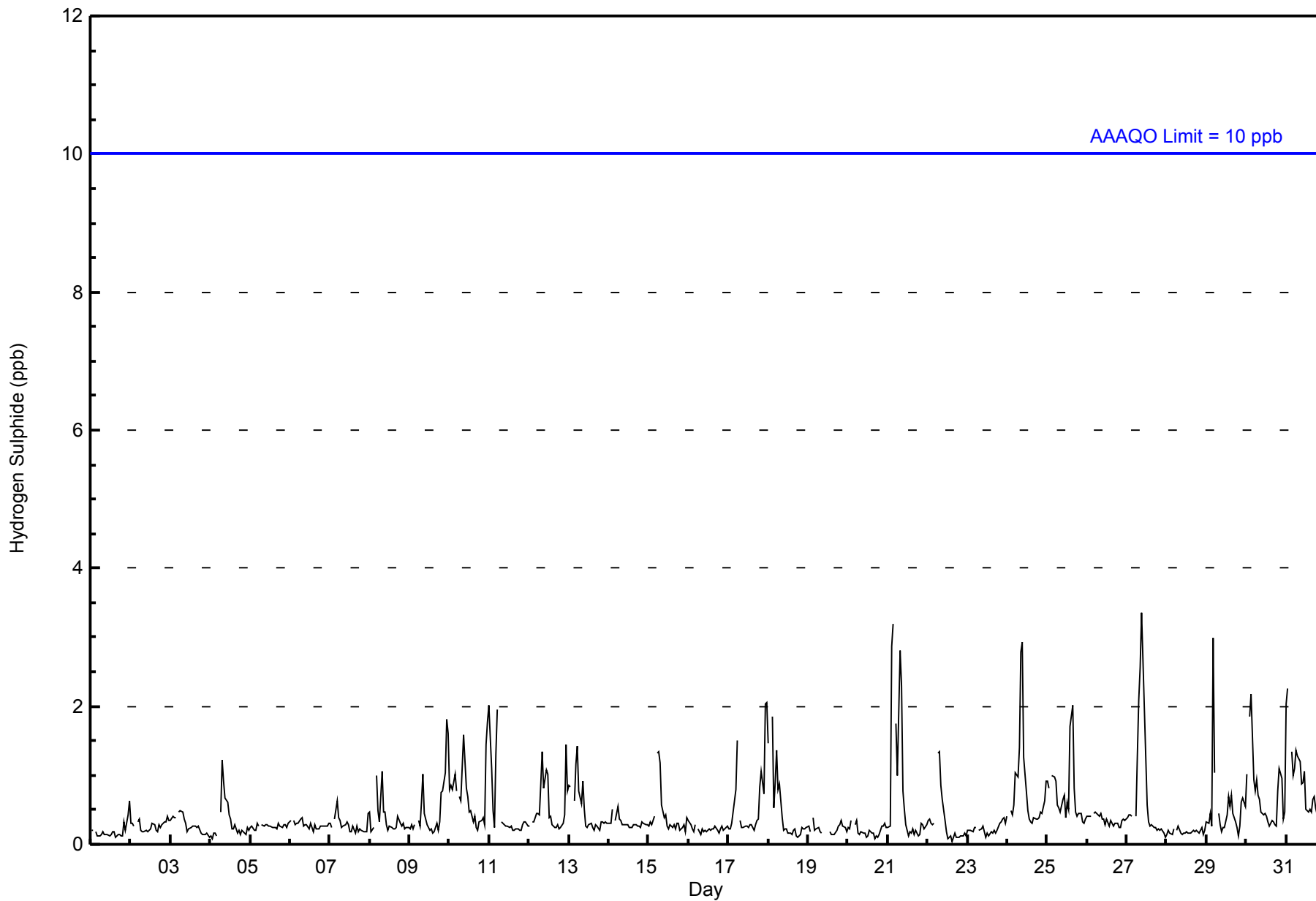
0.5	0.4	0.6	0.6	0.7	0.8	0.6	0.7	0.7	0.7	0.6	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.5	0.5	Diurnal Average
2	2	3	3	3	2	1	3	3	3	3	3	1	1	1	2	2	1	1	1	1	1	1	2	2	Diurnal Maximum

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



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - May 2015





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	700	98.73	98.73
3 - 4	9	1.27	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	62	118	49	23	24	19	30	59	79	96	57	37	12	13	9	13	700
3 - 4	0	0	0	0	1	1	2	4	1	0	0	0	0	0	0	0	9
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	62	118	49	23	25	20	32	63	80	96	57	37	12	13	9	13	709

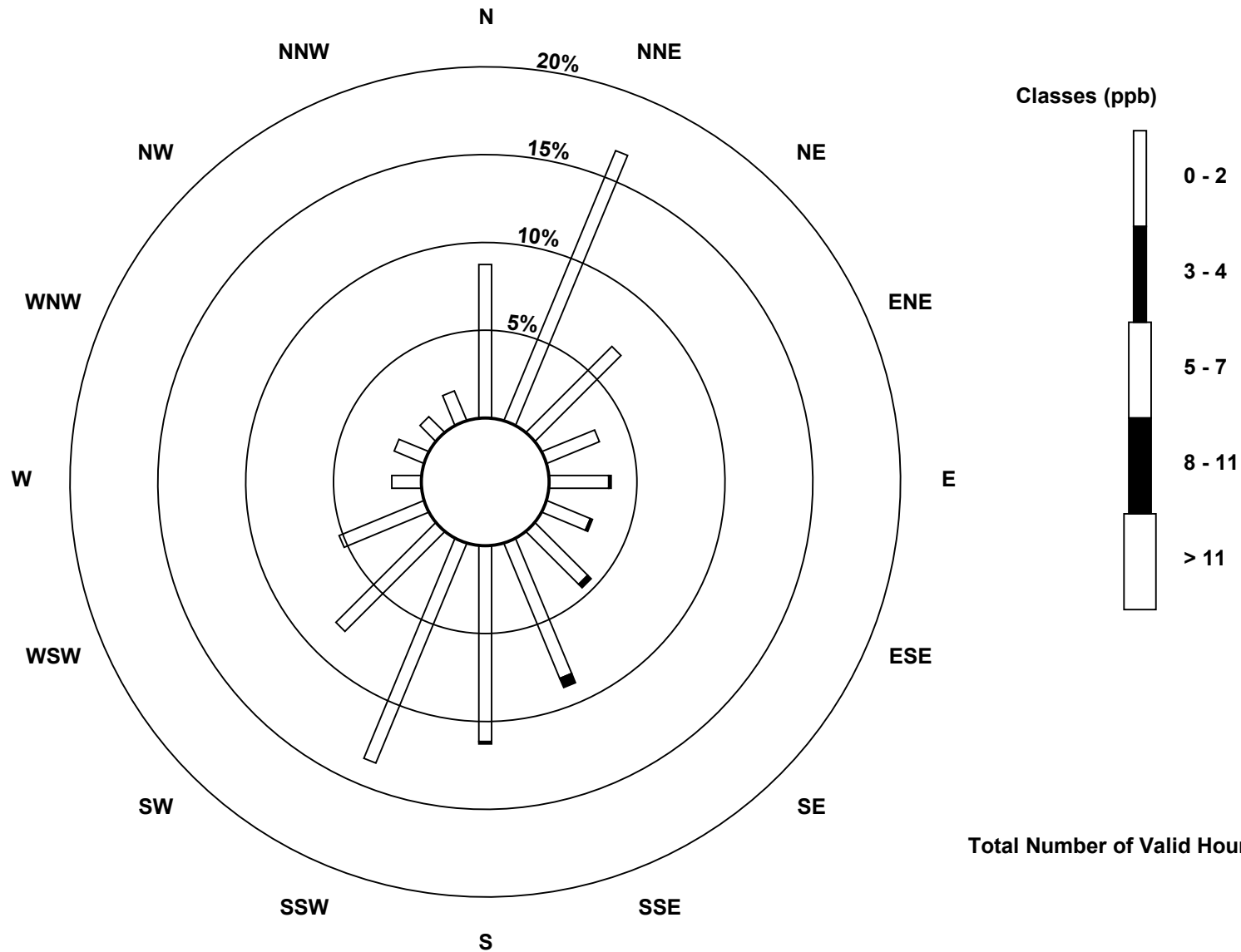
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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

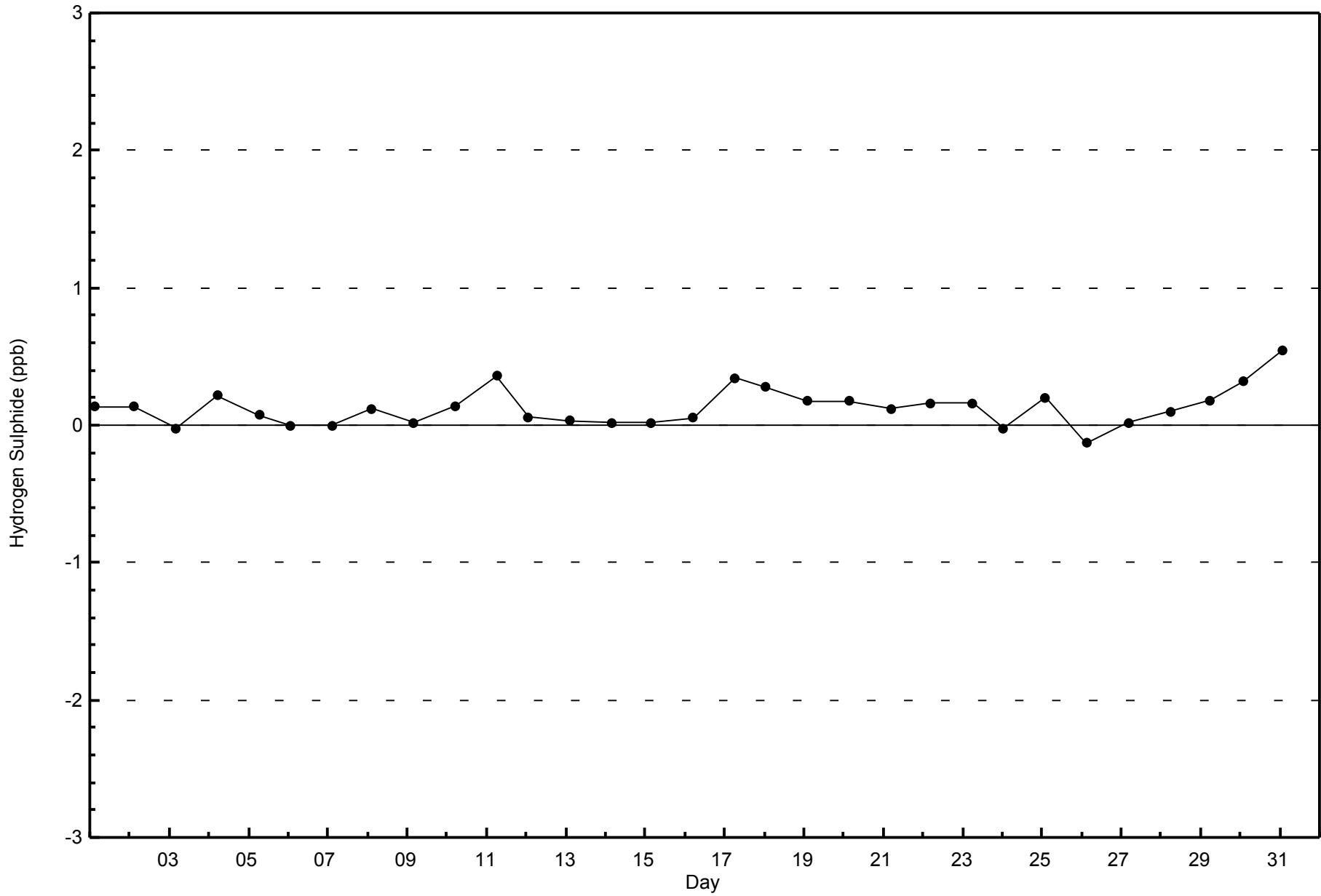


Total Number of Valid Hours: 709



WBEA
Zero Responses

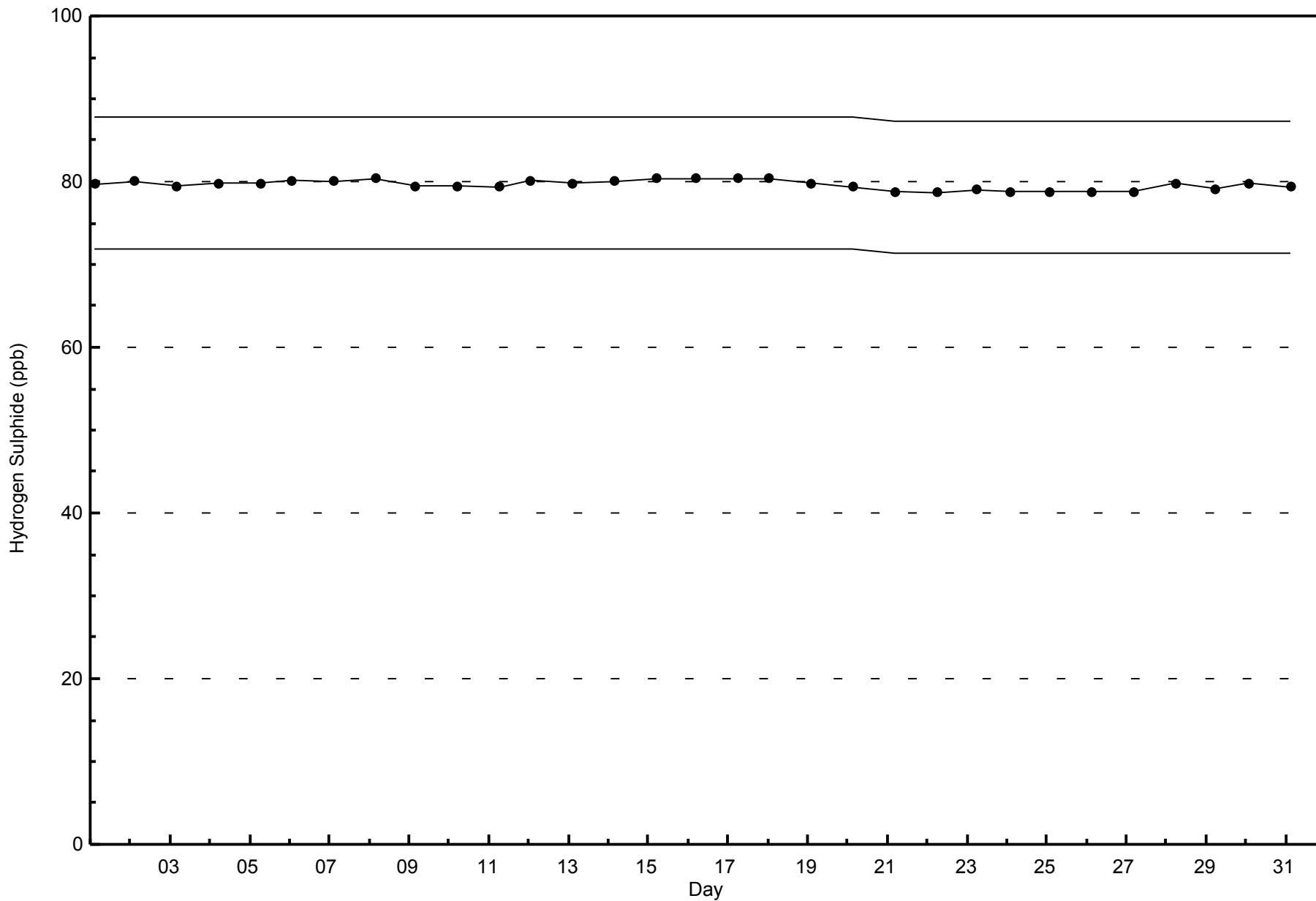
Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - May 2015





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Mildred Lake - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

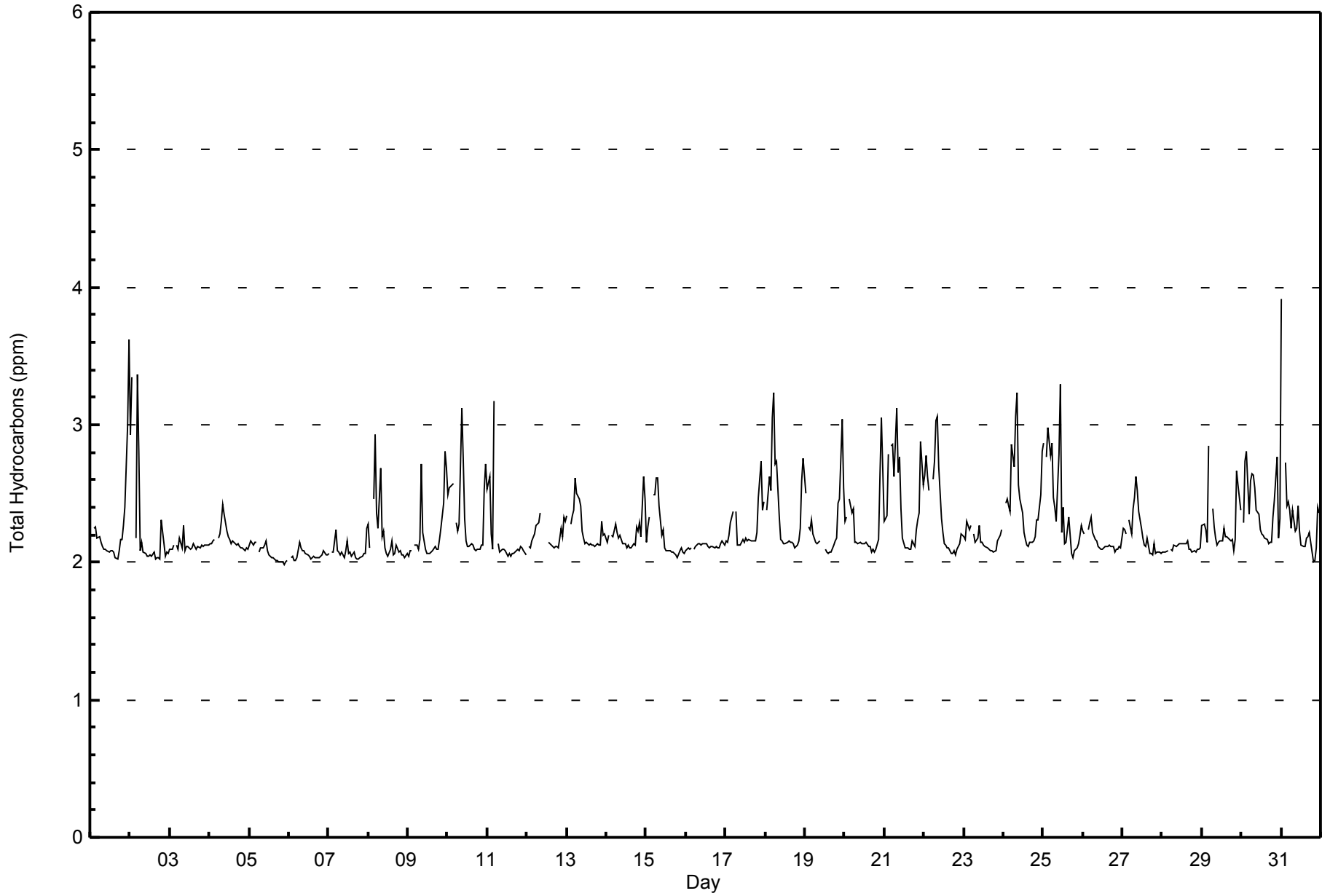
Mildred Lake - May 2015

Maximum Value: 3.9 ppm on May 31 01:00																			Maximum Daily Average: 2.4 ppm on May 24						Hours in Service: 744	
Minimum Value: 2.0 ppm on May 5 22:00																			Minimum Daily Average: 2.1 ppm on May 6						Hours of Data: 707	
Maximum Diurnal Average: 2.5 ppm at hour 5																			Minimum Diurnal Average: 2.1 ppm at hour 17						Hours of Missing Data: 37	
Monthly Average: 2.24 ppm																			Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.1 Q ₃ = 2.3 P ₉₀ = 2.6 P ₉₉ = 3.2						Hours of Calibration: 35	
																									Percent Operational Time: 99.7	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	2.2	Z	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.2	2.2	2.3	2.4	3.0	3.6	2.2	3.6
2-May	2.9	3.3	Z	2.2	3.4	2.8	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.3	2.1	2.0	2.1	2.1	2.3	3.4
3-May	2.1	2.1	2.1	Z	2.1	2.1	2.2	2.1	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
4-May	2.1	2.1	2.2	2.2	Z	2.2	2.2	2.3	2.4	2.3	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	
5-May	2.1	2.2	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	
6-May	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	
7-May	2.1	Z	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	
8-May	2.3	2.1	Z	2.5	2.9	2.4	2.2	2.7	2.2	2.2	2.1	2.1	2.0	2.1	2.2	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.9	
9-May	2.0	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.7	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4	2.8	2.2	2.8	
10-May	2.5	2.5	2.6	2.6	Z	2.3	2.2	2.3	3.1	2.8	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5	2.7	2.3	3.1	
11-May	2.5	2.6	2.2	2.1	3.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	3.2	
12-May	Z	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.4	C	C	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.2	2.4	
13-May	2.3	Z	2.3	2.3	2.4	2.6	2.5	2.5	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.2	2.6		
14-May	2.1	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.3	2.2	2.6	2.2	2.6	
15-May	2.1	2.3	2.3	Z	2.5	2.5	2.6	2.6	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.6	
16-May	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	
17-May	2.2	2.1	2.2	2.3	2.4	Z	2.4	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.7	2.4	2.2	2.7	
18-May	Z	2.4	2.6	2.5	3.1	3.2	2.7	2.7	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.6	2.4	3.2	
19-May	2.5	Z	2.3	2.2	2.3	2.2	2.1	2.1	2.1	2.2	M	M	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4	2.5	3.0	2.3	3.0	
20-May	2.3	2.3	Z	2.5	2.4	2.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.6	3.1	2.3	3.1	
21-May	2.3	2.3	2.8	Z	2.8	2.9	2.6	3.1	2.7	2.8	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.3	2.4	2.9	2.4	3.1	
22-May	2.6	2.8	2.6	2.5	Z	2.6	2.7	3.0	3.1	2.7	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4	3.1	
23-May	2.2	2.2	2.3	2.2	2.3	Z	2.2	2.1	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	
24-May	Z	2.4	2.5	2.4	2.4	2.9	2.7	3.1	3.2	2.6	2.5	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.5	2.4	3.2	
25-May	2.9	Z	2.8	3.0	2.8	2.9	2.5	2.4	2.3	2.8	3.3	2.2	2.4	2.1	2.1	2.3	2.2	2.1	2.0	2.1	2.1	2.1	2.2	2.4	3.3	
26-May	2.2	2.2	Z	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	
27-May	2.3	2.2	2.2	Z	2.3	2.2	2.4	2.5	2.6	2.5	2.4	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.6	
28-May	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
29-May	2.3	2.3	2.2	2.1	2.8	Z	2.4	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.7	2.6	2.3	2.8	
30-May	Z	2.3	2.7	2.8	2.3	2.6	2.6	2.6	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.5	2.8	2.2	2.4	2.8	
31-May	3.9	Z	2.7	2.4	2.4	2.4	2.3	2.4	2.2	2.2	2.4	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.0	2.0	2.1	2.4	2.3	3.9	
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	51	7.21	7.21
2.1 - 3.0	642	90.81	98.02
3.1 - 10.0	14	1.98	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	12	12	7	7	3	1	0	0	1	4	2	0	0	0	1	1	51
2.1 - 3.0	48	109	39	16	22	19	30	62	73	88	58	35	12	10	8	13	642
3.1 - 10.0	1	0	0	0	1	0	0	2	5	2	1	0	0	2	0	0	14
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	121	46	23	26	20	30	64	79	94	61	35	12	12	9	14	707

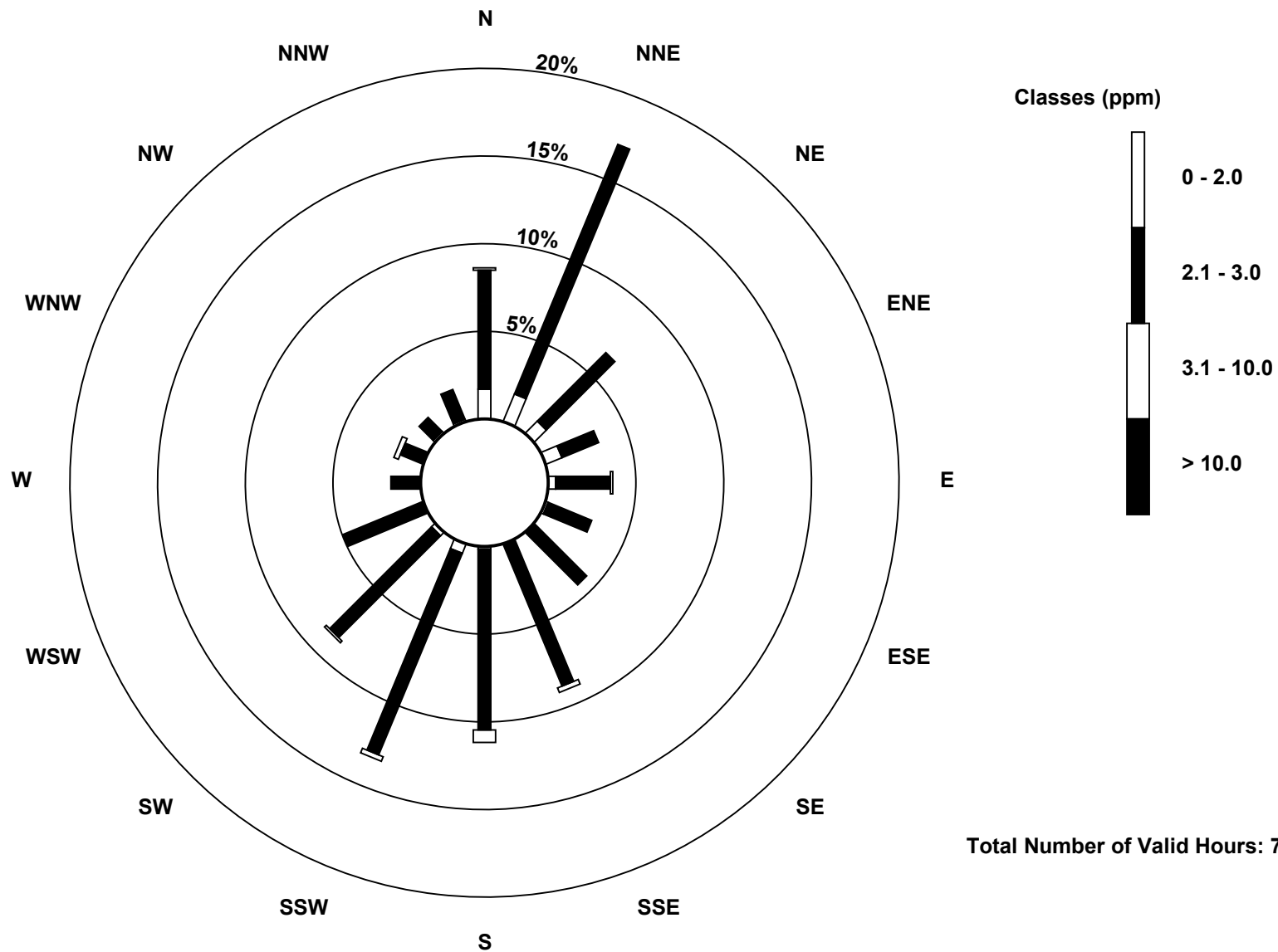
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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

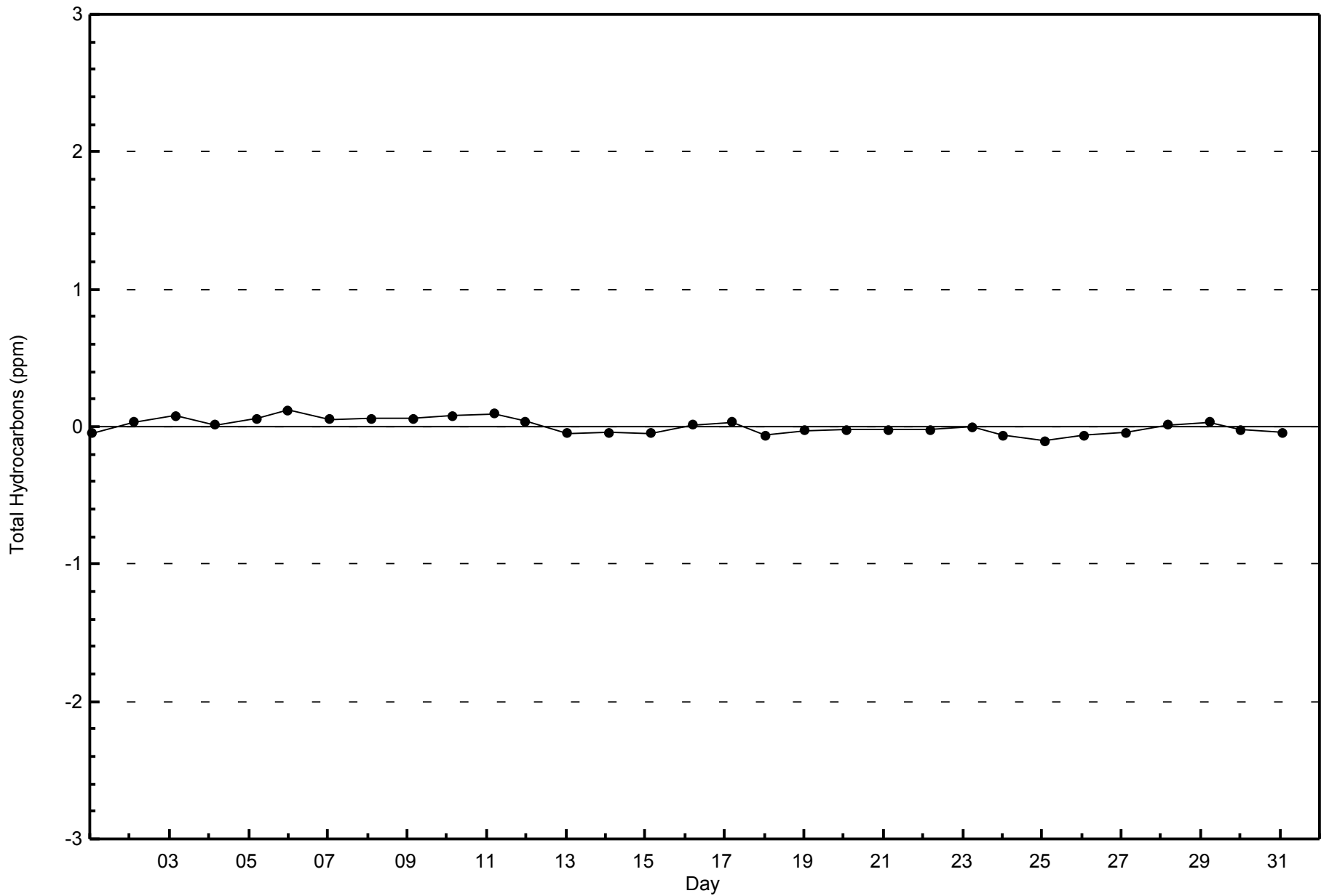


Total Number of Valid Hours: 707



WBEA
Zero Responses

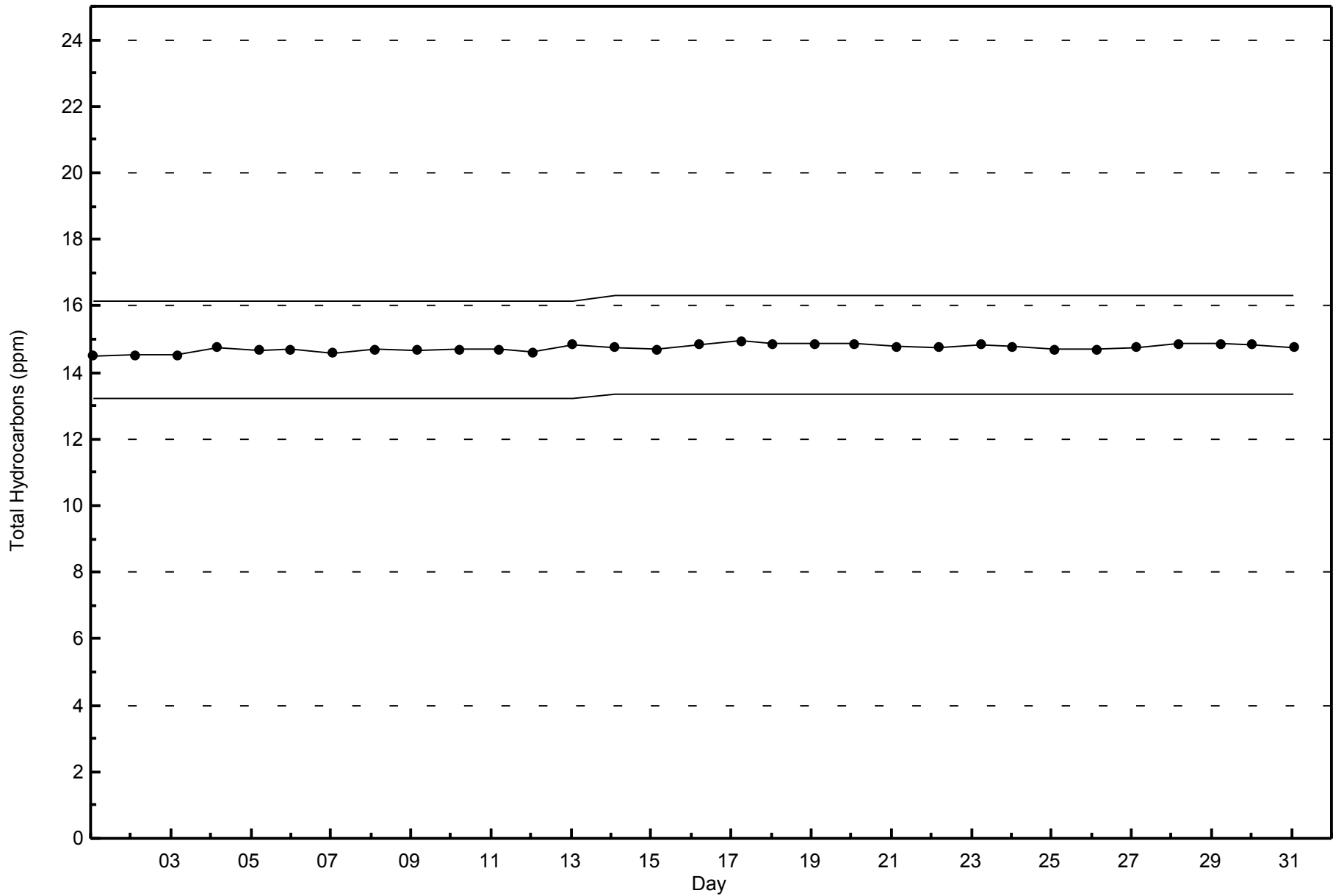
Total Hydrocarbons (THC) - ppm
Mildred Lake - May 2015





WBEA
Span Responses

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



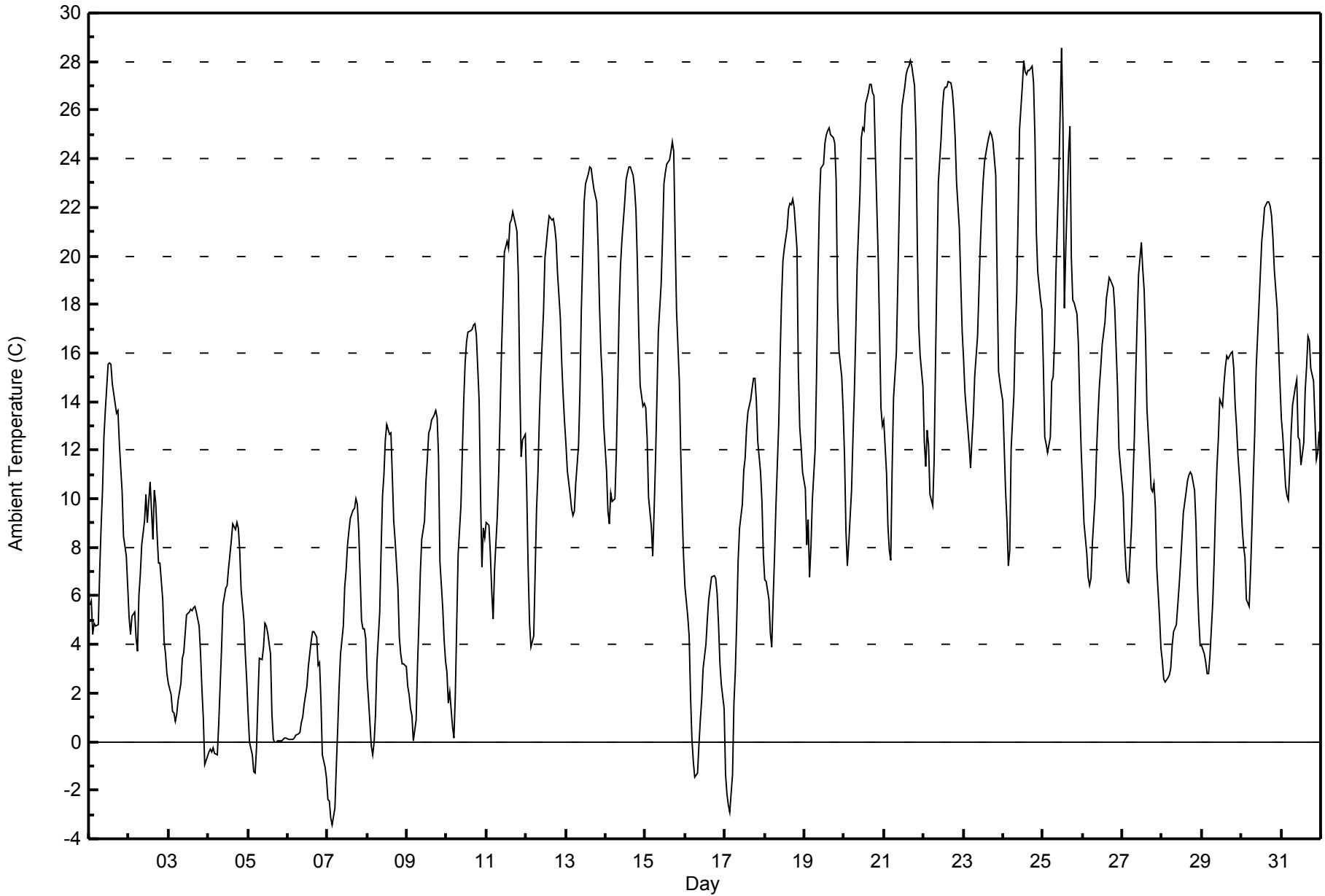


Maximum Value: 28.6 C on May 25 12:00		Maximum Daily Average: 20.1 C on May 22		Hours in Service: 744																							
Minimum Value: -3.4 C on May 7 04:00		Minimum Daily Average: 1.2 C on May 5		Hours of Data: 744																							
Maximum Diurnal Average: 17.2 C at hour 16		Minimum Diurnal Average: 4.7 C at hour 5		Hours of Missing Data: 0																							
Monthly Average: 11.72 C		Percentiles: P ₁ = -2.2 P ₁₀ = 1.6 Q ₁ = 5.4 Median = 11.1 Q ₃ = 17.2 P ₉₀ = 23.3 P ₉₉ = 27.6		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	5.6	5.8	4.4	4.9	4.7	4.8	7.1	8.8	10.4	12.5	13.6	15.6	15.6	15.6	14.7	14.3	13.5	13.6	12.3	11.3	10.3	8.5	7.6	6.4	10.1	15.6	
2-May	5.1	4.4	5.1	5.4	4.2	3.7	6.0	6.9	8.1	9.1	10.2	9.0	9.9	10.7	8.3	10.3	9.8	8.5	7.3	7.3	5.8	4.1	3.6	2.8	6.9	10.7	
3-May	2.4	1.9	1.2	1.2	0.9	1.1	1.7	2.4	3.5	3.7	4.4	5.2	5.4	5.4	5.5	5.6	5.4	4.8	3.7	2.2	0.9	-1.0	-0.6	3.0	5.6		
4-May	-0.4	-0.3	-0.4	-0.2	-0.5	-0.5	0.7	2.3	3.8	5.6	6.3	6.4	7.1	7.7	8.3	9.0	8.7	9.0	8.8	7.9	6.2	5.0	3.6	2.5	4.4	9.0	
5-May	1.1	-0.1	-0.5	-1.2	-1.3	-0.2	1.7	3.4	3.4	3.9	4.9	4.8	4.5	3.6	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	1.2	4.9	
6-May	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.4	0.8	1.0	1.5	2.3	3.1	3.6	4.1	4.5	4.5	4.3	3.1	3.3	1.7	-0.5	-1.0	-1.5	1.5	4.5	
7-May	-2.4	-2.4	-3.1	-3.4	-2.7	-1.0	0.6	2.3	3.6	4.7	6.4	7.1	8.1	8.7	9.2	9.5	9.6	10.0	9.8	8.7	5.0	4.7	4.6	4.3	4.2	10.0	
8-May	2.6	1.7	-0.2	-0.5	0.0	1.1	3.3	5.4	7.9	10.1	11.0	12.4	13.0	12.7	12.7	10.9	9.1	8.3	6.3	4.3	3.6	3.2	3.2	3.1	6.0	13.0	
9-May	2.3	1.9	1.3	1.1	0.0	0.9	3.1	4.9	7.0	8.3	9.1	10.7	11.6	12.7	12.9	13.2	13.5	13.6	13.3	11.8	7.4	5.5	4.2	3.3	7.2	13.6	
10-May	2.8	1.6	2.0	0.6	0.1	1.9	4.9	7.7	9.7	11.9	14.0	15.6	16.4	16.9	16.9	17.0	17.1	17.2	16.7	14.0	10.1	7.2	8.8	8.4	10.0	17.2	
11-May	9.0	8.9	7.8	6.2	5.1	7.1	9.3	11.1	13.6	16.1	18.1	20.1	20.6	20.3	21.3	21.5	21.8	21.3	21.0	19.2	14.9	11.7	12.4	12.7	14.6	21.8	
12-May	10.4	7.2	4.9	3.9	4.4	6.9	9.6	11.1	13.3	15.1	17.7	19.9	20.5	21.1	21.6	21.5	21.5	21.2	20.6	19.3	17.4	15.6	14.3	13.2	14.7	21.6	
13-May	12.3	11.2	10.2	9.6	9.3	9.5	10.6	12.2	14.4	17.8	19.9	22.2	23.0	23.4	23.6	23.6	23.1	22.8	22.2	20.4	17.9	16.0	14.9	13.0	16.8	23.6	
14-May	11.1	9.5	9.0	10.2	9.9	10.0	11.9	14.7	17.8	19.7	20.7	22.2	23.1	23.4	23.7	23.7	23.3	22.8	21.9	19.8	16.9	14.7	13.8	13.9	17.0	23.7	
15-May	13.7	12.5	10.1	8.9	7.7	9.6	11.6	14.2	16.9	18.8	20.7	23.0	23.5	23.8	24.0	24.3	24.7	24.3	20.8	17.8	14.8	11.9	9.5	7.6	16.4	24.7	
16-May	6.3	5.2	4.4	1.9	0.1	-0.8	-1.5	-1.3	-0.2	0.9	1.8	3.0	4.0	5.1	5.8	6.3	6.8	6.8	6.7	6.1	4.8	3.2	2.3	1.4	3.3	6.8	
17-May	-1.4	-2.2	-2.6	-2.9	-1.4	1.6	2.9	5.0	7.5	8.8	9.8	11.2	11.7	12.9	13.6	14.1	14.5	14.9	15.0	14.1	12.4	11.1	9.9	7.7	7.8	15.0	
18-May	6.7	6.6	5.8	4.5	3.9	5.8	7.6	9.7	13.1	15.9	18.3	19.8	20.3	21.1	21.9	22.2	22.1	22.3	22.0	20.3	15.3	12.9	12.2	11.1	14.2	22.3	
19-May	10.4	8.1	9.2	6.8	8.1	9.9	12.0	15.1	19.1	22.0	23.6	23.8	24.6	25.0	25.2	25.3	25.0	24.8	24.6	23.1	18.2	16.1	15.0	13.6	17.9	25.3	
20-May	11.8	8.7	7.2	8.2	10.4	12.5	14.4	16.8	19.6	22.6	24.9	25.3	25.2	26.3	26.7	27.0	27.1	26.7	26.6	24.3	20.0	17.0	13.7	13.0	19.0	27.1	
21-May	13.2	11.1	8.8	7.9	7.5	11.2	14.2	16.0	18.7	21.7	24.6	26.1	27.0	27.5	27.7	27.8	28.0	27.8	27.0	25.1	20.3	17.1	15.9	14.6	19.5	28.0	
22-May	12.3	11.3	12.8	12.2	10.2	9.7	11.6	15.7	19.4	23.0	24.9	26.2	26.8	26.9	26.9	27.2	27.1	26.8	26.1	24.9	23.0	21.1	18.9	16.9	20.1	27.2	
23-May	15.8	14.4	13.6	12.2	11.2	12.4	13.4	15.1	16.7	18.6	20.5	21.9	23.1	23.9	24.6	24.9	25.1	25.0	24.7	23.3	19.0	15.2	14.8	14.4	18.5	25.1	
24-May	14.1	10.4	9.1	7.2	7.8	12.1	14.3	16.9	18.5	21.7	25.2	27.0	28.0	27.6	27.4	27.6	27.7	27.8	27.1	24.9	21.0	19.3	18.2	17.8	19.9	28.0	
25-May	15.5	12.6	12.2	11.9	12.6	14.9	15.0	16.5	19.3	23.3	25.9	28.6	25.5	17.9	20.3	24.3	25.4	19.9	18.2	18.1	17.6	16.4	14.0	12.0	18.2	28.6	
26-May	10.6	9.0	7.8	6.8	6.4	6.7	8.2	10.1	12.0	13.4	14.6	15.4	16.3	17.3	18.3	18.6	19.1	19.0	18.7	17.8	16.1	14.6	12.1	11.4	13.3	19.1	
27-May	10.1	8.3	7.1	6.6	6.6	8.9	10.7	12.5	15.1	17.4	19.2	20.6	19.5	18.6	16.6	13.7	11.6	10.4	10.3	10.6	9.6	7.2	5.1	3.8	11.7	20.6	
28-May	3.3	2.6	2.4	2.6	2.7	3.0	3.9	4.5	4.8	5.6	6.4	7.4	8.4	9.4	10.3	10.8	11.0	11.1	11.0	10.4	9.0	6.5	5.1	4.0	6.5	11.1	
29-May	3.9	3.6	3.3	2.8	2.8	3.6	5.7	7.5	9.6	11.3	12.5	14.1	13.8	14.7	15.4	15.9	15.8	16.0	16.0	15.4	13.9	12.9	11.8	10.1	10.5	16.0	
30-May	8.9	8.0	7.6	5.9	5.5	7.0	8.9	10.9	12.8	15.3	17.9	19.3	20.6	21.3	22.0	22.2	22.2	22.0	21.6	20.7	19.4	17.9	16.3	14.8	15.4	22.2	
31-May	13.3	12.6	10.5	10.1	10.0	11.2	12.8	13.9	14.6	14.9	12.5	12.4	11.4	12.3	14.4	15.4	16.7	16.5	15.4	14.8	13.2	11.6	11.9	12.7	13.1	16.7	
		7.4	6.3	5.5	4.9	4.7	6.0	7.6	9.4	11.4	13.4	14.9	16.1	16.5	16.7	16.9	17.2	17.1	16.8	16.1	14.9	12.5	10.6	9.5	8.7	Diurnal Average	
		15.8	14.4	13.6	12.2	12.6	14.9	15.0	16.9	19.6	23.3	25.9	28.6	28.0	27.6	27.7	27.8	28.0	27.8	27.1	25.1	23.0	21.1	18.9	17.8	Diurnal Maximum	



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Mildred Lake - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Mildred Lake - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	34	4.57	4.57
0 - 10	296	39.78	44.35
10 - 20	278	37.37	81.72
> 20	136	18.28	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

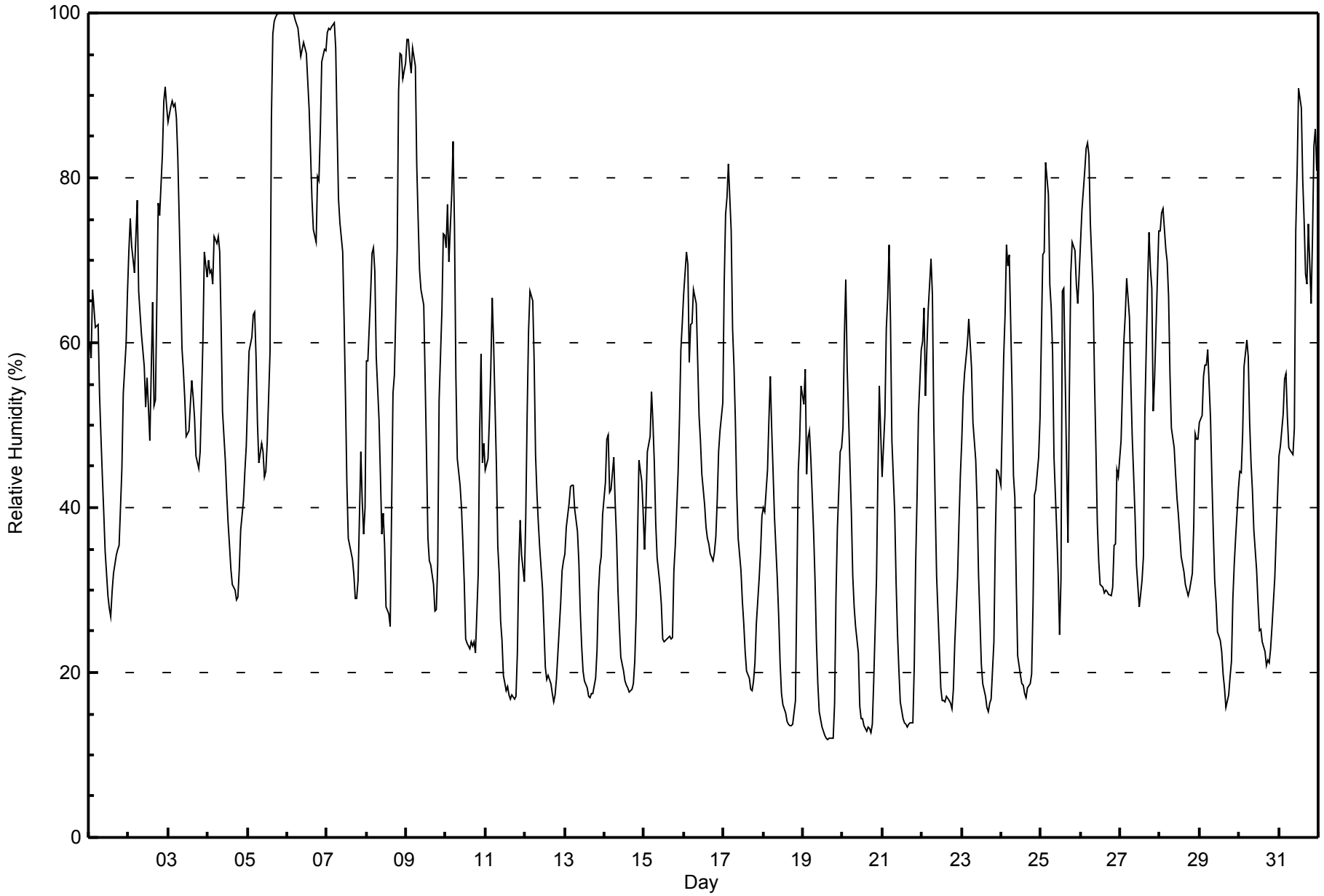


Maximum Value: 100 % on May 5 21:00																		Maximum Daily Average: 91.4 % on May 6																		Hours in Service: 744													
Minimum Value: 12 % on May 19 16:00																		Minimum Daily Average: 29.1 % on May 19																		Hours of Data: 744													
Maximum Diurnal Average: 68.0 % at hour 5																		Minimum Diurnal Average: 32.1 % at hour 13																		Hours of Missing Data: 0													
Monthly Average: 47.2 %																		Percentiles: P ₁ = 13 P ₁₀ = 18 Q ₁ = 30 Median = 45 Q ₃ = 63 P ₉₀ = 79 P ₉₉ = 100																		Hours of Calibration: 0													
																																				Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	60	58	66	64	62	62	54	49	44	40	35	29	28	27	30	32	34	35	35	40	45	54	60	66	46.2	66																							
2-May	71	75	72	68	73	77	66	64	61	57	52	56	52	48	65	52	53	65	77	75	83	89	91	89	68.0	91																							
3-May	87	89	89	89	89	87	83	68	59	57	53	49	49	52	55	53	51	46	45	47	53	61	71	68	64.6	89																							
4-May	70	69	69	67	73	72	73	71	62	52	46	42	38	35	32	31	30	29	29	33	37	41	44	47	49.7	73																							
5-May	53	59	61	63	64	58	50	45	48	47	44	44	48	59	87	98	99	100	100	100	100	100	100	100	71.9	100																							
6-May	100	100	100	100	100	99	98	96	95	96	96	95	92	88	83	78	74	72	80	80	86	94	96	95	91.4	100																							
7-May	98	98	98	98	99	96	86	77	75	71	63	53	43	36	35	34	32	29	29	31	47	41	37	40	60.2	99																							
8-May	58	58	66	71	72	69	58	51	44	37	39	35	28	27	26	40	54	56	71	90	95	95	92	94	59.4	95																							
9-May	97	97	94	93	96	94	81	75	69	66	65	56	46	36	34	33	31	27	28	33	53	64	73	73	63.1	97																							
10-May	71	77	70	78	84	74	56	46	43	40	36	31	24	24	23	24	23	24	22	32	49	59	45	48	45.9	84																							
11-May	45	46	51	57	65	60	45	35	32	26	24	20	18	18	17	17	17	17	17	22	33	38	34	31	32.8	65																							
12-May	39	51	61	66	65	58	46	42	38	35	30	26	21	19	20	19	17	17	17	19	25	28	32	34	34.4	66																							
13-May	34	38	41	43	43	43	40	37	33	28	23	20	19	18	17	17	17	17	19	23	30	33	34	39	29.4	43																							
14-May	43	48	49	42	42	46	41	36	30	26	22	20	19	19	18	18	18	19	21	27	37	46	43	39	32.0	49																							
15-May	35	40	47	49	54	50	45	38	34	31	28	24	24	24	24	24	24	24	32	35	44	51	59	62	37.7	62																							
16-May	66	71	69	58	62	62	67	65	58	51	48	44	40	38	36	36	34	34	35	37	41	47	49	53	50.0	71																							
17-May	67	76	78	82	74	62	57	50	42	36	32	29	26	23	20	19	18	18	19	21	26	31	35	39	40.8	82																							
18-May	40	39	45	51	56	50	44	39	31	27	21	18	16	15	14	14	14	14	14	17	30	44	48	55	31.4	56																							
19-May	53	57	44	48	49	46	37	31	24	19	15	13	13	12	12	12	12	12	12	16	29	37	47	47	29.1	57																							
20-May	50	61	68	57	45	39	32	28	26	22	16	14	14	14	13	13	13	13	14	19	32	44	55	49	31.3	68																							
21-May	44	51	62	65	72	63	48	39	31	25	20	16	14	14	14	13	14	14	14	21	33	41	51	59	35.0	72																							
22-May	60	64	54	59	64	70	66	50	40	32	23	18	17	17	16	17	17	16	16	18	23	32	38	44	36.3	70																							
23-May	48	54	56	60	63	60	57	50	46	40	32	27	21	19	17	16	15	16	17	24	36	45	44	44	37.7	63																							
24-May	43	58	63	72	69	71	54	44	41	31	22	20	19	18	17	18	19	20	28	41	42	46	51	38.6	72																								
25-May	61	71	71	82	78	67	64	59	46	37	32	25	31	66	67	46	36	54	68	72	71	67	65	68	58.5	82																							
26-May	72	76	81	84	84	83	75	66	55	47	38	34	31	30	30	30	30	30	29	30	35	36	45	44	49.7	84																							
27-May	48	54	60	63	68	63	55	49	44	39	33	28	30	31	34	51	67	73	69	67	52	56	68	74	53.2	74																							
28-May	74	76	76	71	70	66	56	50	47	44	41	39	37	34	32	31	30	29	30	32	38	49	48	48	47.8	76																							
29-May	50	51	56	57	57	59	51	43	37	31	29	25	24	22	20	18	16	17	19	21	29	33	36	42	35.3	59																							
30-May	44	44	49	57	60	58	50	45	42	37	32	29	25	25	24	23	21	22	21	23	26	32	37	41	36.1	60																							
31-May	46	47	51	56	56	51	47	47	46	50	74	81	91	89	80	75	68	67	74	65	73	84	86	81	66.0	91																							
																								58.9	63.0	65.0	66.8	68.0	65.0	57.5	51.1	45.9	41.1	37.6	34.1	32.1	32.2	32.7	32.2	32.2	33.0	35.3	38.7	46.2	52.0	55.2	56.9	Diurnal Average	
																								100	100	100	100	100	99	98	96	95	96	96	95	92	89	87	98	99	100	100	100	100	100	100	100	100	Diurnal Maximum



WBEA
Hourly Averages

Relative Humidity (RH) - %
Mildred Lake - May 2015





Wood Buffalo Environmental Association
Summary of Hour Averages

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

Maximum Speed: 31 km/h on May 15 23:00	Maximum Daily Speed Average: 16.1 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 20 03:00	Minimum Daily Speed Average: 0.2 km/h on May 9	Hours of Data: 744
Maximum Diurnal Speed Average: 3.5 km/h at hour 22	Minimum Diurnal Speed Average: 1.0 km/h at hour 5	Hours of Missing Data: 0
Monthly Average Velocity: 0.9 km/h 71.0 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 5 Median = 8 Q ₃ = 11 P ₉₀ = 15 P ₉₉ = 23	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	WSW8	WSW9	SSW8	SSW9	SW8	SSW9	SSW9	SW10	WSW14	SW13	WSW13	SW15	WSW13	WSW15	WSW16	NW8	N6	WNW6	NW16	WSW7	WNW8	NNW7	WNW7	WNW7	WSW8.3	NW16
2-May	NNW8	WNW6	NNW6	NNW8	N4	NE3	N8	N16	NNE16	NNE14	N15	N17	N15	N12	NNW12	N10	NNE10	NNE4	SSW3	WSW4	NNW15	N14	NNE12	NNE12	N9.0	N17
3-May	NNE11	NNE7	N7	N7	N6	NNE5	NNW8	N8	NW9	NNW15	NW12	NW11	N10	N10	NNE16	NNE17	NNE14	NNE14	NE12	NE7	E6	E5	ENE4	NE5	N7.9	NNE17
4-May	NE4	NNE4	NNE4	NNE5	NE2	NNE4	ENE4	SSE5	SSW5	SSW8	SSW6	N1	ESE3	NE5	ENE6	E6	E5	E6	E7	NE7	NE9	NE10	NE9	NE10	ENE3.7	NE10
5-May	NNE10	N10	N9	N10	NNE9	NNE10	NNE10	NE9	N12	NNE12	NNE12	N16	NNE12	NNE17	NNE15	NE13	NE13	NE8	NE11	NNE10	NNE7	NNE8	NNE7	NNE9	NNE10.5	NNE17
6-May	NNE9	N9	N10	NNE9	N10	N10	N10	NNE13	NNE17	NNE15	NNE13	NNE13	NE13	NE15	NE14	NE14	ENE12	ENE9	E9	ENE5	NE5	ENE5	ESE3	N4	NNE9.2	NNE17
7-May	NE4	NNE3	ESE2	S3	S6	SSW7	SSW9	SSW8	SW7	SSW6	W2	NNW7	N6	ENE7	NNE7	ENE7	ENE7	ENE7	ENE7	E7	E7	E8	ESE10	SSE6	ESE2.3	ESE10
8-May	SW5	SSW5	SSE3	ESE5	SSE3	SW5	S6	S8	SW6	SSW7	SSW4	SSW3	SW5	SSW2	NNW5	NNW21	N14	NE14	ENE13	NE10	E11	E10	ESE9	SSE1	E1.7	NNW21
9-May	N8	NNE9	NE7	NE9	N8	NNE5	E4	S1	SW4	SW6	WSW5	WSW6	WSW8	SW7	W5	SW3	S5	SSW2	S5	SSE4	SSE6	SE4	ESE4	E5	SSW0.2	NE9
10-May	SE1	E3	SSE5	WSW1	WNW2	NNW3	N3	WNW2	SW5	SW5	SW6	SW8	SW7	SW7	SSW5	SSE7	SE7	SE8	SE6	E4	E5	E7	SE7	SE8	SSE2.7	SE8
11-May	SSE10	S8	S7	S6	S6	SSW5	S8	S10	SSW9	SSW9	SSW8	SSW8	SSW8	S8	SW7	SSW7	SW9	SW6	SW3	NNE2	WNW2	NE6	E10	ESE14	S5.3	ESE14
12-May	E7	NNE4	NE4	ENE3	NE1	N2	E6	SE7	SSW7	WSW6	SW6	SSW8	SSE14	S10	S12	SSE11	S11	SSE10	SE11	ESE10	SE17	SE19	SE18	SE17	SSE7.1	SE19
13-May	SE15	SE13	SSE13	SSE13	SSE12	SSE13	SSE14	SSE14	SSE11	S6	SSW7	SW9	SW11	SW9	WSW8	WSW6	SSW7	SSW7	SSW8	SSW14	SSW9	S9	S9	S6	S8.7	SE15
14-May	S6	S7	S3	SW7	SW7	SSW7	SSW9	SSW10	SW12	SW12	WSW13	WSW11	SW11	SW10	SW10	SW10	WSW10	WSW9	SW8	SW7	SSW6	SW7	SW9	WSW10	SW8.4	WSW13
15-May	WSW11	SW8	S4	SSE3	E4	E6	SE7	SSE6	SSW7	SSW7	SSW9	SW12	WSW12	W10	W10	WSW10	SW11	WNW8	NNE15	NW3	N25	N31	NNE31	N30	NNW4.2	NNE31
16-May	NNE23	NNE19	NNE18	NNE23	NNE19	NNE22	N21	N21	N20	NNE22	NNE21	NNE19	NNE18	NE18	NNE17	NE17	NE15	NE14	NE11	NNE10	NNE8	NNE8	NE7	NE6	NNE16.1	NNE23
17-May	NE4	NNE4	SSE2	S3	S7	S10	S15	S14	SSW13	SSW11	S10	S8	SSE10	S11	SSE10	SSE8	SSE11	SSE12	SSE10	SSE10	SSE9	SSE10	SE10	SE9	SSE8.4	SSE15
18-May	SE9	SSE13	S10	S7	S6	S7	S7	S7	SSW8	SSW9	SW8	WSW10	SW9	WSW8	SW8	WSW7	W7	W8	WSW6	SW4	SSW4	SSW5	WSW3	SW5	SSW6.0	SSE13
19-May	SSW6	SSW6	SW5	SSW3	SSW6	SSW8	SSW10	SSW10	SSW10	SW10	SW10	SW6	SW5	WSW5	SSW6	SSW5	S7	S6	S5	SSE5	S4	SSW4	WSW3	SSW6	SSW5.9	SW10
20-May	SSW5	SSE2	SSW1	SSW4	S7	SSW10	SSW10	SSW10	SSW9	SSW8	SW6	SW4	S1	W4	WSW4	WNW5	WSW5	SSW3	SW5	SSW6	SW4	SSW4	S3	SSW3	SSW4.5	SSW10
21-May	S5	S4	SE4	ESE2	SSE1	SSW2	SSW5	SSE7	SSE8	S8	S6	SW3	WSW5	W5	W7	WNW7	W7	WNW6	NW6	ESE1	ESE1	SSW4	SSW5	SW4	SW2.8	SSE8
22-May	NE2	S1	SW6	SSW8	SSW2	E2	SE3	SSW3	SSW4	W1	NNE11	NNE16	N16	N18	NNE15	NNE15	N17	NNE17	NNE17	NNE13	NE10	NNE10	NNE9	N10	NNE7.1	N18
23-May	NNE7	N12	NNE11	NNE8	NNE8	NE6	NNE7	NNE6	N8	N10	NNE9	NNE8	N9	NE6	ENE5	NNE4	NNE5	NNE5	ESE4	ENE3	NNE1	NE5	NE4	N7	NNE6.2	N12
24-May	N8	NNE4	NNW1	NNE1	S3	SSW6	SSW7	S4	E6	SE7	S7	SW5	WSW5	NW5	NNE2	N4	SE3	S7	SSE5	E5	ESE4	ESE2	ENE2	NNW4	SSE1.2	N8
25-May	SSW1	N3	SSW3	S4	SE2	S4	SSW7	SSW7	SSW6	SSW5	SSW6	SW6	NW7	ENE5	ESE6	SE6	NW3	N20	NNE6	N8	N15	N20	N23	NNE17	N2.7	N23
26-May	N12	NNE11	N6	NNE5	NNE6	NNE10	N12	N13	NNE12	NNE13	NNE16	NNE15	NNE11	NNE10	N8	NNE6	NE6	ENE8	ENE10	NE8	NE7	NE7	E7	ESE8	NNE8.6	NNE16
27-May	SE6	ESE7	ESE6	ESE4	SW2	SSW6	SE4	SSE6	S6	SSE4	SSE4	SSW3	N9	NNW12	N22	N22	NNE21	NNE20	NNE15	NNE11	NNE21	NNE19	NNE18	NNE17	NNE7.2	N22
28-May	NNE20	NE17	NNE15	NNE14	NNE10	NNE12	NNE15	NNE18	NNE18	NNE17	N18	NNE17	NNE16	NNE15	NNE12	NNE12	NE12	NE11	NE10	NE10	NNE6	ENE6	ESE8	ESE8	NNE12.4	NNE20
29-May	SE8	SE9	S6	SSW10	SSE8	SE7	SSE10	S13	S11	S7	S6	SW6	W4	S6	SW4	WSW4	N3	SSE5	SSE7	SSW9	S8	S14	SSE18	SSE16	S7.3	SSE18
30-May	SSE12	SSE14	S11	SSE5	S7	S9	S10	S9	S8	SSW4	SSW6	SSE4	S4	S11	S10	SSE10	S13	SSE14	SSE14	SSE13	SSE15	S14	S15	S12	S10.1	SSE15
31-May	SSE11	SSE11	SE8	SE10	SE11	SSE14	SSE18	SSE16	SSE16	S9	S10	SSE5	SSW12	SSW13	S14	S15	S15	SSE13	S10	SSW14	S9	SSW6	W4	WNW9	S10.0	SSE18

ENE2.1	ENE1.8	E1.3	E1.0	ESE1.0	SE1.5	SSE2.4	SSE2.4	SSW1.9	SW1.5	W1.6	NNW2.3	NW1.8	NNW1.3	NNW1.7	NNE2.1	NE1.9	ENE2.3	ENE2.7	ENE2.4	ENE2.9	ENE3.5	E2.9	ENE2.5	Diurnal Average	
NNE23	NNE19	NNE18	NNE23	NNE19	NNE22	N21	N21	N20	NNE22	NNE21	NNE19	NNE18	N18	N22	N22	NNE21	N20	NNE17	N30	N25	N31	NNE31	N30	Diurnal Maximum	

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

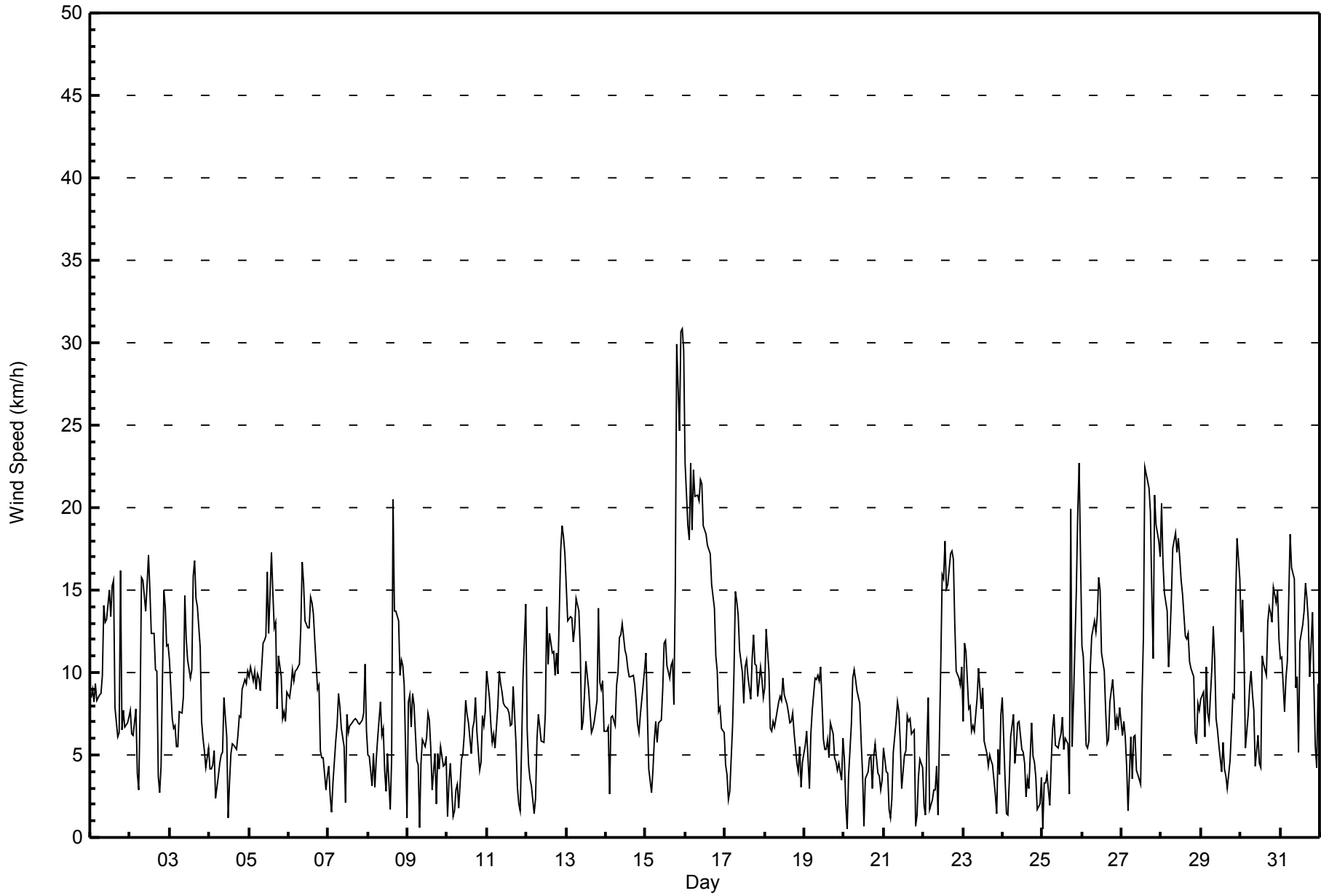
Wind Speed (WS) - km/h
Mildred Lake - May 2015

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



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	195	26.21	26.21
6 - 11	376	50.54	76.75
12 - 19	150	20.16	96.91
20 - 28	19	2.55	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
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	20	12	9	10	12	7	19	17	33	20	11	7	4	2	4	195
6 - 11	30	40	25	11	17	9	20	26	54	61	38	20	5	9	5	6	376
12 - 19	15	56	12	3	0	1	6	24	10	5	5	7	0	0	2	4	150
20 - 28	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	1	19
29 - 38	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	65	126	49	23	27	22	33	69	81	99	63	38	12	13	9	15	744

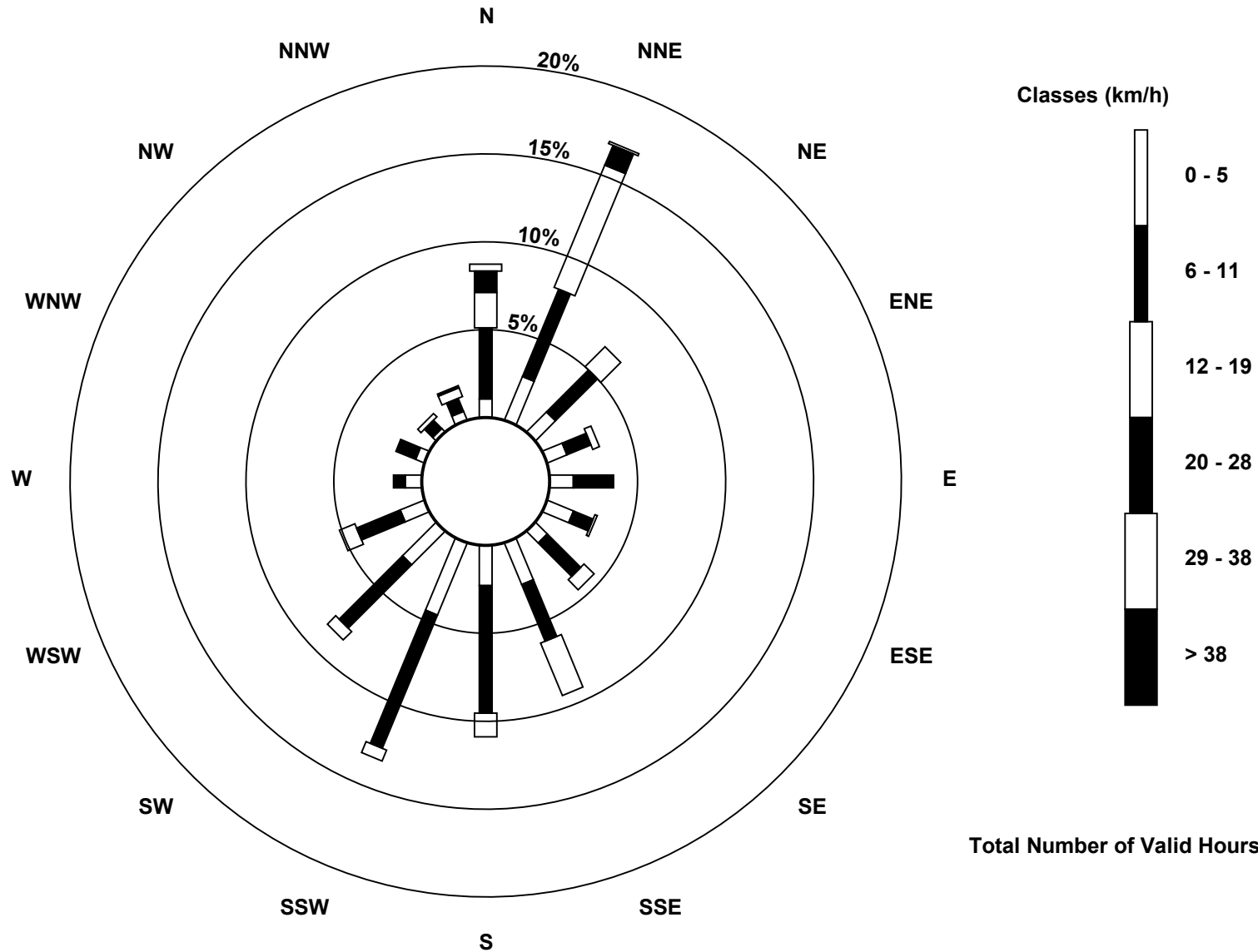
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Mildred Lake - May 2015

Direction of Maximum Speed: 12 deg on May 15 23:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 23.7 deg on May 16	Hours of Data: 744
Direction of Minimum Speed: 201 deg on May 20 03:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.2 deg on May 9	Percent Operational Time: 100.0
Monthly Average Direction: 206.8 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-May	243	245	205	212	228	212	212	231	247	234	243	230	245	246	256	309	355	296	304	244	289	330	285	296	252.2
2-May	337	299	330	335	350	51	360	9	21	31	10	359	4	5	327	7	13	28	205	239	346	10	21	23	2.0
3-May	22	18	5	1	357	18	340	350	325	330	313	318	356	5	15	16	33	31	38	44	92	82	65	37	9.2
4-May	46	31	32	31	38	27	63	152	203	205	197	350	106	56	73	95	93	80	83	47	42	45	53	39	65.5
5-May	12	7	10	7	14	27	32	34	11	20	20	11	31	21	22	34	49	44	43	29	30	22	21	14	23.3
6-May	13	11	9	12	9	5	5	12	15	15	20	32	36	42	56	53	67	77	89	77	44	78	106	351	32.2
7-May	47	30	122	174	179	200	203	207	214	211	270	330	358	63	20	72	71	72	71	87	83	87	115	156	104.9
8-May	215	208	152	118	154	226	186	171	215	203	200	199	236	198	333	345	0	52	60	56	81	88	104	158	88.0
9-May	4	14	39	38	9	29	81	178	227	225	239	248	251	229	281	220	189	201	188	147	155	130	119	92	206.2
10-May	143	92	157	244	300	338	351	293	223	232	221	222	224	231	202	165	133	141	137	91	100	92	140	126	167.8
11-May	155	170	181	179	175	192	186	191	206	203	204	212	208	180	215	204	234	215	216	26	298	42	91	108	184.2
12-May	100	14	42	63	46	359	97	131	200	241	230	213	163	174	180	168	169	153	124	115	129	129	146	144	147.9
13-May	139	128	150	155	161	162	166	167	153	189	208	229	228	234	250	240	204	202	206	195	202	180	188	172	180.9
14-May	187	173	171	228	224	193	197	204	221	231	249	248	232	230	234	228	239	238	235	224	212	219	224	237	224.3
15-May	242	228	183	164	84	101	131	165	209	208	204	235	244	274	259	253	234	290	20	4	6	11	12	9	331.6
16-May	12	12	15	17	25	13	8	7	10	24	19	31	29	35	24	41	53	48	46	31	25	15	42	55	23.7
17-May	43	32	150	182	173	172	169	176	197	193	183	189	165	174	151	150	153	154	153	155	160	160	146	130	164.3
18-May	131	161	175	188	188	184	187	181	208	205	223	238	236	241	234	250	272	260	249	234	201	209	246	231	211.2
19-May	204	199	236	196	196	198	196	198	212	219	221	236	227	242	205	200	172	182	172	148	170	212	237	196	203.9
20-May	208	161	201	204	180	192	196	196	196	201	229	221	169	270	240	285	240	197	215	203	218	212	179	193	207.3
21-May	191	178	144	105	157	197	204	160	159	173	184	227	241	266	275	290	274	290	320	110	109	199	203	236	217.6
22-May	51	185	228	211	207	97	141	196	212	273	24	18	9	9	22	18	11	24	22	30	37	32	12	8	19.0
23-May	22	3	14	21	25	48	15	16	10	11	25	33	4	48	72	27	19	31	105	75	25	53	34	3	24.6
24-May	10	30	335	18	184	205	199	176	95	129	187	225	238	306	30	4	125	187	156	94	103	117	72	348	155.6
25-May	212	11	192	191	145	188	201	204	195	193	195	228	323	69	109	146	309	352	12	5	4	8	9	13	2.6
26-May	11	13	7	13	20	14	8	360	21	29	18	12	21	24	11	13	49	61	61	54	46	47	81	111	26.8
27-May	128	116	117	114	226	209	124	152	169	168	160	193	5	346	4	2	19	20	21	19	29	20	24	19	26.6
28-May	25	34	30	31	25	27	30	23	12	12	6	14	27	20	16	33	36	35	43	34	32	66	110	110	28.4
29-May	136	132	176	198	158	135	164	173	180	183	190	226	264	178	220	237	353	156	168	193	180	169	166	164	173.7
30-May	149	157	172	157	191	189	177	179	181	198	192	167	178	170	175	168	173	165	162	161	162	174	191	174	171.7
31-May	153	156	132	132	142	154	158	164	163	182	169	163	195	194	177	172	176	168	191	194	174	204	277	297	171.4
65.9 70.9 89.6 84.1 119.9 141.3 154.0 166.1 205.2 227.3 261.8 296.7 308.4 336.0 343.2 15.6 53.5 65.0 74.5 72.5 65.2 65.0 80.3 62.9																									
Diurnal Average																									

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

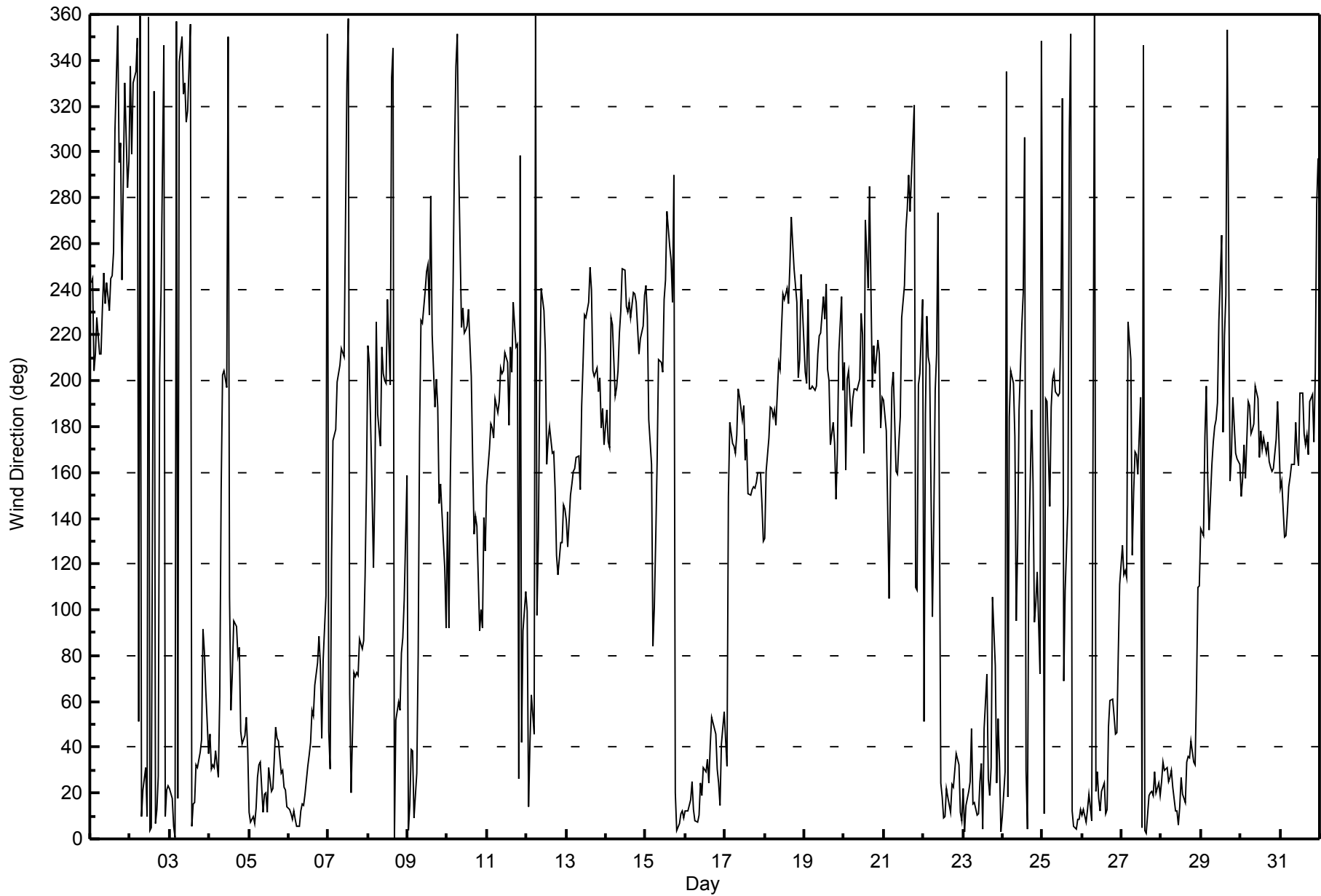
Mildred Lake - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on May 20 13:00 Minimum Value: 7 deg on May 10 22:00 Percentiles: P ₁ = 9 P ₁₀ = 13 Q ₁ = 16 Median = 23 Q ₃ = 37 P ₉₀ = 63 P ₉₉ = 97																			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-May	26	23	25	19	29	18	23	29	23	23	26	25	33	30	34	71	77	60	27	28	30	37	19	18	77
2-May	12	21	33	16	41	36	16	17	22	27	24	21	24	40	22	34	65	71	64	27	46	13	17	17	71
3-May	16	18	12	13	14	13	18	39	31	17	22	29	30	29	19	24	25	26	23	18	12	15	11	15	39
4-May	13	17	18	15	49	26	31	45	42	30	56	101	79	66	61	66	63	48	29	16	14	15	17	18	101
5-May	15	11	11	13	13	14	18	23	14	17	18	16	27	19	17	16	20	21	18	17	16	16	15	13	27
6-May	14	13	12	12	12	13	12	13	14	14	15	17	21	20	20	20	22	27	20	24	11	16	77	20	77
7-May	12	41	51	14	10	16	14	16	21	31	79	35	61	61	65	55	39	48	30	12	9	11	11	24	79
8-May	18	20	34	13	27	22	23	17	27	28	72	91	53	97	71	14	27	22	19	18	14	13	12	93	97
9-May	14	16	16	15	11	33	25	97	41	39	52	46	41	42	52	77	56	89	27	16	9	15	32	17	97
10-May	91	42	24	39	44	26	18	66	29	33	26	23	34	46	59	40	53	28	25	20	12	7	19	12	91
11-May	14	17	13	12	14	22	17	17	18	19	21	31	34	42	45	41	31	52	77	54	69	29	16	13	77
12-May	30	28	19	12	66	46	15	25	34	30	28	37	21	40	24	35	32	33	16	11	15	14	19	17	66
13-May	17	16	20	14	12	12	12	13	22	36	25	31	29	30	39	47	43	23	21	13	12	17	16	58	58
14-May	15	42	67	28	22	21	13	15	18	25	26	28	29	28	29	33	29	27	23	18	13	12	19	22	67
15-May	23	23	80	57	35	16	19	31	29	25	22	29	30	36	37	31	32	50	29	17	16	18	17	18	80
16-May	17	16	19	20	18	17	16	17	19	22	23	25	26	26	24	27	23	25	24	18	15	12	16	11	27
17-May	13	22	29	37	16	15	14	18	19	28	32	46	32	35	37	38	26	20	18	15	15	14	15	14	46
18-May	15	13	16	16	12	22	26	24	20	20	38	29	39	39	54	44	39	29	26	18	10	9	24	15	54
19-May	20	17	30	64	15	17	14	15	18	21	23	54	53	54	53	59	32	24	31	16	18	19	25	9	64
20-May	14	36	103	47	17	13	12	14	19	22	52	72	105	80	70	51	61	72	28	16	10	9	25	46	105
21-May	8	36	17	68	85	19	21	22	21	25	41	90	67	72	69	50	39	42	27	76	61	21	13	43	90
22-May	54	77	18	12	97	34	33	50	31	85	36	28	27	27	31	29	24	23	19	18	17	17	15	13	97
23-May	16	12	14	14	18	19	16	25	30	26	37	48	44	65	65	73	63	75	53	20	31	7	41	14	75
24-May	9	69	83	92	26	13	16	35	35	37	31	50	52	77	101	85	75	25	37	10	24	51	70	52	101
25-May	92	64	36	58	87	30	14	15	26	31	28	49	76	61	37	43	69	14	60	18	13	14	15	16	92
26-May	16	14	16	18	15	13	17	17	24	27	23	28	40	46	50	72	72	37	25	17	13	15	18	9	72
27-May	23	17	14	32	59	16	58	30	29	73	67	84	32	41	26	17	19	18	19	19	20	18	19	18	84
28-May	20	20	20	19	19	19	22	24	24	22	22	26	28	27	34	37	29	31	27	19	21	17	12	9	37
29-May	19	15	38	14	28	22	20	21	22	50	58	54	72	70	71	77	84	57	33	18	16	12	12	14	84
30-May	18	15	14	33	20	19	19	21	39	54	38	87	76	35	36	34	22	19	16	14	12	17	15	16	87
31-May	14	16	12	13	14	15	13	13	15	38	29	38	15	17	19	16	20	15	17	15	25	22	38	20	38
Diurnal Maximum																								92	



WBEA
Hourly Averages

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





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	May 12, 2015	Last Calibration	April 2, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	12:45
Gas Cert Reference	CC307191	Station temp.	22 Deg C
Cal Gas Concentration	59.4 ppm	Cal Gas Exp Date	26/03/2012
Calibrator Make/Model	Sabio 4010	Serial Number	11541008
ZAG Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8346

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-652	-652
Analyzer IP address	192.168.1.43		Lamp voltage	777	782
Calculated slope	0.999876	0.995872	Chamber temp	45.0	45.1
Calculated intercept	1.632533	2.772657	Pressure	701.2	696.5
Analyzer Background	25.4	25.4	Flow	0.495	0.492
Analyzer Coefficient	1.119	1.119	Intensity	90	91

Analyzer make TEI 43i Analyzer serial # JC1404901075

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-1.1	----
as found span	5000	69.9	830.4	856.0	0.970
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	69.9	830.4	832.4	0.998
second point	5000	35.4	420.6	418.5	1.005
third point	5000	17.7	210.3	205.0	1.026
as left zero	5000	0.0	0.0	-0.4	----
as left span	5000	69.9	830.4	815.6	1.018
Average Correction Factor					1.009

Corrected As found 857.1 Previous response 828.9 % change -3.3%

Notes:

Sample inlet filter changed after as founds. Adjusted zero and span. Analyzer pulling ambient air from 11:50-12:00 MST.

Calibration Performed By: Asad Hidayat



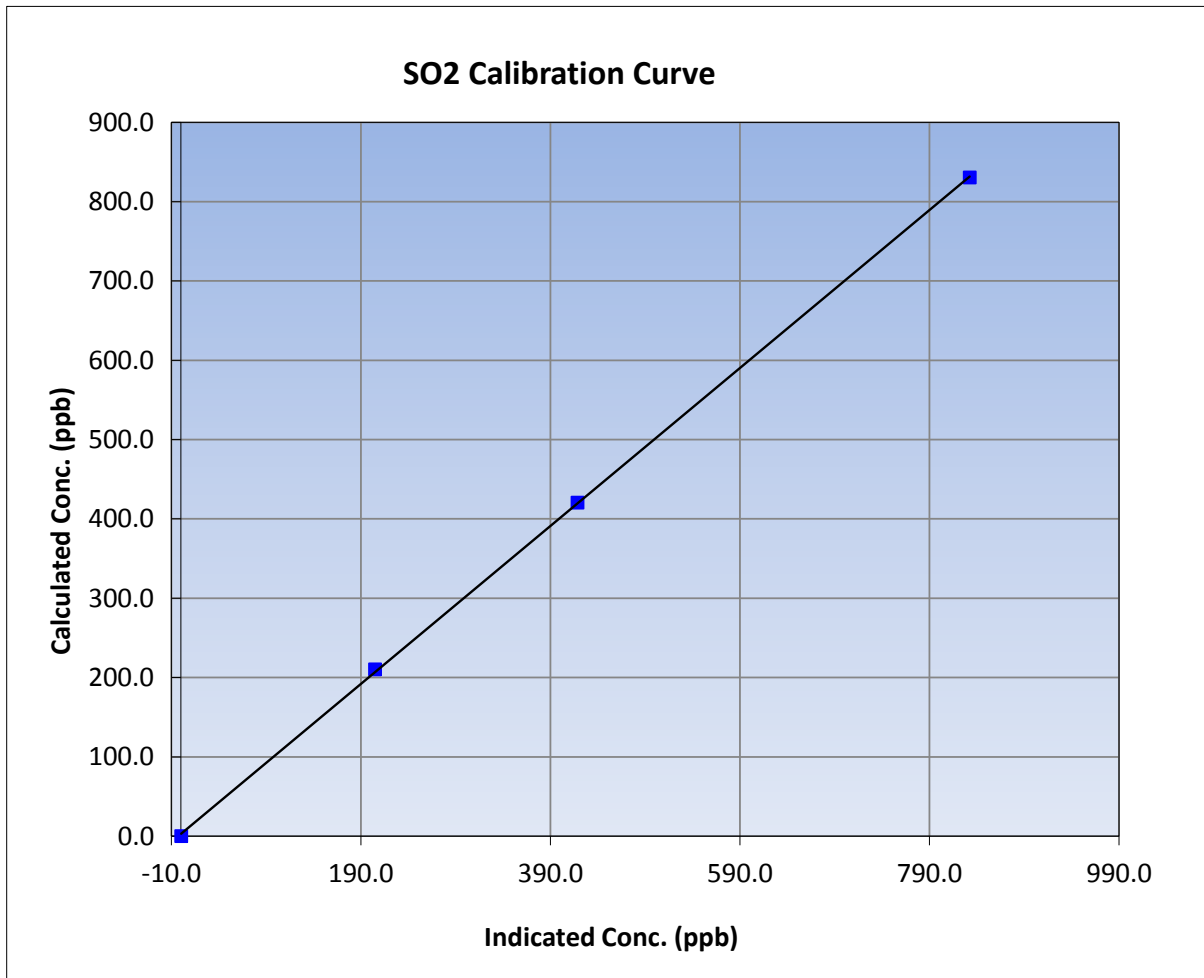
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 12, 2015	Previous Calibration	April 2, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	9:15	End Time (MST)	12:45
Analyzer make	TEI 43i	Analyzer serial #	JC1404901075

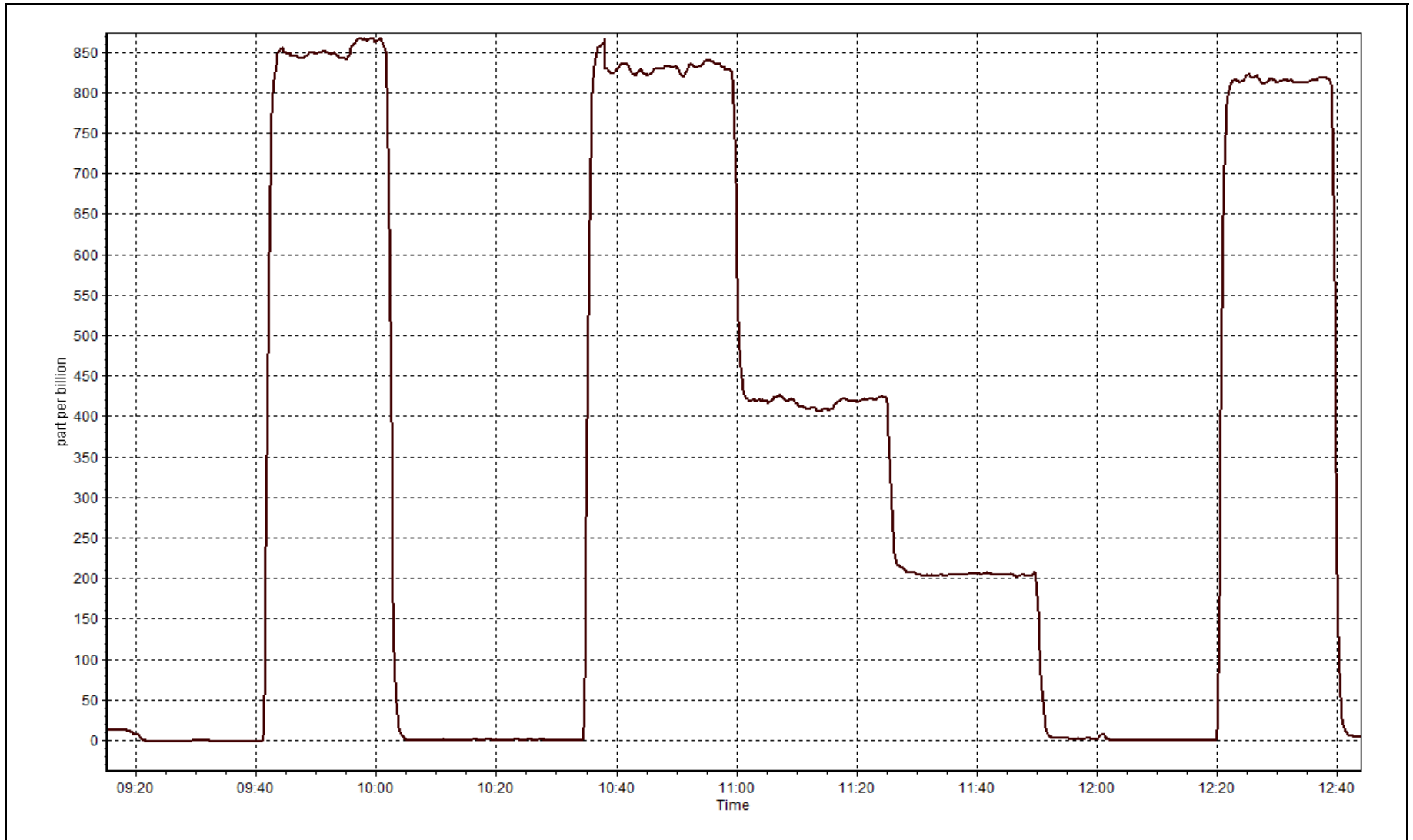
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999937
830.4	832.4	0.9976		
420.6	418.5	1.0049	Slope	0.995872
210.3	205.0	1.0259		
			Intercept	2.772657



SO2 Calibration Plot

Date: May 12, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 19, 2015	Last Calibration	April 8, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	12:20
Gas Cert Reference	ALM028262	Station temp.	21 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11541008
ZAG air Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346
SO2 gas concentration	59.4 ppm	SO2 gas cert/exp	CC307191 26/03/2012

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-601	-601
Analyzer IP address	192.168.1.42		Lamp voltage	779	777
Calculated slope	0.992013	0.999615	Chamber temp	45	45
Calculated intercept	-0.071896	-0.248405	Pressure	546.9	561.2
Analyzer Background	14.2	13.9	Flow	0.990	0.977
Analyzer Coefficient	0.914	0.908	Intensity	87	87
			Converter temp.	325	324
Analyzer make/model	TEI 450i		Analyzer serial #	815129107	
Converter make/model	n/a		Converter serial #	n/a	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	4000	0.0	0.0	0.1	----
as found span	4000	63.5	80.0	80.4	0.996
SO2 scrubber check	5000	17.7	210.3	0.2	----
calibrator zero	4000	0.0	0.0	0.1	----
high point	4000	63.5	80.0	80.1	0.999
second point	4000	31.8	40.1	40.7	0.984
third point	4000	15.9	20.0	20.2	0.991
as left zero	5000	0.0	0.0	0.3	----
as left span	4000	63.5	80.0	80.3	0.997
Average Correction Factor					0.991

Corrected As found	80.3	Previous response	80.7	% change	0.6%
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Notes:

Changed inlter filter and scrubber check done after as founds. Span slightly adjusted.

Calibration Performed By:

Asad Hidayat



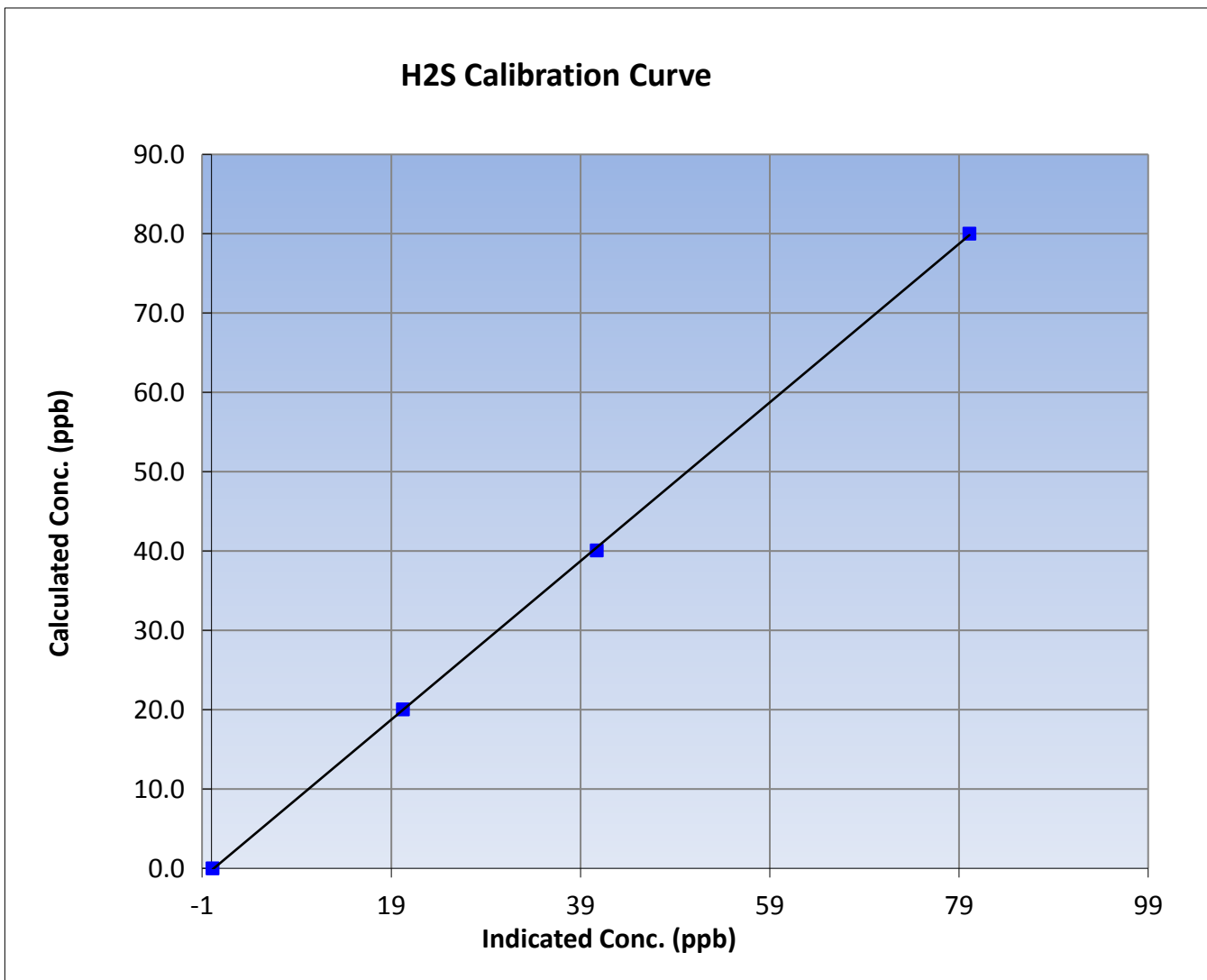
Wood Buffalo Environmental Association H2S Calibration Report

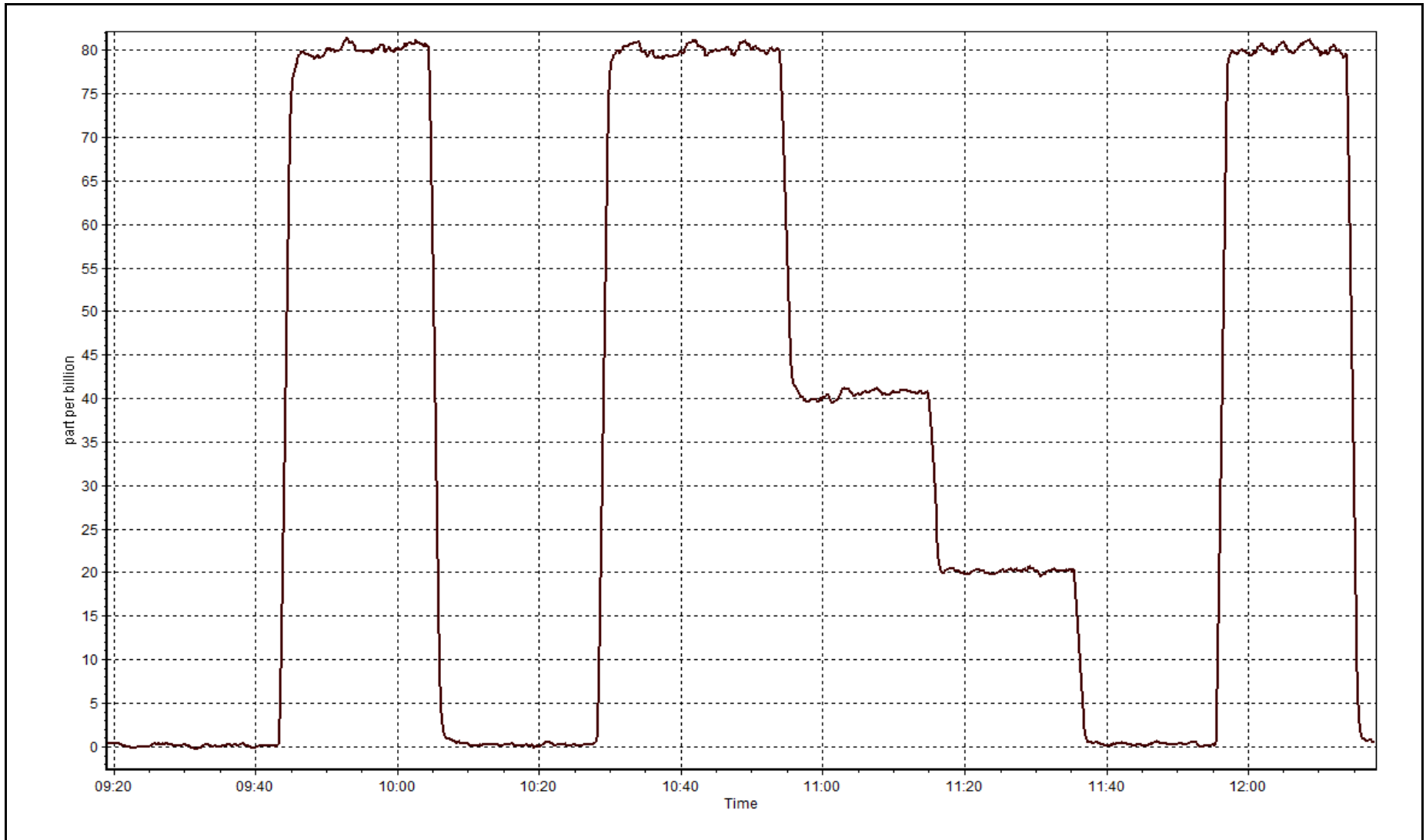
Station Information

Calibration Date	May 19, 2015	Previous Calibration	April 8, 2015
Station Name	AMS 2	Station Number	AMS 2
Start Time (MST)	9:20	End Time (MST)	12:20
Analyzer make	TEI 450i	Analyzer serial #	815129107

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999941
80.0	80.1	0.9988		
40.1	40.7	0.9840	Slope	0.999615
20.0	20.2	0.9908		
			Intercept	-0.248405







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-12-15	Last Calibration	April-02-15
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	12:45
Gas Cert Reference	CC307191	Cal Gas Expiry Date	26/03/2012
CH4 Cal Gas Conc.	505 ppm	CH4 Equiv Conc.	1060.5 ppm
C3H8 Cal Gas Conc.	202 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11541008
ZAG make/model	Teledyne API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.4	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	42.3	39.8
Calculated slope	0.999605	0.997760	Fuel Pressure	20.2	25.7
Calculated intercept	0.012147	0.034144	Analyzer Coeff	4.6	4.6
			Analyzer BKG	2.440	2.540

Analyzer make	51i-LT	Analyzer serial #	1300156231
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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	0.05	----
as found span	5000	69.9	14.83	14.72	1.007
calibrator zero	5000	0.0	0.00	-0.03	----
high point	5000	69.9	14.83	14.83	1.000
second point	5000	35.4	7.51	7.48	1.004
third point	5000	17.7	3.75	3.73	1.006
as left zero	5000	0.0	0.00	-0.02	----
as left span	5000	69.9	14.83	14.76	1.004
Average Correction Factor					1.003

Corrected As found	14.67	Previous response	14.82	% change	1.0%
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Notes:

Sample inlet filter changed after as founds. Adjusted zero and span. Analyzer pulling ambient air from 11:50-12:00 MST.

Calibration Performed By:

Asad Hidayat



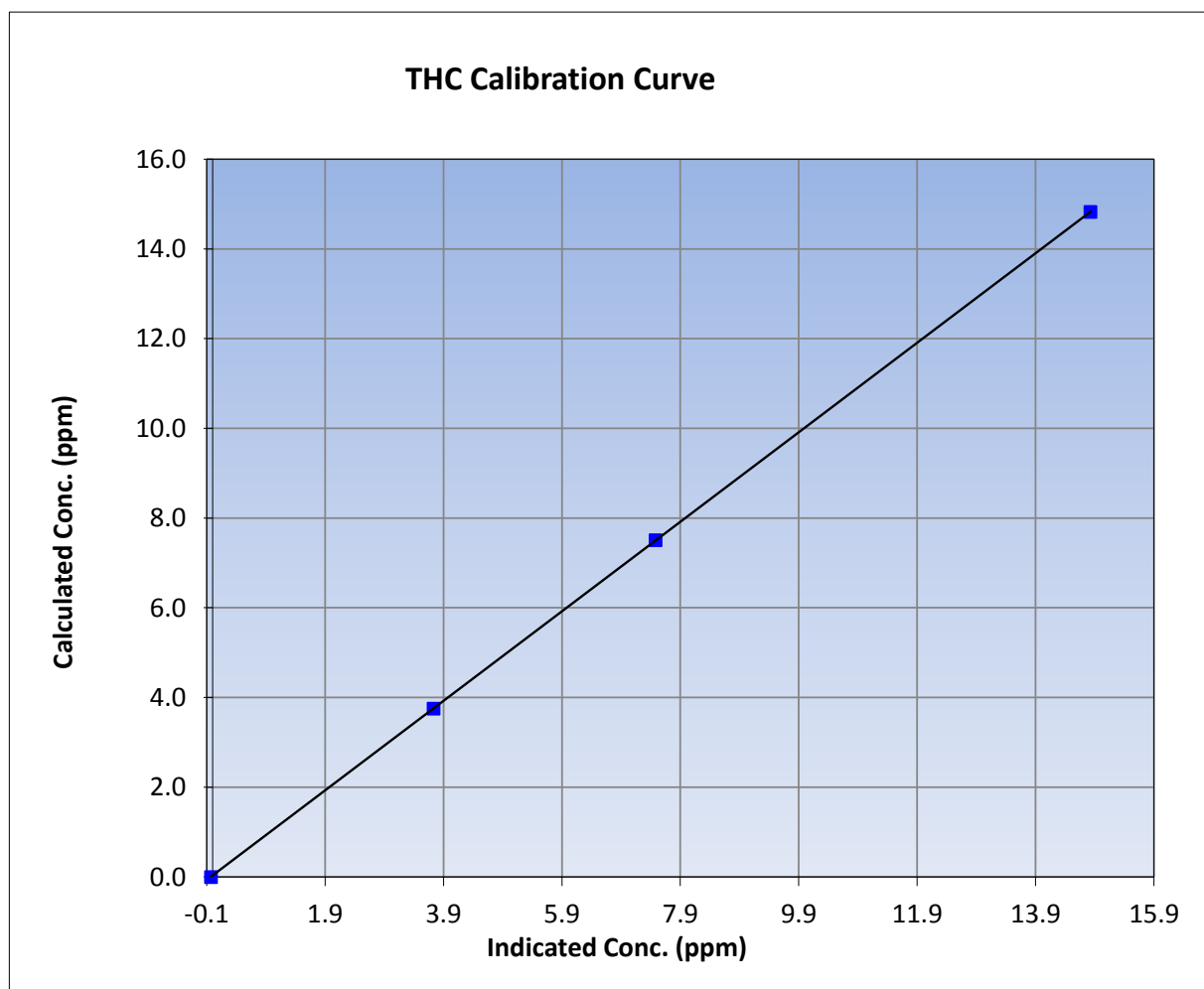
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 12, 2015	Previous Calibration	April 2, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	9:15	End Time (MST)	12:45
Analyzer make	51i-LT	Analyzer serial #	1300156231

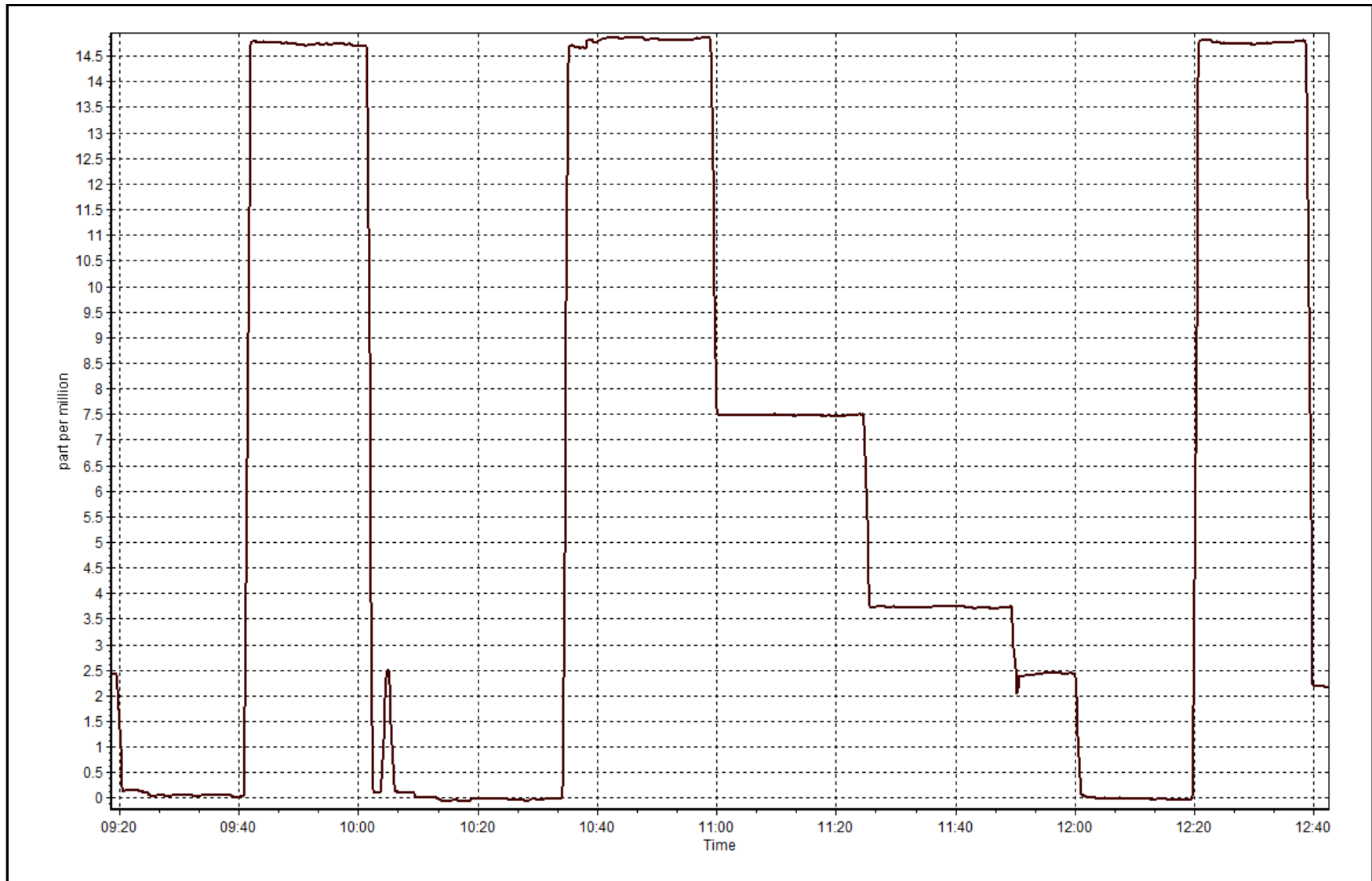
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	----	Correlation Coefficient	0.999999
14.83	14.83	0.9997		
7.51	7.48	1.0038	Slope	0.997760
3.75	3.73	1.0065		
			Intercept	0.034144



THC Calibration Plot

Date: May 12, 2015





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 3 LOWER CAMP METEOROLOGY MAY 2015

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

June 29, 2015



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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
Temperature 20 m (C) Average	744	0	0	100.00	28.4	-	20.0	-
Temperature 45 m (C) Average	744	0	0	100.00	28	-	20.1	-
Temperature 100 m (C) Average	744	0	0	100.00	27.3	-	20.7	-
Temperature 167 m (C) Average	744	0	0	100.00	27.1	-	21.2	-
Relative Humidity 20 m (%) Average	744	0	0	100.00	99	-	87.0	-
Relative Humidity 45 m (%) Average	744	0	0	100.00	98	-	85.0	-
Relative Humidity 100 m (%) Average	744	0	0	100.00	99	-	85.0	-
Relative Humidity 167 m (%) Average	744	0	0	100.00	99	-	86.0	-
Wind Speed 20 m (km/h) Average	737	0	7	99.06	24	-	12.0	-
Wind Speed 45 m (km/h) Average	737	0	7	99.06	31	-	18.0	-
Wind Speed 100 m (km/h) Average	736	0	8	98.92	46	-	25.0	-
Wind Speed 167 m (km/h) Average	740	0	4	99.46	50	-	28.0	-
Wind Direction 20 m (deg) Average	737	0	7	99.06	-	-	-	-
Wind Direction 45 m (deg) Average	737	0	7	99.06	-	-	-	-
Wind Direction 100 m (deg) Average	736	0	8	98.92	-	-	-	-
Wind Direction 167 m (deg) Average	740	0	4	99.46	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	737	0	7	99.06	1	-	0.4	-
Vertical Wind Speed 45 m (km/h) Average	737	0	7	99.06	1.7	-	0.8	-
Vertical Wind Speed 100 m (km/h) Average	736	0	8	98.92	2.8	-	1.1	-
Vertical Wind Speed 167 m (km/h) Average	740	0	4	99.46	4.9	-	1.1	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
Temperature 20 m (C) Average	744	11.99	7.5	-	-2.5	2.1	5.9	11.5	17.3	22.6	28.4
Temperature 45 m (C) Average	744	11.94	7.4	-	-2.3	2.3	5.7	11.4	17.6	22.5	28
Temperature 100 m (C) Average	744	11.87	7.4	-	-1.6	2.1	5.7	11.6	17.7	22.1	27.3
Temperature 167 m (C) Average	744	11.74	7.3	-	-1.9	1.9	5.6	11.7	17.7	22.2	27.1
Relative Humidity 20 m (%) Average	744	47.2	23	-	11	17	28	45	65	81	99
Relative Humidity 45 m (%) Average	744	45.5	23	-	10	17	27	43	63	78	98
Relative Humidity 100 m (%) Average	744	42.5	22	-	10	17	25	39	56	75	99
Relative Humidity 167 m (%) Average	744	40.8	22	-	11	17	24	36	53	75	99
Wind Speed 20 m (km/h) Average	737	7.2	5	-	0	2	3	7	10	13	24
Wind Speed 45 m (km/h) Average	737	9.4	6	-	0	2	5	9	13	17	31
Wind Speed 100 m (km/h) Average	736	12.9	8	-	0	4	6	11	18	24	46
Wind Speed 167 m (km/h) Average	740	15.1	9	-	1	5	8	13	21	28	50
Wind Direction 20 m (deg) Average	737	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	737	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	736	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	737	-0.07	0.3	-	-1.1	-0.5	-0.2	0	0.1	0.3	1
Vertical Wind Speed 45 m (km/h) Average	737	0.08	0.5	-	-1.3	-0.6	-0.2	0.1	0.4	0.7	1.7
Vertical Wind Speed 100 m (km/h) Average	736	0.28	0.6	-	-1	-0.3	0	0.2	0.5	0.9	2.8
Vertical Wind Speed 167 m (km/h) Average	740	0.47	0.8	-	-1.7	-0.3	0.1	0.4	0.8	1.4	4.9

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	05 May 2015 16:00	05 May 2015 22:00	7	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	05 May 2015 16:00	05 May 2015 22:00	7	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 100 m	05 May 2015 15:00	05 May 2015 22:00	8	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	05 May 2015 18:00	05 May 2015 19:00	2	Unstable operation - excessive noise on output signal
Wind Speed. Wind Direction, Vertical Wind Speed 167 m	08 May 2015 20:00	08 May 2015 21:00	2	Unstable operation - excessive noise on output signal

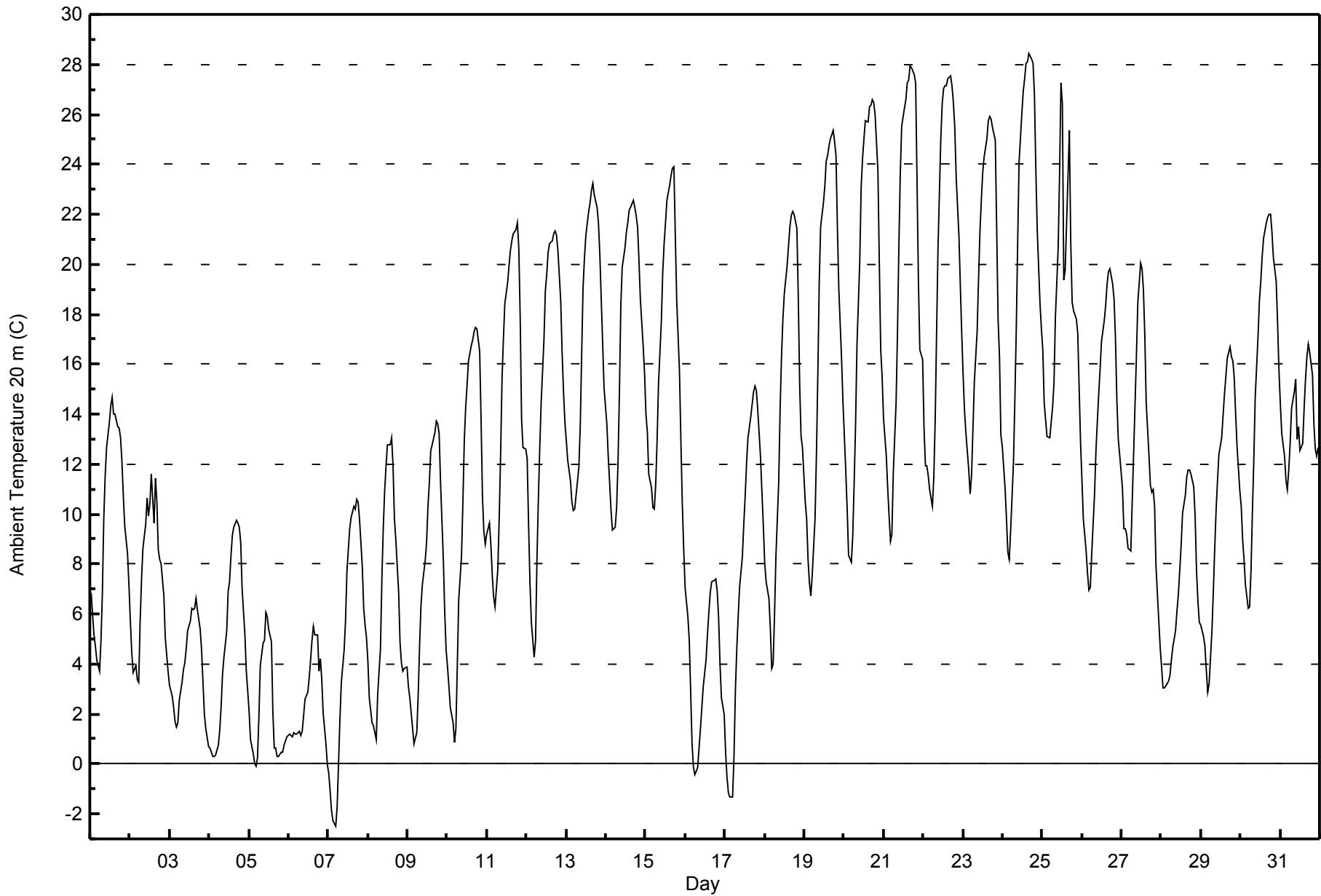


Maximum Value: 28.4 C on May 24 17:00		Maximum Daily Average: 20.0 C on May 22		Hours in Service: 744																																												
Minimum Value: -2.5 C on May 7 05:00		Minimum Daily Average: 2.0 C on May 5		Hours of Data: 744																																												
Maximum Diurnal Average: 17.3 C at hour 17		Minimum Diurnal Average: 5.2 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 11.99 C		Percentiles: P ₁ = -1.1 P ₁₀ = 2.1 Q ₁ = 5.9 Median = 11.5 Q ₃ = 17.3 P ₉₀ = 22.6 P ₉₉ = 27.9		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-May	6.9	6.0	5.2	4.7	4.1	3.7	4.9	6.8	9.8	11.5	12.7	13.7	14.4	14.7	14.0	14.0	13.5	13.5	13.0	12.1	10.7	9.5	8.4	7.2	9.8	14.7																						
2-May	5.7	4.5	3.6	3.9	3.4	3.3	5.7	7.3	8.6	9.6	10.7	9.9	10.4	11.6	9.6	11.5	10.5	8.6	8.2	8.0	6.7	5.0	4.4	3.7	7.3	11.6																						
3-May	3.1	2.7	2.3	1.7	1.5	1.7	2.5	3.2	3.8	4.1	4.6	5.3	5.7	6.2	6.2	6.6	6.2	5.4	4.6	3.3	2.0	1.4	0.7	3.8	6.6																							
4-May	0.7	0.5	0.3	0.3	0.4	0.8	1.3	2.3	3.6	4.2	5.3	6.9	7.3	8.3	9.1	9.5	9.8	9.6	8.9	7.0	5.2	3.7	2.9	4.9	9.8																							
5-May	2.1	1.0	0.4	0.0	-0.1	0.3	1.9	3.9	4.8	5.0	6.1	5.9	5.4	4.9	2.1	0.6	0.7	0.3	0.5	0.5	0.7	0.9	1.1	2.0	6.1																							
6-May	1.2	1.2	1.1	1.2	1.2	1.2	1.3	1.1	1.3	1.9	2.6	2.9	3.4	4.2	5.0	5.5	5.2	5.2	3.7	4.2	3.4	2.0	0.8	0.0	2.5	5.5																						
7-May	-0.3	-1.1	-1.9	-2.3	-2.5	-1.7	0.0	1.8	3.2	4.5	5.7	7.7	8.6	9.4	9.8	10.3	10.2	10.6	10.5	9.8	7.9	6.2	5.6	5.1	4.9	10.6																						
8-May	4.1	2.6	1.6	1.5	1.2	1.0	2.8	4.6	7.3	9.4	10.9	11.9	12.7	12.8	13.0	12.0	9.8	9.0	6.9	4.9	4.1	3.7	3.8	3.9	6.5	13.0																						
9-May	3.1	2.6	2.1	1.4	0.8	1.2	2.7	4.7	6.3	7.2	8.1	8.9	10.3	11.3	12.5	12.8	13.3	13.7	13.6	13.2	11.3	8.2	6.1	4.5	7.5	13.7																						
10-May	3.9	3.1	2.3	1.7	0.9	1.4	3.9	6.5	8.3	10.5	12.9	14.3	15.2	16.1	16.7	17.0	17.3	17.5	17.4	16.5	13.8	10.7	9.3	8.8	10.3	17.5																						
11-May	9.2	9.6	8.8	7.6	6.7	6.3	7.8	9.9	12.4	15.4	17.0	18.4	19.3	19.9	20.6	20.9	21.2	21.4	21.7	20.7	17.8	13.8	12.7	12.6	14.7	21.7																						
12-May	12.2	9.6	7.2	5.7	4.3	4.9	8.2	10.6	12.6	14.5	17.0	18.9	19.6	20.5	20.8	20.9	21.2	21.3	21.2	20.5	18.5	16.5	14.9	13.7	14.8	21.3																						
13-May	12.9	12.2	11.3	10.5	10.1	10.2	10.8	11.9	13.6	16.4	19.1	20.3	21.1	22.1	22.5	23.0	23.2	22.8	22.3	21.7	20.4	18.6	16.9	15.1	17.0	23.2																						
14-May	13.6	12.3	11.3	10.1	9.4	9.5	10.2	12.1	14.9	18.3	19.9	20.7	21.3	21.7	22.1	22.3	22.6	22.3	22.0	21.5	20.2	18.6	16.7	15.6	17.0	22.6																						
15-May	14.0	13.3	11.6	11.0	10.2	10.2	11.2	13.0	15.2	17.7	19.7	20.9	21.7	22.6	23.2	23.6	23.9	23.9	21.2	18.6	15.7	13.0	10.4	8.6	16.4	23.9																						
16-May	7.1	5.9	4.9	2.9	0.8	-0.1	-0.4	-0.2	0.6	1.4	2.3	3.1	4.2	5.2	6.1	6.8	7.3	7.4	7.4	6.9	5.8	4.0	2.7	2.0	3.9	7.4																						
17-May	0.5	-0.6	-1.2	-1.3	-1.3	0.3	2.9	4.6	5.9	7.1	8.3	9.6	10.7	12.1	13.0	13.9	14.4	14.9	15.1	14.9	14.2	12.3	10.9	9.6	7.9	15.1																						
18-May	8.0	7.3	6.6	5.5	3.8	4.0	5.9	8.3	11.2	14.2	16.3	17.8	18.8	19.9	20.7	21.5	21.9	22.1	22.0	21.5	18.7	15.2	13.1	12.7	14.0	22.1																						
19-May	10.5	9.8	8.2	7.2	6.7	7.5	9.8	12.4	15.6	19.3	21.5	22.4	23.1	24.1	24.4	24.7	25.0	25.4	24.9	24.3	21.5	19.0	16.2	14.5	17.4	25.4																						
20-May	13.1	11.7	10.2	8.3	8.1	9.1	11.3	13.6	16.8	20.1	23.1	24.2	25.0	25.8	25.7	26.3	26.4	26.6	26.5	26.0	23.7	20.0	16.6	15.5	18.9	26.6																						
21-May	13.8	12.3	11.0	9.9	8.9	9.2	11.7	14.5	17.3	20.7	23.6	25.5	26.2	26.6	27.3	27.4	27.9	27.9	27.6	27.3	23.3	19.2	16.6	16.2	19.7	27.9																						
22-May	13.4	11.9	11.9	11.6	11.0	10.3	11.5	13.8	17.3	20.7	25.0	26.4	27.0	27.2	27.1	27.4	27.5	27.2	26.5	25.5	23.5	21.1	19.1	17.2	20.0	27.5																						
23-May	15.5	14.1	13.2	11.8	10.8	11.5	13.4	15.3	17.3	19.4	21.3	22.6	23.7	24.3	25.0	25.7	25.9	25.8	25.5	24.9	21.4	17.8	16.3	13.2	19.0	25.9																						
24-May	12.7	11.1	9.8	8.5	8.2	9.4	12.1	14.6	17.4	20.8	24.1	26.0	26.9	27.4	28.0	28.1	28.4	28.2	28.1	26.8	23.9	21.4	18.4	17.4	19.9	28.4																						
25-May	16.6	14.4	13.8	13.1	13.0	13.7	14.3	15.2	17.9	20.6	23.6	27.3	26.4	19.4	19.8	23.5	25.3	20.9	18.5	18.1	17.8	17.3	15.1	12.9	18.3	27.3																						
26-May	11.4	9.8	8.5	7.6	6.9	7.1	8.4	10.7	12.5	13.7	14.8	15.8	16.9	17.8	18.4	19.2	19.7	19.8	19.2	18.6	17.0	14.6	13.0	12.4	13.9	19.8																						
27-May	11.1	9.4	9.4	9.2	8.6	8.5	10.5	12.4	14.4	16.4	18.5	20.0	19.8	19.0	17.1	14.4	12.3	11.1	10.9	11.0	10.3	7.9	5.7	4.7	12.2	20.0																						
28-May	3.9	3.0	3.0	3.2	3.3	3.6	4.2	4.6	5.4	6.1	6.8	7.7	8.8	10.0	10.7	11.5	11.8	11.8	11.6	11.1	9.9	7.8	6.5	5.7	7.2	11.8																						
29-May	5.6	5.1	4.7	3.8	2.9	3.2	5.3	6.8	8.6	10.2	11.3	12.4	13.0	14.0	14.8	15.5	16.2	16.7	16.3	16.1	15.5	14.0	12.7	10.9	10.6	16.7																						
30-May	10.3	8.9	8.2	7.2	6.2	6.3	7.8	10.1	12.1	14.7	17.1	18.5	19.3	20.3	21.1	21.7	21.9	22.0	22.0	21.3	20.2	19.3	17.7	15.7	15.4	22.0																						
31-May	14.4	13.2	12.3	11.4	11.0	11.8	12.8	14.2	14.9	15.4	13.0	13.5	12.6	12.9	14.2	15.4	16.3	16.8	16.5	15.6	13.6	12.6	12.3	12.7	13.7	16.8																						
																								8.4	7.3	6.5	5.8	5.2	5.5	7.0	8.7	10.7	12.6	14.3	15.5	16.1	16.5	16.8	17.2	17.3	17.1	16.6	16.0	14.2	12.2	10.6	9.6	Diurnal Average
																								16.6	14.4	13.8	13.1	13.0	13.7	14.3	15.3	17.9	20.8	25.0	27.3	27.0	27.4	28.0	28.1	28.4	28.2	28.1	27.3	23.9	21.4	19.1	17.4	Diurnal Maximum



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	16	2.15	2.15
0 - 10	299	40.19	42.34
10 - 20	293	39.38	81.72
> 20	136	18.28	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

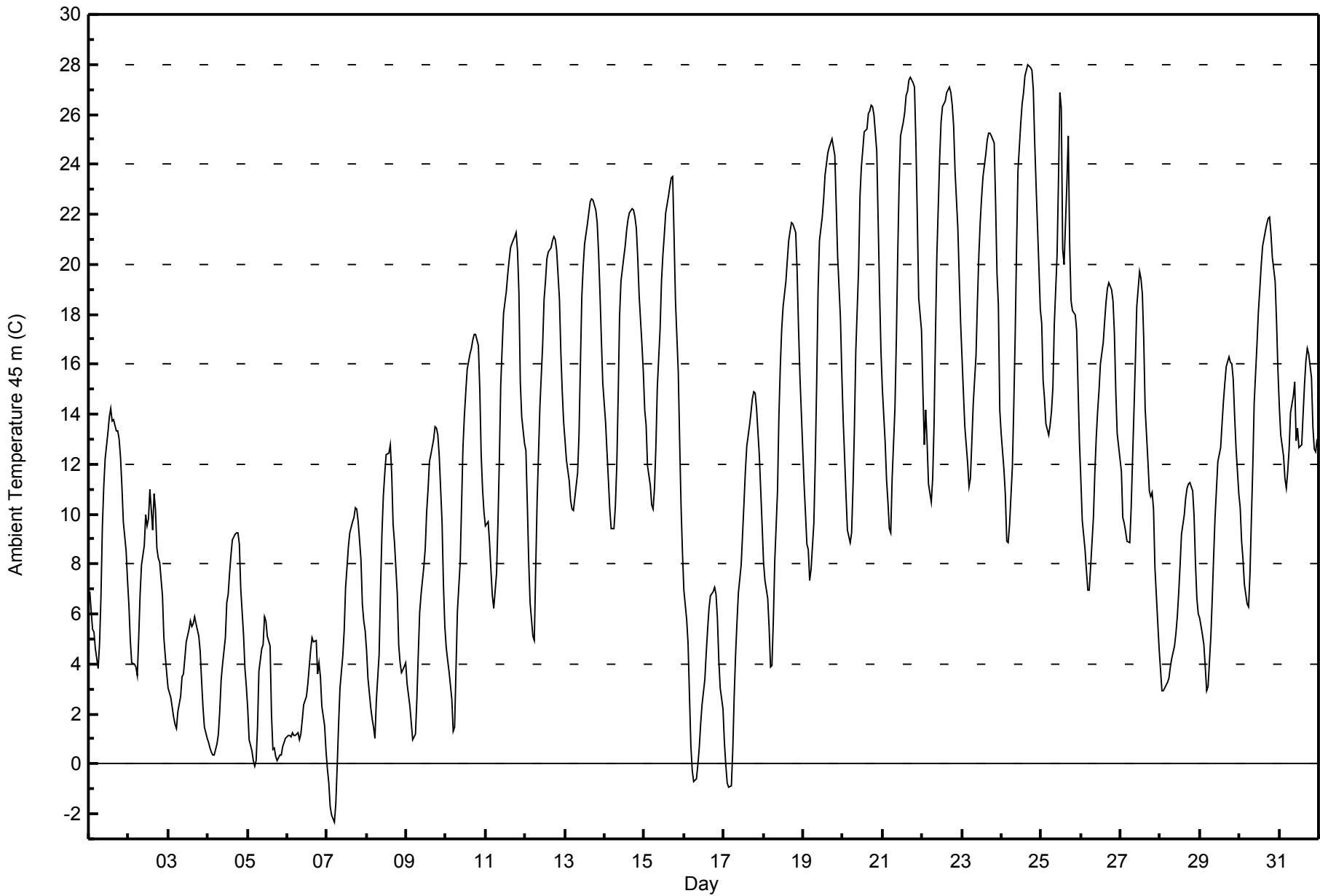


Maximum Value: 28.0 C on May 24 17:00		Maximum Daily Average: 20.1 C on May 22		Hours in Service: 744																																													
Minimum Value: -2.3 C on May 7 05:00		Minimum Daily Average: 2.0 C on May 5		Hours of Data: 744																																													
Maximum Diurnal Average: 16.9 C at hour 17		Minimum Diurnal Average: 5.4 C at hour 5		Hours of Missing Data: 0																																													
Monthly Average: 11.94 C		Percentiles: P ₁ = -0.8 P ₁₀ = 2.3 Q ₁ = 5.7 Median = 11.4 Q ₃ = 17.6 P ₉₀ = 22.5 P ₉₉ = 27.3		Hours of Calibration: 0																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	6.9	6.1	5.4	5.3	4.6	3.8	4.9	6.7	9.4	11.1	12.2	13.3	13.9	14.2	13.7	13.8	13.3	13.3	13.0	12.3	11.1	9.7	8.5	7.3	9.7	14.2																							
2-May	6.3	4.9	4.0	4.0	3.9	3.5	5.0	6.8	8.0	8.7	10.0	9.6	9.8	11.0	9.4	10.8	10.2	8.7	8.3	8.1	6.8	5.1	4.3	3.6	7.1	11.0																							
3-May	3.1	2.6	2.3	1.9	1.6	1.4	2.1	2.7	3.5	3.6	4.2	4.9	5.4	5.7	5.5	5.6	5.9	5.6	5.1	4.5	3.3	2.2	1.5	1.1	3.6	5.9																							
4-May	0.9	0.6	0.4	0.4	0.4	0.8	1.2	2.1	3.4	4.0	5.1	6.5	6.8	7.6	8.4	9.0	9.2	9.3	9.2	8.8	7.0	5.2	3.8	3.1	4.7	9.3																							
5-May	2.2	1.0	0.5	0.1	-0.1	0.1	1.5	3.7	4.6	4.8	5.9	5.7	5.1	4.7	2.0	0.6	0.6	0.3	0.2	0.4	0.3	0.7	0.9	1.0	2.0	5.9																							
6-May	1.1	1.1	1.1	1.3	1.2	1.2	1.3	1.0	1.2	1.7	2.4	2.7	3.2	3.9	4.5	5.0	4.9	4.9	3.6	4.0	3.5	2.3	1.5	0.5	2.5	5.0																							
7-May	-0.2	-0.8	-1.7	-2.0	-2.3	-1.6	-0.1	1.6	3.0	4.3	5.3	7.0	7.9	8.7	9.2	9.7	9.8	10.3	10.2	9.7	8.2	6.4	5.7	5.4	4.7	10.3																							
8-May	4.6	3.4	2.3	1.8	1.5	1.0	2.6	4.4	7.0	9.2	10.7	11.6	12.4	12.5	12.8	11.6	9.6	8.8	6.8	4.8	4.0	3.7	3.8	4.0	6.4	12.8																							
9-May	3.2	2.8	2.3	1.6	1.0	1.2	2.6	4.4	6.0	6.8	7.9	8.7	10.1	11.0	12.1	12.4	13.0	13.5	13.5	13.2	12.3	9.7	7.2	5.5	7.6	13.5																							
10-May	4.7	4.2	3.7	2.6	1.3	1.5	3.8	6.1	8.1	10.4	12.7	14.0	14.9	15.8	16.4	16.6	17.0	17.2	17.2	16.8	15.0	12.4	11.0	10.1	10.6	17.2																							
11-May	9.5	9.7	8.9	7.7	6.7	6.2	7.6	9.6	12.2	15.2	16.6	18.0	18.9	19.6	20.2	20.6	20.9	21.1	21.3	20.6	18.9	15.3	13.9	12.8	14.7	21.3																							
12-May	12.6	10.5	8.1	6.4	5.1	4.9	7.7	10.5	12.4	14.3	16.8	18.6	19.3	20.2	20.5	20.6	21.0	21.1	21.0	20.5	18.6	16.5	14.9	13.7	14.8	21.1																							
13-May	13.0	12.2	11.3	10.5	10.2	10.2	10.6	11.6	13.2	16.0	18.7	19.9	20.9	21.6	22.0	22.5	22.6	22.6	22.2	21.7	20.4	18.8	17.0	15.2	16.9	22.6																							
14-May	13.7	12.5	11.3	10.2	9.4	9.4	10.3	12.0	14.7	17.9	19.3	20.3	20.7	21.3	21.8	22.1	22.3	22.1	21.9	21.4	20.2	18.8	16.8	15.7	16.9	22.3																							
15-May	14.2	13.6	11.9	11.2	10.4	10.2	11.0	12.7	15.1	17.4	19.3	20.4	21.1	22.0	22.7	23.1	23.4	23.5	21.1	18.5	15.7	12.9	10.3	8.5	16.3	23.5																							
16-May	7.0	5.8	4.9	2.8	0.7	-0.3	-0.7	-0.6	-0.1	0.7	1.6	2.4	3.4	4.5	5.4	6.2	6.7	6.9	7.0	6.8	5.9	4.2	3.0	2.2	3.6	7.0																							
17-May	0.9	-0.1	-0.8	-0.9	-0.9	0.6	2.7	4.4	5.6	6.8	7.9	9.2	10.4	11.7	12.7	13.6	14.1	14.6	14.9	14.9	14.2	12.3	10.9	9.5	7.9	14.9																							
18-May	8.1	7.3	6.6	5.5	3.9	4.0	5.7	8.1	10.9	13.9	15.9	17.4	18.3	19.3	20.2	20.9	21.3	21.6	21.6	21.3	19.8	17.5	15.6	14.1	14.1	21.6																							
19-May	11.2	10.0	8.8	8.6	7.3	7.8	9.6	12.1	15.2	18.9	21.0	21.9	22.6	23.6	24.0	24.5	24.7	25.0	24.7	24.4	22.3	20.3	17.8	15.6	17.6	25.0																							
20-May	13.7	12.3	10.7	9.4	8.8	9.2	11.1	13.4	16.5	19.8	22.7	23.9	24.6	25.3	25.4	26.0	26.1	26.3	26.3	26.0	24.5	21.7	18.9	16.5	19.1	26.3																							
21-May	15.0	12.9	11.4	10.5	9.4	9.3	11.4	14.3	17.0	20.4	23.2	25.1	25.7	26.1	26.8	26.9	27.4	27.5	27.3	27.1	24.9	21.9	18.6	17.4	19.9	27.5																							
22-May	14.9	12.8	14.2	12.9	11.2	10.5	11.4	13.6	17.2	20.4	24.3	25.7	26.3	26.4	26.5	26.9	27.1	26.9	26.3	25.5	23.7	21.4	19.5	17.6	20.1	27.1																							
23-May	16.2	14.9	13.5	12.0	11.1	11.4	12.9	14.4	16.3	18.5	20.3	21.6	22.7	23.5	24.4	25.0	25.2	25.3	25.1	24.8	22.5	19.6	18.4	14.2	18.9	25.3																							
24-May	13.2	11.8	10.8	8.9	8.9	9.6	11.9	14.3	17.1	20.6	23.7	25.7	26.4	26.9	27.5	27.7	28.0	27.9	27.8	27.0	24.8	23.1	19.9	18.2	20.1	28.0																							
25-May	17.6	15.4	14.6	13.6	13.2	13.6	14.1	15.1	17.6	20.4	23.4	26.9	26.2	20.6	20.0	23.3	25.1	20.8	18.5	18.1	17.9	17.3	15.1	12.9	18.4	26.9																							
26-May	11.4	9.8	8.6	7.7	7.0	7.0	7.9	9.9	11.6	13.1	14.1	15.0	16.0	16.8	17.7	18.5	19.1	19.3	19.0	18.5	17.3	14.9	13.2	12.7	13.6	19.3																							
27-May	11.7	9.9	9.6	9.3	8.9	8.9	10.3	12.2	14.1	16.1	18.3	19.7	19.4	18.8	17.0	14.2	12.1	10.9	10.7	10.9	10.2	7.8	5.6	4.6	12.1	19.7																							
28-May	3.8	2.9	2.9	3.2	3.3	3.4	3.9	4.2	4.7	5.2	5.9	6.8	8.0	9.2	10.0	10.7	11.0	11.2	11.2	10.9	9.9	8.0	6.6	6.0	6.8	11.2																							
29-May	5.8	5.2	4.8	3.9	2.9	3.1	5.1	6.6	8.3	9.9	11.0	12.1	12.6	13.6	14.5	15.2	15.9	16.3	16.1	16.0	15.4	14.0	12.7	10.8	10.5	16.3																							
30-May	10.2	8.9	8.2	7.2	6.4	6.3	7.6	9.8	11.9	14.5	16.8	18.1	19.0	19.9	20.7	21.3	21.6	21.8	21.9	21.2	20.3	19.3	17.7	15.7	15.3	21.9																							
31-May	14.3	13.2	12.3	11.4	11.0	11.7	12.6	14.0	14.7	15.3	13.0	13.4	12.7	12.8	14.0	15.2	16.1	16.7	16.4	15.4	13.5	12.6	12.5	13.0	13.7	16.7																							
																								8.7	7.7	6.9	6.1	5.4	5.5	6.8	8.4	10.3	12.3	13.9	15.0	15.6	16.1	16.4	16.8	16.9	16.8	16.4	15.9	14.6	12.8	11.2	10.0	Diurnal Average	
																								17.6	15.4	14.6	13.6	13.2	13.6	14.1	15.1	17.6	20.6	24.3	26.9	26.4	26.9	27.5	27.7	28.0	27.9	27.8	27.1	24.9	23.1	19.9	18.2		Diurnal Maximum



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	16	2.15	2.15
0 - 10	302	40.59	42.74
10 - 20	290	38.98	81.72
> 20	136	18.28	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

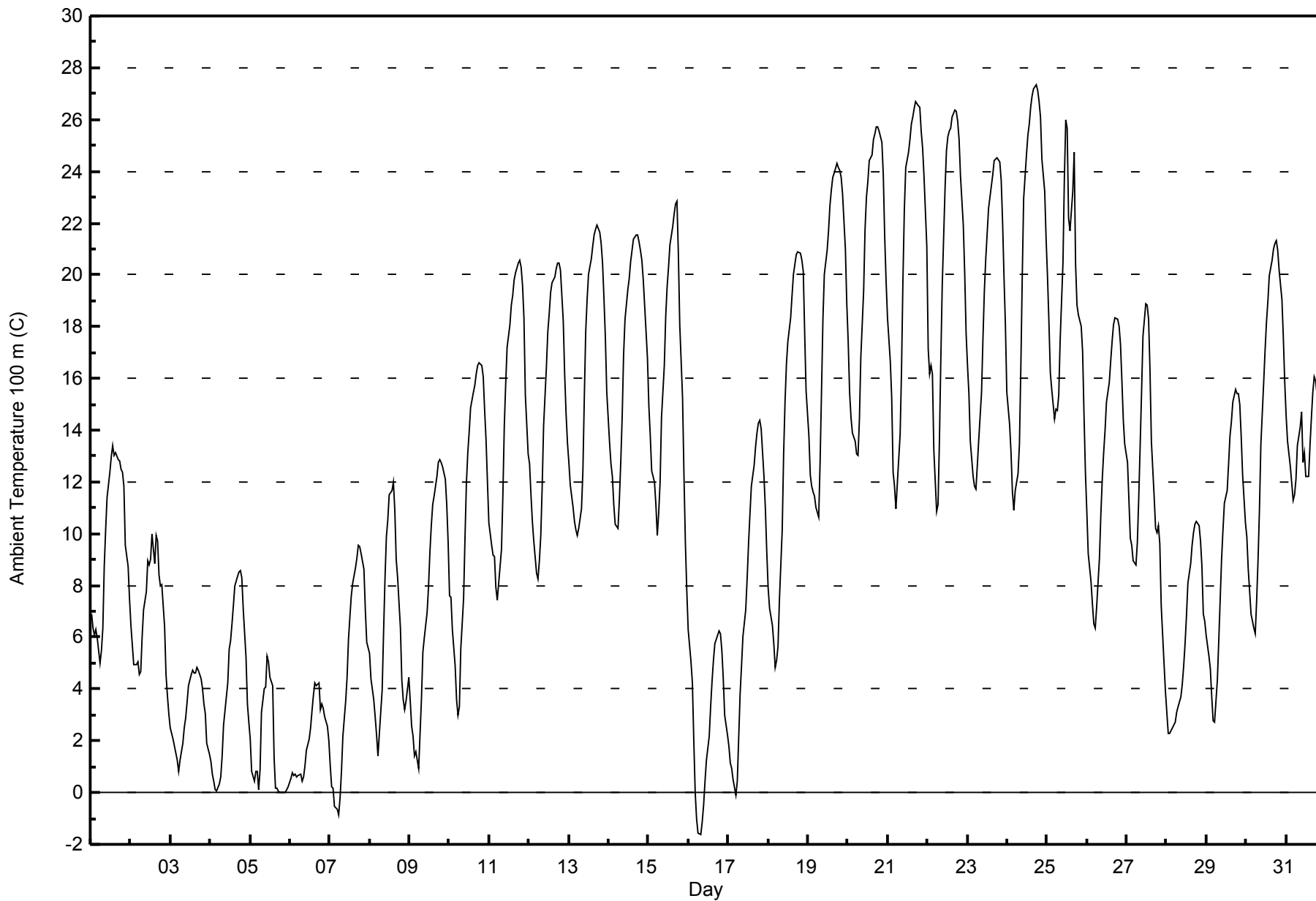


Maximum Value: 27.3 C on May 24 18:00		Maximum Daily Average: 20.7 C on May 21		Hours in Service: 744																																													
Minimum Value: -1.6 C on May 16 08:00		Minimum Daily Average: 1.6 C on May 5		Hours of Data: 744																																													
Maximum Diurnal Average: 16.2 C at hour 17		Minimum Diurnal Average: 6.1 C at hour 6		Hours of Missing Data: 0																																													
Monthly Average: 11.87 C		Percentiles: P ₁ = -0.5 P ₁₀ = 2.1 Q ₁ = 5.7 Median = 11.6 Q ₃ = 17.7 P ₉₀ = 22.1 P ₉₉ = 26.5		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-May	6.9	6.4	6.1	6.3	6.0	5.0	5.5	6.4	8.7	10.2	11.4	12.4	13.0	13.4	13.0	13.1	12.8	12.8	12.5	12.4	11.8	9.6	8.7	7.5	9.7	13.4																							
2-May	6.5	5.7	4.9	4.9	5.0	4.6	4.7	6.1	7.1	7.8	9.0	8.8	9.0	10.0	8.9	9.9	9.7	8.4	8.0	8.0	6.4	4.6	3.7	3.0	6.9	10.0																							
3-May	2.5	2.1	1.8	1.5	1.3	0.8	1.3	1.9	2.5	2.9	3.5	4.1	4.5	4.7	4.6	4.6	4.9	4.7	4.4	4.0	3.4	3.0	1.9	1.5	3.0	4.9																							
4-May	1.2	0.7	0.4	0.1	0.1	0.3	0.6	1.4	2.6	3.2	4.3	5.5	5.8	6.5	7.2	8.0	8.4	8.5	8.6	8.3	7.1	5.2	3.4	2.7	4.2	8.6																							
5-May	2.0	0.8	0.4	0.8	0.8	0.1	0.9	3.1	4.0	4.1	5.3	5.0	4.4	4.1	1.4	0.2	0.2	0.0	0.0	0.0	0.0	0.1	0.3	1.6	5.3																								
6-May	0.5	0.7	0.7	0.7	0.6	0.6	0.7	0.4	0.6	1.0	1.7	2.1	2.5	3.2	3.8	4.2	4.1	4.2	3.2	3.4	3.3	2.9	2.5	2.0	2.1	4.2																							
7-May	1.0	0.2	0.2	-0.6	-0.6	-0.9	-0.2	0.8	2.2	3.5	4.5	5.9	6.8	7.6	8.1	8.7	9.1	9.5	9.5	9.2	8.6	7.0	5.8	5.6	4.7	9.5																							
8-May	5.4	4.4	3.6	2.9	2.2	1.4	2.3	4.0	6.2	8.3	9.9	10.5	11.5	11.7	12.0	10.9	9.0	8.3	6.4	4.4	3.6	3.2	3.6	4.4	6.2	12.0																							
9-May	3.5	2.6	2.2	1.4	1.6	0.9	2.3	3.6	5.5	6.0	7.0	8.0	9.3	10.3	11.1	11.5	12.2	12.7	12.8	12.7	12.6	12.1	11.1	9.6	7.6	12.8																							
10-May	7.6	7.5	6.3	4.9	3.6	3.0	3.3	5.5	7.5	9.8	12.0	13.1	13.9	14.8	15.5	15.7	16.2	16.5	16.6	16.5	16.1	14.8	13.6	12.0	11.1	16.6																							
11-May	10.4	9.5	9.2	9.1	7.9	7.4	8.7	9.4	11.5	14.2	15.8	17.2	18.0	18.8	19.2	19.8	20.1	20.4	20.6	20.3	19.6	18.3	15.4	13.1	14.8	20.6																							
12-May	12.7	11.5	10.5	9.7	8.5	8.2	9.0	9.9	11.8	14.2	16.4	17.8	18.5	19.3	19.7	19.9	20.2	20.4	20.5	20.2	18.2	16.2	14.7	13.5	15.1	20.5																							
13-May	12.7	11.9	11.0	10.5	10.2	9.9	10.2	11.0	12.4	15.3	17.8	19.1	20.0	20.6	21.1	21.6	21.7	21.9	21.7	21.2	20.4	19.1	17.6	15.5	16.4	21.9																							
14-May	13.5	12.7	12.2	11.1	10.3	10.2	11.3	12.8	14.5	17.0	18.3	19.4	19.8	20.5	21.0	21.4	21.5	21.5	21.3	21.0	20.5	19.8	17.8	16.7	16.9	21.5																							
15-May	14.9	13.8	12.4	12.0	11.1	10.0	10.8	12.0	14.5	16.5	18.4	19.5	20.3	21.1	21.8	22.3	22.7	22.9	20.8	18.1	15.3	12.3	9.7	7.8	15.9	22.9																							
16-May	6.3	5.1	4.2	2.0	0.0	-1.0	-1.6	-1.6	-1.1	-0.5	0.4	1.3	2.2	3.3	4.3	5.1	5.7	6.1	6.2	6.1	5.5	4.4	3.0	2.2	2.8	6.3																							
17-May	1.8	1.1	0.9	0.5	-0.1	0.4	2.1	3.8	4.9	6.0	7.0	8.2	9.6	10.7	11.8	12.7	13.3	13.9	14.3	14.4	14.1	12.2	10.9	9.3	7.7	14.4																							
18-May	7.9	7.1	6.5	5.8	4.8	5.1	5.6	7.4	10.1	13.1	15.1	16.5	17.4	18.3	19.2	20.0	20.4	20.8	20.9	20.9	20.5	20.1	17.8	15.5	14.0	20.9																							
19-May	13.8	12.3	11.8	11.6	11.4	11.0	10.6	12.8	15.5	18.3	20.0	20.9	21.7	22.7	23.2	23.8	23.9	24.3	24.1	24.0	23.8	23.1	21.0	18.9	18.5	24.3																							
20-May	17.4	15.5	14.5	13.9	13.6	13.1	13.0	14.5	16.8	19.4	21.7	23.0	23.6	24.4	24.6	25.2	25.4	25.7	25.7	25.5	25.1	23.9	21.5	19.8	20.3	25.7																							
21-May	18.4	16.7	15.3	12.4	11.8	11.0	12.0	13.9	16.4	19.8	22.5	24.1	24.8	25.2	25.8	26.1	26.4	26.7	26.6	26.5	25.6	24.9	23.8	21.1	20.7	26.7																							
22-May	17.1	16.2	16.5	16.1	13.2	10.9	11.2	13.6	16.7	19.6	23.3	24.8	25.4	25.5	25.7	26.1	26.4	26.3	25.9	25.2	23.8	21.9	20.1	17.7	20.4	26.4																							
23-May	16.5	15.4	13.5	12.2	11.8	11.7	12.6	13.6	15.5	17.5	19.3	20.6	21.6	22.6	23.4	23.9	24.4	24.5	24.3	23.6	22.0	19.9	18.1	18.9	18.9	24.5																							
24-May	15.5	14.2	13.2	11.6	10.9	11.7	12.3	13.5	16.4	19.9	23.0	24.6	25.4	25.8	26.5	26.9	27.2	27.3	27.1	26.7	26.1	24.5	23.2	21.4	20.6	27.3																							
25-May	19.9	18.2	16.2	15.6	14.4	14.8	14.8	15.3	17.5	20.5	23.7	26.0	25.7	22.2	21.7	23.2	24.7	20.4	18.8	18.5	18.0	17.0	14.6	12.4	18.9	26.0																							
26-May	10.9	9.2	8.1	7.3	6.5	6.4	7.2	9.0	10.7	12.1	13.1	14.0	15.1	15.9	16.6	17.4	18.1	18.4	18.3	18.0	17.3	15.9	14.4	13.5	13.1	18.4																							
27-May	12.8	11.3	9.8	9.6	8.9	8.8	9.7	11.4	13.4	15.5	17.6	18.9	18.8	18.3	16.3	13.6	11.4	10.2	10.0	10.3	9.6	7.2	5.0	3.9	11.8	18.9																							
28-May	3.1	2.3	2.3	2.5	2.6	2.7	3.1	3.3	3.7	4.2	4.9	5.8	6.8	8.1	8.9	9.5	10.0	10.4	10.5	10.3	9.7	8.7	6.9	6.6	6.1	10.5																							
29-May	6.1	5.3	4.8	3.7	2.8	2.7	4.4	5.9	7.5	9.0	10.1	11.2	11.7	12.7	13.8	14.3	15.1	15.5	15.4	15.4	15.0	13.7	12.3	10.4	10.0	15.5																							
30-May	9.9	8.6	7.7	6.9	6.3	6.1	7.5	9.0	11.0	13.5	15.8	17.1	18.2	19.0	19.9	20.6	21.0	21.2	21.3	20.9	20.2	19.0	17.6	15.8	14.8	21.3																							
31-May	14.5	13.6	12.6	11.9	11.3	11.5	12.1	13.4	14.1	14.7	12.8	13.1	12.2	12.2	13.4	14.5	15.5	16.1	15.9	14.9	13.0	12.4	12.6	13.0	13.4	16.1																							
																								9.5	8.5	7.7	7.1	6.4	6.1	6.7	8.0	9.7	11.5	13.1	14.1	14.8	15.3	15.6	16.0	16.2	16.2	15.9	15.5	14.8	13.5	12.1	10.8	Diurnal Average	
																								19.9	18.2	16.5	16.1	14.4	14.8	14.8	15.3	17.5	20.5	23.7	26.0	25.7	25.8	26.5	26.9	27.2	27.3	27.1	26.7	26.1	24.9	23.8	21.4		Diurnal Maximum



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	12	1.61	1.61
0 - 10	303	40.73	42.34
10 - 20	297	39.92	82.26
> 20	132	17.74	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

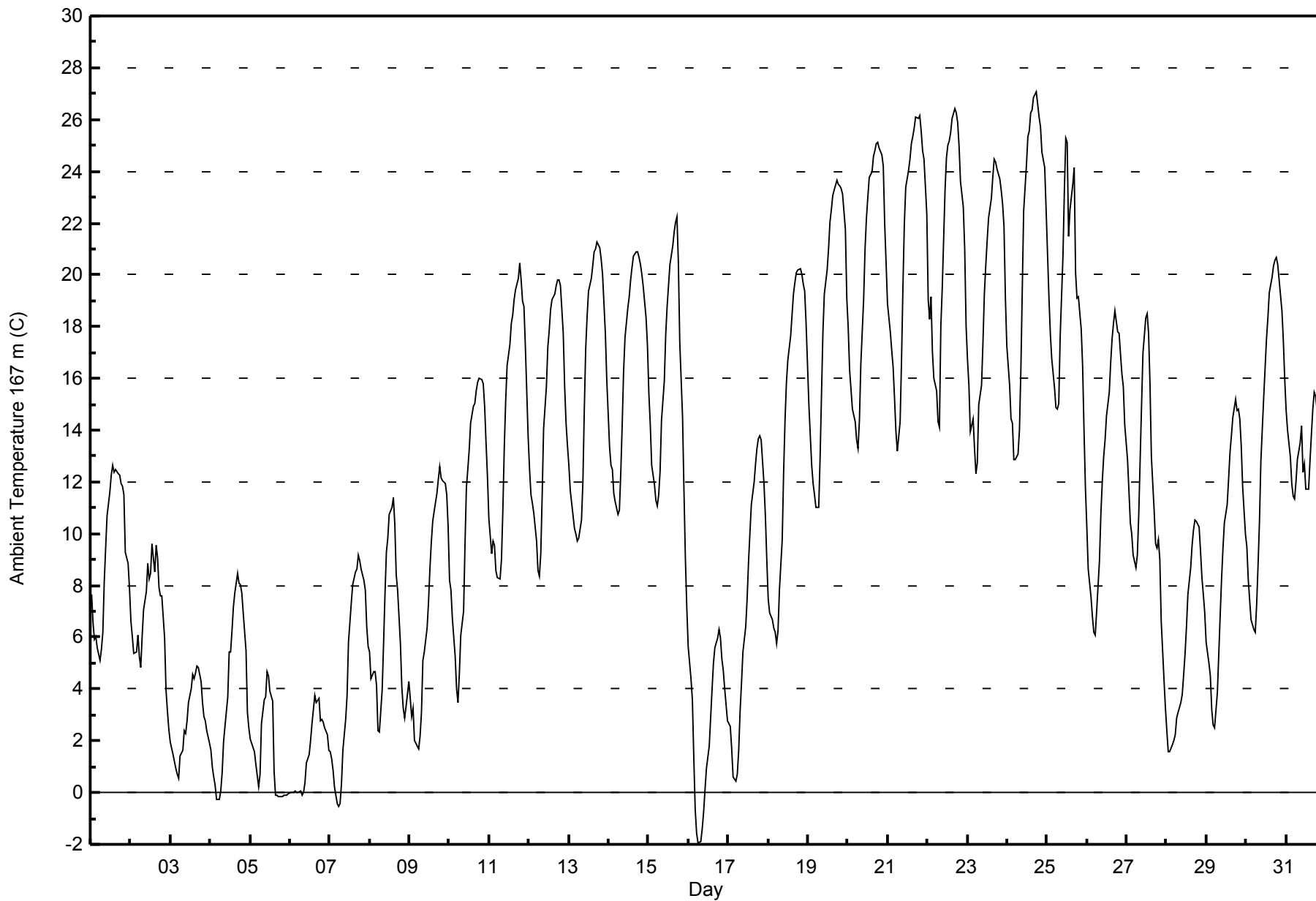


Maximum Value: 27.1 C on May 24 18:00		Maximum Daily Average: 21.2 C on May 22		Hours in Service: 744																																													
Minimum Value: -1.9 C on May 16 07:00		Minimum Daily Average: 1.4 C on May 5		Hours of Data: 744																																													
Maximum Diurnal Average: 15.7 C at hour 17		Minimum Diurnal Average: 6.5 C at hour 6		Hours of Missing Data: 0																																													
Monthly Average: 11.74 C		Percentiles: P ₁ = -0.4 P ₁₀ = 1.9 Q ₁ = 5.6 Median = 11.7 Q ₃ = 17.7 P ₉₀ = 22.2 P ₉₉ = 26.2		Hours of Calibration: 0																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	7.7	6.5	5.9	6.0	5.6	5.1	5.5	6.2	8.1	9.4	10.7	11.6	12.3	12.7	12.4	12.5	12.3	12.3	11.9	11.9	11.5	9.3	8.8	7.9	9.3	12.7																							
2-May	6.7	6.0	5.4	5.4	6.1	5.2	4.8	6.0	7.1	7.7	8.8	8.3	8.5	9.6	8.5	9.5	9.1	7.9	7.6	7.6	5.9	3.9	3.2	2.5	6.7	9.6																							
3-May	1.9	1.5	1.2	0.9	0.7	0.6	1.4	1.7	2.4	2.3	2.8	3.5	4.0	4.6	4.4	4.6	4.9	4.8	4.3	3.5	2.9	2.8	2.4	1.9	2.7	4.9																							
4-May	1.7	1.0	0.6	0.3	-0.3	-0.3	0.1	0.8	2.0	2.5	3.7	5.4	6.3	7.2	7.7	8.5	8.1	8.0	7.7	7.0	5.5	3.1	2.5	3.9	8.5	8.5																							
5-May	2.0	1.9	1.6	1.1	0.7	0.2	0.7	2.7	3.6	3.7	4.7	4.5	3.9	3.6	0.8	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	1.4	4.7																							
6-May	0.0	0.0	0.0	0.1	0.0	0.0	0.1	-0.1	0.0	0.4	1.1	1.5	2.0	2.7	3.2	3.8	3.5	3.6	2.8	2.8	2.7	2.5	2.2	1.6	1.5	3.8																							
7-May	1.6	1.3	0.9	0.2	-0.4	-0.5	-0.4	0.4	1.6	2.8	3.8	5.8	6.6	7.3	8.0	8.5	8.6	9.2	9.0	8.6	8.2	7.8	6.4	5.7	4.6	9.2																							
8-May	5.4	4.4	4.7	4.7	4.2	2.4	2.3	4.0	5.8	7.6	9.3	9.8	10.7	11.0	11.4	10.4	8.4	7.8	5.8	4.1	3.3	2.9	3.3	4.3	6.2	11.4																							
9-May	3.6	3.0	3.3	2.0	1.9	1.7	2.1	3.1	5.1	5.4	6.4	7.3	8.6	9.7	10.5	10.9	11.5	12.1	12.6	12.1	12.1	11.9	11.5	10.3	7.4	12.6																							
10-May	8.2	7.8	6.8	5.3	4.0	3.5	4.6	6.1	7.0	9.6	11.8	12.5	13.2	14.3	14.9	15.0	15.5	15.9	16.0	15.9	15.8	14.9	13.5	12.2	11.0	16.0																							
11-May	10.6	9.2	9.7	9.5	8.6	8.3	8.3	9.0	11.0	13.4	15.2	16.5	17.3	18.1	18.5	19.1	19.4	19.8	20.5	19.8	19.0	18.8	17.2	13.8	14.6	20.5																							
12-May	12.5	11.5	11.2	10.8	9.7	8.6	8.3	9.2	11.5	14.1	15.7	17.2	17.9	18.7	19.0	19.3	19.6	19.8	19.8	19.6	17.7	15.7	14.3	13.4	14.8	19.8																							
13-May	12.6	11.7	10.7	10.2	10.0	9.7	9.8	10.5	12.0	14.8	17.1	18.4	19.4	19.8	20.3	20.9	21.0	21.3	21.0	20.6	20.0	18.9	17.7	15.9	16.0	21.3																							
14-May	13.4	12.6	12.5	11.6	11.2	10.8	10.9	12.4	14.2	16.3	17.6	18.7	19.2	19.8	20.3	20.7	20.9	20.9	20.7	20.4	20.0	19.5	18.4	17.3	16.7	20.9																							
15-May	15.4	14.2	12.7	11.9	11.3	11.1	11.5	12.4	14.4	15.9	17.7	18.8	19.6	20.4	21.1	21.6	22.0	22.2	20.5	17.4	14.5	11.6	9.0	7.2	15.6	22.2																							
16-May	5.6	4.4	3.6	1.4	-0.7	-1.6	-1.9	-1.9	-1.4	-0.8	0.1	0.9	1.8	2.9	4.0	5.0	5.6	6.0	6.3	6.0	5.2	4.7	4.0	2.8	2.6	6.3																							
17-May	2.6	2.5	1.7	0.6	0.4	0.7	1.6	3.2	4.3	5.4	6.4	7.5	8.9	10.1	11.1	12.0	12.7	13.3	13.7	13.8	13.6	11.9	10.7	9.0	7.4	13.8																							
18-May	7.5	7.0	6.7	6.4	6.2	5.8	6.2	7.8	9.7	12.4	14.4	15.9	16.7	17.6	18.4	19.2	19.7	20.1	20.2	20.2	20.0	19.6	19.4	18.1	14.0	20.2																							
19-May	15.0	13.8	12.6	11.9	11.5	11.0	11.0	12.9	15.4	17.8	19.3	20.2	21.0	22.0	22.5	23.1	23.3	23.7	23.5	23.4	23.3	23.1	21.7	19.1	18.4	23.7																							
20-May	18.0	16.3	15.6	14.8	14.3	13.6	13.3	14.4	16.6	19.0	21.0	22.2	23.0	23.7	24.0	24.6	24.8	25.1	25.1	24.9	24.7	24.2	22.0	20.5	20.2	25.1																							
21-May	18.9	17.8	17.1	16.4	15.2	13.9	13.2	14.3	16.7	19.6	22.0	23.4	24.0	24.5	25.0	25.4	25.7	26.1	26.0	26.2	25.6	24.8	24.5	22.4	21.2	26.2																							
22-May	19.1	18.3	19.2	17.0	16.0	15.5	14.3	14.1	18.0	19.5	23.3	24.5	25.0	25.2	25.5	26.1	26.4	26.3	25.9	24.9	23.6	22.6	21.0	18.0	21.2	26.4																							
23-May	16.7	15.7	13.9	14.4	13.3	12.3	12.8	15.0	15.7	17.4	19.3	20.3	21.3	22.2	22.9	23.8	24.5	24.4	24.1	23.7	23.3	22.7	21.9	19.1	19.2	24.5																							
24-May	17.3	15.7	14.4	14.3	12.9	12.9	13.1	14.0	16.3	19.4	22.5	24.3	25.3	25.5	26.2	26.3	26.9	27.1	26.6	26.1	25.7	24.8	24.1	22.5	21.0	27.1																							
25-May	20.9	19.2	17.7	16.8	15.6	14.8	14.8	15.1	17.6	20.7	23.2	25.3	25.1	21.5	22.5	23.5	24.2	20.1	19.1	19.2	17.9	16.5	14.0	11.8	19.0	25.3																							
26-May	10.3	8.6	7.6	6.8	6.2	6.1	7.0	9.0	10.8	12.0	13.0	13.6	14.5	15.5	16.6	17.5	18.1	18.6	17.8	17.7	16.9	16.1	15.7	14.2	12.9	18.6																							
27-May	12.9	11.6	10.4	10.0	9.2	8.7	9.2	10.7	12.9	15.0	17.0	18.3	18.5	17.8	15.8	13.0	10.8	9.6	9.5	9.8	9.0	6.6	4.4	3.3	11.4	18.5																							
28-May	2.4	1.6	1.6	1.9	2.0	2.2	2.9	3.1	3.5	3.8	4.6	5.4	6.4	7.7	8.7	9.5	10.1	10.5	10.5	10.3	9.4	8.3	7.7	7.0	5.9	10.5																							
29-May	5.8	5.0	4.5	3.2	2.6	2.5	3.8	5.3	6.9	8.3	9.4	10.4	11.1	12.1	13.1	13.8	14.5	15.2	14.8	14.8	14.5	13.4	11.8	10.0	9.5	15.2																							
30-May	9.5	8.2	7.4	6.7	6.3	6.2	7.3	8.8	10.5	12.8	15.2	16.4	17.5	18.4	19.3	19.9	20.3	20.6	20.7	20.4	19.8	18.6	17.5	15.9	14.3	20.7																							
31-May	14.8	14.0	13.0	11.9	11.4	11.3	12.0	12.9	13.5	14.1	12.4	12.7	11.7	11.7	12.8	13.8	14.8	15.5	15.3	14.3	12.5	12.2	12.8	12.6	13.1	15.5																							
																								9.7	8.8	8.2	7.6	7.0	6.5	6.8	7.8	9.4	11.0	12.6	13.6	14.2	14.7	15.1	15.5	15.7	15.5	15.1	14.4	13.4	12.4	11.0	Diurnal Average		
																								20.9	19.2	19.2	17.0	16.0	15.5	14.8	15.1	18.0	20.7	23.3	25.3	25.3	25.5	26.2	26.3	26.9	27.1	26.6	26.2	25.7	24.8	24.5	22.5	Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	22	2.96	2.96
0 - 10	299	40.19	43.15
10 - 20	305	40.99	84.14
> 20	118	15.86	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

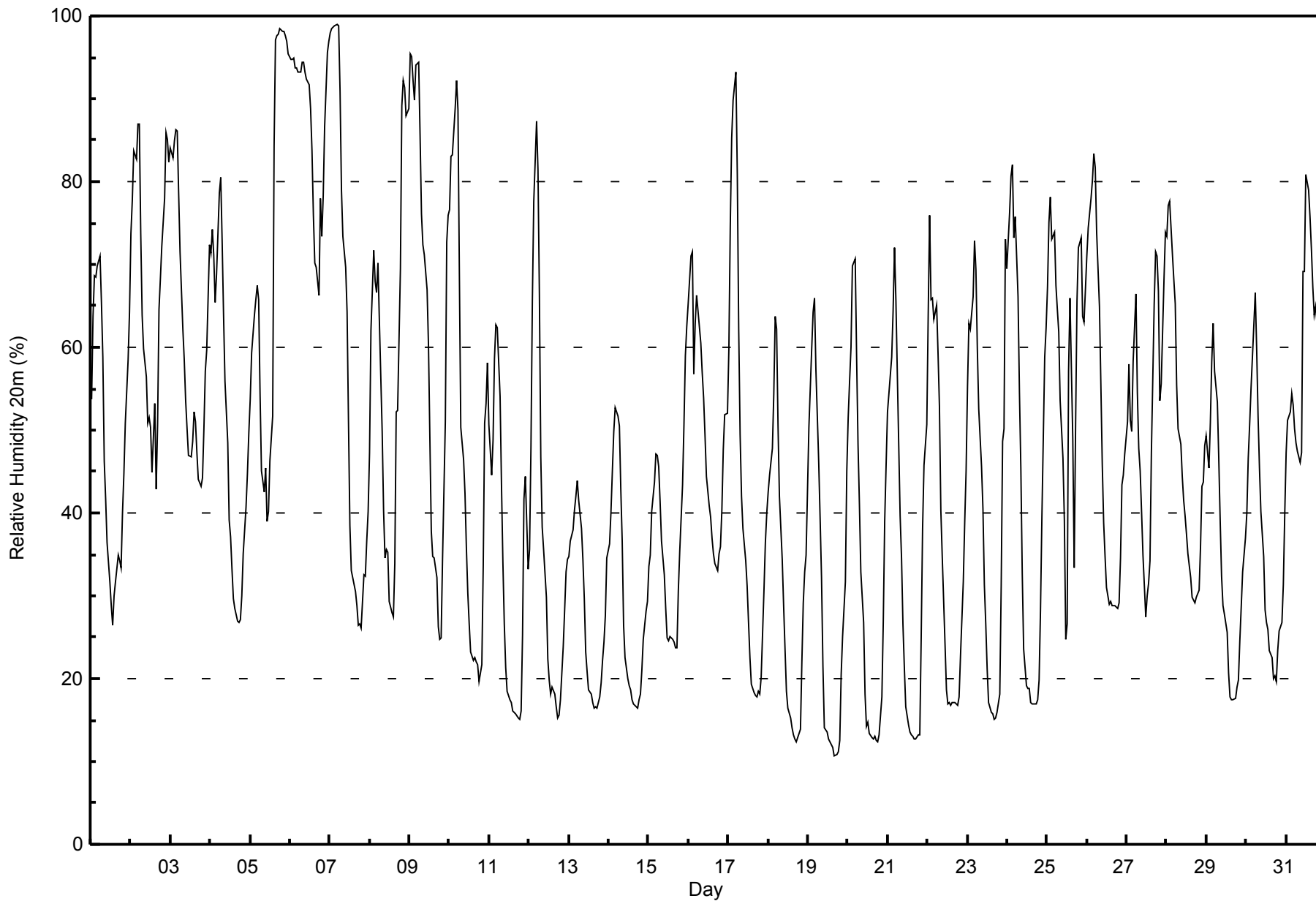


Maximum Value: 99 % on May 7 05:00																			Maximum Daily Average: 87.0 % on May 6						Hours in Service: 744																								
Minimum Value: 11 % on May 19 17:00																			Minimum Daily Average: 28.0 % on May 13						Hours of Data: 744																								
Maximum Diurnal Average: 71.5 % at hour 5																			Minimum Diurnal Average: 30.8 % at hour 16						Hours of Missing Data: 0																								
Monthly Average: 47.2 %																			Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 28 Median = 45 Q ₃ = 65 P ₉₀ = 81 P ₉₉ = 98						Hours of Calibration: 0																								
																									Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	54	64	69	68	70	71	65	59	46	42	37	32	29	26	30	32	35	34	33	40	45	51	58	64	48.1	71																							
2-May	74	78	84	83	87	87	74	64	60	56	51	52	50	45	53	43	51	65	68	72	78	86	85	82	67.8	87																							
3-May	84	83	85	86	86	79	72	62	58	54	50	47	47	49	52	51	47	44	43	44	50	57	60	72	61.0	86																							
4-May	71	74	71	65	69	79	81	73	64	56	49	39	37	33	30	28	27	27	27	30	35	41	45	50	50.0	81																							
5-May	54	59	64	66	68	66	54	45	43	45	39	40	46	52	84	97	98	98	99	98	98	98	97	96	70.9	99																							
6-May	95	95	95	94	94	93	93	94	94	93	92	92	89	84	76	70	70	66	78	73	78	87	96	97	87.0	97																							
7-May	98	98	99	99	99	99	91	79	73	70	64	51	39	33	32	30	29	26	27	26	33	32	37	40	58.5	99																							
8-May	47	62	72	68	67	70	63	50	40	35	36	35	29	28	27	34	52	52	69	89	92	91	88	89	57.8	92																							
9-May	96	95	92	90	94	94	86	76	72	71	67	60	49	38	35	35	32	26	25	25	34	51	73	76	62.2	96																							
10-May	77	83	83	89	92	89	69	50	46	42	36	30	27	23	22	22	22	22	20	22	34	51	53	58	48.4	92																							
11-May	51	45	49	59	63	62	54	43	34	27	21	18	17	17	16	16	16	15	15	16	25	42	44	33	33.3	63																							
12-May	36	48	66	78	87	81	66	47	38	36	30	22	20	18	19	18	17	15	16	17	24	28	33	34	37.2	87																							
13-May	35	37	38	40	42	44	42	38	34	30	23	21	19	18	17	16	17	16	18	19	22	24	28	35	28.0	44																							
14-May	36	40	45	50	53	52	51	43	37	26	23	20	19	19	18	17	17	16	17	18	21	25	28	29	29.9	53																							
15-May	34	35	40	44	47	47	46	41	37	33	28	25	25	25	25	24	24	24	31	35	43	51	59	62	36.8	62																							
16-May	65	71	72	57	63	66	64	61	57	54	49	44	41	39	37	35	34	33	35	36	40	48	52	52	50.2	72																							
17-May	60	75	85	90	93	81	62	49	42	38	34	31	27	23	19	18	18	18	18	18	20	31	36	40	42.8	93																							
18-May	43	45	48	54	64	62	51	42	34	29	24	18	16	15	14	13	13	12	13	14	22	29	33	35	31.0	64																							
19-May	50	55	60	64	66	57	46	39	32	22	14	14	13	12	12	12	11	11	11	13	21	25	32	45	30.7	66																							
20-May	51	56	60	70	71	59	48	41	33	27	18	14	15	13	13	13	13	12	12	13	18	27	39	46	32.6	71																							
21-May	52	57	59	64	72	66	57	40	35	27	21	17	14	14	13	13	13	13	13	13	25	38	46	51	34.6	72																							
22-May	64	76	66	66	63	65	59	53	40	35	24	19	17	17	17	17	17	17	17	17	18	23	32	39	45	37.7	76																						
23-May	55	63	62	66	73	69	60	52	46	41	31	27	21	17	16	16	15	15	16	18	31	49	50	73	40.9	73																							
24-May	70	76	81	82	73	76	66	55	45	33	24	19	19	19	17	17	17	17	17	20	28	40	59	62	43.0	82																							
25-May	67	75	78	73	74	67	65	62	54	47	39	25	27	57	66	49	33	50	66	72	73	64	63	67	58.9	78																							
26-May	71	74	78	80	83	82	74	65	56	46	39	35	31	29	29	29	29	29	28	29	35	43	45	47	49.4	83																							
27-May	51	58	51	50	58	66	55	48	45	40	35	28	30	31	34	47	65	72	71	67	53	56	68	74	52.2	74																							
28-May	73	77	78	71	68	65	55	50	48	44	42	40	37	35	32	30	30	29	30	31	36	43	44	48	47.4	78																							
29-May	49	45	51	58	63	57	53	47	39	32	29	28	26	21	18	17	17	18	19	20	25	29	33	37	34.6	63																							
30-May	40	47	51	55	63	67	60	52	45	40	35	28	27	26	23	23	20	20	20	23	26	27	31	40	37.0	67																							
31-May	47	51	52	54	53	50	48	48	46	47	69	69	81	79	76	72	67	64	65	61	71	79	83	82	63.1	83																							
																								59.7	64.4	67.1	68.8	71.5	69.9	62.2	53.8	47.6	42.5	37.8	33.5	31.7	30.8	31.4	30.8	31.1	31.6	33.5	35.2	40.7	47.5	52.8	56.8	Diurnal Average	
																								98	98	99	99	99	99	93	94	94	93	92	92	89	84	84	97	98	98	99	98	98	98	97	97	Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	112	15.05	15.05
20 - 40	210	28.23	43.28
40 - 60	197	26.48	69.76
60 - 80	147	19.76	89.52
80 - 100	78	10.48	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

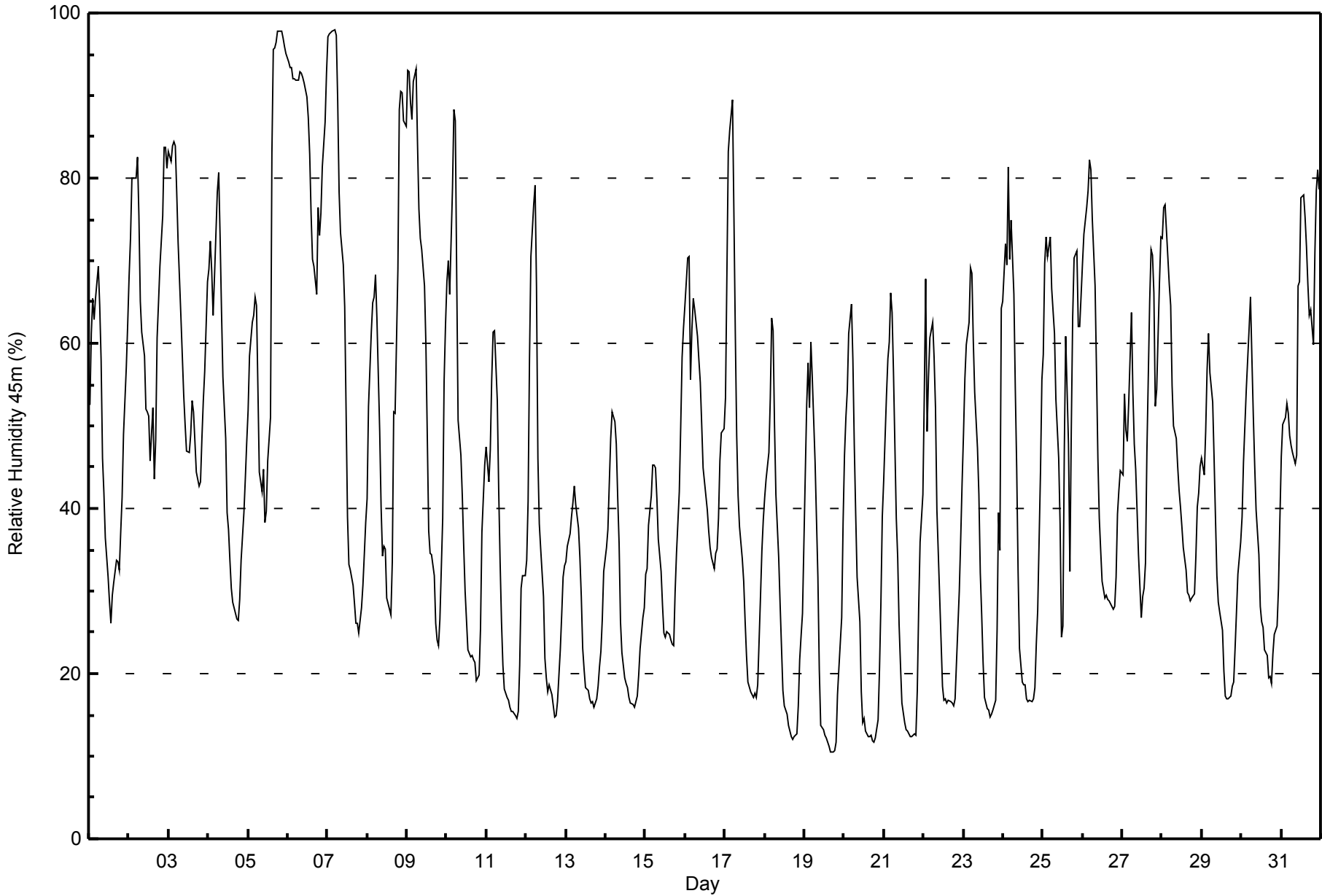


Maximum Value: 98 % on May 7 05:00																		Maximum Daily Average: 85.2 % on May 6																		Hours in Service: 744												
Minimum Value: 10 % on May 19 17:00																		Minimum Daily Average: 27.2 % on May 13																		Hours of Data: 744												
Maximum Diurnal Average: 68.7 % at hour 5																		Minimum Diurnal Average: 30.3 % at hour 14																		Hours of Missing Data: 0												
Monthly Average: 45.5 %																		Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 27 Median = 43 Q ₃ = 63 P ₉₀ = 78 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-May	53	61	65	63	65	69	65	58	46	42	36	32	29	26	30	31	34	34	33	37	41	49	57	62	46.6	69																						
2-May	68	73	80	80	80	82	75	65	61	58	52	52	51	46	52	44	48	61	65	69	75	84	84	81	66.1	84																						
3-May	83	82	84	84	84	78	72	63	59	54	50	47	47	49	53	52	48	44	43	43	48	53	57	67	60.2	84																						
4-May	69	72	69	63	68	78	81	73	64	56	48	39	38	34	30	29	27	27	26	29	34	40	43	48	49.4	81																						
5-May	52	58	63	63	66	65	55	44	42	45	38	40	46	51	83	96	96	96	98	98	98	97	96	95	69.9	98																						
6-May	94	93	93	92	92	92	92	93	93	92	91	90	87	83	76	70	69	66	77	73	76	81	87	93	85.2	94																						
7-May	97	97	98	98	98	97	89	78	73	70	64	52	39	33	33	31	28	26	26	25	28	31	34	38	57.7	98																						
8-May	41	52	61	65	66	68	63	49	40	34	35	35	29	28	27	34	52	51	69	88	90	90	87	86	56.0	90																						
9-May	93	93	89	87	92	93	84	76	73	71	67	60	49	37	35	34	32	26	24	23	27	39	55	62	59.2	93																						
10-May	67	70	66	79	88	87	68	51	46	42	35	30	26	23	22	22	22	21	19	20	26	37	41	45	43.9	88																						
11-May	47	43	47	56	61	61	53	42	34	26	21	18	17	17	16	15	15	15	15	15	21	30	32	32	31.3	61																						
12-May	34	41	58	71	77	79	67	46	38	35	29	22	19	18	19	18	16	15	15	17	23	27	32	33	35.3	79																						
13-May	33	35	37	39	41	43	40	38	34	29	23	21	18	18	17	16	17	16	17	19	21	23	27	32	27.2	43																						
14-May	35	38	43	48	52	50	48	41	36	26	22	20	19	18	17	16	16	16	17	17	20	23	27	28	28.9	52																						
15-May	32	33	38	42	45	45	45	41	36	32	28	25	24	25	25	24	24	23	30	35	42	50	58	62	36.0	62																						
16-May	65	70	71	56	62	65	64	61	58	55	50	45	41	40	37	35	34	33	35	35	39	46	49	50	49.8	71																						
17-May	53	68	83	86	90	76	61	49	42	38	34	31	26	22	19	18	17	17	18	17	19	29	35	39	41.1	90																						
18-May	41	44	47	53	63	61	50	42	34	29	23	18	16	15	14	13	12	12	12	13	16	22	25	27	29.3	63																						
19-May	44	53	58	52	60	56	46	39	32	21	14	13	13	12	12	11	10	11	11	12	17	21	27	38	28.3	60																						
20-May	47	51	54	61	65	58	48	39	32	26	18	14	15	13	12	12	12	12	12	12	14	20	28	39	29.8	65																						
21-May	43	54	58	60	66	64	56	39	34	26	21	16	14	13	13	13	12	12	13	13	18	28	36	42	31.8	66																						
22-May	54	68	49	56	61	62	58	52	40	35	24	18	17	17	16	17	17	16	16	17	21	30	36	43	35.0	68																						
23-May	49	56	60	63	69	68	60	54	47	42	32	27	21	17	16	15	15	16	17	17	25	40	35	64	38.5	69																						
24-May	65	72	70	81	70	75	66	55	45	32	23	19	19	19	17	17	17	17	17	18	24	28	44	56	40.2	81																						
25-May	59	70	73	70	73	67	64	61	53	46	38	24	26	47	61	48	32	50	63	70	71	62	62	66	56.5	73																						
26-May	70	73	76	78	82	81	75	67	57	46	39	35	31	29	29	29	29	29	28	28	32	39	42	44	48.7	82																						
27-May	44	54	50	48	53	64	54	48	45	40	34	27	29	30	33	47	65	71	71	66	52	54	67	73	50.8	73																						
28-May	73	76	77	70	67	65	55	50	49	45	42	40	38	35	33	30	29	29	29	30	34	40	42	45	46.8	77																						
29-May	46	44	49	57	61	56	53	46	39	32	29	27	25	20	17	17	17	17	18	19	23	28	32	36	33.7	61																						
30-May	39	46	50	54	62	66	58	51	45	40	34	28	26	26	23	22	20	20	19	22	25	26	30	39	36.3	66																						
31-May	46	50	51	53	52	49	48	47	45	46	67	67	78	78	75	72	67	63	64	60	71	78	81	79	62.0	81																						
																								56.0	61.0	63.4	65.5	68.7	68.5	61.7	53.5	47.5	42.3	37.6	33.3	31.4	30.3	31.0	30.6	30.7	31.0	32.7	34.1	37.8	43.4	48.0	53.1	Diurnal Average
																								97	97	98	98	98	97	92	93	93	92	91	90	87	83	83	96	96	96	98	98	98	97	96	95	Diurnal Maximum



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	120	16.13	16.13
20 - 40	223	29.97	46.10
40 - 60	187	25.13	71.24
60 - 80	147	19.76	90.99
80 - 100	67	9.01	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

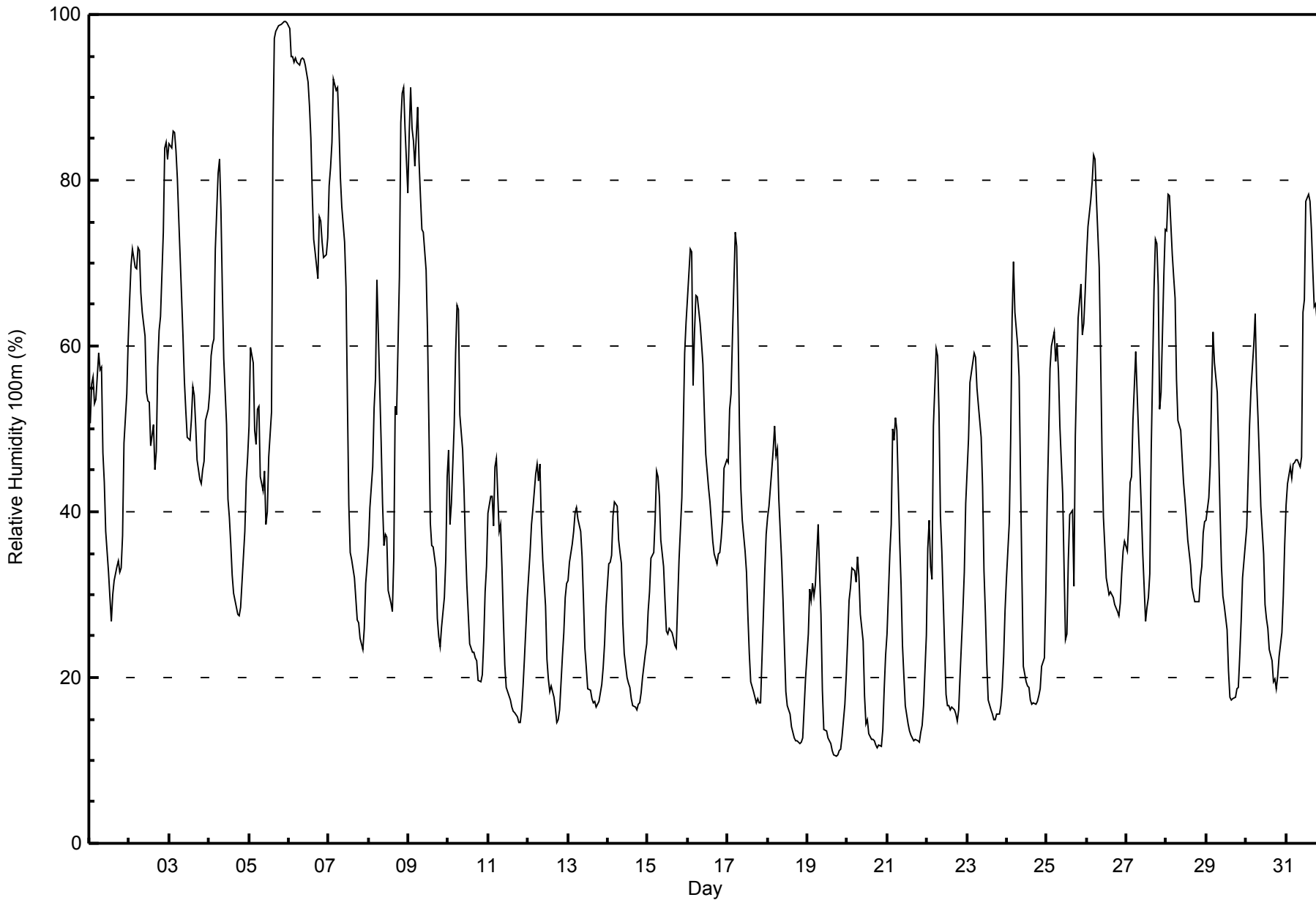


Maximum Value: 99 % on May 5 23:00																		Maximum Daily Average: 84.9 % on May 6																		Hours in Service: 744														
Minimum Value: 10 % on May 19 18:00																		Minimum Daily Average: 19.8 % on May 19																		Hours of Data: 744														
Maximum Diurnal Average: 60.8 % at hour 6																		Minimum Diurnal Average: 30.7 % at hour 14																		Hours of Missing Data: 0														
Monthly Average: 42.5 %																		Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 25 Median = 39 Q ₃ = 56 P ₉₀ = 75 P ₉₉ = 98																		Hours of Calibration: 0														
																																				Percent Operational Time: 100.0														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-May	51	55	56	53	53	59	57	57	47	44	38	33	30	27	30	32	33	34	33	33	37	48	54	61	44.0	61																								
2-May	65	70	72	69	69	72	72	66	64	61	54	53	53	48	51	45	47	57	62	64	74	84	85	83	64.2	85																								
3-May	84	84	86	86	84	80	75	66	61	56	52	49	49	51	55	54	50	46	44	43	45	46	51	52	60.4	86																								
4-May	54	59	60	61	72	81	82	76	67	58	51	42	39	36	32	30	28	28	27	29	32	38	44	47	48.9	82																								
5-May	50	60	58	50	48	52	53	44	43	45	39	40	47	52	85	97	98	98	99	99	99	99	99	99	68.8	99																								
6-May	98	95	95	94	95	94	94	95	95	95	94	92	89	85	78	73	71	68	76	75	72	71	71	73	84.9	98																								
7-May	79	82	85	92	91	91	86	80	77	73	67	54	41	35	34	32	29	27	27	25	23	26	31	34	55.0	92																								
8-May	36	41	45	53	56	68	62	49	41	36	37	37	31	29	28	34	53	52	68	87	90	91	86	78	53.7	91																								
9-May	86	91	86	85	82	89	82	78	74	74	69	62	50	39	36	36	33	27	25	24	26	30	34	44	56.7	91																								
10-May	47	38	41	51	59	65	64	52	47	42	36	31	28	24	23	23	22	22	20	19	20	24	30	33	36.0	65																								
11-May	40	42	42	38	45	46	38	38	33	27	22	19	18	17	16	16	16	15	15	15	16	19	22	30	26.9	46																								
12-May	32	35	38	40	45	46	44	46	39	34	29	22	20	18	19	18	16	15	15	16	23	25	30	31	29.0	46																								
13-May	32	34	36	38	40	41	39	38	35	29	24	21	19	18	18	17	17	16	17	18	19	21	24	28	26.6	41																								
14-May	34	34	35	39	41	41	37	35	34	27	23	20	19	19	18	17	16	16	17	17	18	20	23	24	25.9	41																								
15-May	28	30	34	35	39	45	44	42	37	33	29	26	25	26	26	25	24	24	29	34	42	50	59	63	35.3	63																								
16-May	66	72	71	55	62	66	66	63	60	58	52	47	43	41	39	37	35	34	35	35	37	39	45	46	50.1	72																								
17-May	46	52	54	61	74	72	62	50	43	39	35	33	27	23	19	18	18	17	17	17	17	27	33	37	37.2	74																								
18-May	39	41	45	47	50	47	48	41	34	29	24	18	17	16	14	13	13	12	12	12	12	13	16	20	26.4	50																								
19-May	25	31	29	31	30	31	38	33	28	18	14	14	13	12	12	11	11	10	11	11	11	13	17	20	19.8	38																								
20-May	25	29	31	33	33	32	35	32	28	24	18	14	15	13	13	13	12	12	12	12	12	14	19	23	20.9	35																								
21-May	25	35	39	50	49	51	50	37	31	24	20	17	14	14	13	13	12	12	12	12	13	14	17	25	25.0	51																								
22-May	36	39	33	32	50	60	59	52	39	35	24	18	17	17	16	16	16	16	15	16	20	28	33	41	30.3	60																								
23-May	45	49	56	58	59	59	55	53	49	43	33	28	22	17	16	16	15	15	16	16	17	19	23	28	33.5	59																								
24-May	32	39	49	63	70	64	60	56	44	32	21	19	19	19	17	17	17	17	17	18	19	21	22	30	32.7	70																								
25-May	41	49	57	60	62	58	60	57	50	42	33	25	25	34	40	40	31	49	57	63	67	61	63	66	49.7	67																								
26-May	71	74	78	80	83	82	78	70	59	47	39	36	32	30	30	30	30	29	28	27	29	33	35	36	48.6	83																								
27-May	35	39	44	44	51	59	54	50	45	40	35	27	28	30	33	47	67	73	72	67	52	54	69	74	49.6	74																								
28-May	74	78	78	71	68	66	56	51	50	47	44	41	39	37	34	31	30	29	29	29	32	33	37	39	46.8	78																								
29-May	39	42	46	55	62	58	54	48	40	33	30	29	26	21	18	17	17	18	19	19	23	27	32	36	33.6	62																								
30-May	38	44	51	55	60	64	56	51	46	41	35	29	27	26	23	22	20	20	19	20	23	26	30	36	35.9	64																								
31-May	41	43	45	44	46	46	46	46	45	47	64	66	77	78	77	74	69	65	65	61	72	79	80	78	60.6	80																								
																								48.2	51.8	54.0	55.6	58.9	60.8	58.2	53.3	47.9	43.0	38.2	34.2	32.2	30.7	31.1	31.1	31.2	31.4	32.5	33.3	35.2	38.5	42.4	45.7	Diurnal Average		
																								98	95	95	94	95	94	94	95	95	95	94	92	89	85	85	97	98	98	99	99	99	99	99	99	99	Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	136	18.28	18.28
20 - 40	260	34.95	53.23
40 - 60	186	25.00	78.23
60 - 80	107	14.38	92.61
80 - 100	55	7.39	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) - %

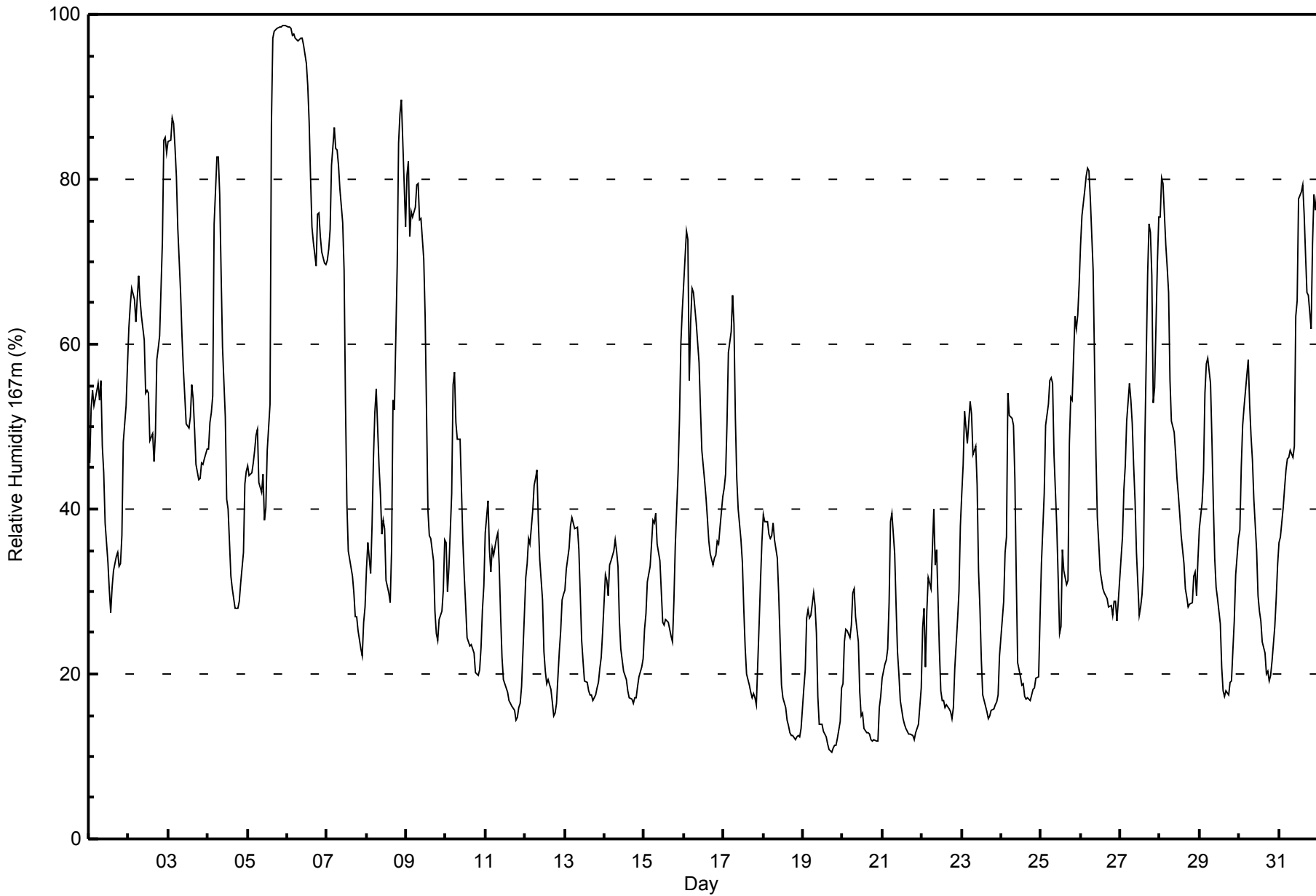
Lower Camp Met Tower - May 2015

Maximum Value: 99 % on May 5 22:00																		Maximum Daily Average: 86.5 % on May 6																		Hours in Service: 744														
Minimum Value: 11 % on May 19 18:00																		Minimum Daily Average: 17.7 % on May 19																		Hours of Data: 744														
Maximum Diurnal Average: 55.0 % at hour 6																		Minimum Diurnal Average: 31.1 % at hour 16																		Hours of Missing Data: 0														
Monthly Average: 40.8 %																		Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 24 Median = 36 Q ₃ = 53 P ₉₀ = 75 P ₉₉ = 98																		Hours of Calibration: 0														
																																				Percent Operational Time: 100.0														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-May	46	52	54	53	53	55	53	56	48	44	38	33	30	27	30	33	34	35	33	33	37	48	53	58	43.2	58																								
2-May	62	65	67	65	63	66	68	65	63	60	54	54	54	48	49	46	49	58	60	61	72	85	85	83	62.7	85																								
3-May	85	85	87	87	84	80	74	66	61	57	54	50	50	51	55	53	50	46	44	44	46	45	46	47	60.3	87																								
4-May	47	51	52	54	75	83	83	78	69	60	51	41	40	36	32	30	28	28	28	29	31	35	43	45	47.8	83																								
5-May	45	44	44	46	47	49	50	43	42	44	39	40	47	53	87	97	98	98	98	98	99	99	99	99	66.8	99																								
6-May	99	98	98	98	98	97	97	97	97	97	96	94	91	87	80	74	72	70	76	76	73	71	70	70	86.5	99																								
7-May	70	71	74	82	86	84	84	82	79	75	69	53	41	35	34	32	30	27	27	25	23	22	26	28	52.4	86																								
8-May	33	36	32	38	46	52	55	45	42	37	39	38	31	30	29	35	53	52	69	84	88	90	85	74	50.5	90																								
9-May	81	82	73	76	75	77	79	79	75	75	70	63	52	40	37	36	34	28	25	24	27	28	30	36	54.3	82																								
10-May	36	30	33	42	55	57	50	48	48	42	36	32	28	24	23	24	23	22	20	20	20	23	28	31	33.2	57																								
11-May	37	41	35	32	35	34	36	37	33	27	22	19	18	18	17	16	16	16	14	15	16	16	18	27	24.9	41																								
12-May	32	33	37	36	40	43	44	45	38	34	29	23	20	19	19	18	17	15	15	16	23	25	29	30	28.3	45																								
13-May	30	33	35	38	39	38	38	38	35	30	24	22	19	19	18	17	17	17	17	18	19	21	22	25	26.2	39																								
14-May	32	31	30	33	34	35	36	35	33	26	23	20	20	19	18	17	17	16	17	17	18	20	21	22	24.7	36																								
15-May	25	27	31	33	36	39	38	39	36	34	30	26	26	27	26	25	24	24	29	36	44	51	60	64	34.6	64																								
16-May	67	74	73	56	63	67	66	63	60	58	52	47	43	41	39	36	35	33	34	34	36	36	38	41	49.7	74																								
17-May	43	44	50	59	62	66	62	51	44	40	36	33	28	23	20	19	18	17	18	17	16	26	31	36	35.8	66																								
18-May	39	38	39	37	36	37	38	36	34	30	24	19	17	16	14	14	13	13	13	12	12	13	12	13	23.7	39																								
19-May	18	21	27	28	27	27	30	28	25	17	14	14	13	13	12	12	11	11	11	11	11	12	14	18	17.7	30																								
20-May	19	24	25	25	24	26	30	30	27	24	18	15	15	13	13	13	13	12	12	12	12	12	16	17	18.6	30																								
21-May	19	21	22	23	29	38	39	35	28	23	20	17	15	14	13	13	13	13	13	12	13	13	14	18	19.9	39																								
22-May	26	28	21	28	32	30	35	40	33	35	23	18	17	17	16	16	16	15	15	16	21	27	30	38	24.6	40																								
23-May	42	45	52	48	51	53	51	47	48	43	33	28	22	17	16	15	15	15	16	16	16	17	17	22	31.0	53																								
24-May	24	29	35	37	54	51	51	50	44	32	21	20	19	19	17	17	17	17	17	18	18	19	20	27	28.0	54																								
25-May	33	38	42	50	53	56	56	55	47	38	32	25	26	35	33	31	31	48	54	53	63	62	64	67	45.4	67																								
26-May	72	76	79	80	81	81	78	69	58	47	39	36	33	30	30	29	29	28	28	27	29	29	26	29	47.6	81																								
27-May	34	37	42	45	51	55	53	50	45	41	35	27	28	30	33	48	69	75	73	68	53	55	70	75	49.7	75																								
28-May	75	80	79	72	69	66	56	51	49	47	44	42	39	37	33	30	29	28	28	29	32	32	30	34	46.4	80																								
29-May	38	41	45	54	58	58	55	49	41	34	31	29	26	21	18	17	18	17	19	19	23	26	32	36	33.5	58																								
30-May	37	45	50	52	56	58	53	49	46	41	35	29	28	26	24	22	20	20	19	20	22	26	29	33	35.1	58																								
31-May	36	37	40	42	45	46	46	47	46	48	63	65	78	78	79	76	71	66	66	62	72	78	76	78	60.1	79																								
																								44.6	47.0	48.5	49.9	53.4	55.0	54.4	51.8	47.6	43.2	38.5	34.6	32.7	31.1	31.2	31.1	31.6	31.6	32.5	33.0	35.0	37.5	39.8	42.7	Diurnal Average		
																								99	98	98	98	98	97	97	97	97	97	96	94	91	87	87	97	98	98	98	98	99	99	99	99	99	Diurnal Maximum	



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	145	19.49	19.49
20 - 40	290	38.98	58.47
40 - 60	166	22.31	80.78
60 - 80	92	12.37	93.15
80 - 100	51	6.85	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 24 km/h on May 30 00:00	Maximum Daily Speed Average: 12.1 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 7 03:00	Minimum Daily Speed Average: 0.8 km/h on May 10	Hours of Data: 737
Maximum Diurnal Speed Average: 4.3 km/h at hour 7	Minimum Diurnal Speed Average: 0.7 km/h at hour 10	Hours of Missing Data: 7
Monthly Average Velocity: 0.7 km/h 99.7 deg	Percentiles: P ₁ = 0 P ₁₀ = 2 Q ₁ = 3 Median = 7 Q ₃ = 10 P ₉₀ = 13 P ₉₉ = 20	Percent Operational Time: 99.1

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	SSW4	SSE8	SSE13	SSE13	SE8	SE10	SSE14	SSE11	WSW11	W11	W14	W14	W13	WSW18	WSW19	W5	N4	SSW3	WNW15	WSW9	W10	WNW4	WNW4	NW3	SW5.6	WSW19
2-May	WNW4	NNW3	NW2	ESE1	SE3	ESE1	N2	N8	NNE9	N10	N10	N13	NNW12	NNE9	NW10	NNW9	NNW9	N2	SSW3	SSW3	NNW10	N9	NNE11	N10	N5.8	N13
3-May	NNE9	N8	NNW5	NNW4	NNW4	N7	NNE7	N6	NW3	NNW11	NW10	NW10	NW6	N7	N12	N12	N11	N10	NNE10	NNE6	E4	ENE1	NNE2	N3	N6.2	N12
4-May	N2	N2	NNW3	NNE2	WSW2	SSE1	ESE4	SSE5	S3	S5	SSW4	NE2	NNW3	NNE5	NNW5	NNW2	NNE5	E4	ENE5	NE6	NE7	NE5	NNW3	N6	NE1.7	NE7
5-May	N7	N7	N6	N6	NNE8	NNE7	N7	NNE5	NNE6	N7	NE8	NNE10	NNE11	NNE12	AF	AF	AF	AF	AF	AF	AF	AF	NNE7	N10	---	NNE12
6-May	N9	N7	N9	N8	N10	N10	N9	N10	N12	N10	N9	NE11	NNE12	NE13	NE13	NE10	ENE11	E7	ENE7	E3	NNE2	NE1	NNW1	NNW3	NNE7.3	NE13
7-May	NW1	NNE1	NNW0	SSE0	SSW1	SE4	SSE7	SSE7	SE5	SW2	WSW7	N3	N6	NE7	NNE5	NE7	ENE6	ENE6	ENE5	ENE6	E3	E1	SE4	ESE2	E2.0	WSW7
8-May	WNW0	NNW0	SE1	SE5	SE5	ESE2	SE3	SSE8	SE8	SE6	SE4	ESE6	W2	WNW4	W4	N11	N12	NE12	NE9	ENE6	E6	E3	ENE2	N1	ENE2.2	NE12
9-May	NNW6	NNW3	N3	N3	N5	NNW2	NNW1	N1	WSW2	WSW5	WSW5	WNW5	SW5	SSW6	SSW5	SSE8	SE5	SE3	SSE2	SSE2	SSE3	NW1	WSW1	NW1	WSW1.0	SSE8
10-May	NNW1	N2	NNW3	NNW4	NNW2	NNW3	N1	NE1	E3	SW2	SW3	WSW5	W7	S2	ESE2	SE6	SE8	SE6	SSE5	E1	NW1	S1	E1	SSE4	S0.8	SE8
11-May	SSE4	SSE7	SSE12	SSE13	SSE7	SE8	SE11	SSE10	SSE6	S3	WSW8	WSW7	WSW6	SW5	WSW6	WSW6	WSW8	WSW6	N2	NNE0	N0	WNW2	E1	E1	S3.7	SSE13
12-May	E3	N4	NNW3	NW2	NNW2	NNW2	NNW1	SSE2	SE3	SW5	SW4	S9	SSE10	SSE7	SSE12	SSE12	SSE10	SSE10	SE11	SE8	SE16	SSE15	SE17	SE19	SSE6.3	SE19
13-May	SE19	SE19	SE12	SE12	SE9	SSE9	SSE15	SSE13	SSE13	SSE14	SW5	WSW7	WSW10	W11	W7	WNW3	WNW6	S7	S13	SSW13	SSW12	S13	SSE15	SSE10	S8.4	SE19
14-May	SE7	SE10	SSE10	SSE8	SE9	SSE10	SSE16	SSE15	SSE8	W9	W13	WSW11	WSW13	SW10	SW9	SSW9	WSW11	SSW11	SSW11	SW9	SSW7	SW10	SW15	SW16	SSW7.8	SSE16
15-May	WSW5	E4	E5	SE11	SE7	SE6	SSE11	SE6	S3	SSE5	SW3	WSW13	WSW14	WSW12	W13	WSW13	WSW13	W11	NNE11	N23	N18	N23	N22	N21	NW3.1	N23
16-May	N18	N16	N13	N21	N17	N15	NNE14	NNE14	NNE13	N15	NNE15	NNE14	NNE14	NNE14	NE12	NNE11	NNE11	NNE10	NNE10	NNE9	NNE7	N4	NNW3	NE2	NNE12.1	N21
17-May	NE3	N3	NW1	N2	N2	NNE0	SSE10	S14	S14	S9	SSE9	SSE8	S8	SSE9	SSE8	SSE8	SSE10	SSE10	SSE10	S12	S11	SSE11	SSE9	SSE9	SSE6.9	S14
18-May	SSE5	SSE6	SSE9	SSE8	ESE4	SE9	SE9	SSE8	SSE7	SSE4	SE6	SW7	WNW8	WNW9	WNW10	WNW8	WNW7	WNW6	WNW5	WNW4	S2	SE3	WNW1	SSE3	SSW2.3	WNW10
19-May	SSE8	SSE6	SSE5	SSE7	SSE9	SE10	SE9	SE10	SE7	SW4	W7	W8	WNW7	W3	S4	SSW3	SSE3	ESE2	SSE4	SSE4	SSE3	NW3	SE2	SSE8	SSE3.7	SE10
20-May	SSE6	SE5	SE3	SSE4	SE9	SE11	SE8	SSE10	SSE9	SSE6	SW3	W3	E3	SW5	SSE7	SSW5	S6	SSW6	SW5	SW7	SW5	NNW2	SSE2	SSE3	SSE4.5	SE11
21-May	SSE5	SE5	ESE5	SE4	ESE2	SE4	SE4	SSE8	SSE8	SE6	SE5	SW1	WNW5	W7	WNW9	W8	WNW6	W5	NW4	NW2	SSE1	SSE2	SSE5	SSE3	S1.8	WNW9
22-May	N3	SSW1	SE9	SE10	ESE3	E3	SSE4	SSE3	SSW2	SW4	N7	N11	N11	N13	N13	NNE12	N12	N14	NNE13	NNE10	NNE6	NNE6	N4	NNW4	NNE4.7	N14
23-May	NNW3	N5	N5	N3	N4	N3	N4	N5	N6	N6	N7	N8	NNW7	NNW7	NW5	NNW4	N4	NE2	SE1	NW1	NNW1	NNW2	NNW3	NNW3	N3.9	N8
24-May	WNW1	SSE1	NNW2	ENE0	SSE2	SE6	SE6	SE3	SSE5	SSE5	SE5	ESE3	NE4	NE2	NW3	WSW4	NNE1	ENE1	E2	ESE4	SW0	NNW2	NNW3	NNW2	SE1.1	SE6
25-May	ENE1	E0	SE1	SE7	SE3	SE8	SE7	SSE8	SSE6	SSE7	SSE5	WSW6	W4	NE1	SE2	SSE5	ESE1	NNW13	N4	NNW4	NNW7	N13	N14	N13	NE1.0	N14
26-May	N10	N12	NNW8	NNW6	NNW4	N8	N8	NNW7	N9	NNE11	N12	N12	NNW8	NNW8	N7	NNW5	N6	NNE5	NE6	NNE6	NE4	NE3	NNE2	ESE3	N6.5	N12
27-May	NE2	N1	ENE0	SE3	ENE2	N2	ESE3	SSE2	S5	S5	S4	ESE2	N6	NNW9	N18	N18	N18	N17	N10	NNE7	NNE16	NNE14	NNE13	N14	N6.1	N18
28-May	NNE16	NNE14	N12	NNE11	NNE9	NNE10	NNE12	NNE15	N12	N13	N13	N14	N12	N9	N9	N8	N8	NNE8	NNE7	NNE8	NE6	ENE4	ESE3	ESE3	NNE9.3	NNE16
29-May	SE8	SE7	SE5	SE3	ESE5	ESE4	SSE8	S10	SSE9	S6	S4	SE3	SSE5	S3	SW3	SE2	W5	ESE1	SSE6	S9	S12	S15	S21	S24	SSE6.7	S24
30-May	SSE19	SSE8	SSE10	SSE8	SE2	SE6	SSE12	SSE8	SSE5	SSE5	SE5	SE9	SSE11	SSE12	S10	SSE11	S11	S13	S12	SSE11	SSE11	S18	S16	SSE14	SSE10.1	SSE19
31-May	SSE14	SSE13	SSE10	SE9	SE8	SE15	SE16	SSE13	SSE13	S11	SSE10	S8	S13	S13	S14	SSE16	S14	S12	S11	S14	SSE9	SSE5	SE2	W6	SSE10.5	SSE16

E1.5	E1.8	ESE1.7	ESE2.5	E2.1	ESE2.8	SE4.3	SE3.9	SE2.6	SSW0.7	NNW1.2	NW2.1	NNW2.7	NW2.1	NW2.1	NNW0.8	N1.2	ENE0.9	E1.2	ESE0.9	ESE1.0	E1.0	ESE1.0	ESE0.9	Diurnal Average
SSW19	SE19	N13	N21	N17	N15	SSE16	SSE15	S14	N15	NNE15	NNE14	WSW14	WSW18	WSW19	N18	N18	N17	WNW15	N23	N18	N23	N22	S24	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

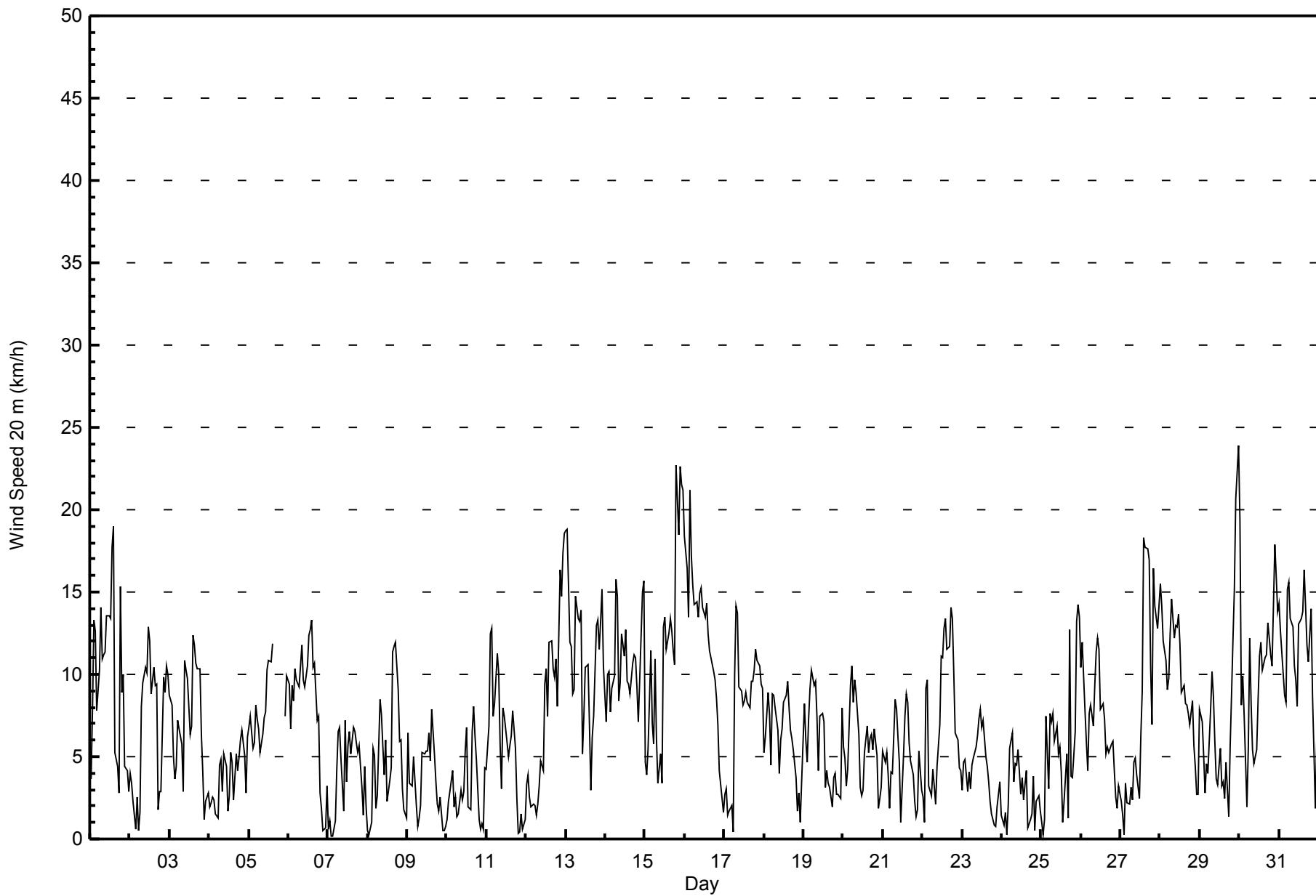
Wind Speed 20 m (WS20m) - km/h
Lower Camp Met Tower - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on May 15 20:00														Hours in Service: 744 Hours of Data: 737 Hours of Missing Data: 7 Hours of Calibration: 0 Percent Operational Time: 99.1											
Minimum Value: 0 km/h on May 7 04:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 8																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-May	2	3	3	4	3	3	3	3	5	5	6	5	6	8	8	4	4	4	7	2	2	3	3	2	8
2-May	2	1	2	1	2	1	2	5	4	4	5	6	5	4	6	4	7	4	2	3	6	5	4	4	7
3-May	3	4	2	1	2	3	3	3	4	4	4	5	4	3	5	5	5	4	5	3	2	1	1	1	5
4-May	1	1	1	1	2	1	2	2	2	2	2	2	3	3	3	3	3	3	3	2	2	3	2	2	3
5-May	2	2	3	2	3	3	3	2	3	3	4	5	5	5	5	AF	AF	AF	AF	AF	AF	AF	3	3	5
6-May	3	3	3	3	4	3	4	4	4	4	4	5	5	5	5	5	5	4	5	2	1	1	1	1	5
7-May	1	1	1	0	1	2	3	2	2	2	3	3	3	4	4	4	3	3	3	2	2	2	2	2	4
8-May	1	1	1	2	2	1	1	3	3	2	2	2	3	3	2	7	5	5	4	3	3	3	1	1	7
9-May	2	1	1	1	2	1	1	1	2	2	2	3	3	3	3	3	2	1	1	1	1	1	1	2	3
10-May	1	1	2	1	2	1	1	1	2	1	1	3	3	3	2	3	4	2	3	1	1	2	1	3	4
11-May	3	5	3	4	3	3	3	3	3	2	3	3	3	3	3	3	3	3	2	1	1	2	1	3	5
12-May	2	2	2	1	1	1	1	2	2	2	2	4	4	4	6	5	4	4	4	3	5	5	6	5	6
13-May	6	5	6	4	3	3	3	4	4	4	4	4	5	4	4	3	3	5	4	3	2	3	3	4	6
14-May	3	2	3	3	3	3	3	4	4	4	5	5	5	5	4	4	5	4	4	3	2	4	4	4	5
15-May	4	2	3	3	4	3	5	2	1	2	3	6	5	5	5	5	4	5	6	9	7	8	8	8	9
16-May	7	7	9	8	7	6	6	6	6	6	6	6	6	6	6	6	6	5	4	4	3	2	1	1	9
17-May	1	1	1	1	1	2	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	4
18-May	3	4	6	3	2	2	3	2	2	2	3	4	4	3	4	4	3	3	3	1	1	1	1	2	6
19-May	2	3	1	2	2	2	2	3	3	4	4	3	4	3	2	2	2	1	1	1	2	1	2	2	4
20-May	2	1	2	2	3	3	2	3	3	2	2	2	2	4	4	4	3	3	3	2	2	1	2	2	4
21-May	1	1	1	1	1	1	2	3	3	2	2	3	3	4	5	4	3	3	3	1	1	1	2	2	5
22-May	2	2	2	3	2	1	2	2	1	2	4	5	5	6	6	6	6	6	6	4	3	3	2	1	6
23-May	1	2	2	1	1	2	2	2	2	3	3	4	3	3	3	3	2	2	1	1	1	1	1	1	4
24-May	1	1	2	1	1	2	3	2	2	2	2	2	2	3	3	2	2	2	2	2	2	2	2	1	3
25-May	2	2	1	2	3	2	2	2	2	2	2	4	6	6	3	2	5	5	5	2	3	6	5	5	6
26-May	5	5	4	4	2	4	3	3	4	5	5	5	5	4	4	3	3	3	3	3	2	1	1	2	5
27-May	1	1	1	2	2	1	2	1	2	2	2	2	4	6	8	7	7	6	4	3	7	6	5	6	8
28-May	7	6	5	4	4	4	5	6	5	6	6	6	5	5	4	4	4	4	4	4	3	2	2	2	7
29-May	4	5	3	2	2	2	3	3	4	3	3	2	3	2	2	2	3	2	3	2	4	4	5	5	5
30-May	7	4	3	3	2	4	3	3	2	2	3	4	6	5	5	5	5	4	4	4	4	5	3	4	7
31-May	3	3	3	4	4	5	6	5	5	4	6	4	3	3	4	4	4	3	3	4	5	4	1	5	6
Diurnal Maximum																									
AF - Analyzer Failure																									



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	312	42.33	42.33
6 - 11	293	39.76	82.09
12 - 19	125	16.96	99.05
20 - 28	7	0.95	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

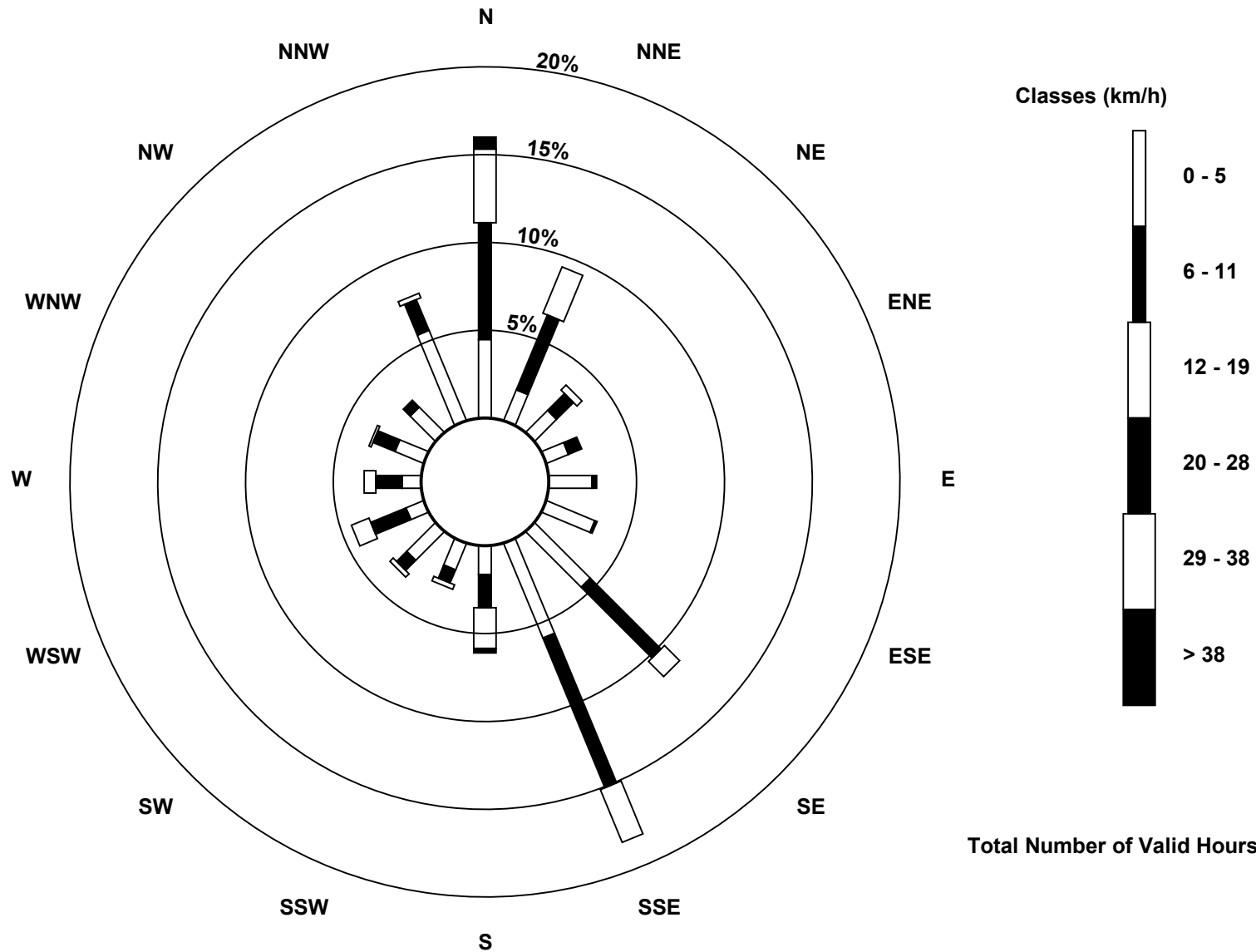
Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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





Maximum Speed: 31 km/h on May 15 20:00	Maximum Daily Speed Average: 17.3 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 7 03:00	Minimum Daily Speed Average: 1.0 km/h on May 10	Hours of Data: 737
Maximum Diurnal Speed Average: 5.1 km/h at hour 7	Minimum Diurnal Speed Average: 0.5 km/h at hour 10	Hours of Missing Data: 7
Monthly Average Velocity: 1.1 km/h 70.3 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 5 Median = 9 Q ₃ = 13 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-May	SSW5	SSE9	SSE16	SSE13	SE9	SE13	SSE16	SSE12	WSW15	W14	W18	W17	W17	WSW23	WSW23	W6	N7	SSW3	NNW19	WSW12	W15	WNW6	WNW6	NW5	WSW7.2	WSW23
2-May	WNW5	NNW5	NW3	ESE1	SE3	ESE1	N2	N11	NNE13	N14	N14	N17	NNW15	NNE12	NW13	NNW12	NNW13	N3	SSW4	SSW4	NNW13	N13	NNE16	N15	N8.0	N17
3-May	NNE14	N12	NNW7	NNW5	NNW7	N10	NNE9	N7	NW4	NNW14	NW13	NW12	NW8	N9	N17	N16	N15	N15	NNE15	NNE9	E6	ENE3	NNE2	N4	N8.5	N17
4-May	N3	N3	NNW4	NNE3	WSW2	SSE2	ESE6	SSE5	S3	S6	SSW5	NE2	NNW4	NNE7	NNW6	NNW3	NNE7	E6	ENE7	NE9	NE11	NE8	NNW4	N9	NE2.6	NE11
5-May	N10	N11	N9	N10	NNE12	NNE11	N9	NNE7	NNE9	N10	NE11	NNE15	NNE15	NNE16	NNE18	AF	AF	AF	AF	AF	AF	AF	NNE11	N14	---	NNE18
6-May	N13	N10	N13	N12	N14	N13	N12	N14	N16	N14	N13	NE15	NNE18	NE18	NE20	NE15	ENE15	E10	ENE11	E4	NNE3	NE1	NNW1	NNW5	NNE10.2	NE20
7-May	NW0	NNE1	NNW0	SSE1	SSW2	SE6	SSE8	SSE8	SE5	SW2	WSW8	N4	N7	NE8	NNE7	NE9	ENE8	ENE8	ENE7	ENE9	E7	E3	SE7	ESE4	E2.9	NE9
8-May	WNW1	NNW2	SE3	SE8	SE8	ESE3	SE3	SSE10	SE9	SE6	SE4	ESE6	W3	WNW5	W5	N15	N16	NE19	NE14	ENE9	E9	E5	ENE3	N1	ENE3.2	NE19
9-May	NNW9	NNW5	N5	N4	N7	NNW3	NNW1	N2	WSW2	WSW6	WSW6	WNW6	SW6	SSW7	SSW5	SSE9	SE6	SE3	SSE2	SSE2	SSE4	NW0	WSW1	NW1	WSW1.1	NNW9
10-May	NNW1	N3	NNW4	NNW6	NNW3	NNW3	N2	NE2	E3	SW2	SW3	WSW6	W7	S1	ESE2	SE7	SE9	SE8	SSE5	E3	NW1	S1	E4	SSE9	SSE1.0	SE9
11-May	SSE7	SSE10	SSE16	SSE16	SSE10	SE11	SE15	SSE12	SSE6	S3	WSW9	WSW9	WSW7	SW6	WSW7	WSW7	WSW9	WSW6	N3	NNE1	N1	WNW3	E2	E3	S4.6	SSE16
12-May	E6	N4	NNW4	NW3	NNW4	NNW3	NNW2	SSE2	SE3	SW5	SW4	S10	SSE11	SSE8	SSE14	SSE14	SSE13	SSE12	SE14	SE11	SE22	SSE19	SE23	SE25	SSE7.8	SE25
13-May	SE25	SE25	SE16	SE16	SE12	SSE11	SSE17	SSE16	SSE17	SSE17	SW6	WSW9	WSW12	W13	W8	WNW3	WNW8	S8	S14	SSW14	SSW12	S15	SSE17	SSE14	S10.2	SE25
14-May	SE9	SE12	SSE14	SSE11	SE12	SSE12	SSE18	SSE18	SSE9	W12	W16	WSW14	WSW16	SW11	SW11	SSW10	WSW13	SSW13	SSW13	SSW13	SSW10	SW14	SW20	SW21	SSW9.6	SW21
15-May	WSW7	E3	E8	SE14	SE10	SE9	SSE14	SE7	S3	SSE6	SW4	WSW16	WSW17	WSW14	W15	WSW17	WSW16	W15	NNE16	N31	N26	N31	N30	N30	NW4.5	N31
16-May	N25	N23	N19	N30	N25	N21	NNE21	NNE21	NNE19	N20	NNE21	NNE21	NNE20	NNE20	NE19	NNE16	NNE16	NNE14	NNE14	NNE12	NNE10	N7	NNW4	NE2	NNE17.3	N30
17-May	NE4	N4	NW1	N2	N2	NNE1	SSE12	S15	S16	S10	SSE10	SSE9	S10	SSE10	SSE10	SSE9	SSE11	SSE11	SSE12	S12	S12	SSE13	SSE13	SSE12	SSE8.1	S16
18-May	SSE9	SSE9	SSE11	SSE10	ESE7	SE11	SE11	SSE9	SSE7	SSE4	SE6	SW8	WNW11	WNW11	WNW12	WNW10	WNW8	WNW8	WNW7	WNW5	S4	SE3	WNW4	SSE4	SSW2.8	WNW12
19-May	SSE12	SSE8	SSE8	SSE11	SSE13	SE14	SE11	SE12	SE8	SW5	W10	W9	WNW8	W4	S4	SSW3	SSE3	ESE2	SSE4	SSE5	SSE5	NW3	SE2	SSE10	SSE4.9	SE14
20-May	SSE9	SE8	SE6	SSE8	SE14	SE14	SE10	SSE12	SSE10	SSE7	SW3	W3	E3	SW6	SSE8	SSW6	S7	SSW7	SW7	SW9	SW8	NNW2	SSE3	SSE6	SSE5.9	SE14
21-May	SSE8	SE8	ESE8	SE6	ESE5	SE6	SE5	SSE10	SSE9	SE7	SE5	SW1	WNW6	W9	WNW11	W10	WNW8	W6	NW5	NW3	SSE1	SSE2	SSE10	SSE7	S2.6	WNW11
22-May	N3	SSW1	SE11	SE13	ESE5	E4	SSE6	SSE4	SSW2	SW5	N9	N15	N15	N18	N19	NNE16	N17	N20	NNE19	NNE15	NNE12	NNE11	N8	NNW6	NNE7.0	N20
23-May	NNW6	N8	N8	N6	N6	N4	N6	N6	N7	N8	N9	N10	NNW9	NNW9	NW7	NNW6	N5	NE3	SE2	NW0	NNW2	NNW3	NNW4	NNW7	N5.4	N10
24-May	WNW2	SSE1	NNW2	ENE1	SSE3	SE8	SE7	SE4	SSE5	SSE5	SE6	ESE3	NE4	NE3	NW4	WSW5	NNE1	ENE2	E2	ESE5	SW3	NNW2	NNW3	NNW3	SE1.3	SE8
25-May	ENE1	E1	SE2	SE11	SE5	SE9	SE9	SSE9	SSE7	SSE8	SSE6	WSW7	W5	NE2	SE4	SSE6	ESE0	NNW19	N6	NNW6	NNW11	N19	N21	N19	NNE1.7	N21
26-May	N15	N17	NNW12	NNW9	NNW7	N11	N11	NNW10	N13	NNE16	N16	N16	NNW10	NNW11	N10	NNW6	N8	NNE7	NE8	NNW9	NE8	NE6	NNE3	ESE5	N9.2	N17
27-May	NE4	N2	ENE1	SE5	ENE4	N2	ESE4	SSE3	S5	S5	S4	ESE3	N8	NNW12	N26	N25	N25	N23	N14	NNE10	NNE24	NNE21	NNE18	N20	N8.7	N26
28-May	NNE22	NNE20	N17	NNE16	NNE13	NNE14	NNE18	NNE20	N17	N18	N18	N19	N16	N12	N12	N11	N11	NNE11	NNE10	NNE12	NE9	ENE9	ESE5	ESE5	NNE13.1	NNE22
29-May	SE12	SE11	SE8	SE4	ESE5	ESE6	SSE9	S11	SSE10	S7	S4	SE4	SSE6	S4	SW4	SE3	W5	ESE2	SSE6	S10	S13	S17	S23	S26	SSE7.9	S26
30-May	SSE22	SSE11	SSE12	SSE9	SE3	SE7	SSE14	SSE9	SSE6	SSE5	SE6	SE11	SSE13	SSE14	S12	SSE13	S13	S14	S13	SSE14	SSE13	S20	S17	SSE16	SSE11.8	SSE22
31-May	SSE17	SSE15	SSE12	SE13	SE13	SE21	SE21	SSE17	SSE17	S13	SSE12	S9	S14	S14	S15	SSE18	S15	S13	S12	S15	SSE11	SSE6	SE2	W10	SSE12.6	SE21

E2.2	ENE2.4	ESE2.3	ESE3.3	E3.1	ESE3.8	SE5.1	SE4.3	SE2.7	WSW0.5	NW1.8	NW2.9	NW3.5	NW2.9	NW3.0	NNW1.6	N2.3	NE1.8	ENE2.1	ENE1.5	ENE1.5	ENE1.8	E1.3	E1.2	Diurnal Average
N25	SE25	N19	N30	N25	N21	SE21	NNE21	NNE19	N20	NNE21	NNE21	NNE20	WSW23	N26	N25	N25	N23	WNW19	N31	N26	N31	N30	N30	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

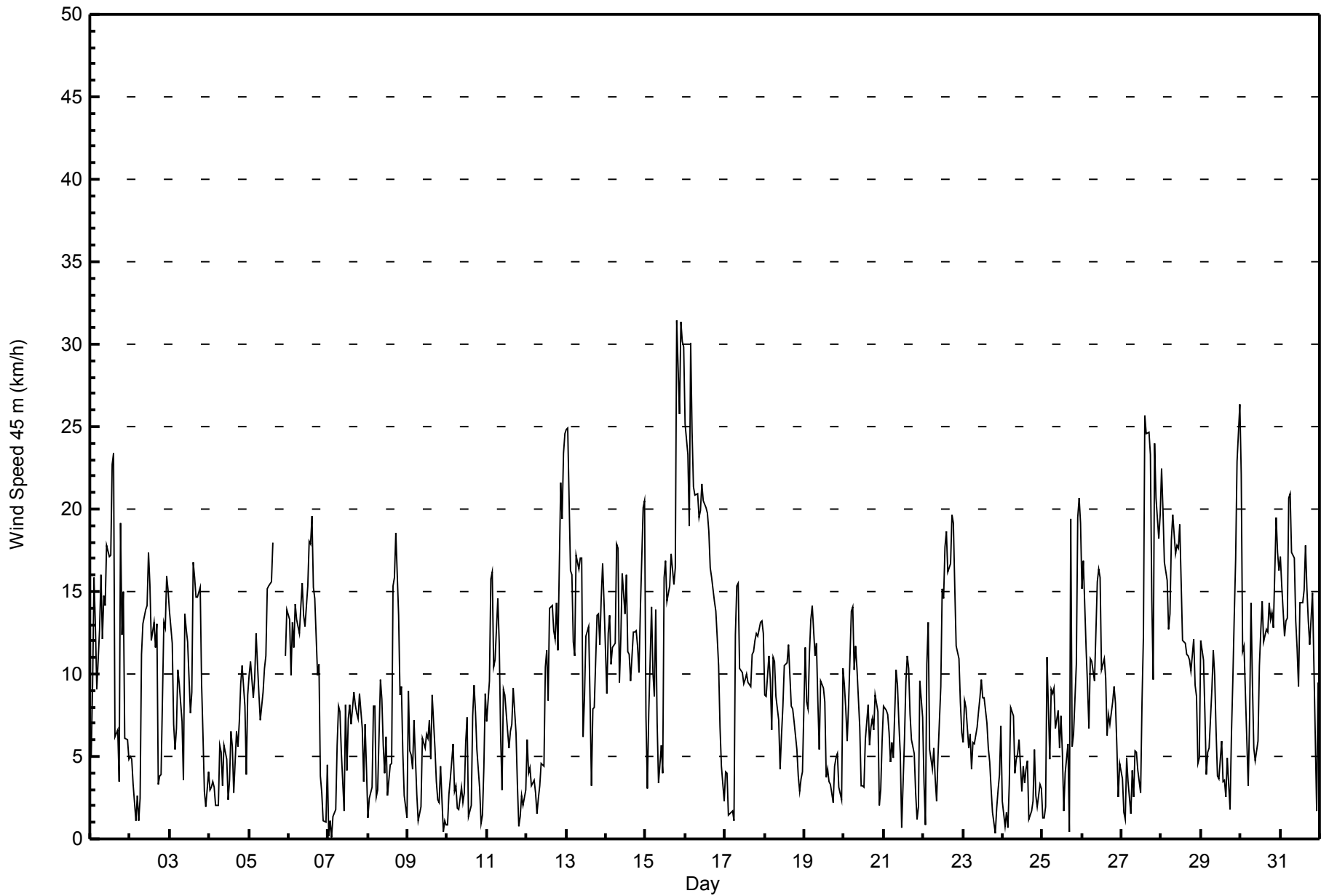
Wind Speed 45 m (WS45m) - km/h
Lower Camp Met Tower - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on May 16 03:00														Hours in Service: 744 Hours of Data: 737 Hours of Missing Data: 7 Hours of Calibration: 0 Percent Operational Time: 99.1											
Minimum Value: 1 km/h on May 7 01:00																									
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 9																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-May	2	3	3	3	3	2	3	3	5	5	6	5	6	8	8	4	6	4	8	2	2	3	3	3	8
2-May	3	2	2	1	2	1	3	6	4	5	5	6	5	5	7	5	9	5	3	3	8	5	5	5	9
3-May	4	4	3	2	2	3	3	3	4	4	4	5	3	3	5	5	5	5	6	3	2	2	2	1	6
4-May	1	1	1	1	2	1	2	3	2	2	2	2	3	3	3	3	4	4	3	2	3	4	2	2	4
5-May	2	3	3	3	3	3	3	2	3	3	5	5	5	6	6	AF	AF	AF	AF	AF	AF	AF	3	3	6
6-May	3	3	3	3	4	3	4	4	4	4	4	6	6	5	6	6	6	4	6	2	1	1	1	2	6
7-May	1	1	1	1	2	3	3	2	2	2	3	3	3	4	4	5	4	4	3	2	2	2	3	3	5
8-May	1	1	2	2	2	1	2	3	3	2	2	2	3	3	2	9	5	5	4	3	3	4	1	2	9
9-May	3	2	2	2	2	1	1	1	2	2	2	3	3	3	3	3	3	2	1	1	1	1	1	2	3
10-May	1	1	1	2	2	1	1	1	2	1	2	3	3	3	3	3	4	2	3	1	1	3	3	4	4
11-May	4	5	3	3	3	3	2	2	3	2	3	3	3	3	3	3	3	3	3	1	1	2	2	3	5
12-May	3	2	2	1	1	1	1	3	2	2	2	4	5	5	7	5	5	4	3	3	6	5	6	5	7
13-May	5	5	7	4	3	3	3	4	4	5	5	4	5	4	4	3	3	5	4	3	3	3	4	4	7
14-May	3	2	3	4	3	4	3	3	4	4	5	6	5	6	5	5	5	5	4	3	3	5	4	4	6
15-May	5	2	3	2	4	4	5	3	1	2	3	6	5	5	5	6	4	5	8	10	7	9	9	8	10
16-May	8	8	11	9	8	6	7	7	7	6	7	7	6	7	7	7	6	6	4	4	3	3	1	1	11
17-May	1	1	1	1	1	3	4	4	4	4	4	4	5	5	4	4	4	3	3	3	3	3	4	4	5
18-May	4	5	6	3	2	2	3	2	2	2	3	5	4	3	4	4	3	3	2	1	2	1	3	2	6
19-May	2	3	2	2	2	2	2	3	2	4	3	3	4	3	2	2	2	1	2	2	3	1	2	3	4
20-May	1	1	2	2	2	2	2	2	3	2	2	3	2	4	4	4	4	3	3	2	2	1	3	2	4
21-May	1	1	2	1	2	2	2	3	3	2	2	4	4	4	5	5	3	3	3	1	2	1	3	4	5
22-May	2	2	3	3	2	1	2	2	2	2	5	5	5	7	7	6	7	7	6	5	3	3	2	1	7
23-May	2	2	2	2	1	2	2	2	2	3	3	4	3	4	4	3	3	3	2	1	1	1	1	2	4
24-May	2	1	1	1	3	2	4	2	2	2	2	2	3	4	3	3	3	2	2	3	2	2	2	2	4
25-May	2	2	2	2	3	2	2	2	2	2	2	5	7	8	4	2	7	7	7	2	4	6	5	6	8
26-May	5	5	4	4	2	4	3	3	4	6	5	5	5	4	5	4	4	3	4	3	2	2	2	3	6
27-May	2	2	2	2	2	1	2	1	2	2	2	2	5	6	9	7	7	7	5	4	8	7	6	6	9
28-May	8	6	6	5	4	4	6	6	6	6	6	6	6	5	5	5	5	5	4	4	3	2	3	3	8
29-May	5	7	4	3	2	2	3	3	4	3	3	3	4	2	2	3	3	2	4	2	4	4	6	6	7
30-May	7	5	3	3	2	5	3	3	2	2	3	4	7	6	5	6	5	4	4	4	4	5	4	5	7
31-May	3	3	3	4	4	5	6	6	6	5	6	4	3	3	4	4	4	3	3	3	5	4	1	5	6
														Diurnal Maximum											
AF - Analyzer Failure																									



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	221	29.99	29.99
6 - 11	266	36.09	66.08
12 - 19	205	27.82	93.89
20 - 28	40	5.43	99.32
29 - 38	5	0.68	100.00
> 38	0	0.00	100.00

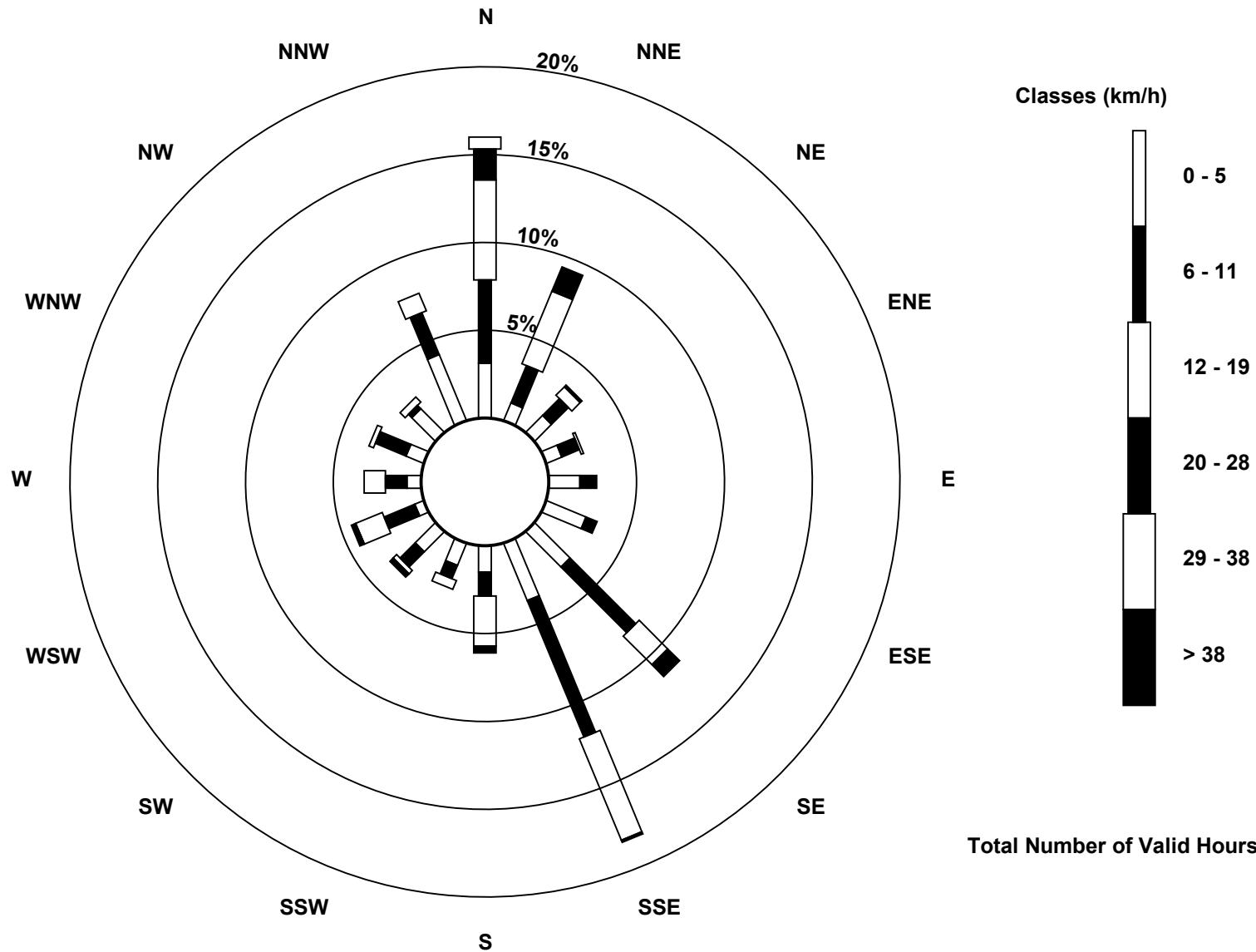
Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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





Maximum Speed: 46 km/h on May 15 22:00	Maximum Daily Speed Average: 24.7 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 10 10:00	Minimum Daily Speed Average: 1.3 km/h on May 9	Hours of Data: 736
Maximum Diurnal Speed Average: 5.1 km/h at hour 22	Minimum Diurnal Speed Average: 0.8 km/h at hour 10	Hours of Missing Data: 8
Monthly Average Velocity: 2.2 km/h 74.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 11 Q ₃ = 18 P ₉₀ = 24 P ₉₉ = 37	Percent Operational Time: 98.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	WSW15	S6	S9	SSW8	S7	SSE10	S10	S9	WSW17	WSW17	WSW20	WSW20	WSW20	WSW24	WSW28	W8	N9	SSW5	NNW24	WSW15	WSW20	NW11	W14	WNW12	WSW11.3	WSW28	
2-May	NW8	W7	NW5	WNW6	WNW3	N2	NNW9	N16	N17	N18	N19	NNW23	NNW20	N16	NW19	NNW15	NNW17	N6	S4	SSW6	NW19	N20	N24	N23	NNW11.8	N24	
3-May	NNE20	N18	N10	N8	N10	N13	N12	NNW9	NNW5	NW17	WNW16	WNW14	NW10	N11	N21	N20	N20	NNE19	NNE13	E16	E14	ESE6	ENE6	N11.1	N21		
4-May	ENE6	NE3	NE4	ENE4	SW5	S3	ESE7	SE6	SSE4	S6	S5	NNE4	NW4	N7	NNW7	N3	NNE7	ENE7	ENE9	NE14	NE21	ENE20	NE5	NNE12	NE4.7	NE21	
5-May	N13	N15	NNE14	NNE15	NE14	NNE13	N11	NNE10	NNE12	NNE14	NE15	NNE20	NNE20	NNE21	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNE18	N20	---	NNE21
6-May	N19	N17	N20	NNE18	N20	N19	N18	N19	N21	N19	N19	NNE20	NNE23	NE23	NE24	NE20	ENE19	ENE13	ENE17	E6	NE4	E7	ESE6	NNW3	NNE14.7	NE24	
7-May	NE5	E2	SE3	SE10	SSE7	SSE11	SSE9	SSE9	SSE5	SW3	WSW8	NNW5	N9	NNE10	NNE9	NE12	NE10	NE9	ENE10	ENE12	E17	E16	ESE14	SE14	E5.4	E17	
8-May	SSE7	SSE5	SSE8	SE13	SE13	SSE3	SE4	SE11	SE8	SE5	SE4	ESE6	W2	WNW5	W5	NNW20	N20	NE25	NE21	ENE16	E17	E12	ESE8	SE8	E5.1	NE25	
9-May	N11	N10	NNE11	NE8	NE9	NE5	NE3	N2	SW1	SW5	SW6	W7	SW7	SSW7	SSW6	SE9	SE6	ESE4	SE3	SSE3	SE7	SSE6	ESE7	ESE7	ESE1.3	NNE11	
10-May	SE13	SE14	SE11	SE5	ESE2	NE1	N3	NNE2	NNE2	WSW0	WSW1	SW6	WSW7	SSW2	ESE3	SE9	SE12	SE10	SE7	E5	ESE7	ESE9	SSE14	SE18	SE5.3	SE18	
11-May	SE18	SE16	SSE19	SSE16	SSE15	SSE12	SSE9	SSE10	S6	SSW3	WSW9	WSW9	WSW7	WSW5	WSW8	WSW7	WSW9	W6	NNE5	E3	WSW1	NE7	E15	ESE15	SSE5.7	SSE19	
12-May	SE14	SE8	WSW1	E3	NE2	ENE2	ESE3	ESE6	ESE3	WSW2	S4	SSE13	SSE14	SSE11	SE16	SE17	SE16	SE16	ESE18	ESE18	SE32	SE30	SE36	SE37	SE12.9	SE37	
13-May	SE37	SE36	SE27	SE28	SE18	SSE16	SSE20	SSE20	SE22	SE21	SW8	WSW9	SW14	W15	WSW9	W5	W9	S9	S15	S16	SSW15	S20	S23	SSE19	SSE14.1	SE37	
14-May	SSE10	SSE10	SSE9	SSE11	SSE11	S11	S9	S10	S6	WSW15	W21	SW16	WSW17	SW12	SW12	SSW11	SW13	SSW13	SSW17	SSW16	SSW17	SW22	SW30	SW38	SW37	SSW13.7	SW38
15-May	SW20	SW11	SSE6	SSE10	SSE9	S16	SE17	ESE8	SE4	SE6	SW5	WSW17	WSW18	WSW16	WSW17	WSW19	WSW17	WSW16	NNE25	N46	N37	N46	N42	N42	NW5.7	N46	
16-May	N37	N33	N28	N44	N37	N31	NNE29	NNE30	N27	N27	N29	NNE27	NNE27	NNE28	NNE25	NNE22	NNE18	NNE20	NNE17	NNE17	NE17	NE9	ENE6	NNE24.7	N44		
17-May	ESE4	SE3	SSE2	SSE2	SSE5	SE10	SE18	SSE17	SSE18	S11	SSE13	SE12	SSE11	SSE12	SE11	SE11	SE13	SE14	SE15	SSE15	SSE16	SE21	SE24	SE23	SSE12.4	SE24	
18-May	SE20	SE20	SE18	SSE17	SSE14	SSE13	SE12	SE10	SSE8	SSE3	SE5	SW10	W12	WNW12	WNW13	WNW11	WNW10	W9	W9	W8	SW6	SSW10	SW13	SW7	SSW5.8	SE20	
19-May	S5	S5	SSE5	SW7	SSW7	SSW10	S9	SSE8	S4	WSW9	WSW11	W10	W9	WNW4	SSE3	S2	SE4	SE3	SE5	SSE7	S12	SW16	SSW6	S6	SSW5.2	SW16	
20-May	S7	SSE3	SSE4	SSW6	SSW8	S10	SSE9	SSE8	SSE8	SSE7	WSW5	W4	ENE4	S6	SSE9	S6	SSE8	S8	SSW8	SSW11	SW14	SW14	SSE8	S6	S6.4	SW14	
21-May	S7	SSE13	SSE16	SSE11	SE10	SE10	SSE8	SE14	SE15	SE8	ESE5	ESE2	W7	W12	W12	W11	W9	W7	WNW7	NNW4	ENE1	S2	SSE5	S6	S4.1	SSE16	
22-May	ESE4	W1	SW11	SW10	SSE6	SE10	SSE7	S2	WNW1	W4	N13	N20	N20	N24	N25	N22	N24	N29	NNE29	NNE23	NE22	NE25	NE21	NNE12	NNE10.9	N29	
23-May	N10	N14	N15	NNE10	NNE10	NE7	NE7	N6	N8	NNW9	N11	N11	NNW10	NNW10	NW8	NNW6	NNW5	NNE5	E3	ENE3	ENE3	NE8	ENE7	N9	N7.1	N15	
24-May	NE6	NE4	NNW3	SE2	SSE6	S5	SSE6	ESE5	E6	SE6	SE6	E3	NNE5	NNE4	NNW4	W4	NNE2	NE2	E3	E7	E12	SE2	E3	NW5	E2.4	E12	
25-May	WSW2	NNE2	SSE5	S6	SSE4	S3	SSE4	S4	SE6	SE6	SSE2	WSW9	WNW6	NW6	SE9	SE8	WNW3	NNW31	N10	NNW12	N20	N30	N29	N27	N4.7	NNW31	
26-May	N21	N24	N18	N14	N11	N17	N14	N12	N16	NNE21	N22	N20	NNW13	NNW13	N12	N9	N10	NNE10	NE12	NNE14	NE17	NE19	E15	SE13	N12.9	N24	
27-May	SE15	ESE19	ESE13	SE14	SE7	SE6	SE7	ESE4	SE7	SE5	SE5	ESE3	N11	NNW17	N37	N35	N34	N34	N21	NNE15	NNE34	NNE32	NNE28	N29	NNE11.7	N37	
28-May	NNE33	NNE28	N25	NNE23	NNE19	NNE19	NNE24	N27	N25	N24	N22	N25	N20	N17	N16	N15	N16	NNE16	NNE15	NNE17	NE15	E20	ESE16	SE12	NNE17.9	NNE33	
29-May	SE21	SE22	SE18	SSE7	SE8	SE12	SE13	SSE14	SSE12	SSE8	SSE5	SE4	SE6	SSE3	SW3	SE3	W4	E2	SSE8	S11	S17	SSE25	SSE31	SSE36	SSE11.6	SSE36	
30-May	SSE33	SE23	SE18	SE14	SSE9	SSE14	SSE15	SE10	SE6	SE5	SE6	SE15	SSE14	SE20	SSE14	SSE16	SSE15	SSE16	SSE16	SE23	SSE24	SSE26	S23	SSE23	SSE16.5	SSE33	
31-May	SSE22	SSE21	SE21	SE28	SE27	SE33	SE32	SE27	SE26	SSE18	SSE16	SSE14	S19	S18	SSE18	SSE20	SSE17	SSE16	S14	S18	SSE15	S7	WSW6	W15	SSE17.7	SE33	

ESE4.3	E4.4	ESE3.9	ESE4.0	ESE3.8	ESE4.4	ESE4.9	ESE4.4	E2.9	N0.8	NW2.2	NW3.2	NW3.9	NNW3.7	NNW3.3	N2.8	N3.7	NE3.7	NE4.1	ENE3.3	E4.5	E5.1	ESE4.7	ESE3.2	Diurnal Average	
SE37	SE36	N28	N44	N37	SE33	SE32	NNE30	N27	N27	N29	NNE27	NNE27	NNE28	N37	N35	N34	N34	NNE29	N46	N37	N46	N42	N42	Diurnal Maximum	

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 100 m (WS100m) - km/h

Lower Camp Met Tower - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 13 km/h on May 16 03:00	Hours of Data: 736
Minimum Value: 1 km/h on May 18 21:00	Hours of Missing Data: 8
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 9	Hours of Calibration: 0
	Percent Operational Time: 98.9

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

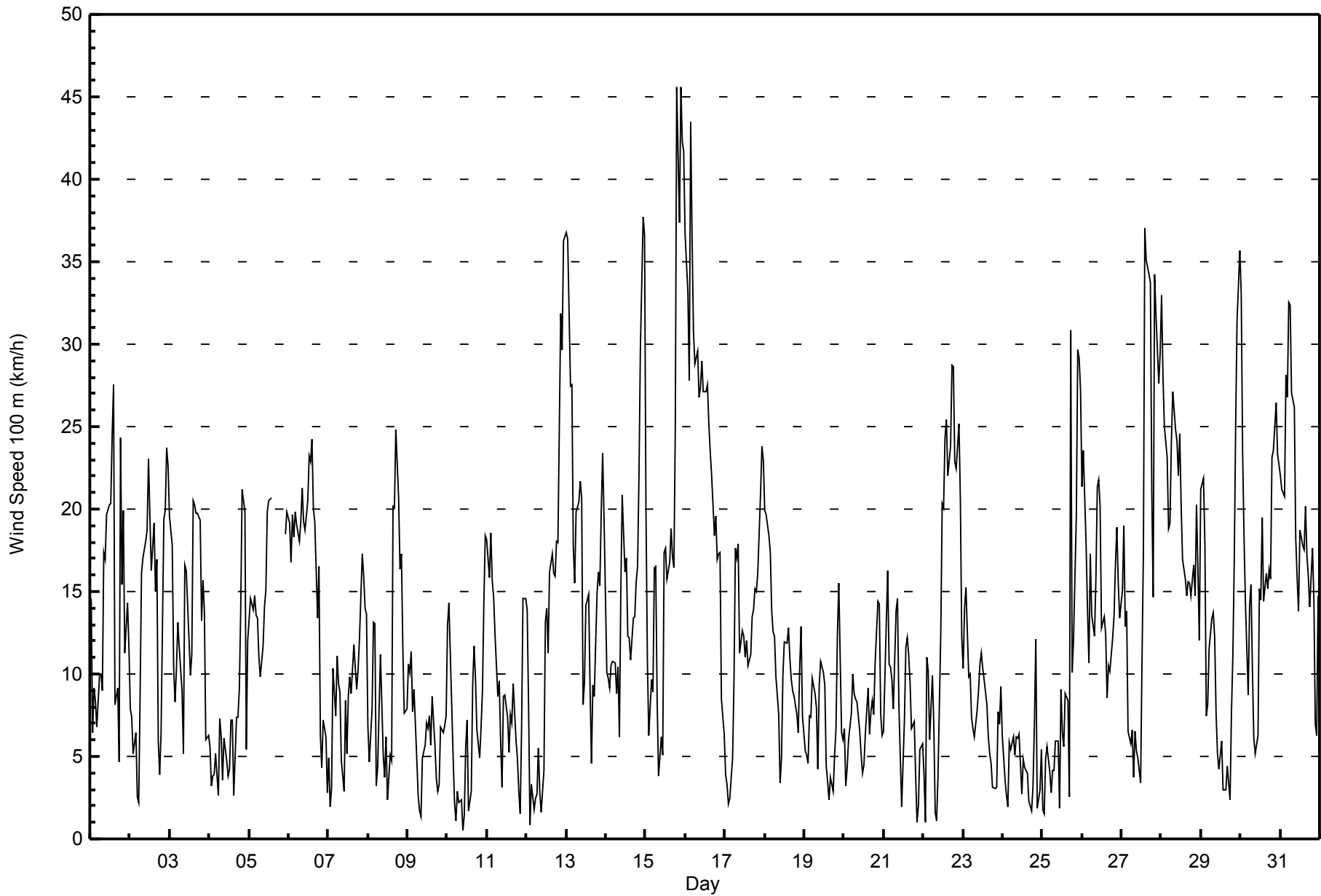
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	143	19.43	19.43
6 - 11	234	31.79	51.22
12 - 19	209	28.40	79.62
20 - 28	110	14.95	94.57
29 - 38	35	4.76	99.32
> 38	5	0.68	100.00

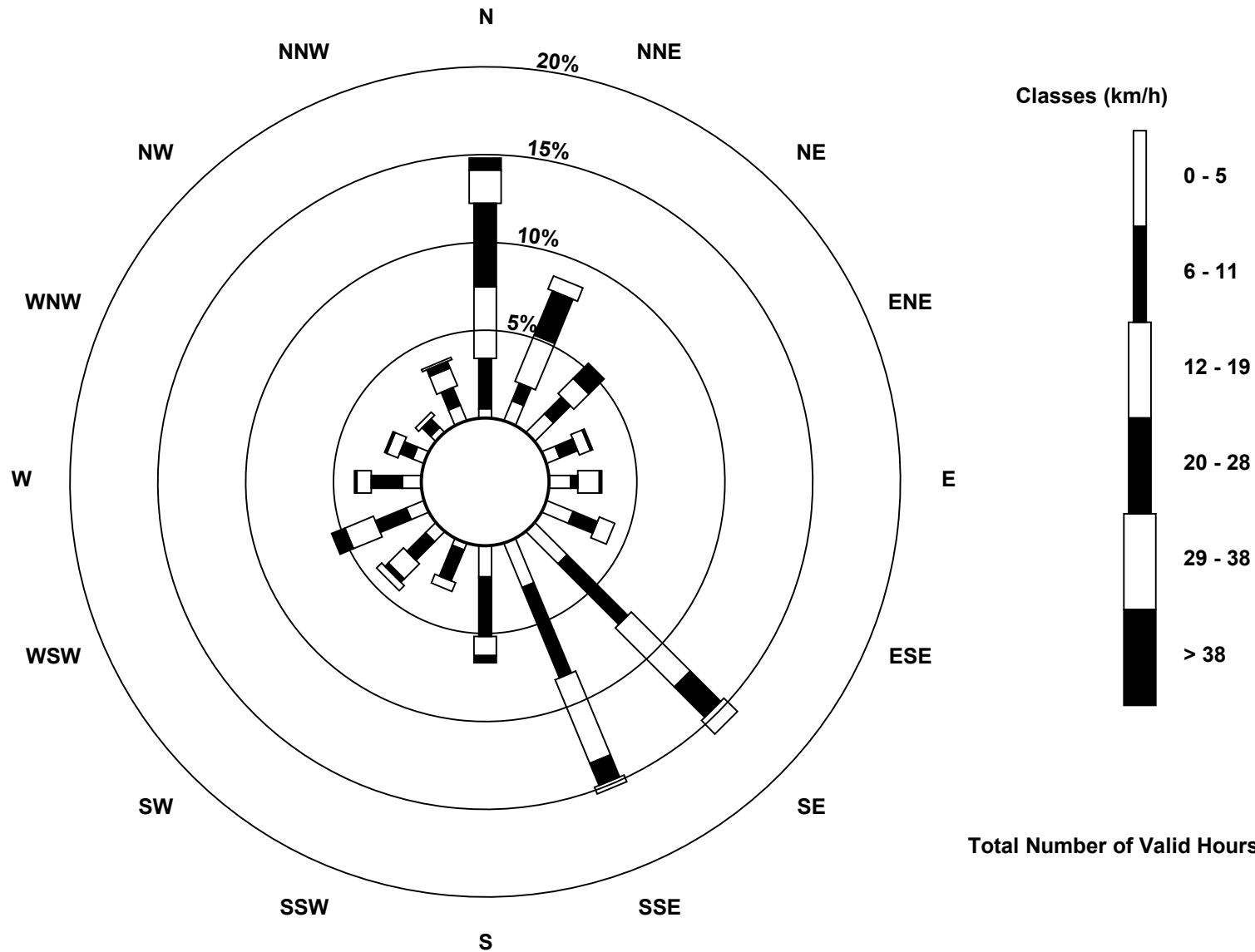
Total Number of Valid Hours: 736

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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





Maximum Speed: 50 km/h on May 15 20:00	Maximum Daily Speed Average: 26.7 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 24 04:00	Minimum Daily Speed Average: 2.5 km/h on May 24	Hours of Data: 740
Maximum Diurnal Speed Average: 7.4 km/h at hour 22	Minimum Diurnal Speed Average: 1.2 km/h at hour 10	Hours of Missing Data: 4
Monthly Average Velocity: 1.8 km/h 75.6 deg	Percentiles: P ₁ = 1 P ₁₀ = 5 Q ₁ = 8 Median = 13 Q ₃ = 21 P ₉₀ = 28 P ₉₉ = 43	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-May	WSW30	SW14	SW15	SW15	SW10	SSW9	SSW10	SSW11	WSW20	WSW18	WSW23	WSW24	W22	WSW28	WSW30	W10	N10	SSW5	NNW27	WSW19	W23	NW16	NNW15	NW16	WSW15.5	WSW30
2-May	NW14	NW12	NW14	NW15	NW13	NW10	NNW17	N18	NNE18	N19	N19	NNW26	NNW21	N17	NNW21	NNW16	NNW20	N8	SE3	SW7	NNW23	N24	N29	NNE27	NNW15.3	NNE29
3-May	NNE24	N22	N12	N11	N12	N14	N11	NNW9	NW6	NW18	NW17	NNW15	NW11	N12	N21	N21	N21	N21	NNE20	NNE15	ENE17	ENE17	E14	ENE14	N12.5	NNE24
4-May	ENE14	E9	E9	E9	SW10	SSW5	SE5	SE6	SSE4	SSE6	S4	N4	NNW5	N6	NNW7	N2	NNE7	ENE8	ENE10	NE15	ENE26	ENE29	ENE13	ENE16	ENE6.4	ENE29
5-May	NE12	ENE12	ENE12	ENE11	ENE11	ENE12	NE11	NE12	NE12	NNE15	NE17	NNE20	NNE22	NNE28	NE26	NE33	UO	UO	NE38	NE37	NE34	NE26	NNE24	NE19.8	NE38	
6-May	NNE25	NNE21	NNE25	NNE25	NNE23	NNE24	N21	N23	N24	NNE21	NNE20	NE24	NNE26	NE25	NE25	NE20	ENE21	E15	E19	E9	ENE4	ESE7	SE8	SSE1	NNE17.0	NNE26
7-May	ENE5	E7	SE8	SE13	S10	S13	S11	SSE7	S3	WSW4	W9	NNW6	N10	NNE10	NNE9	NE12	NE10	ENE10	ENE12	E18	E23	ESE26	SE18	E6.3	ESE26	
8-May	SSE10	S9	S10	SSE12	SSE13	S8	S8	SSE10	SSE6	SE5	SSE3	SE5	W3	W5	W5	NNW23	N21	NE28	NE26	UO	UO	E19	ESE14	SE13	ESE3.9	NE28
9-May	N7	NNE17	NE20	ENE15	ENE13	ENE10	E3	W1	SSW1	SW5	SW7	WSW8	SW8	SSW8	SSW6	SE7	SE5	ESE3	SE2	SSE4	SSE7	S7	SE6	ESE12	ESE2.8	NE20
10-May	SE19	SE20	SE20	SE14	SSE4	S3	N3	N2	NW3	NNW2	NW1	SW5	WSW7	WSW1	ESE3	SE9	SE11	SE10	SE7	E5	ESE7	ESE13	SSE19	SSE23	SE6.9	SSE23
11-May	SSE20	SSE17	S16	SSW13	SSW10	SSW9	SSW8	SSW9	SSW7	SW5	WSW9	WSW10	WSW8	W6	WSW9	W8	WSW9	W7	NNE6	E3	SW1	NE9	E30	ESE28	S5.3	E30
12-May	SE17	SE13	SSE4	ESE8	ESE8	ESE9	ESE7	ESE9	E3	E1	SSE6	SSE13	SSE15	SSE12	SSE16	SSE17	SE16	SE16	SE18	ESE20	SE37	SE36	SE42	SE42	SE15.7	SE42
13-May	SE41	SE41	SE33	SE29	SSE19	SSE19	SSE21	SSE18	SSE20	SSE18	SW10	WSW10	WSW16	W16	WSW10	WSW5	W10	S9	S17	SSW20	SSW23	S22	SSW23	SSW22	S15.9	SE41
14-May	SSW11	SSW12	SW15	SSW9	SW10	SW13	SW12	SSW12	SW9	WSW17	W22	SW18	WSW19	SW14	SW13	SSW12	SW15	SSW16	SSW18	SSW19	SW24	SW34	SW48	SW47	SW17.7	SW48
15-May	SW31	SW28	SSW16	SSW14	SSW12	S8	S9	SSE4	SSE2	SSE5	SW7	WSW21	WSW20	WSW18	WSW19	WSW21	WSW19	W19	NNE28	N50	N42	N49	N47	N45	WNW8.5	N50
16-May	N40	N36	N31	N47	N40	N33	NNE30	NNE32	N28	N29	NNE30	NNE28	NNE28	NNE29	NNE26	NNE25	NNE22	NNE19	NNE20	NNE18	NNE21	NE22	ENE20	E15	NNE26.7	N47
17-May	SE13	SE15	SE10	SSE10	SSE16	SSE16	SSE18	SSE18	S11	SSE13	SE12	SSE11	SSE12	SSE10	SSE11	SSE13	SSE14	SE15	SSE17	S20	SSE25	SSE26	SSE23	SSE14.9	SSE26	
18-May	SSE17	SE23	SSE20	S17	SSE14	S12	S5	SSE5	S6	SW4	SSW4	SW11	W13	W12	W13	NNW11	NNW11	NNW10	W10	W9	WSW8	SW12	WSW21	WSW20	SW7.7	SE23
19-May	SW12	WSW15	W10	WSW20	SW15	SW16	SW14	SW10	SW8	WSW13	W12	W10	W9	WNW6	SSE2	SSW2	ESE3	SE3	SE5	SSE8	SSW15	SW19	WSW11	SW6	SW8.7	WSW20
20-May	SW8	WSW10	W10	WSW18	SW17	SW13	SSW9	SSW7	SSW7	SSW5	W6	W5	E4	SSW7	SSE10	SSW7	S7	S9	SSW9	SSW12	SW16	SW20	SSW10	SSW12	SW8.8	SW20
21-May	SW9	SSW7	S9	S7	S10	SSE9	SSE8	SE12	SE13	S6	SE4	SE4	W8	W13	W14	W12	NNW10	W8	WNW8	NNW5	NNE3	SSE3	SSW6	SSW9	SSW4.3	W14
22-May	W3	WNW9	W17	WSW18	SSW9	SSW9	WSW7	WSW5	NNW1	NW4	N14	N21	N21	N26	N27	NNE24	NNE25	NNE30	NNE30	NNE28	NE30	NE37	NE32	NE24	NNE12.8	NE37
23-May	NE19	NNE16	NNE19	ENE15	E13	E13	ENE7	N5	N8	NNW9	N10	N11	N10	NNW10	NW8	NNW6	NNW5	NNE5	ENE3	ENE3	ENE4	NE13	ENE17	NE6	NNE7.9	NE19
24-May	NE10	ENE6	N1	SSW1	S5	S8	SSW9	SSE5	E7	SE9	SSE5	SE1	NE5	NNE4	NNW5	WNW5	NNE2	NE1	E3	E7	E13	E7	E4	WSW2	ESE2.5	E13
25-May	WNW4	N3	SSW2	SW7	WSW5	SW5	SW8	SSW7	S5	SW5	SW6	WSW11	WNW7	WNW8	SSE4	SE5	W5	NNW38	N13	N15	N25	N32	N33	N30	NNW6.8	NNW38
26-May	N24	N26	N22	N18	N17	N23	N14	N13	N16	NNE22	NNE22	N21	NNW13	NNW14	N13	NNW9	NNW11	NNE11	NE13	NE15	NE20	ENE24	E24	ESE23	NNE14.8	N26
27-May	SE20	SE25	SE19	SE17	SSE10	SSE9	SE8	ESE5	SE7	SE5	ESE5	ESE4	N11	NNW19	N39	N37	N35	NNE35	N22	NNE17	NNE38	NNE37	NNE32	N32	NNE11.9	N39
28-May	NNE36	NNE31	NNE29	NNE27	NNE22	NNE21	NNE25	NNE29	N26	N25	N23	N26	N21	N18	N17	N16	N16	NNE17	NNE16	NNE17	NE16	E23	E28	ESE21	NNE19.5	NNE36
29-May	SE25	SE26	SSE20	SSE9	SSE14	SSE15	SSE14	SSE14	SSE11	SSE8	SSE5	SE4	SE5	SSE2	SW2	SE2	WSW4	ESE2	SSE8	S13	S20	SSE27	SSE33	SSE35	SSE12.8	SSE35
30-May	SSE37	SSE23	SSE20	SE20	SSE12	SSE14	SSE13	SSE7	SSE5	SSE4	SSE6	SE16	SSE15	SE19	SSE15	SSE16	SSE16	SSE18	SSE17	SE26	SSE29	S33	S32	S28	SSE18.0	SSE37
31-May	S28	S29	SSE23	SE30	SE28	SE34	SE34	SE27	SE26	SSE20	SSE19	S18	S23	S22	SSE18	SSE20	SSE18	SSE17	S17	S19	SSE17	SW13	W14	W18	SSE19.6	SE34

ESE4.4 ESE4.4 SE3.1 SE3.3 SSE3.2 SSE3.6 SSE3.1 ESE2.4 E1.3 NW1.2 NW2.6 NW3.2 NW4.0 NNW3.9 NNW4.3 N3.7 NNE4.6 NNE4.0 NE4.4 ENE4.1 ENE5.3 E7.4 ESE6.8 ESE5.0	Diurnal Average
SE41 SE41 SE33 N47 N40 SE34 SSE34 NNE32 N28 N29 NNE30 NNE28 NNE28 NNE29 N39 N37 N35 NNW38 NNE30 N50 N42 N49 SW48 SW47	Diurnal Maximum

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed 167 m (WS167m) - km/h

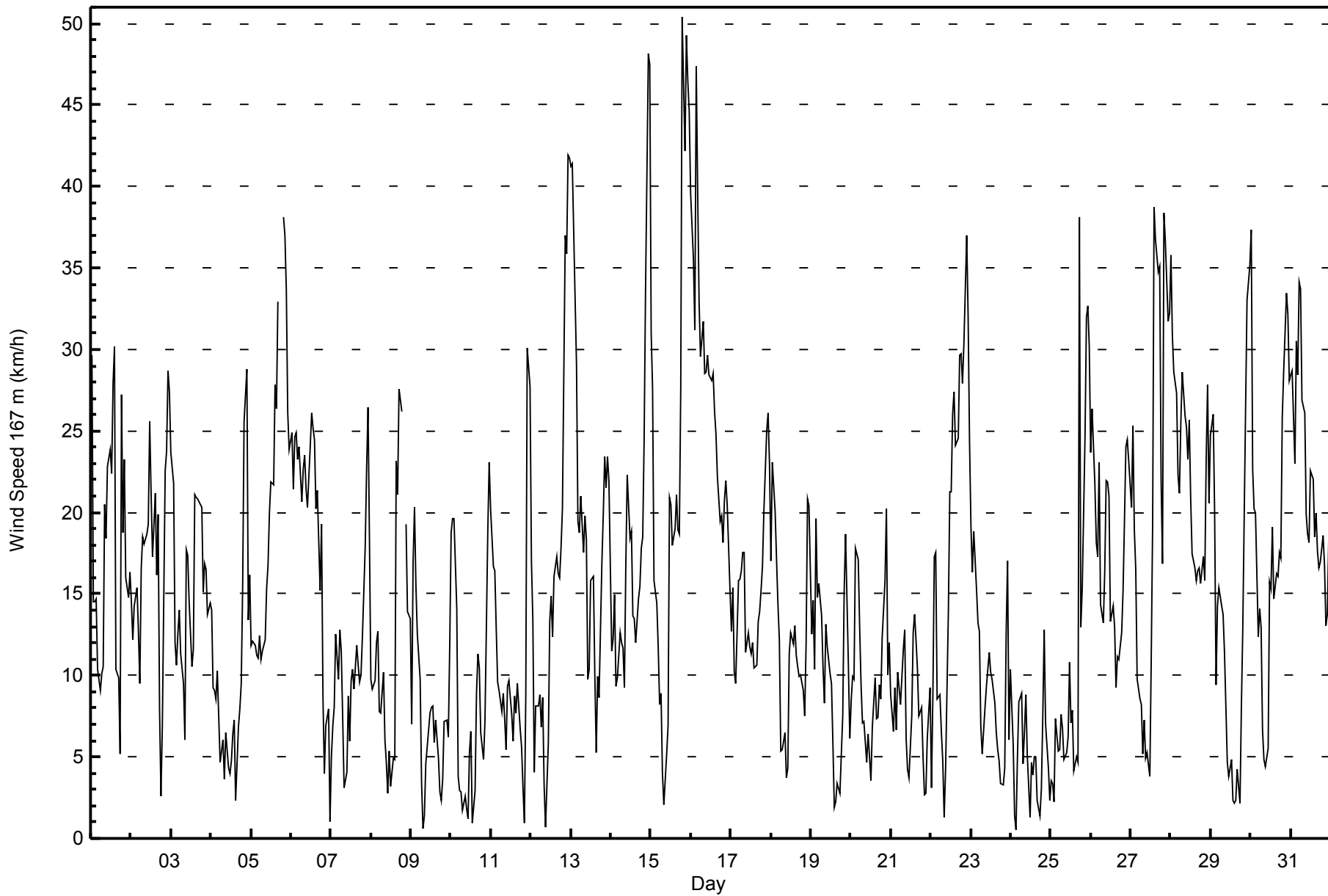
Lower Camp Met Tower - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 14 km/h on May 25 14:00																	Hours in Service: 744 Hours of Data: 740 Hours of Missing Data: 4 Hours of Calibration: 0 Percent Operational Time: 99.5								
Minimum Value: 0 km/h on May 7 03:00																									
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-May	5	6	3	3	5	3	3	3	4	4	5	4	5	7	8	7	6	4	11	2	2	5	2	3	11
2-May	3	3	2	3	3	2	3	4	3	4	4	7	4	4	9	6	14	9	3	2	12	5	4	4	14
3-May	4	4	3	2	2	2	2	3	5	4	4	4	3	3	3	4	4	3	5	2	1	2	2	3	5
4-May	2	1	2	3	4	3	1	2	2	2	2	2	4	4	4	3	3	4	3	3	3	4	5	3	5
5-May	2	2	2	1	1	1	2	2	3	2	5	5	6	5	4	4	6	UO	UO	6	4	4	4	3	6
6-May	3	3	3	3	3	3	3	3	3	3	4	6	4	5	5	5	4	4	4	5	2	2	2	2	6
7-May	2	1	0	1	2	2	2	2	2	2	2	2	3	4	5	5	4	4	3	1	3	2	4	4	5
8-May	4	2	2	2	2	2	2	2	2	2	2	2	3	3	2	12	3	4	3	UO	UO	7	2	3	12
9-May	3	2	3	4	1	2	2	1	1	2	2	3	3	4	3	3	3	1	2	1	1	2	1	3	4
10-May	3	1	2	5	2	3	1	1	2	2	2	3	3	3	3	3	3	3	3	1	1	4	3	3	5
11-May	4	4	3	3	2	2	2	2	3	3	3	2	3	3	2	2	2	3	3	2	1	6	7	7	7
12-May	5	6	2	3	3	2	1	2	2	1	4	3	4	5	6	4	5	3	2	4	5	5	4	3	6
13-May	2	2	6	4	4	4	3	3	3	3	5	6	5	3	4	4	2	6	4	2	4	3	3	4	6
14-May	3	3	3	4	3	2	3	3	4	3	2	5	4	5	5	5	4	4	3	1	6	2	3	6	6
15-May	4	3	9	4	4	2	2	3	1	2	4	4	4	4	5	4	5	4	6	10	9	6	6	7	10
16-May	6	8	12	9	7	5	5	5	5	5	4	4	4	6	4	4	5	4	3	3	2	1	1	4	12
17-May	2	2	2	3	3	3	3	4	4	4	4	4	5	4	4	4	3	3	3	3	3	3	3	3	5
18-May	2	2	4	3	3	2	2	2	2	2	3	6	4	3	4	3	3	3	2	1	1	2	1	2	6
19-May	2	2	3	3	4	2	2	2	2	3	2	3	4	4	2	2	2	1	1	3	3	3	3	2	4
20-May	2	3	2	4	3	2	3	2	2	2	2	3	3	5	4	5	3	4	3	2	2	1	4	3	5
21-May	2	1	2	1	1	2	3	5	2	2	2	4	4	5	4	4	3	4	4	1	1	1	2	3	5
22-May	1	5	3	2	3	2	1	3	1	2	6	5	5	5	6	6	6	6	5	4	3	1	2	4	6
23-May	4	2	2	4	2	1	3	2	2	3	3	3	4	4	3	3	2	2	1	2	3	2	3	4	4
24-May	1	2	1	1	2	2	2	1	1	2	2	2	2	3	5	3	4	2	2	4	2	5	3	2	5
25-May	1	1	2	2	2	1	1	1	1	2	1	5	7	14	3	2	12	6	10	3	5	5	5	5	14
26-May	5	3	4	4	2	3	3	3	3	5	4	5	5	3	4	4	4	3	3	2	2	3	1	4	5
27-May	2	3	3	2	2	2	2	2	2	2	2	3	6	7	9	5	5	7	4	3	8	7	6	5	9
28-May	6	5	5	4	4	4	4	5	4	4	5	5	5	5	5	5	5	4	4	2	2	3	1	4	6
29-May	5	4	6	3	5	3	3	3	3	3	2	2	4	2	2	2	3	3	3	2	5	3	6	4	6
30-May	6	3	2	3	3	3	4	2	1	2	3	4	6	5	5	7	5	4	4	4	5	4	3	3	7
31-May	3	3	3	2	3	3	3	5	3	4	7	5	4	3	4	4	4	3	3	3	5	7	3	4	7
Diurnal Maximum																									
UO - Unstable Operation																									



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	115	15.54	15.54
6 - 11	195	26.35	41.89
12 - 19	215	29.05	70.95
20 - 28	147	19.86	90.81
29 - 38	53	7.16	97.97
> 38	15	2.03	100.00

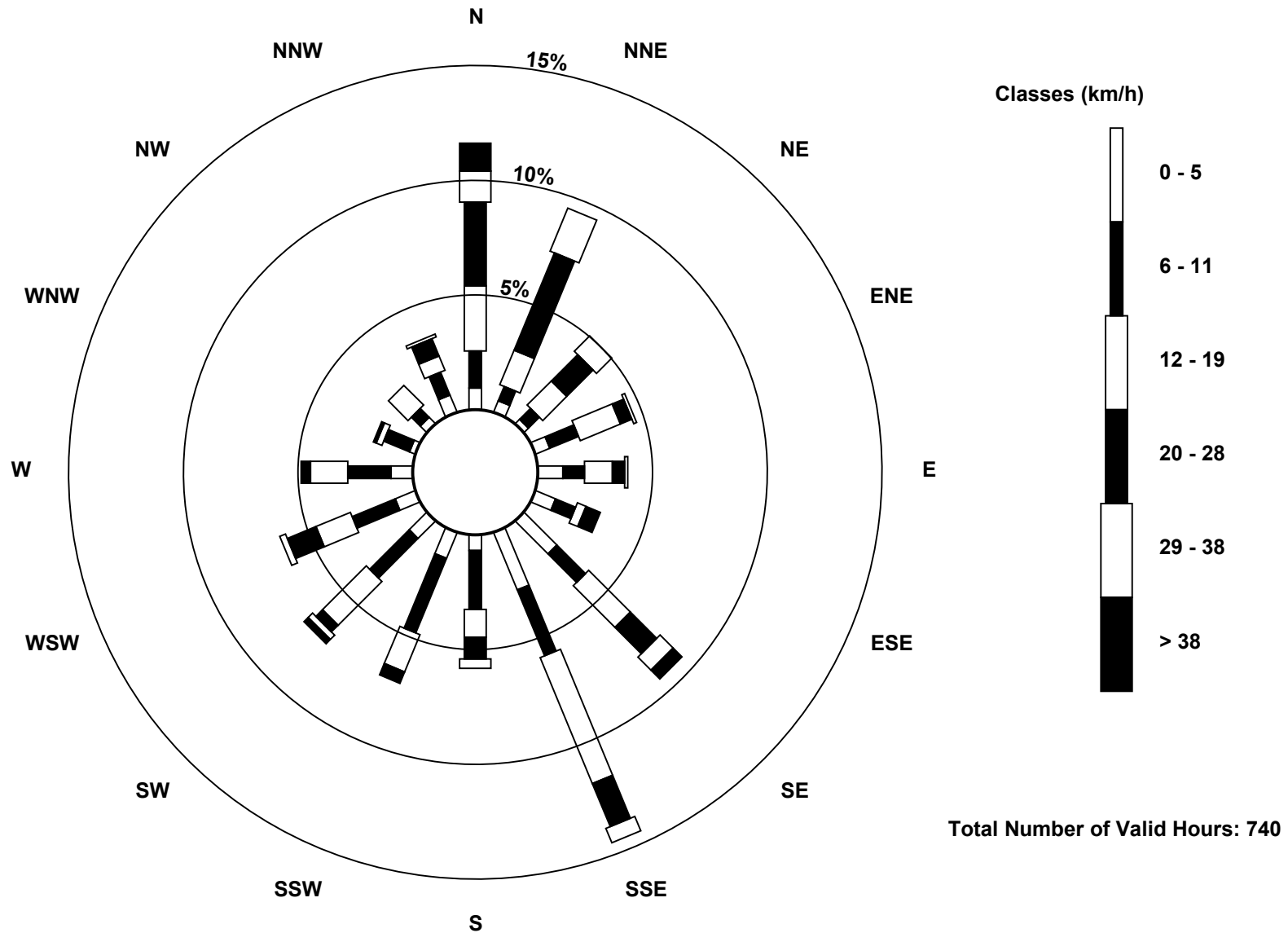
Total Number of Valid Hours: 740

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - May 2015

Direction of Maximum Speed: 169 deg on May 30 00:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 15.2 deg on May 16		Hours of Data: 737
Direction of Minimum Speed: 338 deg on May 7 03:00	Direction of Minimum Daily Speed Average: 0.8 deg on May 10	Hours of Missing Data: 7
Monthly Average Direction: 283.1 deg		Percent Operational Time: 99.1

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	211	155	150	155	142	129	151	160	254	273	265	264	266	257	253	263	357	198	292	255	259	297	294	314	235.4
2-May	301	340	321	112	128	106	358	5	14	9	8	350	347	12	326	339	344	0	199	198	334	2	12	11	354.4
3-May	26	6	343	331	343	8	21	350	325	332	311	309	326	6	4	10	8	8	28	30	91	72	17	2	359.0
4-May	358	359	345	24	239	152	107	152	172	191	194	45	333	18	343	343	24	99	65	50	42	41	329	2	39.2
5-May	352	351	353	6	14	13	356	20	27	11	45	23	18	30	19	AF	AF	AF	AF	AF	AF	AF	15	359	--
6-May	358	351	354	5	356	358	354	356	359	3	7	34	32	39	51	44	68	80	68	80	26	55	331	344	20.7
7-May	316	17	338	150	200	140	147	148	146	222	257	2	10	41	30	44	58	61	77	71	92	92	145	112	81.5
8-May	284	338	135	138	130	112	128	149	141	145	144	109	262	293	266	350	358	46	54	60	81	83	62	7	78.3
9-May	346	334	350	355	350	343	329	355	237	245	242	284	231	213	201	150	146	131	155	159	148	319	242	318	240.8
10-May	327	349	333	345	331	337	351	44	83	225	222	244	263	181	123	142	144	138	153	97	307	176	95	151	169.7
11-May	149	152	166	158	150	136	144	151	161	181	245	247	258	234	255	241	248	253	357	30	355	297	98	96	187.3
12-May	101	359	346	321	333	332	344	165	140	232	220	170	161	161	156	158	155	152	127	124	142	149	145	141	149.9
13-May	141	140	135	136	141	156	160	156	147	149	222	247	243	273	266	286	298	186	182	197	196	173	165	157	171.3
14-May	124	138	151	149	145	157	152	150	157	270	278	246	253	232	233	211	237	210	212	216	211	215	223	224	202.5
15-May	245	96	93	141	140	126	154	141	180	152	216	258	252	254	260	252	255	266	20	356	358	1	359	359	313.2
16-May	1	6	7	4	9	3	25	27	12	4	16	23	28	13	34	23	28	32	16	23	21	10	343	41	15.2
17-May	35	351	325	355	355	16	154	176	169	182	166	156	172	166	151	148	152	156	156	171	169	153	150	155	161.0
18-May	150	153	161	163	119	141	146	152	153	168	134	228	284	299	296	297	301	292	292	285	190	140	301	160	199.4
19-May	148	150	149	156	147	132	135	141	145	215	267	277	289	271	189	201	158	119	149	156	154	326	132	153	163.9
20-May	152	140	144	151	143	136	138	147	148	149	223	269	81	214	167	192	178	196	219	217	230	341	147	159	165.9
21-May	149	140	116	128	119	137	144	156	150	142	138	222	286	278	284	277	285	272	305	323	149	155	152	153	186.4
22-May	350	205	145	139	112	100	149	160	202	234	355	2	1	0	4	12	11	6	12	30	33	27	11	329	18.2
23-May	345	355	4	8	4	3	5	357	353	354	352	354	347	329	315	332	350	35	130	305	330	332	337	347	350.2
24-May	299	154	342	66	147	141	140	133	157	162	143	114	42	40	315	248	31	73	97	108	214	341	327	329	127.4
25-May	75	87	158	138	137	141	143	147	149	155	147	242	274	45	132	147	119	346	356	332	341	354	354	359	47.8
26-May	352	357	345	344	345	2	357	346	356	13	11	356	344	346	3	337	353	17	52	31	48	50	29	119	2.3
27-May	39	350	67	142	64	350	119	150	169	174	188	113	355	337	358	358	4	6	4	19	22	15	18	3	10.8
28-May	15	15	9	17	18	14	22	12	11	354	359	358	0	8	358	3	8	16	22	23	41	70	102	110	12.8
29-May	132	135	146	133	110	123	157	175	165	179	170	143	154	176	225	136	264	102	157	177	186	170	170	169	164.5
30-May	164	152	164	152	137	140	161	148	157	157	143	139	165	153	174	161	173	173	173	163	168	174	171	160	162.2
31-May	159	157	156	143	138	141	143	152	148	174	168	180	185	180	173	167	172	171	183	179	152	159	136	279	164.1

85.6 79.7 110.0 115.1 93.5 105.4 128.4 135.0 136.6 208.4 285.0 305.8 302.1 310.6 311.1 326.6 355.7 59.5 80.8 104.1 104.5 87.7 112.2 107.7
 Diurnal Average

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 20 m (WD20m) - deg

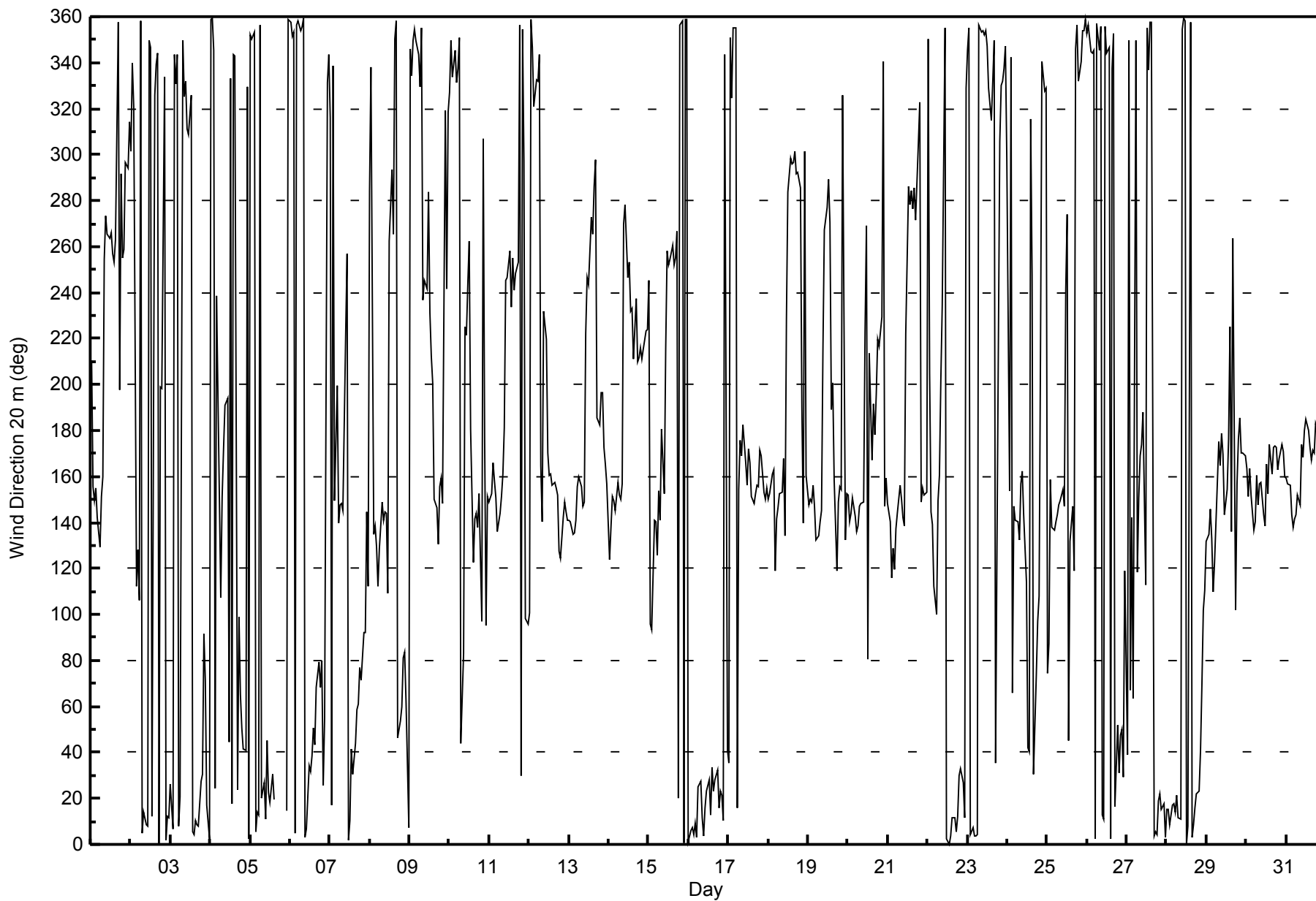
Lower Camp Met Tower - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 108 deg on May 10 23:00		Hours in Service: 744 Hours of Data: 737 Hours of Missing Data: 7 Hours of Calibration: 0 Percent Operational Time: 99.1																							
Minimum Value: 7 deg on May 20 00:00																									
Percentiles: P ₁ = 9 P ₁₀ = 14 Q ₁ = 21 Median = 29 Q ₃ = 47 P ₉₀ = 73 P ₉₉ = 99																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	25	20	10	11	51	14	16	12	40	23	22	22	27	24	24	65	73	74	26	12	18	51	44	78	78
2-May	33	30	42	81	59	87	91	25	28	28	27	23	23	33	29	26	58	100	59	59	32	22	20	23	100
3-May	20	22	30	25	29	21	27	40	75	25	27	26	42	30	23	26	30	28	25	22	17	67	22	23	75
4-May	35	22	39	41	88	75	23	38	56	30	49	89	84	49	53	80	47	67	35	18	17	51	49	20	89
5-May	13	14	21	22	18	20	22	31	36	21	29	28	25	31	23	AF	AF	AF	AF	AF	AF	AF	22	17	36
6-May	16	20	17	18	16	16	17	17	19	19	22	24	21	24	24	32	27	34	28	63	33	84	86	38	86
7-May	93	49	90	93	55	16	19	22	36	70	29	70	48	47	61	44	35	40	37	20	37	92	40	75	93
8-May	91	99	82	13	17	32	39	16	20	29	54	26	79	59	41	24	28	24	23	28	27	78	60	80	99
9-May	19	29	29	30	19	52	87	67	68	26	24	39	52	38	51	22	38	36	47	38	29	76	79	72	87
10-May	80	54	53	20	71	38	51	77	57	56	41	41	35	78	99	34	36	27	25	76	92	87	108	44	108
11-May	35	40	11	12	21	15	12	13	30	55	19	36	47	45	39	26	23	30	68	99	90	71	96	101	101
12-May	71	48	53	32	24	21	51	58	49	25	26	16	21	44	32	23	22	20	19	17	16	15	16	14	71
13-May	13	14	24	16	17	13	11	17	17	17	58	43	36	28	54	89	38	54	18	10	11	9	8	20	89
14-May	28	10	12	19	15	15	10	11	22	27	21	36	23	37	31	33	25	24	14	10	9	10	9	9	37
15-May	75	39	36	11	47	30	22	21	29	29	58	22	21	26	25	23	19	30	46	18	20	18	20	20	75
16-May	20	22	28	21	23	22	29	29	31	26	27	31	32	29	34	36	34	35	28	27	22	33	20	69	69
17-May	37	37	36	22	30	91	21	14	17	26	32	39	31	29	35	27	24	18	18	12	13	14	17	17	91
18-May	38	31	36	21	29	18	17	16	20	32	37	65	40	30	28	35	36	33	26	21	50	30	81	39	81
19-May	10	13	17	8	11	13	14	16	18	61	32	35	50	84	38	37	55	63	24	20	41	36	58	7	84
20-May	12	18	27	30	14	13	16	15	15	21	69	80	73	61	41	53	37	37	34	13	12	47	67	51	80
21-May	9	13	14	23	58	17	23	18	19	23	35	102	59	45	36	39	39	42	58	32	85	66	16	72	102
22-May	72	71	9	12	36	37	30	33	47	26	43	28	28	27	28	33	31	25	25	27	25	27	30	12	72
23-May	27	19	22	37	13	25	26	24	29	33	31	31	34	33	65	53	63	74	93	78	76	40	24	24	93
24-May	49	88	71	103	44	20	21	36	26	33	27	65	55	88	73	49	104	73	70	21	85	66	65	80	104
25-May	86	88	87	13	81	15	15	15	20	18	23	51	83	90	97	28	79	22	85	25	23	19	19	19	97
26-May	20	21	23	28	33	26	22	28	26	33	28	26	48	39	47	60	62	46	39	29	27	47	59	44	62
27-May	56	69	104	29	51	60	49	46	26	21	28	72	21	37	24	21	23	22	25	33	27	26	27	23	104
28-May	27	25	26	25	26	26	29	27	33	28	29	26	28	39	36	36	38	42	37	29	30	26	55	60	60
29-May	22	71	36	43	15	34	22	21	28	39	66	70	50	66	40	79	43	97	29	15	12	11	9	9	97
30-May	16	27	15	20	73	42	11	22	26	31	33	34	31	27	30	25	22	15	14	17	19	10	9	12	73
31-May	10	11	13	22	25	16	18	22	21	34	35	27	13	13	13	11	13	15	13	14	42	59	62	36	62
93 99 104 103 88 91 91 77 75 70 69 102 84 90 99 89 104 100 93 99 92 92 108 101																									
Diurnal Maximum																									
AF - Analyzer Failure																									



WBEA
Hourly Averages

Wind Direction 20 m (WD20m) - deg
Lower Camp Met Tower - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 45 m (WD45m) - deg

Lower Camp Met Tower - May 2015

Direction of Maximum Speed: 350 deg on May 15 20:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 11.7 deg on May 16	Hours of Data: 737
Direction of Minimum Speed: 35 deg on May 7 03:00	Hours of Missing Data: 7
Direction of Minimum Daily Speed Average: 0.6 deg on May 9	Percent Operational Time: 99.1
Monthly Average Direction: 304.8 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-May	208	149	142	150	142	128	143	151	248	263	255	255	257	248	245	264	354	192	283	247	247	296	281	299	231.2
2-May	300	336	342	21	129	138	346	1	9	4	2	345	341	4	319	333	340	356	191	193	327	358	8	8	350.1
3-May	19	3	344	336	345	4	12	343	321	324	303	297	319	0	357	3	2	4	20	25	85	81	11	4	355.5
4-May	360	358	347	11	224	134	102	140	165	181	184	29	325	10	338	349	15	82	56	43	36	40	344	359	33.2
5-May	344	345	353	5	8	5	353	16	22	6	41	18	14	25	14	AF	AF	AF	AF	AF	AF	AF	12	354	--
6-May	354	348	350	1	352	353	349	353	355	0	4	29	25	32	46	38	63	70	62	70	26	57	270	351	16.4
7-May	303	357	35	165	146	136	139	139	139	217	251	350	2	30	19	36	48	52	69	65	82	94	133	124	75.9
8-May	168	229	135	134	131	121	119	138	134	134	137	102	266	286	267	342	355	38	48	52	77	84	80	62	71.4
9-May	340	342	357	353	350	352	351	345	237	239	236	273	226	204	197	139	135	116	145	147	137	11	22	40	254.2
10-May	300	349	336	341	348	348	1	27	68	225	217	240	255	166	105	131	134	128	140	85	70	125	125	131	127.5
11-May	138	141	153	147	142	132	137	142	153	182	239	241	250	230	252	240	243	248	358	58	296	338	86	119	173.4
12-May	112	2	334	316	322	331	356	141	129	227	209	158	150	152	145	147	144	140	119	116	132	138	137	133	138.0
13-May	133	133	125	126	131	143	148	143	137	140	216	243	238	265	257	278	288	178	171	184	185	166	161	151	160.0
14-May	119	128	140	141	138	147	145	142	148	261	269	239	244	226	226	204	229	202	203	209	205	209	216	216	195.3
15-May	231	121	94	133	132	123	143	130	164	138	220	251	245	246	252	243	246	257	15	350	352	356	355	354	314.4
16-May	358	3	3	1	6	0	23	24	6	359	10	19	23	11	27	20	20	29	13	19	18	13	353	50	11.7
17-May	34	346	354	347	359	140	140	165	159	172	154	146	162	154	142	139	143	145	145	162	161	144	137	141	148.9
18-May	134	140	149	149	121	133	137	138	142	155	126	222	274	289	288	286	295	282	285	275	226	176	240	186	195.8
19-May	141	145	147	147	140	133	129	135	135	218	260	272	281	276	179	196	146	113	140	151	172	250	138	146	158.4
20-May	145	139	140	144	139	133	132	137	137	137	226	268	64	207	156	186	168	188	211	207	212	251	137	149	157.6
21-May	147	141	130	131	133	134	139	142	140	135	128	212	278	271	277	268	278	269	300	319	134	207	147	145	176.1
22-May	337	223	149	137	122	119	140	147	211	241	351	358	356	356	358	8	8	5	10	26	28	26	17	331	14.6
23-May	333	343	353	4	357	358	7	0	349	347	350	348	340	323	311	324	344	33	104	0	339	338	328	349	345.8
24-May	341	166	337	212	135	138	132	119	142	147	135	96	32	29	309	246	25	58	82	96	113	344	346	335	106.2
25-May	141	354	173	137	134	134	135	139	136	140	134	238	275	352	120	136	59	338	356	330	338	347	348	354	19.2
26-May	347	352	342	341	346	356	351	340	351	10	7	348	338	340	357	339	345	8	48	28	45	44	69	126	358.6
27-May	90	89	121	131	87	38	112	135	156	159	176	96	350	328	353	353	359	2	0	13	18	15	16	1	9.5
28-May	14	12	5	13	15	11	20	9	7	347	353	353	355	5	350	354	0	13	17	19	38	68	100	114	9.6
29-May	129	128	135	143	111	117	145	163	153	164	164	125	142	173	220	128	262	87	150	167	173	163	161	161	154.0
30-May	153	138	149	141	147	137	150	139	143	144	136	130	156	141	162	149	160	163	164	147	152	165	163	151	151.3
31-May	147	145	144	132	129	132	134	141	138	164	157	168	174	171	164	158	163	161	173	171	142	154	157	266	153.1

79.1 70.6 95.0 102.7 90.1 99.6 114.4 117.3 114.9 241.9 302.5 312.7 306.1 317.0 321.7 345.0 357.5 36.4 56.1 67.7 75.7 64.1 87.6 88.4
Diurnal Average

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 45 m (WD45m) - deg

Lower Camp Met Tower - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 109 deg on May 17 06:00			Hours of Data:	737
Minimum Value: 5 deg on May 19 04:00			Hours of Missing Data:	7
			Hours of Calibration:	0
Percentiles: P ₁ = 7 P ₁₀ = 10 Q ₁ = 15 Median = 22 Q ₃ = 40 P ₉₀ = 65 P ₉₉ = 90			Percent Operational Time:	99.1

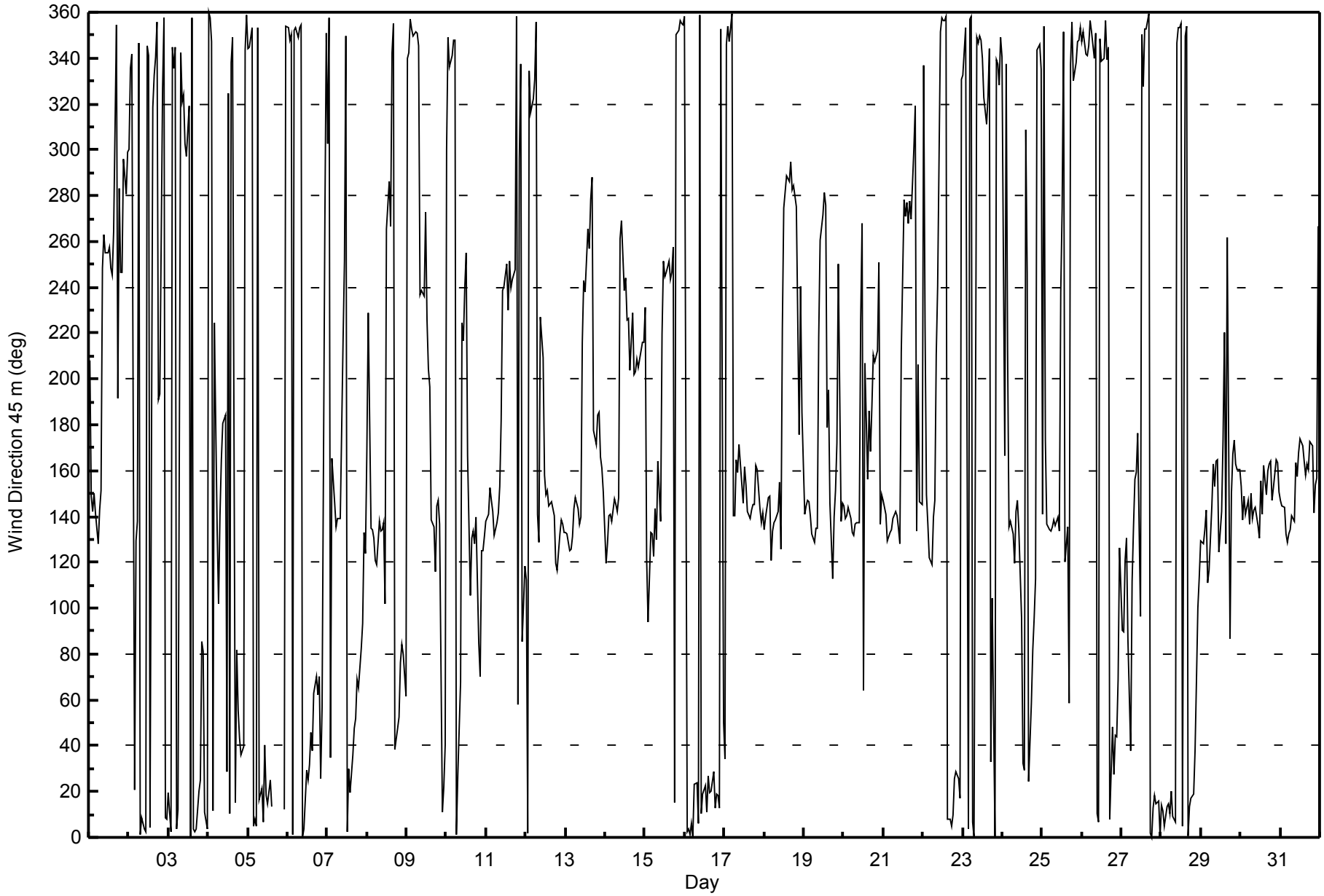
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	23	18	6	10	42	10	13	10	33	17	15	16	22	20	21	66	66	72	23	9	16	42	32	44	72
2-May	23	18	53	82	72	50	74	19	22	23	21	20	19	27	27	23	41	100	54	52	34	18	15	16	100
3-May	14	17	25	18	25	17	20	36	66	21	23	22	40	21	17	20	25	22	19	18	14	26	50	13	66
4-May	26	18	25	37	87	48	17	33	54	27	47	84	76	36	44	75	40	55	30	15	12	40	43	15	87
5-May	10	10	14	15	11	14	19	26	32	16	25	22	20	25	16	AF	AF	AF	AF	AF	AF	AF	17	13	32
6-May	13	16	13	14	12	12	13	14	14	15	17	18	15	18	17	27	24	27	22	42	23	65	80	33	80
7-May	86	50	89	42	51	11	15	18	33	72	23	64	40	37	52	40	29	37	30	14	19	50	33	39	89
8-May	71	61	34	8	9	20	44	13	15	27	52	22	81	44	46	18	26	18	17	23	19	44	46	84	84
9-May	17	23	22	28	13	52	78	65	65	21	21	35	48	41	53	19	34	34	53	29	15	74	65	78	78
10-May	89	33	37	14	58	28	38	75	58	56	47	42	30	89	100	28	30	23	22	31	92	85	32	17	100
11-May	18	23	8	7	13	10	7	9	27	56	14	28	41	42	34	22	18	26	59	85	60	40	90	89	90
12-May	35	65	26	22	11	14	52	64	52	24	30	13	22	40	28	20	19	16	13	12	11	12	10	9	65
13-May	9	9	16	11	11	11	10	14	13	13	54	40	32	22	50	94	32	54	15	11	12	7	7	13	94
14-May	26	7	8	13	11	13	7	7	21	20	15	34	18	31	29	33	22	25	16	10	9	9	7	6	34
15-May	55	64	30	7	32	21	15	17	31	27	56	17	16	19	20	17	13	28	39	16	16	15	15	15	64
16-May	16	17	21	16	17	18	22	19	23	22	20	22	21	22	24	29	25	24	20	19	14	20	26	49	49
17-May	19	20	45	32	41	109	17	12	15	27	29	33	28	28	28	22	21	14	15	10	11	12	12	14	109
18-May	24	22	25	16	18	12	12	14	17	32	36	61	35	24	18	23	31	23	19	16	34	18	56	48	61
19-May	6	8	9	5	6	7	10	11	11	58	24	26	48	83	42	43	48	58	22	18	23	37	73	8	83
20-May	7	9	10	11	7	7	10	9	10	17	68	71	78	60	37	54	43	39	31	14	6	46	91	19	91
21-May	7	9	10	10	32	11	19	14	15	18	30	107	52	34	30	31	29	34	39	22	84	54	7	49	107
22-May	41	75	12	8	22	31	20	30	62	22	35	21	23	20	20	26	23	20	19	16	11	13	17	11	75
23-May	12	12	14	19	10	17	18	21	25	25	27	24	30	32	51	47	58	68	84	80	40	22	14	11	84
24-May	52	68	67	69	27	12	18	29	24	26	22	59	44	84	67	47	100	70	64	15	74	55	67	74	100
25-May	85	86	63	7	46	10	10	9	14	12	21	42	82	90	87	25	84	15	81	16	15	14	13	15	90
26-May	15	14	17	17	19	18	17	21	20	25	21	19	42	29	35	55	50	36	29	16	13	37	50	30	55
27-May	56	89	99	20	33	72	38	40	23	19	26	68	16	30	20	17	18	16	19	25	17	18	18	19	99
28-May	18	19	19	18	18	20	19	20	25	24	23	18	23	32	28	28	31	31	27	21	21	14	40	42	42
29-May	13	42	24	34	17	27	18	18	22	41	61	60	50	61	39	79	44	83	27	11	7	9	8	7	83
30-May	13	21	13	16	67	33	8	17	24	28	31	28	29	22	28	26	21	12	11	15	17	8	8	11	67
31-May	8	9	11	14	15	11	13	16	15	31	29	23	8	9	10	10	10	12	10	10	38	47	79	20	79
89 89 99 82 87 109 78 75 66 72 68 107 82 90 100 94 100 100 84 85 92 85 91 89																									
Diurnal Maximum																									

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction 45 m (WD45m) - deg
Lower Camp Met Tower - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 100 m (WD100m) - deg

Lower Camp Met Tower - May 2015

Direction of Maximum Speed: 359 deg on May 15 22:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 14.9 deg on May 16		Hours of Data:	736
Direction of Minimum Speed: 244 deg on May 10 10:00		Hours of Missing Data:	8
Direction of Minimum Daily Speed Average: 1.3 deg on May 9		Percent Operational Time:	98.9
Monthly Average Direction: 206.0 deg			

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	238	191	178	204	190	158	172	171	247	257	251	255	257	246	245	275	354	194	284	248	254	306	266	284	247.2
2-May	319	278	312	303	302	10	332	355	9	4	5	344	345	3	322	338	345	7	172	209	326	360	8	11	347.6
3-May	16	7	358	355	352	2	8	344	330	325	303	302	321	0	358	2	7	5	19	27	81	87	102	60	3.7
4-May	64	41	34	60	216	173	119	134	153	169	177	23	325	7	345	356	18	78	63	49	52	59	39	20	54.2
5-May	7	6	13	27	36	23	9	33	27	15	45	21	18	27	AF	AF	AF	AF	AF	AF	AF	AF	24	7	--
6-May	7	4	2	12	3	6	3	3	4	6	10	30	29	35	47	42	66	78	74	79	52	86	110	340	25.8
7-May	45	100	136	135	154	152	158	147	150	229	257	347	4	29	22	41	45	52	72	70	87	89	122	140	91.7
8-May	154	153	149	139	134	160	133	146	140	130	140	122	275	283	271	340	354	44	50	60	81	93	109	139	86.8
9-May	353	5	29	40	41	35	49	351	232	234	227	262	229	203	198	136	136	122	141	148	143	153	117	121	108.4
10-May	140	133	136	133	112	41	360	31	19	244	244	232	247	200	111	132	129	128	133	93	103	122	151	145	135.9
11-May	139	142	156	162	154	157	168	161	180	200	240	243	252	240	252	247	243	261	20	97	237	48	97	117	167.3
12-May	132	144	250	89	41	64	111	108	103	245	171	153	149	149	145	145	139	138	122	121	132	135	140	138	136.1
13-May	138	138	134	135	143	152	155	147	138	145	218	249	236	265	257	267	278	180	173	187	199	173	178	166	164.2
14-May	149	155	164	151	157	175	190	172	182	253	262	235	239	229	225	198	222	204	208	212	214	221	225	227	212.8
15-May	224	215	158	163	154	139	145	123	126	135	225	250	242	244	247	242	244	258	19	353	355	359	358	357	317.2
16-May	1	4	7	3	7	4	22	23	7	0	10	20	23	15	29	22	22	31	15	23	24	38	42	68	14.9
17-May	120	136	147	153	159	145	144	159	158	172	149	141	156	152	144	142	142	144	143	162	164	145	144	144	149.5
18-May	136	137	146	149	156	157	136	131	150	168	144	218	266	283	282	282	292	280	278	267	234	210	218	217	192.2
19-May	182	180	157	232	206	198	169	166	170	238	257	272	281	287	162	185	135	124	134	158	183	222	206	184	203.7
20-May	179	163	148	213	194	175	163	155	159	147	251	260	73	188	161	184	166	184	208	211	219	222	155	173	185.0
21-May	171	151	154	151	145	146	153	136	137	140	121	123	276	277	272	268	280	270	303	331	75	178	167	173	178.7
22-May	118	275	230	216	154	145	147	181	282	270	354	0	0	358	359	10	9	10	14	30	36	39	39	16	15.4
23-May	5	350	353	15	32	56	46	1	354	348	352	349	346	337	316	330	347	30	84	76	69	52	63	359	5.6
24-May	34	38	344	143	150	177	161	113	100	129	140	88	33	29	328	267	23	51	87	98	91	129	91	319	93.0
25-May	238	17	162	179	159	181	165	179	139	136	163	241	291	307	129	134	288	337	1	341	350	353	354	359	348.8
26-May	354	356	353	358	0	360	353	349	356	14	9	351	342	344	357	350	350	15	51	32	50	55	91	130	10.3
27-May	125	123	115	125	138	145	129	119	141	146	140	103	354	331	356	357	4	7	5	16	19	16	18	5	23.3
28-May	14	14	9	16	15	13	21	10	9	349	356	357	359	7	356	355	5	17	20	20	45	84	105	130	15.5
29-May	135	138	142	158	146	139	144	156	150	158	149	129	134	157	219	131	264	97	156	169	171	159	157	157	152.1
30-May	151	139	141	143	156	148	152	142	135	139	138	133	155	139	156	148	158	162	163	142	147	165	169	159	150.6
31-May	157	157	146	138	134	136	138	139	138	157	160	166	175	172	162	159	161	161	173	176	152	191	240	270	155.4

102.4	98.6	105.2	108.6	110.4	117.0	117.3	108.7	98.2	5.3	322.8	323.1	318.2	331.2	328.2	1.9	8.6	35.7	52.4	66.0	79.9	83.3	109.4	112.5
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 100 m (WD100m) - deg

Lower Camp Met Tower - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 105 deg on May 10 10:00			Hours of Data:	736
Minimum Value: 2 deg on May 14 23:00			Hours of Missing Data:	8
Percentiles: P ₁ = 3 P ₁₀ = 7 Q ₁ = 10 Median = 16 Q ₃ = 27 P ₉₀ = 51 P ₉₉ = 83			Hours of Calibration:	0
			Percent Operational Time:	98.9

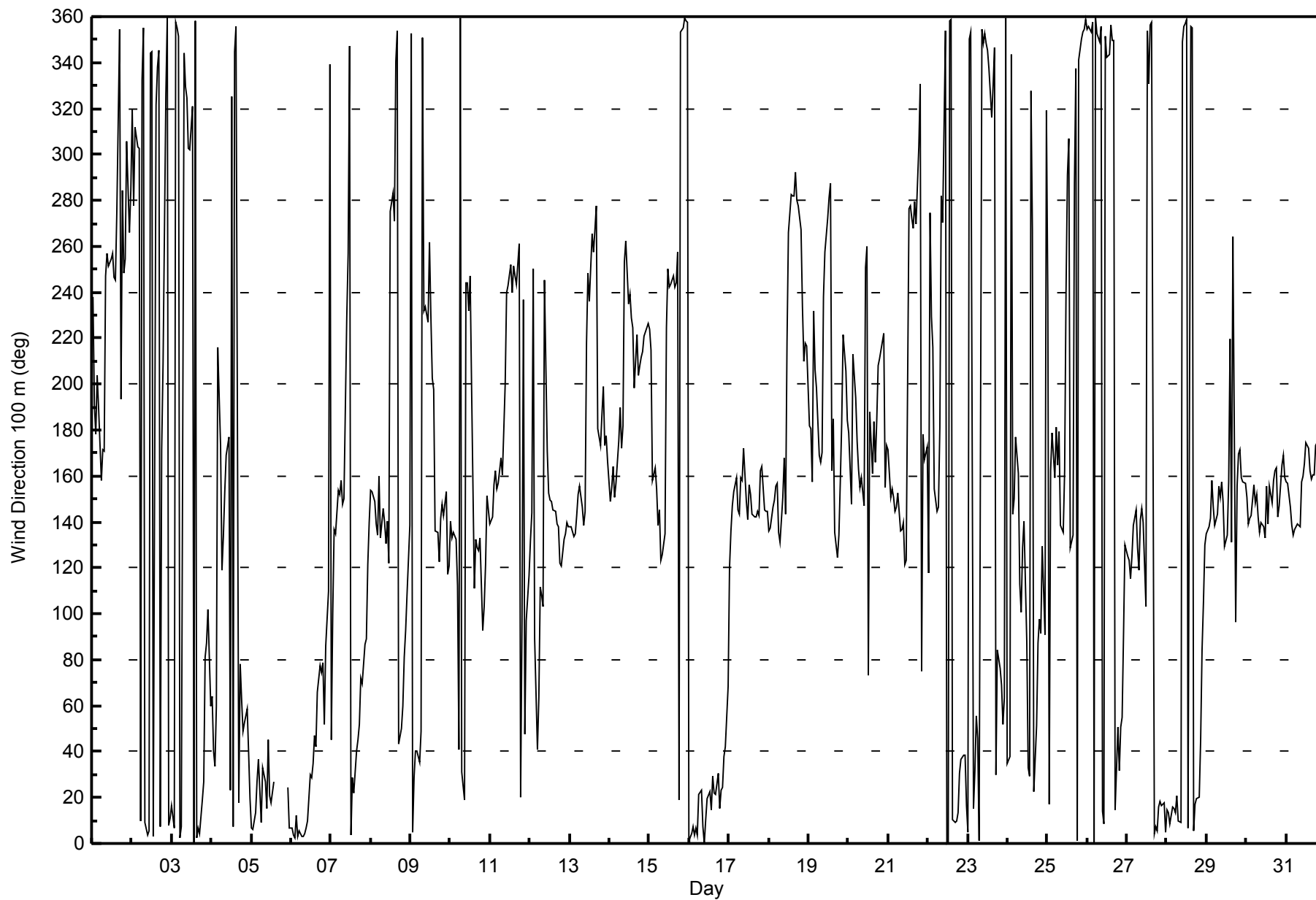
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	10	30	15	15	32	31	19	18	18	11	13	12	17	17	16	63	69	56	20	6	15	28	17	18	69
2-May	13	17	34	14	69	54	11	13	16	16	14	15	16	23	21	19	35	98	61	20	33	7	7	9	98
3-May	9	9	11	13	14	9	10	24	53	16	18	19	35	14	12	14	19	16	12	18	6	8	10	18	53
4-May	17	30	29	33	63	55	9	17	47	22	43	68	78	46	33	80	39	48	21	10	7	14	56	13	80
5-May	9	6	6	14	6	8	17	19	27	8	17	17	15	20	AF	AF	AF	AF	AF	AF	AF	AF	12	9	27
6-May	8	9	8	8	7	7	10	11	9	9	10	12	9	13	12	21	18	16	12	30	22	19	18	51	51
7-May	21	44	11	4	14	7	12	14	45	62	17	53	32	28	39	28	22	35	25	9	3	9	16	7	62
8-May	18	33	15	11	4	56	23	6	14	24	45	20	88	46	34	14	24	15	12	16	10	17	17	17	88
9-May	49	12	12	23	14	15	57	60	69	20	19	30	42	32	43	14	27	27	54	22	12	19	9	8	69
10-May	10	5	9	30	24	71	22	49	74	105	78	41	26	83	91	19	21	20	17	25	6	19	10	11	105
11-May	4	8	7	10	7	10	16	15	28	55	14	19	30	48	24	21	15	30	46	46	39	60	12	16	60
12-May	8	32	70	31	57	45	33	27	70	81	41	8	15	30	23	17	14	9	8	6	6	7	4	4	81
13-May	3	3	7	4	9	9	8	8	6	9	48	38	21	16	50	83	19	46	16	9	11	7	5	9	83
14-May	18	15	13	14	14	22	17	16	39	13	9	26	14	29	23	30	19	20	14	6	2	3	2	2	39
15-May	7	16	51	20	18	6	6	11	24	18	55	13	12	12	15	13	11	29	28	11	9	7	8	8	55
16-May	7	9	14	8	7	7	14	10	15	14	13	15	12	15	14	17	17	17	11	10	6	7	20	25	25
17-May	22	33	28	40	20	13	9	12	11	25	21	18	27	23	23	18	15	11	12	9	9	5	4	4	40
18-May	5	6	8	5	7	6	4	5	17	44	48	49	28	19	17	17	23	19	12	14	8	7	9	15	49
19-May	17	19	20	25	20	19	15	18	25	21	16	19	46	74	54	56	34	46	21	15	11	12	44	16	74
20-May	17	35	30	33	31	10	14	13	18	23	40	59	57	61	34	56	45	30	29	8	2	11	24	22	61
21-May	9	6	2	8	5	11	14	5	5	13	26	95	43	30	27	26	21	38	36	22	71	33	15	50	95
22-May	34	85	11	13	17	6	9	50	71	35	20	14	15	13	15	20	17	13	10	9	6	6	9	13	85
23-May	15	10	7	9	21	17	23	11	18	19	16	19	23	26	40	45	55	55	55	18	14	11	14	20	55
24-May	17	33	63	68	15	12	22	16	14	20	15	58	32	81	80	80	87	78	43	17	5	80	67	23	87
25-May	51	66	26	19	41	26	22	20	22	18	43	34	74	82	39	19	72	9	61	8	8	7	7	7	82
26-May	8	6	10	10	12	8	11	13	13	15	14	14	33	22	22	36	32	27	20	9	8	11	19	14	36
27-May	9	7	18	7	14	21	16	28	16	12	25	61	12	25	14	10	10	7	11	16	10	10	10	9	61
28-May	9	10	9	9	9	10	11	12	18	16	17	11	16	23	22	17	20	16	19	13	22	9	11	16	23
29-May	6	7	9	15	18	12	9	16	15	39	46	51	52	64	52	75	55	75	25	9	6	6	6	5	75
30-May	8	5	7	10	15	11	6	11	16	20	19	16	26	14	23	22	21	12	10	8	11	7	6	8	26
31-May	6	7	5	3	3	3	4	6	5	29	17	15	6	7	10	9	10	10	9	8	28	33	32	15	33
Diurnal Maximum																									
51 85 70 68 69 71 57 60 74 105 78 95 88 83 91 83 87 98 61 46 71 80 67 51																									

AF - Analyzer Failure



WBEA
Hourly Averages

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





Maximum Value: 1.0 km/h on May 29 23:00		Maximum Daily Average: 0.4 km/h on May 30		Hours in Service: 744																									
Minimum Value: -1.1 km/h on May 27 21:00		Minimum Daily Average: -0.6 km/h on May 28		Hours of Data: 737																									
Maximum Diurnal Average: 0.0 km/h at hour 9		Minimum Diurnal Average: -0.2 km/h at hour 13		Hours of Missing Data: 7																									
Monthly Average: -0.07 km/h		Percentiles: $P_1 = -0.9$ $P_{10} = -0.5$ $Q_1 = -0.2$ Median = 0.0 $Q_3 = 0.1$ $P_{90} = 0.3$ $P_{99} = 0.8$		Hours of Calibration: 0																									
				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-May	0.1	0.1	0.1	0.4	0.2	-0.1	-0.2	-0.2	-0.4	-0.4	-0.4	-0.3	-0.2	-0.4	-0.5	0.0	-0.1	-0.1	-0.5	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.4	
2-May	-0.2	-0.1	-0.1	0.0	0.0	0.0	0.0	-0.1	-0.3	-0.4	-0.1	-0.5	-0.3	-0.1	-0.3	-0.2	-0.1	0.0	0.0	0.2	-0.2	-0.1	-0.2	0.0	-0.1	-0.1	0.2	0.2	
3-May	-0.1	-0.1	-0.1	-0.1	0.0	-0.3	-0.1	-0.1	-0.1	-0.3	-0.2	-0.2	-0.1	-0.1	-0.4	-0.5	-0.2	-0.2	-0.3	-0.1	-0.1	0.0	0.0	-0.1	-0.2	-0.2	0.0	0.0	
4-May	0.0	-0.1	-0.2	-0.2	0.0	0.0	-0.2	0.2	-0.1	0.1	0.0	0.2	0.1	0.1	0.0	-0.3	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	-0.2	-0.2	0.0	0.2	0.2	
5-May	0.0	-0.1	0.0	-0.1	-0.2	-0.1	-0.1	-0.2	-0.2	0.0	-0.1	-0.2	0.2	-0.4	-0.1	AF	AF	AF	AF	AF	AF	AF	AF	-0.1	-0.1	--	0.0	0.0	
6-May	-0.1	0.0	-0.2	-0.1	-0.3	-0.2	-0.3	-0.4	-0.5	-0.2	0.0	-0.3	-0.2	-0.5	-0.2	-0.1	-0.2	-0.1	-0.2	0.0	-0.1	0.1	0.0	-0.1	-0.2	-0.2	0.1	0.1	
7-May	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.1	0.1	-0.4	0.1	0.1	-0.2	0.1	-0.1	-0.3	-0.1	0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
8-May	0.1	0.1	0.1	0.0	-0.1	0.0	0.0	-0.2	0.3	0.1	0.0	0.0	0.2	0.0	0.0	-0.3	-0.2	-0.3	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
9-May	-0.1	-0.1	-0.1	-0.3	-0.3	0.0	0.2	0.2	-0.1	0.1	-0.3	0.0	0.0	-0.1	0.4	0.1	0.1	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.4	0.4
10-May	0.0	0.1	-0.1	-0.1	0.0	-0.1	0.0	0.3	0.2	0.2	0.1	-0.2	-0.2	0.0	0.1	0.0	0.0	-0.2	-0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.3	0.3
11-May	-0.1	-0.1	0.0	0.1	-0.2	-0.3	-0.2	-0.2	0.0	0.2	-0.4	-0.3	-0.1	0.0	0.0	0.0	-0.2	-0.2	0.0	0.0	0.1	0.0	0.0	-0.2	-0.1	-0.1	0.2	0.2	
12-May	-0.1	-0.2	0.0	0.0	-0.1	0.0	-0.1	0.0	0.1	-0.2	-0.3	-0.2	-0.2	0.1	-0.4	-0.2	0.1	0.0	-0.4	-0.2	-0.3	0.0	-0.2	-0.4	-0.1	-0.1	0.1	0.1	0.1
13-May	-0.4	-0.4	-0.3	-0.3	-0.2	0.1	-0.1	0.1	0.1	0.0	0.2	-0.2	-0.2	-0.4	-0.2	-0.1	-0.1	0.1	0.2	0.0	0.0	0.7	0.5	0.3	0.0	0.0	0.7	0.7	
14-May	-0.3	0.0	0.3	0.3	0.3	0.4	0.2	-0.1	0.1	-0.2	-0.2	0.0	-0.2	-0.2	-0.2	-0.2	-0.4	0.0	0.0	0.1	0.1	-0.1	-0.2	-0.2	0.0	0.4	0.4	0.4	
15-May	-0.1	-0.2	-0.4	0.0	0.2	0.0	0.0	0.3	0.3	0.1	0.2	-0.3	-0.4	-0.3	-0.4	-0.3	-0.3	-0.2	-0.5	-0.7	-0.6	-0.9	-0.8	-0.9	-0.3	-0.3	0.3	0.3	
16-May	-0.9	-0.8	-0.6	-0.8	-0.6	-0.8	-0.8	-0.6	-0.3	-0.6	-0.6	-0.4	-0.4	-0.4	-0.4	-0.1	-0.3	-0.5	-0.3	-0.4	-0.3	-0.2	-0.2	0.0	-0.5	0.0	0.0	0.0	
17-May	-0.1	-0.1	0.0	0.1	0.0	0.0	0.1	0.2	0.1	0.2	0.1	0.0	0.0	0.1	0.0	0.2	0.2	0.0	0.0	0.4	0.5	0.1	0.0	0.1	0.1	0.1	0.1	0.5	0.5
18-May	0.1	0.1	0.0	0.0	0.0	-0.2	-0.1	0.3	0.1	0.2	0.3	-0.2	-0.2	-0.4	-0.3	-0.1	-0.2	0.0	-0.2	-0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.3	0.3	
19-May	0.2	0.1	0.0	-0.1	0.2	0.2	0.1	0.2	0.4	0.1	0.2	-0.2	-0.4	0.2	0.4	0.3	0.1	0.3	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.4	0.4	
20-May	0.0	0.1	0.1	0.0	0.3	0.2	0.1	0.3	0.2	0.4	0.0	0.0	0.0	0.1	-0.2	0.0	0.2	0.3	0.1	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.4	0.4	
21-May	0.2	0.0	0.1	0.1	0.0	0.0	0.3	0.2	0.3	0.4	0.2	-0.1	0.0	-0.3	-0.2	-0.2	0.0	-0.1	-0.2	-0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.4	0.4	
22-May	0.0	0.1	0.1	0.1	0.1	0.0	0.3	0.1	0.0	0.3	-0.3	-0.6	-0.9	-0.6	-0.6	-0.9	-0.5	-0.8	-0.5	-0.7	-0.3	-0.2	-0.2	-0.3	-0.3	-0.3	0.3	0.3	
23-May	-0.2	-0.2	-0.2	-0.1	-0.2	-0.2	-0.2	-0.4	-0.4	-0.5	-0.5	-0.6	-0.4	-0.4	-0.3	0.2	-0.2	-0.1	0.1	0.1	0.1	0.1	0.1	-0.1	-0.2	0.2	0.2	0.2	
24-May	0.0	0.1	0.0	0.1	0.1	0.0	0.2	-0.1	0.6	0.4	0.5	0.3	0.1	0.3	0.1	0.2	-0.2	-0.1	-0.1	-0.1	0.1	0.0	-0.1	0.0	0.1	0.1	0.6	0.6	
25-May	0.0	0.0	0.1	0.2	0.1	0.2	0.2	0.3	0.2	0.4	0.5	-0.1	-0.2	-0.1	-0.2	0.0	0.0	-0.2	-0.4	-0.2	-0.3	-0.4	-0.5	-0.7	0.0	0.0	0.5	0.5	
26-May	-0.4	-0.7	-0.4	-0.2	-0.3	-0.3	-0.6	-0.3	-0.5	-0.7	-0.8	-0.7	-0.5	-0.5	-0.5	-0.3	-0.3	-0.3	-0.5	-0.5	-0.3	-0.1	-0.1	0.0	-0.4	0.0	0.0	0.0	
27-May	-0.1	0.0	0.0	0.1	0.0	-0.1	-0.1	-0.1	-0.1	0.2	0.4	0.1	0.1	-0.5	-0.3	-1.0	-1.0	-1.0	-0.9	-0.5	-0.5	-1.1	-0.6	-0.6	-0.5	-0.3	0.4	0.4	
28-May	-0.7	-1.1	-0.7	-0.6	-0.5	-0.6	-0.8	-1.0	-0.5	-0.6	-1.1	-0.7	-0.7	-0.3	-0.7	-0.3	-0.4	-0.5	-0.4	-0.6	-0.5	-0.4	-0.1	0.0	-0.6	0.0	0.0	0.0	
29-May	0.0	-0.1	0.1	0.0	-0.1	-0.1	0.2	0.3	0.4	0.1	0.4	0.2	0.3	0.0	-0.1	0.2	-0.1	-0.1	0.3	0.5	0.6	0.8	1.0	0.8	0.2	1.0	1.0	1.0	
30-May	0.8	0.2	0.6	0.1	0.1	-0.1	0.0	0.2	0.6	0.8	0.4	0.3	0.1	0.3	0.5	0.5	0.3	0.4	0.5	0.4	0.7	0.8	0.9	0.3	0.4	0.9	0.9	0.9	
31-May	0.0	0.0	0.2	-0.3	0.0	-0.1	-0.1	0.5	0.4	0.4	0.2	0.5	0.5	0.7	0.6	0.4	0.6	0.6	0.5	0.7	0.1	0.2	0.0	-0.3	0.3	0.7	0.7	0.7	
																								Diurnal Average					
																								Diurnal Maximum					
AF - Analyzer Failure																													



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 5.1 km/h on May 16 04:00			Hours of Data:	737
Minimum Value: 0.1 km/h on May 9 22:00			Hours of Missing Data:	7
			Hours of Calibration:	0
			Percent Operational Time:	99.1
Percentiles: P ₁ = 0.2 P ₁₀ = 0.4 Q ₁ = 1.0 Median = 1.7 Q ₃ = 2.2 P ₉₀ = 2.9 P ₉₉ = 4.4				

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-May	0.9	1.0	1.5	1.3	1.0	1.4	1.7	1.6	2.3	2.5	2.7	2.7	2.7	3.0	2.8	1.9	1.4	1.3	2.9	1.0	1.1	0.8	1.2	0.9	3.0
2-May	0.4	0.4	0.3	0.3	0.3	0.2	0.8	2.3	2.4	2.7	2.8	2.9	2.6	2.7	2.4	2.3	2.5	1.4	0.7	0.7	2.3	2.1	2.6	2.4	2.9
3-May	2.2	2.0	1.2	0.6	0.8	1.6	1.8	1.7	1.7	2.2	2.3	2.1	1.9	1.9	2.9	2.9	2.9	2.7	2.6	1.6	0.7	0.4	0.3	0.3	2.9
4-May	0.3	0.3	0.4	0.4	0.6	0.6	1.2	1.3	1.6	1.6	1.7	2.1	2.0	2.1	2.2	2.0	1.9	1.8	1.4	1.3	1.4	1.4	0.8	1.2	2.2
5-May	1.1	1.3	1.1	1.4	1.8	1.6	1.5	1.5	1.7	1.9	2.2	2.6	2.7	2.8	2.9	AF	AF	AF	AF	AF	AF	AF	1.8	2.0	2.9
6-May	1.9	1.5	1.9	1.7	2.0	1.9	1.8	2.2	2.4	2.2	2.3	2.7	3.1	3.1	3.3	2.8	2.7	2.0	1.9	1.0	0.4	0.3	0.2	0.4	3.3
7-May	0.2	0.1	0.2	0.2	0.2	0.8	1.3	1.6	1.7	1.4	1.8	2.1	2.2	2.4	2.4	2.4	1.9	1.9	1.6	1.3	0.8	0.7	1.0	0.7	2.4
8-May	0.3	0.3	0.2	0.7	0.8	0.4	1.0	1.7	2.0	1.8	2.0	2.1	1.8	1.5	1.4	2.5	2.4	2.9	2.2	1.6	1.6	1.3	0.5	0.5	2.9
9-May	1.0	0.7	0.7	0.6	0.7	0.5	0.8	1.0	1.2	1.6	1.6	1.4	1.8	1.5	1.9	1.9	1.7	1.4	0.8	0.3	0.4	0.1	0.1	0.2	1.9
10-May	0.3	0.3	0.5	0.4	0.2	0.4	0.7	1.1	1.5	1.3	1.4	1.8	2.2	2.0	1.8	1.9	1.8	1.4	1.0	0.3	0.2	0.3	0.3	0.7	2.2
11-May	0.9	1.4	1.7	1.7	1.3	1.3	1.9	1.8	1.5	1.6	1.7	1.9	1.9	1.8	1.8	1.6	1.6	1.3	1.1	0.4	0.2	0.3	0.7	1.0	1.9
12-May	1.0	0.8	0.3	0.1	0.1	0.2	0.6	1.3	1.4	1.6	1.4	1.7	2.0	2.0	2.5	2.3	2.2	2.0	2.1	1.6	3.1	2.9	3.4	3.3	3.4
13-May	3.1	3.4	2.6	2.3	1.6	1.4	2.2	2.7	2.9	2.8	2.2	2.1	2.1	2.5	2.0	1.9	1.8	1.5	1.6	1.4	1.1	1.3	1.7	1.8	3.4
14-May	1.5	1.1	1.5	1.5	1.5	1.6	2.3	2.2	1.8	2.2	2.8	2.3	2.3	2.1	1.9	1.7	1.8	1.7	1.3	1.1	1.0	1.3	1.7	1.7	2.8
15-May	0.9	1.0	1.5	1.4	1.2	1.4	2.1	1.7	1.3	1.7	1.9	2.4	2.5	2.3	2.3	2.4	2.2	2.3	3.1	4.5	4.0	4.8	4.8	4.7	4.8
16-May	4.2	3.9	3.5	5.1	4.4	3.6	3.9	4.0	3.8	3.7	4.1	4.1	4.0	3.9	3.9	3.5	3.2	2.9	2.7	2.3	1.6	1.1	0.5	0.5	5.1
17-May	0.4	0.3	0.2	0.2	0.2	0.8	2.2	2.0	2.3	1.8	2.1	2.3	2.0	2.1	2.2	2.0	2.0	2.0	1.8	1.4	1.3	1.5	1.9	2.0	2.3
18-May	1.7	1.6	1.7	1.4	1.0	1.6	1.9	1.7	1.8	1.6	2.2	2.0	2.3	2.3	2.3	2.1	1.9	1.7	1.3	0.6	0.2	0.3	0.4	0.6	2.3
19-May	0.8	0.8	0.4	0.7	1.2	1.4	1.5	1.9	1.8	1.8	2.2	2.1	2.2	1.9	1.5	1.3	1.5	1.1	0.8	0.5	0.5	0.4	0.3	0.4	2.2
20-May	0.5	0.5	0.4	0.5	1.4	1.6	1.5	1.9	1.9	1.8	1.7	1.8	2.1	1.9	1.9	1.7	1.5	1.5	1.0	0.8	0.4	0.3	0.4	0.3	2.1
21-May	0.3	0.5	0.7	0.5	0.4	0.7	1.2	1.8	1.9	1.8	1.6	1.7	2.0	2.2	2.3	2.1	1.7	1.5	1.1	0.3	0.2	0.2	0.4	0.6	2.3
22-May	0.4	0.3	0.9	1.2	0.7	0.6	0.9	1.0	1.0	1.4	2.1	2.8	2.8	3.1	3.3	3.3	3.2	3.6	3.6	2.6	1.6	1.6	1.2	0.5	3.6
23-May	0.4	0.7	0.9	0.7	0.5	0.7	1.1	1.3	1.6	1.9	2.1	2.2	2.1	2.1	1.9	1.9	1.6	1.4	0.8	0.3	0.2	0.2	0.3	0.5	2.2
24-May	0.2	0.2	0.2	0.1	0.3	0.9	1.5	1.2	1.5	1.4	1.7	1.7	1.8	1.9	1.8	1.5	1.4	1.0	0.7	0.4	0.3	0.3	0.4	0.3	1.9
25-May	0.3	0.4	0.2	1.0	0.7	1.3	1.2	1.4	1.5	1.5	1.4	1.8	2.1	2.0	1.1	1.1	1.6	3.1	1.8	0.7	1.4	2.9	3.0	2.9	3.1
26-May	2.3	2.5	1.8	1.5	1.0	2.0	2.0	2.0	2.4	3.3	3.0	2.9	2.4	2.3	2.4	1.9	1.9	1.6	1.8	1.7	1.1	0.7	0.6	0.7	3.3
27-May	0.6	0.7	0.7	0.8	0.5	0.5	1.1	1.1	1.3	1.3	1.2	1.5	1.4	2.3	4.3	4.0	4.2	4.1	2.7	1.9	4.4	3.8	3.5	3.4	4.4
28-May	4.1	3.7	3.2	2.8	2.4	2.5	3.4	3.7	3.5	3.2	3.2	3.4	3.1	2.8	2.6	2.5	2.5	2.5	2.1	2.2	1.6	1.0	0.9	0.9	4.1
29-May	1.9	2.0	1.5	0.8	0.8	1.1	1.9	1.9	2.1	1.7	1.8	1.9	2.0	1.8	1.7	1.7	1.5	1.4	1.2	1.1	1.4	1.9	2.4	2.5	2.5
30-May	2.8	2.3	1.8	1.4	0.7	1.6	1.8	2.0	1.7	1.8	1.9	2.4	2.2	2.7	2.3	2.3	1.9	1.7	1.6	2.1	1.9	1.9	1.7	1.9	2.8
31-May	2.1	1.9	1.8	2.0	2.2	3.1	3.5	3.1	3.0	2.2	1.6	1.2	1.6	1.6	1.9	2.2	1.8	1.7	1.4	1.8	2.1	1.0	0.7	1.3	3.5
4.2 3.9 3.5 5.1 4.4 3.6 3.9 4.0 3.8 3.7 4.1 4.1 4.0 3.9 4.3 4.0 4.2 4.1 3.6 4.5 4.4 4.8 4.8 4.7																									
Diurnal Maximum																									

AF - Analyzer Failure



Maximum Value: 1.7 km/h on May 30 01:00		Maximum Daily Average: 0.8 km/h on May 30		Hours in Service: 744																							
Minimum Value: -1.3 km/h on May 27 15:00		Minimum Daily Average: -0.5 km/h on May 28		Hours of Data: 737																							
Maximum Diurnal Average: 0.3 km/h at hour 8		Minimum Diurnal Average: -0.2 km/h at hour 13		Hours of Missing Data: 7																							
Monthly Average: 0.08 km/h		Percentiles: P ₁ = -1.1 P ₁₀ = -0.6 Q ₁ = -0.2 Median = 0.1 Q ₃ = 0.4 P ₉₀ = 0.7 P ₉₉ = 1.2		Hours of Calibration: 0																							
				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-May	0.1	0.5	1.1	1.1	0.9	0.4	0.6	0.3	-0.6	-0.3	-0.7	-0.4	-0.5	-0.7	-0.7	-0.3	-0.2	-0.1	-1.2	-0.2	-0.1	-0.4	-0.4	-0.2	-0.1	1.1	
2-May	-0.3	-0.3	-0.2	0.0	0.1	0.1	-0.1	-0.2	-0.4	-0.6	-0.4	-0.8	-0.4	0.2	-0.5	-0.4	-0.3	0.0	0.1	0.2	-0.6	-0.1	-0.1	0.0	-0.2	0.2	
3-May	0.0	0.0	0.0	-0.1	-0.2	-0.3	0.1	-0.2	0.1	-0.7	-0.5	-0.6	-0.3	-0.3	-0.6	-0.4	0.1	-0.3	-0.2	0.0	0.2	0.1	-0.1	-0.1	-0.2	0.2	
4-May	-0.1	-0.1	-0.3	-0.2	-0.1	0.1	0.2	0.5	0.0	0.1	0.2	0.2	0.2	0.3	0.1	-0.2	-0.1	0.1	0.1	0.1	0.2	0.2	-0.1	-0.3	0.0	0.5	
5-May	-0.3	-0.4	-0.1	-0.1	-0.5	-0.2	-0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	-0.2	AF	AF	AF	AF	AF	AF	AF	AF	0.0	-0.3	--	0.1
6-May	-0.3	-0.1	-0.3	0.1	-0.3	-0.1	-0.4	-0.3	-0.7	-0.1	0.1	-0.2	-0.2	-0.2	0.0	0.3	0.2	0.3	0.1	0.1	-0.1	0.1	0.0	-0.1	-0.1	0.3	0.3
7-May	0.0	0.1	0.0	0.1	0.1	0.3	0.4	0.3	0.4	0.1	-0.3	0.2	0.1	0.2	-0.1	0.0	0.2	0.5	0.3	0.4	0.1	0.3	0.2	0.2	0.2	0.2	0.5
8-May	0.2	0.1	0.2	0.4	0.3	0.2	0.1	0.2	0.7	0.4	0.4	0.4	0.4	-0.1	0.2	-0.6	-0.3	0.2	0.2	0.3	0.3	0.2	0.1	0.0	0.2	0.2	0.7
9-May	-0.3	-0.1	-0.2	-0.4	-0.5	0.0	0.2	0.4	-0.1	-0.1	-0.4	0.0	-0.2	-0.4	0.6	0.5	0.6	0.8	0.3	0.1	0.4	0.1	0.1	0.1	0.1	0.1	0.8
10-May	0.1	0.1	-0.1	-0.3	0.0	-0.1	0.1	0.6	0.4	0.3	0.2	-0.1	-0.1	0.3	0.3	0.3	0.4	0.1	0.3	0.1	0.1	0.1	0.4	0.6	0.2	0.6	
11-May	0.3	0.1	0.7	1.3	0.2	0.1	0.7	0.4	0.2	0.3	-0.6	-0.5	-0.2	0.2	-0.2	-0.1	-0.2	-0.3	0.2	0.1	0.0	0.0	0.1	0.0	0.1	1.3	
12-May	0.1	-0.2	-0.1	-0.1	-0.2	-0.1	0.1	0.2	0.3	-0.2	-0.4	0.1	0.2	0.3	0.3	0.4	0.5	0.7	0.4	0.4	0.8	1.0	1.0	0.9	0.3	1.0	
13-May	1.0	1.0	0.6	0.5	0.4	0.6	0.7	0.8	0.8	0.7	0.1	-0.3	-0.3	-0.2	-0.3	0.1	-0.3	0.3	0.4	-0.1	0.1	0.9	1.1	1.1	0.4	1.1	
14-May	0.0	0.5	1.1	0.8	0.9	1.1	1.2	0.8	0.6	-0.3	-0.7	0.1	-0.2	-0.1	-0.1	0.0	-0.4	0.1	0.1	-0.1	-0.1	0.0	-0.2	-0.1	0.2	1.2	
15-May	-0.1	0.1	0.0	0.6	0.8	0.4	0.7	0.6	0.4	0.5	0.2	-0.5	-0.3	-0.5	-0.4	-0.3	-0.3	-0.4	-0.3	-1.1	-0.9	-1.0	-1.2	-1.1	-0.2	0.8	
16-May	-0.7	-0.8	-0.6	-1.2	-0.7	-0.6	-0.4	-0.3	-0.4	-0.8	-0.6	-0.5	-0.3	-0.4	-0.3	-0.1	-0.2	-0.5	-0.2	-0.2	-0.1	0.0	-0.2	0.0	-0.4	0.0	
17-May	-0.1	-0.2	0.0	0.0	0.0	0.1	0.4	0.4	0.5	0.3	0.4	0.3	0.3	0.5	0.2	0.5	0.5	0.5	0.5	0.6	0.8	0.7	0.8	0.8	0.4	0.8	
18-May	0.6	0.5	0.4	0.3	0.2	0.2	0.4	0.7	0.3	0.5	0.6	-0.1	-0.5	-0.6	-0.5	-0.3	-0.2	-0.2	-0.2	-0.2	0.0	0.1	0.0	0.2	0.1	0.7	
19-May	1.1	0.7	0.5	0.5	1.4	1.2	0.7	0.6	0.8	0.2	0.0	-0.3	-0.8	0.4	0.6	0.3	0.0	0.5	0.2	0.4	0.2	0.0	0.2	0.8	0.4	1.4	
20-May	0.7	0.6	0.4	0.5	1.4	1.1	0.6	0.7	0.7	0.7	0.2	0.0	0.1	0.3	0.0	0.1	0.3	0.4	0.2	0.1	0.0	0.0	0.3	0.5	0.4	1.4	
21-May	0.6	0.5	0.5	0.6	0.3	0.2	0.4	0.6	0.7	0.6	0.5	0.2	-0.1	-0.4	-0.4	-0.2	0.0	-0.1	-0.3	-0.1	0.1	0.1	0.7	0.4	0.2	0.7	
22-May	-0.1	0.0	0.8	1.2	0.6	0.2	0.4	0.1	-0.1	0.3	-0.2	-0.6	-0.9	-0.7	-0.7	-0.8	-0.6	-0.6	-0.6	-0.4	-0.1	-0.1	-0.1	-0.5	-0.1	1.2	
23-May	-0.3	-0.4	-0.3	-0.3	-0.2	-0.1	-0.1	-0.4	-0.6	-0.4	-0.6	-0.9	-0.5	-0.4	-0.3	0.2	-0.2	-0.1	0.2	0.1	0.1	0.0	0.0	-0.2	-0.2	0.2	
24-May	0.0	0.1	0.0	0.0	0.3	0.4	0.7	0.1	0.8	0.7	0.7	0.4	0.5	0.4	0.4	0.2	-0.1	-0.1	0.2	0.3	0.0	-0.1	-0.1	0.3	0.8		
25-May	0.1	0.0	0.2	1.1	0.5	0.8	0.6	0.7	0.4	0.7	0.9	-0.3	-0.3	0.1	-0.1	0.3	0.1	-0.6	-0.6	-0.4	-0.4	-0.8	-0.9	-0.9	0.0	1.1	
26-May	-0.7	-1.0	-0.4	-0.3	-0.2	-0.5	-0.8	-0.6	-0.7	-0.6	-0.8	-1.0	-0.7	-0.8	-0.5	-0.3	-0.1	-0.1	-0.2	-0.3	-0.2	0.1	0.0	0.2	-0.4	0.2	
27-May	0.1	0.0	0.1	0.2	0.2	-0.1	0.1	0.1	0.1	0.6	0.1	0.2	-0.7	-0.7	-1.3	-1.1	-1.2	-1.0	-0.6	-0.5	-0.7	-0.7	-0.3	-0.6	-0.3	0.6	
28-May	-0.7	-1.0	-0.7	-0.6	-0.5	-0.5	-0.7	-1.0	-0.6	-0.9	-1.2	-1.0	-1.1	-0.2	-0.3	-0.4	-0.2	-0.3	-0.2	-0.5	-0.3	0.0	0.2	0.1	-0.5	0.2	
29-May	0.5	0.3	0.4	0.0	0.0	0.2	0.6	0.5	0.6	0.4	0.4	0.5	0.7	0.0	-0.3	0.3	0.1	0.0	0.4	0.4	0.3	1.3	1.5	1.4	0.4	1.5	
30-May	1.7	0.7	1.3	0.4	0.3	0.4	0.5	0.7	0.9	1.1	0.6	0.5	0.3	0.8	0.7	1.1	0.6	0.5	0.7	0.9	1.0	1.1	1.0	1.0	0.8	1.7	
31-May	0.6	0.7	0.7	0.6	0.5	0.8	0.8	1.1	1.0	0.6	0.2	0.4	0.2	0.5	0.6	0.7	0.7	0.8	0.3	0.7	0.3	0.4	0.1	-0.5	0.5	1.1	
																								Diurnal Average			
																								Diurnal Maximum			
AF - Analyzer Failure																											



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Vertical Wind Speed 45 m (VW45m) - km/h
Lower Camp Met Tower - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.2 km/h on May 16 04:00 Minimum Value: 0.2 km/h on May 24 04:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 1.1 Median = 1.8 Q ₃ = 2.3 P ₉₀ = 2.9 P ₉₉ = 4.3																								Hours in Service: 744 Hours of Data: 737 Hours of Missing Data: 7 Hours of Calibration: 0 Percent Operational Time: 99.1	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	1.1	1.2	1.4	1.3	1.3	1.3	1.5	1.7	2.4	2.8	2.7	2.7	2.9	2.8	3.1	2.3	1.6	1.6	2.9	0.8	0.9	1.0	1.5	1.1	3.1
2-May	0.4	0.4	0.3	0.4	0.3	0.3	1.0	2.3	2.4	2.7	2.8	3.1	2.9	2.9	2.6	2.5	2.7	1.6	1.0	0.8	2.5	2.3	2.7	2.7	3.1
3-May	2.1	2.1	1.4	0.8	0.9	1.7	2.0	1.9	1.7	2.4	2.6	2.3	2.1	2.1	2.8	2.9	3.0	2.7	2.5	1.5	0.8	0.5	0.4	0.4	3.0
4-May	0.4	0.4	0.4	0.5	0.8	0.7	1.2	1.5	1.7	1.8	2.1	2.3	2.4	2.5	2.5	2.3	2.2	2.0	1.5	1.3	1.4	1.6	1.0	1.3	2.5
5-May	1.3	1.4	1.3	1.6	1.7	1.7	1.7	1.6	1.8	1.9	2.1	2.5	2.8	2.9	3.0	AF	AF	AF	AF	AF	AF	AF	2.0	2.1	3.0
6-May	2.0	1.8	2.0	1.9	2.1	2.0	1.9	2.4	2.4	2.3	2.4	2.6	2.9	3.0	3.1	2.9	2.6	2.1	1.8	1.1	0.5	0.4	0.2	0.4	3.1
7-May	0.2	0.2	0.2	0.3	0.5	0.8	1.2	1.5	1.8	1.6	2.1	2.2	2.4	2.4	2.5	2.4	2.0	2.0	1.7	1.2	0.9	0.9	1.0	0.8	2.5
8-May	0.5	0.5	0.4	0.6	0.6	0.4	1.0	1.5	1.9	1.9	2.2	2.2	2.2	1.8	1.7	2.7	2.4	2.7	2.4	1.8	1.7	1.4	0.6	0.6	2.7
9-May	1.2	0.9	0.9	0.7	0.7	0.6	0.9	1.1	1.3	1.8	1.9	1.5	2.1	1.7	2.1	1.9	1.8	1.7	1.0	0.4	0.5	0.2	0.3	0.3	2.1
10-May	0.4	0.4	0.8	0.6	0.3	0.5	0.7	1.1	1.6	1.4	1.5	2.0	2.5	2.2	2.1	2.1	1.9	1.5	1.0	0.3	0.3	0.5	0.6	1.1	2.5
11-May	1.1	1.5	1.7	1.4	1.4	1.2	1.5	1.5	1.6	1.8	1.8	2.1	2.2	2.1	2.0	1.9	1.7	1.4	1.1	0.4	0.2	0.3	0.8	1.3	2.2
12-May	1.2	1.0	0.4	0.2	0.2	0.3	0.6	1.2	1.5	1.6	1.6	1.7	2.0	2.2	2.5	2.2	2.3	1.9	1.9	1.6	2.9	2.8	3.1	2.8	3.1
13-May	2.9	3.0	2.7	2.2	1.6	1.4	2.1	2.6	2.8	2.6	2.4	2.3	2.4	2.8	2.4	2.2	2.0	1.8	1.9	1.9	1.6	1.2	1.7	1.9	3.0
14-May	1.6	1.0	1.3	1.6	1.4	1.5	2.0	1.9	1.8	2.4	2.9	2.7	2.3	2.5	2.3	2.2	2.0	2.1	1.7	1.4	1.2	1.6	2.1	2.1	2.9
15-May	1.1	1.3	1.8	1.2	1.2	1.7	2.0	1.8	1.4	1.9	2.1	2.5	2.4	2.4	2.6	2.3	2.1	2.2	3.1	4.8	4.3	5.2	4.8	4.8	5.2
16-May	4.4	4.1	3.7	5.2	4.5	3.9	3.9	4.0	4.1	4.0	4.1	4.0	4.0	4.0	4.0	3.7	3.4	2.9	2.7	2.3	1.7	1.3	0.7	0.8	5.2
17-May	0.5	0.4	0.2	0.2	0.4	1.0	2.2	2.4	2.5	2.1	2.5	2.5	2.3	2.4	2.3	2.2	1.9	1.9	1.7	1.5	1.5	1.6	2.1	2.2	2.5
18-May	2.1	2.0	1.9	1.6	1.1	1.3	1.7	1.7	1.8	1.9	2.3	2.4	2.5	2.5	2.6	2.2	2.1	2.0	1.5	0.7	0.2	0.4	0.6	0.9	2.6
19-May	0.9	0.9	0.5	0.9	1.1	1.2	1.4	1.7	1.6	1.8	2.4	2.4	2.5	2.2	1.8	1.5	1.8	1.3	0.8	0.7	0.8	0.7	0.5	0.6	2.5
20-May	0.5	0.5	0.5	0.7	1.3	1.3	1.3	1.7	1.7	1.7	1.9	2.0	2.3	2.1	2.1	1.9	1.6	1.7	1.1	1.0	0.5	0.5	0.6	0.6	2.3
21-May	0.4	0.6	0.8	0.5	0.6	0.7	1.2	1.7	2.0	1.8	1.8	2.0	2.4	2.5	2.5	2.2	2.0	1.7	1.3	0.3	0.3	0.3	0.5	0.6	2.5
22-May	0.5	0.3	1.0	1.2	0.8	0.8	1.0	1.1	1.1	1.6	2.2	3.0	3.0	3.2	3.6	3.1	3.3	3.5	3.6	2.6	1.6	1.7	1.3	0.7	3.6
23-May	0.5	0.8	1.0	0.7	0.6	0.8	1.2	1.4	1.6	2.0	2.1	2.4	2.4	2.2	2.3	2.1	1.8	1.6	1.0	0.4	0.2	0.3	0.4	0.5	2.4
24-May	0.3	0.2	0.2	0.2	0.4	0.9	1.5	1.3	1.5	1.6	1.8	2.0	2.2	2.0	2.2	1.5	1.8	1.2	0.8	0.4	0.5	0.4	0.5	0.4	2.2
25-May	0.3	0.3	0.4	0.9	0.8	1.0	1.1	1.3	1.4	1.3	1.3	1.8	2.4	2.2	1.1	1.0	1.8	3.5	1.8	0.8	1.8	3.1	3.1	3.1	3.5
26-May	2.4	2.6	2.2	1.8	1.2	2.3	2.0	2.1	2.5	3.2	3.2	3.0	2.7	2.5	2.6	2.1	2.1	1.8	1.9	1.7	1.0	0.9	0.8	1.0	3.2
27-May	0.8	1.0	0.9	1.0	0.7	0.6	1.2	1.3	1.4	1.4	1.4	1.7	1.4	2.5	4.4	4.2	4.1	4.2	2.8	2.0	4.7	3.9	3.6	3.7	4.7
28-May	4.4	3.8	3.4	3.0	2.6	2.7	3.5	3.6	3.6	3.5	3.3	3.6	3.3	3.1	2.8	2.6	2.7	2.7	2.3	2.2	1.5	1.1	1.1	1.1	4.4
29-May	1.8	2.0	1.9	1.1	0.8	1.4	2.1	2.0	2.1	1.9	2.1	2.2	2.2	2.1	1.9	1.9	1.9	1.6	1.4	1.3	1.5	2.1	2.7	2.7	2.7
30-May	3.1	2.6	2.0	1.5	0.9	1.8	1.5	2.0	1.8	2.0	2.0	2.5	2.3	2.7	2.4	2.5	2.2	2.0	1.8	2.2	2.2	2.3	1.8	2.0	3.1
31-May	2.1	2.0	1.8	2.2	2.2	2.9	3.4	3.1	3.1	2.3	1.7	1.5	1.9	1.9	2.2	2.3	2.0	1.8	1.6	2.1	2.2	1.2	0.9	1.3	3.4
4.4 4.1 3.7 5.2 4.5 3.9 3.9 4.0 4.1 4.0 4.1 4.0 4.0 4.0 4.4 4.2 4.1 4.2 3.6 4.8 4.7 5.2 4.8 4.8																								Diurnal Maximum	
AF - Analyzer Failure																									



Maximum Value: 2.8 km/h on May 30 01:00		Maximum Daily Average: 1.1 km/h on May 30		Hours in Service: 744																						
Minimum Value: -1.0 km/h on May 28 11:00		Minimum Daily Average: -0.1 km/h on May 26		Hours of Data: 736																						
Maximum Diurnal Average: 0.6 km/h at hour 1		Minimum Diurnal Average: -0.1 km/h at hour 13		Hours of Missing Data: 8																						
Monthly Average: 0.28 km/h		Percentiles: P ₁ = -0.8 P ₁₀ = -0.3 Q ₁ = 0.0 Median = 0.2 Q ₃ = 0.5 P ₉₀ = 0.9 P ₉₉ = 2.2		Hours of Calibration: 0																						
				Percent Operational Time: 98.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	1.6	0.3	0.0	-0.1	-0.1	0.1	-0.2	-0.1	0.3	0.1	-0.2	-0.2	-0.3	-0.4	-0.3	0.0	0.1	-0.6	-0.9	0.3	0.4	-0.5	0.6	-0.1	0.0	1.6
2-May	-0.2	-0.3	-0.1	-0.2	0.0	0.0	-0.2	-0.3	0.0	-0.4	-0.4	-0.3	0.1	0.4	-0.5	-0.1	-0.1	-0.1	0.2	0.4	-0.6	0.8	0.3	0.5	0.0	0.8
3-May	0.0	0.6	0.5	0.1	0.0	0.1	-0.3	0.0	0.5	-0.7	-0.2	-0.6	-0.2	-0.3	-0.3	-0.4	0.6	0.2	0.5	0.0	0.4	0.8	0.1	-0.2	0.0	0.8
4-May	-0.1	-0.3	-0.3	-0.1	0.0	0.2	0.5	0.3	0.3	-0.1	0.4	0.4	-0.2	0.2	0.4	-0.1	-0.4	0.4	0.2	0.1	0.3	0.7	0.0	0.0	0.1	0.7
5-May	0.1	-0.3	0.5	0.5	-0.1	0.1	0.1	0.3	0.4	0.2	0.7	0.6	0.3	0.1	AF	AF	AF	AF	AF	AF	AF	AF	0.1	0.2	--	0.7
6-May	0.4	0.4	0.5	0.5	0.3	0.6	0.0	0.0	-0.3	0.7	0.9	0.5	0.0	-0.1	-0.3	0.1	0.1	0.4	0.0	0.1	0.0	0.1	0.3	0.1	0.2	0.9
7-May	0.2	0.1	0.1	0.6	0.2	0.5	0.5	0.5	0.6	0.1	-0.6	0.5	-0.2	0.4	0.2	0.0	0.1	0.6	0.9	0.0	0.9	0.7	0.4	0.7	0.3	0.9
8-May	0.4	0.1	0.3	0.4	0.3	0.3	0.2	0.4	0.4	0.2	0.2	0.6	0.7	-0.2	0.8	-0.4	-0.1	0.2	0.2	0.3	0.2	0.4	0.1	0.3	0.3	0.8
9-May	-0.1	0.2	0.2	0.1	-0.3	0.0	0.6	0.6	0.2	-0.2	-0.7	0.5	0.1	-0.5	0.9	0.1	1.1	0.9	0.7	0.0	0.4	0.3	0.4	0.3	0.2	1.1
10-May	0.8	0.9	0.5	0.3	0.1	0.1	0.1	0.9	0.3	1.6	1.3	-0.3	0.0	0.7	0.4	0.2	0.4	0.1	0.2	0.1	0.4	0.3	0.7	1.3	0.5	1.6
11-May	1.5	0.1	1.1	1.3	1.1	-0.3	0.4	0.2	0.1	0.3	-0.5	-0.8	-0.4	0.7	-0.7	0.0	0.1	-0.3	1.0	0.3	0.1	0.1	0.3	0.9	0.3	1.5
12-May	0.4	0.5	0.1	0.1	0.1	0.1	0.0	0.5	0.1	-0.2	-0.3	0.0	-0.1	0.1	0.3	0.5	0.4	0.6	-0.1	0.9	1.2	1.4	1.7	1.7	0.4	1.7
13-May	1.7	2.2	1.8	1.6	0.8	0.7	1.3	1.9	0.8	0.9	0.2	-0.3	0.5	0.1	-0.4	0.2	-0.1	0.3	0.4	0.1	0.4	0.3	0.3	2.0	0.7	2.2
14-May	0.2	0.0	0.5	0.9	0.4	0.7	0.0	-0.3	0.3	0.2	-0.5	0.7	0.5	-0.1	0.4	0.5	0.0	0.6	0.4	0.0	0.4	1.2	1.6	1.6	0.4	1.6
15-May	1.7	0.9	0.2	0.0	0.5	1.0	1.5	0.3	0.5	0.6	0.0	-0.4	-0.2	-0.2	0.2	0.6	0.0	0.1	-0.3	-0.2	0.1	0.1	0.4	0.1	0.3	1.7
16-May	0.2	-0.1	-0.4	0.8	0.4	0.7	-0.1	0.4	0.3	0.0	0.4	-0.4	-0.2	0.4	-0.2	-0.3	0.7	-0.1	0.3	-0.1	0.2	0.7	0.1	0.1	0.2	0.8
17-May	0.2	0.1	-0.2	-0.1	0.2	0.6	1.7	1.0	0.6	1.0	1.1	0.6	0.5	0.8	0.2	0.2	0.3	0.5	0.7	0.5	0.7	0.6	2.2	2.1	0.7	2.2
18-May	2.4	1.6	0.5	1.1	0.7	-0.1	0.2	0.1	0.4	0.5	0.3	0.3	-0.3	-0.6	-0.4	-0.5	0.0	-0.3	-0.3	0.0	0.1	-0.1	-0.5	-0.4	0.2	2.4
19-May	0.0	0.0	0.3	-0.1	0.0	0.0	0.2	0.4	0.1	0.0	-0.4	0.2	-1.0	1.1	1.2	0.3	-0.6	0.4	-0.3	0.1	0.6	0.4	0.4	0.0	0.1	1.2
20-May	0.0	0.0	0.2	0.1	0.3	0.0	0.3	0.4	0.5	0.5	-0.1	0.0	-0.4	1.4	-0.3	0.2	0.1	0.7	0.8	0.2	0.5	0.1	0.3	0.1	0.3	1.4
21-May	0.1	1.1	1.3	0.6	0.9	0.5	0.4	0.5	0.5	0.2	0.1	1.0	0.0	-0.5	0.5	-0.2	-0.2	0.2	-0.1	-0.3	0.1	0.1	0.0	0.1	0.3	1.3
22-May	0.3	-0.1	-0.2	-0.2	0.5	0.8	0.3	0.1	-0.1	0.2	0.4	-0.1	-0.8	-0.6	-0.5	-0.3	0.1	-0.1	0.1	0.1	0.0	0.2	0.5	0.4	0.0	0.8
23-May	-0.1	-0.2	-0.3	0.0	-0.2	0.2	0.2	-0.3	-0.4	0.2	-0.9	-0.8	-0.6	-0.2	0.4	0.5	0.1	-0.3	0.5	0.1	0.2	0.1	0.0	0.0	-0.1	0.5
24-May	0.0	0.2	0.1	0.1	0.2	0.0	0.5	0.4	0.1	0.4	0.2	0.6	-0.5	0.5	0.7	1.0	0.9	-0.3	-0.3	0.1	0.4	0.0	0.1	0.0	0.2	1.0
25-May	0.1	0.1	0.2	0.1	0.2	0.0	0.2	0.0	0.3	0.3	0.4	-0.2	-0.2	0.0	-0.1	0.1	0.1	-0.7	-0.5	-0.2	0.0	-0.2	0.2	-0.3	0.0	0.4
26-May	-0.1	-0.5	-0.2	0.2	0.2	0.2	-0.4	-0.1	-0.2	-0.3	-0.2	-0.9	0.5	-0.9	-0.8	-0.5	-0.3	0.5	0.4	0.1	-0.1	0.4	0.4	0.7	-0.1	0.7
27-May	0.6	2.3	1.1	0.6	0.4	0.3	0.1	0.0	0.2	0.2	0.3	-0.1	0.0	-0.8	-0.2	0.5	0.2	0.0	0.3	0.1	-0.2	0.2	0.2	0.2	0.3	2.3
28-May	0.1	-0.2	0.0	-0.4	0.2	0.3	-0.2	-0.6	0.0	-0.8	-1.0	-0.4	-0.8	0.4	0.0	-0.2	0.3	0.2	0.9	0.0	0.1	0.6	0.7	0.2	0.0	0.9
29-May	1.2	1.0	1.8	0.4	-0.2	1.0	1.0	1.5	0.8	1.0	-0.2	0.3	0.7	0.0	-1.0	0.6	0.5	-0.1	0.2	-0.3	-0.1	1.9	2.0	1.4	0.6	2.0
30-May	2.8	2.1	2.2	0.4	0.6	0.9	0.8	0.8	0.4	0.4	0.3	0.5	0.8	1.7	1.3	1.7	0.9	0.0	0.4	2.6	2.2	0.5	0.3	1.1	1.1	2.8
31-May	1.7	1.1	1.1	2.4	1.9	1.7	1.8	2.4	1.4	0.7	0.1	0.2	-0.4	-0.4	0.2	0.4	0.2	0.5	0.0	0.1	0.5	-0.2	0.1	0.2	0.7	2.4
																								Diurnal Average		
																								Diurnal Maximum		
																								0.6 2.8		
																								0.4 2.3		
																								0.4 2.2		
																								0.4 2.4		
																								0.3 1.9		
																								0.4 1.7		
																								0.4 1.8		
																								0.4 2.4		
																								0.3 1.4		
																								0.3 1.6		
																								0.0 1.3		
																								0.1 1.0		
																								-0.1 0.8		
																								0.1 1.7		
																								0.1 1.3		
																								0.1 1.7		
																								0.2 1.1		
																								0.2 0.9		
																								0.2 1.0		
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																								0.2 2.2		
																								0.3 1.9		
																								0.4 2.2		
																								0.5 2.1		

AF - Analyzer Failure



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 4.7 km/h on May 16 04:00	Hours of Data: 736
Minimum Value: 0.2 km/h on May 11 21:00	Hours of Missing Data: 8
Percentiles: P ₁ = 0.3 P ₁₀ = 0.6 Q ₁ = 1.1 Median = 1.8 Q ₃ = 2.7 P ₉₀ = 3.2 P ₉₉ = 4.2	Hours of Calibration: 0
	Percent Operational Time: 98.9

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	1.8	1.4	1.5	1.5	1.9	1.8	1.5	1.7	2.7	2.9	3.0	3.0	3.1	3.1	3.1	2.9	1.5	2.5	3.2	0.7	0.6	1.4	1.5	1.7	3.2
2-May	0.5	0.5	0.6	0.8	0.4	0.4	1.3	2.0	2.7	2.8	3.1	3.3	3.1	3.1	2.5	2.9	3.4	2.0	1.1	1.0	2.8	2.0	2.4	2.6	3.4
3-May	2.2	2.3	1.7	1.2	1.1	1.8	1.6	2.4	2.1	3.1	3.1	3.3	2.5	2.1	2.7	3.1	3.4	3.1	3.1	1.3	0.3	0.4	0.8	0.9	3.4
4-May	0.8	0.4	0.5	0.7	1.0	1.0	1.1	1.7	2.2	2.0	2.4	3.1	2.8	2.7	3.2	2.6	2.8	2.4	1.9	1.1	0.9	1.9	1.7	1.7	3.2
5-May	1.1	1.0	1.0	0.7	0.6	0.9	1.6	1.9	1.8	1.7	2.4	2.6	2.9	3.3	AF	AF	AF	AF	AF	AF	AF	AF	2.6	2.0	3.3
6-May	1.8	1.7	1.7	2.1	1.7	1.8	2.2	1.8	2.2	2.4	2.6	3.3	3.3	3.3	3.6	3.4	3.2	2.2	1.7	1.4	0.7	0.6	0.5	0.4	3.6
7-May	0.4	0.2	0.2	0.5	0.6	0.8	1.2	1.4	1.7	1.7	2.4	2.5	2.9	3.2	2.7	3.0	2.9	2.9	2.6	0.9	0.5	1.3	1.9	1.0	3.2
8-May	0.7	0.8	0.6	0.7	0.6	0.6	0.8	1.0	1.1	1.7	2.5	2.0	3.0	2.3	2.0	3.0	2.3	2.3	2.7	2.3	2.1	1.9	1.1	1.0	3.0
9-May	0.7	0.9	1.4	1.2	0.7	0.6	1.0	1.4	1.4	1.7	1.5	2.1	2.6	2.4	2.4	1.9	2.0	1.9	1.2	0.7	0.7	0.6	0.4	0.5	2.6
10-May	1.1	0.7	1.1	1.0	0.3	0.4	0.7	1.4	1.6	1.8	1.7	2.5	3.0	3.1	2.6	2.3	2.7	1.8	1.4	0.5	0.6	0.9	1.7	2.0	3.1
11-May	1.2	1.9	1.7	1.6	1.5	1.0	1.3	1.4	1.5	2.0	1.9	2.6	2.9	2.7	2.4	2.4	2.4	1.8	1.4	0.7	0.2	0.8	1.6	2.3	2.9
12-May	1.6	1.5	0.6	0.4	0.4	0.4	0.6	1.3	1.5	1.3	1.3	1.8	2.1	2.6	3.1	2.7	2.9	2.1	1.8	1.4	2.8	2.9	2.5	2.0	3.1
13-May	1.9	2.1	2.1	1.5	1.8	1.9	2.4	2.3	2.2	2.4	2.9	3.1	3.3	3.1	2.9	2.4	2.4	2.2	2.2	1.6	1.4	1.2	1.3	1.9	3.3
14-May	2.1	1.6	1.4	1.5	1.2	1.2	1.4	1.7	1.8	2.3	2.3	3.2	3.4	3.2	3.0	3.2	2.9	2.7	2.0	1.6	0.6	0.6	0.9	1.0	3.4
15-May	1.2	2.0	2.1	1.6	1.5	1.4	1.6	1.0	1.7	1.9	2.3	3.3	3.0	3.0	3.3	3.2	2.7	2.5	2.8	4.1	3.7	4.3	4.0	3.9	4.3
16-May	3.9	3.4	3.2	4.7	4.3	3.6	4.2	4.3	4.0	3.9	3.9	4.0	4.2	4.2	4.4	3.7	4.0	3.6	3.1	2.2	1.1	1.1	1.4	1.5	4.7
17-May	0.9	0.6	0.6	0.7	1.0	1.7	2.0	3.1	3.2	2.8	3.0	3.2	3.0	2.9	2.6	2.7	2.1	2.1	2.1	1.5	1.5	1.8	1.6	1.6	3.2
18-May	1.3	1.8	1.9	1.7	1.4	0.8	0.7	0.8	1.3	2.0	2.5	3.3	3.0	3.3	3.0	2.6	2.7	2.3	1.6	0.5	0.2	0.8	1.7	1.6	3.3
19-May	0.8	0.8	0.6	1.5	1.1	1.0	1.3	1.2	0.9	2.1	2.7	3.2	3.2	3.2	2.5	1.8	1.9	1.4	1.1	0.9	1.0	1.1	0.9	0.7	3.2
20-May	0.7	0.6	0.8	1.2	1.4	0.9	1.0	1.0	1.1	1.3	2.5	2.4	3.0	2.6	2.7	2.6	2.2	2.0	1.8	1.1	0.4	1.0	1.3	0.8	3.0
21-May	0.6	0.8	0.7	0.7	0.7	0.7	0.8	1.1	1.0	1.1	1.4	2.4	3.2	2.9	3.2	2.8	2.6	2.3	1.6	0.6	0.4	0.3	0.6	0.7	3.2
22-May	0.5	0.5	1.2	1.2	0.7	0.6	0.7	0.5	1.1	1.5	2.3	2.9	3.1	3.1	3.4	3.7	3.4	3.4	3.1	2.9	1.6	1.5	1.2	1.5	3.7
23-May	1.1	1.0	0.7	0.5	0.8	1.1	1.0	0.9	2.0	2.5	2.5	2.7	2.6	2.9	3.3	2.7	2.3	2.4	1.4	0.6	0.3	0.6	0.9	0.7	3.3
24-May	0.6	0.4	0.3	0.2	0.4	0.6	0.9	1.1	1.1	1.2	1.3	2.0	2.5	2.3	2.6	2.5	2.4	1.2	1.0	0.5	0.7	0.9	0.6	0.5	2.6
25-May	0.4	0.3	0.5	0.7	0.8	0.5	0.8	0.8	0.8	0.6	0.8	2.2	2.9	2.9	1.5	0.8	1.7	3.4	1.4	0.6	1.5	2.5	2.7	2.6	3.4
26-May	2.3	2.1	2.3	2.0	1.8	1.9	2.1	2.4	2.8	3.3	3.3	3.2	3.5	3.4	3.1	2.9	2.8	2.4	2.4	1.5	0.7	0.9	1.2	1.2	3.5
27-May	0.8	1.5	1.5	1.3	0.9	1.2	1.2	1.4	1.0	0.9	1.4	1.5	1.2	3.0	3.7	3.6	3.9	3.7	3.1	2.3	4.3	3.8	3.7	3.5	4.3
28-May	4.1	3.7	3.4	2.9	2.6	3.0	3.3	3.5	3.5	3.5	3.4	3.2	3.6	3.6	3.6	3.3	3.1	3.1	3.1	2.2	1.0	0.5	1.5	1.7	4.1
29-May	1.5	1.7	1.8	1.6	1.2	1.6	1.8	2.4	2.5	2.4	2.5	2.9	2.4	2.6	2.3	2.5	2.5	2.1	1.9	1.3	1.3	2.2	3.0	2.7	3.0
30-May	3.5	1.8	1.9	2.0	1.5	1.7	1.2	1.3	1.6	1.8	1.9	3.0	2.7	3.0	3.0	2.8	2.9	2.6	2.1	1.8	2.3	2.4	1.4	2.0	3.5
31-May	1.9	1.7	1.3	1.1	1.0	1.7	2.0	2.3	2.2	2.1	1.7	1.7	1.7	1.6	2.6	2.7	2.4	2.0	1.5	2.0	2.5	1.8	1.2	1.4	2.7
	4.1	3.7	3.4	4.7	4.3	3.6	4.2	4.3	4.0	3.9	3.9	4.0	4.2	4.2	4.4	3.7	4.0	3.7	3.2	4.1	4.3	4.3	4.0	3.9	

Diurnal Maximum

AF - Analyzer Failure



Maximum Value: 4.9 km/h on May 15 02:00		Maximum Daily Average: 1.1 km/h on May 13		Hours in Service: 744																						
Minimum Value: -1.7 km/h on May 24 13:00		Minimum Daily Average: 0.0 km/h on May 2		Hours of Data: 740																						
Maximum Diurnal Average: 1.1 km/h at hour 23		Minimum Diurnal Average: -0.1 km/h at hour 13		Hours of Missing Data: 4																						
Monthly Average: 0.47 km/h		Percentiles: P ₁ = -1.0 P ₁₀ = -0.3 Q ₁ = 0.1 Median = 0.4 Q ₃ = 0.8 P ₉₀ = 1.4 P ₉₉ = 2.8		Hours of Calibration: 0																						
				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-May	4.1	1.7	0.9	0.2	-0.6	0.2	0.3	0.7	1.2	0.7	0.3	0.3	-0.1	0.2	0.6	0.3	0.0	-0.3	-0.5	0.7	0.8	-0.2	0.7	0.5	0.5	4.1
2-May	-0.3	-0.3	-0.2	-0.3	-0.1	-0.1	-0.3	-0.2	0.1	-0.5	-0.7	-0.1	0.0	0.7	-0.3	-0.2	1.0	-0.2	0.2	0.8	-0.2	0.8	0.5	0.6	0.0	1.0
3-May	0.2	0.8	0.6	0.2	0.2	0.0	-0.5	0.1	0.8	-0.8	0.0	-0.3	-0.3	-0.6	-0.3	-0.8	0.7	0.2	0.6	0.2	0.8	1.3	0.9	0.2	0.2	1.3
4-May	0.1	0.1	0.0	0.3	1.0	0.3	0.5	0.1	0.1	-0.1	0.4	0.1	-0.5	0.4	-0.1	-0.2	-0.5	0.8	0.3	0.2	1.1	2.3	0.7	0.2	0.3	2.3
5-May	0.1	0.2	0.8	0.6	0.0	0.4	0.1	0.3	0.7	0.1	0.9	0.8	0.4	0.6	-0.1	0.2	-0.6	UO	UO	0.6	0.5	0.7	0.3	0.1	0.3	0.9
6-May	0.4	0.4	0.3	0.6	0.4	0.6	0.6	0.2	0.4	0.9	0.8	0.5	0.2	0.0	-0.4	0.4	0.2	0.7	0.3	0.6	0.3	0.4	0.6	0.2	0.4	0.9
7-May	0.3	0.3	0.6	0.8	0.3	0.4	0.4	0.5	0.7	0.1	-0.8	0.3	-0.5	0.3	0.3	0.0	0.2	0.5	1.3	0.3	1.5	1.8	1.3	1.0	0.5	1.8
8-May	0.5	0.2	0.6	0.4	0.8	0.5	0.3	0.2	0.2	-0.2	-0.2	-0.1	0.3	-0.2	1.1	-0.1	-0.2	0.4	0.7	UO	UO	1.2	0.7	0.7	0.4	1.2
9-May	0.1	0.6	0.8	1.2	0.0	0.2	0.5	-0.1	-0.1	-0.4	-0.7	1.0	0.9	0.0	0.5	-0.1	1.3	-0.1	0.8	0.3	0.4	0.3	0.4	0.4	0.3	1.3
10-May	1.0	1.2	1.2	1.1	0.2	0.2	0.2	0.5	0.2	1.9	1.8	-0.2	-0.4	0.0	0.4	0.0	-0.2	-0.3	0.1	0.2	0.8	0.8	0.5	1.1	0.5	1.9
11-May	1.8	-0.3	0.6	0.9	0.4	0.3	0.5	0.4	0.4	0.1	-0.3	-1.0	-0.3	0.6	-0.9	-0.4	0.2	-0.5	1.6	0.3	0.1	0.3	1.7	2.3	0.4	2.3
12-May	0.8	1.1	0.2	0.6	0.5	0.4	0.2	1.4	-0.3	-0.2	0.4	-0.5	-0.7	-0.1	0.3	0.2	0.3	0.1	-0.2	1.6	1.9	2.0	2.1	2.1	0.6	2.1
13-May	2.2	2.6	3.1	2.2	0.8	0.5	0.4	1.3	1.0	0.6	0.4	-0.1	1.0	0.7	-0.1	0.7	-0.1	0.6	0.6	1.2	2.0	1.1	2.2	2.4	1.1	3.1
14-May	0.7	0.4	0.9	0.6	0.4	1.5	0.7	-0.1	1.2	0.9	0.1	1.3	0.8	0.3	0.8	0.7	0.8	1.4	1.5	1.4	1.7	2.4	3.4	3.4	1.1	3.4
15-May	3.7	4.9	2.3	0.5	0.4	0.2	0.7	0.4	0.2	0.5	0.1	-0.5	0.2	0.0	0.7	1.2	0.6	0.4	0.1	0.4	0.6	0.3	0.6	0.4	0.8	4.9
16-May	0.4	-0.2	-0.3	0.8	0.5	0.7	0.4	0.3	0.3	0.5	1.0	-0.5	-0.3	0.0	0.2	-0.4	1.0	-0.3	0.4	-0.2	0.3	1.5	1.1	0.6	0.3	1.5
17-May	0.8	1.0	0.9	0.3	1.2	1.0	1.4	0.9	0.5	1.7	1.5	0.3	0.9	1.1	0.5	-0.1	0.3	0.5	0.9	0.5	0.6	0.9	2.9	2.9	1.0	2.9
18-May	2.3	1.7	0.0	0.6	0.6	0.0	0.2	0.2	0.3	0.5	0.0	0.8	-0.1	-0.7	-0.5	-0.2	-0.5	-0.2	-0.4	0.2	0.4	1.0	1.1	0.4	0.3	2.3
19-May	0.7	0.5	0.3	0.3	0.6	0.9	1.0	1.0	0.3	0.3	-0.6	-0.1	-1.1	1.1	1.3	1.1	-1.3	-0.1	-0.6	0.3	1.3	1.4	0.7	0.4	0.4	1.4
20-May	0.6	0.3	0.2	0.2	0.4	1.0	0.7	0.6	0.7	0.1	-0.7	-0.2	-0.9	1.9	0.2	0.5	0.2	1.2	1.2	1.0	1.3	1.4	0.7	0.7	0.6	1.9
21-May	0.7	0.5	0.3	0.2	0.3	0.6	0.4	0.6	0.5	0.3	-0.2	1.1	0.1	-0.5	1.0	-0.3	0.0	0.3	0.1	-0.2	0.2	0.3	0.6	0.6	0.3	1.1
22-May	0.1	-0.3	0.3	0.3	0.6	1.0	0.4	0.2	0.3	0.3	-0.1	0.0	-0.8	-0.9	-0.6	-0.4	0.3	0.4	0.4	0.4	0.4	0.7	1.4	1.1	0.2	1.4
23-May	0.4	0.0	-0.4	0.4	0.4	0.8	0.2	-0.3	0.0	0.8	-1.0	-0.7	-0.8	-0.2	0.1	0.4	0.2	-0.1	0.7	0.4	0.3	0.4	0.3	0.3	0.1	0.8
24-May	0.2	0.2	0.1	0.2	0.2	0.3	0.7	0.6	-0.2	0.5	0.0	0.4	-1.7	0.3	-0.1	1.2	1.5	-0.3	-0.4	0.3	0.8	0.6	0.2	0.2	0.2	1.5
25-May	0.1	0.2	0.3	0.5	0.1	0.1	0.4	0.4	0.4	0.3	0.6	-0.1	0.3	0.7	-0.1	0.0	0.3	-0.4	-0.3	0.0	0.3	0.1	0.5	-0.3	0.2	0.7
26-May	0.2	-0.4	-0.3	0.2	0.6	0.5	-0.4	-0.2	-0.2	-0.4	0.1	-0.8	0.6	-0.7	-0.8	-1.1	-0.2	1.0	0.8	0.1	0.3	1.1	1.4	1.7	0.1	1.7
27-May	0.9	3.1	2.2	0.8	0.6	0.4	0.4	0.1	0.2	0.2	0.2	-0.4	0.1	-0.5	0.1	0.7	0.6	0.1	0.4	0.2	0.3	0.4	0.5	0.4	0.5	3.1
28-May	0.2	-0.1	0.3	-0.1	0.2	0.2	-0.1	-0.5	0.2	-0.6	-1.3	-0.2	-0.8	1.2	0.2	-0.5	0.6	0.3	1.5	-0.1	0.4	1.4	2.4	1.0	0.2	2.4
29-May	1.7	1.5	2.2	1.0	0.2	1.4	1.4	1.8	0.9	2.1	-0.7	-0.2	0.6	-0.5	-1.2	0.5	0.7	-0.5	0.0	-0.3	0.0	2.5	2.5	2.2	0.8	2.5
30-May	2.8	2.2	1.9	0.1	0.9	0.8	0.8	0.7	0.4	0.1	0.2	0.6	1.0	2.0	1.3	2.0	1.3	0.1	0.5	3.5	2.9	0.2	-0.5	0.5	1.1	3.5
31-May	1.1	0.7	1.2	2.7	2.3	1.8	1.7	2.5	1.2	1.0	0.1	0.2	-0.4	-0.4	0.0	0.2	-0.1	0.4	0.0	0.6	0.8	-0.1	0.6	0.5	0.8	2.7
																								Diurnal Average		
																								Diurnal Maximum		
																								0.9 4.1		
																								0.8 4.9		
																								0.7 3.1		
																								0.6 2.7		
																								0.5 2.3		
																								0.6 1.8		
																								0.5 1.7		
																								0.5 2.5		
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																								0.4 1.6		
																								0.5 3.5		
																								0.8 2.9		
																								0.9 2.5		
																								1.1 3.4		
																								0.9 3.4		

UO - Unstable Operation



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 1 Maximum Value: 8.4 km/h on May 2 17:00 Minimum Value: 0.2 km/h on May 23 22:00 Percentiles: P ₁ = 0.3 P ₁₀ = 0.6 Q ₁ = 1.0 Median = 1.8 Q ₃ = 2.8 P ₉₀ = 3.5 P ₉₉ = 4.7																								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-May	1.8	1.7	1.5	2.2	2.6	2.0	1.6	1.7	2.5	2.4	2.5	2.8	2.9	3.0	3.0	3.0	2.1	2.7	3.1	0.8	0.8	1.4	1.2	1.7	3.1
2-May	0.7	0.7	0.8	1.0	0.5	0.7	1.3	2.1	3.2	3.0	3.5	3.3	3.0	3.5	2.7	3.4	8.4	2.1	1.3	1.1	2.7	2.1	2.2	2.7	8.4
3-May	1.8	2.1	1.8	1.4	1.1	1.7	1.6	2.8	2.5	3.2	3.5	3.7	3.0	2.3	3.1	3.4	3.8	3.4	3.2	1.1	0.3	0.3	0.5	0.9	3.8
4-May	0.6	0.4	0.7	0.9	1.4	1.2	0.9	1.6	1.8	1.7	2.1	3.1	3.3	3.0	3.3	3.0	3.1	2.9	2.1	1.0	0.5	1.1	2.1	1.7	3.3
5-May	1.4	1.6	1.1	0.7	0.8	0.8	1.6	1.9	2.0	1.5	2.3	2.8	3.5	3.7	2.7	2.4	2.8	UO	UO	3.2	3.0	3.0	2.4	2.2	3.7
6-May	2.0	1.8	1.8	1.7	1.5	2.0	2.1	2.0	2.3	2.7	2.8	3.1	3.0	3.0	3.3	3.5	3.4	2.3	1.7	1.5	1.1	0.8	0.6	0.5	3.5
7-May	0.3	0.2	0.3	0.5	0.7	0.7	0.8	1.1	1.6	1.7	2.3	2.6	3.2	3.6	3.3	3.5	3.2	3.1	3.2	1.0	0.4	0.6	1.8	1.0	3.6
8-May	0.8	0.7	0.6	0.6	0.6	0.7	0.7	0.7	0.9	1.2	2.3	1.5	2.7	2.3	2.3	3.2	2.3	1.9	2.3	UO	UO	1.9	1.2	0.9	3.2
9-May	0.7	1.0	1.3	1.4	0.7	0.7	0.6	1.0	1.4	1.4	1.6	2.5	2.7	2.6	2.2	2.0	2.5	1.2	1.3	0.7	0.9	0.4	0.7	0.9	2.7
10-May	1.4	0.7	1.0	1.4	0.6	0.5	0.5	1.0	1.5	2.0	1.8	2.6	3.1	3.2	2.8	2.3	3.2	2.3	1.7	0.7	0.6	1.0	1.4	1.6	3.2
11-May	2.0	2.5	1.3	1.4	1.0	0.9	1.2	1.3	1.4	1.8	2.1	2.6	2.9	3.1	2.5	2.6	2.4	2.0	1.9	1.0	0.2	0.6	1.4	2.6	3.1
12-May	1.6	1.4	1.0	0.6	0.7	0.6	0.6	1.3	1.5	1.2	1.4	1.9	2.6	3.3	3.8	3.0	3.4	2.7	2.1	1.3	2.5	3.1	2.5	2.0	3.8
13-May	1.7	1.7	2.1	2.0	2.2	1.8	2.0	2.2	2.3	2.2	3.0	3.1	3.6	3.2	3.1	2.6	2.3	2.3	1.8	1.1	0.9	1.4	1.1	1.1	3.6
14-May	1.4	1.5	1.2	1.2	1.5	1.3	1.7	1.6	2.0	1.6	1.9	3.3	3.7	3.5	3.3	3.2	3.5	2.5	2.2	1.5	0.5	0.6	0.4	0.7	3.7
15-May	1.0	1.6	3.0	1.5	1.3	0.8	1.1	0.7	0.9	1.5	2.3	3.0	2.7	3.0	3.3	3.2	2.7	2.4	3.2	6.3	5.1	4.4	4.3	4.2	6.3
16-May	4.0	3.7	3.5	4.8	4.4	3.7	4.4	3.8	4.3	4.4	4.4	4.6	4.6	4.7	5.1	4.2	4.7	3.8	3.1	2.0	0.8	0.6	1.2	1.7	5.1
17-May	1.0	0.9	1.0	1.2	1.2	1.6	2.1	3.1	2.8	2.6	3.1	3.1	3.0	3.0	3.0	3.1	2.2	2.3	2.3	1.2	1.0	2.0	1.8	1.7	3.1
18-May	1.7	1.7	1.7	1.3	1.1	0.6	0.4	0.7	1.0	1.9	2.2	3.6	3.3	3.5	2.9	2.7	2.6	2.2	1.2	0.6	0.3	0.7	0.7	1.0	3.6
19-May	0.7	0.7	1.0	1.3	1.5	1.0	1.4	1.4	1.0	1.9	2.2	3.2	3.6	3.5	2.4	1.9	1.8	1.2	1.1	0.8	1.0	0.4	0.8	0.6	3.6
20-May	0.7	0.8	1.2	1.0	1.4	1.0	0.8	0.7	0.9	1.2	2.7	2.6	3.2	3.0	3.0	3.0	2.2	2.1	2.0	1.3	0.5	0.5	1.5	1.4	3.2
21-May	0.7	0.6	0.5	0.5	0.4	0.5	0.6	0.8	1.0	0.9	1.2	2.7	3.4	3.2	3.5	3.2	2.7	2.2	1.8	0.7	0.4	0.3	0.5	0.9	3.5
22-May	0.6	0.6	0.7	1.2	0.7	0.5	0.4	0.4	0.9	1.7	2.6	3.5	3.6	3.7	4.1	4.1	4.1	4.0	3.5	2.6	1.1	0.5	0.5	1.7	4.1
23-May	1.2	1.1	0.7	0.5	0.5	0.9	0.8	0.6	2.3	2.7	2.6	3.2	3.0	3.6	3.7	2.9	2.6	2.7	1.8	0.8	0.3	0.2	0.7	0.9	3.7
24-May	0.5	0.3	0.3	0.4	0.3	0.5	0.7	0.6	0.9	1.1	0.8	1.9	1.9	2.7	3.2	3.0	2.5	1.4	1.1	0.7	0.5	1.1	0.8	0.6	3.2
25-May	0.5	0.3	0.4	0.5	0.8	0.5	0.4	0.6	0.5	0.6	0.9	2.5	3.2	5.8	1.2	0.7	1.6	3.0	1.7	0.9	1.7	2.6	2.8	2.5	5.8
26-May	2.5	2.0	2.4	2.1	1.4	1.6	2.1	2.5	2.8	3.5	4.1	3.8	4.1	3.8	3.5	3.1	3.0	3.0	2.6	1.3	0.6	0.6	1.0	1.3	4.1
27-May	1.1	1.8	1.9	0.9	0.9	1.0	1.3	1.0	0.9	0.9	1.6	1.5	1.4	3.5	4.2	3.9	4.2	3.7	3.4	2.2	4.2	3.8	3.7	3.6	4.2
28-May	3.9	3.5	3.4	2.7	2.8	3.0	3.4	3.9	3.7	4.0	3.9	3.8	4.1	4.2	4.0	3.8	3.9	3.7	3.4	2.1	0.8	0.5	0.5	1.9	4.2
29-May	1.6	1.9	2.0	1.4	1.3	1.4	1.9	2.5	2.3	2.6	2.5	2.8	2.7	2.4	2.3	2.6	2.8	2.1	2.1	0.9	0.9	1.8	2.7	2.8	2.8
30-May	3.4	2.0	1.8	2.0	1.4	1.1	0.8	1.0	0.9	1.3	1.8	3.1	3.0	3.4	3.0	3.1	3.1	2.4	2.0	1.9	2.3	1.9	0.9	1.3	3.4
31-May	1.2	0.9	1.3	1.7	1.5	2.0	2.0	2.8	2.5	1.8	1.7	1.1	1.2	1.0	2.2	2.6	2.3	2.0	1.1	1.3	2.5	2.2	1.2	1.6	2.8
4.0 3.7 3.5 4.8 4.4 3.7 4.4 3.9 4.3 4.4 4.4 4.6 4.6 5.8 5.1 4.2 8.4 4.0 3.5 6.3 5.1 4.4 4.3 4.2																								Diurnal Maximum	
UO - Unstable Operation																									



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

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

**AMS 4
BUFFALO VIEWPOINT
MAY 2015**

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

June 29, 2015



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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	709	35	35	100.00	45	0	8	0
H2S (ppb) Average	709	35	35	100.00	4	0	1	0
THC (ppm) Average	709	35	35	100.00	3.5	-	2.5	-
Temperature (C) Average	744	0	0	100.00	29	-	20.3	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	89	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	49	-	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 - BUFFALO VIEWPOINT (AMS 4)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	1.3	4	-	0	0	0	0	1	2	45
H2S (ppb) Average	709	0.2	0	-	0	0	0	0	0	0	4
THC (ppm) Average	709	2.23	0.2	-	2.1	2.1	2.2	2.2	2.3	2.4	3.5
Temperature 2 m (C) Average	744	11.65	8	-	-4.1	1.1	5.1	10.9	17.7	22.9	29
Relative Humidity (%) Average	744	47.7	23	-	12	18	28	46	65	81	99
Wind Speed 10 m (km/h) Average	743	10.5	7	-	0	4	6	9	12	19	49
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	11 May 2015 20:00	11 May 2015 20:00	1	Flat line in sensor output signal



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 45 ppb on May 10 12:00	Maximum Daily Average: 7.9 ppb on May 24
Minimum Value: 0 ppb on May 18 15:00	Hours of Data: 709
Maximum Diurnal Average: 3.1 ppb at hour 12	Hours of Missing Data: 35
Monthly Average: 1.3 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.1 ppb on May 18	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.3 ppb at hour 6	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 22	

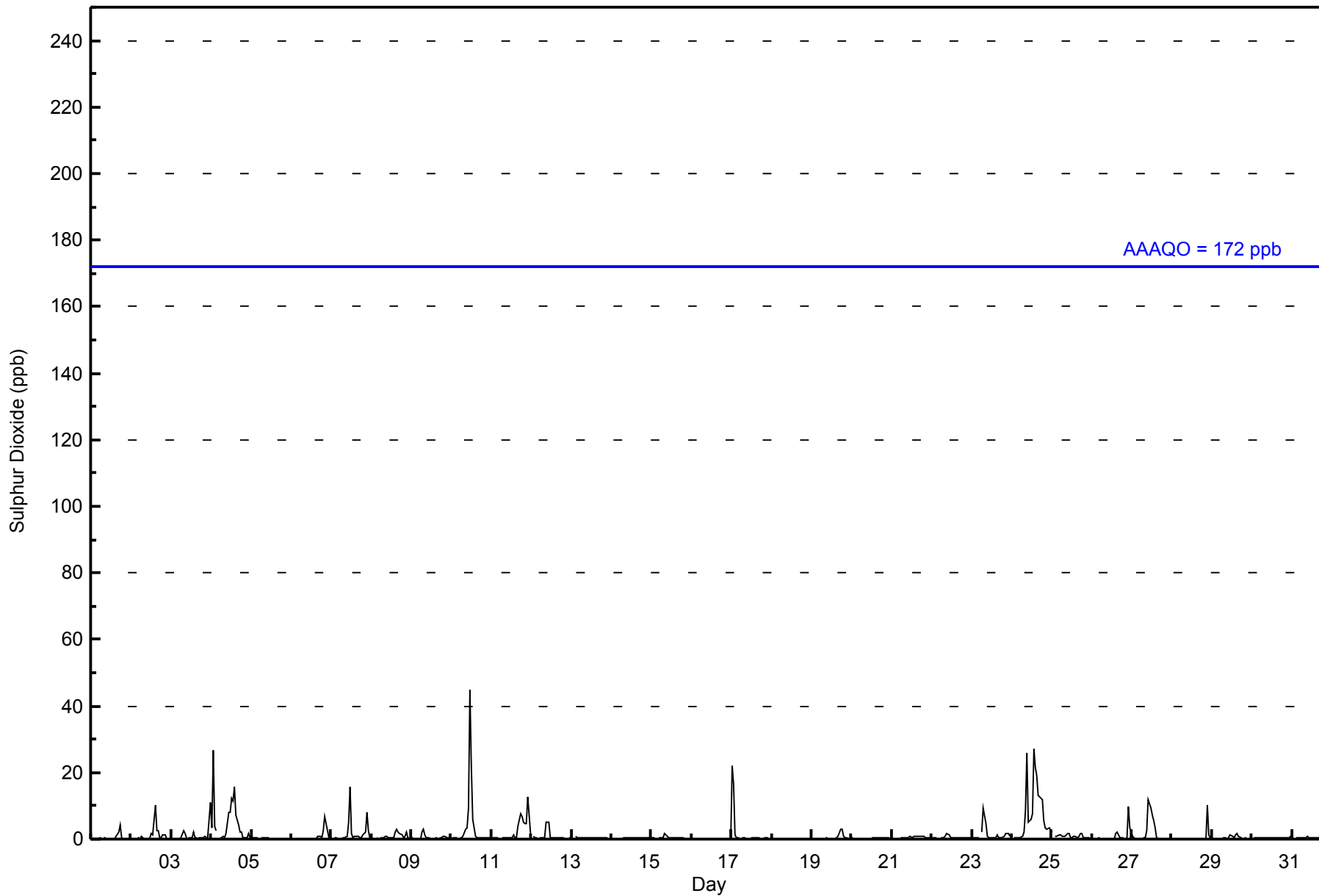
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4	0	0	0	0	0	0	0.5	4
2-May	0	0	Z	0	0	0	1	0	0	0	0	0	2	1	10	3	2	0	0	1	1	0	0	0	1.1	10
3-May	0	0	0	Z	0	0	0	3	2	0	0	1	2	0	0	0	0	0	0	1	0	0	11	1.0	11	
4-May	3	27	4	3	Z	0	1	1	1	2	8	8	12	11	16	7	4	2	2	1	0	2	1	5.0	27	
5-May	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-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	7	5	0	0.8	7	
7-May	0	Z	0	0	0	0	0	0	0	1	5	16	2	0	1	1	1	0	1	1	2	8	3	1.9	16	
8-May	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	2	3	2	2	1	0	1	2	0	0.8	3	
9-May	0	0	0	Z	0	0	2	3	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.5	3	
10-May	0	0	0	0	Z	0	0	1	3	3	9	45	22	6	1	1	1	1	0	0	0	0	0	4.2	45	
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	4	8	7	5	5	5	13	2.3	13	
12-May	Z	1	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	1	0.7	5	
13-May	1	Z	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
14-May	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	
15-May	0	0	0	Z	0	0	0	0	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	2	
16-May	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	
17-May	22	17	1	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2.0	22	
18-May	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	3	1	0	0	0	0.5	3	
20-May	0	0	Z	0	0	0	0	0	0	C	C	C	C	1	0	0	0	0	0	0	0	0	0	0.3	1	
21-May	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0.5	1	
22-May	0	0	0	0	Z	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
23-May	0	0	0	0	0	Z	2	9	5	1	0	0	0	0	1	0	0	0	1	2	2	1	1.3	9		
24-May	Z	0	0	0	1	0	1	2	8	26	5	6	7	27	22	19	13	12	12	6	4	3	2	7.9	27	
25-May	2	Z	1	1	1	1	1	1	1	2	2	1	0	1	1	0	1	2	2	1	0	0	0	1.0	2	
26-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0	0	0	10	4	0.9	10	
27-May	1	0	0	Z	0	0	0	0	0	3	12	9	7	5	3	0	0	0	0	0	0	0	0	1.9	12	
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1	0	0.6	10	
29-May	0	0	0	0	0	Z	0	1	0	0	0	1	1	1	1	2	1	0	0	0	0	0	0	0.4	2	
30-May	Z	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
31-May	1	Z	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
	1.3	2.0	0.5	0.4	0.3	0.3	0.4	0.8	1.0	1.7	1.8	3.1	2.0	2.0	2.1	1.5	1.2	1.3	1.1	0.8	0.9	1.3	1.3	0.8	Diurnal Average	
	22	27	4	3	1	1	2	9	8	26	12	45	22	27	22	19	13	12	12	6	7	10	13	11	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	690	97.32	97.32
11 - 20	12	1.69	99.01
21 - 60	7	0.99	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	126	85	26	15	17	28	61	138	42	37	21	18	14	20	18	23	689
11 - 20	3	2	1	3	1	1	1	0	0	0	0	0	0	0	0	0	12
21 - 60	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	7
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	132	89	29	18	18	29	62	138	42	37	21	18	14	20	18	23	708

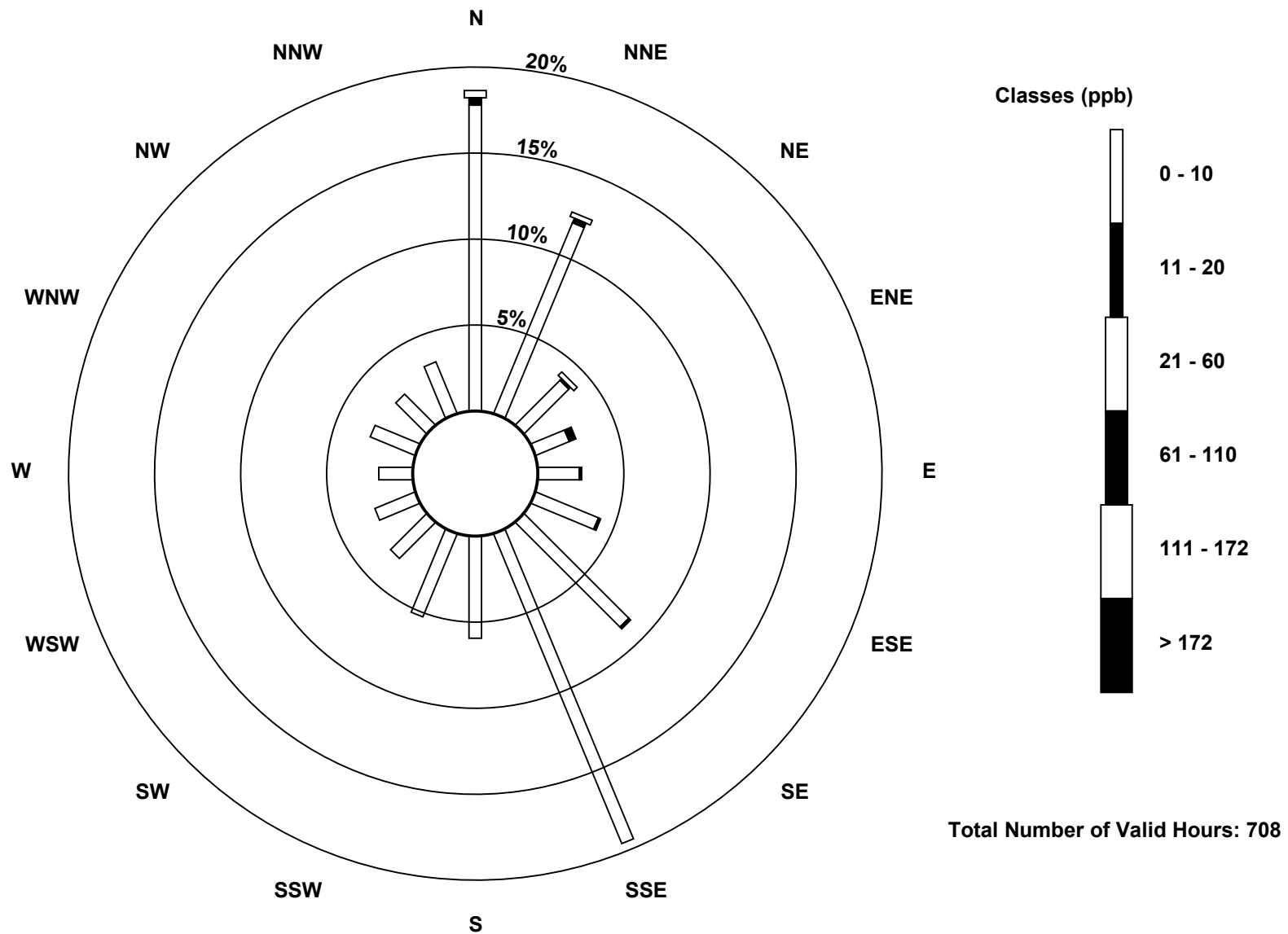
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

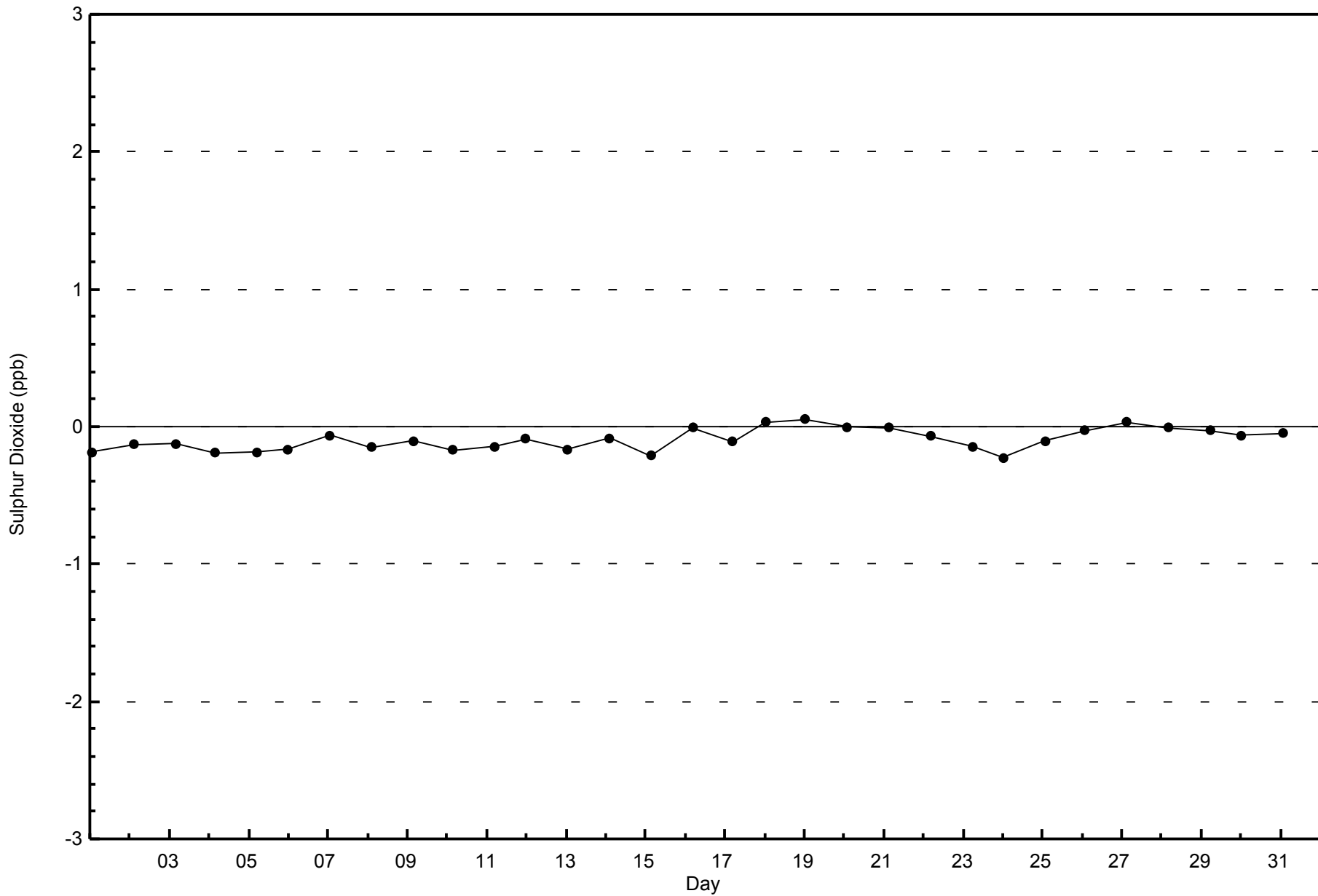
Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint (AMS 4)





WBEA
Zero Responses

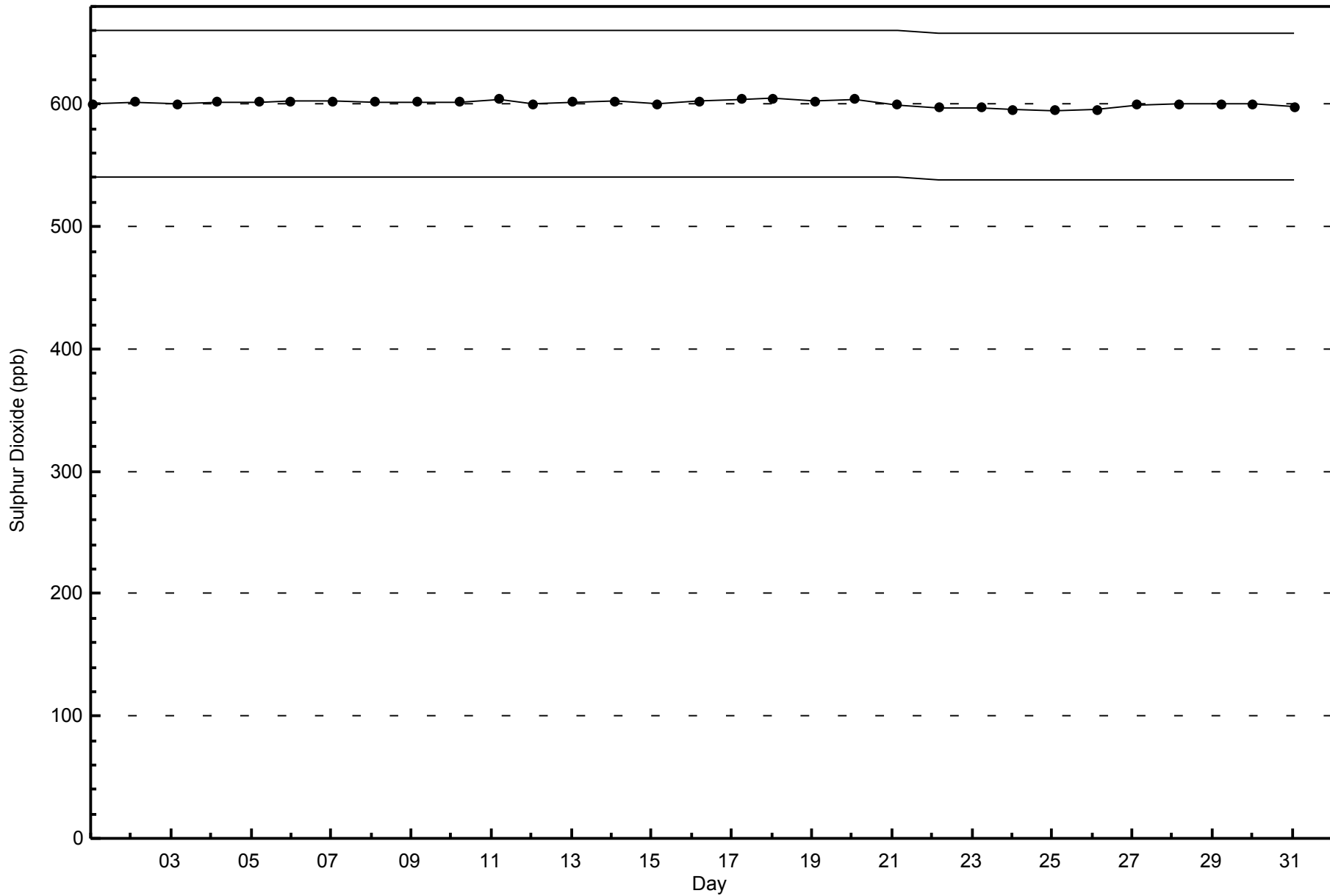
Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Buffalo Viewpoint - May 2015



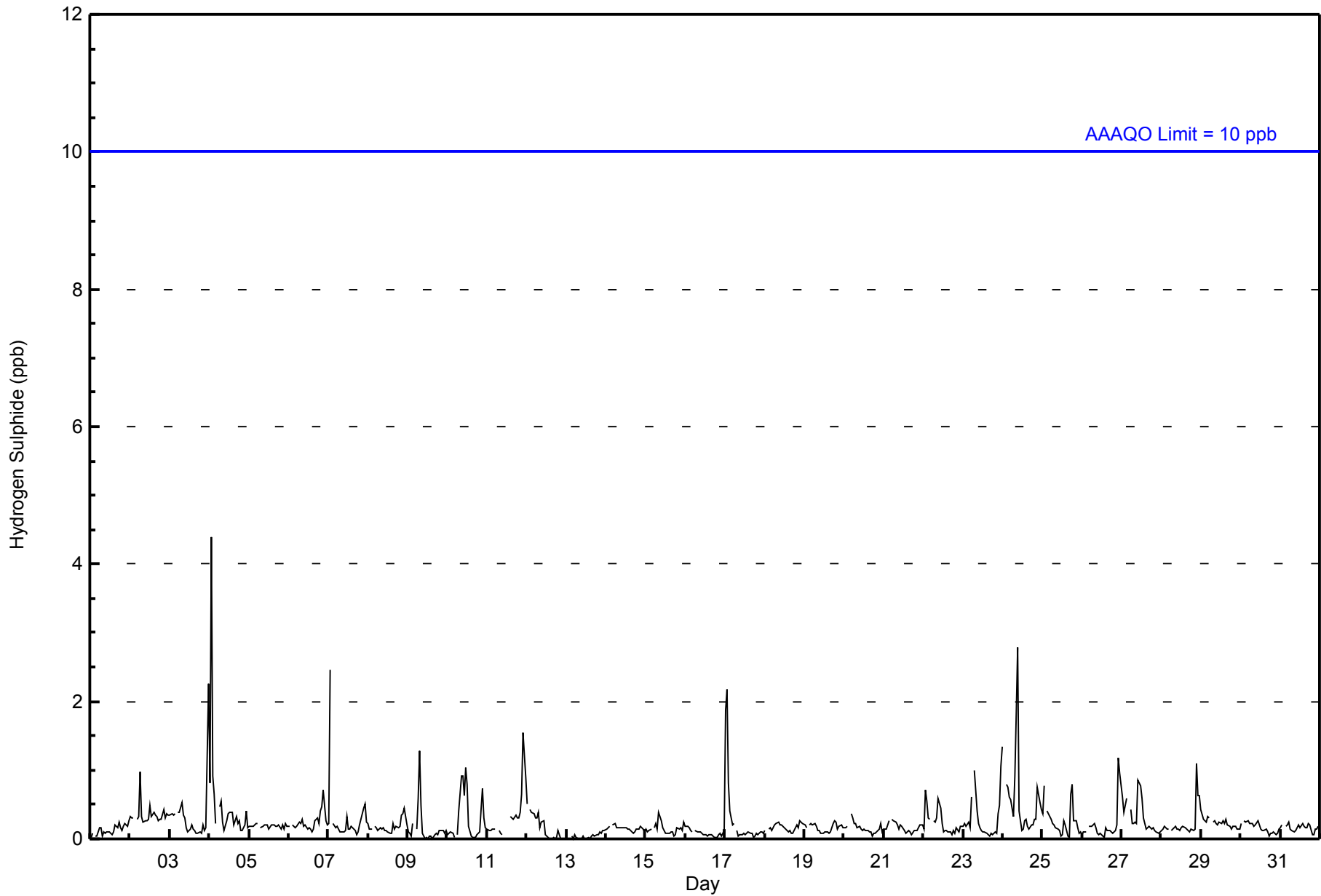


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 4 ppb on May 4 02:00										Maximum Daily Average: 0.6 ppb on May 24										Hours of Data: 709																												
Minimum Value: 0 ppb on May 9 13:00										Minimum Daily Average: 0.0 ppb on May 13										Hours of Missing Data: 35																												
Maximum Diurnal Average: 0.5 ppb at hour 2										Minimum Diurnal Average: 0.1 ppb at hour 17										Hours of Calibration: 35																												
Monthly Average: 0.2 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 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-May	0	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-May	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
3-May	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.3	2																						
4-May	1	4	1	1	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4																						
5-May	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1																						
7-May	0	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	2																						
8-May	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																						
9-May	0	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
10-May	0	0	0	0	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0.3	1																						
11-May	0	0	0	0	0	0	Z	0	0	0	C	C	C	C	0	0	0	0	0	0	0	1	2	1	0.3	2																						
12-May	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																						
13-May	0	0	Z	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-May	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-May	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																						
16-May	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																						
17-May	2	2	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																						
18-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
19-May	0	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-May	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																						
21-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
22-May	0	1	1	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
23-May	0	0	0	0	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1																						
24-May	1	Z	1	1	1	1	0	1	2	3	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.6	3																						
25-May	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1																						
26-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.2	1																						
27-May	1	0	0	1	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
28-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.2	1																						
29-May	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																						
30-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
31-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
																								0.3	0.5	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	Diurnal Average
																								2	4	1	1	1	1	1	1	2	3	1	1	1	0	0	0	0	1	1	0	0	1	2	2	Diurnal Maximum
Z - zerospan C - Calibration																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - May 2015





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	707	99.72	99.72
3 - 4	2	0.28	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	132	86	28	17	18	29	64	138	42	38	20	17	15	21	17	24	706
3 - 4	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	132	87	29	17	18	29	64	138	42	38	20	17	15	21	17	24	708

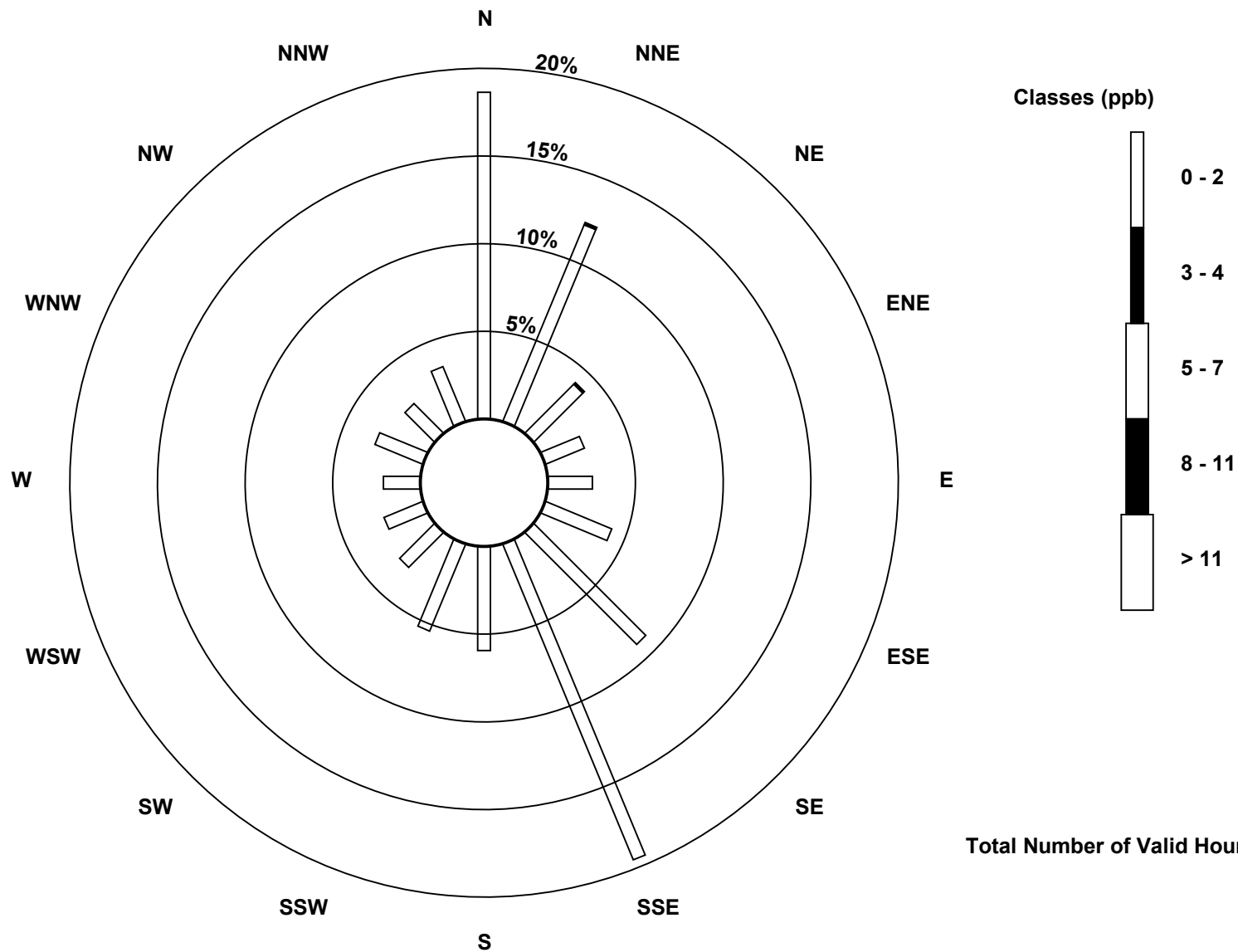
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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

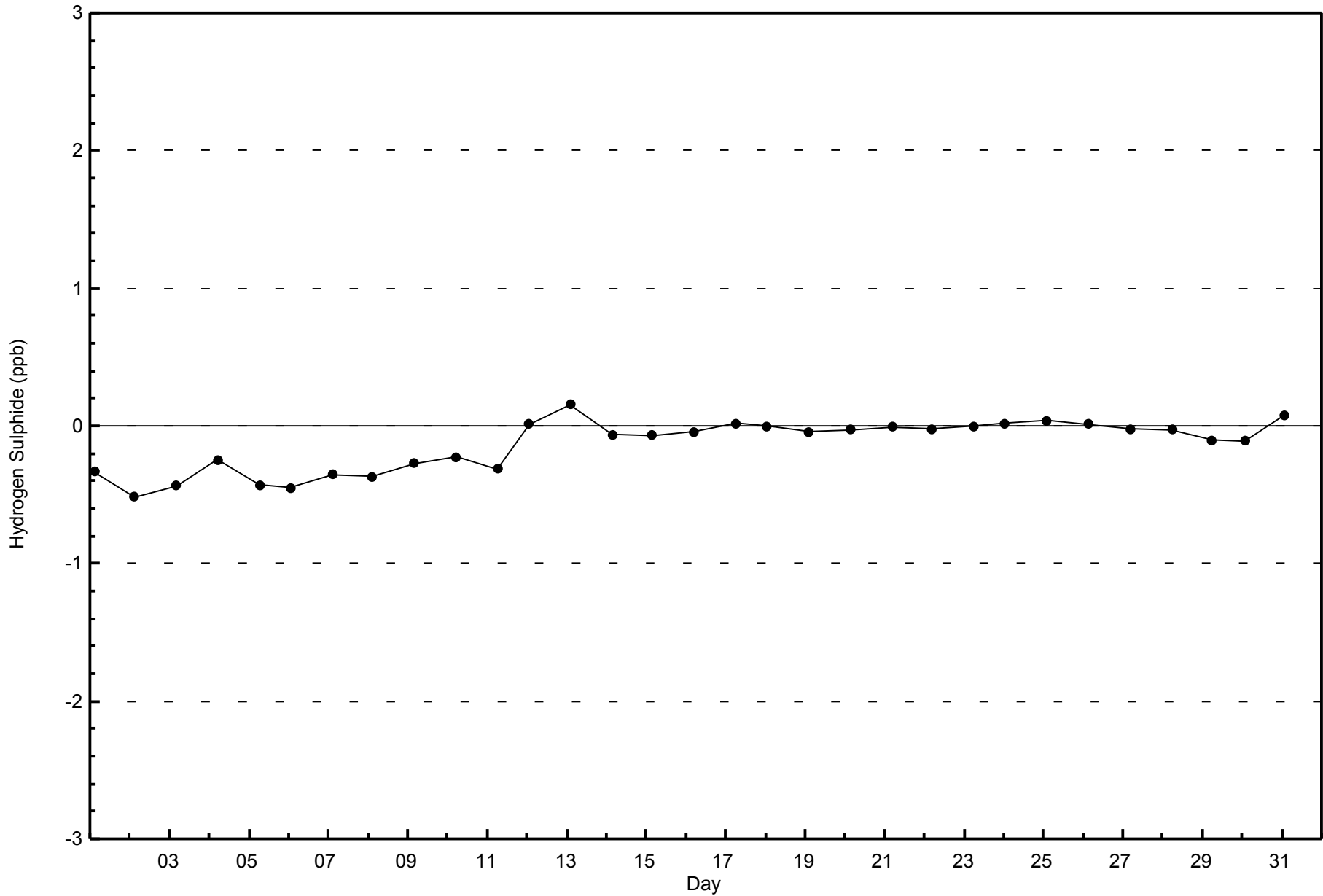


Total Number of Valid Hours: 708



WBEA
Zero Responses

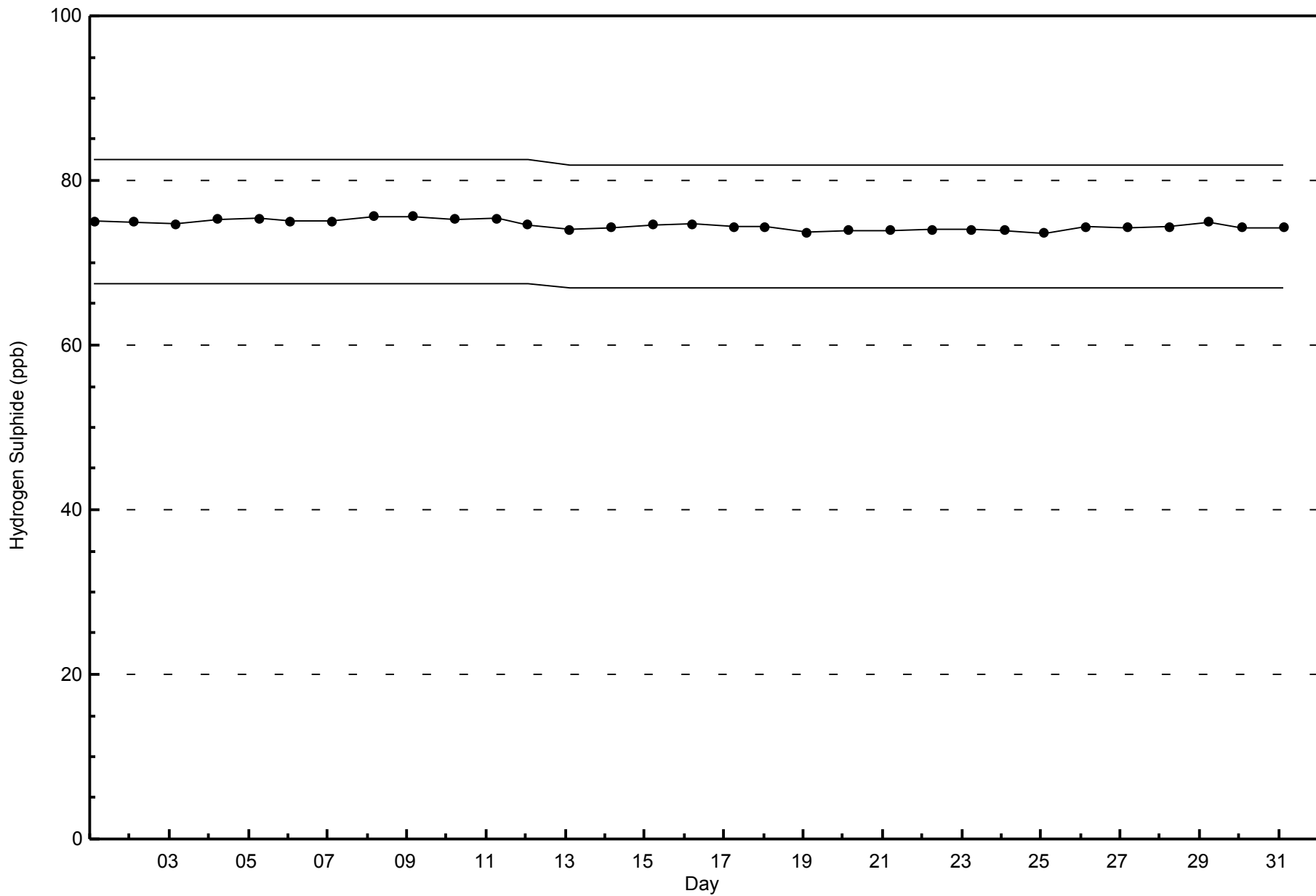
Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - May 2015





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Buffalo Viewpoint - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

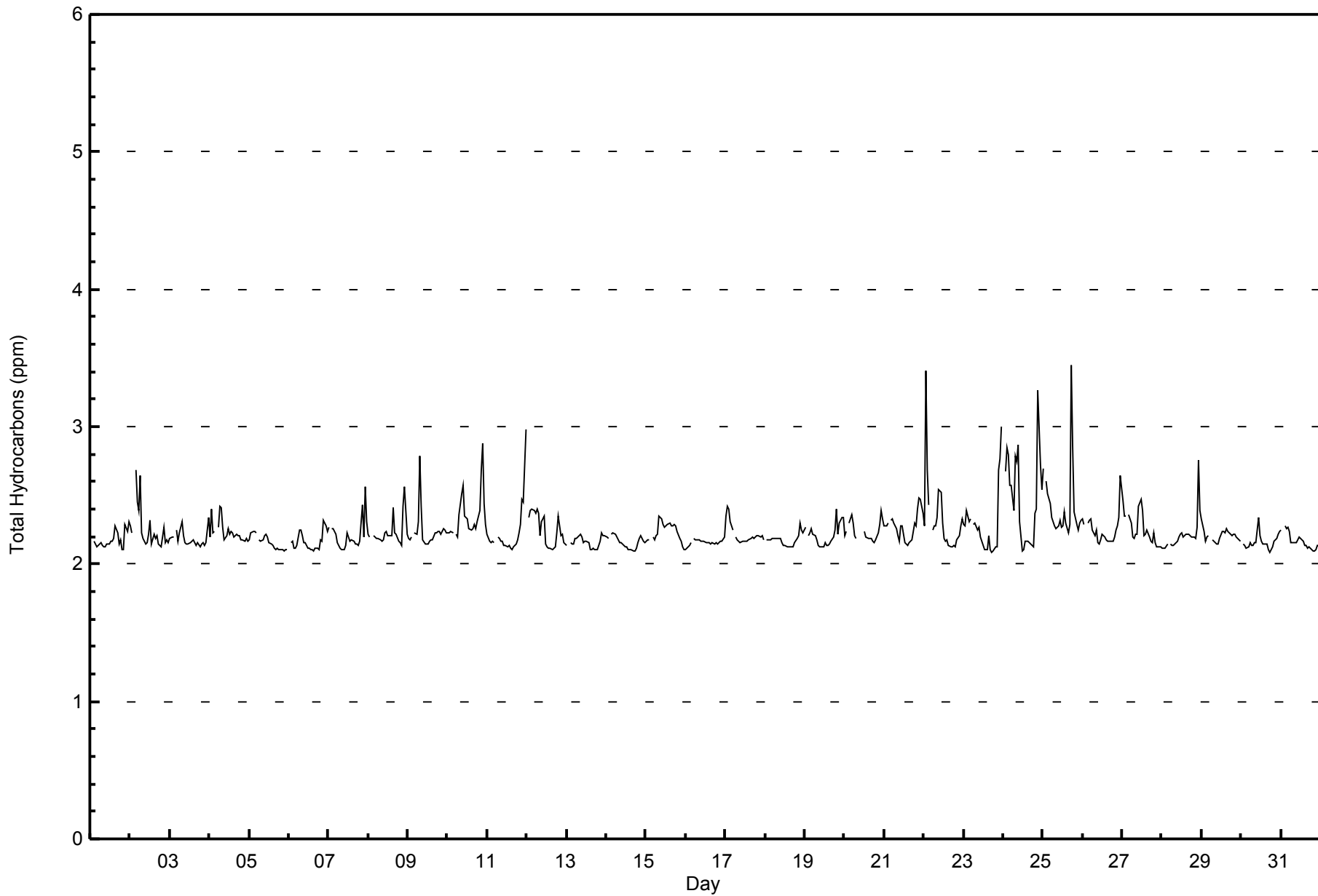
Buffalo Viewpoint - May 2015

Maximum Value: 3.5 ppm on May 25 18:00														Maximum Daily Average: 2.5 ppm on May 24														Hours in Service: 744	
Minimum Value: 2.1 ppm on May 23 18:00														Minimum Daily Average: 2.2 ppm on May 14														Hours of Data: 709	
Maximum Diurnal Average: 2.3 ppm at hour 23														Minimum Diurnal Average: 2.2 ppm at hour 17														Hours of Missing Data: 35	
Monthly Average: 2.23 ppm														Percentiles: P ₁ = 2.1 P ₁₀ = 2.1 Q ₁ = 2.2 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.4 P ₉₉ = 2.9														Hours of Calibration: 35	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-May	2.2	Z	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.1	2.2	2.1	2.1	2.3	2.2	2.3	2.2	2.3			
2-May	2.3	2.2	Z	2.7	2.5	2.4	2.6	2.2	2.2	2.1	2.2	2.2	2.3	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.2	2.2	2.2	2.2	2.3			
3-May	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.1	2.2	2.3	2.2	2.3			
4-May	2.2	2.4	2.2	2.2	Z	2.3	2.4	2.4	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	2.2	2.2	2.2	2.2	2.4			
5-May	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2			
6-May	Z	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.2	2.2	2.3			
7-May	2.3	Z	2.3	2.3	2.2	2.2	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	2.2	2.4	2.2	2.6	2.3	2.2	2.6			
8-May	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.1	2.4	2.6	2.2	2.2	2.6			
9-May	2.2	2.2	2.2	Z	2.2	2.2	2.3	2.8	2.4	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.8			
10-May	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.4	2.5	2.6	2.4	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.4	2.7	2.9	2.4	2.3	2.4	2.9			
11-May	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.5	2.5	3.0	2.2	3.0			
12-May	Z	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.2	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.2	2.1	2.2	2.4			
13-May	2.1	Z	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2			
14-May	2.2	2.2	Z	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	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2			
15-May	2.2	2.2	2.2	Z	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	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.3		
16-May	2.1	2.1	2.1	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2			
17-May	2.4	2.4	2.4	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2			
18-May	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	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3			
19-May	2.3	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.4	2.2	2.3	2.3	2.3	2.2	2.4		
20-May	2.2	2.2	Z	2.3	2.4	2.3	2.2	2.2	2.2	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.4			
21-May	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.4	2.5	2.5	2.4	2.3	2.5			
22-May	2.3	3.4	2.7	2.4	Z	2.2	2.3	2.3	2.3	2.5	2.5	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	3.4			
23-May	2.3	2.3	2.4	2.3	2.3	Z	2.3	2.3	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.7	2.8	3.0	2.3	3.0			
24-May	Z	2.7	2.9	2.8	2.6	2.6	2.4	2.8	2.7	2.9	2.3	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.4	2.4	3.3	2.7	2.5	2.5	3.3			
25-May	2.7	Z	2.6	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.2	2.3	3.5	2.8	2.4	2.3	2.3	2.3	2.3	2.4	3.5			
26-May	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.6	2.2	2.6			
27-May	2.5	2.3	2.4	Z	2.4	2.3	2.2	2.2	2.2	2.2	2.4	2.5	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.5			
28-May	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.8	2.4	2.2	2.8			
29-May	2.3	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3			
30-May	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3			
31-May	2.3	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3			
																								Diurnal Average					
																								Diurnal Maximum					
Z - zerospan C - Calibration																													



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	0	0.00	0.00
2.1 - 3.0	706	99.58	99.58
3.1 - 10.0	3	0.42	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

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

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	132	89	29	18	17	29	62	138	42	37	21	18	14	20	17	22	705
3.1 - 10.0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	3
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	132	89	29	18	18	29	62	138	42	37	21	18	14	20	18	23	708

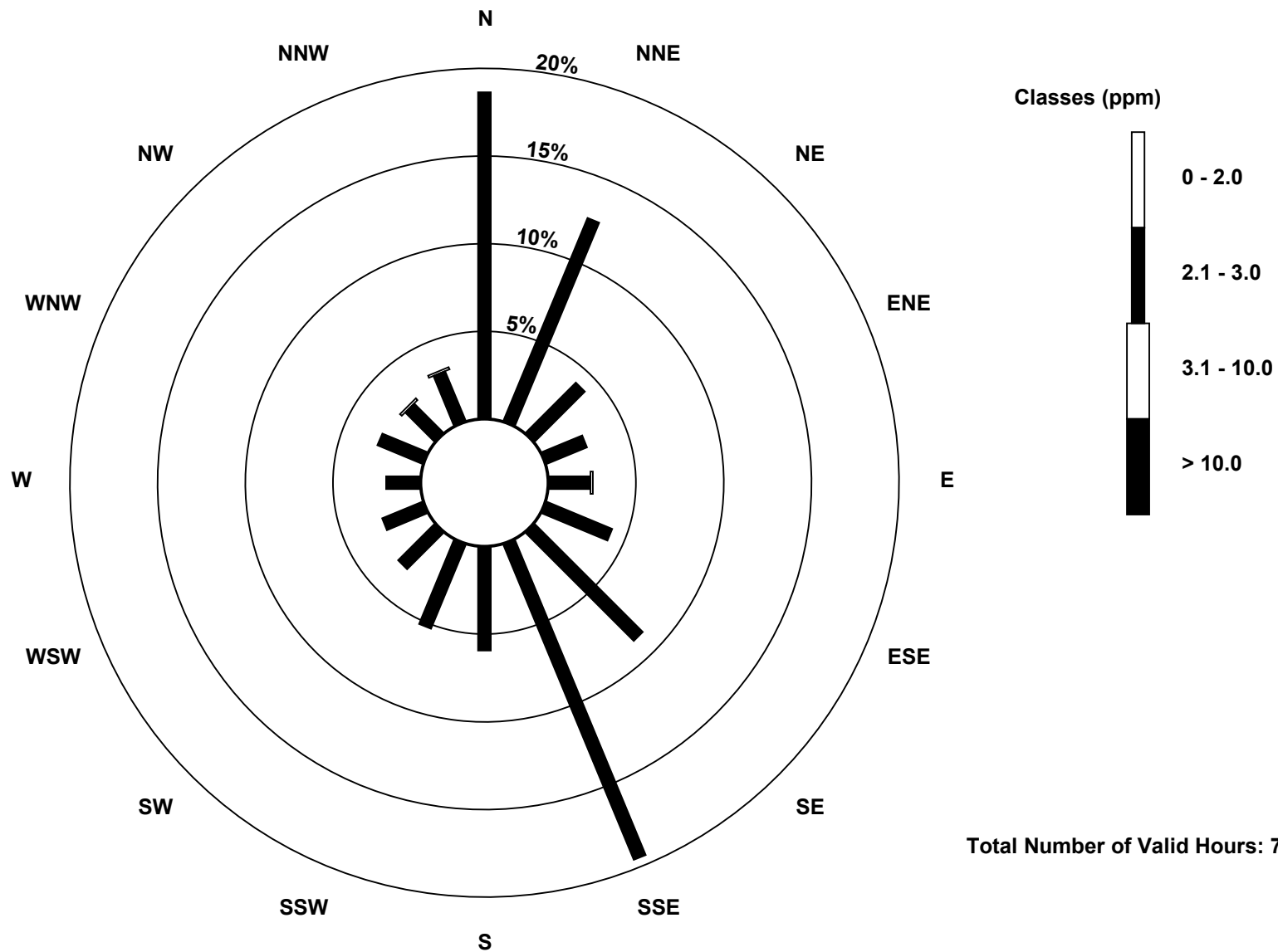
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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

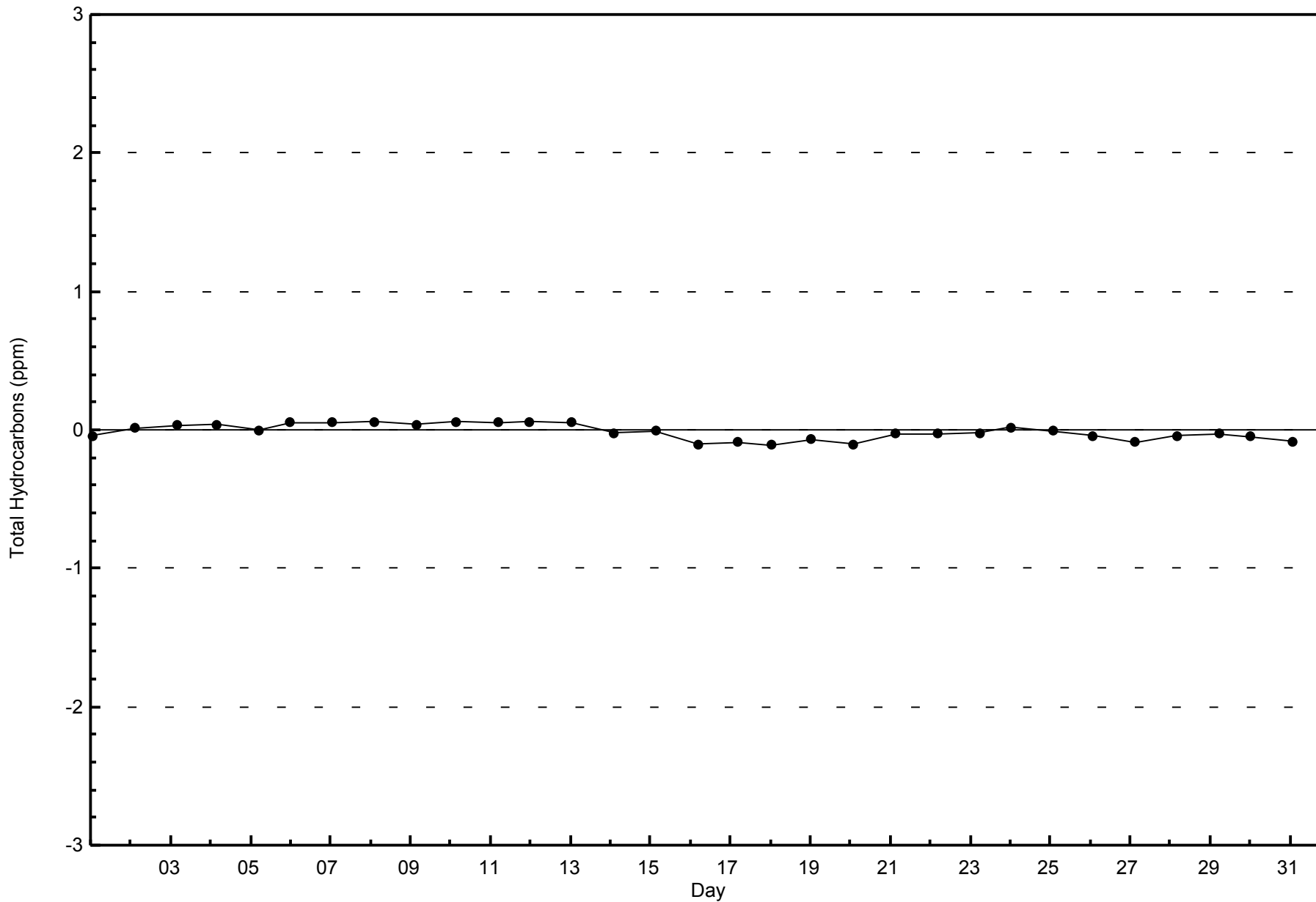


Total Number of Valid Hours: 708



WBEA
Zero Responses

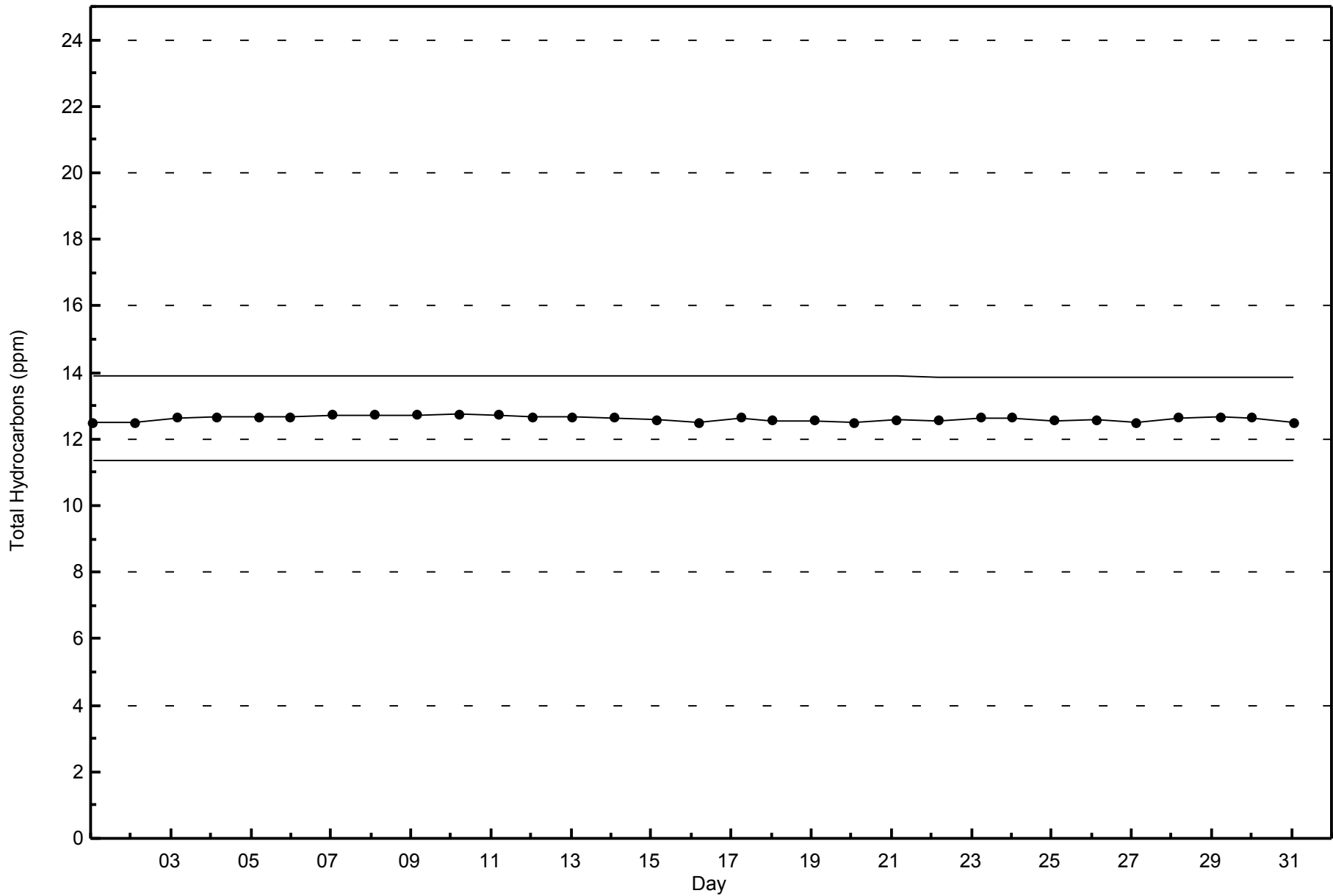
Total Hydrocarbons (THC) - ppm
Buffalo Viewpoint - May 2015





WBEA
Span Responses

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

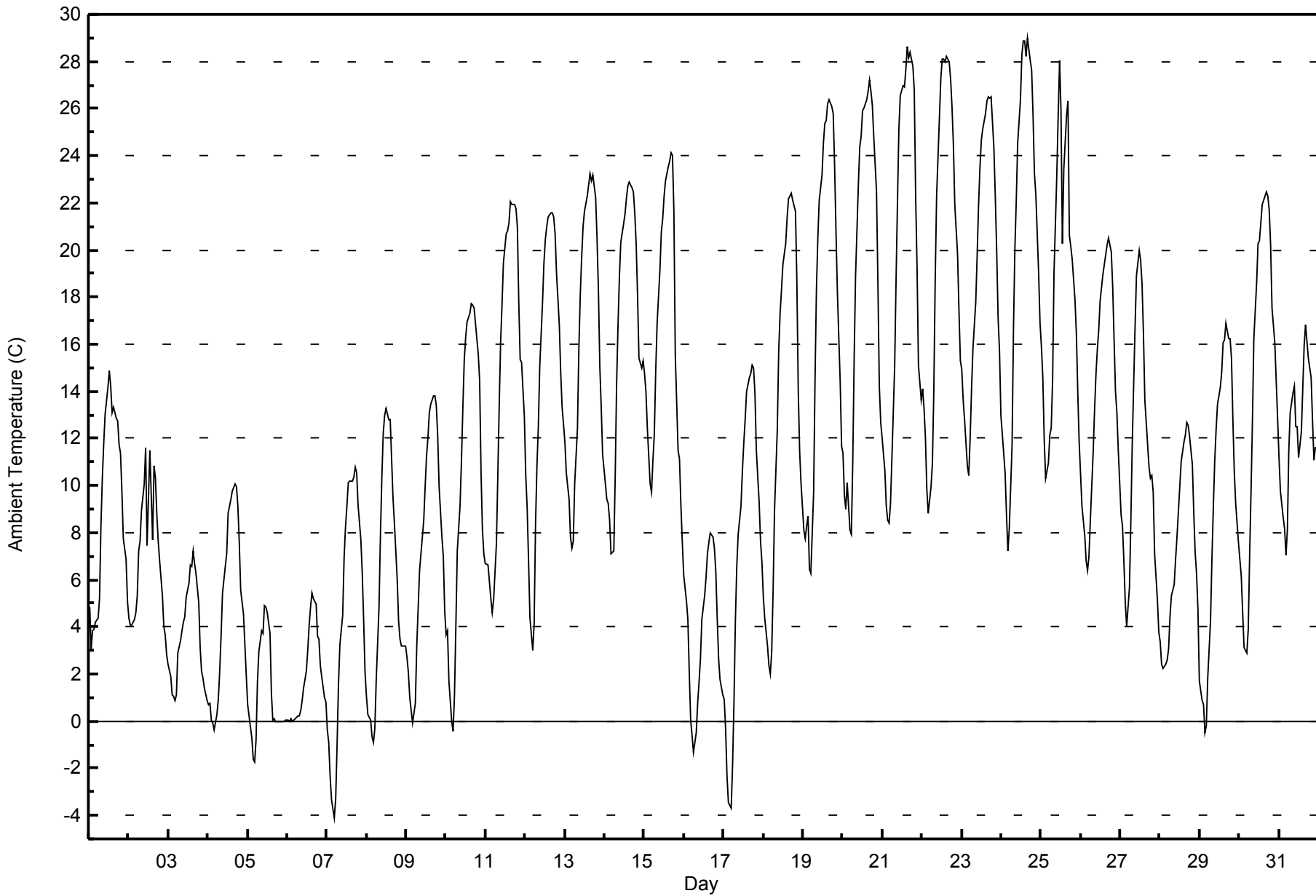
Buffalo Viewpoint - May 2015

Maximum Value: 29.0 C on May 24 17:00		Maximum Daily Average: 20.3 C on May 24		Hours in Service: 744																							
Minimum Value: -4.1 C on May 7 05:00		Minimum Daily Average: 1.1 C on May 5		Hours of Data: 744																							
Maximum Diurnal Average: 17.6 C at hour 16		Minimum Diurnal Average: 3.7 C at hour 5		Hours of Missing Data: 0																							
Monthly Average: 11.65 C		Percentiles: P ₁ = -1.9 P ₁₀ = 1.1 Q ₁ = 5.1 Median = 10.9 Q ₃ = 17.7 P ₉₀ = 22.9 P ₉₉ = 28.2		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	4.9	3.0	3.9	3.9	4.2	4.4	5.2	8.3	10.3	11.8	13.0	14.2	14.9	14.2	13.1	13.4	12.8	12.7	11.7	11.4	9.8	7.8	6.8	5.1	9.2	14.9	
2-May	4.4	4.0	4.1	4.3	4.6	5.3	7.2	7.6	8.9	10.0	11.6	7.4	9.4	11.5	7.7	10.8	10.3	8.8	7.6	6.8	5.3	4.0	3.7	2.8	7.0	11.6	
3-May	2.4	1.9	1.1	1.1	0.9	1.1	2.9	3.4	3.9	4.2	4.4	5.3	5.9	6.6	6.6	7.2	6.7	6.3	5.0	3.2	2.1	1.8	1.4	0.9	3.6	7.2	
4-May	0.7	0.8	0.0	-0.1	-0.4	0.3	0.9	2.1	3.7	5.4	6.6	7.1	8.8	9.1	9.4	9.8	10.1	10.0	9.1	7.6	5.6	4.6	3.3	1.9	4.8	10.1	
5-May	0.7	0.2	-0.7	-1.6	-1.8	-0.8	1.6	2.9	3.8	3.7	4.9	4.8	4.6	3.7	1.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.1	4.9	
6-May	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.2	0.5	0.9	1.4	2.1	3.0	4.0	4.8	5.4	5.2	5.0	3.6	3.5	2.3	1.9	1.0	0.8	1.9	5.4	
7-May	-0.4	-0.9	-2.3	-3.3	-4.1	-3.3	-1.0	1.6	3.2	4.5	6.9	8.2	9.1	10.1	10.2	10.2	10.4	10.8	10.6	9.2	7.7	6.3	4.3	2.0	4.6	10.8	
8-May	1.1	0.3	0.0	-0.7	-0.9	-0.3	1.8	4.8	7.9	10.3	12.2	13.0	13.3	12.8	12.8	11.2	9.5	8.4	6.0	4.3	3.5	3.2	3.2	3.2	5.9	13.3	
9-May	2.7	2.0	1.0	0.4	-0.1	0.8	3.2	4.8	6.4	7.1	8.5	9.9	11.2	12.0	13.1	13.4	13.8	13.8	13.4	12.1	10.0	7.8	7.0	4.7	7.5	13.8	
10-May	3.6	3.8	1.7	0.0	-0.4	1.1	4.1	7.2	9.2	11.1	13.4	15.3	16.3	16.9	17.3	17.7	17.6	17.5	16.9	15.6	14.4	10.6	8.1	7.1	10.3	17.7	
11-May	6.7	6.6	5.9	5.2	4.6	5.1	7.5	10.4	13.4	16.0	17.7	19.5	20.7	20.8	21.2	22.1	21.9	22.0	21.8	21.0	17.8	15.4	15.2	12.9	14.6	22.1	
12-May	10.4	9.1	6.8	4.4	3.0	4.2	8.4	10.8	12.5	15.0	17.8	19.4	20.5	21.0	21.4	21.6	21.6	21.4	20.7	19.0	16.8	14.8	13.3	12.6	14.4	21.6	
13-May	11.8	10.6	9.4	7.8	7.3	7.6	10.0	12.4	15.8	18.0	19.7	21.0	21.6	22.3	22.8	23.2	22.9	23.2	22.2	20.5	18.3	15.0	13.3	11.3	16.2	23.2	
14-May	10.0	9.4	9.3	8.5	7.1	7.2	10.4	14.3	16.8	18.9	20.3	21.1	21.5	22.2	22.7	22.9	22.6	22.5	21.6	20.3	18.1	15.4	15.0	15.3	16.4	22.9	
15-May	14.8	14.0	12.4	10.1	9.7	11.1	12.2	14.9	16.9	19.2	20.7	21.3	22.3	23.0	23.5	23.8	24.1	24.0	21.6	15.5	11.5	11.1	9.2	7.6	16.4	24.1	
16-May	6.2	5.1	4.3	2.1	0.0	-0.6	-1.3	-0.5	0.7	1.7	2.6	4.3	5.3	6.1	7.1	7.6	8.0	7.8	7.4	6.3	4.3	2.6	1.8	1.1	3.8	8.0	
17-May	0.9	-0.3	-2.3	-3.4	-3.7	-1.9	0.8	4.3	6.5	7.9	9.1	10.6	11.8	12.8	14.0	14.6	14.7	15.1	15.0	13.9	11.5	9.3	7.7	6.8	7.3	15.1	
18-May	5.3	4.4	3.2	2.4	2.0	3.0	5.6	9.0	12.4	15.7	17.3	18.3	19.4	20.3	21.4	22.2	22.3	22.4	22.1	21.7	18.7	14.0	11.4	10.1	13.5	22.4	
19-May	8.1	7.7	8.3	8.7	6.4	6.3	9.7	14.5	18.3	20.5	22.1	23.2	24.5	25.4	25.5	26.2	26.4	26.1	25.8	23.6	20.7	18.2	14.4	11.6	17.6	26.4	
20-May	11.4	9.6	9.0	10.1	8.1	7.9	11.0	15.4	18.9	22.8	24.3	24.8	25.9	26.0	26.4	26.8	27.2	26.7	26.1	24.9	22.5	18.5	14.2	12.7	18.8	27.2	
21-May	12.0	10.6	9.1	8.5	8.4	9.2	11.1	15.1	18.8	22.0	25.2	26.6	27.0	26.9	27.7	28.7	28.2	28.4	27.8	26.8	22.3	19.3	15.1	13.6	19.5	28.7	
22-May	14.1	13.3	12.0	9.8	8.8	10.0	10.9	14.1	18.8	22.3	25.6	27.3	28.1	28.1	28.0	28.2	28.0	27.3	26.1	24.5	22.0	19.8	17.4	15.3	20.0	28.2	
23-May	14.9	13.6	12.8	10.8	10.4	12.0	14.1	15.8	17.8	19.7	21.9	23.5	24.6	25.1	25.8	26.3	26.5	26.4	26.5	24.3	22.2	19.9	17.1	15.7	19.5	26.5	
24-May	13.0	11.4	10.5	8.7	7.2	8.2	11.7	16.7	20.0	22.1	24.5	26.4	28.3	28.9	28.9	28.2	29.0	28.0	27.6	25.8	23.2	22.4	19.1	16.9	20.3	29.0	
25-May	15.9	14.6	11.9	10.3	10.9	12.2	12.5	14.5	19.0	23.2	25.7	28.0	25.9	20.3	23.4	25.7	26.3	20.6	20.1	19.6	17.9	16.5	14.0	11.9	18.4	28.0	
26-May	10.5	9.1	7.9	6.8	6.4	7.0	8.5	11.4	13.1	14.7	15.7	16.6	17.8	18.9	19.4	19.8	20.2	20.5	19.9	18.4	16.2	14.0	13.1	11.5	14.1	20.5	
27-May	8.8	8.3	6.8	5.0	4.0	5.7	8.5	11.8	14.3	16.7	18.9	20.0	19.6	18.5	16.5	13.6	11.8	10.8	10.3	10.5	9.7	7.1	5.1	3.8	11.1	20.0	
28-May	3.4	2.4	2.3	2.4	2.6	3.1	4.4	5.3	5.8	6.9	7.8	8.9	9.9	11.0	11.8	12.1	12.7	12.6	12.1	10.9	8.9	7.1	6.2	4.8	7.3	12.7	
29-May	1.7	0.9	0.7	-0.5	-0.2	1.8	4.3	6.9	9.1	11.0	12.4	13.4	14.2	14.8	16.0	16.2	16.9	16.2	16.3	15.4	12.8	10.6	9.2	7.6	9.5	16.9	
30-May	6.9	6.2	4.6	3.1	2.9	3.9	7.0	9.8	12.7	16.3	18.6	20.3	20.4	21.1	21.9	22.3	22.5	22.3	21.7	20.2	17.5	16.1	14.5	12.9	14.4	22.5	
31-May	11.2	9.8	8.7	8.2	7.0	8.1	11.4	13.1	13.9	14.2	12.5	12.5	11.2	12.3	14.1	16.0	16.9	16.1	15.4	14.6	12.7	11.1	11.6	11.6	12.2	16.9	
		7.0	6.2	5.2	4.3	3.7	4.5	6.6	9.1	11.4	13.4	15.0	15.9	16.7	17.0	17.3	17.6	17.6	17.2	16.5	15.2	13.1	11.2	9.6	8.3	Diurnal Average	
		15.9	14.6	12.8	10.8	10.9	12.2	14.1	16.7	20.0	23.2	25.7	28.0	28.3	28.9	28.9	28.7	29.0	28.4	27.8	26.8	23.2	22.4	19.1	16.9	Diurnal Maximum	



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Buffalo Viewpoint - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Buffalo Viewpoint - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	32	4.30	4.30
0 - 10	306	41.13	45.43
10 - 20	262	35.22	80.65
> 20	144	19.35	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

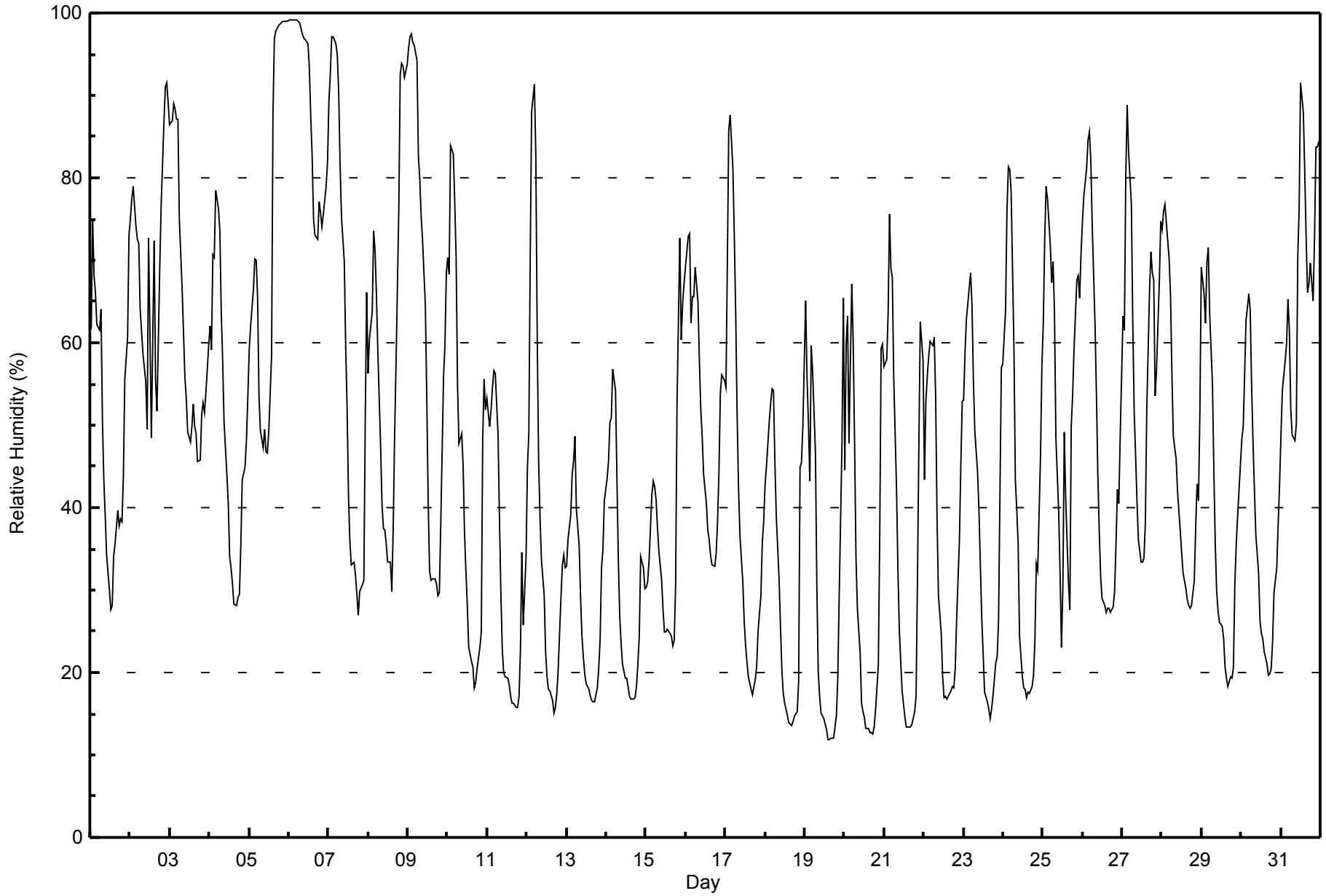


Maximum Value: 99 % on May 6 05:00																			Maximum Daily Average: 88.6 % on May 6						Hours in Service: 744																									
Minimum Value: 12 % on May 19 16:00																			Minimum Daily Average: 28.8 % on May 13						Hours of Data: 744																									
Maximum Diurnal Average: 71.7 % at hour 5																			Minimum Diurnal Average: 31.0 % at hour 16						Hours of Missing Data: 0																									
Monthly Average: 47.7 %																			Percentiles: P ₁ = 13 P ₁₀ = 18 Q ₁ = 28 Median = 46 Q ₃ = 65 P ₉₀ = 81 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-May	62	75	68	66	62	61	64	51	43	39	34	30	28	28	34	36	40	38	39	38	44	56	61	73	48.7	75																								
2-May	75	77	79	74	73	72	64	61	59	55	50	73	61	49	72	56	52	60	69	77	87	91	91	89	69.4	91																								
3-May	86	87	89	88	87	87	75	67	61	56	53	49	48	50	53	50	49	46	46	51	53	52	54	60	62.3	89																								
4-May	62	59	71	70	78	76	74	64	58	50	44	40	34	33	31	28	28	29	29	35	43	45	48	53	49.4	78																								
5-May	59	62	66	70	70	65	53	49	47	49	47	47	49	58	88	97	98	98	99	99	99	99	99	99	73.7	99																								
6-May	99	99	99	99	99	99	99	98	98	97	97	96	93	88	83	75	73	72	77	76	74	76	79	82	88.6	99																								
7-May	89	92	97	97	96	95	90	81	75	70	59	52	42	36	33	33	32	30	27	30	31	31	51	66	59.9	97																								
8-May	56	61	64	74	71	66	59	47	40	38	37	36	33	33	30	38	49	57	76	93	94	94	92	94	59.6	94																								
9-May	96	97	98	96	96	94	83	80	75	72	64	53	41	32	31	31	31	31	29	30	38	56	60	68	61.8	98																								
10-May	70	68	84	83	77	70	55	48	49	45	37	32	28	23	21	21	18	19	21	23	25	48	56	52	44.7	84																								
11-May	53	50	52	55	57	56	49	39	30	23	20	20	19	18	17	16	16	16	16	17	23	35	26	34	31.4	57																								
12-May	45	49	70	88	91	83	61	46	39	34	29	22	19	18	18	17	15	16	17	20	29	33	34	33	38.6	91																								
13-May	33	36	39	44	46	49	40	35	29	24	22	20	19	18	17	17	16	16	18	21	24	33	35	41	28.8	49																								
14-May	44	46	50	51	57	54	44	34	27	23	21	19	19	18	17	17	17	17	18	21	24	34	33	30	30.6	57																								
15-May	30	31	33	42	43	42	41	38	35	31	28	25	25	25	25	24	23	24	31	53	73	60	65	67	38.1	73																								
16-May	69	73	73	62	66	66	69	65	58	52	49	44	40	37	36	34	33	33	34	38	44	54	56	55	51.7	73																								
17-May	55	70	86	88	81	73	63	51	42	37	31	26	23	21	20	18	17	18	19	21	25	29	36	38	41.2	88																								
18-May	43	45	51	53	54	54	46	39	31	26	20	17	16	15	14	14	14	14	15	15	19	45	45	50	31.5	54																								
19-May	65	56	50	43	60	56	47	31	20	17	15	14	14	13	12	12	12	12	13	15	19	29	48	65	30.8	65																								
20-May	45	60	63	48	67	60	48	34	28	22	16	15	15	13	13	13	13	12	13	15	21	37	59	60	33.0	67																								
21-May	57	58	64	76	69	68	56	42	33	25	21	18	14	13	13	13	13	14	15	17	32	48	62	58	37.5	76																								
22-May	43	53	56	58	60	60	61	53	39	29	25	19	17	17	17	17	18	18	18	21	26	36	45	53	35.8	61																								
23-May	53	59	63	67	69	65	55	49	44	39	33	26	22	18	17	16	14	16	17	21	22	26	42	57	37.9	69																								
24-May	57	64	76	81	81	78	59	43	40	36	24	19	18	17	18	17	18	17	18	20	24	33	32	46	57	40.8	81																							
25-May	62	72	79	77	72	67	70	64	48	39	32	23	30	49	41	31	28	50	54	59	68	68	65	71	55.0	79																								
26-May	75	78	81	85	86	82	74	62	54	44	37	32	29	28	27	28	28	27	28	30	36	42	41	49	49.2	86																								
27-May	63	61	80	89	83	77	62	52	47	41	36	33	33	34	38	52	66	71	68	68	54	57	68	75	58.7	89																								
28-May	74	76	77	72	70	66	56	49	46	42	39	37	34	32	30	29	28	28	28	31	38	43	41	52	46.6	77																								
29-May	69	66	62	70	72	63	55	44	36	30	27	26	26	24	21	19	18	19	19	21	31	36	39	45	39.1	72																								
30-May	48	50	56	63	66	64	55	48	42	37	32	26	25	24	23	21	20	20	20	24	30	33	38	43	37.7	66																								
31-May	49	54	58	60	65	61	52	49	48	50	70	76	91	88	81	73	66	67	70	65	73	84	84	84	67.4	91																								
																								60.9	64.0	68.9	70.6	71.7	68.8	60.6	52.0	45.8	41.1	37.2	34.5	32.5	31.4	31.9	31.0	31.1	32.5	34.3	37.7	42.9	49.7	54.8	59.8	Diurnal Average		
																								99	99	99	99	99	99	99	98	98	97	97	96	93	88	88	97	98	98	99	99	99	99	99	99	99	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Buffalo Viewpoint - May 2015





Maximum Speed: 49 km/h on May 15 20:00	Maximum Daily Speed Average: 23.9 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 24 02:00	Minimum Daily Speed Average: 0.5 km/h on May 19	Hours of Data: 743
Maximum Diurnal Speed Average: 6.0 km/h at hour 18	Minimum Diurnal Speed Average: 1.6 km/h at hour 8	Hours of Missing Data: 1
Monthly Average Velocity: 3.0 km/h 28.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 12 P ₉₀ = 19 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-May	SW10	SSE9	SSE10	SSE8	SE5	SSE7	SE8	SSW7	WSW14	SW15	SW17	WSW16	W17	W15	WSW15	NW10	NNE4	SE4	WNW17	WSW7	WSW9	WNW9	W7	WNW10	WSW7.1	WNW17
2-May	W7	W8	WNW9	WNW10	WSW4	WNW4	NNW11	N20	N17	N17	N16	NNW17	NNW15	N15	NW13	NNW8	N14	NNE11	SSW1	S6	NNW18	N20	N18	N20	NNW10.6	N20
3-May	N18	N16	N14	N14	N13	N10	N11	NNW8	WNW9	NW14	NW13	WNW8	NW7	N12	N21	N20	N21	NNE18	NNE18	NNE13	ENE9	ENE9	ENE8	NE7	N11.4	N21
4-May	NE7	NE6	NE8	E4	S6	SW5	SSE4	S4	W2	E3	ENE6	NNE7	N10	NNE9	N7	NNE7	N5	NE10	NE9	NNE10	NNE13	NE12	NE11	NE10	NE5.3	NNE13
5-May	NNE11	NNE12	NNE11	NNE11	NNE11	NNE12	NNE13	NNE12	NNE16	N17	N18	N23	N21	N25	N24	NNE18	NNE21	NNE20	NNE24	NNE23	NNE20	NNE18	NNE17	N15	NNE17.0	N25
6-May	N15	N14	N16	NNE15	N18	N21	N19	N21	N22	N21	N19	NNE18	NNE20	NNE20	NNE18	NNE17	NE14	NE11	NE12	ENE8	ENE9	E9	SE7	WSW3	NNE13.7	N22
7-May	NE1	ESE2	S5	SSE6	SSE8	SSE8	SSE8	SSE6	WSW4	SW4	NW7	N8	N8	N8	NE6	NE8	NE7	NE6	NE3	E5	E9	ENE11	SE6	S8	E2.3	ENE11
8-May	S8	SSE7	SE8	SSE8	S8	S8	SSE8	SSE7	SSE6	E3	NNE10	NE7	N8	N6	N7	NNW15	NNE18	NNE21	NE18	NE14	ENE13	E10	ESE6	SSW5	ENE4.2	NNE21
9-May	NNW5	NNE12	NNE12	NNE11	NNE9	NNE7	NE5	WSW1	SSW4	SSW9	SSW7	SSW8	S9	SSW8	S6	ESE6	ESE8	E5	ESE5	SE6	SE8	SE6	SSE6	SSE7	ESE2.2	NNE12
10-May	SE6	SSW3	S4	S5	SE7	SE4	SE4	ESE3	N6	N8	N7	N8	N11	N5	E6	E7	ESE6	ESE6	E7	ENE7	ESE7	SE6	SSE8	SSE10	E3.1	N11
11-May	SE11	SSE12	SSE12	SSE9	SSE6	SSE6	SSE7	SSE7	SSW7	WSW6	W8	NW8	NNW10	NNE7	NNW5	N6	NNW5	NNE3	NNW2	AF	SSW2	ESE1	ENE10	SE7	SSE1.6	SSE12
12-May	SSW5	SSE4	SSE2	SSE3	S5	S4	SE4	SE6	SE7	SE5	E4	SE9	ESE10	SE11	ESE13	SE11	ESE10	ESE10	ESE10	ESE9	SE16	SE15	SE16	SE17	SE8.2	SE17
13-May	SE17	SE17	SE13	SSE11	SSE5	SE10	SSE12	SSE10	S8	SW9	SSW10	SSW12	SW11	WSW9	WSW8	SW6	S5	SW5	S9	S12	S8	SSE10	SSE11	SE11	S8.2	SE17
14-May	SSE11	SE10	SSE8	SSE8	SE9	SE8	SSE8	SSW10	SW12	WSW13	SW13	SSW13	SSW12	SW10	S11	S10	SSW10	SSW10	SSW11	SSW8	S7	SSW8	SSW11	SSW15	SSW8.8	SSW15
15-May	SSW14	SSW12	S11	SE9	ESE8	E5	ESE5	NNE4	NNE5	N5	WNW5	W15	W12	W13	W13	W13	WSW11	W11	N16	N49	N40	N46	N45	N45	NNW9.5	N49
16-May	N38	N34	N25	N40	N30	N38	N31	N30	N28	N29	N29	N24	N24	N24	NNE21	NNE19	NNE19	NNE17	NNE18	N17	NNE15	NNE12	NNE9	NE10	N23.9	N40
17-May	NE6	ESE2	SSE5	SSE6	SSE7	SSE9	SSE11	SSE12	SSE12	SE12	SSE10	SSE9	SE10	SE10	SE9	ESE9	SE11	SE11	SE10	SE10	SE8	SSE9	SSE10	SSE11	SE8.8	SSE12
18-May	SSE11	SSE9	SSE13	SSE11	SSE9	SSE10	SE8	SE6	S4	WNW3	SSW7	SSW11	SSW9	SW9	SW3	WNW9	WNW10	NW10	WNW7	WNW2	S4	SSE8	SSE9	SSE8	S4.6	SSE13
19-May	SSE9	SSE9	SE3	S3	SSE6	SSE8	SSE6	S6	SW8	WNW9	WNW10	NW11	NNW10	N12	N8	N8	N7	NNW5	N6	ESE5	SSE6	SSW7	SSE7	SE10	SSW0.5	N12
20-May	SSE7	SSE7	SE6	NE3	SSE7	SSE9	SSE8	SSE7	SSE5	NNW3	WNW10	SSE3	NNW4	SW4	SSW5	SW5	SW2	S7	S7	S6	SSW7	S7	SSE10	SE11	S4.3	SE11
21-May	SSE8	SSE6	SSE6	SSE7	SE8	SSE7	SSE7	SSE6	SE6	SE5	ENE5	NNW9	WNW3	SW9	WNW7	NW10	NW12	NW10	NW8	WNW4	SSE4	S6	SSE9	SSE11	S1.9	NW12
22-May	SSW1	NW6	SSW7	SSE11	SE10	SE8	SSE5	SSW2	NNW3	N7	N7	N18	N18	N22	N21	N20	N23	N25	N25	NNE21	NNE14	NNE13	NNE10	NNE13	N9.4	N25
23-May	NNE10	N15	NNE12	NNE12	NNE10	NE6	NNE8	N8	N9	N10	N10	NNW10	N10	NNE8	NNE5	N6	NNE7	NNE5	NNW3	S1	ESE3	NE5	N1	NW6	N6.8	N15
24-May	NNW7	ENE0	WNW4	S2	SSE7	SSE6	SSE8	SE4	NNE6	NNE7	SSE5	E3	N8	N9	NNE6	ENE6	ENE5	E4	ENE5	ESE5	E5	SSW6	S3	ENE2.0	N9	
25-May	SW3	W2	S6	SE9	SSE6	SSE7	SSE7	SSE6	S4	SSE3	SW5	W9	W12	NW11	E2	SSW6	WSW3	NNW28	NW7	N8	N18	N26	NNW25	N20	NNW3.9	NNW28
26-May	N20	N20	N17	N13	N13	N12	N12	N14	N14	N15	N19	N20	N14	N11	N7	NNE5	NE8	NNE9	NNE10	NNE13	NE10	NE9	ENE9	SE6	N11.5	N20
27-May	SSE7	SE4	S5	S6	SSE5	SSE5	SSE6	ESE7	SE5	ESE5	SE2	WNW3	NW7	NNW15	NNW29	N36	N34	N33	N25	N19	NNE33	N32	N30	N29	N11.5	N36
28-May	NNE29	NNE27	NNE25	NNE23	N19	N19	N19	N22	N26	N22	N22	N22	N18	N17	N15	N15	NNE14	NNE13	NNE12	NNE13	NNE12	ENE9	E8	SSE6	NNE16.6	NNE29
29-May	SSE7	SSE8	SSE7	SSE8	SSE7	SSE6	SSE7	SSE10	SSE11	SSE7	S1	N4	ESE6	ESE3	NE7	ESE4	ENE6	SE6	SSE6	S6	SSE8	SSE10	SSE12	SSE11	SSE5.8	SSE12
30-May	SSE13	SSE12	SSE9	SSE8	SSE6	SSE7	SE6	SE5	ESE3	NNE2	NNE5	ENE4	SSW9	S7	SSE7	SSE8	SSE11	SSE11	SE11	SE10	SE9	SSE12	SSE11	SSE12	SSE7.4	SSE13
31-May	SSE11	SSE11	SSE10	SSE9	SSE5	SSE9	SSE13	SSE13	SE11	S9	SSE7	SSE4	SSE10	SSE11	SSE12	SSE12	SSE10	SSE8	SSE9	SSE10	SSE11	S7	SW5	WSW8	SSE8.9	SSE13

ENE2.0	ENE2.5	E1.8	E2.5	E2.8	E2.5	E2.7	ENE1.6	N1.8	N3.5	NNW4.2	NNW4.9	NNW5.1	N5.2	N4.8	N5.1	NNE5.6	NNE6.0	NNE5.1	NE4.9	NE4.9	NE5.0	ENE3.6	ENE2.1	Diurnal Average	
N38	N34	N25	N40	N30	N38	N31	N30	N28	N29	N29	N24	N24	N25	NNW29	N36	N34	N33	N25	N49	N40	N46	N45	N45	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
Buffalo Viewpoint - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on May 2 15:00	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9
Minimum Value: 0 km/h on May 9 23:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 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-May	2	2	2	2	2	3	2	4	3	4	5	5	5	6	7	7	4	3	7	1	2	2	2	2	7
2-May	2	3	3	2	2	1	4	4	3	4	5	6	5	6	11	3	7	5	2	1	11	6	4	4	11
3-May	3	3	2	2	2	2	2	2	4	4	4	3	3	4	6	5	4	4	4	3	1	1	1	1	6
4-May	1	1	1	2	1	1	1	2	2	2	3	3	3	4	3	3	3	3	3	2	3	3	3	2	4
5-May	2	2	2	1	2	2	2	3	3	3	4	4	6	6	5	4	4	4	3	5	4	4	3	2	6
6-May	2	2	2	2	3	3	3	3	3	4	3	4	4	4	4	4	4	3	4	2	1	2	1	1	4
7-May	1	1	1	0	1	1	2	2	2	2	3	3	3	4	3	3	3	3	2	1	2	2	2	1	4
8-May	1	1	1	1	1	1	2	2	2	3	3	3	3	2	2	10	6	5	4	4	3	3	2	1	10
9-May	2	2	1	2	1	1	1	1	2	2	2	3	4	3	3	3	3	2	1	1	1	1	0	1	4
10-May	1	2	1	1	1	1	1	1	2	1	2	2	3	3	4	3	3	3	2	1	1	1	2	1	4
11-May	2	2	2	3	2	1	2	2	2	2	3	3	3	3	3	3	3	2	2	AF	1	3	3	2	3
12-May	1	3	2	1	1	1	1	2	2	2	2	3	4	4	4	4	4	3	3	3	4	4	4	4	4
13-May	3	3	4	3	1	2	3	3	2	3	3	4	4	4	4	3	4	2	3	3	2	2	2	2	4
14-May	2	1	1	2	1	2	2	3	3	4	4	5	4	6	4	4	4	3	3	2	1	1	3	3	6
15-May	3	3	3	1	2	2	1	2	2	3	4	4	5	4	4	4	4	3	11	9	6	7	7	7	11
16-May	6	6	11	8	6	7	5	5	5	6	6	5	6	5	5	5	5	4	4	3	2	2	2	1	11
17-May	1	1	1	1	1	2	3	4	4	4	4	3	4	4	4	3	3	3	3	3	1	1	2	2	4
18-May	2	2	2	4	2	1	1	1	2	3	4	4	4	3	4	3	3	2	2	1	1	1	1	1	4
19-May	1	1	3	1	1	1	2	2	2	2	3	4	3	3	3	3	2	3	1	1	1	1	1	1	4
20-May	1	1	2	2	1	1	1	2	2	3	3	5	4	4	4	3	3	3	3	1	1	1	2	2	5
21-May	2	1	1	1	1	1	2	1	2	2	3	3	3	5	4	4	3	2	3	1	1	1	1	2	5
22-May	2	2	2	1	2	1	1	1	1	2	2	5	5	6	5	5	5	6	5	4	3	3	2	2	6
23-May	2	3	5	2	2	2	2	1	2	3	3	3	3	4	3	3	2	2	1	1	2	1	1	2	5
24-May	1	2	2	2	1	1	2	2	4	3	2	2	2	3	4	2	2	2	1	1	1	2	2	2	4
25-May	2	2	2	2	3	1	1	1	1	1	2	3	6	10	2	2	6	10	6	2	7	4	5	4	10
26-May	3	4	3	3	2	2	2	3	3	4	5	6	4	5	4	4	3	3	3	3	2	1	2	1	6
27-May	2	1	1	1	1	2	2	2	1	2	2	3	1	6	11	6	6	6	5	4	8	6	8	6	11
28-May	6	6	5	4	4	4	4	5	5	5	5	6	6	5	4	5	5	4	4	3	2	2	2	1	6
29-May	1	1	1	1	1	2	2	3	4	3	3	4	3	3	3	3	3	3	2	1	2	2	3	2	4
30-May	3	3	2	2	2	2	2	2	2	2	3	3	4	4	4	4	3	4	4	3	2	2	2	2	4
31-May	2	2	2	2	1	2	4	4	3	3	3	2	3	3	4	4	4	3	3	3	3	2	1	2	4
	6	6	11	8	6	7	5	5	5	6	6	6	6	10	11	10	7	10	11	9	11	7	8	7	

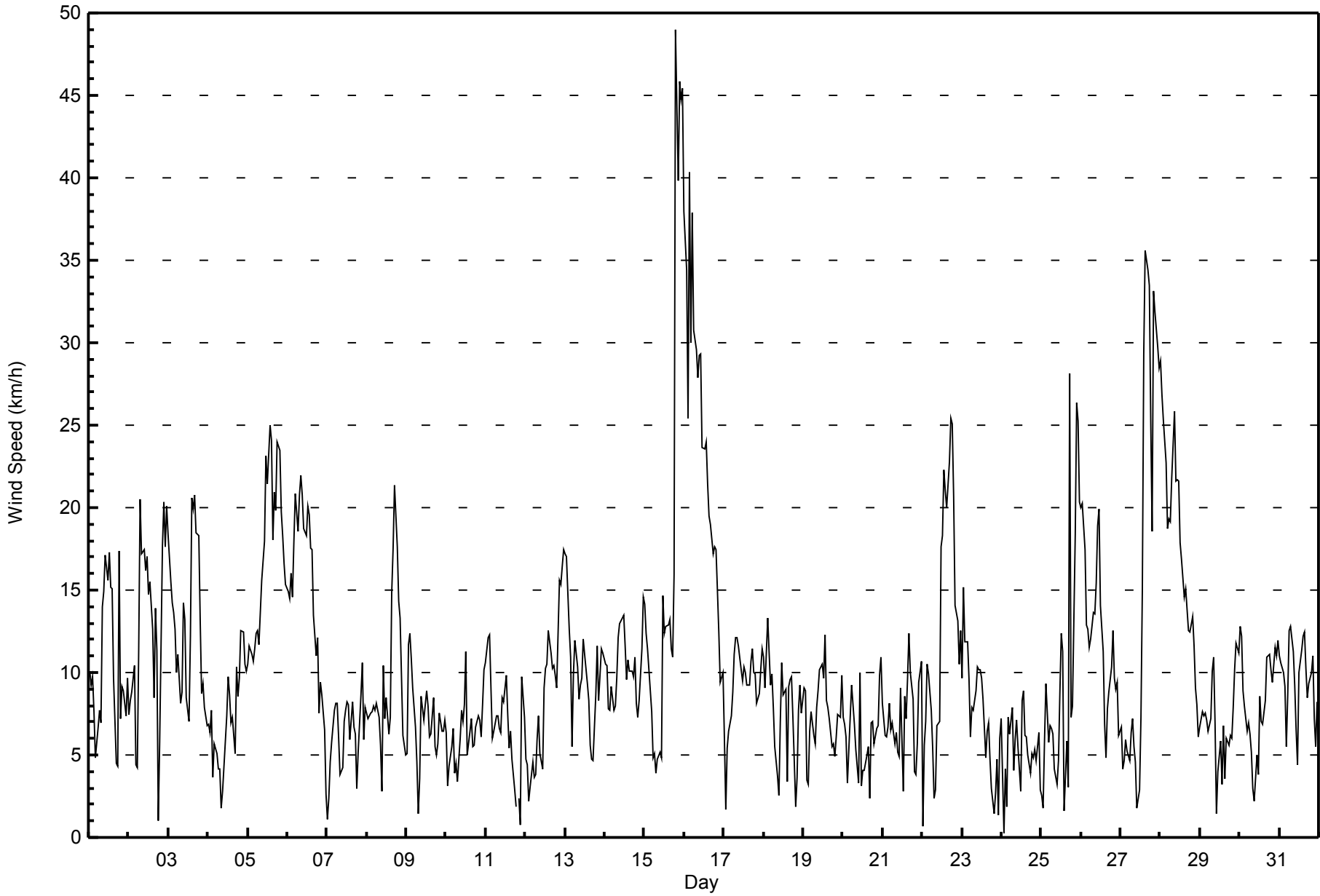
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	137	18.44	18.44
6 - 11	387	52.09	70.52
12 - 19	145	19.52	90.04
20 - 28	51	6.86	96.90
29 - 38	17	2.29	99.19
> 38	6	0.81	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



WBEA
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	10	5	4	11	14	12	17	16	9	10	5	2	8	0	9	137
6 - 11	30	30	20	13	7	15	48	118	27	23	7	9	5	13	14	8	387
12 - 19	46	36	5	1	0	1	8	15	1	6	4	4	8	1	4	5	145
20 - 28	36	13	0	0	0	0	0	0	0	0	0	0	0	0	0	2	51
29 - 38	14	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	17
> 38	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Totals	137	91	30	18	18	30	68	150	44	38	21	18	15	22	18	25	743

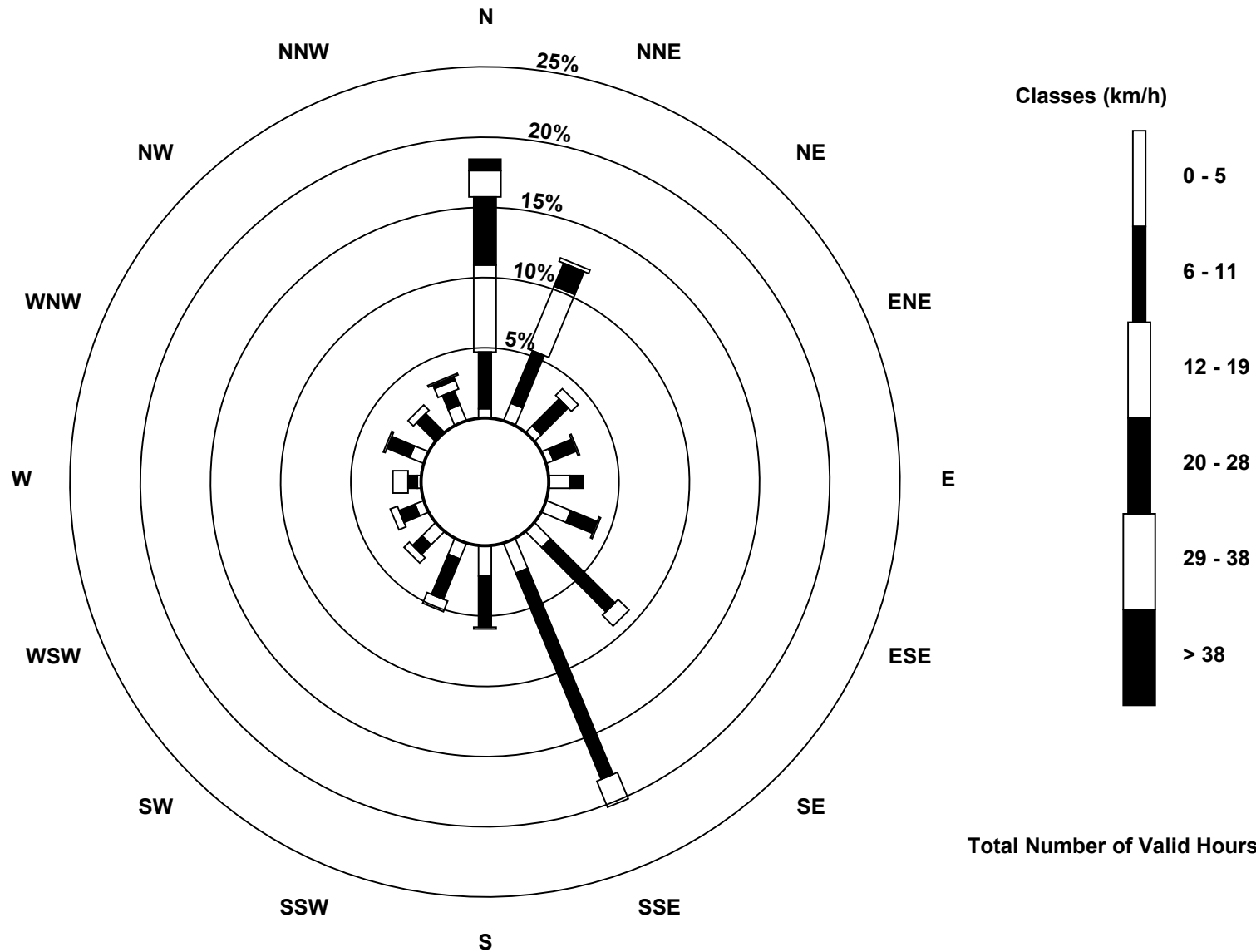
Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Buffalo Viewpoint - May 2015

Direction of Maximum Speed: 353 deg on May 15 20:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 5.7 deg on May 16	Hours of Data: 743
Direction of Minimum Speed: 76 deg on May 24 02:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 0.5 deg on May 19	Percent Operational Time: 99.9
Monthly Average Direction: 200.9 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	216	150	160	167	125	167	144	197	251	231	236	251	259	263	247	307	21	128	290	243	246	283	261	286	240.0
2-May	278	273	286	302	240	302	328	356	2	4	351	333	341	359	319	332	355	18	210	178	335	2	5	8	343.0
3-May	4	1	2	1	357	4	359	346	302	322	311	299	324	8	7	6	9	13	16	13	64	73	70	46	2.7
4-May	55	55	38	91	173	226	151	187	261	94	75	26	359	16	9	29	354	34	51	33	30	44	42	38	39.0
5-May	16	17	18	17	20	16	21	22	20	10	8	358	10	5	7	20	23	18	20	19	21	20	21	3	14.9
6-May	4	9	6	12	7	5	5	0	1	7	4	14	19	21	29	30	52	49	48	71	70	82	130	250	19.2
7-May	53	111	170	164	153	157	158	165	238	222	314	357	9	10	42	42	39	36	55	92	80	73	133	176	89.4
8-May	171	149	141	151	177	178	147	159	160	91	19	39	6	355	352	329	28	25	42	41	66	87	112	208	62.1
9-May	333	19	13	24	21	29	51	244	211	212	202	199	183	197	179	118	112	86	115	134	138	137	151	164	121.5
10-May	134	194	170	174	142	134	129	108	2	357	2	355	357	10	97	97	116	120	89	77	106	145	151	152	99.2
11-May	146	151	153	156	147	159	152	153	203	258	259	314	335	13	332	349	348	29	328	AF	202	122	65	125	151.0
12-May	207	152	163	149	176	172	140	137	139	128	97	132	114	132	118	127	116	110	108	109	125	129	138	138	129.7
13-May	140	143	146	148	153	138	149	151	170	215	212	196	225	257	250	228	179	217	188	170	174	151	152	145	171.6
14-May	149	143	159	148	137	140	148	209	235	247	224	201	208	218	183	191	201	194	197	192	188	194	207	211	192.9
15-May	211	204	189	139	121	99	118	21	13	350	303	268	279	272	275	264	254	262	1	353	358	357	355	357	334.2
16-May	357	356	359	0	8	359	355	355	357	7	1	6	8	10	15	22	20	23	12	11	15	16	30	38	5.7
17-May	48	107	161	152	152	156	157	161	159	142	148	155	139	133	133	123	130	132	143	143	145	153	148	151	144.0
18-May	148	156	152	149	150	149	143	137	171	287	210	210	192	217	225	291	291	305	303	293	180	157	161	156	182.3
19-May	147	154	146	190	163	159	152	187	236	290	290	306	347	1	8	355	3	343	11	110	163	194	157	144	200.5
20-May	155	147	131	52	151	155	157	165	167	337	298	151	344	217	205	223	229	182	177	177	206	176	147	141	169.9
21-May	150	155	158	153	142	150	166	147	132	137	67	342	283	214	287	318	307	313	318	302	165	175	151	147	180.3
22-May	208	321	200	162	143	134	157	192	346	2	11	4	4	356	1	10	356	2	3	13	24	29	23	12	10.1
23-May	26	9	13	16	19	38	17	2	1	352	351	348	349	15	24	350	28	19	346	170	117	50	356	308	8.4
24-May	341	76	293	186	153	161	155	130	26	18	151	80	3	358	16	69	16	89	57	109	120	82	193	181	74.5
25-May	228	261	176	145	149	153	166	162	170	166	228	268	279	306	95	192	239	343	324	2	357	356	348	351	330.7
26-May	354	358	358	1	356	4	2	357	356	10	2	358	6	11	6	13	36	30	32	28	39	42	68	138	10.4
27-May	165	139	186	184	162	159	149	123	129	121	128	299	321	347	348	356	8	7	8	2	12	11	10	6	8.4
28-May	12	19	14	13	11	11	9	8	359	2	357	359	4	3	359	7	15	20	21	19	17	65	94	158	11.5
29-May	150	156	162	153	150	156	165	162	162	147	186	10	102	116	35	111	59	125	162	170	152	155	153	159	146.5
30-May	149	150	161	160	164	156	143	142	117	30	29	58	201	169	161	158	168	159	143	135	138	150	156	153	151.5
31-May	150	148	150	150	155	154	149	149	143	169	164	164	163	162	156	156	168	162	164	161	155	173	223	252	160.2
65.1 66.3 84.6 81.0 97.5 95.4 100.8 78.0 357.0 349.9 336.9 337.6 344.8 351.8 0.9 7.9 19.4 21.8 24.8 35.5 46.1 49.9 68.8 70.6																									
Diurnal Average																									

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

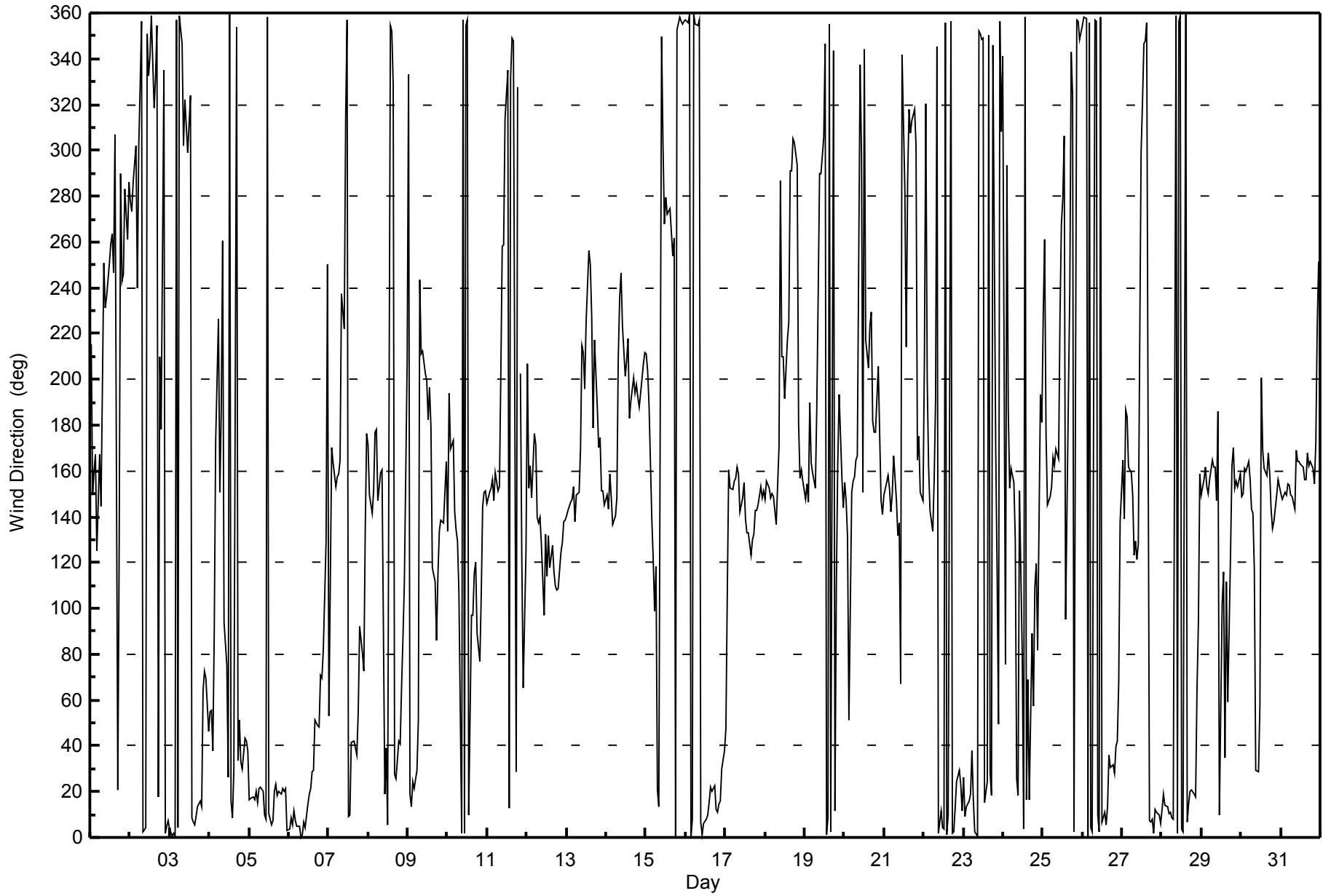
Wind Direction (WD) - deg
Buffalo Viewpoint - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																			Hours in Service: 744						
Maximum Value: 104 deg on May 2 19:00																			Hours of Data: 743						
Minimum Value: 5 deg on May 17 00:00																			Hours of Missing Data: 1						
Percentiles: P ₁ = 8 P ₁₀ = 12 Q ₁ = 15 Median = 21 Q ₃ = 35 P ₉₀ = 58 P ₉₉ = 92																			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-May	14	21	19	27	50	40	25	49	20	22	21	26	27	32	37	69	74	40	20	22	28	20	12	11	74
2-May	11	17	17	11	37	40	15	16	16	17	19	27	22	30	43	29	31	33	104	21	38	15	15	15	104
3-May	14	14	13	14	13	13	14	32	32	21	22	33	47	17	17	19	17	18	16	12	21	14	13	11	47
4-May	15	9	11	59	22	37	31	47	84	85	58	57	37	56	57	47	62	20	28	16	14	13	14	14	85
5-May	12	11	9	8	12	12	16	19	19	13	16	17	17	18	15	13	14	14	13	12	13	12	12	14	19
6-May	13	12	12	11	12	15	13	15	15	13	13	15	15	16	16	17	24	22	17	22	12	20	24	37	37
7-May	69	62	12	12	10	11	17	37	52	64	45	37	42	42	55	30	38	44	66	30	13	10	34	16	69
8-May	12	11	15	10	14	21	16	24	39	78	24	45	34	33	27	47	33	16	16	16	16	19	41	24	78
9-May	41	11	8	9	7	21	27	80	75	26	48	40	53	39	60	56	37	44	32	10	8	13	11	12	80
10-May	30	53	17	15	11	45	21	56	28	19	29	26	21	74	69	45	79	44	21	8	7	13	14	10	79
11-May	10	9	14	14	17	11	19	26	34	50	36	46	30	41	60	52	60	75	93	AF	32	84	16	23	93
12-May	27	23	57	47	15	19	18	26	23	61	66	34	31	33	24	24	27	23	21	18	15	16	16	15	66
13-May	16	14	15	17	21	14	18	19	30	26	33	29	34	45	41	62	78	61	23	18	12	14	12	9	78
14-May	9	10	22	22	17	14	17	26	23	25	25	30	33	46	34	33	35	25	23	18	10	10	14	13	46
15-May	14	17	15	25	13	29	19	52	47	61	78	27	30	29	30	27	30	29	57	20	22	21	22	21	78
16-May	19	19	18	19	16	19	16	18	19	20	17	20	19	19	19	20	19	19	16	15	11	10	12	5	20
17-May	9	60	12	11	7	16	17	23	27	31	35	40	40	42	45	38	29	23	22	16	10	14	12	15	60
18-May	15	14	11	11	9	10	14	29	58	83	67	34	44	38	81	40	30	19	18	51	29	10	9	12	83
19-May	16	14	69	40	18	13	19	26	30	28	30	29	34	20	37	36	30	62	22	31	17	11	15	8	69
20-May	19	11	16	58	17	10	13	21	39	90	37	88	87	78	86	71	95	37	25	15	7	17	9	8	95
21-May	13	18	13	15	9	13	17	23	24	44	60	35	98	43	68	37	17	19	18	18	37	8	9	11	98
22-May	90	38	28	12	11	7	16	68	59	23	29	20	20	18	22	21	19	18	17	13	12	14	14	14	90
23-May	12	9	20	9	13	22	18	18	19	21	24	24	30	41	73	44	34	58	55	53	29	17	49	13	73
24-May	12	90	43	84	9	15	17	37	60	76	39	81	25	28	66	49	54	56	28	24	15	36	35	78	90
25-May	53	75	27	8	46	30	15	17	31	49	43	36	33	62	77	44	55	18	62	15	17	17	15	16	77
26-May	17	17	15	14	14	15	16	16	17	20	19	20	26	31	57	88	37	26	21	15	16	13	19	28	88
27-May	12	24	19	12	27	24	23	24	34	46	93	87	15	24	26	19	17	17	17	15	17	17	17	18	93
28-May	15	15	15	14	15	16	17	19	19	18	18	20	23	22	25	24	24	24	20	19	14	17	23	25	25
29-May	12	15	19	14	13	21	25	26	30	63	100	87	68	94	56	83	48	53	30	18	16	19	18	18	100
30-May	18	18	19	16	17	21	25	38	72	87	73	76	49	54	69	54	29	29	29	18	16	18	18	17	87
31-May	16	15	16	20	22	19	20	23	22	29	34	25	21	23	23	26	27	25	21	22	18	34	29	27	34
90 90 69 84 50 45 31 80 84 90 100 88 98 94 86 88 95 75 104 53 38 84 49 78																									
Diurnal Maximum																									
AF - Analyzer Failure																									



WBEA
Hourly Averages

Wind Direction (WD) - deg
Buffalo Viewpoint - May 2015





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 20, 2015	Last Calibration	April 16, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	8:32	End Time (MST)	11:35
Gas Cert Reference	LL107926	Station temp.	22 Deg C
Cal Gas Concentration	51 ppm	Cal Gas Exp Date	5/29/2014
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2636

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-592	-592
Analyzer IP address	192.168.1.43		Lamp voltage	839	836
Calculated slope	0.995400	0.995749	Chamber temp	45.0	45.0
Calculated intercept	0.211577	-0.027297	Pressure	690.1	701.2
Analyzer Background	10.1	10.0	Flow	0.489	0.492
Analyzer Coefficient	0.877	0.867	Intensity	85	85

Analyzer make TEI 43i Analyzer serial # JC1327300932

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	58.8	599.8	607.0	0.988
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	58.8	599.8	601.8	0.997
second point	5000	29.4	299.9	302.7	0.991
third point	5000	14.7	149.9	149.7	1.002
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	58.8	599.8	603.0	0.995
Average Correction Factor					0.996

Corrected As found 607.1 Previous response 602.3 % change -0.8%

Notes:

Sample inlet filter changed after as founds. Adjusted span.

Calibration Performed By: Asad Hidayat



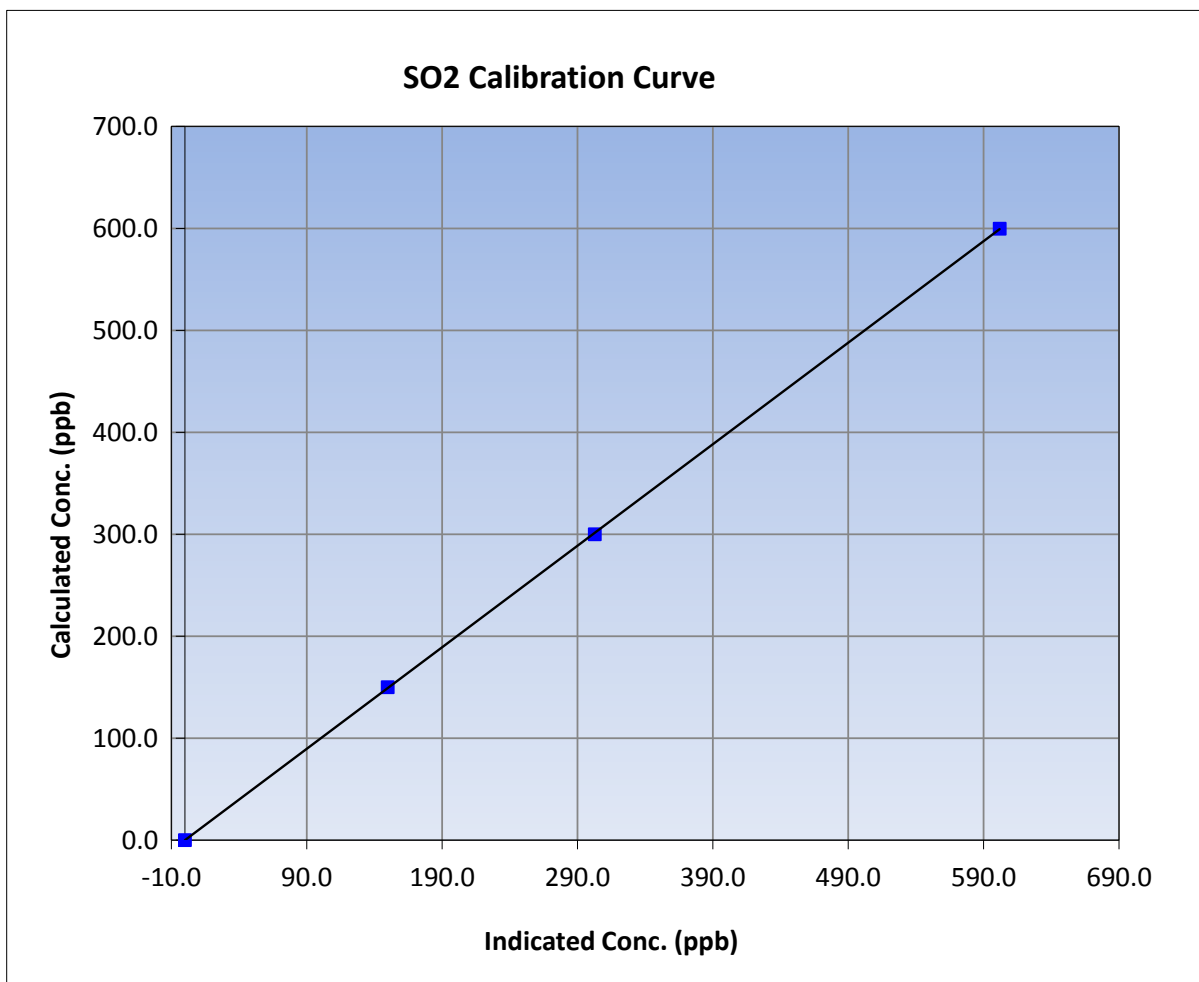
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 20, 2015	Previous Calibration	April 16, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	8:32	End Time (MST)	11:35
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

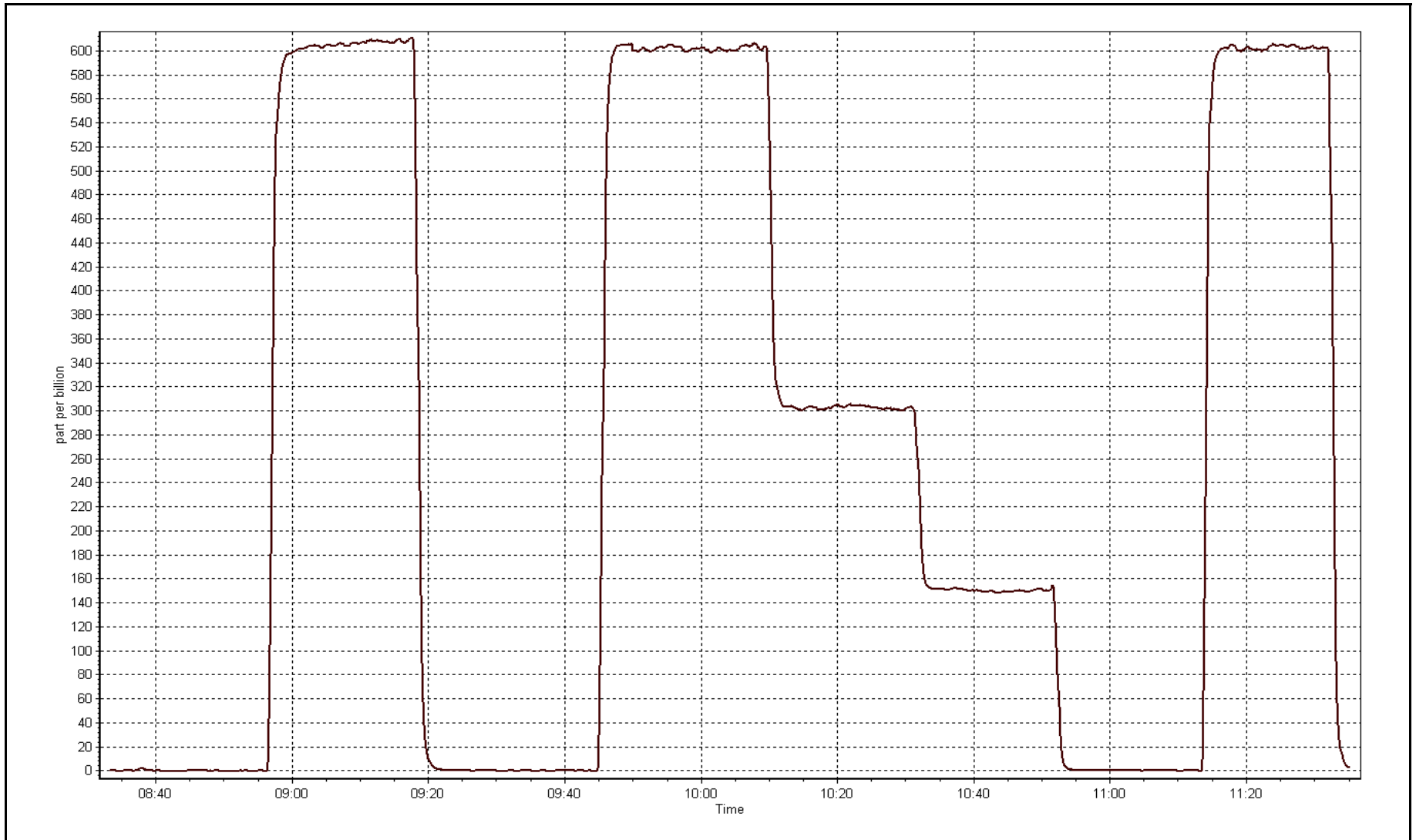
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999983
599.8	601.8	0.9966		
299.9	302.7	0.9907	Slope	0.995749
149.9	149.7	1.0017		
			Intercept	-0.027297



SO2 Calibration Plot

Date: May 20, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 11, 2015	Last Calibration	April 13, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	13:48
Gas Cert Reference	LL10590	Station temp.	22 Deg C
Cal Gas Concentration	9.75 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG air Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635
SO2 gas concentration	51 ppm	SO2 gas cert/exp	LL107926 5/29/2014

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-617	-616
Analyzer IP address	192.168.1.42		Lamp voltage	872	871
Calculated slope	0.988238	0.994664	Chamber temp	45	45
Calculated intercept	0.190178	-0.082000	Pressure	547.5	556.2
Analyzer Background	14.8	14.1	Flow	1.053	1.057
Analyzer Coefficient	0.868	0.852	Intensity	94	94
			Converter temp.	329	332

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	-0.4	----
as found span	6000	46.2	75.1	75.8	0.991
SO2 scrubber check	5000	14.7	149.9	3.0	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	46.2	75.1	75.5	0.994
second point	6000	25.9	42.1	42.5	0.991
third point	6000	15.4	25.0	25.2	0.993
as left zero	6000	0.0	0.0	0.2	----
as left span	6000	46.1	74.9	75.5	0.992
Average Correction Factor					0.993

Corrected As found	76.2	Previous response	75.8	% change	-0.5%
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Notes:

Inlet filter changed and scrubber check done after as founds. Slightly adjusted zero and span.

Calibration Performed By:

Asad Hidayat



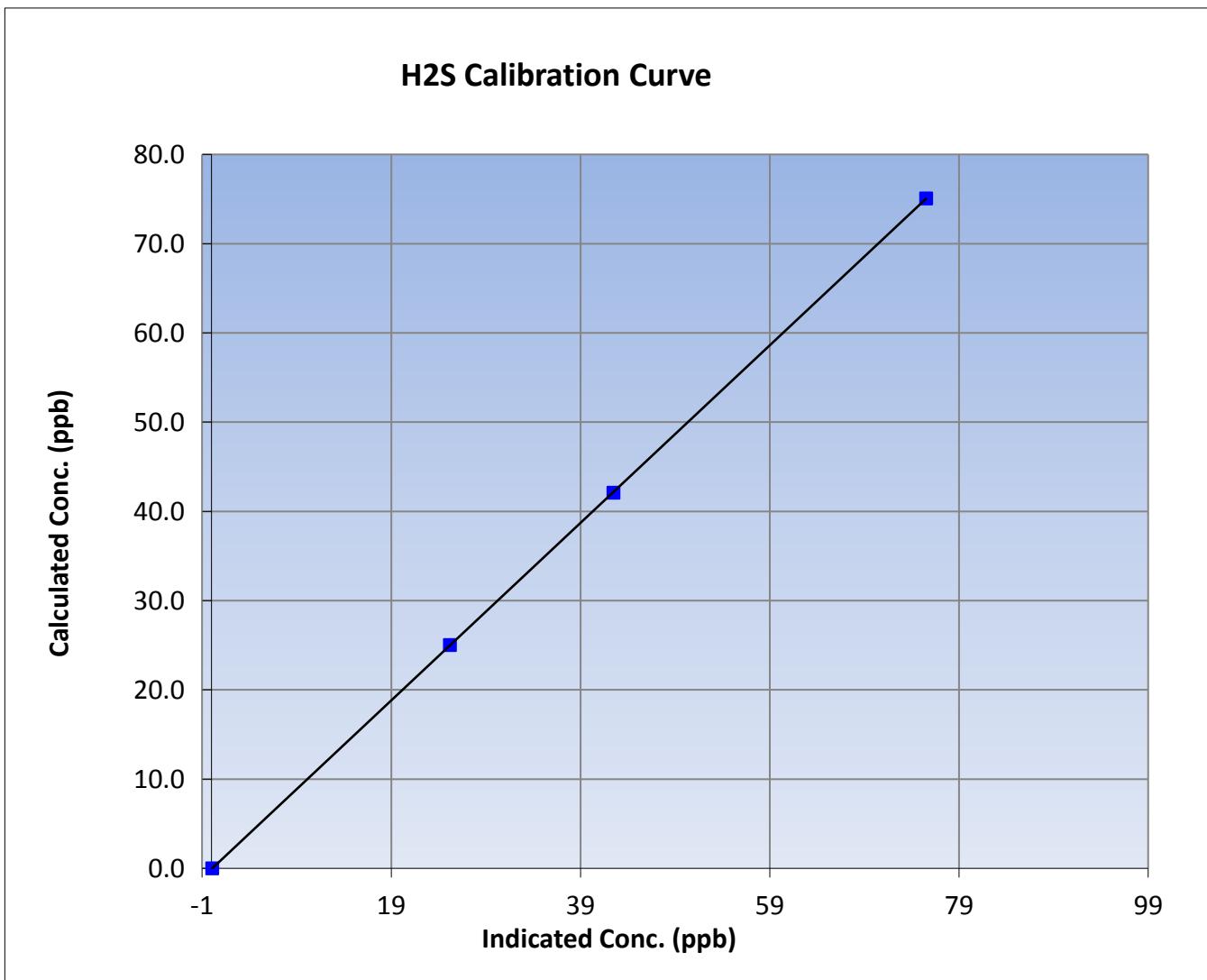
Wood Buffalo Environmental Association H2S Calibration Report

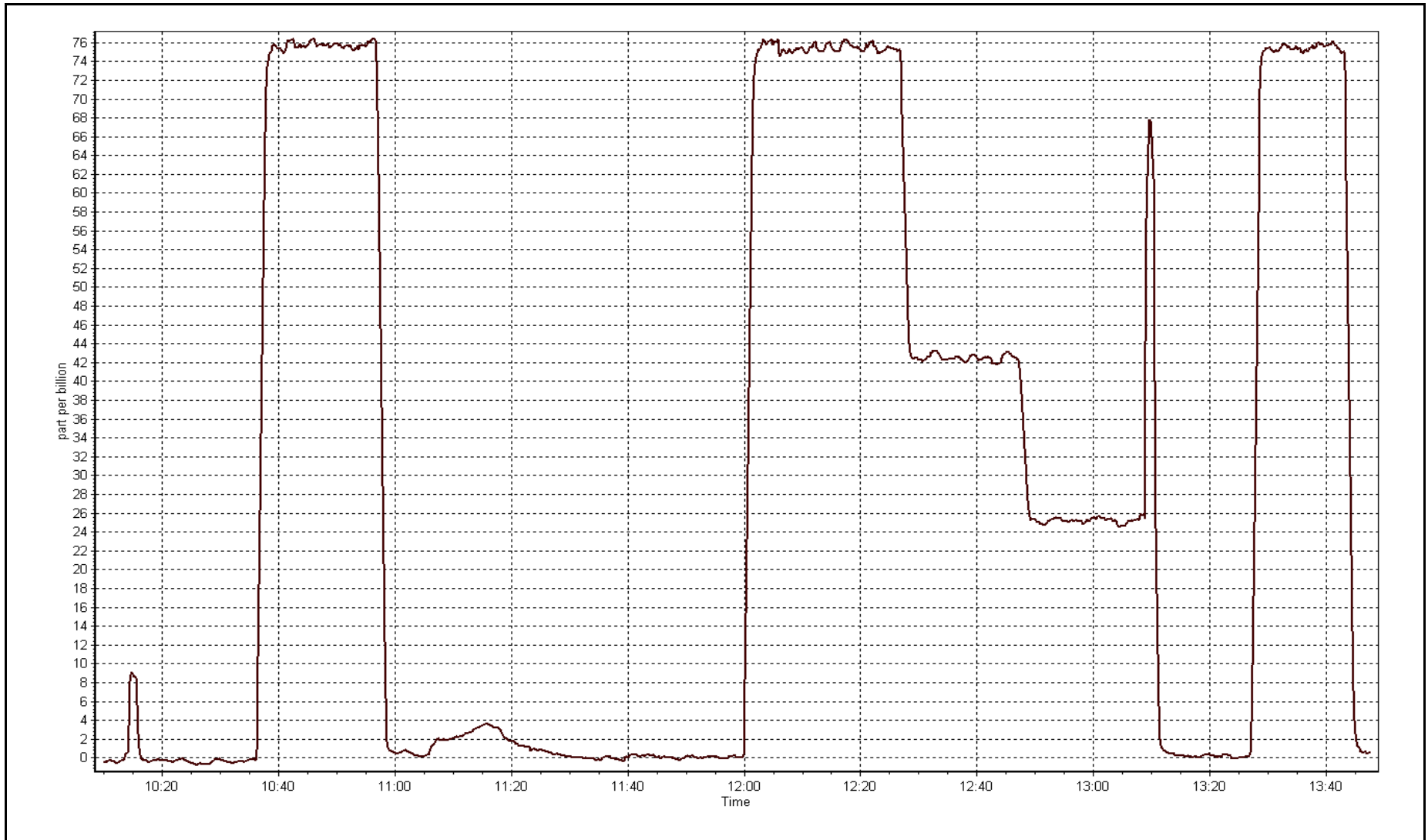
Station Information

Calibration Date	May 11, 2015	Previous Calibration	April 13, 2015
Station Name	AMS 4	Station Number	AMS 4
Start Time (MST)	10:10	End Time (MST)	13:48
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	0.1	----	Correlation Coefficient	0.999996
75.1	75.5	0.9940		
42.1	42.5	0.9908	Slope	0.994664
25.0	25.2	0.9934		
			Intercept	-0.082000







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-20-15	Last Calibration	April-16-15
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	8:32	End Time (MST)	11:35
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	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG make/model	Teledyne API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	30.4	30.4
Calculated slope	1.000116	1.002631	Fuel Pressure	19.8	19.8
Calculated intercept	-0.029566	-0.025910	Analyzer Coeff	4.0	4.1
			Analyzer BKG	1.270	1.160

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	-0.10	----
as found span	5000	58.8	12.56	12.42	1.011
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	58.8	12.56	12.53	1.002
second point	5000	29.4	6.28	6.33	0.992
third point	5000	14.7	3.14	3.15	0.997
as left zero	5000	0.0	0.00	-0.01	----
as left span	5000	58.8	12.56	12.60	0.997
Average Correction Factor					0.997

Corrected As found 12.52 Previous response 12.58 % change 0.5%

Notes:

Sample inlet filter changed after as founds. Adjusted both zero and span.

Calibration Performed By:

Asad Hidayat



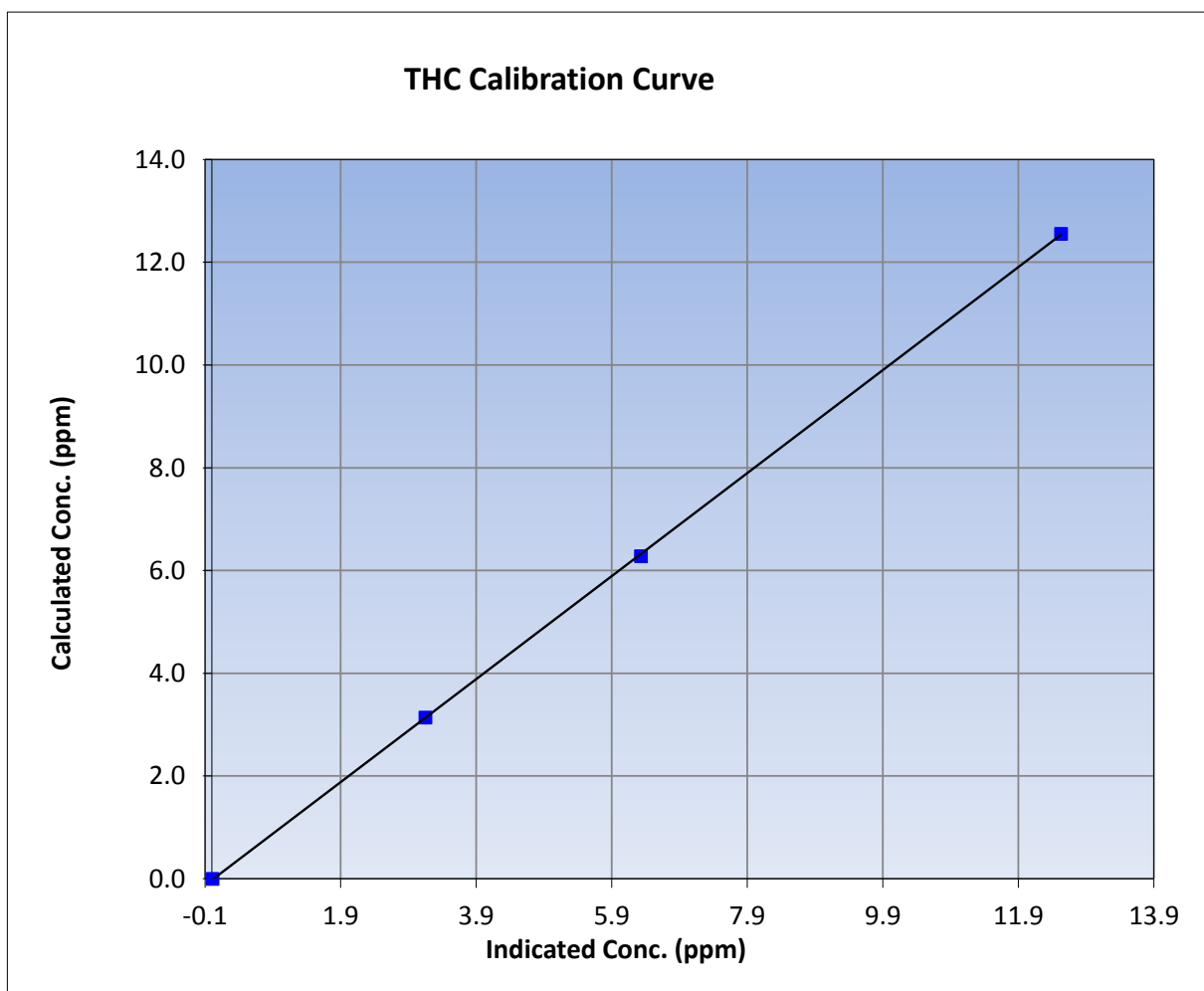
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 20, 2015	Previous Calibration	April 16, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	8:32	End Time (MST)	11:35
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

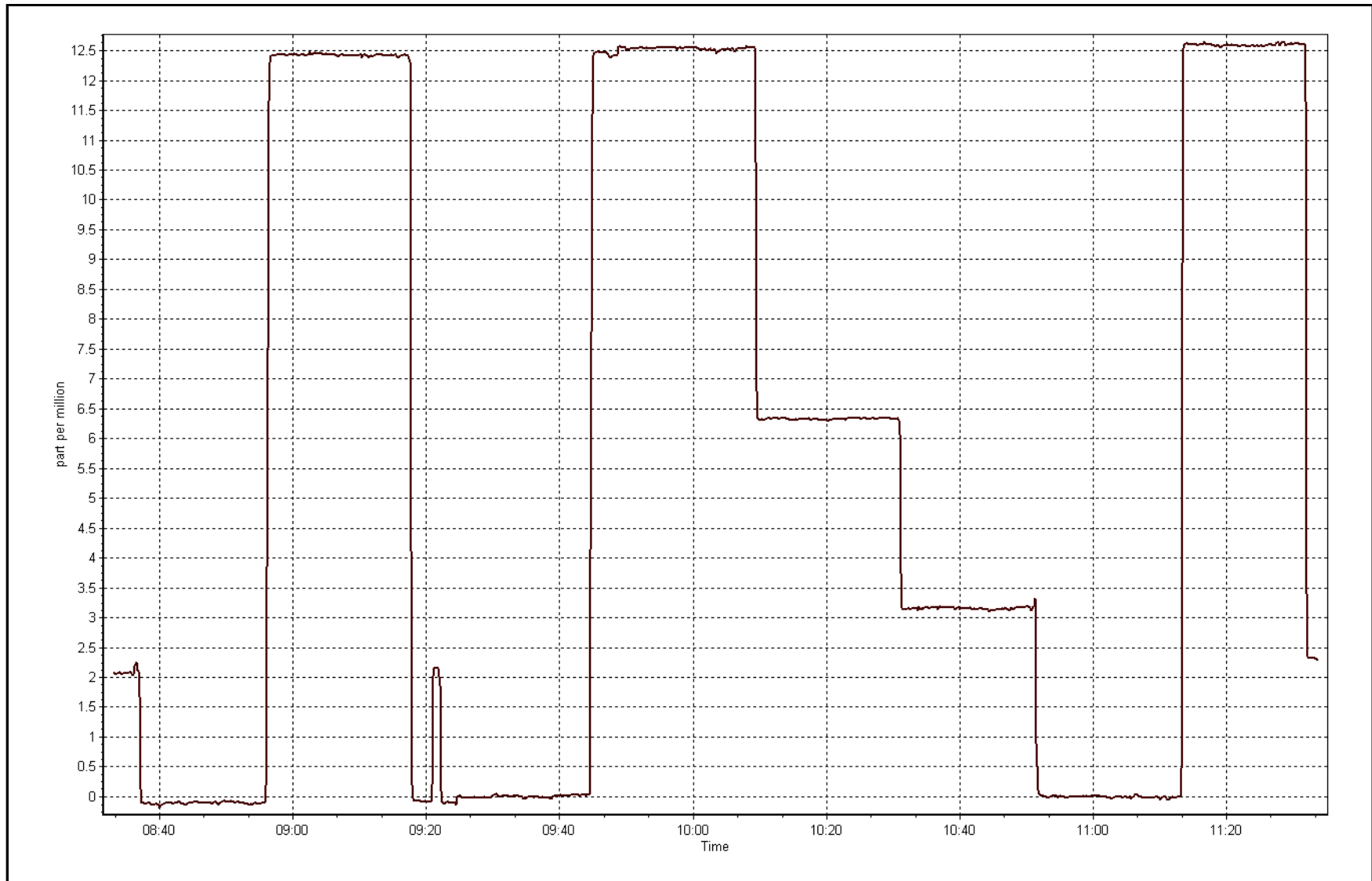
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999971
12.56	12.53	1.0021		
6.28	6.33	0.9918	Slope	1.002631
3.14	3.15	0.9966		
			Intercept	-0.025910



THC Calibration Plot

Date: May 20, 2015





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

**AMS 5
MANNIX
MAY 2015**

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

June 29, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)

MAY 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	35	36	99.87	74	0	20	0
H2S (ppb) Average	709	35	35	100.00	3	0	1	0
THC (ppm) Average	701	42	43	99.87	4.4	-	2.6	-
Temperature 2 m (C) Average	744	0	0	100.00	28.3	-	19.9	-
Temperature 20 m (C) Average	735	0	9	98.79	27.2	-	20.5	-
Temperature 45 m (C) Average	735	0	9	98.79	26.9	-	20.7	-
Temperature 75 m (C) Average	735	0	9	98.79	26.6	-	21	-
Temperature 90 m (C) Average	736	0	8	98.92	26.5	-	21.2	-
Relative Humidity 2 m (%) Average	744	0	0	100.00	97	-	84	-
Relative Humidity 20 m (%) Average	735	0	9	98.79	94	-	83	-
Relative Humidity 45 m (%) Average	735	0	9	98.79	95	-	83	-
Relative Humidity 75 m (%) Average	735	0	9	98.79	95	-	84	-
Relative Humidity 90 m (%) Average	736	0	8	98.92	96	-	85	-
Wind Speed 20 m (km/h) Average	735	0	9	98.79	31	-	19	-
Wind Speed 45 m (km/h) Average	736	0	8	98.92	42	-	24	-
Wind Speed 75 m (km/h) Average	735	0	9	98.79	48	-	27	-
Wind Speed 90 m (km/h) Average	738	0	6	99.19	49	-	28	-
Wind Direction 20 m (deg) Average	735	0	9	98.79	-	-	-	-
Wind Direction 45 m (deg) Average	736	0	8	98.92	-	-	-	-
Wind Direction 75 m (deg) Average	735	0	9	98.79	-	-	-	-
Wind Direction 90 m (deg) Average	738	0	6	99.19	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	735	0	9	98.79	0.8	-	0.3	-
Vertical Wind Speed 45 m (km/h) Average	736	0	8	98.92	1.6	-	0.7	-
Vertical Wind Speed 75 m (km/h) Average	735	0	9	98.79	1.9	-	0.4	-
Vertical Wind Speed 90 m (km/h) Average	738	0	6	99.19	2.7	-	1.2	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	2.7	8	-	0	0	0	0	1	6	74
H2S (ppb) Average	709	0.4	0	-	0	0	0	0	0	1	3
THC (ppm) Average	701	2.16	0.2	-	1.9	2	2	2.1	2.2	2.4	4.4
Temperature 2 m (C) Average	744	11.71	7.5	-	-2.9	2.3	5.9	10.7	17.1	22.7	28.3
Temperature 20 m (C) Average	735	11.96	7.3	-	-1.4	2.6	5.6	11.5	17.8	22.3	27.2
Temperature 45 m (C) Average	735	11.86	7.3	-	-1.8	2.4	5.6	11.6	17.7	22.2	26.9
Temperature 75 m (C) Average	735	11.81	7.3	-	-2.2	2.3	5.5	11.5	17.8	22.3	26.6
Temperature 90 m (C) Average	736	11.76	7.3	-	-2.3	2.2	5.4	11.5	17.8	22.3	26.5
Relative Humidity 2 m (%) Average	744	45.3	21	-	12	18	29	43	59	78	97
Relative Humidity 20 m (%) Average	735	41.9	21	-	11	17	26	39	54	74	94
Relative Humidity 45 m (%) Average	735	41	21	-	10	17	25	37	53	74	95
Relative Humidity 75 m (%) Average	735	40.4	21	-	11	17	24	36	52	73	95
Relative Humidity 90 m (%) Average	736	40.6	21	-	11	17	24	36	52	74	96
Wind Speed 20 m (km/h) Average	735	9.8	5	-	1	4	6	9	12	17	31
Wind Speed 45 m (km/h) Average	736	13.4	7	-	1	5	8	12	17	23	42
Wind Speed 75 m (km/h) Average	735	14.8	9	-	1	5	8	14	20	27	48
Wind Speed 90 m (km/h) Average	738	16	9	-	0	5	8	15	21	29	49
Wind Direction 20 m (deg) Average	735	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	736	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	735	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	738	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	735	0.06	0.3	-	-1.1	-0.3	-0.1	0.1	0.3	0.4	0.8
Vertical Wind Speed 45 m (km/h) Average	736	0.26	0.4	-	-1.2	-0.3	0	0.3	0.6	0.7	1.6
Vertical Wind Speed 75 m (km/h) Average	735	0.18	0.4	-	-0.9	-0.3	-0.1	0.2	0.4	0.7	1.9
Vertical Wind Speed 90 m (km/h) Average	738	0.41	0.7	-	-1.2	-0.4	-0.1	0.4	0.8	1.4	2.7

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	13 May 2015 11:00	13 May 2015 11:00	1	Maintenance - sample manifold cleaned
THC	13 May 2015 11:00	13 May 2015 11:00	1	Maintenance - sample manifold cleaned
Temperature, Relative Humidity 20 m	05 May 2015 16:00	06 May 2015 00:00	9	Flat line in sensor output signal - Sensor frozen
Temperature, Relative Humidity 45 m	05 May 2015 16:00	06 May 2015 00:00	9	Flat line in sensor output signal - Sensor frozen
Temperature, Relative Humidity 75 m	05 May 2015 16:00	06 May 2015 00:00	9	Flat line in sensor output signal - Sensor frozen
Temperature, Relative Humidity 90 m	05 May 2015 16:00	05 May 2015 23:00	8	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 20 m	05 May 2015 16:00	06 May 2015 00:00	9	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	05 May 2015 16:00	05 May 2015 23:00	8	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 75 m	05 May 2015 16:00	06 May 2015 00:00	9	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 90 m	05 May 2015 16:00	05 May 2015 21:00	6	Flat line in sensor output signal - Sensor frozen



Summary of Hour Averages

Mannix - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 74 ppb on May 6 08:00	Maximum Daily Average: 20.2 ppb on May 6
Minimum Value: 0 ppb on May 31 20:00	Hours of Data: 708
Maximum Diurnal Average: 5.2 ppb at hour 10	Hours of Missing Data: 36
Monthly Average: 2.7 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.2 ppb on May 18	Percent Operational Time: 99.9
Minimum Diurnal Average: 1.0 ppb at hour 21	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 6 P ₉₉ = 46	

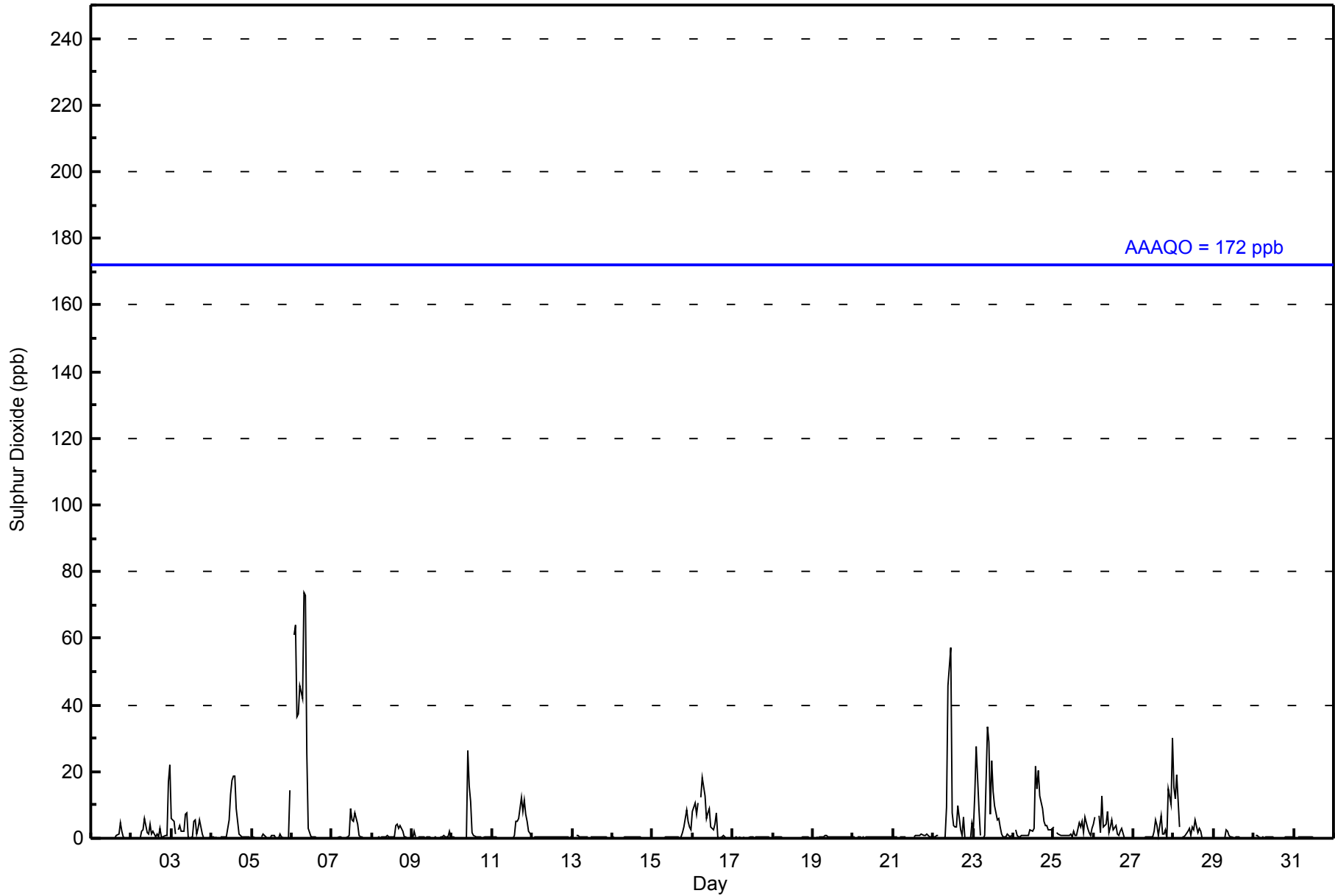
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5	2	0	0	0	0	0	0.5	5
2-May	0	0	Z	0	0	0	2	3	6	2	1	4	1	2	0	1	1	3	1	0	1	1	17	22	3.0	22
3-May	6	5	1	Z	3	4	2	2	7	8	0	0	5	5	1	3	5	1	0	0	0	0	0	2.6	8	
4-May	0	0	0	0	Z	0	0	0	0	0	6	13	18	19	19	9	1	1	1	0	0	0	0	3.8	19	
5-May	0	0	0	0	0	Z	0	1	0	0	0	0	1	1	0	0	0	1	1	0	0	0	14	0.9	14	
6-May	Z	61	64	37	37	46	42	74	73	25	3	0	0	0	0	0	0	0	0	0	0	0	0	20.2	74	
7-May	0	Z	0	0	0	0	0	0	0	0	1	9	6	5	8	4	1	0	0	0	0	0	0	1.6	9	
8-May	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	4	4	3	4	2	0	0	0	0	1.0	4	
9-May	0	2	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0.5	2	
10-May	0	0	0	0	Z	0	0	0	0	26	16	11	2	1	0	0	0	0	0	0	0	0	0	2.6	26	
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	1	5	5	6	12	8	12	7	5	2	1	2.9	12	
12-May	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-May	1	Z	1	1	1	0	1	1	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
14-May	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-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	9	5	3	1.2	9	
16-May	8	10	7	11	Z	12	18	13	6	8	9	3	2	4	8	1	0	0	1	0	0	0	0	5.3	18	
17-May	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0.3	1	
18-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
19-May	0	Z	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0.4	1	
20-May	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	0	0	0.4	1	
21-May	0	0	0	Z	0	0	0	0	C	C	C	C	1	1	1	1	1	1	1	1	1	1	1	0.7	1	
22-May	0	0	1	1	Z	0	0	0	9	46	57	8	4	4	3	10	3	1	7	0	0	0	5	6.9	57	
23-May	3	13	28	8	1	Z	0	1	34	29	7	23	14	10	5	6	4	1	0	1	1	0	1	8.3	34	
24-May	Z	3	1	1	1	1	1	1	1	1	3	2	3	22	15	21	13	9	5	4	4	3	2	5.0	22	
25-May	3	Z	2	1	1	1	1	1	1	1	1	1	2	1	1	5	3	5	2	7	3	2	1	2.0	7	
26-May	4	7	Z	7	2	13	4	4	8	2	3	5	2	4	1	1	2	3	0	0	0	0	0	3.2	13	
27-May	0	0	0	Z	0	0	0	0	0	0	0	0	2	5	4	1	7	1	1	3	0	15	10	3.6	30	
28-May	15	12	19	4	Z	0	0	1	2	3	1	4	3	6	2	3	2	0	0	0	0	0	0	3.3	19	
29-May	0	0	0	0	0	Z	0	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	3	
30-May	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
31-May	1	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
1.7 4.7 4.9 2.8 1.9 3.1 2.4 3.5 5.2 5.2 3.9 3.0 2.1 3.0 2.8 2.5 1.7 1.8 1.2 1.2 1.0 1.2 1.4 2.8																								Diurnal Average		
15 61 64 37 37 46 42 74 73 46 57 23 18 22 19 21 13 12 8 12 9 15 17 30																								Diurnal Maximum		

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Mannix - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	665	93.93	93.93
11 - 20	23	3.25	97.18
21 - 60	16	2.26	99.44
61 - 110	4	0.56	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Mannix - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	39	61	41	41	22	44	100	114	31	36	26	15	17	13	20	37	657
11 - 20	6	8	0	3	1	0	0	1	1	0	0	0	0	0	1	1	22
21 - 60	7	6	0	1	0	0	0	0	0	0	0	0	0	1	0	1	16
61 - 110	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	76	41	45	23	44	100	115	32	36	26	15	17	14	21	39	699

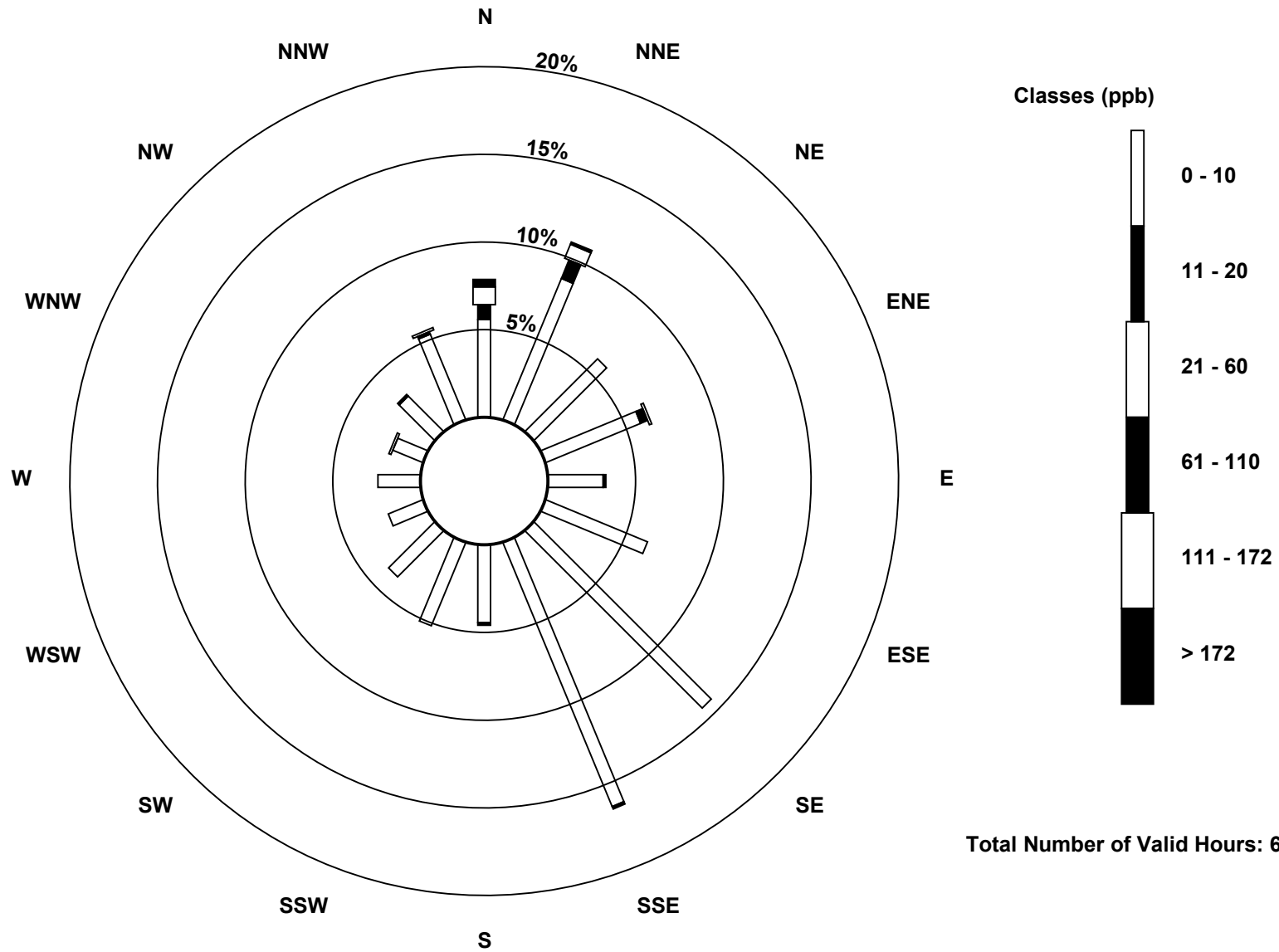
Total Number of Valid Hours: 699

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

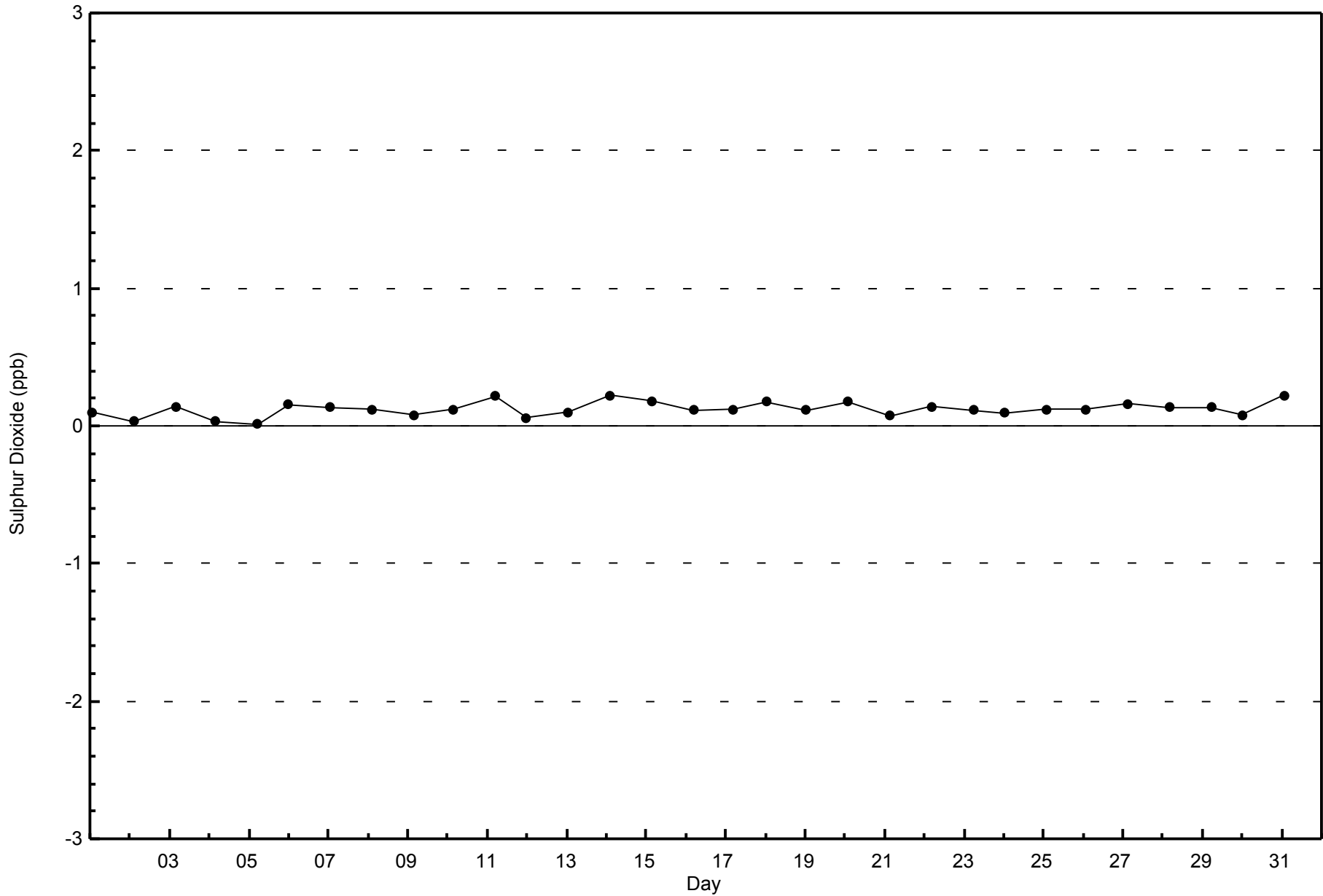
Sulphur Dioxide (SO₂) - ppb
Mannix (AMS 5)





WBEA
Zero Responses

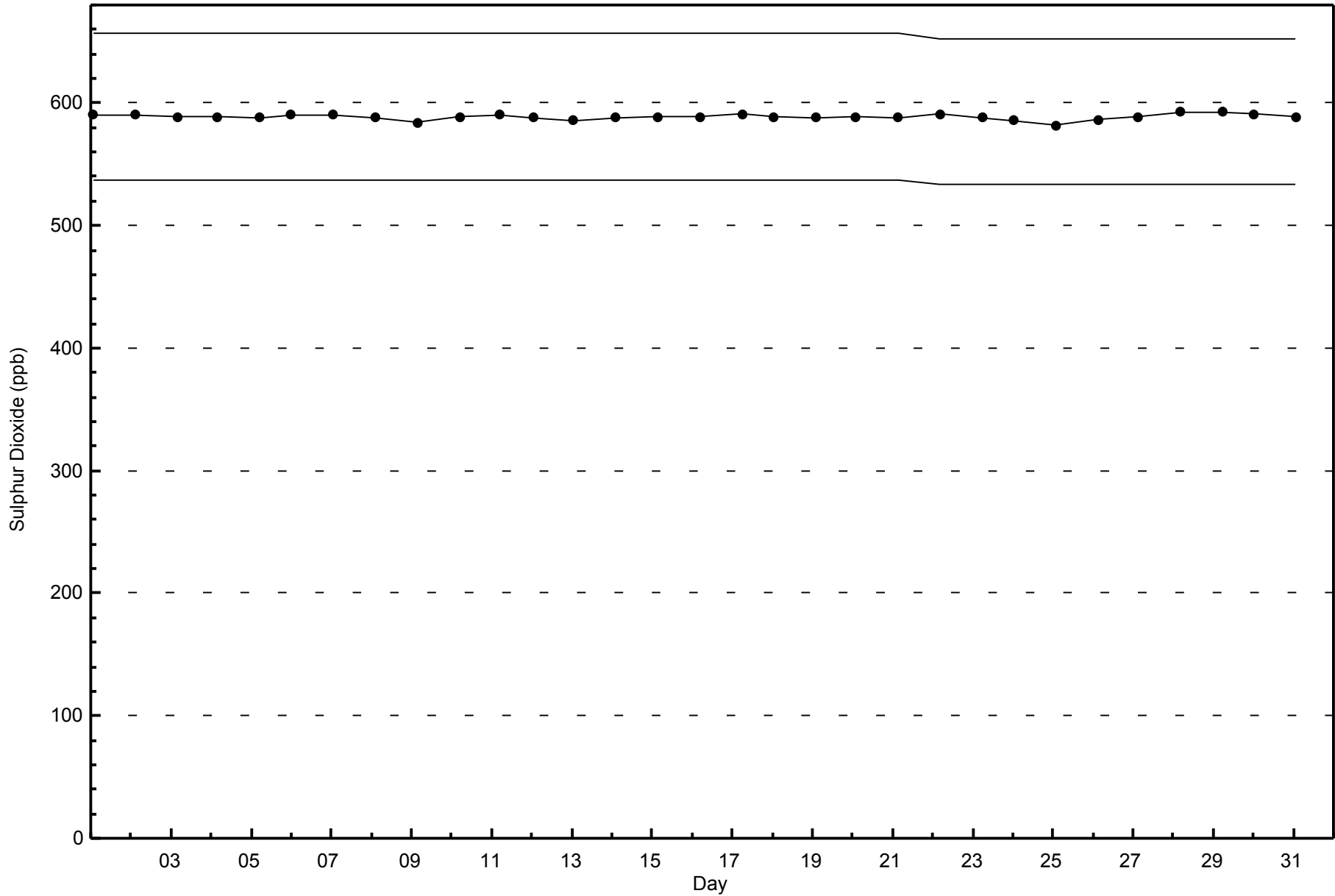
Sulphur Dioxide (SO₂) - ppb
Mannix - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Mannix - May 2015





Summary of Hour Averages

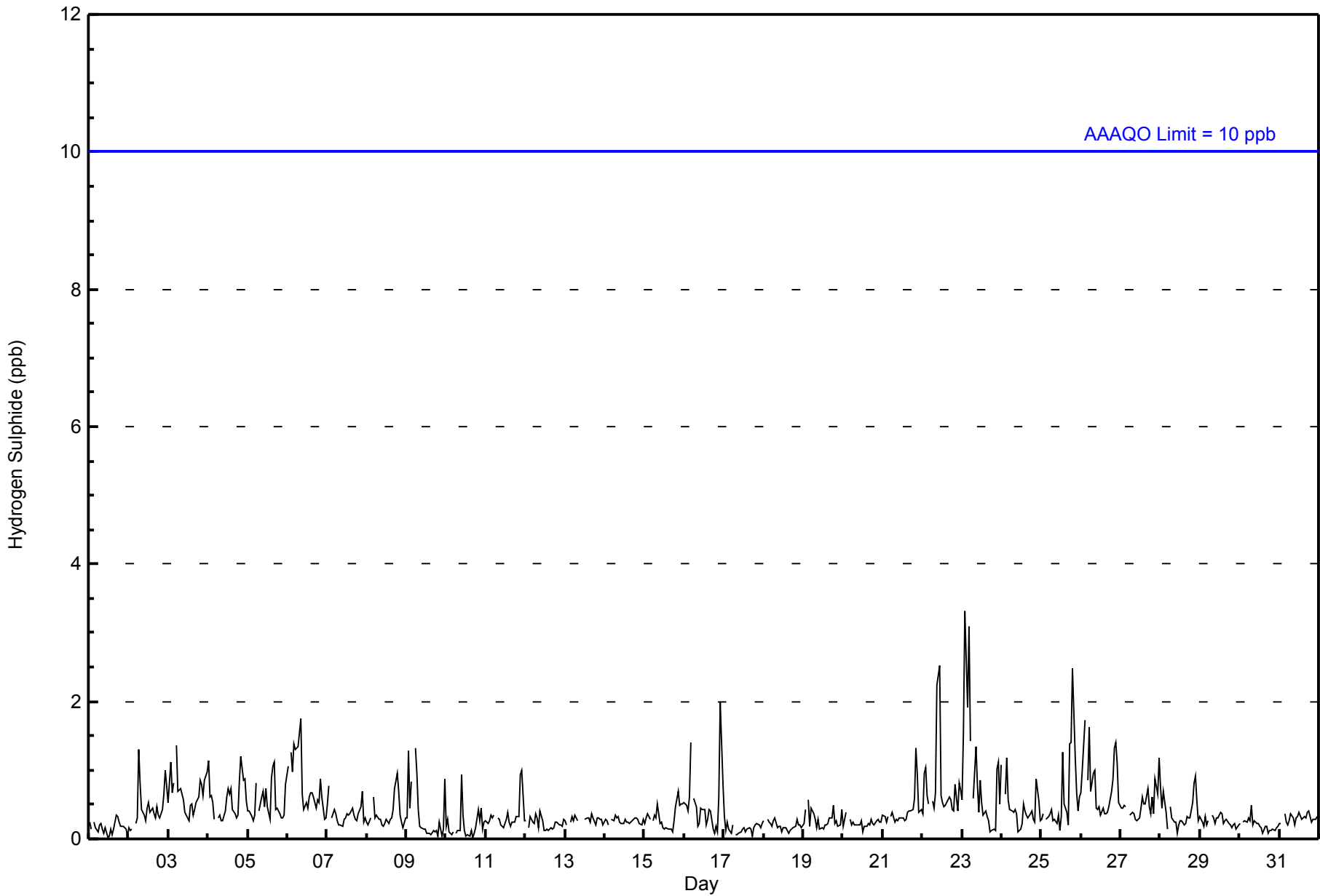
Mannix - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																	Hours in Service: 744										
Maximum Value: 3 ppb on May 23 03:00																	Maximum Daily Average: 0.9 ppb on May 23		Hours of Data: 709								
Minimum Value: 0 ppb on May 10 17:00																	Minimum Daily Average: 0.2 ppb on May 17		Hours of Missing Data: 35								
Maximum Diurnal Average: 0.6 ppb at hour 3																	Minimum Diurnal Average: 0.3 ppb at hour 13		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 = 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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
2-May	0	0	0	Z	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0.5	1
3-May	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	0.7	1	
4-May	1	1	1	1	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1	1	1	1	0.6	1	
5-May	0	0	0	0	0	1	Z	0	1	1	0	1	0	1	1	1	1	0	0	0	0	0	0	1	0.5	1	
6-May	1	Z	1	1	1	1	1	2	2	1	0	1	0	1	1	1	1	0	1	1	1	1	0	0	0.8	2	
7-May	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1
8-May	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.4	1	
9-May	0	1	0	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
10-May	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
11-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	1
12-May	0	Z	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-May	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	0.3	0
14-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
15-May	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0.3	1
16-May	1	0	0	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0.5	2
17-May	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
18-May	0	Z	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
19-May	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	0.3	1
20-May	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
21-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.4	1
22-May	0	1	1	1	1	Z	1	0	1	2	3	1	1	0	0	1	1	1	0	0	1	0	1	1	1	0.8	3
23-May	1	2	3	2	3	1	Z	1	1	1	0	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0.9	3
24-May	1	Z	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0.5	1
25-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	2	1	1	0	1	0.6	2
26-May	1	1	2	Z	1	2	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.8	2
27-May	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	1	0	1	1	1	1	0.5	1
28-May	1	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0.4	1
29-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-May	0	0	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 0.6 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.5 0.5 0.5 0.4																								Diurnal Average			
1 2 3 2 3 2 1 2 2 2 3 1 1 1 1 1 1 1 1 1 2 1 1 2 1																								Diurnal Maximum			
Z - zerospan C - Calibration																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Mannix - May 2015





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mannix - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	706	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: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Mannix - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	57	74	40	45	23	49	96	116	34	35	23	15	17	14	21	38	697
3 - 4	1	2	0	0	0	0	0	0	0	0	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	58	76	40	45	23	49	96	116	34	35	23	15	17	14	21	38	700

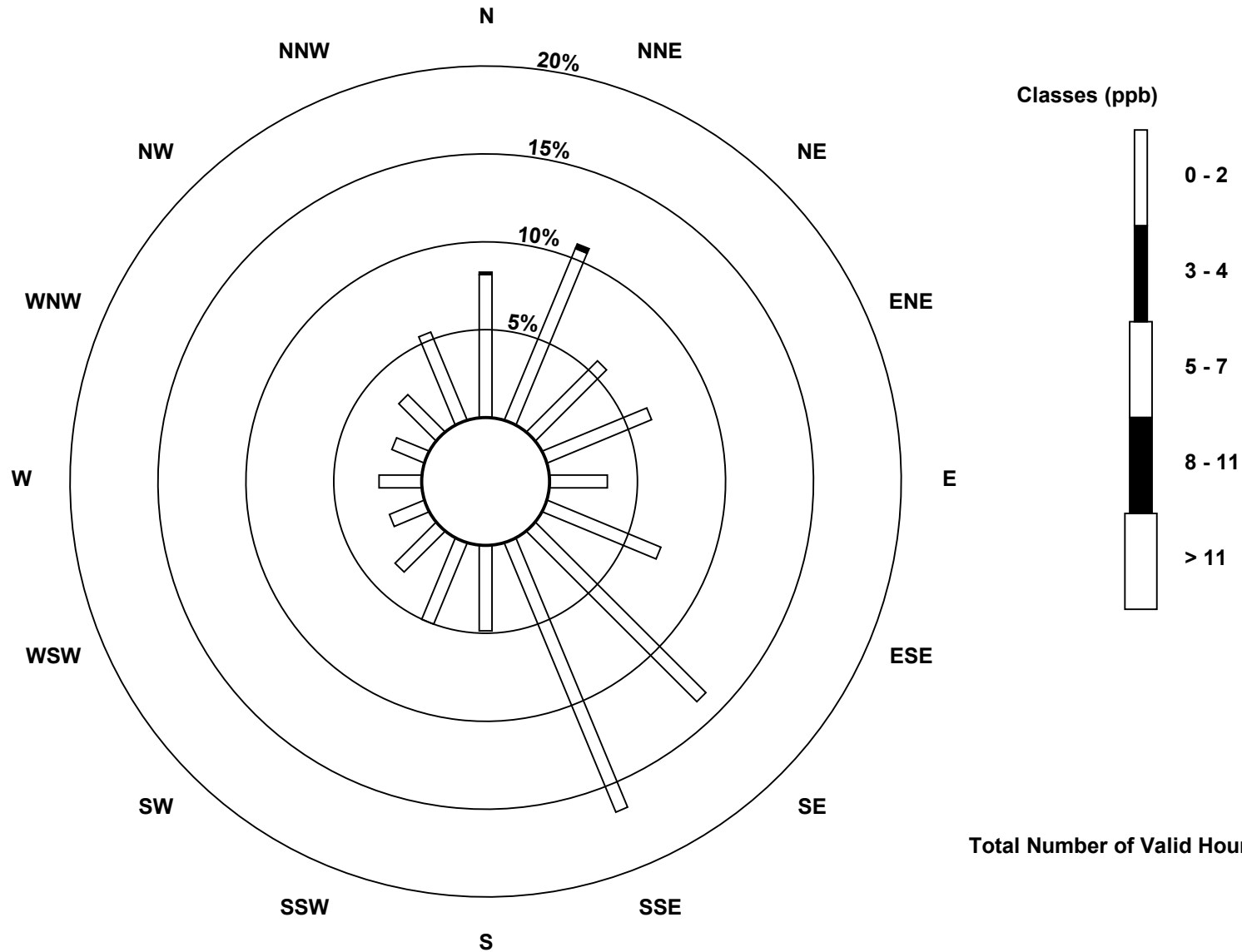
Total Number of Valid Hours: 700

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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

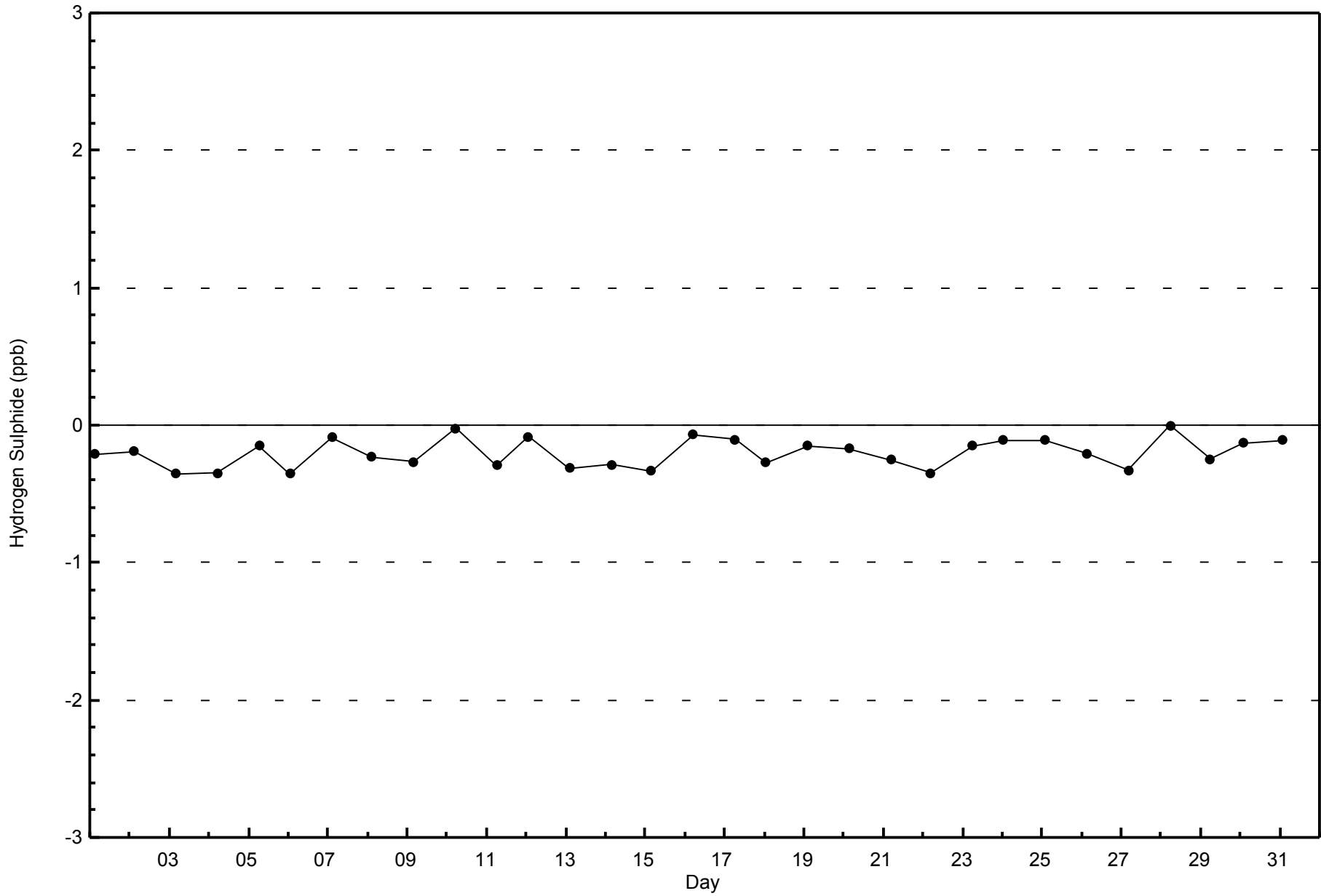


Total Number of Valid Hours: 700



WBEA
Zero Responses

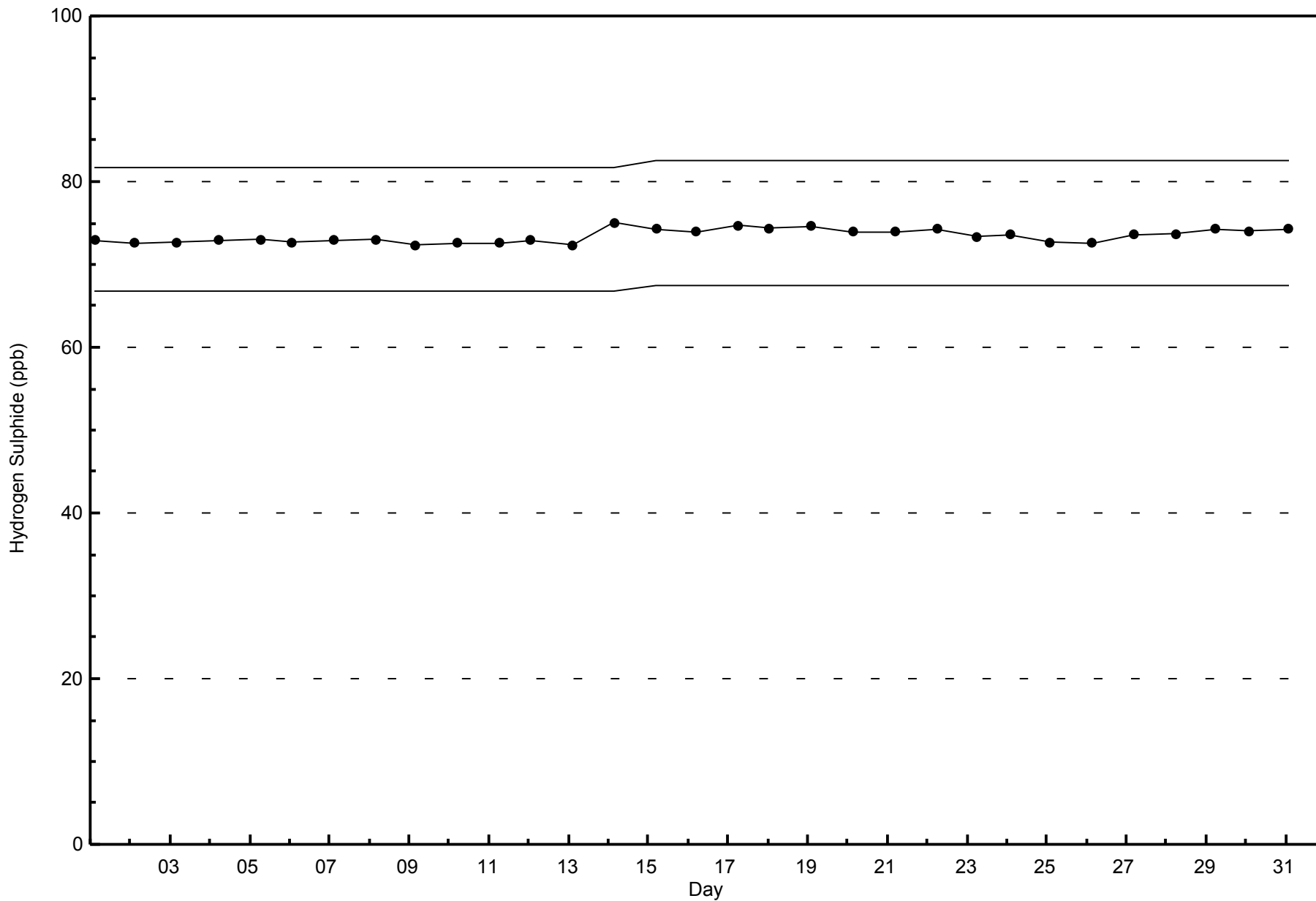
Hydrogen Sulphide (H₂S) - ppb
Mannix - May 2015





WBEA
Span Responses

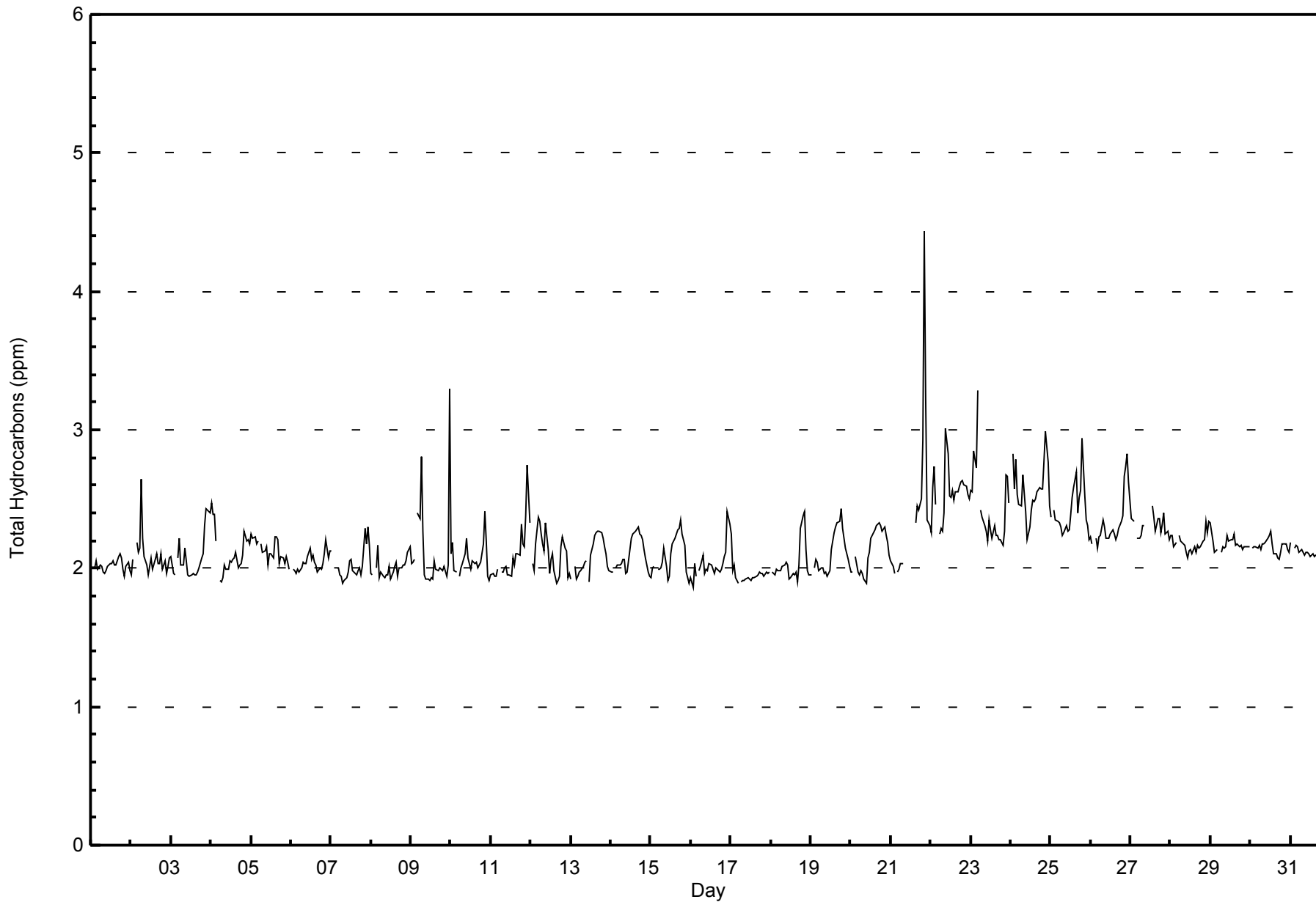
Hydrogen Sulphide (H₂S) - ppb
Mannix - May 2015





WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Mannix - May 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	279	39.80	39.80
2.1 - 3.0	418	59.63	99.43
3.1 - 10.0	4	0.57	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 701

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Mannix - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	29	18	11	12	7	13	55	59	10	16	14	6	7	6	3	9	275
2.1 - 3.0	26	57	30	33	16	29	45	55	21	19	10	8	10	7	18	29	413
3.1 - 10.0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	0	0	4
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	55	76	41	45	23	43	100	114	31	35	24	15	17	14	21	38	692

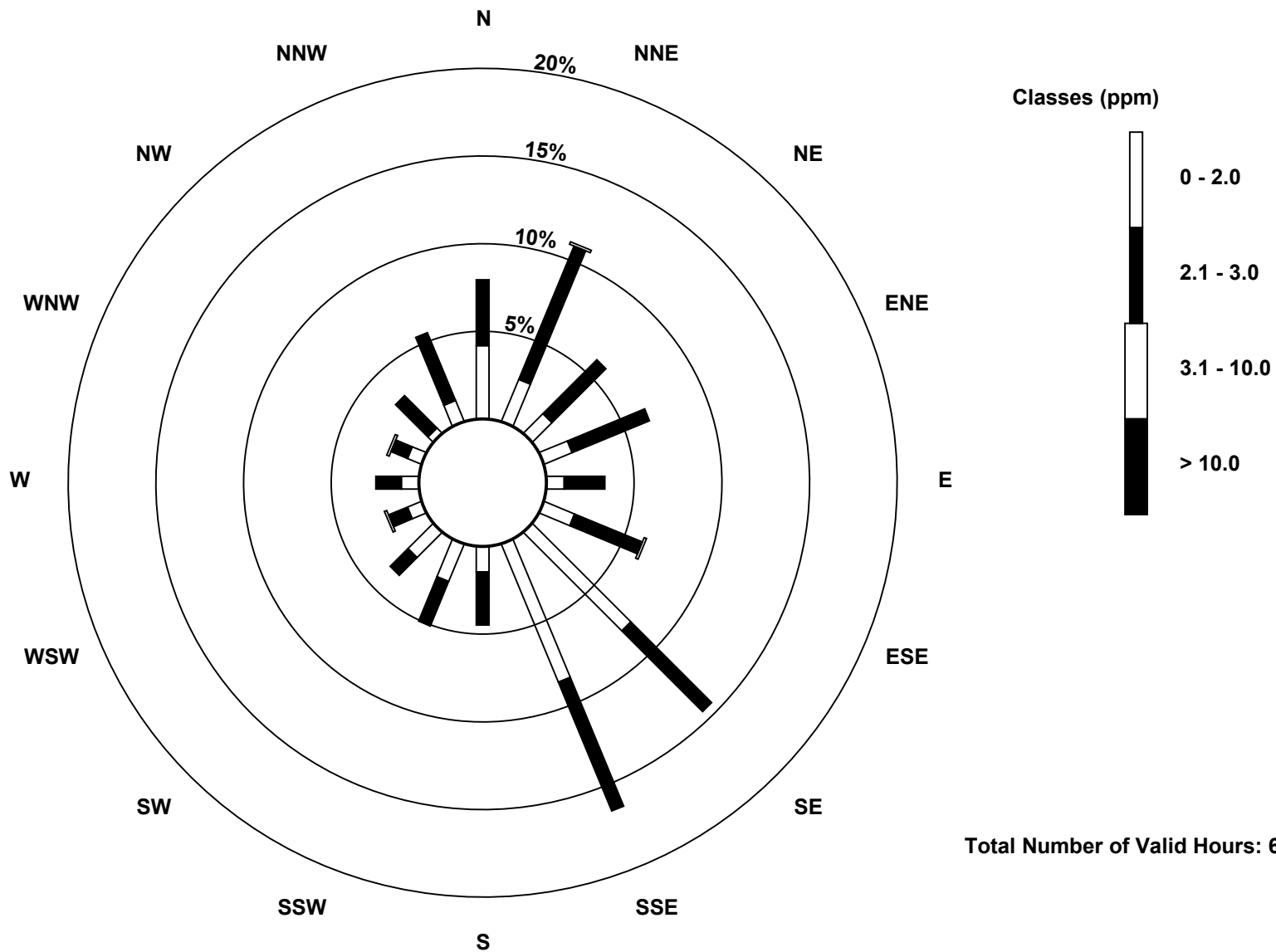
Total Number of Valid Hours: 692

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

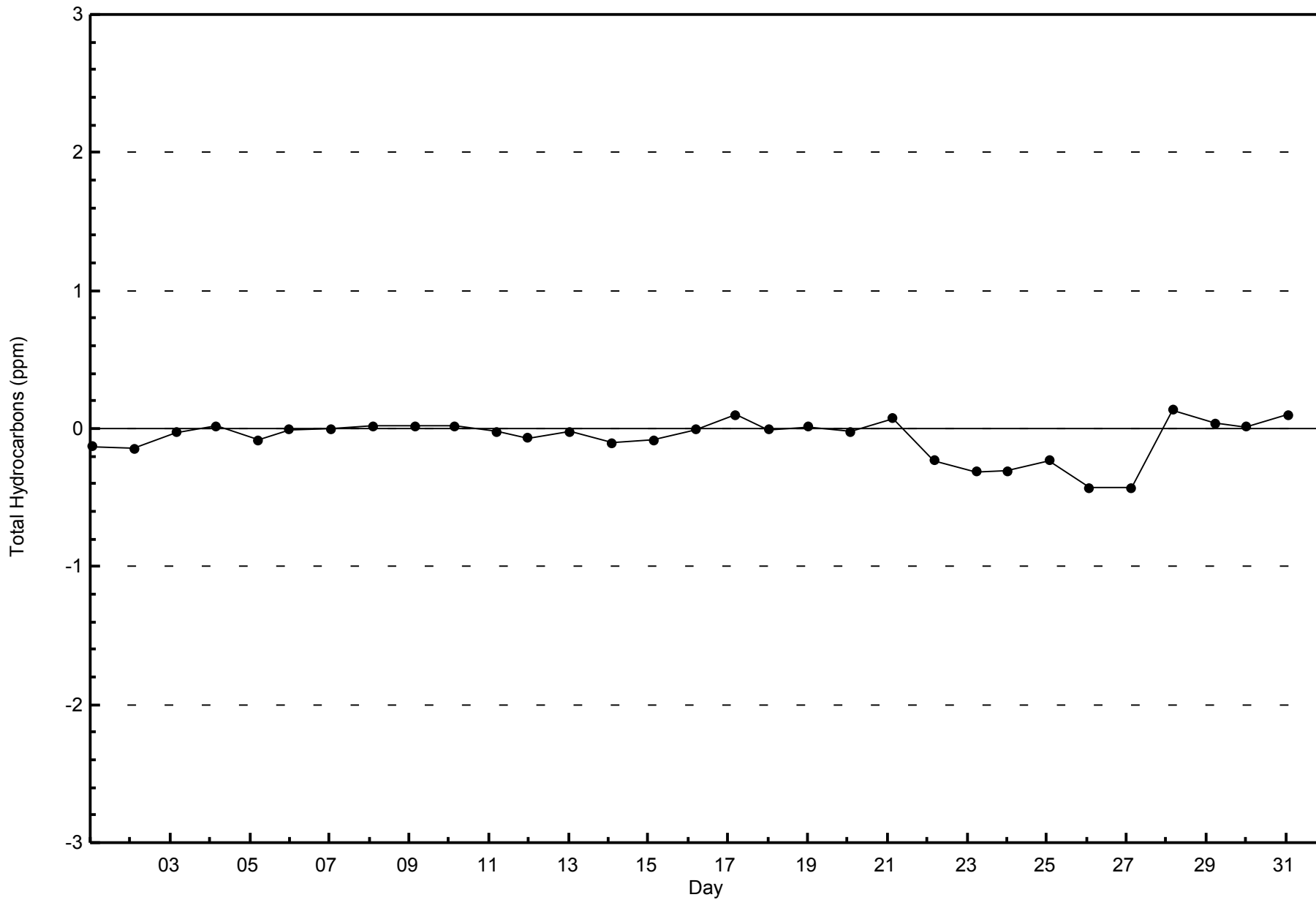
Total Hydrocarbons (THC) - ppm
Mannix (AMS 5)





WBEA
Zero Responses

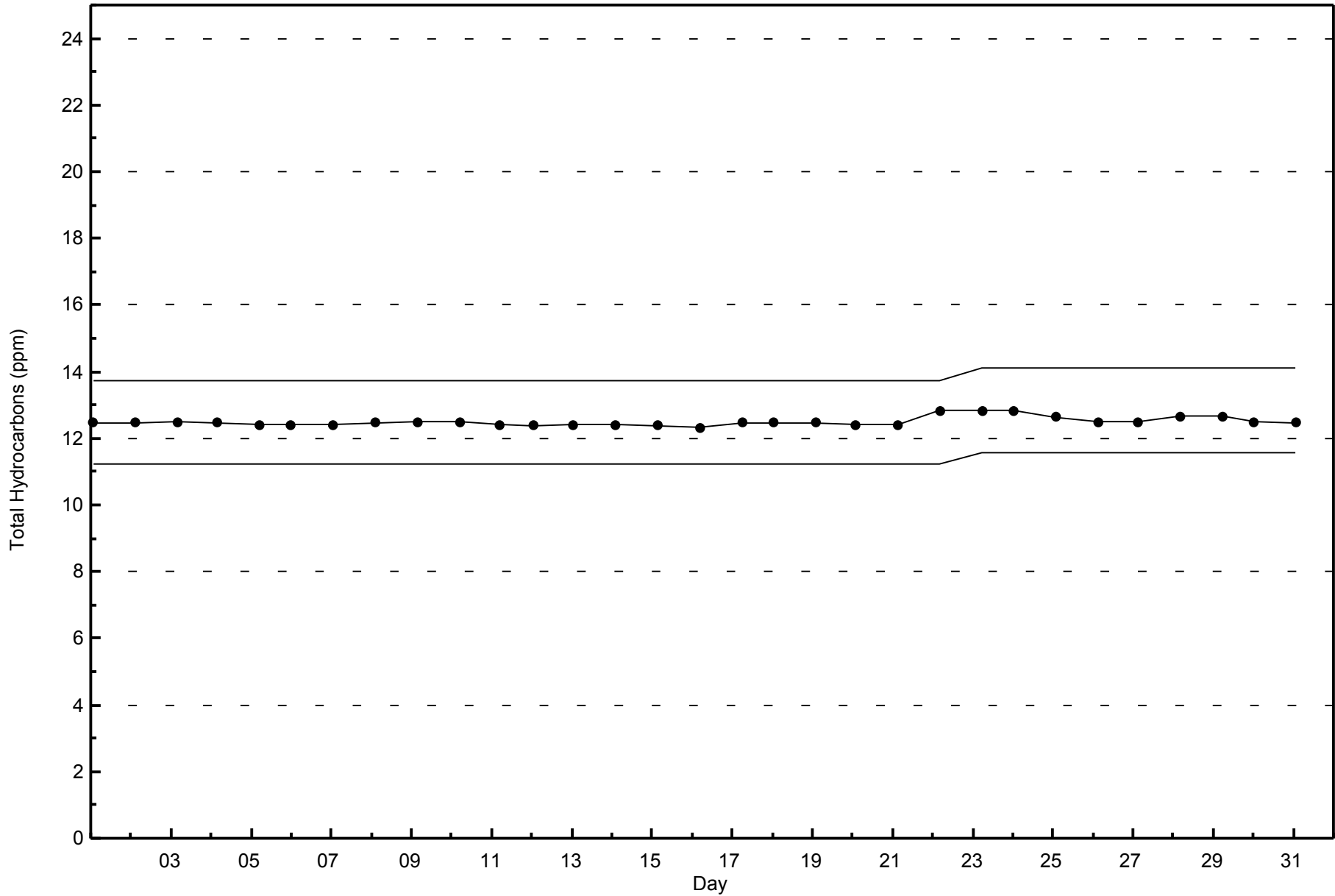
Total Hydrocarbons (THC) - ppm
Mannix - May 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Mannix - May 2015



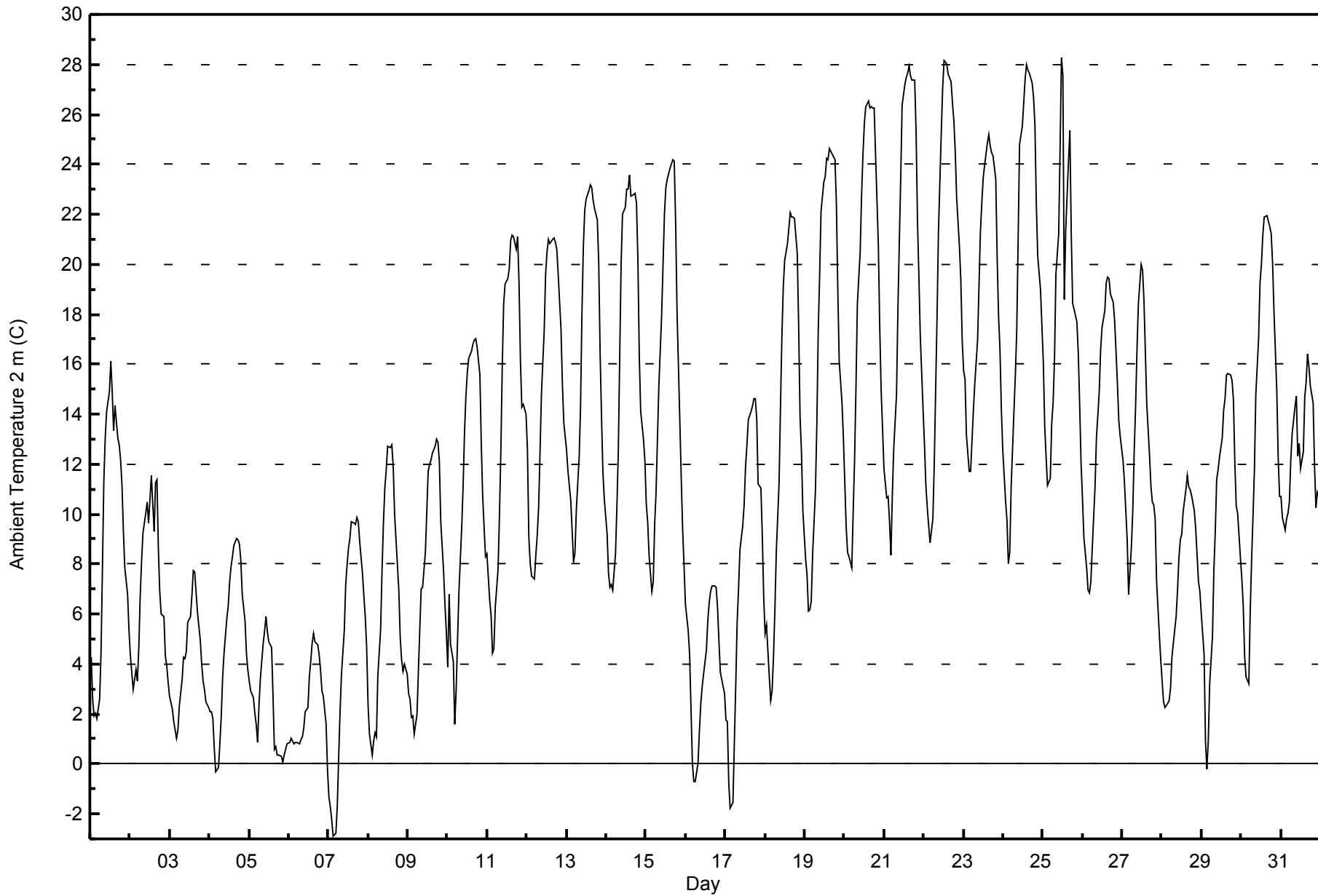


Maximum Value: 28.3 C on May 25 12:00		Maximum Daily Average: 19.9 C on May 22		Hours in Service: 744																							
Minimum Value: -2.9 C on May 7 04:00		Minimum Daily Average: 2.4 C on May 6		Hours of Data: 744																							
Maximum Diurnal Average: 17.3 C at hour 16		Minimum Diurnal Average: 4.5 C at hour 5		Hours of Missing Data: 0																							
Monthly Average: 11.71 C		Percentiles: P ₁ = -1.4 P ₁₀ = 2.3 Q ₁ = 5.9 Median = 10.7 Q ₃ = 17.1 P ₉₀ = 22.7 P ₉₉ = 27.7		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	4.3	2.6	1.9	2.1	1.8	2.6	4.5	7.8	11.3	13.1	14.1	14.9	16.1	14.9	13.3	14.4	13.0	12.8	12.2	11.1	9.3	7.8	6.8	5.3	9.1	16.1	
2-May	4.4	3.6	3.0	3.8	3.3	4.6	6.7	8.1	9.3	10.0	10.5	9.7	10.6	11.5	9.3	11.3	11.4	8.6	6.9	6.0	5.9	4.3	3.9	3.2	7.1	11.5	
3-May	2.7	2.2	1.7	1.4	1.1	1.3	2.3	3.4	4.3	4.2	4.5	5.7	5.9	6.7	7.7	7.7	6.8	6.1	5.0	4.0	3.3	3.0	2.5	2.3	4.0	7.7	
4-May	2.1	2.1	1.8	0.6	-0.3	-0.1	0.8	1.9	3.5	4.5	5.9	6.4	7.3	7.9	8.3	8.7	9.0	9.0	8.8	8.1	6.8	5.7	4.4	3.8	4.9	9.0	
5-May	3.3	2.9	2.6	2.0	1.6	0.9	2.4	3.4	4.8	5.4	5.9	5.3	4.9	4.7	2.8	0.6	0.7	0.4	0.4	0.3	0.1	0.3	0.6	0.8	2.4	5.9	
6-May	0.9	1.0	0.9	0.8	0.9	0.8	0.8	1.0	1.1	1.4	2.1	2.3	3.5	4.1	4.9	5.2	4.9	4.8	4.4	3.8	2.9	2.7	1.6	-0.2	2.4	5.2	
7-May	-1.3	-1.7	-2.2	-2.9	-2.8	-1.7	0.3	2.1	3.6	5.3	7.2	8.0	8.6	9.0	9.7	9.6	9.6	9.9	9.7	8.9	7.7	6.8	5.9	4.7	4.7	9.9	
8-May	2.4	1.2	0.3	0.9	1.2	1.1	3.5	5.4	7.7	9.6	11.1	11.7	12.7	12.7	12.8	11.9	10.0	9.0	6.9	5.0	4.1	3.7	4.0	3.6	6.4	12.8	
9-May	2.8	2.6	1.9	1.9	1.2	2.0	3.7	5.4	7.0	7.1	8.5	10.1	11.7	12.0	12.2	12.4	12.7	13.0	12.9	12.1	9.7	7.7	6.4	5.3	7.6	13.0	
10-May	3.9	6.8	4.8	4.1	1.6	3.0	4.9	6.9	9.4	11.1	13.2	14.7	15.7	16.2	16.5	16.8	17.0	17.0	16.7	15.5	12.8	10.7	9.5	8.3	10.7	17.0	
11-May	8.4	6.6	5.9	4.5	4.6	6.3	7.8	10.0	12.6	16.0	18.4	19.2	19.5	19.8	20.9	21.1	21.1	20.6	21.1	19.2	16.1	14.3	14.4	14.0	14.3	21.1	
12-May	12.6	9.1	8.0	7.5	7.4	8.3	9.2	10.3	12.4	14.8	17.4	19.6	20.5	21.0	20.8	21.0	21.0	20.9	20.6	19.6	17.4	15.2	13.7	13.1	15.1	21.0	
13-May	12.6	11.7	10.5	9.3	8.1	8.4	10.2	12.3	14.4	18.1	20.7	22.2	22.6	23.0	23.2	23.1	22.6	22.2	21.8	20.0	16.4	13.9	11.6	10.6	16.2	23.2	
14-May	9.2	7.6	7.1	7.2	6.9	8.4	10.3	12.5	16.3	20.0	22.0	22.3	23.0	23.0	23.6	22.7	22.8	22.8	22.5	20.2	16.4	14.1	13.0	12.2	16.1	23.6	
15-May	10.4	9.7	8.3	6.9	7.3	9.6	10.9	13.0	15.1	18.0	20.0	22.0	23.0	23.4	23.9	24.0	24.2	24.1	21.7	18.1	13.7	11.5	9.4	7.9	15.7	24.2	
16-May	6.4	5.3	4.4	2.2	0.0	-0.7	-0.7	0.0	1.3	2.4	3.1	3.6	4.5	5.8	6.5	6.9	7.1	7.1	7.0	6.2	4.9	3.6	3.4	2.8	3.9	7.1	
17-May	1.7	1.7	-0.8	-1.8	-1.6	0.9	3.2	5.7	7.0	8.6	9.5	10.4	11.9	12.8	13.8	14.1	14.4	14.6	14.6	13.8	11.2	11.0	9.1	6.7	8.0	14.6	
18-May	5.2	5.5	3.5	2.5	2.9	4.3	6.2	8.5	11.3	14.3	17.1	19.1	20.1	20.8	21.4	22.1	21.9	21.9	21.8	20.5	17.5	13.9	12.5	10.1	13.5	22.1	
19-May	8.2	7.6	6.1	6.2	6.5	8.4	10.9	13.5	17.3	19.6	22.1	23.3	23.5	24.3	24.2	24.6	24.5	24.3	24.2	22.4	19.0	16.1	14.4	13.1	16.8	24.6	
20-May	11.3	9.4	8.5	8.3	7.9	10.1	12.2	15.1	18.4	20.5	22.7	24.4	25.6	26.3	26.5	26.3	26.3	26.3	26.3	24.4	20.7	17.5	14.9	13.5	18.5	26.5	
21-May	11.8	10.6	10.7	9.7	8.3	10.8	12.6	14.8	18.2	20.9	23.4	26.3	27.2	27.5	27.6	27.9	27.6	27.3	27.4	25.3	21.7	19.5	17.1	14.2	19.5	27.9	
22-May	12.8	11.1	10.3	9.5	8.9	9.8	12.0	15.0	17.9	21.3	25.3	27.0	28.1	28.1	28.0	27.6	27.3	26.5	25.7	24.5	22.7	20.7	19.3	16.9	19.9	28.1	
23-May	15.7	15.4	13.2	11.7	11.7	12.9	14.2	15.2	16.9	19.2	21.3	22.4	23.4	24.0	24.8	25.2	24.8	24.5	24.4	23.4	20.2	17.9	16.6	14.2	18.9	25.2	
24-May	12.5	10.5	9.8	8.0	8.5	11.1	14.1	15.6	17.4	21.0	24.8	25.5	26.5	27.5	28.0	27.8	27.7	27.3	26.7	25.6	22.4	20.3	19.0	17.5	19.8	28.0	
25-May	16.1	13.6	12.3	11.2	11.5	13.6	14.5	16.2	19.6	21.2	24.6	28.3	27.6	18.6	21.3	24.1	25.3	21.2	18.4	18.2	17.7	16.5	14.4	12.1	18.2	28.3	
26-May	10.6	9.1	7.9	6.9	6.9	7.3	8.6	11.1	13.0	13.9	14.9	16.6	17.5	18.1	19.2	19.5	19.4	18.8	18.5	17.7	16.5	15.2	13.7	13.1	13.9	19.5	
27-May	12.2	11.3	10.1	9.0	6.8	8.7	10.1	12.5	14.3	16.6	18.4	20.0	19.8	18.5	16.4	14.4	12.3	11.1	10.5	10.4	9.8	7.3	5.2	4.1	12.1	20.0	
28-May	3.3	2.5	2.3	2.4	2.5	3.1	4.3	4.8	5.9	6.9	8.3	9.0	9.2	10.1	11.0	11.5	11.1	11.0	10.7	10.2	9.4	8.4	7.3	6.9	7.2	11.5	
29-May	6.0	4.4	0.9	-0.2	0.9	3.2	5.1	7.8	9.3	11.4	11.7	12.3	13.0	14.2	14.6	15.6	15.6	15.6	15.3	14.5	12.0	10.3	10.0	8.3	9.7	15.6	
30-May	7.4	6.3	4.3	3.5	3.2	6.1	8.2	9.9	11.8	14.8	17.0	19.3	20.0	21.2	21.9	21.9	21.7	21.5	21.2	20.1	18.1	14.9	12.3	10.7	14.1	21.9	
31-May	10.7	9.8	9.4	9.8	10.0	10.5	12.1	13.2	14.3	14.8	12.3	12.9	11.8	12.5	14.7	15.3	16.4	15.9	15.1	14.4	11.9	10.3	10.9	10.7	12.5	16.4	
		7.4	6.5	5.5	4.8	4.5	5.7	7.3	9.1	11.2	13.1	14.8	15.9	16.6	16.8	17.1	17.3	17.1	16.6	16.1	15.0	12.9	11.1	9.9	8.7	Diurnal Average	
		16.1	15.4	13.2	11.7	11.7	13.6	14.5	16.2	19.6	21.3	25.3	28.3	28.1	28.1	28.0	27.9	27.7	27.3	27.4	25.6	22.7	20.7	19.3	17.5	Diurnal Maximum	



WBEA
Hourly Averages

Ambient Temperature 2 m (AT2m) - C
Mannix - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature 2 m (AT2m) - C
Mannix - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	15	2.02	2.02
0 - 10	323	43.41	45.43
10 - 20	271	36.42	81.85
> 20	135	18.15	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

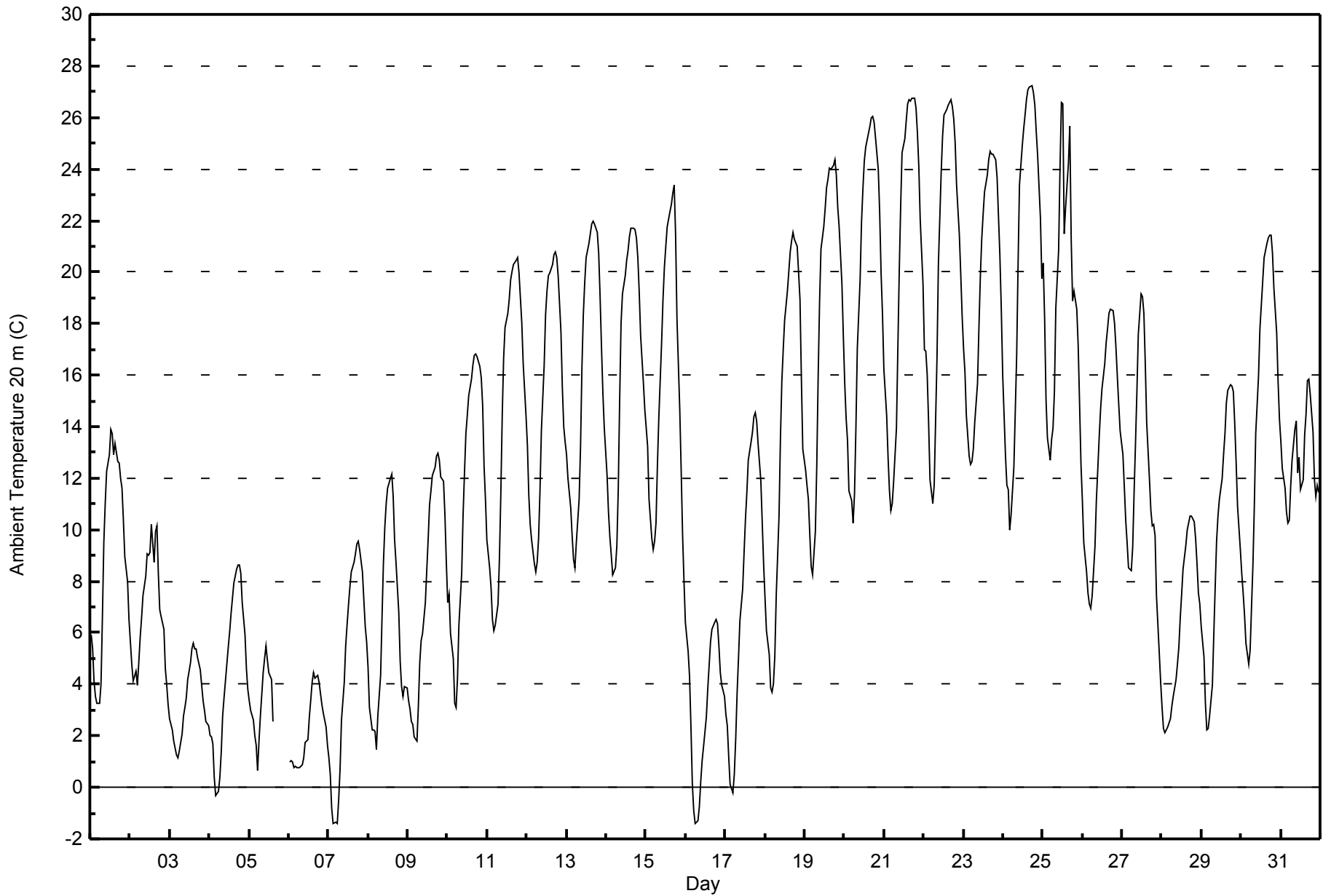
Mannix - May 2015

Maximum Value: 27.2 C on May 24 18:00		Maximum Daily Average: 20.5 C on May 22		Hours in Service: 744																							
Minimum Value: -1.4 C on May 7 04:00		Minimum Daily Average: 2.2 C on May 6		Hours of Data: 735																							
Maximum Diurnal Average: 17.0 C at hour 17		Minimum Diurnal Average: 5.6 C at hour 6		Hours of Missing Data: 9																							
Monthly Average: 11.96 C		Percentiles: P ₁ = -0.8 P ₁₀ = 2.6 Q ₁ = 5.6 Median = 11.5 Q ₃ = 17.8 P ₉₀ = 22.3 P ₉₉ = 26.7		Hours of Calibration: 0																							
				Percent Operational Time: 98.8																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	5.9	5.4	4.2	3.5	3.3	3.2	4.0	6.6	9.5	11.0	12.3	12.9	13.9	13.7	12.9	13.4	12.6	12.6	12.0	11.6	10.4	9.0	8.0	6.5	9.1	13.9	
2-May	5.6	4.8	4.1	4.5	4.0	4.8	5.8	6.6	7.4	8.2	9.0	9.0	9.1	10.2	8.8	9.9	10.2	8.3	6.9	6.6	6.1	4.6	4.0	3.2	6.7	10.2	
3-May	2.6	2.2	1.8	1.5	1.3	1.1	1.4	2.1	2.8	3.1	3.5	4.2	4.8	5.4	5.6	5.4	5.4	5.1	4.6	4.0	3.4	3.0	2.6	2.4	3.3	5.6	
4-May	2.0	1.9	1.7	0.4	-0.3	-0.2	0.4	1.4	2.8	3.5	4.8	5.4	6.1	6.7	7.3	7.9	8.5	8.6	8.6	8.3	7.2	5.9	4.6	3.8	4.5	8.6	
5-May	3.3	3.0	2.6	2.0	1.6	0.7	1.8	2.8	4.4	5.0	5.5	4.9	4.5	4.2	2.6	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	5.5	
6-May	1.0	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.9	1.2	1.7	1.8	2.7	3.3	4.1	4.5	4.2	4.4	4.1	3.6	3.2	2.9	2.3	1.6	2.2	4.5	
7-May	1.1	0.5	-0.8	-1.4	-1.4	-1.4	-0.5	0.7	2.6	4.1	5.5	6.3	7.1	7.8	8.3	8.7	9.1	9.4	9.5	9.3	8.3	7.3	6.3	5.6	4.7	9.5	
8-May	4.7	3.1	2.2	2.2	2.2	1.5	2.8	4.3	6.6	8.7	10.1	11.0	11.6	12.0	12.2	11.3	9.6	8.7	6.8	4.9	3.9	3.5	3.9	3.9	6.3	12.2	
9-May	3.4	3.1	2.5	2.4	2.0	1.8	3.1	4.9	5.7	6.0	7.1	8.4	9.6	10.9	11.5	12.1	12.4	12.9	13.0	12.7	12.0	11.9	10.6	8.7	7.9	13.0	
10-May	7.2	7.5	6.0	5.0	3.3	3.1	4.2	6.3	8.3	10.6	12.2	13.7	14.4	15.2	15.8	16.4	16.8	16.8	16.7	16.3	15.9	14.8	12.5	11.2	11.3	16.8	
11-May	9.6	8.5	7.8	6.5	6.1	6.3	7.1	8.9	11.4	14.5	16.6	17.9	18.4	18.9	19.7	20.0	20.3	20.5	20.6	20.0	19.0	18.0	16.4	14.4	14.5	20.6	
12-May	13.3	11.3	10.2	9.6	8.7	8.3	8.7	9.6	11.5	13.8	16.4	18.4	19.3	19.8	20.0	20.3	20.6	20.8	20.6	19.9	17.7	15.5	14.0	13.4	15.1	20.8	
13-May	12.9	12.0	10.9	9.8	8.9	8.5	9.5	11.2	13.2	16.3	18.3	19.6	20.6	21.1	21.5	21.8	22.0	21.9	21.6	20.7	19.0	17.1	15.3	14.0	16.1	22.0	
14-May	12.1	10.7	9.7	9.0	8.3	8.5	9.4	11.5	15.0	18.0	19.2	19.8	20.4	20.8	21.4	21.7	21.7	21.6	21.3	20.6	19.2	17.6	15.7	14.7	16.2	21.7	
15-May	13.9	13.2	11.2	9.7	9.2	9.5	10.3	12.5	14.3	17.3	19.0	20.2	21.0	21.7	22.3	22.6	23.1	23.4	23.4	21.5	18.2	14.7	12.3	9.8	8.0	15.8	23.4
16-May	6.4	5.3	4.3	2.3	0.1	-0.9	-1.4	-1.3	-0.7	0.2	1.0	1.6	2.7	3.8	4.7	5.6	6.1	6.4	6.5	6.3	5.5	4.5	3.9	3.6	3.2	6.5	
17-May	2.8	2.4	1.2	0.1	-0.2	0.5	1.8	3.6	5.0	6.5	7.7	9.1	10.4	11.4	12.7	13.4	13.8	14.4	14.5	14.2	13.3	11.9	10.3	8.6	7.9	14.5	
18-May	7.3	6.1	5.1	3.9	3.7	4.0	5.1	7.5	10.5	13.5	15.7	17.0	18.1	19.3	20.0	20.8	21.2	21.5	21.3	21.0	20.0	19.0	15.9	13.1	13.8	21.5	
19-May	12.3	11.7	11.2	9.8	8.6	8.2	9.9	12.5	15.9	18.8	20.9	21.8	22.5	23.3	23.6	24.0	24.0	24.2	24.3	23.8	22.5	21.8	19.5	17.5	18.0	24.3	
20-May	15.7	14.3	13.5	11.5	11.1	10.2	11.4	13.9	17.1	19.7	21.9	23.2	24.3	24.8	25.4	25.6	26.0	26.1	25.8	25.2	24.0	22.3	19.9	18.4	19.6	26.1	
21-May	16.2	14.4	12.8	11.5	10.8	11.0	11.9	13.9	17.0	20.0	22.5	24.6	25.1	25.9	26.5	26.7	26.6	26.7	26.7	26.4	25.4	24.1	22.0	19.5	20.4	26.7	
22-May	17.0	16.9	16.0	14.2	11.9	11.0	11.7	14.2	16.6	20.3	23.8	25.3	26.1	26.2	26.3	26.5	26.7	26.4	25.9	25.0	23.4	21.4	19.9	18.3	20.5	26.7	
23-May	17.0	16.1	14.4	12.9	12.5	12.6	13.2	14.2	15.7	17.9	19.8	21.3	22.3	23.1	23.8	24.4	24.7	24.6	24.6	24.4	23.6	22.1	20.6	18.5	19.3	24.7	
24-May	16.0	12.9	11.7	11.5	10.0	10.6	12.4	14.6	16.8	20.3	23.4	24.9	25.5	26.1	26.7	27.1	27.2	27.2	26.9	26.5	25.4	24.5	22.1	19.8	20.4	27.2	
25-May	20.4	18.2	15.1	13.6	12.7	13.5	13.9	15.4	18.6	20.8	24.0	26.6	26.5	21.5	22.5	24.2	25.7	21.3	18.9	19.2	18.5	17.2	14.9	12.6	19.0	26.6	
26-May	11.1	9.5	8.4	7.5	7.1	6.9	7.4	9.3	11.1	12.3	13.6	14.7	15.5	16.5	17.3	17.8	18.4	18.6	18.5	18.0	17.1	16.0	14.9	13.8	13.4	18.6	
27-May	12.9	11.6	10.4	9.5	8.5	8.4	9.4	11.5	13.4	15.3	17.6	19.1	19.1	18.4	16.4	14.2	11.9	10.7	10.2	10.2	9.8	7.5	5.2	4.1	11.9	19.1	
28-May	3.1	2.3	2.1	2.3	2.5	2.7	3.2	3.5	4.2	4.8	5.4	6.5	7.5	8.5	9.4	10.0	10.2	10.5	10.5	10.3	9.7	8.7	7.5	7.1	6.4	10.5	
29-May	6.3	5.1	3.3	2.2	2.3	2.8	4.0	5.9	7.8	9.6	10.5	11.2	12.0	12.9	13.8	14.9	15.4	15.6	15.6	15.4	14.1	12.6	10.9	9.2	9.7	15.6	
30-May	8.3	7.6	6.7	5.6	4.8	5.3	7.0	8.6	10.9	13.7	16.0	17.8	18.7	19.7	20.5	21.1	21.3	21.4	21.4	20.7	19.3	17.6	15.7	14.3	14.3	21.4	
31-May	13.4	12.4	11.6	10.7	10.3	10.4	11.7	12.7	13.9	14.2	12.2	12.8	11.6	12.0	13.7	14.5	15.8	15.8	15.2	13.8	12.0	11.3	11.7	11.5	12.7	15.8	
																								Diurnal Average			
																								Diurnal Maximum			
9.2 8.2 7.2 6.3 5.6 5.6 6.5 8.1 10.0 11.9 13.5 14.6 15.2 15.7 16.0 16.9 17.0 16.9 16.5 15.9 14.8 13.5 12.0 10.7																											
20.4 18.2 16.0 14.2 12.7 13.5 13.9 15.4 18.6 20.8 24.0 26.6 26.5 26.2 26.7 27.1 27.2 27.2 26.9 26.5 25.4 24.5 22.1 19.8																											
UO - Unstable Operation																											



WBEA
Hourly Averages

Ambient Temperature 20 m (AT20m) - C
Mannix - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature 20 m (AT20m) - C
Mannix - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	12	1.63	1.63
0 - 10	305	41.50	43.13
10 - 20	287	39.05	82.18
> 20	131	17.82	100.00

Total Number of Valid Hours: 735

Total Number of Hours: 744



Summary of Hour Averages

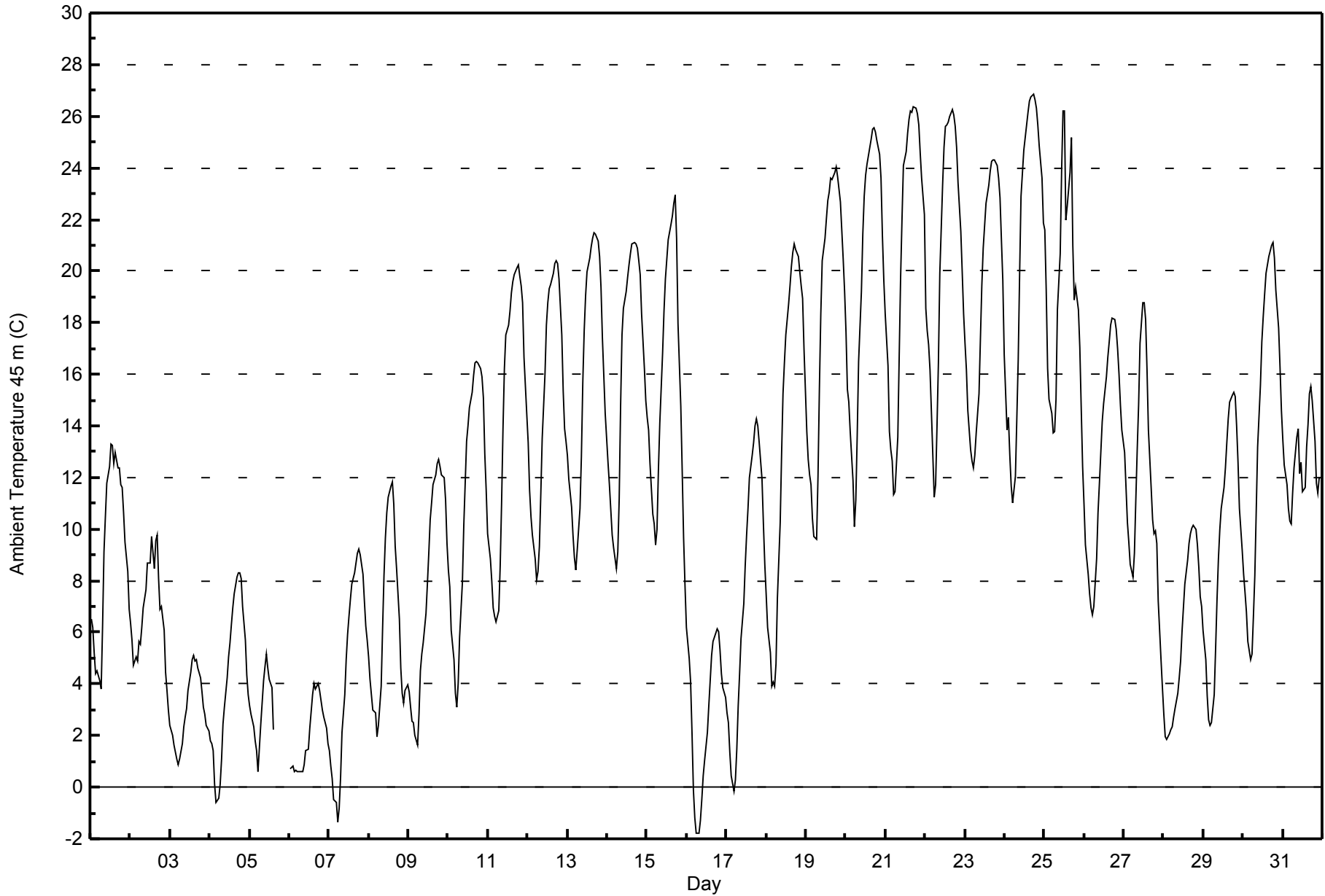
Mannix - May 2015

Maximum Value: 26.9 C on May 24 18:00		Maximum Daily Average: 20.7 C on May 24		Hours in Service: 744																																												
Minimum Value: -1.8 C on May 16 07:00		Minimum Daily Average: 2.0 C on May 6		Hours of Data: 735																																												
Maximum Diurnal Average: 16.6 C at hour 17		Minimum Diurnal Average: 5.6 C at hour 6		Hours of Missing Data: 9																																												
Monthly Average: 11.86 C		Percentiles: P ₁ = -0.6 P ₁₀ = 2.4 Q ₁ = 5.6 Median = 11.6 Q ₃ = 17.7 P ₉₀ = 22.2 P ₉₉ = 26.3		Hours of Calibration: 0																																												
				Percent Operational Time: 98.8																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	6.5	6.2	5.2	4.4	4.5	4.1	3.8	6.2	9.1	10.5	11.8	12.4	13.3	13.3	12.5	13.0	12.4	12.4	11.7	11.6	10.6	9.5	8.3	6.9	9.2	13.3																						
2-May	6.3	5.7	4.7	5.1	4.9	5.6	5.6	6.2	7.0	7.7	8.7	8.7	8.7	9.7	8.5	9.5	9.8	8.1	6.9	7.0	6.1	4.4	3.8	3.0	6.7	9.8																						
3-May	2.4	2.0	1.6	1.4	1.1	0.9	1.1	1.7	2.4	2.7	3.1	3.8	4.4	4.9	5.1	4.9	4.9	4.6	4.2	3.7	3.1	2.8	2.4	2.2	3.0	5.1																						
4-May	1.8	1.7	1.4	0.1	-0.6	-0.4	0.1	1.1	2.4	3.1	4.2	5.1	5.6	6.3	7.0	7.5	8.1	8.3	8.3	8.1	7.0	5.7	4.4	3.6	4.2	8.3																						
5-May	3.1	2.8	2.3	1.8	1.4	0.6	1.5	2.5	4.2	4.7	5.2	4.6	4.2	3.9	2.2	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	5.2																						
6-May	0.7	0.8	0.8	0.6	0.7	0.6	0.6	0.6	0.6	0.9	1.4	1.5	2.3	3.0	3.6	4.0	3.8	4.0	3.8	3.4	3.0	2.7	2.3	1.7	2.0	4.0																						
7-May	1.4	0.8	0.3	-0.5	-0.6	-1.3	-0.8	0.4	2.1	3.6	5.0	5.9	6.6	7.3	7.9	8.3	8.7	9.1	9.2	9.0	8.2	7.2	6.2	5.7	4.6	9.2																						
8-May	5.1	4.2	3.0	2.9	2.9	2.0	2.4	3.9	6.1	8.2	9.7	10.6	11.2	11.6	11.8	11.0	9.3	8.5	6.5	4.6	3.6	3.3	3.8	4.0	6.3	11.8																						
9-May	3.7	3.1	2.6	2.5	2.0	1.6	2.8	4.5	5.2	5.6	6.7	7.9	9.1	10.4	11.0	11.7	12.1	12.5	12.7	12.4	12.1	12.0	11.1	9.4	7.7	12.7																						
10-May	8.4	7.7	6.1	5.0	3.6	3.1	4.0	5.8	8.0	10.1	11.8	13.4	14.0	14.7	15.3	16.0	16.5	16.5	16.4	16.2	15.9	15.1	12.9	11.5	11.2	16.5																						
11-May	9.8	8.9	8.0	7.0	6.6	6.4	6.8	8.6	11.0	13.9	16.2	17.5	17.9	18.5	19.2	19.6	19.9	20.1	20.2	19.8	19.4	18.8	16.7	14.4	14.4	20.2																						
12-May	13.4	11.5	10.5	9.8	8.9	8.0	8.4	9.3	11.3	13.5	16.0	17.9	18.8	19.3	19.5	19.9	20.3	20.4	20.3	19.7	17.5	15.4	13.9	13.4	14.9	20.4																						
13-May	12.8	11.9	10.8	9.8	8.9	8.4	9.2	10.8	12.8	15.7	17.7	19.1	20.0	20.5	20.9	21.3	21.5	21.4	21.2	20.6	19.4	17.4	16.0	14.5	15.9	21.5																						
14-May	12.6	11.7	10.8	9.8	9.3	8.5	9.1	11.2	14.7	17.5	18.5	19.2	19.8	20.2	20.7	21.1	21.1	21.0	20.9	20.4	19.8	18.3	16.2	15.0	16.1	21.1																						
15-May	14.3	13.8	12.5	10.6	10.2	9.4	10.0	12.2	14.1	16.8	18.4	19.7	20.4	21.2	21.8	22.1	22.6	23.0	21.2	18.0	14.7	12.3	9.7	7.8	15.7	23.0																						
16-May	6.2	5.0	4.1	2.1	-0.1	-1.2	-1.8	-1.8	-1.3	-0.5	0.4	1.0	2.1	3.2	4.1	5.1	5.6	5.9	6.1	6.0	5.3	4.4	3.9	3.5	2.8	6.2																						
17-May	2.9	2.5	1.4	0.4	-0.2	0.3	1.5	3.1	4.4	5.8	7.1	8.6	9.8	10.8	12.0	12.9	13.4	14.0	14.2	14.0	13.3	11.9	10.2	8.7	7.6	14.2																						
18-May	7.5	6.2	5.2	3.9	4.1	3.9	4.8	7.3	10.3	12.9	15.2	16.5	17.5	18.7	19.4	20.2	20.7	21.0	20.9	20.6	20.0	19.4	18.9	17.0	13.8	21.0																						
19-May	13.8	12.7	12.1	11.7	10.4	9.7	9.6	12.0	15.4	18.3	20.4	21.3	22.0	22.7	23.1	23.6	23.5	23.8	24.0	23.6	23.2	22.7	20.5	19.2	18.3	24.0																						
20-May	17.6	15.4	14.9	13.8	11.9	10.1	11.1	13.6	16.5	19.2	21.5	22.9	23.7	24.2	24.8	25.1	25.5	25.5	25.4	25.1	24.5	23.6	21.4	19.7	19.9	25.5																						
21-May	18.3	16.3	13.8	13.1	12.7	11.3	11.5	13.6	16.7	19.7	22.0	24.1	24.6	25.3	25.9	26.2	26.1	26.3	26.3	26.1	25.6	24.6	23.6	22.2	20.7	26.3																						
22-May	18.6	17.7	17.1	16.2	14.5	11.2	11.7	14.0	16.4	19.9	23.3	24.8	25.6	25.7	25.8	26.0	26.3	26.1	25.6	24.8	23.4	21.5	20.0	18.3	20.6	26.3																						
23-May	17.2	16.2	14.6	13.1	12.7	12.4	12.8	13.8	15.3	17.4	19.4	20.9	21.8	22.6	23.3	23.8	24.3	24.3	24.3	24.1	23.6	22.8	21.2	19.6	19.2	24.3																						
24-May	16.7	13.8	14.3	12.8	11.7	11.0	12.0	14.3	16.6	19.9	22.9	24.7	25.2	25.6	26.2	26.6	26.7	26.9	26.7	26.3	25.6	24.9	23.6	21.9	20.7	26.9																						
25-May	21.6	19.2	16.2	15.0	14.5	13.7	13.8	15.1	18.5	20.7	23.9	26.2	26.2	22.0	22.5	23.8	25.2	21.0	18.9	19.3	18.5	17.0	14.7	12.4	19.2	26.2																						
26-May	11.0	9.4	8.2	7.5	7.0	6.7	7.0	8.8	10.7	11.8	13.0	14.1	14.9	15.9	16.7	17.3	17.9	18.2	18.1	17.7	17.0	16.0	14.8	13.8	13.1	18.2																						
27-May	13.0	11.6	10.3	9.5	8.6	8.1	9.1	11.1	13.1	14.8	17.2	18.8	18.8	18.1	16.2	13.9	11.6	10.4	9.8	9.9	9.5	7.2	5.0	3.8	11.6	18.8																						
28-May	2.8	2.0	1.8	2.1	2.2	2.3	2.7	3.1	3.6	4.2	4.9	6.0	6.9	7.9	8.8	9.4	9.8	10.0	10.1	10.0	9.4	8.5	7.4	7.0	6.0	10.1																						
29-May	6.1	4.9	3.5	2.6	2.4	2.5	3.6	5.4	7.3	8.8	10.0	10.8	11.6	12.4	13.4	14.3	14.9	15.2	15.3	15.1	14.0	12.6	10.8	9.2	9.4	15.3																						
30-May	8.3	7.6	6.8	5.6	4.9	5.2	6.6	8.2	10.7	13.2	15.6	17.3	18.2	19.1	19.9	20.6	20.8	21.0	21.1	20.5	19.3	17.8	16.3	14.6	14.1	21.1																						
31-May	13.5	12.5	11.7	10.8	10.3	10.2	11.4	12.4	13.6	13.9	12.1	12.6	11.4	11.6	13.2	14.0	15.2	15.5	15.0	13.4	11.8	11.4	12.0	12.0	12.6	15.5																						
																								9.6	8.6	7.6	6.8	6.2	5.6	6.2	7.7	9.6	11.4	13.0	14.1	14.7	15.2	15.6	16.4	16.6	16.5	16.2	15.7	14.8	13.7	12.4	11.2	Diurnal Average
																								21.6	19.2	17.1	16.2	14.5	13.7	13.8	15.1	18.5	20.7	23.9	26.2	26.2	25.7	26.2	26.6	26.7	26.9	26.7	26.3	25.6	24.9	23.6	22.2	Diurnal Maximum
UO - Unstable Operation																																																



WBEA
Hourly Averages

Ambient Temperature 45 m (AT45m) - C
Mannix - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature 45 m (AT45m) - C
Mannix - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	13	1.77	1.77
0 - 10	307	41.77	43.54
10 - 20	291	39.59	83.13
> 20	124	16.87	100.00

Total Number of Valid Hours: 735

Total Number of Hours: 744



Summary of Hour Averages

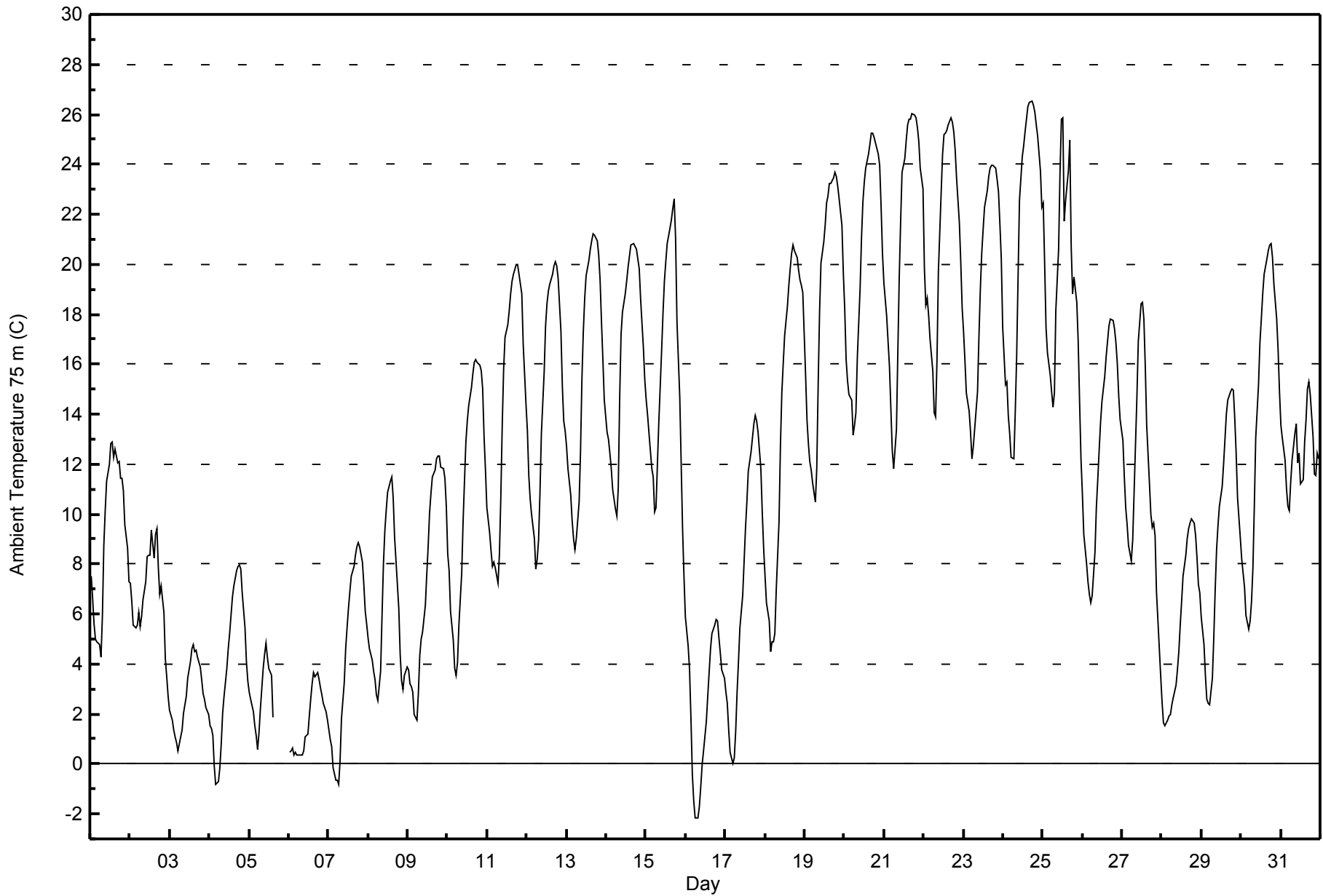
Mannix - May 2015

Maximum Value: 26.6 C on May 24 18:00		Maximum Daily Average: 21.0 C on May 22		Hours in Service: 744																						
Minimum Value: -2.2 C on May 16 08:00		Minimum Daily Average: 1.7 C on May 6		Hours of Data: 735																						
Maximum Diurnal Average: 16.3 C at hour 17		Minimum Diurnal Average: 6.3 C at hour 6		Hours of Missing Data: 9																						
Monthly Average: 11.81 C		Percentiles: P ₁ = -0.7 P ₁₀ = 2.3 Q ₁ = 5.5 Median = 11.5 Q ₃ = 17.8 P ₉₀ = 22.3 P ₉₉ = 26.0		Hours of Calibration: 0																						
				Percent Operational Time: 98.8																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	7.5	6.6	5.6	5.0	4.9	4.8	4.3	6.0	8.7	10.1	11.3	12.0	12.9	12.9	12.3	12.6	12.0	12.1	11.5	11.4	10.9	9.6	8.6	7.3	9.2	12.9
2-May	7.2	6.5	5.5	5.4	5.5	6.0	5.5	5.9	6.6	7.3	8.3	8.4	8.3	9.3	8.2	9.2	9.4	7.9	6.8	7.1	6.1	4.2	3.5	2.7	6.7	9.4
3-May	2.1	1.7	1.4	1.1	0.8	0.5	0.8	1.3	2.0	2.4	2.7	3.4	4.1	4.6	4.8	4.5	4.5	4.3	3.9	3.4	2.8	2.6	2.2	2.0	2.7	4.8
4-May	1.5	1.4	1.1	-0.1	-0.8	-0.7	-0.1	0.8	2.0	2.7	3.8	4.6	5.2	6.0	6.7	7.1	7.7	7.9	8.0	7.8	6.9	5.5	4.1	3.3	3.9	8.0
5-May	2.9	2.6	2.1	1.6	1.2	0.6	1.3	2.2	3.8	4.4	4.8	4.3	3.8	3.5	1.9	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	4.8
6-May	0.4	0.5	0.6	0.3	0.4	0.4	0.4	0.4	0.3	0.5	1.1	1.2	1.9	2.6	3.2	3.7	3.5	3.6	3.4	3.0	2.7	2.4	2.1	1.8	1.7	3.7
7-May	1.4	1.0	0.7	-0.2	-0.6	-0.7	-0.8	0.1	1.8	3.2	4.6	5.5	6.2	6.9	7.5	7.9	8.3	8.7	8.9	8.7	8.1	7.2	6.1	5.6	4.4	8.9
8-May	5.1	4.6	4.1	3.7	3.4	2.8	2.5	3.7	5.9	8.0	9.3	10.2	10.9	11.3	11.5	10.7	9.1	8.2	6.2	4.4	3.3	3.0	3.6	3.9	6.2	11.5
9-May	3.8	3.2	3.1	2.9	2.0	1.8	2.8	4.3	5.0	5.3	6.3	7.6	8.7	10.1	10.8	11.5	11.7	12.2	12.3	12.3	11.9	11.8	11.4	10.3	7.6	12.3
10-May	8.4	7.7	6.1	4.9	3.9	3.5	4.1	5.5	7.6	9.7	11.3	12.9	13.7	14.4	15.1	15.6	16.1	16.2	16.1	16.0	15.7	15.0	13.1	11.8	11.0	16.2
11-May	10.2	9.3	8.5	7.9	8.1	7.8	7.3	8.4	10.7	13.6	15.8	17.1	17.6	18.1	18.8	19.3	19.6	20.0	20.0	19.6	19.2	18.8	16.8	14.4	14.5	20.0
12-May	13.3	11.5	10.6	10.0	9.0	7.8	8.2	9.0	10.8	13.2	15.7	17.5	18.4	18.9	19.2	19.6	20.0	20.1	20.0	19.4	17.3	15.1	13.7	13.4	14.7	20.1
13-May	12.7	11.8	10.8	9.8	9.0	8.6	9.0	10.5	12.5	15.4	17.3	18.6	19.6	20.1	20.6	20.9	21.2	21.2	20.9	20.4	19.4	17.7	16.2	14.6	15.8	21.2
14-May	13.3	13.0	12.5	11.8	11.0	10.2	9.9	11.1	14.6	17.2	18.1	18.8	19.3	19.9	20.3	20.8	20.8	20.7	20.6	20.2	19.8	18.6	16.6	15.4	16.4	20.8
15-May	14.5	14.0	13.2	11.8	11.5	10.1	10.2	12.0	13.7	16.5	18.0	19.3	20.1	20.8	21.4	21.8	22.2	22.6	21.1	17.7	14.7	12.0	9.4	7.5	15.7	22.6
16-May	5.9	4.7	3.8	1.8	-0.4	-1.5	-2.1	-2.2	-1.7	-0.9	0.0	0.5	1.7	2.7	3.7	4.6	5.2	5.6	5.8	5.7	5.1	4.4	3.8	3.4	2.5	5.9
17-May	2.9	2.4	1.4	0.5	0.0	0.3	1.3	2.9	4.1	5.4	6.7	8.1	9.4	10.5	11.7	12.5	13.1	13.6	14.0	13.7	13.3	11.8	10.1	8.6	7.4	14.0
18-May	7.5	6.5	5.7	4.5	4.9	4.9	5.2	6.9	9.7	12.7	14.8	16.0	17.1	18.3	19.1	19.8	20.4	20.8	20.6	20.3	19.8	19.4	19.1	18.9	13.9	20.8
19-May	15.6	13.8	12.8	12.1	11.8	11.3	10.5	11.8	15.2	18.1	20.1	20.9	21.6	22.4	22.7	23.2	23.2	23.5	23.7	23.5	23.1	22.6	21.5	19.7	18.5	23.7
20-May	18.2	16.2	15.4	14.8	14.6	13.2	13.6	14.1	16.2	19.0	21.1	22.5	23.3	23.9	24.4	24.8	25.2	25.2	25.1	24.9	24.4	24.0	22.3	20.5	20.3	25.2
21-May	19.3	17.9	16.9	15.9	14.2	12.5	11.8	13.4	16.5	19.5	21.7	23.7	24.2	24.9	25.6	25.8	25.8	26.0	26.0	25.8	25.5	24.9	23.9	23.0	21.0	26.0
22-May	19.8	18.3	18.6	18.0	17.0	15.7	14.0	13.9	16.2	19.7	22.9	24.4	25.2	25.3	25.4	25.6	25.9	25.7	25.3	24.6	23.5	21.7	20.1	18.2	21.0	25.9
23-May	17.3	16.1	14.9	14.1	13.3	12.2	12.7	13.5	14.9	17.1	19.0	20.5	21.4	22.3	23.0	23.5	23.9	23.9	23.9	23.8	23.4	22.9	21.6	20.2	19.1	23.9
24-May	17.5	15.2	15.3	13.9	13.2	12.3	12.2	14.1	16.4	19.5	22.6	24.3	24.7	25.3	25.8	26.3	26.5	26.6	26.3	26.1	25.6	25.1	23.7	22.3	20.9	26.6
25-May	22.4	20.1	17.5	16.5	15.6	14.9	14.3	14.9	18.2	20.6	23.7	25.8	25.9	21.7	22.6	23.7	25.0	20.7	18.8	19.5	18.5	16.9	14.5	12.2	19.3	25.9
26-May	10.8	9.2	8.0	7.3	6.8	6.4	6.7	8.5	10.3	11.4	12.5	13.7	14.5	15.5	16.3	16.9	17.5	17.8	17.8	17.4	16.9	16.0	14.7	13.8	12.8	17.8
27-May	12.9	11.5	10.2	9.6	8.7	8.2	9.0	10.9	12.8	14.7	16.9	18.4	18.5	17.8	15.9	13.5	11.2	10.0	9.5	9.6	9.2	6.9	4.6	3.5	11.4	18.5
28-May	2.5	1.7	1.5	1.8	1.9	2.0	2.4	2.7	3.2	3.8	4.5	5.6	6.5	7.5	8.4	9.0	9.4	9.7	9.8	9.6	9.1	8.2	7.2	6.8	5.6	9.8
29-May	5.9	4.7	3.5	2.6	2.4	2.3	3.4	5.1	6.9	8.6	9.5	10.3	11.1	12.0	13.0	14.0	14.6	14.9	15.0	15.0	13.8	12.5	10.6	9.0	9.2	15.0
30-May	8.2	7.6	7.1	6.0	5.4	5.7	6.5	7.9	10.3	13.0	15.2	16.9	17.8	18.8	19.6	20.2	20.6	20.8	20.9	20.3	19.2	17.8	16.6	14.9	14.0	20.9
31-May	13.5	13.0	12.2	11.0	10.3	10.2	11.3	12.1	13.2	13.6	12.0	12.4	11.2	11.3	12.9	13.8	15.0	15.3	14.8	13.1	11.6	11.5	12.5	12.2	12.5	15.3
																								Diurnal Average		
																								Diurnal Maximum		
9.8 8.9 8.1 7.3 6.7 6.3 6.4 7.5 9.3 11.1 12.6 13.7 14.4 14.8 15.2 16.1 16.3 16.2 15.9 15.5 14.7 13.7 12.5 11.4																										
22.4 20.1 18.6 18.0 17.0 15.7 14.3 14.9 18.2 20.6 23.7 25.8 25.9 25.3 25.8 26.3 26.5 26.6 26.3 26.1 25.6 25.1 23.9 23.0																										
UO - Unstable Operation																										



WBEA
Hourly Averages

Ambient Temperature 75 m (AT75m) - C
Mannix - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature 75 m (AT75m) - C
Mannix - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	15	2.04	2.04
0 - 10	301	40.95	42.99
10 - 20	296	40.27	83.27
> 20	123	16.73	100.00

Total Number of Valid Hours: 735

Total Number of Hours: 744



Summary of Hour Averages

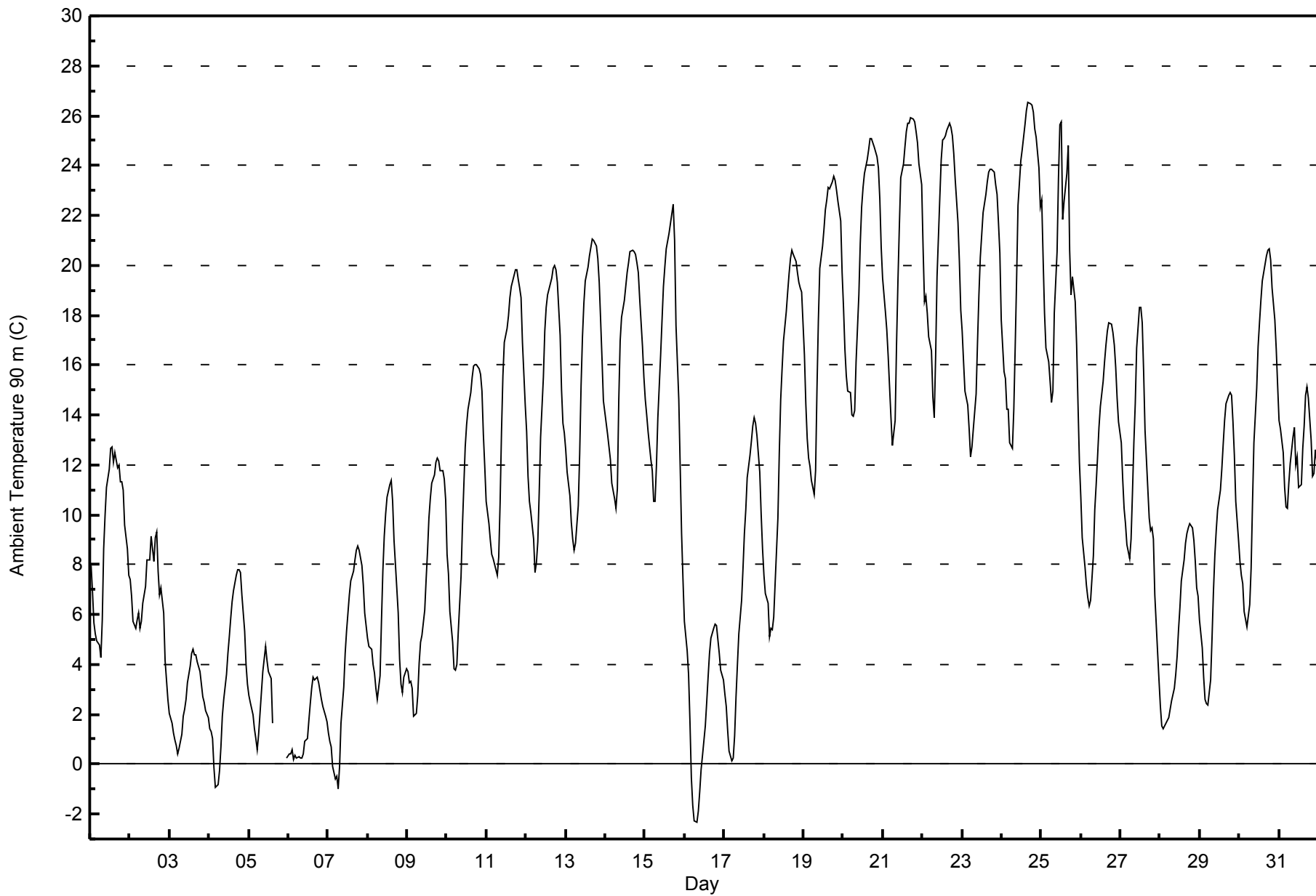
Mannix - May 2015

Maximum Value: 26.5 C on May 24 17:00		Maximum Daily Average: 21.2 C on May 21		Hours in Service: 744																							
Minimum Value: -2.3 C on May 16 08:00		Minimum Daily Average: 1.6 C on May 6		Hours of Data: 736																							
Maximum Diurnal Average: 16.1 C at hour 17		Minimum Diurnal Average: 6.5 C at hour 6		Hours of Missing Data: 8																							
Monthly Average: 11.76 C		Percentiles: P ₁ = -0.9 P ₁₀ = 2.2 Q ₁ = 5.4 Median = 11.5 Q ₃ = 17.8 P ₉₀ = 22.3 P ₉₉ = 25.9		Hours of Calibration: 0																							
				Percent Operational Time: 98.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	8.0	6.9	5.7	5.2	4.9	4.8	4.3	5.8	8.6	10.0	11.1	11.8	12.7	12.7	12.1	12.5	11.9	12.0	11.3	11.3	11.0	9.6	8.7	7.6	9.2	12.7	
2-May	7.4	6.7	5.7	5.5	5.8	6.1	5.5	5.7	6.4	7.1	8.2	8.2	8.2	9.2	8.1	9.1	9.3	7.7	6.8	7.1	6.0	4.1	3.4	2.6	6.7	9.3	
3-May	2.0	1.6	1.2	1.0	0.7	0.4	0.6	1.2	1.9	2.2	2.6	3.3	4.0	4.5	4.6	4.4	4.4	4.1	3.7	3.2	2.7	2.5	2.2	1.9	2.5	4.6	
4-May	1.4	1.3	1.0	-0.1	-0.9	-0.8	-0.3	0.7	1.9	2.6	3.6	4.5	5.1	5.8	6.5	7.0	7.6	7.8	7.8	7.7	6.8	5.3	4.0	3.2	3.7	7.8	
5-May	2.7	2.5	2.0	1.4	1.1	0.6	1.2	2.1	3.7	4.2	4.7	4.1	3.7	3.4	1.6	UO	UO	UO	UO	UO	UO	UO	UO	0.2	--	4.7	
6-May	0.4	0.4	0.6	0.2	0.3	0.3	0.3	0.3	0.2	0.4	0.9	1.0	1.8	2.4	3.1	3.5	3.3	3.5	3.3	2.9	2.6	2.3	1.9	1.7	1.6	3.5	
7-May	1.3	0.9	0.7	-0.1	-0.6	-0.5	-1.0	-0.1	1.6	3.1	4.4	5.3	6.1	6.8	7.4	7.8	8.2	8.6	8.7	8.6	8.0	7.2	6.1	5.6	4.3	8.7	
8-May	5.1	4.7	4.6	4.0	3.7	3.0	2.6	3.6	5.7	7.7	9.1	10.1	10.7	11.2	11.4	10.5	9.0	8.0	6.1	4.2	3.2	2.9	3.5	3.8	6.2	11.4	
9-May	3.7	3.3	3.3	3.0	1.9	2.1	2.8	4.1	4.9	5.1	6.2	7.4	8.5	9.9	10.7	11.3	11.6	12.1	12.3	12.1	11.8	11.8	11.4	10.6	7.6	12.3	
10-May	8.4	7.7	6.1	4.9	3.8	3.8	4.0	5.3	7.5	9.5	11.1	12.7	13.6	14.2	14.9	15.5	16.0	16.0	16.0	15.9	15.6	15.0	13.2	11.9	10.9	16.0	
11-May	10.5	9.7	9.0	8.4	8.2	8.0	7.6	8.3	10.5	13.3	15.6	16.9	17.5	18.0	18.7	19.1	19.4	19.8	19.8	19.4	19.1	18.7	16.9	14.4	14.5	19.8	
12-May	13.3	11.5	10.6	10.1	9.0	7.7	8.1	8.9	10.9	13.1	15.5	17.4	18.3	18.8	19.0	19.5	19.9	20.0	19.8	19.3	17.2	15.0	13.7	13.3	14.6	20.0	
13-May	12.6	11.7	10.7	9.7	9.0	8.6	8.9	10.4	12.5	15.2	17.1	18.5	19.4	19.9	20.4	20.7	21.1	21.0	20.8	20.3	19.3	17.8	16.2	14.6	15.7	21.1	
14-May	13.7	13.2	12.7	12.2	11.2	10.6	10.3	11.1	14.6	17.0	17.9	18.6	19.2	19.7	20.1	20.6	20.6	20.6	20.5	20.1	19.7	18.6	16.8	15.5	16.5	20.6	
15-May	14.6	14.0	13.3	12.2	11.8	10.6	10.5	12.0	13.9	16.4	17.8	19.1	19.9	20.7	21.3	21.6	22.1	22.4	21.0	17.6	14.6	11.9	9.3	7.4	15.7	22.4	
16-May	5.7	4.6	3.6	1.7	-0.5	-1.7	-2.3	-2.3	-1.9	-1.1	-0.2	0.3	1.5	2.5	3.5	4.4	5.1	5.4	5.6	5.6	5.0	4.4	3.8	3.4	2.3	5.7	
17-May	2.8	2.3	1.4	0.5	0.1	0.3	1.1	2.7	4.0	5.2	6.6	7.9	9.3	10.2	11.5	12.4	12.9	13.5	13.9	13.7	13.2	11.7	10.0	8.6	7.3	13.9	
18-May	7.6	6.8	6.4	5.1	5.5	5.4	5.9	7.2	9.9	12.5	14.6	15.8	16.9	18.1	18.9	19.6	20.3	20.6	20.5	20.2	19.7	19.3	19.1	18.9	14.0	20.6	
19-May	16.4	14.4	13.1	12.3	12.0	11.4	10.8	11.7	15.1	17.8	19.9	20.8	21.5	22.2	22.6	23.1	23.1	23.3	23.6	23.4	23.0	22.6	21.8	19.7	18.6	23.6	
20-May	18.3	16.6	15.6	14.9	14.9	14.0	14.0	14.2	16.1	18.8	20.9	22.3	23.1	23.7	24.2	24.6	25.1	25.1	24.9	24.7	24.3	23.9	22.7	20.7	20.3	25.1	
21-May	19.5	18.2	17.4	16.4	15.1	13.9	12.8	13.8	16.9	19.4	21.5	23.5	24.1	24.7	25.3	25.7	25.7	25.9	25.9	25.7	25.3	24.9	24.1	23.2	21.2	25.9	
22-May	20.7	18.6	18.8	18.1	17.1	16.6	14.7	13.9	16.4	19.5	22.7	24.3	25.0	25.1	25.2	25.4	25.7	25.5	25.2	24.5	23.4	21.7	20.2	18.2	21.1	25.7	
23-May	17.3	16.1	15.0	14.4	13.5	12.3	12.7	13.5	14.9	16.9	18.8	20.3	21.2	22.1	22.8	23.4	23.7	23.8	23.9	23.7	23.3	22.8	21.7	20.5	19.1	23.9	
24-May	17.8	15.7	15.5	14.2	14.2	12.9	12.7	14.2	16.8	19.4	22.4	24.2	24.6	25.1	25.6	26.2	26.5	26.5	26.4	26.1	25.5	25.1	23.9	22.3	21.0	26.5	
25-May	22.6	20.3	18.1	16.7	16.1	15.4	14.5	14.9	18.1	20.6	23.5	25.6	25.7	21.8	22.5	23.7	24.8	20.6	18.8	19.6	18.5	16.8	14.4	12.1	19.4	25.7	
26-May	10.7	9.1	7.9	7.2	6.7	6.3	6.6	8.4	10.2	11.2	12.4	13.5	14.3	15.4	16.2	16.8	17.4	17.7	17.6	17.3	16.8	15.9	14.7	13.7	12.7	17.7	
27-May	12.9	11.4	10.2	9.6	8.8	8.3	9.0	10.9	12.9	14.5	16.7	18.3	18.3	17.7	15.8	13.4	11.0	9.8	9.3	9.5	9.0	6.8	4.5	3.4	11.3	18.3	
28-May	2.3	1.5	1.4	1.6	1.7	1.8	2.2	2.5	3.0	3.6	4.3	5.4	6.3	7.3	8.2	8.8	9.2	9.5	9.6	9.5	9.0	8.1	7.1	6.7	5.5	9.6	
29-May	5.8	4.7	3.5	2.6	2.4	2.4	3.4	5.0	6.9	8.3	9.3	10.2	11.0	11.8	12.8	13.8	14.5	14.8	14.9	14.8	13.7	12.4	10.6	9.0	9.1	14.9	
30-May	8.1	7.6	7.3	6.1	5.5	5.9	6.4	7.9	10.5	12.9	15.1	16.7	17.7	18.6	19.4	20.1	20.4	20.6	20.7	20.2	19.1	17.8	16.6	15.2	14.0	20.7	
31-May	13.8	13.5	12.5	11.1	10.3	10.2	11.3	12.1	13.1	13.5	12.0	12.3	11.1	11.2	12.7	13.6	14.8	15.1	14.7	13.0	11.6	11.7	12.6	12.2	12.5	15.1	
		9.9	9.0	8.2	7.4	6.9	6.5	7.4	9.3	11.0	12.5	13.6	14.2	14.7	15.1	15.9	16.1	16.0	15.8	15.4	14.6	13.6	12.5	11.0	Diurnal Average		
		22.6	20.3	18.8	18.1	17.1	16.6	14.7	14.9	18.1	20.6	23.5	25.6	25.7	25.1	25.6	26.2	26.5	26.5	26.4	26.1	25.5	25.1	24.1	23.2	Diurnal Maximum	
UO - Unstable Operation																											



WBEA
Hourly Averages

Ambient Temperature 90 m (AT90m) - C
Mannix - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature 90 m (AT90m) - C
Mannix - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	16	2.17	2.17
0 - 10	302	41.03	43.21
10 - 20	299	40.63	83.83
> 20	119	16.17	100.00

Total Number of Valid Hours: 736

Total Number of Hours: 744

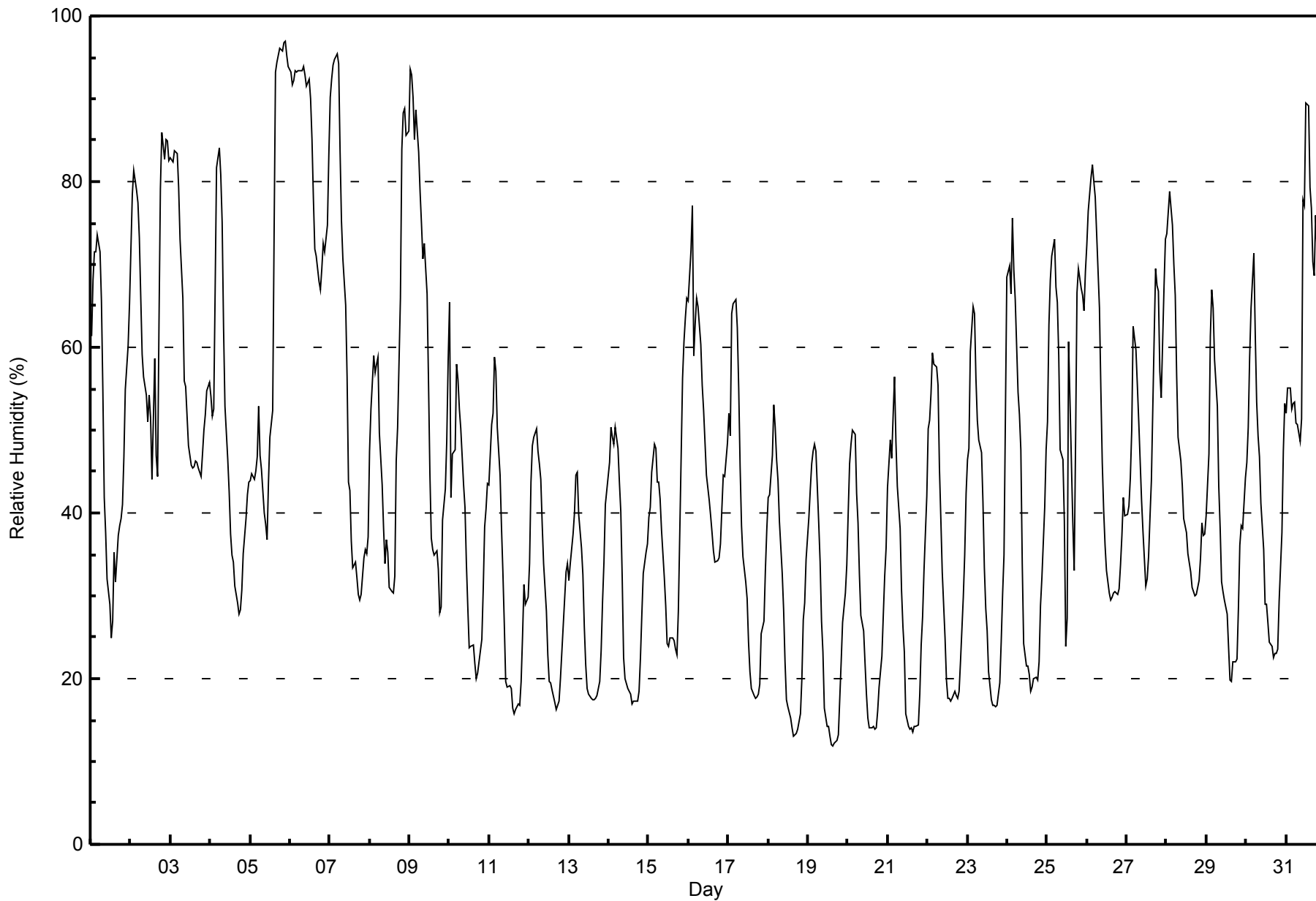


Maximum Value: 97 % on May 5 22:00																		Maximum Daily Average: 84.0 % on May 6																		Hours in Service: 744													
Minimum Value: 12 % on May 19 16:00																		Minimum Daily Average: 26.9 % on May 19																		Hours of Data: 744													
Maximum Diurnal Average: 64.7 % at hour 5																		Minimum Diurnal Average: 31.0 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 45.3 %																		Percentiles: P ₁ = 13 P ₁₀ = 18 Q ₁ = 29 Median = 43 Q ₃ = 59 P ₉₀ = 78 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-May	61	68	72	72	74	72	66	55	42	38	32	29	25	27	35	32	37	38	39	41	47	55	60	65	49.2	74																							
2-May	72	78	81	79	77	73	66	59	57	54	51	54	52	44	59	47	44	63	79	86	83	85	85	83	67.1	86																							
3-May	83	82	84	83	83	79	73	66	56	55	52	48	46	45	46	46	46	45	44	47	50	52	55	56	59.3	84																							
4-May	54	52	53	67	82	84	81	75	62	53	46	43	37	35	34	31	29	28	28	31	35	39	42	44	48.5	84																							
5-May	44	45	44	45	47	53	47	45	40	39	37	44	49	52	74	93	94	95	96	96	97	97	95	94	65.1	97																							
6-May	93	92	92	93	93	93	93	93	94	93	92	92	90	85	78	72	71	68	67	69	72	72	75	83	84.0	94																							
7-May	90	92	94	95	95	94	84	75	71	65	56	44	43	37	33	34	32	30	29	30	35	36	35	37	57.0	95																							
8-May	48	52	59	57	58	59	50	43	38	34	37	35	31	31	30	32	46	50	66	84	88	89	86	86	53.7	89																							
9-May	94	93	90	85	89	84	79	75	71	72	66	56	45	37	36	35	35	33	28	29	39	43	49	58	59.1	94																							
10-May	65	42	47	48	58	56	53	50	43	41	34	29	24	24	24	22	20	21	22	25	31	38	41	44	37.5	65																							
11-May	43	51	52	59	57	50	45	38	33	27	20	19	19	19	16	16	16	17	17	20	25	31	29	30	31.2	59																							
12-May	34	44	48	49	50	48	46	44	39	34	28	23	20	19	19	17	16	17	17	20	26	30	33	34	31.4	50																							
13-May	32	34	37	40	45	45	40	36	33	26	22	19	18	18	17	17	18	18	20	23	29	34	41	43	29.3	45																							
14-May	46	50	49	48	50	48	44	40	32	23	20	19	18	17	17	17	17	17	18	23	28	33	35	36	31.2	50																							
15-May	39	41	45	48	48	44	44	42	38	32	29	24	24	25	25	25	24	23	28	37	56	61	64	66	38.8	66																							
16-May	66	72	77	59	63	66	65	60	55	52	48	45	42	40	38	35	34	34	35	36	41	45	44	48	50.0	77																							
17-May	52	49	64	65	66	62	55	46	38	35	32	30	24	21	19	18	18	18	18	19	25	27	33	38	36.3	66																							
18-May	42	42	47	53	50	46	44	39	33	28	22	17	17	15	14	13	13	13	14	16	20	27	29	34	28.8	53																							
19-May	40	43	46	47	48	47	39	34	27	23	16	14	14	13	12	12	12	13	13	18	22	27	30	34	26.9	48																							
20-May	40	46	48	50	50	42	39	33	28	26	22	18	15	14	14	14	14	14	16	19	23	28	32	36	28.3	50																							
21-May	43	49	47	52	56	49	43	38	31	26	23	16	14	14	14	14	14	14	14	18	24	27	33	42	29.8	56																							
22-May	50	51	54	59	58	58	55	45	39	33	25	20	18	18	17	18	18	18	18	18	22	30	35	42	34.2	59																							
23-May	46	48	59	65	64	56	51	49	47	41	33	28	26	21	17	17	17	17	17	19	24	30	35	52	36.7	65																							
24-May	68	70	66	76	69	66	55	52	48	34	24	22	21	20	18	19	20	20	20	22	29	32	41	48	40.0	76																							
25-May	51	63	68	71	73	67	65	59	48	46	39	24	27	61	54	39	33	49	67	69	67	66	64	69	55.8	73																							
26-May	72	76	80	82	80	78	74	65	55	46	40	36	33	30	29	30	30	30	30	31	34	37	42	40	49.3	82																							
27-May	40	41	44	50	62	60	55	51	46	42	38	31	32	35	39	44	61	70	67	67	57	54	67	73	51.1	73																							
28-May	74	76	79	75	70	66	57	49	46	43	39	38	38	35	33	31	30	30	30	32	35	39	37	37	46.7	79																							
29-May	40	47	61	67	65	58	53	43	38	32	30	29	28	24	20	20	22	22	22	28	36	39	38	44	37.8	67																							
30-May	46	50	59	65	71	62	53	49	47	41	36	29	29	27	24	24	23	23	23	24	29	38	48	53	40.5	71																							
31-May	52	55	55	53	53	53	51	51	49	51	78	77	89	89	79	77	70	69	76	67	80	88	88	88	68.3	89																							
																								55.5	57.9	61.4	63.1	64.7	61.9	56.9	51.6	45.9	41.5	37.7	33.9	32.5	32.0	31.8	31.0	31.5	32.8	34.8	37.6	42.2	46.1	49.1	52.8	Diurnal Average	
																								94	93	94	95	95	94	93	93	94	93	92	92	90	89	79	93	94	95	96	96	97	97	95	94	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Mannix - May 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Mannix - May 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	98	13.17	13.17
20 - 40	245	32.93	46.10
40 - 60	226	30.38	76.48
60 - 80	112	15.05	91.53
80 - 100	63	8.47	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Summary of Hour Averages

Mannix - May 2015

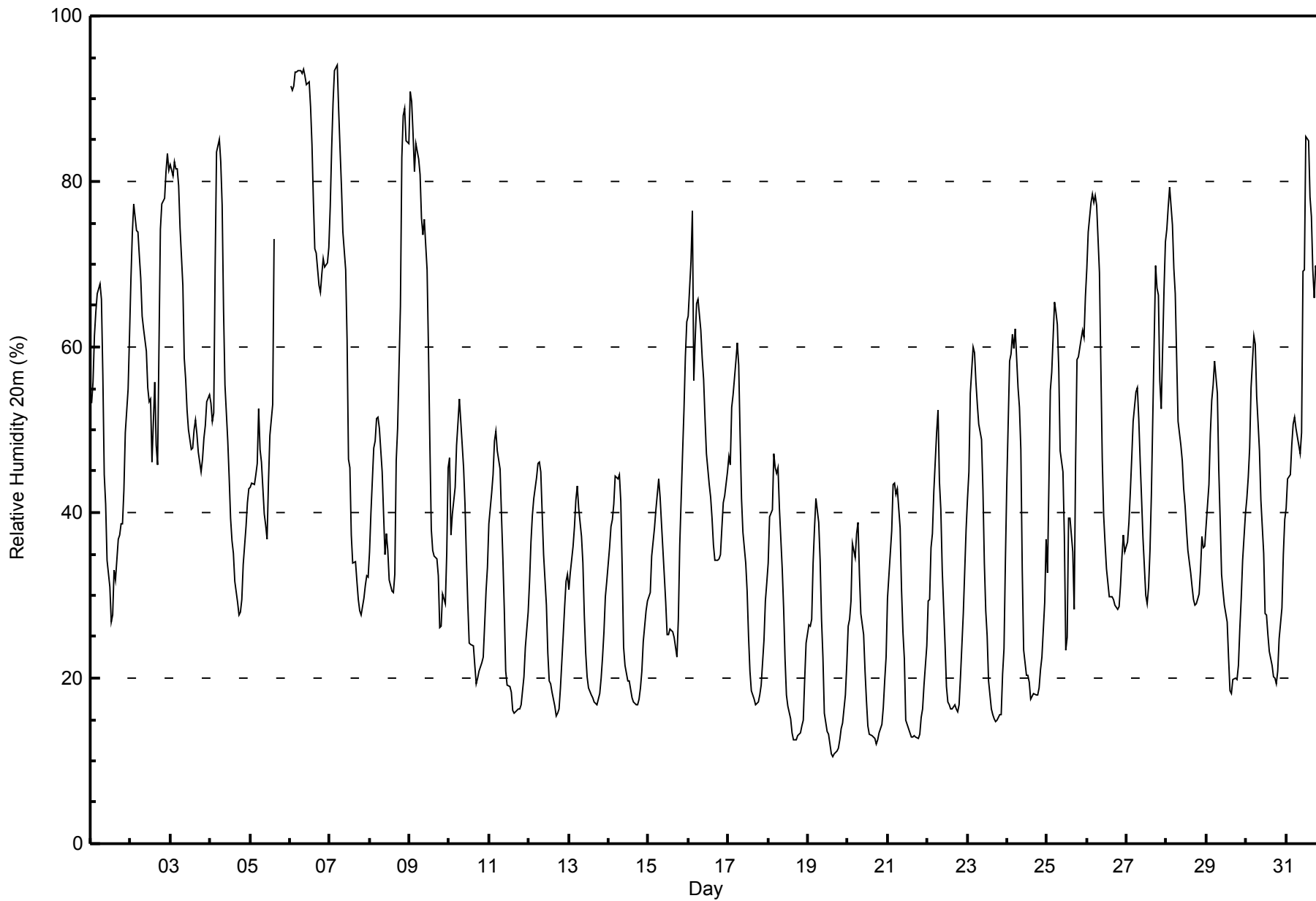
Maximum Value: 94 % on May 7 05:00														Maximum Daily Average: 82.9 % on May 6														Hours in Service: 744	
Minimum Value: 11 % on May 19 16:00														Minimum Daily Average: 21.1 % on May 19														Hours of Data: 735	
Maximum Diurnal Average: 59.3 % at hour 6														Minimum Diurnal Average: 28.5 % at hour 16														Hours of Missing Data: 9	
Monthly Average: 41.9 %														Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 26 Median = 39 Q ₃ = 54 P ₉₀ = 74 P ₉₉ = 93														Hours of Calibration: 0	
																												Percent Operational Time: 98.8	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-May	53	56	61	64	66	68	66	57	45	41	34	31	27	28	33	32	37	37	39	39	43	50	55	61	46.7	68			
2-May	68	74	77	74	74	71	68	64	62	60	55	53	54	46	56	48	46	60	74	77	78	81	83	81	66.1	83			
3-May	82	81	82	82	81	79	74	68	59	56	52	50	48	48	50	51	49	47	45	47	49	51	53	54	59.9	82			
4-May	53	51	52	70	84	85	82	77	64	56	49	44	39	37	35	32	29	28	28	30	34	38	41	43	49.1	85			
5-May	43	44	43	44	46	53	48	46	40	38	37	44	49	53	73	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	73	
6-May	91	91	92	93	93	93	93	93	94	93	92	92	89	84	78	72	71	68	67	69	71	70	70	72	82.9	94			
7-May	77	84	89	93	94	89	84	79	74	69	61	46	45	37	34	34	32	30	28	28	30	31	32	32	55.6	94			
8-May	35	40	48	49	51	52	50	45	40	35	38	35	32	31	30	32	46	50	65	83	88	89	85	85	51.4	89			
9-May	91	90	86	81	85	83	81	76	74	75	69	60	48	38	35	35	34	32	26	26	30	29	35	45	56.8	91			
10-May	47	37	40	43	48	51	54	51	45	41	35	29	24	24	24	21	19	20	21	22	23	27	31	33	33.7	54			
11-May	39	42	45	49	50	47	45	40	34	28	21	19	19	18	16	16	16	16	16	17	19	20	24	28	28.5	50			
12-May	32	36	40	42	44	46	46	45	40	35	29	23	20	19	18	17	15	16	16	19	25	29	32	33	29.8	46			
13-May	31	33	36	38	41	43	41	37	34	28	23	20	19	18	18	17	17	17	18	20	22	26	30	32	27.4	43			
14-May	36	38	39	41	44	44	45	41	33	24	22	20	20	19	18	17	17	17	18	19	21	24	28	29	28.0	45			
15-May	30	30	35	38	40	42	44	42	39	32	29	25	25	26	26	25	24	23	27	36	47	52	59	63	35.8	63			
16-May	64	70	76	56	61	65	66	62	59	56	51	47	43	42	39	36	34	34	34	35	38	41	42	45	49.9	76			
17-May	47	46	53	54	58	61	58	49	42	38	34	30	25	21	18	17	17	17	17	18	19	25	29	31	34.3	61			
18-May	34	40	40	47	45	45	45	40	33	29	22	18	17	15	13	12	13	12	13	13	14	15	20	24	25.9	47			
19-May	26	26	27	34	38	42	39	34	27	23	16	14	13	12	11	11	11	11	12	12	14	15	18	22	21.1	42			
20-May	26	27	29	36	35	37	39	33	28	25	21	17	14	13	13	13	13	12	13	13	14	16	20	23	22.1	39			
21-May	30	35	38	43	44	42	43	38	31	26	22	15	14	13	13	13	13	13	13	13	15	16	19	24	24.4	44			
22-May	29	30	36	37	43	50	52	44	40	33	24	19	17	17	16	16	17	16	16	17	20	28	33	38	28.7	52			
23-May	42	45	54	60	59	56	53	51	49	43	34	28	25	20	16	16	15	15	15	16	16	21	24	34	33.5	60			
24-May	43	58	59	62	60	62	55	53	48	33	23	20	20	19	18	18	18	18	18	19	21	22	29	37	34.8	62			
25-May	33	44	55	57	65	64	63	57	47	45	37	23	25	39	39	35	28	46	59	59	61	62	61	66	48.8	66			
26-May	69	74	77	78	77	78	77	69	58	46	40	36	33	30	30	30	29	29	28	29	31	35	37	35	48.2	78			
27-May	36	39	43	47	51	55	55	51	46	42	37	30	29	31	35	42	61	70	67	66	56	52	67	73	49.2	73			
28-May	74	77	79	75	69	66	59	51	48	46	43	41	38	35	33	31	30	29	29	30	33	37	36	36	46.9	79			
29-May	38	43	49	54	55	58	54	45	39	33	30	29	27	22	18	18	20	20	20	22	26	30	34	40	34.4	58			
30-May	42	44	48	55	61	60	54	51	47	42	35	28	28	25	23	22	20	20	19	21	25	28	35	39	36.4	61			
31-May	41	44	45	48	51	52	50	49	47	50	69	69	85	85	78	76	69	66	70	67	78	84	83	83	64.1	85			
																												Diurnal Average	
																												Diurnal Maximum	
47.8														50.6														91	
54.0														56.3														92	
58.6														59.3														93	
57.5														52.8														93	
47.3														42.5														93	
38.2														34.1														92	
32.6														31.2														89	
30.9														28.5														78	
28.7														29.6														71	
31.0														32.7														70	
35.4														38.1														88	
41.5														44.7														89	
85														85														85	

UO - Unstable Operation



WBEA
Hourly Averages

Relative Humidity 20m (RH20m) - %
Mannix - May 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity 20m (RH20m) - %
Mannix - May 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	121	16.46	16.46
20 - 40	269	36.60	53.06
40 - 60	202	27.48	80.54
60 - 80	95	12.93	93.47
80 - 100	48	6.53	100.00

Total Number of Valid Hours: 735

Total Number of Hours: 744



Summary of Hour Averages

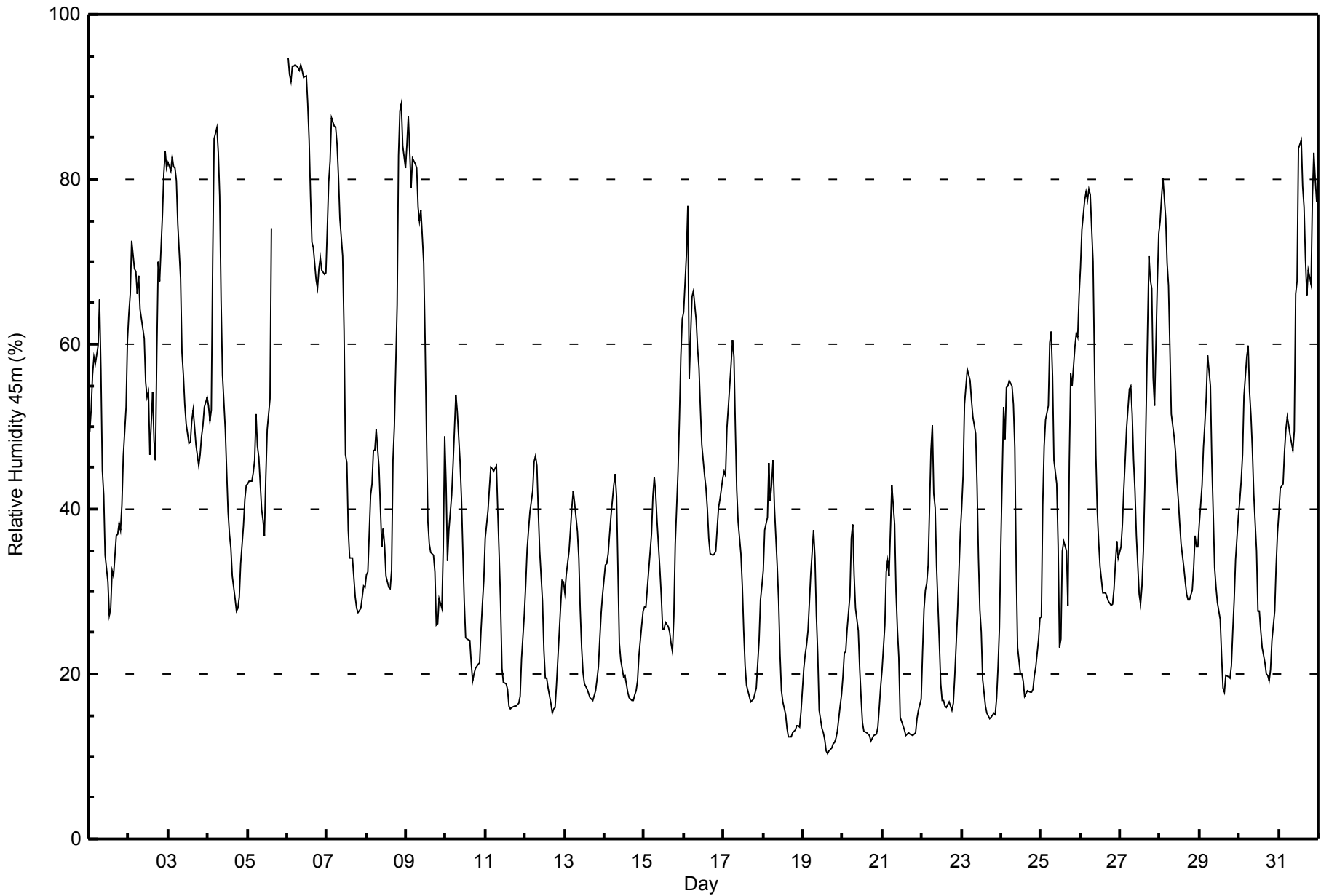
Mannix - May 2015

Maximum Value: 95 % on May 6 01:00														Maximum Daily Average: 83.2 % on May 6														Hours in Service: 744	
Minimum Value: 10 % on May 19 16:00														Minimum Daily Average: 18.9 % on May 19														Hours of Data: 735	
Maximum Diurnal Average: 57.5 % at hour 6														Minimum Diurnal Average: 28.5 % at hour 16														Hours of Missing Data: 9	
Monthly Average: 41.0 %														Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 25 Median = 37 Q ₃ = 53 P ₉₀ = 74 P ₉₉ = 93														Hours of Calibration: 0	
																												Percent Operational Time: 98.8	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-May	49	52	56	58	58	60	65	57	45	42	34	31	27	28	33	32	37	37	38	37	41	46	52	60	44.9	65			
2-May	64	66	72	69	69	66	68	64	63	61	55	54	54	47	54	48	46	59	70	68	76	81	83	81	64.1	83			
3-May	82	81	83	82	81	80	75	68	59	56	53	50	48	48	51	52	50	48	45	47	49	50	52	54	60.1	83			
4-May	53	51	52	70	85	86	83	78	65	56	50	45	40	37	35	32	29	28	28	29	33	38	41	43	49.5	86			
5-May	43	43	43	44	46	51	48	46	40	39	37	44	50	53	74	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	74			
6-May	95	93	92	94	94	94	94	93	94	93	92	93	89	85	78	72	72	68	67	69	71	69	69	69	83.2	95			
7-May	74	80	82	87	87	86	84	80	75	71	62	47	46	37	34	34	32	29	28	27	28	29	31	30	54.2	87			
8-May	32	32	42	43	47	47	50	45	40	36	38	36	32	31	30	33	46	50	65	83	88	89	84	81	50.0	89			
9-May	84	88	83	79	83	82	81	77	75	76	70	60	49	38	36	35	34	32	26	26	29	28	35	49	56.5	88			
10-May	43	34	37	42	45	50	54	52	46	41	35	29	24	24	24	21	19	20	21	21	21	25	29	31	32.9	54			
11-May	36	40	43	45	45	45	45	40	34	29	21	19	19	18	16	16	16	16	16	16	17	17	22	27	27.4	45			
12-May	31	35	37	40	42	46	46	45	40	35	29	23	19	19	18	16	15	16	16	19	25	28	31	31	29.3	46			
13-May	30	32	35	37	40	42	41	37	34	28	23	20	19	18	18	17	17	17	18	19	21	24	27	30	26.9	42			
14-May	33	33	35	37	39	43	44	42	33	24	22	20	20	19	18	17	17	17	17	18	19	22	26	28	26.7	44			
15-May	28	28	30	35	37	42	44	42	38	33	29	25	25	26	26	25	24	23	27	36	45	51	58	63	35.0	63			
16-May	64	71	77	56	61	66	66	63	60	57	52	48	44	43	40	37	35	34	35	35	38	40	41	44	50.2	77			
17-May	45	44	50	52	58	60	58	50	42	38	35	31	25	21	19	17	17	17	17	18	18	24	29	31	34.0	60			
18-May	33	38	39	46	41	43	46	40	33	29	22	18	17	15	13	12	12	12	13	13	14	14	14	15	24.7	46			
19-May	21	22	23	25	29	32	38	34	27	22	16	13	13	12	11	10	11	11	12	12	12	13	16	18	18.9	38			
20-May	20	23	23	25	29	36	38	32	28	25	21	17	14	13	13	13	12	12	12	13	13	14	16	18	20.0	38			
21-May	21	26	32	34	32	38	43	38	30	25	22	15	14	13	13	13	13	13	13	13	15	16	17	17	21.6	43			
22-May	23	28	30	31	33	47	50	42	40	33	24	19	17	17	16	16	17	16	16	17	20	27	32	37	26.9	50			
23-May	40	44	53	57	56	56	53	51	49	43	34	28	25	19	16	15	15	15	15	15	15	17	21	26	32.4	57			
24-May	36	52	48	55	55	56	55	53	47	33	23	20	20	19	17	18	18	18	18	18	20	21	24	27	32.1	56			
25-May	27	41	48	51	53	60	62	56	46	43	36	23	24	35	36	35	28	46	57	55	60	61	61	66	46.1	66			
26-May	69	74	78	78	77	79	78	70	58	47	40	36	33	30	30	30	29	29	28	28	30	33	36	34	48.1	79			
27-May	35	38	42	46	50	55	55	52	46	42	37	30	29	31	35	42	61	71	68	67	56	53	67	73	49.2	73			
28-May	75	78	80	75	70	67	59	52	49	47	43	41	38	36	33	31	30	29	29	30	33	37	35	35	47.2	80			
29-May	38	43	48	50	54	59	55	46	39	33	31	29	27	22	18	18	20	20	20	21	25	29	34	39	34.0	59			
30-May	41	43	47	54	58	60	54	51	47	42	35	28	28	25	23	21	20	20	19	21	24	28	33	37	35.8	60			
31-May	40	43	43	47	50	51	50	49	47	50	66	68	84	85	79	77	70	66	69	67	78	83	80	77	63.3	85			
																								Diurnal Average					
																								Diurnal Maximum					
45.3 48.2 51.1 53.1 55.0 57.5 57.5 53.1 47.4 42.9 38.2 34.1 32.6 31.1 30.9 28.5 28.7 29.6 30.7 31.9 34.3 36.9 39.9 42.4																													
95 93 92 94 94 94 94 93 94 93 92 93 89 85 79 77 72 71 70 83 88 89 84 81																													
UO - Unstable Operation																													



WBEA
Hourly Averages

Relative Humidity 45m (RH45m) - %
Mannix - May 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity 45m (RH45m) - %
Mannix - May 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	136	18.50	18.50
20 - 40	266	36.19	54.69
40 - 60	199	27.07	81.77
60 - 80	87	11.84	93.61
80 - 100	47	6.39	100.00

Total Number of Valid Hours: 735

Total Number of Hours: 744



Summary of Hour Averages

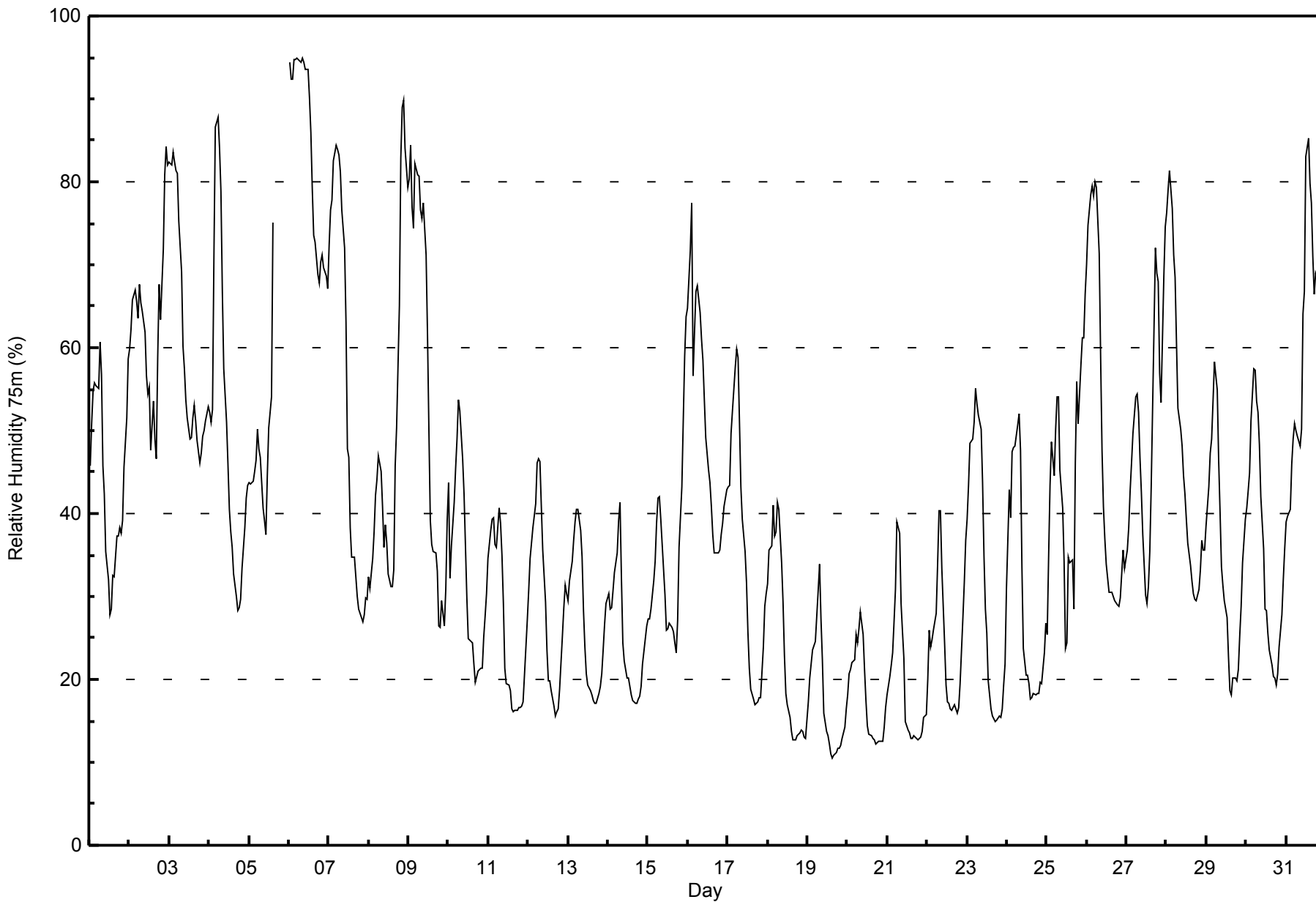
Mannix - May 2015

Maximum Value: 95 % on May 6 06:00														Maximum Daily Average: 83.9 % on May 6														Hours in Service: 744	
Minimum Value: 11 % on May 19 16:00														Minimum Daily Average: 17.6 % on May 19														Hours of Data: 735	
Maximum Diurnal Average: 55.2 % at hour 7														Minimum Diurnal Average: 29.0 % at hour 16														Hours of Missing Data: 9	
Monthly Average: 40.4 %														Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 24 Median = 36 Q ₃ = 52 P ₉₀ = 73 P ₉₉ = 94														Hours of Calibration: 0	
																												Percent Operational Time: 98.8	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-May	46	51	55	56	55	55	61	57	46	42	35	32	28	29	33	32	37	37	38	38	39	46	51	59	44.1	61			
2-May	60	62	66	67	66	64	68	65	64	62	57	54	55	48	54	49	47	59	68	63	72	81	84	82	63.1	84			
3-May	82	82	84	82	81	81	75	69	60	57	54	52	49	49	52	53	51	49	46	47	49	50	51	53	60.8	84			
4-May	52	51	53	71	87	88	84	79	67	57	51	46	41	38	36	33	30	28	29	30	33	38	42	43	50.2	88			
5-May	44	44	44	45	46	50	48	47	41	39	37	44	50	54	75	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	75			
6-May	94	92	92	95	95	95	95	94	95	94	94	94	90	86	79	73	73	69	68	70	71	70	69	67	83.9	95			
7-May	72	77	78	83	84	84	83	81	77	72	63	48	47	38	35	35	32	30	28	28	27	28	30	30	53.7	84			
8-May	32	31	35	38	42	44	47	45	41	36	39	37	33	31	31	33	46	50	65	83	89	90	84	79	49.2	90			
9-May	80	84	77	74	82	81	81	77	76	77	71	62	50	39	36	35	35	33	26	26	30	26	31	39	55.4	84			
10-May	44	32	36	41	45	49	54	52	47	42	36	30	25	25	24	22	20	20	21	21	21	25	28	30	33.0	54			
11-May	35	38	39	39	36	36	41	39	35	29	21	19	19	19	16	16	16	16	17	17	17	17	20	27	26.1	41			
12-May	31	35	37	38	41	46	47	46	41	36	29	24	20	20	19	17	16	16	16	19	25	29	31	30	29.5	47			
13-May	30	32	34	37	39	40	41	38	35	28	24	21	19	19	18	18	17	17	18	19	21	24	27	29	26.8	41			
14-May	30	29	29	31	33	35	39	41	32	24	22	20	20	19	18	17	17	17	18	18	19	22	25	26	25.1	41			
15-May	27	27	29	32	34	39	42	42	39	33	30	26	26	27	26	26	24	23	27	36	43	51	59	64	34.7	64			
16-May	65	72	78	57	62	67	68	64	61	59	54	49	45	44	41	37	35	35	35	36	38	39	41	43	50.9	78			
17-May	43	43	50	52	58	60	59	51	43	39	35	32	26	21	19	18	17	17	17	18	18	24	29	30	34.1	60			
18-May	32	36	36	41	37	38	41	41	34	29	23	18	17	15	14	13	13	13	13	14	14	14	13	13	23.8	41			
19-May	17	20	22	24	24	25	31	34	27	22	16	14	13	12	11	11	11	11	12	12	12	13	14	16	17.6	34			
20-May	18	21	21	22	22	25	24	26	28	25	21	17	14	13	13	13	13	13	13	13	13	13	14	17	18.0	28			
21-May	18	20	22	23	27	31	39	38	29	26	23	15	14	13	13	13	13	13	13	13	13	14	15	16	19.7	39			
22-May	20	26	24	25	26	28	34	40	40	33	24	19	17	17	16	16	17	16	16	17	19	27	32	37	24.5	40			
23-May	39	43	48	49	51	55	53	52	50	44	35	28	26	20	16	16	15	15	15	16	15	16	19	22	31.7	55			
24-May	31	43	40	47	48	48	51	52	48	34	24	21	20	18	18	18	18	18	18	18	20	19	23	27	30.1	52			
25-May	25	35	43	49	45	50	54	54	45	41	34	24	24	35	34	34	28	46	56	51	58	61	61	67	44.0	67			
26-May	70	75	78	79	78	80	79	71	59	48	41	37	34	30	30	30	30	29	29	29	30	33	36	33	48.7	80			
27-May	36	38	43	46	50	54	54	52	47	42	38	30	29	31	35	43	62	72	69	68	57	53	69	75	49.7	75			
28-May	76	79	81	77	71	68	61	53	50	48	45	42	39	36	34	32	30	30	30	31	33	37	36	36	48.1	81			
29-May	38	43	47	49	54	58	55	46	40	34	31	29	27	23	19	18	20	20	20	21	25	29	34	39	34.2	58			
30-May	41	43	45	51	57	57	53	52	48	42	36	28	28	26	24	22	20	20	19	21	24	28	32	36	35.6	57			
31-May	39	40	40	46	49	51	50	49	48	50	64	67	83	85	80	77	71	66	69	68	78	82	77	75	62.7	85			
																												Diurnal Average	
																												Diurnal Maximum	
UO - Unstable Operation																													



WBEA
Hourly Averages

Relative Humidity 75m (RH75m) - %
Mannix - May 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity 75m (RH75m) - %
Mannix - May 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	132	17.96	17.96
20 - 40	286	38.91	56.87
40 - 60	185	25.17	82.04
60 - 80	88	11.97	94.01
80 - 100	44	5.99	100.00

Total Number of Valid Hours: 735

Total Number of Hours: 744



Summary of Hour Averages

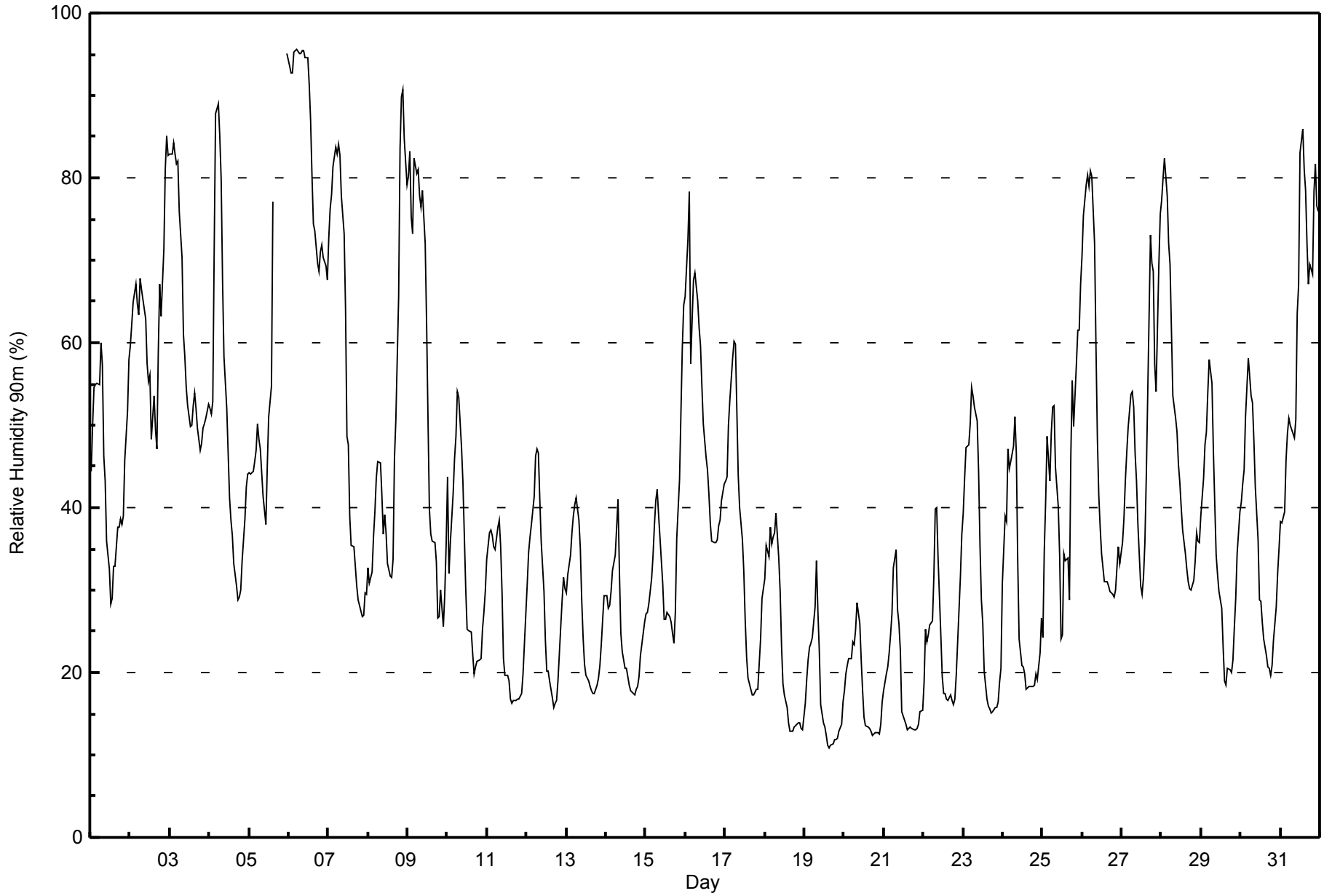
Mannix - May 2015

Maximum Value: 96 % on May 6 06:00														Maximum Daily Average: 84.6 % on May 6														Hours in Service: 744	
Minimum Value: 11 % on May 19 16:00														Minimum Daily Average: 17.4 % on May 19														Hours of Data: 736	
Maximum Diurnal Average: 54.5 % at hour 7														Minimum Diurnal Average: 29.4 % at hour 16														Hours of Missing Data: 8	
Monthly Average: 40.6 %														Percentiles: P ₁ = 12 P ₁₀ = 17 Q ₁ = 24 Median = 36 Q ₃ = 52 P ₉₀ = 74 P ₉₉ = 95														Hours of Calibration: 0	
																												Percent Operational Time: 98.9	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-May	44	50	55	55	55	55	60	57	46	43	36	33	28	29	33	33	38	38	39	38	39	46	52	58	44.1	60			
2-May	60	62	65	67	65	63	68	66	65	63	57	55	56	48	54	50	47	59	67	63	71	81	85	83	63.4	85			
3-May	83	83	84	83	82	82	76	70	61	58	54	52	50	50	52	54	52	50	47	48	50	50	51	53	61.4	84			
4-May	52	51	53	71	88	89	85	80	68	58	52	47	41	38	37	33	30	29	29	30	34	39	42	44	50.8	89			
5-May	44	44	44	46	47	50	48	47	41	40	38	45	51	55	77	UO	UO	UO	UO	UO	UO	UO	UO	95	--	95			
6-May	93	93	93	95	95	96	95	95	95	95	95	95	91	87	80	74	74	70	69	71	72	70	69	68	84.6	96			
7-May	73	76	78	81	84	83	84	83	78	73	64	49	48	39	35	35	33	30	29	28	27	27	30	29	54.0	84			
8-May	33	31	32	36	39	44	46	45	41	37	39	37	33	32	32	34	46	51	66	84	90	91	85	79	49.2	91			
9-May	80	83	75	73	82	81	81	78	76	78	72	62	51	40	37	36	36	33	27	27	30	26	30	36	55.4	83			
10-May	44	32	36	42	46	49	54	53	47	43	37	30	25	25	25	22	20	21	21	22	22	25	27	30	33.2	54			
11-May	34	37	37	37	35	35	38	38	35	30	22	20	20	19	17	16	17	17	17	17	17	17	20	27	25.7	38			
12-May	31	35	37	38	41	46	47	47	41	36	30	24	20	20	19	17	16	16	17	19	26	29	31	30	29.7	47			
13-May	30	32	34	37	39	40	41	38	35	29	24	21	20	19	18	18	17	17	19	19	21	23	27	29	27.0	41			
14-May	29	28	28	30	32	34	38	41	32	25	23	21	21	20	18	18	17	17	18	18	19	22	25	26	25.0	41			
15-May	27	27	28	31	34	38	41	42	39	34	31	26	26	27	27	26	25	24	27	36	43	51	60	65	34.8	65			
16-May	66	73	78	57	63	68	68	65	62	60	55	50	46	45	42	38	36	36	36	36	38	38	41	43	51.6	78			
17-May	43	44	50	53	58	60	60	52	44	40	36	32	26	22	19	18	17	17	18	18	18	24	29	30	34.5	60			
18-May	31	35	34	38	36	36	37	39	34	30	23	19	17	16	14	13	13	13	13	14	14	14	13	13	23.3	39			
19-May	16	19	22	23	23	24	28	34	27	23	16	14	13	12	11	11	11	11	12	12	12	13	14	16	17.4	34			
20-May	18	20	21	22	22	24	23	25	28	26	21	18	15	14	13	13	13	12	13	13	13	13	14	16	17.8	28			
21-May	18	20	21	22	25	27	33	35	28	26	23	15	14	14	13	13	13	13	13	13	13	14	15	15	19.0	35			
22-May	19	25	24	25	26	26	32	40	40	34	24	20	18	17	17	17	17	17	16	17	20	28	32	37	24.3	40			
23-May	39	43	47	48	50	54	54	52	50	44	35	29	26	20	17	16	16	15	15	16	16	17	19	20	31.6	54			
24-May	31	39	38	47	45	46	48	51	47	34	24	21	20	18	18	18	18	18	18	18	20	19	22	27	29.5	51			
25-May	24	35	41	49	43	49	52	52	45	40	34	24	25	34	34	34	29	46	55	50	57	61	62	67	43.5	67			
26-May	71	75	79	80	79	81	80	72	60	48	41	38	34	31	31	31	30	30	29	29	30	33	35	33	49.3	81			
27-May	36	39	43	47	50	54	54	52	47	43	38	31	29	32	36	44	63	73	70	69	58	54	69	76	50.2	76			
28-May	77	80	82	78	72	69	61	53	51	49	45	43	40	37	34	33	31	30	30	31	34	37	36	36	48.8	82			
29-May	39	44	48	49	54	58	55	47	40	34	32	30	28	23	19	19	21	20	20	22	25	29	34	39	34.5	58			
30-May	41	43	45	51	58	56	53	53	48	42	36	29	29	26	24	22	21	21	20	21	24	28	32	35	35.7	58			
31-May	38	38	39	46	49	51	50	49	49	51	64	67	83	86	81	78	72	67	69	68	78	82	77	76	62.9	86			
																								Diurnal Average					
																								Diurnal Maximum					
44.0 46.3 48.1 50.2 52.2 53.8 54.5 53.4 48.4 44.1 39.4 35.3 33.7 32.1 31.7 29.4 29.6 30.4 31.3 32.2 34.3 36.7 39.2 43.0																													
93 93 93 95 95 96 95 95 95 95 95 95 91 87 81 78 74 73 70 84 90 91 85 95																													
UO - Unstable Operation																													



WBEA
Hourly Averages

Relative Humidity 90m (RH90m) - %
Mannix - May 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity 90m (RH90m) - %
Mannix - May 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	133	18.07	18.07
20 - 40	292	39.67	57.74
40 - 60	178	24.18	81.93
60 - 80	83	11.28	93.21
80 - 100	50	6.79	100.00

Total Number of Valid Hours: 736

Total Number of Hours: 744



Maximum Speed: 31 km/h on May 15 22:00	Maximum Daily Speed Average: 18.5 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 22 02:00	Minimum Daily Speed Average: 1.1 km/h on May 24	Hours of Data: 735
Maximum Diurnal Speed Average: 4.8 km/h at hour 18	Minimum Diurnal Speed Average: 0.9 km/h at hour 12	Hours of Missing Data: 9
Monthly Average Velocity: 2.2 km/h 68.0 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 12 P ₉₀ = 17 P ₉₉ = 28	Percent Operational Time: 98.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-May	SW10	S9	SSE8	SE8	SE7	SE9	SE10	S7	SW12	SW12WSW19	SW20	SW21	W18	W22WSW10	NW4	NE4WNW11	SW6	WSW9WNW11	W11	W11							SW7.8	W22
2-May	W13	W12	W7	W10	W8	NW2	NW6	NNW14	N14	N15	NNW11	NNW18	NNW17	NNE15	NW17	NW16	NNW16	NNE6	SSE6	SSW8	NW14	NNW18	N18	N21			NNW9.6	N21
3-May	NNE18	N15	NNW11	N11	NNW10	NNE12	NNW10	NNW7	NW6	NW14	NNW17	NNW12	WNW9	N9	N15	NNW16	N16	N15	NNE17	NE10	ENE10	ENE9	ENE6	ENE6			N9.3	NNE18
4-May	ENE7	E7	ENE8	S6	SSW6	SSW3	SSE4	SE4	ESE4	ESE7	ESE4	ENE7	NNE5	N5	ENE6	ENE7	ENE7	ENE9	NE10	NE9	NE11	NE10	NE9	ENE14			ENE5.2	ENE14
5-May	ENE13	ENE11	ENE16	E17	ENE14	NNE10	NE11	N9	ENE12	NE12	ENE16	NE16	NE17	NNE22	NNE22	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF		----	NNE22
6-May	N21	NNE18	N15	N17	N12	N12	N13	N19	N19	NNE20	NNE19	NNE19	NNE21	NNE22	NE20	NE19	NE20	ENE16	NE16	ENE11	NE8	ENE10	ESE6	W1			NNE14.2	NNE22
7-May	ENE2	ESE2	SW5	S4	S6	SSE8	SSE11	SSE11	SSE5	SSW3	NW5	NW8	NNW6	NNE7	NNE10	NE10	NE6	E7	ENE7	ENE6	ENE8	ENE9	ESE9	SE7			E2.7	SSE11
8-May	S7	S5	SE5	SE5	SE6	SSE8	SE6	SE10	SSE7	SE4	E5	E8	NNE4	ENE4	NNE4	WNW13	N17	NNE20	NE19	NE16	ENE15	E12	ESE8	S3			ENE4.4	NNE20
9-May	NW6	N10	NNE12	NE8	NE4	NE3	ENE2	SE4	SSE7	SSW6	SSW6	S8	SSW10	SSE7	ESE6	ESE5	ENE6	ENE6	E6	SSE5	SSE7	SSE6	ESE4	ESE4			ESE2.2	NNE12
10-May	SSE7	ESE9	SE8	SE9	SSE8	SSE7	SE3	SE3	SE3	ENE4	ENE3	E3	S4	SE3	E4	ESE6	E6	NE5	ENE7	ENE5	ESE3	SE7	SSE13	SSE12			SE4.8	SSE13
11-May	SE10	SSE12	SSE9	SSE10	SSE8	SE9	SE9	SE8	SSE5	SSW4	W5	WSW2	NE4	NE5	NNW4	NW5	NNW4	SSE5	NW2	S4	SW5	NNW3	NE9	E12			SE3.2	E12
12-May	ESE8	SSE8	SSE3	ESE4	ESE5	E5	ESE5	ESE7	E4	ENE4	ESE5	ESE6	SE8	SE11	SE13	SE11	ESE9	ESE9	E11	ESE11	SE13	SE12	SE17	SE12			ESE7.9	SE17
13-May	SE15	SE13	SE10	SE11	SE9	SE6	SE10	SE11	SE12	SSE13	S13	SSW12	SW10	SSW9	SSW9	S11	SSW10	SSE11	S14	S10	S10	SSE13	SSE14	SSE14			SSE10.2	SE15
14-May	S13	S11	SSE8	SE8	SSE9	SSE8	SSE9	SE8	S6	SW11	SSW15	SW12	SSW12	SSW11	S9	S12	SSW12	SSW12	SSW12	SSW9	SSW10	SSW12	SSW13	SW13			S9.6	SSW15
15-May	SSW10	SSW7	SSE9	SSE10	SSE7	SE8	SE8	ESE6	ENE6	ESE5	SE6	WSW15	WSW14	W14	W15	W15	WSW14	W12	N14	NNW29	N27	N31	N30	N28			NW4.9	N31
16-May	N25	N23	N20	N29	N29	N20	NNE22	N22	N22	N20	N20	NNE22	NNE21	N20	NNE20	NNE19	NNE17	NNE16	N15	NNE15	NNE13	NNE10	NE9	ENE7			N18.5	N29
17-May	ESE5	SE9	SSE4	SSE8	SSE8	SSE10	SSE14	SSE16	SSE15	SSE11	SSE9	SE8	SSE9	SSE10	SSE8	SE9	SE10	SE10	SE10	SE11	SSE10	SE12	SE12	SSE11			SSE9.8	SSE16
18-May	SSE12	SE10	SE10	SE9	SE10	SSE10	SE7	SE6	ESE5	SE5	SSW4	SW10	SSW6	SW6	SW5	W6	W3	WNW3	NW5	NNW3	SSE3	SSW6	SW10	SW9			S4.3	SSE12
19-May	SSE6	S5	S5	SE6	SE6	SSE9	SSE7	SE6	SSE5	ESE4	NW2	S4	SE8	SE6	ESE7	E6	NE11	NE7	ENE5	SSE8	S8	SW9	SW6	SSE6			SE4.2	NE11
20-May	SSE7	SSE6	SSE5	SE7	SE5	SE6	SE5	SSE6	SSE6	SE5	E5	ESE4	SSE9	S9	SSW7	SSE7	SSW3	S7	SSW8	SSW7	SSW7	SW8	SSE3	SSE5			SSE5.3	S9
21-May	SE6	SE7	SE7	SE8	SSE8	SE6	SE5	SE7	SE7	ESE6	ESE8	S8	SW10	SW8	SSW6	WNW6	NNW6	NW7	NW6	NW5	WNW3	WSW3	SSW5	S6			S2.9	SW10
22-May	S2	WNW1	WSW4	S9	SSE10	SE6	SSE3	WSW4	WSW2	NNE1	NNE9	NNW12	NNW14	N17	NNW17	N16	NNE15	NNE20	NNE22	NNE20	NNE13	NNE14	NNE12	N11			N7.1	NNE22
23-May	NNE12	NNE10	N8	NNE8	NNE7	NE5	NE4	NNE6	NNE7	NNE5	NNE4	NNE7	NNE6	N6	NNE4	E6	E6	NE4	SSW3	S3	NNE6	NNE5	N2			NNE5.1	NNE12	
24-May	N3	SW2	WNW4	SSE1	SSW4	SSE5	S7	ESE4	E5	ESE6	SE5	ESE4	ENE5	NNW8	NNW7	WNW4	NW5	NE4	ENE8	E5	ESE4	ENE6	SW4	WSW6			E1.1	ENE8
25-May	WNW5	SE1	SW5	SSE5	SSE6	SSE4	SSE4	S3	SSE2	SE3	SE2	W9	NNW13	NNW13	ESE2	ESE5	SSW2	NNW22	NNW6	NNW6	NNW15	N22	NNW23	N16			NNW4.1	NNW23
26-May	NNW15	N15	N11	N12	N13	N14	NNW9	NNW11	N12	NNE16	NNE15	N12	NNW10	N9	NW10	NW10	N7	NE10	NE10	NE11	NE10	NE9	ENE8	ESE9			N9.5	NNE16
27-May	ESE9	ESE11	ESE8	SE8	SSE6	SSE7	SE7	SE5	SE6	SSE6	ESE4	S3	NNW6	NNW13	NNW18	NNW22	NNE29	NNE27	NNE21	NNE15	NNE24	NNE30	NNE26	N21			NNE8.8	NNE30
28-May	NNE25	NNE24	NNE23	NNE19	NNE18	NNE17	NNE18	NNE21	NNE18	N16	NNW18	N15	NNE13	NNE13	NNE12	N12	NNE14	NNE13	NNE13	NE12	NE12	ENE10	E9	E10			NNE14.3	NNE25
29-May	ESE10	SE11	SSE8	SSE8	SE9	SE10	SE11	SSE11	SE9	S6	ESE7	E7	ENE7	NNE6	NE5	WSW2	ESE3	SE5	SE7	SSE7	SSE11	SSE13	SSE15	SSE13			SE7.2	SSE15
30-May	SSE12	SE12	SSE11	SSE9	SSE8	SSE8	SSE9	SE6	SE4	SE5	ESE8	SE12	SE12	SSE12	S9	SSE12	SSE14	SSE13	SSE11	SE13	SE12	SSE13	SSE12	SSE12			SSE10.2	SSE14
31-May	SSE12	SSE10	SE10	SE10	SE11	SE9	SE10	SE12	SE13	SSE10	SSE9	SSE8	SSE10	S9	SSE12	SSE14	SSE12	SSE12	S8	S13	SSE10	SSW6	WSW10	WSW9			SSE9.3	SSE14

E2.4	E2.7	E2.5	ESE3.3	ESE3.2	ESE3.4	ESE3.7	ESE2.9	E2.6	ENE1.8	NE1.4	NNW0.9	NNW1.5	N2.9	N2.9	N2.2	NNE4.2	NE4.8	NE4.7	ENE3.2	ENE2.9	NE3.4	E2.4	E2.1					Diurnal Average
N25	NNE24	NNE23	N29	N29	N20	NNE22	N22	N22	NNE20	N20	NNE22	SW21	NNE22	NNE22	NNW22	NNE29	NNE27	NNE22	NNW29	N27	N31	N30	N28					Diurnal Maximum

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



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 10 km/h on May 25 14:00	Hours of Data: 735
Minimum Value: 1 km/h on May 21 21:00	Hours of Missing Data: 9
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 9	Hours of Calibration: 0
	Percent Operational Time: 98.8

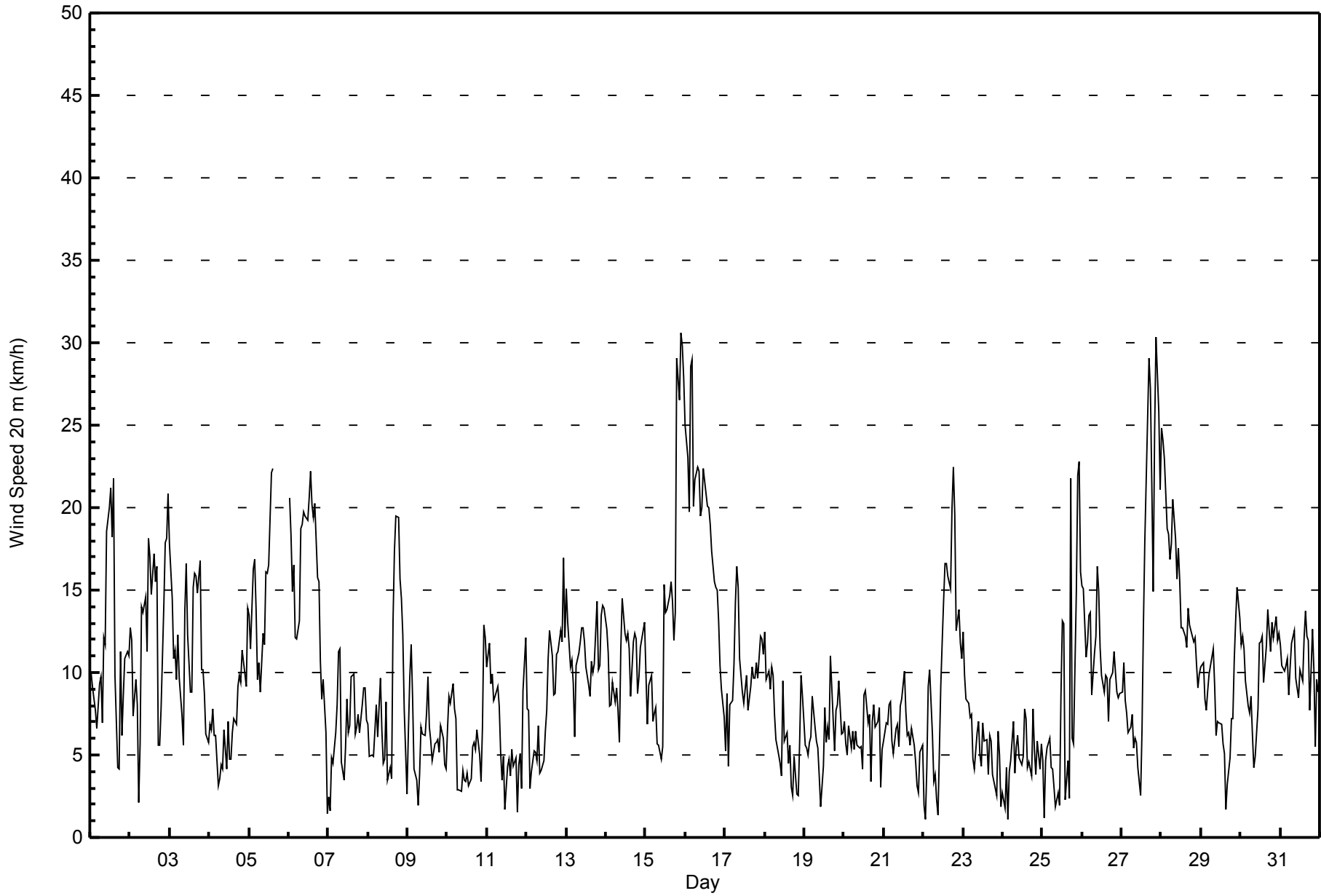
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	1	1	2	2	2	2	3	3	4	5	6	6	7	7	9	7	5	2	8	2	1	2	1	1	9
2-May	2	1	3	3	3	2	5	4	5	5	4	6	5	6	7	5	7	5	2	2	8	6	7	6	8
3-May	5	5	3	4	3	4	3	3	3	4	4	4	4	4	6	5	5	5	5	3	3	2	1	2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

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	158	21.50	21.50
6 - 11	350	47.62	69.12
12 - 19	176	23.95	93.06
20 - 28	44	5.99	99.05
29 - 38	7	0.95	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 735

Total Number of Hours: 744



WBEA
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	8	11	9	8	23	22	19	11	10	6	6	3	6	9	4	158
6 - 11	10	15	21	28	12	26	68	76	22	20	13	5	7	4	8	15	350
12 - 19	28	32	9	8	3	0	17	29	3	7	5	4	7	4	4	16	176
20 - 28	15	21	2	0	0	0	0	0	0	0	2	0	1	0	0	3	44
29 - 38	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	60	78	43	45	23	49	107	124	36	37	26	15	18	14	21	39	735

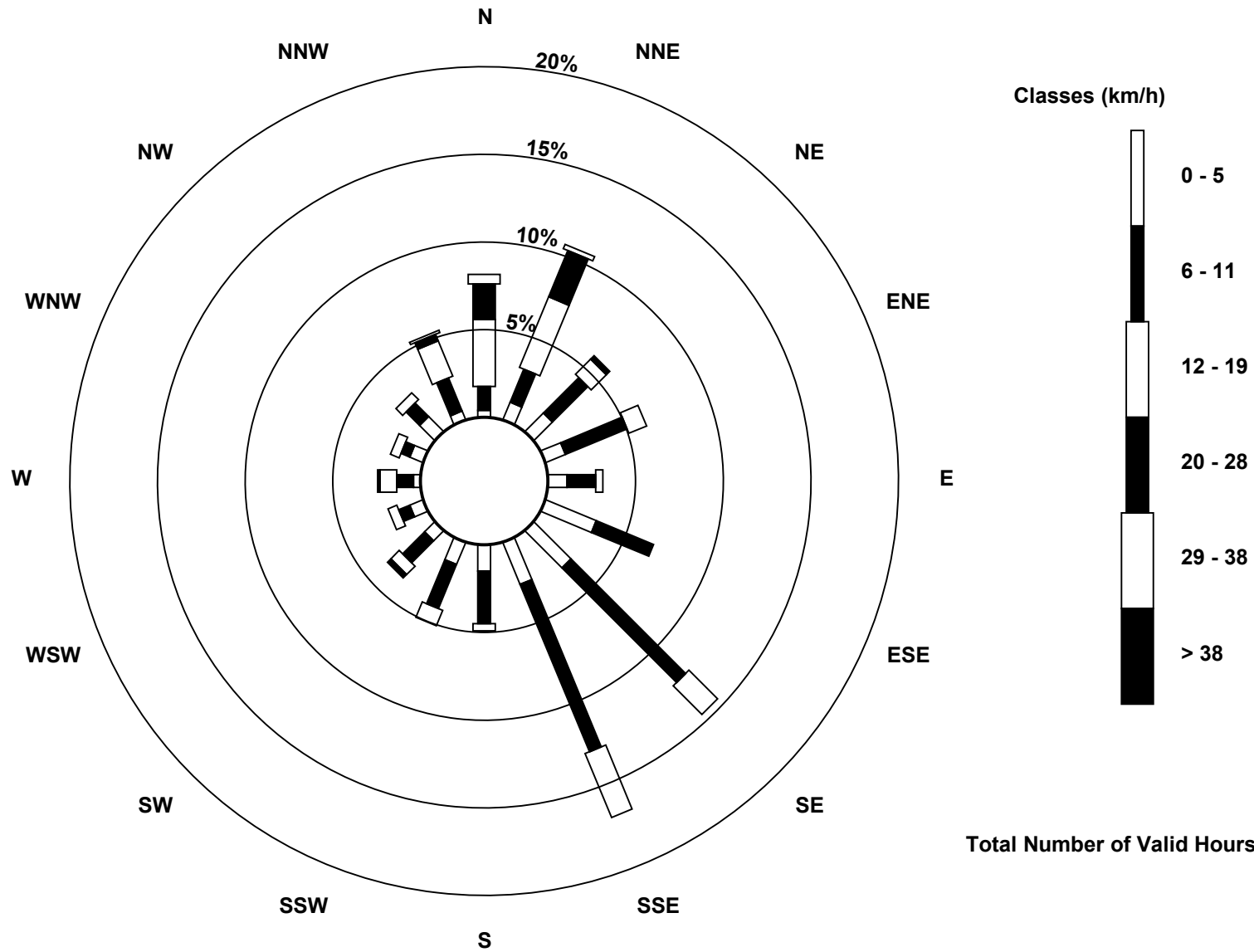
Total Number of Valid Hours: 735

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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





Maximum Speed: 42 km/h on May 15 22:00	Maximum Daily Speed Average: 23.8 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 19 11:00	Minimum Daily Speed Average: 2.2 km/h on May 24	Hours of Data: 736
Maximum Diurnal Speed Average: 5.9 km/h at hour 18	Minimum Diurnal Speed Average: 0.8 km/h at hour 12	Hours of Missing Data: 8
Monthly Average Velocity: 2.8 km/h 78.8 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 8 Median = 12 Q ₃ = 17 P ₉₀ = 23 P ₉₉ = 38	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-May	WSW17	SSW14	S13	SSE12	SSE10	SSE13	SE12	S9	SW15	SW15	WSW22	SW24	SW25	W21	W25	WSW12	NW5	NE5	WNW13	SW9	WSW14	WNW16	W16	W16	WSW10.8	SW25
2-May	WNW17	WNW18	WNW14	WNW14	WNW11	NW6	NW8	NNW17	N16	N18	NNW13	NNW23	NNW20	NNE18	NW21	NW18	NNW20	NNE8	SSE7	S13	NW17	N25	N24	N28	NNW12.9	N28
3-May	NNE24	N19	NNW15	N16	NNW13	NNE15	NNW12	NNW9	NW6	NW17	WNW19	NNW14	WNW10	N10	N17	NNW19	N19	N19	NNE20	NE12	ENE12	ENE11	ENE8	ENE7	N11.7	NNE24
4-May	ENE9	E8	ENE9	S9	SSW9	SSW5	SSE4	SE5	ESE5	ESE7	SE5	ENE8	NNE5	N5	ENE7	ENE8	ENE8	ENE10	NE11	NE12	NE16	NE13	NE12	ENE16	ENE6.1	ENE16
5-May	ENE16	ENE14	E19	E20	ENE16	NE11	NE12	NNE11	ENE14	NE14	ENE19	NE19	NE20	NNE29	NNE29	AF	AF	AF	AF	AF	AF	AF	AF	NNE24	---	NNE29
6-May	N28	NNE24	N21	N22	N17	N17	N17	N26	N25	NNE25	NNE24	NNE24	NNE25	NNE27	NE24	NE23	NE23	ENE19	NE19	ENE12	NE11	ENE12	ESE9	ESE2	NNE18.2	N28
7-May	E5	ESE4	SE5	SSE7	SSE10	SSE12	SSE14	SSE13	SSE6	SSW5	NW6	NW10	NNW7	N8	NNE11	NE12	NE7	E8	ENE9	ENE7	ENE11	ENE12	ESE13	SE11	E4.3	SSE14
8-May	SSE11	S13	SSE12	SE10	SE12	SSE13	SSE8	SE12	SSE8	SE5	E5	E9	NNE3	E5	NNE4	WNW15	N22	NNE25	NE26	NE20	ENE17	E15	ESE10	SSE5	E5.9	NE26
9-May	NW6	N13	NNE17	NE11	NE6	NE5	E2	SSE4	SSE8	SSW8	SSW9	S10	SSW12	SSE9	ESE7	ESE5	E6	ENE7	E6	SSE6	SSE9	SSE8	ESE7	ESE7	ESE3.1	NNE17
10-May	SSE13	ESE12	SE12	SE14	SSE12	SSE11	SE3	SSE3	SSE3	ENE4	ENE4	E4	S4	SE4	E4	ESE6	E6	ENE5	ENE7	ENE6	ESE5	SE11	SSE20	SSE19	SE7.1	SSE20
11-May	SSE18	SSE20	SSE16	SSE16	SSE16	SSE13	SE11	SE9	SSE6	SSW4	WNW5	WSW2	NNE5	NE5	NNW5	NW6	NNW6	SSE5	NNW2	S6	SW7	NNW2	ENE13	E16	SE5.0	SSE20
12-May	ESE11	SSE12	SSE7	ESE7	ESE9	E7	ESE5	ESE7	E4	ENE4	ESE6	SE8	SE10	SE13	SE15	SE13	SE10	ESE10	E13	ESE14	SE17	SE16	SE24	SE19	SE10.5	SE24
13-May	SE23	SE19	SE17	SE17	SE15	SE11	SSE13	SSE14	SE15	SSE17	S17	SSW16	SSW13	SSW12	SSW11	S14	SSE12	SSE14	S19	S20	S19	SSE21	SSE23	S23	SSE15.0	SE23
14-May	S20	S18	S14	SSE14	SSE15	SSE13	SSE11	SSE10	S8	SW14	SSW20	SSW17	SW16	SSW16	SSW15	S12	S16	SSW19	SSW18	SSW15	SSW19	SSW23	SW23	SW22	SSW15.1	SW23
15-May	SSW19	SSW16	S16	S17	S11	SE12	SSE10	ESE6	ENE6	ESE5	SE6	WSW18	WSW16	W15	W17	W18	WSW17	W14	N18	N39	N37	N42	N40	N38	NW6.0	N42
16-May	N33	N31	NNE26	N38	N39	N27	NNE28	N29	N28	N25	NNE25	NNE27	NNE25	NNE25	NNE24	NNE23	NNE21	NNE19	NNE19	NNE19	NNE17	NNE15	NE13	ENE10	NNE23.8	N39
17-May	ESE8	SE13	SSE7	SSE13	SSE14	SSE15	SSE18	SSE21	SSE19	SSE14	SSE11	SE10	SSE12	SSE12	SSE10	SE11	SE13	SE13	SE12	SE14	SSE15	SE18	SE17	SSE18	SSE13.5	SSE21
18-May	SSE20	SE17	SSE16	SSE15	SE18	SSE15	SSE8	SE6	ESE5	SE5	SSW5	SSW13	SSW8	SW9	SW6	WSW7	W4	WNW3	NNW6	NNW4	SSE3	SSW8	SW19	SW20	S6.9	SW20
19-May	SSW10	SW12	SW8	SSE7	SSE10	SSE12	SSE9	SSE8	SSE6	SE4	NW1	S6	SE9	SE7	ESE8	E7	NE13	NE8	ENE6	SSE12	S15	SW14	SW11	S11	SSE5.7	S15
20-May	S11	SSW6	SSW8	SSE11	SE11	SE10	SE7	SSE7	SSE8	SE6	E6	ESE5	SSE11	S13	SSW10	SSE10	SSW5	S11	SSW13	SSW12	SSW14	SW16	S11	S12	S8.3	SW16
21-May	S12	SSE14	SSE14	SE15	SE15	SE12	SSE7	SE8	SE9	ESE6	ESE9	S12	SW12	SW10	SSW9	NW7	NNW8	NW8	NW8	NW7	WNW4	W3	SSW6	S15	S5.0	SE15
22-May	SSW9	NW6	W10	S10	SSE18	SSE12	SSE6	W5	WSW2	N2	NNE12	NNW16	NNW19	N22	N22	N21	NNE20	NNE26	NNE31	NNE27	NNE20	NNE22	NNE19	N17	N9.7	NNE31
23-May	NNE18	NNE15	N14	NNE12	NNE10	ENE9	NE5	NNE5	NNE8	NNE9	N6	NNE5	NNE9	NNE7	N7	N6	ENE7	E7	NE5	S4	S3	NE10	NE9	ENE5	NNE7.1	NNE18
24-May	N7	SE2	NNW4	NE4	SSE6	S8	S10	SE5	E6	ESE7	SSE6	ESE5	ENE6	NNW10	NNW9	NW6	NW6	NE5	ENE9	E8	ESE7	E10	SSE6	SW6	E2.2	NNW10
25-May	W4	ENE3	SSW7	SSW8	S8	SSE6	S6	SSW5	SSW2	SSE2	SSE2	W10	NNW16	NNW19	E1	SE5	SSW3	NNW31	NNW9	NNW11	NNW24	N32	N33	N24	NNW6.3	N33
26-May	N24	N23	N17	N19	N22	N20	NNW13	NNW15	N16	NNE21	NNE19	N15	NNW13	N12	NW14	NW13	N10	NE11	NE12	NE15	NE15	NE14	ENE12	ESE12	N13.6	N24
27-May	ESE12	ESE14	ESE12	ESE11	SSE12	SSE11	SE10	SE6	SE8	SSE7	SE5	S3	NNW8	NNW19	NNW25	N31	NNE40	NNE36	NNE29	NNE20	NNE33	NNE41	NNE35	N30	NNE12.1	NNE41
28-May	NNE34	NNE33	NNE31	NNE25	NNE25	NNE22	NNE23	NNE26	NNE24	N21	NNW23	N20	NNE16	NNE17	NNE16	N15	NNE17	NNE16	NNE16	NE15	NE16	ENE14	E13	E13	NNE18.9	NNE34
29-May	ESE14	SE15	SSE15	SSE15	SE14	SE13	SE15	SSE16	SSE12	S9	ESE8	E8	ENE7	NNE6	NE6	SW3	ESE5	SE6	SE9	SSE11	SSE17	SSE20	SSE24	SSE21	SE10.6	SSE24
30-May	SSE18	SE19	SSE20	SE15	SSE13	SSE11	SSE12	SE8	SE5	SE5	ESE9	SE16	SE16	SSE16	S14	SSE17	SSE19	SSE17	SSE17	SE18	SE19	SSE23	SSE23	SSE22	SSE15.3	SSE23
31-May	SSE20	SSE18	SE17	SE16	SE16	SE13	SE15	SE17	SE17	SSE16	SSE15	SSE14	SSE17	SSE15	SSE17	SSE18	SSE17	SSE18	S14	S21	S18	SSW12	WSW16	WSW15	SSE14.4	S21

ESE3.2 ESE3.7 ESE3.7 ESE5.1 ESE5.8 ESE5.4 ESE4.8 ESE3.4 E3.1 ENE2.0 NE1.6 NNW0.8 NNW1.4 N3.5 N3.4 N2.8 NE5.1 NE5.9 NE5.7 ENE3.9 ENE3.7 ENE4.4 E3.7 ESE3.4	Diurnal Average
NNE34 NNE33 NNE31 N38 N39 N27 NNE28 N29 N28 N25 NNE25 NNE27 SW25 NNE29 NNE29 N31 NNE40 NNE36 NNE31 N39 N37 N42 N40 N38	Diurnal Maximum

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



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 14 km/h on May 25 14:00			Hours of Data:	736
Minimum Value: 0 km/h on May 11 21:00			Hours of Missing Data:	8
			Hours of Calibration:	0
			Percent Operational Time:	98.9
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 9				

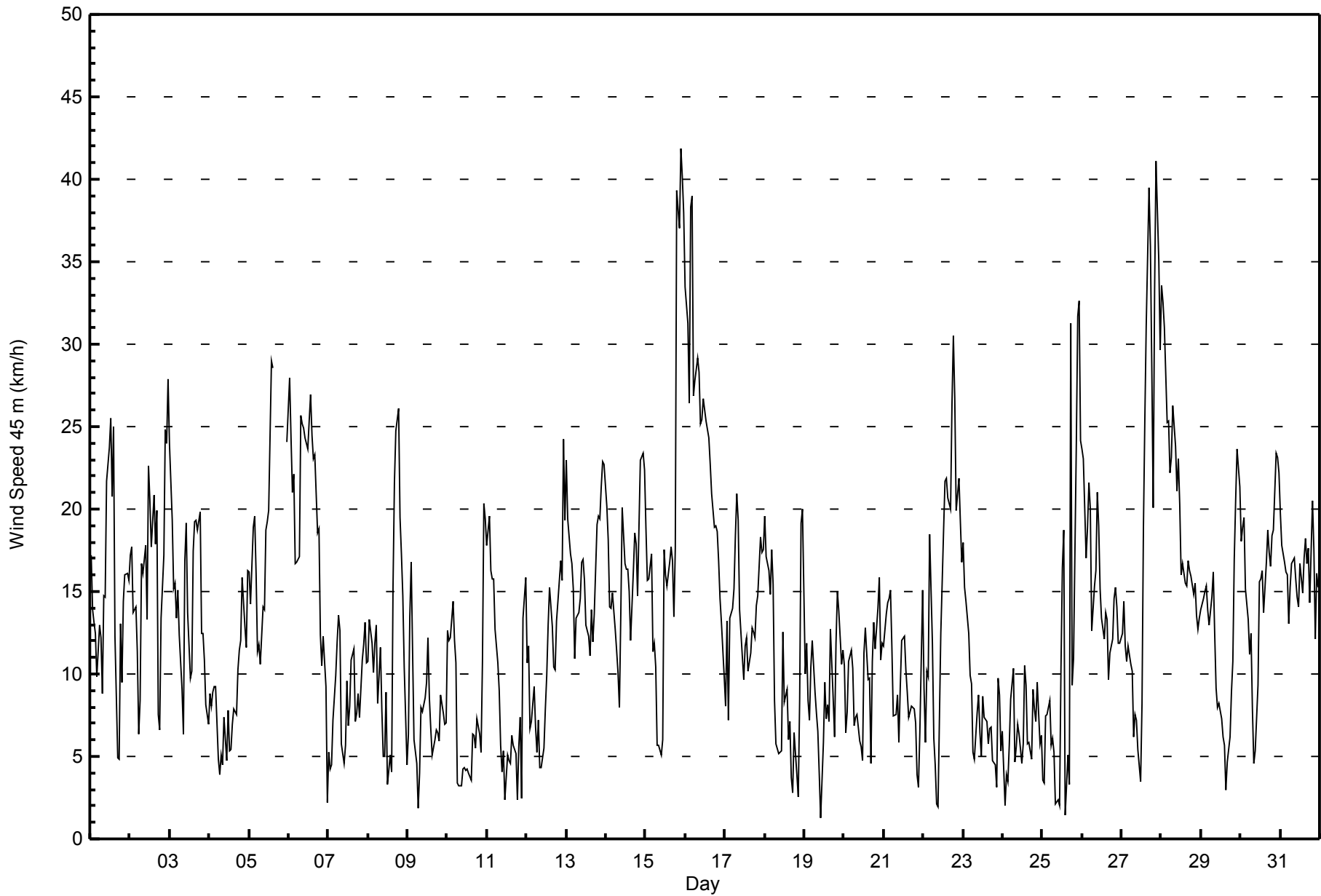
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	2	1	1	1	1	2	2	3	4	6	5	7	6	7	9	8	6	2	9	3	2	2	1	1	9
2-May	2	1	3	2	3	3	6	3	4	4	4	6	4	6	9	4	9	6	2	2	9	5	7	5	9
3-May	6	5	3	4	3	4	3	2	3	4	3	4	4	4	6	4	5	5	4	3	3	2	2	3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

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	92	12.50	12.50
6 - 11	227	30.84	43.34
12 - 19	292	39.67	83.02
20 - 28	98	13.32	96.33
29 - 38	21	2.85	99.18
> 38	6	0.82	100.00

Total Number of Valid Hours: 736

Total Number of Hours: 744



WBEA
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	6	6	7	8	11	14	10	3	8	1	2	4	3	2	5	92
6 - 11	7	10	10	24	14	23	27	43	17	15	8	1	2	2	14	10	227
12 - 19	20	20	18	15	6	8	45	68	21	20	9	8	6	10	5	13	292
20 - 28	22	32	6	0	1	0	2	14	4	2	4	2	2	0	1	6	98
29 - 38	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21
> 38	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Totals	65	80	40	46	29	42	88	135	45	45	22	13	14	15	22	35	736

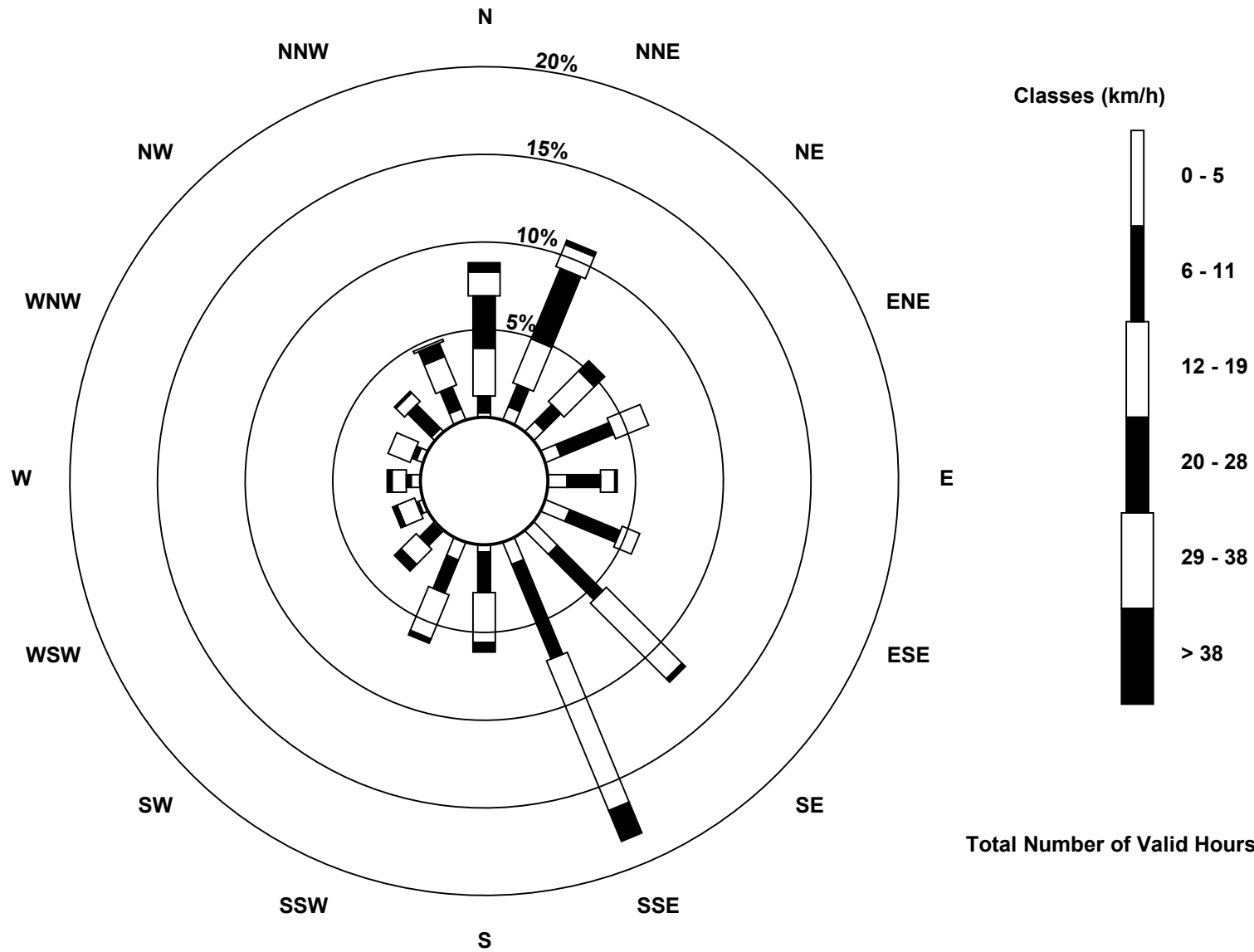
Total Number of Valid Hours: 736

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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





Maximum Speed: 48 km/h on May 15 22:00	Maximum Daily Speed Average: 26.3 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 19 11:00	Minimum Daily Speed Average: 3.0 km/h on May 24	Hours of Data: 735
Maximum Diurnal Speed Average: 6.6 km/h at hour 18	Minimum Diurnal Speed Average: 0.7 km/h at hour 12	Hours of Missing Data: 9
Monthly Average Velocity: 2.8 km/h 79.8 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 8 Median = 14 Q ₃ = 20 P ₉₀ = 27 P ₉₉ = 43	Percent Operational Time: 98.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	WSW25	SW18	SSW15	SSW12	SSW9	S11	SSE13	S10	SW15	SW16	WSW23	SW25	SW27	W22	W26	WSW13	WNW5	NE5	WNW14	SW10	WSW20	WNW19	W20	WNW20	WSW13.3	SW27
2-May	NW19	NW19	NW18	NW16	NW14	NNW9	NNW11	NNW18	N17	N19	N14	NNW24	NNW22	NNE20	NW22	NW18	NNW21	NNE9	SSE6	S12	NW19	N29	N27	NNE32	NNW15.0	NNE32
3-May	NNE27	N22	N18	N18	N16	NNE17	N13	NNW9	NW7	NW18	WNW20	WNW14	WNW9	N11	N18	N20	N21	N20	NNE22	NE15	ENE14	E13	E10	ENE8	N12.7	NNE27
4-May	ENE11	E9	ENE10	S11	SSW11	SSW5	S4	SE5	ESE5	SE7	SE5	ENE8	NNE6	NNE6	E8	ENE8	ENE8	ENE11	NE12	NE15	NE20	ENE16	NE13	ENE18	ENE6.9	NE20
5-May	E18	E16	E20	E21	E18	ENE12	ENE13	NNE11	ENE15	NE15	ENE20	NE22	NE22	NNE32	NNE33	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	NNE33
6-May	NNE31	NNE28	N25	N25	N20	N20	N21	N29	N29	NNE27	NNE27	NNE26	NNE28	NNE29	NE27	NE25	NE25	ENE20	NE21	ENE13	ENE12	E13	ESE8	ESE3	NNE20.4	NNE31
7-May	E6	E5	ESE3	SE9	SSE11	SE15	SSE15	SSE13	SSE6	SSW5	WNW5	NW9	NNW7	N8	NNE11	NE13	NE8	E8	ENE10	ENE8	ENE13	ENE16	E13	SE10	E5.2	ENE16
8-May	SSE11	S17	S14	SE12	SE16	SSE17	SSE11	SSE13	SSE8	SE5	ESE5	E8	NNE3	E5	NNE4	WNW16	N23	NNE28	NE29	NE23	ENE19	E17	ESE9	SE5	E6.5	NE29
9-May	N6	NNE14	NNE21	ENE14	ENE6	ENE6	ESE2	SE4	SSE8	SSW8	SSW9	S10	SSW13	SSE9	ESE6	ESE5	E6	ENE7	E7	SSE6	SSE9	SSE8	SE5	ESE5	ESE3.8	NNE21
10-May	SE11	ESE9	SE9	SE14	SE13	SE9	SE3	SSE3	SSE3	ENE4	ENE5	ESE5	SSE4	SE5	ESE4	ESE6	E6	ENE6	ENE8	E6	ESE4	SE11	SSE27	SSE26	SE7.4	SSE27
11-May	SSE25	SSE25	SSE23	SSE23	SSE15	SSE11	SSE12	SSE10	S6	SSW4	WNW5	WSW2	NNE5	NE5	NNW5	NW6	NNW7	SSE5	NNW2	S5	SW7	NNE3	ENE18	E15	SSE6.0	SSE25
12-May	ESE8	SE13	SE8	ESE7	ESE7	ESE7	ESE4	ESE6	ESE4	ENE4	ESE6	SE8	SE10	SE12	SE15	SE12	SE10	ESE9	E11	ESE11	SE14	SE15	SE25	SE22	SE10.0	SE25
13-May	SE26	SE21	SE21	SE20	SE21	SE16	SSE15	SSE15	SE15	SSE18	S18	SSW17	SSW14	SSW13	SSW12	S15	SSE12	SSE14	S21	S22	S23	SSE27	S28	S28	SSE17.5	S28
14-May	S25	SSW23	SSW18	SSW13	S11	S13	S12	SSE11	SSW10	SW14	SSW21	SSW18	SSW17	SSW17	SSW15	S13	S17	SSW20	SSW19	SSW17	SSW22	SSW29	SW31	SW31	SSW17.7	SW31
15-May	SSW26	SSW22	SSW21	SSW19	SSW15	SSE14	SSE14	SE6	E5	ESE5	SE6	WSW19	WSW17	WSW16	W18	W19	WSW18	W14	N20	N46	N43	N48	N46	N44	NNW7.1	N48
16-May	N38	N35	NNE30	N42	N43	N30	NNE31	N32	N31	N27	NNE27	NNE29	NNE27	NNE27	NNE26	NNE25	NNE23	NNE21	NNE21	NNE20	NNE19	NE19	NE16	E12	NNE26.3	N43
17-May	ESE7	SE10	SE9	SE17	SSE20	SSE20	SSE20	SSE21	SSE20	SSE15	SSE11	SE9	SSE12	SSE13	SSE11	SE11	SE12	SE12	SE11	SE15	SSE18	SE21	SE22	SSE24	SSE14.8	SSE24
18-May	SSE26	SE24	SSE24	SSE22	SSE22	SSE19	SSE9	SE4	SE5	SE5	SSW6	SSW13	SSW9	SSW10	SW6	WSW7	W4	WNW3	NNW7	NNW4	SE3	SSW9	SW19	SW21	S8.7	SSE26
19-May	SW17	SW21	WSW16	SW5	SSW6	SSW10	S10	SSE9	S7	SSE4	NW1	S6	SE9	SE7	ESE8	E7	NE13	NE9	ENE6	SSE14	S17	SW15	SW13	S10	S6.0	SW21
20-May	SW11	WSW12	SW12	S5	SSE3	SSE9	S6	SSE8	SSE8	SE5	E5	ESE5	SSE12	S14	S10	SSE10	SSW4	S12	SSW14	SSW13	SSW16	SW19	SSW15	SSW15	S8.8	SW19
21-May	SSW13	S12	S14	S12	SSE19	SSE18	SSE11	SE7	SE8	SE5	ESE8	S13	SW13	SW11	SSW9	NW7	NNW8	NNW8	NW8	NW7	WNW4	W5	S6	S18	S5.9	SSE19
22-May	SW15	WNW10	W17	SW12	S16	S13	SW3	W6	WNW2	NW2	N14	NNW16	N19	N23	N23	N22	NNE22	NNE30	NNE35	NNE32	NNE27	NNE31	NE26	NNE20	N11.5	NNE35
23-May	NNE21	NE18	NNE17	NE16	NE12	ENE11	NE5	NNE5	NNE8	NNE9	N6	NNE5	NNE9	NNE7	N7	NNE6	ENE7	ENE7	ENE5	S4	S4	NE9	NE13	ENE8	NE8.0	NNE21
24-May	N8	ESE4	NNE3	ENE4	SE5	SSE12	S13	SSE6	ESE4	ESE6	SE6	ESE5	ENE6	NNW11	NNW10	NW5	NNW6	NE5	ENE10	E7	ESE6	E12	SSE6	S6	E3.0	S13
25-May	S5	ENE4	S8	SSW8	SSW6	SSW4	SSW6	SW6	SW3	SW3	SW2	W11	NNW17	NNW20	NW1	SE4	SSW3	NNW36	NNW11	N14	N30	N37	N37	N28	NNW7.8	N37
26-May	N28	N27	N21	N21	N26	N24	N14	NNW16	N17	NNE23	NNE21	N16	NNW14	N13	NNW14	NW14	N10	NE12	NE13	NE17	NE19	NE18	ENE14	ESE10	N15.4	N28
27-May	ESE9	ESE10	ESE8	SE8	SE15	SE14	SE10	ESE5	SE7	SSE7	SE5	S4	NNW8	NNW20	NNW28	N35	NNE44	NNE40	NNE32	NNE23	NNE38	NNE46	NNE40	N33	NNE13.8	NNE46
28-May	NNE38	NNE36	NNE34	NNE28	NNE28	NNE25	NNE26	NNE29	NNE26	N23	NNW24	N21	NNE17	NNE18	NNE16	N16	NNE18	NNE18	NNE17	NE17	NE18	ENE16	E12	E12	NNE20.6	NNE38
29-May	ESE11	SE14	SSE19	SSE18	SE12	SE12	SE16	SSE17	SSE13	SSE10	ESE7	E8	ENE8	NNE6	NE6	SSW3	ESE5	SE6	SE8	SSE12	SSE21	SSE25	SSE29	SSE27	SE11.7	SSE29
30-May	SSE24	SE25	SE27	SE19	SE16	SE16	SSE15	SSE8	SE4	SE4	ESE8	SE14	SE15	SSE17	S14	SSE17	SSE19	SSE19	SSE17	SE21	SE24	SSE30	SSE30	SSE28	SSE17.7	SSE30
31-May	SSE27	SSE27	SSE23	SE18	SE17	SE16	SE18	SE19	SE15	SSE17	SSE18	SSE17	SSE20	SSE16	SSE18	SSE19	SSE17	SSE20	S17	S23	S21	SSW17	WSW21	WSW20	SSE16.7	SSE27

ESE3.0 ESE3.2 SE3.4 ESE4.6 ESE5.0 SE5.8 SE4.8 ESE3.1 E2.9 ENE1.9 NE1.6 N0.7 NNW1.4 N3.6 N3.7 N3.1 NE5.6 NE6.6 NE6.4 ENE4.6 ENE4.5 ENE5.4 ESE4.4 SE4.1	Diurnal Average
NNE38 NNE36 NNE34 N42 N43 N30 NNE31 N32 N31 N27 NNE27 NNE29 NNE28 NNE32 NNE33 N35 NNE44 NNE40 NNE35 N46 N43 N48 N46 N44	Diurnal Maximum

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



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 15 km/h on May 25 14:00			Hours of Data:	735
Minimum Value: 1 km/h on May 19 00:00			Hours of Missing Data:	9
			Hours of Calibration:	0
			Percent Operational Time:	98.8
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 10				

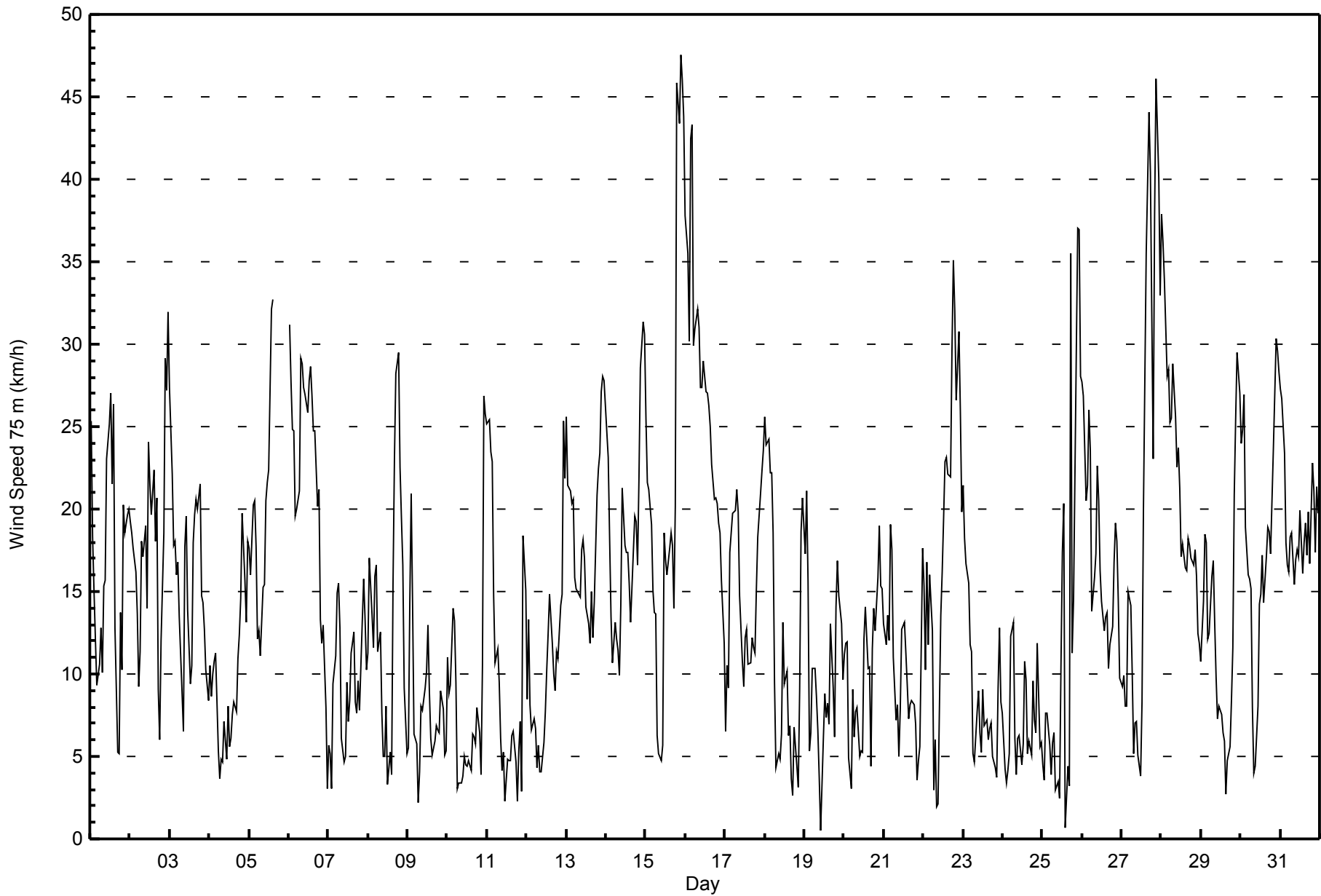
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	2	2	1	1	2	2	2	4	4	6	5	7	6	7	9	8	7	3	9	3	4	3	2	1	9
2-May	3	1	4	3	2	2	5	3	4	4	4	7	4	6	11	4	10	7	3	2	10	5	7	5	11
3-May	6	5	4	4	3	4	3	2	3	4	3	4	4	4	6	4	5	5	4	3	3	2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

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	100	13.61	13.61
6 - 11	199	27.07	40.68
12 - 19	239	32.52	73.20
20 - 28	147	20.00	93.20
29 - 38	39	5.31	98.50
> 38	11	1.50	100.00

Total Number of Valid Hours: 735

Total Number of Hours: 744



WBEA
Frequency Distribution

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

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	0	7	4	6	4	20	18	6	7	7	5	1	2	6	4	3	100
6 - 11	7	11	4	22	14	26	27	28	15	15	6	1	2	2	6	13	199
12 - 19	13	10	20	16	11	0	34	42	22	25	13	7	4	7	7	8	239
20 - 28	25	31	9	2	2	0	14	28	7	7	4	5	3	2	1	7	147
29 - 38	13	18	1	0	0	0	0	3	0	1	2	0	0	0	0	1	39
> 38	7	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Totals	65	81	38	46	31	46	93	107	51	55	30	14	11	17	18	32	735

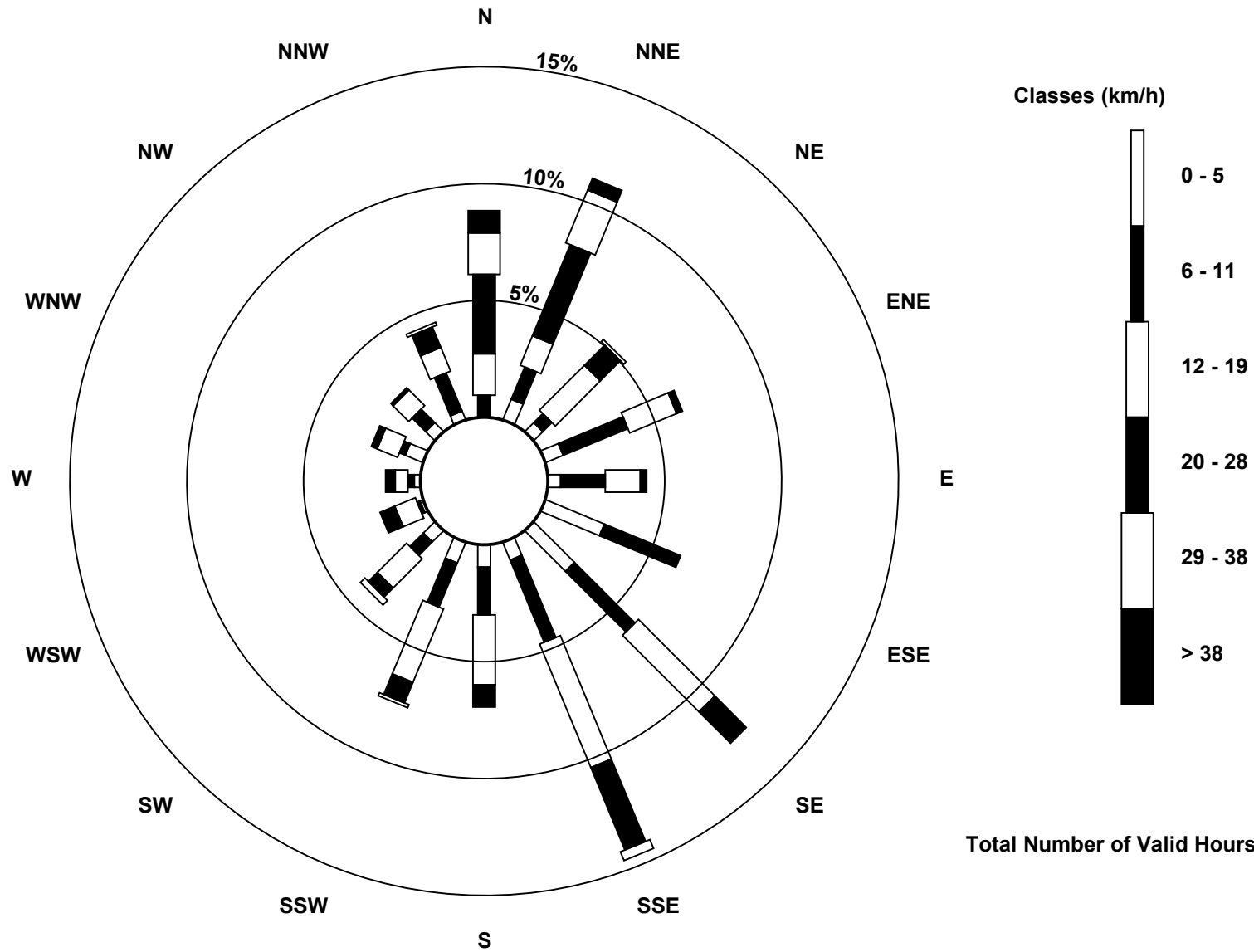
Total Number of Valid Hours: 735

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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





Maximum Speed: 49 km/h on May 15 22:00	Maximum Daily Speed Average: 27.3 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 19 11:00	Minimum Daily Speed Average: 3.7 km/h on May 24	Hours of Data: 738
Maximum Diurnal Speed Average: 6.8 km/h at hour 18	Minimum Diurnal Speed Average: 0.7 km/h at hour 12	Hours of Missing Data: 6
Monthly Average Velocity: 3.0 km/h 75.2 deg	Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 8 Median = 15 Q ₃ = 21 P ₉₀ = 29 P ₉₉ = 44	Percent Operational Time: 99.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	WSW29	SW21	SSW16	SSW13	SSW11	S11	SSE12	S11	SW16	SSW16	SW23	SW26	SW27	W21	W26	WSW14	WNW6	NNE5	W14	SW11	WSW22	WNW19	W19	WNW20	WSW14.4	WSW29	
2-May	NW19	NW18	WNW18	NW17	NW14	NW10	NW13	NNW19	N18	N19	NNW14	NNW25	NNW22	N20	NW23	NW18	NNW21	N10	SE5	S11	NW19	NNW31	N28	N33	NNW15.9	N33	
3-May	N29	N23	NNW19	NNW19	NNW17	N17	NNW14	NNW9	NW7	NW18	WNW19	W14	WNW10	NNW11	NNW18	NNW20	N21	N21	NNE22	NNE16	NE15	ENE14	ENE12	ENE9	N13.2	N29	
4-May	ENE12	ENE9	ENE11	S12	S12	SSW6	S4	SE5	ESE5	ESE8	ESE5	ENE9	NNE6	NNE6	ENE8	ENE9	ENE8	NE11	NE13	NNE15	NE21	NE18	NE14	ENE20	ENE7.4	NE21	
5-May	ENE20	ENE18	ENE22	ENE22	ENE20	ENE13	ENE13	NNE11	ENE16	NE16	NE21	NE23	NNE23	N33	NNE33	AF	AF	AF	AF	AF	AF	AF	NNE28	ENE28	N29	NE19.6	NNE33
6-May	N33	N29	N27	N26	N21	N22	N23	N31	N31	N29	N28	NNE27	NNE29	NNE30	NNE28	NE26	NE25	NE21	NE22	ENE14	NE12	ENE14	ESE10	ESE4	NNE21.5	N33	
7-May	E7	E8	ESE5	SE9	SE12	SE16	SSE17	SSE13	SSE6	SSW5	WNW5	NW10	NNW7	N9	NNE12	NE13	NE9	E8	NE10	ENE8	ENE14	ENE18	E20	ESE13	E6.1	E20	
8-May	SE12	SSE18	S16	SE14	SE19	SSE17	SSE13	SE13	SSE8	ESE5	E5	E9	N3	E5	N4	WNW16	N23	NNE30	NE31	NE24	ENE21	ENE19	E15	ESE8	E7.2	NE31	
9-May	N5	N14	NNE21	ENE15	ENE7	ENE6	ESE3	SE4	SE8	SSW8	SSW9	S10	SSW13	SSE10	ESE7	ESE6	ENE7	ENE7	E7	SE7	SSE9	SSE8	ESE7	E10	ESE4.4	NNE21	
10-May	SE12	ESE16	ESE16	SE16	SE12	ESE10	ESE3	SSE4	SSE3	NE3	ENE5	ESE5	SSE5	ESE5	ESE4	E7	E7	NE6	ENE8	E7	ESE7	SE14	SSE30	SSE29	ESE8.7	SSE30	
11-May	SSE29	SSE28	SSE26	SSE22	S13	S9	SSE11	SSE10	S7	SSW4	W6	WSW2	NNE5	NNE5	NNW5	NW6	NNW7	SSE5	NW2	SSE5	SW7	N3	ENE21	E22	SSE6.2	SSE29	
12-May	ESE16	SE14	SE10	ESE13	ESE13	E11	ESE6	ESE7	ESE4	ENE4	ESE6	ESE8	SE11	SE14	SE16	SE14	ESE12	ESE12	E16	ESE19	ESE22	ESE20	SE29	SE26	ESE13.2	SE29	
13-May	SE30	SE26	SE25	SE24	SE24	SE18	SSE16	SSE16	SE16	SSE18	S19	SSW18	SSW14	SSW13	SSW12	SSE16	SSE13	SSE15	SSE22	S24	S25	SSE29	SSE30	SSE29	SSE19.0	SSE30	
14-May	SSW27	SSW26	SW21	SSW15	SSW10	SSW12	S12	SSE12	SSW11	SW14	SSW22	SSW18	SSW18	SSW18	SSW16	S14	S18	S20	SSW20	SSW17	SSW23	SSW31	SSW35	SSW34	SSW18.9	SSW35	
15-May	SSW29	SSW25	SSW24	SSW21	SSW18	SSE13	SSE15	SE7	ENE5	ESE5	SE6	WSW19	WSW17	WSW16	WSW18	W19	WSW18	W14	N21	NNW49	N46	N49	N48	N46	WNW7.9	N49	
16-May	N39	N37	N31	N44	N45	N31	N32	N33	N32	N28	N28	N30	NNE28	N28	N27	NNE26	NNE23	N21	N21	NNE21	NNE20	NNE20	NE17	ENE14	N27.3	N45	
17-May	ESE11	ESE14	SE11	SE19	SE22	SE23	SSE21	SSE22	SSE20	SSE15	SE11	SE11	SE13	SSE14	SSE11	SE12	SE13	SE14	SE13	SE17	SE20	SE23	SE25	SE26	SE16.5	SE26	
18-May	SSE29	SE27	SSE28	SSE26	SSE20	SSE16	SSE8	ESE5	SE6	SE5	SSW6	SSW13	S10	SSW11	SW7	WSW7	WSW4	W3	NW7	NW5	SE3	SSW9	SW19	SW20	S9.3	SSE29	
19-May	SW21	SW26	WSW19	WSW7	SW8	SW11	SSW12	SSE9	S7	SSE4	WNW0	S6	ESE10	SE8	ESE9	E7	NE13	NE9	ENE6	SSE15	S18	SW15	SW14	S10	SSW6.5	SW26	
20-May	SW13	WSW16	SW15	SW5	SW2	SSE5	SSW6	SSE7	SSE8	SE5	E6	ESE5	SSE13	S14	S11	SSE11	S5	S12	SSW14	SSW13	SSW17	SW19	SSW18	SSW17	SSW9.1	SW19	
21-May	SSW15	SSW13	SSW14	S12	SSE15	SSE15	SSE13	SE9	SE9	SE6	ESE9	S14	SW14	SW11	SSW10	WNW7	NNW8	NW9	NW8	NW7	WNW4	W5	S6	S18	S6.2	S18	
22-May	SW20	WNW12	W17	SW13	SSW16	SSW10	W5	W7	NW2	NW2	N14	NNW16	NNW20	NNW24	NNW24	N23	N23	NNE31	N36	NNE34	NNE29	NNE35	NE29	NNE21	N12.5	N36	
23-May	NNE23	NNE19	NNE16	NNE15	NE12	ENE12	NE5	NNE5	NNE8	N9	N7	N5	NNE9	NNE7	N7	N6	ENE7	ENE7	ENE5	S4	S4	NNE8	NE14	ENE10	NNE8.2	NNE23	
24-May	N7	E5	NNE3	ENE5	ESE7	SE13	SSE16	SSE8	SE4	ESE7	SE6	ESE5	ENE6	NNW11	NNW10	WNW5	NW6	NNE5	NE10	E9	ESE10	ENE14	SE6	SSE7	E3.7	SSE16	
25-May	S5	NE4	SSE10	SSW9	SW6	WSW3	SW6	SW7	SW4	SW4	SW3	W11	WNW17	NNW21	W1	ESE4	SSW3	NNW37	NNW13	N16	NNW32	N39	NNW38	N29	NNW8.5	N39	
26-May	N29	N28	N22	N22	N27	N25	NNW14	NNW16	N18	NNE23	NNE21	N17	NNW15	N13	NNW13	NW14	N11	NNE12	NE14	NNE18	NE20	NE19	ENE16	ESE15	N16.1	N29	
27-May	ESE15	ESE19	ESE16	ESE12	SE16	SE17	ESE12	ESE6	SE8	SE7	ESE6	SSE4	NNW9	NNW20	NNW29	NNW37	N45	N42	N33	NNE24	NNE40	N48	N42	N34	NNE14.3	N48	
28-May	N39	N37	N35	N29	N29	NNE26	NNE27	NNE30	N26	NNW23	NNW24	N22	N18	NNE19	N17	N17	NNE19	NNE19	NNE17	NNE17	NE18	ENE18	E16	E17	NNE21.4	N39	
29-May	ESE18	SE17	SE20	SE19	ESE15	SE15	SE18	SSE18	SE14	SSE10	ESE8	E9	ENE8	NNE7	NE6	SSW3	ESE5	SE6	SE9	SSE12	SE23	SE28	SE33	SSE30	SE13.2	SE33	
30-May	SE27	SE27	SE30	SE19	SE16	SE19	SE17	SSE8	ESE4	SE4	ESE9	SE16	SE17	SSE18	SSE15	SSE18	SE20	SSE19	SSE18	SE23	SE26	SSE34	SSE32	SSE32	SE19.3	SSE34	
31-May	SSE32	SSE30	SE26	SE21	SE20	SE20	SE21	SE21	SE18	SSE18	SSE19	SSE19	SSE22	SSE17	SSE19	SSE20	SSE18	SSE21	SSE18	SSE24	SSE23	SSW20	WSW22	WSW20	SSE18.3	SSE32	

ESE3.8 ESE3.8 SE4.1 ESE4.7 ESE4.8 ESE5.6 SE4.7 ESE3.0 E2.8 ENE1.8 NE1.6 N0.7 NNW1.5 N3.7 N3.7 N3.2 NNE5.7 NE6.8 NE6.7 ENE5.0 ENE5.0 ENE6.5 E5.5 ESE5.0	Diurnal Average
N39 N37 N35 N44 N45 N31 N32 N33 N32 N29 N28 N30 NNE29 N33 NNE33 NNW37 N45 N42 N36 NNW49 N46 N49 N48 N46	Diurnal Maximum

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



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 16 km/h on May 25 14:00			Hours of Data:	738
Minimum Value: 0 km/h on May 19 00:00			Hours of Missing Data:	6
			Hours of Calibration:	0
			Percent Operational Time:	99.2
Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 2 Median = 3 Q ₃ = 5 P ₉₀ = 6 P ₉₉ = 11				

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

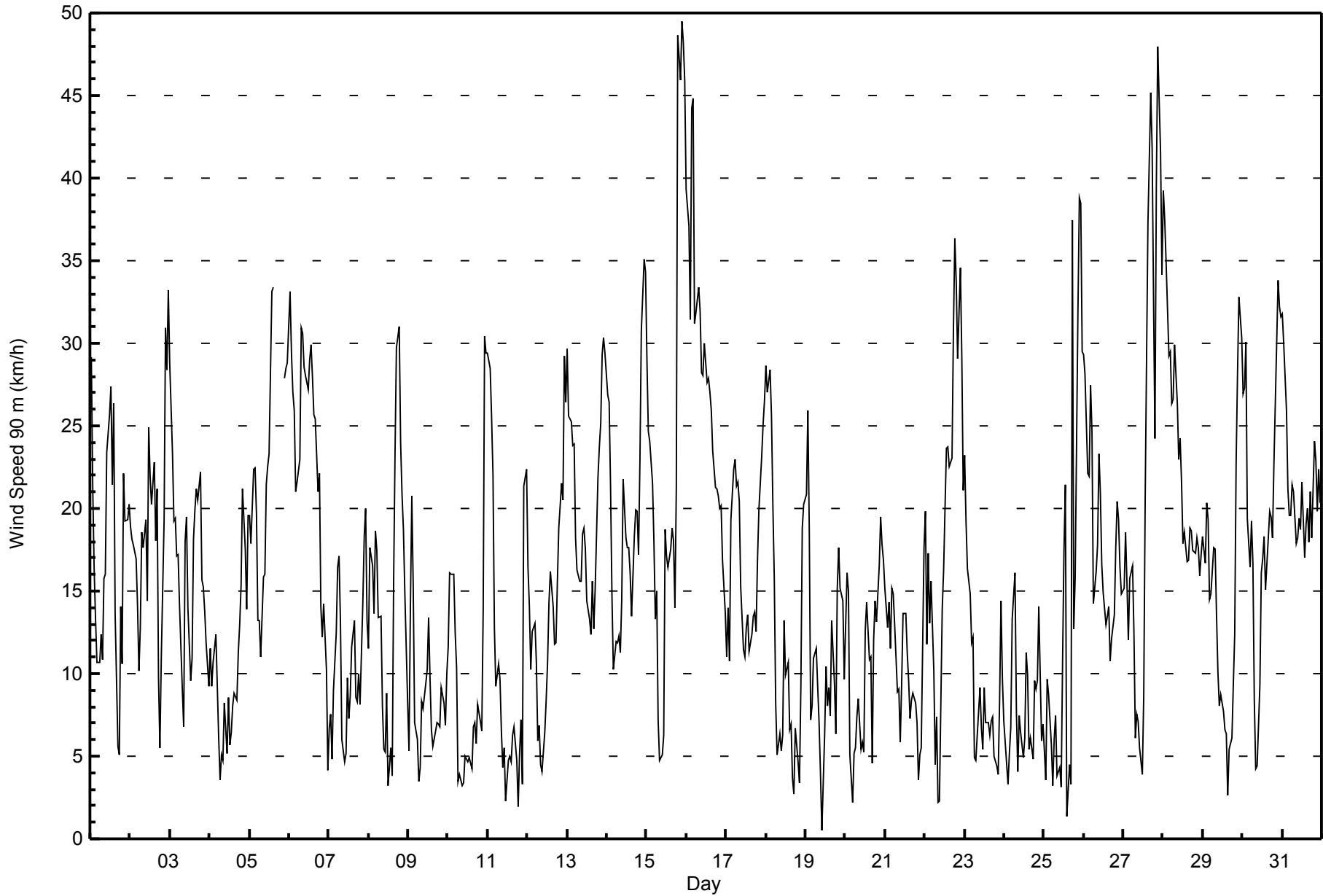
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

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





WBEA
Cumulative Frequency Distribution

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

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	86	11.65	11.65
6 - 11	177	23.98	35.64
12 - 19	248	33.60	69.24
20 - 28	148	20.05	89.30
29 - 38	64	8.67	97.97
> 38	15	2.03	100.00

Total Number of Valid Hours: 738

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed 90 m (WS90m) - km/h

Mannix - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	7	3	5	3	18	8	8	5	4	5	3	4	4	4	1	86
6 - 11	8	8	7	19	14	23	19	20	12	13	9	2	3	3	9	8	177
12 - 19	11	14	14	18	4	19	36	39	14	27	10	8	6	6	10	12	248
20 - 28	27	21	9	7	2	2	26	15	3	9	8	4	2	1	1	11	148
29 - 38	25	9	2	0	0	0	4	13	0	4	0	1	0	0	0	6	64
> 38	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	15
Totals	88	60	35	49	23	62	93	95	34	57	32	18	15	14	24	39	738

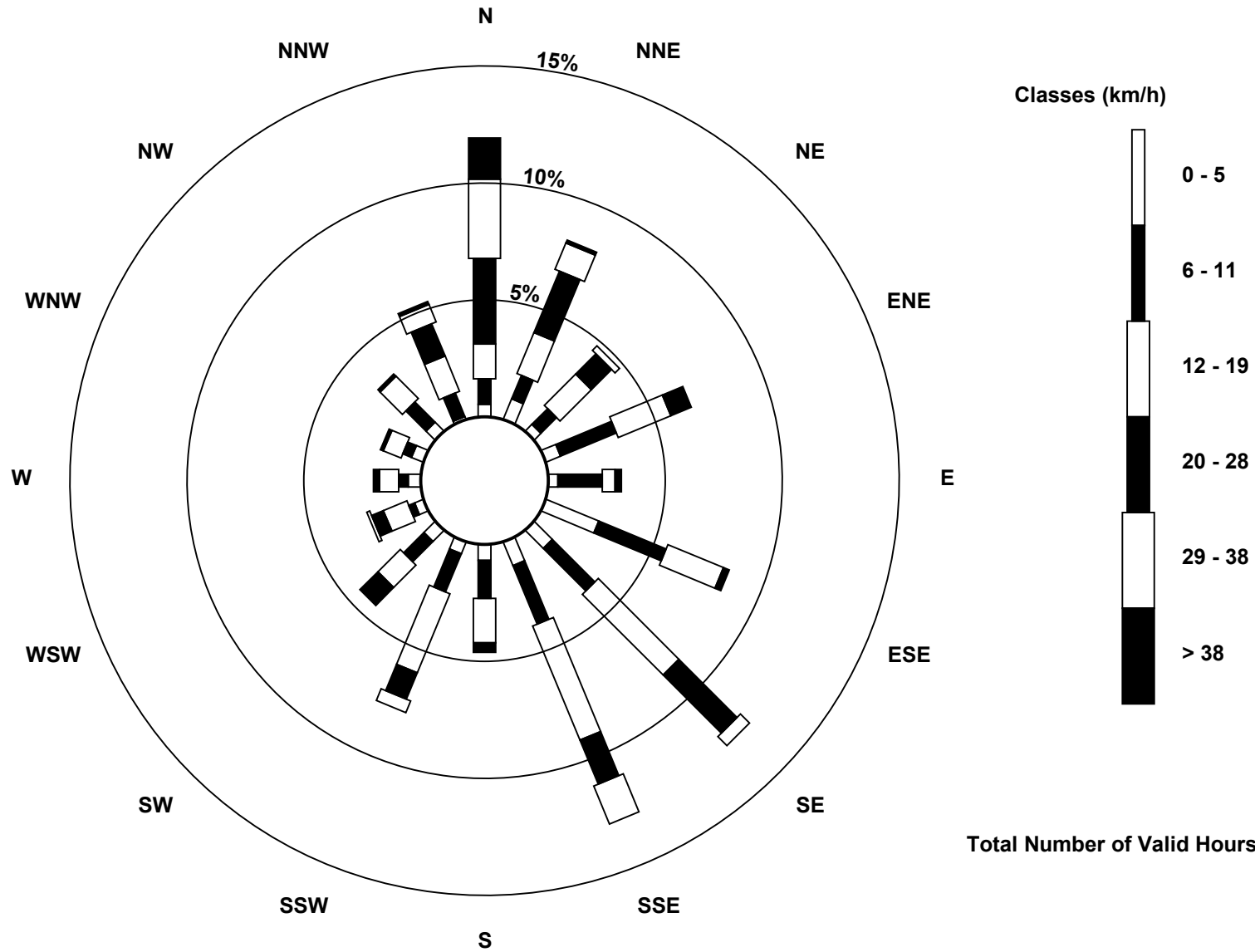
Total Number of Valid Hours: 738

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 20 m (WD20m) - deg

Mannix - May 2015

Direction of Maximum Speed: 354 deg on May 15 22:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 10.2 deg on May 16	Hours of Data: 735
Direction of Minimum Speed: 287 deg on May 22 02:00	Hours of Missing Data: 9
Direction of Minimum Daily Speed Average: 1.1 deg on May 24	Percent Operational Time: 98.8
Monthly Average Direction: 180.5 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	231	181	153	139	141	146	143	169	227	218	243	236	234	273	275	257	309	54	283	224	249	283	265	264	235.8
2-May	272	277	275	279	260	306	322	331	0	7	342	333	331	13	305	313	331	21	162	195	316	347	8	10	329.7
3-May	14	351	343	352	340	21	343	332	313	320	290	289	299	351	354	346	2	8	23	45	57	77	72	65	355.4
4-May	60	86	72	179	203	196	156	133	111	117	117	73	28	6	62	68	58	66	47	38	40	52	39	69	69.7
5-May	71	72	78	80	76	24	49	7	58	45	58	50	36	13	24	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
6-May	8	13	356	7	0	357	359	4	3	13	16	18	18	23	38	45	48	59	55	60	51	76	111	261	23.8
7-May	74	121	228	186	180	159	162	163	152	209	306	317	331	13	26	48	46	93	62	65	76	74	102	140	95.8
8-May	176	191	141	128	137	164	145	145	149	126	87	93	20	78	17	299	1	26	41	49	67	82	104	174	76.8
9-May	307	4	15	46	34	35	74	143	166	212	210	186	202	155	122	117	77	71	79	155	167	161	122	120	121.1
10-May	151	117	139	142	161	156	129	134	145	77	77	89	177	128	86	106	89	55	57	74	113	138	162	157	127.3
11-May	145	159	153	154	147	146	144	145	156	201	281	246	41	52	348	316	341	156	316	178	223	329	54	94	140.9
12-May	114	159	166	109	108	98	105	113	94	62	107	120	138	139	145	134	123	108	99	119	128	135	133	126	123.7
13-May	132	129	131	135	141	145	142	146	137	162	187	208	217	211	211	174	161	159	169	186	175	162	167	168	163.5
14-May	169	169	157	144	149	154	151	141	177	234	208	214	218	208	201	181	185	197	198	200	202	206	213	215	191.1
15-May	209	196	161	162	147	136	141	102	60	112	134	258	248	259	262	267	250	266	358	348	354	354	350	353	313.8
16-May	357	351	10	352	3	356	13	10	359	3	10	18	23	11	17	27	25	15	10	14	15	22	40	75	10.2
17-May	113	130	164	162	151	157	161	163	157	161	154	131	152	152	153	133	142	134	140	139	147	139	146	149	148.3
18-May	154	136	146	145	142	151	146	136	118	125	208	217	205	225	226	261	272	293	323	333	168	208	231	233	179.5
19-May	165	191	169	141	144	162	154	141	156	115	326	178	125	135	113	88	42	39	76	157	178	225	214	166	145.4
20-May	161	159	149	140	135	142	145	148	158	127	83	108	151	178	192	149	193	184	199	211	212	223	164	147	163.6
21-May	146	144	138	144	148	143	145	144	136	118	111	178	236	226	203	302	345	315	312	314	302	240	206	185	175.1
22-May	178	287	243	173	161	143	154	250	249	16	12	343	340	350	347	2	16	20	16	20	29	24	30	8	10.2
23-May	13	27	6	12	25	56	39	38	22	14	14	22	22	32	351	12	79	85	47	197	180	26	22	350	27.0
24-May	9	229	282	149	211	168	171	113	92	111	146	103	66	341	338	296	325	39	63	100	115	69	218	251	89.6
25-May	285	131	216	168	163	156	166	188	165	131	142	273	287	347	113	123	210	336	329	332	343	351	345	349	330.5
26-May	348	357	352	352	352	354	344	328	1	19	22	1	337	356	318	311	357	45	51	38	36	44	67	107	6.0
27-May	117	112	115	124	154	158	140	133	135	151	122	180	341	338	335	348	13	16	14	25	20	15	15	6	24.4
28-May	13	13	13	16	17	21	24	20	15	350	339	353	21	20	13	9	25	32	22	38	49	60	97	97	19.7
29-May	117	141	160	163	143	136	142	152	145	169	107	93	62	22	51	239	107	132	131	157	153	151	152	152	137.8
30-May	147	146	153	149	158	155	148	140	130	138	121	133	135	159	173	154	152	153	156	142	146	156	160	155	149.4
31-May	152	148	143	135	129	133	138	142	136	164	154	160	165	169	157	153	151	152	170	173	167	196	239	247	157.3

83.8	94.4	99.0	107.6	115.4	114.6	117.4	108.2	91.5	70.2	41.1	344.9	332.4	0.3	352.6	5.0	33.7	46.0	46.5	66.0	61.4	52.7	78.9	100.0
Diurnal Average																							

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



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 102 deg on May 11 12:00			Hours of Data:	735
Minimum Value: 6 deg on May 14 01:00			Hours of Missing Data:	9
Percentiles: P ₁ = 7 P ₁₀ = 11 Q ₁ = 14 Median = 19 Q ₃ = 34 P ₉₀ = 57 P ₉₉ = 84			Hours of Calibration:	0
			Percent Operational Time:	98.8

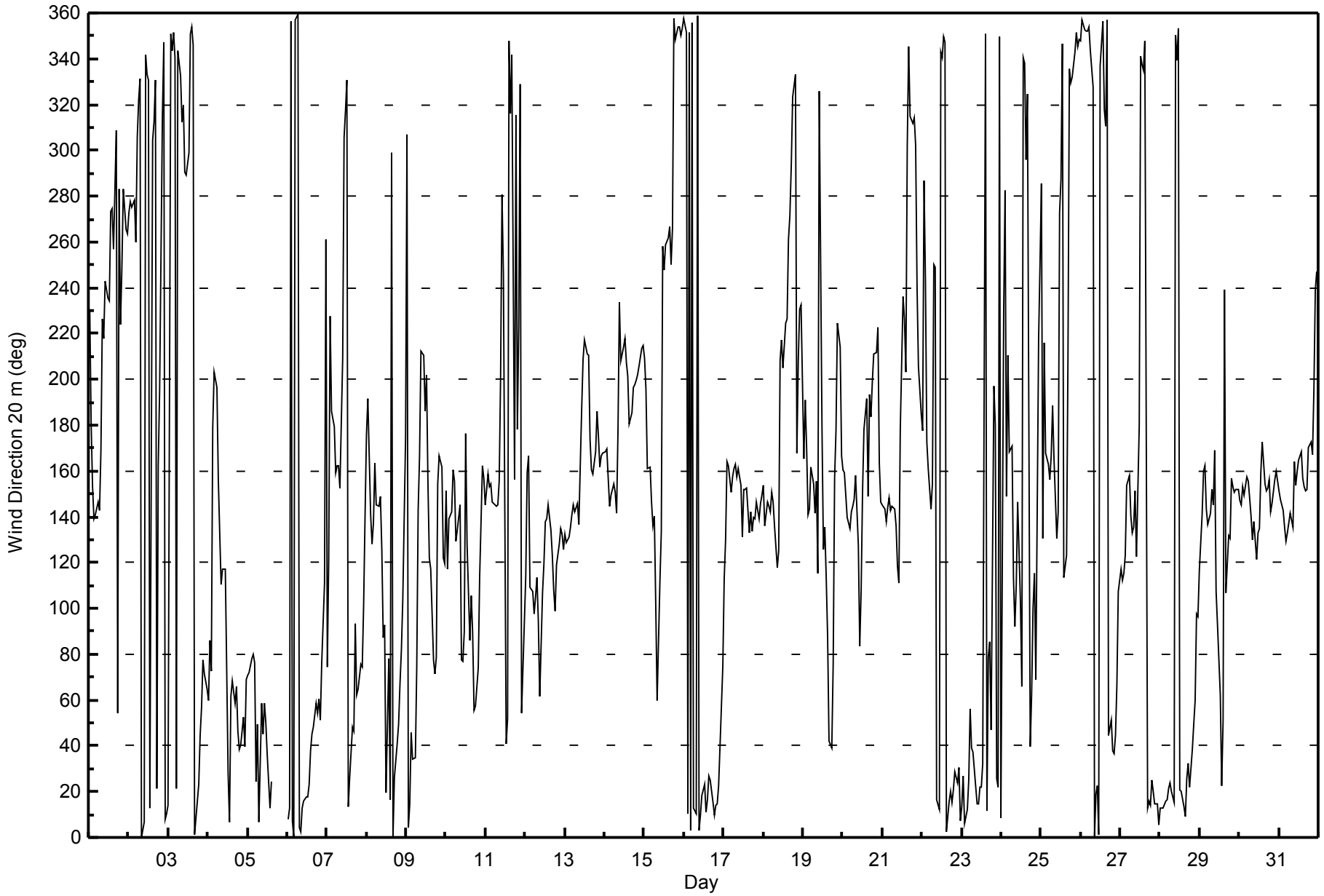
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	10	15	10	9	10	8	10	28	22	32	21	19	18	23	19	48	66	54	64	23	9	12	11	10	66
2-May	10	6	21	15	23	79	79	15	25	24	22	20	17	29	24	16	26	51	48	18	32	12	13	14	79
3-May	13	14	14	18	21	11	25	26	49	22	15	25	36	31	24	18	22	22	14	14	12	10	15	16	49
4-May	17	15	15	51	15	19	24	32	60	31	61	38	66	72	67	49	44	24	19	14	12	15	17	19	72
5-May	19	25	12	11	13	19	18	16	19	17	14	20	26	14	12	AF	AF	AF	AF	AF	AF	AF	AF	AF	26
6-May	10	10	13	12	15	20	17	15	14	11	12	10	12	14	16	15	13	16	14	17	12	17	19	83	
7-May	58	47	14	17	12	9	12	13	51	46	45	31	58	53	32	37	47	29	36	16	10	13	13	22	58
8-May	20	32	17	12	15	20	19	13	21	38	74	26	76	74	61	32	20	18	11	11	12	13	15	58	76
9-May	31	11	10	24	38	21	44	34	22	25	35	37	32	46	46	48	41	37	32	8	7	15	15	33	48
10-May	21	16	21	11	7	10	45	42	59	33	60	79	60	71	70	51	37	38	24	28	13	16	8	15	79
11-May	11	10	10	10	9	10	10	14	32	61	42	102	79	73	76	56	72	48	90	23	17	66	15	13	102
12-May	40	20	49	12	17	14	20	22	40	49	54	44	48	30	22	22	35	26	17	17	16	19	11	12	54
13-May	11	12	14	10	10	13	10	14	12	21	29	30	41	44	53	33	27	25	17	14	18	8	6	7	53
14-May	6	6	9	8	9	10	11	15	46	18	20	35	24	34	28	46	25	20	20	13	8	10	10	10	46
15-May	10	21	8	8	13	14	18	24	26	31	49	28	33	32	23	25	20	18	43	15	17	12	13	15	49
16-May	17	15	16	13	15	15	17	18	17	21	21	18	19	20	19	17	20	18	14	11	8	11	11	18	21
17-May	27	14	20	9	10	11	14	13	17	24	34	39	37	32	36	28	28	17	16	12	10	11	11	11	39
18-May	10	12	10	11	9	11	12	14	20	45	80	33	78	70	77	65	85	82	46	55	78	26	7	13	85
19-May	23	18	18	15	12	8	15	16	28	52	95	61	39	60	44	69	25	29	50	15	11	10	26	19	95
20-May	10	13	18	10	10	11	14	14	32	20	41	65	53	42	64	54	71	41	24	14	11	10	43	9	71
21-May	10	10	12	12	11	13	16	16	15	21	27	54	45	58	57	56	53	41	26	14	28	65	15	39	65
22-May	84	88	40	10	11	12	29	34	82	85	32	32	24	24	23	23	28	16	14	11	12	11	19	11	88
23-May	10	14	17	11	11	14	20	37	33	34	48	57	49	65	60	74	45	41	41	44	35	9	10	67	74
24-May	47	80	57	69	28	16	19	41	16	24	35	56	67	51	66	76	60	70	20	20	20	15	43	22	80
25-May	31	74	46	28	30	24	22	27	67	32	70	41	41	53	84	35	77	16	56	29	14	14	13	17	84
26-May	17	15	16	15	17	16	22	19	29	21	19	31	42	47	32	32	46	27	19	14	11	15	16	26	47
27-May	18	18	14	19	13	15	16	25	20	31	41	70	31	23	28	18	12	13	14	17	14	14	14	17	70
28-May	16	13	12	14	13	15	16	17	22	29	21	29	30	35	34	35	23	22	21	16	10	15	16	16	35
29-May	16	16	13	11	14	12	14	21	23	52	40	43	47	59	67	88	86	55	23	16	13	13	13	14	88
30-May	13	11	12	12	12	14	15	25	28	25	26	27	25	29	41	29	19	19	18	13	12	13	12	12	41
31-May	13	12	11	12	11	12	14	17	17	30	16	18	19	18	17	16	20	15	22	18	16	21	16	12	30
	84	88	57	69	38	79	79	42	82	85	95	102	79	74	84	88	86	82	90	55	78	66	43	83	
	Diurnal Maximum																								

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction 20 m (WD20m) - deg
Mannix - May 2015





Summary of Hour Averages

Mannix - May 2015

Direction of Maximum Speed: 357 deg on May 15 22:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 11.3 deg on May 16	Hours of Data: 736
Direction of Minimum Speed: 325 deg on May 19 11:00	Hours of Missing Data: 8
Direction of Minimum Daily Speed Average: 2.2 deg on May 24	Percent Operational Time: 98.9
Monthly Average Direction: 176.4 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-May	241	205	177	160	167	159	145	176	227	217	241	236	234	272	275	257	304	48	284	229	247	292	272	276	237.1
2-May	289	286	287	299	288	319	325	336	2	8	347	336	332	12	311	316	334	20	156	191	316	350	9	11	332.7
3-May	14	354	348	353	345	19	347	336	315	322	293	289	298	350	354	348	2	10	24	43	57	77	76	63	357.5
4-May	63	85	73	182	204	201	164	133	112	123	124	73	26	11	70	71	58	64	48	38	43	56	43	71	71.9
5-May	75	76	80	81	78	36	54	12	60	45	57	49	34	14	25	AF	AF	AF	AF	AF	AF	AF	AF	13	--
6-May	9	13	2	9	5	0	1	10	4	12	16	20	18	24	38	45	48	58	52	62	56	77	109	123	24.7
7-May	79	111	137	156	167	159	160	162	157	203	307	322	332	11	26	43	47	92	62	65	75	73	103	132	98.1
8-May	166	178	154	128	132	157	152	146	150	131	96	93	18	87	12	302	3	26	41	47	67	80	104	151	87.3
9-May	325	7	18	51	49	50	87	147	160	208	205	184	202	159	121	119	81	69	82	151	162	158	122	112	117.1
10-May	147	119	131	137	150	148	132	149	154	71	75	99	169	133	98	105	97	59	60	75	110	138	161	155	130.0
11-May	151	160	155	154	152	148	145	145	163	195	288	245	30	43	341	323	340	153	333	176	222	348	64	97	144.1
12-May	113	147	147	112	106	101	107	113	98	66	114	125	142	138	144	133	125	109	101	118	125	132	132	129	124.1
13-May	133	130	133	134	138	144	147	147	138	165	186	206	211	209	208	173	163	159	169	186	178	161	168	169	163.3
14-May	176	183	177	159	157	155	156	147	187	234	207	210	215	204	200	182	184	195	198	200	207	209	214	217	193.8
15-May	213	205	184	174	173	141	148	116	69	108	131	256	247	260	261	267	249	265	1	351	356	357	353	355	309.1
16-May	359	355	12	355	3	358	13	10	1	4	12	18	23	13	15	26	25	16	12	16	19	27	41	77	11.3
17-May	113	127	149	155	151	154	159	162	158	163	150	136	155	155	155	132	142	133	137	137	147	138	145	149	147.2
18-May	154	138	148	148	144	151	152	132	120	132	205	213	195	214	227	256	267	286	328	335	150	209	222	230	179.7
19-May	198	221	222	155	152	165	159	150	166	133	325	181	129	133	115	90	42	40	68	158	184	233	220	173	163.3
20-May	189	210	195	148	140	146	145	148	159	129	87	108	154	180	194	157	197	183	198	209	213	224	185	173	175.9
21-May	174	158	152	146	138	138	150	139	135	123	113	178	231	227	200	305	345	323	314	318	295	270	193	184	173.1
22-May	202	312	272	187	167	151	165	263	258	349	12	345	346	352	350	3	16	20	16	21	29	26	32	10	9.5
23-May	20	29	8	17	31	59	44	31	24	13	9	12	22	23	355	8	70	82	56	191	180	34	43	60	29.7
24-May	357	129	338	56	149	172	174	136	100	111	151	112	68	343	340	305	326	35	64	98	112	79	164	218	92.4
25-May	269	63	210	198	175	167	173	197	200	161	168	276	293	344	96	126	203	337	335	342	347	354	349	352	332.9
26-May	351	359	359	357	355	357	345	331	5	20	23	0	339	356	323	317	354	42	47	37	37	45	67	110	7.0
27-May	117	114	115	122	148	154	137	129	136	151	126	178	341	340	338	351	14	16	15	24	21	14	15	7	25.8
28-May	13	14	12	16	17	20	24	19	14	352	342	354	19	18	12	8	25	30	22	37	47	62	96	100	19.5
29-May	115	138	155	163	137	133	141	153	147	169	109	96	66	21	50	224	108	131	129	155	152	149	151	153	139.9
30-May	147	144	150	146	148	147	148	142	126	134	121	134	135	159	172	155	151	155	157	141	145	157	162	158	149.5
31-May	153	151	145	133	128	135	137	140	134	163	155	161	166	168	157	154	154	154	171	173	169	201	243	251	159.4

102.7	106.7	113.9	114.8	121.5	121.1	121.6	106.9	91.9	71.1	48.0	341.8	330.7	0.4	353.3	6.5	33.8	45.7	48.2	73.3	72.2	59.7	98.5	109.7
Diurnal Average																							

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



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 98 deg on May 19 11:00	Hours of Data: 736
Minimum Value: 3 deg on May 19 00:00	Hours of Missing Data: 8
Percentiles: P ₁ = 4 P ₁₀ = 7 Q ₁ = 9 Median = 15 Q ₃ = 28 P ₉₀ = 50 P ₉₉ = 75	Hours of Calibration: 0
	Percent Operational Time: 98.9

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	4	16	9	6	10	6	7	26	19	29	18	17	16	22	17	47	68	49	63	18	6	14	9	9	68
2-May	7	6	11	11	17	40	58	12	23	18	20	18	14	24	23	15	24	46	45	12	37	8	10	11	58
3-May	9	11	11	15	17	9	20	24	41	21	14	21	36	26	21	14	20	19	11	11	10	8	12	16	41
4-May	14	12	13	50	10	12	25	24	40	22	55	37	62	76	64	46	36	19	16	11	10	13	15	17	76
5-May	16	19	10	10	12	20	17	13	16	14	12	17	23	10	8	AF	AF	AF	AF	AF	AF	AF	AF	7	23
6-May	6	7	9	7	10	13	13	11	10	8	9	8	9	11	13	13	11	14	12	15	10	15	17	73	73
7-May	7	14	11	9	6	8	8	10	37	40	46	28	55	46	29	31	43	25	32	13	9	11	9	16	55
8-May	14	18	6	8	5	18	16	9	19	31	79	23	83	67	59	30	15	15	8	9	10	12	12	51	83
9-May	54	7	7	25	25	17	47	32	16	22	28	28	25	40	41	41	47	29	30	8	6	13	12	18	54
10-May	15	9	12	8	6	7	31	35	54	28	45	67	59	66	69	44	32	37	18	16	11	16	5	10	69
11-May	8	6	5	6	4	6	8	11	31	56	41	98	68	74	72	50	61	45	85	22	9	77	11	10	98
12-May	17	11	29	10	7	11	16	17	33	35	49	38	43	29	18	16	26	22	15	12	13	16	7	8	49
13-May	7	8	9	5	6	7	9	12	9	18	23	23	36	37	50	32	25	23	14	6	16	6	3	3	50
14-May	4	5	6	5	4	5	7	12	39	16	15	30	19	28	25	38	20	13	16	6	5	3	4	5	39
15-May	5	7	10	5	17	6	14	23	23	27	45	24	29	31	21	23	18	16	40	11	13	8	9	12	45
16-May	13	12	13	9	11	11	13	14	14	17	16	13	15	15	15	13	16	14	11	9	5	7	7	11	17
17-May	19	6	12	5	5	8	9	8	14	20	28	36	26	27	29	23	25	14	12	8	7	6	7	7	36
18-May	6	7	6	7	4	6	10	11	16	30	76	25	69	48	71	59	75	77	34	44	72	26	3	3	77
19-May	19	6	11	21	9	7	11	12	22	59	98	52	30	58	41	67	19	25	45	11	11	9	18	12	98
20-May	16	15	23	12	4	7	9	11	21	16	41	58	45	32	66	44	70	32	16	9	6	3	27	8	70
21-May	10	10	5	8	3	7	11	10	8	18	22	48	44	52	53	58	40	33	16	10	26	39	19	15	58
22-May	25	38	29	23	5	7	21	22	87	74	20	25	21	20	19	19	26	12	10	8	7	8	13	6	87
23-May	8	10	8	8	10	11	20	26	27	25	39	53	39	55	53	62	53	32	34	39	18	11	10	35	62
24-May	23	67	63	42	15	9	10	33	16	18	25	44	54	45	59	75	70	65	17	15	17	11	20	28	75
25-May	42	49	45	29	13	22	12	17	63	45	63	35	36	51	93	33	51	11	48	22	8	8	7	10	93
26-May	9	8	11	7	8	8	13	11	22	16	15	24	34	38	26	26	38	23	18	10	6	12	14	19	38
27-May	12	11	8	13	7	10	11	20	14	26	32	66	34	17	23	12	8	9	10	11	10	10	10	11	66
28-May	11	9	7	9	8	10	12	12	17	24	16	23	23	26	31	31	18	18	15	12	7	11	12	11	31
29-May	11	12	7	5	9	7	9	14	17	37	30	30	44	53	56	79	77	52	18	9	7	7	8	9	79
30-May	8	6	6	7	6	8	8	20	24	22	18	22	20	23	33	22	14	16	12	9	9	6	4	6	33
31-May	7	7	7	7	6	7	9	12	12	25	11	11	11	9	11	11	14	10	13	8	8	12	12	7	25
	54	67	63	50	25	40	58	35	87	74	98	98	83	76	93	79	77	77	85	44	72	77	27	73	

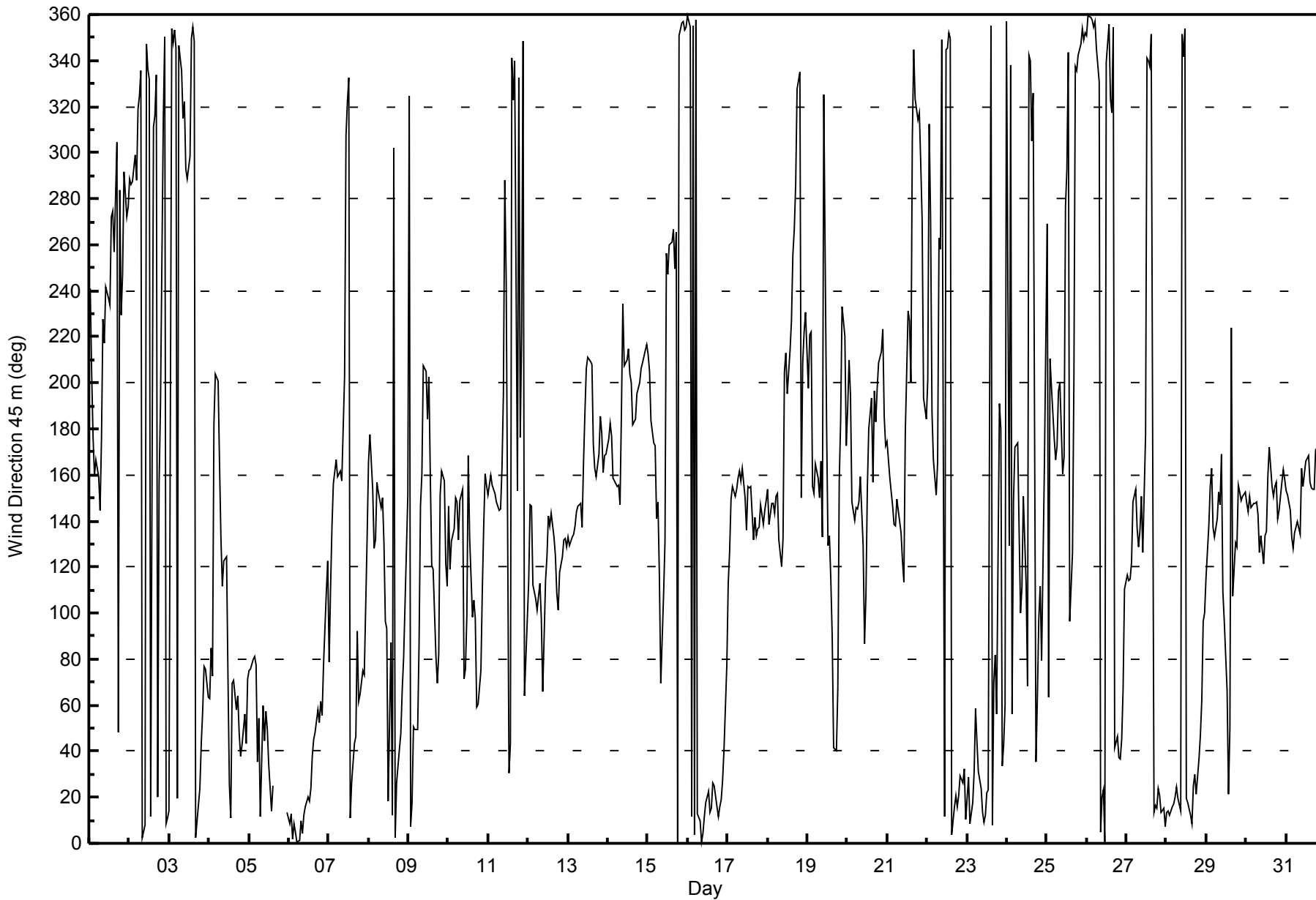
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction 45 m (WD45m) - deg
Mannix - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction 75 m (WD75m) - deg

Mannix - May 2015

Direction of Maximum Speed: 359 deg on May 15 22:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 13.5 deg on May 16		Hours of Data: 735
Direction of Minimum Speed: 305 deg on May 19 11:00	Direction of Minimum Daily Speed Average: 3.0 deg on May 24	Hours of Missing Data: 9
Monthly Average Direction: 184.5 deg		Percent Operational Time: 98.8

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	247	221	200	192	204	184	158	187	227	217	241	235	234	271	274	257	299	37	284	235	247	296	278	287	243.3
2-May	307	304	299	315	304	331	330	340	5	10	352	340	333	13	316	320	337	19	151	191	315	354	10	12	338.5
3-May	15	357	350	354	349	18	351	335	316	323	294	287	296	353	354	351	5	10	25	42	60	79	82	66	0.6
4-May	68	81	73	181	198	203	172	134	115	124	124	73	28	23	80	70	63	62	49	39	49	61	52	75	74.3
5-May	79	80	82	82	80	59	64	21	63	46	58	51	35	17	27	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
6-May	13	16	7	11	10	6	6	8	7	14	18	22	20	25	39	46	50	59	54	66	61	79	111	116	26.3
7-May	86	99	123	136	155	146	157	161	163	202	300	325	338	9	29	43	49	89	62	68	77	75	99	128	95.3
8-May	152	174	175	143	139	156	160	150	154	128	102	92	19	89	13	303	4	28	43	49	68	80	102	134	92.0
9-May	359	12	25	65	66	70	115	144	154	206	201	182	198	160	122	119	82	72	84	149	157	158	129	105	113.8
10-May	143	123	127	135	138	135	128	154	157	61	72	109	162	125	118	103	101	62	65	83	113	141	160	156	130.5
11-May	156	163	162	166	166	168	151	150	172	202	286	251	30	39	337	324	336	157	329	174	222	16	73	98	152.7
12-May	112	140	139	110	107	102	109	117	103	72	119	128	144	139	143	135	127	107	101	119	124	130	136	135	125.9
13-May	137	135	137	138	141	146	152	151	143	166	186	205	211	209	204	171	163	160	169	186	179	163	169	170	164.4
14-May	190	208	212	197	184	179	174	163	201	234	207	209	212	203	199	181	183	194	198	200	208	211	214	216	201.6
15-May	212	207	199	198	204	160	162	143	79	116	136	255	247	258	261	264	248	264	1	353	359	359	356	357	302.0
16-May	1	357	13	357	5	0	14	11	2	6	13	18	22	14	17	28	26	19	15	19	24	37	49	81	13.5
17-May	118	129	142	146	147	151	158	160	157	162	149	138	153	155	154	135	142	136	137	138	147	140	145	150	147.1
18-May	154	145	149	155	155	159	154	130	130	139	204	211	195	210	231	248	263	285	327	329	143	207	222	230	178.3
19-May	218	230	239	218	210	203	187	164	179	160	305	185	131	134	115	88	44	42	70	157	187	230	228	185	187.9
20-May	215	242	226	186	164	149	180	156	165	139	90	108	155	180	190	162	192	182	197	208	212	220	198	198	190.0
21-May	204	187	185	173	157	151	161	144	136	130	119	180	229	224	197	307	343	328	316	318	294	278	186	185	188.0
22-May	225	303	275	222	189	185	226	277	293	326	10	347	349	353	352	4	18	22	17	22	31	32	39	17	5.0
23-May	32	36	19	34	53	66	51	31	24	14	9	13	22	22	358	13	70	78	62	184	177	38	53	72	37.9
24-May	6	109	27	60	129	154	175	161	115	118	144	114	65	347	343	307	330	35	63	95	111	82	150	177	95.1
25-May	185	58	186	209	213	199	207	214	234	216	215	277	297	340	306	127	205	338	345	353	353	358	352	356	334.9
26-May	355	2	3	2	358	1	349	334	8	21	23	4	342	357	330	318	358	42	47	37	40	51	69	111	10.2
27-May	122	118	119	126	140	145	134	122	138	149	124	178	342	340	339	354	14	18	17	24	21	15	16	8	23.6
28-May	14	15	13	17	18	21	24	20	15	353	343	357	18	20	14	10	25	30	24	37	49	66	93	101	20.3
29-May	116	137	147	155	134	133	143	152	149	165	111	96	66	23	55	203	110	133	132	154	151	147	151	154	140.4
30-May	147	143	145	141	137	140	149	152	126	130	121	137	138	160	169	156	151	155	156	141	145	158	164	160	149.4
31-May	155	157	147	135	134	139	138	141	135	161	155	160	165	166	155	155	153	153	170	173	171	208	250	257	161.8

116.3	118.6	127.1	119.5	123.2	125.8	129.5	110.7	89.6	65.5	48.6	350.4	336.6	3.5	358.2	9.9	34.1	44.1	48.0	68.3	73.2	64.8	101.6	127.3
Diurnal Average																							

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



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 102 deg on May 25 15:00			Hours of Data:	735
Minimum Value: 2 deg on May 19 00:00			Hours of Missing Data:	9
			Hours of Calibration:	0
			Percent Operational Time:	98.8
Percentiles: P ₁ = 3 P ₁₀ = 6 Q ₁ = 9 Median = 14 Q ₃ = 25 P ₉₀ = 46 P ₉₉ = 84				

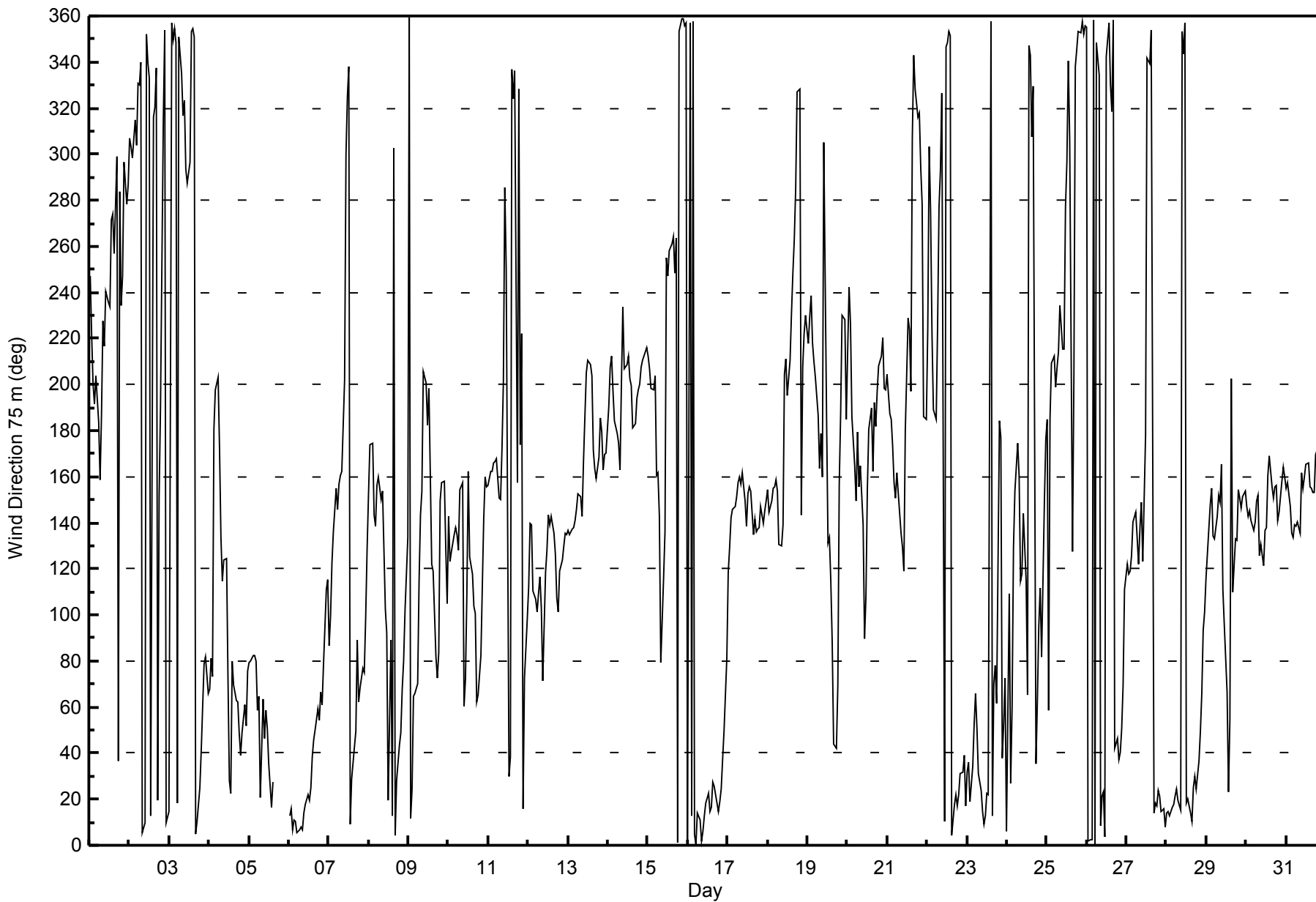
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	4	15	8	9	15	11	8	23	18	23	17	16	16	23	17	47	67	48	52	17	6	15	8	10	67
2-May	8	10	10	9	15	16	12	12	22	17	19	18	13	21	21	15	24	41	48	10	43	7	8	9	48
3-May	8	10	9	13	15	8	18	25	37	20	12	19	38	22	19	13	19	18	10	8	10	6	10	16	38
4-May	10	10	10	47	8	13	30	19	34	21	51	31	53	83	42	37	32	16	14	9	9	10	13	15	83
5-May	13	14	9	9	10	17	16	13	14	11	11	13	21	9	6	AF	AF	AF	AF	AF	AF	AF	AF	AF	21
6-May	5	5	7	6	9	11	12	8	8	7	7	6	8	9	12	11	10	12	9	13	8	13	19	21	21
7-May	13	11	12	5	4	6	6	10	30	38	54	26	55	44	28	29	38	24	27	12	7	10	10	15	55
8-May	12	9	9	11	4	12	10	9	15	26	65	28	77	55	61	30	16	15	6	8	7	10	14	33	77
9-May	45	6	5	19	26	15	33	25	13	19	24	24	22	38	42	36	44	31	29	6	6	12	13	14	45
10-May	13	11	11	7	5	7	23	32	51	33	36	51	60	59	65	44	27	37	16	15	15	16	4	6	65
11-May	5	5	4	4	6	10	9	9	30	53	39	97	69	68	75	52	54	53	85	21	8	80	9	11	97
12-May	13	9	16	15	11	13	15	17	34	34	41	34	48	20	15	15	24	21	18	13	13	14	6	7	48
13-May	6	7	7	5	5	5	8	10	9	16	21	22	33	32	47	30	23	20	14	5	16	5	3	3	47
14-May	9	5	5	8	15	8	8	10	32	14	13	25	19	26	23	32	19	12	15	5	5	3	3	3	32
15-May	4	6	6	5	13	6	12	25	26	28	45	22	28	32	20	22	17	15	40	10	12	6	7	11	45
16-May	12	11	12	8	9	10	11	13	12	16	14	11	13	13	13	11	14	12	10	8	5	6	8	10	16
17-May	15	8	12	5	3	6	8	7	11	17	25	29	22	23	25	21	23	12	11	7	5	4	5	5	29
18-May	4	5	4	4	4	4	10	13	17	23	69	21	60	39	76	58	75	84	28	30	40	26	4	2	84
19-May	12	6	9	36	20	11	14	11	28	55	97	49	28	50	38	65	17	23	44	10	12	8	9	10	97
20-May	12	7	11	23	35	9	20	9	16	19	37	54	44	28	53	40	81	30	13	9	6	2	19	9	81
21-May	8	14	14	12	5	8	7	16	9	19	21	46	42	47	53	57	34	28	16	10	26	11	24	17	57
22-May	11	27	23	15	6	9	55	24	85	72	19	23	21	18	17	18	24	11	7	6	4	5	10	6	85
23-May	7	10	7	11	7	10	26	21	23	23	44	50	34	64	53	61	50	27	29	34	14	23	8	19	64
24-May	19	32	55	25	12	13	8	22	23	19	20	39	49	44	46	78	69	61	12	14	19	11	20	31	78
25-May	64	53	36	15	33	39	20	15	51	29	56	35	36	45	102	34	55	10	42	17	6	6	6	8	102
26-May	7	6	8	6	6	6	11	10	21	14	13	23	31	35	24	25	34	20	15	9	4	8	14	17	35
27-May	13	12	11	12	5	7	11	18	13	22	25	60	32	16	21	11	6	7	8	10	8	9	8	10	60
28-May	10	7	6	8	7	8	10	10	15	21	14	22	23	22	30	28	17	14	13	10	6	10	14	13	30
29-May	13	10	6	6	9	7	9	12	13	31	30	28	38	45	49	86	70	51	16	10	6	6	6	6	86
30-May	5	3	3	6	4	5	6	18	24	20	18	20	19	19	29	20	12	14	11	7	7	5	2	4	29
31-May	4	3	7	4	6	6	7	9	11	24	8	8	10	8	10	10	12	9	14	7	6	13	12	7	24
64	53	55	47	35	39	55	32	85	72	97	97	77	83	102	86	81	84	85	34	43	80	24	33		
Diurnal Maximum																									

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction 75 m (WD75m) - deg
Mannix - May 2015





Summary of Hour Standard Deviations

Mannix - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 96 deg on May 19 11:00			Hours of Data:	738
Minimum Value: 2 deg on May 19 00:00			Hours of Missing Data:	6
Percentiles: P ₁ = 3 P ₁₀ = 5 Q ₁ = 8 Median = 13 Q ₃ = 26 P ₉₀ = 45 P ₉₉ = 81			Hours of Calibration:	0
			Percent Operational Time:	99.2

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	3	14	8	11	13	11	9	21	17	23	17	16	16	22	17	46	67	50	45	16	5	14	6	11	67
2-May	7	9	10	8	14	11	11	11	21	17	19	17	13	20	19	15	24	41	51	11	42	6	7	8	51
3-May	7	9	9	11	14	8	17	25	33	19	11	19	36	21	21	12	19	17	9	7	9	6	10	17	36
4-May	9	10	10	47	8	13	34	22	41	20	52	33	52	83	43	38	32	17	13	9	10	10	13	15	83
5-May	13	14	9	9	11	18	16	13	13	10	10	12	21	8	6	AF	AF	AF	AF	AF	AF	5	6	6	21
6-May	5	5	7	6	8	10	10	7	7	7	7	6	7	8	11	11	11	12	9	13	9	12	15	16	16
7-May	13	5	8	5	3	5	5	10	32	42	51	23	57	43	26	27	39	28	27	12	7	10	8	13	57
8-May	13	7	11	12	5	9	9	9	14	29	64	31	76	57	63	30	16	14	6	7	8	11	11	25	76
9-May	48	6	5	18	25	22	22	27	13	19	24	24	23	40	45	40	40	35	28	6	6	12	7	8	48
10-May	14	6	8	6	4	4	23	30	65	39	35	56	64	62	68	41	28	42	17	16	11	17	3	5	68
11-May	5	5	4	5	10	12	12	9	30	47	35	95	68	65	75	51	49	59	86	24	9	79	9	9	95
12-May	7	9	14	8	5	8	18	18	35	37	39	37	55	20	16	16	22	18	17	9	10	12	6	6	55
13-May	6	6	6	4	5	5	9	10	10	15	21	21	31	29	46	31	24	20	14	5	16	5	3	3	46
14-May	11	4	5	7	17	12	13	9	27	15	13	25	20	26	19	30	20	12	15	5	5	3	2	2	30
15-May	3	6	5	4	6	9	12	26	36	33	48	21	27	29	19	20	15	13	39	10	11	6	7	10	48
16-May	11	10	12	7	9	10	10	12	12	15	14	10	12	12	12	11	13	12	9	7	6	6	9	11	15
17-May	9	5	11	4	3	6	7	7	11	17	26	31	25	22	26	22	23	12	11	6	6	5	5	4	31
18-May	3	4	5	3	5	4	11	13	17	28	72	22	57	38	65	56	74	82	27	25	31	27	3	2	82
19-May	9	5	7	27	14	10	13	11	25	52	96	51	29	49	40	58	17	21	44	9	12	8	5	12	96
20-May	10	7	7	23	41	25	26	13	16	24	41	57	45	29	48	42	81	32	13	10	6	2	13	8	81
21-May	7	13	16	13	5	6	5	17	8	21	20	46	41	47	52	56	32	25	15	10	23	5	30	21	56
22-May	9	28	21	12	7	17	30	22	82	73	19	22	20	17	17	18	23	10	7	5	4	4	8	6	82
23-May	7	11	7	10	6	10	31	20	23	23	42	49	33	61	53	61	51	27	31	34	16	22	8	17	61
24-May	18	29	40	24	8	12	6	18	26	20	21	43	51	43	41	71	72	65	14	12	16	9	20	30	72
25-May	50	60	34	13	32	41	22	13	43	23	47	32	36	42	84	35	55	10	24	16	5	5	6	8	84
26-May	7	5	7	6	5	5	12	10	20	13	13	23	29	34	24	23	33	19	14	9	4	7	15	12	34
27-May	9	7	5	8	4	7	9	19	14	24	29	62	30	16	21	10	6	6	7	9	7	8	8	9	62
28-May	9	6	5	7	6	7	9	9	14	20	14	21	21	21	29	26	17	14	13	10	6	9	14	11	29
29-May	11	9	6	5	6	5	9	11	14	33	34	33	39	44	45	84	69	53	19	10	5	5	6	6	84
30-May	5	3	2	6	4	5	6	19	30	26	22	21	20	19	29	19	12	13	10	8	7	5	2	3	30
31-May	3	2	10	4	4	6	6	9	10	25	6	7	9	7	10	10	13	8	16	7	5	15	13	6	25
	50	60	40	47	41	41	34	30	82	73	96	95	76	83	84	84	81	82	86	34	42	79	30	30	

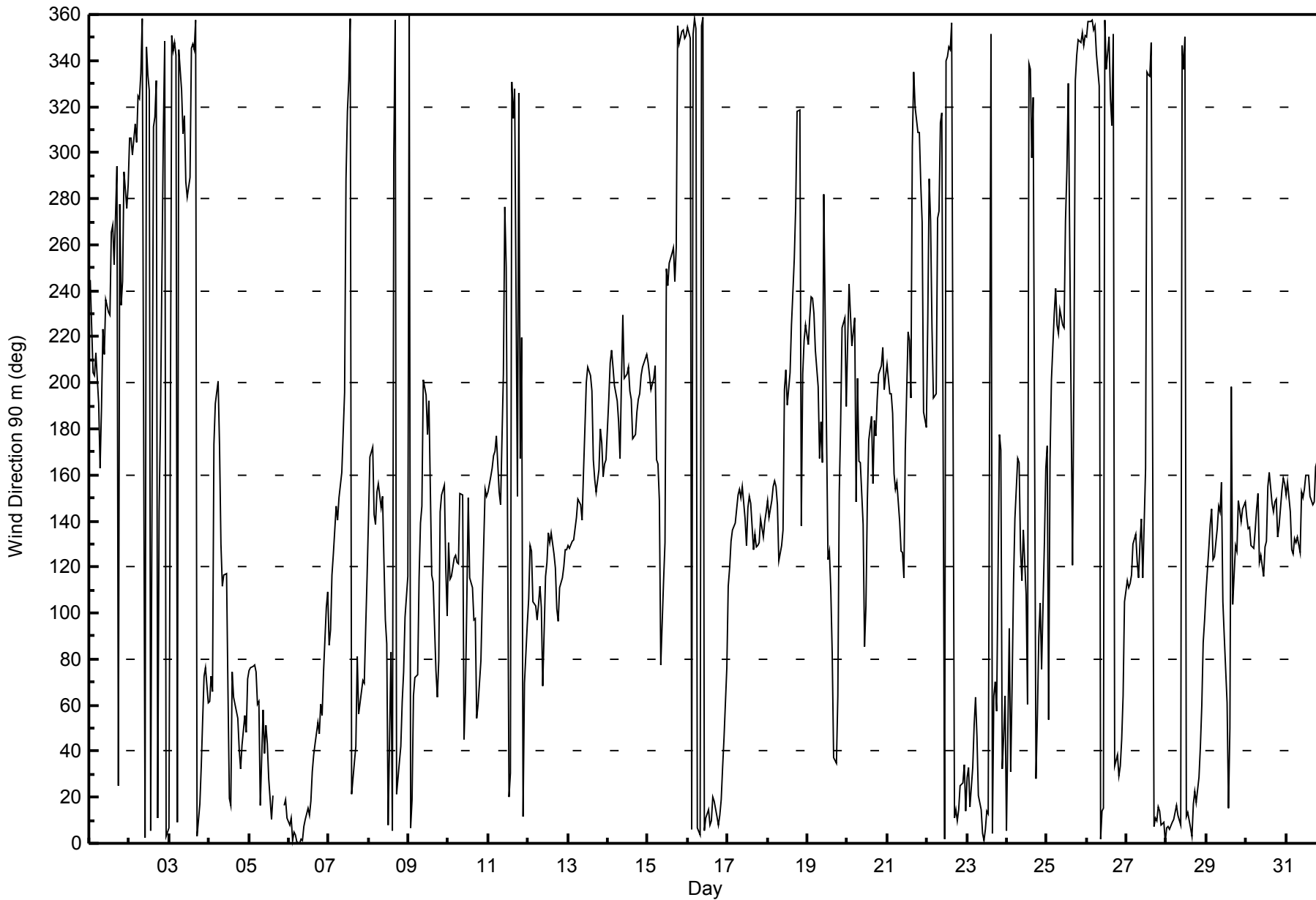
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction 90 m (WD90m) - deg
Mannix - May 2015





Maximum Value: 0.8 km/h on May 23 17:00		Maximum Daily Average: 0.3 km/h on May 30		Hours in Service: 744																							
Minimum Value: -1.1 km/h on May 15 23:00		Minimum Daily Average: -0.3 km/h on May 16		Hours of Data: 735																							
Maximum Diurnal Average: 0.2 km/h at hour 11		Minimum Diurnal Average: 0.0 km/h at hour 15		Hours of Missing Data: 9																							
Monthly Average: 0.06 km/h		Percentiles: P ₁ = -0.8 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.1 Q ₃ = 0.3 P ₉₀ = 0.4 P ₉₉ = 0.7		Hours of Calibration: 0																							
				Percent Operational Time: 98.8																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	-0.4	0.0	0.2	0.4	0.2	0.4	0.2	0.2	-0.3	-0.2	-0.2	-0.5	-0.5	-0.1	-0.2	-0.5	0.1	0.0	0.1	-0.1	-0.2	-0.2	-0.3	-0.3	-0.1	0.4	
2-May	-0.1	-0.1	0.0	-0.1	-0.2	0.0	-0.1	-0.5	-0.1	-0.3	-0.4	-0.6	-0.6	-0.1	-0.2	-0.6	-0.4	0.2	0.1	-0.1	-0.5	-0.6	-0.3	-0.4	-0.2	0.2	
3-May	-0.3	-0.3	-0.2	-0.2	-0.3	0.1	-0.2	0.0	-0.1	-0.3	0.0	0.0	-0.2	0.0	-0.8	-0.5	-0.4	-0.1	-0.1	0.2	0.4	0.3	0.3	0.4	-0.1	0.4	
4-May	0.3	0.2	0.4	0.0	-0.1	0.0	0.0	0.1	0.7	0.4	0.6	0.4	0.1	0.2	0.5	0.1	0.4	0.3	0.1	0.1	0.0	0.2	0.1	0.1	0.2	0.7	
5-May	0.6	0.6	0.5	0.6	0.6	0.0	0.1	-0.2	0.3	0.2	0.3	0.4	0.0	-0.3	0.0	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.6
6-May	-0.7	-0.4	-0.3	-0.4	-0.3	-0.2	-0.8	-0.5	-0.6	-0.4	-0.3	-0.2	0.0	0.0	0.2	0.4	0.0	0.5	0.4	0.2	0.2	0.3	0.1	0.0	-0.1	0.5	
7-May	0.1	0.1	-0.2	-0.2	-0.1	0.3	0.2	0.1	0.3	0.2	0.0	-0.1	-0.1	0.3	-0.1	0.3	0.2	0.3	0.2	0.2	0.3	0.4	0.4	0.3	0.1	0.4	
8-May	0.0	-0.1	0.2	0.1	0.2	0.2	0.3	0.3	0.4	-0.1	0.4	0.0	0.0	0.5	0.0	-0.3	-0.7	-0.2	0.3	0.3	0.7	0.3	0.1	0.0	0.1	0.7	
9-May	0.0	-0.3	-0.2	0.1	0.0	0.1	0.1	0.4	0.2	0.0	0.2	-0.1	-0.2	0.3	0.2	-0.1	-0.1	0.2	0.0	0.1	0.1	0.2	0.2	0.1	0.1	0.4	
10-May	0.2	0.2	0.2	0.4	0.3	0.2	0.0	0.3	0.1	0.0	0.1	0.8	-0.1	0.0	0.3	0.0	0.2	-0.1	0.5	0.4	0.1	0.2	0.5	0.5	0.2	0.8	
11-May	0.4	0.5	0.5	0.4	0.4	0.3	0.2	0.3	-0.1	0.1	-0.2	0.3	-0.1	0.1	0.4	-0.1	0.0	0.0	0.4	0.0	-0.1	0.0	0.1	0.3	0.2	0.5	
12-May	0.1	0.2	0.1	0.1	0.1	0.2	0.4	0.2	0.2	-0.3	-0.1	0.3	0.3	0.3	0.1	0.2	0.1	0.1	0.4	0.2	0.2	0.2	0.1	0.2	0.2	0.4	
13-May	0.5	0.1	0.4	0.3	0.3	0.3	0.3	0.4	0.2	0.3	0.0	-0.2	0.0	0.0	0.1	0.4	0.0	0.3	0.3	0.2	0.2	0.6	0.5	0.5	0.2	0.6	
14-May	0.4	0.2	0.2	0.2	0.2	0.3	0.2	0.5	0.1	-0.3	-0.2	0.1	0.1	-0.2	-0.1	0.2	0.0	0.0	0.0	0.0	-0.1	-0.2	-0.4	-0.5	0.0	0.5	
15-May	-0.3	0.0	0.2	0.3	0.2	0.2	0.2	0.0	0.3	0.0	0.4	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-1.0	-0.7	-1.0	-1.1	-0.6	-0.2	0.4	
16-May	-0.8	-0.6	-0.4	-1.1	-0.6	-0.7	-0.6	-0.2	-0.6	-0.2	-0.2	-0.2	-0.2	-0.2	-0.4	0.0	0.1	-0.2	-0.3	-0.3	-0.3	-0.1	0.1	0.4	-0.3	0.4	
17-May	0.1	0.1	-0.1	0.2	0.3	0.3	0.5	0.4	0.2	0.3	0.3	0.6	0.4	0.3	0.3	0.4	0.3	0.4	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.6	
18-May	0.5	0.3	0.3	0.3	0.3	0.3	0.3	-0.2	0.2	0.2	0.4	-0.3	0.0	0.2	0.0	0.2	0.1	0.0	0.2	0.1	0.0	-0.1	0.0	-0.1	0.1	0.5	
19-May	0.0	-0.2	-0.1	0.0	0.0	0.0	0.3	0.3	0.3	0.4	0.7	0.3	0.2	0.5	0.1	0.5	0.3	0.2	0.4	0.2	0.0	-0.2	-0.1	-0.1	0.2	0.7	
20-May	-0.1	-0.1	0.0	0.1	0.2	0.1	0.1	0.1	0.4	0.3	0.7	0.0	0.4	0.2	-0.2	0.2	0.3	-0.1	0.0	-0.1	-0.2	-0.2	0.1	0.1	0.1	0.7	
21-May	0.0	0.2	0.1	0.1	0.2	0.1	0.2	0.0	0.1	-0.2	0.2	0.2	-0.2	0.2	0.3	-0.2	-0.2	-0.2	0.0	-0.1	-0.1	-0.5	-0.3	-0.1	0.0	0.3	
22-May	-0.1	-0.1	-0.2	-0.1	0.1	0.1	0.2	0.0	0.0	0.2	0.3	-0.1	-0.3	-0.5	-0.5	-0.3	0.4	-0.1	-0.5	-0.2	0.1	-0.1	0.0	-0.3	-0.1	0.4	
23-May	-0.2	0.1	-0.2	-0.2	-0.1	0.3	0.2	0.2	0.0	0.0	0.2	0.1	0.1	0.1	0.0	0.5	0.8	0.3	0.0	-0.3	-0.1	-0.1	0.0	-0.2	0.1	0.8	
24-May	-0.1	-0.1	-0.3	-0.1	-0.2	0.2	0.1	0.4	0.3	0.4	0.3	0.1	0.3	0.0	-0.2	-0.2	-0.1	0.2	0.7	0.3	0.1	0.2	-0.3	-0.2	0.1	0.7	
25-May	-0.2	0.0	-0.2	-0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.2	-0.2	-0.1	-0.5	0.0	0.1	0.0	-0.8	-0.3	-0.2	-0.4	-0.7	-0.9	-0.4	-0.2	0.2	
26-May	-0.4	-0.6	-0.5	-0.4	-0.3	-0.5	-0.2	-0.5	-0.3	-0.1	0.1	0.0	-0.1	0.1	0.0	-0.2	0.0	0.4	0.7	0.2	0.2	0.2	0.6	0.4	0.0	0.7	
27-May	0.4	0.4	0.1	0.2	0.3	0.3	0.1	0.3	-0.1	0.0	0.3	0.3	-0.2	-0.4	-0.7	-0.5	-0.7	-0.4	-0.2	0.1	-0.1	-0.7	-0.4	-0.4	-0.1	0.4	
28-May	-0.4	-0.5	-0.5	-0.2	-0.2	0.0	0.0	-0.1	0.0	-0.2	-0.5	-0.2	0.2	0.1	0.2	0.1	-0.2	0.4	0.1	0.4	0.4	0.6	0.4	0.6	0.0	0.6	
29-May	0.2	0.2	0.3	0.3	0.1	0.0	0.3	0.3	0.2	0.6	0.6	0.4	0.4	0.2	0.1	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.6	0.5	0.3	0.6	
30-May	0.4	0.2	0.3	0.2	0.2	0.2	0.4	0.2	0.2	0.2	0.2	0.7	0.5	0.0	0.0	0.3	0.4	0.2	0.3	0.3	0.3	0.6	0.6	0.6	0.3	0.7	
31-May	0.6	0.4	0.3	0.2	0.0	0.1	0.3	0.2	0.2	0.3	0.3	0.3	0.4	0.1	0.4	0.3	0.5	0.4	0.3	0.2	0.2	-0.1	-0.2	-0.2	0.2	0.6	
		0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	Diurnal Average
		0.6	0.6	0.5	0.6	0.6	0.4	0.5	0.5	0.7	0.6	0.7	0.8	0.5	0.5	0.5	0.5	0.8	0.5	0.7	0.4	0.7	0.6	0.6	0.6	0.6	Diurnal Maximum
AF - Analyzer Failure																											



Summary of Hour Standard Deviations

Mannix - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.3 km/h on May 16 05:00 Minimum Value: 0.2 km/h on May 7 03:00 Percentiles: P ₁ = 0.3 P ₁₀ = 0.6 Q ₁ = 1.1 Median = 1.6 Q ₃ = 2.2 P ₉₀ = 2.6 P ₉₉ = 4.1																								Hours in Service: 744 Hours of Data: 735 Hours of Missing Data: 9 Hours of Calibration: 0 Percent Operational Time: 98.8	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	0.5	0.5	0.7	0.8	0.7	0.9	1.2	1.4	1.9	2.1	2.5	2.8	3.1	2.3	2.4	2.2	1.5	1.1	1.4	0.7	0.5	0.6	0.6	0.5	3.1
2-May	0.3	0.4	0.6	0.7	0.6	0.4	1.3	2.0	2.3	2.4	2.0	2.4	2.2	2.7	2.2	2.1	2.5	1.5	0.9	0.9	2.0	2.5	2.7	3.0	3.0
3-May	2.5	2.3	1.8	1.9	1.3	1.6	1.6	1.7	1.5	2.0	1.9	1.8	1.8	2.1	2.5	2.4	2.6	2.4	2.4	1.5	1.2	1.0	0.9	0.8	2.6
4-May	1.0	0.9	1.1	1.1	0.9	0.6	0.8	1.3	1.6	2.1	2.0	2.1	2.1	2.1	2.2	1.8	1.9	1.8	1.5	1.3	1.4	1.5	1.4	2.0	2.2
5-May	1.8	1.8	2.0	1.8	1.5	1.3	1.5	1.4	1.6	1.5	2.1	2.2	2.4	3.1	2.8	AF	AF	AF	AF	AF	AF	AF	AF	AF	3.1
6-May	2.6	2.4	2.2	2.2	1.9	2.2	2.4	2.9	2.8	2.5	2.6	2.5	2.8	3.0	2.8	2.6	2.4	2.1	2.1	1.4	1.0	1.1	0.5	0.4	3.0
7-May	0.2	0.2	0.2	0.3	0.4	0.7	1.2	1.4	1.5	1.5	1.9	2.1	2.0	2.1	2.3	2.3	1.7	1.5	1.4	0.9	0.9	1.0	1.4	0.9	2.3
8-May	0.4	0.5	0.5	0.6	0.7	0.8	1.2	1.6	1.6	1.7	1.8	2.0	1.7	1.5	1.5	2.2	2.4	2.6	2.8	2.0	1.9	1.6	1.1	0.8	2.8
9-May	0.4	0.8	1.2	0.8	0.5	0.5	0.8	1.3	1.5	1.3	1.7	1.8	2.1	2.0	1.9	1.7	1.6	1.6	1.1	0.4	0.2	0.2	0.3	0.3	2.1
10-May	0.6	1.3	1.4	1.3	0.4	0.8	0.9	1.3	1.4	1.5	1.7	2.0	1.9	1.9	1.9	1.9	1.6	1.2	1.1	0.7	0.3	0.8	1.0	1.1	2.0
11-May	1.2	1.2	1.1	0.8	0.9	1.0	1.1	1.4	1.5	1.8	1.8	1.9	2.0	1.7	1.9	2.1	1.7	1.3	1.2	0.5	0.3	0.4	1.0	1.6	2.1
12-May	1.1	1.0	0.7	0.5	0.8	0.8	1.1	1.3	1.5	1.5	1.9	2.0	2.1	2.3	2.2	2.1	1.9	1.7	1.7	2.1	2.4	2.3	2.6	2.2	2.6
13-May	2.5	2.2	1.9	1.5	1.2	0.9	1.5	1.7	1.8	2.2	2.3	2.2	2.3	2.3	2.2	2.1	1.7	1.9	1.7	1.2	1.3	1.0	1.2	1.2	2.5
14-May	0.9	0.7	0.6	0.8	1.0	1.0	1.2	1.4	1.6	1.9	2.3	2.4	2.4	2.5	2.2	2.0	2.2	2.2	1.9	1.2	0.9	1.2	1.4	1.5	2.5
15-May	1.2	0.9	0.8	0.9	0.7	1.1	1.2	1.2	1.4	1.7	1.9	2.3	2.3	2.3	2.3	2.1	2.1	1.6	2.3	4.2	3.6	4.2	4.2	4.2	4.2
16-May	3.6	3.5	2.9	4.1	4.3	3.2	3.0	3.3	3.3	3.2	3.4	3.3	3.2	3.3	3.1	2.8	2.7	2.3	2.2	1.8	1.4	1.1	1.1	0.9	4.3
17-May	1.0	1.5	0.5	0.7	1.0	1.5	2.0	2.2	2.2	2.2	2.2	2.1	2.3	2.2	2.2	2.2	1.9	1.8	1.5	1.4	1.0	1.6	1.6	1.5	2.3
18-May	1.4	1.4	1.3	1.2	1.2	1.4	1.2	1.2	1.6	1.6	2.2	2.1	2.2	2.3	2.0	1.8	1.6	1.4	1.1	0.7	0.3	0.4	0.6	0.5	2.3
19-May	0.4	0.5	0.4	0.6	0.6	0.8	1.1	1.3	1.4	1.5	1.9	1.9	2.0	2.1	1.9	2.0	1.9	1.5	1.2	1.0	0.7	0.5	0.4	0.6	2.1
20-May	0.4	0.4	0.4	0.5	0.6	0.9	0.9	1.2	1.6	1.6	1.7	1.8	2.3	2.3	2.2	2.0	1.8	1.9	1.7	1.1	0.6	0.5	0.4	0.4	2.3
21-May	0.4	0.7	0.9	1.0	0.9	0.8	1.0	1.2	1.4	1.4	1.7	2.4	2.3	2.3	2.1	1.9	1.6	1.5	1.1	0.6	0.3	0.4	0.3	0.7	2.4
22-May	0.7	0.4	0.5	0.8	1.1	0.9	0.8	0.9	1.1	1.5	2.2	2.4	2.7	2.9	2.8	2.8	2.9	2.9	3.4	2.7	1.7	2.0	1.7	1.4	3.4
23-May	1.3	1.3	1.1	0.9	0.7	1.0	1.0	1.4	1.7	1.9	1.9	1.8	2.4	2.2	2.0	1.9	1.7	1.4	0.9	0.5	0.2	0.4	0.3	0.4	2.4
24-May	0.4	0.4	0.5	0.3	0.4	0.9	1.5	1.2	1.4	1.6	1.7	1.6	1.8	2.2	2.1	1.8	1.5	1.5	1.2	0.8	0.4	0.4	0.5	0.4	2.2
25-May	0.3	0.3	0.6	0.6	0.8	0.8	0.8	0.9	1.1	0.9	1.1	2.0	2.5	2.4	1.0	1.3	1.1	3.4	1.4	1.1	2.6	3.6	3.5	2.8	3.6
26-May	2.8	2.6	2.1	2.2	2.6	2.5	2.0	2.0	2.4	2.8	2.6	2.5	2.4	2.5	2.3	2.3	1.9	1.9	1.7	1.6	1.4	1.2	1.0	1.2	2.8
27-May	1.5	2.0	1.6	1.3	1.0	1.3	1.4	1.4	1.3	1.5	1.5	1.5	1.3	2.3	3.1	3.6	4.0	3.9	3.1	2.3	3.6	4.3	3.7	3.5	4.3
28-May	3.6	3.4	3.1	2.6	2.7	2.6	2.8	3.2	3.0	2.8	3.1	3.0	2.6	2.7	2.6	2.5	2.5	2.3	2.1	1.8	1.5	1.4	1.5	1.6	3.6
29-May	2.0	1.5	1.2	1.0	1.3	1.5	1.8	2.1	1.9	2.1	2.1	2.2	2.2	2.0	1.9	1.7	1.8	1.5	1.6	1.3	1.7	2.0	2.6	2.3	2.6
30-May	1.9	1.6	1.8	1.4	1.2	1.2	1.6	1.4	1.4	1.6	1.9	2.5	2.7	2.4	2.5	2.5	2.5	2.2	2.0	1.9	1.8	2.3	1.8	1.9	2.7
31-May	2.0	1.6	1.4	1.5	1.9	1.4	1.8	2.0	2.2	2.1	1.7	1.6	2.0	1.9	2.3	2.2	2.2	2.0	1.6	2.4	1.9	1.0	1.1	0.7	2.4
Diurnal Maximum																									
AF - Analyzer Failure																									



Summary of Hour Averages

Mannix - May 2015

Maximum Value: 1.6 km/h on May 4 11:00		Maximum Daily Average: 0.7 km/h on May 29		Hours in Service: 744																							
Minimum Value: -1.2 km/h on May 16 04:00		Minimum Daily Average: -0.2 km/h on May 2		Hours of Data: 736																							
Maximum Diurnal Average: 0.4 km/h at hour 11		Minimum Diurnal Average: 0.1 km/h at hour 22		Hours of Missing Data: 8																							
Monthly Average: 0.26 km/h		Percentiles: P ₁ = -0.9 P ₁₀ = -0.3 Q ₁ = 0.0 Median = 0.3 Q ₃ = 0.6 P ₉₀ = 0.7 P ₉₉ = 1.4		Hours of Calibration: 0																							
				Percent Operational Time: 98.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	-0.6	-0.1	0.3	0.6	0.4	0.6	0.5	0.3	-0.2	0.1	-0.1	-0.6	-0.4	0.1	-0.4	-0.5	0.4	0.1	0.2	-0.2	-0.3	-0.2	-0.3	-0.4	0.0	0.6	
2-May	-0.3	-0.2	-0.1	-0.2	-0.1	0.0	-0.2	-0.3	0.1	-0.4	0.1	-0.7	-0.5	0.4	-0.1	-0.5	-0.4	0.4	0.2	0.1	-0.5	-0.7	0.0	-0.2	-0.2	0.4	
3-May	-0.1	0.0	-0.1	0.0	-0.3	0.6	0.0	0.3	-0.1	-0.3	-0.1	0.0	0.3	0.4	-0.8	-0.6	-0.3	0.5	0.5	0.5	0.5	0.4	0.6	0.6	0.1	0.6	
4-May	0.3	0.3	0.5	0.2	0.0	0.0	0.1	0.3	1.5	0.5	1.6	0.7	0.0	0.6	1.2	0.2	0.6	0.5	0.1	0.2	0.1	0.3	0.1	0.1	0.4	1.6	
5-May	1.1	1.0	0.6	0.6	0.7	0.5	0.5	0.0	0.5	0.5	0.6	0.7	0.4	-0.2	0.1	AF	AF	AF	AF	AF	AF	AF	AF	0.0	--	1.1	
6-May	-0.5	-0.1	0.0	-0.2	0.0	0.0	0.0	-0.5	-0.5	-0.2	-0.1	-0.1	0.3	0.4	0.3	0.9	0.0	0.4	0.4	0.4	0.4	0.5	0.3	0.2	0.1	0.9	
7-May	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.2	0.7	0.4	0.2	0.1	0.1	0.6	0.0	0.5	0.6	0.5	0.4	0.4	0.6	0.6	0.4	0.5	0.4	0.7	
8-May	0.3	0.2	0.6	0.4	0.6	0.5	0.4	0.3	0.7	-0.2	0.7	0.0	0.1	0.9	0.2	-0.5	-0.8	0.2	0.3	0.5	0.7	0.6	0.2	0.2	0.3	0.9	
9-May	0.1	-0.1	0.0	0.3	0.2	0.3	0.2	0.7	0.2	0.4	0.6	0.0	0.1	0.8	0.5	-0.1	-0.2	0.8	0.0	0.2	0.3	0.3	0.3	0.3	0.3	0.8	
10-May	0.6	0.3	0.5	0.7	0.6	0.5	0.2	0.4	0.2	-0.4	0.1	1.3	0.2	0.0	0.6	-0.1	0.5	0.3	0.7	0.7	0.2	0.5	0.6	0.7	0.4	1.3	
11-May	0.7	0.8	0.9	0.7	1.0	0.8	0.4	0.5	-0.1	0.2	0.2	0.7	-0.3	0.4	1.0	0.2	-0.1	-0.1	1.0	0.2	0.1	0.1	0.3	0.3	0.4	1.0	
12-May	0.3	0.7	0.4	0.2	0.3	0.2	0.6	0.4	0.3	0.0	-0.1	0.7	0.2	0.8	0.2	0.2	0.2	0.3	0.7	0.6	0.7	0.3	0.5	0.5	0.4	0.8	
13-May	0.7	0.5	0.8	0.6	0.6	0.5	0.5	0.7	0.5	0.0	-0.1	0.6	0.2	0.5	0.9	0.1	0.7	0.6	0.2	0.4	0.7	0.5	0.6	0.6	0.5	0.9	
14-May	0.5	0.2	0.1	0.3	0.5	0.6	0.4	0.8	0.3	-0.1	0.4	0.4	-0.1	0.4	0.5	0.3	0.0	0.2	0.1	-0.2	-0.4	-0.6	-0.6	-0.6	0.1	0.8	
15-May	-0.3	0.0	0.3	0.4	0.2	0.6	0.5	0.3	0.6	0.1	0.7	-0.2	0.3	0.0	0.0	-0.1	0.0	0.0	-0.1	-1.2	-1.0	-1.0	-1.1	-0.6	-0.1	0.7	
16-May	-0.6	-0.3	-0.2	-1.2	0.0	-0.3	-0.2	0.3	-0.4	-0.2	0.2	0.2	0.3	0.0	-0.4	0.3	0.2	0.0	0.0	-0.1	0.0	0.1	0.1	0.6	-0.1	0.6	
17-May	0.5	0.3	0.3	0.6	0.4	0.6	0.8	0.4	0.2	0.6	0.9	1.5	0.9	0.8	0.6	0.8	0.6	0.6	0.4	0.4	0.6	0.8	0.7	0.7	0.6	1.5	
18-May	0.7	0.8	0.7	0.6	0.9	0.7	0.7	0.0	0.3	0.2	0.7	-0.3	0.1	0.7	0.3	0.8	0.2	0.5	0.6	0.1	0.3	0.0	-0.1	0.0	0.4	0.9	
19-May	-0.1	-0.3	-0.2	0.3	0.2	0.0	0.6	0.7	0.5	0.5	1.5	0.4	0.6	0.9	0.2	0.6	0.3	0.4	0.9	0.4	0.2	-0.2	0.0	0.2	0.4	1.5	
20-May	0.0	0.0	0.0	0.4	0.6	0.3	0.2	0.3	0.7	0.3	1.0	0.1	1.1	0.9	0.3	0.6	0.6	0.2	0.1	-0.1	-0.1	-0.1	0.2	0.2	0.3	1.1	
21-May	0.1	0.4	0.5	0.6	0.7	0.3	0.4	0.2	0.2	-0.2	0.5	0.8	-0.1	0.5	0.5	0.2	0.0	-0.3	0.2	0.0	0.0	0.0	0.0	0.2	0.2	0.8	
22-May	0.0	-0.2	-0.2	0.0	0.1	0.3	0.2	0.2	0.3	0.3	0.5	0.1	-0.1	-0.5	-0.3	-0.3	0.7	-0.2	-0.3	-0.1	0.1	-0.1	0.1	-0.3	0.0	0.7	
23-May	-0.2	0.1	-0.2	-0.1	0.1	0.5	0.4	0.4	0.1	0.0	0.3	0.3	0.3	0.4	0.3	1.2	1.4	0.3	-0.1	-0.1	0.0	0.1	0.1	0.2	0.2	1.4	
24-May	0.0	0.2	-0.1	0.1	0.3	0.3	0.3	0.4	0.1	0.7	0.4	0.3	0.4	0.5	0.1	0.0	-0.1	0.6	0.8	0.4	0.3	0.3	0.2	0.0	0.3	0.8	
25-May	-0.1	0.2	0.0	0.0	0.1	0.2	0.2	0.2	0.3	0.2	0.5	0.1	0.2	-0.7	0.1	0.3	0.2	-1.1	-0.1	0.0	-0.6	-0.7	-1.1	-0.5	-0.1	0.5	
26-May	-0.4	-0.7	-0.3	-0.6	-0.4	-0.3	-0.1	-0.5	-0.4	-0.2	0.1	0.5	0.0	0.6	0.5	0.2	0.1	0.5	0.9	0.4	0.2	0.3	0.4	0.5	0.1	0.9	
27-May	0.7	0.7	0.5	0.6	0.7	0.5	0.4	0.8	0.0	0.3	0.9	0.8	0.1	-0.3	-0.8	-0.4	-0.8	-0.4	-0.1	0.4	-0.2	-0.8	-0.4	0.1	0.1	0.9	
28-May	-0.2	-0.9	-0.8	0.0	-0.4	0.2	0.1	0.0	0.2	0.1	-0.6	0.5	0.4	0.2	0.4	0.6	0.1	0.5	0.1	0.6	0.3	0.5	0.4	0.7	0.1	0.7	
29-May	0.8	0.6	0.7	0.4	0.5	0.3	0.4	0.8	0.6	1.5	1.4	0.7	0.5	0.7	0.2	0.8	0.7	0.6	1.0	0.7	0.8	0.8	1.3	0.9	0.7	1.5	
30-May	0.8	0.7	0.8	0.6	0.5	0.5	1.0	0.2	0.3	0.3	0.5	1.1	1.0	0.6	-0.1	0.7	0.6	0.3	1.0	0.7	0.7	1.0	0.9	1.0	0.7	1.1	
31-May	1.2	1.1	0.8	0.6	0.3	0.4	0.7	0.4	0.6	0.7	0.6	0.6	0.9	0.4	1.2	0.8	1.0	0.7	0.6	0.7	0.6	0.0	-0.3	-0.3	0.6	1.2	
		0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.3	0.3	0.2	0.4	0.3	0.3	0.4	0.2	0.3	0.2	0.3	0.4	0.2	0.2	0.1	0.1	0.2	Diurnal Average	
		1.2	1.1	0.9	0.7	1.0	0.8	1.0	0.8	1.5	1.5	1.6	1.5	1.1	0.9	1.2	1.2	1.4	0.8	1.0	0.7	0.8	1.0	1.3	1.0	Diurnal Maximum	
AF - Analyzer Failure																											



Summary of Hour Standard Deviations

Mannix - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 4.7 km/h on May 16 00:00			Hours of Data:	736
Minimum Value: 0.1 km/h on May 23 21:00			Hours of Missing Data:	8
			Hours of Calibration:	0
			Percent Operational Time:	98.9
Percentiles: P ₁ = 0.2 P ₁₀ = 0.5 Q ₁ = 1.0 Median = 1.9 Q ₃ = 2.6 P ₉₀ = 3.0 P ₉₉ = 3.7				

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

AF - Analyzer Failure



Summary of Hour Averages

Mannix - May 2015

Maximum Value: 1.9 km/h on May 19 11:00		Maximum Daily Average: 0.4 km/h on May 6		Hours in Service: 744																							
Minimum Value: -0.9 km/h on May 15 00:00		Minimum Daily Average: -0.2 km/h on May 14		Hours of Data: 735																							
Maximum Diurnal Average: 0.5 km/h at hour 14		Minimum Diurnal Average: 0.1 km/h at hour 4		Hours of Missing Data: 9																							
Monthly Average: 0.18 km/h		Percentiles: P ₁ = -0.7 P ₁₀ = -0.3 Q ₁ = -0.1 Median = 0.2 Q ₃ = 0.4 P ₉₀ = 0.7 P ₉₉ = 1.4		Hours of Calibration: 0																							
				Percent Operational Time: 98.8																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	-0.8	-0.4	-0.2	-0.1	0.0	0.0	0.3	0.1	-0.5	-0.1	0.0	-0.5	-0.1	0.5	-0.1	-0.7	0.3	0.0	0.3	-0.2	-0.4	0.1	-0.1	-0.2	-0.1	0.5	
2-May	0.0	0.3	0.3	0.0	0.1	0.0	0.1	0.0	0.4	-0.1	0.6	-0.3	0.0	0.7	0.3	-0.3	0.0	0.4	0.0	0.0	-0.3	-0.3	0.9	0.4	0.1	0.9	
3-May	0.5	0.7	0.3	0.4	-0.1	0.8	0.2	0.5	0.0	-0.1	0.1	0.3	0.7	0.7	-0.6	-0.3	0.0	0.8	0.6	0.5	0.5	0.2	0.5	0.4	0.3	0.8	
4-May	0.3	0.2	0.2	0.2	-0.1	-0.1	-0.2	0.1	1.4	-0.1	1.5	1.0	-0.6	0.7	1.3	0.0	0.5	0.2	0.1	0.3	0.4	0.3	0.0	-0.2	0.3	1.5	
5-May	1.4	1.3	0.2	0.3	0.5	1.4	0.7	0.2	0.7	0.6	0.7	0.8	0.6	0.5	0.3	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	1.4	
6-May	0.1	0.5	0.4	0.5	0.5	0.6	0.5	0.3	0.2	0.4	0.2	0.3	0.9	0.5	1.3	0.1	0.2	0.4	0.3	0.3	0.6	0.3	-0.1	0.0	0.4	1.3	
7-May	0.0	0.0	0.1	-0.1	0.3	0.1	0.2	0.1	0.5	0.3	0.4	0.0	0.2	0.6	-0.1	0.4	0.7	0.4	0.3	0.5	0.6	0.4	0.1	0.0	0.3	0.7	
8-May	0.1	0.2	0.2	0.0	0.0	0.4	0.3	0.0	0.6	-0.5	0.5	-0.5	0.2	1.3	0.3	-0.5	-0.9	0.6	0.4	0.6	0.5	0.3	-0.1	0.1	0.2	1.3	
9-May	0.2	0.0	0.5	0.4	0.2	0.2	0.2	0.7	-0.2	0.5	0.7	-0.1	0.0	0.8	0.3	-0.7	-0.4	1.1	-0.5	0.0	0.2	0.1	0.1	0.4	0.2	1.1	
10-May	0.2	-0.3	-0.2	0.0	0.1	0.1	0.2	0.0	0.1	-0.6	-0.2	1.2	-0.2	-0.2	0.4	-0.6	0.1	0.3	0.5	0.5	0.2	0.3	0.6	0.5	0.1	1.2	
11-May	0.4	0.7	0.8	0.5	0.6	0.5	0.4	0.1	-0.1	0.2	0.3	0.4	-0.4	0.6	1.3	0.0	-0.3	-0.4	1.2	0.1	0.0	0.2	0.3	0.0	0.3	1.3	
12-May	0.0	0.2	0.1	-0.3	0.6	-0.1	0.3	0.2	0.1	-0.1	-0.5	0.5	-0.1	0.5	-0.4	-0.3	-0.3	0.0	0.3	0.3	0.1	-0.2	-0.7	-0.3	0.0	0.6	
13-May	-0.1	-0.3	0.0	-0.1	-0.2	0.1	0.3	0.4	-0.1	0.3	-0.3	-0.5	0.3	-0.1	0.6	0.8	0.1	0.6	0.2	0.0	0.2	0.6	0.3	0.4	0.1	0.8	
14-May	-0.1	-0.5	-0.3	-0.3	0.0	0.0	0.0	0.6	0.3	-0.2	-0.3	0.1	0.2	-0.3	-0.7	0.1	-0.2	-0.4	0.1	-0.2	-0.5	-0.7	-0.9	-0.9	-0.2	0.6	
15-May	-0.5	-0.2	-0.3	-0.2	-0.2	0.3	0.3	0.0	0.7	-0.1	0.6	-0.1	0.6	0.0	0.1	0.1	0.0	0.1	0.2	-0.4	-0.6	-0.2	-0.3	-0.1	0.0	0.7	
16-May	0.1	0.3	0.3	-0.3	0.8	0.7	0.5	0.8	-0.1	0.0	0.5	0.3	0.6	0.3	-0.2	0.5	0.4	0.4	0.3	0.2	0.3	0.3	0.1	0.4	0.3	0.8	
17-May	0.1	-0.5	0.1	0.1	-0.1	0.3	0.5	0.0	-0.4	0.2	0.8	1.6	1.1	0.6	0.6	0.6	0.4	-0.1	-0.2	-0.2	0.0	0.0	0.0	0.0	0.2	1.6	
18-May	0.2	0.2	0.1	0.3	0.5	0.4	0.2	-0.1	-0.2	-0.1	0.5	-0.7	-0.2	0.7	0.2	0.7	0.2	0.9	1.2	0.1	0.0	0.0	-0.2	0.0	0.2	1.2	
19-May	-0.3	-0.4	-0.3	0.0	0.0	-0.2	0.2	0.3	0.4	0.4	1.9	-0.1	0.4	0.8	0.2	0.4	0.2	0.3	1.2	0.3	-0.1	-0.3	-0.1	0.1	0.2	1.9	
20-May	-0.2	-0.2	-0.2	0.0	0.1	0.1	0.0	0.2	0.4	-0.2	0.7	0.3	0.9	1.1	0.2	0.6	0.7	-0.1	-0.2	-0.4	-0.3	-0.3	0.0	-0.1	0.1	1.1	
21-May	-0.2	0.0	0.0	0.2	0.5	-0.1	0.1	-0.1	-0.2	-0.7	0.4	0.7	-0.3	0.2	0.3	0.3	0.1	-0.2	0.2	0.1	0.0	0.0	-0.1	0.0	0.1	0.7	
22-May	-0.3	0.0	0.0	-0.3	-0.1	-0.1	0.0	0.0	0.3	0.1	0.6	0.7	0.5	-0.1	0.1	-0.1	1.2	0.0	0.2	0.2	0.2	0.3	0.4	-0.1	0.2	1.2	
23-May	0.0	0.2	0.2	0.1	0.1	0.5	0.3	0.3	0.1	-0.2	0.4	0.4	0.5	0.4	0.6	1.3	1.8	0.0	-0.4	-0.2	-0.1	0.2	0.2	0.1	0.3	1.8	
24-May	0.1	0.1	0.2	0.1	0.0	0.2	0.2	0.2	0.0	0.4	0.2	0.1	0.4	0.8	0.1	0.0	-0.2	0.6	0.7	0.2	0.1	0.0	0.1	0.0	0.2	0.8	
25-May	0.0	0.2	0.1	-0.1	0.0	0.0	-0.1	-0.1	0.1	-0.1	0.3	0.3	0.4	-0.7	0.0	0.1	0.2	-0.7	-0.1	0.3	-0.3	-0.1	-0.3	-0.1	0.0	0.4	
26-May	0.2	-0.1	0.1	-0.3	0.0	0.1	0.1	-0.3	-0.3	0.1	0.3	0.8	0.2	1.2	0.7	0.3	0.4	0.5	0.9	0.4	0.4	0.3	0.3	-0.1	0.3	1.2	
27-May	0.2	0.4	0.0	0.2	0.2	0.0	-0.2	0.6	-0.2	0.0	0.8	0.7	0.1	0.0	-0.5	0.3	-0.6	0.2	0.2	0.3	0.2	-0.1	-0.1	0.7	0.1	0.8	
28-May	0.2	-0.6	-0.5	0.1	-0.2	0.2	0.3	0.3	0.6	0.4	0.0	1.0	0.7	0.4	0.8	0.8	0.5	0.5	0.3	0.4	0.3	0.5	0.0	0.3	0.3	1.0	
29-May	0.9	-0.2	0.1	0.3	-0.2	-0.5	-0.5	0.4	0.4	1.5	1.6	0.3	0.5	0.7	-0.3	0.9	0.7	0.7	0.7	0.3	0.3	0.0	0.4	0.5	0.4	1.6	
30-May	0.0	-0.1	0.0	0.1	-0.1	-0.1	0.3	-0.4	0.0	-0.1	0.2	0.7	0.5	0.5	-0.9	0.5	-0.2	-0.2	0.5	-0.1	-0.1	0.7	0.7	0.8	0.1	0.8	
31-May	0.8	0.9	0.3	-0.3	-0.5	-0.2	-0.1	-0.3	-0.4	0.1	0.4	0.4	0.7	0.0	0.7	0.4	0.5	0.3	0.3	0.5	0.3	-0.1	-0.3	-0.2	0.2	0.9	
		0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.4	0.3	0.3	0.5	0.2	0.2	0.2	0.2	0.3	0.2	0.1	0.1	0.1	0.1	Diurnal Average	
		1.4	1.3	0.8	0.5	0.8	1.4	0.7	0.8	1.4	1.5	1.9	1.6	1.1	1.3	1.3	1.3	1.8	1.1	1.2	0.6	0.6	0.7	0.9	0.8	Diurnal Maximum	
AF - Analyzer Failure																											



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.5 km/h on May 16 04:00 Minimum Value: 0.1 km/h on May 19 00:00 Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 1.0 Median = 1.9 Q ₃ = 2.9 P ₉₀ = 3.3 P ₉₉ = 4.1																								Hours in Service: 744 Hours of Data: 735 Hours of Missing Data: 9 Hours of Calibration: 0 Percent Operational Time: 98.8	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	0.5	0.7	0.6	0.8	1.1	0.9	0.8	1.6	2.5	3.1	3.4	3.6	3.9	3.4	3.1	2.9	2.6	1.8	1.7	0.7	0.5	0.6	0.3	0.4	3.9
2-May	0.4	0.4	0.8	0.6	0.7	0.4	1.9	2.6	3.0	2.9	3.1	3.1	3.1	3.3	2.5	3.0	2.9	2.1	1.0	0.7	2.2	2.3	2.9	2.9	3.3
3-May	2.5	2.8	1.9	2.1	1.4	1.8	1.8	2.2	2.3	2.7	2.7	2.9	2.8	3.3	3.1	3.1	3.2	3.0	2.9	1.3	1.1	1.0	1.2	1.0	3.3
4-May	1.0	1.0	1.3	1.1	0.6	0.5	0.9	1.6	2.2	2.7	2.6	2.9	2.9	3.0	3.1	2.6	2.6	2.5	1.8	1.2	1.2	2.0	2.0	3.2	3.2
5-May	2.8	2.6	2.7	2.6	2.4	2.1	1.7	1.5	1.8	1.8	2.2	2.6	3.1	3.1	2.8	AF	AF	AF	AF	AF	AF	AF	AF	AF	3.1
6-May	2.4	2.0	2.6	2.1	2.1	2.7	3.0	3.1	2.9	2.9	2.7	2.5	3.0	3.2	2.9	3.0	2.6	2.3	1.6	1.5	1.0	1.2	1.0	0.5	3.2
7-May	0.7	0.8	0.7	0.6	0.3	0.4	1.1	1.6	2.4	2.2	2.7	2.9	3.0	2.9	3.1	3.0	2.5	2.2	1.7	1.3	1.0	1.5	2.4	1.5	3.1
8-May	0.4	0.3	0.3	0.6	0.5	0.5	1.0	1.2	2.0	2.1	2.6	2.7	2.5	2.6	2.3	3.4	2.9	2.2	2.1	1.8	2.0	2.1	2.0	1.4	3.4
9-May	0.5	0.6	0.8	0.8	0.5	0.4	0.7	1.5	1.8	2.1	2.7	2.8	2.9	3.0	2.6	2.4	2.1	2.4	1.6	0.6	0.2	0.2	0.7	1.2	3.0
10-May	0.9	1.7	1.7	1.1	0.7	0.8	0.9	1.3	1.4	1.6	2.4	2.7	3.0	2.7	2.7	2.5	2.3	1.9	1.6	1.3	0.9	1.2	0.8	0.9	3.0
11-May	1.1	0.9	1.0	0.9	0.9	0.8	0.9	1.1	1.8	2.3	2.7	2.6	2.9	2.7	3.1	2.9	2.7	2.1	2.0	0.7	0.3	1.0	1.4	2.7	3.1
12-May	2.2	1.2	1.1	1.4	1.7	1.4	1.3	1.9	1.7	1.7	2.2	2.9	3.1	3.2	3.0	2.9	2.8	2.5	2.6	2.7	3.0	3.0	2.4	2.2	3.2
13-May	2.4	2.1	1.9	1.4	1.3	0.9	1.7	2.0	1.8	2.7	3.2	3.2	3.5	3.2	3.3	3.2	3.1	2.7	1.9	1.1	1.0	0.8	0.7	0.7	3.5
14-May	0.7	0.7	0.6	0.6	1.1	0.6	0.8	1.1	1.9	2.8	3.0	3.4	3.5	3.4	3.1	3.2	2.9	2.4	2.2	0.9	0.3	0.5	0.8	1.0	3.5
15-May	1.0	1.0	0.9	0.5	0.7	0.6	1.2	1.1	1.8	1.9	2.6	3.3	4.1	3.5	3.5	3.0	3.1	2.4	2.4	4.3	3.4	4.0	4.0	4.2	4.3
16-May	3.7	4.0	2.8	4.5	4.4	3.4	3.3	3.8	3.4	3.6	4.3	3.9	3.8	3.6	3.6	3.3	3.1	3.0	2.3	1.7	1.0	0.8	0.7	1.3	4.5
17-May	1.5	1.4	1.0	0.8	0.7	1.7	2.2	2.3	2.4	3.1	3.3	3.2	3.3	3.2	3.3	3.0	2.6	2.1	1.6	1.4	0.7	1.4	1.6	1.3	3.3
18-May	0.9	0.8	0.8	0.9	0.7	0.8	0.8	1.0	1.5	1.9	3.3	2.8	3.4	3.5	3.0	2.6	2.2	2.2	1.7	1.1	0.5	0.5	0.2	0.1	3.5
19-May	0.7	0.5	0.6	1.1	1.0	0.6	0.8	1.2	1.5	1.9	2.6	2.9	2.8	3.6	3.1	2.5	2.6	2.3	1.8	0.9	0.4	0.3	0.3	0.6	3.6
20-May	0.7	0.8	0.8	0.4	0.5	0.5	0.4	0.8	1.9	1.6	2.1	3.0	3.6	3.4	2.8	2.9	2.9	2.6	1.8	0.9	0.3	0.1	0.3	0.8	3.6
21-May	0.7	1.0	0.9	0.9	0.7	0.6	0.6	1.0	1.1	1.6	2.3	3.6	3.4	3.5	2.9	2.9	2.6	2.2	1.8	0.8	0.4	0.3	0.3	0.5	3.6
22-May	0.7	0.7	0.5	0.3	0.4	0.6	0.6	1.0	1.2	1.7	2.9	3.5	4.0	3.6	3.6	3.4	3.2	2.8	2.7	2.2	1.2	1.7	1.4	1.2	4.0
23-May	1.4	1.3	0.8	0.7	0.5	1.1	1.4	1.8	2.2	2.6	2.9	2.7	3.1	2.9	3.1	2.9	2.4	2.1	1.5	0.6	0.2	0.2	0.3	0.5	3.1
24-May	0.3	0.5	0.3	0.3	0.7	0.3	1.0	1.1	1.2	1.9	2.3	2.5	2.5	3.5	3.1	2.8	2.5	2.4	1.8	1.2	1.1	0.7	0.6	0.3	3.5
25-May	0.3	0.5	0.5	0.1	0.4	0.4	0.5	0.9	1.3	0.8	1.4	3.0	3.5	3.1	1.1	1.7	1.6	3.4	1.6	0.9	1.9	3.0	3.0	2.6	3.5
26-May	2.7	2.1	2.1	1.6	2.0	2.0	2.0	2.3	2.9	3.0	3.2	3.5	3.7	3.5	3.5	3.6	2.9	2.4	2.1	1.5	0.8	0.8	1.3	1.9	3.7
27-May	2.2	2.4	1.9	1.5	0.8	1.1	1.4	1.6	1.6	1.8	2.3	2.3	1.8	2.6	3.8	3.5	2.9	3.4	2.9	2.6	3.4	3.7	3.0	3.7	3.8
28-May	3.5	3.2	2.7	2.9	2.6	2.9	3.0	3.2	3.7	3.7	4.0	4.3	3.6	3.9	3.4	3.4	3.3	3.1	2.5	1.8	1.1	1.6	2.2	2.6	4.3
29-May	2.8	1.8	0.9	0.4	1.1	1.3	1.7	2.3	2.6	3.0	3.0	3.3	3.4	3.0	3.1	2.9	2.6	2.4	2.4	1.3	1.4	1.7	2.5	2.3	3.4
30-May	1.7	1.0	0.9	1.0	0.8	0.8	1.5	1.5	1.8	1.7	2.8	3.2	3.2	3.2	3.0	2.9	2.8	2.5	2.1	1.8	1.7	1.5	0.7	0.8	3.2
31-May	1.6	1.1	0.8	1.1	1.2	1.3	1.9	1.8	2.1	2.0	1.3	1.1	1.6	1.6	2.7	2.5	2.5	1.6	1.3	1.8	1.2	0.6	0.5	0.4	2.7
3.7 4.0 2.8 4.5 4.4 3.4 3.3 3.8 3.7 3.7 4.3 4.3 4.1 3.9 3.8 3.6 3.3 3.4 2.9 4.3 3.4 4.0 4.0 4.2																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Summary of Hour Averages

Mannix - May 2015

Maximum Value: 2.7 km/h on May 1 15:00		Maximum Daily Average: 1.2 km/h on May 2		Hours in Service: 744																						
Minimum Value: -1.2 km/h on May 17 02:00		Minimum Daily Average: -0.4 km/h on May 12		Hours of Data: 738																						
Maximum Diurnal Average: 0.8 km/h at hour 14		Minimum Diurnal Average: 0.1 km/h at hour 10		Hours of Missing Data: 6																						
Monthly Average: 0.41 km/h		Percentiles: P ₁ = -0.9 P ₁₀ = -0.4 Q ₁ = -0.1 Median = 0.4 Q ₃ = 0.8 P ₉₀ = 1.4 P ₉₉ = 2.2		Hours of Calibration: 0																						
				Percent Operational Time: 99.2																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	1.7	0.9	0.4	0.3	0.4	0.3	0.5	0.5	0.5	0.8	2.0	1.5	2.0	2.6	2.7	0.5	0.7	-0.2	1.8	0.5	1.4	2.4	2.1	2.2	1.2	2.7
2-May	2.0	2.2	2.4	1.6	1.5	0.7	1.0	1.3	0.7	0.1	1.2	1.1	1.4	0.9	2.2	1.0	1.4	0.5	0.0	0.4	1.4	1.0	1.6	0.9	1.2	2.4
3-May	0.9	1.8	1.3	1.3	0.8	0.9	0.9	0.9	0.4	1.3	2.0	1.5	1.8	1.1	0.0	0.5	0.4	1.1	0.5	0.0	-0.1	-0.2	0.0	0.0	0.8	2.0
4-May	-0.2	-0.2	-0.2	0.6	0.4	0.1	-0.1	-0.1	0.9	-0.7	1.0	0.4	-0.9	0.7	0.5	-0.4	-0.1	-0.3	-0.4	-0.1	-0.3	-0.4	-0.6	-1.0	-0.1	1.0
5-May	0.7	0.5	-0.7	-0.7	-0.3	1.0	0.2	0.0	0.1	0.1	-0.1	0.0	0.1	0.6	-0.2	AF	AF	AF	AF	AF	AF	1.1	-0.4	0.0	0.1	1.1
6-May	0.0	0.1	0.5	0.6	0.6	1.0	1.0	0.7	0.9	0.3	0.1	0.0	0.7	0.4	-0.4	0.6	-0.7	-0.7	-0.4	-0.3	0.2	-0.2	-0.5	-0.2	0.2	1.0
7-May	-0.2	-0.3	-0.1	-0.5	0.4	0.4	0.6	0.3	0.4	0.4	0.7	0.6	0.4	0.7	-0.3	-0.2	0.4	-0.2	-0.1	0.2	0.2	-0.4	-0.7	-0.3	0.1	0.7
8-May	0.2	0.9	0.9	0.3	0.3	0.9	0.7	0.2	0.5	-0.8	-0.2	-1.1	0.2	0.9	0.4	0.8	-0.4	0.2	-0.4	-0.1	-0.4	-0.5	-0.7	-0.1	0.1	0.9
9-May	0.3	0.0	0.2	-0.2	-0.1	-0.1	0.0	0.4	-0.2	0.8	1.1	0.2	0.5	0.9	-0.2	-1.2	-0.8	0.6	-0.9	-0.1	0.3	0.3	-0.1	-0.3	0.1	1.1
10-May	0.0	-0.6	-0.3	-0.4	-0.4	-0.5	0.0	0.1	0.0	-0.9	-0.5	0.6	-0.4	-0.5	0.4	-0.9	-0.5	0.0	0.1	0.1	-0.1	0.3	1.5	1.3	-0.1	1.5
11-May	1.3	1.8	1.7	1.2	0.8	0.6	0.7	0.2	0.0	0.2	0.6	0.4	-0.3	0.4	1.7	0.3	0.0	-0.5	1.4	0.2	0.3	0.3	-0.3	-0.9	0.5	1.8
12-May	-0.6	0.1	0.0	-0.5	-0.3	-0.5	-0.2	-0.4	-0.2	-0.3	-0.8	0.0	-0.2	0.4	-0.7	-0.7	-0.6	-0.7	-0.3	-0.5	-0.8	-0.8	-0.9	-0.6	-0.4	0.4
13-May	-0.3	-0.5	0.1	-0.2	0.1	0.5	0.7	0.7	0.1	0.9	0.3	0.3	1.0	0.5	1.4	1.2	0.5	0.8	0.9	1.2	1.2	1.6	1.6	1.6	0.7	1.6
14-May	1.0	0.7	0.6	0.2	0.4	0.2	0.2	0.9	0.8	0.7	0.6	1.0	1.2	0.7	0.1	0.7	0.5	0.6	1.2	0.6	0.4	0.4	0.6	0.6	0.6	1.2
15-May	0.6	0.8	0.7	0.5	0.4	0.5	0.6	0.0	0.2	-0.4	0.3	1.5	2.2	1.6	1.7	1.9	1.6	1.3	0.7	1.7	1.1	1.6	1.8	1.7	1.0	2.2
16-May	1.5	1.7	0.6	1.5	2.1	1.9	1.0	1.3	0.8	0.6	0.9	0.1	0.4	0.4	-0.4	0.1	0.1	0.3	0.4	0.1	0.0	-0.3	-0.4	-0.1	0.6	2.1
17-May	-0.5	-1.2	0.0	0.4	0.3	0.8	1.0	0.4	-0.1	0.5	0.8	1.3	1.1	0.7	0.7	0.1	0.1	-0.4	-0.5	-0.3	0.4	0.1	0.6	0.6	0.3	1.3
18-May	0.9	0.9	1.0	1.2	1.0	0.8	0.2	-0.3	-0.5	-0.5	0.5	-0.1	0.1	1.0	0.7	1.5	0.4	1.3	1.8	0.5	-0.1	0.3	0.6	1.2	0.6	1.8
19-May	0.8	1.2	1.1	0.4	0.5	0.3	0.5	0.6	0.6	0.2	2.1	-0.1	0.1	0.6	-0.1	0.0	-0.3	0.0	0.9	0.6	0.6	0.5	0.7	0.4	0.5	2.1
20-May	0.4	1.1	0.7	0.1	0.2	0.0	0.2	0.3	0.6	-0.4	0.2	0.2	0.8	1.8	0.7	0.6	0.8	0.3	0.3	0.1	0.3	0.6	0.8	0.5	0.5	1.8
21-May	0.4	0.4	0.4	0.5	0.8	0.5	0.5	-0.1	-0.2	-0.9	-0.2	0.9	0.7	1.0	0.8	1.0	0.5	0.3	0.8	0.7	0.3	0.6	0.1	0.8	0.4	1.0
22-May	0.9	1.2	2.0	0.4	0.5	0.3	0.4	0.7	0.3	0.2	0.7	1.7	1.5	0.8	1.1	0.4	1.3	-0.2	0.1	0.0	-0.3	-0.4	-0.3	-0.2	0.5	2.0
23-May	-0.7	-0.3	0.0	-0.2	-0.3	0.0	0.1	0.2	0.0	-0.2	0.5	0.7	0.5	0.8	1.4	1.3	-0.5	-0.7	-0.1	-0.1	-0.1	-0.3	-0.2	-0.2	0.1	1.4
24-May	0.1	-0.1	0.1	-0.1	-0.3	0.2	0.7	0.3	-0.2	-0.1	-0.1	-0.2	0.1	1.4	0.5	0.3	0.2	0.3	-0.2	-0.2	-0.4	0.0	0.2	0.2	0.1	1.4
25-May	0.2	0.1	0.3	0.2	0.4	0.2	0.2	0.3	0.4	0.0	0.3	1.2	2.1	0.7	0.2	-0.3	0.4	1.7	0.5	0.9	1.2	1.4	1.4	1.2	0.6	2.1
26-May	1.5	0.7	0.9	0.2	1.1	0.9	0.8	0.7	-0.1	-0.1	0.1	1.3	0.8	1.6	1.6	1.3	0.6	0.1	0.5	-0.1	-0.2	-0.2	-0.4	-0.7	0.5	1.6
27-May	-0.5	-0.2	-0.3	-0.1	0.1	0.0	-0.5	0.1	-0.3	-0.1	0.4	0.6	0.5	1.1	1.3	1.9	-0.5	0.2	0.2	0.1	0.0	0.1	-0.1	1.5	0.2	1.9
28-May	0.5	-0.6	-0.5	0.3	-0.3	-0.2	0.0	0.2	0.8	1.3	1.3	1.7	0.9	0.4	0.9	1.1	0.4	0.1	0.2	0.0	-0.2	-0.4	-0.5	-0.4	0.3	1.7
29-May	0.0	-0.6	0.4	0.6	-0.8	-0.9	-0.4	0.9	0.6	1.6	0.7	-0.4	0.1	0.5	-0.7	0.9	0.3	0.5	0.1	0.5	0.7	0.5	1.2	1.3	0.3	1.6
30-May	0.6	0.5	1.0	-0.1	-0.4	0.1	0.6	-0.4	-0.4	-0.5	-0.5	0.3	0.3	1.0	-0.6	0.8	0.2	0.1	1.0	-0.1	0.2	1.7	1.9	1.9	0.4	1.9
31-May	1.8	1.9	0.9	-0.6	-1.0	-0.2	-0.1	-0.3	-0.9	0.3	0.7	0.9	1.2	0.5	1.1	1.0	0.7	0.8	1.1	1.2	1.1	0.9	1.9	1.8	0.7	1.9
																								Diurnal Average		
																								Diurnal Maximum		
AF - Analyzer Failure																										



Summary of Hour Standard Deviations

Mannix - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 4.9 km/h on May 16 05:00			Hours of Data:	738
Minimum Value: 0.1 km/h on May 9 22:00			Hours of Missing Data:	6
			Hours of Calibration:	0
			Percent Operational Time:	99.2
Percentiles: P ₁ = 0.2 P ₁₀ = 0.6 Q ₁ = 0.9 Median = 1.9 Q ₃ = 2.9 P ₉₀ = 3.5 P ₉₉ = 4.1				

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	0.7	0.8	0.7	1.0	1.3	1.0	0.8	1.7	2.6	3.2	3.6	3.9	4.0	3.5	3.6	3.2	2.7	1.7	2.0	0.8	0.6	0.7	0.4	0.4	4.0
2-May	0.6	0.5	0.8	0.8	0.9	0.5	2.0	2.7	3.1	3.0	3.2	3.1	3.2	3.6	2.5	3.0	3.6	2.5	1.1	0.8	2.3	2.2	3.1	3.0	3.6
3-May	2.7	3.0	1.9	2.2	1.5	1.9	1.8	2.4	2.6	2.7	3.0	2.9	3.5	3.2	3.4	3.2	3.3	2.9	1.2	1.0	0.9	1.0	0.8	3.5	
4-May	0.9	0.9	1.2	1.0	0.6	0.5	0.8	1.4	2.1	2.4	2.5	2.8	2.9	3.2	2.9	2.5	2.4	2.5	1.9	1.1	1.2	2.0	2.1	3.0	3.2
5-May	2.5	2.3	2.4	2.4	2.3	1.9	1.7	1.6	1.8	1.8	2.2	2.7	3.3	3.4	2.7	AF	AF	AF	AF	AF	AF	3.2	2.0	2.0	3.4
6-May	2.6	2.1	2.7	2.2	2.4	2.9	3.2	3.2	3.0	3.0	2.7	2.5	3.3	3.2	3.1	3.1	2.6	2.2	1.6	1.5	1.0	1.0	0.5	0.4	3.3
7-May	0.4	0.3	0.4	0.6	0.3	0.4	1.1	1.6	2.3	2.2	2.8	3.1	3.2	3.0	3.1	2.9	2.5	1.9	1.6	1.3	0.9	1.3	1.6	1.1	3.2
8-May	0.6	0.4	0.4	0.6	0.4	0.4	1.0	1.2	1.9	1.9	2.2	2.3	2.6	2.4	2.4	3.8	3.1	2.2	2.1	1.7	1.8	1.9	1.3	1.0	3.8
9-May	0.6	0.6	0.6	0.7	0.4	0.3	0.6	1.4	1.9	2.1	2.8	3.0	3.0	3.2	2.2	2.2	2.0	2.2	1.5	0.6	0.2	0.1	0.4	0.5	3.2
10-May	1.0	1.5	1.5	1.1	0.7	0.8	0.7	1.2	1.3	1.4	2.2	2.6	3.1	2.7	2.8	2.3	2.0	2.1	1.4	1.2	0.5	1.1	0.8	0.8	3.1
11-May	1.0	0.8	1.0	1.1	1.1	0.9	0.9	0.9	1.7	2.1	2.8	2.8	3.1	2.8	3.2	3.1	3.0	2.2	2.1	0.8	0.4	1.1	1.2	1.8	3.2
12-May	1.5	1.3	1.2	0.8	0.8	0.9	1.0	1.5	1.4	1.6	2.1	2.7	3.2	3.5	3.0	2.8	2.7	2.2	2.0	2.2	2.8	2.9	2.5	2.3	3.5
13-May	2.3	2.1	1.9	1.3	1.4	1.0	1.7	2.0	1.8	2.8	3.3	3.4	3.7	3.5	3.5	3.3	3.4	2.9	2.0	1.1	1.0	0.9	0.7	0.7	3.7
14-May	0.8	0.8	0.7	0.7	1.2	0.7	0.8	1.2	2.0	2.9	3.2	3.5	3.7	3.7	3.6	3.4	3.1	2.6	2.3	1.0	0.4	0.5	0.8	1.0	3.7
15-May	1.1	1.2	1.1	0.7	0.8	0.7	1.3	0.9	1.5	1.6	2.5	3.5	4.4	3.8	3.6	3.3	3.3	2.7	2.5	4.1	4.2	4.1	4.1	4.2	4.4
16-May	3.9	3.9	2.9	4.6	4.9	3.4	3.5	4.0	3.5	3.8	4.5	3.9	4.2	3.8	3.8	3.5	3.4	3.2	2.6	1.8	0.9	0.6	0.7	1.2	4.9
17-May	1.3	1.4	1.1	0.8	0.6	1.5	2.3	2.3	2.6	3.2	3.1	3.0	3.3	3.3	3.4	2.8	2.4	2.1	1.6	1.3	0.8	1.4	1.5	1.2	3.4
18-May	0.8	0.7	0.8	0.9	0.8	0.8	0.8	0.8	1.3	1.7	3.3	3.1	3.5	3.7	3.3	2.7	2.2	2.1	1.8	1.1	0.5	0.6	0.2	0.2	3.7
19-May	0.8	0.6	0.7	1.3	1.1	0.7	0.7	1.1	1.5	1.8	2.6	2.8	2.8	3.6	2.9	2.5	2.6	2.4	1.8	1.0	0.4	0.3	0.3	0.6	3.6
20-May	0.9	1.1	0.8	0.6	0.6	0.5	0.5	0.7	1.9	1.4	1.8	3.0	3.6	3.5	3.2	2.8	3.0	2.6	2.0	0.9	0.4	0.2	0.3	0.9	3.6
21-May	0.8	1.1	0.9	1.0	0.8	0.5	0.6	0.8	0.9	1.3	1.9	3.6	3.6	3.7	3.2	3.0	2.9	2.4	1.9	0.9	0.5	0.4	0.3	0.6	3.7
22-May	0.8	0.9	0.5	0.5	0.5	0.6	0.8	1.0	1.1	1.7	3.1	3.7	4.0	3.8	3.9	3.6	3.5	2.7	2.6	2.1	1.1	1.4	1.3	1.3	4.0
23-May	1.5	1.4	0.8	0.6	0.4	1.0	1.4	1.8	2.2	2.7	3.0	2.9	3.4	3.2	3.3	3.1	2.5	2.0	1.4	0.8	0.2	0.2	0.3	0.4	3.4
24-May	0.3	0.3	0.3	0.2	0.5	0.6	1.0	1.0	0.9	1.4	2.1	2.5	2.5	3.6	3.4	2.7	2.7	2.4	1.7	0.9	0.7	0.4	0.6	0.3	3.6
25-May	0.4	0.4	0.4	0.2	0.6	0.4	0.5	0.8	1.2	0.8	1.3	2.9	4.1	4.1	1.1	1.4	1.7	3.3	1.7	1.0	1.8	3.1	3.0	2.7	4.1
26-May	2.8	2.2	2.1	1.7	2.0	1.9	2.0	2.3	3.2	3.2	3.5	3.8	3.9	3.7	3.7	3.8	3.1	2.6	2.2	1.4	0.7	0.8	1.1	1.4	3.9
27-May	1.8	1.8	1.3	1.1	0.7	0.9	1.3	1.2	1.7	1.6	2.2	2.4	1.8	2.7	4.0	3.5	2.9	3.5	3.2	2.7	3.4	3.7	3.1	4.1	4.1
28-May	3.8	3.4	2.9	3.2	2.7	3.1	3.1	3.2	3.9	3.9	4.1	4.6	4.2	4.1	3.8	3.7	3.6	3.3	2.8	1.9	1.1	1.6	1.8	1.9	4.6
29-May	2.2	1.9	0.9	0.4	1.1	1.1	1.7	2.5	2.9	3.0	2.6	3.0	3.4	3.1	3.1	3.1	2.4	2.4	2.0	1.4	1.3	1.7	2.3	2.2	3.4
30-May	1.6	0.9	0.7	1.0	0.8	0.6	1.4	1.5	1.5	1.5	2.4	3.1	3.1	3.5	3.2	3.1	3.0	2.7	2.1	1.8	1.6	1.5	0.6	0.6	3.5
31-May	1.2	0.8	0.9	0.9	1.1	1.2	1.7	1.9	2.2	2.2	1.3	1.1	1.6	1.6	2.7	2.4	2.5	1.6	3.4	1.7	1.1	0.7	0.7	0.5	3.4
3.9 3.9 2.9 4.6 4.9 3.4 3.5 4.0 3.9 3.9 4.5 4.6 4.4 4.1 4.0 3.8 3.6 3.5 3.4 4.1 4.2 4.1 4.1 4.2																									
Diurnal Maximum																									

AF - Analyzer Failure



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 21, 2015	Last Calibration	April 15, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	11:10
Gas Cert Reference	S9610161A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26-Sep-17
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG Make/Model	API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-634	-635
Analyzer IP address	192.168.1.43		Lamp voltage	874	873
Calculated slope	0.995744	1.011344	Chamber temp	44.9	45.3
Calculated intercept	0.592006	-1.286369	Pressure	694.0	698.9
Analyzer Background	7.3	7.2	Flow	0.467	0.476
Analyzer Coefficient	1.009	1.009	Intensity	90	90

Analyzer make TEI 43i Analyzer serial # 1008841399

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	60.0	600.0	593.1	1.012
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	60.0	600.0	593.1	1.012
second point	5000	30.0	300.0	301.0	0.997
third point	5000	15.0	150.0	149.0	1.007
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	60.0	600.0	593.0	1.012
Average Correction Factor					1.005

Corrected As found 592.9 Previous response 602.0 % change 1.5%

Notes:

Inlet filter changed after as founds. No adjustments made.

Calibration Performed By: Asad Hidayat



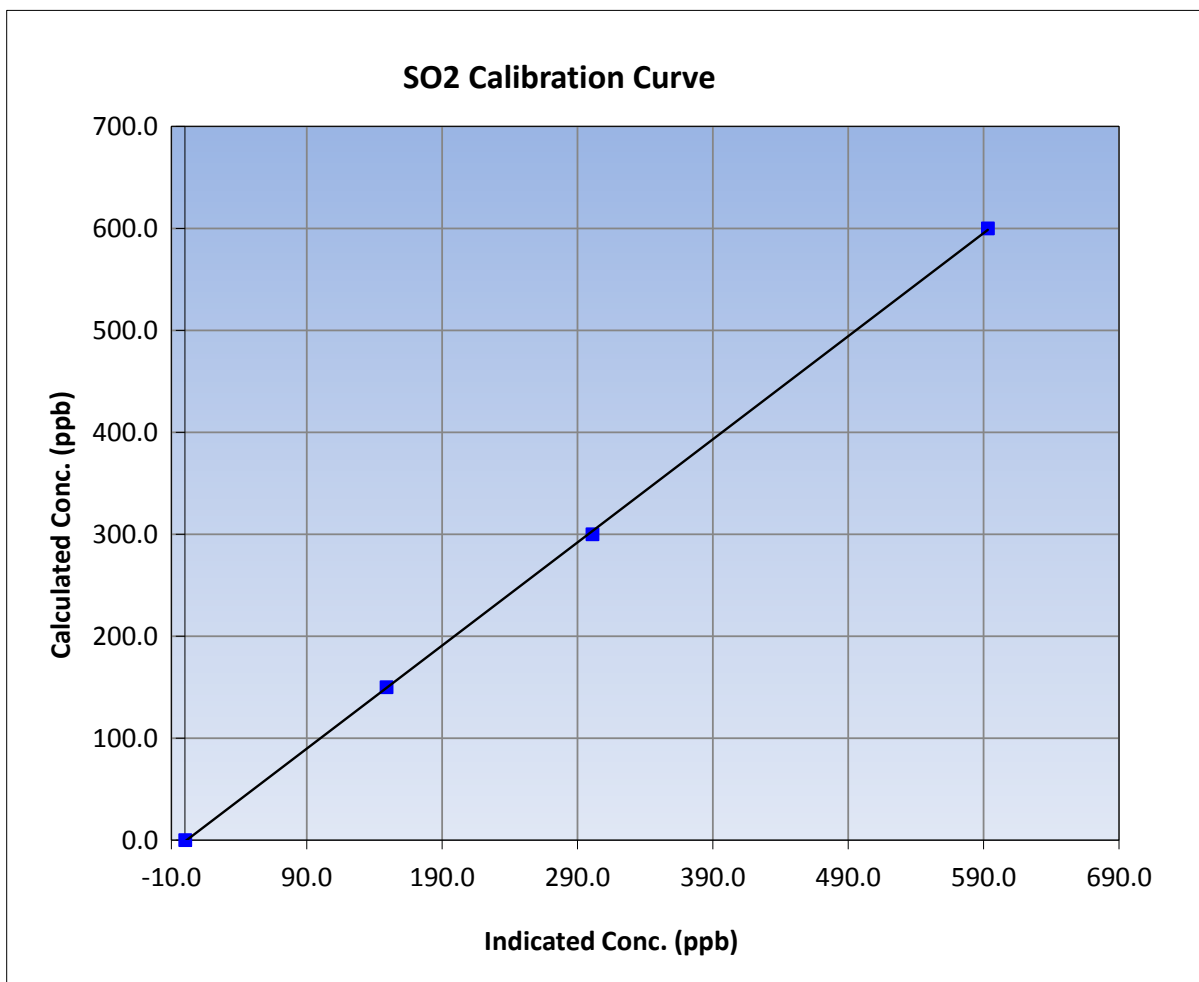
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 21, 2015	Previous Calibration	April 15, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:25	End Time (MST)	11:10
Analyzer make	TEI 43i	Analyzer serial #	1008841399

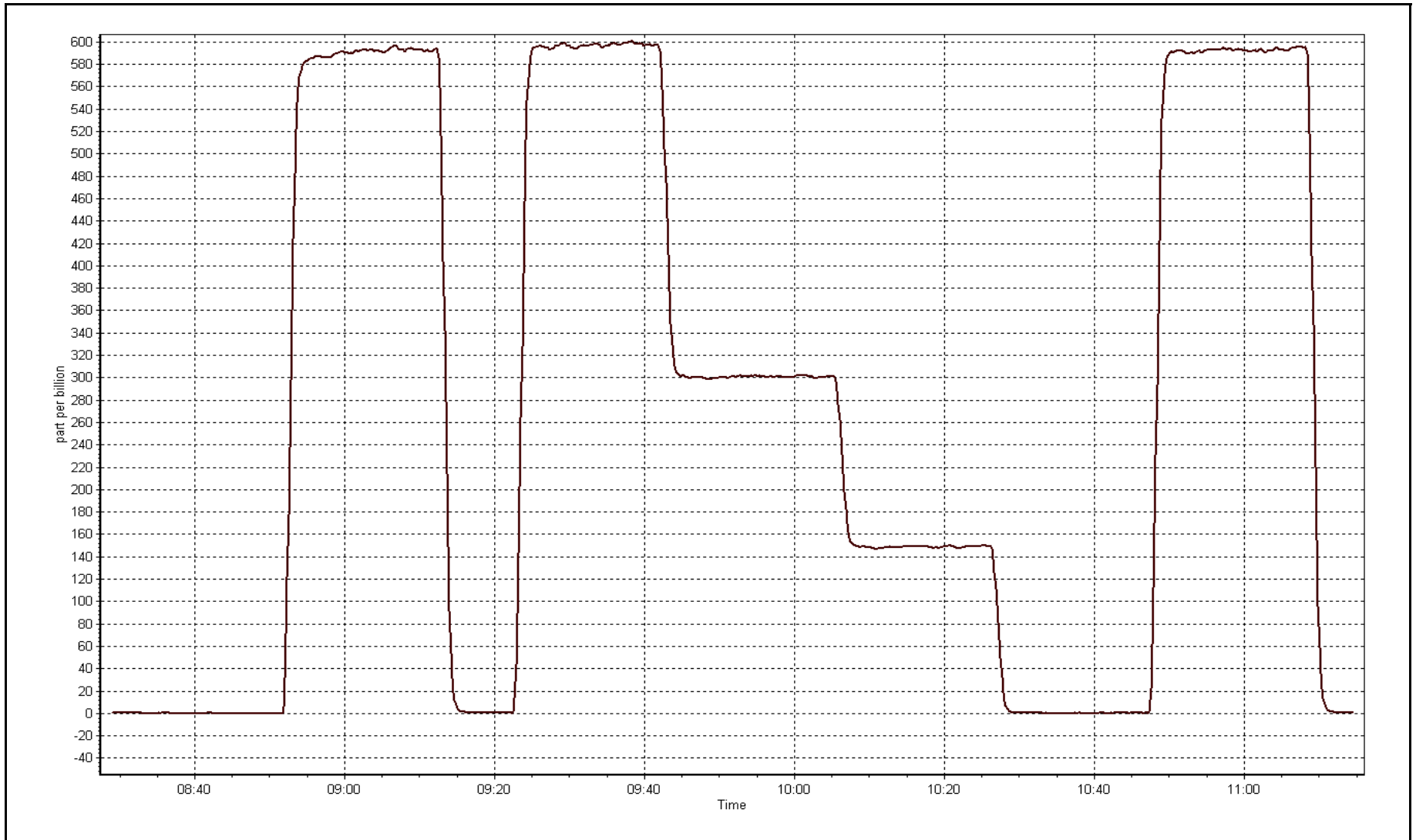
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999930
600.0	593.1	1.0116		
300.0	301.0	0.9966	Slope	1.011344
150.0	149.0	1.0066		
			Intercept	-1.286369



SO2 Calibration Plot

Date: May 21, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 13, 2015	Last Calibration	April 7, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	8:17	End Time (MST)	11:40
Gas Cert Reference	CC62844	Station temp.	21 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG air Make/Model	API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S960161A 9/Sep/17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-624	-624
Analyzer IP address	192.168.1.42		Lamp voltage	889	891
Calculated slope	0.990775	0.996021	Chamber temp	45.1	45
Calculated intercept	0.069249	-0.153255	Pressure	526.8	528.3
Analyzer Background	16.8	17.2	Flow	1.075	1.077
Analyzer Coefficient	1.325	1.353	Intensity	114	115
			Converter temp.	327	325

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	74.4	75.0	73.3	1.023
SO2 scrubber check	5000	15.0	150.0	0.7	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	74.4	75.0	75.3	0.996
second point	5000	41.7	42.0	42.5	0.988
third point	5000	24.8	25.0	25.5	0.980
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	74.4	75.0	75.0	1.000
Average Correction Factor					0.988

Corrected As found	73.4	Previous response	75.6	% change	3.1%
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Notes:

Changed inlet filter after as founds. Slightly adjusted span.

Calibration Performed By: Asad Hidayat



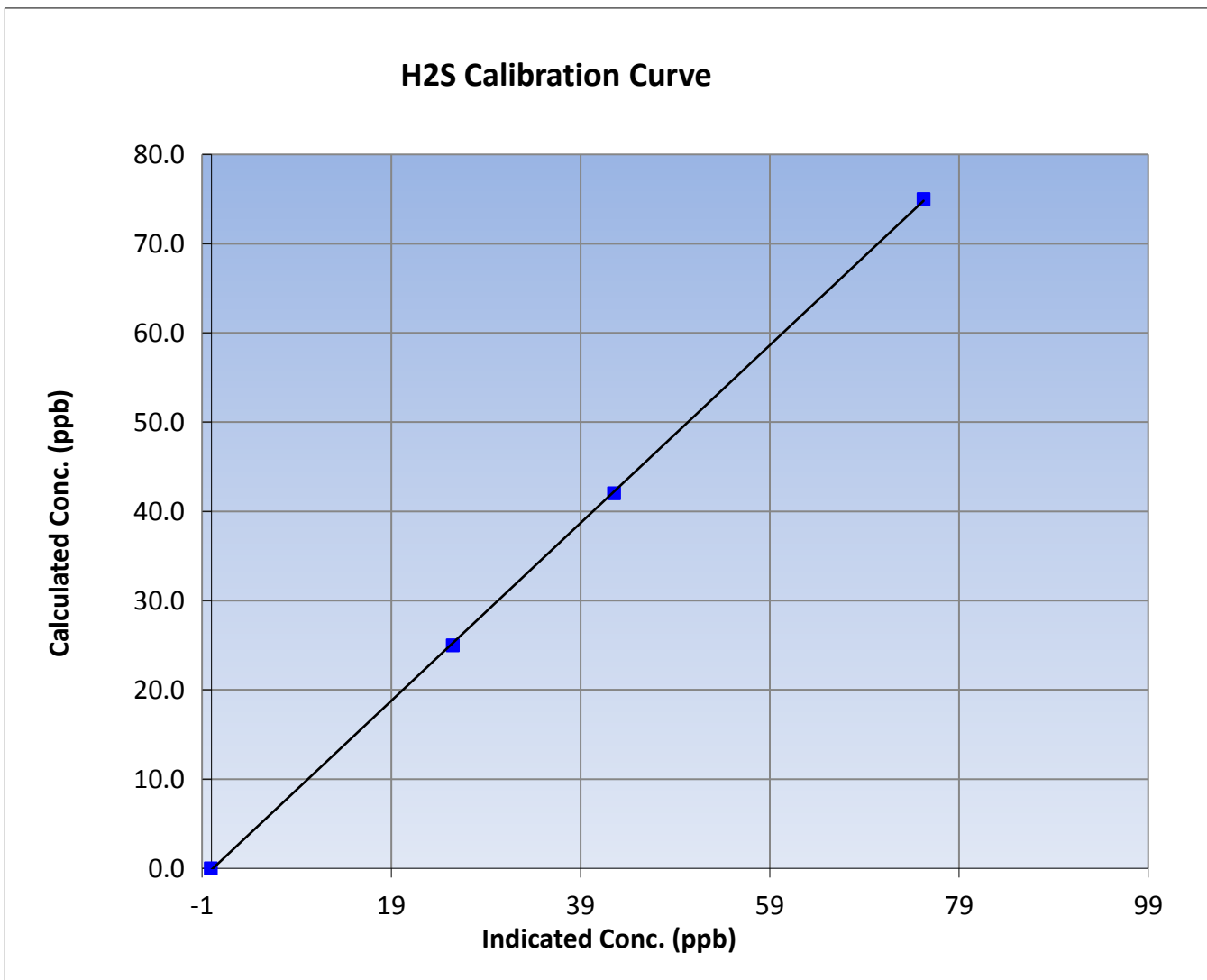
Wood Buffalo Environmental Association H2S Calibration Report

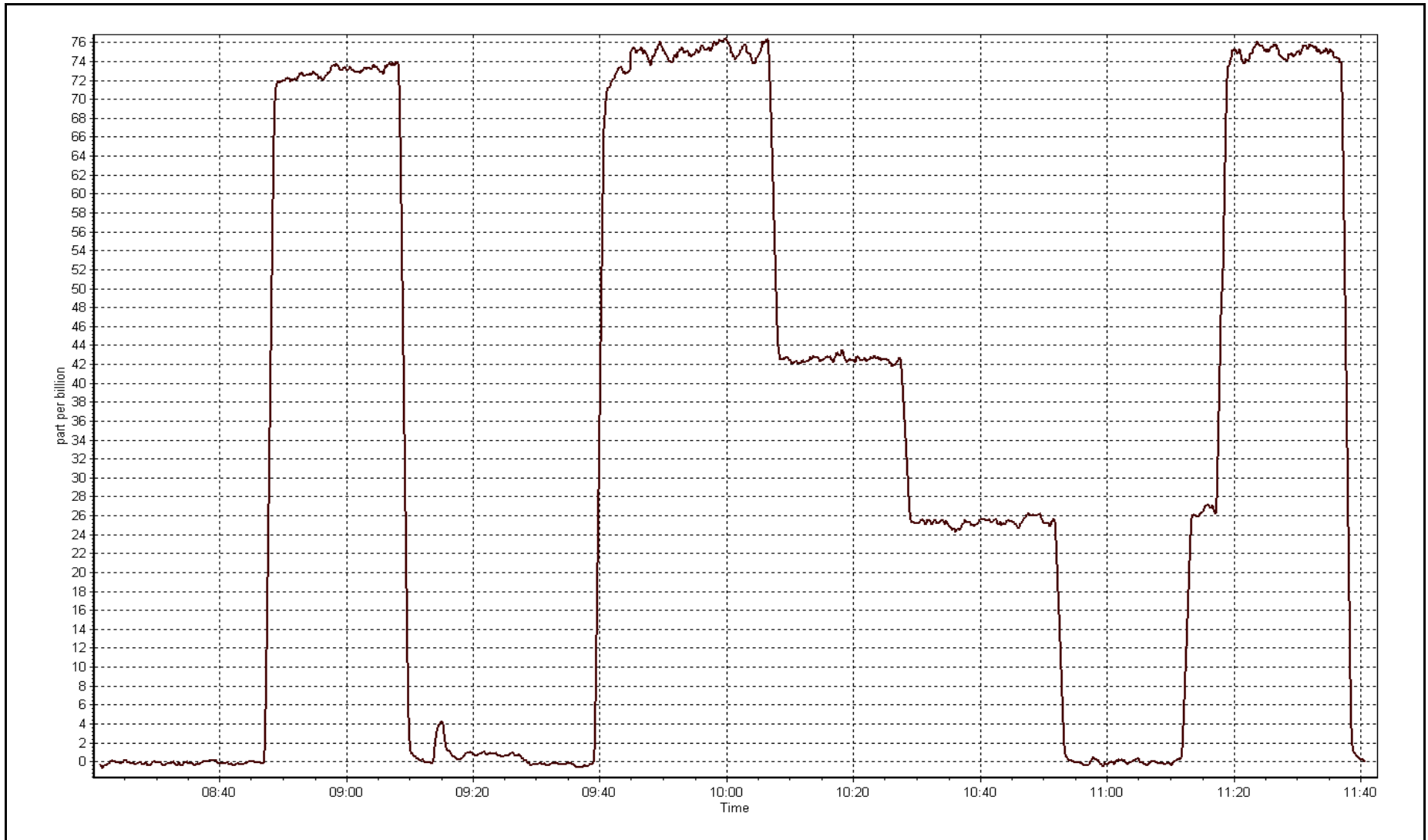
Station Information

Calibration Date	May 13, 2015	Previous Calibration	April 7, 2015
Station Name	AMS 5	Station Number	AMS 5
Start Time (MST)	8:17	End Time (MST)	11:40
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	----	Correlation Coefficient	0.999936
75.0	75.3	0.9965		
42.0	42.5	0.9881	Slope	0.996021
25.0	25.5	0.9803		
			Intercept	-0.153255







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-21-15	Last Calibration	April-29-2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Removal		
Start Time (MST)	8:25	End Time (MST)	10:30
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Sept-26-2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	7.6	NA
Analyzer IP address	192.168.1.51		Air or Bypass Press	25.1	NA
Calculated slope	0.999437	1.010827	Fuel Pressure	40.2	NA
Calculated intercept	-0.019917	0.021359	Analyzer Coeff	7.194	NA
			Analyzer BKG	4.240	NA

Analyzer make	Thermo 51i-LT	Analyzer serial #	128153353
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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	0.06	----
as found span	5000	60.0	12.46	12.35	1.009
calibrator zero	5000	0.0	0.00	0.06	----
high point	5000	60.0	12.46	12.35	1.009
second point	5000	30.0	6.23	6.07	1.026
third point	5000	15.0	3.11	3.00	1.038
as left zero					
as left span					
Average Correction Factor					1.024

Corrected As found	12.29	Previous response	12.48	% change	1.6%
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Notes:

Removal cal. No adjustments made.

Calibration Performed By:

Asad Hidayat



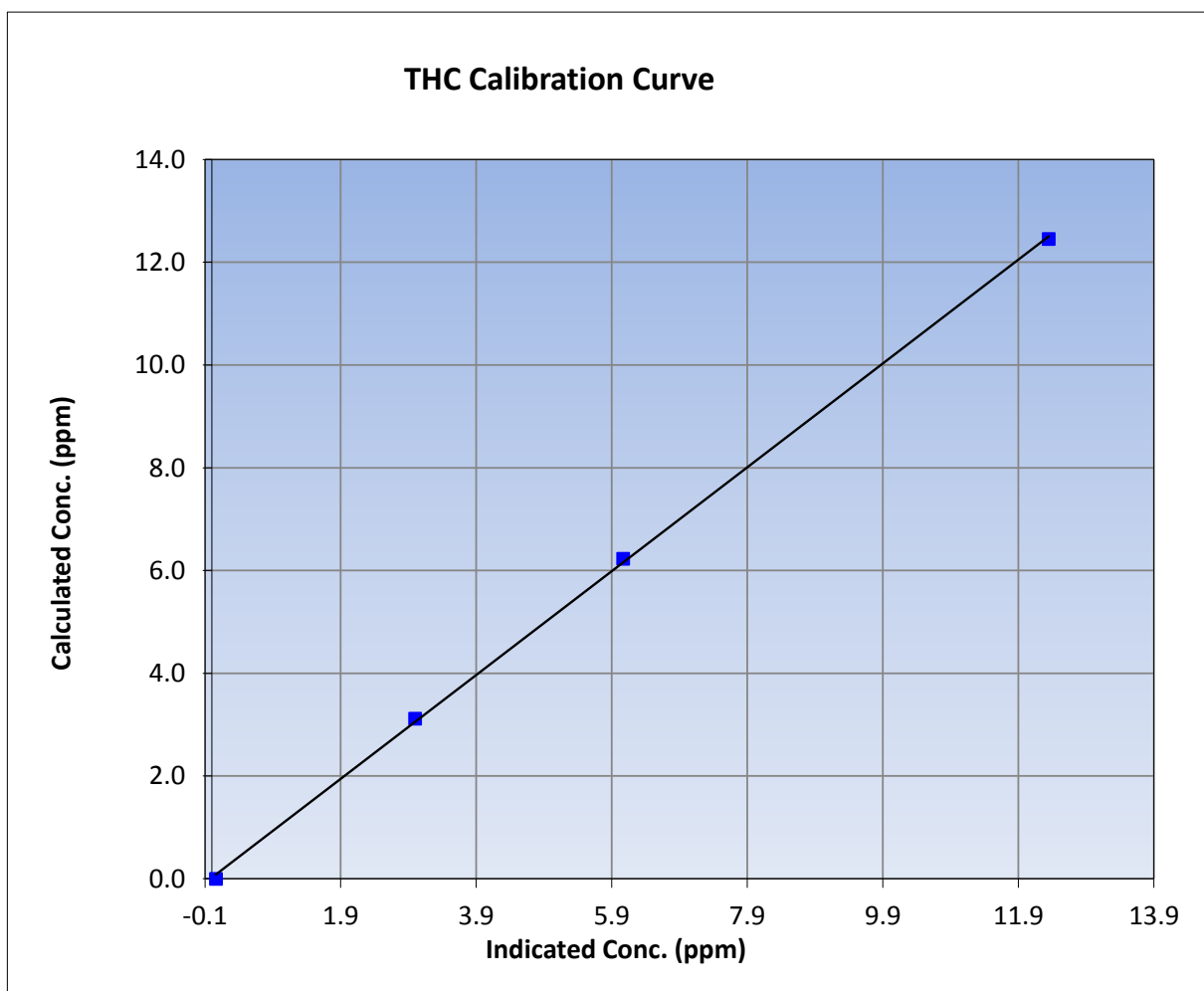
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 21, 2015	Previous Calibration	April-29-2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:25	End Time (MST)	10:30
Analyzer make	Thermo 51i-LT	Analyzer serial #	128153353

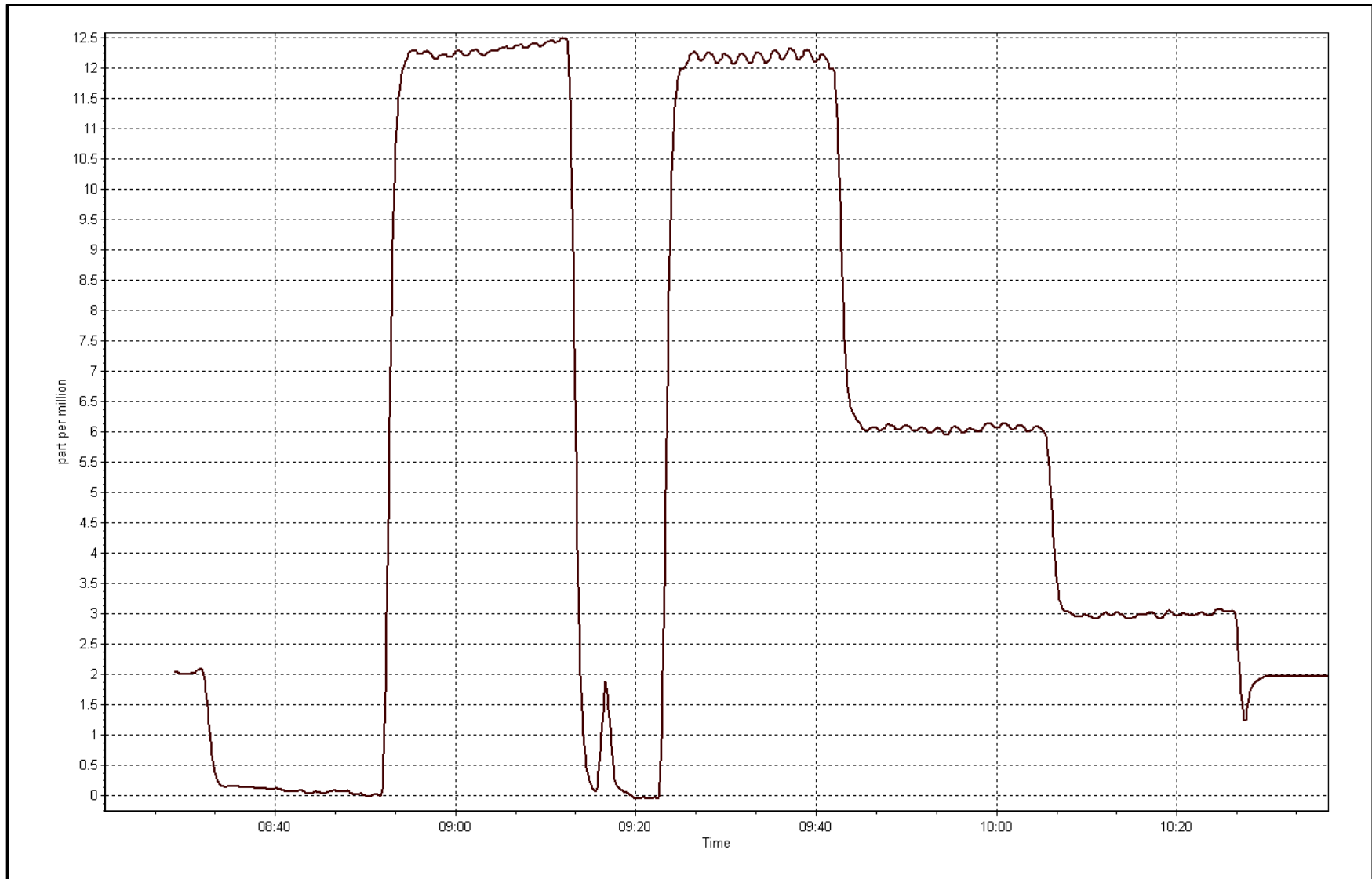
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.06	----	Correlation Coefficient	0.999790
12.46	12.35	1.0086		
6.23	6.07	1.0260	Slope	1.010827
3.11	3.00	1.0380		
			Intercept	0.021359



THC Calibration Plot

Date: May 21, 2015





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-21-15	Last Calibration	NA
Station Name	Mannix	Station Number	AMS 5
Reason:	Install		
Start Time (MST)	11:55	End Time (MST)	14:10
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Sept-26-2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	29 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	NA	9.4
Analyzer IP address	192.168.1.51		Air or Bypass Press	NA	42.3
Calculated slope	NA	1.000568	Fuel Pressure	NA	20.2
Calculated intercept	NA	-0.039867	Analyzer Coeff	NA	3.983
			Analyzer BKG	NA	4.120

Analyzer make	Thermo 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					
as found span					
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	60.0	12.46	12.47	0.999
second point	5000	30.0	6.23	6.29	0.990
third point	5000	15.0	3.11	3.18	0.981
as left zero	5000	0.0	0.00	0.10	----
as left span	5000	60.0	12.46	12.50	0.996
Average Correction Factor					0.990

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

Install cal. Sample inlet filter and Hydrogen cylinder replaced before calibration. Adjusted both zero and span. Warm temp inside station.

Calibration Performed By:

_____ Asad Hidayat



Wood Buffalo Environmental Association THC Calibration Report

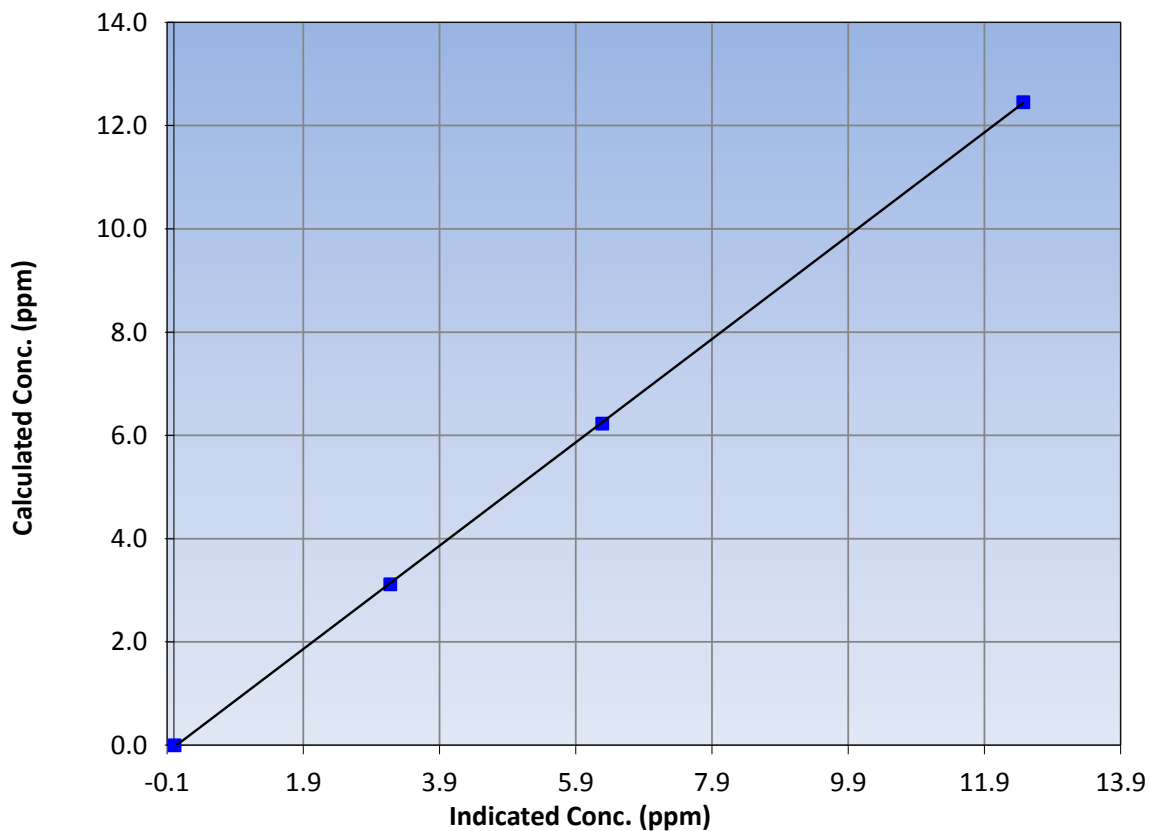
Station Information

Calibration Date	May 21, 2015	Previous Calibration	NA
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:55	End Time (MST)	14:10
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

Calibration Data

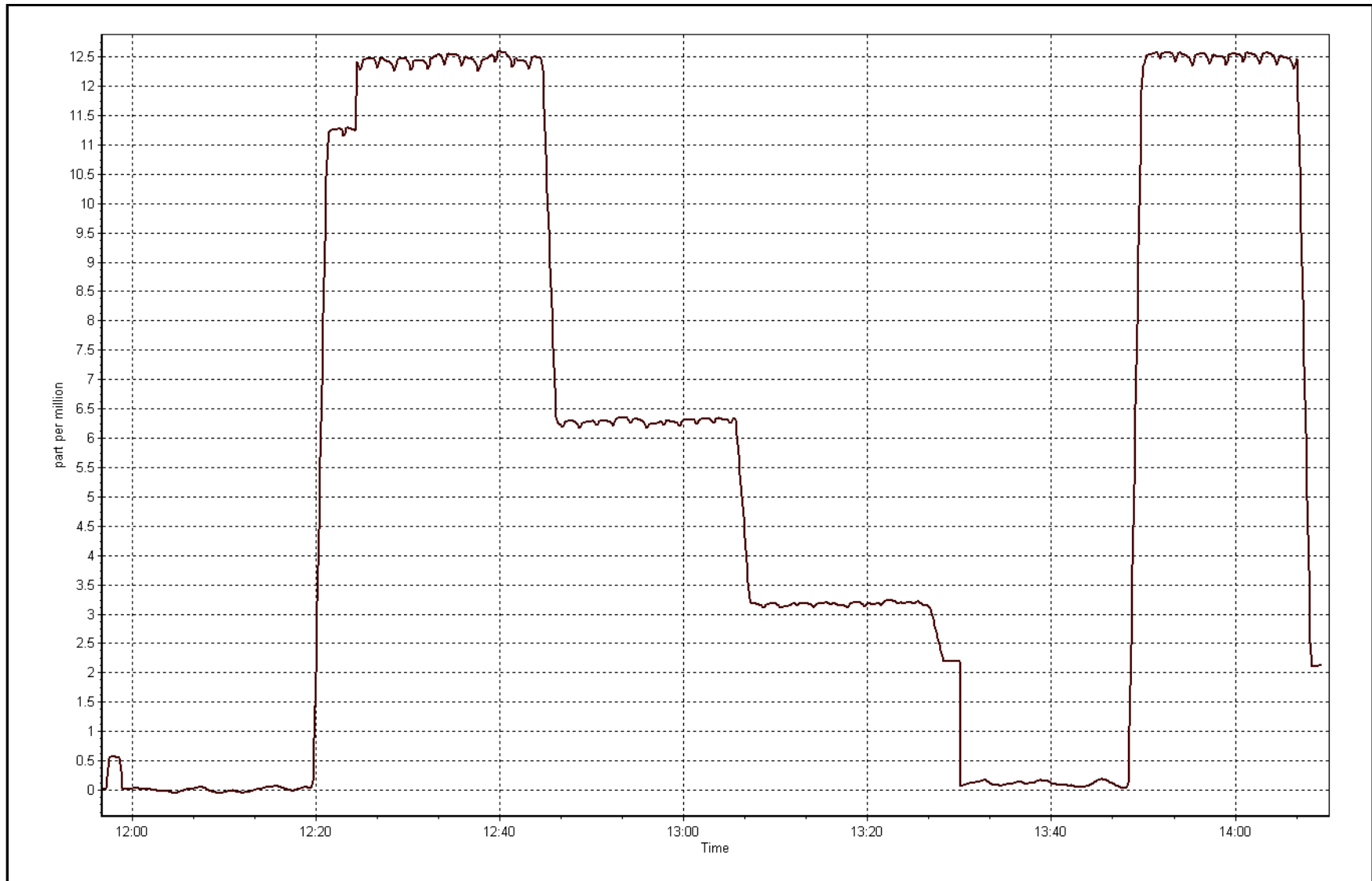
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999971
12.46	12.47	0.9989		
6.23	6.29	0.9901	Slope	1.000568
3.11	3.18	0.9808		
			Intercept	-0.039867

THC Calibration Curve



THC Calibration Plot

Date: May 21, 2015





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-27-15	Last Calibration	May-21-15
Station Name	Mannix	Station Number	AMS 5
Reason:	Other:	Repair	
Start Time (MST)	9:00	End Time (MST)	12:00
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Sept-26-2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.4	9.4
Analyzer IP address	192.168.1.51		Air or Bypass Press	42.3	42.3
Calculated slope	1.000568	1.005531	Fuel Pressure	20.2	20.2
Calculated intercept	-0.039867	-0.068351	Analyzer Coeff	3.983	3.822
			Analyzer BKG	4.120	3.450

Analyzer make	Thermo 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	-0.40	----
as found span	5000	60.0	12.46	12.46	1.000
calibrator zero	5000	0.0	0.00	0.08	----
high point	5000	60.0	12.46	12.46	1.000
second point	5000	30.0	6.23	6.26	0.995
third point	5000	15.0	3.11	3.15	0.989
as left zero	5000	0.0	0.00	-0.01	----
as left span	5000	60.0	12.46	12.50	0.996
Average Correction Factor					0.994

Corrected As found	12.86	Previous response	12.49	% change	-2.9%
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Notes:

Adjusted zero.

Calibration Performed By:

Asad Hidayat



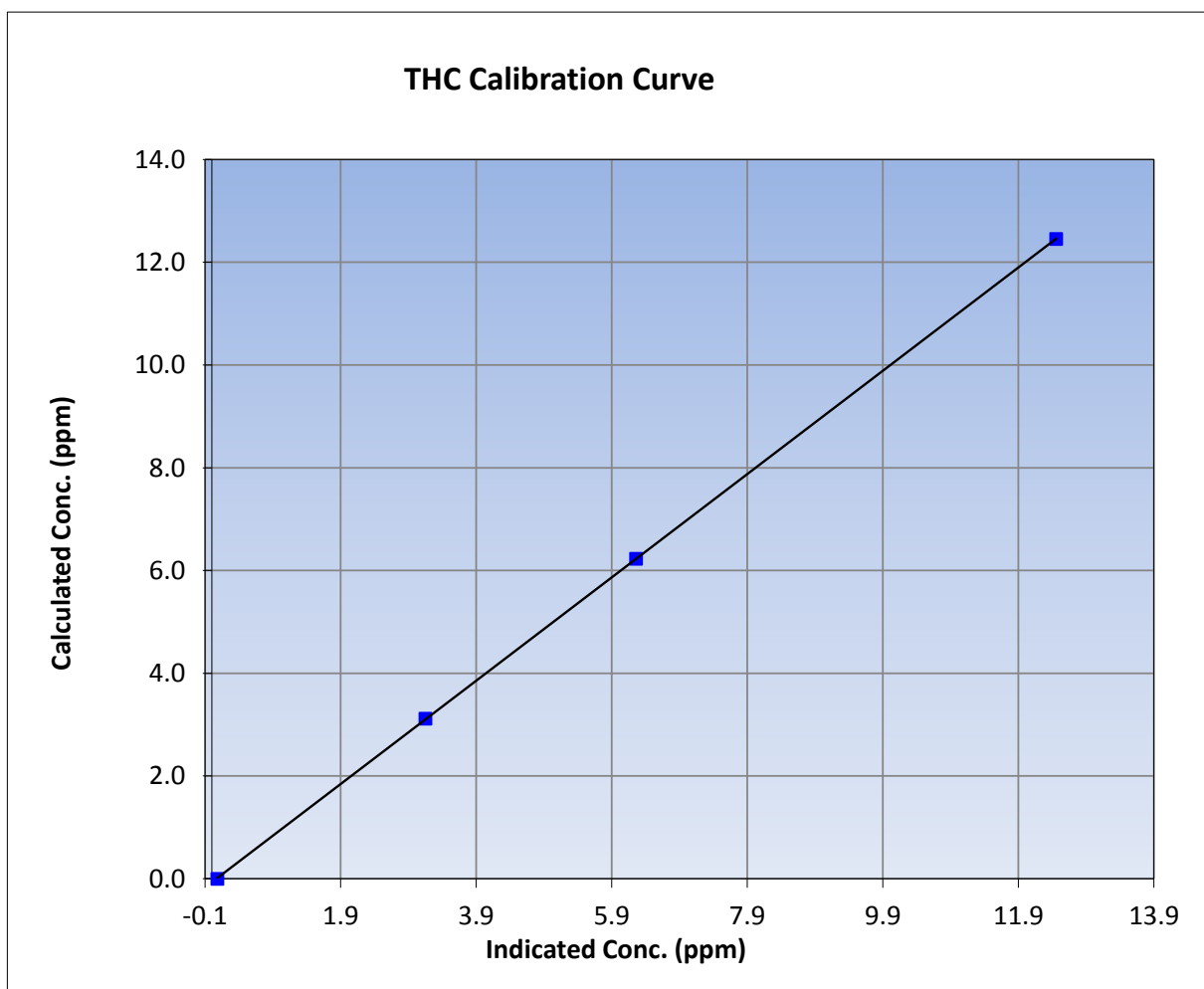
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 27, 2015	Previous Calibration	May 21, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:00	End Time (MST)	12:00
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

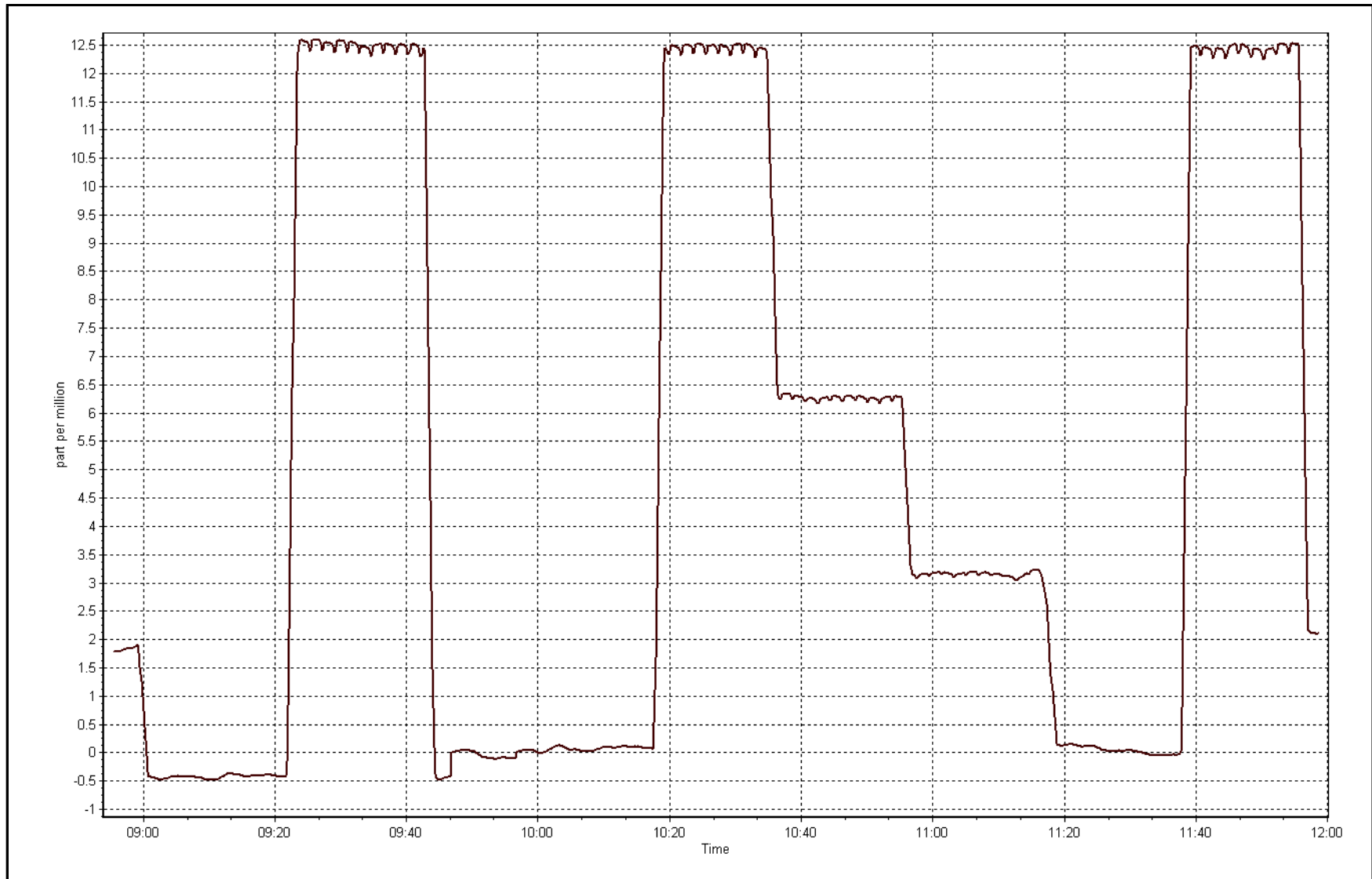
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.08	----	Correlation Coefficient	0.999995
12.46	12.46	0.9997		
6.23	6.26	0.9949	Slope	1.005531
3.11	3.15	0.9886		
			Intercept	-0.068351



THC Calibration Plot

Date: May 27, 2015





WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

AMS 6
PATRICIA MCINNES
MAY 2015

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

June 29, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
MAY 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	702	38	42	99.46	7	0	2	0
TRS (ppb) Average	700	40	44	99.46	1	0	0	0
THC (ppm) Average	658	37	86	93.41	2.1	-	1.9	-
NMHC(ppm) Average	658	37	86	93.41	0.067	-	0.003	-
CH4(ppm) Average	658	37	86	93.41	2.1	-	1.9	-
O3 (ppb) Average	706	34	38	99.46	60	0	45	-
NO2 (ppb) Average	702	38	42	99.46	15	0	4	-
NO (ppb) Average	702	38	42	99.46	17	-	3	-
NOX (ppb) Average	702	38	42	99.46	29	-	6	-
NH3 (ppb) Average	648	49	96	93.68	13	0	2	-
PM2.5 (ug/m3) Average	739	0	5	99.33	145.4	-	31.8	1
Temperature 2 m (C) Average	744	0	0	100.00	27.7	-	20.2	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	85	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	30	-	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 - PATRICIA McINNES (AMS 6)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	702	0.6	1	-	0	0	0	0	0	2	7
TRS (ppb) Average	700	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	658	1.9	0	-	1.8	1.9	1.9	1.9	1.9	2	2.1
NMHC(ppm) Average	658	0	0.003	-	0	0	0	0	0	0	0.067
CH4(ppm) Average	658	1.9	0	-	1.8	1.9	1.9	1.9	1.9	2	2.1
O3 (ppb) Average	706	33.9	11	-	4	18	26	34	43	48	60
NO2 (ppb) Average	702	2.4	2	-	0	0	1	2	3	5	15
NO (ppb) Average	702	0.8	1	-	0	0	0	0	1	2	17
NOX (ppb) Average	702	3.2	3	-	0	1	1	2	4	6	29
NH3 (ppb) Average	648	0.1	1	-	0	0	0	0	0	0	13
PM2.5 (ug/m3) Average	739	10.07	14.4	-	0.2	2	3.2	6	11.4	21.5	145.4
Temperature 2 m (C) Average	744	10.89	7.9	-	-5.2	0.7	4.4	10	17	22.2	27.7
Relative Humidity (%) Average	744	47.4	24	-	11	18	28	43	67	83	97
Wind Speed 10 m (km/h) Average	744	9.6	6	-	0	3	5	8	13	18	30
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)
MAY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	07 May 2015 11:00	07 May 2015 13:00	3	Station power failure
SO2	20 May 2015 14:00	20 May 2015 14:00	1	Maintenance - sample manifold cleaned
TRS	20 May 2015 14:00	20 May 2015 14:00	1	Maintenance - sample manifold cleaned
NMHC, CH4, THC	20 May 2015 14:00	20 May 2015 14:00	1	Maintenance - sample manifold cleaned
NMHC, CH4, THC	29 May 2015 07:00	30 May 2015 06:00	24	Analyzer failure - actuator failed
NMHC, CH4, THC	30 May 2015 07:00	30 May 2015 11:00	5	Maintenance - replace actuator and re-calibration
NMHC, CH4, THC	30 May 2015 12:00	30 May 2015 13:00	2	Unstable operation - excessive noise in output signal
NMHC, CH4, THC	30 May 2015 15:00	30 May 2015 18:00	4	Unstable operation - excessive noise in output signal
NMHC, CH4, THC	30 May 2015 20:00	30 May 2015 21:00	2	Unstable operation - excessive noise in output signal
NMHC, CH4, THC	30 May 2015 23:00	31 May 2015 01:00	3	Unstable operation - excessive noise in output signal
NMHC, CH4, THC	31 May 2015 03:00	31 May 2015 07:00	5	Unstable operation - excessive noise in output signal
O3	20 May 2015 14:00	20 May 2015 14:00	1	Maintenance - sample manifold cleaned
NO2, NO, NOX	20 May 2015 14:00	20 May 2015 14:00	1	Maintenance - sample manifold cleaned
NH3	01 May 2015 06:00	31 May 2015 06:00	43	Stabilization after daily span
NH3	19 May 2015 21:00	19 May 2015 21:00	1	Unstable operation - excessive baseline drift
PM2.5	20 May 2015 12:00	20 May 2015 13:00	2	Maintenance - Flow and zero check, sample head cleaning

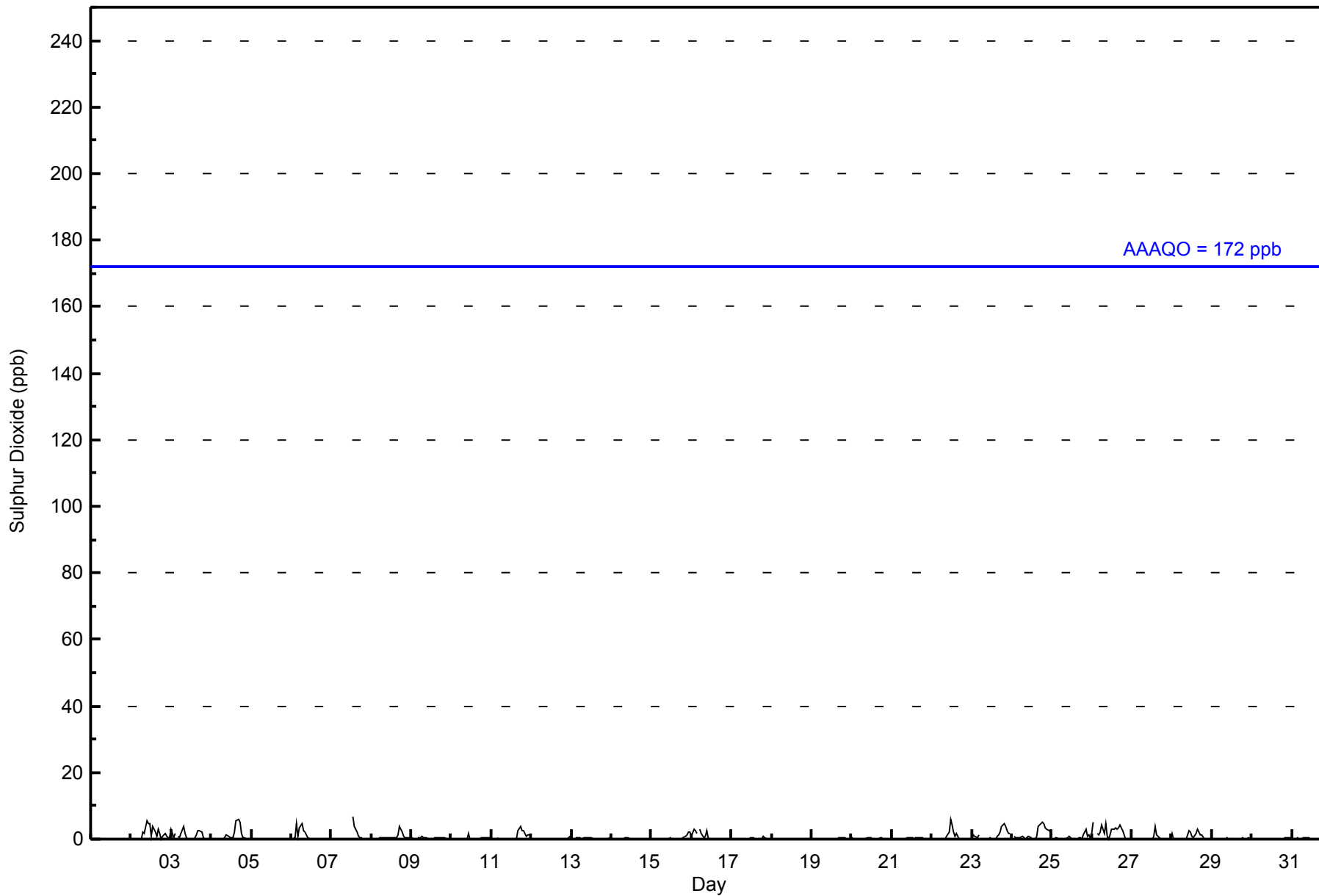


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 ppb on May 7 14:00 Maximum Daily Average: 2.1 ppb on May 26																	Hours in Service: 744		Hours of Data: 702																													
Minimum Value: 0 ppb on May 14 18:00 Minimum Daily Average: 0.0 ppb on May 18 Maximum Diurnal Average: 1.0 ppb at hour 18 Minimum Diurnal Average: 0.2 ppb at hour 5																	Hours of Missing Data: 42		Hours of Calibration: 38																													
Monthly Average: 0.6 ppb Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 2 P ₉₉ = 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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																					
2-May	0	0	Z	0	0	0	0	2	2	6	5	5	1	4	2	1	3	2	0	1	2	1	0	0	1.6	6																						
3-May	3	1	2	Z	1	0	2	4	2	0	0	0	0	0	1	2	2	2	0	0	0	0	0	1.0	4																							
4-May	0	0	0	0	Z	0	0	0	1	1	0	0	1	2	5	6	5	2	0	0	0	0	0	1.1	6																							
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
6-May	Z	0	0	5	1	3	5	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	5																							
7-May	0	Z	0	0	0	0	0	0	0	0	PF	PF	PF	7	4	2	1	1	0	0	0	0	0	0.8	7																							
8-May	0	0	Z	0	0	0	0	1	0	1	1	0	0	0	0	0	1	4	2	1	0	0	0	0.6	4																							
9-May	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
10-May	0	0	0	0	Z	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0.3	2																							
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	3	4	3	3	1	1	1	1	0.8	4																							
12-May	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																							
13-May	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
14-May	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																							
15-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	0.4	2																						
16-May	1	3	3	2	Z	3	2	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	3																							
17-May	0	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0.1	1																							
18-May	Z	0	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-May	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	-	0																							
20-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0.2	0																							
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
22-May	0	0	0	0	Z	0	0	0	0	1	2	6	4	2	1	2	0	0	0	0	0	0	0	0.8	6																							
23-May	0	1	1	1	1	Z	0	0	0	0	0	0	0	0	1	1	2	4	5	4	3	2	2	1.2	5																							
24-May	Z	1	0	0	0	0	1	1	0	0	1	0	0	0	0	1	4	5	5	5	3	3	2	1.5	5																							
25-May	1	Z	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	3	1	1	0.5	3																							
26-May	2	5	Z	2	1	2	4	2	5	1	0	1	3	3	3	3	4	3	1	0	0	0	0	2.1	5																							
27-May	0	0	0	Z	0	0	0	0	0	0	0	0	1	4	1	1	0	0	0	0	0	0	0	0.3	4																							
28-May	2	0	0	0	Z	0	0	0	0	1	2	2	1	1	2	3	2	1	1	0	0	0	0	0.8	3																							
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
30-May	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																							
31-May	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
																								0.4	0.5	0.3	0.4	0.2	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.7	0.7	0.8	1.0	1.0	0.8	0.7	0.6	0.4	0.4	0.3	Diurnal Average
																								3	5	3	5	1	3	5	4	5	6	5	6	4	7	4	5	6	5	5	5	4	3	2	2	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																																																
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 172 ppb 24-hr 48 ppb																																																



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	702	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: 702

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	102	52	29	21	26	50	49	45	54	62	64	24	25	20	20	59	702
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	102	52	29	21	26	50	49	45	54	62	64	24	25	20	20	59	702

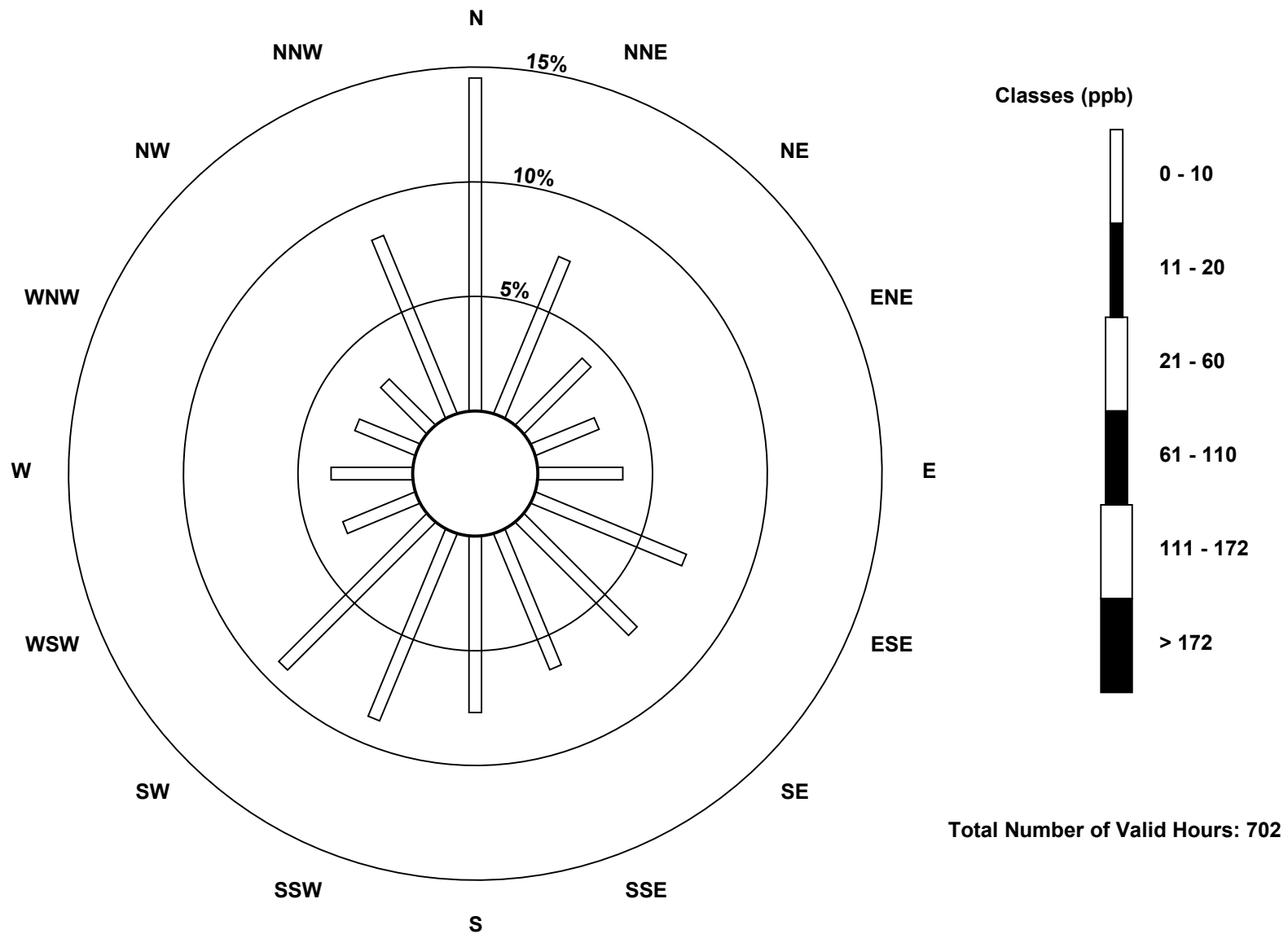
Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

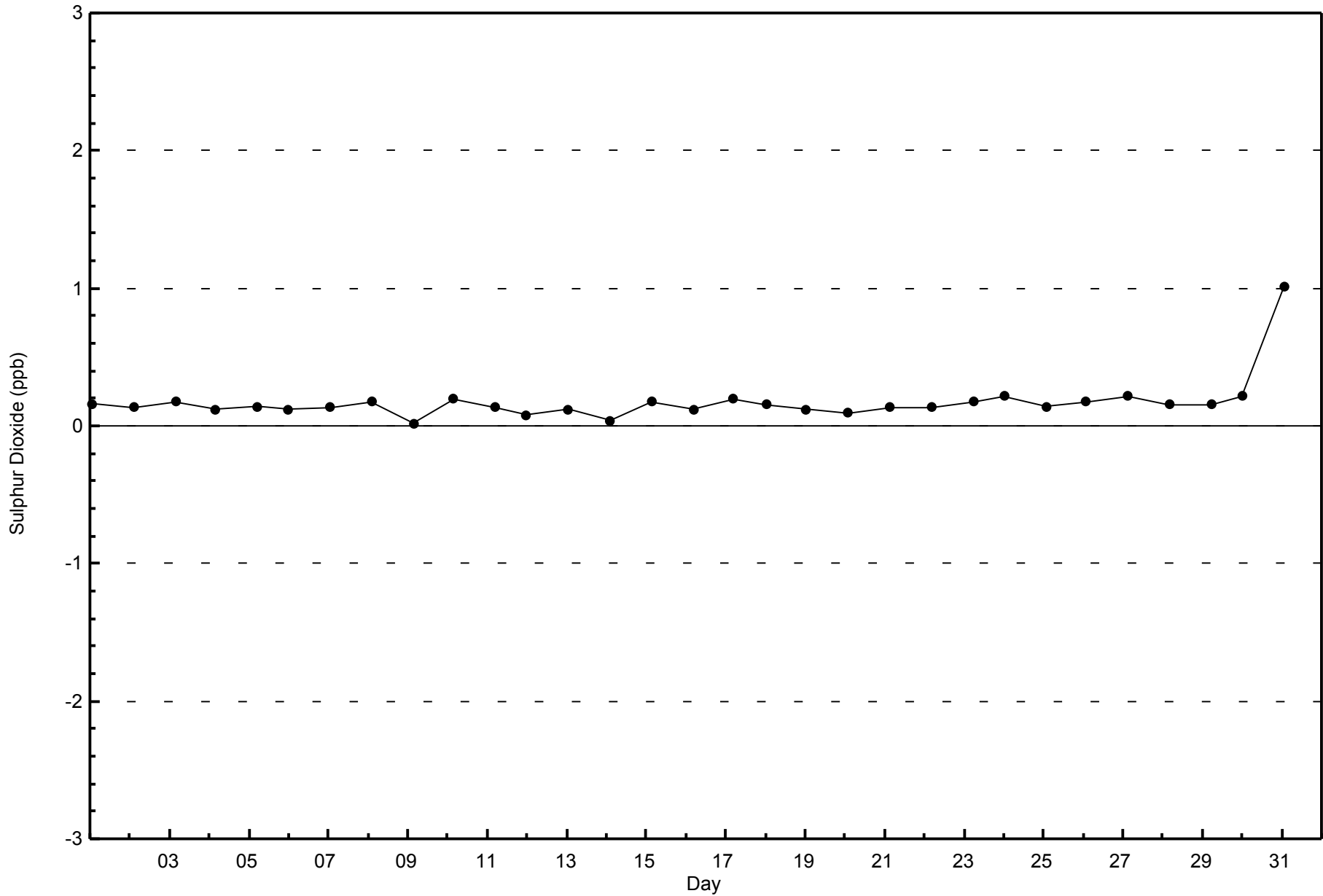
Sulphur Dioxide (SO₂) - ppb
Patricia McInnes (AMS 6)





WBEA
Zero Responses

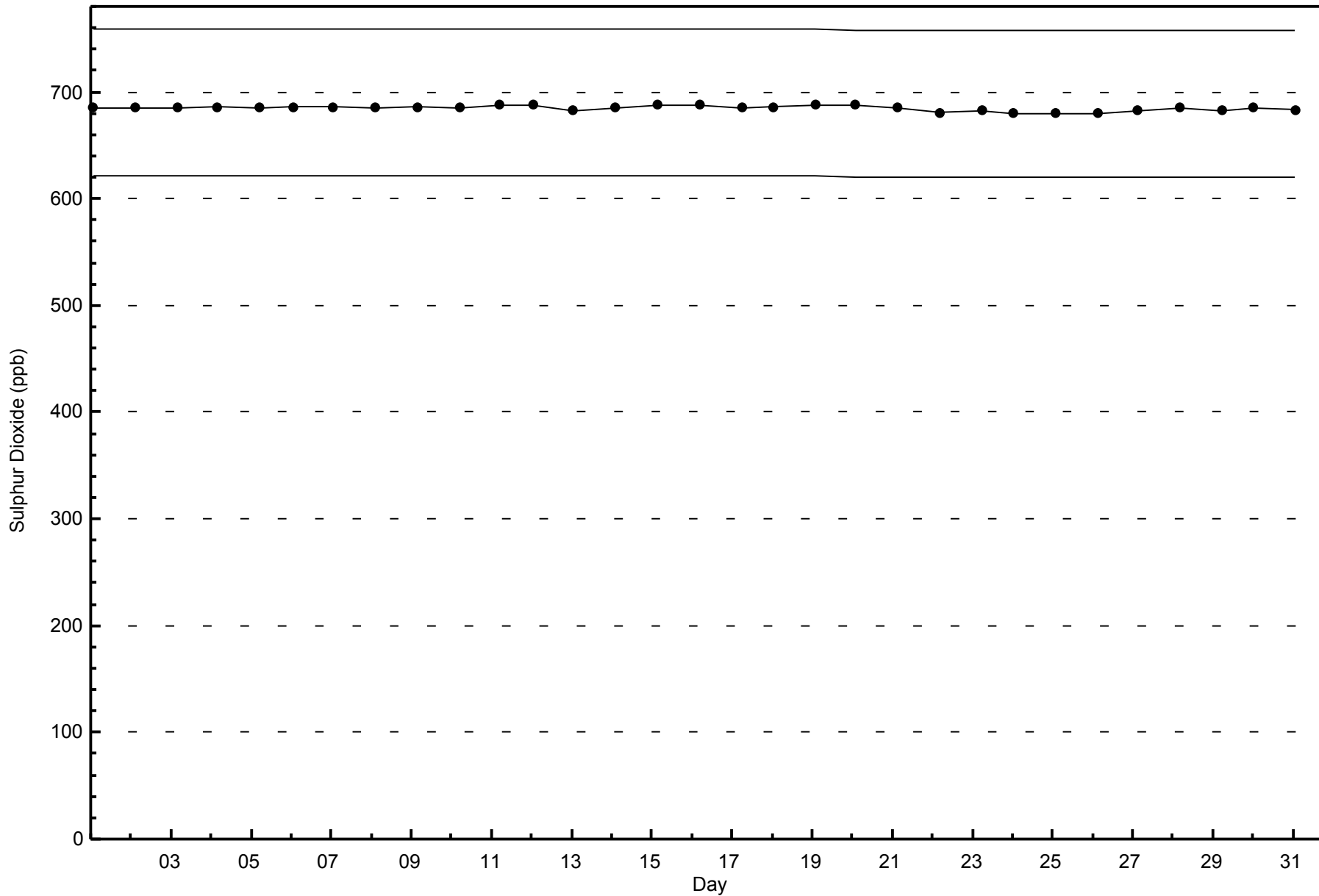
Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Patricia McInnes - May 2015



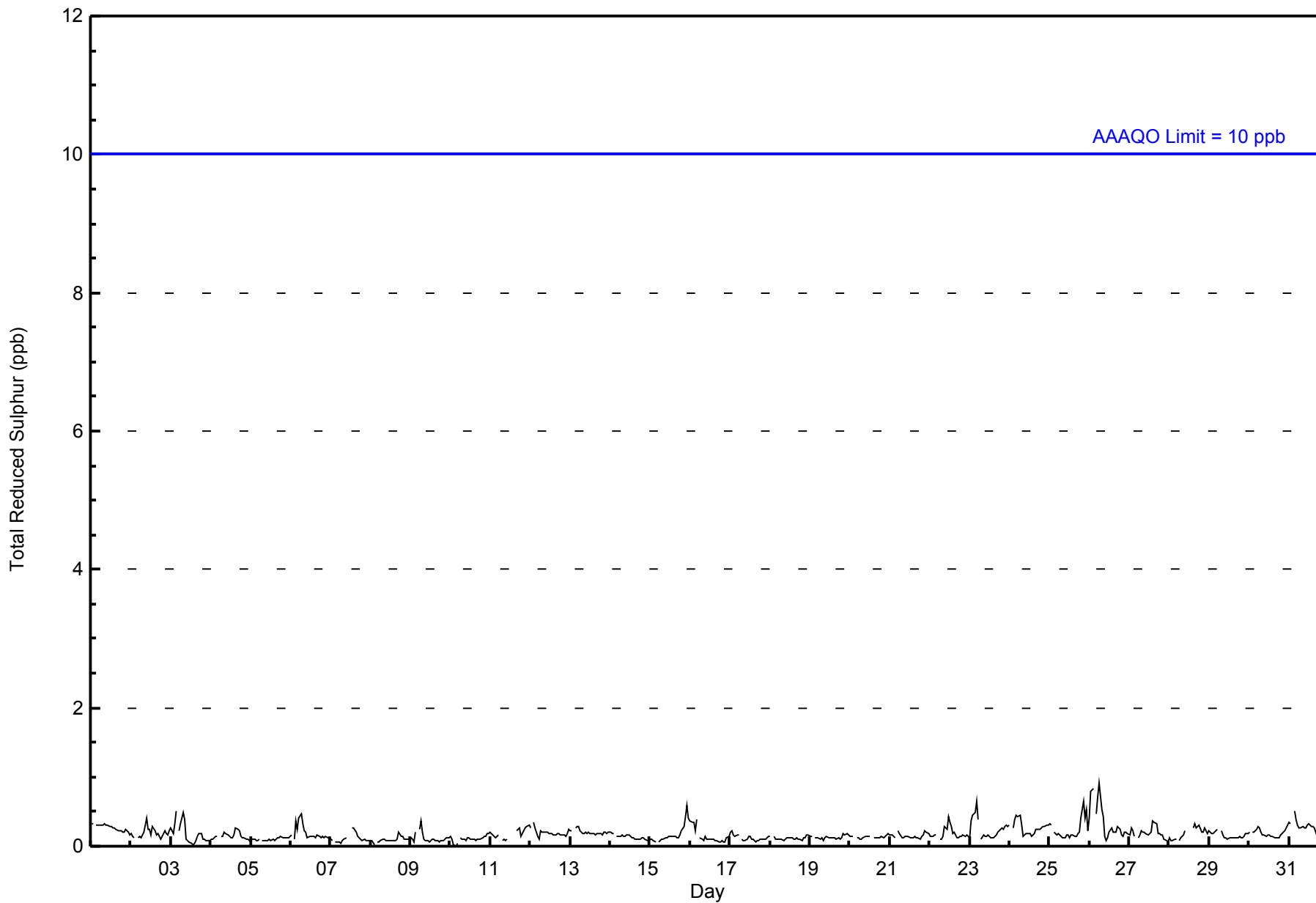


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																						
Maximum Value: 1 ppb on May 26 07:00										Maximum Daily Average: 0.3 ppb on May 26										Hours of Data: 700																												
Minimum Value: 0 ppb on May 10 04:00										Minimum Daily Average: 0.1 ppb on May 8										Hours of Missing Data: 44																												
Maximum Diurnal Average: 0.2 ppb at hour 7										Minimum Diurnal Average: 0.1 ppb at hour 19										Hours of Calibration: 40																												
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: 99.5																												
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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
2-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
3-May	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
4-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
5-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
7-May	0	0	Z	0	0	0	0	0	0	0	PF	PF	PF	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
8-May	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																						
9-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
10-May	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																						
11-May	0	0	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0.2	0																						
12-May	0	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-May	0	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-May	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																						
15-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1																						
16-May	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																						
17-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
18-May	0	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
20-May	0	0	0	Z	0	0	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
21-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
22-May	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																						
23-May	0	0	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
24-May	0	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.2	1																						
26-May	0	1	1	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
27-May	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																						
28-May	0	0	0	0	0	Z	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0																						
29-May	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																						
30-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
31-May	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																						
																								0.2	0.2	0.2	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	0.1	0.2	0.2	0.2	0.2	0.2	Diurnal Average
																								0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	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
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - May 2015





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	700	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: 700

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	101	50	26	20	27	51	44	46	58	58	68	28	25	20	21	57	700
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	101	50	26	20	27	51	44	46	58	58	68	28	25	20	21	57	700

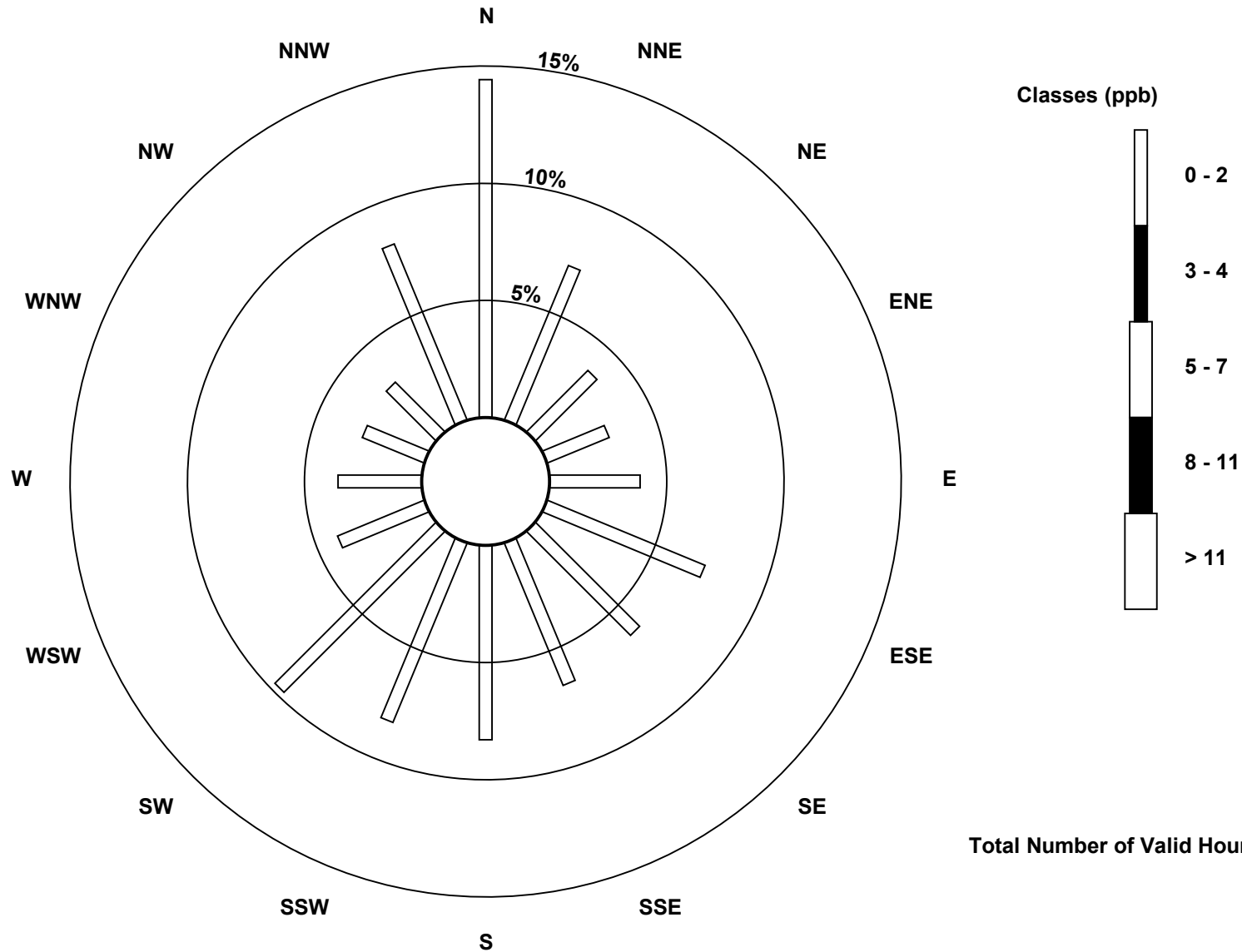
Total Number of Valid Hours: 700

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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



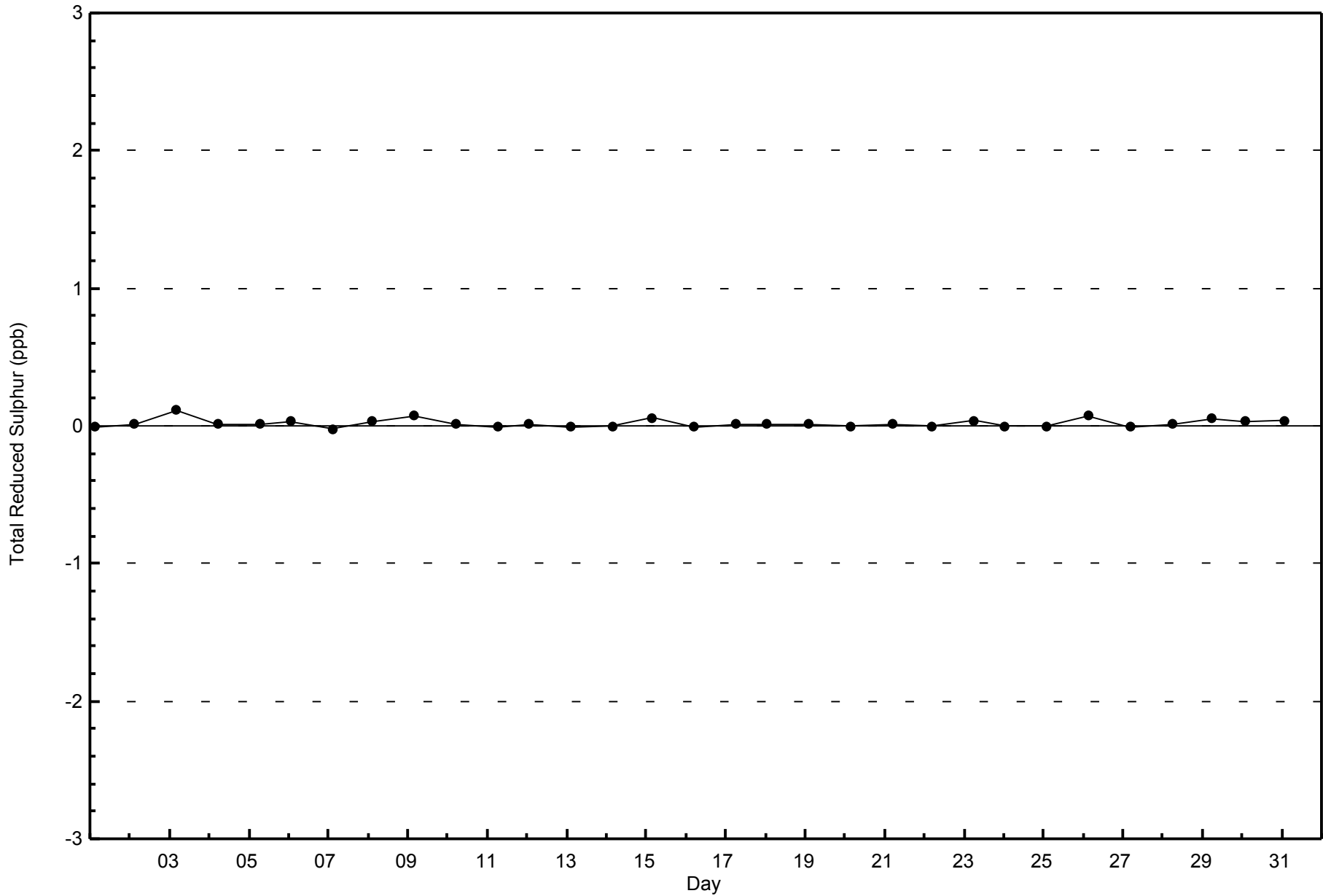


WBEA

Zero Responses

Total Reduced Sulphur (TRS) - ppb

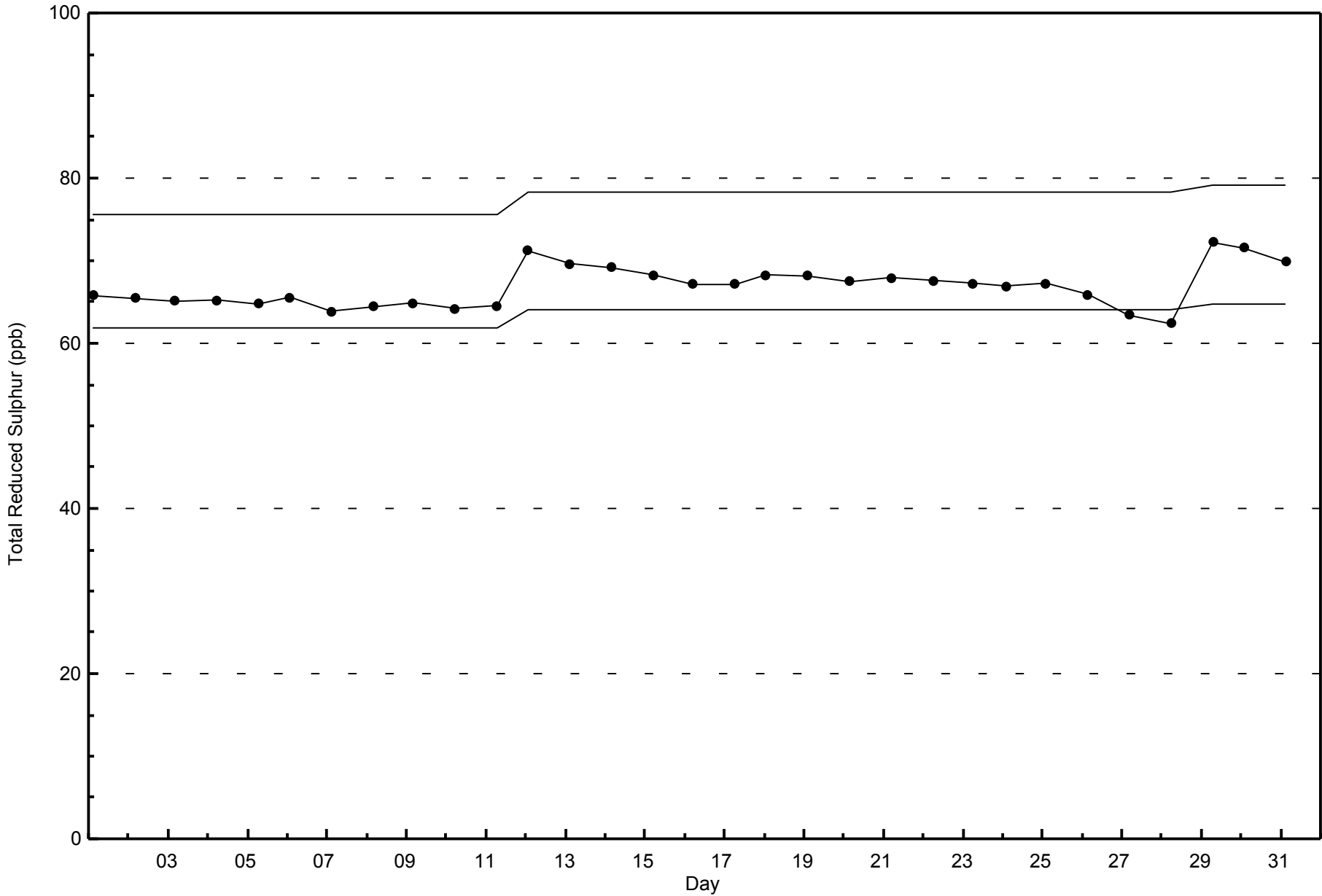
Patricia McInnes - May 2015





WBEA
Span Responses

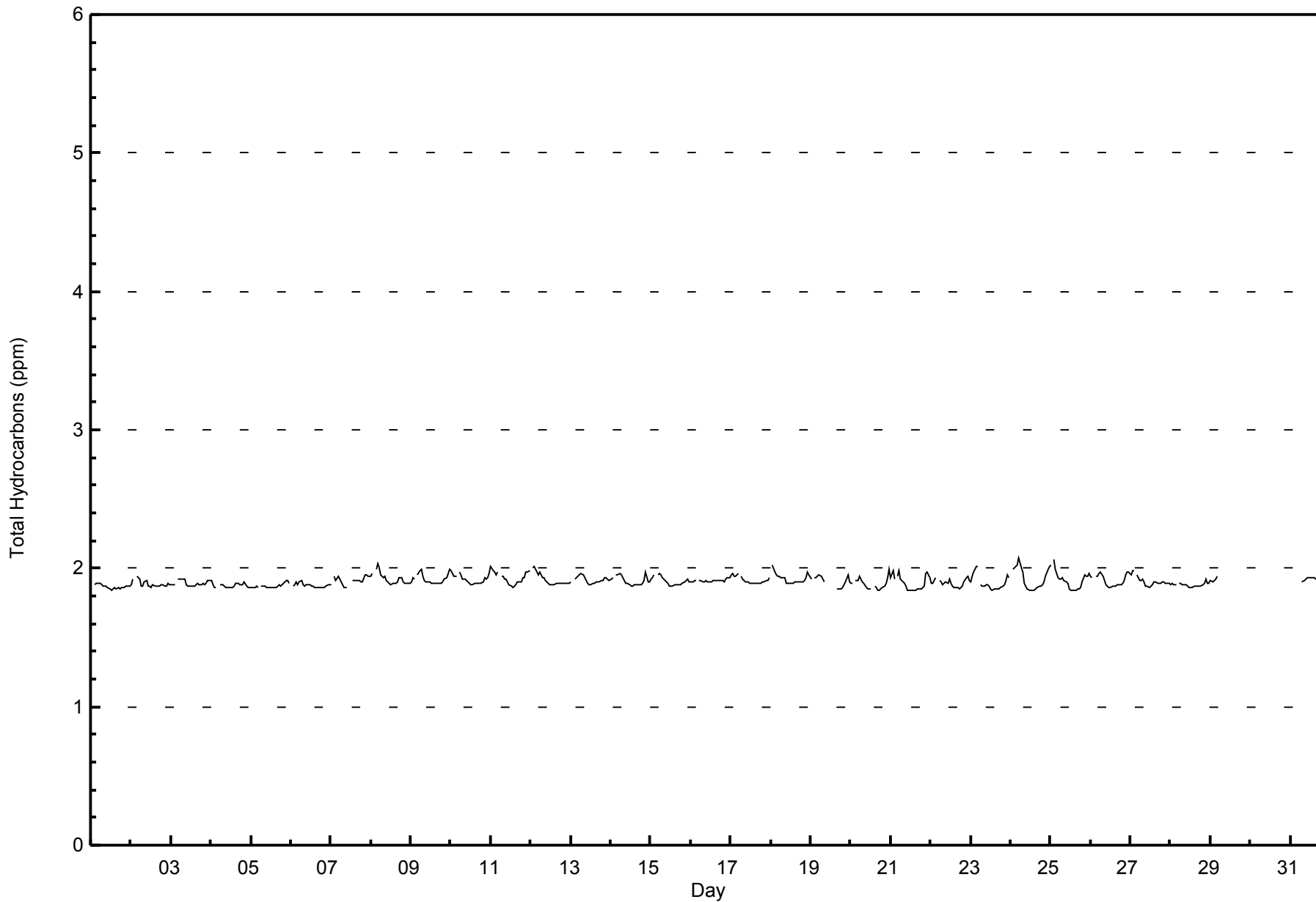
Total Reduced Sulphur (TRS) - ppb
Patricia McInnes - May 2015





WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Patricia McInnes - May 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Patricia McInnes - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	656	99.70	99.70
2.1 - 3.0	2	0.30	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 658

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Patricia McInnes - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	102	52	28	20	23	37	33	38	51	60	64	24	25	20	20	59	656
2.1 - 3.0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	102	52	28	20	23	37	33	38	52	61	64	24	25	20	20	59	658

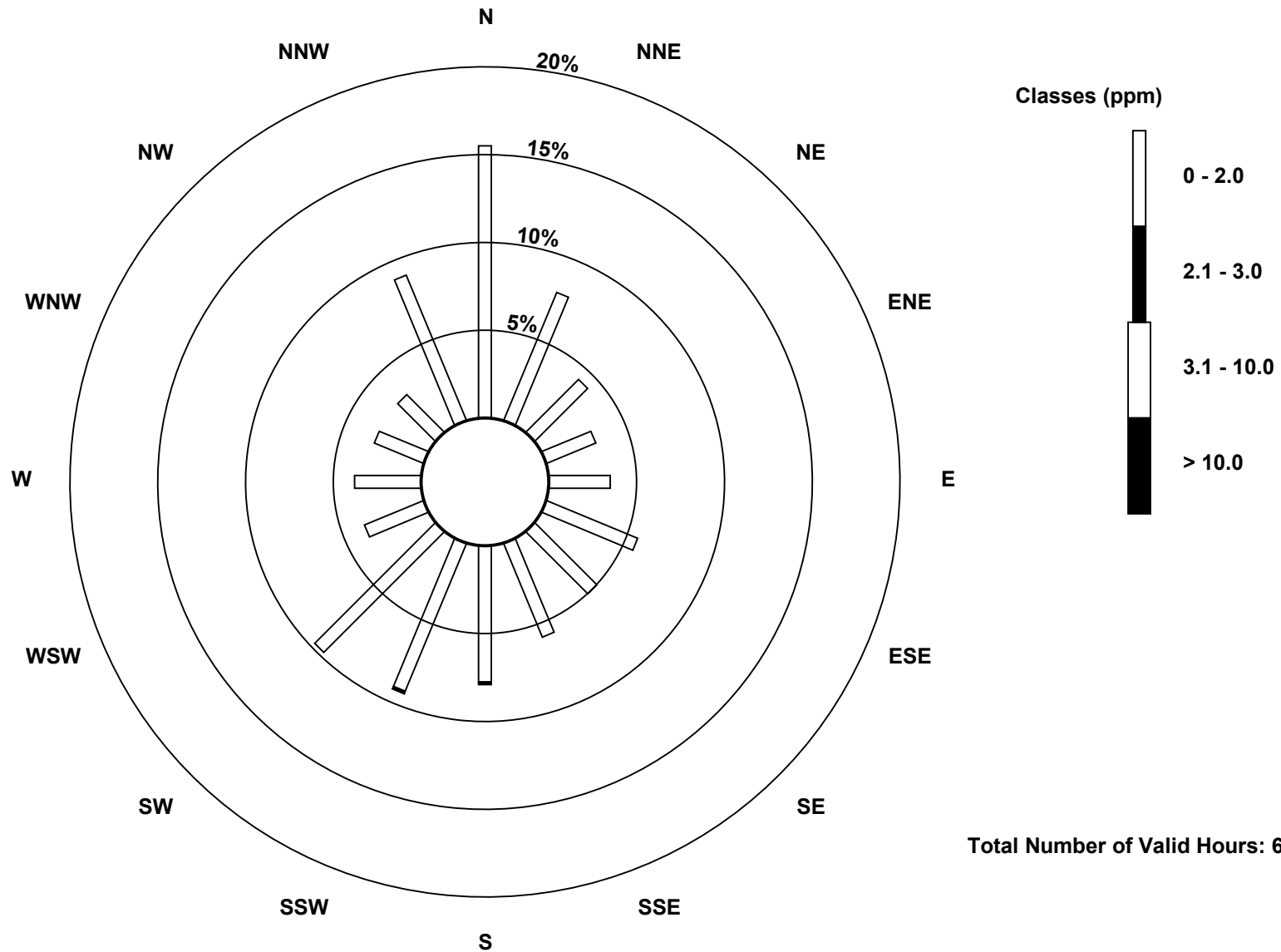
Total Number of Valid Hours: 658

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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

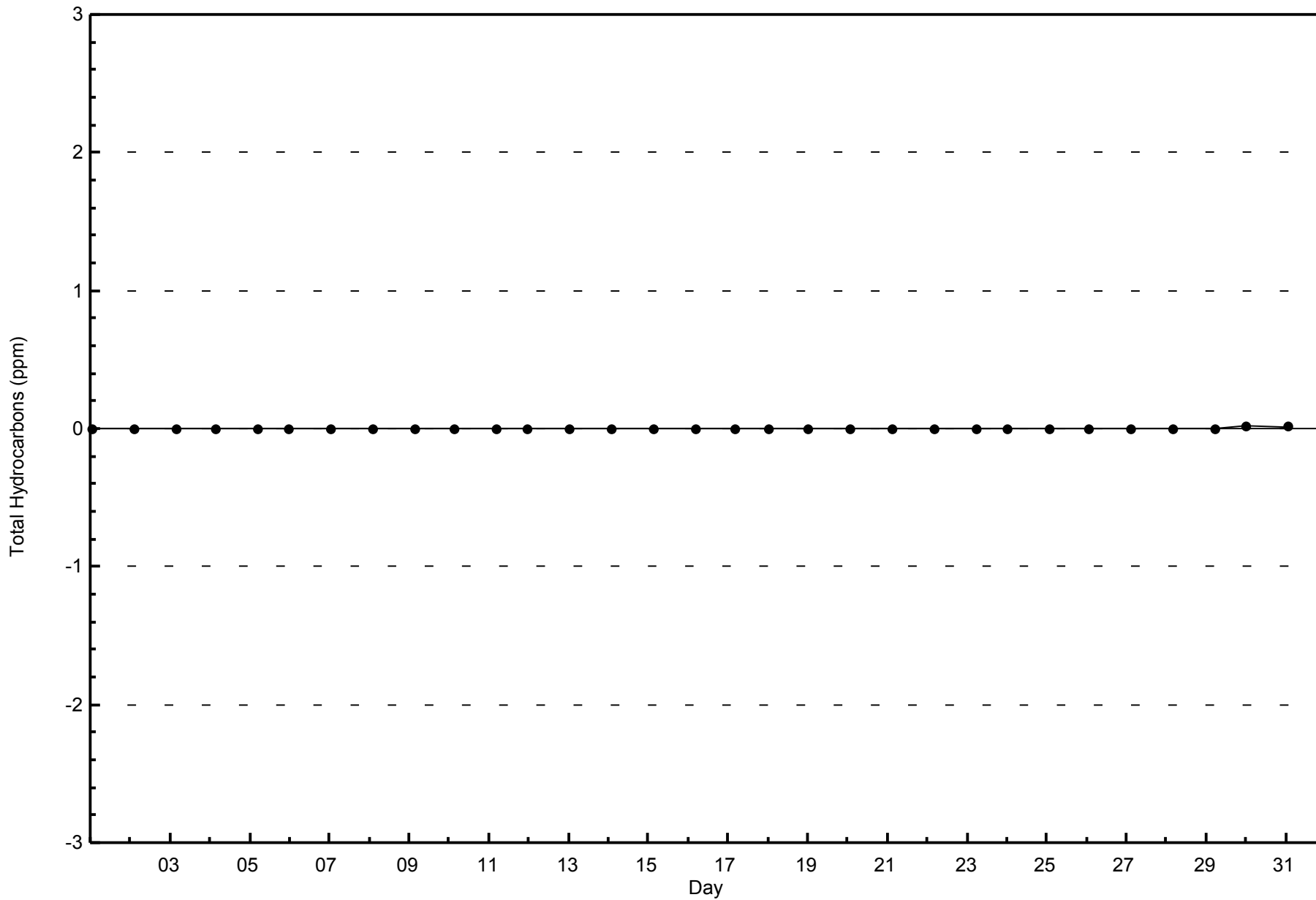


Total Number of Valid Hours: 658



WBEA
Zero Responses

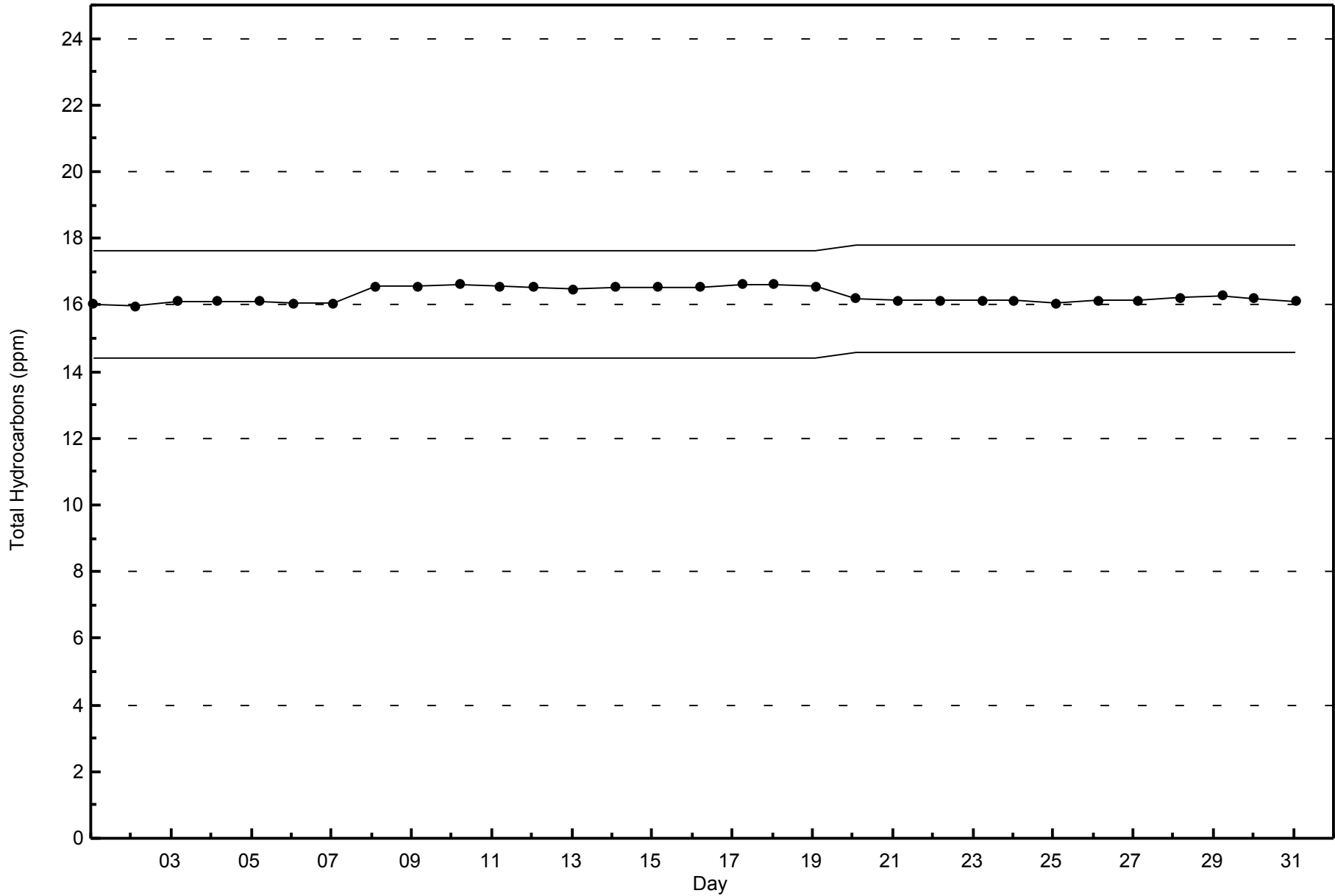
Total Hydrocarbons (THC) - ppm
Patricia McInnes - May 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Patricia McInnes - May 2015





Summary of Hour Averages

Patricia McInnes - May 2015

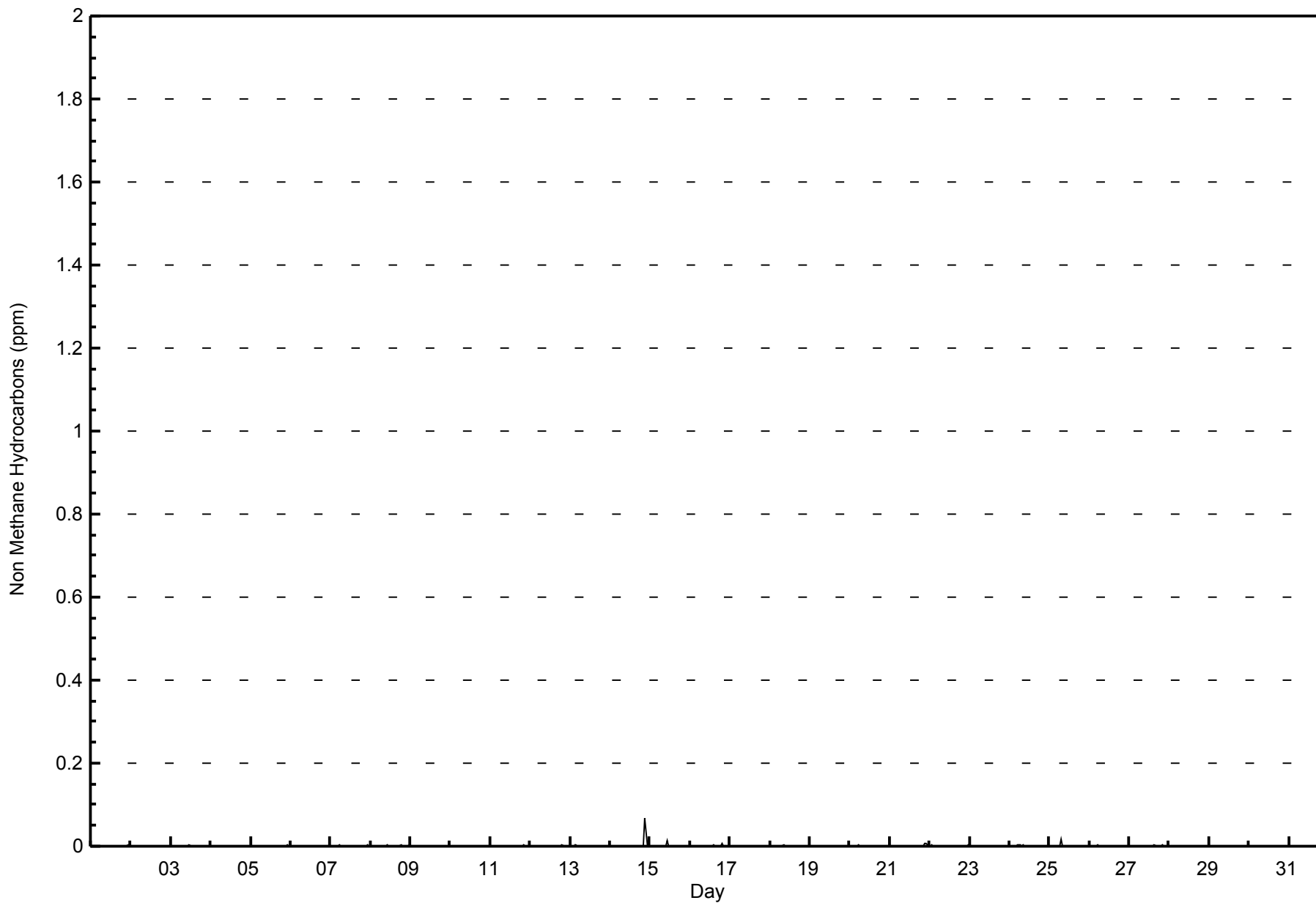
Maximum Value: 0.067 ppm on May 14 22:00														Maximum Daily Average: 0.003 ppm on May 14														Hours in Service: 744	
Minimum Value: 0.000 ppm on May 1 01:00														Minimum Daily Average: 0.000 ppm on May 2														Hours of Data: 658	
Maximum Diurnal Average: 0.003 ppm at hour 22														Minimum Diurnal Average: 0.000 ppm at hour 1														Hours of Missing Data: 86	
Monthly Average: 0.000 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: 37	
																												Percent Operational Time: 93.4	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-May	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	0.003	0.000	0.000	0.003			
2-May	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
3-May	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003			
4-May	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
5-May	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.003				
6-May	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-May	0.000	Z	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	PF	PF	PF	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.003				
8-May	0.000	0.000	Z	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	0.005	0.000	0.000	0.000	0.004	0.001	0.005				
9-May	0.000	0.000	0.000	Z	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001				
10-May	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
11-May	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.002	0.000	0.000	0.002				
12-May	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.003				
13-May	0.000	Z	0.003	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003				
14-May	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.067	0.000	0.000	0.003	0.067				
15-May	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.012				
16-May	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.007				
17-May	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
18-May	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004				
19-May	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.000				
20-May	0.000	0.000	Z	0.000	0.000	0.003	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	0.003				
21-May	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.008	0.007	0.000	0.001	0.008				
22-May	0.000	0.003	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.003				
23-May	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
24-May	Z	0.000	0.000	0.000	0.000	0.003	0.003	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003				
25-May	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.017				
26-May	0.000	0.000	Z	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003				
27-May	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.003				
28-May	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
29-May	0.000	0.000	0.000	0.000	0.000	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0.000				
30-May	AF	AF	AF	AF	AF	AF	M	M	M	M	M	UO	UO	0.007	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	0.007				
31-May	UO	Z	UO	UO	UO	UO	UO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.000				
																								Diurnal Average					
																								Diurnal Maximum					
Z - zerospan																								C - Calibration					
																								M - Maintenance					
																								AF - Analyzer Failure					
																								UO - Unstable Operation					
																								PF - Power Failure					



WBEA
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm

Patricia McInnes - May 2015





WBEA
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	651	98.94	98.94
0.006 - 0.05	6	0.91	99.85
0.06 - 0.1	1	0.15	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 658

Total Number of Hours: 744



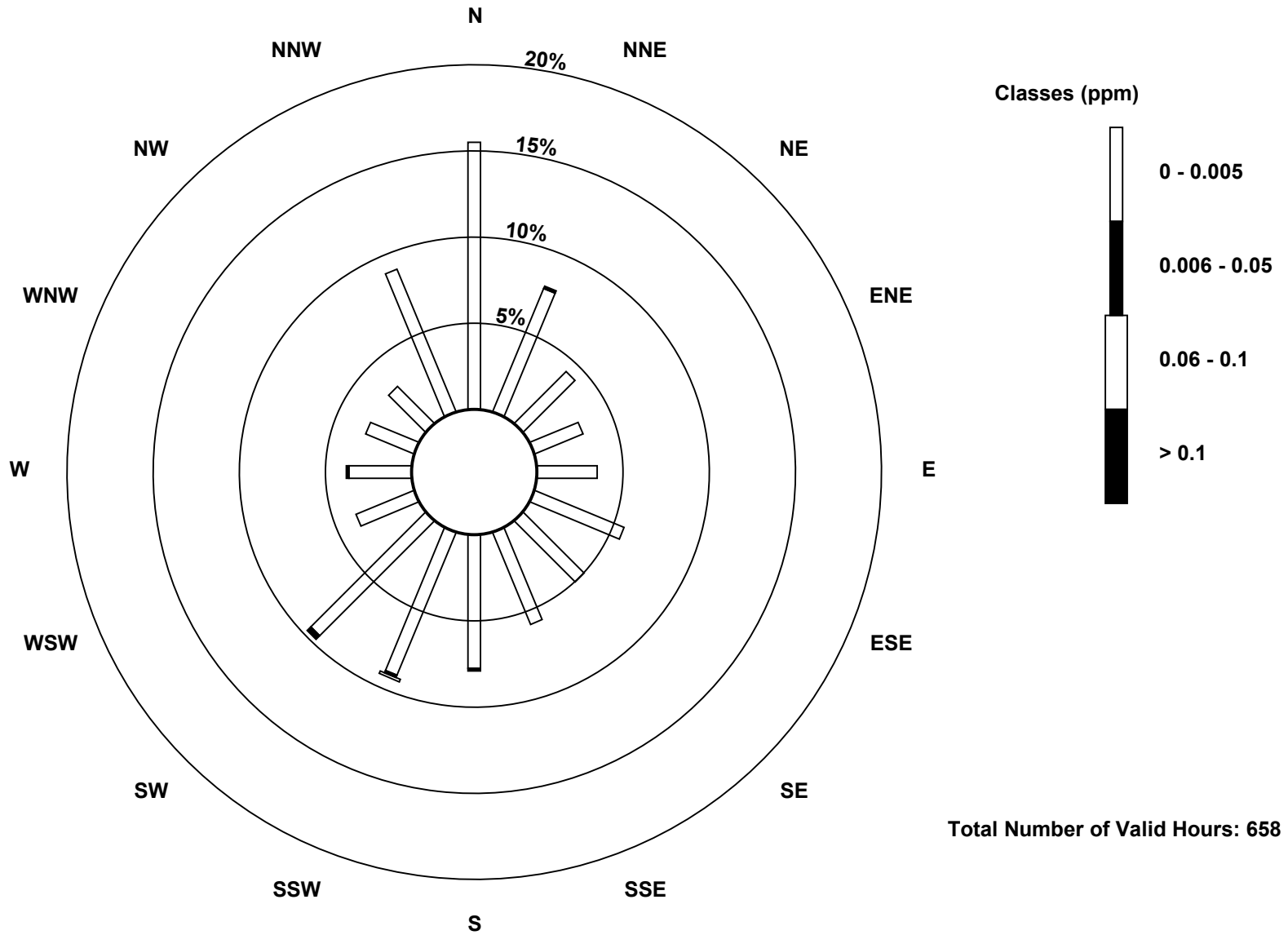
WBEA
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	102	51	28	20	23	37	33	38	51	59	62	24	24	20	20	59	651
0.006 - 0.05	0	1	0	0	0	0	0	0	1	1	2	0	1	0	0	0	6
0.06 - 0.1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	102	52	28	20	23	37	33	38	52	61	64	24	25	20	20	59	658

Total Number of Valid Hours: 658

Total Number of Hours: 744



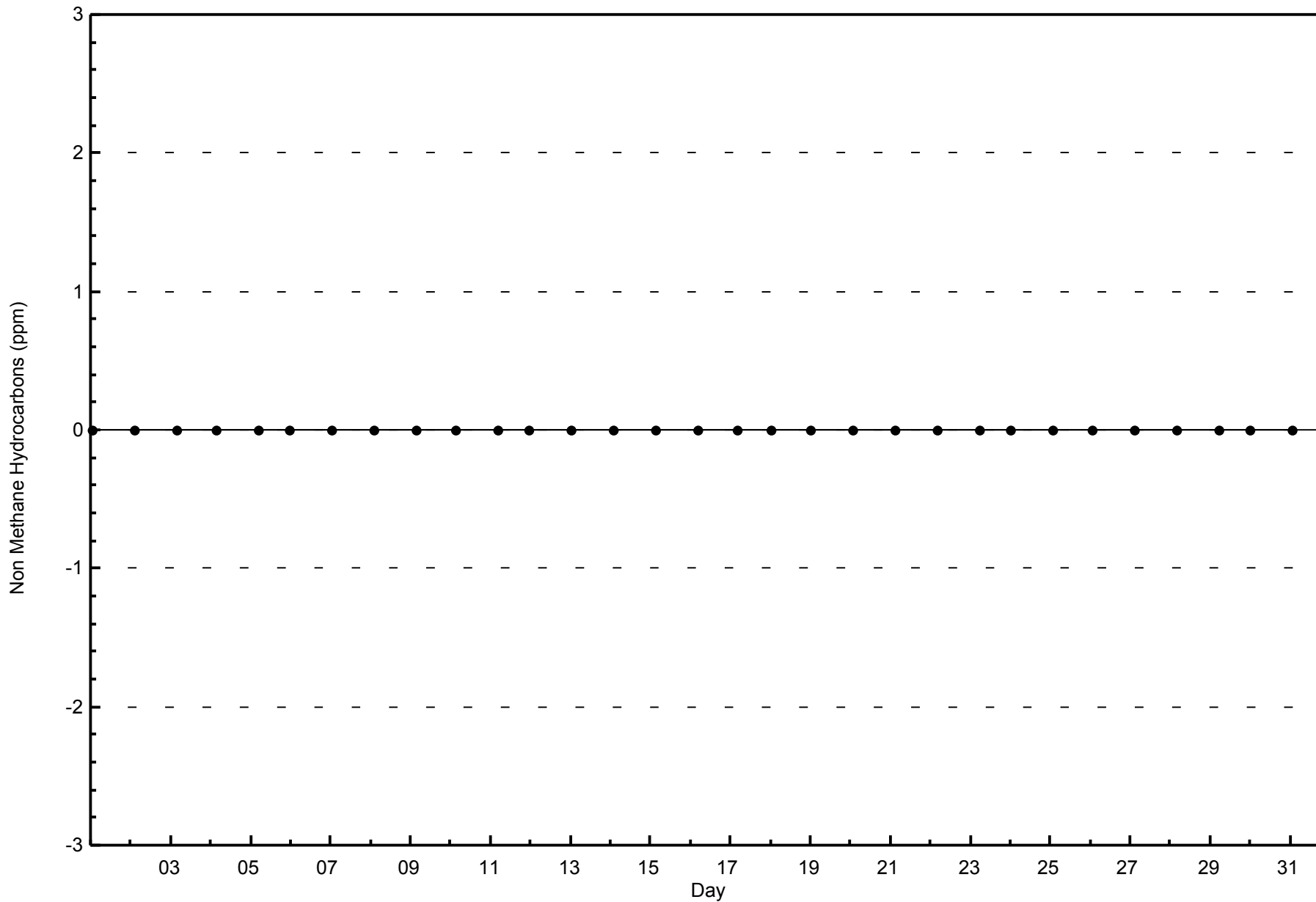


WBEA

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

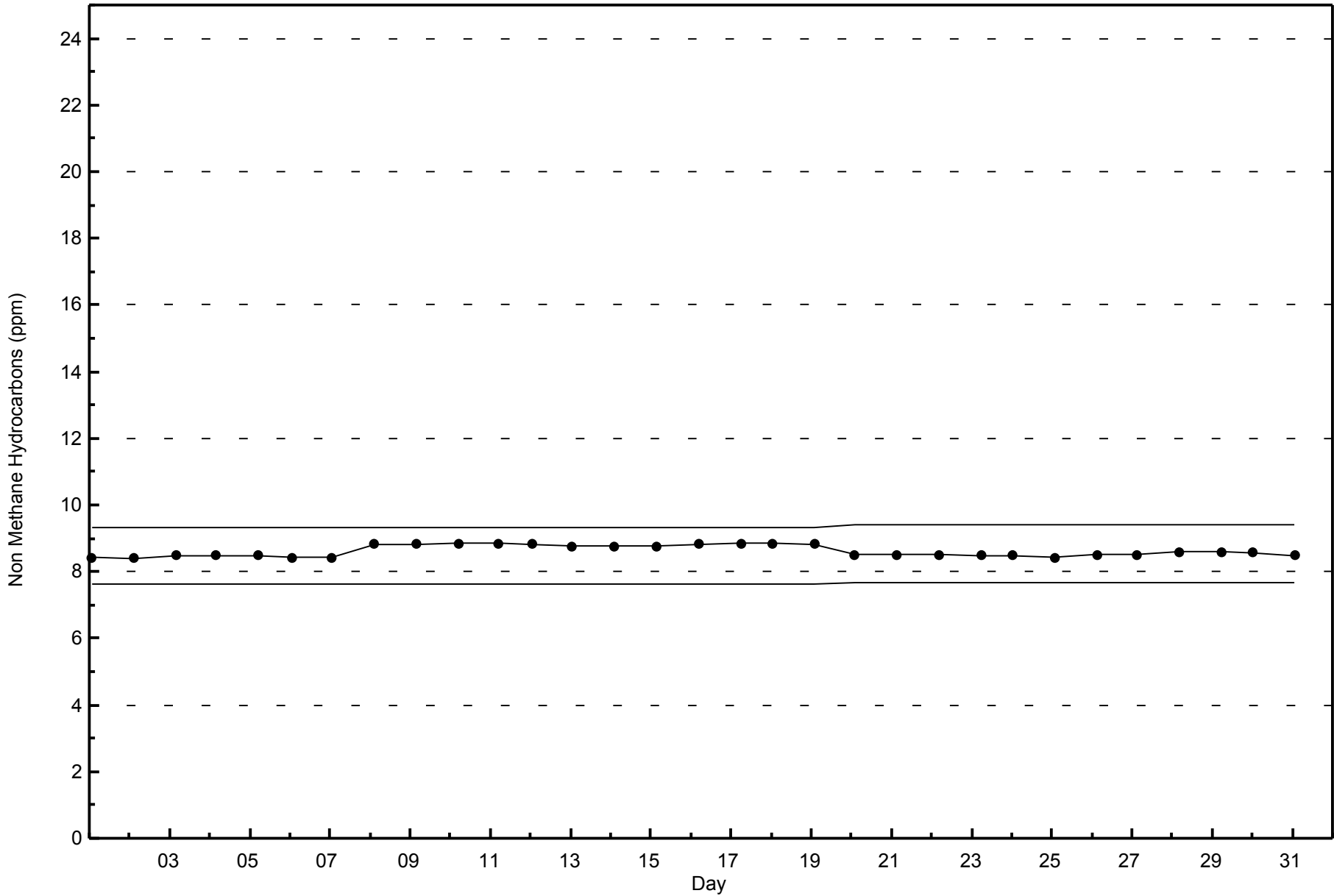
Patricia McInnes - May 2015





WBEA
Span Responses

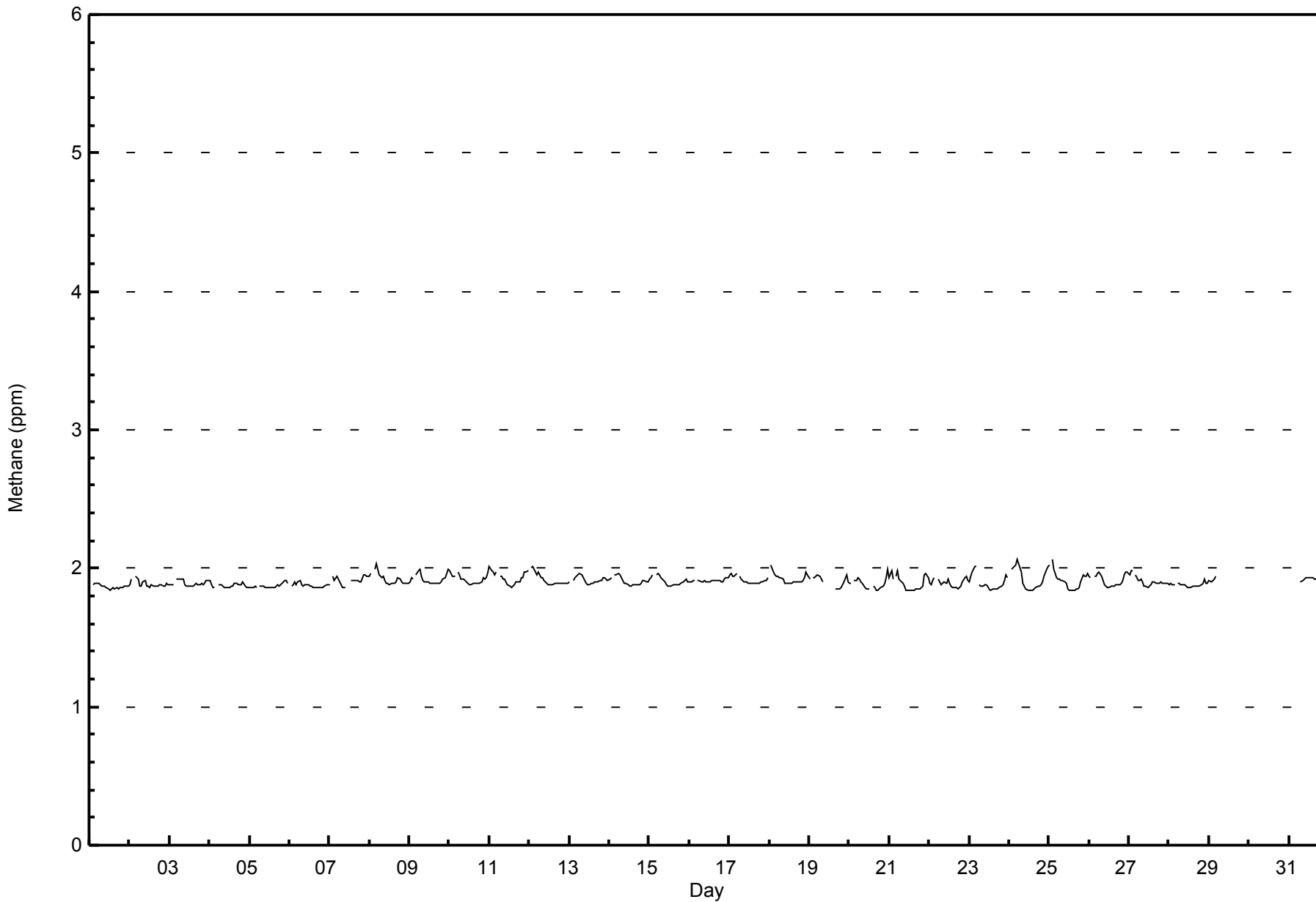
Non Methane Hydrocarbons (NMHC) - ppm
Patricia McInnes - May 2015





WBEA
Hourly Averages

Methane (CH₄) - ppm
Patricia McInnes - May 2015





WBEA
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	656	99.70	99.70
2.1 - 3.0	2	0.30	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 658

Total Number of Hours: 744



WBEA
Frequency Distribution

Methane (CH₄) - ppm
Patricia McInnes - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	102	52	28	20	23	37	33	38	51	60	64	24	25	20	20	59	656
2.1 - 3.0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	102	52	28	20	23	37	33	38	52	61	64	24	25	20	20	59	658

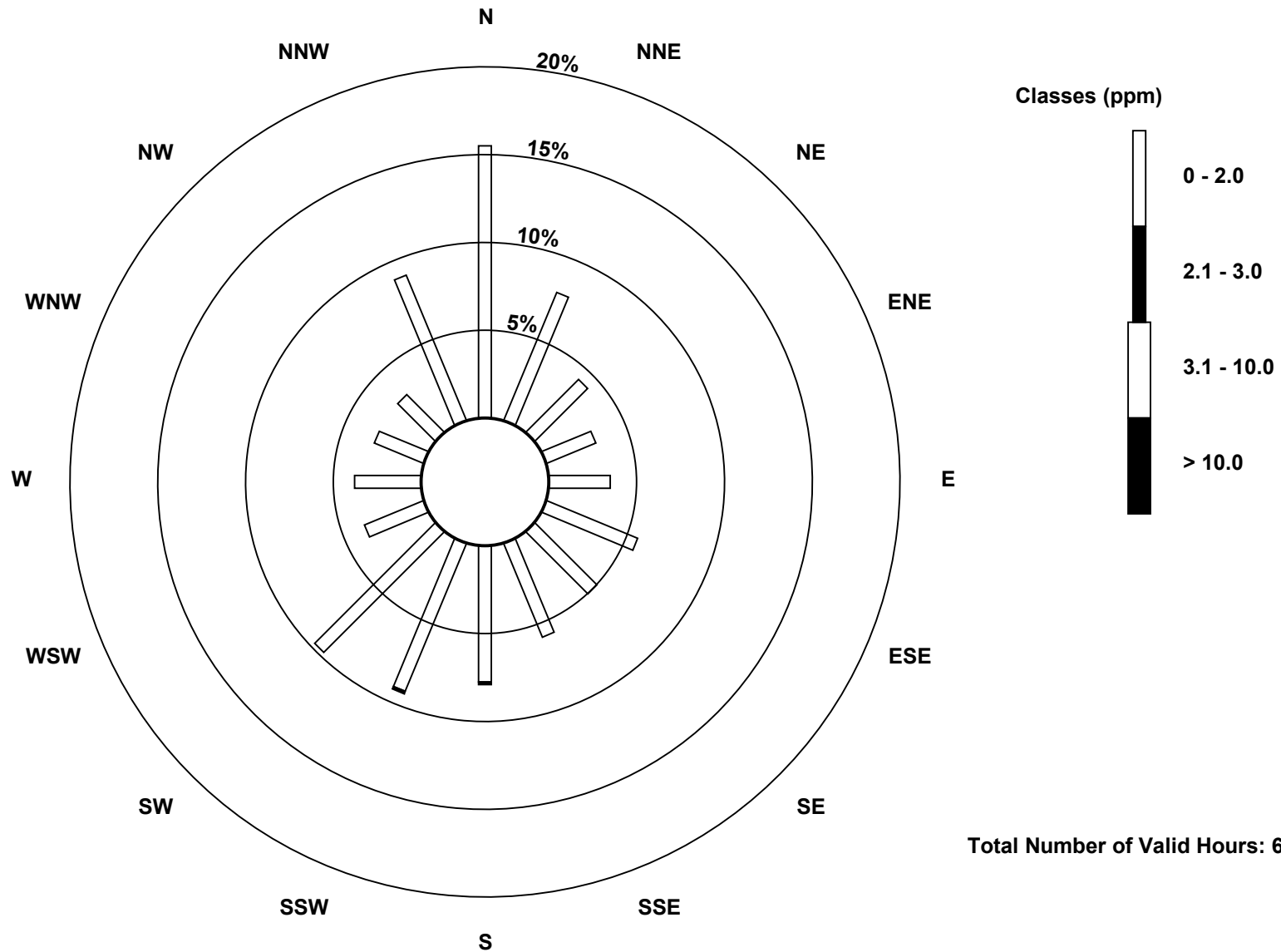
Total Number of Valid Hours: 658

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

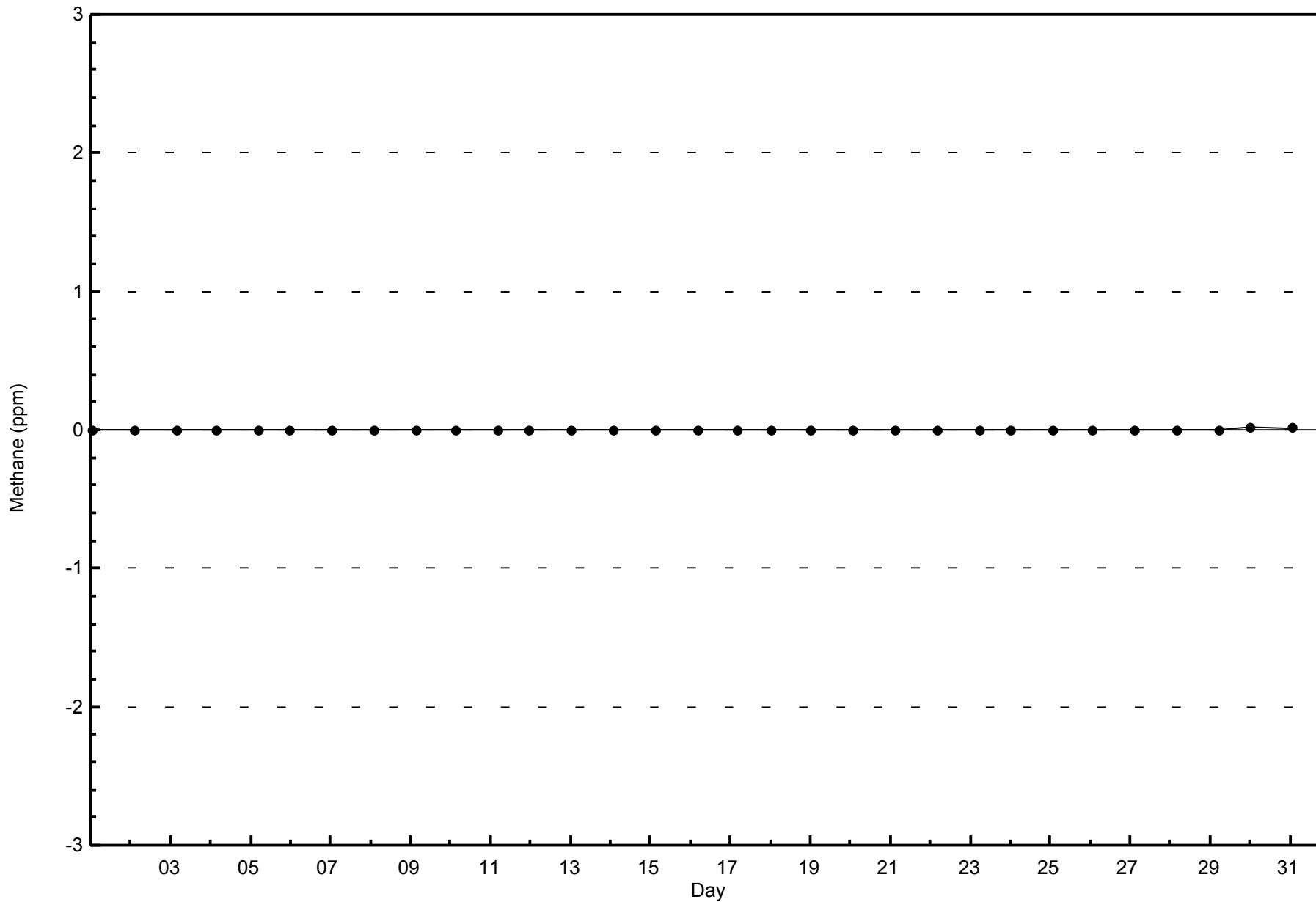
Methane (CH₄) - ppm
Patricia McInnes (AMS 6)





WBEA
Zero Responses

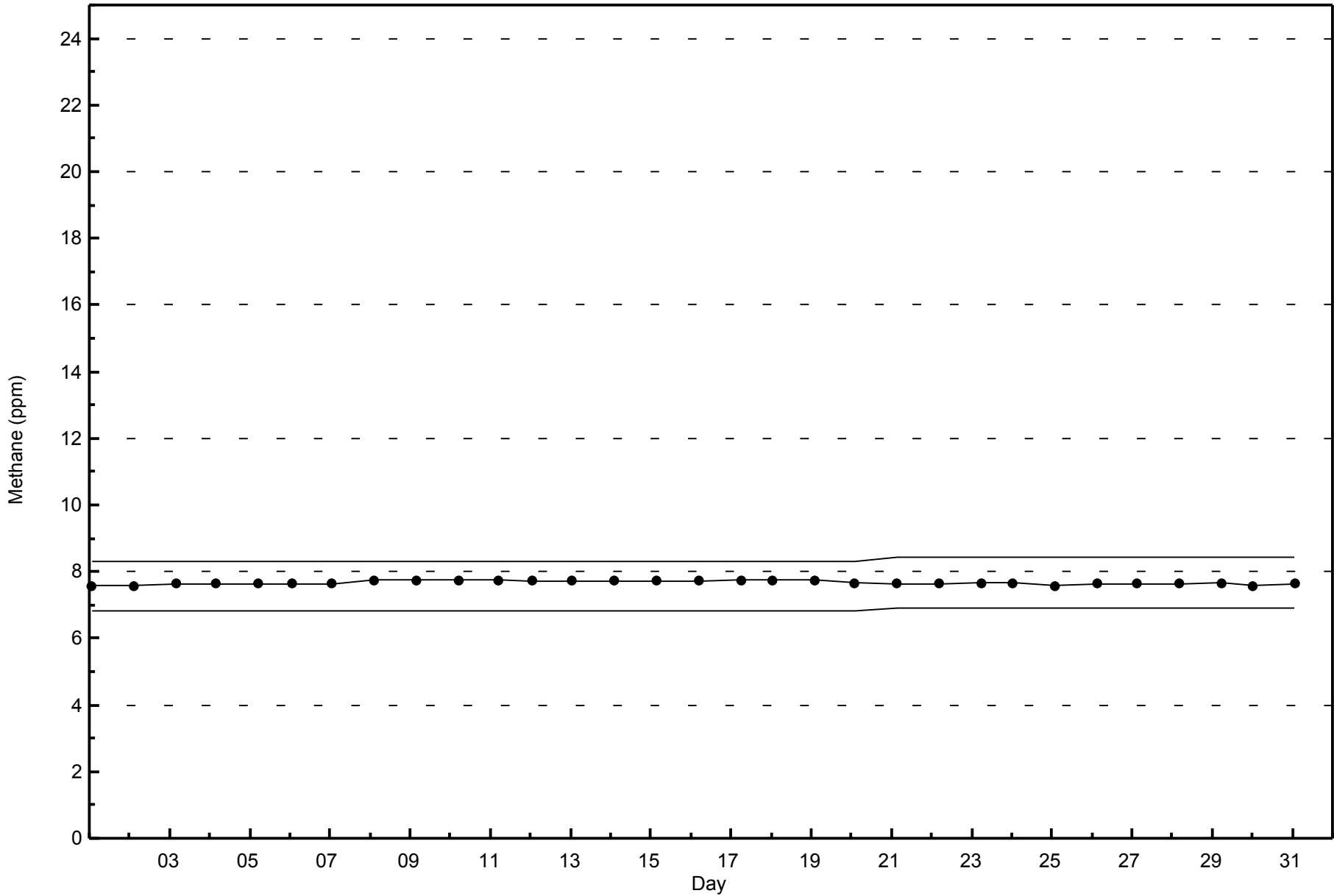
Methane (CH₄) - ppm
Patricia McInnes - May 2015





WBEA
Span Responses

Methane (CH₄) - ppm
Patricia McInnes - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Patricia McInnes - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 60 ppb on May 24 19:00	Maximum Daily Average: 45.1 ppb on May 14		Hours of Data:	706
Minimum Value: 4 ppb on May 7 05:00	Minimum Daily Average: 20.0 ppb on May 3		Hours of Missing Data:	38
Maximum Diurnal Average: 42.7 ppb at hour 15	Minimum Diurnal Average: 21.7 ppb at hour 5		Hours of Calibration:	34
Monthly Average: 33.9 ppb	Percentiles: P ₁ = 11 P ₁₀ = 18 Q ₁ = 26 Median = 34 Q ₃ = 43 P ₉₀ = 48 P ₉₉ = 54		Percent Operational Time:	99.5

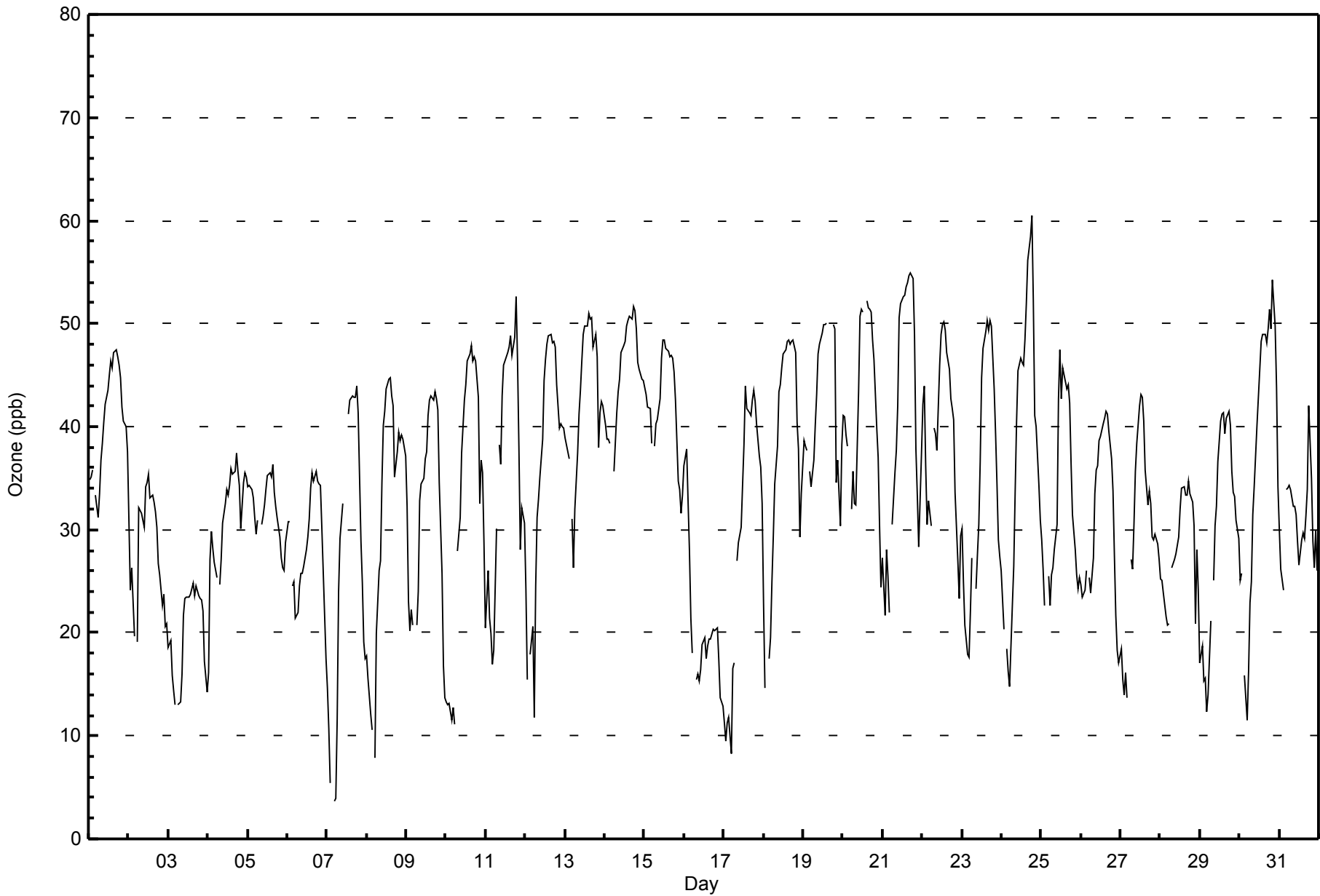
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	35	35	36	Z	33	31	34	37	38	40	42	44	45	46	46	47	47	47	46	45	42	41	40	38	40.6	47																							
2-May	31	24	26	20	Z	19	32	32	32	30	34	35	35	33	33	33	32	30	27	26	23	24	21	21	28.3	35																							
3-May	19	19	16	14	13	Z	13	13	16	22	23	23	23	24	24	25	24	25	24	23	23	22	17	14	20.0	25																							
4-May	16	27	30	28	27	25	Z	25	27	31	33	34	33	34	36	35	36	37	36	34	30	35	36	35	31.3	37																							
5-May	34	34	34	33	31	30	31	Z	31	31	32	34	35	35	35	36	34	32	31	29	27	26	26	29	31.8	36																							
6-May	31	31	Z	25	25	21	22	25	26	26	26	28	29	31	34	36	35	36	35	34	34	30	22	17	28.6	36																							
7-May	15	11	5	Z	4	4	12	24	29	32	PF	PF	PF	41	43	43	43	43	44	41	29	25	19	18	26.2	44																							
8-May	18	16	12	11	Z	8	20	26	27	35	40	41	44	45	45	43	42	35	38	39	39	39	39	37	32.0	45																							
9-May	32	23	20	22	21	Z	21	24	33	34	35	37	38	41	43	43	43	43	43	42	35	26	17	14	31.6	43																							
10-May	13	13	13	11	13	11	Z	28	31	37	40	43	44	46	47	48	46	47	46	43	33	37	35	29	32.9	48																							
11-May	20	26	21	20	17	18	30	Z	38	36	43	46	47	47	48	49	47	49	53	47	38	28	32	31	36.1	53																							
12-May	24	15	Z	18	21	12	25	31	33	35	39	45	47	48	49	49	48	48	48	44	40	40	40	40	36.4	49																							
13-May	39	38	37	Z	31	26	32	37	41	44	46	49	50	50	51	51	51	48	49	47	38	41	42	42	42.6	51																							
14-May	40	39	39	38	Z	36	38	41	43	45	47	48	48	50	50	51	50	52	51	50	46	46	45	44	45.1	52																							
15-May	44	43	42	42	38	Z	38	40	41	43	47	48	48	48	47	47	47	45	43	35	34	32	33	33	42.2	48																							
16-May	36	38	33	28	21	18	Z	16	16	15	16	19	19	17	19	19	19	20	20	20	21	17	14	13	20.7	38																							
17-May	11	9	11	12	8	16	17	Z	27	29	30	34	38	44	42	41	41	43	44	42	40	37	36	32	29.9	44																							
18-May	23	15	Z	18	20	25	29	34	38	43	44	46	47	47	48	48	48	48	48	47	40	38	29	33	37.3	48																							
19-May	39	38	38	Z	36	34	37	40	43	47	48	49	50	50	50	C	C	C	50	49	35	37	30	38	41.9	50																							
20-May	41	41	39	38	Z	32	36	33	32	43	51	51	51	M	52	51	51	51	48	46	40	37	30	24	41.9	52																							
21-May	27	22	28	25	22	Z	31	35	38	42	51	52	53	53	54	54	55	55	54	49	38	33	28	37	40.7	55																							
22-May	42	44	36	31	33	30	Z	40	39	38	46	49	50	50	49	47	46	43	42	41	34	27	23	29	39.5	50																							
23-May	30	25	21	18	18	22	27	Z	24	27	30	37	45	48	49	50	49	50	50	44	39	34	29	27	34.6	50																							
24-May	26	20	Z	18	16	15	23	26	34	40	45	47	46	46	48	52	56	58	60	52	41	40	34	31	38.1	60																							
25-May	29	26	23	Z	25	23	26	26	28	30	43	47	43	46	45	44	44	42	36	31	28	26	24	25	33.1	47																							
26-May	25	24	24	26	Z	25	24	27	33	36	36	39	39	40	41	42	41	40	37	34	28	22	18	17	31.2	42																							
27-May	19	15	14	16	14	Z	27	26	31	36	38	42	43	43	41	36	32	34	33	29	29	30	29	27	29.7	43																							
28-May	25	25	24	22	21	21	Z	26	27	28	28	29	32	34	34	33	33	35	33	33	30	21	28	24	28.1	35																							
29-May	17	19	15	16	12	14	21	Z	25	30	32	37	41	41	41	39	41	41	40	36	34	33	31	29	29.8	41																							
30-May	25	26	Z	16	11	16	23	25	31	34	40	43	46	48	49	49	48	49	51	49	54	50	44	34	37.5	54																							
31-May	30	26	24	Z	34	34	34	34	32	32	31	29	27	29	30	29	31	34	42	35	29	26	30	26	30.8	42																							
																								27.6	26.1	25.4	22.6	21.7	21.8	27.0	29.7	31.8	34.6	38.0	40.1	41.2	41.9	42.7	42.3	42.0	42.1	42.1	39.5	34.5	32.3	29.7	28.8	Diurnal Average	
																								44	44	42	42	38	36	38	41	43	47	51	52	53	53	54	54	56	58	60	52	54	50	45	44	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Patricia McInnes - May 2015





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	93	13.17	13.17
21 - 50	583	82.58	95.75
51 - 82	30	4.25	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Patricia McInnes - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	5	1	0	1	1	3	4	12	5	3	7	7	6	10	12	93
21 - 50	84	45	25	21	26	49	41	39	37	47	58	22	19	12	13	45	583
51 - 82	1	2	3	0	0	0	2	0	6	10	6	0	0	0	0	0	30
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	101	52	29	21	27	50	46	43	55	62	67	29	26	18	23	57	706

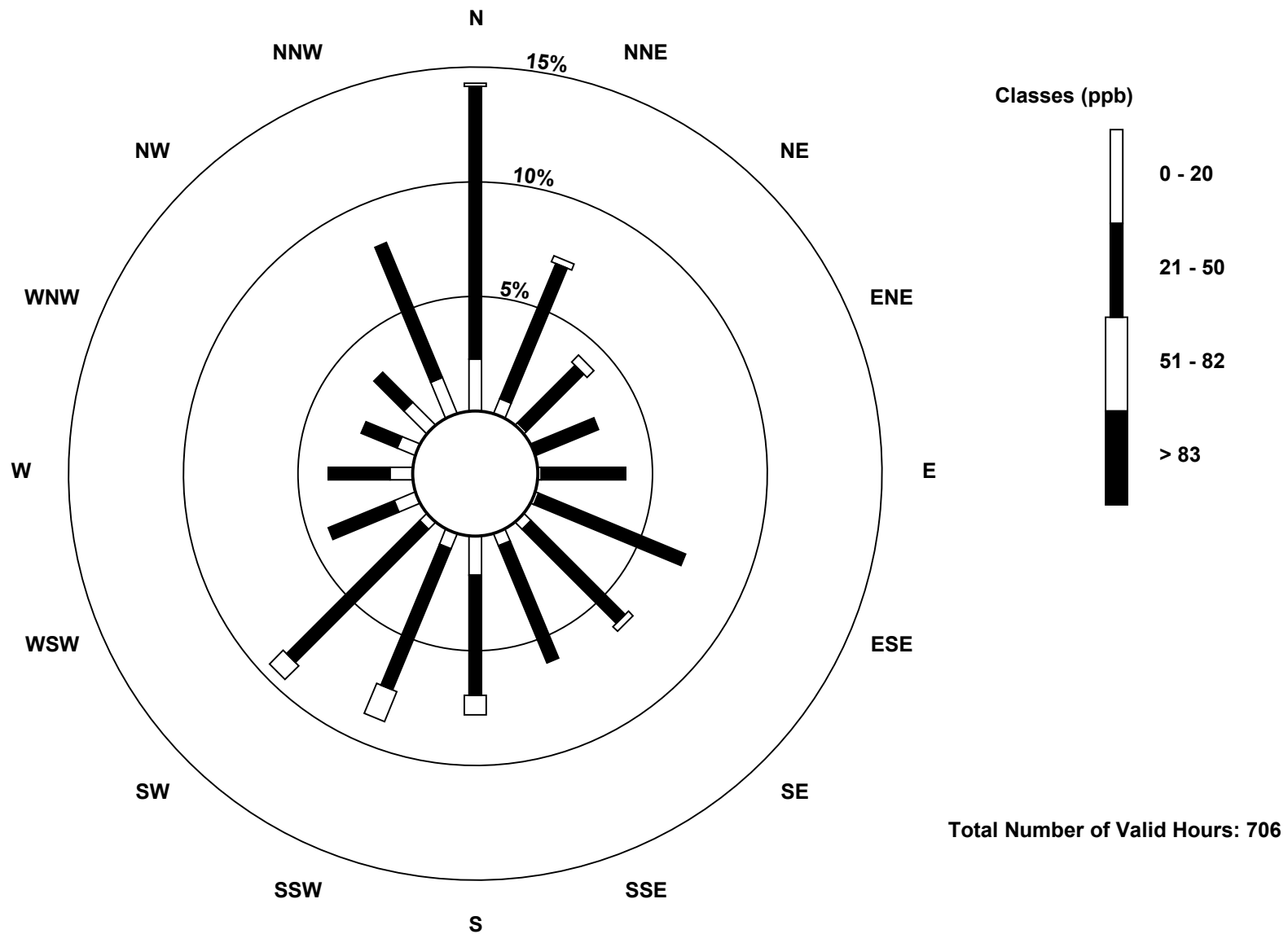
Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

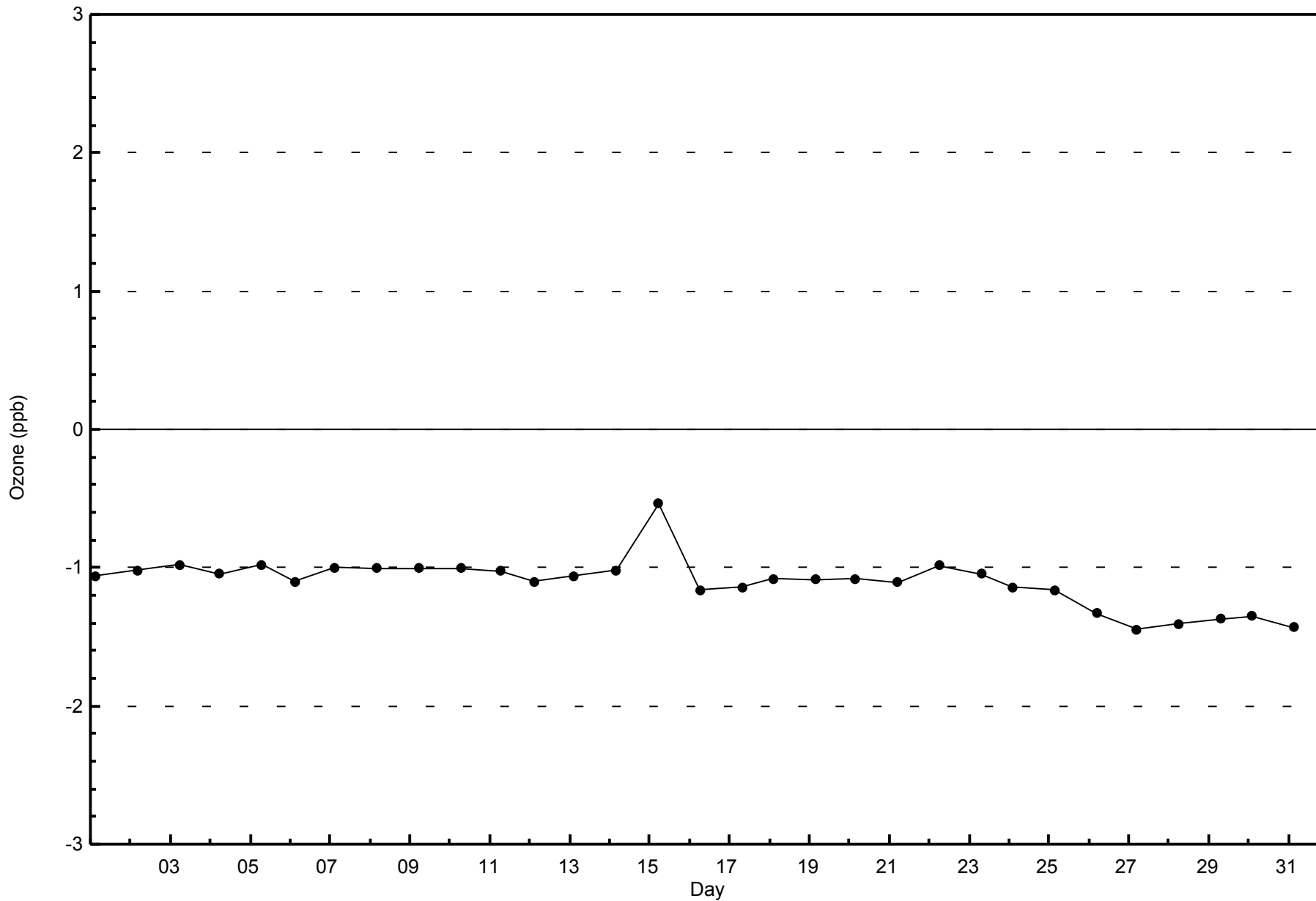
Ozone (O₃) - ppb
Patricia McInnes (AMS 6)





WBEA
Zero Responses

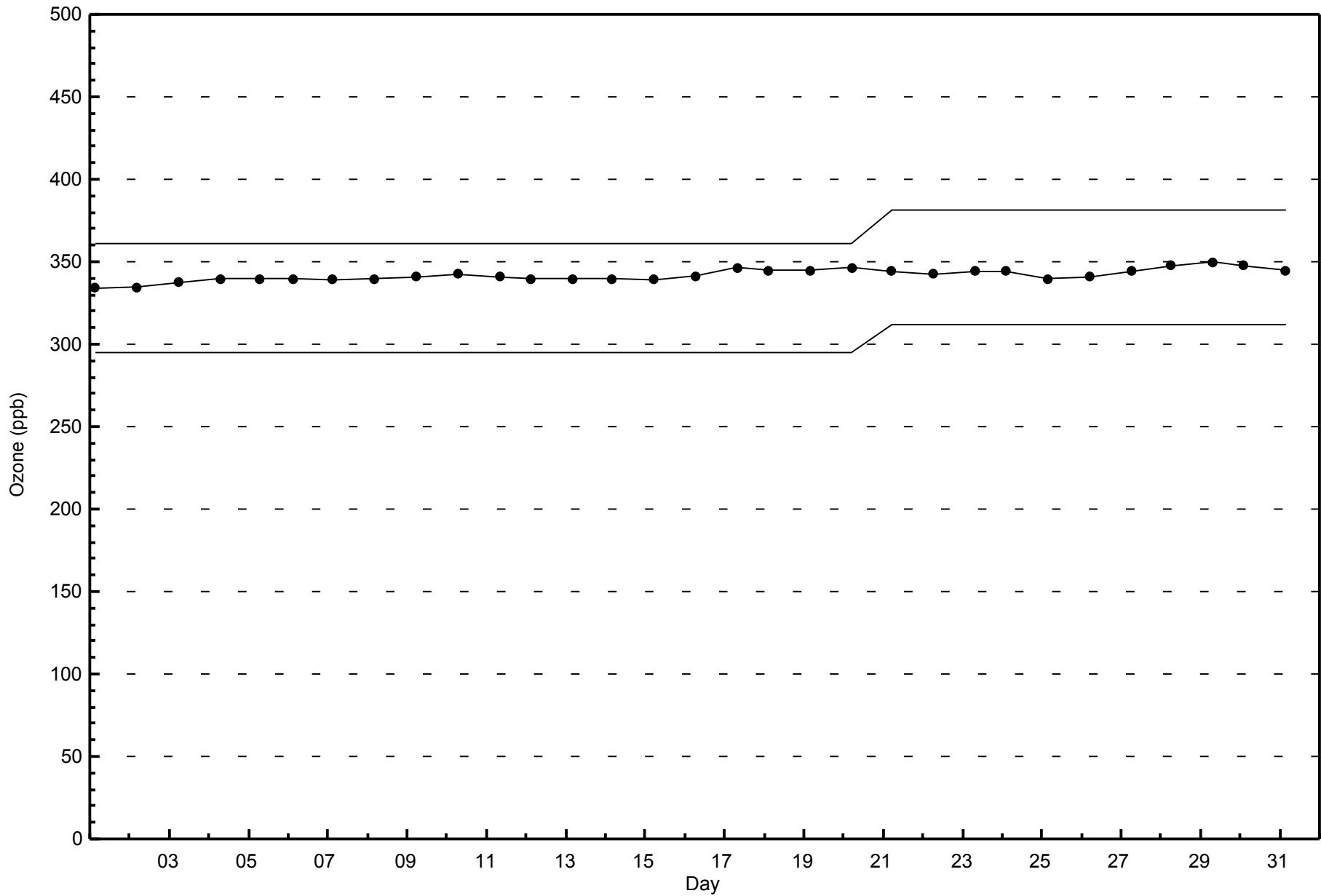
Ozone (O₃) - ppb
Patricia McInnes - May 2015





WBEA
Span Responses

Ozone (O₃) - ppb
Patricia McInnes - May 2015



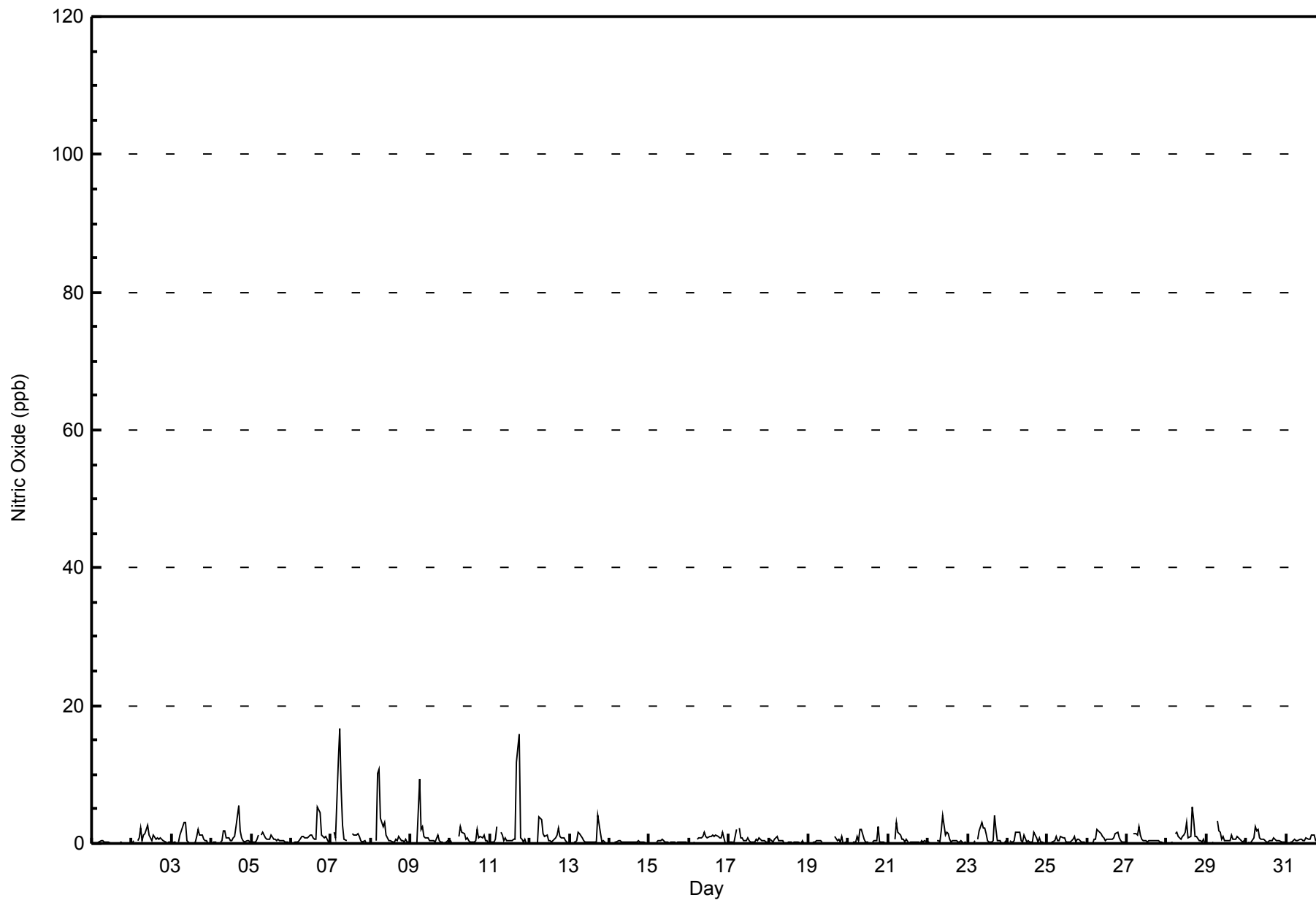


Maximum Value: 17 ppb on May 7 06:00																	Maximum Daily Average: 2.5 ppb on May 7																	Hours in Service: 744	
Minimum Value: 0 ppb on May 1 17:00																	Minimum Daily Average: 0.1 ppb on May 1																	Hours of Data: 702	
Maximum Diurnal Average: 2.5 ppb at hour 6																	Minimum Diurnal Average: 0.1 ppb at hour 1																	Hours of Missing Data: 42	
Monthly Average: 0.8 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 9																	Hours of Calibration: 38	
																	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
2-May	0	0	Z	0	1	2	0	1	1	3	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0.8	3									
3-May	0	0	0	Z	0	1	2	3	3	0	0	0	0	0	1	2	1	1	1	0	0	0	0	0.8	3										
4-May	0	0	0	0	Z	0	0	2	2	1	1	0	0	1	1	2	5	2	1	0	0	0	0	0.9	5										
5-May	0	0	0	1	1	Z	1	2	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0.6	2										
6-May	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	5	5	1	1	1	1	0	1.1	5										
7-May	0	Z	2	1	12	17	8	3	1	0	PF	PF	PF	1	1	1	1	1	0	0	0	0	0	2.5	17										
8-May	0	0	Z	0	10	11	4	2	3	1	1	0	0	0	1	0	1	0	0	0	1	0	0	1.6	11										
9-May	0	0	0	Z	0	9	2	3	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0.9	9										
10-May	0	0	0	0	Z	1	2	2	1	1	1	0	0	0	0	0	2	1	1	1	1	0	0	0.7	2										
11-May	0	0	0	1	3	Z	2	1	0	1	0	0	1	0	1	1	12	16	1	1	0	1	0	1.7	16										
12-May	Z	0	0	0	0	4	4	3	1	1	1	0	0	0	1	1	2	1	1	1	0	0	0	1.1	4										
13-May	0	Z	0	0	0	2	1	1	0	0	0	0	0	0	0	0	4	1	0	1	0	0	0	0.6	4										
14-May	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-May	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1										
16-May	0	0	0	0	Z	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	1	0	0.8	2										
17-May	0	0	0	0	2	Z	2	1	1	0	0	1	0	0	0	0	1	0	1	1	0	0	0	0.6	2										
18-May	Z	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1										
19-May	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	C	1	0	1	0	1	0	0	-	1										
20-May	0	0	Z	0	0	1	0	2	2	1	0	0	0	M	0	0	0	0	2	0	0	0	0	0.6	2										
21-May	0	0	0	Z	1	3	2	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.5	3										
22-May	0	0	0	0	Z	1	0	0	2	4	1	2	1	1	0	0	0	0	0	0	0	0	0	0.6	4										
23-May	0	0	0	0	0	Z	1	2	3	2	2	1	0	0	0	4	2	0	0	0	0	0	0	0.9	4										
24-May	Z	0	0	0	0	2	2	2	0	0	1	0	0	0	0	2	1	0	1	0	0	0	0	0.6	2										
25-May	0	Z	0	0	1	1	0	0	1	1	1	0	0	0	0	1	1	0	1	1	0	0	0	0.4	1										
26-May	0	0	Z	0	1	1	2	2	1	1	1	0	1	1	1	1	1	1	2	1	0	0	0	0.7	2										
27-May	0	0	0	Z	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2										
28-May	0	0	0	0	Z	1	2	1	1	1	1	2	3	1	1	5	4	1	1	0	0	1	0	1.1	5										
29-May	0	0	0	0	0	Z	3	2	2	1	1	1	0	0	0	1	1	1	1	1	1	0	0	0.7	3										
30-May	Z	0	0	0	1	2	2	2	1	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0.6	2										
31-May	0	Z	0	0	0	1	0	0	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0.5	1										
																	0.1		Diurnal Average																
																	0		Diurnal Maximum																
																	0.1		Diurnal Average																
																	0		Diurnal Maximum																
Z - zerospan																	C - Calibration		M - Maintenance		PF - Power Failure														



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Patricia McInnes - May 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Patricia McInnes - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	702	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Patricia McInnes - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	102	52	29	21	26	50	49	45	54	62	64	24	25	20	20	59	702
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	102	52	29	21	26	50	49	45	54	62	64	24	25	20	20	59	702

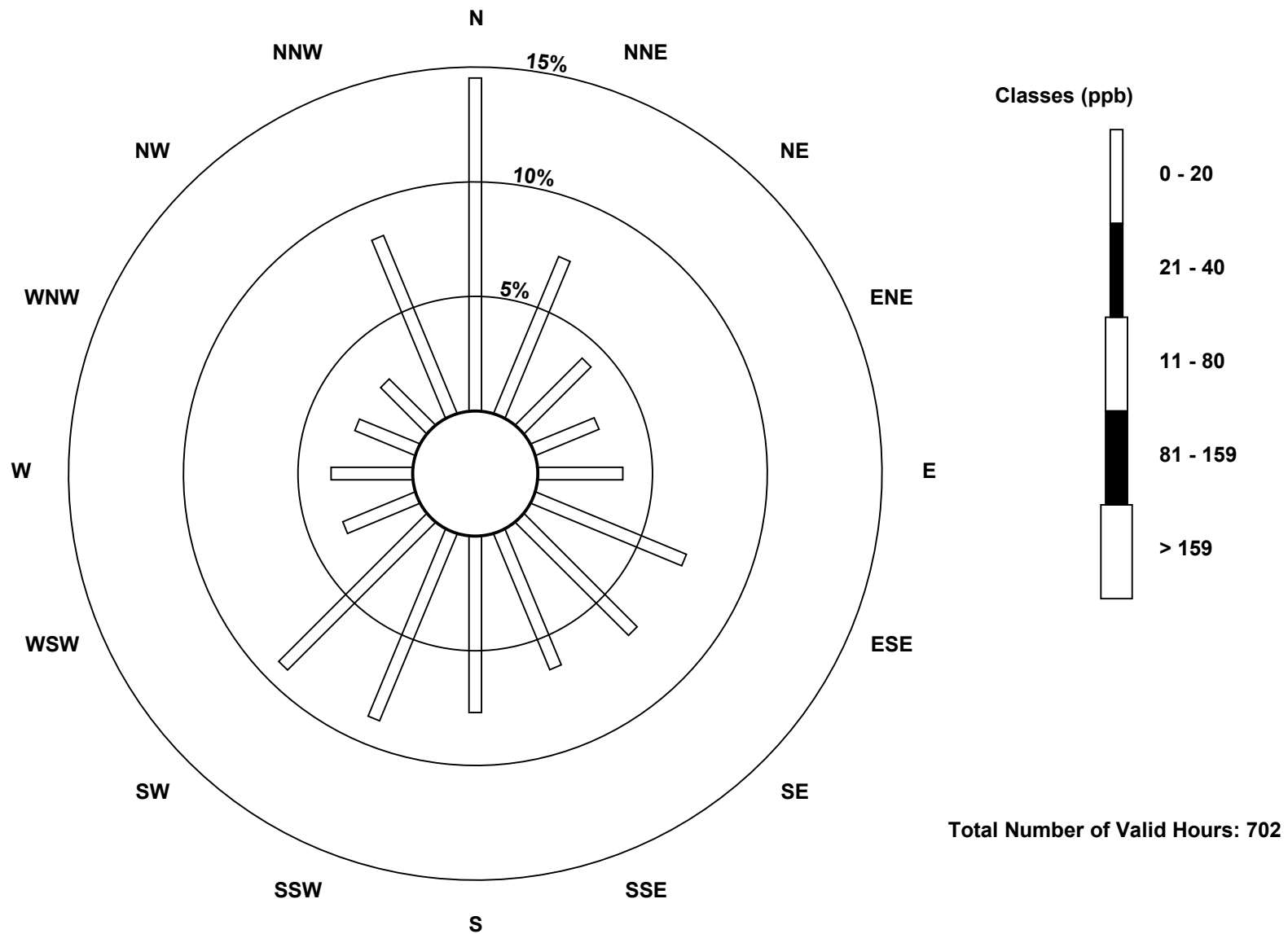
Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

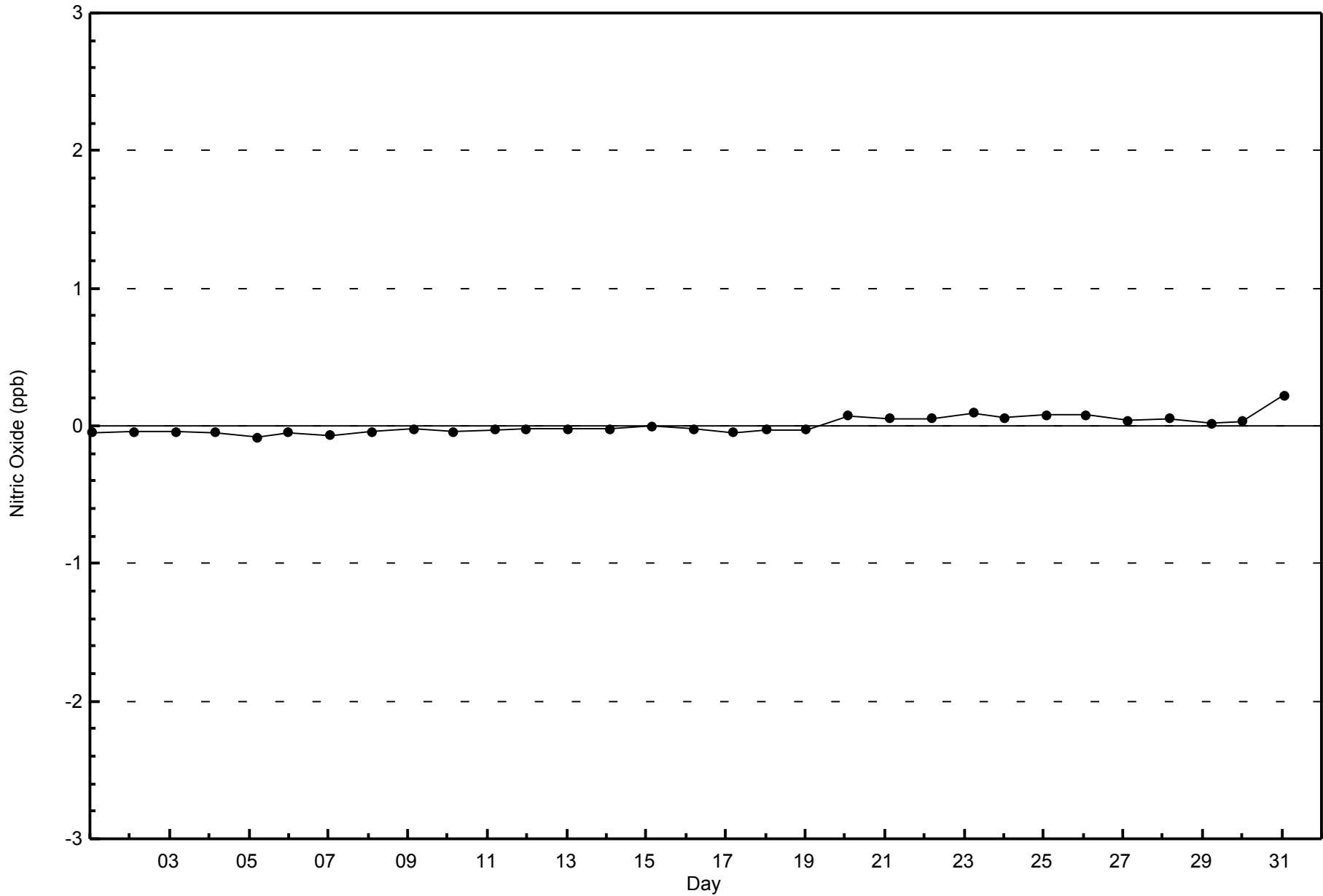
Nitric Oxide (NO) - ppb
Patricia McInnes (AMS 6)





WBEA
Zero Responses

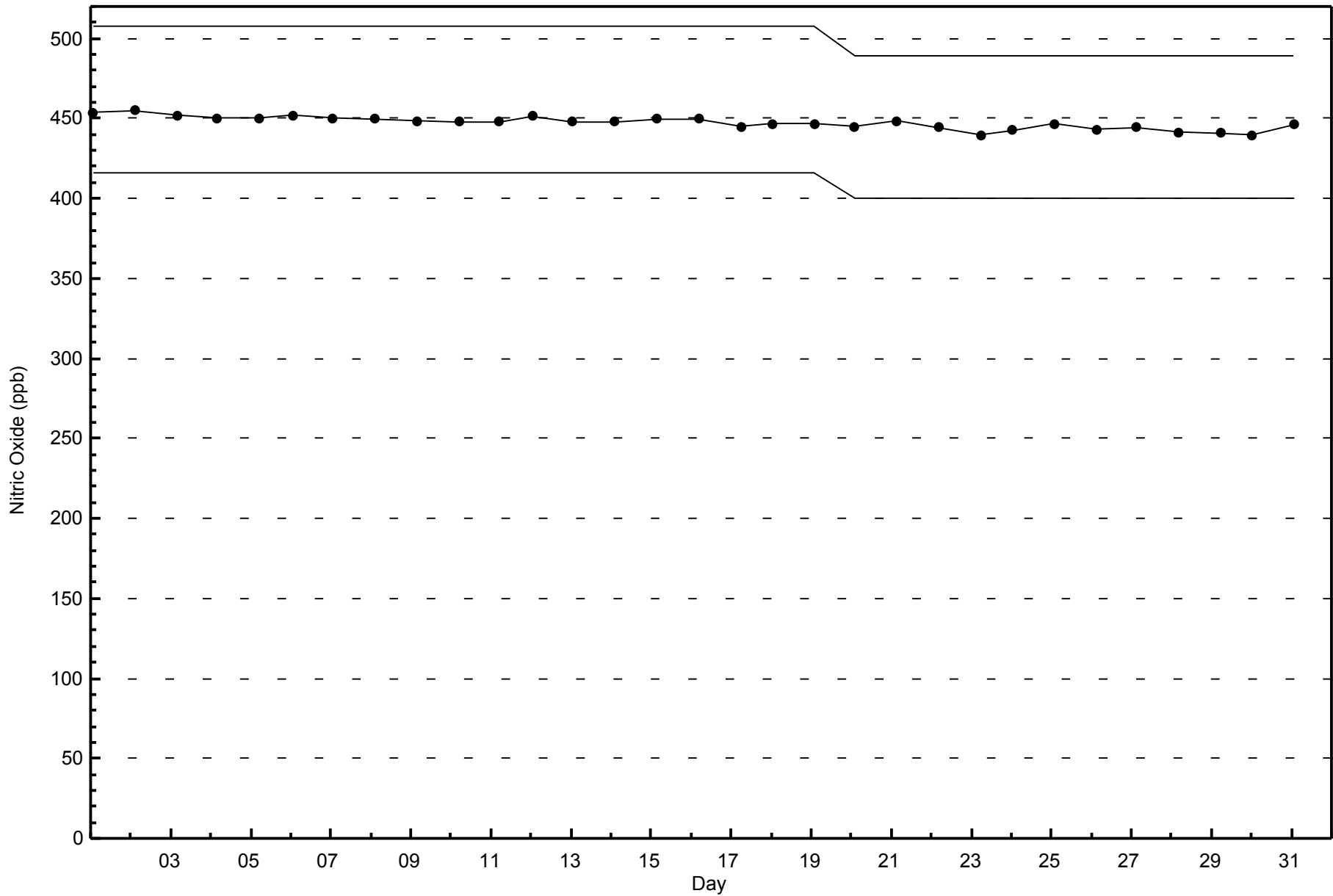
Nitric Oxide (NO) - ppb
Patricia McInnes - May 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Patricia McInnes - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

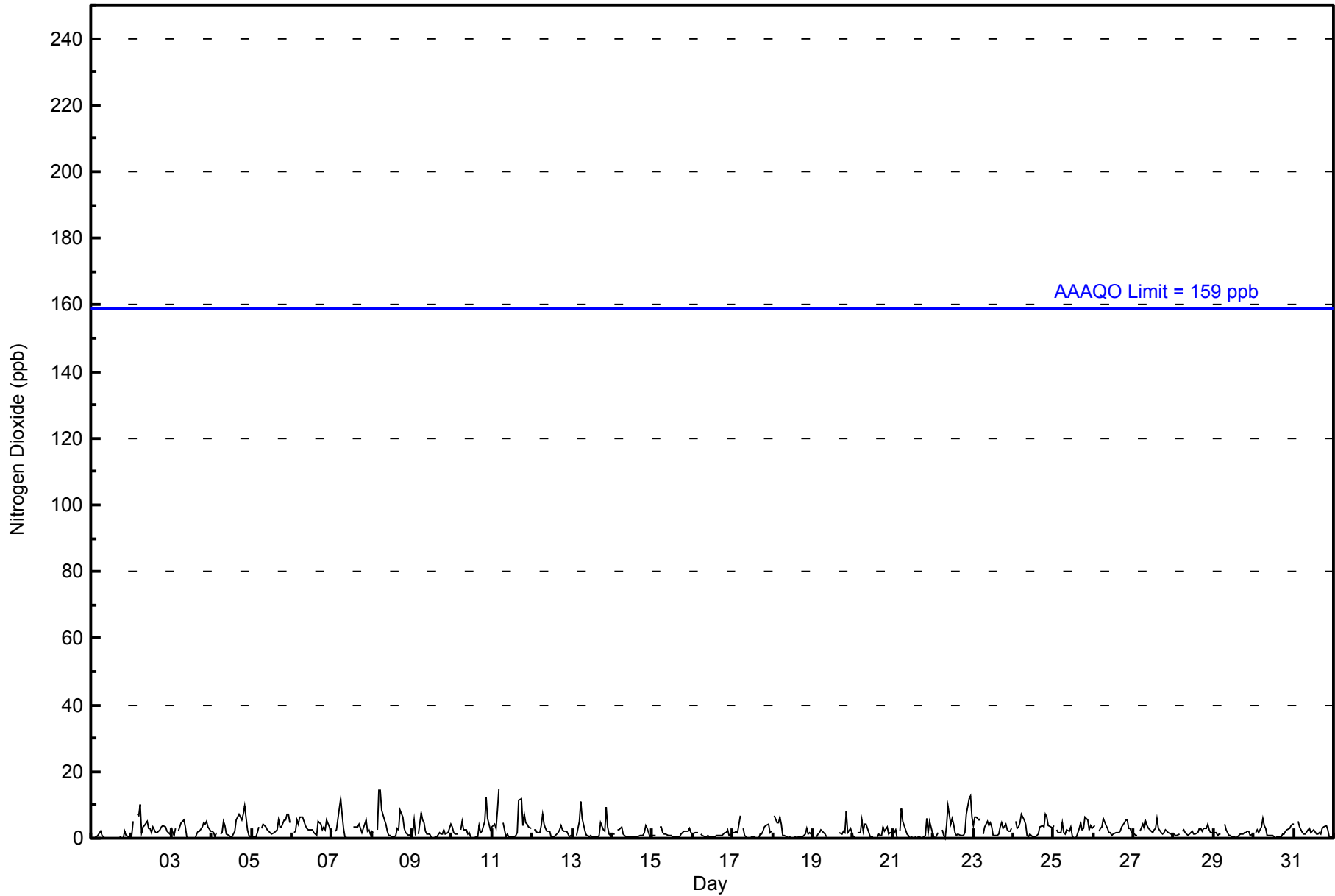
Patricia McInnes - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 15 ppb on May 11 05:00										Maximum Daily Average: 4.2 ppb on May 11										Hours of Data: 702																													
Minimum Value: 0 ppb on May 1 12:00										Minimum Daily Average: 0.5 ppb on May 1										Hours of Missing Data: 42																													
Maximum Diurnal Average: 5.2 ppb at hour 6										Minimum Diurnal Average: 0.9 ppb at hour 13										Hours of Calibration: 38																													
Monthly Average: 2.4 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 12										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-May	0	Z	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	1	0.5	2																							
2-May	1	5	Z	7	7	10	2	3	4	5	3	3	2	4	2	2	2	3	4	4	3	2	2	1	3.4	10																							
3-May	3	1	3	Z	2	4	5	5	3	1	0	0	0	0	0	1	2	2	4	5	4	5	3	2	2.4	5																							
4-May	2	2	1	2	Z	1	2	5	4	1	1	0	1	1	2	6	7	6	6	7	10	3	1	0	3.0	10																							
5-May	0	1	1	2	4	Z	3	4	3	3	2	2	1	2	2	2	6	3	3	5	6	7	7	5	3.2	7																							
6-May	Z	2	2	6	4	7	6	5	4	3	3	3	3	2	1	1	5	4	2	3	3	5	3	2	3.4	7																							
7-May	2	Z	2	2	9	12	7	3	0	0	PF	PF	PF	3	3	3	4	3	2	3	6	2	2	1	3.6	12																							
8-May	2	2	Z	3	15	14	8	5	4	2	1	1	1	1	1	3	2	9	6	3	2	1	1	1	3.8	15																							
9-May	2	5	1	Z	1	8	6	5	2	1	1	1	0	0	0	0	2	1	1	3	1	2	3	4	2.2	8																							
10-May	3	2	1	1	Z	3	5	3	2	1	2	0	0	0	0	0	4	2	2	5	12	6	4	3	2.7	12																							
11-May	3	4	3	9	15	Z	5	3	1	1	1	1	0	1	1	2	12	12	4	7	5	4	3	3	4.2	15																							
12-May	Z	3	3	2	2	4	7	4	3	2	2	0	1	0	1	2	3	4	3	2	2	1	1	1	2.2	7																							
13-May	1	Z	1	3	5	11	6	2	1	1	1	1	0	0	1	0	1	5	2	2	10	3	1	1	2.5	11																							
14-May	1	1	Z	2	3	3	1	1	1	1	0	0	0	0	0	1	1	1	1	2	4	3	1	0	1.2	4																							
15-May	1	1	1	Z	3	4	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	2	2	1.4	4																							
16-May	1	2	2	2	Z	1	1	0	0	1	0	0	1	1	1	1	1	1	1	2	2	3	1	1	1.1	3																							
17-May	2	2	2	2	7	Z	3	1	0	0	0	1	1	1	0	0	1	1	2	3	4	4	2	2	1.8	7																							
18-May	Z	7	5	5	6	4	1	1	1	0	0	0	0	1	0	1	1	1	0	1	3	1	2	1	1.8	7																							
19-May	0	Z	0	1	2	3	2	1	1	C	C	C	C	C	C	C	2	1	2	2	8	2	3	2	-	8																							
20-May	1	1	Z	2	2	6	2	4	4	2	1	0	1	M	1	1	1	1	4	2	4	1	2	2	1.9	6																							
21-May	1	2	0	Z	2	9	5	3	1	1	0	1	0	0	0	1	0	0	1	1	6	2	5	2	1.8	9																							
22-May	1	0	1	2	Z	2	1	0	4	10	4	6	4	2	1	1	1	1	1	2	7	12	13	6	3.5	13																							
23-May	4	6	6	5	6	Z	1	4	5	4	5	4	1	1	1	1	4	5	3	4	3	2	2	3	3.4	6																							
24-May	Z	5	3	3	5	7	6	4	1	1	1	1	1	0	1	1	4	4	3	7	6	4	4	3	3.2	7																							
25-May	4	Z	2	2	2	5	2	1	3	2	3	1	0	0	1	3	5	2	3	6	5	3	4	3	2.6	6																							
26-May	3	4	Z	2	3	3	6	4	3	2	2	1	1	2	2	2	2	3	5	5	6	3	3	2	2.9	6																							
27-May	1	1	1	Z	2	4	3	5	4	3	2	2	3	3	6	3	2	1	2	3	2	2	1	1	2.4	6																							
28-May	1	1	1	1	Z	2	3	2	1	1	2	2	1	1	2	3	3	2	3	3	4	3	2	2	1.9	4																							
29-May	2	2	1	1	1	Z	4	3	2	1	1	1	0	0	1	1	1	1	2	2	2	2	1	1	1.4	4																							
30-May	Z	2	2	2	3	6	4	3	1	1	1	1	0	0	0	0	0	1	1	2	2	3	4	4	1.9	6																							
31-May	4	Z	5	3	2	2	1	1	3	3	2	2	2	1	1	2	1	3	3	4	3	1	0	0	2.2	5																							
																								1.8	2.4	1.9	2.7	4.4	5.2	3.5	2.8	2.1	1.8	1.4	1.1	0.9	0.9	1.1	1.4	2.5	2.7	2.5	3.3	4.4	3.0	2.7	2.0	Diurnal Average	
																								4	7	6	9	15	14	8	5	5	10	5	6	4	4	6	6	12	12	6	7	12	12	13	6	Diurnal Maximum	
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																	



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	702	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	102	52	29	21	26	50	49	45	54	62	64	24	25	20	20	59	702
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	102	52	29	21	26	50	49	45	54	62	64	24	25	20	20	59	702

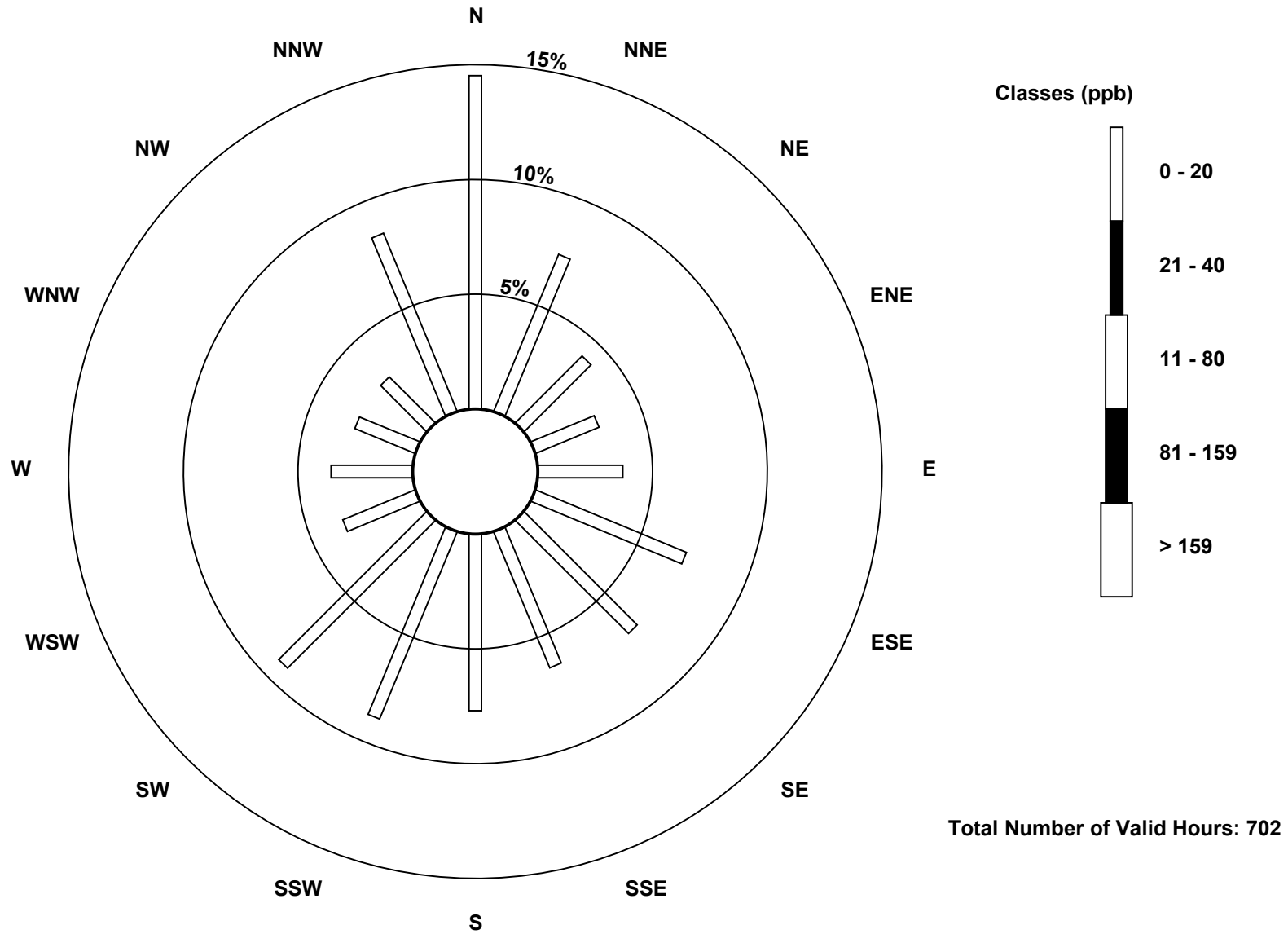
Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

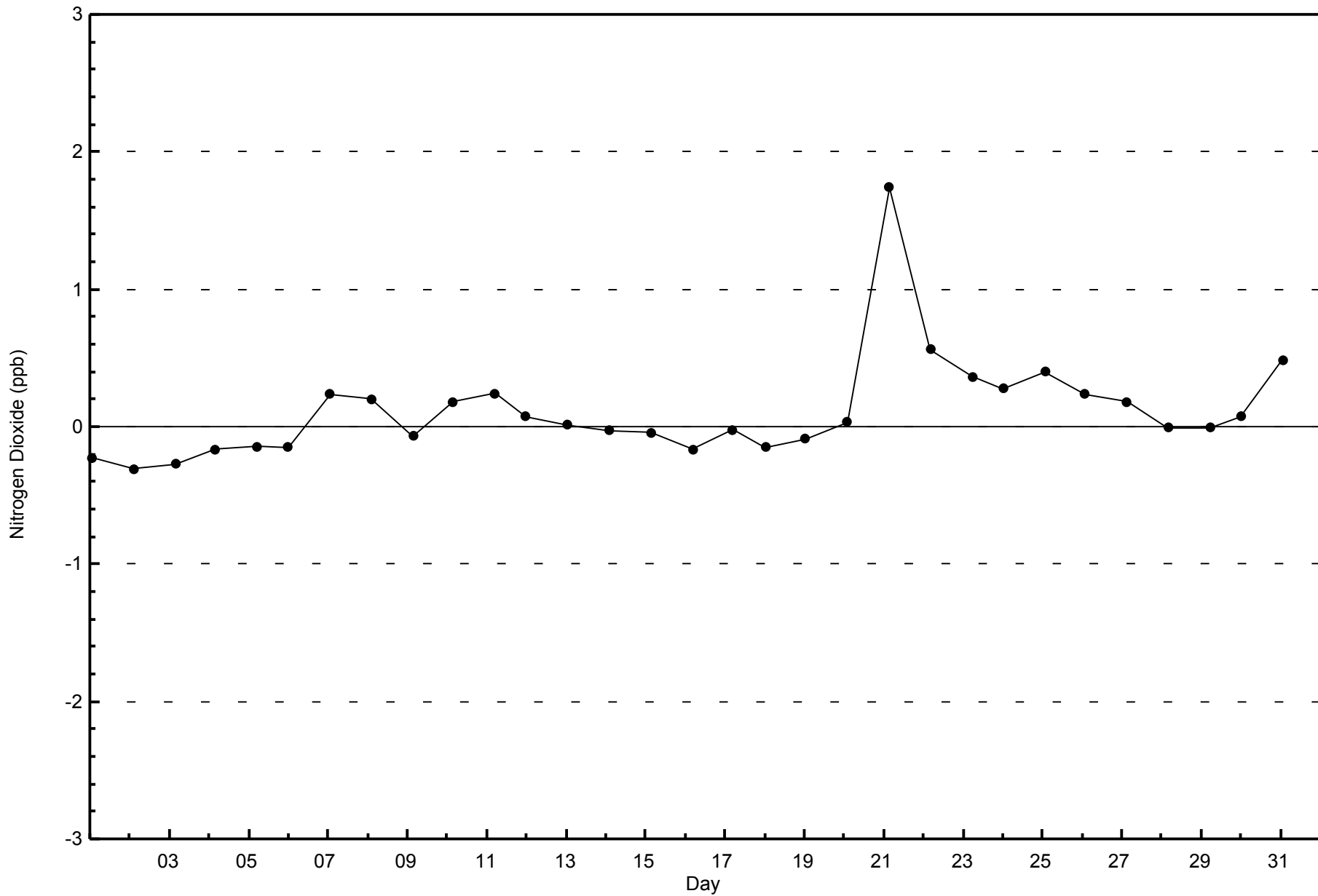
Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes (AMS 6)





WBEA
Zero Responses

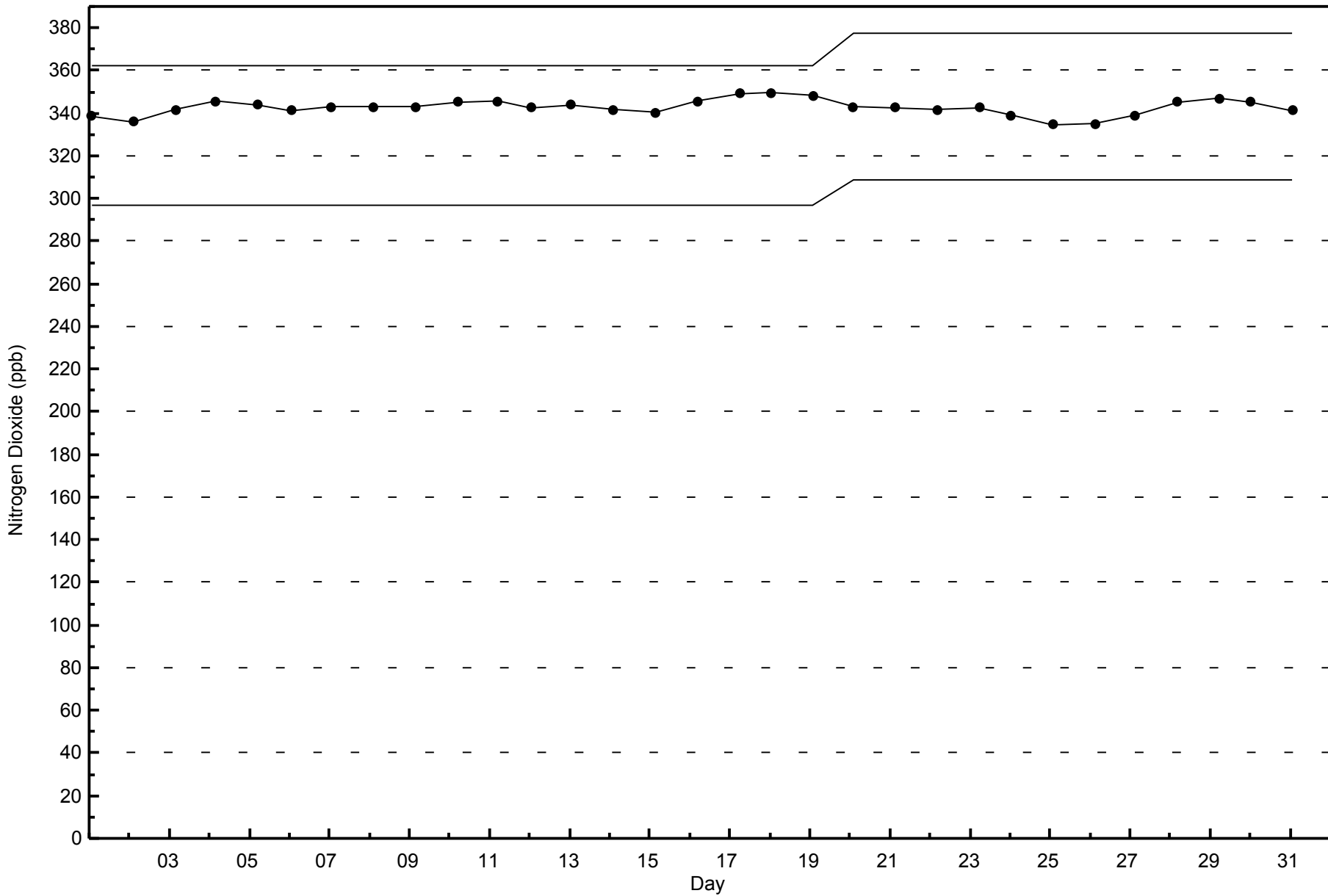
Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - May 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Patricia McInnes - May 2015



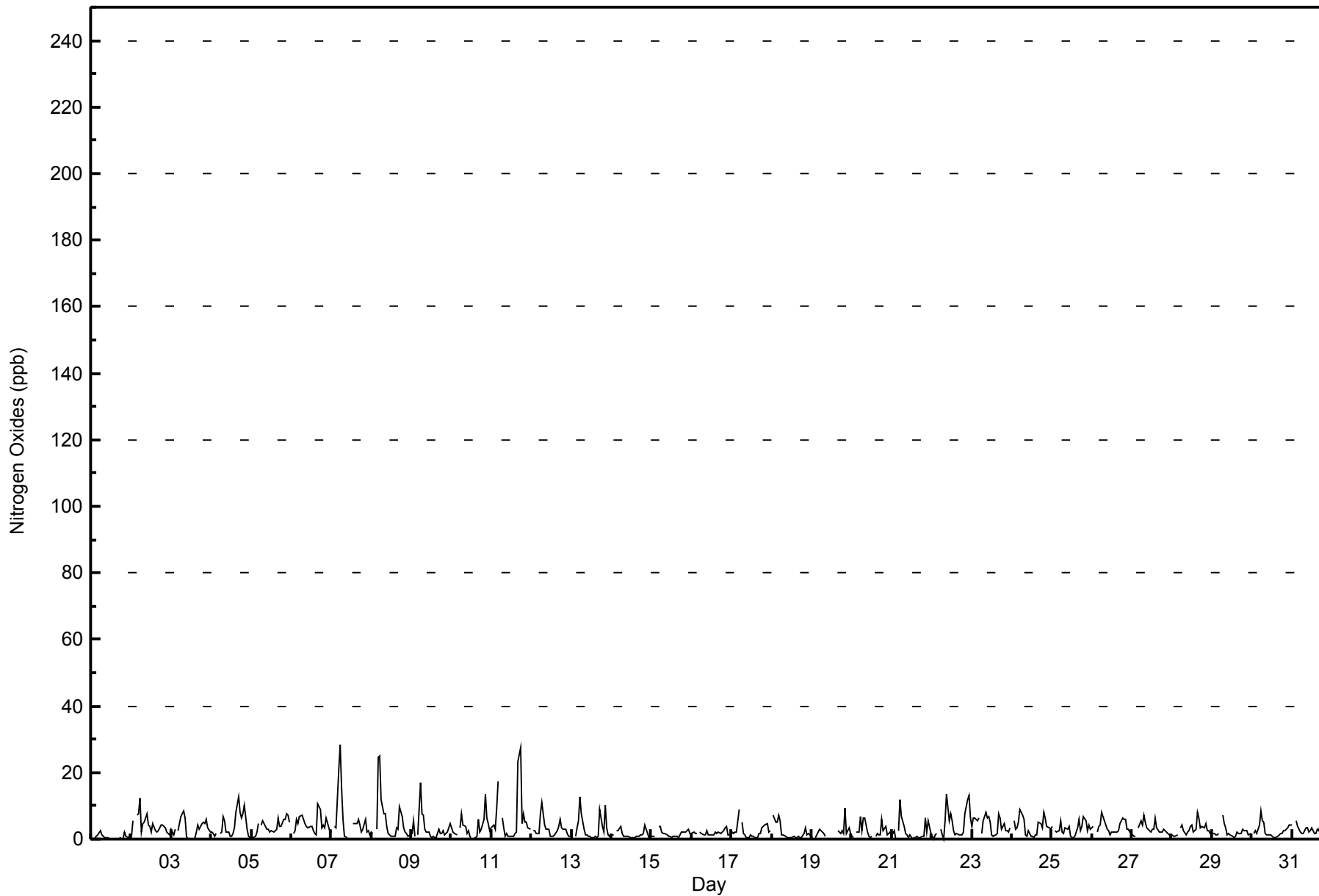


Maximum Value: 29 ppb on May 7 06:00																		Maximum Daily Average: 6.1 ppb on May 7						Hours in Service: 744																								
Minimum Value: 0 ppb on May 1 17:00																		Minimum Daily Average: 0.6 ppb on May 1						Hours of Data: 702																								
Maximum Diurnal Average: 7.7 ppb at hour 6																		Minimum Diurnal Average: 1.3 ppb at hour 14						Hours of Missing Data: 42																								
Monthly Average: 3.2 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 4 P ₉₀ = 6 P ₉₉ = 15						Hours of Calibration: 38																								
																		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-May	1	Z	1	1	1	3	1	1	0	0	0	0	0	0	0	0	0	0	0	2	1	0	1	0.6	3																							
2-May	1	5	Z	7	8	12	2	5	5	8	4	4	2	5	2	2	3	3	4	4	4	2	2	1	4.2	12																						
3-May	3	1	3	Z	3	5	7	9	6	1	0	0	0	0	0	2	4	3	5	5	5	6	3	2	3.2	9																						
4-May	2	2	1	2	Z	2	2	7	6	2	2	1	1	2	3	8	13	8	6	8	10	3	1	1	4.0	13																						
5-May	0	1	1	2	5	Z	4	6	4	3	3	2	2	2	3	3	6	4	4	6	6	8	7	5	3.7	8																						
6-May	Z	2	2	6	5	7	7	6	5	4	3	4	4	3	2	1	10	9	4	4	3	6	3	2	4.4	10																						
7-May	3	Z	4	3	21	29	15	6	1	0	PF	PF	PF	5	4	4	6	4	2	3	6	2	3	1	6.1	29																						
8-May	2	2	Z	3	25	25	12	8	7	4	2	1	1	1	1	3	3	10	7	4	2	2	1	1	5.5	25																						
9-May	2	5	1	Z	1	17	8	7	3	2	2	1	1	1	1	1	3	2	2	3	1	2	3	5	3.1	17																						
10-May	4	2	2	1	Z	4	8	4	4	2	2	1	0	0	1	1	6	2	3	6	14	6	5	3	3.4	14																						
11-May	3	4	3	9	17	Z	6	4	1	2	1	1	1	1	2	2	23	28	5	8	5	5	4	3	5.9	28																						
12-May	Z	3	3	2	2	8	11	8	4	3	3	1	1	1	1	3	4	6	4	3	3	2	1	1	3.2	11																						
13-May	1	Z	1	3	6	13	8	3	1	1	1	1	0	1	1	1	1	9	4	2	10	4	1	1	3.1	13																						
14-May	1	1	Z	3	3	4	2	1	1	1	1	1	1	1	1	1	1	1	1	2	4	3	1	0	1.4	4																						
15-May	1	1	1	Z	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	2	2	2	3	2	1.6	4																						
16-May	2	2	2	2	Z	2	2	1	1	3	1	1	1	1	2	2	2	2	2	2	3	4	1	1	1.9	4																						
17-May	2	2	2	2	9	Z	5	2	1	1	1	1	1	1	0	1	2	1	3	4	4	5	2	2	2.3	9																						
18-May	Z	7	5	5	7	5	1	1	1	0	0	0	0	1	0	1	1	1	1	2	3	1	2	1	2.1	7																						
19-May	0	Z	0	1	2	3	2	1	1	C	C	C	C	C	C	C	2	2	3	2	9	2	3	2	-	9																						
20-May	1	1	Z	2	2	7	3	6	6	2	1	1	1	M	1	2	1	1	6	3	4	1	2	2	2.4	7																						
21-May	1	3	0	Z	3	12	7	4	2	1	0	1	0	1	0	1	0	0	1	1	6	2	5	2	2.3	12																						
22-May	1	0	1	2	Z	3	1	0	6	14	6	8	6	2	1	2	1	1	1	2	8	12	13	6	4.2	14																						
23-May	4	6	6	5	6	Z	2	5	8	6	7	5	1	1	1	8	6	3	4	3	2	2	3	4.3	8																							
24-May	Z	5	3	4	5	9	7	6	1	1	2	1	1	0	1	1	5	5	3	8	6	4	4	3	3.7	9																						
25-May	4	Z	3	2	2	5	2	2	3	3	4	1	0	0	1	3	6	3	4	7	6	3	4	3	3.0	7																						
26-May	4	4	Z	2	4	4	8	5	4	3	2	1	2	2	2	3	5	6	6	6	6	3	3	2	3.7	8																						
27-May	1	1	1	Z	3	6	4	7	5	4	3	2	3	3	6	3	2	2	2	3	2	2	1	1	3.0	7																						
28-May	1	1	1	1	Z	3	4	3	1	2	3	4	4	2	3	8	6	3	4	3	5	3	3	2	3.1	8																						
29-May	2	2	1	1	2	Z	7	4	3	1	2	1	1	1	1	2	2	2	3	3	3	2	1	2	2.1	7																						
30-May	Z	2	3	2	4	8	6	5	2	1	1	1	0	1	1	1	2	2	3	3	3	3	4	4	2.6	8																						
31-May	4	Z	5	4	3	2	2	2	3	3	2	3	3	2	2	3	3	4	4	4	3	1	0	0	2.7	5																						
																								1.9	2.5	2.1	3.0	5.8	7.7	5.1	4.2	3.2	2.6	2.1	1.7	1.4	1.3	1.5	2.2	4.1	4.2	3.2	3.7	4.9	3.3	2.9	2.1	Diurnal Average
																								4	7	6	9	25	29	15	9	8	14	7	8	6	5	6	8	23	28	7	8	14	12	13	6	Diurnal Maximum
Z - zerospan C - Calibration M - Maintenance PF - Power Failure																																																



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	696	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: 702

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	102	51	28	21	26	50	49	44	51	62	64	24	25	20	20	59	696
21 - 40	0	1	1	0	0	0	0	1	3	0	0	0	0	0	0	0	6
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	102	52	29	21	26	50	49	45	54	62	64	24	25	20	20	59	702

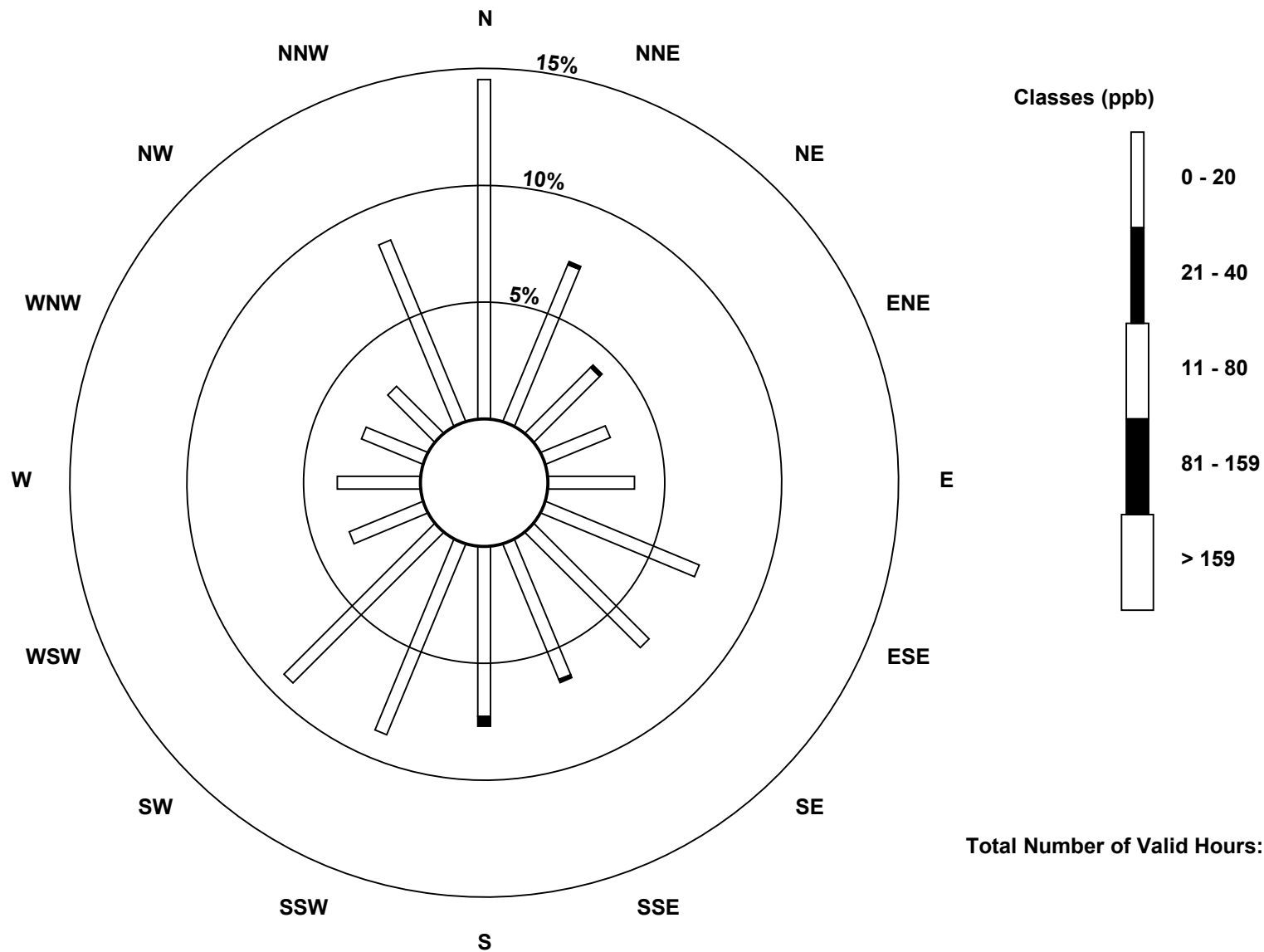
Total Number of Valid Hours: 702

Total Number of Hours: 744

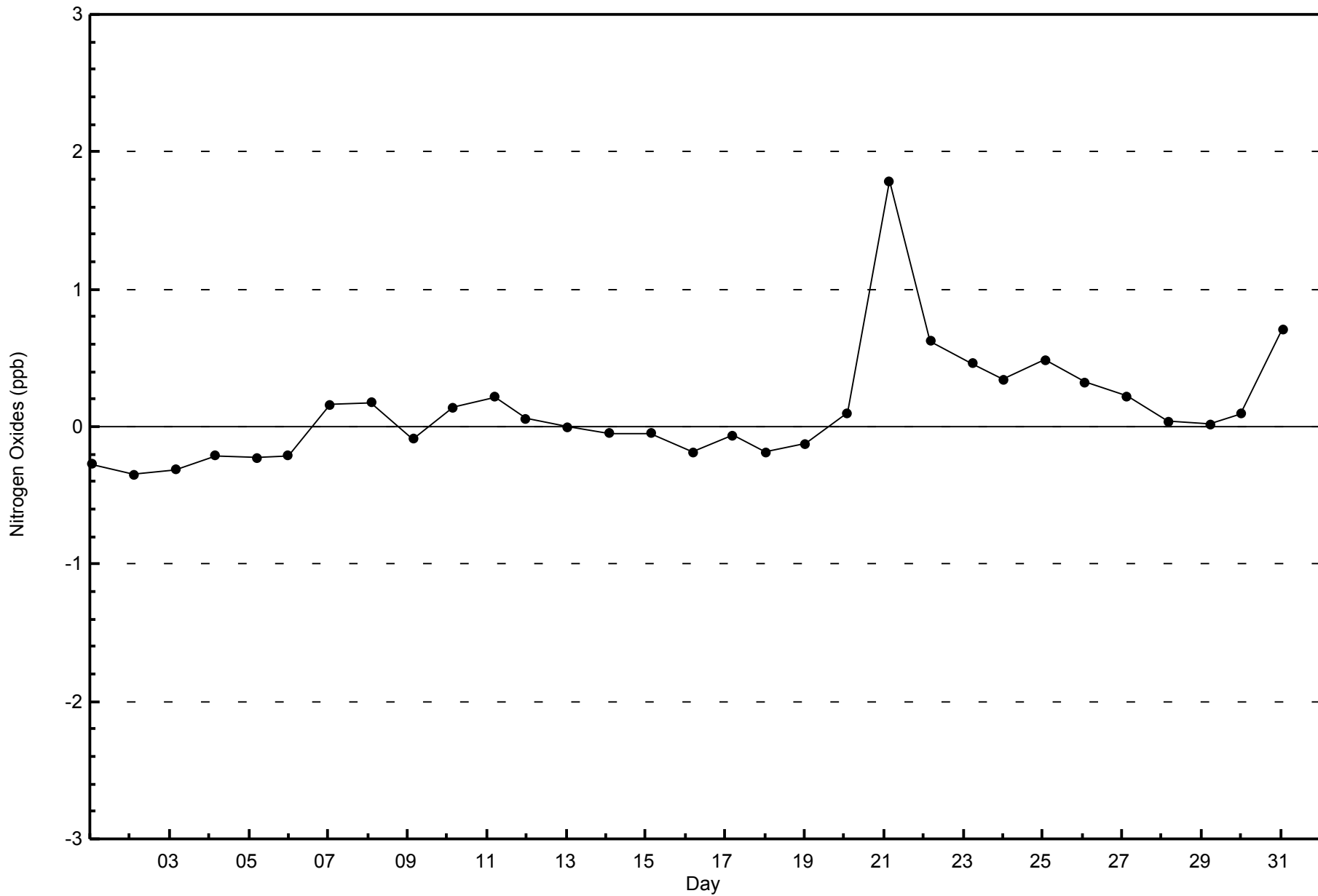


Wood Buffalo Environmental Association
Wind Rose May 2015

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



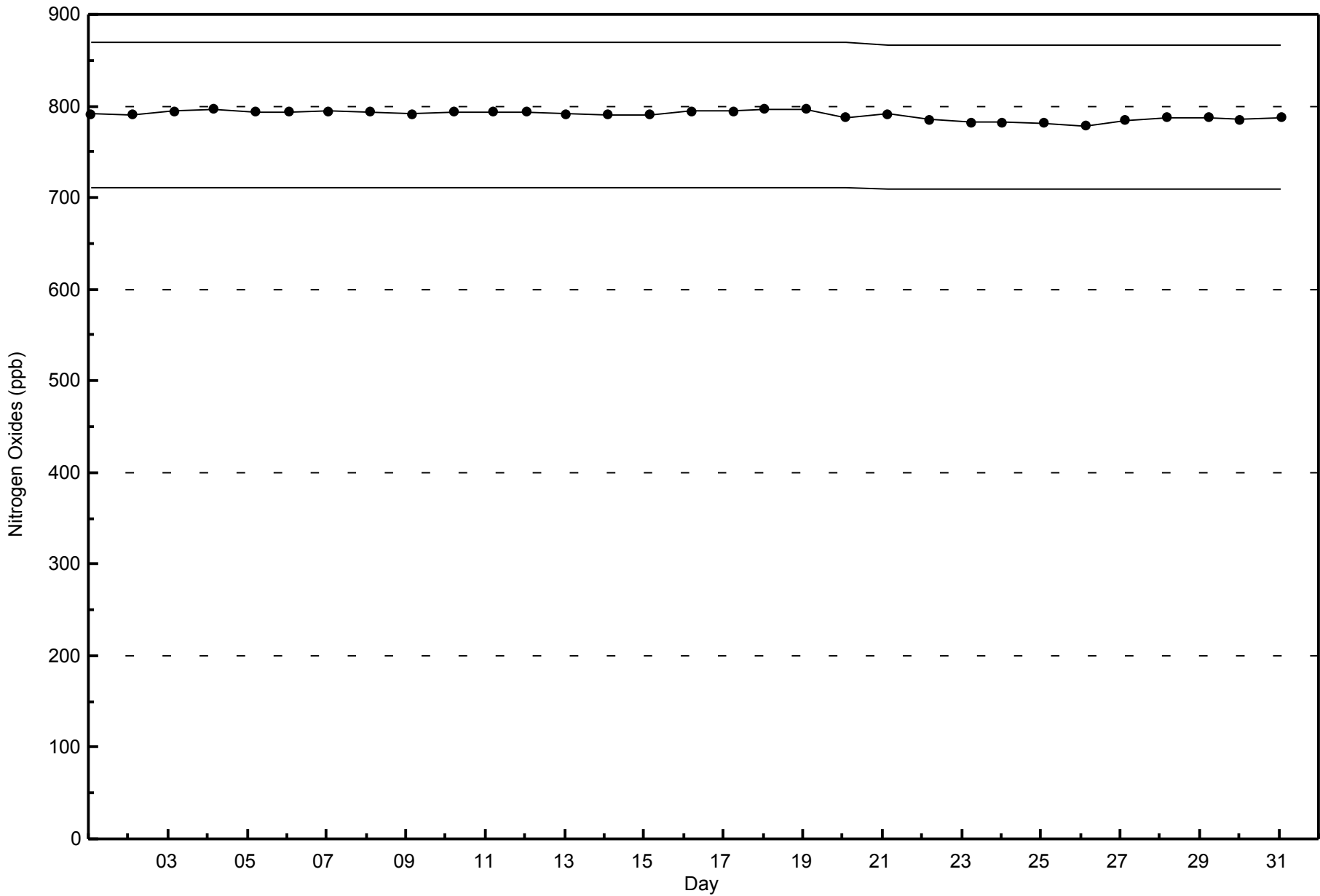
Total Number of Valid Hours: 702





WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Patricia McInnes - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Ammonia (NH₃) - ppb

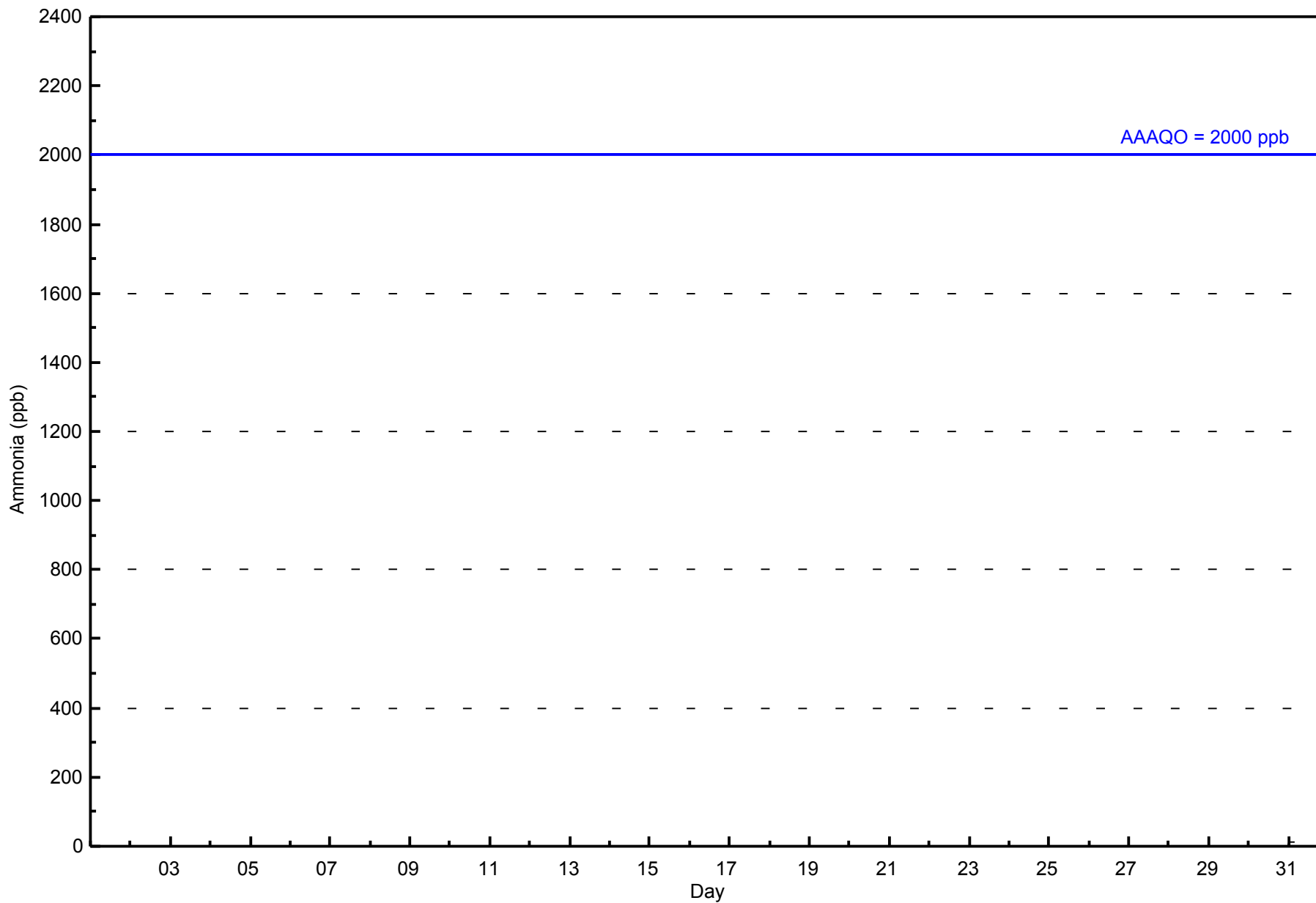
Patricia McInnes - May 2015

Number of Exceedences (AAAQO): 1-hr: 0										Hours in Service: 744																																								
Maximum Value: 13 ppb on May 31 04:00										Maximum Daily Average: 2.1 ppb on May 31										Hours of Data: 648																														
Minimum Value: 0 ppb on May 1 01:00										Minimum Daily Average: 0.0 ppb on May 1										Hours of Missing Data: 96																														
Maximum Diurnal Average: 0.5 ppb at hour 4										Minimum Diurnal Average: 0.0 ppb at hour 5										Hours of Calibration: 49																														
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 = 0										Percent Operational Time: 93.7																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-May	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
2-May	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
3-May	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
4-May	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
5-May	0	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
6-May	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
7-May	0	0	0	0	Z	RE	RE	RE	RE	0	0	PF	PF	PF	0	0	0	0	0	0	0	0	0	0	0	--	0																							
8-May	0	0	0	0	0	Z	RE	RE	RE	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
9-May	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
10-May	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
11-May	0	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
12-May	0	0	0	Z	RE	RE	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
13-May	0	0	0	0	Z	RE	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
14-May	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
15-May	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
16-May	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
17-May	0	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
18-May	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
19-May	0	0	0	0	Z	RE	0	0	0	C	C	C	C	C	C	C	C	0	0	0	0	0	0	UO	0	--	0																							
20-May	0	0	0	0	0	Z	RE	0	C	C	C	C	C	C	C	C	C	C	C	0	0	0	0	0	--	0																								
21-May	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
22-May	0	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
23-May	0	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
24-May	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
25-May	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
26-May	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
27-May	0	0	0	0	0	0	Z	RE	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
28-May	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
29-May	0	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
30-May	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
31-May	11	12	12	13	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.1	13																							
																								0.4	0.4	0.4	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	Diurnal Average		
																								11	12	12	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum	
Z - zerospan C - Calibration UO - Unstable Operation PF - Power Failure RE - Recovery																																																		
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb																																																		



WBEA
Hourly Averages

Ammonia (NH₃) - ppb
Patricia McInnes - May 2015





WBEA
Cumulative Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 5	644	99.38	99.38
6 - 10	0	0.00	99.38
11 - 15	4	0.62	100.00
16 - 20	0	0.00	100.00
21 - 25	0	0.00	100.00
> 26	0	0.00	100.00

Total Number of Valid Hours: 648

Total Number of Hours: 744



WBEA
Frequency Distribution

Ammonia (NH₃) - ppb
Patricia McInnes - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	98	48	27	19	23	43	42	38	44	53	65	28	22	17	23	54	644
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	1	1	1	0	0	0	0	1	0	0	0	0	4
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	98	48	27	19	24	44	43	38	44	53	65	29	22	17	23	54	648

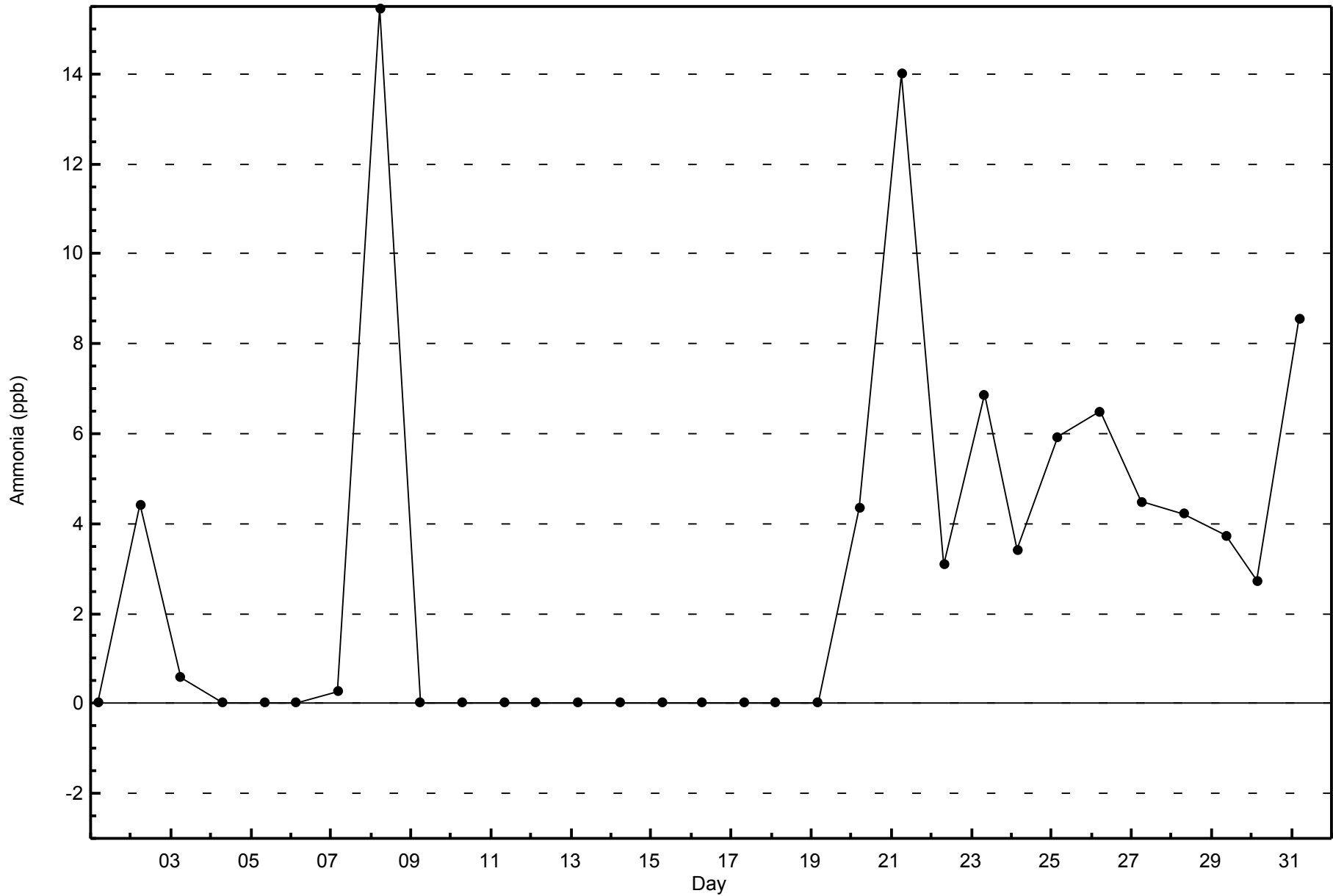
Total Number of Valid Hours: 648

Total Number of Hours: 744



WBEA
Zero Responses

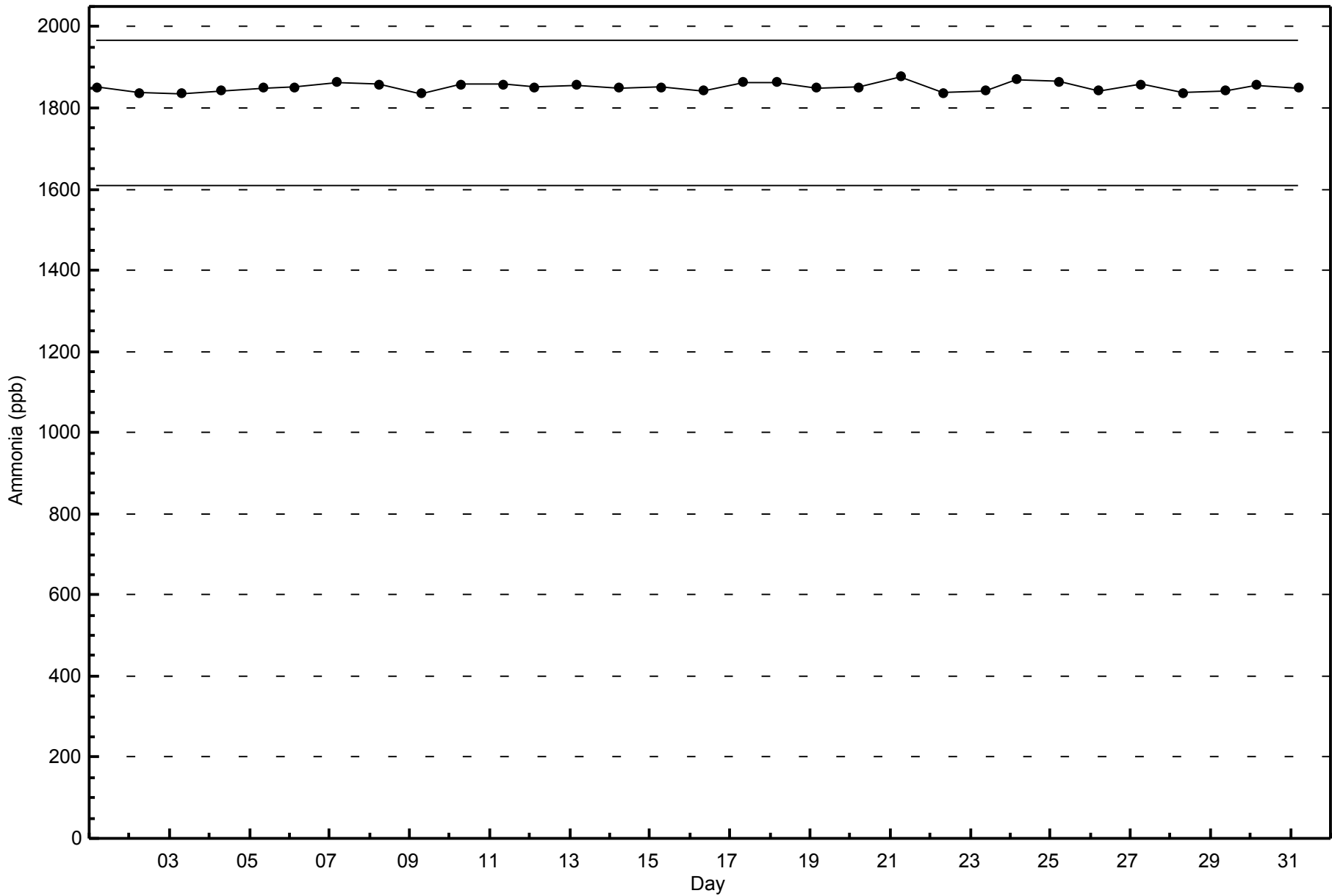
Ammonia (NH₃) - ppb
Patricia McInnes - May 2015





WBEA
Span Responses

Ammonia (NH₃) - ppb
Patricia McInnes - May 2015





Summary of Hour Averages

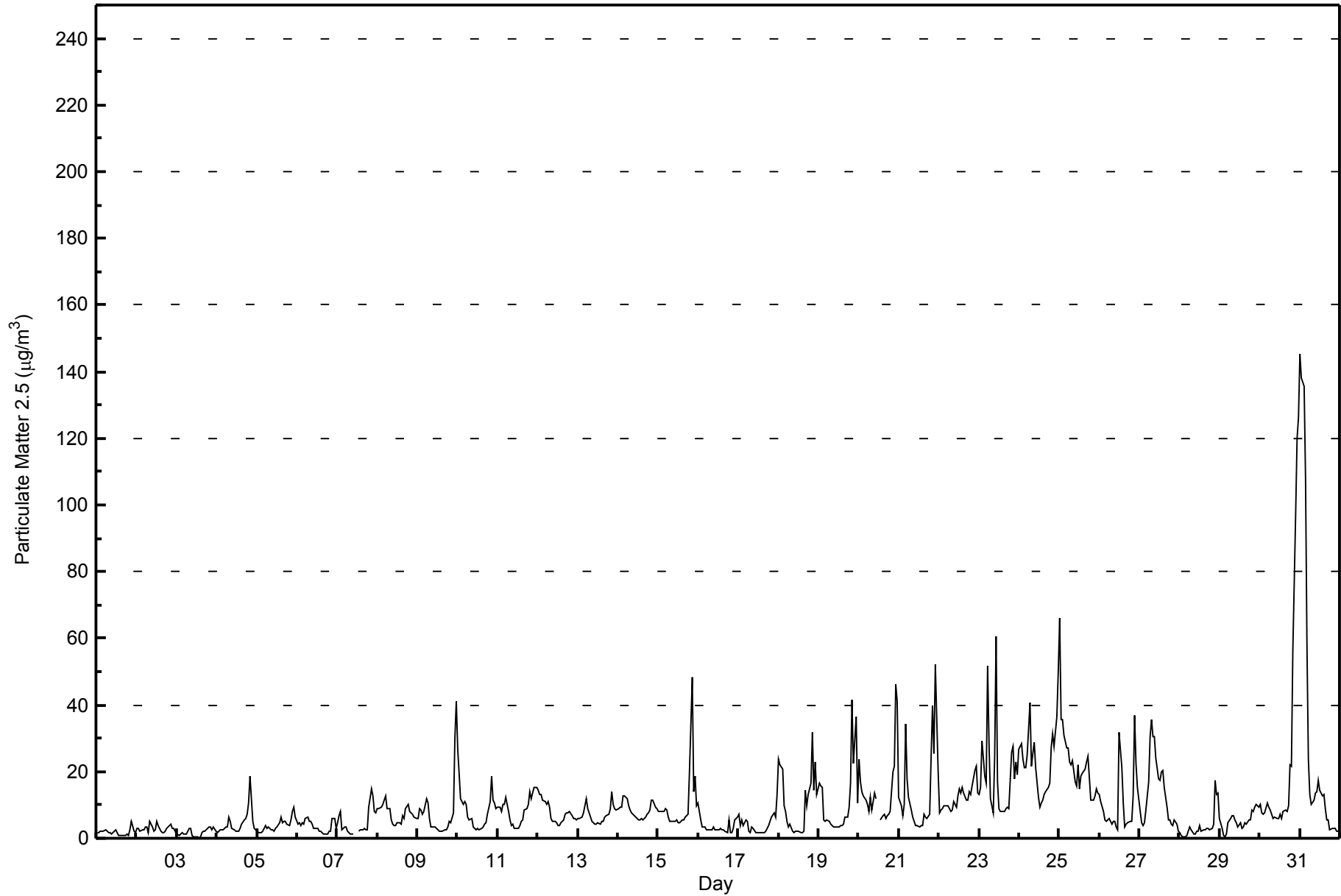
Patricia McInnes - May 2015

Number of Exceedences (AAAQO): 24-hr: 1 Maximum Value: 145.4 µg/m ³ on May 31 01:00		Maximum Daily Average: 31.8 µg/m ³ on May 31		Hours in Service: 744 Hours of Data: 739																						
Minimum Value: 0.2 µg/m ³ on May 3 14:00 Maximum Diurnal Average: 18.6 µg/m ³ at hour 23 Monthly Average: 10.07 µg/m ³		Minimum Daily Average: 1.7 µg/m ³ on May 3 Minimum Diurnal Average: 5.8 µg/m ³ at hour 16 Percentiles: P ₁ = 0.6 P ₁₀ = 2.0 Q ₁ = 3.2 Median = 6.0 Q ₃ = 11.4 P ₉₀ = 21.5 P ₉₉ = 88.4		Hours of Missing Data: 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-May	1.8	1.7	2.2	2.3	2.2	2.5	2.1	1.8	1.5	1.5	1.6	2.3	1.6	1.0	0.7	0.7	0.7	0.9	1.1	1.0	2.7	5.0	2.2	1.9	1.8	5.0
2-May	3.0	2.8	2.0	2.7	2.6	3.3	3.3	1.8	5.0	3.4	2.3	2.6	4.9	3.6	2.1	1.7	1.5	2.0	3.0	3.6	4.2	2.9	2.8	1.9	2.9	5.0
3-May	1.4	0.8	1.1	1.6	1.4	1.4	1.3	3.1	3.2	0.7	0.4	0.2	0.2	0.2	0.6	1.7	2.2	2.3	2.8	3.4	3.4	2.7	3.4	2.2	1.7	3.4
4-May	1.8	2.2	2.5	2.6	2.6	3.5	3.2	6.4	5.1	2.8	2.4	2.3	2.1	2.3	2.8	4.2	5.3	6.1	7.4	10.7	18.5	5.0	3.0	2.4	4.5	18.5
5-May	2.1	1.9	1.7	2.2	3.0	3.9	3.1	3.5	2.6	2.4	2.3	2.8	3.5	4.7	6.3	4.5	5.0	5.0	7.1	3.6	5.3	8.1	9.2	6.2	4.0	9.2
6-May	4.2	4.6	3.9	4.8	4.4	5.7	6.5	5.0	4.9	4.4	3.0	3.0	2.8	2.1	2.3	1.7	1.5	1.4	1.5	2.2	2.3	5.9	6.1	2.8	3.6	6.5
7-May	4.5	6.8	8.2	2.4	3.4	3.6	2.0	1.7	1.2	1.1	PF	PF	PF	2.1	2.6	2.7	2.9	2.7	2.5	9.3	14.9	12.6	7.8	7.8	4.9	14.9
8-May	8.9	9.1	9.3	10.0	11.5	12.7	9.1	8.8	5.5	4.0	3.8	4.0	4.6	4.6	4.4	6.9	5.7	8.7	10.1	8.0	7.8	7.2	6.2	5.8	7.4	12.7
9-May	6.0	9.0	8.3	7.3	7.9	11.7	10.8	6.1	3.3	3.2	3.2	3.0	2.5	2.0	1.9	2.0	2.6	2.7	3.5	4.9	4.6	7.5	30.0	41.3	7.7	41.3
10-May	26.7	19.6	11.9	10.3	11.1	10.0	6.3	5.6	5.9	3.2	2.9	2.7	2.9	2.5	3.0	3.6	4.4	4.6	7.2	10.9	18.7	11.6	10.7	9.0	8.5	26.7
11-May	9.4	9.2	7.9	10.1	10.3	12.2	7.8	5.7	3.7	4.2	3.1	3.2	3.1	3.9	5.3	5.4	8.4	9.1	10.0	14.1	12.0	13.5	15.4	15.3	8.4	15.4
12-May	14.5	13.2	13.0	11.5	11.0	10.3	11.2	9.2	6.0	5.1	5.0	4.7	3.8	3.7	4.6	5.4	7.0	7.7	7.8	8.1	6.8	6.1	5.8	5.6	7.8	14.5
13-May	5.9	6.0	6.4	7.5	9.9	11.8	8.9	6.3	5.0	4.6	4.3	4.4	4.5	4.4	4.9	5.0	6.2	6.9	7.3	8.9	14.0	10.0	8.8	8.3	7.1	14.0
14-May	8.9	9.4	9.5	12.8	12.6	11.7	9.9	8.4	7.7	7.1	7.0	5.9	5.5	5.5	5.9	5.6	6.3	7.1	7.8	8.6	11.4	11.2	9.3	8.8	8.5	12.8
15-May	7.9	8.0	8.2	8.0	8.8	8.6	6.5	5.0	5.2	5.0	5.3	5.4	4.6	4.7	5.5	5.3	6.4	6.8	7.4	19.9	48.3	14.2	18.8	9.5	9.7	48.3
16-May	10.7	5.7	3.4	3.6	3.5	2.4	2.6	2.4	2.7	3.4	2.8	2.6	2.5	3.1	2.4	2.5	2.2	1.9	5.7	1.8	1.9	2.8	5.4	6.5	3.5	10.7
17-May	7.1	3.6	5.7	3.8	5.5	5.1	2.1	1.9	3.3	3.0	1.7	1.6	1.6	1.8	1.6	1.8	2.2	2.8	3.6	4.9	6.2	7.7	6.4	13.3	4.1	13.3
18-May	23.6	22.0	20.7	9.7	8.1	4.9	3.3	4.4	2.1	1.8	2.0	1.9	2.2	1.9	1.8	2.0	14.3	9.7	13.0	16.6	31.9	14.3	22.9	13.0	10.3	31.9
19-May	16.7	15.6	15.3	5.3	5.1	5.3	4.9	4.2	3.8	3.5	3.3	3.6	3.4	3.9	3.9	4.4	6.3	6.3	9.2	16.6	41.4	22.4	36.4	10.5	10.5	41.4
20-May	23.9	16.9	14.0	12.7	11.3	10.0	8.2	12.3	8.4	13.6	12.0	M	M	5.5	6.8	7.3	6.0	6.7	7.2	8.0	20.1	21.5	46.0	41.3	14.5	46.0
21-May	12.2	9.8	6.7	10.2	34.1	17.7	12.4	8.3	6.5	4.9	3.6	3.9	3.5	3.9	3.9	7.1	6.4	6.1	7.0	24.1	39.9	25.3	52.2	19.9	13.7	52.2
22-May	7.5	8.3	8.9	10.0	9.6	9.6	8.9	8.0	8.4	11.0	9.4	12.8	14.9	13.6	15.3	13.7	11.5	11.6	14.0	13.2	15.7	20.5	21.7	13.4	12.1	21.7
23-May	13.0	15.4	29.4	18.6	16.7	51.6	28.5	11.7	7.7	24.6	60.5	16.9	8.7	7.9	8.0	8.1	8.9	9.3	9.0	25.7	27.7	17.9	22.9	18.9	19.5	60.5
24-May	26.8	28.3	23.7	21.2	21.1	25.0	40.7	21.8	25.3	28.9	21.4	12.4	9.3	10.4	11.5	13.1	14.1	15.2	16.4	27.0	31.3	27.5	36.6	50.2	23.3	50.2
25-May	66.0	35.4	35.5	30.9	26.9	26.9	22.9	21.8	23.2	17.2	15.5	21.9	15.0	18.6	19.3	20.7	22.8	24.8	18.0	11.3	11.3	12.5	14.9	13.6	22.8	66.0
26-May	13.2	11.1	7.9	5.7	5.2	5.5	5.8	4.4	4.9	5.0	3.5	2.6	31.6	21.1	10.5	3.2	4.1	4.7	4.9	5.0	12.9	36.7	22.6	15.3	10.3	36.7
27-May	8.1	4.5	3.6	4.5	8.6	16.8	30.4	35.4	30.5	30.4	24.2	17.6	17.5	19.9	20.2	15.3	9.2	5.6	5.4	4.0	3.8	5.4	4.1	2.2	13.6	35.4
28-May	1.6	0.8	0.5	0.5	0.7	2.0	3.2	2.7	1.2	1.1	2.1	2.2	3.6	2.0	2.6	2.4	3.0	2.9	2.5	2.9	4.3	17.3	13.3	13.7	3.7	17.3
29-May	6.1	2.9	0.9	0.5	1.2	4.6	5.9	6.6	6.9	5.4	4.5	3.5	4.5	3.0	3.4	4.6	4.3	5.3	5.7	8.5	7.9	9.4	10.0	9.5	5.2	10.0
30-May	10.4	7.8	7.2	7.7	10.8	9.4	8.4	7.4	6.0	6.5	6.0	5.8	7.2	5.9	7.8	8.4	7.8	9.9	22.1	21.6	56.3	97.4	119.8	126.2	24.3	126.2
31-May	145.4	138.3	135.5	107.5	57.5	23.9	13.2	10.3	11.5	13.4	13.8	17.3	14.5	12.6	13.2	8.8	5.5	5.5	2.5	2.8	3.0	2.8	2.0	2.0	31.8	145.4
																								Diurnal Average		
																								Diurnal Maximum		
																								16.1 13.9 13.4 11.2 10.6 10.8 9.5 7.8 7.0 7.3 7.8 6.0 6.4 5.9 6.0 5.8 6.3 6.5 7.4 10.0 15.8 15.0 18.6 16.1		
																								145.4 138.3 135.5 107.5 57.5 51.6 40.7 35.4 30.5 30.4 60.5 21.9 31.6 21.1 20.2 20.7 22.8 24.8 22.1 27.0 56.3 97.4 119.8 126.2		
M - Maintenance PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - May 2015





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	319	43.17	43.17
6 - 15	290	39.24	82.41
16 - 25	64	8.66	91.07
26 - 80	41	5.55	96.62
> 81.0	7	0.95	97.56

Total Number of Valid Hours: 739

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Patricia McInnes - May 2015

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	58	30	17	16	12	17	18	17	27	20	30	12	4	6	8	27	319
6 - 15	30	19	9	5	11	27	27	23	27	38	25	6	8	5	10	20	290
16 - 25	9	2	1	0	3	3	3	4	5	1	10	3	7	3	1	9	64
26 - 80	2	2	2	1	0	4	1	2	0	5	4	6	5	3	0	4	41
> 81.0	0	0	0	0	1	1	1	3	0	0	0	1	0	0	0	0	7
Totals	99	53	29	22	27	52	50	49	59	64	69	28	24	17	19	60	721

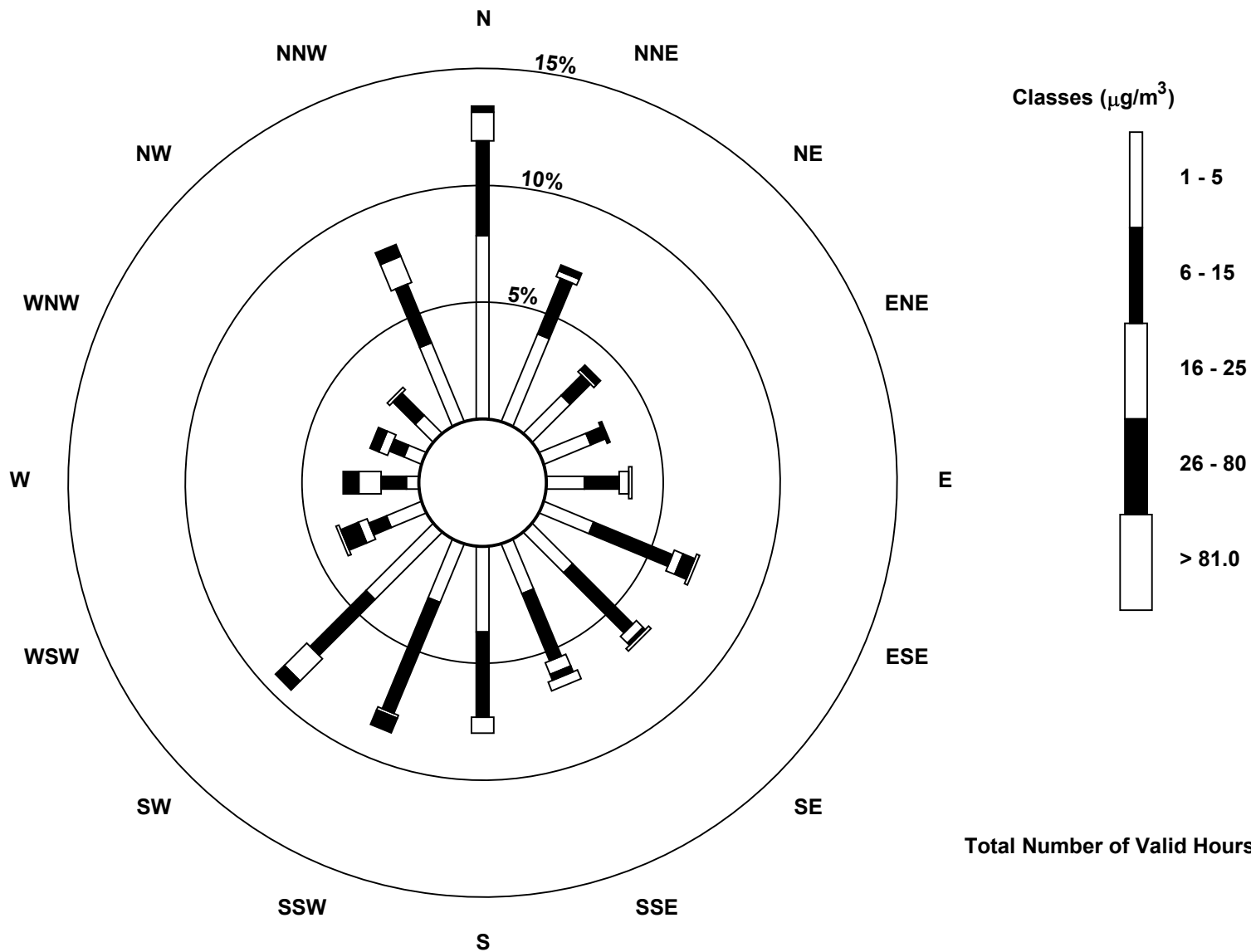
Total Number of Valid Hours: 739

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Patricia McInnes (AMS 6)



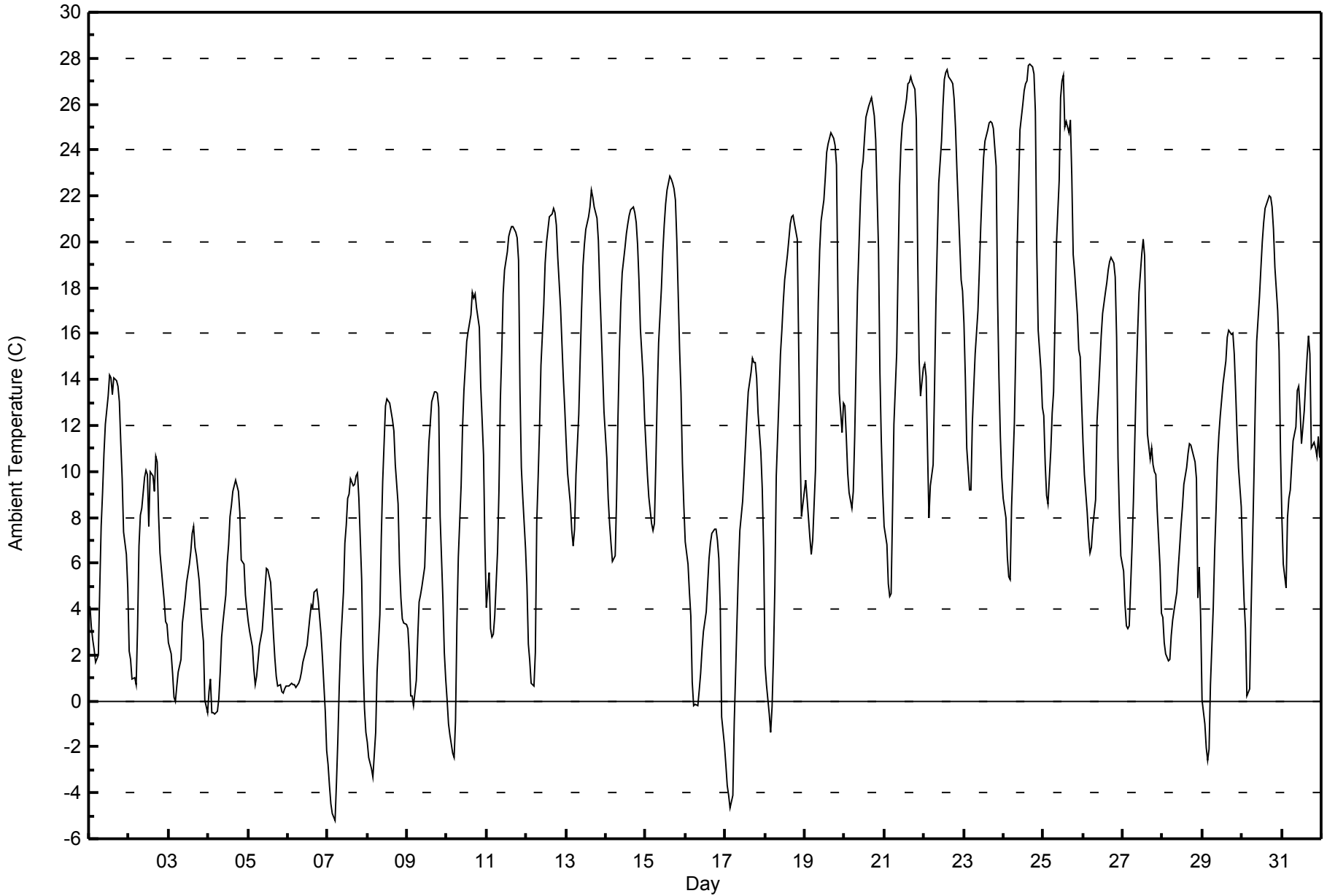


Maximum Value: 27.7 C on May 24 17:00		Maximum Daily Average: 20.2 C on May 22		Hours in Service: 744																																												
Minimum Value: -5.2 C on May 7 05:00		Minimum Daily Average: 2.0 C on May 6		Hours of Data: 744																																												
Maximum Diurnal Average: 17.1 C at hour 17		Minimum Diurnal Average: 2.8 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 10.89 C		Percentiles: P ₁ = -3.7 P ₁₀ = 0.7 Q ₁ = 4.4 Median = 10.0 Q ₃ = 17.0 P ₉₀ = 22.2 P ₉₉ = 27.2		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	4.1	3.2	2.7	2.2	1.7	2.0	4.9	7.6	9.1	10.8	12.1	13.3	14.2	14.1	13.3	14.1	14.0	13.7	13.0	11.3	9.7	7.3	6.4	4.9	8.7	14.2																						
2-May	2.2	1.8	1.0	1.0	0.7	3.2	6.8	8.1	8.4	9.7	10.1	9.9	7.6	10.0	9.8	9.1	10.6	10.4	8.1	6.5	5.1	4.4	3.4	3.4	6.3	10.6																						
3-May	2.6	2.0	1.2	0.1	0.0	0.7	1.3	1.8	3.4	3.9	4.5	5.2	6.0	6.5	7.3	7.6	6.7	6.3	5.3	4.2	3.3	2.6	0.0	-0.5	3.4	7.6																						
4-May	0.4	0.9	-0.5	-0.5	-0.6	-0.4	0.1	1.3	2.8	3.5	4.6	6.0	6.8	8.0	8.5	9.2	9.6	9.4	9.2	8.2	6.1	5.9	4.6	4.0	4.5	9.6																						
5-May	3.5	3.0	2.3	1.4	0.7	1.1	1.8	2.4	3.1	3.9	4.8	5.8	5.7	5.2	4.1	2.9	1.9	1.1	0.7	0.7	0.4	0.3	0.5	0.6	2.4	5.8																						
6-May	0.6	0.7	0.7	0.7	0.7	0.6	0.8	1.0	1.3	1.7	1.9	2.4	3.0	3.6	4.2	4.1	4.7	4.9	4.4	3.6	2.9	1.9	-0.5	-2.1	2.0	4.9																						
7-May	-2.8	-3.7	-4.4	-4.9	-5.2	-3.6	-1.7	0.7	2.5	4.7	6.9	7.6	8.8	9.0	9.7	9.4	9.5	9.8	9.9	8.9	5.3	1.7	-0.3	-1.4	3.2	9.9																						
8-May	-1.8	-2.5	-3.0	-3.3	-2.4	-1.4	1.3	3.8	7.1	9.5	11.2	12.8	13.2	13.0	12.6	12.3	11.8	10.3	8.6	5.9	4.5	3.6	3.4	3.4	5.6	13.2																						
9-May	3.1	2.0	0.2	0.2	-0.2	0.9	2.7	4.3	4.6	5.0	5.9	7.8	9.6	11.3	12.1	13.0	13.5	13.5	13.4	12.8	8.1	4.5	2.1	0.9	6.3	13.5																						
10-May	0.0	-1.0	-1.5	-2.3	-2.4	-0.9	3.4	6.3	9.4	11.9	13.5	14.5	15.7	16.1	16.8	17.8	17.5	17.7	17.1	16.3	13.7	12.3	10.7	6.8	9.6	17.8																						
11-May	4.1	5.6	3.1	2.8	2.9	3.7	6.5	9.1	13.1	15.2	17.7	18.8	19.6	20.3	20.5	20.7	20.7	20.4	20.2	19.2	13.6	10.1	8.9	6.6	12.6	20.7																						
12-May	5.0	2.5	1.7	0.8	0.6	2.1	7.8	9.8	11.9	14.6	17.2	19.1	20.0	20.5	21.1	21.2	21.5	21.3	20.7	19.3	17.1	15.5	14.0	12.7	13.3	21.5																						
13-May	11.3	9.9	8.6	7.4	6.8	7.5	9.9	12.5	14.9	17.1	19.0	19.9	20.5	21.1	21.5	22.2	22.0	21.5	21.0	20.1	18.0	16.2	14.4	12.6	15.7	22.2																						
14-May	10.6	8.8	7.7	6.9	6.1	6.3	8.8	12.4	15.3	17.3	18.7	19.8	20.3	20.8	21.1	21.4	21.5	21.3	20.8	19.9	18.3	16.2	14.1	12.3	15.3	21.5																						
15-May	11.1	9.8	8.9	7.8	7.4	7.7	10.3	13.3	15.6	18.0	19.5	20.7	21.6	22.3	22.8	22.8	22.5	22.3	21.8	20.1	15.3	13.4	10.3	8.5	15.6	22.8																						
16-May	7.0	6.0	4.7	3.7	0.8	-0.2	-0.2	-0.2	0.5	1.2	2.3	3.0	3.9	5.1	6.2	6.9	7.3	7.5	7.5	7.0	6.2	4.1	-0.7	-1.9	3.6	7.5																						
17-May	-2.8	-3.7	-4.1	-4.6	-4.1	-0.9	1.3	3.6	5.8	7.4	8.7	9.9	11.1	12.4	13.5	14.3	15.0	14.7	14.7	14.0	12.5	10.8	9.2	6.6	6.9	15.0																						
18-May	1.6	0.7	-0.6	-1.3	-0.2	1.9	5.0	9.8	13.3	15.1	16.2	17.4	18.4	19.5	20.1	20.8	21.1	21.1	20.8	20.1	15.5	10.9	8.1	8.6	11.8	21.1																						
19-May	9.6	8.8	8.0	7.1	6.4	7.0	10.0	13.9	17.4	19.6	20.9	21.8	22.8	23.9	24.3	24.5	24.7	24.5	24.2	23.3	17.9	13.4	11.7	13.0	16.6	24.7																						
20-May	12.9	11.5	9.9	9.1	8.4	9.1	11.5	14.8	17.8	21.6	23.1	23.5	24.5	25.4	25.9	26.1	26.3	25.9	25.5	24.5	19.7	14.3	11.4	9.1	18.0	26.3																						
21-May	7.6	6.8	5.1	4.5	4.7	8.2	12.1	15.2	18.9	22.4	24.2	25.1	25.8	26.2	26.9	27.0	27.2	27.0	26.6	25.3	19.3	14.9	13.3	14.5	17.9	27.2																						
22-May	14.7	14.2	11.0	7.9	9.4	10.3	13.6	17.4	20.1	22.5	24.4	25.9	27.1	27.4	27.5	27.2	27.0	26.9	26.2	24.9	23.1	19.9	18.3	17.8	20.2	27.5																						
23-May	16.4	14.1	11.0	9.2	9.2	12.1	13.7	15.1	17.0	18.7	20.7	22.3	23.7	24.4	24.9	25.2	25.2	25.2	24.9	23.3	17.6	14.1	11.5	9.8	17.9	25.2																						
24-May	8.8	8.0	6.3	5.4	5.3	8.5	12.1	15.3	19.8	22.4	24.9	26.0	26.6	26.9	27.0	27.7	27.7	27.6	27.3	25.7	19.7	16.1	14.4	12.8	18.4	27.7																						
25-May	12.4	10.4	9.0	8.6	10.9	12.5	13.5	16.5	19.9	22.7	26.3	27.0	27.3	25.0	25.2	24.7	25.3	22.9	19.4	18.7	16.8	15.3	15.0	13.1	18.3	27.3																						
26-May	11.3	9.9	8.2	7.1	6.4	6.7	7.6	8.8	12.2	13.4	14.6	15.9	16.9	17.8	18.2	18.7	19.1	19.3	19.1	18.5	15.9	10.6	8.1	6.3	12.9	19.3																						
27-May	5.7	4.2	3.3	3.2	3.2	6.7	8.7	11.4	13.9	16.0	17.8	19.5	20.1	19.4	15.5	11.6	10.6	11.0	10.3	10.0	9.8	8.3	5.8	3.8	10.4	20.1																						
28-May	3.6	2.5	2.1	1.8	1.8	2.8	3.5	3.9	4.8	5.8	6.7	7.7	8.4	9.4	10.2	10.8	11.2	11.2	10.9	10.4	9.7	4.5	5.8	3.6	6.4	11.2																						
29-May	0.0	-1.0	-2.0	-2.6	-2.1	0.7	4.1	6.5	8.3	10.4	11.6	12.5	13.8	14.3	14.8	15.8	16.2	16.0	16.0	15.1	13.5	11.7	10.2	8.5	8.8	16.2																						
30-May	6.2	4.3	3.2	0.2	0.5	3.9	6.8	9.6	12.9	15.7	17.6	18.9	20.0	20.9	21.5	21.8	22.0	21.9	21.5	20.5	18.9	17.0	15.2	10.9	13.8	22.0																						
31-May	8.0	5.9	4.9	8.0	8.8	9.2	10.3	11.3	12.0	13.5	13.7	12.7	11.2	12.7	13.9	15.0	15.9	15.1	11.0	11.3	11.0	10.6	11.5	10.6	11.2	15.9																						
																								5.7	4.7	3.5	2.8	2.8	4.1	6.4	8.6	10.9	12.8	14.2	15.2	15.9	16.5	16.8	17.0	17.1	16.8	16.1	15.1	12.5	10.1	8.4	7.1	Diurnal Average
																								16.4	14.2	11.0	9.2	10.9	12.5	13.7	17.4	20.1	22.7	26.3	27.0	27.3	27.4	27.5	27.7	27.7	27.6	27.3	25.7	23.1	19.9	18.3	17.8	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Patricia McInnes - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Patricia McInnes - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	47	6.32	6.32
0 - 10	327	43.95	50.27
10 - 20	245	32.93	83.20
> 20	125	16.80	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

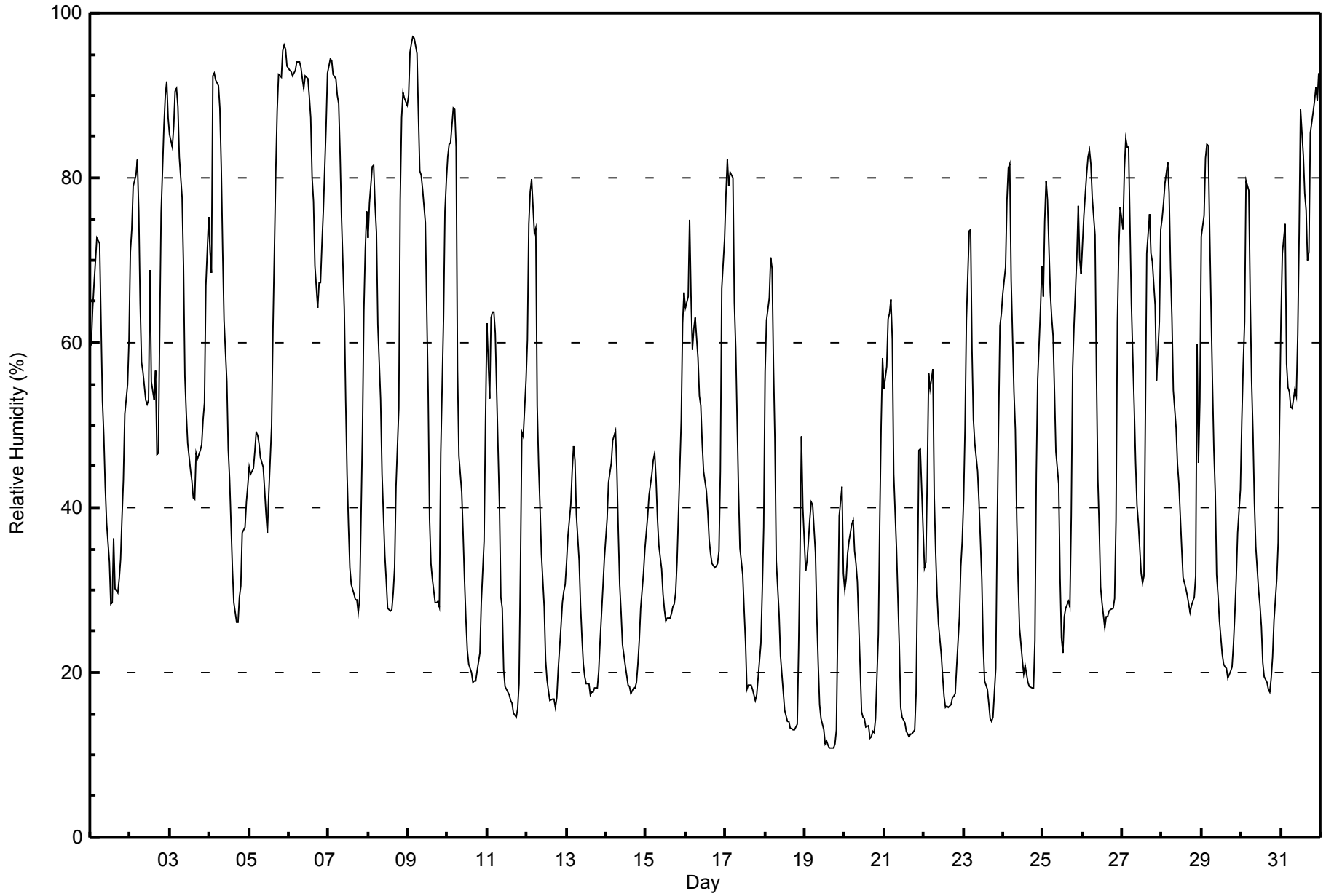
Patricia McInnes - May 2015

Maximum Value: 97 % on May 9 04:00														Maximum Daily Average: 85.1 % on May 6														Hours in Service: 744	
Minimum Value: 11 % on May 19 16:00														Minimum Daily Average: 24.1 % on May 19														Hours of Data: 744	
Maximum Diurnal Average: 71.7 % at hour 4														Minimum Diurnal Average: 29.6 % at hour 17														Hours of Missing Data: 0	
Monthly Average: 47.4 %														Percentiles: P ₁ = 12 P ₁₀ = 18 Q ₁ = 28 Median = 43 Q ₃ = 67 P ₉₀ = 83 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-May	60	64	67	70	73	72	63	53	49	43	38	33	28	28	36	30	30	31	34	39	43	51	55	60	48.0	73			
2-May	71	74	79	80	82	76	65	58	56	53	53	53	69	55	53	57	46	47	62	76	86	90	92	87	67.5	92			
3-May	85	84	86	91	91	89	82	78	69	56	51	48	45	43	41	41	47	46	47	48	51	53	67	75	63.0	91			
4-May	71	69	92	93	92	91	88	81	71	63	55	47	43	38	33	29	26	26	29	30	37	38	41	43	55.3	93			
5-May	45	44	45	47	49	49	48	46	45	42	39	37	42	50	62	71	81	88	93	92	95	96	96	94	62.3	96			
6-May	93	93	92	93	93	94	94	93	92	91	92	92	90	87	80	77	69	64	67	67	72	76	86	93	85.1	94			
7-May	94	94	94	93	92	90	89	83	75	64	53	44	38	33	31	29	29	29	27	29	49	64	71	76	61.2	94			
8-May	73	77	81	81	77	73	62	53	44	39	34	31	28	27	28	30	33	43	52	77	87	90	90	89	58.3	90			
9-May	90	95	96	97	97	95	88	81	80	79	75	64	54	39	33	31	29	28	29	28	47	63	76	80	65.5	97			
10-May	83	84	84	88	88	84	57	46	42	37	31	26	23	21	20	19	19	19	20	22	28	32	36	50	44.2	88			
11-May	62	53	63	64	64	61	47	40	29	28	20	18	18	17	17	16	15	15	16	19	32	49	49	55	36.1	64			
12-May	60	74	78	80	73	74	52	45	40	34	28	21	19	18	17	17	17	16	17	20	26	28	30	31	38.2	80			
13-May	33	37	40	44	47	46	39	34	28	24	21	19	19	19	17	18	18	18	18	20	24	27	30	34	28.1	47			
14-May	39	43	44	45	48	49	45	37	31	27	23	21	20	18	18	17	18	18	19	21	24	28	32	35	30.1	49			
15-May	37	39	42	44	46	47	43	39	35	33	29	28	26	27	27	27	28	28	30	33	45	51	62	66	37.9	66			
16-May	64	66	75	66	59	62	63	58	54	52	48	44	42	39	36	34	33	33	33	33	35	44	67	73	50.5	75			
17-May	78	82	79	81	80	65	59	51	42	35	32	28	24	18	19	19	18	17	17	17	19	24	30	38	40.4	82			
18-May	56	63	65	70	69	57	48	34	27	22	20	18	15	14	14	13	13	13	13	14	23	35	49	40	33.6	70			
19-May	32	34	36	39	41	40	35	27	21	16	14	13	11	12	11	11	11	11	11	13	26	39	42	32	24.1	42			
20-May	30	31	34	36	38	39	35	33	31	21	15	15	14	13	14	12	12	13	13	14	25	38	50	58	26.4	58			
21-May	54	57	63	63	65	60	44	35	29	23	16	15	14	13	13	12	13	13	13	17	31	47	47	37	33.1	65			
22-May	33	33	43	56	54	57	41	35	30	26	22	19	17	16	16	16	16	17	17	17	21	27	33	36	29.1	57			
23-May	41	49	63	74	74	59	51	48	44	41	36	31	23	19	18	16	14	14	15	20	37	50	62	64	40.2	74			
24-May	66	69	77	81	82	68	54	50	39	31	25	22	20	21	20	19	18	18	18	24	44	56	64	69	43.9	82			
25-May	66	75	80	77	66	63	61	54	47	43	32	24	22	27	28	29	28	39	57	62	70	77	70	68	52.7	80			
26-May	72	75	81	83	83	82	78	73	56	44	38	30	28	25	27	27	27	28	28	29	38	62	72	76	52.6	83			
27-May	74	81	85	84	84	65	58	52	46	40	38	32	31	32	51	71	76	71	70	67	65	55	63	74	60.9	85			
28-May	75	77	79	82	78	69	63	54	50	45	43	39	35	32	30	29	28	27	28	29	32	60	45	53	49.3	82			
29-May	73	75	82	84	84	74	55	47	42	32	29	26	22	21	21	20	19	20	21	23	27	31	37	42	42.1	84			
30-May	51	57	62	80	79	66	55	49	41	35	30	28	26	21	20	19	18	18	19	22	26	31	36	51	39.1	80			
31-May	63	71	74	57	55	54	52	52	54	53	61	73	88	83	78	76	70	71	85	88	89	91	89	93	71.8	93			
														62.0 65.2 69.9 71.7 71.1 66.7 58.5 52.2 46.4 41.0 36.9 33.6 32.1 29.9 29.8 30.1 29.6 30.3 32.8 35.9 43.7 51.8 57.0 60.4														Diurnal Average	
														94 95 96 97 97 95 94 93 92 91 92 92 90 87 80 77 81 88 93 92 95 96 96 94														Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Patricia McInnes - May 2015





Maximum Speed: 30 km/h on May 15 21:00	Maximum Daily Speed Average: 19.7 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 3 09:00	Minimum Daily Speed Average: 0.7 km/h on May 24	Hours of Data: 744
Maximum Diurnal Speed Average: 4.4 km/h at hour 20	Minimum Diurnal Speed Average: 0.4 km/h at hour 6	Hours of Missing Data: 0
Monthly Average Velocity: 1.6 km/h 5.6 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 8 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-May	SW13	SW12	SW13	SW13	SW14	SW10	SW12	SW17	SW19	SW18	SW15	WSW19	WSW19	WSW18	WNW16	W21	W19	SW17	WNW14	WNW10	SW7	WSW9	WSW9	WSW7	WSW13.1	W21
2-May	WSW5	SSW3	SW3	S2	SW4	WNW4	NNW6	N9	N16	NNW15	N15	N18	NW7	NNW12	NNW16	NNW12	NW14	N15	NNE12	N9	WSW11	NW9	NNW9	N16	NNW8.2	N18
3-May	NNW16	N14	NNW11	NW5	NW6	WNW5	N8	NNW6	SSW0	NW11	NW14	NW10	NW11	WNW12	NNW14	NNW17	N18	N19	NNE17	NNE15	NNE8	NE6	NE3	N4	NNW9.1	N19
4-May	NW2	S8	S9	SSE5	SSW4	NNW3	NNW5	NE4	ENE5	ESE6	SE5	ESE5	ENE6	ENE5	ENE2	NNE7	N8	N10	N9	N9	N8	ENE13	E15	E16	ENE3.8	E16
5-May	E13	E12	E13	ENE13	ENE12	ENE12	ENE11	ENE10	NNE11	NE13	NE14	NE16	NE19	NNE24	NNE27	NNE26	N24	NNW20	N20	N15	N13	N12	N14	NNW15	NNE13.3	NNE27
6-May	NNW18	NNW16	NNW17	NNW15	NNW16	NNW16	NNW17	NNW20	NNW20	NNW21	N21	N21	N22	N23	NNE22	NE18	NNE18	NE15	ENE14	ENE12	E9	ESE6	W3	WSW3	N13.2	N23
7-May	W2	W3	SW2	SW2	S3	S2	S4	SSE7	SSE7	SSE4	SW1	NNW6	NNE10	NNE11	NNE14	NNE14	NNE10	N8	N8	NNW7	N3	NW3	NW1	NNW3	N2.6	NNE14
8-May	WSW3	WSW2	NW1	SSW2	SSE4	S4	SSE6	SE5	ESE5	SSE5	ESE7	E7	ESE7	SSW3	W5	NE11	N13	NNE18	NNE23	NNE19	NE15	ENE13	E12	ESE6	ENE4.6	NNE23
9-May	ESE1	NNE5	NW5	NW8	NW7	NNW5	N6	E5	SE8	ESE8	SE8	SE10	SSE8	SSE9	SSE7	SSW5	SE3	W4	SSW1	NNW4	W3	WSW3	W3	WSW3	SSE1.1	SE10
10-May	N1	NNW2	W2	WNW2	WSW0	WSW2	SE4	SE5	SE4	NE2	E3	E3	NW1	N5	NE4	N6	SSE6	NE2	ESE7	ESE7	ESE7	SE9	SE6	SSE5	ESE2.2	SE9
11-May	S6	SSE8	S5	S6	S6	SSE6	SSE7	S8	S6	E9	ENE6	SE7	SE6	NE6	ENE7	NE7	NE11	NNE9	NNE8	NNE6	WNW5	W5	NW7	N4	E2.5	NE11
12-May	E3	NNW3	N5	NNW4	WNW3	WNW3	E1	E7	ENE6	NE7	E10	ESE11	ESE9	SE11	ESE10	ESE10	E10	ESE10	E14	E17	E16	ESE18	ESE16	ESE14	E7.5	ESE18
13-May	ESE12	ESE11	SE10	SE9	SE9	SE8	SSE9	S13	S16	S14	S13	S14	S12	S9	S8	SW5	SSW9	S9	S11	SSW10	SSE7	SSE11	SSW10	S11	S9.1	S16
14-May	SSW7	SSW7	SSW6	SSW8	SSW9	SSW7	SSW10	SW14	SW17	SW15	SW16	SSW13	SSW13	SSW12	SW13	S12	SSW11	SSW12	SW12	SW9	SSW9	SSW11	SW11	SW11	SSW10.8	SW17
15-May	SW9	SW7	SSW9	SW10	SSW8	S6	SSW8	SSW13	SSW13	SW11	SW15	WSW15	WSW13	SW14	SW12	WSW11	W10	SW8	S11	NW12	NNW30	N24	NNW26	N29	W6.8	NNW30
16-May	N26	N23	N24	N26	N27	N26	N25	N24	N25	N25	NNE26	N26	NNE24	N23	NNE19	N20	N19	N19	N15	NNE14	NE11	NNE7	NW5	NW5	N19.7	N27
17-May	NW5	NW4	WNW2	NNW1	SSE3	SE7	SE5	SSE10	SSE9	SSE9	SE8	SE9	SE9	SE7	SE8	ESE4	E8	ESE8	ESE10	ESE11	ESE10	ESE9	SE10	SE5	SE5.9	ESE11
18-May	S3	SSE4	S5	SSW5	S7	S7	S7	S7	S8	SW12	SSW12	SW12	SSW11	S9	SW9	S10	S9	SSW6	SW6	SW5	SW4	WSW4	WSW3	SSW8	SSW6.8	SW12
19-May	SW13	SW12	SW12	SW12	SSW8	S7	SSW8	SSW9	SW10	SW11	SW8	S10	SSE7	S3	S7	SSE7	S7	SSE6	S5	SW5	W4	WSW4	SW6	SW9	SSW7.1	SW13
20-May	SW12	SW11	SW9	SSW9	SSW9	SSE5	S7	SSE7	SE8	S10	SSW7	SSW11	SSW7	SSE8	SSW9	S9	S8	SW9	SSW9	SW6	SW5	SW3	WSW3	SSW4	SSW6.9	SW12
21-May	SSW5	S5	SSW3	SSW4	SSW5	SSE6	SE5	SSE7	SSE6	SSE6	SSW11	S11	SSW10	SSW12	SSW8	S11	SW8	SW5	SW6	W4	WSW3	W4	SW6	SW9	SSW5.7	SSW12
22-May	SW9	SW11	S3	S5	SSW7	SSW6	SSW6	W3	NNE2	NNE7	N13	NNE14	N15	N16	NNW18	N20	N20	N18	N21	N20	N12	N9	N10	N11	N7.6	N21
23-May	N10	NNW8	NNW6	NNW7	NNW7	NNE8	NE7	NNE6	NNE5	NNE8	NNW6	N4	N8	NNW8	NNE8	NE7	NNE8	ENE6	NNE7	NNE3	W4	W3	WNW4	W3	N5.1	N10
24-May	WSW5	W2	WNW3	W3	W1	S3	SSE3	SSE6	S9	ESE7	E6	NE4	NE5	SSE6	NNE10	NE6	N7	NNE8	NE3	NE4	WNW2	WNW4	WSW3	WNW3	ENE0.7	NNE10
25-May	W2	WSW3	SSW3	SSW4	SW7	SSW5	SW9	SSW3	E4	ESE5	ENE4	SW5	W13	WNW21	NNW18	N8	N4	W11	NNW4	NE4	W5	WN9	NNW16	NNW21	WNW4.3	WNW21
26-May	NNW17	NNW14	NNW12	NNW13	NNW10	NNW10	NNW12	NNW14	N15	N18	N17	N16	N14	N13	N15	N14	N13	NNE11	NE10	NNE10	N6	NNW5	NNW4	N2	N11.5	N18
27-May	ESE2	N2	NNW3	WSW2	SSW2	SE8	ESE8	ESE5	ENE4	ESE3	SSE4	E5	NNE8	NNW17	NNW26	NNW23	NNW20	N24	N21	N18	N18	N26	N24	N25	N9.6	N26
28-May	N22	N22	N19	N18	N18	N19	N21	N20	N18	N18	N19	NNE19	NNE19	NNE17	NNE16	NNE17	NNE17	NNE16	N15	NNE13	NNE8	N4	ENE9	ESE4	N15.4	N22
29-May	E2	SW2	SW2	WNW2	WNW2	S0	ESE6	ESE5	ESE6	ESE4	E5	ESE7	ENE5	NE3	S4	SE4	SE4	SE4	E8	ESE12	ESE12	SE11	SE13	ESE9	ESE4.6	SE13
30-May	ESE5	SE6	SE5	SSW3	S3	SE5	SE7	SSE7	SSE9	SE8	ESE7	SE7	SE4	S10	SSE12	SSE13	SSE13	SE13	SE15	SE14	SE15	SSE12	SSE9	SSE2	SE8.2	SE15
31-May	E1	WSW1	SE1	ESE8	ESE11	ESE11	ESE13	ESE14	ESE11	SSE7	S7	S9	SSE9	SE11	SE11	ESE11	ESE12	SE6	S7	SSE7	SSW6	SW10	SW10	WSW9	SE6.2	ESE14

NNW2.0	NNW1.6	NNW1.4	NNW1.6	WSW1.4	ESE0.4	ESE1.0	SE1.2	SE1.2	NE0.6	NNE1.1	NE1.1	NNE1.8	NNW2.3	N4.1	NNE4.1	N4.4	N4.0	NNE4.3	NNE4.4	NNE2.3	NNE1.4	NNW1.4	NNW2.0	Diurnal Average
N26	N23	N24	N26	N27	N26	N25	N24	N25	N25	NNE26	N26	NNE24	NNE24	NNE27	NNE26	N24	N24	NNE23	N20	NNW30	N26	NNW26	N29	Diurnal Maximum

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

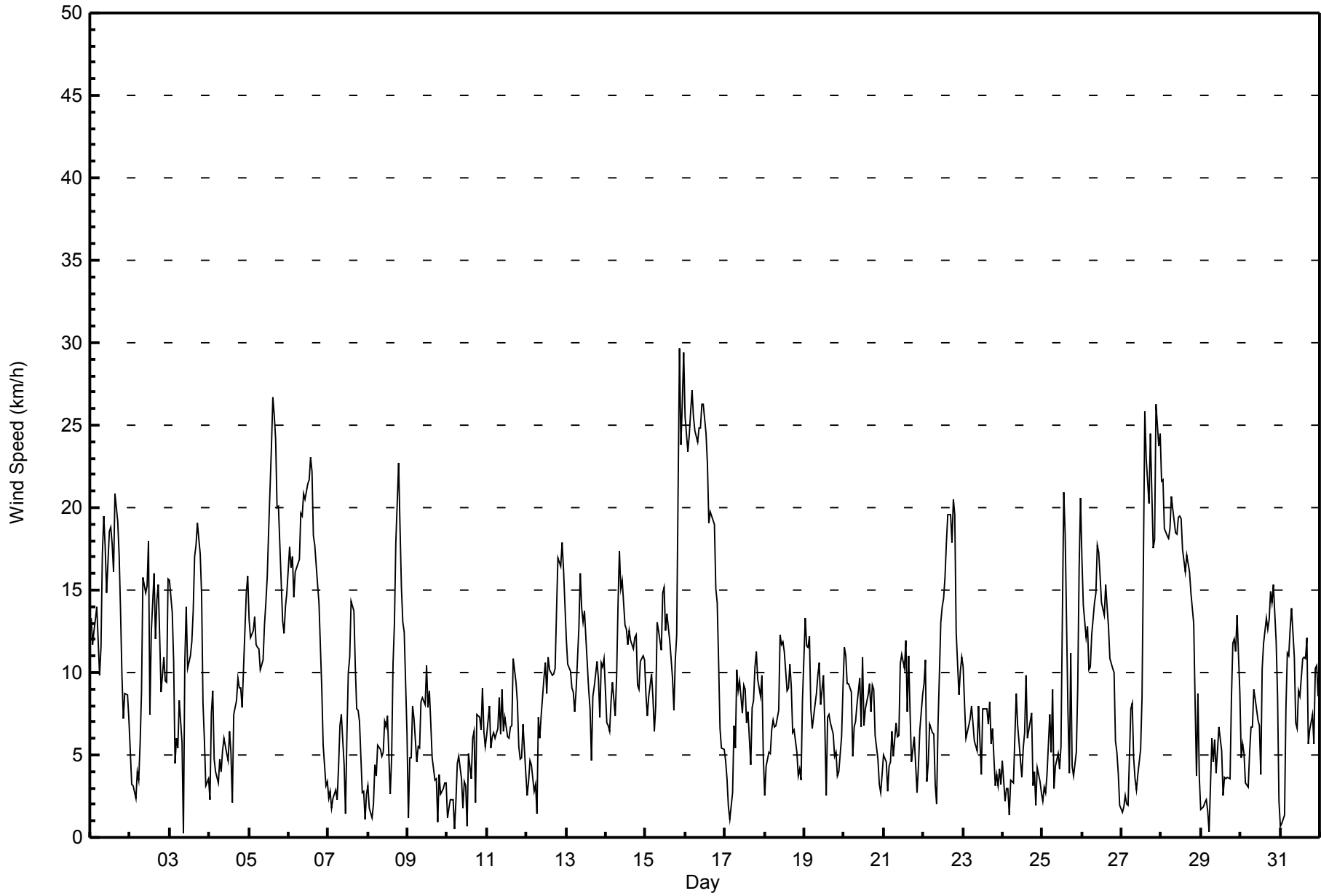
Patricia McInnes - May 2015

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Patricia McInnes - May 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Patricia McInnes - May 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	209	28.09	28.09
6 - 11	302	40.59	68.68
12 - 19	180	24.19	92.88
20 - 28	51	6.85	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
Frequency Distribution

Wind Speed (WS) - km/h
Patricia McInnes - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	10	5	11	6	10	12	16	11	17	19	14	19	21	15	10	13	209
6 - 11	20	23	11	8	9	31	29	34	35	39	30	6	2	1	10	14	302
12 - 19	40	19	7	8	8	9	5	4	7	8	28	4	2	3	3	25	180
20 - 28	33	7	0	0	0	0	0	0	0	0	0	0	1	1	0	9	51
29 - 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	104	54	29	22	27	52	50	49	59	66	72	29	26	20	23	62	744

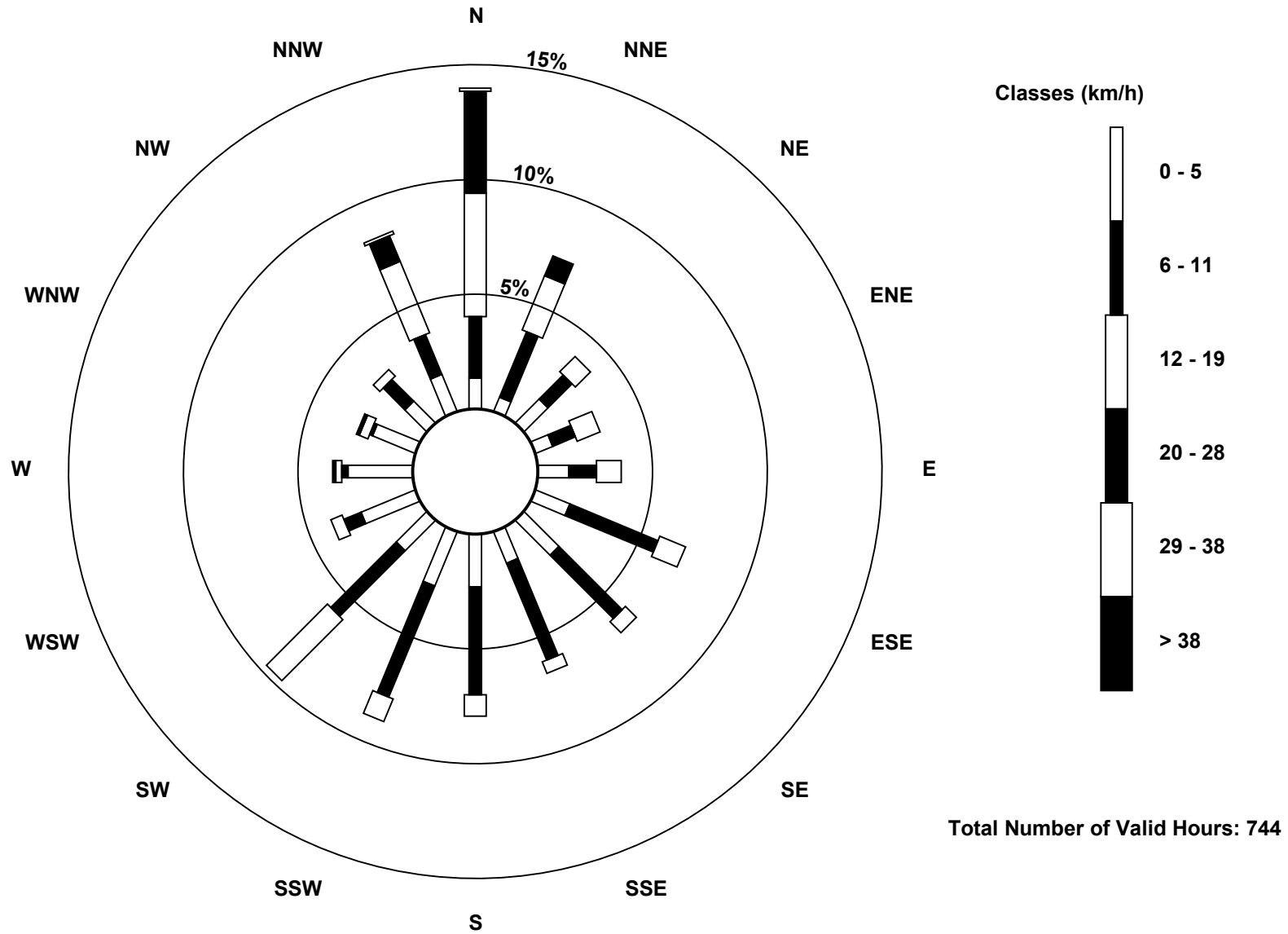
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

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





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Patricia McInnes - May 2015

Direction of Maximum Speed: 344 deg on May 15 21:00															Hours in Service: 744						
Direction of Maximum Daily Speed Average: 2.5 deg on May 16															Hours of Data: 744						
Direction of Minimum Speed: 197 deg on May 3 09:00										Direction of Minimum Daily Speed Average: 0.7 deg on May 24										Hours of Missing Data: 0	
Monthly Average Direction: 268.6 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-May	221	224	224	227	229	220	217	228	227	227	223	236	253	237	287	263	272	233	292	290	228	253	244	239	241.6
2-May	244	195	215	170	221	283	346	352	350	345	355	354	308	335	345	329	310	359	14	353	258	310	333	350	335.6
3-May	344	354	346	315	316	298	357	330	197	317	323	310	317	298	331	344	3	1	19	24	33	49	38	352	345.8
4-May	319	180	176	161	205	332	346	47	58	106	144	113	61	66	67	30	2	353	5	11	4	68	79	83	57.7
5-May	86	87	81	76	72	73	74	58	33	41	43	42	41	29	15	12	5	346	359	5	352	358	351	345	28.6
6-May	342	343	347	346	343	342	339	344	347	342	351	0	0	1	21	39	33	51	71	69	98	122	276	252	3.8
7-May	274	268	233	229	180	173	173	155	161	168	220	342	12	12	19	22	18	8	356	345	354	310	325	345	7.4
8-May	240	247	321	206	163	175	163	141	102	152	115	96	112	194	271	37	5	19	25	32	36	76	93	105	61.2
9-May	112	18	318	308	307	345	356	92	129	109	137	135	160	163	163	193	144	259	203	330	280	253	275	248	159.1
10-May	9	331	281	297	241	242	140	133	145	38	98	88	304	349	50	8	162	47	105	114	119	124	139	150	111.9
11-May	170	155	183	190	177	150	149	175	176	87	60	127	125	54	73	42	42	30	30	25	289	276	321	11	100.5
12-May	94	327	350	334	296	282	89	94	58	50	80	103	115	126	113	105	91	104	91	91	95	111	119	120	97.3
13-May	119	118	125	127	136	138	147	179	184	187	191	190	180	191	172	234	212	189	191	198	156	166	193	188	172.0
14-May	206	199	203	206	212	200	211	221	225	223	223	192	206	197	220	187	203	213	218	218	201	209	224	233	211.6
15-May	225	216	210	228	212	190	195	200	202	214	233	252	257	232	235	242	271	223	191	318	344	350	343	353	263.7
16-May	358	353	358	359	351	355	360	359	8	355	15	11	16	3	12	2	1	1	4	15	40	27	310	309	2.5
17-May	312	320	289	343	156	124	145	161	147	147	138	126	143	138	135	118	90	109	108	111	122	112	127	131	127.9
18-May	175	165	182	195	190	171	175	173	189	225	202	214	196	189	214	174	187	203	229	226	234	252	241	210	199.5
19-May	227	227	224	223	206	189	201	201	215	220	216	187	156	185	179	155	175	167	184	228	278	256	216	222	206.8
20-May	227	227	216	210	201	165	181	150	140	173	208	197	199	154	203	179	179	217	204	214	233	228	238	199	197.3
21-May	201	181	207	192	195	163	144	158	157	148	209	190	200	203	193	176	224	219	223	280	243	278	221	228	197.8
22-May	228	226	179	189	197	192	212	264	30	13	8	15	3	0	341	360	356	357	355	2	9	349	350	5	351.7
23-May	353	342	335	331	336	17	39	20	22	24	348	10	1	344	20	51	19	71	22	26	264	270	289	271	2.3
24-May	256	263	285	279	260	170	156	165	171	151	89	50	52	159	16	41	11	25	44	37	293	284	256	300	61.3
25-May	261	248	201	207	221	200	215	209	99	117	57	236	279	291	344	357	7	275	345	41	261	307	335	335	301.1
26-May	343	345	338	340	337	348	348	340	359	6	4	6	358	353	355	1	2	13	46	17	354	329	334	357	355.5
27-May	123	349	346	258	202	134	123	113	75	104	163	99	23	346	337	339	348	356	357	1	1	0	359	359	0.3
28-May	353	358	356	350	355	1	1	7	355	7	349	12	24	22	22	27	23	18	11	19	32	10	75	116	9.0
29-May	100	225	228	302	301	181	102	114	123	105	95	109	74	47	183	125	136	131	99	103	110	125	129	123	115.3
30-May	110	128	146	194	175	145	133	149	155	142	123	124	145	173	158	158	151	136	127	131	139	154	149	156	144.4
31-May	95	248	130	111	115	117	115	113	112	147	185	172	162	145	138	119	117	133	182	155	205	235	236	239	146.0
308.4	303.4	297.3	281.4	255.6	111.0	102.1	135.4	124.0	55.3	13.5	52.5	12.5	344.4	357.4	16.2	7.3	7.0	27.4	27.5	23.3	13.0	347.9	336.3		
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

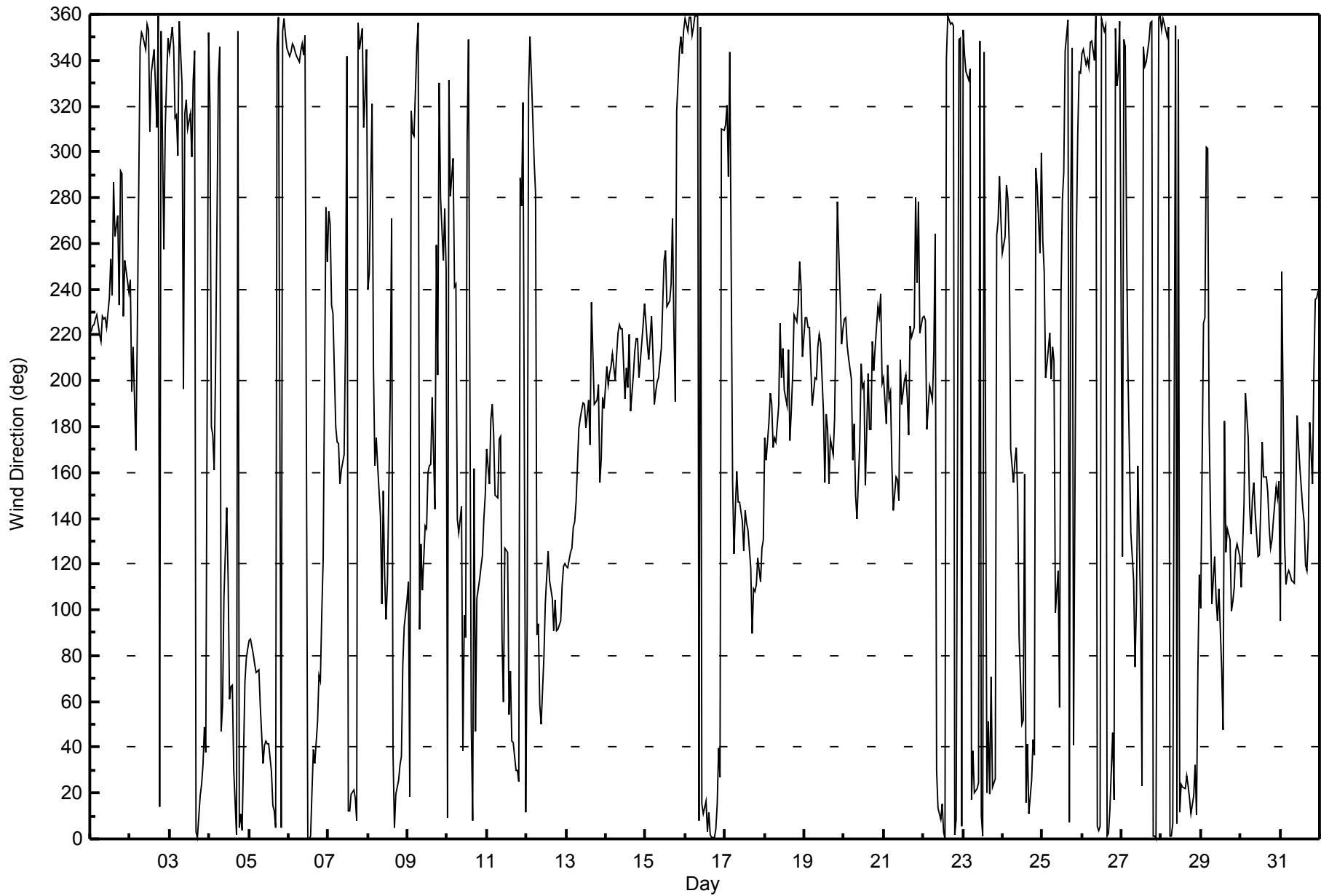
Patricia McInnes - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on May 10 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: 5 deg on May 20 00:00																									
Percentiles: P ₁ = 7 P ₁₀ = 12 Q ₁ = 15 Median = 23 Q ₃ = 40 P ₉₀ = 62 P ₉₉ = 97																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-May	8	10	8	9	9	15	14	14	15	21	27	25	26	37	21	21	18	19	35	23	14	8	29	17	37
2-May	32	57	44	65	33	43	27	38	17	22	22	23	47	29	26	25	19	24	13	42	23	17	15	14	65
3-May	15	14	15	25	22	18	15	35	98	46	21	29	34	28	24	28	20	16	16	12	14	17	43	25	98
4-May	71	69	14	26	40	23	21	36	40	58	62	84	59	63	97	46	36	31	22	17	22	14	13	13	97
5-May	12	12	14	13	15	16	15	18	14	12	14	15	25	17	14	15	16	13	15	13	14	13	12	12	25
6-May	10	12	12	12	12	11	11	11	14	11	14	15	16	14	17	13	18	21	14	14	22	11	53	33	53
7-May	53	13	54	16	36	34	20	21	24	68	95	70	44	40	25	19	29	37	34	16	25	46	76	41	95
8-May	34	39	64	38	26	22	19	28	39	50	52	57	58	94	57	36	21	17	13	13	13	19	18	29	94
9-May	68	23	29	11	9	33	19	44	24	31	30	27	41	42	70	73	72	58	100	26	31	23	40	40	100
10-May	62	78	45	43	78	21	43	24	66	85	78	81	104	60	86	51	52	91	23	17	7	8	16	24	104
11-May	23	7	12	12	11	24	21	17	42	26	61	46	74	63	63	69	27	37	22	29	10	9	28	35	74
12-May	65	34	25	23	28	18	95	18	29	29	23	39	60	34	31	45	37	30	23	13	12	13	12	12	95
13-May	10	12	10	10	10	9	13	17	15	23	25	32	30	53	53	101	49	38	26	16	16	15	14	13	101
14-May	12	11	14	12	12	14	15	15	14	19	21	37	42	36	30	36	44	26	20	12	12	10	11	7	44
15-May	9	12	17	7	16	11	16	16	17	28	32	28	34	36	43	35	27	33	15	59	19	18	12	17	59
16-May	17	16	17	16	16	16	19	18	18	19	15	17	17	19	24	20	19	21	18	20	11	24	14	10	24
17-May	13	17	30	64	31	12	18	16	32	41	53	45	44	61	51	72	40	28	20	16	10	10	14	27	72
18-May	56	20	9	9	9	11	15	23	31	26	31	29	34	64	44	40	38	53	35	20	13	14	26	19	64
19-May	7	6	7	7	15	16	14	18	19	27	48	46	45	97	60	51	49	62	51	20	15	20	15	5	97
20-May	7	6	7	11	12	16	19	25	19	34	64	40	59	63	57	41	62	52	30	16	6	11	30	18	64
21-May	14	9	20	18	16	11	22	20	29	40	44	46	49	41	75	35	58	71	42	10	37	40	18	8	75
22-May	8	9	57	21	11	15	32	43	82	36	21	23	28	25	22	23	21	19	17	15	13	11	13	18	82
23-May	17	12	19	11	11	20	18	27	43	29	61	81	59	47	46	51	34	56	30	46	18	30	19	30	81
24-May	36	58	45	40	69	30	25	19	22	27	38	88	79	52	35	77	53	37	77	42	58	18	34	60	88
25-May	63	32	43	30	18	50	16	80	40	30	59	78	28	31	19	44	48	42	59	83	28	30	11	10	83
26-May	13	13	11	11	11	13	17	13	23	21	22	22	31	34	22	23	25	34	21	16	26	9	21	63	63
27-May	73	63	41	56	51	15	16	34	57	67	58	36	34	23	11	13	14	16	17	15	16	18	16	17	73
28-May	17	16	15	15	14	16	17	20	20	25	21	27	16	19	22	21	22	21	19	15	16	30	20	55	55
29-May	72	66	35	35	22	84	20	40	41	68	80	54	77	97	83	91	96	83	33	15	14	12	13	14	97
30-May	16	11	11	14	19	23	15	21	21	32	50	62	96	46	39	22	27	23	16	14	14	12	17	53	96
31-May	87	83	81	14	15	16	14	14	17	31	29	17	31	15	18	20	22	60	45	20	24	12	16	14	87
	87	83	81	65	78	84	95	80	98	85	95	88	104	97	97	101	96	91	100	83	58	46	76	63	
Diurnal Maximum																									



WBEA
Hourly Averages

Wind Direction (WD) - deg
Patricia McInnes - May 2015





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	May 19, 2015	Last Calibration	April 9, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	15:03
Gas Cert Reference	SA130110A	Station temp.	22 Deg C
Cal Gas Concentration	47 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG Make/Model	API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-677	-677
Analyzer IP address	192.168.1.43		Lamp voltage	775	771
Calculated slope	0.993106	0.997362	Chamber temp	45.1	45.0
Calculated intercept	0.938086	0.654623	Pressure	691.3	701.5
Analyzer Background	5.1	5.0	Flow	0.444	0.448
Analyzer Coefficient	1.003	0.999	Intensity	90	90

Analyzer make Termo 43i Analyzer serial # 1008841397

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	88.2	690.9	694.3	0.995
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	88.2	690.9	692.5	0.998
second point	6000	44.1	345.5	345.3	1.000
third point	6000	22.1	173.1	172.2	1.005
as left zero	6000	0.0	0.0	0.3	----
as left span	6000	88.2	690.9	687.8	1.004
Average Correction Factor					1.001

Corrected As found 694.2 Previous response 694.8 % change 0.1%

Notes:

Small adjustments to zero and span. Filter changed after As Found

Calibration Performed By:

Ryan Power



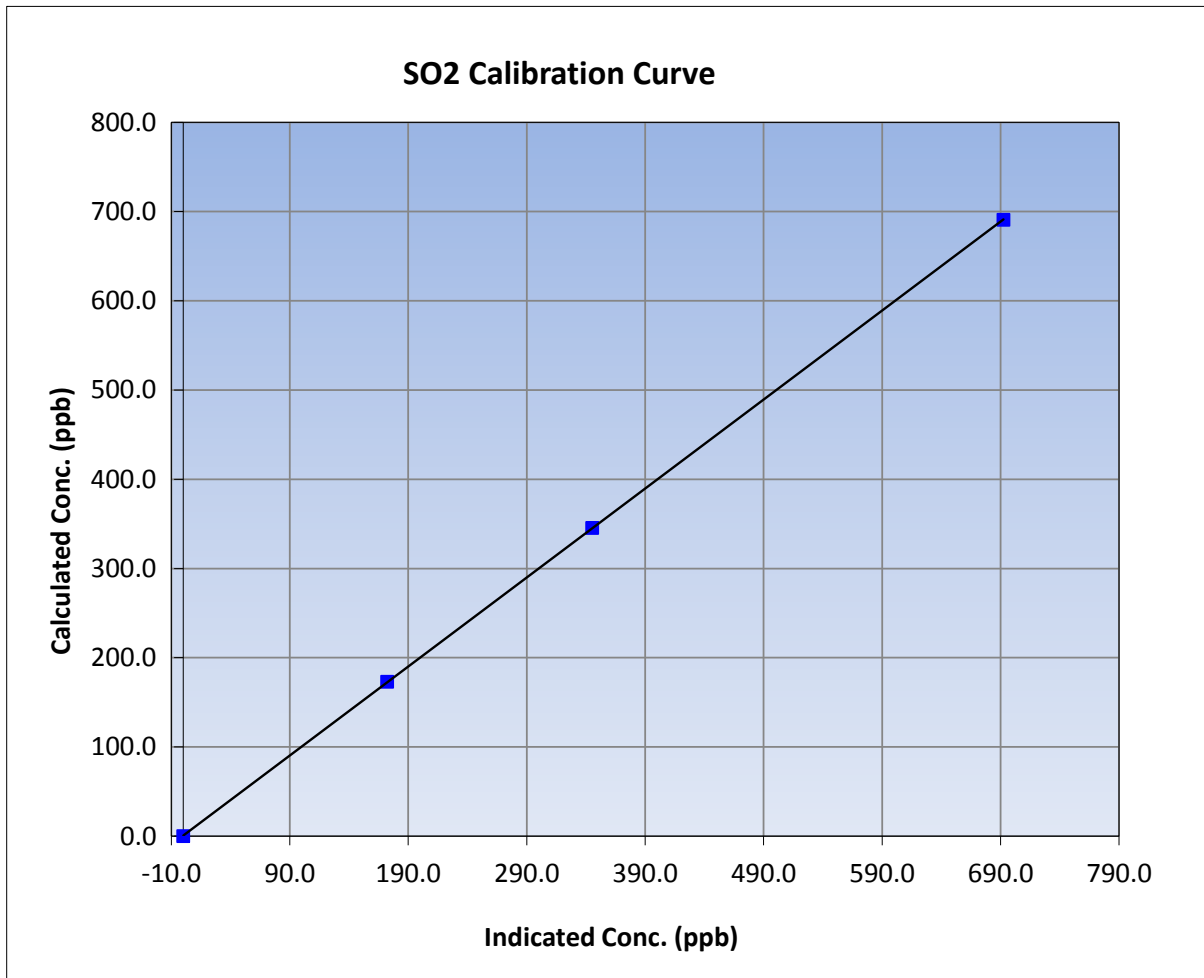
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 19, 2015	Previous Calibration	April 9, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:05	End Time (MST)	15:03
Analyzer make	Termo 43i	Analyzer serial #	1008841397

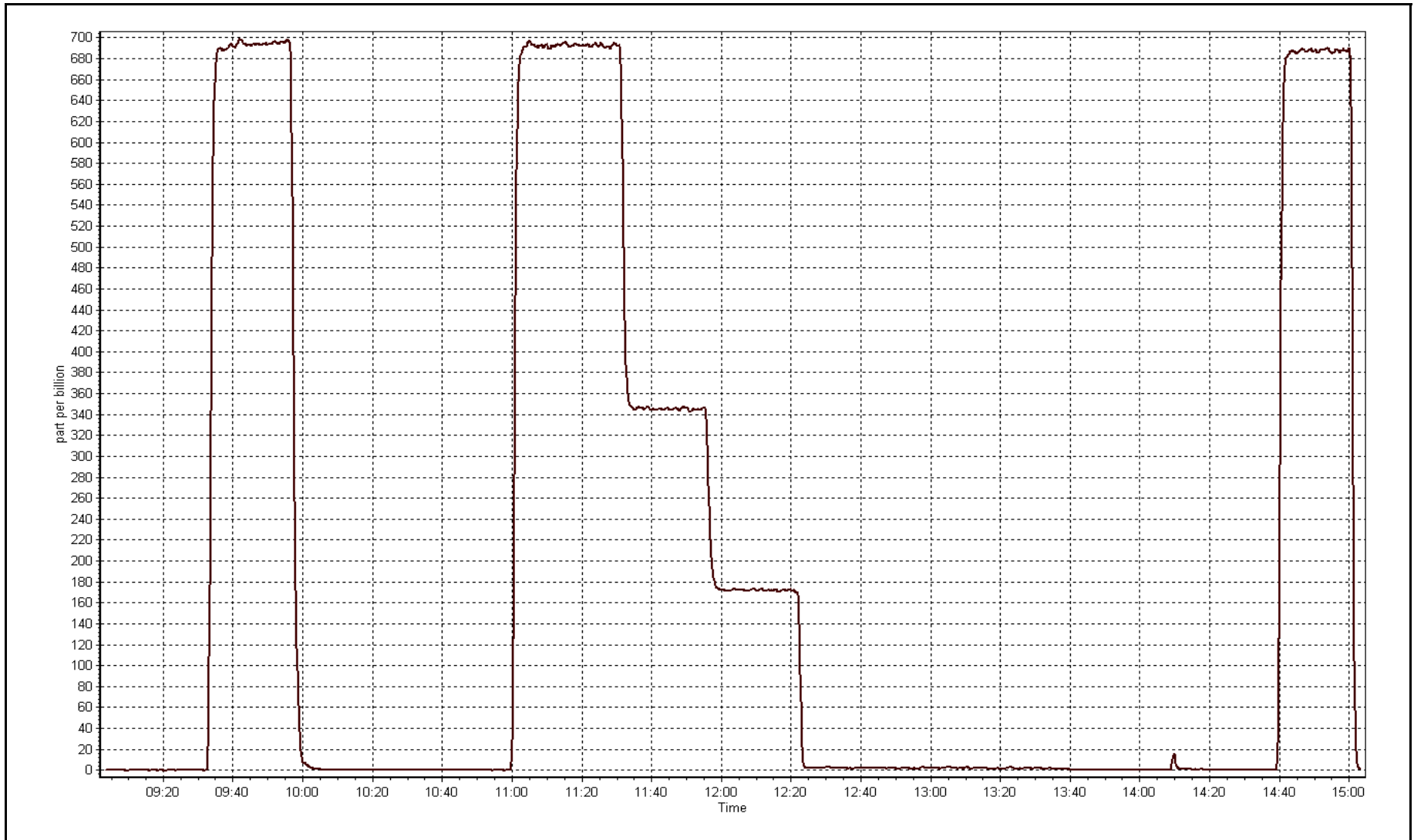
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999995
690.9	692.5	0.9978		
345.5	345.3	1.0004	Slope	0.997362
173.1	172.2	1.0054		
			Intercept	0.654623



SO2 Calibration Plot

Date: May 19, 2015





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	May 11, 2015	Last Calibration	April 2, 2015
Station Name	Patricia McInnes	Station Number	AMS 06
Reason:	Routine		
Start Time (MST)	11:14	End Time (MST)	15:25
Gas Cert Reference	ALM009562	Station temp.	22 Deg C
Cal Gas Concentration	4.84 ppm	Cal Gas Exp Date	15/02/2017
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
Dil air Make/Model	API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036
SO2 gas concentration	47 ppm	SO2 gas cert/exp	SA130110A 12/Dec/16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-720	-720
Analyzer IP address	192.168.1.44		Lamp voltage	1012	1008
Calculated slope	0.989621	0.984732	Chamber temp	45	45
Calculated intercept	0.364478	0.579528	Pressure	704.9	702.1
Analyzer Background	2.26	1.63	Flow	0.449	0.449
Analyzer Coefficient	1.213	0.976	Intensity	90	90
			Converter temp.	850	850

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1218153358
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	----
as found span	5000	72.3	70.0	66.8	1.048
SO2 scrubber check	5000	13.8	129.7	0.7	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	72.3	70.0	70.8	0.989
second point	5000	36.2	35.0	34.6	1.012
third point	6000	22.3	18.0	17.2	1.049
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	72.3	70.0	70.8	0.989
Average Correction Factor					1.017

Corrected As found	66.8	Previous response	70.4	% change	5.4%
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Notes:

Pump replacement last month originally suspected for 5.4% change. Linearity not great. To investigate after finishing other calibrations

Calibration Performed By:

Ryan Power



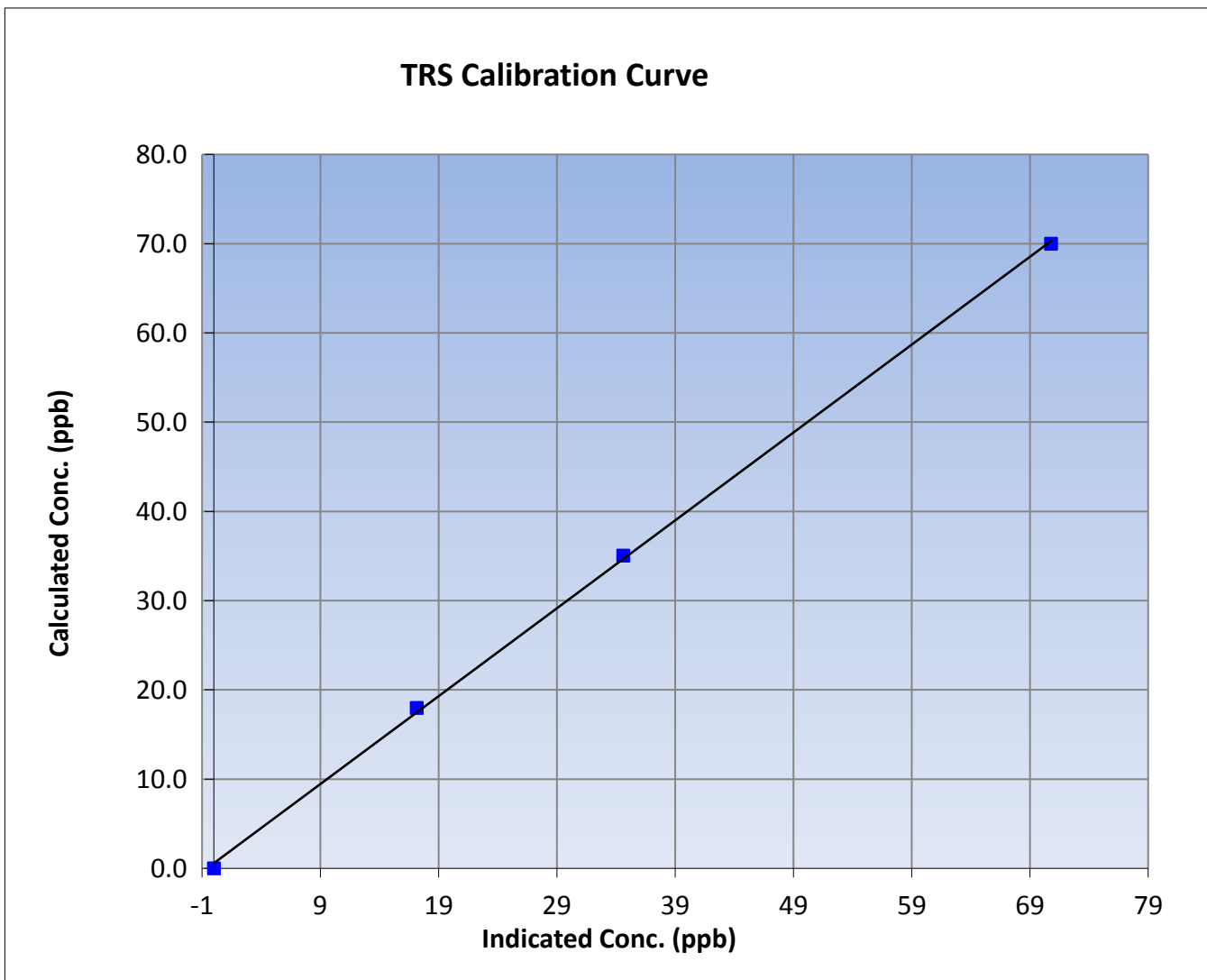
Wood Buffalo Environmental Association TRS Calibration Report

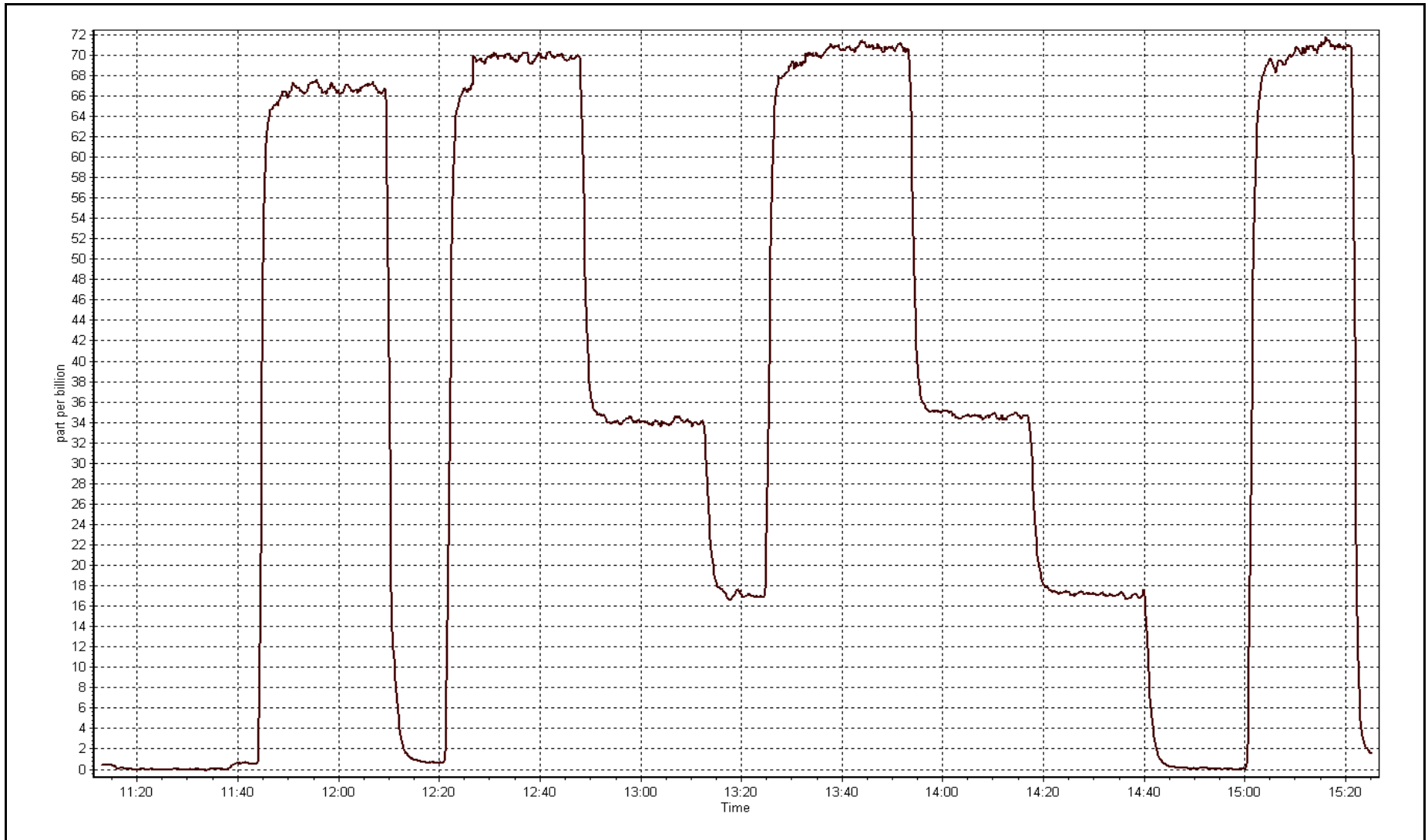
Station Information

Calibration Date	May 11, 2015	Previous Calibration	April 2, 2015
Station Name	AMS 06	Station Number	AMS 06
Start Time (MST)	11:14	End Time (MST)	15:25
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999677
70.0	70.8	0.9885		
35.0	34.6	1.0125	Slope	0.984732
18.0	17.2	1.0489		
			Intercept	0.579528







Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	May 28, 2015	Last Calibration	May 11, 2015
Station Name	Patricia McInnes	Station Number	AMS 06
Reason:	other repair		
Start Time (MST)	10:00	End Time (MST)	13:40
Gas Cert Reference	ALM009562	Station temp.	22 Deg C
Cal Gas Concentration	4.84 ppm	Cal Gas Exp Date	15/02/2017
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
Dil air Make/Model	API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036
SO2 gas concentration	47 ppm	SO2 gas cert/exp	SA130110A 2016/12/12

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-720	-720
Analyzer IP address	192.168.1.42		Lamp voltage	1008	1001
Calculated slope	0.984732	0.988603	Chamber temp	45	45
Calculated intercept	0.579528	0.137117	Pressure	702.1	711.0
Analyzer Background	2.39	2.2	Flow	0.449	0.456
Analyzer Coefficient	1.284	1.2	Intensity	90	90
			Converter temp.	850	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1218153358
Converter make/model	CDN-101	Converter serial #	520

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	72.3	70.0	62.2	1.125
SO2 scrubber check	5000	22.1	207.7	0.3	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	72.3	70.0	70.7	0.989
second point	5000	36.2	35.0	35.2	0.995
third point	6000	22.3	18.0	17.9	1.007
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	72.3	70.0	71.4	0.980
Average Correction Factor					0.997

Corrected As found	62.2	Previous response	70.5	% change	13.3%
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Notes:

Large %change due to problem with the converter. Removed and replaced JC Andelle Model 26 with CD NOVA CDN-101

Calibration Performed By:

Ryan Power



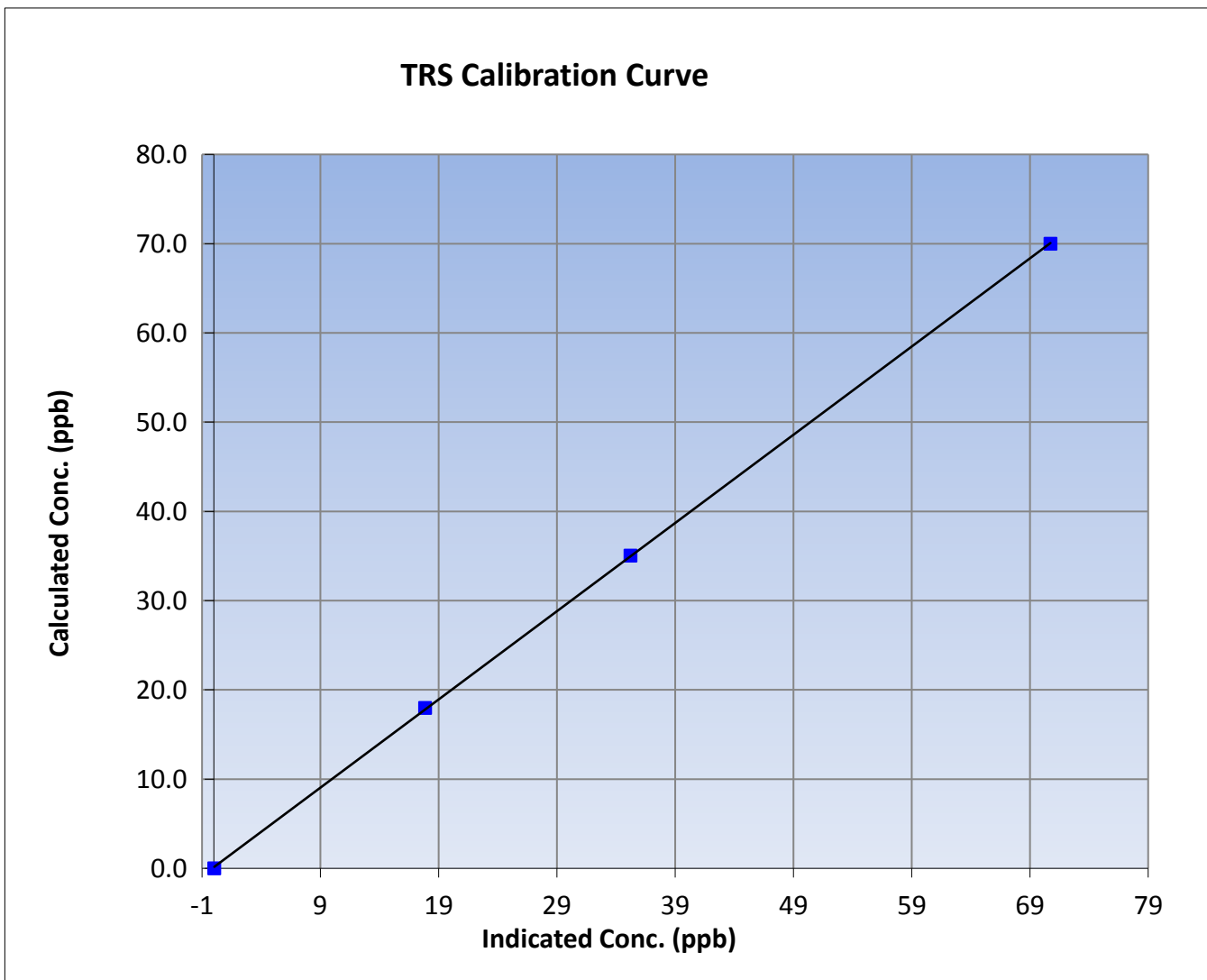
Wood Buffalo Environmental Association TRS Calibration Report

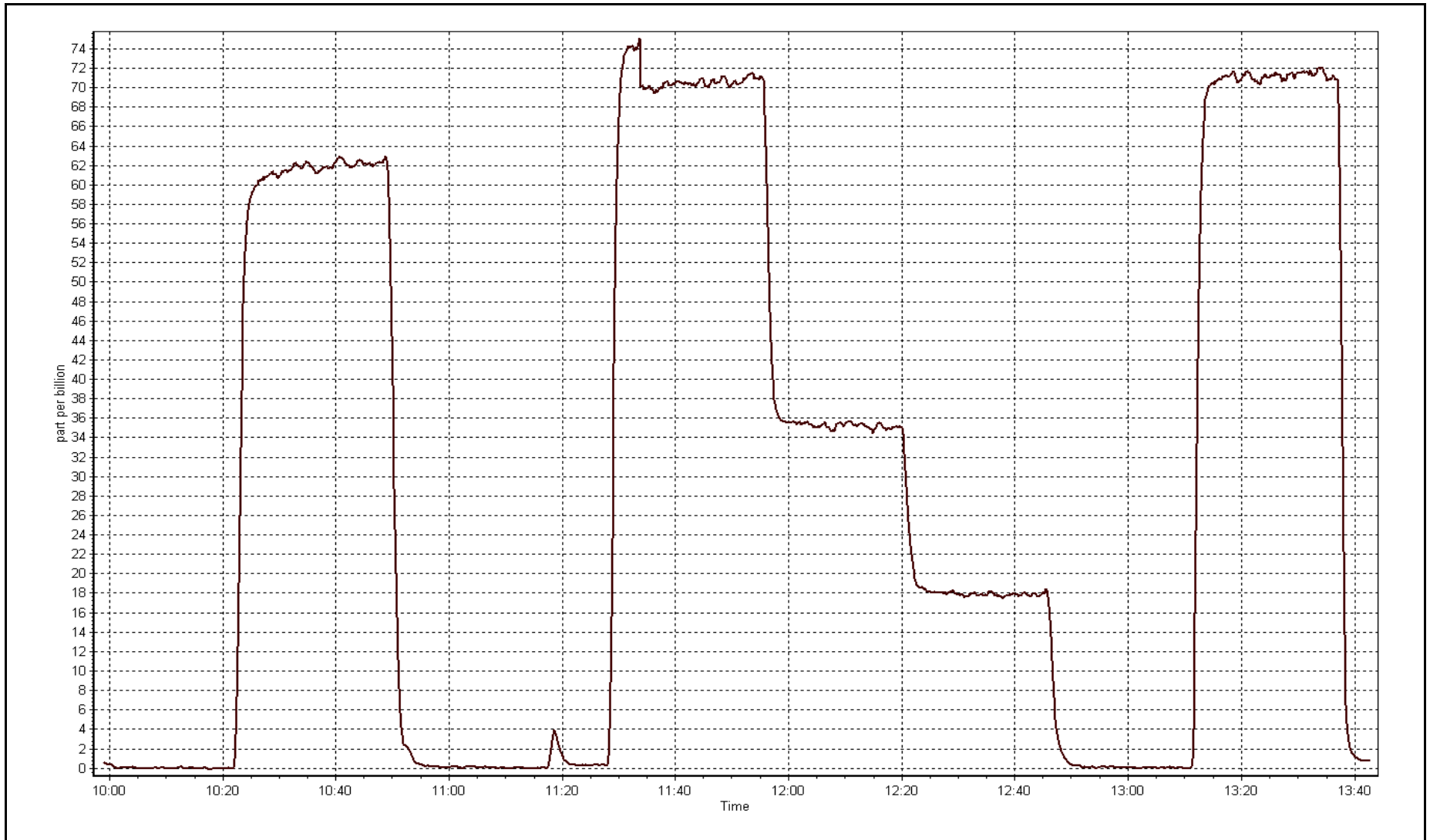
Station Information

Calibration Date	May 28, 2015	Previous Calibration	May 11, 2015
Station Name	AMS 06	Station Number	AMS 06
Start Time (MST)	10:00	End Time (MST)	13:40
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999971
70.0	70.7	0.9893		
35.0	35.2	0.9947	Slope	0.988603
18.0	17.9	1.0066		
			Intercept	0.137117







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	May-19-15	Last Calibration	April-09-15
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	15:02
Gas Cert Reference	SA130110A	Cal Gas Expiry Date	December-12-16
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211.0 ppm	Station temp.	22 Deg C
Calibrator Model	Sabio 4010	Serial Number	14300410
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	75.3
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.0
Analyzer IP address	192.168.1.55		Flame Temp	398.5	405.0
THC Calc slope	0.997681	0.999518	Carrier Pressure	34.5	34.5
THC Calc intercept	0.022413	0.017688	Fuel Pressure	42.3	42.3
NMHC Calc slope	0.998016	1.000797	Air Pressure	32.4	32.4
NMHC Calc intercept	-0.003661	-0.010039			

Analyzer make Thermo 55i Analyzer serial # 1331259521

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.00	0.00	----
as found span	6000	88.2	16.06	16.46	0.975
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	88.2	16.06	16.06	1.000
second point	6000	44.1	8.03	7.99	1.005
third point	6000	22.1	4.02	4.00	1.006
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	88.2	16.06	16.11	0.997
Average Correction Factor					1.003

Corrected As found 16.46 Previous response 16.07 % change -2.4%

Notes:

Span adjusted. Filter changed after As Finds

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0	0.00	0.00	----
as found span	6000	88.2	8.53	8.83	0.966
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	88.2	8.53	8.53	1.000
second point	6000	44.1	4.26	4.27	0.999
third point	6000	22.1	2.14	2.16	0.989
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	88.2	8.53	8.55	0.998
Average Correction Factor					0.996

Corrected As found 8.83 Previous response 8.55 % change -3.2%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0	0.00	0.00	----
as found span	6000	88.2	7.53	7.63	0.986
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	88.2	7.53	7.53	1.000
second point	6000	44.1	3.76	3.72	1.012
third point	6000	22.1	1.89	1.84	1.025
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	88.2	7.53	7.57	0.994
Average Correction Factor					1.012

Corrected As found 7.63 Previous response 7.52 % change -1.4%



Wood Buffalo Environmental Association

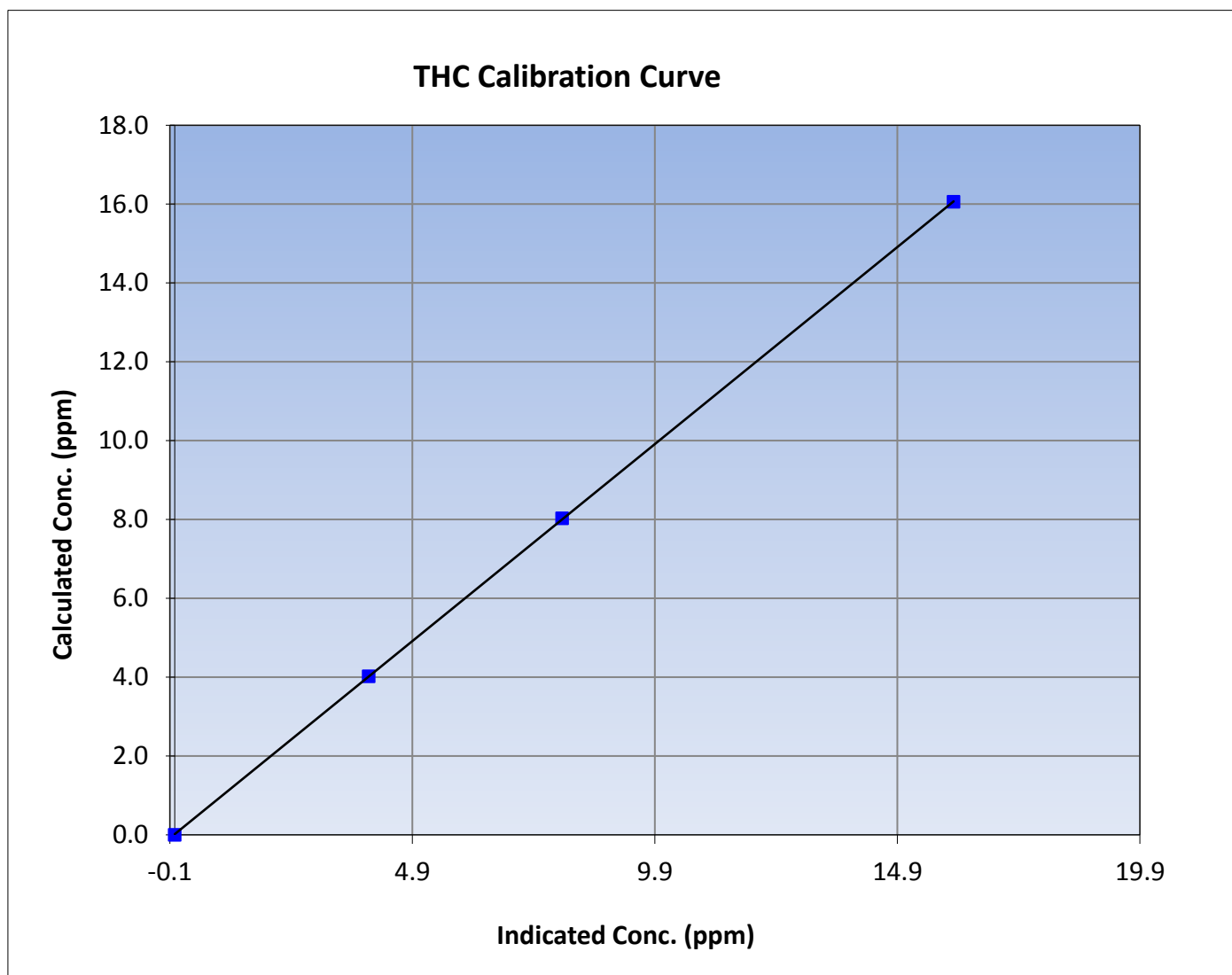
THC Calibration Summary

Station Information

Calibration Date	May 19, 2015	Previous Calibration	April 9, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	15:02
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999992
16.06	16.06	0.9998		
8.03	7.99	1.0048	Slope	0.999518
4.02	4.00	1.0058		
			Intercept	0.017688





Wood Buffalo Environmental Association

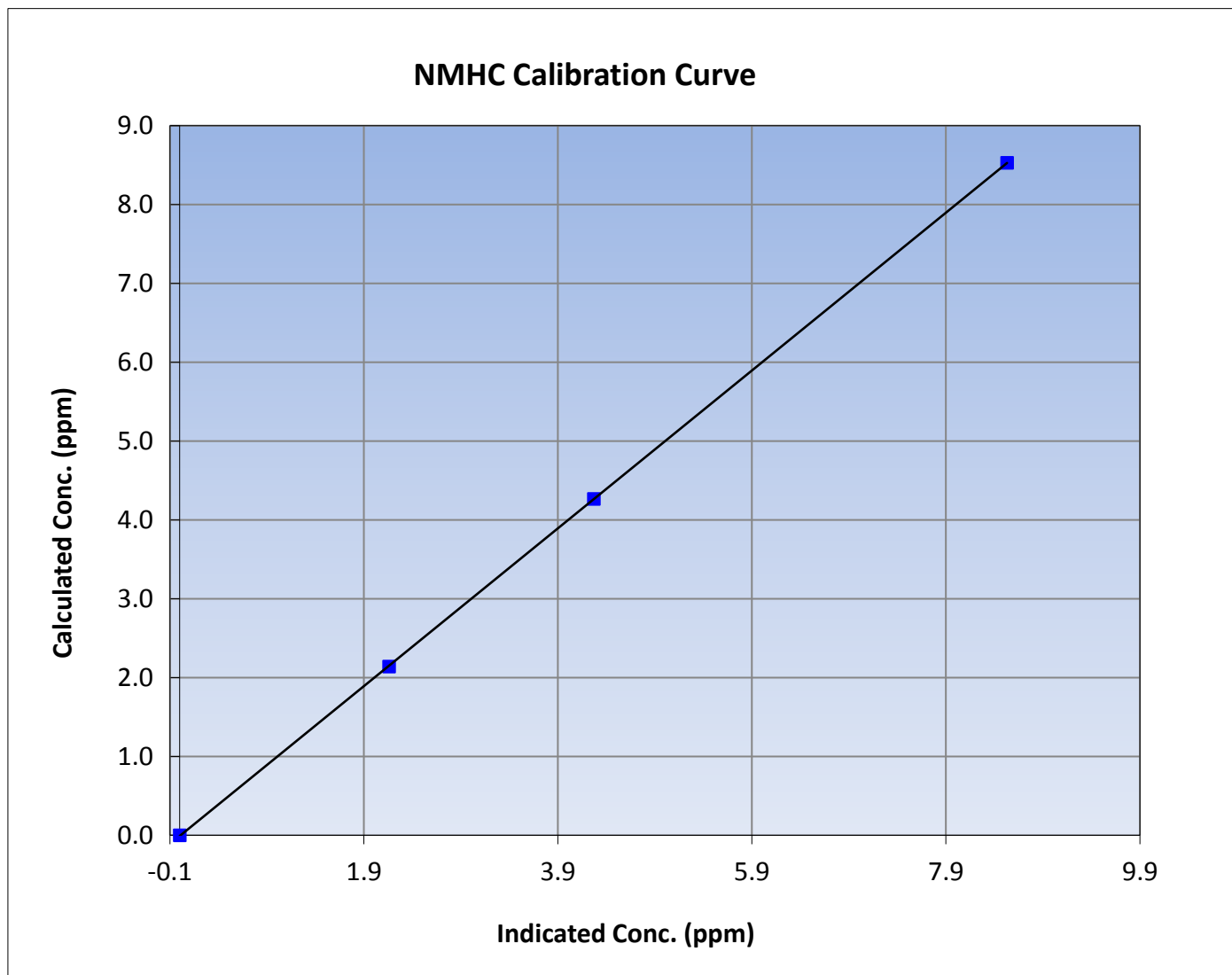
NMHC Calibration Summary

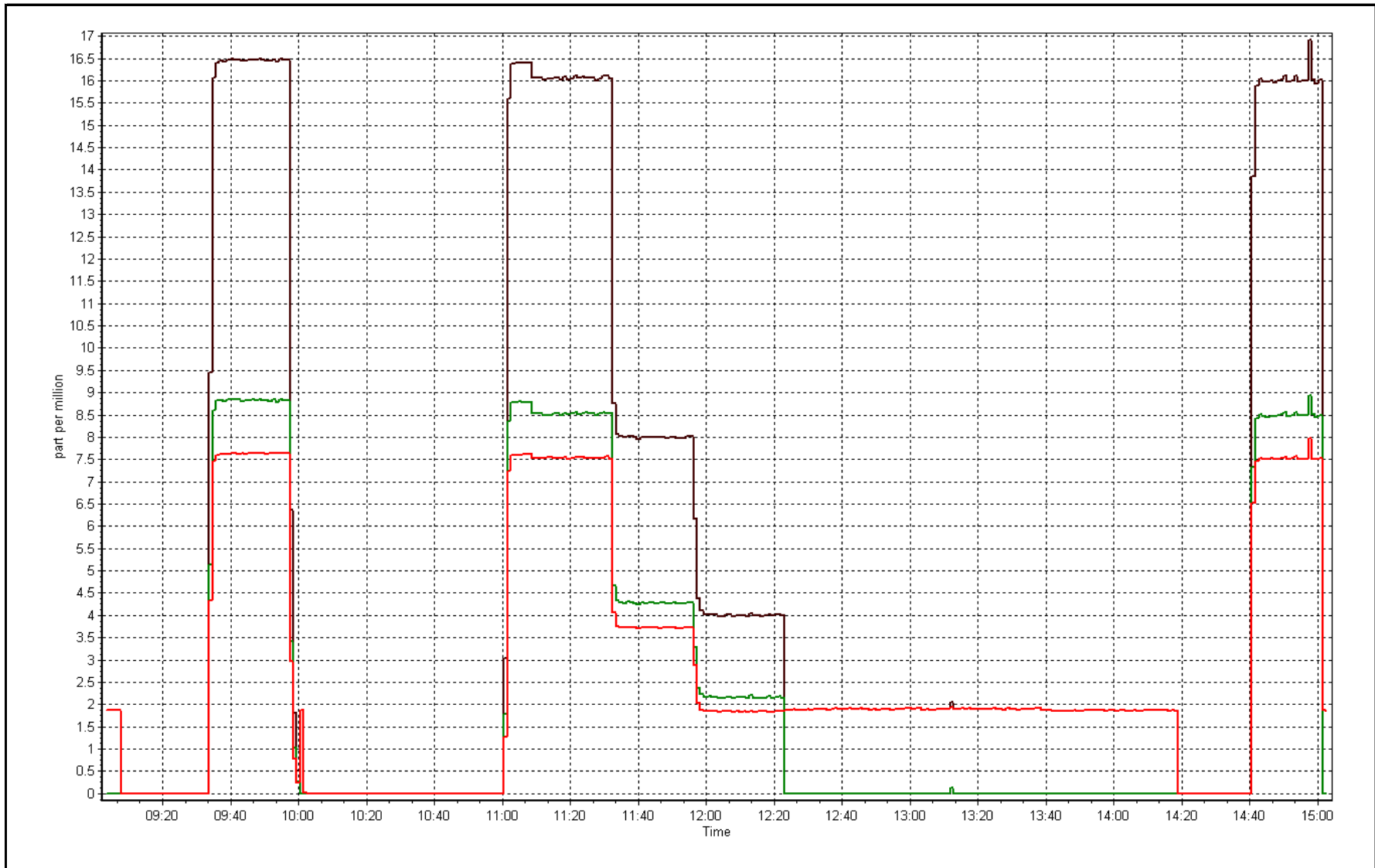
Station Information

Calibration Date	May 19, 2015	Previous Calibration	April 9, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:10	End Time (MST)	15:02
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999992
8.53	8.53	1.0000		
4.26	4.27	0.9988	Slope	1.000797
2.14	2.16	0.9895		
			Intercept	-0.010039







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	May-30-15	Last Calibration	May-19-15
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Other:	Repair	
Start Time (MST)	5:50	End Time (MST)	10:10
Gas Cert Reference	SA130110A	Cal Gas Expiry Date	December-12-16
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211.0 ppm	Station temp.	22 Deg C
Calibrator Model	Sabio 4010	Serial Number	14300410
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.3	75.3
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.999518	0.993721	Carrier Pressure	34.5	34.5
THC Calc intercept	0.017688	0.018288	Fuel Pressure	42.3	42.3
NMHC Calc slope	1.000797	0.999246	Air Pressure	32.4	32.4
NMHC Calc intercept	-0.010039	-0.001929			

Analyzer make Thermo 55i Analyzer serial # 1331259521

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	66.2	12.05	12.12	0.994
second point	6000	33.1	6.03	6.03	0.999
third point	6000	16.5	3.00	2.99	1.005
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	88.2	16.06	16.14	0.995
Average Correction Factor					0.999

Corrected As found NA Previous response NA % change NA

Notes:

Actuator was stuck on backflush unable to get a response for a span, replaced Actuator, Chromatograph done during third point

Calibration Performed By: Melissa Lemay



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	66.2	6.40	6.41	0.999
second point	6000	33.1	3.20	3.20	1.000
third point	6000	16.5	1.60	1.61	0.994
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	88.2	8.53	8.56	0.996
Average Correction Factor					0.998

Corrected As found NA Previous response NA % change NA

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	66.2	5.65	5.71	0.989
second point	6000	33.1	2.82	2.81	1.005
third point	6000	16.5	1.41	1.39	1.014
as left zero	6000	0.0	0.00	0.00	----
as left span	6000	88.2	7.53	7.58	0.993
Average Correction Factor					1.003

Corrected As found NA Previous response NA % change NA



Wood Buffalo Environmental Association

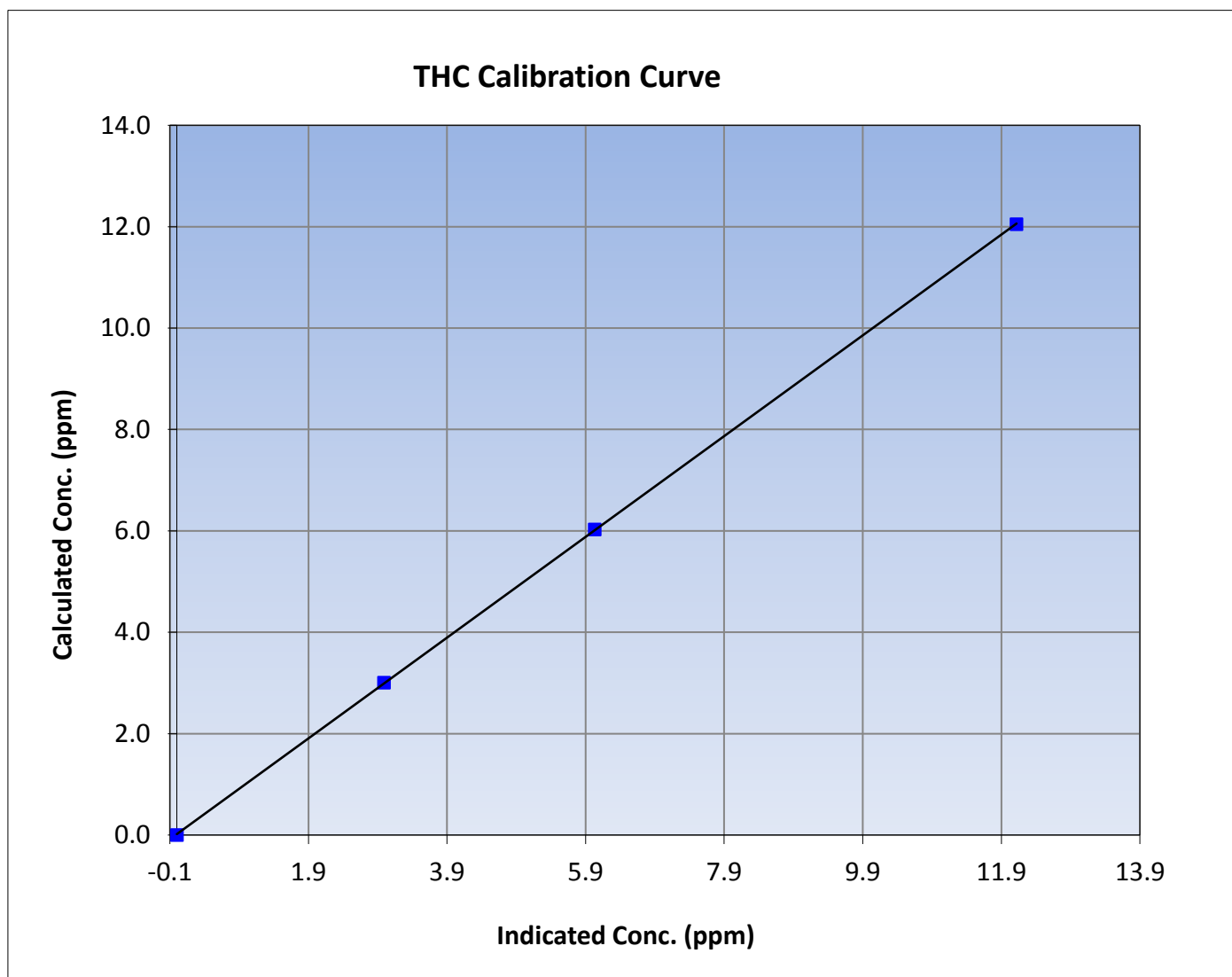
THC Calibration Summary

Station Information

Calibration Date	May 30, 2015	Previous Calibration	May 19, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	5:50	End Time (MST)	10:10
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999989
12.05	12.12	0.9943		
6.03	6.03	0.9993	Slope	0.993721
3.00	2.99	1.0046		
			Intercept	0.018288





Wood Buffalo Environmental Association

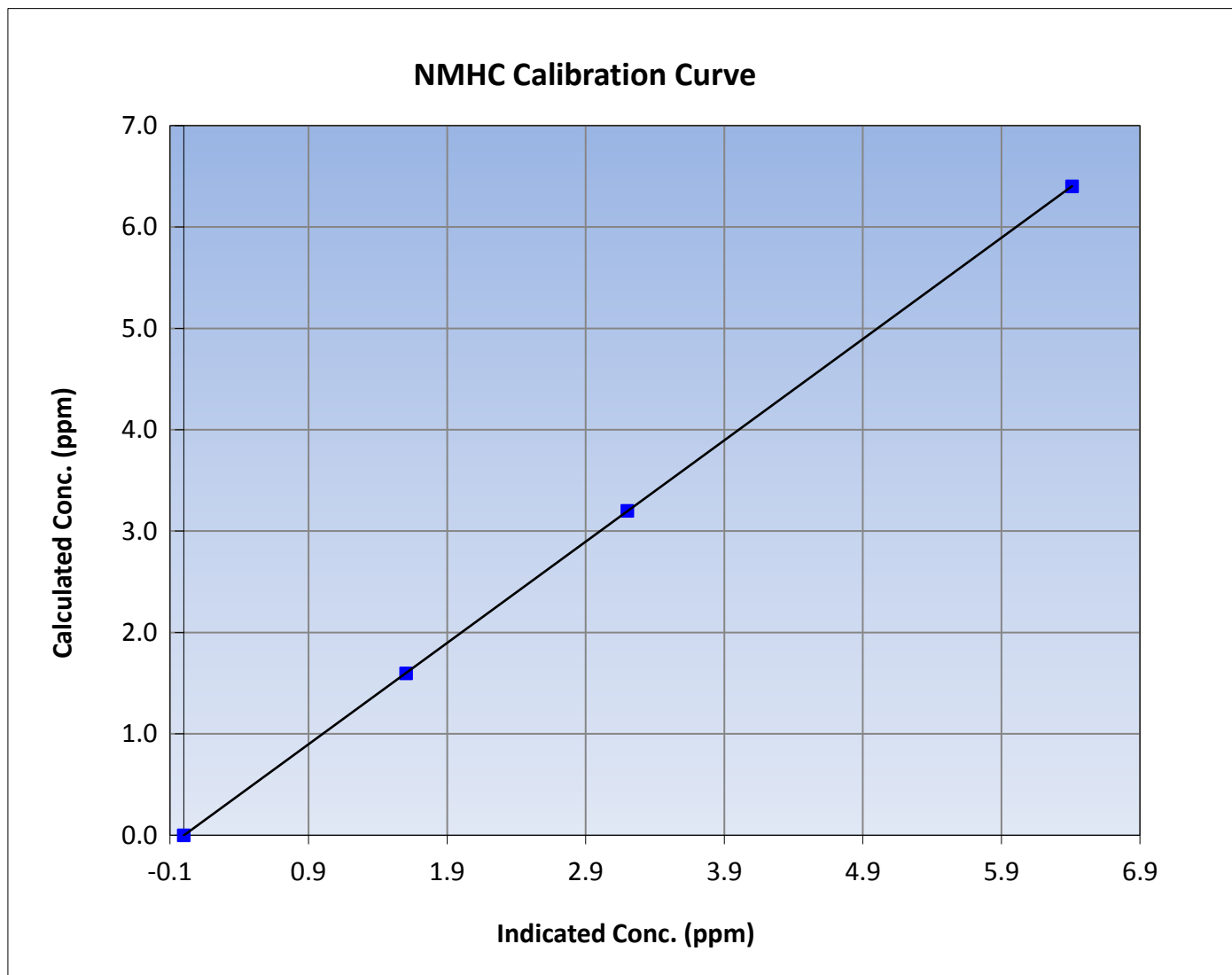
NMHC Calibration Summary

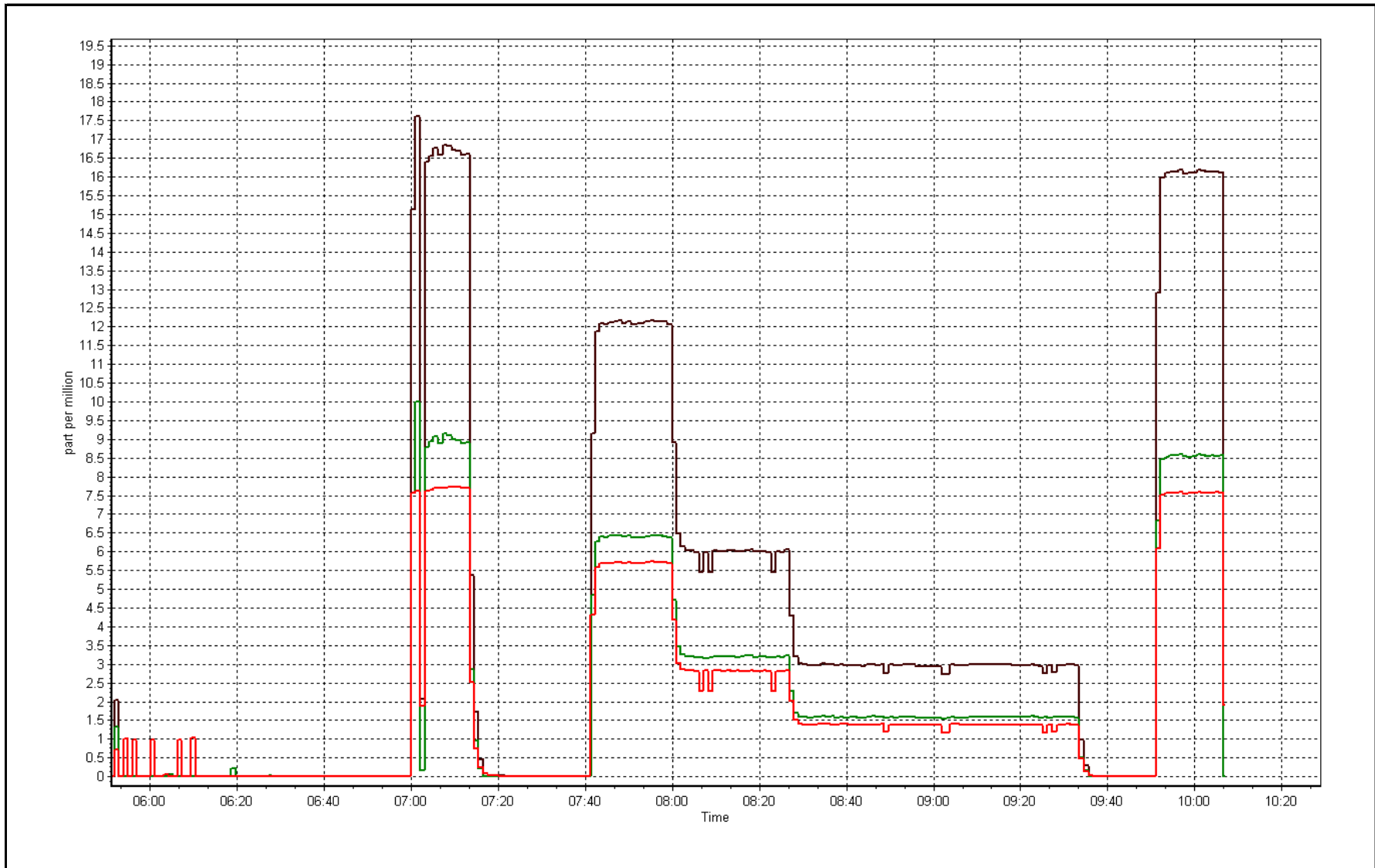
Station Information

Calibration Date	May 30, 2015	Previous Calibration	May 19, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	5:50	End Time (MST)	10:10
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999997
6.40	6.41	0.9988		
3.20	3.20	1.0003	Slope	0.999246
1.60	1.61	0.9942		
			Intercept	-0.001929







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 19, 2015	Previous Calibration	April 10, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	15:00	End Time (MST)	17:55
NO2 GPT Ref date	May-19-15	Transfer Standard	NO2 GPT ref May 19, 2015
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	14300410
DACS make/model	Campbell Scientific CR3000	Serial Number	60
		Serial Number	9036

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	24.8	26.6
Analyzer IP address	192.168.1.48		Lamp temp.	53.5	53.5
Calculated slope	1.004332	1.003575	Pressure	653.7	667.3
Calculated intercept	-0.886534	1.018924	Flow cell A	0.697	0.705
Analyzer Background	-0.4	-0.4	Flow cell B	0.720	0.729
Analyzer Coefficient	0.917	0.925	Cell A Intensity	83500	82500
			Cell B Intensity	78200	77300

Analyzer make	Thermo 49i	Analyzer serial #	1300156234
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.00	0.0	-0.2	----
as found span	6000	0.783	344.3	340.6	1.011
calibrator zero	6000	0.00	0.0	-0.2	----
high point	6000	0.783	344.3	342.6	1.005
second point	6000	0.522	218.7	216.4	1.011
third point	6000	0.261	93.6	91.3	1.025
as left zero	6000	0.00	0.0	0.3	----
as left span	6000	0.783	344.3	342.3	1.006
Average Correction Factor					1.013

Corrected As found	340.8	Previous response	343.7	% change	0.9%
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Notes:

As Found Zero used as Calibrator Zero. Span with a small adjustment. Filter changed after As Finds.

Calibration Performed By:

Ryan Power



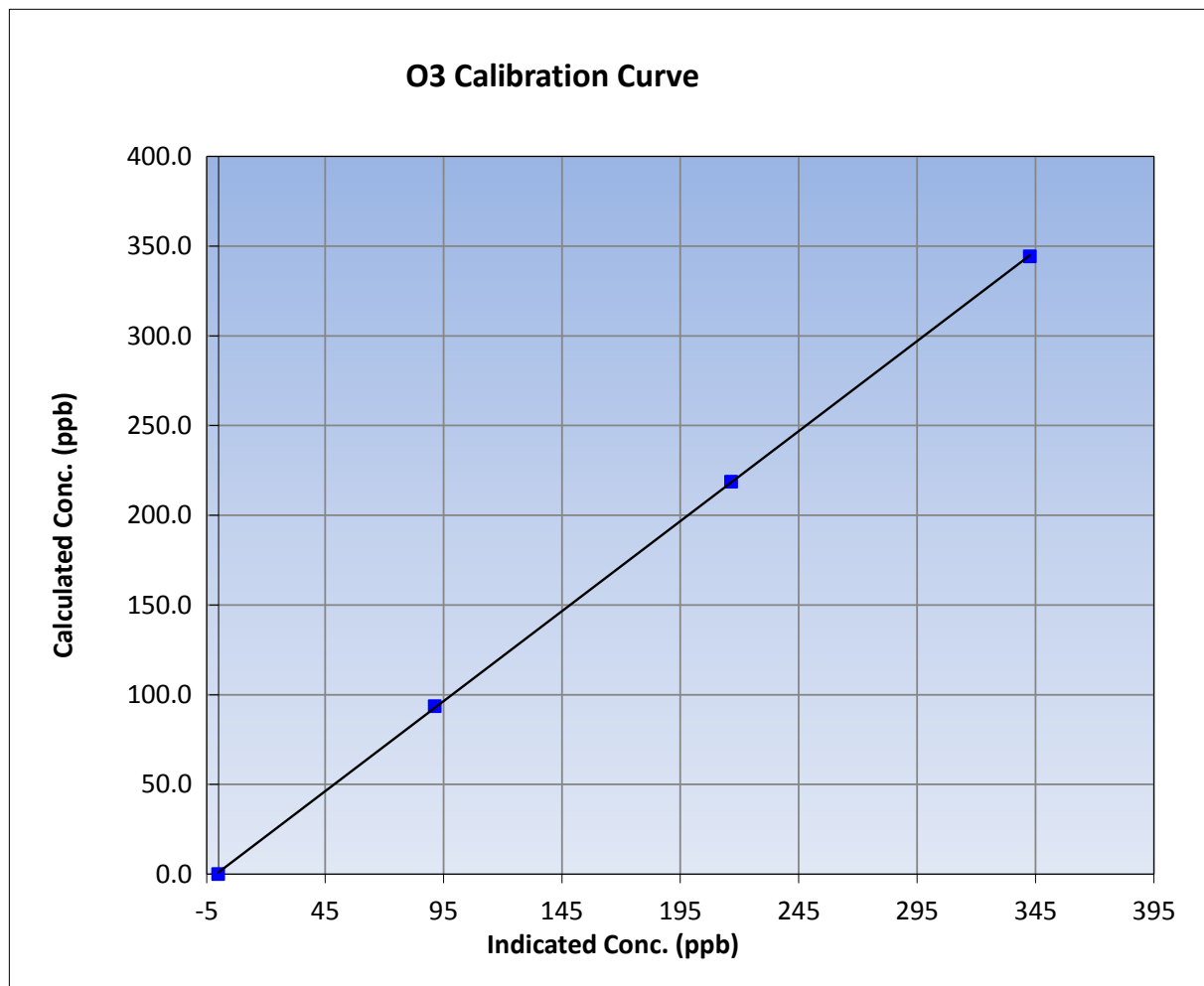
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	May-19-15	Previous Calibration	April 10, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	15:00	End Time (MST)	17:55
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

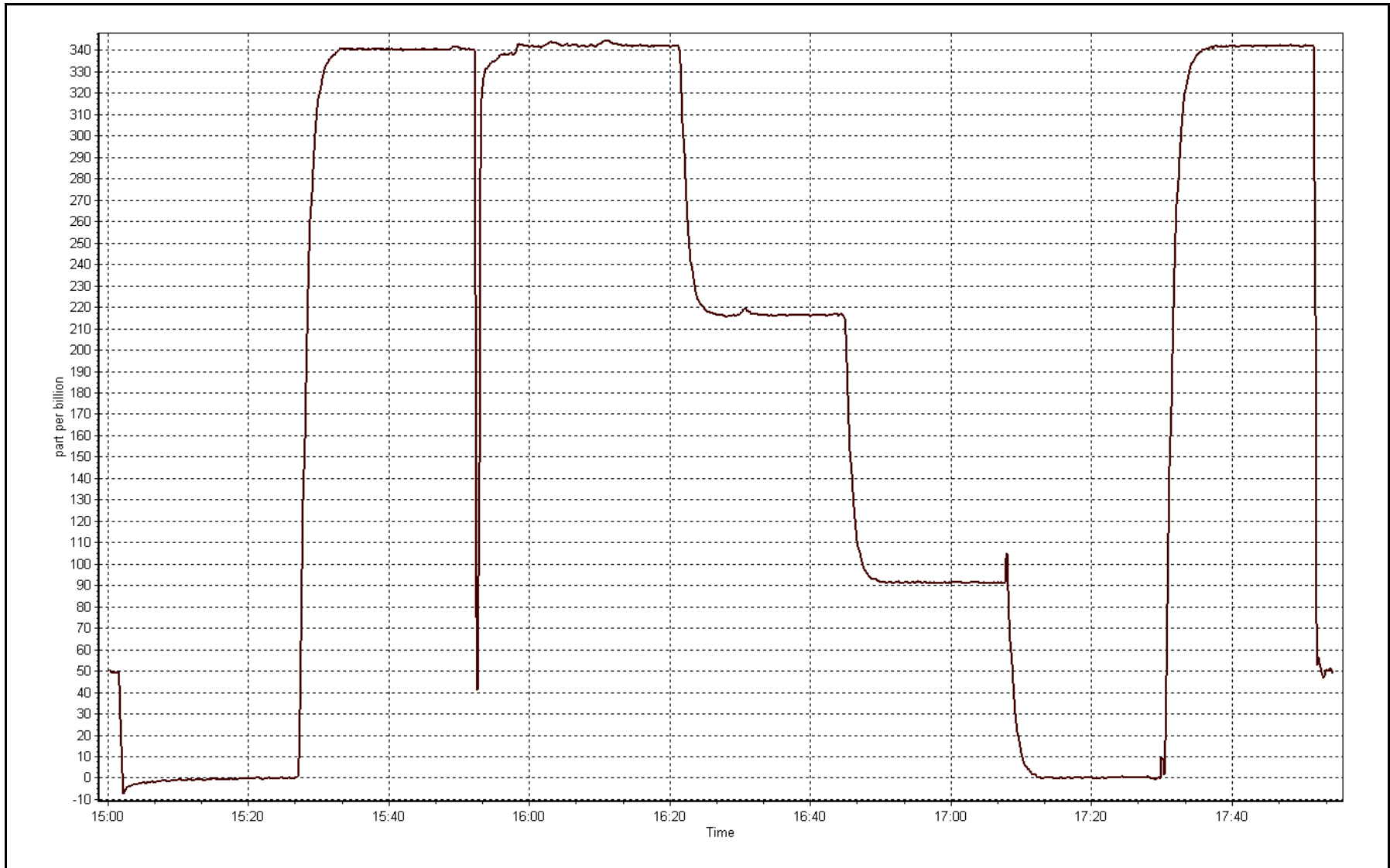
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999967
344.3	342.6	1.0049		
218.7	216.4	1.0106	Slope	1.003575
93.6	91.3	1.0250		
			Intercept	1.018924



O3 Calibration Plot

Date: May 19, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 19, 2015	Previous Calibration	April 9, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Install		
Start Time (MST)	9:05	End Time (MST)	15:04
NO Cal Gas Conc	54.4 ppm	Gas Cert Reference	SA130110A
NOx Cal Gas Conc	54.4 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	Sabio 4010	Serial Number	14300410
Zero air Generator	Teledyne API T701	Serial Number	60

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9036
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.993657	0.995707	0.997055
	Data Offset	0.646925	1.188351	1.127237
Current Calibration	Data Slope	0.996118	0.998105	0.995423
	Data Offset	0.642250	1.345175	0.462732

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153460
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.935		0.927	
NOx coefficient	1.000		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	2.4		2.3	
NOx bkgrnd	3.1		2.8	
Chamber Temp	50.4	Deg C	50.4	Deg C
Moly Temp	322.4	Deg C	324.7	Deg C
PMT voltage	-761	V	-761	V
PMT Temp	-2.8	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	163.2	mmHg	165.5	mmHg
R Cell Press Nox	163.5	mmHg	165.5	mmHg
NO sample flow	0.837	lpm	0.855	lpm
Nox sample Flow	0.839	lpm	0.855	lpm

Notes:

Small adjustments to zero and span. Filter changed after As Finds.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 19, 2015

Station Number:

AMS 6

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	-0.3	-0.1	-0.2	----	----
as found span	6000	88.2	799.7	799.7	0.0	806.6	803.5	3.2	0.9914	0.9953
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
high point	6000	88.2	799.7	799.7	0.0	802.3	800.4	1.8	0.9968	0.9991
second point	6000	44.1	399.8	399.8	0.0	401.0	398.8	2.1	0.9972	1.0025
third point	6000	22.1	200.4	200.4	0.0	199.6	197.9	1.8	1.0037	1.0127
as left zero	6000	0.0	0.0	0.0	0.0	0.3	0.1	0.2	----	----
as left span	6000	88.2	799.7	454.7	345.0	798.6	452.0	346.5	1.0014	1.0060
Average Correction Factor									0.9992	1.0047

Corrected As found

NO_x= 806.9

NO= 803.6

Percent Change

NO_x= -0.3%

NO= -0.2%

Previous Response

NO_x= 804.1

NO= 801.9

GPT Calibration Data

Dilution Flow

6000

ccm

Source Gas Flow

88.20

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO2 (300)	----	454.7	344.3	800.0	454.7	345.4	0.9851	1.0000	0.9970	100.3%
2nd NO2 (200)	----	580.3	218.7	800.0	580.3	219.7	0.9851	1.0000	0.9955	100.5%
3rd NO2 (100)	----	705.4	93.6	798.3	705.4	92.9	0.9873	1.0000	1.0079	99.2%
4th NO2 (0)	799.0	----	1.8	800.8	799.0	1.8	0.9842	1.0000	N/A	----
Average Correction Factor							0.9854	1.0000	1.0001	100.0%

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

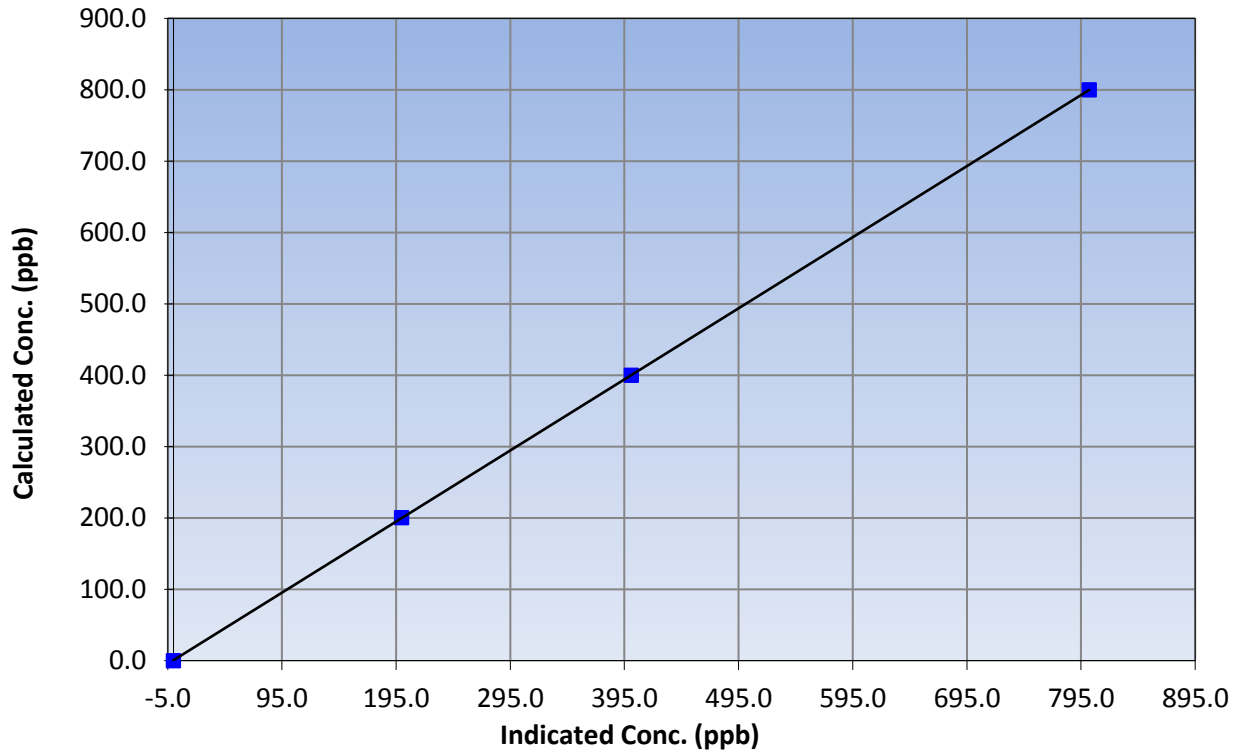
Station Information

Calibration Date	May 19, 2015	Previous Calibration	April 9, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:05	End Time (MST)	15:04
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999997
799.7	802.3	0.9968		
399.8	401.0	0.9972	Slope	0.996118
200.4	199.6	1.0037		
			Intercept	0.642250

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

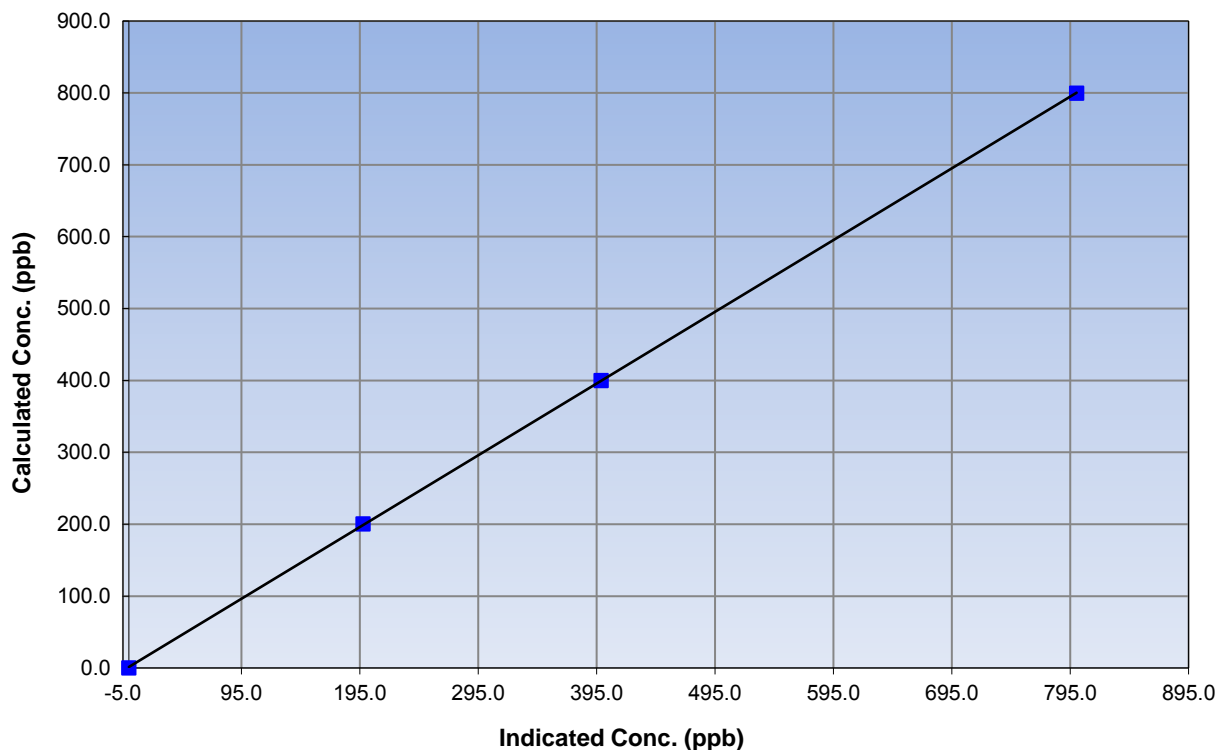
Station Information

Calibration Date	May 19, 2015	Previous Calibration	April 9, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:05	End Time (MST)	15:04
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999986
799.7	800.4	0.9991		
399.8	398.8	1.0025	Slope	0.998105
200.4	197.9	1.0127		
			Intercept	1.345175

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

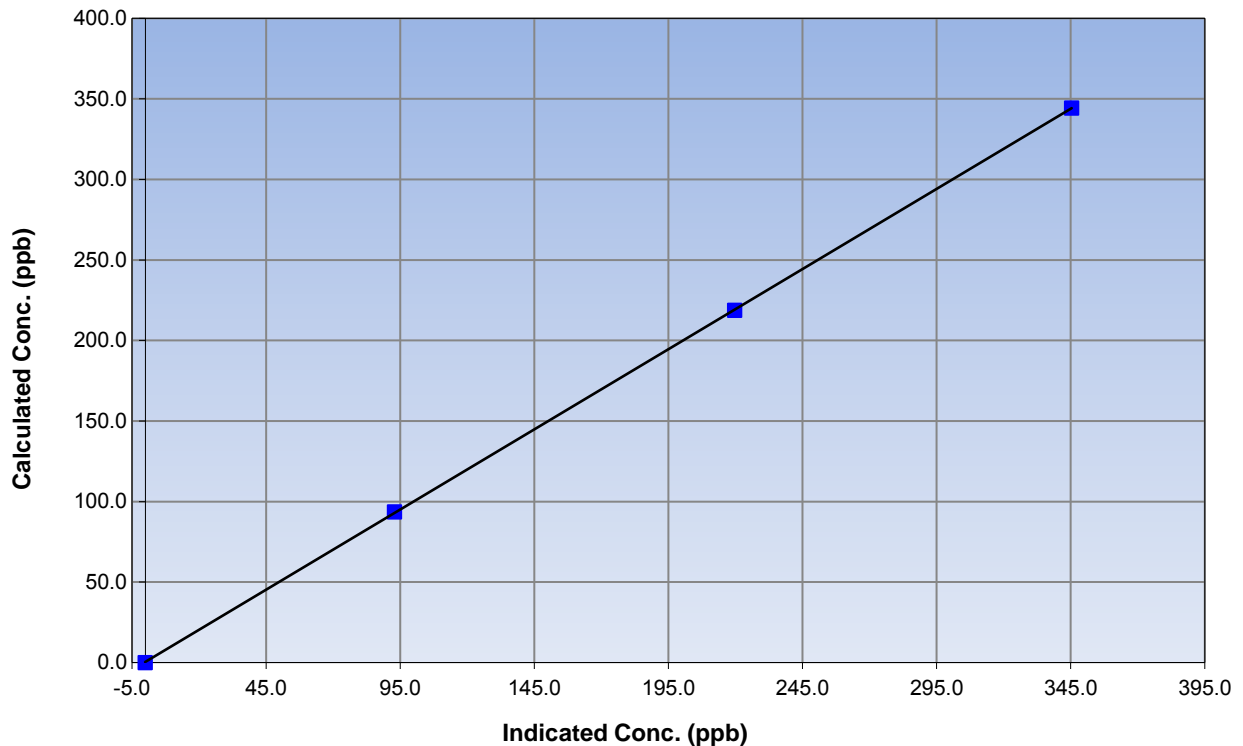
Station Information

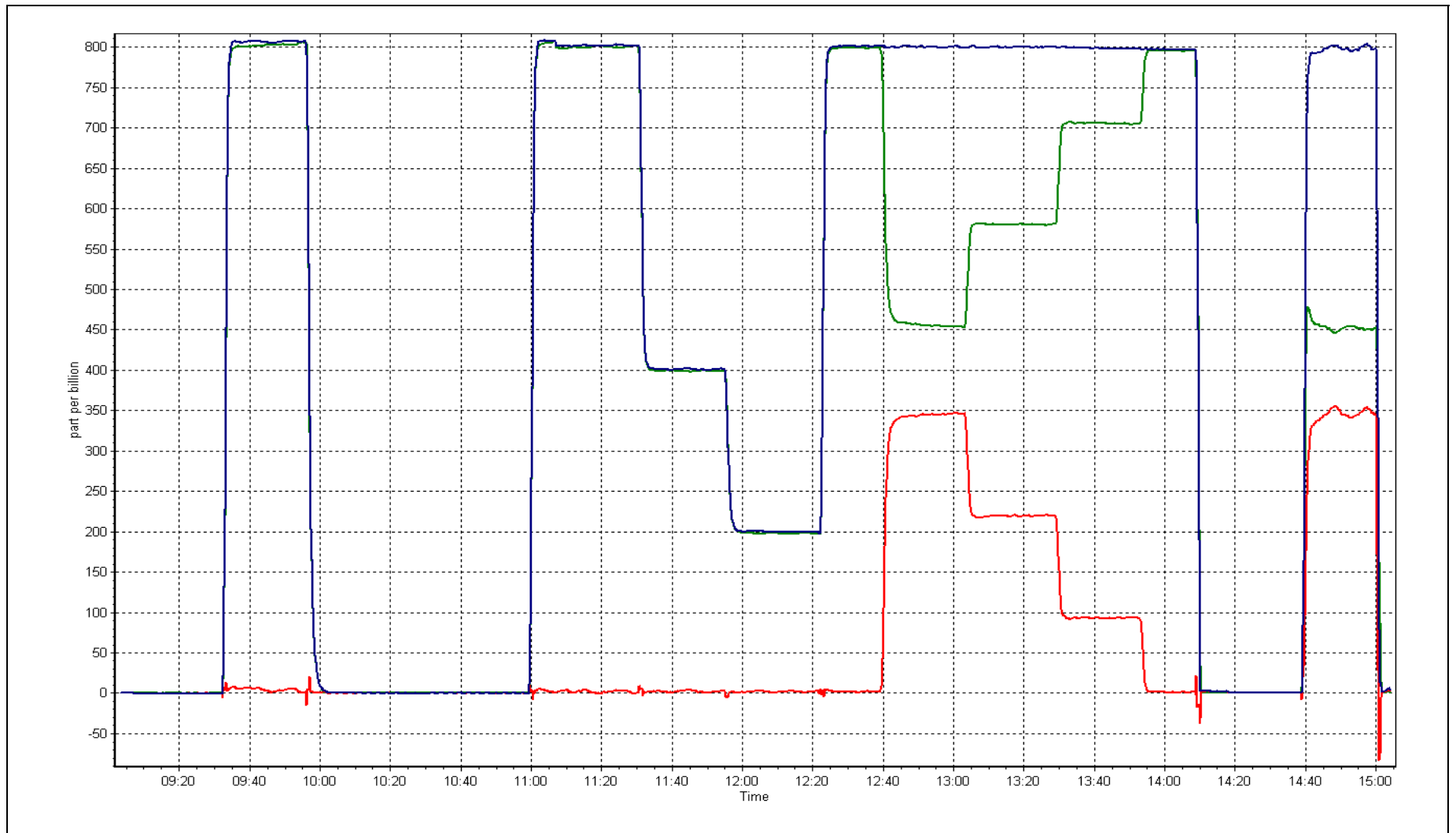
Calibration Date	May 19, 2015	Previous Calibration	April 9, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:05	End Time (MST)	15:04
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999988
344.3	345.4	0.9970		
218.7	219.7	0.9955	Slope	0.995423
93.6	92.9	1.0079		
			Intercept	0.462732

NO₂ Calibration Curve







Wood Buffalo Environmental Association

N_t-NO_x-NH₃ Calibration Report

Station Information

Station Name	Patricia McInnis		Station Number	AMS 6		
NOx Calibration Date	May 19, 2015		NOx Previous Cal Date	April 9, 2015		
NH3 Calibration Date	May 20, 2015		NH3 Previous Cal Date	April 9, 2015		
Reason:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Routine</td> </tr> </table>					Routine
Routine						
Start Time (MST)	9:05		End Time (MST)	14:10		
Barometric Pressure	n/a	mmHg	Station Temperature	21.0	Deg C	
Calibrator	Sabio 4010		Serial Number	14300410		
NH3 Cal Gas Conc	190	ppm	NH3 Expiry Date / SN	April 3, 2012	LL86349	
NOx Cal Gas Conc	54.4	ppm	NO Expiry Date / SN	December 12, 2016	SA130110A	
NO Cal Gas Conc	54.4	ppm				

DACs Information

DACS make & model Campbell Scientific CR3000 DACS serial No. 9036

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	1.005123	0.997381	0.997090	1.005078	1.011172
	Data Offset	3.546684	3.893993	2.715383	3.912738	-4.081474
Cal Stats After	Data Slope	0.998793	0.980616	1.001305	0.999897	1.008542
	Data Offset	-1.686105	-1.607314	0.740784	2.134116	1.026837
IP address			192.168.1.17			

Analyzer Information

Analyzer make/model	<u>API T201</u>		Analyzer serial #	<u>215</u>	
Converter	<u>API 501 NH3</u>		Converter serial #	<u>217</u>	
Test Point	before		after		
NH3 Conc range	2500	ppb	2500	ppb	
NOx Conc range	1000	ppb	1000	ppb	
NO BKG	1.1	ppb	-0.1	ppb	
NOx BKG	0.8	ppb	0.2	ppb	
Nt BKG	18.7		2.1		
NO coefficient	0.961		0.965		
NO2 coefficient	1.000	ppb	1.000	ppb	
NOx coefficient	0.975		0.973		
NH3 coefficient	NA		NA		
Nt coefficient	0.970		0.960		
NH3 conv temp	825	DegC	825	Deg C	
Chamber Temp	49.5	Deg C	50.0	Deg C	
Moly Temp	316.2	Deg C	314.6	Deg C	
PMT Temp	7.1	Deg C	7.0	Deg C	
O3 flow	85.0	ccm	86.0	ccm	
R Cell Press	4.6	mmHg	4.6	mmHg	
HVPS	NA	v	693.0	v	
Sample Flow 1 NO	541.0	ccm	553.0	ccm	
Sample Flow 2 Nox	544.0	ccm	553.0	ccm	
Sample Flow 3 Nt	545.0	ccm	553.0	ccm	

Notes:

Filter changed after As Finds. Zero and span adjusted for NO, Nox and Nt.



Wood Buffalo Environmental Association

Nt-NO_x-NH₃ Calibration Report

Station Information

Calibration Date:

May 20, 2015

Station Number:

AMS 6

NH₃ Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NOx conc (ppb)	Calculated NH ₃ conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH ₃ conc (ppb)	Nt Correction factor	NH ₃ Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	-0.2	0.0	-0.1	----	----
as found NO	6000	88.2	799.7	799.7	----	797.8	797.8	0.0	1.002	----
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high NO point	6000	88.2	799.7	799.7	----	796.2	798.2	-2.0	1.004	----
NO/O ₃ point	6000	88.2	799.7	799.7	----	803.3	803.3	0.0	0.995	----
as found NH ₃	6000	63.2	2001.3	NA	2001.3	2025.0	37.8	1987.2	0.988	1.007
first NH ₃	6000	63.2	2001.3	NA	2001.3	2041.9	37.1	2004.8	0.980	0.998
second NH ₃	5000	26.3	999.4	NA	999.4	1020.9	18.4	1002.5	0.979	0.997
third NH ₃	5000	13.2	501.6	NA	501.6	515.5	9.4	506.1	0.973	0.991
Average Correction Factor									0.9999	0.9955

NH₃ Corrected As Found
 Nt Corrected As Found
 NOx Corrected As Found

NH₃ = 1987.3 ppb
 NH₃ = 797.9 ppb
 NH₃ = 797.9 ppb

Previous Response
 Previous Response
 Previous Response

NH₃ = 1973.6 ppb
 Nt = 796.1 ppb
 NOx = 797.5 ppb

NH₃ percent change -0.7%
 Nt percent change -0.2%
 NOx percent change 0.0%



Wood Buffalo Environmental Association

NO_x(NH₃) Calibration Report

Station Information

Calibration Date:

May 19, 2015

Station Number:

AMS 6

NO_x / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO _x conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO _x conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO _x Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	-0.3	-0.6	-8.9	----	----
as found span	6000	88.2	799.7	799.7	799.7	798.0	794.8	793.8	1.0022	1.0061
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	----	----
high point	6000	88.2	799.7	799.7	799.7	798.2	798.6	796.2	1.0019	1.0013
second point	6000	44.1	399.8	399.8	399.8	398.4	396.7	398.4	1.0036	1.0079
third point	6000	22.1	200.4	200.4	200.4	198.6	196.3	198.6	1.0087	1.0206
calibrator zero										
as left zero	6000	0.0	0.0	0.0	0.0	0.0	-0.2	2.2	----	----
as left span	6000	88.2	799.7	455.3	799.7	798.4	459.1	801.7	1.0016	0.9918
Average Correction Factor									1.0047	1.0100

	<u>Nt</u>	<u>NOX</u>	<u>NO</u>	<u>NO2</u>
Corrected As found	802.73	797.85	795.43	343.19
Previous Response	797.9	799.3	786.9	343.9
Percent Change	-0.6%	0.2%	-1.1%	0.2%

GPT Calibration Data

Dilution Flow 6000 ccm Source Gas Flow 88.20 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			0.4			----	
1st NO ₂ (300)	----	455.3	347.6	798.9	455.3	343.6	1.0010	1.0000	1.0117	98.8%
2nd NO ₂ (200)	----	583.4	219.6	801.1	583.4	217.7	0.9982	1.0000	1.0083	99.2%
3rd NO ₂ (100)	----	709.1	93.8	796.7	709.1	89.5	1.0038	1.0000	1.0472	95.5%
4th NO ₂ (0)	802.9	----	0.4	803.3	802.9	0.4	0.9955	1.0000	----	----
Average Correction Factor							0.9996	1.0000	1.0224	97.8%

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

NH3 Calibration Summary

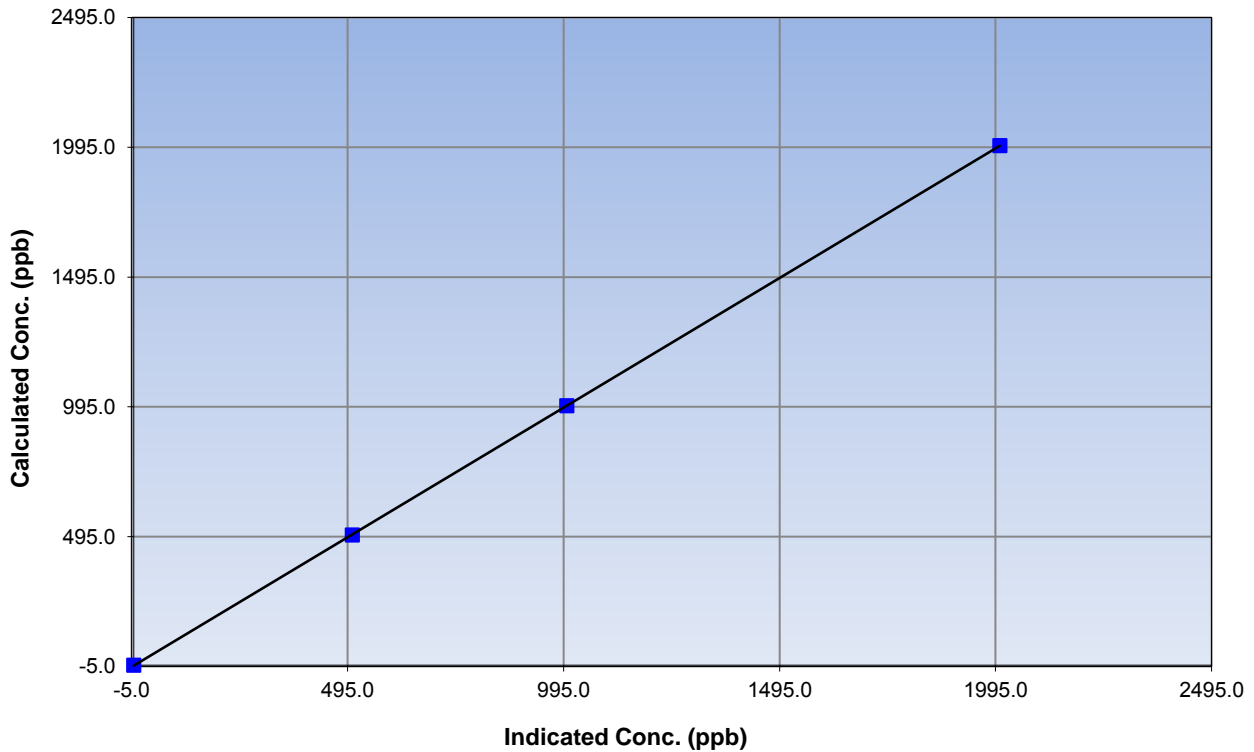
Station Information

Calibration Date	May 20, 2015	Previous Calibration	April 9, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:05	End Time (MST)	14:10
Analyzer make	API T201	Analyzer serial #	215

NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999996
2001.3	2004.8	0.9983		
999.4	1002.5	0.9969		
501.6	506.1	0.9912	Slope	0.998793
			Intercept	-1.686105

NH3 Calibration Curve





Wood Buffalo Environmental Association

Nt Calibration Summary

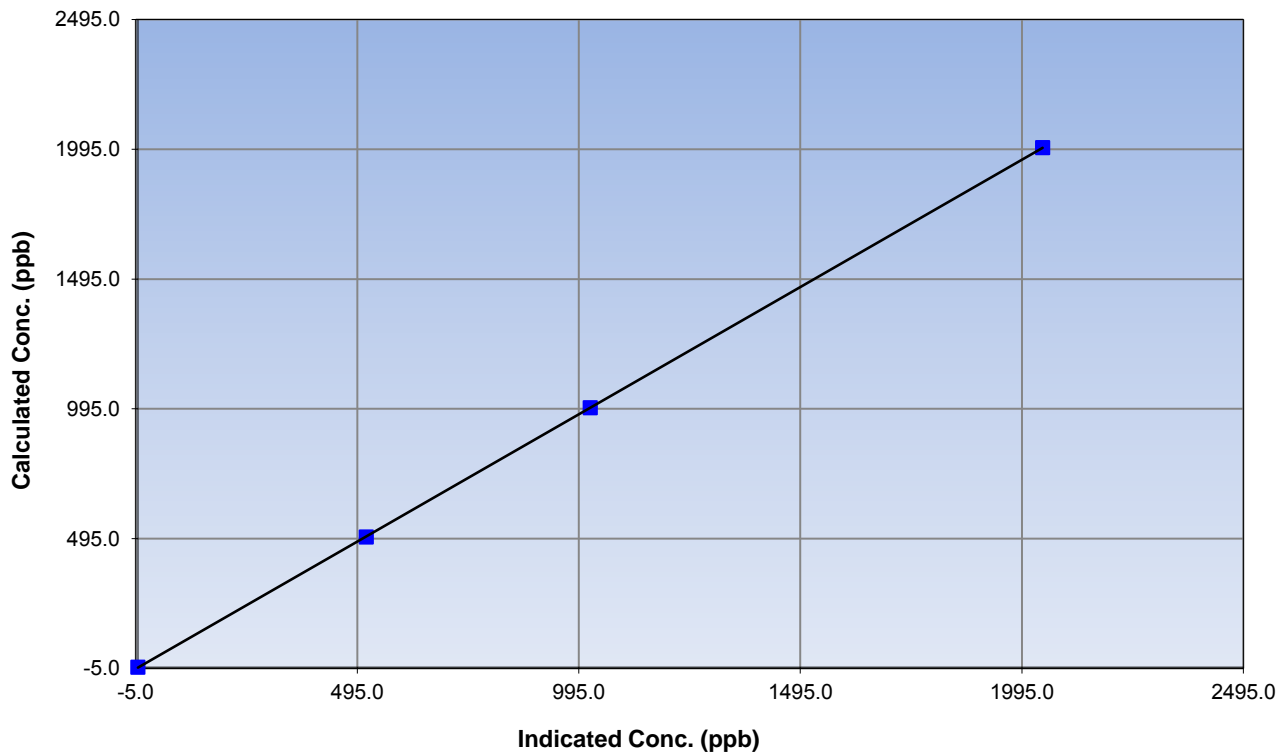
Station Information

Calibration Date	May 20, 2015	Previous Calibration	April 9, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:05	End Time (MST)	14:10
Analyzer make	API T201	Analyzer serial #	215

Nt (NH₃) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999996
2001.3	2041.9	0.9801		
999.4	1020.9	0.9789	Slope	0.980616
501.6	515.5	0.9731		
			Intercept	-1.607314

Nt Calibration Curve





Wood Buffalo Environmental Association

NOx Calibration Summary

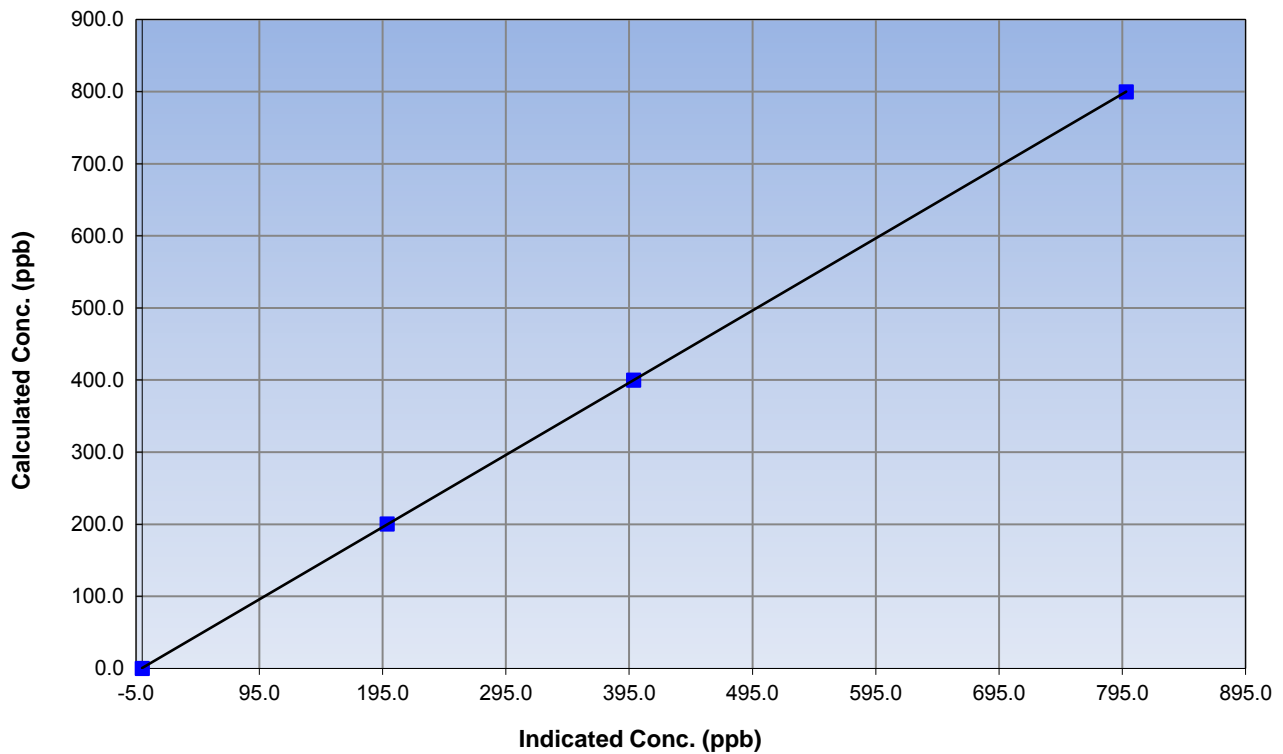
Station Information

Calibration Date	May 19, 2015	Previous Calibration	April 9, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:05	End Time (MST)	14:10
Analyzer make	API T201	Analyzer serial #	215

NO_x Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999997
799.7	798.2	1.0019		
399.8	398.4	1.0036	Slope	1.001305
200.4	198.6	1.0087		
			Intercept	0.740784

NOx Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

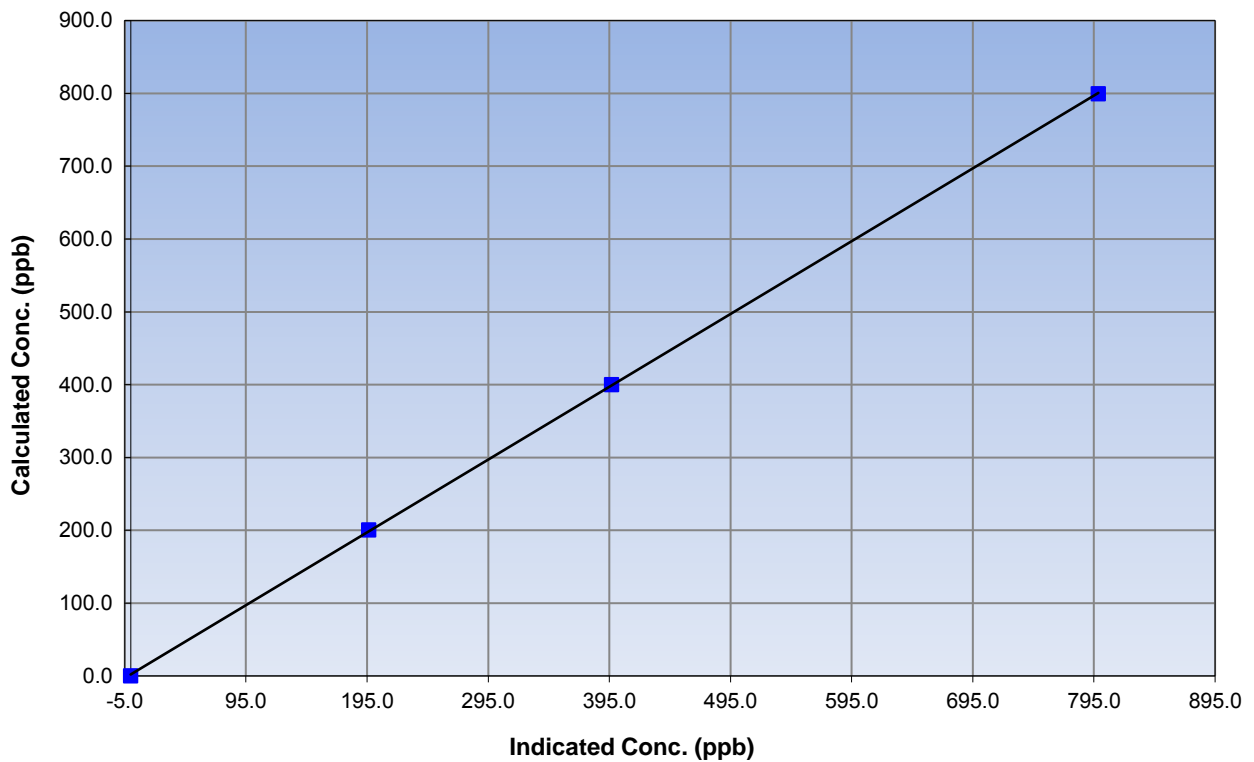
Station Information

Calibration Date	May 19, 2015	Previous Calibration	April 9, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:05	End Time (MST)	14:10
Analyzer make	API T201	Analyzer serial #	215

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999972
799.7	798.6	1.0013		
399.8	396.7	1.0079	Slope	0.999897
200.4	196.3	1.0206		
			Intercept	2.134116

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

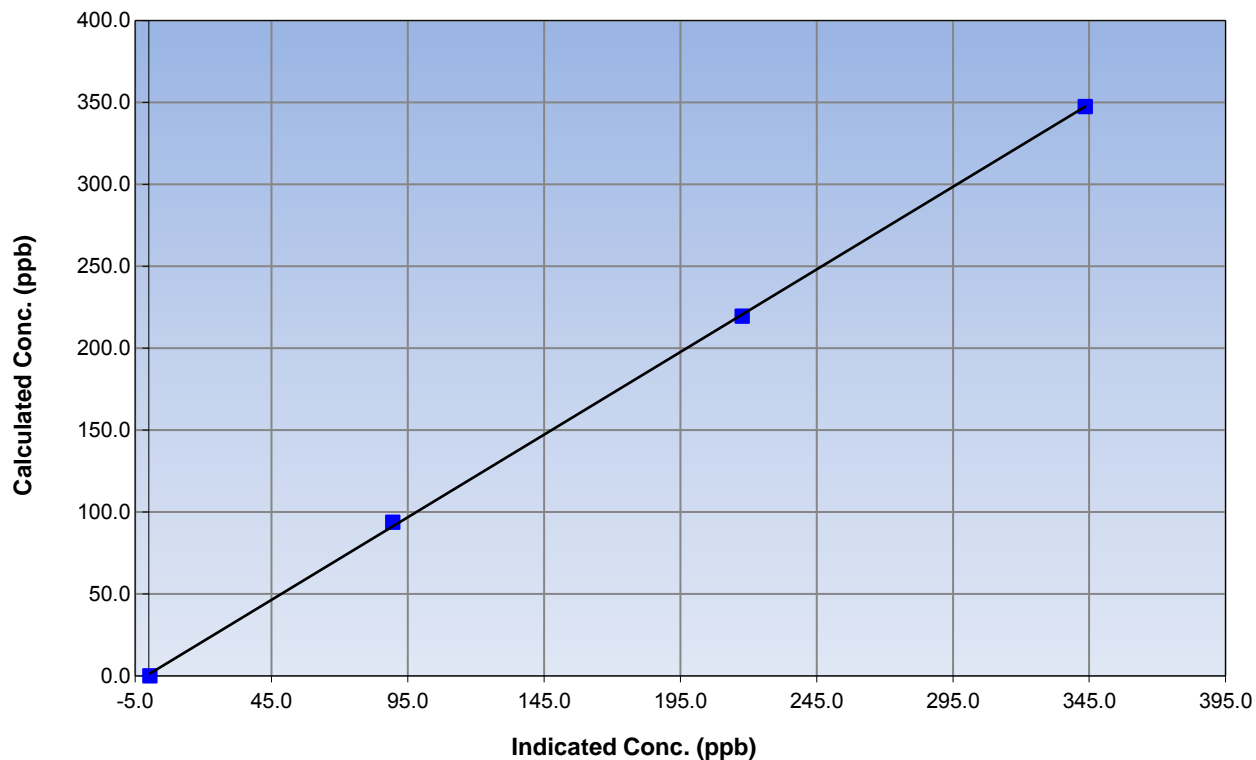
Station Information

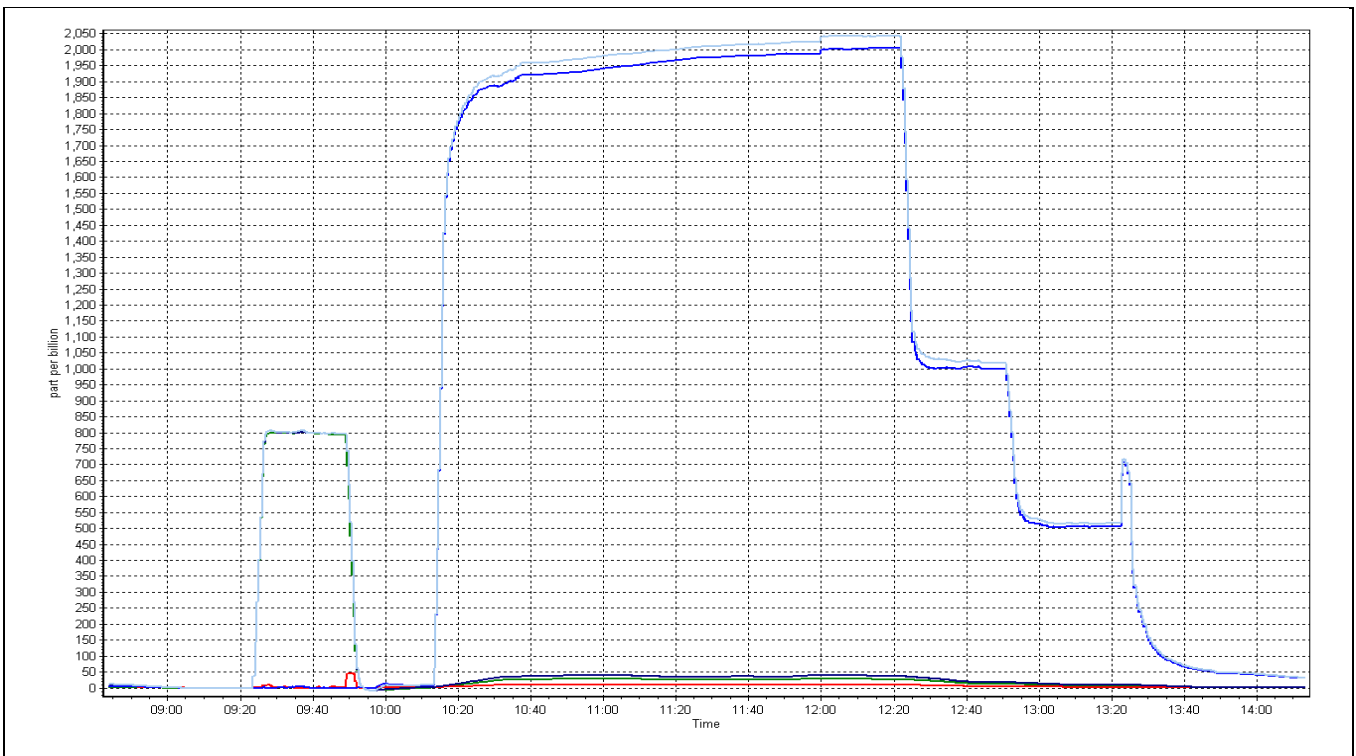
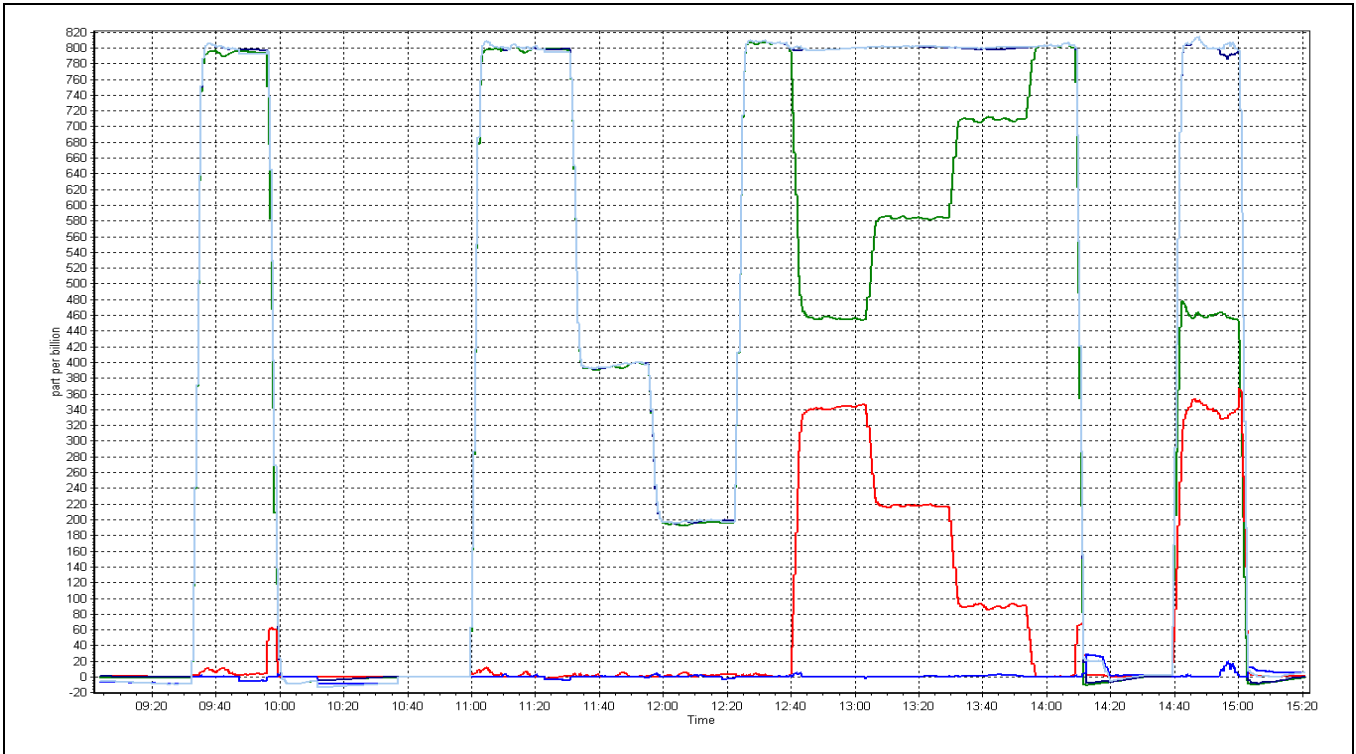
Calibration Date	May 19, 2015	Previous Calibration	April 9, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	9:05	End Time (MST)	14:10
Analyzer make	API T201	Analyzer serial #	215

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999867
347.6	343.6	1.0117		
219.6	217.7	1.0083	Slope	1.008542
93.8	89.5	1.0472		
			Intercept	1.026837

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	<u>May 20, 2015</u>	Previous Calibration:	<u>April 10, 2015</u>
Station Name:	<u>Patricia McInnis</u>	Station Number:	<u>AMS 6</u>
Start Time (MST):	<u>11:30</u>	End Time (MST):	<u>13:00</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>1212</u>

SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number:	<u>E-1475</u>
Source SN:	<u>5680</u>
HEPA PN:	<u>12144</u>
Time Correct (MST):	<u>Yes</u>
Parameters Checked:	<u>T1, T2, T2,T4, P3, Main Flow, Beta, Neph</u>

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	22.0	23.7	1.7	24.0
T2	23.0	na	na	23.0
T3	23.0	na	na	23.0
T4	19.0	na	na	19.0
RH (%)	18.0	na	na	18.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	971	977.0	6.0	977

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1003	3	1002	1000

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	202		202
Neph	1.3		-0.1
C14	20.3		49
Indicated Concentration (ug/m3)	0.9	no	-0.1
Offset 1	202		201.8
Offset 2	32		32.2

Leak Check (Quarterly)

Leak Check Date:	<u>May 20, 2015</u>	Previous Leak Check Date:	NA
	<u>Measured</u>	<u>Difference LPM (Limit +/- 0.42 LPM)</u>	
Flow without adaptor (LPM):	16.73		
Flow with adaptor [turn off pump first](LPM):	16.54	0.19	

Mass Foil Calibration (Annualy)

Foil Calibration Date:	<u>May 20, 2015</u>	Previous Foil Calibration:	NA
Zeroed?:	<u>Yes</u>		
Foil Mass:	<u>1167</u>		
Previous Correction Factor:	<u>7038</u>	<u>Mass foil set S/N:</u>	2597
New Correction Factor:	<u>6978</u>		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	20/05/2015
Pump	Good	NA
Filter Tape	Good	NA
Mass Foil Cal Set	Good	NA
HEPA filter	Good	NA

NOTES:

Temperature slightly adjusted, Nephelometer zeroed.

Calibration Performed By: Ryan Power



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 7
ATHABASCA VALLEY
MAY 2015**

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

June 29, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
MAY 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	709	34	35	99.87	13	0	3	0
TRS (ppb) Average	708	35	36	99.87	1	0	0	0
THC (ppm) Average	709	34	35	99.87	2.3	-	1.9	-
NMHC (ppm) Average	709	34	35	99.87	0.123	-	0.02	-
CH4(ppm) Average	709	34	35	99.87	2.3	-	1.9	-
O3 (ppb) Average	704	39	40	99.87	64	0	45	-
NO2 (ppb) Average	703	39	41	99.73	24	0	7	-
NO (ppb) Average	703	39	41	99.73	19	-	2	-
NOX (ppb) Average	703	39	41	99.73	33	-	9	-
PM2.5 (ug/m3) Average	739	0	5	99.33	144.7	-	38.8	2
CO(ppm) Average	709	35	35	100.00	0.6	0	0.2	-
Temperature 2 m (C) Average	744	0	0	100.00	28.3	-	19.7	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.6	-	29.5	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	81	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	30	-	19	-
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)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	709	1	1	-	0	0	1	1	1	2	13
TRS (ppb) Average	708	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	709	1.86	0.1	-	1.8	1.8	1.8	1.8	1.9	1.9	2.3
NMHC (ppm) Average	709	0.002	0.01	-	0	0	0	0	0	0	0.123
CH4(ppm) Average	709	1.86	0.1	-	1.8	1.8	1.8	1.8	1.9	1.9	2.3
O3 (ppb) Average	704	33	13	-	1	16	23	32	44	52	64
NO2 (ppb) Average	703	4.7	4	-	0	1	2	4	7	10	24
NO (ppb) Average	703	0.9	2	-	0	0	0	0	1	3	19
NOX (ppb) Average	703	5.6	5	-	0	1	2	4	8	12	33
PM2.5 (ug/m3) Average	739	12.11	15.1	-	1.4	3	4.8	7.9	13.5	23.2	144.7
CO(ppm) Average	709	0.06	0.1	-	0	0	0	0	0.1	0.1	0.6
Temperature 2 m (C) Average	744	11.83	7.5	-	-2.9	2.4	5.6	10.8	17.4	22.7	28.3
Barometric Pressure (inHg) Average	744	29.1	0.2	-	28.6	28.8	29	29.1	29.2	29.4	29.6
Relative Humidity (%) Average	744	47.6	22	-	11	19	29	46	65	79	99
Wind Speed 10 m (km/h) Average	744	8.7	6	-	0	3	4	7	12	17	30
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)
MAY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	14 May 2015 10:00	14 May 2015 10:00	1	Maintenance - sample manifold cleaned
TRS	14 May 2015 10:00	14 May 2015 10:00	1	Maintenance - sample manifold cleaned
NMHC, CH4, THC	14 May 2015 10:00	14 May 2015 10:00	1	Maintenance - sample manifold cleaned
O3	14 May 2015 10:00	14 May 2015 10:00	1	Maintenance - sample manifold cleaned
NO2, NO, NOX	15 May 2015 09:00	15 May 2015 10:00	2	Maintenance - confirmed analyzer response to span target
PM2.5	15 May 2015 07:00	15 May 2015 08:00	2	Maintenance - Flow and zero check, sample head cleaning
PM2.5	28 May 2015 12:00	28 May 2015 14:00	3	Maintenance- replaced analyzer - AESRD equipment



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 13 ppb on May 26 08:00	Maximum Daily Average: 3.2 ppb on May 26		Hours of Data:	709
Minimum Value: 0 ppb on May 16 09:00	Minimum Daily Average: 0.4 ppb on May 16		Hours of Missing Data:	35
Maximum Diurnal Average: 1.5 ppb at hour 18	Minimum Diurnal Average: 0.6 ppb at hour 3		Hours of Calibration:	34
Monthly Average: 1.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 6		Percent Operational Time:	99.9

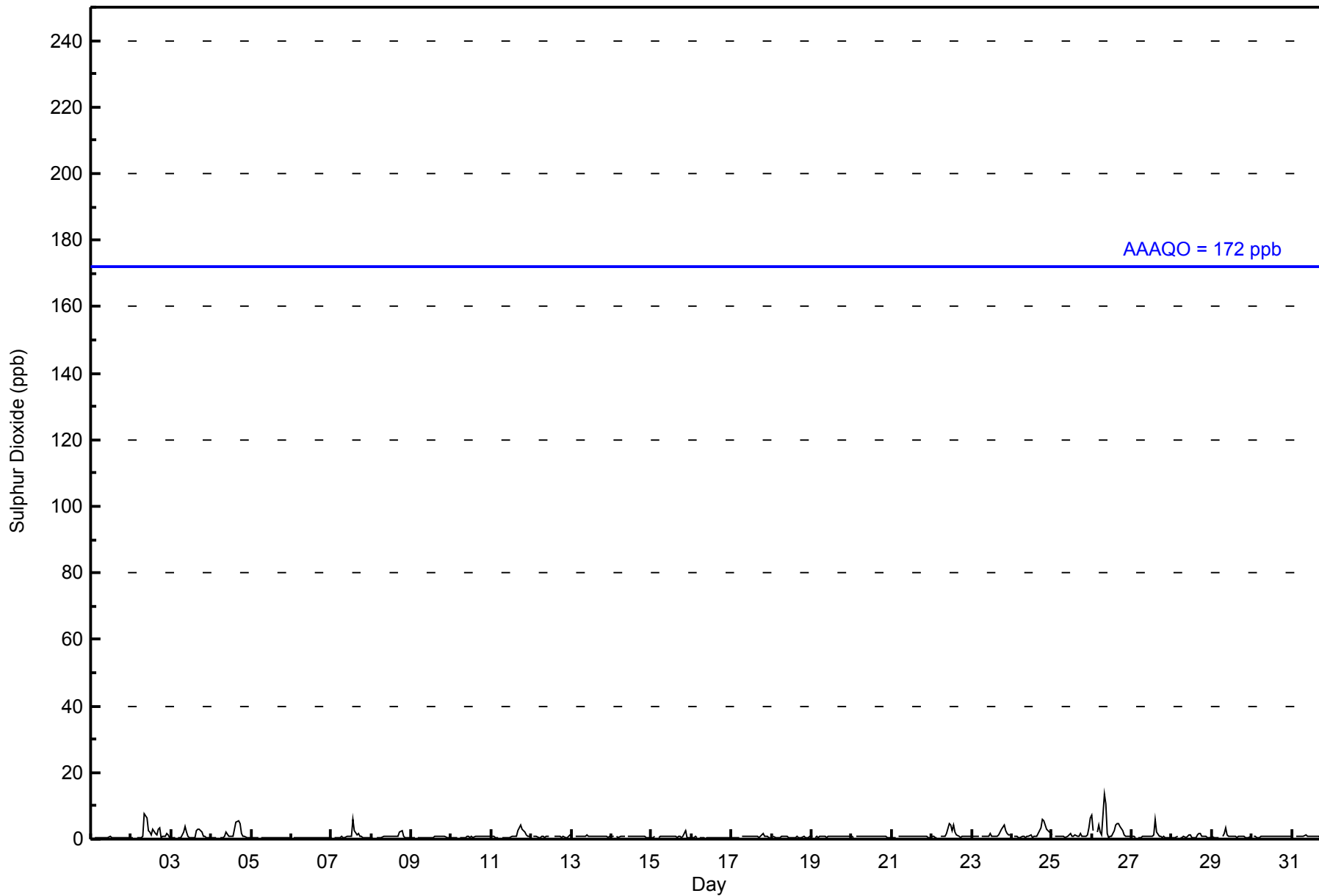
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1																							
2-May	0	0	Z	0	0	0	1	1	8	6	3	2	1	3	2	1	3	3	1	1	1	2	1	1	1.8	8																							
3-May	0	0	1	Z	0	0	0	2	4	2	1	1	0	0	1	3	3	3	2	1	1	0	1	1	1.2	4																							
4-May	0	0	0	0	Z	0	0	1	1	2	1	1	1	1	3	5	6	5	2	1	1	1	0	1	1.4	6																							
5-May	1	0	0	0	0	Z	1	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0.5	1																							
6-May	Z	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0.4	1																							
7-May	0	Z	0	1	1	1	1	1	1	1	1	1	1	6	2	1	2	1	1	1	0	1	0	0	1.0	6																							
8-May	1	0	Z	1	1	0	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	0.8	2																							
9-May	1	0	0	Z	0	1	1	1	1	0	0	1	0	0	1	1	1	1	1	1	1	1	1	0	0.6	1																							
10-May	0	0	1	1	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1																							
11-May	1	1	1	0	1	Z	1	1	1	1	1	1	1	1	1	1	2	4	3	3	2	1	1	1	1.2	4																							
12-May	Z	1	1	1	1	1	1	1	1	1	1	C	C	C	1	1	1	1	1	1	0	1	1	1	0.7	1																							
13-May	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																							
14-May	1	1	Z	1	1	1	1	1	1	M	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.7	1																							
15-May	1	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	0	1	0.8	3																							
16-May	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1																							
17-May	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	0	0.8	2																							
18-May	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0.6	1																							
19-May	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1																							
20-May	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.8	1																							
21-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1																							
22-May	1	1	1	1	Z	1	1	1	1	2	5	4	2	4	2	1	1	1	1	1	1	1	1	1	1.4	5																							
23-May	1	1	1	1	1	Z	1	1	1	1	1	2	1	1	1	1	1	2	3	4	2	2	1	1	1.3	4																							
24-May	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	6	5	4	3	2	2	2	1.7	6																							
25-May	1	Z	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	4	6	6	1.3	6																							
26-May	7	3	Z	2	4	2	1	13	11	2	1	1	3	4	5	4	4	4	3	1	1	1	1	1	3.2	13																							
27-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	6	2	1	1	1	1	1	1	1	1	1	1.0	6																							
28-May	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	0.8	2																							
29-May	1	1	1	1	1	Z	1	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	3																							
30-May	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1																							
31-May	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																							
																								0.9	0.7	0.6	0.7	0.7	0.7	0.7	1.1	1.4	1.1	1.0	1.0	0.8	1.2	1.2	1.2	1.3	1.5	1.2	1.1	0.9	0.8	0.8	0.9	Diurnal Average	
																								7	3	1	2	4	2	1	13	11	6	5	4	2	6	6	5	6	5	6	5	4	3	4	6	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	99.72	99.72
11 - 20	2	0.28	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: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	67	26	14	31	39	56	143	45	16	19	42	42	18	23	33	93	707
11 - 20	1	0	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	68	26	14	31	39	56	143	45	16	19	42	42	18	23	33	94	709

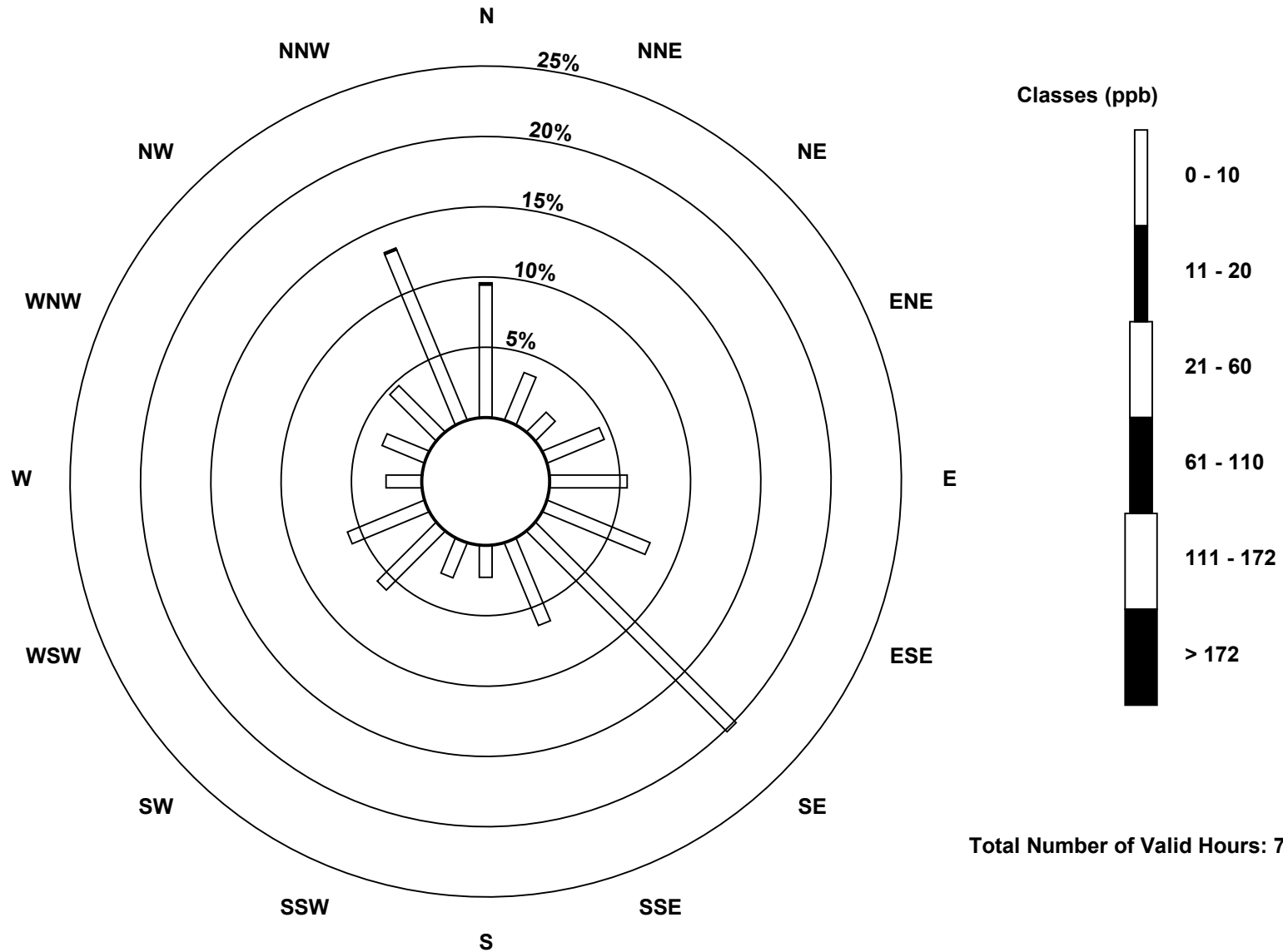
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

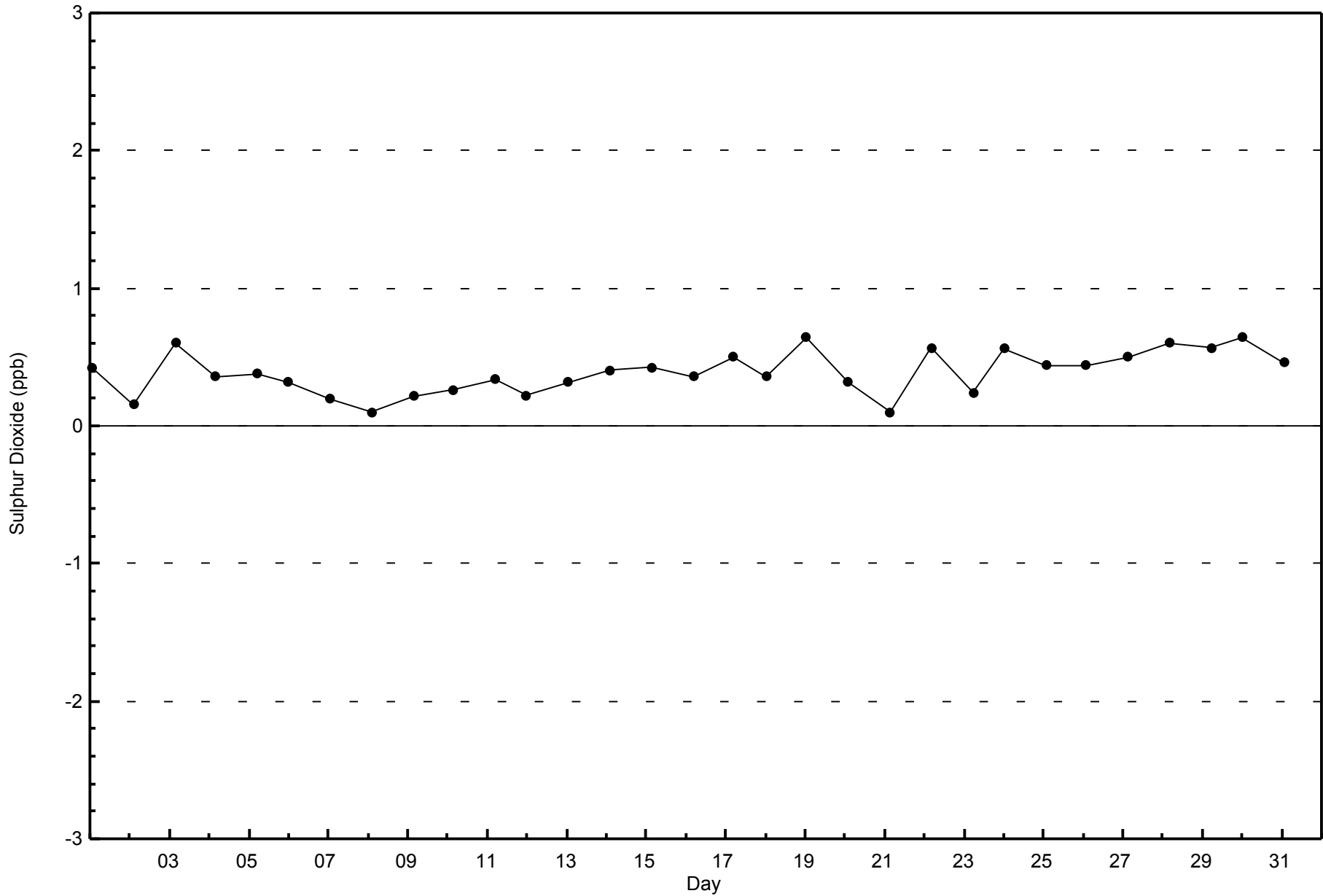
Sulphur Dioxide (SO₂) - ppb
Athabasca Valley (AMS 7)





WBEA
Zero Responses

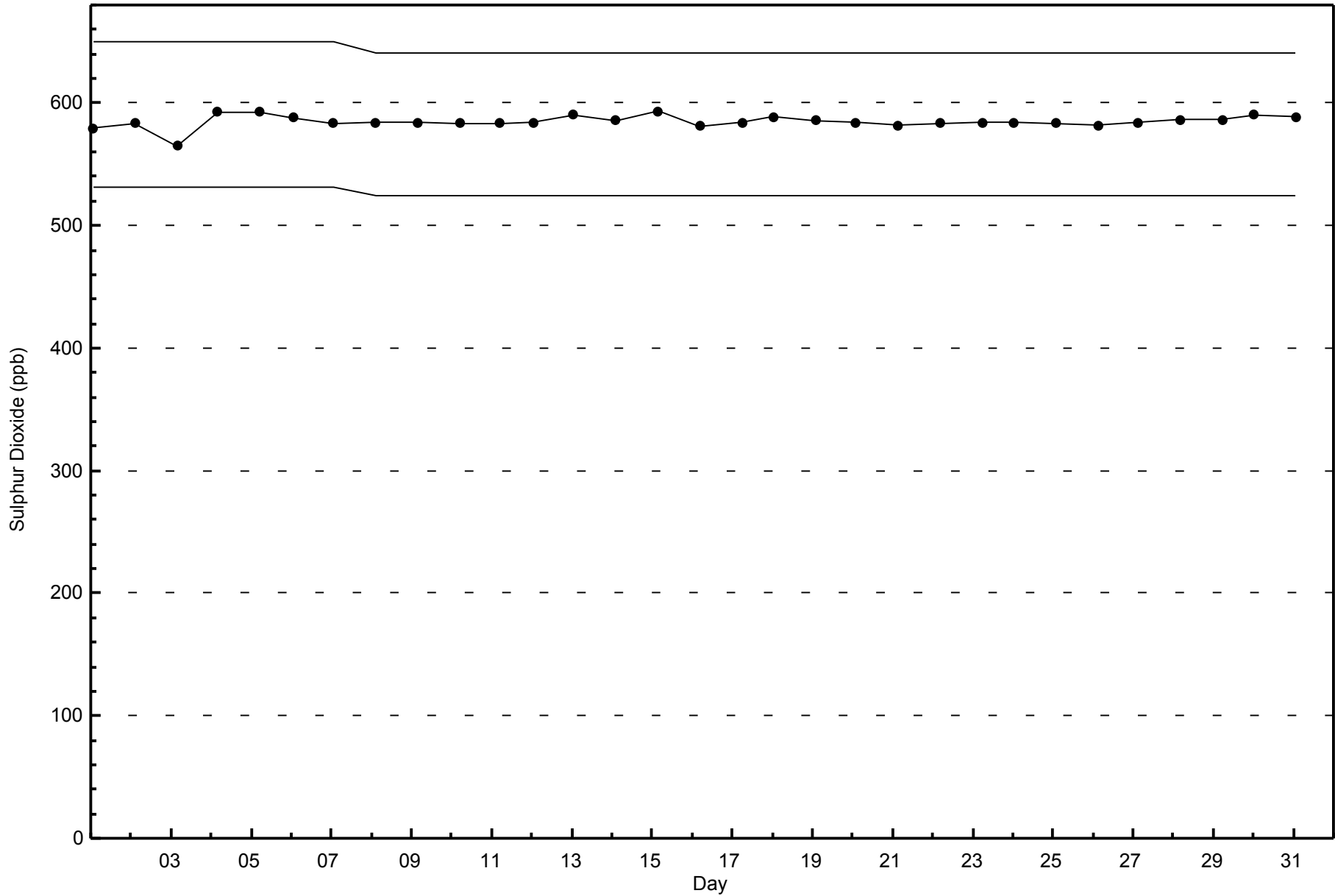
Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Athabasca Valley - May 2015



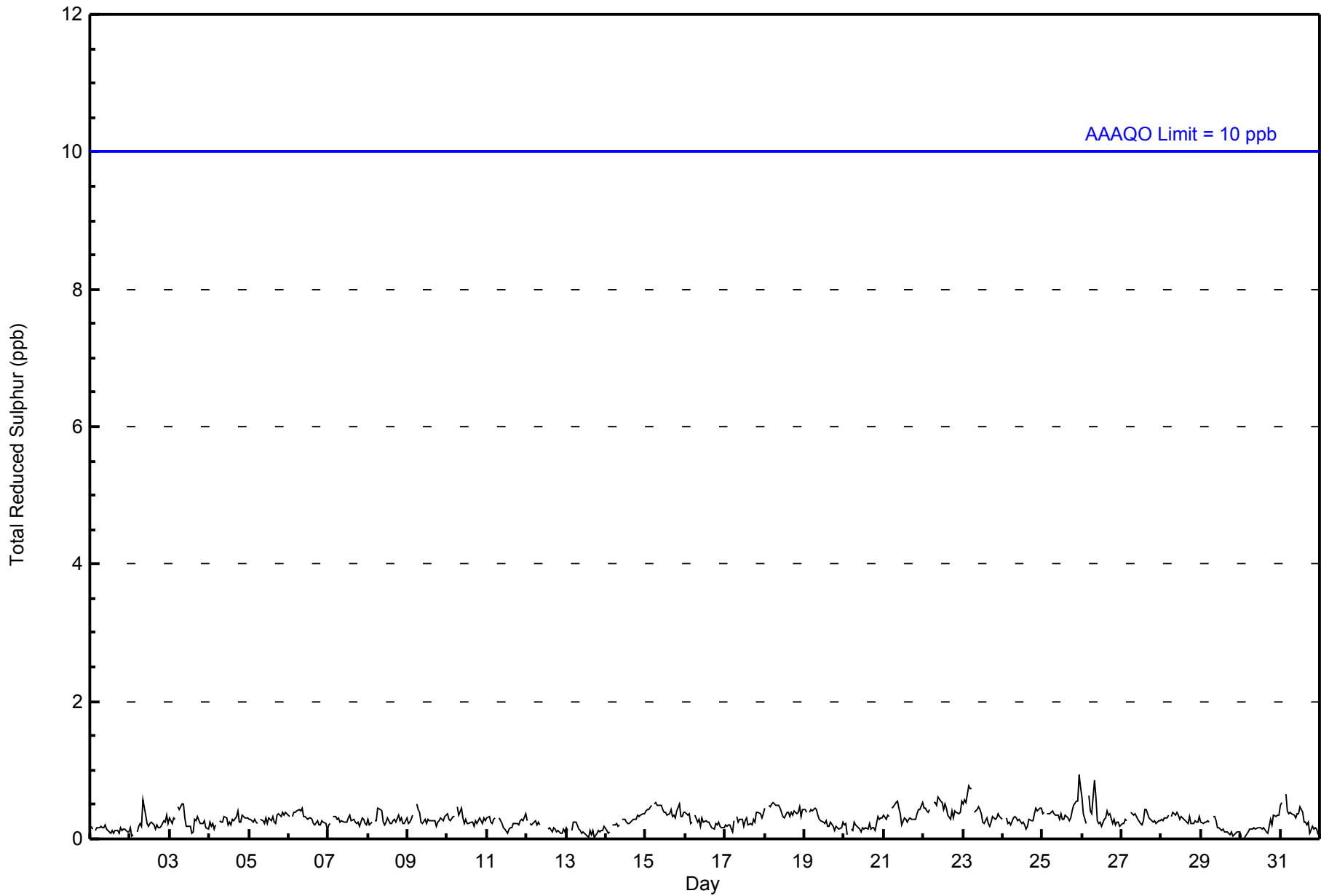


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744										Daily Average	Daily Maximum						
Maximum Value: 1 ppb on May 25 23:00										Maximum Daily Average: 0.4 ppb on May 22																	
Minimum Value: 0 ppb on May 30 03:00										Minimum Daily Average: 0.1 ppb on May 13										Hours of Data: 708							
Maximum Diurnal Average: 0.4 ppb at hour 7										Minimum Diurnal Average: 0.2 ppb at hour 17										Hours of Missing Data: 36							
Monthly Average: 0.3 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1										Hours of Calibration: 35							
																				Percent Operational Time: 99.9							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-May	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
3-May	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-May	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
5-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
6-May	0	Z	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
7-May	0	0	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-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
9-May	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	0.3	1
10-May	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
11-May	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-May	0	Z	0	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-May	0	0	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-May	0	0	0	Z	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-May	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1
16-May	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
17-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
18-May	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
19-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
20-May	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
21-May	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
22-May	0	0	0	0	0	Z	1	1	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0.4	1
23-May	1	1	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
24-May	0	Z	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
25-May	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
26-May	1	0	0	Z	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
27-May	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
28-May	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
29-May	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
30-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-May	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
0.3																								Diurnal Average			
1																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - May 2015





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - May 2015

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

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	70	26	14	30	38	57	139	49	18	19	42	42	18	23	31	92	708
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	70	26	14	30	38	57	139	49	18	19	42	42	18	23	31	92	708

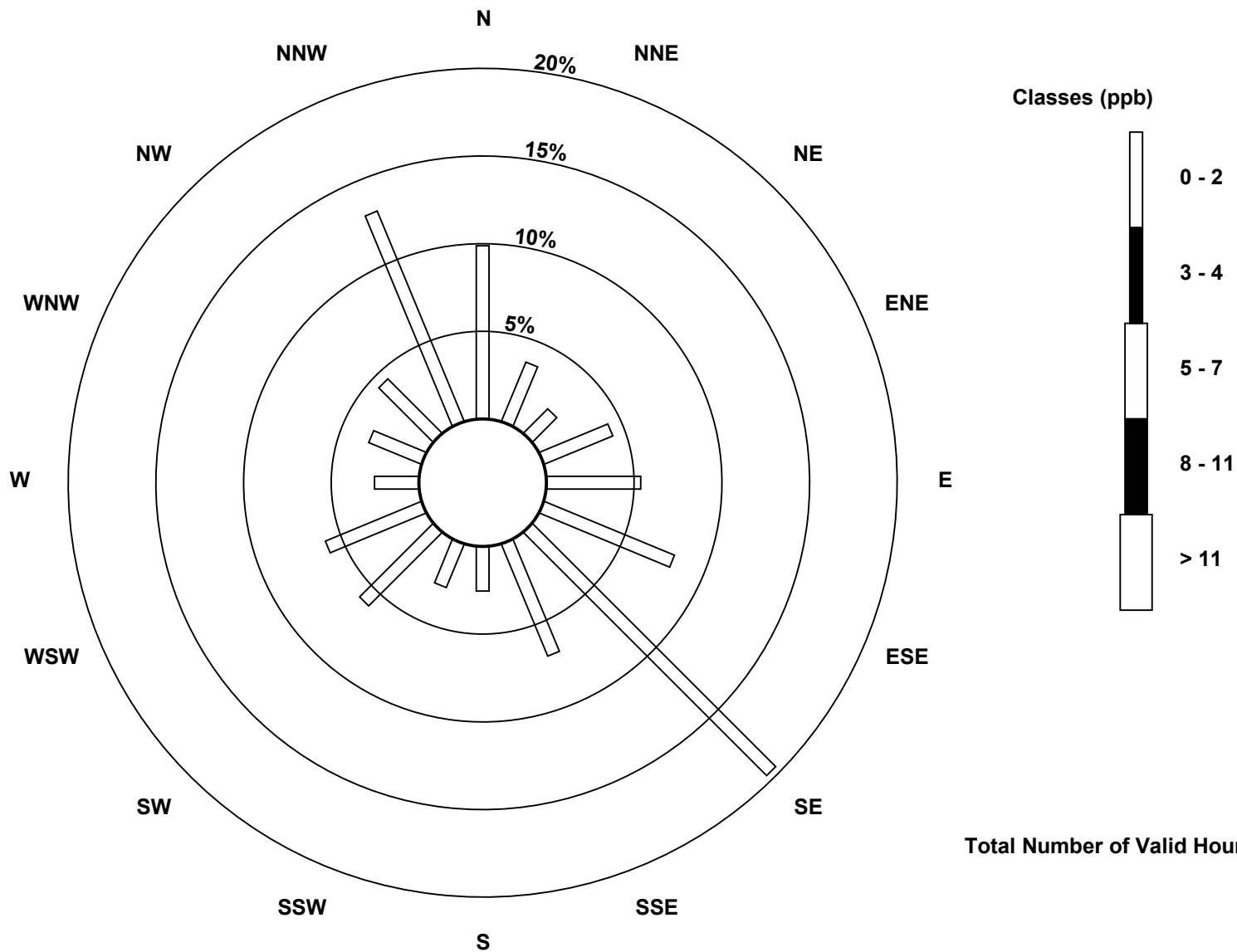
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

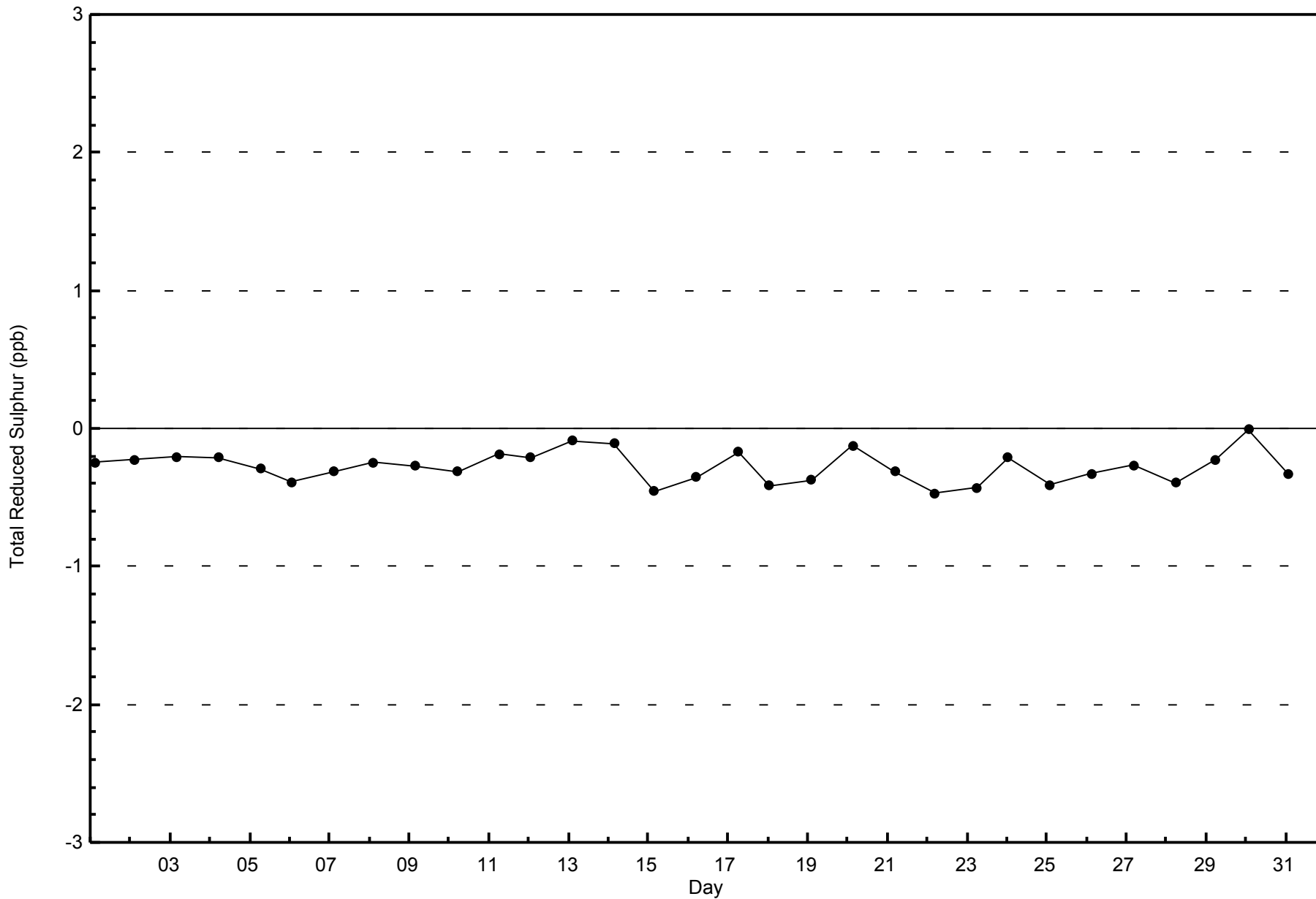
Total Reduced Sulphur (TRS) - ppb
Athabasca Valley (AMS 7)





WBEA
Zero Responses

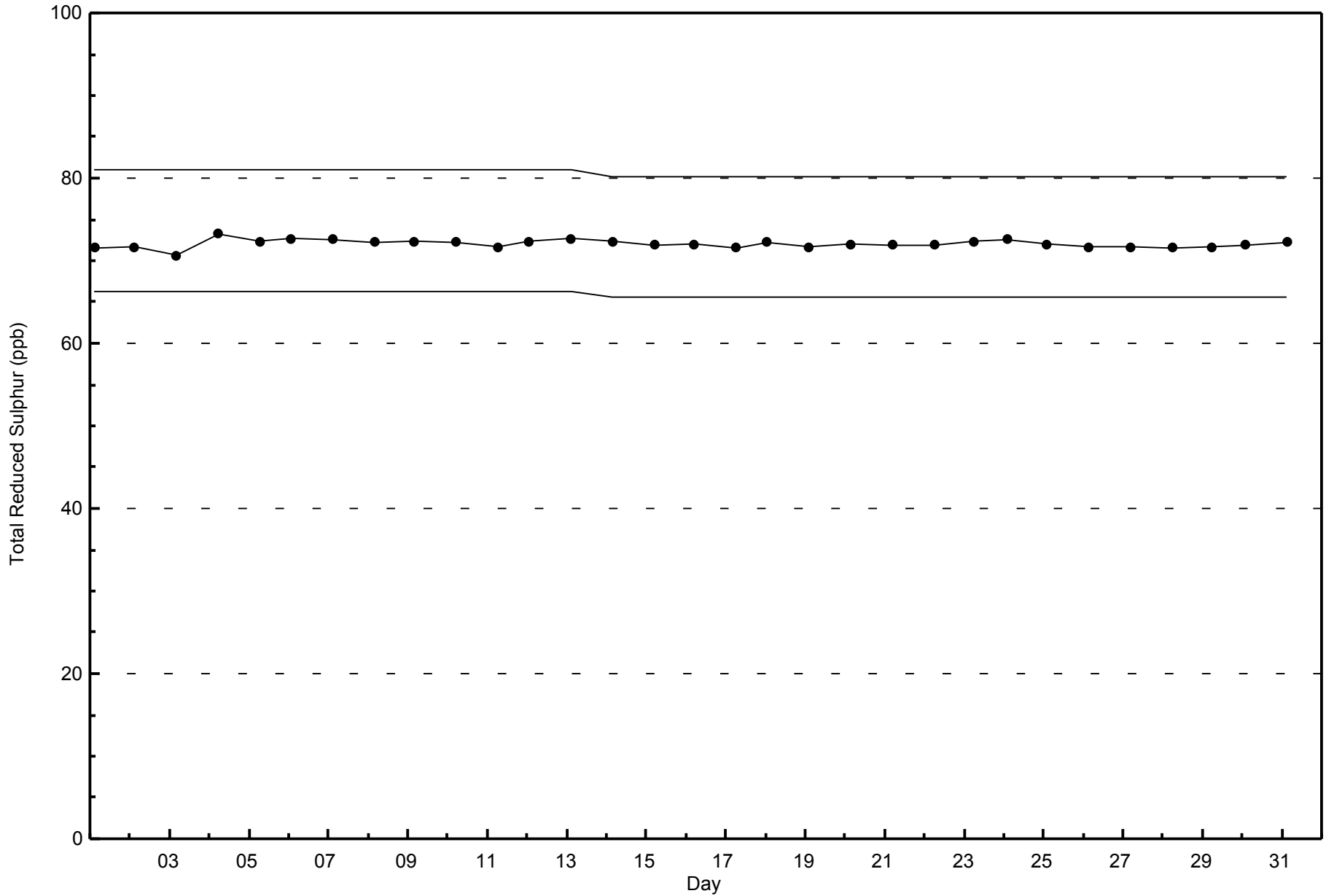
Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - May 2015





WBEA
Span Responses

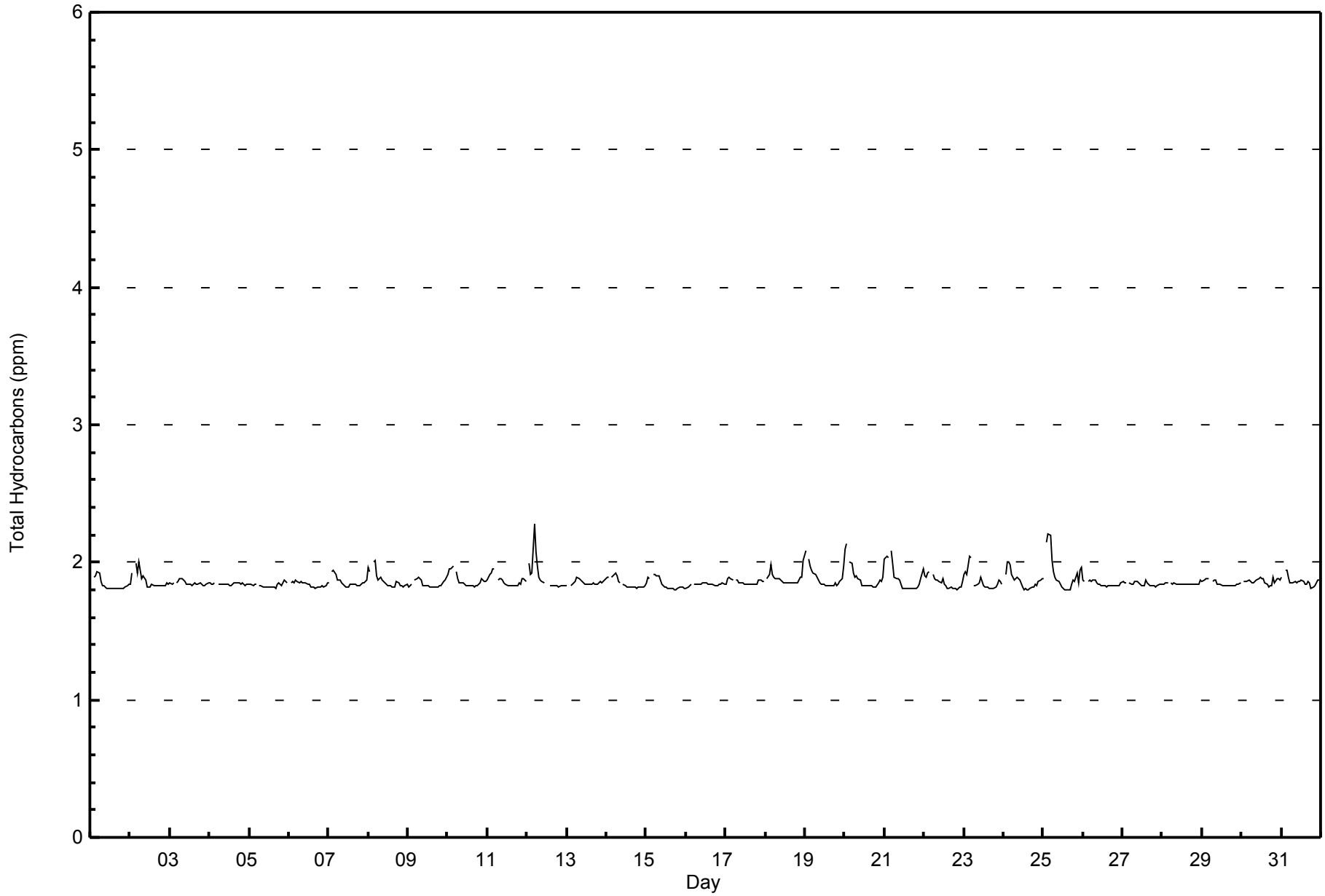
Total Reduced Sulphur (TRS) - ppb
Athabasca Valley - May 2015





WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Athabasca Valley - May 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Athabasca Valley - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	700	98.73	98.73
2.1 - 3.0	9	1.27	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Athabasca Valley - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	68	26	14	29	39	55	138	44	16	19	42	42	18	23	33	94	700
2.1 - 3.0	0	0	0	2	0	1	5	1	0	0	0	0	0	0	0	0	9
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	68	26	14	31	39	56	143	45	16	19	42	42	18	23	33	94	709

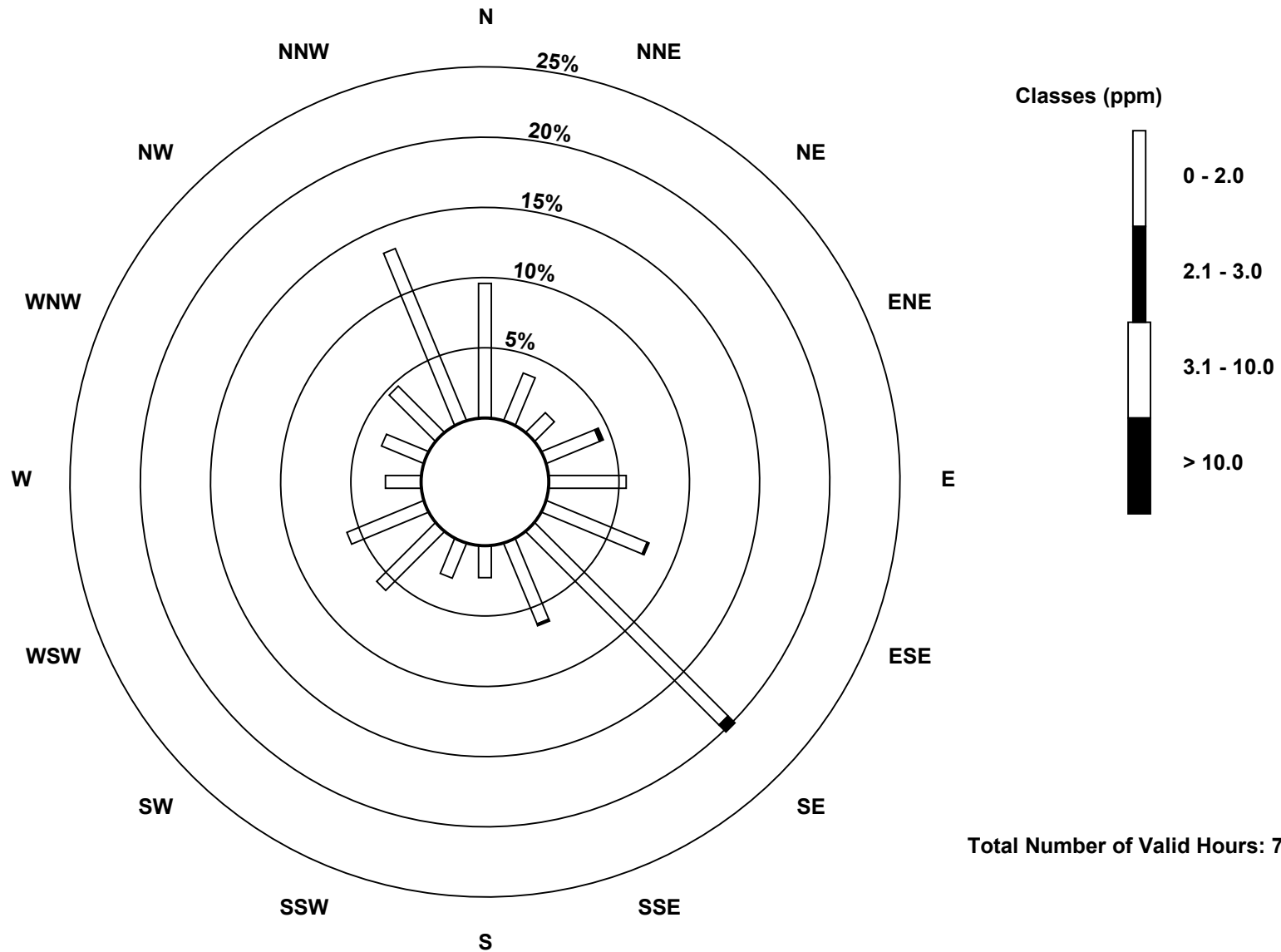
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

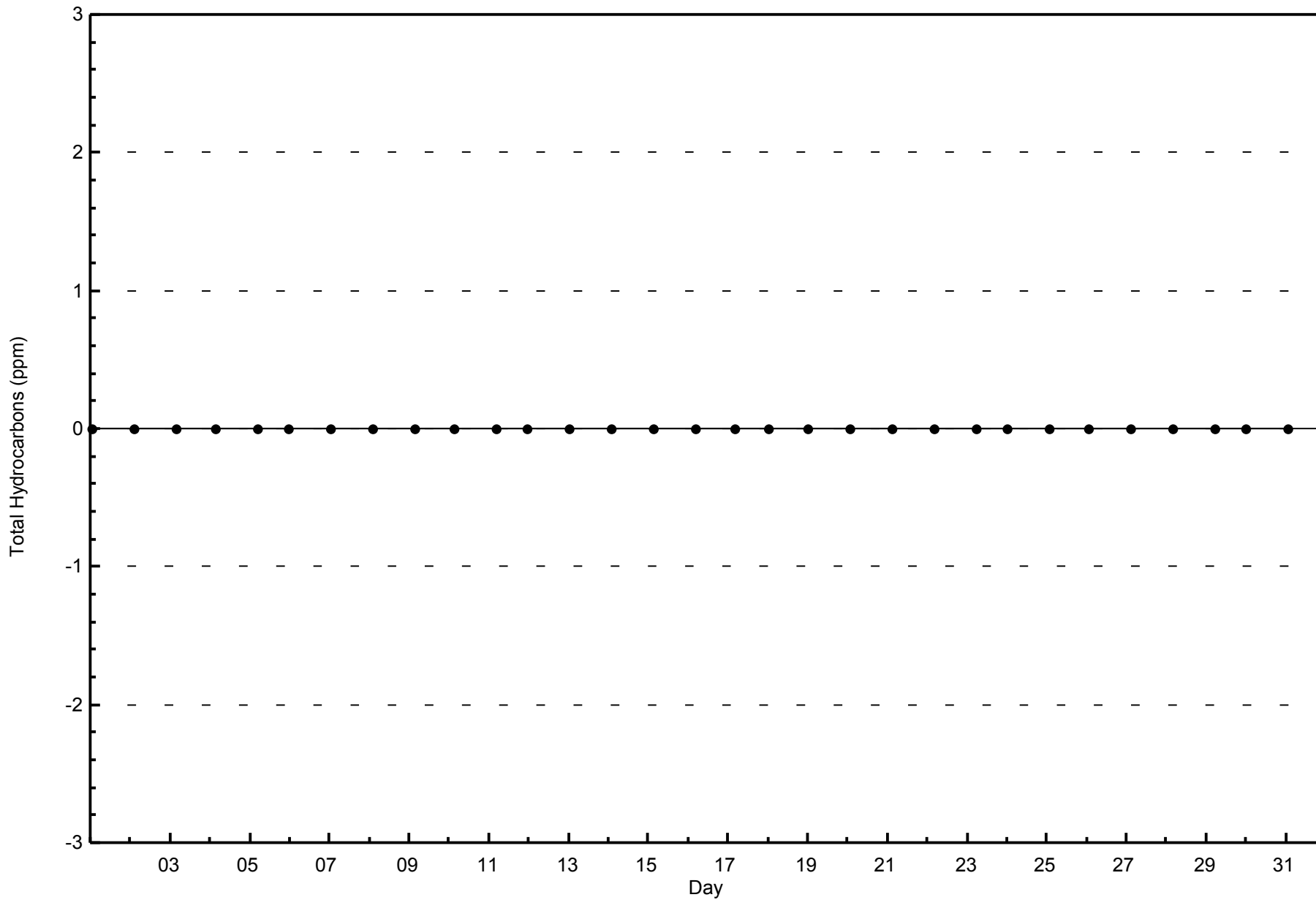
Total Hydrocarbons (THC) - ppm
Athabasca Valley (AMS 7)





WBEA
Zero Responses

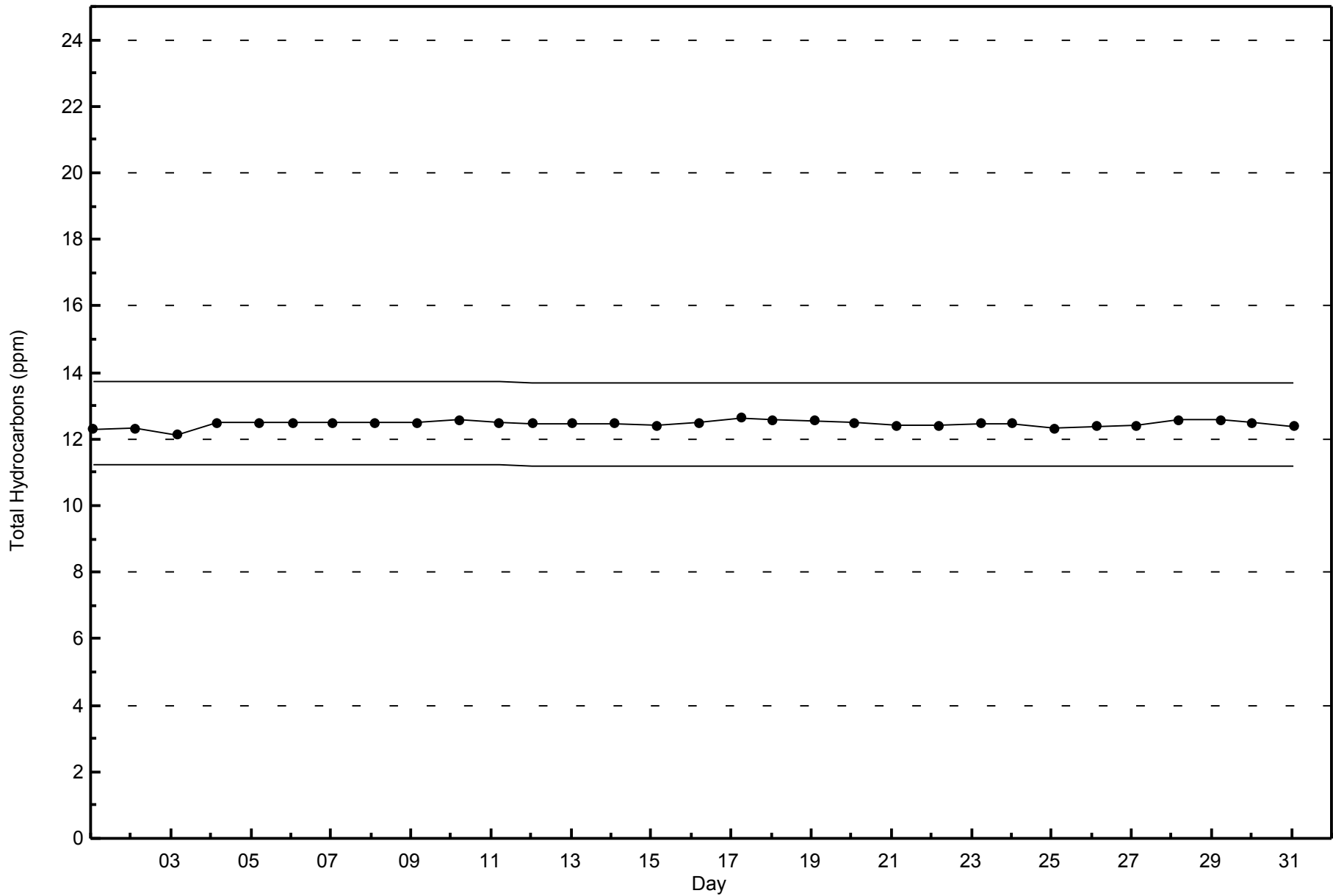
Total Hydrocarbons (THC) - ppm
Athabasca Valley - May 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Athabasca Valley - May 2015



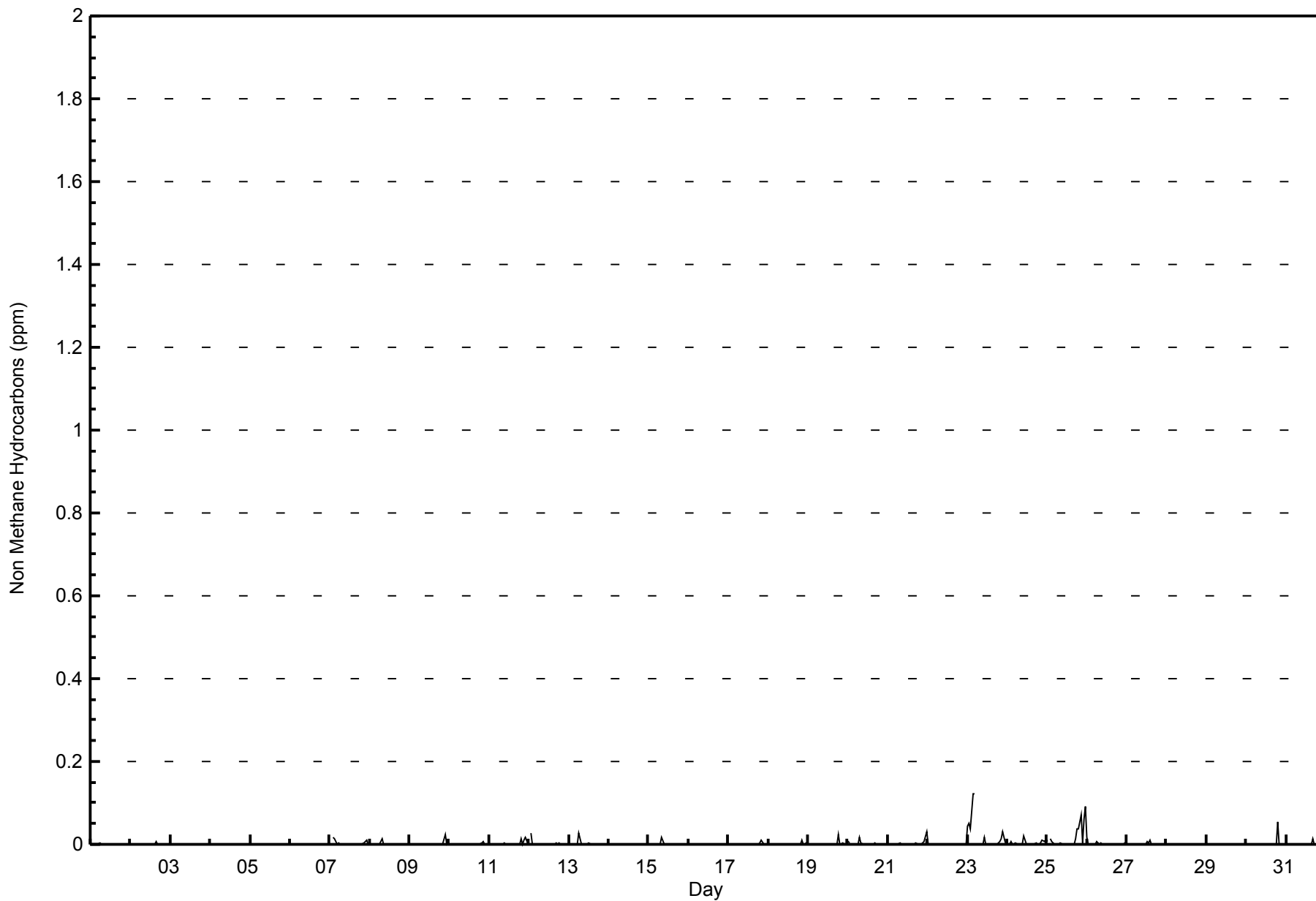


Maximum Value: 0.123 ppm on May 23 05:00		Maximum Daily Average: 0.020 ppm on May 23		Hours in Service:	744																														
Minimum Value: 0.000 ppm on May 1 01:00		Minimum Daily Average: 0.000 ppm on May 5		Hours of Data:	709																														
Maximum Diurnal Average: 0.006 ppm at hour 4		Minimum Diurnal Average: 0.000 ppm at hour 12		Hours of Missing Data:	35																														
Monthly Average: 0.002 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.0		Hours of Calibration:	34																														
				Percent Operational Time:	99.9																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-May	0.000	Z	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
2-May	0.000	0.000	Z	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.007	
3-May	0.000	0.000	0.000	Z	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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	0.001	
4-May	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	
5-May	0.000	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
6-May	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
7-May	0.000	Z	0.016	0.014	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.004	0.007	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
8-May	0.005	0.000	Z	0.000	0.000	0.000	0.001	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.014	
9-May	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.025	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.025	
10-May	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.003	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
11-May	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.001	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.010	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
12-May	Z	0.027	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	0.000	0.000	0.005	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	0.002		
13-May	0.000	Z	0.000	0.000	0.000	0.000	0.027	0.002	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001		
14-May	0.000	0.000	Z	0.000	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
15-May	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.001	0.000	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001		
16-May	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
17-May	0.000	0.000	0.000	0.001	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	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001		
18-May	Z	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	0.009	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001		
19-May	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	0.024	0.000	0.001	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001		
20-May	0.008	0.003	Z	0.001	0.000	0.000	0.000	0.018	0.002	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001		
21-May	0.001	0.000	0.000	Z	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.003	0.000	0.000	0.001	0.005	0.008	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002		
22-May	0.001	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	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-May	0.044	0.051	0.038	0.121	0.123	Z	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.013	0.031	0.015	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020		
24-May	Z	0.002	0.006	0.000	0.000	0.003	0.000	0.001	0.000	0.000	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.002	0.011	0.006	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003			
25-May	0.006	Z	0.013	0.006	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.001	0.000	0.000	0.000	0.002	0.000	0.014	0.039	0.038	0.070	0.003	0.061	0.093	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015			
26-May	0.016	0.000	Z	0.000	0.000	0.000	0.008	0.000	0.002	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	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001			
27-May	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.003	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001			
28-May	0.000	0.000	0.001	0.000	Z	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
29-May	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.001	0.001	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	0.000	0.000		
30-May	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002			
31-May	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	0.014	0.000	0.000	0.000	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	0.003	0.006	0.005	0.000	0.001	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.004	0.004	0.003	0.004	0.005	Diurnal Average										
		0.044	0.051	0.038	0.121	0.123	0.003	0.027	0.018	0.018	0.003	0.020	0.001	0.006	0.003	0.010	0.007	0.014	0.014	0.039	0.056	0.070	0.031	0.061	0.093	Diurnal Maximum									
Z - zerospan		C - Calibration			M - Maintenance																														



WBEA
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - May 2015





WBEA
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	658	92.81	92.81
0.006 - 0.05	45	6.35	99.15
0.06 - 0.1	6	0.85	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	65	26	14	28	37	52	131	42	16	15	40	41	17	18	28	88	658
0.006 - 0.05	3	0	0	3	2	4	11	3	0	4	2	0	1	4	5	3	45
0.06 - 0.1	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	3	6
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	68	26	14	31	39	56	143	45	16	19	42	42	18	23	33	94	709

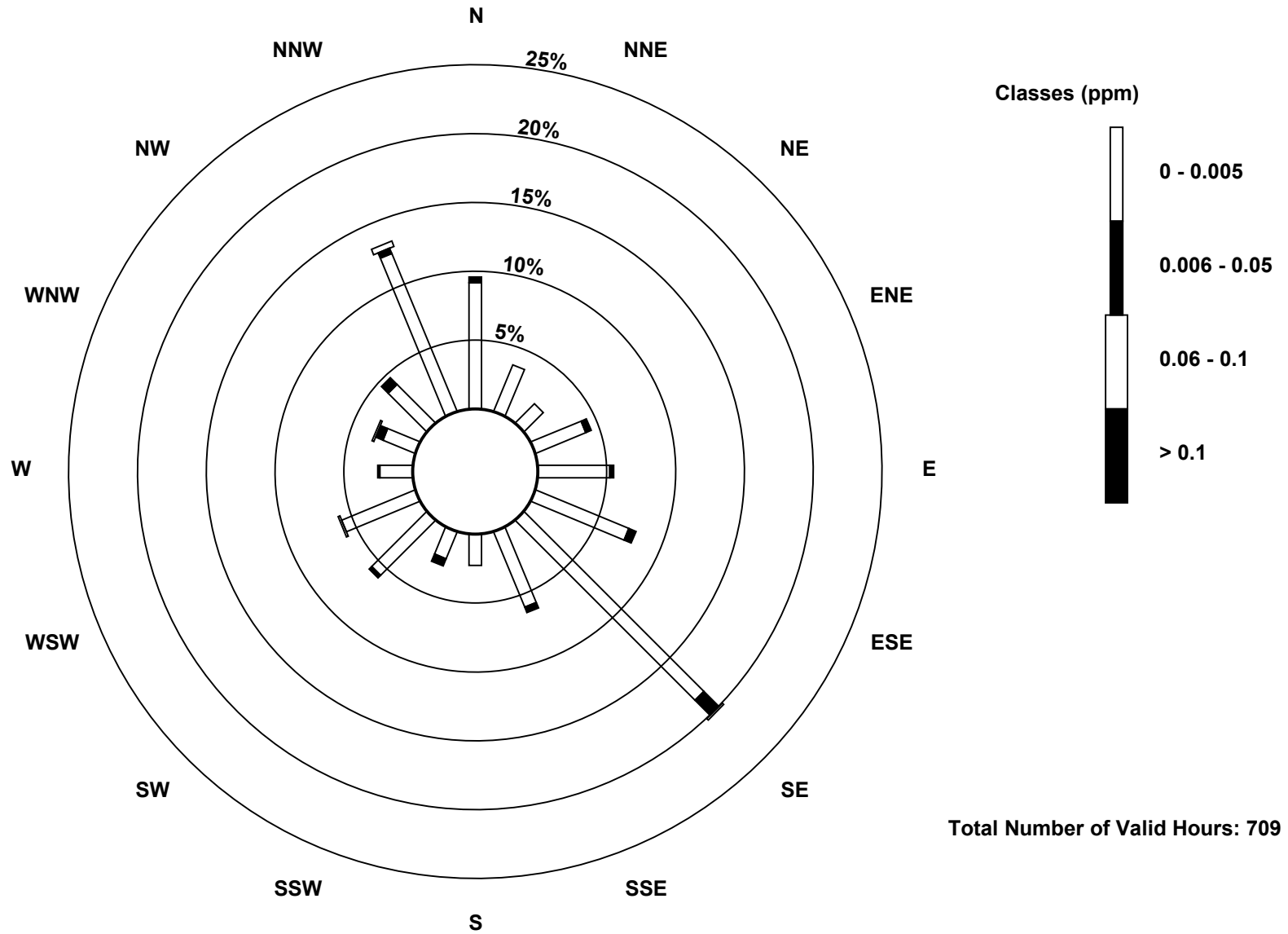
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley (AMS 7)



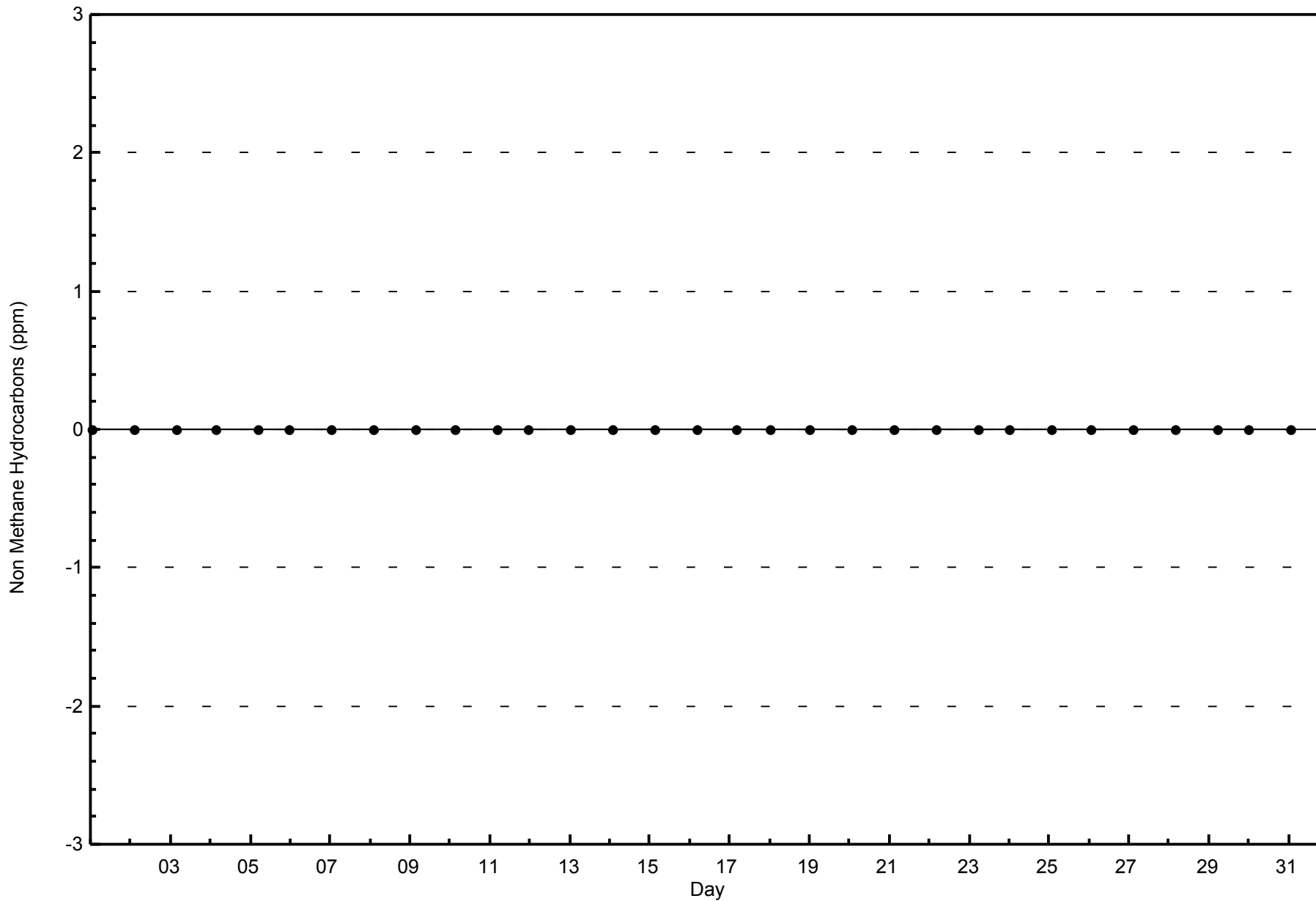


WBEA

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

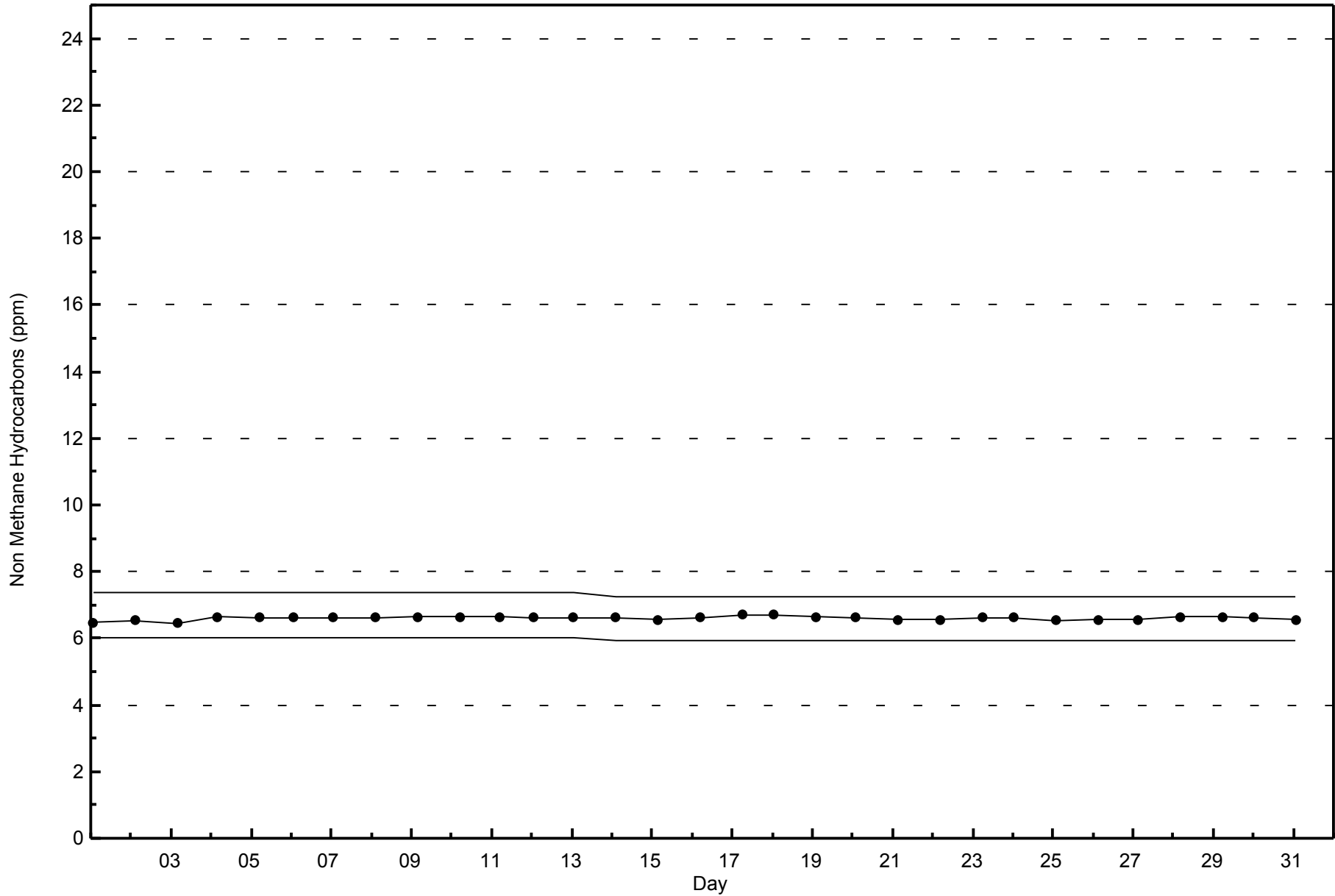
Athabasca Valley - May 2015





WBEA
Span Responses

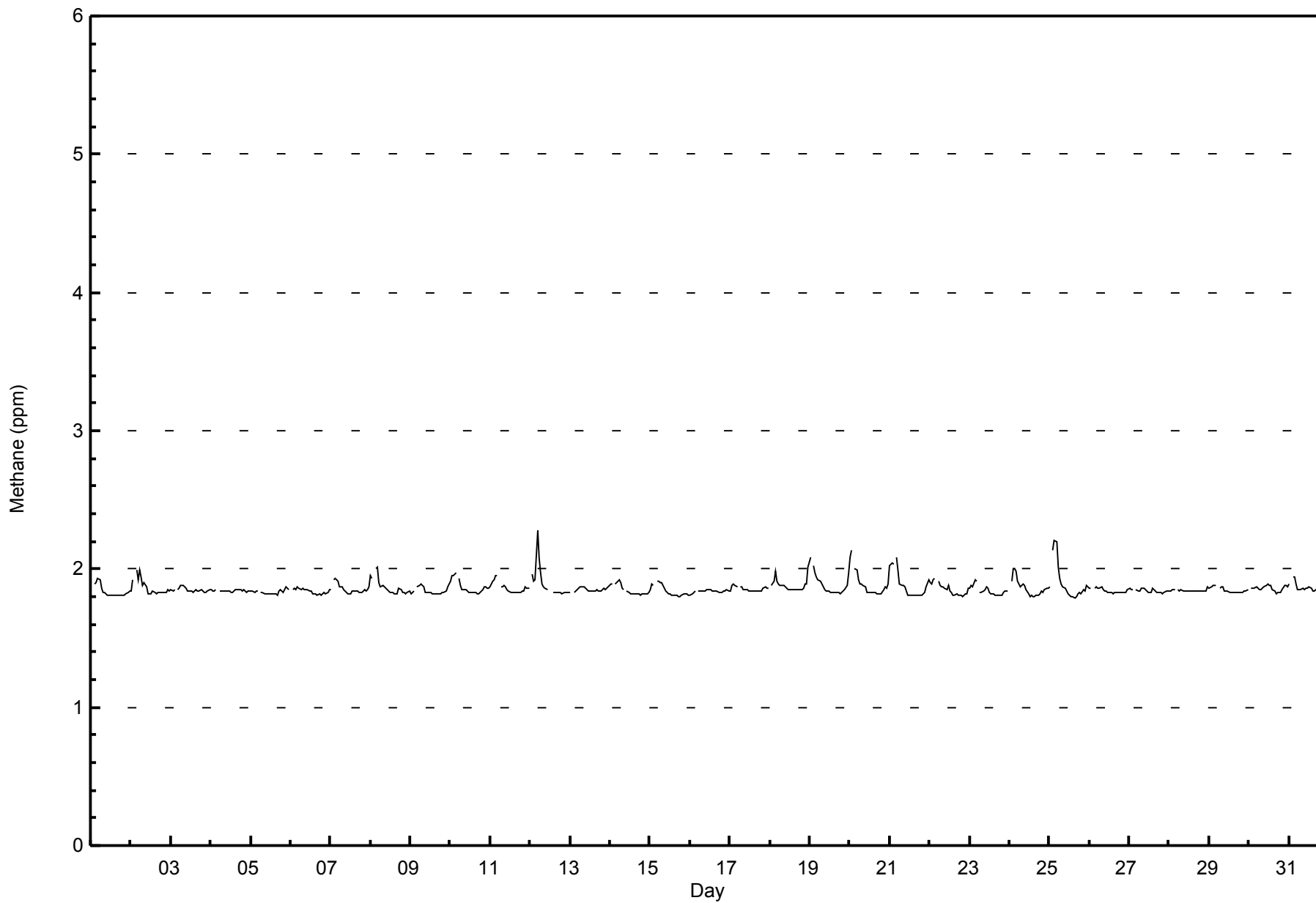
Non Methane Hydrocarbons (NMHC) - ppm
Athabasca Valley - May 2015





WBEA
Hourly Averages

Methane (CH₄) - ppm
Athabasca Valley - May 2015





WBEA
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Athabasca Valley - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	700	98.73	98.73
2.1 - 3.0	9	1.27	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Methane (CH₄) - ppm
Athabasca Valley - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	68	26	14	29	39	55	138	44	16	19	42	42	18	23	33	94	700
2.1 - 3.0	0	0	0	2	0	1	5	1	0	0	0	0	0	0	0	0	9
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	68	26	14	31	39	56	143	45	16	19	42	42	18	23	33	94	709

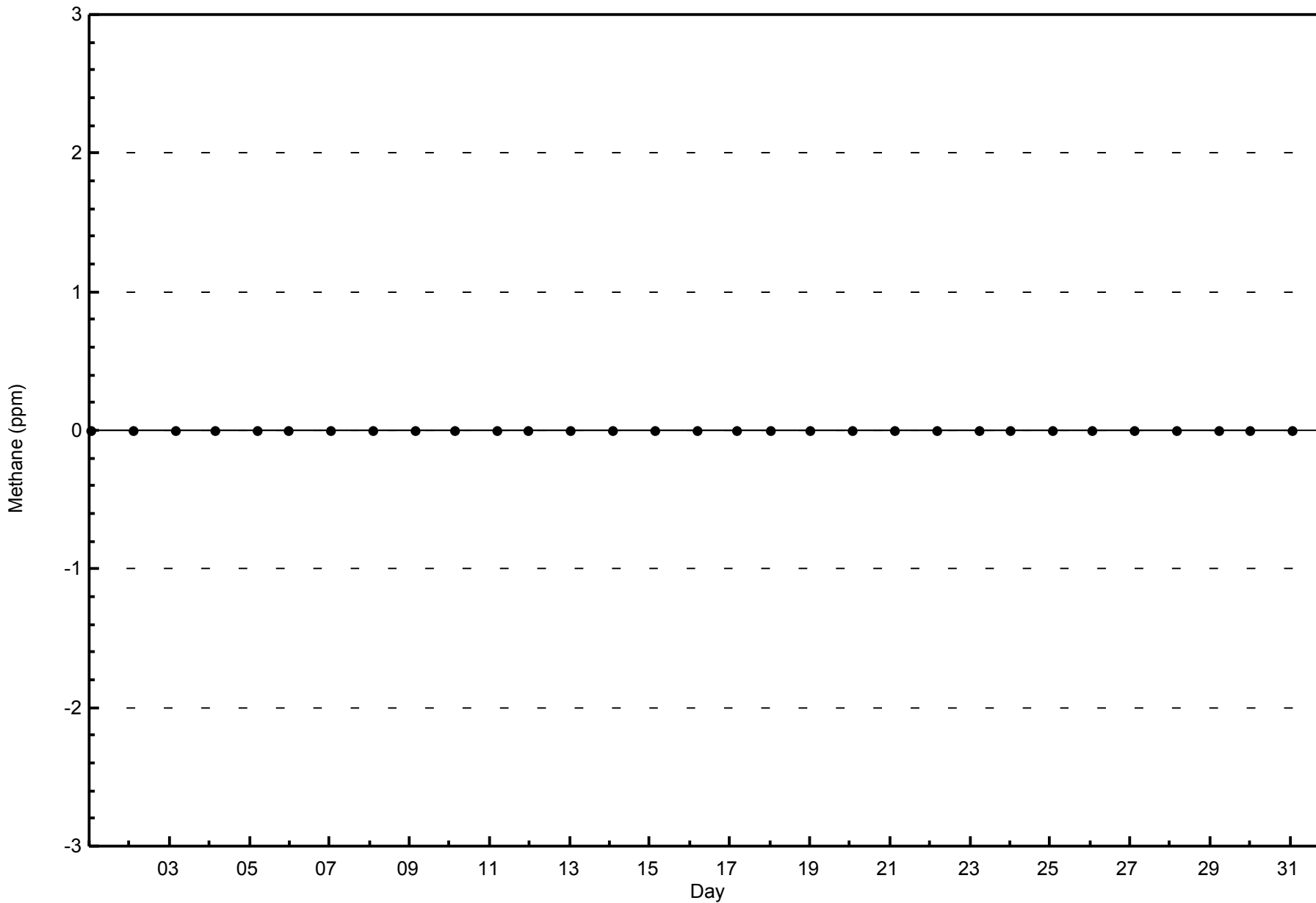
Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Zero Responses

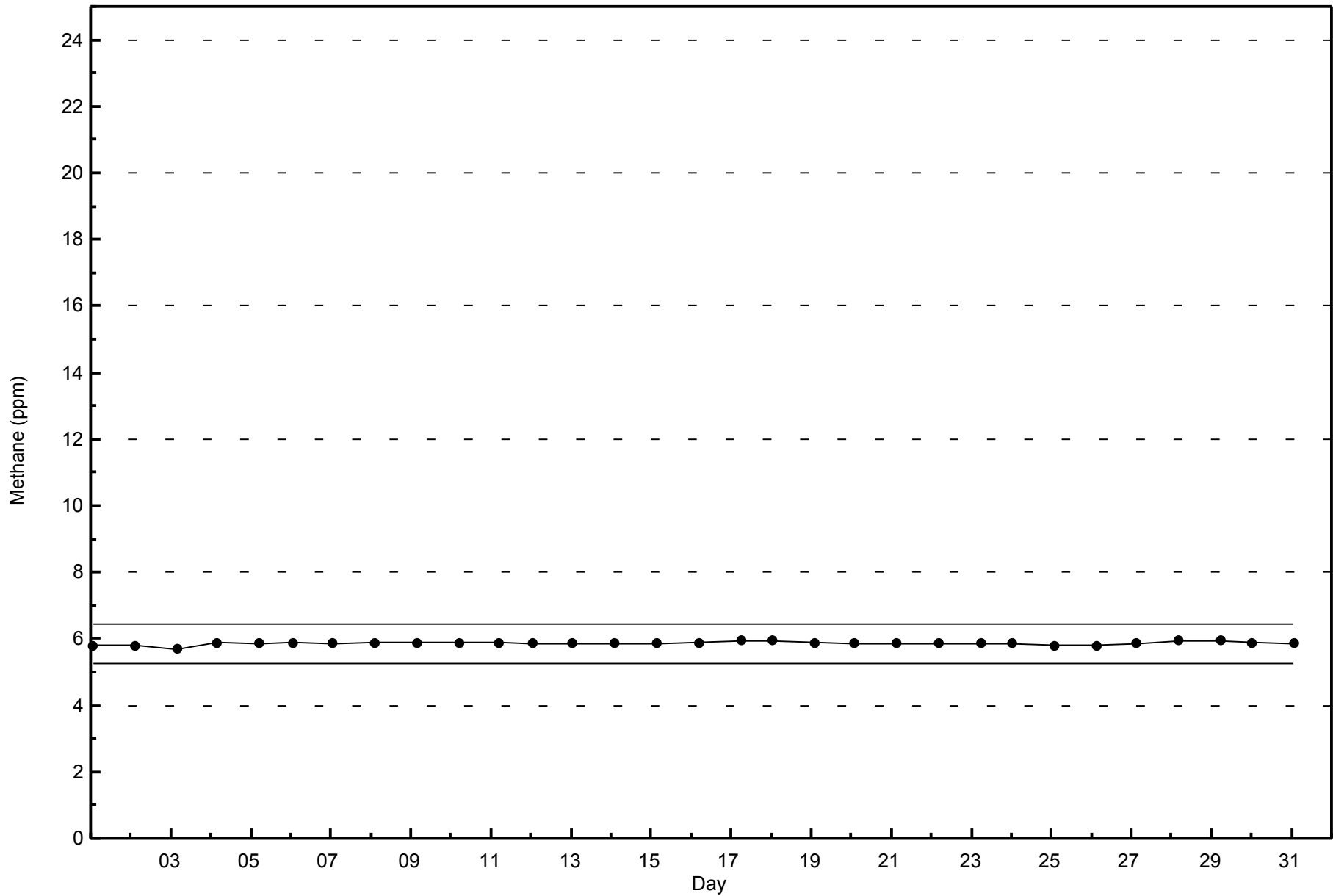
Methane (CH₄) - ppm
Athabasca Valley - May 2015





WBEA
Span Responses

Methane (CH₄) - ppm
Athabasca Valley - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Athabasca Valley - May 2015

Number of Exceedences (AAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 64 ppb on May 24 19:00	Maximum Daily Average: 44.5 ppb on May 13		Hours of Data:	704
Minimum Value: 1 ppb on May 7 05:00	Minimum Daily Average: 21.9 ppb on May 16		Hours of Missing Data:	40
Maximum Diurnal Average: 45.3 ppb at hour 17	Minimum Diurnal Average: 16.4 ppb at hour 5		Hours of Calibration:	39
Monthly Average: 33.0 ppb	Percentiles: P ₁ = 8 P ₁₀ = 16 Q ₁ = 23 Median = 32 Q ₃ = 44 P ₉₀ = 52 P ₉₉ = 58		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-May	19	22	28	Z	13	13	30	36	41	43	44	47	49	50	51	51	53	51	51	47	44	41	37	33	38.9	53
2-May	32	24	25	15	Z	9	16	22	30	32	37	39	37	36	36	36	35	33	31	28	24	25	21	20	28.0	39
3-May	19	18	17	19	16	Z	12	14	17	20	24	25	24	24	25	24	25	25	25	27	28	27	26	25	22.0	28
4-May	26	26	29	27	24	26	Z	28	27	34	34	35	35	37	39	38	39	39	38	40	32	39	37	36	33.3	40
5-May	35	36	36	34	32	33	32	Z	34	34	36	38	41	40	38	39	40	34	30	32	29	26	26	30	34.2	41
6-May	29	30	Z	26	20	19	22	22	25	25	26	28	30	35	36	38	40	40	40	39	37	37	34	26	30.6	40
7-May	21	16	6	Z	1	6	8	11	20	33	38	41	42	46	49	49	48	49	49	47	36	31	25	22	30.2	49
8-May	10	12	14	8	Z	13	17	18	28	31	40	44	48	50	50	49	47	40	42	43	41	42	40	37	33.1	50
9-May	34	27	23	18	10	Z	13	15	22	35	36	37	40	44	45	46	47	46	46	36	28	24	19	17	30.8	47
10-May	18	13	11	7	3	8	Z	27	26	34	44	46	48	51	52	53	53	53	52	45	29	31	32	35	33.5	53
11-May	30	23	24	19	16	18	24	Z	32	38	44	51	52	54	55	55	57	60	59	50	35	26	27	25	38.0	60
12-May	21	20	Z	20	8	9	16	26	30	33	39	46	51	53	54	54	53	55	54	48	44	43	42	42	37.5	55
13-May	41	40	39	Z	33	32	33	35	40	46	50	53	54	55	56	56	55	54	53	49	45	44	31	32	44.5	56
14-May	39	33	33	29	Z	21	24	39	45	M	50	52	53	54	56	55	55	55	56	52	41	46	45	45	44.5	56
15-May	39	36	41	31	30	Z	25	C	C	C	C	C	C	C	C	50	51	51	48	46	37	35	34	36	--	51
16-May	39	41	37	29	24	17	Z	15	15	16	16	17	19	19	19	19	20	21	22	21	21	18	21	21.9	41	
17-May	18	11	6	9	10	14	17	Z	28	29	32	34	38	44	47	46	45	46	47	44	37	32	32	32	30.3	47
18-May	30	28	Z	16	23	24	27	29	30	42	47	49	50	51	52	52	53	52	51	46	32	26	23	15	36.9	53
19-May	16	20	12	Z	14	17	20	29	38	47	50	53	53	54	54	54	54	54	53	44	31	26	20	16	36.1	54
20-May	15	12	14	10	Z	16	21	30	33	39	54	55	56	56	57	55	56	55	52	47	33	24	22	20	36.2	57
21-May	18	18	20	16	13	Z	25	27	32	36	48	55	56	56	57	58	58	59	57	45	34	27	20	14	36.9	59
22-May	21	19	23	20	18	19	Z	27	29	41	50	52	55	56	52	51	49	46	45	43	40	34	24	19	36.2	56
23-May	20	17	15	10	9	11	26	Z	27	28	28	36	45	49	52	52	52	53	51	42	30	25	23	23	31.4	53
24-May	18	18	Z	13	12	17	21	22	26	32	41	52	47	47	49	52	54	58	64	54	39	34	32	28	36.0	64
25-May	25	19	16	Z	11	12	12	17	23	31	43	50	43	45	47	46	46	40	33	22	17	22	21	21	28.7	50
26-May	23	24	24	22	Z	20	23	23	30	34	35	38	38	40	41	41	40	39	37	35	31	24	23	18	30.6	41
27-May	15	18	18	16	15	Z	20	23	23	26	34	40	43	43	39	33	33	33	32	29	29	29	27	26	28.0	43
28-May	24	23	20	17	17	19	Z	25	26	27	28	29	30	32	33	34	35	35	35	34	33	30	27	25	27.8	35
29-May	22	16	14	12	9	12	15	Z	24	29	32	35	37	38	38	39	40	41	38	36	34	30	28	26	28.0	41
30-May	25	24	Z	20	20	19	21	24	26	28	37	43	46	47	48	47	47	49	50	47	51	46	39	38	36.5	51
31-May	33	30	22	Z	28	32	30	32	28	28	28	27	22	27	27	27	29	33	36	32	23	16	12	11	26.6	36

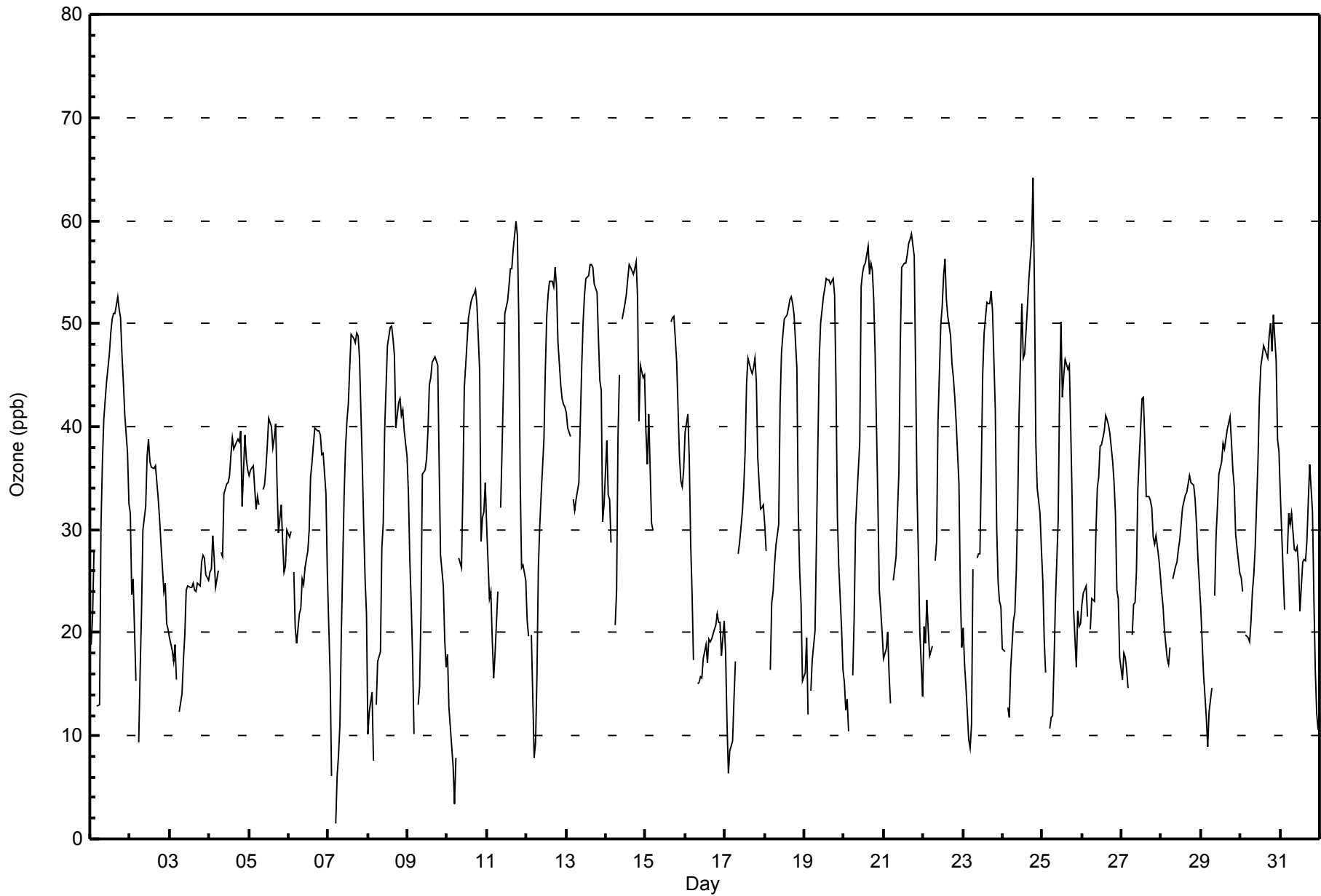
25.1	23.1	21.9	18.5	16.4	17.5	21.2	24.7	28.5	32.7	38.2	41.5	42.7	44.4	45.1	45.1	45.3	45.1	44.3	40.4	33.7	31.2	28.0	26.2	Diurnal Average	
41	41	41	34	33	33	33	39	45	47	54	55	56	56	57	58	58	60	64	54	51	46	45	45	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Athabasca Valley - May 2015





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	142	20.17	20.17
21 - 50	469	66.62	86.79
51 - 82	93	13.21	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 744



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Athabasca Valley - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	15	4	0	3	9	12	50	16	6	3	0	1	1	4	4	14	142
21 - 50	51	22	12	25	29	40	85	31	13	13	25	19	7	11	25	61	469
51 - 82	3	1	2	1	2	4	2	3	1	2	12	21	10	8	3	18	93
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	69	27	14	29	40	56	137	50	20	18	37	41	18	23	32	93	704

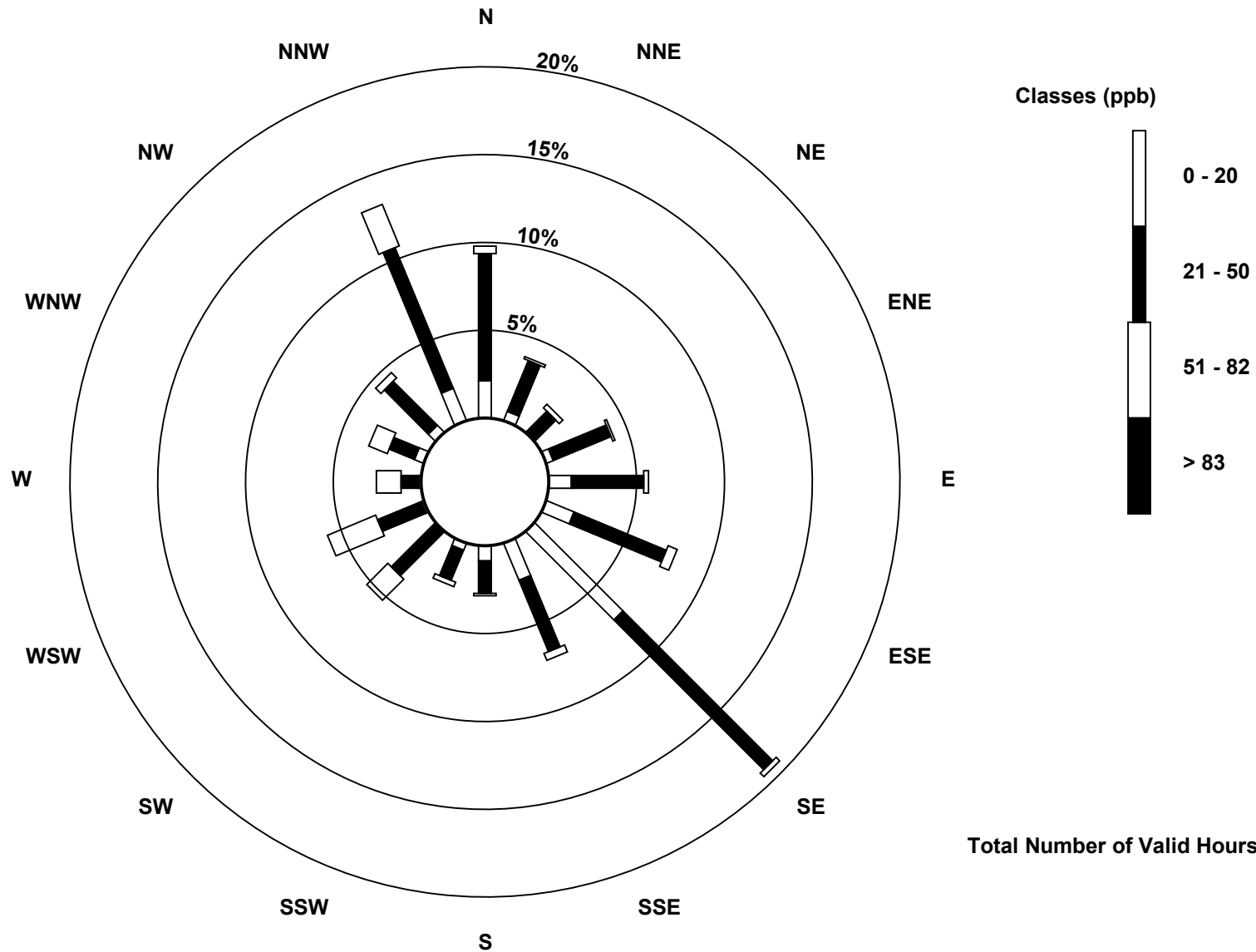
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

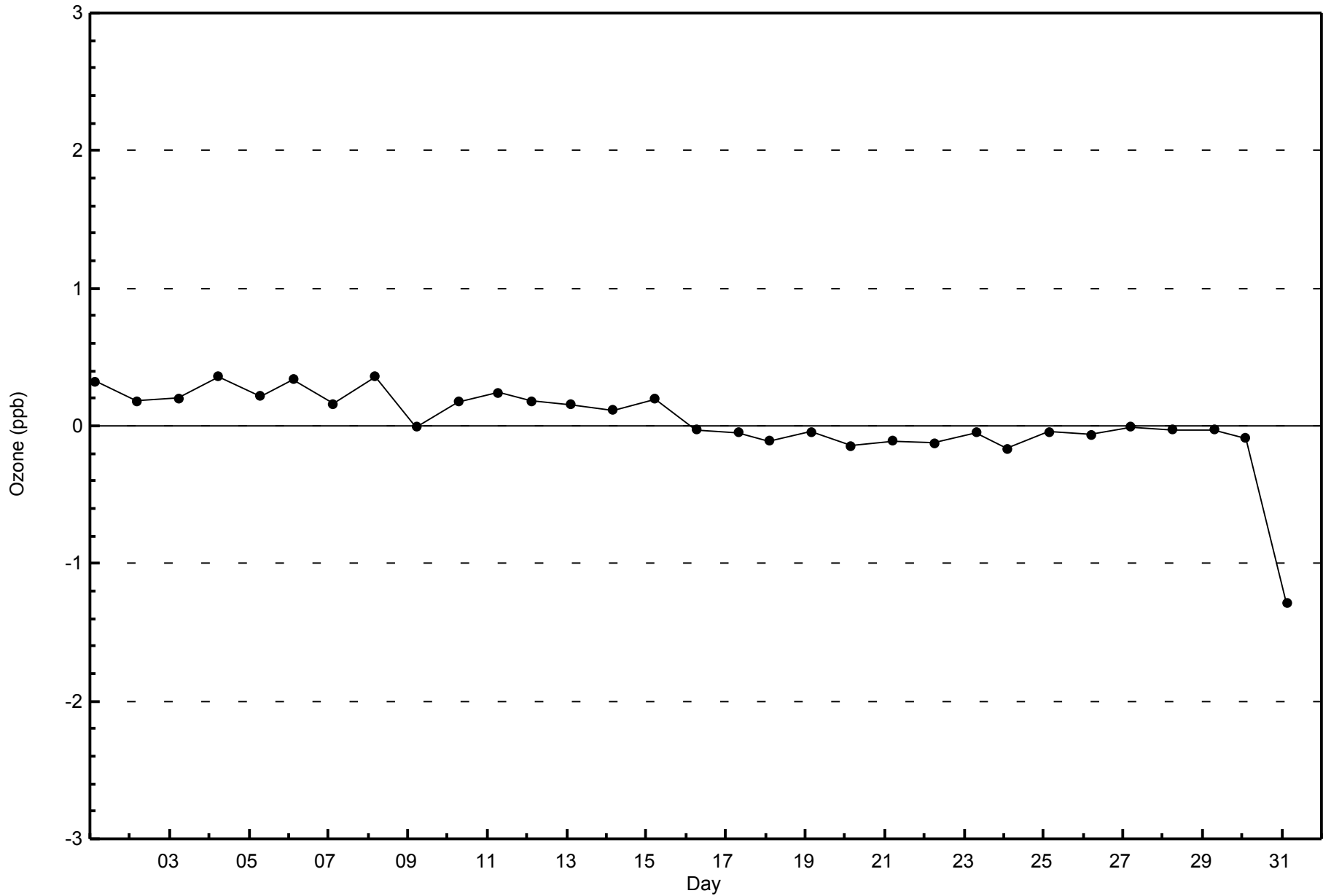
Ozone (O_3) - ppb
Athabasca Valley (AMS 7)





WBEA
Zero Responses

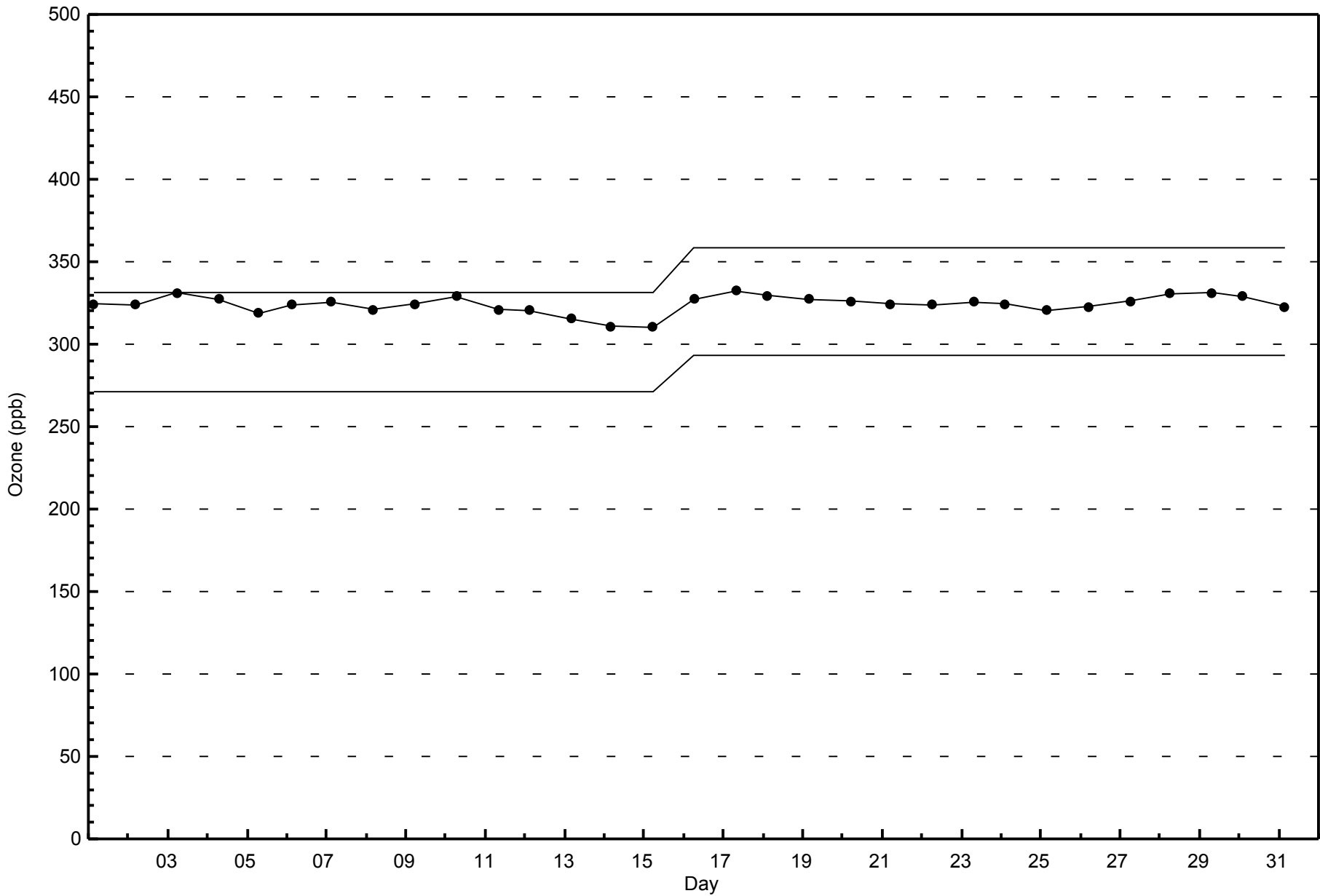
Ozone (O₃) - ppb
Athabasca Valley - May 2015





WBEA
Span Responses

Ozone (O₃) - ppb
Athabasca Valley - May 2015



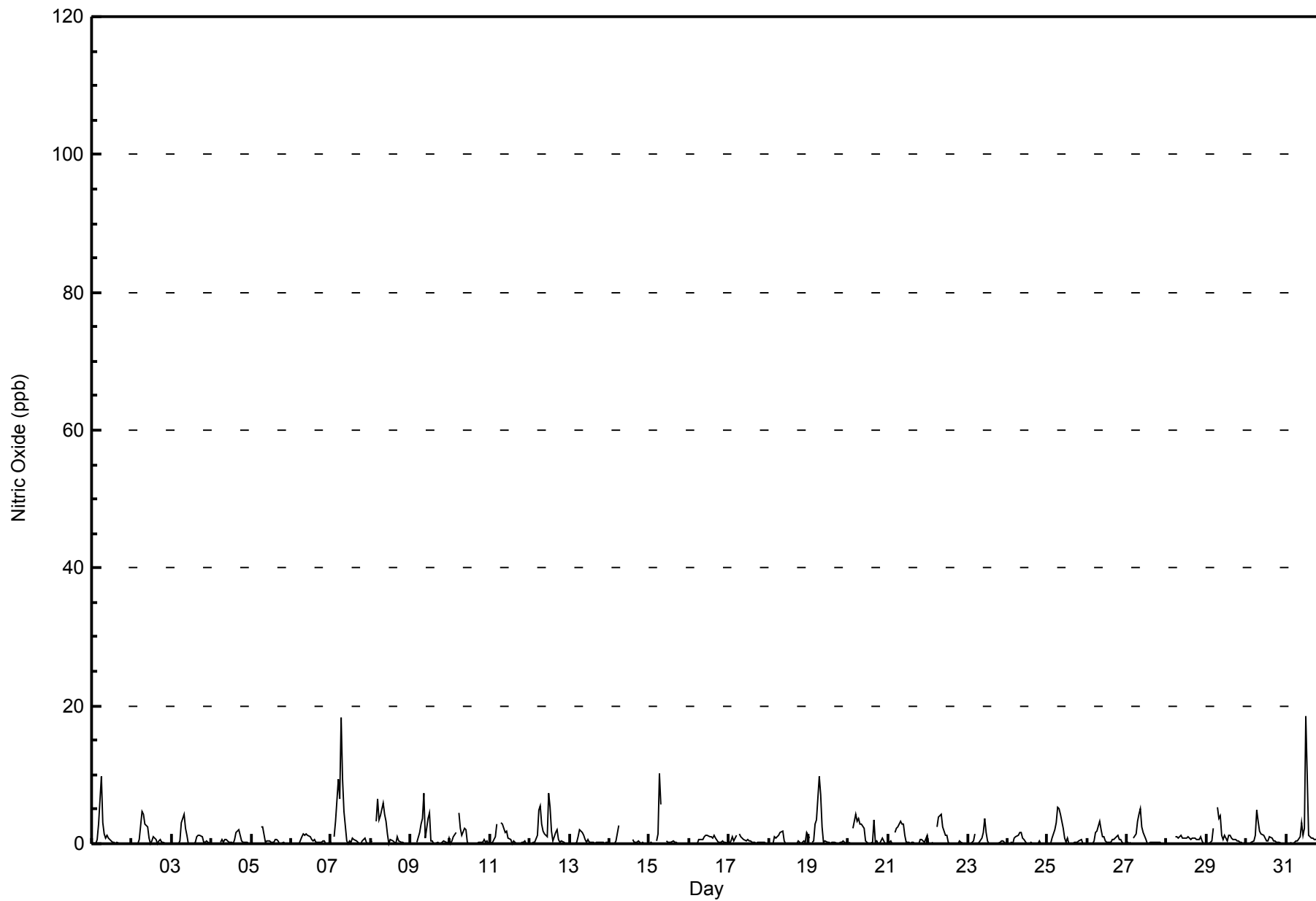


Maximum Value: 19 ppb on May 31 13:00														Maximum Daily Average: 2.5 ppb on May 7														Hours in Service: 744			
Minimum Value: 0 ppb on May 2 22:00														Minimum Daily Average: 0.4 ppb on May 24														Hours of Data: 703			
Maximum Diurnal Average: 3.6 ppb at hour 7														Minimum Diurnal Average: 0.1 ppb at hour 1														Hours of Missing Data: 41			
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: 39			
																												Percent Operational Time: 99.7			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-May	0	Z	0	1	3	10	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	10					
2-May	0	0	Z	0	1	3	5	4	3	2	1	0	0	1	1	0	0	1	0	0	0	0	0	0	1.0	5					
3-May	0	0	0	Z	0	0	3	4	2	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0.7	4					
4-May	0	0	0	0	Z	0	1	0	1	1	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0.4	2					
5-May	0	0	0	0	0	Z	2	3	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.4	3					
6-May	Z	0	0	0	0	0	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0.5	1					
7-May	0	Z	1	3	9	6	18	9	5	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	2.5	18					
8-May	0	0	Z	3	6	4	4	6	4	3	1	0	1	0	0	1	0	0	0	0	0	0	0	0	1.6	6					
9-May	0	0	0	Z	0	2	3	4	7	1	4	4	0	0	0	0	0	0	0	0	0	0	0	0	1.2	7					
10-May	0	0	1	2	Z	4	2	1	2	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.8	4					
11-May	0	0	1	1	3	Z	3	3	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.8	3					
12-May	Z	0	0	0	1	5	6	3	2	1	1	7	5	2	0	2	2	1	0	0	0	0	0	0	1.7	7					
13-May	0	Z	0	0	0	1	2	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2					
14-May	0	0	Z	0	0	3	C	C	C	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0	-	3					
15-May	0	0	0	Z	0	1	10	6	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	10					
16-May	0	0	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1					
17-May	0	0	1	0	1	Z	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1					
18-May	Z	0	0	1	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2					
19-May	1	Z	0	0	3	3	10	7	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	10					
20-May	0	0	Z	2	4	3	4	3	3	2	0	0	0	0	0	3	0	0	0	0	0	1	0	0	1.2	4					
21-May	0	0	0	Z	2	2	2	3	3	3	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0.9	3					
22-May	0	0	0	0	Z	2	4	4	4	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.9	4					
23-May	0	0	0	0	1	Z	0	0	1	2	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4					
24-May	Z	0	0	0	1	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2					
25-May	0	Z	0	1	2	3	5	5	4	2	1	0	1	0	0	0	0	0	0	0	1	1	0	0	1.1	5					
26-May	0	0	Z	0	0	2	2	3	2	1	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0.7	3					
27-May	0	0	0	Z	1	1	3	4	5	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.9	5					
28-May	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.6	1					
29-May	0	0	0	0	2	Z	5	4	4	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	1.1	5					
30-May	Z	0	0	0	0	1	5	3	2	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0.8	5					
31-May	0	Z	0	0	0	0	0	0	1	3	1	2	19	1	1	1	1	1	1	1	1	1	1	1	1.6	19					
														0.1 0.1 0.2 0.6 1.7 2.3 3.6 3.0 2.4 1.4 1.0 0.9 1.1 0.4 0.4 0.5 0.4 0.3 0.2 0.3 0.4 0.2 0.1 0.2														Diurnal Average			
														1 0 1 3 9 10 18 9 7 3 4 7 19 2 1 3 2 1 1 1 1 1 1 0 2														Diurnal Maximum			
Z - zerospan														C - Calibration														M - Maintenance			



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Athabasca Valley - May 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - May 2015

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
Frequency Distribution

Nitric Oxide (NO) - ppb
Athabasca Valley - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	68	26	14	31	38	56	143	46	17	18	37	41	18	23	33	94	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	68	26	14	31	38	56	143	46	17	18	37	41	18	23	33	94	703

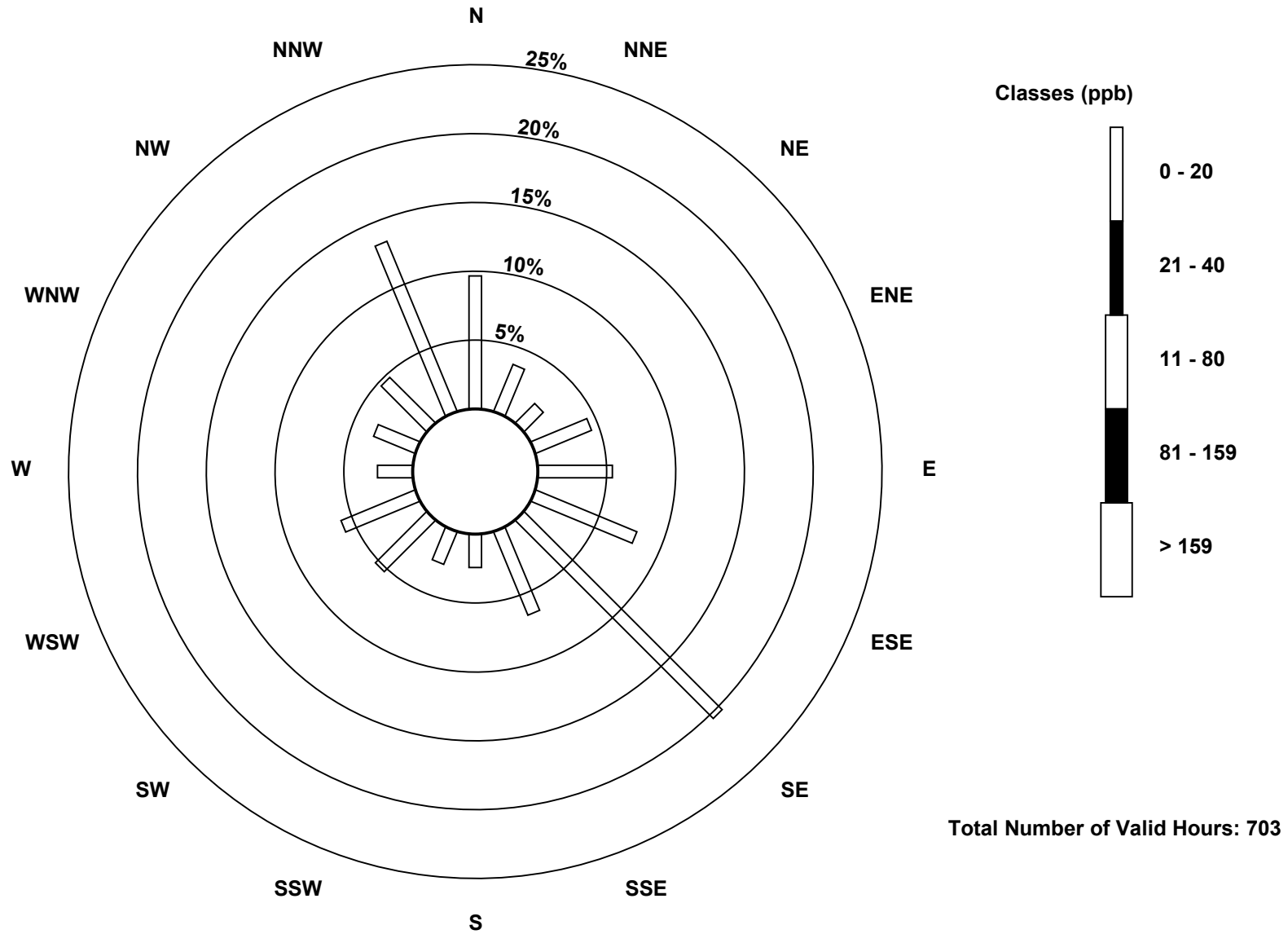
Total Number of Valid Hours: 703

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

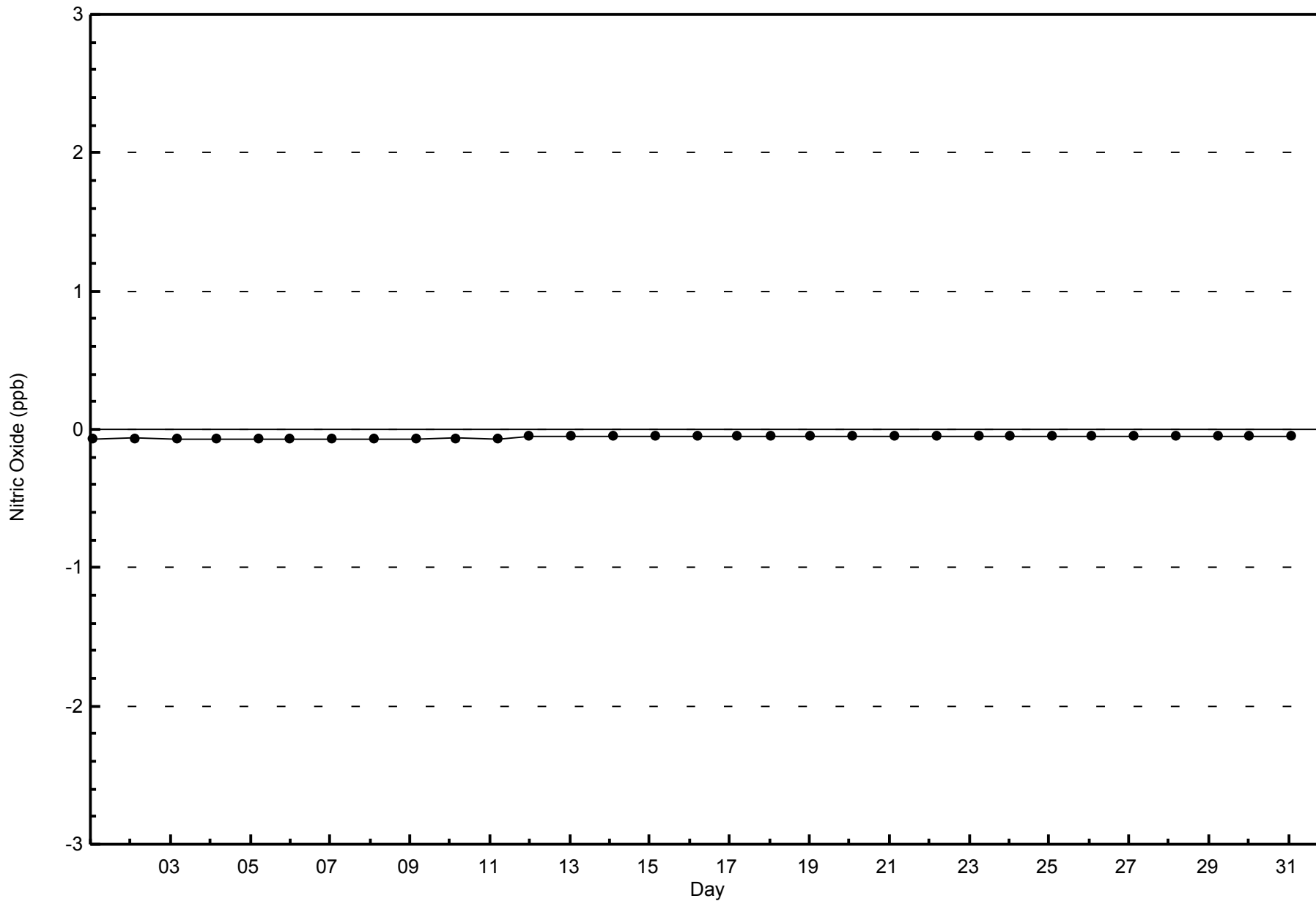
Nitric Oxide (NO) - ppb
Athabasca Valley (AMS 7)





WBEA
Zero Responses

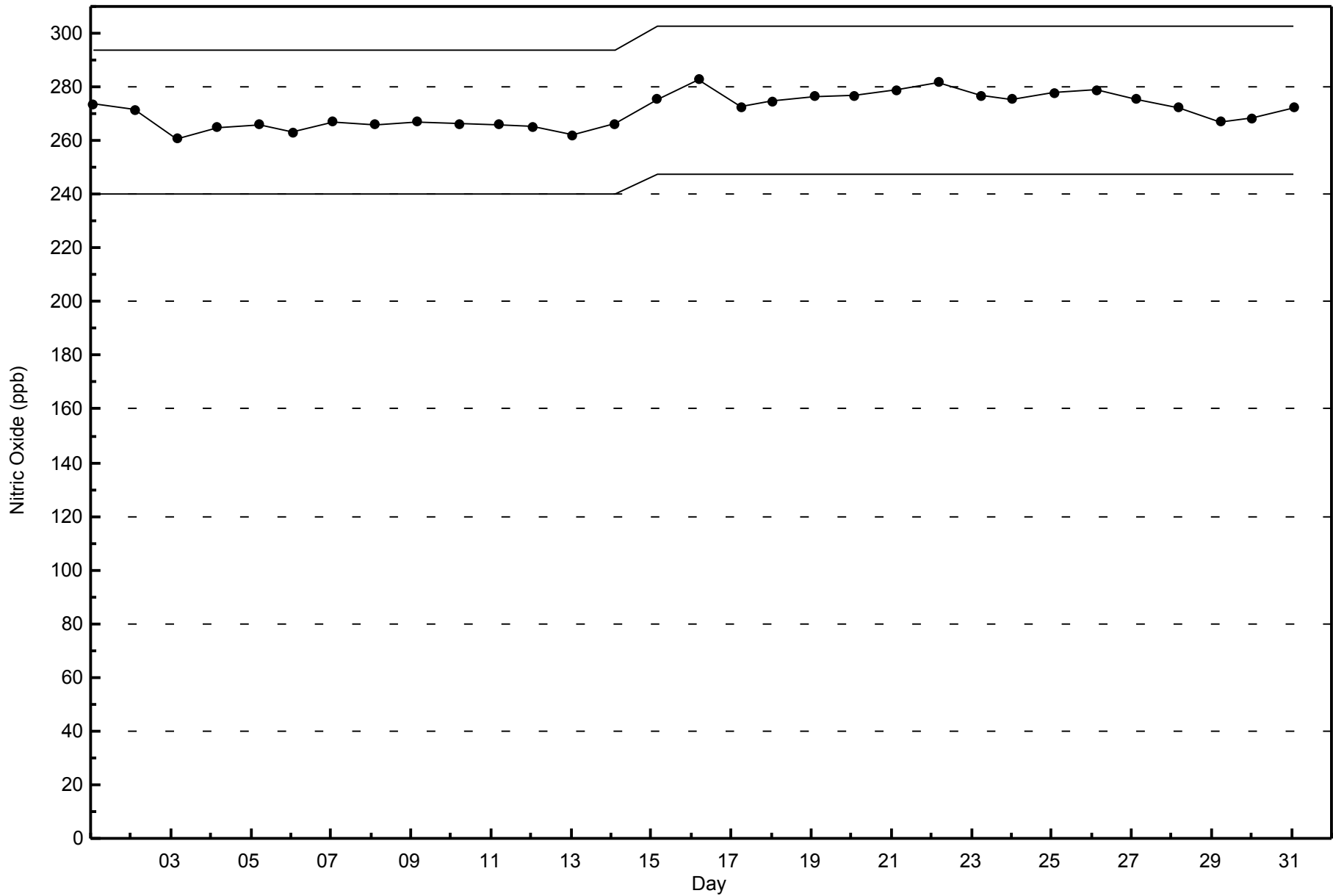
Nitric Oxide (NO) - ppb
Athabasca Valley - May 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Athabasca Valley - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

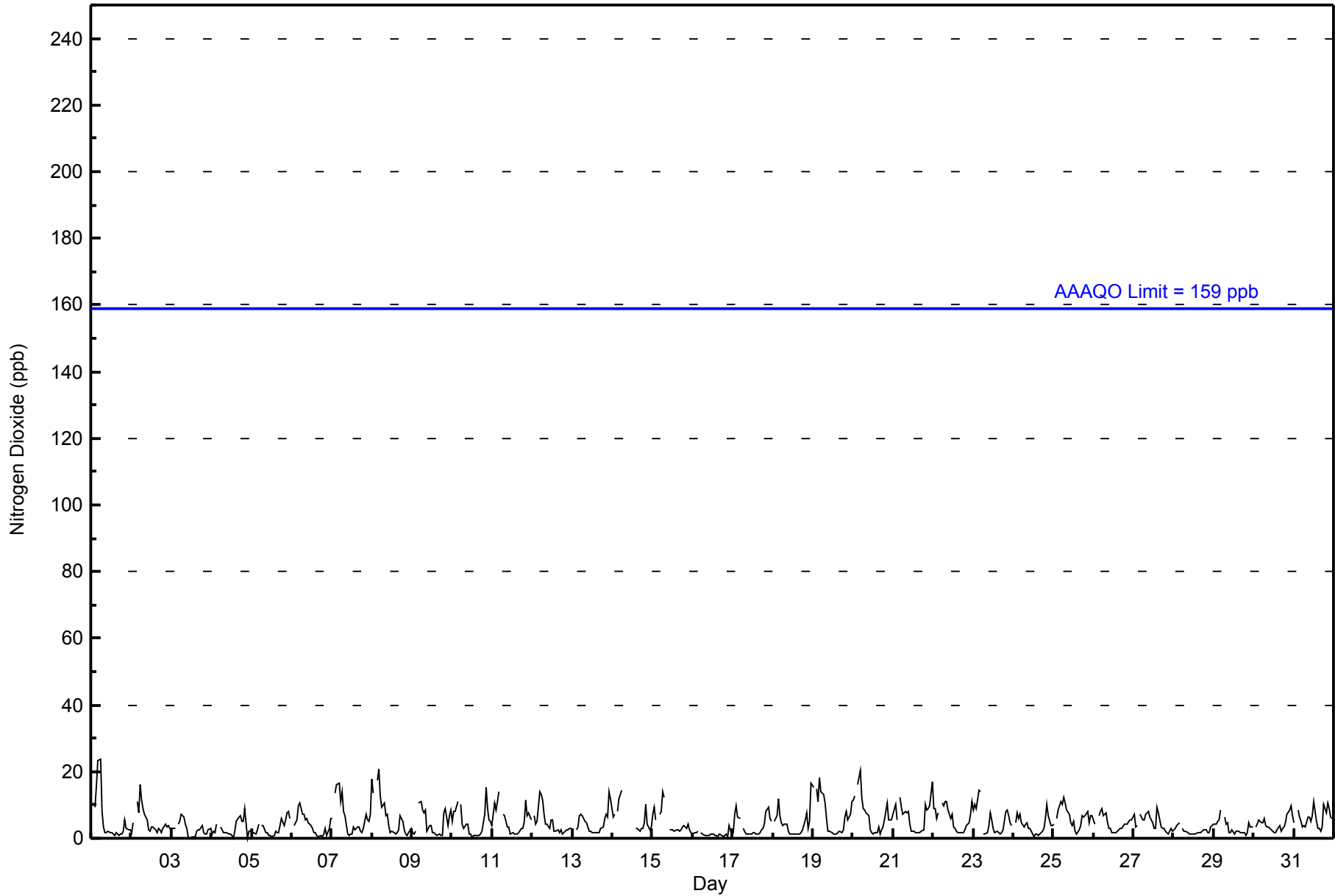
Athabasca Valley - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 24 ppb on May 1 06:00										Maximum Daily Average: 6.9 ppb on May 19										Hours of Data: 703						
Minimum Value: 0 ppb on May 3 12:00										Minimum Daily Average: 1.2 ppb on May 16										Hours of Missing Data: 41						
Maximum Diurnal Average: 10.7 ppb at hour 5										Minimum Diurnal Average: 1.8 ppb at hour 14										Hours of Calibration: 39						
Monthly Average: 4.7 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 7 P ₉₀ = 10 P ₉₉ = 17										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-May	15	Z	9	16	23	24	8	3	2	2	2	2	2	1	1	2	1	1	1	2	5	3	3	3	5.7	24
2-May	2	5	Z	11	8	16	12	9	7	5	3	2	4	3	2	2	3	3	2	3	4	4	4	3	5.0	16
3-May	3	3	3	Z	4	5	7	6	4	3	1	0	0	0	0	2	3	3	4	2	1	1	3	3	2.7	7
4-May	1	2	2	4	Z	3	3	2	2	2	1	1	1	0	2	5	7	7	5	5	9	0	2	2	3.0	9
5-May	2	2	1	3	4	Z	4	4	2	2	1	1	1	1	2	2	2	4	6	4	6	8	8	6	3.1	8
6-May	Z	4	5	6	10	10	7	7	5	6	5	4	3	2	2	1	0	1	0	1	3	1	3	6	3.9	10
7-May	6	Z	14	16	17	11	14	8	7	1	1	1	4	3	3	3	2	2	3	7	5	5	7	6.2	17	
8-May	18	14	Z	17	21	13	9	11	7	7	4	2	2	2	1	2	3	7	5	2	1	1	2	3	6.6	21
9-May	2	1	2	Z	11	11	8	8	9	2	4	4	2	2	1	1	1	1	1	8	9	4	7	9	4.6	11
10-May	5	8	8	11	Z	10	4	3	4	4	1	1	0	1	1	1	1	1	2	7	15	9	5	5	4.7	15
11-May	4	11	9	11	14	Z	7	7	5	4	4	1	2	1	1	1	2	3	3	5	11	7	8	5	5.4	14
12-May	Z	7	4	5	14	13	11	7	4	4	3	6	6	2	2	2	2	2	1	2	2	3	3	3	4.7	14
13-May	3	Z	3	4	7	7	7	5	5	3	2	2	2	2	2	2	2	3	3	6	7	6	14	12	4.6	14
14-May	6	7	Z	8	12	14	C	C	C	C	C	C	C	C	3	3	2	3	3	5	10	4	3	3	-	14
15-May	7	9	6	Z	7	8	14	12	M	M	3	3	3	2	2	2	2	3	4	4	3	4	2	2	4.8	14
16-May	1	2	2	2	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	1.2	4
17-May	2	7	10	7	6	Z	3	2	1	1	1	1	2	2	1	1	2	2	3	4	8	9	6	5	3.7	10
18-May	Z	5	7	12	7	5	4	4	4	2	1	1	1	1	1	1	1	2	3	5	8	3	5	17	4.4	17
19-May	15	Z	15	11	18	14	13	11	6	2	2	2	1	1	1	2	2	2	3	6	8	6	7	11	6.9	18
20-May	12	13	Z	16	20	12	9	8	8	7	3	2	1	2	2	3	1	3	3	6	11	6	5	6	6.8	20
21-May	7	10	6	Z	12	9	7	8	8	8	4	2	2	2	2	2	2	2	3	10	8	9	10	17	6.5	17
22-May	9	9	6	8	Z	11	10	11	11	9	6	7	3	3	2	2	2	2	2	2	4	5	7	11	6.1	11
23-May	9	10	9	15	14	Z	1	1	2	4	8	6	3	2	2	2	1	2	3	8	8	7	5	4	5.3	15
24-May	Z	5	8	6	7	5	4	4	5	3	3	1	1	1	1	1	2	3	6	10	7	4	4	3.9	10	
25-May	4	Z	6	9	11	10	12	11	9	7	5	4	5	2	1	3	4	7	6	7	8	5	7	7	6.4	12
26-May	5	4	Z	7	8	9	7	8	5	3	3	2	2	2	2	3	3	3	4	4	4	5	5	5	4.5	9
27-May	7	4	4	Z	7	6	6	7	8	8	6	5	3	3	10	8	4	3	3	2	2	1	3	2	4.8	10
28-May	3	3	4	5	Z	3	2	2	2	1	1	1	1	1	2	2	2	2	3	2	2	2	3	4	2.3	5
29-May	4	4	5	6	9	Z	6	4	5	2	2	3	1	2	2	2	2	2	2	1	2	5	3	4	3.3	9
30-May	Z	3	4	6	5	5	6	4	4	3	3	2	2	2	3	4	2	3	4	5	7	9	10	7	4.3	10
31-May	5	Z	9	6	5	3	4	4	6	6	5	7	11	5	3	3	2	3	10	8	11	9	6	6	6.0	11
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	700	99.57	99.57
21 - 40	3	0.43	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	68	26	14	31	38	56	140	46	17	18	37	41	18	23	33	94	700
21 - 40	0	0	0	0	0	0	3	0	0	0	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	68	26	14	31	38	56	143	46	17	18	37	41	18	23	33	94	703

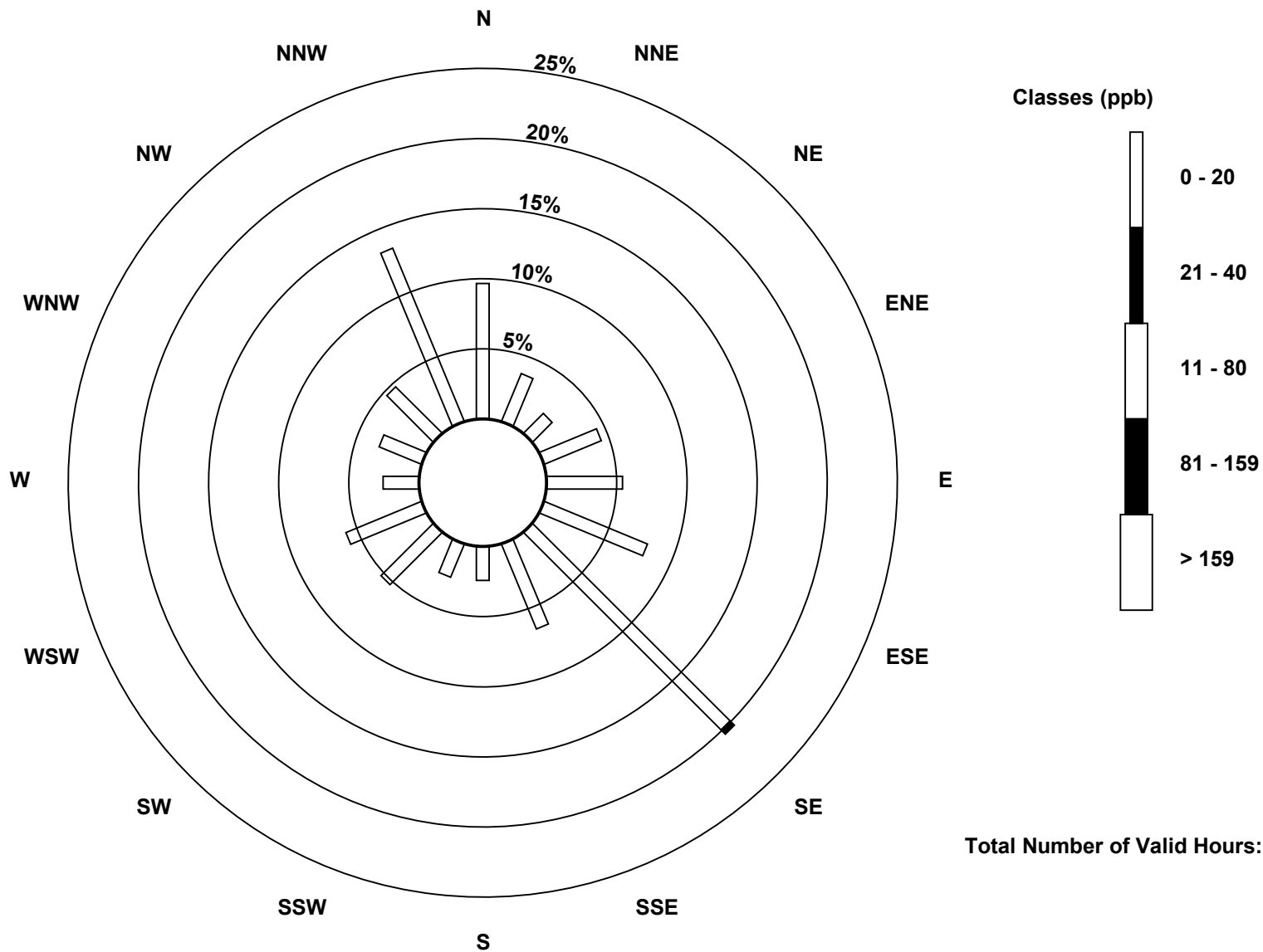
Total Number of Valid Hours: 703

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

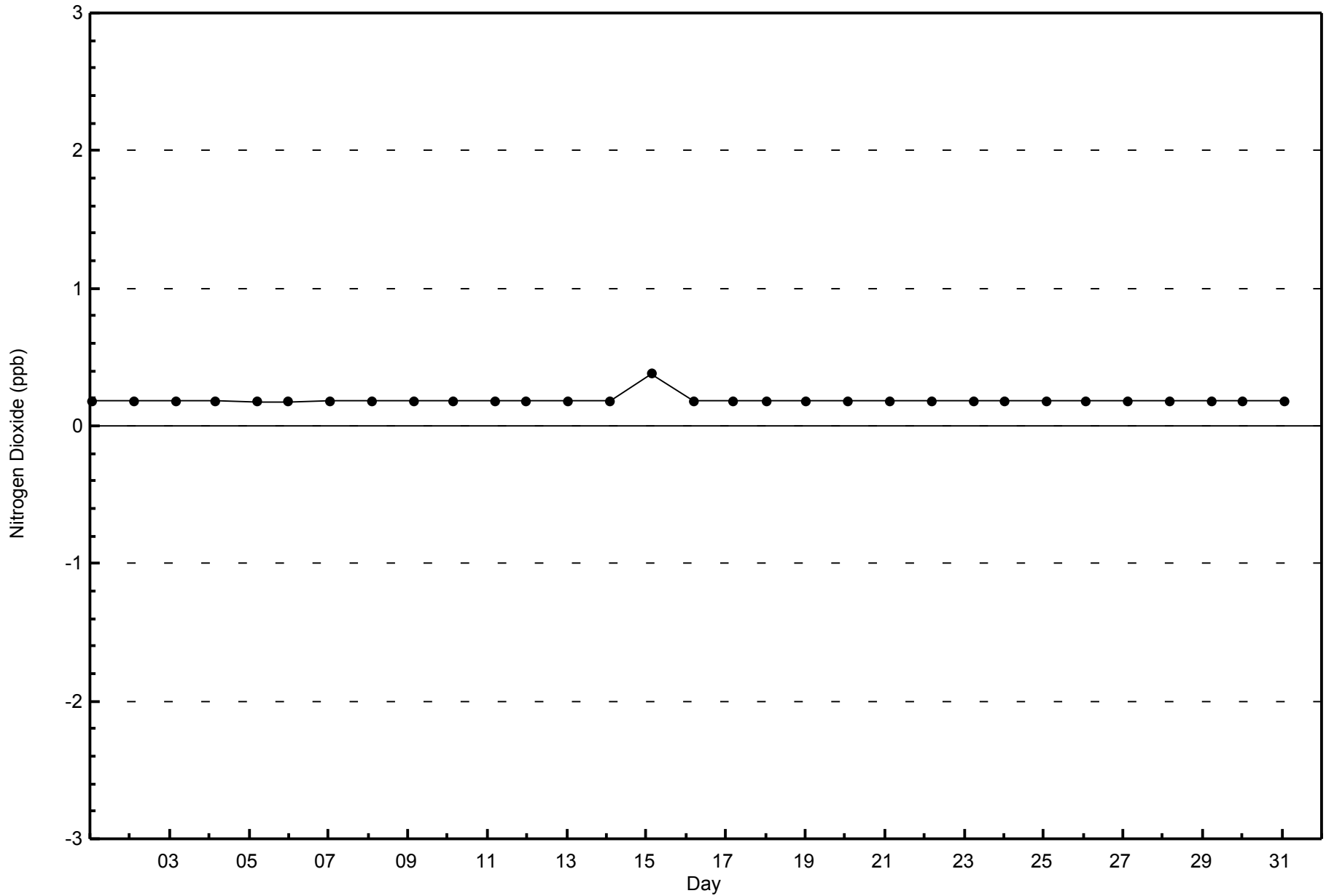
Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley (AMS 7)





WBEA
Zero Responses

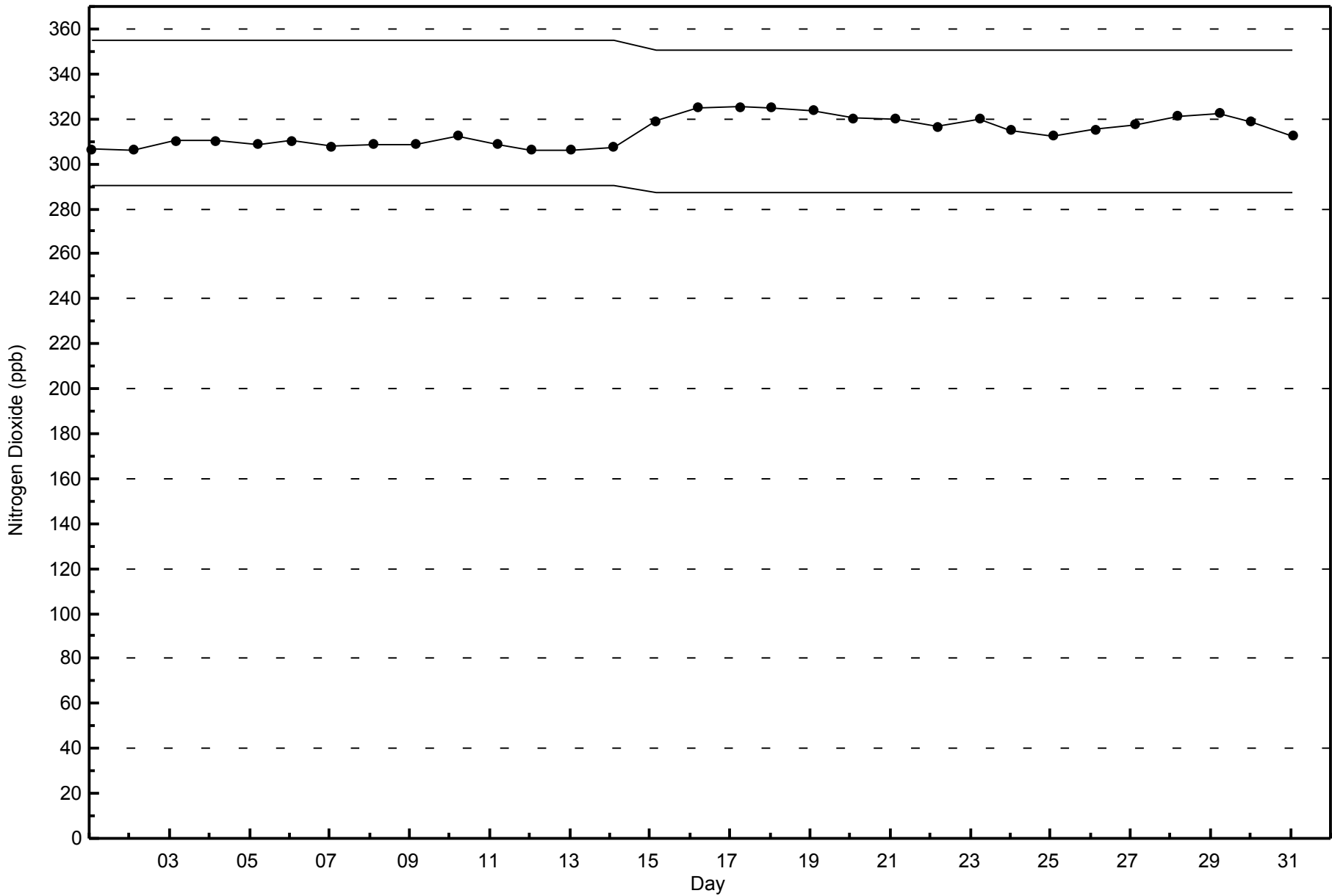
Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - May 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Athabasca Valley - May 2015



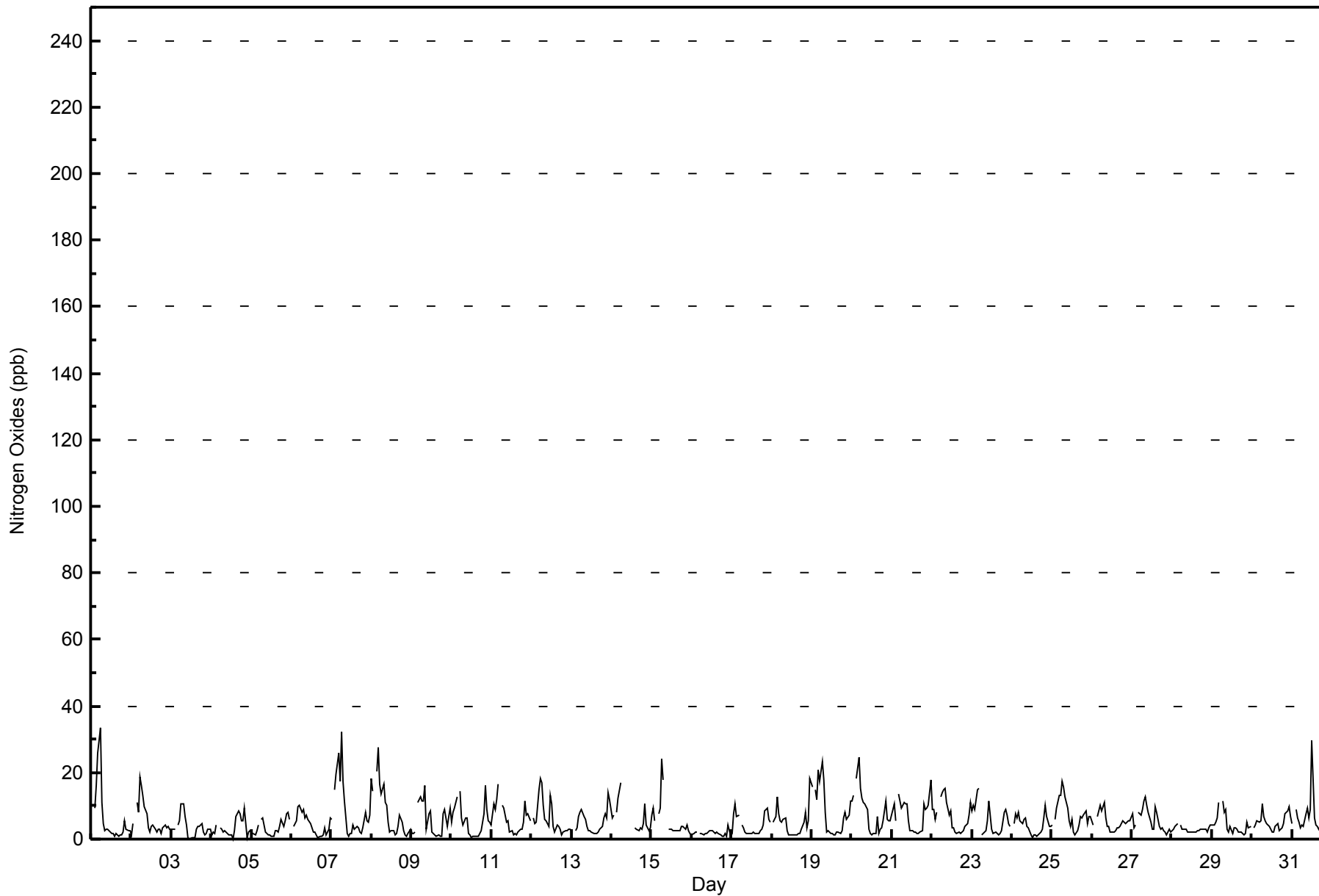


Maximum Value: 33 ppb on May 1 06:00		Maximum Daily Average: 8.6 ppb on May 7		Hours in Service: 744																																														
Minimum Value: 0 ppb on May 3 12:00		Minimum Daily Average: 1.7 ppb on May 16		Hours of Data: 703																																														
Maximum Diurnal Average: 12.4 ppb at hour 5		Minimum Diurnal Average: 2.2 ppb at hour 14		Hours of Missing Data: 41																																														
Monthly Average: 5.6 ppb		Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 4 Q ₃ = 8 P ₉₀ = 12 P ₉₉ = 24		Hours of Calibration: 39																																														
				Percent Operational Time: 99.7																																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-May	15	Z	9	16	26	33	11	5	3	3	3	2	2	2	1	2	1	1	1	2	5	3	3	3	6.6	33																								
2-May	1	5	Z	11	8	19	16	13	10	8	3	2	4	4	3	2	3	3	2	3	4	4	4	3	5.9	19																								
3-May	3	3	3	Z	4	5	10	11	7	4	1	0	0	0	1	3	4	4	5	2	1	2	3	3	3.4	11																								
4-May	1	2	2	4	Z	4	3	2	3	2	1	1	0	0	3	7	8	8	6	5	9	0	2	2	3.4	9																								
5-May	2	2	1	3	4	Z	6	6	2	2	1	1	1	1	3	2	2	4	6	4	6	8	8	6	3.5	8																								
6-May	Z	4	5	5	10	10	8	9	7	7	6	5	4	2	2	1	1	1	1	1	4	1	3	6	4.4	10																								
7-May	6	Z	15	19	26	18	32	17	11	2	1	2	2	4	3	4	3	2	2	3	8	6	5	7	8.6	32																								
8-May	18	14	Z	21	27	16	14	17	11	10	5	2	3	2	1	2	4	7	5	2	1	1	2	3	8.2	27																								
9-May	2	2	2	Z	11	13	11	11	16	3	8	9	2	2	1	1	1	1	1	8	9	4	7	9	5.8	16																								
10-May	5	8	9	13	Z	15	6	4	6	6	2	1	0	1	1	1	1	2	2	8	16	9	6	5	5.5	16																								
11-May	4	11	9	12	17	Z	10	10	7	5	5	2	2	1	2	1	2	3	3	5	12	7	8	5	6.2	17																								
12-May	Z	7	4	5	15	18	17	10	6	6	4	13	11	4	2	4	4	3	1	2	3	3	3	3	6.4	18																								
13-May	2	Z	3	4	7	8	9	7	6	4	2	3	2	2	2	2	2	3	4	6	8	6	14	12	5.0	14																								
14-May	6	7	Z	8	12	17	C	C	C	C	C	C	C	C	3	3	2	3	3	5	11	4	3	3	-	17																								
15-May	7	9	6	Z	7	9	24	18	M	M	3	3	3	2	3	3	2	2	4	4	3	4	2	2	5.7	24																								
16-May	1	2	2	2	Z	2	2	1	2	2	2	2	2	2	2	2	2	2	1	1	1	2	1	4	1	1.7	4																							
17-May	2	7	11	7	7	Z	4	3	2	2	2	2	2	2	2	2	2	3	3	4	9	9	6	5	4.2	11																								
18-May	Z	5	7	13	8	6	5	6	6	3	1	1	1	1	1	1	2	2	3	5	8	3	5	18	4.9	18																								
19-May	16	Z	15	12	21	18	23	18	8	2	3	2	2	1	1	2	2	2	3	7	8	6	7	11	8.2	23																								
20-May	11	13	Z	18	25	15	12	11	11	9	3	2	1	2	2	7	1	3	3	6	11	6	5	6	8.0	25																								
21-May	7	11	6	Z	14	12	9	11	10	11	6	3	2	2	2	2	2	2	3	11	9	9	10	18	7.4	18																								
22-May	9	9	6	8	Z	13	14	15	15	11	7	9	4	3	2	2	2	2	2	3	4	5	7	11	7.0	15																								
23-May	8	10	9	15	15	Z	1	2	3	5	11	7	3	2	2	2	1	2	3	8	9	7	5	4	5.8	15																								
24-May	Z	5	8	6	8	5	5	6	6	4	4	1	1	1	1	1	1	2	3	6	10	7	4	4	4.3	10																								
25-May	4	Z	6	9	13	13	17	16	13	9	5	4	6	2	1	3	4	7	6	7	9	5	7	7	7.5	17																								
26-May	5	4	Z	7	8	10	9	11	6	4	4	2	2	2	2	3	3	4	5	5	5	5	5	5	5.2	11																								
27-May	7	4	4	Z	8	7	9	12	13	10	8	5	3	3	10	8	4	3	3	2	2	1	3	2	5.7	13																								
28-May	3	3	4	5	Z	4	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	2	3	4	2.9	5																								
29-May	4	4	5	6	11	Z	12	8	9	3	2	4	2	3	4	3	2	2	2	1	2	5	3	4	4.3	12																								
30-May	Z	3	4	6	5	6	11	7	5	5	4	3	2	2	4	5	3	3	4	5	7	8	10	7	5.1	11																								
31-May	5	Z	9	7	5	4	4	4	7	9	6	9	30	6	4	4	3	4	11	8	12	10	7	6	7.5	30																								
																								6.0	6.1	6.2	9.3	12.4	11.5	10.6	9.1	7.3	5.3	3.9	3.5	3.4	2.2	2.3	2.7	2.5	2.9	3.3	4.6	6.7	4.9	5.3	6.0	Diurnal Average		
																								18	14	15	21	27	33	32	18	16	11	11	13	30	6	10	8	8	8	8	11	11	16	10	14	18	Diurnal Maximum	
Z - zerospan																								C - Calibration				M - Maintenance																						



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	692	98.44	98.44
21 - 40	11	1.56	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: 703

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	68	26	14	31	38	55	136	44	16	18	37	41	18	23	33	94	692
21 - 40	0	0	0	0	0	1	7	2	1	0	0	0	0	0	0	0	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	68	26	14	31	38	56	143	46	17	18	37	41	18	23	33	94	703

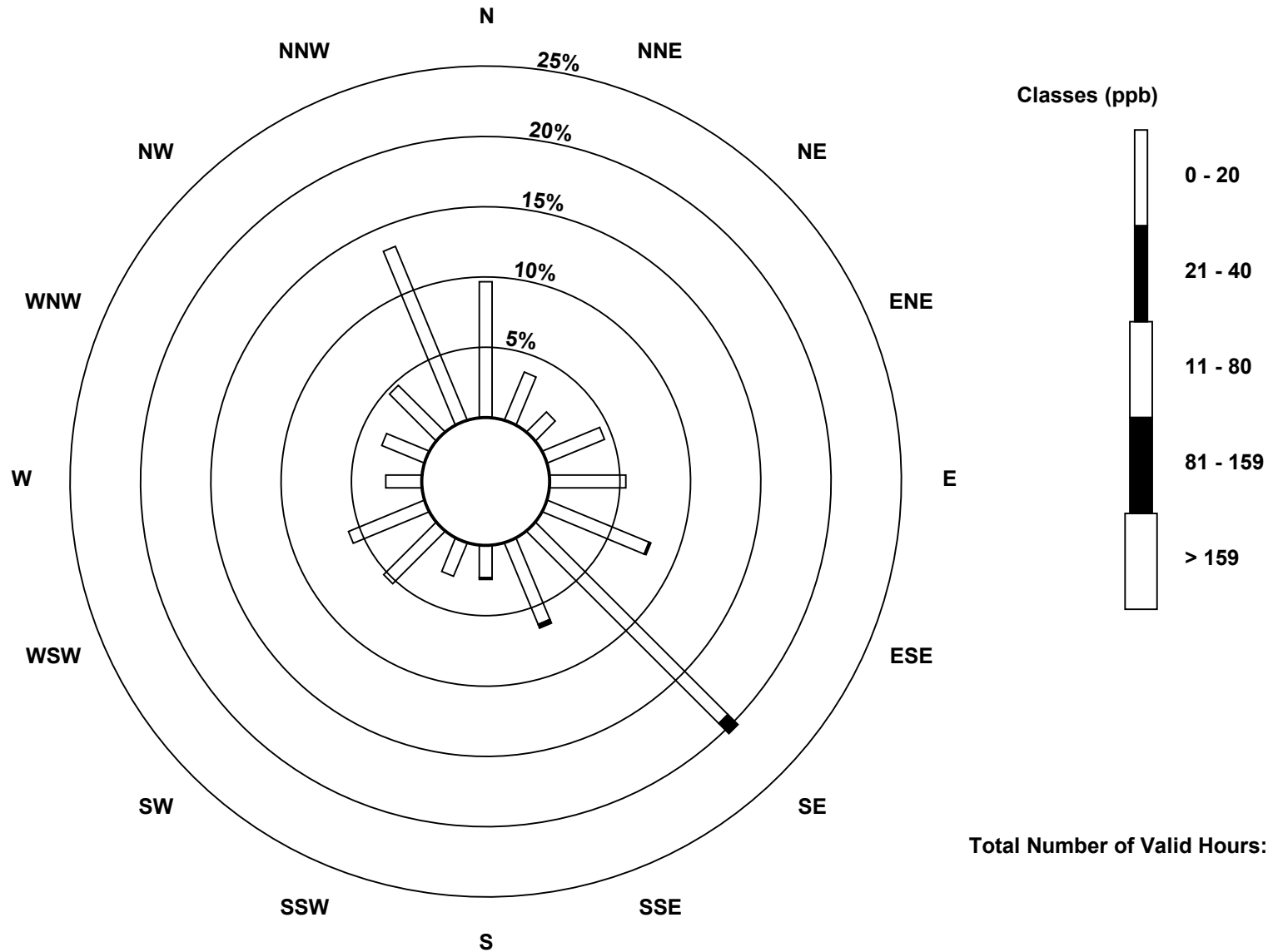
Total Number of Valid Hours: 703

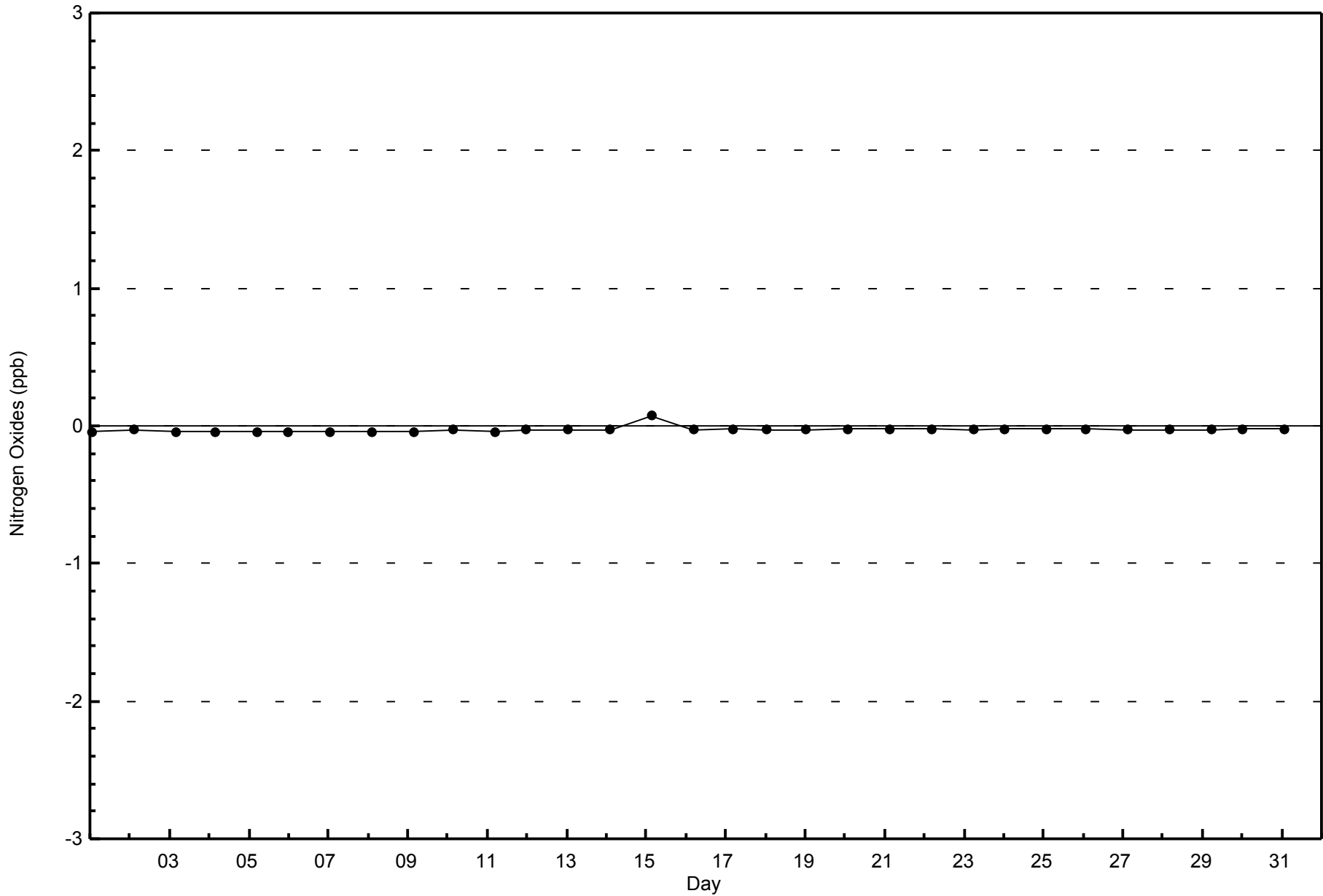
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley (AMS 7)

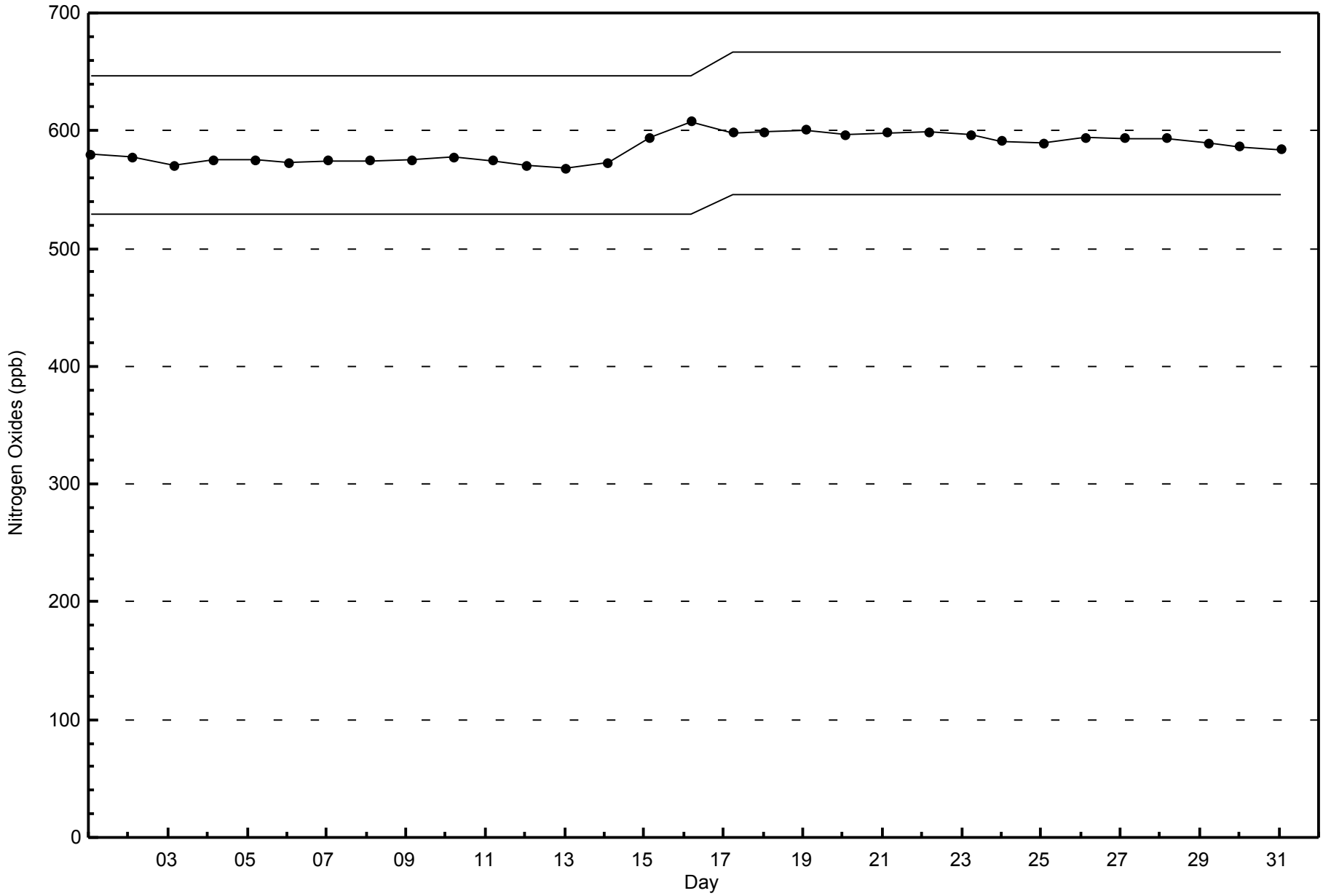






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Athabasca Valley - May 2015





Summary of Hour Averages

Athabasca Valley - May 2015

Number of Exceedences (AAAQO): 24-hr: 2	Hours in Service: 744
Maximum Value: 144.7 µg/m ³ on May 31 02:00	Maximum Daily Average: 38.8 µg/m ³ on May 25
Minimum Value: 1.4 µg/m ³ on May 3 14:00	Hours of Data: 739
Maximum Diurnal Average: 17.5 µg/m ³ at hour 23	Hours of Missing Data: 5
Monthly Average: 12.11 µg/m ³	Hours of Calibration: 0
Minimum Daily Average: 2.2 µg/m ³ on May 3	Percent Operational Time: 99.3
Minimum Diurnal Average: 7.4 µg/m ³ at hour 12	
Percentiles: P ₁ = 1.9 P ₁₀ = 3.0 Q ₁ = 4.8 Median = 7.9 Q ₃ = 13.5 P ₉₀ = 23.2 P ₉₉ = 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-May	7.5	8.4	5.3	5.5	6.2	9.6	5.9	2.8	2.8	2.8	2.8	2.5	2.6	2.1	1.9	1.9	1.9	1.9	1.9	2.2	2.9	3.1	4.3	5.3	3.9	9.6																						
2-May	6.1	5.5	5.3	7.5	7.5	11.2	6.4	5.1	4.1	3.4	3.3	3.1	4.2	3.5	3.6	3.7	4.0	4.5	3.2	3.9	5.0	4.4	3.9	3.0	4.8	11.2																						
3-May	2.3	2.0	2.0	1.8	2.1	2.1	2.3	2.7	2.7	2.3	1.5	1.4	1.5	1.4	1.5	2.2	2.6	2.7	3.1	2.6	2.1	2.0	2.6	3.0	2.2	3.1																						
4-May	2.5	3.5	3.5	7.0	4.8	3.9	4.2	9.8	5.0	5.5	2.7	2.5	2.8	2.7	3.2	5.2	7.6	8.8	8.6	9.3	10.0	5.0	4.3	4.0	5.3	10.0																						
5-May	3.5	3.1	2.9	3.0	3.3	12.5	6.3	7.8	11.5	2.9	2.7	3.1	3.8	3.7	4.6	4.1	5.6	6.2	6.2	9.0	6.2	10.5	9.1	6.0	5.6	12.5																						
6-May	6.4	6.2	6.5	5.9	6.8	6.4	5.9	5.8	4.8	4.4	4.0	4.5	4.3	3.6	2.6	2.7	3.2	3.5	3.3	3.8	5.5	4.4	4.2	4.4	4.7	6.8																						
7-May	4.9	5.0	5.7	6.9	8.0	8.6	9.0	6.5	5.6	2.8	2.2	2.4	2.5	3.4	4.6	7.1	8.5	8.0	7.6	7.8	9.4	11.0	11.5	12.9	6.8	12.9																						
8-May	16.5	13.3	10.2	10.4	11.5	11.4	10.7	10.3	8.6	7.1	6.1	5.2	8.8	5.6	5.2	5.8	6.8	9.1	8.5	8.6	8.6	8.1	8.3	8.2	8.9	16.5																						
9-May	7.3	7.3	7.9	5.6	6.3	6.8	13.8	17.7	11.3	4.8	5.2	4.9	3.9	3.5	3.6	3.9	4.8	4.9	5.3	7.2	11.7	10.5	43.6	20.2	9.3	43.6																						
10-May	11.2	13.9	13.5	14.2	12.5	11.2	7.9	4.9	5.7	5.1	3.8	4.2	4.2	4.4	5.0	6.9	7.3	7.5	8.0	11.5	20.6	15.4	11.4	10.8	9.2	20.6																						
11-May	11.2	14.6	15.3	11.6	12.4	13.2	10.8	9.9	8.8	7.2	6.5	5.1	6.0	5.7	10.1	7.3	10.9	13.6	12.7	14.0	20.5	23.1	22.3	20.9	12.2	23.1																						
12-May	23.3	22.9	18.6	18.8	22.7	25.3	20.1	12.9	10.3	13.2	8.6	9.9	8.8	7.2	7.4	8.2	9.5	8.2	7.4	7.2	6.8	7.4	7.2	7.0	12.5	25.3																						
13-May	7.3	7.2	7.5	21.3	15.6	13.5	11.2	15.6	8.6	7.5	7.1	8.0	8.3	7.6	8.1	8.7	9.8	10.0	10.5	12.4	13.5	12.5	16.3	15.0	11.0	21.3																						
14-May	14.7	15.1	14.7	17.4	17.9	19.9	18.9	14.1	12.4	10.9	11.8	9.5	9.4	13.0	12.7	15.0	12.6	14.3	10.8	13.1	16.3	12.5	10.9	11.3	13.7	19.9																						
15-May	12.1	13.5	11.4	13.5	13.9	16.0	M	M	13.8	8.2	7.7	7.9	7.3	7.1	6.3	7.7	7.8	7.9	7.8	13.0	33.1	9.8	6.8	11.2	11.1	33.1																						
16-May	12.2	6.3	5.0	6.2	6.9	3.6	3.6	4.1	4.0	4.2	4.5	4.3	4.0	3.8	3.4	3.7	3.6	2.8	2.4	2.2	2.5	2.4	3.5	2.8	4.2	12.2																						
17-May	5.2	5.1	9.3	9.3	4.4	4.5	3.6	3.4	2.5	2.0	2.1	2.3	2.5	2.5	3.0	3.5	4.6	5.4	5.5	5.7	11.9	14.6	10.1	7.2	5.4	14.6																						
18-May	7.5	7.9	12.5	9.1	10.6	7.1	6.4	5.3	4.8	4.4	3.5	2.8	2.8	2.7	3.0	3.8	3.5	3.5	4.0	5.9	11.3	12.5	12.7	17.1	6.9	17.1																						
19-May	14.3	11.3	12.5	10.4	11.0	12.9	11.5	9.1	6.6	4.8	4.7	3.5	3.3	4.1	5.8	5.4	5.0	5.8	6.3	8.4	13.7	16.4	18.2	23.0	9.5	23.0																						
20-May	25.6	23.2	19.3	16.0	16.5	17.9	14.8	12.2	13.1	10.8	6.1	4.4	4.4	4.8	5.0	6.5	5.5	6.2	6.1	7.0	10.7	14.9	15.8	17.8	11.9	25.6																						
21-May	20.5	16.9	16.7	14.7	15.7	21.0	14.9	14.2	13.3	11.4	6.8	5.0	5.0	4.5	4.7	5.6	5.6	5.9	6.3	8.7	12.3	17.6	19.4	20.4	12.0	21.0																						
22-May	16.8	15.5	12.7	12.5	14.3	16.9	17.1	14.8	15.3	12.7	10.8	13.5	12.5	14.3	12.9	13.7	69.8	34.0	17.5	34.7	101.3	38.4	55.7	43.1	25.9	101.3																						
23-May	37.6	28.6	29.9	22.9	21.9	19.1	8.9	7.9	8.2	10.4	11.9	11.7	10.1	8.4	12.0	24.8	8.7	9.0	9.0	11.8	17.4	24.8	33.4	21.9	17.1	37.6																						
24-May	30.8	22.7	28.3	25.3	21.3	19.6	24.0	25.9	29.7	27.2	24.5	12.5	7.0	10.2	10.3	11.1	11.9	12.7	15.2	19.0	23.1	26.4	27.5	28.5	20.6	30.8																						
25-May	27.3	31.0	30.0	40.1	40.7	37.7	37.3	33.3	31.1	29.6	25.9	26.4	25.7	34.2	48.2	93.1	85.3	63.5	38.4	36.9	37.3	27.5	25.3	25.1	38.8	93.1																						
26-May	19.0	15.3	11.8	9.7	8.5	7.7	7.4	7.7	7.9	5.7	5.3	5.3	4.4	3.9	3.8	4.9	5.7	6.3	6.7	7.2	7.0	8.1	26.0	15.2	8.8	26.0																						
27-May	15.5	10.9	10.8	9.8	10.8	13.9	29.3	46.0	40.7	35.7	26.8	18.4	17.3	18.8	36.1	20.0	12.7	9.4	7.5	6.2	7.9	9.3	6.6	5.2	17.7	46.0																						
28-May	3.2	3.1	2.8	2.9	2.8	3.2	3.1	2.6	3.0	2.6	2.6	M	M	M	11.8	6.4	3.7	4.0	3.7	3.9	4.9	4.9	4.6	14.9	4.5	14.9																						
29-May	10.4	6.6	5.9	5.7	4.8	5.0	6.4	7.2	9.5	10.5	11.9	11.0	12.8	12.7	5.1	8.6	25.1	17.0	16.7	12.7	7.0	9.2	7.2	6.8	9.8	25.1																						
30-May	8.7	8.6	6.8	5.7	5.0	4.8	4.6	4.9	6.1	6.2	7.1	7.0	7.9	8.5	18.4	16.1	11.1	36.7	26.2	23.5	64.9	103.3	98.9	109.5	25.0	109.5																						
31-May	120.2	144.7	142.4	129.2	66.3	26.0	16.2	11.8	14.1	14.8	15.5	18.7	22.8	21.2	12.3	8.2	8.9	8.5	5.7	5.6	6.4	7.7	9.6	7.9	35.2	144.7																						
																								16.5	16.1	15.7	15.5	13.3	12.7	11.4	11.2	10.5	9.1	7.9	7.4	7.4	7.6	8.9	10.5	12.1	11.0	9.1	10.4	16.5	15.4	17.5	16.4	Diurnal Average
																								120.2	144.7	142.4	129.2	66.3	37.7	37.3	46.0	40.7	35.7	26.8	26.4	25.7	34.2	48.2	93.1	85.3	63.5	38.4	36.9	101.3	103.3	98.9	109.5	Diurnal Maximum

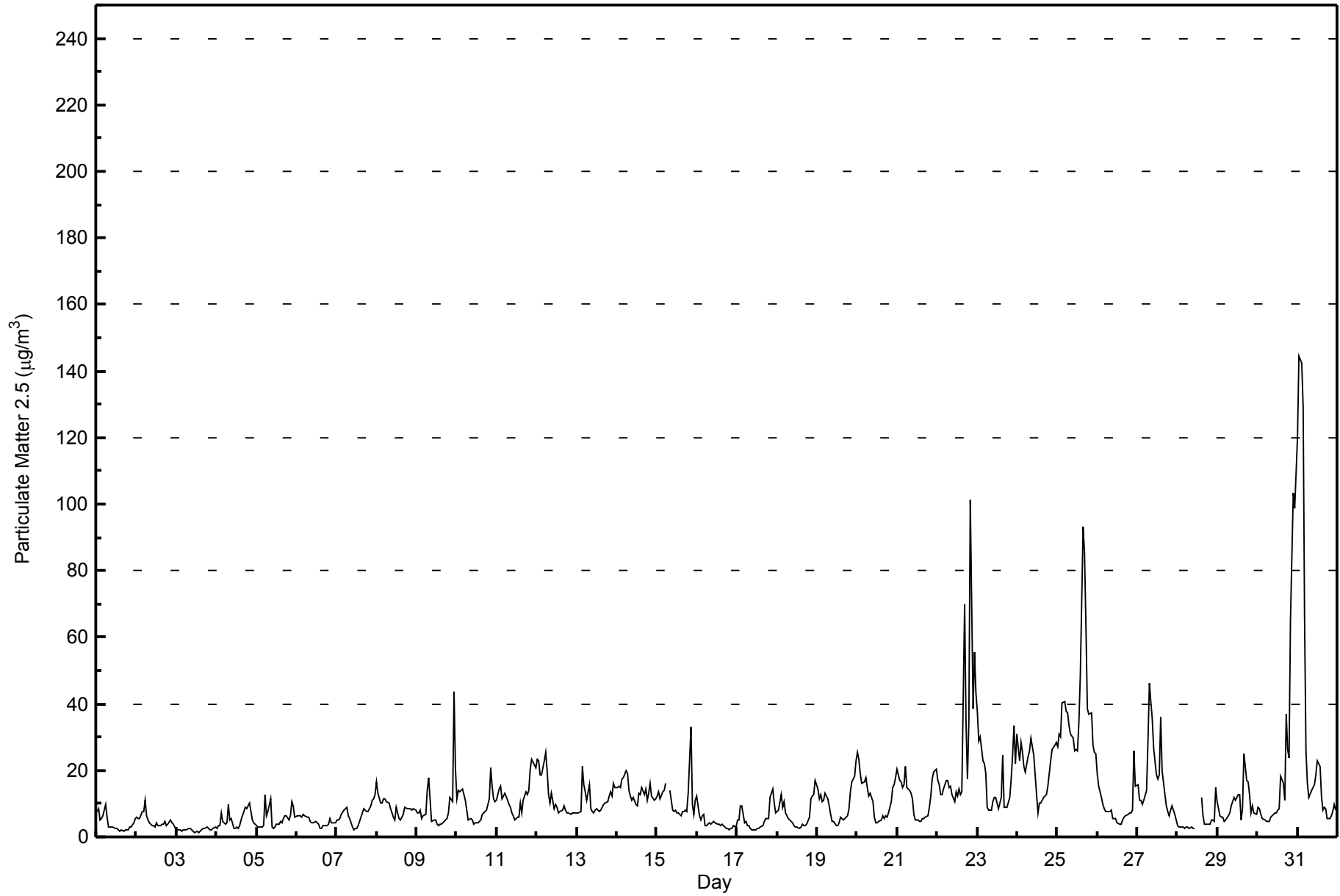
M - Maintenance

Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - May 2015





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	228	30.85	30.85
6 - 15	367	49.66	80.51
16 - 25	81	10.96	91.48
26 - 80	53	7.17	98.65
> 81.0	10	1.35	100.00

Total Number of Valid Hours: 739

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Athabasca Valley - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	39	9	8	13	10	17	20	6	5	4	11	22	6	12	14	32	228
6 - 15	25	13	6	9	21	28	90	31	12	9	27	18	8	3	14	53	367
16 - 25	2	1	0	4	5	8	27	10	3	3	4	1	1	1	2	9	81
26 - 80	4	2	0	4	5	4	13	3	0	3	1	1	2	7	3	1	53
> 81.0	0	2	0	1	0	2	2	2	0	0	0	0	1	0	0	0	10
Totals	70	27	14	31	41	59	152	52	20	19	43	42	18	23	33	95	739

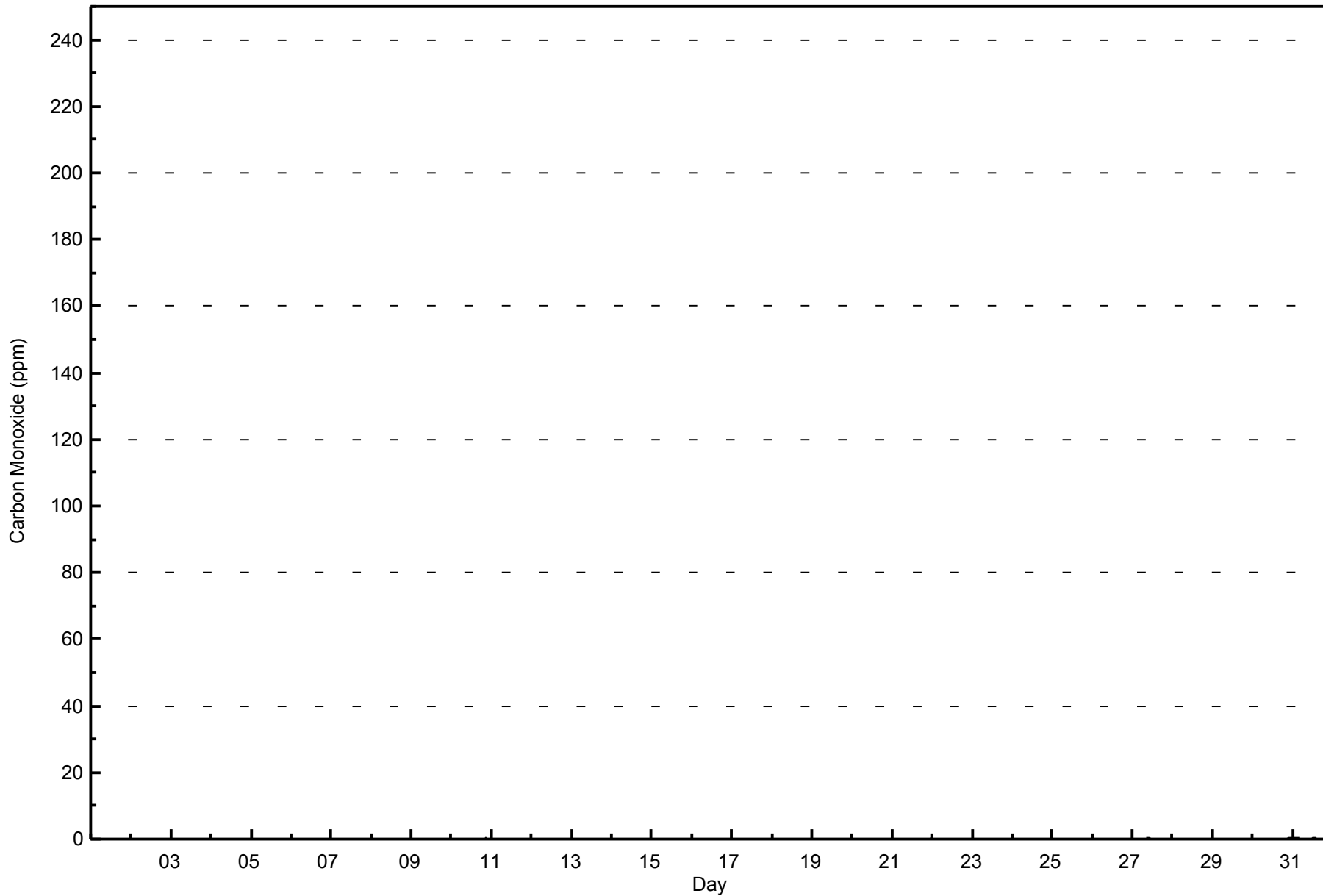
Total Number of Valid Hours: 739

Total Number of Hours: 744



WBEA
Hourly Averages

Carbon Monoxide (CO) - ppm
Athabasca Valley - May 2015





WBEA
Cumulative Frequency Distribution

Carbon Monoxide (CO) - ppm
Athabasca Valley - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.3	705	99.44	99.44
0.4 - 0.5	3	0.42	99.86
0.6 - 0.7	1	0.14	100.00
0.8 - 1.4	0	0.00	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Carbon Monoxide (CO) - ppm
Athabasca Valley - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	66	23	13	28	38	54	138	52	20	19	43	42	18	23	33	95	705
0.4 - 0.5	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	3
0.6 - 0.7	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
0.8 - 1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.5 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	23	13	29	38	56	139	52	20	19	43	42	18	23	33	95	709

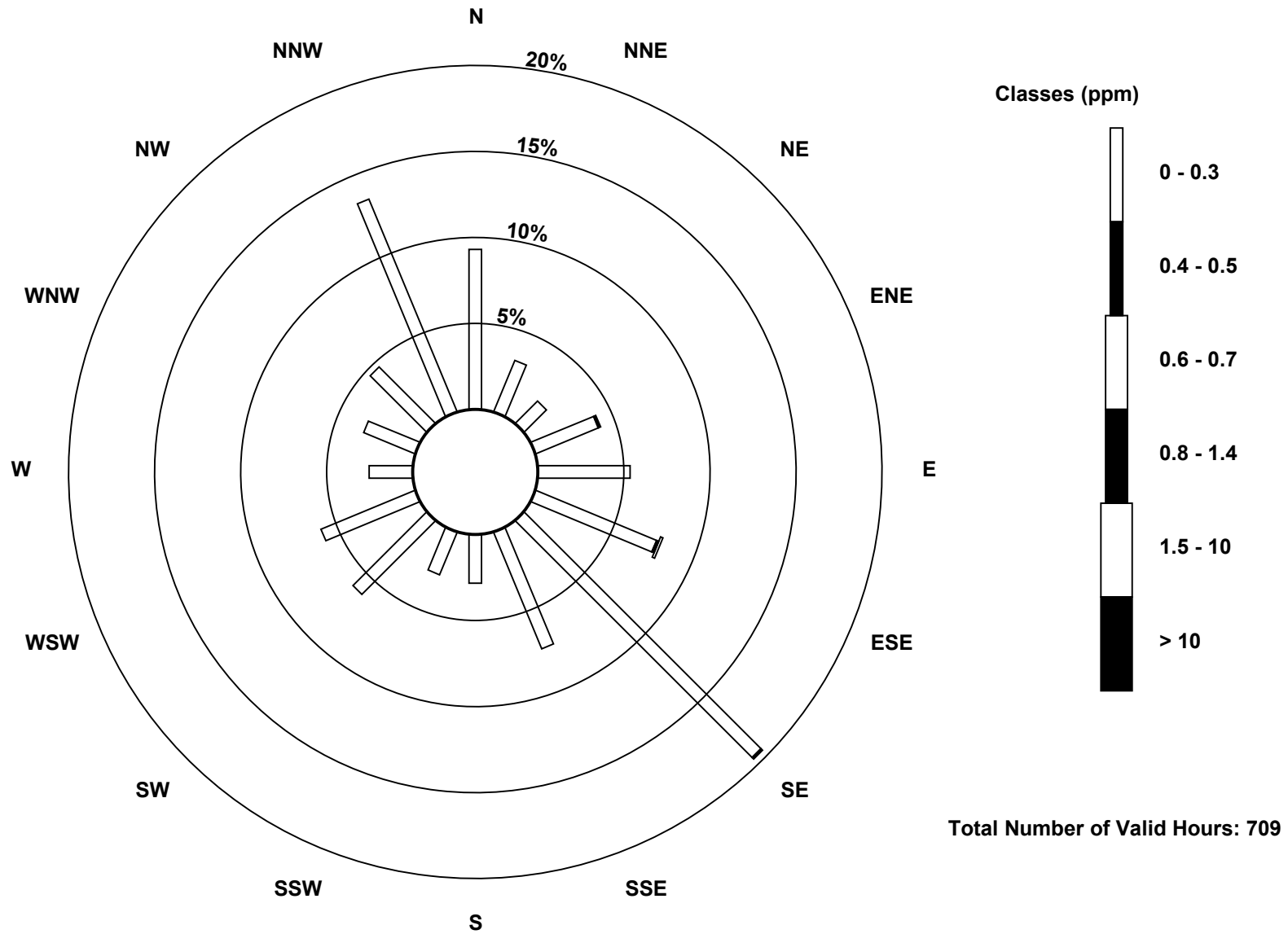
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

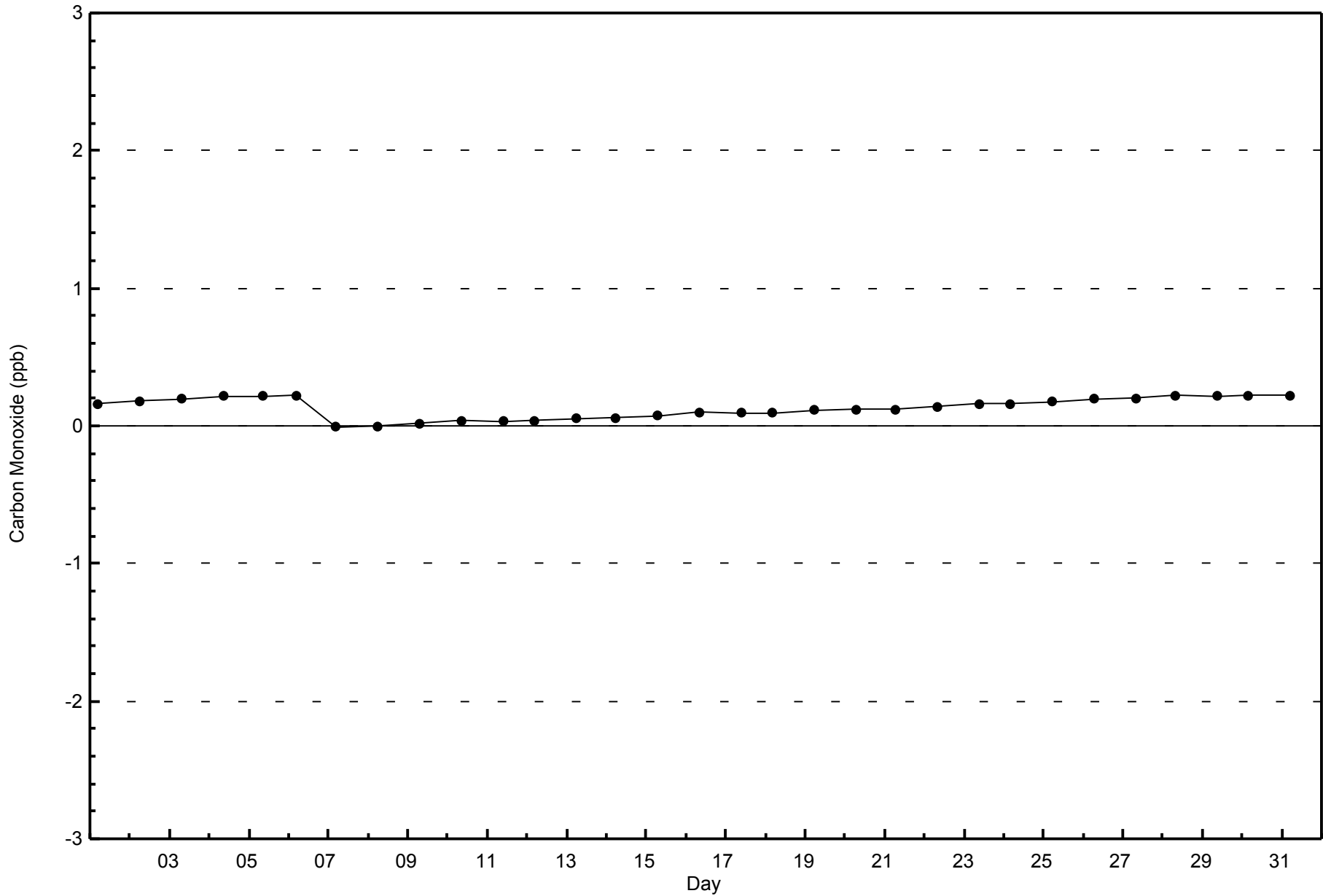
Carbon Monoxide (CO) - ppm
Athabasca Valley (AMS 7)





WBEA
Zero Responses

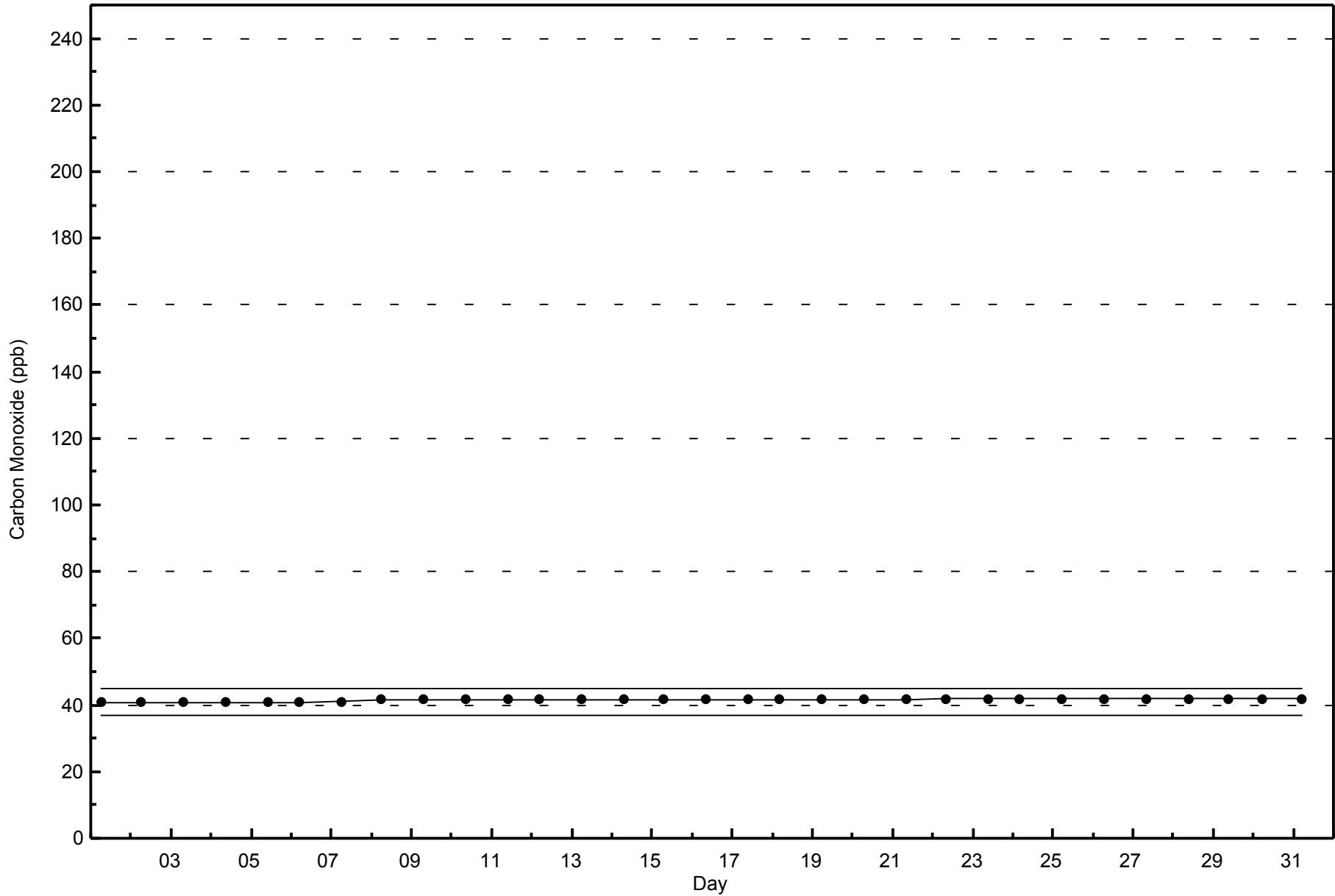
Carbon Monoxide (CO) - ppb
Athabasca Valley - May 2015





WBEA
Span Responses

Carbon Monoxide (CO) - ppb
Athabasca Valley - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

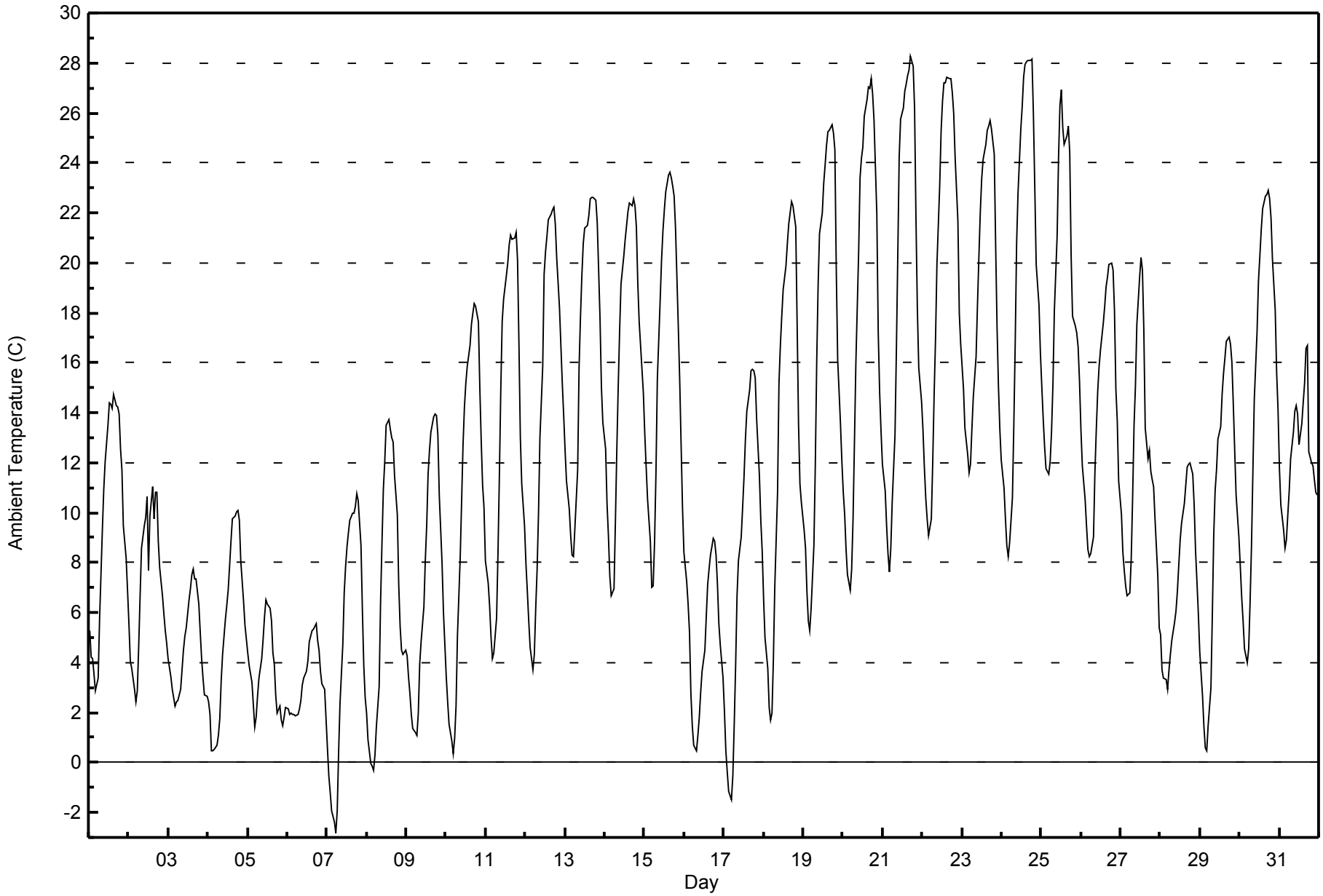
Athabasca Valley - May 2015

Maximum Value: 28.3 C on May 21 18:00		Maximum Daily Average: 19.7 C on May 22		Hours in Service: 744																																												
Minimum Value: -2.9 C on May 7 06:00		Minimum Daily Average: 3.3 C on May 6		Hours of Data: 744																																												
Maximum Diurnal Average: 17.8 C at hour 18		Minimum Diurnal Average: 4.4 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 11.83 C		Percentiles: P ₁ = -0.5 P ₁₀ = 2.4 Q ₁ = 5.6 Median = 10.8 Q ₃ = 17.4 P ₉₀ = 22.7 P ₉₉ = 27.8		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	5.3	4.2	4.1	3.5	2.9	3.4	5.7	7.5	9.3	11.0	12.0	13.5	14.4	14.4	14.2	14.7	14.3	14.2	13.9	12.6	11.7	9.5	8.2	6.9	9.6	14.7																						
2-May	5.6	4.1	3.8	2.9	2.4	2.9	4.7	6.7	8.6	9.5	9.8	10.7	7.7	9.8	11.0	9.8	10.8	10.8	8.8	7.8	6.7	5.9	5.3	4.8	7.1	11.0																						
3-May	4.1	3.4	2.9	2.6	2.3	2.4	2.5	2.9	3.7	4.5	5.1	5.4	6.5	6.9	7.5	7.8	7.3	7.3	6.4	5.2	4.2	3.4	2.7	2.6	4.6	7.8																						
4-May	2.4	1.9	0.4	0.5	0.5	0.7	1.1	1.8	3.3	4.3	5.7	6.3	6.9	7.9	8.9	9.7	9.9	10.0	10.1	9.7	8.1	6.5	5.5	4.9	5.3	10.1																						
5-May	4.4	3.9	3.2	2.3	1.4	1.8	2.7	3.4	4.2	5.0	5.9	6.5	6.4	6.2	5.7	4.4	3.9	2.7	2.0	2.3	1.7	1.5	1.8	2.2	3.6	6.5																						
6-May	2.1	1.9	2.0	1.9	1.9	1.9	1.9	2.1	2.5	3.1	3.3	3.7	4.0	4.8	5.1	5.3	5.3	5.5	4.9	4.5	3.7	3.2	2.9	1.7	3.3	5.5																						
7-May	0.6	-0.5	-1.2	-1.9	-2.4	-2.9	-2.0	0.4	2.4	4.7	6.8	7.8	8.6	9.2	9.7	10.0	10.0	10.2	10.7	10.5	8.7	6.1	3.9	2.6	4.7	10.7																						
8-May	2.0	0.9	-0.1	-0.2	-0.3	0.3	1.4	3.1	6.4	8.8	10.9	12.1	13.5	13.7	13.4	13.0	12.8	11.5	9.9	7.1	5.4	4.5	4.3	4.5	6.6	13.7																						
9-May	4.2	3.5	2.8	1.9	1.4	1.2	1.1	2.0	3.9	4.9	6.2	8.0	9.5	11.5	12.5	13.2	13.8	13.9	13.9	13.1	10.7	8.0	6.0	4.7	7.2	13.9																						
10-May	3.4	2.4	1.5	0.9	0.3	1.0	2.3	5.1	8.2	10.5	12.7	14.2	15.2	15.9	16.7	17.5	18.0	18.4	18.3	17.7	15.0	12.9	11.1	10.2	10.4	18.4																						
11-May	8.1	7.2	6.3	5.0	4.2	4.4	5.8	8.4	11.5	14.9	17.7	18.5	19.5	20.0	20.7	21.1	21.0	21.0	21.2	20.1	16.7	13.0	11.1	9.5	13.6	21.2																						
12-May	8.0	6.8	5.7	4.6	3.7	4.3	6.2	7.7	10.0	13.0	15.9	19.5	20.4	21.0	21.7	22.0	22.1	22.2	21.6	20.2	18.2	16.7	15.2	13.9	14.2	22.2																						
13-May	12.5	11.3	10.1	9.1	8.3	8.3	9.4	11.7	15.8	17.8	19.5	20.8	21.4	21.5	21.9	22.5	22.6	22.6	22.5	21.6	19.7	17.7	15.0	13.6	16.6	22.6																						
14-May	12.6	10.4	9.1	7.5	6.7	6.9	9.6	12.5	15.0	17.2	19.2	20.3	20.9	21.5	22.1	22.4	22.3	22.6	22.3	21.4	19.2	17.6	15.7	14.8	16.2	22.6																						
15-May	13.2	11.8	10.5	8.9	7.0	7.1	8.8	11.5	15.3	18.5	20.1	21.3	22.1	22.8	23.5	23.6	23.4	23.1	22.7	21.4	17.4	15.3	12.7	10.2	16.3	23.6																						
16-May	8.4	7.3	6.4	5.2	2.8	1.5	0.7	0.4	1.1	1.8	2.8	3.7	4.5	5.8	7.1	7.7	8.3	9.0	8.9	8.3	7.1	5.6	4.7	3.4	5.1	9.0																						
17-May	2.0	0.5	-0.4	-1.1	-1.5	-0.5	1.5	3.9	6.7	8.1	9.0	10.2	11.4	13.0	14.1	14.9	15.7	15.7	15.7	15.4	13.8	11.5	9.7	8.5	8.2	15.7																						
18-May	6.5	5.0	3.8	2.2	1.7	2.0	4.1	7.0	10.8	15.2	16.7	17.9	18.9	19.9	20.8	21.6	22.0	22.4	22.3	21.4	17.5	13.6	11.2	10.4	13.1	22.4																						
19-May	9.3	8.6	6.9	5.7	5.3	6.2	8.7	11.9	16.0	19.1	21.1	22.0	23.2	23.9	24.7	25.2	25.3	25.5	25.2	24.5	19.7	16.1	13.6	12.1	16.7	25.5																						
20-May	10.8	9.9	8.5	7.5	6.9	7.7	9.8	12.8	16.0	20.5	23.4	24.2	24.7	25.8	26.5	27.0	27.0	27.4	26.8	25.7	21.9	17.2	14.9	13.3	18.2	27.4																						
21-May	11.9	10.9	9.5	8.4	7.7	8.6	10.4	13.1	16.5	20.3	24.3	25.7	26.2	26.9	27.1	27.5	27.7	28.3	27.9	26.2	21.8	18.2	15.8	14.4	19.0	28.3																						
22-May	13.3	11.8	10.6	9.8	9.1	9.7	12.1	14.7	17.0	19.9	23.1	25.3	26.5	27.2	27.2	27.4	27.4	27.4	26.8	26.0	24.3	21.7	18.0	16.8	19.7	27.4																						
23-May	15.9	15.0	13.4	12.3	11.6	11.9	13.3	14.6	16.3	18.3	20.2	22.0	23.3	24.2	24.7	25.3	25.5	25.7	25.3	24.3	20.7	17.4	15.1	13.3	18.7	25.7																						
24-May	12.1	11.0	9.8	8.7	8.2	8.8	10.6	13.5	16.8	20.8	22.8	25.4	26.3	27.4	27.9	28.0	28.1	28.1	28.1	26.0	23.0	19.9	18.3	16.4	19.4	28.1																						
25-May	15.1	13.8	12.7	11.8	11.5	12.0	13.3	15.2	18.1	21.1	24.2	26.3	27.0	27.4	27.7	28.1	28.1	28.1	28.1	26.0	23.0	19.9	18.3	16.4	19.4	28.1																						
26-May	13.4	11.9	10.5	9.5	8.5	8.2	8.3	9.0	11.6	13.4	14.8	15.8	16.5	17.6	18.3	19.0	19.4	19.9	20.0	19.7	18.1	14.9	13.7	11.3	14.3	20.0																						
27-May	9.9	8.4	7.7	7.1	6.7	6.8	8.2	10.6	13.5	15.0	17.5	19.5	20.2	19.7	17.3	13.4	12.2	12.5	11.6	11.3	11.1	9.8	7.4	5.4	11.8	20.2																						
28-May	5.1	3.7	3.4	3.3	3.0	3.7	4.3	4.9	5.6	6.1	6.8	7.9	8.9	9.6	10.4	11.1	11.8	11.9	12.0	11.5	10.3	8.5	7.2	5.9	7.4	12.0																						
29-May	4.4	2.7	1.4	0.6	0.5	1.5	3.0	5.9	9.1	10.9	11.7	13.0	13.4	14.7	15.6	16.2	16.9	17.0	16.8	16.0	14.4	12.5	10.7	9.1	9.9	17.0																						
30-May	7.8	6.6	5.6	4.5	4.0	4.6	6.4	8.7	11.6	14.5	17.2	19.3	20.3	21.3	22.2	22.7	22.7	22.9	22.6	21.8	20.2	18.1	15.7	14.1	14.8	22.9																						
31-May	11.8	10.3	9.3	8.6	8.9	9.9	10.8	12.2	13.2	14.1	14.3	14.0	12.7	13.5	14.4	15.2	16.6	16.7	12.4	12.0	11.9	11.3	10.8	10.7	12.3	16.7																						
																								7.9	6.8	5.8	4.9	4.4	4.7	6.0	7.9	10.3	12.5	14.2	15.5	16.2	16.9	17.3	17.6	17.7	17.8	17.2	16.2	14.2	12.1	10.5	9.3	Diurnal Average
																								15.9	15.0	13.4	12.3	11.6	12.0	13.3	15.2	18.1	21.1	24.3	26.3	27.0	27.4	27.9	28.0	28.1	28.3	28.1	26.2	24.3	21.7	18.3	16.8	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Athabasca Valley - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Athabasca Valley - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	13	1.75	1.75
0 - 10	328	44.09	45.83
10 - 20	266	35.75	81.59
> 20	137	18.41	100.00

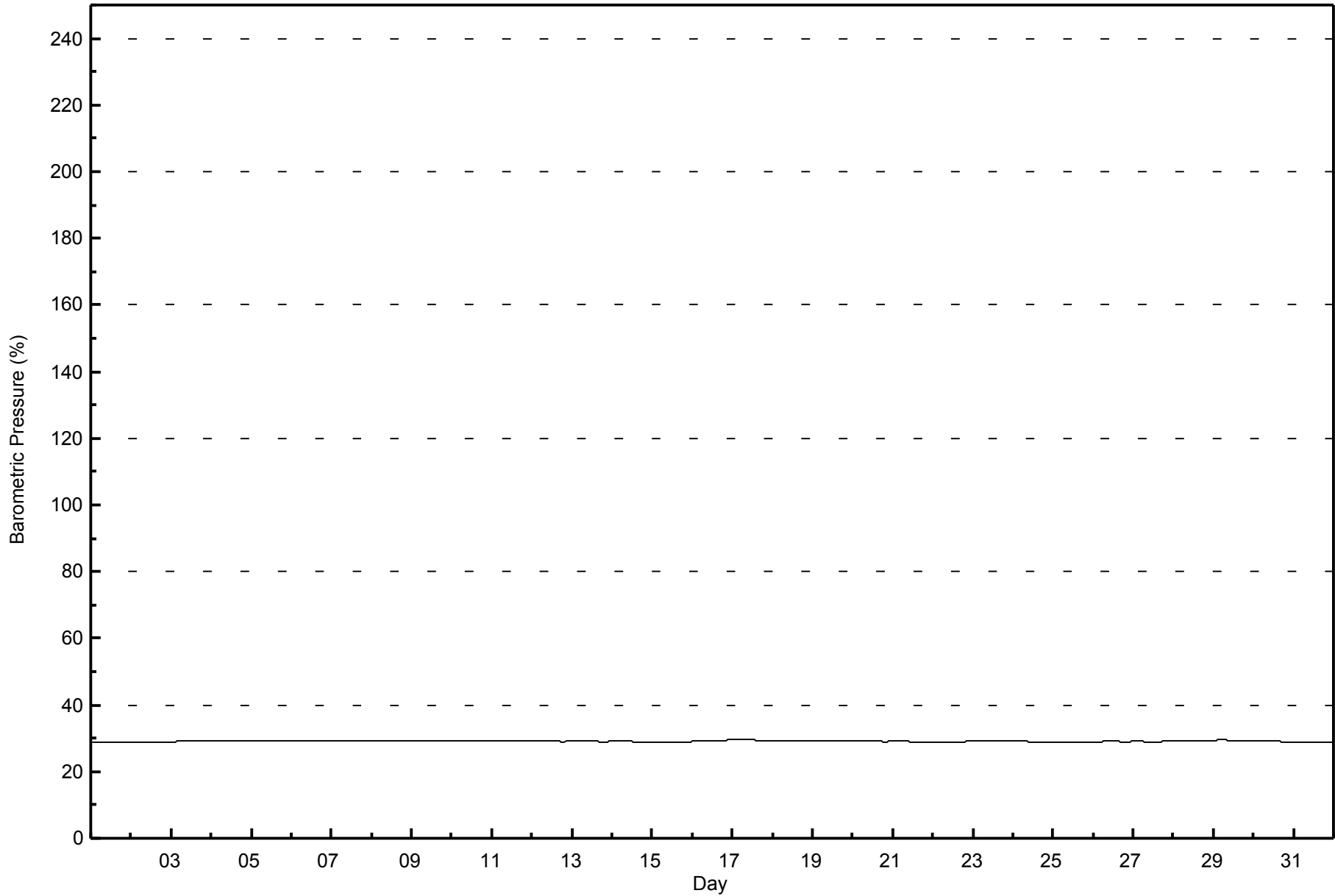
Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA
Hourly Averages

Barometric Pressure (BP) - %
Athabasca Valley - May 2015



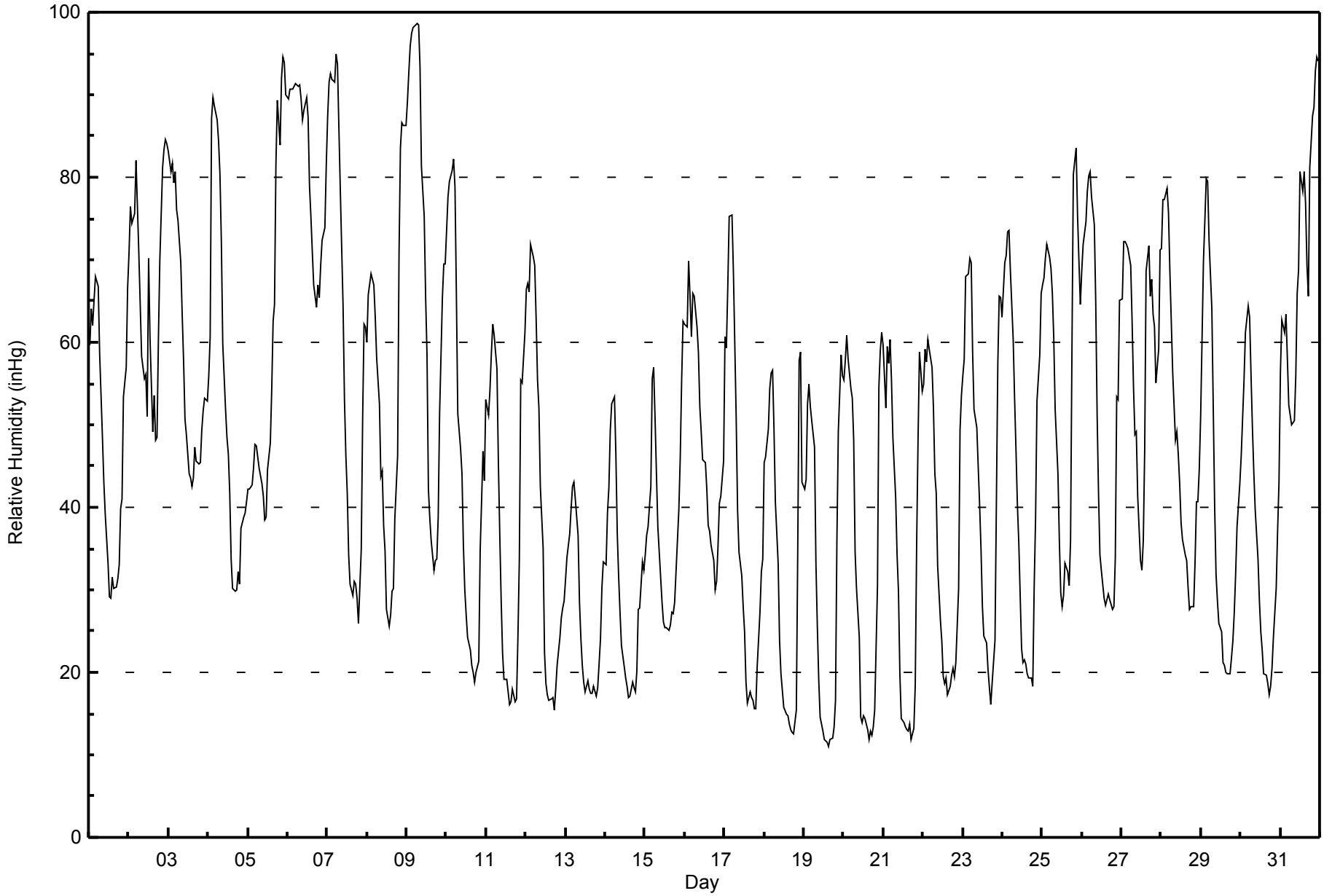


Maximum Value: 99 inHg on May 9 07:00														Maximum Daily Average: 81.4 inHg on May 6														Hours in Service: 744																					
Minimum Value: 11 inHg on May 19 16:00														Minimum Daily Average: 27.0 inHg on May 13														Hours of Data: 744																					
Maximum Diurnal Average: 69.1 inHg at hour 5														Minimum Diurnal Average: 29.9 inHg at hour 17														Hours of Missing Data: 0																					
Monthly Average: 47.6 inHg														Percentiles: P ₁ = 12 P ₁₀ = 19 Q ₁ = 29 Median = 46 Q ₃ = 65 P ₉₀ = 79 P ₉₉ = 94														Hours of Calibration: 0																					
																												Percent Operational Time: 100.0																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	60	64	62	65	68	67	59	54	48	43	39	33	29	29	32	30	30	31	33	40	41	53	57	67	47.3	68																							
2-May	71	76	74	76	82	76	71	65	58	56	56	51	70	60	49	53	48	48	60	70	81	83	85	84	66.9	85																							
3-May	83	81	82	79	81	76	75	70	63	58	51	49	44	44	43	44	47	46	45	45	49	52	53	53	58.8	83																							
4-May	56	61	87	90	89	87	84	80	72	60	52	48	46	42	34	30	30	30	32	31	37	39	39	41	54.0	90																							
5-May	42	42	43	45	48	47	46	45	43	41	38	39	44	48	54	63	65	82	89	84	92	95	94	90	59.1	95																							
6-May	90	91	91	91	91	91	91	91	90	87	88	90	87	79	75	71	67	64	67	65	69	72	74	81	81.4	91																							
7-May	87	91	93	92	92	95	94	86	79	64	53	46	42	34	31	29	31	31	29	26	35	51	62	62	59.8	95																							
8-May	60	66	68	68	67	63	58	53	44	44	38	35	28	26	27	30	30	39	46	71	84	87	86	86	54.2	87																							
9-May	89	93	96	97	98	98	99	99	93	81	75	66	58	42	39	36	32	34	34	39	51	65	70	70	68.9	99																							
10-May	73	78	80	81	82	79	66	51	47	44	35	30	27	24	23	21	20	19	20	21	35	41	47	43	45.3	82																							
11-May	53	51	54	59	62	61	57	46	37	29	22	19	19	18	16	16	18	16	17	24	34	55	55	61	37.5	62																							
12-May	66	67	66	72	70	69	63	55	52	42	35	22	19	17	17	17	17	15	18	21	24	27	28	29	38.7	72																							
13-May	31	34	37	40	43	43	41	37	29	24	21	19	18	19	18	17	17	18	17	18	21	24	30	33	27.0	43																							
14-May	33	39	42	49	52	53	46	37	32	27	23	21	19	18	17	17	19	18	18	20	28	28	33	32	30.1	53																							
15-May	34	37	38	43	56	57	51	44	38	31	28	26	25	25	25	26	27	27	28	32	40	46	55	63	37.6	63																							
16-May	62	62	70	66	61	66	66	62	59	52	49	46	45	42	38	37	35	34	30	31	35	41	41	46	49.0	70																							
17-May	61	59	67	75	75	69	60	51	40	35	32	28	25	19	16	18	17	17	16	16	21	27	32	34	37.8	75																							
18-May	45	46	49	54	56	57	50	41	33	24	20	18	16	15	15	14	13	13	12	15	35	58	59	43	33.4	59																							
19-May	42	43	53	55	52	51	47	33	26	19	15	13	12	12	12	11	12	12	13	17	36	49	58	56	31.2	58																							
20-May	55	58	61	58	54	53	48	35	30	24	15	14	15	14	13	12	13	12	13	15	30	55	59	61	34.1	61																							
21-May	60	52	59	57	60	55	48	41	34	30	20	14	14	13	13	13	14	12	13	19	36	48	59	54	35.0	60																							
22-May	55	59	58	60	59	57	52	44	42	33	26	24	20	19	19	17	18	20	20	20	21	30	49	54	36.5	60																							
23-May	56	58	68	68	70	70	59	52	50	45	40	35	28	24	24	20	18	16	19	24	41	57	66	65	44.7	70																							
24-May	63	70	70	73	73	69	60	53	47	40	36	23	21	22	21	20	19	19	18	30	39	53	58	66	44.4	73																							
25-May	67	68	70	72	70	69	66	61	52	44	36	30	28	29	33	32	31	36	59	80	84	75	70	65	55.3	84																							
26-May	69	72	75	78	80	81	78	74	65	51	42	34	32	29	28	29	30	29	28	28	34	53	53	65	51.5	81																							
27-May	65	72	72	72	71	69	63	55	49	49	41	34	32	36	47	69	72	66	68	63	62	55	59	71	58.8	72																							
28-May	71	77	77	79	76	69	63	56	48	49	46	43	38	36	34	33	30	28	28	28	33	41	41	45	48.7	79																							
29-May	51	70	75	80	79	72	64	52	40	32	29	26	25	21	21	20	20	20	22	24	27	32	38	43	40.9	80																							
30-May	46	51	55	61	64	63	56	50	44	40	34	29	25	23	20	20	19	17	18	21	24	30	37	43	37.1	64																							
31-May	56	63	61	63	58	52	51	50	51	56	66	69	81	78	81	77	69	66	81	87	88	93	95	94	70.2	95																							
																								59.8	62.9	66.2	68.3	69.1	67.3	62.3	55.5	49.4	43.7	38.8	34.6	33.3	30.9	30.1	30.4	29.9	30.1	32.7	36.3	44.1	52.1	56.2	58.0	Diurnal Average	
																								90	93	96	97	98	98	99	99	93	87	88	90	87	79	81	77	72	82	89	87	92	95	95	94	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - inHg
Athabasca Valley - May 2015





Maximum Speed: 30 km/h on May 15 21:00	Maximum Daily Speed Average: 17.3 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 24 23:00	Minimum Daily Speed Average: 0.6 km/h on May 9	Hours of Data: 744
Maximum Diurnal Speed Average: 6.0 km/h at hour 15	Minimum Diurnal Speed Average: 1.0 km/h at hour 24	Hours of Missing Data: 0
Monthly Average Velocity: 1.6 km/h 17.1 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 4 Median = 7 Q ₃ = 12 P ₉₀ = 17 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-May	SSE6	SE5	SE5	SE5	SE6	SE6	S2	SW15	SW17	SW16	SW17	SW17	WSW17	WSW19	NNW11	WSW15	NNW24	W18	NNW14	NW10	SW5	WSW6	SW1	WSW2	WSW8.0	NNW24
2-May	SW4	ESE3	S4	SE1	SE3	E3	ESE4	NE2	N12	N16	NNW18	NNW21	NW12	NW10	NNW17	NW16	NW15	N12	N9	N8	WSW10	NNW14	NNW12	NNW15	NNW7.6	NNW21
3-May	NNW18	N12	NNW9	N10	NNW8	NNW11	N10	NNE8	NNW3	WNW5	NNW13	NNW13	NNW3	NW10	NNW12	N15	N16	N15	NNE14	NNE11	ENE8	E6	ESE3	ESE2	N8.5	NNW18
4-May	NE2	S8	S8	SE5	S4	E3	ENE5	E4	ESE4	SE9	SSE9	SSW4	N1	NW7	WNW4	W6	WNW9	NNW11	NNW10	N7	NNE6	E16	ESE8	SE8	E1.0	E16
5-May	SE6	ESE6	ESE6	SE4	SE2	ESE4	E8	ENE6	NE5	NE9	ENE13	ENE16	ENE22	NE23	NNE21	NE21	NNE18	NNW21	NNW18	N8	NNW13	NNW13	NNW14	NNW14	NNE8.8	NE23
6-May	NNW18	NNW17	NNW16	NNW17	NNW17	NNW18	NNW18	NNW20	NNW22	NNW23	N19	N16	N16	NNE17	NE17	ENE17	ENE17	ENE14	E16	ENE10	SE8	ESE5	SSE2	SSE2	N11.3	NNW23
7-May	WSW3	E2	ESE2	ESE3	SE4	SE6	SE5	NW1	W4	SW5	WNW3	WNW3	NNW6	NNW12	NNW13	N12	NNW11	NNW8	NNW7	NNE6	ENE3	SSE2	ESE1	E2	N2.4	NNW13
8-May	ESE3	SE1	SSE2	S3	SE4	SE6	SE7	SE7	SE6	NW3	NW4	NW5	E8	ENE8	NNW8	NNE10	NNE7	NNE15	NE19	ENE16	ENE15	E12	ESE8	SE3	ENE4.8	NE19
9-May	N1	NNE4	N4	NNW5	NNW4	NW7	NNW5	NNE1	SSE4	ESE7	ESE6	SE7	SW4	SSE3	WSW2	WNW4	ENE4	NW6	NNW6	NW5	WSW2	E1	E4	S4	NNW0.6	ESE7
10-May	SSE2	SE1	SSW2	SSE3	SSE4	SE4	SE8	SE5	E3	W4	WNW3	NW4	NW6	NW11	NNW9	NNE4	NE7	SE6	ESE5	SE6	SE5	SE7	SE6	SE6	ESE1.4	NW11
11-May	SE3	SSE5	SE4	SSE5	SSE6	SE7	SE9	SE8	ESE8	E7	E1	WNW2	E10	ENE1	NE3	W4	NNW10	NNW7	NNW4	N3	WSW4	SW1	W4	SE2	ESE1.7	NNW10
12-May	ESE1	ENE1	SW4	SSW3	ENE2	ENE1	E2	NW3	NW3	NNW5	NW5	S11	SSE11	SE12	SSE9	ESE8	ESE11	ESE9	E15	ESE14	ESE13	SE14	SE14	SE12	SE5.5	E15
13-May	SE13	SE15	SE14	SSE12	SE13	SE16	SE15	SE12	SSW5	WSW9	WSW10	SSW9	S10	WSW10	W5	WSW9	SW5	WSW9	SSW9	S10	SSE12	SE10	SE4	SSE6	S7.3	SE16
14-May	SSE9	SE9	SE7	ESE7	SE9	SE8	SE5	SSW9	SW15	SW16	SW13	SW15	SW14	SW14	SW10	SW11	WSW12	WSW12	SW12	SW8	SW6	SSW7	SW9	SSW8	SSW8.1	SW16
15-May	SSE6	SSE6	S6	SSE8	SE13	SE14	SE11	ESE9	E4	SW9	SSW15	SW15	SW14	SW13	WSW11	WSW13	W9	WSW11	SW9	NW9	N30	N23	N22	N24	WSW2.6	N30
16-May	N27	N21	N19	N22	N24	N26	N24	N23	N24	N23	N22	N20	N22	N20	NNW21	NNW20	N16	NE13	NE12	NE10	ENE6	S5	E5	N17.3	N27	
17-May	E3	ESE4	SE4	ESE4	SE8	SE8	SSE9	SE7	ESE7	ESE10	ESE13	ESE12	E12	SSE6	SE8	E9	ESE9	ESE9	ESE10	SE11	SE8	ESE6	SE8	S5	ESE7.6	ESE13
18-May	S3	SSE6	SE4	S4	SE10	SE13	SE9	SE9	SE9	SSW7	WSW9	WSW9	WSW11	W7	WSW7	WSW8	WSW9	WSW5	WSW6	WSW5	SW2	E2	ESE3	SE5	SSW3.7	SE13
19-May	SSE5	SSE5	SE3	SE2	SE2	SE4	ESE5	SE6	SW6	SSW11	SW10	WSW6	WSW3	NW4	W3	WSW8	W7	W6	WNW5	W3	SW2	SSE1	ESE3	SE3	SSW2.6	SSW11
20-May	SE2	SE3	ESE3	SE3	SSE5	SE6	SE7	SE9	ESE9	SSE4	SW8	WSW7	NNW6	WNW3	N1	SW7	WNW5	SW5	WSW7	WSW5	SSW2	E1	SE1	SSW1	S2.0	SE9
21-May	SE2	S3	E2	SE5	SE6	SE9	SE8	SE8	ESE8	E7	ENE3	SW11	WSW12	WSW11	W12	W7	NNW4	SW3	WSW5	SW6	SW3	SSE2	SE2	SSE2	SSW2.5	WSW12
22-May	SE2	S2	ESE3	SE5	SE8	SE7	ESE5	E6	ENE4	NNW6	N10	NNW15	NNW16	NNW15	NNW19	N17	N16	N16	N16	NNE12	NNE9	NNE3	WNW3	NW6	N6.4	NNW19
23-May	NW6	WNW3	WNW3	NNW6	WNW3	NNW4	NNW6	NNW4	NW4	NNW8	NNW9	NNW8	NNW11	NNW14	NNW11	NNW11	NNW11	NNW7	NW7	NW3	SSW3	ENE1	ENE2	SE2	NNW5.5	NNW14
24-May	E2	E2	SE2	ESE4	SE6	SE10	SE9	ESE6	E6	ENE3	NW4	WNW3	NW6	NNE5	N10	NNW10	NNW8	NNW7	N6	NNW4	SW4	SSW2	SE0	SE1	NE1.5	NNW10
25-May	SSW2	SSE2	ESE3	SE3	SE5	SE5	ESE5	E5	ENE6	ENE4	WNW3	SW4	ESE7	WNW25	N17	NNE7	W4	WNW10	NW4	SSW4	WSW6	W7	NNW15	NNW18	NW2.4	WNW25
26-May	NNW18	N16	N15	NNW14	NNW13	NNW15	N15	N11	NNW14	NNW18	NNW19	NNW17	NNW17	NNW17	NNW16	NNW15	NNW14	N10	ENE8	NNE7	NE5	WSW5	E1	SE1	NNW11.6	NNW19
27-May	SSE4	ESE5	SSE4	SSE5	SE5	SE7	SE9	SE10	SE4	WNW4	W6	NW5	N7	NNW15	NNW27	NNW22	N15	N19	N15	NNE12	NNE11	NNE19	N18	N18	N6.6	NNW27
28-May	N17	N17	N16	N16	NNE14	NNE16	N18	N16	NNE16	NNW21	NNW21	NNW20	N16	NNW17	NNW17	NNW19	N15	N13	N12	NE9	ENE7	E6	SE5	ESE6	N12.8	NNW21
29-May	SE6	SE5	SE4	SE5	SE5	SE5	SE5	SE7	ESE7	E6	SSE1	SW6	WSW4	S5	SSW2	E3	E4	ESE7	E10	ESE11	ESE9	SE9	SE14	SE10	SE5.3	SE14
30-May	SE7	SE6	SE8	SSE4	SE6	SE8	SE9	SE10	ESE7	E7	NE6	E12	ESE11	SE12	SE11	SSE11	SE12	SE12	SE13	SE13	SSE12	SSE8	SE8	SSE5	SE8.6	SE13
31-May	ENE2	ESE3	SE4	ESE5	SE10	SE13	SE9	SE11	SE8	S6	SSE9	S7	SSE7	SSE8	SE11	SE12	SE12	SSE7	SSE7	SSE9	SSE6	SE5	SE9	SE5	SE7.4	SE13

NE1.3	E1.9	E1.5	E1.6	ESE2.5	ESE3.5	E3.7	E2.9	ENE1.5	NNW1.8	NW3.2	WNW3.2	NNW2.7	NW5.1	NNW6.0	NNW5.2	NNW5.4	NNW4.5	NNE3.3	NE2.9	E1.8	E2.1	E1.6	ENE1.0	Diurnal Average
N27	N21	N19	N22	N24	N26	N24	N23	N24	N23	N22	NNW21	N22	WNW25	NNW27	NNW22	WNW24	NNW21	NE19	ENE16	N30	N23	N22	N24	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

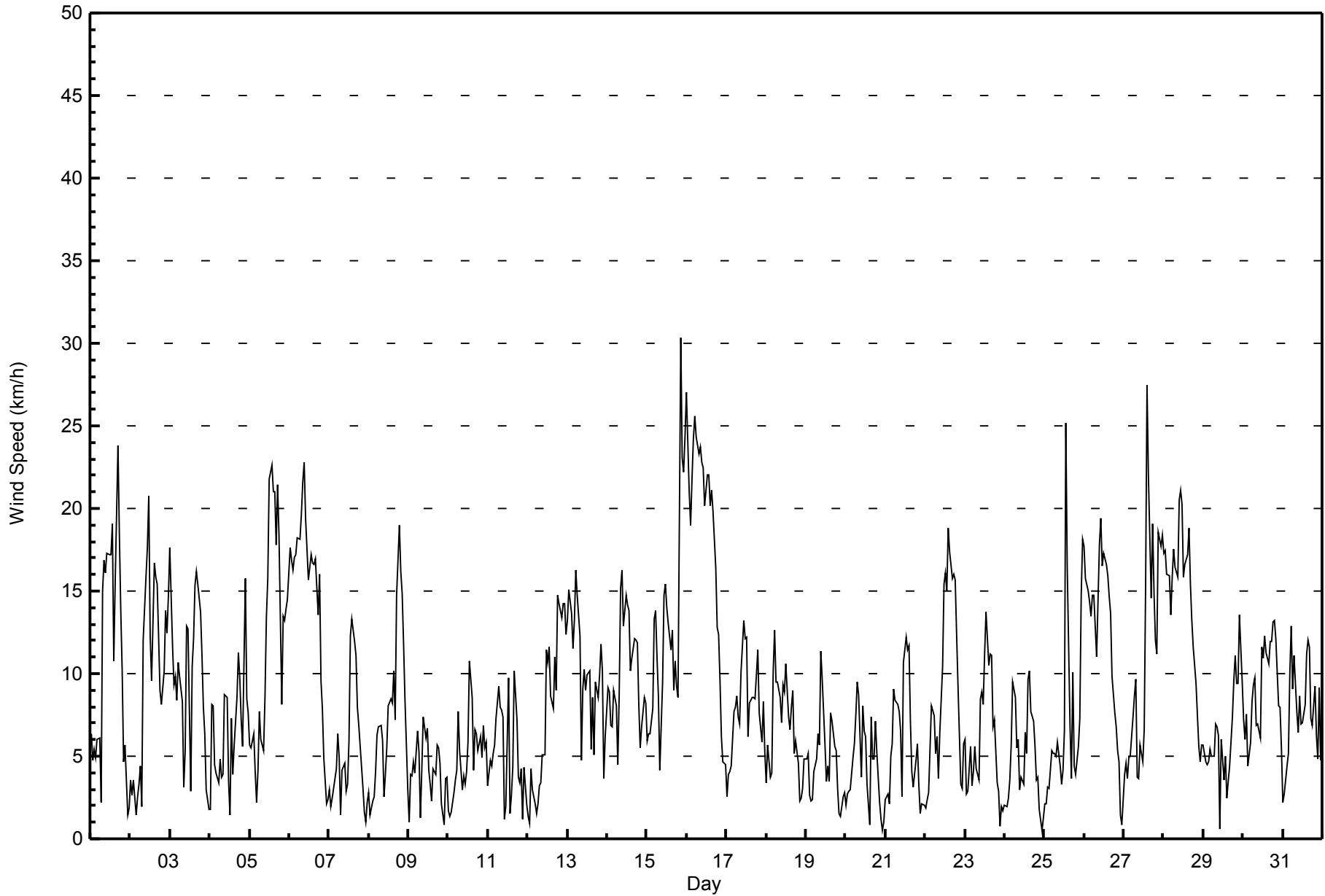
Wind Speed (WS) - km/h
Athabasca Valley - May 2015

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Athabasca Valley - May 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Athabasca Valley - May 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	263	35.35	35.35
6 - 11	276	37.10	72.45
12 - 19	169	22.72	95.16
20 - 28	35	4.70	99.87
29 - 38	1	0.13	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Athabasca Valley - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	5	5	14	22	27	58	26	12	11	15	12	8	17	15	11	263
6 - 11	12	10	4	9	13	29	73	22	8	7	14	22	8	2	15	28	276
12 - 19	36	10	4	7	6	4	22	4	0	1	14	8	2	2	3	46	169
20 - 28	17	2	1	1	0	0	0	0	0	0	0	0	0	2	0	12	35
29 - 38	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	71	27	14	31	41	60	153	52	20	19	43	42	18	23	33	97	744

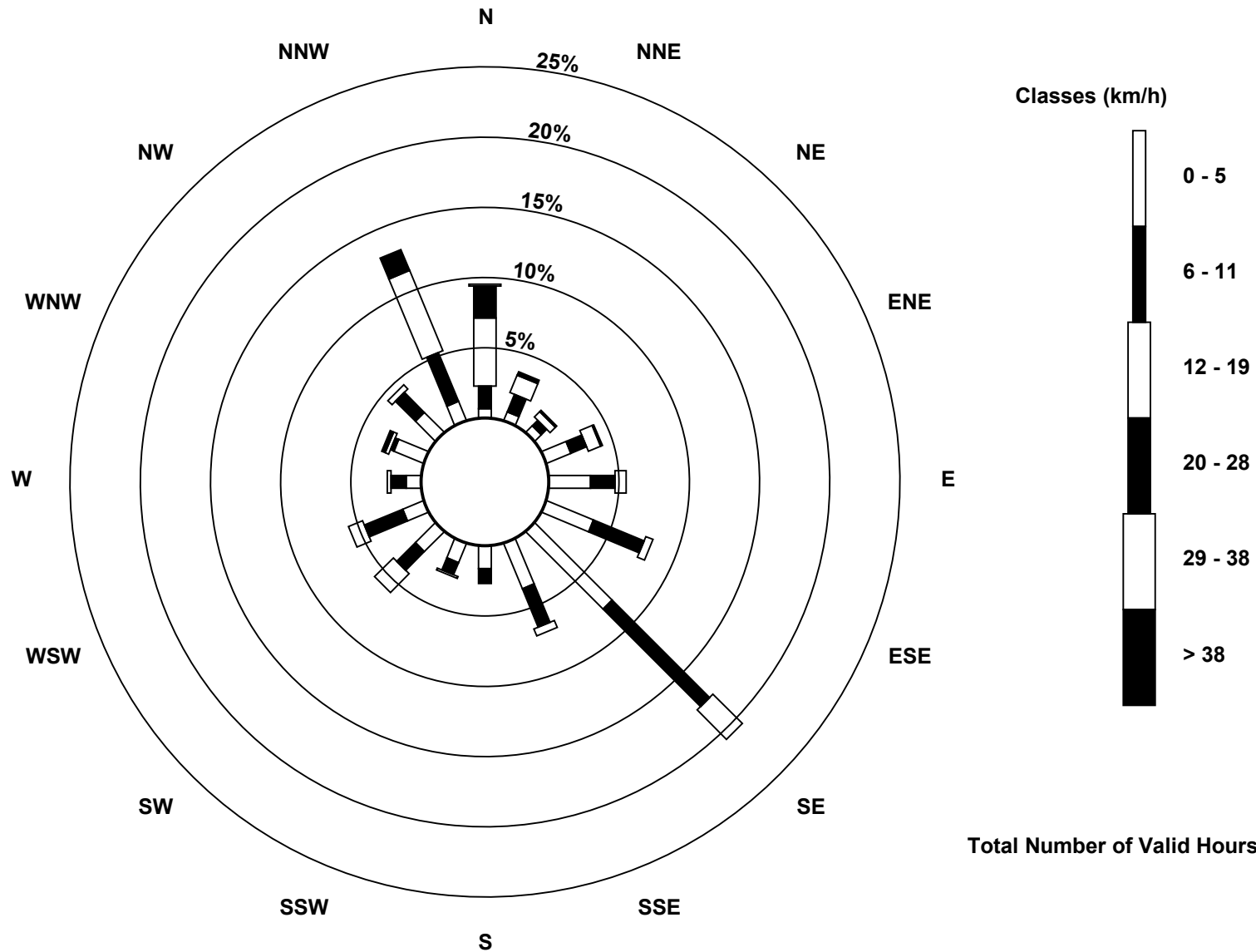
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Wind Speed (WS) - km/h
Athabasca Valley (AMS 7)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Athabasca Valley - May 2015

Direction of Maximum Speed: 349 deg on May 15 21:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 1.0 deg on May 16	Hours of Data: 744
Direction of Minimum Speed: 133 deg on May 24 23:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.6 deg on May 9	Percent Operational Time: 100.0
Monthly Average Direction: 309.2 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-May	153	143	142	135	141	135	173	218	216	221	222	230	249	244	283	250	285	259	293	321	223	241	220	249	238.6
2-May	232	110	184	146	141	96	105	39	351	350	343	340	310	323	344	322	307	353	6	350	251	291	333	345	333.4
3-May	342	9	348	360	316	339	5	17	331	303	346	331	346	324	342	3	4	7	25	31	68	84	113	104	358.6
4-May	42	187	179	146	187	89	69	89	105	137	166	205	353	310	294	276	317	329	340	8	15	86	123	140	97.1
5-May	124	112	120	129	132	106	100	78	54	54	66	74	69	49	27	34	33	342	346	4	342	344	343	341	33.5
6-May	341	338	342	339	340	340	339	339	339	338	351	352	353	17	40	58	70	61	82	75	125	102	155	154	5.0
7-May	255	97	108	110	137	135	132	316	278	229	303	292	337	336	347	0	343	337	330	30	76	165	113	95	350.6
8-May	115	144	166	169	146	136	134	135	135	319	310	320	80	71	337	12	33	31	49	57	60	86	120	127	67.3
9-May	354	33	352	343	338	315	329	17	155	123	122	139	233	165	245	300	70	308	327	326	237	92	89	186	347.5
10-May	167	144	195	162	160	144	135	129	84	274	295	312	311	325	333	23	41	127	114	135	135	135	134	144	118.3
11-May	144	157	137	148	147	133	137	134	109	96	96	300	87	67	55	278	336	327	330	6	238	233	267	146	117.5
12-May	120	71	228	204	65	70	81	320	309	327	318	172	147	128	150	122	102	120	93	102	123	130	139	138	125.9
13-May	141	140	145	150	146	142	138	133	208	242	240	212	184	257	263	247	233	246	209	176	154	144	141	162	173.7
14-May	156	145	131	121	136	140	135	208	221	219	236	232	235	236	216	233	253	240	230	235	216	210	231	204	212.6
15-May	158	152	171	157	143	139	133	120	91	226	211	220	222	233	237	245	276	250	222	317	349	357	359	360	248.9
16-May	357	7	358	5	355	350	355	356	353	4	2	1	350	350	353	347	348	357	38	46	56	70	184	96	1.0
17-May	93	110	136	119	139	137	147	131	122	115	106	103	100	148	125	94	117	108	116	128	134	120	125	172	120.9
18-May	181	161	136	173	142	135	131	130	133	213	248	255	249	265	257	258	256	252	244	257	215	81	104	144	198.8
19-May	153	156	125	125	129	125	120	136	219	213	215	258	243	316	268	249	269	270	282	259	222	159	119	136	212.0
20-May	140	130	110	144	155	131	136	129	122	150	221	249	331	303	352	233	303	229	253	239	195	90	132	200	186.4
21-May	126	190	97	136	137	141	132	127	108	91	57	235	241	253	269	271	341	216	258	225	217	158	140	150	194.2
22-May	124	170	119	135	135	138	118	80	61	343	349	344	343	342	345	355	351	351	354	18	16	24	300	319	1.4
23-May	311	297	301	328	289	335	344	331	309	338	333	329	333	341	333	334	336	329	318	305	208	67	75	125	329.3
24-May	82	98	132	109	131	135	135	118	101	64	312	301	325	25	5	346	342	340	358	332	228	197	133	153	36.9
25-May	192	153	123	132	135	135	120	92	77	77	297	231	123	297	351	15	274	299	316	194	241	259	329	329	319.3
26-May	338	351	358	342	334	339	353	355	341	334	341	345	335	342	338	344	337	356	59	33	51	238	83	124	346.0
27-May	150	120	164	166	132	133	133	141	135	292	275	316	353	344	341	336	358	0	2	17	22	15	3	3	4.2
28-May	7	6	3	2	19	19	9	356	16	341	340	345	354	338	333	338	349	6	356	43	74	88	146	122	0.7
29-May	141	129	127	143	143	136	125	131	121	94	149	224	252	188	205	91	100	110	100	102	108	127	135	143	128.5
30-May	138	141	141	153	127	134	137	135	115	93	52	96	102	125	144	148	136	141	132	136	148	149	136	156	131.2
31-May	74	107	146	115	132	133	135	132	138	183	152	183	151	152	131	130	130	160	168	147	154	142	127	135	141.0

37.7	81.5	90.7	82.8	114.7	106.1	95.9	97.7	62.4	327.1	317.6	302.6	329.4	323.9	339.1	337.4	345.7	340.4	11.3	48.9	81.1	85.4	85.0	70.0
Diurnal Average																							

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

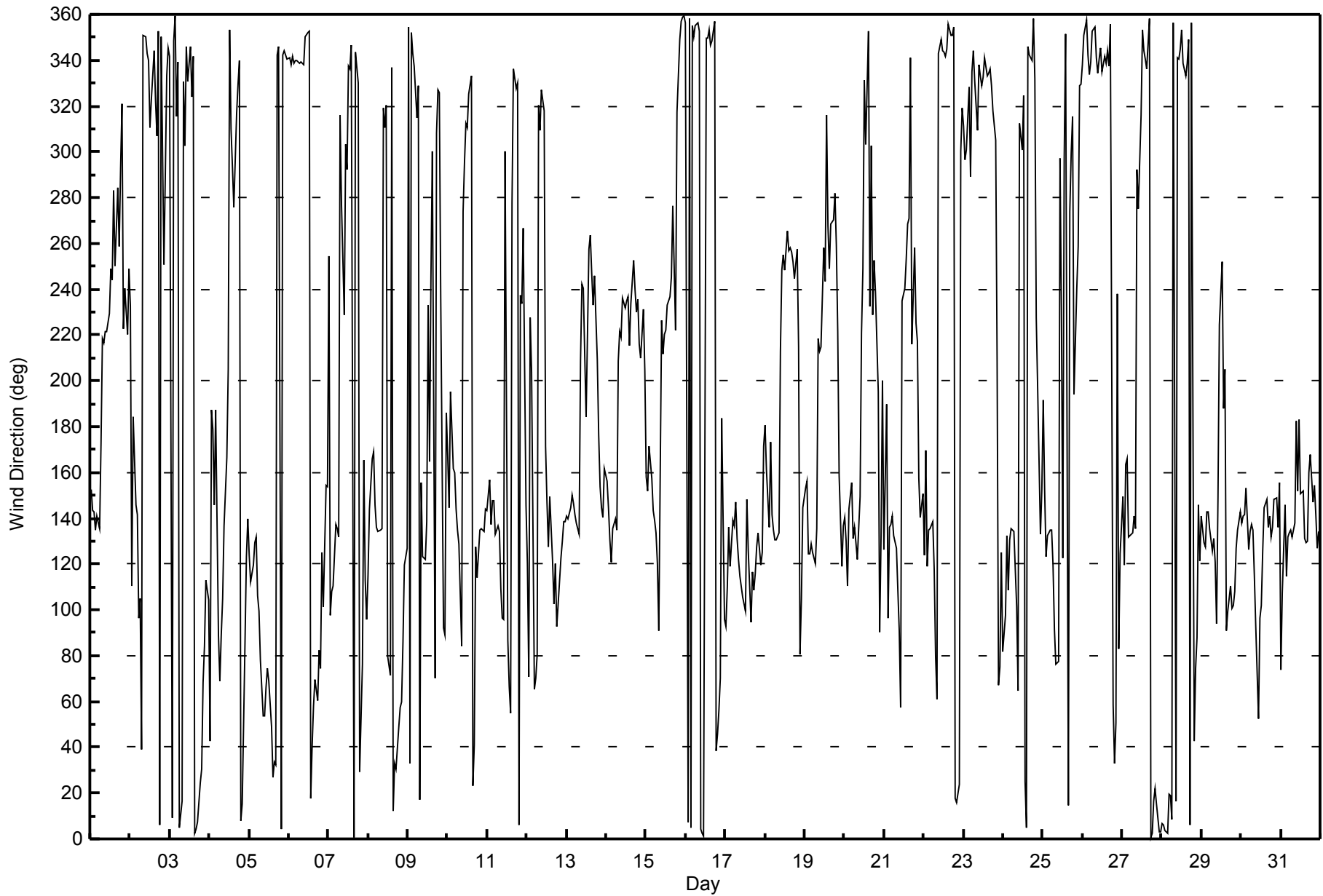
Wind Direction (WD) - deg
Athabasca Valley - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																			Hours in Service: 744						
Maximum Value: 106 deg on May 29 11:00																			Hours of Data: 744						
Minimum Value: 8 deg on May 6 02:00																			Hours of Missing Data: 0						
Percentiles: P ₁ = 9 P ₁₀ = 14 Q ₁ = 18 Median = 26 Q ₃ = 44 P ₉₀ = 71 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-May	13	37	31	32	14	16	88	15	11	14	13	23	28	25	47	33	14	22	42	22	36	28	83	82	88
2-May	82	57	66	70	62	33	35	86	17	16	10	16	27	27	21	20	16	43	31	36	26	20	12	15	86
3-May	17	18	29	24	21	21	23	24	87	60	18	31	92	33	25	21	22	20	21	18	17	18	50	82	92
4-May	59	33	16	36	31	46	27	45	52	35	36	75	84	23	66	35	24	18	28	25	42	12	32	26	84
5-May	31	34	28	63	82	57	23	27	31	29	18	24	17	19	20	18	26	13	20	36	15	13	12	12	82
6-May	11	8	11	10	8	9	10	9	9	9	22	19	19	23	27	19	17	21	15	26	21	21	54	60	60
7-May	83	50	27	21	15	14	30	80	27	46	71	72	66	24	20	33	20	18	31	25	42	77	92	61	92
8-May	38	74	69	38	32	25	20	21	32	64	56	37	40	33	55	46	70	23	18	15	20	24	24	64	74
9-May	89	42	30	30	39	16	27	72	83	33	52	51	75	89	76	54	74	25	9	25	82	93	53	56	93
10-May	71	75	68	46	30	20	13	61	65	24	26	52	30	25	33	65	48	45	42	20	16	21	26	37	75
11-May	53	24	42	30	23	14	13	14	25	34	99	86	30	95	74	40	24	33	46	38	58	92	53	77	99
12-May	75	88	32	50	74	86	86	28	23	18	55	30	41	34	54	50	44	48	22	19	17	16	15	14	88
13-May	13	12	13	15	12	10	12	12	71	18	21	44	50	35	69	53	81	22	33	26	16	35	35	23	81
14-May	14	16	23	17	9	9	30	38	12	11	19	21	17	22	48	30	24	28	18	19	25	22	20	26	48
15-May	36	16	17	17	10	10	10	20	68	24	15	19	23	29	29	31	40	34	18	63	19	21	21	20	68
16-May	20	20	20	21	20	18	20	20	21	21	23	23	19	19	21	18	20	22	28	18	14	50	25	46	50
17-May	69	20	22	23	14	15	17	26	36	45	28	30	28	70	55	48	43	30	20	17	23	20	21	25	70
18-May	53	40	37	30	16	13	12	11	17	63	33	65	35	50	56	37	30	60	23	22	85	33	37	21	85
19-May	19	14	42	33	34	18	23	18	41	10	20	53	77	77	84	44	28	42	23	33	80	78	45	33	84
20-May	39	41	37	33	22	15	14	12	18	61	28	42	59	79	98	64	61	66	18	15	66	83	102	89	102
21-May	46	46	30	15	13	14	15	11	23	25	84	54	32	42	30	55	73	76	30	14	61	88	47	46	88
22-May	68	44	47	30	13	13	27	13	58	19	15	14	13	17	16	21	26	20	20	18	16	43	52	31	68
23-May	25	59	36	30	38	34	13	26	33	14	17	25	23	14	20	21	23	24	11	30	67	95	83	75	95
24-May	66	71	61	34	20	16	13	28	31	65	17	15	15	70	37	16	16	10	19	19	22	79	91	95	95
25-May	78	60	41	44	20	27	26	23	16	16	44	54	62	31	19	52	48	52	77	75	41	22	14	10	78
26-May	13	19	21	17	12	13	18	19	15	13	15	17	14	14	14	20	13	35	28	22	32	43	85	94	94
27-May	36	31	44	30	38	19	19	19	64	33	12	44	32	18	13	13	22	19	22	22	18	19	21	21	64
28-May	21	20	20	21	19	17	19	21	25	16	15	18	25	18	20	15	24	27	30	26	16	20	45	26	45
29-May	24	28	27	31	19	22	31	36	60	51	106	59	81	80	97	87	73	43	26	20	18	20	15	16	106
30-May	19	20	27	37	18	17	15	14	29	31	40	28	35	36	32	48	35	24	18	16	17	24	18	40	48
31-May	50	50	33	28	16	15	19	17	30	47	33	24	31	22	18	16	23	49	40	18	18	35	15	28	50
89 88 69 70 82 86 88 86 87 65 106 86 92 95 98 87 81 76 77 75 85 95 102 95																									
Diurnal Maximum																									



WBEA
Hourly Averages

Wind Direction (WD) - deg
Athabasca Valley - May 2015





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 21, 2015	Last Calibration	April 15, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	11:10
Gas Cert Reference	S9610161A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26-Sep-17
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG Make/Model	API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-634	-635
Analyzer IP address	192.168.1.43		Lamp voltage	874	873
Calculated slope	0.995744	1.011344	Chamber temp	44.9	45.3
Calculated intercept	0.592006	-1.286369	Pressure	694.0	698.9
Analyzer Background	7.3	7.2	Flow	0.467	0.476
Analyzer Coefficient	1.009	1.009	Intensity	90	90

Analyzer make TEI 43i Analyzer serial # 1008841399

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	60.0	600.0	593.1	1.012
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	60.0	600.0	593.1	1.012
second point	5000	30.0	300.0	301.0	0.997
third point	5000	15.0	150.0	149.0	1.007
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	60.0	600.0	593.0	1.012
Average Correction Factor					1.005

Corrected As found 592.9 Previous response 602.0 % change 1.5%

Notes:

Inlet filter changed after as founds. No adjustments made.

Calibration Performed By: Asad Hidayat



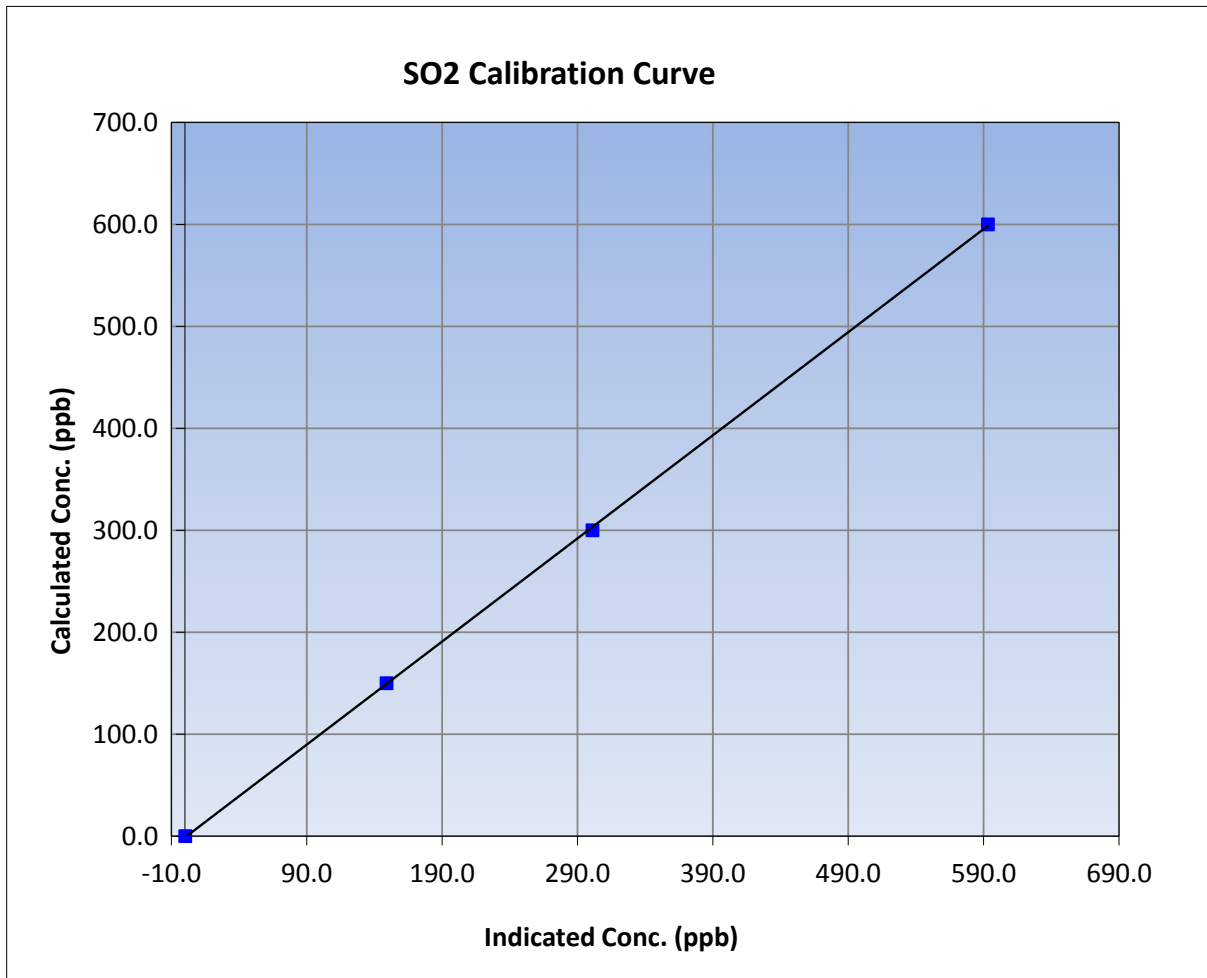
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 21, 2015	Previous Calibration	April 15, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:25	End Time (MST)	11:10
Analyzer make	TEI 43i	Analyzer serial #	1008841399

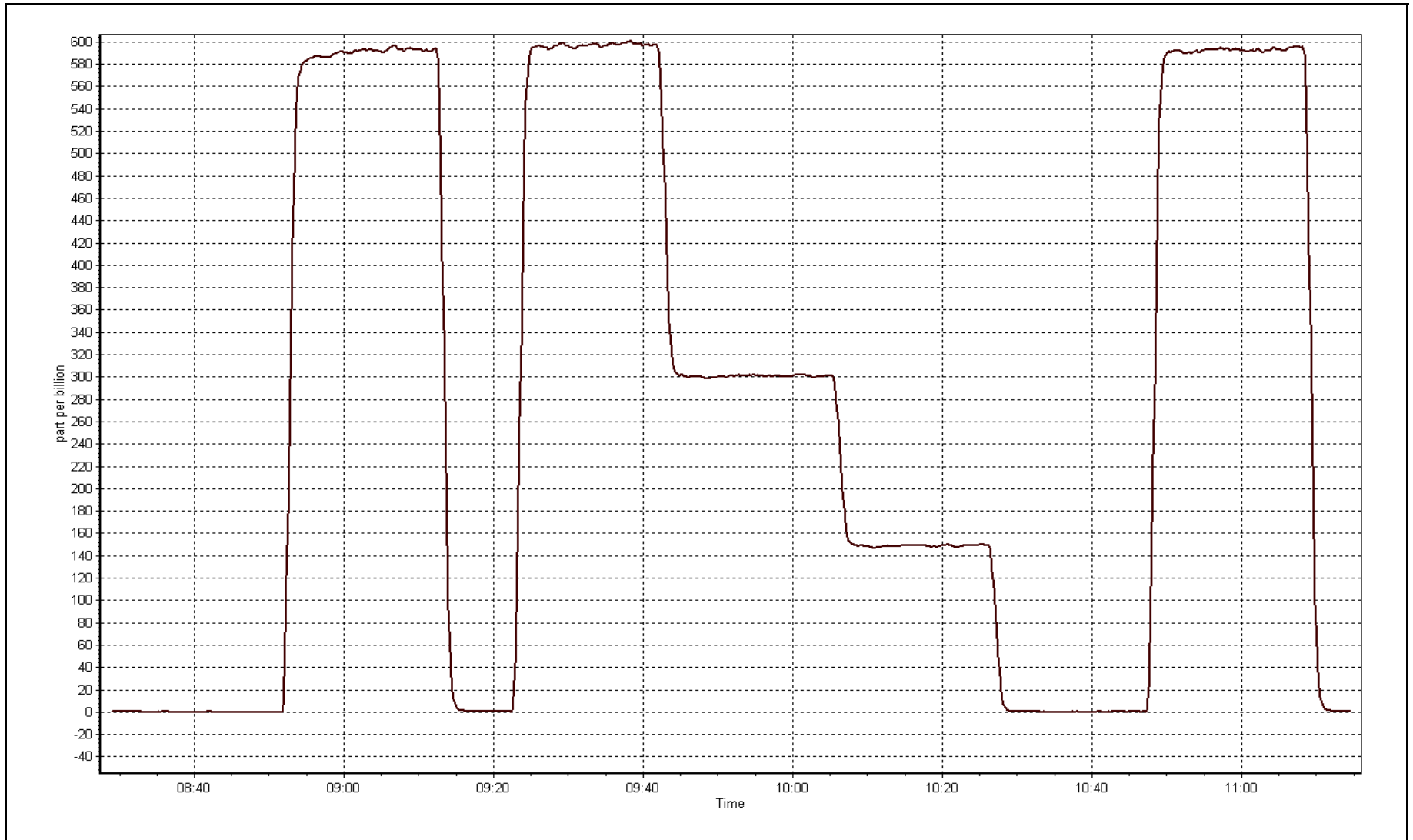
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999930
600.0	593.1	1.0116		
300.0	301.0	0.9966	Slope	1.011344
150.0	149.0	1.0066		
			Intercept	-1.286369



SO2 Calibration Plot

Date: May 21, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 13, 2015	Last Calibration	April 7, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	8:17	End Time (MST)	11:40
Gas Cert Reference	CC62844	Station temp.	21 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG air Make/Model	API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S960161A 9/Sep/17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-624	-624
Analyzer IP address	192.168.1.42		Lamp voltage	889	891
Calculated slope	0.990775	0.996021	Chamber temp	45.1	45
Calculated intercept	0.069249	-0.153255	Pressure	526.8	528.3
Analyzer Background	16.8	17.2	Flow	1.075	1.077
Analyzer Coefficient	1.325	1.353	Intensity	114	115
			Converter temp.	327	325

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

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	74.4	75.0	73.3	1.023
SO2 scrubber check	5000	15.0	150.0	0.7	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	74.4	75.0	75.3	0.996
second point	5000	41.7	42.0	42.5	0.988
third point	5000	24.8	25.0	25.5	0.980
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	74.4	75.0	75.0	1.000
Average Correction Factor					0.988

Corrected As found	73.4	Previous response	75.6	% change	3.1%
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Notes:

Changed inlet filter after as founds. Slightly adjusted span.

Calibration Performed By: Asad Hidayat



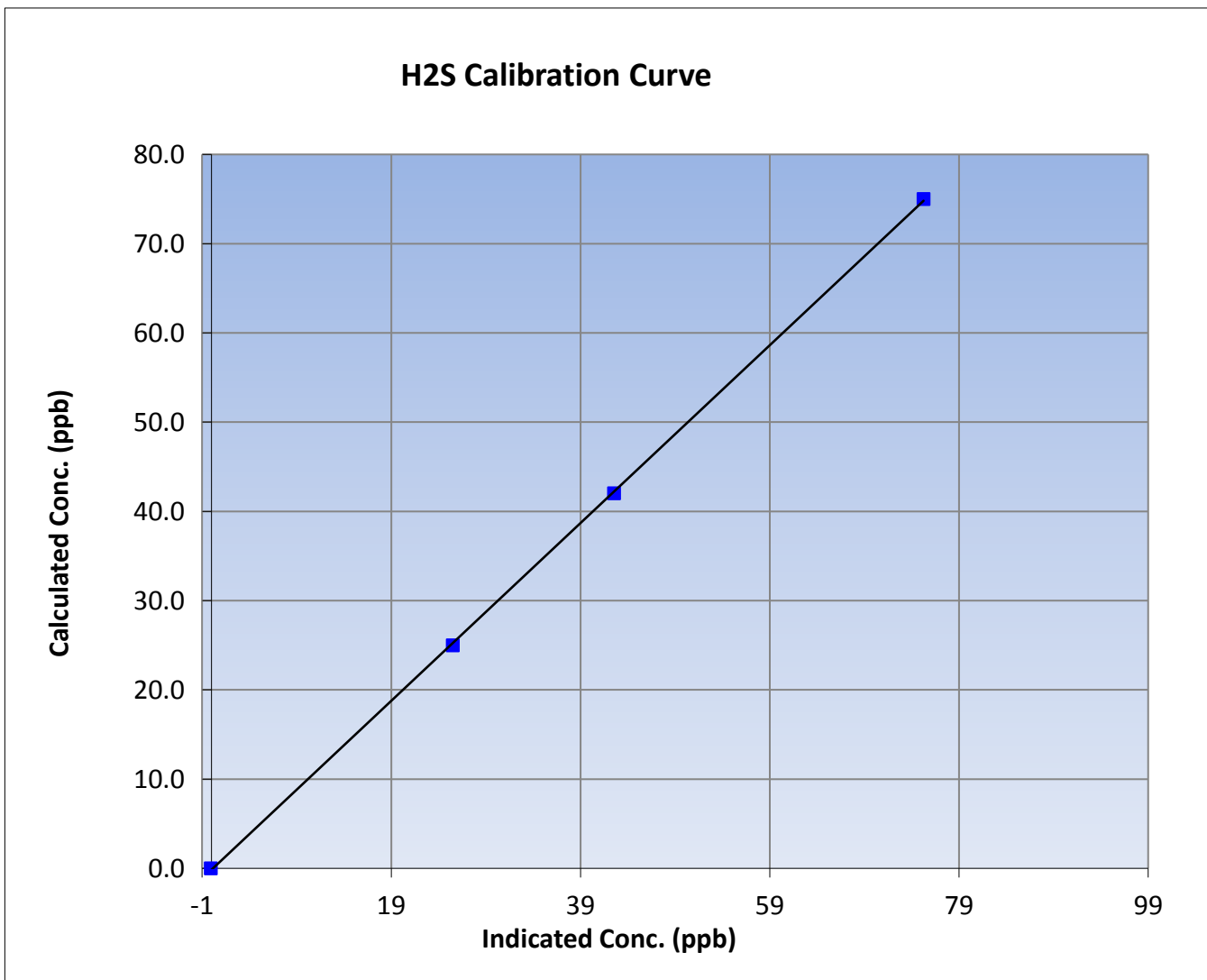
Wood Buffalo Environmental Association H2S Calibration Report

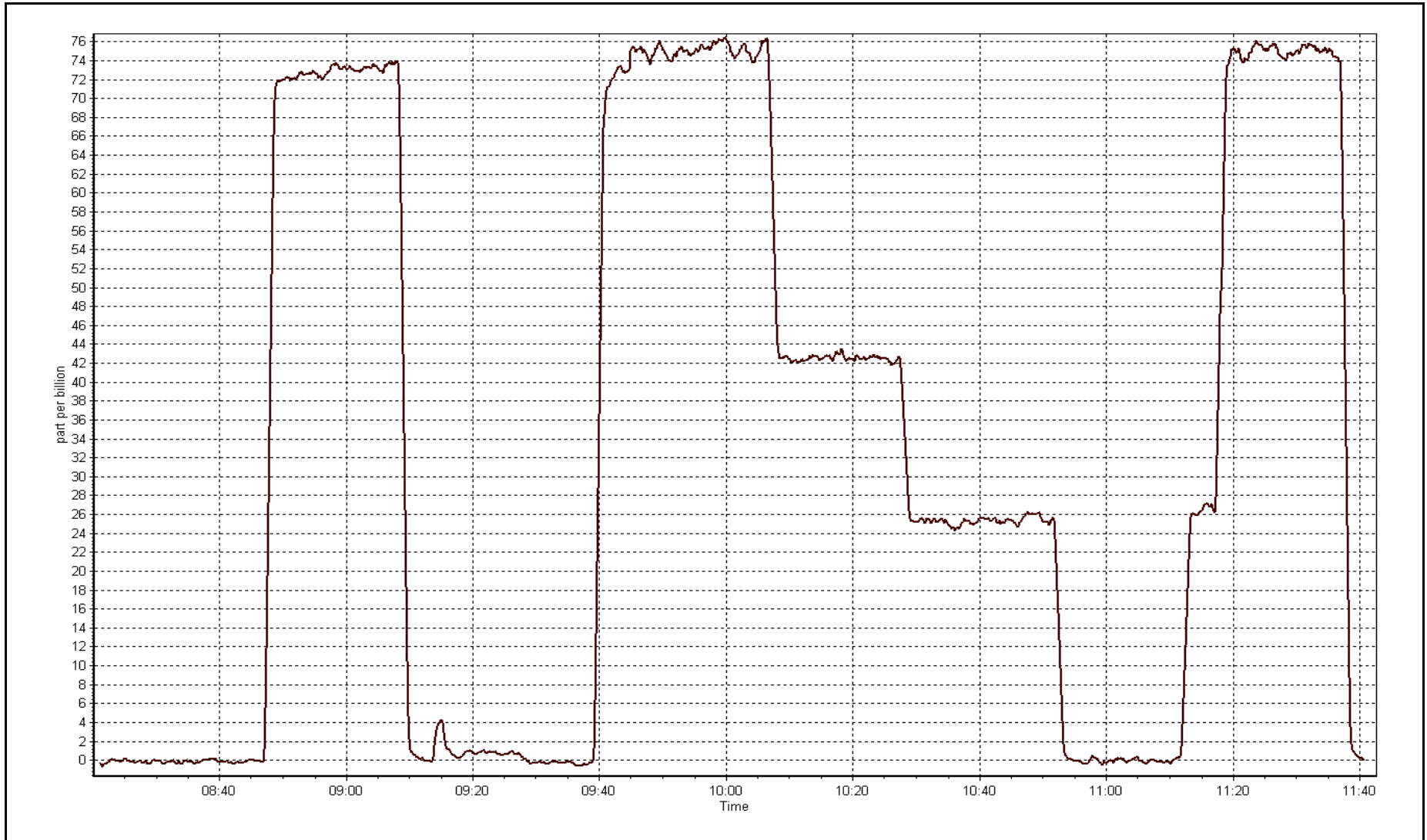
Station Information

Calibration Date	May 13, 2015	Previous Calibration	April 7, 2015
Station Name	AMS 5	Station Number	AMS 5
Start Time (MST)	8:17	End Time (MST)	11:40
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	----	Correlation Coefficient	0.999936
75.0	75.3	0.9965		
42.0	42.5	0.9881	Slope	0.996021
25.0	25.5	0.9803		
			Intercept	-0.153255







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-21-15	Last Calibration	April-29-2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Removal		
Start Time (MST)	8:25	End Time (MST)	10:30
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Sept-26-2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	7.6	NA
Analyzer IP address	192.168.1.51		Air or Bypass Press	25.1	NA
Calculated slope	0.999437	1.010827	Fuel Pressure	40.2	NA
Calculated intercept	-0.019917	0.021359	Analyzer Coeff	7.194	NA
			Analyzer BKG	4.240	NA

Analyzer make Thermo 51i-LT Analyzer serial # 128153353

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	----
as found span	5000	60.0	12.46	12.35	1.009
calibrator zero	5000	0.0	0.00	0.06	----
high point	5000	60.0	12.46	12.35	1.009
second point	5000	30.0	6.23	6.07	1.026
third point	5000	15.0	3.11	3.00	1.038
as left zero					
as left span					
Average Correction Factor					1.024

Corrected As found 12.29 Previous response 12.48 % change 1.6%

Notes:

Removal cal. No adjustments made.

Calibration Performed By:

Asad Hidayat



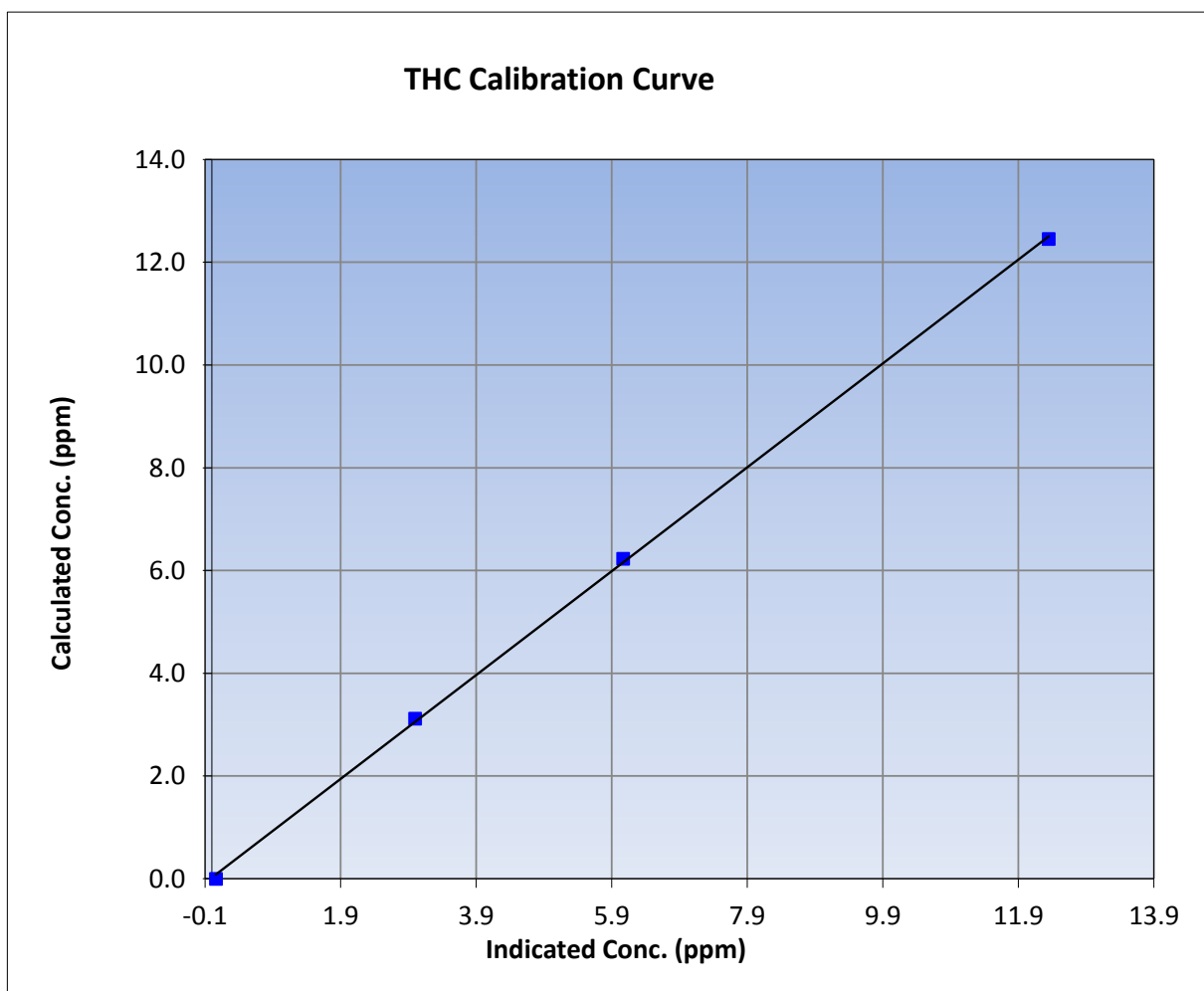
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 21, 2015	Previous Calibration	April-29-2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:25	End Time (MST)	10:30
Analyzer make	Thermo 51i-LT	Analyzer serial #	128153353

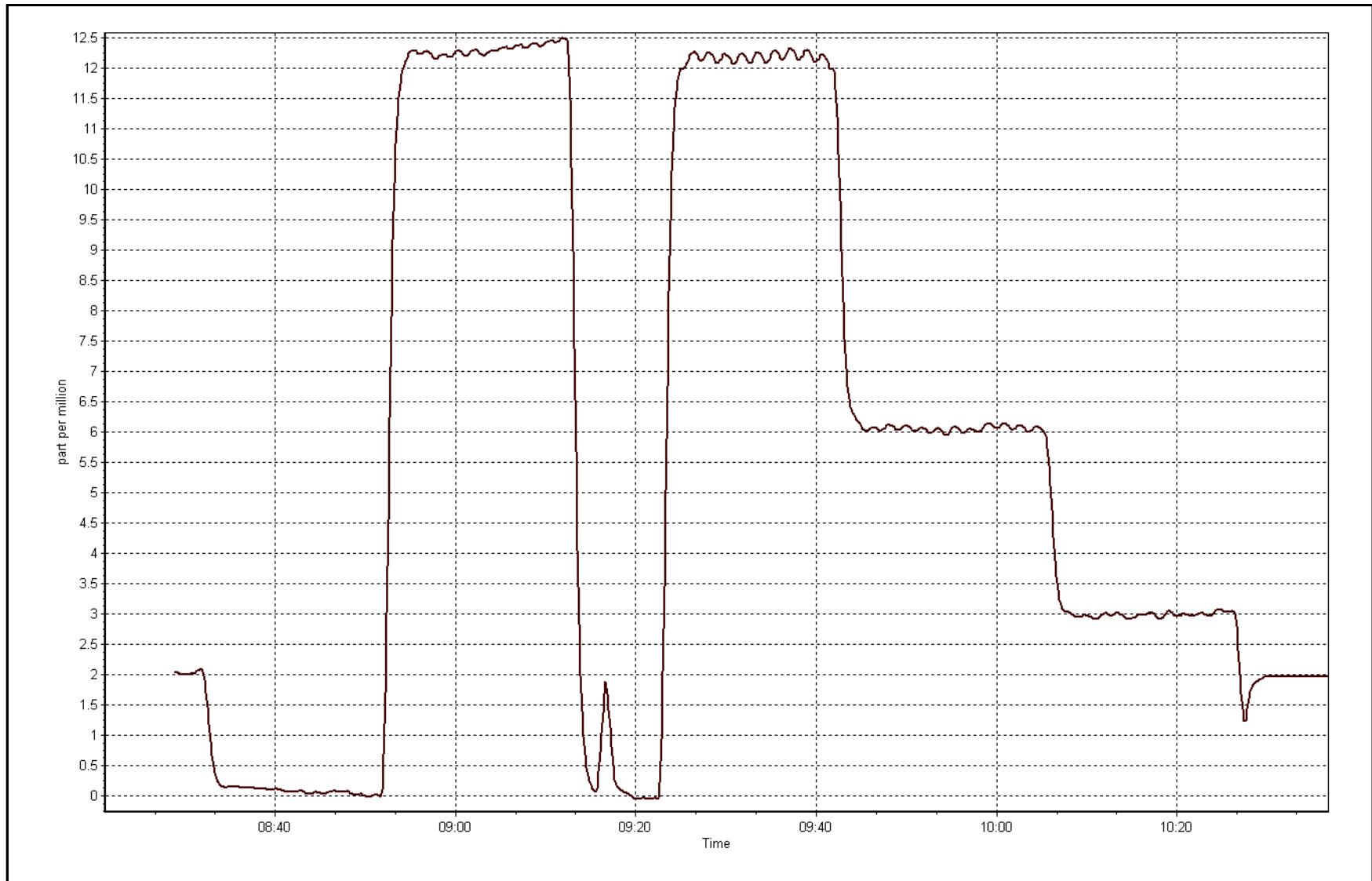
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.06	----	Correlation Coefficient	0.999790
12.46	12.35	1.0086		
6.23	6.07	1.0260	Slope	1.010827
3.11	3.00	1.0380		
			Intercept	0.021359



THC Calibration Plot

Date: May 21, 2015





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-21-15	Last Calibration	NA
Station Name	Mannix	Station Number	AMS 5
Reason:	Install		
Start Time (MST)	11:55	End Time (MST)	14:10
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Sept-26-2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	29 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	NA	9.4
Analyzer IP address	192.168.1.51		Air or Bypass Press	NA	42.3
Calculated slope	NA	1.000568	Fuel Pressure	NA	20.2
Calculated intercept	NA	-0.039867	Analyzer Coeff	NA	3.983
			Analyzer BKG	NA	4.120

Analyzer make	Thermo 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					
as found span					
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	60.0	12.46	12.47	0.999
second point	5000	30.0	6.23	6.29	0.990
third point	5000	15.0	3.11	3.18	0.981
as left zero	5000	0.0	0.00	0.10	----
as left span	5000	60.0	12.46	12.50	0.996
Average Correction Factor					0.990

Corrected As found	NA	Previous response	NA	% change	NA
--------------------	----	-------------------	----	----------	----

Notes:

Install cal. Sample inlet filter and Hydrogen cylinder replaced before calibration. Adjusted both zero and span. Warm temp inside station.

Calibration Performed By: _____ Asad Hidayat



Wood Buffalo Environmental Association THC Calibration Report

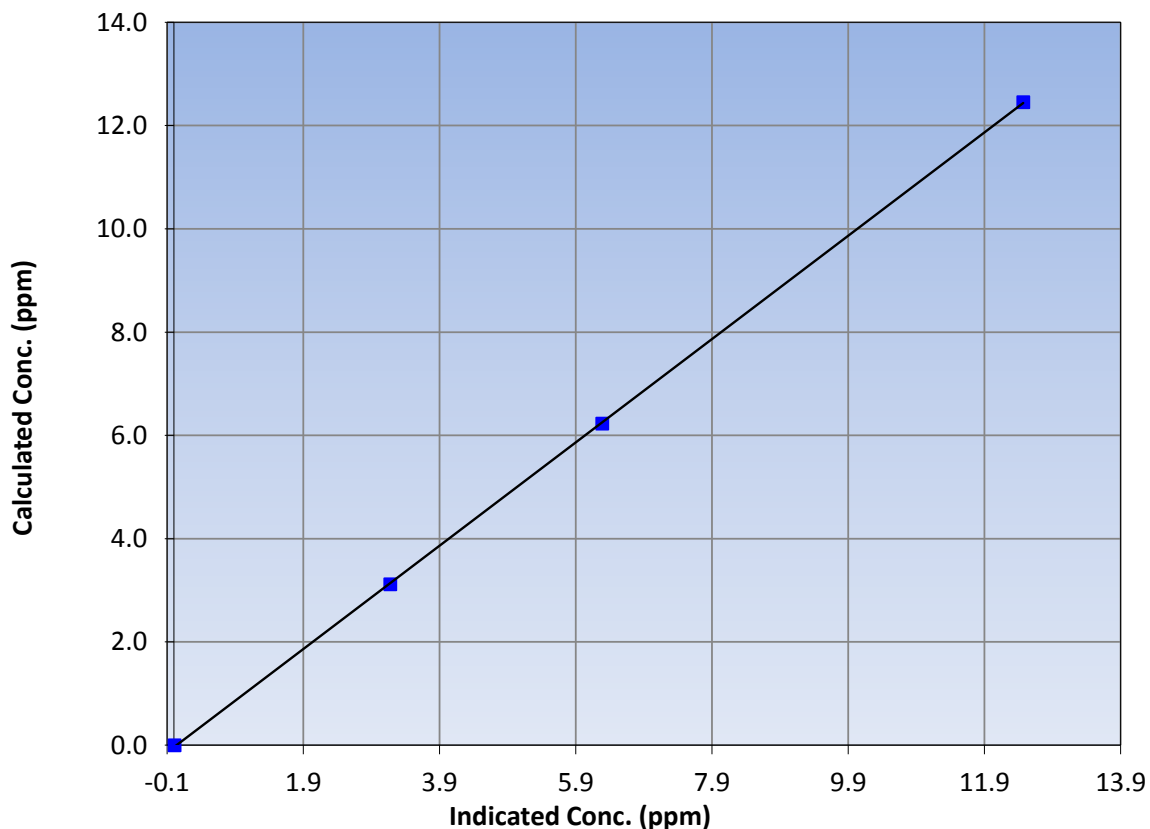
Station Information

Calibration Date	May 21, 2015	Previous Calibration	NA
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:55	End Time (MST)	14:10
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

Calibration Data

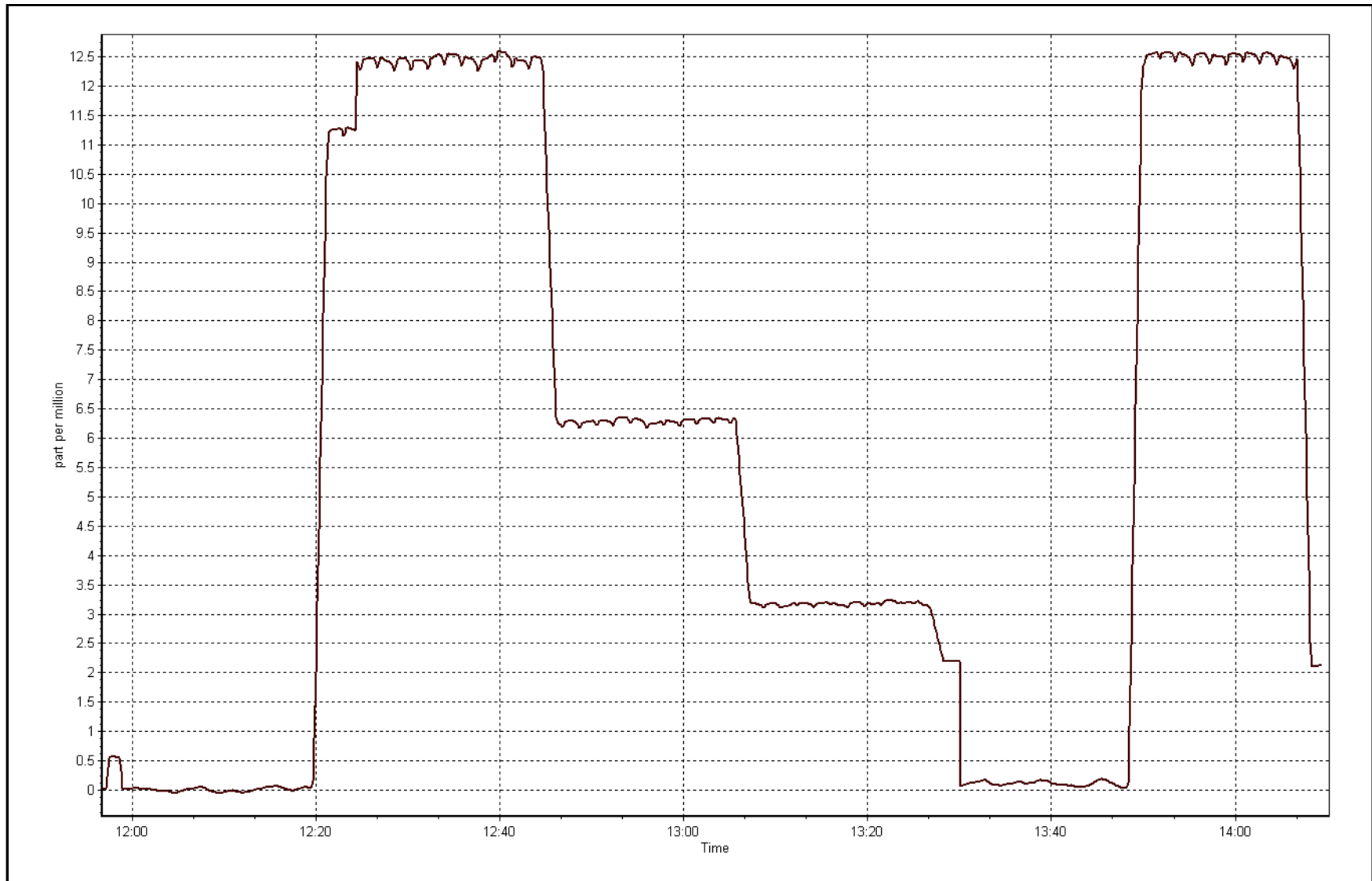
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999971
12.46	12.47	0.9989		
6.23	6.29	0.9901	Slope	1.000568
3.11	3.18	0.9808		
			Intercept	-0.039867

THC Calibration Curve



THC Calibration Plot

Date: May 21, 2015





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-27-15	Last Calibration	May-21-15
Station Name	Mannix	Station Number	AMS 5
Reason:	Other:	Repair	
Start Time (MST)	9:00	End Time (MST)	12:00
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Sept-26-2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.4	9.4
Analyzer IP address	192.168.1.51		Air or Bypass Press	42.3	42.3
Calculated slope	1.000568	1.005531	Fuel Pressure	20.2	20.2
Calculated intercept	-0.039867	-0.068351	Analyzer Coeff	3.983	3.822
			Analyzer BKG	4.120	3.450

Analyzer make Thermo 51i-LT Analyzer serial # 1317958295

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.40	----
as found span	5000	60.0	12.46	12.46	1.000
calibrator zero	5000	0.0	0.00	0.08	----
high point	5000	60.0	12.46	12.46	1.000
second point	5000	30.0	6.23	6.26	0.995
third point	5000	15.0	3.11	3.15	0.989
as left zero	5000	0.0	0.00	-0.01	----
as left span	5000	60.0	12.46	12.50	0.996
Average Correction Factor					0.994

Corrected As found 12.86 Previous response 12.49 % change -2.9%

Notes:

Adjusted zero.

Calibration Performed By:

Asad Hidayat



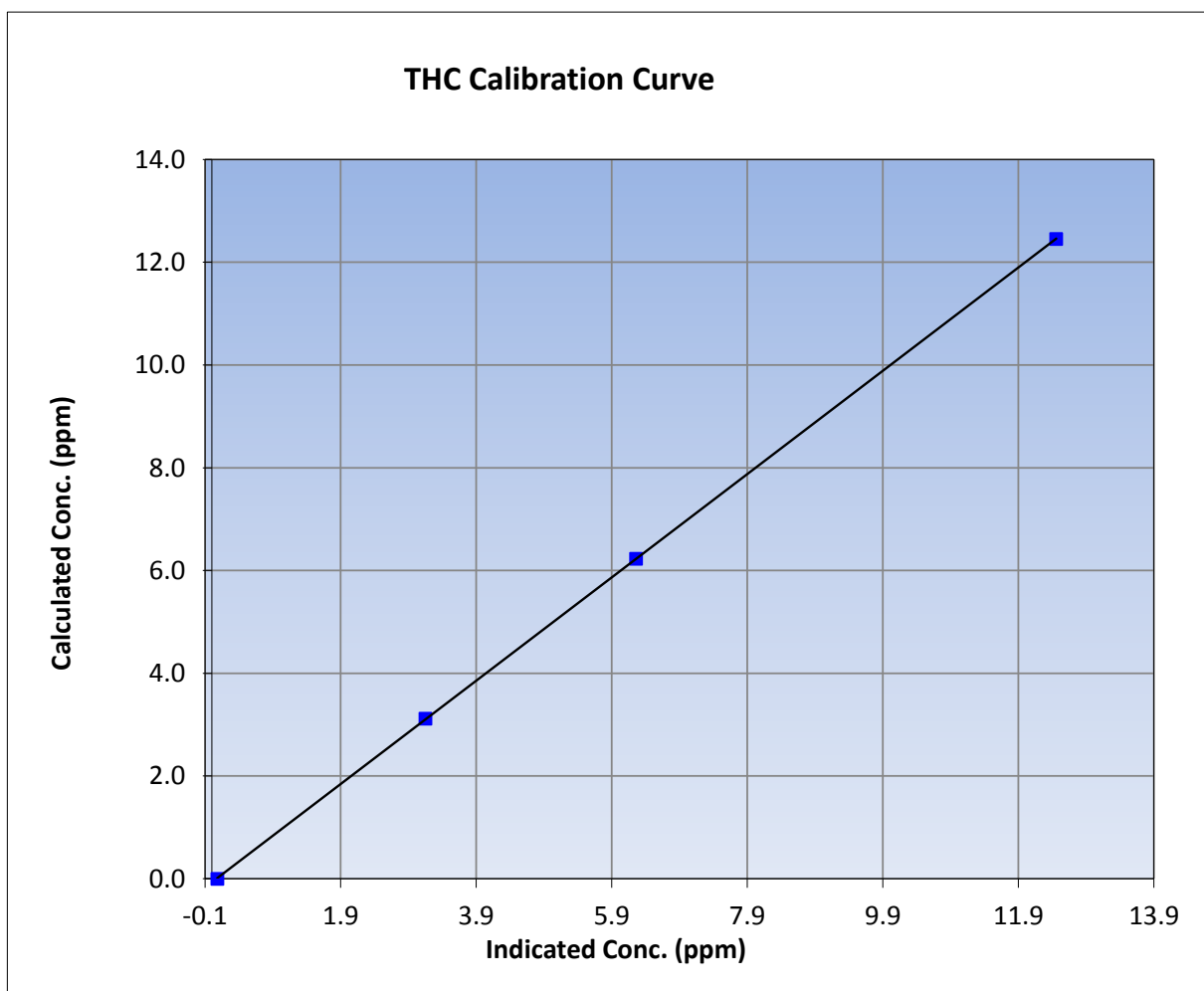
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 27, 2015	Previous Calibration	May 21, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:00	End Time (MST)	12:00
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

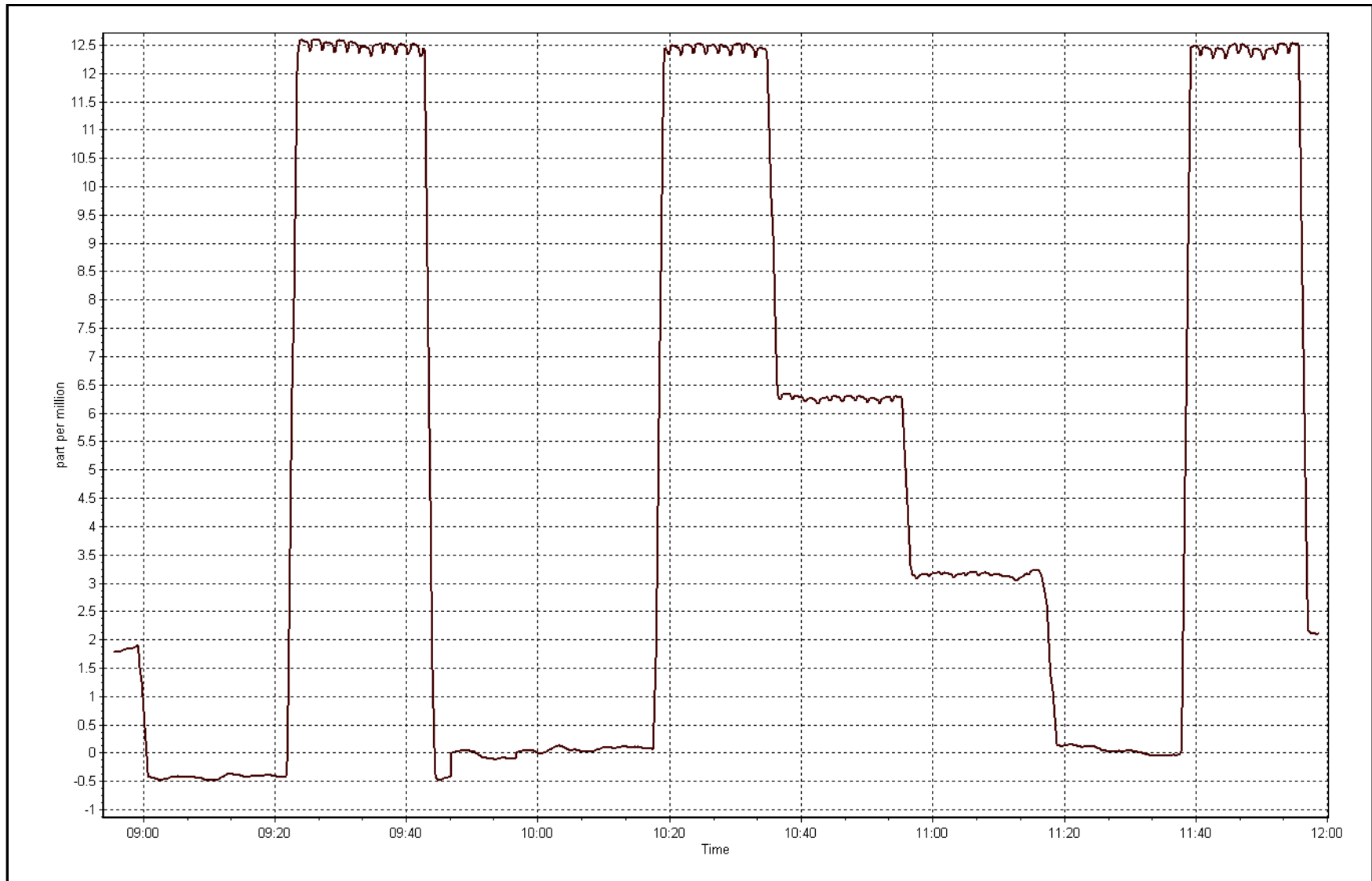
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.08	----	Correlation Coefficient	0.999995
12.46	12.46	0.9997		
6.23	6.26	0.9949	Slope	1.005531
3.11	3.15	0.9886		
			Intercept	-0.068351



THC Calibration Plot

Date: May 27, 2015





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 8
FORT CHIPEWYAN
MAY 2015**

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

June 29, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MAY 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO ₂ (ppb) Average	707	37	37	100.00	5	0	1	0
O ₃ (ppb) Average	707	37	37	100.00	65	0	53	-
NO ₂ (ppb) Average	707	37	37	100.00	8	0	3	0
NO(ppb) Average	707	37	37	100.00	2	-	0	-
NOX(ppb) Average	707	37	37	100.00	9	-	3	-
PM _{2.5} (ug/m ³) Average	734	0	10	98.66	121.4	-	28.9	0
Wind Speed 10 m (km/h) Average	744	0	0	100.00	49	-	21	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	744	0	0	100.00	27.2	-	17.2	-
Relative Humidity (%) Average	744	0	0	100.00	97	-	76	-
Precipitation (mm) Total	744	0	0	100.00	1	-	2	-
Global Solar Radiation (W/m ²) Average	594	0	150	79.84	908	-	377	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2(ppb) Average	707	0.2	0	-	0	0	0	0	0	0	0	5
O3(ppb) Average	707	39.5	8	-	12	29	35	40	45	49	49	65
NO2(ppb) Average	707	0.6	1	-	0	0	0	0	1	1	1	8
NO(ppb) Average	707	0.1	0	-	0	0	0	0	0	0	0	2
NOX(ppb) Average	707	0.7	1	-	0	0	0	0	1	1	1	9
PM2.5(ug/m3) Average	734	5.2	7.7	-	1.2	2.2	2.6	3.5	5.5	9.2	9.2	121.4
Wind Speed 10 m (km/h) Average	744	15.7	7	-	1	7	11	15	20	25	25	49
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	744	9.37	6.5	-	-4.4	1	4.1	9.3	13.9	17.9	17.9	27.2
Relative Humidity (%) Average	744	52.1	16	-	9	30	40	52	64	73	73	97
Precipitation (mm) Total	744	-	-	3.56	-	-	-	-	-	-	-	-
Global Solar Radiation (W/m2) Average	594	306.8	323	-	0	0	0	179	612	821	821	908

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MAY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	06 May 2015 17:00	06 May 2015 18:00	2	Maintenance - Flow and zero check, sample head cleaning
PM2.5	06 May 2015 19:00	07 May 2015 02:00	8	Unstable operation - stabilization following maintenance
GR	02 May 2015 21:00	02 May 2015 22:00	2	Unstable operation - Shadow affected sensor readings
GR	03 May 2015 08:00	03 May 2015 08:00	1	Unstable operation - Shadow affected sensor readings
GR	03 May 2015 15:00	03 May 2015 15:00	1	Unstable operation - Shadow affected sensor readings
GR	03 May 2015 19:00	03 May 2015 19:00	1	Unstable operation - Shadow affected sensor readings
GR	06 May 2015 15:00	06 May 2015 15:00	1	Maintenance - rewired sensor for lightning protection
GR	07 May 2015 07:00	07 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	08 May 2015 07:00	08 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	09 May 2015 07:00	09 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	10 May 2015 07:00	10 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	11 May 2015 07:00	11 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	11 May 2015 13:00	11 May 2015 14:00	2	DAS collection error - data not recorded
GR	12 May 2015 07:00	12 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	12 May 2015 09:00	12 May 2015 09:00	1	Unstable operation - Shadow affected sensor readings
GR	13 May 2015 07:00	13 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	14 May 2015 07:00	14 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	15 May 2015 07:00	15 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	15 May 2015 15:00	15 May 2015 17:00	3	DAS collection error - data not recorded
GR	16 May 2015 07:00	16 May 2015 08:00	2	DAS collection error - data not recorded
GR	17 May 2015 11:00	17 May 2015 16:00	6	DAS collection error - data not recorded
GR	18 May 2015 07:00	18 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	19 May 2015 07:00	19 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	20 May 2015 07:00	20 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	21 May 2015 07:00	21 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	22 May 2015 07:00	22 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	22 May 2015 12:00	22 May 2015 13:00	2	DAS collection error - data not recorded
GR	22 May 2015 14:00	22 May 2015 18:00	5	DAS collection error - data not recorded
GR	23 May 2015 07:00	23 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	24 May 2015 03:00	24 May 2015 03:00	1	DAS collection error - data not recorded
GR	24 May 2015 07:00	24 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	24 May 2015 14:00	24 May 2015 14:00	1	DAS collection error - data not recorded
GR	24 May 2015 19:00	25 May 2015 07:00	13	DAS collection error - data not recorded
GR	25 May 2015 08:00	28 May 2015 15:00	80	DAS collection error - data not recorded
GR	29 May 2015 07:00	29 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	30 May 2015 07:00	30 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings
GR	31 May 2015 07:00	31 May 2015 07:00	1	Unstable operation - Shadow affected sensor readings

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)
MAY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
GR	31 May 2015 16:00	01 Jun 2015 00:00	9	DAS collection error - data not recorded



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 5 ppb on May 31 09:00	Maximum Daily Average: 1.1 ppb on May 31		Hours of Data:	707
Minimum Value: 0 ppb on May 4 11:00	Minimum Daily Average: 0.0 ppb on May 27		Hours of Missing Data:	37
Maximum Diurnal Average: 0.4 ppb at hour 9	Minimum Diurnal Average: 0.1 ppb at hour 22		Hours of Calibration:	37
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 = 3		Percent Operational Time:	100.0

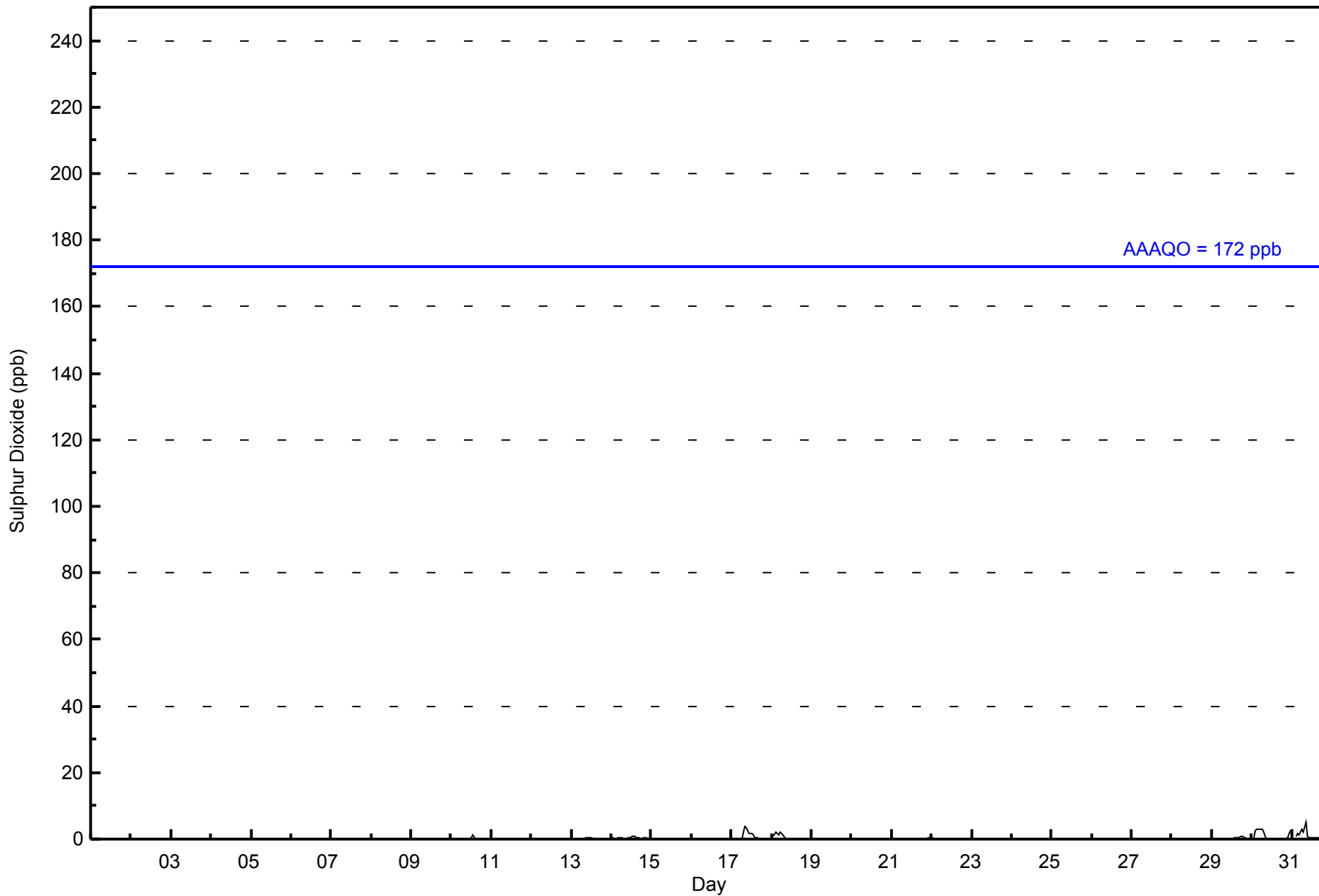
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
2-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
3-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
6-May	Z	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
7-May	0	Z	0	0	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-May	0	0	Z	0	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-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-May	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-May	Z	0	0	0	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-May	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
14-May	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
15-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
17-May	0	0	0	0	0	Z	0	2	4	3	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0.8	4
18-May	Z	1	2	2	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
19-May	0	Z	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
20-May	0	0	Z	0	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-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-May	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
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-May	Z	0	0	0	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-May	0	Z	0	0	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-May	0	0	Z	0	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-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-May	Z	1	3	3	3	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	3
31-May	2	Z	1	2	1	2	3	2	5	1	0	0	0	0	0	1	0	0	0	1	2	1	1	0	0	1.1	5
	0.1	0.1	0.2	0.3	0.2	0.3	0.3	0.3	0.4	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average
	2	1	3	3	3	3	3	3	2	5	3	2	2	2	1	1	1	1	1	1	1	2	1	1	2	3	Diurnal Maximum

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	22	8	32	94	275	52	15	16	25	20	31	32	16	10	26	33	707
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	22	8	32	94	275	52	15	16	25	20	31	32	16	10	26	33	707

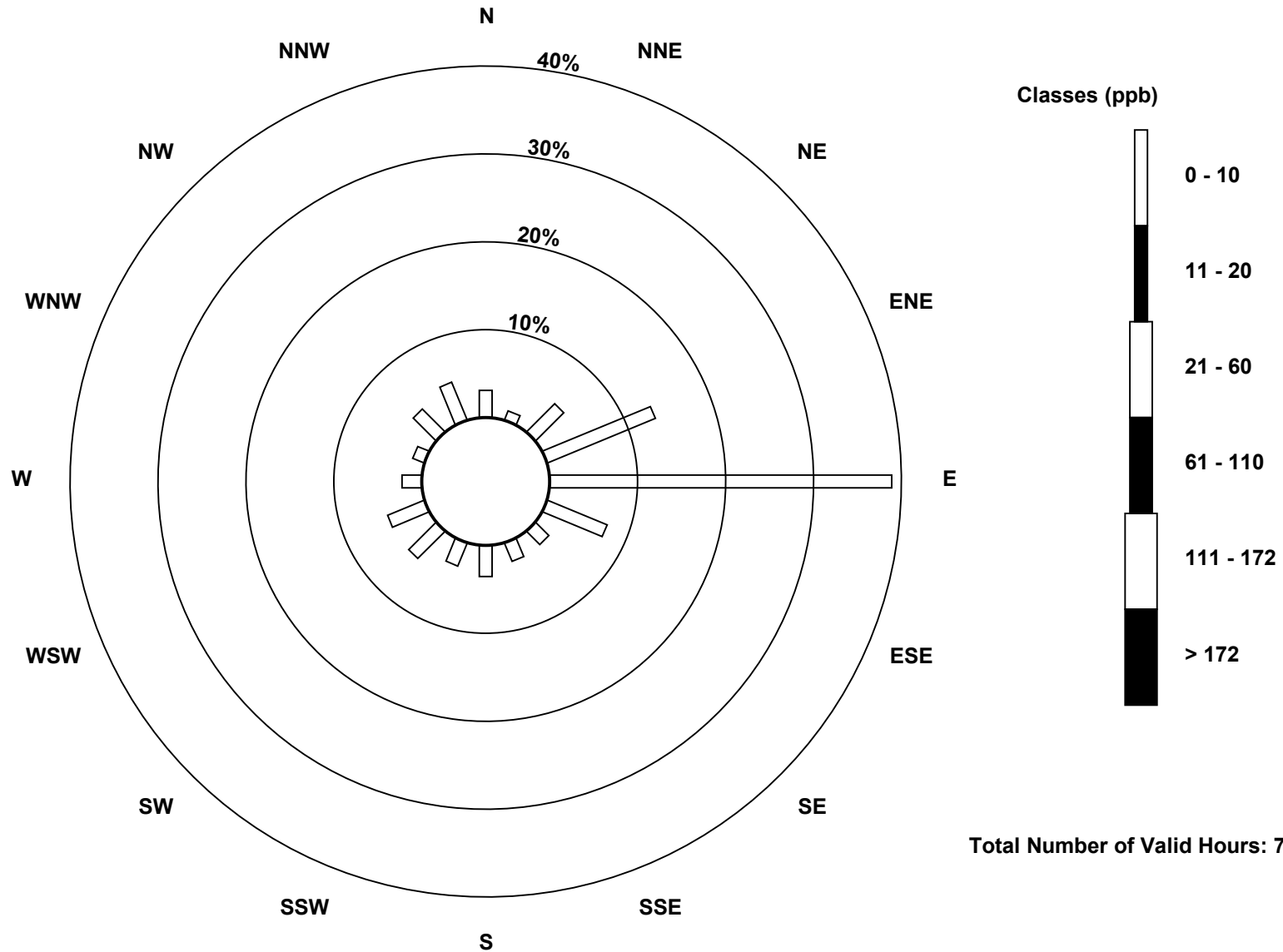
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan (AMS 8)

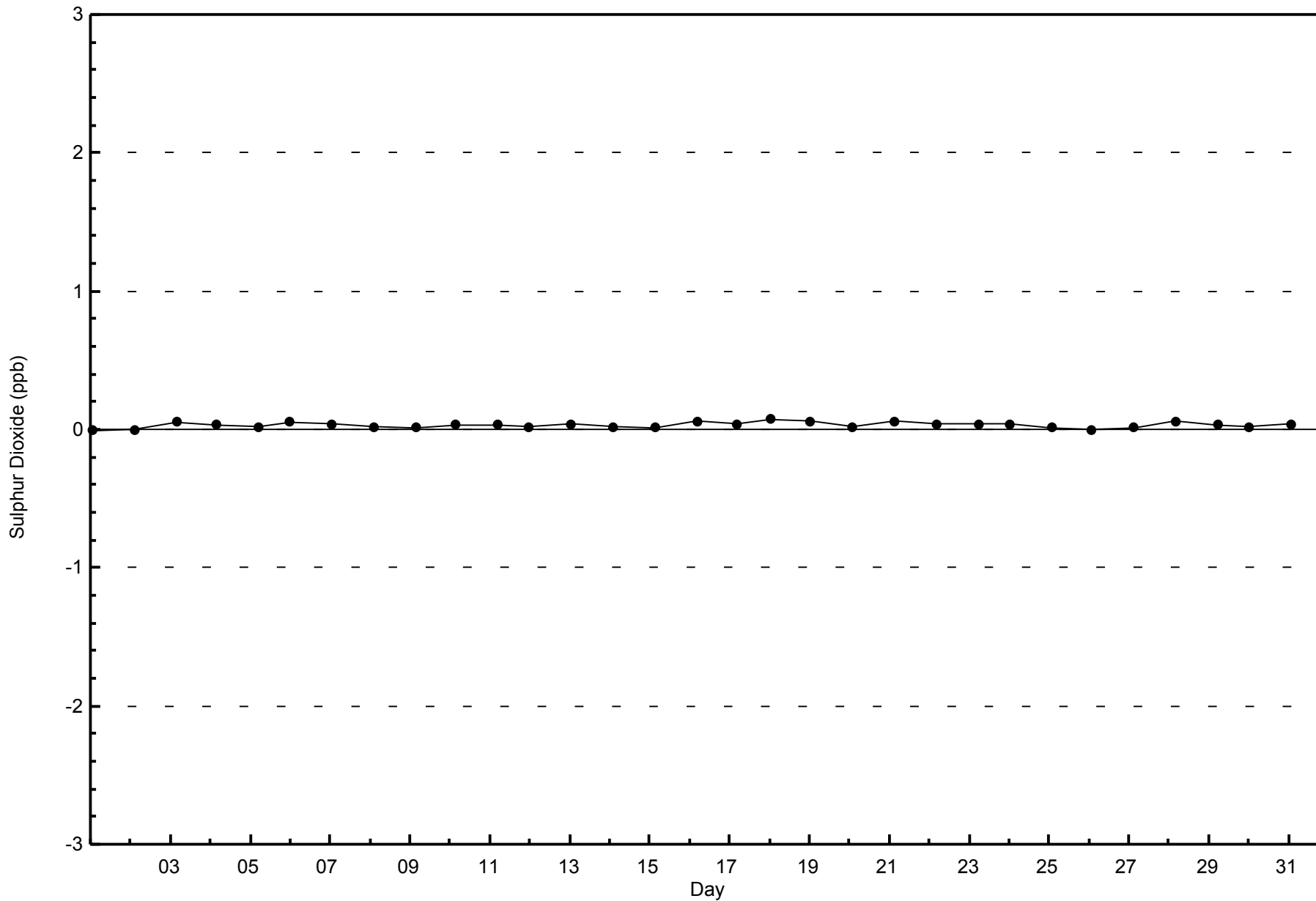


Total Number of Valid Hours: 707



WBEA
Zero Responses

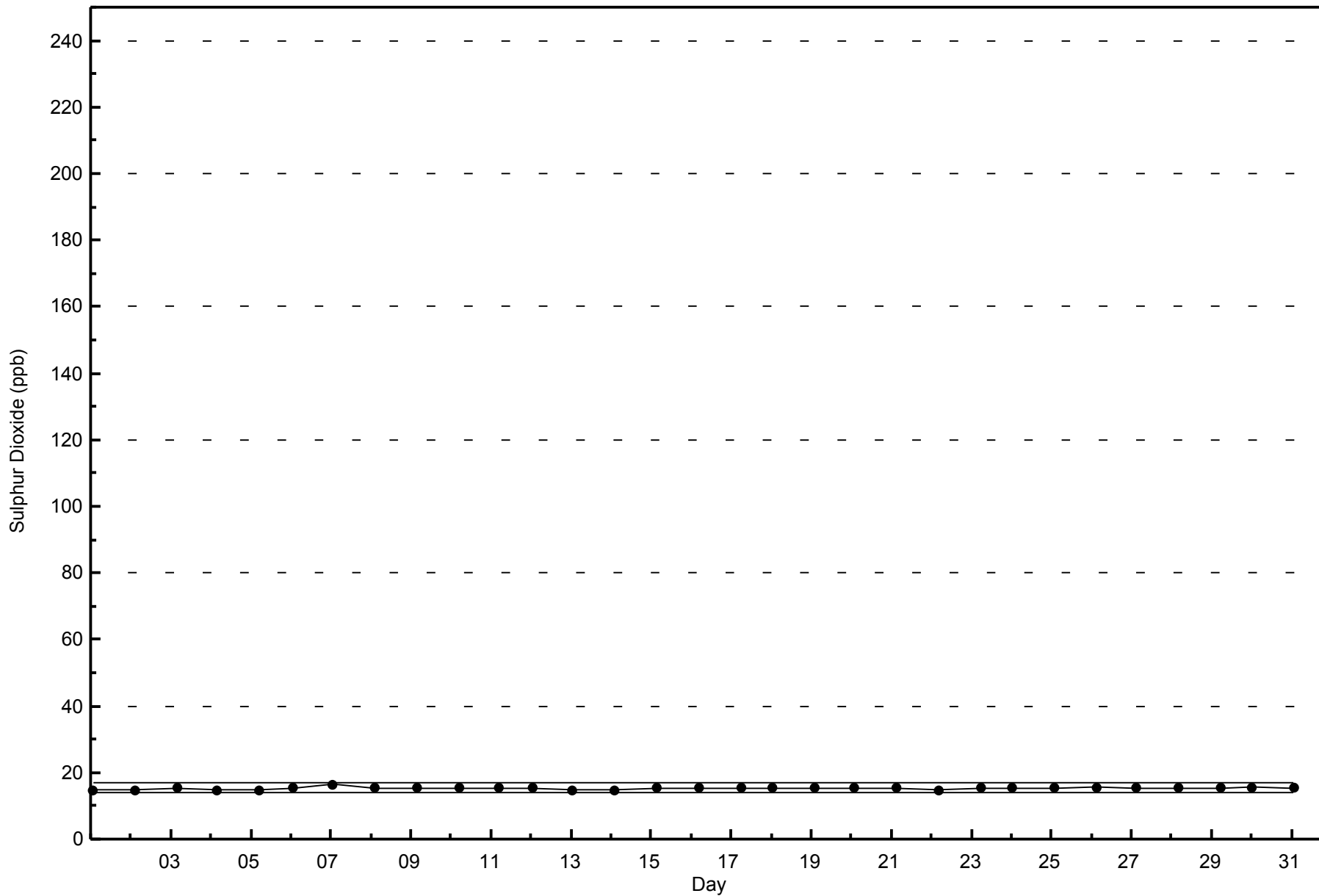
Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort Chipewyan - May 2015



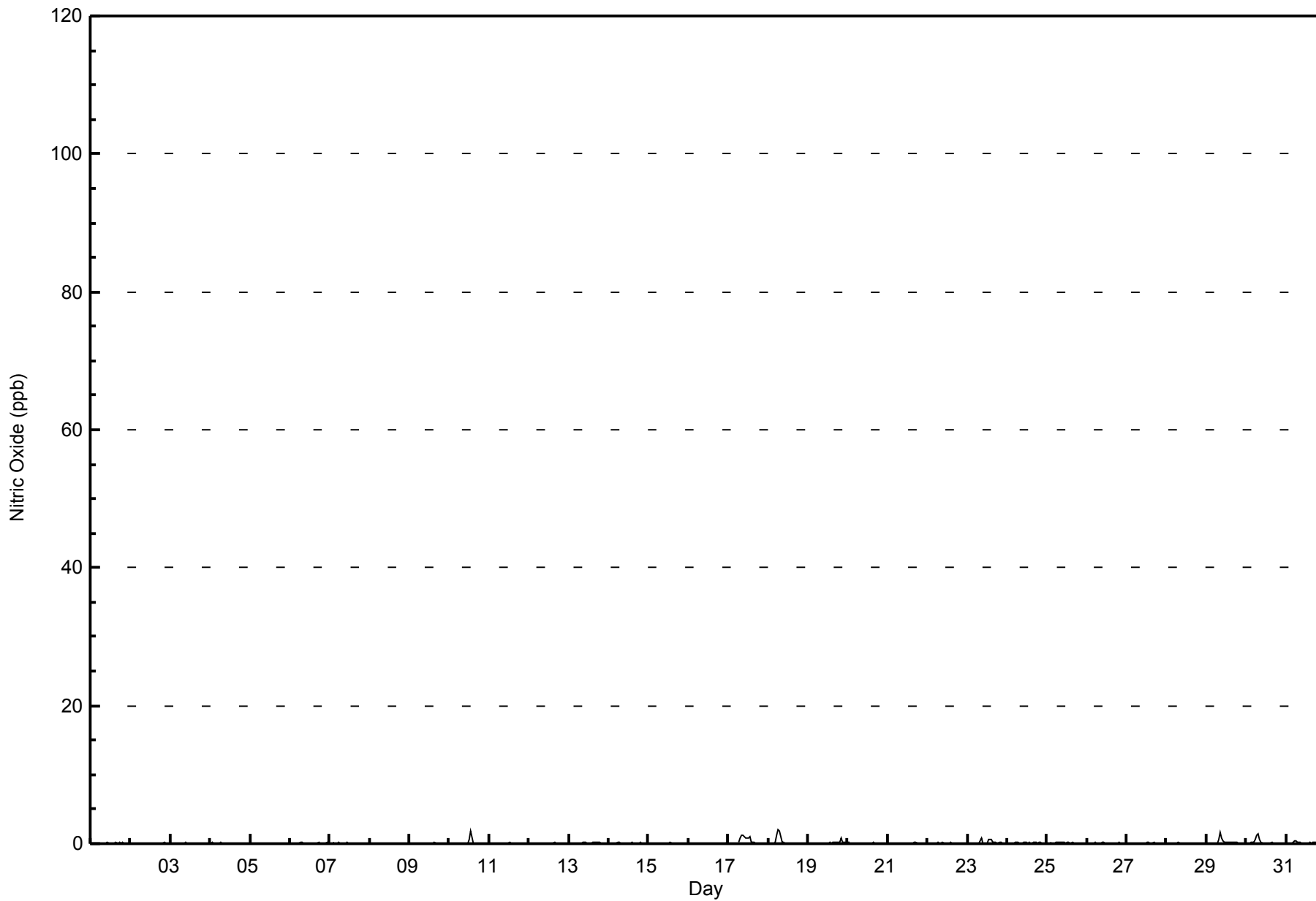


Maximum Value: 2 ppb on May 18 07:00																	Maximum Daily Average: 0.3 ppb on May 17																	Hours in Service: 744			
Minimum Value: 0 ppb on May 5 01:00																	Minimum Daily Average: 0.0 ppb on May 9																	Hours of Data: 707			
Maximum Diurnal Average: 0.2 ppb at hour 9																	Minimum Diurnal Average: 0.0 ppb at hour 2																	Hours of Missing Data: 37			
Monthly Average: 0.1 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1																	Hours of Calibration: 37			
																	Percent Operational Time: 100.0																				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0										
2-May	0	0	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-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0										
4-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0										
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0										
6-May	Z	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0										
7-May	0	Z	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										
8-May	0	0	Z	0	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-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0										
10-May	0	0	0	0	Z	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2										
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0										
12-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0										
13-May	0	Z	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										
14-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0										
15-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0										
16-May	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										
17-May	0	0	0	0	0	Z	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1										
18-May	Z	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2										
19-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	1										
20-May	0	0	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-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0										
22-May	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										
23-May	0	0	0	0	0	Z	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1										
24-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0										
25-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0										
26-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0										
27-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0										
28-May	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										
29-May	0	0	0	0	0	Z	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2										
30-May	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1										
31-May	0	Z	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																								Diurnal Average													
0																								Diurnal Maximum													
Z - zerospan																								C - Calibration													



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Fort Chipewyan - May 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipewyan - May 2015

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
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort Chipewyan - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	8	32	94	275	52	15	16	25	20	31	32	16	10	26	33	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	22	8	32	94	275	52	15	16	25	20	31	32	16	10	26	33	707

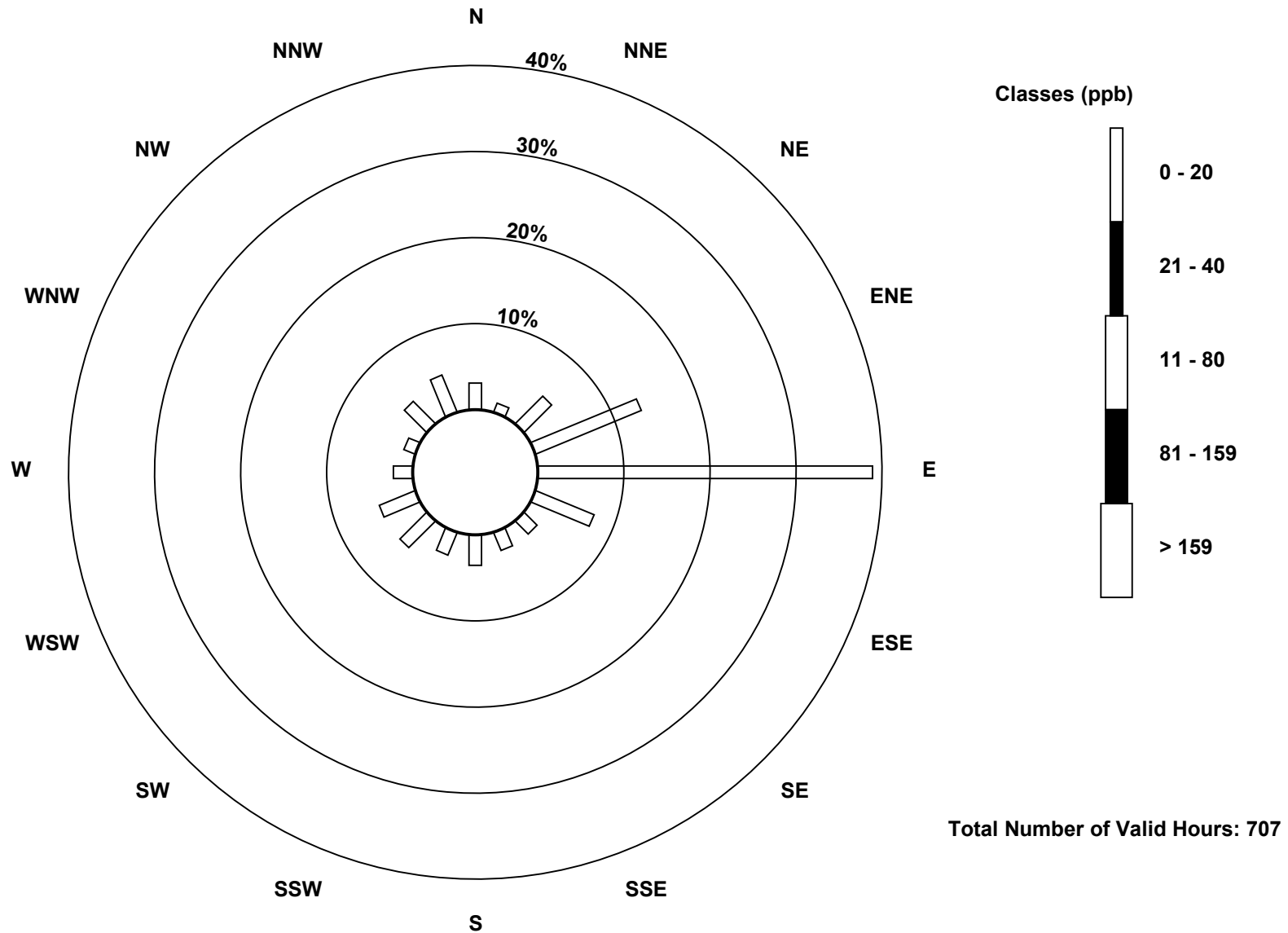
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

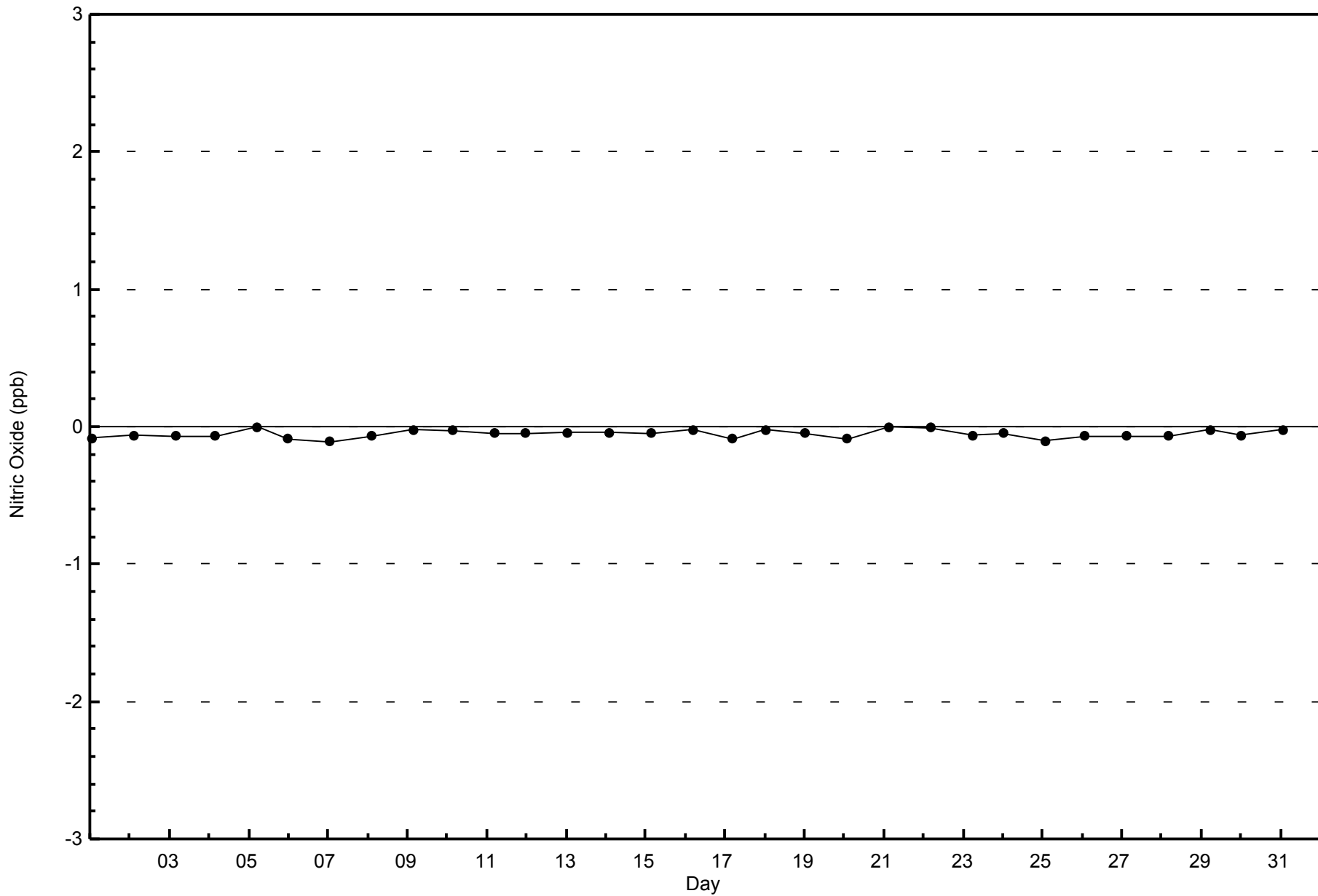
Nitric Oxide (NO) - ppb
Fort Chipewyan (AMS 8)





WBEA
Zero Responses

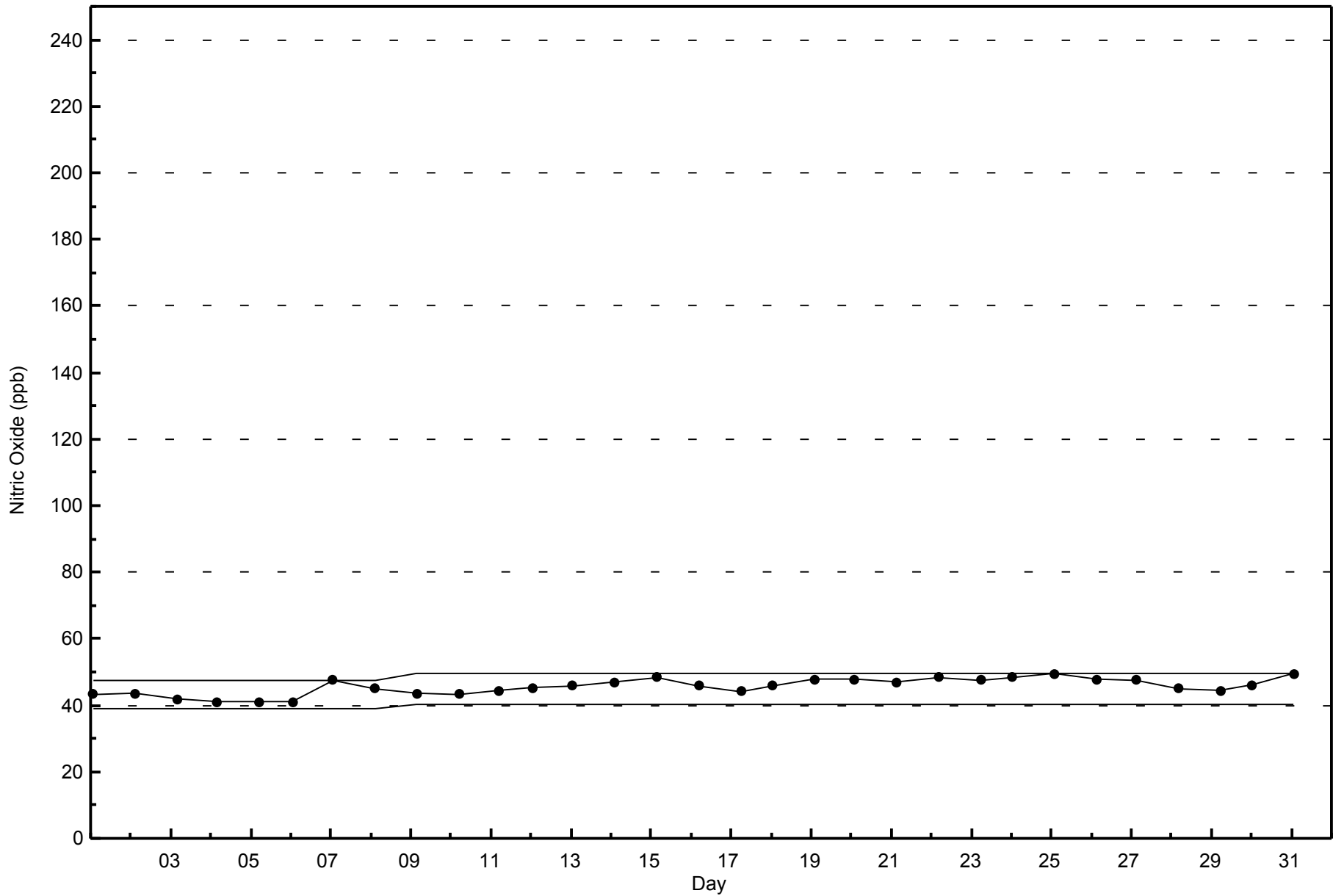
Nitric Oxide (NO) - ppb
Fort Chipewyan - May 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Fort Chipewyan - May 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 8 ppb on May 18 06:00	Maximum Daily Average: 3.1 ppb on May 31		Hours of Data:	707
Minimum Value: 0 ppb on May 6 10:00	Minimum Daily Average: 0.1 ppb on May 28		Hours of Missing Data:	37
Maximum Diurnal Average: 1.2 ppb at hour 6	Minimum Diurnal Average: 0.3 ppb at hour 12		Hours of Calibration:	37
Monthly Average: 0.6 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 6		Percent Operational Time:	100.0

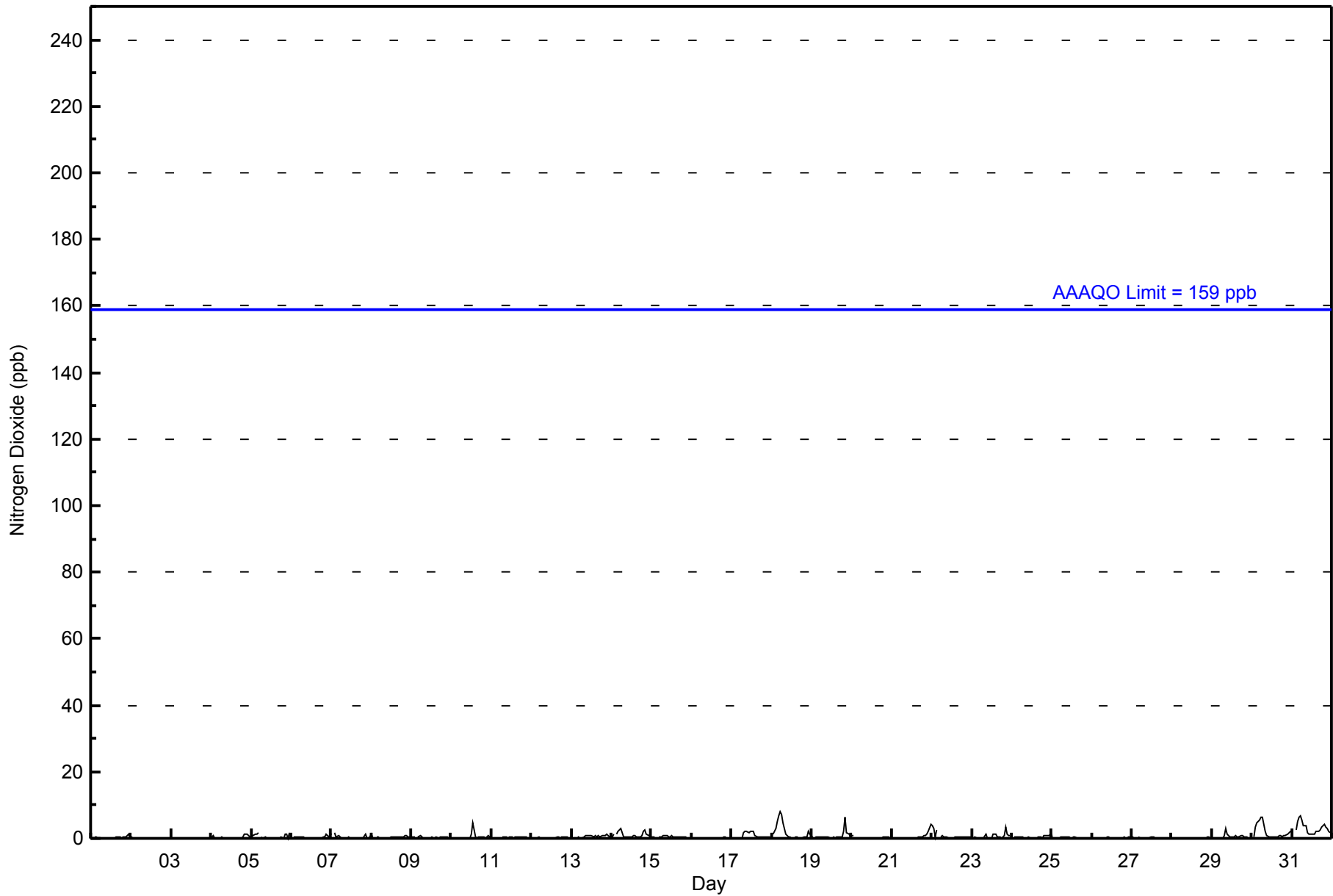
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0.3	1
2-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-May	0	1	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.4	1
5-May	1	1	1	1	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0.5	2
6-May	Z	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	1	1	1	1	--	1
7-May	1	Z	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	2
8-May	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.4	1
9-May	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
10-May	0	0	0	0	Z	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0	1	1	0	0.5	5
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
12-May	Z	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-May	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.6	1
14-May	1	1	Z	1	2	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1	1	1.1	3
15-May	1	1	0	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
16-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
17-May	0	0	0	0	0	Z	0	2	2	2	2	2	2	2	1	1	0	0	0	0	0	1	0	0	0.8	2
18-May	Z	1	3	5	7	8	7	5	1	1	0	0	0	0	0	0	0	0	0	0	1	1	2	1	2.0	8
19-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	2	7	2	1	1	0.8	7
20-May	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
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	4	0.6	4
22-May	4	3	1	3	Z	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.7	4
23-May	0	0	0	0	0	Z	0	0	1	0	0	0	0	1	1	0	0	0	0	1	3	1	1	1	0.6	3
24-May	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	0.4	2	
25-May	0	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-May	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
27-May	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.1	1
29-May	0	0	0	0	0	Z	0	1	3	1	1	0	0	0	1	0	1	1	1	1	0	0	0	0	0.5	3
30-May	Z	1	3	5	5	7	6	4	2	1	0	0	0	1	1	1	1	1	1	1	1	1	2	2	2.0	7
31-May	2	Z	2	5	6	7	6	4	4	2	1	1	1	1	2	2	2	3	3	4	4	3	2	2	3.1	7
0.5 0.5 0.6 0.9 1.1 1.2 0.9 0.7 0.6 0.4 0.3 0.3 0.4 0.5 0.4 0.4 0.3 0.4 0.4 0.6 1.0 0.7 0.7 0.7																								Diurnal Average		
4 3 3 5 7 8 7 5 4 2 2 2 2 5 2 2 2 3 3 4 7 3 2 4																								Diurnal Maximum		

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - May 2015

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
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	8	32	94	275	52	15	16	25	20	31	32	16	10	26	33	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	22	8	32	94	275	52	15	16	25	20	31	32	16	10	26	33	707

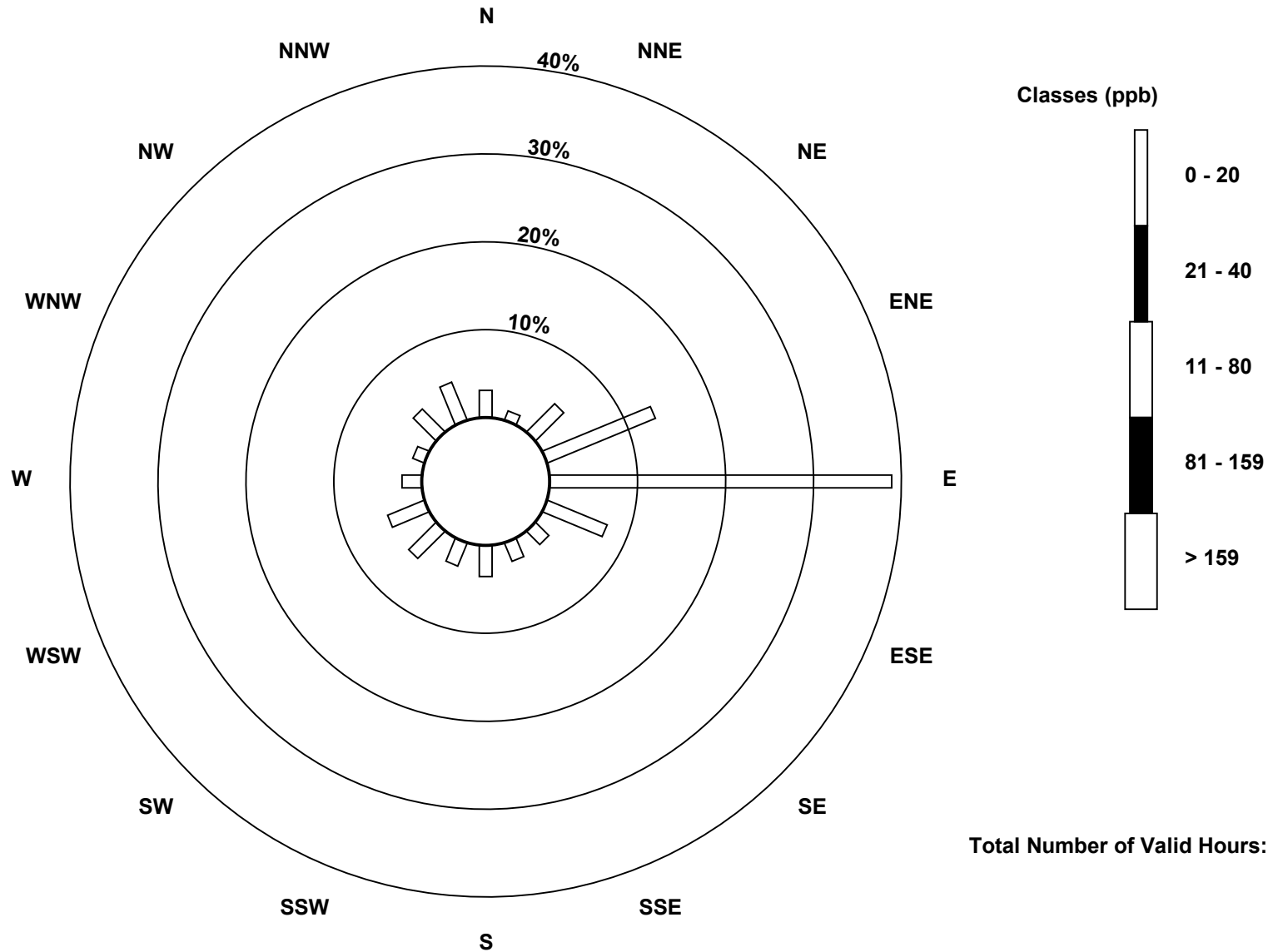
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan (AMS 8)

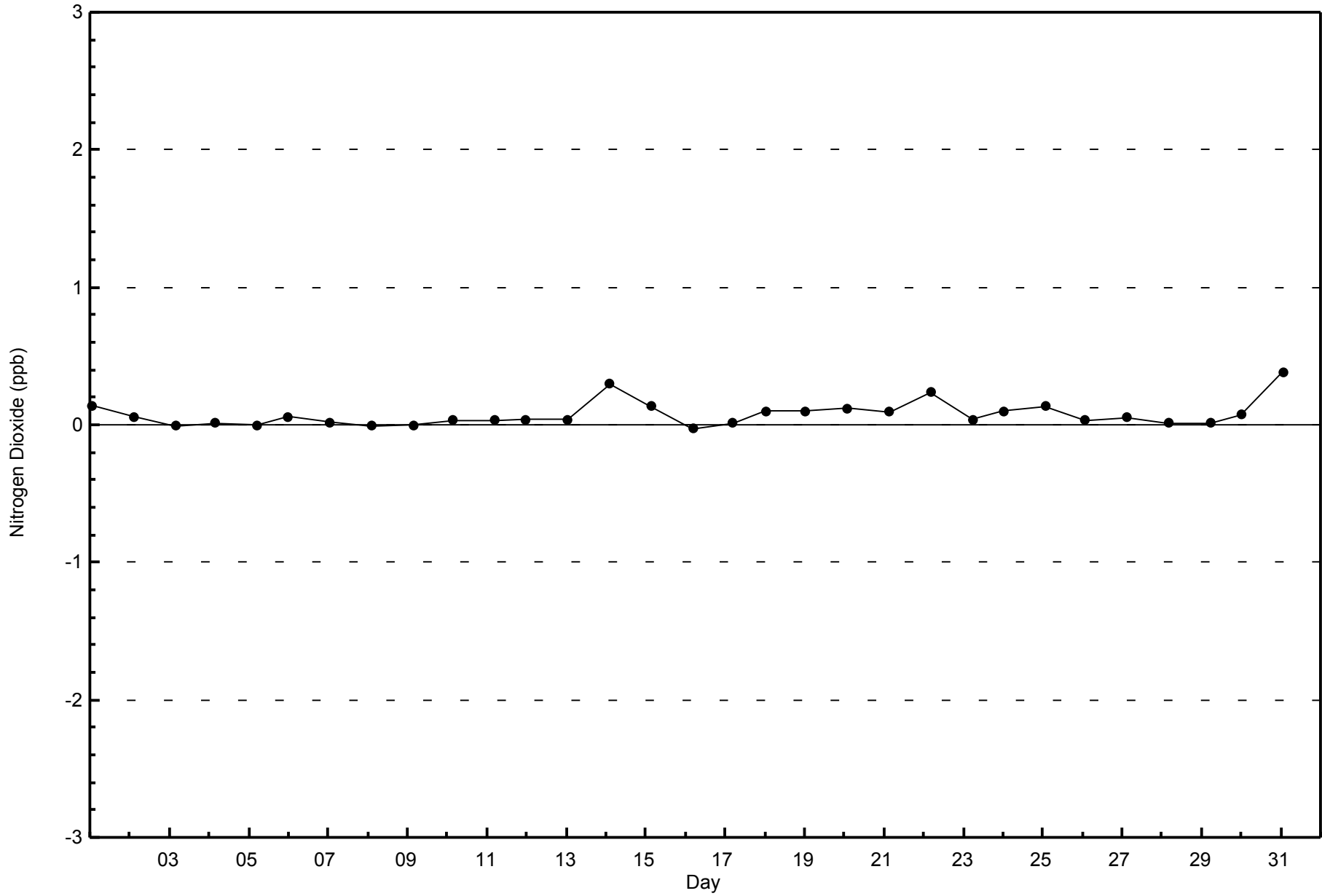


Total Number of Valid Hours: 707



WBEA
Zero Responses

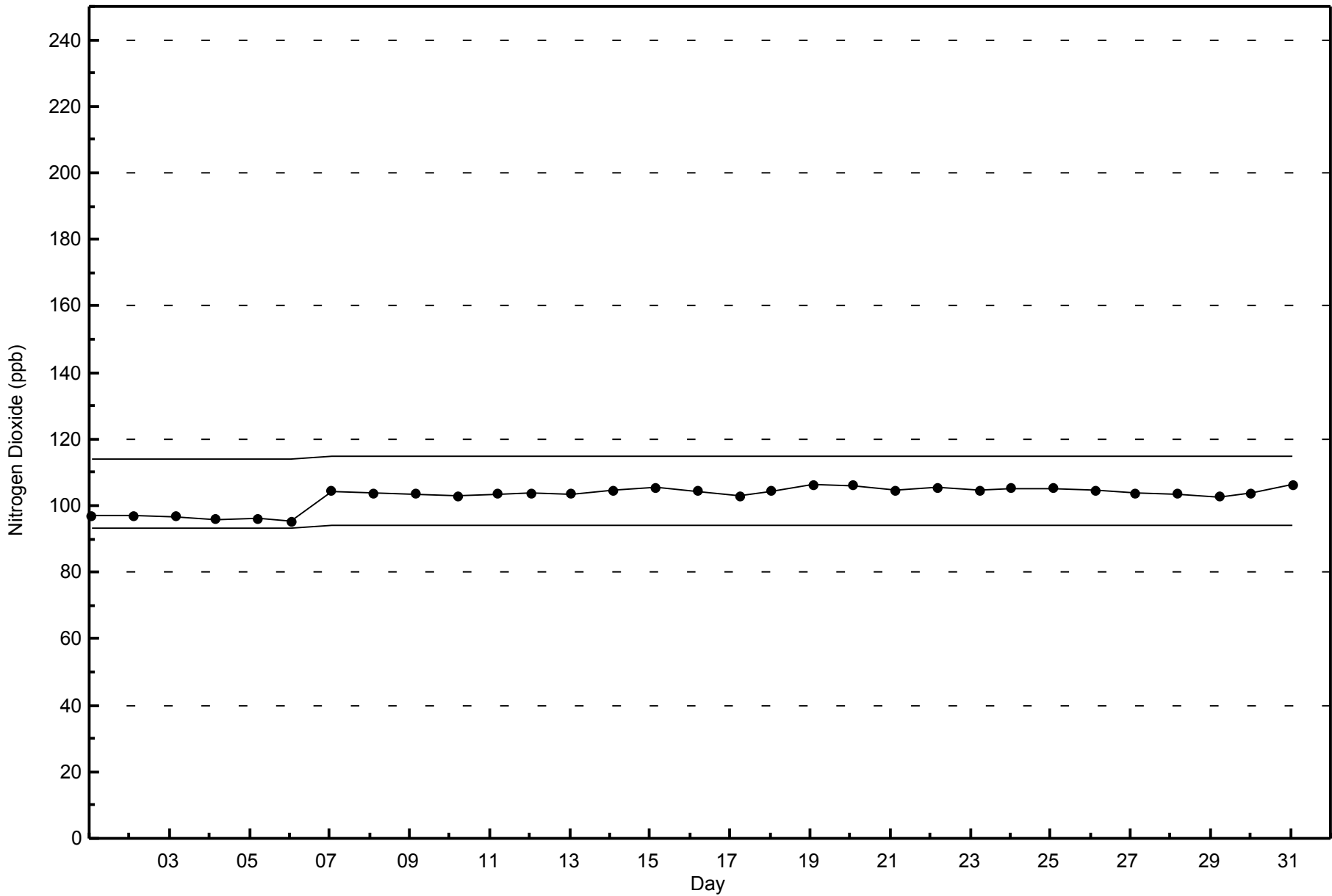
Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - May 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Fort Chipewyan - May 2015



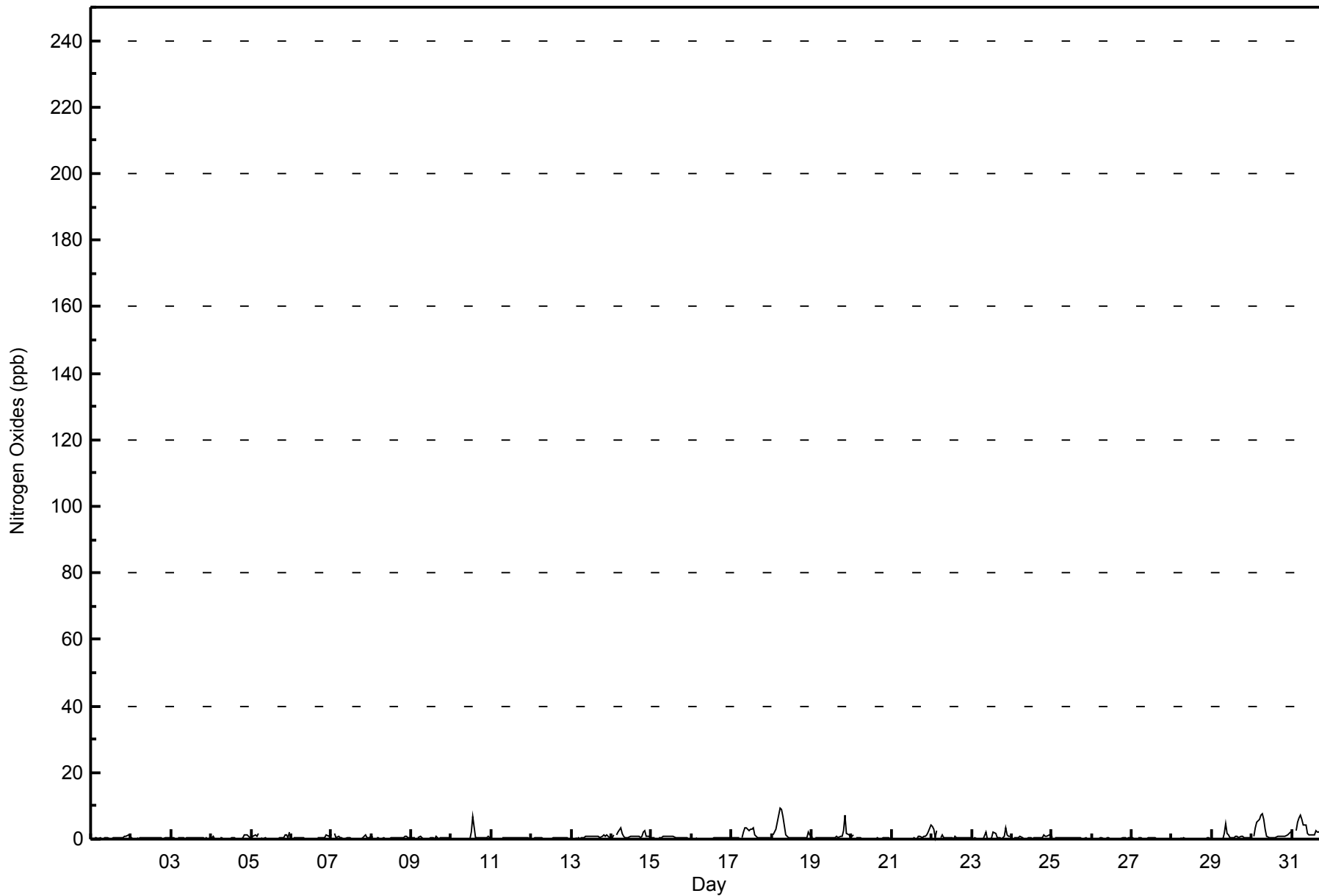


Maximum Value: 9 ppb on May 18 06:00																	Maximum Daily Average: 3.2 ppb on May 31																	Hours in Service: 744	
Minimum Value: 0 ppb on May 21 02:00																	Minimum Daily Average: 0.2 ppb on May 28																	Hours of Data: 707	
Maximum Diurnal Average: 1.3 ppb at hour 6																	Minimum Diurnal Average: 0.4 ppb at hour 12																	Hours of Missing Data: 37	
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																	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-May	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0.4	1									
2-May	0	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-May	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									
4-May	0	1	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.4	1									
5-May	0	1	1	1	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0.6	2									
6-May	Z	0	1	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	1	1	1	1	--	1									
7-May	1	Z	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	2									
8-May	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0.4	1									
9-May	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1									
10-May	0	0	0	0	Z	0	0	0	0	0	0	2	7	0	0	0	0	0	0	0	0	1	1	0	0.6	7									
11-May	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1									
12-May	Z	0	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									
13-May	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	1									
14-May	1	1	Z	1	2	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1	1	1.1	3									
15-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1									
16-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0									
17-May	0	0	0	0	0	Z	0	2	3	3	3	3	3	3	1	1	0	1	0	1	0	0	0	0	1.2	3									
18-May	Z	1	3	5	7	9	9	7	1	1	0	0	0	0	0	0	0	0	0	0	1	0	2	1	2.3	9									
19-May	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1	1	2	7	2	1	1	1.0	7									
20-May	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1									
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	4	0.6	4									
22-May	4	3	1	3	Z	0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.8	4									
23-May	0	0	0	0	0	Z	0	0	2	0	0	0	0	2	2	0	0	1	0	1	4	1	1	1	0.7	4									
24-May	Z	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	2	0.5	2										
25-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0									
26-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0.3	1									
27-May	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1									
29-May	0	0	0	0	0	Z	0	2	4	2	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0.7	4									
30-May	Z	1	4	5	6	7	7	6	3	1	0	0	1	1	1	1	1	1	1	1	1	1	2	2	2.2	7									
31-May	2	Z	2	5	7	7	6	4	4	2	1	1	1	1	2	2	2	3	4	4	4	4	3	2	2	3.2	7								
																								Diurnal Average											
																								Diurnal Maximum											
0.6 0.5 0.7 1.0 1.2 1.3 1.1 0.9 0.8 0.5 0.4 0.4 0.5 0.7 0.5 0.4 0.4 0.5 0.5 0.7 1.1 0.8 0.7 0.7																																			
4 3 4 5 7 9 9 7 4 3 3 3 3 7 2 2 2 3 4 4 7 3 2 4																																			
Z - zerospan C - Calibration																																			



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - May 2015

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
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	22	8	32	94	275	52	15	16	25	20	31	32	16	10	26	33	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	22	8	32	94	275	52	15	16	25	20	31	32	16	10	26	33	707

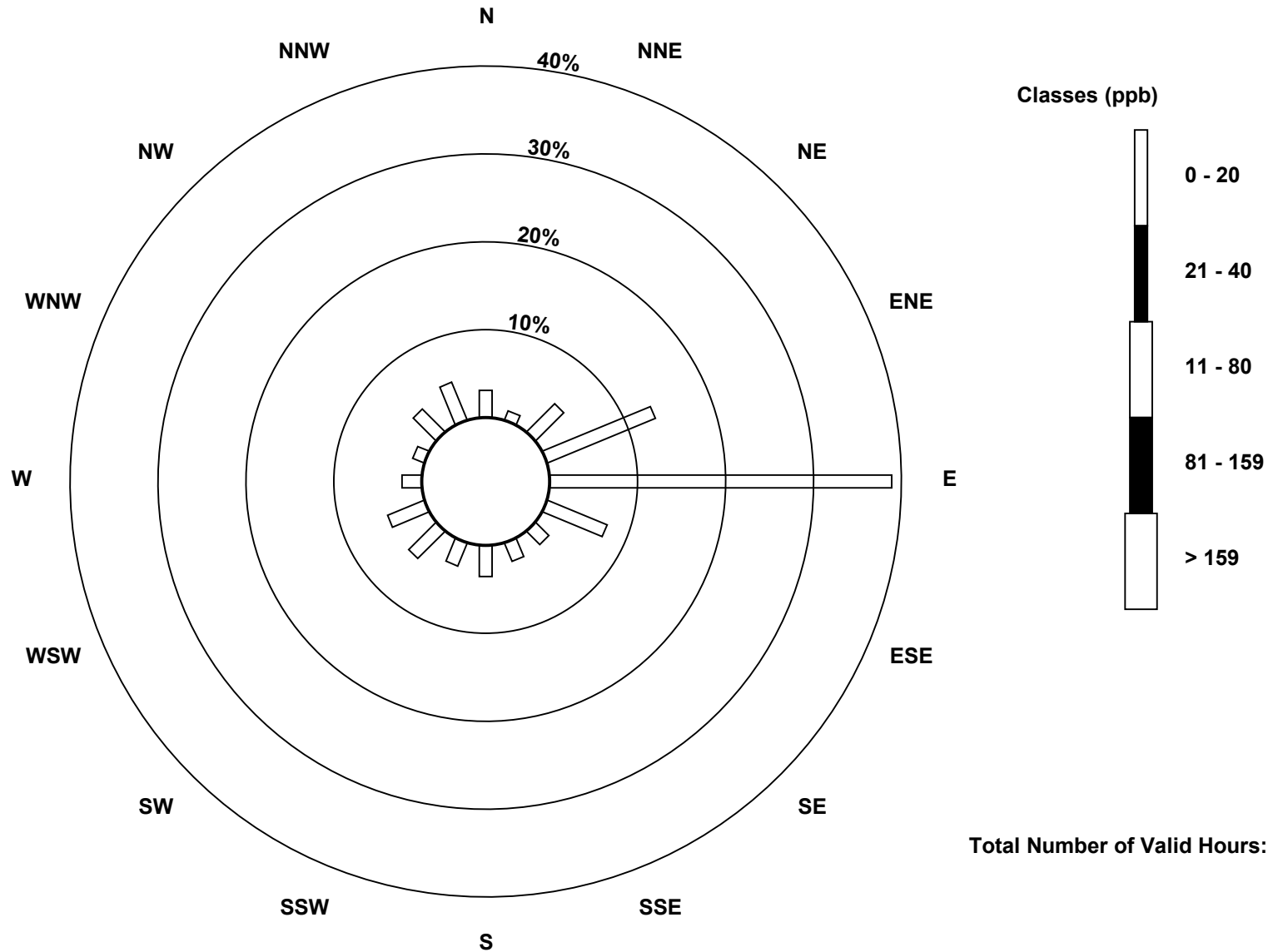
Total Number of Valid Hours: 707

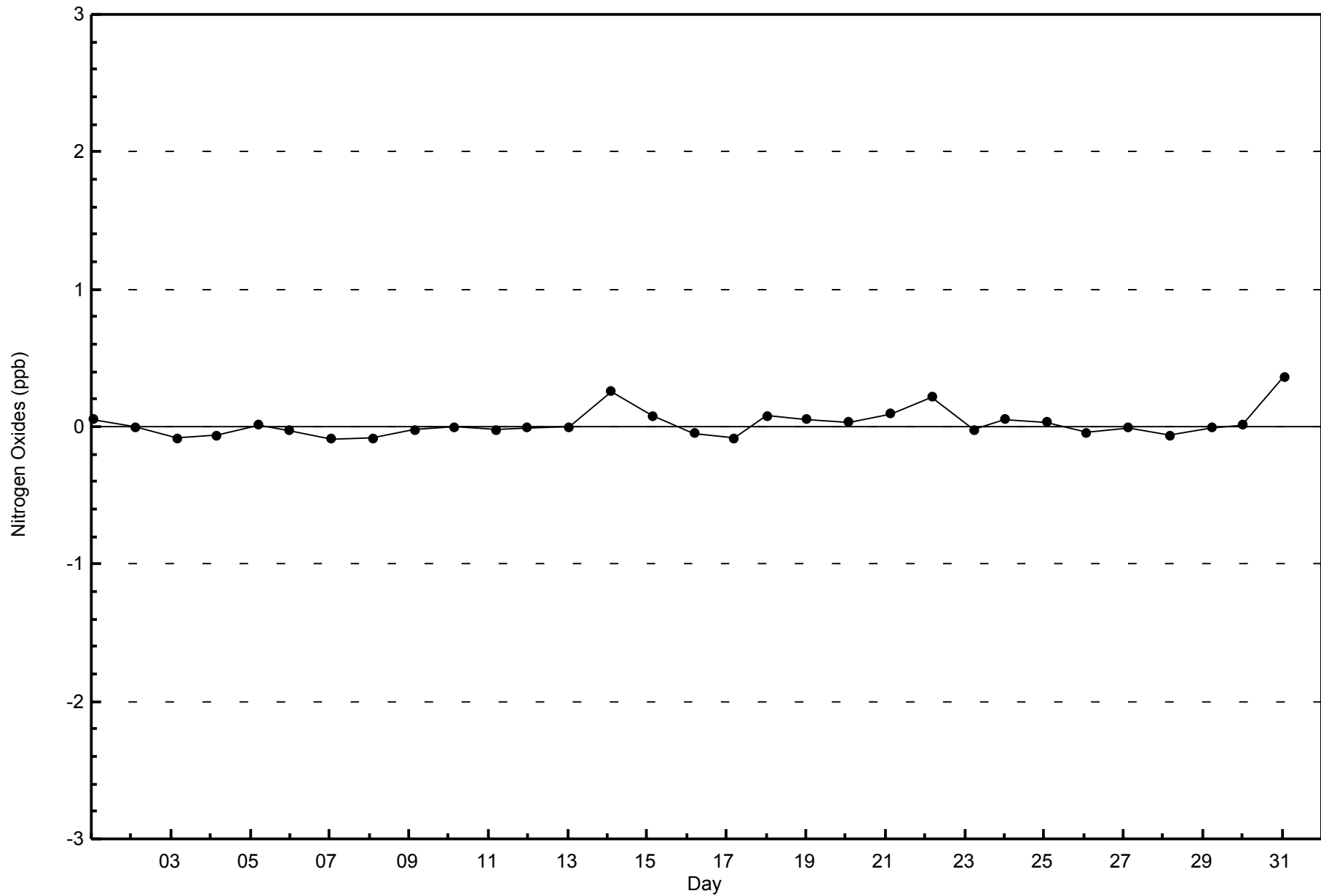
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan (AMS 8)

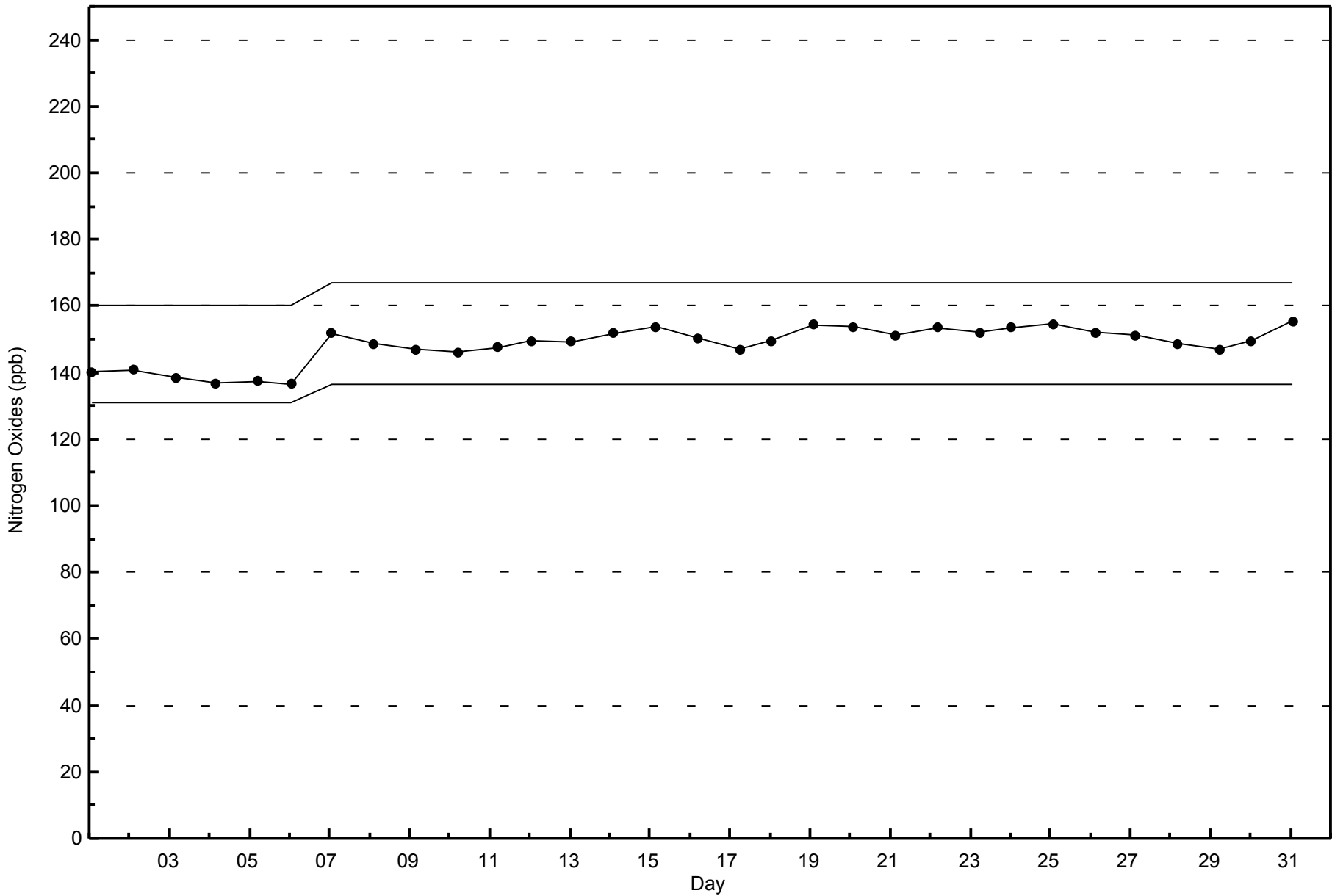






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort Chipewyan - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Fort Chipewyan - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 65 ppb on May 14 16:00	Maximum Daily Average: 52.9 ppb on May 14		Hours of Data:	707
Minimum Value: 12 ppb on May 16 06:00	Minimum Daily Average: 24.3 ppb on May 16		Hours of Missing Data:	37
Maximum Diurnal Average: 42.7 ppb at hour 19	Minimum Diurnal Average: 34.5 ppb at hour 6		Hours of Calibration:	37
Monthly Average: 39.5 ppb	Percentiles: P ₁ = 17 P ₁₀ = 29 Q ₁ = 35 Median = 40 Q ₃ = 45 P ₉₀ = 49 P ₉₉ = 58		Percent Operational Time:	100.0

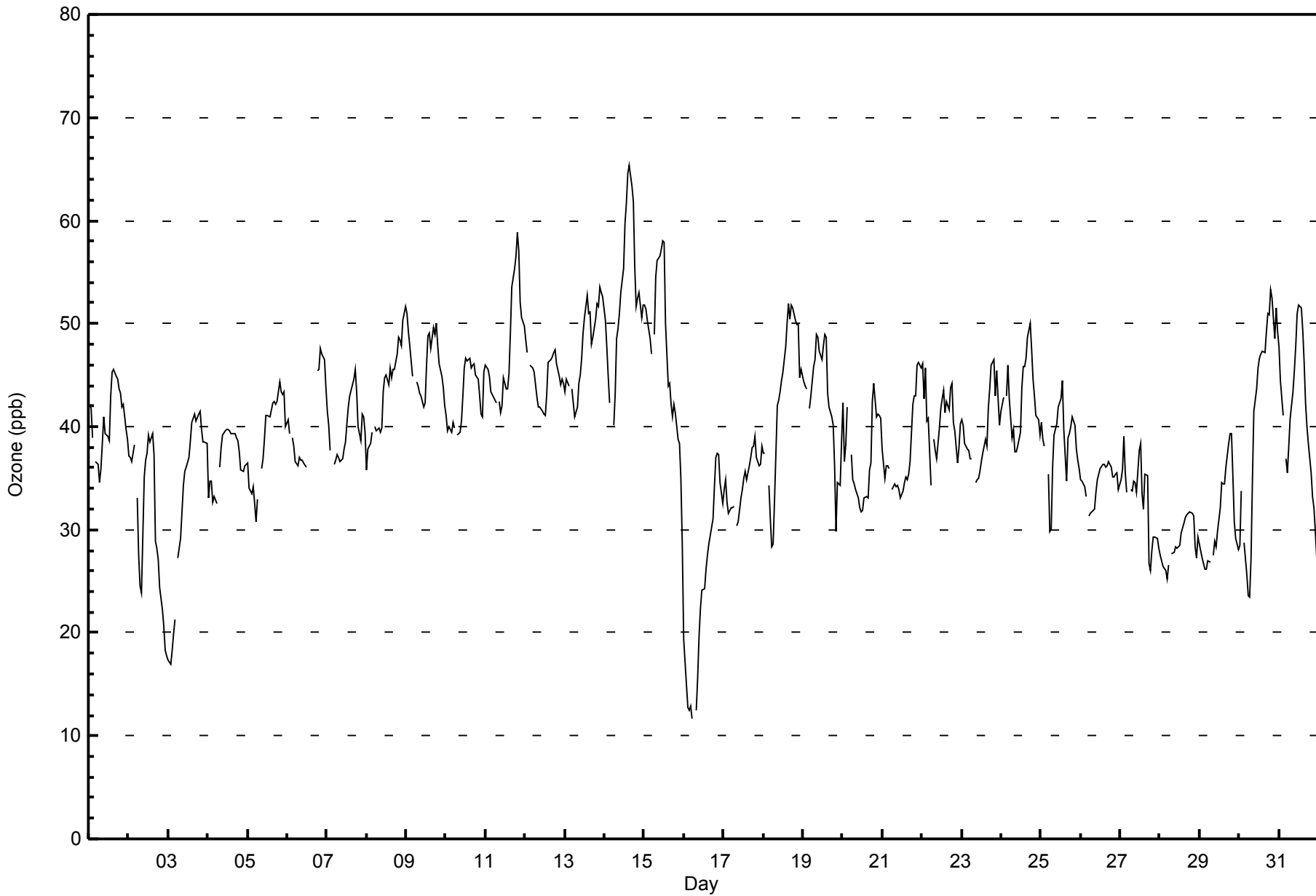
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	42	42	39	Z	37	36	35	36	38	41	39	39	39	43	45	46	45	45	44	43	42	42	40	39	40.7	46																							
2-May	37	37	37	38	Z	33	28	25	24	35	37	37	39	38	39	37	29	28	27	24	22	21	18	18	30.8	39																							
3-May	17	17	18	20	21	Z	27	29	32	34	36	36	37	39	40	41	41	41	41	42	40	38	39	38	33.2	42																							
4-May	33	35	35	33	33	33	Z	37	36	38	39	40	40	40	39	39	39	39	39	38	36	36	36	36	37.0	40																							
5-May	36	34	33	34	33	31	33	Z	36	37	39	41	41	41	42	42	42	42	42	44	43	43	43	40	38.9	44																							
6-May	41	39	Z	39	38	37	36	37	37	37	37	36	C	C	C	C	C	C	45	46	48	47	47	44	--	48																							
7-May	41	40	38	Z	36	37	37	37	37	37	38	39	40	42	43	44	45	46	43	40	39	41	41	39	40.0	46																							
8-May	36	38	38	39	Z	40	40	40	40	40	43	45	45	44	46	45	46	46	47	49	48	48	50	52	43.6	52																							
9-May	51	49	48	46	45	Z	44	44	43	43	42	42	46	49	49	48	50	49	50	48	46	45	44	42	46.2	51																							
10-May	41	40	40	39	40	40	Z	39	39	41	43	46	47	46	47	46	46	46	45	45	43	41	41	45	42.9	47																							
11-May	46	46	45	43	43	43	42	Z	42	41	42	45	44	44	45	49	54	55	57	59	57	52	51	50	47.6	59																							
12-May	48	47	Z	46	46	45	44	43	42	42	42	41	41	43	46	46	47	47	48	46	45	44	45	44	44.7	48																							
13-May	43	45	44	Z	44	42	41	42	44	45	47	49	51	53	51	51	48	49	50	52	52	54	53	53	47.9	54																							
14-May	50	48	45	42	Z	40	43	48	50	51	53	55	60	62	65	65	63	62	55	52	52	53	51	52	52.9	65																							
15-May	52	51	50	49	47	Z	49	55	56	57	57	58	58	50	44	44	42	41	42	41	39	38	35	29	47.1	58																							
16-May	19	15	13	12	13	12	Z	13	16	20	22	24	24	26	28	29	29	31	34	37	37	37	35	33	24.3	37																							
17-May	34	35	33	32	32	32	32	Z	30	31	33	34	35	36	35	36	37	38	38	39	37	36	36	38	34.7	39																							
18-May	37	37	Z	34	31	28	29	33	42	43	43	44	45	48	50	52	50	52	51	50	50	50	45	46	43.1	52																							
19-May	44	44	44	Z	42	43	46	47	49	49	47	47	48	49	49	43	42	41	40	36	30	35	34	39	42.9	49																							
20-May	42	37	38	42	Z	37	35	34	34	33	32	32	32	33	33	33	36	36	42	44	41	41	41	41	37.0	44																							
21-May	38	35	36	36	36	Z	34	34	34	34	34	33	34	35	35	35	35	37	42	43	43	46	46	46	37.4	46																							
22-May	46	43	46	41	41	34	Z	39	38	37	40	42	43	44	41	43	42	44	44	40	40	37	38	40	40.9	46																							
23-May	41	40	38	38	38	37	37	Z	35	35	35	36	37	37	39	38	42	44	46	46	43	45	43	40	39.5	46																							
24-May	42	43	Z	43	46	43	39	40	38	38	38	39	44	46	46	47	49	50	47	45	43	41	41	39	42.8	50																							
25-May	40	39	38	Z	35	30	30	36	39	40	42	42	43	44	40	35	39	39	40	41	40	38	37	36	38.4	44																							
26-May	35	35	34	33	Z	31	32	32	32	34	35	35	36	36	36	36	36	37	36	35	35	35	35	34	34.6	37																							
27-May	35	36	39	36	34	Z	34	34	35	35	34	38	38	33	32	35	35	27	26	28	29	29	28	28	33.0	39																							
28-May	28	27	26	26	25	27	Z	28	28	28	28	28	28	30	31	31	31	32	32	32	31	28	27	29	28.8	32																							
29-May	29	27	27	26	26	27	27	Z	27	29	28	30	32	35	34	34	36	38	39	39	35	31	29	28	31.1	39																							
30-May	28	34	Z	29	26	24	23	27	35	42	44	46	47	47	47	47	49	51	51	53	53	48	52	49	41.3	53																							
31-May	48	45	41	Z	37	36	38	41	43	45	48	51	52	52	49	46	42	40	38	36	33	32	30	27	41.3	52																							
																								38.8	38.0	37.0	35.9	35.5	34.5	36.0	36.4	37.2	38.4	39.3	40.3	41.5	42.1	42.2	42.1	42.2	42.4	42.7	42.3	41.0	40.4	39.7	39.1	Diurnal Average	
																								52	51	50	49	47	45	49	55	56	57	57	58	60	62	65	65	63	62	57	59	57	54	53	53	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Fort Chipewyan - May 2015





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort Chipewyan - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	15	2.12	2.12
21 - 50	640	90.52	92.64
51 - 82	52	7.36	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Fort Chipewyan - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	4	2	0	0	0	0	0	0	0	0	0	0	0	0	6	3	15
21 - 50	21	5	31	87	263	47	15	12	25	17	26	18	13	10	20	30	640
51 - 82	0	0	0	7	14	4	0	3	1	1	5	15	2	0	0	0	52
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	25	7	31	94	277	51	15	15	26	18	31	33	15	10	26	33	707

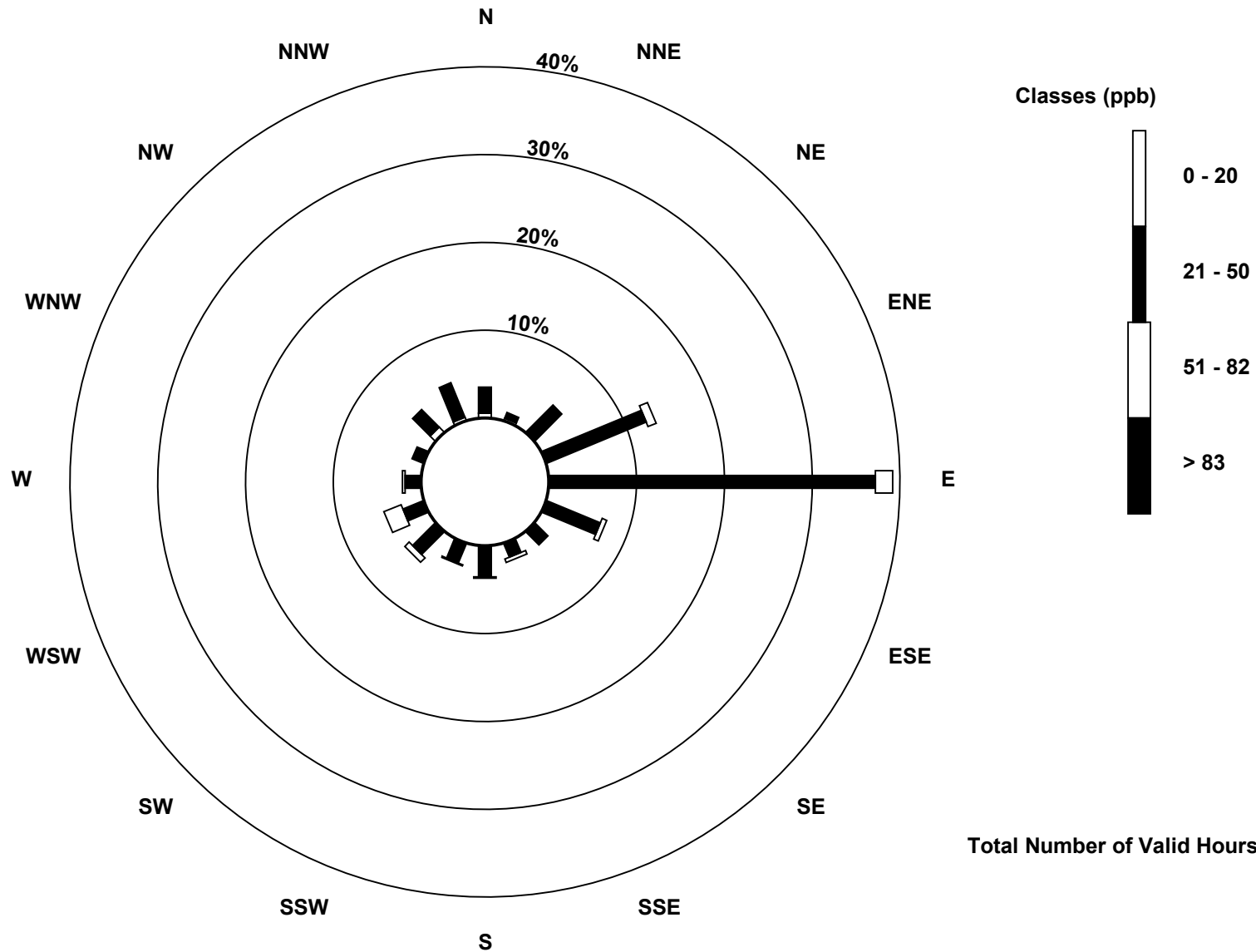
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Ozone (O_3) - ppb
Fort Chipewyan (AMS 8)

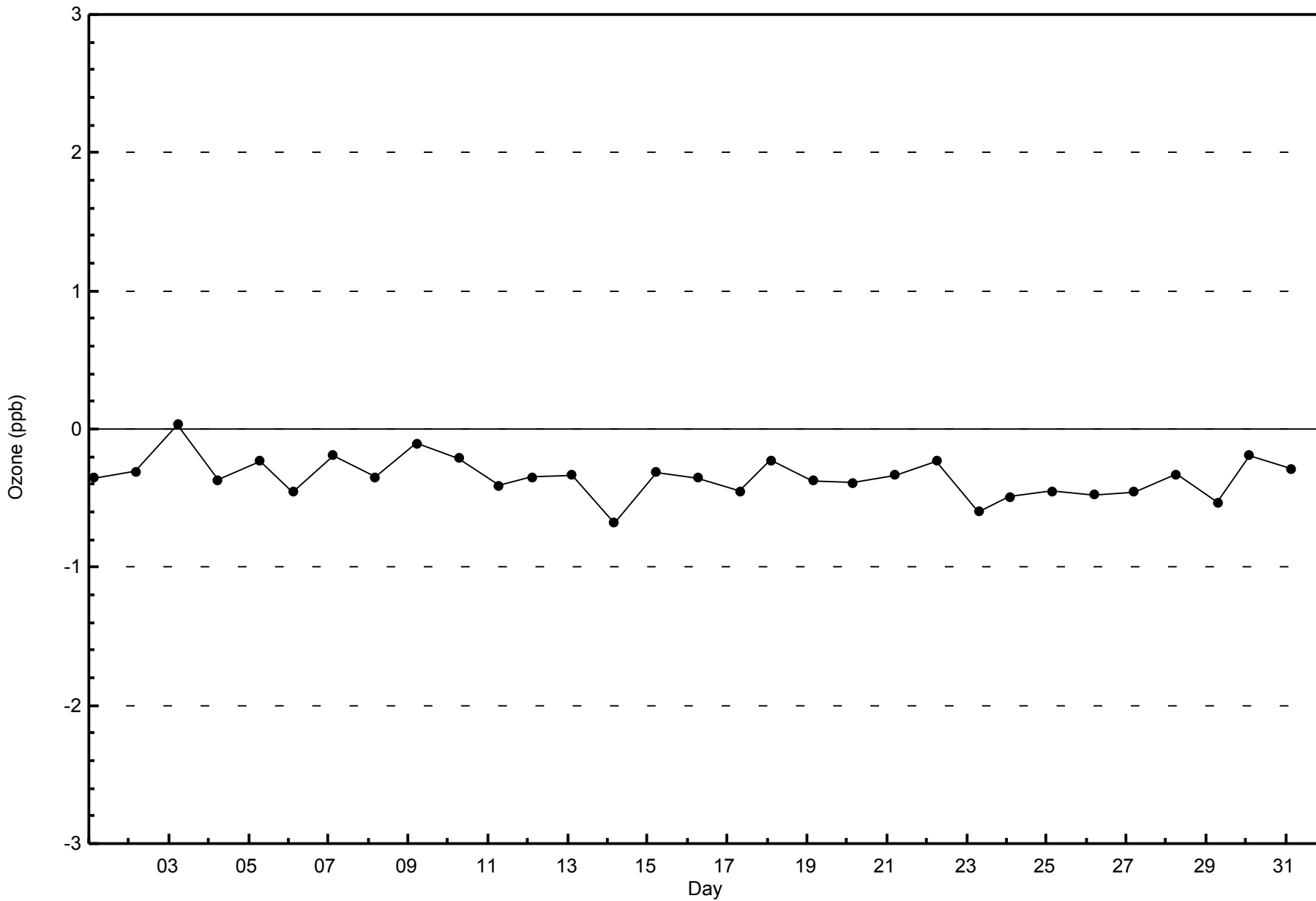


Total Number of Valid Hours: 707



WBEA
Zero Responses

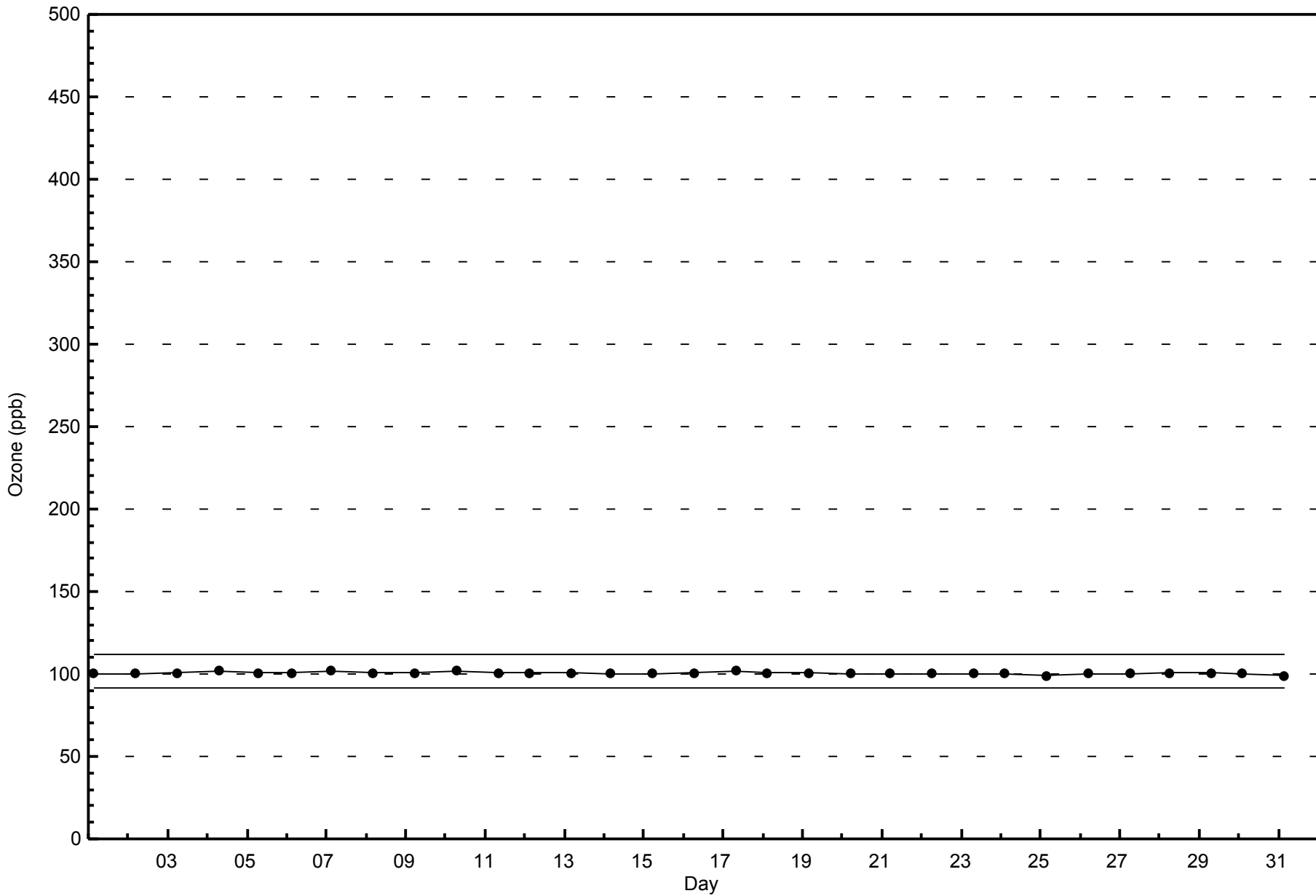
Ozone (O₃) - ppb
Fort Chipewyan - May 2015





WBEA
Span Responses

Ozone (O₃) - ppb
Fort Chipewyan - May 2015





Summary of Hour Averages

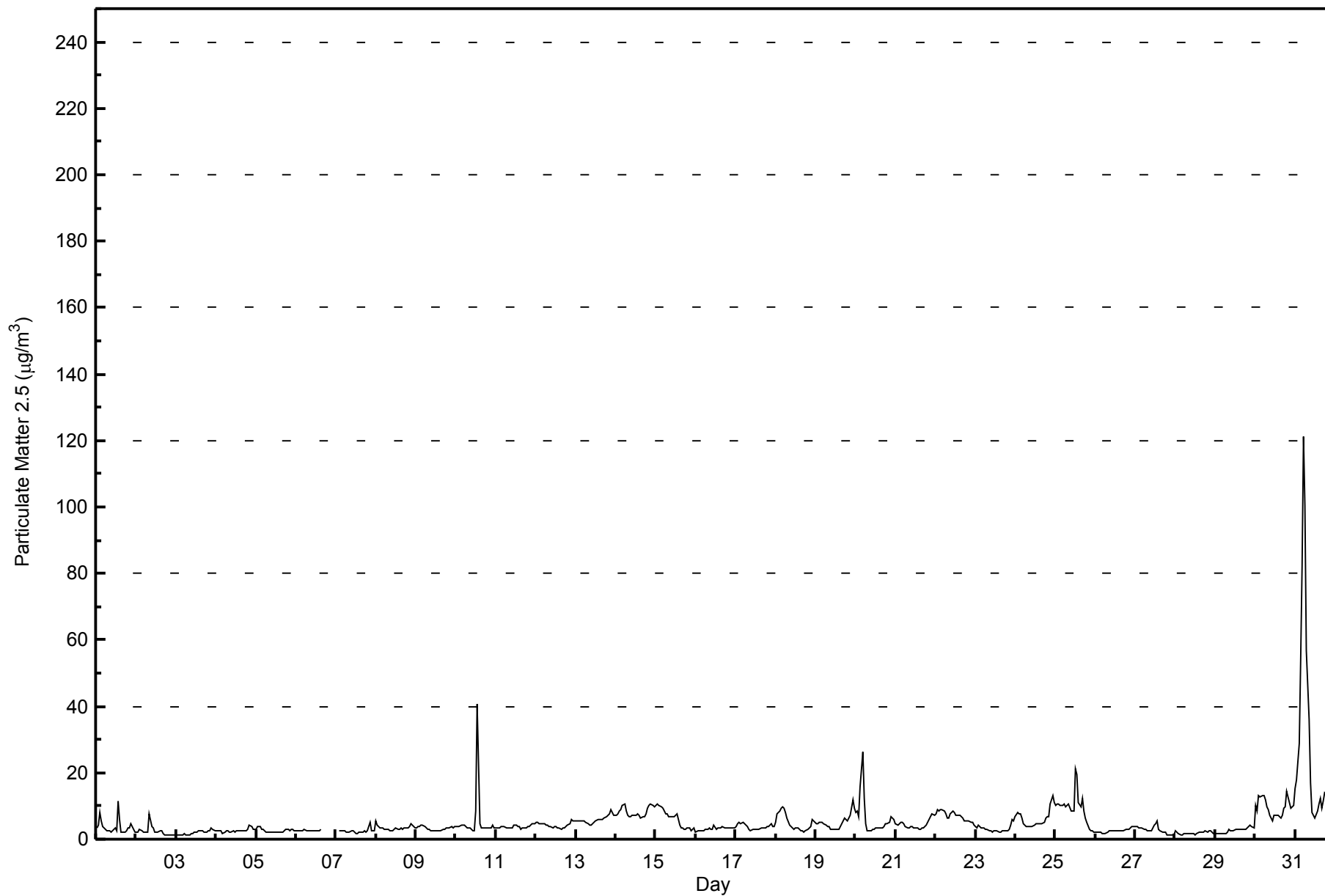
Fort Chipewyan - May 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 121.4 µg/m ³ on May 31 06:00		Maximum Daily Average: 28.9 µg/m ³ on May 31		Hours in Service: 744 Hours of Data: 734																						
Minimum Value: 1.2 µg/m ³ on May 27 23:00 Maximum Diurnal Average: 8.7 µg/m ³ at hour 6 Monthly Average: 5.20 µg/m ³		Minimum Daily Average: 1.9 µg/m ³ on May 28 Minimum Diurnal Average: 3.8 µg/m ³ at hour 11 Percentiles: P ₁ = 1.2 P ₁₀ = 2.2 Q ₁ = 2.6 Median = 3.5 Q ₃ = 5.5 P ₉₀ = 9.2 P ₉₉ = 31.7		Hours of Missing Data: 10 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-May	3.6	4.2	8.0	5.4	3.7	2.9	2.6	2.5	2.4	2.3	2.6	3.6	2.5	11.3	5.9	2.2	1.9	2.1	2.5	3.3	3.5	4.5	2.8	2.3	3.7	11.3
2-May	2.2	2.2	3.1	2.5	2.1	2.1	2.2	2.2	7.5	4.0	3.5	2.2	2.1	2.0	2.4	2.4	1.7	1.4	1.3	1.3	1.2	1.2	1.2	1.2	2.3	7.5
3-May	1.2	1.2	1.3	1.3	1.3	1.5	1.4	1.4	1.4	1.6	1.8	2.0	2.2	2.5	2.6	2.5	2.5	2.2	2.2	2.4	2.5	3.5	2.9	2.7	2.0	3.5
4-May	2.7	2.7	2.7	2.4	1.7	2.2	2.7	2.3	2.2	2.3	2.4	2.3	2.4	2.4	2.5	2.5	2.6	2.6	2.7	3.0	4.3	3.8	3.1	3.1	2.6	4.3
5-May	2.9	3.8	3.9	2.8	2.8	2.7	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.5	3.0	3.1	2.7	2.9	2.9	2.7	2.7	3.9
6-May	2.4	2.5	2.7	2.7	2.7	2.8	2.7	2.6	2.5	2.4	2.4	2.5	2.5	2.5	2.6	2.9	M	M	UO	UO	UO	UO	UO	UO	--	2.9
7-May	UO	UO	2.4	2.4	2.5	2.5	2.3	2.2	2.2	2.5	2.7	2.0	1.9	1.9	2.0	2.1	2.2	2.4	2.3	2.7	5.1	2.6	2.5	2.7	2.5	5.1
8-May	5.4	4.1	3.5	3.2	3.3	3.2	3.0	2.8	2.7	2.6	2.6	2.8	3.3	2.8	3.0	3.4	3.0	3.2	3.3	3.4	3.8	4.5	4.3	3.4	3.4	5.4
9-May	3.6	3.9	3.9	4.2	4.1	3.8	3.4	2.8	2.8	2.6	2.6	2.4	2.5	2.6	2.7	2.6	2.9	3.2	3.4	3.3	3.4	3.7	3.5	3.7	3.2	4.2
10-May	3.8	3.9	4.0	4.2	4.2	4.0	3.9	3.5	3.3	3.0	2.7	2.7	8.5	40.8	4.5	3.5	3.3	3.4	3.5	3.6	3.5	3.4	4.1	3.4	5.4	40.8
11-May	3.2	3.2	3.5	3.6	3.9	3.7	3.5	3.5	3.4	3.4	3.5	4.4	4.1	4.0	4.0	3.2	3.3	3.5	3.6	3.7	4.0	4.2	4.6	4.5	3.7	4.6
12-May	5.0	4.9	4.6	4.6	4.7	4.8	4.2	4.1	3.9	3.6	3.6	3.9	3.9	3.5	3.3	3.1	3.2	3.3	3.8	4.1	4.5	6.1	5.3	5.3	4.2	6.1
13-May	5.5	5.4	5.3	5.6	5.6	5.4	5.0	4.5	4.2	4.2	4.5	5.2	5.7	5.9	6.0	5.9	6.2	6.8	7.2	7.7	8.8	8.0	7.2	5.9	8.8	
14-May	7.1	7.8	8.5	8.7	10.2	10.5	8.5	7.1	6.6	6.7	7.0	7.3	7.4	7.5	7.0	6.2	6.8	7.0	7.7	9.2	10.2	10.7	10.0	9.7	8.1	10.7
15-May	10.0	10.5	10.3	9.8	9.2	8.7	7.8	7.5	6.9	6.7	6.7	6.9	7.0	7.4	4.4	3.2	3.3	2.8	3.1	3.5	3.2	2.7	2.8	3.2	6.2	10.5
16-May	2.2	2.7	2.5	2.4	2.4	2.6	2.9	3.1	3.2	3.0	2.9	4.1	3.0	3.2	3.3	3.2	3.8	3.4	3.2	3.5	3.5	3.3	3.4	3.4	3.1	4.1
17-May	4.0	4.8	5.0	4.9	4.9	4.8	4.3	3.8	3.1	2.7	2.9	3.0	3.0	3.0	2.9	3.5	3.4	3.4	3.3	3.8	3.8	4.5	3.8	3.8	3.8	5.0
18-May	5.3	7.7	8.5	9.4	9.8	9.5	8.1	6.6	4.3	3.8	3.3	3.2	3.3	3.2	3.0	2.7	2.6	2.3	2.4	3.0	3.4	4.0	5.9	5.4	5.0	9.8
19-May	4.5	4.8	5.2	5.2	4.9	4.6	4.3	3.9	3.7	3.1	3.1	3.1	2.9	2.8	2.9	3.7	4.8	6.3	6.0	5.5	6.2	7.0	11.8	9.3	5.0	11.8
20-May	8.2	8.4	6.6	15.5	26.1	12.3	4.6	2.6	2.5	2.4	3.1	3.1	3.3	3.4	3.4	3.4	3.5	3.6	4.7	4.8	5.0	6.8	6.3	5.9	6.2	26.1
21-May	4.6	4.2	4.8	5.2	5.1	4.6	3.8	3.5	3.3	3.7	3.8	3.4	3.6	3.4	3.0	2.9	3.4	3.5	4.2	4.9	6.1	6.8	7.7	7.0	4.4	7.7
22-May	7.6	8.7	8.5	8.9	8.8	8.6	7.5	6.4	6.5	7.5	8.5	8.0	7.3	7.0	7.1	7.3	6.3	5.5	5.7	5.7	5.5	5.1	5.2	4.3	7.0	8.9
23-May	3.6	3.4	4.4	3.5	3.4	3.2	2.9	2.8	2.7	2.4	2.2	2.4	2.6	2.4	2.3	2.3	2.3	2.3	2.3	2.5	3.0	4.3	6.1	5.4	3.1	6.1
24-May	6.6	8.3	7.7	7.8	6.5	4.6	3.7	3.7	3.8	3.7	3.8	4.2	4.7	4.8	4.6	4.7	5.1	6.4	6.9	6.9	10.7	13.2	11.1	6.2	13.2	
25-May	10.2	10.7	10.6	10.4	10.2	10.6	9.8	10.1	10.7	8.3	8.4	8.6	21.0	19.5	11.0	9.6	12.5	8.5	6.2	5.2	2.9	2.7	2.5	1.9	9.3	21.0
26-May	1.9	2.2	2.2	2.0	1.8	1.7	1.6	2.2	2.4	2.5	2.7	2.7	2.5	2.6	2.5	2.5	2.7	2.7	2.8	3.0	3.0	3.4	3.7	3.9	2.5	3.9
27-May	3.7	3.6	3.5	3.5	3.4	3.0	2.8	2.7	2.7	2.5	2.6	4.1	4.7	5.4	3.1	2.7	2.2	2.0	2.0	1.4	1.2	1.2	1.2	1.3	2.8	5.4
28-May	2.4	1.9	1.6	1.3	1.4	1.7	1.7	1.8	1.9	1.7	1.6	1.5	1.5	1.9	2.3	2.3	2.2	2.2	2.4	2.3	2.3	2.3	2.0	1.6	1.9	2.4
29-May	1.9	1.8	1.8	1.8	1.7	1.8	1.8	2.3	3.0	2.6	2.7	2.7	2.9	3.2	3.0	2.9	3.0	3.2	3.1	3.3	4.0	4.3	4.0	3.6	2.8	4.3
30-May	10.3	8.6	13.0	12.6	13.0	13.1	11.7	9.9	8.7	7.1	5.4	7.3	7.0	7.4	7.2	6.5	7.3	9.5	9.6	14.4	12.7	9.2	9.8	10.3	9.6	14.4
31-May	15.4	17.8	29.0	54.3	82.1	121.4	100.4	56.9	35.8	17.0	8.3	7.4	6.5	8.4	10.5	12.1	9.3	11.4	14.1	13.2	13.3	14.8	15.2	18.9	28.9	121.4
																								Diurnal Average		
																								Diurnal Maximum		
M - Maintenance UO - Unstable Operation Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort Chipewyan - May 2015





WBEA

Cumulative Frequency Distribution

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

Fort Chipewyan - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	548	74.66	74.66
6 - 15	171	23.30	97.96
16 - 25	6	0.82	98.77
26 - 80	6	0.82	99.59
> 81.0	3	0.41	100.00

Total Number of Valid Hours: 734

Total Number of Hours: 744



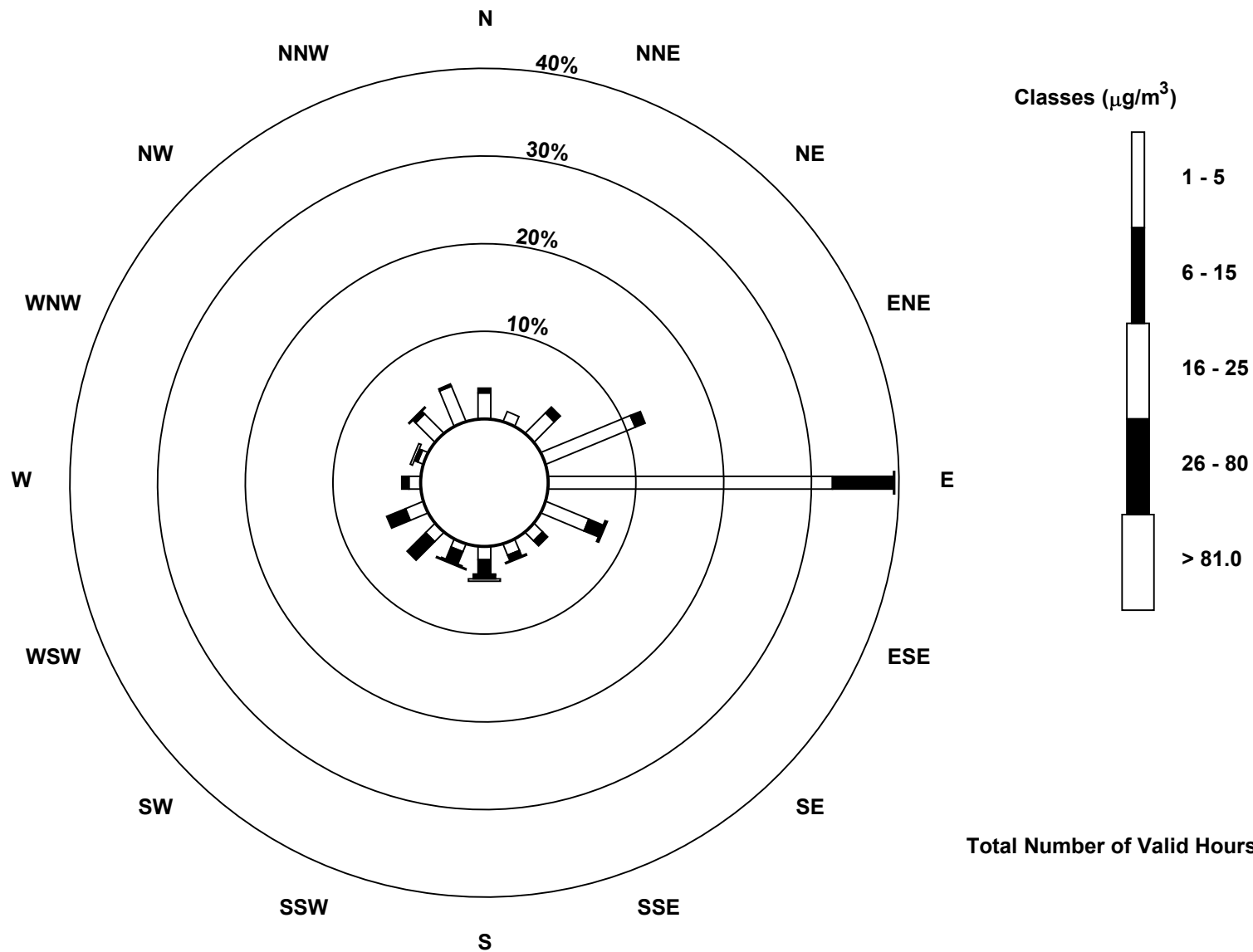
WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort Chipewyan - May 2015

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	22	9	24	81	238	39	10	10	11	7	11	16	10	5	23	32	548
6 - 15	4	0	7	9	51	13	6	5	12	11	22	17	6	3	3	2	171
16 - 25	0	0	0	0	0	1	0	1	1	0	0	0	0	2	1	0	6
26 - 80	0	0	0	0	1	1	0	0	3	1	0	0	0	0	0	0	6
> 81.0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	3
Totals	26	9	31	90	290	54	16	16	29	20	33	33	16	10	27	34	734

Total Number of Valid Hours: 734

Total Number of Hours: 744



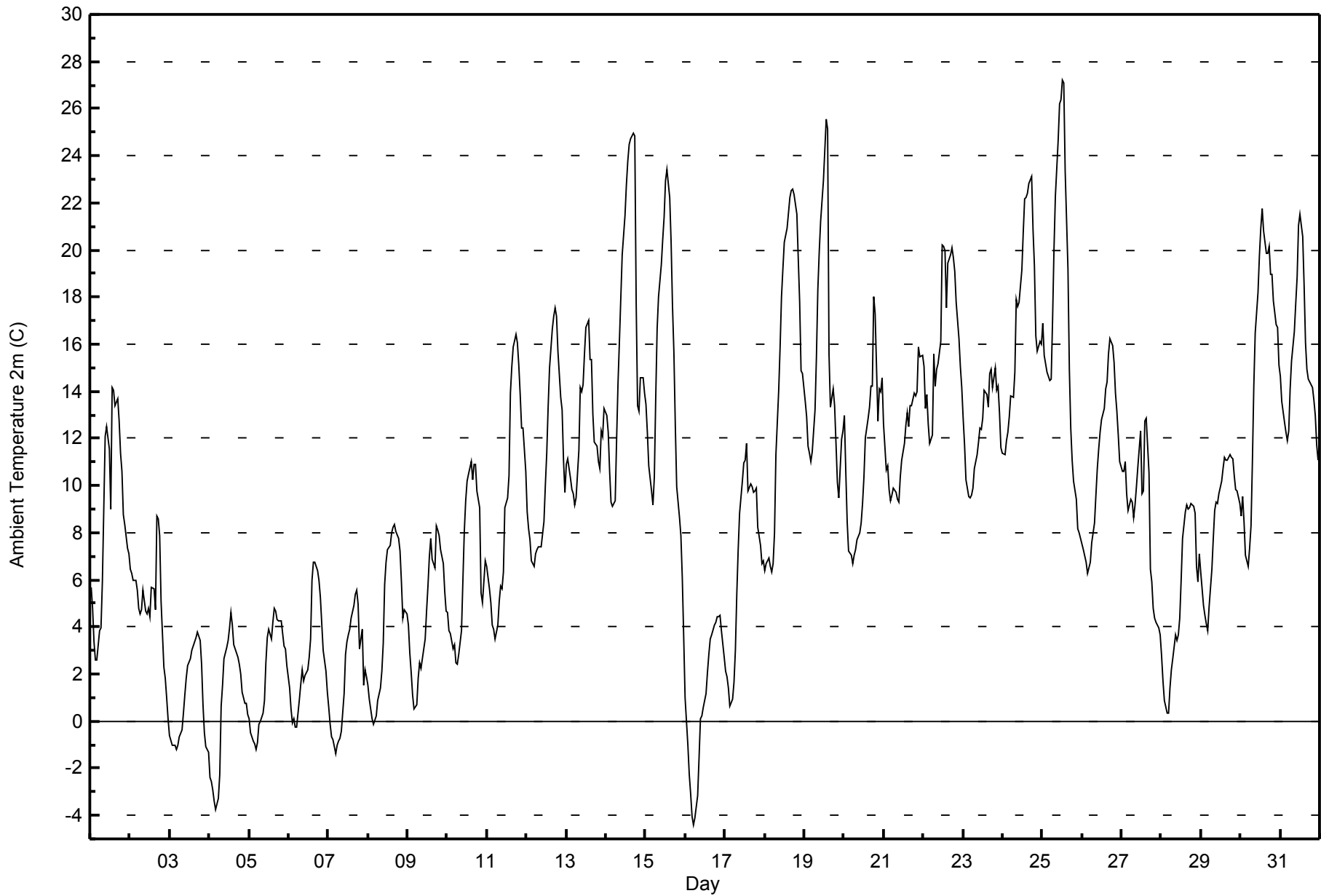


Maximum Value: 27.2 C on May 25 13:00		Maximum Daily Average: 17.2 C on May 24		Hours in Service: 744																																												
Minimum Value: -4.4 C on May 16 06:00		Minimum Daily Average: 0.8 C on May 16		Hours of Data: 744																																												
Maximum Diurnal Average: 13.1 C at hour 15		Minimum Diurnal Average: 5.2 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 9.37 C		Percentiles: P ₁ = -3.1 P ₁₀ = 1.0 Q ₁ = 4.1 Median = 9.3 Q ₃ = 13.9 P ₉₀ = 17.9 P ₉₉ = 24.8		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	5.7	4.8	3.3	2.6	2.6	3.8	3.9	5.9	9.0	12.1	12.5	11.6	9.0	14.2	14.0	13.4	13.7	12.7	11.4	10.6	8.8	8.3	7.4	7.1	8.7	14.2																						
2-May	6.5	6.3	6.0	6.0	5.6	4.8	4.6	4.7	5.6	4.7	4.5	4.8	4.5	5.7	5.6	4.7	8.7	8.6	7.9	5.1	2.3	1.8	1.0	0.1	5.0	8.7																						
3-May	-0.6	-1.0	-1.0	-1.1	-1.2	-1.0	-0.7	-0.4	0.3	1.1	1.8	2.4	2.6	3.0	3.2	3.4	3.6	3.8	3.4	2.4	0.7	-0.5	-1.1	-1.3	0.9	3.8																						
4-May	-2.4	-2.6	-2.9	-3.4	-3.7	-3.3	-2.3	0.6	1.5	2.7	3.2	3.4	3.9	4.6	4.1	3.3	2.9	2.7	2.4	2.0	1.2	0.8	0.7	0.3	0.8	4.6																						
5-May	0.1	-0.5	-0.9	-0.9	-1.2	-0.9	-0.1	0.0	0.3	0.9	2.5	3.6	3.9	3.5	4.2	4.8	4.7	4.3	4.3	4.3	3.7	3.2	3.1	2.3	2.0	4.8																						
6-May	1.4	0.5	-0.1	0.1	-0.3	-0.2	0.9	1.6	2.2	1.7	2.0	2.2	2.7	3.5	6.0	6.7	6.7	6.4	6.0	5.3	4.1	3.0	2.1	1.2	2.7	6.7																						
7-May	0.6	-0.2	-0.6	-0.8	-1.4	-1.0	-0.9	-0.7	-0.4	1.1	2.8	3.3	3.6	3.9	4.4	4.9	5.4	5.6	5.0	3.1	3.9	1.5	2.2	1.9	2.0	5.6																						
8-May	1.5	0.9	0.1	-0.1	0.0	0.2	0.9	1.4	2.1	3.3	5.8	6.7	7.3	7.5	8.0	8.2	8.3	8.0	7.8	7.2	5.9	4.3	4.7	4.5	4.4	8.3																						
9-May	4.1	2.9	2.0	1.1	0.5	0.7	1.8	2.4	2.3	2.7	3.5	4.7	5.7	7.0	7.8	6.8	6.5	8.3	8.1	7.9	7.3	6.7	5.5	4.7	4.6	8.3																						
10-May	4.6	3.8	3.7	3.1	3.3	2.5	2.4	2.8	3.8	6.0	8.0	9.3	10.2	10.5	11.0	10.2	10.9	10.9	9.8	9.1	5.4	5.0	5.9	6.8	6.6	11.0																						
11-May	6.5	5.6	5.0	4.0	3.9	3.5	4.1	5.1	5.8	5.6	6.3	9.0	9.4	10.4	13.9	15.1	15.9	16.4	16.0	15.1	13.8	12.4	12.4	10.6	9.4	16.4																						
12-May	8.9	8.2	7.7	6.8	6.6	7.1	7.3	7.4	7.4	7.4	8.5	10.0	11.4	13.3	15.0	16.6	17.2	17.6	17.2	15.7	13.7	13.2	11.1	9.7	11.0	17.6																						
13-May	10.9	11.1	10.3	9.8	9.7	9.2	9.5	11.5	14.2	14.0	14.3	15.6	16.7	17.0	15.4	15.4	13.0	11.8	11.7	11.0	10.7	12.3	12.1	13.3	12.5	17.0																						
14-May	12.9	12.3	10.6	9.3	9.1	9.4	12.0	14.4	16.1	18.0	19.8	21.5	22.8	23.8	24.5	24.7	25.0	24.8	17.8	13.4	13.1	14.6	14.6	13.9	16.6	25.0																						
15-May	13.5	12.3	10.8	9.7	9.2	10.4	13.7	16.7	18.0	19.4	20.4	21.4	23.0	23.4	22.2	20.3	17.6	15.6	12.5	10.0	8.7	7.9	6.1	3.6	14.4	23.4																						
16-May	1.0	-1.0	-2.2	-3.1	-4.0	-4.4	-4.1	-3.1	-1.6	0.1	0.2	0.6	1.2	2.1	2.8	3.5	3.7	4.1	4.2	4.4	4.5	4.5	3.9	2.7	0.8	4.5																						
17-May	2.1	1.9	1.4	0.6	0.9	1.7	3.0	5.4	7.3	8.8	10.2	10.9	11.1	11.8	9.8	10.0	9.9	9.7	9.8	9.9	8.2	7.4	6.7	6.8	6.9	11.8																						
18-May	6.4	6.7	6.9	6.6	6.3	6.7	8.0	11.3	14.0	15.9	18.0	19.2	20.3	20.9	21.6	22.2	22.5	22.6	22.4	21.5	19.6	17.8	14.9	14.7	15.3	22.6																						
19-May	13.6	12.9	11.7	11.4	11.0	11.4	13.2	15.5	18.3	19.9	21.2	22.9	24.3	25.6	25.1	15.6	13.3	14.1	13.4	11.8	10.1	9.5	12.0	12.3	15.4	25.6																						
20-May	13.0	10.6	8.5	7.2	7.1	6.7	7.1	7.3	7.7	8.0	8.4	9.2	10.3	12.0	12.8	13.3	14.2	14.2	18.0	17.3	12.8	14.1	14.0	14.6	11.2	18.0																						
21-May	12.6	10.7	10.9	9.8	9.4	9.6	9.9	9.7	9.4	9.3	10.3	11.1	11.8	12.6	13.1	12.5	13.4	13.4	14.0	13.8	14.0	15.9	15.4	15.5	12.0	15.9																						
22-May	15.0	13.3	13.9	12.6	11.8	12.1	15.6	14.2	14.9	15.1	16.1	20.2	20.1	20.0	17.5	19.5	19.8	20.1	19.7	19.1	17.8	16.2	15.0	14.2	16.4	20.2																						
23-May	12.8	11.8	10.3	9.6	9.5	9.6	9.9	10.7	11.3	11.9	12.4	12.4	12.9	14.1	13.9	13.3	14.7	15.0	14.1	15.0	14.0	14.2	13.1	11.6	12.4	15.0																						
24-May	11.4	11.3	11.9	12.2	12.9	13.8	13.7	14.8	17.9	17.6	17.8	19.2	20.8	22.2	22.2	22.4	22.8	23.1	20.9	19.3	16.3	15.7	16.1	16.0	17.2	23.1																						
25-May	16.9	15.5	15.2	14.8	14.5	14.5	17.1	20.0	22.3	24.6	26.2	26.4	27.2	27.1	23.4	19.2	15.0	12.5	11.1	10.2	9.4	8.2	8.0	7.8	17.0	27.2																						
26-May	7.5	7.3	6.8	6.3	6.5	6.7	7.6	8.4	9.6	10.7	11.6	12.3	12.8	13.3	14.1	14.4	15.6	16.2	15.9	15.2	13.9	13.1	12.1	11.0	11.2	16.2																						
27-May	10.6	10.6	11.0	9.7	8.9	9.4	9.3	8.6	9.2	10.0	10.8	12.3	9.7	9.8	12.8	12.9	10.5	6.5	5.9	4.8	4.4	4.2	4.0	3.7	8.7	12.9																						
28-May	2.8	1.7	0.9	0.3	0.3	1.4	2.2	2.6	3.7	3.4	3.6	4.4	5.9	7.8	8.9	9.2	9.0	9.1	9.2	9.1	8.8	6.6	5.9	7.1	5.2	9.2																						
29-May	6.3	4.9	4.5	4.1	3.8	4.8	6.5	7.8	8.9	9.3	9.2	9.6	10.2	10.7	11.2	11.1	11.0	11.3	11.2	11.1	10.4	9.9	9.8	9.3	8.6	11.3																						
30-May	8.7	9.6	8.5	7.0	6.5	7.4	8.3	11.0	14.2	16.5	18.2	19.7	20.9	21.8	20.8	19.9	19.8	20.2	18.9	19.0	17.8	16.8	16.7	15.1	15.1	21.8																						
31-May	14.6	13.6	12.7	12.3	11.9	12.3	14.1	15.3	16.6	17.7	18.9	21.0	21.5	20.6	18.5	16.0	15.0	14.5	14.4	14.1	13.7	13.0	11.7	11.1	15.2	21.5																						
																								7.4	6.6	6.0	5.4	5.2	5.4	6.4	7.5	8.8	9.7	10.6	11.6	12.2	13.0	13.1	12.7	12.6	12.4	11.8	10.9	9.7	9.1	8.6	8.1	Diurnal Average
																								16.9	15.5	15.2	14.8	14.5	14.5	17.1	20.0	22.3	24.6	26.2	26.4	27.2	27.1	25.1	24.7	25.0	24.8	22.4	21.5	19.6	17.8	16.7	16.0	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature 2m (AT 2m) - C
Fort Chipewyan - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	44	5.91	5.91
0 - 10	367	49.33	55.24
10 - 20	282	37.90	93.15
> 20	51	6.85	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

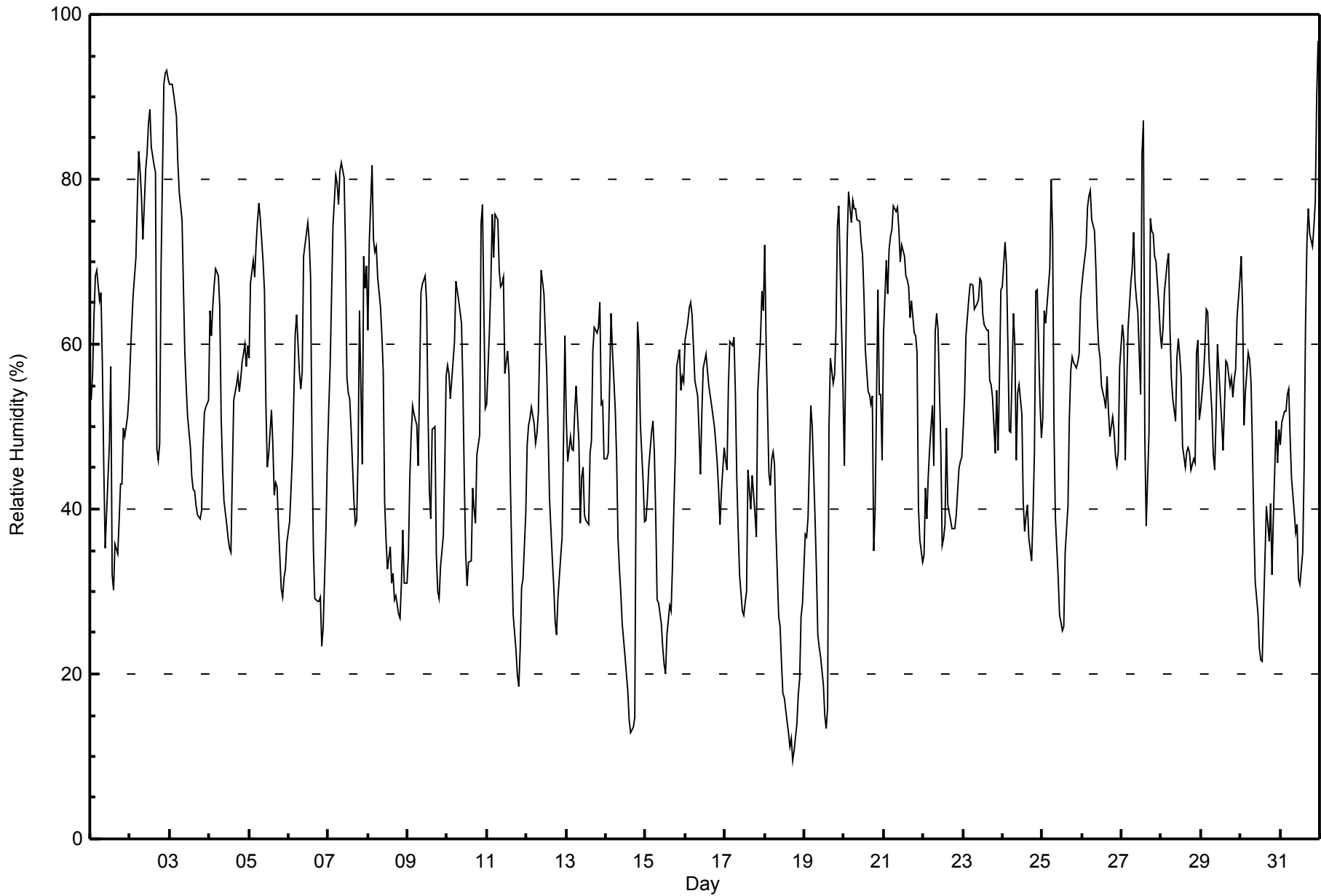
Fort Chipewyan - May 2015

Maximum Value: 97 % on Jun 1 00:00																		Maximum Daily Average: 75.6 % on May 2																		Hours in Service: 744													
Minimum Value: 9 % on May 18 18:00																		Minimum Daily Average: 28.4 % on May 18																		Hours of Data: 744													
Maximum Diurnal Average: 63.8 % at hour 6																		Minimum Diurnal Average: 42.8 % at hour 15																		Hours of Missing Data: 0													
Monthly Average: 52.1 %																		Percentiles: P ₁ = 14 P ₁₀ = 30 Q ₁ = 40 Median = 52 Q ₃ = 64 P ₉₀ = 73 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-May	53	56	63	68	69	65	66	57	45	35	40	48	57	32	30	36	35	39	43	43	50	49	51	54	49.4	69																							
2-May	58	62	66	71	77	83	81	78	73	81	83	87	88	84	82	81	47	46	48	69	91	93	93	92	75.6	93																							
3-May	92	91	90	89	88	82	78	75	67	59	55	51	47	44	42	42	41	39	39	40	47	52	52	53	60.7	92																							
4-May	64	61	64	67	69	68	64	51	45	41	38	37	35	35	44	53	55	56	54	56	58	60	57	60	53.9	69																							
5-May	58	67	70	68	72	75	77	75	70	66	53	45	47	52	48	42	43	43	38	30	29	32	33	36	52.9	77																							
6-May	39	42	47	54	61	64	57	55	57	71	72	75	73	68	48	35	29	29	29	29	23	26	37	46	48.5	75																							
7-May	52	57	66	74	80	80	77	81	82	80	71	56	54	53	50	41	38	39	47	64	45	71	67	69	62.3	82																							
8-May	62	72	82	73	71	72	68	65	61	57	41	36	33	35	31	32	29	30	27	27	31	37	31	31	47.2	82																							
9-May	34	44	49	53	51	50	45	55	66	67	68	65	52	42	39	50	50	34	30	29	33	37	45	56	47.8	68																							
10-May	57	56	53	58	60	68	66	65	63	55	44	34	31	34	34	43	40	38	47	49	75	77	64	52	52.6	77																							
11-May	53	62	67	76	70	76	75	69	67	67	68	56	59	56	43	34	27	23	20	19	23	30	31	40	50.5	76																							
12-May	48	50	51	52	50	48	49	52	60	69	66	61	57	49	41	34	31	26	25	29	34	37	48	61	47.1	69																							
13-May	51	46	49	47	47	52	55	48	38	44	45	39	39	38	47	48	59	62	61	62	65	53	53	46	49.8	65																							
14-May	46	47	55	64	59	52	46	36	33	30	26	22	20	18	14	13	14	15	45	63	60	50	43	38	37.9	64																							
15-May	39	41	45	49	51	47	39	29	29	26	23	21	20	25	28	28	33	40	46	57	59	54	56	55	39.3	59																							
16-May	60	63	64	65	64	60	56	54	49	44	52	57	59	57	55	54	53	50	48	46	42	38	42	48	53.3	65																							
17-May	46	45	55	60	60	61	54	44	38	32	28	27	29	30	45	40	44	42	40	37	54	61	66	64	45.8	66																							
18-May	72	60	44	43	46	47	45	38	27	26	21	18	17	14	13	11	12	9	11	14	17	20	27	28	28.4	72																							
19-May	37	37	39	46	52	50	39	33	25	23	22	19	15	13	16	50	58	55	56	62	74	77	62	55	42.3	77																							
20-May	45	59	73	78	75	77	76	76	75	75	72	71	66	59	54	54	53	54	35	40	67	54	54	46	62.0	78																							
21-May	61	70	66	72	73	74	77	76	77	74	70	72	71	68	68	67	63	65	61	61	59	40	36	34	64.8	77																							
22-May	34	43	39	44	47	53	45	61	64	62	48	36	37	38	50	40	39	38	38	38	39	45	46	46	44.5	64																							
23-May	50	54	61	65	67	67	67	64	65	65	68	68	64	62	62	62	56	55	54	47	54	47	56	67	60.2	68																							
24-May	67	72	69	60	49	49	64	60	46	54	55	51	41	37	39	40	36	34	39	47	67	67	53	49	51.9	72																							
25-May	51	64	62	65	69	80	74	50	39	32	27	26	25	26	35	40	51	57	59	58	57	58	65	65	51.2	80																							
26-May	67	69	72	77	78	79	75	74	69	63	60	58	55	53	52	56	52	49	51	49	46	45	47	57	60.6	79																							
27-May	62	61	46	54	62	67	69	74	68	65	64	54	83	87	49	38	49	75	74	73	71	70	65	62	64.3	87																							
28-May	60	62	66	70	71	62	56	53	51	58	61	59	56	48	45	47	47	47	45	46	46	59	61	51	55.2	71																							
29-May	52	56	60	64	64	58	52	47	45	51	60	57	51	47	52	58	58	55	56	54	56	57	63	68	55.8	68																							
30-May	71	64	50	54	59	58	55	47	38	31	27	23	22	22	28	40	38	36	41	32	39	51	46	50	42.6	71																							
31-May	48	50	52	52	54	55	49	44	39	37	38	31	31	35	45	62	72	76	73	72	74	77	90	97	56.4	97																							
																								54.5	57.6	59.3	62.3	63.5	63.8	61.3	57.6	53.9	53.0	50.5	47.1	46.2	44.0	42.8	44.3	43.6	43.7	44.5	46.5	51.2	52.3	52.8	54.1	Diurnal Average	
																								92	91	90	89	88	83	81	81	82	81	83	87	88	87	82	81	72	76	74	73	91	93	93	97	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Fort Chipewyan - May 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Fort Chipewyan - May 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	23	3.09	3.09
20 - 40	160	21.51	24.60
40 - 60	318	42.74	67.34
60 - 80	214	28.76	96.10
80 - 100	29	3.90	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

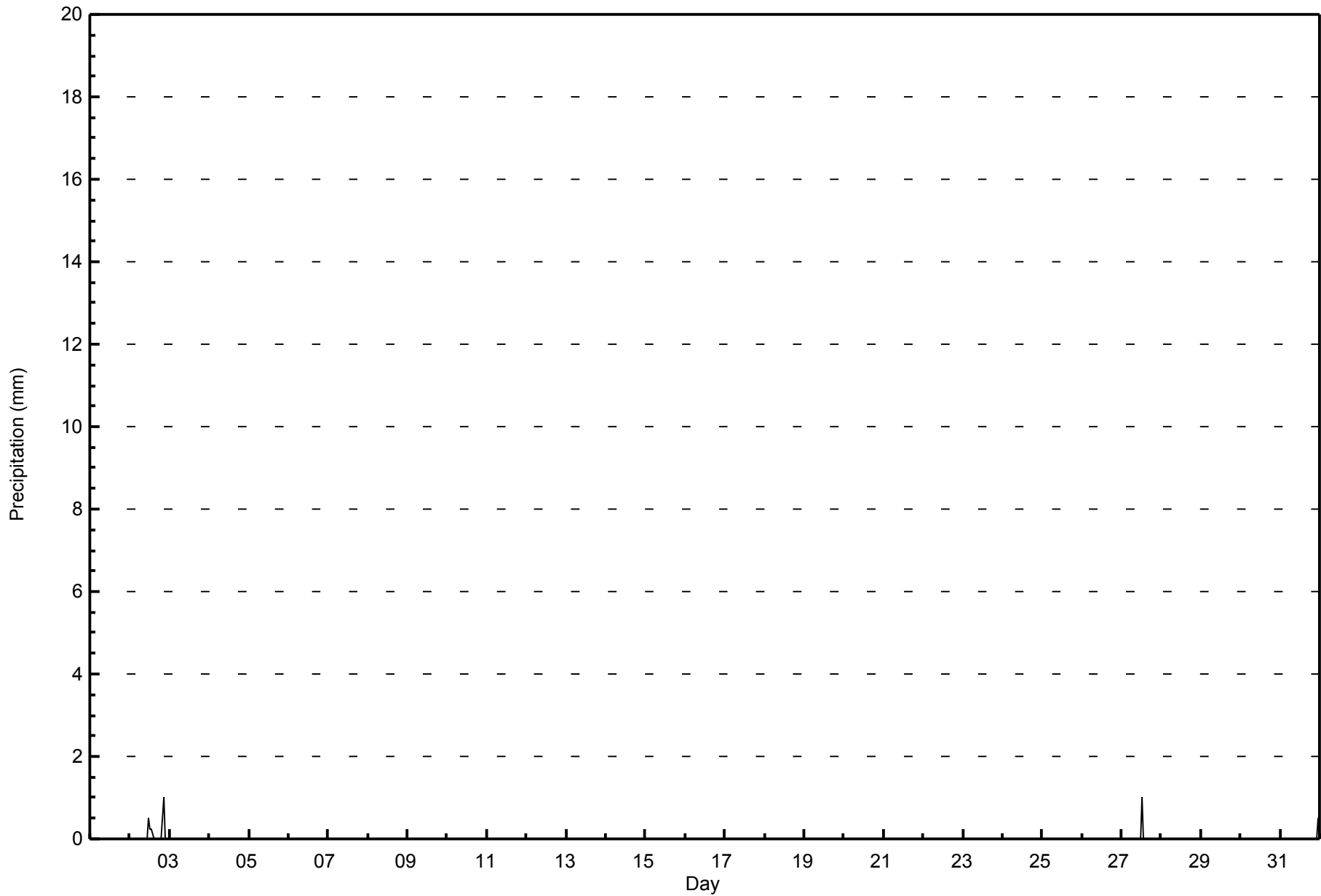


Maximum Value: 1.0 mm on May 2 21:00		Maximum Daily Total: 2.0 mm on May 2		Hours in Service: 744																															
Minimum Value: 0.0 mm on May 1 01:00		Minimum Daily Total: 0.0 mm on May 1		Hours of Data: 744																															
Maximum Diurnal Total: 1.3 mm at hour 13		Minimum Diurnal Total: 0.0 mm at hour 1		Hours of Missing Data: 0																															
Monthly Total: 3.56 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 = -0.2		Hours of Calibration: 0																															
				Percent Operational Time: 100.0																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	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	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.0
3-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
17-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	
28-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.5			Diurnal Average							
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.5			Diurnal Maximum								



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Fort Chipewyan - May 2015





WBEA
Cumulative Frequency Distribution

Precipitation (PC) - mm
Fort Chipewyan - May 2015

Concentration Ranges (mm)	Number of Hours	%	Cumulative %
0 - 0.3	740	99.46	99.46
0.4 - 0.5	2	0.27	99.73
0.6 - 0.7	0	0.00	99.73
0.8 - 1.4	2	0.27	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

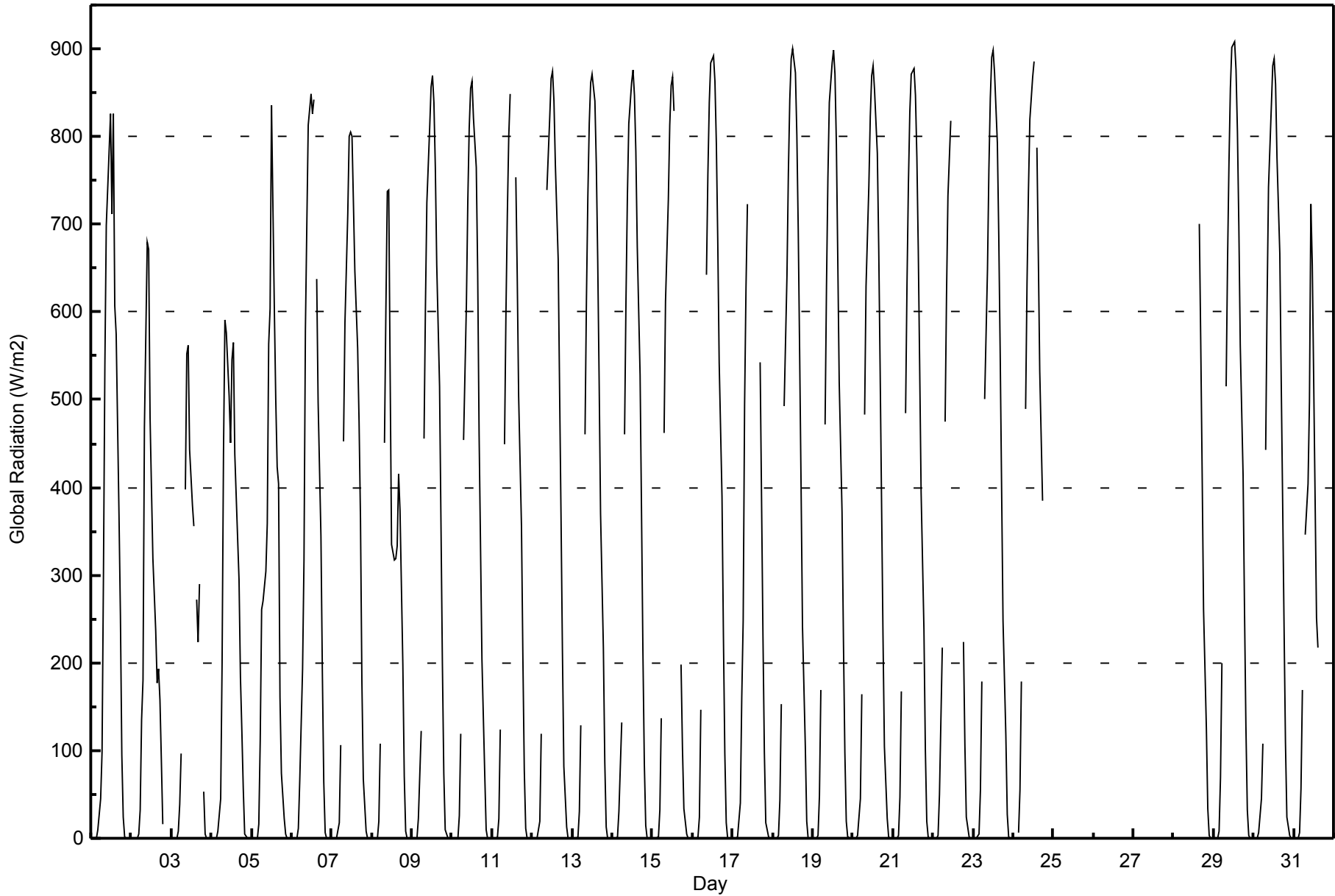


Maximum Value: 908 W/m2 on May 29 13:00		Maximum Daily Average: 376.6 W/m2 on May 29		Hours in Service: 744																							
Minimum Value: 0 W/m2 on May 1 23:00		Minimum Daily Average: 175.2 W/m2 on May 3		Hours of Data: 594																							
Maximum Diurnal Average: 783.6 W/m2 at hour 12		Minimum Diurnal Average: 0.0 W/m2 at hour 23		Hours of Missing Data: 150																							
Monthly Average: 306.8 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 179 Q ₃ = 612 P ₉₀ = 821 P ₉₉ = 890		Hours of Calibration: 0																							
				Percent Operational Time: 79.8																							
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-May	0	0	1	0	10	45	98	301	539	699	740	826	711	827	606	574	369	255	95	23	2	0	0	0	280.1	827	
2-May	0	0	0	0	4	33	135	180	468	679	672	480	398	318	237	177	193	158	89	15	AF	AF	0	0	192.6	679	
3-May	0	0	0	0	7	39	97	AF	397	552	563	444	380	356	AF	273	223	290	AF	54	5	0	0	0	175.2	563	
4-May	0	0	0	0	8	45	199	439	591	577	505	451	547	566	437	390	295	184	122	56	5	0	0	0	225.7	591	
5-May	0	0	0	0	16	111	261	270	305	359	564	604	836	604	500	424	404	161	75	23	4	0	0	0	230.0	836	
6-May	0	0	0	0	11	66	193	317	580	699	813	849	827	843	M	638	497	344	191	65	6	0	0	0	301.7	849	
7-May	0	0	0	0	17	106	AF	452	588	711	800	806	801	725	647	559	475	364	179	68	8	0	0	0	317.7	806	
8-May	0	0	0	0	19	108	AF	451	604	738	739	530	334	317	319	334	415	373	198	71	8	0	0	0	241.7	739	
9-May	0	0	0	0	23	122	AF	456	608	725	809	857	869	839	764	654	515	359	200	74	9	0	0	0	342.8	869	
10-May	0	0	0	1	25	120	AF	454	608	726	809	855	863	822	765	644	460	334	205	72	9	0	0	0	338.0	863	
11-May	0	0	0	1	23	125	AF	450	598	711	800	848	AF	AF	754	641	505	356	206	77	11	0	0	0	290.7	848	
12-May	0	0	0	1	20	119	AF	453	AF	740	821	867	875	840	768	660	511	369	214	83	12	0	0	0	334.1	875	
13-May	0	0	0	1	31	128	AF	460	614	731	816	861	871	840	769	658	522	371	217	86	13	0	0	0	347.4	871	
14-May	0	0	0	1	30	132	AF	461	612	730	815	862	876	847	782	675	528	373	213	86	14	0	0	0	349.6	876	
15-May	0	0	0	1	32	138	AF	463	612	728	813	859	867	830	AF	AF	AF	198	103	33	4	0	0	0	284.0	867	
16-May	0	0	0	2	24	147	AF	AF	643	756	839	884	892	863	792	681	542	389	231	97	17	1	0	0	354.6	892	
17-May	0	0	0	2	40	160	247	494	627	724	AF	AF	AF	AF	AF	AF	543	388	231	98	18	1	0	0	198.6	724	
18-May	0	0	0	3	43	154	AF	492	641	758	842	889	900	873	802	693	551	401	241	104	19	1	0	0	365.5	900	
19-May	0	0	0	2	48	169	AF	472	630	754	839	885	898	871	791	659	521	373	225	98	20	1	0	0	358.9	898	
20-May	0	0	0	3	45	165	AF	482	629	743	823	870	880	853	782	671	532	382	232	104	22	1	0	0	357.5	880	
21-May	0	0	0	4	47	168	AF	485	631	745	827	871	877	847	776	670	535	395	238	101	19	1	0	0	358.2	877	
22-May	0	0	0	4	50	218	AF	474	620	733	818	MS	MS	AF	AF	AF	AF	AF	224	106	24	2	0	0	--	818	
23-May	0	0	0	5	55	179	AF	501	649	764	844	891	899	873	793	686	552	399	248	118	27	2	0	0	368.9	899	
24-May	0	0	MS	6	55	179	AF	489	632	738	819	867	885	MS	787	664	533	384	MS	MS	MS	MS	MS	MS	--	885	
25-May	MS	MS	MS	MS	MS	MS	MS	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
26-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
27-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
28-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	700	567	418	261	125	34	3	0	0	--	700
29-May	0	0	0	8	70	199	AF	515	658	770	855	902	908	877	805	698	562	414	260	128	32	3	0	0	376.6	908	
30-May	0	0	1	7	45	108	AF	444	612	743	834	881	889	860	777	666	522	385	243	110	24	3	0	0	354.4	889	
31-May	0	0	0	7	56	170	AF	346	404	498	723	654	521	251	218	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	723	
																								Diurnal Average			
																								Diurnal Maximum			
0.0 0.0 0.1 2.2 31.7 127.8 175.5 432.1 580.8 697.4 774.6 783.6 775.2 727.9 666.8 587.1 474.9 339.1 197.7 79.8 14.7 0.8 0.0 0.0																											
0 0 1 8 70 218 261 515 658 770 855 902 908 877 805 700 567 418 261 128 34 3 0 0																											
M - Maintenance AF - Analyzer Failure MS - Missing																											



WBEA
Hourly Averages

Global Radiation (GR) - W/m²
Fort Chipewyan - May 2015





WBEA
Cumulative Frequency Distribution

Global Radiation (GR) - W/m2
Fort Chipewyan - May 2015

Concentration Ranges (W/m2)	Number of Hours	%	Cumulative %
0 - 20	213	35.86	35.86
21 - 100	51	8.59	44.44
101 - 300	73	12.29	56.73
301 - 600	102	17.17	73.91
601 - 900	153	25.76	99.66
> 900	2	0.34	100.00

Total Number of Valid Hours: 594

Total Number of Hours: 744



Maximum Speed: 49 km/h on May 25 17:00	Maximum Daily Speed Average: 20.9 km/h on May 9	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 24 05:00	Minimum Daily Speed Average: 3.9 km/h on May 19	Hours of Data: 744
Maximum Diurnal Speed Average: 15.1 km/h at hour 17	Minimum Diurnal Speed Average: 3.9 km/h at hour 5	Hours of Missing Data: 0
Monthly Average Velocity: 8.9 km/h 86.8 deg	Percentiles: P ₁ = 3 P ₁₀ = 7 Q ₁ = 11 Median = 15 Q ₃ = 20 P ₉₀ = 25 P ₉₉ = 32	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	SW6	WSW7	S3	SW6	WSW10	W8	SW5	W10	W9	W7	SSE9	ESE13	ESE14	SW9	SW26	SSW24	NW2	NE7	W6	WNW8	NNW5	NE5	NNW10	NNW10	WSW3.9	SW26
2-May	N13	N14	N13	N13	NNW12	NNW12	NNW14	NNW13	N9	ESE13	ESE14	E15	E10	E12	E16	E8	NNW13	NNW11	NNW12	NNW19	NNW15	NW11	NW10	NW11	N7.8	NNW19
3-May	NW10	NW11	NW13	NW12	NW11	NW13	NW15	NW15	NNW16	NNW16	NNW14	NNW13	NW16	NW16	NW14	NW14	NW14	NW14	NNW13	NNW9	N7	NNE9	N8	NNW5	NW12.0	NNW16
4-May	WNW6	NW8	NNW8	NNW9	N10	N8	N5	N4	NNW7	NNE1	NW10	NW10	NNW12	NW3	E9	E15	E17	E15	E16	E12	ENE10	ENE11	ENE11	ENE9	NE5.1	E17
5-May	ENE9	E7	ENE9	ENE8	ENE7	ENE8	E11	ESE12	ESE11	E12	E13	E20	E22	E20	E23	E25	E26	ENE23	ENE21	NE12	NNE10	NE15	NE15	ENE11	ENE13.6	E26
6-May	N11	N11	NNE10	NE12	NE14	ENE13	ENE14	ENE16	E16	E20	E23	E24	E22	E24	E27	E28	ENE28	ENE26	ENE22	ENE16	NE15	ENE13	ENE14	ENE10	ENE16.4	E28
7-May	ENE11	ENE12	ENE12	E14	ENE11	E16	E19	E19	E17	E15	E20	E23	E23	E24	E27	E28	E29	E21	E15	E11	E10	ESE11	E12	E9	E16.9	E29
8-May	E10	E11	E13	E14	E14	E18	E19	E20	E20	E21	E25	E25	E23	ENE21	ENE22	ENE17	ENE25	ENE27	ENE26	ENE25	ENE20	ENE17	ENE21	E25	ENE19.6	ENE27
9-May	E26	E24	E18	ENE12	ENE11	ENE12	ENE14	E18	E21	E20	ESE17	E20	E25	E28	E27	E24	E25	ENE26	ENE27	ENE24	ENE24	ENE24	E24	E22	E20.9	E28
10-May	E22	ESE19	SE20	E19	E22	E22	E23	E23	E25	E29	E28	E28	E29	E26	E24	E23	E20	E21	E17	E13	ESE14	E8	E8	E15	E20.3	E29
11-May	E16	E16	E13	ESE14	E14	E12	E13	E16	E19	ESE14	ESE20	E22	E21	E24	E24	E25	ENE25	ENE24	ENE25	ENE26	ENE30	ENE29	ENE28	E29	E20.0	ENE30
12-May	E26	E22	E21	E20	ENE20	E24	E24	E26	E23	E20	E24	E24	E23	E22	E22	ENE22	ENE22	ENE19	NE15	ENE17	ENE17	ENE18	E22	ESE18	E20.8	E26
13-May	SSE19	S21	S18	S14	SE10	ESE11	ESE11	SE14	SE13	E13	E14	E15	E16	E17	E18	E18	ESE15	ESE14	ESE17	ESE12	ESE9	E10	E12	ESE12	ESE12.4	S21
14-May	S17	S8	ESE8	ESE6	SSW5	SW12	WSW11	W15	WSW15	WSW14	SW16	WSW16	SW17	WSW14	WSW13	WSW16	WSW14	WSW14	ESE4	E10	E9	SSE3	SW11	SW14	SW8.5	SW17
15-May	SW12	WSW9	SW10	SW11	SW13	SW11	SW14	WSW19	WSW21	WSW19	WSW22	W22	W18	NW19	NNW20	NNW22	NNW26	NNW21	NNW23	NNW18	NNW14	N17	N18	N18	WNW11.4	NNW26
16-May	NNW18	N19	NNW18	NNW16	N14	N16	NNE18	N13	NNE12	NNE12	E13	ESE16	ESE17	E18	E20	E22	E23	E23	E20	E19	ESE18	SE17	SE17	SSE16	ENE10.2	E23
17-May	SSE16	S16	SSE16	SSE15	S14	S14	S16	S19	SSW18	SSW18	SSW15	SSE13	SSE17	SE16	E25	E24	E22	E22	E20	E16	E16	E14	E14	E13	SE12.2	E25
18-May	ESE12	SE7	SSE7	S8	SSW10	SSW11	SSW11	SSW10	WSW16	SW14	SW16	WSW18	WSW18	WSW19	W16	WSW15	WSW16	WSW14	WSW11	WSW8	SW7	SW8	S2	SSW3	SW9.5	WSW19
19-May	SW4	SW5	WSW6	W9	W9	NNW10	W17	W16	WSW15	WSW15	SW17	WSW15	WSW13	S8	SSW11	ESE10	E11	E9	E9	E8	E7	E7	ENE6	E9	SW3.9	SW17
20-May	E9	E7	SE3	ESE12	ESE13	E16	E17	E19	E18	E21	E25	E24	E25	E27	E28	E26	E24	E21	E23	E18	ESE13	E12	E13	E17	E17.7	E28
21-May	E17	E15	E14	E15	E14	E10	E11	E13	E16	E20	E19	ESE17	ESE16	E12	E13	E13	ESE14	ESE12	ESE13	ESE12	E4	NE4	E4	N8	E12.4	E20
22-May	NE4	N5	N6	NE6	NNW6	NNW4	E1	ESE4	E7	E14	E26	E30	E31	E28	E21	E29	ENE35	ENE29	ENE22	ENE20	ENE23	ENE23	ENE19	ENE21	ENE16.0	ENE35
23-May	ENE18	ENE19	ENE13	E15	E17	E15	E18	E17	E16	E17	E17	E17	E17	E16	E17	E16	E14	E14	E10	E6	E5	E6	E8	E14.2	ENE19	
24-May	E10	E8	E6	SSE3	SE1	E2	E6	E6	E5	E9	E11	E13	E21	E21	E20	E16	ESE12	E13	E16	E9	ESE6	E4	ENE3	E8	E9.5	E21
25-May	E11	E8	E7	ESE3	WSW4	WSW6	W10	NNW12	NW9	NNW10	NW12	NNW15	NNW14	NW17	NE21	ENE43	NE49	NE45	NE42	NE35	NE26	NE23	NE25	ENE28	NE13.2	NE49
26-May	ENE28	ENE25	ENE21	ENE18	ENE14	ENE11	ENE7	ESE7	SE7	ESE10	ESE18	E22	E23	E22	E23	E25	E16	E12	ENE12	ENE8	NE11	NE11	ENE7	ENE7	E14.5	ENE28
27-May	ENE8	ENE9	ENE8	ENE9	ENE11	ENE12	E15	E20	E15	E12	E13	N11	NNW12	NNW10	N18	N19	NE27	ENE40	ENE34	ENE37	ENE31	ENE24	ENE19	NE19	ENE15.1	ENE40
28-May	NE16	NE19	NE17	NE15	NNE13	NE13	NE13	NE9	NE9	ESE14	ESE18	ESE16	ESE16	ESE14	ESE15	E20	E21	E21	E17	E18	E15	ENE16	E15	SE25	E14.0	SE25
29-May	SE18	S18	SSE11	S12	SSW11	S13	SSE7	SE9	SE12	E18	E22	E24	E25	E25	E24	E25	E23	E22	E20	E18	E15	ENE16	E16	ENE14	ESE14.7	E25
30-May	E13	ESE12	S10	SW12	SW13	SW13	SW13	SSW11	SW9	SW11	SW14	WSW15	SW12	SSW11	E12	E16	E16	E14	E19	E17	E13	SE6	S16	S14	SSE6.1	E19
31-May	S19	S21	S20	SSW18	SSW18	S17	S20	S21	S19	SSE17	SE18	SSE20	SSE25	SSW22	SW28	SSW32	SSW28	S22	S18	SSW15	SW8	W7	W9	WNW8	S16.8	SSW32

E7.7	E6.4	E5.6	E5.1	E3.9	E4.2	E5.0	ESE5.2	ESE5.5	ESE7.6	ESE10.1	ESE10.0	ESE10.7	E10.1	E12.4	E14.2	E15	ENE14.4	ENE14.4	ENE12	ENE10.6	ENE10.0	ENE9.3	E8.8		Diurnal Average
ENE28	ENE25	ENE21	E20	E22	E24	E24	E26	E25	E29	E28	E30	E31	E28	E28	ENE43	NE49	NE45	NE42	ENE37	ENE31	ENE29	ENE28	E29		Diurnal Maximum

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

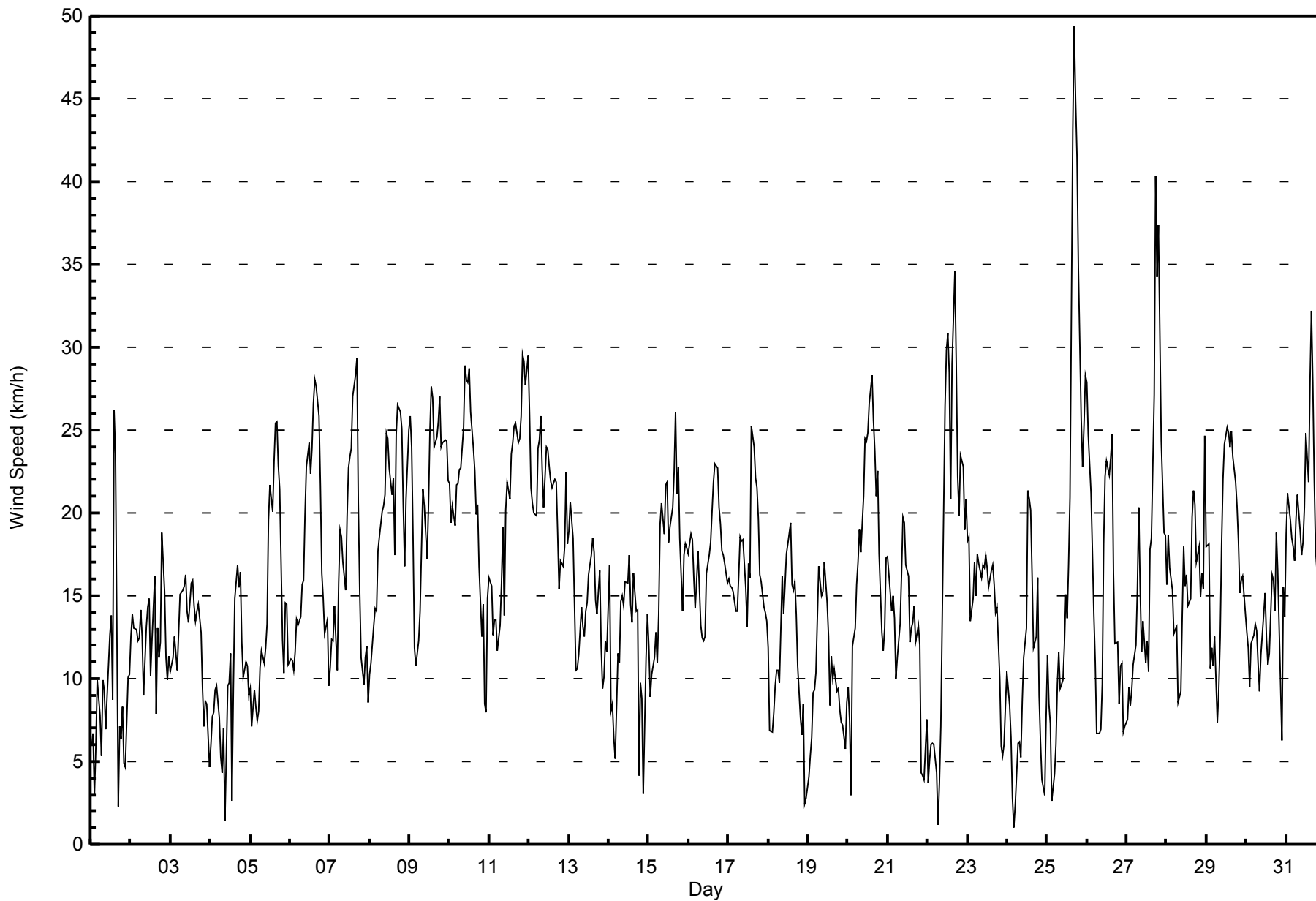
Fort Chipewyan - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 15 km/h on May 27 17:00 Minimum Value: 1 km/h on May 5 01:00 Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 5 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-May	2	2	1	3	2	2	2	2	3	3	1	2	4	7	9	6	5	5	4	2	2	2	2	2	9
2-May	3	3	4	4	3	3	4	5	3	2	3	2	2	2	3	5	4	4	4	6	5	4	2	2	6
3-May	2	3	3	3	3	4	4	5	5	5	5	5	6	5	5	5	5	6	4	3	2	2	1	1	6
4-May	1	1	1	2	1	1	1	3	3	3	4	4	4	3	5	3	3	3	2	2	1	1	1	1	5
5-May	1	2	1	1	2	1	1	1	1	1	1	3	1	2	3	2	3	2	4	3	2	3	2	2	4
6-May	2	2	3	3	3	3	4	3	2	3	2	2	2	2	3	3	4	4	4	3	2	2	2	1	4
7-May	1	1	2	3	1	3	2	1	2	2	1	2	2	1	2	3	3	2	2	1	1	2	2	1	3
8-May	2	1	4	1	1	1	2	1	1	1	2	2	3	3	4	3	3	4	4	4	3	2	3	3	4
9-May	3	3	2	4	1	2	2	3	1	2	2	2	2	2	3	2	2	3	4	3	3	3	2	2	4
10-May	2	2	3	2	2	2	2	2	3	2	2	2	2	3	2	2	2	2	2	3	2	5	2	2	5
11-May	2	2	1	2	3	3	2	2	2	4	2	1	2	1	3	3	3	4	5	4	4	4	4	3	5
12-May	3	2	2	3	3	3	2	2	3	2	1	1	2	2	3	2	3	4	4	3	2	2	2	2	4
13-May	4	2	3	3	4	1	1	2	3	1	1	1	2	2	2	2	2	5	3	3	1	2	2	5	5
14-May	5	5	1	2	4	1	3	5	4	3	4	4	3	3	4	4	4	4	3	1	1	1	2	1	5
15-May	2	2	2	2	2	2	3	4	5	4	5	6	5	7	7	8	9	8	8	7	5	6	6	6	9
16-May	6	6	6	5	5	6	5	5	5	4	4	2	2	2	2	2	2	2	1	1	3	3	2	2	6
17-May	1	1	1	1	2	2	2	5	3	3	4	4	4	4	3	2	2	2	2	2	1	1	1	1	5
18-May	1	2	1	1	1	2	2	2	3	3	4	4	4	5	4	4	4	3	3	2	1	1	1	1	5
19-May	1	2	2	3	2	2	4	3	4	4	3	4	3	3	4	2	2	1	1	1	1	1	2	2	4
20-May	1	2	2	2	2	1	2	2	3	1	2	1	2	2	2	2	2	2	2	2	2	3	2	1	3
21-May	2	2	2	1	1	2	1	2	1	2	1	2	2	3	3	4	3	1	1	2	2	3	2	2	4
22-May	1	5	2	2	3	2	1	1	3	5	6	4	3	3	2	6	5	5	4	3	4	4	2	3	6
23-May	2	3	2	2	2	3	2	2	1	1	1	1	2	2	1	1	1	1	2	2	1	1	1	1	3
24-May	1	1	1	1	1	2	2	1	1	2	3	2	3	2	1	1	1	1	2	3	2	1	2	2	3
25-May	1	1	1	1	3	2	2	3	3	4	4	5	6	6	13	8	10	8	7	7	5	4	5	5	13
26-May	4	3	3	2	4	1	2	1	1	3	2	2	2	2	2	3	3	1	2	2	2	1	1	2	4
27-May	1	1	1	2	1	2	2	2	4	2	3	5	4	2	7	7	15	6	6	7	6	4	4	4	15
28-May	3	3	3	3	3	3	4	3	4	3	2	2	2	3	4	4	3	3	2	2	2	3	7	3	7
29-May	2	2	3	2	3	2	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	3	2	3	3
30-May	2	2	2	2	2	2	2	2	2	3	3	4	4	3	3	2	1	4	3	2	2	3	1	2	4
31-May	2	2	2	2	2	2	3	3	2	4	4	5	5	5	6	6	4	5	3	3	3	1	2	2	6
Diurnal Maximum																									



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Fort Chipewyan - May 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort Chipewyan - May 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	35	4.70	4.70
6 - 11	173	23.25	27.96
12 - 19	333	44.76	72.72
20 - 28	182	24.46	97.18
29 - 38	16	2.15	99.33
> 38	5	0.67	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Fort Chipewyan - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	1	3	1	7	3	2	2	2	2	3	1	0	0	2	3	35
6 - 11	10	4	6	24	43	11	5	4	4	8	12	8	10	6	10	8	173
12 - 19	13	4	14	29	116	39	7	8	17	6	16	22	5	4	15	18	333
20 - 28	0	0	5	36	117	1	2	2	6	3	2	2	1	0	0	5	182
29 - 38	0	0	1	7	7	0	0	0	0	1	0	0	0	0	0	0	16
> 38	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	5
Totals	26	9	32	99	290	54	16	16	29	20	33	33	16	10	27	34	744

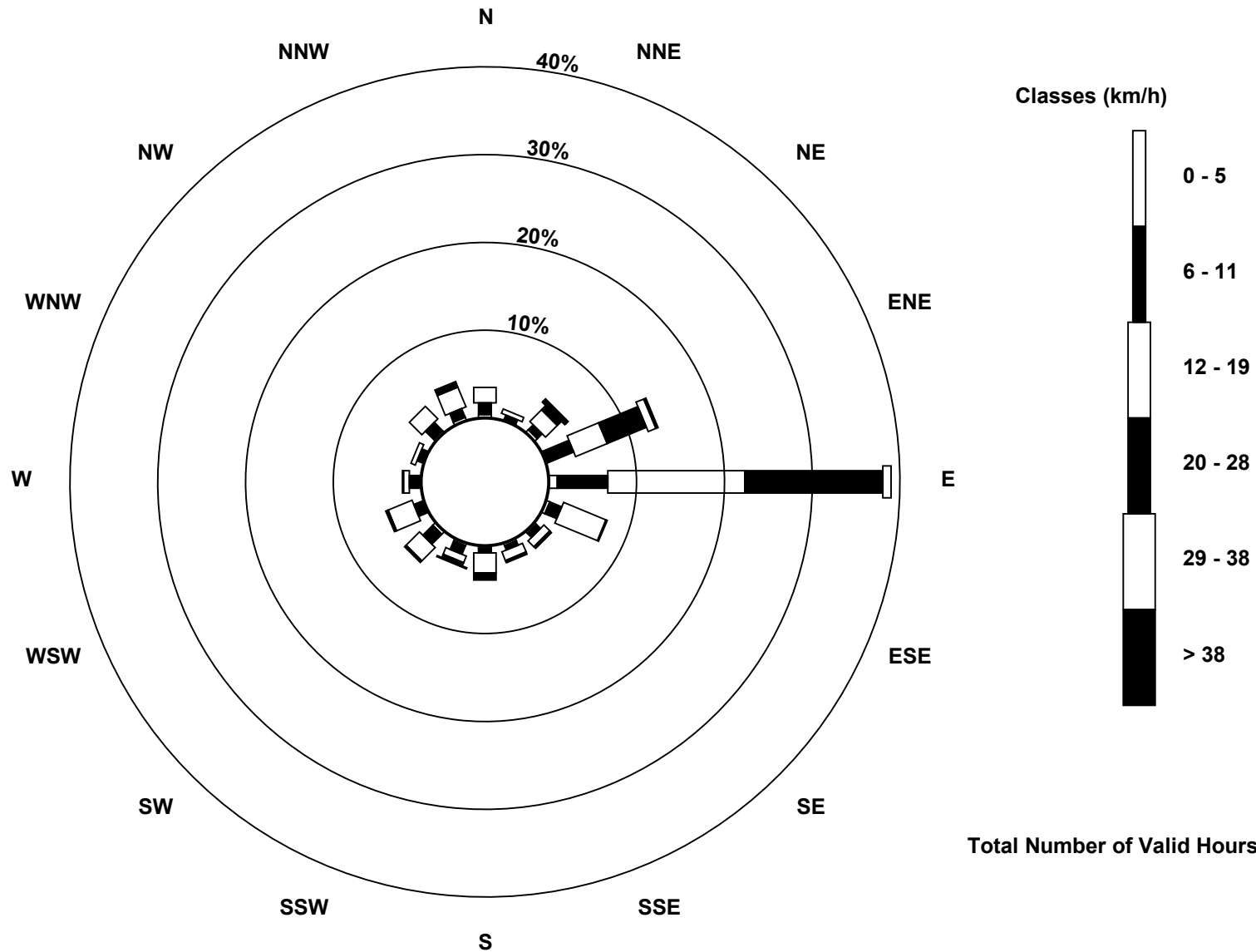
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Wind Speed (WS) - km/h
Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Fort Chipewyan - May 2015

Direction of Maximum Speed: 54 deg on May 25 17:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 83.7 deg on May 9	Hours of Data: 744
Direction of Minimum Speed: 138 deg on May 24 05:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 3.9 deg on May 19	Percent Operational Time: 100.0
Monthly Average Direction: 71.7 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-May	225	250	174	221	246	272	228	268	280	267	153	114	106	216	218	213	326	52	272	287	327	43	347	343	239.3
2-May	355	8	2	349	339	343	335	341	358	110	103	94	101	95	91	90	345	341	345	329	327	326	318	314	5.8
3-May	314	311	319	318	310	311	315	322	328	329	331	336	319	311	319	314	316	323	327	333	5	12	3	339	324.2
4-May	290	313	334	347	352	353	352	6	340	18	305	305	298	314	88	97	90	85	81	81	66	67	65	62	36.3
5-May	64	84	72	76	78	70	96	102	103	97	96	96	95	95	91	87	83	76	67	47	22	39	45	21	78.1
6-May	6	4	19	52	54	60	63	73	79	101	98	97	97	95	87	83	73	67	67	67	55	69	75	73	73.7
7-May	69	65	75	85	75	81	83	94	96	94	91	93	94	95	91	88	86	90	91	95	82	104	90	101	88.6
8-May	88	88	90	87	88	90	89	90	91	93	89	86	82	69	73	73	70	66	59	62	64	68	73	80	78.3
9-May	81	83	83	69	67	70	71	92	99	101	105	95	95	91	90	95	94	73	65	61	67	78	83	86	83.7
10-May	98	111	129	101	99	88	83	86	86	85	86	84	86	84	84	90	83	82	81	80	109	88	84	86	90.0
11-May	87	97	98	103	92	98	99	93	98	104	102	94	98	96	85	83	75	67	57	59	62	62	77	84	83.3
12-May	86	84	85	81	78	80	85	87	91	98	95	91	91	92	82	77	73	61	52	59	66	74	91	114	83.2
13-May	166	175	178	169	142	117	108	137	144	93	94	96	92	91	94	92	106	117	107	112	108	94	89	121	119.2
14-May	182	181	104	113	200	226	242	267	254	239	228	243	229	238	250	241	258	247	115	91	93	165	232	229	227.1
15-May	234	241	236	231	233	233	227	249	247	254	245	267	280	312	335	347	343	346	343	347	338	353	359	353	298.3
16-May	346	351	347	348	356	359	13	1	18	18	96	113	106	100	99	91	91	89	91	90	113	136	145	157	69.4
17-May	164	169	158	164	178	185	178	182	202	204	198	168	149	130	89	87	90	89	87	86	91	90	94	100	135.1
18-May	104	132	168	188	198	204	210	212	238	230	232	240	244	252	265	251	239	250	253	258	233	227	175	206	230.0
19-May	225	218	249	266	277	283	270	264	249	240	225	243	247	191	197	104	88	91	90	90	96	90	74	89	225.4
20-May	86	88	130	104	103	99	100	96	95	98	96	99	97	94	92	91	97	91	82	95	112	88	87	86	94.8
21-May	91	94	93	95	94	97	92	93	95	94	100	105	104	101	95	101	106	112	107	104	92	38	80	7	96.1
22-May	37	354	4	46	348	342	83	113	95	95	88	83	87	90	90	81	73	67	64	59	57	64	60	67	72.2
23-May	70	75	78	81	86	83	87	89	101	99	100	99	98	96	100	92	94	95	95	95	95	90	90	88	90.5
24-May	82	81	90	151	138	86	95	84	99	94	100	99	90	90	90	96	103	95	86	91	103	87	77	82	92.5
25-May	85	93	87	103	251	253	272	283	306	290	316	290	299	323	48	62	54	54	54	50	52	47	56	67	41.8
26-May	72	76	75	72	69	57	68	118	132	122	109	92	94	91	89	88	90	86	73	61	43	45	64	75	82.0
27-May	70	59	65	75	70	78	86	89	88	100	94	349	314	286	353	7	52	73	70	63	59	63	57	51	59.7
28-May	49	44	42	37	31	38	54	35	55	106	105	114	112	105	110	94	87	88	94	94	96	71	89	130	82.2
29-May	146	175	154	171	193	177	166	138	124	91	92	91	91	90	91	90	89	90	90	86	81	76	80	74	104.3
30-May	81	107	190	224	223	219	217	213	217	236	235	238	218	206	97	93	92	89	87	81	86	140	180	189	164.2
31-May	185	186	189	192	192	188	186	185	179	159	136	166	164	204	223	209	194	177	186	208	227	279	268	289	191.1

90.8	92.5	93.2	94.6	92.2	89.2	95.5	103.4	107.5	109.8	108.6	102.6	102.2	97.6	89.5	87.6	79.0	76.1	72.1	68.1	68.3	67.6	73.6	80.8
Diurnal Average																							

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

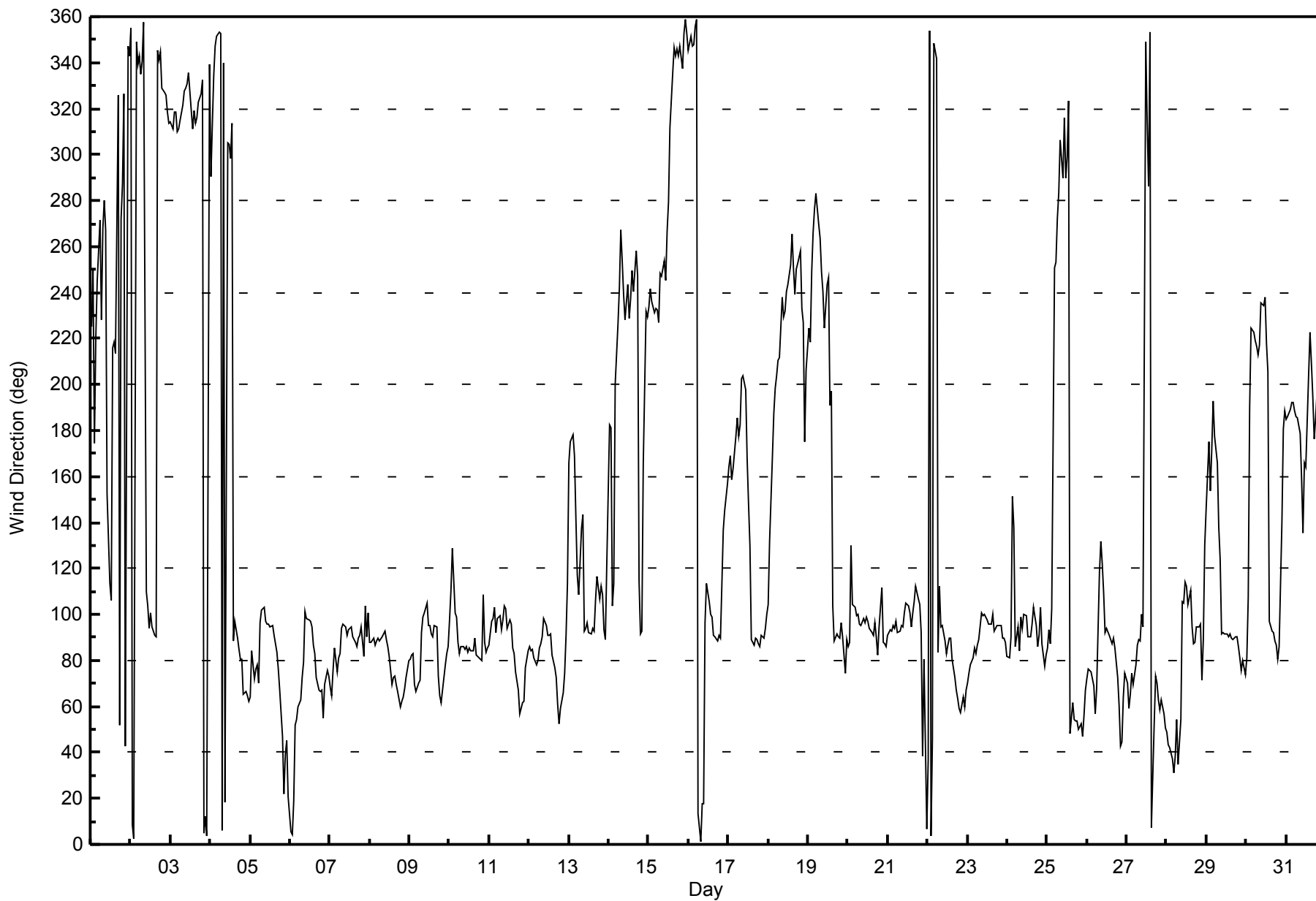
Fort Chipewyan - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744											
Maximum Value: 97 deg on May 4 10:00														Hours of Data: 744											
Minimum Value: 3 deg on May 11 14:00														Hours of Missing Data: 0											
Percentiles: P ₁ = 3 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 18 P ₉₀ = 27 P ₉₉ = 76														Hours of Calibration: 0											
														Percent Operational Time: 100.0											
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	18	18	37	40	17	14	52	19	22	52	26	8	11	64	24	11	83	64	79	13	57	30	15	15	83
2-May	17	18	22	24	22	20	20	24	49	7	7	7	13	8	8	68	26	27	25	22	21	20	15	13	68
3-May	13	15	17	17	18	17	17	22	25	27	29	29	25	22	23	24	26	29	24	22	17	14	12	24	29
4-May	6	9	14	15	13	16	21	77	48	97	39	41	30	94	74	10	9	13	7	10	7	5	5	6	97
5-May	5	30	7	10	9	8	7	7	6	5	4	6	4	4	6	6	7	8	8	15	14	12	9	20	30
6-May	19	18	23	13	10	15	12	15	17	4	4	4	4	4	9	10	9	9	8	9	7	8	6	7	23
7-May	8	6	11	9	8	7	6	5	5	5	4	4	4	3	4	5	5	5	4	12	6	10	7	6	12
8-May	7	7	6	5	7	5	4	4	3	4	5	6	6	9	8	8	8	9	8	8	7	7	8	6	9
9-May	6	5	5	9	7	7	7	8	3	4	7	4	4	4	6	3	4	10	8	8	8	8	5	5	10
10-May	8	5	18	8	7	6	4	5	5	5	5	6	6	7	8	5	11	9	9	10	9	22	12	5	22
11-May	5	8	7	7	6	8	7	5	4	8	4	4	4	3	10	8	9	10	9	8	7	7	9	5	10
12-May	5	5	5	6	6	5	6	5	5	5	4	4	3	4	11	10	9	12	11	9	8	6	9	9	12
13-May	23	6	7	10	28	14	8	14	23	6	4	4	5	3	7	4	18	21	17	10	9	11	6	27	28
14-May	19	52	17	21	58	8	16	17	21	22	12	23	13	24	26	19	20	18	72	6	8	53	10	6	72
15-May	8	12	12	12	10	11	10	15	16	19	17	19	18	28	29	26	24	26	26	27	25	26	25	24	29
16-May	24	24	24	23	25	27	25	28	31	31	46	10	8	7	6	6	6	5	6	5	17	10	7	7	46
17-May	6	7	5	6	7	7	9	9	16	12	18	26	20	22	5	7	5	5	5	5	5	5	5	8	26
18-May	6	27	24	9	8	9	9	12	14	14	17	22	21	22	20	23	16	17	16	13	10	6	47	36	47
19-May	13	11	18	13	12	13	13	13	19	20	11	24	24	28	29	24	7	8	7	5	8	23	28	18	29
20-May	8	14	68	5	5	5	4	4	5	5	6	3	5	4	4	5	5	5	7	21	11	13	7	4	68
21-May	6	5	7	4	3	5	6	4	4	4	4	4	7	11	11	22	13	9	8	5	34	51	15	31	51
22-May	17	76	45	40	43	50	79	24	29	16	8	9	7	5	4	11	8	8	9	9	9	8	7	9	79
23-May	9	8	8	6	7	8	6	6	4	4	4	4	5	5	4	4	5	4	4	7	7	10	6	5	10
24-May	6	7	12	52	79	22	11	13	18	11	9	16	4	4	3	5	8	4	5	27	20	25	54	6	79
25-May	10	14	4	38	41	25	16	17	27	34	35	27	35	29	59	10	10	10	10	10	10	11	11	9	59
26-May	9	7	7	8	14	10	20	13	13	10	10	7	6	6	5	5	13	9	19	20	10	8	20	19	20
27-May	9	8	8	14	8	8	7	5	8	7	12	44	24	18	29	28	34	8	11	10	10	10	11	11	44
28-May	10	10	10	11	14	14	22	41	50	16	10	11	11	14	29	11	7	9	9	11	20	10	27	6	50
29-May	9	8	15	19	10	8	25	14	13	8	4	3	3	4	3	4	4	4	5	5	7	8	6	10	25
30-May	8	26	24	11	11	10	9	10	21	24	18	22	25	39	9	6	4	8	6	6	6	43	6	6	43
31-May	6	4	6	6	6	7	7	7	10	20	16	21	16	26	11	10	9	9	15	9	18	17	18	13	26
														Diurnal Maximum											



WBEA
Hourly Averages

Wind Direction (WD) - deg
Fort Chipewyan - May 2015





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 6, 2015	Last Calibration	April 1, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	14:55
Gas Cert Reference	LL103809	Station temp.	22 Deg C
Cal Gas Concentration	2.45 ppm	Cal Gas Exp Date	16-Sep-16
Calibrator Make/Model	Teledyne API T700	Serial Number	747
ZAG Make/Model	Teledyne API 701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 20 ppb		PMT voltage	-826	-826
Analyzer IP address	192.168.1.43		Lamp voltage	1011	1004
Calculated slope	0.990586	0.987080	Chamber temp	45.2	45.0
Calculated intercept	-0.045119	-0.062865	Pressure	711.0	712.5
Analyzer Background	1.2	1.2	Flow	0.433	0.434
Analyzer Coefficient	1.035	1.035	Intensity	91	91

Analyzer make Thermo 43i-TLE Analyzer serial # 1136451241

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.0	----
as found span	6000	44.6	18.2	18.3	0.992
calibrator zero	6000	0.0	0.0	0.0	----
high point	6000	44.6	18.2	18.5	0.985
second point	6000	23.8	9.7	9.9	0.978
third point	6000	11.9	4.9	5.0	0.971
as left zero	6000	0.0	0.0	0.0	----
as left span	6000	44.6	18.2	18.1	1.005
Average Correction Factor					0.978

Corrected As found 18.3 Previous response 18.4 % change 0.6%

Notes:

As Found Zero used as Calibrator Zero. No adjustments, filter changed after As Found

Calibration Performed By: Ryan Power



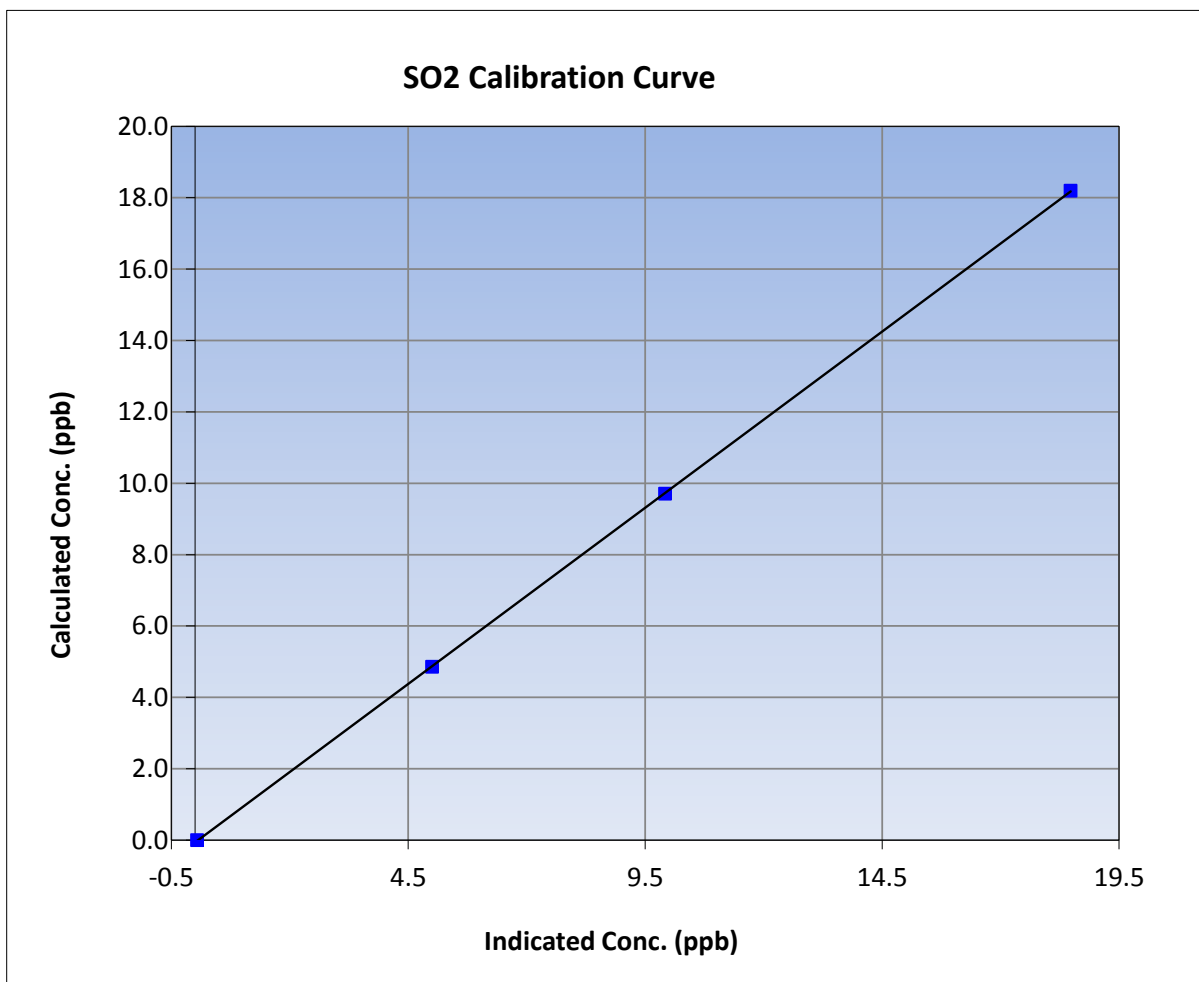
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 6, 2015	Previous Calibration	April 1, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:15	End Time (MST)	14:55
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

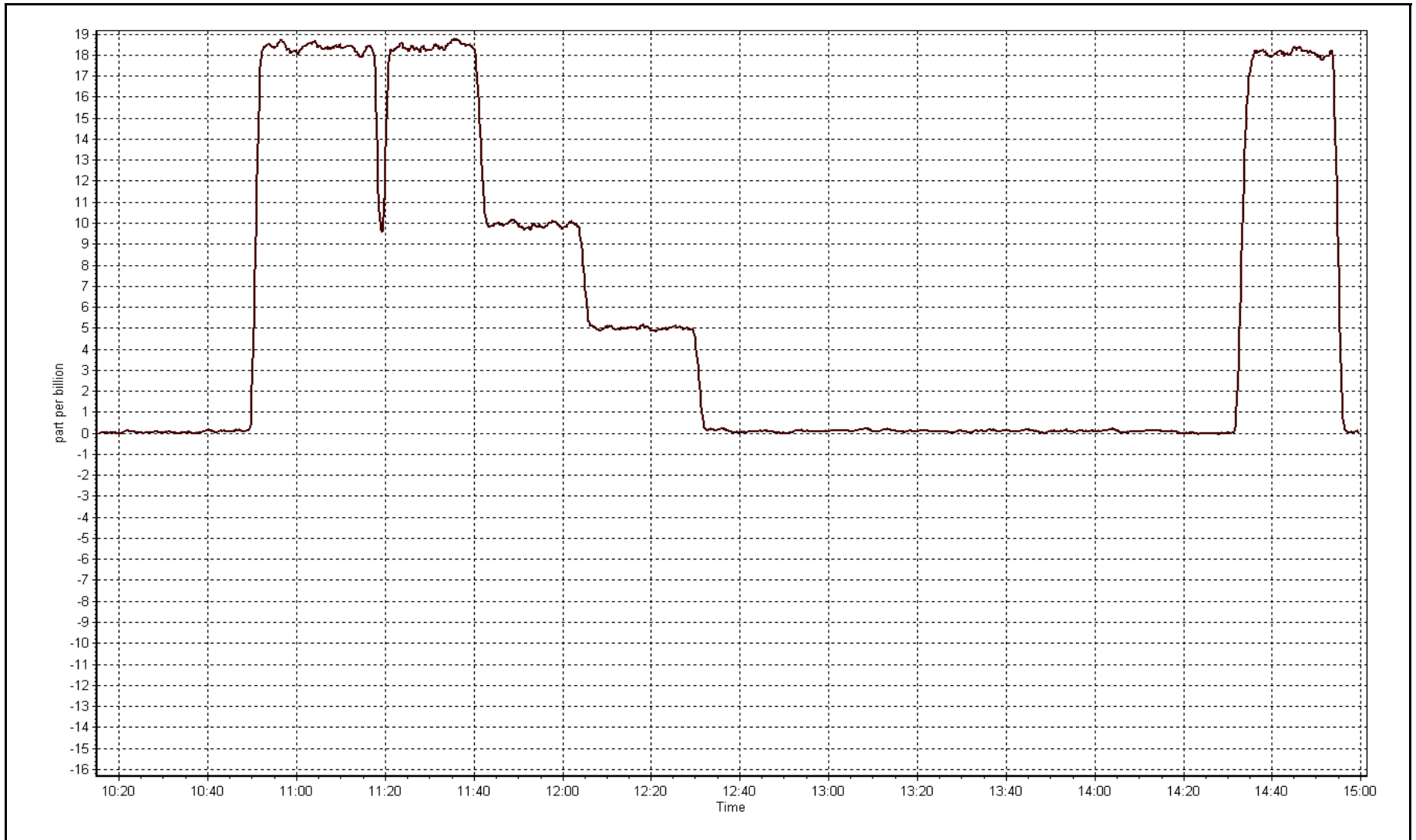
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999991
18.2	18.5	0.9846		
9.7	9.9	0.9784	Slope	0.987080
4.9	5.0	0.9710		
			Intercept	-0.062865



SO2 Calibration Plot

Date: May 6, 2015





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 6, 2015	Previous Calibration	April 1, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	14:55	End Time (MST)	17:30
NO2 GPT Ref date	May-06-15	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	735
ZAG make/model	Teledyne API 701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	Serial Number	8205

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	25.6	26.5
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	0.999850	0.994596	Pressure	27.2	27.2
Calculated intercept	0.286118	0.383582	Flow cell A	0.770	0.773
Analyzer Background	0.0	0.0	Flow cell B	NA	NA
Analyzer Coefficient	0.987	0.987	Cell A Intensity	NA	NA
			Cell B Intensity	NA	NA

Analyzer make	Teledyne API T400	Analyzer serial #	1020
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA) GenRef-GenDrv (mv)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.00	0.0	-0.2	----
as found span	6000	237.0 - 829.6	100.4	100.6	0.998
calibrator zero	6000	0.00	0.0	-0.2	----
high point	6000	237.0 - 829.6	100.4	100.7	0.997
second point	6000	177.9 - 789.4	76.6	76.8	0.998
third point	6000	114.1 - 732.9	51.7	51.1	1.012
as left zero	6000	0.00	0.0	0.1	----
as left span	6000	237.0 - 829.6	100.4	101.2	0.992
Average Correction Factor					1.002

Corrected As found	100.7	Previous response	100.1	% change	-0.6%
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Notes:

No adjustments. As Found Zero used as Calibrator Zero.

Calibration Performed By:

Ryan Power



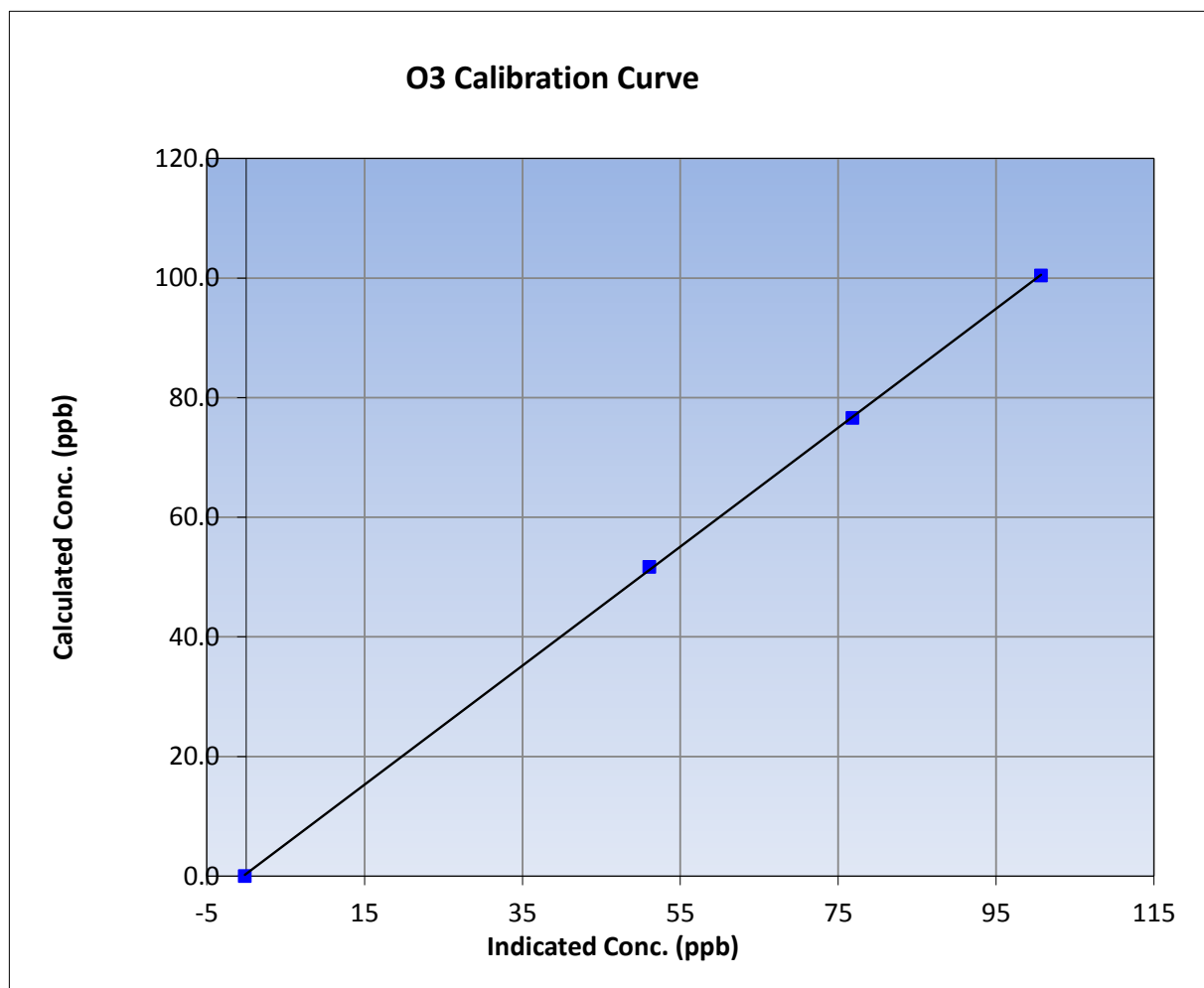
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	May-06-15	Previous Calibration	April 1, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	14:55	End Time (MST)	17:30
Analyzer make	Teledyne API T400	Analyzer serial #	1020

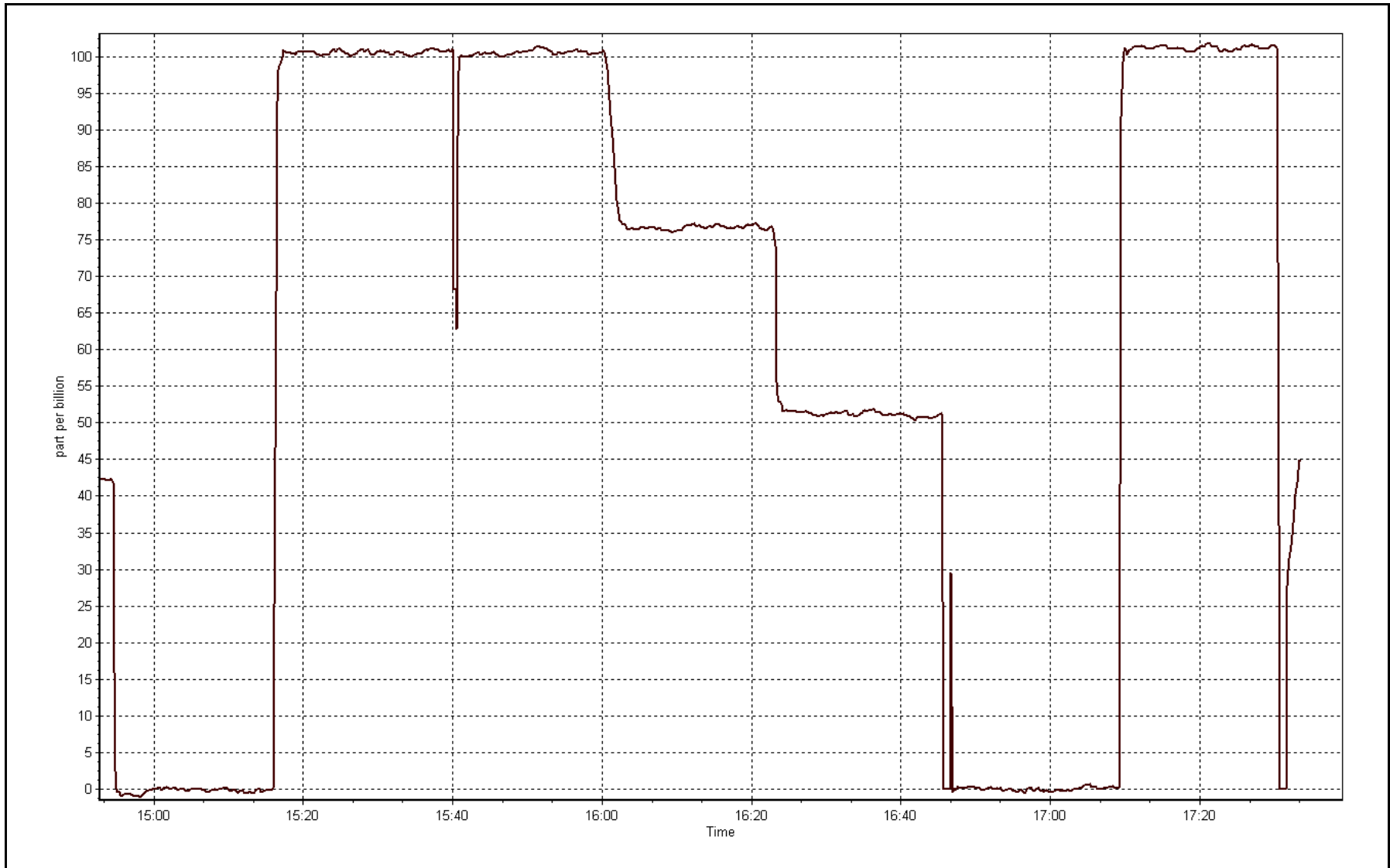
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999936
100.4	100.7	0.9970		
76.6	76.8	0.9975	Slope	0.994596
51.7	51.1	1.0121		
			Intercept	0.383582



O3 Calibration Plot

Date: May 6, 2015





Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 6, 2015	Previous Calibration	April 1, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	14:55
NO Cal Gas Conc	20.2 ppm	Gas Cert Reference	LL103809
NOx Cal Gas Conc	20.3 ppm	Cal Gas Expiry Date	16-Sep-16
Calibrator	Teledyne API T700	Serial Number	747
Zero air Generator	Teledyne API T701	Serial Number	4698

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8205
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.003781	1.002249	0.991534
	Data Offset	0.140207	0.250050	-0.146581
Current Calibration	Data Slope	1.000815	1.001453	0.995513
	Data Offset	0.567981	0.699047	0.020129

Analyzer Information

Analyzer make/model	Teledyne API T200u	Analyzer serial #	172
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Test Point	before		after	
Concentration range	0-200	ppb	0-200	ppb
NO coefficient	1.095		1.177	
NOx coefficient	1.111		1.194	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.1		0.1	
NOx bkgrnd	0.2		0.2	
Chamber Temp	40	Deg C	40	Deg C
Moly Temp	316.6	Deg C	316.4	Deg C
HVPS	502	V	502	V
PMT Temp	5.1	Deg C	5.1	Deg C
O3 flow	88	ccm	88	ccm
R Cell press NO	3.8	"Hg	3.8	"Hg
R Cell Press Nox	NA	"Hg	NA	"Hg
NO sample flow	1110	ccm	1109	ccm
Nox sample Flow	1133	ccm	1132	ccm

Notes:

Span adjusted analyzer. Filter changed after As Finds which were 7% respectively. Diagnostics seem fine; correlation of sensitivity change related to station temperature change after Apr cal.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 6, 2015

Station Number:

AMS 8

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as found span	6000	44.6	150.8	150.0	0.7	140.0	139.4	0.7	1.0767	1.0764
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	6000	44.6	150.8	150.0	0.7	150.5	149.6	0.9	1.0019	1.0027
second point	6000	23.8	80.4	80.0	0.4	79.1	78.4	0.7	1.0163	1.0203
third point	6000	11.9	40.2	40.0	0.2	39.4	38.9	0.5	1.0213	1.0290
as left zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as left span	6000	44.6	150.8	47.4	103.4	148.3	47.3	101.1	1.0164	1.0030
Average Correction Factor									1.0132	1.0174

Corrected As found NO_x= 140.1 NO= 139.4 Percent Change NO_x= 7.1% NO= 7.2%
 Previous Response NO_x= 150.1 NO= 149.4

GPT Calibration Data

Dilution Flow 6000 ccm Source Gas Flow 44.6 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	47.4	100.4	148.2	47.4	100.8	1.0096	1.0000	0.9957	100.4%
2nd NO2 (200)	----	71.2	76.6	148.1	71.2	76.9	1.0103	1.0000	0.9957	100.4%
3rd NO2 (100)	----	96.1	51.7	148.0	96.1	51.9	1.0110	1.0000	0.9960	100.4%
4th NO2 (0)	147.8	----	0.9	148.8	147.8	1.0	1.0060	1.0000	N/A	----
Average Correction Factor							1.0092	1.0000	0.9958	100.4%

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

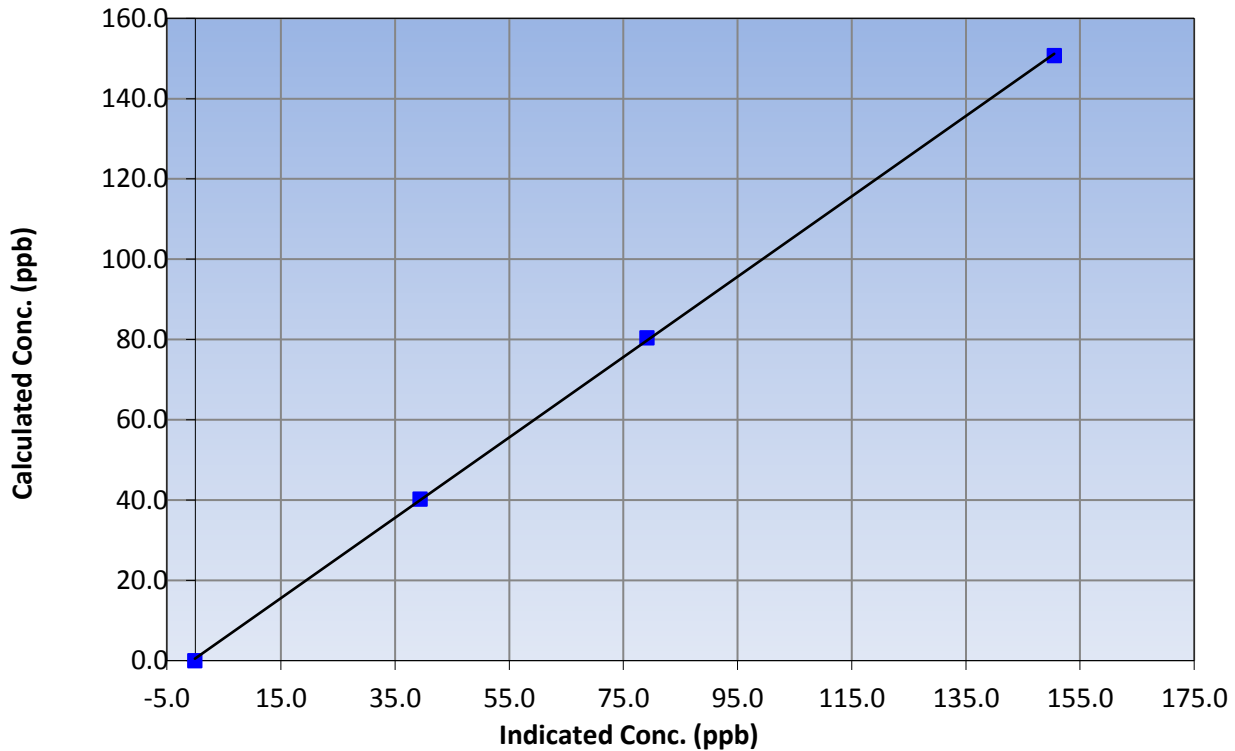
Station Information

Calibration Date	May 6, 2015	Previous Calibration	April 1, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:15	End Time (MST)	14:55
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999928
150.8	150.5	1.0019		
80.4	79.1	1.0163	Slope	1.000815
40.2	39.4	1.0213		
			Intercept	0.567981

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

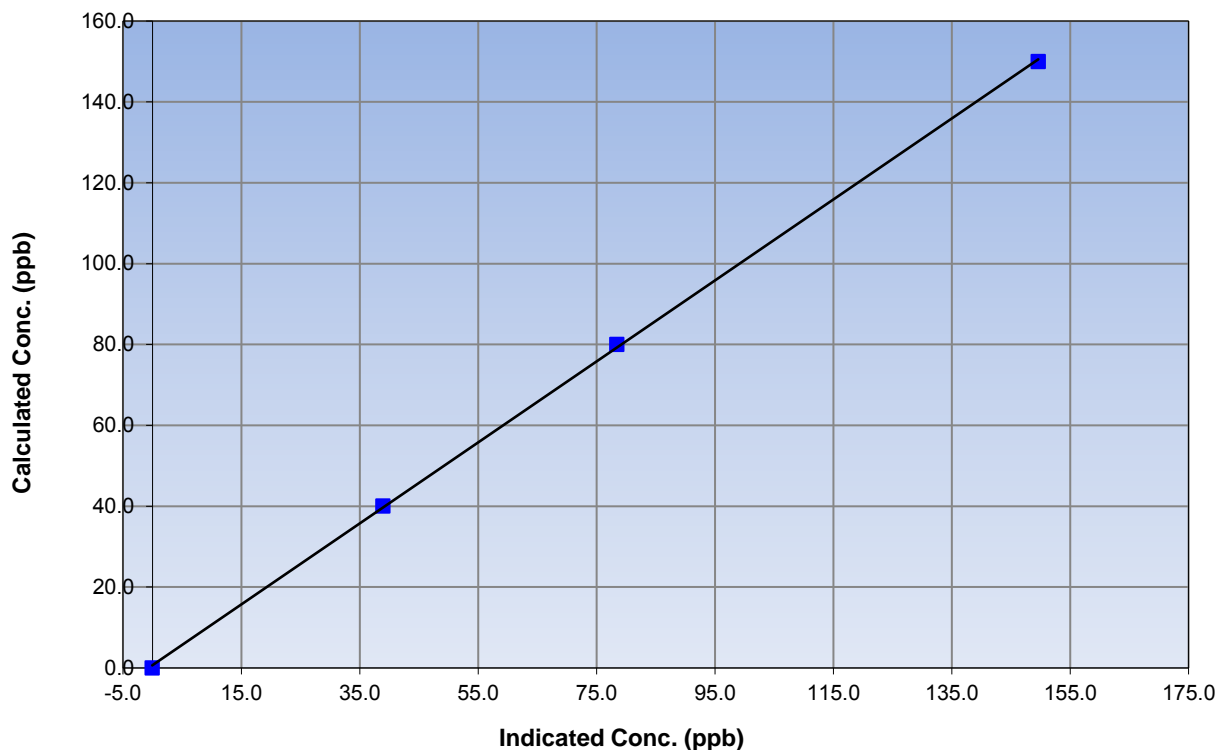
Station Information

Calibration Date	May 6, 2015	Previous Calibration	April 1, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:15	End Time (MST)	14:55
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999883
150.0	149.6	1.0027		
80.0	78.4	1.0203	Slope	1.001453
40.0	38.9	1.0290		
			Intercept	0.699047

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

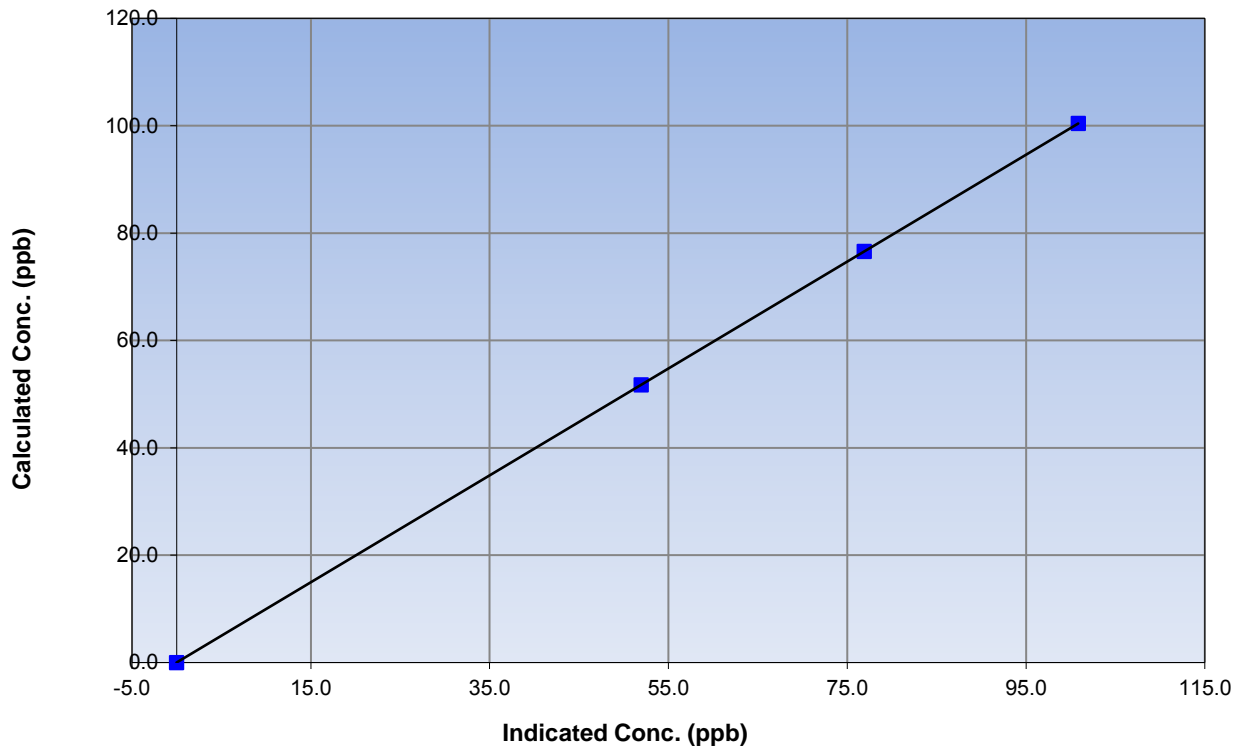
Station Information

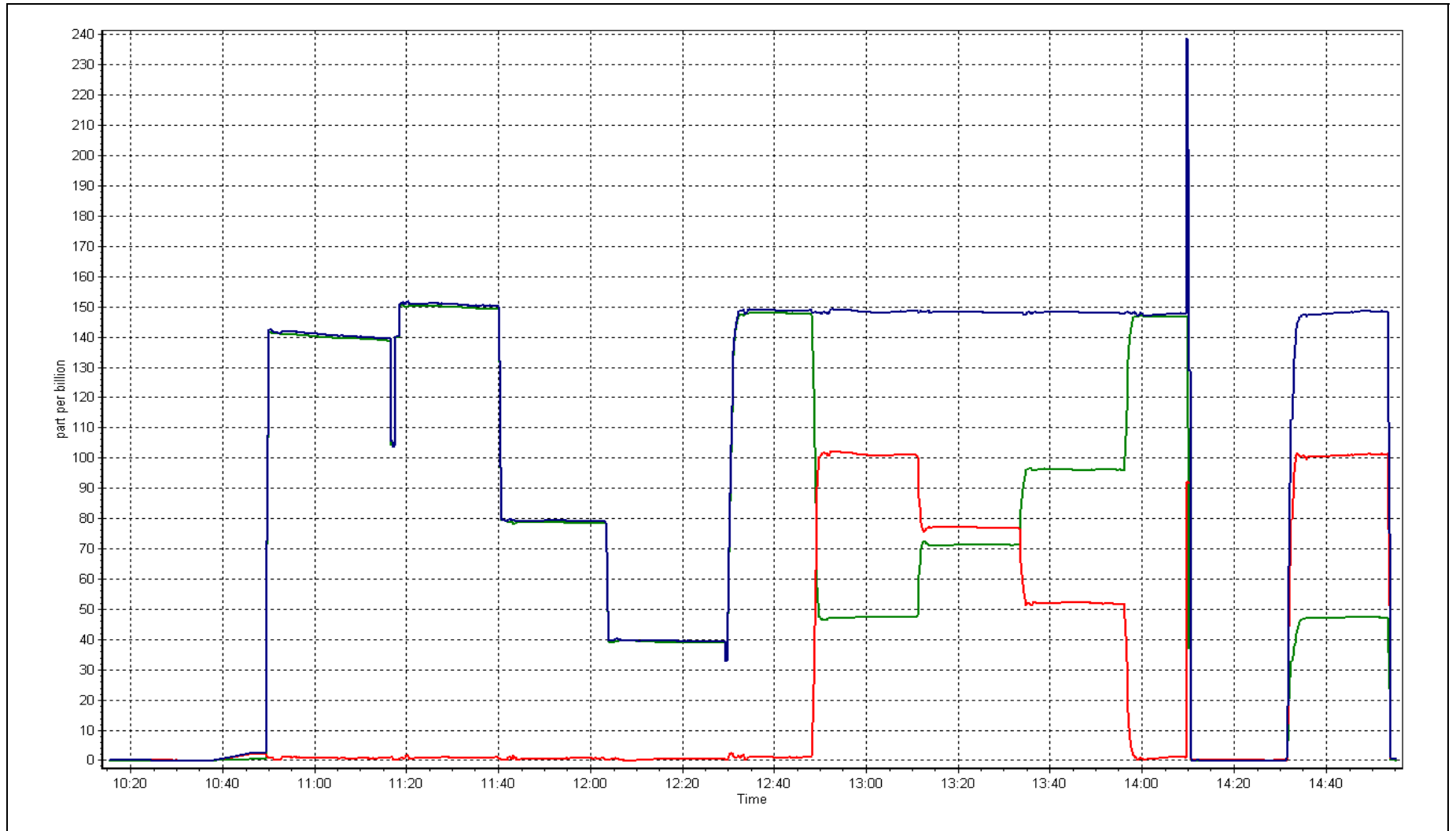
Calibration Date	May 6, 2015	Previous Calibration	April 1, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:15	End Time (MST)	14:55
Analyzer make	Teledyne API T200u	Analyzer serial #	172

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	1.000000
100.4	100.8	0.9957		
76.6	76.9	0.9957	Slope	0.995513
51.7	51.9	0.9960		
			Intercept	0.020129

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	<u>May 6, 2015</u>	Previous Calibration:	<u>April 1, 2015</u>
Station Name:	<u>Fort Chipewyan</u>	Station Number:	<u>AMS 8</u>
Start Time (MST):	<u>15:50</u>	End Time (MST):	<u>17:28</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>1212</u>

SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number:	<u>E-2025</u>
Source SN:	<u>7414</u>
HEPA PN:	<u>9064</u>
Time Correct (MST):	<u>YES</u>
Parameters Checked:	<u>T1, T2, T2,T4, P3, Main Flow, Beta, Neph</u>

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	6.0	6.6	0.6	6.0
T2	20.0	na	na	20.0
T3	20.0	na	na	20.0
T4	25.0	na	na	25.0
RH (%)	16.0	na	na	16.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	988	993.0	5.0	993

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
999	994	-5	994	999

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	161		161
Neph	0.4		0.4
C14	0.6		0.5
Indicated Concentration (ug/m3)	0.3	yes	0.3
Offset 1	161.4		161.8
Offset 2	28.8		28.8

Leak Check (Quarterly)

Leak Check Date:	<u>May 6, 2015</u>	Previous Leak Check Date:	NA
	Measured	Difference LPM (Limit +/- 0.42 LPM)	
Flow without adaptor (LPM):	16.60		
Flow with adaptor [turn off pump first](LPM):	16.50	0.10	

Mass Foil Calibration (Annualy)

Foil Calibration Date:	<u>May 6, 2015</u>	Previous Foil Calibration:	NA
Zeroed?:			
Foil Mass:	<u>1324</u>		
Previous Correction Factor:	<u>7081</u>	Mass foil set S/N:	5868
New Correction Factor:	<u>7022</u>		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	06/05/2015
Pump	Good	NA
Filter Tape	Good	NA
Mass Foil Cal Set	Good	NA
HEPA filter	Good	NA

NOTES:

Pressure with a small adjustment. Leak check and Foil calibration carried out. Nephelometer zeroed

Calibration Performed By: Ryan Power



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 9
BARGE LANDING
MAY 2015**

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

June 29, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
MAY 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
TRS(ppb) Average	707	35	37	99.73	2	0	0	0
THC(ppm) Average	709	35	35	100.00	3.5	-	2.4	-
Temperature (C) Average	744	0	0	100.00	29.3	-	20.3	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	88	-
Wind Speed 10 m (km/h) Average	743	0	1	99.87	18	-	11	-
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)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
TRS(ppb) Average	707	0.2	0	-	0	0	0	0	0	0	2
THC(ppm) Average	709	2.23	0.2	-	2	2.1	2.1	2.2	2.3	2.5	3.5
Temperature (C) Average	744	11.83	8.1	-	-4.1	1.4	5.1	11	17.9	23.6	29.3
Relative Humidity (%) Average	744	46	24	-	10	17	27	43	62	80	99
Wind Speed 10 m (km/h) Average	743	6.3	3	-	0	3	4	6	8	10	18
Wind Direction 10 m (deg) Average	743	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)
MAY 2015

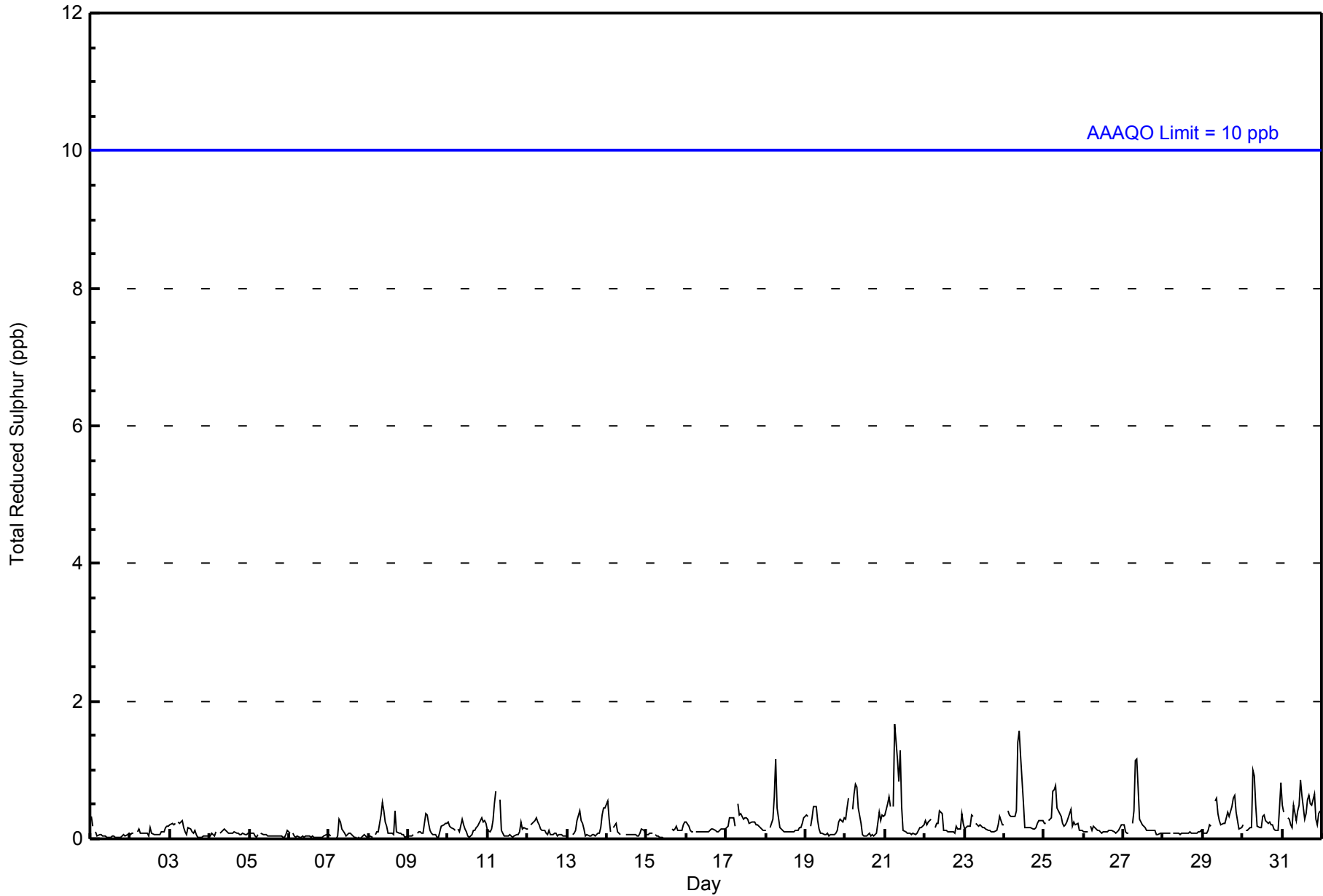
OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	14 May 2015 10:00	14 May 2015 11:00	2	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction	09 May 2015 06:00	09 May 2015 06:00	1	Flat line in sensor output signal



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Barge Landing - May 2015





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	707	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Barge Landing - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	79	68	66	32	19	22	58	75	97	56	30	18	20	17	21	28	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	79	68	66	32	19	22	58	75	97	56	30	18	20	17	21	28	706

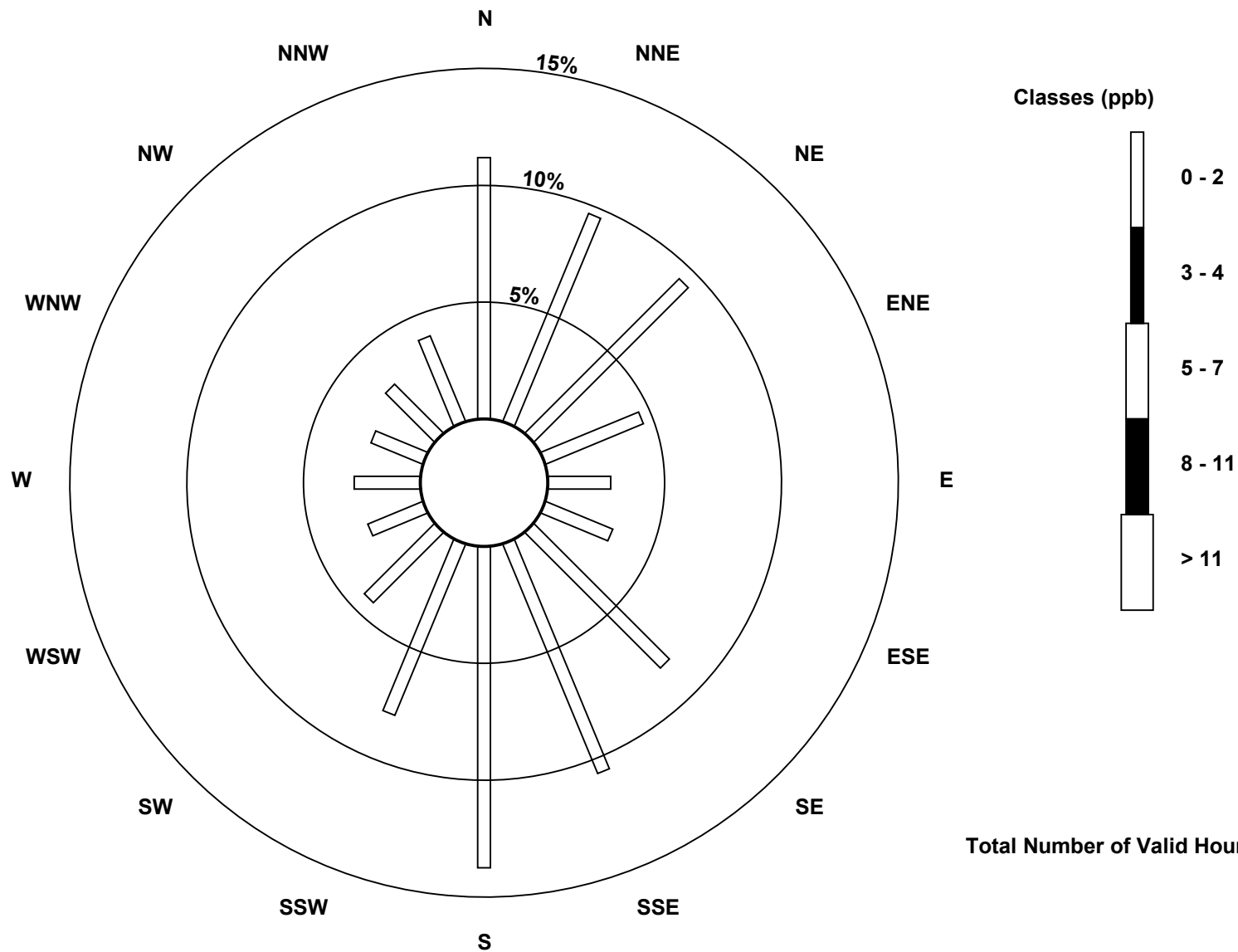
Total Number of Valid Hours: 706

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

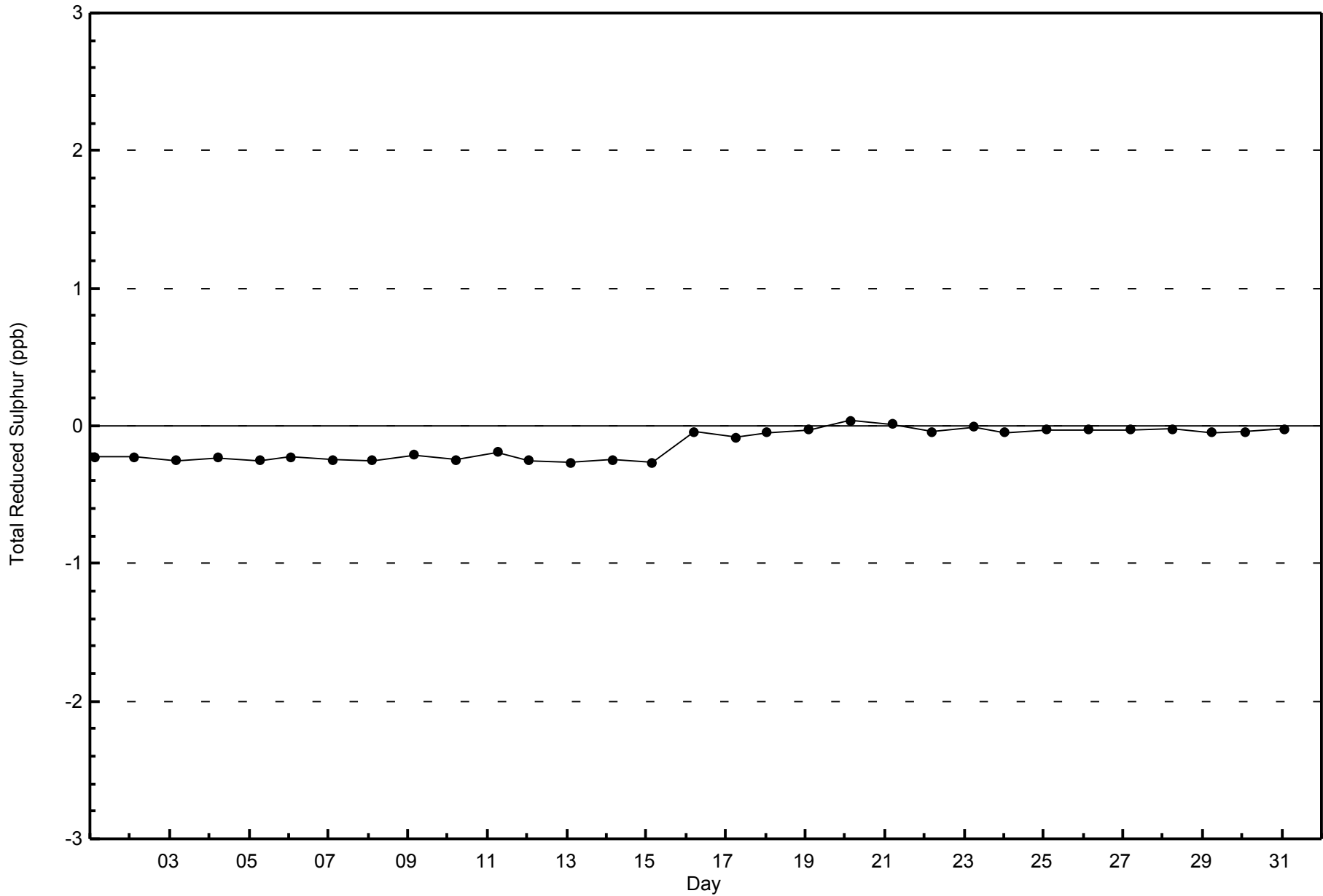
Total Reduced Sulphur (TRS) - ppb
Barge Landing (AMS 9)





WBEA
Zero Responses

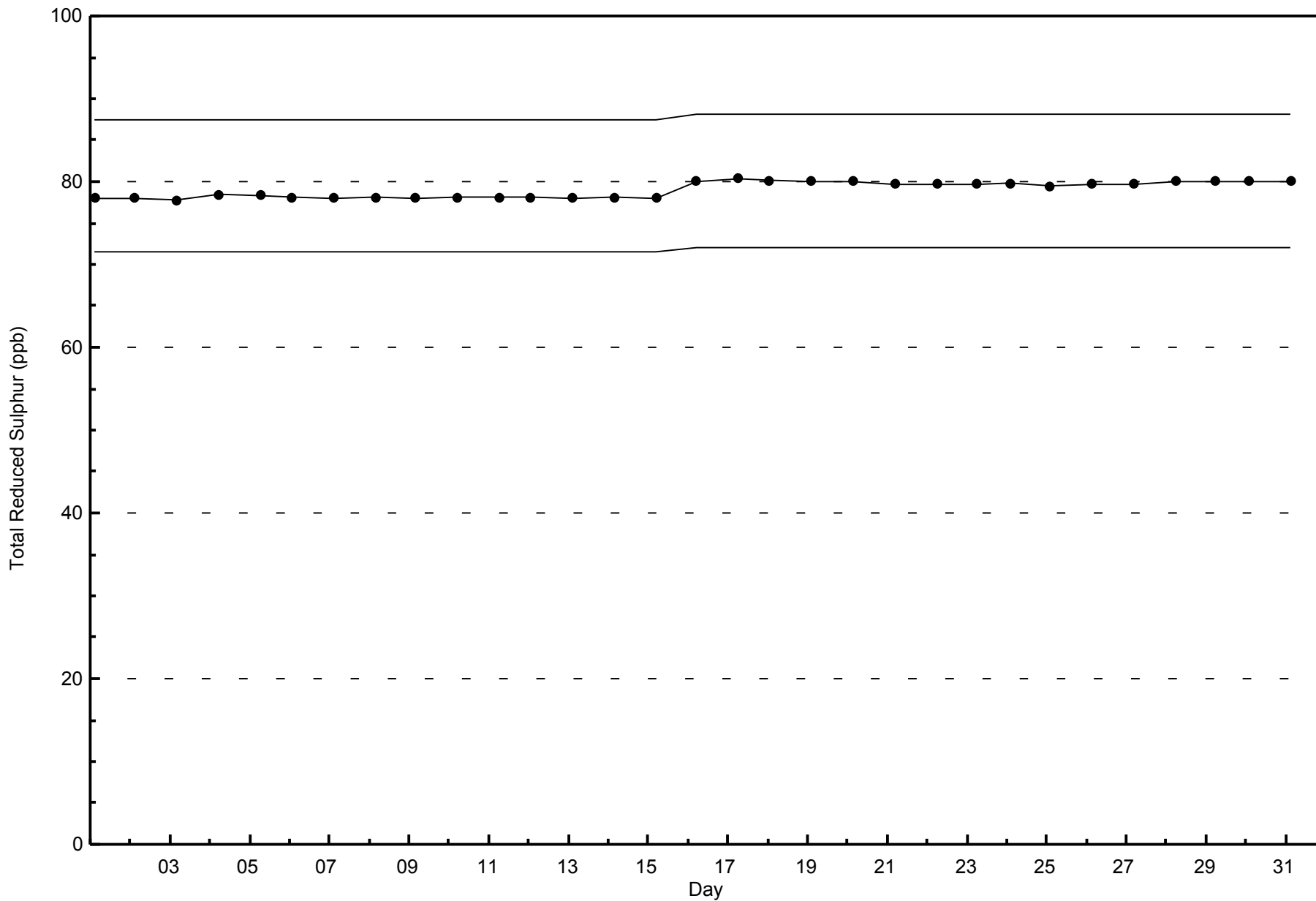
Total Reduced Sulphur (TRS) - ppb
Barge Landing - May 2015





WBEA
Span Responses

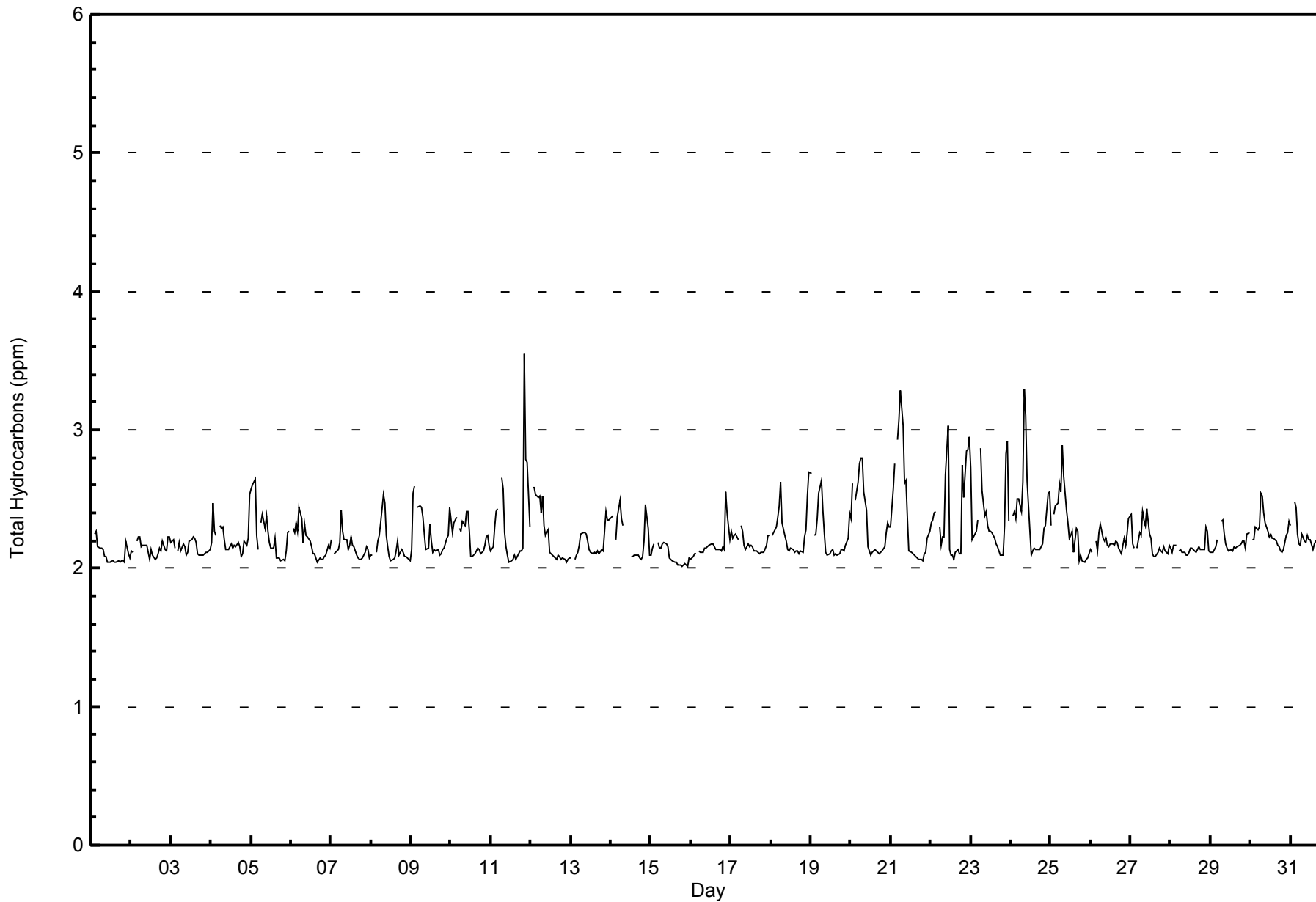
Total Reduced Sulphur (TRS) - ppb
Barge Landing - May 2015





WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Barge Landing - May 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	21	2.96	2.96
2.1 - 3.0	683	96.33	99.29
3.1 - 10.0	5	0.71	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Barge Landing - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	4	0	0	1	0	0	1	0	0	0	3	4	3	1	2	2	21
2.1 - 3.0	73	68	65	32	18	23	55	73	98	58	25	17	17	16	19	25	682
3.1 - 10.0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	1	0	5
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	77	68	66	33	18	23	57	74	99	58	28	21	20	17	22	27	708

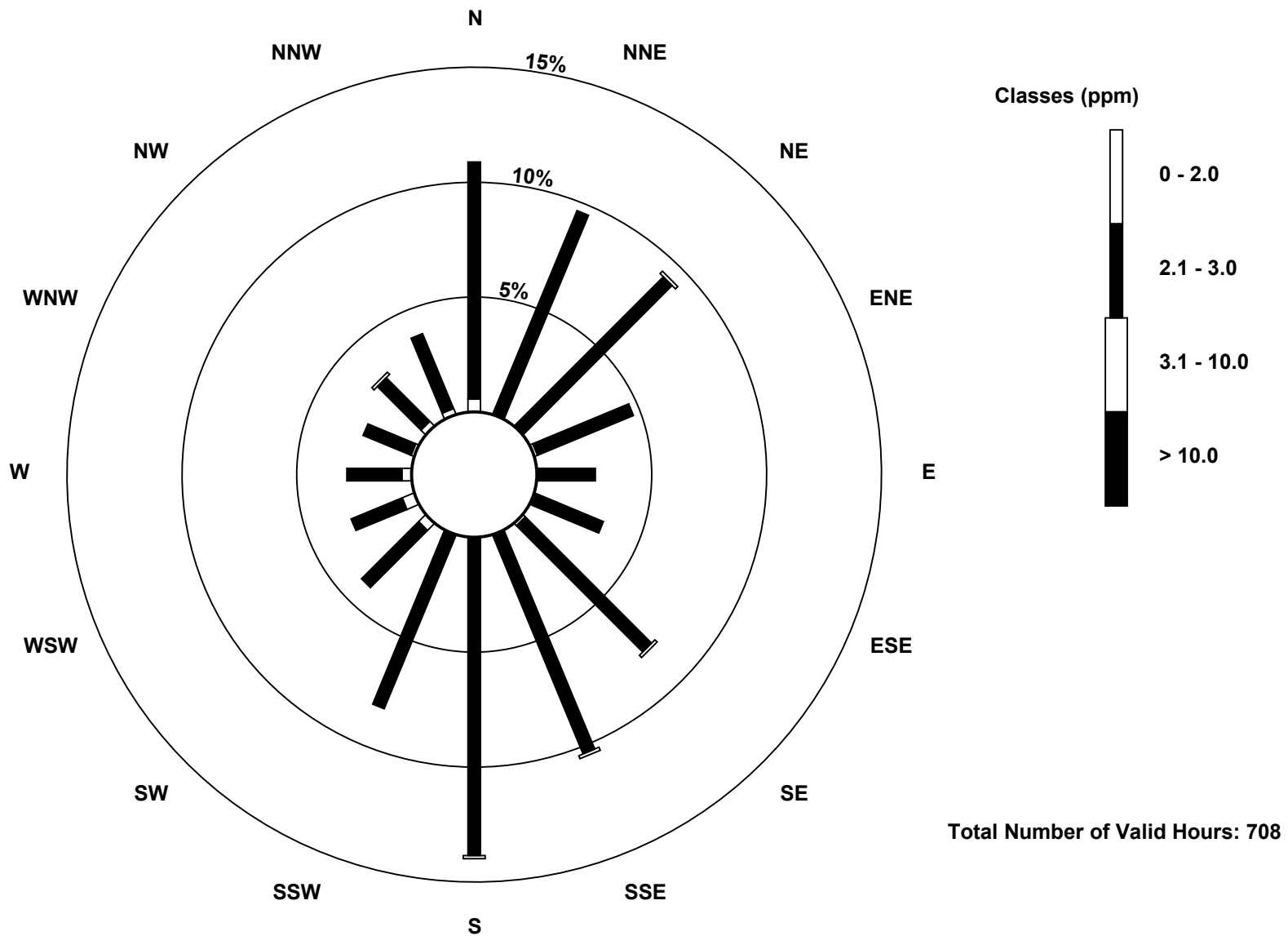
Total Number of Valid Hours: 708

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

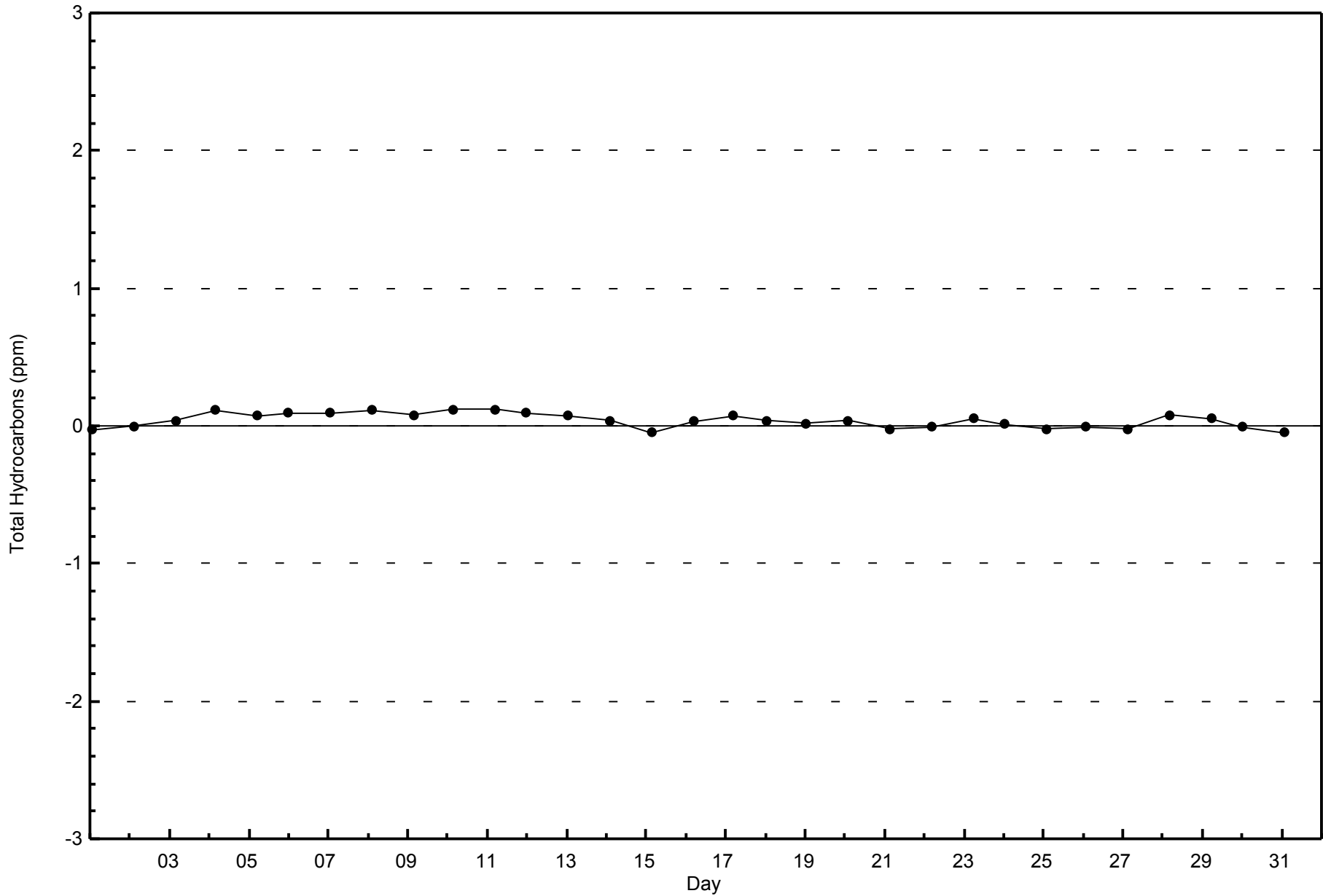
Total Hydrocarbons (THC) - ppm
Barge Landing (AMS 9)





WBEA
Zero Responses

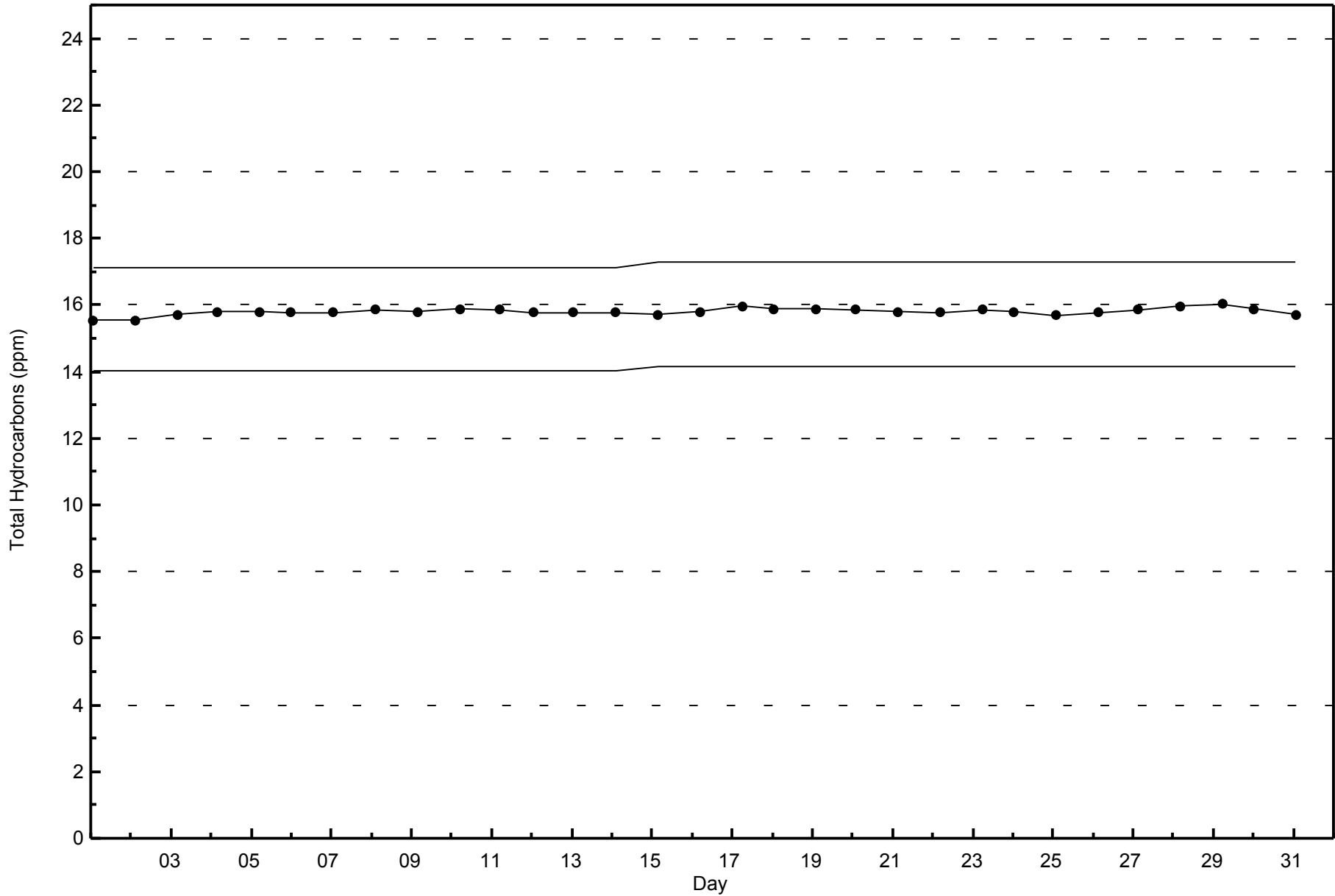
Total Hydrocarbons (THC) - ppm
Barge Landing - May 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Barge Landing - May 2015



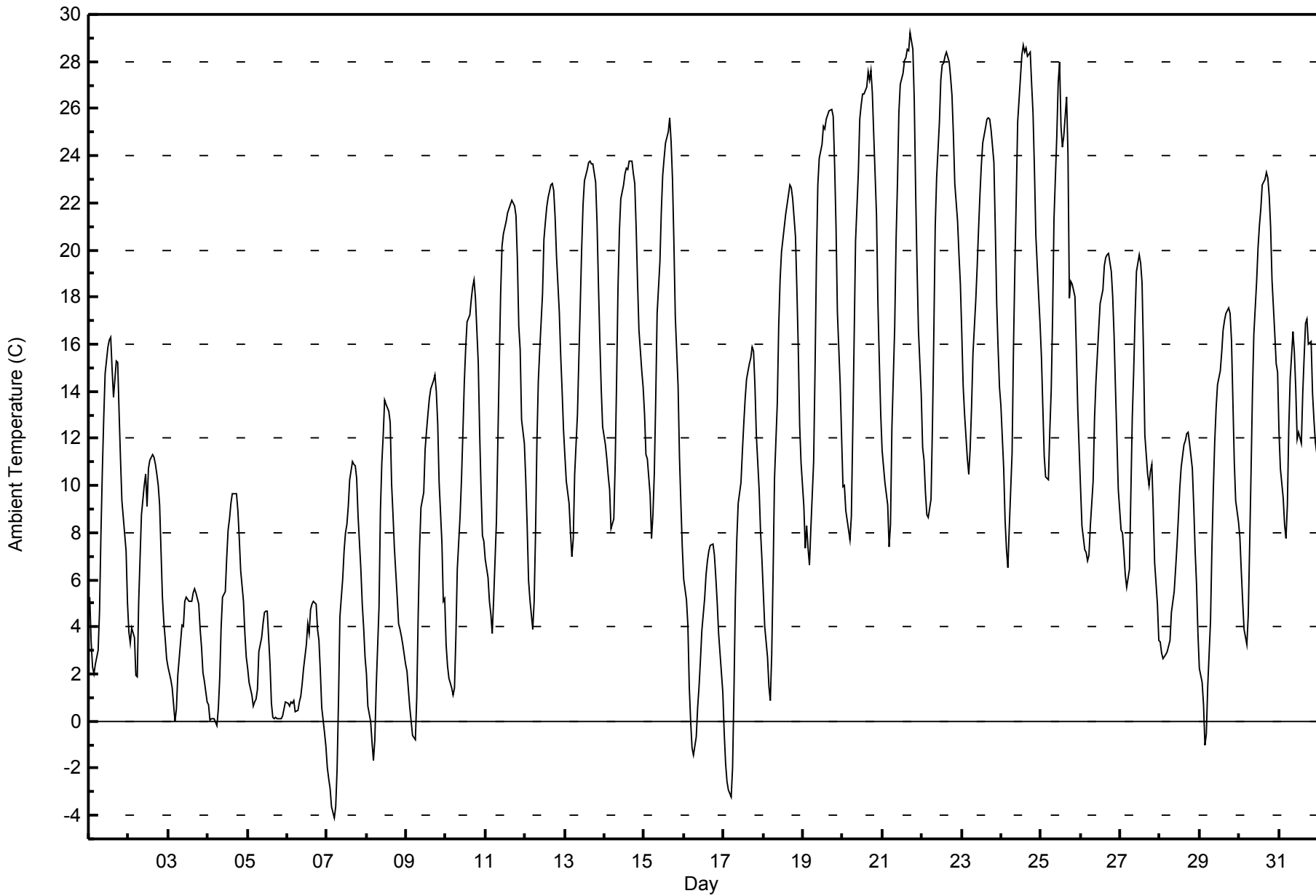


Maximum Value: 29.3 C on May 21 18:00		Maximum Daily Average: 20.3 C on May 22		Hours in Service: 744																																												
Minimum Value: -4.1 C on May 7 05:00		Minimum Daily Average: 1.6 C on May 5		Hours of Data: 744																																												
Maximum Diurnal Average: 17.8 C at hour 16		Minimum Diurnal Average: 3.6 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 11.83 C		Percentiles: P ₁ = -2.5 P ₁₀ = 1.4 Q ₁ = 5.1 Median = 11.0 Q ₃ = 17.9 P ₉₀ = 23.6 P ₉₉ = 28.3		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	5.3	3.4	2.3	2.0	2.4	3.0	4.7	8.0	10.6	12.9	14.7	15.9	16.2	16.3	14.9	13.7	15.3	15.2	13.1	11.2	9.4	8.6	7.2	5.0	9.6	16.3																						
2-May	3.8	3.3	4.0	3.6	1.9	1.9	5.0	6.9	8.7	10.0	10.5	9.1	10.7	11.1	11.3	11.2	10.9	10.5	10.0	9.2	5.2	4.2	3.5	2.7	7.1	11.3																						
3-May	2.3	1.8	1.4	0.7	0.0	0.5	1.9	3.4	4.1	4.0	5.1	5.3	5.1	5.1	5.1	5.4	5.6	5.5	5.0	3.9	3.1	2.1	1.7	0.8	3.3	5.6																						
4-May	0.7	0.0	0.1	0.1	0.1	-0.2	0.5	1.8	4.0	5.3	5.5	6.9	8.1	8.6	9.2	9.7	9.7	9.6	8.9	7.8	6.4	5.1	3.7	2.7	4.8	9.7																						
5-May	2.2	1.7	1.1	0.6	0.8	0.9	1.4	2.9	3.6	4.1	4.6	4.7	4.7	2.4	0.7	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.5	0.8	1.6	4.7																						
6-May	0.7	0.6	0.8	0.8	0.9	0.4	0.5	0.8	1.1	1.6	2.2	3.2	4.1	3.7	4.7	5.0	5.1	5.0	3.9	3.5	2.1	0.6	-0.5	-1.1	2.1	5.1																						
7-May	-2.0	-2.5	-2.8	-3.6	-4.1	-3.7	-2.0	0.9	4.4	6.0	7.2	8.0	8.4	9.1	10.3	11.0	10.9	10.9	10.3	8.7	6.4	5.0	4.0	2.7	4.3	11.0																						
8-May	2.0	0.6	0.0	-0.9	-1.7	-0.8	1.5	4.8	8.9	11.0	12.1	13.6	13.5	13.2	12.6	10.0	8.8	7.4	5.2	4.1	3.9	3.6	3.2	2.4	5.8	13.6																						
9-May	2.1	1.3	0.6	0.0	-0.6	-0.8	1.0	4.4	7.3	9.0	9.7	11.5	12.3	13.0	13.7	14.1	14.5	14.7	14.0	12.6	10.1	7.6	5.1	5.2	7.6	14.7																						
10-May	3.3	2.3	1.8	1.4	1.1	1.4	3.6	6.5	8.7	10.2	12.2	14.3	15.9	17.0	17.3	17.9	18.4	18.7	17.9	15.2	12.3	9.8	7.9	7.6	10.1	18.7																						
11-May	6.9	6.1	5.1	4.5	3.7	5.1	8.5	11.8	15.1	18.1	20.2	20.7	21.2	21.6	21.8	22.0	22.1	21.9	21.5	19.6	16.8	15.7	12.8	11.8	14.8	22.1																						
12-May	10.2	8.3	6.0	5.2	3.9	5.1	8.0	11.9	14.5	15.8	18.1	20.5	21.2	21.8	22.3	22.8	22.8	22.5	21.4	19.7	17.4	15.6	14.0	12.4	15.1	22.8																						
13-May	11.3	10.2	9.3	8.0	7.0	7.8	10.5	13.0	15.4	17.7	20.0	21.9	23.0	23.4	23.7	23.8	23.7	23.7	22.9	21.1	18.6	16.2	14.1	12.5	16.6	23.8																						
14-May	11.7	11.1	10.4	9.8	8.1	8.6	11.0	14.5	18.4	20.8	22.2	22.8	23.2	23.5	23.4	23.8	23.8	23.2	22.8	20.9	18.6	16.6	14.9	14.2	17.4	23.8																						
15-May	13.0	11.3	11.1	9.6	7.8	8.8	10.5	13.7	17.3	19.5	21.6	23.2	23.9	24.5	25.0	25.6	24.6	23.0	20.3	17.2	14.2	11.2	9.2	7.4	16.4	25.6																						
16-May	6.0	5.1	4.1	1.5	0.0	-1.2	-1.5	-0.7	0.6	1.4	2.6	3.8	5.2	6.2	6.8	7.2	7.5	7.5	7.0	6.1	5.0	3.7	2.9	1.2	3.7	7.5																						
17-May	-0.5	-1.8	-2.6	-2.9	-3.2	-2.0	1.3	5.3	7.7	9.2	10.1	11.4	12.6	13.7	14.5	15.2	15.4	15.9	15.7	14.2	12.2	9.8	8.1	6.9	7.8	15.9																						
18-May	5.5	4.0	2.7	1.5	0.9	2.8	6.3	10.3	13.5	16.8	18.7	19.9	20.5	21.5	21.9	22.3	22.8	22.7	22.2	20.6	18.3	15.8	12.6	10.9	14.0	22.8																						
19-May	9.1	7.3	8.3	7.4	6.6	8.2	11.0	14.9	19.6	22.8	23.9	24.5	25.2	25.1	25.5	25.8	25.9	26.0	25.7	23.7	21.0	17.4	14.3	12.1	18.0	26.0																						
20-May	10.0	10.0	9.0	8.6	7.7	8.7	12.4	16.3	20.4	23.3	25.5	26.2	26.6	26.6	26.9	27.5	27.2	27.6	26.7	24.9	21.4	17.7	15.3	13.0	19.1	27.6																						
21-May	11.5	10.1	9.7	9.2	7.4	8.3	12.4	16.7	20.4	22.9	25.9	27.0	27.5	28.1	28.2	28.5	28.5	29.3	28.5	26.4	22.5	19.3	16.6	13.9	19.9	29.3																						
22-May	11.6	11.1	9.7	8.8	8.7	9.4	12.5	16.4	21.0	23.1	25.4	27.2	27.9	27.9	28.2	28.4	28.0	27.3	26.5	24.9	22.8	21.2	19.8	18.6	20.3	28.4																						
23-May	16.5	14.2	13.0	11.1	10.5	11.5	13.3	15.6	17.8	19.3	20.8	22.3	23.6	24.5	25.2	25.5	25.6	25.6	25.1	23.7	20.9	17.7	15.8	14.1	18.9	25.6																						
24-May	13.4	10.7	8.5	7.3	6.5	8.2	11.4	15.8	19.3	22.3	25.4	27.3	28.3	28.7	28.4	28.6	28.3	28.4	27.1	25.8	23.4	20.6	18.1	16.9	19.9	28.7																						
25-May	15.4	13.3	11.3	10.4	10.2	12.3	14.0	17.2	21.3	24.9	27.1	28.0	25.3	24.3	24.8	26.5	24.1	17.9	18.7	18.5	18.0	15.7	13.3	11.6	18.5	28.0																						
26-May	9.9	8.3	7.3	7.2	6.8	7.0	8.3	10.2	12.9	14.4	15.5	16.6	17.7	18.3	19.3	19.7	19.8	19.9	19.1	18.0	16.3	14.1	12.0	9.8	13.7	19.9																						
27-May	8.1	8.0	7.2	6.2	5.7	6.5	9.6	12.9	14.8	17.2	19.1	19.8	19.4	18.6	15.7	12.1	10.5	10.0	10.6	10.9	9.0	6.8	5.0	3.4	11.1	19.8																						
28-May	3.4	2.9	2.7	2.8	3.0	3.2	3.4	4.6	5.5	6.5	7.5	8.7	9.9	10.8	11.7	11.9	12.2	12.3	11.8	10.7	9.1	7.2	5.8	3.7	7.1	12.3																						
29-May	2.2	1.6	0.7	-1.0	-0.6	1.5	4.2	7.3	9.8	11.9	13.3	14.3	14.8	15.7	16.6	17.0	17.3	17.5	17.3	16.2	13.6	11.0	9.4	8.5	10.0	17.5																						
30-May	7.8	6.4	5.1	3.9	3.2	4.5	7.4	10.6	13.9	16.4	18.6	20.1	21.1	21.8	22.8	23.0	23.3	23.1	22.3	21.0	18.7	16.4	15.2	14.8	15.1	23.3																						
31-May	12.3	10.7	9.5	8.4	7.7	9.2	12.4	14.5	16.5	15.7	14.1	12.0	12.3	11.8	13.9	15.5	16.9	17.1	16.0	16.1	13.9	12.8	11.8	11.4	13.0	17.1																						
																								7.0	5.9	5.1	4.2	3.6	4.4	6.6	9.5	12.2	14.0	15.5	16.5	17.1	17.4	17.6	17.8	17.7	17.4	16.7	15.4	13.3	11.3	9.6	8.3	Diurnal Average
																								16.5	14.2	13.0	11.1	10.5	12.3	14.0	17.2	21.3	24.9	27.1	28.0	28.3	28.7	28.4	28.6	28.5	29.3	28.5	26.4	23.4	21.2	19.8	18.6	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Barge Landing - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Barge Landing - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	29	3.90	3.90
0 - 10	308	41.40	45.30
10 - 20	258	34.68	79.97
> 20	149	20.03	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

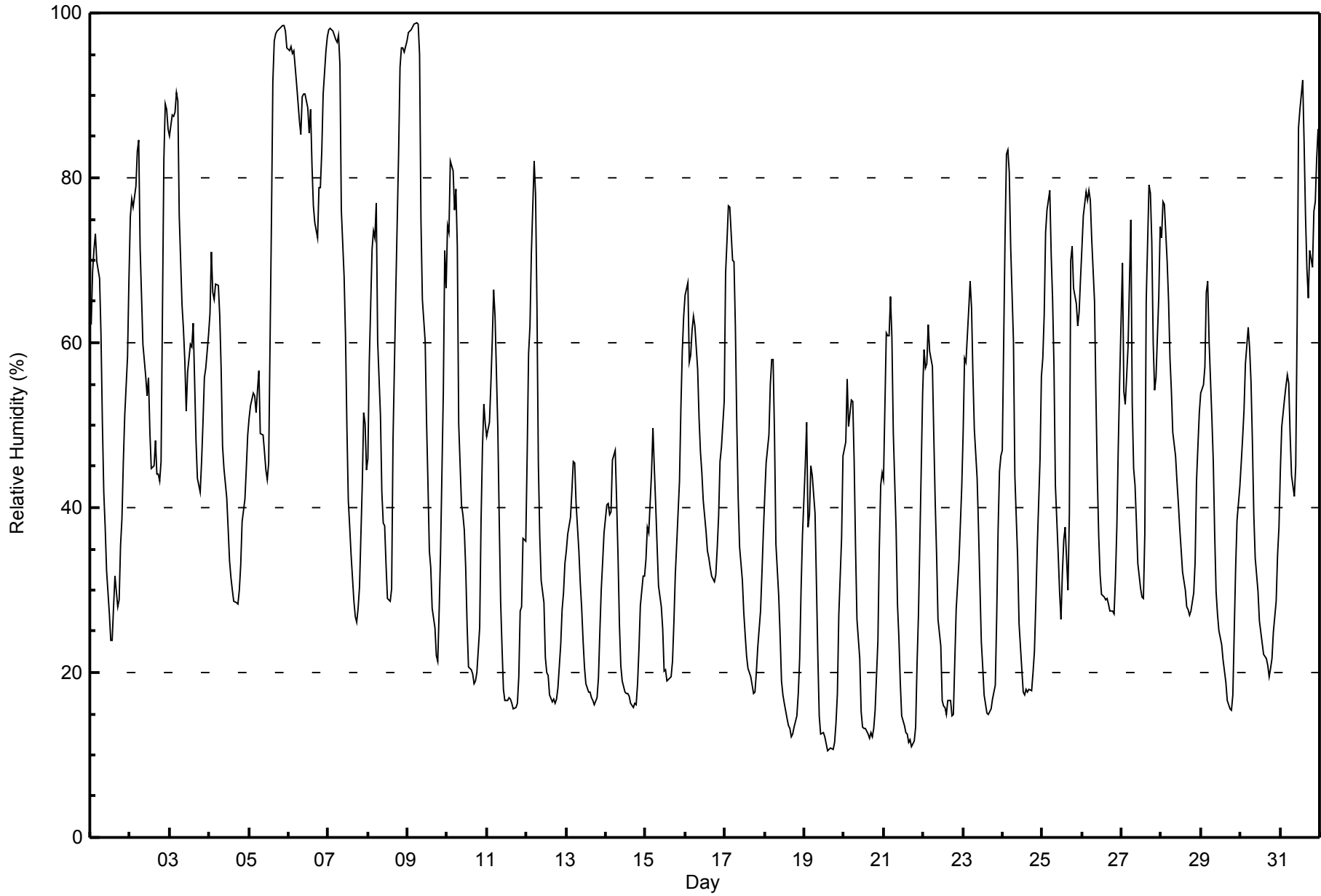


Maximum Value: 99 % on May 9 06:00																		Maximum Daily Average: 87.5 % on May 6																		Hours in Service: 744													
Minimum Value: 10 % on May 19 15:00																		Minimum Daily Average: 25.5 % on May 19																		Hours of Data: 744													
Maximum Diurnal Average: 68.3 % at hour 5																		Minimum Diurnal Average: 30.8 % at hour 15																		Hours of Missing Data: 0													
Monthly Average: 46.0 %																		Percentiles: P ₁ = 11 P ₁₀ = 17 Q ₁ = 27 Median = 43 Q ₃ = 62 P ₉₀ = 80 P ₉₉ = 98																		Hours of Calibration: 0													
																																				Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	62	69	71	73	70	68	61	50	42	38	32	27	24	24	28	32	28	29	35	39	46	51	58	68	46.8	73																							
2-May	75	77	76	79	83	85	72	66	60	56	54	56	49	45	45	48	44	44	43	46	82	89	88	86	64.5	89																							
3-May	85	88	87	88	90	89	75	65	62	58	52	56	60	59	62	55	48	44	42	46	50	56	57	61	64.0	90																							
4-May	64	71	66	65	67	67	63	57	48	45	41	37	34	32	30	29	29	28	30	33	38	41	45	49	46.1	71																							
5-May	51	52	54	54	52	54	57	49	49	47	45	43	45	75	92	97	97	98	98	98	98	98	98	96	70.7	98																							
6-May	95	96	95	95	93	91	87	85	90	90	90	89	85	88	82	77	75	73	79	79	83	90	95	97	87.5	97																							
7-May	98	98	98	98	97	96	97	94	76	68	61	50	41	38	34	29	27	26	28	30	43	51	50	45	61.3	98																							
8-May	46	58	71	74	73	77	60	51	42	38	38	33	29	29	30	48	57	66	83	93	96	96	95	97	61.7	97																							
9-May	98	98	98	98	99	99	99	95	75	65	60	50	43	35	33	28	25	22	21	27	35	54	71	67	62.3	99																							
10-May	74	73	82	81	76	79	72	50	40	39	37	33	26	21	20	20	19	19	20	25	38	47	52	50	45.6	82																							
11-May	49	50	55	60	67	63	49	39	29	23	18	17	17	17	17	16	16	16	16	20	27	28	36	36	32.5	67																							
12-May	46	59	62	71	82	78	64	46	37	31	29	22	20	20	17	16	17	16	17	18	23	28	30	33	36.7	82																							
13-May	35	37	39	42	46	45	41	35	31	28	24	21	19	18	18	17	17	16	17	19	25	30	33	37	28.6	46																							
14-May	40	40	39	39	46	47	41	34	26	21	19	18	17	16	16	16	16	16	16	19	23	28	32	32	27.5	47																							
15-May	34	38	37	44	50	45	40	35	30	28	25	20	20	19	19	19	21	26	32	36	43	52	59	63	34.9	63																							
16-May	66	67	58	58	62	63	62	57	51	47	44	41	37	35	34	33	32	31	32	35	39	46	47	53	47.0	67																							
17-May	68	72	77	76	70	70	62	50	41	35	31	27	25	22	21	20	19	18	18	20	23	28	32	37	40.0	77																							
18-May	41	45	49	55	58	58	49	36	29	25	19	17	16	14	14	13	12	13	13	15	17	22	30	37	29.0	58																							
19-May	45	50	38	39	45	44	39	31	22	15	13	13	12	11	10	11	11	11	11	14	18	27	36	46	25.5	50																							
20-May	47	48	56	50	53	53	46	35	26	22	15	13	13	13	13	12	13	12	13	15	24	35	43	44	29.8	56																							
21-May	43	61	61	61	66	61	49	37	28	24	19	15	14	13	13	11	12	11	12	13	21	27	36	54	31.7	66																							
22-May	59	57	57	62	59	57	49	41	34	26	23	17	16	16	15	17	17	15	15	21	28	34	38	42	33.9	62																							
23-May	49	58	58	64	67	64	56	50	44	37	30	24	21	17	15	15	15	16	17	19	27	37	44	46	37.1	67																							
24-May	47	73	83	83	81	72	60	44	39	34	26	20	18	17	18	18	18	18	20	23	28	35	46	56	40.7	83																							
25-May	58	63	73	76	78	71	65	57	43	34	30	26	32	36	38	30	39	70	72	67	65	62	64	68	54.9	78																							
26-May	72	76	78	77	78	77	73	65	54	44	37	32	29	29	29	29	28	27	27	27	31	38	47	56	48.4	78																							
27-May	70	54	52	56	59	75	53	45	43	38	33	30	29	29	37	65	79	78	72	60	54	56	66	74	54.5	79																							
28-May	73	77	77	70	65	58	54	49	46	43	40	37	35	32	30	28	28	27	28	30	33	43	47	51	45.9	77																							
29-May	54	55	57	66	67	60	51	46	37	30	27	25	23	21	20	19	17	16	15	17	25	33	39	43	35.9	67																							
30-May	45	48	52	57	62	59	55	48	39	34	30	26	25	24	22	22	21	19	20	22	25	29	34	38	35.7	62																							
31-May	45	50	53	55	56	55	49	44	41	45	62	86	88	92	84	75	69	65	71	69	76	77	82	86	65.7	92																							
																								59.2	63.2	64.8	66.7	68.3	67.1	59.6	51.1	43.6	39.0	35.6	33.0	31.0	30.9	30.8	31.1	31.1	31.8	33.4	35.3	41.5	47.3	52.7	56.3	Diurnal Average	
																								98	98	98	98	99	99	99	95	90	90	90	89	88	92	92	97	97	98	98	98	98	98	98	97	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Barge Landing - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Barge Landing - May 2015

Maximum Speed: 18 km/h on May 15 20:00	Maximum Daily Speed Average: 10.7 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 27 06:00	Minimum Daily Speed Average: 0.4 km/h on May 24	Hours of Data: 743
Maximum Diurnal Speed Average: 2.7 km/h at hour 22	Minimum Diurnal Speed Average: 0.4 km/h at hour 14	Hours of Missing Data: 1
Monthly Average Velocity: 0.7 km/h 107.7 deg	Percentiles: P ₁ = 0 P ₁₀ = 3 Q ₁ = 4 Median = 6 Q ₃ = 8 P ₉₀ = 10 P ₉₉ = 16	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-May	SSW5	S3	S4	S5	S9	S6	SSW7	SSW8	SW13	SW11	SW12	SW12	SW14	SW12	WSW6	W7WSW10	W8	WSW3	S3	W4	NNW3	WSW5	W3	SW6.3	SW14	
2-May	WNW3	WNW3	NW4	WNW3	W2	N2	NNW5	N6	NNE9	NNE9	N9	NNW8	NE8	NNW8	NW7	NW6	N7	NNE9	N9	N7	NW10	N7	N9	N9	N5.8	NW10
3-May	N8	N5	N5	NNW4	N3	NW4	NW4	WSW2	WNW6	NW6	NW8	N8	NE7	NNE9	NE9	NNE8	NNE9	N9	NNE7	NNE4	ENE5	ENE4	NE4	NE3	N4.6	N9
4-May	N2	NNE2	ENE3	NNE3	NNE3	ENE3	NE4	NNE4	NE5	NNE5	NE5	NE5	ENE5	NE5	NE6	NNE6	NNE6	NE5	ENE7	NE8	NE10	NE11	NE9	NNE7	NE5.2	NE11
5-May	N7	NNE6	NE6	NE6	NE7	N5	NNW6	N6	N6	NNE8	NNE10	N10	N9	NE9	NE9	ENE7	ENE5	E2	ENE2	NE3	NE3	NE5	NE8	NNE7	NNE5.8	N10
6-May	N6	N6	N5	N7	N6	NNW8	N8	N7	N8	N9	NNE9	NE9	NE9	NE10	ENE10	ENE10	ENE9	E7	E7	SE3	ESE2	ESE3	W1	NNW1	NNE5.1	NE10
7-May	ESE3	SE3	SE3	SE4	SSE3	SSW2	SSW4	S6	SSW6	SW5	SSW0	NE6	NNE6	NNE7	NE4	NE7	NE7	ENE5	ENE7	E5	E4	E5	ESE4	S3	E2.3	ENE7
8-May	SSE2	NE1	E3	ESE4	SE1	NNE0	SE4	S5	SSW5	SW3	W7	SSW6	W5	E2	N6	NW11	NNW10	NE7	NE10	ENE8	ESE5	ESE6	SSE3	NNW3	NE0.8	NW11
9-May	NNW4	N3	NE1	N3	NW2	AF	WNW2	WNW2	NW4	SSW3	S5	WSW9	WSW8	WSW7	W8	WSW6	WSW4	S6	SSE4	S4	SE4	ESE4	E3	ENE4	SW1.8	WSW9
10-May	WNW1	W0	NNW3	N3	NNW3	NNW3	NW3	NNE4	NE4	NNE5	NNE5	NE5	NE6	NW7	NNW4	SW2	WSW7	W6	SW4	ENE0	E4	E3	SE5	ESE6	N1.5	NW7
11-May	SE6	SE4	SE4	SSE4	SSE4	SSE6	S7	S8	SSW8	SW8	SW7	NW2	S4	SSE7	SSE7	SE4	E5	E5	E4	ESE1	NE2	NE4	NE3	ENE5	SSE3.1	SSW8
12-May	N3	N3	SW0	N1	NNE2	WNW1	WNW1	WNW2	WNW4	NNE4	NNW1	WNW5	W4	WSW4	NW3	SE7	S7	S7	SE9	SE7	SE10	SE15	SE14	SE12	SE2.4	SE15
13-May	SE12	SE11	SE9	SSE5	SE8	SE8	SSE9	S9	SSW11	S10	SSW10	S10	S11	S12	S12	S11	SSE10	S10	S9	S6	S7	SSE7	SSE6	SSE7	SSE8.7	S12
14-May	SSE8	S7	SSW5	SSW7	SSE6	SSE6	S7	SSW7	SW10	SW12	SSW14	SW14	SSW14	SSW12	S12	S10	SSW9	S9	SSW10	SSW8	SSW7	S6	SSW7	SSW7	SSW8.4	SSW14
15-May	S6	SSE6	S7	SW2	SSW3	SW6	SW5	SW5	SSW6	SSW9	SSW9	WSW13	SSW12	WSW11	WSW12	SW11	WSW8	WNW7	N14	N18	N16	N17	N16	N15	W3.7	NNW18
16-May	N13	N12	N17	N17	N15	NNE15	NNE16	N14	NNE12	NNE13	NNE12	NNE12	NE12	NE12	NE11	NNE10	NE9	NE8	NE6	NE6	NE4	NE4	NNE2	NNE10.7	N17	
17-May	NW0	SE0	E2	ESE2	SE3	SE3	SSE7	S10	S11	S10	S10	S9	S10	S8	S8	S7	SSE8	SSE7	SSE7	SE6	SE6	SE7	SSE7	SE8	SSE6.2	S11
18-May	SE7	SE6	SE3	SE4	SSE4	SSE5	S7	S8	SSW8	SSW7	SW10	SSW10	SSW10	SSW9	SSW8	S9	S7	S8	S7	S6	S5	SSW4	SSW5	SE3	S6.1	SSW10
19-May	SSE3	SSE4	S6	S5	S4	SSE4	S6	S7	SSW8	SW9	SW9	SSW7	S8	SSE8	SSE8	SSE7	SSE6	S6	S6	SSE4	SSE4	SE3	SE2	S1	S5.2	SW9
20-May	S3	SSE4	SE5	SSE4	SE4	SSE5	S7	S7	SSW7	SSE7	S7	S10	SSW10	S6	S4	SW6	SSE3	SSW5	SE4	SE4	ESE2	ESE4	ESE4	SE4	S4.7	S10
21-May	S2	S4	SSE5	SSE5	SE4	SE5	S6	S8	S7	SSE7	SSW7	S9	S8	SSW9	S8	SSW9	SW4	WSW6	SW4	S3	S3	S4	SE2	NE1	S5.0	S9
22-May	SSW2	SSW2	S3	SSE2	SSE4	SSW4	SW4	WSW4	W2	NE6	NE7	NNE10	NNE10	N10	NNW10	NNE10	NNE12	NNE11	N10	NE9	NE9	NNE7	NNE8	NE8	NNE4.5	NNE12
23-May	N5	NNW5	N5	NNW3	N3	N4	NNE5	N4	NNW5	NNE7	NNE7	NE7	NE6	ENE6	NNE5	NE4	ENE5	ENE4	ESE4	ENE3	ENE2	NNE1	NNW4	NNW4	NNE3.8	NNE7
24-May	NNW3	NW2	WSW1	W1	S4	SSE2	SW3	NW1	SSE2	NW4	W3	WSW3	WSW5	W2	ENE6	NNE2	ENE4	E3	E3	E3	E3	ENE1	NW3	WNW3	NW0.4	ENE6
25-May	NW3	WNW1	SSE3	SW3	ESE3	SE3	S4	SSW6	SSW5	SSE4	SSE5	SSW4	ENE5	W1	SSE6	SSW8	WNW7	NW6	W3	NNW7	NNW9	NNW10	NNW12	N11	WNW1.1	NNW12
26-May	N9	NE4	NNE3	N7	N6	N6	N6	N6	N8	NE8	NNE9	NNE8	NE7	NNE7	NNE4	NE5	ENE6	ENE5	ENE6	NE6	NE6	ENE4	E3	NE0	NNE5.2	NNE9
27-May	WNW1	SSE3	S4	S1	SE1	W0	E2	S1	WNW3	N4	NNE5	NNW6	NW6	N9	N16	N14	N11	N8	N7	NNE12	NNE16	N13	N15	N11	N5.8	NNE16
28-May	N11	N10	N8	N9	N10	N9	N10	NNE11	N11	N10	NNE10	NNE9	NNE9	NNE8	NE8	NNE9	NNE7	NNE7	NNE7	N7	N6	ENE4	ESE4	SE3	NNE7.6	N11
29-May	SE4	S4	SE4	S1	E2	SE4	S4	SSW5	SSE8	S6	SSW4	SSE2	ESE3	W6	SSW5	S6	S6	SSW6	S7	SSW5	SSE5	SSE6	SSE7	SSE7	S4.2	SSE8
30-May	SSE8	SSE6	SE4	ESE4	ESE5	SE4	SSE6	S7	SSW8	SSW7	SSW7	SSE10	S9	SSE9	S8	S7	SSE8	SSE10	SE10	SE10	SE8	SE9	SE8	SSE8	SSE6.7	SSE10
31-May	SE7	SE8	SE7	SE7	SE5	SE4	SSE6	S7	SE9	S5	S10	SSE4	S6	S8	SSE10	SSE9	SSE7	SSE8	SSE6	SSE7	S7	S5	SE3	SW3	SSE6.1	S10

ENE0.9 ESE1.0 ESE1.2 ENE0.8 E1.1 ESE0.9 S1.0 SSW1.7 SW2.0 SW0.8 SW1.3 WSW0.8 S0.8 S0.4 ESE0.8 SE0.8 E0.9 ESE0.9 E2.1 ENE2.0 ENE2.2 ENE2.7 ENE2.0 ENE1.6	Diurnal Average
N13 N12 N17 N17 N15 NNE15 NNE16 N14 SW13 NNE13 SSW14 SW14 SW14 S12 N16 N14 NNE12 NNE11 N14 NNW18 N16 N17 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
Barge Landing - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 6 km/h on May 1 13:00	Hours of Data: 743
Minimum Value: 0 km/h on May 23 21:00	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

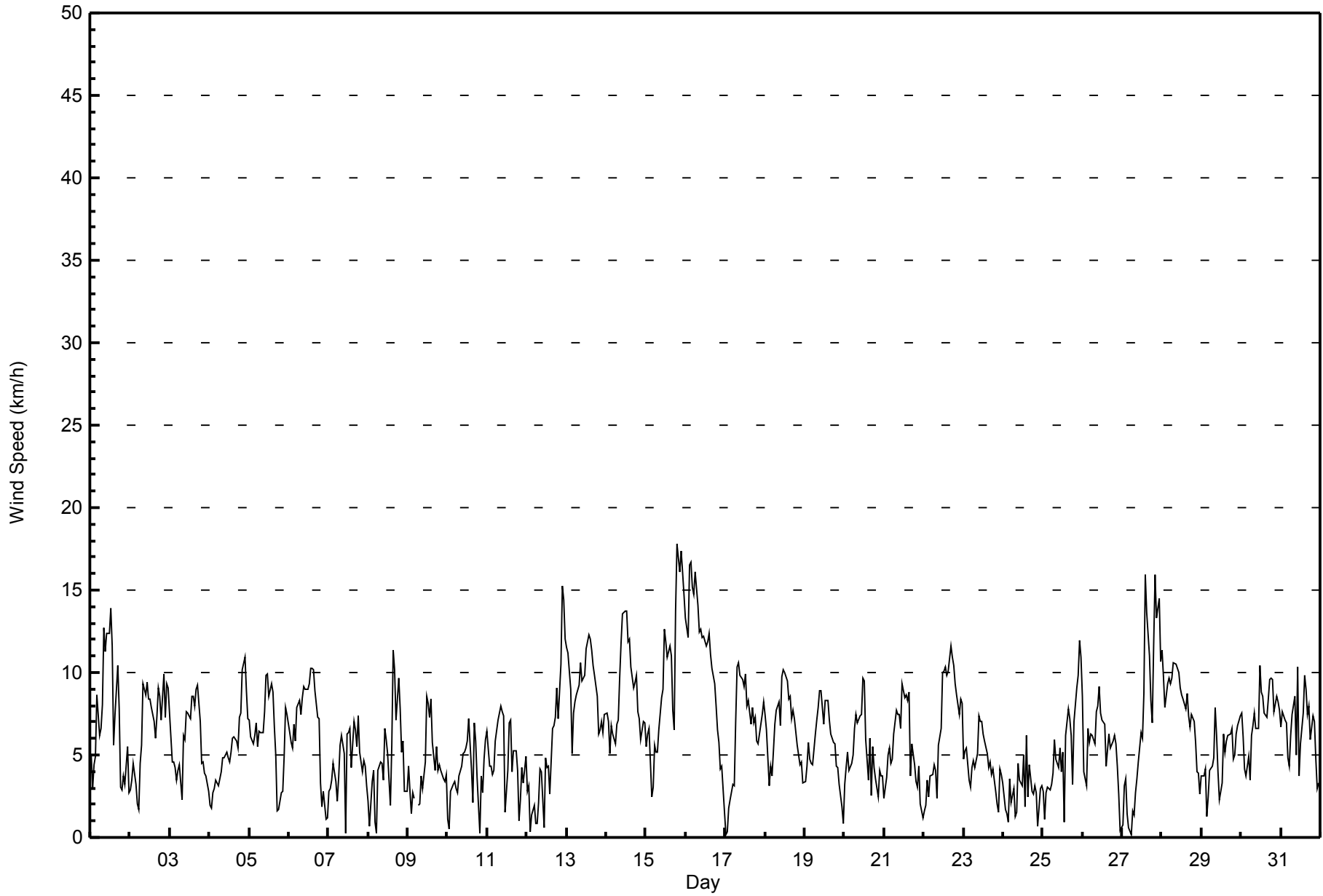
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	2	1	1	2	3	3	2	3	3	4	4	4	6	4	4	6	4	4	4	1	3	2	2	1	6
2-May	1	2	1	1	1	1	1	2	3	3	3	3	3	4	3	4	3	3	2	3	4	3	3	3	4
3-May	2	2	1	1	1	1	2	2	2	2	3	3	2	3	3	2	3	3	2	1	1	1	2	1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

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Barge Landing - May 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Barge Landing - May 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	327	44.01	44.01
6 - 11	367	49.39	93.41
12 - 19	49	6.59	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
Frequency Distribution

Wind Speed (WS) - km/h
Barge Landing - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	19	20	26	22	18	20	36	32	31	20	14	9	14	15	14	17	327
6 - 11	50	40	38	11	1	3	24	47	67	37	10	10	6	3	9	11	367
12 - 19	15	10	2	0	0	0	4	0	3	3	7	3	0	0	0	2	49
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	84	70	66	33	19	23	64	79	101	60	31	22	20	18	23	30	743

Total Number of Valid Hours: 743

Total Number of Hours: 744



Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Barge Landing - May 2015

Direction of Maximum Speed: 349 deg on May 15 20:00 Direction of Maximum Daily Speed Average: 18.2 deg on May 16																						Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1			
Direction of Minimum Speed: 269 deg on May 27 06:00											Direction of Minimum Daily Speed Average: 0.4 deg on May 24											Percent Operational Time: 99.9			
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-May	201	186	181	176	189	189	192	208	234	221	215	231	234	222	257	268	239	278	245	174	265	331	239	260	225.3
2-May	299	283	315	297	260	349	331	353	27	29	3	339	43	342	321	311	4	16	9	4	323	6	6	1	353.5
3-May	9	355	0	345	349	318	321	253	289	305	308	9	48	33	34	30	18	2	13	20	77	57	42	51	6.9
4-May	8	18	60	32	20	76	42	22	46	32	49	41	66	47	50	28	33	46	73	51	47	49	46	21	43.8
5-May	8	30	34	46	39	355	339	9	349	21	18	7	9	42	34	59	60	90	70	54	51	46	40	20	26.0
6-May	352	349	350	352	352	348	351	358	356	7	17	37	45	50	61	74	76	86	101	125	102	110	269	333	30.3
7-May	105	133	143	141	151	198	213	178	205	223	194	52	27	15	50	46	42	57	78	81	79	88	103	178	91.8
8-May	151	56	99	109	140	18	124	174	201	230	263	206	277	88	1	322	336	40	54	66	105	108	149	336	52.4
9-May	337	3	42	352	324	AF	303	302	312	204	184	248	246	245	259	237	240	179	156	173	144	109	87	77	234.7
10-May	288	260	348	350	340	345	319	21	35	23	21	45	36	314	336	227	246	262	226	58	92	91	124	113	2.1
11-May	135	138	140	151	168	159	170	183	212	224	220	314	170	153	165	131	79	79	101	118	54	48	54	67	150.9
12-May	10	357	229	356	15	300	301	294	303	21	343	294	266	257	322	144	186	178	139	134	125	131	134	138	144.0
13-May	139	140	143	149	133	139	153	179	194	191	194	186	178	183	172	169	165	183	174	177	172	157	152	152	166.8
14-May	168	176	196	195	158	162	191	198	218	236	210	216	199	192	174	190	198	181	202	200	194	190	200	205	196.0
15-May	181	151	174	234	206	226	223	207	199	198	246	233	249	238	233	237	301	357	349	357	357	352	2	276.3	
16-May	360	356	358	7	5	14	13	4	21	18	14	14	22	34	39	37	28	38	43	42	45	35	40	18	18.2
17-May	307	125	94	119	130	126	160	174	178	169	176	182	186	178	178	176	165	158	155	143	135	132	151	145	162.7
18-May	139	132	141	127	153	155	174	191	204	207	224	199	197	200	201	190	189	170	170	173	187	198	193	140	182.9
19-May	152	166	188	183	173	156	176	187	213	223	227	192	183	155	154	168	154	177	174	153	154	136	124	188	177.9
20-May	170	151	134	163	145	154	175	173	198	168	189	177	194	173	190	217	165	207	144	146	105	115	117	135	169.1
21-May	191	179	156	154	144	140	176	180	189	156	195	176	170	194	184	211	215	244	221	188	184	173	137	42	181.3
22-May	197	200	187	153	160	206	219	237	266	35	40	12	22	4	343	22	27	12	9	34	45	33	25	34	20.7
23-May	5	340	357	344	357	354	17	350	346	22	21	38	46	60	22	48	74	72	119	73	57	22	328	339	21.7
24-May	330	320	249	278	172	160	227	315	168	309	279	256	249	267	59	12	66	92	100	98	85	69	323	298	320.3
25-May	325	284	148	236	119	146	185	198	208	161	161	201	70	276	152	198	303	311	262	333	348	345	347	355	297.3
26-May	353	38	27	4	2	351	355	11	357	38	20	22	36	31	20	55	66	68	64	45	50	63	93	41	28.0
27-May	284	159	171	189	140	269	86	174	296	359	19	335	325	349	360	360	358	357	354	13	16	3	4	357	0.1
28-May	7	2	357	1	3	11	5	12	5	1	12	20	19	13	34	17	29	24	14	0	355	72	103	127	13.2
29-May	146	170	129	170	99	125	173	197	165	188	203	167	105	266	196	181	176	197	187	193	152	152	152	152	171.5
30-May	147	151	125	115	122	132	157	169	206	206	207	162	178	150	179	173	159	160	146	138	134	138	146	153	157.6
31-May	137	138	137	130	129	136	148	184	146	190	184	161	182	172	156	161	167	159	164	164	182	188	137	236	160.7
66.7 107.0 107.1 73.7 96.2 106.7 175.1 197.0 226.9 227.3 230.9 240.0 172.7 173.5 103.5 142.2 90.0 102.5 100.4 77.0 71.0 75.8 69.1 60.0 Diurnal Average																									
AF - Analyzer Failure All monthly, daily, and diurnal averages have been calculated using vector methods																									



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Barge Landing - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 106 deg on May 7 11:00	Hours in Service: 744 Hours of Data: 743 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9
Minimum Value: 7 deg on May 31 03:00	
Percentiles: P ₁ = 9 P ₁₀ = 17 Q ₁ = 22 Median = 29 Q ₃ = 42 P ₉₀ = 62 P ₉₉ = 96	

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	23	28	24	26	26	27	24	29	18	28	29	28	29	32	61	69	29	49	82	29	51	24	16	32	82
2-May	22	32	13	22	74	57	17	29	23	25	27	24	29	45	37	55	35	22	22	29	24	20	21	23	74
3-May	21	21	23	18	14	18	32	85	38	38	36	42	28	26	24	27	25	28	24	30	15	19	18	17	85
4-May	44	25	25	21	30	36	32	34	42	46	42	66	70	60	44	54	48	41	24	18	18	18	20	19	70
5-May	21	22	19	21	19	26	24	27	27	21	19	23	31	24	19	20	21	29	17	20	20	20	21	20	31
6-May	22	19	20	22	21	20	22	21	22	21	21	20	20	22	24	24	23	24	21	37	27	10	85	48	85
7-May	21	18	20	11	25	39	27	29	39	52	106	37	36	38	67	42	32	30	20	18	19	17	24	27	106
8-May	38	78	12	18	57	84	17	49	43	72	42	56	53	88	43	23	31	28	20	20	24	18	60	35	88
9-May	18	23	56	39	12	AF	44	63	34	74	61	29	45	50	35	54	66	45	48	24	13	15	13	43	74
10-May	78	97	54	19	18	23	23	41	41	36	39	45	50	35	69	90	51	35	42	83	13	39	17	9	97
11-May	12	15	16	17	18	21	24	28	27	30	38	101	77	57	44	66	42	32	31	44	45	17	39	20	101
12-May	42	26	102	56	29	69	70	76	44	59	103	67	75	84	95	59	60	39	20	15	12	13	15	14	103
13-May	16	15	17	14	10	15	23	28	32	40	37	38	38	35	34	35	29	32	26	21	18	15	12	14	40
14-May	16	23	28	28	18	22	26	25	25	23	26	27	30	34	30	36	35	30	26	22	20	20	25	26	36
15-May	25	16	22	58	48	28	34	31	34	34	40	31	36	41	39	31	33	52	26	25	26	25	25	24	58
16-May	24	25	26	23	24	23	23	25	24	26	27	28	27	26	24	24	24	28	26	23	19	18	19	40	40
17-May	88	94	18	21	15	16	28	27	33	36	37	43	39	45	47	46	41	38	28	21	9	11	13	11	94
18-May	11	9	25	15	22	21	26	32	31	48	32	40	39	42	48	48	43	34	25	21	21	18	16	30	48
19-May	25	23	24	25	25	28	24	30	28	28	35	62	47	38	37	45	48	56	32	16	11	12	41	62	62
20-May	31	32	11	21	15	20	22	27	32	39	45	42	46	61	76	69	88	46	48	21	25	11	12	17	88
21-May	26	32	12	10	9	17	27	27	34	33	44	45	50	47	44	45	79	41	49	18	30	30	66	73	79
22-May	81	67	30	44	34	36	24	36	77	39	37	32	32	31	32	34	26	25	27	20	20	24	25	21	81
23-May	34	18	18	21	22	23	30	39	43	36	36	37	41	44	52	60	50	49	34	22	14	18	13	16	60
24-May	12	24	53	54	16	61	29	72	82	35	65	86	77	92	45	91	47	66	46	17	20	61	33	49	92
25-May	64	75	51	38	59	40	34	27	45	50	48	80	47	85	42	40	60	60	51	22	26	24	23	23	85
26-May	30	59	69	22	24	23	27	35	30	33	34	41	39	38	69	45	34	37	26	23	20	21	23	80	80
27-May	93	67	21	91	75	101	70	89	75	54	47	27	20	40	27	26	25	25	25	28	24	24	25	23	101
28-May	24	25	25	24	25	24	25	28	31	30	30	34	39	38	37	32	38	40	30	25	24	17	14	33	40
29-May	23	32	23	61	22	23	46	52	39	64	81	99	84	55	68	57	57	44	30	25	13	13	12	16	99
30-May	15	13	12	8	8	23	30	30	35	42	49	36	39	39	46	51	38	30	23	17	12	12	15	20	51
31-May	13	8	7	10	20	20	32	29	26	43	31	26	25	24	25	28	36	31	32	26	35	33	17	52	52
	93	97	102	91	75	101	70	89	82	74	106	101	84	92	95	91	88	66	82	83	51	61	85	80	

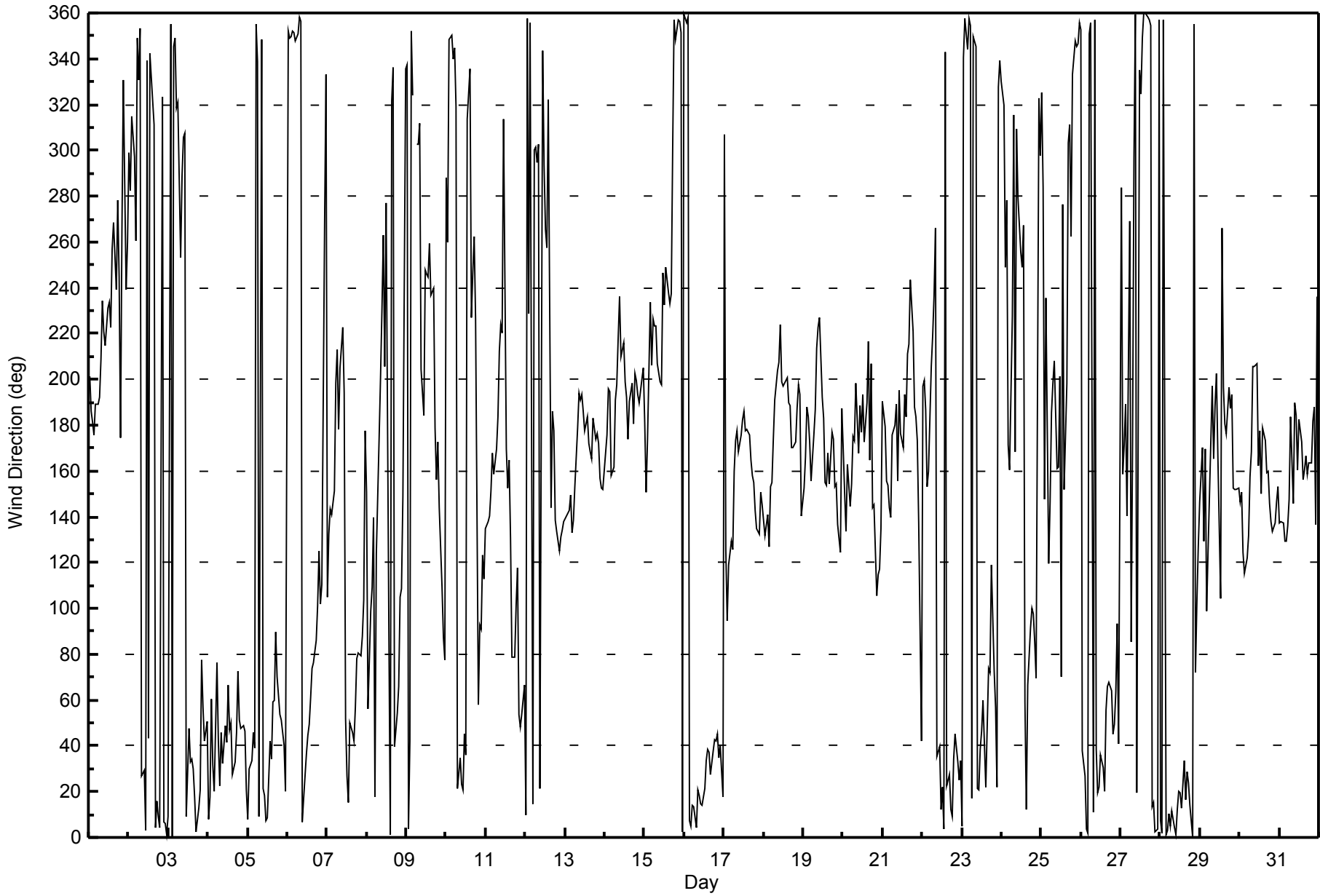
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Barge Landing - May 2015





Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	May 15, 2015	Last Calibration	April 9, 2015
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	14:16
Gas Cert Reference	CC62993	Station temp.	22 Deg C
Cal Gas Concentration	4.77 ppm	Cal Gas Exp Date	10/06/2014
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
Dil air Make/Model	API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6466
SO2 gas concentration	59 ppm	SO2 gas cert/exp	FF54535 6/Jul/2014

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-690	-689
Analyzer IP address	192.168.1.42		Lamp voltage	1017	1012
Calculated slope	1.000482	0.991981	Chamber temp	45	45
Calculated intercept	-0.037948	-0.099960	Pressure	681.8	686.3
Analyzer Background	2.11	1.93	Flow	0.431	0.434
Analyzer Coefficient	0.993	1.011	Intensity	90	91
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153461	
Converter make/model	CDN-101		Converter serial #	519	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	----
as found span	5000	83.7	79.8	78.5	1.018
SO2 scrubber check	6000	12.2	120.0	0.1	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	83.7	79.8	80.5	0.992
second point	5000	41.9	40.0	40.6	0.984
third point	5000	21.0	20.0	20.3	0.987
as left zero	6000	0.0	0.0	0.1	----
as left span	5000	83.7	79.8	80.3	0.995
Average Correction Factor					0.988

Corrected As found	78.7	Previous response	79.8	% change	1.4%
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Notes:

Scrubber check done after as founds. Inlet filter changed after as founds. Adjusted zero and span.

Calibration Performed By:

Asad Hidayat



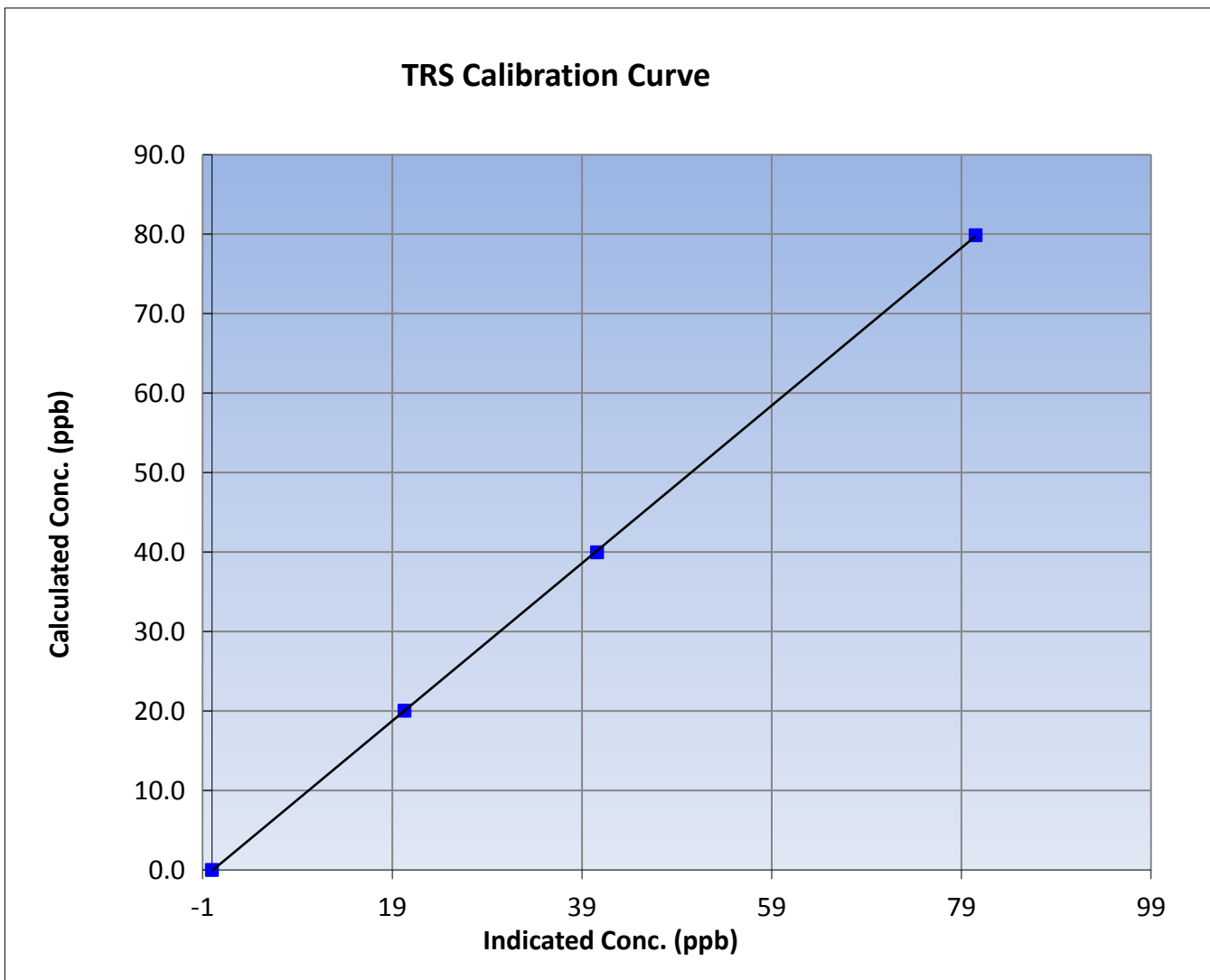
Wood Buffalo Environmental Association TRS Calibration Report

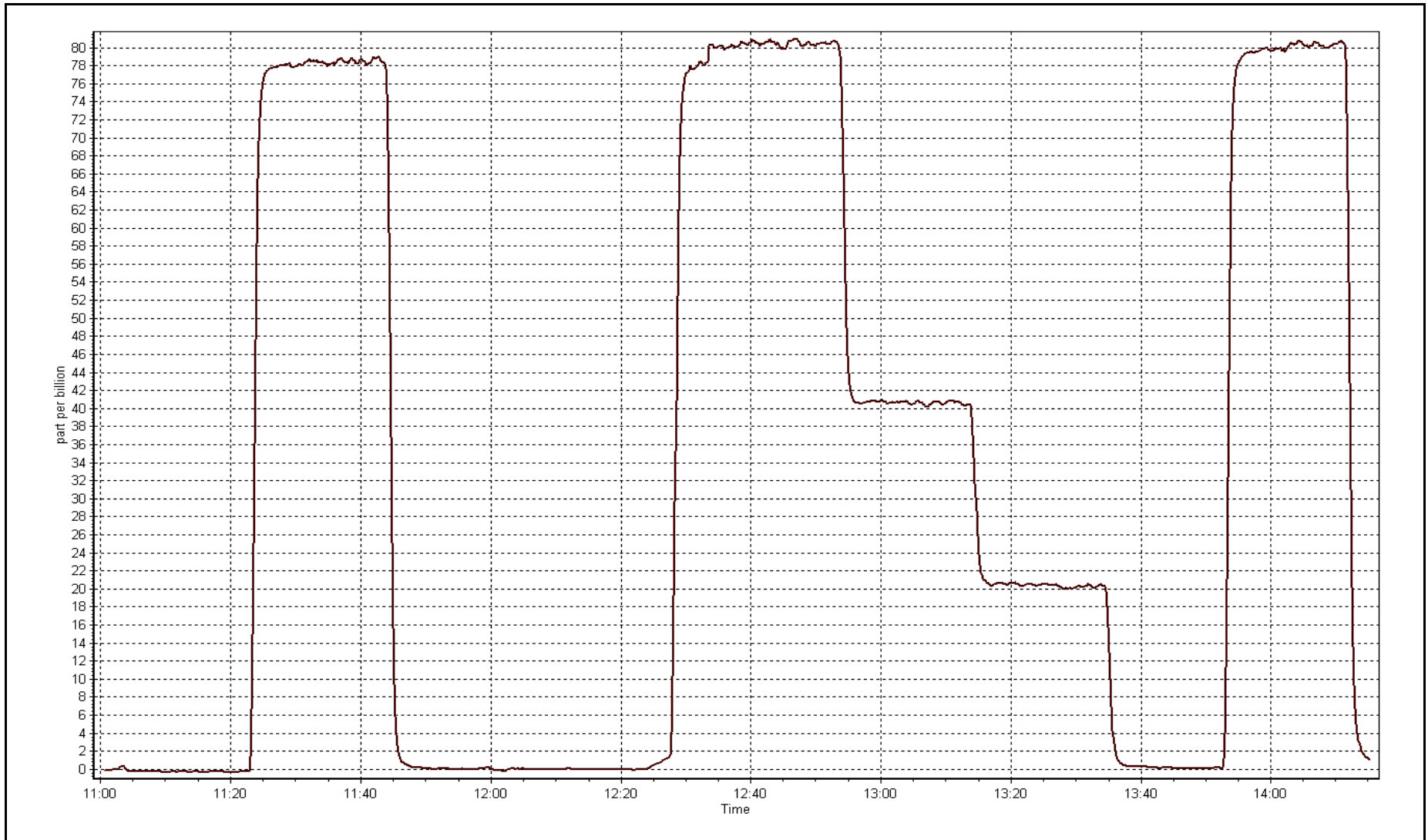
Station Information

Calibration Date	May 15, 2015	Previous Calibration	April 9, 2015
Station Name	AMS 9	Station Number	AMS 9
Start Time (MST)	11:00	End Time (MST)	14:16
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999981
79.8	80.5	0.9920		
40.0	40.6	0.9843	Slope	0.991981
20.0	20.3	0.9874		
			Intercept	-0.099960







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-14-15	Last Calibration	April-20-15
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	8:46	End Time (MST)	11:40
Gas Cert Reference	LL104180	Cal Gas Expiry Date	12/02/2018
CH4 Cal Gas Conc.	490 ppm	CH4 Equiv Conc.	1023.5 ppm
C3H8 Cal Gas Conc.	194 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
ZAG make/model	Teledyne API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	Serial Number	6466

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.1	9.1
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.7	34.7
Calculated slope	1.002934	1.004316	Fuel Pressure	24.1	24.1
Calculated intercept	-0.021951	0.011318	Analyzer Coeff	4.3	4.3
			Analyzer BKG	5.580	5.680

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	0.10	----
as found span	6000	92.0	15.69	15.62	1.005
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	92.0	15.69	15.62	1.005
second point	6000	49.2	8.39	8.34	1.006
third point	6000	18.5	3.16	3.12	1.011
as left zero	6000	0.0	0.00	-0.02	----
as left span	6000	92.0	15.69	15.70	1.000
Average Correction Factor					1.008

Corrected As found	15.52	Previous response	15.67	% change	1.0%
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Notes:

Changed inlet filter after as founds. Slightly adjusted zero.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association THC Calibration Report

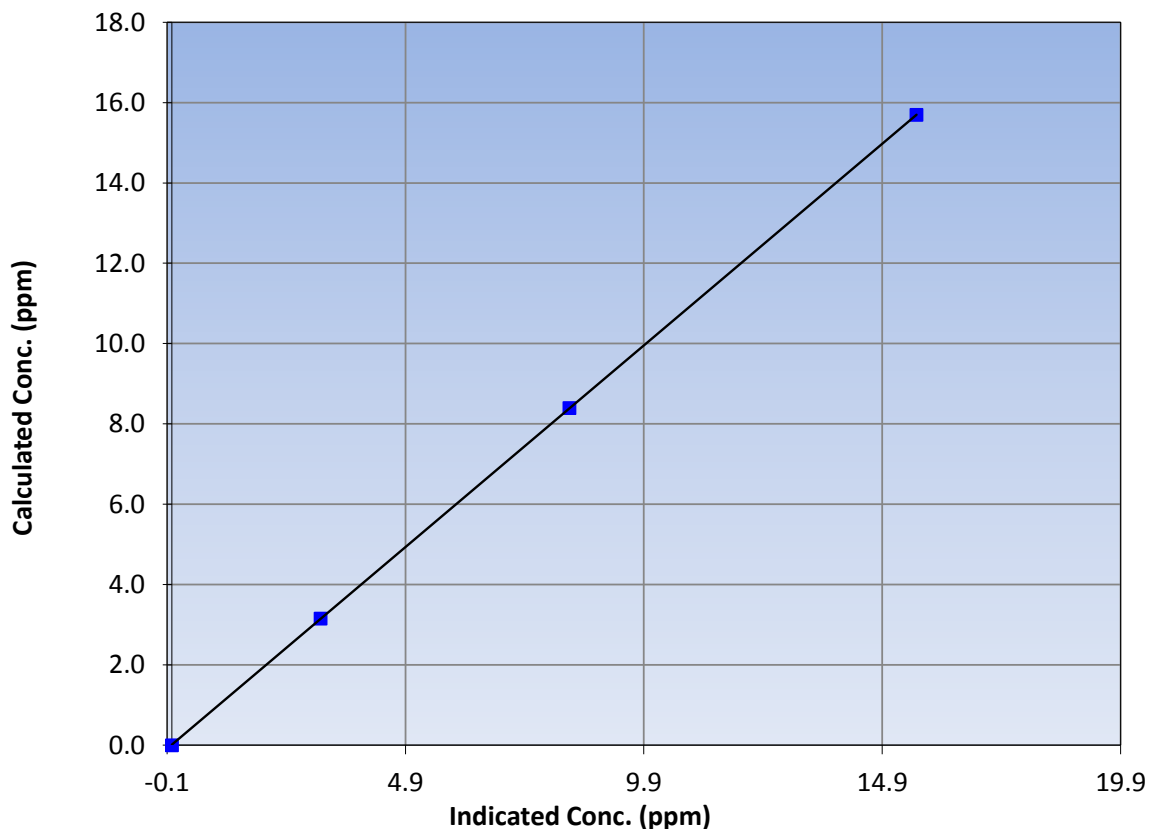
Station Information

Calibration Date	May 14, 2015	Previous Calibration	April 20, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	8:46	End Time (MST)	11:40
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

Calibration Data

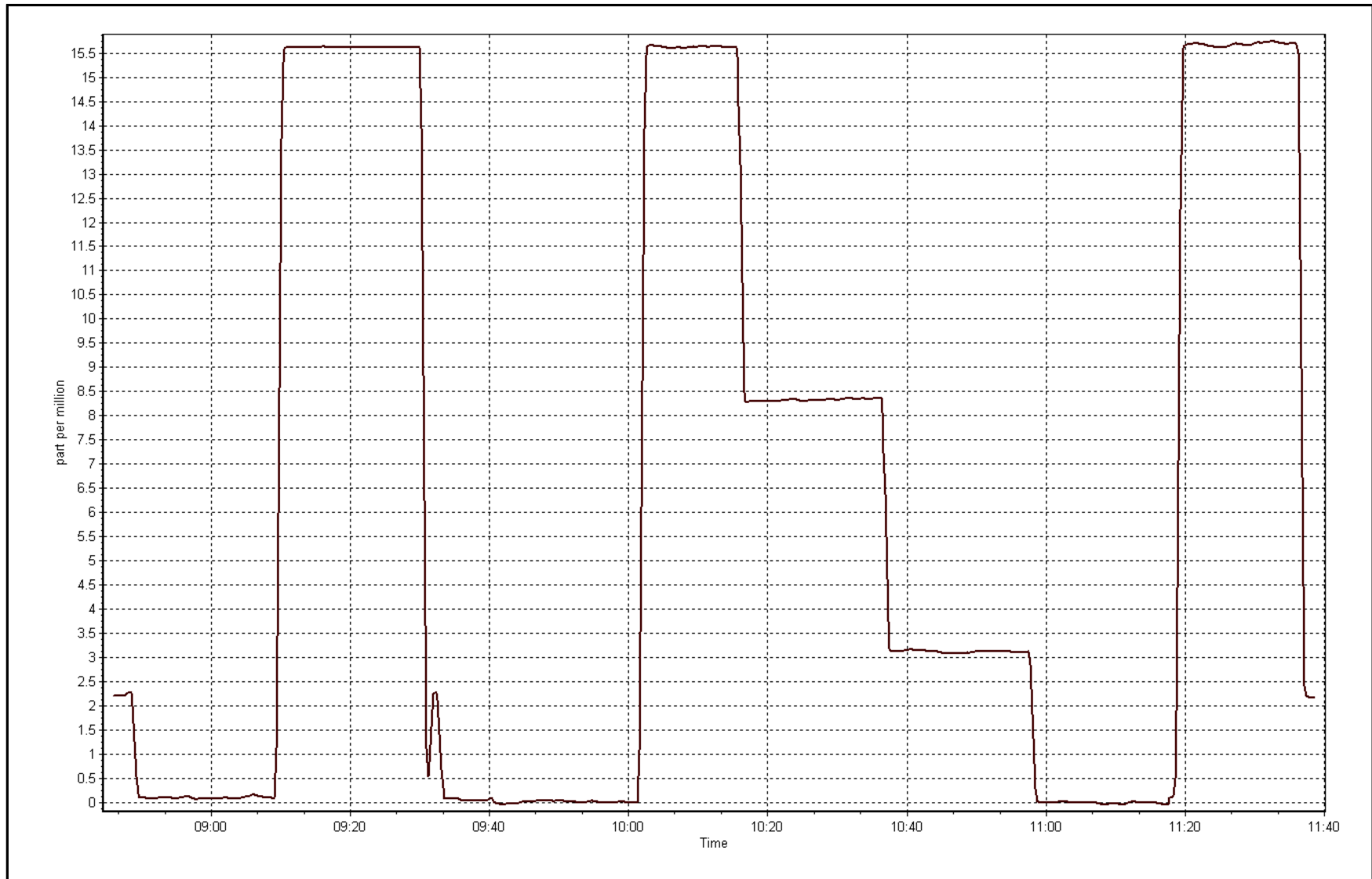
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999998
15.69	15.62	1.0047		
8.39	8.34	1.0063	Slope	1.004316
3.16	3.12	1.0115		
			Intercept	0.011318

THC Calibration Curve



THC Calibration Plot

Date: May 14, 2015





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 11
LOWER CAMP
MAY 2015**

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

June 29, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
MAY 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	697	36	47	98.52	60	0	8	0
H2S (ppb) Average	702	34	42	98.92	21	1	2	0
THC (ppm) Average	698	36	46	98.66	4.1	-	2.6	-
Temperature (C) Average	744	0	0	100.00	28.6	-	19.7	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	86	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	30	-	19	-
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)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	697	2.8	6	-	0	0	0	1	3	8	60
H2S (ppb) Average	702	0.7	1	-	0	0	0	1	1	1	21
THC (ppm) Average	698	2.28	0.3	-	2	2.1	2.1	2.2	2.3	2.6	4.1
Temperature 2 m (C) Average	744	12.09	7.5	-	-2.4	2.5	6.1	11.4	17.5	23.3	28.6
Relative Humidity (%) Average	744	50.6	23	-	12	20	31	50	69	83	99
Wind Speed 10 m (km/h) Average	744	8.6	6	-	0	2	4	8	12	16	30
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)
MAY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Air Quality Analyzers	01 May 2015 08:00	01 May 2015 13:00	6	Station power interruption - generator power
SO2	01 May 2015 14:00	01 May 2015 16:00	3	Maintenance - stablization following power interruption
SO2	28 May 2015 11:00	28 May 2015 12:00	2	Maintenance - sample manifold cleaned
H2S	01 May 2015 14:00	01 May 2015 15:00	2	Maintenance - stablization following power interruption
THC	01 May 2015 14:00	01 May 2015 15:00	2	Maintenance - stablization following power interruption
THC	28 May 2015 11:00	28 May 2015 12:00	2	Maintenance - sample manifold cleaned



Summary of Hour Averages

Lower Camp - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 60 ppb on May 7 05:00	Maximum Daily Average: 7.6 ppb on May 10
Minimum Value: 0 ppb on May 28 04:00	Hours of Data: 697
Maximum Diurnal Average: 5.4 ppb at hour 9	Hours of Missing Data: 47
Monthly Average: 2.8 ppb	Hours of Calibration: 36
Minimum Daily Average: 0.1 ppb on May 28	Percent Operational Time: 98.5
Minimum Diurnal Average: 0.8 ppb at hour 7	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 8 P ₉₉ = 27	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	31	Z	2	1	1	1	1	AF	AF	AF	AF	AF	AF	M	M	M	0	8	5	8	36	18	28	3	--	36	
2-May	8	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4	5	0	0	0	1.1	8	
3-May	0	0	0	Z	0	0	0	0	1	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
4-May	0	0	0	0	Z	19	1	1	7	9	12	9	7	4	3	1	1	1	1	0	0	0	0	0	3.4	19	
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
7-May	1	Z	6	4	60	5	0	1	1	7	7	4	1	1	1	1	0	0	0	0	0	0	0	0	4.4	60	
8-May	0	0	Z	1	1	2	1	0	3	7	10	11	9	1	4	4	1	3	2	0	0	0	0	0	2.7	11	
9-May	0	0	0	Z	0	0	0	2	14	4	5	3	2	2	5	8	5	13	13	8	3	1	1	1	4.0	14	
10-May	3	1	1	2	Z	0	1	10	21	15	22	27	38	11	7	4	2	5	0	0	1	1	0	1	7.6	38	
11-May	1	2	25	7	5	Z	1	1	4	7	11	0	3	11	5	6	8	3	2	1	6	5	3	1	5.1	25	
12-May	Z	0	1	1	0	1	1	1	0	6	4	3	5	9	12	8	9	1	0	0	0	1	10	0	3.2	12	
13-May	0	Z	0	1	1	1	2	2	1	2	2	4	3	1	2	1	1	2	1	3	5	1	0	0	1.6	5	
14-May	0	0	Z	0	0	1	1	2	11	8	2	3	2	2	2	3	4	2	14	11	3	7	16	8	4.6	16	
15-May	20	13	1	Z	1	2	1	4	21	14	3	1	1	1	1	1	1	1	0	0	0	0	0	0	3.8	21	
16-May	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	
17-May	0	0	0	0	0	Z	2	2	2	5	5	3	11	4	5	3	1	1	2	4	3	3	13	2	3.2	13	
18-May	Z	1	2	33	5	1	1	0	17	14	10	4	1	0	0	0	0	0	0	0	42	5	1	1	6.0	42	
19-May	0	Z	0	0	0	0	1	2	5	4	0	0	1	1	9	11	12	7	4	1	5	1	1	1	2.9	12	
20-May	1	0	Z	1	1	0	0	0	2	6	6	1	5	2	2	2	2	1	3	9	21	3	2	1	3.0	21	
21-May	1	0	0	Z	1	0	0	0	0	7	18	5	2	1	2	2	2	4	3	3	2	3	2	1	2.7	18	
22-May	1	1	1	1	Z	0	0	1	17	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.5	17	
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	0.4	3	
24-May	Z	0	1	0	0	0	1	1	2	1	3	19	5	8	6	5	6	4	3	3	2	1	1	3	3.2	19	
25-May	1	Z	1	1	1	1	1	1	2	C	C	C	C	C	6	5	5	1	3	1	0	0	0	0	1.7	6	
26-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
27-May	0	0	0	Z	0	0	0	0	0	1	1	3	7	4	1	0	0	0	0	0	0	0	0	0	0	0.8	7
28-May	0	0	0	0	Z	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
29-May	0	1	11	9	1	Z	7	7	7	3	7	11	9	8	16	13	3	3	2	0	1	1	3	1	5.3	16	
30-May	Z	1	1	1	1	0	0	5	15	17	11	2	2	22	10	7	8	4	3	2	10	2	1	1	5.4	22	
31-May	1	Z	1	0	0	1	0	11	10	2	1	1	0	0	1	1	2	2	0	1	0	1	9	3	2.1	11	

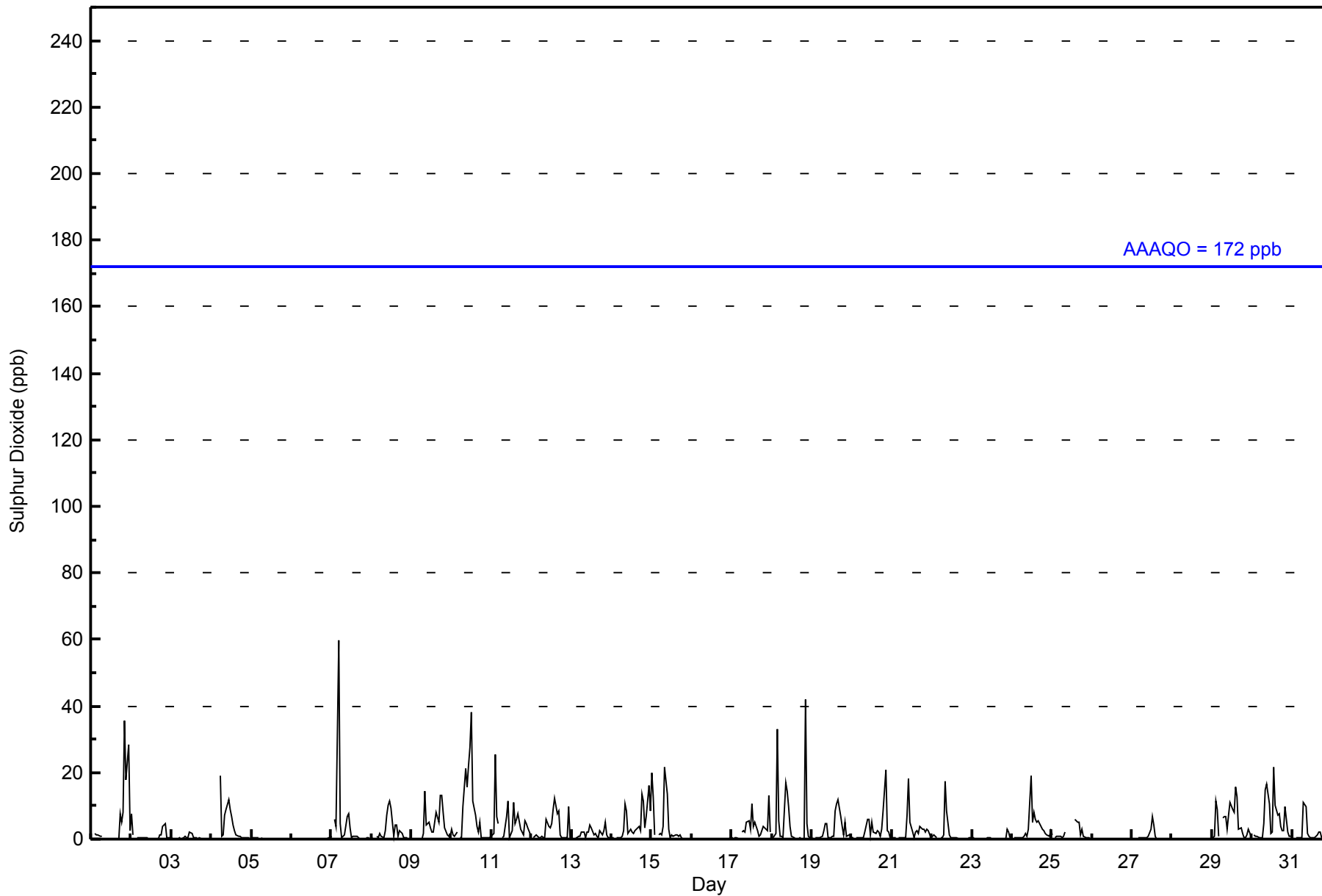
2.7	1.0	2.1	2.5	3.1	1.3	0.8	1.9	5.4	5.1	5.1	4.2	4.0	3.3	3.4	2.9	2.3	2.3	2.1	2.0	4.7	1.8	3.1	1.0		Diurnal Average
31	13	25	33	60	19	7	11	21	17	22	27	38	22	16	13	12	13	14	11	42	18	28	8		Diurnal Maximum

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Lower Camp - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Lower Camp - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	647	92.83	92.83
11 - 20	36	5.16	97.99
21 - 60	14	2.01	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: 697

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Lower Camp - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	88	68	29	24	30	71	116	32	12	12	4	18	21	29	33	60	647
11 - 20	2	0	1	0	5	5	11	1	0	5	0	0	3	0	1	2	36
21 - 60	0	1	0	0	0	1	4	1	0	1	0	2	1	2	1	0	14
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	90	69	30	24	35	77	131	34	12	18	4	20	25	31	35	62	697

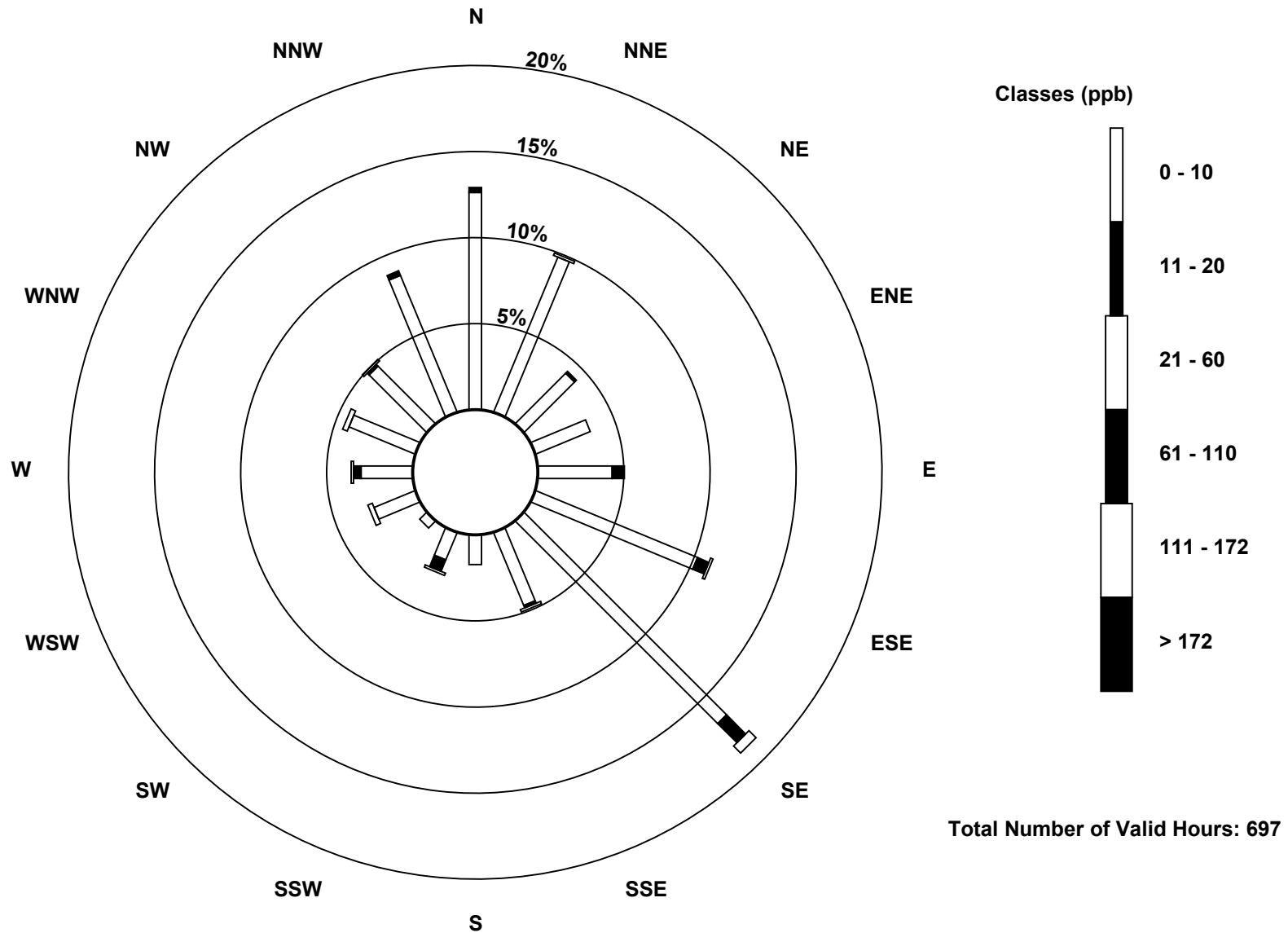
Total Number of Valid Hours: 697

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Sulphur Dioxide (SO₂) - ppb
Lower Camp (AMS 11)

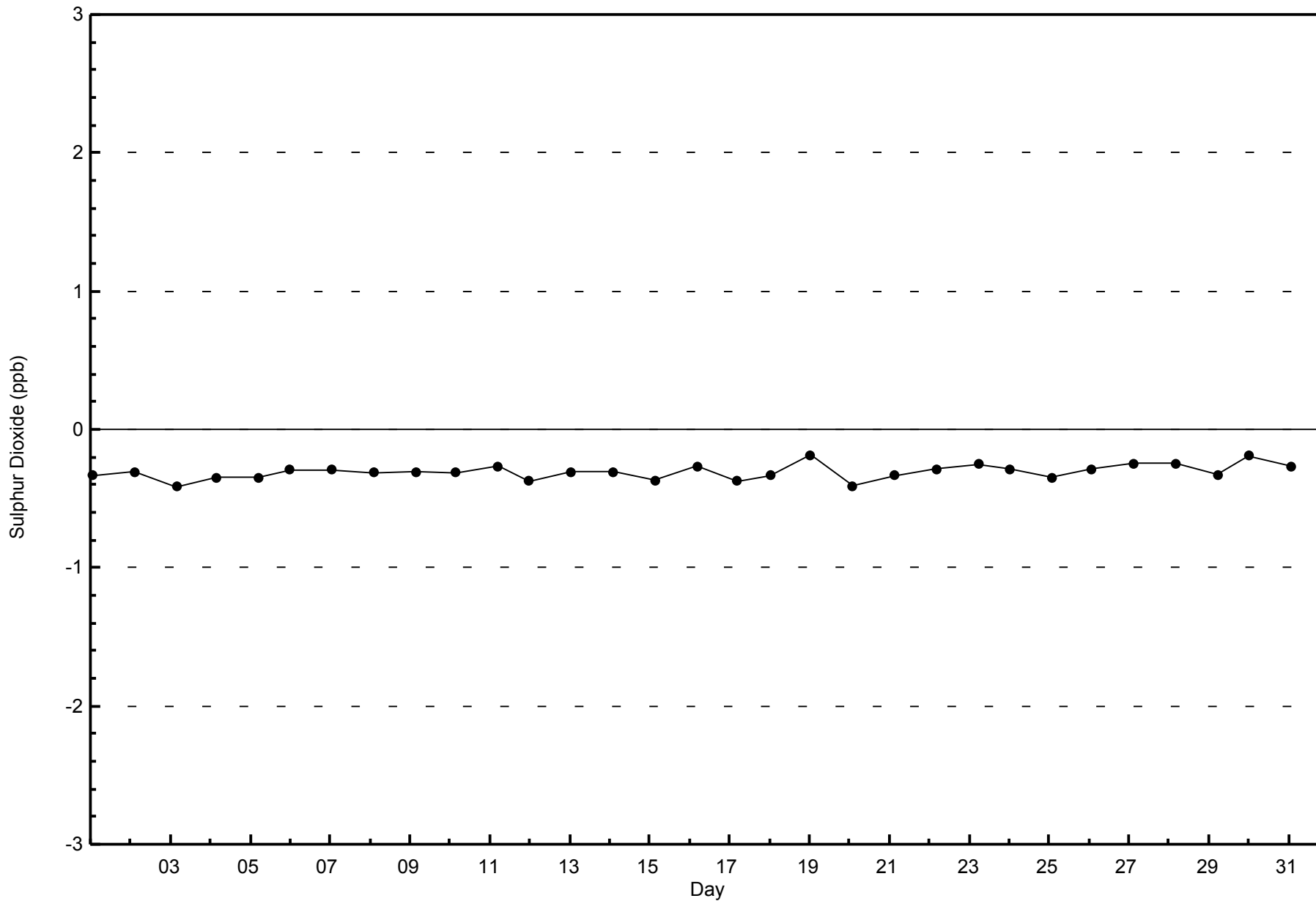


Total Number of Valid Hours: 697



WBEA
Zero Responses

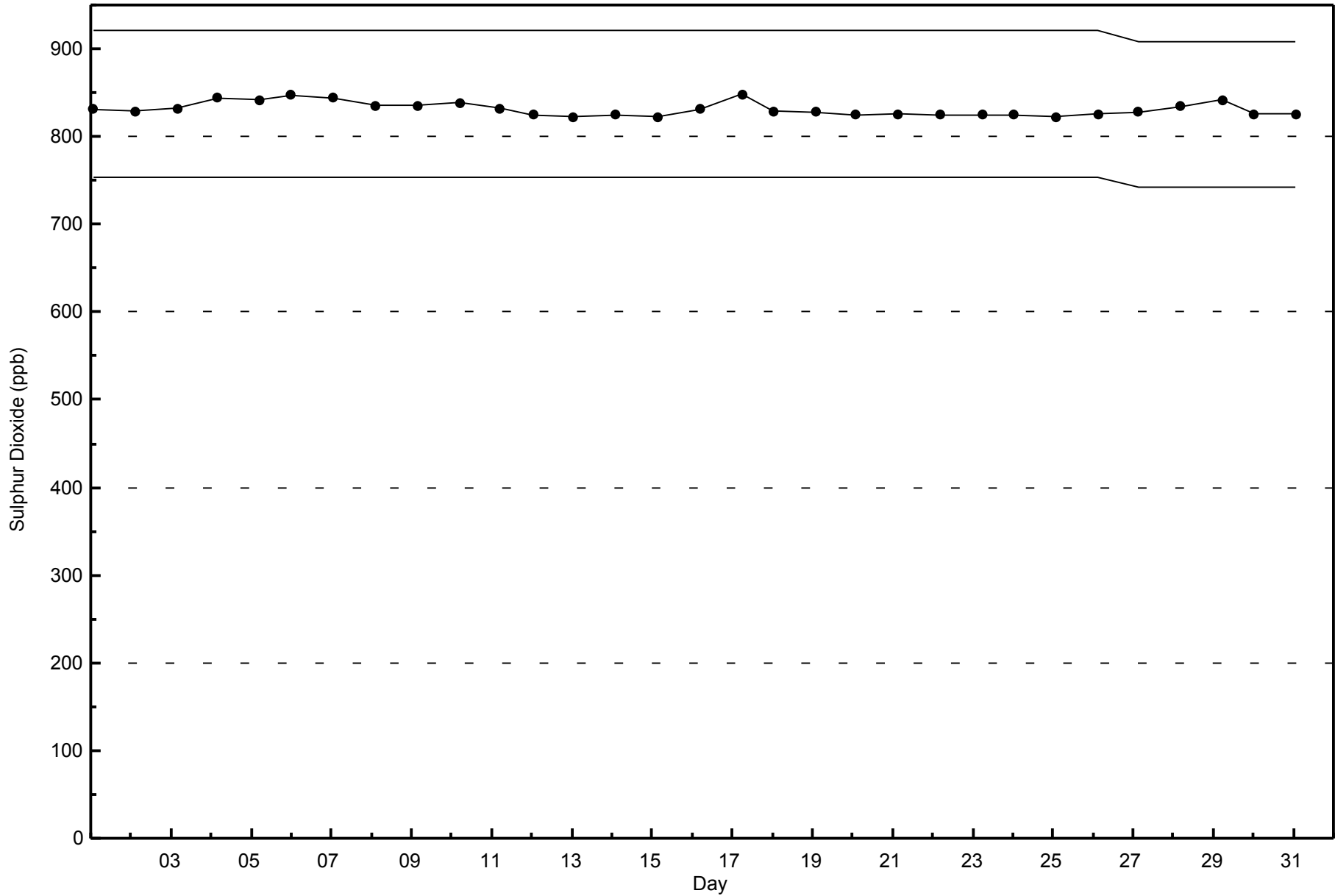
Sulphur Dioxide (SO₂) - ppb
Lower Camp - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Lower Camp - May 2015





Summary of Hour Averages

Lower Camp - May 2015

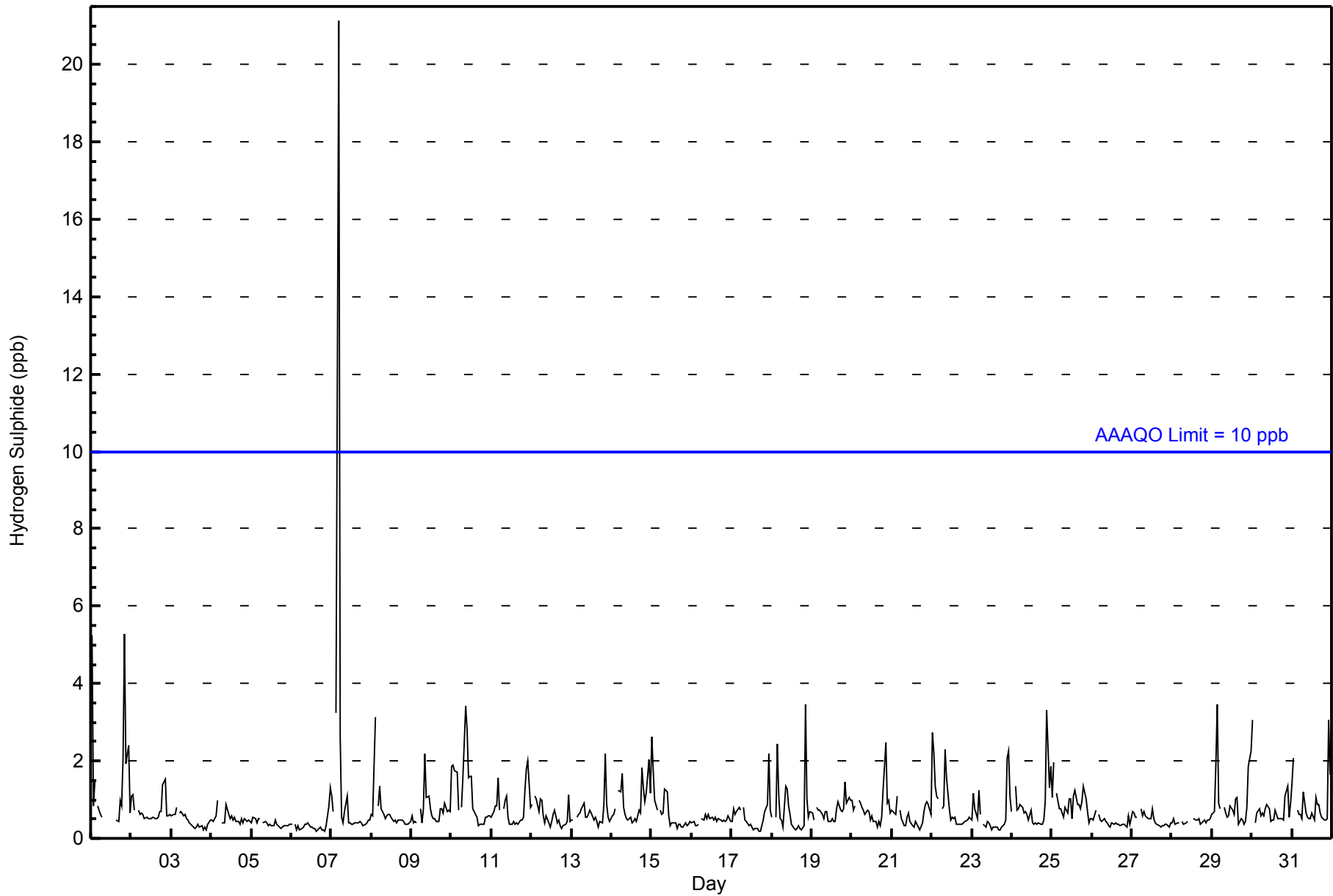
Number of Exceedences (AAAQO): 1-hr: 1 24-hr: 0 Maximum Value: 21 ppb on May 7 05:00 Maximum Daily Average: 1.6 ppb on May 7																	Hours in Service: 744 Hours of Data: 702									
Minimum Value: 0 ppb on May 6 16:00 Minimum Daily Average: 0.4 ppb on May 6 Maximum Diurnal Average: 1.6 ppb at hour 5 Minimum Diurnal Average: 0.4 ppb at hour 17 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 = 3																	Hours of Missing Data: 42 Hours of Calibration: 34 Percent Operational Time: 98.9									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	5	1	1	Z	1	1	1	AF	AF	AF	AF	AF	AF	M	M	0	0	1	1	2	5	2	2	1	--	5
2-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	2	1	1	1	0.7	2
3-May	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
4-May	0	0	1	1	1	Z	0	0	0	1	1	1	1	0	1	0	0	0	1	0	1	0	0	0.5	1	
5-May	0	1	1	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1	
7-May	1	1	Z	3	21	3	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.6	21	
8-May	1	1	3	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.7	3	
9-May	1	0	0	0	Z	1	0	1	2	1	1	1	0	1	0	0	1	1	1	1	1	1	1	0.7	2	
10-May	2	2	2	2	1	Z	1	2	3	3	2	2	2	1	1	1	0	0	0	0	1	1	1	1.2	3	
11-May	1	1	1	1	2	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	1	1	2	2	0.8	2	
12-May	1	Z	1	1	1	1	1	1	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0.6	1	
13-May	0	0	Z	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	1	2	1	1	0	0.7	2	
14-May	1	1	1	Z	1	1	2	1	1	1	0	1	0	0	0	0	1	1	2	1	1	1	2	0.9	2	
15-May	3	2	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	3	
16-May	0	0	0	0	0	Z	1	0	1	1	1	1	0	1	0	1	0	0	0	0	0	1	0	0.5	1	
17-May	0	1	1	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0.6	2	
18-May	1	Z	1	2	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	3	1	1	0.8	3	
19-May	1	0	Z	1	1	1	1	1	1	1	0	0	1	0	0	1	1	1	1	1	1	1	1	0.7	1	
20-May	1	1	1	Z	1	1	1	1	1	1	1	0	1	0	0	0	0	0	1	1	2	1	1	0.8	2	
21-May	1	1	1	1	Z	1	1	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0.6	1	
22-May	3	2	1	1	1	Z	1	1	2	2	1	0	1	1	1	0	0	0	0	0	0	1	1	0.9	3	
23-May	0	1	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0.6	2	
24-May	1	Z	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	1	3	1	2	0.8	3	
25-May	1	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.9	2	
26-May	1	0	1	Z	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1	
27-May	1	1	1	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1	
28-May	0	1	0	0	0	Z	0	0	0	0	C	C	C	1	0	0	1	0	0	0	0	1	0.4	1		
29-May	1	1	2	3	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	1	2	2	1.0	3	
30-May	3	Z	0	1	1	1	1	1	1	1	1	0	0	0	1	1	0	0	0	0	1	1	1	0.8	3	
31-May	1	2	Z	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	0	0	1	3	0.9	3	
																								Diurnal Average	Diurnal Maximum	
																								1.1	5	
																								0.9	2	
																								0.9	3	
																								1.0	3	
																								1.6	21	
																								0.8	3	
																								0.6	2	
																								0.6	2	
																								0.8	3	
																								0.8	3	
																								0.6	2	
																								0.5	2	
																								0.5	2	
																								0.5	2	
																								0.5	1	
																								0.5	1	
																								0.4	1	
																								0.4	1	
																								0.4	1	
																								0.5	2	
																								0.6	2	
																								1.0	5	
																								0.8	3	
																								1.0	3	
																								0.8	2	

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



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - May 2015





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	687	97.86	97.86
3 - 4	12	1.71	99.57
5 - 7	2	0.28	99.86
8 - 11	0	0.00	99.86
> 11	1	0.14	100.00

Total Number of Valid Hours: 702

Total Number of Hours: 744



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	88	68	29	23	36	72	131	33	12	17	5	18	28	33	33	61	687
3 - 4	0	2	0	0	1	2	2	1	0	1	0	0	0	1	2	0	12
5 - 7	0	0	0	0	0	0	0	1	0	0	0	1	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	1	0	0	0	0	1
Totals	88	70	29	23	37	74	133	35	12	18	5	20	28	34	35	61	702

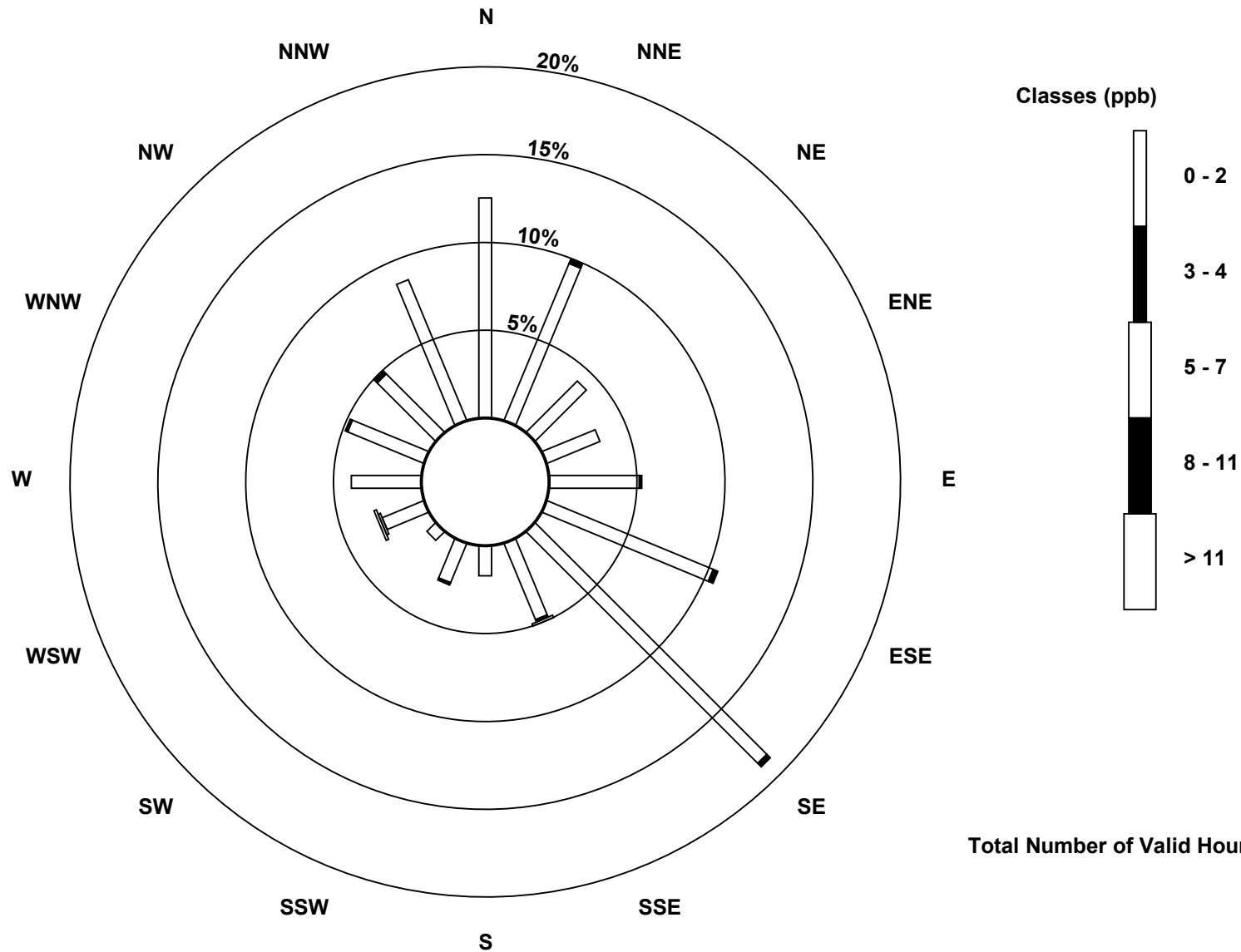
Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Hydrogen Sulphide (H₂S) - ppb
Lower Camp (AMS 11)

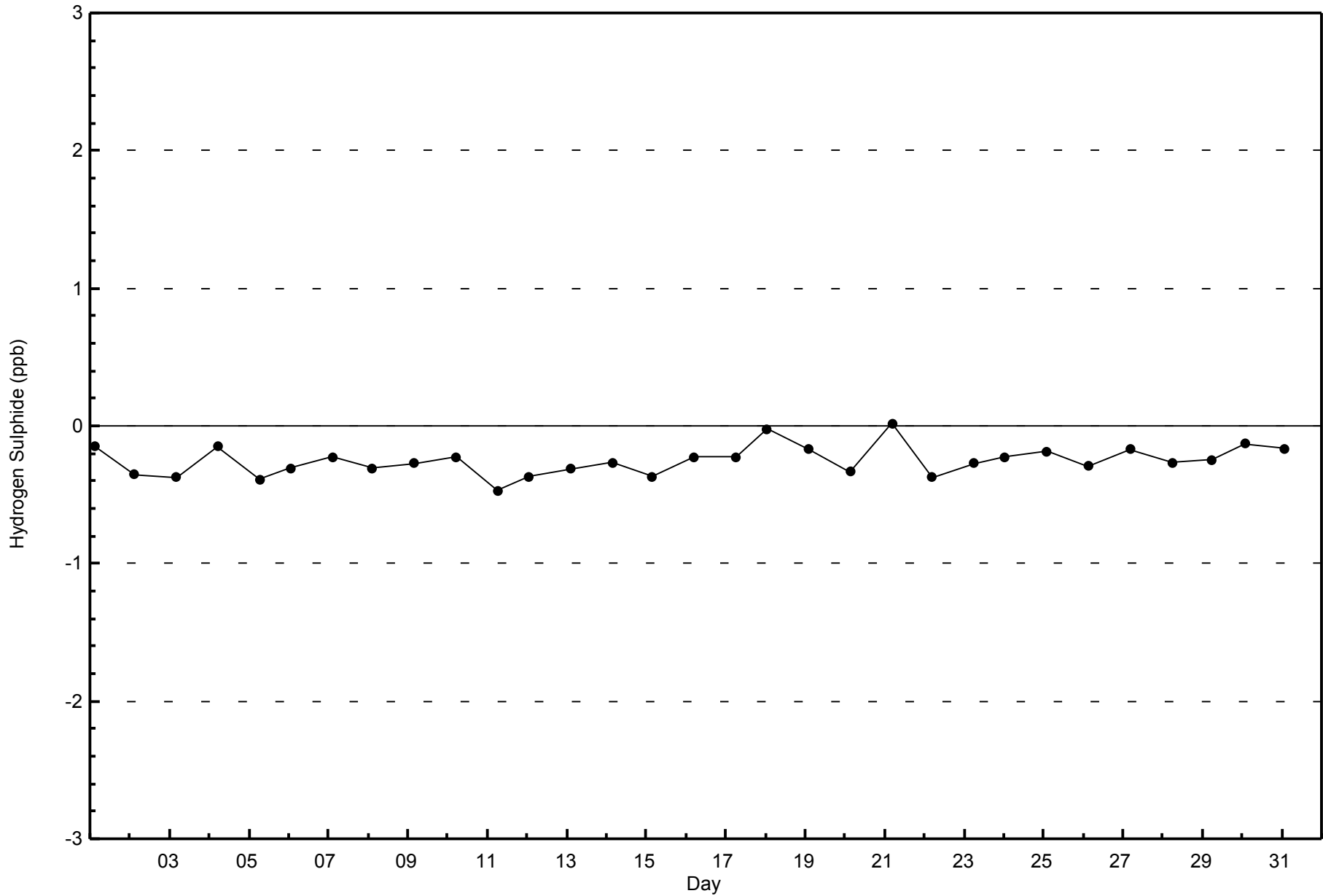


Total Number of Valid Hours: 702



WBEA
Zero Responses

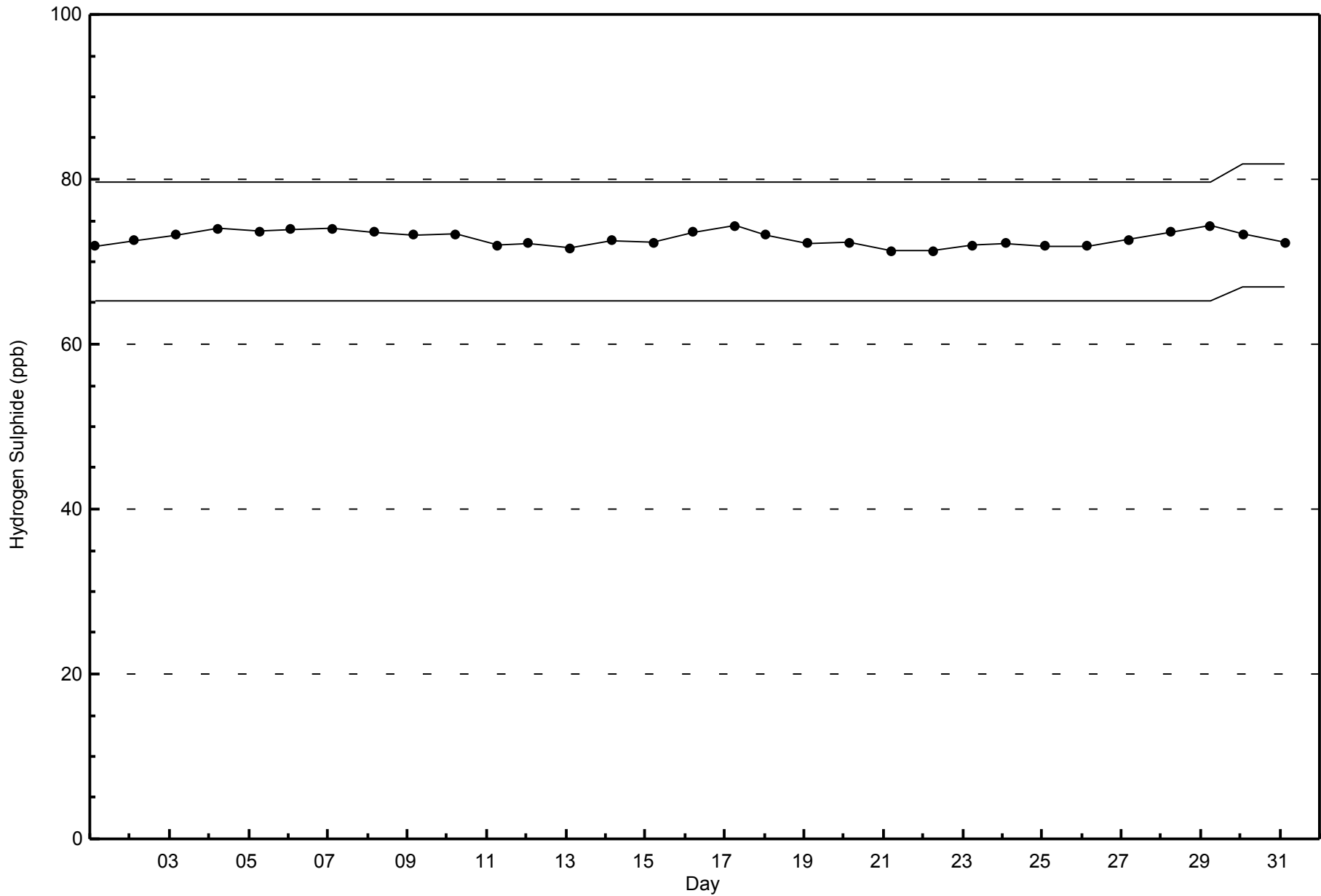
Hydrogen Sulphide (H₂S) - ppb
Lower Camp - May 2015





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Lower Camp - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

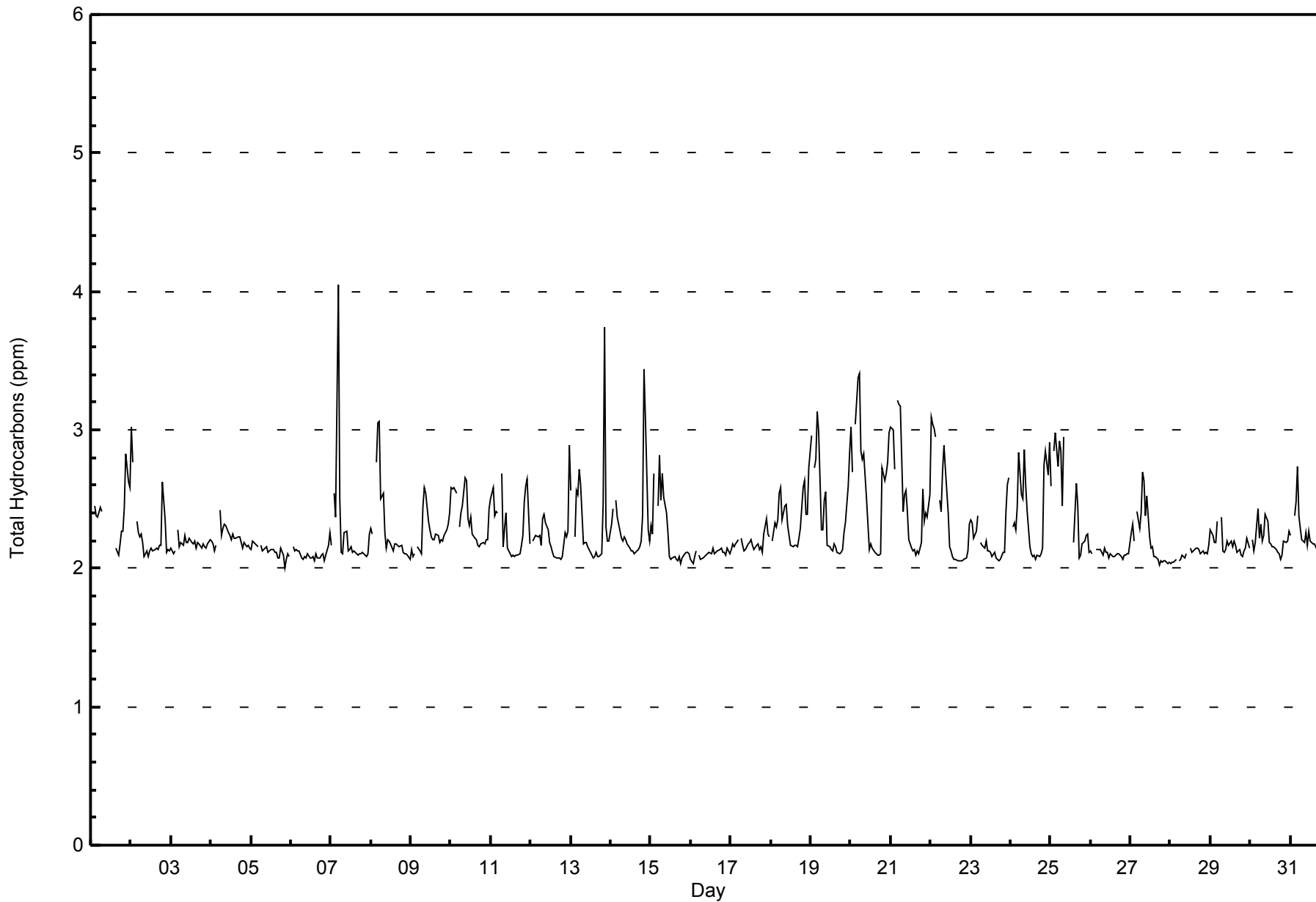
Lower Camp - May 2015

Maximum Value: 4.1 ppm on May 7 05:00																	Maximum Daily Average: 2.6 ppm on May 20																	Hours in Service: 744	
Minimum Value: 2.0 ppm on May 5 21:00																	Minimum Daily Average: 2.1 ppm on May 28																	Hours of Data: 698	
Maximum Diurnal Average: 2.6 ppm at hour 5																	Minimum Diurnal Average: 2.1 ppm at hour 18																	Hours of Missing Data: 46	
Monthly Average: 2.28 ppm																	Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.6 P ₉₉ = 3.2																	Hours of Calibration: 36	
																																		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-May	2.6	Z	2.4	2.4	2.4	2.4	2.4	AF	AF	AF	AF	AF	AF	M	M	2.1	2.1	2.2	2.3	2.3	2.4	2.8	2.6	2.6	--	2.8									
2-May	3.0	2.8	Z	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.6	2.3	2.1	2.1	2.1	2.3	3.0									
3-May	2.1	2.1	2.1	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.3									
4-May	2.2	2.2	2.1	2.2	Z	2.4	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.4									
5-May	2.1	2.2	2.2	2.2	2.2	Z	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.2									
6-May	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.1	2.3									
7-May	2.2	Z	2.5	2.4	4.1	2.5	2.1	2.1	2.3	2.3	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	4.1									
8-May	2.3	2.2	Z	2.8	3.1	3.1	2.5	2.5	2.3	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.3	3.1									
9-May	2.1	2.1	2.1	Z	2.2	2.1	2.1	2.4	2.6	2.5	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.6									
10-May	2.6	2.6	2.6	2.5	Z	2.3	2.4	2.4	2.7	2.6	2.4	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.7									
11-May	2.5	2.6	2.4	2.4	2.4	Z	2.7	2.2	2.3	2.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.5	2.6	2.6	2.2	2.3	2.7									
12-May	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.3	2.9	2.2	2.9									
13-May	2.6	Z	2.2	2.6	2.5	2.7	2.6	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5	3.7	2.3	2.2	2.2	2.3	3.7									
14-May	2.3	2.4	Z	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4	3.4	3.1	2.3	2.2	2.3	3.4									
15-May	2.3	2.2	2.7	Z	2.5	2.8	2.5	2.7	2.5	2.4	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.3	2.8									
16-May	2.1	2.0	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1									
17-May	2.1	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.1	2.2	2.4	2.2	2.2	2.2	2.4									
18-May	Z	2.2	2.3	2.3	2.4	2.5	2.6	2.3	2.5	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.6	2.6	2.4	2.4	2.7	2.4									
19-May	3.0	Z	2.7	2.8	3.1	3.0	2.3	2.3	2.5	2.6	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.3	2.3	2.6	2.8	2.4	3.1									
20-May	3.0	2.7	Z	3.0	3.4	3.4	2.8	2.8	2.8	2.5	2.3	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.7	2.6	2.7	2.8	3.0	2.6	3.4									
21-May	3.0	3.0	2.7	Z	3.2	3.2	3.2	2.4	2.5	2.6	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.6	2.3	2.4	2.4	2.5	2.5	3.2									
22-May	3.1	3.0	3.0	2.9	Z	2.5	2.4	2.7	2.9	2.7	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.4	3.1									
23-May	2.3	2.3	2.2	2.3	2.4	Z	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.6	2.7	2.2	2.7									
24-May	Z	2.3	2.3	2.3	2.4	2.8	2.5	2.5	2.9	2.6	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.7	2.8	2.7	2.9	2.4	2.9									
25-May	2.6	Z	2.8	3.0	2.7	2.9	2.8	2.5	3.0	C	C	C	C	C	2.2	2.6	2.5	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.5	3.0									
26-May	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1									
27-May	2.3	2.3	2.2	Z	2.4	2.3	2.4	2.7	2.6	2.4	2.5	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.0	2.0	2.2	2.7									
28-May	2.0	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.1	M	M	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2									
29-May	2.3	2.2	2.2	2.2	2.3	Z	2.4	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.4									
30-May	Z	2.2	2.1	2.2	2.4	2.2	2.3	2.2	2.2	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.4									
31-May	2.2	Z	2.4	2.5	2.7	2.4	2.3	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.2	2.5	2.4	2.3	2.7									
																								Diurnal Average											
																								Diurnal Maximum											
Z - zerospan																																			
C - Calibration																																			
M - Maintenance																																			
AF - Analyzer Failure																																			



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Lower Camp - May 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	10	1.43	1.43
2.1 - 3.0	675	96.70	98.14
3.1 - 10.0	13	1.86	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 698

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Lower Camp - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
2.1 - 3.0	84	65	29	24	34	74	128	34	11	16	4	19	26	31	34	62	675
3.1 - 10.0	0	0	1	0	1	3	3	0	1	2	0	1	0	0	1	0	13
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	90	69	30	24	35	77	131	34	12	18	4	20	26	31	35	62	698

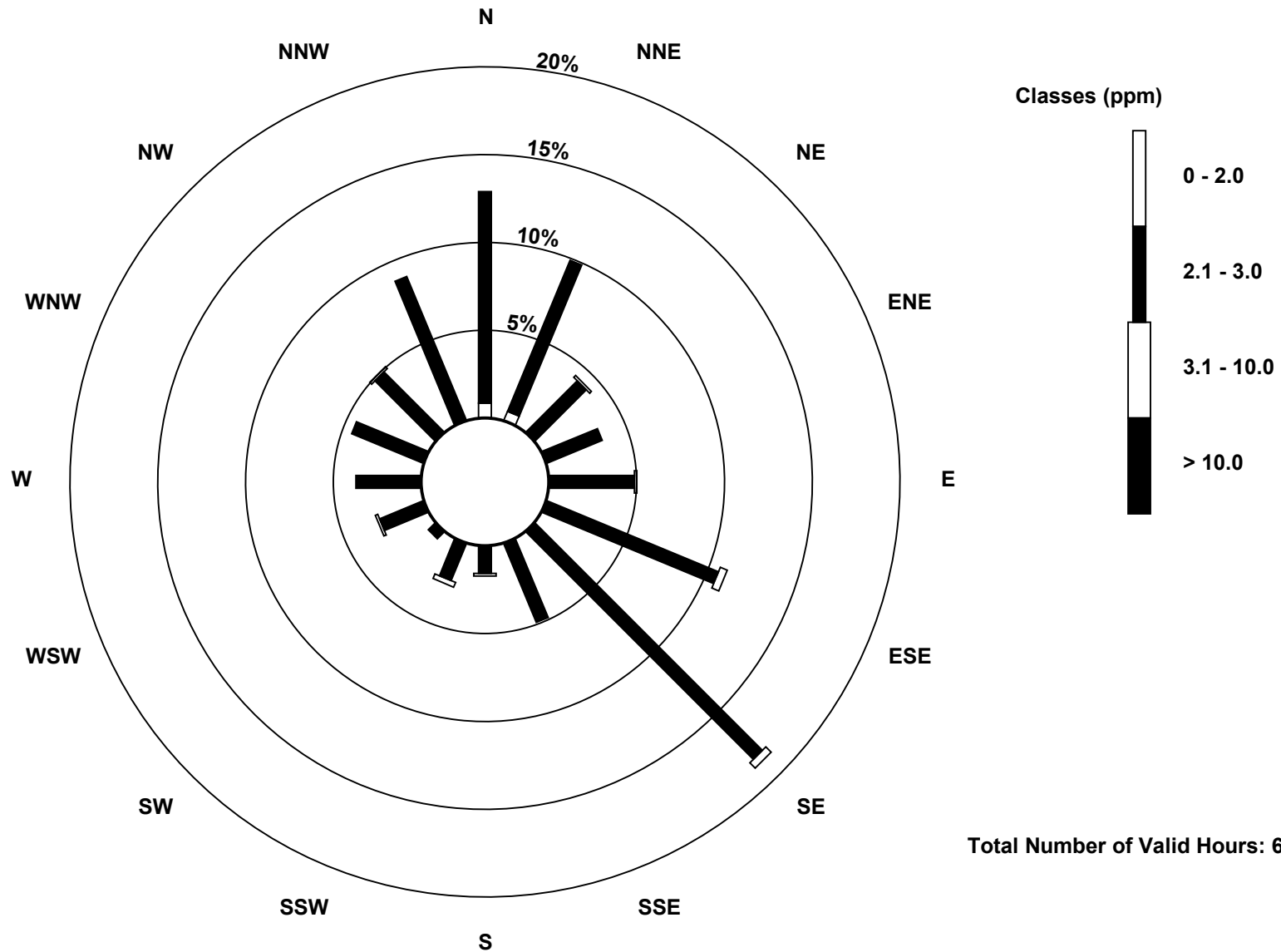
Total Number of Valid Hours: 698

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

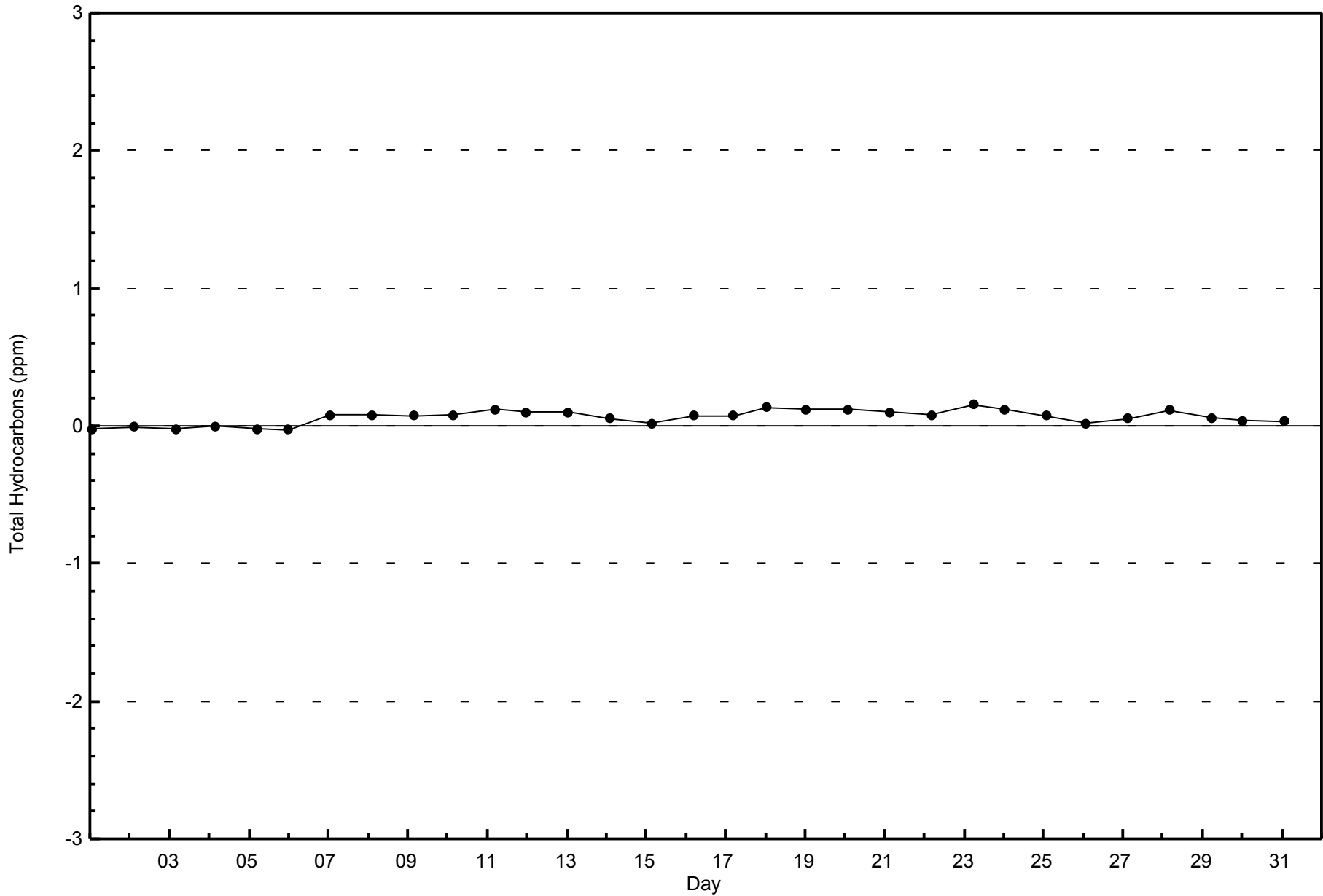
Total Hydrocarbons (THC) - ppm
Lower Camp (AMS 11)





WBEA
Zero Responses

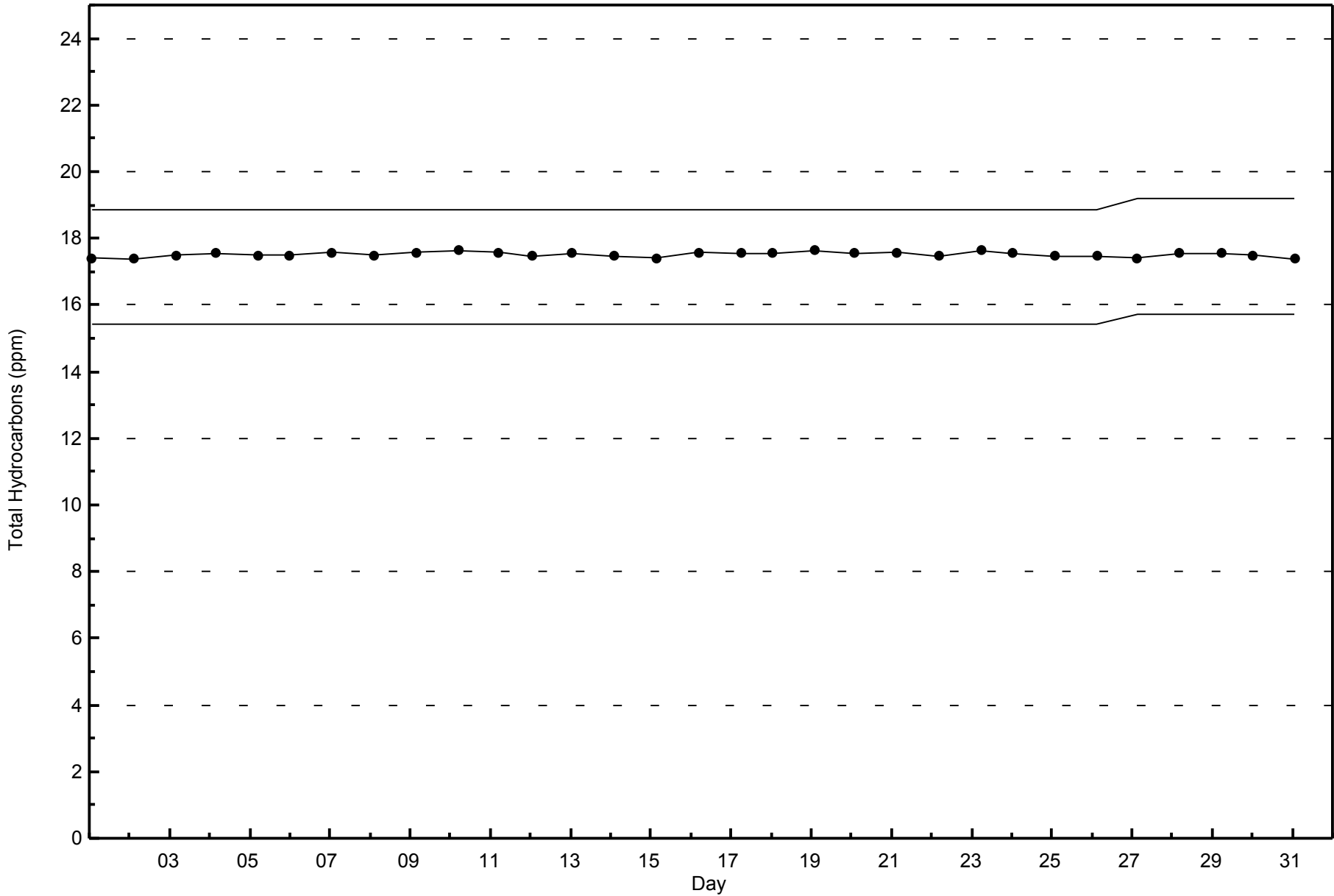
Total Hydrocarbons (THC) - ppm
Lower Camp - May 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Lower Camp - May 2015



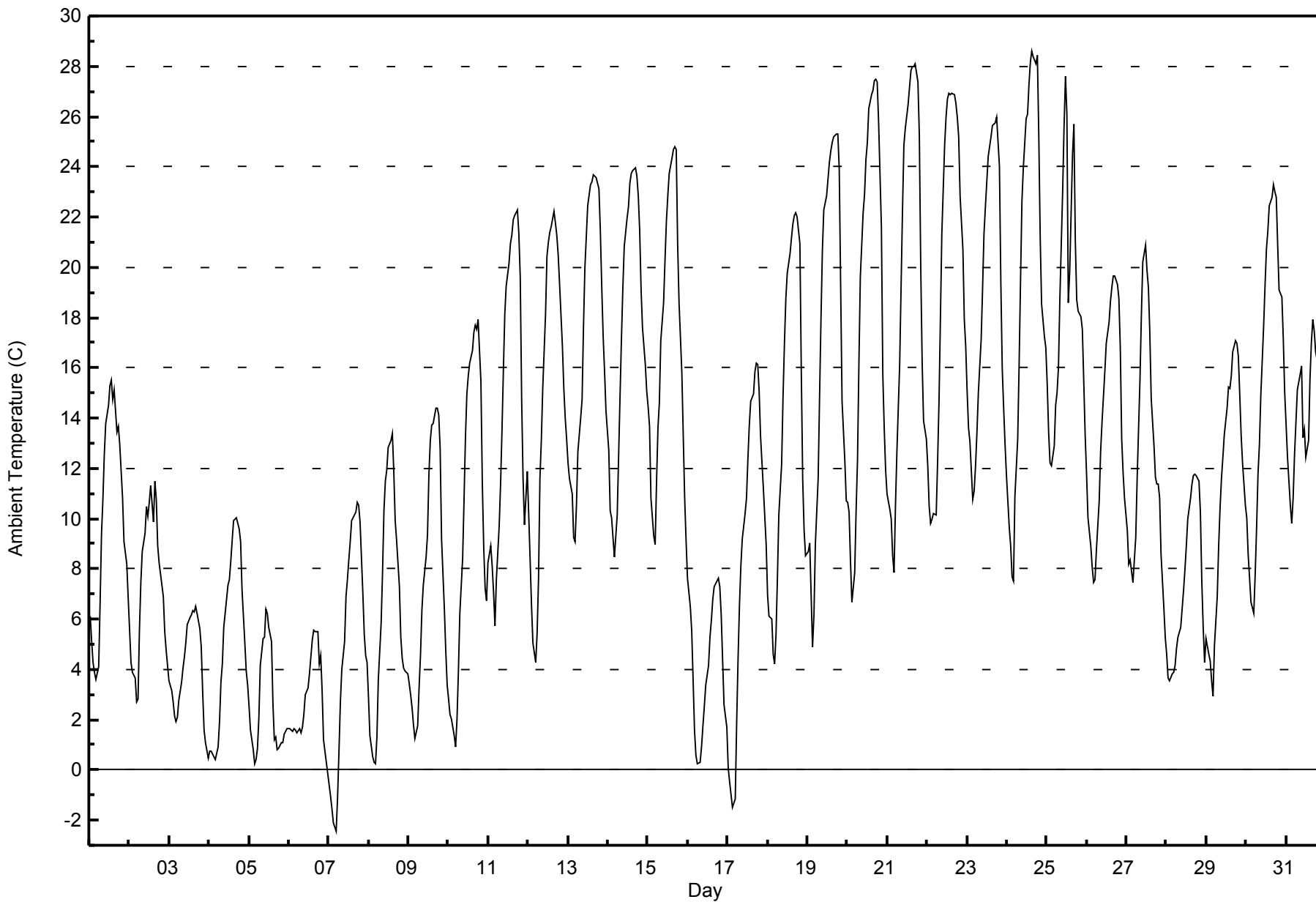


Maximum Value: 28.6 C on May 24 16:00		Maximum Daily Average: 19.7 C on May 24		Hours in Service: 744																																												
Minimum Value: -2.4 C on May 7 05:00		Minimum Daily Average: 2.5 C on May 5		Hours of Data: 744																																												
Maximum Diurnal Average: 17.8 C at hour 17		Minimum Diurnal Average: 5.0 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 12.09 C		Percentiles: P ₁ = -1.0 P ₁₀ = 2.5 Q ₁ = 6.1 Median = 11.4 Q ₃ = 17.5 P ₉₀ = 23.3 P ₉₉ = 27.9		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-May	6.1	5.1	4.3	3.9	3.6	4.1	6.6	9.4	10.8	12.6	13.8	14.5	15.3	15.5	14.7	15.1	13.4	13.7	13.0	11.9	10.8	9.1	8.2	6.9	10.1	15.5																						
2-May	5.6	4.3	3.9	3.6	2.7	2.8	5.6	7.4	8.7	9.4	10.5	10.1	10.6	11.3	9.9	11.5	10.8	8.9	8.3	7.8	6.9	5.5	4.8	4.2	7.3	11.5																						
3-May	3.6	3.1	2.7	2.2	1.9	2.1	2.8	3.5	4.1	4.5	5.1	5.8	6.1	6.2	6.3	6.3	6.5	6.2	5.6	4.9	3.1	1.6	1.1	0.5	4.0	6.5																						
4-May	0.8	0.7	0.7	0.6	0.4	0.9	1.9	3.5	4.2	5.7	6.8	7.4	7.6	8.3	9.2	9.9	10.1	9.8	9.6	9.1	7.2	5.1	3.9	3.4	5.3	10.1																						
5-May	2.5	1.6	0.8	0.3	0.4	0.9	2.1	4.2	5.2	5.3	6.4	6.2	5.7	5.1	2.6	1.2	1.3	0.8	0.9	1.1	1.1	1.4	1.5	1.7	2.5	6.4																						
6-May	1.6	1.6	1.5	1.6	1.6	1.5	1.7	1.5	1.7	2.2	3.0	3.3	3.8	4.5	5.2	5.5	5.5	5.5	4.2	4.5	3.1	1.2	0.3	-0.1	2.7	5.5																						
7-May	-0.6	-1.0	-1.6	-2.1	-2.4	-1.1	0.7	2.7	4.0	5.1	6.9	7.6	8.3	9.1	9.9	10.1	10.2	10.6	10.5	9.8	7.0	5.4	4.6	4.3	4.9	10.6																						
8-May	2.9	1.4	0.5	0.3	0.3	1.3	3.6	5.8	7.8	10.3	11.5	11.9	12.8	13.1	13.4	11.9	9.9	9.1	7.3	5.3	4.5	4.1	4.0	3.8	6.5	13.4																						
9-May	3.4	3.0	2.5	1.8	1.2	1.8	3.2	4.6	6.4	7.4	8.5	9.4	11.8	13.1	13.7	13.8	14.4	14.4	14.1	12.8	9.2	6.4	4.7	3.4	7.7	14.4																						
10-May	2.8	2.2	2.0	1.4	0.9	2.0	3.9	6.2	8.4	10.8	13.2	14.9	15.7	16.2	16.7	17.4	17.7	17.5	17.9	15.4	11.5	8.9	7.2	6.7	9.9	17.9																						
11-May	8.2	8.9	8.1	7.1	5.7	7.6	9.7	11.4	13.5	15.9	18.2	19.3	20.2	21.0	21.3	21.9	22.0	22.3	21.3	19.6	14.7	11.6	9.8	11.9	14.6	22.3																						
12-May	10.2	8.4	6.6	5.0	4.3	5.5	7.6	11.6	13.1	15.2	18.1	20.4	21.0	21.4	21.6	22.2	21.8	21.3	20.5	19.3	16.8	15.2	14.0	13.1	14.8	22.2																						
13-May	12.2	11.6	11.0	9.3	9.1	10.5	12.7	14.0	14.7	17.6	20.0	21.2	22.4	23.3	23.4	23.7	23.6	23.6	23.1	21.4	19.2	17.2	15.9	14.3	17.3	23.7																						
14-May	12.7	10.3	10.0	9.2	8.4	10.1	12.5	14.9	17.1	19.2	20.8	21.9	22.4	23.3	23.7	23.9	23.6	23.6	22.9	21.4	19.1	17.6	16.2	15.1	17.5	23.9																						
15-May	14.5	13.7	10.8	9.3	9.0	11.5	13.6	14.6	17.1	18.6	20.3	21.8	22.8	23.8	24.4	24.7	24.8	24.7	20.9	18.6	15.8	13.3	10.8	9.1	17.0	24.8																						
16-May	7.6	6.5	5.5	3.6	1.6	0.6	0.3	0.3	0.9	1.8	2.5	3.4	4.2	5.3	5.9	6.8	7.3	7.5	7.6	7.3	6.2	4.4	2.6	1.7	4.2	7.6																						
17-May	0.1	-0.5	-1.0	-1.5	-1.1	1.9	4.4	6.5	8.1	9.2	10.2	10.8	12.4	13.7	14.7	15.0	15.9	16.2	16.1	15.1	13.3	11.2	10.1	8.9	8.7	16.2																						
18-May	7.0	6.1	6.0	4.6	4.2	5.4	7.6	10.1	12.1	14.9	17.0	18.8	19.8	20.5	21.2	21.7	22.1	22.2	22.0	21.0	15.9	11.5	9.5	8.5	13.7	22.2																						
19-May	8.7	9.0	7.0	4.9	6.2	9.0	11.6	14.8	17.9	20.7	22.3	22.8	23.5	24.2	24.6	25.0	25.2	25.3	25.3	23.9	19.2	14.7	12.3	10.7	17.0	25.3																						
20-May	10.6	10.2	8.3	6.7	7.8	10.3	12.3	16.2	19.6	22.2	22.9	24.3	24.9	26.3	26.9	27.0	27.4	27.5	27.4	25.8	21.6	15.7	13.6	12.0	18.7	27.5																						
21-May	11.0	10.3	10.0	8.5	7.9	10.5	12.6	16.2	19.2	22.2	24.9	25.5	26.5	27.2	27.8	28.0	28.0	28.1	27.4	25.2	20.0	16.2	13.9	13.2	19.2	28.1																						
22-May	12.1	10.5	9.8	10.0	10.2	10.2	12.3	14.7	18.0	21.3	24.8	26.0	26.7	26.9	26.8	26.9	26.9	26.5	26.0	25.2	22.8	20.7	17.9	16.8	19.6	26.9																						
23-May	15.0	13.6	13.1	10.8	11.1	12.1	13.4	15.0	17.1	19.2	21.3	22.4	23.4	24.4	25.2	25.6	25.7	25.7	26.0	24.0	19.4	16.0	14.4	12.9	18.6	26.0																						
24-May	11.7	9.6	8.9	7.7	7.5	10.9	13.2	16.1	19.4	22.6	24.0	25.9	26.1	27.2	28.2	28.6	28.4	28.1	28.4	25.3	21.2	18.6	17.2	16.8	19.7	28.6																						
25-May	15.4	13.4	12.2	12.1	12.9	14.5	15.0	16.0	18.8	23.1	25.6	27.6	26.1	18.6	19.8	24.4	25.7	21.1	18.7	18.3	18.0	17.5	15.4	13.3	18.5	27.6																						
26-May	11.8	10.0	8.9	8.1	7.4	7.6	8.8	10.7	12.6	13.9	14.9	15.9	17.0	17.8	18.6	19.2	19.7	19.6	19.3	18.8	16.8	13.2	11.8	10.8	13.9	19.7																						
27-May	9.5	8.2	8.4	7.9	7.5	9.2	11.6	13.5	15.5	18.1	20.2	20.9	19.9	19.2	17.4	14.8	12.9	11.7	11.4	11.4	10.8	8.6	6.4	5.3	12.5	20.9																						
28-May	4.6	3.6	3.5	3.8	3.9	4.2	4.8	5.3	5.7	6.4	7.1	7.9	8.9	10.0	10.8	11.4	11.7	11.8	11.7	11.5	10.3	7.5	5.6	4.3	7.4	11.8																						
29-May	5.2	4.6	4.3	3.5	2.9	4.9	6.9	8.9	10.4	11.6	12.4	13.3	14.4	15.2	15.2	15.7	16.6	17.1	17.0	16.5	14.9	13.3	12.2	10.5	11.2	17.1																						
30-May	10.0	8.6	7.6	6.7	6.2	7.8	9.7	11.8	12.9	14.9	17.6	19.2	20.7	21.4	22.5	22.8	23.3	23.0	22.8	20.9	19.1	18.8	17.1	15.0	15.9	23.3																						
31-May	13.7	12.4	10.5	9.8	10.8	12.5	13.8	15.1	15.8	16.1	13.2	13.6	12.4	13.1	15.6	17.0	17.9	17.5	16.6	16.0	13.8	12.2	11.4	12.0	13.9	17.9																						
																								7.8	6.8	6.0	5.2	5.0	6.2	7.9	9.9	11.6	13.5	15.0	15.9	16.6	17.0	17.3	17.7	17.8	17.4	16.9	15.8	13.3	11.1	9.6	8.7	Diurnal Average
																								15.4	13.7	13.1	12.1	12.9	14.5	15.0	16.2	19.6	23.1	25.6	27.6	26.7	27.2	28.2	28.6	28.4	28.1	28.4	25.8	22.8	20.7	17.9	16.8	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Lower Camp - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Lower Camp - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	11	1.48	1.48
0 - 10	307	41.26	42.74
10 - 20	289	38.84	81.59
> 20	137	18.41	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

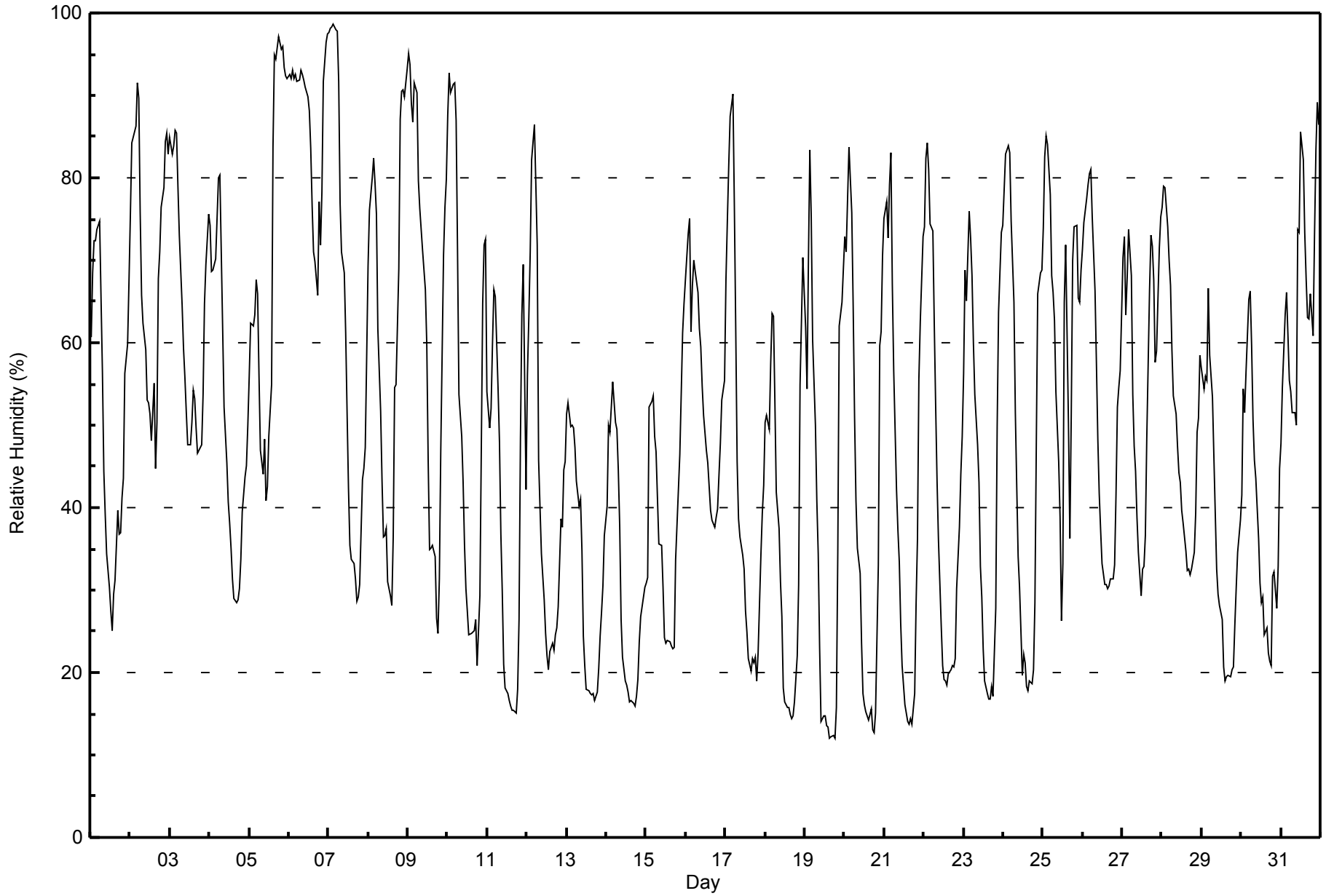


Maximum Value: 99 % on May 7 04:00														Maximum Daily Average: 86.3 % on May 6														Hours in Service: 744																					
Minimum Value: 12 % on May 19 16:00														Minimum Daily Average: 31.0 % on May 14														Hours of Data: 744																					
Maximum Diurnal Average: 75.3 % at hour 5														Minimum Diurnal Average: 32.0 % at hour 16														Hours of Missing Data: 0																					
Monthly Average: 50.6 %														Percentiles: P ₁ = 14 P ₁₀ = 20 Q ₁ = 31 Median = 50 Q ₃ = 69 P ₉₀ = 83 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-May	61	68	72	72	74	75	65	56	44	39	34	30	27	25	29	31	40	37	37	41	44	56	60	67	49.5	75																							
2-May	76	84	85	86	92	90	76	66	62	59	53	53	51	48	55	45	50	68	71	76	79	84	85	83	69.9	92																							
3-May	85	83	84	86	85	79	73	65	59	56	52	48	48	50	54	53	50	47	47	48	54	65	70	76	63.1	86																							
4-May	74	69	69	70	70	80	80	71	62	52	45	41	38	35	31	29	28	29	30	34	39	44	45	50	50.7	80																							
5-May	56	62	62	63	68	66	56	47	44	48	41	42	49	55	84	95	94	96	97	96	96	93	92	92	70.6	97																							
6-May	92	92	93	92	93	92	92	93	93	92	91	90	88	84	77	71	70	66	77	72	78	92	96	98	86.3	98																							
7-May	98	98	98	99	98	98	92	77	71	69	61	52	42	35	34	33	31	29	29	31	43	45	47	58	61.2	99																							
8-May	69	76	80	82	79	76	62	52	43	36	37	37	31	29	28	36	55	55	69	87	90	91	90	93	61.9	93																							
9-May	95	94	89	87	92	90	80	76	74	71	66	60	46	35	35	35	34	27	25	31	47	71	77	80	63.1	95																							
10-May	88	93	90	91	92	87	71	54	49	43	35	30	28	25	25	25	25	26	21	29	47	65	72	73	53.4	93																							
11-May	54	50	52	60	66	66	54	48	37	30	21	18	18	17	16	15	15	15	18	26	48	63	70	42	38.3	70																							
12-May	56	63	71	82	86	79	72	46	40	34	29	25	22	20	23	24	23	25	25	28	39	38	45	46	43.3	86																							
13-May	51	53	50	50	50	47	43	40	41	35	24	21	18	18	18	17	17	17	18	21	24	27	31	37	32.0	53																							
14-May	40	50	49	52	55	50	50	45	38	27	22	19	18	18	16	17	16	16	17	19	24	27	29	30	31.0	55																							
15-May	31	32	52	53	54	49	47	41	36	35	30	24	24	24	24	23	23	23	34	38	46	54	61	65	38.4	65																							
16-May	68	73	75	61	67	70	69	66	62	59	55	51	47	45	43	40	38	38	39	40	44	48	53	55	54.4	75																							
17-May	68	75	82	88	90	77	62	46	39	36	34	32	27	25	22	20	22	21	22	19	22	34	39	43	43.5	90																							
18-May	50	51	49	57	64	63	53	42	37	31	27	18	16	16	16	15	14	15	16	22	31	55	62	70	37.2	70																							
19-May	62	54	70	83	75	60	50	41	34	23	14	15	15	14	13	12	12	12	12	16	35	62	65	69	38.3	83																							
20-May	73	71	77	84	76	64	51	41	35	32	24	17	16	15	14	15	16	13	13	15	33	60	61	71	41.1	84																							
21-May	75	77	73	79	83	67	57	42	37	33	26	21	16	15	14	14	14	14	17	28	36	56	63	73	43.0	83																							
22-May	74	82	84	81	74	73	62	52	43	36	26	21	19	19	18	20	20	21	21	22	30	38	44	49	42.9	84																							
23-May	56	69	65	76	73	68	60	54	48	43	33	29	23	19	17	17	18	17	18	28	50	64	69	73	45.2	76																							
24-May	74	83	83	84	83	75	65	51	42	34	30	20	22	21	18	18	19	19	20	28	48	66	69	69	47.6	84																							
25-May	74	82	85	84	78	68	66	63	54	46	39	26	33	65	72	50	36	51	70	74	74	65	65	69	62.1	85																							
26-May	71	75	77	79	81	81	75	66	58	48	42	37	33	31	31	30	30	31	31	33	41	52	54	57	51.9	81																							
27-May	70	73	63	68	74	68	54	47	44	39	35	29	32	33	37	48	66	73	72	68	58	59	72	75	56.6	75																							
28-May	76	79	79	74	70	67	59	54	51	47	44	43	40	38	35	32	32	32	33	35	39	49	51	58	50.8	79																							
29-May	57	54	56	55	67	58	53	46	39	32	29	28	26	21	19	19	20	20	20	21	26	30	35	38	36.3	67																							
30-May	42	54	52	56	65	66	60	51	46	44	36	31	28	29	25	25	22	21	21	32	32	28	33	45	39.3	66																							
31-May	48	55	63	66	61	55	54	52	52	50	74	73	86	82	73	68	63	63	66	61	73	83	89	86	66.5	89																							
																								66.6	70.2	72.0	74.3	75.3	71.2	63.3	54.5	48.8	43.9	39.0	34.9	33.2	32.5	32.8	32.0	32.8	33.4	35.7	39.3	47.5	56.9	61.0	64.2	Diurnal Average	
																								98	98	98	99	98	98	92	93	93	92	91	90	88	84	84	95	94	96	97	96	96	93	96	98	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Lower Camp - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Lower Camp - May 2015

Maximum Speed: 30 km/h on May 15 22:00	Maximum Daily Speed Average: 18.3 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 24 23:00	Minimum Daily Speed Average: 0.6 km/h on May 21	Hours of Data: 744
Maximum Diurnal Speed Average: 5.9 km/h at hour 7	Minimum Diurnal Speed Average: 1.5 km/h at hour 24	Hours of Missing Data: 0
Monthly Average Velocity: 2.4 km/h 40.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 4 Median = 8 Q ₃ = 12 P ₉₀ = 16 P ₉₉ = 25	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	SSE4	SSE8	SE10	SSE10	SE9	SE12	SE15	SE12	W10WSW12	W15	W18	W16WSW19	WSW19	W6	N5	S2	W16	WSW9	WSW11	W5	W8	W6				SW5.9	WSW19
2-May	W6	NW4	WNW3	SE1	E3	E1	NNE3	N11	N14	N15	N14	NNW17	NNW15	N12	NW14	NNW12	NNW13	N3	S2	SSE1	NW13	N13	N16	N16	NNW8.0	NNW17	
3-May	NNE14	N13	N8	NNW5	NNW6	N11	N12	NNW8	NNW5	NW14	WNW14	WNW12	NW8	N9	N16	N16	N16	N15	NNE17	NNE9	E6	ENE2	N2	WNW3	N8.7	NNE17	
4-May	WNW2	NNE3	NNW4	NNE3	SW1	ESE1	E9	SE7	ESE4	SSE5	SSE5	ENE5	N5	NNE7	N6	ENE3	ENE4	NE6	NE9	NE10	NE8	NE6	N5	N8	NE3.3	NE10	
5-May	NNW8	NNW10	N6	N7	N14	N14	N11	NNE7	NNE9	N12	NE13	NNE16	NNE17	NNE17	NNE18	NNE11	NNE15	N13	NNE17	NNE17	NNE16	NNE14	N11	N13	NNE12.5	NNE18	
6-May	NNW11	NNW9	NNW11	N12	N12	NNW12	NNW11	NNW11	N13	N13	N15	NNE16	NNE18	NE18	NE19	NE17	ENE16	ENE12	NE11	E6	E3	WNW1	NNE0	W4	NNE9.5	NE19	
7-May	W1	NW1	WSW2	WNW1	WSW2	ESE5	SE10	ESE12	ESE7	NE4	WNW7	N6	N7	NNE9	NNE6	NE9	NNE8	NE8	ENE10	ENE9	ESE3	ENE1	SE5	E2	ENE3.1	ESE12	
8-May	NNW2	ENE2	E1	ESE4	ESE4	E1	ESE6	SE11	SE11	ESE9	ESE6	E5	NNW4	NW6	NW6	NNW14	NNW16	NE18	NE15	ENE9	E9	E7	ENE3	NNW2	ENE4.0	NE18	
9-May	NNW7	NW4	NNW5	N4	NNW5	NNW3	NNE3	N4	NNW4	WSW6	WSW6	WNW6	SW7	SW7	SSE5	SE9	SE8	E2	E2	ESE2	ESE3	NE2	E2	NNE1	WNW0.6	SE9	
10-May	NE1	W3	NW3	WNW4	WNW4	NW3	NNW2	NE3	NNE3	NW4	NW5	WNW3	WNW9	N5	NE4	ESE9	ESE10	ESE8	SE5	NNE1	N1	E1	NNE2	SE4	NNE0.9	ESE10	
11-May	SE8	SE11	SE12	SE13	SE10	SE11	SE12	SE12	SE8	E6	W6	W8	WNW6	W4	W7	W6	WSW8	WSW6	NW4	E1	ENE1	S1	W1	ESE4	SSE3.1	SE13	
12-May	E4	N3	NW2	NNW1	NNW2	NW3	N3	ESE6	ESE5	WNW6	ESE2	SE10	SE9	ESE8	SE13	SE11	SE12	SE11	ESE13	ESE13	ESE18	SE18	SE22	ESE23	ESE7.4	ESE23	
13-May	SE21	SE22	ESE18	ESE14	SE6	SE7	SE10	SE13	SE19	SE15	SSW3	W8WSW11	WSW8	WSW4	SSW2	NW3	SSW4	SSE9	S8	S7	SSE8	SSE9	SE10	SE7.4	SE22		
14-May	ESE5	SE6	SE10	SE8	SE9	SE9	SE13	SE14	SE10	W9	W15	SW12WSW14	SSW7	SW10	SSW6	SSW8	S9	SSW9	SSW7	SSW7	SSW8	SSW12	SSW12	S6.7	W15		
15-May	SSW10	SSW7	ENE5	SE8	SE9	SE10	SE13	SE10	SE7	ESE9	SE1	W15WSW15	WSW13	WSW15	WSW16	WSW14	W13	NNE16	NNW26	NNW22	N30	N28	N26	NW3.9	N30		
16-May	N25	N22	N17	N30	N25	N21	NNE22	NNE25	N22	N22	N23	NNE22	NNE20	NNE22	N19	NNE17	NNE17	NNE15	NNE14	NNE10	N6	NNW4	NNE4	N18.3	N30		
17-May	NNE2	WNW4	WNW3	W3	NW1	E5	ESE13	SSE10	SE10	SSE9	SE11	ESE10	SE9	SE10	SE9	SE9	SE9	SE9	SE8	SSE7	SSE6	SE8	SE9	SE11	SE6.6	ESE13	
18-May	ESE10	SE10	SE10	SE9	ESE9	ESE10	SE11	SE10	SE9	ESE6	E7	SW7	W9WNW10	WNW12	NW10	WNW10	WNW8	WNW8	WNW4	ESE2	E3	ENE2	E3	SE1.6	WNW12		
19-May	SE7	SE7	ESE4	ESE4	SE7	SE9	SE10	SE10	SE9	S5	W11WNW11	NW11	NNW5	NE3	N3	ESE4	ENE3	ESE4	SSE3	ESE2	NNE3	E3	ESE3	SE2.1	WNW11		
20-May	E3	ESE3	E3	E3	SE8	ESE11	SE11	SE9	SE9	SE8	NE3	NE4	ENE4	SE8	SE6	ESE5	SSE7	SSE6	SSW4	SSW5	SSW2	NE2	E2	ENE1	SE4.4	SE11	
21-May	E3	ENE3	SE5	E1	NE2	ESE5	SE7	SE9	SE9	SE8	SE7	ESE8	NW7WNW10	W11WNW10	WNW9	NW3	NW6	NW3	ESE2	ESE3	ESE4	NNE1	ESE0.6	W11			
22-May	NW1	E0	ESE6	ESE7	ESE4	E3	ESE6	SE5	E4	NNW1	NNW9	N15	NNW14	NNW16	NNW16	N15	N17	N19	N20	NNE17	NNE9	NNE8	NNW3	WNW7	N6.8	N20	
23-May	W6	NW4	NNW4	N1	NW4	N4	N6	N7	NNW8	N8	NW9	NNW9	NNW9	NW9	NW8	NW6	N4	E4	ESE3	NNE1	NNE1	NW2	NW2	W4	NNW4.2	NW9	
24-May	WSW1	E2	NNE1	ENE2	E2	ESE6	SE9	SE7	SE6	SE6	SE7	E3	NNE6	NE5	N4	W1	N3	NNE4	ESE1	ESE4	WNW1	NNE1	NW0	WNW2	E2.0	SE9	
25-May	ENE1	SSE1	ENE2	SE6	SE4	SE8	SE6	SE7	SE7	SE7	SE6	W5	WNW4	W1	ESE4	SE7	NE1	NNW18	N5	WNW5	NW8	NNW15	NNW17	N15	NNE1.5	NNW18	
26-May	NNW13	NNW13	NNW10	NNW8	NNW7	N10	N9	NNW10	NNW11	NNE16	N17	NNW15	NNW10	NNW10	NNW9	NNW7	NNW9	NNE9	NE11	NNE9	NE7	NE1	WSW3	E3	N8.6	N17	
27-May	NNW2	E4	E2	W2	WSW2	WNW2	ESE7	ESE4	SE6	SE6	SE6	ESE5	NNW8	NW12	NNW23	N22	N23	N23	N15	NNE10	NNE24	NNE24	NNE21	N19	N8.4	NNE24	
28-May	N22	N19	N17	NNE15	NNE13	N15	NNE19	N20	N19	NNW17	NNW16	N18	N15	N14	N12	N12	N12	NNE12	NNE13	NNE12	NE8	ENE6	ESE3	SE3	N13.0	N22	
29-May	ESE13	ESE11	SE8	SSE5	ENE5	ESE10	SE10	SE9	SE9	SE6	ESE3	SE7	SE7	SE2	NE3	NNW7	ESE5	E3	SE4	S5	S7	SSE9	SSE11	SSE13	SE5.9	SSE13	
30-May	SE14	ESE12	SSE10	SSE7	SSE2	SE8	SE9	SE9	SE8	SE8	ESE8	ESE12	SE11	SE13	SE10	SE11	SE9	SSE9	SSE8	SE9	SE8	SSE12	SSE9	SE9	SE9.1	SE14	
31-May	SE10	SE7	SE7	ESE13	ESE15	ESE20	ESE22	SE14	SE15	SSE9	SE6	SSE6	S8	S9	SSE9	SSE10	SSE8	SSE8	S7	SSE9	SE10	ESE5	SE2	WSW7	SE8.8	ESE22	

NE2.0	ENE2.2	ENE2.0	ENE2.4	ENE2.5	E3.9	E5.9	E4.9	E4.1	NE1.8	NNW2.4	NNW3.1	NNW4.5	NNW3.5	NNW3.8	N3.4	NNE3.8	NNE3.8	NE4.2	NE3.2	NE2.6	NE2.9	NE1.9	NNE1.5	Diurnal Average
N25	N22	ESE18	N30	N25	N21	NNE22	NNE25	N22	N22	N23	NNE22	NNE22	NNE20	NNW23	N22	N23	N23	N20	NNW26	NNE24	N30	N28	N26	Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

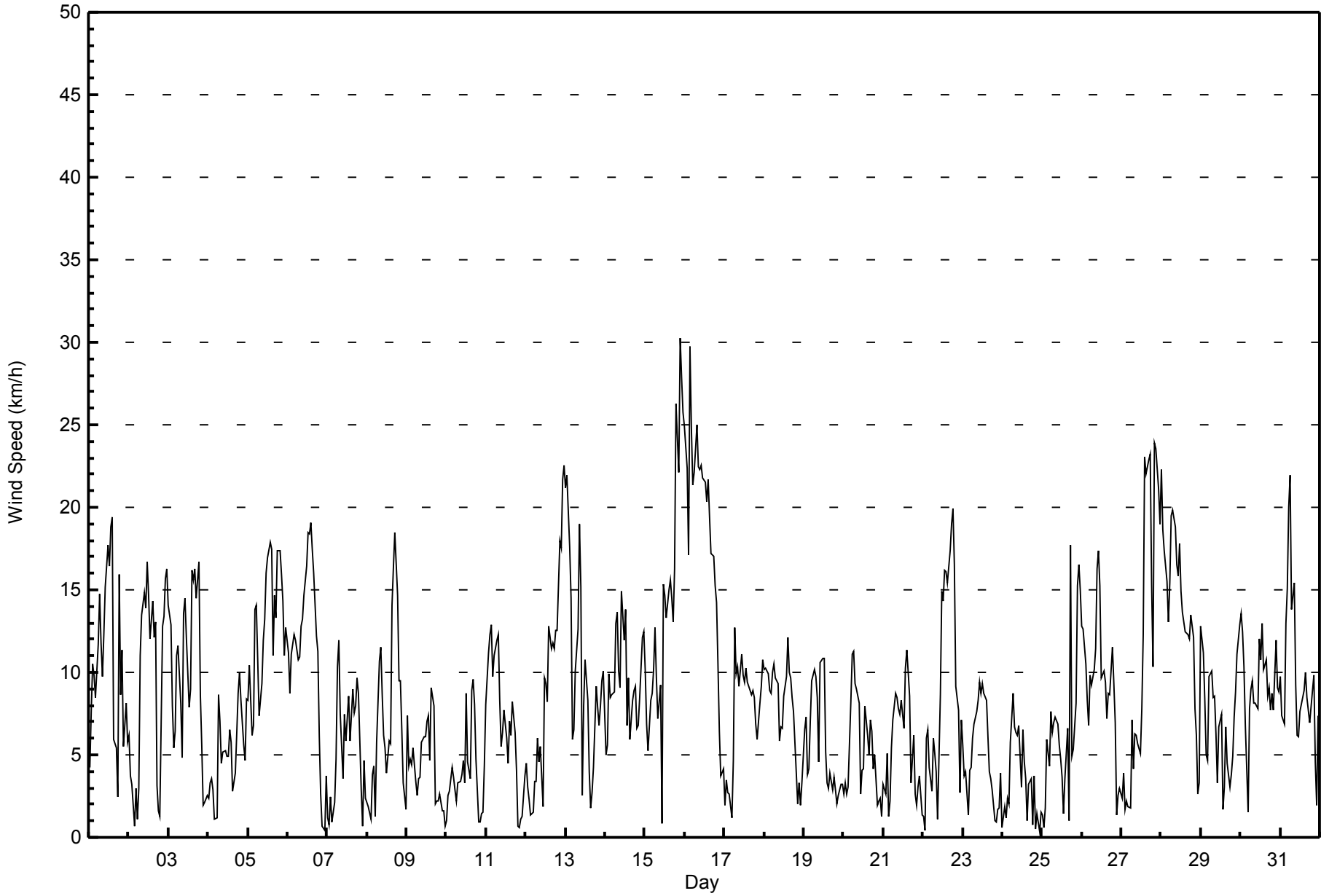
Wind Speed (WS) - km/h
Lower Camp - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on May 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: 1 km/h on May 10 08:00																									
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-May	1	2	3	3	2	3	3	3	5	4	5	4	4	6	6	5	4	3	8	2	3	3	3	2	8
2-May	2	2	1	1	2	2	2	5	4	4	4	5	4	4	7	5	7	5	2	2	7	3	4	3	7
3-May	2	3	3	1	2	2	2	3	3	3	4	3	3	3	4	4	5	4	3	2	1	2	1	1	5
4-May	1	1	1	2	2	2	1	2	2	2	2	2	3	4	3	3	3	4	3	2	1	3	2	2	4
5-May	2	2	2	3	2	2	3	2	3	2	4	3	4	6	5	2	4	3	5	4	3	3	2	2	6
6-May	2	2	3	3	3	3	3	2	3	3	3	4	4	4	4	4	4	4	5	2	2	1	1	1	5
7-May	1	1	1	1	2	3	2	2	4	1	2	2	3	5	5	5	4	4	4	2	1	2	2	2	5
8-May	1	1	1	3	2	1	1	2	2	1	2	2	2	2	2	7	4	4	3	2	2	3	1	2	7
9-May	2	2	1	1	1	1	1	1	1	2	2	3	3	3	3	3	2	1	1	1	1	1	1	2	3
10-May	1	1	1	2	2	1	1	1	1	1	1	3	2	2	3	3	3	2	2	1	1	2	1	2	3
11-May	2	3	3	2	2	3	2	3	2	2	3	2	3	3	3	3	3	2	3	1	1	3	1	5	5
12-May	3	2	1	1	1	1	1	4	2	2	2	3	4	4	6	4	5	3	3	2	4	4	5	4	6
13-May	4	5	5	4	3	3	3	4	4	5	3	3	4	4	3	6	3	3	3	3	2	2	2	2	6
14-May	3	1	3	3	2	2	3	3	3	5	4	5	4	3	4	4	4	3	4	2	1	2	4	4	5
15-May	3	3	3	2	2	3	3	3	1	2	3	4	4	5	4	4	3	5	7	7	6	6	7	7	7
16-May	6	6	8	7	6	5	5	5	5	5	6	5	5	5	5	5	6	4	4	3	2	2	1	2	8
17-May	1	1	1	1	1	3	4	4	4	3	5	4	4	4	3	4	3	3	3	2	2	3	3	3	5
18-May	4	4	3	3	3	3	2	2	2	2	3	4	4	4	3	3	3	2	2	1	2	1	1	1	4
19-May	2	2	2	2	2	3	3	2	2	3	2	3	3	3	2	1	1	1	2	1	1	1	1	1	3
20-May	1	1	1	1	2	3	3	2	2	2	2	2	3	4	3	3	3	2	3	2	2	1	1	1	4
21-May	1	1	2	2	1	2	2	2	2	1	2	4	3	3	5	4	3	2	2	1	1	1	1	1	5
22-May	2	1	1	2	2	1	2	1	1	1	3	4	4	5	5	5	6	4	4	4	2	2	2	1	6
23-May	1	2	1	1	1	1	1	1	1	2	2	3	3	3	3	3	2	2	1	1	1	1	1	2	3
24-May	2	1	1	1	2	2	2	2	1	2	2	1	2	2	3	2	2	3	1	1	1	1	2	2	3
25-May	2	1	1	2	2	2	2	2	2	1	1	4	5	8	3	2	7	5	5	2	2	5	5	4	8
26-May	3	3	3	3	2	3	2	2	3	5	4	4	4	4	3	3	3	3	3	2	1	1	1	3	5
27-May	1	3	2	1	1	2	3	2	2	2	1	2	4	6	7	6	6	6	4	3	8	5	5	4	8
28-May	5	4	4	3	3	3	4	5	5	5	5	5	4	5	4	4	4	4	4	2	2	1	2	2	5
29-May	6	4	4	2	2	3	3	3	3	4	2	3	2	2	2	2	2	2	2	2	3	3	4	4	6
30-May	4	4	3	3	1	3	2	3	2	2	3	4	4	5	5	4	3	3	3	4	3	4	3	3	5
31-May	2	2	2	4	3	4	4	6	5	4	3	3	3	3	3	3	3	3	3	3	4	3	1	5	6
Diurnal Maximum																									
6 6 8 7 6 5 5 6 5 5 6 5 5 8 7 7 7 6 8 7 8 6 7 7																									



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Lower Camp - May 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Lower Camp - May 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	244	32.80	32.80
6 - 11	310	41.67	74.46
12 - 19	155	20.83	95.30
20 - 28	33	4.44	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
Frequency Distribution

Wind Speed (WS) - km/h
Lower Camp - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	18	19	13	18	34	37	11	9	5	6	1	7	10	17	20	19	244
6 - 11	18	15	11	4	6	28	107	25	7	10	3	9	15	14	12	26	310
12 - 19	42	27	6	2	0	12	20	2	0	2	1	9	7	3	4	18	155
20 - 28	15	9	0	0	0	3	3	0	0	0	0	0	0	0	0	3	33
29 - 38	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	95	70	30	24	40	80	141	36	12	18	5	25	32	34	36	66	744

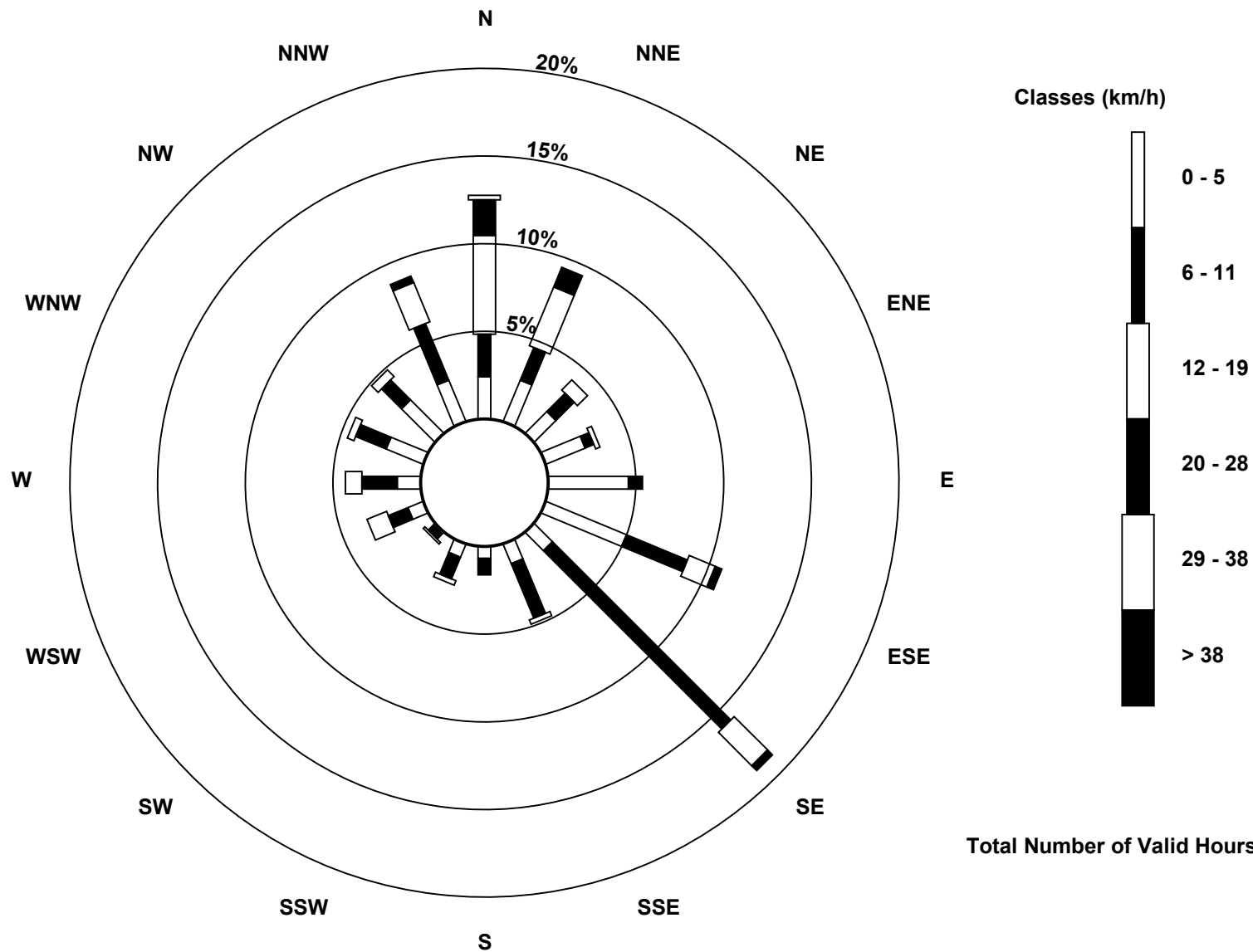
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Wind Speed (WS) - km/h
Lower Camp (AMS 11)





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Lower Camp - May 2015

Direction of Maximum Speed: 354 deg on May 15 22:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 11.0 deg on May 16	Hours of Data: 744
Direction of Minimum Speed: 311 deg on May 24 23:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.6 deg on May 21	Percent Operational Time: 100.0
Monthly Average Direction: 329.7 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-May	153	149	142	147	138	131	127	132	260	252	264	265	268	251	249	263	349	178	273	238	243	275	259	276	232.3
2-May	274	314	300	133	97	86	23	351	6	359	354	339	335	11	308	331	331	350	171	156	317	359	6	6	345.9
3-May	16	2	349	336	345	5	5	343	331	326	299	293	315	358	352	353	0	359	22	26	95	68	4	297	351.7
4-May	292	15	337	25	220	105	101	132	123	158	161	69	358	31	360	58	68	52	46	41	37	36	5	353	48.3
5-May	348	346	355	357	4	5	356	13	22	8	40	20	15	27	13	20	24	6	14	18	18	18	6	350	12.0
6-May	346	338	344	356	350	348	346	346	350	359	6	27	23	37	47	51	65	77	49	83	87	291	29	277	18.4
7-May	263	319	244	287	237	121	124	122	105	50	284	8	358	22	15	49	16	40	63	58	105	69	124	79	59.0
8-May	341	74	91	122	104	95	118	130	124	121	109	93	346	310	309	339	345	36	48	59	82	95	73	340	58.8
9-May	329	320	335	354	330	348	15	9	336	258	254	285	214	221	168	129	129	91	100	120	116	40	80	32	297.3
10-May	34	281	304	288	293	315	348	34	24	321	310	301	302	355	41	117	122	120	132	29	357	97	25	127	20.8
11-May	137	144	143	142	131	130	129	130	129	92	266	265	287	271	279	264	257	254	323	93	67	184	281	116	161.8
12-May	86	353	305	331	327	319	9	102	105	300	116	139	126	121	125	129	127	128	115	110	123	129	128	121	119.8
13-May	125	127	120	113	127	135	137	132	125	129	207	269	243	258	237	210	312	192	164	174	178	166	151	146	146.2
14-May	121	128	139	142	138	140	133	131	133	261	261	232	246	213	232	195	210	190	204	198	196	198	204	205	189.3
15-May	210	193	60	129	135	131	132	128	135	123	137	263	254	253	255	252	255	261	15	344	348	354	353	352	314.2
16-May	356	359	5	359	3	1	17	21	7	2	9	26	15	24	29	9	27	18	13	16	16	5	333	24	11.0
17-May	13	296	282	271	313	101	122	154	146	149	128	122	137	129	128	125	134	133	136	157	156	141	136	140	136.7
18-May	121	135	144	135	123	120	128	130	124	102	86	227	280	299	295	306	302	301	296	286	121	93	72	98	141.8
19-May	133	143	108	111	124	125	128	131	132	186	278	291	304	342	46	9	114	77	123	153	120	12	99	107	124.5
20-May	86	104	84	99	128	121	125	134	133	134	54	37	61	138	136	118	150	161	193	198	193	36	96	60	126.4
21-May	98	72	124	86	34	102	126	131	132	133	128	112	324	297	275	283	299	305	307	314	116	108	112	17	118.9
22-May	315	101	115	119	121	98	123	129	96	344	334	353	343	344	347	2	11	10	11	27	30	27	345	286	10.8
23-May	268	311	342	8	322	1	7	4	345	349	325	334	329	317	310	315	1	84	122	19	33	320	306	276	333.8
24-May	255	97	19	61	85	113	128	135	138	137	128	86	13	54	356	266	5	13	104	111	300	22	311	282	94.5
25-May	76	154	68	131	138	124	130	131	131	136	138	259	282	277	113	136	51	328	9	302	317	345	346	350	17.2
26-May	342	338	331	338	337	353	352	329	345	15	7	344	334	335	336	328	337	19	37	28	48	34	256	101	352.4
27-May	330	92	92	266	242	301	114	118	131	135	137	121	348	319	348	350	0	3	5	17	16	14	14	358	8.6
28-May	11	8	1	15	14	10	20	2	6	346	346	349	349	9	355	351	8	17	26	25	44	76	115	127	8.1
29-May	117	110	128	157	64	112	127	139	131	143	102	129	136	142	51	334	102	89	133	172	180	156	155	156	131.3
30-May	146	121	149	150	168	131	132	128	127	129	121	120	134	127	137	136	142	156	156	132	144	162	160	143	138.2
31-May	144	137	129	114	112	116	120	132	126	154	145	165	174	171	155	153	158	154	175	160	129	116	141	257	139.4
52.1 61.9 70.4 75.8 65.4 81.4 97.0 100.0 90.9 52.2 347.6 339.4 327.0 346.8 342.0 2.8 15.5 26.6 35.5 42.5 49.2 41.3 44.3 28.2																									
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

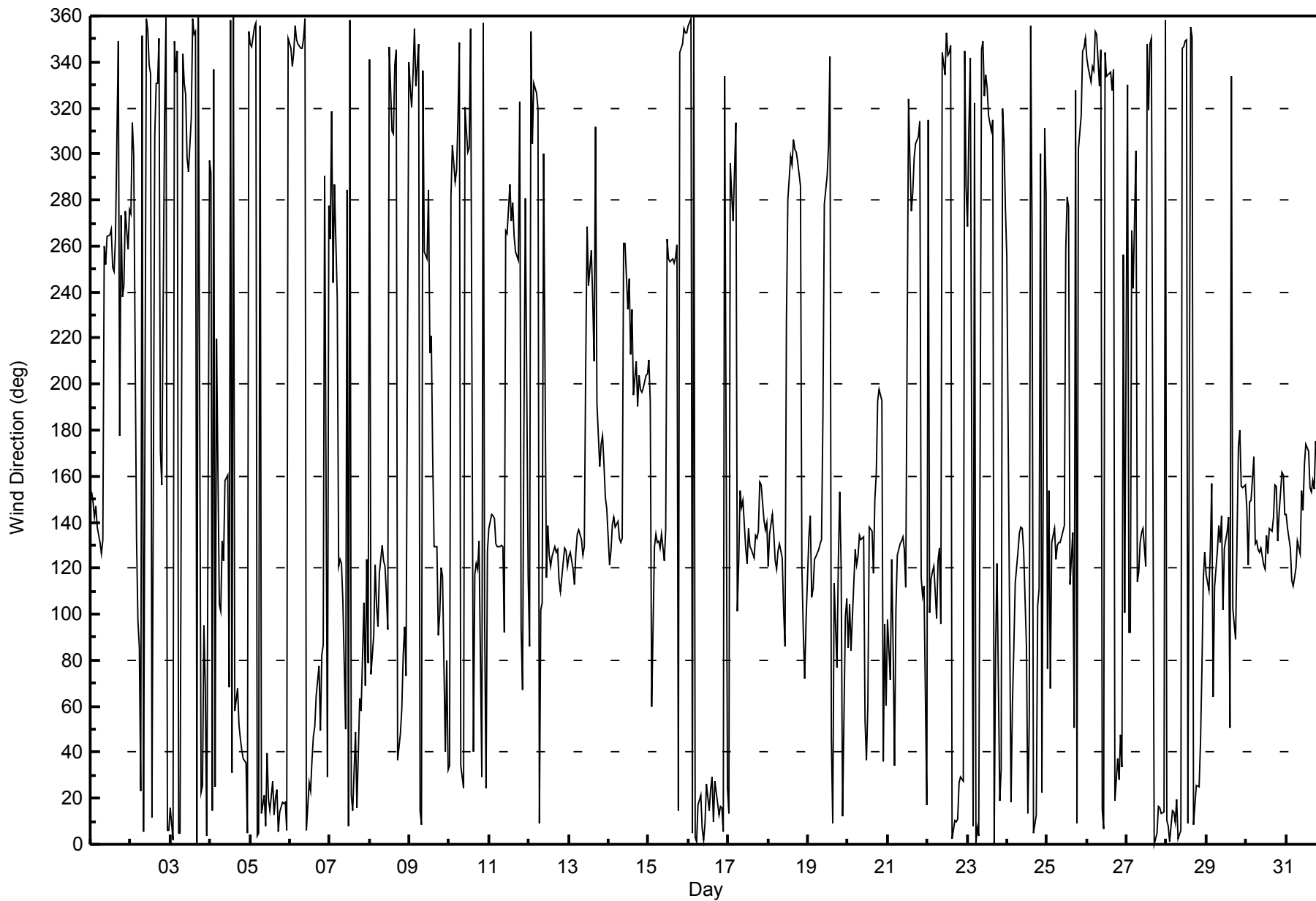
Lower Camp - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on May 24 16:00																			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 May 13 00:00																									
Percentiles: P ₁ = 11 P ₁₀ = 15 Q ₁ = 20 Median = 28 Q ₃ = 46 P ₉₀ = 72 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-May	37	27	14	15	18	12	14	18	74	31	21	14	17	22	22	74	77	74	28	11	16	54	28	26	77
2-May	28	40	42	87	43	83	60	22	23	22	28	21	21	33	28	30	29	95	79	86	32	19	14	16	95
3-May	12	16	24	27	35	16	13	29	55	22	20	23	43	19	18	23	27	27	17	16	23	67	52	54	67
4-May	75	39	29	61	84	99	12	16	32	43	56	42	66	47	59	83	81	63	18	13	11	69	40	20	99
5-May	19	20	23	26	12	10	19	25	36	12	25	21	23	29	15	13	13	19	16	15	13	14	17	18	36
6-May	18	20	20	16	18	17	19	18	18	16	17	14	15	15	17	18	19	23	20	29	65	92	87	30	92
7-May	76	77	31	75	67	53	13	13	26	56	32	53	34	42	61	46	37	38	24	15	64	92	71	58	92
8-May	50	45	81	42	61	77	21	12	11	15	23	31	59	33	33	21	28	17	14	21	20	29	45	75	81
9-May	28	38	22	33	35	36	47	30	44	20	30	50	58	48	70	14	17	68	38	42	27	35	40	73	73
10-May	92	43	61	37	39	44	50	20	37	43	31	88	31	62	65	22	25	20	23	62	50	75	67	50	92
11-May	16	20	14	10	13	14	13	14	18	25	55	30	61	72	42	38	28	26	49	80	58	93	88	82	93
12-May	67	65	47	53	48	36	28	46	50	26	76	19	30	55	31	26	20	14	15	11	12	15	12	9	76
13-May	11	12	15	13	30	23	24	21	11	15	84	44	50	65	91	89	98	84	29	24	19	22	18	16	98
14-May	64	16	14	25	16	20	14	15	16	71	20	38	25	58	39	64	49	36	33	25	15	20	20	22	71
15-May	23	38	56	20	18	18	18	16	14	16	95	17	17	22	17	17	25	29	21	21	19	20	21	21	95
16-May	20	19	20	19	17	17	19	15	25	19	23	20	21	22	21	21	22	21	20	13	10	28	33	37	37
17-May	53	28	38	31	75	64	28	38	36	47	27	32	33	32	40	32	27	21	29	29	25	23	27	23	75
18-May	29	29	27	24	23	21	18	19	16	27	34	74	43	31	20	24	19	21	14	25	76	21	43	26	76
19-May	21	28	37	28	23	21	21	24	19	61	21	23	22	58	66	75	33	41	34	54	67	42	18	22	75
20-May	46	47	42	46	16	16	16	21	19	19	67	55	66	62	61	61	48	42	47	21	85	42	22	52	85
21-May	36	30	23	69	62	34	21	22	21	17	28	54	46	33	37	38	27	61	21	43	54	45	32	75	75
22-May	83	98	24	21	41	45	27	19	18	87	34	22	25	23	21	28	24	20	18	12	10	21	58	14	98
23-May	15	36	35	72	17	23	14	15	24	27	25	35	29	35	29	55	54	64	49	64	72	59	42	58	72
24-May	93	54	48	32	41	35	19	22	23	24	16	46	18	60	73	105	74	47	88	13	77	59	87	79	105
25-May	67	91	62	23	45	20	28	25	20	25	20	87	83	99	75	23	72	18	90	26	21	21	20	20	99
26-May	20	19	19	21	22	22	24	20	23	26	21	26	45	35	37	45	35	31	18	12	10	79	43	85	85
27-May	61	80	91	64	84	75	26	31	22	25	19	31	23	30	25	21	21	18	19	24	17	16	14	20	91
28-May	17	20	20	15	15	18	16	17	27	26	29	24	24	30	32	28	31	29	22	16	20	25	73	63	73
29-May	23	27	43	59	47	24	28	42	37	63	80	35	31	98	60	33	55	58	61	35	31	31	30	29	98
30-May	32	25	30	48	76	41	31	24	19	18	22	25	32	28	44	33	37	34	33	35	39	28	28	32	76
31-May	24	35	36	19	13	12	12	30	23	44	47	36	32	31	36	34	37	34	31	31	37	44	57	32	57
Diurnal Maximum																									



WBEA
Hourly Averages

Wind Direction (WD) - deg
Lower Camp - May 2015





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 25, 2015	Last Calibration	April 10, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	12:55
Gas Cert Reference	LL110099	Station temp.	21 Deg C
Cal Gas Concentration	51.3 ppm	Cal Gas Exp Date	25/03/2016
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-675	-675
Analyzer IP address	192.168.1.43		Lamp voltage	804	806
Calculated slope	0.998492	1.001723	Chamber temp	45.0	45.1
Calculated intercept	1.459060	0.661677	Pressure	703.3	706.9
Analyzer Background	11.1	11.1	Flow	0.484	0.484
Analyzer Coefficient	1.013	1.013	Intensity	92	91

Analyzer make TEI 43i Analyzer serial # 100841398

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	----
as found span	5000	80.9	830.0	828.0	1.002
calibrator zero	5000	0.0	0.0	-0.4	----
high point	5000	80.9	830.0	828.0	1.002
second point	5000	40.9	419.6	418.3	1.003
third point	5000	20.4	209.3	207.9	1.007
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	80.9	830.0	832.2	0.997
Average Correction Factor					1.004

Corrected As found 828.4 Previous response 829.8 % change 0.2%

Notes:

Inlet filter changed after as founds. No adjustments.

Calibration Performed By:

Asad Hidayat



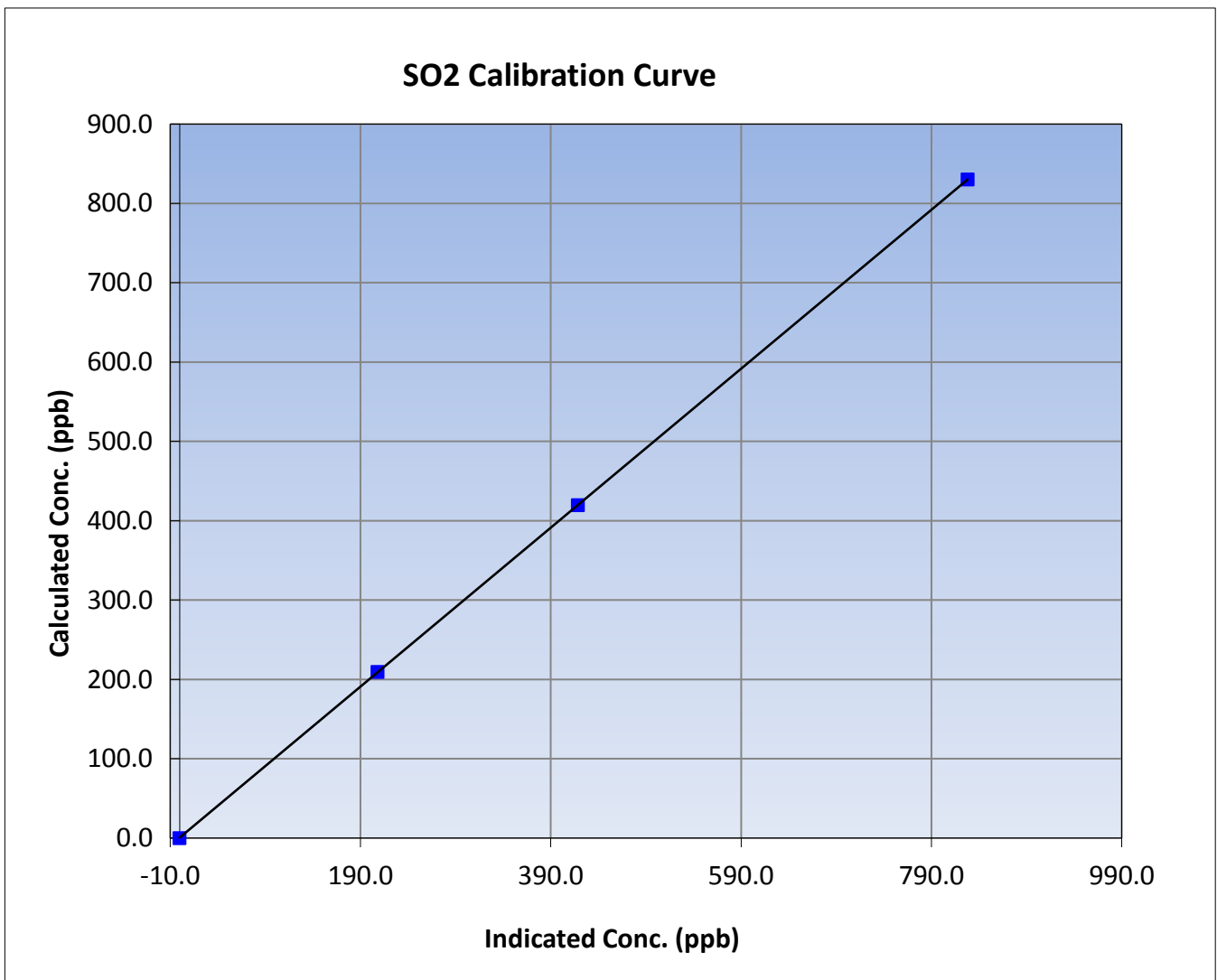
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 25, 2015	Previous Calibration	April 10, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:35	End Time (MST)	12:55
Analyzer make	TEI 43i	Analyzer serial #	100841398

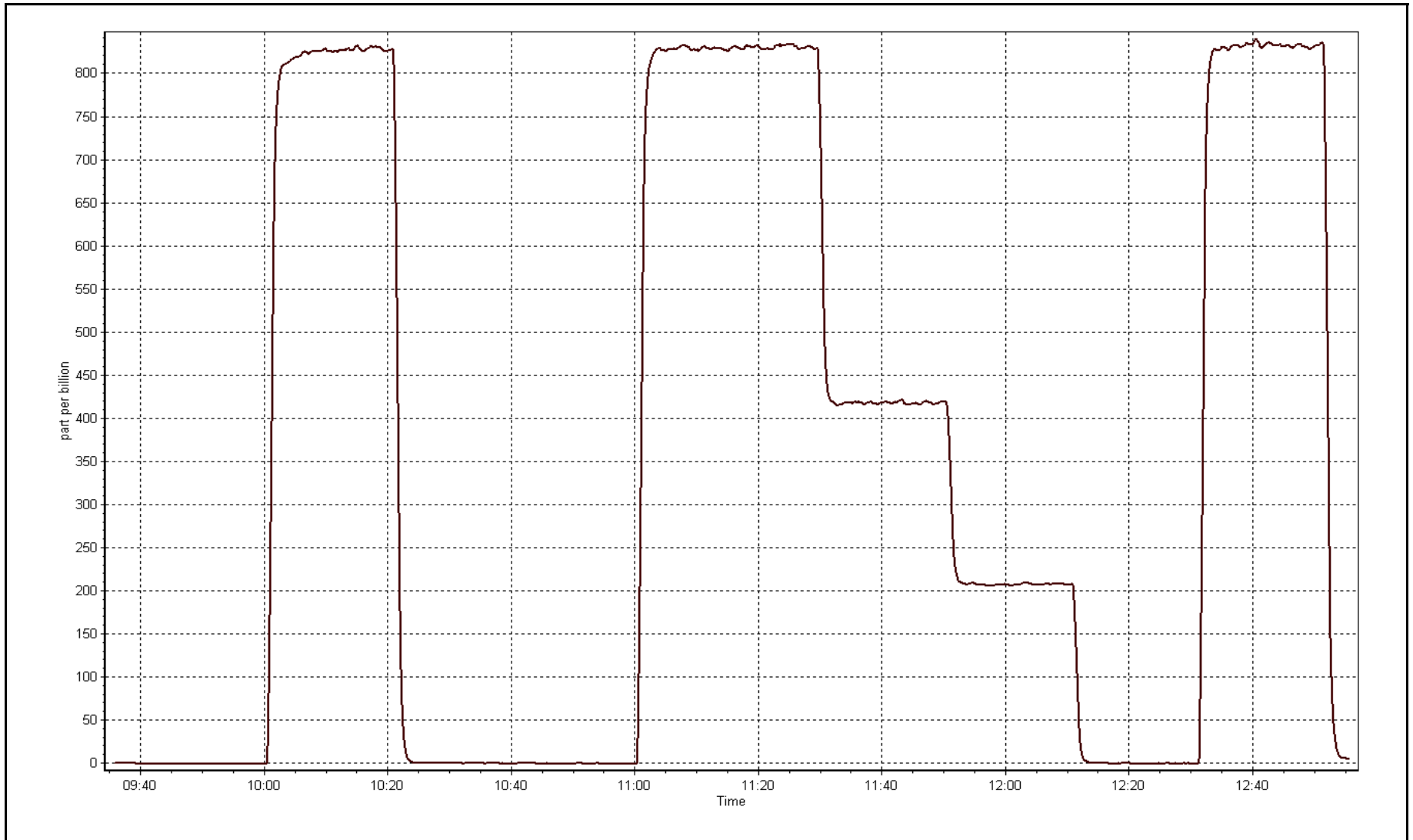
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999999
830.0	828.0	1.0024		
419.6	418.3	1.0032	Slope	1.001723
209.3	207.9	1.0068		
			Intercept	0.661677



SO2 Calibration Plot

Date: May 25, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 28, 2015	Last Calibration	April 14, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	10:02	End Time (MST)	12:50
Gas Cert Reference	ALM061435	Station temp.	22 Deg C
Cal Gas Concentration	5.15 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG air Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	3492
SO2 gas concentration	51.4 ppm	SO2 gas cert/exp	LL110099 25/03/2016

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-633	-634
Analyzer IP address	192.168.1.45		Lamp voltage	904	880
Calculated slope	1.005363	1.002897	Chamber temp	45	45
Calculated intercept	-0.559828	-0.397931	Pressure	567.0	581.7
Analyzer Background	21.6	21.2	Flow	1.152	1.128
Analyzer Coefficient	1.297	1.297	Intensity	61	62
			Converter temp.	340	340
Analyzer make/model	Thermo 450i		Analyzer serial #	922436966	
Converter make/model	NA		Converter serial #	NA	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	72.9	75.1	75.1	0.999
SO2 scrubber check	5000	20.5	210.7	1.3	----
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	72.9	75.1	75.1	0.999
second point	5000	38.8	40.0	40.5	0.986
third point	5000	19.4	20.0	20.2	0.987
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	72.9	75.1	76.7	0.979
Average Correction Factor					0.991

Corrected As found	75.2	Previous response	75.2	% change	0.0%
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Notes:

Scrubber check and inlet filter replaced after as founds. No adjustments.

Calibration Performed By:

Asad Hidayat



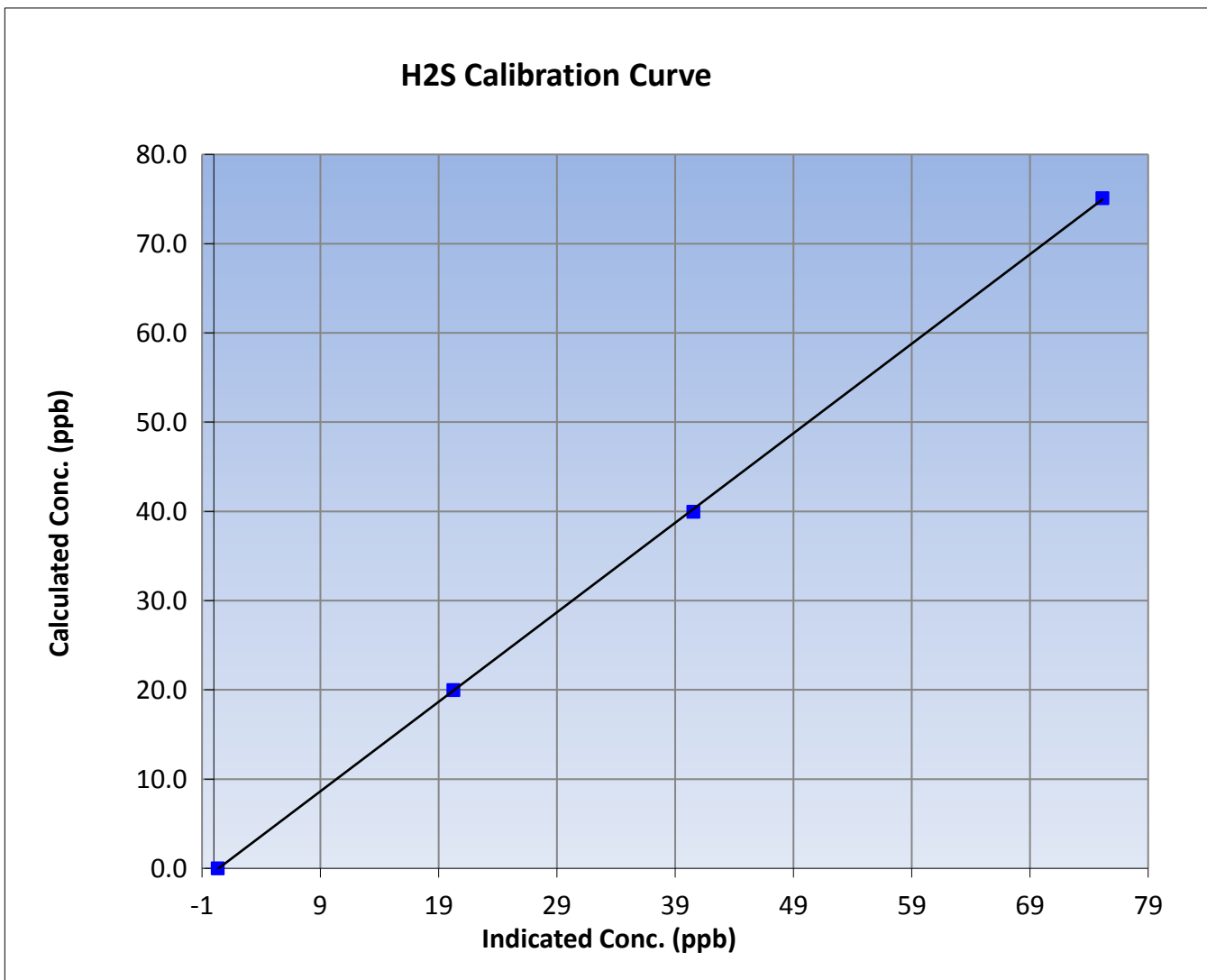
Wood Buffalo Environmental Association H2S Calibration Report

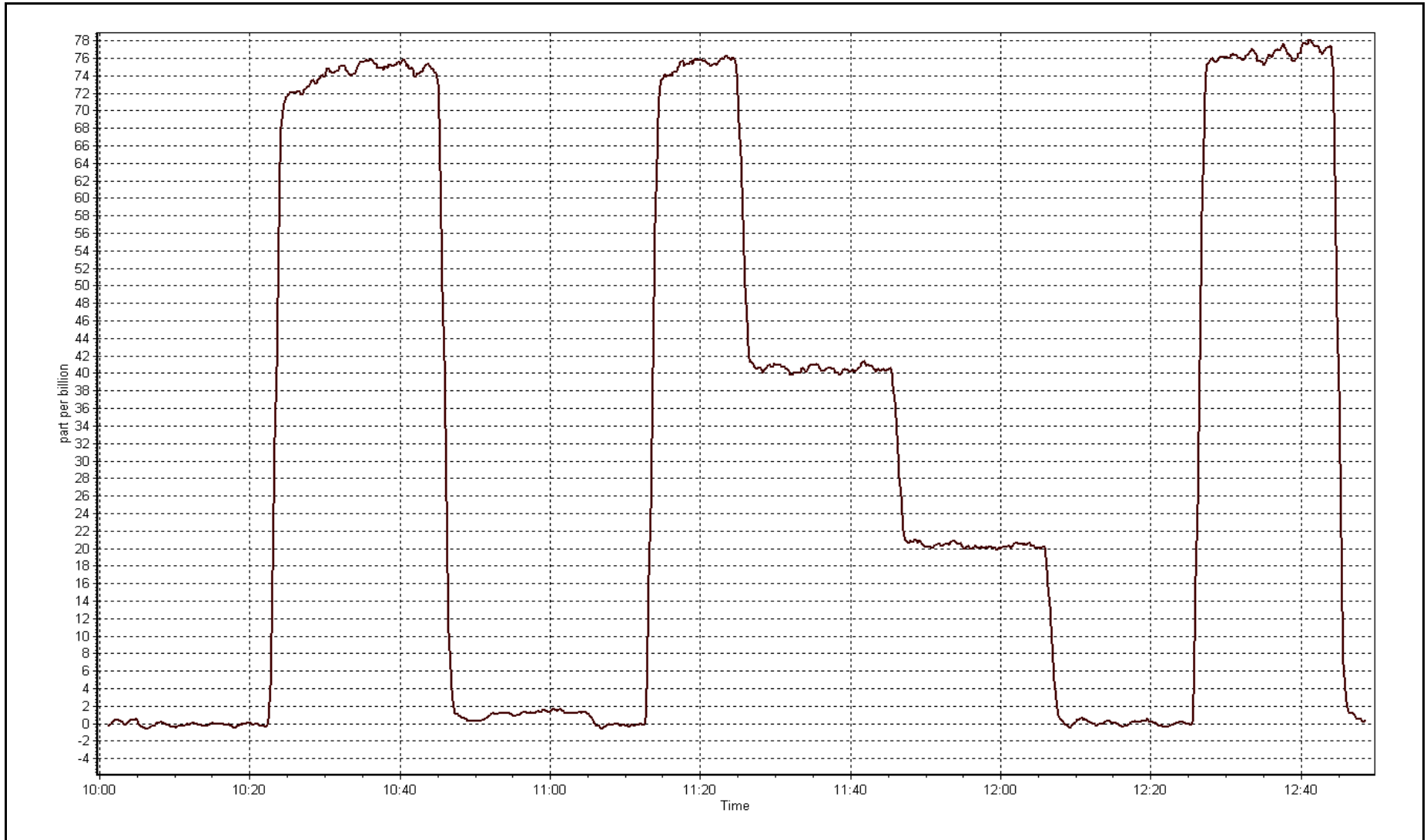
Station Information

Calibration Date	May 28, 2015	Previous Calibration	April 14, 2015
Station Name	AMS 11	Station Number	AMS 11
Start Time (MST)	10:02	End Time (MST)	12:50
Analyzer make	Thermo 450i	Analyzer serial #	922436966

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999961
75.1	75.1	0.9994		
40.0	40.5	0.9858	Slope	1.002897
20.0	20.2	0.9873		
			Intercept	-0.397931







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-25-15	Last Calibration	April-10-15
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	12:55
Gas Cert Reference	LL110099	Cal Gas Expiry Date	25/03/2016
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1070.5 ppm
C3H8 Cal Gas Conc.	202 ppm	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG make/model	Teledyne API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	3492

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	37.3	37.3
Calculated slope	0.999530	1.001783	Fuel Pressure	24.0	24.0
Calculated intercept	0.042314	0.000211	Analyzer Coeff	4.1	4.1
			Analyzer BKG	5.990	6.050

Analyzer make	51i-LT	Analyzer serial #	1410661326
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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	0.10	----
as found span	5000	80.9	17.32	17.42	0.994
calibrator zero	5000	0.0	0.00	-0.01	----
high point	5000	80.9	17.32	17.29	1.002
second point	5000	40.9	8.76	8.73	1.003
third point	5000	20.4	4.37	4.38	0.997
as left zero	5000	0.0	0.00	-0.01	----
as left span	5000	80.9	17.32	17.38	0.997
Average Correction Factor					1.001

Corrected As found	17.32	Previous response	17.29	% change	-0.2%
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Notes:

Hydrogen cylinder and inlet filter changed after as founds. Adjusted zero and span.

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association THC Calibration Report

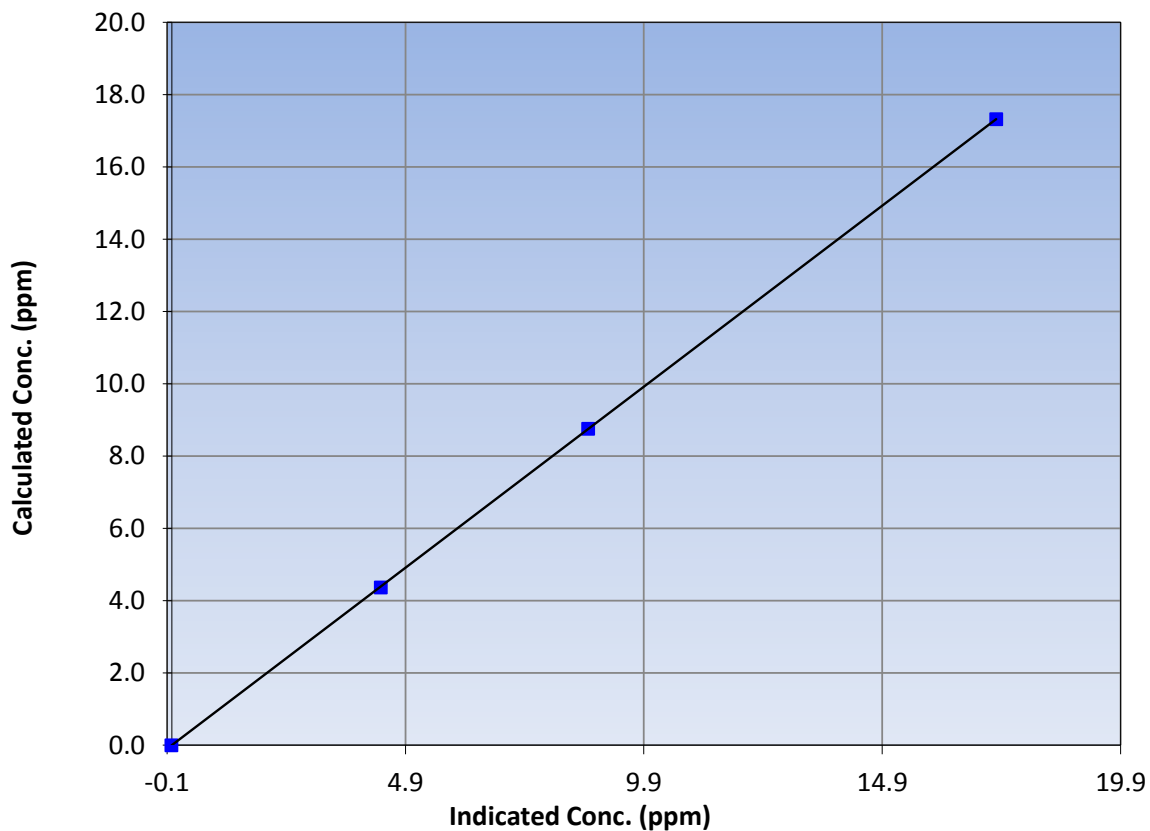
Station Information

Calibration Date	May 25, 2015	Previous Calibration	April 10, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:35	End Time (MST)	12:55
Analyzer make	51i-LT	Analyzer serial #	1410661326

Calibration Data

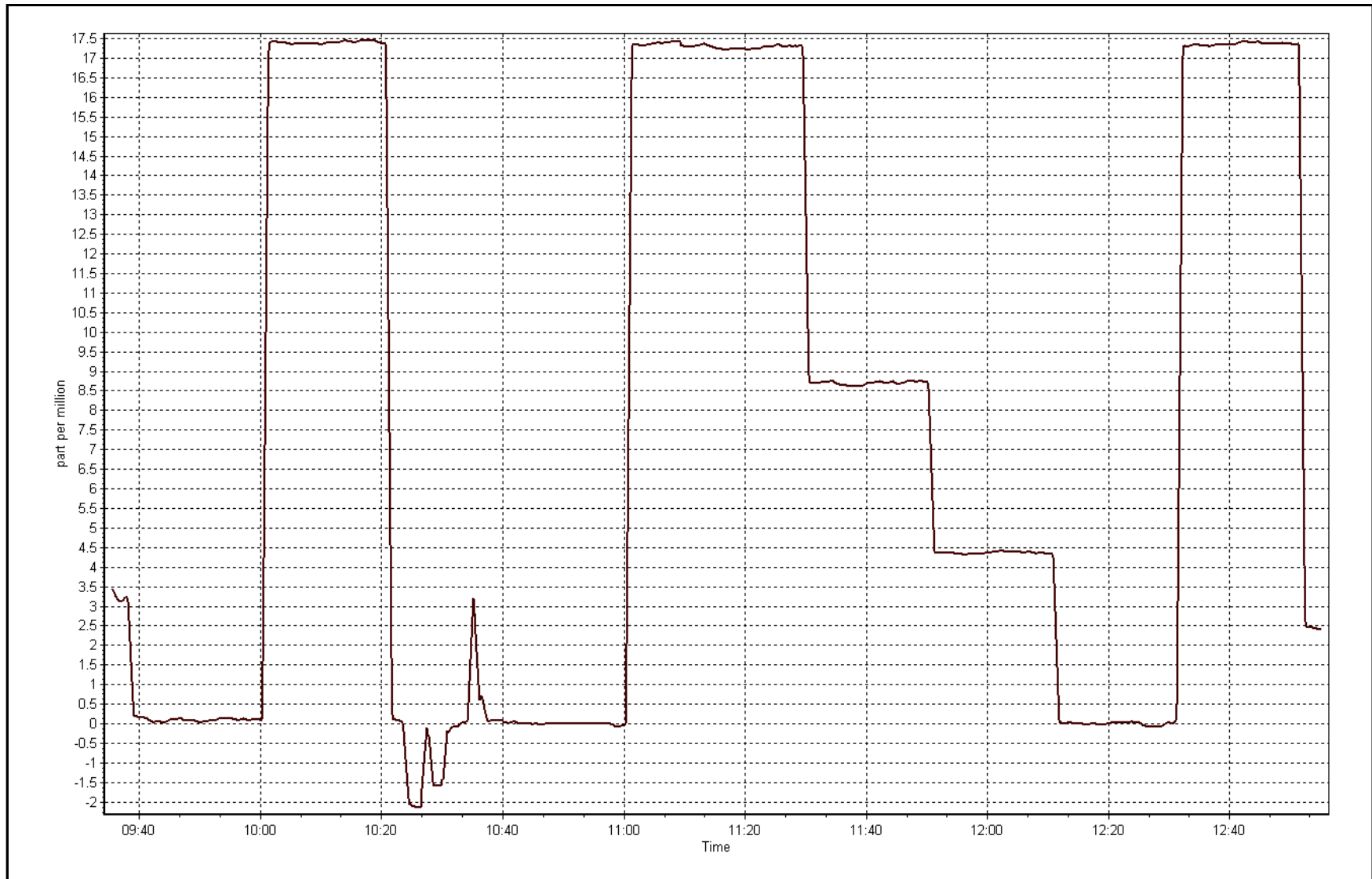
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	----	Correlation Coefficient	0.999996
17.32	17.29	1.0018		
8.76	8.73	1.0031	Slope	1.001783
4.37	4.38	0.9972		
			Intercept	0.000211

THC Calibration Curve



THC Calibration Plot

Date: May 25, 2015





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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 12
MILLENNIUM MINE
MAY 2015**

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

June 29, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)

MAY 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	706	38	38	100.00	23	0	3	0
TRS(ppb) Average	708	36	36	100.00	2	0	0	0
THC(ppm) Average	706	38	38	100.00	5.6	-	2.9	-
NO2(ppb) Average	706	38	38	100.00	53	0	17	-
NO(ppb) Average	706	38	38	100.00	156	-	21	-
NOX(ppb) Average	706	38	38	100.00	203	-	35	-
PM2.5(ug/m3) Average	709	0	35	95.30	740	-	70.2	4
Temperature 2 m (C) Average	744	0	0	100.00	28.2	-	19.8	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	86	-
Wind Speed 10 m (km/h) Average	737	0	7	99.06	35	-	19	-
Wind Direction 10 m (deg) Average	737	0	7	99.06	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	706	0.8	2	-	0	0	0	0	1	1	23
TRS(ppb) Average	708	0.2	0	-	0	0	0	0	0	0	2
THC(ppm) Average	706	2.3	0.5	-	2	2.1	2.1	2.1	2.3	2.7	5.6
NO2(ppb) Average	706	9.7	11	-	0	1	2	5	15	27	53
NO(ppb) Average	706	4.8	13	-	0	0	0	1	3	10	156
NOX(ppb) Average	706	14.5	22	-	0	1	2	6	17	37	203
PM2.5(ug/m3) Average	709	20.43	53.6	-	0.8	2.9	4.5	9.4	17.5	37.2	740
Temperature 2 m (C) Average	744	11.72	7.6	-	-2.2	2	5.5	11	17.1	23	28.2
Relative Humidity (%) Average	744	46.2	22	-	11	19	28	43	60	81	98
Wind Speed 10 m (km/h) Average	737	8.5	6	-	0	3	5	7	10	17	35
Wind Direction 10 m (deg) Average	737	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -MILLENNIUM MINE (AMS 12)
MAY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	23 May 2015 22:00	24 May 2015 00:00	3	Analyzer failure - foreign material in sample chamber
PM2.5	24 May 2015 23:00	25 May 2015 12:00	14	Analyzer failure - foreign material in sample chamber
PM2.5	25 May 2015 13:00	25 May 2015 18:00	6	Maintenance - clean asample chamber and re-calibration
PM2.5	31 May 2015 13:00	01 Jun 2015 00:00	12	Analyzer failure - sample flow shut off, wild fire materials
Wind Speed, Wind Direction	02 May 2015 03:00	02 May 2015 03:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	09 May 2015 20:00	09 May 2015 21:00	2	Flat line in sensor output signal
Wind Speed, Wind Direction	21 May 2015 05:00	21 May 2015 05:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	21 May 2015 22:00	21 May 2015 22:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	22 May 2015 03:00	22 May 2015 03:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	24 May 2015 01:00	24 May 2015 01:00	1	Flat line in sensor output signal



Summary of Hour Averages

Millennium - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 23 ppb on May 22 09:00	Maximum Daily Average: 3.3 ppb on May 11		Hours of Data:	706
Minimum Value: 0 ppb on May 5 21:00	Minimum Daily Average: 0.1 ppb on May 26		Hours of Missing Data:	38
Maximum Diurnal Average: 1.3 ppb at hour 16	Minimum Diurnal Average: 0.4 ppb at hour 2		Hours of Calibration:	38
Monthly Average: 0.8 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 9		Percent Operational Time:	100.0

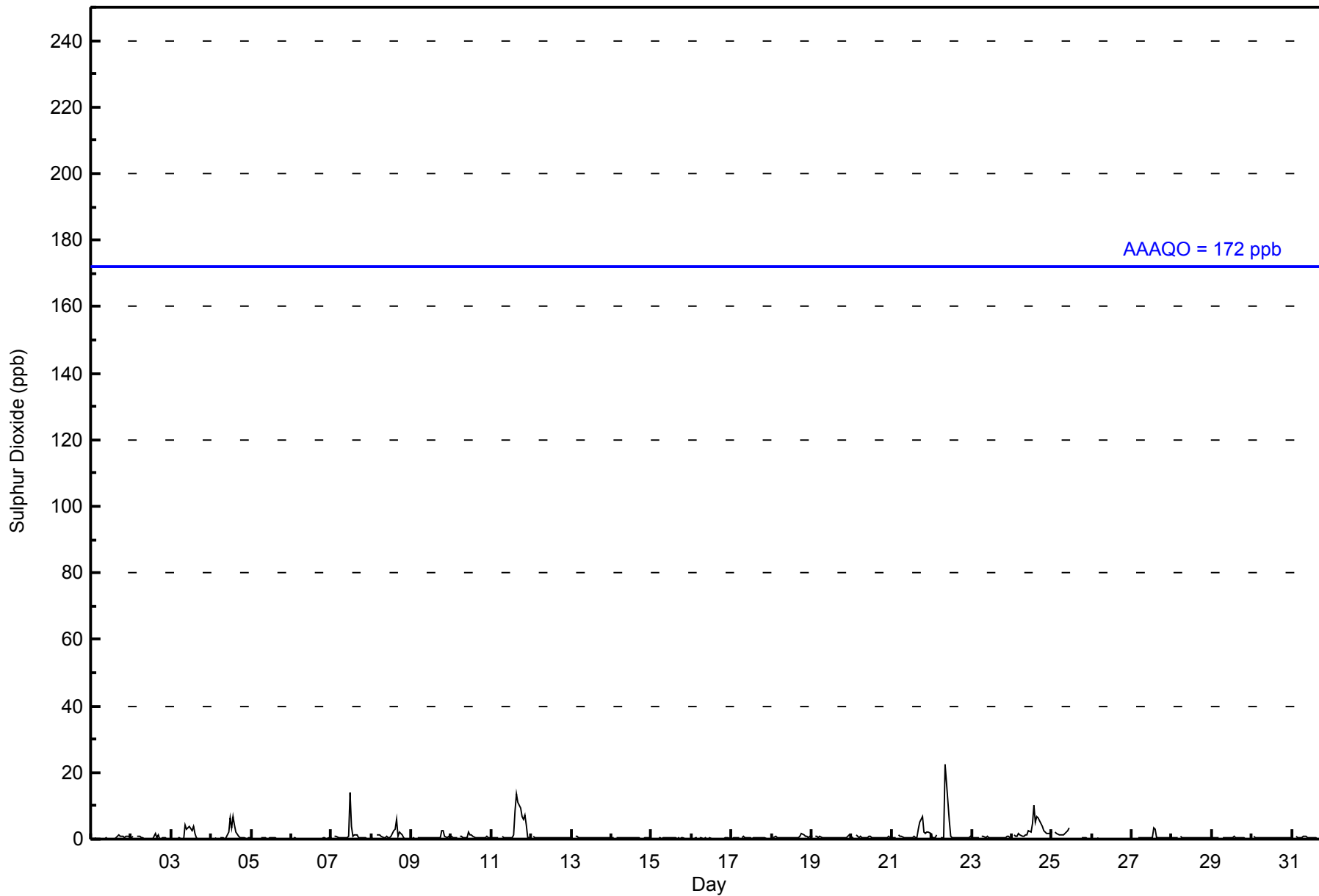
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0.4	1																						
2-May	0	1	Z	1	1	1	1	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0.4	2																						
3-May	0	0	0	Z	0	0	0	0	0	4	3	4	4	3	4	2	0	0	0	0	0	0	0	0	1.1	4																						
4-May	0	0	0	0	Z	1	0	0	0	0	2	6	3	7	4	2	1	1	1	0	0	0	0	0	1.3	7																						
5-May	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
6-May	Z	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																						
7-May	0	Z	1	1	1	1	0	0	0	0	1	14	4	1	1	1	1	0	0	0	0	0	0	0	1.3	14																						
8-May	1	0	Z	1	1	1	1	0	0	1	1	0	1	2	3	6	1	2	1	0	0	0	0	0	1.1	6																						
9-May	0	0	0	Z	1	0	1	1	1	0	0	0	0	0	0	0	0	1	2	3	1	1	1	1	0.6	3																						
10-May	1	0	0	0	Z	1	1	1	1	1	2	1	1	1	1	1	0	0	0	0	0	1	1	0	0.7	2																						
11-May	0	1	0	0	0	Z	1	1	0	0	0	0	1	8	14	11	9	7	6	7	4	1	1	3.3	14																							
12-May	Z	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
13-May	0	Z	1	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1																						
14-May	0	0	Z	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
15-May	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																						
16-May	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
17-May	0	0	0	0	0	Z	1	1	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0.4	1																						
18-May	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	1	1	0	1	0.5	2																						
19-May	1	Z	1	1	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0.6	1																						
20-May	1	0	Z	1	0	1	1	1	0	1	1	1	0	1	1	0	0	0	0	0	0	0	1	1	0.6	1																						
21-May	0	0	0	Z	1	1	1	0	1	1	1	1	1	1	1	1	3	5	7	2	2	2	2	2	1.5	7																						
22-May	1	0	0	1	Z	1	1	1	1	23	17	5	1	1	1	1	0	0	0	0	0	0	1	2.4	23																							
23-May	1	0	0	0	1	Z	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0	0.6	1																							
24-May	Z	1	1	1	2	1	1	1	1	1	3	2	5	10	5	7	6	5	4	2	2	2	2	2	2.9	10																						
25-May	2	Z	2	2	1	1	1	1	2	3	3	C	C	C	C	C	C	C	0	1	0	0	0	--	3																							
26-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
27-May	0	0	0	Z	1	0	0	0	1	1	1	1	1	4	3	1	0	0	0	0	0	0	0	0	0.6	4																						
28-May	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																						
29-May	0	0	0	0	0	Z	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
30-May	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1																						
31-May	0	Z	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
																								0.4	0.4	0.5	0.6	0.6	0.6	0.5	0.4	1.3	1.1	1.0	1.2	0.9	1.2	1.2	1.3	1.1	1.0	1.0	0.8	0.7	0.6	0.5	0.4	Diurnal Average
																								2	1	2	2	2	1	1	1	23	17	5	14	5	10	8	14	11	9	7	6	7	4	2	2	Diurnal Maximum

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Millennium - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Millennium - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	701	99.29	99.29
11 - 20	4	0.57	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: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Millennium - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	95	92	32	37	21	22	78	105	76	61	18	10	17	3	10	19	696
11 - 20	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	4
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	96	93	33	37	21	22	78	105	76	61	19	10	17	3	11	19	701

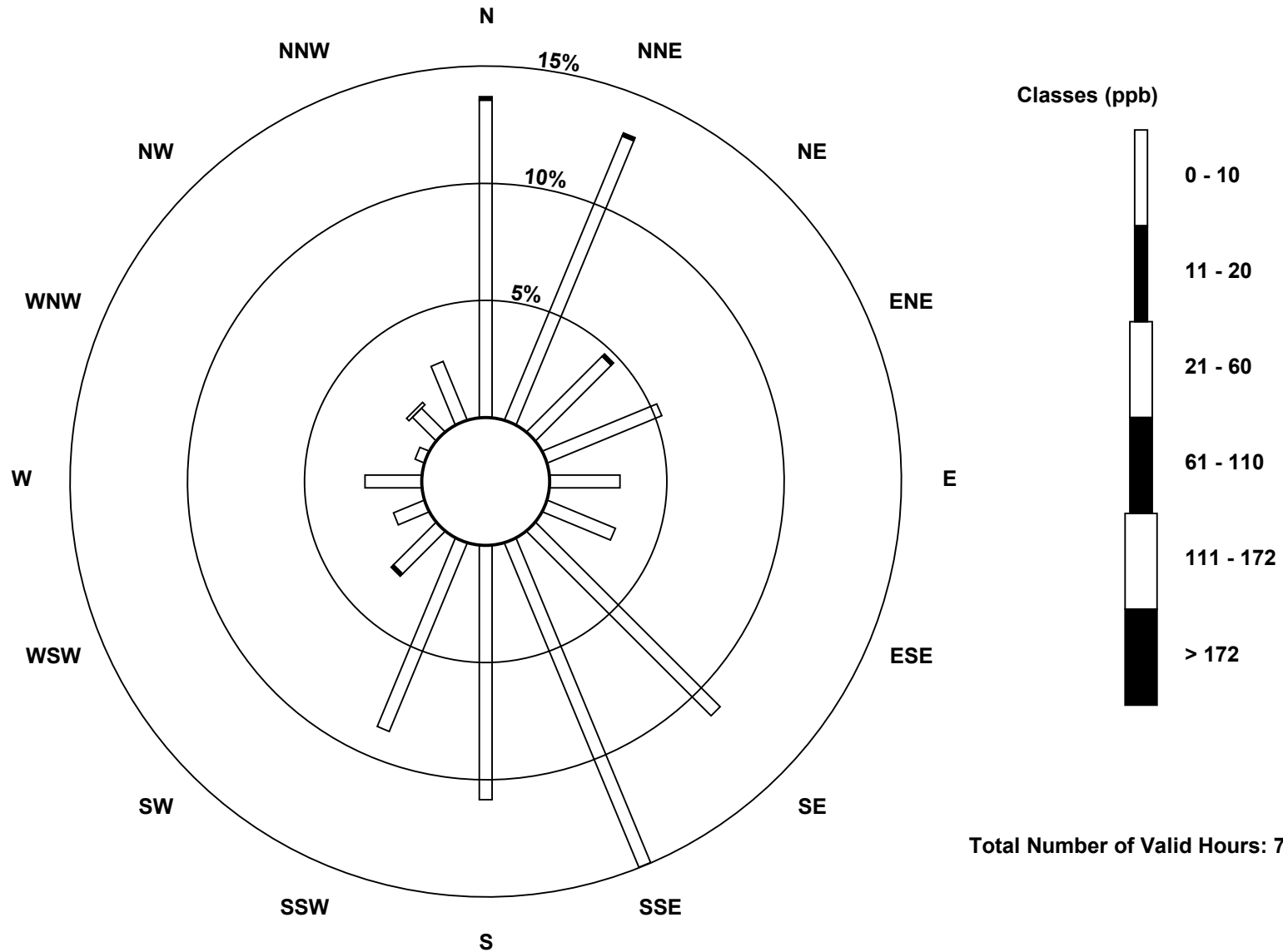
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Sulphur Dioxide (SO₂) - ppb
Millennium (AMS 12)

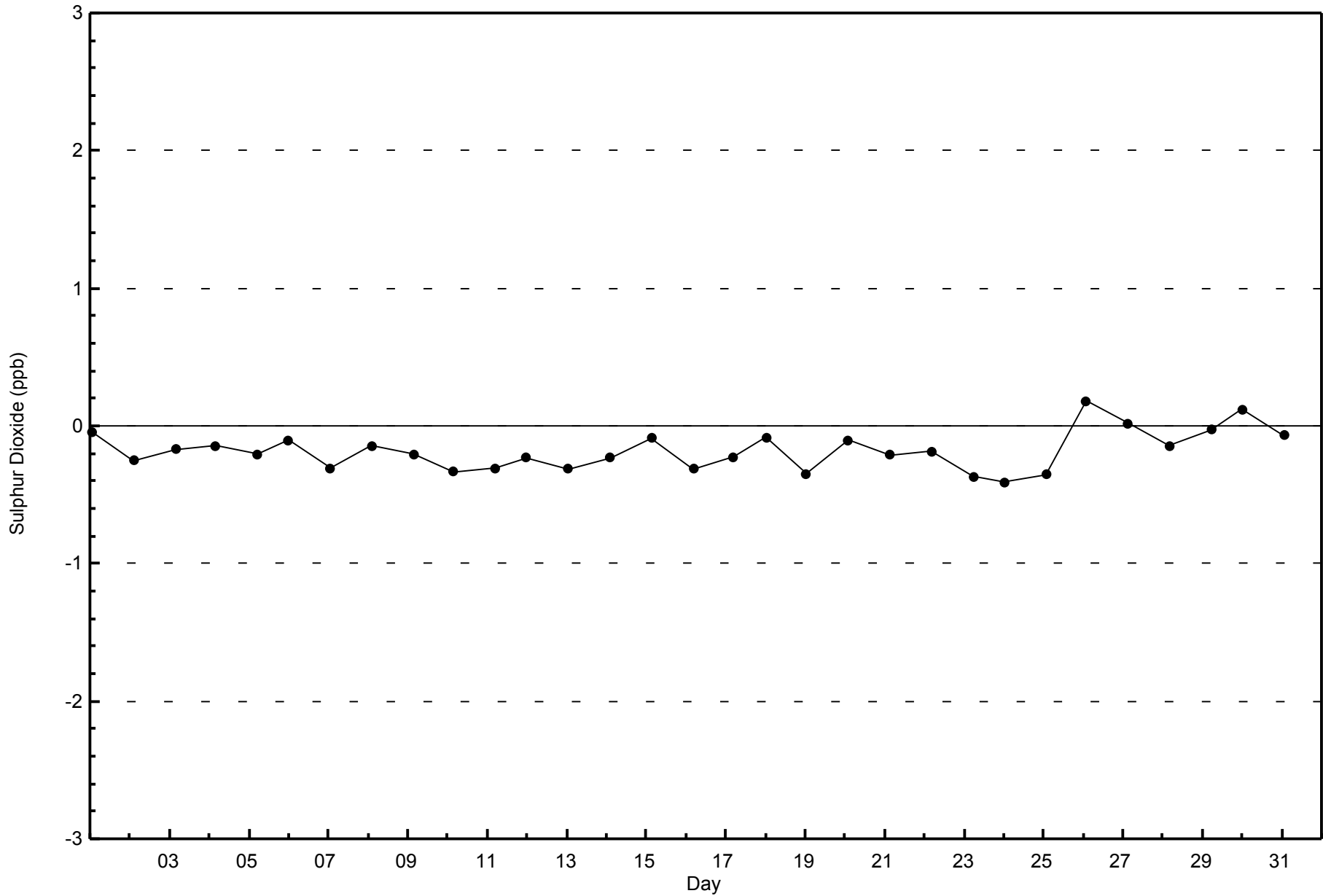


Total Number of Valid Hours: 701



WBEA
Zero Responses

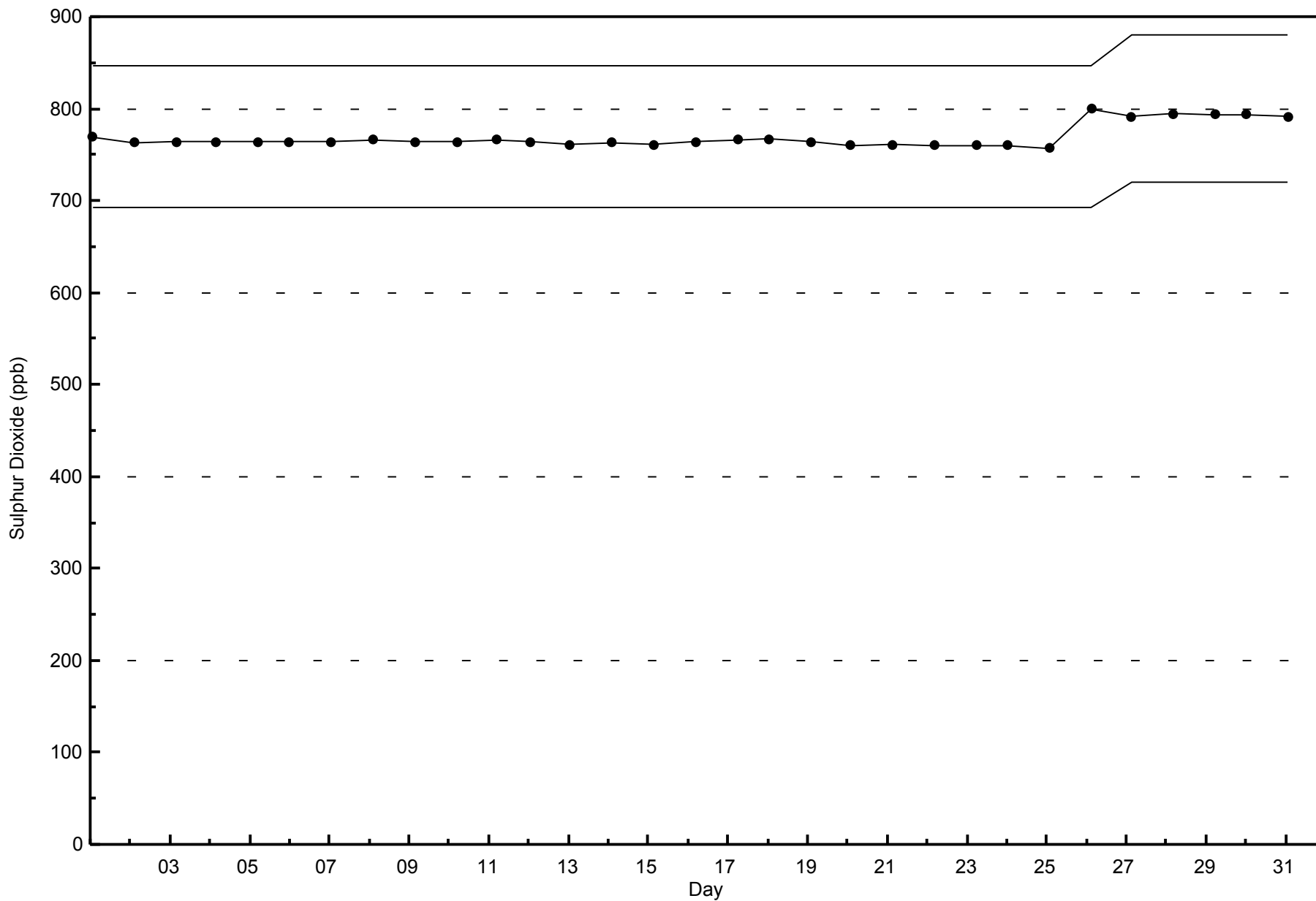
Sulphur Dioxide (SO₂) - ppb
Millennium - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Millennium - May 2015





Summary of Hour Averages

Millennium - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 2 ppb on May 22 09:00	Maximum Daily Average: 0.5 ppb on May 21		Hours of Data:	708
Minimum Value: 0 ppb on May 1 10:00	Minimum Daily Average: 0.0 ppb on May 15		Hours of Missing Data:	36
Maximum Diurnal Average: 0.3 ppb at hour 5	Minimum Diurnal Average: 0.2 ppb at hour 17		Hours of Calibration:	36
Monthly Average: 0.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1		Percent Operational Time:	100.0

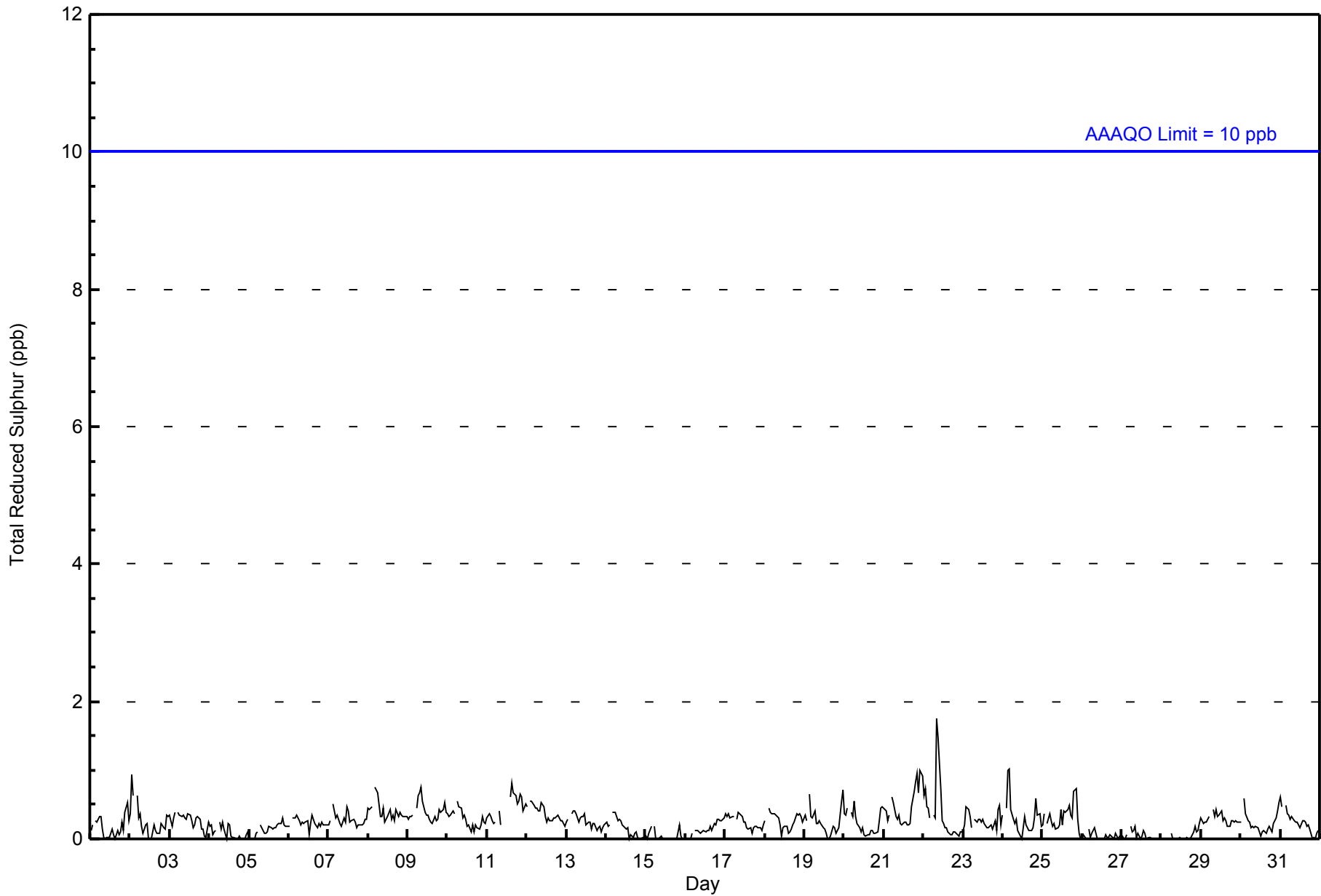
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1																								
2-May	0	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
3-May	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																							
4-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
5-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
6-May	0	Z	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																							
7-May	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	0.3	1																							
8-May	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
9-May	0	0	0	0	Z	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1																							
10-May	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
11-May	0	0	0	0	0	0	Z	0	0	C	C	C	C	C	1	1	1	1	1	1	1	1	0	1	0.5	1																								
12-May	0	Z	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
13-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
14-May	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																							
15-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
16-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
17-May	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																							
18-May	0	Z	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-May	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1																							
20-May	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
21-May	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.5	1																							
22-May	1	1	0	0	0	Z	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																							
23-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
24-May	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	0.3	1																							
25-May	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	0.3	1																							
26-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
27-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
28-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
29-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
30-May	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1																							
31-May	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
																								0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	Diurnal Average		
																								1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	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
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Millennium - May 2015





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Millennium - May 2015

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

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Millennium - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	94	91	34	35	24	27	77	105	73	60	19	11	16	3	13	20	702
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	94	91	34	35	24	27	77	105	73	60	19	11	16	3	13	20	702

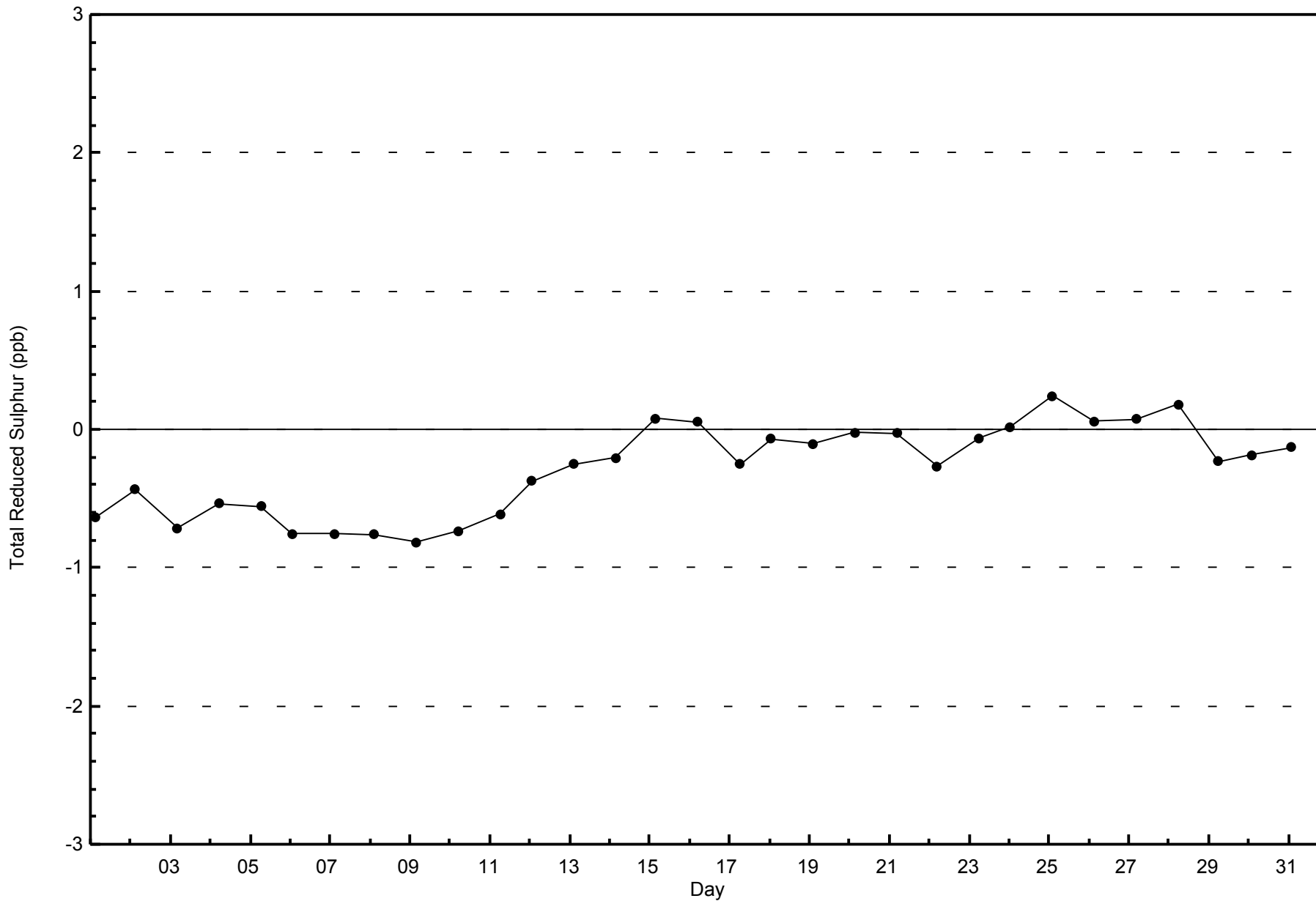
Total Number of Valid Hours: 702

Total Number of Hours: 744



WBEA
Zero Responses

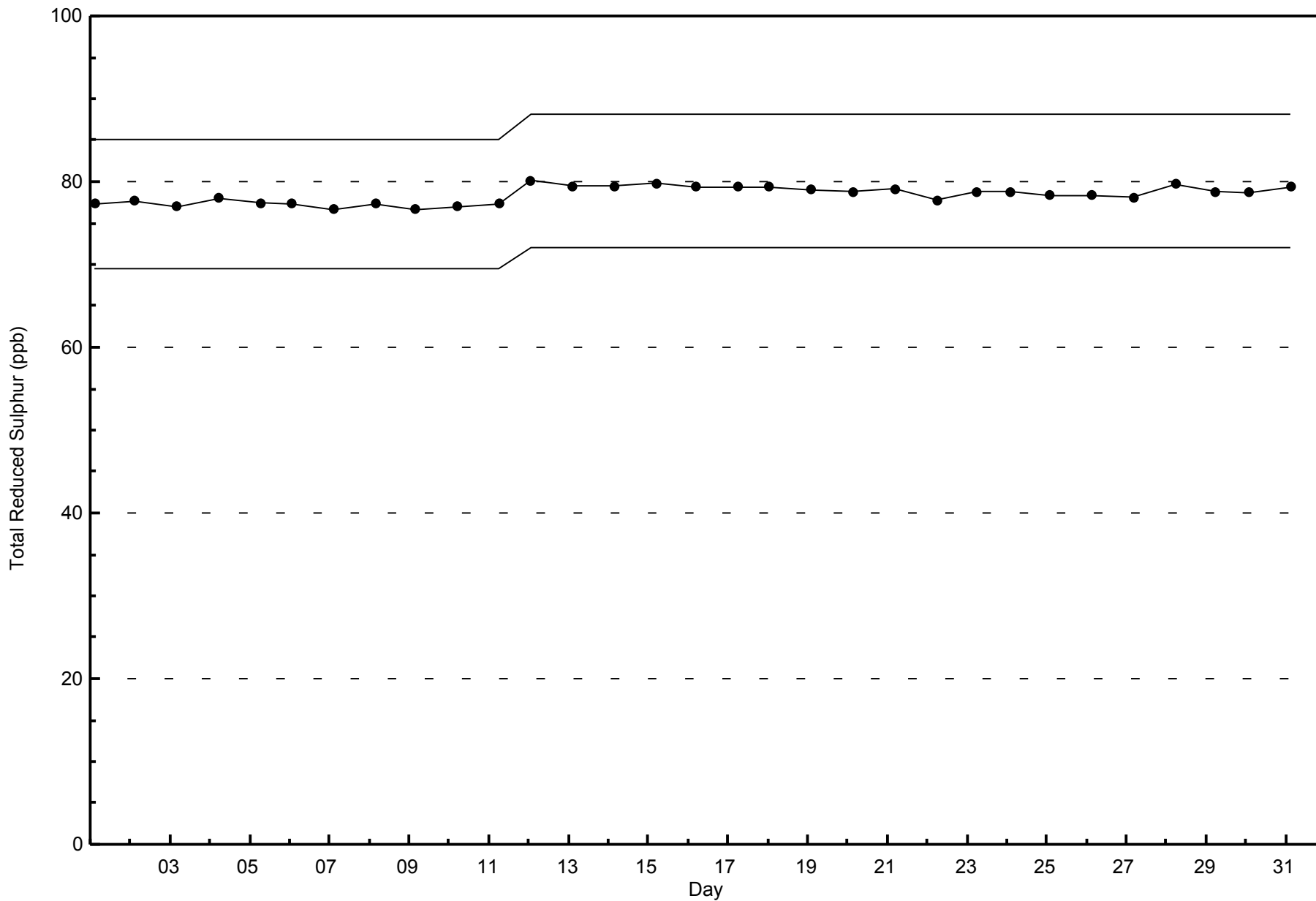
Total Reduced Sulphur (TRS) - ppb
Millennium - May 2015





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Millennium - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

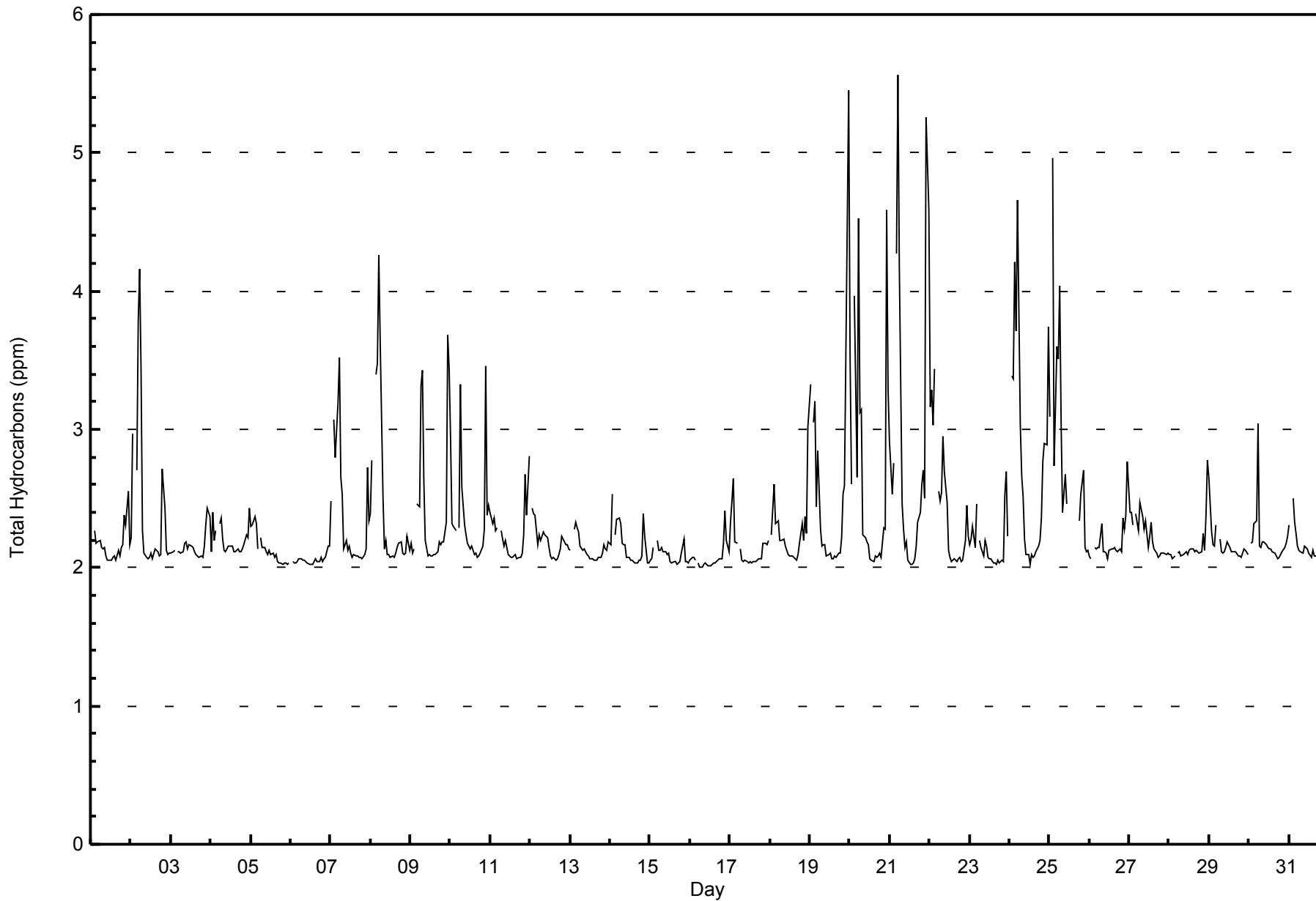
Millennium - May 2015

Maximum Value: 5.6 ppm on May 21 06:00																			Maximum Daily Average: 2.9 ppm on May 21						Hours in Service: 744		
Minimum Value: 2.0 ppm on May 16 07:00																			Minimum Daily Average: 2.1 ppm on May 6						Hours of Data: 706		
Maximum Diurnal Average: 2.9 ppm at hour 6																			Minimum Diurnal Average: 2.1 ppm at hour 16						Hours of Missing Data: 38		
Monthly Average: 2.30 ppm																			Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.1 Q ₃ = 2.3 P ₉₀ = 2.7 P ₉₉ = 4.6						Hours of Calibration: 38		
																			Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	2.8	Z	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.3	2.5	2.2	2.2	2.8	
2-May	2.2	3.0	Z	2.7	3.8	4.2	3.4	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.7	2.4	2.1	2.1	2.1	2.4	4.2	
3-May	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.4	2.2	2.4	
4-May	2.1	2.4	2.2	2.3	Z	2.3	2.4	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.4	2.2	2.4	
5-May	2.3	2.3	2.4	2.3	2.1	Z	2.2	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	2.4	
6-May	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.0	2.1	2.1	2.2	2.2	2.1	2.2	
7-May	2.5	Z	3.1	2.8	3.2	3.5	2.7	2.5	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.7	2.3	2.4	3.5	
8-May	2.4	2.8	Z	3.4	3.5	4.3	3.6	2.5	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.5	4.3	
9-May	2.2	2.1	2.1	Z	2.5	2.4	3.3	3.4	2.6	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	3.7	3.4	2.4	3.7	
10-May	2.9	2.3	2.3	2.3	Z	2.3	3.3	2.6	2.3	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	3.5	2.4	2.5	2.4	3.5	
11-May	2.4	2.3	2.4	2.3	2.3	Z	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.7	2.4	2.8	2.2	2.8	
12-May	Z	2.4	2.4	2.4	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.4	
13-May	2.1	Z	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.3	
14-May	2.2	2.5	Z	2.2	2.3	2.4	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.4	2.2	2.0	2.0	2.2	2.5	
15-May	2.1	2.1	2.1	Z	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.0	2.0	2.1	2.2	
16-May	2.1	2.1	2.1	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.4	2.2	2.1	2.1	2.4	
17-May	2.3	2.5	2.6	2.2	2.2	Z	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.6	
18-May	Z	2.2	2.6	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.4	2.2	3.0	2.2	3.0	
19-May	3.3	Z	3.1	3.2	2.4	2.9	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5	2.6	4.5	5.5	2.6	5.5	
20-May	3.5	2.6	Z	4.0	2.7	4.5	3.1	3.1	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.3	2.3	4.6	3.3	2.7	4.6	
21-May	2.9	2.5	2.8	Z	4.3	5.6	4.2	2.5	2.3	2.1	2.2	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.4	2.6	2.7	2.5	5.3	4.6	2.9	5.6	
22-May	3.2	3.3	3.0	3.4	Z	2.6	2.5	2.5	3.0	2.7	2.5	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.2	2.4	2.2	2.4	3.4	
23-May	2.2	2.2	2.3	2.2	2.5	Z	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.5	2.7	2.2	2.2	2.7	
24-May	Z	3.4	3.4	4.2	3.7	4.7	3.0	2.7	2.5	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.4	2.8	2.9	2.9	3.7	2.8	4.7	
25-May	3.1	Z	5.0	2.7	3.6	3.5	4.0	3.1	2.4	2.7	2.5	C	C	C	C	C	C	C	C	2.3	2.5	2.7	2.1	2.1	2.1	--	5.0
26-May	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.3	2.4	2.8	2.2	2.8	
27-May	2.4	2.4	2.3	Z	2.4	2.3	2.5	2.4	2.4	2.3	2.3	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	2.2	2.5	
28-May	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.4	2.8	2.2	2.8	
29-May	2.6	2.3	2.2	2.2	2.3	Z	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.6	
30-May	Z	2.2	2.2	2.3	2.3	3.0	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	3.0	
31-May	2.3	Z	2.5	2.3	2.3	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.4	2.4	2.2	2.2	2.5	
																								Diurnal Average			
																								Diurnal Maximum			
2.5 2.4 2.5 2.6 2.6 2.9 2.6 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 2.3 2.6 2.6																											
3.5 3.4 5.0 4.2 4.3 5.6 4.2 3.4 3.0 2.7 2.5 2.2 2.2 2.3 2.2 2.1 2.2 2.3 2.4 2.7 2.8 3.5 5.3 5.5																											
Z - zerospan C - Calibration																											



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Millennium - May 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Millennium - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	71	10.06	10.06
2.1 - 3.0	587	83.14	93.20
3.1 - 10.0	48	6.80	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Millennium - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	12	31	1	2	0	0	0	7	5	4	2	2	4	1	0	0	71
2.1 - 3.0	84	62	32	34	20	20	69	91	66	39	16	8	12	2	10	18	583
3.1 - 10.0	0	0	0	1	1	2	9	7	5	18	1	0	1	0	1	1	47
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	93	33	37	21	22	78	105	76	61	19	10	17	3	11	19	701

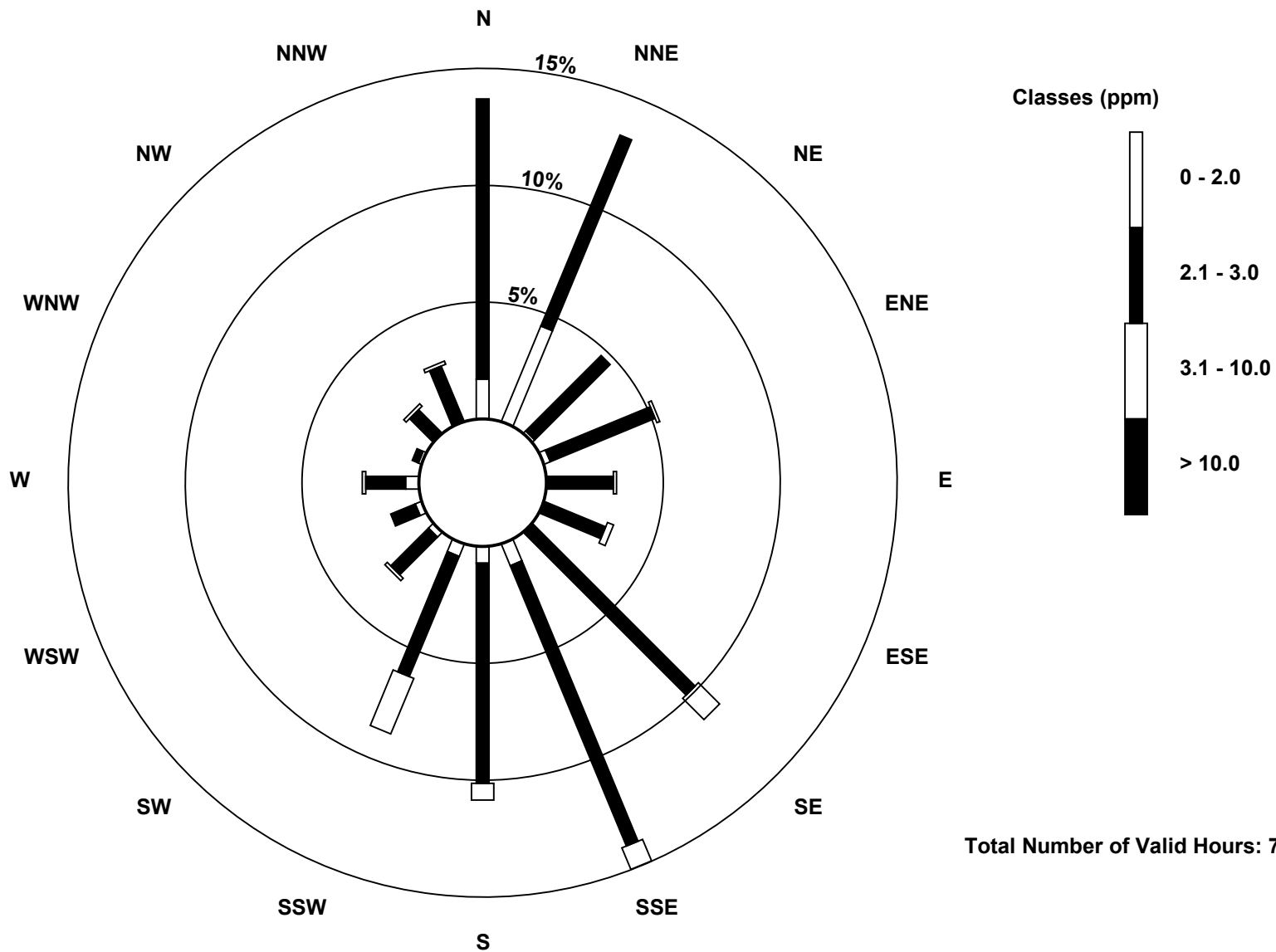
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Total Hydrocarbons (THC) - ppm
Millennium (AMS 12)

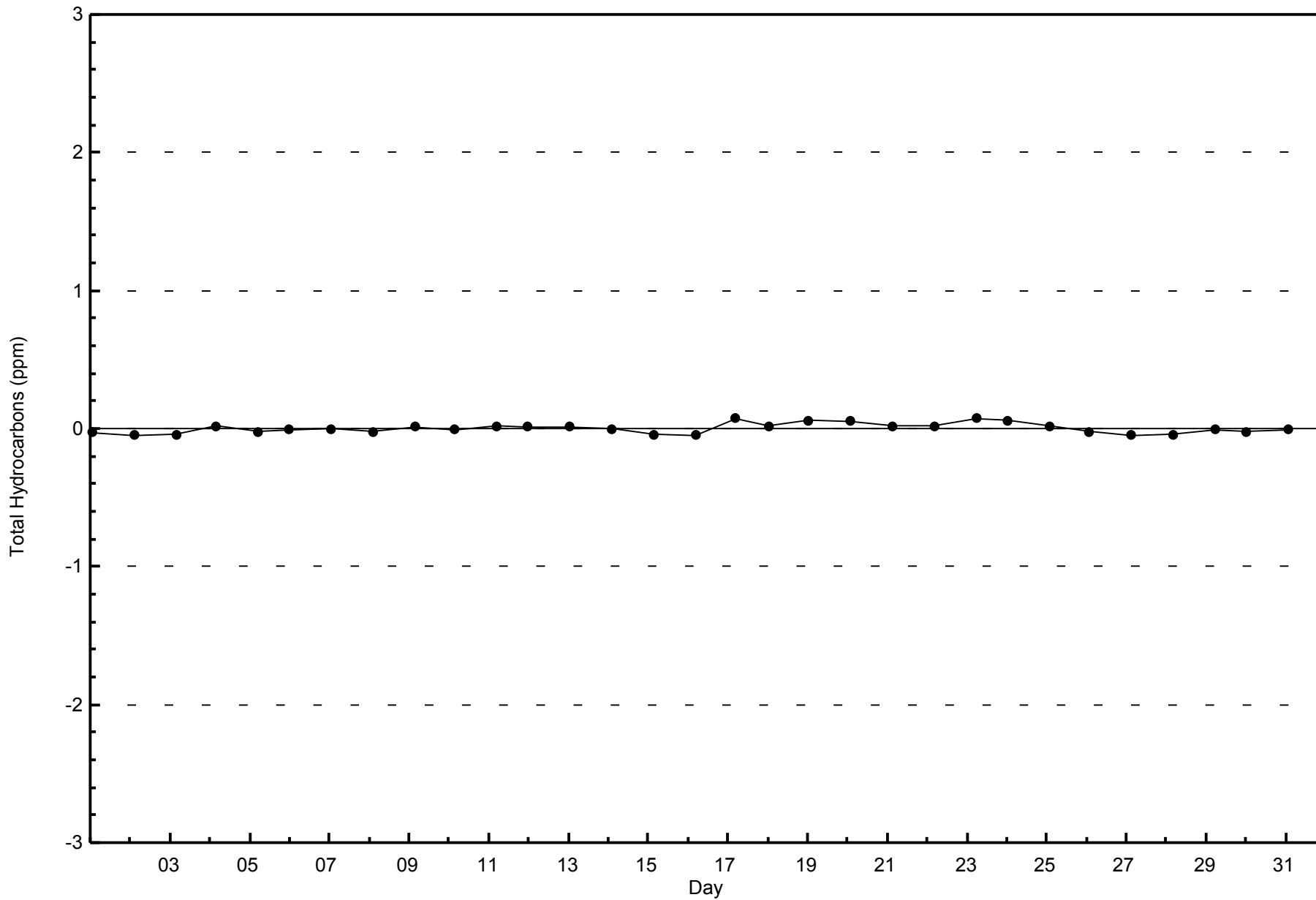


Total Number of Valid Hours: 701



WBEA
Zero Responses

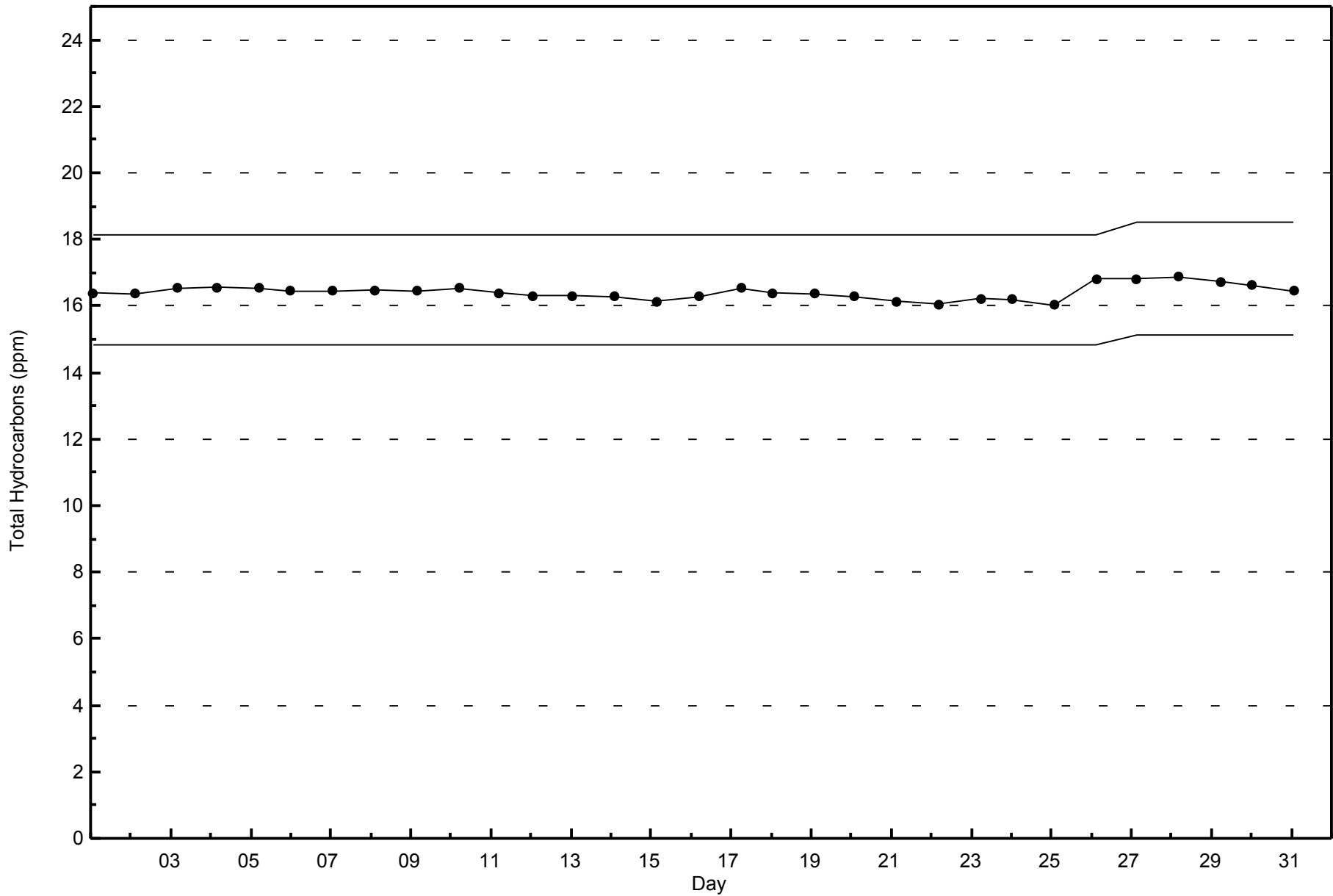
Total Hydrocarbons (THC) - ppm
Millennium - May 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Millennium - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

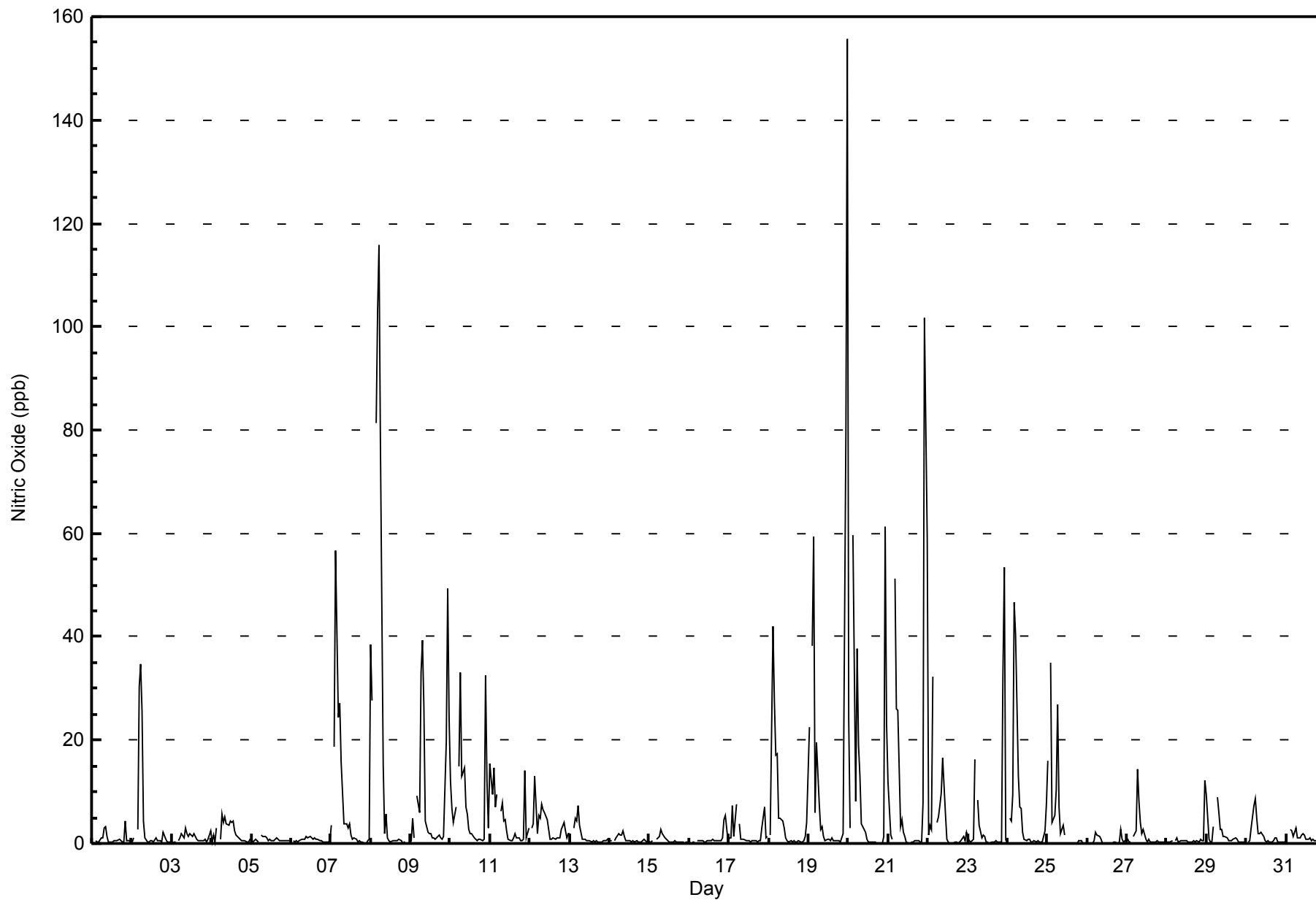
Millennium - May 2015

Maximum Value: 156 ppb on May 20 00:00																		Maximum Daily Average: 20.6 ppb on May 8						Hours in Service: 744																								
Minimum Value: 0 ppb on May 20 20:00																		Minimum Daily Average: 0.5 ppb on May 26						Hours of Data: 706																								
Maximum Diurnal Average: 15.0 ppb at hour 6																		Minimum Diurnal Average: 0.5 ppb at hour 20						Hours of Missing Data: 38																								
Monthly Average: 4.8 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 3 P ₉₀ = 10 P ₉₉ = 77						Hours of Calibration: 38																								
																		Percent Operational Time: 100.0																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	5	Z	1	0	0	1	1	3	3	1	0	0	0	0	0	1	1	1	0	0	4	1	0	0	1.1	5																						
2-May	0	1	Z	3	30	35	25	4	1	0	0	1	1	0	1	1	0	0	0	2	1	0	0	0	4.7	35																						
3-May	0	0	0	Z	0	1	2	1	3	2	1	2	1	2	1	1	0	1	1	1	1	0	1	2	1.1	3																						
4-May	0	2	0	3	Z	1	6	4	5	4	3	4	4	4	2	2	1	1	0	0	1	0	0	1	2.2	6																						
5-May	1	0	1	0	0	Z	2	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	1	1	0.7	2																						
6-May	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0.7	1																						
7-May	4	Z	19	57	24	27	16	10	4	4	3	4	2	1	1	1	0	1	0	0	0	0	0	1	7.7	57																						
8-May	38	28	Z	81	103	116	78	15	2	6	1	1	0	0	0	1	0	1	1	0	0	0	0	0	20.6	116																						
9-May	1	5	1	Z	9	6	33	39	27	4	2	2	2	1	1	1	1	2	1	1	1	20	49	24	10.1	49																						
10-May	12	7	4	7	Z	15	33	13	15	7	6	3	2	2	1	1	1	1	1	1	1	33	12	3	7.7	33																						
11-May	15	10	15	7	9	Z	6	8	4	5	2	1	1	1	2	1	1	1	1	0	1	14	1	3	4.7	15																						
12-May	Z	3	4	13	2	5	5	7	7	6	5	3	1	1	1	1	1	1	1	3	4	2	1	2	3.4	13																						
13-May	2	Z	3	5	4	7	4	1	1	1	0	1	0	0	1	0	0	0	0	0	1	1	1	1	1.5	7																						
14-May	1	1	Z	1	1	2	2	2	2	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0.8	2																						
15-May	0	0	1	Z	1	1	1	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3																						
16-May	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	5	6	0	0.9	6																						
17-May	1	1	7	1	8	Z	4	1	1	1	1	0	1	0	1	1	1	0	0	1	3	7	1	1	1.9	8																						
18-May	Z	2	42	27	17	17	5	5	4	3	1	1	0	0	0	1	0	0	0	0	0	1	1	4	5.8	42																						
19-May	23	Z	38	59	6	19	8	3	3	1	0	1	1	1	1	1	1	1	1	0	1	2	80	156	17.6	156																						
20-May	24	3	Z	60	8	38	19	13	4	3	2	1	0	0	0	0	0	0	0	0	0	1	61	23	11.3	61																						
21-May	12	2	1	Z	51	26	26	3	4	2	1	0	0	0	0	0	0	0	1	1	0	0	8	102	59	13.0	102																					
22-May	2	3	3	32	Z	4	5	7	10	16	6	1	0	0	0	0	0	0	0	0	1	1	1	2	4.2	32																						
23-May	1	1	0	1	16	Z	8	4	1	2	1	0	0	0	0	0	0	0	0	0	0	33	53	0	5.4	53																						
24-May	Z	5	4	10	47	40	13	7	7	2	1	1	1	1	0	0	0	1	0	0	0	0	2	8	6.6	47																						
25-May	16	Z	35	4	5	10	27	7	2	4	2	C	C	C	C	C	C	C	C	0	1	1	0	0	0	--	35																					
26-May	0	0	Z	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	1	0.5	3																					
27-May	1	0	0	Z	1	2	14	8	4	2	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1.8	14																					
28-May	0	0	0	0	Z	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	12	1.0	12																					
29-May	10	1	0	0	3	Z	9	6	3	3	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	1.9	10																					
30-May	Z	0	1	3	7	9	5	2	2	2	1	0	0	1	0	0	1	1	1	1	0	0	0	0	0	1.7	9																					
31-May	1	Z	3	3	1	2	3	1	1	2	2	2	1	1	1	0	1	1	0	0	0	0	0	0	0	1.1	3																					
																								6.5	3.0	7.1	14.6	13.8	15.0	11.7	5.8	4.0	2.9	1.6	1.1	0.8	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.9	4.3	12.1	9.9	Diurnal Average
																								38	28	42	81	103	116	78	39	27	16	6	4	4	4	2	2	1	2	1	3	4	33	102	156	Diurnal Maximum
Z - zerospan																								C - Calibration																								



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Millennium - May 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Millennium - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	663	93.91	93.91
21 - 40	26	3.68	97.59
41 - 80	12	1.70	99.29
81 - 159	4	0.57	99.86
> 159	0	0.00	99.86

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Millennium - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	96	92	33	36	20	20	69	97	73	47	18	10	16	3	10	19	659
21 - 40	0	1	0	0	0	2	0	6	3	11	1	0	1	0	1	0	26
11 - 80	0	0	0	1	1	0	5	2	0	2	0	0	0	0	0	0	11
81 - 159	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	4
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	93	33	37	21	22	77	105	76	61	19	10	17	3	11	19	700

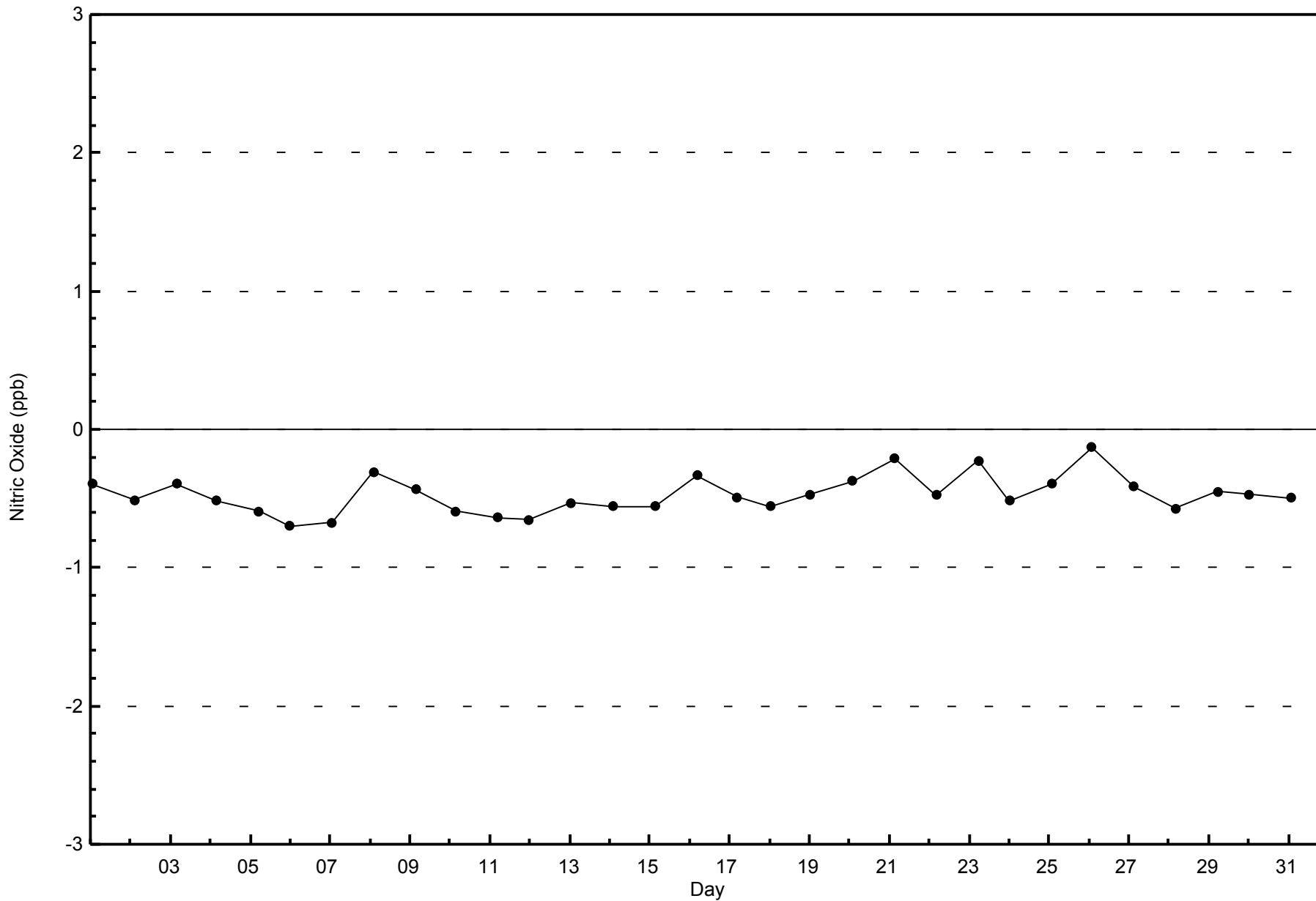
Total Number of Valid Hours: 701

Total Number of Hours: 744



WBEA
Zero Responses

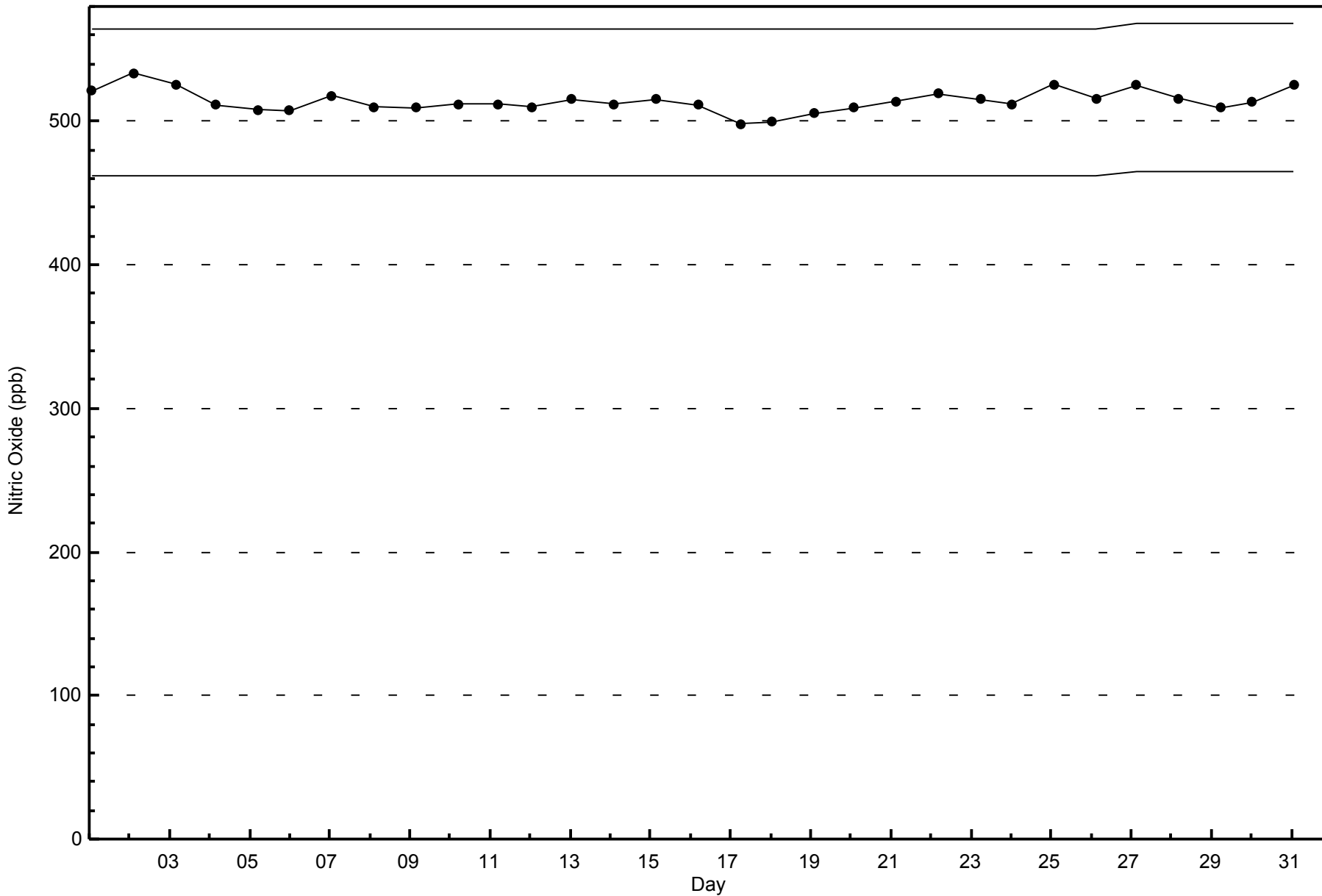
Nitric Oxide (NO) - ppb
Millennium - May 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Millennium - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Millennium - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 53 ppb on May 21 23:00	Maximum Daily Average: 17.5 ppb on May 19
Minimum Value: 0 ppb on May 6 20:00	Minimum Daily Average: 2.5 ppb on May 6
Maximum Diurnal Average: 21.9 ppb at hour 4	Minimum Diurnal Average: 1.8 ppb at hour 13
Monthly Average: 9.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 5 Q ₃ = 15 P ₉₀ = 27 P ₉₉ = 42
	Hours of Data: 706
	Hours of Missing Data: 38
	Hours of Calibration: 38
	Percent Operational Time: 100.0

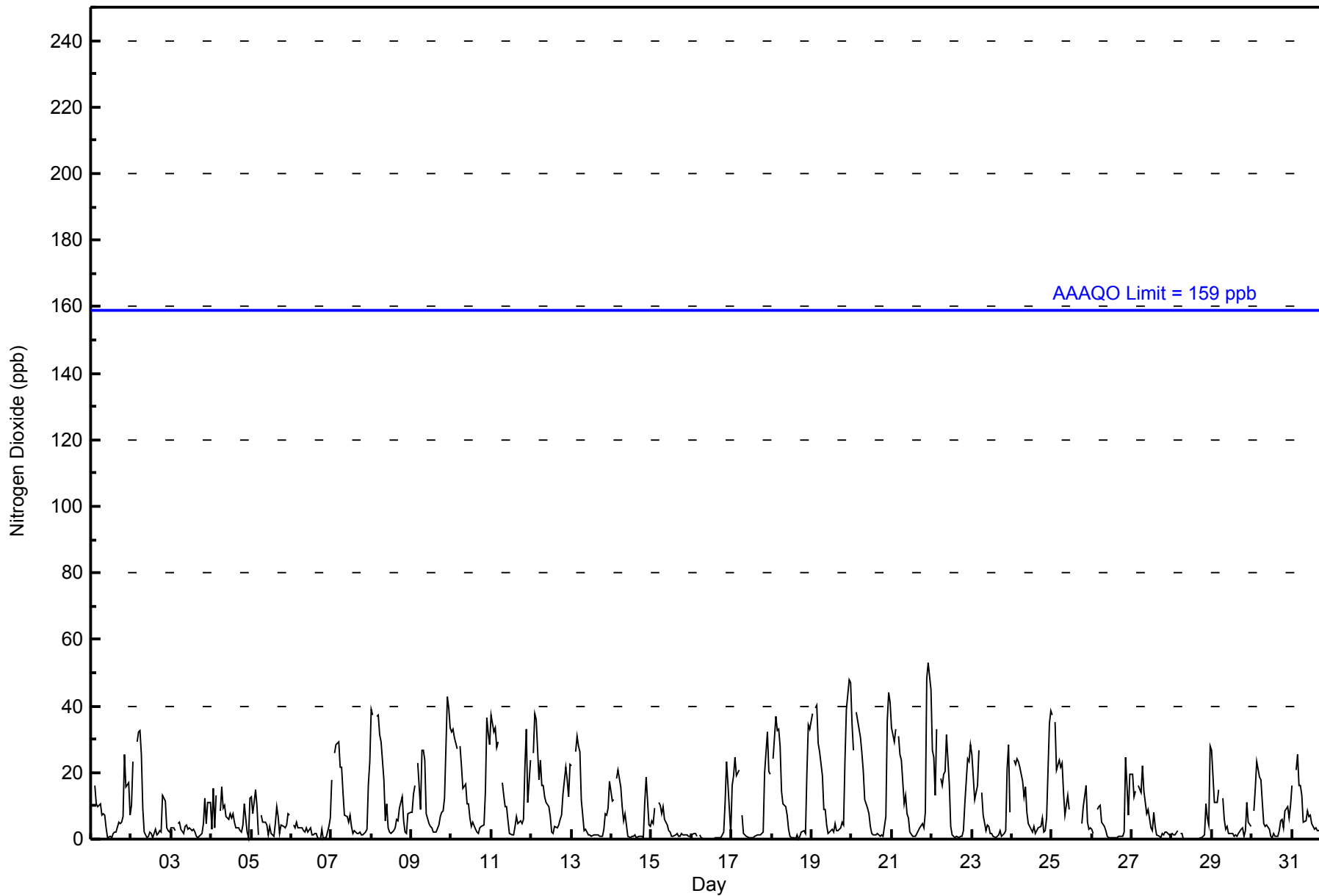
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	27	Z	16	10	10	11	7	8	7	3	1	1	1	2	2	2	5	5	5	7	25	16	17	7	8.4	27
2-May	10	24	Z	29	32	33	25	9	2	1	1	2	2	1	3	1	2	3	2	13	11	3	2	2	9.3	33
3-May	4	3	2	Z	5	5	3	2	4	4	3	4	3	3	2	1	1	1	2	5	12	5	11	11	4.1	12
4-May	3	15	3	13	Z	9	16	10	10	7	6	8	6	8	5	3	4	3	2	4	11	2	1	12	6.9	16
5-May	13	8	15	10	1	Z	7	5	5	4	1	4	2	1	5	10	7	2	4	4	3	4	8	7	5.6	15
6-May	Z	4	3	5	3	4	3	2	2	3	2	3	1	1	2	2	1	0	3	0	0	0	4	6	2.5	6
7-May	18	Z	26	28	29	22	21	14	7	7	5	7	4	2	3	2	2	2	1	1	2	3	17	23	10.7	29
8-May	39	37	Z	37	37	31	29	18	6	11	4	2	2	3	3	6	5	9	13	5	2	2	8	8	13.8	39
9-May	8	13	16	Z	23	9	27	27	24	8	5	4	4	2	2	2	4	7	8	8	12	43	40	33	14.3	43
10-May	32	33	30	27	Z	28	22	15	16	11	10	6	4	5	3	2	2	3	4	4	14	36	32	28	16.0	36
11-May	37	32	34	28	29	Z	17	13	10	10	5	2	1	1	4	7	5	5	5	6	22	33	11	24	14.7	37
12-May	Z	26	38	36	18	24	16	16	13	11	10	7	2	2	4	3	4	6	7	14	22	18	13	22	14.4	38
13-May	22	Z	26	31	28	26	12	3	3	2	1	1	1	1	1	1	1	1	1	3	8	7	10	17	9.0	31
14-May	12	12	Z	18	21	16	10	5	8	4	1	1	1	1	1	1	1	1	1	1	11	19	4	4	6.6	21
15-May	6	5	9	Z	11	10	8	10	6	4	3	2	1	1	1	2	1	1	2	1	1	1	1	1	3.7	11
16-May	1	2	2	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	1	1	2	11	23	17	2	2.8	23
17-May	16	19	25	19	21	Z	7	2	1	1	1	0	1	0	1	1	1	1	2	2	20	32	20	20	9.2	32
18-May	Z	24	37	33	33	28	15	11	10	7	3	1	0	0	0	1	0	1	2	3	2	20	34	33	12.9	37
19-May	38	Z	40	40	29	26	19	9	9	4	2	2	3	2	5	3	3	3	5	4	24	39	48	47	17.5	48
20-May	35	27	Z	38	33	31	26	20	12	9	Z	8	4	2	1	1	2	1	1	1	7	36	44	41	16.5	44
21-May	33	29	33	Z	31	26	24	11	13	8	7	2	1	1	1	2	3	3	5	3	8	48	53	45	16.9	53
22-May	27	25	13	33	Z	18	16	19	20	31	17	4	1	1	1	1	1	1	1	3	11	24	23	28	13.8	33
23-May	25	19	12	16	27	Z	14	7	3	4	4	2	2	1	1	1	1	3	1	2	3	21	28	8	8.8	28
24-May	Z	24	22	24	24	22	17	13	16	8	5	3	2	4	2	2	4	4	6	2	3	6	35	38	12.4	38
25-May	37	Z	35	21	24	22	23	14	7	13	9	C	C	C	C	C	C	C	5	10	16	5	3	3	--	37
26-May	3	2	Z	9	10	10	5	4	2	1	1	0	1	0	1	1	1	1	1	2	24	16	7	19	5.3	24
27-May	20	13	15	Z	16	14	22	14	11	8	9	3	2	8	4	1	1	1	2	1	2	2	1	1	7.4	22
28-May	2	1	1	2	Z	2	2	0	0	0	0	0	0	0	0	0	0	0	0	1	11	7	4	28	2.7	28
29-May	27	11	11	11	15	Z	12	6	3	4	2	2	2	1	1	1	2	3	4	1	3	11	5	4	6.1	27
30-May	Z	9	15	23	19	18	11	5	4	4	3	1	1	2	1	1	2	5	6	3	8	10	6	10	7.2	23
31-May	16	Z	21	25	16	16	13	5	6	8	7	7	5	3	3	2	3	3	5	4	5	8	4	6	8.3	25
	19.6	16.6	19.2	21.9	21.0	17.7	14.5	9.5	7.7	6.5	4.2	2.8	1.8	1.9	2.1	2.1	2.2	2.6	3.4	3.9	10.1	16.2	16.4	17.5	Diurnal Average	
	39	37	40	40	37	33	29	27	24	31	17	8	6	8	5	10	7	9	13	14	25	48	53	47	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Millennium - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Millennium - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	582	82.44	82.44
21 - 40	116	16.43	98.87
41 - 80	8	1.13	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Millennium - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	96	91	25	34	20	14	39	88	64	39	15	9	16	3	9	17	579
21 - 40	0	2	8	3	1	8	34	15	12	22	4	1	1	0	2	2	115
11 - 80	0	0	0	0	0	0	5	2	0	0	0	0	0	0	0	0	7
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	96	93	33	37	21	22	78	105	76	61	19	10	17	3	11	19	701

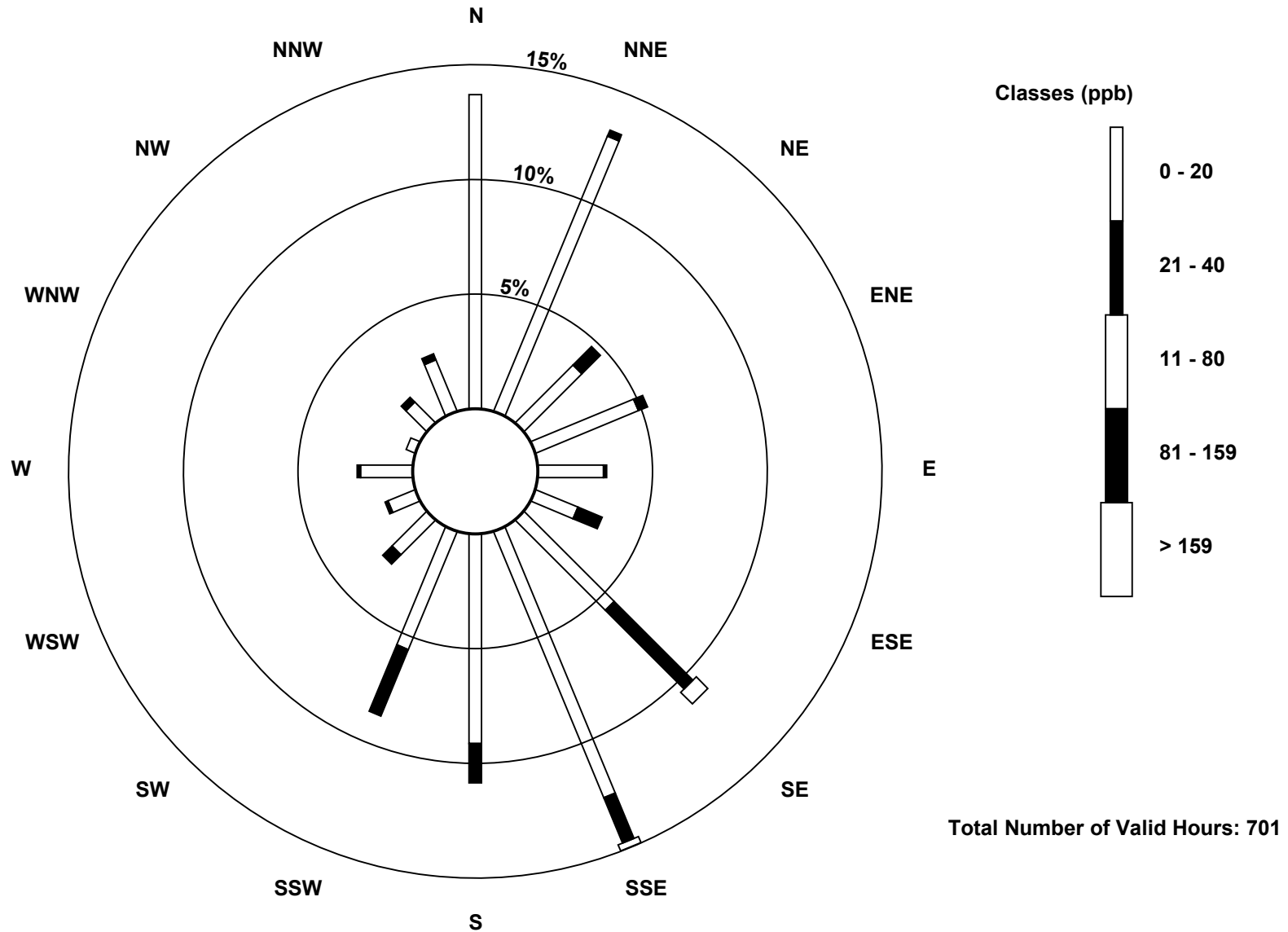
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

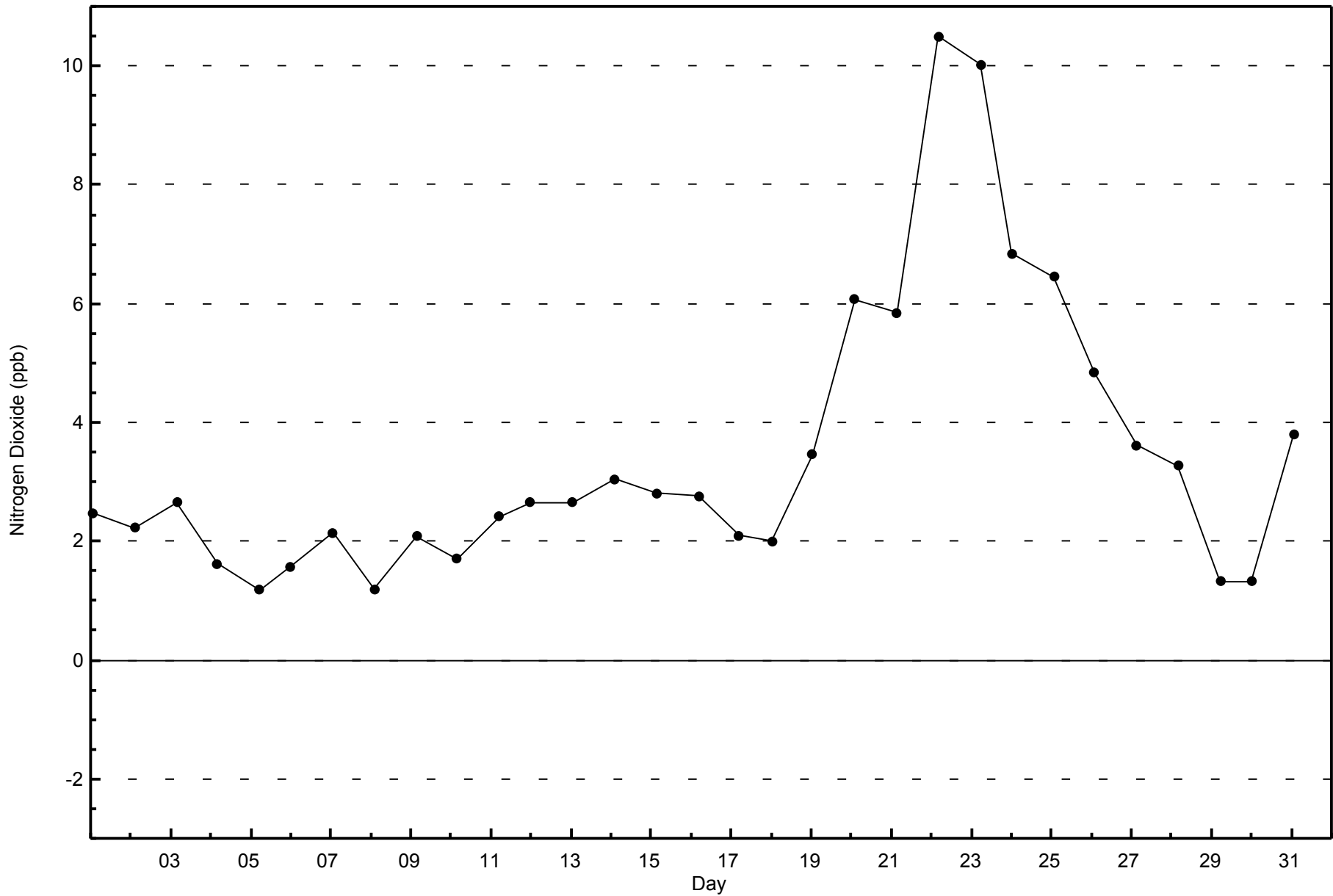
Nitrogen Dioxide (NO₂) - ppb
Millennium (AMS 12)





WBEA
Zero Responses

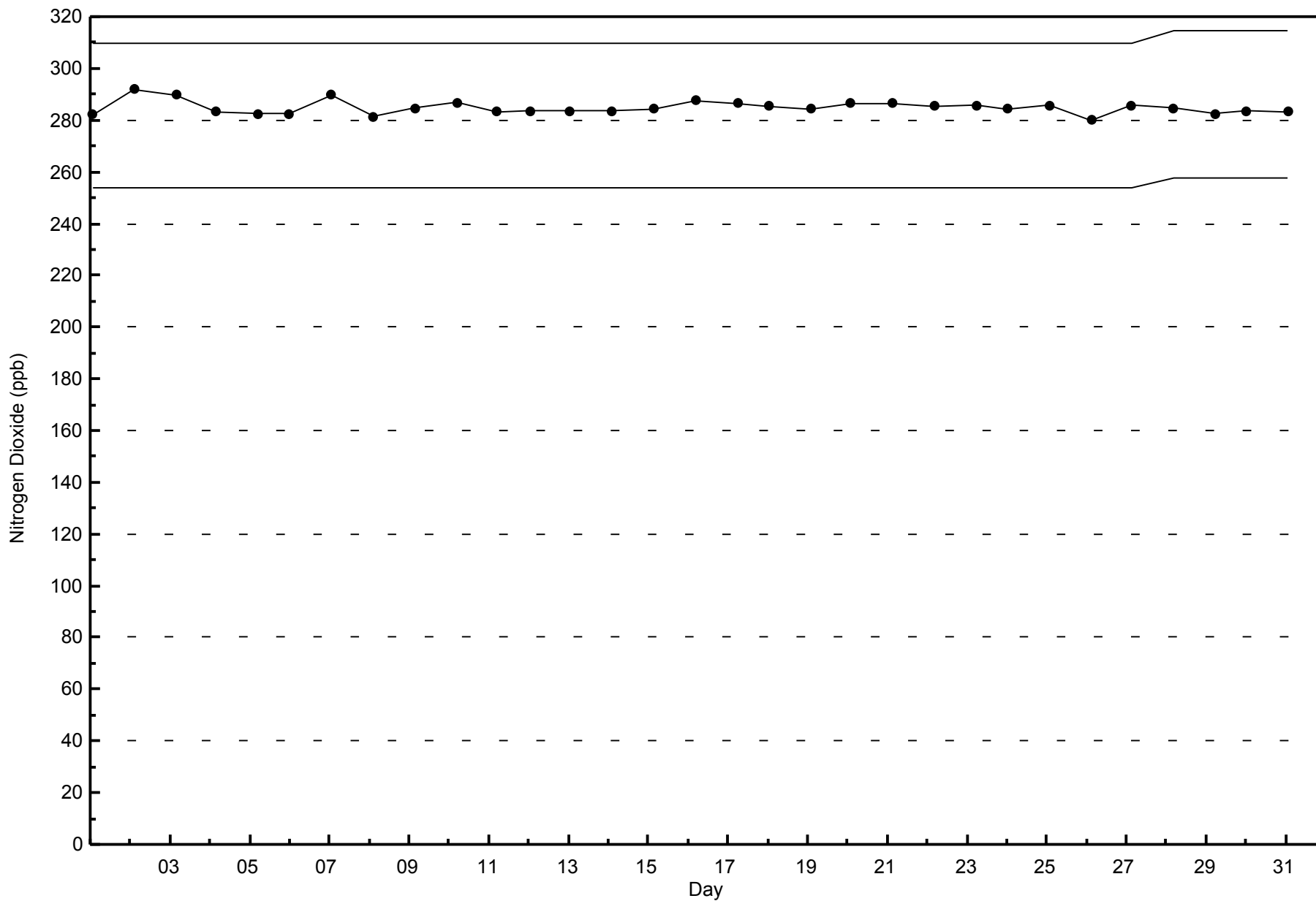
Nitrogen Dioxide (NO₂) - ppb
Millennium - May 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Millennium - May 2015



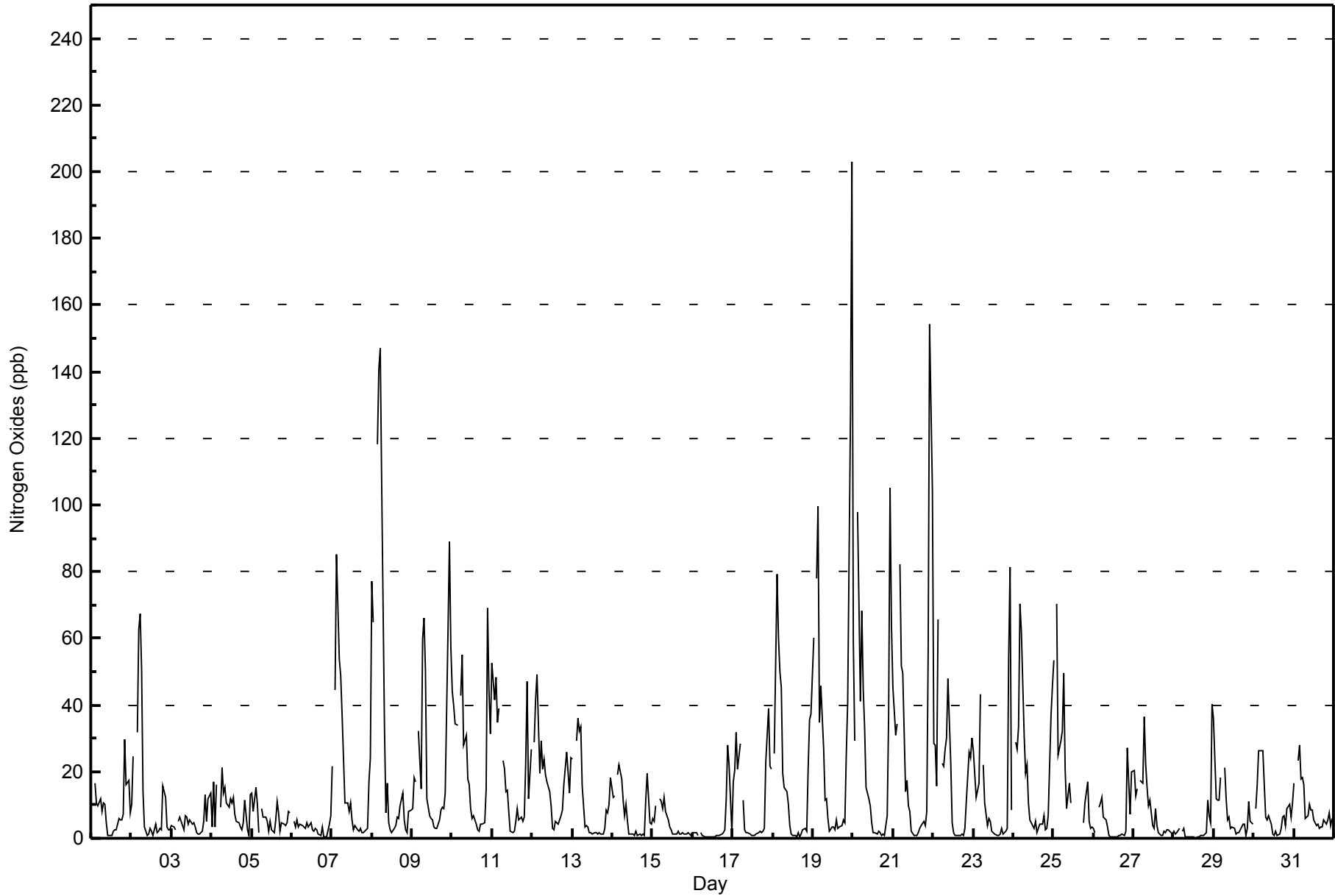


Maximum Value: 203 ppb on May 20 00:00		Maximum Daily Average: 35.1 ppb on May 19		Hours in Service: 744																							
Minimum Value: 0 ppb on May 28 14:00		Minimum Daily Average: 3.2 ppb on May 6		Hours of Data: 706																							
Maximum Diurnal Average: 36.5 ppb at hour 4		Minimum Diurnal Average: 2.6 ppb at hour 13		Hours of Missing Data: 38																							
Monthly Average: 14.5 ppb		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 6 Q ₃ = 17 P ₉₀ = 37 P ₉₉ = 101		Hours of Calibration: 38																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	32	Z	16	11	10	12	8	11	10	5	1	1	1	2	3	3	6	5	5	7	30	16	17	8	9.6	32	
2-May	10	25	Z	32	63	68	51	14	3	1	1	3	2	1	4	2	2	3	3	16	12	4	3	2	14.1	68	
3-May	4	4	3	Z	5	6	5	3	7	6	4	5	4	5	3	2	1	1	2	5	13	5	12	13	5.2	13	
4-May	3	17	3	16	Z	9	21	14	15	10	9	12	10	12	7	5	5	4	3	5	11	3	1	13	9.1	21	
5-May	13	8	15	10	2	Z	9	6	7	5	2	5	2	2	5	11	8	2	5	4	4	5	8	7	6.3	15	
6-May	Z	5	4	6	4	4	4	3	3	5	3	5	2	2	3	2	1	1	3	0	1	1	4	7	3.2	7	
7-May	21	Z	45	85	54	49	37	24	11	11	8	11	5	3	4	3	2	3	2	2	2	3	17	24	18.4	85	
8-May	77	65	Z	118	141	147	107	33	7	16	5	3	2	3	4	6	6	10	13	6	3	2	8	8	34.3	147	
9-May	9	18	17	Z	32	15	60	66	50	12	7	6	6	3	3	3	6	8	9	9	13	63	89	57	24.4	89	
10-May	44	40	34	34	Z	43	55	28	31	18	16	9	6	7	4	3	2	4	4	5	15	69	44	31	23.8	69	
11-May	53	41	48	35	39	Z	23	21	14	14	8	2	2	2	5	9	6	6	5	6	23	47	12	27	19.5	53	
12-May	Z	29	42	49	19	29	21	24	19	17	14	10	3	2	5	4	5	7	8	16	26	20	14	24	17.7	49	
13-May	24	Z	29	36	32	34	15	3	4	3	2	2	1	2	2	1	2	1	1	3	8	8	10	18	10.5	36	
14-May	12	13	Z	19	22	18	11	7	10	6	1	1	1	1	2	1	1	1	1	1	12	20	5	4	7.4	22	
15-May	6	5	10	Z	12	11	9	12	8	5	4	3	1	1	1	2	1	1	2	1	1	2	1	1	4.4	12	
16-May	2	2	2	1	Z	1	1	0	0	0	0	0	1	1	1	1	1	1	2	3	12	28	22	2	3.6	28	
17-May	17	20	32	21	28	Z	11	3	2	2	1	1	1	1	1	2	2	2	2	3	23	39	21	21	11.1	39	
18-May	Z	26	79	60	50	45	19	15	14	10	4	1	1	1	1	2	1	1	2	3	2	21	36	37	18.7	79	
19-May	60	Z	78	99	35	46	27	12	12	6	2	3	4	3	6	3	3	4	5	5	25	41	128	203	35.1	203	
20-May	59	29	Z	98	41	68	45	33	15	12	10	4	2	2	1	2	2	1	1	1	7	37	105	64	27.8	105	
21-May	45	31	34	Z	82	51	49	14	17	10	8	2	1	1	1	2	3	4	5	4	8	56	154	104	29.9	154	
22-May	28	28	16	66	Z	23	21	27	30	48	22	5	2	1	1	1	1	1	1	3	11	26	24	30	18.0	66	
23-May	26	19	12	17	43	Z	22	11	4	6	5	2	2	1	1	1	1	3	1	2	3	54	82	8	14.2	82	
24-May	Z	29	27	34	70	62	30	20	22	10	5	4	3	5	2	3	4	4	7	2	3	7	37	46	18.9	70	
25-May	53	Z	70	25	29	32	50	21	9	17	10	C	C	C	C	C	C	C	5	10	17	5	3	3	--	70	
26-May	3	2	Z	9	10	12	7	5	3	1	1	0	1	1	1	1	1	1	1	2	27	17	7	20	5.8	27	
27-May	20	13	15	Z	17	16	36	23	15	10	12	4	3	9	4	2	1	1	2	2	3	3	2	1	9.2	36	
28-May	2	1	2	3	Z	2	3	0	0	1	1	1	0	0	0	0	1	1	1	2	11	7	5	40	3.6	40	
29-May	36	12	11	11	18	Z	21	12	6	6	3	3	3	1	2	2	3	4	4	1	3	11	5	4	8.0	36	
30-May	Z	9	16	26	26	26	16	6	6	7	4	1	1	2	1	1	3	6	7	4	9	10	7	11	8.9	26	
31-May	17	Z	23	28	18	18	16	6	7	10	9	9	5	4	4	3	3	4	5	4	6	8	4	6	9.4	28	
		26.1	19.6	26.3	36.5	34.7	32.6	26.2	15.3	11.7	9.3	5.9	3.9	2.6	2.6	2.7	2.7	3.2	3.8	4.4	11.0	20.4	28.6	27.3	Diurnal Average		
		77	65	79	118	141	147	107	66	50	48	22	12	10	12	7	11	8	10	13	16	30	69	154	203	Diurnal Maximum	
Z - zerospan		C - Calibration																									



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Millennium - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Millennium - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	551	78.05	78.05
21 - 40	89	12.61	90.65
41 - 80	51	7.22	97.88
81 - 159	14	1.98	99.86
> 159	1	0.14	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Millennium - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	95	91	25	32	20	14	33	83	57	32	15	9	15	3	8	16	548
21 - 40	1	1	5	3	0	6	27	11	13	13	2	1	1	0	2	3	89
11 - 80	0	1	3	1	0	2	10	9	6	14	2	0	1	0	1	0	50
81 - 159	0	0	0	1	1	0	7	2	0	2	0	0	0	0	0	0	13
> 159	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Totals	96	93	33	37	21	22	78	105	76	61	19	10	17	3	11	19	701

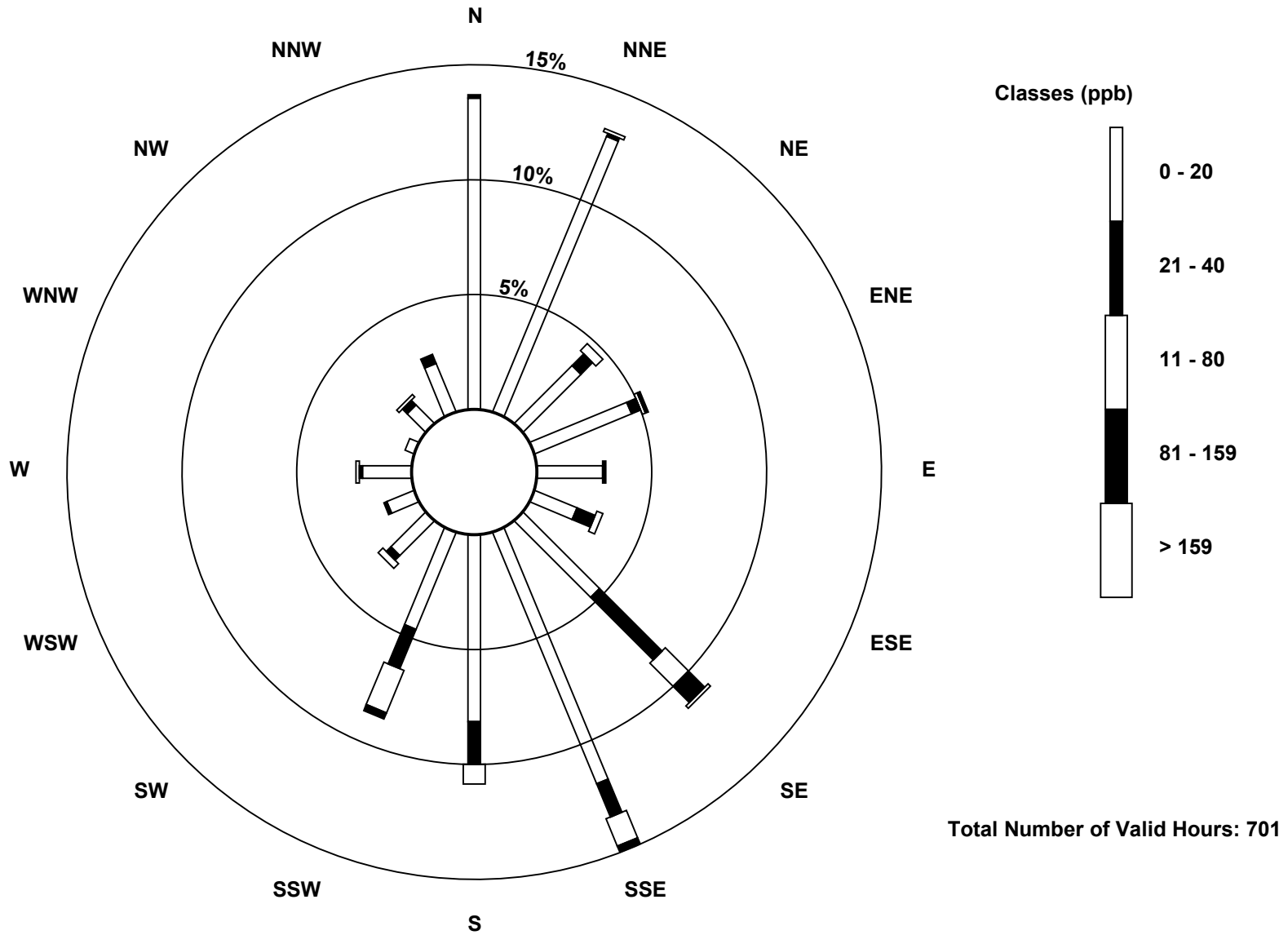
Total Number of Valid Hours: 701

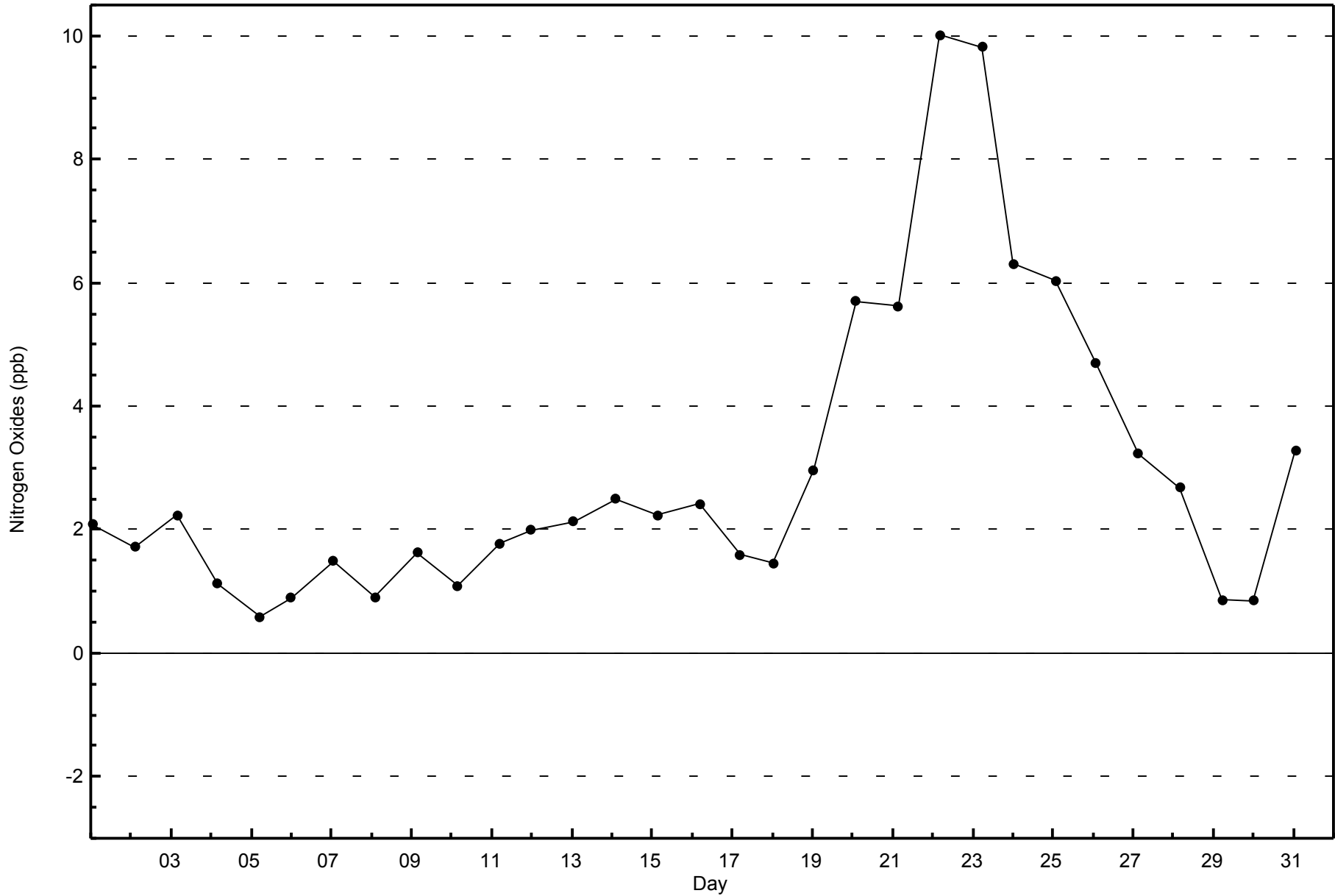
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Nitrogen Oxides (NO_x) - ppb
Millennium (AMS 12)

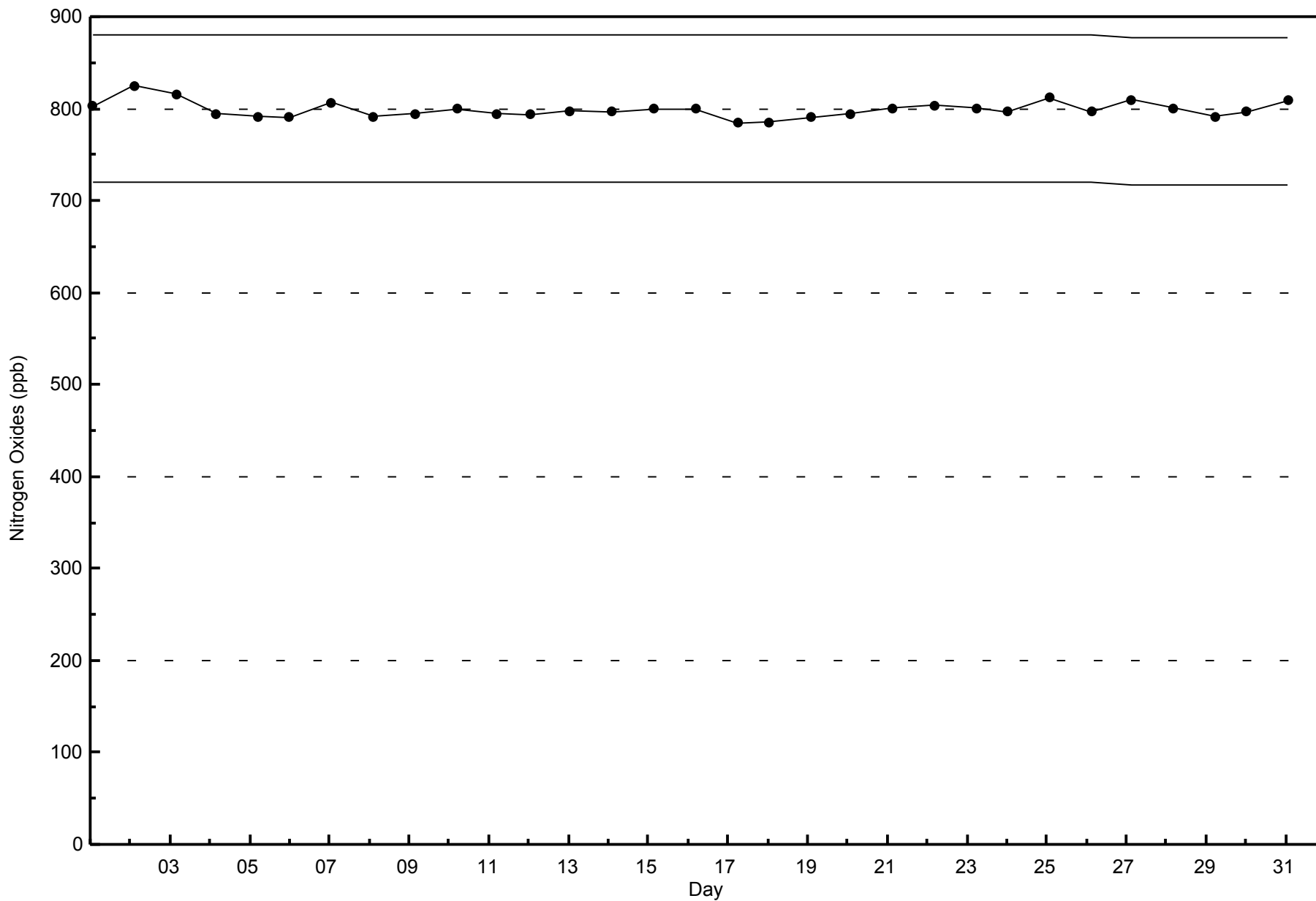






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Millennium - May 2015





Summary of Hour Averages

Millennium - May 2015

Number of Exceedences (AAAQO): 24-hr: 4	Hours in Service: 744
Maximum Value: 740.0 µg/m ³ on May 22 14:00	Maximum Daily Average: 70.2 µg/m ³ on May 22
Minimum Value: 0.8 µg/m ³ on May 3 14:00	Hours of Data: 709
Maximum Diurnal Average: 43.8 µg/m ³ at hour 1	Hours of Missing Data: 35
Monthly Average: 20.43 µg/m ³	Hours of Calibration: 0
Minimum Daily Average: 1.7 µg/m ³ on May 3	Percent Operational Time: 95.3
Minimum Diurnal Average: 9.3 µg/m ³ at hour 17	
Percentiles: P ₁ = 1.2 P ₁₀ = 2.9 Q ₁ = 4.5 Median = 9.4 Q ₃ = 17.5 P ₉₀ = 37.2 P ₉₉ = 289.5	

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-May	7.3	8.6	8.9	5.6	6.4	6.4	5.5	6.7	4.2	1.9	1.1	1.2	1.3	1.8	1.8	2.1	2.2	1.6	2.9	2.6	4.3	4.0	5.0	3.0	4.0	8.9	
2-May	3.9	13.1	10.5	10.5	10.3	10.4	8.3	4.3	3.9	3.2	2.6	2.3	1.5	1.4	2.3	1.6	4.0	1.3	1.3	3.1	2.8	1.9	1.5	1.3	4.5	13.1	
3-May	1.2	1.2	1.3	1.4	1.4	1.5	1.6	1.5	1.8	1.8	1.6	1.6	1.5	0.8	0.9	1.0	1.1	1.4	2.0	2.6	3.1	2.4	2.8	3.2	1.7	3.2	
4-May	3.6	4.4	4.0	4.1	4.4	4.1	4.8	3.8	3.3	2.4	2.6	3.0	3.7	4.1	4.2	4.8	5.0	6.4	8.0	20.8	13.2	6.2	4.6	4.4	5.4	20.8	
5-May	4.3	3.3	3.2	3.3	3.0	2.6	3.0	5.2	3.2	2.9	3.4	4.1	5.1	5.3	4.2	4.0	3.5	3.1	2.8	2.9	3.1	3.1	3.3	3.4	3.6	5.3	
6-May	3.3	3.5	3.6	3.7	3.7	3.9	3.7	3.3	2.9	2.9	2.6	2.3	1.8	1.7	2.3	2.1	1.5	1.4	1.4	1.8	2.3	2.6	3.4	5.7	2.8	5.7	
7-May	8.7	7.4	8.0	9.1	8.3	9.9	7.3	5.5	3.7	3.5	2.9	3.2	3.1	3.1	3.7	4.0	4.2	4.5	4.0	3.9	5.1	6.7	8.3	9.0	5.7	9.9	
8-May	12.9	11.1	9.1	11.8	11.4	15.0	11.9	6.2	4.6	5.7	3.9	3.6	3.4	4.7	5.4	6.2	6.3	7.6	8.4	8.3	8.0	7.0	6.9	7.4	7.8	15.0	
9-May	11.0	9.1	7.7	8.1	8.3	7.5	11.7	12.2	7.9	4.1	3.1	3.1	3.3	3.1	3.4	3.9	4.3	5.3	5.7	6.5	13.2	20.7	22.4	17.8	8.5	22.4	
10-May	12.9	9.0	9.6	7.4	7.7	7.9	15.2	11.2	10.8	7.2	5.1	4.2	4.5	4.9	4.6	5.1	4.7	5.1	7.8	12.2	11.0	19.2	15.3	11.0	8.9	19.2	
11-May	14.4	11.1	13.4	11.8	11.4	11.0	8.8	9.8	8.7	10.1	7.3	5.1	5.4	6.0	7.7	9.1	8.7	11.0	13.3	17.5	27.0	25.4	17.0	12.7	11.8	27.0	
12-May	10.4	10.5	18.6	18.1	9.7	10.0	8.1	7.9	7.3	7.0	7.3	7.5	5.4	5.4	7.9	7.1	6.7	7.6	7.9	10.4	14.5	12.2	10.5	11.8	9.6	18.6	
13-May	14.4	11.5	14.5	16.6	15.6	15.6	15.2	9.0	9.1	7.9	7.6	7.4	7.2	7.2	7.3	7.2	7.1	6.9	7.4	9.0	12.7	16.8	13.9	15.3	10.9	16.8	
14-May	12.3	12.6	11.3	13.4	14.9	14.5	13.8	15.7	14.2	11.0	8.2	7.8	7.5	7.7	7.5	8.0	7.3	6.5	7.1	7.3	14.8	17.5	9.1	9.4	10.8	17.5	
15-May	10.3	9.7	11.2	10.4	11.6	9.8	9.9	11.9	12.1	8.2	7.2	9.3	6.3	6.7	7.5	7.8	5.5	6.0	22.0	56.3	17.4	5.5	8.6	10.0	11.7	56.3	
16-May	7.7	4.5	3.0	8.8	5.5	3.7	3.9	4.5	3.6	3.5	3.3	3.3	5.1	3.3	3.3	4.0	2.6	3.1	2.3	3.8	6.1	9.8	8.7	5.6	4.7	9.8	
17-May	5.4	6.0	10.2	7.8	7.5	5.1	3.9	4.0	2.6	1.9	1.8	1.9	2.0	2.1	2.9	3.3	3.6	3.4	4.0	3.8	12.0	15.5	9.9	15.3	5.7	15.5	
18-May	11.0	9.4	16.0	9.9	9.2	8.5	10.8	9.8	6.2	7.0	6.6	4.0	3.5	3.4	3.4	4.2	4.2	6.1	22.5	18.9	8.2	23.7	26.6	38.1	11.3	38.1	
19-May	26.7	15.2	17.2	22.7	20.6	37.8	21.4	16.4	18.6	13.6	7.6	13.1	11.0	6.9	7.7	6.0	6.5	7.6	7.8	8.9	42.0	45.2	67.2	58.6	21.1	67.2	
20-May	27.6	23.4	18.7	25.3	13.1	23.5	24.4	38.7	22.7	20.9	13.9	11.2	9.9	6.9	7.6	7.1	7.5	7.3	6.7	6.6	20.7	58.2	53.4	37.3	20.5	58.2	
21-May	20.5	19.1	21.2	18.3	58.4	51.6	31.9	24.4	19.9	13.8	12.9	9.9	9.4	10.5	6.6	7.8	13.7	17.5	43.1	173.6	4.1	2.8	7.2	23.7	25.9	173.6	
22-May	22.5	21.0	10.8	15.2	11.6	10.2	12.1	18.1	32.8	20.4	17.7	332.5	123.1	740.0	44.9	20.7	18.1	29.7	26.7	19.3	36.4	47.8	18.6	33.9	70.2	740.0	
23-May	204.9	30.4	20.2	13.5	12.5	10.7	13.8	19.6	14.8	34.0	20.9	21.2	15.3	18.4	18.1	9.8	11.9	13.7	10.5	16.3	22.8	UO	UO	UO	26.4	204.9	
24-May	81.2	61.5	54.5	45.4	47.2	65.7	73.9	64.0	56.8	46.2	32.0	26.7	16.0	17.8	14.7	55.0	43.0	107.3	48.7	26.2	12.8	5.2	AF	AF	45.5	107.3	
25-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	M	M	M	M	38.5	39.2	33.1	35.5	52.7	39.8	--	52.7	
26-May	32.0	24.0	19.5	17.8	16.9	15.4	14.1	15.0	12.9	11.0	9.4	9.9	11.5	9.9	9.5	10.2	10.7	11.3	14.7	9.8	17.2	21.9	18.7	15.8	15.0	32.0	
27-May	18.0	13.9	17.5	21.7	45.8	93.0	107.8	122.2	149.6	151.2	147.6	78.0	86.9	85.6	67.8	44.8	19.4	16.1	15.2	13.9	15.7	14.4	10.3	8.3	56.9	151.2	
28-May	7.2	5.9	6.6	7.4	7.6	8.2	8.5	9.8	9.4	10.8	10.4	10.1	9.7	8.7	9.5	10.9	13.5	9.3	11.4	13.0	16.8	17.7	17.1	20.9	10.9	20.9	
29-May	19.9	14.2	16.1	21.9	19.6	15.8	23.7	17.4	23.6	17.2	15.8	13.9	14.2	14.0	14.0	14.5	16.0	14.7	29.1	16.6	21.2	38.2	32.7	45.3	20.4	45.3	
30-May	21.0	22.8	26.7	20.6	19.6	45.6	24.7	36.3	32.5	33.2	25.2	23.2	20.6	21.5	23.4	26.8	26.6	31.2	38.9	42.0	31.3	141.1	256.5	418.4	58.7	418.4	
31-May	677.1	508.1	364.9	305.4	133.7	49.7	50.0	58.6	81.2	79.9	45.6	42.1	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	677.1

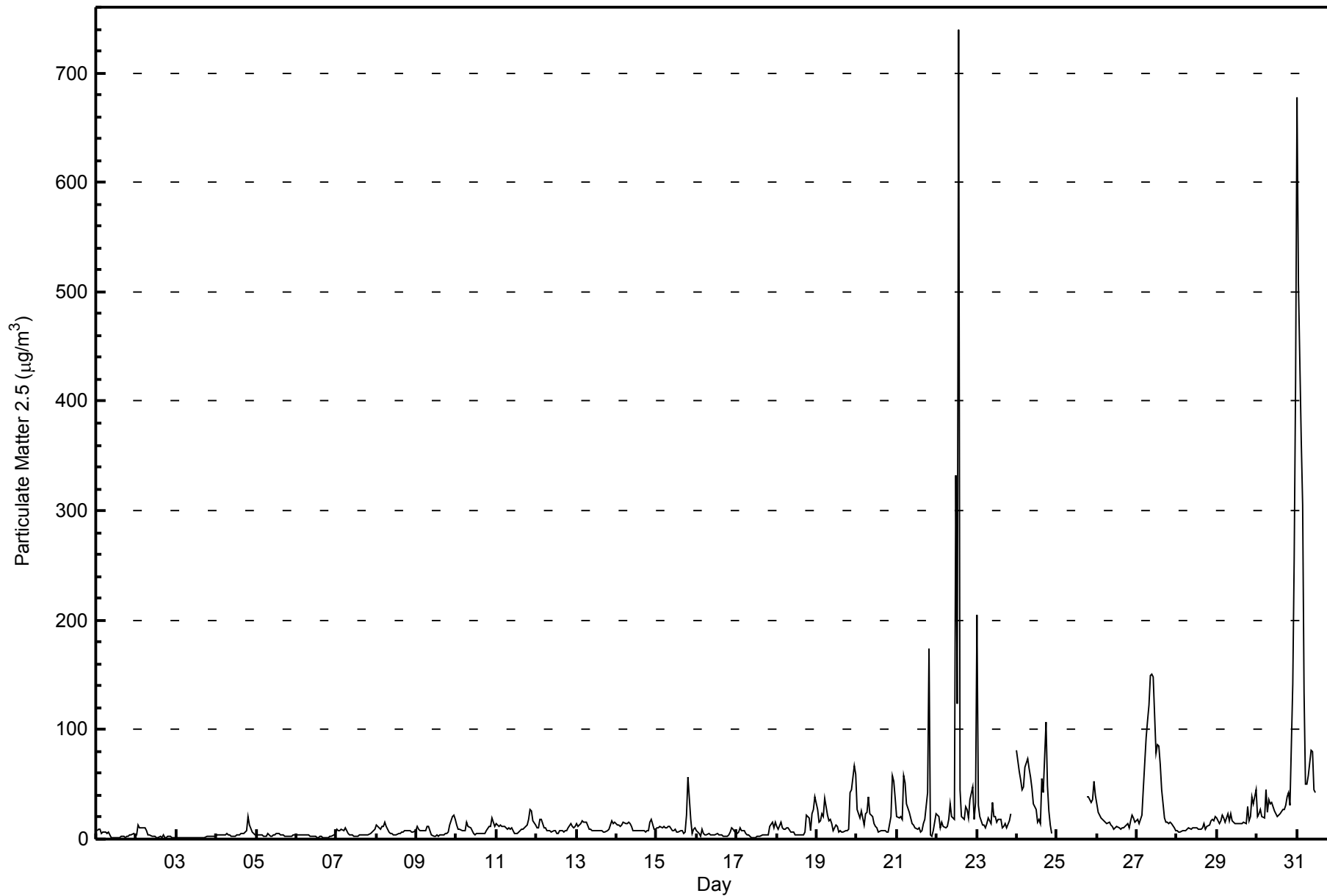
43.8	30.2	25.3	23.2	18.6	19.2	18.5	19.1	19.5	18.1	14.6	22.2	13.8	34.9	10.5	10.3	9.3	12.2	14.1	19.2	15.1	21.7	25.4	31.7	Diurnal Average	
677.1	508.1	364.9	305.4	133.7	93.0	107.8	122.2	149.6	151.2	147.6	332.5	123.1	740.0	67.8	55.0	43.0	107.3	48.7	173.6	42.0	141.1	256.5	418.4	Diurnal Maximum	

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



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Millennium - May 2015





WBEA

Cumulative Frequency Distribution

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

Millennium - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	204	28.77	28.77
6 - 15	299	42.17	70.95
16 - 25	104	14.67	85.61
26 - 80	75	10.58	96.19
> 81.0	24	3.39	99.58

Total Number of Valid Hours: 709

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Millennium - May 2015

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	32	50	14	17	12	4	2	22	11	10	8	6	6	2	3	4	203
6 - 15	40	31	9	11	9	13	42	44	38	30	7	3	9	1	4	4	295
16 - 25	11	7	6	4	2	7	21	20	9	7	1	1	1	0	1	6	104
26 - 80	10	4	4	2	0	0	11	15	13	8	1	0	0	0	3	3	74
> 81.0	3	2	1	0	0	1	9	5	0	0	0	0	0	0	0	2	23
Totals	96	94	34	34	23	25	85	106	71	55	17	10	16	3	11	19	699

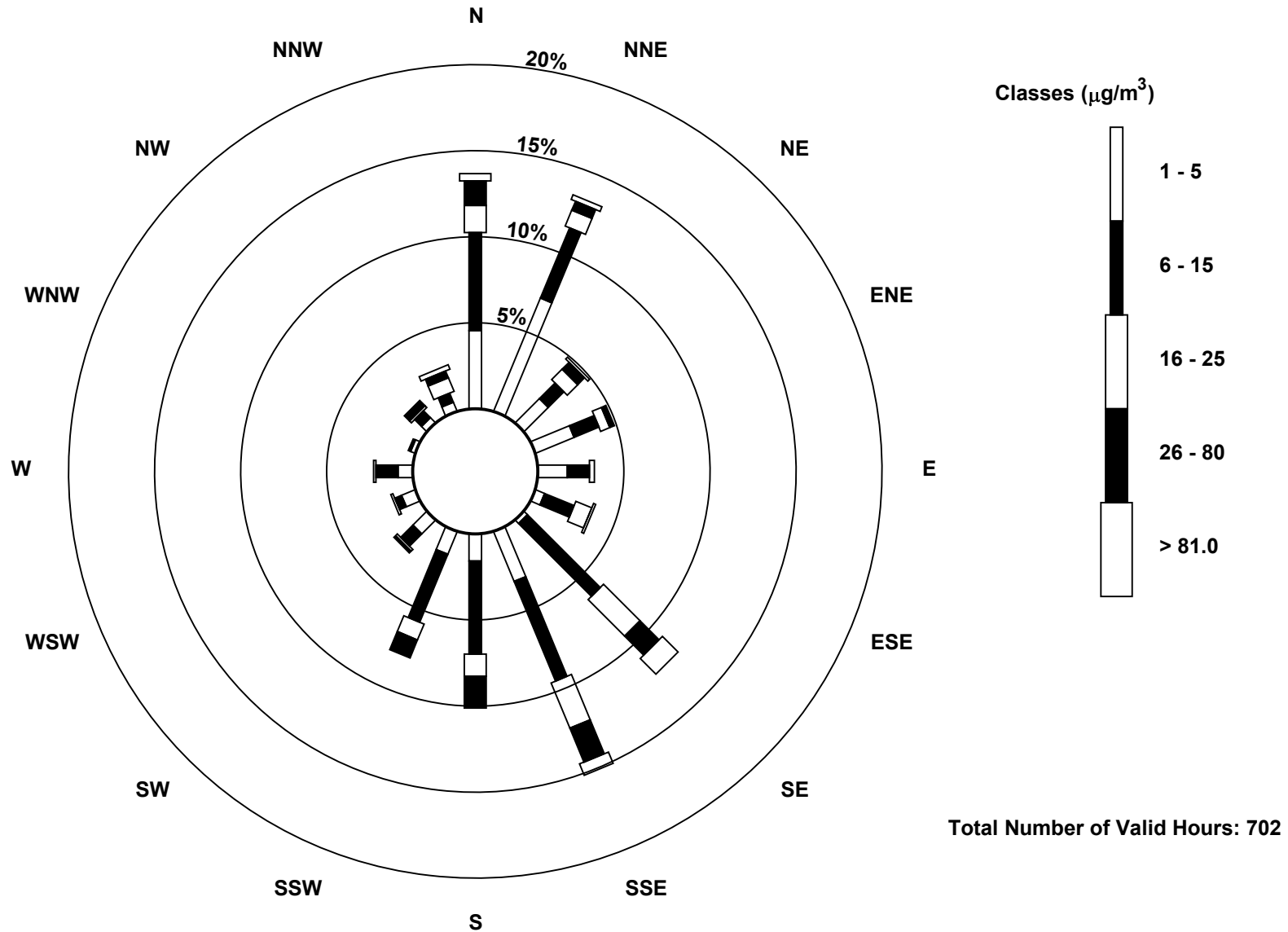
Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Millennium (AMS 12)



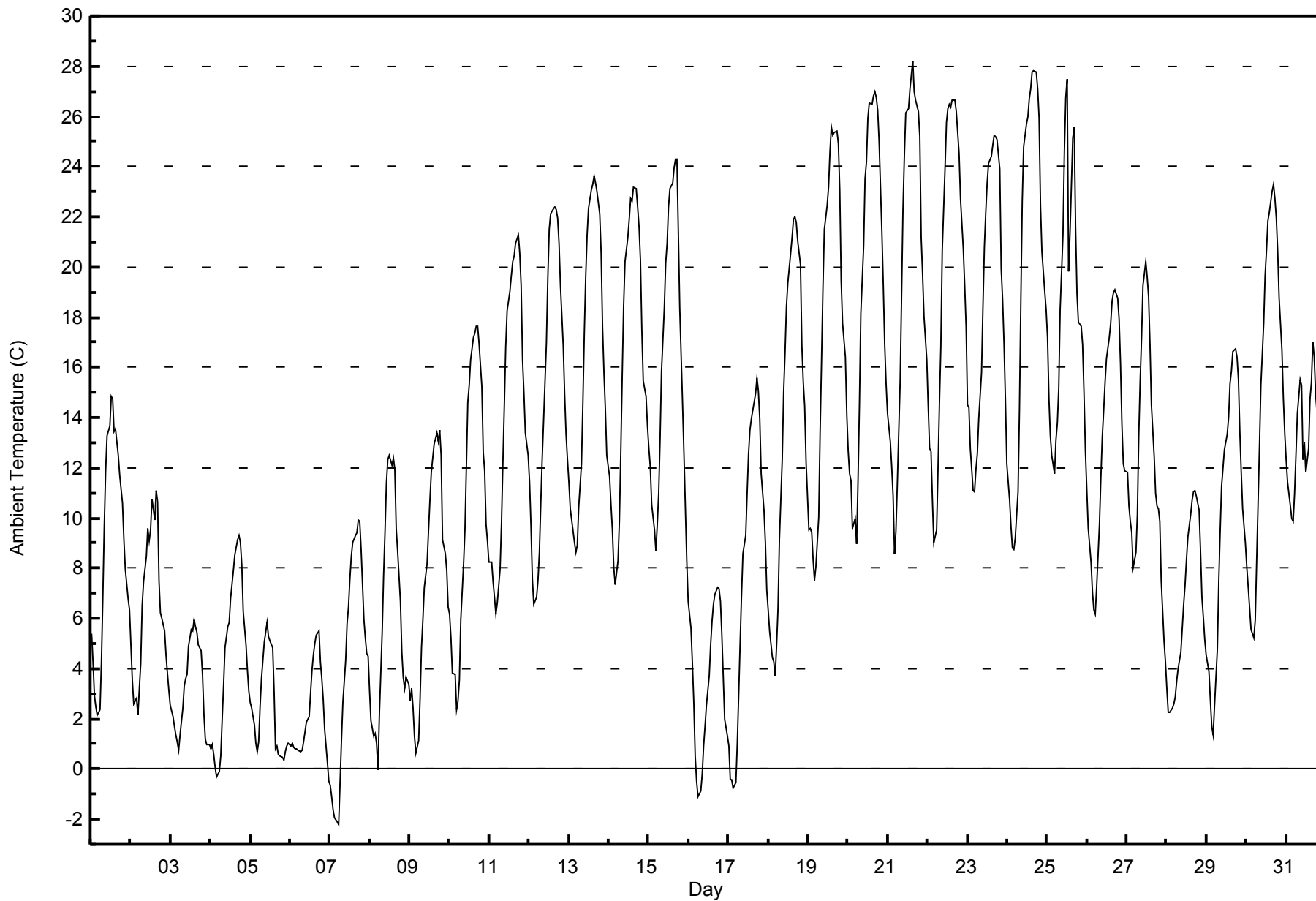


Maximum Value: 28.2 C on May 21 16:00		Maximum Daily Average: 19.8 C on May 21		Hours in Service: 744																																												
Minimum Value: -2.2 C on May 7 06:00		Minimum Daily Average: 2.2 C on May 6		Hours of Data: 744																																												
Maximum Diurnal Average: 17.3 C at hour 17		Minimum Diurnal Average: 4.8 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 11.72 C		Percentiles: P ₁ = -0.8 P ₁₀ = 2.0 Q ₁ = 5.5 Median = 11.0 Q ₃ = 17.1 P ₉₀ = 23.0 P ₉₉ = 26.7		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	5.4	4.3	2.9	2.5	2.1	2.4	4.2	6.8	9.7	11.9	13.3	13.7	14.9	14.8	13.5	13.6	12.5	11.7	11.2	10.6	9.2	8.0	6.8	6.3	8.8	14.9																						
2-May	4.9	3.5	2.6	2.8	2.2	3.2	4.2	6.5	7.4	8.4	9.6	9.1	9.5	10.8	9.9	11.1	10.7	7.5	6.3	6.0	5.5	4.5	3.8	3.2	6.4	11.1																						
3-May	2.5	2.1	1.7	1.3	1.1	0.8	1.4	2.4	3.3	3.6	3.8	4.9	5.6	5.5	5.9	5.7	5.4	4.9	4.7	3.8	2.2	1.2	1.0	1.0	3.2	5.9																						
4-May	0.8	1.0	0.6	0.1	-0.3	-0.1	0.5	2.0	3.3	4.8	5.7	5.8	6.8	7.3	7.9	8.5	9.1	9.3	9.0	8.1	6.3	5.0	4.0	3.1	4.5	9.3																						
5-May	2.6	2.4	1.8	1.0	0.7	1.1	2.5	3.6	5.0	5.4	5.9	5.3	5.1	4.8	3.1	0.8	0.9	0.6	0.5	0.3	0.7	0.9	1.0	2.4	5.9																							
6-May	0.9	1.0	0.9	0.8	0.8	0.8	0.7	0.8	1.1	1.5	1.8	2.1	3.1	4.0	4.6	5.0	5.3	5.5	4.3	3.6	2.8	1.6	0.2	-0.5	2.2	5.5																						
7-May	-0.7	-1.1	-1.6	-2.0	-2.1	-2.2	-0.6	1.2	2.7	4.3	5.8	6.5	7.5	8.5	9.0	9.3	9.4	9.9	9.9	8.7	5.9	5.2	4.6	4.5	4.3	9.9																						
8-May	3.1	1.9	1.3	1.4	1.0	0.0	2.1	5.4	7.7	9.4	11.4	12.3	12.5	12.1	12.4	11.9	9.6	8.7	6.7	4.7	3.7	3.2	3.6	3.4	6.2	12.5																						
9-May	2.7	3.2	2.4	1.3	0.6	1.2	2.8	4.8	6.0	7.2	8.2	9.5	10.7	11.8	12.4	13.0	13.4	13.1	13.5	12.5	9.1	8.6	7.9	6.5	7.6	13.5																						
10-May	6.2	5.2	3.8	3.8	2.4	2.7	3.5	5.9	8.2	9.6	12.1	14.6	15.3	16.3	17.2	17.4	17.6	17.6	17.0	15.2	12.6	11.9	9.8	9.1	10.6	17.6																						
11-May	8.2	8.3	7.5	6.8	6.1	6.6	8.0	9.8	12.2	14.5	16.8	18.3	19.0	19.7	20.2	20.4	20.9	21.3	20.6	19.2	16.3	14.9	13.4	12.5	14.2	21.3																						
12-May	11.4	9.7	7.6	6.5	6.8	7.5	8.6	10.6	12.4	13.9	17.0	19.6	21.5	22.1	22.2	22.4	22.3	21.9	20.9	19.3	16.9	14.9	13.4	12.3	15.1	22.4																						
13-May	11.4	10.4	9.5	9.0	8.6	8.9	10.5	12.1	14.6	17.4	19.6	21.3	22.3	23.1	23.3	23.6	23.4	23.0	22.1	20.5	17.6	15.8	14.4	12.5	16.5	23.6																						
14-May	11.7	10.5	9.6	8.0	7.4	8.3	9.9	12.6	15.6	18.4	20.2	21.2	21.9	22.7	22.6	23.2	23.1	22.4	21.6	20.3	17.5	15.5	14.8	13.7	16.4	23.2																						
15-May	12.8	12.0	10.6	9.5	8.7	9.7	11.0	13.2	15.9	18.4	20.2	20.9	22.4	23.1	23.3	23.9	24.3	24.3	21.4	18.4	14.5	12.5	10.4	8.3	16.2	24.3																						
16-May	6.7	5.6	4.2	2.6	0.5	-0.5	-1.1	-0.9	-0.2	0.9	1.7	2.6	3.7	4.9	5.9	6.6	7.0	7.2	7.2	6.7	5.3	3.6	2.0	1.3	3.5	7.2																						
17-May	0.9	-0.5	-0.4	-0.8	-0.5	1.0	3.0	5.0	6.9	8.6	9.3	11.0	12.5	13.5	13.9	14.6	15.0	15.6	15.1	14.0	11.8	10.3	9.0	7.1	8.2	15.6																						
18-May	6.3	5.5	4.4	4.3	3.7	4.9	6.4	9.1	12.3	15.0	16.6	18.4	19.3	20.5	21.2	21.9	22.0	21.8	21.0	20.1	16.9	15.4	14.5	12.2	13.9	22.0																						
19-May	9.5	9.6	9.4	8.4	7.5	8.1	10.0	13.5	16.3	19.1	21.5	22.5	23.2	24.5	25.6	25.2	25.4	25.4	24.9	23.1	19.4	17.7	16.4	14.1	17.5	25.6																						
20-May	12.7	11.8	11.5	9.6	10.0	9.0	11.5	14.5	18.2	20.8	23.5	24.2	25.9	26.5	26.5	26.8	27.0	26.8	26.3	25.0	21.4	19.3	16.9	15.4	19.2	27.0																						
21-May	14.2	13.0	12.0	10.9	8.6	9.5	11.4	15.4	18.8	22.2	24.4	26.2	26.3	27.1	27.7	28.2	27.0	26.6	26.2	25.2	21.2	19.7	18.0	16.3	19.8	28.2																						
22-May	14.5	12.7	12.7	10.7	9.0	9.6	12.0	14.5	16.8	20.6	23.9	25.7	26.3	26.5	26.4	26.6	26.6	26.2	25.4	24.5	22.8	20.7	19.3	17.6	19.7	26.6																						
23-May	14.5	14.4	12.8	11.1	11.0	11.9	12.5	14.0	15.8	18.4	20.8	22.2	23.4	24.1	24.4	24.8	25.2	25.2	25.1	23.9	19.9	18.7	17.0	14.7	18.6	25.2																						
24-May	12.2	10.7	9.6	8.8	8.7	9.2	11.1	14.3	18.7	22.6	24.8	25.7	26.0	26.7	27.1	27.8	27.8	27.8	27.1	25.9	22.4	20.6	19.1	18.3	19.7	27.8																						
25-May	17.2	14.8	13.3	12.5	11.7	13.1	13.8	15.2	18.3	21.3	24.6	26.8	27.5	19.8	21.3	25.1	25.6	21.6	18.9	17.8	17.7	16.9	15.0	12.7	18.4	27.5																						
26-May	11.1	9.6	8.3	7.1	6.4	6.2	7.2	9.8	11.6	13.2	14.3	15.4	16.4	17.2	17.8	18.7	19.0	19.1	18.8	17.9	16.2	13.7	12.2	11.9	13.3	19.1																						
27-May	11.8	10.5	9.9	9.4	8.0	8.7	10.1	13.3	15.4	17.2	19.2	20.2	19.6	18.8	16.9	14.5	12.4	11.0	10.5	10.4	9.8	7.5	5.1	4.2	12.3	20.2																						
28-May	3.2	2.3	2.3	2.4	2.6	2.9	3.5	4.0	4.7	5.6	6.6	7.4	8.3	9.3	10.1	10.7	11.0	11.1	10.9	10.3	8.7	6.9	6.0	5.2	6.5	11.1																						
29-May	4.6	3.9	2.7	1.7	1.4	2.5	4.8	7.5	9.5	11.3	12.0	12.7	13.3	14.0	15.4	15.8	16.6	16.8	16.4	15.5	13.4	11.8	10.4	9.0	10.1	16.8																						
30-May	8.0	7.2	6.4	5.6	5.2	6.0	8.3	10.6	12.9	15.3	17.7	19.7	20.7	21.8	22.2	23.0	23.3	22.7	22.0	20.6	18.7	16.7	14.8	13.4	15.1	23.3																						
31-May	12.3	11.4	10.5	10.0	9.9	11.0	12.6	14.2	15.5	15.3	12.3	13.0	11.8	12.8	14.7	15.4	17.0	16.4	15.0	13.4	12.1	11.1	10.9	11.0	12.9	17.0																						
																								7.9	7.0	6.1	5.4	4.8	5.3	6.7	8.8	10.9	12.8	14.3	15.4	16.2	16.6	16.9	17.3	17.3	16.9	16.1	15.0	12.8	11.4	10.2	9.1	Diurnal Average
																								17.2	14.8	13.3	12.5	11.7	13.1	13.8	15.4	18.8	22.6	24.8	26.8	27.5	27.1	27.7	28.2	27.8	27.8	27.1	25.9	22.8	20.7	19.3	18.3	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Millennium - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Millennium - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	19	2.55	2.55
0 - 10	322	43.28	45.83
10 - 20	269	36.16	81.99
> 20	134	18.01	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

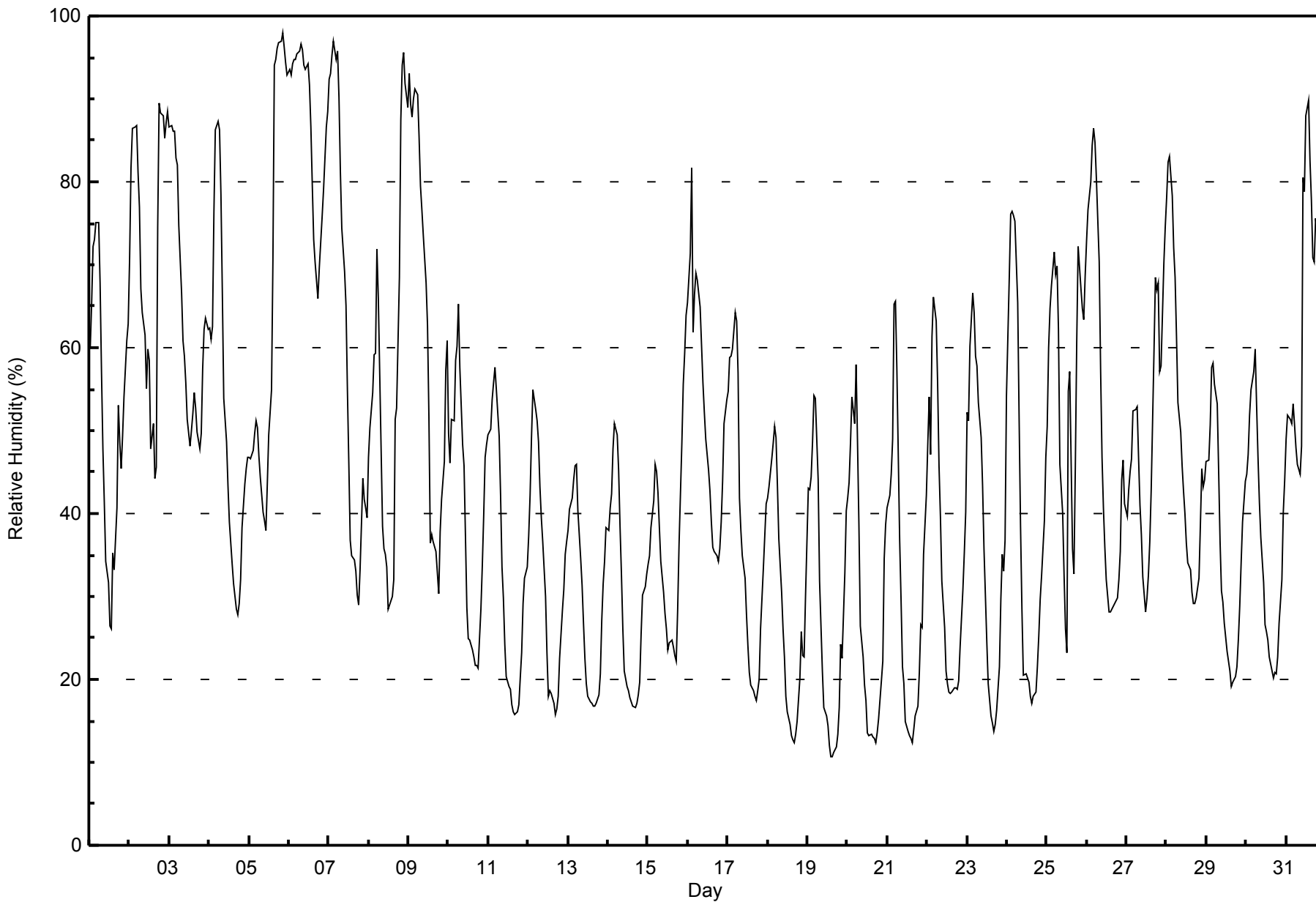


Maximum Value: 98 % on May 5 21:00																		Maximum Daily Average: 86.5 % on May 6																		Hours in Service: 744												
Minimum Value: 11 % on May 19 16:00																		Minimum Daily Average: 27.6 % on May 19																		Hours of Data: 744												
Maximum Diurnal Average: 65.9 % at hour 5																		Minimum Diurnal Average: 30.9 % at hour 16																		Hours of Missing Data: 0												
Monthly Average: 46.2 %																		Percentiles: P ₁ = 12 P ₁₀ = 19 Q ₁ = 28 Median = 43 Q ₃ = 60 P ₉₀ = 81 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-May	60	65	72	73	75	75	68	57	48	41	34	32	26	26	35	33	41	53	49	45	49	54	61	63	51.5	75																						
2-May	71	82	86	87	87	81	77	67	64	62	55	60	58	48	51	44	46	75	89	88	88	85	87	88	71.9	89																						
3-May	87	87	86	86	83	82	75	67	61	59	56	51	48	50	52	55	53	50	48	50	58	62	64	62	63.7	87																						
4-May	62	61	63	76	86	87	86	79	67	54	49	43	39	36	34	31	28	28	29	32	38	44	45	47	51.9	87																						
5-May	47	47	48	50	51	50	47	44	40	39	38	43	49	55	71	94	95	96	97	97	98	96	94	93	65.8	98																						
6-May	94	93	94	95	95	95	96	97	96	94	93	94	92	87	80	73	70	66	70	73	76	79	87	89	86.5	97																						
7-May	92	93	95	97	95	96	90	81	74	69	65	55	46	37	35	34	33	30	29	33	44	42	41	40	60.3	97																						
8-May	47	50	55	59	59	72	66	48	39	36	35	34	29	30	30	32	51	53	68	88	94	96	92	89	56.2	96																						
9-May	93	89	88	90	91	90	85	80	77	74	68	63	52	36	37	37	35	33	30	38	42	46	57	61	62.2	93																						
10-May	50	46	51	51	59	60	65	58	48	46	37	29	25	25	24	23	22	22	21	28	34	40	47	48	39.9	65																						
11-May	49	50	54	56	58	55	49	42	34	30	24	20	19	19	17	16	16	16	17	20	23	29	32	34	32.5	58																						
12-May	37	42	49	55	52	51	49	43	40	37	30	23	18	19	18	17	16	16	18	22	28	31	35	37	32.7	55																						
13-May	38	41	42	44	46	46	40	35	31	27	22	20	18	17	17	17	17	17	18	21	27	32	34	38	29.4	46																						
14-May	38	41	42	48	51	50	45	38	33	26	21	19	19	18	17	17	17	17	18	20	25	30	31	33	29.7	51																						
15-May	34	35	38	42	46	45	43	38	34	30	28	26	24	24	25	24	23	22	28	36	48	56	59	64	36.4	64																						
16-May	65	71	82	62	66	69	68	65	60	56	52	49	45	43	39	36	35	35	34	36	39	44	51	54	52.4	82																						
17-May	55	59	59	60	64	63	57	42	38	35	32	28	24	21	19	19	18	18	19	20	26	33	37	41	36.9	64																						
18-May	42	43	47	48	51	49	43	37	31	26	23	18	16	15	13	13	12	13	15	20	26	23	23	30	28.2	51																						
19-May	43	43	44	49	54	54	44	32	27	21	17	16	14	12	11	11	11	12	13	17	24	23	33	40	27.6	54																						
20-May	42	44	49	54	51	58	49	39	26	23	19	18	14	13	13	13	13	12	14	15	20	22	35	39	28.9	58																						
21-May	41	42	45	49	65	66	57	37	29	22	19	15	14	13	13	12	14	16	17	21	27	26	35	42	30.7	66																						
22-May	48	54	47	61	66	63	56	46	40	32	26	21	19	19	18	18	19	19	19	20	24	31	35	40	35.1	66																						
23-May	52	51	60	67	64	59	58	53	49	43	36	30	25	20	16	15	14	14	16	22	30	35	33	37	37.4	67																						
24-May	54	69	76	76	76	75	65	51	39	28	21	21	20	20	18	17	18	18	21	25	30	33	39	47	39.9	76																						
25-May	50	60	65	68	72	69	70	62	46	40	33	26	23	55	57	36	33	46	61	72	67	65	63	69	54.4	72																						
26-May	73	77	80	84	86	85	80	70	57	47	41	36	32	28	28	29	29	29	30	32	35	44	46	41	50.8	86																						
27-May	40	43	45	47	52	53	53	47	41	37	32	28	30	33	37	43	60	69	67	68	57	58	70	75	49.2	75																						
28-May	78	82	83	78	72	68	61	53	50	46	43	40	36	34	33	30	29	29	30	32	39	45	43	44	49.2	83																						
29-May	46	46	51	58	58	56	53	45	37	31	29	27	23	22	21	19	20	20	21	25	29	34	39	44	35.6	58																						
30-May	45	47	52	55	57	60	53	47	41	37	32	27	26	25	23	21	20	21	21	23	27	32	40	44	36.4	60																						
31-May	49	52	51	51	53	51	48	46	45	48	80	79	88	90	82	78	71	70	76	72	81	87	90	89	67.8	90																						
																								55.5	58.2	61.3	63.7	65.9	65.6	61.2	53.1	46.5	41.8	38.4	35.1	32.7	31.8	31.7	30.9	31.5	33.4	35.6	39.0	43.6	47.0	50.9	53.5	Diurnal Average
																								94	93	95	97	95	96	96	97	96	94	93	94	92	90	82	94	95	96	97	97	98	96	94	93	Diurnal Maximum



WBEA
Hourly Averages

Relative Humidity (RH) - %
Millennium - May 2015





Maximum Speed: 35 km/h on May 16 00:00	Maximum Daily Speed Average: 18.7 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 10 23:00	Minimum Daily Speed Average: 0.8 km/h on May 24	Hours of Data: 737
Maximum Diurnal Speed Average: 5.3 km/h at hour 18	Minimum Diurnal Speed Average: 1.1 km/h at hour 10	Hours of Missing Data: 7
Monthly Average Velocity: 2.6 km/h 55.2 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 10 P ₉₀ = 17 P ₉₉ = 27	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-May	SSW6	SSE5	SSE4	SE7	SSE6	SSE5	SSE6	S7	SSW8	S9WSW11	WSW12	SW16WSW11	W10	WSW9	WSW1	SSE2	W7	SW3	SW5	W4	WSW4	W6	SW5.2	SW16		
2-May	W5	NW2	AF	NNW2	SSW4	SSW2	NW3	N10	NNE13	N15	N13	NNE15	N12	NNE16	NNW12	NNW11	N12	ENE3	S2	SW7	NW7	N16	N16	N17	N7.5	N17
3-May	N16	N10	N13	N12	N14	NNE14	N14	N9	NNW7	NW9	NW9	WNW8	WNW8	N8	N14	N15	NNE18	NNE16	NNE15	NNE11	ENE7	E5	E4	E5	N9.4	NNE18
4-May	ENE4	ENE4	E5	S6	SW4	SW1	S2	SSE3	S5	SSE6	ESE2	N7	N6	N7	NNW5	N6	N5	NNE9	NNE9	NE10	NE11	ENE10	E10	E10	NE3.3	NE11
5-May	ESE8	ENE9	E8	E9	E9	E9	ENE6	N5	E8	NE9	NE14	NE15	NE16	ENE14	NNE22	NE16	NNE18	NNE19	NNE21	NNE23	NNE20	NNE19	NNE15	NNE17	NE12.5	NNE23
6-May	NNE17	NNE14	N15	NNE15	NNE12	NNE17	NNE18	N18	NNE18	NNE18	NNE19	NNE19	NNE22	NNE21	NNE20	NE19	NE16	ENE15	NE13	ENE10	NE6	ENE4	E2	E1	NNE13.7	NNE22
7-May	ENE3	ESE3	SE3	SSE4	S4	S4	S5	SSW6	S7	SSW5	NE3	NNE6	N8	N9	NNE8	NNE9	NNE8	NE8	NE8	ENE6	ENE6	ENE7	ESE7	ESE6	ENE2.7	N9
8-May	SSW4	SSW7	SSE4	SE5	SE6	SSW4	SSW4	S6	SSE7	S6	SSE5	SSE5	NE6	NNE6	N6	NNW5	N16	NNE20	NE20	NE17	ENE10	E9	ESE6	SE6	ENE3.5	NNE20
9-May	N2	NNE8	NNE10	E6	ENE3	ENE2	SSE1	SSW2	SSW5	SSW7	SSW7	S9	S9	S7	SSW4	S4	E3	NNE5	N1	AF	AF	SE2	E5	ESE4	SE1.6	NNE10
10-May	SE4	S2	SSE1	SE7	SSE4	S4	W3	W2	SSW3	N5	N5	SE3	W1	ESE3	SSE4	ENE5	ENE6	ESE4	NNE4	ENE2	ENE2	ESE6	SSE0	SE3	ESE1.7	SE7
11-May	SE8	SE8	SE8	SSE7	SE7	SE6	SSE5	S6	S6	S5	W1	N3	NNE6	NNE4	N3	N5	SW3	WSW2	NNE3	W3	SW4	NE5	ENE8	ESE9	SE2.4	ESE9
12-May	ESE9	SE3	SW3	SSE2	SE6	ESE4	SE6	SSE5	NNE1	N6	NW1	SW3	SSE6	SSE9	SSE9	SE9	SE7	ESE8	ESE8	ESE11	ESE16	ESE17	SE16	SE15	SE6.4	ESE17
13-May	SE13	SE11	SE11	SE11	SE10	SSE8	S11	SSE11	SSE10	S10	S11	S10	S10	SSE10	SSE9	SE9	S8	S9	S9	S7	SSE7	S8	S6	SSE9.1	SE13	
14-May	S6	S5	SSE4	SSE5	SSE6	SSE5	SSE7	S8	S7	SSW9	SSW11	SSW10	SSW11	S10	SSW10	S10	S10	SSW11	SW11	SW9	SSW6	SSW7	SSW10	SSW9	SSW7.8	SW11
15-May	SSW10	SSW9	S6	S6	SSE6	SE9	SSE8	S7	S5	SSE6	SSE6	NW5WSW11	W8	W9	WNW10	W10	W6	N16	N27	N29	N31	N33	N35	NNW4.4	N35	
16-May	N26	N23	N21	N28	N27	N24	NNE24	N25	N25	NNE25	NNE23	NNE20	NNE20	NNE19	NNE18	NNE17	NNE16	NNE14	NNE12	NE11	NE10	ENE6	ENE6	NNE18.7	N28	
17-May	E4	W1	WSW2	SSE6	SE7	SE9	SSE9	SSE11	SSE9	SSE9	S8	SSE9	SSE9	SSE8	SSE7	SSE6	SSE6	SSE6	SSE7	SSE7	SE8	SE10	SE9	SSE7	SSE7.0	SSE11
18-May	SE9	SE9	SE8	SSE8	SE7	SE6	S6	SSE5	SE6	S4	S2	SSW8	SSW8	SSW6	SW7	SW5	SSW6	N5	NNE5	N4	E1	SSW5	SSW7	S5	S4.1	SE9
19-May	SE4	SSE5	SSE4	SE5	SE5	S4	S5	SSE6	S6	SSW4	S2	ENE2	NNE2	SE6	SE8	E5	E6	E5	SE4	SSE4	S4	S3	SE5	SE5	SE3.8	SE8
20-May	SSE3	SE4	SE4	SE5	SE5	SSW4	SSW4	S5	S6	S5	SE5	NE4	S9	SSE8	SSE6	S5	SSE5	SW5	SSW6	SW5	SSW5	S4	SE5	SSE5	SSE4.3	S9
21-May	SSE4	SSE4	SE4	SSE4	AF	S3	SSW4	S6	SSE6	SSE5	SE5	S7	SW5	SW7	SSW7	SSE4	N8	N7	N6	N4	NE3	AF	SE4	SSE4	SSE2.1	N8
22-May	SSE2	SSW2	AF	SSW8	SSW7	S4	SSW4	SSW3	NW3	NE2	NNW7	N12	N14	NNE17	NNE17	NNE17	NNE18	N20	N23	NNE18	NE14	NE15	NE14	NE12	NNE8.1	N23
23-May	NNE4	NE4	NNW7	NNE7	NE7	NE6	N7	NNW6	N6	NW6	NNW7	NNW8	NNW8	NNW7	N6	N6	N3	N5	N3	NW1	WSW2	NNE6	ENE4	ENE3	N4.6	NNW8
24-May	AF	SSW3	NNW1	S3	SSW4	SSW6	SSW7	SSW5	S4	SSE5	S4	N3	N6	N7	N8	NNE4	NE6	NE3	ENE5	ENE3	E4	ENE5	SE1	SSW3	E0.8	N8
25-May	ENE1	ESE1	SSW5	S6	SSW4	SSW3	SW4	SSW5	SSW4	S3	W2	NW4	NNW11	NW8	E5	ESE3	WSW1	NNW13	NNW7	NW5	NNW9	N20	N19	N17	NNW3.2	N20
26-May	N18	N20	N17	N11	N10	N13	N8	NNW7	N15	NNE16	N17	N14	N12	N11	N9	N8	NNE7	NNE9	NNE9	NNE9	NE9	ENE8	ENE6	ESE7	NNE10.4	N20
27-May	ESE10	ESE9	SE8	ESE7	SSE4	SE8	SE6	SE5	SSE4	SSE4	ESE3	SSW1	NNW6	NNW10	N16	NNE27	N27	NNE28	NNE21	NNE14	NNE25	NNE24	NNE27	N22	NNE9.1	NNE28
28-May	NNE23	N22	N20	NNE18	NNE19	NNE15	NNE17	N21	N19	NNE17	N17	N17	N15	N13	N13	NNE13	NNE13	NNE12	NE11	NE9	ENE8	E7	ESE6	NNE14.4	NNE23	
29-May	ESE9	SE10	SSE7	SSE5	SE8	SE8	SE9	SSE9	SSE8	SSE6	SE6	SE4	E2	W3	SSW4	SSW5	S4	SSE5	SSE4	SSE5	SSE8	SE11	SSE9	SSE7	SSE5.9	SE11
30-May	SE10	SE12	SE10	SE10	SE7	SE5	SSE6	S6	SSE5	SSE4	SSE7	S10	S10	SE7	SSE5	S8	SSE9	SE9	SSE9	SE11	SSE10	SSE7	SSE7	SSE6	SSE7.6	SE12
31-May	SE7	SE6	SE9	SE10	SE10	SE10	SE14	SE15	SE13	SSE11	S8	SSE8	S9	SSE7	SSE8	SSE8	SSE9	SSE8	S8	S10	S7	SSW7	SW6	SW6	SSE8.1	SE15

E3.1	E2.7	ENE2.8	E3.0	E2.9	E2.5	ESE1.9	SE1.3	ESE1.6	E1.1	NNE1.2	N1.9	N2.2	NNE2.9	NNE2.9	NNE3.5	NNE4.5	NNE5.3	NNE5.2	NE4.1	NE4.2	ENE5.0	ENE4.0	ENE3.3	Diurnal Average	
N26	N23	N21	N28	N27	N24	NNE24	NNE25	N25	NNE25	NNE23	NNE20	NNE22	NNE21	NNE22	NNE27	NNE27	NNE28	N23	N27	N29	N31	N33	N35	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 - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on May 27 15:00	Hours in Service: 744 Hours of Data: 737 Hours of Missing Data: 7 Hours of Calibration: 0 Percent Operational Time: 99.1
Minimum Value: 0 km/h on May 11 21:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 2 Q ₃ = 3 P ₉₀ = 5 P ₉₉ = 7	

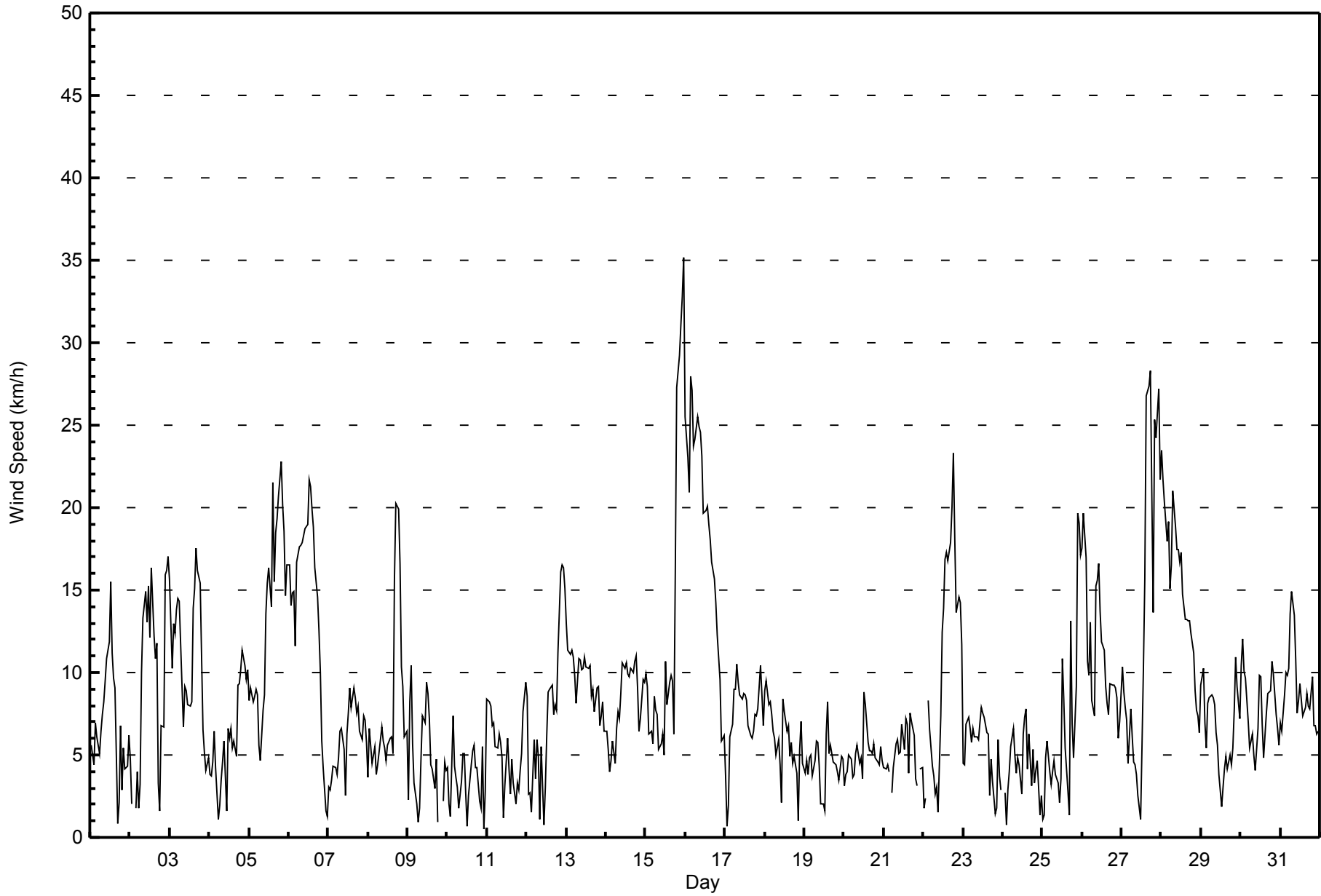
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	2	2	1	2	1	1	2	2	3	3	4	5	5	5	5	4	3	2	5	2	1	1	1	1	5
2-May	1	1	AF	2	2	2	2	5	3	4	4	6	5	4	5	4	6	4	2	2	5	4	3	4	6
3-May	4	3	3	3	3	3	2	3	2	3	3	3	2	6	4	4	4	4	3	2	1	1	1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

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Millennium - May 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Millennium - May 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	247	33.51	33.51
6 - 11	339	46.00	79.51
12 - 19	107	14.52	94.03
20 - 28	40	5.43	99.46
29 - 38	4	0.54	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 737

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Millennium - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	16	9	7	18	14	9	25	47	30	32	12	6	10	0	8	4	247
6 - 11	28	17	15	17	10	16	54	65	46	30	7	4	7	3	5	15	339
12 - 19	37	44	11	2	0	2	7	0	0	0	1	1	0	0	0	2	107
20 - 28	14	25	1	0	0	0	0	0	0	0	0	0	0	0	0	0	40
29 - 38	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	99	95	34	37	24	27	86	112	76	62	20	11	17	3	13	21	737

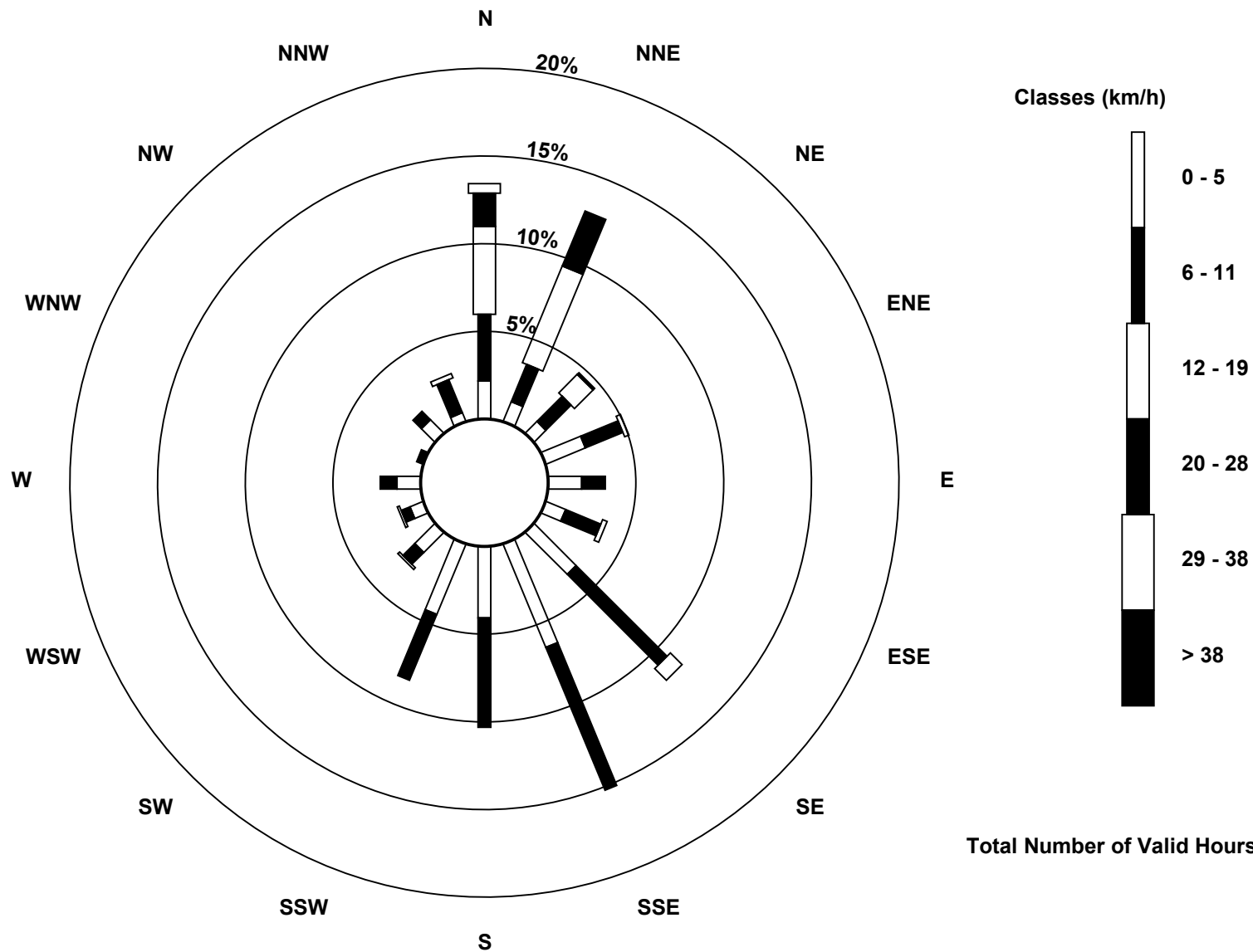
Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Wind Speed (WS) - km/h
Millennium (AMS 12)





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Direction (WD) - deg
Millennium - May 2015

Direction of Maximum Speed: 7 deg on May 16 00:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 14.8 deg on May 16	Hours of Data: 737
Direction of Minimum Speed: 164 deg on May 10 23:00	Hours of Missing Data: 7
Direction of Minimum Daily Speed Average: 0.8 deg on May 24	Percent Operational Time: 99.1
Monthly Average Direction: 176.2 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-May	203	166	156	146	147	155	165	174	197	190	241	238	228	257	273	248	242	148	276	229	218	272	257	269	219.0
2-May	264	321	AF	340	211	213	308	360	14	11	9	19	357	14	327	332	357	67	183	217	315	2	8	6	356.9
3-May	6	356	358	1	11	13	11	0	338	326	305	296	286	1	4	10	18	15	20	32	60	82	81	80	5.9
4-May	75	76	79	190	216	223	181	166	182	166	116	352	5	7	340	5	359	30	30	43	51	73	89	93	55.5
5-May	103	75	87	83	82	83	76	11	79	55	54	39	50	64	33	34	29	14	30	28	29	32	30	23	43.4
6-May	13	16	7	20	21	16	15	10	14	16	19	19	20	26	33	44	50	59	53	64	48	77	97	98	26.8
7-May	77	114	128	150	175	188	181	195	191	202	38	12	6	7	16	16	29	37	46	64	67	73	109	122	66.9
8-May	192	199	157	131	129	204	198	175	168	184	159	148	37	13	5	333	7	33	42	50	70	81	114	125	75.0
9-May	353	17	23	79	61	62	148	207	201	194	197	185	184	185	192	179	81	15	6	AF	AF	142	99	105	142.4
10-May	141	169	154	132	164	170	260	274	201	5	6	137	278	108	156	63	66	105	28	76	77	119	164	130	112.8
11-May	132	142	143	149	145	145	164	179	173	180	261	356	25	33	4	6	236	258	21	271	228	35	78	114	131.3
12-May	110	129	231	160	128	118	128	147	28	357	314	235	147	160	154	146	132	109	116	123	123	123	129	129	130.2
13-May	130	125	126	135	137	130	163	175	168	168	177	179	182	179	168	154	145	169	180	188	172	165	169	172	159.6
14-May	177	188	166	154	150	162	166	169	173	195	211	209	195	189	198	180	186	199	214	215	203	194	199	204	191.3
15-May	203	199	172	169	151	145	158	179	180	165	165	320	256	276	273	287	268	271	4	7	7	10	8	7	346.4
16-May	7	6	10	5	3	8	15	11	10	13	14	15	12	13	18	17	13	17	28	33	44	43	65	64	14.8
17-May	101	270	246	152	145	141	147	168	156	151	169	155	150	164	158	162	164	151	147	150	138	134	146	150	151.9
18-May	143	135	143	147	140	145	175	159	146	170	174	198	195	205	217	227	203	350	13	11	89	201	207	189	171.0
19-May	146	149	148	125	141	177	170	167	170	207	180	78	19	139	132	93	95	93	136	158	177	186	135	139	143.7
20-May	162	144	133	127	145	197	195	182	175	172	129	49	172	165	165	170	153	214	196	229	204	180	132	147	167.0
21-May	155	159	146	149	AF	176	208	176	153	151	146	184	232	228	206	150	6	356	357	3	36	AF	125	166	167.9
22-May	152	207	AF	211	209	174	203	211	325	37	328	5	5	12	13	15	12	11	8	25	34	38	43	34	15.7
23-May	21	54	348	14	43	42	5	338	359	324	328	334	327	340	350	349	3	359	352	315	250	23	63	61	358.7
24-May	AF	213	333	179	192	210	201	206	174	166	180	358	10	5	7	14	49	52	65	77	79	77	145	211	94.5
25-May	65	103	203	188	211	202	214	206	200	178	260	312	347	316	97	118	239	345	342	315	347	4	360	360	340.9
26-May	1	8	5	353	360	3	350	327	8	18	7	358	3	11	360	2	14	28	18	28	41	57	76	111	11.3
27-May	122	123	126	116	161	141	128	140	156	163	108	210	347	345	353	12	11	18	21	13	21	19	16	11	27.5
28-May	17	8	11	15	15	17	24	5	8	12	5	8	8	5	359	7	13	20	19	41	49	62	80	108	16.3
29-May	115	131	152	151	125	125	140	160	165	150	138	131	79	276	192	205	176	161	161	163	158	145	152	149	148.7
30-May	133	135	139	131	140	145	158	180	161	162	155	172	170	128	149	172	151	146	152	144	148	162	168	161	151.2
31-May	145	143	124	127	130	137	134	136	137	160	171	167	183	166	168	163	149	152	169	186	176	201	214	227	156.4
79.4 81.3 73.6 98.8 101.0 98.6 115.1 143.2 113.9 90.3 29.0 9.7 0.5 14.2 14.1 23.4 32.2 32.0 33.3 46.0 54.0 57.5 67.4 69.1																									
Diurnal Average																									

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Millennium - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 105 deg on May 17 02:00	Hours of Data: 737
Minimum Value: 7 deg on May 18 23:00	Hours of Missing Data: 7
Percentiles: P ₁ = 9 P ₁₀ = 14 Q ₁ = 17 Median = 24 Q ₃ = 40 P ₉₀ = 67 P ₉₉ = 98	Hours of Calibration: 0
	Percent Operational Time: 99.1

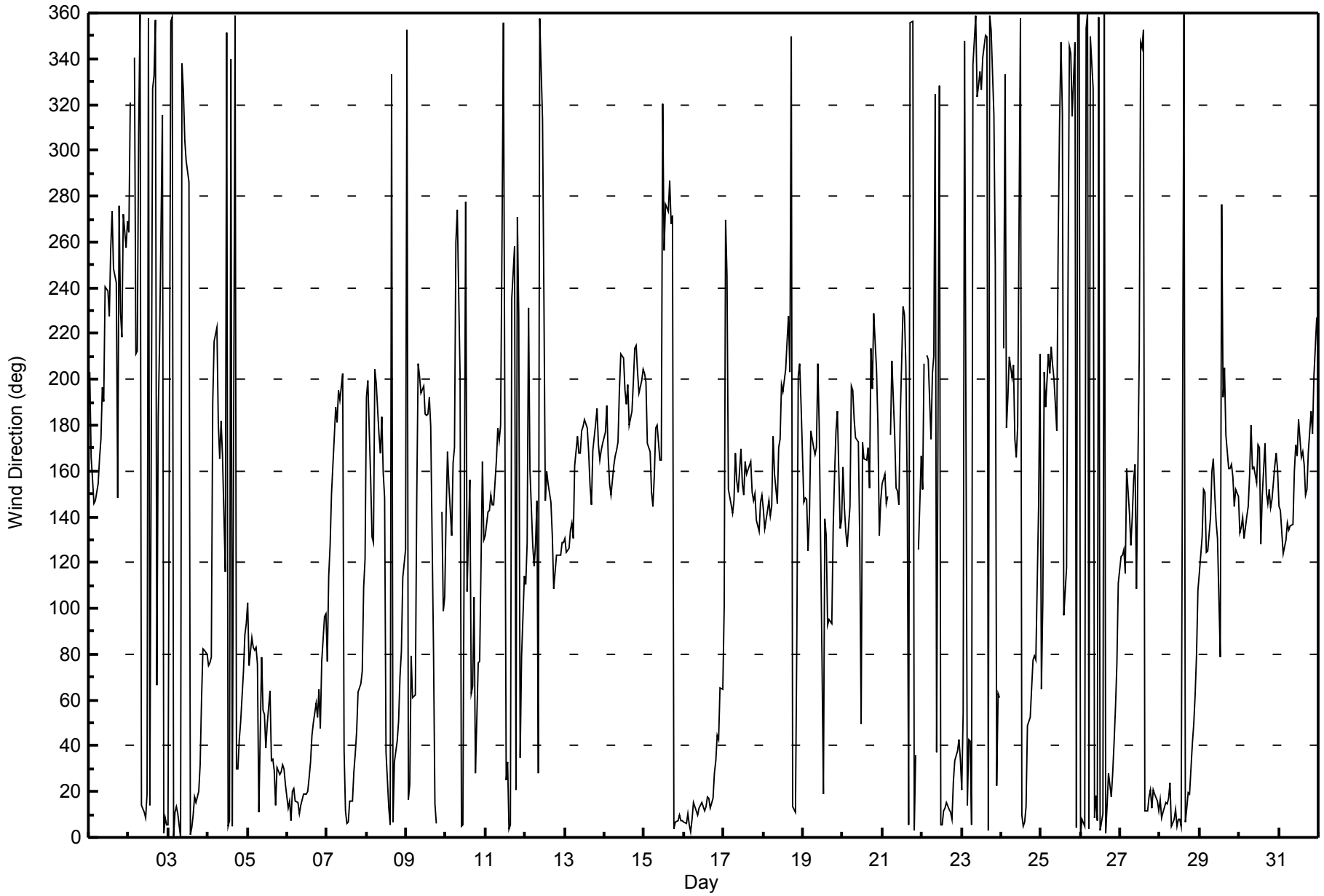
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	29	22	14	12	10	12	17	17	31	24	42	37	28	41	44	40	95	68	66	63	15	39	28	18	95
2-May	20	53	AF	46	18	60	58	33	15	14	19	23	25	18	40	34	37	75	64	15	46	19	15	16	75
3-May	16	20	19	20	13	13	13	26	39	33	35	41	43	21	28	19	17	16	16	14	15	17	16	17	43
4-May	22	21	18	42	20	31	36	45	44	50	91	40	48	39	47	39	59	28	20	13	9	19	29	31	91
5-May	42	26	29	24	25	28	52	31	29	19	17	17	15	24	15	14	13	13	20	13	12	13	12	14	52
6-May	13	12	16	14	16	13	12	14	14	14	14	14	14	15	15	16	21	19	18	18	21	24	45	80	80
7-May	20	25	17	9	23	24	23	21	27	45	89	30	33	32	65	25	30	38	26	19	12	18	24	20	89
8-May	46	28	21	20	20	24	27	22	26	41	47	56	57	33	22	52	23	19	12	12	20	23	29	28	57
9-May	80	10	12	29	52	52	76	70	34	30	44	25	27	44	68	64	76	32	96	AF	AF	41	9	59	96
10-May	37	82	90	19	23	22	45	75	70	45	27	80	98	79	69	55	44	48	30	39	38	23	97	50	98
11-May	14	16	14	12	12	17	17	21	30	44	100	84	51	83	91	58	71	83	43	37	9	65	22	21	100
12-May	24	73	57	79	20	73	28	39	95	31	104	76	55	31	32	31	37	33	30	18	18	18	16	17	104
13-May	17	17	16	15	15	15	20	18	19	22	23	26	30	25	31	33	27	32	23	18	20	18	18	16	33
14-May	24	22	19	14	10	14	17	20	22	27	32	41	37	40	31	30	27	24	21	16	11	15	15	16	41
15-May	16	18	22	20	14	14	21	24	35	37	45	82	40	51	48	42	41	53	43	20	19	16	16	19	82
16-May	19	18	16	18	19	18	17	17	17	19	17	20	19	18	19	20	20	18	16	16	10	8	34	21	34
17-May	36	105	76	16	14	18	23	22	25	30	37	35	34	38	46	44	39	34	23	18	18	16	15	14	105
18-May	14	15	14	12	13	16	18	34	34	60	103	61	46	55	53	74	54	59	27	16	66	13	7	12	103
19-May	35	26	37	37	10	16	17	22	29	62	90	99	92	58	34	56	38	47	35	21	9	29	9	18	99
20-May	55	20	28	16	13	16	20	25	26	40	48	84	35	35	62	68	54	59	30	22	11	33	16	15	84
21-May	10	11	14	13	AF	25	17	19	31	39	48	57	85	67	57	74	22	25	21	15	9	AF	19	19	85
22-May	86	91	AF	9	9	23	24	44	59	88	35	25	22	19	17	19	19	18	17	16	13	12	12	16	91
23-May	36	86	40	14	17	17	15	26	26	41	38	30	38	39	40	42	85	48	49	61	53	7	36	32	86
24-May	AF	69	73	29	13	25	19	23	51	38	69	94	32	42	25	67	33	85	18	14	15	15	80	82	94
25-May	75	70	43	21	36	27	23	23	37	33	69	67	41	76	34	68	96	31	68	36	27	16	18	19	96
26-May	18	16	18	20	16	18	24	33	17	18	20	27	28	26	29	36	43	26	19	16	12	10	22	24	43
27-May	20	26	24	22	20	19	23	45	43	54	82	102	34	30	39	17	17	15	16	15	16	15	16	16	102
28-May	16	17	15	16	14	17	17	18	20	17	21	22	19	24	26	24	26	24	20	17	12	15	24	21	26
29-May	24	22	24	19	19	17	22	25	29	46	54	77	98	80	81	76	58	42	35	26	20	17	22	25	98
30-May	17	16	15	16	16	24	24	31	39	54	43	35	33	50	63	36	31	27	24	21	19	20	19	19	63
31-May	14	15	15	15	18	20	18	19	20	34	26	22	21	24	27	23	27	22	22	21	20	16	17	18	34
	86	105	90	79	52	73	76	75	95	88	104	102	98	83	91	76	96	85	96	63	66	65	97	82	
	Diurnal Maximum																								

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Millennium - May 2015





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 25, 2015	Last Calibration	April 28, 2015
Station Name	Millennium	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	11:15	End Time (MST)	17:00
Gas Cert Reference	LL104223	Station temp.	22 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	12/02/2018
Calibrator Make/Model	Sabio 4010	Serial Number	11091107
ZAG Make/Model	API 701	Serial Number	4889
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2581

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-665	-665
Analyzer IP address	192.168.1.43		Lamp voltage	793	797
Calculated slope	0.999404	0.999243	Chamber temp	45.0	44.9
Calculated intercept	0.372119	-0.858186	Pressure	724.8	702.4
Analyzer Background	8.9	9.1	Flow	0.442	0.424
Analyzer Coefficient	1.204	1.254	Intensity	92	92

Analyzer make Thermo 43i Analyzer serial # 1118148499

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	-0.3	----
as found span	5000	82.8	799.8	765.5	1.045
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	82.8	799.8	800.4	0.999
second point	5000	41.4	399.9	403.0	0.992
third point	5000	20.7	200.0	200.6	0.997
as left zero	5000	0.0	0.0	0.7	----
as left span	5000	82.8	799.8	801.1	0.998
Average Correction Factor					0.996

Corrected As found 765.9 Previous response 800.0 % change 4.5%

Notes:

Filter changed after as founds. Zero and span was adjusted.

Calibration Performed By: Devin Russell



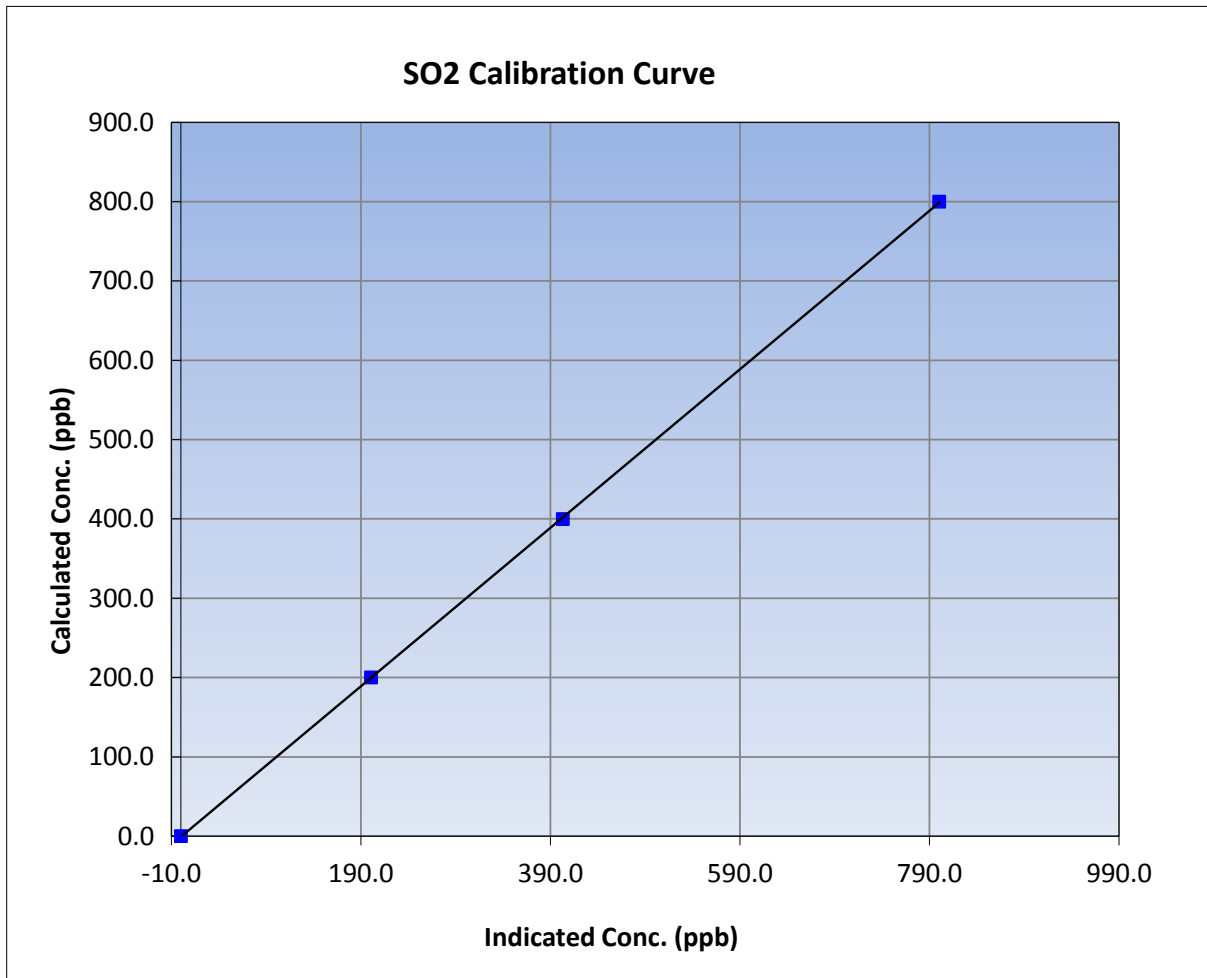
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 25, 2015	Previous Calibration	April 28, 2015
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	11:15	End Time (MST)	17:00
Analyzer make	Thermo 43i	Analyzer serial #	1118148499

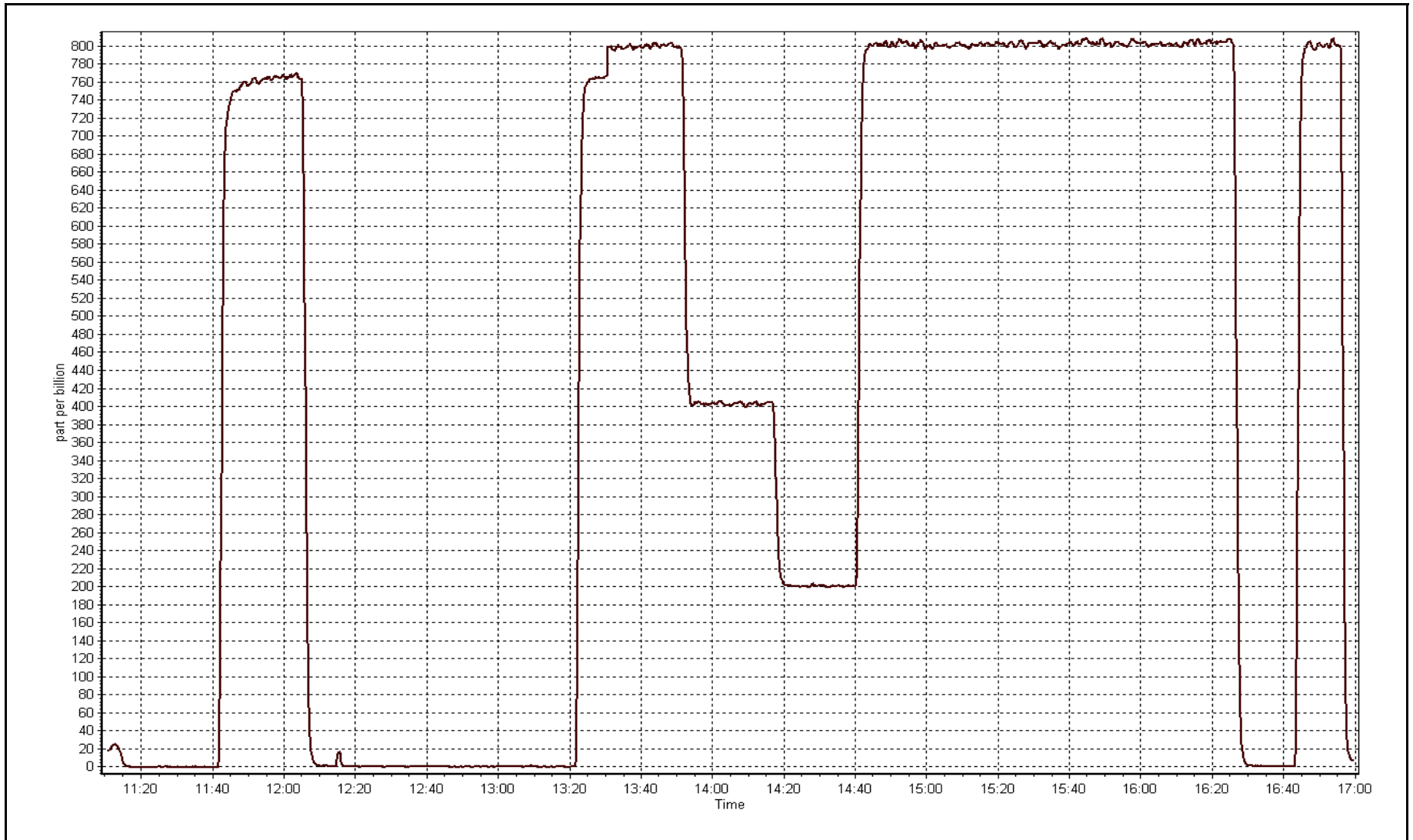
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999985
799.8	800.4	0.9993		
399.9	403.0	0.9923	Slope	0.999243
200.0	200.6	0.9969		
			Intercept	-0.858186



SO2 Calibration Plot

Date: May 25, 2015





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	May 11, 2015	Last Calibration	April 29, 2015
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	13:35
Gas Cert Reference	LL84557	Station temp.	22 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	30/05/2013
Calibrator Make/Model	Sabio 4010	Serial Number	11091107
Dil air Make/Model	API 701	Serial Number	4889
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2581
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104223 12/02/20118

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-597	-597
Analyzer IP address	192.168.1.42		Lamp voltage	888	887
Calculated slope	0.995977	0.994129	Chamber temp	44	44
Calculated intercept	0.711967	0.039935	Pressure	682.4	685.0
Analyzer Background	19.5	19.2	Flow	0.601	0.603
Analyzer Coefficient	0.640	0.651	Intensity	47xxx	47xxx
			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	----
as found span	5000	38.4	79.9	78.2	1.021
SO2 scrubber check	5000	20.7	200.0	0.2	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	38.5	80.1	80.5	0.995
second point	5000	19.2	39.9	40.2	0.993
third point	5000	9.6	20.0	20.1	0.995
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	38.5	80.1	80.6	0.993
Average Correction Factor					0.995

Corrected As found	78.7	Previous response	79.5	% change	1.0%
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Notes:

Filter changed after as founds. Scrubber check completed after as founds. Zero adjusted slightly. Span adjusted.

Calibration Performed By:

Devin Russell



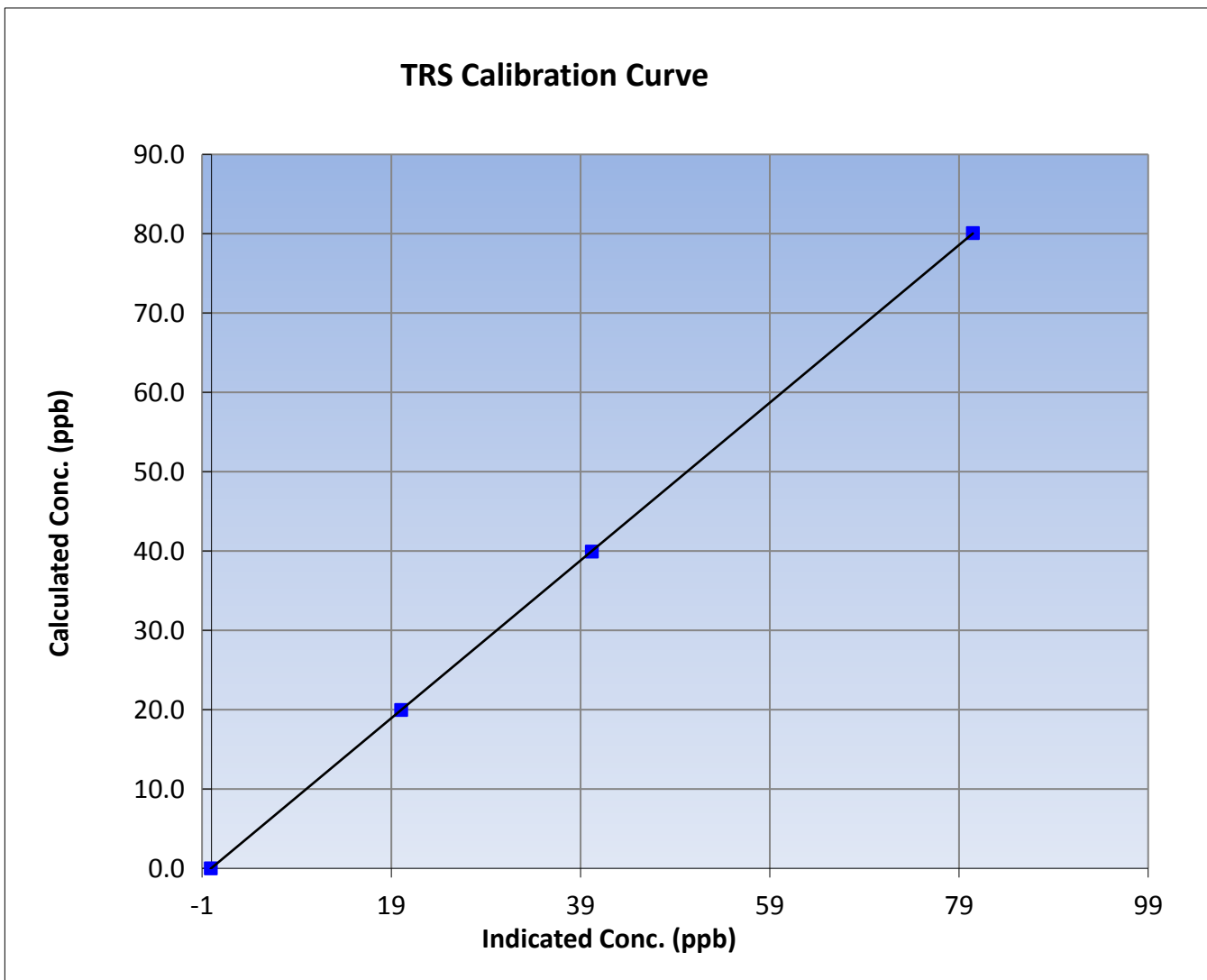
Wood Buffalo Environmental Association TRS Calibration Report

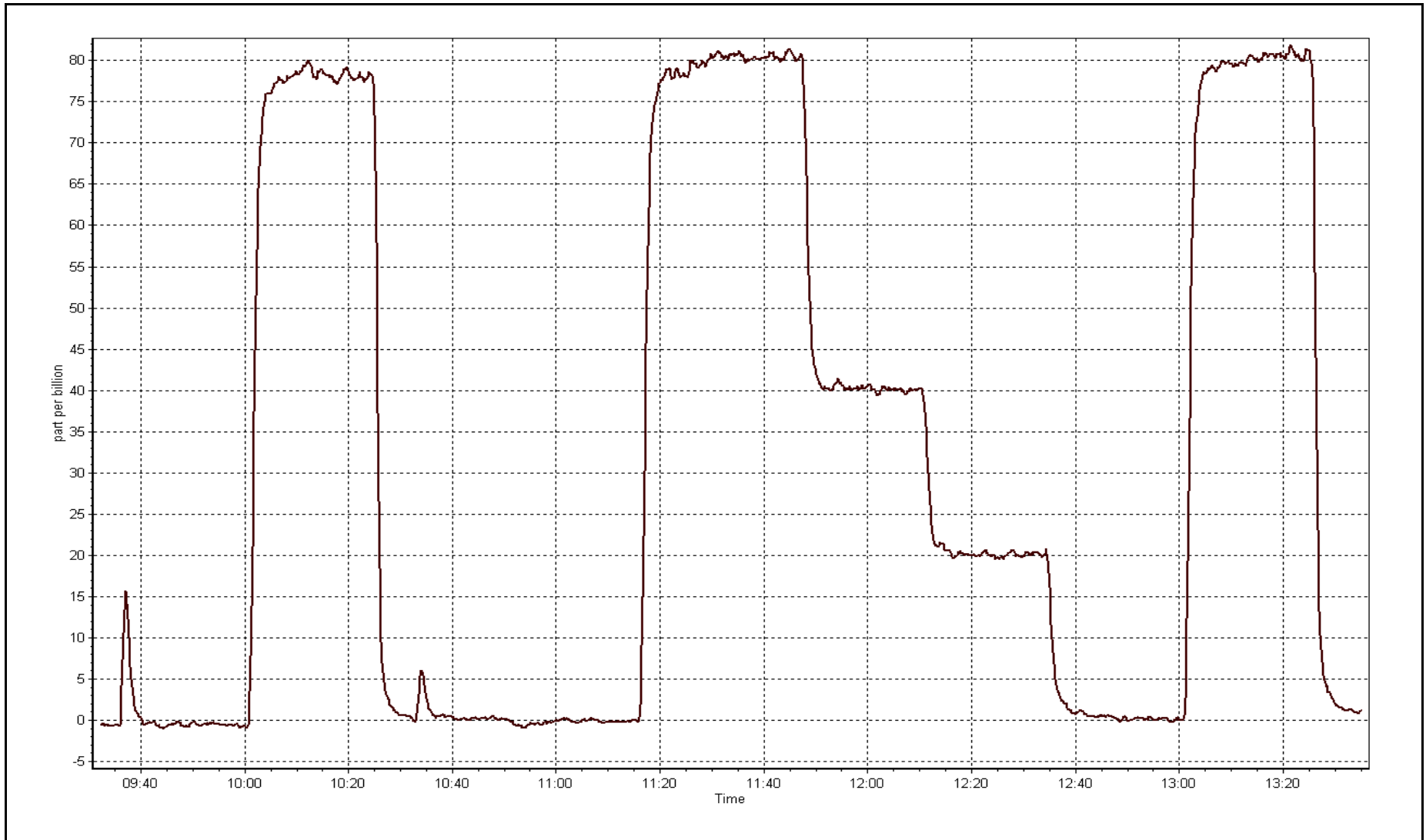
Station Information

Calibration Date	May 11, 2015	Previous Calibration	April 29, 2015
Station Name	AMS 12	Station Number	AMS 12
Start Time (MST)	9:30	End Time (MST)	13:35
Analyzer make	TEI 43C	Analyzer serial #	0509110887

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999997
80.1	80.5	0.9952		
39.9	40.2	0.9932	Slope	0.994129
20.0	20.1	0.9954		
			Intercept	0.039935







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-25-15	Last Calibration	April-28-15
Station Name	Millennium	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	11:15	End Time (MST)	17:00
Gas Cert Reference	LL104223	Cal Gas Expiry Date	12/02/2018
CH4 Cal Gas Conc.	489 ppm	CH4 Equiv Conc.	1017.0 ppm
C3H8 Cal Gas Conc.	192 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11091107
ZAG make/model	Teledyne API 701	Serial Number	4889
DACS make/model	Campbell Scientific CR3000	Serial Number	2581

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	11.8	11.8
Analyzer IP address	192.168.1.51		Air or Bypass Press	42.9	42.9
Calculated slope	0.997855	0.999138	Fuel Pressure	19.3	19.3
Calculated intercept	0.043910	0.028383	Analyzer Coeff	3.9	4.2
			Analyzer BKG	2.308	2.430

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	0.05	----
as found span	5000	82.8	16.84	15.99	1.053
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	82.8	16.84	16.83	1.001
second point	5000	41.4	8.42	8.44	0.998
third point	5000	20.7	4.21	4.23	0.995
as left zero	5000	0.0	0.00	0.06	----
as left span	5000	82.8	16.84	16.91	0.996
Average Correction Factor					0.998

Corrected As found 15.94 Previous response 16.83 % change 5.6%

Notes:

Filter changed after as founds. Zero and span adjusted. As founds span was 5.3% low. Diagnostics look good; however the pump is overdue for rebuild/replacement.

Calibration Performed By:

Devin Russell



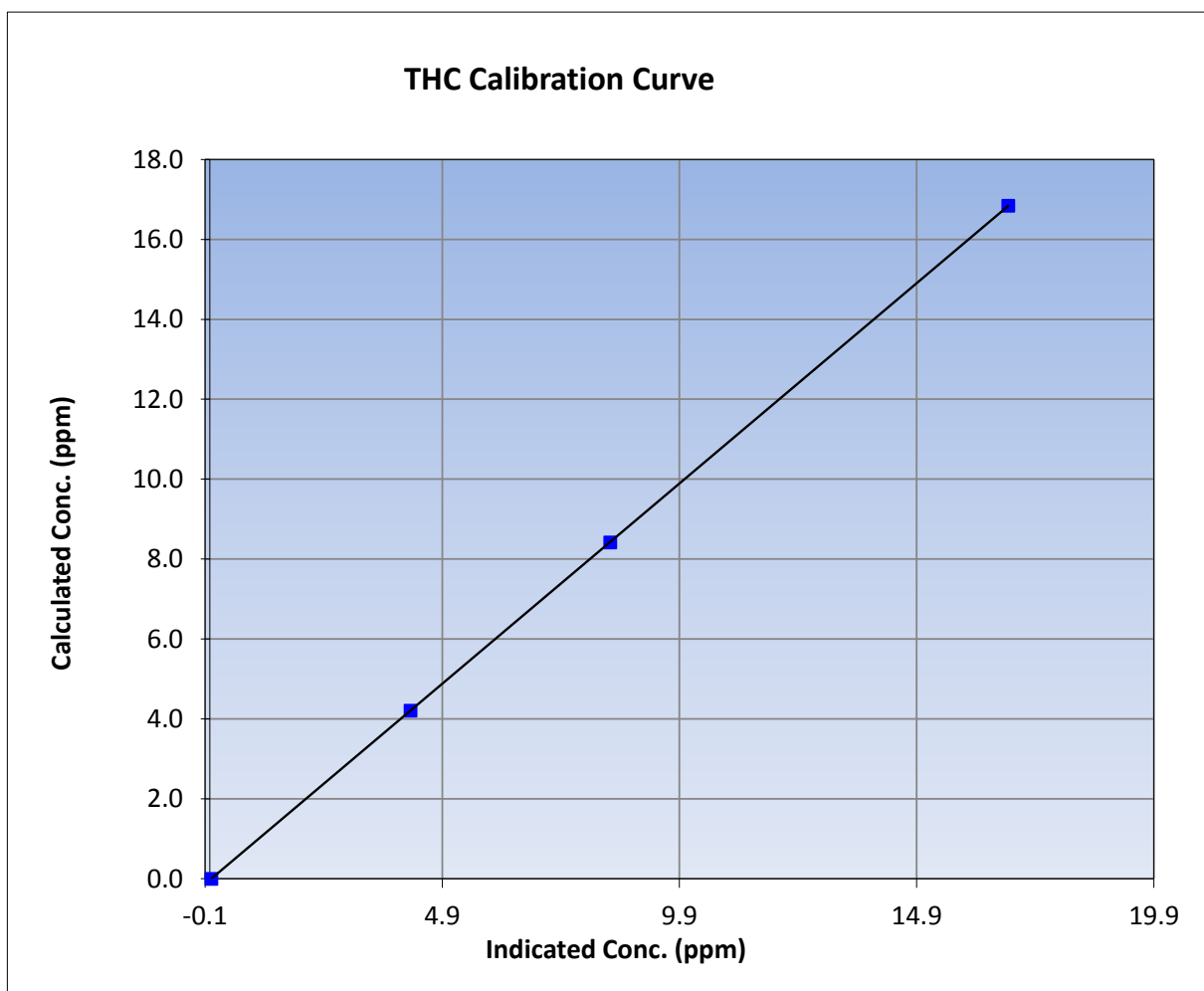
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 25, 2015	Previous Calibration	April 28, 2015
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	11:15	End Time (MST)	17:00
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958296

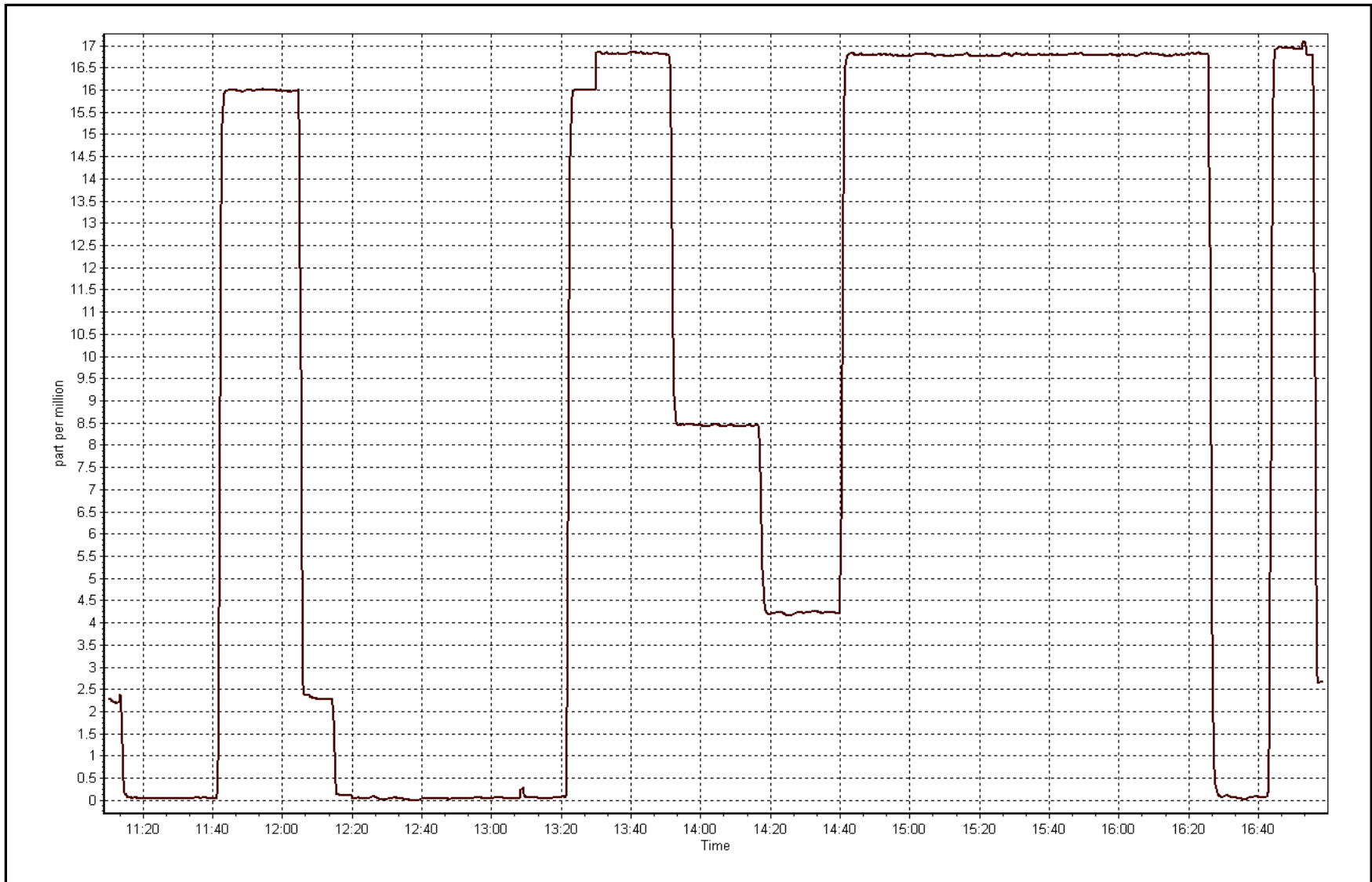
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	1.000000
16.84	16.83	1.0007		
8.42	8.44	0.9977	Slope	1.002403
4.21	4.23	0.9954		
			Intercept	-0.032073



THC Calibration Plot

Date: May 25, 2015





Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 25, 2015	Previous Calibration	April 28, 2015
Station Name	Millennium	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	11:15	End Time (MST)	17:00
NO Cal Gas Conc	48.3 ppm	Gas Cert Reference	LL104223
NOx Cal Gas Conc	48.3 ppm	Cal Gas Expiry Date	12/02/2018
Calibrator	Sabio 4010	Serial Number	11091107
Zero air Generator	Teledyne API T701	Serial Number	4889

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2581
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.995920	0.996820	1.015124
	Data Offset	0.669374	0.597874	-0.643022
Current Calibration	Data Slope	0.995964	0.999467	1.015134
	Data Offset	1.321209	0.742355	-0.753474

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	723
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	1.164		1.164	
NOX coefficient	1.161		1.163	
NO2 coefficient	1.000		1.000	
NO bkgrnd	0.8		0.8	
NOX bkgrnd	2.0		4.7	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	316.7	Deg C	316.7	Deg C
HVPS voltage		V	802	V
PMT Temp	6.9	Deg C	6.9	Deg C
O3 flow	87	ccm	86	ccm
R Cell press NO	2.9	mmHg	3	mmHg
R Cell Press Nox	2.9	mmHg	2.9	mmHg
NO sample flow	508	lpm	495	lpm
Nox sample Flow	514.000	lpm	500.000	lpm

Notes:

Filter changed after as founds. Zero adjusted. NO values used for GPT portion of the calibration was the Second High NO point of the GPT.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 25, 2015

Station Number:

AMS 12

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	2.6	-0.6	3.2	----	----
as found span	6000	98.8	795.3	795.3	0.0	802.1	798.8	3.4	0.9916	0.9957
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.8	-0.4	-0.4	----	----
high point	5000	82.8	799.8	799.8	0.0	801.5	799.3	2.2	0.9980	1.0007
second point	5000	41.4	399.9	399.9	0.0	401.6	400.5	1.2	0.9959	0.9985
third point	5000	20.7	200.0	200.0	0.0	197.9	198.2	-0.3	1.0105	1.0090
as left zero	5000	0.0	0.0	0.0	0.0	-1.0	0.4	-1.4	----	----
as left span	5000	82.8	799.8	509.3	290.5	798.6	511.7	286.8	1.0016	0.9953
Average Correction Factor									1.0014	1.0028

Corrected As found NO_x= 799.5 NO= 799.3 Percent Change NO_x= -0.2% NO= -0.3%
 Previous Response NO_x= 797.9 NO= 797.3

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 82.80 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.4			N/A	
1st NO2 (300)	----	509.3	293.3	797.8	509.3	288.5	0.9862	1.0000	1.0168	98.3%
2nd NO2 (200)	----	609.7	193.0	801.8	609.7	192.1	0.9813	1.0000	1.0046	99.5%
3rd NO2 (100)	----	706.2	96.5	803.1	706.2	96.9	0.9797	1.0000	0.9958	100.4%
4th NO2 (0)	802.7	----	2.1	804.8	802.7	2.1	0.9777	1.0000	N/A	----
Average Correction Factor							0.9812	1.0000	1.0057	99.4%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

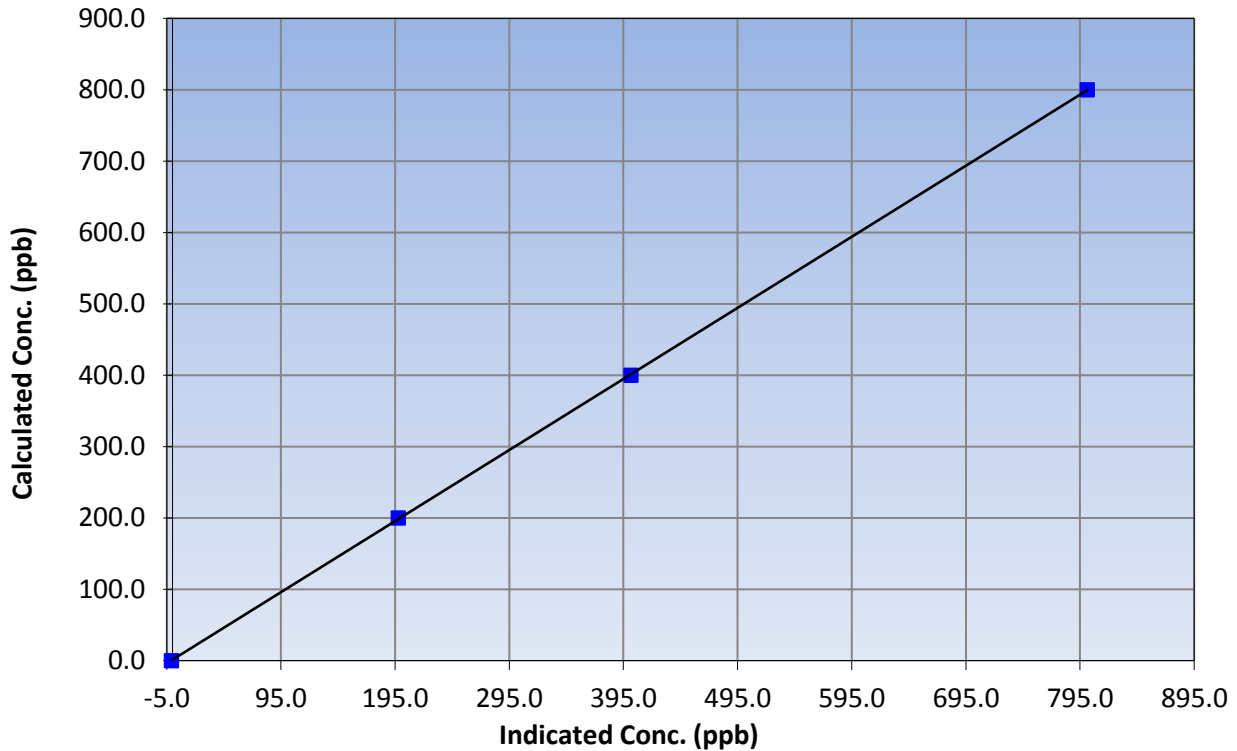
Station Information

Calibration Date	May 25, 2015	Previous Calibration	April 28, 2015
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	11:15	End Time (MST)	17:00
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	-0.8	----	Correlation Coefficient	0.999987
799.8	801.5	0.9980		
399.9	401.6	0.9959	Slope	0.995964
200.0	197.9	1.0105		
			Intercept	1.321209

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

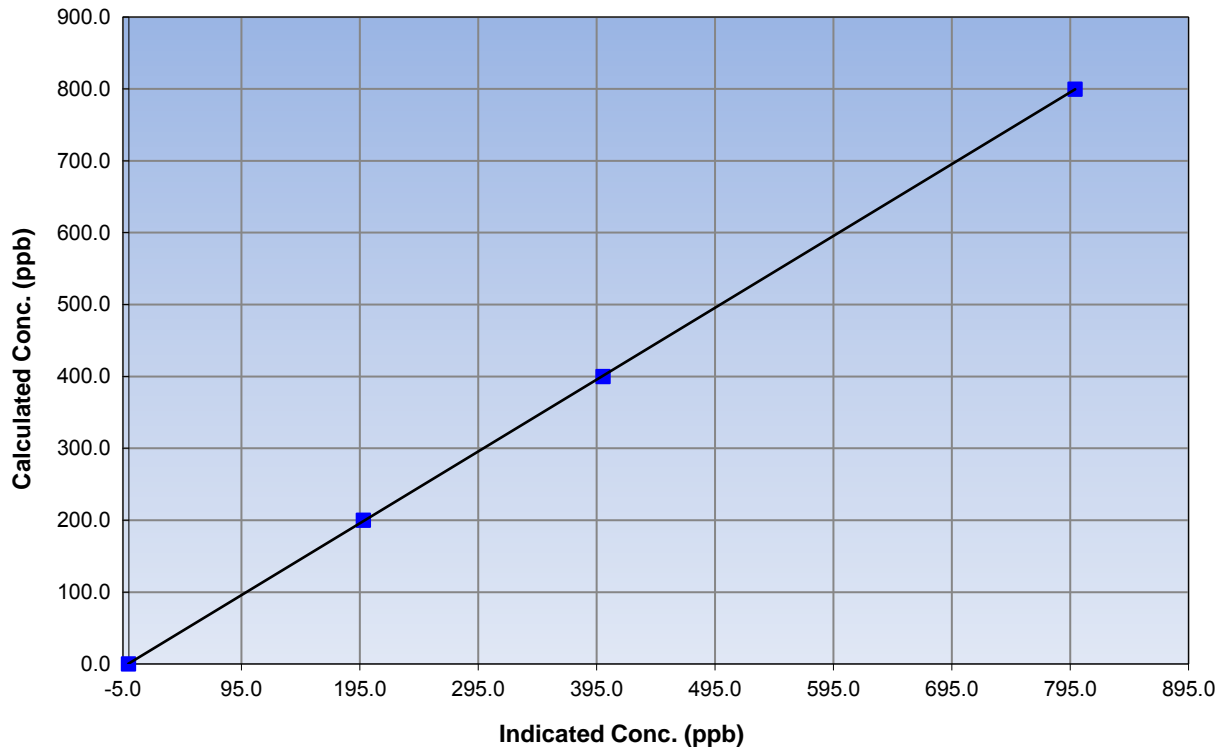
Station Information

Calibration Date	May 25, 2015	Previous Calibration	April 28, 2015
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	11:15	End Time (MST)	17:00
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999992
799.8	799.3	1.0007		
399.9	400.5	0.9985	Slope	0.999467
200.0	198.2	1.0090		
			Intercept	0.742355

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

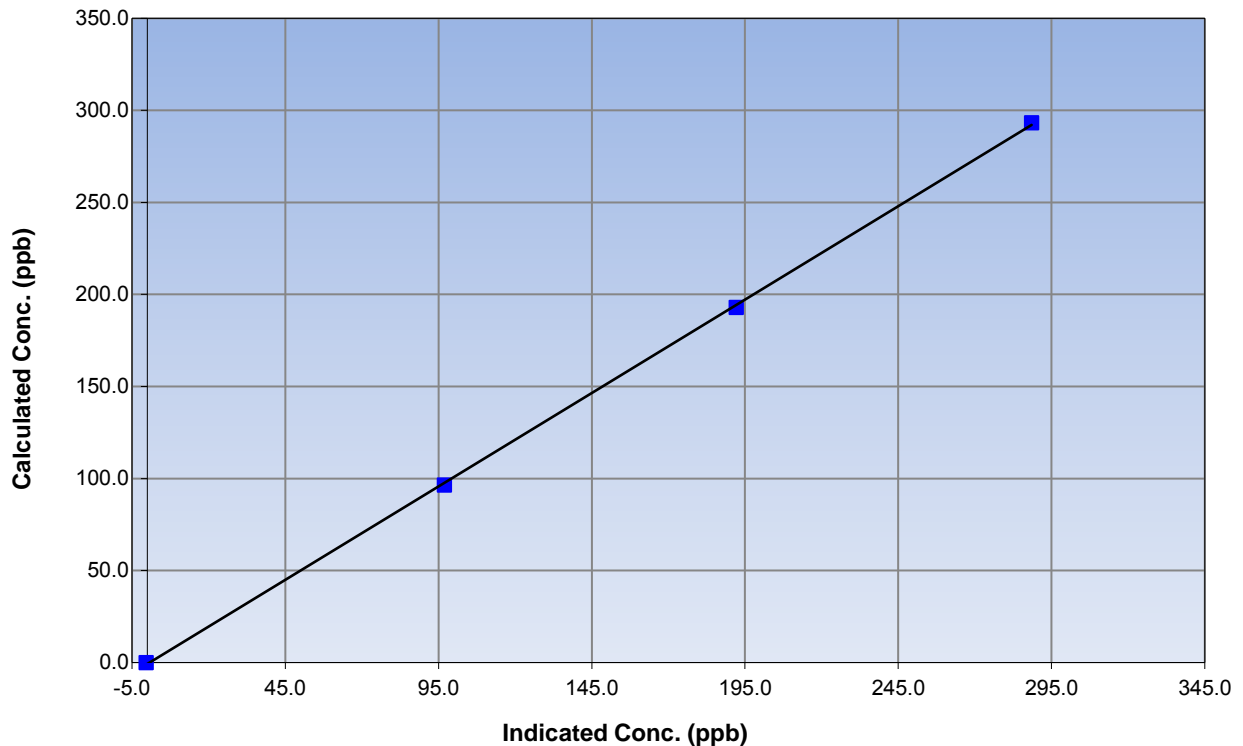
Station Information

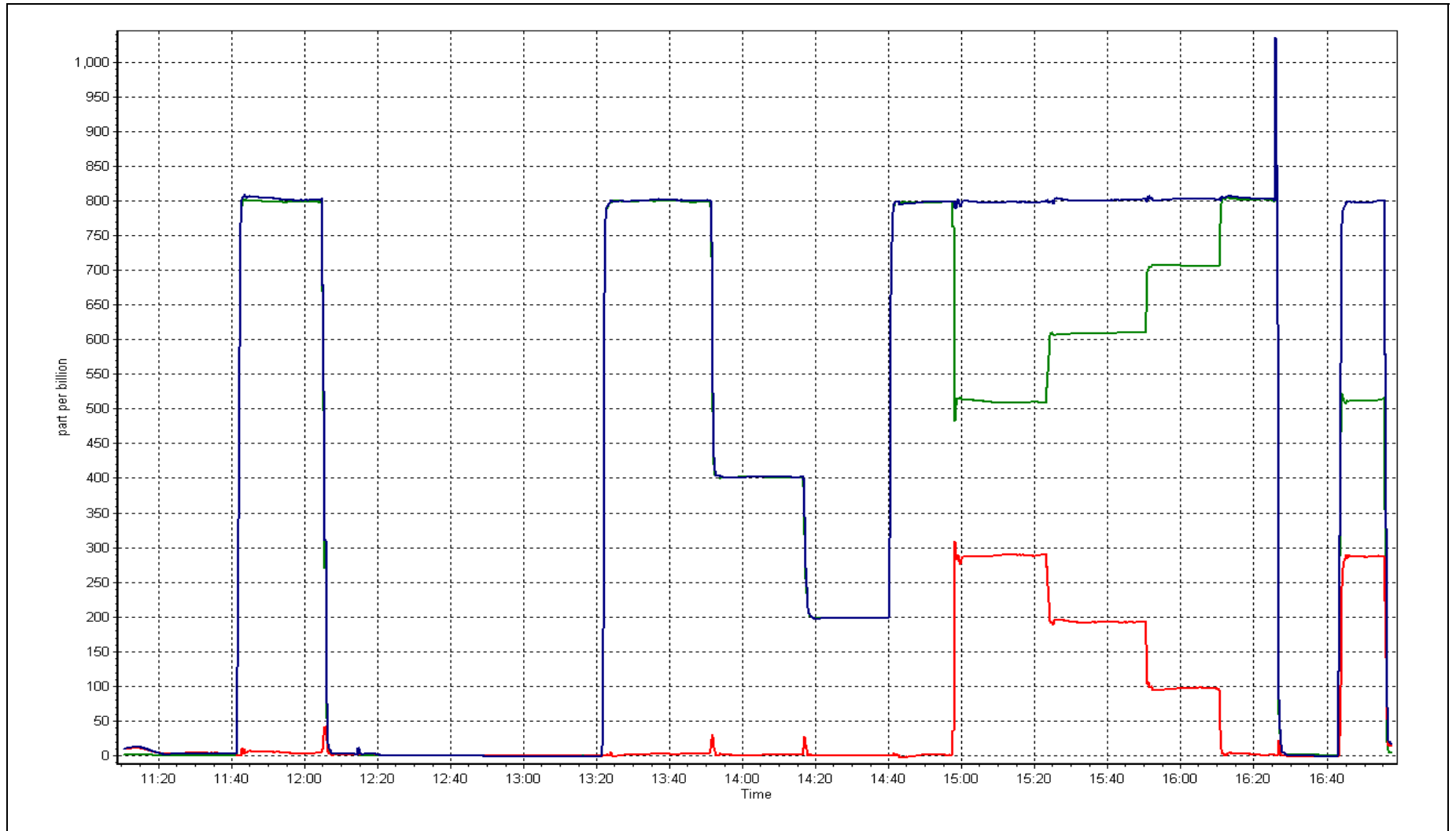
Calibration Date	May 25, 2015	Previous Calibration	April 28, 2015
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	11:15	End Time (MST)	17:00
Analyzer make	API T200	Analyzer serial #	723

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999879
293.3	288.5	1.0168		
193.0	192.1	1.0046	Slope	1.015134
96.5	96.9	0.9958		
			Intercept	-0.753474

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CONFORMANCE TEST

STATION INFORMATION

Calibration Date:	May 25, 2015	Previous Calibration:	April 30, 2015
Station Name:	Millennium	Station Number:	AMS 12
Start Time (MST):	12:30	End Time (MST):	15:45
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1212

SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number	E-1486
Source SN:	5691
HEPA PN:	12144
Time Correct (MST):	Yes
Parameters Checked:	T1, T2, T2,T4, P3, Main Flow, Beta, Neph

AUDIT DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	25.0	26.2	1.2	26.0
T2	29.0	na	na	29.0
T3	25.0	na	na	25.0
T4	28.0	na	na	28.0
RH (%)	29.0	na	na	29.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	967	967.0	0.0	967

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1000	0	1000	1000

Nephelometer Calibration

Parameter	As Found	adjusted (Limit +/- 2.0ug/m3)	As Left
Analog	199		199
Neph	6.8		-0.6
C14	1.3	Yes	382
Indicated Concentration (ug/m3)	14.5		-1.1
Offset 1	190.7		200.6
Offset 2	32.7		33.8

Leak Check (Quarterly)

Leak Check Date:	April 30, 2015	Previous Leak Check Date:	
	Measured		Difference LPM (Limit +/- 0.42 LPM)
Flow without adaptor (LPM):	16.71		0.02
Flow with adaptor [turn off pump first](LPM):	16.69		

Mass Foil Calibration (Annualy)

Foil Calibration Date:	NA	Previous Foil Calibration:	March 27, 2015
Zeroed?:	No		
Foil Mass:			<u>Mass foil set S/N:</u>
Previous Correction Factor:			
New Correction Factor:			

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / Replaced	25/05/2015
Pump	Needs Testing	NA
Filter Tape	Good	NA
Mass Foil Cal Set	Good	NA
HEPA filter	Good	NA

NOTES:

Nephelometer zeroed. As found concentration with HEPA filter was 14.5 ug/m3. After zero adjustment concentration was reading -1.1 ug/m3. Nephelometer chamber and SHARP chambers were opened,inspected, and cleaned (relatively clean).

Audit Performed By: Devin Russell/Ryan Power



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 13
FORT MCKAY SOUTH
MAY 2015**

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

June 29, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
MAY 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	706	37	38	99.87	49	0	7	0
TRS(ppb) Average	707	35	37	99.73	2	0	1	0
THC(ppm) Average	700	37	44	99.06	3.1	-	2.3	-
O3(ppb) Average	706	35	38	99.60	56	0	36	-
NO2(ppb) Average	706	37	38	99.87	48	0	10	-
NO(ppb) Average	706	37	38	99.87	44	-	3	-
NOX(ppb) Average	706	37	38	99.87	73	-	12	-
PM2.5(ug/m3) Average	743	0	1	99.87	103.8	-	32.5	1
Temperature 2 m (C) Average	744	0	0	100.00	29.2	-	18.2	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	89.0	-
Wind Speed 10 m (km/h) Average	738	0	6	99.19	21	-	13.0	-
Wind Direction 10 m (deg) Average	738	0	6	99.19	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	706	2	4	-	0	0	0	1	1	5	49
TRS(ppb) Average	707	0.2	0	-	0	0	0	0	0	0	2
THC(ppm) Average	700	2.19	0.2	-	1.8	2	2.1	2.1	2.3	2.4	3.1
O3(ppb) Average	706	26.4	14	-	0	6	14	26	38	46	56
NO2(ppb) Average	706	4.1	5	-	0	1	1	2	5	10	48
NO(ppb) Average	706	1.1	3	-	0	0	0	0	1	3	44
NOX(ppb) Average	706	5.2	8	-	0	1	1	2	5	13	73
PM2.5(ug/m3) Average	743	8.19	9.7	-	1.4	2.2	3.1	5.8	10.3	15.1	103.8
Temperature 2 m (C) Average	744	10.14	9	-	-7.6	-1	2.7	9.5	16.9	23.4	29.2
Relative Humidity (%) Average	744	52.1	26	-	10	18	29	51	74	87	98
Wind Speed 10 m (km/h) Average	738	5.9	4	-	0	2	3	5	8	11	21
Wind Direction 10 m (deg) Average	738	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)
MAY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Air Quality Analyzers	28 May 2015 08:00	28 May 2015 08:00	1	Maintenance - manual activation of daily zero and span system
TRS	07 May 2015 09:00	07 May 2015 09:00	1	Maintenance - Station operator on site
THC	11 May 2015 09:00	11 May 2015 10:00	2	Maintenance - installed pressure gauge on zero air system
THC	29 May 2015 09:00	29 May 2015 12:00	4	Maintenance - replace zero air system
O3	07 May 2015 09:00	07 May 2015 09:00	1	Maintenance - Station operator on site
PM2.5	11 May 2015 13:00	11 May 2015 13:00	1	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	05 May 2015 19:00	05 May 2015 19:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	05 May 2015 21:00	05 May 2015 22:00	2	Flat line in sensor output signal
Wind Speed, Wind Direction	09 May 2015 04:00	09 May 2015 06:00	3	Flat line in sensor output signal



Wood Buffalo Environmental Association

Summary of Hour Averages

Sulphur Dioxide (SO₂) - ppb

Fort McKay South - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 49 ppb on May 24 11:00	Maximum Daily Average: 7.4 ppb on May 29
Minimum Value: 0 ppb on May 6 02:00	Hours of Data: 706
Maximum Diurnal Average: 5.9 ppb at hour 10	Hours of Missing Data: 38
Monthly Average: 2.0 ppb	Hours of Calibration: 37
Minimum Daily Average: 0.1 ppb on May 28	Percent Operational Time: 99.9
Minimum Diurnal Average: 0.5 ppb at hour 5	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 5 P ₉₉ = 23	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1
2-May	0	0	Z	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1
3-May	0	0	0	Z	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.7	1
4-May	1	1	1	1	Z	1	1	1	1	13	17	11	5	3	2	2	1	1	1	1	0	0	0	0	2.7	17
5-May	0	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-May	0	Z	0	0	0	0	1	1	C	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0	--	1
8-May	0	0	Z	0	0	0	0	1	1	3	5	3	3	7	6	1	1	2	1	1	0	0	0	0	1.7	7
9-May	0	0	1	Z	1	1	1	1	1	5	16	17	16	14	12	9	10	2	1	4	5	2	1	1	5.1	17
10-May	1	1	1	1	Z	1	1	2	15	17	8	3	2	5	10	16	15	16	10	4	2	1	1	1	5.7	17
11-May	1	1	1	1	1	Z	1	1	1	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0.5	1
12-May	Z	1	1	1	1	1	1	1	1	1	1	2	6	2	2	4	3	2	1	1	1	1	1	1	1.4	6
13-May	1	Z	1	1	1	1	5	7	4	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.7	7
14-May	1	1	Z	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	0	1	0.7	1
15-May	0	0	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0.6	1
16-May	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
17-May	0	0	0	0	0	Z	1	7	13	5	15	7	9	8	6	7	6	4	4	3	1	1	1	1	4.3	15
18-May	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0.8	1
19-May	1	Z	1	1	1	1	1	1	1	1	1	1	11	3	1	1	1	2	13	8	2	1	1	1	2.2	13
20-May	1	1	Z	0	0	0	1	1	1	1	1	1	1	3	2	1	2	2	4	2	1	1	0	1	1.2	4
21-May	1	0	1	Z	1	1	2	1	2	2	1	2	1	1	1	1	1	1	1	1	1	0	0	1	1.0	2
22-May	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	0.6	1
23-May	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
24-May	Z	0	0	0	0	0	0	1	3	34	49	24	8	8	6	5	4	3	2	1	1	1	1	1	7.0	49
25-May	1	Z	1	1	1	1	1	1	2	2	3	1	1	0	2	4	9	2	0	1	1	1	1	1	1.5	9
26-May	1	1	Z	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.5	1
27-May	0	0	0	Z	0	0	0	9	23	34	11	2	7	1	0	0	0	0	0	0	0	0	0	0	3.9	34
28-May	0	0	0	0	Z	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-May	0	0	0	0	0	Z	1	7	23	12	6	9	9	11	11	14	11	15	20	12	4	1	1	1	7.4	23
30-May	Z	1	1	0	0	0	1	2	1	0	0	1	8	7	7	5	3	3	1	1	1	2	1	1	2.1	8
31-May	1	Z	1	1	1	1	12	24	37	20	8	1	2	3	5	5	4	5	2	2	1	1	1	1	5.9	37

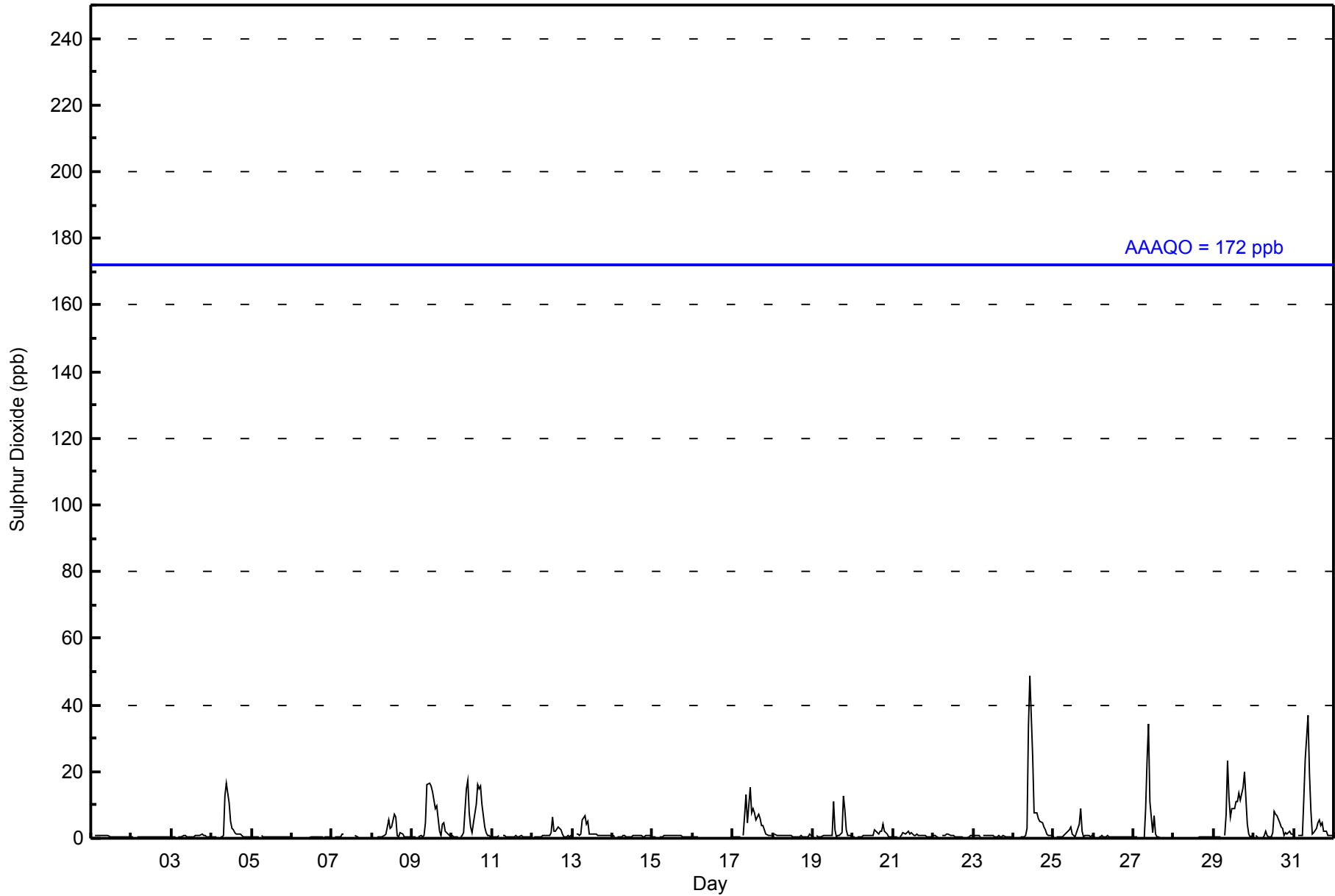
0.5	0.5	0.5	0.5	0.5	0.5	1.2	2.5	5.1	5.9	4.8	2.9	3.0	2.7	2.6	2.7	2.3	2.2	2.4	1.6	0.8	0.6	0.6	0.5	Diurnal Average	
1	1	1	1	1	1	12	24	37	34	49	24	14	12	11	16	15	16	20	12	4	2	1	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	670	94.90	94.90
11 - 20	28	3.97	98.87
21 - 60	8	1.13	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
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	87	92	19	9	13	10	22	37	97	62	65	82	25	15	14	16	665
11 - 20	1	0	1	2	2	2	3	2	9	5	1	0	0	0	0	0	28
21 - 60	0	0	0	0	2	1	2	3	0	0	0	0	0	0	0	0	8
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	88	92	20	11	17	13	27	42	106	67	66	82	25	15	14	16	701

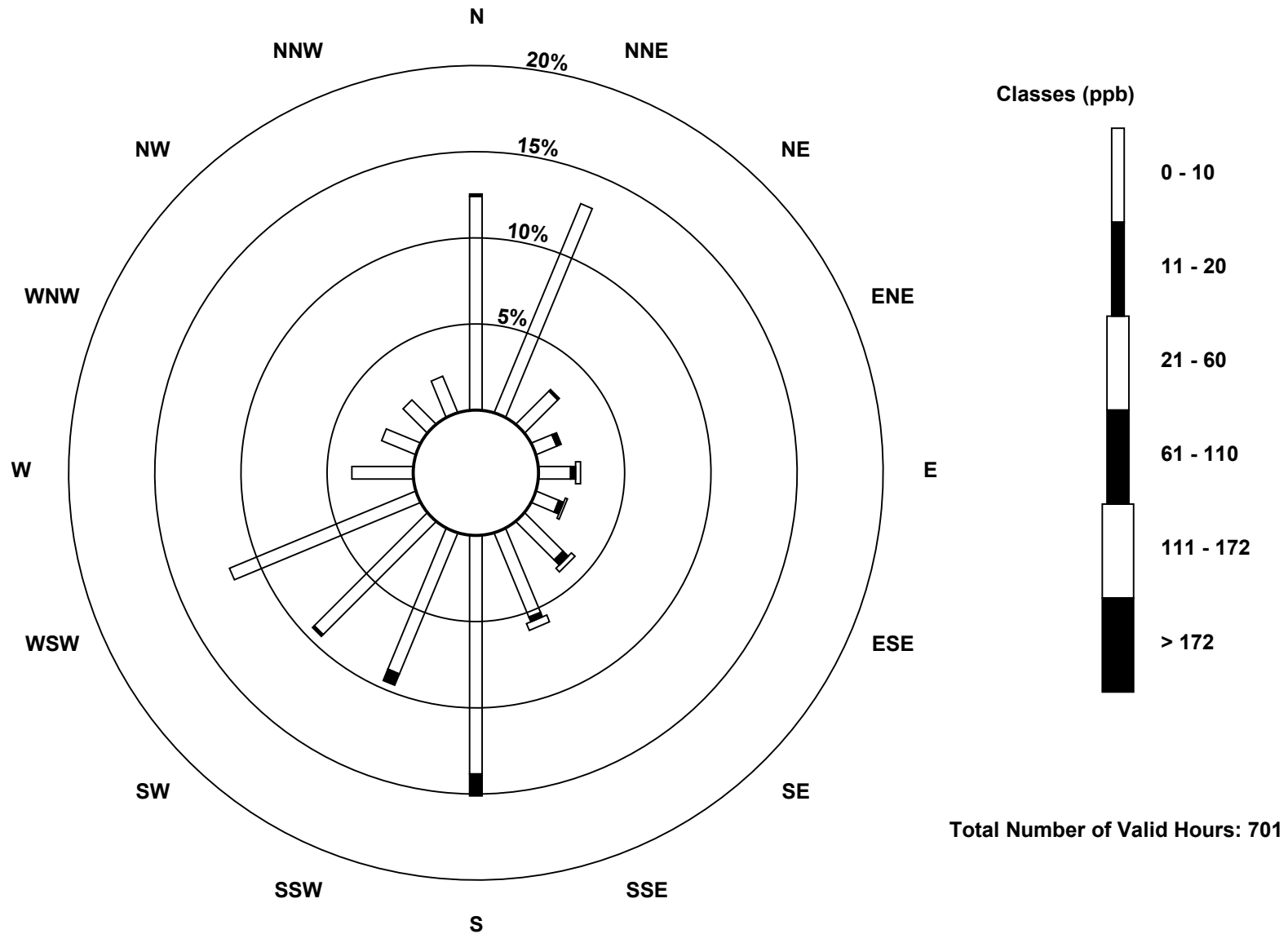
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

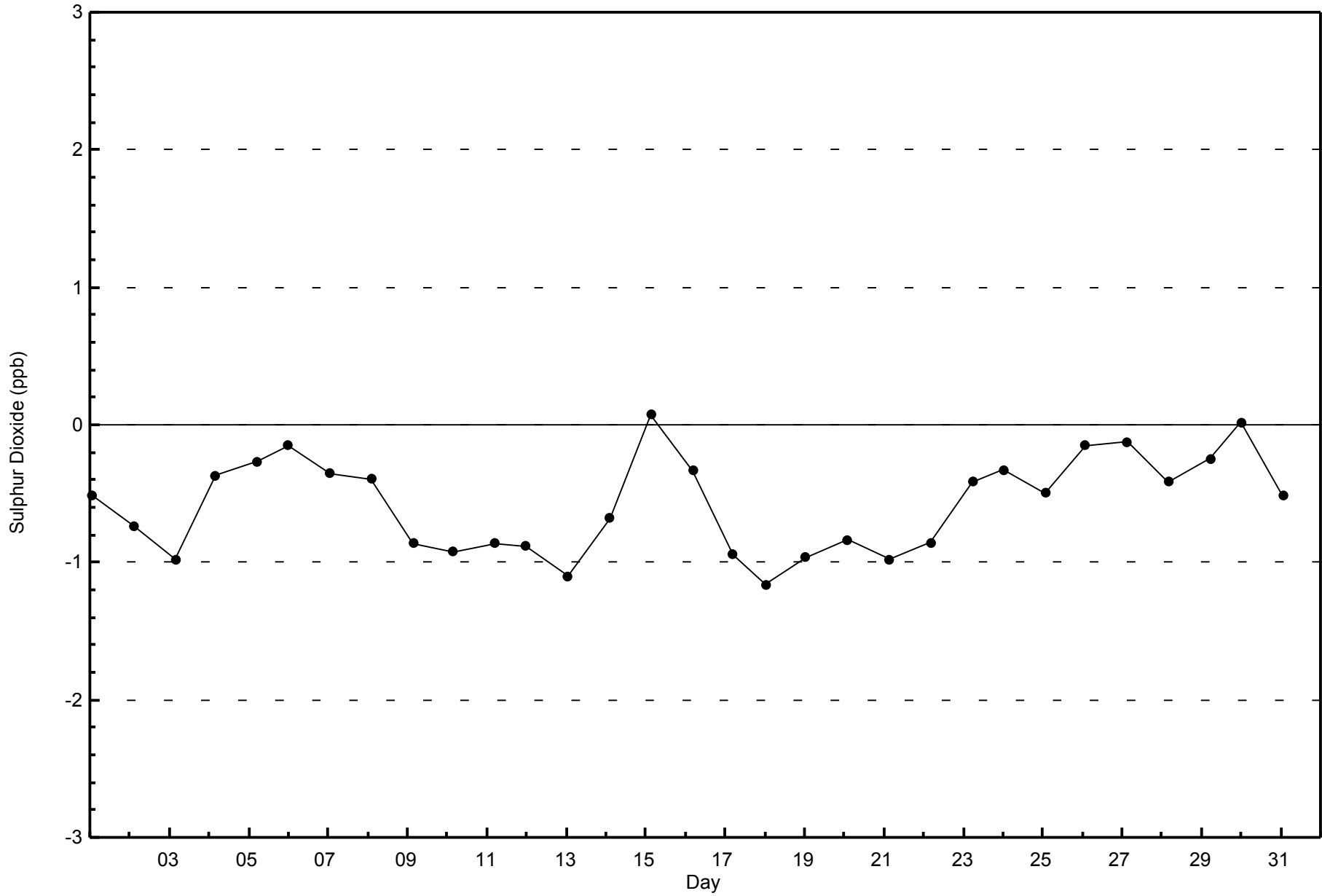
Sulphur Dioxide (SO₂) - ppb
Fort McKay South (AMS 13)





WBEA
Zero Responses

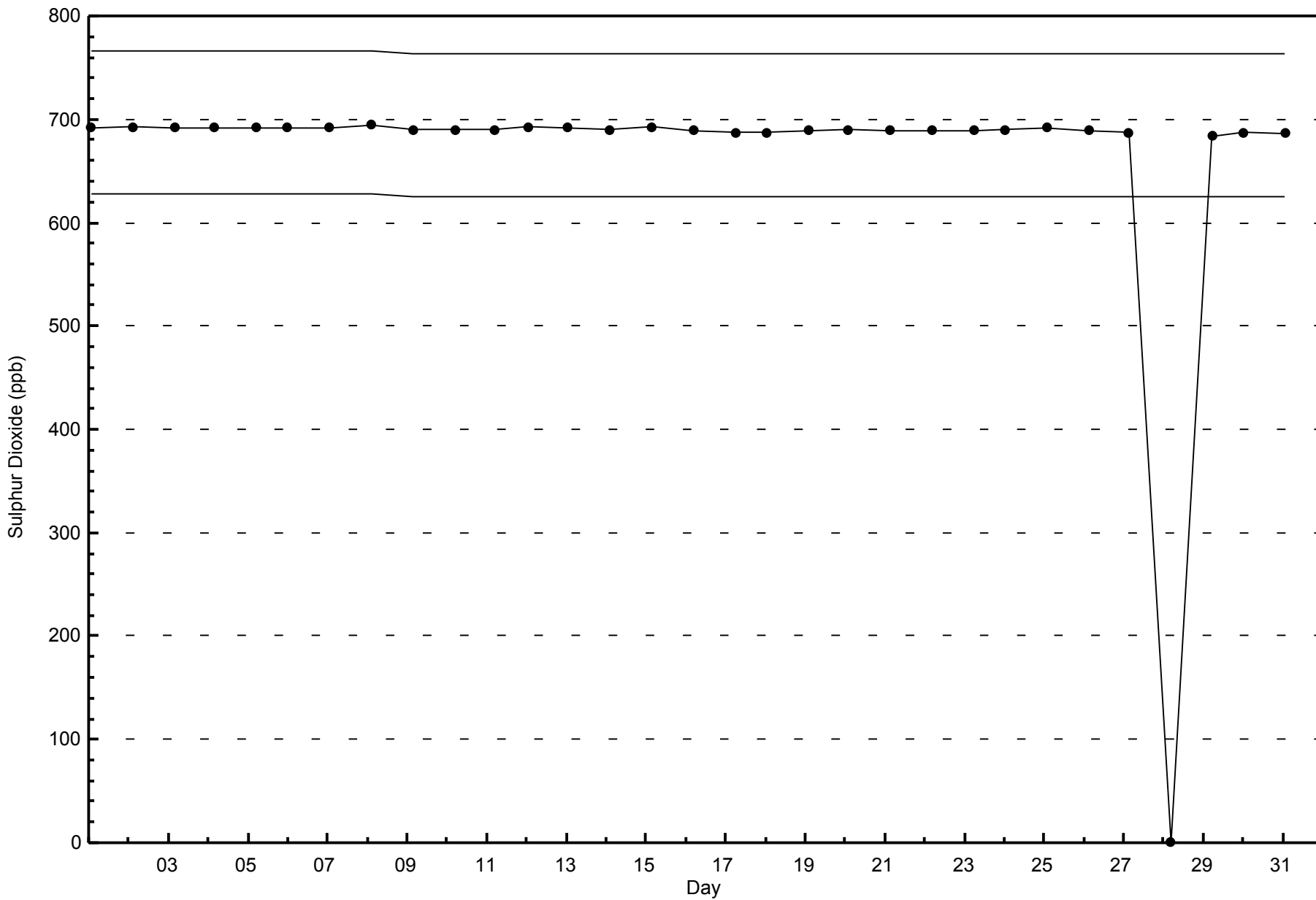
Sulphur Dioxide (SO₂) - ppb
Fort McKay South - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - May 2015



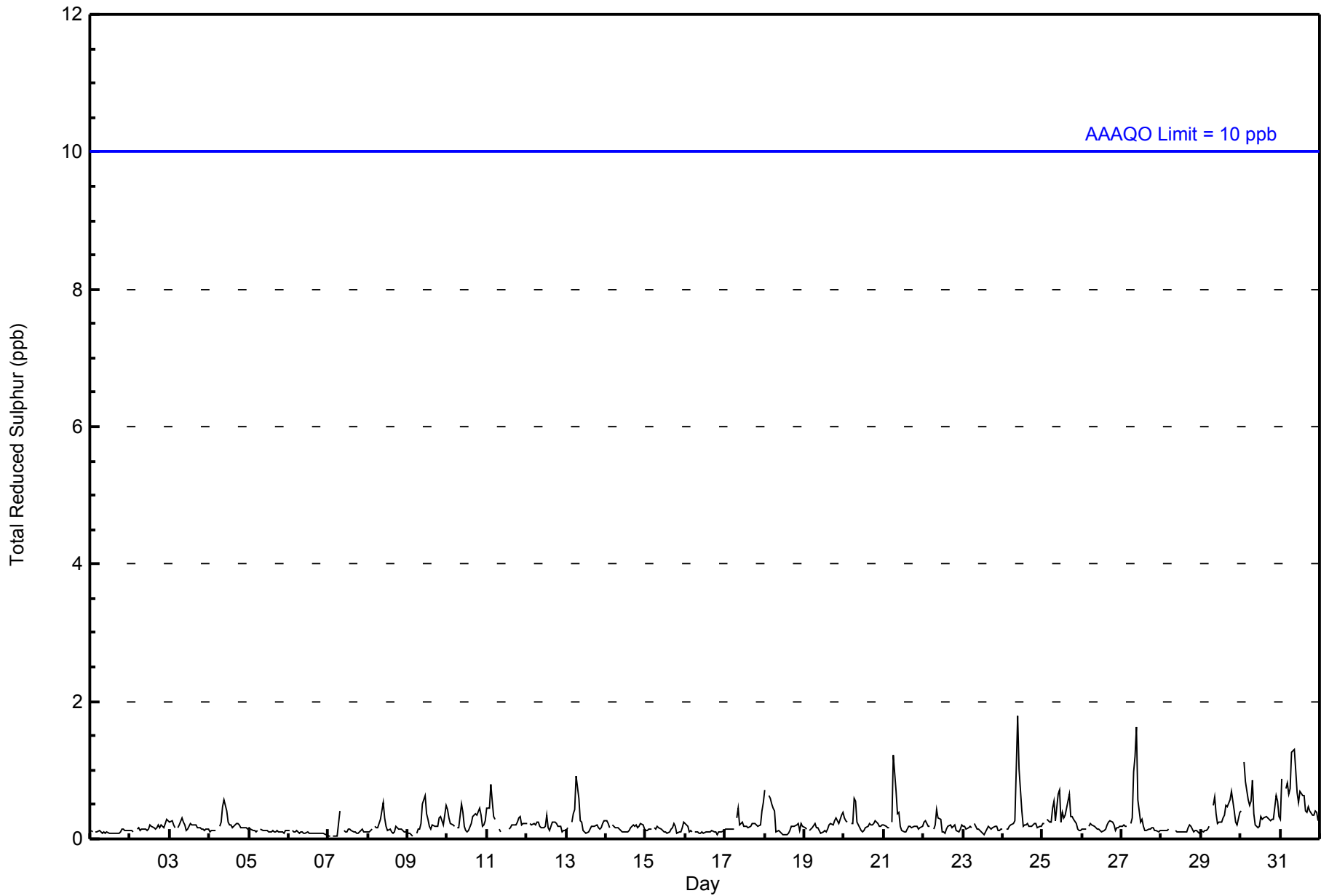


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744										Daily Average	Daily Maximum																														
Maximum Value: 2 ppb on May 24 10:00										Maximum Daily Average: 0.6 ppb on May 31												Hours of Data: 707																													
Minimum Value: 0 ppb on May 9 04:00										Minimum Daily Average: 0.1 ppb on May 6										Hours of Missing Data: 37																															
Maximum Diurnal Average: 0.4 ppb at hour 10										Minimum Diurnal Average: 0.2 ppb at hour 14										Hours of Calibration: 35																															
Monthly Average: 0.2 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1										Percent Operational Time: 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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																								
2-May	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																								
3-May	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																								
4-May	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																								
5-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																								
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																								
7-May	0	0	Z	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																								
8-May	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																								
9-May	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																								
10-May	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
11-May	0	0	1	1	0	0	Z	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
12-May	0	Z	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-May	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	0.2	1																								
14-May	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																								
15-May	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																								
16-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																								
17-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1																								
18-May	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	0.2	1																								
19-May	0	0	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-May	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																								
21-May	0	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
22-May	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																								
23-May	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																								
24-May	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	0.3	2																								
25-May	0	0	Z	0	0	0	0	1	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.3	1																								
26-May	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																								
27-May	0	0	0	0	Z	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																								
28-May	0	0	0	0	0	Z	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																								
29-May	0	0	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0.3	1																								
30-May	0	Z	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.4	1																								
31-May	0	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																								
																								0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
																								1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
Z - zerospan C - Calibration M - Maintenance																								Diurnal Average																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																								Diurnal Maximum																											



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	707	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	88	94	22	11	17	13	26	41	106	61	67	83	23	16	16	18	702
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	88	94	22	11	17	13	26	41	106	61	67	83	23	16	16	18	702

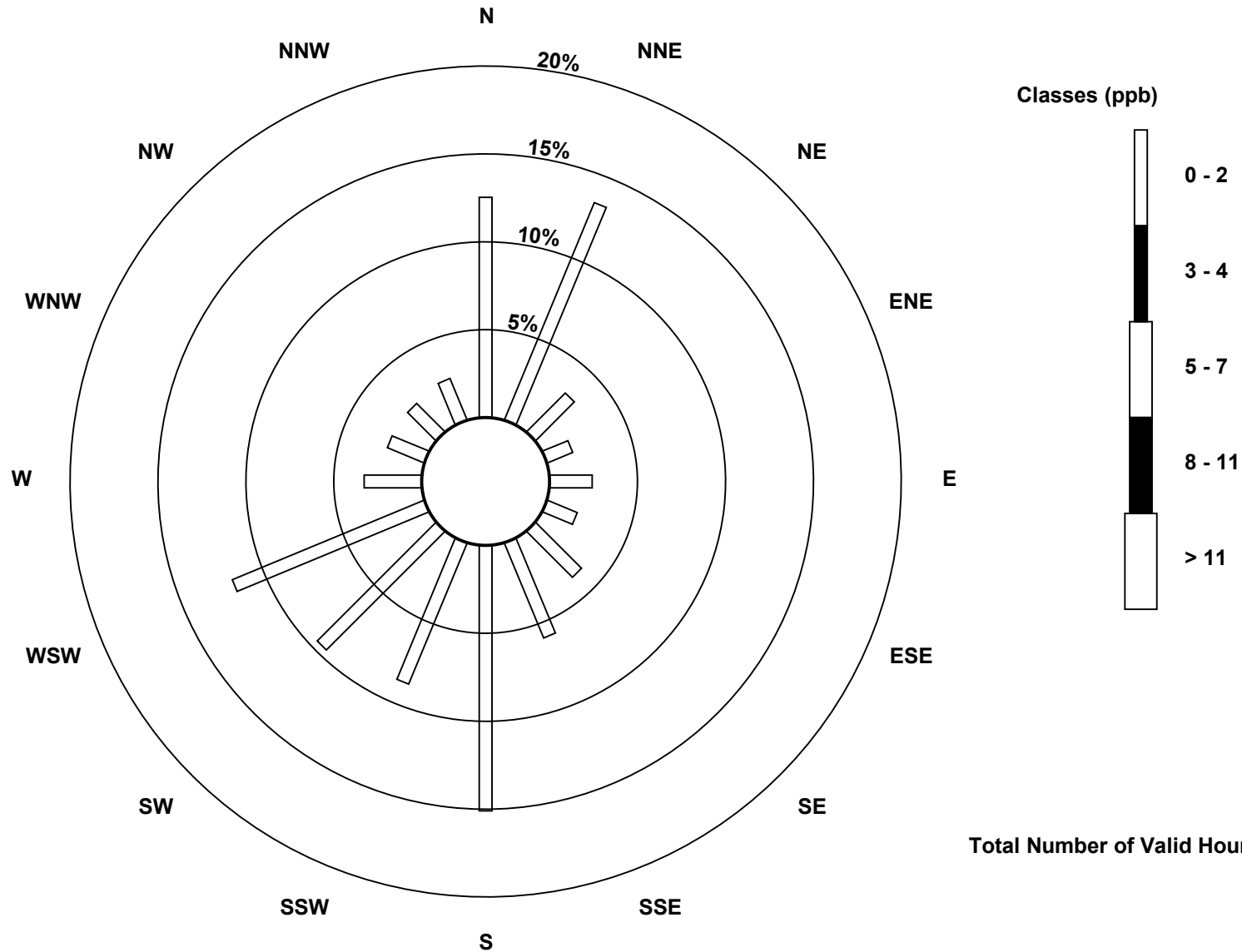
Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

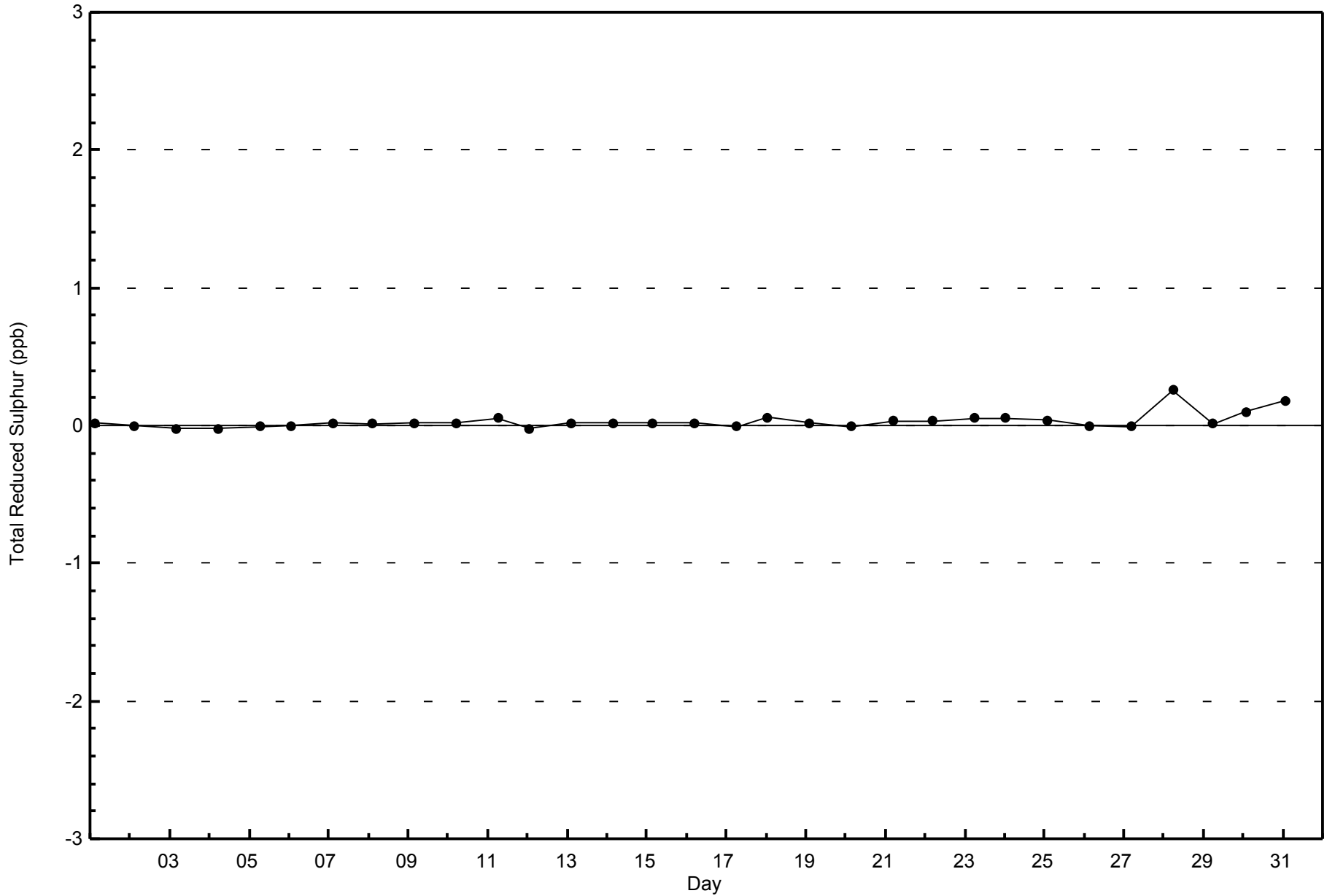
Total Reduced Sulphur (TRS) - ppb
Fort McKay South (AMS 13)





WBEA
Zero Responses

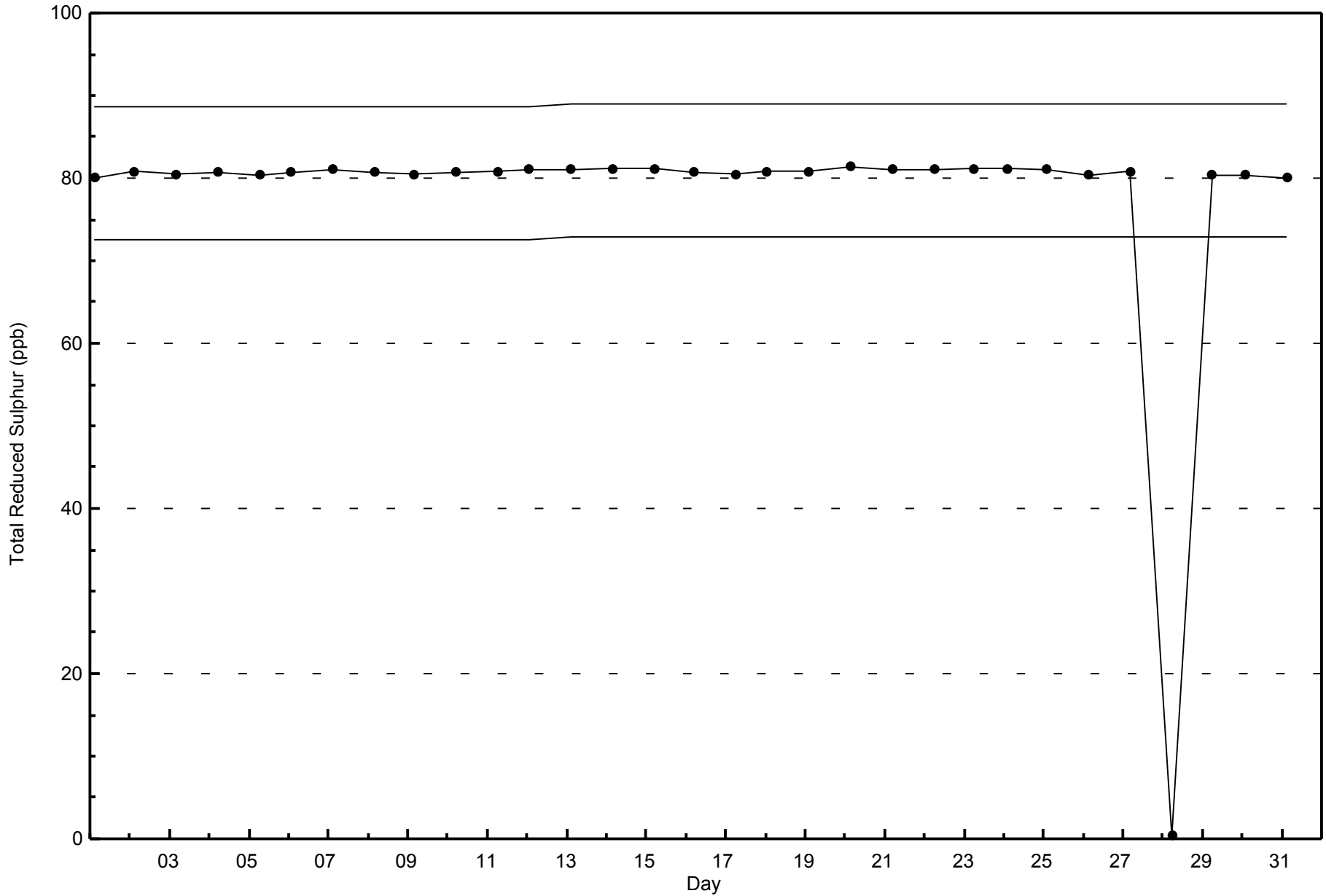
Total Reduced Sulphur (TRS) - ppb
Fort McKay South - May 2015





WBEA
Span Responses

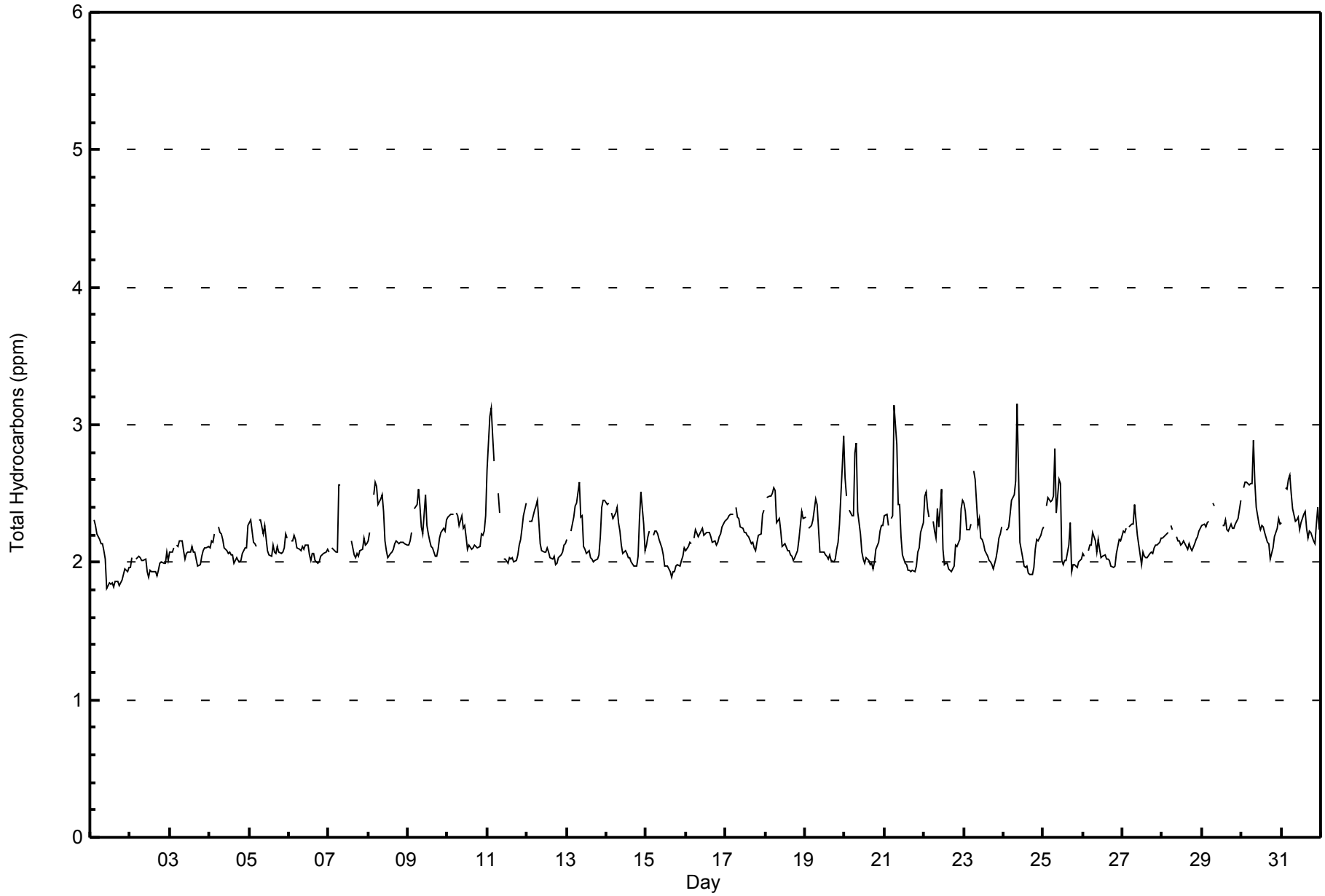
Total Reduced Sulphur (TRS) - ppb
Fort McKay South - May 2015





WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	166	23.71	23.71
2.1 - 3.0	530	75.71	99.43
3.1 - 10.0	4	0.57	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 700

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	23	25	8	5	6	4	5	6	23	15	9	17	6	3	5	6	166
2.1 - 3.0	65	66	12	5	11	9	22	34	81	49	56	65	19	12	9	10	525
3.1 - 10.0	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	4
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	92	20	10	17	13	27	40	105	65	66	82	25	15	14	16	695

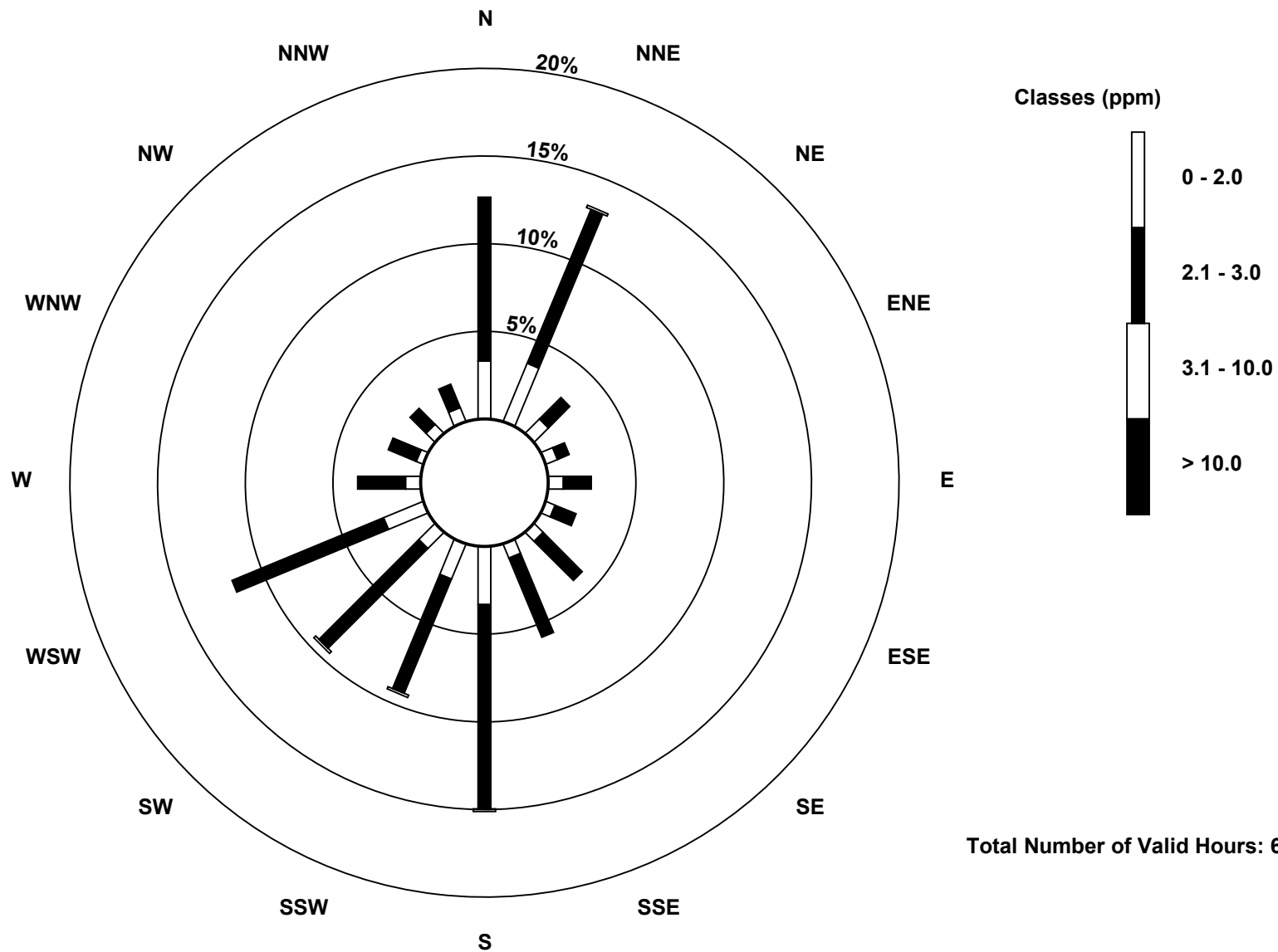
Total Number of Valid Hours: 695

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

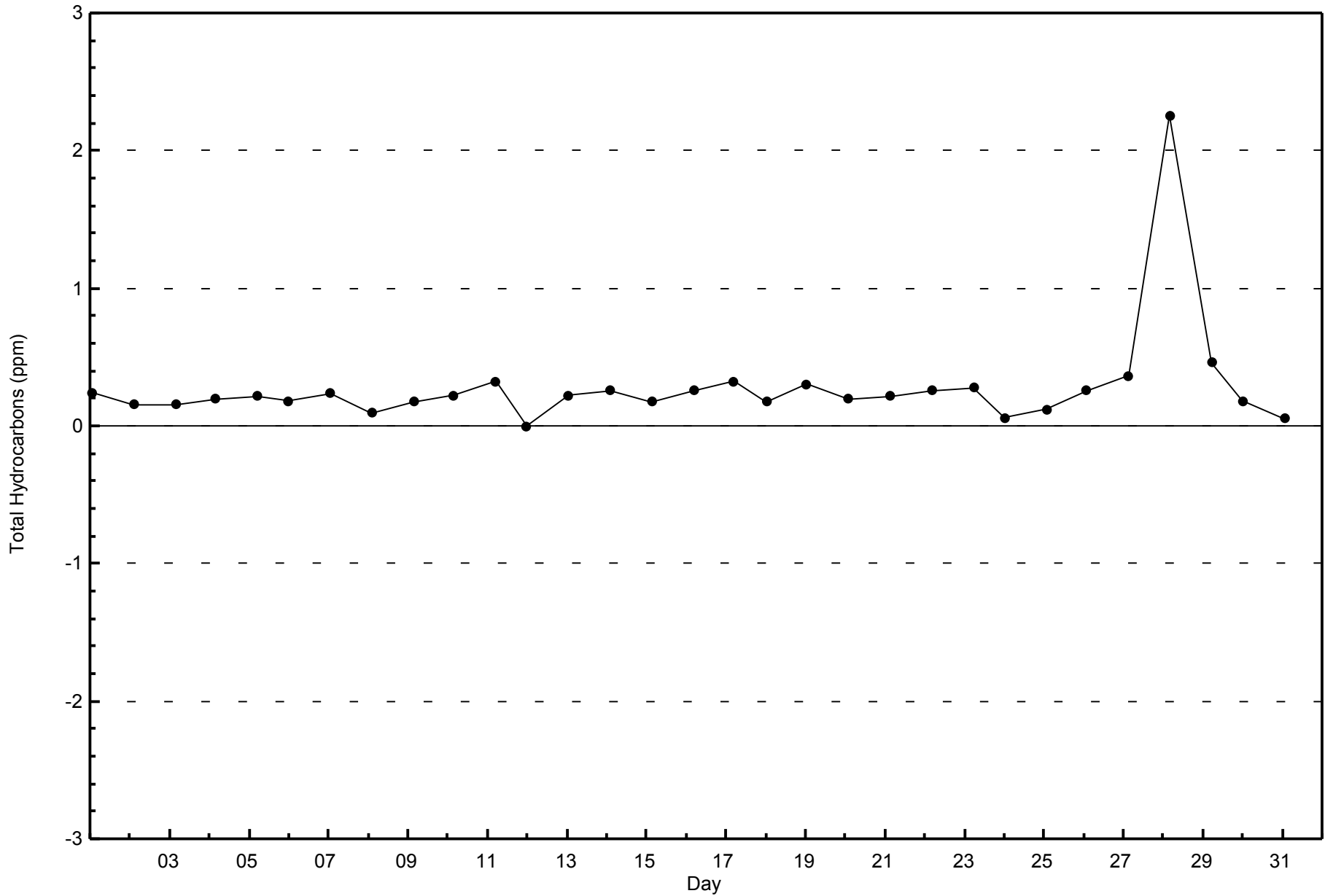
Total Hydrocarbons (THC) - ppm
Fort McKay South (AMS 13)





WBEA
Zero Responses

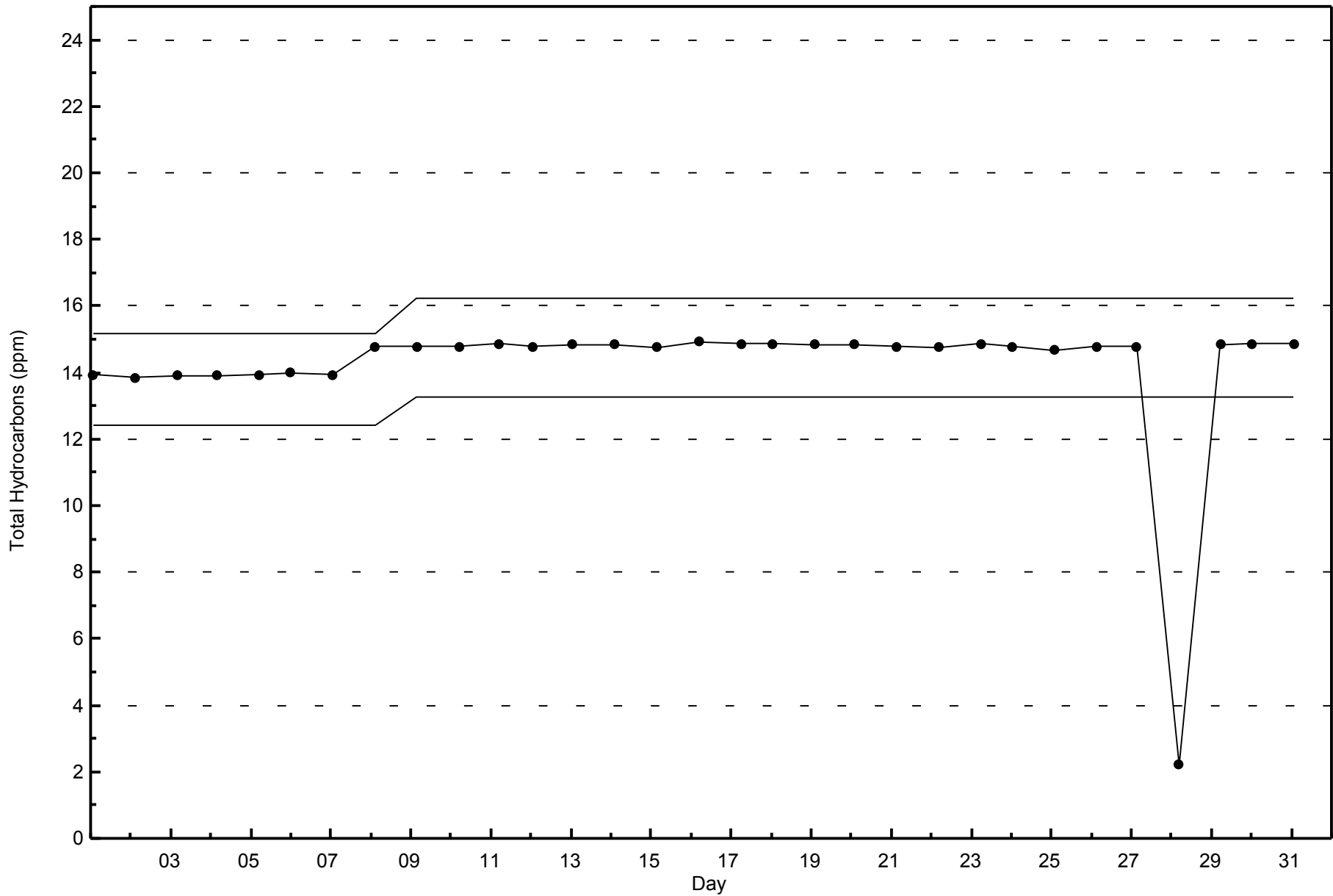
Total Hydrocarbons (THC) - ppm
Fort McKay South - May 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Fort McKay South - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Fort McKay South - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 56 ppb on May 24 17:00	Maximum Daily Average: 35.9 ppb on May 15		Hours of Data:	706
Minimum Value: 0 ppb on May 7 03:00	Minimum Daily Average: 15.8 ppb on May 3		Hours of Missing Data:	38
Maximum Diurnal Average: 41.0 ppb at hour 17	Minimum Diurnal Average: 8.7 ppb at hour 5		Hours of Calibration:	35
Monthly Average: 26.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 6 Q ₁ = 14 Median = 26 Q ₃ = 38 P ₉₀ = 46 P ₉₉ = 52		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-May	8	11	6	Z	5	4	14	32	37	38	40	43	44	45	46	45	46	46	46	46	32	32	27	28	26	30.5	46
2-May	24	17	25	Z	9	26	30	31	32	35	34	31	31	30	32	28	16	26	20	24	18	17	16	16	16	24.9	35
3-May	15	12	3	3	1	Z	9	15	19	21	22	20	18	18	21	22	24	28	30	26	15	9	7	6	6	15.8	30
4-May	4	3	2	2	3	4	Z	22	23	26	28	30	33	35	37	38	38	38	38	35	31	33	29	25	25	24.1	38
5-May	15	18	26	25	28	26	20	Z	23	22	26	28	30	33	32	31	26	20	28	32	32	34	30	26	26	26.6	34
6-May	26	24	Z	23	24	26	26	26	26	29	29	32	34	34	34	34	36	35	32	15	3	1	1	0	23.9	36	
7-May	0	0	0	Z	0	0	1	13	M	28	27	36	39	38	40	43	43	43	42	33	18	11	12	10	21.6	43	
8-May	8	6	2	0	Z	2	7	13	22	C	C	C	C	41	41	38	36	36	35	31	23	29	19	6	20.9	41	
9-May	3	2	1	1	1	Z	11	14	25	25	19	29	32	36	39	38	41	42	38	23	15	9	9	5	19.9	42	
10-May	4	3	2	2	2	2	Z	25	21	24	27	33	39	39	42	42	42	41	37	25	19	14	12	11	22.1	42	
11-May	8	5	5	6	3	2	21	Z	31	32	43	46	46	47	47	47	50	51	51	51	36	24	17	14	16	28.1	51
12-May	15	14	Z	8	5	3	11	24	35	37	38	43	43	45	48	46	46	47	47	39	36	37	34	32	31.9	48	
13-May	30	24	19	Z	10	9	29	33	37	39	42	46	49	50	50	50	50	50	49	42	20	2	1	4	32.0	50	
14-May	10	9	10	10	Z	10	16	31	37	47	48	48	48	48	48	49	49	48	47	41	7	0	15	40	31.0	49	
15-May	36	16	20	11	19	Z	29	29	33	35	42	51	50	51	50	49	48	42	37	37	36	35	34	36	35.9	51	
16-May	37	32	28	22	18	14	Z	13	14	15	16	15	14	14	16	20	21	25	25	25	22	13	10	7	19.0	37	
17-May	5	4	3	2	2	3	10	Z	18	22	22	26	30	33	37	38	41	43	41	38	26	20	18	13	21.5	43	
18-May	14	17	Z	10	8	8	21	25	22	32	41	43	43	44	44	45	46	45	44	35	25	7	0	3	27.1	46	
19-May	11	18	15	Z	11	8	10	20	29	46	46	44	46	47	48	48	47	46	45	34	26	17	13	7	29.5	48	
20-May	11	11	11	9	Z	6	12	25	27	34	45	49	49	49	50	50	50	50	48	36	26	14	14	10	29.8	50	
21-May	6	5	9	9	9	Z	9	31	40	44	46	50	50	50	52	52	52	51	50	38	24	19	13	7	31.1	52	
22-May	1	0	5	12	11	11	Z	28	26	36	35	43	45	44	43	40	39	40	41	37	33	22	14	15	27.0	45	
23-May	15	13	18	14	8	11	13	Z	24	26	36	40	42	45	46	46	45	44	44	31	23	19	15	12	27.3	46	
24-May	11	11	Z	10	6	6	15	13	11	29	41	44	47	51	53	55	56	56	48	34	25	23	18	17	29.6	56	
25-May	14	10	6	Z	6	6	10	8	22	25	33	39	22	21	33	43	45	32	19	22	29	28	31	30	23.3	45	
26-May	30	30	27	19	Z	26	27	29	33	34	37	38	39	39	39	39	39	38	37	37	38	33	21	16	12	31.3	39
27-May	9	7	6	5	3	Z	14	20	22	22	31	42	38	43	38	35	32	32	29	28	30	31	27	25	24.7	43	
28-May	25	25	23	22	23	24	Z	M	M	27	29	29	31	32	33	34	34	35	35	34	25	16	13	11	26.7	35	
29-May	10	10	7	5	4	4	12	Z	20	26	31	33	37	40	42	43	45	43	41	34	26	23	26	28	25.7	45	
30-May	27	24	Z	12	7	6	18	25	25	25	36	43	45	46	47	49	50	50	48	47	41	36	42	38	34.2	50	
31-May	34	27	21	Z	10	6	16	24	31	29	25	19	18	18	23	25	28	28	26	30	21	10	3	10	21.0	34	

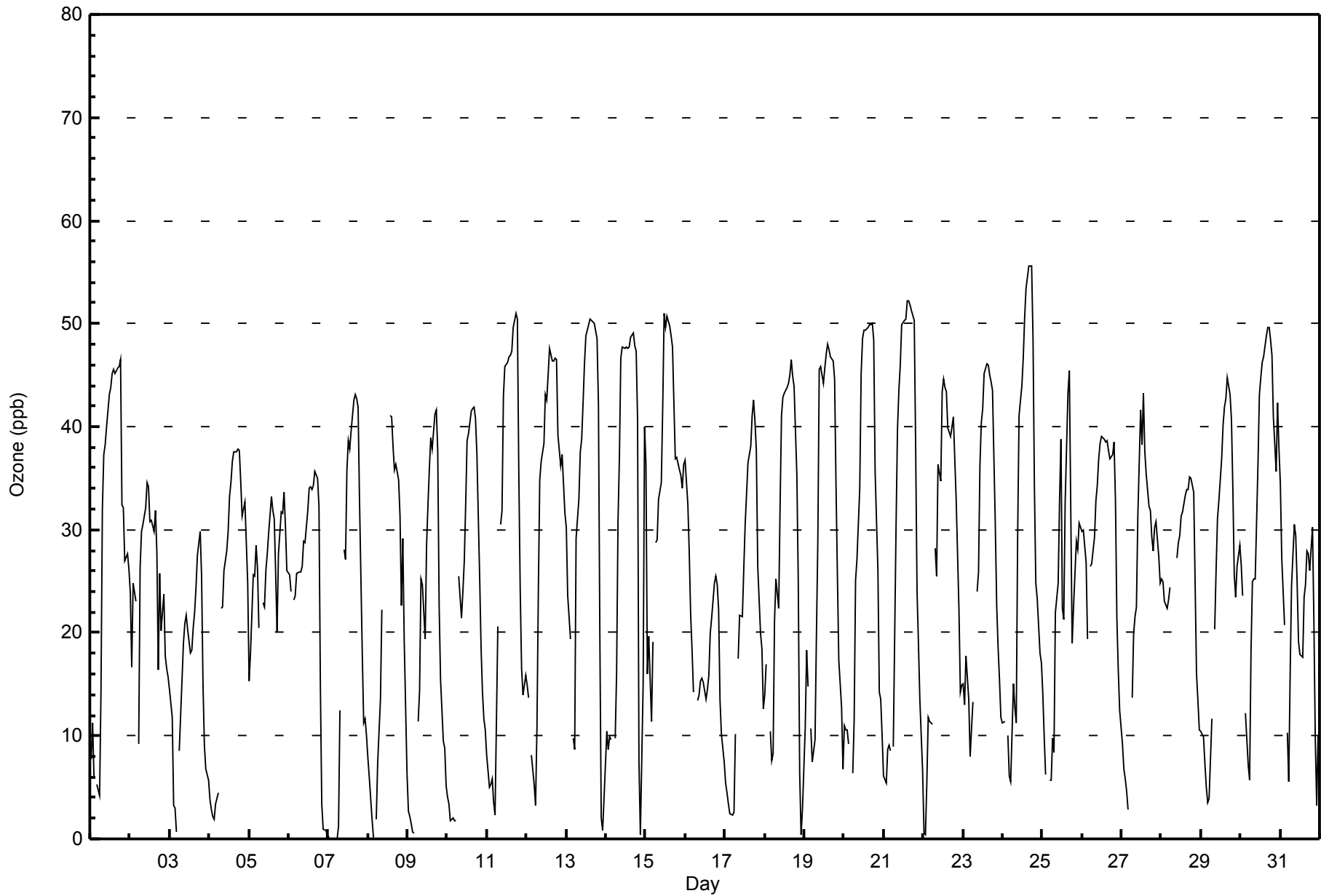
15.0	13.2	11.5	10.7	8.7	9.1	15.6	22.8	26.3	30.3	33.8	37.2	37.7	39.0	40.2	40.8	41.0	39.9	38.8	32.5	24.8	19.2	17.3	16.2	Diurnal Average	
37	32	28	25	28	26	29	33	40	47	48	51	50	51	53	55	56	56	51	47	41	37	42	40	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	251	35.55	35.55
21 - 50	442	62.61	98.16
51 - 82	13	1.84	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	18	17	2	0	2	1	2	9	23	26	48	56	16	10	10	9	249
21 - 50	71	75	18	11	12	10	23	31	80	38	19	24	8	5	6	8	439
51 - 82	0	0	1	0	2	1	2	0	1	2	2	2	0	0	0	0	13
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	92	21	11	16	12	27	40	104	66	69	82	24	15	16	17	701

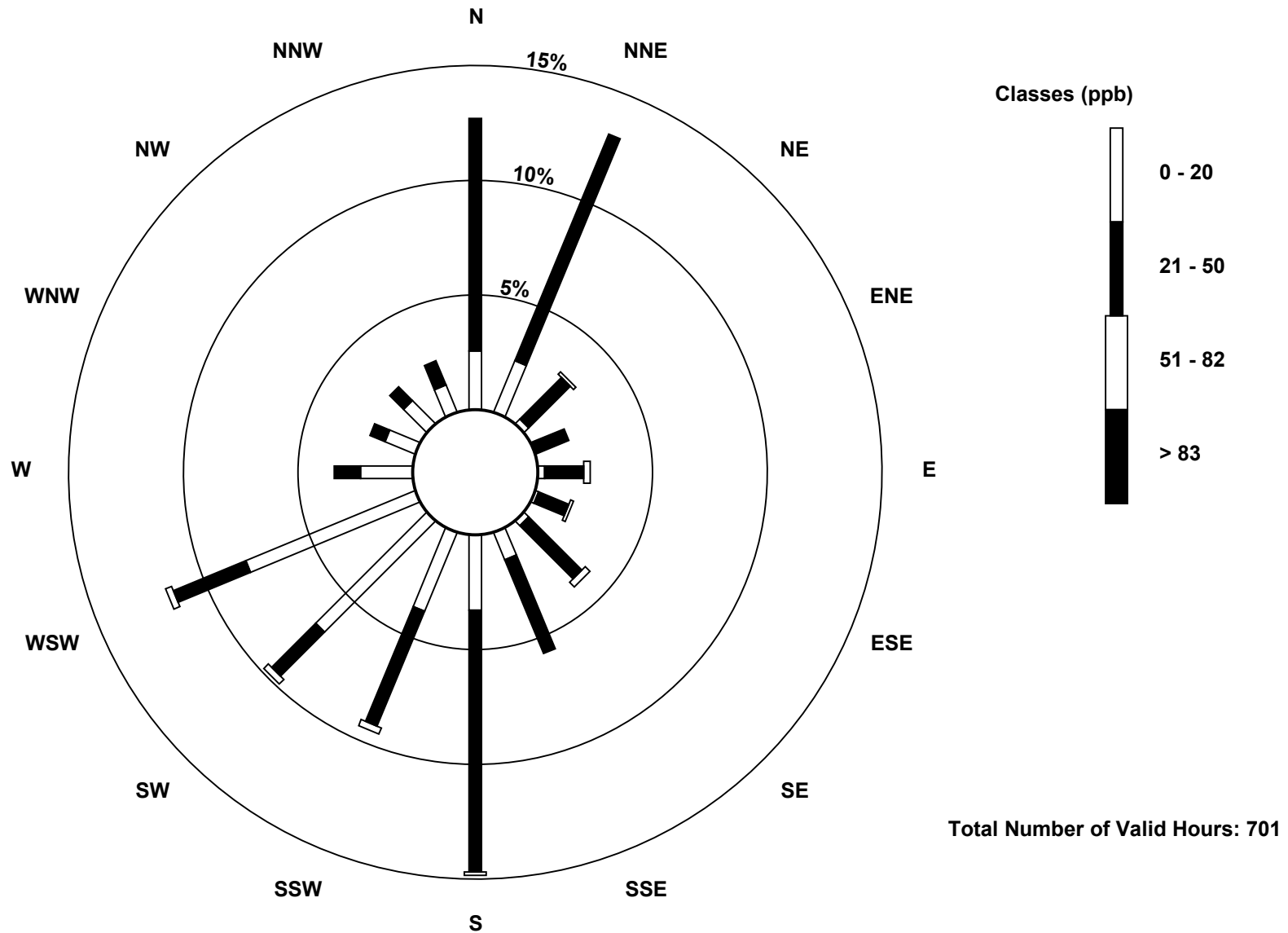
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

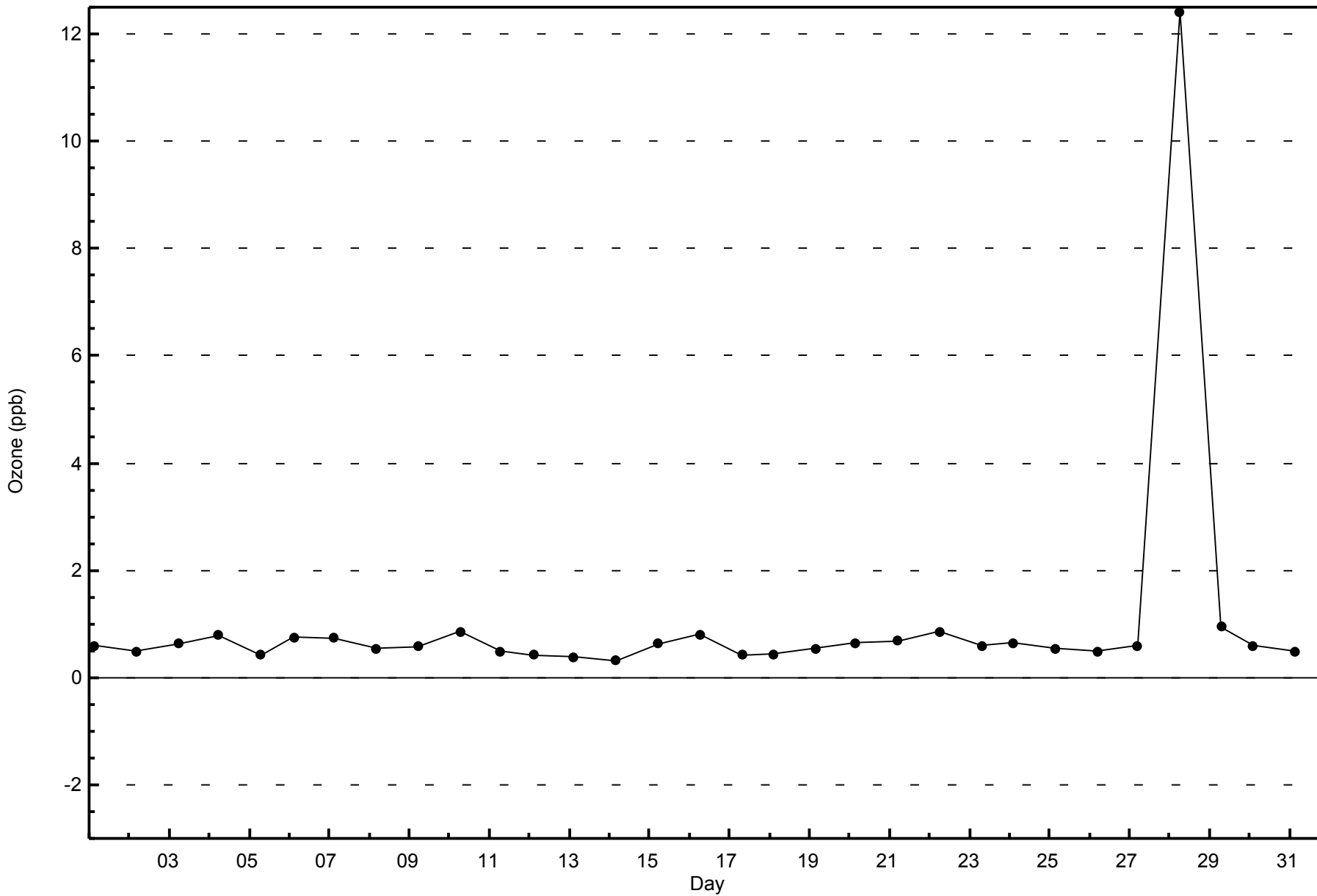
Ozone (O₃) - ppb
Fort McKay South (AMS 13)





WBEA
Zero Responses

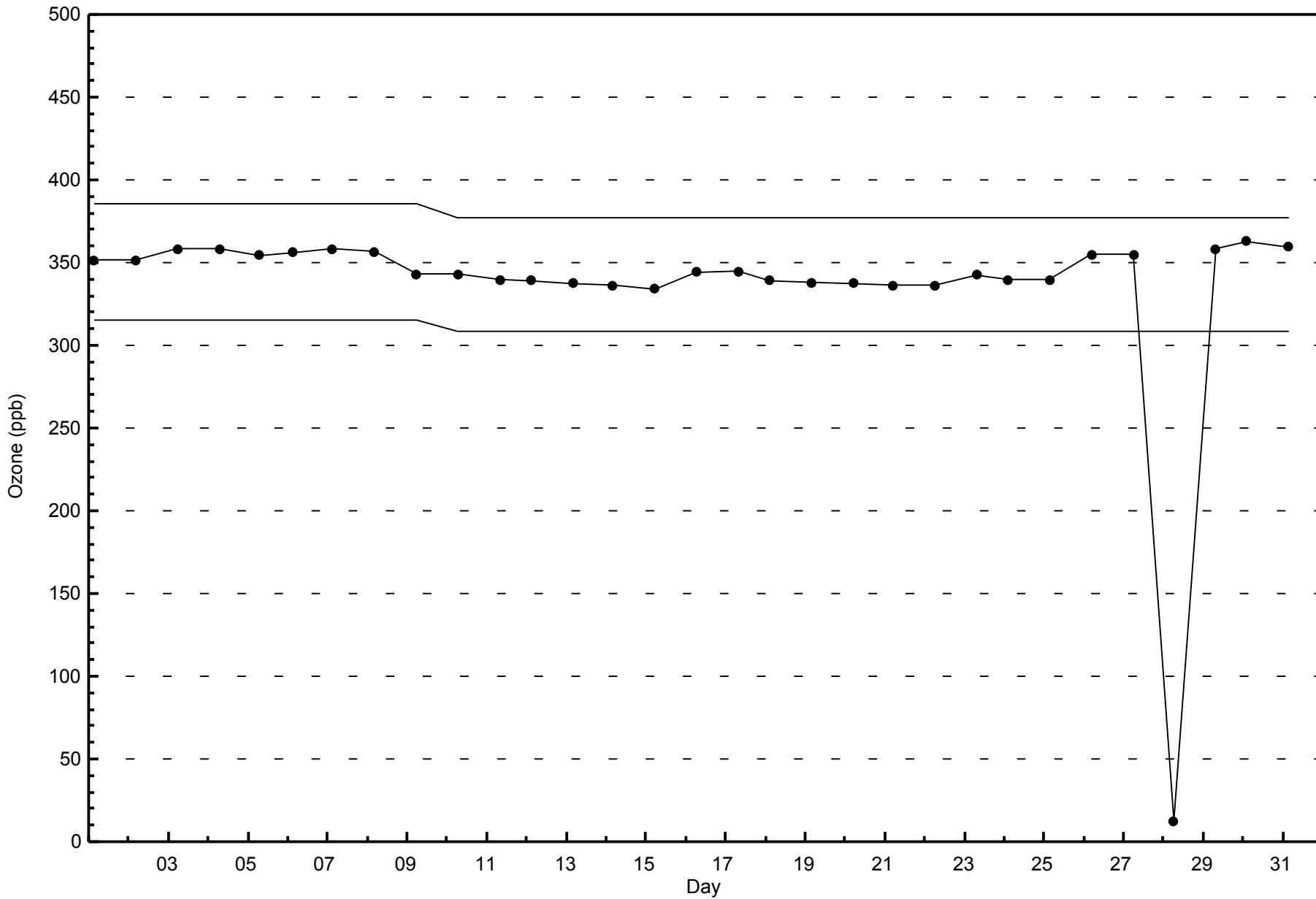
Ozone (O₃) - ppb
Fort McKay South - May 2015





WBEA
Span Responses

Ozone (O₃) - ppb
Fort McKay South - May 2015



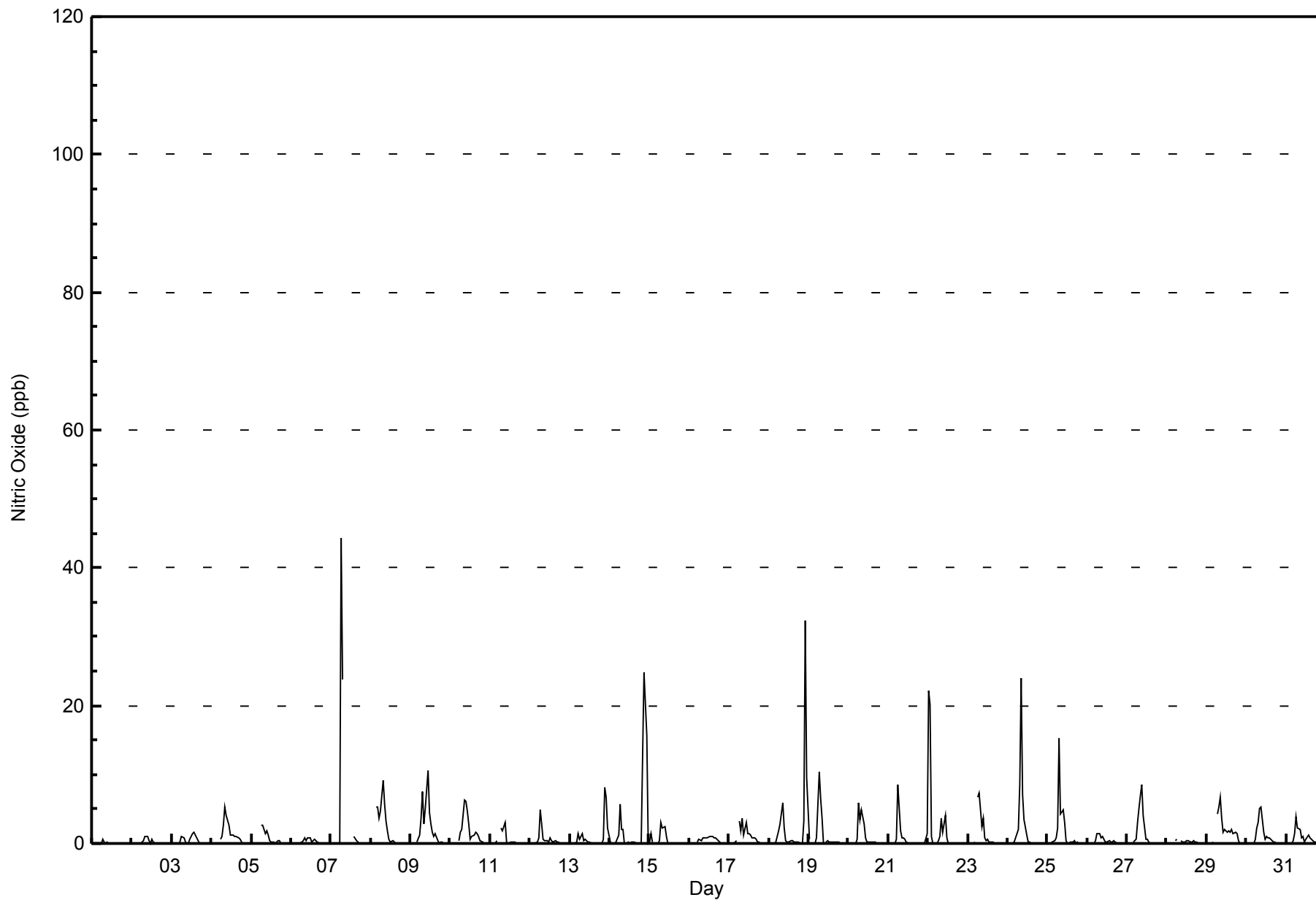


Maximum Value: 44 ppb on May 7 07:00																	Maximum Daily Average: 2.9 ppb on May 14																	Hours in Service: 744			
Minimum Value: 0 ppb on May 1 12:00																	Minimum Daily Average: 0.2 ppb on May 2																	Hours of Data: 706			
Maximum Diurnal Average: 4.2 ppb at hour 8																	Minimum Diurnal Average: 0.0 ppb at hour 20																	Hours of Missing Data: 38			
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 = 19																	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-May	3	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	3											
2-May	0	0	Z	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1											
3-May	0	0	0	Z	0	0	1	1	1	0	0	1	2	2	1	1	0	0	0	0	0	0	0	0.4	2												
4-May	0	0	0	0	Z	1	1	3	5	4	3	1	1	1	1	1	1	1	1	0	0	0	0	1.0	5												
5-May	0	0	0	0	0	Z	3	3	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3												
6-May	Z	0	0	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0.2	1												
7-May	0	Z	0	0	0	0	44	24	C	C	C	C	C	C	1	0	0	0	0	0	0	0	0	--	44												
8-May	0	0	Z	5	5	4	5	9	6	3	2	1	0	0	0	0	0	0	0	0	0	0	0	1.7	9												
9-May	0	0	0	Z	0	1	4	7	3	5	11	5	3	2	1	1	0	0	0	0	0	0	0	1.9	11												
10-May	0	0	0	0	Z	0	2	2	6	6	5	3	1	1	1	2	1	1	0	0	0	0	0	1.4	6												
11-May	0	0	0	0	0	Z	2	2	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3												
12-May	Z	0	0	0	0	1	5	3	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.5	5												
13-May	0	Z	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	8	7	2	1.0	8										
14-May	0	0	Z	0	0	1	6	2	2	0	0	0	0	0	0	0	0	0	0	0	13	25	16	0	2.9	25											
15-May	0	1	0	Z	0	0	0	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3												
16-May	0	0	0	0	Z	0	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1												
17-May	0	0	0	0	0	Z	3	2	4	1	3	1	1	1	1	1	1	0	0	0	0	0	0	0.9	4												
18-May	Z	0	0	0	0	1	2	3	6	2	0	0	0	0	0	0	0	0	0	0	0	3	32	9	2.7	32											
19-May	1	Z	0	0	0	1	10	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	10												
20-May	0	0	Z	0	0	1	6	3	5	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0.9	6												
21-May	0	0	0	Z	0	1	9	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	9												
22-May	22	20	1	0	Z	0	0	1	4	2	4	1	0	0	0	0	0	0	0	0	0	0	0	2.4	22												
23-May	0	0	0	0	0	Z	7	7	2	4	1	0	1	0	0	0	0	0	0	0	0	0	0	1.0	7												
24-May	Z	0	0	0	0	1	2	8	24	7	3	1	0	0	0	0	0	0	0	0	0	0	0	2.1	24												
25-May	0	Z	0	0	0	1	2	15	4	5	3	0	0	0	0	0	0	0	0	0	0	0	0	1.4	15												
26-May	0	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1												
27-May	0	0	0	Z	0	1	3	5	7	9	4	1	1	0	0	0	0	0	0	0	0	0	0	1.3	9												
28-May	0	0	0	0	Z	0	1	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1												
29-May	0	0	0	0	0	Z	4	5	7	4	2	2	2	2	2	2	1	2	1	0	0	0	0	1.6	7												
30-May	Z	0	0	0	0	1	2	3	5	5	2	1	1	1	1	0	0	0	0	0	0	0	0	1.0	5												
31-May	0	Z	0	0	0	2	4	2	2	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0.7	4												
																								Diurnal Average													
																								Diurnal Maximum													
Z - zerospan C - Calibration M - Maintenance																																					



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	700	99.15	99.15
21 - 40	5	0.71	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: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	91	20	11	17	13	26	42	106	66	63	82	25	15	14	16	695
21 - 40	0	1	0	0	0	0	1	0	0	0	3	0	0	0	0	0	5
11 - 80	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	92	20	11	17	13	27	42	106	67	66	82	25	15	14	16	701

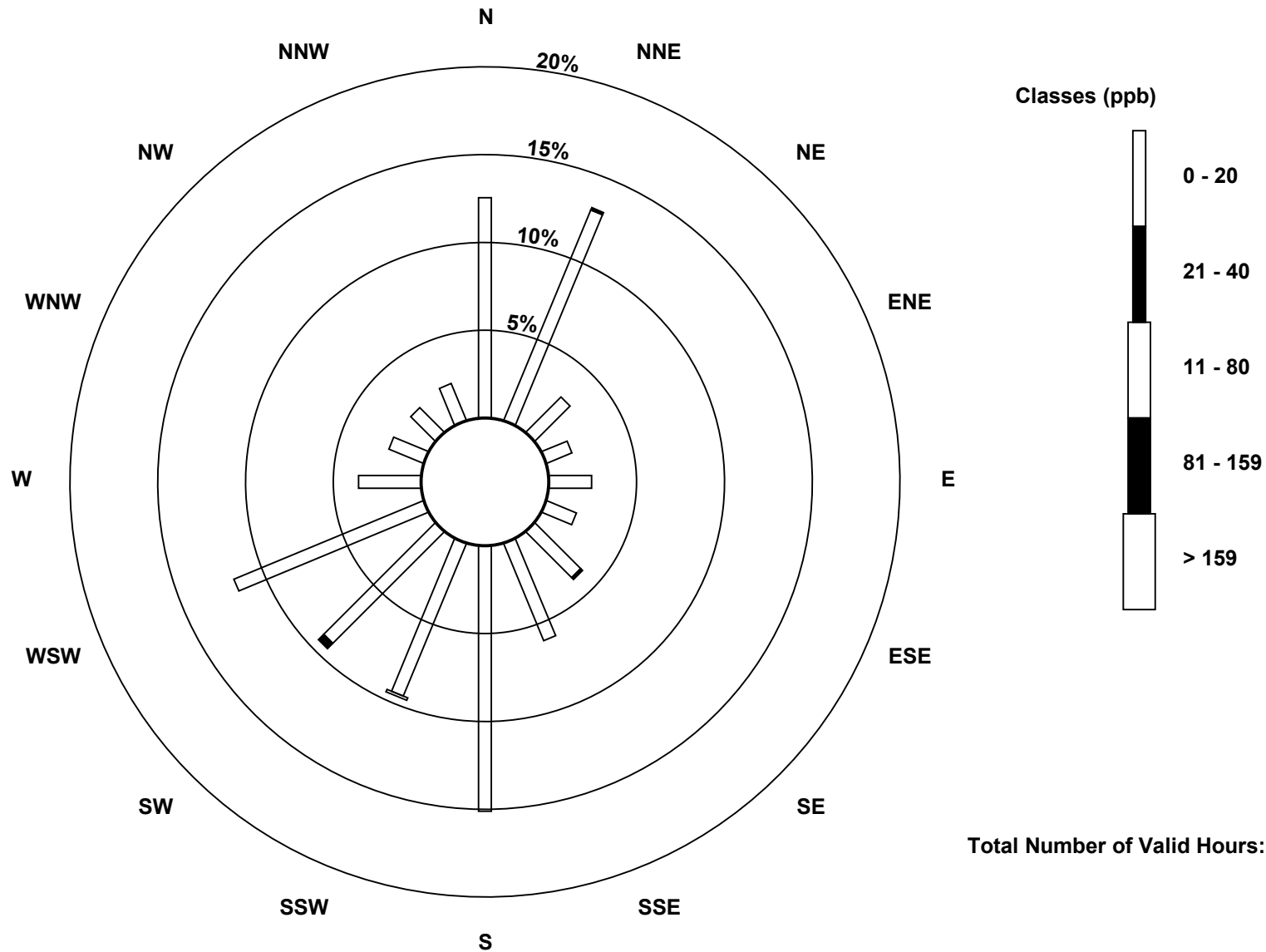
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

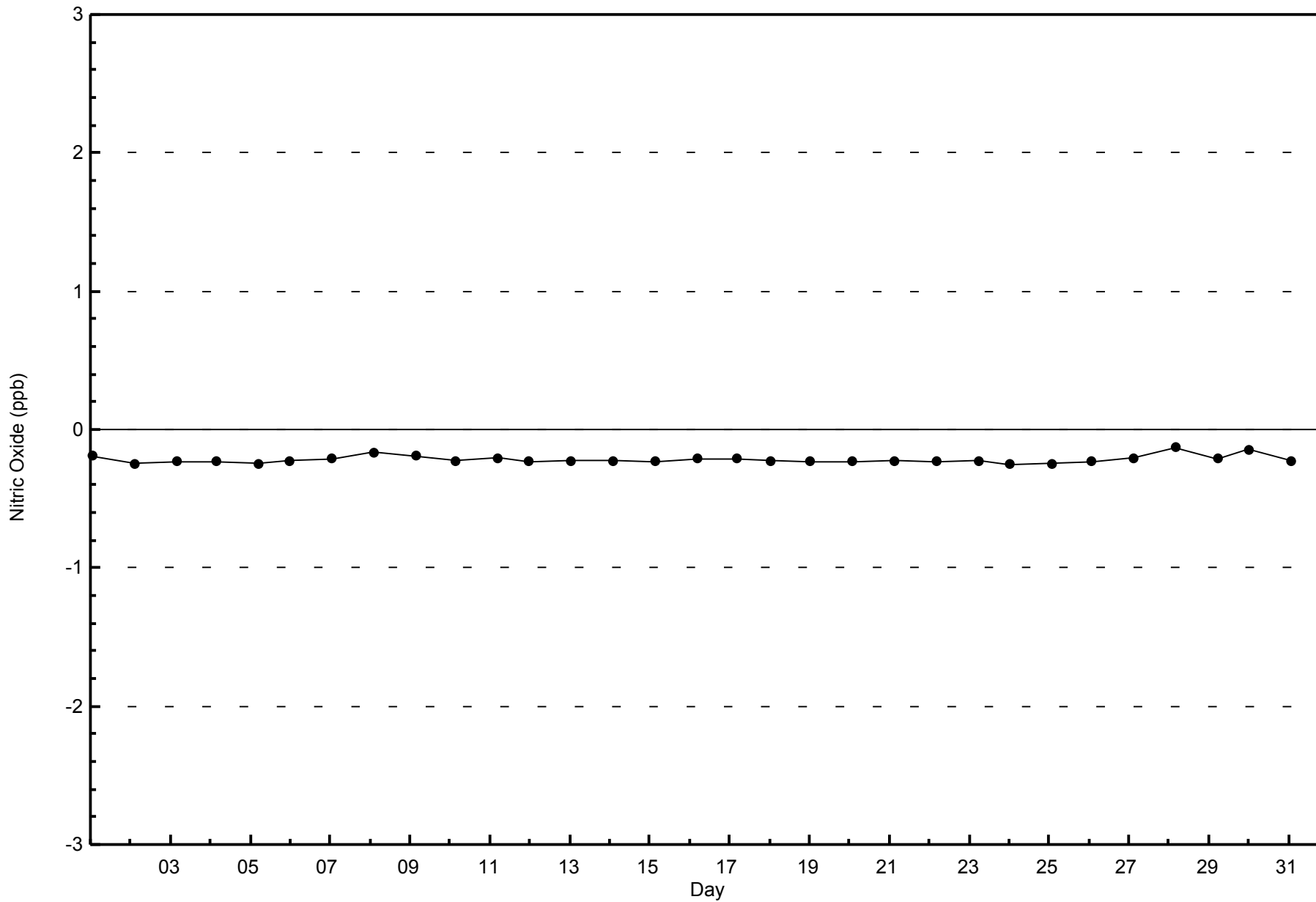
Nitric Oxide (NO) - ppb
Fort McKay South (AMS 13)





WBEA
Zero Responses

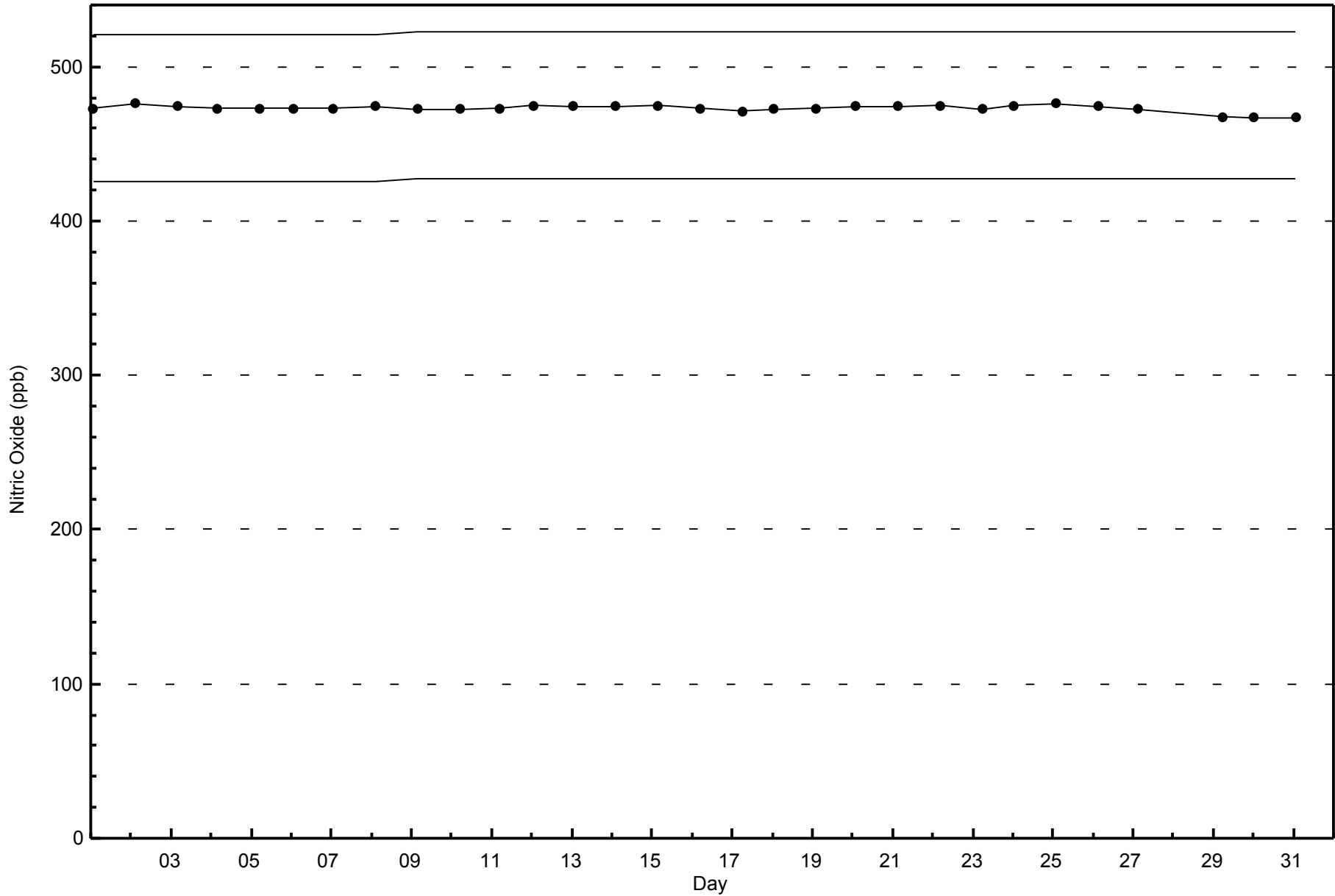
Nitric Oxide (NO) - ppb
Fort McKay South - May 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Fort McKay South - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

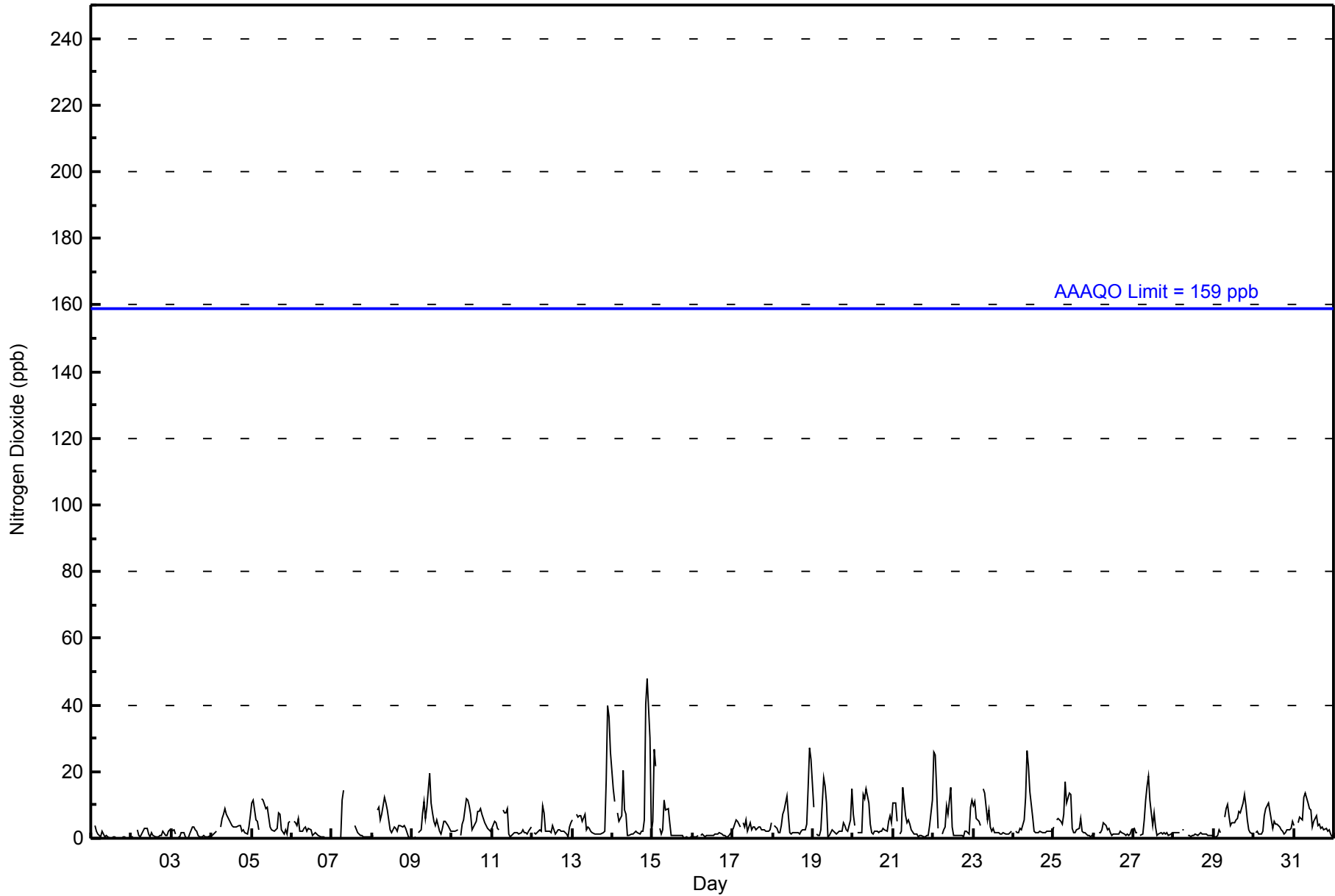
Fort McKay South - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 48 ppb on May 14 22:00 Maximum Daily Average: 9.6 ppb on May 14																		Hours in Service: 744 Hours of Data: 706								
Minimum Value: 0 ppb on May 6 22:00 Minimum Daily Average: 0.9 ppb on May 16 Maximum Diurnal Average: 8.4 ppb at hour 8 Minimum Diurnal Average: 2.2 ppb at hour 15 Monthly Average: 4.1 ppb Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 10 P ₉₉ = 27																		Hours of Missing Data: 38 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-May	13	Z	4	2	1	0	2	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	13
2-May	0	0	Z	2	1	1	1	2	3	3	1	1	2	1	0	0	0	1	1	2	1	1	2	2	1.3	3
3-May	2	3	1	Z	0	1	2	2	0	0	0	1	3	4	2	2	1	0	1	1	1	0	1	1	1.2	4
4-May	1	1	2	2	Z	4	6	7	9	7	5	5	4	4	3	3	4	4	2	2	2	1	3	7	3.8	9
5-May	11	12	6	5	2	Z	12	12	9	9	6	3	3	2	3	3	8	7	3	1	2	1	5	5	5.6	12
6-May	Z	5	5	4	6	2	2	3	3	2	3	3	1	1	2	1	1	0	1	0	0	0	0	0	2.0	6
7-May	0	Z	0	0	0	0	11	15	C	C	C	C	C	C	4	2	1	1	1	1	0	0	0	0	--	15
8-May	0	1	Z	9	9	6	7	12	11	8	5	3	2	3	3	2	4	4	4	4	3	2	1	0	4.4	12
9-May	0	0	1	Z	2	3	8	11	6	9	20	10	8	5	4	6	2	1	3	5	5	4	3	2	5.1	20
10-May	2	2	2	3	Z	1	4	6	12	11	10	7	3	4	5	8	8	9	7	5	4	3	3	2	5.2	12
11-May	3	5	5	3	3	Z	8	8	8	9	1	1	1	2	2	2	1	2	2	2	2	1	2	4	3.3	9
12-May	Z	2	1	2	3	2	10	8	2	2	2	2	4	3	1	3	3	2	2	2	1	1	3	5	2.8	10
13-May	6	Z	7	7	7	7	5	7	3	4	3	2	2	1	1	1	1	1	2	2	17	40	36	26	8.2	40
14-May	15	11	Z	8	5	7	20	9	7	1	1	1	1	2	2	2	1	2	2	6	40	48	30	2	9.6	48
15-May	5	27	22	Z	3	1	2	12	8	9	5	1	1	1	1	1	1	1	1	0	0	0	0	0	4.4	27
16-May	0	0	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	0.9	2
17-May	3	4	5	5	3	Z	5	3	5	2	5	3	4	3	3	3	3	2	3	3	2	2	2	5	3.4	5
18-May	Z	4	3	2	2	4	7	9	13	7	2	1	2	2	2	2	1	2	3	3	4	15	27	24	6.0	27
19-May	9	Z	1	1	1	3	18	16	11	1	1	3	2	2	1	2	2	2	5	4	3	2	6	15	4.7	18
20-May	7	4	Z	2	2	2	13	12	15	11	Z	4	2	1	2	2	2	2	3	2	2	5	7	5	4.7	15
21-May	11	11	5	Z	1	2	15	7	5	6	4	2	1	1	1	1	1	1	1	1	1	1	4	11	4.0	15
22-May	26	25	14	3	Z	1	2	3	10	7	15	4	1	1	1	1	1	1	1	2	2	1	9	11	6.2	26
23-May	10	11	6	5	4	Z	15	14	6	9	3	2	3	2	2	2	1	1	2	1	1	1	2	2	4.5	15
24-May	Z	2	2	2	3	3	6	12	26	22	14	6	2	2	2	2	2	2	2	2	2	2	2	2	5.3	26
25-May	3	Z	5	6	5	4	7	17	11	13	13	3	2	2	3	3	6	2	2	2	1	1	1	1	4.9	17
26-May	1	1	Z	2	2	3	5	4	2	3	2	1	1	1	1	1	2	2	1	1	1	1	1	3	1.8	5
27-May	3	2	2	Z	1	1	6	12	16	19	12	4	8	3	1	1	2	1	2	1	2	1	1	2	4.3	19
28-May	2	2	2	2	Z	3	3	M	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1.2	3
29-May	1	1	1	2	2	Z	7	9	10	7	4	5	5	5	6	8	8	11	13	10	6	3	2	1	5.3	13
30-May	Z	2	2	1	1	2	7	9	10	11	5	3	5	4	4	4	3	2	1	2	2	3	3	5	4.0	11
31-May	4	Z	5	6	6	5	12	14	11	9	9	3	5	7	4	4	3	3	3	3	2	3	1	1	5.3	14
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	692	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: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	91	20	11	17	13	26	42	104	63	60	82	25	15	14	16	687
21 - 40	0	1	0	0	0	0	1	0	2	4	5	0	0	0	0	0	13
11 - 80	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	92	20	11	17	13	27	42	106	67	66	82	25	15	14	16	701

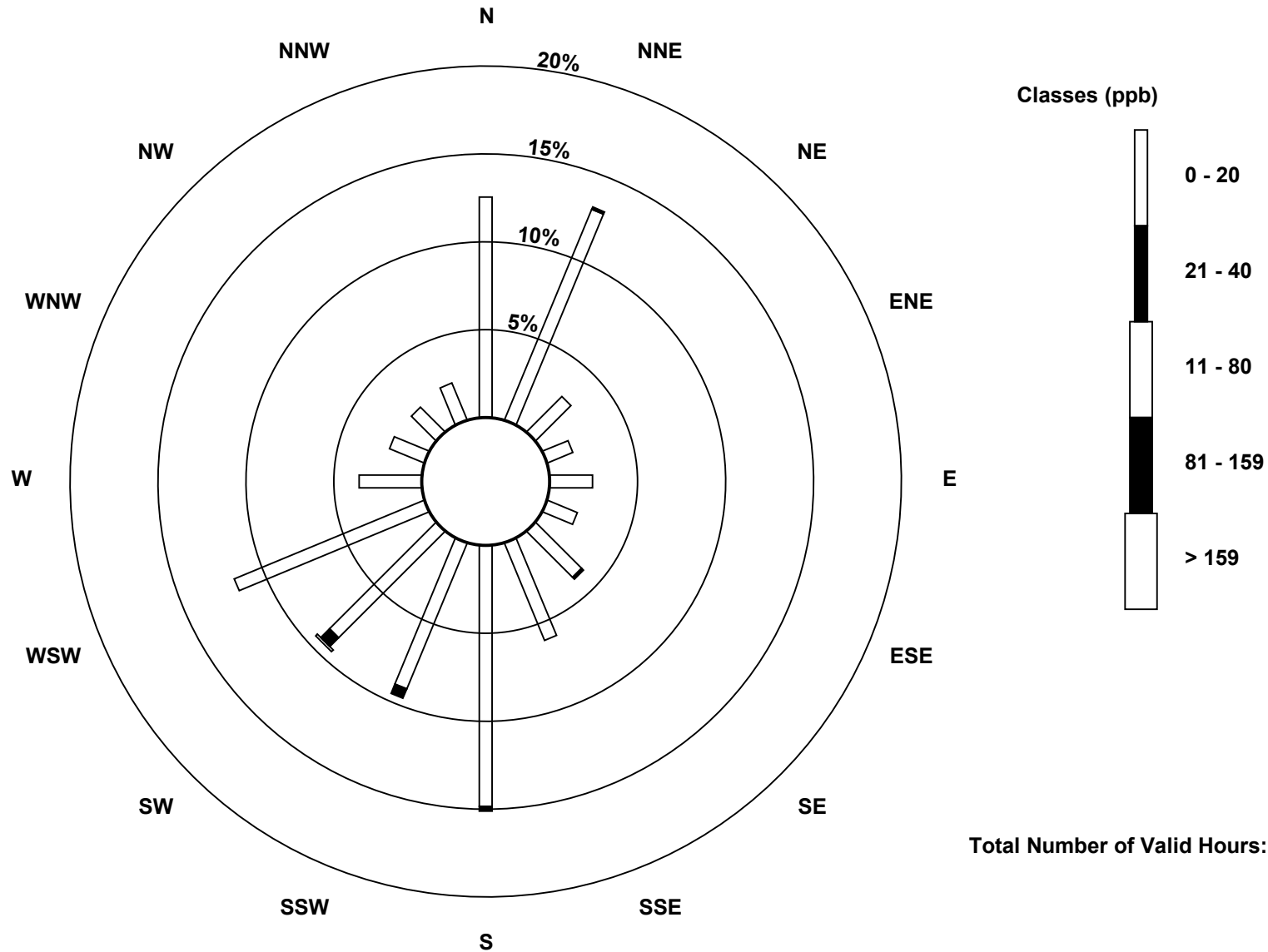
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

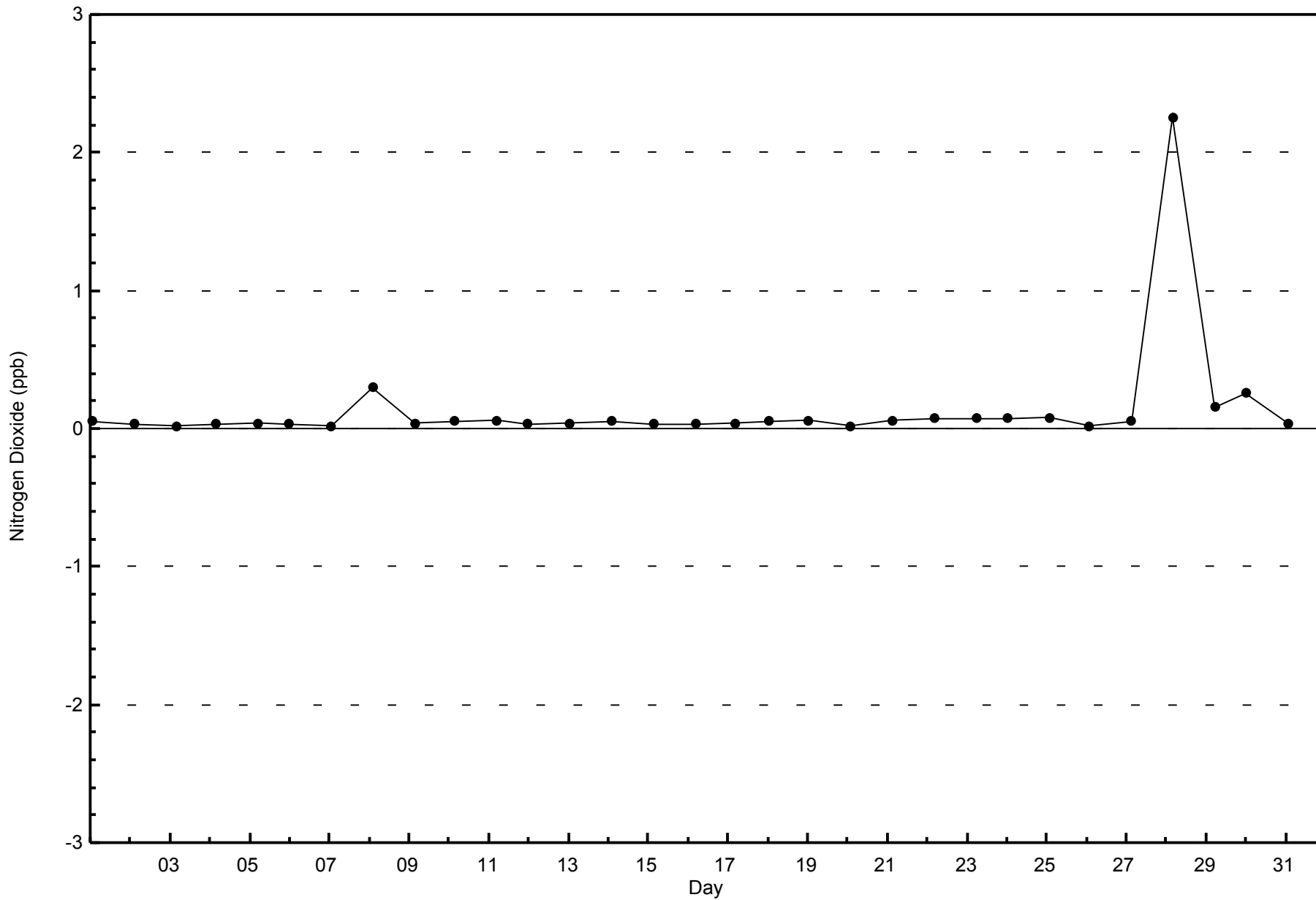
Nitrogen Dioxide (NO₂) - ppb
Fort McKay South (AMS 13)





WBEA
Zero Responses

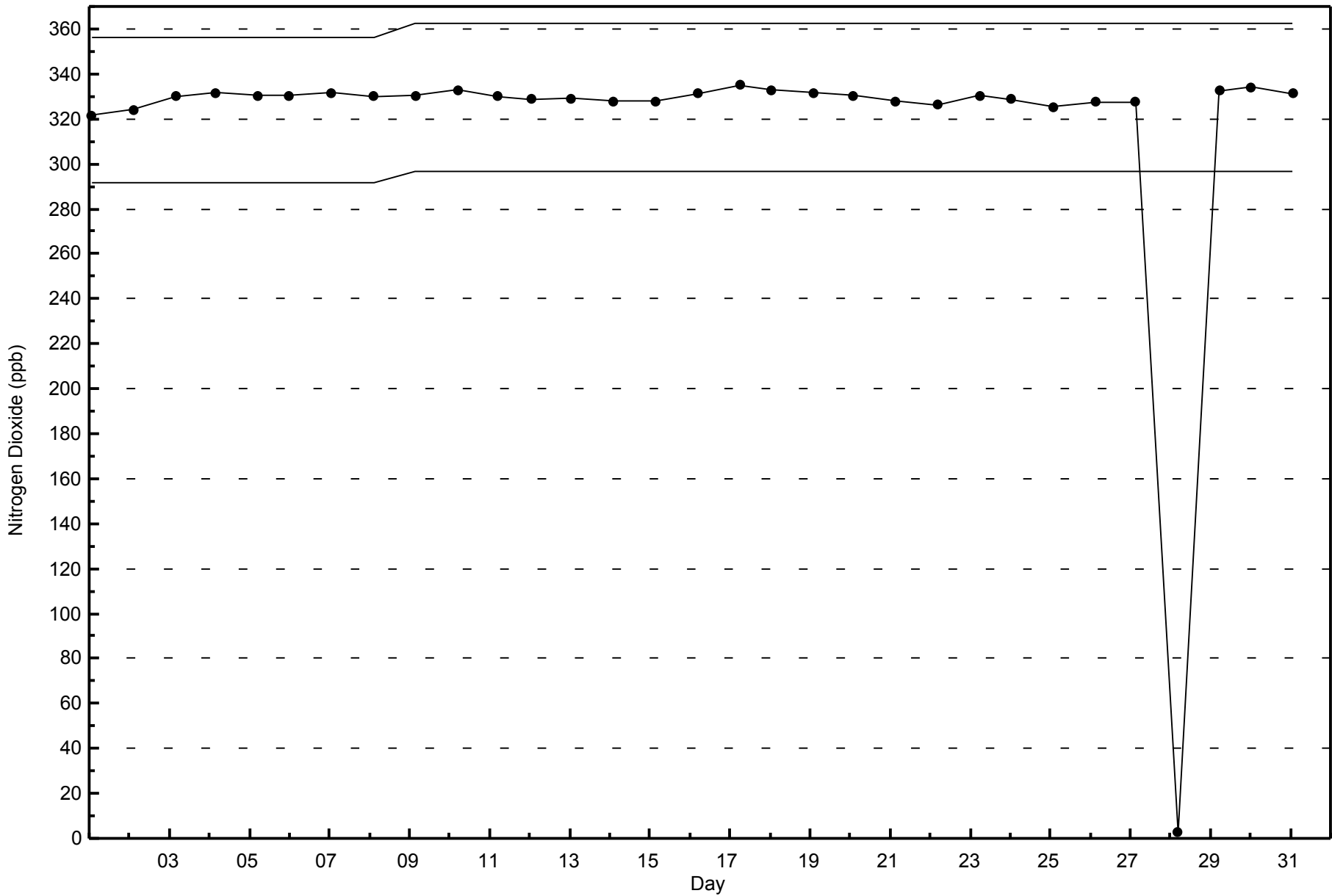
Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - May 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - May 2015



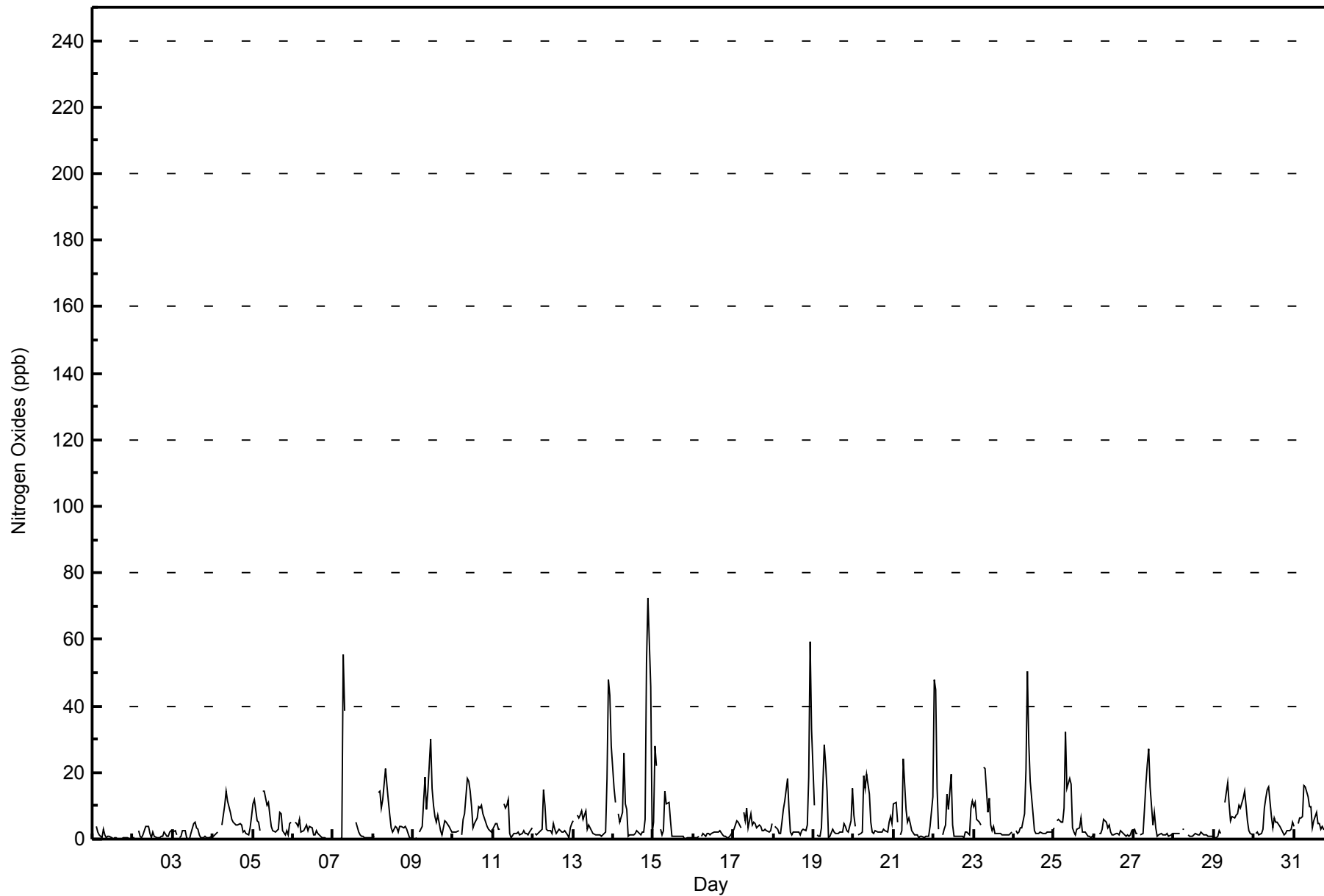


Maximum Value: 73 ppb on May 14 22:00																		Maximum Daily Average: 12.5 ppb on May 14						Hours in Service: 744		
Minimum Value: 0 ppb on May 7 04:00																		Minimum Daily Average: 1.3 ppb on May 16						Hours of Data: 706		
Maximum Diurnal Average: 12.7 ppb at hour 8																		Minimum Diurnal Average: 2.3 ppb at hour 20						Hours of Missing Data: 38		
Monthly Average: 5.2 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 13 P ₉₉ = 48						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-May	16	Z	4	2	1	1	3	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	16
2-May	0	0	Z	2	1	1	1	3	4	4	2	1	2	1	0	0	0	1	1	2	1	1	2	2	1.4	4
3-May	2	3	1	Z	0	1	3	2	1	0	0	2	5	5	4	3	1	1	1	1	0	0	1	1	1.6	5
4-May	1	1	2	2	Z	4	7	10	14	11	8	6	5	5	4	4	4	4	2	2	2	1	3	7	4.8	14
5-May	11	12	6	5	2	Z	14	14	10	11	7	4	3	2	3	3	8	8	3	1	2	1	4	5	6.1	14
6-May	Z	5	4	4	6	2	2	3	4	3	4	3	1	1	2	2	1	0	1	0	0	0	0	0	2.2	6
7-May	0	Z	0	0	0	0	56	38	C	C	C	C	C	C	5	2	1	1	1	1	0	0	0	0	--	56
8-May	0	1	Z	14	15	9	12	21	16	12	7	3	2	4	3	2	4	4	3	4	3	2	1	0	6.2	21
9-May	0	0	0	Z	2	4	11	18	9	14	30	15	10	7	5	7	3	1	3	5	5	4	3	2	7.0	30
10-May	2	2	2	3	Z	1	6	8	18	17	14	10	3	5	6	10	9	10	8	5	4	3	3	2	6.6	18
11-May	3	5	5	3	3	Z	11	10	10	12	2	1	2	2	2	2	1	2	2	2	2	1	2	4	3.7	12
12-May	Z	2	1	2	3	3	15	10	3	3	3	2	5	3	2	3	3	2	2	2	1	0	3	5	3.4	15
13-May	5	Z	7	6	7	8	6	9	3	4	3	2	2	1	1	1	1	1	2	2	18	48	43	28	9.2	48
14-May	15	11	Z	8	5	8	26	10	9	1	1	1	1	2	2	2	1	2	2	6	53	73	46	2	12.5	73
15-May	5	28	22	Z	3	1	3	14	11	11	6	1	1	1	1	1	1	1	1	0	0	0	0	0	4.9	28
16-May	0	0	0	1	Z	1	2	1	2	2	1	2	2	2	2	2	2	1	1	1	1	1	1	2	1.3	2
17-May	3	4	5	5	4	Z	8	5	9	3	8	4	5	5	4	4	4	3	3	3	2	2	2	5	4.3	9
18-May	Z	4	3	2	2	5	9	11	18	9	2	1	2	2	2	2	1	2	3	3	4	19	59	33	8.7	59
19-May	10	Z	1	1	1	3	28	22	14	0	1	3	2	2	2	2	2	2	5	4	2	2	5	15	5.7	28
20-May	7	4	Z	1	2	2	19	15	20	13	5	2	2	3	2	2	2	2	3	2	2	5	7	5	5.6	20
21-May	10	11	5	Z	1	3	24	9	5	6	5	3	1	1	1	1	1	1	1	1	1	1	4	13	4.7	24
22-May	48	45	15	3	Z	1	3	4	13	9	19	4	1	1	1	1	1	1	1	2	2	1	9	11	8.6	48
23-May	10	11	6	5	4	Z	22	21	8	12	4	3	4	2	2	2	2	1	1	1	1	1	2	2	5.5	22
24-May	Z	2	2	2	3	3	8	21	50	29	17	8	2	2	2	2	2	2	2	2	2	2	2	2	7.4	50
25-May	3	Z	5	6	5	5	10	32	15	18	16	3	2	1	3	3	6	2	2	2	1	1	1	1	6.3	32
26-May	1	1	Z	1	2	3	6	5	3	4	2	1	1	2	2	1	3	2	1	1	1	1	1	3	2.1	6
27-May	3	2	2	Z	1	2	9	17	23	27	16	4	8	3	1	1	2	1	1	1	2	1	1	2	5.6	27
28-May	2	2	2	2	Z	3	3	M	1	1	1	1	1	2	1	1	2	2	1	1	1	1	1	1	1.4	3
29-May	1	0	1	2	2	Z	11	14	17	10	5	7	6	7	8	10	9	12	15	10	6	2	2	1	6.9	17
30-May	Z	2	2	1	2	3	9	12	15	16	7	4	6	5	5	4	3	2	1	2	2	3	3	5	4.9	16
31-May	4	Z	5	6	6	7	16	16	13	10	10	3	6	8	5	5	3	4	3	3	2	3	1	0	6.0	16
																								Diurnal Average		
																								Diurnal Maximum		
6.3 6.3 4.2 3.5 3.2 3.2 11.6 12.7 11.3 9.1 6.9 3.4 3.1 2.9 2.7 2.7 2.8 2.6 2.4 2.3 4.0 5.8 6.9 5.2																										
48 45 22 14 15 9 56 38 50 29 30 15 10 8 8 10 9 12 15 10 53 73 59 33																										
Z - zerospan C - Calibration M - Maintenance																										



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	678	96.03	96.03
21 - 40	18	2.55	98.58
41 - 80	10	1.42	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	89	19	11	16	13	25	36	103	61	60	82	25	15	14	16	673
21 - 40	0	2	1	0	1	0	2	6	2	1	3	0	0	0	0	0	18
11 - 80	0	1	0	0	0	0	0	0	1	5	3	0	0	0	0	0	10
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	92	20	11	17	13	27	42	106	67	66	82	25	15	14	16	701

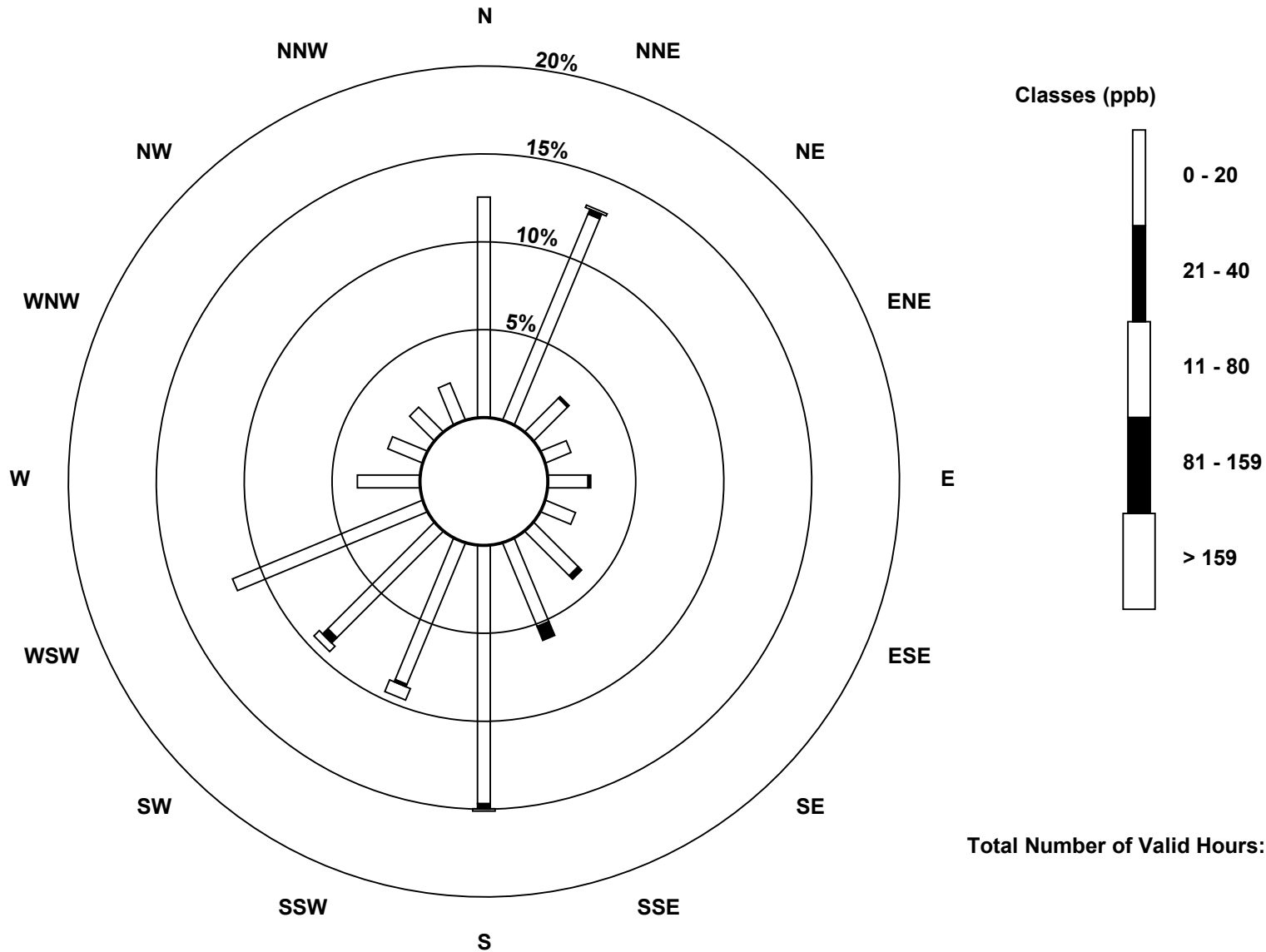
Total Number of Valid Hours: 701

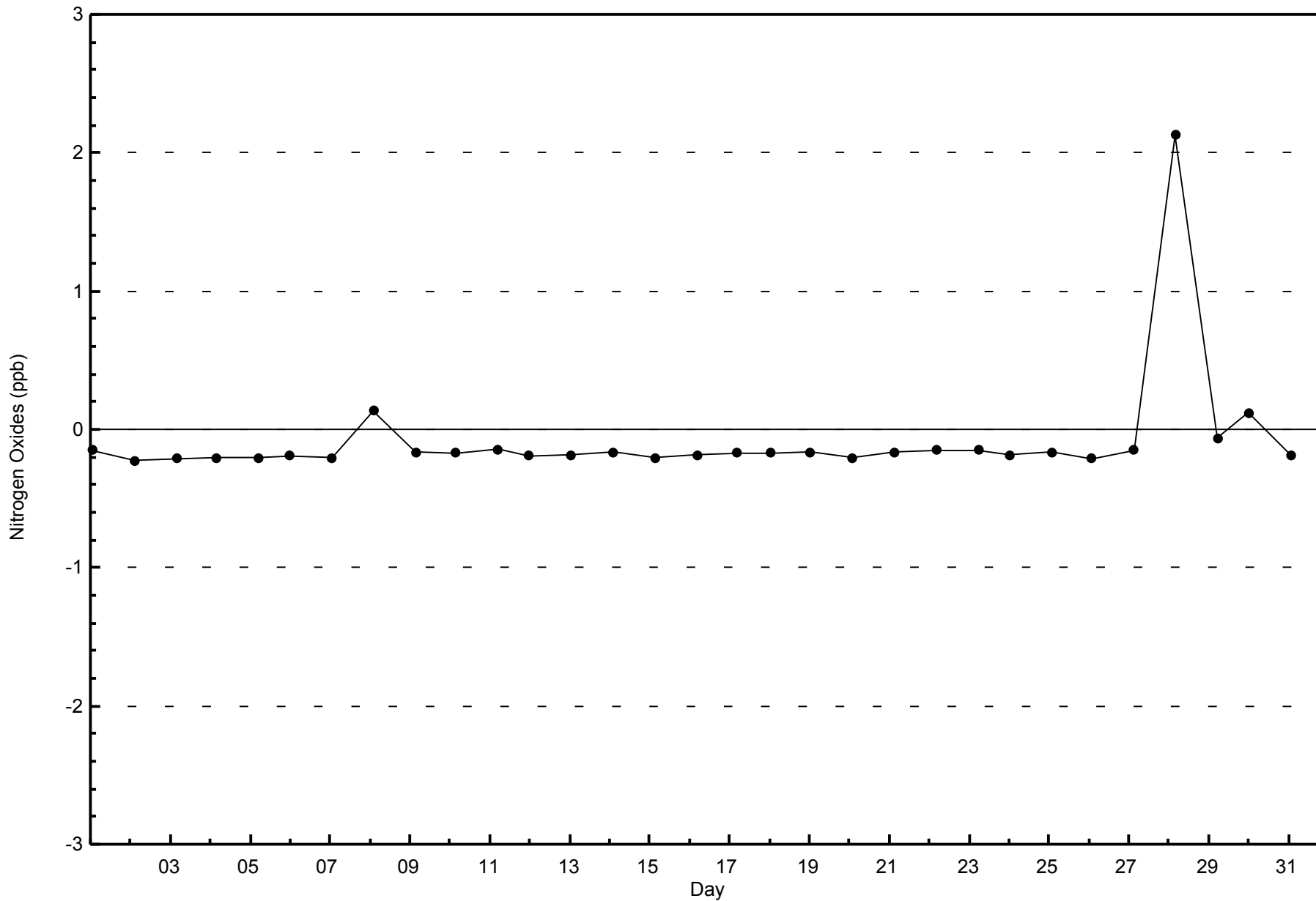
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Nitrogen Oxides (NO_x) - ppb
Fort McKay South (AMS 13)

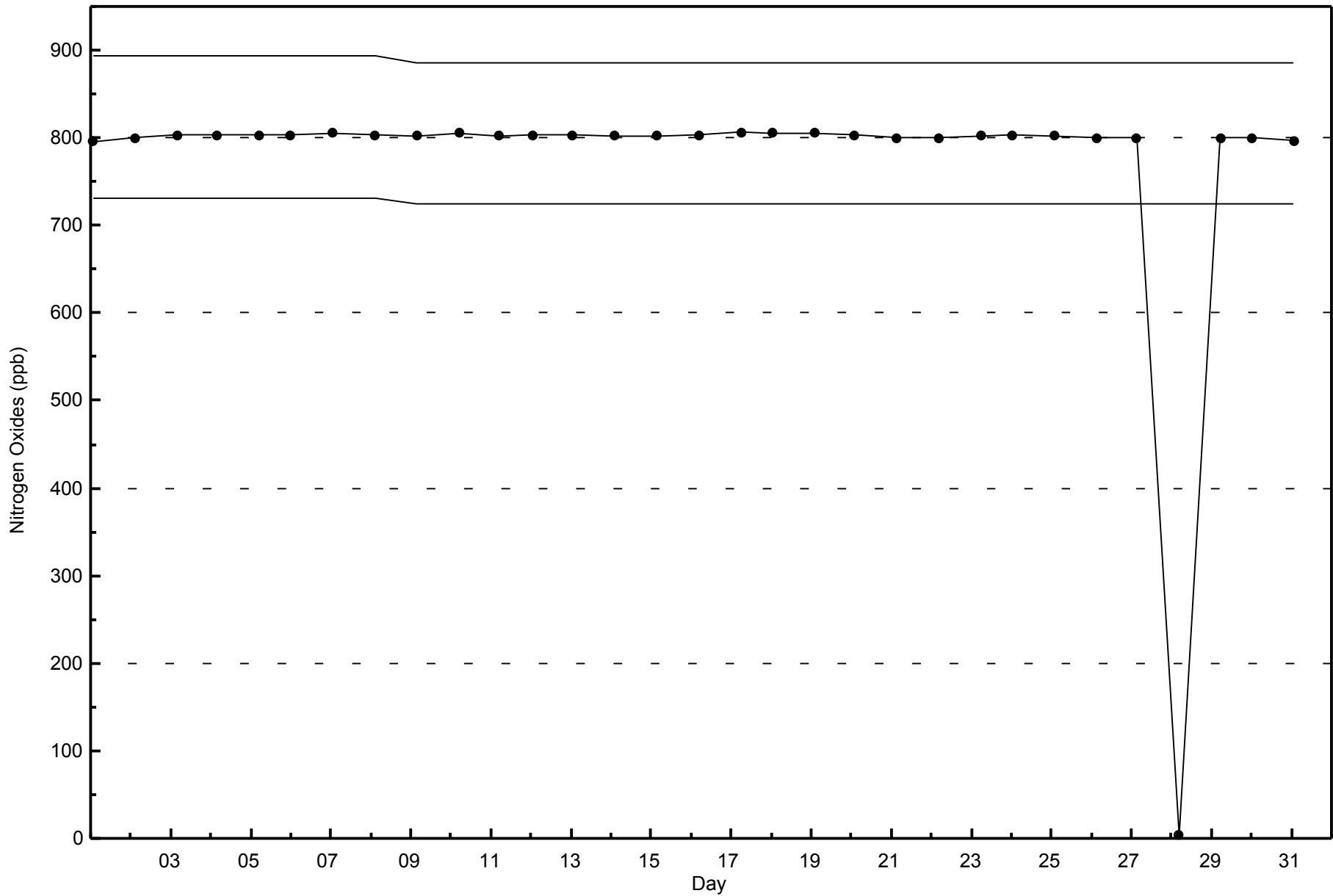






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - May 2015





Summary of Hour Averages

Fort McKay South - May 2015

Number of Exceedences (AAAQO):	24-hr: 1	Hours in Service:	744
Maximum Value: 103.8 µg/m ³ on May 31 04:00	Maximum Daily Average: 32.5 µg/m ³ on May 31	Hours of Data:	743
Minimum Value: 1.4 µg/m ³ on May 1 10:00	Minimum Daily Average: 2.1 µg/m ³ on May 3	Hours of Missing Data:	1
Maximum Diurnal Average: 12.1 µg/m ³ at hour 24	Minimum Diurnal Average: 5.1 µg/m ³ at hour 15	Hours of Calibration:	0
Monthly Average: 8.19 µg/m ³	Percentiles: P ₁ = 1.5 P ₁₀ = 2.2 Q ₁ = 3.1 Median = 5.8 Q ₃ = 10.3 P ₉₀ = 15.1 P ₉₉ = 47.5	Percent Operational Time:	99.9

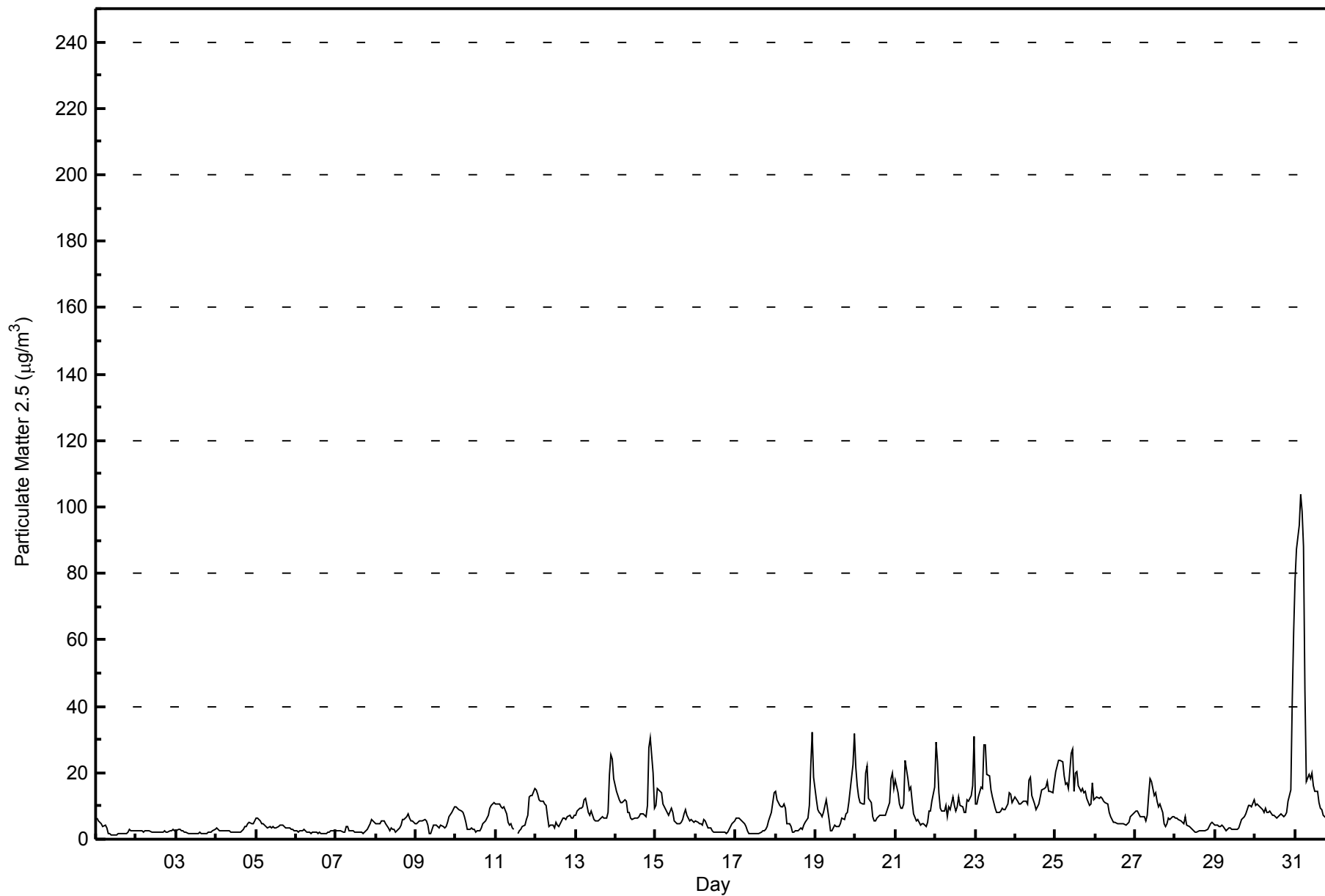
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	6.5	5.5	5.3	4.6	4.0	4.3	3.4	1.7	1.5	1.4	1.4	1.4	1.4	1.5	1.5	1.7	1.7	1.6	1.6	1.9	2.9	2.7	2.7	2.4	2.7	6.5
2-May	2.5	2.4	2.6	2.4	2.3	2.4	2.5	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.1	2.2	2.7	2.3	2.3	2.4	2.5	2.9	2.5	2.4	2.9
3-May	2.7	2.8	2.8	2.7	2.5	2.3	2.1	1.8	1.7	1.7	1.6	1.7	1.9	1.9	1.9	1.9	1.8	1.7	1.7	2.0	2.1	2.3	2.7	2.9	2.1	2.9
4-May	3.4	2.9	2.7	2.5	2.4	2.4	2.5	2.4	2.2	2.0	2.0	2.0	2.0	2.0	2.1	2.2	3.0	3.6	3.6	4.6	5.0	4.7	4.5	5.5	3.0	5.5
5-May	6.3	6.3	5.4	4.9	4.5	4.4	3.7	3.6	3.9	3.5	3.7	3.4	3.2	3.9	4.4	4.4	4.3	4.0	3.3	3.3	3.4	2.9	3.2	2.7	4.0	6.3
6-May	2.5	2.3	2.7	2.7	2.4	2.8	2.3	2.0	2.0	1.9	1.9	2.0	1.9	1.8	2.0	1.9	1.8	1.8	1.8	2.0	2.3	2.7	2.5	2.4	2.2	2.8
7-May	2.5	2.5	2.6	2.4	2.3	2.2	3.9	4.0	2.6	2.3	2.5	2.0	2.2	2.3	2.3	2.1	1.7	2.0	2.5	3.0	4.6	5.9	5.6	4.9	2.9	5.9
8-May	4.6	4.5	4.8	5.4	5.6	5.3	4.6	3.5	2.6	3.2	2.9	2.8	2.3	3.0	3.2	4.3	5.7	6.1	6.9	7.8	6.6	5.6	5.5	4.8	4.7	7.8
9-May	4.9	5.1	5.6	5.5	5.7	6.0	5.6	4.1	1.9	1.9	4.4	4.3	4.3	3.8	3.4	4.2	3.8	3.4	3.7	5.0	6.6	8.1	8.9	9.8	5.0	9.8
10-May	9.9	9.2	8.9	8.6	8.0	7.0	5.1	3.0	3.1	3.4	3.2	2.8	2.3	2.6	2.7	3.6	4.6	4.9	5.5	7.2	9.4	10.3	10.7	10.9	6.1	10.9
11-May	10.7	10.7	10.4	9.8	9.2	9.9	7.8	5.0	4.4	4.6	3.4	2.9	M	1.7	2.4	3.1	3.7	4.4	5.8	7.3	12.8	13.2	13.2	15.2	7.5	15.2
12-May	14.9	13.4	12.0	11.4	11.2	10.6	10.4	6.6	4.0	4.1	4.4	3.3	5.0	4.4	3.9	5.6	6.4	6.3	5.8	6.7	7.2	6.1	6.4	7.0	7.4	14.9
13-May	7.1	8.3	9.3	9.1	9.9	11.7	12.5	7.9	7.2	8.4	7.2	5.7	5.4	5.5	5.9	6.3	6.9	6.2	6.6	7.9	19.6	25.6	24.0	18.2	10.1	25.6
14-May	14.2	13.3	11.8	11.0	10.9	11.7	11.5	8.0	8.0	6.2	5.9	6.4	6.4	6.4	6.9	7.5	7.7	7.2	6.9	10.3	27.4	30.7	20.1	9.3	11.1	30.7
15-May	10.3	15.4	14.6	14.0	10.6	9.6	8.8	8.1	7.4	9.2	8.0	5.6	5.0	4.7	4.6	5.1	5.8	7.5	8.8	7.1	5.4	5.9	5.4	5.1	8.0	15.4
16-May	5.5	5.2	4.7	4.5	4.2	5.8	5.7	3.3	3.2	3.2	2.7	2.2	2.1	2.1	2.1	2.1	2.2	2.0	1.9	2.3	3.0	3.8	4.6	5.4	3.5	5.8
17-May	6.4	6.4	6.4	6.0	5.0	4.8	3.9	2.4	1.7	1.5	1.8	1.6	1.5	1.6	1.6	1.9	2.4	2.5	2.8	3.7	5.6	7.9	11.2	14.1	4.4	14.1
18-May	14.4	12.0	10.2	9.6	9.7	10.7	9.2	4.8	4.5	3.8	2.3	2.1	2.6	2.4	2.8	3.5	3.0	4.1	5.1	6.6	10.3	21.9	32.0	18.7	8.6	32.0
19-May	12.0	8.8	8.2	7.6	7.0	8.2	12.1	8.8	6.1	2.6	2.5	4.3	3.8	3.8	3.8	4.8	6.3	6.1	7.5	8.2	11.1	14.8	22.7	31.6	8.9	31.6
20-May	21.5	16.1	12.8	11.1	10.5	10.4	19.9	22.1	12.1	11.1	6.7	5.7	5.3	6.6	7.1	7.1	7.1	7.2	7.3	8.3	11.1	18.1	19.8	15.4	11.7	22.1
21-May	17.8	14.0	10.6	9.5	9.3	10.8	23.9	18.4	14.9	15.7	11.6	7.6	5.4	6.0	5.3	4.3	4.6	4.7	3.9	5.1	8.4	8.6	11.5	15.8	10.3	23.9
22-May	29.3	23.2	14.2	9.3	8.5	8.5	10.1	6.8	9.8	8.9	12.8	10.3	8.4	9.8	12.7	10.0	9.6	8.0	8.1	11.7	11.4	13.0	16.0	31.0	12.6	31.0
23-May	10.6	10.5	12.8	15.8	15.2	28.6	28.4	19.4	18.9	14.8	12.7	11.1	9.4	8.2	8.1	8.7	9.2	8.9	8.7	10.5	13.8	13.6	11.1	12.0	13.4	28.6
24-May	12.6	11.6	10.8	10.5	10.8	11.3	11.5	10.5	17.8	18.6	13.0	10.5	9.1	9.9	10.7	12.8	14.8	15.1	15.8	17.6	14.3	14.2	14.1	17.5	13.1	18.6
25-May	20.2	22.1	23.6	23.8	23.2	18.9	16.6	17.1	15.2	25.7	27.1	14.4	19.9	20.2	16.2	14.4	15.4	13.9	14.6	12.2	10.0	10.5	17.1	11.9	17.7	27.1
26-May	12.5	12.7	12.1	12.9	12.1	11.5	11.1	10.5	8.2	6.6	6.0	5.2	5.2	4.6	4.5	4.7	4.9	4.5	4.3	4.8	5.2	6.6	7.0	7.6	7.7	12.9
27-May	8.3	8.3	7.6	6.9	6.6	6.8	5.4	7.3	13.2	18.2	17.5	13.2	14.1	11.4	9.5	10.7	7.9	4.8	3.9	4.7	6.2	6.1	6.7	6.7	8.8	18.2
28-May	6.3	6.3	6.0	5.6	5.1	4.8	7.0	4.3	3.9	3.3	2.9	2.4	2.1	1.9	2.6	2.5	2.5	2.4	2.6	3.1	3.8	4.8	5.1	4.7	4.0	7.0
29-May	4.4	4.2	4.0	4.0	4.1	3.9	2.7	3.1	3.5	3.4	2.9	3.0	3.1	3.1	3.5	4.8	6.1	6.9	7.7	8.8	10.2	10.0	9.8	11.7	5.4	11.7
30-May	10.1	10.5	10.1	9.9	8.8	8.2	9.3	7.9	8.1	8.3	7.3	7.4	6.6	6.5	6.7	7.4	7.3	6.7	7.1	7.9	11.5	14.7	41.7	62.2	12.2	62.2
31-May	78.0	87.2	94.4	103.8	98.7	88.0	44.8	17.5	19.6	18.4	19.7	16.0	14.6	14.6	10.8	9.2	8.7	7.0	6.8	5.8	4.9	4.6	4.2	3.5	32.5	103.8
																								Diurnal Average		
																								Diurnal Maximum		

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



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	348	46.84	46.84
6 - 15	328	44.15	90.98
16 - 25	47	6.33	97.31
26 - 80	15	2.02	99.33
> 81.0	5	0.67	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Fort McKay South - May 2015

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	52	69	17	8	9	8	14	6	31	30	24	37	10	9	13	8	345
6 - 15	36	23	5	3	7	4	10	30	63	32	36	47	13	4	3	9	325
16 - 25	3	3	0	0	1	0	2	6	11	5	8	3	2	1	0	2	47
26 - 80	2	1	0	0	0	1	1	1	3	2	4	0	0	0	0	0	15
> 81.0	0	0	0	0	0	0	0	0	0	1	2	0	0	2	0	0	5
Totals	93	96	22	11	17	13	27	43	108	70	74	87	25	16	16	19	737

Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

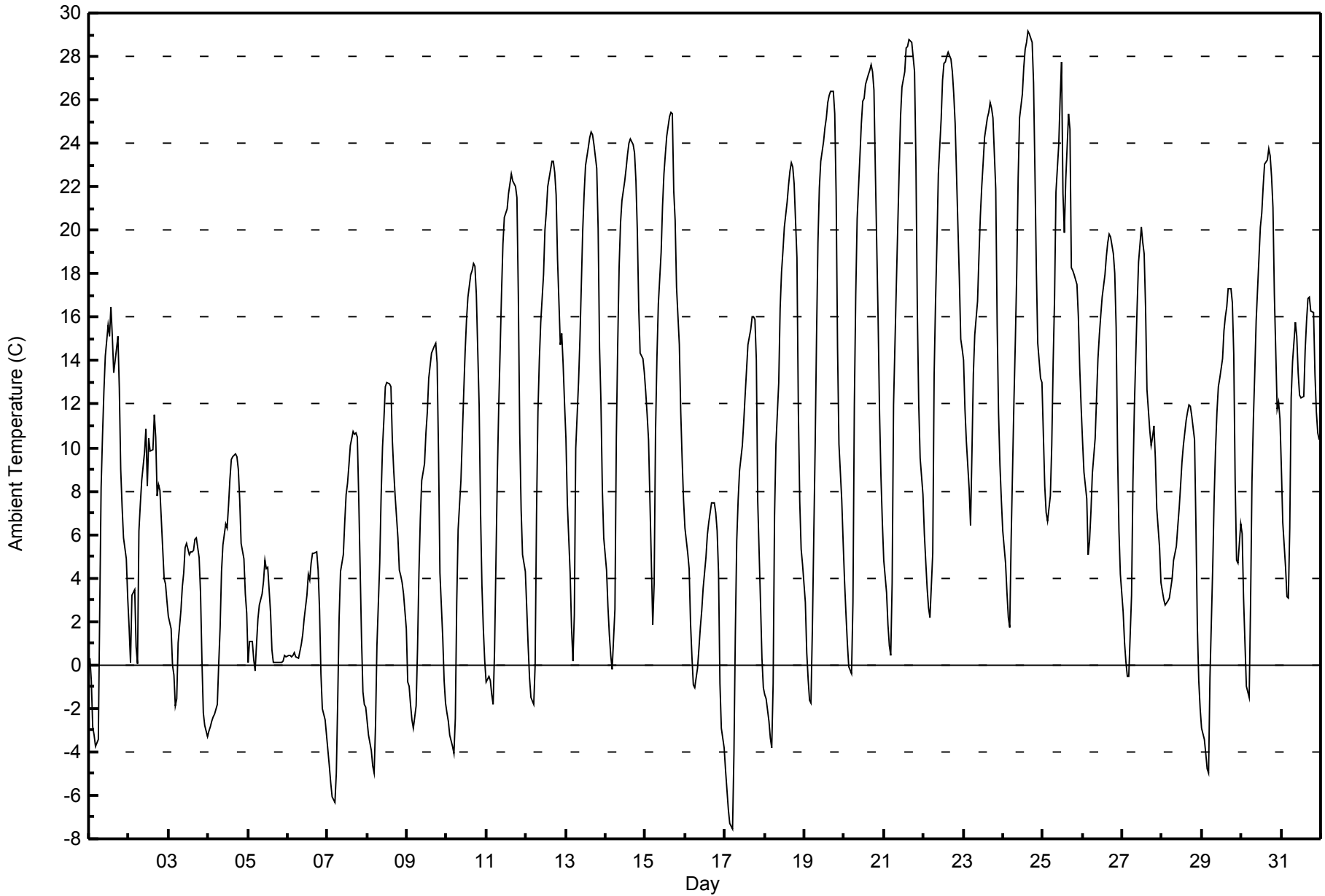
Fort McKay South - May 2015

Maximum Value: 29.2 C on May 24 16:00		Maximum Daily Average: 18.2 C on May 22		Hours in Service: 744																						
Minimum Value: -7.6 C on May 17 05:00		Minimum Daily Average: 1.4 C on May 5		Hours of Data: 744																						
Maximum Diurnal Average: 17.9 C at hour 17		Minimum Diurnal Average: -0.5 C at hour 5		Hours of Missing Data: 0																						
Monthly Average: 10.14 C		Percentiles: P ₁ = -5.0 P ₁₀ = -1.0 Q ₁ = 2.7 Median = 9.5 Q ₃ = 16.9 P ₉₀ = 23.4 P ₉₉ = 28.6		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0.3	-0.7	-2.8	-3.3	-3.8	-3.4	2.4	8.2	10.5	12.6	14.2	15.6	15.1	16.5	15.1	13.5	14.6	15.1	12.8	9.0	7.3	5.9	4.9	3.1	7.6	16.5
2-May	1.7	0.1	3.2	3.4	0.8	0.1	6.2	7.4	8.5	9.8	10.9	8.3	10.4	9.8	9.9	11.5	10.5	7.8	8.3	8.0	5.3	4.0	3.7	2.9	6.4	11.5
3-May	2.2	1.7	0.0	-0.5	-1.9	-1.6	1.0	2.5	3.6	4.2	5.4	5.6	5.1	5.2	5.2	5.3	5.8	5.9	5.0	3.4	0.3	-2.2	-2.8	-3.3	2.3	5.9
4-May	-3.0	-2.8	-2.6	-2.4	-2.3	-1.8	0.1	1.7	4.3	5.5	6.5	6.3	7.3	8.6	9.5	9.6	9.7	9.6	9.0	7.6	5.6	4.9	3.3	2.4	4.0	9.7
5-May	0.1	1.1	1.1	0.2	-0.2	0.9	2.1	2.7	3.3	3.8	4.8	4.4	4.5	2.4	0.7	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.4	0.4	1.4	4.8
6-May	0.5	0.5	0.4	0.4	0.6	0.4	0.3	0.6	0.9	1.4	2.1	3.2	4.1	3.9	4.7	5.1	5.1	5.2	4.3	2.6	-0.4	-2.0	-2.5	-3.2	1.6	5.2
7-May	-3.9	-4.6	-5.4	-6.1	-6.3	-5.0	-1.6	2.2	4.3	5.1	6.6	7.9	8.4	9.2	10.1	10.7	10.6	10.7	10.5	7.7	1.2	-1.2	-1.8	-1.9	2.8	10.7
8-May	-2.6	-3.3	-3.9	-4.6	-4.9	-2.8	0.9	4.7	7.8	10.0	11.3	12.8	13.0	13.0	12.8	10.3	8.9	7.8	5.8	4.4	4.1	3.8	3.3	1.7	4.8	13.0
9-May	-0.8	-1.0	-1.8	-2.6	-2.9	-1.9	0.8	4.3	6.7	8.5	9.3	10.7	11.7	13.2	13.7	14.3	14.6	14.8	13.9	9.7	4.3	1.3	-0.7	-1.8	5.8	14.8
10-May	-2.2	-2.6	-3.2	-3.8	-4.1	-2.5	2.9	6.3	8.5	10.6	12.5	14.4	15.9	16.9	17.9	18.2	18.5	18.3	17.0	12.0	7.1	3.7	1.7	0.1	7.7	18.5
11-May	-0.8	-0.6	-0.7	-1.3	-1.8	0.6	8.8	11.9	14.5	17.1	19.4	20.6	21.0	21.7	22.2	22.6	22.3	22.0	21.5	17.0	10.7	7.1	5.0	4.3	11.9	22.6
12-May	2.6	0.9	-0.6	-1.5	-1.8	0.0	6.9	11.7	14.0	15.7	18.0	20.0	20.9	22.0	22.4	23.2	23.2	22.6	21.7	18.7	14.7	15.3	13.8	12.0	13.2	23.2
13-May	10.4	7.5	4.2	1.7	0.2	2.3	9.9	13.0	15.0	17.5	20.0	21.7	23.0	23.8	24.2	24.5	24.4	24.0	22.8	20.1	14.6	12.1	8.1	5.8	14.6	24.5
14-May	4.4	2.7	1.4	0.4	-0.2	2.6	10.5	14.8	18.3	20.4	21.4	22.3	22.9	23.5	24.0	24.2	24.0	23.5	22.3	20.0	16.4	14.3	14.1	13.4	15.1	24.2
15-May	12.6	11.5	10.4	4.8	1.8	3.7	10.7	14.1	16.6	19.0	21.1	22.6	23.5	24.3	25.2	25.4	25.3	21.8	20.5	17.4	14.7	11.6	9.4	7.6	15.7	25.4
16-May	6.3	5.2	4.4	1.9	0.4	-0.9	-1.0	-0.1	0.8	1.7	2.5	3.6	5.0	6.0	6.5	7.0	7.4	7.5	7.0	6.1	4.2	-0.9	-2.9	-3.8	3.1	7.5
17-May	-4.9	-5.8	-6.6	-7.3	-7.6	-4.1	1.4	5.7	7.6	8.9	10.1	11.2	12.4	13.6	14.8	15.4	16.0	16.0	15.9	14.0	7.5	2.8	0.3	-1.1	5.7	16.0
18-May	-1.4	-1.6	-2.6	-3.4	-3.8	-0.8	6.9	10.2	13.0	16.4	18.1	19.1	20.1	21.3	22.1	22.7	23.1	22.9	22.1	18.7	11.8	7.5	5.3	4.6	11.4	23.1
19-May	2.9	0.6	-0.6	-1.6	-1.7	1.6	10.0	15.1	19.4	22.0	23.2	24.0	24.7	25.2	25.9	26.2	26.4	26.4	25.4	21.7	14.6	10.2	7.6	5.6	14.8	26.4
20-May	3.8	2.4	1.0	-0.1	-0.4	2.9	12.0	17.1	20.5	23.4	24.9	25.9	26.1	26.7	27.1	27.3	27.6	27.3	26.5	22.8	15.8	11.6	8.7	6.6	16.2	27.6
21-May	4.8	3.3	1.9	0.9	0.4	3.8	12.0	17.5	20.2	22.7	25.2	26.6	27.3	28.4	28.4	28.8	28.7	28.6	27.3	23.1	16.2	11.9	9.5	7.9	16.9	28.8
22-May	6.1	4.7	3.5	2.6	2.2	5.2	13.4	16.7	19.5	22.6	25.1	26.9	27.7	27.8	28.0	28.2	27.9	27.3	26.3	24.9	22.5	17.8	15.0	14.5	18.2	28.2
23-May	14.0	11.8	10.3	8.1	6.4	9.8	13.4	15.2	16.7	18.8	20.7	22.0	23.1	24.2	25.2	25.4	25.9	25.6	25.2	21.9	15.7	11.6	9.2	7.6	17.0	25.9
24-May	6.2	4.7	3.3	2.2	1.7	5.8	12.2	14.9	18.1	22.4	25.2	26.2	27.5	28.3	28.6	29.2	29.0	28.6	26.8	22.7	18.2	14.8	13.2	13.0	17.6	29.2
25-May	10.6	8.2	7.0	6.6	7.8	10.1	13.9	16.8	21.8	23.9	26.1	27.8	21.7	19.9	22.4	25.4	24.6	18.3	18.2	18.0	17.5	16.0	13.7	11.9	17.0	27.8
26-May	10.3	8.9	7.6	5.1	5.7	7.1	8.8	10.5	12.3	14.1	15.2	16.1	16.9	17.9	18.8	19.5	19.8	19.7	18.9	18.0	15.5	9.8	6.2	4.2	12.8	19.8
27-May	2.5	1.0	0.1	-0.6	-0.5	3.2	8.5	11.8	14.2	16.5	18.5	20.2	19.4	18.9	16.5	12.7	10.8	10.1	10.5	11.0	9.5	7.2	5.4	3.8	9.6	20.2
28-May	3.4	3.0	2.7	2.9	3.1	3.5	4.0	4.8	5.5	6.4	7.2	8.2	9.3	10.1	11.3	11.6	12.0	11.9	11.5	10.3	6.4	1.7	-0.7	-2.0	6.2	12.0
29-May	-2.9	-3.4	-4.1	-4.8	-5.0	-0.6	4.5	7.7	10.0	11.7	12.8	13.2	14.1	15.3	16.0	16.5	17.3	17.3	16.7	14.3	8.4	4.8	4.7	6.5	8.0	17.3
30-May	6.0	3.1	1.0	-1.0	-1.5	2.8	8.4	11.3	13.4	15.8	18.7	20.2	20.8	22.0	23.0	23.2	23.7	23.4	22.5	21.0	17.1	11.8	12.1	11.3	13.8	23.7
31-May	9.1	6.6	4.5	3.1	3.1	6.3	12.3	14.0	15.8	15.1	13.5	12.4	12.3	12.4	14.5	15.8	16.8	16.9	16.3	16.2	13.4	11.7	10.7	10.4	11.8	16.9
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Fort McKay South - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	99	13.31	13.31
0 - 10	287	38.58	51.88
10 - 20	220	29.57	81.45
> 20	138	18.55	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

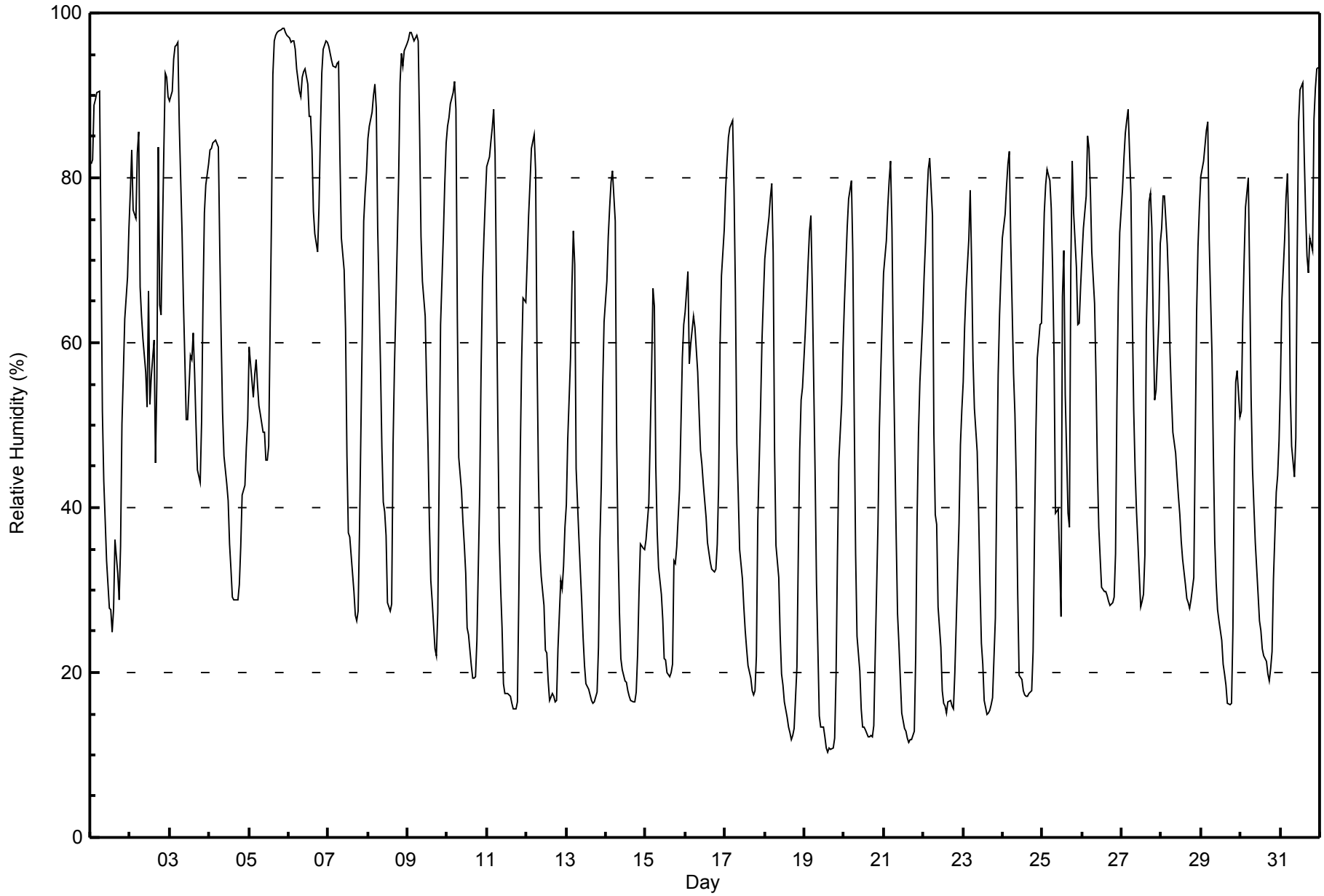
**Relative Humidity (RH) - %
Fort McKay South - May 2015**

Maximum Value: 98 % on May 5 22:00																		Maximum Daily Average: 89.5 % on May 6																		Hours in Service: 744							
Minimum Value: 10 % on May 19 15:00																		Minimum Daily Average: 35.0 % on May 19																		Hours of Data: 744							
Maximum Diurnal Average: 82.2 % at hour 5																		Minimum Diurnal Average: 31.4 % at hour 16																		Hours of Missing Data: 0							
Monthly Average: 52.1 %																		Percentiles: P ₁ = 12 P ₁₀ = 18 Q ₁ = 29 Median = 51 Q ₃ = 74 P ₉₀ = 87 P ₉₉ = 98																		Hours of Calibration: 0							
																																				Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																			
1-May	82	82	89	90	90	90	72	52	43	39	34	28	28	25	28	36	32	29	35	50	56	63	68	74	54.7	90																	
2-May	78	83	76	75	83	86	67	63	60	56	52	66	52	56	60	45	56	84	65	63	84	93	92	90	70.3	93																	
3-May	89	90	94	96	96	97	87	73	65	58	51	51	58	58	61	56	50	45	43	51	65	76	79	82	69.6	97																	
4-May	83	83	84	84	85	84	71	61	52	46	43	41	36	33	29	29	29	29	31	35	42	43	47	51	52.0	85																	
5-May	60	57	53	56	58	55	52	51	49	49	46	46	48	75	92	97	97	98	98	98	98	98	98	97	71.9	98																	
6-May	97	97	97	97	96	93	90	90	92	93	93	91	88	88	83	76	73	71	76	85	93	96	97	96	89.5	97																	
7-May	96	95	94	94	93	94	94	82	73	69	62	46	37	36	34	30	27	26	27	37	62	75	78	81	64.3	96																	
8-May	85	86	88	90	91	88	74	57	47	41	40	37	29	28	28	48	57	64	80	92	95	94	95	96	67.9	96																	
9-May	97	98	98	97	97	97	97	86	73	67	63	55	48	38	31	29	23	22	27	44	62	73	79	84	66.0	98																	
10-May	86	87	89	90	92	88	63	46	42	38	35	32	25	25	21	19	19	19	24	42	57	67	73	77	52.4	92																	
11-May	81	83	84	86	88	83	50	36	30	25	19	17	17	17	17	16	16	16	17	30	46	58	65	65	44.3	88																	
12-May	70	75	79	83	85	81	59	44	35	32	28	23	22	19	17	18	17	16	17	23	31	30	33	38	40.6	85																	
13-May	40	48	58	67	74	69	45	36	32	29	24	21	19	18	17	17	16	16	18	23	36	43	55	63	36.8	74																	
14-May	67	73	76	79	81	75	48	36	27	22	20	19	19	18	17	16	16	16	18	22	30	36	35	35	37.6	81																	
15-May	36	38	41	57	67	64	45	37	33	30	26	22	22	20	20	20	21	33	33	35	42	50	58	62	38.0	67																	
16-May	64	69	57	60	61	63	62	56	51	47	45	43	39	36	35	33	33	32	33	36	43	60	68	74	50.0	74																	
17-May	79	82	85	86	87	78	66	48	42	35	31	28	25	23	21	19	18	17	18	22	38	52	60	65	46.9	87																	
18-May	70	72	75	78	79	71	47	35	31	25	20	18	16	15	13	13	12	12	13	21	35	47	53	55	38.6	79																	
19-May	61	65	70	74	75	67	44	31	23	15	13	13	12	11	10	11	11	11	12	20	34	46	53	60	35.0	75																	
20-May	65	69	74	77	80	71	51	34	24	20	16	13	13	13	12	12	12	12	13	22	38	50	56	63	38.1	80																	
21-May	68	72	77	80	82	74	59	37	27	23	19	15	13	13	12	11	12	12	13	22	39	49	55	63	39.5	82																	
22-May	68	72	77	81	82	75	49	39	38	28	23	18	16	16	15	16	17	16	16	20	26	38	48	52	39.4	82																	
23-May	55	62	66	73	78	70	58	52	47	39	31	24	21	17	15	15	15	16	17	27	43	56	63	68	42.8	78																	
24-May	73	76	79	82	83	72	56	51	43	30	20	19	18	17	17	18	18	18	23	37	49	58	62	62	45.0	83																	
25-May	69	76	79	81	80	76	69	58	39	40	34	27	66	71	54	39	38	69	82	76	69	62	62	67	61.8	82																	
26-May	71	74	78	85	84	78	71	65	56	45	38	34	30	30	30	29	29	28	28	29	34	53	66	73	51.6	85																	
27-May	79	82	85	87	88	78	63	52	45	39	36	28	29	29	34	61	77	78	74	62	53	54	63	72	60.4	88																	
28-May	74	78	78	72	67	59	54	49	47	44	41	39	36	34	31	29	29	28	29	31	47	64	72	76	50.2	78																	
29-May	80	82	84	86	87	72	59	46	36	31	28	26	24	21	20	19	16	16	16	25	46	55	57	51	45.1	87																	
30-May	52	63	70	77	80	68	53	45	40	36	29	26	25	23	22	21	20	19	21	23	31	42	44	48	40.7	80																	
31-May	55	65	72	78	81	73	54	48	44	49	71	87	91	92	83	76	70	68	73	71	87	91	93	93	73.5	93																	
																		72.0	75.4	77.7	80.5	82.2	77.1	62.3	51.6	44.7	39.9	36.5	34.0	32.9	32.6	31.6	31.4	31.5	33.5	35.1	41.1	52.0	60.3	65.4	68.8	Diurnal Average	
																		97	98	98	97	97	97	97	90	92	93	93	91	91	92	92	97	97	98	98	98	98	98	98	97	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Fort McKay South - May 2015





Maximum Speed: 21 km/h on May 15 20:00	Maximum Daily Speed Average: 12.0 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 15 04:00	Minimum Daily Speed Average: 0.6 km/h on May 10	Hours of Data: 738
Maximum Diurnal Speed Average: 1.7 km/h at hour 21	Minimum Diurnal Speed Average: 0.2 km/h at hour 13	Hours of Missing Data: 6
Monthly Average Velocity: 0.4 km/h 343.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 P ₉₀ = 11 P ₉₉ = 19	Percent Operational Time: 99.2

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-May	SW6	SW1	WSW2	SW1	WSW3	SSW3	S4	SSW7	SW9	SSW11	SW11	WSW11	WSW10	SSW13	SSW13	W5	WSW6	WNW8	SW9	WSW4	W5	WSW2	WSW6	WSW5	SW5.9	SSW13
2-May	WSW2	WSW4	WNW4	W3	NE1	NW1	NNW7	N10	NNE11	NNE11	NNE12	NNW7	NNE9	NW7	NW6	N7	N6	NW3	N7	N6	NNW10	N6	N7	N10	N5.7	NNE12
3-May	N6	N5	NW3	NW3	SW2	WNW3	NW4	NW4	WNW5	WNW6	W8	NNW6	NNE9	NNE10	NNE10	NNE10	NNE11	NNE12	NNE10	NNE4	WNW1	WSW3	WSW3	W2	N4.3	NNE12
4-May	WSW2	SW2	WSW2	WNW2	NNW2	N2	N4	NNE5	ENE3	E6	E6	NE3	NE5	E0	ESE5	NNE5	NNE7	NE6	NE7	NE5	NNE7	NNE8	N7	N7	NNE3.4	NNE8
5-May	N5	NNE7	NNE8	NNE7	NNE7	N7	N9	N9	N9	N10	N11	N11	NNE8	NNE11	NNE9	NNE7	NE4	N1	AF	N1	AF	AF	N7	N5	NNE7.0	N11
6-May	N6	N6	NNW6	N7	N7	N8	N9	N8	N9	N10	N10	NNE10	NNE11	NNE10	NE10	ENE8	NE9	ENE6	E6	ESE2	W2	SW3	WSW3	SW2	NNE5.6	NNE11
7-May	SW2	SW3	SW2	SW2	SW2	SSW2	SE5	SSW5	SW5	N1	NE8	NE7	NNE8	NE7	NNE8	NNE8	NNE5	ENE2	E4	W2	WSW3	WSW3	WSW3	WSW3	NNE0.8	NNE8
8-May	WSW3	WSW2	WSW3	SW2	WSW2	W1	E2	SSE5	SE4	ESE5	E8	SSE6	WSW5	ESE2	NNE5	NW12	NNW9	NNE9	NNE8	NE4	ESE2	E3	S1	NW2	NE0.8	NW12
9-May	NW3	NNW3	WSW2	AF	AF	AF	NNE4	NNE1	ENE1	S1	SSW4	SSW6	SSW8	S7	S6	SSW4	SSW4	S6	S5	S3	WSW3	WSW3	WSW3	W3	SSW2.5	SSW8
10-May	WSW4	W2	W2	W2	WSW3	W2	N3	NNE3	NE3	ENE4	NNE5	NE6	NE5	SE2	S7	SW6	SW5	SE2	NNE1	WSW1	WSW3	WSW4	WSW2	WSW3	WSW0.6	S7
11-May	WSW3	SSW2	SW3	WSW3	SW3	SSW4	S4	S6	SSW7	SSW6	SW7	S8	S8	SSW8	S6	SE7	E1	NE5	E2	SW1	WSW2	W3	W3	W3	SSW3.2	SSW8
12-May	NW2	WSW3	WSW3	WSW3	WSW2	W2	NNE3	SE3	SE2	NNE3	E2	SE5	WNW4	SE5	ESE4	S8	S7	SSE8	SSE6	SE4	SE6	SSE7	SSE8	SSE6	SSE2.8	S8
13-May	SSE5	SSE4	SSE3	WSW2	SW2	S3	SSE7	S9	S10	S9	S9	SSW10	S11	S12	S11	S11	S9	S9	S8	S6	SSW6	SSW4	S3	S3	S6.8	S12
14-May	SSW3	S3	SW2	SSW3	S4	S3	SSE4	S6	SSW6	SW11	SW12	SSW14	SSW13	S12	S11	SSW9	SSW10	S9	SSW9	SSW7	SSW8	SW7	SSW9	SW9	SSW7.3	SSW14
15-May	SW9	SW9	SW6	NNE0	WSW3	SSW1	SSW3	SSW2	S6	S8	S9	WSW10	SSW10	WSW11	WSW9	WSW10	WSW6	W1	NNE15	N21	N19	N20	N20	N19	WNW3.3	N21
16-May	N16	N13	N19	N19	N16	N16	N17	NNE17	NNE15	NNE16	NNE16	NNE15	N14	NNE13	NNE13	NNE13	NNE12	NNE11	NE8	NNE8	NNE5	NW3	WNW2	WSW3	NNE12.0	N19
17-May	WSW3	WSW2	WSW3	SSW3	SW2	WSW2	S4	SSE9	S9	S9	S9	S9	SSW9	S7	S6	S6	SE8	SE7	SE6	SE5	WSW3	WSW3	WSW3	S3	S4.6	SSE9
18-May	S3	SSW3	SW1	SSW2	SW3	S4	S6	S7	S7	S8	SSW10	SSW10	SSW10	S9	S8	SSW9	S7	S7	S6	S4	WSW4	SW5	SW5	SW5	SSW5.7	SSW10
19-May	WNW2	SW3	SSW3	SSW3	SW3	S3	SSE5	SSE6	S6	WSW8	SW6	SSW9	S8	SSW8	SSW7	SSW6	S6	S6	SSE4	S2	WSW3	SSW3	WSW3	SW2	SSW4.2	SSW9
20-May	SW3	SSW3	SSW3	SW3	WSW3	SSW2	S4	S5	S6	SSE6	S7	S10	SW8	S6	SW6	WSW2	SSE3	SE4	ESE4	SSE1	WSW3	SW2	SW3	SW2	SSW3.6	S10
21-May	SW3	SW2	SW3	SW3	S3	S3	S5	S6	S7	S6	S6	S8	S10	S9	SSW7	SW7	SSW4	SW3	W3	WSW3	SW3	SW3	SW2	WSW2	SSW4.2	S10
22-May	SW3	SSW1	SW3	SW2	S3	SSE3	S2	SE1	ENE3	N6	NNE9	NNE11	N13	NNE13	N12	NNE11	NNE14	N13	NNE12	NNE8	NNE6	N5	N5	N5	NNE5.3	NNE14
23-May	N6	NNW4	NNW5	NNW4	NNW3	N4	NNE6	NNE6	NNE8	N9	N10	N10	NNE8	NNE5	NE5	N7	ENE5	NE5	E2	ENE0	WSW2	WSW2	W2	W1	N4.2	N10
24-May	WSW2	SW2	SW2	SW2	S3	S2	NE2	NE4	NNE4	SE5	ESE5	E6	E6	ESE5	SE4	SE3	S3	E1	NNW2	W2	WSW3	WSW3	WNW2	WNW1	SE1.1	E6
25-May	SW1	SW2	SSW3	S2	SW1	S2	S3	SSE4	S3	ESE6	SE7	SW7	W2	S2	SSE5	SSE6	NW5	NW6	WNW2	NNW5	N11	N11	N11	N11	NW0.7	N11
26-May	N9	N10	NNW8	NNW4	NNW6	N6	N8	N8	NNE9	NNE10	NNE10	NNE9	NNE9	NNE7	NNE9	NNE7	NNE6	ENE6	NE7	NNE6	NNE5	WNW2	SW3	WSW2	NNE6.2	NNE10
27-May	WSW2	SW2	WSW3	WSW2	WSW3	W1	N3	E2	SSE3	E3	N5	NNW1	N7	N10	N19	N15	N13	N12	N8	N12	NNE18	N17	N15	N12	N6.6	N19
28-May	N12	N12	N11	N9	N10	N10	NNE12	NNE13	NNE13	NNE12	NNE13	NNE10	NNE12	NNE11	NNE10	NNE10	NNE10	NNE10	N9	N8	NW3	W2	WSW3	WSW3	NNE8.9	NNE13
29-May	WSW2	WSW2	WSW2	WSW2	WSW1	NNW2	SE2	SSE4	SSE8	SSE6	S6	ENE7	ESE5	ESE6	ESE6	SE7	SE6	S4	S5	SSW2	WSW3	S4	S6	S6	SSE3.0	SSE8
30-May	S5	SSW5	SW2	W2	SW2	SSW2	S4	S6	SSW6	SSW6	S7	S10	S9	S9	SE8	SSE7	SSE8	SSE8	SSE7	SE6	SSE3	S4	SSE6	S5	S5.2	S10
31-May	S4	SW4	SW4	SSW2	WNW2	WNW2	S5	SSE5	SE8	S6	S7	SSE2	S5	S6	SSE8	SSE6	SSE6	SSE5	SSE6	SSE6	S3	SSW2	WSW2	WSW4	S3.9	SE8

WNW1.4	WNW1.4	WNW1.7	WNW1.5	WNW1.3	NW0.9	NNE0.9	E1.1	SE1.0	SE0.6	ESE0.5	SSE0.5	E0.2	SE1.1	ESE1.2	NE0.7	NE1.1	ENE1.4	ENE1.5	NNE1.3	NW1.7	WNW1.5	WNW1.5	WNW1.7	Diurnal Average
N16	N13	N19	N19	N16	N16	N17	NNE17	NNE15	NNE16	NNE16	NNE15	N14	NNE13	N19	N15	NNE14	N13	NNE15	N21	N19	N20	N20	N19	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 McKay South - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on May 15 20:00	Hours in Service: 744 Hours of Data: 738 Hours of Missing Data: 6 Hours of Calibration: 0 Percent Operational Time: 99.2
Minimum Value: 0 km/h on May 21 21:00	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	

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

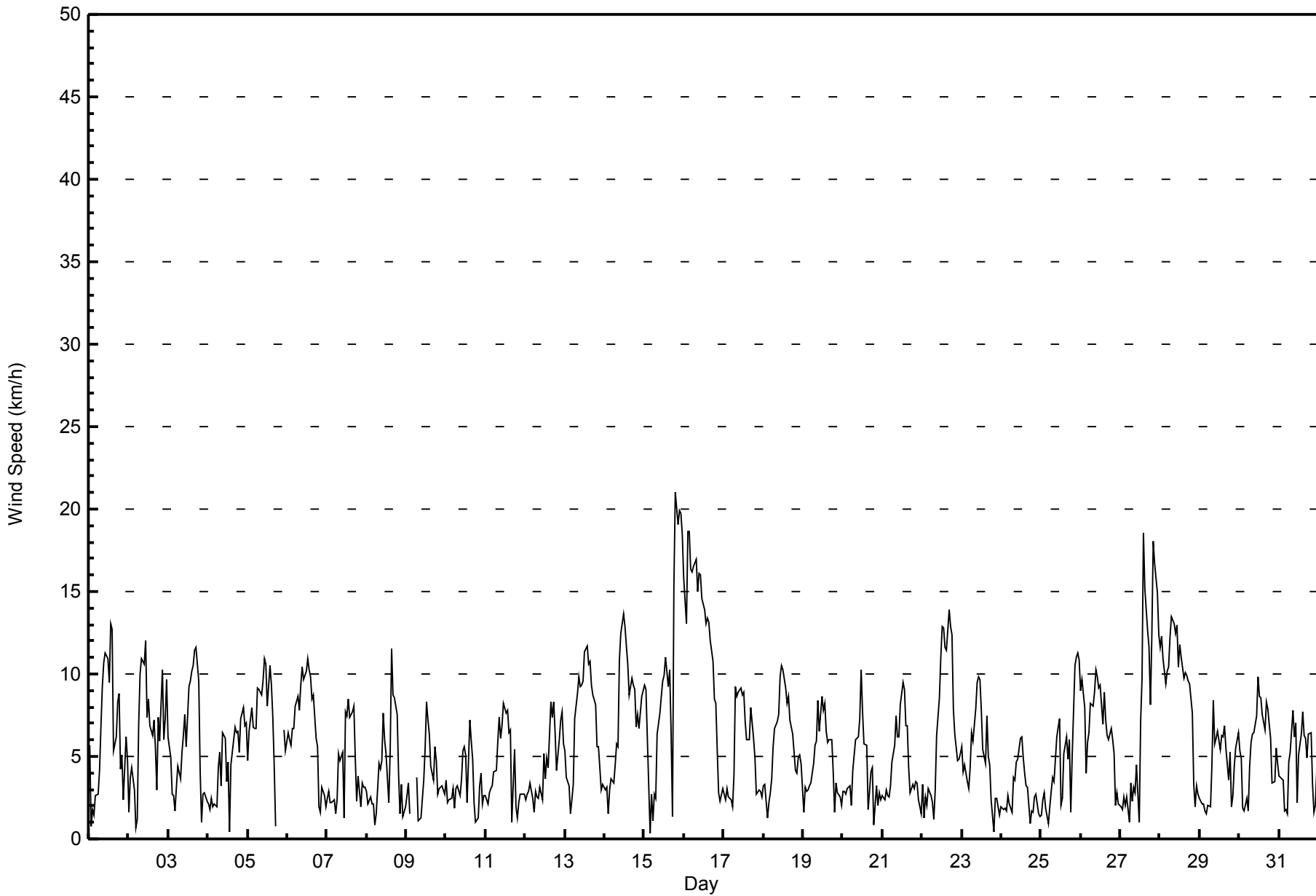
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - May 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	378	51.22	51.22
6 - 11	304	41.19	92.41
12 - 19	53	7.18	99.59
20 - 28	3	0.41	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 738

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	17	13	7	11	10	16	19	42	34	56	77	24	14	12	11	378
6 - 11	52	57	9	4	6	3	11	24	65	32	17	10	1	2	3	8	304
12 - 19	23	22	0	0	0	0	0	0	2	4	1	0	0	0	1	0	53
20 - 28	3	0	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	93	96	22	11	17	13	27	43	109	70	74	87	25	16	16	19	738

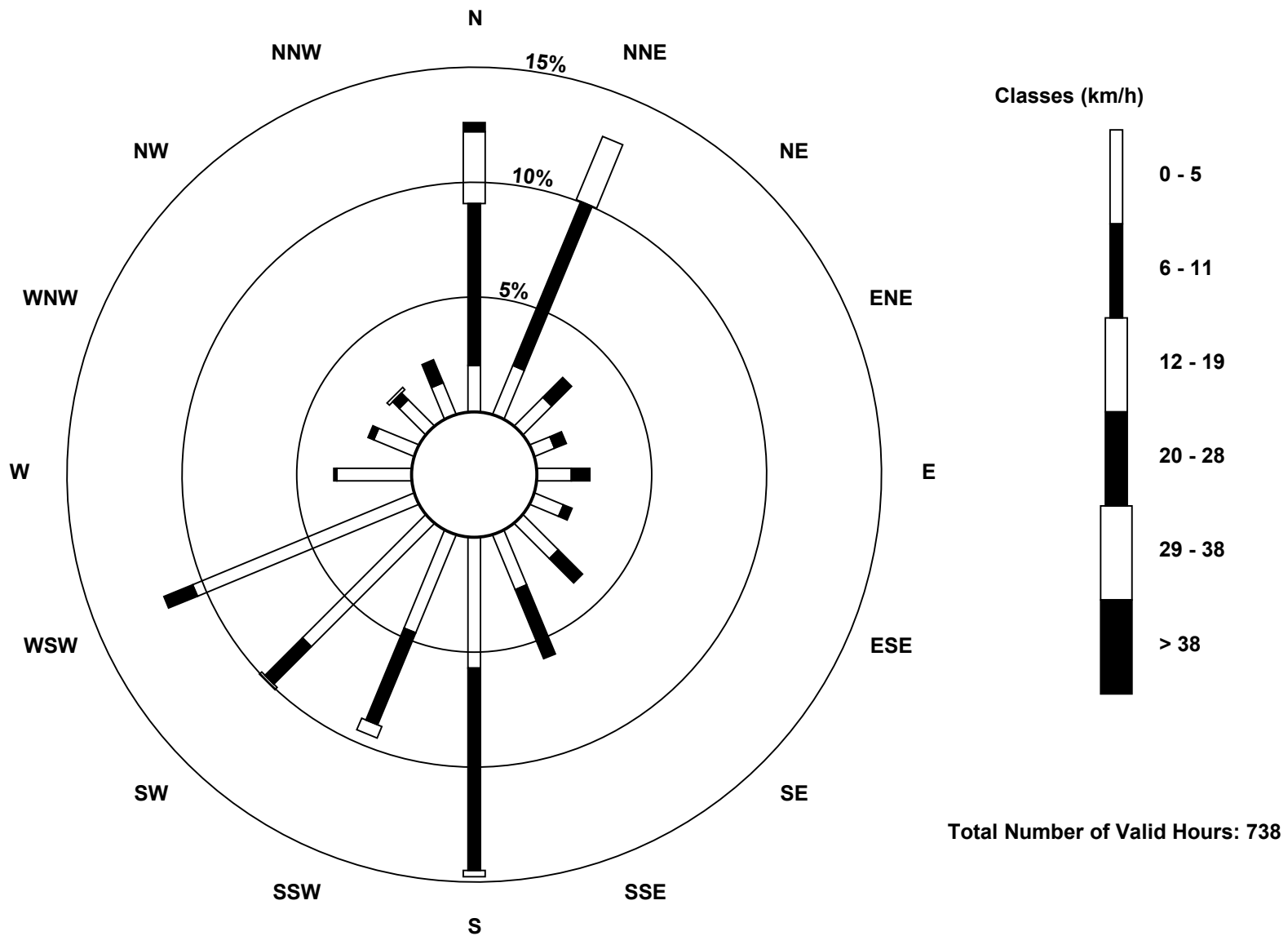
Total Number of Valid Hours: 738

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Wind Speed (WS) - km/h
Fort McKay South (AMS 13)





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg
Fort McKay South - May 2015

Direction of Maximum Speed: 358 deg on May 15 20:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 12.4 deg on May 16		Hours of Data: 738
Direction of Minimum Speed: 29 deg on May 15 04:00	Direction of Minimum Daily Speed Average: 0.6 deg on May 10	Hours of Missing Data: 6
Monthly Average Direction: 232.4 deg		Percent Operational Time: 99.2

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	222	235	246	214	249	206	172	205	228	207	227	238	241	201	213	272	255	282	223	239	267	244	251	255	230.4
2-May	257	252	290	269	47	324	343	3	18	13	21	342	14	323	313	1	351	313	9	354	331	354	6	3	351.8
3-May	3	355	313	317	223	299	308	306	284	297	278	345	20	20	24	23	21	19	12	19	298	256	250	266	350.9
4-May	248	235	248	293	344	356	357	25	77	93	84	40	44	91	115	23	21	34	38	39	22	18	8	7	30.7
5-May	355	21	24	23	19	11	7	1	0	8	9	2	13	33	15	30	38	8	AF	11	AF	AF	6	354	12.9
6-May	355	355	343	350	359	356	358	357	359	2	11	22	28	30	40	57	48	68	86	107	267	233	251	231	15.6
7-May	226	225	226	226	226	226	197	133	206	225	349	35	38	12	45	27	20	21	70	86	267	242	237	243	19.9
8-May	242	248	247	235	253	277	87	155	134	121	88	154	237	118	20	324	332	32	27	50	110	81	187	307	37.7
9-May	324	336	252	AF	AF	AF	14	33	58	184	207	213	208	181	185	205	209	190	185	180	243	240	243	262	211.1
10-May	252	270	270	268	252	266	351	32	42	65	19	39	50	142	171	214	216	143	31	252	238	240	237	239	246.9
11-May	237	211	223	244	234	195	174	181	199	201	219	191	190	205	188	135	81	47	83	226	253	269	276	272	200.6
12-May	309	245	249	251	256	259	16	138	125	28	95	125	287	144	102	170	175	162	157	135	145	149	148	151	157.0
13-May	158	159	163	246	214	191	168	172	182	181	189	198	184	180	185	178	179	177	186	188	200	193	180	190	182.5
14-May	196	186	235	213	183	178	166	170	212	218	216	199	193	189	178	196	194	191	192	195	207	214	213	218	198.4
15-May	215	223	222	29	247	200	200	206	182	189	177	257	233	245	243	236	245	266	12	358	3	0	358	360	299.6
16-May	1	357	1	4	4	6	10	12	20	16	14	16	7	26	31	27	20	22	39	26	24	324	288	243	12.4
17-May	243	242	239	213	219	240	171	165	182	177	177	183	197	185	190	180	138	125	136	142	239	248	236	185	181.1
18-May	185	193	228	195	216	185	175	191	183	189	201	194	193	186	181	195	190	180	190	187	237	236	230	230	195.3
19-May	291	234	204	204	223	191	164	151	190	244	225	201	174	194	198	200	170	174	148	183	242	212	245	223	198.1
20-May	219	208	209	224	238	206	170	169	180	168	187	179	217	189	215	245	162	146	105	161	238	218	227	230	192.6
21-May	228	216	223	225	191	186	174	169	183	190	184	175	184	184	196	226	212	225	260	249	219	218	232	256	199.5
22-May	218	210	228	234	181	168	179	141	77	9	12	19	10	18	8	13	21	9	12	20	19	354	360	2	13.0
23-May	357	338	341	341	339	357	14	27	29	8	5	8	18	16	39	356	65	38	79	62	246	239	263	274	8.4
24-May	237	221	223	226	189	184	38	37	16	133	114	92	93	111	131	136	171	93	334	260	247	238	298	285	131.5
25-May	220	229	194	191	229	181	178	168	189	116	130	221	279	191	163	168	318	320	288	344	354	352	1	358	317.8
26-May	0	357	347	334	344	359	357	7	12	23	23	16	23	32	27	25	28	60	34	32	22	303	230	253	12.6
27-May	254	233	238	244	242	267	9	86	148	87	9	347	356	351	2	358	2	0	352	5	12	4	4	358	0.4
28-May	1	2	1	3	2	10	16	15	19	17	19	27	22	26	21	30	23	19	5	358	319	259	240	241	11.7
29-May	240	240	253	238	249	333	138	148	162	166	172	67	109	104	104	138	141	190	188	208	240	190	185	177	159.9
30-May	180	194	236	270	230	209	171	183	198	199	176	173	186	185	135	152	149	167	148	145	164	175	161	175	173.5
31-May	191	226	232	212	302	292	174	158	144	176	175	166	169	173	164	166	165	165	160	166	169	210	238	249	177.1

287.0 287.6 293.2 301.0 295.1 324.0 30.6 97.8 145.1 138.3 122.2 152.2 99.4 139.6 104.4 53.7 52.6 59.3 60.2 26.8 322.8 299.9 297.8 298.9
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
Fort McKay South - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 105 deg on May 27 12:00	Hours of Data: 738
Minimum Value: 0 deg on May 7 01:00	Hours of Missing Data: 6
Percentiles: P ₁ = 7 P ₁₀ = 18 Q ₁ = 25 Median = 34 Q ₃ = 48 P ₉₀ = 68 P ₉₉ = 97	Hours of Calibration: 0
	Percent Operational Time: 99.2

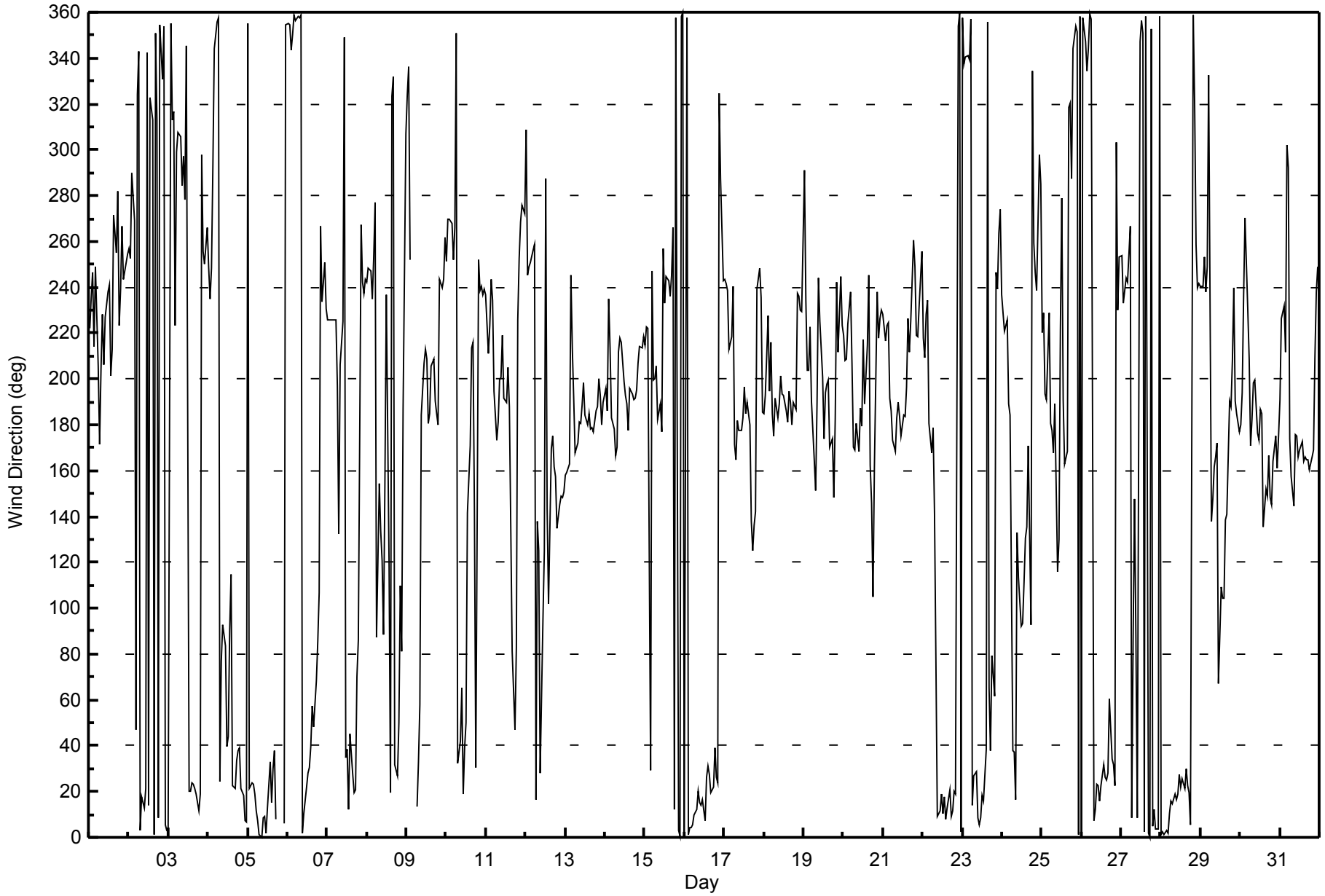
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	34	97	56	67	36	33	23	35	33	33	35	42	48	33	36	78	54	43	34	17	35	68	15	28	97
2-May	95	43	38	70	88	70	26	30	27	32	32	32	35	48	49	46	76	71	23	27	37	25	25	26	95
3-May	24	23	28	35	63	25	34	51	52	44	46	66	29	30	33	29	30	28	24	45	59	16	16	24	66
4-May	27	43	18	41	66	42	23	33	68	47	57	78	79	104	77	74	49	45	34	30	22	26	22	22	104
5-May	21	19	23	19	17	23	24	24	25	23	25	27	39	31	25	28	30	63	AF	17	AF	AF	25	22	63
6-May	23	25	21	25	22	24	24	23	25	25	25	28	28	29	33	38	36	36	42	48	55	11	12	8	55
7-May	0	0	0	0	0	37	30	35	56	39	93	42	46	40	48	45	36	55	91	32	63	24	28	19	93
8-May	12	35	23	63	31	87	48	35	60	65	40	56	56	88	43	36	37	27	29	47	62	46	86	47	88
9-May	36	17	46	AF	AF	AF	18	84	89	89	70	63	47	50	56	75	83	44	28	20	16	14	12	49	89
10-May	38	34	27	20	15	37	44	48	77	73	55	57	70	92	50	59	68	88	98	79	17	8	31	18	98
11-May	28	38	23	25	20	20	25	29	41	42	53	42	48	49	59	50	101	43	96	65	40	38	21	60	101
12-May	24	21	29	10	22	46	22	79	75	75	78	68	84	76	71	50	42	35	34	23	26	28	29	27	84
13-May	27	28	31	40	31	22	23	25	29	34	38	39	36	33	37	36	34	30	25	16	15	25	21	17	40
14-May	17	21	60	28	10	17	21	29	68	28	29	28	31	29	34	43	33	30	23	17	13	14	16	19	68
15-May	19	18	25	96	26	78	35	89	38	39	44	49	42	35	47	39	55	85	27	28	27	28	29	28	96
16-May	29	29	27	26	28	29	29	27	30	30	28	33	31	36	35	31	32	32	40	27	23	33	23	11	40
17-May	7	14	7	20	21	20	31	30	33	38	42	44	43	58	65	58	37	36	36	26	37	13	21	15	65
18-May	18	11	58	30	26	16	20	36	34	43	41	36	38	47	45	47	46	46	30	17	7	5	9	51	58
19-May	52	19	24	20	18	18	25	27	41	42	66	45	47	43	58	67	51	43	36	55	9	22	11	29	67
20-May	29	24	35	17	11	34	19	30	34	38	54	36	54	70	76	97	85	76	38	70	14	40	29	35	97
21-May	28	28	21	18	23	14	21	29	29	43	62	40	49	38	67	58	76	80	67	20	19	26	38	66	80
22-May	42	78	38	38	44	20	43	84	52	43	39	36	34	33	39	37	29	28	27	26	25	23	18	20	84
23-May	21	17	19	14	21	29	27	34	30	30	31	35	46	66	73	47	58	61	70	85	9	20	34	35	85
24-May	17	26	43	41	18	55	60	33	52	54	54	50	52	65	74	82	78	98	58	21	21	13	67	71	98
25-May	64	42	29	66	82	60	25	46	57	31	32	55	83	74	51	39	82	65	70	33	25	28	28	27	83
26-May	28	23	22	23	21	25	26	32	31	35	39	38	37	57	41	55	52	46	38	28	25	42	36	29	57
27-May	59	52	16	39	25	68	28	76	75	74	63	105	30	35	29	28	28	28	29	29	27	26	26	27	105
28-May	27	26	29	29	27	29	29	29	32	32	32	38	35	35	42	41	41	33	30	28	22	50	21	17	50
29-May	14	23	15	37	29	37	60	55	37	58	51	67	66	57	55	48	57	70	30	61	21	14	15	18	70
30-May	20	17	44	34	13	34	28	35	41	42	42	34	44	46	50	52	43	37	38	30	29	24	24	22	52
31-May	31	17	11	44	38	41	47	34	34	35	28	44	24	26	30	32	32	32	29	26	42	63	41	20	63
	95	97	60	96	88	87	60	89	89	89	93	105	84	104	77	97	101	98	98	85	63	68	86	71	
	Diurnal Maximum																								

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Fort McKay South - May 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 49 ppb on May 24 11:00	Maximum Daily Average: 7.4 ppb on May 29		Hours of Data:	706
Minimum Value: 0 ppb on May 6 02:00	Minimum Daily Average: 0.1 ppb on May 28		Hours of Missing Data:	38
Maximum Diurnal Average: 5.9 ppb at hour 10	Minimum Diurnal Average: 0.5 ppb at hour 5		Hours of Calibration:	37
Monthly Average: 2.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 5 P ₉₉ = 23		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	1
2-May	0	0	Z	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0.5	1
3-May	0	0	0	Z	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.7	1
4-May	1	1	1	1	Z	1	1	1	1	13	17	11	5	3	2	2	1	1	1	1	0	0	0	0	2.7	17
5-May	0	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-May	0	Z	0	0	0	0	1	1	C	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0	--	1
8-May	0	0	Z	0	0	0	0	1	1	3	5	3	3	7	6	1	1	2	1	1	0	0	0	0	1.7	7
9-May	0	0	1	Z	1	1	1	1	1	5	16	17	16	14	12	9	10	2	1	4	5	2	1	1	5.1	17
10-May	1	1	1	1	Z	1	1	2	15	17	8	3	2	5	10	16	15	16	10	4	2	1	1	1	5.7	17
11-May	1	1	1	1	1	Z	1	1	1	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0.5	1
12-May	Z	1	1	1	1	1	1	1	1	1	1	2	6	2	2	4	3	2	1	1	1	1	1	1	1.4	6
13-May	1	Z	1	1	1	1	5	7	4	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.7	7
14-May	1	1	Z	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	0	1	0.7	1
15-May	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0.6	1
16-May	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
17-May	0	0	0	0	0	Z	1	7	13	5	15	7	9	8	6	7	6	4	4	3	1	1	1	1	4.3	15
18-May	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0.8	1
19-May	1	Z	1	1	1	1	1	1	1	1	1	1	11	3	1	1	1	2	13	8	2	1	1	1	2.2	13
20-May	1	1	Z	0	0	0	1	1	1	1	1	1	1	3	2	1	2	2	4	2	1	1	0	1	1.2	4
21-May	1	0	1	Z	1	1	2	1	2	2	1	2	1	1	1	1	1	1	1	1	1	0	0	1	1.0	2
22-May	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	0.6	1
23-May	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
24-May	Z	0	0	0	0	0	0	1	3	34	49	24	8	8	6	5	4	3	2	1	1	1	1	1	7.0	49
25-May	1	Z	1	1	1	1	1	1	2	2	3	1	1	0	2	4	9	2	0	1	1	1	1	1	1.5	9
26-May	1	1	Z	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.5	1
27-May	0	0	0	Z	0	0	0	9	23	34	11	2	7	1	0	0	0	0	0	0	0	0	0	0	3.9	34
28-May	0	0	0	0	Z	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-May	0	0	0	0	0	Z	1	7	23	12	6	9	9	11	11	14	11	15	20	12	4	1	1	1	7.4	23
30-May	Z	1	1	0	0	0	1	2	1	0	0	1	8	7	7	5	3	3	1	1	1	2	1	1	2.1	8
31-May	1	Z	1	1	1	1	12	24	37	20	8	1	2	3	5	5	4	5	2	2	1	1	1	1	5.9	37

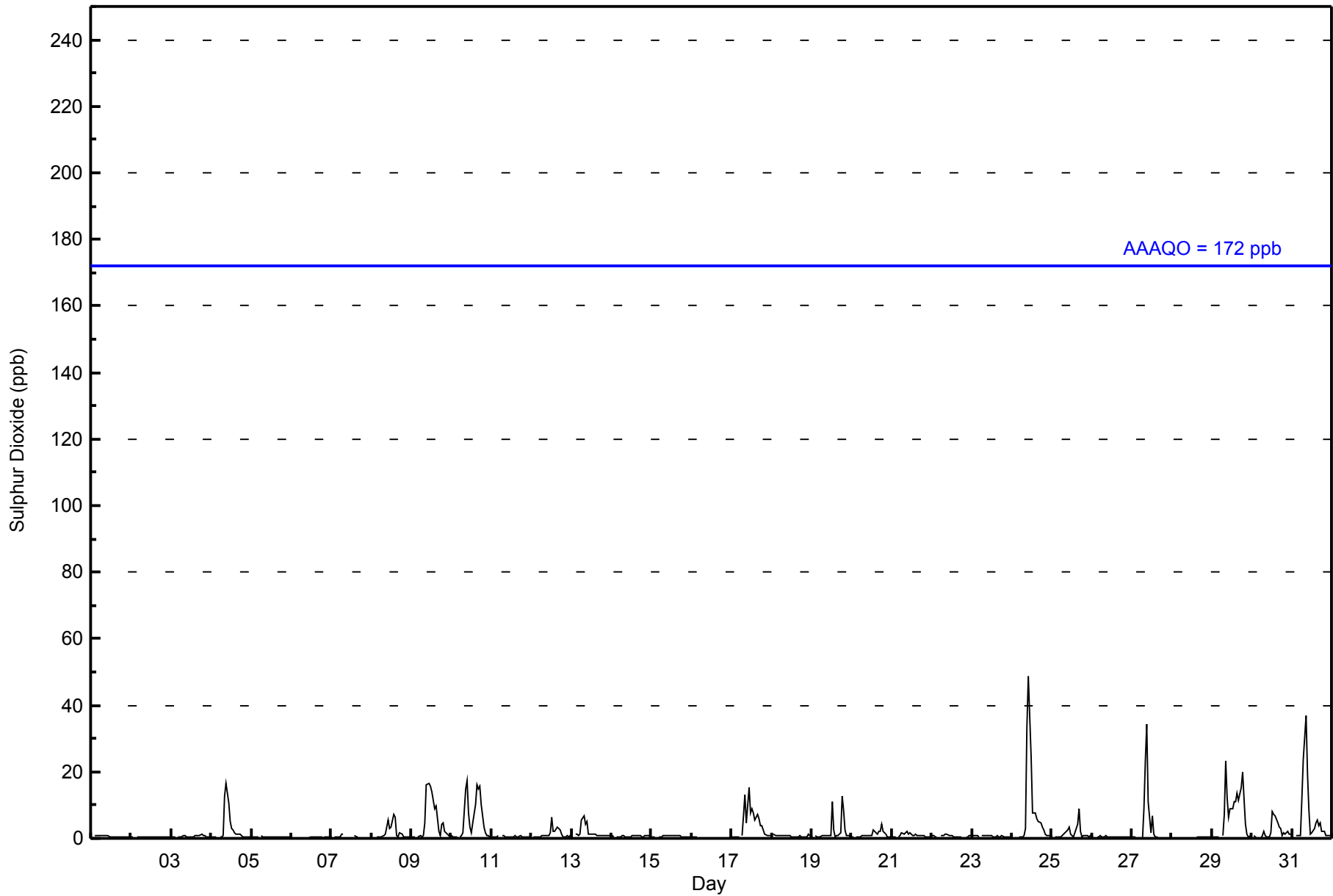
0.5	0.5	0.5	0.5	0.5	0.5	1.2	2.5	5.1	5.9	4.8	2.9	3.0	2.7	2.6	2.7	2.3	2.2	2.4	1.6	0.8	0.6	0.6	0.5	Diurnal Average	
1	1	1	1	1	1	12	24	37	34	49	24	14	12	11	16	15	16	20	12	4	2	1	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	670	94.90	94.90
11 - 20	28	3.97	98.87
21 - 60	8	1.13	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
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	87	92	19	9	13	10	22	37	97	62	65	82	25	15	14	16	665
11 - 20	1	0	1	2	2	2	3	2	9	5	1	0	0	0	0	0	28
21 - 60	0	0	0	0	2	1	2	3	0	0	0	0	0	0	0	0	8
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	88	92	20	11	17	13	27	42	106	67	66	82	25	15	14	16	701

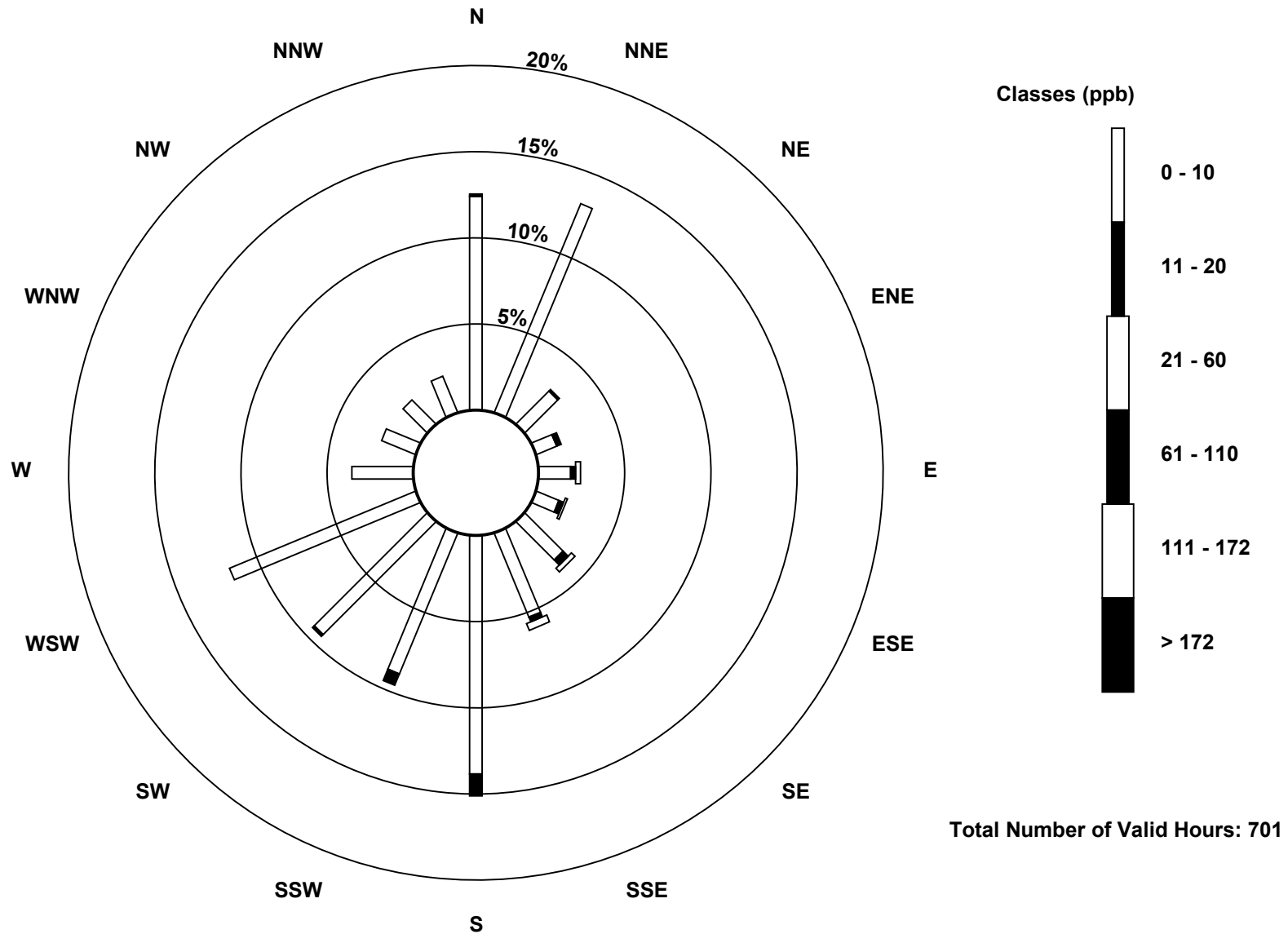
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

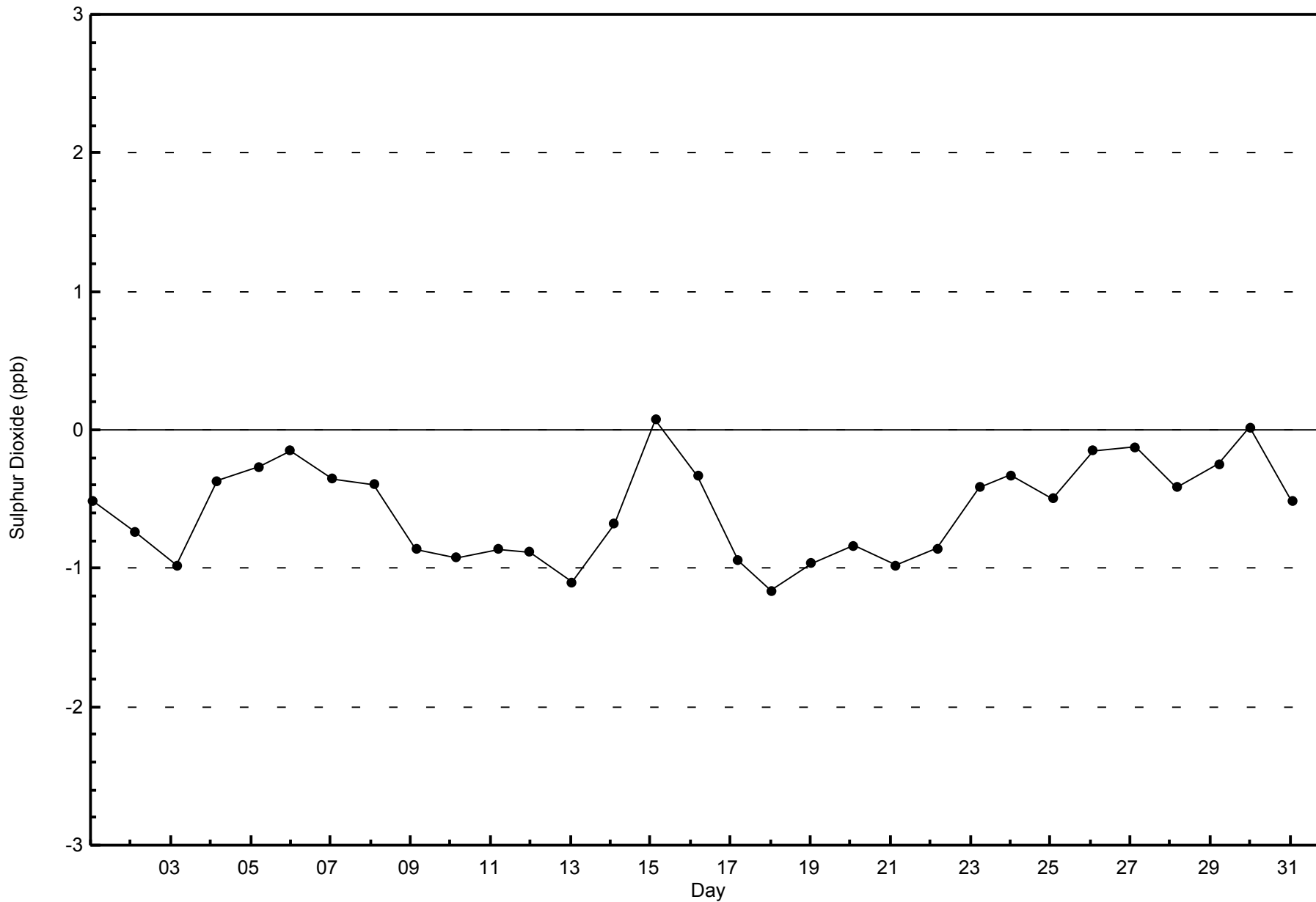
Sulphur Dioxide (SO₂) - ppb
Fort McKay South (AMS 13)





WBEA
Zero Responses

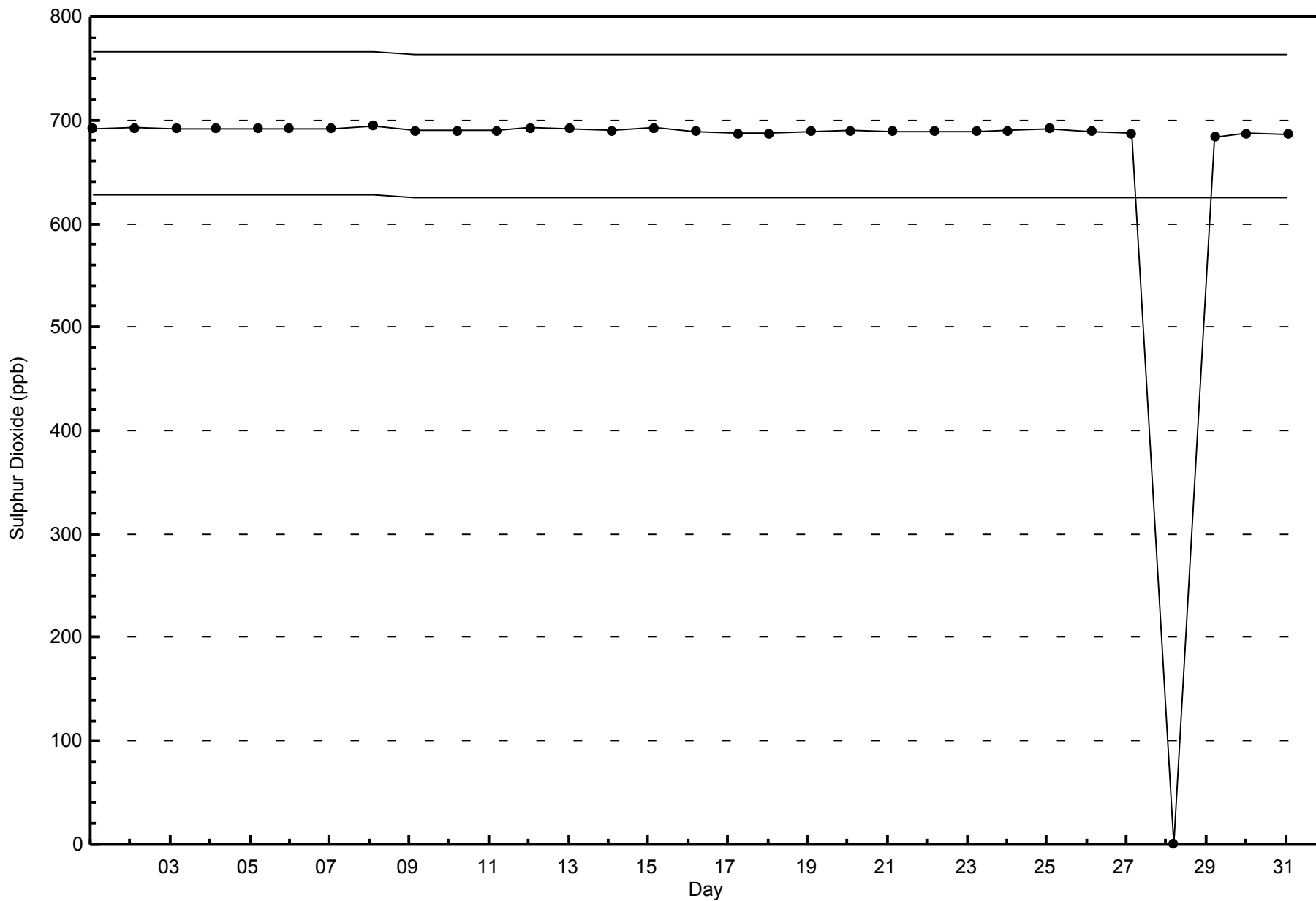
Sulphur Dioxide (SO₂) - ppb
Fort McKay South - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Fort McKay South - May 2015



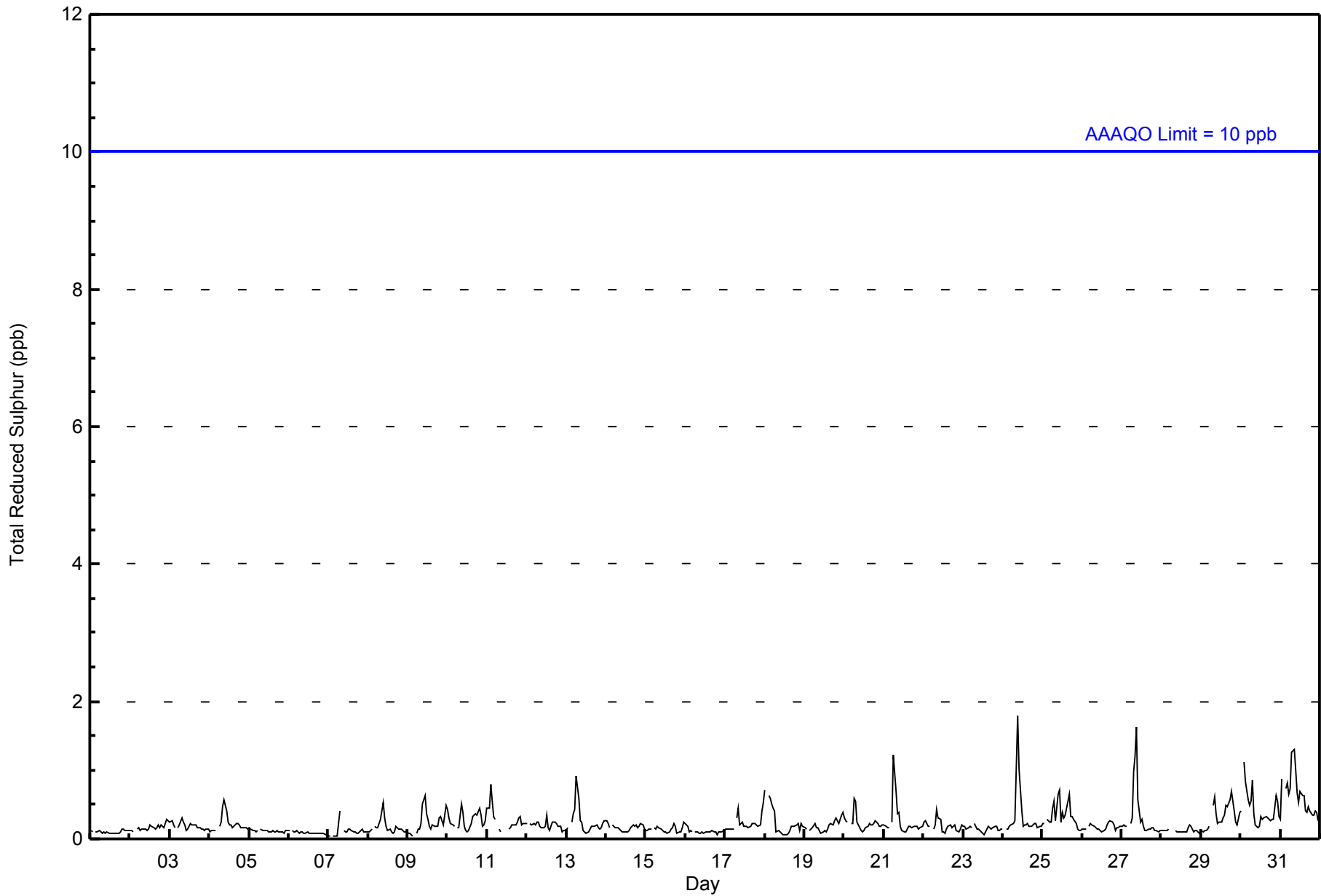


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744										Daily	Daily						
Maximum Value: 2 ppb on May 24 10:00										Maximum Daily Average: 0.6 ppb on May 31										Hours of Data: 707	Average	Maximum					
Minimum Value: 0 ppb on May 9 04:00										Minimum Daily Average: 0.1 ppb on May 6										Hours of Missing Data: 37							
Maximum Diurnal Average: 0.4 ppb at hour 10										Minimum Diurnal Average: 0.2 ppb at hour 14										Hours of Calibration: 35							
Monthly Average: 0.2 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1										Percent Operational Time: 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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-May	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
3-May	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
4-May	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
5-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
6-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-May	0	0	Z	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-May	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
9-May	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
10-May	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
11-May	0	0	1	1	0	0	Z	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-May	0	Z	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-May	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
14-May	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
15-May	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
16-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
18-May	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	0.2	1
19-May	0	0	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-May	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
21-May	0	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-May	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
23-May	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
24-May	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	0.3	2
25-May	0	0	Z	0	0	0	0	1	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.3	1
26-May	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
27-May	0	0	0	0	Z	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
28-May	0	0	0	0	0	Z	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-May	0	0	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0.3	1
30-May	0	Z	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.4	1
31-May	0	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
0.2																								Diurnal Average			
1																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																											



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	707	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	88	94	22	11	17	13	26	41	106	61	67	83	23	16	16	18	702
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	88	94	22	11	17	13	26	41	106	61	67	83	23	16	16	18	702

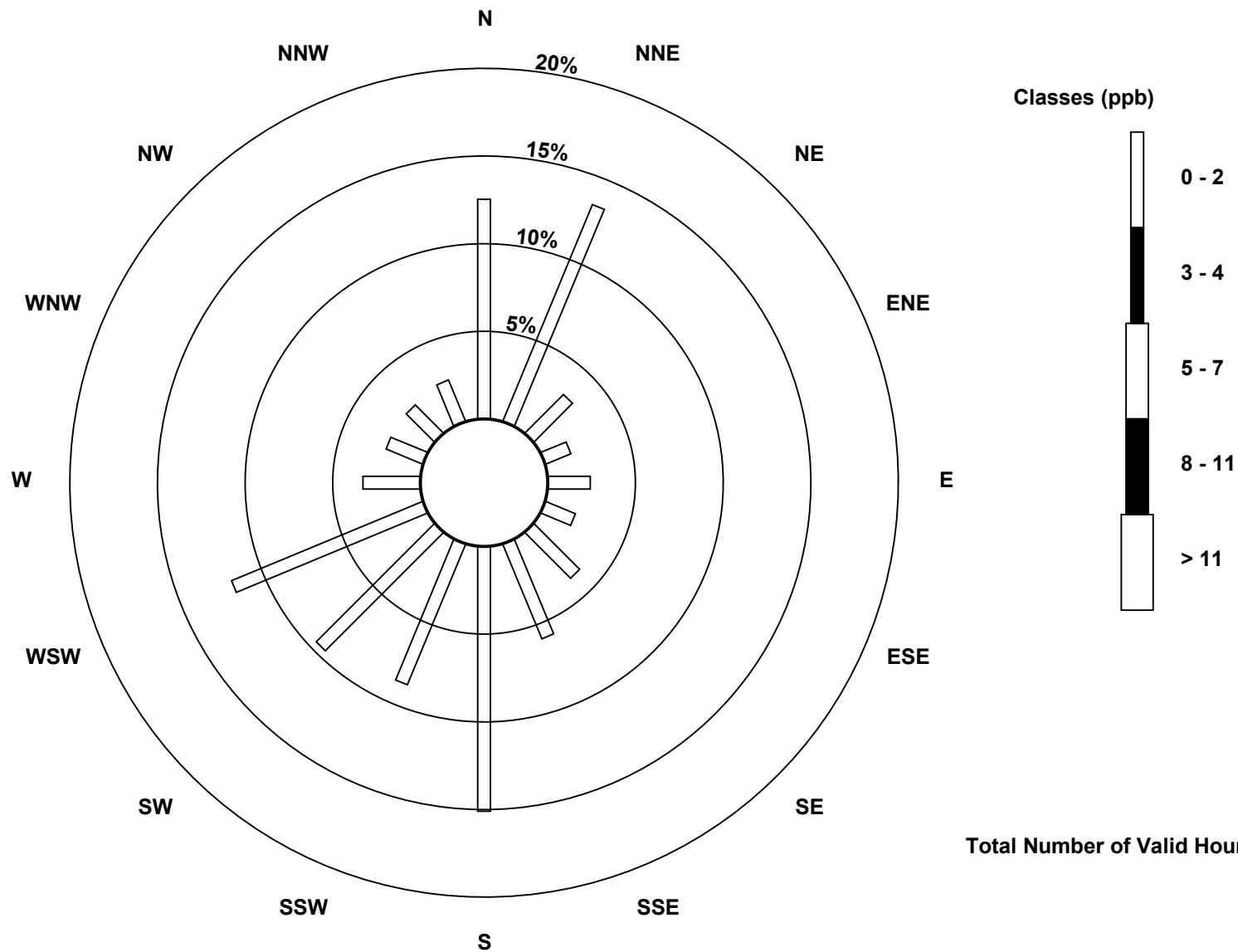
Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

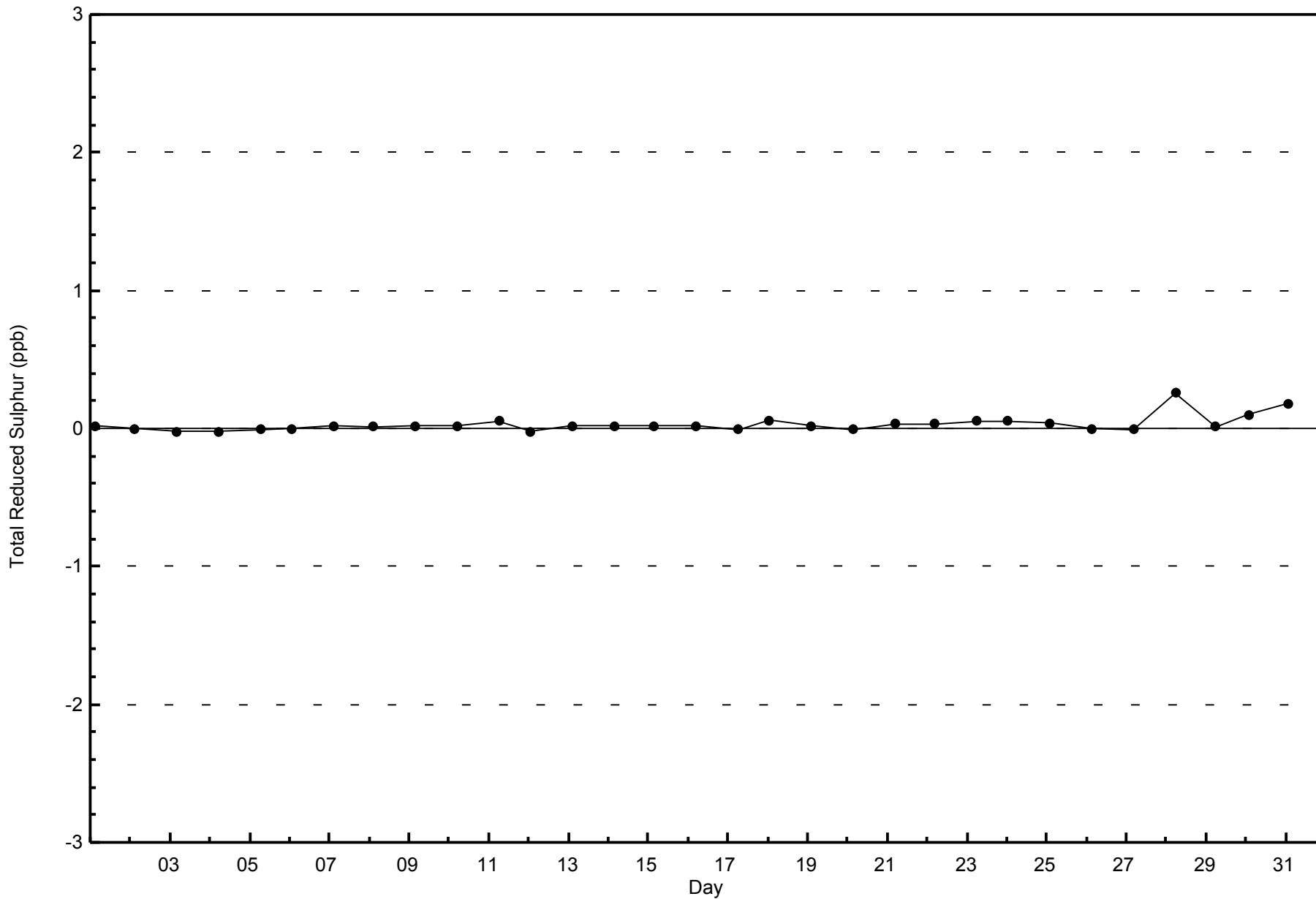
Total Reduced Sulphur (TRS) - ppb
Fort McKay South (AMS 13)





WBEA
Zero Responses

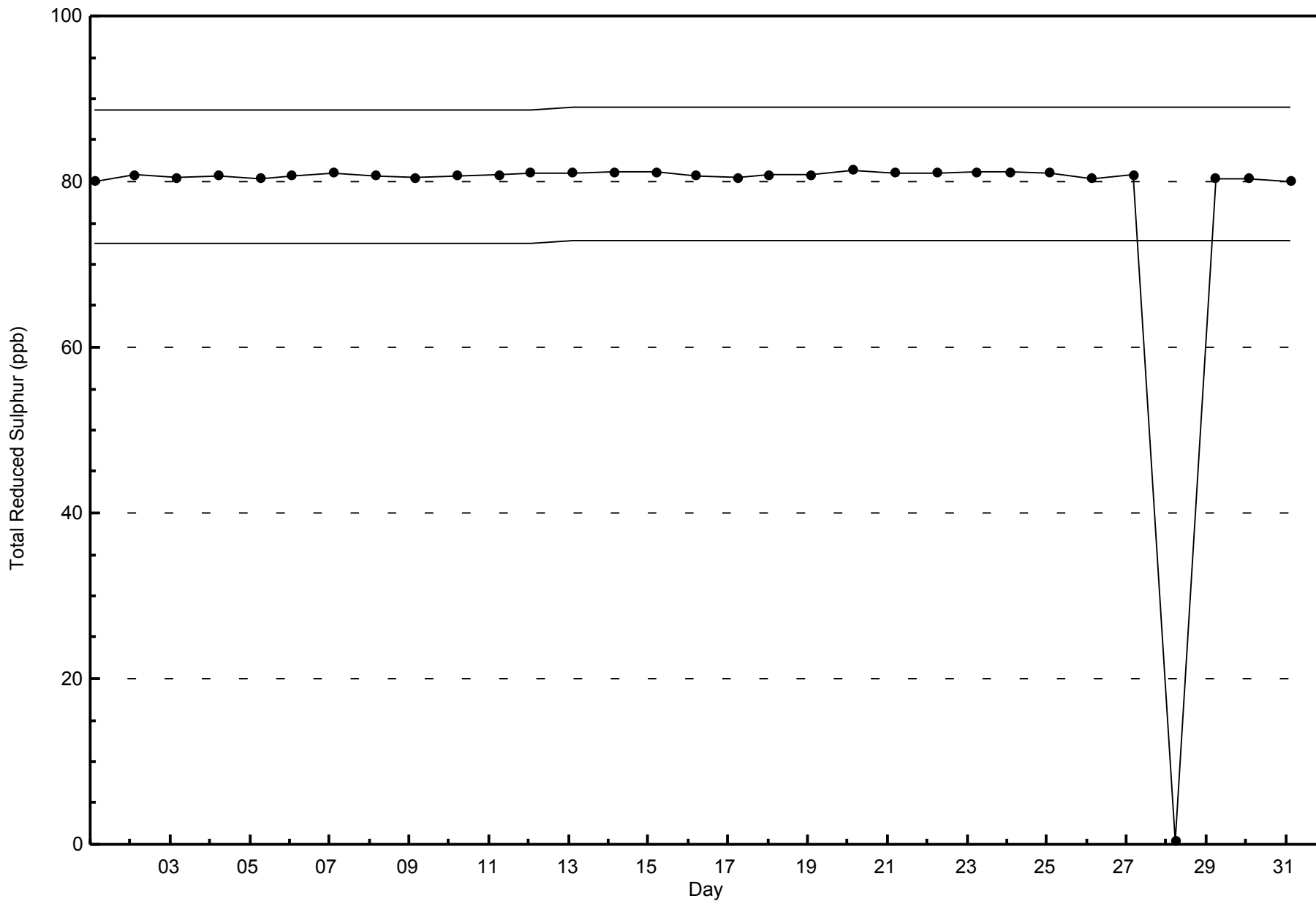
Total Reduced Sulphur (TRS) - ppb
Fort McKay South - May 2015





WBEA
Span Responses

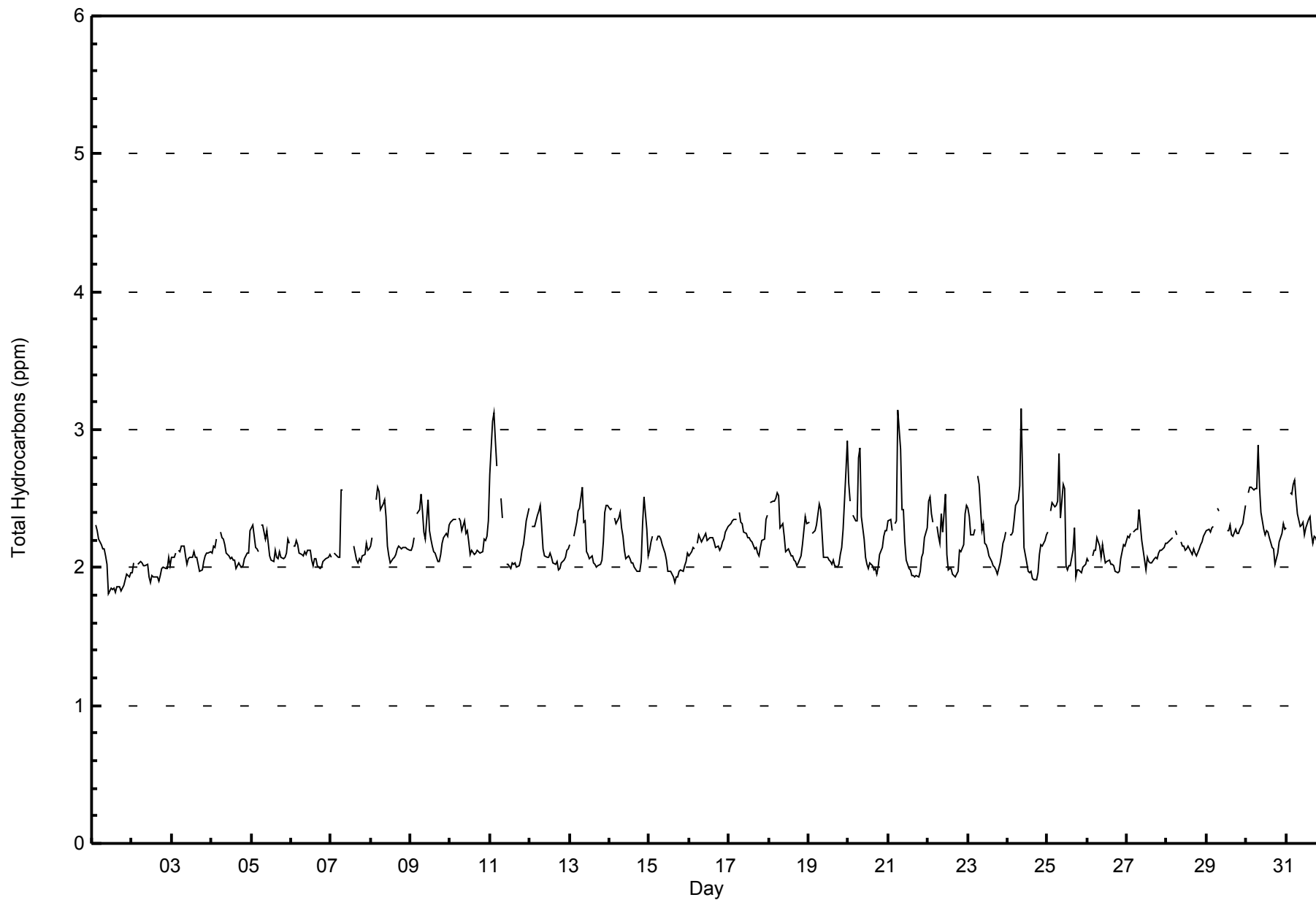
Total Reduced Sulphur (TRS) - ppb
Fort McKay South - May 2015





WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	166	23.71	23.71
2.1 - 3.0	530	75.71	99.43
3.1 - 10.0	4	0.57	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 700

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Fort McKay South - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	23	25	8	5	6	4	5	6	23	15	9	17	6	3	5	6	166
2.1 - 3.0	65	66	12	5	11	9	22	34	81	49	56	65	19	12	9	10	525
3.1 - 10.0	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	4
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	92	20	10	17	13	27	40	105	65	66	82	25	15	14	16	695

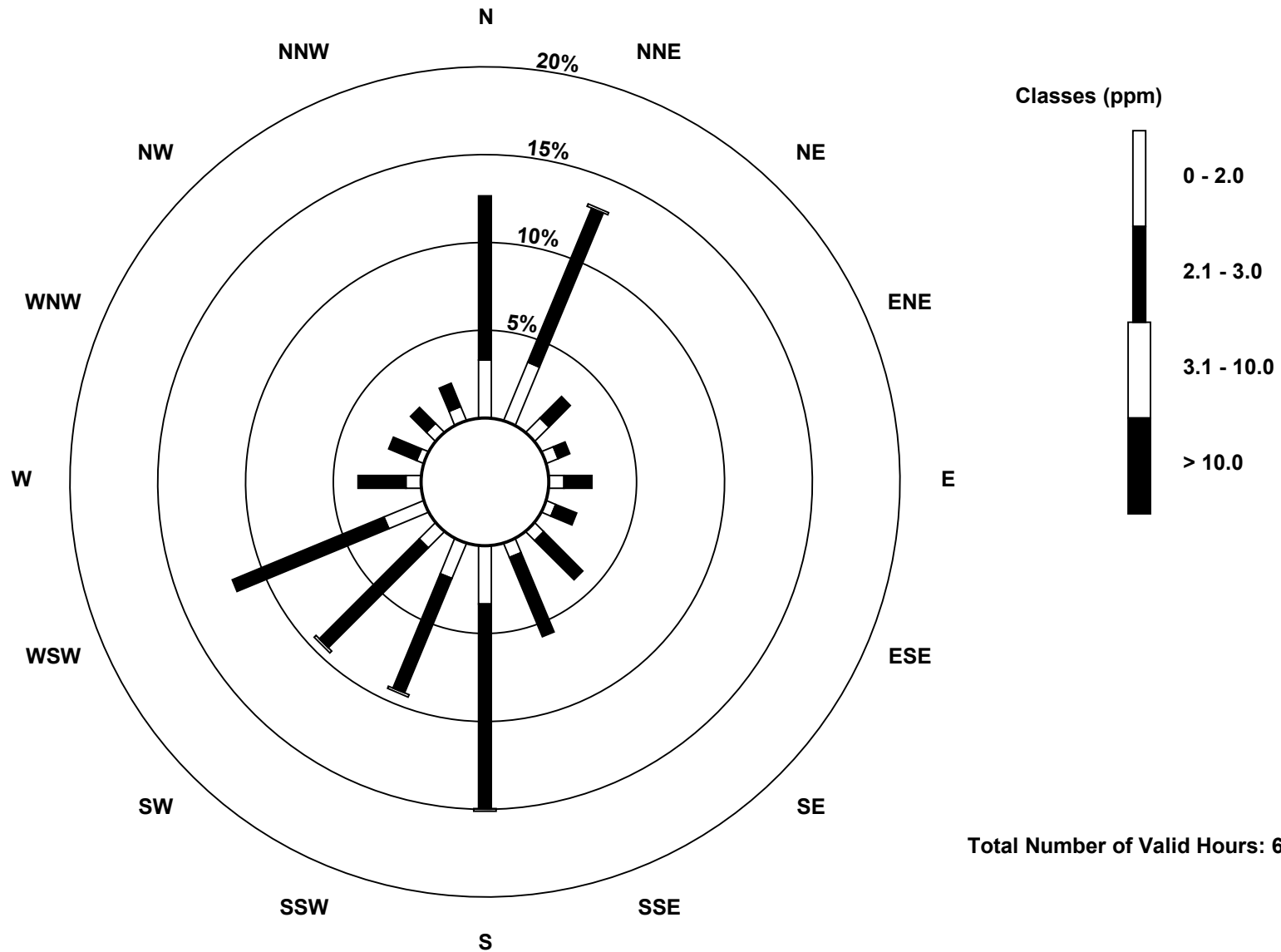
Total Number of Valid Hours: 695

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

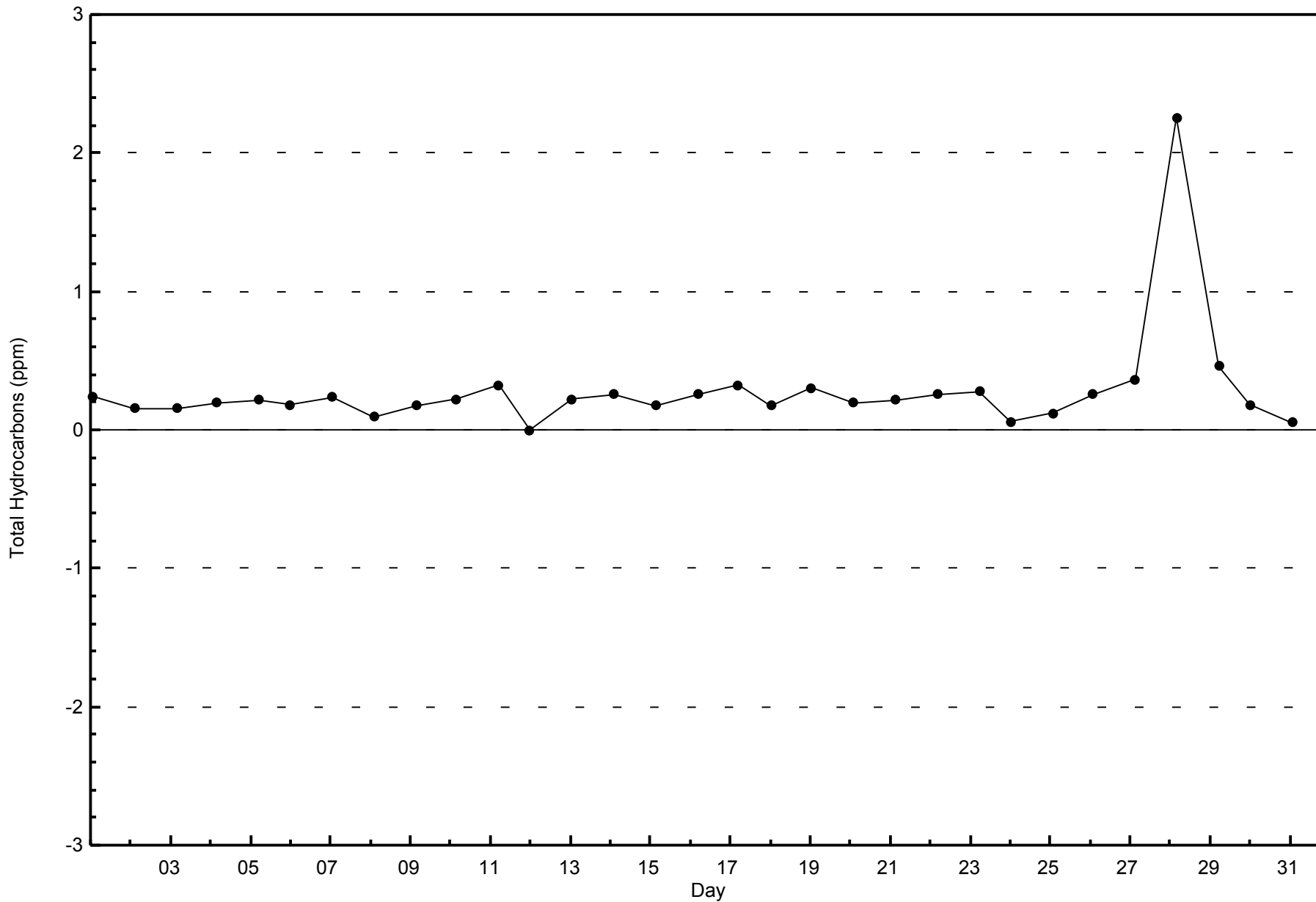
Total Hydrocarbons (THC) - ppm
Fort McKay South (AMS 13)





WBEA
Zero Responses

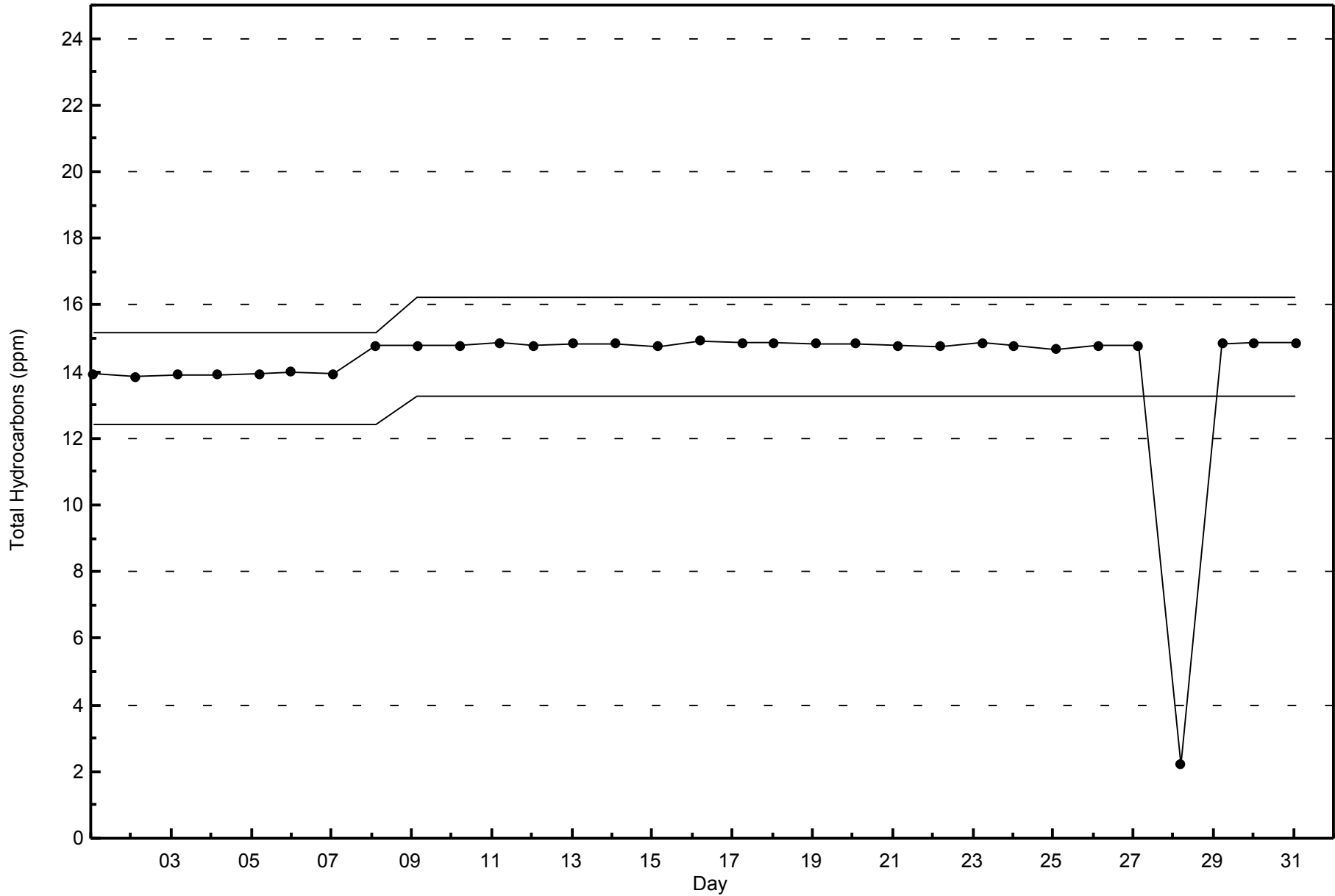
Total Hydrocarbons (THC) - ppm
Fort McKay South - May 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Fort McKay South - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Fort McKay South - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 56 ppb on May 24 17:00	Maximum Daily Average: 35.9 ppb on May 15		Hours of Data:	706
Minimum Value: 0 ppb on May 7 03:00	Minimum Daily Average: 15.8 ppb on May 3		Hours of Missing Data:	38
Maximum Diurnal Average: 41.0 ppb at hour 17	Minimum Diurnal Average: 8.7 ppb at hour 5		Hours of Calibration:	35
Monthly Average: 26.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 6 Q ₁ = 14 Median = 26 Q ₃ = 38 P ₉₀ = 46 P ₉₉ = 52		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-May	8	11	6	Z	5	4	14	32	37	38	40	43	44	45	46	45	46	46	46	46	32	32	27	28	26	30.5	46
2-May	24	17	25	Z	9	26	30	31	32	35	34	31	31	30	32	28	16	26	20	24	18	17	16	16	16	24.9	35
3-May	15	12	3	3	1	Z	9	15	19	21	22	20	18	18	21	22	24	28	30	26	15	9	7	6	6	15.8	30
4-May	4	3	2	2	3	4	Z	22	23	26	28	30	33	35	37	38	38	38	38	35	31	33	29	25	25	24.1	38
5-May	15	18	26	25	28	26	20	Z	23	22	26	28	30	33	32	31	26	20	28	32	32	34	30	26	26	26.6	34
6-May	26	24	Z	23	24	26	26	26	26	29	29	32	34	34	34	34	36	35	32	15	3	1	1	0	23.9	36	
7-May	0	0	0	Z	0	0	1	13	M	28	27	36	39	38	40	43	43	43	42	33	18	11	12	10	21.6	43	
8-May	8	6	2	0	Z	2	7	13	22	C	C	C	C	41	41	38	36	36	35	31	23	29	19	6	20.9	41	
9-May	3	2	1	1	1	Z	11	14	25	25	19	29	32	36	39	38	41	42	38	23	15	9	9	5	19.9	42	
10-May	4	3	2	2	2	2	Z	25	21	24	27	33	39	39	42	42	42	41	37	25	19	14	12	11	22.1	42	
11-May	8	5	5	6	3	2	21	Z	31	32	43	46	46	47	47	47	50	51	51	51	36	24	17	14	16	28.1	51
12-May	15	14	Z	8	5	3	11	24	35	37	38	43	43	45	48	46	46	47	47	39	36	37	34	32	31.9	48	
13-May	30	24	19	Z	10	9	29	33	37	39	42	46	49	50	50	50	50	50	49	42	20	2	1	4	32.0	50	
14-May	10	9	10	10	Z	10	16	31	37	47	48	48	48	48	48	49	49	48	47	41	7	0	15	40	31.0	49	
15-May	36	16	20	11	19	Z	29	29	33	35	42	51	50	51	50	49	48	42	37	37	36	35	34	36	35.9	51	
16-May	37	32	28	22	18	14	Z	13	14	15	16	15	14	14	16	20	21	25	25	25	22	13	10	7	19.0	37	
17-May	5	4	3	2	2	3	10	Z	18	22	22	26	30	33	37	38	41	43	41	38	26	20	18	13	21.5	43	
18-May	14	17	Z	10	8	8	21	25	22	32	41	43	43	44	44	45	46	45	44	35	25	7	0	3	27.1	46	
19-May	11	18	15	Z	11	8	10	20	29	46	46	44	46	47	48	48	47	46	45	34	26	17	13	7	29.5	48	
20-May	11	11	11	9	Z	6	12	25	27	34	45	49	49	49	50	50	50	50	48	36	26	14	14	10	29.8	50	
21-May	6	5	9	9	9	Z	9	31	40	44	46	50	50	50	52	52	52	51	50	38	24	19	13	7	31.1	52	
22-May	1	0	5	12	11	11	Z	28	26	36	35	43	45	44	43	40	39	40	41	37	33	22	14	15	27.0	45	
23-May	15	13	18	14	8	11	13	Z	24	26	36	40	42	45	46	46	45	44	44	31	23	19	15	12	27.3	46	
24-May	11	11	Z	10	6	6	15	13	11	29	41	44	47	51	53	55	56	56	48	34	25	23	18	17	29.6	56	
25-May	14	10	6	Z	6	6	10	8	22	25	33	39	22	21	33	43	45	32	19	22	29	28	31	30	23.3	45	
26-May	30	30	27	19	Z	26	27	29	33	34	37	38	39	39	39	39	39	38	37	37	38	33	21	16	12	31.3	39
27-May	9	7	6	5	3	Z	14	20	22	22	31	42	38	43	38	35	32	32	29	28	30	31	27	25	24.7	43	
28-May	25	25	23	22	23	24	Z	M	M	27	29	29	31	32	33	34	34	35	35	34	25	16	13	11	26.7	35	
29-May	10	10	7	5	4	4	12	Z	20	26	31	33	37	40	42	43	45	43	41	34	26	23	26	28	25.7	45	
30-May	27	24	Z	12	7	6	18	25	25	25	36	43	45	46	47	49	50	50	48	47	41	36	42	38	34.2	50	
31-May	34	27	21	Z	10	6	16	24	31	29	25	19	18	18	23	25	28	28	26	30	21	10	3	10	21.0	34	

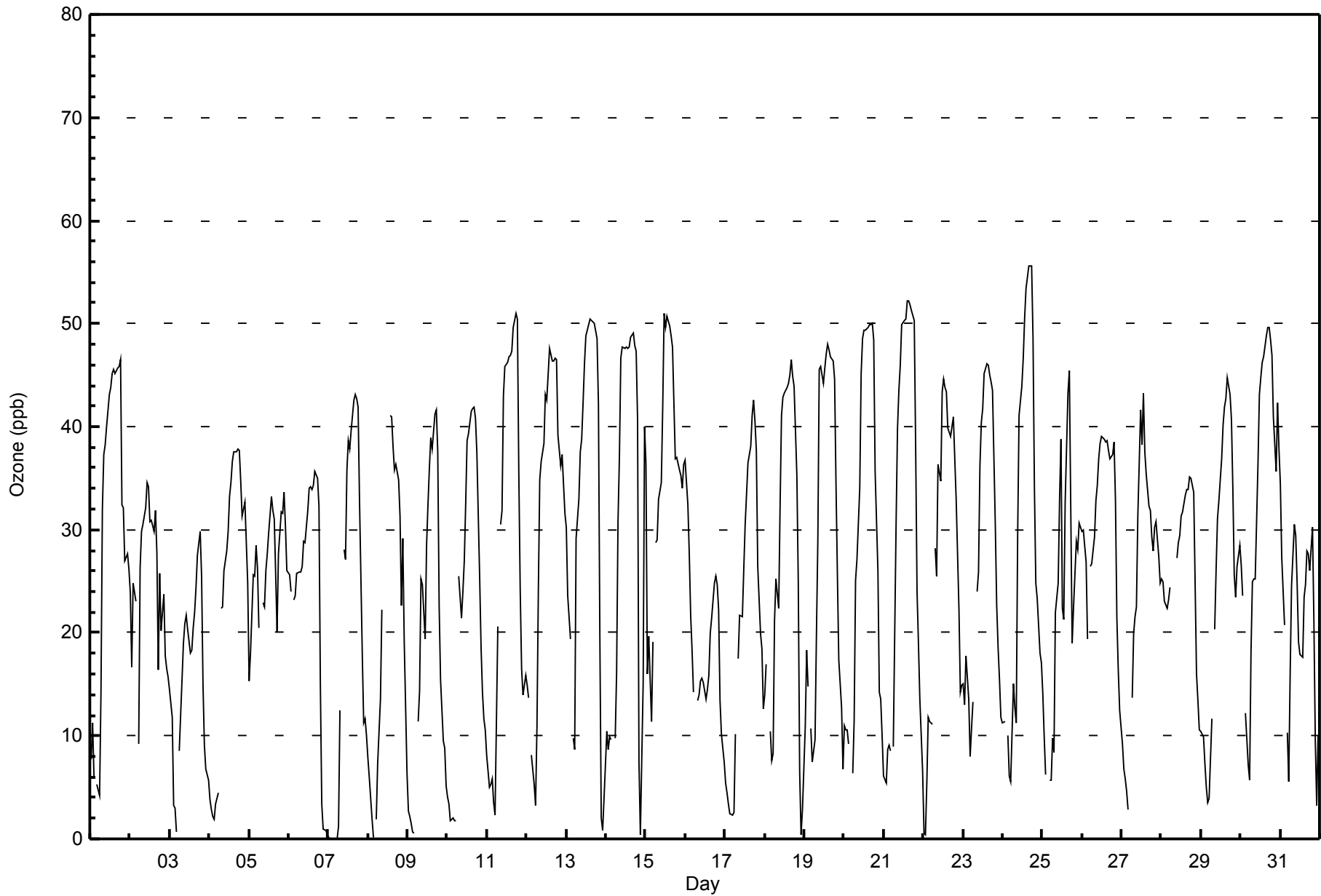
15.0	13.2	11.5	10.7	8.7	9.1	15.6	22.8	26.3	30.3	33.8	37.2	37.7	39.0	40.2	40.8	41.0	39.9	38.8	32.5	24.8	19.2	17.3	16.2	Diurnal Average
37	32	28	25	28	26	29	33	40	47	48	51	50	51	53	55	56	56	51	47	41	37	42	40	Diurnal Maximum

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Fort McKay South - May 2015





WBEA

Cumulative Frequency Distribution

Ozone (O₃) - ppb

Fort McKay South - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	251	35.55	35.55
21 - 50	442	62.61	98.16
51 - 82	13	1.84	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	18	17	2	0	2	1	2	9	23	26	48	56	16	10	10	9	249
21 - 50	71	75	18	11	12	10	23	31	80	38	19	24	8	5	6	8	439
51 - 82	0	0	1	0	2	1	2	0	1	2	2	2	0	0	0	0	13
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	89	92	21	11	16	12	27	40	104	66	69	82	24	15	16	17	701

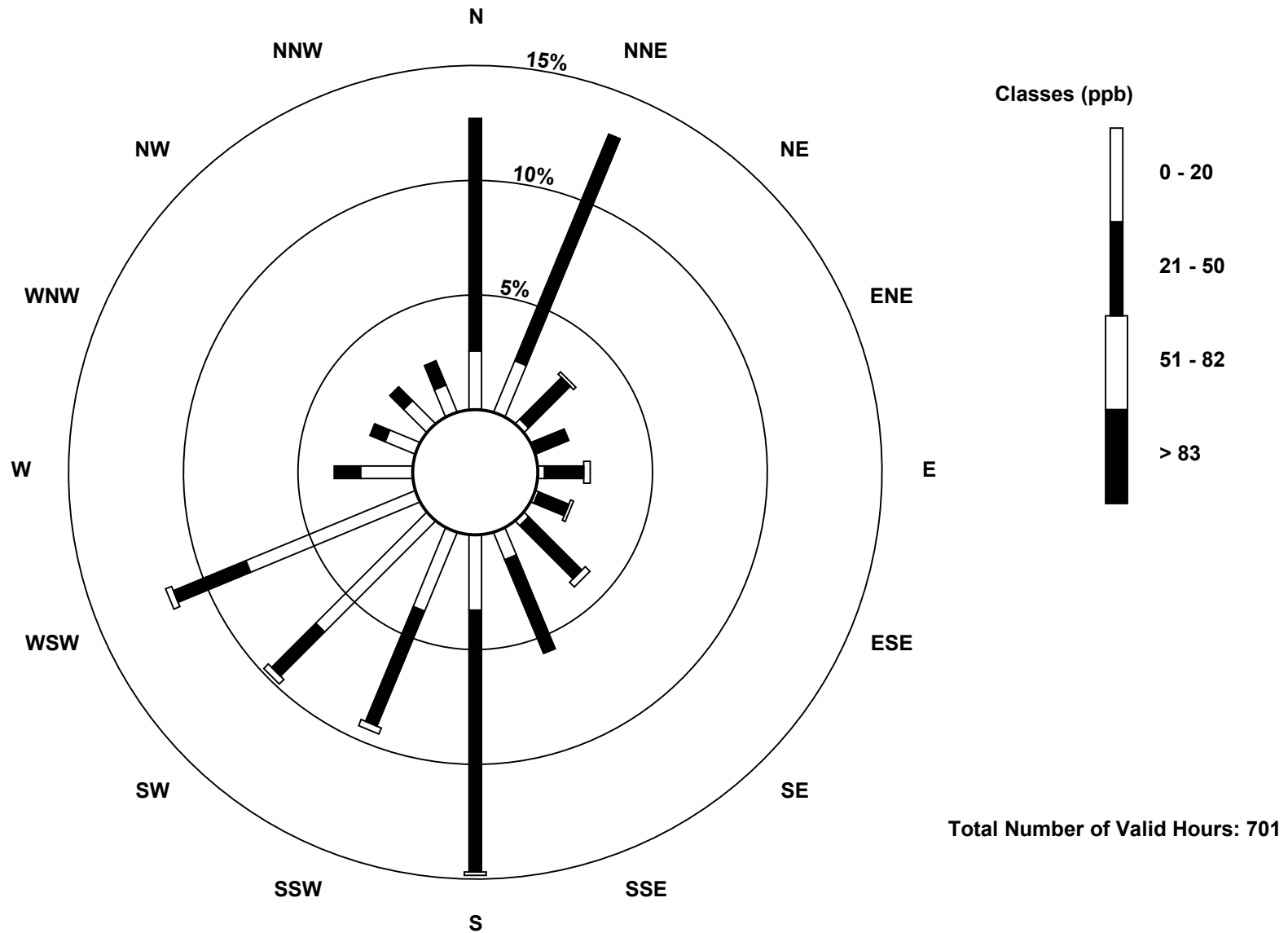
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

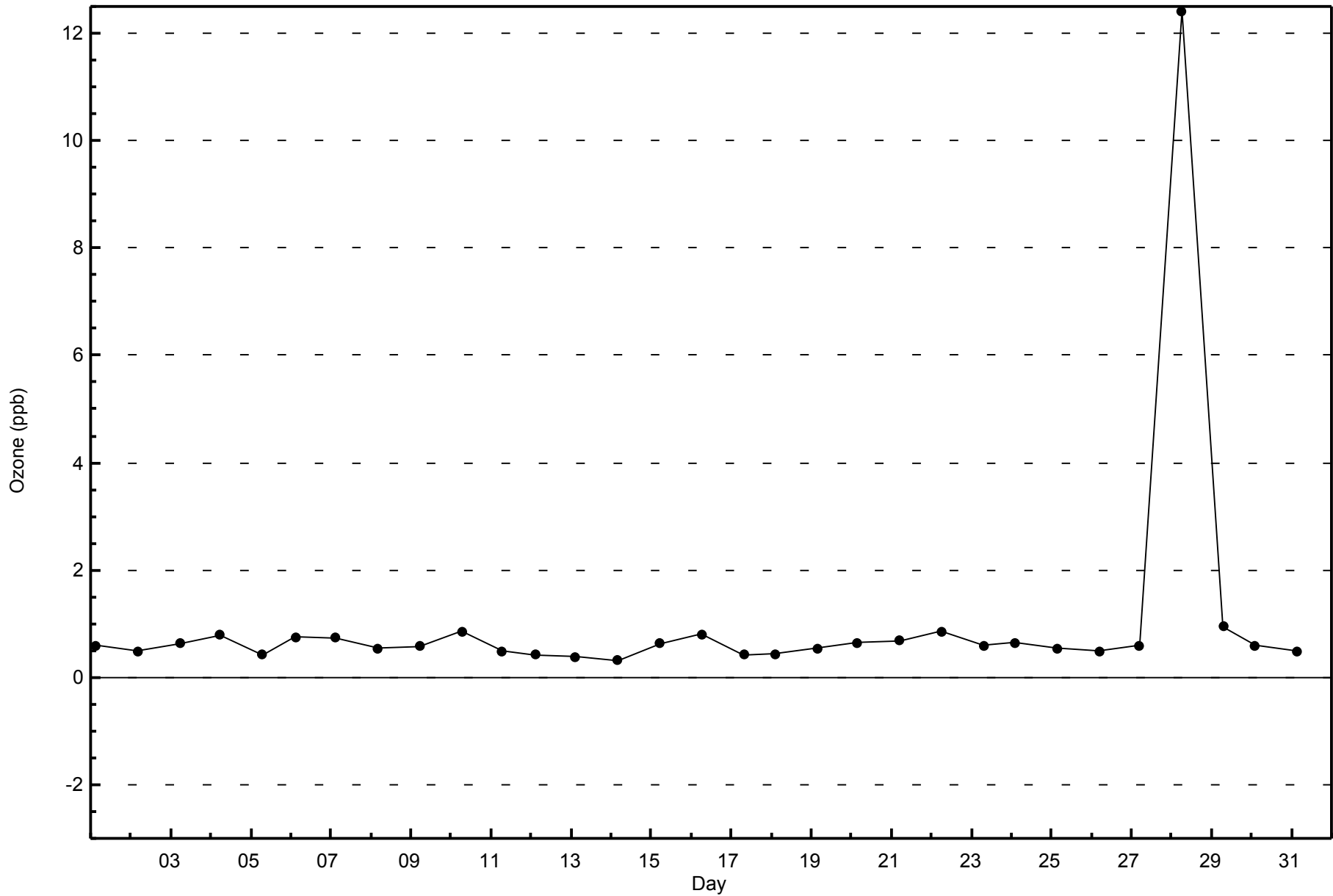
Ozone (O_3) - ppb
Fort McKay South (AMS 13)





WBEA
Zero Responses

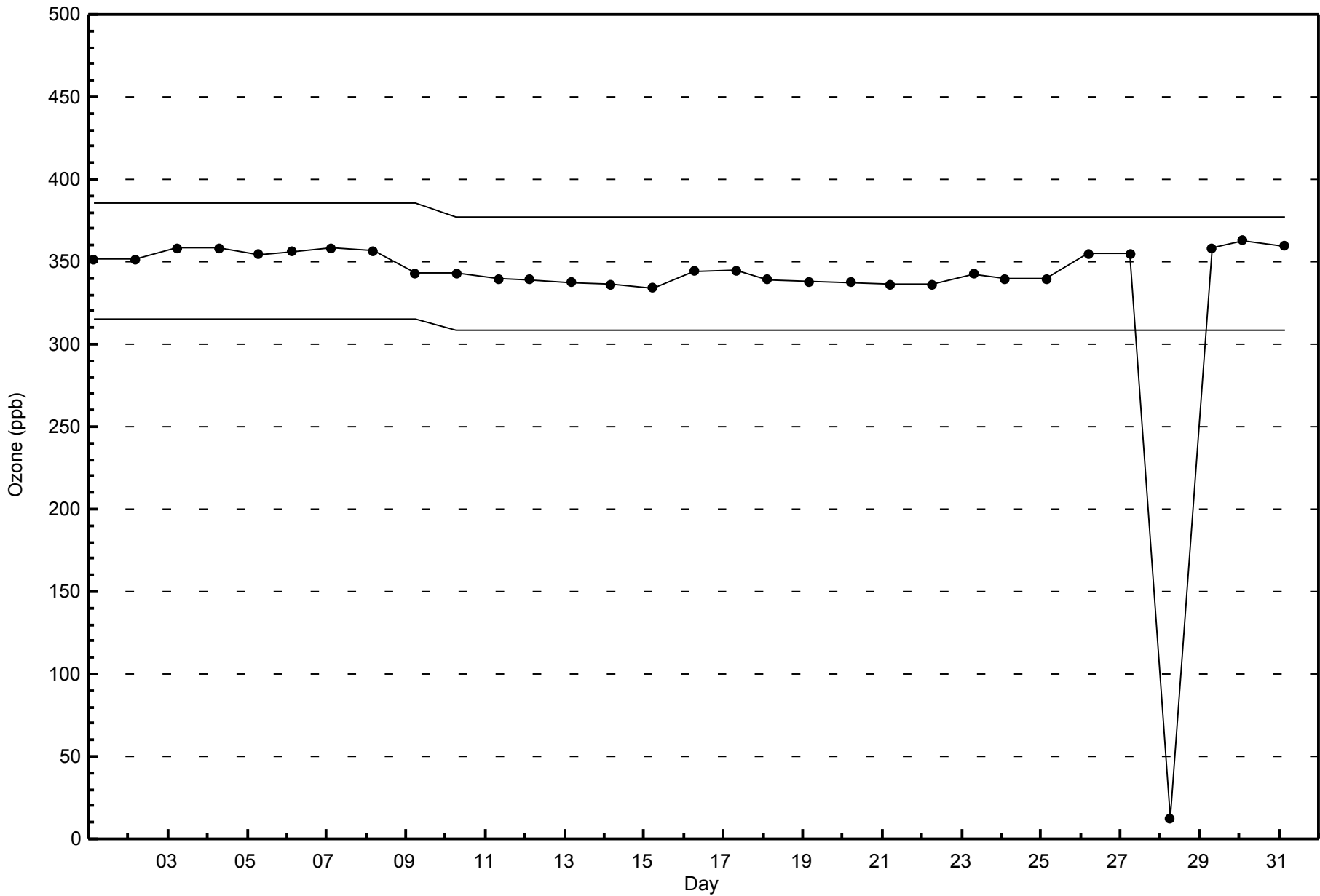
Ozone (O₃) - ppb
Fort McKay South - May 2015





WBEA
Span Responses

Ozone (O₃) - ppb
Fort McKay South - May 2015



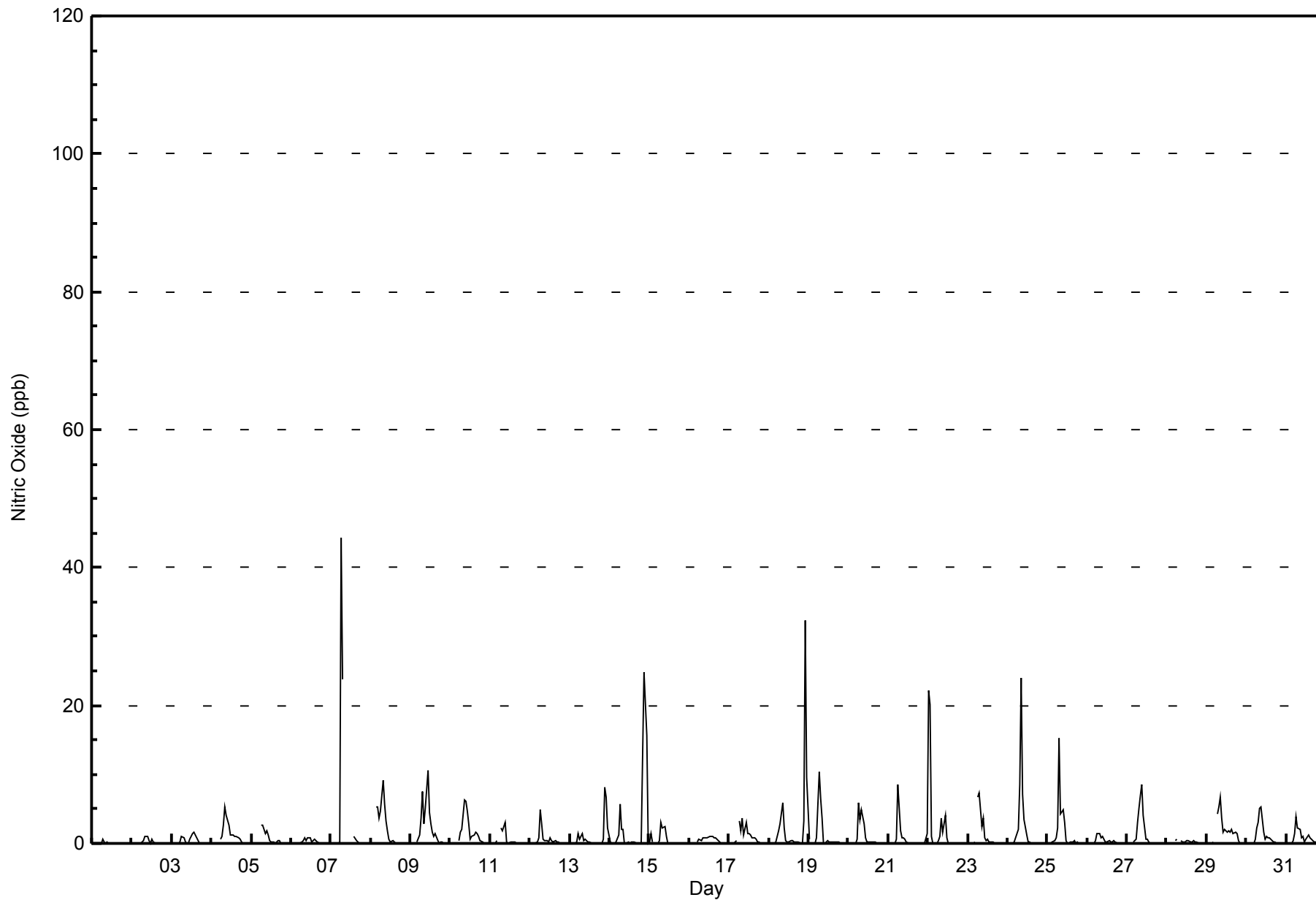


Maximum Value: 44 ppb on May 7 07:00																	Maximum Daily Average: 2.9 ppb on May 14																	Hours in Service: 744			
Minimum Value: 0 ppb on May 1 12:00																	Minimum Daily Average: 0.2 ppb on May 2																	Hours of Data: 706			
Maximum Diurnal Average: 4.2 ppb at hour 8																	Minimum Diurnal Average: 0.0 ppb at hour 20																	Hours of Missing Data: 38			
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 = 19																	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-May	3	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	3											
2-May	0	0	Z	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1											
3-May	0	0	0	Z	0	0	1	1	1	0	0	1	2	2	1	1	0	0	0	0	0	0	0	0.4	2												
4-May	0	0	0	0	Z	1	1	3	5	4	3	1	1	1	1	1	1	1	1	0	0	0	0	1.0	5												
5-May	0	0	0	0	0	Z	3	3	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3												
6-May	Z	0	0	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0.2	1												
7-May	0	Z	0	0	0	0	44	24	C	C	C	C	C	C	1	0	0	0	0	0	0	0	0	--	44												
8-May	0	0	Z	5	5	4	5	9	6	3	2	1	0	0	0	0	0	0	0	0	0	0	0	1.7	9												
9-May	0	0	0	Z	0	1	4	7	3	5	11	5	3	2	1	1	0	0	0	0	0	0	0	1.9	11												
10-May	0	0	0	0	Z	0	2	2	6	6	5	3	1	1	1	2	1	1	0	0	0	0	0	1.4	6												
11-May	0	0	0	0	0	Z	2	2	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3												
12-May	Z	0	0	0	0	1	5	3	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.5	5												
13-May	0	Z	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	8	7	2	1.0	8										
14-May	0	0	Z	0	0	1	6	2	2	0	0	0	0	0	0	0	0	0	0	0	13	25	16	0	2.9	25											
15-May	0	1	0	Z	0	0	0	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3												
16-May	0	0	0	0	Z	0	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1												
17-May	0	0	0	0	0	Z	3	2	4	1	3	1	1	1	1	1	1	0	0	0	0	0	0	0.9	4												
18-May	Z	0	0	0	0	1	2	3	6	2	0	0	0	0	0	0	0	0	0	0	0	3	32	9	2.7	32											
19-May	1	Z	0	0	0	1	10	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	10												
20-May	0	0	Z	0	0	1	6	3	5	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0.9	6												
21-May	0	0	0	Z	0	1	9	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	9												
22-May	22	20	1	0	Z	0	0	1	4	2	4	1	0	0	0	0	0	0	0	0	0	0	0	2.4	22												
23-May	0	0	0	0	0	Z	7	7	2	4	1	0	1	0	0	0	0	0	0	0	0	0	0	1.0	7												
24-May	Z	0	0	0	0	1	2	8	24	7	3	1	0	0	0	0	0	0	0	0	0	0	0	2.1	24												
25-May	0	Z	0	0	0	1	2	15	4	5	3	0	0	0	0	0	0	0	0	0	0	0	0	1.4	15												
26-May	0	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1												
27-May	0	0	0	Z	0	1	3	5	7	9	4	1	1	0	0	0	0	0	0	0	0	0	0	1.3	9												
28-May	0	0	0	0	Z	0	1	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1												
29-May	0	0	0	0	0	Z	4	5	7	4	2	2	2	2	2	2	1	2	1	0	0	0	0	1.6	7												
30-May	Z	0	0	0	0	1	2	3	5	5	2	1	1	1	1	0	0	0	0	0	0	0	0	1.0	5												
31-May	0	Z	0	0	0	2	4	2	2	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0.7	4												
																								Diurnal Average													
																								Diurnal Maximum													
Z - zerospan C - Calibration M - Maintenance																																					



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	700	99.15	99.15
21 - 40	5	0.71	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: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	91	20	11	17	13	26	42	106	66	63	82	25	15	14	16	695
21 - 40	0	1	0	0	0	0	1	0	0	0	3	0	0	0	0	0	5
11 - 80	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	92	20	11	17	13	27	42	106	67	66	82	25	15	14	16	701

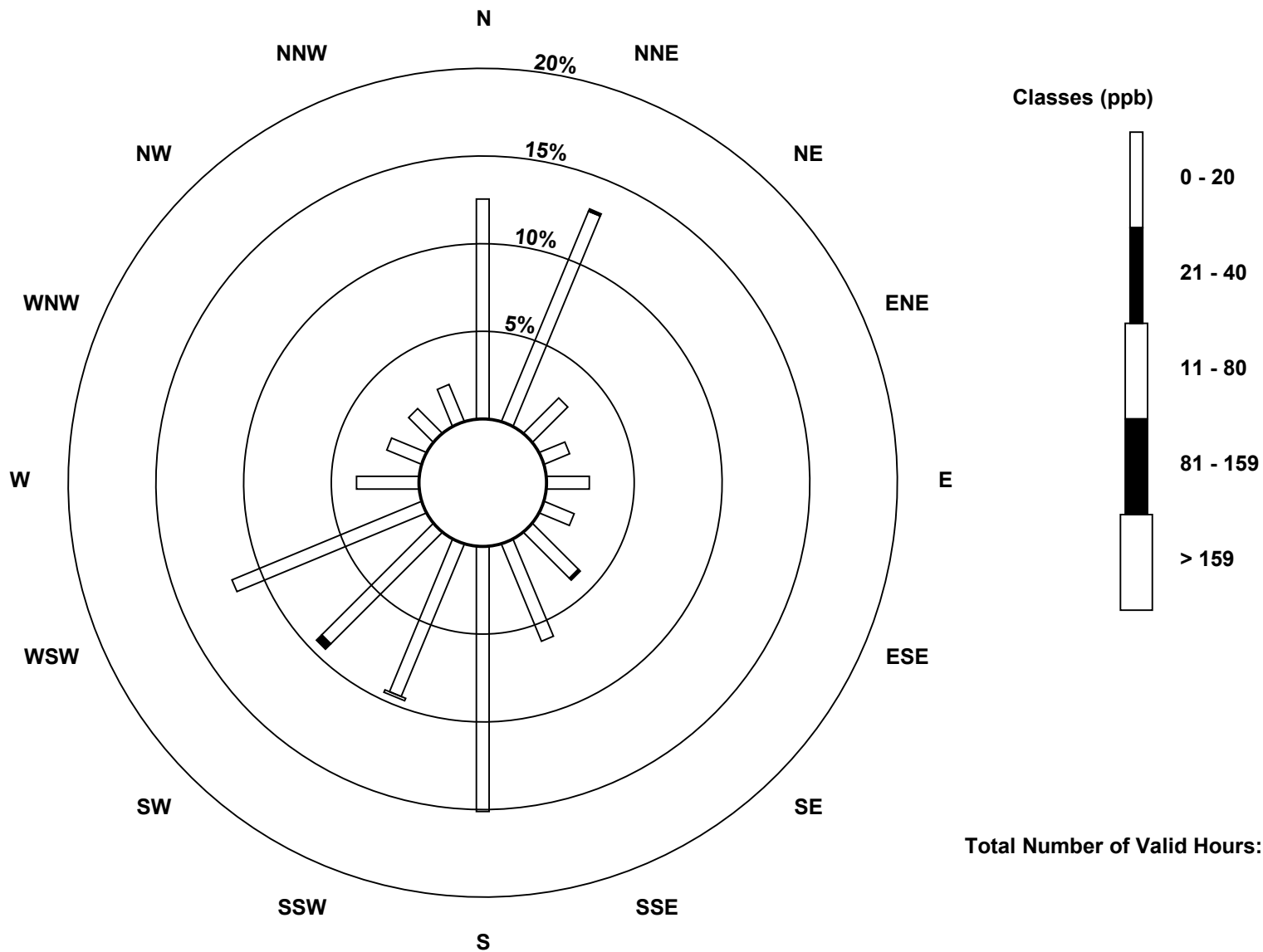
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

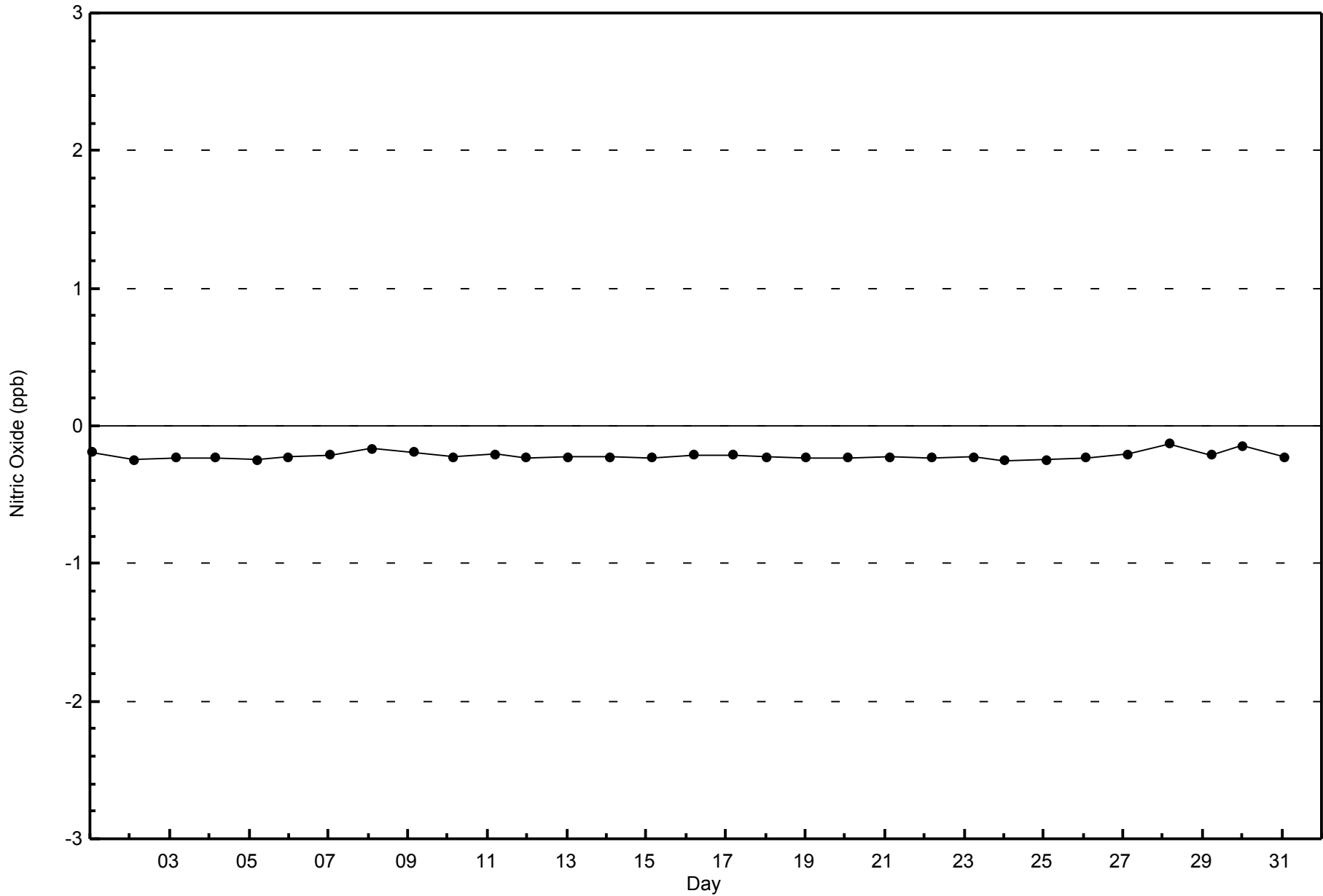
Nitric Oxide (NO) - ppb
Fort McKay South (AMS 13)





WBEA
Zero Responses

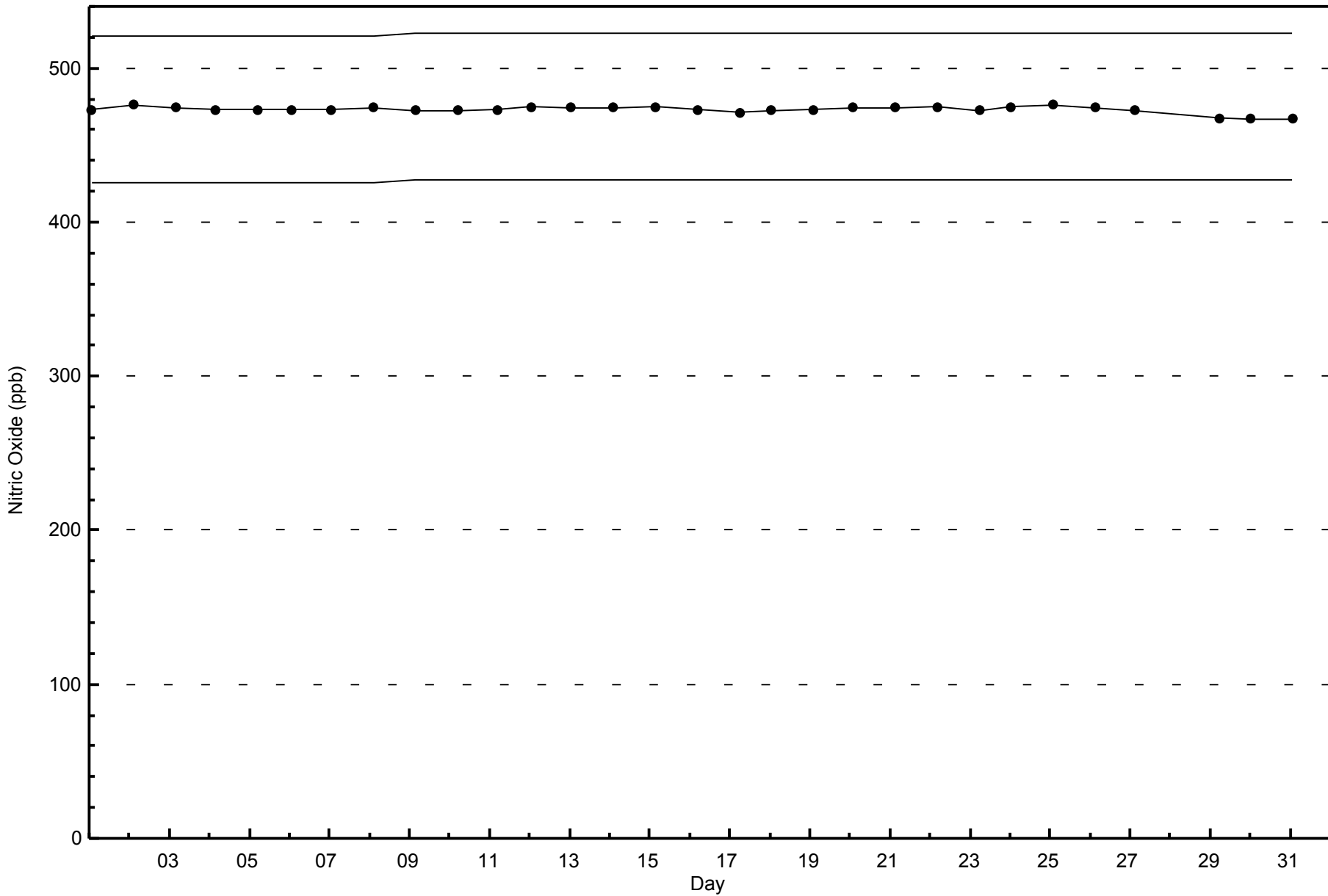
Nitric Oxide (NO) - ppb
Fort McKay South - May 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Fort McKay South - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

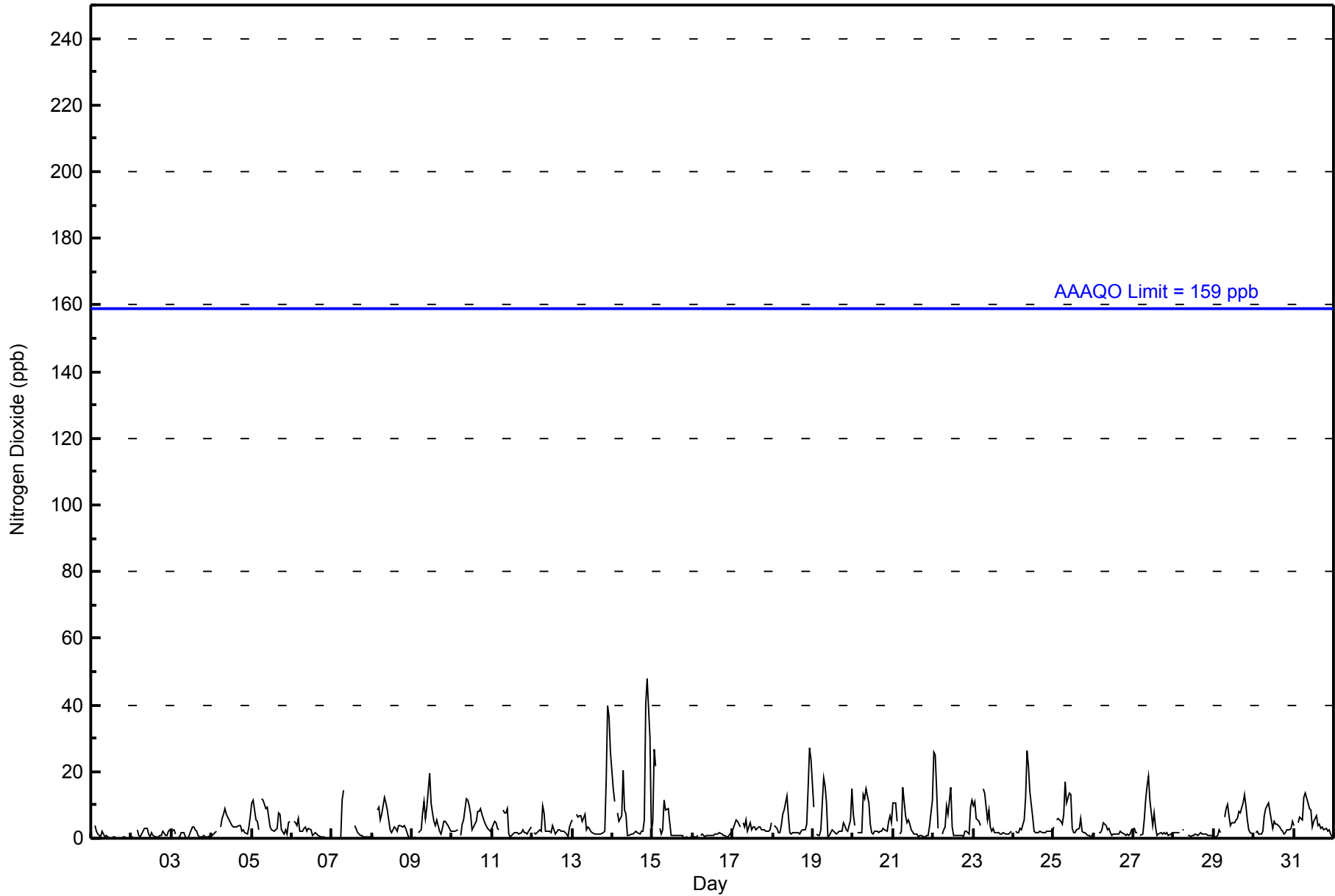
Fort McKay South - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 48 ppb on May 14 22:00 Maximum Daily Average: 9.6 ppb on May 14																		Hours in Service: 744 Hours of Data: 706 Hours of Missing Data: 38 Hours of Calibration: 37 Percent Operational Time: 99.9								
Minimum Value: 0 ppb on May 6 22:00 Minimum Daily Average: 0.9 ppb on May 16 Maximum Diurnal Average: 8.4 ppb at hour 8 Minimum Diurnal Average: 2.2 ppb at hour 15 Monthly Average: 4.1 ppb Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 10 P ₉₉ = 27																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	13	Z	4	2	1	0	2	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	13
2-May	0	0	Z	2	1	1	1	2	3	3	1	1	2	1	0	0	0	1	1	2	1	1	2	2	1.3	3
3-May	2	3	1	Z	0	1	2	2	0	0	0	1	3	4	2	2	1	0	1	1	1	0	1	1	1.2	4
4-May	1	1	2	2	Z	4	6	7	9	7	5	5	4	4	3	3	4	4	2	2	2	1	3	7	3.8	9
5-May	11	12	6	5	2	Z	12	12	9	9	6	3	3	2	3	3	8	7	3	1	2	1	5	5	5.6	12
6-May	Z	5	5	4	6	2	2	3	3	2	3	3	1	1	2	1	1	0	1	0	0	0	0	0	2.0	6
7-May	0	Z	0	0	0	0	11	15	C	C	C	C	C	C	4	2	1	1	1	1	0	0	0	0	--	15
8-May	0	1	Z	9	9	6	7	12	11	8	5	3	2	3	3	2	4	4	4	4	3	2	1	0	4.4	12
9-May	0	0	1	Z	2	3	8	11	6	9	20	10	8	5	4	6	2	1	3	5	5	4	3	2	5.1	20
10-May	2	2	2	3	Z	1	4	6	12	11	10	7	3	4	5	8	8	9	7	5	4	3	3	2	5.2	12
11-May	3	5	5	3	3	Z	8	8	8	9	1	1	1	2	2	2	1	2	2	2	2	1	2	4	3.3	9
12-May	Z	2	1	2	3	2	10	8	2	2	2	2	4	3	1	3	3	2	2	2	1	1	3	5	2.8	10
13-May	6	Z	7	7	7	7	5	7	3	4	3	2	2	1	1	1	1	1	2	2	17	40	36	26	8.2	40
14-May	15	11	Z	8	5	7	20	9	7	1	1	1	1	2	2	2	1	2	2	6	40	48	30	2	9.6	48
15-May	5	27	22	Z	3	1	2	12	8	9	5	1	1	1	1	1	1	1	1	0	0	0	0	0	4.4	27
16-May	0	0	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	0.9	2
17-May	3	4	5	5	3	Z	5	3	5	2	5	3	4	3	3	3	3	2	3	3	2	2	2	5	3.4	5
18-May	Z	4	3	2	2	4	7	9	13	7	2	1	2	2	2	2	1	2	3	3	4	15	27	24	6.0	27
19-May	9	Z	1	1	1	3	18	16	11	1	1	3	2	2	1	2	2	2	5	4	3	2	6	15	4.7	18
20-May	7	4	Z	2	2	2	13	12	15	11	Z	4	2	1	2	2	2	2	3	2	2	5	7	5	4.7	15
21-May	11	11	5	Z	1	2	15	7	5	6	4	2	1	1	1	1	1	1	1	1	1	1	4	11	4.0	15
22-May	26	25	14	3	Z	1	2	3	10	7	15	4	1	1	1	1	1	1	1	2	2	1	9	11	6.2	26
23-May	10	11	6	5	4	Z	15	14	6	9	3	2	3	2	2	2	1	1	2	1	1	1	2	2	4.5	15
24-May	Z	2	2	2	3	3	6	12	26	22	14	6	2	2	2	2	2	2	2	2	2	2	2	2	5.3	26
25-May	3	Z	5	6	5	4	7	17	11	13	13	3	2	2	3	3	6	2	2	2	1	1	1	1	4.9	17
26-May	1	1	Z	2	2	3	5	4	2	3	2	1	1	1	1	1	2	2	1	1	1	1	1	3	1.8	5
27-May	3	2	2	Z	1	1	6	12	16	19	12	4	8	3	1	1	2	1	2	1	2	1	1	2	4.3	19
28-May	2	2	2	2	Z	3	3	M	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1.2	3
29-May	1	1	1	2	2	Z	7	9	10	7	4	5	5	5	6	8	8	11	13	10	6	3	2	1	5.3	13
30-May	Z	2	2	1	1	2	7	9	10	11	5	3	5	4	4	4	3	2	1	2	2	3	3	5	4.0	11
31-May	4	Z	5	6	6	5	12	14	11	9	9	3	5	7	4	4	3	3	3	3	2	3	1	1	5.3	14
																								Diurnal Average		
																								Diurnal Maximum		
5.3 5.5 4.1 3.2 2.8 2.5 7.4 8.4 7.7 6.7 5.2 2.7 2.5 2.4 2.2 2.3 2.5 2.4 2.3 2.3 3.6 4.6 5.1 4.7 26 27 22 9 9 7 20 17 26 22 20 10 8 7 6 8 8 8 11 13 10 40 48 36 26																										
Z - zerospan C - Calibration M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																										



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	692	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: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	91	20	11	17	13	26	42	104	63	60	82	25	15	14	16	687
21 - 40	0	1	0	0	0	0	1	0	2	4	5	0	0	0	0	0	13
11 - 80	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	92	20	11	17	13	27	42	106	67	66	82	25	15	14	16	701

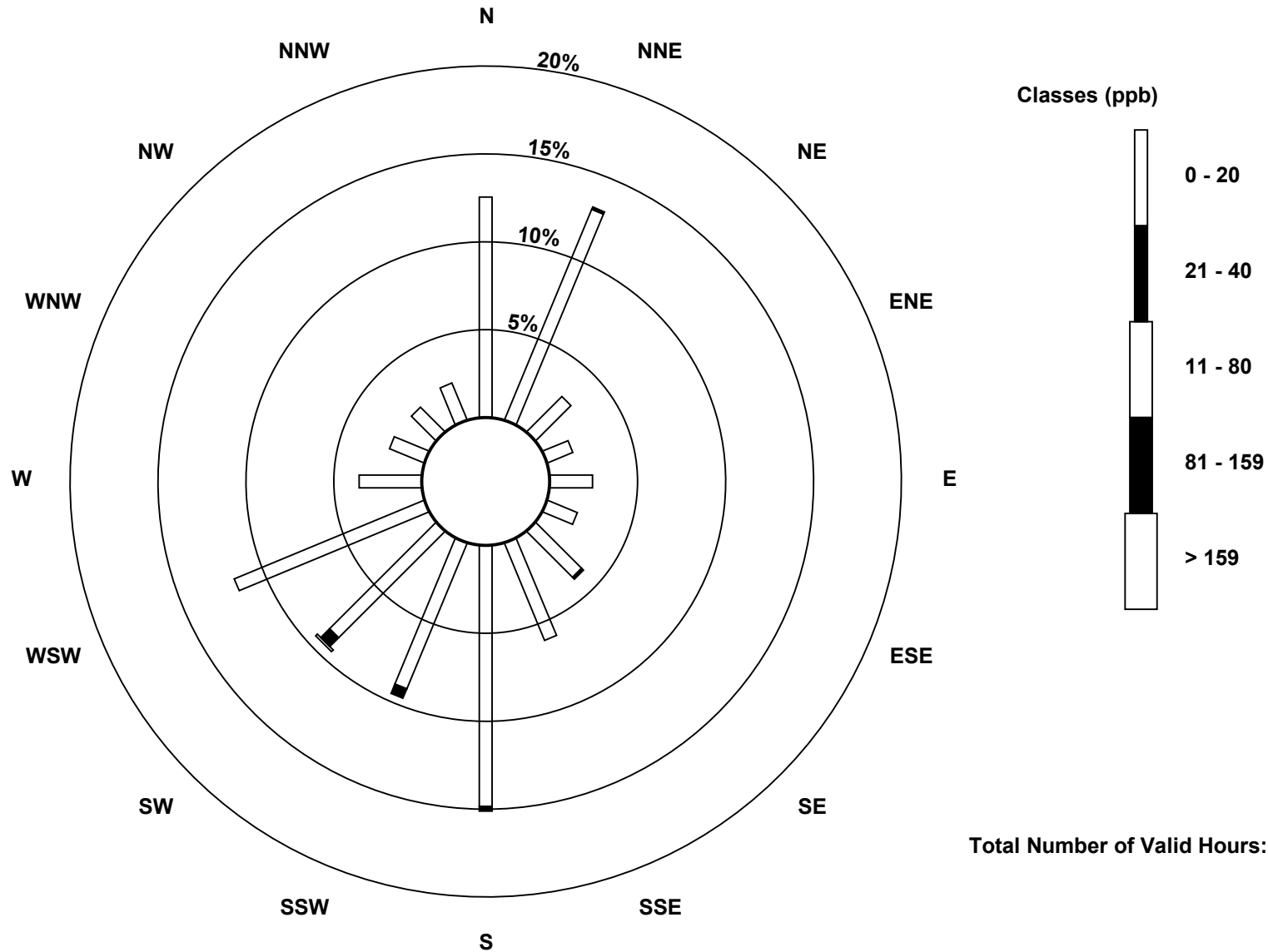
Total Number of Valid Hours: 701

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South (AMS 13)

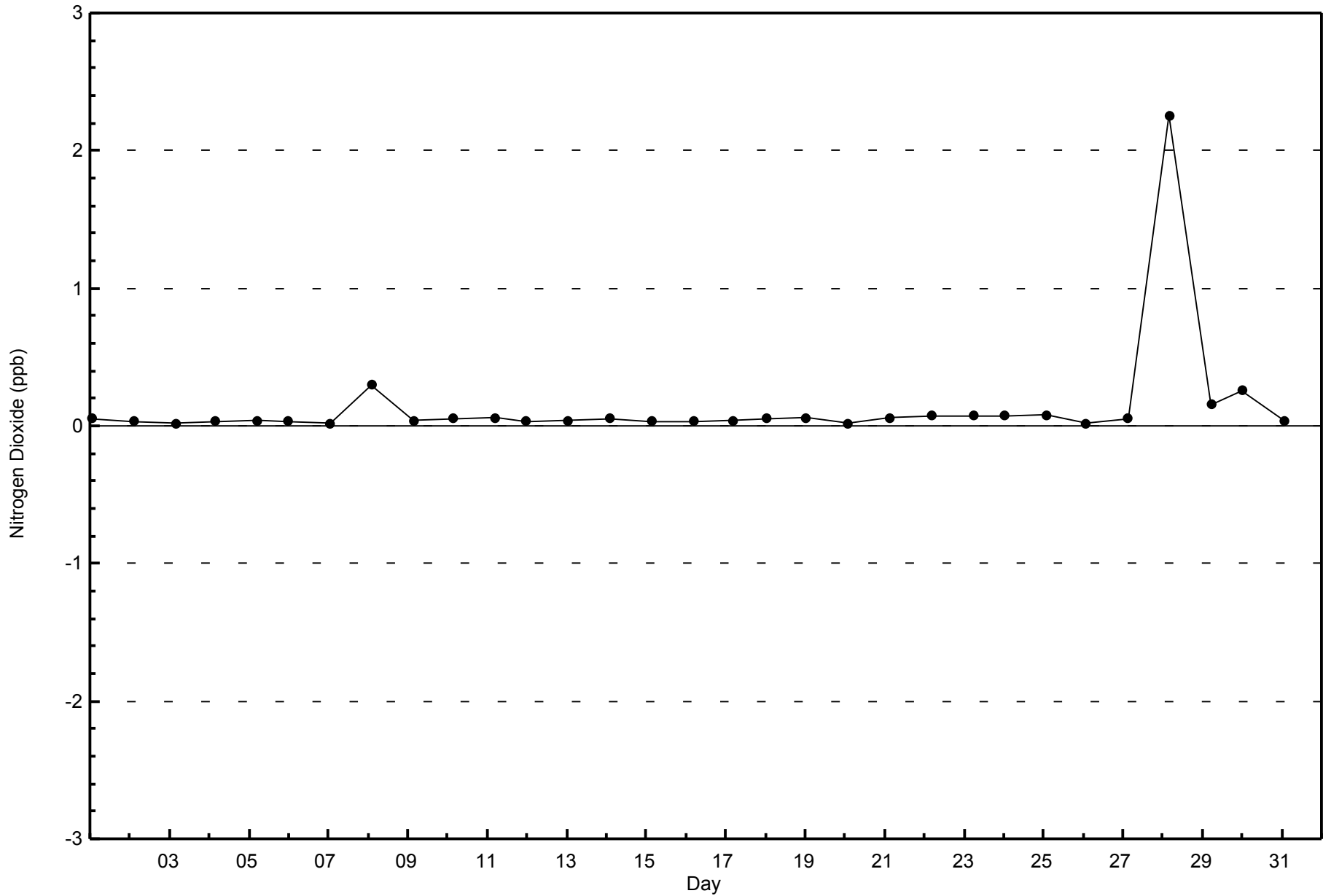


Total Number of Valid Hours: 701



WBEA
Zero Responses

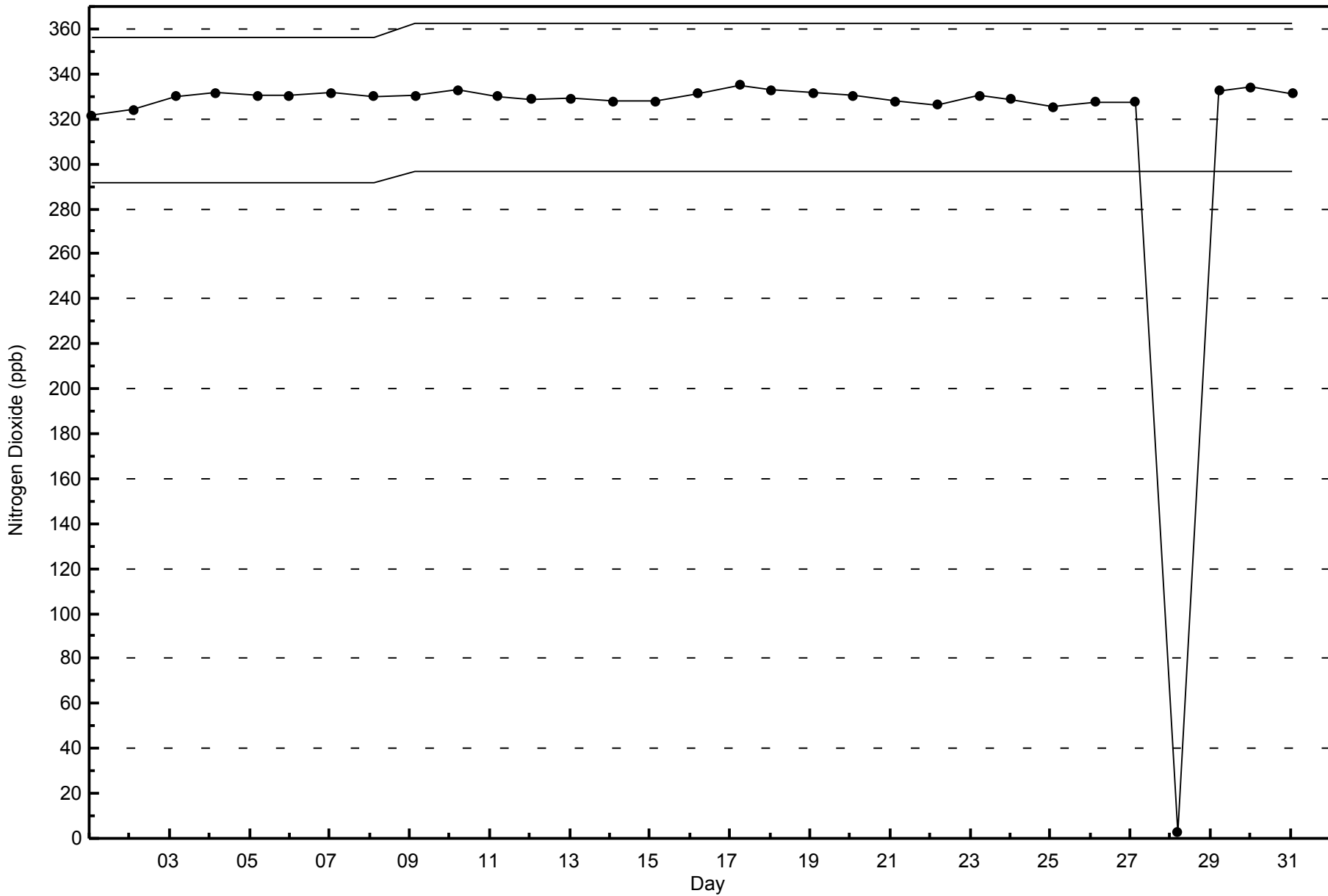
Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - May 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Fort McKay South - May 2015



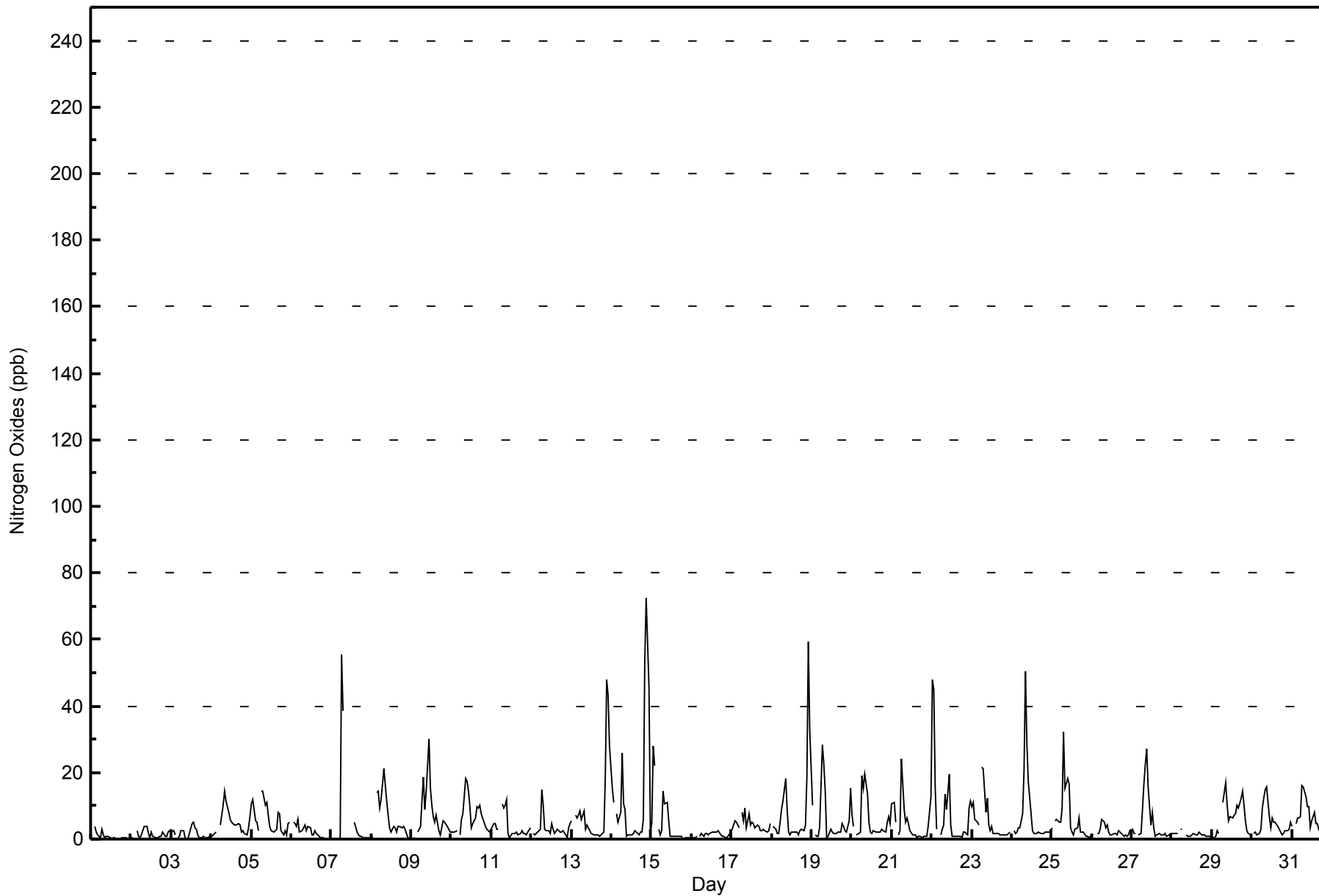


Maximum Value: 73 ppb on May 14 22:00																		Maximum Daily Average: 12.5 ppb on May 14																		Hours in Service: 744	
Minimum Value: 0 ppb on May 7 04:00																		Minimum Daily Average: 1.3 ppb on May 16																		Hours of Data: 706	
Maximum Diurnal Average: 12.7 ppb at hour 8																		Minimum Diurnal Average: 2.3 ppb at hour 20																		Hours of Missing Data: 38	
Monthly Average: 5.2 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 13 P ₉₉ = 48																		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-May	16	Z	4	2	1	1	3	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	16											
2-May	0	0	Z	2	1	1	1	3	4	4	2	1	2	1	0	0	0	1	1	2	1	1	2	2	1.4	4											
3-May	2	3	1	Z	0	1	3	2	1	0	0	2	5	5	4	3	1	1	1	1	0	0	1	1	1.6	5											
4-May	1	1	2	2	Z	4	7	10	14	11	8	6	5	5	4	4	4	4	2	2	2	1	3	7	4.8	14											
5-May	11	12	6	5	2	Z	14	14	10	11	7	4	3	2	3	3	8	8	3	1	2	1	4	5	6.1	14											
6-May	Z	5	4	4	6	2	2	3	4	3	4	3	1	1	2	2	1	0	1	0	0	0	0	0	2.2	6											
7-May	0	Z	0	0	0	0	56	38	C	C	C	C	C	C	5	2	1	1	1	1	0	0	0	0	--	56											
8-May	0	1	Z	14	15	9	12	21	16	12	7	3	2	4	3	2	4	4	3	4	3	2	1	0	6.2	21											
9-May	0	0	0	Z	2	4	11	18	9	14	30	15	10	7	5	7	3	1	3	5	5	4	3	2	7.0	30											
10-May	2	2	2	3	Z	1	6	8	18	17	14	10	3	5	6	10	9	10	8	5	4	3	3	2	6.6	18											
11-May	3	5	5	3	3	Z	11	10	10	12	2	1	2	2	2	2	1	2	2	2	2	1	2	4	3.7	12											
12-May	Z	2	1	2	3	3	15	10	3	3	3	2	5	3	2	3	3	2	2	2	1	0	3	5	3.4	15											
13-May	5	Z	7	6	7	8	6	9	3	4	3	2	2	1	1	1	1	1	2	2	18	48	43	28	9.2	48											
14-May	15	11	Z	8	5	8	26	10	9	1	1	1	1	2	2	2	1	2	2	6	53	73	46	2	12.5	73											
15-May	5	28	22	Z	3	1	3	14	11	11	6	1	1	1	1	1	1	1	1	0	0	0	0	0	4.9	28											
16-May	0	0	0	1	Z	1	2	1	2	2	1	2	2	2	2	2	2	1	1	1	1	1	1	2	1.3	2											
17-May	3	4	5	5	4	Z	8	5	9	3	8	4	5	5	4	4	4	3	3	3	2	2	2	5	4.3	9											
18-May	Z	4	3	2	2	5	9	11	18	9	2	1	2	2	2	2	1	2	3	3	4	19	59	33	8.7	59											
19-May	10	Z	1	1	1	3	28	22	14	0	1	3	2	2	2	2	2	2	5	4	2	2	5	15	5.7	28											
20-May	7	4	Z	1	2	2	19	15	20	13	5	2	2	3	2	2	2	2	3	2	2	5	7	5	5.6	20											
21-May	10	11	5	Z	1	3	24	9	5	6	5	3	1	1	1	1	1	1	1	1	1	1	4	13	4.7	24											
22-May	48	45	15	3	Z	1	3	4	13	9	19	4	1	1	1	1	1	1	1	2	2	1	9	11	8.6	48											
23-May	10	11	6	5	4	Z	22	21	8	12	4	3	4	2	2	2	2	1	1	1	1	1	2	2	5.5	22											
24-May	Z	2	2	2	3	3	8	21	50	29	17	8	2	2	2	2	2	2	2	2	2	2	2	2	7.4	50											
25-May	3	Z	5	6	5	5	10	32	15	18	16	3	2	1	3	3	6	2	2	2	1	1	1	1	6.3	32											
26-May	1	1	Z	1	2	3	6	5	3	4	2	1	1	2	2	1	3	2	1	1	1	1	1	3	2.1	6											
27-May	3	2	2	Z	1	2	9	17	23	27	16	4	8	3	1	1	2	1	1	1	2	1	1	2	5.6	27											
28-May	2	2	2	2	Z	3	3	M	1	1	1	1	1	2	1	1	2	2	1	1	1	1	1	1	1.4	3											
29-May	1	0	1	2	2	Z	11	14	17	10	5	7	6	7	8	10	9	12	15	10	6	2	2	1	6.9	17											
30-May	Z	2	2	1	2	3	9	12	15	16	7	4	6	5	5	4	3	2	1	2	2	3	3	5	4.9	16											
31-May	4	Z	5	6	6	7	16	16	13	10	10	3	6	8	5	5	3	4	3	3	2	3	1	0	6.0	16											
																								Diurnal Average													
																								Diurnal Maximum													
6.3 6.3 4.2 3.5 3.2 3.2 11.6 12.7 11.3 9.1 6.9 3.4 3.1 2.9 2.7 2.7 2.8 2.6 2.4 2.3 4.0 5.8 6.9 5.2																																					
48 45 22 14 15 9 56 38 50 29 30 15 10 8 8 10 9 12 15 10 53 73 59 33																																					
Z - zerospan C - Calibration M - Maintenance																																					



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	678	96.03	96.03
21 - 40	18	2.55	98.58
41 - 80	10	1.42	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	88	89	19	11	16	13	25	36	103	61	60	82	25	15	14	16	673
21 - 40	0	2	1	0	1	0	2	6	2	1	3	0	0	0	0	0	18
41 - 80	0	1	0	0	0	0	0	0	1	5	3	0	0	0	0	0	10
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	88	92	20	11	17	13	27	42	106	67	66	82	25	15	14	16	701

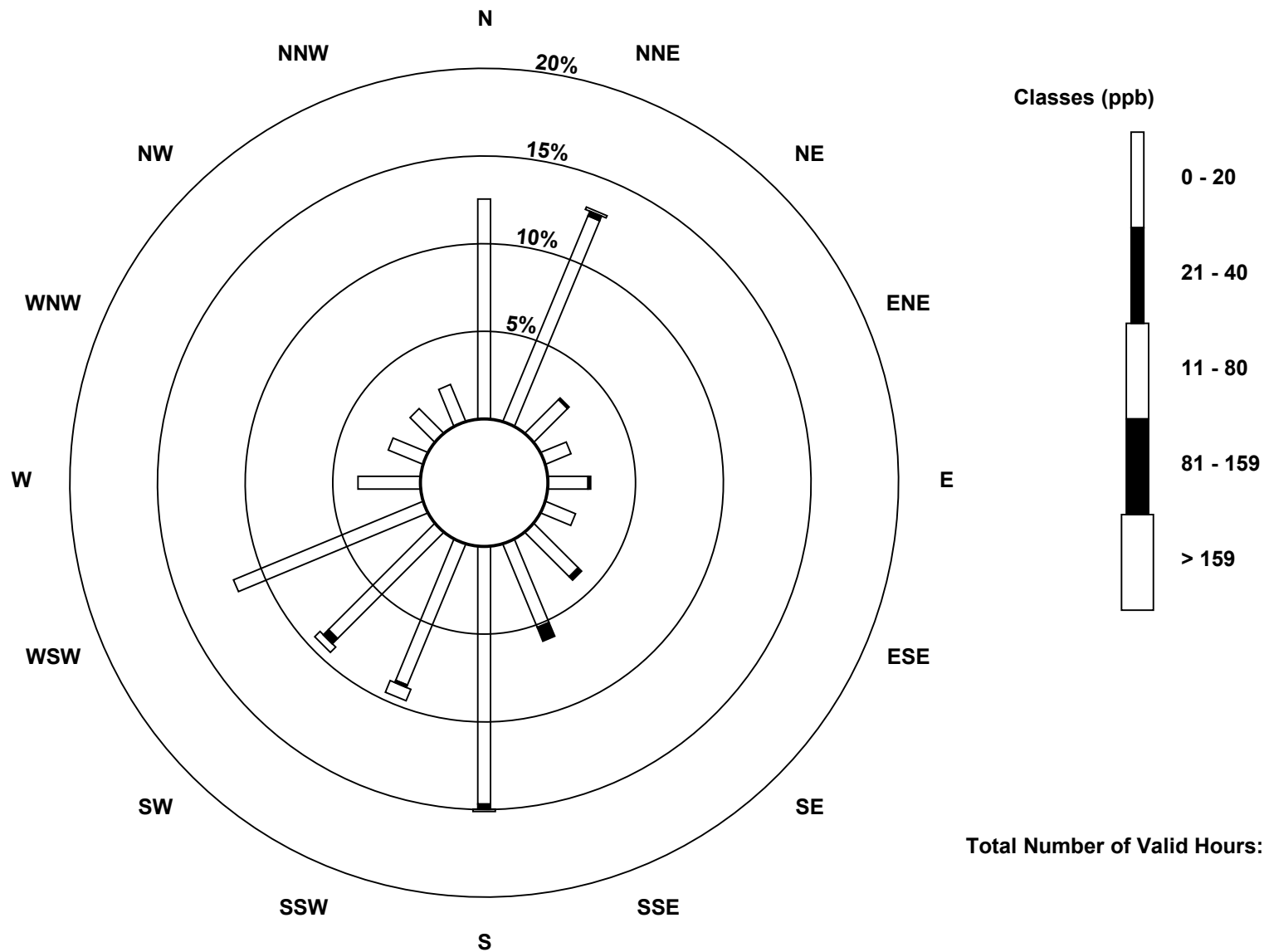
Total Number of Valid Hours: 701

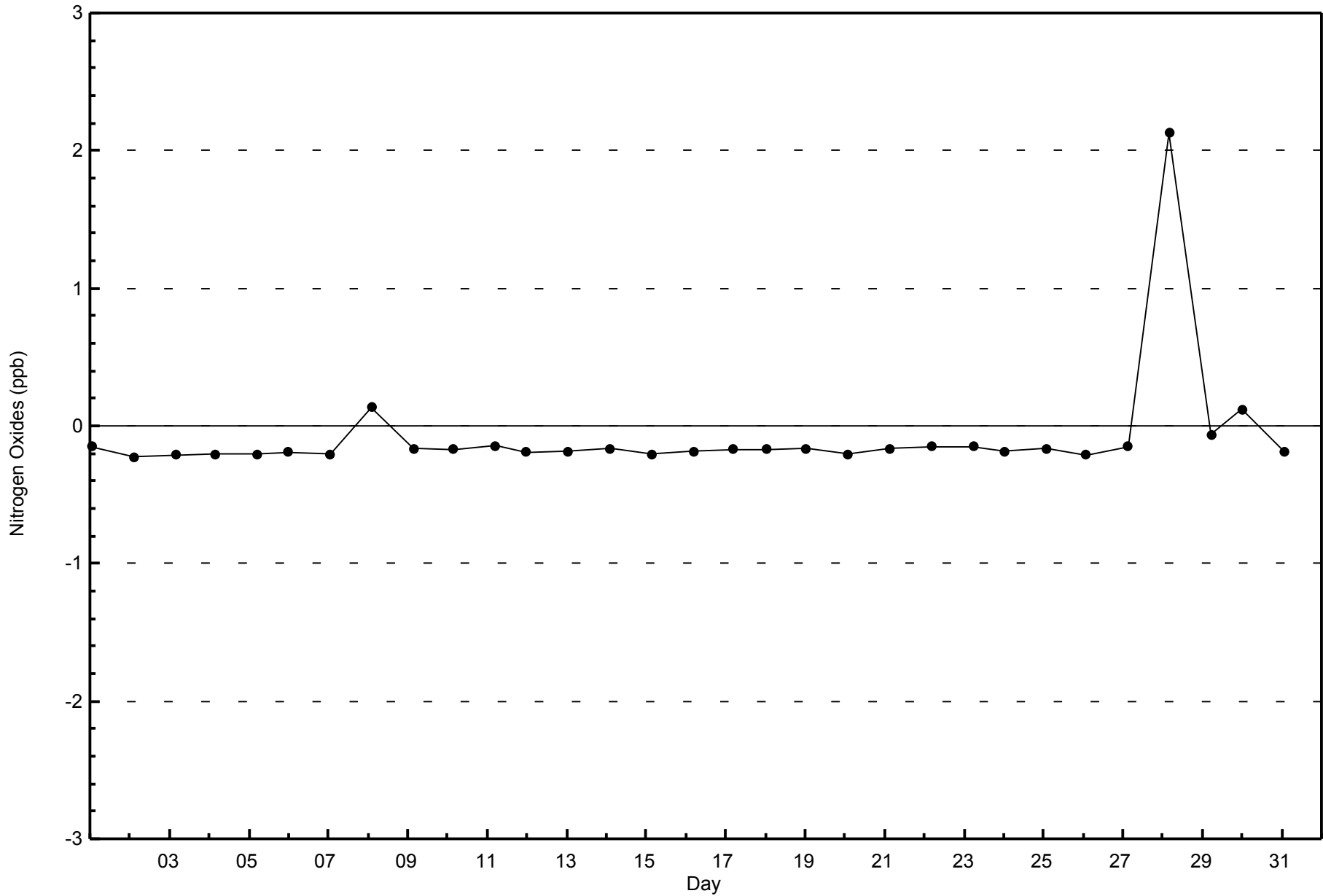
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Nitrogen Oxides (NO_x) - ppb
Fort McKay South (AMS 13)

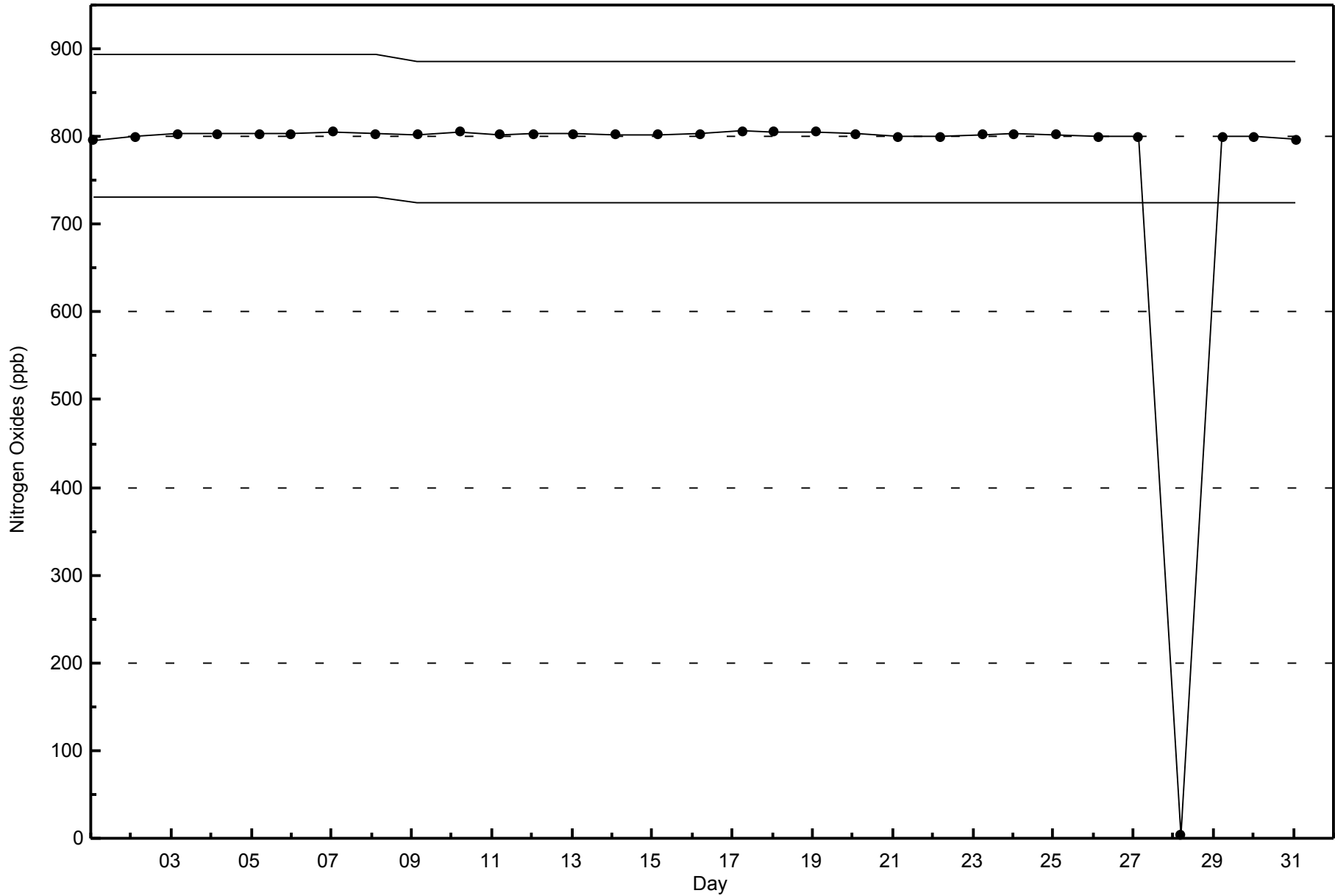






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Fort McKay South - May 2015





Summary of Hour Averages

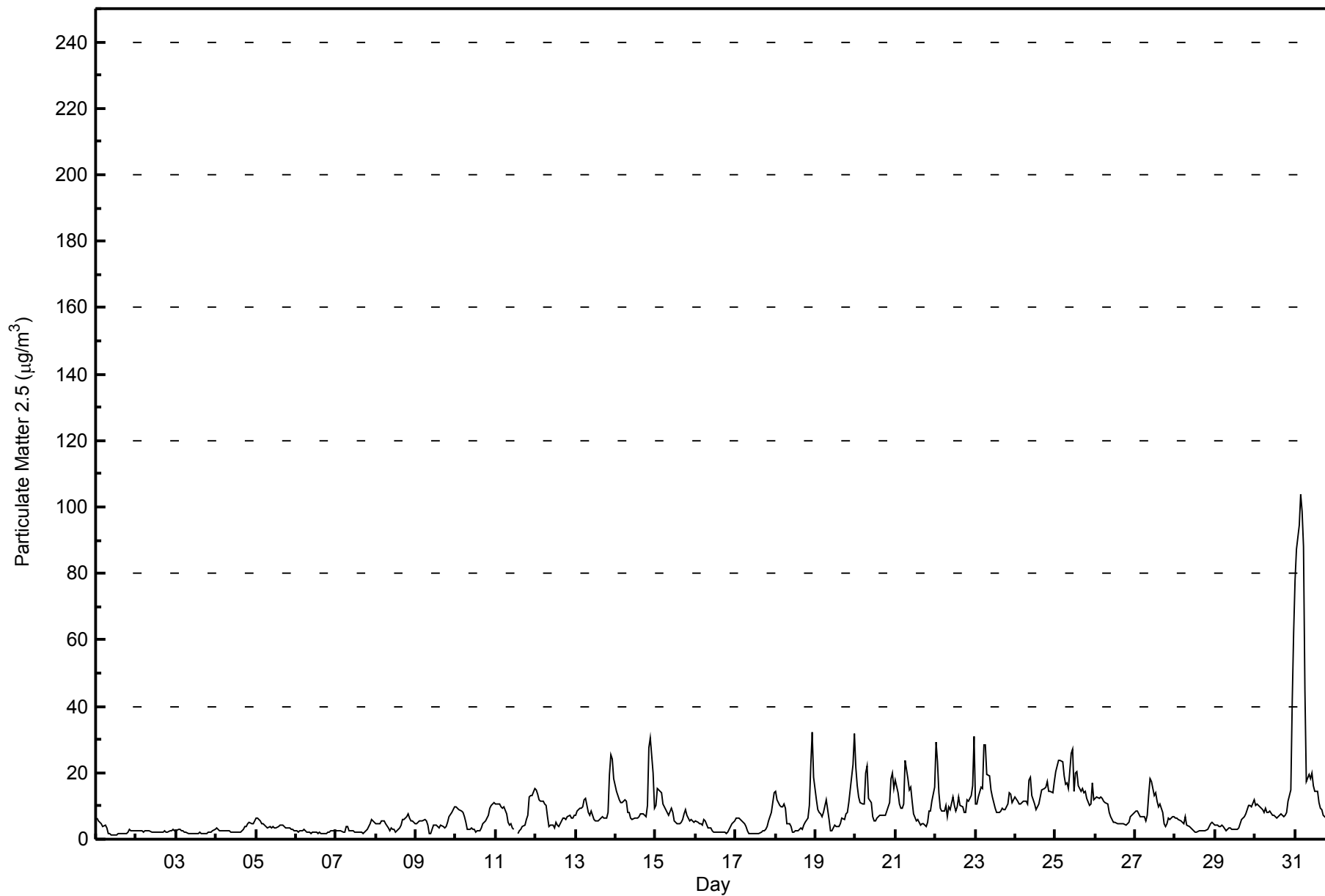
Fort McKay South - May 2015

Number of Exceedences (AAAQO): 24-hr: 1		Hours in Service: 744																								
Maximum Value: 103.8 µg/m ³ on May 31 04:00		Maximum Daily Average: 32.5 µg/m ³ on May 31																								
Minimum Value: 1.4 µg/m ³ on May 1 10:00		Hours of Data: 743																								
Maximum Diurnal Average: 12.1 µg/m ³ at hour 24		Hours of Missing Data: 1																								
Monthly Average: 8.19 µg/m ³		Hours of Calibration: 0																								
Minimum Daily Average: 2.1 µg/m ³ on May 3		Percent Operational Time: 99.9																								
Minimum Diurnal Average: 5.1 µg/m ³ at hour 15																										
Percentiles: P ₁ = 1.5 P ₁₀ = 2.2 Q ₁ = 3.1 Median = 5.8 Q ₃ = 10.3 P ₉₀ = 15.1 P ₉₉ = 47.5																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	6.5	5.5	5.3	4.6	4.0	4.3	3.4	1.7	1.5	1.4	1.4	1.4	1.4	1.5	1.5	1.7	1.7	1.6	1.6	1.9	2.9	2.7	2.7	2.4	2.7	6.5
2-May	2.5	2.4	2.6	2.4	2.3	2.4	2.5	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.1	2.2	2.7	2.3	2.3	2.4	2.5	2.9	2.5	2.4	2.9
3-May	2.7	2.8	2.8	2.7	2.5	2.3	2.1	1.8	1.7	1.7	1.6	1.7	1.9	1.9	1.9	1.9	1.8	1.7	1.7	2.0	2.1	2.3	2.7	2.9	2.1	2.9
4-May	3.4	2.9	2.7	2.5	2.4	2.4	2.5	2.4	2.2	2.0	2.2	2.0	2.0	2.0	2.1	2.2	3.0	3.6	3.6	4.6	5.0	4.7	4.5	5.5	3.0	5.5
5-May	6.3	6.3	5.4	4.9	4.5	4.4	3.7	3.6	3.9	3.5	3.7	3.4	3.2	3.9	4.4	4.4	4.3	4.0	3.3	3.3	3.4	2.9	3.2	2.7	4.0	6.3
6-May	2.5	2.3	2.7	2.7	2.4	2.8	2.3	2.0	2.0	1.9	1.9	2.0	1.9	1.8	2.0	1.9	1.8	1.8	1.8	2.0	2.3	2.7	2.5	2.4	2.2	2.8
7-May	2.5	2.5	2.6	2.4	2.3	2.2	3.9	4.0	2.6	2.3	2.5	2.0	2.2	2.3	2.3	2.1	1.7	2.0	2.5	3.0	4.6	5.9	5.6	4.9	2.9	5.9
8-May	4.6	4.5	4.8	5.4	5.6	5.3	4.6	3.5	2.6	3.2	2.9	2.8	2.3	3.0	3.2	4.3	5.7	6.1	6.9	7.8	6.6	5.6	5.5	4.8	4.7	7.8
9-May	4.9	5.1	5.6	5.5	5.7	6.0	5.6	4.1	1.9	1.9	4.4	4.3	4.3	3.8	3.4	4.2	3.8	3.4	3.7	5.0	6.6	8.1	8.9	9.8	5.0	9.8
10-May	9.9	9.2	8.9	8.6	8.0	7.0	5.1	3.0	3.1	3.4	3.2	2.8	2.3	2.6	2.7	3.6	4.6	4.9	5.5	7.2	9.4	10.3	10.7	10.9	6.1	10.9
11-May	10.7	10.7	10.4	9.8	9.2	9.9	7.8	5.0	4.4	4.6	3.4	2.9	M	1.7	2.4	3.1	3.7	4.4	5.8	7.3	12.8	13.2	13.2	15.2	7.5	15.2
12-May	14.9	13.4	12.0	11.4	11.2	10.6	10.4	6.6	4.0	4.1	4.4	3.3	5.0	4.4	3.9	5.6	6.4	6.3	5.8	6.7	7.2	6.1	6.4	7.0	7.4	14.9
13-May	7.1	8.3	9.3	9.1	9.9	11.7	12.5	7.9	7.2	8.4	7.2	5.7	5.4	5.5	5.9	6.3	6.9	6.2	6.6	7.9	19.6	25.6	24.0	18.2	10.1	25.6
14-May	14.2	13.3	11.8	11.0	10.9	11.7	11.5	8.0	8.0	6.2	5.9	6.4	6.4	6.4	6.9	7.5	7.7	7.2	6.9	10.3	27.4	30.7	20.1	9.3	11.1	30.7
15-May	10.3	15.4	14.6	14.0	10.6	9.6	8.8	8.1	7.4	9.2	8.0	5.6	5.0	4.7	4.6	5.1	5.8	7.5	8.8	7.1	5.4	5.9	5.4	5.1	8.0	15.4
16-May	5.5	5.2	4.7	4.5	4.2	5.8	5.7	3.3	3.2	3.2	2.7	2.2	2.1	2.1	2.1	2.1	2.2	2.0	1.9	2.3	3.0	3.8	4.6	5.4	3.5	5.8
17-May	6.4	6.4	6.4	6.0	5.0	4.8	3.9	2.4	1.7	1.5	1.8	1.6	1.5	1.6	1.6	1.9	2.4	2.5	2.8	3.7	5.6	7.9	11.2	14.1	4.4	14.1
18-May	14.4	12.0	10.2	9.6	9.7	10.7	9.2	4.8	4.5	3.8	2.3	2.1	2.6	2.4	2.8	3.5	3.0	4.1	5.1	6.6	10.3	21.9	32.0	18.7	8.6	32.0
19-May	12.0	8.8	8.2	7.6	7.0	8.2	12.1	8.8	6.1	2.6	2.5	4.3	3.8	3.8	3.8	4.8	6.3	6.1	7.5	8.2	11.1	14.8	22.7	31.6	8.9	31.6
20-May	21.5	16.1	12.8	11.1	10.5	10.4	19.9	22.1	12.1	11.1	6.7	5.7	5.3	6.6	7.1	7.1	7.1	7.2	7.3	8.3	11.1	18.1	19.8	15.4	11.7	22.1
21-May	17.8	14.0	10.6	9.5	9.3	10.8	23.9	18.4	14.9	15.7	11.6	7.6	5.4	6.0	5.3	4.3	4.6	4.7	3.9	5.1	8.4	8.6	11.5	15.8	10.3	23.9
22-May	29.3	23.2	14.2	9.3	8.5	8.5	10.1	6.8	9.8	8.9	12.8	10.3	8.4	9.8	12.7	10.0	9.6	8.0	8.1	11.7	11.4	13.0	16.0	31.0	12.6	31.0
23-May	10.6	10.5	12.8	15.8	15.2	28.6	28.4	19.4	18.9	14.8	12.7	11.1	9.4	8.2	8.1	8.7	9.2	8.9	8.7	10.5	13.8	13.6	11.1	12.0	13.4	28.6
24-May	12.6	11.6	10.8	10.5	10.8	11.3	11.5	10.5	17.8	18.6	13.0	10.5	9.1	9.9	10.7	12.8	14.8	15.1	15.8	17.6	14.3	14.2	14.1	17.5	13.1	18.6
25-May	20.2	22.1	23.6	23.8	23.2	18.9	16.6	17.1	15.2	25.7	27.1	14.4	19.9	20.2	16.2	14.4	15.4	13.9	14.6	12.2	10.0	10.5	17.1	11.9	17.7	27.1
26-May	12.5	12.7	12.1	12.9	12.1	11.5	11.1	10.5	8.2	6.6	6.0	5.2	5.2	4.6	4.5	4.7	4.9	4.5	4.3	4.8	5.2	6.6	7.0	7.6	7.7	12.9
27-May	8.3	8.3	7.6	6.9	6.6	6.8	5.4	7.3	13.2	18.2	17.5	13.2	14.1	11.4	9.5	10.7	7.9	4.8	3.9	4.7	6.2	6.1	6.7	6.7	8.8	18.2
28-May	6.3	6.3	6.0	5.6	5.1	4.8	7.0	4.3	3.9	3.3	2.9	2.4	2.1	1.9	2.6	2.5	2.5	2.4	2.6	3.1	3.8	4.8	5.1	4.7	4.0	7.0
29-May	4.4	4.2	4.0	4.0	4.1	3.9	2.7	3.1	3.5	3.4	2.9	3.0	3.1	3.1	3.5	4.8	6.1	6.9	7.7	8.8	10.2	10.0	9.8	11.7	5.4	11.7
30-May	10.1	10.5	10.1	9.9	8.8	8.2	9.3	7.9	8.1	8.3	7.3	7.4	6.6	6.5	6.7	7.4	7.3	6.7	7.1	7.9	11.5	14.7	41.7	62.2	12.2	62.2
31-May	78.0	87.2	94.4	103.8	98.7	88.0	44.8	17.5	19.6	18.4	19.7	16.0	14.6	14.6	10.8	9.2	8.7	7.0	6.8	5.8	4.9	4.6	4.2	3.5	32.5	103.8
																								Diurnal Average		
																								Diurnal Maximum		
																								12.0 11.7 11.3 11.2 10.7 10.8 9.9 7.4 7.0 7.1 6.6 5.3 5.3 5.2 5.1 5.3 5.6 5.4 5.6 6.4 8.3 9.8 11.4 12.1		
																								78.0 87.2 94.4 103.8 98.7 88.0 44.8 22.1 19.6 25.7 27.1 16.0 19.9 20.2 16.2 14.4 15.4 15.1 15.8 17.6 27.4 30.7 41.7 62.2		
M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																										



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	348	46.84	46.84
6 - 15	328	44.15	90.98
16 - 25	47	6.33	97.31
26 - 80	15	2.02	99.33
> 81.0	5	0.67	100.00

Total Number of Valid Hours: 743

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Fort McKay South - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	52	69	17	8	9	8	14	6	31	30	24	37	10	9	13	8	345
6 - 15	36	23	5	3	7	4	10	30	63	32	36	47	13	4	3	9	325
16 - 25	3	3	0	0	1	0	2	6	11	5	8	3	2	1	0	2	47
26 - 80	2	1	0	0	0	1	1	1	3	2	4	0	0	0	0	0	15
> 81.0	0	0	0	0	0	0	0	0	0	1	2	0	0	2	0	0	5
Totals	93	96	22	11	17	13	27	43	108	70	74	87	25	16	16	19	737

Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

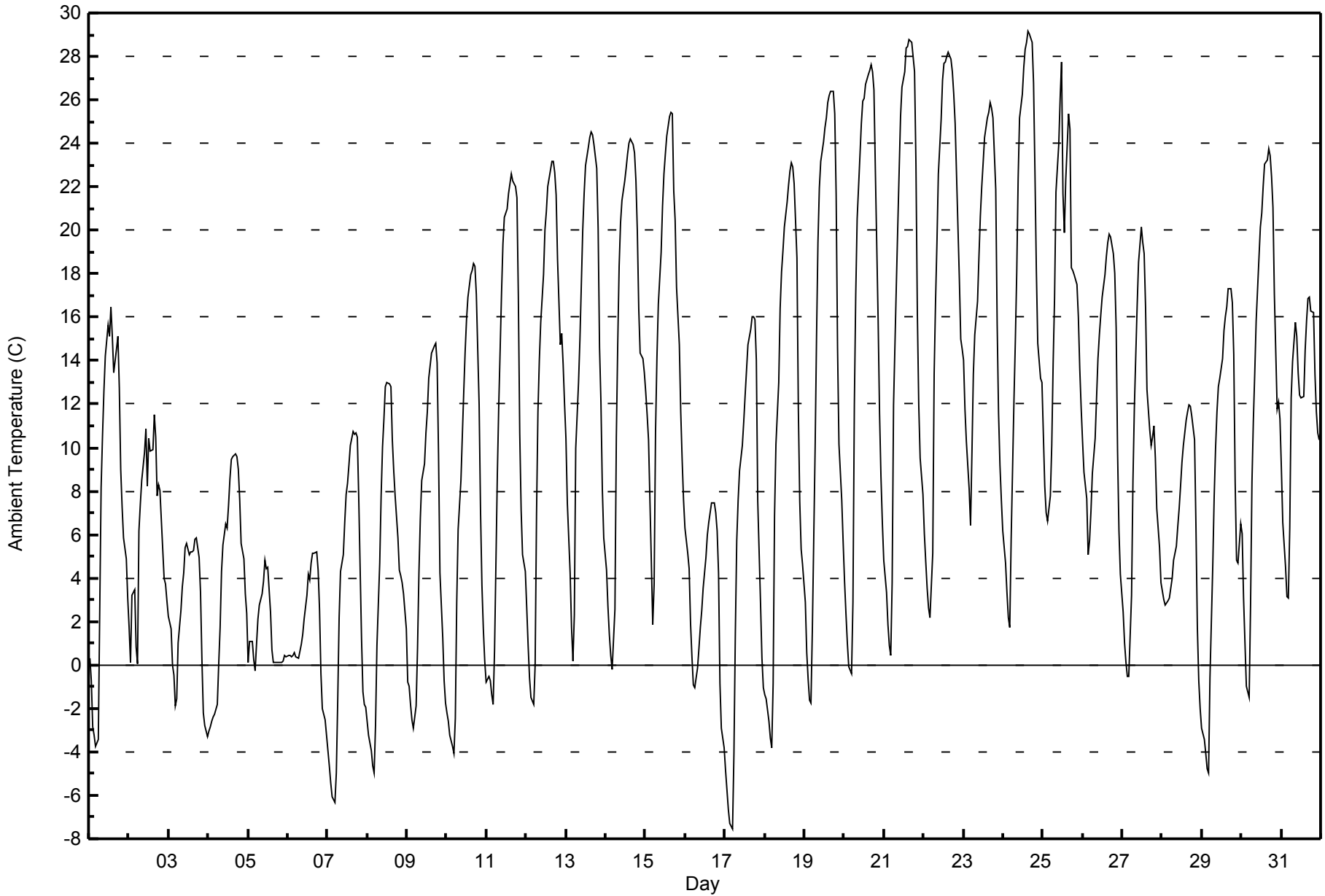
Fort McKay South - May 2015

Maximum Value: 29.2 C on May 24 16:00		Maximum Daily Average: 18.2 C on May 22		Hours in Service: 744																						
Minimum Value: -7.6 C on May 17 05:00		Minimum Daily Average: 1.4 C on May 5		Hours of Data: 744																						
Maximum Diurnal Average: 17.9 C at hour 17		Minimum Diurnal Average: -0.5 C at hour 5		Hours of Missing Data: 0																						
Monthly Average: 10.14 C		Percentiles: P ₁ = -5.0 P ₁₀ = -1.0 Q ₁ = 2.7 Median = 9.5 Q ₃ = 16.9 P ₉₀ = 23.4 P ₉₉ = 28.6		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0.3	-0.7	-2.8	-3.3	-3.8	-3.4	2.4	8.2	10.5	12.6	14.2	15.6	15.1	16.5	15.1	13.5	14.6	15.1	12.8	9.0	7.3	5.9	4.9	3.1	7.6	16.5
2-May	1.7	0.1	3.2	3.4	0.8	0.1	6.2	7.4	8.5	9.8	10.9	8.3	10.4	9.8	9.9	11.5	10.5	7.8	8.3	8.0	5.3	4.0	3.7	2.9	6.4	11.5
3-May	2.2	1.7	0.0	-0.5	-1.9	-1.6	1.0	2.5	3.6	4.2	5.4	5.6	5.1	5.2	5.2	5.3	5.8	5.9	5.0	3.4	0.3	-2.2	-2.8	-3.3	2.3	5.9
4-May	-3.0	-2.8	-2.6	-2.4	-2.3	-1.8	0.1	1.7	4.3	5.5	6.5	6.3	7.3	8.6	9.5	9.6	9.7	9.6	9.0	7.6	5.6	4.9	3.3	2.4	4.0	9.7
5-May	0.1	1.1	1.1	0.2	-0.2	0.9	2.1	2.7	3.3	3.8	4.8	4.4	4.5	2.4	0.7	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.4	0.4	1.4	4.8
6-May	0.5	0.5	0.4	0.4	0.6	0.4	0.3	0.6	0.9	1.4	2.1	3.2	4.1	3.9	4.7	5.1	5.1	5.2	4.3	2.6	-0.4	-2.0	-2.5	-3.2	1.6	5.2
7-May	-3.9	-4.6	-5.4	-6.1	-6.3	-5.0	-1.6	2.2	4.3	5.1	6.6	7.9	8.4	9.2	10.1	10.7	10.6	10.7	10.5	7.7	1.2	-1.2	-1.8	-1.9	2.8	10.7
8-May	-2.6	-3.3	-3.9	-4.6	-4.9	-2.8	0.9	4.7	7.8	10.0	11.3	12.8	13.0	13.0	12.8	10.3	8.9	7.8	5.8	4.4	4.1	3.8	3.3	1.7	4.8	13.0
9-May	-0.8	-1.0	-1.8	-2.6	-2.9	-1.9	0.8	4.3	6.7	8.5	9.3	10.7	11.7	13.2	13.7	14.3	14.6	14.8	13.9	9.7	4.3	1.3	-0.7	-1.8	5.8	14.8
10-May	-2.2	-2.6	-3.2	-3.8	-4.1	-2.5	2.9	6.3	8.5	10.6	12.5	14.4	15.9	16.9	17.9	18.2	18.5	18.3	17.0	12.0	7.1	3.7	1.7	0.1	7.7	18.5
11-May	-0.8	-0.6	-0.7	-1.3	-1.8	0.6	8.8	11.9	14.5	17.1	19.4	20.6	21.0	21.7	22.2	22.6	22.3	22.0	21.5	17.0	10.7	7.1	5.0	4.3	11.9	22.6
12-May	2.6	0.9	-0.6	-1.5	-1.8	0.0	6.9	11.7	14.0	15.7	18.0	20.0	20.9	22.0	22.4	23.2	23.2	22.6	21.7	18.7	14.7	15.3	13.8	12.0	13.2	23.2
13-May	10.4	7.5	4.2	1.7	0.2	2.3	9.9	13.0	15.0	17.5	20.0	21.7	23.0	23.8	24.2	24.5	24.4	24.0	22.8	20.1	14.6	12.1	8.1	5.8	14.6	24.5
14-May	4.4	2.7	1.4	0.4	-0.2	2.6	10.5	14.8	18.3	20.4	21.4	22.3	22.9	23.5	24.0	24.2	24.0	23.5	22.3	20.0	16.4	14.3	14.1	13.4	15.1	24.2
15-May	12.6	11.5	10.4	4.8	1.8	3.7	10.7	14.1	16.6	19.0	21.1	22.6	23.5	24.3	25.2	25.4	25.3	21.8	20.5	17.4	14.7	11.6	9.4	7.6	15.7	25.4
16-May	6.3	5.2	4.4	1.9	0.4	-0.9	-1.0	-0.1	0.8	1.7	2.5	3.6	5.0	6.0	6.5	7.0	7.4	7.5	7.0	6.1	4.2	-0.9	-2.9	-3.8	3.1	7.5
17-May	-4.9	-5.8	-6.6	-7.3	-7.6	-4.1	1.4	5.7	7.6	8.9	10.1	11.2	12.4	13.6	14.8	15.4	16.0	16.0	15.9	14.0	7.5	2.8	0.3	-1.1	5.7	16.0
18-May	-1.4	-1.6	-2.6	-3.4	-3.8	-0.8	6.9	10.2	13.0	16.4	18.1	19.1	20.1	21.3	22.1	22.7	23.1	22.9	22.1	18.7	11.8	7.5	5.3	4.6	11.4	23.1
19-May	2.9	0.6	-0.6	-1.6	-1.7	1.6	10.0	15.1	19.4	22.0	23.2	24.0	24.7	25.2	25.9	26.2	26.4	26.4	25.4	21.7	14.6	10.2	7.6	5.6	14.8	26.4
20-May	3.8	2.4	1.0	-0.1	-0.4	2.9	12.0	17.1	20.5	23.4	24.9	25.9	26.1	26.7	27.1	27.3	27.6	27.3	26.5	22.8	15.8	11.6	8.7	6.6	16.2	27.6
21-May	4.8	3.3	1.9	0.9	0.4	3.8	12.0	17.5	20.2	22.7	25.2	26.6	27.3	28.4	28.4	28.8	28.7	28.6	27.3	23.1	16.2	11.9	9.5	7.9	16.9	28.8
22-May	6.1	4.7	3.5	2.6	2.2	5.2	13.4	16.7	19.5	22.6	25.1	26.9	27.7	27.8	28.0	28.2	27.9	27.3	26.3	24.9	22.5	17.8	15.0	14.5	18.2	28.2
23-May	14.0	11.8	10.3	8.1	6.4	9.8	13.4	15.2	16.7	18.8	20.7	22.0	23.1	24.2	25.2	25.4	25.9	25.6	25.2	21.9	15.7	11.6	9.2	7.6	17.0	25.9
24-May	6.2	4.7	3.3	2.2	1.7	5.8	12.2	14.9	18.1	22.4	25.2	26.2	27.5	28.3	28.6	29.2	29.0	28.6	26.8	22.7	18.2	14.8	13.2	13.0	17.6	29.2
25-May	10.6	8.2	7.0	6.6	7.8	10.1	13.9	16.8	21.8	23.9	26.1	27.8	21.7	19.9	22.4	25.4	24.6	18.3	18.2	18.0	17.5	16.0	13.7	11.9	17.0	27.8
26-May	10.3	8.9	7.6	5.1	5.7	7.1	8.8	10.5	12.3	14.1	15.2	16.1	16.9	17.9	18.8	19.5	19.8	19.7	18.9	18.0	15.5	9.8	6.2	4.2	12.8	19.8
27-May	2.5	1.0	0.1	-0.6	-0.5	3.2	8.5	11.8	14.2	16.5	18.5	20.2	19.4	18.9	16.5	12.7	10.8	10.1	10.5	11.0	9.5	7.2	5.4	3.8	9.6	20.2
28-May	3.4	3.0	2.7	2.9	3.1	3.5	4.0	4.8	5.5	6.4	7.2	8.2	9.3	10.1	11.3	11.6	12.0	11.9	11.5	10.3	6.4	1.7	-0.7	-2.0	6.2	12.0
29-May	-2.9	-3.4	-4.1	-4.8	-5.0	-0.6	4.5	7.7	10.0	11.7	12.8	13.2	14.1	15.3	16.0	16.5	17.3	17.3	16.7	14.3	8.4	4.8	4.7	6.5	8.0	17.3
30-May	6.0	3.1	1.0	-1.0	-1.5	2.8	8.4	11.3	13.4	15.8	18.7	20.2	20.8	22.0	23.0	23.2	23.7	23.4	22.5	21.0	17.1	11.8	12.1	11.3	13.8	23.7
31-May	9.1	6.6	4.5	3.1	3.1	6.3	12.3	14.0	15.8	15.1	13.5	12.4	12.3	12.4	14.5	15.8	16.8	16.9	16.3	16.2	13.4	11.7	10.7	10.4	11.8	16.9
																								Diurnal Average		
																								Diurnal Maximum		



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Fort McKay South - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	99	13.31	13.31
0 - 10	287	38.58	51.88
10 - 20	220	29.57	81.45
> 20	138	18.55	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

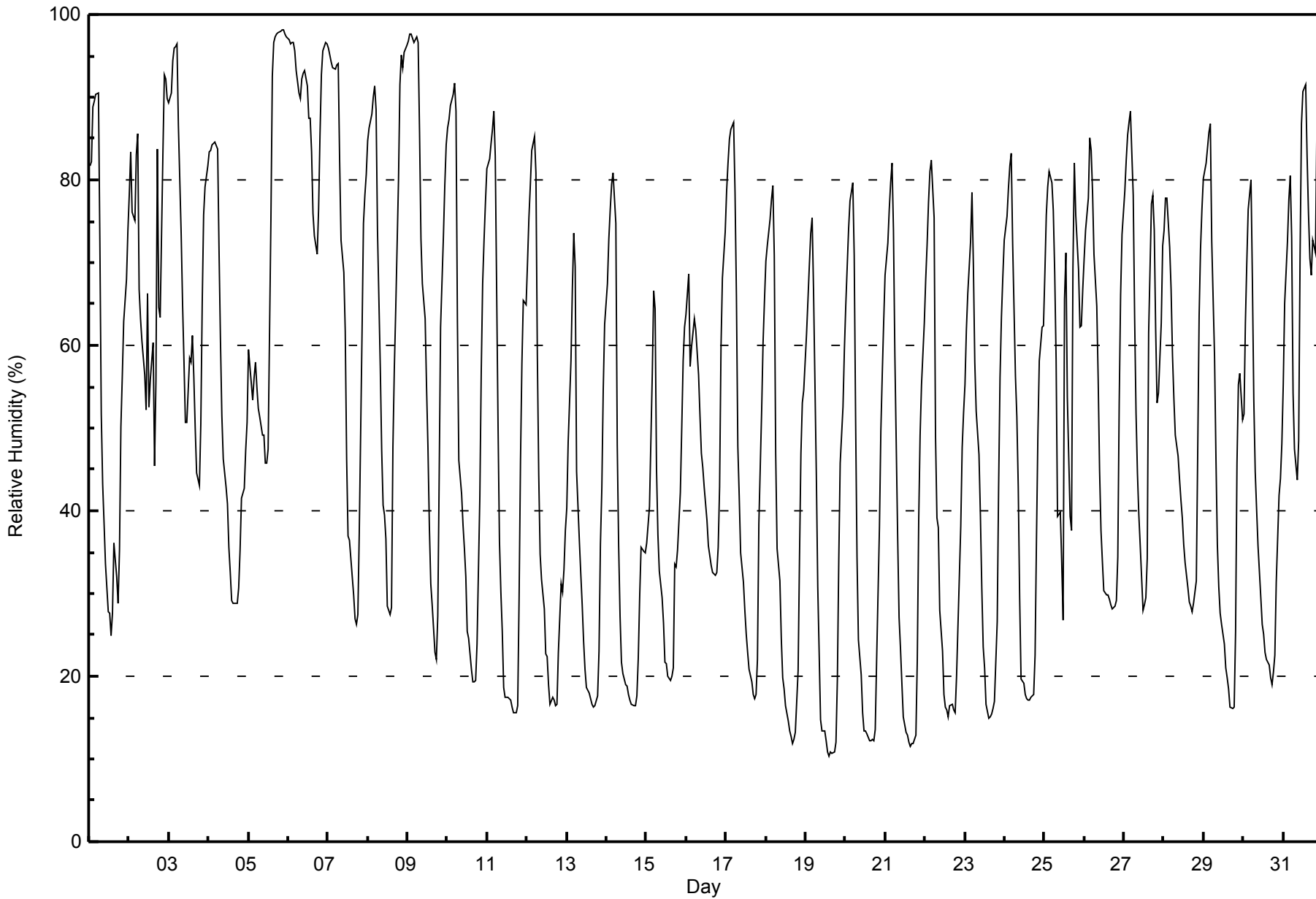
**Relative Humidity (RH) - %
Fort McKay South - May 2015**

Maximum Value: 98 % on May 5 22:00 Maximum Daily Average: 89.5 % on May 6																		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 10 % on May 19 15:00 Minimum Daily Average: 35.0 % on May 19 Maximum Diurnal Average: 82.2 % at hour 5 Minimum Diurnal Average: 31.4 % at hour 16 Monthly Average: 52.1 % Percentiles: P ₁ = 12 P ₁₀ = 18 Q ₁ = 29 Median = 51 Q ₃ = 74 P ₉₀ = 87 P ₉₉ = 98																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	82	82	89	90	90	90	72	52	43	39	34	28	28	25	28	36	32	29	35	50	56	63	68	74	54.7	90
2-May	78	83	76	75	83	86	67	63	60	56	52	66	52	56	60	45	56	84	65	63	84	93	92	90	70.3	93
3-May	89	90	94	96	96	97	87	73	65	58	51	51	58	58	61	56	50	45	43	51	65	76	79	82	69.6	97
4-May	83	83	84	84	85	84	71	61	52	46	43	41	36	33	29	29	29	29	31	35	42	43	47	51	52.0	85
5-May	60	57	53	56	58	55	52	51	49	49	46	46	48	75	92	97	97	98	98	98	98	98	98	97	71.9	98
6-May	97	97	97	97	96	93	90	90	92	93	93	91	88	88	83	76	73	71	76	85	93	96	97	96	89.5	97
7-May	96	95	94	94	93	94	94	82	73	69	62	46	37	36	34	30	27	26	27	37	62	75	78	81	64.3	96
8-May	85	86	88	90	91	88	74	57	47	41	40	37	29	28	28	48	57	64	80	92	95	94	95	96	67.9	96
9-May	97	98	98	97	97	97	97	86	73	67	63	55	48	38	31	29	23	22	27	44	62	73	79	84	66.0	98
10-May	86	87	89	90	92	88	63	46	42	38	35	32	25	25	21	19	19	19	24	42	57	67	73	77	52.4	92
11-May	81	83	84	86	88	83	50	36	30	25	19	17	17	17	17	16	16	16	17	30	46	58	65	65	44.3	88
12-May	70	75	79	83	85	81	59	44	35	32	28	23	22	19	17	18	17	16	17	23	31	30	33	38	40.6	85
13-May	40	48	58	67	74	69	45	36	32	29	24	21	19	18	17	17	16	16	18	23	36	43	55	63	36.8	74
14-May	67	73	76	79	81	75	48	36	27	22	20	19	19	18	17	16	16	16	18	22	30	36	35	35	37.6	81
15-May	36	38	41	57	67	64	45	37	33	30	26	22	22	20	20	20	21	33	33	35	42	50	58	62	38.0	67
16-May	64	69	57	60	61	63	62	56	51	47	45	43	39	36	35	33	33	32	33	36	43	60	68	74	50.0	74
17-May	79	82	85	86	87	78	66	48	42	35	31	28	25	23	21	19	18	17	18	22	38	52	60	65	46.9	87
18-May	70	72	75	78	79	71	47	35	31	25	20	18	16	15	13	13	12	12	13	21	35	47	53	55	38.6	79
19-May	61	65	70	74	75	67	44	31	23	15	13	13	12	11	10	11	11	11	12	20	34	46	53	60	35.0	75
20-May	65	69	74	77	80	71	51	34	24	20	16	13	13	13	12	12	12	12	13	22	38	50	56	63	38.1	80
21-May	68	72	77	80	82	74	59	37	27	23	19	15	13	13	12	11	12	12	13	22	39	49	55	63	39.5	82
22-May	68	72	77	81	82	75	49	39	38	28	23	18	16	16	15	16	17	16	16	20	26	38	48	52	39.4	82
23-May	55	62	66	73	78	70	58	52	47	39	31	24	21	17	15	15	15	16	17	27	43	56	63	68	42.8	78
24-May	73	76	79	82	83	72	56	51	43	30	20	19	18	17	17	18	18	18	23	37	49	58	62	62	45.0	83
25-May	69	76	79	81	80	76	69	58	39	40	34	27	66	71	54	39	38	69	82	76	69	62	62	67	61.8	82
26-May	71	74	78	85	84	78	71	65	56	45	38	34	30	30	30	29	29	28	28	29	34	53	66	73	51.6	85
27-May	79	82	85	87	88	78	63	52	45	39	36	28	29	29	34	61	77	78	74	62	53	54	63	72	60.4	88
28-May	74	78	78	72	67	59	54	49	47	44	41	39	36	34	31	29	29	28	29	31	47	64	72	76	50.2	78
29-May	80	82	84	86	87	72	59	46	36	31	28	26	24	21	20	19	16	16	16	25	46	55	57	51	45.1	87
30-May	52	63	70	77	80	68	53	45	40	36	29	26	25	23	22	21	20	19	21	23	31	42	44	48	40.7	80
31-May	55	65	72	78	81	73	54	48	44	49	71	87	91	92	83	76	70	68	73	71	87	91	93	93	73.5	93
																		72.0 75.4 77.7 80.5 82.2 77.1 62.3 51.6 44.7 39.9 36.5 34.0 32.9 32.6 31.6 31.4 31.5 33.5 35.1 41.1 52.0 60.3 65.4 68.8						Diurnal Average		
																		97 98 98 97 97 97 97 90 92 93 93 91 91 92 92 97 97 98 98 98 98 98 98 97						Diurnal Maximum		



WBEA
Hourly Averages

Relative Humidity (RH) - %
Fort McKay South - May 2015





Maximum Speed: 21 km/h on May 15 20:00	Maximum Daily Speed Average: 12.0 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 15 04:00	Minimum Daily Speed Average: 0.6 km/h on May 10	Hours of Data: 738
Maximum Diurnal Speed Average: 1.7 km/h at hour 21	Minimum Diurnal Speed Average: 0.2 km/h at hour 13	Hours of Missing Data: 6
Monthly Average Velocity: 0.4 km/h 343.8 deg	Percentiles: P ₁ = 1 P ₁₀ = 2 Q ₁ = 3 Median = 5 Q ₃ = 8 P ₉₀ = 11 P ₉₉ = 19	Percent Operational Time: 99.2

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-May	SW6	SW1	WSW2	SW1	WSW3	SSW3	S4	SSW7	SW9	SSW11	SW11	WSW11	WSW10	SSW13	SSW13	W5	WSW6	WNW8	SW9	WSW4	W5	WSW2	WSW6	WSW5	SW5.9	SSW13
2-May	WSW2	WSW4	WNW4	W3	NE1	NW1	NNW7	N10	NNE11	NNE11	NNE12	NNW7	NNE9	NW7	NW6	N7	N6	NW3	N7	N6	NNW10	N6	N7	N10	N5.7	NNE12
3-May	N6	N5	NW3	NW3	SW2	WNW3	NW4	NW4	WNW5	WNW6	W8	NNW6	NNE9	NNE10	NNE10	NNE10	NNE11	NNE12	NNE10	NNE4	WNW1	WSW3	WSW3	W2	N4.3	NNE12
4-May	WSW2	SW2	WSW2	WNW2	NNW2	N2	N4	NNE5	ENE3	E6	E6	NE3	NE5	E0	ESE5	NNE5	NNE7	NE6	NE7	NE5	NNE7	NNE8	N7	N7	NNE3.4	NNE8
5-May	N5	NNE7	NNE8	NNE7	NNE7	N7	N9	N9	N9	N10	N11	N11	NNE8	NNE11	NNE9	NNE7	NE4	N1	AF	N1	AF	AF	N7	N5	NNE7.0	N11
6-May	N6	N6	NNW6	N7	N7	N8	N9	N8	N9	N10	N10	NNE10	NNE11	NNE10	NE10	ENE8	NE9	ENE6	E6	ESE2	W2	SW3	WSW3	SW2	NNE5.6	NNE11
7-May	SW2	SW3	SW2	SW2	SW2	SSW2	SE5	SSW5	SW5	N1	NE8	NE7	NNE8	NE7	NNE8	NNE8	NNE5	ENE2	E4	W2	WSW3	WSW3	WSW3	WSW3	NNE0.8	NNE8
8-May	WSW3	WSW2	WSW3	SW2	WSW2	W1	E2	SSE5	SE4	ESE5	E8	SSE6	WSW5	ESE2	NNE5	NW12	NNW9	NNE9	NNE8	NE4	ESE2	E3	S1	NW2	NE0.8	NW12
9-May	NW3	NNW3	WSW2	AF	AF	AF	NNE4	NNE1	ENE1	S1	SSW4	SSW6	SSW8	S7	S6	SSW4	SSW4	S6	S5	S3	WSW3	WSW3	WSW3	W3	SSW2.5	SSW8
10-May	WSW4	W2	W2	W2	WSW3	W2	N3	NNE3	NE3	ENE4	NNE5	NE6	NE5	SE2	S7	SW6	SW5	SE2	NNE1	WSW1	WSW3	WSW4	WSW2	WSW3	WSW0.6	S7
11-May	WSW3	SSW2	SW3	WSW3	SW3	SSW4	S4	S6	SSW7	SSW6	SW7	S8	S8	SSW8	S6	SE7	E1	NE5	E2	SW1	WSW2	W3	W3	W3	SSW3.2	SSW8
12-May	NW2	WSW3	WSW3	WSW3	WSW2	W2	NNE3	SE3	SE2	NNE3	E2	SE5	WNW4	SE5	ESE4	S8	S7	SSE8	SSE6	SE4	SE6	SSE7	SSE8	SSE6	SSE2.8	S8
13-May	SSE5	SSE4	SSE3	WSW2	SW2	S3	SSE7	S9	S10	S9	S9	SSW10	S11	S12	S11	S11	S9	S9	S8	S6	SSW6	SSW4	S3	S3	S6.8	S12
14-May	SSW3	S3	SW2	SSW3	S4	S3	SSE4	S6	SSW6	SW11	SW12	SSW14	SSW13	S12	S11	SSW9	SSW10	S9	SSW9	SSW7	SSW8	SW7	SSW9	SW9	SSW7.3	SSW14
15-May	SW9	SW9	SW6	NNE0	WSW3	SSW1	SSW3	SSW2	S6	S8	S9	WSW10	SSW10	WSW11	WSW9	WSW10	WSW6	W1	NNE15	N21	N19	N20	N20	N19	WNW3.3	N21
16-May	N16	N13	N19	N19	N16	N16	N17	NNE17	NNE15	NNE16	NNE16	NNE15	N14	NNE13	NNE13	NNE13	NNE12	NNE11	NE8	NNE8	NNE5	NW3	WNW2	WSW3	NNE12.0	N19
17-May	WSW3	WSW2	WSW3	SSW3	SW2	WSW2	S4	SSE9	S9	S9	S9	S9	SSW9	S7	S6	S6	SE8	SE7	SE6	SE5	WSW3	WSW3	SW3	S3	S4.6	SSE9
18-May	S3	SSW3	SW1	SSW2	SW3	S4	S6	S7	S7	S8	SSW10	SSW10	SSW10	S9	S8	SSW9	S7	S7	S6	S4	WSW4	SW5	SW5	SW5	SSW5.7	SSW10
19-May	WNW2	SW3	SSW3	SSW3	SW3	S3	SSE5	SSE6	S6	WSW8	SW6	SSW9	S8	SSW8	SSW7	SSW6	S6	S6	SSE4	S2	WSW3	SSW3	WSW3	SW2	SSW4.2	SSW9
20-May	SW3	SSW3	SSW3	SW3	WSW3	SSW2	S4	S5	S6	SSE6	S7	S10	SW8	S6	SW6	WSW2	SSE3	SE4	ESE4	SSE1	WSW3	SW2	SW3	SW2	SSW3.6	S10
21-May	SW3	SW2	SW3	SW3	S3	S3	S5	S6	S7	S6	S6	S8	S10	S9	SSW7	SW7	SSW4	SW3	W3	WSW3	SW3	SW3	SW2	WSW2	SSW4.2	S10
22-May	SW3	SSW1	SW3	SW2	S3	SSE3	S2	SE1	ENE3	N6	NNE9	NNE11	N13	NNE13	N12	NNE11	NNE14	N13	NNE12	NNE8	NNE6	N5	N5	N5	NNE5.3	NNE14
23-May	N6	NNW4	NNW5	NNW4	NNW3	N4	NNE6	NNE6	NNE8	N9	N10	N10	NNE8	NNE5	NE5	N7	ENE5	NE5	E2	ENE0	WSW2	WSW2	W2	W1	N4.2	N10
24-May	WSW2	SW2	SW2	SW2	S3	S2	NE2	NE4	NNE4	SE5	ESE5	E6	E6	ESE5	SE4	SE3	S3	E1	NNW2	W2	WSW3	WSW3	WNW2	WNW1	SE1.1	E6
25-May	SW1	SW2	SSW3	S2	SW1	S2	S3	SSE4	S3	ESE6	SE7	SW7	W2	S2	SSE5	SSE6	NW5	NW6	WNW2	NNW5	N11	N11	N11	N11	NW0.7	N11
26-May	N9	N10	NNW8	NNW4	NNW6	N6	N8	N8	NNE9	NNE10	NNE10	NNE9	NNE9	NNE7	NNE9	NNE7	NNE6	ENE6	NE7	NNE6	NNE5	WNW2	SW3	WSW2	NNE6.2	NNE10
27-May	WSW2	SW2	WSW3	WSW2	WSW3	W1	N3	E2	SSE3	E3	N5	NNW1	N7	N10	N19	N15	N13	N12	N8	N12	NNE18	N17	N15	N12	N6.6	N19
28-May	N12	N12	N11	N9	N10	N10	NNE12	NNE13	NNE13	NNE12	NNE13	NNE10	NNE12	NNE11	NNE10	NNE10	NNE10	NNE10	N9	N8	NW3	W2	WSW3	WSW3	NNE8.9	NNE13
29-May	WSW2	WSW2	WSW2	WSW2	WSW1	NNW2	SE2	SSE4	SSE8	SSE6	S6	ENE7	ESE5	ESE6	ESE6	SE7	SE6	S4	S5	SSW2	WSW3	S4	S6	S6	SSE3.0	SSE8
30-May	S5	SSW5	SW2	W2	SW2	SSW2	S4	S6	SSW6	SSW6	S7	S10	S9	S9	SE8	SSE7	SSE8	SSE8	SSE7	SE6	SSE3	S4	SSE6	S5	S5.2	S10
31-May	S4	SW4	SW4	SSW2	WNW2	WNW2	S5	SSE5	SE8	S6	S7	SSE2	S5	S6	SSE8	SSE6	SSE6	SSE5	SSE6	SSE6	S3	SSW2	WSW2	WSW4	S3.9	SE8

WNW1.4	WNW1.4	WNW1.7	WNW1.5	WNW1.3	NW0.9	NNE0.9	E1.1	SE1.0	SE0.6	ESE0.5	SSE0.5	E0.2	SE1.1	ESE1.2	NE0.7	NE1.1	ENE1.4	ENE1.5	NNE1.3	NW1.7	WNW1.5	WNW1.5	WNW1.7	Diurnal Average
N16	N13	N19	N19	N16	N16	N17	NNE17	NNE15	NNE16	NNE16	NNE15	N14	NNE13	N19	N15	NNE14	N13	NNE15	N21	N19	N20	N20	N19	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 McKay South - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on May 15 20:00	Hours in Service: 744 Hours of Data: 738 Hours of Missing Data: 6 Hours of Calibration: 0 Percent Operational Time: 99.2
Minimum Value: 0 km/h on May 21 21:00	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 4 P ₉₉ = 6	

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

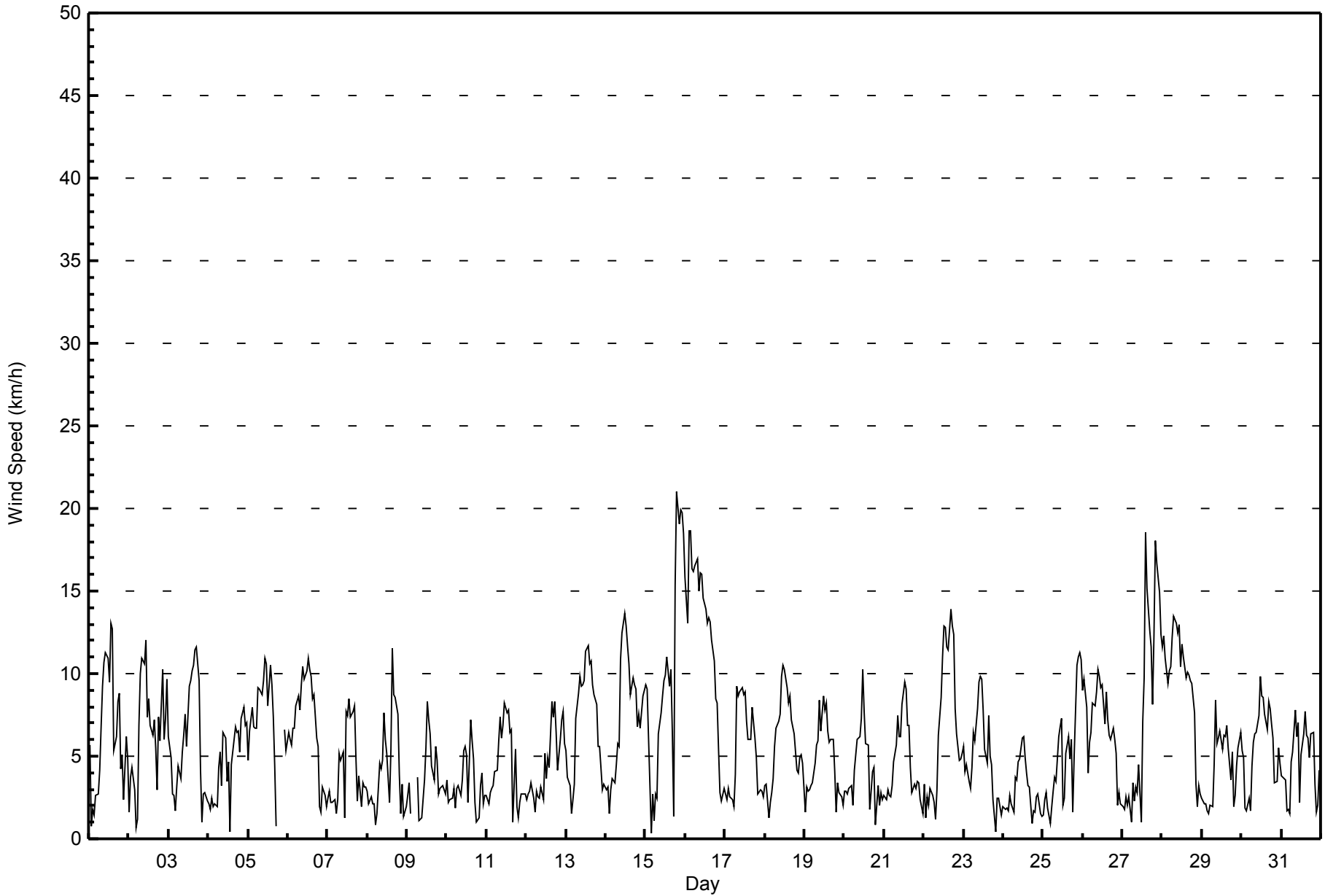
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Fort McKay South - May 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - May 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	378	51.22	51.22
6 - 11	304	41.19	92.41
12 - 19	53	7.18	99.59
20 - 28	3	0.41	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 738

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Fort McKay South - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	17	13	7	11	10	16	19	42	34	56	77	24	14	12	11	378
6 - 11	52	57	9	4	6	3	11	24	65	32	17	10	1	2	3	8	304
12 - 19	23	22	0	0	0	0	0	0	2	4	1	0	0	0	1	0	53
20 - 28	3	0	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	93	96	22	11	17	13	27	43	109	70	74	87	25	16	16	19	738

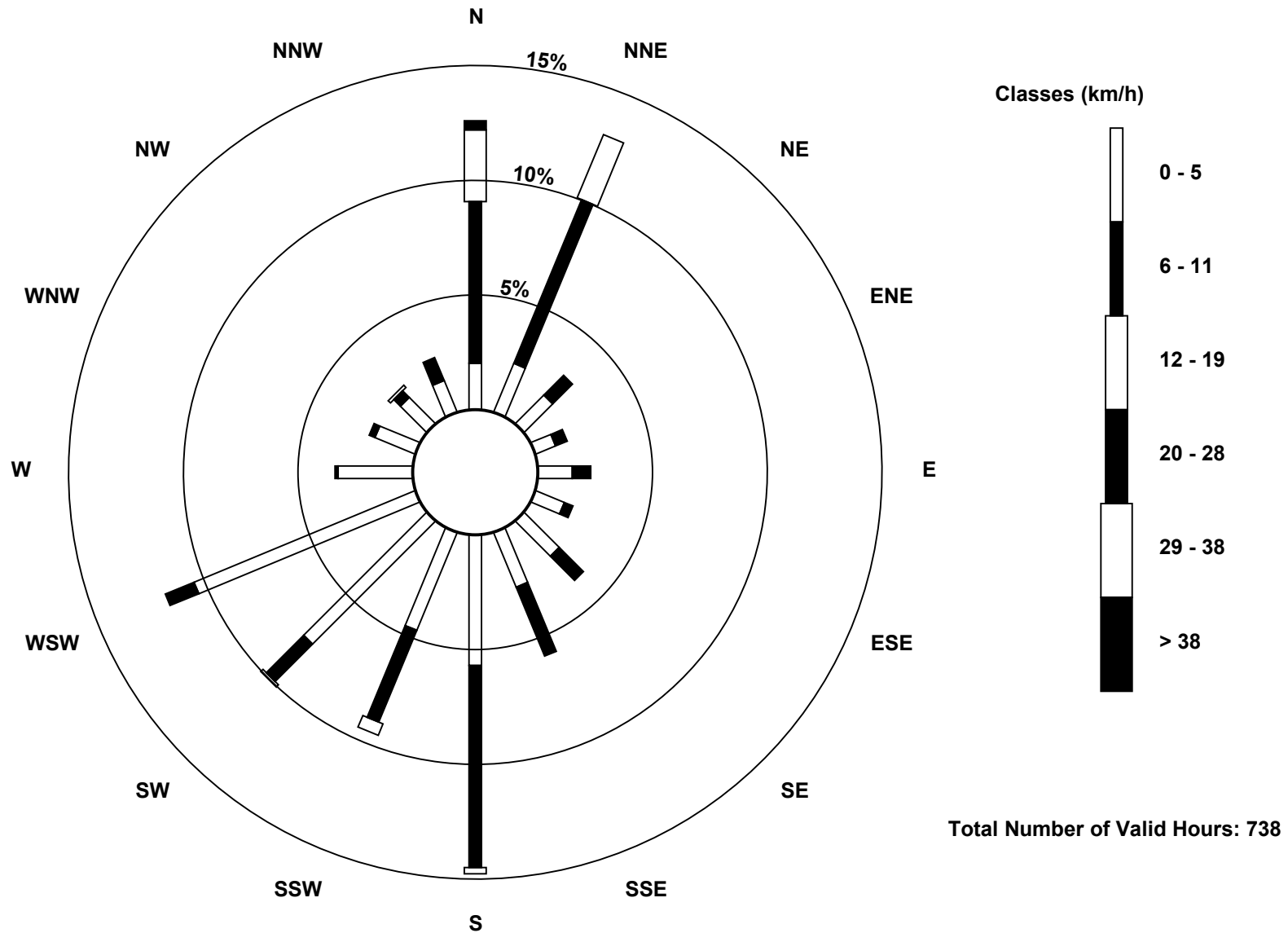
Total Number of Valid Hours: 738

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Wind Speed (WS) - km/h
Fort McKay South (AMS 13)





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg
Fort McKay South - May 2015

Direction of Maximum Speed: 358 deg on May 15 20:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 12.4 deg on May 16		Hours of Data:	738
Direction of Minimum Speed: 29 deg on May 15 04:00		Hours of Missing Data:	6
Direction of Minimum Daily Speed Average: 0.6 deg on May 10		Percent Operational Time:	99.2
Monthly Average Direction: 232.4 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-May	222	235	246	214	249	206	172	205	228	207	227	238	241	201	213	272	255	282	223	239	267	244	251	255	230.4
2-May	257	252	290	269	47	324	343	3	18	13	21	342	14	323	313	1	351	313	9	354	331	354	6	3	351.8
3-May	3	355	313	317	223	299	308	306	284	297	278	345	20	20	24	23	21	19	12	19	298	256	250	266	350.9
4-May	248	235	248	293	344	356	357	25	77	93	84	40	44	91	115	23	21	34	38	39	22	18	8	7	30.7
5-May	355	21	24	23	19	11	7	1	0	8	9	2	13	33	15	30	38	8	AF	11	AF	AF	6	354	12.9
6-May	355	355	343	350	359	356	358	357	359	2	11	22	28	30	40	57	48	68	86	107	267	233	251	231	15.6
7-May	226	225	226	226	226	226	197	133	206	225	349	35	38	12	45	27	20	21	70	86	267	242	237	243	19.9
8-May	242	248	247	235	253	277	87	155	134	121	88	154	237	118	20	324	332	32	27	50	110	81	187	307	37.7
9-May	324	336	252	AF	AF	AF	14	33	58	184	207	213	208	181	185	205	209	190	185	180	243	240	243	262	211.1
10-May	252	270	270	268	252	266	351	32	42	65	19	39	50	142	171	214	216	143	31	252	238	240	237	239	246.9
11-May	237	211	223	244	234	195	174	181	199	201	219	191	190	205	188	135	81	47	83	226	253	269	276	272	200.6
12-May	309	245	249	251	256	259	16	138	125	28	95	125	287	144	102	170	175	162	157	135	145	149	148	151	157.0
13-May	158	159	163	246	214	191	168	172	182	181	189	198	184	180	185	178	179	177	186	188	200	193	180	190	182.5
14-May	196	186	235	213	183	178	166	170	212	218	216	199	193	189	178	196	194	191	192	195	207	214	213	218	198.4
15-May	215	223	222	29	247	200	200	206	182	189	177	257	233	245	243	236	245	266	12	358	3	0	358	360	299.6
16-May	1	357	1	4	4	6	10	12	20	16	14	16	7	26	31	27	20	22	39	26	24	324	288	243	12.4
17-May	243	242	239	213	219	240	171	165	182	177	177	183	197	185	190	180	138	125	136	142	239	248	236	185	181.1
18-May	185	193	228	195	216	185	175	191	183	189	201	194	193	186	181	195	190	180	190	187	237	236	230	230	195.3
19-May	291	234	204	204	223	191	164	151	190	244	225	201	174	194	198	200	170	174	148	183	242	212	245	223	198.1
20-May	219	208	209	224	238	206	170	169	180	168	187	179	217	189	215	245	162	146	105	161	238	218	227	230	192.6
21-May	228	216	223	225	191	186	174	169	183	190	184	175	184	184	196	226	212	225	260	249	219	218	232	256	199.5
22-May	218	210	228	234	181	168	179	141	77	9	12	19	10	18	8	13	21	9	12	20	19	354	360	2	13.0
23-May	357	338	341	341	339	357	14	27	29	8	5	8	18	16	39	356	65	38	79	62	246	239	263	274	8.4
24-May	237	221	223	226	189	184	38	37	16	133	114	92	93	111	131	136	171	93	334	260	247	238	298	285	131.5
25-May	220	229	194	191	229	181	178	168	189	116	130	221	279	191	163	168	318	320	288	344	354	352	1	358	317.8
26-May	0	357	347	334	344	359	357	7	12	23	23	16	23	32	27	25	28	60	34	32	22	303	230	253	12.6
27-May	254	233	238	244	242	267	9	86	148	87	9	347	356	351	2	358	2	0	352	5	12	4	4	358	0.4
28-May	1	2	1	3	2	10	16	15	19	17	19	27	22	26	21	30	23	19	5	358	319	259	240	241	11.7
29-May	240	240	253	238	249	333	138	148	162	166	172	67	109	104	104	138	141	190	188	208	240	190	185	177	159.9
30-May	180	194	236	270	230	209	171	183	198	199	176	173	186	185	135	152	149	167	148	145	164	175	161	175	173.5
31-May	191	226	232	212	302	292	174	158	144	176	175	166	169	173	164	166	165	165	160	166	169	210	238	249	177.1

287.0 287.6 293.2 301.0 295.1 324.0 30.6 97.8 145.1 138.3 122.2 152.2 99.4 139.6 104.4 53.7 52.6 59.3 60.2 26.8 322.8 299.9 297.8 298.9
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
Fort McKay South - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 105 deg on May 27 12:00	Hours of Data: 738
Minimum Value: 0 deg on May 7 01:00	Hours of Missing Data: 6
Percentiles: P ₁ = 7 P ₁₀ = 18 Q ₁ = 25 Median = 34 Q ₃ = 48 P ₉₀ = 68 P ₉₉ = 97	Hours of Calibration: 0
	Percent Operational Time: 99.2

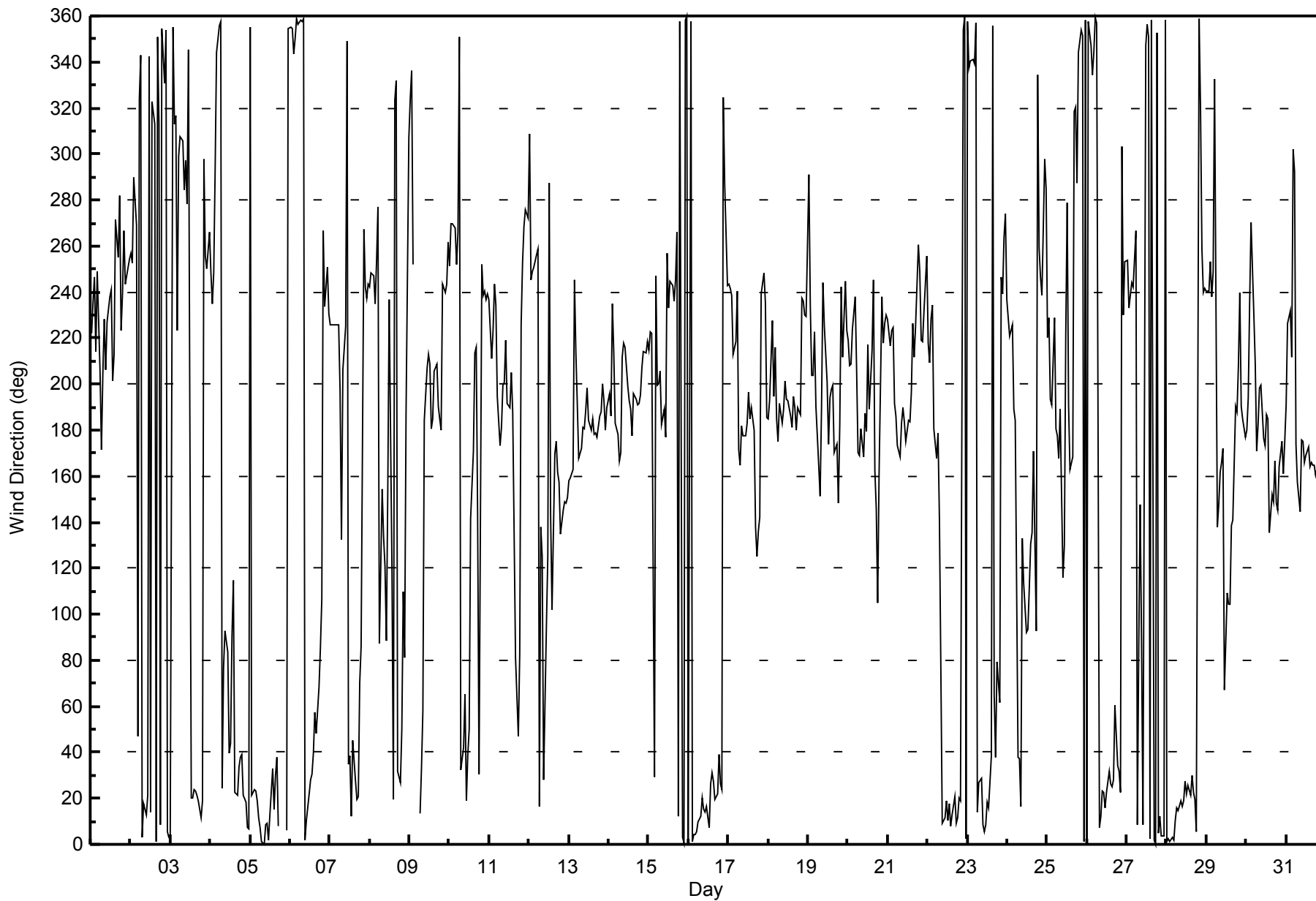
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	34	97	56	67	36	33	23	35	33	33	35	42	48	33	36	78	54	43	34	17	35	68	15	28	97
2-May	95	43	38	70	88	70	26	30	27	32	32	32	35	48	49	46	76	71	23	27	37	25	25	26	95
3-May	24	23	28	35	63	25	34	51	52	44	46	66	29	30	33	29	30	28	24	45	59	16	16	24	66
4-May	27	43	18	41	66	42	23	33	68	47	57	78	79	104	77	74	49	45	34	30	22	26	22	22	104
5-May	21	19	23	19	17	23	24	24	25	23	25	27	39	31	25	28	30	63	AF	17	AF	AF	25	22	63
6-May	23	25	21	25	22	24	24	23	25	25	25	28	28	29	33	38	36	36	42	48	55	11	12	8	55
7-May	0	0	0	0	0	37	30	35	56	39	93	42	46	40	48	45	36	55	91	32	63	24	28	19	93
8-May	12	35	23	63	31	87	48	35	60	65	40	56	56	88	43	36	37	27	29	47	62	46	86	47	88
9-May	36	17	46	AF	AF	AF	18	84	89	89	70	63	47	50	56	75	83	44	28	20	16	14	12	49	89
10-May	38	34	27	20	15	37	44	48	77	73	55	57	70	92	50	59	68	88	98	79	17	8	31	18	98
11-May	28	38	23	25	20	20	25	29	41	42	53	42	48	49	59	50	101	43	96	65	40	38	21	60	101
12-May	24	21	29	10	22	46	22	79	75	75	78	68	84	76	71	50	42	35	34	23	26	28	29	27	84
13-May	27	28	31	40	31	22	23	25	29	34	38	39	36	33	37	36	34	30	25	16	15	25	21	17	40
14-May	17	21	60	28	10	17	21	29	68	28	29	28	31	29	34	43	33	30	23	17	13	14	16	19	68
15-May	19	18	25	96	26	78	35	89	38	39	44	49	42	35	47	39	55	85	27	28	27	28	29	28	96
16-May	29	29	27	26	28	29	29	27	30	30	28	33	31	36	35	31	32	32	40	27	23	33	23	11	40
17-May	7	14	7	20	21	20	31	30	33	38	42	44	43	58	65	58	37	36	36	26	37	13	21	15	65
18-May	18	11	58	30	26	16	20	36	34	43	41	36	38	47	45	47	46	46	30	17	7	5	9	51	58
19-May	52	19	24	20	18	18	25	27	41	42	66	45	47	43	58	67	51	43	36	55	9	22	11	29	67
20-May	29	24	35	17	11	34	19	30	34	38	54	36	54	70	76	97	85	76	38	70	14	40	29	35	97
21-May	28	28	21	18	23	14	21	29	29	43	62	40	49	38	67	58	76	80	67	20	19	26	38	66	80
22-May	42	78	38	38	44	20	43	84	52	43	39	36	34	33	39	37	29	28	27	26	25	23	18	20	84
23-May	21	17	19	14	21	29	27	34	30	31	35	46	66	73	47	58	61	70	85	9	20	34	35	85	
24-May	17	26	43	41	18	55	60	33	52	54	54	50	52	65	74	82	78	98	58	21	21	13	67	71	98
25-May	64	42	29	66	82	60	25	46	57	31	32	55	83	74	51	39	82	65	70	33	25	28	28	27	83
26-May	28	23	22	23	21	25	26	32	31	35	39	38	37	57	41	55	52	46	38	28	25	42	36	29	57
27-May	59	52	16	39	25	68	28	76	75	74	63	105	30	35	29	28	28	28	29	29	27	26	26	27	105
28-May	27	26	29	29	27	29	29	29	32	32	32	38	35	35	42	41	41	33	30	28	22	50	21	17	50
29-May	14	23	15	37	29	37	60	55	37	58	51	67	66	57	55	48	57	70	30	61	21	14	15	18	70
30-May	20	17	44	34	13	34	28	35	41	42	42	34	44	46	50	52	43	37	38	30	29	24	24	22	52
31-May	31	17	11	44	38	41	47	34	34	35	28	44	24	26	30	32	32	32	29	26	42	63	41	20	63
	95	97	60	96	88	87	60	89	89	89	93	105	84	104	77	97	101	98	98	85	63	68	86	71	
	Diurnal Maximum																								

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Fort McKay South - May 2015





Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	May 7, 2015	Last Calibration	April 2, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:15	End Time (MST)	13:15
Gas Cert Reference	S980455A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG Make/Model	API 701	Serial Number	3410
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		HVPS voltage	512	512
Analyzer IP address	192.168.1.44		Lamp voltage	1930	1893
Calculated slope	0.994253	0.989465	Chamber temp	50.0	50.0
Calculated intercept	1.434025	1.977934	Pressure	26.5	26.4
Analyzer Background	24.2	24.2	Flow	695	693
Analyzer Coefficient	1.770	1.770	Intensity	65.2	63.9

Analyzer make API T100 Analyzer serial # 599

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	----
as found span	5000	70.3	703.0	701.1	1.003
calibrator zero	5000	0.0	0.0	-0.4	----
high point	5000	70.3	703.0	709.3	0.991
second point	5000	35.1	351.0	351.8	0.998
third point	5000	17.6	176.0	174.4	1.009
as left zero	5000	0.0	0.0	-0.5	----
as left span	5000	70.3	703.0	700.2	1.004
Average Correction Factor					0.999

Corrected As found 701.4 Previous response 705.6 % change 0.6%

Notes:

No adjustments or maintenance done, Filter changed out

Calibration Performed By: Melissa Lemay



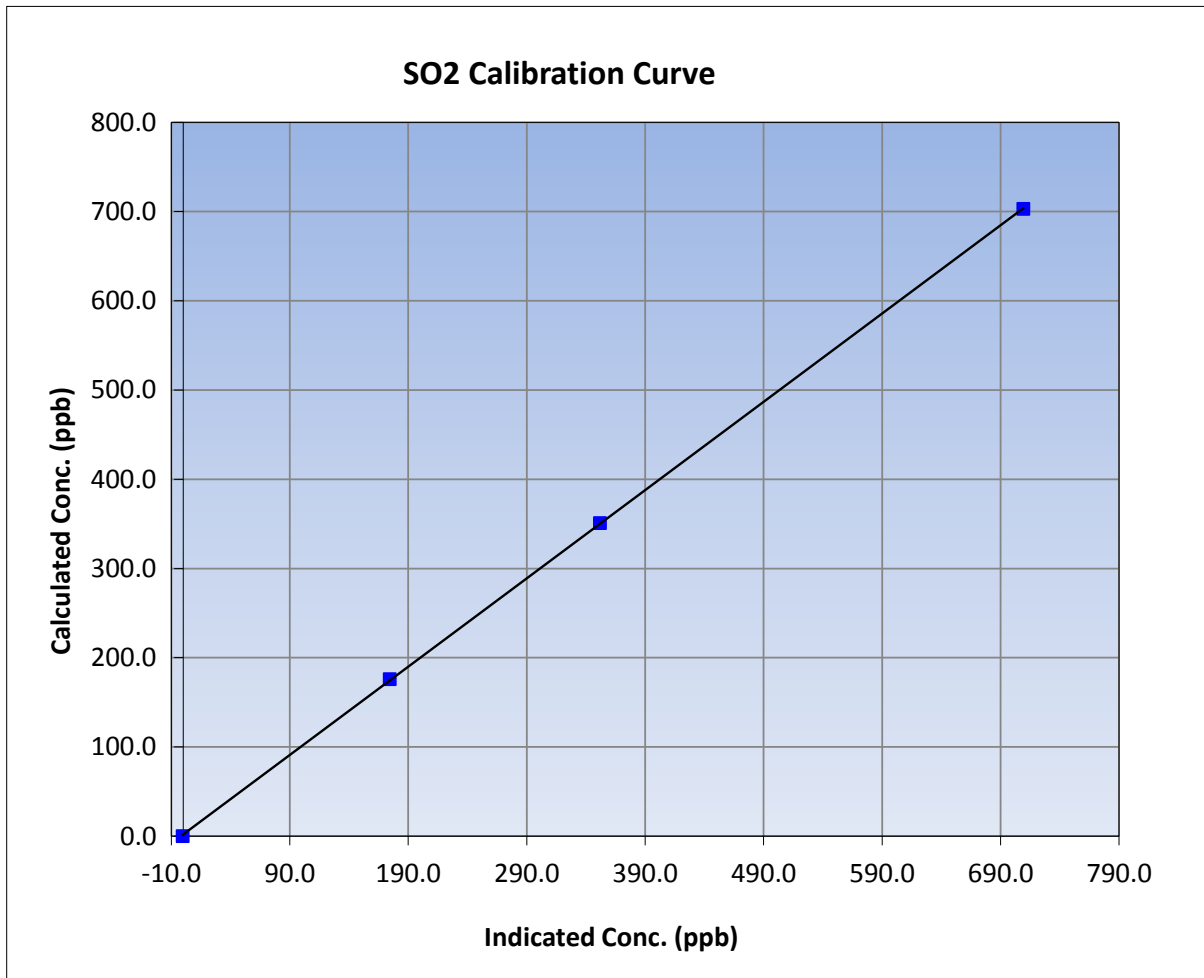
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 7, 2015	Previous Calibration	April 2, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:15	End Time (MST)	13:15
Analyzer make	API T100	Analyzer serial #	599

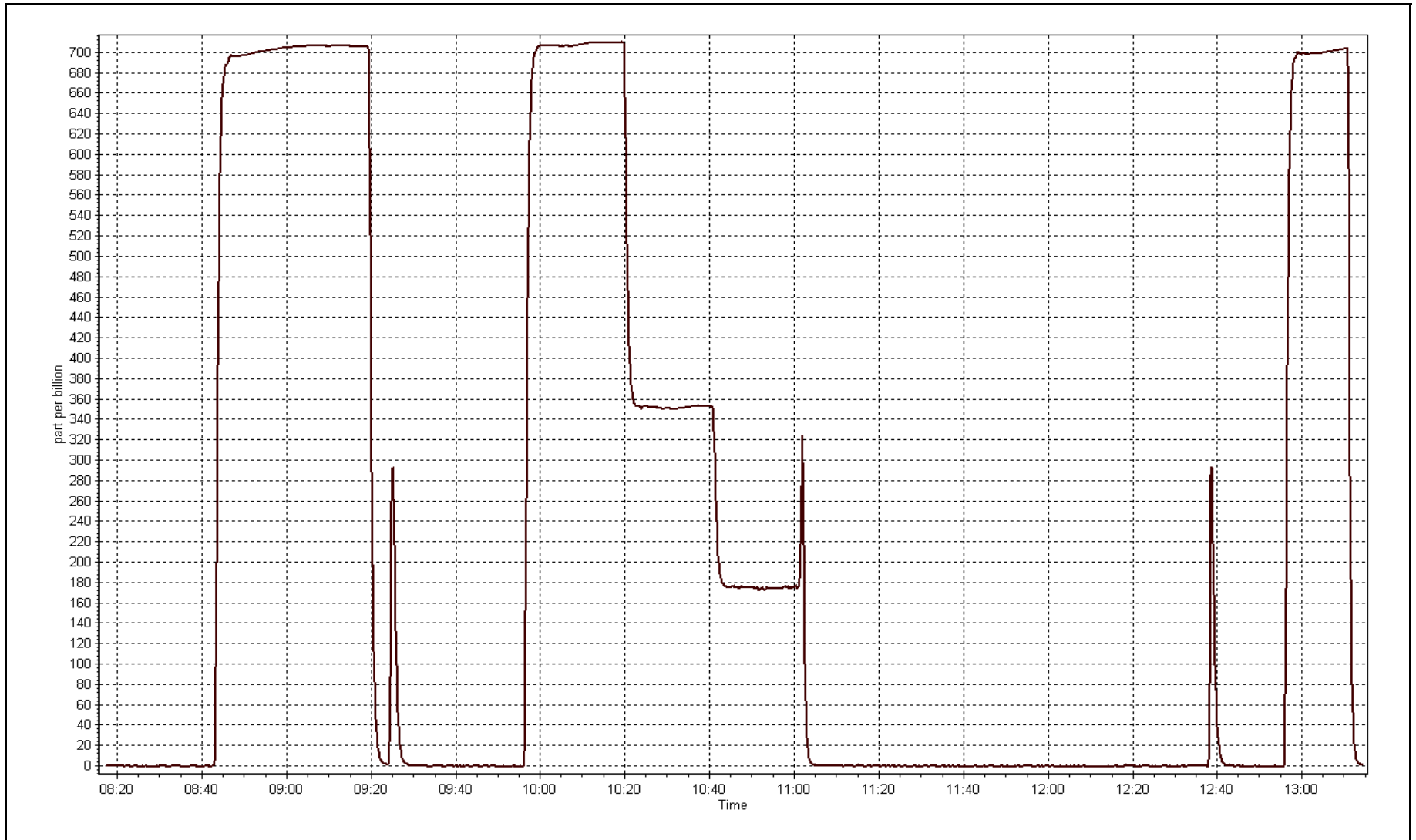
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999978
703.0	709.3	0.9911		
351.0	351.8	0.9976	Slope	0.989465
176.0	174.4	1.0092		
			Intercept	1.977934



SO2 Calibration Plot

Date: May 7, 2015





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	May 11, 2015	Last Calibration	April 10, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	12:10
Gas Cert Reference	CC178364	Station temp.	22 Deg C
Cal Gas Concentration	5.07 ppm	Cal Gas Exp Date	30/05/2013
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
Dil air Make/Model	API 701	Serial Number	3410
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
SO2 gas concentration	51.1 ppm	SO2 gas cert/exp	S980455A 26/Sep/17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-727	-727
Analyzer IP address	192.168.1.44		Lamp voltage	1011	1006
Calculated slope	0.990974	0.986401	Chamber temp	45	45
Calculated intercept	0.113112	0.096469	Pressure	704.0	694.7
Analyzer Background	1.81	1.81	Flow	0.455	0.444
Analyzer Coefficient	1.044	1.044	Intensity	90	89
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153359	
Converter make/model	CDN-101		Converter serial #	456	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	78.9	80.0	81.0	0.988
SO2 scrubber check	5000	17.6	179.9	0.3	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	78.9	80.0	81.0	0.988
second point	5000	39.4	40.0	40.5	0.986
third point	5000	19.7	20.0	20.0	0.999
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	78.9	80.0	81.3	0.984
Average Correction Factor					0.991

Corrected As found	81.0	Previous response	80.6	% change	-0.5%
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Notes:

Filter changed out after as founds, scrubber checked after as founds, no adjustments or maintenance done

Calibration Performed By:

Melissa Lemay



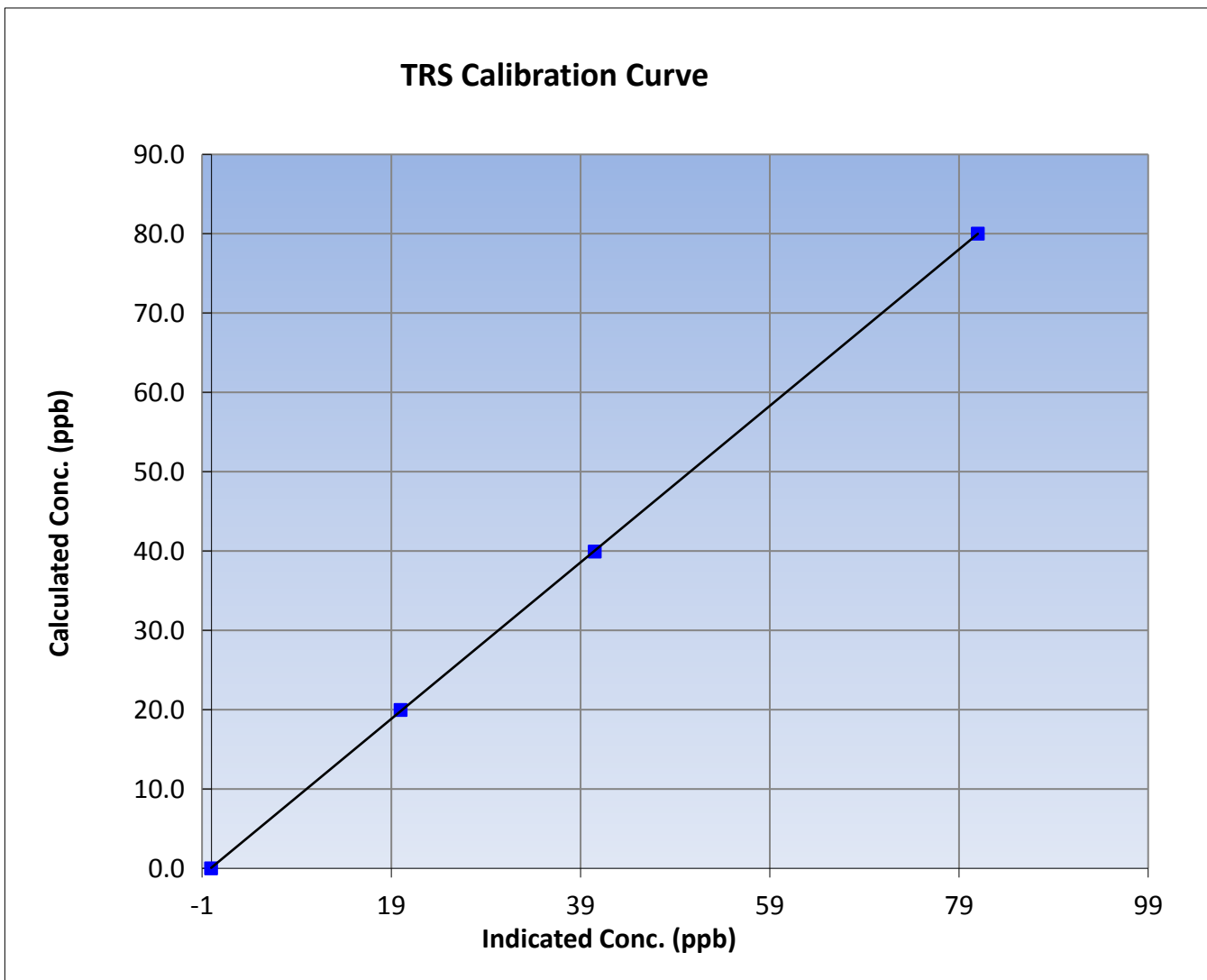
Wood Buffalo Environmental Association TRS Calibration Report

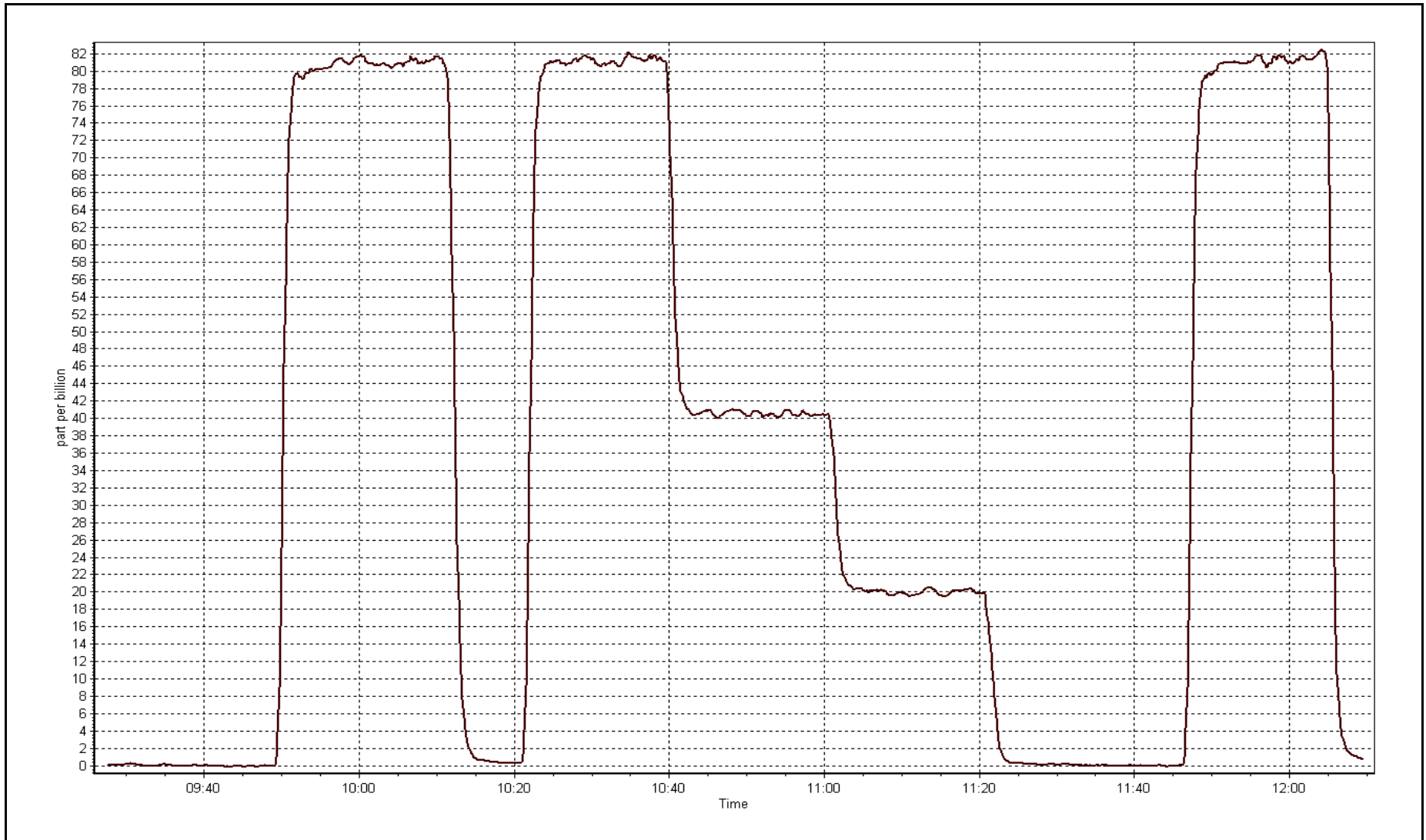
Station Information

Calibration Date	May 11, 2015	Previous Calibration	April 10, 2015
Station Name	AMS 13	Station Number	AMS 13
Start Time (MST)	9:30	End Time (MST)	12:10
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153359

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999990
80.0	81.0	0.9877		
40.0	40.5	0.9865	Slope	0.986401
20.0	20.0	0.9988		
			Intercept	0.096469







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-07-15	Last Calibration	April-02-15
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:15	End Time (MST)	13:15
Gas Cert Reference	S980455A	Cal Gas Expiry Date	26/09/2017
CH4 Cal Gas Conc.	497 ppm	CH4 Equiv Conc.	1033.3 ppm
C3H8 Cal Gas Conc.	195 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG make/model	Teledyne API 701	Serial Number	3410
DACS make/model	Campbell Scientific CR3000	Serial Number	1850

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.0	8.0
Analyzer IP address	192.168.1.51		Air or Bypass Press	36.6	42.5
Calculated slope	1.002959	0.998460	Fuel Pressure	22.6	22.6
Calculated intercept	-0.021824	0.054206	Analyzer Coeff	4.512	4.681
			Analyzer BKG	2.220	1.910
Analyzer make	51i-LT		Analyzer serial #	1236656114	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.12	----
as found span	5000	70.3	14.53	13.74	1.057
calibrator zero	5000	0.0	0.00	-0.01	----
high point	5000	70.3	14.53	14.51	1.001
second point	5000	35.1	7.25	7.21	1.006
third point	5000	17.6	3.64	3.53	1.030
as left zero	5000	0.0	0.00	-0.01	----
as left span	5000	70.3	14.53	14.49	1.003
Average Correction Factor					1.013

Corrected As found	13.62	Previous response	14.51	% change	6.5%
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Notes:

zero and span adjusted, air pressure changed from last month, filter changed out

Calibration Performed By:

Melissa Lemay



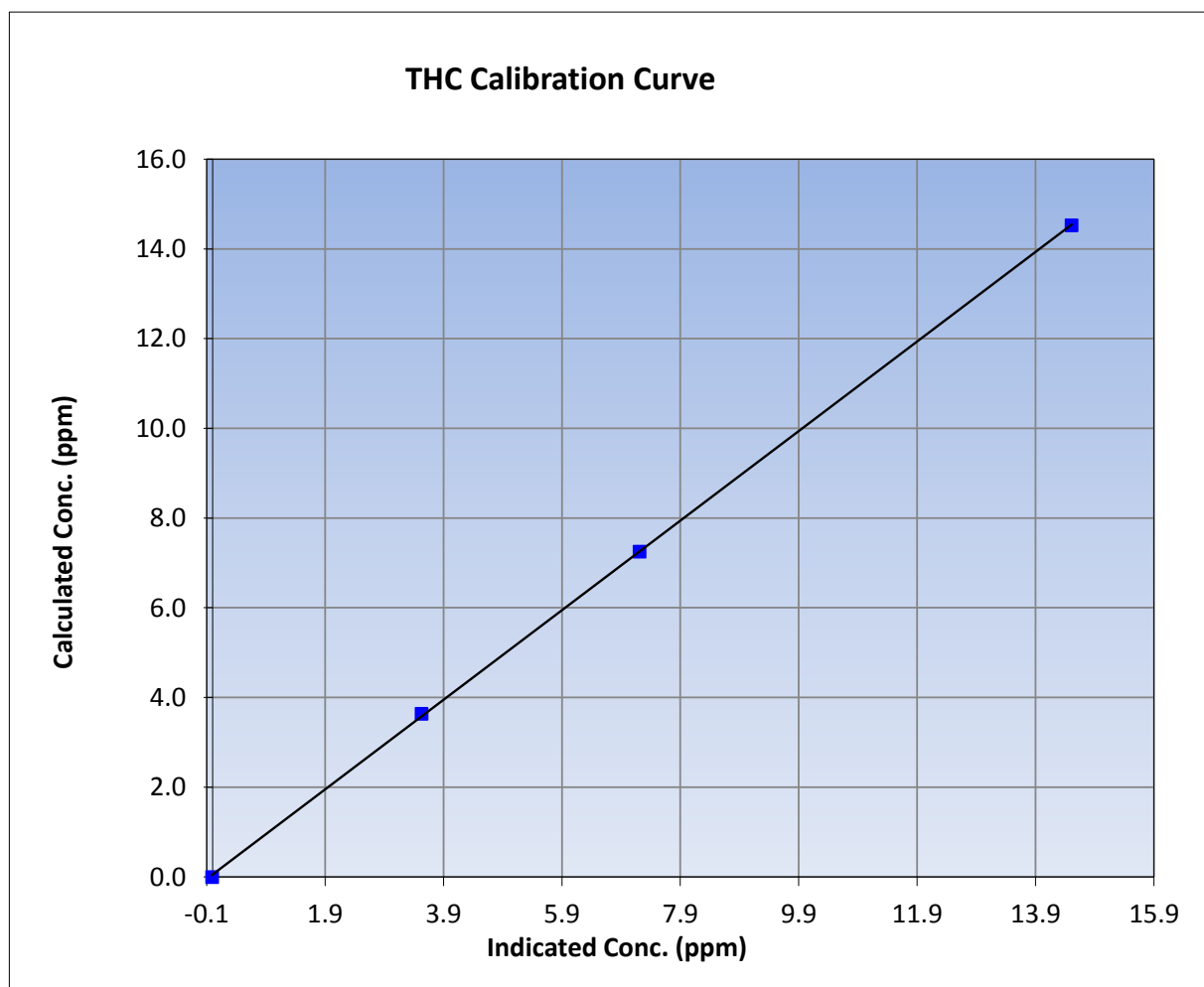
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 7, 2015	Previous Calibration	April 2, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:15	End Time (MST)	13:15
Analyzer make	51i-LT	Analyzer serial #	1236656114

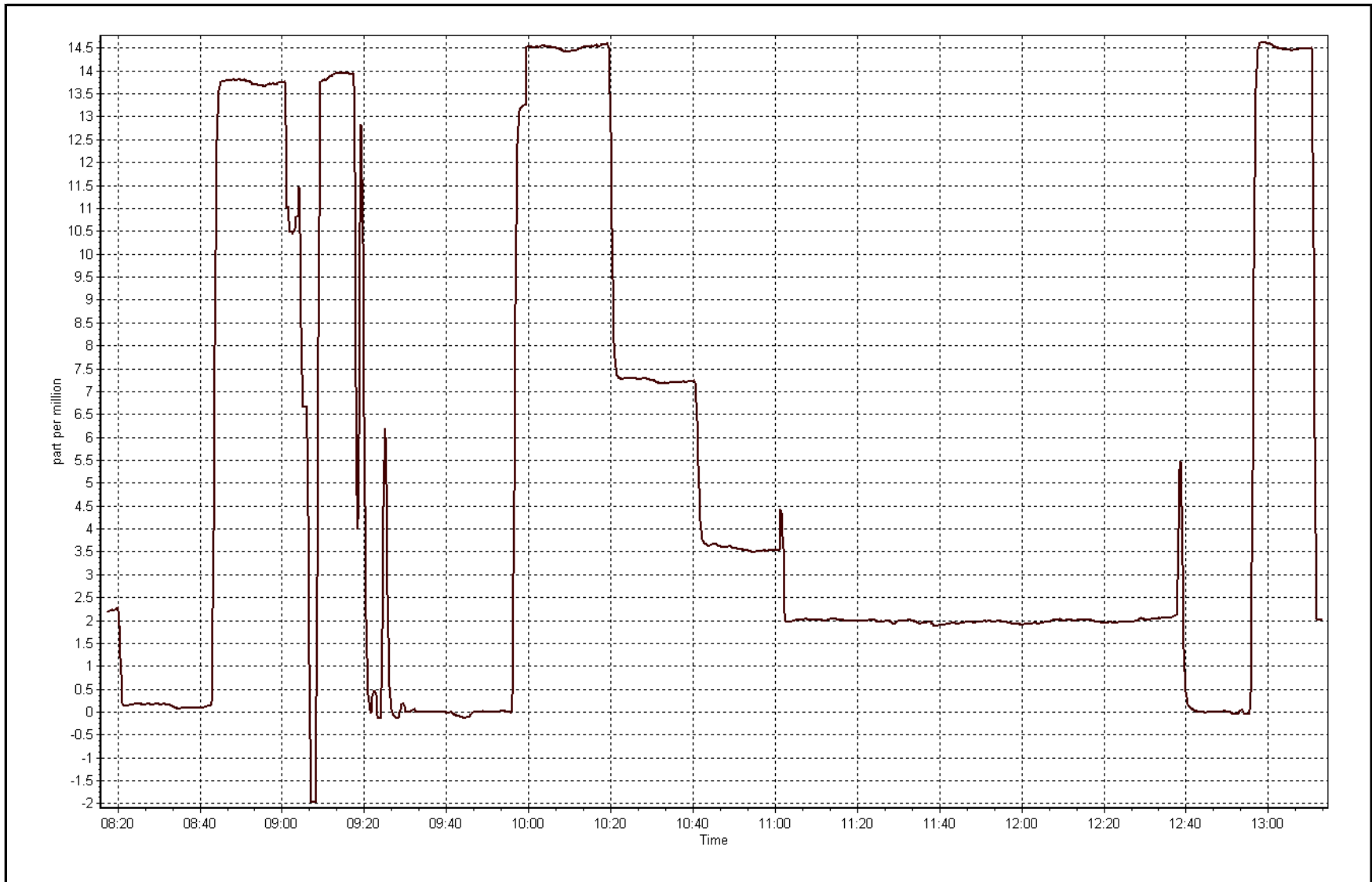
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	----	Correlation Coefficient	0.999952
14.53	14.51	1.0012		
7.25	7.21	1.0060	Slope	0.998460
3.64	3.53	1.0303		
			Intercept	0.054206



THC Calibration Plot

Date: May 7, 2015





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 8, 2015	Previous Calibration	April 9, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	12:23
NO2 GPT Ref date	May-07-15	Transfer Standard	Sabio 4010
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	11041107
DACS make/model	Campbell Scientific CR3000	Serial Number	3410
		Serial Number	1850

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Box temp.	26.8	24.8
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	1.002209	1.003485	Pressure	26.5	26.7
Calculated intercept	-0.697667	-1.031494	Flow	742	754
Analyzer Background	-0.1	-0.1	Intensity	2996.2	2967.0
Analyzer Coefficient	1.034	0.991			

Analyzer make	API T400	Analyzer serial #	825
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.4	----
as found span	5000	0.90	324.6	346.4	0.937
calibrator zero	5000	0.00	0.0	0.4	----
high point	5000	0.90	324.6	323.8	1.002
second point	5000	0.58	193.1	194.4	0.993
third point	5000	0.36	101.9	103.0	0.989
as left zero	5000	0.00	0.0	0.3	----
as left span	5000	0.90	324.6	331.0	0.981
Average Correction Factor					0.995

Corrected As found	346.0	Previous response	324.6	% change	-6.2%
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Notes:

checked diaganstics flow changed from last month; did a big adjustment up last month, changed filter, span adjusted

Calibration Performed By: Melissa Lemay



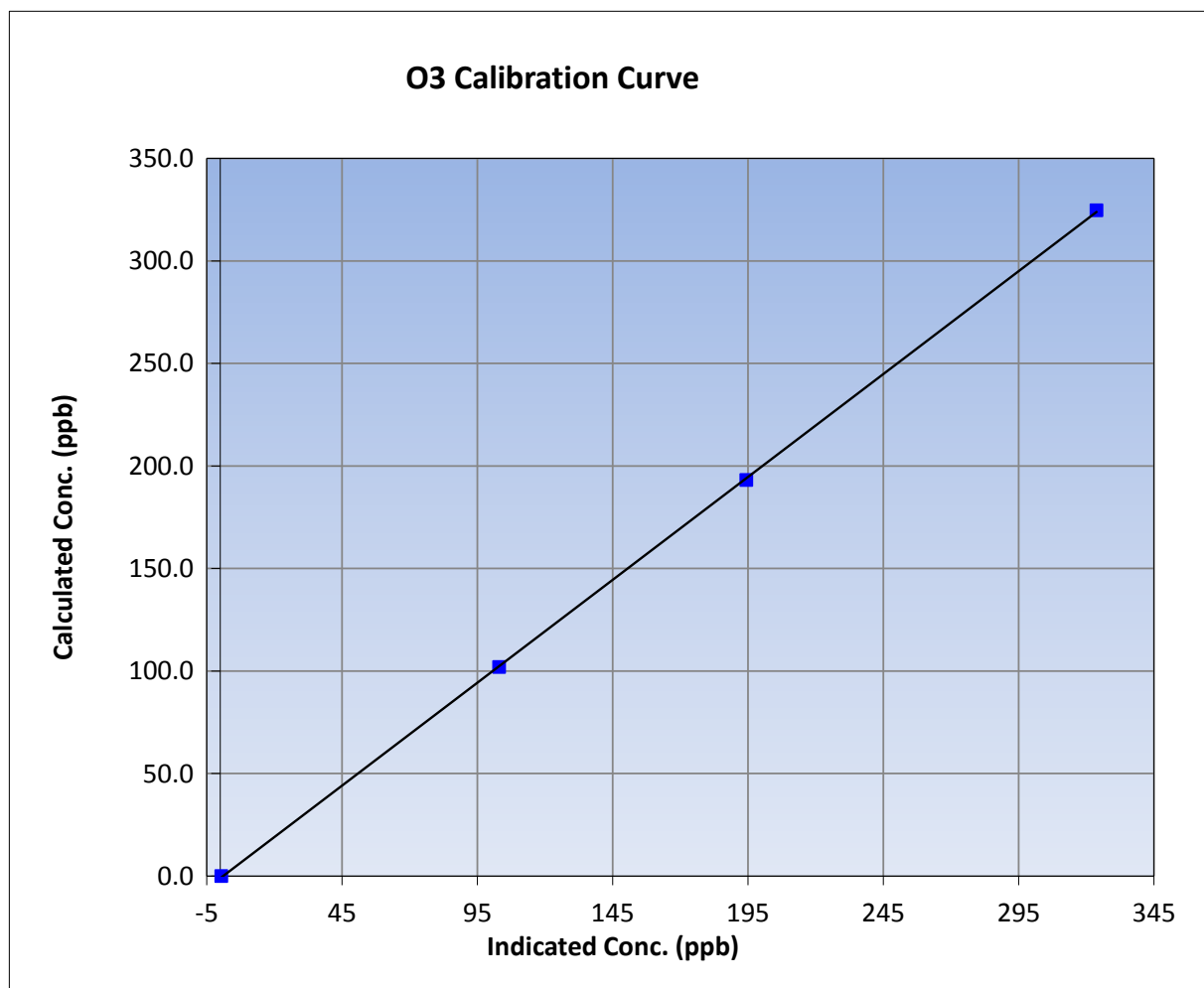
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	May-08-15	Previous Calibration	April 9, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	9:45	End Time (MST)	12:23
Analyzer make	API T400	Analyzer serial #	825

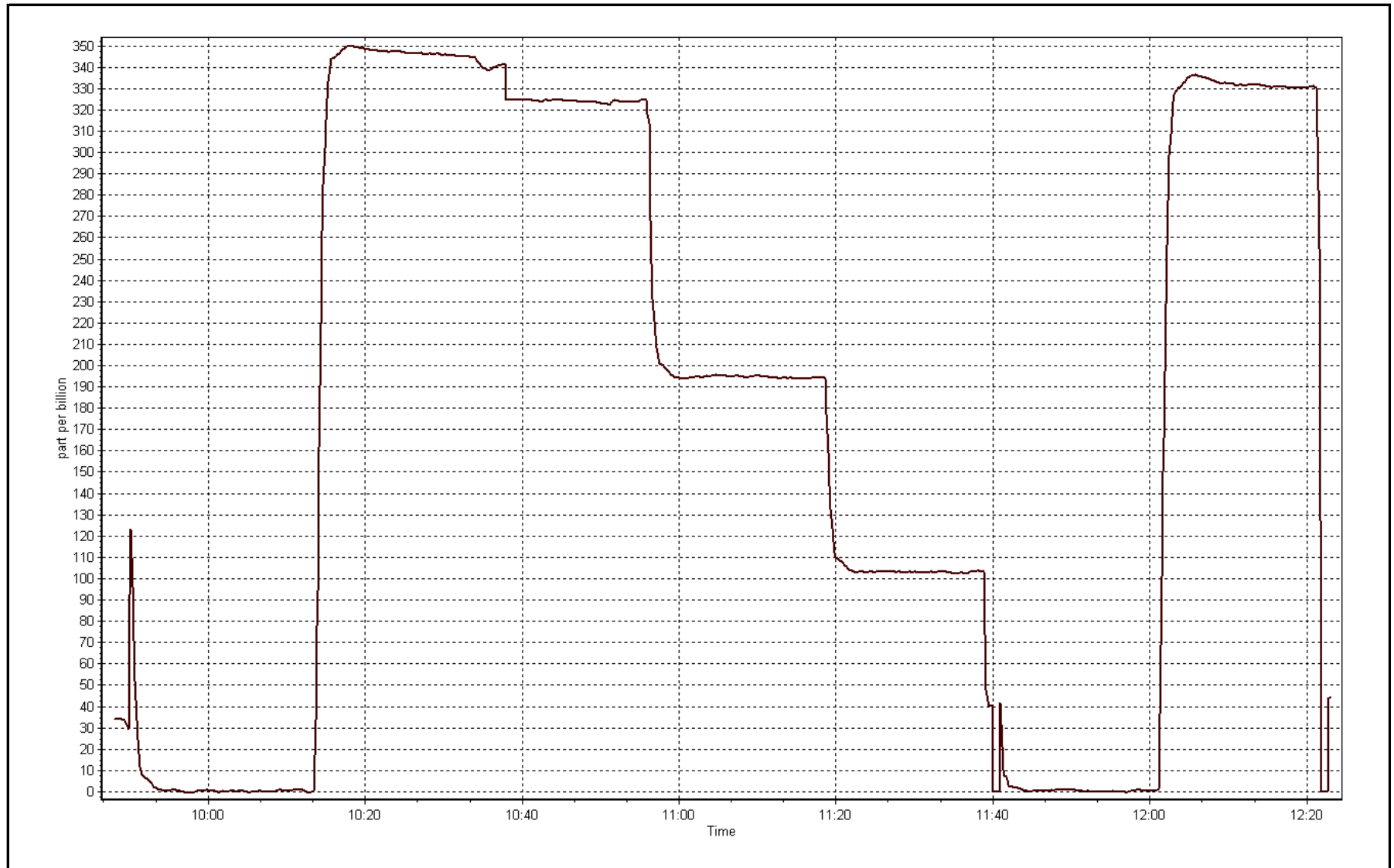
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999965
324.6	323.8	1.0025		
193.1	194.4	0.9933	Slope	1.003485
101.9	103.0	0.9893		
			Intercept	-1.031494



O3 Calibration Plot

Date: May 8, 2015





Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 7, 2015	Previous Calibration	April 2, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:15	End Time (MST)	13:15
NO Cal Gas Conc	56.9 ppm	Gas Cert Reference	S980455A
NOx Cal Gas Conc	56.9 ppm	Cal Gas Expiry Date	26/9/2017
Calibrator	Sabio 4010	Serial Number	11041107
Zero air Generator	Teledyne API T701	Serial Number	3410

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	1850
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998929	1.001752	0.993054
	Data Offset	1.441219	1.352688	0.368073
Current Calibration	Data Slope	0.999357	1.001596	0.994863
	Data Offset	1.399100	1.289606	-0.442808

Analyzer Information

Analyzer make/model	42i	Analyzer serial #	1410661329
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.708		0.708	
NOx coefficient	0.998		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	6.3		6.3	
NOx bkgrnd	6.4		6.4	
Chamber Temp	50.3	Deg C	50.6	Deg C
Moly Temp	322.6	Deg C	324.5	Deg C
PMT voltage	-846.6	V	-846.9	V
PMT Temp	-2.7	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	180.9	mmHg	181.2	mmHg
R Cell Press Nox	181.2	mmHg	180.6	mmHg
NO sample flow	0.904	lpm	0.904	lpm
Nox sample Flow	0.908	lpm	0.905	lpm

Notes:

No adjustments or maintenance done, filter changed out



Wood Buffalo Environmental Association

NO_x Calibration Summary

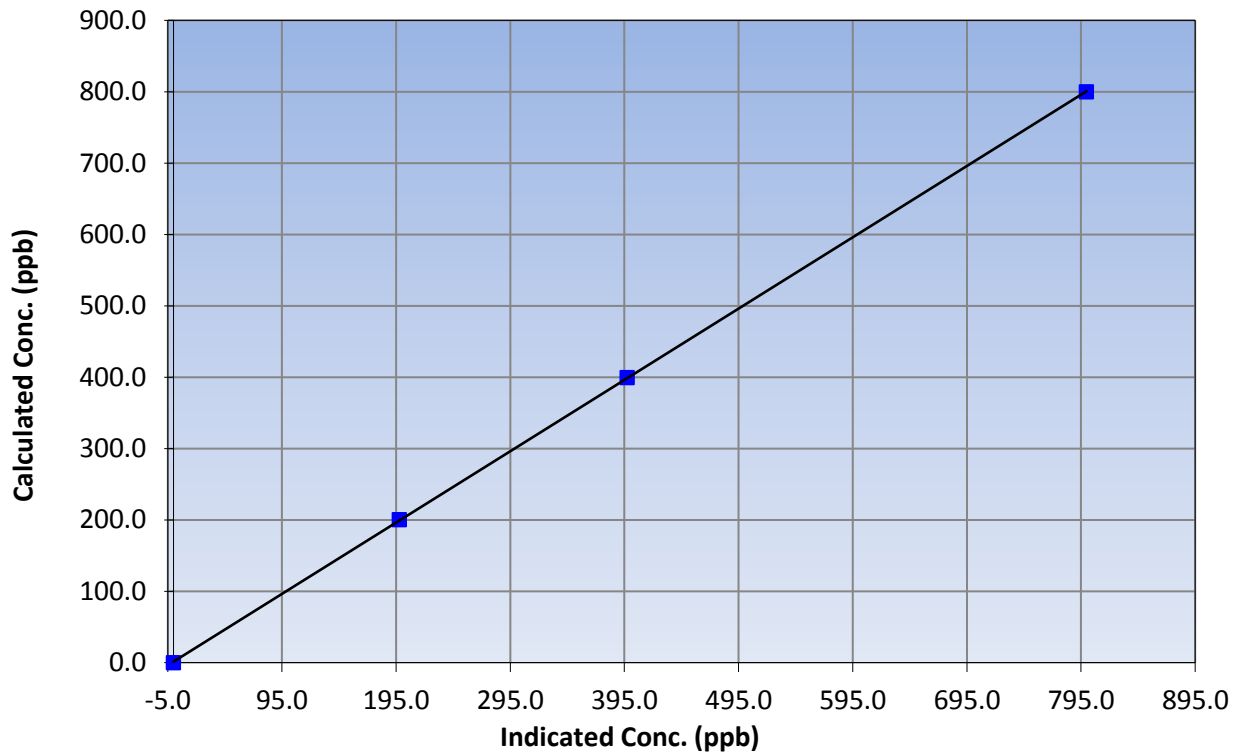
Station Information

Calibration Date	May 7, 2015	Previous Calibration	April 2, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:15	End Time (MST)	13:15
Analyzer make	42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999989
800.0	799.8	1.0003		
399.4	397.5	1.0049	Slope	0.999357
200.3	197.9	1.0121		
			Intercept	1.399100

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

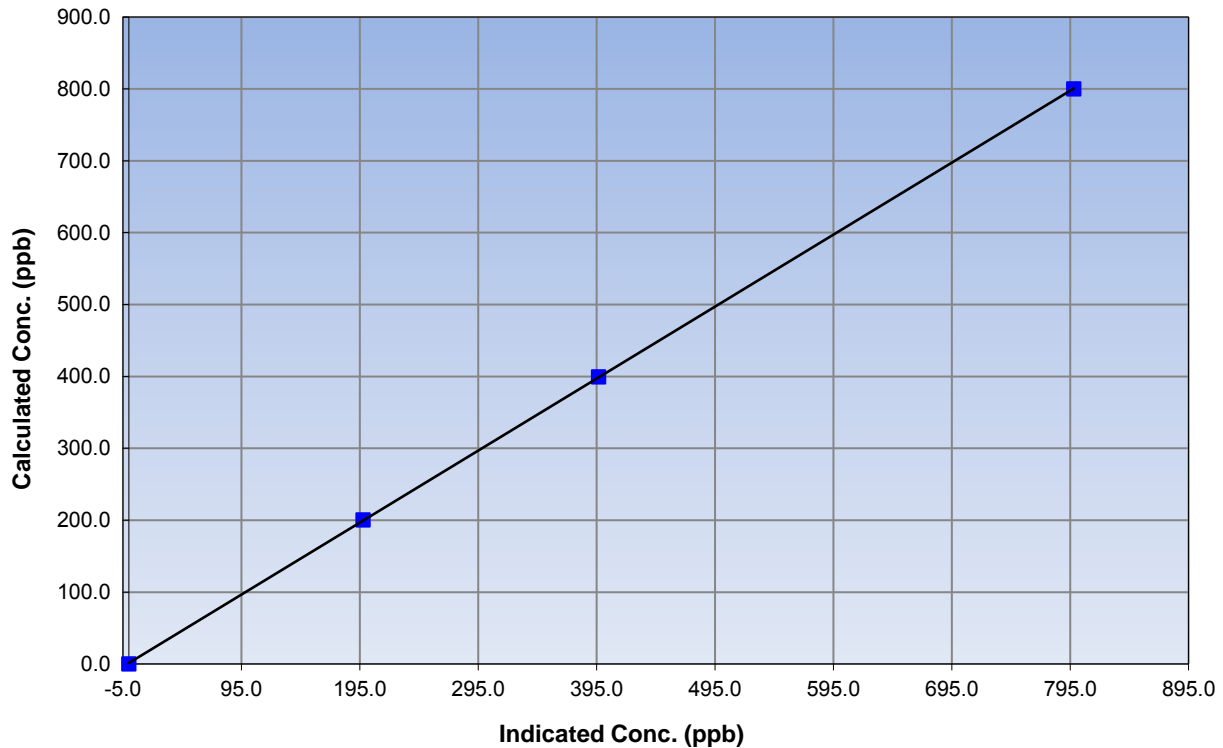
Station Information

Calibration Date	May 7, 2015	Previous Calibration	April 2, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:15	End Time (MST)	13:15
Analyzer make	42i	Analyzer serial #	1410661329

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999990
800.0	798.1	1.0024		
399.4	396.7	1.0069	Slope	1.001596
200.3	197.7	1.0131		
			Intercept	1.289606

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

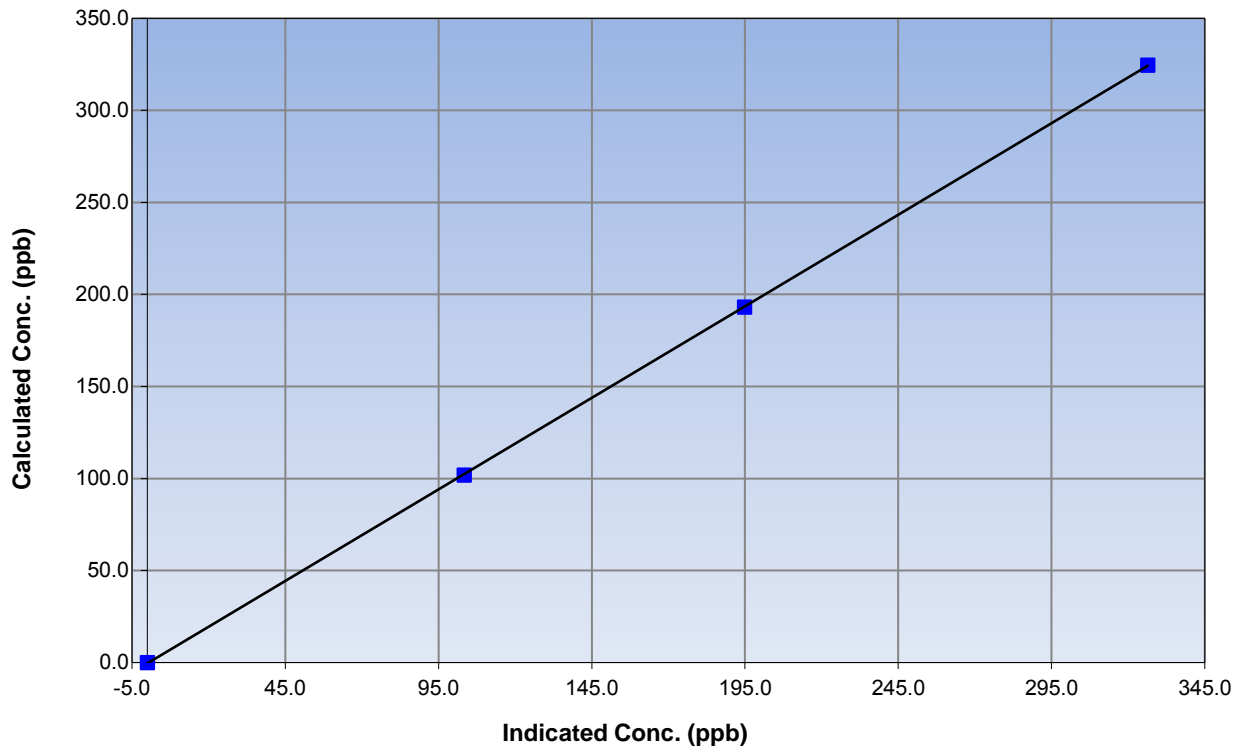
Station Information

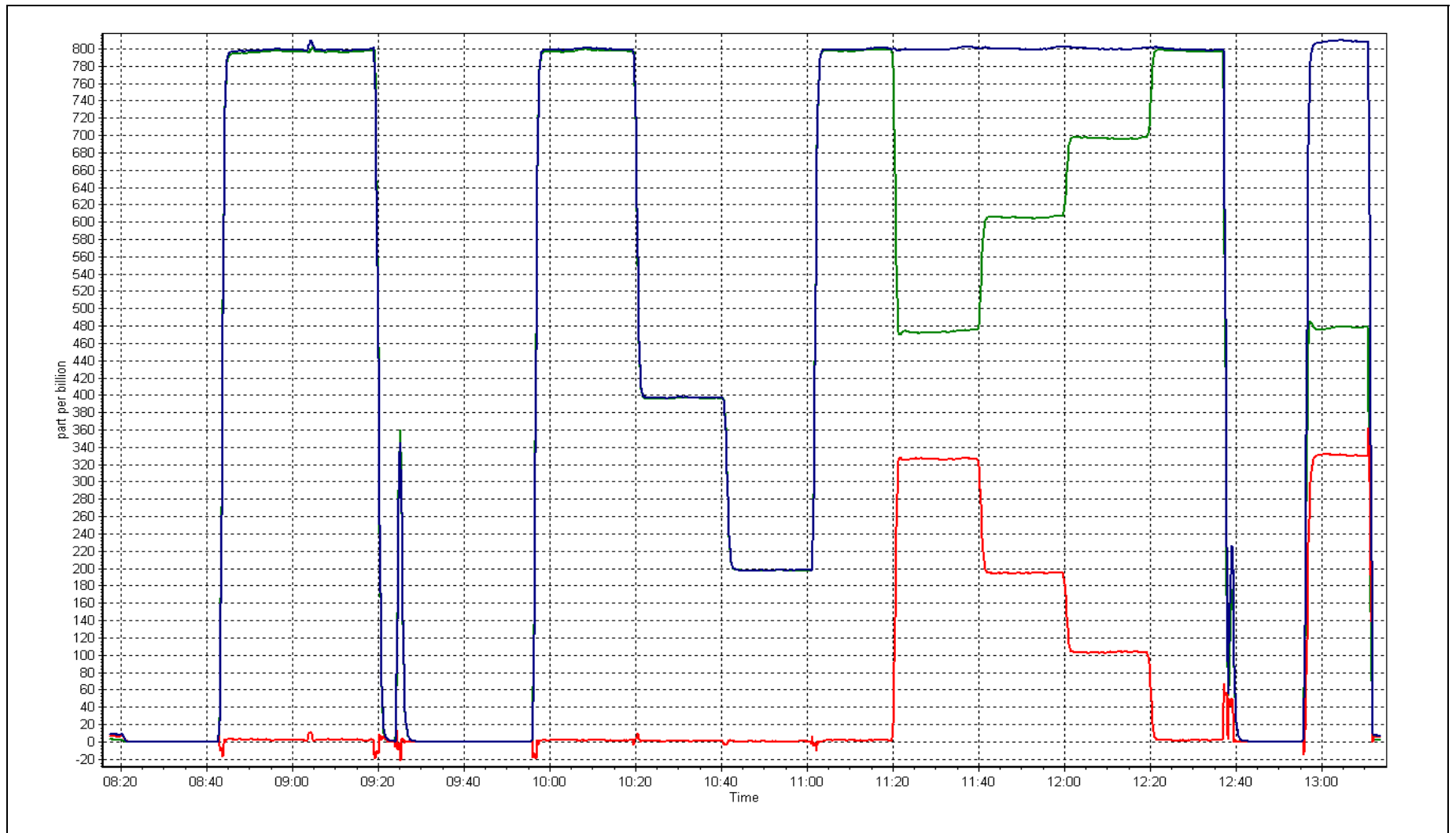
Calibration Date	May 7, 2015	Previous Calibration	April 2, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:15	End Time (MST)	13:15
Analyzer make	42i	Analyzer serial #	1410661329

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
324.6	326.4	0.9945		
193.1	194.8	0.9913	Slope	0.994863
101.9	103.4	0.9855		
			Intercept	-0.442808

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CONFORMANCE TEST

STATION INFORMATION

Calibration Date:	<u>May 11, 2015</u>	Previous Calibration:	<u>April 10, 2015</u>
Station Name:	<u>Fort McKay South</u>	Station Number:	<u>AMS 13</u>
Start Time (MST):	<u>12:09</u>	End Time (MST):	<u>12:35</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>N/A</u>

SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number:	<u>E-803</u>
Source SN:	<u>4173</u>
HEPA PN:	<u>12144</u>
Time Correct (MST):	<u>Yes</u>
Parameters Checked:	<u>T1, P3, Main Flow, Neph</u>

AUDIT DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	20.0	20.0	0.0	20.0
T2	24.0	na	na	24.0
T3	23.0	na	na	23.0
T4	24.0	na	na	24.0
RH (%)	21.0	na	na	21.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	983	985.0	2.0	983

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	980	-20	1000	1000

Nephelometer Calibration

Parameter	As Found	adjusted (Limit +/- 2.0ug/m3)	As Left
Analog	322		326
Neph	6.7		-0.3
C14	9	yes	10.6
Indicated Concentration (ug/m3)	1.5		-0.1
Offset 1	326		325.7
Offset 2	42.9		44

Leak Check (Quarterly)

Leak Check Date:	Previous Leak Check Date:
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Measured

Difference LPM (Limit +/- 0.42 LPM)

Flow without adaptor (LPM):	
Flow with adaptor [turn off pump first](LPM):	0.00

Mass Foil Calibration (Annualy)

Foil Calibration Date:	Previous Foil Calibration:
Zeroed?:	<u>NO</u>
Foil Mass:	<u>1507</u>
Previous Correction Factor:	<u>6970</u>
New Correction Factor:	<u>6979</u>
	<u>Mass foil set S/N:</u>

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

zero and flow adjusted, sample head cleaned

Audit Performed By:	<u>Melissa Lemay</u>
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Wood Buffalo Environmental Association

WS/WD Calibration Report

Station Information

Calibration Date	May-27-15	Previous Calibration	October-22-14
Station Number	AMS 13	Station Location	Fort Mackay South
Reason:	<input checked="" type="checkbox"/> Routine	<input type="checkbox"/> Installation	<input type="checkbox"/> Removal
	<input type="text"/> Other:		
Start Time (MST)	7:55	End Time (MST)	8:35
Barometric Pressure	729 mm Hg	Station Temperature	23.1 Deg C
WS Calibrator	Met One 053-120	Serial Number	K13090

WIND SPEED

Sensor make/model	Met One 010C	Sensor serial #	N14664
DACS make	Campbel Scientific CR3000	DACS serial No.	1850
DACS voltage range		DACS channel #	
	<u>Before</u>		<u>After</u>
DACS slope		DACS slope	
DACS intercept		DACS intercept	
Calculated slope	1.010937411	Calculated slope	0.991938
Calculated intercept	-0.645115244	Calculated intercept	0.181139

Wind Speed Calibration Data

Shaft RPM	Actual Speed (K/hr)	Indicated Speed (K/hr)	Correction factor
0	0	0.0	n/a
100	10.6	10.2	1.0392
200	20.162	20.1	1.0026
400	39.359	39.4	0.9990
600	58.555	59.5	0.9841
800	77.752	77.8	0.9994
Average Correction Factor			1.0049

WIND DIRECTION

Sensor make/model	Met One 020C	Sensor serial #	N13744
DACS make	Campbel Scientific CR3000	DACS serial No.	1850
DACS voltage range		DACS channel #	
	<u>Before</u>		<u>After</u>
DACS slope		DACS slope	
DACS intercept		DACS intercept	
Calculated slope	1.000727267	Calculated slope	1.005384
Calculated intercept	0.16931019	Calculated intercept	-1.733214

Wind Direction Calibration Data

Physical Direction (Degrees)	Indicated Direction (Degrees)	Correction factor
0	1.1	n/a
90	91.0	0.9890
180	181.5	0.9917
270	272.1	0.9923
360	358.1	1.0053
Average Correction Factor		0.9946

Notes:

Calibration Performed By: Melissa Lemay & Shinsie Tiempo



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

**AMS 14
ANZAC
MAY 2015**

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

June 29, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MAY 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	707	37	37	100.00	5	0	1	0
TRS(ppb) Average	707	37	37	100.00	4	0	0	0
THC(ppm) Average	705	37	39	99.73	3.3	-	2.1	-
NMHC(ppm) Average	705	37	39	99.73	0.149	-	0.065	-
CH4(ppm) Average	705	37	39	99.73	3.2	-	2	-
NO2(ppb) Average	707	37	37	100.00	17	0	2	-
NO(ppb) Average	707	37	37	100.00	16	-	1	-
NOX(ppb) Average	707	37	37	100.00	32	-	3	-
O3(ppb) Average	708	36	36	100.00	61	0	52	-
PM2.5(ug/m3) Average	742	0	2	99.73	174.9	-	27.3	0
Temperature 2 m (C) Average	744	0	0	100.00	27.5	-	19.3	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	91	-
Surface Wetness (% of range) Average	744	0	0	100.00	54	-	16	-
Wind Speed 10 m (km/h) Average	733	0	11	98.52	18	-	11	-
Wind Direction 10 m (deg) Average	733	0	11	98.52	-	-	-	-
Precipitation (mm) Total	744	0	0	100.00	2.8	-	7.1	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2(ppb) Average	707	0.4	1	-	0	0	0	0	0	1	5
TRS(ppb) Average	707	0.3	0	-	0	0	0	0	0	0	4
THC(ppm) Average	705	1.9	0.1	-	1.8	1.9	1.9	1.9	1.9	1.9	3.3
NMHC (ppm) Average	705	0.009	0.023	-	0	0	0	0	0	0	0.149
CH4(ppm) Average	705	1.89	0.1	-	1.8	1.8	1.9	1.9	1.9	1.9	3.2
NO2(ppb) Average	707	1.2	1	-	0	0	0	1	1	2	17
NO(ppb) Average	707	0.2	1	-	0	0	0	0	0	1	16
NOX(ppb) Average	707	1.4	2	-	0	0	0	1	2	3	32
O3(ppb) Average	708	38.7	12	-	9	21	29	39	48	55	61
PM2.5(ug/m3) Average	742	6.44	12.9	-	0.3	1	1.7	2.7	6.9	12.7	174.9
Temperature 2 m (C) Average	744	10.34	7.9	-	-4.1	0.3	3.9	9.3	16.3	21.6	27.5
Relative Humidity (%) Average	744	49.2	25	-	12	19	28	46	68	89	98
Surface Wetness (% of range) Average	744	2.3	8	-	0	0	0	0	0	6	54
Wind Speed 20 m (km/h) Average	733	7.3	3	-	0	3	5	7	9	12	18
Wind Direction 20 m (deg) Average	733	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	16.26	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)
MAY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
CH4, NMHC, THC	15 May 2015 11:00	15 May 2015 12:00	2	Maintenance - replaced carrier gas cylinder
PM2.5	27 May 2015 14:00	27 May 2015 15:00	2	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	06 May 2015 21:00	07 May 2015 07:00	11	Flat line in sensor output signal



Summary of Hour Averages

Anzac - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 5 ppb on May 12 21:00	Maximum Daily Average: 1.0 ppb on May 9		Hours of Data:	707
Minimum Value: 0 ppb on May 2 03:00	Minimum Daily Average: 0.1 ppb on May 26		Hours of Missing Data:	37
Maximum Diurnal Average: 0.9 ppb at hour 11	Minimum Diurnal Average: 0.2 ppb at hour 5		Hours of Calibration:	37
Monthly Average: 0.4 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 3		Percent Operational Time:	100.0

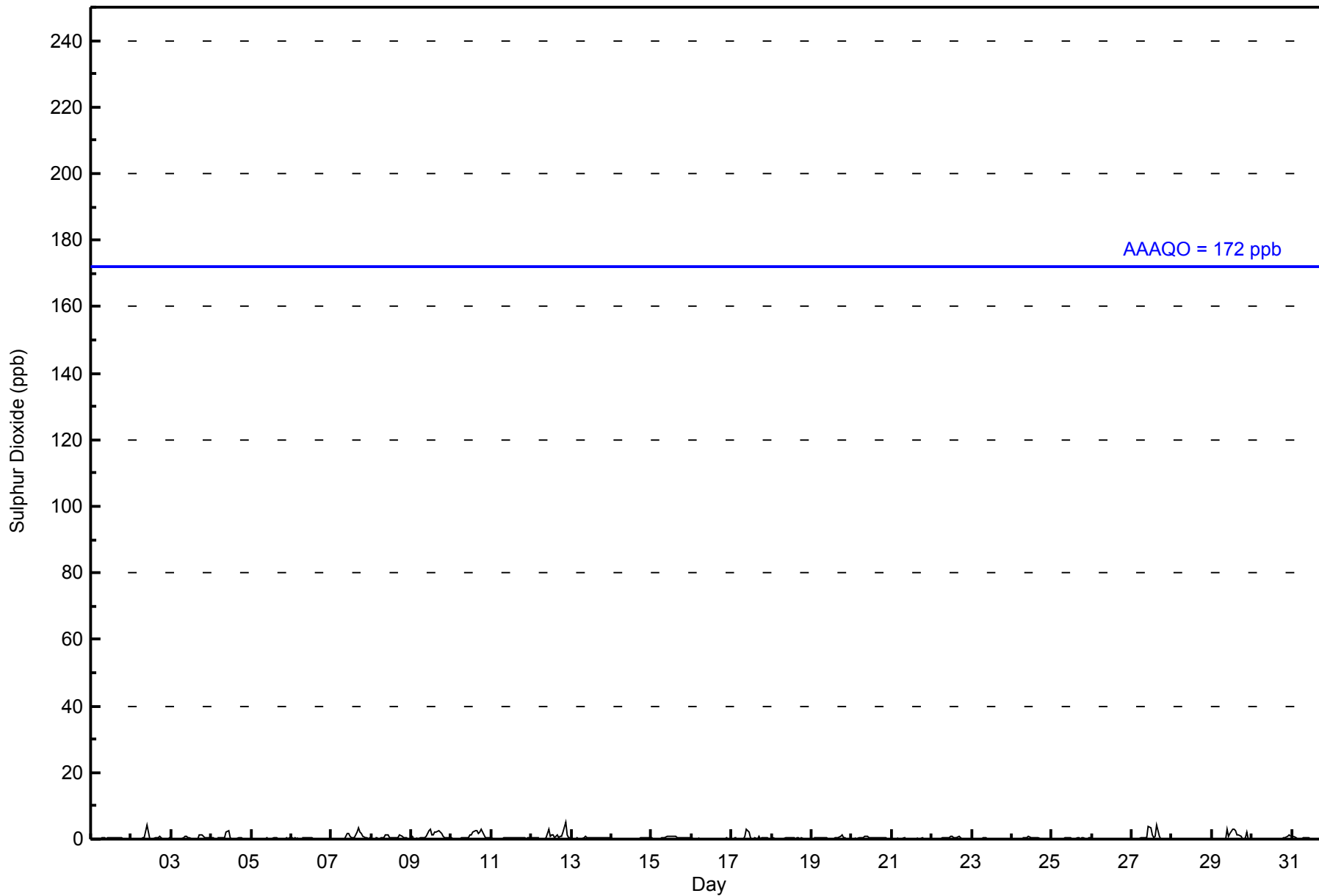
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
2-May	0	Z	0	0	0	0	0	0	1	4	2	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0.5	4																						
3-May	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0.4	1																						
4-May	0	0	0	Z	0	0	0	0	0	2	3	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0.4	3																						
5-May	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																						
6-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
7-May	Z	0	0	0	0	0	0	0	0	2	2	1	0	0	1	2	3	2	2	1	0	0	0	0	0	0.8	3																						
8-May	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0.5	1																						
9-May	1	0	Z	0	0	0	0	0	0	1	2	3	1	1	2	2	2	2	2	1	0	0	0	0	0	1.0	3																						
10-May	0	0	0	Z	0	0	0	0	0	0	0	1	1	2	3	2	2	2	3	1	0	0	0	0	0	1.0	3																						
11-May	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																						
12-May	0	0	0	0	0	Z	0	0	0	1	3	1	1	1	1	1	0	1	1	2	5	1	0	0	0	0.9	5																						
13-May	Z	0	0	0	0	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0.4	1																						
14-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
15-May	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	0.4	1																						
16-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
17-May	0	0	0	0	Z	0	0	0	1	3	2	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0.5	3																						
18-May	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																						
19-May	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0.3	1																						
20-May	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
21-May	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	--	0																						
22-May	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0.3	1																						
23-May	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																						
24-May	0	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
25-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																						
26-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
27-May	0	0	Z	0	0	0	0	0	0	0	4	3	1	0	1	4	1	0	0	0	0	0	0	0	0	0.7	4																						
28-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																						
29-May	0	0	0	0	Z	0	0	0	0	3	1	2	3	3	3	1	1	1	0	0	0	2	0	0	0	0.9	3																						
30-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.2	1																							
31-May	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																						
																								0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.8	0.9	0.6	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.4	0.4	0.3	0.2	0.2	Diurnal Average	
																								1	1	0	0	0	0	0	1	1	4	4	3	3	3	3	4	3	2	3	2	5	2	1	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Anzac - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	707	100.00	100.00
11 - 20	0	0.00	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Anzac - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	65	36	37	33	24	28	47	81	49	38	65	36	30	65	27	36	697
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	65	36	37	33	24	28	47	81	49	38	65	36	30	65	27	36	697

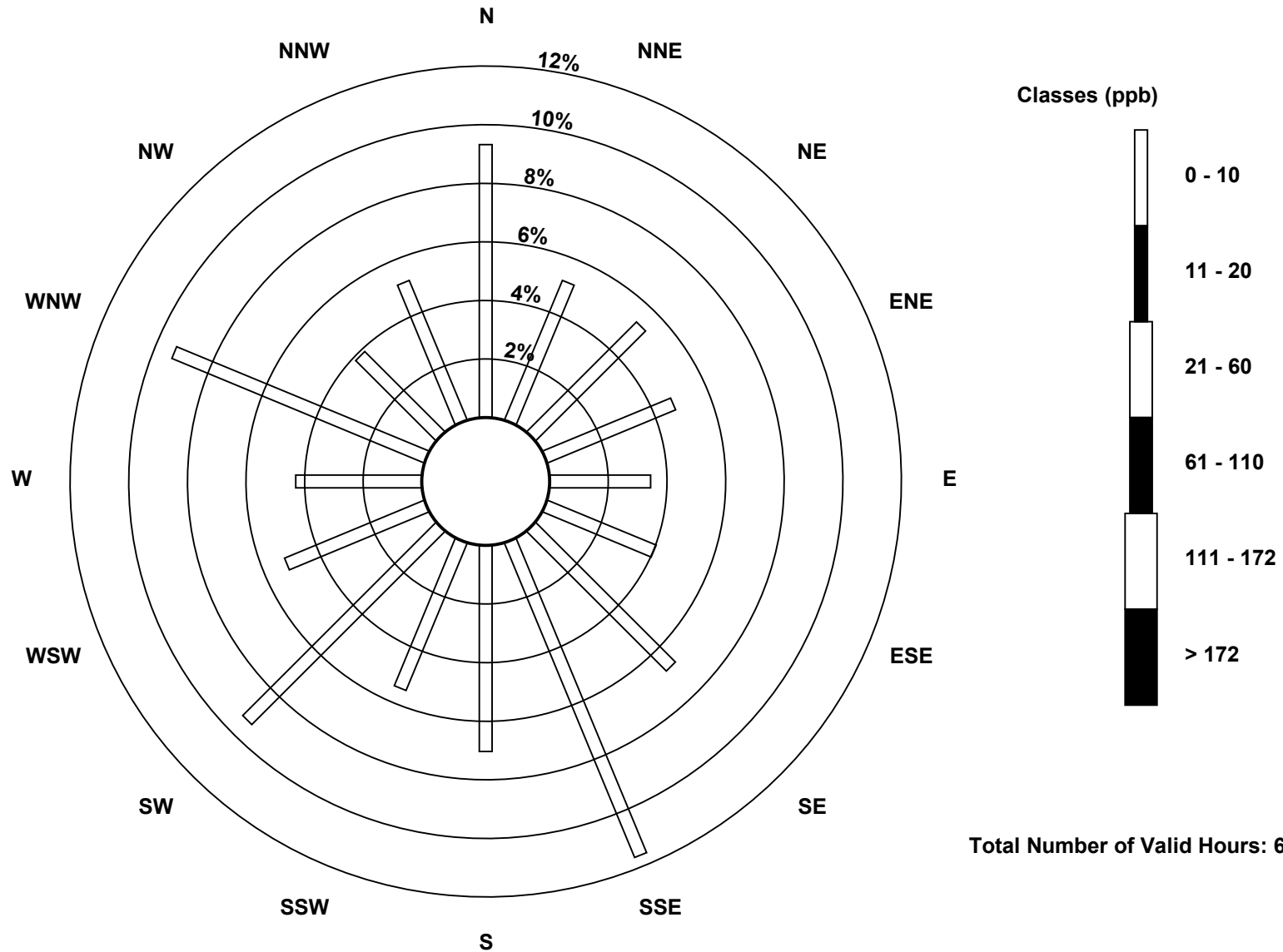
Total Number of Valid Hours: 697

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

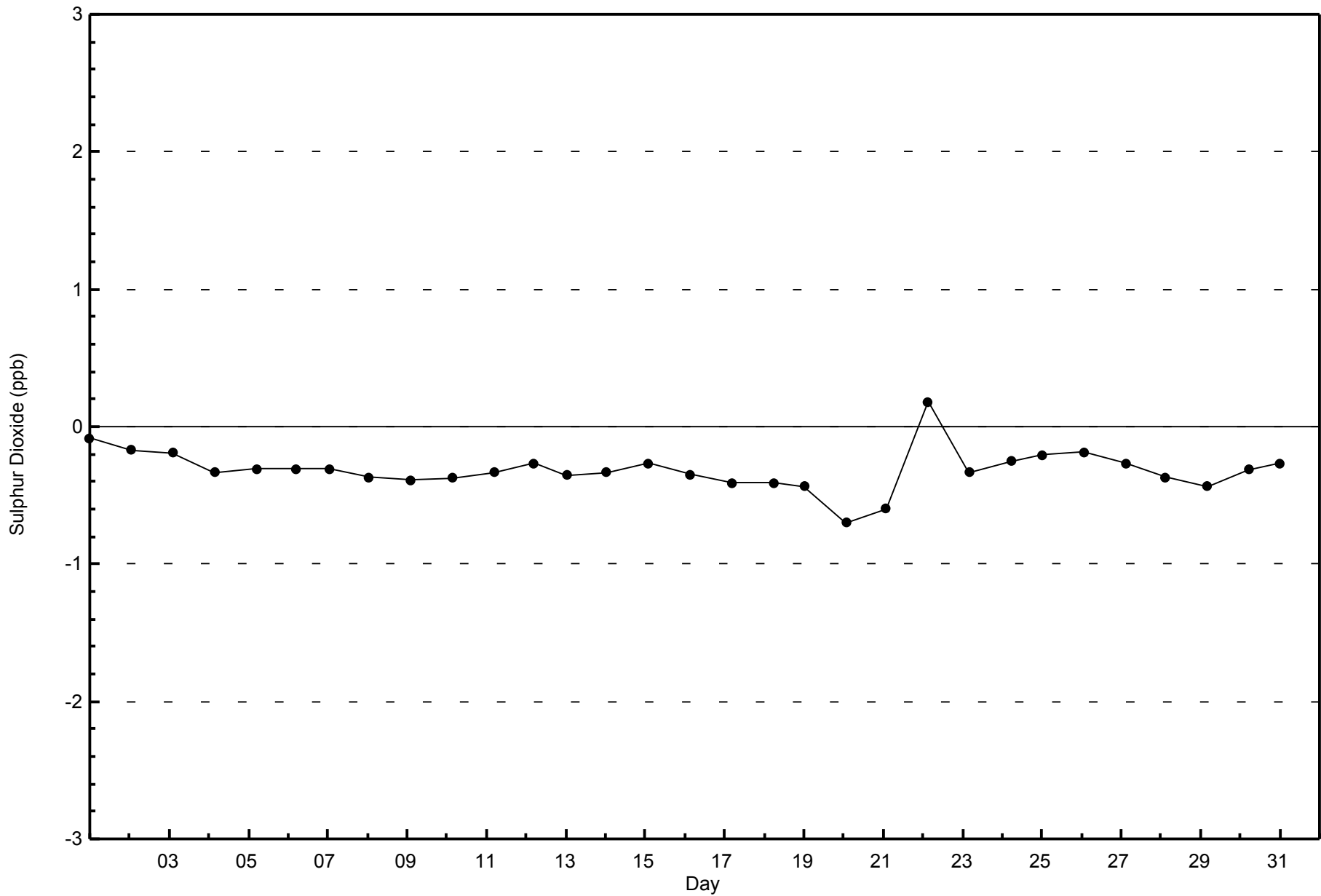
Sulphur Dioxide (SO₂) - ppb
Anzac (AMS 14)





WBEA
Zero Responses

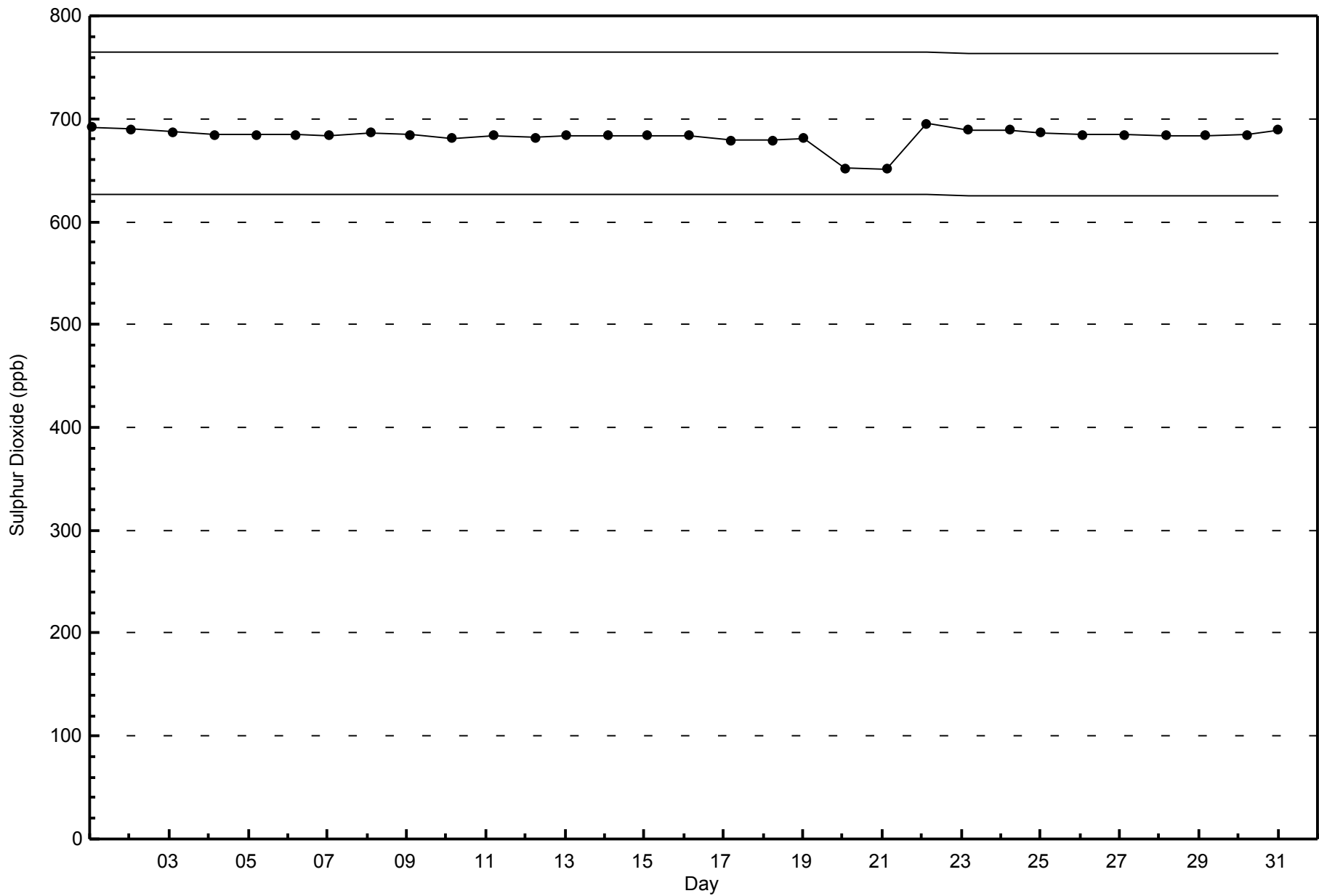
Sulphur Dioxide (SO₂) - ppb
Anzac - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Anzac - May 2015





Summary of Hour Averages

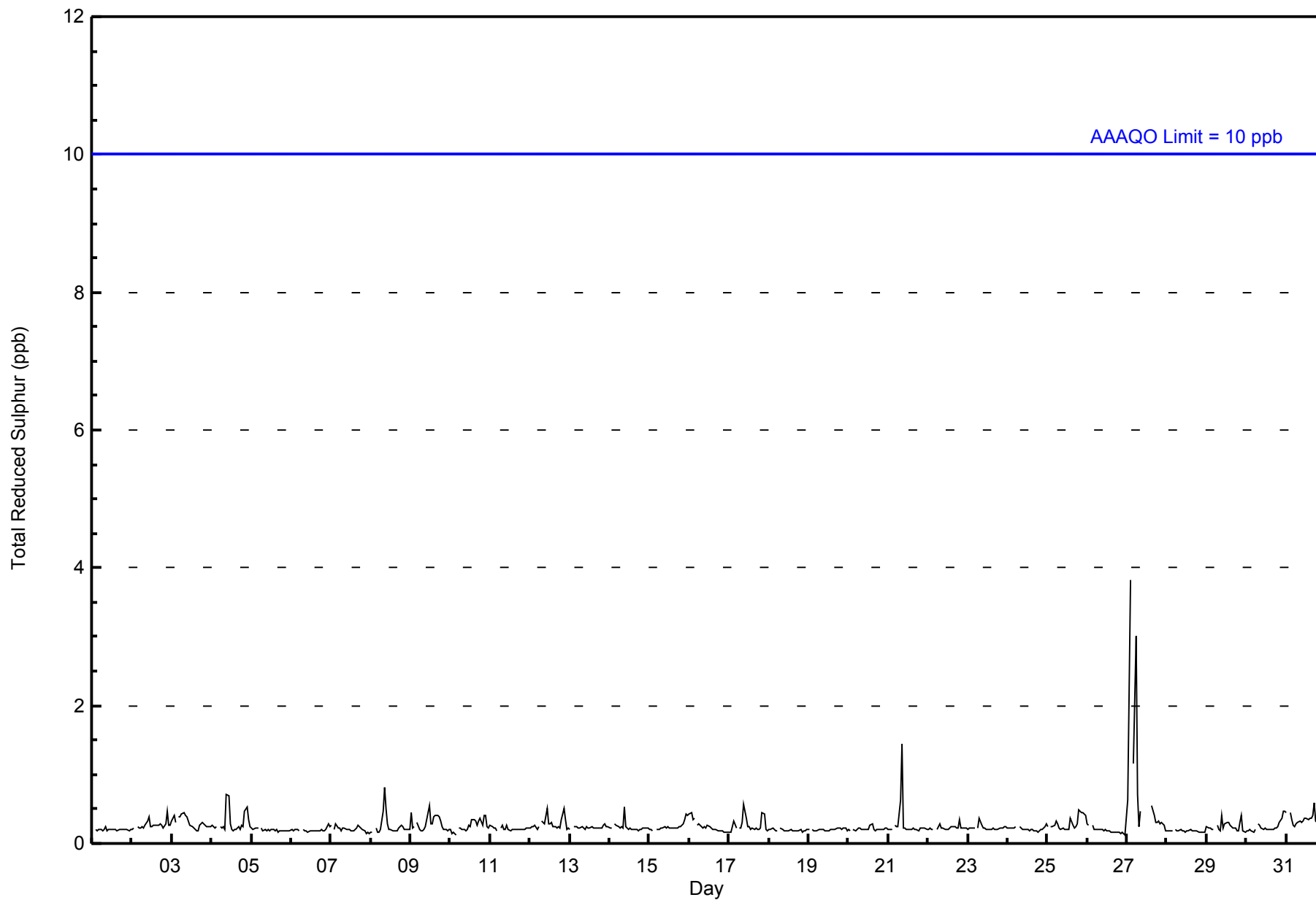
Anzac - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																																							
Maximum Value: 4 ppb on May 27 03:00										Maximum Daily Average: 0.3 ppb on May 31										Hours of Data: 707																													
Minimum Value: 0 ppb on May 10 04:00										Minimum Daily Average: 0.2 ppb on May 28										Hours of Missing Data: 37																													
Maximum Diurnal Average: 0.4 ppb at hour 3										Minimum Diurnal Average: 0.2 ppb at hour 13										Hours of Calibration: 37																													
Monthly Average: 0.3 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1										Percent Operational Time: 100.0																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	0	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
3-May	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																							
4-May	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1																							
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
6-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
7-May	0	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-May	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
9-May	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
10-May	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																							
11-May	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-May	0	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1																							
13-May	0	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-May	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
15-May	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																							
16-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
17-May	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
18-May	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																							
19-May	0	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-May	0	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-May	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
22-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
23-May	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																							
24-May	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																							
25-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
26-May	0	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-May	1	2	4	Z	1	3	1	0	0	C	C	C	C	C	C	1	0	0	0	0	0	0	0	0	--	4																							
28-May	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																							
29-May	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																							
30-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
31-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1																							
																								0.3	0.3	0.4	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	Diurnal Average	
																								1	2	4	0	1	3	1	1	1	1	1	1	0	0	0	1	0	1	0	0	1	1	0	0	Diurnal Maximum	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																	



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Anzac - May 2015





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	705	99.72	99.72
3 - 4	2	0.28	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
Anzac - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	64	36	37	32	24	27	46	80	50	40	64	39	30	64	26	36	695
3 - 4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	64	36	37	32	24	27	46	82	50	40	64	39	30	64	26	36	697

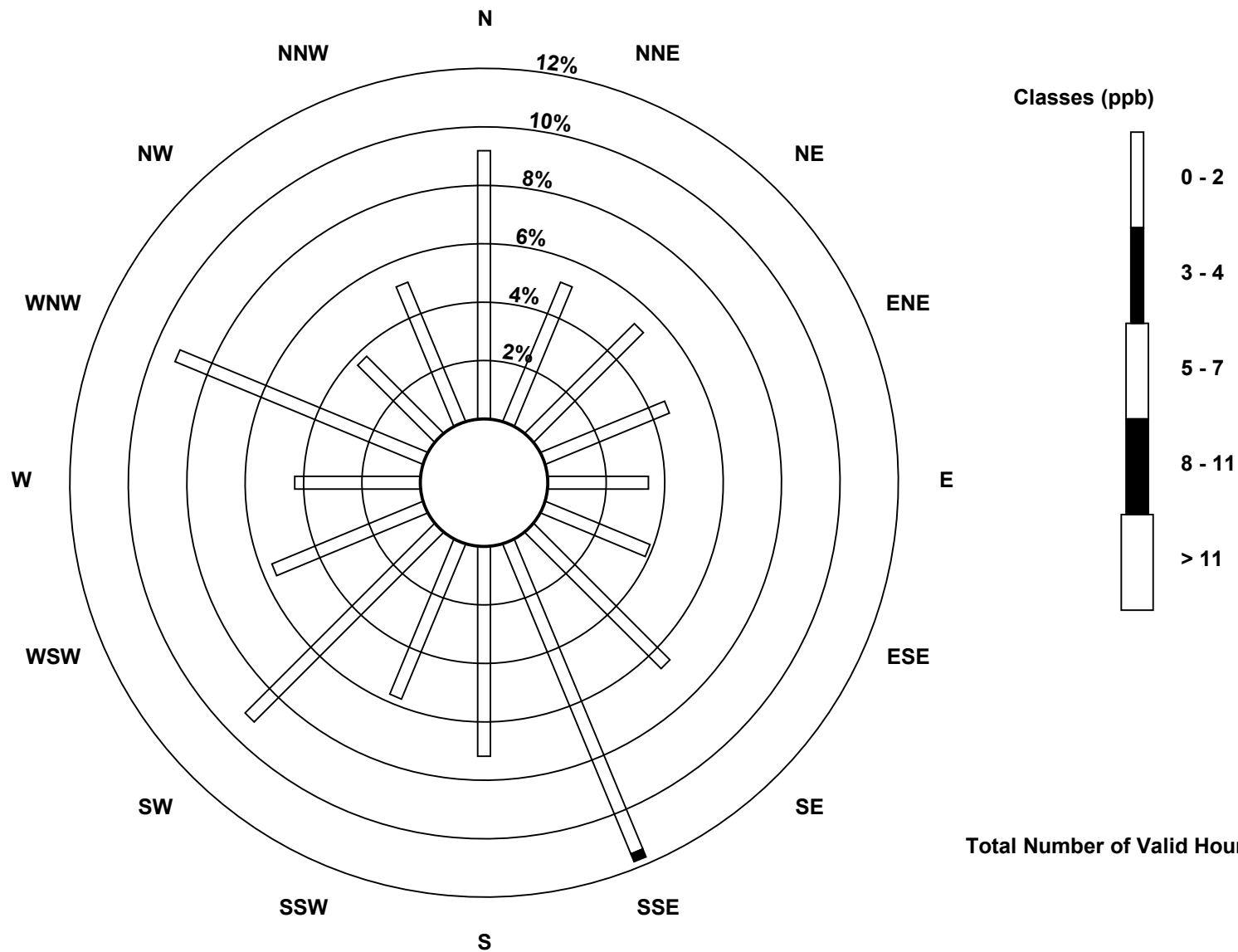
Total Number of Valid Hours: 697

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Total Reduced Sulphur (TRS) - ppb
Anzac (AMS 14)



Total Number of Valid Hours: 697

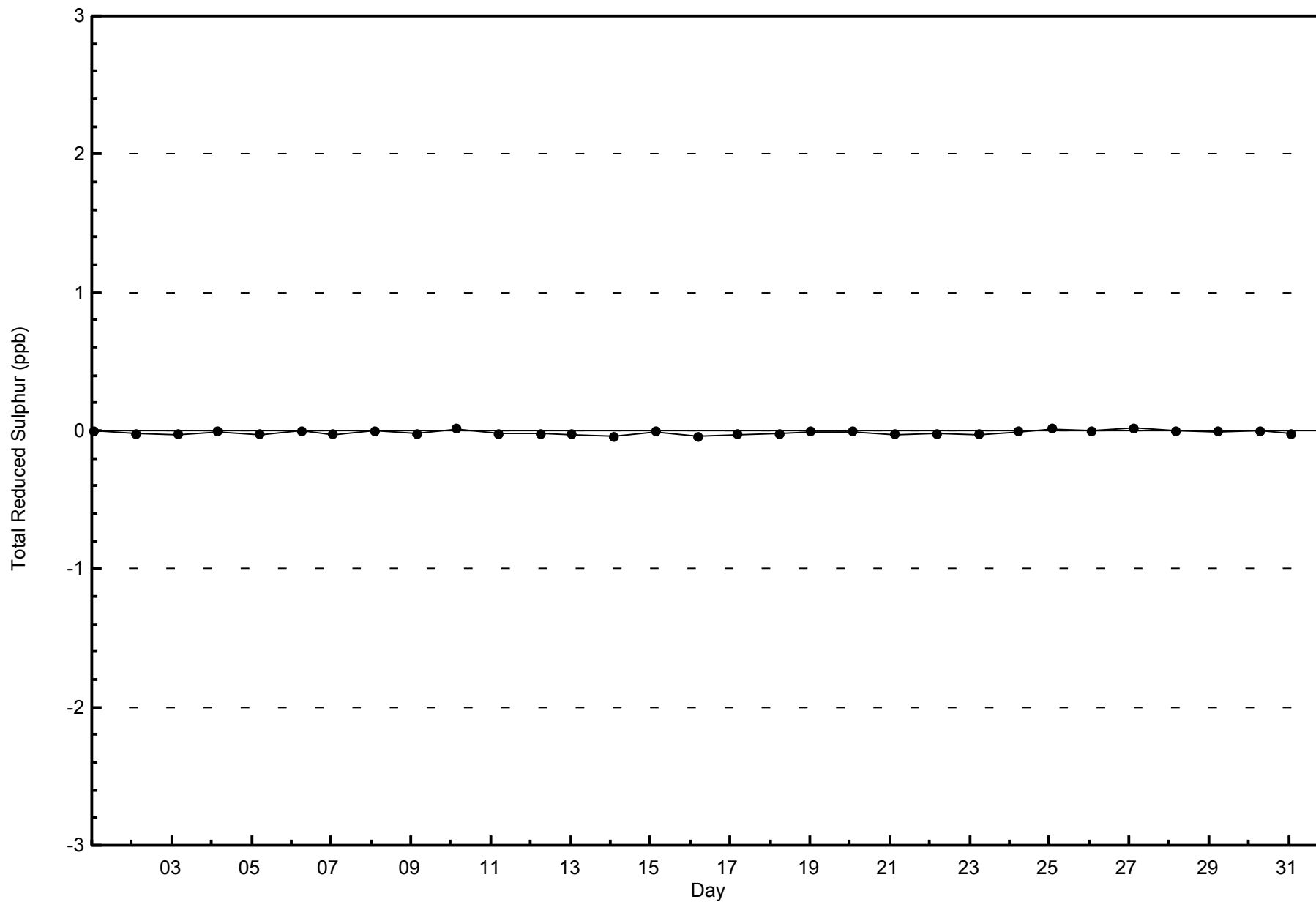


WBEA

Zero Responses

Total Reduced Sulphur (TRS) - ppb

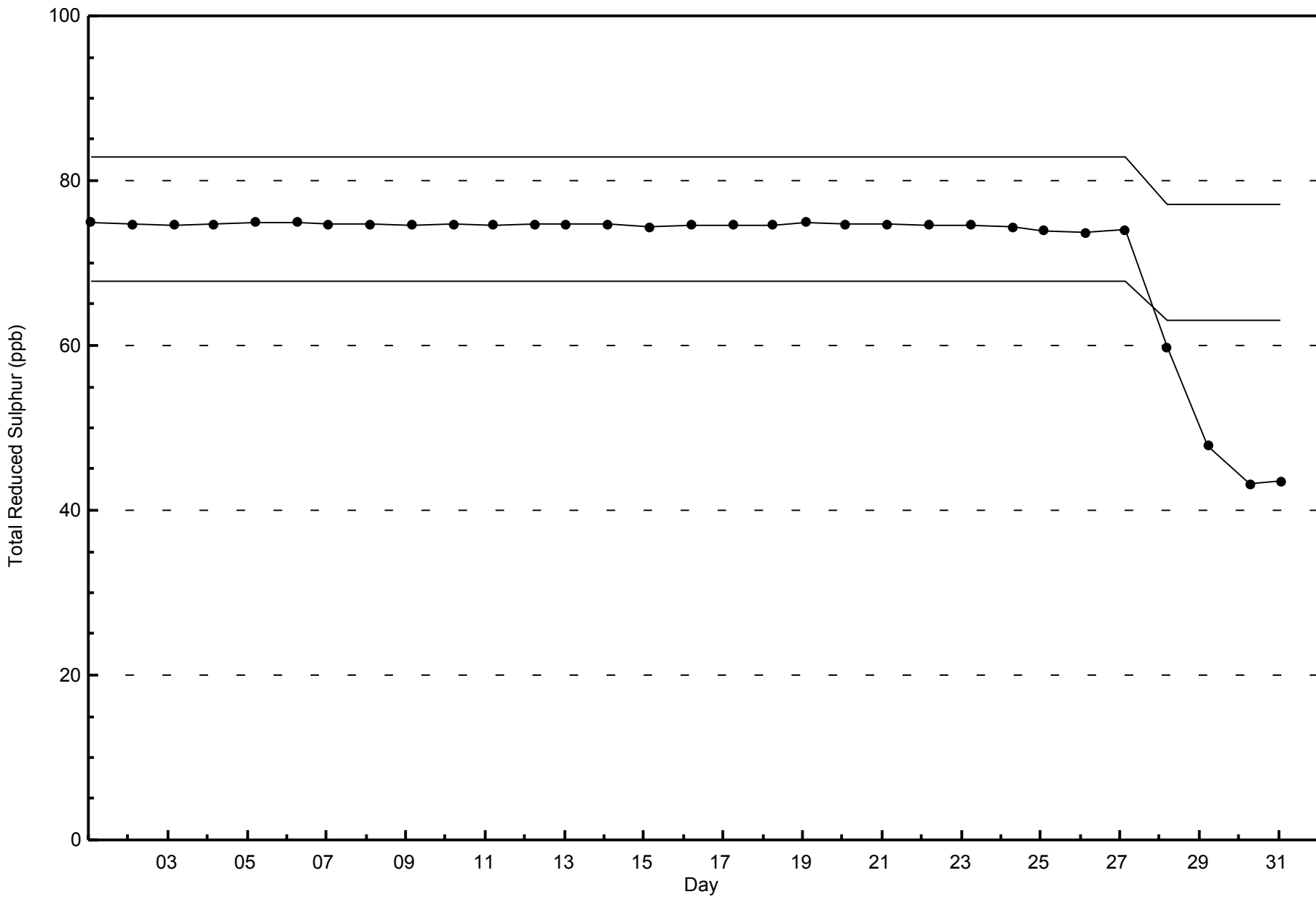
Anzac - May 2015





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
Anzac - May 2015



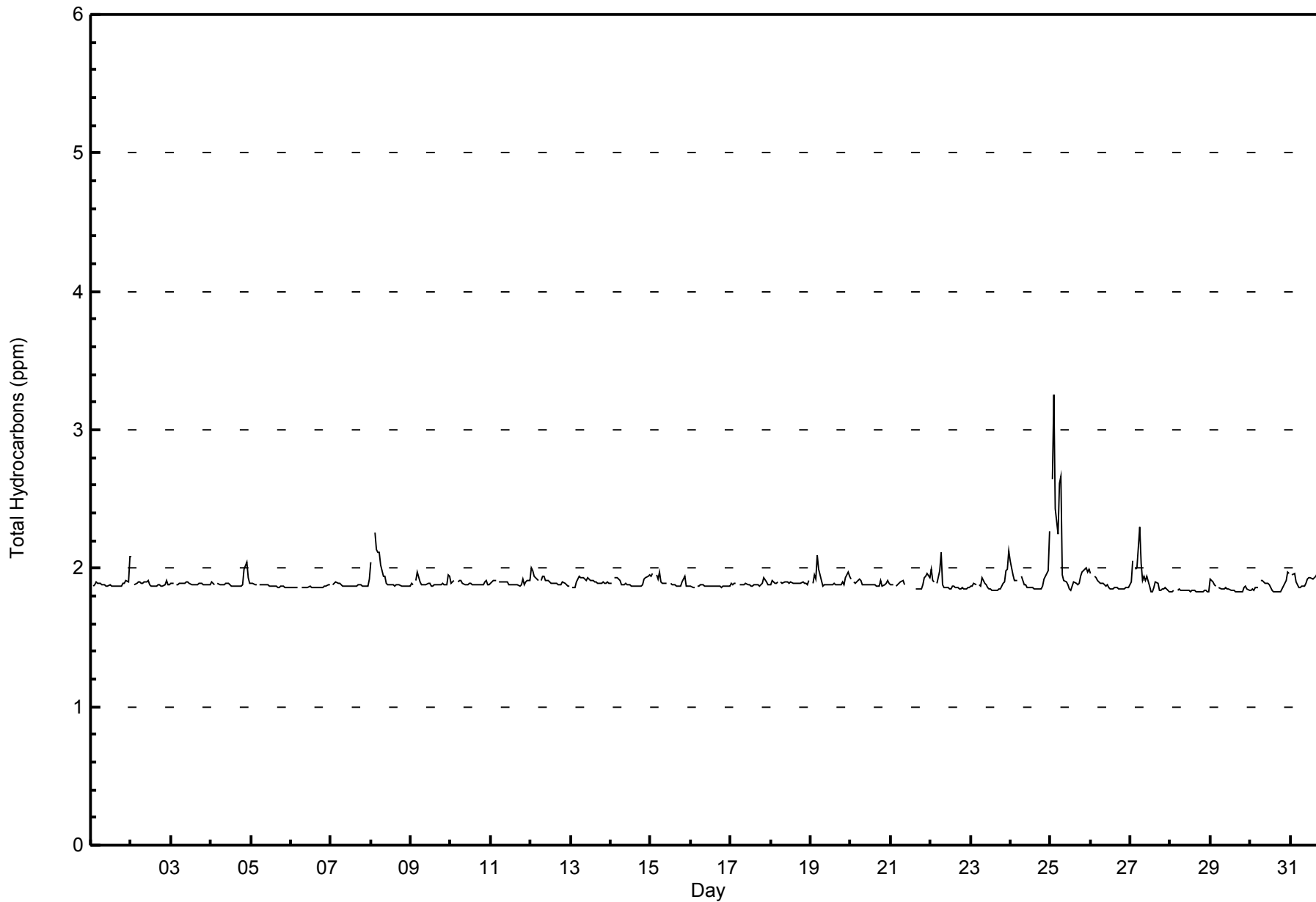


Maximum Value: 3.3 ppm on May 25 03:00																			Maximum Daily Average: 2.1 ppm on May 25						Hours in Service: 744		
Minimum Value: 1.8 ppm on May 30 17:00																			Minimum Daily Average: 1.8 ppm on May 28						Hours of Data: 705		
Maximum Diurnal Average: 2.0 ppm at hour 3																			Minimum Diurnal Average: 1.9 ppm at hour 18						Hours of Missing Data: 39		
Monthly Average: 1.90 ppm																			Percentiles: P ₁ = 1.8 P ₁₀ = 1.9 Q ₁ = 1.9 Median = 1.9 Q ₃ = 1.9 P ₉₀ = 1.9 P ₉₉ = 2.2						Hours of Calibration: 37		
																									Percent Operational Time: 99.7		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	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	2.1	1.9	2.1	
2-May	2.1	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	2.1
3-May	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
4-May	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0
5-May	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
6-May	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
7-May	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
8-May	2.0	Z	2.3	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	1.9	1.9	1.9	1.9	1.9	2.3
9-May	1.9	1.9	Z	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0
10-May	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
11-May	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
12-May	2.0	2.0	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
13-May	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
14-May	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	2.0	1.9	1.9	1.9	2.0
15-May	1.9	2.0	Z	1.9	1.9	2.0	1.9	1.9	1.9	1.9	M	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
16-May	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
17-May	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
18-May	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
19-May	Z	1.9	2.0	1.9	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.1
20-May	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
21-May	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	--	2.0	
22-May	2.0	1.9	1.9	Z	1.9	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	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
23-May	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.1	1.9	2.1	
24-May	2.1	2.0	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	1.8	1.9	1.9	1.9	2.0	2.3	1.9	1.9	2.3	
25-May	Z	2.6	3.3	2.4	2.3	2.6	2.7	2.0	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1	3.3
26-May	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
27-May	1.9	2.1	Z	2.0	2.0	2.3	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.8	1.9	1.8	1.8	1.9	1.9	2.3
28-May	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
29-May	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.8	1.9	1.9	1.9
30-May	1.8	1.8	1.8	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	1.9	1.9	2.0
31-May	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Anzac - May 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	686	97.30	97.31
2.1 - 3.0	18	2.55	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
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Anzac - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	65	36	37	33	24	28	46	80	43	32	63	33	30	63	27	36	676
2.1 - 3.0	0	0	0	0	0	0	1	1	5	6	2	3	0	0	0	0	18
3.1 - 10.0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	65	36	37	33	24	28	47	81	49	38	65	36	30	63	27	36	695

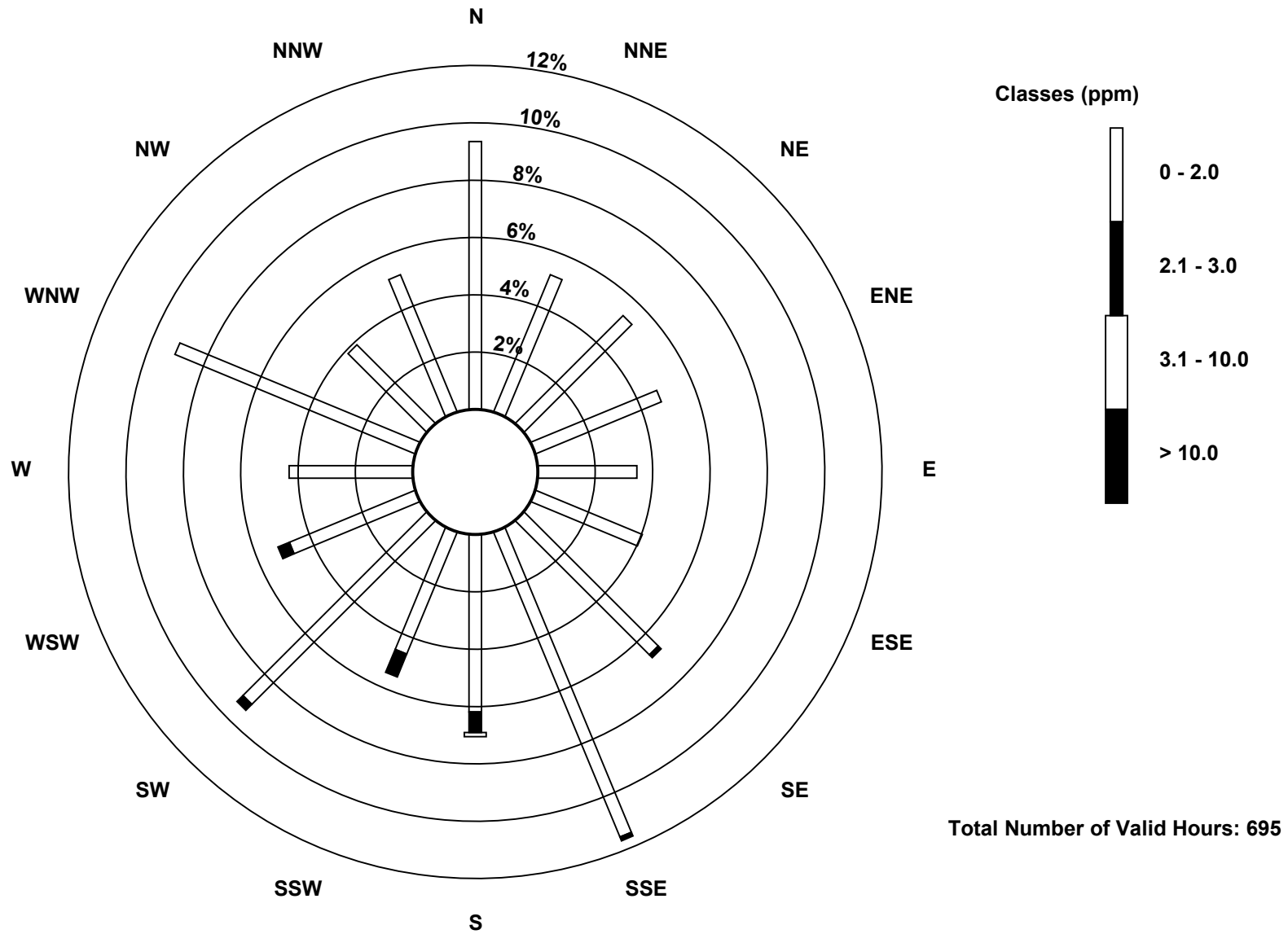
Total Number of Valid Hours: 695

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Total Hydrocarbons (THC) - ppm
Anzac (AMS 14)



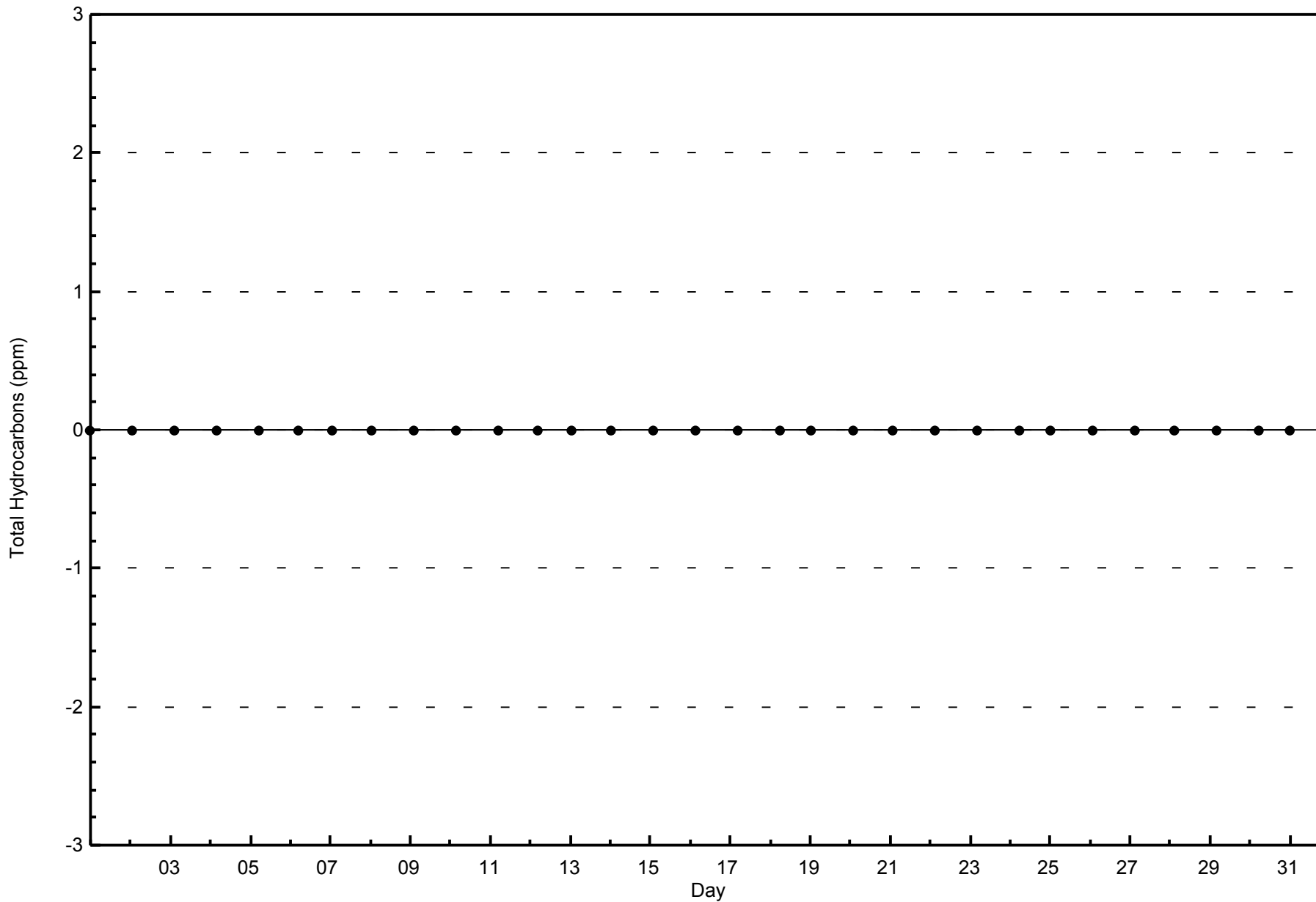


WBEA

Zero Responses

Total Hydrocarbons (THC) - ppm

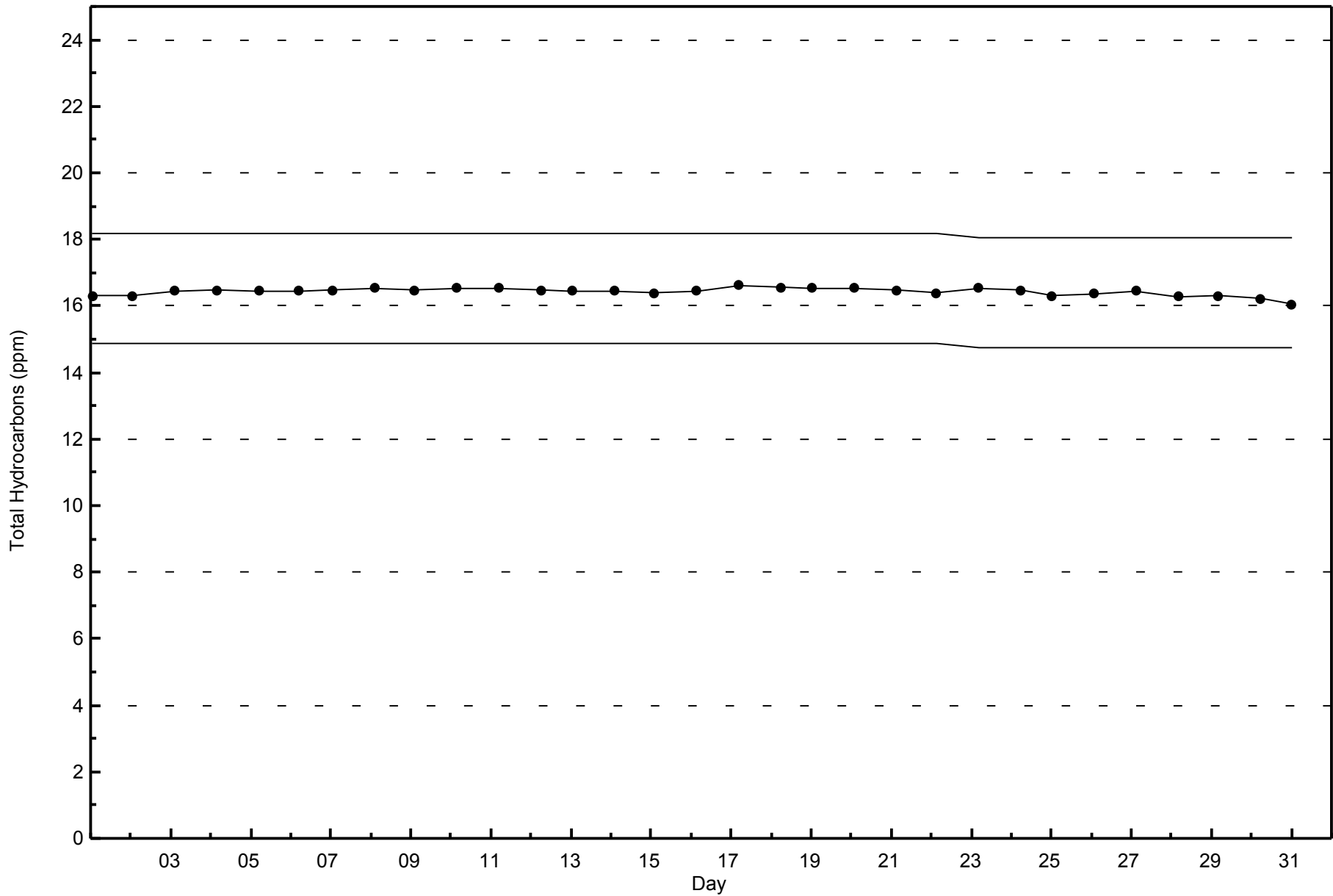
Anzac - May 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Anzac - May 2015





Summary of Hour Averages

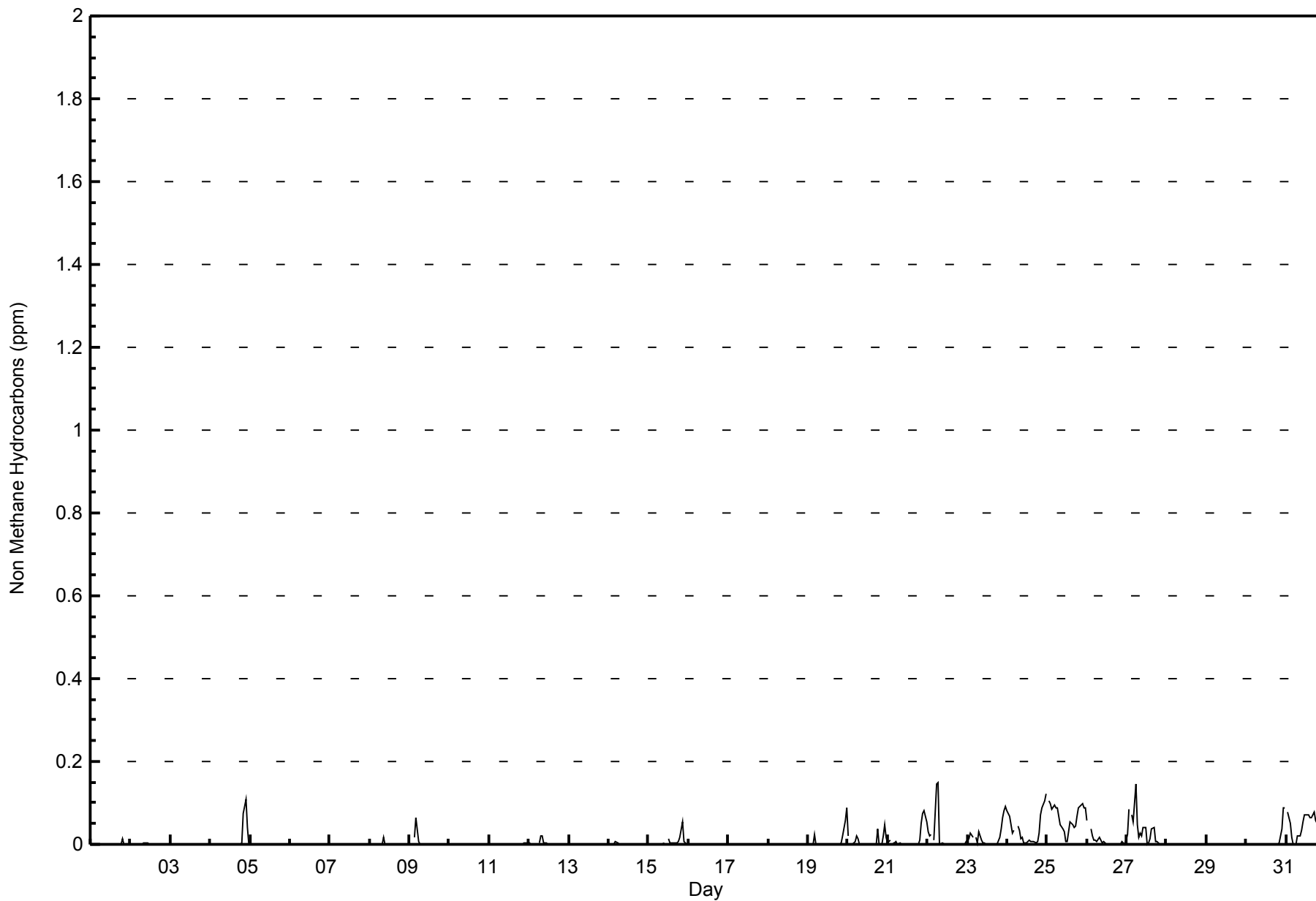
Anzac - May 2015

Maximum Value: 0.149 ppm on May 22 07:00		Maximum Daily Average: 0.065 ppm on May 25		Hours in Service: 744																						
Minimum Value: 0.000 ppm on May 1 02:00		Minimum Daily Average: 0.000 ppm on May 3		Hours of Data: 705																						
Maximum Diurnal Average: 0.021 ppm at hour 23		Minimum Diurnal Average: 0.003 ppm at hour 13		Hours of Missing Data: 39																						
Monthly Average: 0.009 ppm		Percentiles: P ₁ = 0.0 P ₁₀ = 0.0 Q ₁ = 0.0 Median = 0.0 Q ₃ = 0.0 P ₉₀ = 0.0 P ₉₉ = 0.1		Hours of Calibration: 37																						
				Percent Operational Time: 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-May	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	0.013	0.000	0.000	0.001	0.000	0.001	0.013
2-May	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.005	0.002	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	0.001	0.005
3-May	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4-May	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.074	0.107	0.040	0.002	0.010	0.107
5-May	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6-May	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
7-May	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
8-May	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.016	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	0.001	0.016
9-May	0.000	0.000	Z	0.018	0.064	0.007	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	0.064
10-May	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001
11-May	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.004	0.002	0.000	0.005
12-May	0.005	0.000	0.001	0.000	0.000	Z	0.002	0.019	0.021	0.003	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.021
13-May	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	0.001	0.000	0.001
14-May	0.000	Z	0.000	0.000	0.005	0.003	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.005
15-May	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	M	M	0.012	0.002	0.005	0.005	0.002	0.002	0.006	0.018	0.055	0.008	0.004	0.001	0.055
16-May	0.002	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
17-May	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18-May	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19-May	Z	0.000	0.000	0.000	0.022	0.000	0.000	0.000	0.000	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	0.021	0.057	0.088	0.088
20-May	0.019	Z	0.001	0.001	0.006	0.021	0.014	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.039	0.001	0.001	0.021	0.048	0.016	0.048
21-May	0.004	0.010	Z	0.003	0.005	0.005	0.001	0.002	0.001	C	C	C	C	C	C	0.000	0.000	0.000	0.000	0.009	0.051	0.074	0.082	0.055	--	0.082
22-May	0.030	0.020	0.024	Z	0.012	0.147	0.149	0.005	0.001	0.003	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.002	0.000	0.000	0.001	0.001	0.000	0.007	0.018	0.149
23-May	0.009	0.014	0.028	0.017	Z	0.018	0.004	0.029	0.009	0.003	0.002	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.017	0.037	0.065	0.082	0.091	0.019	0.091
24-May	0.080	0.067	0.046	0.028	0.034	Z	0.045	0.034	0.015	0.017	0.004	0.002	0.006	0.010	0.007	0.005	0.006	0.003	0.006	0.026	0.072	0.090	0.107	0.122	0.036	0.122
25-May	Z	0.106	0.097	0.083	0.094	0.089	0.088	0.067	0.046	0.036	0.030	0.007	0.008	0.029	0.053	0.047	0.040	0.046	0.068	0.088	0.096	0.100	0.087	0.089	0.065	0.106
26-May	0.059	Z	0.036	0.020	0.010	0.010	0.007	0.018	0.009	0.004	0.008	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.008	0.003	0.000	0.009	0.059
27-May	0.022	0.085	Z	0.071	0.054	0.147	0.048	0.016	0.026	0.019	0.041	0.042	0.001	0.003	0.013	0.036	0.041	0.008	0.005	0.004	0.000	0.000	0.000	0.000	0.030	0.147
28-May	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
29-May	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30-May	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
31-May	Z	0.077	0.052	0.016	0.000	0.000	0.001	0.020	0.020	0.034	0.056	0.071	0.071	0.070	0.063	0.063	0.071	0.078	0.058	0.046	0.024	0.040	0.042	0.025	0.043	0.078
		0.009	0.015	0.011	0.010	0.012	0.017	0.012	0.007	0.005	0.004	0.005	0.004	0.003	0.004	0.005	0.005	0.005	0.004	0.006	0.007	0.014	0.019	0.021	0.019	Diurnal Average
		0.080	0.106	0.097	0.083	0.094	0.147	0.149	0.067	0.046	0.036	0.056	0.071	0.071	0.070	0.063	0.063	0.071	0.078	0.068	0.088	0.096	0.107	0.107	0.122	Diurnal Maximum
Z - zerospan		C - Calibration				M - Maintenance																				



WBEA
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - May 2015





WBEA
Cumulative Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 0.005	563	79.86	79.86
0.006 - 0.05	94	13.33	93.19
0.06 - 0.1	48	6.81	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA
Frequency Distribution

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	58	33	31	27	20	20	38	65	36	24	46	31	26	54	21	23	553
0.006 - 0.05	6	2	6	5	4	5	5	8	2	8	14	4	3	7	4	11	94
0.06 - 0.1	1	1	0	1	0	3	4	8	11	6	5	1	1	2	2	2	48
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	65	36	37	33	24	28	47	81	49	38	65	36	30	63	27	36	695

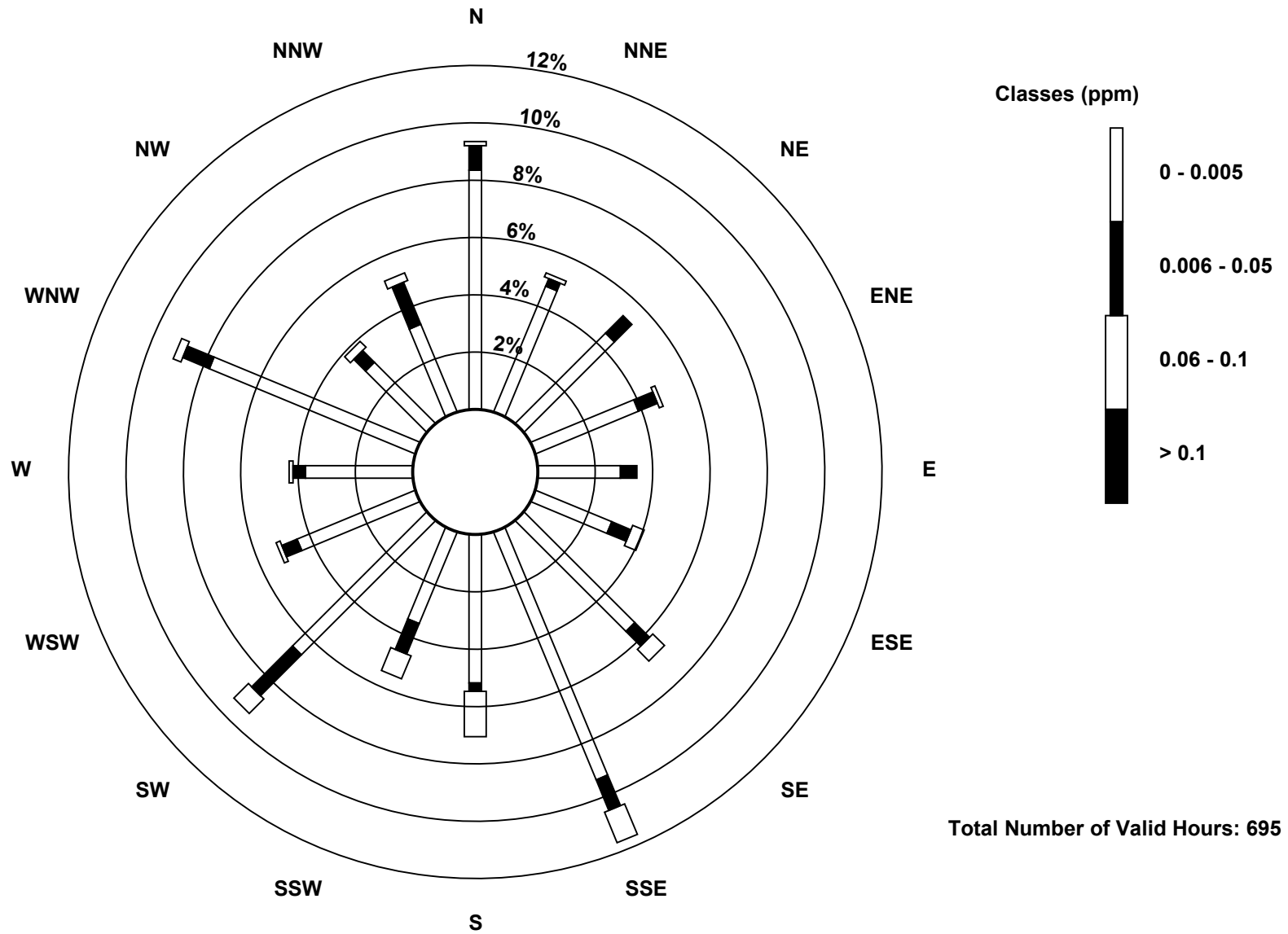
Total Number of Valid Hours: 695

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Non Methane Hydrocarbons (NMHC) - ppm
Anzac (AMS 14)



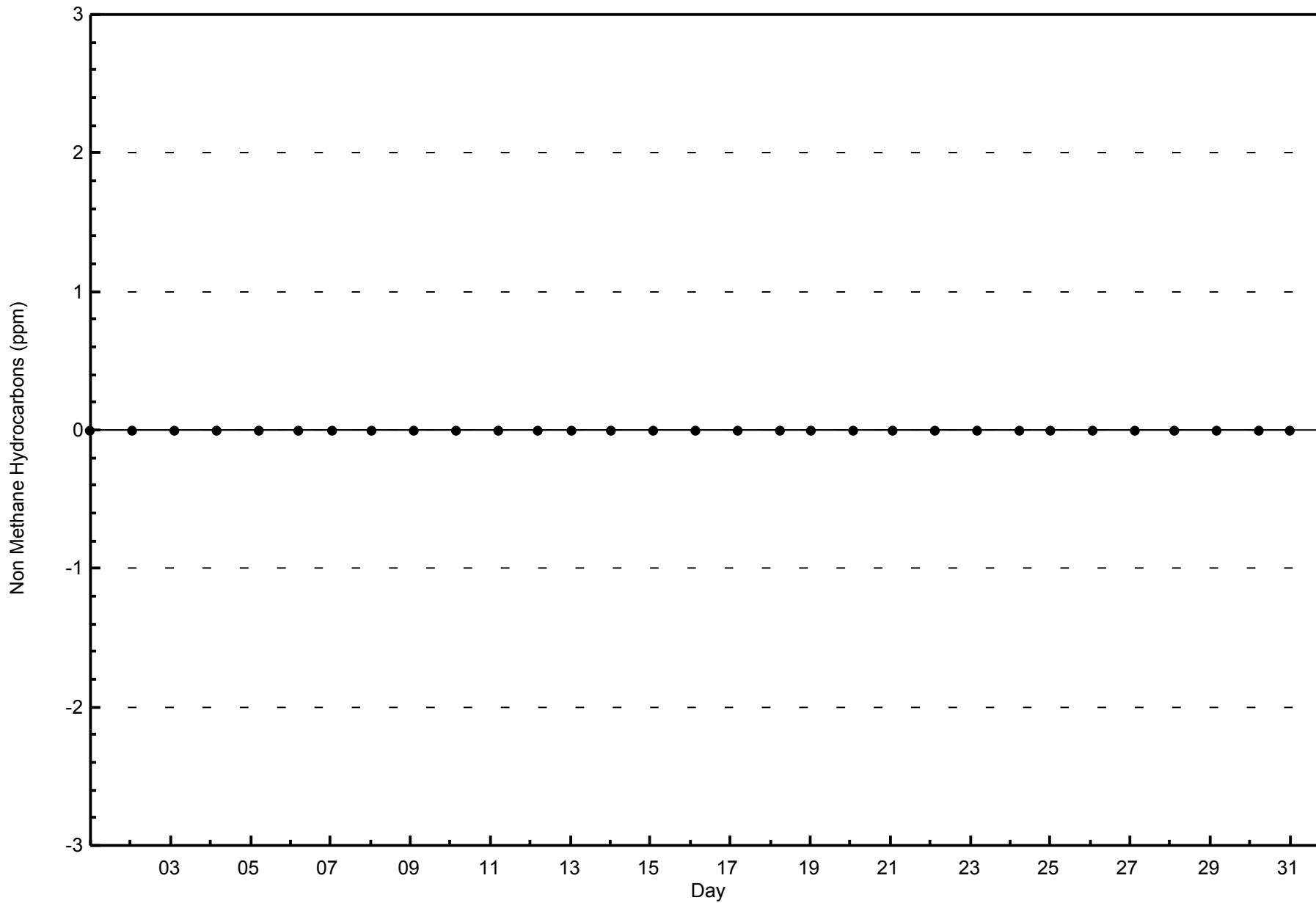


WBEA

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

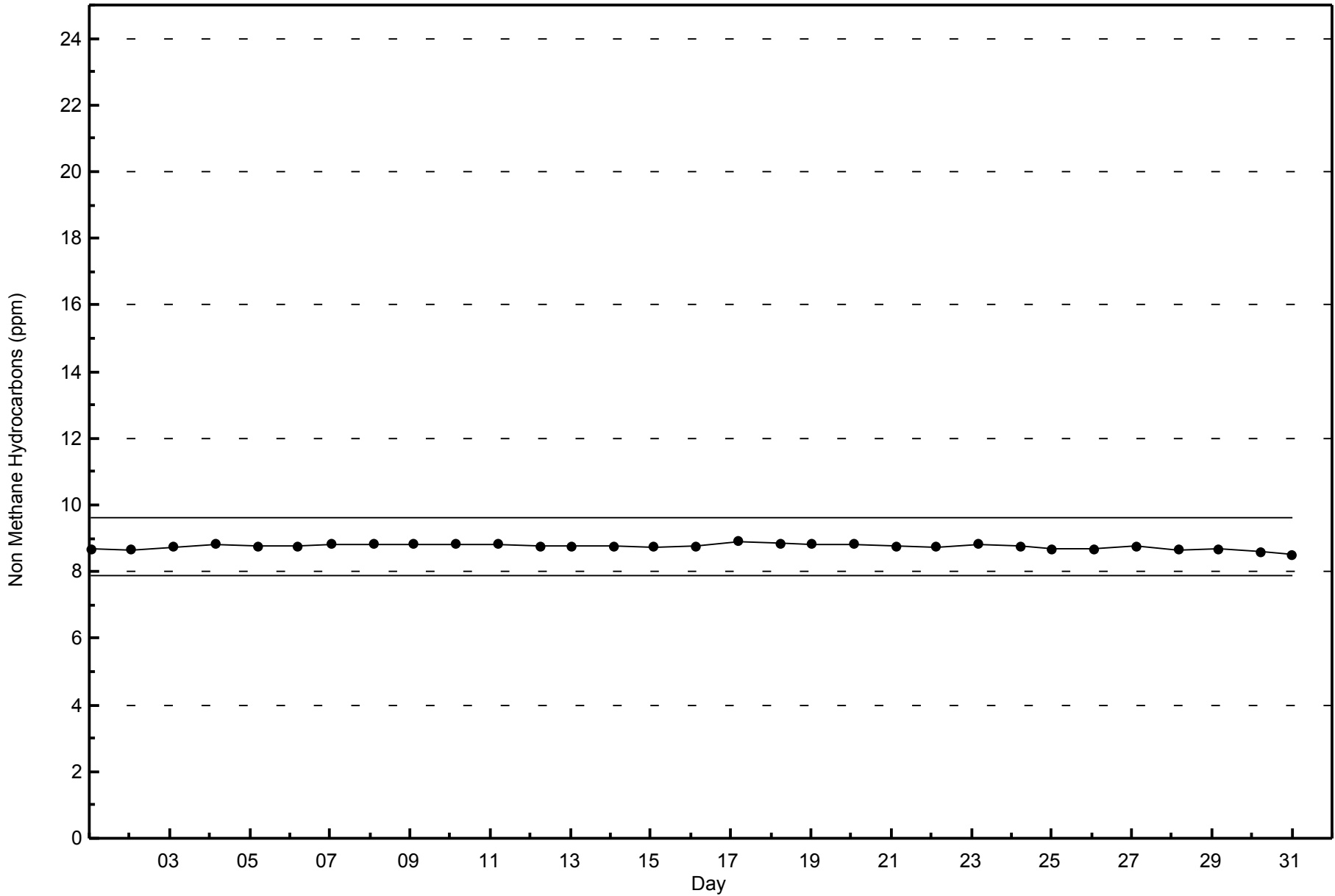
Anzac - May 2015





WBEA
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm
Anzac - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Methane (CH₄) - ppm

Anzac - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 3.2 ppm on May 25 03:00	Maximum Daily Average: 2.0 ppm on May 25		Hours of Data:	705
Minimum Value: 1.8 ppm on May 27 12:00	Minimum Daily Average: 1.8 ppm on May 28		Hours of Missing Data:	39
Maximum Diurnal Average: 2.0 ppm at hour 3	Minimum Diurnal Average: 1.9 ppm at hour 18		Hours of Calibration:	37
Monthly Average: 1.89 ppm	Percentiles: P ₁ = 1.8 P ₁₀ = 1.8 Q ₁ = 1.9 Median = 1.9 Q ₃ = 1.9 P ₉₀ = 1.9 P ₉₉ = 2.1		Percent Operational Time:	99.7

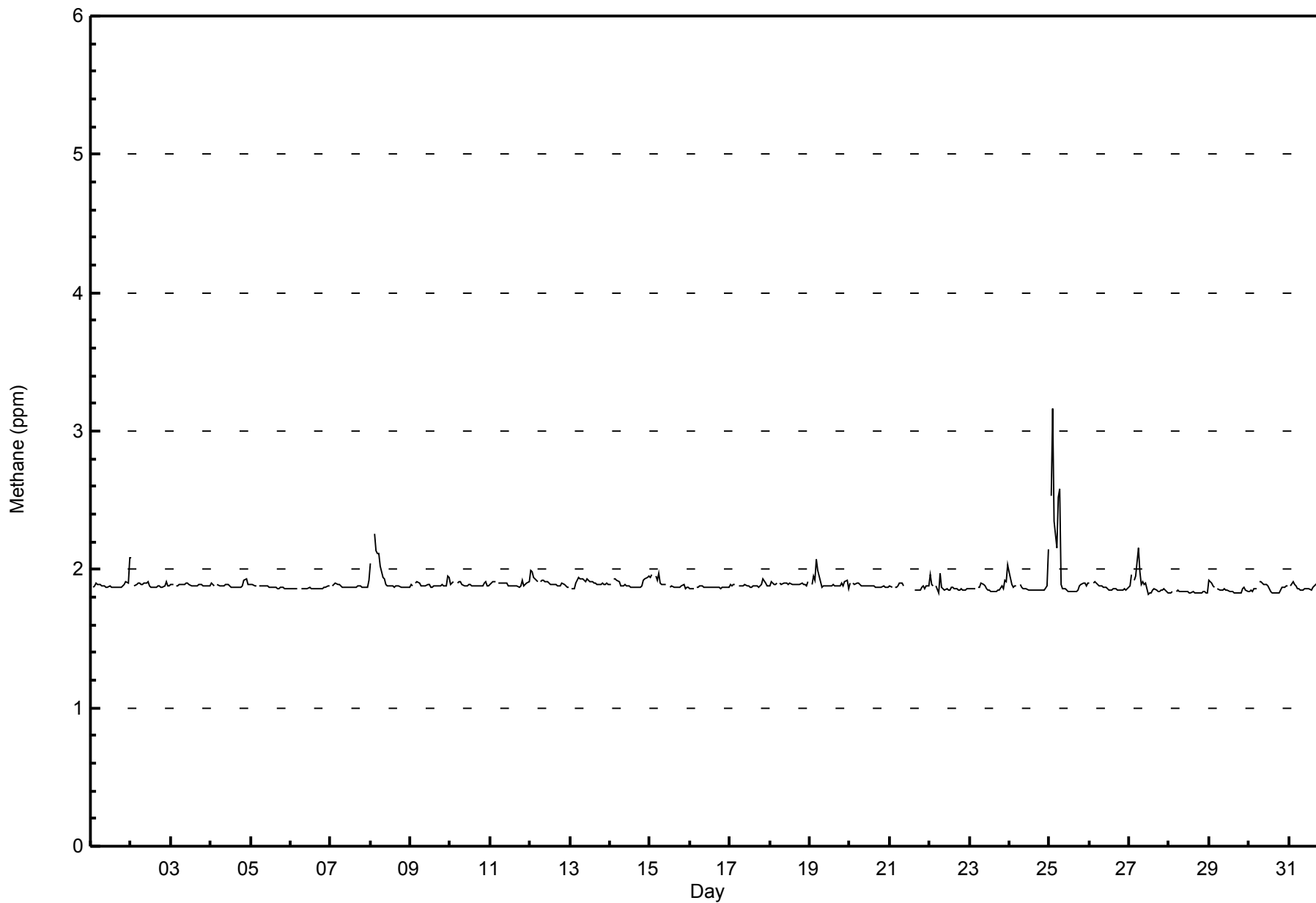
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	1.9	2.1	
2-May	2.1	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	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	2.1
3-May	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
4-May	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
5-May	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
6-May	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
7-May	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
8-May	2.0	Z	2.3	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	1.9	1.9	1.9	1.9	1.9	2.3
9-May	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.0
10-May	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
11-May	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
12-May	2.0	2.0	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
13-May	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
14-May	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	2.0	1.9	1.9	2.0	2.0
15-May	1.9	2.0	Z	1.9	1.9	2.0	1.9	1.9	1.9	1.9	M	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
16-May	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
17-May	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
18-May	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
19-May	Z	1.9	2.0	1.9	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
20-May	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
21-May	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	--
22-May	2.0	1.9	1.9	Z	1.9	1.8	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
23-May	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0
24-May	2.0	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.1	1.9	2.1	2.1
25-May	Z	2.5	3.2	2.3	2.2	2.5	2.6	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	2.0	3.2
26-May	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
27-May	1.9	2.0	Z	1.9	1.9	2.2	2.0	1.9	1.9	1.9	1.9	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	2.2
28-May	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
29-May	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.8	1.9
30-May	1.8	1.8	1.8	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9
31-May	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	1.8	1.9	1.9	2.0	1.9	1.9	2.0
																								Diurnal Average			
																								Diurnal Maximum			

Z - zerospan C - Calibration M - Maintenance



WBEA
Hourly Averages

Methane (CH₄) - ppm
Anzac - May 2015





WBEA
Cumulative Frequency Distribution

Methane (CH₄) - ppm
Anzac - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	690	97.87	97.87
2.1 - 3.0	14	1.99	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
Frequency Distribution

Methane (CH₄) - ppm
Anzac - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	65	36	37	33	24	28	47	80	44	34	63	33	30	63	27	36	680
2.1 - 3.0	0	0	0	0	0	0	0	1	4	4	2	3	0	0	0	0	14
3.1 - 10.0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	65	36	37	33	24	28	47	81	49	38	65	36	30	63	27	36	695

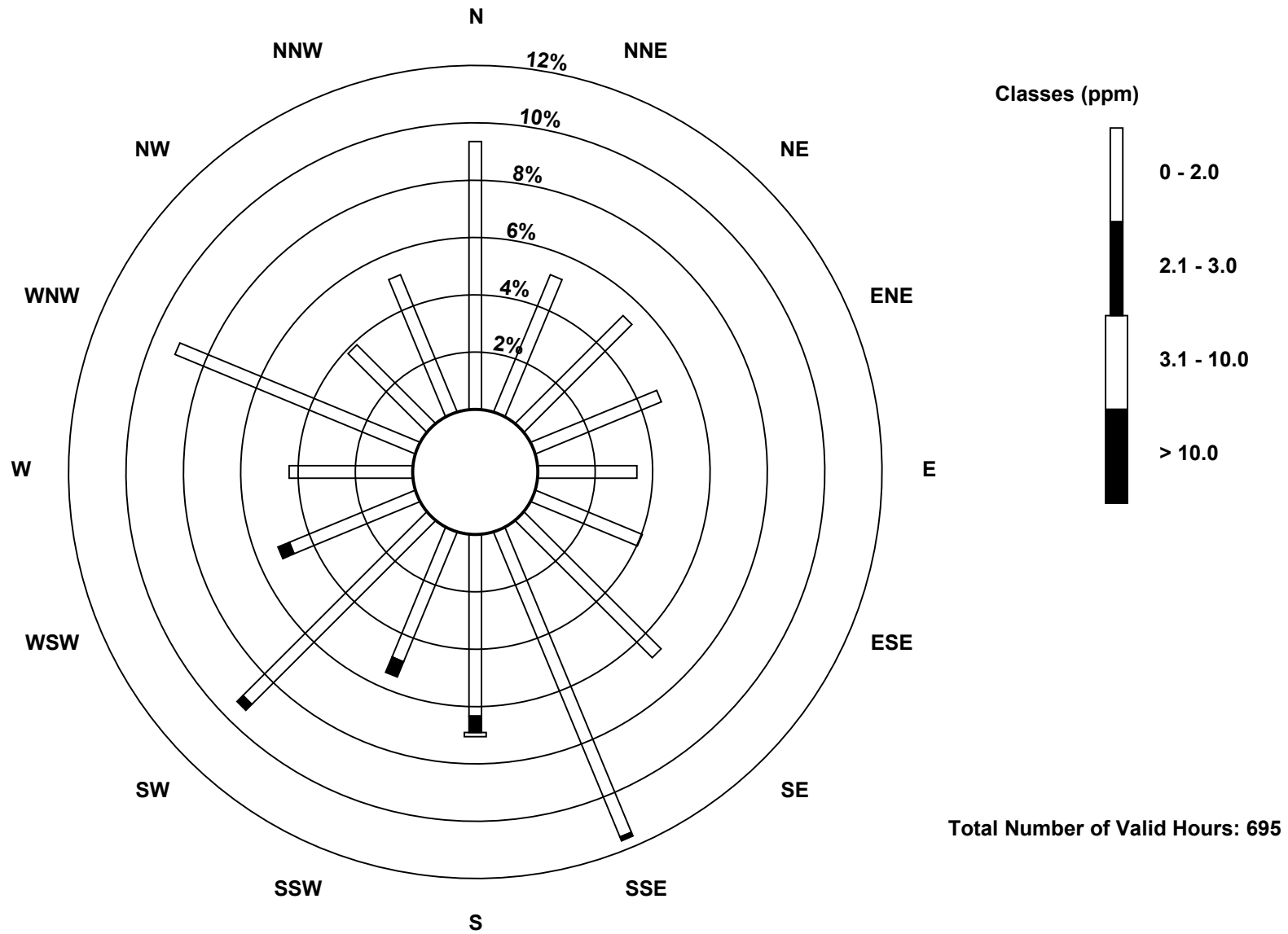
Total Number of Valid Hours: 695

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

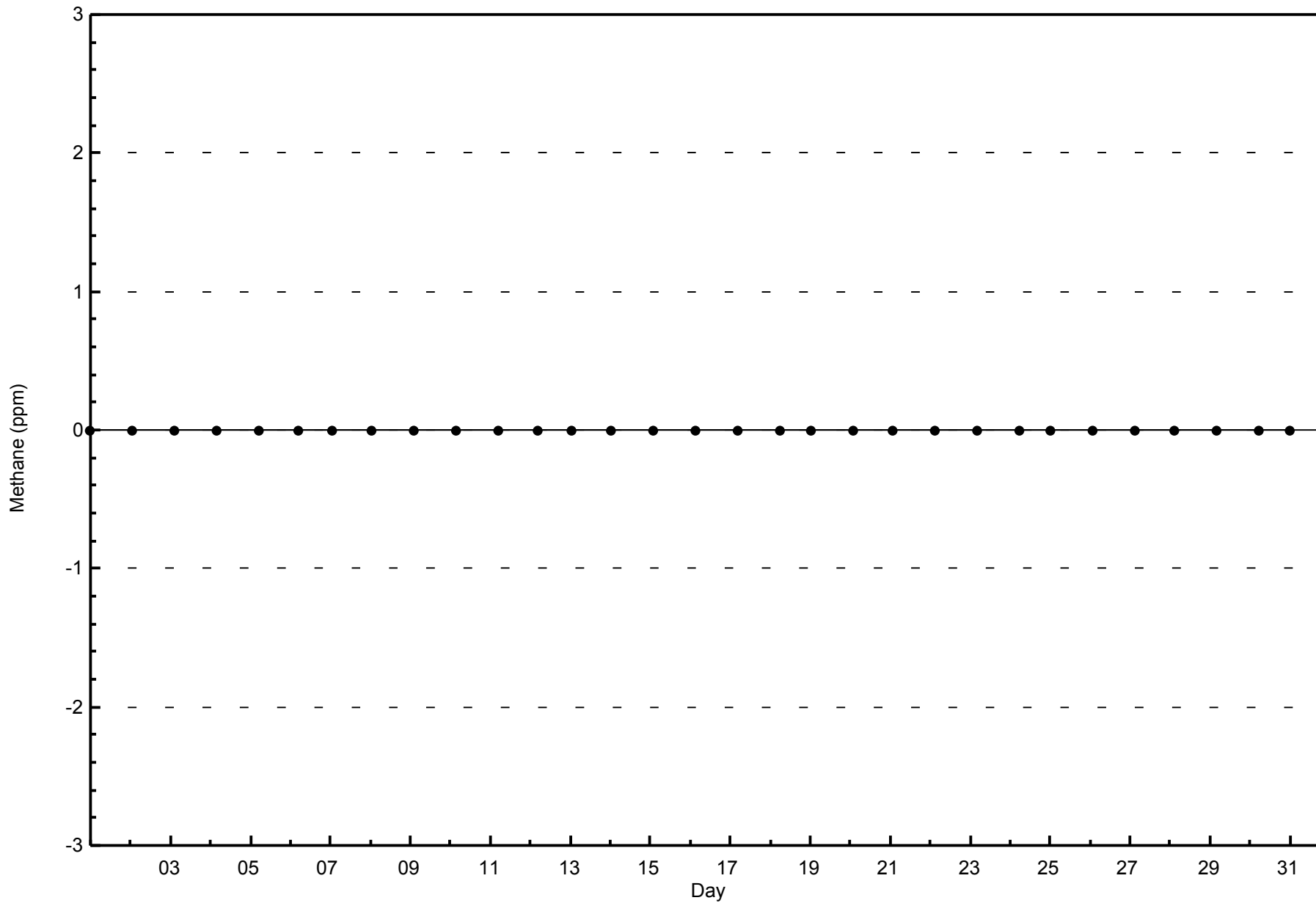
Methane (CH₄) - ppm
Anzac (AMS 14)





WBEA
Zero Responses

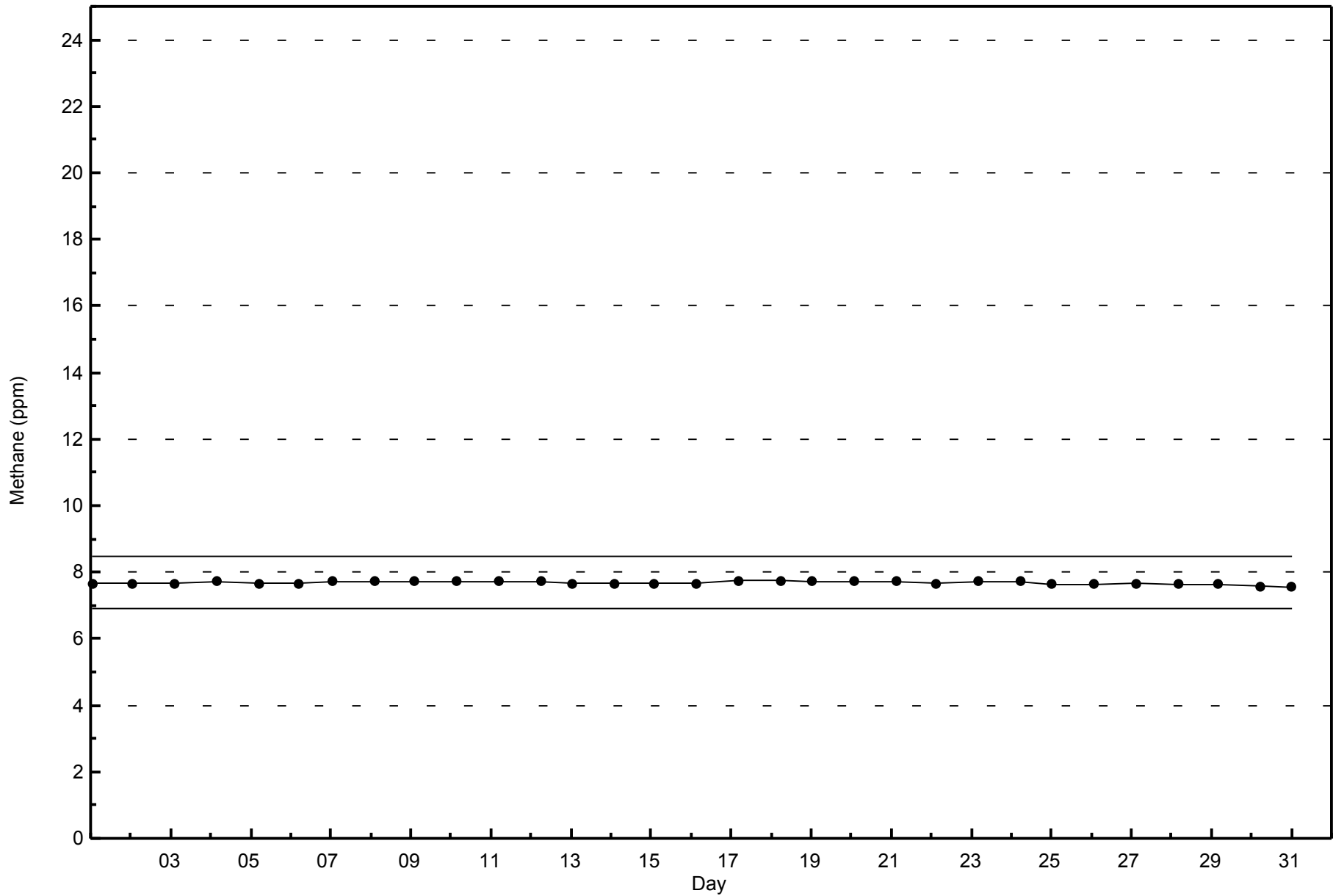
Methane (CH₄) - ppm
Anzac - May 2015





WBEA
Span Responses

Methane (CH₄) - ppm
Anzac - May 2015



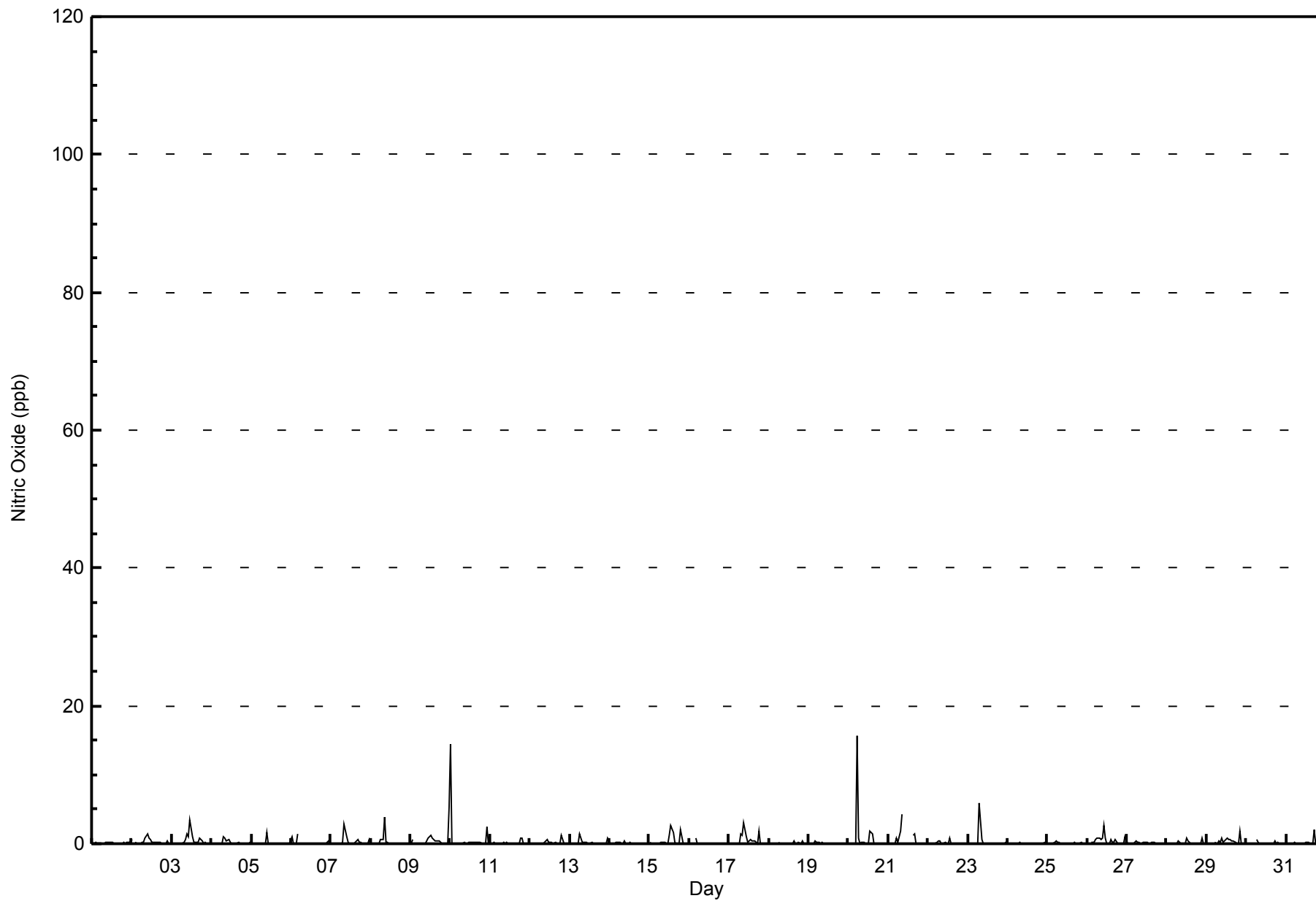


Maximum Value: 16 ppb on May 20 06:00																	Maximum Daily Average: 0.9 ppb on May 20																	Hours in Service: 744	
Minimum Value: 0 ppb on May 2 20:00																	Minimum Daily Average: 0.0 ppb on May 24																	Hours of Data: 707	
Maximum Diurnal Average: 0.7 ppb at hour 6																	Minimum Diurnal Average: 0.0 ppb at hour 4																	Hours of Missing Data: 37	
Monthly Average: 0.2 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 3																	Hours of Calibration: 37	
																	Percent Operational Time: 100.0																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
2-May	1	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1									
3-May	0	0	Z	0	0	0	0	0	1	1	1	3	1	0	0	0	0	1	0	0	0	0	0	0	0.4	3									
4-May	0	0	0	Z	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1									
5-May	0	0	0	0	Z	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2									
6-May	1	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
7-May	Z	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	3									
8-May	0	Z	0	0	0	0	1	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	4									
9-May	0	1	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	5	0.5	5									
10-May	14	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0.8	14									
11-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.1	1									
12-May	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0.1	1									
13-May	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									
14-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
15-May	0	0	Z	0	0	0	0	0	0	0	0	1	3	2	0	0	0	0	0	2	0	0	0	0	0.4	3									
16-May	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	1									
17-May	0	0	0	0	Z	0	0	1	1	3	1	0	0	1	0	0	0	0	2	0	0	0	0	0	0.5	3									
18-May	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									
19-May	Z	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									
20-May	0	Z	0	0	0	16	1	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0.9	16									
21-May	0	0	Z	0	0	1	0	2	4	C	C	C	C	C	C	1	1	0	0	0	0	0	0	0	--	4									
22-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1									
23-May	0	0	0	0	Z	0	0	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	6									
24-May	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									
25-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
26-May	0	Z	0	0	0	1	1	1	1	1	3	1	0	0	1	0	0	1	0	0	0	0	0	1	0.5	3									
27-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0									
28-May	0	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0.1	1									
29-May	0	0	0	0	Z	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	2	0	0	0	0.3	2									
30-May	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1									
31-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0.2	2									
																	Diurnal Average		Diurnal Maximum																
																	0.7		0.3																
																	14		5																
Z - zerospan																	C - Calibration																		



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Anzac - May 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Anzac - May 2015

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
Frequency Distribution

Nitric Oxide (NO) - ppb
Anzac - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	65	36	37	33	24	28	47	81	49	38	65	36	30	65	27	36	697
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	65	36	37	33	24	28	47	81	49	38	65	36	30	65	27	36	697

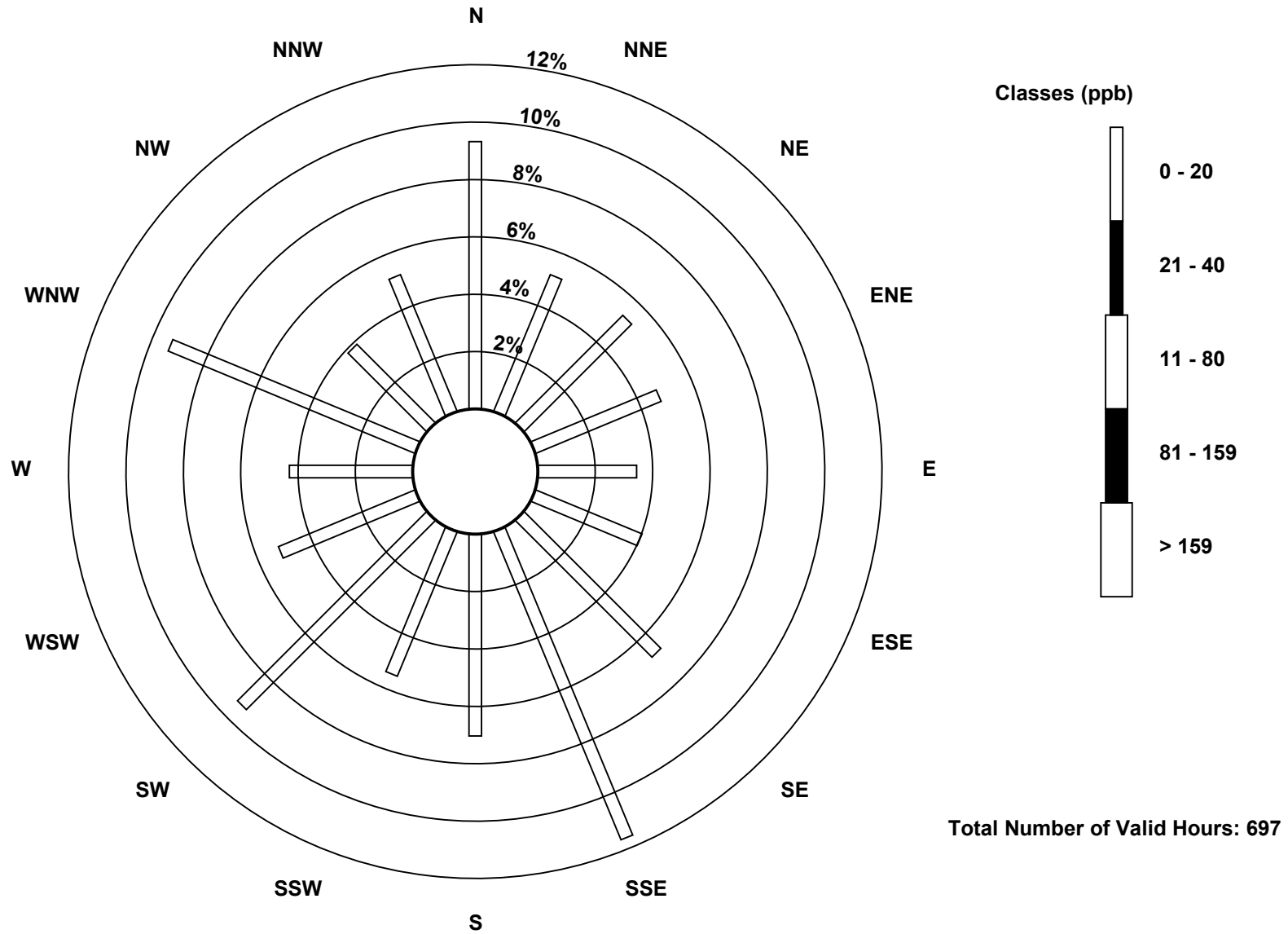
Total Number of Valid Hours: 697

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

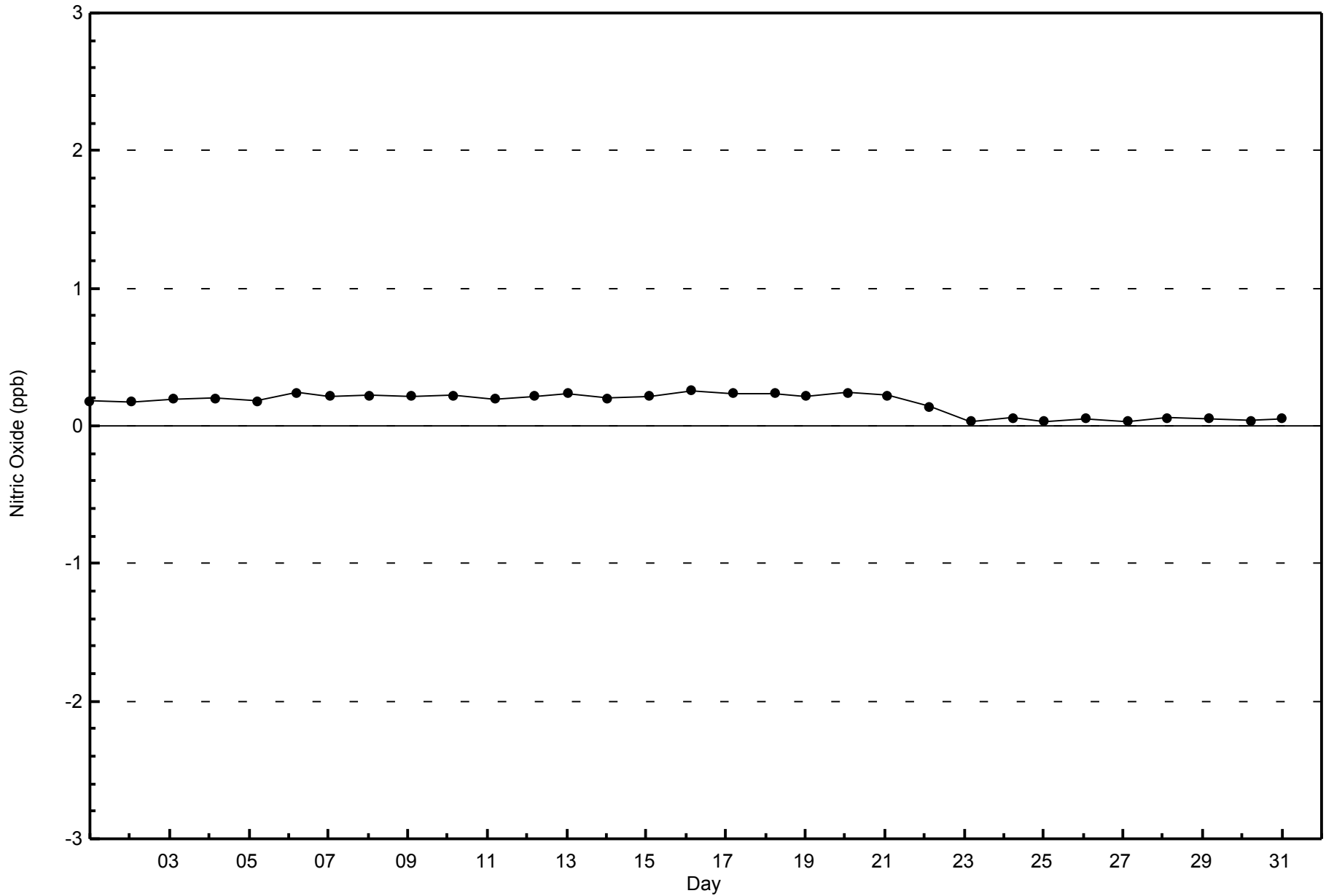
Nitric Oxide (NO) - ppb
Anzac (AMS 14)





WBEA
Zero Responses

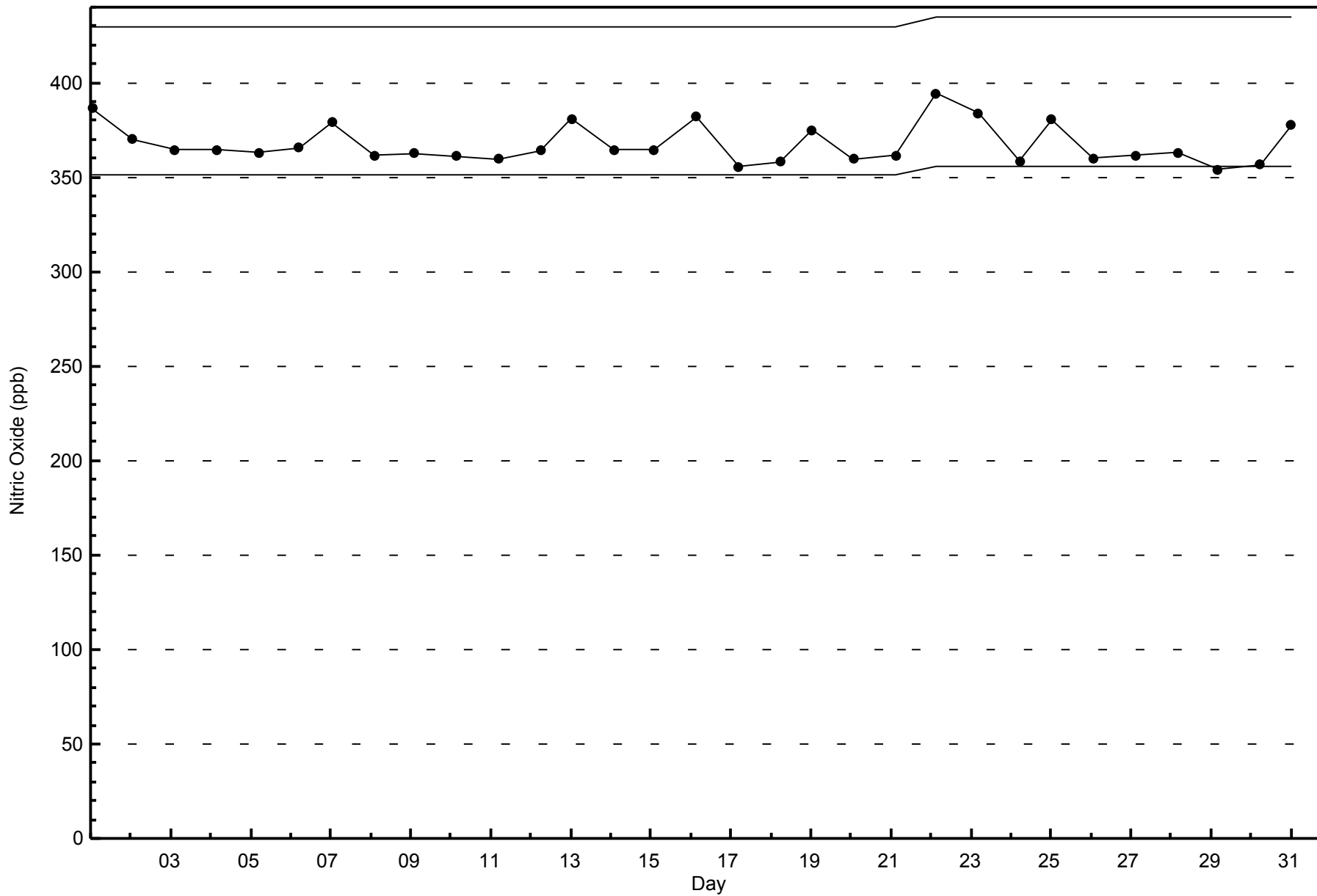
Nitric Oxide (NO) - ppb
Anzac - May 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Anzac - May 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 17 ppb on May 10 01:00	Maximum Daily Average: 1.8 ppb on May 26		Hours of Data:	707
Minimum Value: 0 ppb on May 16 19:00	Minimum Daily Average: 0.2 ppb on May 5		Hours of Missing Data:	37
Maximum Diurnal Average: 2.4 ppb at hour 1	Minimum Diurnal Average: 0.8 ppb at hour 4		Hours of Calibration:	37
Monthly Average: 1.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 6		Percent Operational Time:	100.0

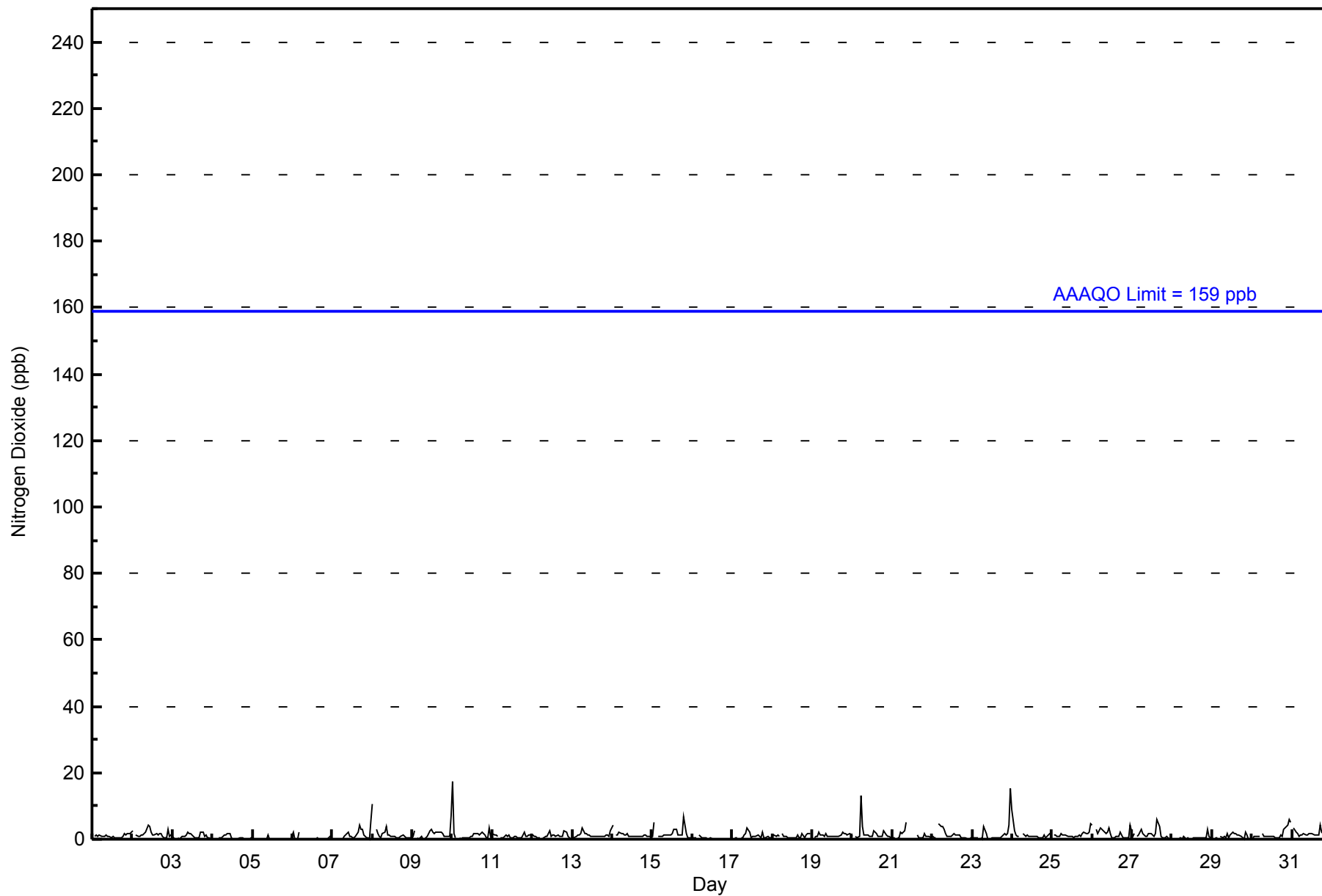
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2	2	1.0	2																							
2-May	2	Z	1	1	1	1	1	2	2	4	4	2	1	1	2	1	2	2	1	0	0	3	1	1	1.6	4																							
3-May	1	0	Z	0	0	0	1	1	1	2	2	2	1	1	1	1	0	2	2	1	1	0	0	0	0.9	2																							
4-May	0	0	0	Z	0	1	1	1	1	2	2	1	0	0	0	0	0	1	0	1	0	0	0	0	0.5	2																							
5-May	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
6-May	2	0	0	0	2	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	2																							
7-May	Z	0	0	0	0	0	0	1	1	2	1	1	1	1	1	2	4	3	3	1	1	0	0	6	1.2	6																							
8-May	11	Z	3	2	1	1	2	2	4	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1.6	11																							
9-May	1	2	Z	0	0	1	0	0	0	1	3	3	2	2	2	2	2	2	2	2	1	1	1	7	1.6	7																							
10-May	17	2	1	Z	0	0	0	0	1	1	1	1	1	2	2	2	1	2	2	1	1	1	3	1	1.8	17																							
11-May	2	1	1	1	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	0.9	2																							
12-May	1	1	1	1	0	Z	1	1	1	1	3	1	1	1	1	1	1	1	1	2	2	1	0	0	1.0	3																							
13-May	Z	0	1	1	1	2	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1.2	3																							
14-May	4	Z	1	1	2	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	4																							
15-May	1	5	Z	1	1	1	1	1	1	1	1	1	2	3	3	1	1	1	1	1	7	2	1	0	1.6	7																							
16-May	1	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
17-May	0	0	0	0	Z	1	0	1	2	4	2	1	1	1	1	1	1	1	0	2	0	1	1	0	0.9	4																							
18-May	1	1	1	1	1	Z	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	2	2	1.0	2																							
19-May	Z	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	2	2	1	2	1	1.1	2																						
20-May	1	Z	1	1	1	13	4	1	1	1	1	1	1	3	2	1	1	1	1	3	1	1	1	1	1.8	13																							
21-May	1	1	Z	1	1	2	2	3	5	C	C	C	C	C	C	1	1	1	1	2	1	1	1	1	--	5																							
22-May	1	0	1	Z	5	4	4	3	2	1	1	1	1	2	1	1	1	1	0	0	0	0	0	0	1.3	5																							
23-May	0	0	0	0	Z	0	0	4	2	0	0	0	0	0	0	1	0	1	1	2	1	2	4	15	1.5	15																							
24-May	9	3	1	1	1	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1.4	9																							
25-May	Z	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	5	1.4	5																							
26-May	4	Z	3	2	3	3	3	2	2	2	3	2	0	0	1	1	1	2	0	0	1	0	0	4	1.8	4																							
27-May	1	2	Z	1	1	3	2	1	1	1	2	2	1	1	2	6	4	1	1	1	0	1	0	0	1.4	6																							
28-May	0	0	0	Z	1	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	3	1	0	0.5	3																							
29-May	0	0	0	0	Z	1	1	1	1	2	1	1	2	2	2	1	1	1	0	0	2	1	0	0	0.9	2																							
30-May	0	1	1	1	1	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	3	3	4	6	5	1.6	6																							
31-May	Z	3	2	2	1	1	1	2	1	1	2	2	2	1	1	1	1	4	2	1	1	1	1	1	1.6	4																							
																								2.4	1.0	0.9	0.8	1.1	1.6	1.2	1.2	1.3	1.2	1.2	1.0	0.9	0.9	0.9	1.1	1.0	1.1	1.1	1.2	0.9	1.0	1.1	2.0	Diurnal Average	
																								17	5	3	2	5	13	4	4	5	4	4	3	2	3	3	6	4	4	3	7	3	4	6	15	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Anzac - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - May 2015

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
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Anzac - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	65	36	37	33	24	28	47	81	49	38	65	36	30	65	27	36	697
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	65	36	37	33	24	28	47	81	49	38	65	36	30	65	27	36	697

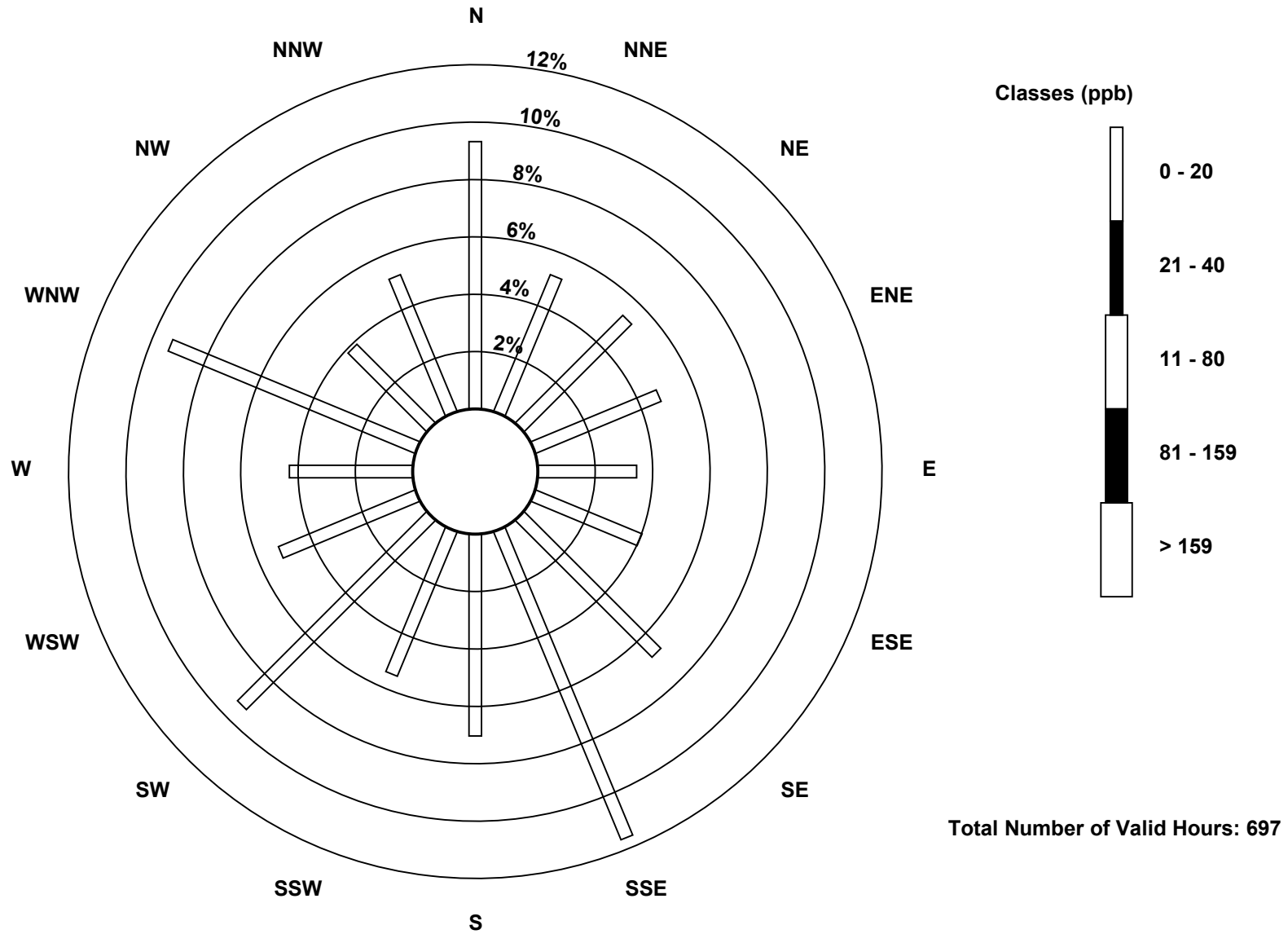
Total Number of Valid Hours: 697

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

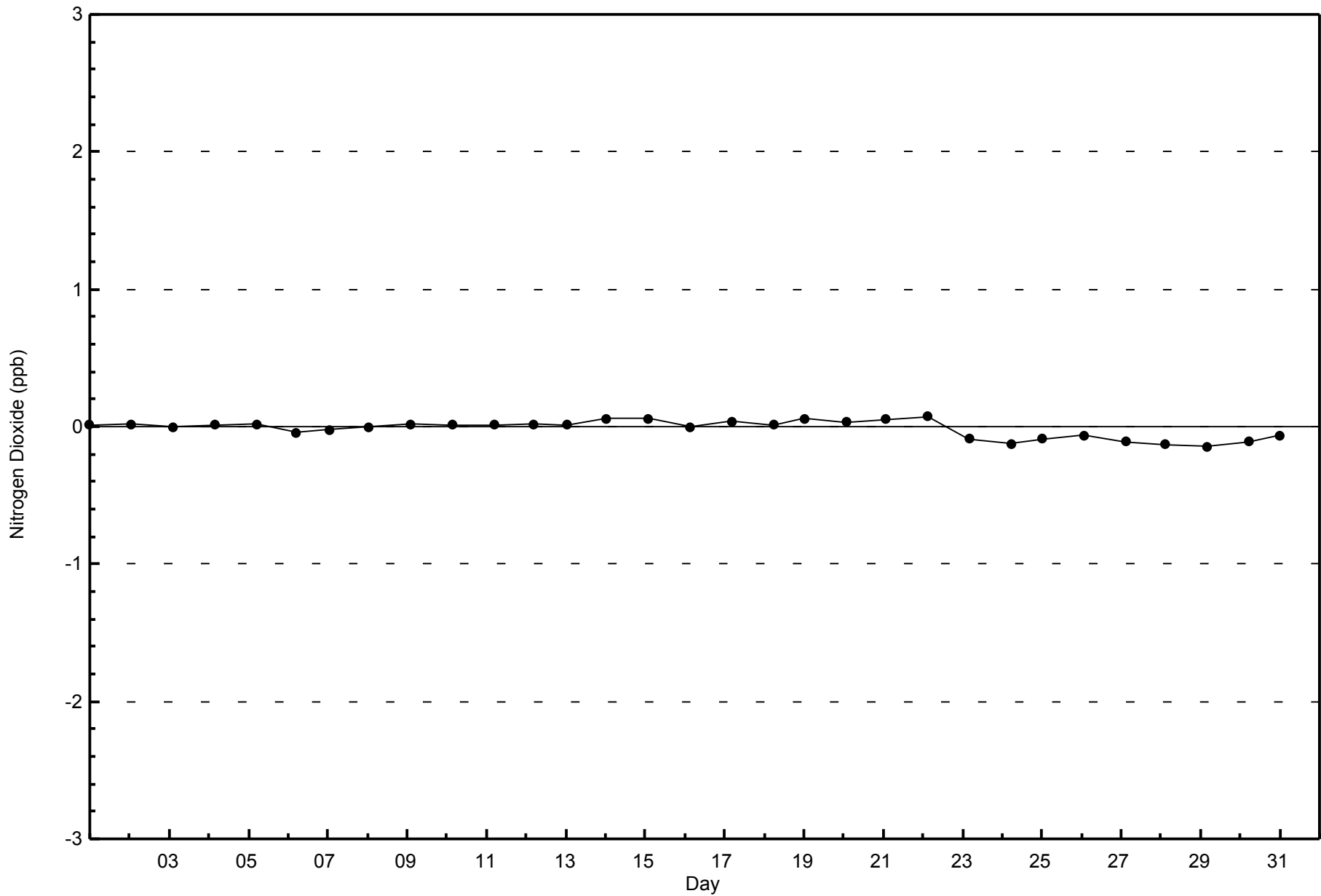
Nitrogen Dioxide (NO₂) - ppb
Anzac (AMS 14)





WBEA
Zero Responses

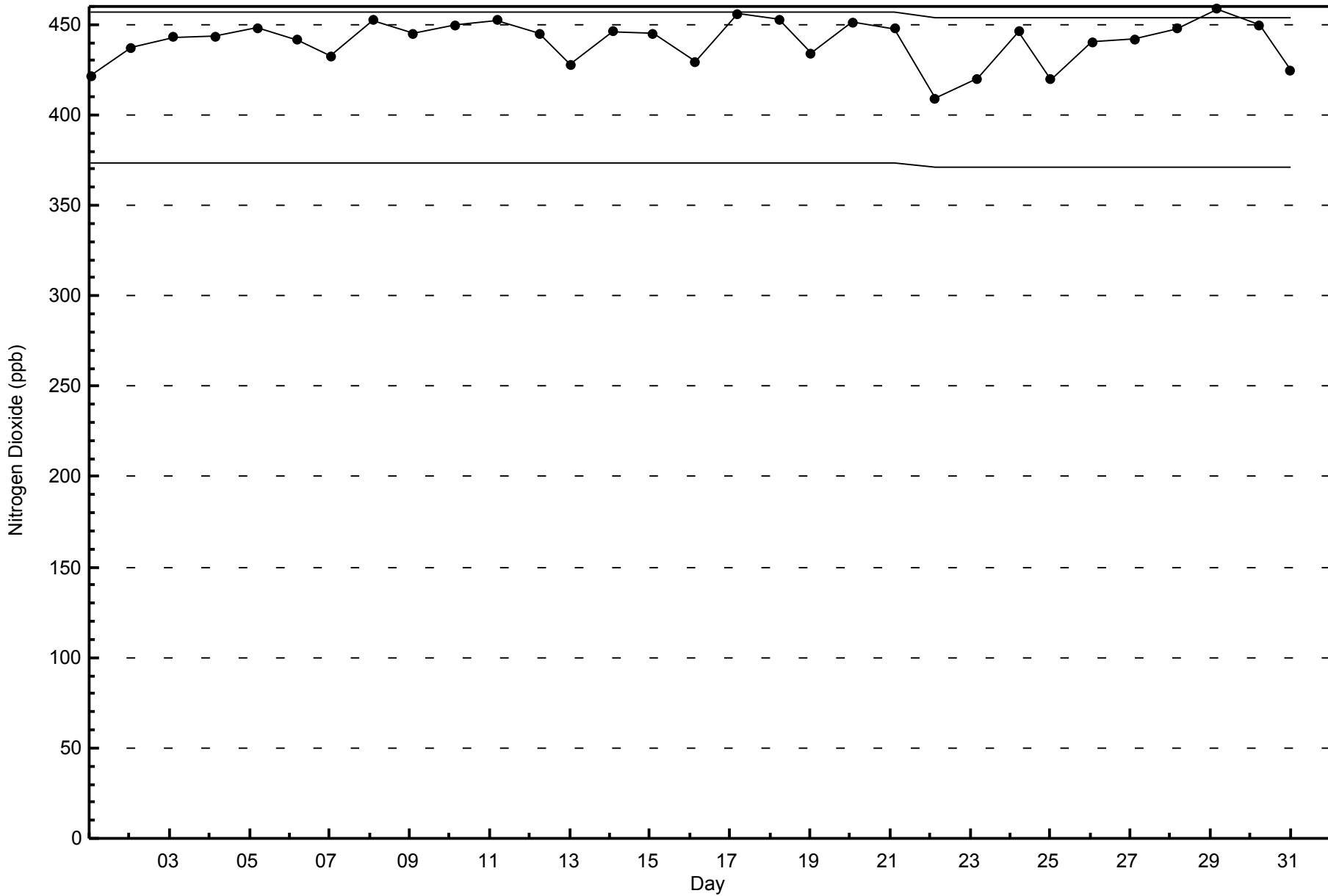
Nitrogen Dioxide (NO₂) - ppb
Anzac - May 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Anzac - May 2015



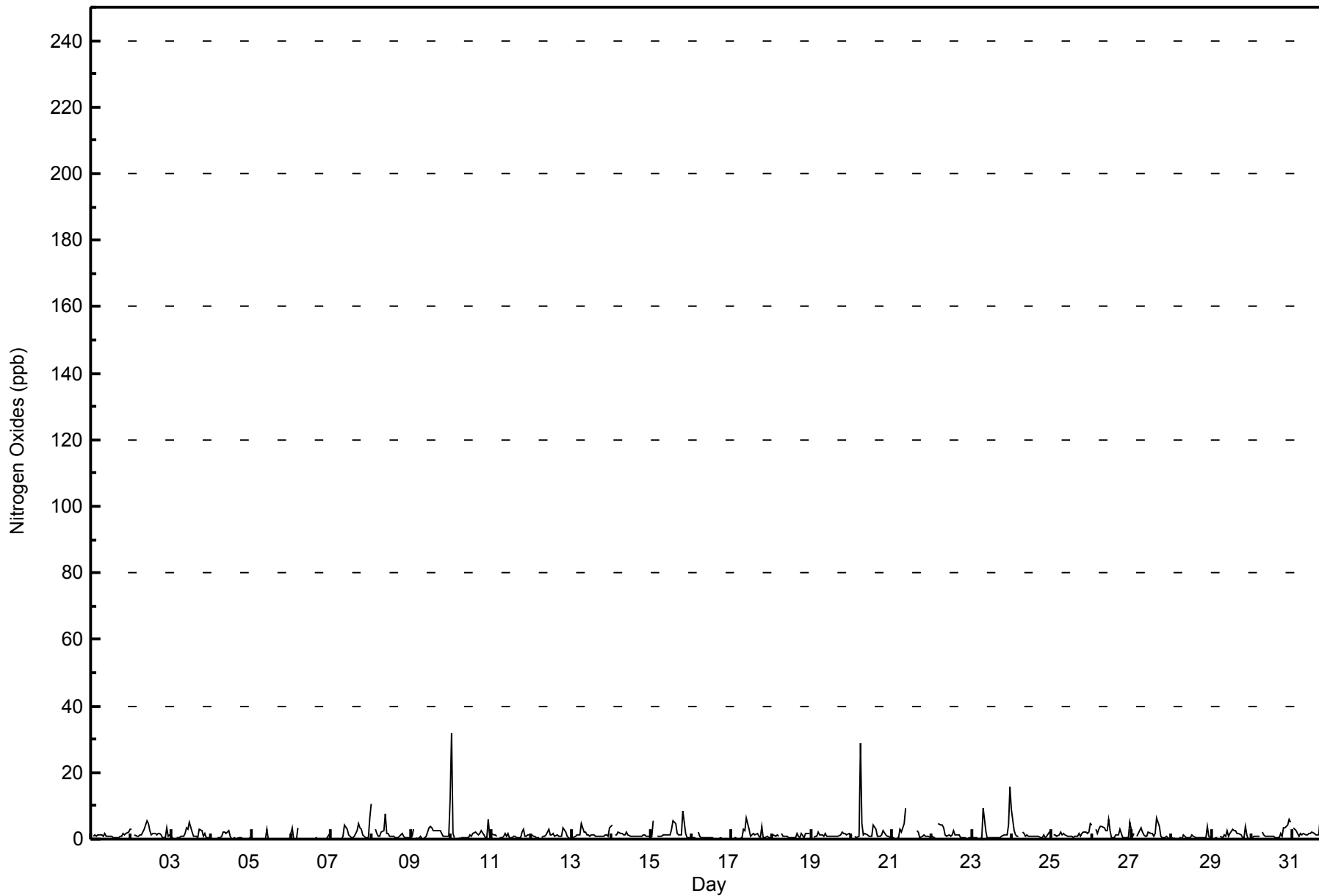


Maximum Value: 32 ppb on May 10 01:00														Maximum Daily Average: 2.6 ppb on May 20														Hours in Service: 744	
Minimum Value: 0 ppb on May 16 20:00														Minimum Daily Average: 0.2 ppb on May 5														Hours of Data: 707	
Maximum Diurnal Average: 3.1 ppb at hour 1														Minimum Diurnal Average: 0.8 ppb at hour 4														Hours of Missing Data: 37	
Monthly Average: 1.4 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 3 P ₉₉ = 9														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-May	Z	1	1	1	1	1	1	1	2	1	1	1	1	1	0	0	0	1	1	2	1	2	2	3	1.1	3			
2-May	3	Z	1	1	1	1	1	2	3	6	5	3	1	2	2	1	2	2	1	0	0	3	1	1	1.9	6			
3-May	1	0	Z	0	0	0	1	1	2	3	3	5	2	1	1	1	3	2	1	2	0	0	0	1.3	5				
4-May	0	0	0	Z	0	1	1	2	2	2	2	1	0	0	0	0	1	0	1	0	0	0	1	0.7	2				
5-May	0	0	0	0	Z	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3				
6-May	3	0	0	0	4	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.5	4			
7-May	Z	0	0	0	0	0	0	1	4	3	1	1	1	1	1	2	5	3	3	1	1	0	0	6	1.5	6			
8-May	11	Z	3	2	1	1	2	3	8	2	1	1	1	1	1	1	1	1	2	1	1	0	0	0	1.8	11			
9-May	1	3	Z	0	0	1	0	0	0	1	3	4	3	2	3	3	3	2	2	1	1	1	1	12	2.1	12			
10-May	32	2	0	Z	0	0	0	0	1	0	0	1	1	2	2	2	1	2	2	1	1	1	6	1	2.6	32			
11-May	2	1	1	1	Z	0	0	1	2	1	2	1	1	1	1	1	1	1	2	3	1	1	1	1	1.0	3			
12-May	1	1	1	1	0	Z	0	1	1	1	3	1	1	2	1	1	1	1	1	4	2	1	0	0	1.1	4			
13-May	Z	0	1	1	1	1	5	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1.4	5				
14-May	4	Z	1	1	2	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	4			
15-May	1	5	Z	1	1	1	1	1	1	1	1	1	3	6	5	2	1	1	1	9	2	1	0	0	2.0	9			
16-May	0	0	0	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2			
17-May	0	0	0	0	Z	1	0	3	3	6	3	1	1	2	1	2	1	0	4	0	0	1	0	0	1.4	6			
18-May	1	1	1	1	1	Z	2	1	1	1	1	1	1	1	1	2	1	1	2	1	2	2	2	2	1.1	2			
19-May	Z	1	1	1	2	1	1	1	2	1	1	1	1	1	1	1	1	1	2	2	2	1	2	1	1.2	2			
20-May	1	Z	1	1	1	29	5	1	2	1	1	1	1	4	3	1	1	1	1	3	1	1	1	1	2.6	29			
21-May	1	1	Z	1	1	3	2	5	9	C	C	C	C	C	C	2	2	1	1	1	1	1	1	0	--	9			
22-May	1	0	1	Z	5	4	4	3	1	1	1	1	1	2	1	1	1	0	0	0	0	0	0	0	1.4	5			
23-May	0	0	0	0	Z	0	0	9	2	0	0	0	0	0	0	0	0	1	1	1	1	4	16	1.8	16				
24-May	9	3	1	1	1	Z	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1.5	9			
25-May	Z	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	4	4	1.4	4			
26-May	4	Z	3	2	3	4	4	3	3	3	6	3	0	0	1	1	1	3	0	0	0	1	0	5	2.3	6			
27-May	1	2	Z	1	1	3	2	1	1	1	2	2	2	1	2	6	4	1	0	0	0	1	0	0	1.5	6			
28-May	0	0	0	Z	1	0	0	1	0	0	0	0	1	1	0	0	0	0	1	0	0	4	1	0	0.6	4			
29-May	0	0	0	0	Z	1	1	1	1	3	1	2	3	2	2	2	2	1	0	0	4	1	0	0	1.2	4			
30-May	0	1	1	1	1	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	3	3	4	6	5	1.6	6			
31-May	Z	3	2	2	1	2	1	2	1	1	2	2	2	2	1	1	1	6	2	1	1	1	1	1	1.7	6			
																												Diurnal Average	
3.1														1.1														Diurnal Maximum	
32														5															
0.9														0.8															
1.2														2.4															
1.4														1.7															
1.8														1.8															
1.6														1.6															
1.5														1.2															
1.2														1.1															
1.2														1.2															
1.2														1.2															
1.1														1.2															
1.2														1.2															
1.4														1.0															
1.1														1.1															
1.2														1.2															
2.2														2.2															
16														16															
Z - zerospan																								C - Calibration					



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Anzac - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	705	99.72	99.72
21 - 40	2	0.28	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Anzac - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	65	36	37	33	24	28	47	81	49	37	65	35	30	65	27	36	695
21 - 40	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	65	36	37	33	24	28	47	81	49	38	65	36	30	65	27	36	697

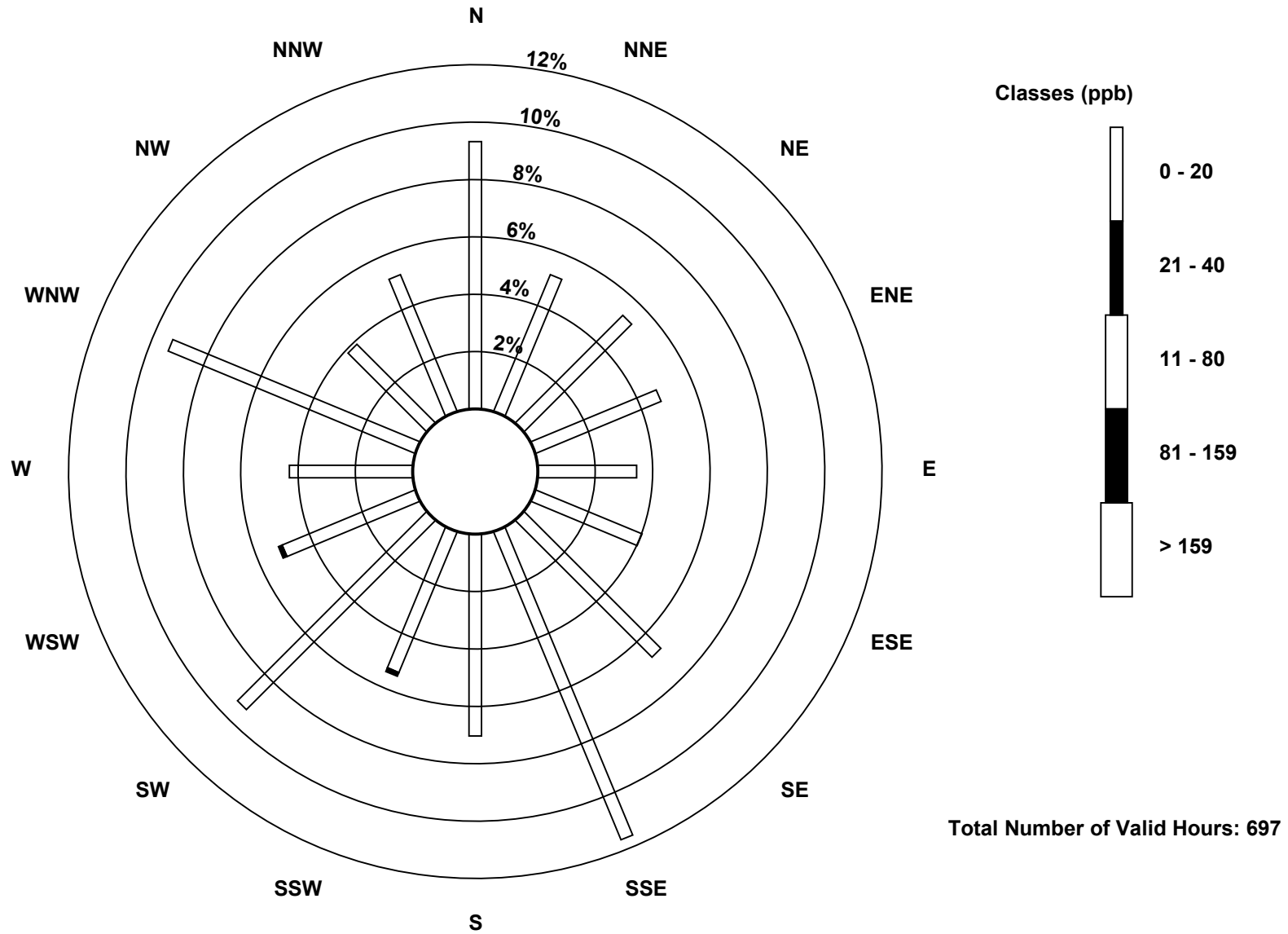
Total Number of Valid Hours: 697

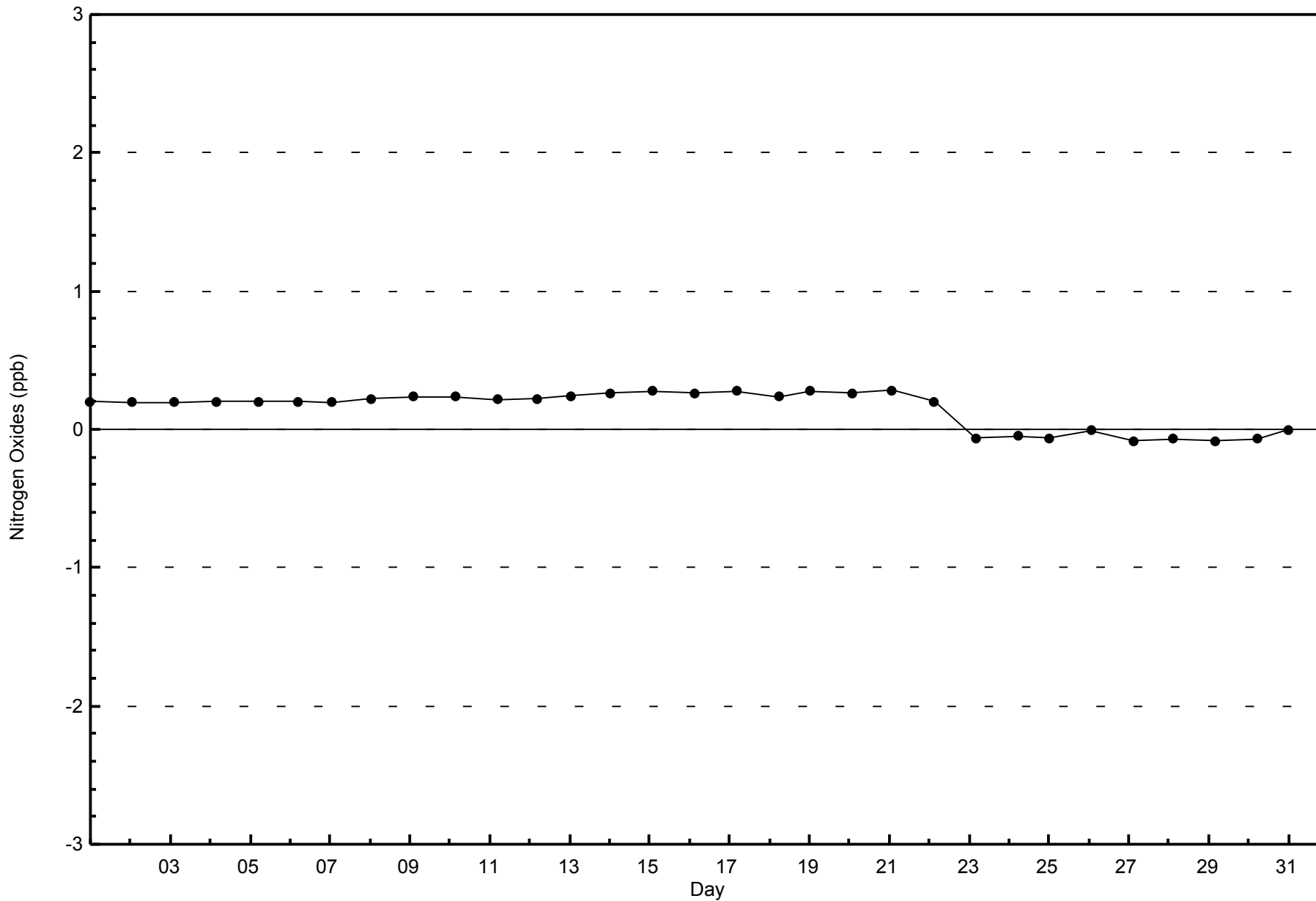
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Nitrogen Oxides (NO_x) - ppb
Anzac (AMS 14)

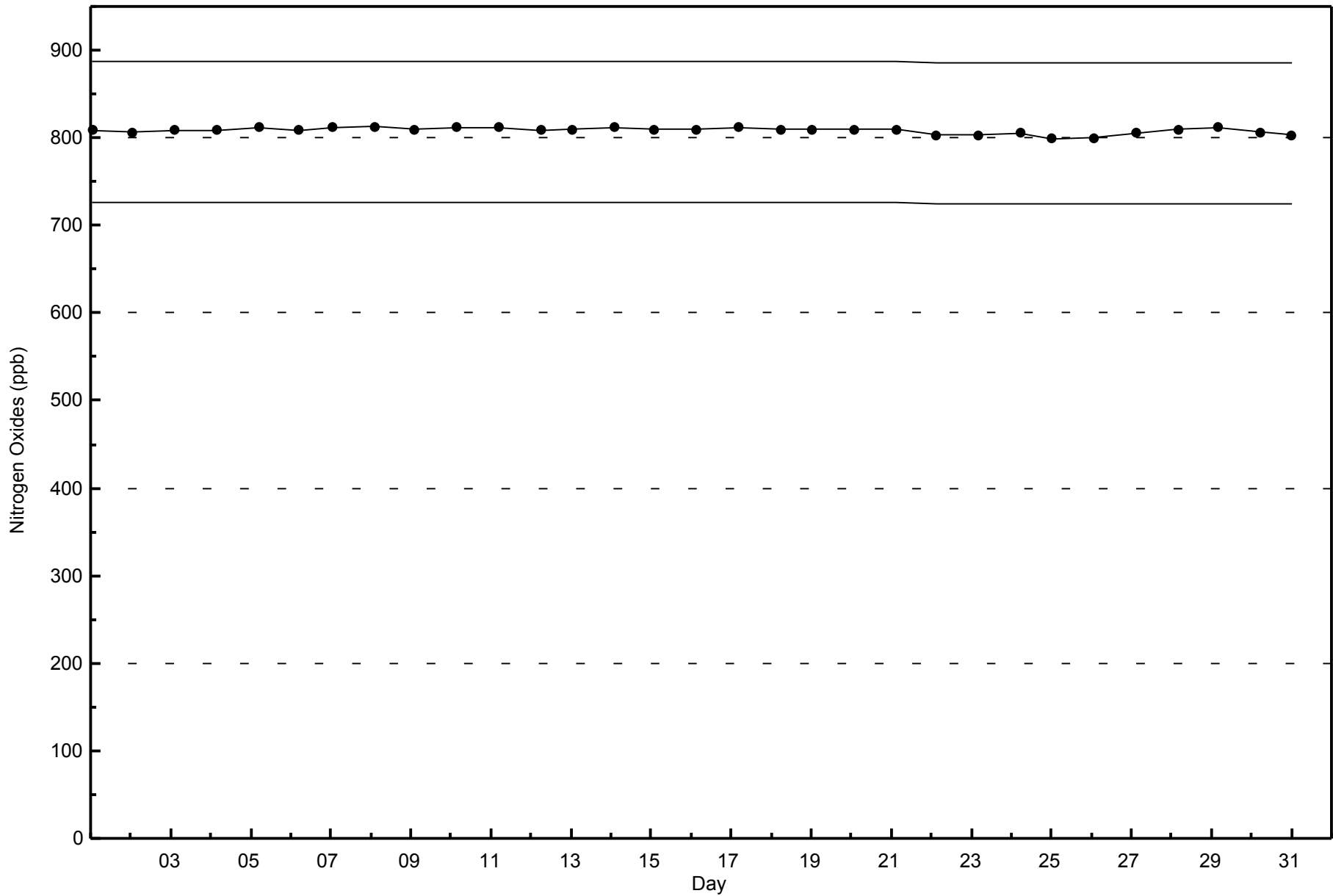






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Anzac - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Anzac - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 61 ppb on May 30 20:00	Maximum Daily Average: 51.9 ppb on May 14		Hours of Data:	708
Minimum Value: 9 ppb on May 10 01:00	Minimum Daily Average: 24.1 ppb on May 3		Hours of Missing Data:	36
Maximum Diurnal Average: 47.9 ppb at hour 16	Minimum Diurnal Average: 27.6 ppb at hour 5		Hours of Calibration:	36
Monthly Average: 38.7 ppb	Percentiles: P ₁ = 12 P ₁₀ = 21 Q ₁ = 29 Median = 39 Q ₃ = 48 P ₉₀ = 55 P ₉₉ = 60		Percent Operational Time:	100.0

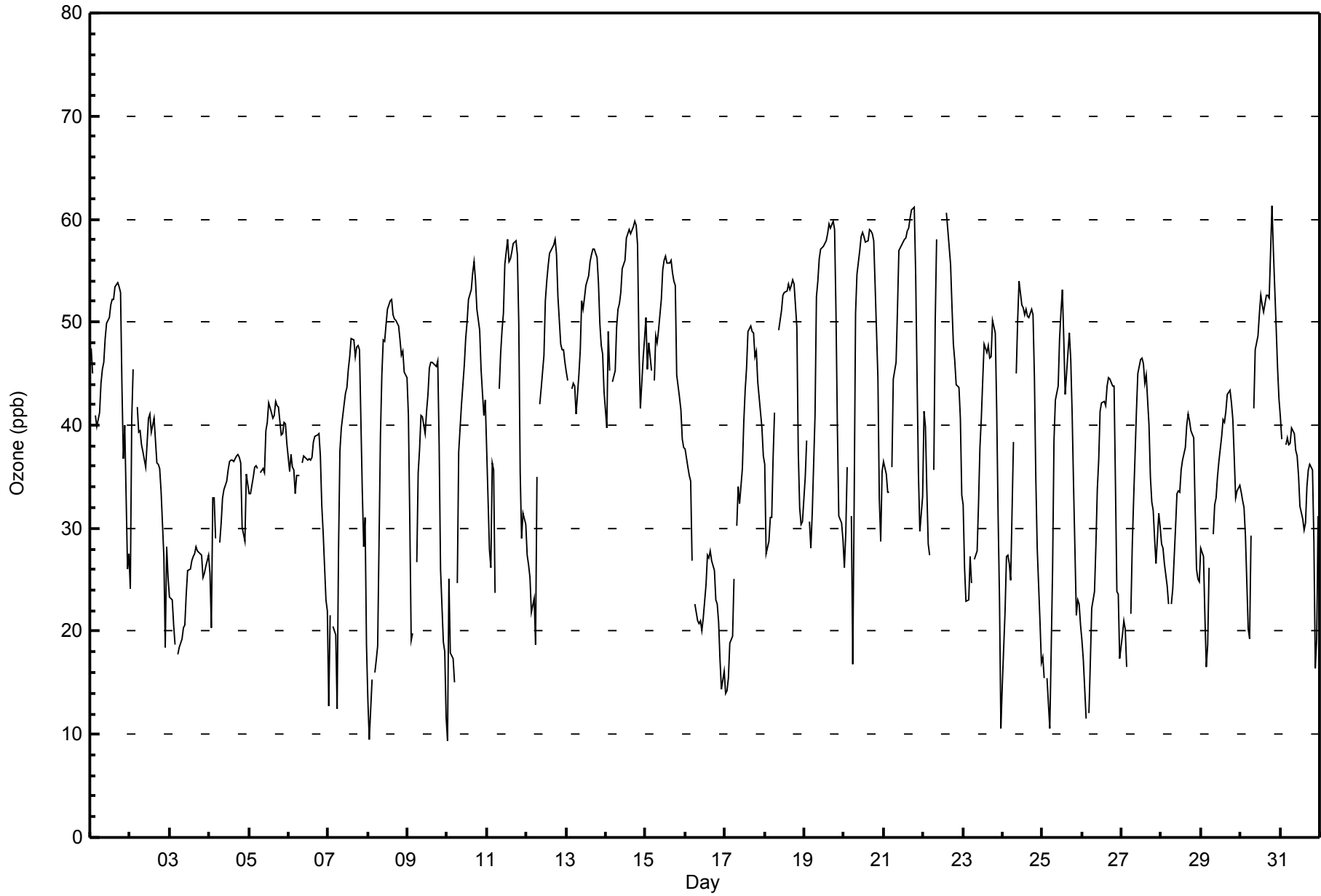
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	47	45	Z	41	40	41	44	45	46	48	50	50	52	52	52	53	54	53	53	44	37	40	26	28	45.3	54	
2-May	24	41	45	Z	42	39	39	38	37	36	38	41	41	39	41	39	36	36	36	34	27	18	28	25	35.7	45	
3-May	23	23	21	19	Z	18	18	19	20	21	24	26	26	27	27	28	28	28	28	27	25	26	26	27	24.1	28	
4-May	26	20	33	33	29	Z	29	31	33	34	35	36	36	37	37	36	37	37	37	36	30	29	35	34	33.0	37	
5-May	33	33	35	36	36	36	Z	35	36	35	39	40	42	41	41	41	42	42	42	39	39	40	40	38	38.4	42	
6-May	36	37	36	36	33	35	35	Z	36	37	37	37	37	37	37	38	39	39	39	39	37	32	30	23	22	35.0	39
7-May	13	21	Z	20	20	12	28	38	40	42	43	44	45	47	48	48	47	48	48	47	34	28	31	19	35.2	48	
8-May	13	10	15	Z	16	17	19	39	45	48	48	50	51	52	52	51	50	50	50	48	47	47	45	45	39.5	52	
9-May	41	31	19	20	Z	27	35	38	41	41	39	41	43	45	46	46	46	46	46	38	26	19	18	12	35.0	46	
10-May	9	25	18	17	15	Z	25	37	42	44	46	48	50	52	53	55	56	54	51	49	45	43	41	42	40.0	56	
11-May	38	28	26	36	36	24	Z	43	47	49	51	56	58	56	56	57	58	58	57	50	35	29	31	30	43.8	58	
12-May	27	26	25	22	23	19	35	Z	42	44	47	52	54	56	57	57	58	58	57	53	48	47	47	46	43.4	58	
13-May	45	44	Z	44	44	44	41	45	47	52	51	52	54	55	56	57	57	57	56	54	50	48	47	43	49.7	57	
14-May	40	49	45	Z	44	45	49	51	52	53	55	56	58	59	59	59	59	60	59	57	48	42	47	48	51.9	60	
15-May	50	45	48	45	Z	44	49	48	49	52	55	56	56	56	56	55	54	54	54	45	43	41	39	38	49.3	56	
16-May	38	36	35	35	27	Z	23	21	21	21	20	21	25	27	27	28	27	26	23	23	21	17	14	16	24.8	38	
17-May	14	14	15	19	19	25	Z	30	34	32	36	40	43	46	49	50	49	49	47	47	44	41	40	37	35.7	50	
18-May	36	28	29	31	31	37	41	Z	49	50	51	53	53	53	54	53	54	54	54	50	37	32	30	31	43.0	54	
19-May	35	38	Z	31	28	31	41	52	54	56	57	57	58	58	59	59	59	60	59	51	40	31	31	29	46.7	60	
20-May	26	30	36	Z	31	17	33	51	55	57	58	59	58	58	58	59	59	59	58	53	45	33	29	36	45.9	59	
21-May	36	35	33	34	Z	36	44	46	51	57	57	58	58	58	59	59	60	61	61	55	45	35	30	33	47.9	61	
22-May	41	40	34	28	27	Z	36	50	58	C	C	C	C	C	61	59	56	52	48	46	44	44	41	33	44.3	61	
23-May	32	26	23	23	27	25	Z	27	28	32	38	41	44	48	47	48	47	47	50	49	41	31	23	11	35.1	50	
24-May	15	22	27	27	27	25	38	Z	45	50	54	52	51	51	51	51	50	51	51	45	35	28	21	17	38.4	54	
25-May	17	15	Z	15	11	18	26	38	42	44	48	51	53	48	43	47	49	46	41	34	22	23	23	21	33.8	53	
26-May	19	17	11	Z	12	17	22	24	28	34	37	41	42	42	42	44	45	45	44	44	34	24	24	17	30.8	45	
27-May	20	21	20	17	Z	22	28	33	37	41	45	46	46	46	44	45	40	35	32	32	29	27	31	30	33.4	46	
28-May	28	28	27	24	23	Z	23	24	30	33	34	33	36	37	38	40	41	40	39	39	32	26	25	25	31.5	41	
29-May	28	27	21	16	19	26	Z	29	32	33	35	37	39	41	40	41	43	43	42	41	37	33	34	34	33.6	43	
30-May	33	33	32	29	20	19	29	Z	42	47	49	51	53	52	51	53	53	52	57	61	57	50	46	43	43.9	61	
31-May	41	39	Z	38	39	38	38	40	39	38	37	35	32	31	30	31	34	36	36	36	29	16	19	31	34.0	41	
29.9 30.0 28.5 28.3 27.6 28.4 33.4 37.5 40.6 42.1 43.8 45.3 46.5 46.8 47.4 47.9 47.9 47.6 46.9 44.0 37.3 32.8 31.8 30.4																								Diurnal Average			
50 49 48 45 44 45 49 52 58 57 58 59 58 59 61 59 60 61 61 61 61 57 50 47 48																								Diurnal Maximum			

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Anzac - May 2015





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Anzac - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	61	8.62	8.62
21 - 50	506	71.47	80.08
51 - 82	141	19.92	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Anzac - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	2	0	0	2	3	1	6	9	8	7	4	4	0	0	3	8	57
21 - 50	59	35	33	30	21	22	37	59	28	27	45	15	14	30	20	25	500
51 - 82	4	0	4	0	0	5	6	13	12	8	18	17	16	32	4	2	141
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	65	35	37	32	24	28	49	81	48	42	67	36	30	62	27	35	698

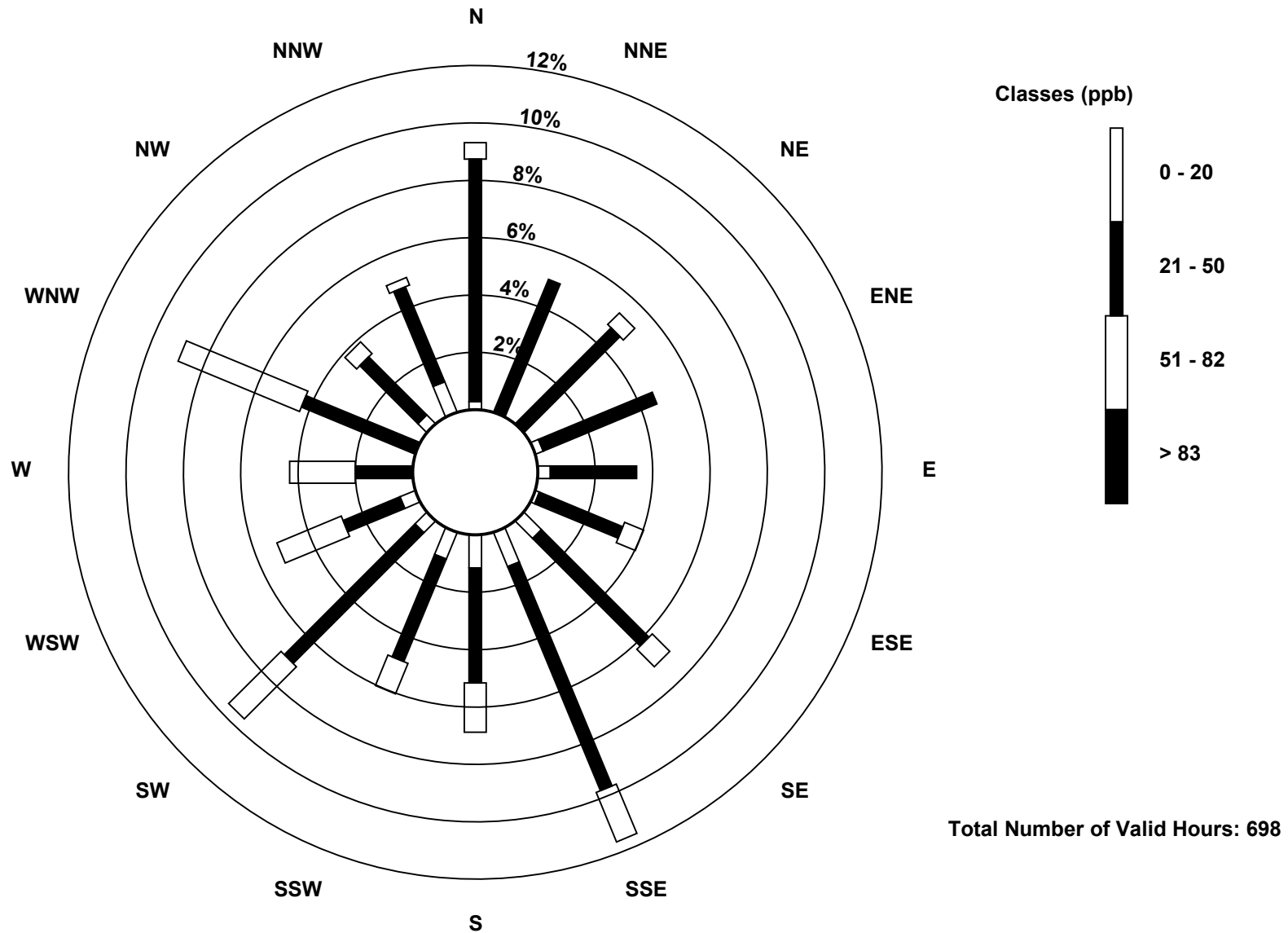
Total Number of Valid Hours: 698

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

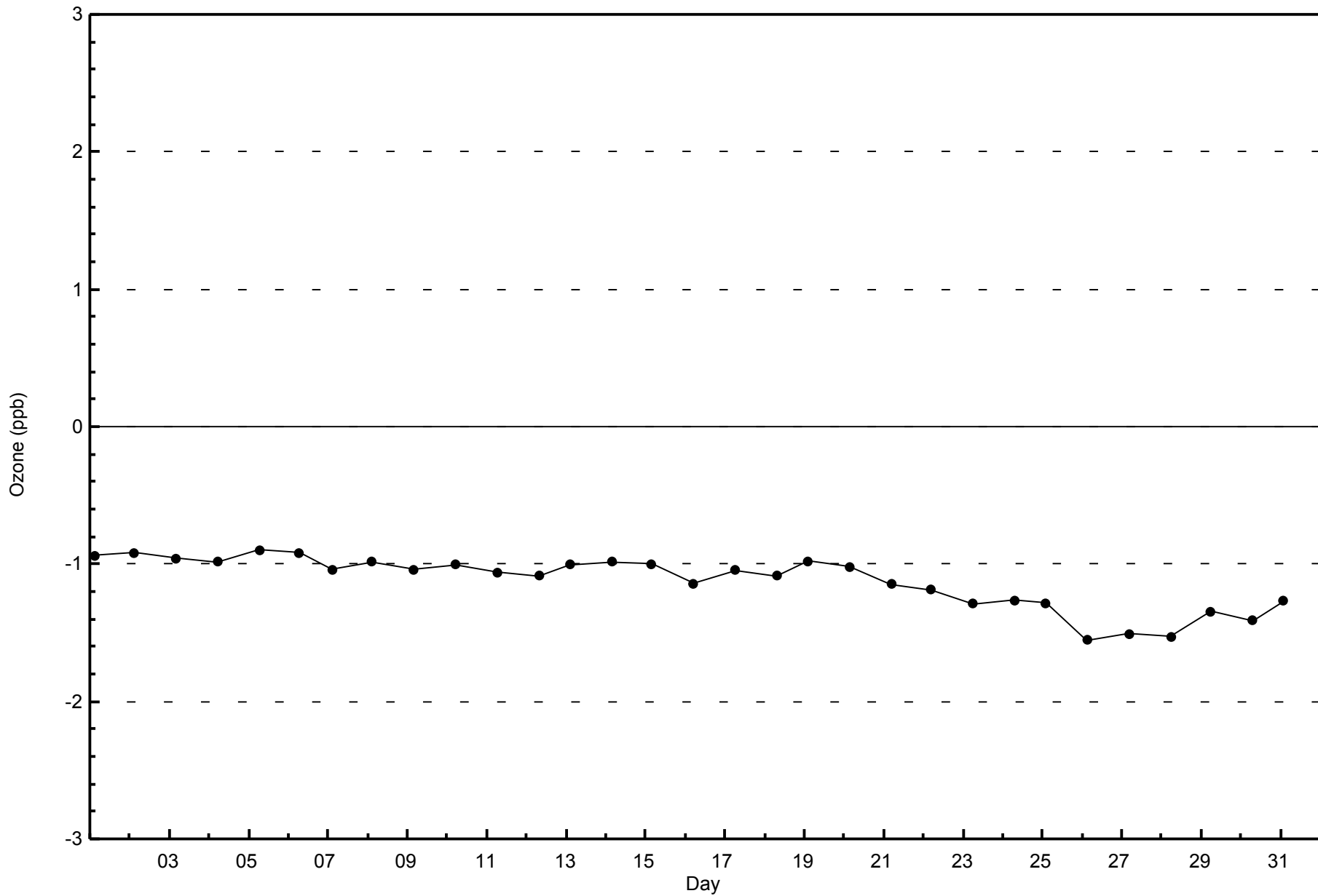
Ozone (O₃) - ppb
Anzac (AMS 14)





WBEA
Zero Responses

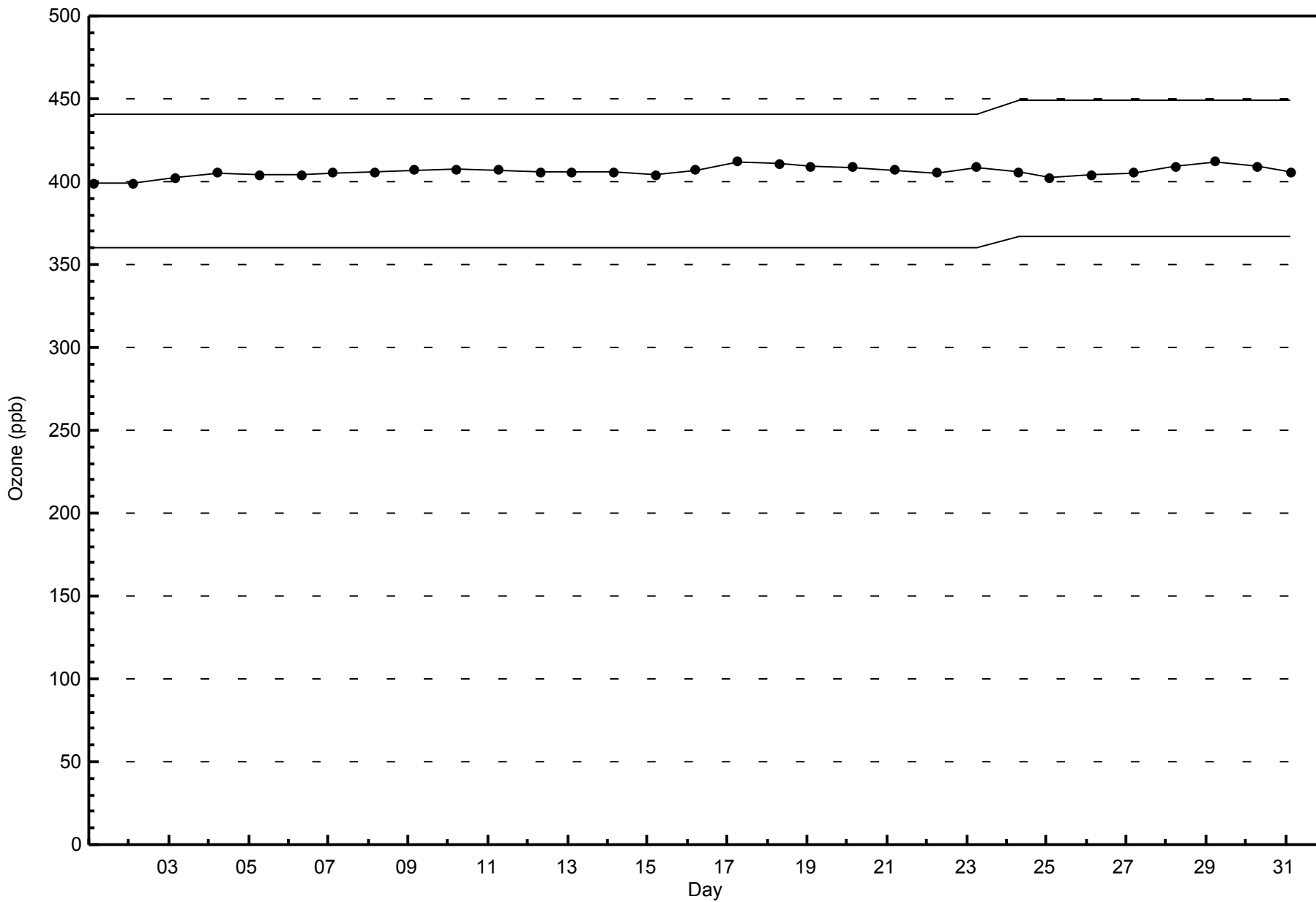
Ozone (O₃) - ppb
Anzac - May 2015





WBEA
Span Responses

Ozone (O₃) - ppb
Anzac - May 2015





Summary of Hour Averages

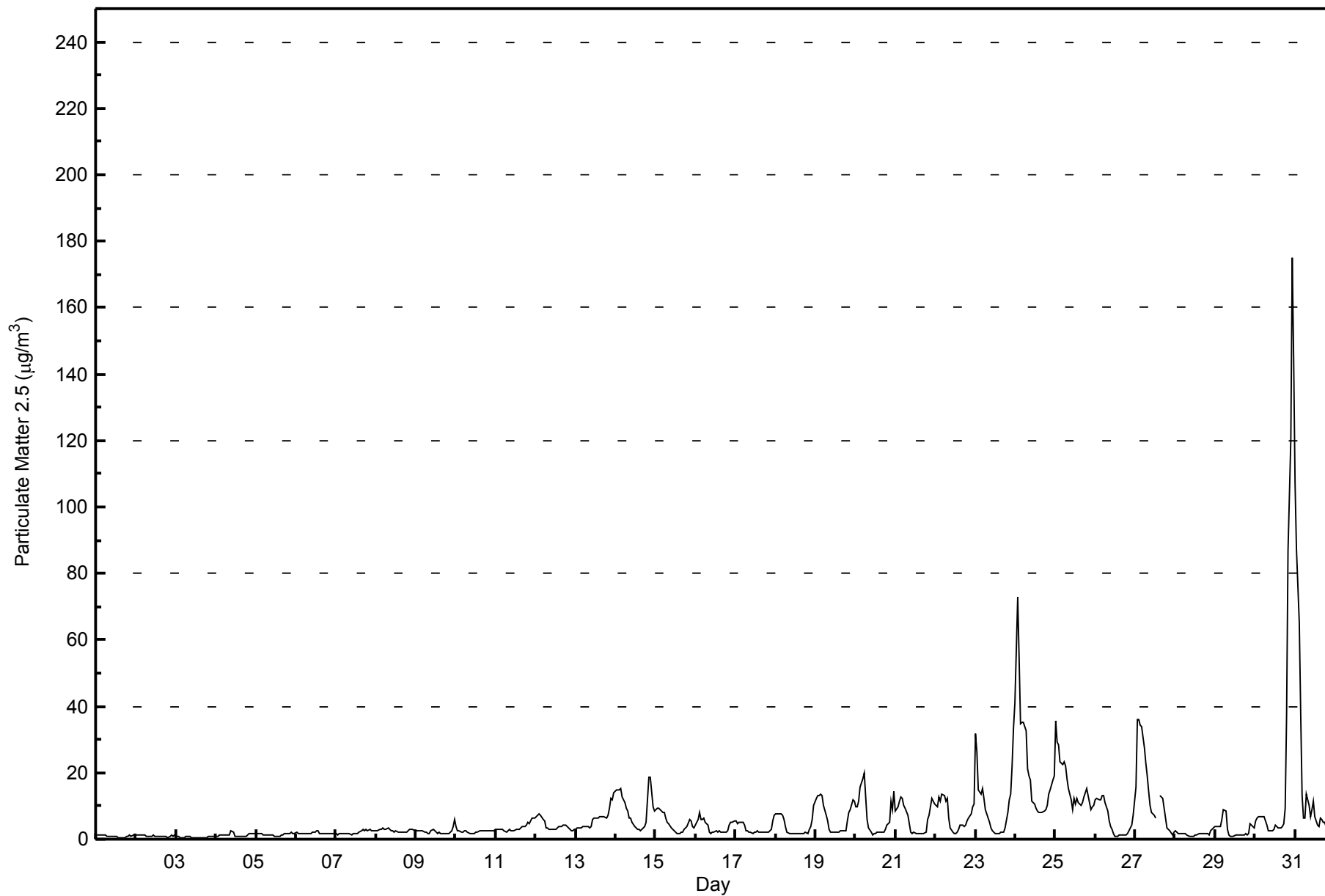
Anzac - May 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 174.9 µg/m ³ on May 30 23:00 Minimum Value: 0.3 µg/m ³ on May 3 17:00 Maximum Diurnal Average: 12.6 µg/m ³ at hour 2 Monthly Average: 6.44 µg/m ³																						Hours in Service: 744 Hours of Data: 742 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																											
Maximum Daily Average: 27.3 µg/m ³ on May 30 Minimum Daily Average: 0.6 µg/m ³ on May 3 Minimum Diurnal Average: 2.7 µg/m ³ at hour 15 Percentiles: P ₁ = 0.5 P ₁₀ = 1.0 Q ₁ = 1.7 Median = 2.7 Q ₃ = 6.9 P ₉₀ = 12.7 P ₉₉ = 60.0																																																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	1.3	1.3	1.3	1.3	1.3	1.3	0.9	0.8	0.9	0.8	0.8	0.8	0.8	0.6	0.4	0.5	0.5	0.5	0.5	0.6	1.0	1.1	0.8	1.3	1.2	0.9	1.3																						
2-May	1.2	1.2	1.1	1.1	1.2	1.2	0.8	0.7	0.8	1.0	1.2	0.8	0.8	0.9	0.8	0.7	0.8	0.8	0.6	0.4	0.9	1.1	1.0	1.1	0.9	1.2	1.2																						
3-May	0.8	0.7	0.6	0.6	0.6	0.6	0.7	0.7	0.6	0.6	0.4	0.5	0.5	0.4	0.6	0.3	0.3	0.5	0.6	0.9	0.9	0.9	0.8	0.9	0.6	0.9	0.9																						
4-May	0.9	0.9	1.1	1.2	1.2	1.2	1.2	1.4	1.5	2.4	1.9	0.9	0.8	0.8	0.8	0.7	0.8	0.8	0.9	1.1	1.6	1.8	1.7	1.7	1.2	2.4	2.4																						
5-May	1.6	1.6	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.4	1.4	1.0	1.0	1.0	1.0	1.4	1.3	1.6	1.7	1.7	1.8	1.9	1.9	1.9	1.5	1.9	1.9																						
6-May	2.0	1.9	1.7	1.6	1.6	1.5	1.7	1.7	1.7	1.9	2.0	2.1	2.5	2.5	1.6	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.5	1.6	1.7	2.5	2.5																						
7-May	1.5	1.5	1.5	1.5	1.6	1.6	1.7	1.7	1.6	1.4	1.5	1.5	1.7	1.9	2.1	2.4	2.8	2.7	2.8	2.7	3.0	2.7	2.5	2.7	2.0	3.0	3.0																						
8-May	2.6	2.7	3.0	3.0	3.4	2.9	3.0	3.3	3.0	2.6	2.5	2.3	2.4	2.3	2.2	2.2	2.1	2.2	2.3	2.4	2.8	3.1	2.8	2.7	2.7	3.4	3.4																						
9-May	2.6	2.5	2.5	2.7	2.5	2.3	2.1	1.8	1.8	2.5	3.0	2.4	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.9	2.6	3.7	5.9	2.4	5.9	5.9																						
10-May	3.8	2.5	2.4	2.3	2.3	2.4	2.5	1.9	1.6	1.6	1.7	1.9	2.0	2.1	2.7	2.5	2.6	2.6	2.5	2.4	2.5	2.4	2.3	2.6	2.3	3.8	3.8																						
11-May	3.0	3.1	3.1	3.0	2.8	2.7	2.2	2.5	2.8	2.4	2.5	2.6	3.0	3.1	3.1	3.3	3.7	3.9	4.2	4.9	4.7	5.3	6.3	6.6	3.5	6.6	6.6																						
12-May	6.7	7.4	7.7	7.3	6.1	5.6	3.5	3.2	3.1	3.0	3.0	2.9	2.9	3.2	3.8	3.9	4.1	4.3	4.2	4.0	3.2	2.6	2.7	2.8	4.2	7.7	7.7																						
13-May	2.9	3.5	3.5	3.6	3.7	3.8	4.0	3.9	3.5	3.9	6.0	6.3	6.5	6.6	6.9	7.0	6.9	6.8	6.5	7.2	9.2	12.2	12.1	13.8	6.3	13.8	13.8																						
14-May	14.9	14.8	14.9	15.4	12.8	11.1	9.2	8.4	6.2	6.2	5.0	3.8	3.3	3.0	2.8	2.7	3.3	4.0	5.2	12.0	18.5	18.6	9.8	8.5	8.9	18.6	18.6																						
15-May	8.7	9.2	9.3	8.6	8.2	8.0	6.5	5.3	4.8	3.6	2.9	2.3	2.0	1.9	1.9	2.1	2.1	3.0	3.5	3.9	6.1	5.5	3.6	3.6	4.9	9.3	9.3																						
16-May	4.4	6.0	8.1	6.0	5.9	6.3	5.1	4.2	2.1	1.8	2.0	2.0	2.3	2.3	2.4	2.2	2.2	2.1	2.1	2.6	4.4	5.1	5.2	5.5	3.9	8.1	8.1																						
17-May	5.4	4.8	5.0	5.2	4.9	4.2	2.7	2.7	2.2	2.3	1.9	2.0	2.1	2.6	2.3	2.1	2.0	2.0	2.2	2.1	2.2	2.9	5.3	7.3	3.3	7.3	7.3																						
18-May	7.6	7.7	7.7	7.5	7.2	5.9	3.7	2.0	1.6	1.6	1.6	1.6	1.8	1.8	1.9	1.8	1.8	1.6	1.9	1.9	3.0	3.9	5.8	10.0	3.9	10.0	10.0																						
19-May	12.3	13.1	13.2	13.8	13.2	10.3	7.2	5.5	2.8	2.0	2.1	2.1	2.1	2.3	2.3	2.4	2.5	2.6	2.7	5.4	7.9	9.1	11.7	11.3	6.7	13.8	13.8																						
20-May	9.8	9.9	11.4	15.5	18.2	19.9	12.6	5.9	3.2	2.0	1.5	1.7	1.8	2.3	2.2	2.1	2.0	2.0	3.0	4.0	5.1	11.6	9.0	14.3	7.1	19.9	19.9																						
21-May	8.6	9.6	11.6	12.6	12.1	10.1	9.3	7.3	4.8	2.1	1.6	2.3	1.8	1.7	1.7	1.7	1.7	1.7	2.2	6.0	7.1	9.9	12.3	10.7	6.3	12.6	12.6																						
22-May	10.4	9.8	12.7	11.6	13.7	12.9	11.3	12.2	6.6	3.4	2.0	1.6	1.5	2.3	3.0	4.1	4.4	3.9	4.4	5.4	6.4	7.8	9.6	10.7	7.1	13.7	13.7																						
23-May	31.7	26.1	14.9	13.5	15.1	12.1	8.9	7.8	5.3	3.6	2.6	2.0	1.7	1.6	1.8	2.0	2.0	2.1	3.5	7.9	11.9	13.5	22.2	33.6	10.3	33.6	33.6																						
24-May	40.9	72.8	54.4	34.9	35.2	35.4	32.7	21.4	19.3	17.9	11.3	10.6	9.3	8.3	8.0	8.2	8.0	8.4	9.1	10.3	13.5	15.0	17.6	18.9	21.7	72.8	72.8																						
25-May	35.6	29.3	28.4	23.1	22.3	23.1	22.2	18.1	15.2	11.7	8.9	12.1	10.7	12.1	10.9	10.3	10.9	12.8	14.1	15.0	10.9	9.1	9.7	10.1	16.1	35.6	35.6																						
26-May	11.8	12.1	11.9	11.9	13.0	13.0	10.9	8.5	5.5	3.9	3.2	1.8	1.0	0.9	1.1	1.2	1.2	1.2	1.2	1.6	2.5	3.5	4.4	7.4	5.6	13.0	13.0																						
27-May	15.6	36.0	36.2	34.3	34.0	27.5	22.8	19.2	14.6	10.0	7.9	7.4	6.5	M	M	13.3	12.4	9.4	6.4	3.5	2.8	2.7	1.4	2.2	14.8	36.2	36.2																						
28-May	2.5	2.0	1.6	1.6	1.7	1.6	1.6	1.3	0.9	0.9	1.0	1.0	1.2	1.3	1.6	1.6	1.6	1.6	1.8	1.9	1.8	1.4	2.4	3.2	1.7	3.4	3.4																						
29-May	3.8	3.7	3.8	3.8	6.0	9.1	8.4	3.0	1.1	0.9	0.9	1.0	1.1	1.3	1.5	1.4	1.4	1.4	1.5	1.5	1.7	4.5	4.2	3.4	2.9	9.1	9.1																						
30-May	5.4	6.5	6.9	6.9	6.9	7.0	5.4	4.1	2.3	2.4	2.6	2.9	4.3	4.0	3.5	3.2	3.7	4.6	9.2	37.8	86.8	120.5	174.9	144.5	27.3	174.9	174.9																						
31-May	107.4	87.2	65.1	38.1	13.1	6.5	6.2	13.5	10.1	6.6	9.0	11.6	7.0	4.1	3.7	6.4	5.9	5.3	4.9	2.5	1.8	2.1	1.8	2.2	17.6	107.4	107.4																						
																								11.9	12.6	11.2	9.5	8.8	8.1	6.8	5.7	4.3	3.5	3.1	3.1	2.8	2.7	2.7	3.1	3.2	3.2	3.5	5.1	7.4	9.2	11.4	11.4	Diurnal Average	
																								107.4	87.2	65.1	38.1	35.2	35.4	32.7	21.4	19.3	17.9	11.3	12.1	10.7	12.1	10.9	13.3	12.4	12.8	14.1	37.8	86.8	120.5	174.9	144.5	Diurnal Maximum	
M - Maintenance																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																	



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - May 2015





WBEA

Cumulative Frequency Distribution

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

Anzac - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	441	59.43	59.43
6 - 15	182	24.53	83.96
16 - 25	19	2.56	86.52
26 - 80	21	2.83	89.35
> 81.0	6	0.81	90.16

Total Number of Valid Hours: 742

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Anzac - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	44	29	24	23	16	21	35	53	26	25	27	26	16	40	9	16	430
6 - 15	12	5	7	7	6	4	7	22	16	14	35	11	5	12	8	11	182
16 - 25	0	0	0	0	0	0	2	1	4	4	6	1	0	1	0	0	19
26 - 80	0	0	2	0	0	1	3	4	3	2	1	1	2	0	0	2	21
> 81.0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	0	0	6
Totals	56	34	33	30	22	26	47	85	50	45	69	39	23	53	17	29	658

Total Number of Valid Hours: 731

Total Number of Hours: 744

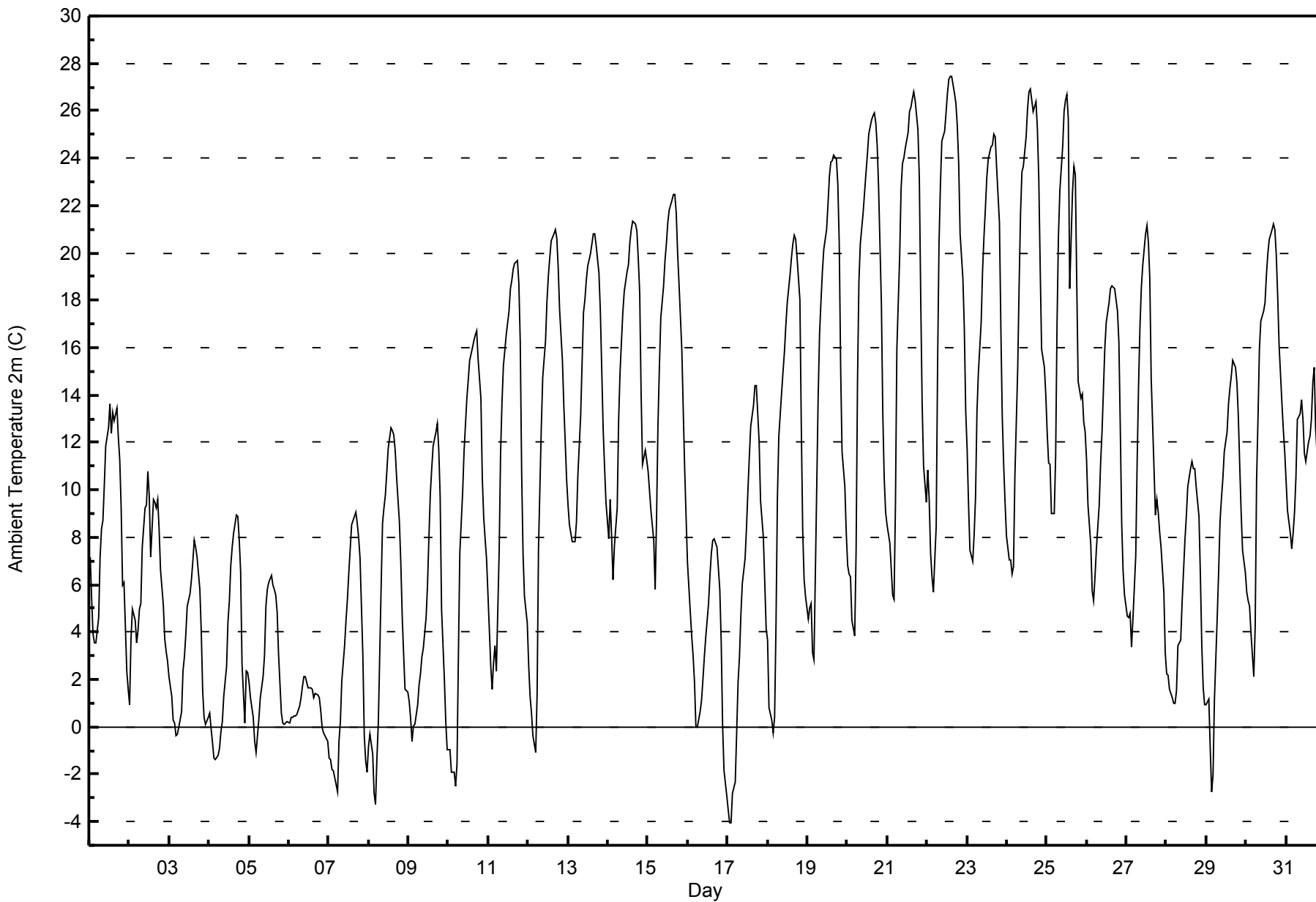


Maximum Value: 27.5 C on May 22 16:00		Maximum Daily Average: 19.3 C on May 22		Hours in Service: 744																																													
Minimum Value: -4.1 C on May 17 02:00		Minimum Daily Average: 0.9 C on May 6		Hours of Data: 744																																													
Maximum Diurnal Average: 16.6 C at hour 17		Minimum Diurnal Average: 2.6 C at hour 5		Hours of Missing Data: 0																																													
Monthly Average: 10.34 C		Percentiles: P ₁ = -2.7 P ₁₀ = 0.3 Q ₁ = 3.9 Median = 9.3 Q ₃ = 16.3 P ₉₀ = 21.6 P ₉₉ = 26.7		Hours of Calibration: 0																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	7.2	5.4	3.9	3.6	3.5	4.6	7.1	8.3	8.7	10.2	11.9	12.6	13.6	12.4	13.3	12.9	13.4	12.2	11.3	9.2	6.0	6.1	2.3	1.6	8.4	13.6																							
2-May	0.9	3.7	5.0	4.5	3.5	4.1	5.0	5.2	7.6	9.2	9.4	10.8	9.7	7.1	9.6	9.5	9.2	9.6	8.4	6.6	5.2	3.7	3.2	2.8	6.4	10.8																							
3-May	2.1	1.3	0.3	0.2	-0.3	-0.3	0.0	0.6	2.4	2.9	3.9	5.1	5.6	6.2	7.0	7.9	7.6	7.2	5.8	4.0	1.5	0.4	0.1	0.4	3.0	7.9																							
4-May	0.6	-0.1	-0.7	-1.3	-1.4	-1.2	-0.9	-0.2	0.2	1.3	2.6	4.4	5.3	6.8	7.6	8.2	8.9	8.9	7.9	6.6	2.7	0.1	2.4	2.3	3.0	8.9																							
5-May	1.9	1.2	0.4	-0.6	-1.1	-0.4	0.3	1.2	2.1	3.0	5.1	5.8	6.1	6.4	6.0	5.8	5.5	4.8	3.1	0.6	0.1	0.1	0.2	0.2	2.4	6.4																							
6-May	0.2	0.4	0.4	0.5	0.5	0.5	0.9	1.2	1.7	2.1	2.1	1.7	1.7	1.7	1.6	1.2	1.4	1.3	1.2	0.7	0.0	-0.3	-0.5	-0.6	0.9	2.1																							
7-May	-1.3	-1.4	-1.8	-1.9	-2.5	-2.7	-0.6	0.2	1.9	3.4	4.5	5.4	6.5	7.5	8.5	8.9	9.1	8.6	8.0	7.1	3.0	-0.4	-1.5	-1.9	2.8	9.1																							
8-May	-0.9	-0.3	-1.1	-2.8	-3.3	-1.3	0.2	5.9	8.6	9.3	9.8	10.7	11.7	12.6	12.5	12.3	11.7	10.6	8.6	6.9	4.7	3.1	1.6	1.4	5.5	12.6																							
9-May	1.1	0.4	-0.6	0.0	0.1	0.9	1.8	2.2	2.9	3.3	4.6	5.9	8.0	9.9	10.9	11.9	12.5	12.8	11.7	9.7	4.9	2.0	0.2	-1.0	4.8	12.8																							
10-May	-1.0	-0.9	-1.9	-1.9	-2.5	-1.5	3.0	7.3	9.9	11.6	12.7	13.8	14.6	15.5	16.0	16.3	16.5	16.7	15.5	13.8	10.5	8.8	7.9	7.1	8.7	16.7																							
11-May	5.6	2.6	1.6	2.7	3.4	2.3	7.4	11.5	13.7	15.2	15.9	16.5	17.5	18.5	18.8	19.3	19.6	19.7	18.7	16.2	10.7	7.3	5.5	4.4	11.4	19.7																							
12-May	2.6	1.3	0.6	-0.4	-1.1	1.4	7.6	10.1	12.7	14.7	16.3	18.0	19.0	19.8	20.5	20.8	21.0	20.6	19.4	17.6	15.5	13.6	12.0	10.5	12.3	21.0																							
13-May	9.4	8.5	7.8	7.8	7.8	8.7	10.6	13.2	15.4	17.5	18.0	18.8	19.4	20.0	20.4	20.8	20.8	20.3	19.1	17.5	15.0	12.6	11.0	9.5	14.6	20.8																							
14-May	7.9	9.6	8.0	6.2	7.6	9.2	12.9	14.9	16.2	17.5	18.4	19.2	19.5	20.4	21.0	21.3	21.2	20.9	19.7	18.3	14.1	11.1	11.6	11.3	14.9	21.3																							
15-May	10.8	9.9	9.1	7.8	5.8	8.8	12.7	15.2	17.3	18.6	19.7	20.4	21.3	21.8	22.3	22.5	22.4	21.7	20.0	18.7	15.9	13.3	10.9	8.9	15.7	22.5																							
16-May	6.9	4.9	3.8	3.0	1.9	0.0	0.0	0.6	1.1	2.0	3.0	3.8	5.2	6.4	7.4	7.8	7.9	7.5	6.7	5.8	3.6	0.1	-1.8	-2.9	3.5	7.9																							
17-May	-3.5	-4.1	-4.0	-2.8	-2.3	-0.3	1.9	3.0	4.7	6.0	7.1	8.4	10.0	11.4	12.7	13.5	14.4	14.4	13.2	12.0	9.5	8.0	6.1	4.1	6.0	14.4																							
18-May	3.7	0.8	0.3	-0.2	0.4	4.3	9.6	12.2	14.1	15.0	15.8	17.0	17.9	19.1	19.8	20.4	20.7	20.6	19.8	18.0	12.7	8.3	6.2	5.5	11.8	20.7																							
19-May	4.6	5.0	5.2	3.1	2.8	6.4	13.9	16.6	18.0	19.2	20.1	21.0	22.1	23.2	23.9	23.9	24.1	23.9	22.9	20.4	15.1	11.6	10.1	8.2	15.2	24.1																							
20-May	6.8	6.5	6.3	4.5	3.8	7.4	14.6	18.8	20.4	21.7	22.5	23.4	24.1	25.0	25.6	25.8	25.9	25.5	24.5	22.8	17.9	13.2	10.5	9.0	16.9	25.9																							
21-May	8.5	7.8	6.7	5.6	5.4	9.4	16.0	19.8	22.7	23.8	24.0	24.4	25.1	26.0	26.2	26.5	26.8	26.4	25.2	23.1	18.0	13.6	11.0	9.5	18.0	26.8																							
22-May	10.9	9.6	7.3	6.3	5.7	8.5	15.3	20.4	22.9	24.7	25.1	25.9	26.7	27.3	27.5	27.5	26.7	26.3	25.4	23.8	20.8	18.9	16.8	13.3	19.3	27.5																							
23-May	11.7	9.4	7.5	7.0	8.1	9.7	13.3	14.9	17.1	19.2	20.7	21.9	23.2	23.9	24.5	24.5	25.0	24.9	23.6	21.3	16.9	13.1	11.1	9.5	16.7	25.0																							
24-May	8.0	7.1	7.0	6.4	6.7	10.6	15.1	18.6	21.7	23.4	23.7	24.9	26.1	26.8	26.9	26.4	26.0	26.4	25.3	23.1	19.4	15.9	15.2	14.0	18.5	26.9																							
25-May	12.4	11.1	11.1	9.0	9.0	11.4	17.1	20.7	22.7	24.5	26.0	26.4	26.7	25.6	18.5	22.6	23.7	23.3	18.8	14.6	13.9	14.1	12.9	12.5	17.9	26.7																							
26-May	11.2	9.4	7.7	5.7	5.3	6.3	7.5	9.3	11.1	12.5	14.2	16.0	17.1	17.9	18.5	18.6	18.6	18.5	17.6	16.2	12.6	8.6	6.5	5.5	12.2	18.6																							
27-May	4.7	4.6	4.8	3.4	4.5	7.2	11.2	14.4	16.9	18.5	19.5	20.8	21.2	20.4	18.9	14.7	10.9	9.0	9.6	9.0	8.2	7.6	5.7	3.2	11.2	21.2																							
28-May	2.3	2.2	1.6	1.2	1.0	1.0	1.5	3.4	3.6	5.3	6.6	7.9	8.9	10.1	10.9	11.2	10.9	10.9	10.1	8.9	6.4	3.4	1.7	0.9	5.5	11.2																							
29-May	0.9	1.2	-0.9	-2.7	-2.0	1.2	4.7	6.6	8.7	9.6	10.5	11.6	12.4	13.6	14.3	14.8	15.5	15.2	14.5	13.1	11.0	9.0	7.5	6.5	8.2	15.5																							
30-May	5.7	5.3	5.1	3.9	2.1	4.3	10.4	13.0	16.0	17.1	17.5	17.9	19.1	20.0	20.5	21.0	21.2	21.0	19.9	18.2	16.1	13.7	12.6	11.6	13.9	21.2																							
31-May	10.4	9.1	8.2	7.5	8.2	9.1	10.5	13.0	13.2	13.8	13.0	11.5	11.2	12.0	12.2	13.0	14.5	15.2	12.6	10.4	10.2	9.0	8.2	9.6	11.1	15.2																							
																								4.9	4.2	3.5	2.8	2.6	4.2	7.4	9.8	11.5	12.8	13.7	14.6	15.4	16.0	16.3	16.5	16.6	16.3	15.1	13.4	10.4	8.0	6.7	5.7	Diurnal Average	
																								12.4	11.1	11.1	9.0	9.0	11.4	17.1	20.7	22.9	24.7	26.0	26.4	26.7	27.3	27.5	27.5	26.8	26.4	25.4	23.8	20.8	18.9	16.8	14.0	Diurnal Maximum	



WBEA
Hourly Averages

Ambient Temperature 2m (AT 2m) - C
Anzac - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature 2m (AT 2m) - C
Anzac - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	56	7.53	7.53
0 - 10	343	46.10	53.63
10 - 20	235	31.59	85.22
> 20	110	14.78	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

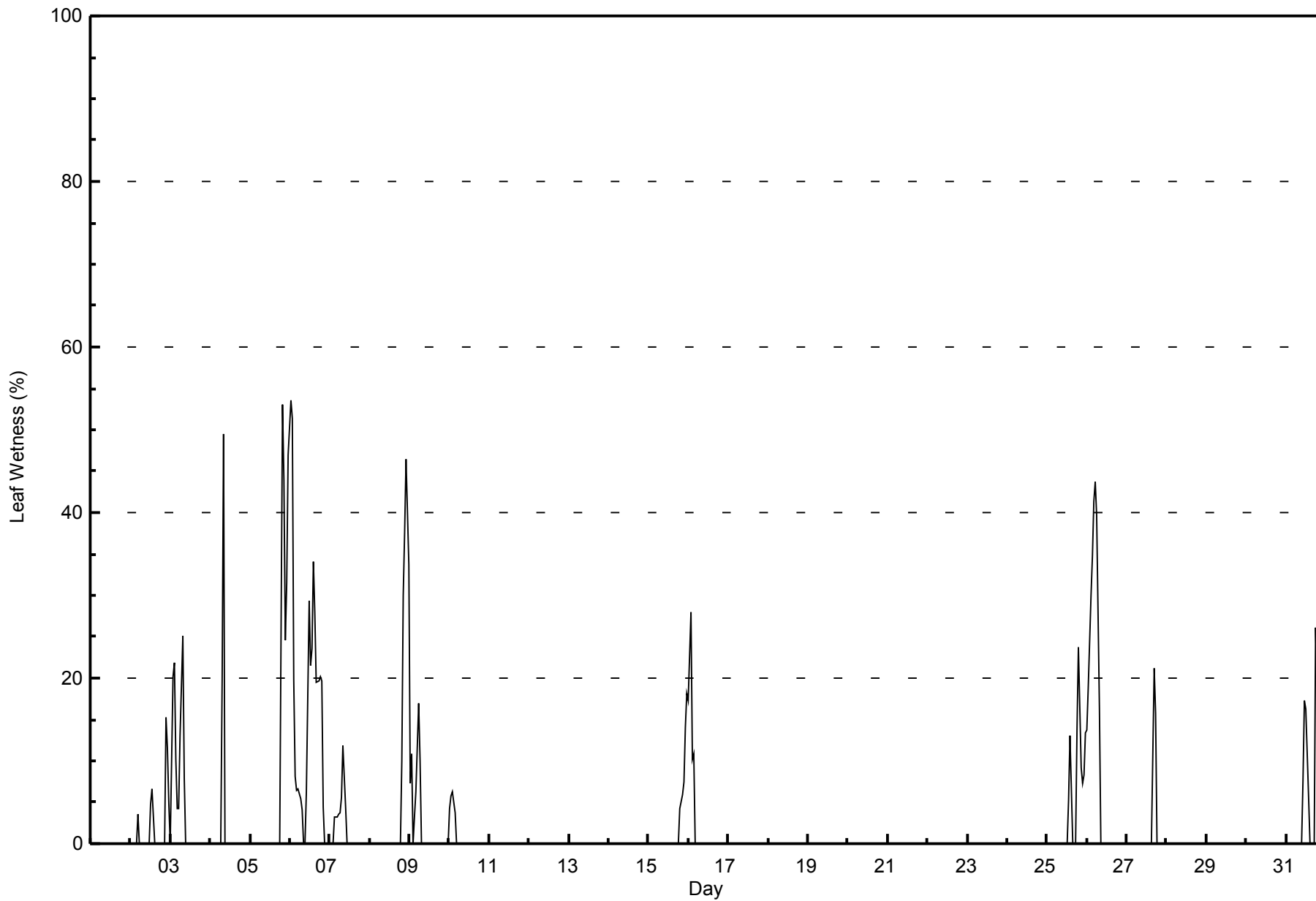


Maximum Value: 54 % on May 6 01:00																	Maximum Daily Average: 15.9 % on May 6																	Hours in Service: 744																																
Minimum Value: 0 % on May 1 01:00																	Minimum Daily Average: 0.0 % on May 1																	Hours of Data: 744																																
Maximum Diurnal Average: 4.6 % at hour 24																	Minimum Diurnal Average: 0.1 % at hour 10																	Hours of Missing Data: 0																																
Monthly Average: 2.3 %																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 6 P ₉₉ = 42																	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-May	0	0	0	0	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-May	0	0	0	0	3	0	0	0	0	0	0	0	5	7	0	0	0	0	0	0	0	15	11	5	1.9	15																																								
3-May	0	20	22	10	4	4	13	25	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.5	25																																								
4-May	0	0	0	0	0	0	0	20	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.9	49																																								
5-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	44	25	32	47	8.3	53																																							
6-May	54	51	20	8	6	7	5	4	0	0	6	29	22	24	34	28	19	20	20	20	4	0	0	0	15.9	54																																								
7-May	0	0	0	3	3	4	4	6	12	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.5	12																																								
8-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	30	38	46	34	6.6	46																																								
9-May	7	11	0	3	6	17	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3	17																																								
10-May	4	6	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	6																																								
11-May	0	0	0	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-May	0	0	0	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-May	0	0	0	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-May	0	0	0	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-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	7	14	18	2.1	18																																							
16-May	17	28	10	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.8	28																																								
17-May	0	0	0	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-May	0	0	0	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-May	0	0	0	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-May	0	0	0	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-May	0	0	0	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-May	0	0	0	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-May	0	0	0	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-May	0	0	0	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-May	0	0	0	0	0	0	0	0	0	0	0	0	0	5	13	0	0	0	14	24	9	7	8	13	3.9	24																																								
26-May	14	19	30	35	41	44	40	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.9	44																																								
27-May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	16	0	0	0	0	0	0	1.5	21																																								
28-May	0	0	0	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-May	0	0	0	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-May	0	0	0	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-May	0	0	0	0	0	0	0	0	0	0	8	17	16	6	0	0	0	0	26	11	6	11	21	25	6.1	26																																								
																	3.1		4.4		2.8		2.4		2.1		2.4		2.3		2.3		2.2		0.1		0.4		1.5		1.4		1.3		1.5		0.9		1.3		1.1		1.9		3.9		3.2		3.3		4.3		4.6		Diurnal Average	
																	54		51		30		35		41		44		40		25		49		4		8		29		22		24		34		28		21		20		26		53		44		38		46		47		Diurnal Maximum	



WBEA
Hourly Averages

Leaf Wetness (SW) - %
Anzac - May 2015





WBEA
Cumulative Frequency Distribution

Leaf Wetness (SW) - %
Anzac - May 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 0.3	645	86.69	86.69
0.4 - 0.5	0	0.00	86.69
0.6 - 0.7	0	0.00	86.69
0.8 - 1.4	0	0.00	86.69
1.5 - 10	39	5.24	91.94
> 10	60	8.06	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

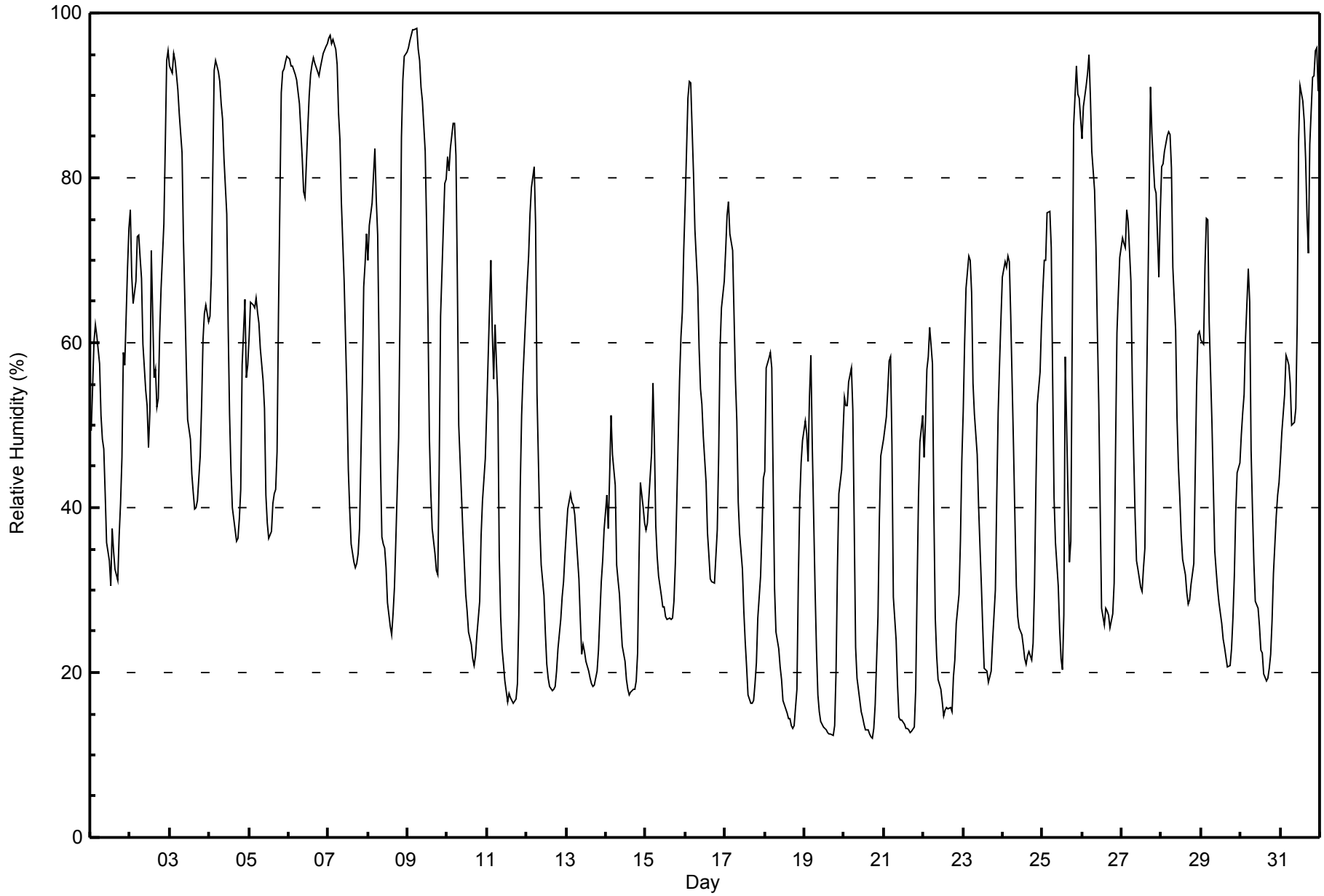


Maximum Value: 98 % on May 9 06:00																		Maximum Daily Average: 91.0 % on May 6																		Hours in Service: 744													
Minimum Value: 12 % on May 20 18:00																		Minimum Daily Average: 28.7 % on May 13																		Hours of Data: 744													
Maximum Diurnal Average: 72.4 % at hour 5																		Minimum Diurnal Average: 30.6 % at hour 17																		Hours of Missing Data: 0													
Monthly Average: 49.2 %																		Percentiles: P ₁ = 13 P ₁₀ = 19 Q ₁ = 28 Median = 46 Q ₃ = 68 P ₉₀ = 89 P ₉₉ = 96																		Hours of Calibration: 0													
																																				Percent Operational Time: 100.0													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	49	55	60	62	61	57	51	48	47	42	36	34	31	37	35	32	31	37	40	46	59	57	69	74	47.9	74																							
2-May	76	68	65	67	73	73	70	68	60	54	52	47	52	71	56	57	52	53	61	67	74	84	94	95	66.3	95																							
3-May	94	93	95	94	92	91	88	83	73	65	58	51	48	44	42	40	40	41	46	52	60	64	65	63	65.9	95																							
4-May	63	68	81	93	94	93	92	89	87	82	76	62	51	45	40	39	36	36	39	42	57	65	56	57	64.3	94																							
5-May	61	65	65	64	65	64	62	59	55	52	42	38	36	37	41	42	42	47	63	90	93	93	94	95	61.1	95																							
6-May	94	94	94	93	93	92	89	86	82	78	78	86	90	93	94	95	94	93	92	93	94	95	96	96	91.0	96																							
7-May	97	97	96	97	96	94	88	85	77	67	61	54	45	40	36	33	33	33	34	37	55	67	70	73	65.1	97																							
8-May	70	74	77	80	84	77	73	45	36	36	35	33	28	26	25	27	30	36	48	64	85	92	95	95	57.2	95																							
9-May	96	97	97	98	98	98	96	94	91	89	83	74	63	48	42	37	34	32	32	45	63	74	79	80	72.6	98																							
10-May	83	81	84	87	87	83	68	50	41	37	33	29	27	25	23	22	21	22	25	29	37	41	43	46	46.8	87																							
11-May	52	64	70	61	56	62	53	34	27	23	21	19	17	17	17	17	16	17	19	27	42	51	56	64	37.5	70																							
12-May	67	70	76	79	81	74	54	46	38	33	29	25	21	19	18	18	18	18	20	23	26	29	31	34	39.6	81																							
13-May	37	40	42	41	40	39	37	31	26	22	23	23	21	20	19	19	18	19	20	23	27	31	33	37	28.7	42																							
14-May	42	37	44	51	46	43	33	31	29	26	23	21	19	18	17	18	18	18	19	22	34	43	40	38	30.5	51																							
15-May	37	38	41	47	55	48	38	34	32	29	28	28	27	26	27	26	27	29	33	41	55	61	64	71	39.2	71																							
16-May	77	90	92	91	86	80	74	67	59	54	53	49	43	37	34	31	31	31	34	37	46	59	64	67	57.8	92																							
17-May	71	75	77	73	71	63	56	50	41	37	33	27	24	21	17	16	16	17	19	21	27	32	37	44	40.2	77																							
18-May	44	57	58	59	57	43	30	25	23	21	19	17	16	15	14	14	14	13	14	18	31	41	45	48	30.7	59																							
19-May	50	49	46	53	58	47	30	23	17	15	14	13	13	13	13	13	12	12	14	20	33	42	45	49	29.0	58																							
20-May	53	52	52	55	57	52	38	23	19	17	15	15	14	13	13	13	12	12	13	16	27	39	46	47	29.7	57																							
21-May	48	51	54	58	58	48	29	24	18	15	14	14	14	13	13	13	13	13	13	18	30	41	48	51	29.7	58																							
22-May	46	50	57	58	62	57	39	27	22	19	18	16	15	15	16	16	16	15	19	22	26	29	36	46	31.0	62																							
23-May	52	60	67	71	70	66	55	51	46	40	35	30	25	21	20	19	19	20	24	30	41	52	58	63	43.1	71																							
24-May	68	70	69	70	70	63	47	39	30	27	25	25	23	22	21	22	23	22	24	30	42	52	57	62	41.8	70																							
25-May	66	70	70	76	76	71	56	41	36	30	25	22	20	27	58	41	33	36	61	86	94	90	87	87	56.8	94																							
26-May	85	89	91	93	95	90	83	78	72	62	52	40	28	26	28	27	27	25	27	31	47	61	66	70	58.0	95																							
27-May	73	72	71	76	75	68	55	46	39	34	33	30	30	33	35	51	77	91	85	82	79	78	68	76	60.7	91																							
28-May	81	82	83	85	86	85	81	69	61	51	45	41	37	34	32	30	28	29	31	33	44	55	61	61	55.2	86																							
29-May	60	60	69	75	75	63	50	42	35	32	30	29	26	24	23	22	21	21	23	27	32	39	44	46	40.3	75																							
30-May	49	51	54	61	69	65	47	40	33	29	28	26	23	22	20	19	19	21	22	26	32	39	42	43	36.6	69																							
31-May	46	49	54	58	58	57	55	50	50	52	62	84	91	89	87	82	75	71	84	92	92	96	96	90	71.8	96																							
																								64.1	66.7	69.3	71.8	72.4	68.0	58.6	51.0	45.3	41.0	38.0	35.5	32.8	32.0	31.5	30.7	30.6	31.6	35.5	41.7	51.1	57.8	60.9	63.6	Diurnal Average	
																								97	97	97	98	98	98	96	94	91	89	83	86	91	93	94	95	94	93	92	93	94	96	96	96	96	Diurnal Maximum



WBEA
Hourly Averages

Relative Humidity (RH) - %
Anzac - May 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Anzac - May 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	89	11.96	11.96
20 - 40	226	30.38	42.34
40 - 60	180	24.19	66.53
60 - 80	133	17.88	84.41
80 - 100	116	15.59	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 18 km/h on May 5 11:00	Maximum Daily Speed Average: 10.7 km/h on May 5	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 12 04:00	Minimum Daily Speed Average: 1.2 km/h on May 8	Hours of Data: 733
Maximum Diurnal Speed Average: 1.9 km/h at hour 21	Minimum Diurnal Speed Average: 0.6 km/h at hour 8	Hours of Missing Data: 11
Monthly Average Velocity: 0.3 km/h 211.9 deg	Percentiles: P ₁ = 1 P ₁₀ = 3 Q ₁ = 5 Median = 7 Q ₃ = 9 P ₉₀ = 12 P ₉₉ = 15	Percent Operational Time: 98.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	WSW9	WSW8	WSW8	WSW7	WSW7	WSW7	W9	W11	W13	W14	W14WNW14WNW12	W10	WNW7	W10WNW14WNW11	W6	WSW4	WNW5	SW6	SW4	SSW5						W8.4	WNW14
2-May	WSW5	W8	WNW8	WNW8WNW10	WNW8	WNW9WNW10	WNW9	WNW8	NNW12	NNW14	N15	NW11	NW9	NE3	NW10WNW10	NW7	NNE6	ESE1	NNW3	NW7	NW8				NW7.4	N15	
3-May	N11	N11	NNW9	NNW7	NNW7	NNW8	N9	NNW10	NNW9	NW9	NW8	NW10	NW10	NW7WNW10WNW10	NNW10	N11	N10	NNE9	NNE7	NE6	ENE6	ESE5			NNW7.4	N11	
4-May	SE4	E2	ENE8	SE5	S9	S9	SSE8	SSE6	SE7	SE8	ESE7	E7	NE5	ENE8	SSE1	ENE4	S6	E8	ESE7	ESE6	ESE6	ESE6	ESE8	E8	ESE5.2	S9	
5-May	E8	E10	E10	E8	E9	E11	E10	ENE10	ENE10	ENE11	E18	ENE17	ENE18	ENE16	NE15	NE13	NE15	NNE10	NE9	NNE9	NNE10	NE10	NE9	NNE9	ENE10.7	E18	
6-May	NNE7	NNE8	NNE7	NNE7	NNE9	NNE8	NNE8	NNE9	NNE9	NNE11	NNE12	NNE11	NNE11	NNE12	NNE12	NE13	NE11	ENE8	ENE9	NE7	AF	AF	AF	AF	NNE9.2	NE13	
7-May	AF	AF	AF	AF	AF	AF	AF	NW2	WNW3	WNW6	W8	W6	NW7	NW6	NNW7	NNW6	N8	N7	N5	NNE5	NNE2	ENE6	E6	SSE2	---	W8	
8-May	SW2	S3	SSW4	SSW1	S3	S4	S3	SSE4	SSE6	N3	WNW4	WSW4	WNW7	WNW7	WNW4	NW6	NNW5	SE9	NE6	NE7	ENE11	ENE12	ENE9	ESE10	E1.2	ENE12	
9-May	S7	SE4	ESE4	SE3	ENE3	ENE4	ENE6	E7	ESE9	ESE8	SE7	SE8	SSE8	S6	SSE5	S5	SSE4	SSE4	SSW4	SSW4	SSW1	SSW3	SW3	WSW3	SE3.7	ESE9	
10-May	WSW5	SW5	NNW1	SSW3	SSW1	NNE3	NE3	NE5	NE3	E5	ENE4	SE3	NE5	ESE4	NE6	SW1	SSW2	SE6	SE8	SE7	SE7	SSE8	SSE9	SSE9	SE2.6	SSE9	
11-May	SSE8	S6	SSW6	SW8	SSW7	SW2	E1	N3	WNW9	WNW8	W10	SW7	WNW6	W6	WSW7	WSW3	W6	N2	WSW4	WNW4	NW3	WNW4	NW3	NE3	WSW3.3	W10	
12-May	NE3	ENE5	E5	NNW0	ENE4	E5	ESE5	ESE3	E7	ESE9	ESE11	ESE12	ESE11	SSE9	SSE9	SSE9	ESE11	ESE11	SE12	SE12	SE14	SE16	SSE14	SSE13	SE7.9	SE16	
13-May	SSE14	SSE14	SSE15	S14	S13	S10	SSE9	S8	SSW9	SSW10	SSE11	SSE14	S14	S13	S12	S10	SSE9	S9	SSE10	S10	S9	S9	S8	S7	S10.7	SSE15	
14-May	SW8	SW12	SW9	WSW8	WSW8	WSW8	WSW8	WNW9WNW10WNW10	WNW9	WSW8	SW9	SW7	S9	S8	SW7	SSW10	SW11	SW9	SW7	SW9	SW10	SW10	SW10	SW10	SW7.6	SW12	
15-May	SW12	SW10	SSW10	SSW9	SSW8	SSW9	SSW13	SSW11	SW12	WSW9WNW11WNW11	WNW11WNW10WNW11	WNW10	WNW9	WNW6	NW5	SSW4	WNW2	N14	N14	N14	N11				W5.5	N14	
16-May	N15	N12	N9	N11	N12	N13	N14	N14	N15	N15	N14	N14	N13	NNE14	NNE12	NE12	NE13	NE11	NNE10	NE8	ENE6	ENE6	E5	E4	NNE10.4	N15	
17-May	SE2	SSE4	SSE6	SSE7	SSE8	SSE8	SSE11	SSE13	SSE10	SSE11	SSE11	S8	SSE7	SE7	S7	SE8	SE9	SE9	SE8	SE8	SE8	SSE9	SSE9	SSE8	SSE8.0	SSE13	
18-May	SSE8	S6	SSW6	SW8	SW9	SW8	SW6	WSW7	WNW7	WNW5	W5	SSW8	SSW8	SW7	SW4	W5	SW5	WSW5	WSW4	S5	S4	SW4	SW6	SW6	SW5.1	SW9	
19-May	SSW4	SW6	SW6	WSW6	WSW6	WSW5	W4	WNW7	WNW9	WNW8	WNW5	WSW6	W6	WNW9	WNW4	WNW7	WNW3	WSW4	NE2	W0	SE2	SW5	SW4	SW5	W4.2	WNW9	
20-May	SW5	SW5	SW6	SW4	SSW3	SSW4	SW4	NW4	WNW7	WNW6	W5	W3	WSW7	SW6	W7	WSW6	SW5	SSW9	S5	SSE6	S5	S5	SSW3	SW5	SW4.1	SSW9	
21-May	SW4	SW3	SSW4	SSW3	SW4	SW6	SW7	SW4	WSW5	WSW8	SSW10	SSW8	SW8	SW8	WSW6	W6	SW5	SW4	SW6	SW5	SSW5	SSW5	SSW4	SW5	SW5.2	SSW10	
22-May	SW6	SW5	SW4	ESE1	E1	S3	SSW4	W4	WNW7	WNW7	WSW9	W9	WNW6	NW7	N9	NNW11	NNW13	N10	N9	N11	NNE9	NNE8	NE6	NNE5	NNW3.9	NNW13	
23-May	NE5	NE2	ENE4	NE6	ENE7	ENE6	E7	E6	NE4	ENE6	NNE7	NE5	NNE4	NNE6	NNW3	SW7	NW2	WNW2	WNW5	NNW2	NE1	S3	S2	S4	NE2.3	E7	
24-May	SSW3	W2	W4	NNW2	NNW2	WSW4	SW5	SSW4	SSW4	SW5	W6	WSW8	W7	N4	WSW7	WSW1	NNW4	NE4	NE4	ENE2	SE4	SSE4	S4	S4	WSW2.0	WSW8	
25-May	S5	SSW5	S5	S4	SW3	WSW6	SW2	WNW5	WNW8	WNW7	WNW7	WNW8	NW1	NNW8	N9	SE1	SW8	WNW4	NW10	NNE9	N2	WNW7	NW7	NNW8	WNW3.4	NW10	
26-May	NW6	NW5	NW4	NNW4	NNW4	NNW5	NNW6	NW6	NNW7	N8	NNW7	NNW8	N9	N9	NNW10	NNW8	NNW9	N7	N6	NE5	ENE2	E3	E5	SE5	NNW5.1	NNW10	
27-May	SE6	SE6	SSE7	SE7	ESE6	SSE4	SSE3	SE4	SSE4	ENE3	ESE2	ESE4	W4	NW7	N13	N17	N12	N7	N8	N8	N7	N7	N10	N12	NNE3.1	N17	
28-May	N9	N10	N10	N9	N9	N9	N10	N10	N9	N11	N12	N10	N11	N9	N8	N9	N10	NNW10	NNW9	N7	NNE5	NE4	ENE6	E6	N8.3	N12	
29-May	ESE7	SSE6	SSE6	SSE4	SSE6	SSE8	SSE8	SSE9	SE9	ESE6	SE5	E5	SE6	ESE7	S6	SSE7	ESE7	SE7	SSE7	SSE8	SE8	SE9	SSE10	SSE11	SE6.6	SSE11	
30-May	SSE10	SSE10	SSE11	SSE8	SSE5	SE2	SE3	SSE4	SE4	SE9	SSE8	S9	S10	SSE11	SSE10	SE12	SE12	SSE11	SSE11	SSE12	S10	SSE8	SSE9	SSE9	SSE8.5	SE12	
31-May	SSE8	SSE8	SSE8	SE9	SE10	SE11	SSE13	SSE14	SSE15	SSE15	S12	S9	SSE6	SSE11	S10	SSE8	ESE7	SE8	SSW10	SW7	SSW4	SW3	WSW6	W9	SSE7.8	SSE15	

S1.8	S1.8	S1.8	SSW1.6	S1.2	SSW1.4	S1.0	WSW0.0	WNW1.3	NW1.3	WNW1.2	W1.3	NW1.4	NW1.4	NW1.8	NW1.3	N1.5	ENE0.8	NE0.6	E1.5	ESE1.9	SE1.8	SE1.6	SSE1.7			Diurnal Average
N15	SSE14	SSE15	S14	S13	N13	N14	N14	SSE15	N15	E18	ENE17	ENE18	ENE16	NE15	N17	NE15	WNW11	SE12	SE12	SE14	SE16	SSE14	SSE13			Diurnal Maximum

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Speed (WS) - km/h
Anzac - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on May 25 15:00	Hours in Service: 744 Hours of Data: 733 Hours of Missing Data: 11 Hours of Calibration: 0 Percent Operational Time: 98.5
Minimum Value: 0 km/h on May 10 00:00	
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 4 P ₉₉ = 6	

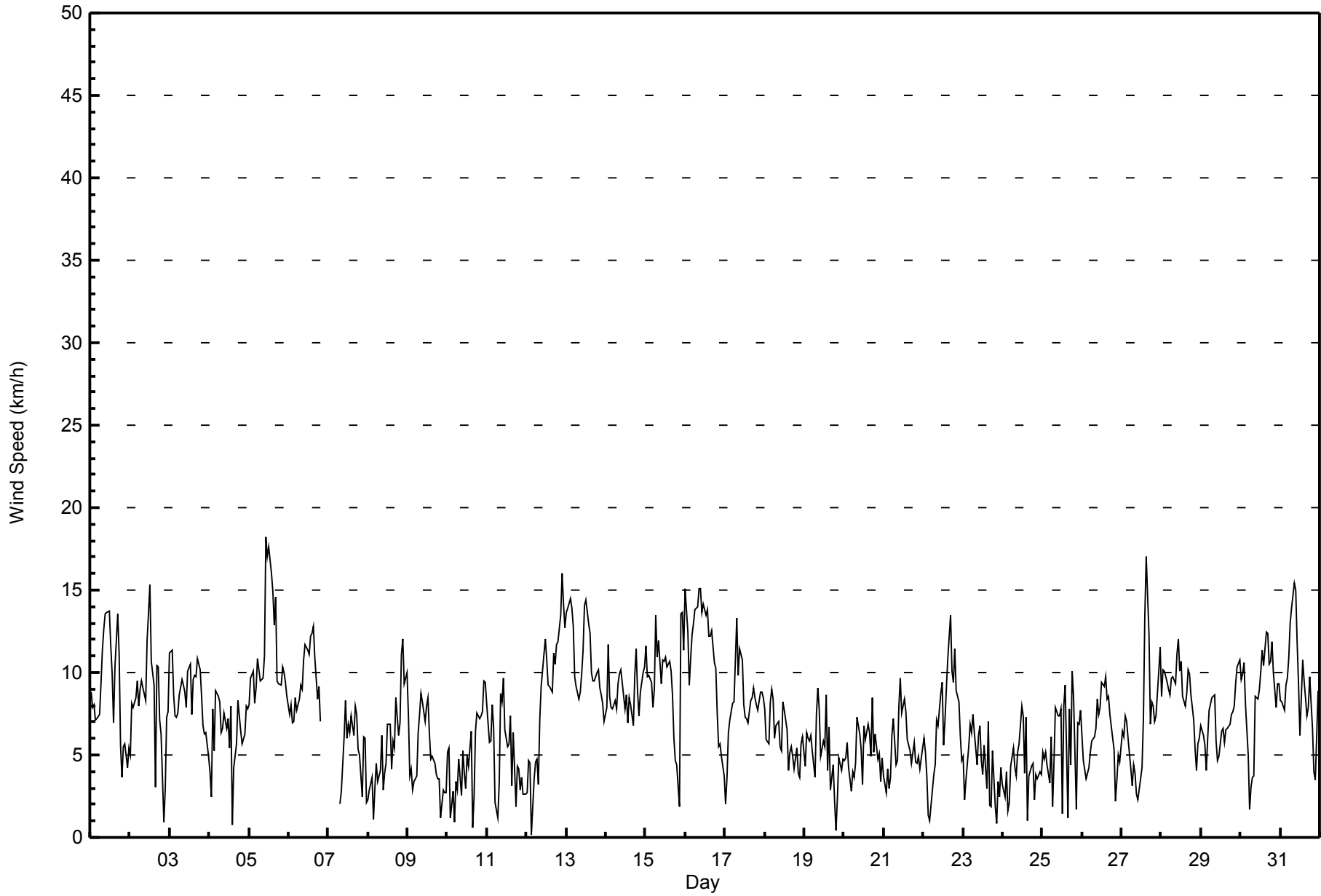
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	3	2	1	2	2	2	3	4	5	5	5	5	5	6	5	5	5	5	2	1	2	2	1	1	6
2-May	1	2	3	3	3	3	3	3	3	3	4	5	6	4	4	4	4	4	4	3	1	1	3	3	6
3-May	3	3	3	2	2	3	3	2	3	3	3	4	4	4	4	4	3	4	3	3	2	2	2	1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

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Anzac - May 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Anzac - May 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	227	30.97	30.97
6 - 11	433	59.07	90.04
12 - 19	73	9.96	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: 733

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Anzac - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	6	18	12	9	9	15	14	19	26	33	14	10	15	9	12	227
6 - 11	42	26	13	18	16	20	28	60	26	18	34	26	18	47	19	22	433
12 - 19	19	5	6	4	1	1	6	12	6	1	3	0	3	3	0	3	73
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	67	37	37	34	26	30	49	86	51	45	70	40	31	65	28	37	733

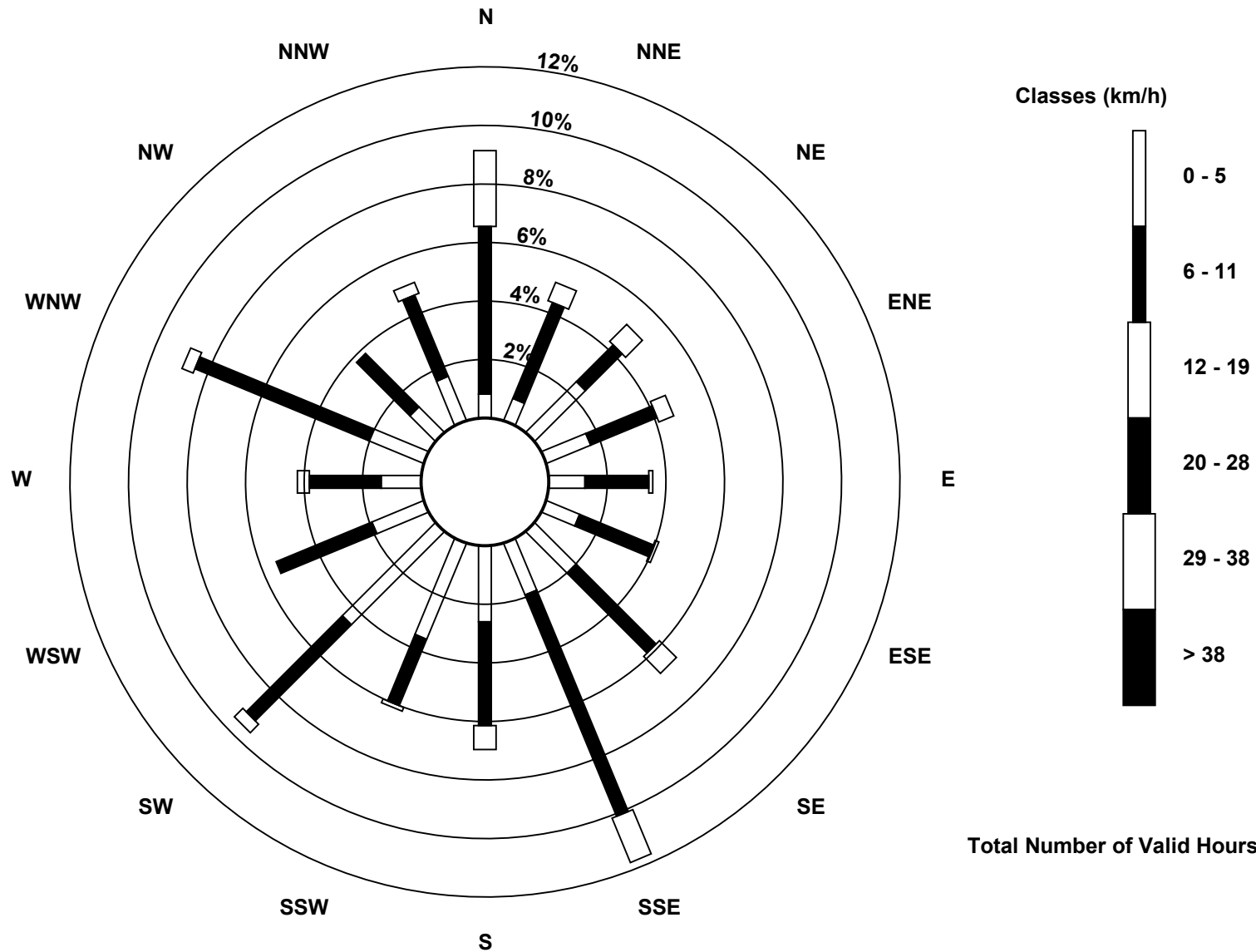
Total Number of Valid Hours: 733

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Wind Speed (WS) - km/h
Anzac (AMS 14)





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Anzac - May 2015

Direction of Maximum Speed: 80 deg on May 5 11:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 62.0 deg on May 5	Hours of Data: 733
Direction of Minimum Speed: 340 deg on May 12 04:00	Hours of Missing Data: 11
Direction of Minimum Daily Speed Average: 1.2 deg on May 8	Percent Operational Time: 98.5
Monthly Average Direction: 257.1 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-May	254	242	245	251	257	248	268	274	264	267	279	285	288	270	300	275	290	287	271	238	284	218	236	207	267.5
2-May	257	270	287	300	298	292	300	296	301	300	333	335	349	325	321	34	322	296	315	27	108	337	322	326	314.6
3-May	350	357	342	337	340	336	355	347	334	322	312	315	306	310	301	300	338	1	355	17	26	39	67	105	342.1
4-May	128	84	66	142	180	182	168	148	143	127	118	97	55	75	150	74	173	101	114	107	105	106	119	84	119.2
5-May	91	86	83	85	85	80	82	74	70	69	80	77	74	64	52	35	39	30	50	33	33	36	36	28	62.0
6-May	14	16	15	15	16	15	18	15	23	26	25	17	16	26	28	36	37	63	58	47	AF	AF	AF	AF	26.4
7-May	AF	AF	AF	AF	AF	AF	AF	305	295	282	261	277	310	311	335	346	4	1	3	13	30	66	92	163	--
8-May	233	178	192	203	170	172	178	157	151	5	290	245	295	293	302	318	348	125	48	54	60	66	64	123	82.8
9-May	174	144	102	125	61	71	71	90	115	110	124	146	167	177	157	191	156	154	204	192	196	201	224	243	142.4
10-May	240	235	347	211	211	29	49	41	42	86	66	127	48	123	48	235	207	125	138	127	133	153	155	160	125.9
11-May	164	172	200	216	211	215	79	2	297	298	261	235	288	277	243	243	265	8	256	296	312	287	321	51	254.9
12-May	48	72	81	340	75	93	119	111	90	118	119	122	122	150	154	155	116	115	131	137	129	145	152	152	127.3
13-May	154	154	158	171	171	179	160	175	197	202	157	161	172	175	170	178	155	179	166	174	176	178	185	190	170.8
14-May	235	228	231	240	243	241	255	284	296	301	301	250	215	230	188	190	221	206	224	223	221	221	216	220	236.1
15-May	222	214	211	212	208	212	224	208	214	250	301	297	302	294	296	298	293	299	315	195	289	9	4	5	267.3
16-May	3	5	355	6	8	354	355	360	351	356	360	360	4	13	26	43	54	42	33	39	57	69	79	85	14.3
17-May	134	155	150	162	157	160	156	165	154	158	152	174	147	126	182	135	138	129	139	136	129	148	160	153	150.7
18-May	166	175	197	230	234	234	221	249	298	296	259	206	205	232	223	278	228	250	237	180	189	219	232	231	227.1
19-May	209	216	224	243	240	250	266	298	293	293	295	245	278	290	284	297	284	240	36	262	142	223	228	227	261.4
20-May	228	225	225	229	209	198	228	310	293	302	273	261	255	225	281	240	232	208	191	167	181	188	208	228	233.6
21-May	236	214	202	208	225	235	234	219	246	242	203	197	215	223	249	261	219	230	229	235	204	207	212	236	224.2
22-May	224	214	215	117	89	183	200	271	289	297	257	276	294	325	355	327	336	350	11	2	16	31	44	32	327.1
23-May	47	52	62	55	71	74	82	91	46	60	31	35	15	28	335	236	324	289	292	338	56	173	184	189	51.4
24-May	196	266	264	336	345	251	234	213	207	226	259	258	268	2	250	251	346	48	44	69	143	166	184	183	244.0
25-May	174	193	184	175	215	253	230	293	291	285	300	287	310	329	359	126	236	295	320	15	4	299	326	333	295.2
26-May	323	325	321	331	332	328	333	319	335	0	338	344	358	353	330	335	342	350	8	56	66	86	91	127	348.5
27-May	126	126	158	134	116	156	161	129	159	65	115	118	273	304	354	357	360	11	6	359	0	358	357	354	20.6
28-May	351	350	350	349	354	2	9	4	355	10	3	352	3	2	350	1	3	347	346	7	19	42	70	83	2.2
29-May	116	155	161	163	164	163	154	166	130	121	127	93	127	108	186	167	120	127	159	148	128	145	153	159	144.5
30-May	161	163	155	155	156	135	129	161	125	142	156	183	169	167	165	144	144	163	151	164	172	156	162	164	158.3
31-May	167	151	147	137	141	145	148	155	152	164	174	173	166	160	174	155	105	146	204	225	197	229	253	271	164.7

186.6	186.8	182.4	195.8	190.7	207.4	186.3	253.6	286.1	306.1	298.2	266.8	306.4	315.4	315.2	318.8	353.3	57.5	49.6	90.5	109.7	124.3	135.2	162.3
Diurnal Average																							

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

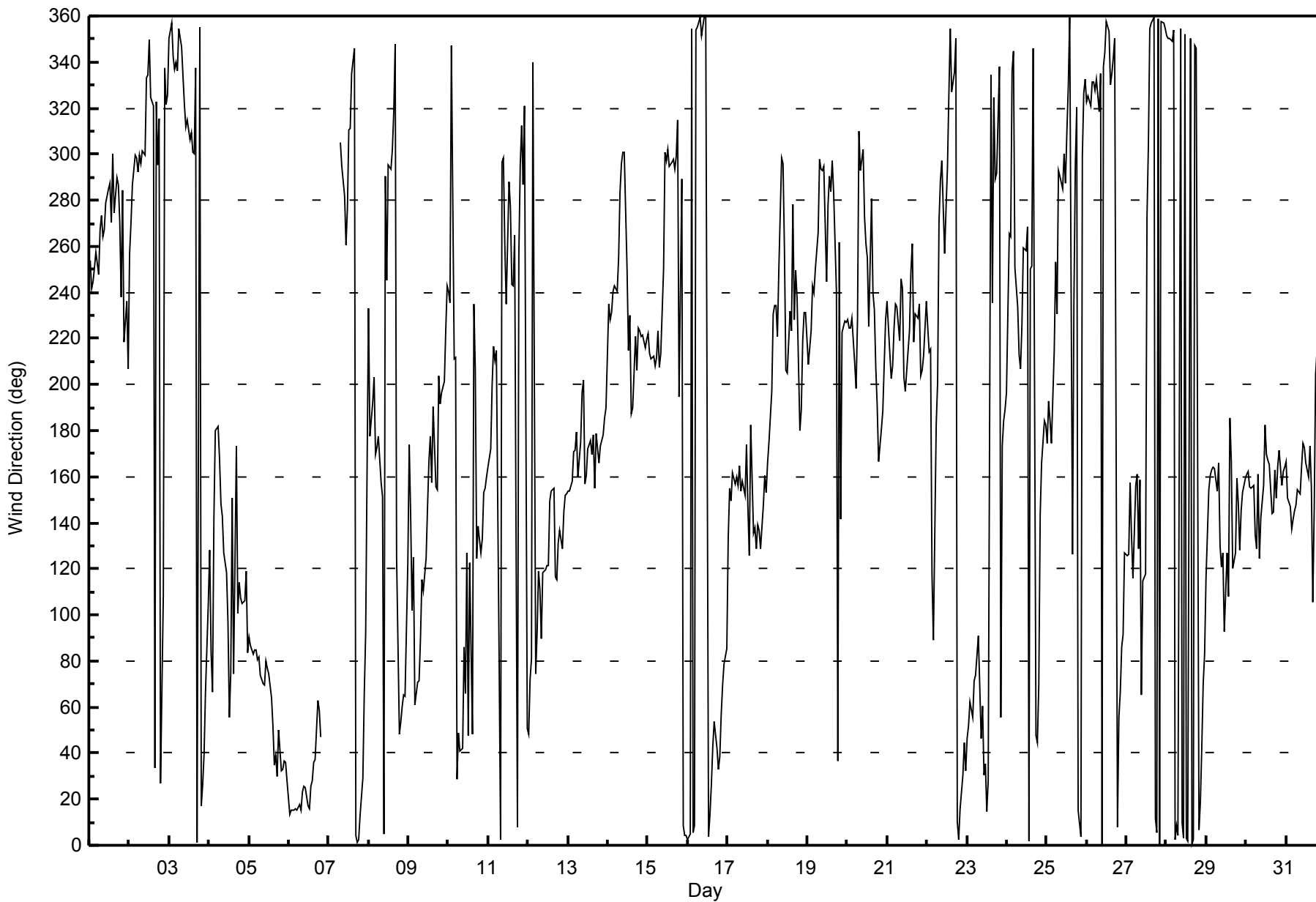
Anzac - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 106 deg on May 4 15:00		Hours in Service: 744 Hours of Data: 733 Hours of Missing Data: 11 Hours of Calibration: 0 Percent Operational Time: 98.5																							
Minimum Value: 8 deg on May 20 04:00																									
Percentiles: P ₁ = 10 P ₁₀ = 16 Q ₁ = 20 Median = 26 Q ₃ = 43 P ₉₀ = 65 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-May	22	15	15	20	20	19	28	30	31	31	34	31	35	45	62	39	29	32	45	25	30	25	22	12	62
2-May	28	21	26	24	24	21	25	27	34	42	21	23	24	21	33	79	22	27	48	34	74	58	19	21	79
3-May	17	18	20	19	18	20	16	16	26	32	45	30	30	49	38	37	24	25	20	20	16	19	19	25	49
4-May	27	43	23	37	19	20	16	26	30	25	57	49	65	44	106	62	58	46	24	23	17	19	21	21	106
5-May	23	19	18	21	20	19	21	19	22	21	24	24	23	23	22	23	23	26	34	23	22	24	22	22	34
6-May	18	19	19	21	18	20	20	20	24	22	21	20	22	22	23	22	25	25	25	26	AF	AF	AF	AF	26
7-May	AF	AF	AF	AF	AF	AF	AF	63	67	41	40	50	53	50	47	53	46	28	30	25	21	12	15	38	67
8-May	57	18	15	78	20	15	31	30	48	75	87	79	41	40	61	37	38	45	59	28	21	22	20	34	87
9-May	22	50	23	23	33	28	23	26	27	23	40	35	45	71	84	65	78	73	50	22	48	18	10	12	84
10-May	11	10	80	35	75	20	32	38	88	68	80	92	69	82	58	98	84	50	29	18	13	18	15	13	98
11-May	14	18	20	13	13	32	79	61	28	30	32	50	71	57	50	100	47	93	59	16	18	26	40	80	100
12-May	67	14	17	70	13	22	23	51	34	35	30	37	44	53	45	52	35	33	25	20	20	20	18	17	70
13-May	17	17	16	18	17	22	21	26	32	32	46	38	35	37	35	43	39	33	24	18	17	16	18	21	46
14-May	27	13	16	16	17	16	23	29	27	25	32	64	70	63	47	60	78	33	23	16	11	11	14	14	78
15-May	13	17	15	16	16	17	19	23	26	42	26	28	26	34	27	31	33	24	76	67	84	20	20	20	84
16-May	20	21	19	20	20	18	20	24	23	24	27	26	27	28	35	32	27	33	27	27	19	17	11	18	35
17-May	26	14	13	14	14	17	18	22	34	34	32	65	64	60	63	50	39	26	21	18	14	19	15	14	65
18-May	16	17	22	17	19	19	23	35	39	56	70	54	54	65	90	60	56	56	66	25	14	24	16	11	90
19-May	10	13	12	11	8	13	35	26	27	31	61	54	60	32	75	42	94	64	62	95	53	35	22	10	95
20-May	9	8	9	8	14	10	15	44	31	37	56	96	62	72	48	63	74	35	53	17	17	15	19	16	96
21-May	13	20	16	17	33	12	14	32	63	47	48	58	57	56	76	73	70	63	27	26	12	18	21	18	76
22-May	16	13	17	68	65	36	18	40	30	39	37	34	67	44	36	33	23	29	26	23	23	25	24	25	68
23-May	22	40	24	21	18	20	23	35	49	47	47	78	85	75	86	50	95	93	32	41	42	26	56	21	95
24-May	23	29	21	69	43	16	17	28	45	43	36	36	50	80	46	94	50	49	31	27	16	11	15	17	94
25-May	11	13	16	14	28	14	72	47	28	34	43	65	95	75	71	81	20	27	35	34	66	24	16	21	95
26-May	24	21	18	14	15	19	26	37	37	32	49	47	34	36	33	40	33	36	36	25	18	13	21	18	49
27-May	16	26	16	16	23	19	33	31	51	93	88	80	77	33	27	23	26	31	26	24	25	23	25	23	93
28-May	23	23	25	22	22	25	26	33	33	29	33	37	34	46	45	38	34	30	27	27	21	30	19	19	46
29-May	25	20	13	15	13	16	20	26	32	65	72	69	63	70	77	59	50	48	31	23	18	19	18	19	77
30-May	18	18	16	15	17	36	29	43	60	36	46	60	49	36	44	30	29	30	23	20	21	18	18	18	60
31-May	15	19	17	18	19	21	22	23	23	26	29	25	38	22	24	32	26	24	36	44	43	26	26	24	44
Diurnal Maximum																									
AF - Analyzer Failure																									



WBEA
Hourly Averages

Wind Direction (WD) - deg
Anzac - May 2015



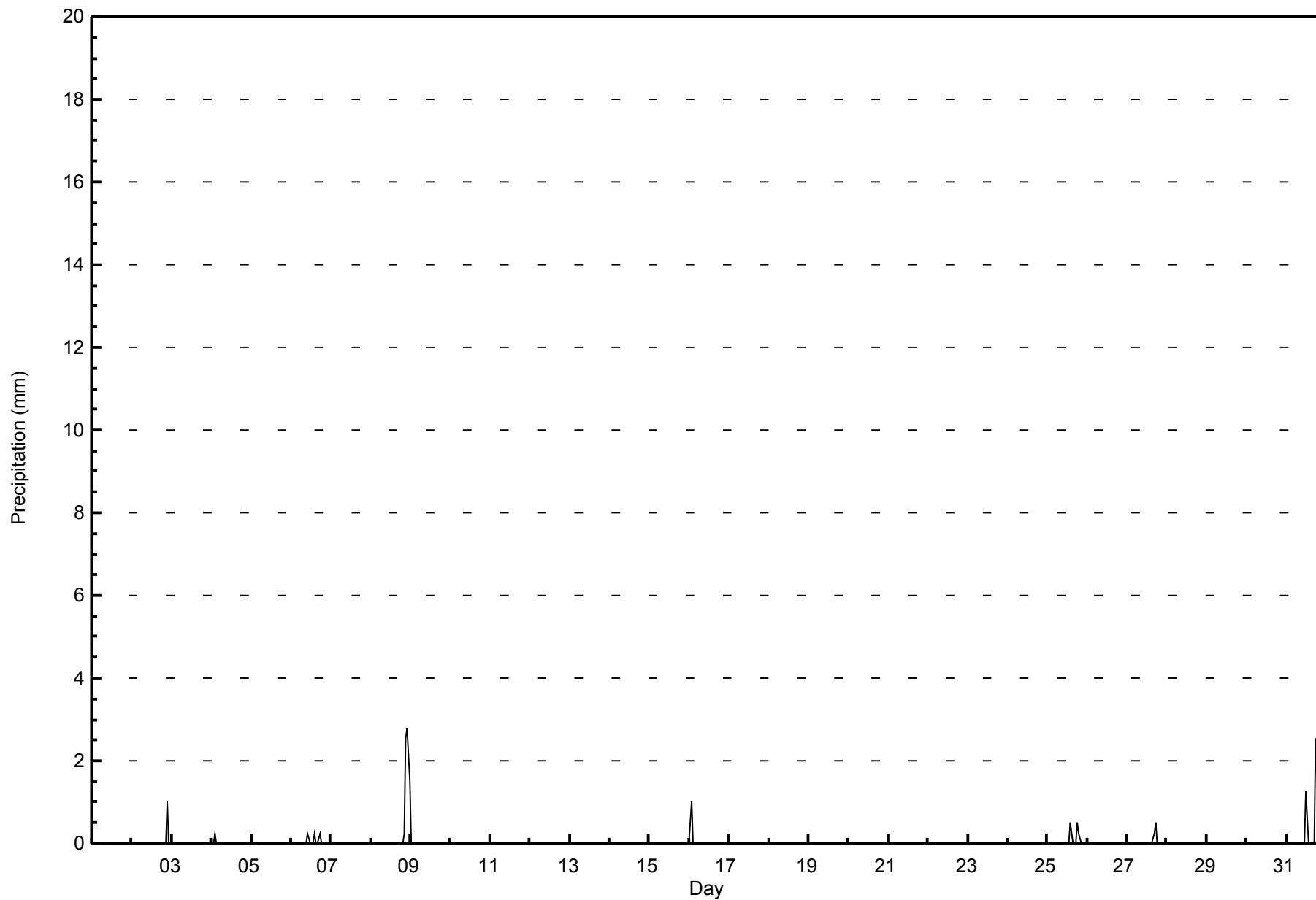


Maximum Value: 2.8 mm on May 8 23:00		Maximum Daily Total: 7.1 mm on May 8		Hours in Service: 744																																												
Minimum Value: 0.0 mm on May 1 01:00		Minimum Daily Total: 0.0 mm on May 1		Hours of Data: 744																																												
Maximum Diurnal Total: 3.6 mm at hour 22		Minimum Diurnal Total: 0.0 mm at hour 1		Hours of Missing Data: 0																																												
Monthly Total: 16.26 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 = 1.0		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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	1.0	1.0																					
3-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	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	0.3	0.3																					
5-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.3																					
7-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	2.8	1.5	7.1	2.8																						
9-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0																					
17-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	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	0.5	0.3	0.0	0.0	0.0	0.0	1.3	0.5	0.5																					
26-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.5	0.8																					
28-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	2.5	0.3	0.0	0.0	0.0	0.0	4.1	2.5	4.1																					
																								0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	1.3	0.0	0.8	0.0	0.3	0.8	3.0	0.5	0.3	3.6	2.8	1.5	Diurnal Average	
																								0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	1.3	0.0	0.5	0.0	0.3	0.5	2.5	0.3	0.3	2.5	2.8	1.5	Diurnal Maximum	



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
Anzac - May 2015





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 21, 2015	Last Calibration	April 14, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	14:35
Gas Cert Reference	SA130026A	Station temp.	20 Deg C
Cal Gas Concentration	47.2 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
ZAG Make/Model	API 701	Serial Number	764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		HVPS voltage	524	524
Analyzer IP address	192.168.1.43		Lamp voltage	3197	3017
Calculated slope	0.995403	0.999522	Chamber temp	43.0	50.0
Calculated intercept	0.151600	-0.313316	Pressure	25.2	25.2
Analyzer Background	19.7	19.7	Flow	643	658
Analyzer Coefficient	0.973	0.988	Intensity	79	74.5

Analyzer make API T100 Analyzer serial # 723

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.5	----
as found span	5000	74.9	707.1	661.4	1.069
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	74.9	707.1	708.1	0.999
second point	5000	37.5	354.0	353.2	1.002
third point	5000	18.7	176.5	178.0	0.992
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	74.9	707.1	696.6	1.015
Average Correction Factor					0.998

Corrected As found 662.0 Previous response 710.2 % change 7.3%

Notes:

Found failing pump upon arrival. Low flow alarm. Pump changed after As Finds

Calibration Performed By: Ryan Power



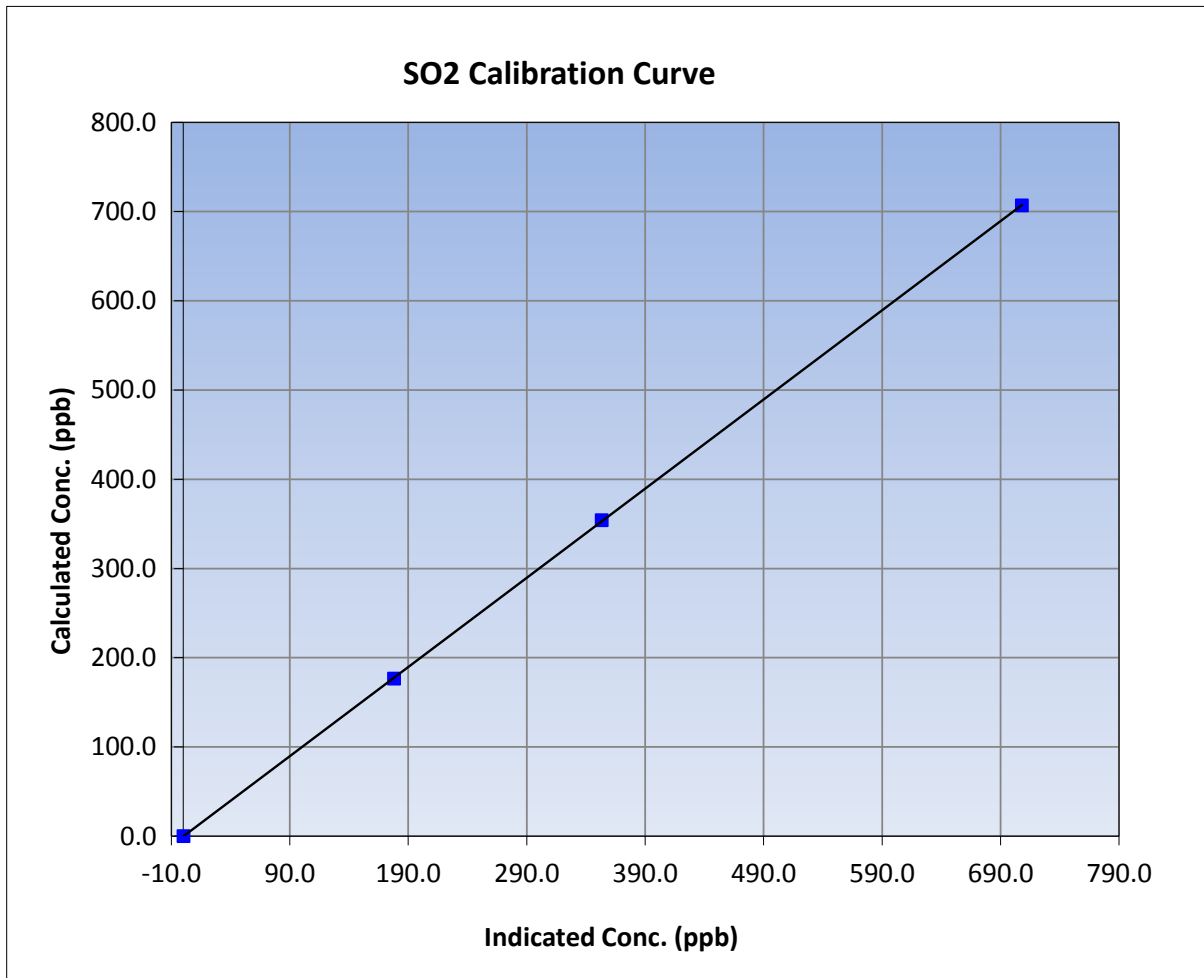
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 21, 2015	Previous Calibration	April 14, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:10	End Time (MST)	14:35
Analyzer make	API T100	Analyzer serial #	723

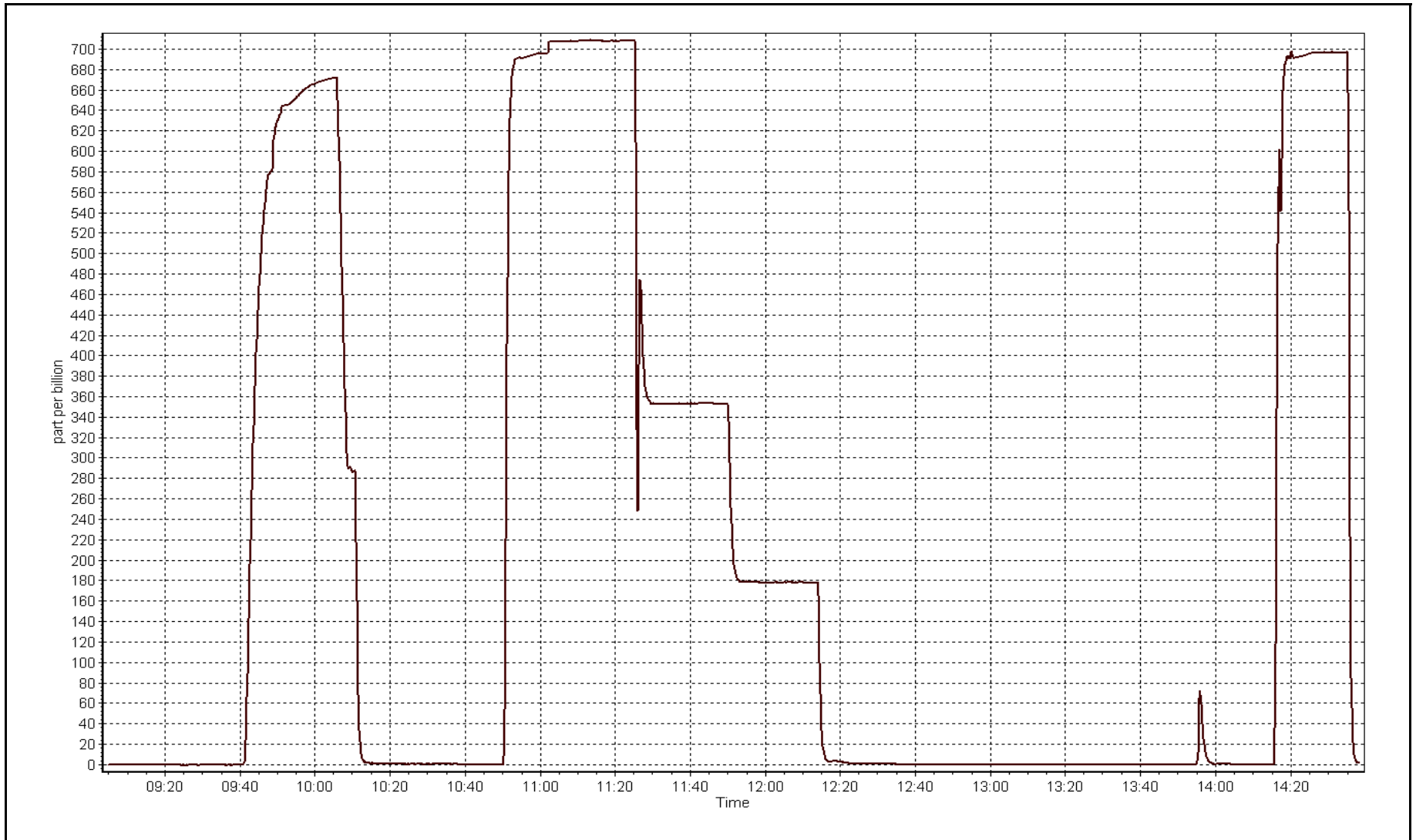
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999989
707.1	708.1	0.9985		
354.0	353.2	1.0024	Slope	0.999522
176.5	178.0	0.9917		
			Intercept	-0.313316



SO2 Calibration Plot

Date: May 21, 2015





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	May 27, 2015	Last Calibration	April 13, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	14:20
Gas Cert Reference	LL82745	Station temp.	22 Deg C
Cal Gas Concentration	9.6 ppm	Cal Gas Exp Date	21/12/2012
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790
SO2 gas concentration	47.2 ppm	SO2 gas cert/exp	SA130026A 12/12/2016

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-731	-731
Analyzer IP address	192.168.1.42		Lamp voltage	999	999
Calculated slope	0.995279	1.010798	Chamber temp	45	45
Calculated intercept	-0.242307	0.020216	Pressure	652.6	652.6
Analyzer Background	1.62	1.62	Flow	0.388	0.388
Analyzer Coefficient	1.117	1.117	Intensity	95	95
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1300156232	
Converter make/model	CDN-101		Converter serial #	510	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	39.1	75.1	74.3	1.011
SO2 scrubber check	5000	18.7	176.5	0.4	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	39.1	75.1	74.3	1.011
second point					
third point					
as left zero					
as left span					
Average Correction Factor					1.011

Corrected As found	74.3	Previous response	75.7	% change	1.9%
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Notes:

Sheet is provided for as found response to existing Cal gas prior to change. Full cal is continued on secondary calibration sheet.

Calibration Performed By:

Ryan Power



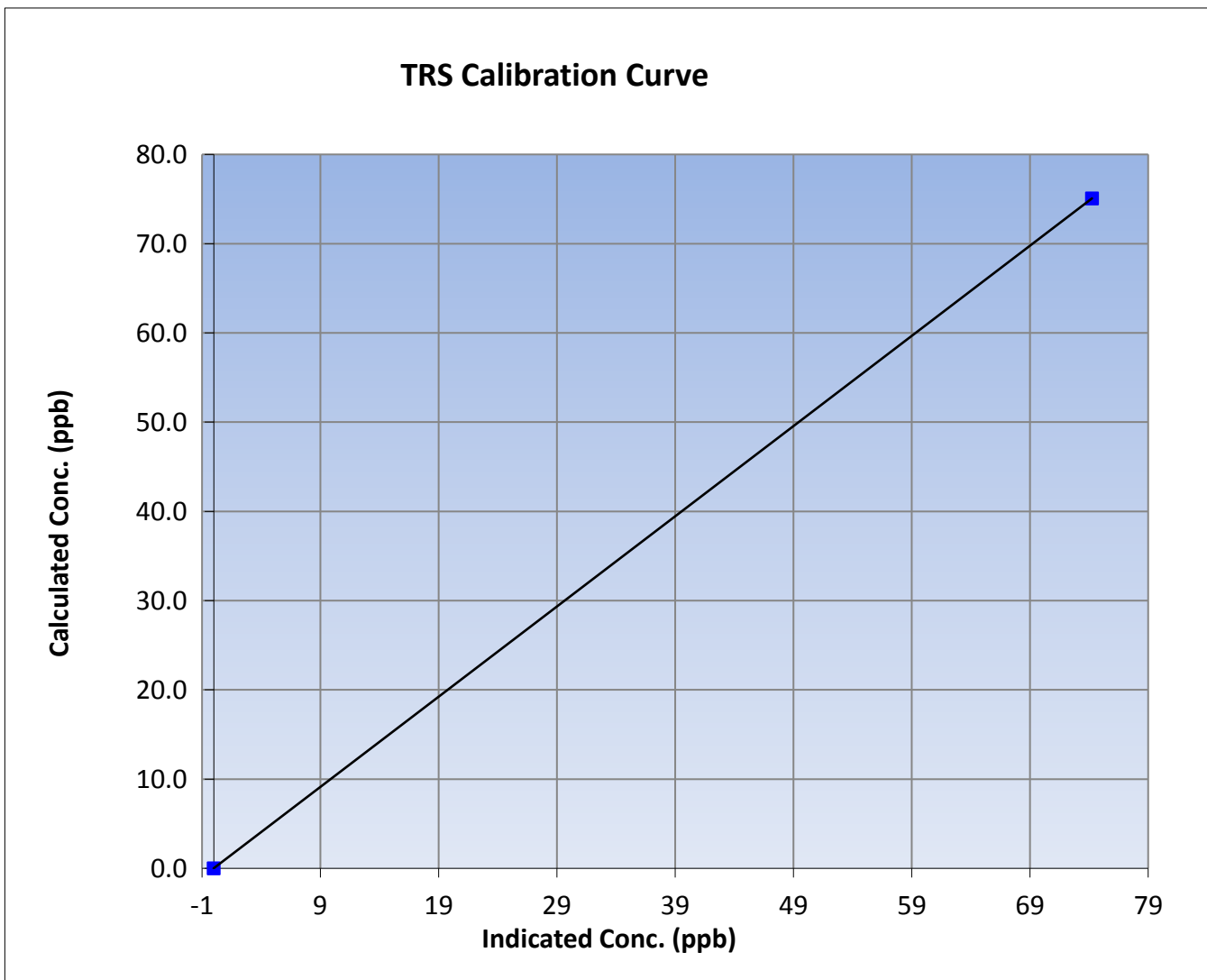
Wood Buffalo Environmental Association TRS Calibration Report

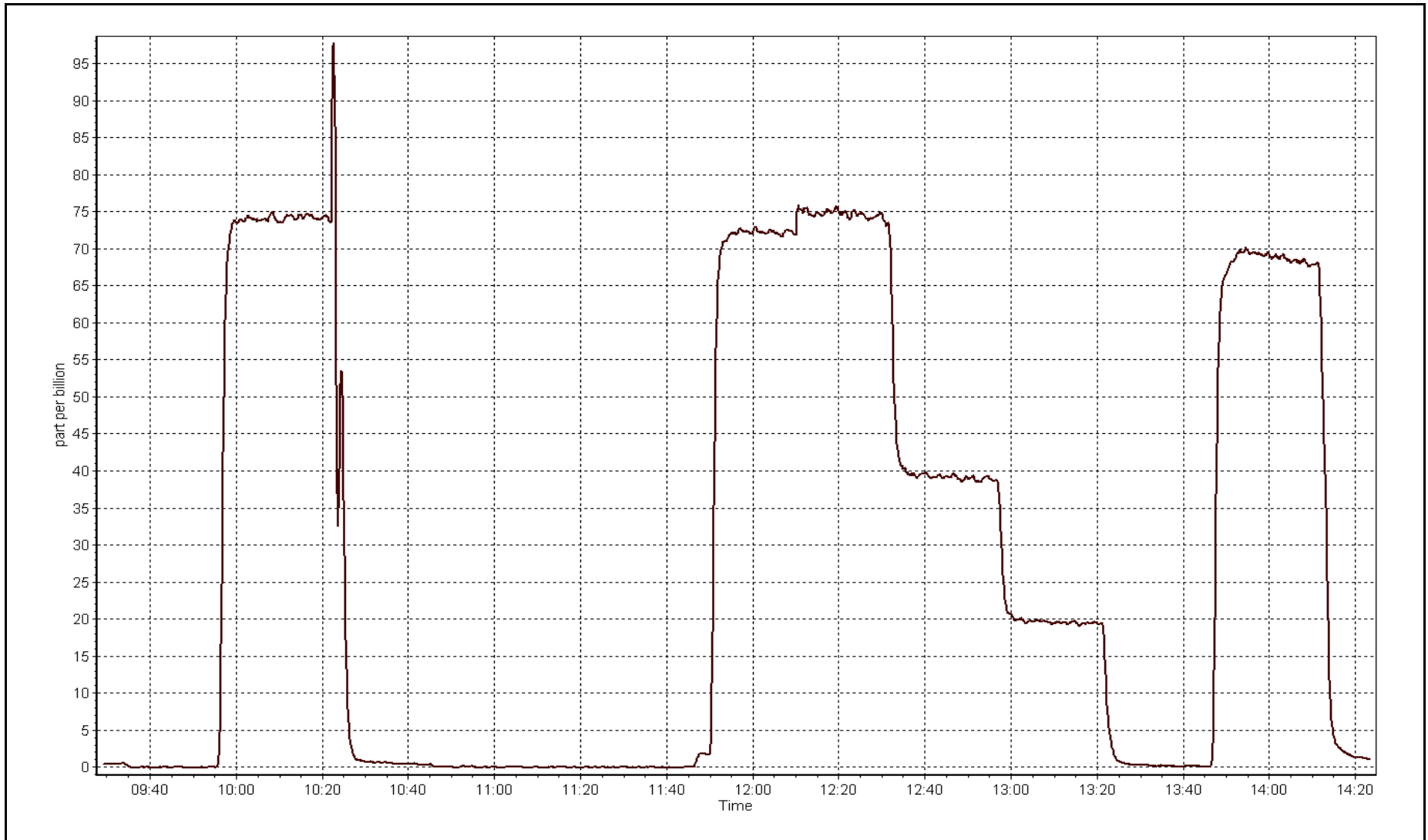
Station Information

Calibration Date	May 27, 2015	Previous Calibration	April 13, 2015
Station Name	AMS 14	Station Number	AMS 14
Start Time (MST)	9:30	End Time (MST)	14:20
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	1.000000
75.1	74.3	1.0111		
			Slope	1.010798
			Intercept	0.020216







Wood Buffalo Environmental Association

TRS Calibration Report

Station Information

Calibration Date	May 27, 2015	Last Calibration	April 13, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	14:20
Gas Cert Reference	56532297-003	Station temp.	22 Deg C
Cal Gas Concentration	5.05 ppm	Cal Gas Exp Date	09/09/2017
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790
SO2 gas concentration	47.2 ppm	SO2 gas cert/exp	SA130026A 12/12/2016

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-731	-732
Analyzer IP address	192.168.1.42		Lamp voltage	999	992
Calculated slope	1.010798	1.006780	Chamber temp	45	45
Calculated intercept	0.020216	0.286341	Pressure	652.6	656.8
Analyzer Background	1.62	1.69	Flow	0.388	0.390
Analyzer Coefficient	1.117	1.166	Intensity	95	95
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1300156232	
Converter make/model	CDN-101		Converter serial #	510	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	74.3	75.0	72.3	1.039
SO2 scrubber check	5000	18.7	176.5	0.4	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	74.3	75.0	74.5	1.007
second point	5000	39.6	40.0	39.0	1.024
third point	5000	19.8	20.0	19.5	1.027
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	74.3	75.0	68.5	1.096
Average Correction Factor					1.020

Corrected As found	72.3	Previous response	74.2	% change	2.7%
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Notes:

As Finds are response after gas change.

Calibration Performed By:

Ryan Power



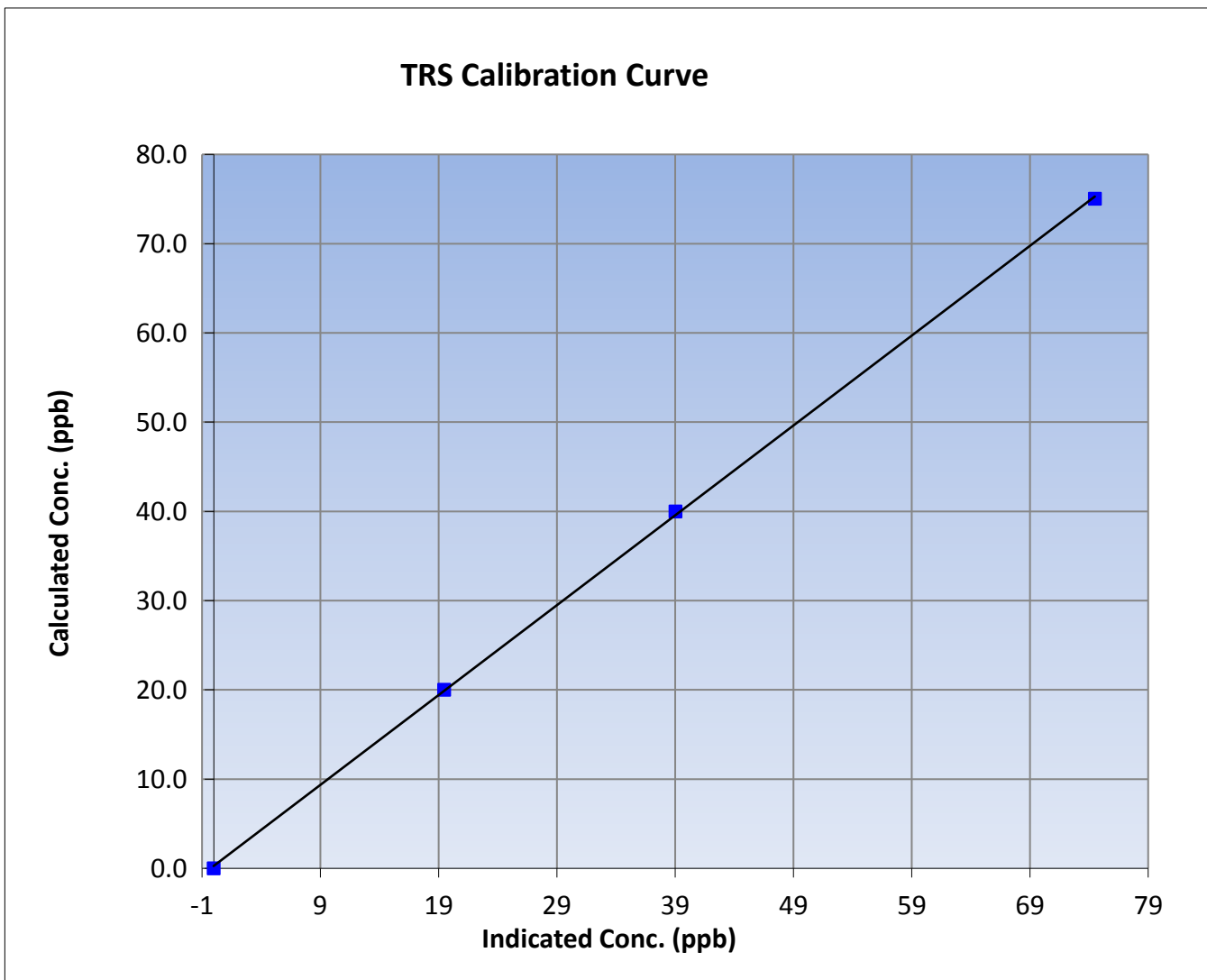
Wood Buffalo Environmental Association TRS Calibration Report

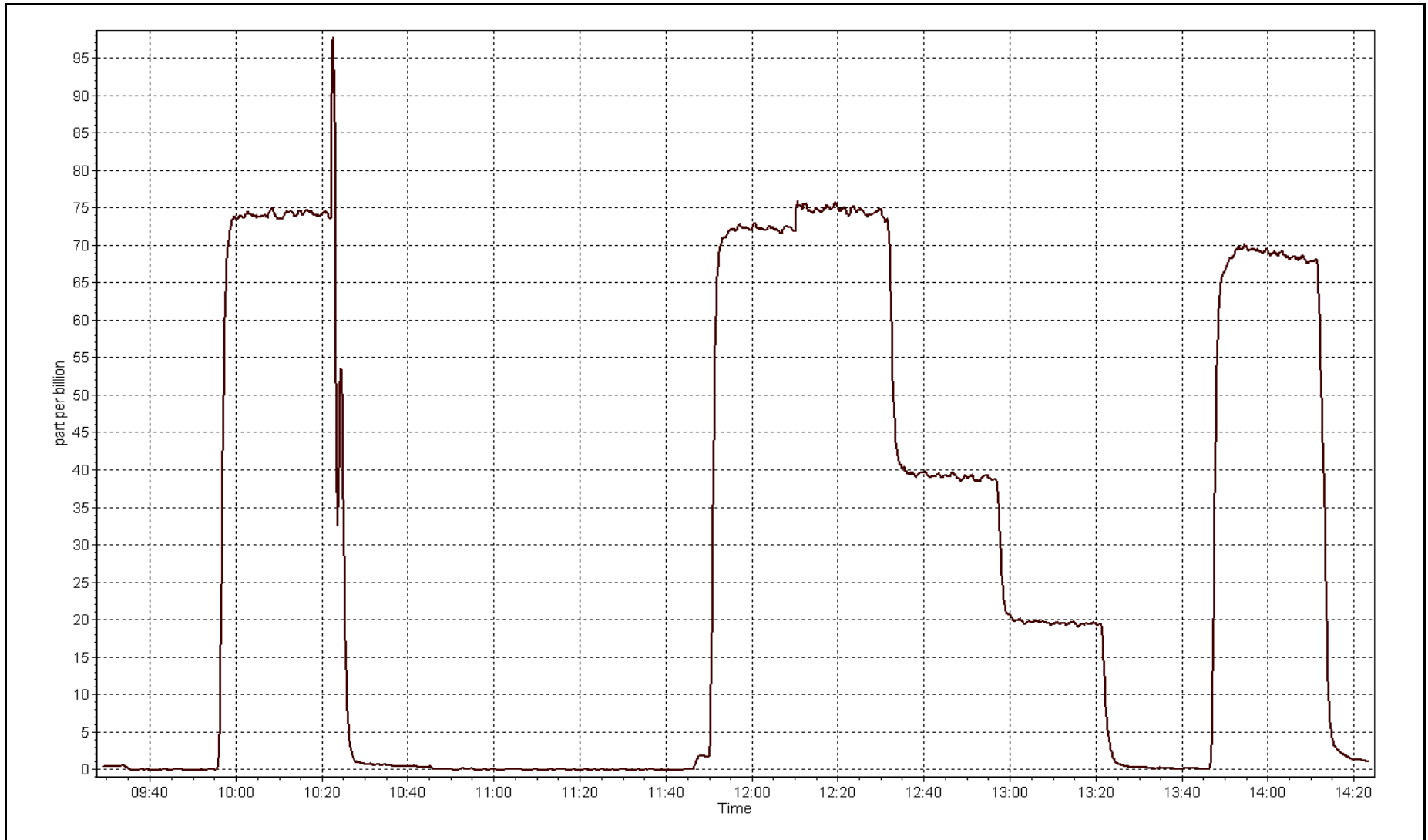
Station Information

Calibration Date	May 27, 2015	Previous Calibration	April 13, 2015
Station Name	AMS 14	Station Number	AMS 14
Start Time (MST)	9:30	End Time (MST)	14:20
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1300156232

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999902
75.0	74.5	1.0074		
40.0	39.0	1.0245	Slope	1.006780
20.0	19.5	1.0266		
			Intercept	0.286341







Wood Buffalo Environmental Association THC / NMHC Calibration Report

Station Information

Calibration Date	May-21-15	Last Calibration	April-14-15
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	14:25
Gas Cert Reference	SA130026A	Cal Gas Expiry Date	December-12-16
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211.0 ppm	Station temp.	20 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.1	74.9
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.996459	0.999522	Carrier Pressure	31.8	31.8
THC Calc intercept	0.010103	0.008118	Fuel Pressure	41.4	41.4
NMHC Calc slope	0.996719	0.997898	Air Pressure	32.5	32.4
NMHC Calc intercept	-0.003929	-0.005936			

Analyzer make Thermo 55i Analyzer serial # 1218153355

THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	74.9	16.36	16.40	0.998
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	16.36	16.38	0.999
second point	5000	37.5	8.19	8.14	1.006
third point	5000	18.7	4.09	4.10	0.996
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	16.36	16.36	1.000
Average Correction Factor					1.001

Corrected As found 16.40 Previous response 16.41 % change 0.1%

Notes:

No adjustments.

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

THC / NMHC Calibration Report

NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	74.9	8.69	8.72	0.997
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	8.69	8.72	0.997
second point	5000	37.5	4.35	4.35	1.000
third point	5000	18.7	2.17	2.20	0.986
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	8.69	8.70	0.999
Average Correction Factor					0.995

Corrected As found 8.72 Previous response 8.72 % change 0.1%

CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	74.9	7.67	7.67	1.000
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	7.67	7.66	1.001
second point	5000	37.5	3.84	3.79	1.013
third point	5000	18.7	1.91	1.90	1.008
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	74.9	7.67	7.65	1.003
Average Correction Factor					1.007

Corrected As found 7.67 Previous response 7.69 % change 0.2%



Wood Buffalo Environmental Association

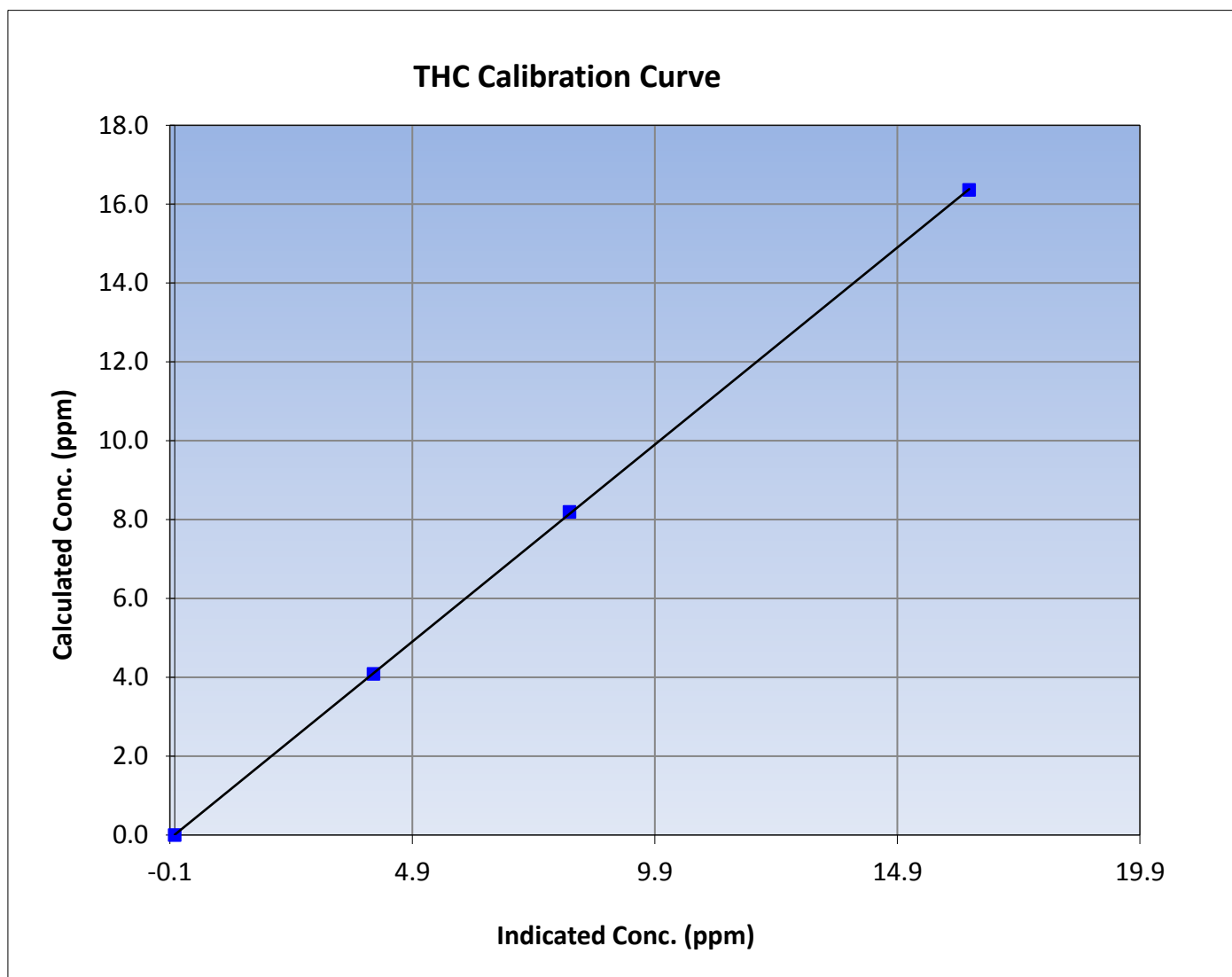
THC Calibration Summary

Station Information

Calibration Date	May 21, 2015	Previous Calibration	April 14, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:20	End Time (MST)	14:25
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999979
16.36	16.38	0.9989		
8.19	8.14	1.0064	Slope	0.999522
4.09	4.10	0.9963		
			Intercept	0.008118





Wood Buffalo Environmental Association

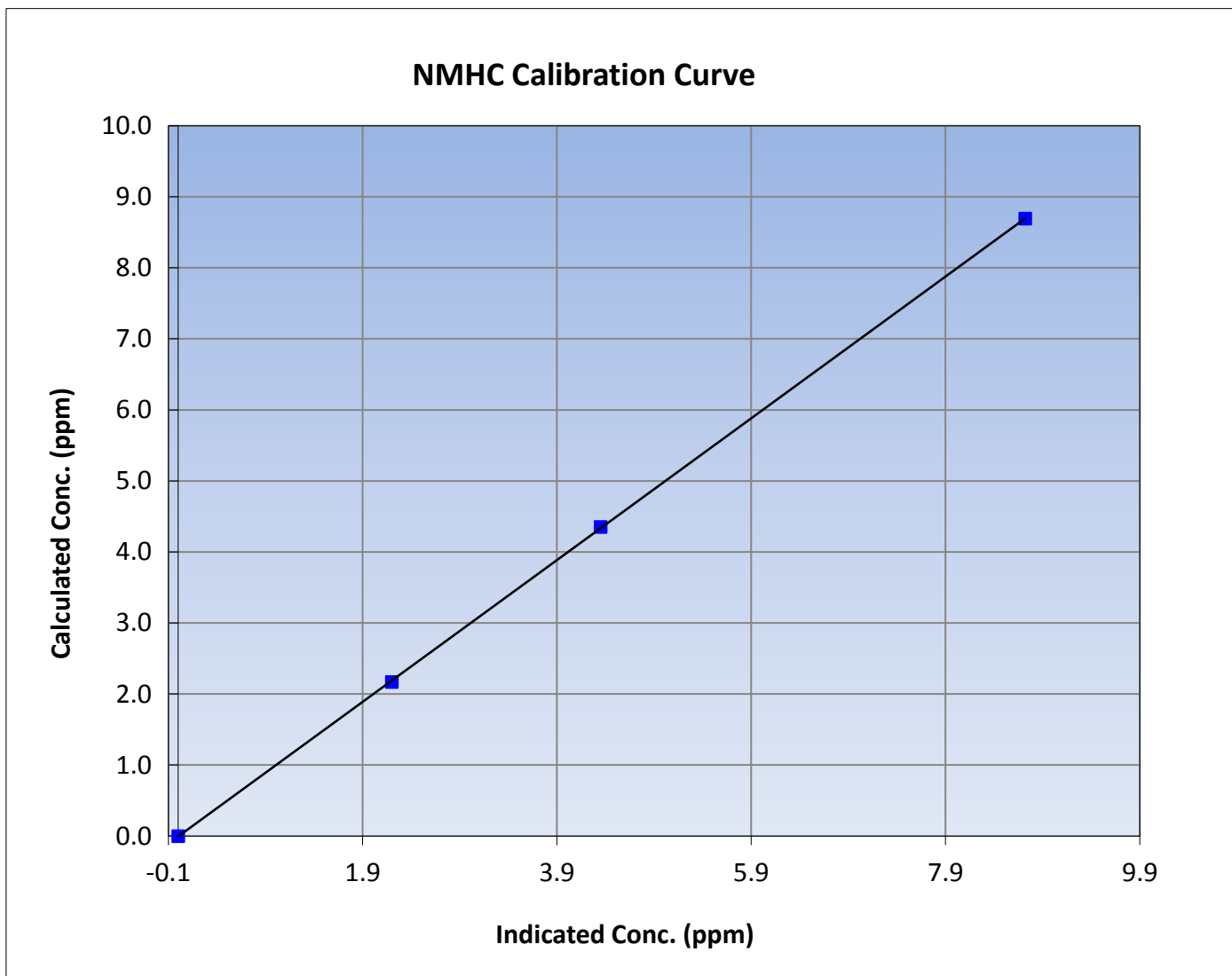
NMHC Calibration Summary

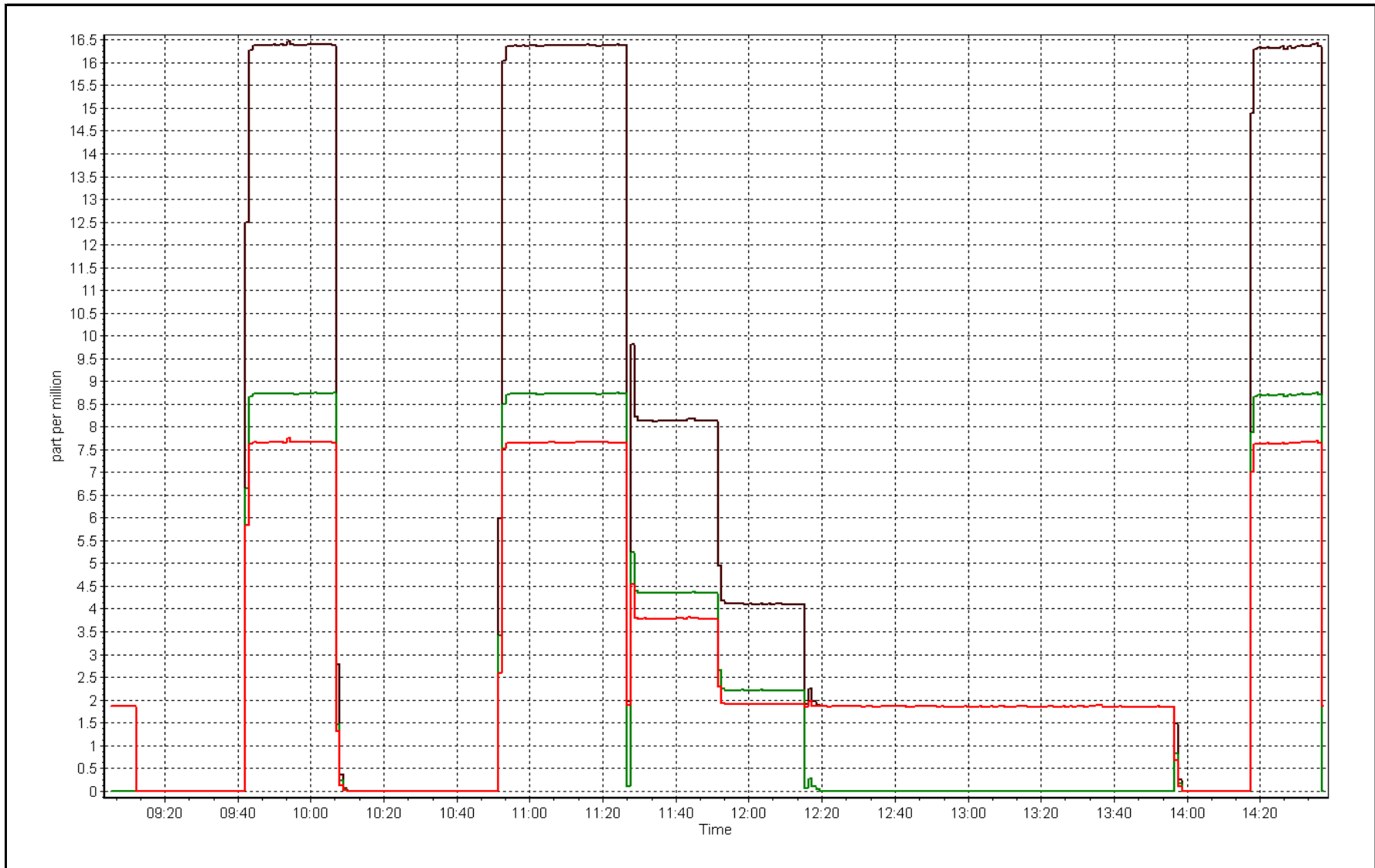
Station Information

Calibration Date	May 21, 2015	Previous Calibration	April 14, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:20	End Time (MST)	14:25
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999983
8.69	8.72	0.9968		
4.35	4.35	1.0004	Slope	0.997898
2.17	2.20	0.9864		
			Intercept	-0.005936







Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 22, 2015	Previous Calibration	April 14, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	12:50
NO2 GPT Ref date	May-21-15	Transfer Standard	NO2
		Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.8	27.6
Analyzer IP address	192.168.1.48		Lamp temp.	53.8	53.8
Calculated slope	0.995707	0.998394	Pressure	656.4	656.7
Calculated intercept	0.691864	-0.057943	Flow cell A	0.702	0.702
Analyzer Background	-0.8	-0.8	Flow cell B	0.705	0.706
Analyzer Coefficient	0.970	0.970	Cell A Intensity	132490	131300
			Cell B Intensity	137600	134800

Analyzer make	Thermo 49i	Analyzer serial #	1426262596
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-0.3	----
as found span	5000	1.190	398.1	398.3	1.000
calibrator zero	5000	0.00	0.0	0.2	----
high point	5000	1.190	398.1	399.0	0.998
second point	5000	0.847	272.6	272.9	0.999
third point	5000	0.505	142.2	142.4	0.998
as left zero	5000	0.00	0.0	0.3	----
as left span	5000	1.190	398.1	406.1	0.980
Average Correction Factor					0.998

Corrected As found	398.5	Previous response	399.1	% change	0.1%
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Notes:

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

Calibration Performed By:

Ryan Power



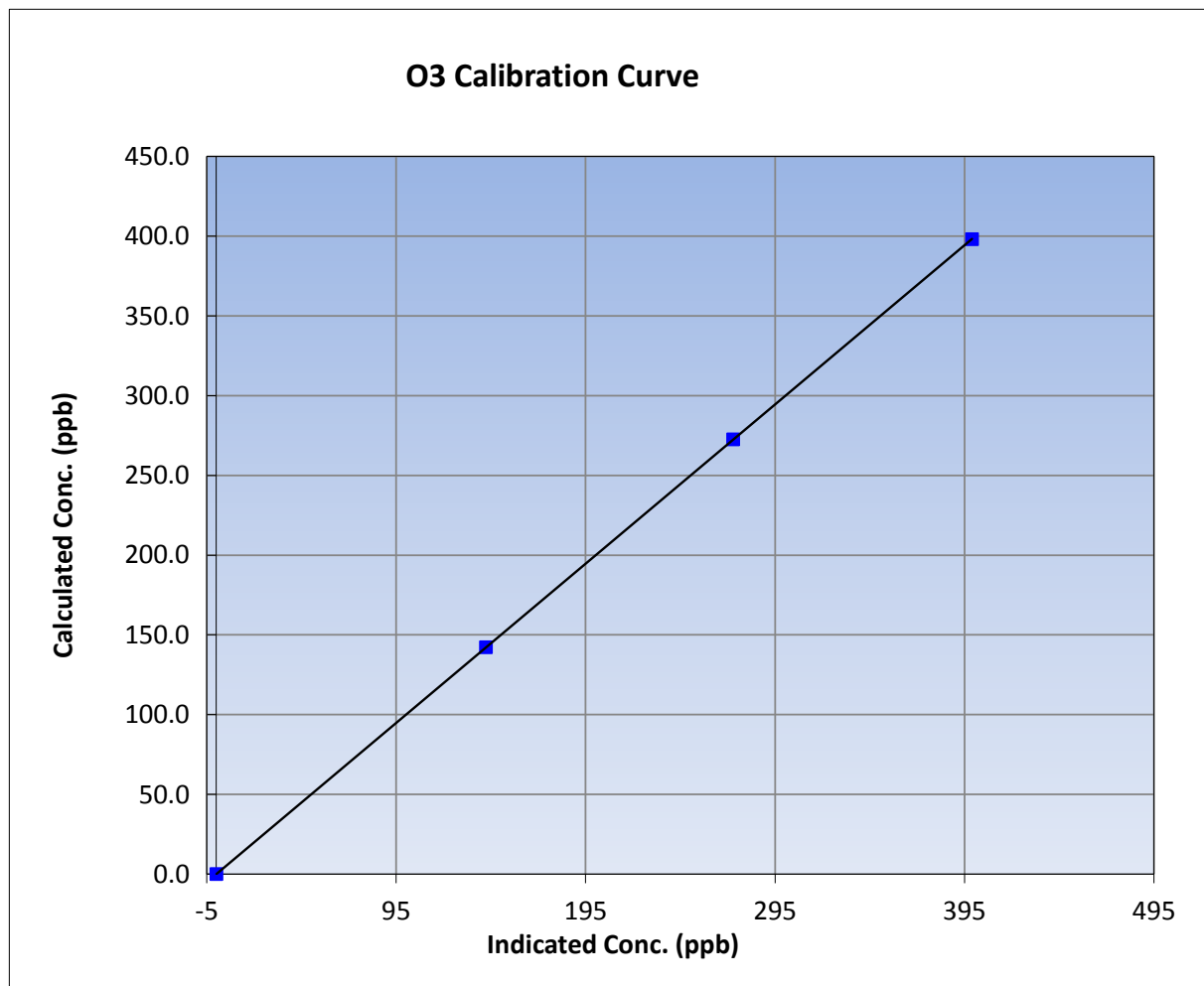
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	May-22-15	Previous Calibration	April 14, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:05	End Time (MST)	12:50
Analyzer make	Thermo 49i	Analyzer serial #	1426262596

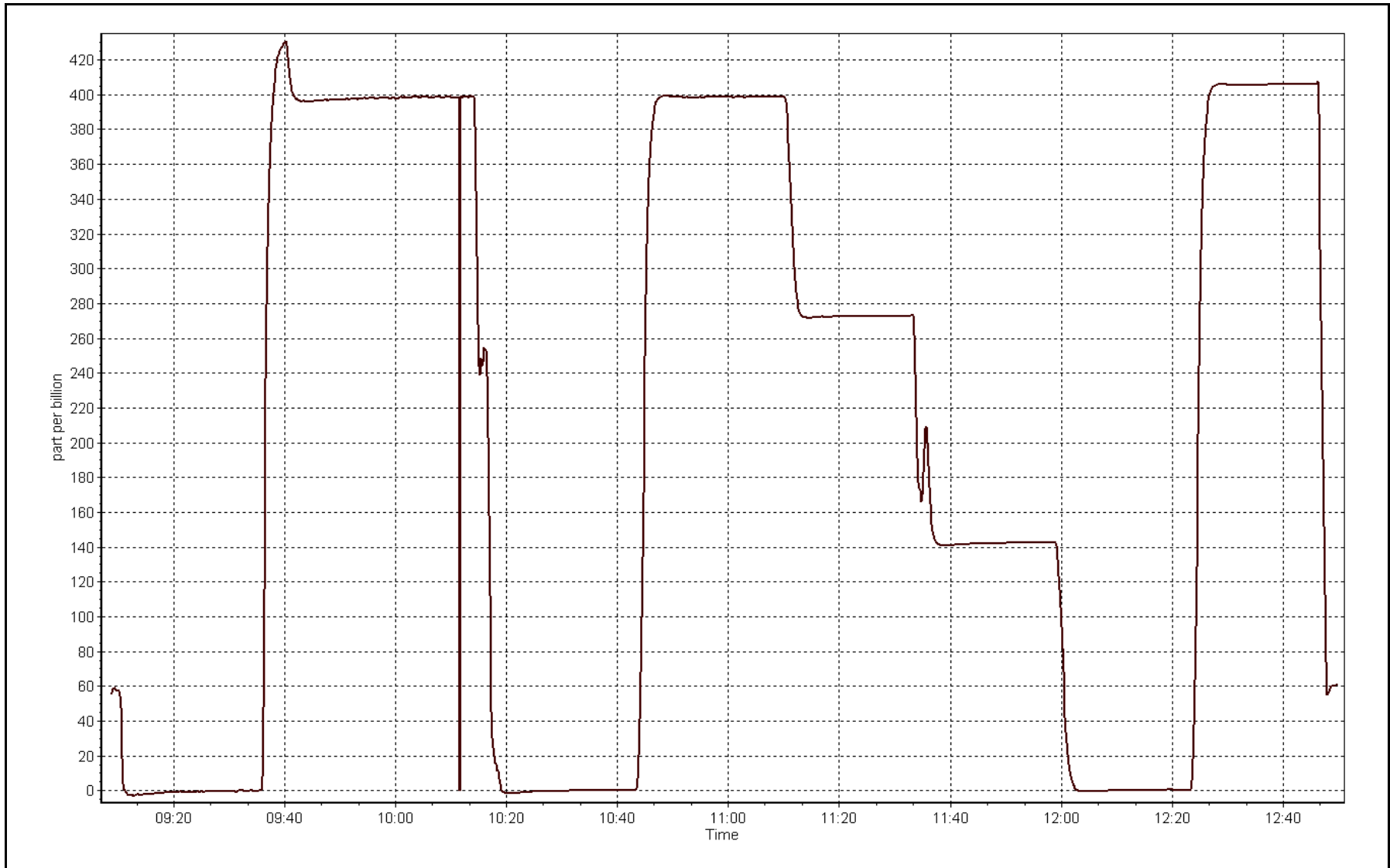
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999999
398.1	399.0	0.9979		
272.6	272.9	0.9989	Slope	0.998394
142.2	142.4	0.9985		
			Intercept	-0.057943



O3 Calibration Plot

Date: May 22, 2015





Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 21, 2015	Previous Calibration	April 14, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	14:35
NO Cal Gas Conc	53.4 ppm	Gas Cert Reference	SA130026A
NOx Cal Gas Conc	53.4 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	Sabio 4010	Serial Number	8400311
Zero air Generator	Teledyne API T701	Serial Number	4764

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8790
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.992212	0.991625	0.998643
	Data Offset	0.738723	0.868626	0.773924
Current Calibration	Data Slope	0.998548	0.998570	0.999335
	Data Offset	0.068439	0.090685	-0.074630

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262592
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.682		0.677	
NOx coefficient	0.998		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	2.8		3.0	
NOx bkgrnd	2.9		3.2	
Chamber Temp	49.9	Deg C	50	Deg C
Moly Temp	326	Deg C	324.2	Deg C
PMT voltage	NA	V	-845.1	V
PMT Temp	-3	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	160.9	mmHg	160.6	mmHg
R Cell Press Nox	160.9	mmHg	160.6	mmHg
NO sample flow	0.845	lpm	0.845	lpm
Nox sample Flow	0.845	lpm	0.845	lpm

Notes:

Small adjustments to zero and span. Span valve changed after As Finds.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 21, 2015

Station Number:

AMS 14

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.4	0.2	0.2	----	----
as found span	5000	74.9	799.9	799.9	0.0	805.8	804.7	1.1	0.9928	0.9941
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
high point	5000	74.9	799.9	799.9	0.0	801.4	801.4	0.0	0.9982	0.9982
second point	5000	37.5	400.5	400.5	0.0	400.1	399.9	0.2	1.0010	1.0014
third point	5000	18.7	199.7	199.7	0.0	200.4	200.4	0.0	0.9967	0.9967
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
as left span	5000	74.9	799.9	402.1	397.8	802.1	397.7	404.4	0.9973	1.0111
Average Correction Factor									0.9986	0.9988

Corrected As found

NO_x= 805.4

NO= 804.5

Percent Change

NO_x= 0.0%

NO= 0.2%

Previous Response

NO_x= 805.5

NO= 805.8

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

74.9

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	402.1	398.1	800.5	402.1	398.4	0.9846	1.0000	0.9992	100.1%
2nd NO2 (200)	----	527.6	272.6	800.4	527.6	272.8	0.9847	1.0000	0.9993	100.1%
3rd NO2 (100)	----	658.0	142.2	800.5	658.0	142.6	0.9845	1.0000	0.9975	100.3%
4th NO2 (0)	800.2	----	0.2	800.4	800.2	0.2	0.9847	1.0000	N/A	----
Average Correction Factor							0.9846	1.0000	0.9987	100.1%

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

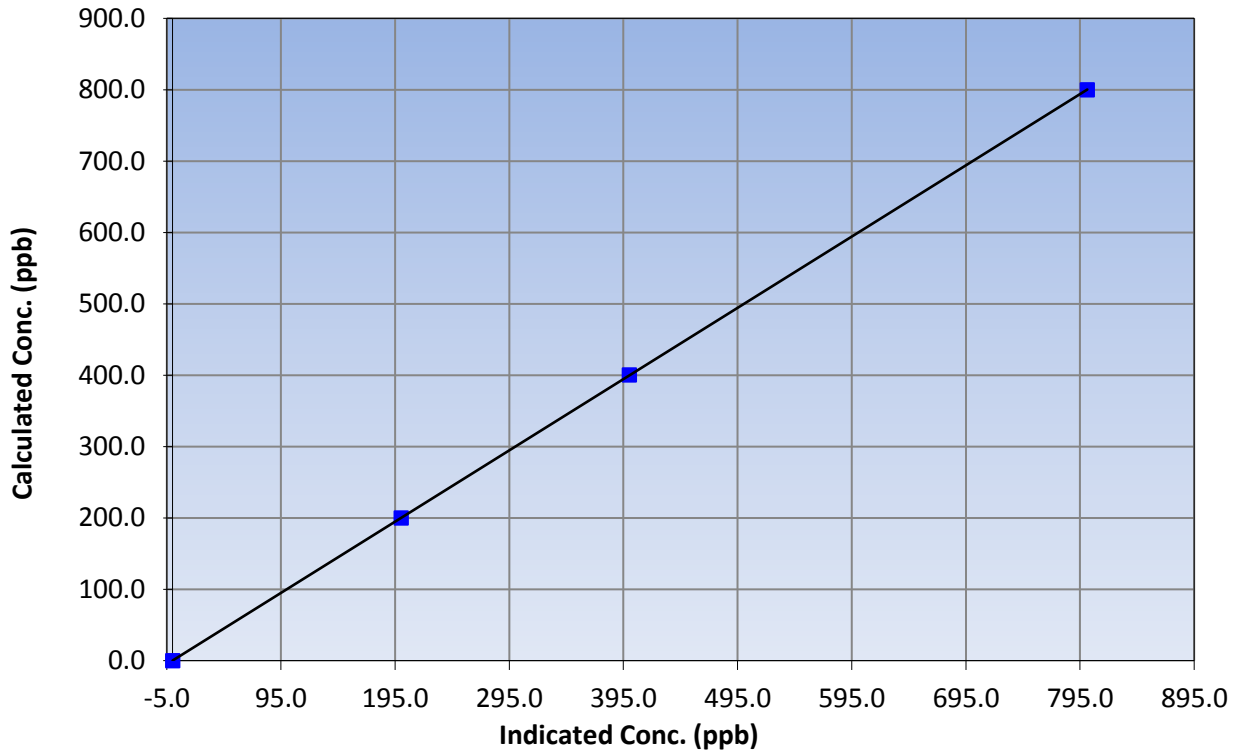
Station Information

Calibration Date	May 21, 2015	Previous Calibration	April 14, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:20	End Time (MST)	14:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999997
799.9	801.4	0.9982		
400.5	400.1	1.0010	Slope	0.998548
199.7	200.4	0.9967		
			Intercept	0.068439

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

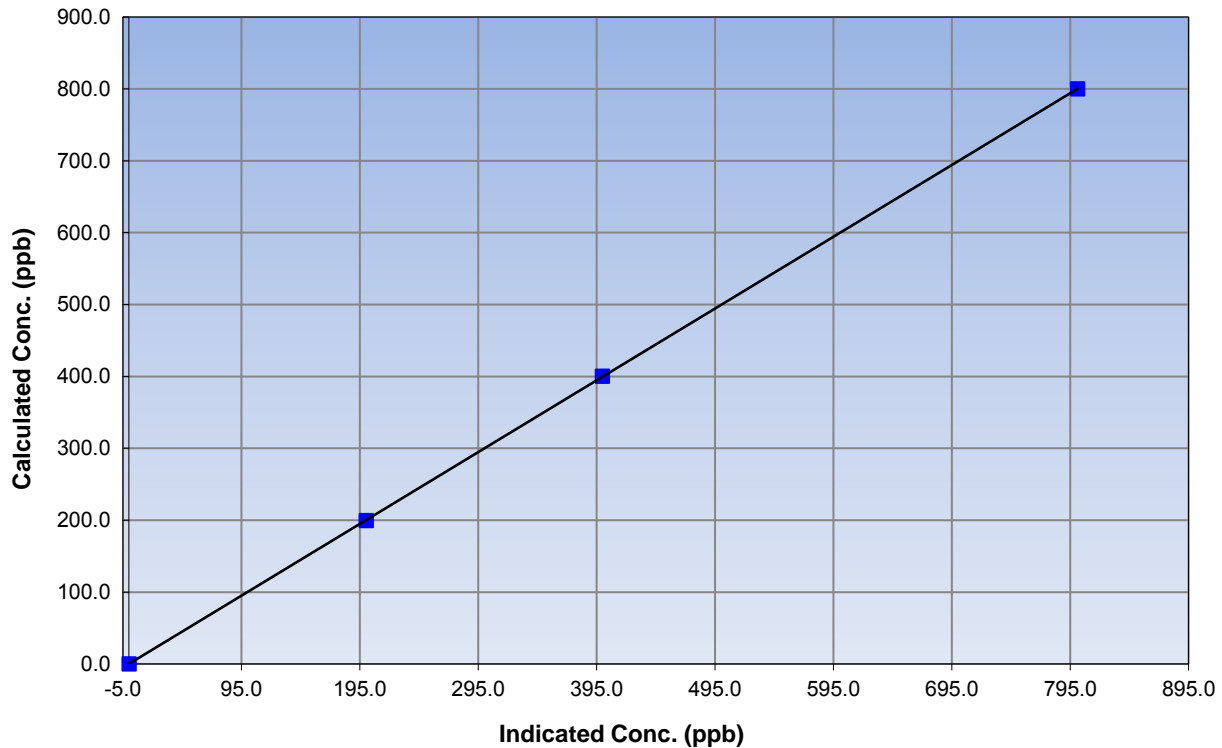
Station Information

Calibration Date	May 21, 2015	Previous Calibration	April 14, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:20	End Time (MST)	14:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999996
799.9	801.4	0.9982		
400.5	399.9	1.0014	Slope	0.998570
199.7	200.4	0.9967		
			Intercept	0.090685

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

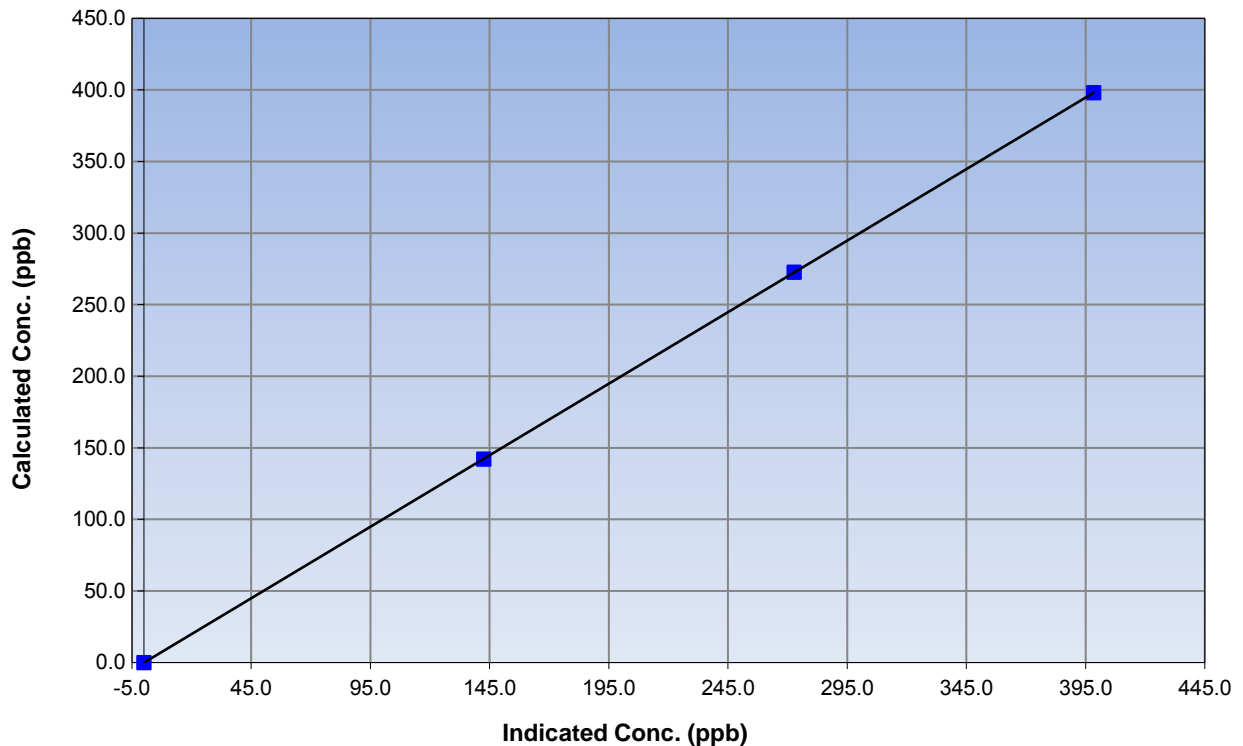
Station Information

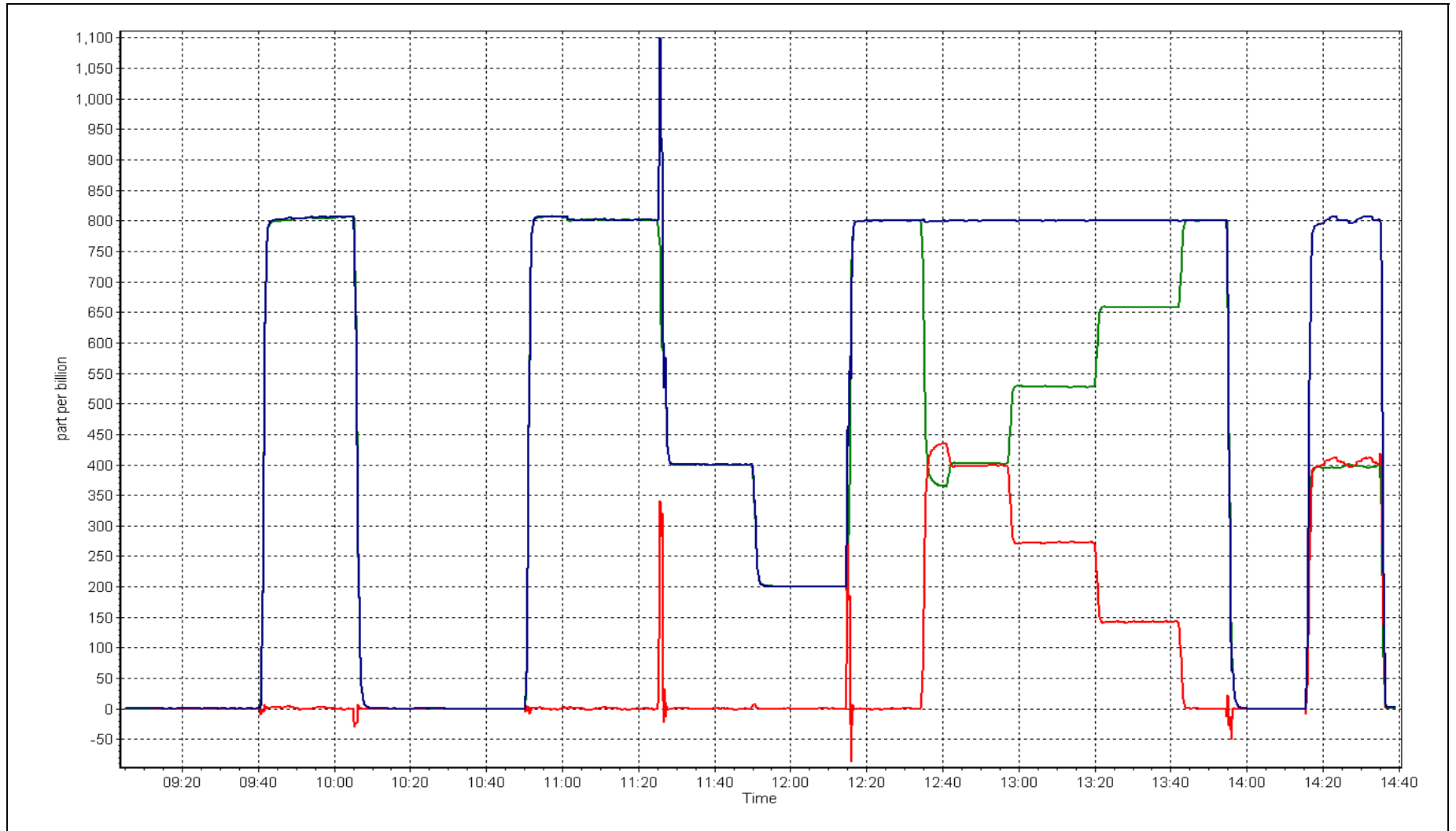
Calibration Date	May 21, 2015	Previous Calibration	April 14, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:20	End Time (MST)	14:35
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999999
398.1	398.4	0.9992		
272.6	272.8	0.9993	Slope	0.999335
142.2	142.6	0.9975		
			Intercept	-0.074630

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	May 27, 2015	Previous Calibration:	April 27, 2015
Station Name:	Anzac	Station Number:	AMS 14
Start Time (MST):	13:50	End Time (MST):	14:23
Calibrator Make/Model:	Delta Cal	Calibrator Serial Number:	1212

SHARP INFORMATION

Particulate Fraction:	PM2.5
Make/Model:	Thermo / SHARP 5030
Serial Number:	E-1093
Source SN:	4933
HEPA PN:	12144
Time Correct (MST):	YES
Parameters Checked:	T1, T2, T2,T4, P3, Main Flow, Beta, Neph

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	21.0	20.7	-0.3	21.0
T2	31.0	na	na	31.0
T3	27.0	na	na	27.0
T4	25.0	na	na	25.0
RH (%)	21.0	na	na	21.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	953	953.0	0.0	953

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1005	5	1005	1000

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	188		188
Neph	0		0
C14	17.6		17.6
Indicated Concentration (ug/m3)		no	
Offset 1	215.5		215.5
Offset 2	34		34

Leak Check (Quarterly)

Leak Check Date:	April 27, 2015	Previous Leak Check Date:	NA
	Measured	Difference LPM (Limit +/- 0.42 LPM)	
Flow without adaptor (LPM):	16.75		
Flow with adaptor [turn off pump first](LPM):	16.69	0.06	

Mass Foil Calibration (Annually)

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

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	27/05/2015
Pump	Good	NA
Filter Tape	Good	NA
Mass Foil Cal Set	Good	NA
HEPA filter	Good	NA

NOTES:

No adjustments.

Calibration Performed By: Ryan Power



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 15
CNRL HORIZON
MAY 2015**

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

June 29, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MAY 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	37	37	100.00	27	0	5	0
TRS (ppb) Average	709	35	35	100.00	1	0	0	0
THC (ppm) Average	705	37	39	99.73	3.6	-	2.5	-
NO2 (ppb) Average	707	37	37	100.00	44	0	9	-
NO (ppb) Average	707	37	37	100.00	26	-	3	-
NOX (ppb) Average	707	37	37	100.00	62	-	11	-
PM2.5 (ug/m3) Average	737	0	7	99.06	187.3	-	36.8	1
Temperature 2 m (C) Average	744	0	0	100.00	28.3	-	19.5	-
Wind Speed 10 m (km/h) Average	744	0	0	100.00	30	-	16.0	-
Wind Direction 10 m (deg) Average	744	0	0	100.00	-	-	-	-
Precipitation (mm) Total	744	0	0	100.00	5.6	-	8.6	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	82	-
Global Solar Radiation (W/m2) Average	744	0	0	100.00	903	-	366	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	1	2	-	0	0	0	0	1	3	27
TRS (ppb) Average	709	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	705	2.2	0.2	-	1.9	2	2.1	2.2	2.3	2.4	3.6
NO2 (ppb) Average	707	4	5	-	0	1	1	2	5	11	44
NO (ppb) Average	707	0.7	2	-	0	0	0	0	0	1	26
NOX (ppb) Average	707	4.7	7	-	0	1	1	2	6	12	62
PM2.5 (ug/m3) Average	737	10.57	15.2	-	0.1	2.3	3.9	6.8	11.3	19.4	187.3
Temperature 2 m (C) Average	744	11.1	8.4	-	-7.1	0.4	4.3	10	17.3	23.7	28.3
Wind Speed 10 m (km/h) Average	744	8.6	4	-	1	4	6	8	11	14	30
Wind Direction 10 m (deg) Average	744	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	744	-	-	21.08	-	-	-	-	-	-	-
Relative Humidity (%) Average	744	45.7	23	-	10	17	26	43	63	78	99
Global Solar Radiation (W/m2) Average	744	288	311	-	0	0	0	153	564	805	903

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)
MAY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	12 May 2015 12:00	12 May 2015 13:00	2	Maintenance - replace fuel cylinder
PM2.5	02 May 2015 23:00	03 May 2015 03:00	5	Unstable operation - excessive baseline drift
PM2.5	14 May 2015 14:00	14 May 2015 15:00	2	Maintenance - Flow and zero check, sample head cleaning



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 27 ppb on May 31 09:00	Maximum Daily Average: 4.8 ppb on May 24		Hours of Data:	707
Minimum Value: 0 ppb on May 1 04:00	Minimum Daily Average: 0.0 ppb on May 28		Hours of Missing Data:	37
Maximum Diurnal Average: 2.1 ppb at hour 11	Minimum Diurnal Average: 0.1 ppb at hour 5		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 = 3 P ₉₉ = 11		Percent Operational Time:	100.0

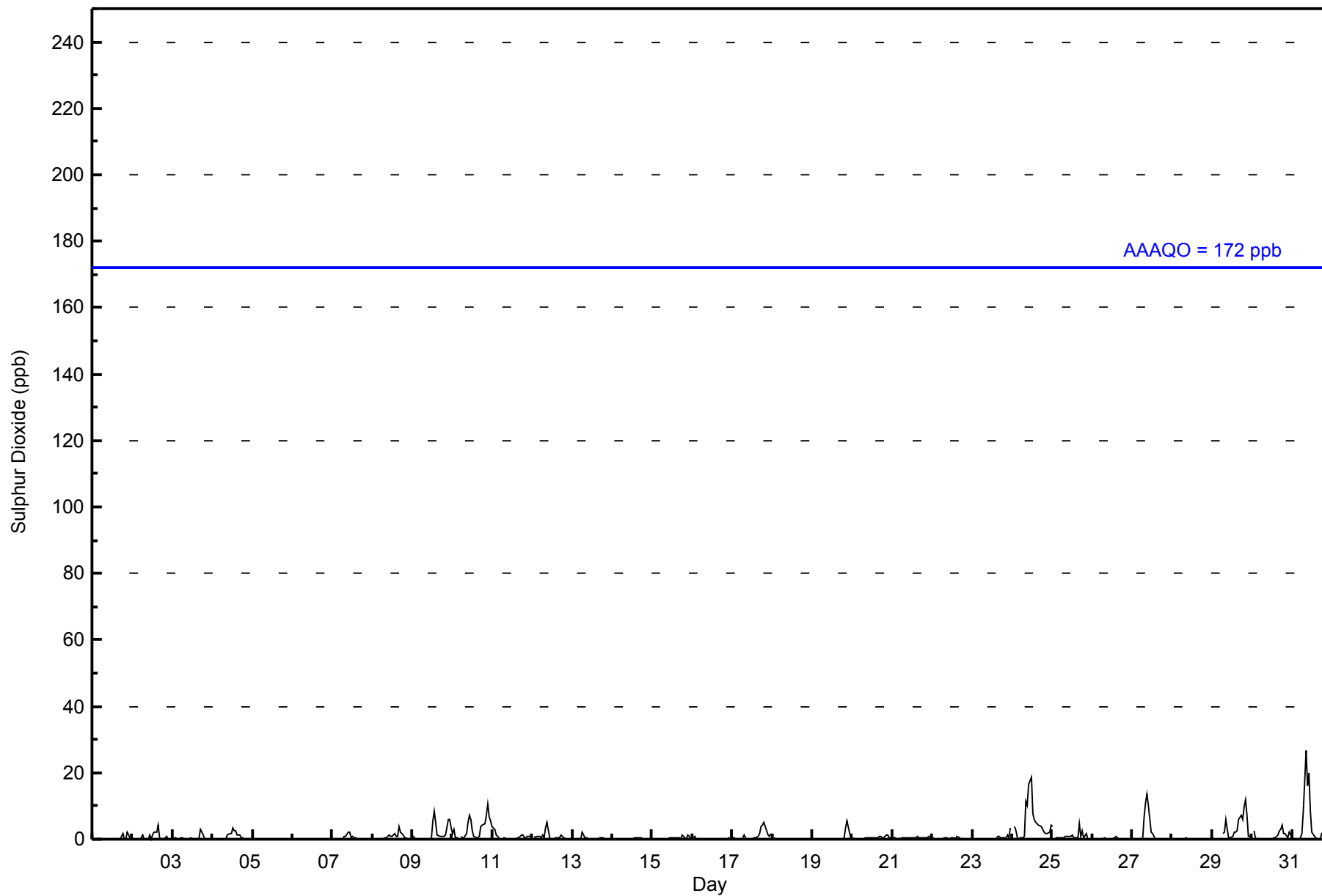
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	2	1	0	0.3	2
2-May	0	0	Z	0	0	1	1	0	0	0	1	0	1	2	2	4	0	0	0	0	1	0	0	0	0.7	4
3-May	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	3	1	0	0	0	0	0	0.3	3
4-May	0	0	0	0	Z	0	0	0	0	1	2	2	4	2	2	1	1	0	0	0	0	0	0	0	0.7	4
5-May	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
6-May	Z	0	0	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-May	0	Z	0	0	0	0	0	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	2
8-May	0	0	Z	0	0	0	0	0	0	1	1	1	1	2	1	1	4	2	1	1	0	0	0	0	0.7	4
9-May	1	0	0	Z	0	0	0	0	0	0	0	6	9	5	1	1	1	1	1	1	1	6	6	3	1.8	9
10-May	2	3	0	0	Z	1	0	1	2	5	7	6	3	1	1	1	1	4	4	5	7	11	7	6	3.3	11
11-May	4	3	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	0.7	4
12-May	Z	1	0	1	1	0	1	1	3	5	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.8	5
13-May	0	Z	0	0	0	0	2	1	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	2
14-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0.3	1
16-May	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
17-May	0	1	0	0	0	Z	1	1	0	0	0	0	1	1	1	2	4	4	4	5	4	1	1	2	1.2	5
18-May	Z	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
19-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	2	0	0.5	5
20-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	1	1	1	0	0.4	1
21-May	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0.4	1
22-May	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	4	0	0.4	4
24-May	Z	4	3	1	0	0	0	1	12	10	16	19	8	6	5	5	4	4	3	2	2	2	2	4	4.8	19
25-May	4	Z	0	0	0	0	0	1	1	1	1	1	1	1	0	0	4	1	3	0	2	0	0	0	1.0	4
26-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1
27-May	0	0	0	Z	0	0	0	7	11	14	10	2	2	1	0	0	0	0	0	0	0	0	0	0	2.1	14
28-May	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
29-May	0	0	0	0	0	Z	2	2	6	3	1	0	1	2	2	3	6	7	6	10	12	7	1	1	3.1	12
30-May	Z	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	3	4	2	2	0	2	1	1.0	4
31-May	1	Z	0	0	0	1	1	9	27	16	20	8	2	1	0	0	0	0	2	2	0	0	0	0	4.0	27
																								Diurnal Average		
																								Diurnal Maximum		

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	697	98.59	98.59
11 - 20	9	1.27	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	103	83	38	29	20	27	32	62	96	93	41	11	6	14	16	26	697
11 - 20	0	0	0	1	1	0	1	5	1	0	0	0	0	0	0	0	9
21 - 60	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	103	83	38	30	21	27	34	67	97	93	41	11	6	14	16	26	707

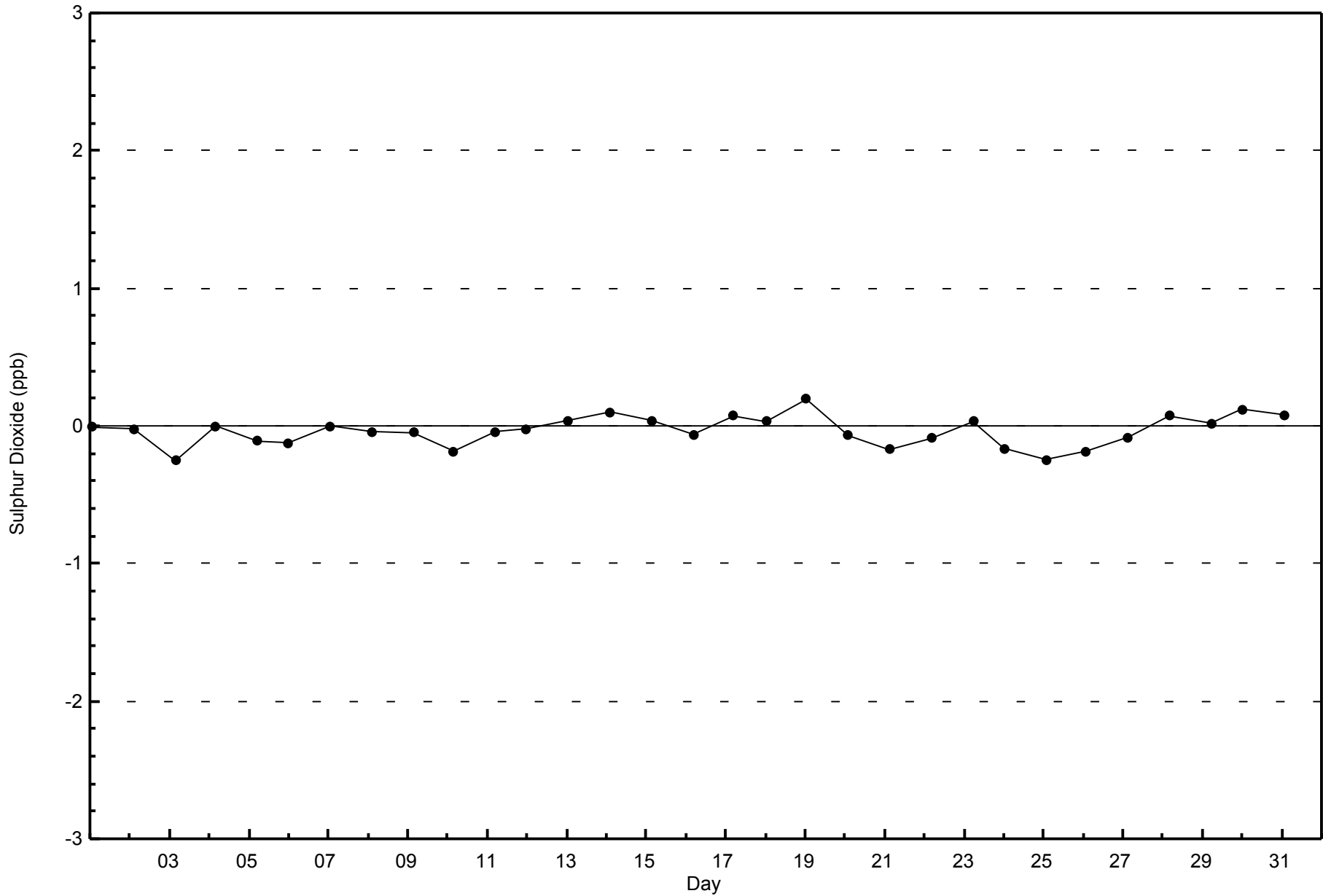
Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Zero Responses

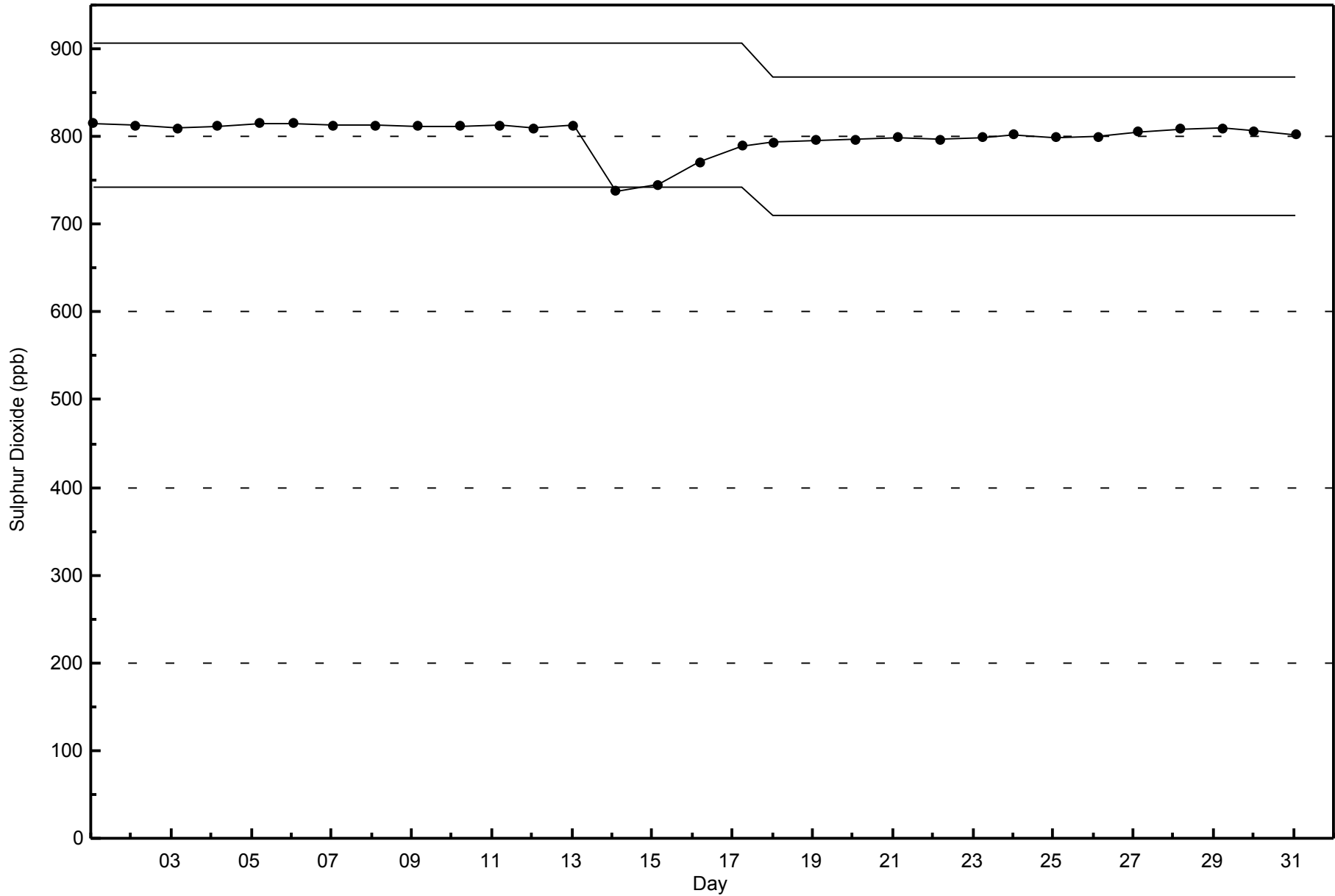
Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
CNRL Horizon - May 2015





Summary of Hour Averages

CNRL Horizon - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 1 ppb on May 31 09:00	Maximum Daily Average: 0.3 ppb on May 31		Hours of Data:	709
Minimum Value: 0 ppb on May 9 10:00	Minimum Daily Average: 0.0 ppb on May 28		Hours of Missing Data:	35
Maximum Diurnal Average: 0.2 ppb at hour 1	Minimum Diurnal Average: 0.1 ppb at hour 16		Hours of Calibration:	35
Monthly Average: 0.2 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 0 P ₉₉ = 1		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-May	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
3-May	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
4-May	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-May	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-May	0	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-May	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
9-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.2	1
11-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-May	0	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-May	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
14-May	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0
15-May	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
16-May	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
17-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-May	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
19-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-May	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-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-May	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
23-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1
25-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1
26-May	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
27-May	0	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
28-May	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
29-May	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
30-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-May	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1

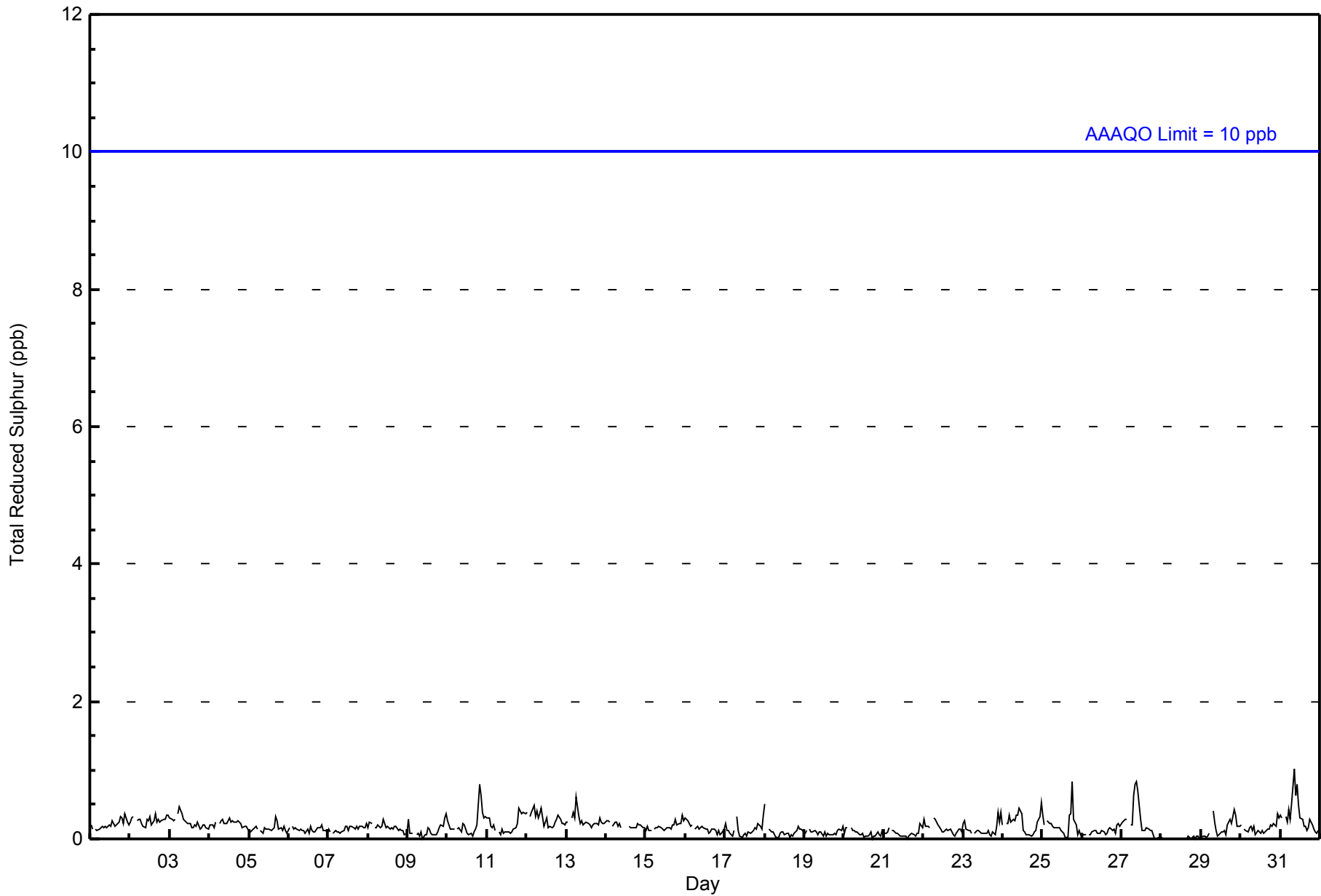
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Diurnal Average
1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	Diurnal Maximum	

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



WBEA
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - May 2015





WBEA
Cumulative Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - May 2015

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
Frequency Distribution

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	106	79	38	30	21	26	34	69	99	94	39	10	8	14	15	27	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	106	79	38	30	21	26	34	69	99	94	39	10	8	14	15	27	709

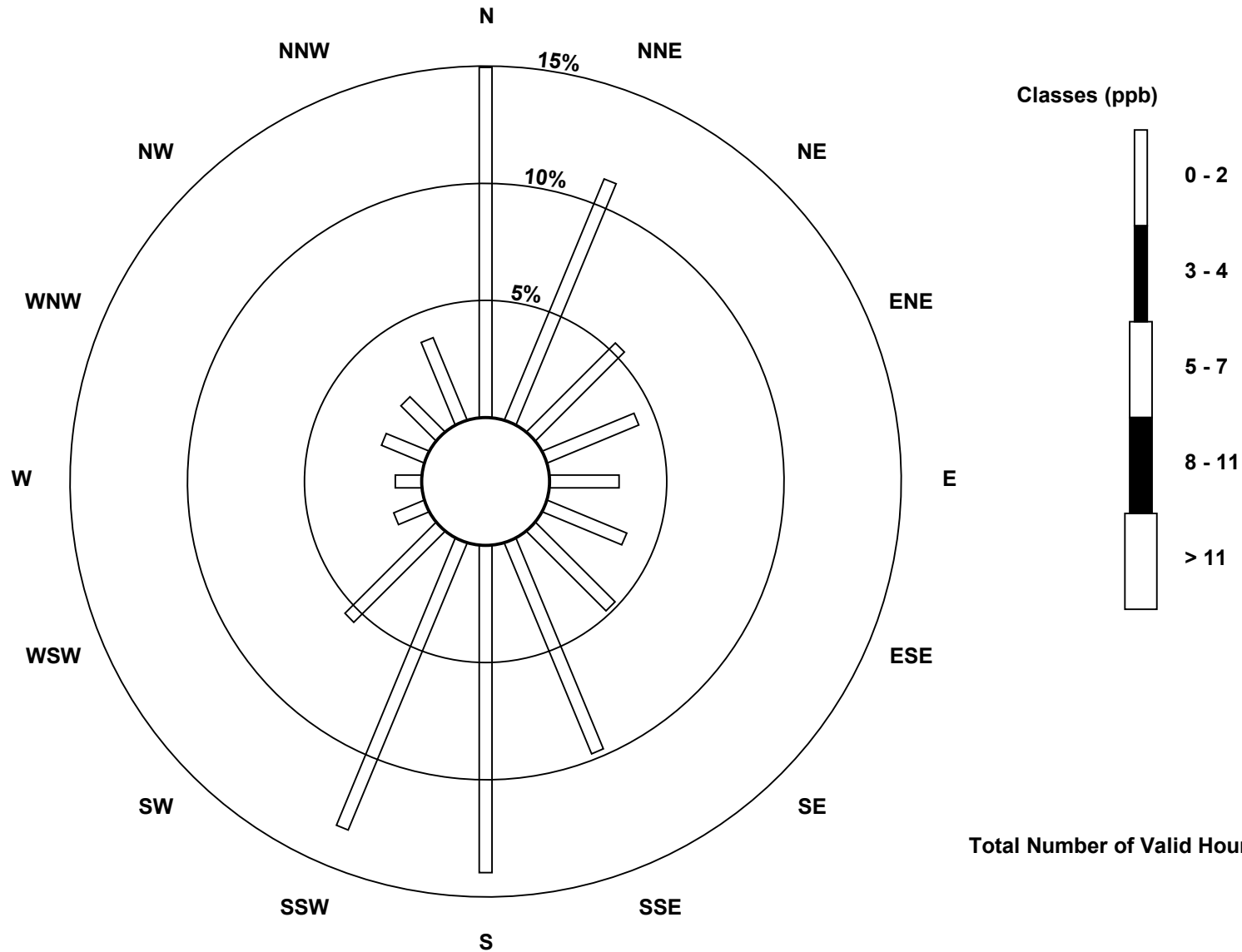
Total Number of Valid Hours: 709

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

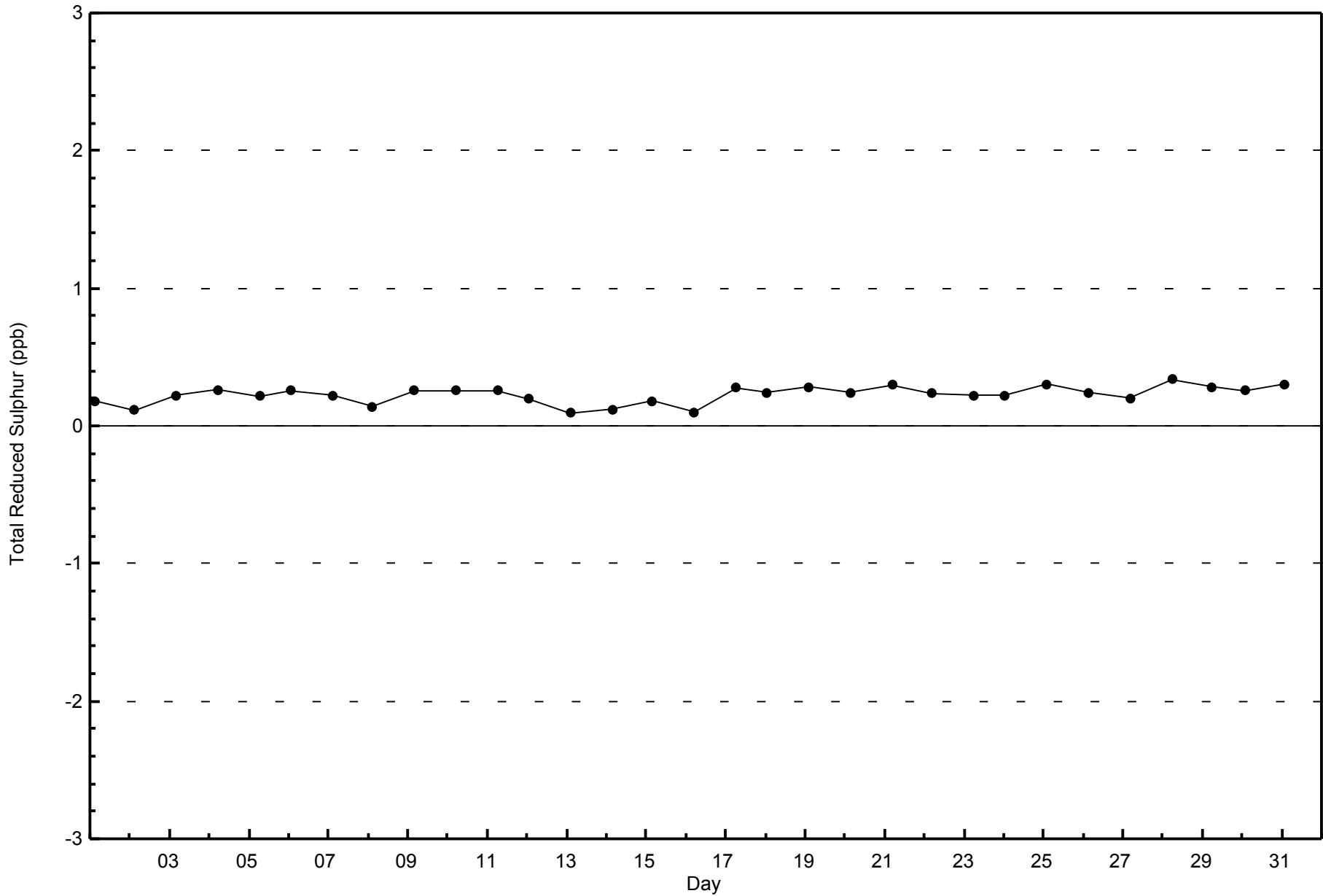
Total Reduced Sulphur (TRS) - ppb
CNRL Horizon (AMS 15)





WBEA
Zero Responses

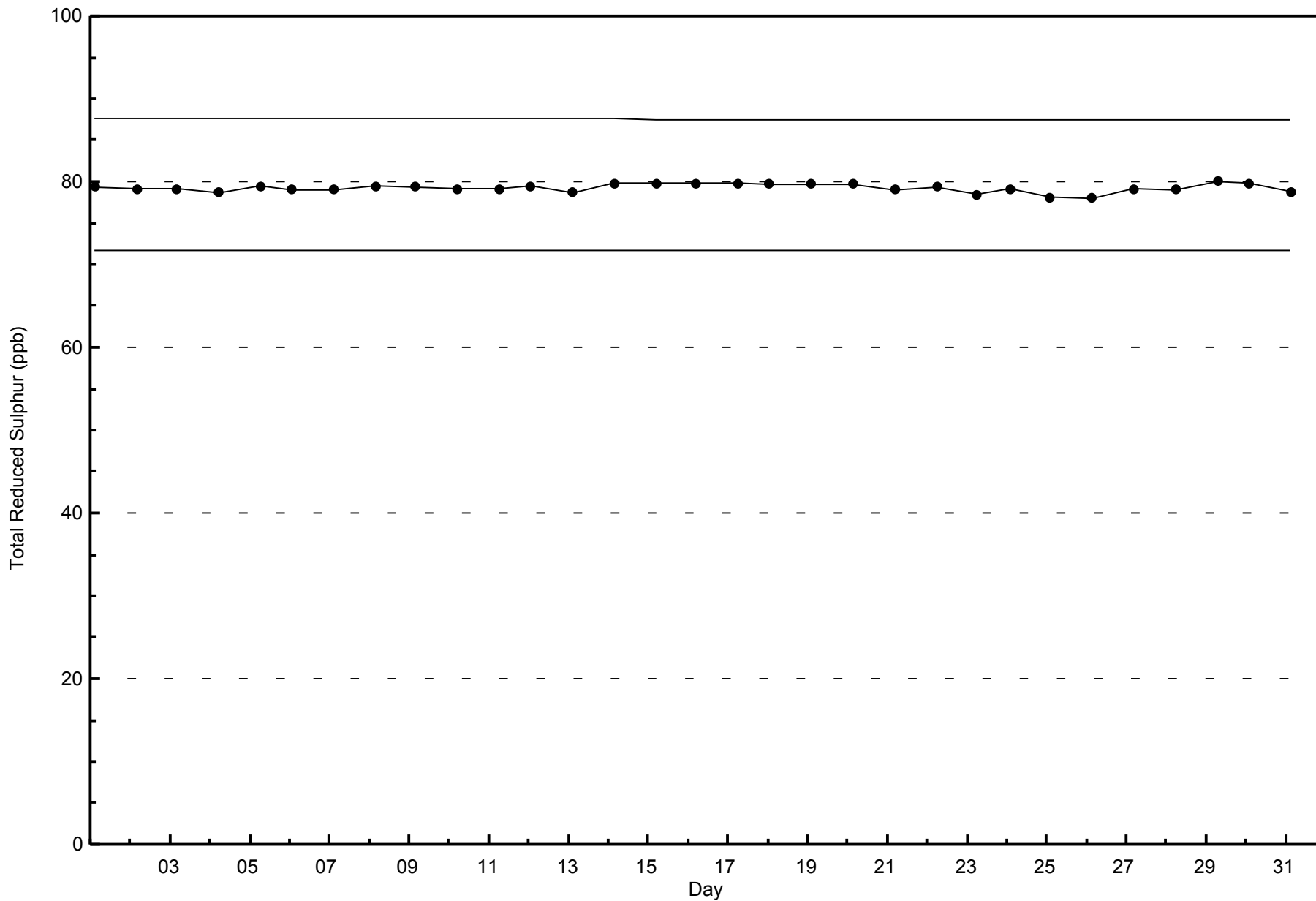
Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - May 2015





WBEA
Span Responses

Total Reduced Sulphur (TRS) - ppb
CNRL Horizon - May 2015



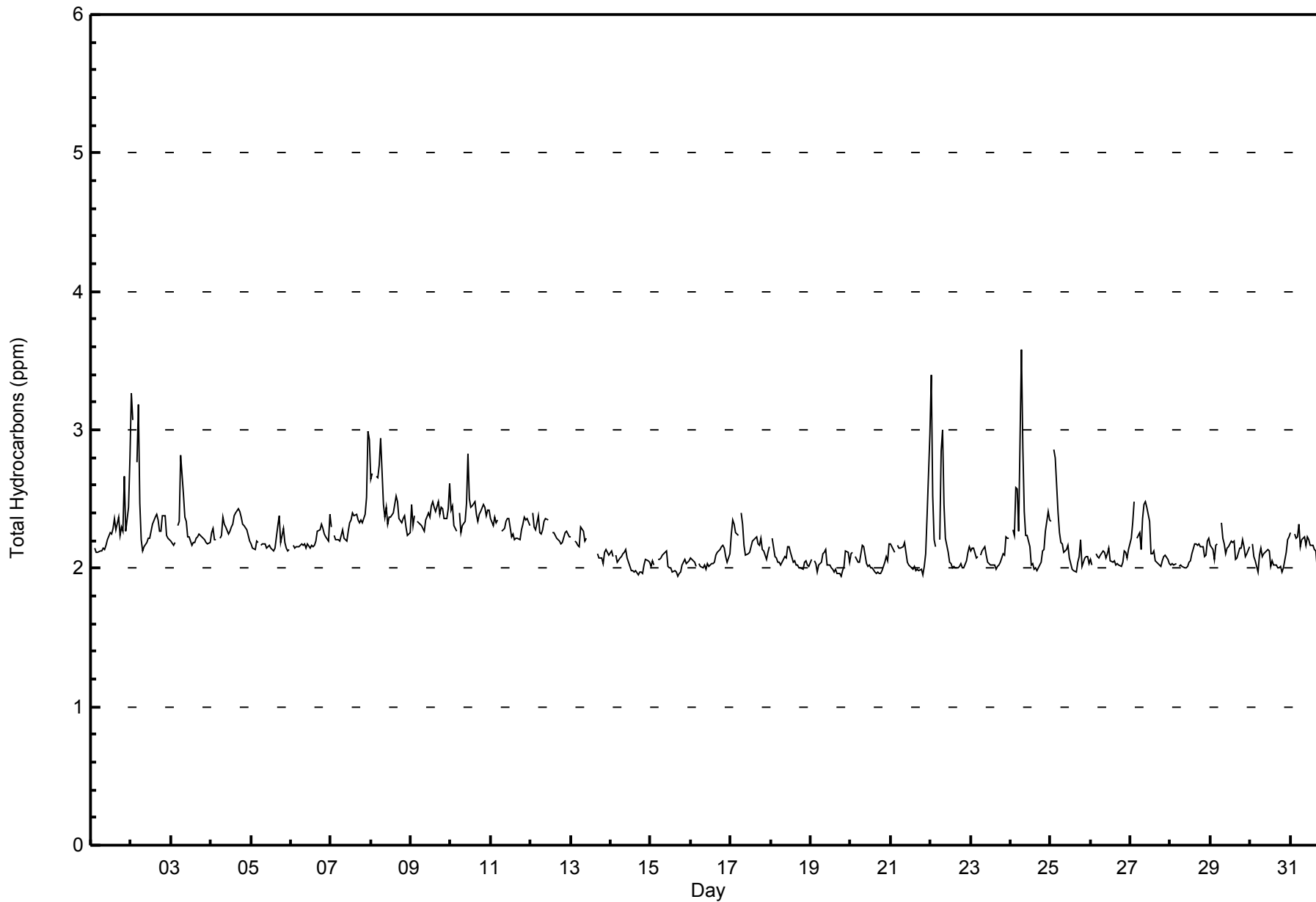


Maximum Value: 3.6 ppm on May 24 07:00																			Maximum Daily Average: 2.5 ppm on May 8						Hours in Service: 744		
Minimum Value: 1.9 ppm on May 19 19:00																			Minimum Daily Average: 2.0 ppm on May 15						Hours of Data: 705		
Maximum Diurnal Average: 2.3 ppm at hour 1																			Minimum Diurnal Average: 2.1 ppm at hour 13						Hours of Missing Data: 39		
Monthly Average: 2.20 ppm																			Percentiles: P ₁ = 2.0 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.2 Q ₃ = 2.3 P ₉₀ = 2.4 P ₉₉ = 3.0						Hours of Calibration: 37		
																									Percent Operational Time: 99.7		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.4	2.3	2.4	2.2	2.3	2.3	2.7	2.3	2.4	2.8	2.3	2.8	
2-May	3.3	3.1	Z	2.8	3.2	2.5	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.4	2.4	2.2	2.2	2.2	2.4	3.3	
3-May	2.2	2.2	2.2	Z	2.3	2.3	2.8	2.5	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.8		
4-May	2.3	2.3	2.2	2.2	Z	2.2	2.2	2.4	2.3	2.3	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.3	2.4		
5-May	2.2	2.1	2.1	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.3	2.4	2.2	2.3	2.2	2.1	2.1	2.2	2.4	
6-May	Z	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.4	2.2	2.4	
7-May	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.3	2.4	2.5	3.0	2.9	2.4	3.0	
8-May	2.6	2.7	Z	2.7	2.7	2.7	2.9	2.5	2.4	2.4	2.3	2.4	2.4	2.4	2.5	2.5	2.5	2.4	2.3	2.4	2.4	2.3	2.2	2.3	2.5	2.9	
9-May	2.5	2.3	2.4	Z	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.5	2.4	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.6	2.4	2.6	
10-May	2.4	2.4	2.3	2.3	Z	2.4	2.3	2.3	2.3	2.5	2.8	2.5	2.4	2.5	2.5	2.4	2.3	2.4	2.4	2.5	2.4	2.4	2.4	2.4	2.8		
11-May	2.4	2.3	2.4	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.4	2.4	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.4	
12-May	Z	2.4	2.3	2.3	2.4	2.3	2.2	2.3	2.3	2.4	2.3	M	M	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.4	
13-May	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	C	C	C	C	C	C	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	--	2.3	
14-May	2.1	2.1	Z	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	
15-May	2.0	2.1	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.1	
16-May	2.1	2.1	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	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.0	2.1	2.1	2.2	
17-May	2.2	2.3	2.3	2.3	2.2	Z	2.4	2.3	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.4	
18-May	Z	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.2	
19-May	2.1	Z	2.1	2.0	2.0	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	1.9	2.0	2.0	2.1	2.1	2.0	2.0	2.1	
20-May	2.1	2.1	Z	2.1	2.0	2.0	2.1	2.2	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	2.1	2.1	2.2	2.0	2.2	
21-May	2.2	2.1	2.1	Z	2.2	2.2	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	2.0	2.0	2.1	2.4	3.0	2.1	3.0	
22-May	3.4	2.5	2.2	2.2	Z	2.2	2.9	3.0	2.5	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	3.4	
23-May	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.1	2.2	
24-May	Z	2.3	2.2	2.6	2.6	2.3	3.6	2.9	2.4	2.2	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.4	2.4	2.3	3.6
25-May	2.3	Z	2.9	2.8	2.4	2.3	2.2	2.2	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.1	2.1	2.1	2.0	2.2	2.9	
26-May	2.1	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	
27-May	2.2	2.3	2.5	Z	2.2	2.3	2.1	2.4	2.5	2.5	2.4	2.3	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.2	2.5	
28-May	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.2	
29-May	2.2	2.1	2.1	2.2	2.2	Z	2.3	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.3	
30-May	Z	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.1	2.2	
31-May	2.3	Z	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.3	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan C - Calibration M - Maintenance																											



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
CNRL Horizon - May 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	162	22.98	22.98
2.1 - 3.0	538	76.31	99.29
3.1 - 10.0	5	0.71	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
CNRL Horizon - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	26	23	9	6	3	2	3	14	25	28	18	4	0	0	0	1	162
2.1 - 3.0	77	60	29	24	17	24	31	52	72	65	22	7	5	13	15	25	538
3.1 - 10.0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	1	0	5
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	103	83	38	30	20	26	34	67	97	93	41	11	6	14	16	26	705

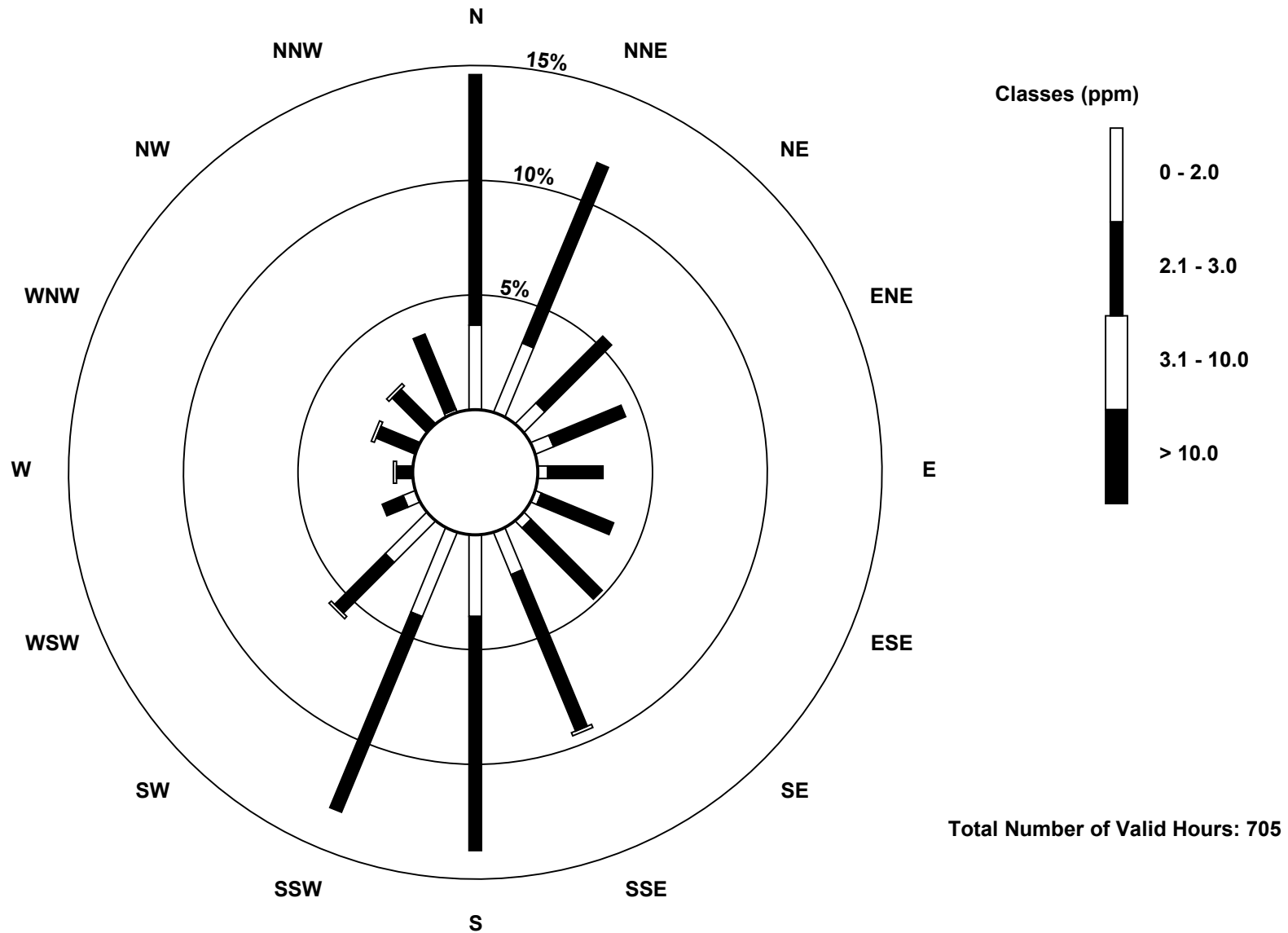
Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

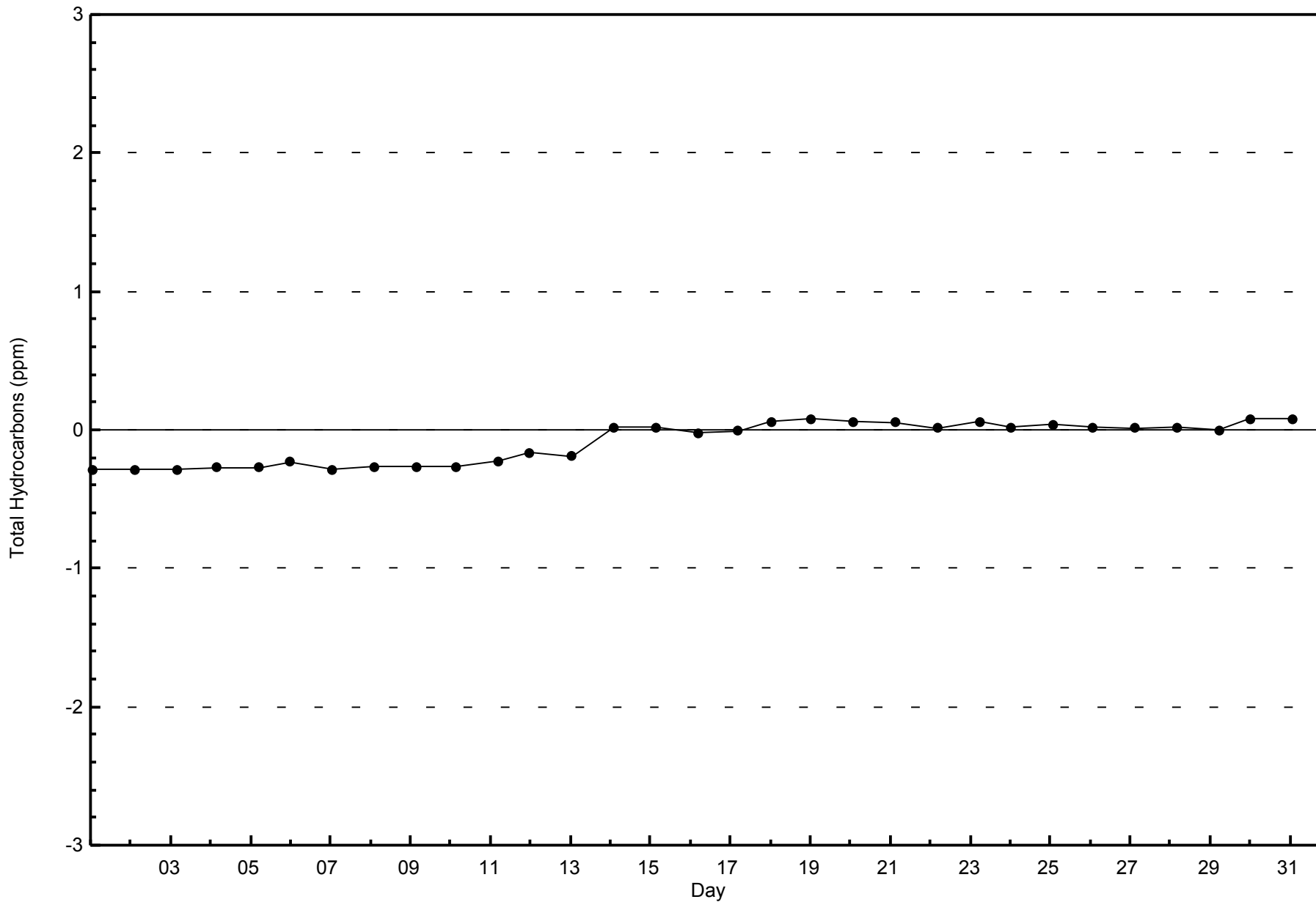
Total Hydrocarbons (THC) - ppm
CNRL Horizon (AMS 15)





WBEA
Zero Responses

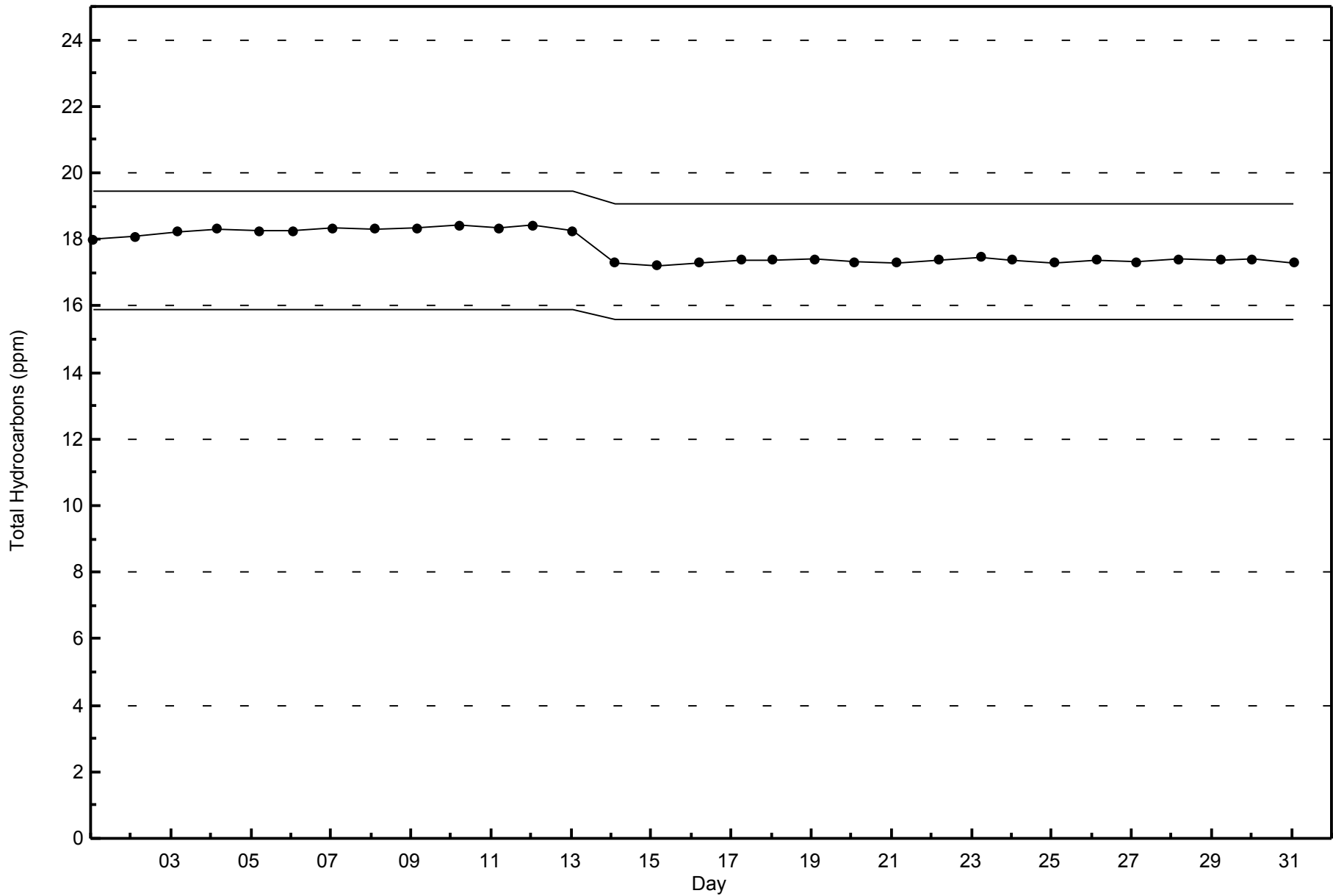
Total Hydrocarbons (THC) - ppm
CNRL Horizon - May 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
CNRL Horizon - May 2015



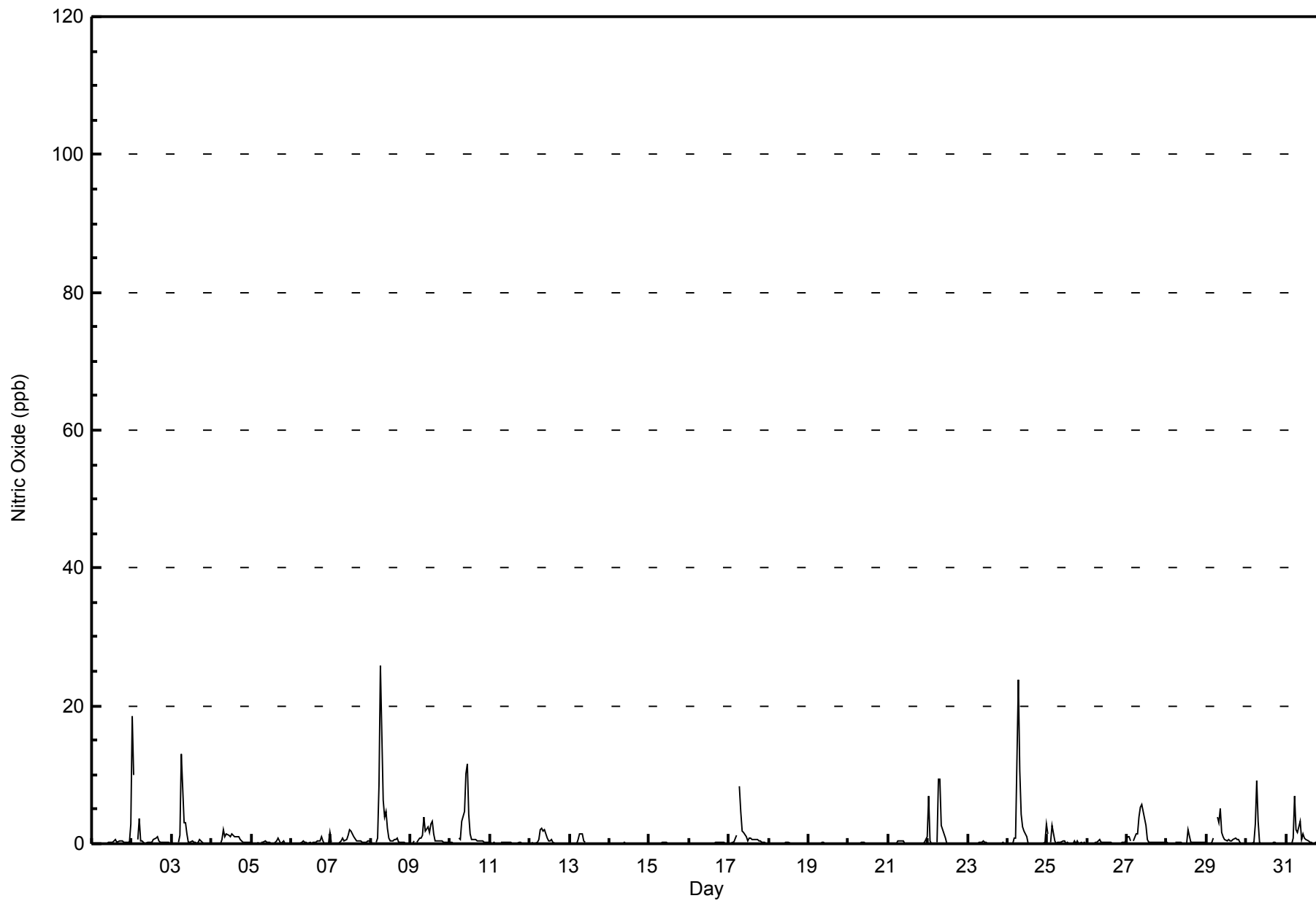


Maximum Value: 26 ppb on May 8 07:00																	Maximum Daily Average: 2.5 ppb on May 8																	Hours in Service: 744	
Minimum Value: 0 ppb on May 1 04:00																	Minimum Daily Average: 0.0 ppb on May 14																	Hours of Data: 707	
Maximum Diurnal Average: 3.4 ppb at hour 7																	Minimum Diurnal Average: 0.1 ppb at hour 3																	Hours of Missing Data: 37	
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 = 10																	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	0.3	3									
2-May	18	10	Z	1	4	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1.7	18										
3-May	0	0	0	Z	0	1	13	3	3	1	0	0	0	0	0	0	1	0	0	0	0	0	1.1	13											
4-May	0	0	0	0	Z	0	1	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.7	2											
5-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1											
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	2											
7-May	0	Z	0	0	0	0	0	1	0	1	1	2	2	1	1	0	0	0	0	0	0	0	0.6	2											
8-May	0	0	Z	0	1	9	26	6	4	5	2	1	0	0	1	1	1	0	0	0	0	0	2.5	26											
9-May	0	0	0	Z	0	1	1	1	4	2	2	2	3	3	1	0	0	0	0	0	0	0	1.0	4											
10-May	0	0	0	0	Z	1	1	3	5	10	12	4	1	1	1	1	0	0	0	0	0	0	1.8	12											
11-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0											
12-May	Z	0	0	0	0	1	2	2	2	2	1	0	0	1	0	0	0	0	0	0	0	0	0.5	2											
13-May	0	Z	0	0	0	1	1	1	0	0	C	C	C	C	C	C	0	0	0	0	0	0	--	1											
14-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0											
15-May	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-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0											
17-May	0	0	0	0	1	Z	8	5	2	2	1	0	1	1	1	1	1	1	0	0	0	0	1.1	8											
18-May	Z	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-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0											
20-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0											
21-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1											
22-May	7	0	0	0	Z	0	9	9	3	2	1	0	0	0	0	0	0	0	0	0	0	0	1.4	9											
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0											
24-May	Z	0	0	0	1	1	24	11	4	2	2	1	0	0	0	0	0	0	0	0	0	3	2.1	24											
25-May	1	Z	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3											
26-May	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1											
27-May	1	1	0	Z	0	1	1	4	5	6	5	3	1	0	0	0	0	0	0	0	0	0	1.3	6											
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.2	2											
29-May	0	0	0	0	1	Z	4	3	5	2	1	1	0	1	0	0	1	1	1	1	0	0	0.9	5											
30-May	Z	0	0	0	0	3	9	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	9											
31-May	0	Z	0	0	1	7	2	2	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0.8	7											
																								Diurnal Average											
																								Diurnal Maximum											
1.1 0.5 0.1 0.2 0.4 1.0 3.4 1.9 1.4 1.3 1.1 0.6 0.4 0.5 0.3 0.2 0.3 0.2 0.2 0.1 0.1 0.1 0.1 0.3																																			
18 10 0 3 4 9 26 11 5 10 12 4 3 3 1 1 1 1 1 1 0 0 0 3																																			
Z - zerospan C - Calibration																																			



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
CNRL Horizon - May 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
CNRL Horizon - May 2015

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
Frequency Distribution

Nitric Oxide (NO) - ppb
CNRL Horizon - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	103	83	38	30	21	27	34	66	96	93	41	11	6	14	16	26	705
21 - 40	0	0	0	0	0	0	0	1	1	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	103	83	38	30	21	27	34	67	97	93	41	11	6	14	16	26	707

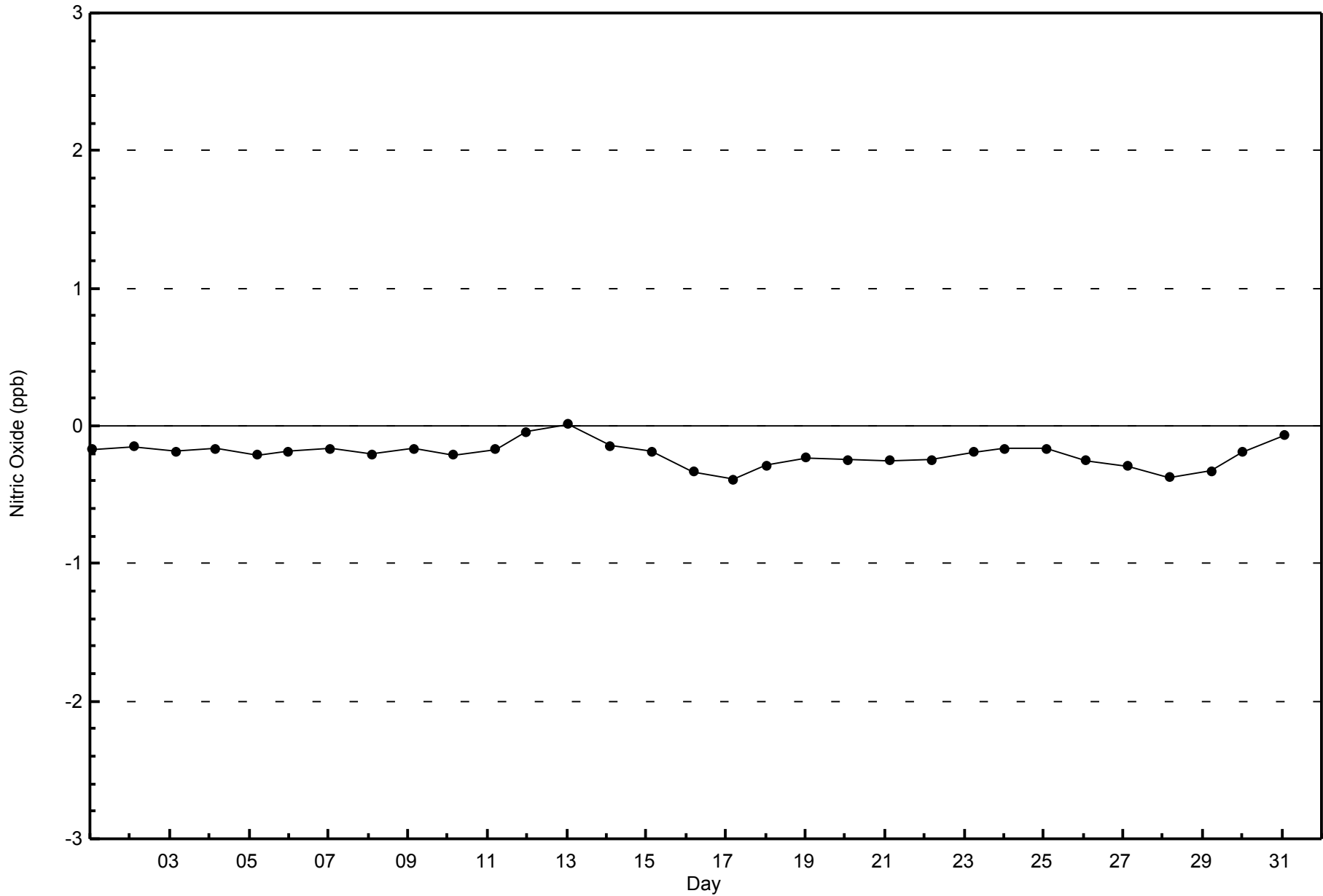
Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Zero Responses

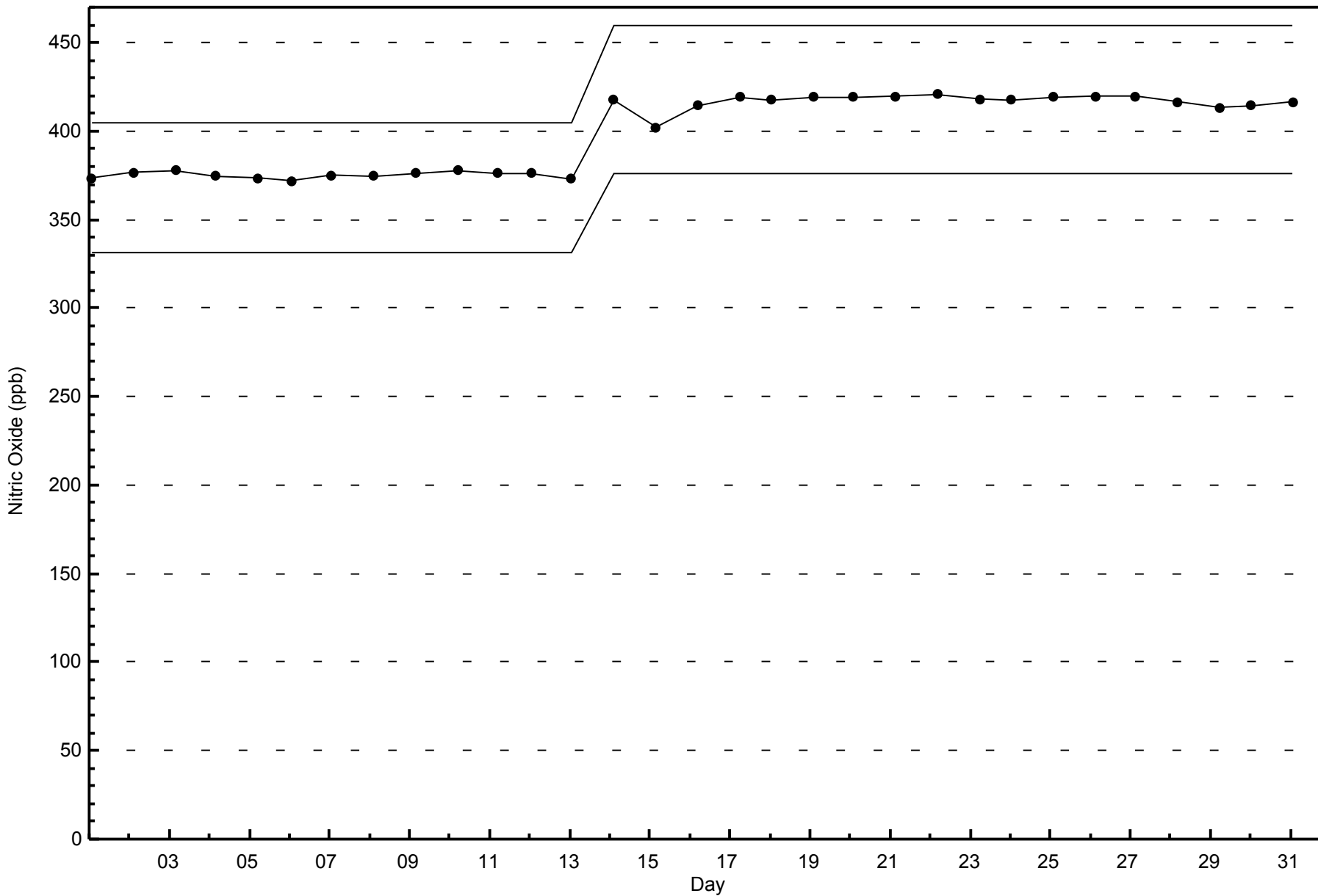
Nitric Oxide (NO) - ppb
CNRL Horizon - May 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
CNRL Horizon - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

CNRL Horizon - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 44 ppb on May 2 01:00	Maximum Daily Average: 9.0 ppb on May 24		Hours of Data:	707
Minimum Value: 0 ppb on May 16 15:00	Minimum Daily Average: 0.8 ppb on May 14		Hours of Missing Data:	37
Maximum Diurnal Average: 8.8 ppb at hour 24	Minimum Diurnal Average: 1.6 ppb at hour 16		Hours of Calibration:	37
Monthly Average: 4.0 ppb	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 5 P ₉₀ = 11 P ₉₉ = 22		Percent Operational Time:	100.0

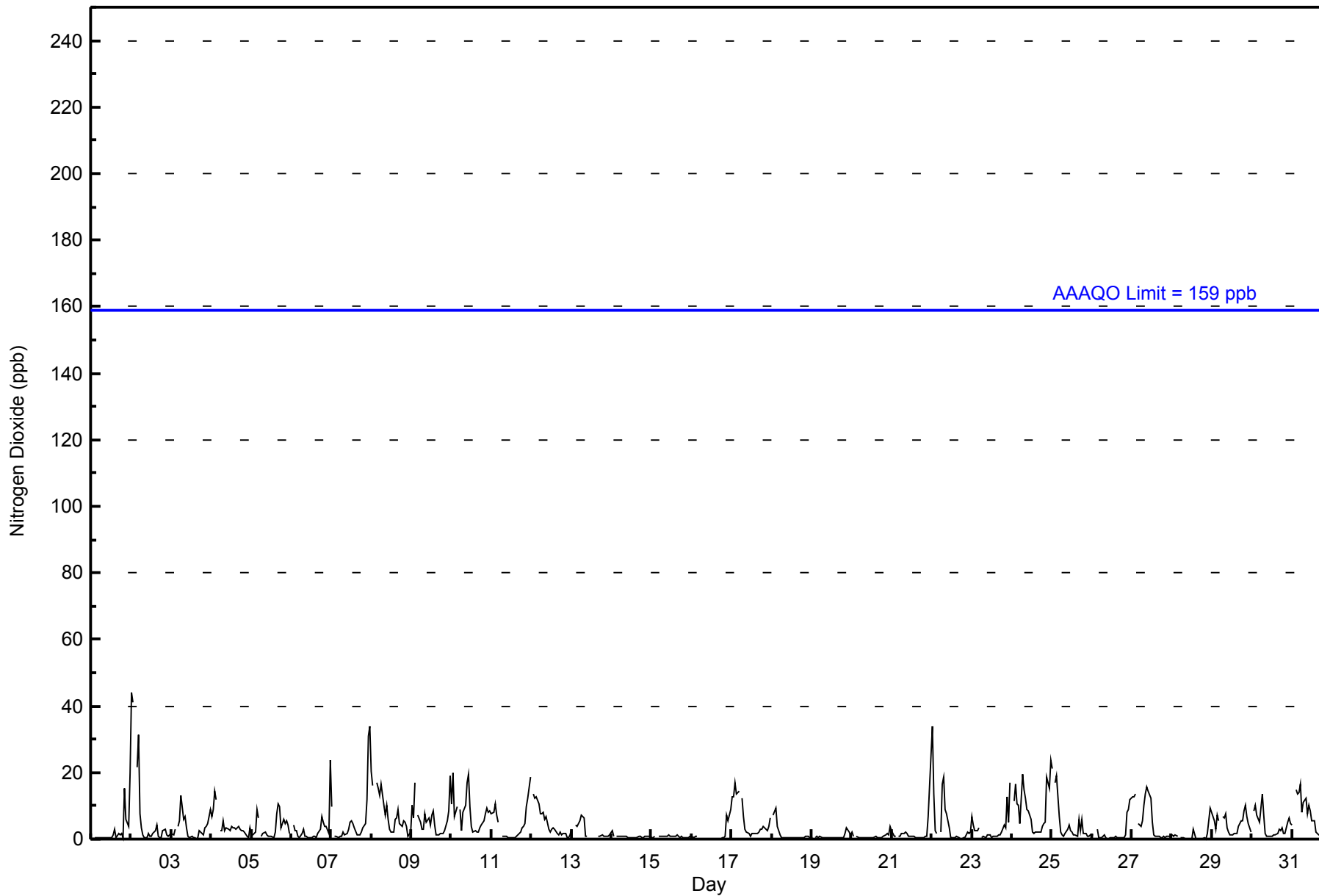
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	1	Z	1	1	1	1	1	1	1	1	1	0	0	1	3	0	2	1	2	0	15	6	4	20	2.6	20																							
2-May	44	41	Z	21	31	8	3	1	0	0	2	1	1	2	3	4	1	0	0	3	3	1	1	1	7.5	44																							
3-May	2	1	3	Z	4	6	13	6	7	3	1	0	1	1	0	0	1	3	2	1	3	4	5	9	3.2	13																							
4-May	7	9	14	12	Z	2	3	6	3	4	3	3	4	4	4	3	4	3	3	3	2	1	1	3	4.2	14																							
5-May	1	1	2	9	6	Z	1	2	2	1	1	1	1	1	2	8	11	10	3	6	5	5	4	2	3.7	11																							
6-May	Z	4	3	2	1	1	2	3	1	1	0	1	1	1	1	1	2	3	7	5	4	4	2	24	3.0	24																							
7-May	10	Z	1	1	1	1	1	2	1	2	3	5	6	5	3	1	1	1	2	3	5	12	31	34	5.7	34																							
8-May	20	16	Z	17	15	13	16	10	7	10	6	3	2	2	6	6	9	5	4	5	5	4	1	2	8.1	20																							
9-May	10	6	17	Z	7	5	3	3	8	5	6	4	7	9	4	1	1	2	2	2	3	5	9	19	6.0	19																							
10-May	11	20	7	10	Z	9	3	8	10	17	19	10	4	2	2	2	2	3	4	6	8	9	8	8	7.9	20																							
11-May	8	8	11	7	5	Z	1	1	1	1	1	1	1	1	1	1	1	2	4	4	5	10	12	19	4.4	19																							
12-May	Z	13	12	13	10	8	8	8	6	7	3	2	3	4	3	2	1	2	1	2	2	1	0	1	4.8	13																							
13-May	3	Z	4	4	5	6	7	7	1	1	C	C	C	C	C	C	1	1	1	1	1	1	1	1	--	7																							
14-May	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	2																							
15-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1																							
16-May	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	7	6	9	1.2	9																							
17-May	13	13	17	14	14	Z	12	7	3	2	2	1	2	2	2	2	2	3	3	4	3	3	4	7	5.8	17																							
18-May	Z	7	9	4	3	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1.5	9																							
19-May	1	Z	1	1	1	1	1	1	1	0	0	1	0	1	1	1	0	1	1	1	2	3	2	1	0.8	3																							
20-May	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	4	0.9	4																							
21-May	3	1	1	Z	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	7	25	2.3	25																							
22-May	34	14	2	2	Z	2	17	19	9	8	4	1	0	1	0	1	1	0	0	0	0	2	2	2	5.2	34																							
23-May	7	4	3	3	3	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	4	4	13	5	17	3.3	17																							
24-May	Z	11	16	11	10	5	20	15	12	9	9	6	2	2	2	2	2	2	4	5	5	19	15	24	9.0	24																							
25-May	21	Z	17	19	7	2	1	1	2	3	4	3	2	1	1	1	6	3	6	2	2	1	1	1	4.6	21																							
26-May	1	1	Z	3	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	1	8	9	12	1.8	12																							
27-May	13	13	14	Z	5	4	5	10	14	16	14	12	5	1	1	1	1	0	1	1	0	1	1	1	5.7	16																							
28-May	1	1	1	1	Z	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	2	5	9	1.2	9																							
29-May	8	6	3	7	6	Z	7	6	8	3	2	1	1	2	2	2	4	5	5	8	10	7	5	2	4.8	10																							
30-May	Z	8	10	7	5	9	14	7	2	1	1	1	1	1	1	2	3	3	3	2	2	5	7	5	4.3	14																							
31-May	4	Z	15	14	14	16	8	11	12	8	10	9	6	5	2	2	1	1	2	4	2	1	1	7	6.7	16																							
																								8.7	8.1	7.1	7.0	6.0	4.0	4.9	4.5	3.7	3.5	3.2	2.3	1.8	1.8	1.6	1.6	2.0	1.9	2.1	2.4	3.1	4.4	4.8	8.8	Diurnal Average	
																								44	41	17	21	31	16	20	19	14	17	19	12	7	9	6	8	11	10	7	8	15	19	31	34	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	696	98.44	98.44
21 - 40	9	1.27	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
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	103	83	38	30	20	27	34	67	96	93	38	11	4	12	15	25	696
21 - 40	0	0	0	0	1	0	0	0	1	0	3	0	2	1	0	1	9
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	103	83	38	30	21	27	34	67	97	93	41	11	6	14	16	26	707

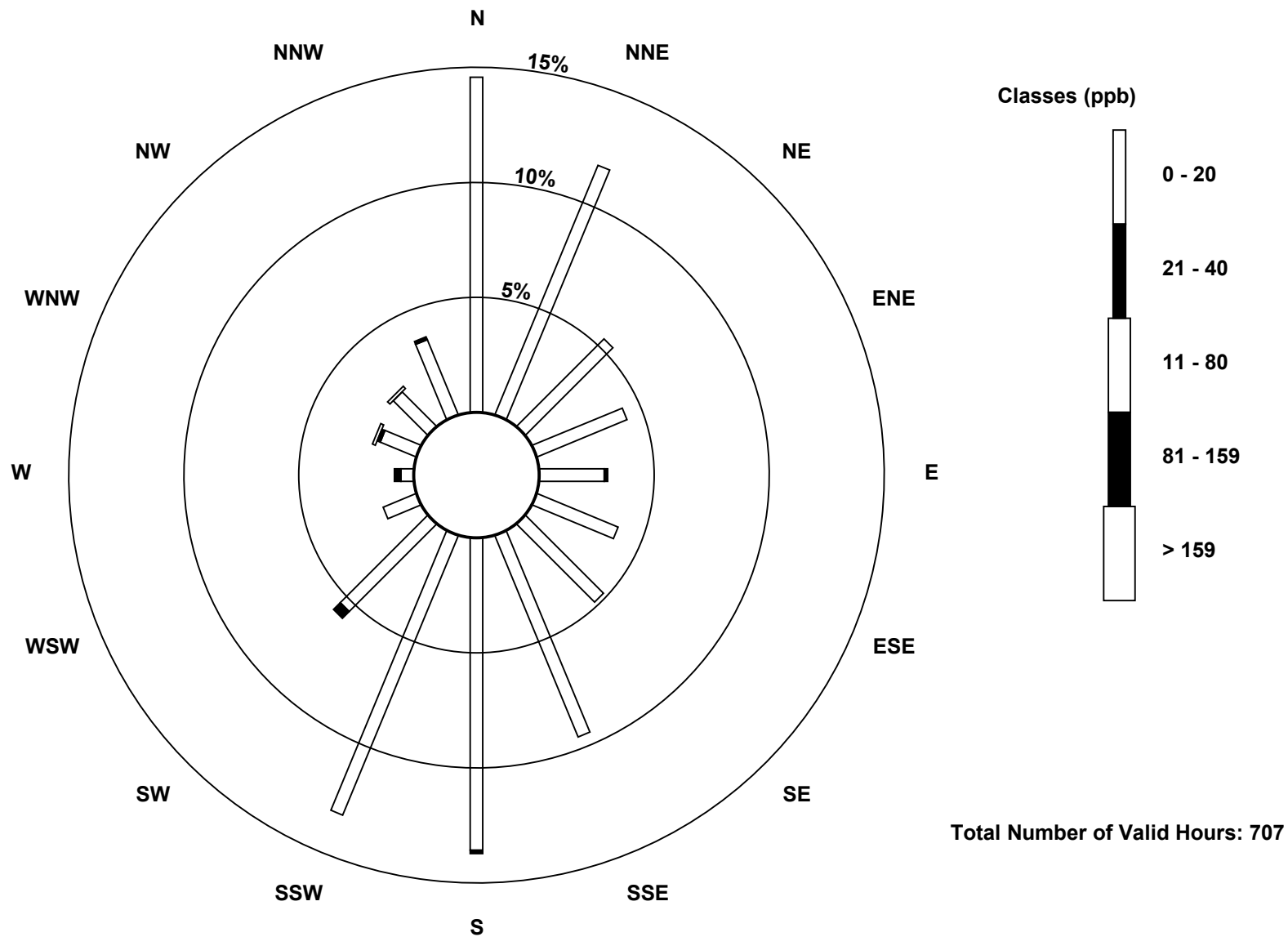
Total Number of Valid Hours: 707

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

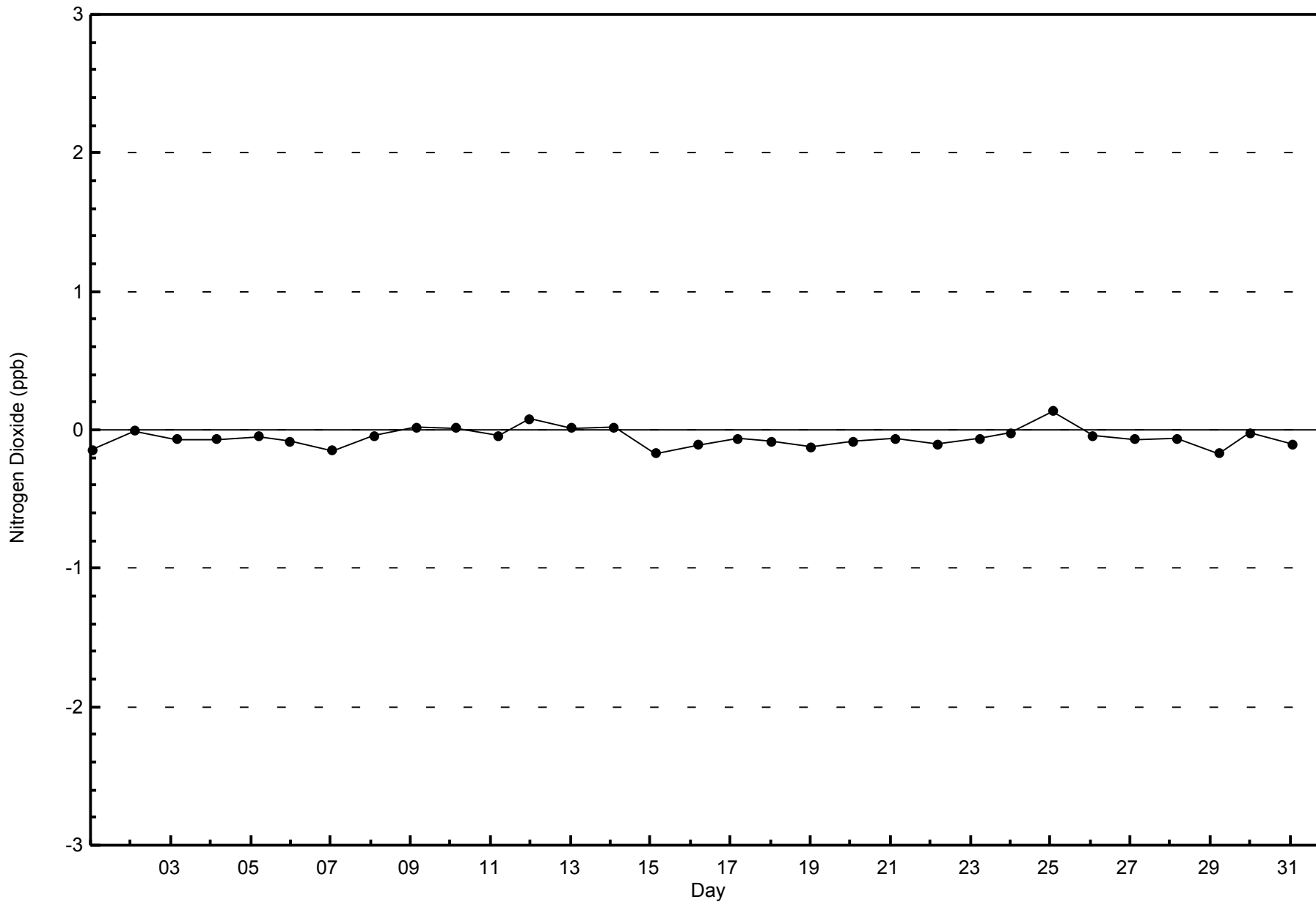
Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon (AMS 15)





WBEA
Zero Responses

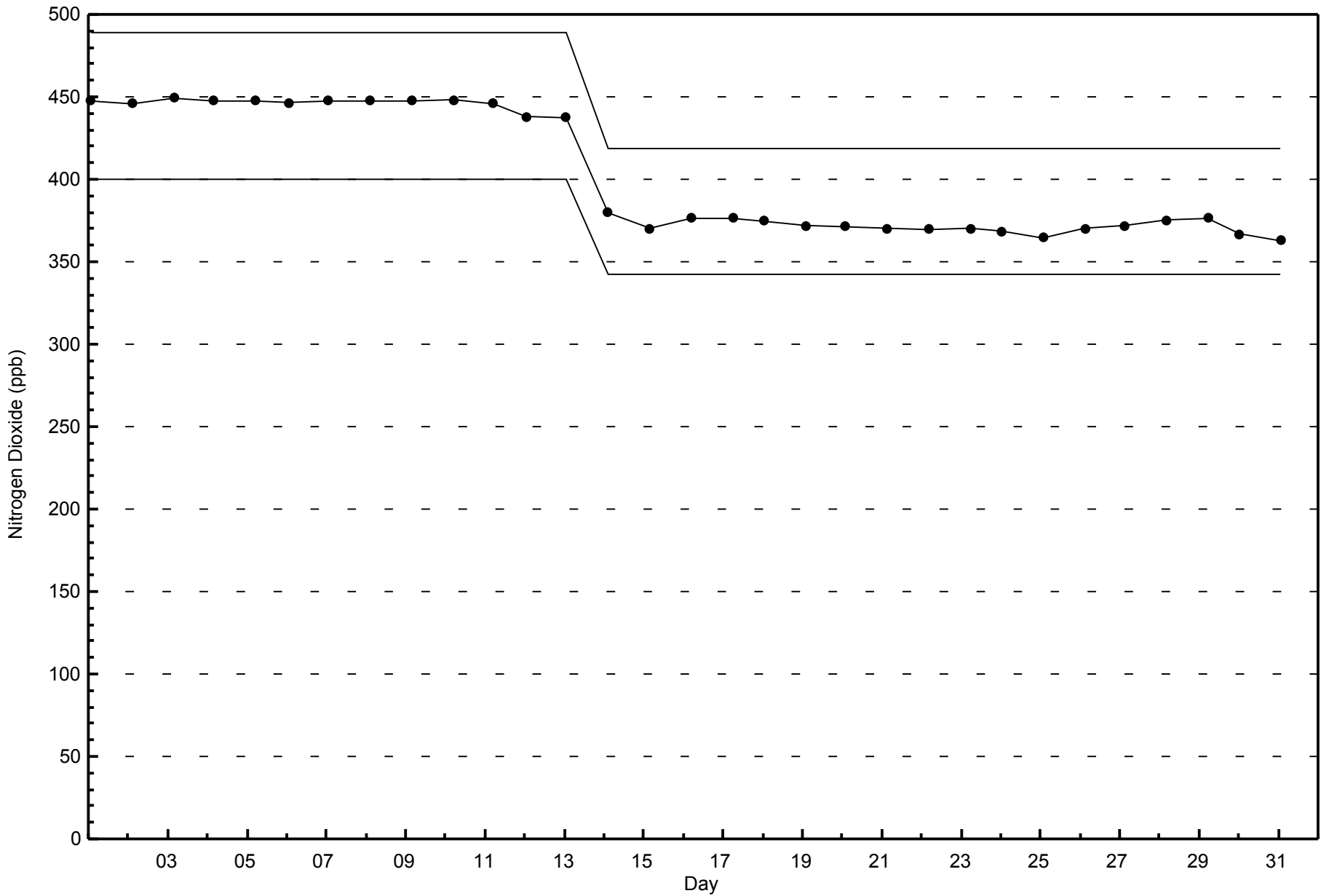
Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - May 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
CNRL Horizon - May 2015



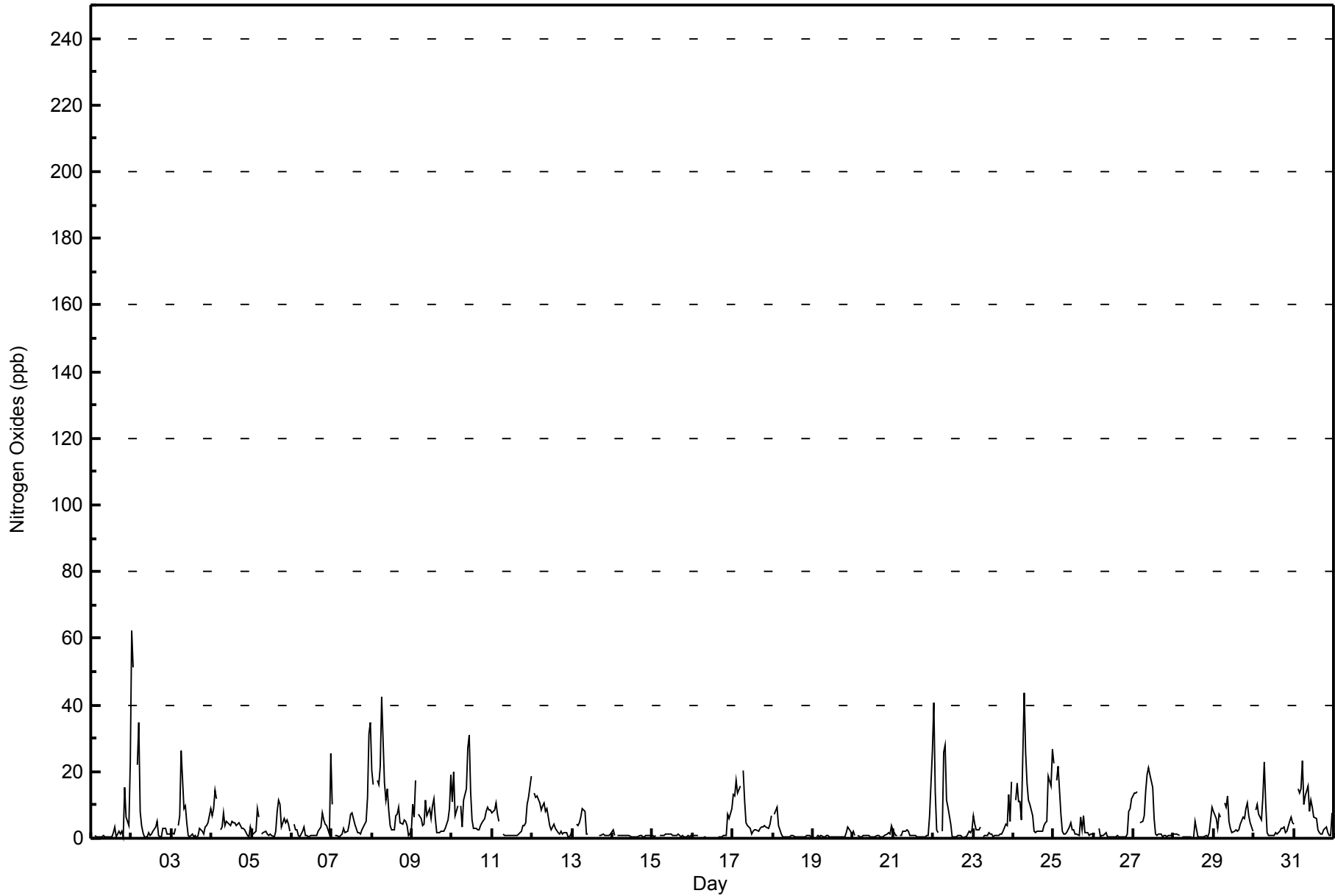


Maximum Value: 62 ppb on May 2 01:00																	Maximum Daily Average: 11.2 ppb on May 24																	Hours in Service: 744															
Minimum Value: 0 ppb on May 16 11:00																	Minimum Daily Average: 0.8 ppb on May 14																	Hours of Data: 707															
Maximum Diurnal Average: 9.8 ppb at hour 1																	Minimum Diurnal Average: 1.8 ppb at hour 16																	Hours of Missing Data: 37															
Monthly Average: 4.7 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 6 P ₉₀ = 12 P ₉₉ = 34																	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-May	1	Z	1	1	1	1	1	1	1	1	1	0	1	3	1	2	1	2	0	15	6	4	23	2.9	23																								
2-May	62	51	Z	22	35	8	4	1	0	0	2	1	1	2	3	5	1	1	0	3	3	1	1	1	9.2	62																							
3-May	2	1	3	Z	4	7	26	9	10	5	1	0	1	1	1	0	1	3	2	1	3	4	5	9	4.3	26																							
4-May	7	9	14	12	Z	3	3	7	4	5	4	4	5	5	5	4	5	4	3	3	2	1	1	3	4.9	14																							
5-May	1	1	2	9	7	Z	1	2	2	1	1	1	1	1	2	8	11	10	3	6	4	5	4	2	3.8	11																							
6-May	Z	4	2	2	1	1	2	3	1	1	0	1	1	1	1	1	2	3	8	5	4	4	1	25	3.3	25																							
7-May	10	Z	1	1	1	1	1	3	2	2	4	7	8	6	4	2	1	1	3	4	5	12	31	35	6.3	35																							
8-May	20	16	Z	17	16	22	42	17	11	15	8	4	3	3	7	7	9	5	4	6	5	4	1	2	10.6	42																							
9-May	10	6	17	Z	7	6	4	4	12	7	9	6	10	12	6	2	2	2	2	2	3	5	9	19	7.0	19																							
10-May	11	20	7	10	Z	10	3	11	15	27	31	14	5	3	3	3	2	4	5	6	8	9	8	9	9.7	31																							
11-May	8	8	11	7	5	Z	1	1	1	1	1	1	1	1	1	1	1	2	4	4	5	10	12	19	4.5	19																							
12-May	Z	14	12	13	11	8	10	10	8	9	4	3	3	4	3	2	1	2	1	2	2	1	0	1	5.3	14																							
13-May	3	Z	4	4	5	6	9	8	1	1	C	C	C	C	C	C	1	1	1	1	1	1	1	1	--	9																							
14-May	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	2																							
15-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1																							
16-May	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	7	6	9	1.3	9																							
17-May	13	13	17	14	16	Z	21	12	5	4	3	1	2	3	3	2	3	4	3	4	3	3	4	7	6.9	21																							
18-May	Z	7	9	4	3	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1.5	9																							
19-May	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0	0	1	1	2	3	2	1	0.8	3																							
20-May	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	4	1.0	4																							
21-May	2	1	1	Z	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	7	26	2.5	26																							
22-May	41	14	2	2	Z	2	26	28	12	9	4	1	0	1	0	1	1	0	0	0	0	2	2	2	6.6	41																							
23-May	7	4	3	3	3	Z	1	1	1	2	1	1	1	1	1	1	1	1	2	4	4	13	5	17	3.3	17																							
24-May	Z	11	16	11	11	6	43	26	17	12	10	7	2	2	2	2	2	2	4	5	5	19	15	27	11.2	43																							
25-May	23	Z	17	22	7	2	1	1	2	3	5	3	2	2	1	1	1	6	3	7	2	1	1	1	5.0	23																							
26-May	1	1	Z	3	1	1	1	2	1	0	0	0	1	0	1	0	0	0	0	1	1	8	9	12	2.0	12																							
27-May	13	14	14	Z	5	5	7	14	19	21	19	15	6	1	1	1	1	1	1	1	1	1	1	1	7.1	21																							
28-May	1	1	1	1	Z	0	1	0	0	0	0	0	0	5	0	0	0	0	0	1	0	2	5	10	1.4	10																							
29-May	8	6	3	7	7	Z	11	9	13	5	3	2	2	3	2	2	4	6	6	9	10	7	5	2	5.7	13																							
30-May	Z	9	10	7	5	12	23	10	2	1	1	1	1	2	1	2	3	3	3	2	2	5	6	5	5.0	23																							
31-May	4	Z	15	14	15	23	10	13	16	8	12	9	6	6	2	2	1	1	3	4	2	1	1	8	7.5	23																							
																								9.8	8.6	7.2	7.2	6.4	4.9	8.3	6.4	5.1	4.7	4.3	2.9	2.2	2.2	1.9	1.8	2.2	2.1	2.3	2.5	3.2	4.5	4.9	9.1	Diurnal Average	
																								62	51	17	22	35	23	43	28	19	27	31	15	10	12	7	8	11	10	8	9	15	19	31	35	Diurnal Maximum	
Z - zerospan																								C - Calibration																									



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	681	96.32	96.32
21 - 40	21	2.97	99.29
41 - 80	5	0.71	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	103	83	37	28	20	25	34	65	92	92	38	11	2	12	15	24	681
21 - 40	0	0	1	2	1	2	0	1	4	1	2	0	4	1	0	2	21
11 - 80	0	0	0	0	0	0	0	1	1	0	1	0	0	1	1	0	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	103	83	38	30	21	27	34	67	97	93	41	11	6	14	16	26	707

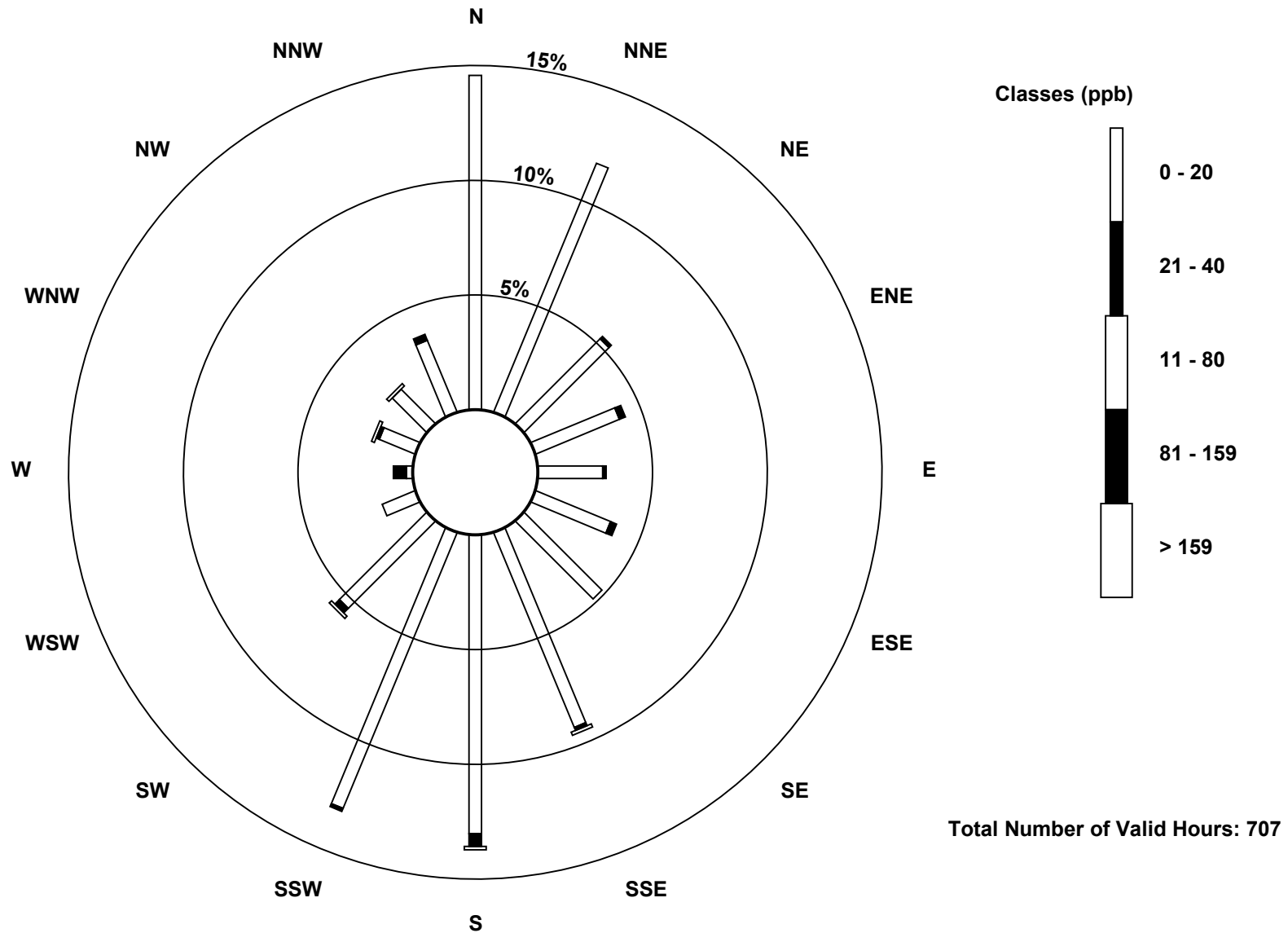
Total Number of Valid Hours: 707

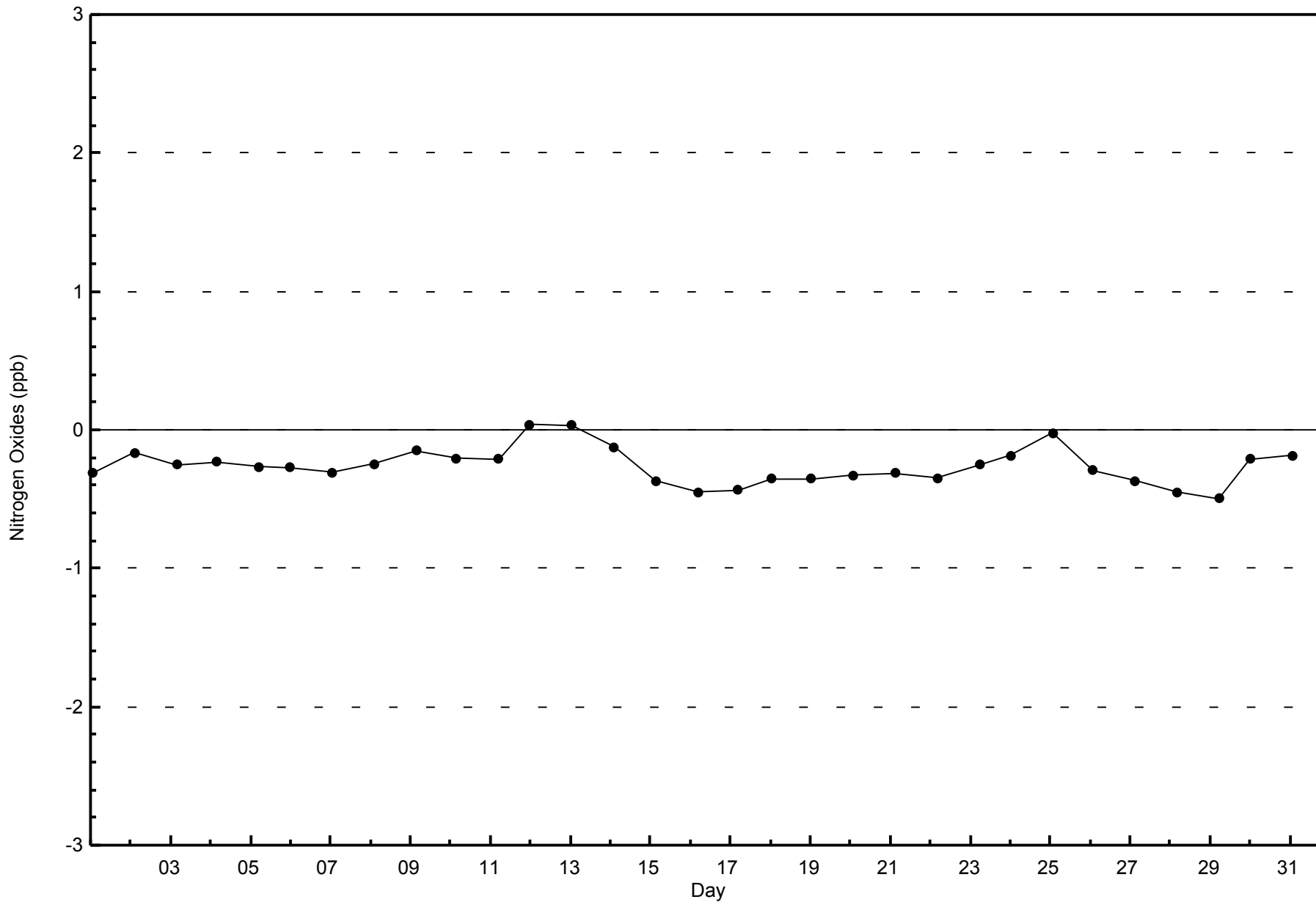
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon (AMS 15)

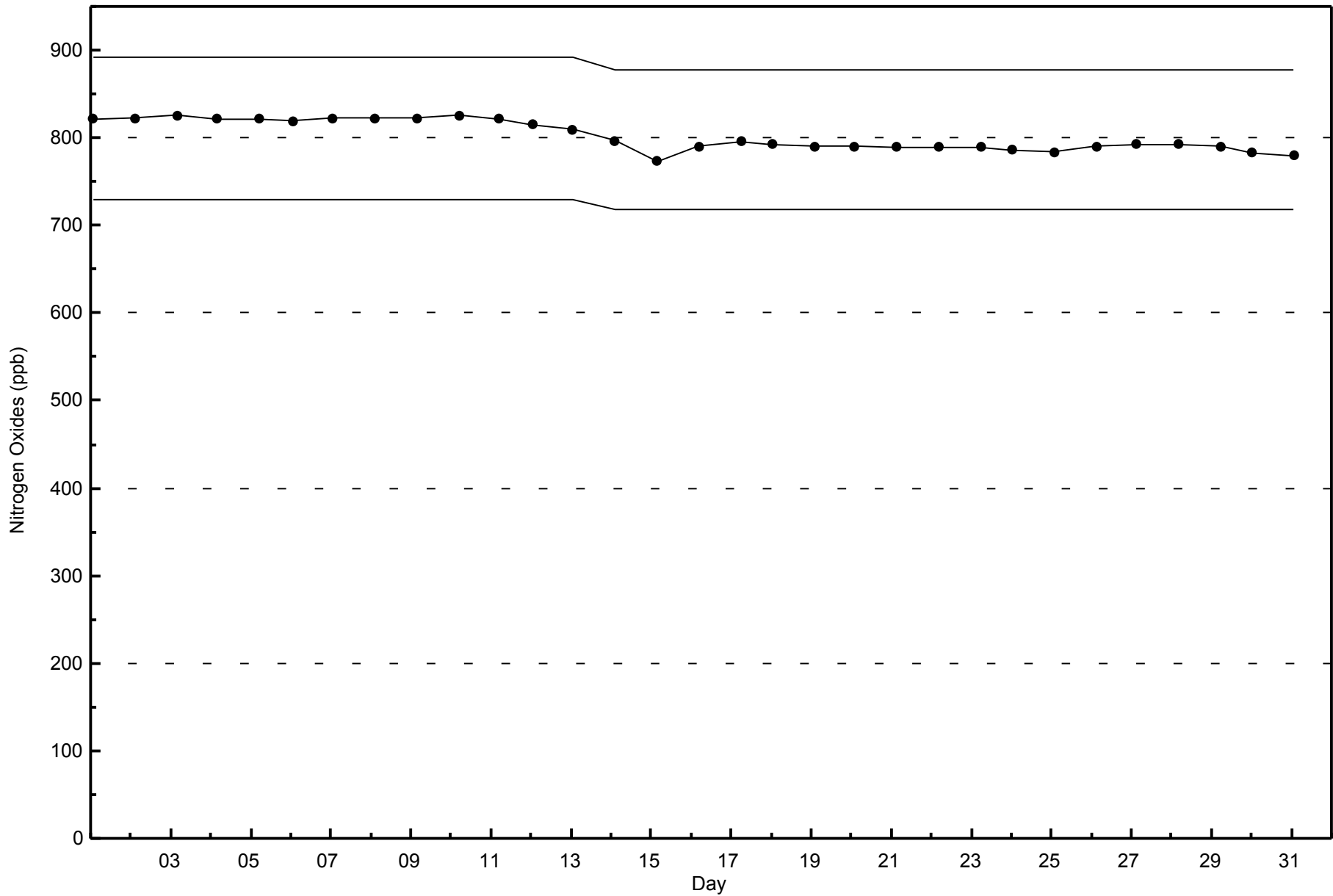






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
CNRL Horizon - May 2015





Summary of Hour Averages

CNRL Horizon - May 2015

Number of Exceedences (AAAQO):	24-hr: 1	Hours in Service:	744
Maximum Value: 187.3 µg/m ³ on May 22 19:00	Maximum Daily Average: 36.8 µg/m ³ on May 31	Hours of Data:	737
Minimum Value: 0.1 µg/m ³ on May 2 22:00	Minimum Daily Average: 1.3 µg/m ³ on May 3	Hours of Missing Data:	7
Maximum Diurnal Average: 26.9 µg/m ³ at hour 6	Minimum Diurnal Average: 6.4 µg/m ³ at hour 16	Hours of Calibration:	0
Monthly Average: 10.57 µg/m ³	Percentiles: P ₁ = 0.5 P ₁₀ = 2.3 Q ₁ = 3.9 Median = 6.8 Q ₃ = 11.3 P ₉₀ = 19.4 P ₉₉ = 83.0	Percent Operational Time:	99.1

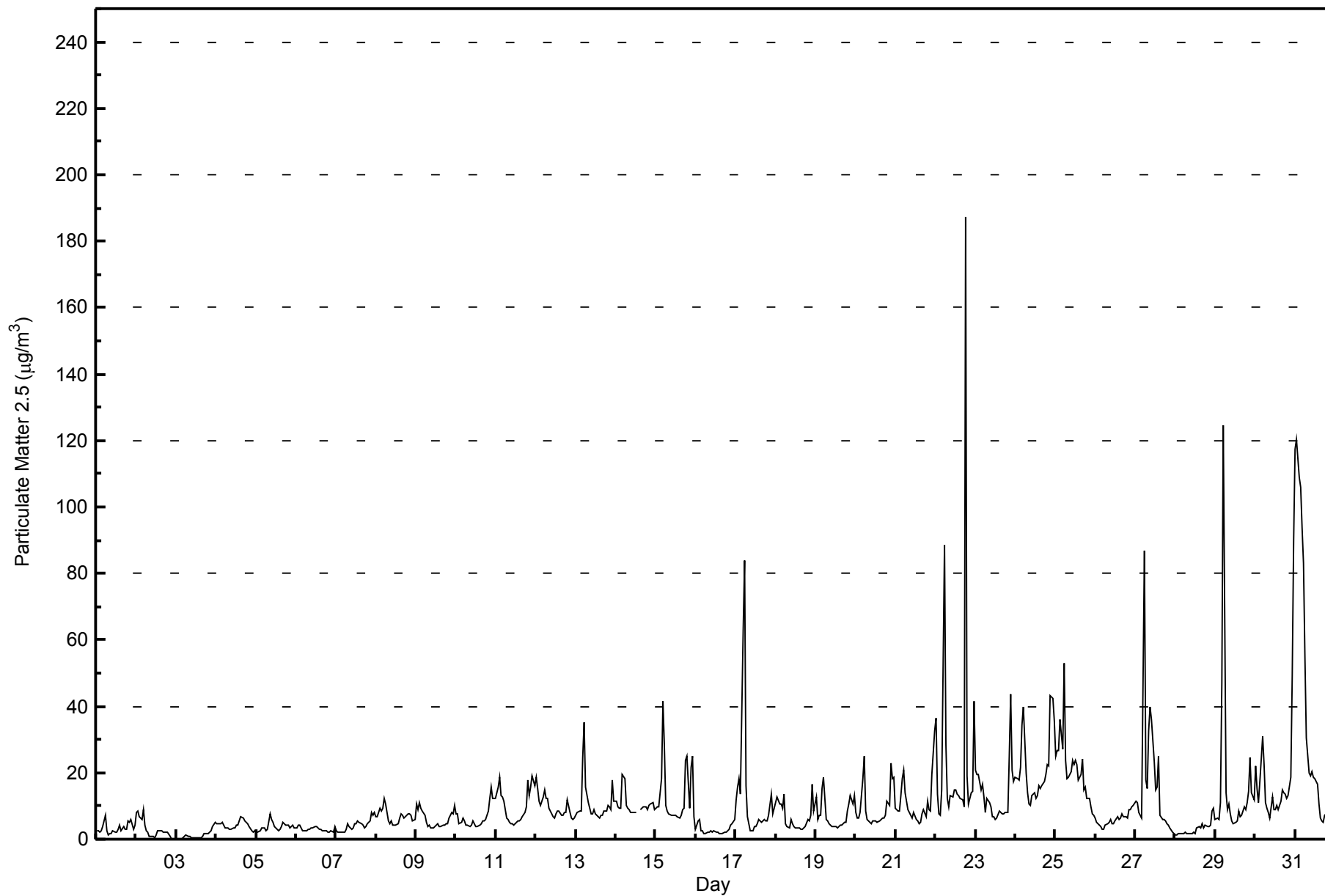
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	2.6	2.4	2.2	2.7	3.8	7.3	2.6	1.5	1.8	1.6	2.4	2.2	2.0	3.0	4.2	2.7	3.6	2.8	3.0	5.3	4.9	5.7	2.9	4.4	3.2	7.3																						
2-May	8.1	8.5	6.9	6.0	8.9	4.1	2.5	2.0	0.7	0.9	1.0	0.6	1.2	2.4	2.5	2.4	2.1	1.9	2.0	2.0	1.0	0.1	UO	UO	3.1	8.9																						
3-May	UO	UO	UO	0.2	0.4	0.7	1.5	0.9	0.9	0.5	0.2	0.3	0.5	0.5	0.5	0.5	0.9	1.5	1.9	1.8	2.2	2.7	3.7	5.0	1.3	5.0																						
4-May	4.5	4.5	4.5	4.5	5.2	3.2	3.4	3.4	2.8	3.1	3.4	3.6	4.2	4.2	5.3	6.6	6.2	5.7	5.1	4.6	3.8	2.4	2.2	2.6	4.1	6.6																						
5-May	2.3	2.3	2.4	3.3	3.4	3.5	2.5	3.0	7.6	5.7	5.0	3.9	3.3	2.7	2.9	3.8	4.9	4.6	4.1	4.4	3.4	3.8	4.1	3.4	3.8	7.6																						
6-May	3.5	4.1	4.1	3.3	2.6	2.4	2.6	3.0	3.1	3.3	3.4	3.7	3.7	3.2	3.1	2.8	2.4	2.4	2.4	2.0	2.3	2.4	2.2	3.8	3.0	4.1																						
7-May	2.7	2.2	2.2	2.2	2.2	2.3	2.9	4.7	3.7	3.1	3.3	4.6	4.9	5.5	5.3	4.8	4.3	3.6	3.6	4.9	5.7	7.9	7.1	7.9	4.2	7.9																						
8-May	6.9	7.0	9.3	8.4	9.1	12.4	10.5	5.6	4.7	5.5	4.4	4.4	4.3	4.5	6.4	7.5	7.0	6.5	7.1	7.7	7.5	7.1	5.3	6.0	6.9	12.4																						
9-May	10.5	8.7	10.8	9.2	8.3	7.4	5.3	4.0	4.2	3.6	3.4	3.7	4.3	4.6	4.0	3.8	4.0	4.4	4.5	4.8	6.5	7.9	7.6	10.1	6.1	10.8																						
10-May	7.8	7.5	4.8	5.0	6.4	5.7	4.3	4.4	3.6	4.4	5.3	4.5	3.7	3.7	4.4	4.5	5.5	5.6	6.0	8.5	12.5	15.5	12.1	12.5	6.6	15.5																						
11-May	12.2	15.6	18.5	13.2	12.6	11.6	6.4	5.7	5.2	4.8	4.5	4.4	5.2	5.5	5.4	5.8	6.9	8.1	9.8	17.8	12.9	15.5	19.1	16.2	10.1	19.1																						
12-May	18.6	15.4	11.6	10.2	12.7	15.0	12.1	12.4	9.2	8.6	6.7	6.3	7.6	8.4	8.4	7.4	7.1	8.2	8.2	12.1	8.1	6.5	6.0	6.2	9.7	18.6																						
13-May	7.4	8.1	8.7	8.3	24.4	35.0	15.8	10.9	9.2	7.7	7.7	8.8	7.5	6.7	6.5	7.0	7.3	8.4	8.7	10.0	9.9	8.9	17.7	11.4	10.9	35.0																						
14-May	11.4	9.9	9.1	9.3	19.4	18.3	10.2	9.3	8.8	7.9	8.1	8.1	M	M	8.9	9.8	9.9	9.9	9.0	10.2	10.5	11.0	9.1	10.3	19.4																							
15-May	9.3	9.6	9.9	18.1	41.5	27.9	10.3	8.3	7.7	7.2	7.2	7.4	7.1	6.9	6.4	7.3	8.8	9.2	23.9	24.9	9.2	21.7	24.9	6.7	13.4	41.5																						
16-May	2.8	5.5	5.9	2.6	2.5	1.8	1.9	2.0	2.1	2.6	2.1	2.3	2.0	2.1	1.8	1.6	1.7	2.1	2.3	2.7	3.0	4.2	4.6	5.7	2.8	5.9																						
17-May	12.1	15.8	18.0	13.7	63.0	83.8	16.1	6.8	4.5	2.6	2.6	3.6	4.0	4.7	5.8	4.9	5.5	5.7	5.6	5.5	7.2	13.7	7.7	9.3	13.4	83.8																						
18-May	11.2	12.5	10.7	10.8	9.1	13.5	4.8	3.6	3.4	5.8	4.6	3.7	3.3	3.4	3.4	2.9	2.9	3.3	3.6	6.1	5.5	7.4	16.7	8.6	6.7	16.7																						
19-May	12.6	5.8	7.4	7.4	15.2	18.5	6.0	5.4	4.9	4.2	3.8	3.9	3.7	3.5	4.0	4.1	4.3	5.1	5.3	8.3	10.6	12.9	10.4	13.3	7.5	18.5																						
20-May	7.9	6.2	6.4	8.2	18.2	24.8	8.6	6.0	5.3	4.8	5.5	5.6	5.3	5.3	5.3	6.1	6.4	6.4	7.1	11.4	10.2	22.7	18.0	18.4	9.6	24.8																						
21-May	9.4	8.4	8.5	13.0	18.3	20.7	14.1	9.0	8.2	7.2	6.2	8.0	6.0	5.6	4.8	4.9	7.4	8.8	7.0	11.5	9.1	8.3	19.4	32.7	10.7	32.7																						
22-May	36.4	13.5	7.6	7.1	15.0	88.6	28.2	12.5	9.6	13.3	12.7	14.9	15.0	13.5	13.1	12.3	12.0	9.9	187.3	19.2	10.7	14.0	14.4	41.6	25.9	187.3																						
23-May	20.6	19.7	19.6	14.8	16.6	12.6	8.1	12.3	11.0	9.6	7.0	6.1	6.3	8.3	8.3	7.5	7.7	7.8	8.1	24.9	43.6	20.6	17.3	13.5	43.6																							
24-May	18.6	18.4	17.9	21.7	34.5	39.7	20.0	13.9	10.8	10.0	13.3	14.0	12.5	13.2	16.3	15.3	16.2	17.4	19.6	22.3	22.0	43.2	42.5	35.6	21.2	43.2																						
25-May	25.1	26.7	26.7	35.8	27.1	52.8	23.9	18.4	18.9	20.5	23.8	22.6	23.8	22.3	17.7	19.6	24.2	14.8	15.6	12.4	12.4	9.9	7.7	7.2	21.2	52.8																						
26-May	6.5	5.3	4.1	3.6	2.9	2.9	4.4	4.8	5.1	5.7	4.8	4.6	5.3	6.8	6.0	6.3	7.7	6.8	6.6	6.5	9.0	9.0	9.7	10.3	6.0	10.3																						
27-May	11.3	11.1	8.0	7.1	6.6	86.7	17.9	15.4	32.7	39.9	36.0	23.2	14.7	15.5	25.0	7.0	6.1	5.8	5.5	4.8	4.1	3.3	2.1	1.5	16.3	86.7																						
28-May	1.4	1.5	1.7	1.8	1.5	1.8	2.0	1.7	1.8	1.7	1.6	1.9	1.9	3.3	3.7	3.5	4.6	3.5	4.0	4.0	3.6	4.2	8.6	9.5	3.1	9.5																						
29-May	5.9	6.3	5.9	11.0	47.0	124.5	13.8	8.9	10.5	7.7	5.5	4.6	5.0	5.7	8.6	6.6	7.2	9.9	8.9	11.1	14.4	24.8	14.2	11.9	15.8	124.5																						
30-May	22.1	15.1	11.0	17.2	31.1	22.5	10.9	9.3	7.9	6.5	12.7	8.8	9.1	10.0	8.9	11.3	14.8	14.1	13.6	12.3	13.0	18.8	49.2	89.7	18.3	89.7																						
31-May	117.2	120.4	108.7	105.8	93.6	83.1	54.9	30.4	19.9	19.1	20.2	18.6	18.2	16.6	10.7	6.5	5.4	4.9	7.4	8.0	4.8	2.5	2.8	3.8	36.8	120.4																						
																								14.3	13.3	12.4	12.4	18.2	26.9	10.6	7.7	7.4	7.4	7.4	6.9	6.6	6.7	7.0	6.4	6.9	6.7	13.1	8.8	8.5	11.7	12.5	14.1	Diurnal Average
																								117.2	120.4	108.7	105.8	93.6	124.5	54.9	30.4	32.7	39.9	36.0	23.2	23.8	22.3	25.0	19.6	24.2	17.4	187.3	24.9	24.9	43.6	49.2	89.7	Diurnal Maximum

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



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - May 2015





WBEA

Cumulative Frequency Distribution

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

CNRL Horizon - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	280	37.99	37.99
6 - 15	323	43.83	81.82
16 - 25	77	10.45	92.27
26 - 80	27	3.66	95.93
> 81.0	12	1.63	97.56

Total Number of Valid Hours: 737

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	58	54	22	11	9	6	7	22	26	30	15	3	5	4	1	7	280
6 - 15	36	18	13	11	9	18	23	32	58	52	22	6	2	6	10	7	323
16 - 25	14	1	2	5	3	3	4	9	12	11	1	1	0	4	0	7	77
26 - 80	1	0	0	2	0	0	0	5	6	6	3	0	0	0	2	2	27
> 81.0	0	1	0	0	0	0	1	1	3	3	1	0	0	0	0	2	12
Totals	109	74	37	29	21	27	35	69	105	102	42	10	7	14	13	25	719

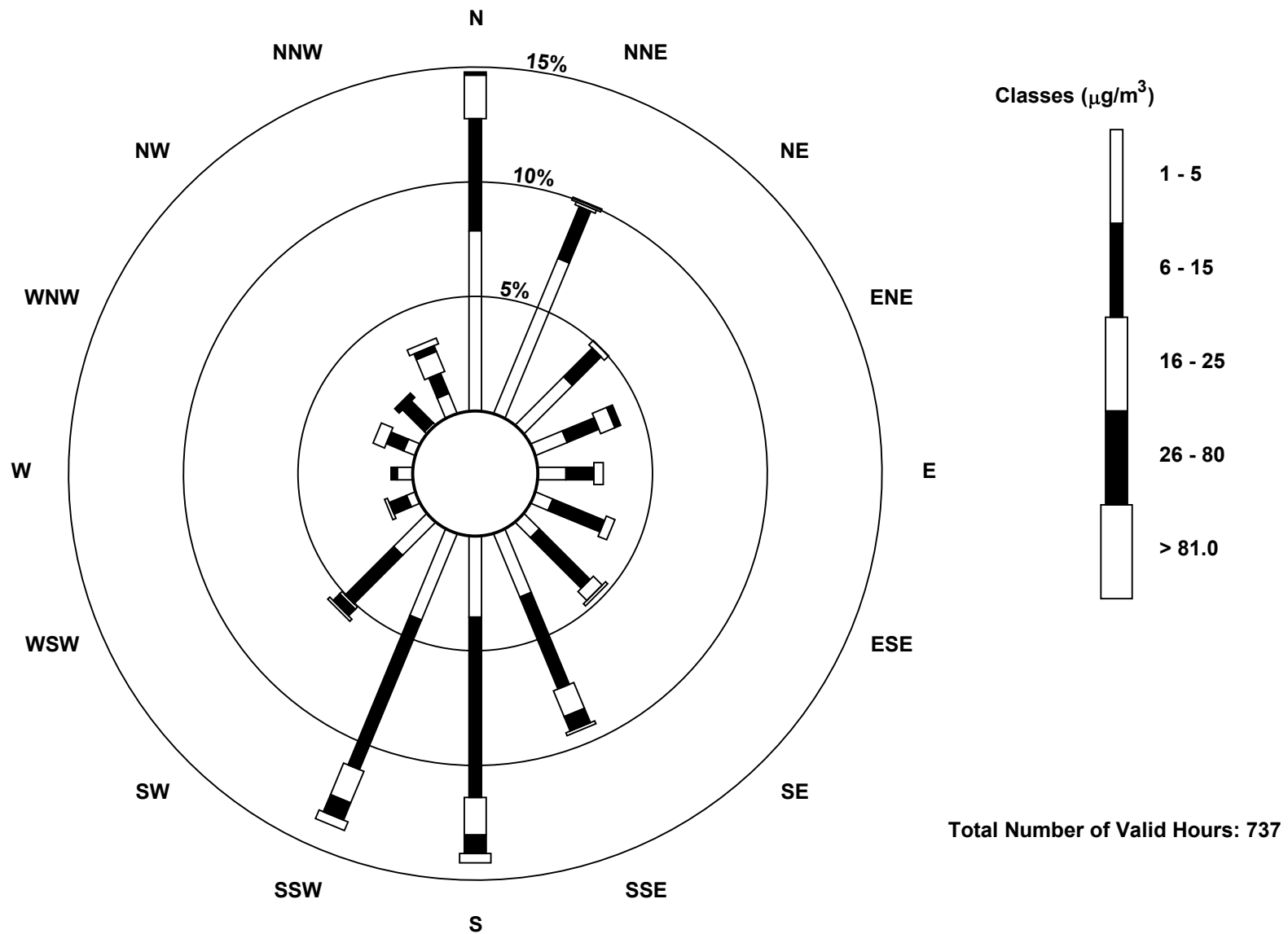
Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
CNRL Horizon (AMS 15)



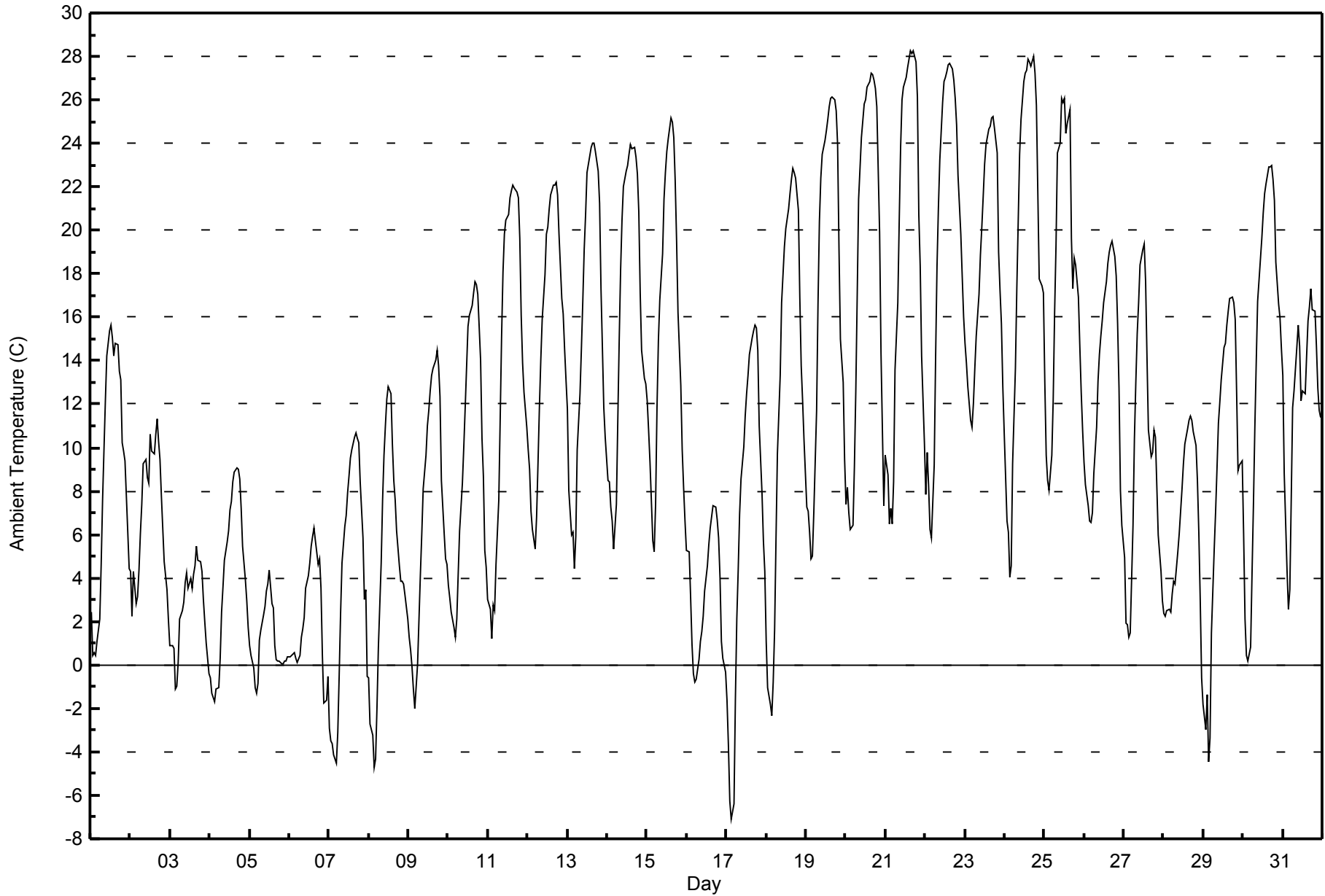


Maximum Value: 28.3 C on May 21 16:00		Maximum Daily Average: 19.5 C on May 22		Hours in Service: 744																																												
Minimum Value: -7.1 C on May 17 04:00		Minimum Daily Average: 1.0 C on May 5		Hours of Data: 744																																												
Maximum Diurnal Average: 17.4 C at hour 16		Minimum Diurnal Average: 2.2 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 11.10 C		Percentiles: P ₁ = -4.2 P ₁₀ = 0.4 Q ₁ = 4.3 Median = 10.0 Q ₃ = 17.3 P ₉₀ = 23.7 P ₉₉ = 27.7		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	2.5	0.4	0.6	0.4	1.1	2.1	4.6	7.6	9.9	12.1	14.2	15.4	15.6	15.1	14.2	14.8	14.8	13.5	13.1	10.2	9.8	9.4	6.1	4.4	8.8	15.6																						
2-May	4.3	2.2	4.3	2.8	3.1	4.4	6.1	7.4	9.2	9.4	8.6	8.4	10.6	9.8	9.7	10.6	11.3	10.3	9.5	7.8	4.7	4.1	3.5	2.1	6.8	11.3																						
3-May	0.9	0.9	0.7	-1.1	-1.0	0.1	2.1	2.5	2.9	3.8	4.3	3.6	4.0	3.5	4.2	4.6	5.5	4.8	4.8	4.3	3.0	2.0	1.0	-0.4	2.5	5.5																						
4-May	-0.6	-1.3	-1.5	-1.7	-1.1	-1.0	0.3	2.4	3.6	4.8	5.7	6.2	7.1	7.5	8.4	8.9	9.1	9.0	8.6	7.2	5.4	3.9	2.9	1.7	4.0	9.1																						
5-May	0.9	0.4	-0.2	-1.0	-1.3	-0.9	1.1	1.6	2.3	2.7	3.4	3.7	4.4	2.8	2.6	0.9	0.3	0.2	0.2	0.1	0.1	0.1	0.2	0.4	1.0	4.4																						
6-May	0.4	0.4	0.5	0.6	0.3	0.1	0.4	1.2	1.7	2.2	3.5	4.1	4.7	5.5	5.9	6.3	5.7	4.6	4.9	3.5	0.4	-1.8	-1.6	-0.5	2.2	6.3																						
7-May	-2.9	-3.5	-3.6	-4.1	-4.5	-3.1	-0.5	2.4	4.7	6.4	6.9	7.9	8.7	9.5	9.9	10.5	10.7	10.4	10.2	8.4	5.8	3.0	3.5	-0.5	4.0	10.7																						
8-May	-0.6	-2.7	-3.2	-4.7	-4.3	-2.0	0.8	4.7	7.6	9.7	11.0	12.2	12.8	12.5	10.1	8.5	7.6	6.1	4.5	3.9	3.9	3.7	3.2	2.1	4.5	12.8																						
9-May	1.3	0.7	-0.1	-1.1	-2.0	0.0	2.1	4.2	6.0	8.1	9.6	11.0	11.7	12.6	13.3	13.7	14.0	14.5	13.8	12.4	8.5	6.0	4.9	4.6	7.1	14.5																						
10-May	3.7	3.1	2.4	1.7	1.3	2.1	4.2	6.2	8.4	10.0	11.8	13.7	15.6	16.1	16.6	17.1	17.6	17.5	17.1	14.0	10.4	8.7	5.3	4.5	9.5	17.6																						
11-May	3.0	2.6	1.2	2.8	2.5	4.6	7.6	11.3	15.1	18.1	19.8	20.5	20.7	21.5	21.8	22.1	22.0	21.8	21.5	19.6	16.1	13.9	12.6	11.0	13.9	22.1																						
12-May	9.9	9.0	7.1	6.2	5.3	6.8	9.3	11.9	14.0	15.9	17.9	19.9	20.1	21.0	21.6	22.1	22.1	22.2	21.6	19.8	16.9	16.1	14.5	13.1	15.2	22.2																						
13-May	11.8	8.1	6.0	6.1	4.4	5.9	9.9	12.5	14.5	16.7	19.1	20.7	22.7	23.4	23.8	24.0	24.0	23.6	22.7	21.2	17.3	14.6	11.8	10.5	15.6	24.0																						
14-May	8.5	8.4	7.3	6.6	5.3	7.4	11.2	14.9	18.2	20.5	22.0	22.7	23.0	23.5	23.9	23.7	23.8	23.4	22.6	20.9	17.1	14.5	13.2	13.0	16.5	23.9																						
15-May	12.2	10.8	9.3	5.7	5.2	7.4	11.8	14.9	16.8	18.9	21.5	22.7	23.6	24.2	25.2	25.0	24.3	22.3	19.5	16.2	12.8	9.9	8.2	6.6	15.6	25.2																						
16-May	5.3	5.2	3.1	1.0	-0.4	-0.8	-0.7	0.2	1.1	1.6	2.2	3.4	4.5	5.5	6.3	6.8	7.3	7.3	6.7	5.9	4.0	1.1	0.3	-0.3	3.2	7.3																						
17-May	-1.6	-3.7	-6.3	-7.1	-6.4	-1.6	2.1	4.4	7.0	8.6	10.0	11.5	12.5	13.3	14.3	15.1	15.4	15.6	15.5	14.5	11.0	7.9	5.7	4.3	6.7	15.6																						
18-May	1.1	-1.0	-1.8	-2.3	-0.8	1.6	5.8	9.7	13.3	16.7	18.0	19.3	20.1	21.0	21.7	22.3	22.8	22.6	22.4	20.9	16.9	13.8	12.2	10.4	12.8	22.8																						
19-May	7.3	7.1	6.1	4.9	5.0	7.0	11.7	16.6	20.4	22.4	23.5	24.2	24.6	25.1	25.7	26.1	26.1	26.0	25.5	24.0	19.1	15.0	13.0	9.4	17.3	26.1																						
20-May	7.4	8.2	7.0	6.2	6.5	9.1	12.6	17.0	21.4	24.3	25.0	25.8	26.0	26.6	26.9	27.2	27.2	26.9	26.6	25.7	19.9	14.4	10.8	7.4	18.2	27.2																						
21-May	9.7	8.7	6.5	7.2	6.5	8.4	13.6	16.7	20.4	23.8	26.0	26.6	27.1	27.5	27.8	28.3	28.1	28.3	27.8	26.2	20.7	18.3	14.2	10.3	19.1	28.3																						
22-May	7.9	9.8	8.2	6.2	5.8	9.2	14.1	18.3	21.0	23.3	25.9	26.8	27.0	27.3	27.6	27.7	27.4	26.9	26.1	24.9	22.5	19.8	17.9	16.0	19.5	27.7																						
23-May	14.8	13.9	12.8	11.3	11.0	12.0	13.6	15.1	17.1	18.9	20.1	21.6	23.0	24.0	24.6	24.8	25.2	25.2	24.7	23.5	19.0	17.2	15.7	12.8	18.4	25.2																						
24-May	10.7	6.7	6.1	4.1	4.6	9.2	13.6	17.3	20.4	23.5	25.1	26.9	27.2	27.4	27.9	27.8	27.6	28.0	27.3	25.7	21.8	17.8	17.4	17.1	19.2	28.0																						
25-May	13.0	9.6	8.5	8.0	9.7	12.2	16.2	19.3	23.6	24.0	26.1	25.9	26.1	24.5	24.9	25.6	19.6	17.3	18.7	18.4	16.9	14.7	12.6	10.8	17.8	26.1																						
26-May	9.3	8.3	7.4	6.7	6.5	7.0	8.8	10.9	13.0	14.3	15.1	15.8	16.6	17.6	18.5	19.0	19.3	19.5	18.8	17.9	15.7	12.7	8.0	6.4	13.0	19.5																						
27-May	5.0	1.9	1.9	1.3	1.5	6.4	10.4	13.0	15.2	16.7	18.4	19.1	19.4	17.6	14.1	10.8	9.6	9.8	10.8	10.5	8.2	6.0	4.3	2.9	9.8	19.4																						
28-May	2.4	2.2	2.5	2.6	2.4	3.3	3.8	3.7	5.2	6.1	7.1	8.1	9.3	10.2	10.9	11.3	11.5	11.3	10.7	10.1	8.5	6.1	3.0	-0.6	6.3	11.5																						
29-May	-1.8	-2.9	-1.3	-4.4	-3.4	1.5	5.4	7.1	9.1	11.2	12.1	13.1	14.6	14.8	15.6	16.3	16.8	17.0	16.6	15.9	12.6	8.9	9.2	9.4	8.9	17.0																						
30-May	6.0	2.1	0.4	0.2	0.8	4.1	7.3	10.9	13.9	16.7	18.7	19.7	20.8	21.7	22.2	22.9	22.9	23.0	22.3	21.3	18.5	16.6	16.0	14.5	14.3	23.0																						
31-May	13.3	8.8	4.4	2.6	3.5	7.6	11.8	12.6	14.6	15.7	14.6	12.1	12.6	12.5	14.2	15.8	16.5	17.3	16.3	16.3	14.7	12.8	11.7	11.4	12.2	17.3																						
																								5.3	4.0	3.1	2.2	2.2	4.2	7.1	9.6	12.0	13.8	15.1	15.9	16.7	16.9	17.2	17.4	17.3	17.0	16.5	15.2	12.3	10.0	8.4	6.9	Diurnal Average
																								14.8	13.9	12.8	11.3	11.0	12.2	16.2	19.3	23.6	24.3	26.1	26.9	27.2	27.5	27.9	28.3	28.1	28.3	27.8	26.2	22.5	19.8	17.9	17.1	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
CNRL Horizon - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
CNRL Horizon - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	53	7.12	7.12
0 - 10	317	42.61	49.73
10 - 20	234	31.45	81.18
> 20	140	18.82	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Precipitation (PC) - mm

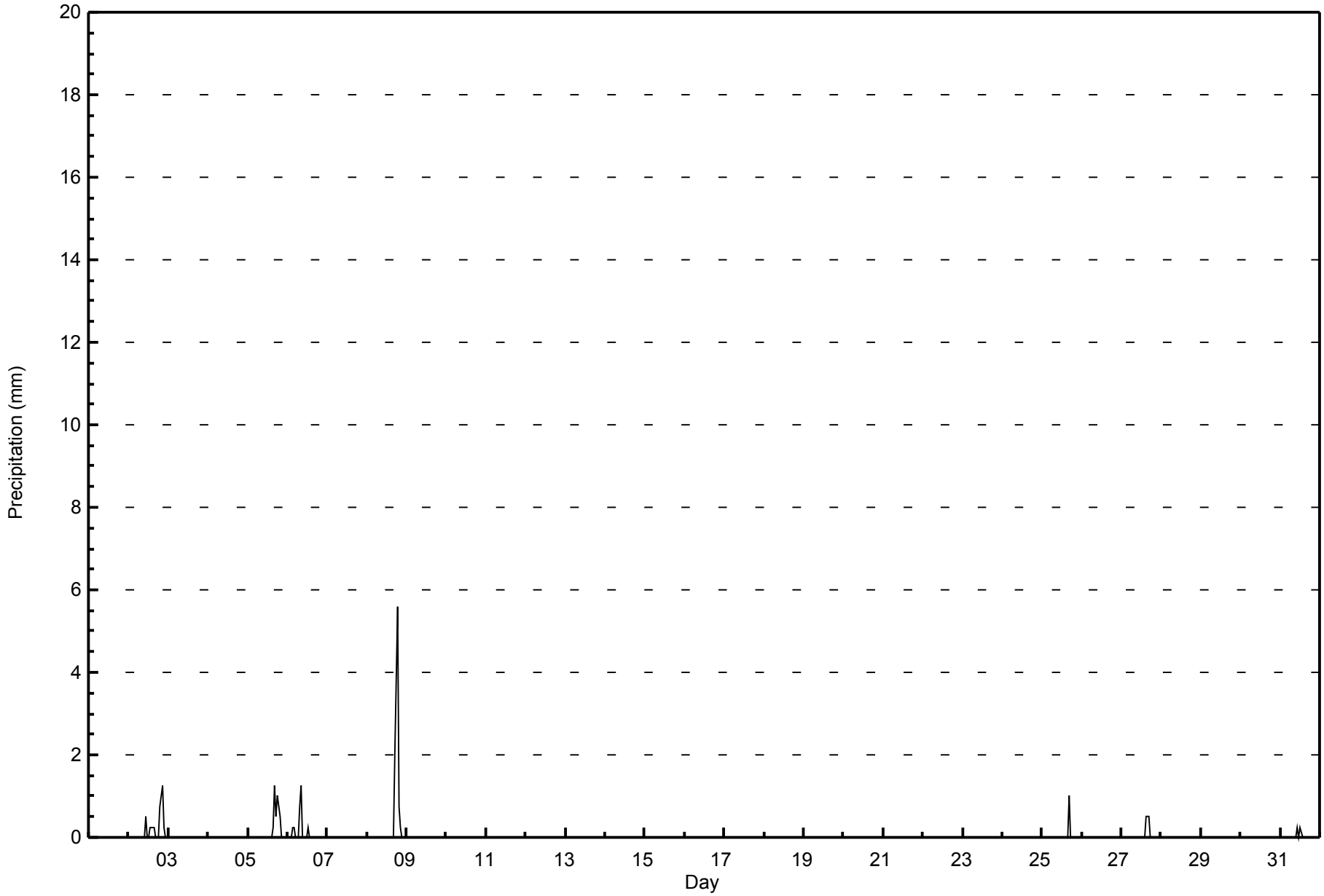
CNRL Horizon - May 2015

Maximum Value: 5.6 mm on May 8 19:00 Maximum Daily Total: 8.6 mm on May 8		Hours in Service: 744 Hours of Data: 744 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																																		
Minimum Value: 0.0 mm on May 1 01:00 Maximum Diurnal Total: 6.6 mm at hour 19 Monthly Total: 21.08 mm		Minimum Daily Total: 0.0 mm on May 1 Minimum Diurnal Total: 0.0 mm at hour 1 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 = 1.0																																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24												
1-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.3	0.3	0.3	0.0	0.0	0.0	0.8	1.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	1.3
3-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.3	0.5	1.0	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	3.6	1.3	
6-May	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.8	1.3	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	2.8	1.3	
7-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	5.6	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	5.6	
9-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
17-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0
26-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.5	
28-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.3	0.0	0.8	1.3	0.0	0.8	0.0	0.5	0.3	0.3	1.0	2.8	2.5	6.6	2.0	1.5	0.3	0.0	0.0	Diurnal Average											
		0.0	0.0	0.0	0.3	0.3	0.0	0.8	1.3	0.0	0.5	0.0	0.3	0.3	0.3	0.5	1.3	2.0	5.6	0.8	1.3	0.3	0.0	0.0	Diurnal Maximum											



Wood Buffalo Environmental Association
Hourly Averages

Precipitation (PC) - mm
CNRL Horizon - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

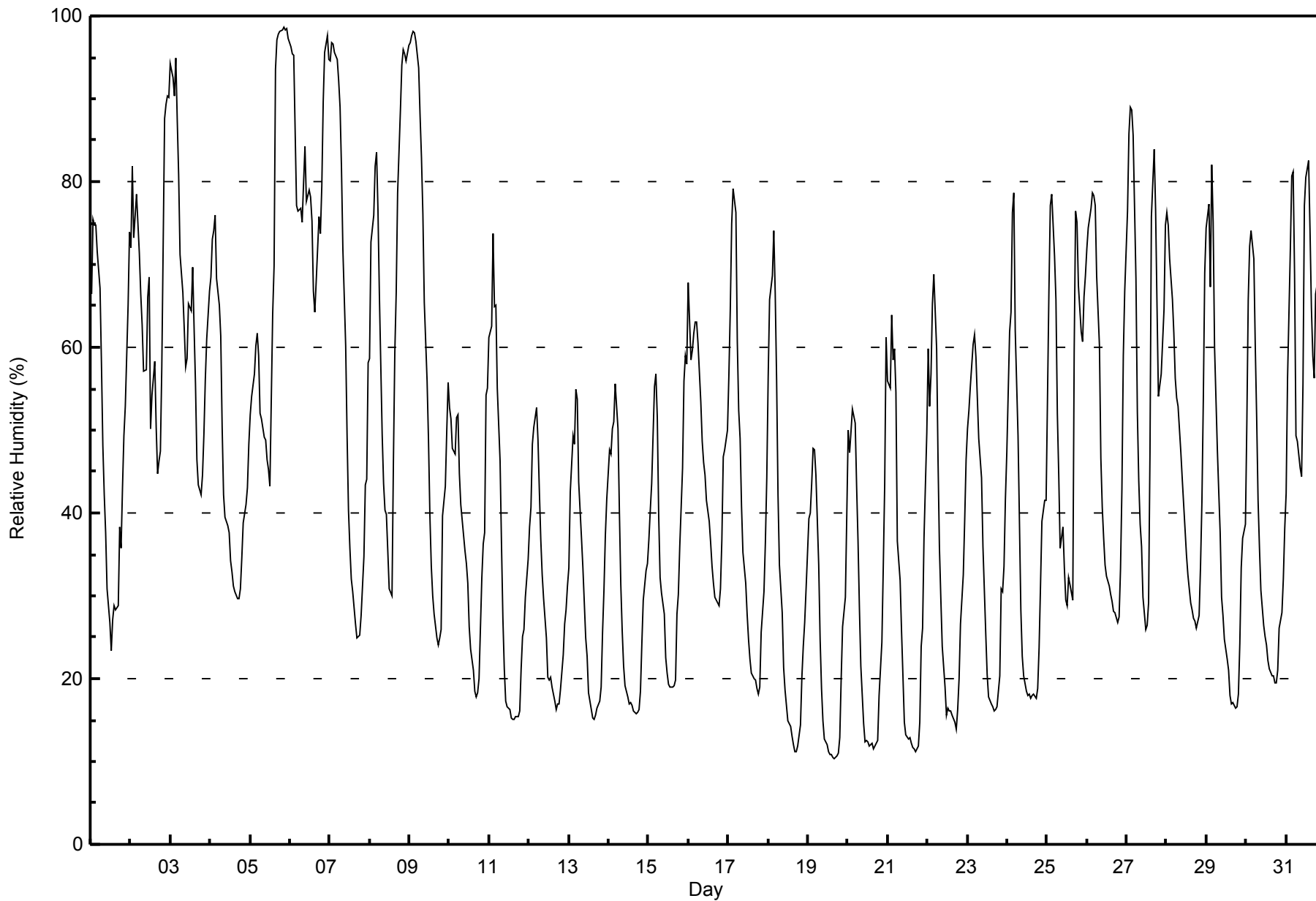
CNRL Horizon - May 2015

Maximum Value: 99 % on May 5 21:00														Maximum Daily Average: 81.6 % on May 6														Hours in Service: 744	
Minimum Value: 10 % on May 19 17:00														Minimum Daily Average: 24.3 % on May 19														Hours of Data: 744	
Maximum Diurnal Average: 70.5 % at hour 4														Minimum Diurnal Average: 30.2 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 45.7 %														Percentiles: P ₁ = 11 P ₁₀ = 17 Q ₁ = 26 Median = 43 Q ₃ = 63 P ₉₀ = 78 P ₉₉ = 98														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-May	66	75	75	75	71	67	58	48	42	38	31	27	23	27	29	28	29	38	36	43	49	53	65	74	48.7	75			
2-May	72	82	73	78	75	71	66	63	57	57	66	69	50	54	58	50	45	46	47	58	88	89	90	90	66.5	90			
3-May	94	93	90	95	87	81	71	67	62	58	59	65	64	70	62	56	46	43	42	45	50	56	61	67	66.0	95			
4-May	69	73	74	76	68	65	61	50	42	39	38	38	34	33	31	30	30	30	31	35	39	41	43	48	46.6	76			
5-May	52	54	57	60	62	59	52	51	49	49	46	45	43	64	70	94	97	98	98	98	99	98	98	97	70.5	99			
6-May	96	95	95	86	77	77	77	75	80	84	78	79	78	75	67	64	68	76	74	79	90	96	98	95	81.6	98			
7-May	95	97	97	96	95	92	89	82	72	60	49	40	36	32	30	27	25	25	25	28	35	43	44	58	57.1	97			
8-May	59	73	76	82	84	77	66	50	44	40	40	35	31	30	46	59	67	79	89	94	96	95	95	96	66.7	96			
9-May	97	98	98	98	97	94	88	83	76	65	56	49	40	34	30	28	25	24	25	26	40	43	50	56	59.1	98			
10-May	53	51	48	47	52	52	45	41	37	35	34	32	26	24	21	18	18	18	20	32	36	38	54	55	37.0	55			
11-May	61	63	74	65	65	55	46	36	27	21	17	17	16	15	15	15	16	15	16	21	25	26	30	34	33.0	74			
12-May	38	41	48	50	53	49	43	37	33	30	25	20	20	20	19	17	16	17	17	19	23	27	28	31	30.0	53			
13-May	33	43	49	48	55	54	44	37	33	29	25	23	18	16	15	15	16	16	17	19	26	31	37	42	30.9	55			
14-May	48	47	50	51	56	50	40	31	26	21	19	18	17	17	16	16	16	16	16	18	24	30	33	34	29.7	56			
15-May	37	40	44	55	57	51	40	32	30	28	23	21	19	19	19	19	20	28	30	36	45	56	59	58	36.1	59			
16-May	68	58	60	62	63	63	61	53	49	46	45	42	39	36	34	31	30	29	29	31	37	47	48	50	46.2	68			
17-May	57	65	75	79	76	61	52	49	41	35	32	28	25	22	21	20	20	19	18	19	26	31	36	44	39.5	79			
18-May	56	66	69	74	67	56	42	34	28	21	19	17	15	14	13	12	11	11	12	14	20	24	27	31	31.4	74			
19-May	39	40	44	48	48	45	34	25	19	15	13	12	11	11	11	10	10	11	11	13	20	26	30	40	24.3	48			
20-May	50	47	50	53	51	43	37	29	21	14	12	13	12	12	12	11	12	12	13	18	24	34	43	61	28.5	61			
21-May	56	55	64	58	60	55	37	32	26	20	15	13	13	13	12	12	12	11	12	15	24	26	37	50	30.2	64			
22-May	60	53	57	65	69	60	46	36	30	24	19	16	16	16	16	16	15	14	16	20	27	33	39	46	33.6	69			
23-May	50	52	55	60	62	59	54	49	44	36	31	25	21	18	17	17	16	16	17	20	31	31	33	42	35.7	62			
24-May	47	62	64	76	79	62	49	39	28	23	20	18	18	18	18	18	18	18	19	24	31	39	41	41	36.3	79			
25-May	54	67	77	78	71	66	52	45	36	38	33	29	29	32	31	30	60	76	75	67	62	61	66	69	54.3	78			
26-May	72	74	77	79	78	77	69	60	47	41	37	34	32	31	30	29	28	28	27	27	33	43	59	67	49.1	79			
27-May	77	86	89	89	86	68	52	44	39	36	30	26	26	29	47	76	84	77	65	54	55	57	65	75	59.6	89			
28-May	76	75	71	66	62	56	54	53	47	44	41	38	35	32	29	28	27	27	26	28	34	41	54	69	46.4	76			
29-May	74	77	67	82	75	60	48	43	38	30	28	25	22	21	18	17	17	16	17	18	24	33	37	39	38.6	82			
30-May	51	66	72	74	71	60	52	42	36	31	26	25	24	22	21	20	20	19	19	21	26	28	32	38	37.4	74			
31-May	42	56	72	81	81	69	49	49	45	44	56	77	81	82	74	65	59	56	66	69	69	77	86	87	66.3	87			
														61.3 65.3 68.1 70.5 69.3 63.0 54.0 47.2 41.4 37.2 34.2 32.7 30.2 30.4 30.2 30.6 31.3 32.6 33.1 35.8 42.1 46.8 52.2 57.5														Diurnal Average	
														97 98 98 98 97 94 89 83 80 84 78 79 81 82 74 94 97 98 98 98 99 98 98 97														Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
CNRL Horizon - May 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
CNRL Horizon - May 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	123	16.53	16.53
20 - 40	224	30.11	46.64
40 - 60	188	25.27	71.91
60 - 80	144	19.35	91.26
80 - 100	65	8.74	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

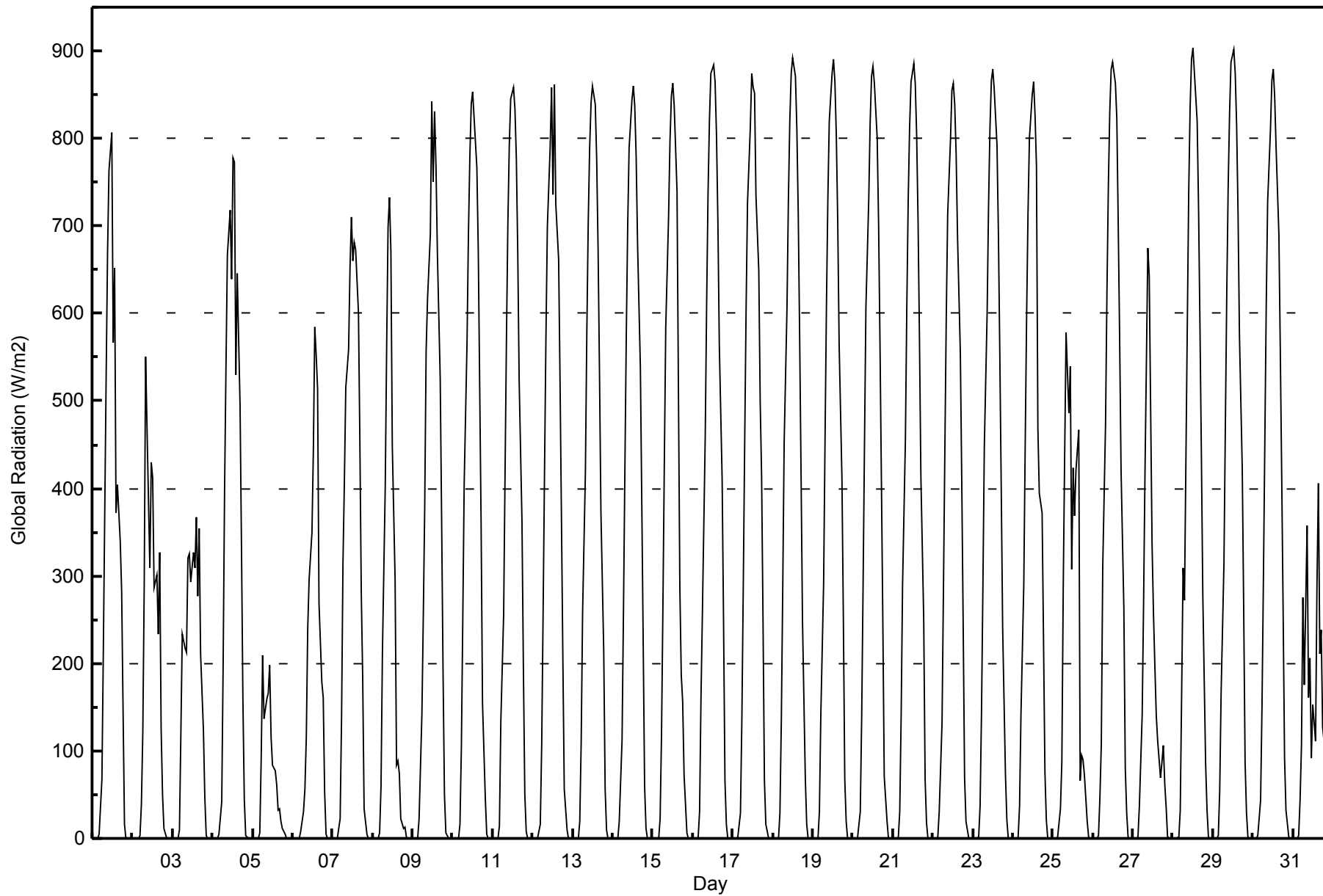


Maximum Value: 903 W/m2 on May 28 13:00		Maximum Daily Average: 365.9 W/m2 on May 29		Hours in Service: 744																						
Minimum Value: 0 W/m2 on May 1 01:00		Minimum Daily Average: 58.7 W/m2 on May 5		Hours of Data: 744																						
Maximum Diurnal Average: 709.7 W/m2 at hour 12		Minimum Diurnal Average: 0.0 W/m2 at hour 24		Hours of Missing Data: 0																						
Monthly Average: 288.0 W/m2		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 153 Q ₃ = 564 P ₉₀ = 805 P ₉₉ = 886		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-May	0	0	0	0	5	68	214	372	528	670	764	807	567	652	371	404	340	281	146	17	0	0	0	0	258.6	807
2-May	0	0	0	0	3	38	121	289	550	389	309	430	412	287	301	233	326	125	50	11	0	0	0	0	161.4	550
3-May	0	0	0	0	9	119	233	217	212	320	325	293	326	309	366	278	354	210	124	47	3	0	0	0	156.1	366
4-May	0	0	0	0	5	42	200	397	538	666	719	639	778	774	529	646	494	334	161	45	4	0	0	0	290.4	778
5-May	0	0	0	0	7	92	210	137	159	166	197	117	84	77	61	33	33	19	12	5	1	0	0	0	58.7	210
6-May	0	0	0	0	1	8	31	57	115	240	297	350	442	585	553	514	268	178	161	54	5	0	0	0	160.8	585
7-May	0	0	0	0	22	137	314	408	515	558	652	710	661	681	673	600	453	280	183	34	5	0	0	0	286.8	710
8-May	0	0	0	0	6	59	212	403	563	699	733	671	449	294	84	89	75	22	11	12	1	0	0	0	182.7	733
9-May	0	0	0	0	22	142	254	378	558	617	691	843	750	831	768	668	525	363	192	50	7	0	0	0	319.1	843
10-May	0	0	0	0	15	103	250	406	565	689	778	838	853	825	766	672	517	360	154	45	5	0	0	0	326.8	853
11-May	0	0	0	0	15	133	256	418	574	703	792	846	858	835	778	671	523	363	194	51	8	0	0	0	334.1	858
12-May	0	0	0	0	17	108	259	421	573	698	790	859	736	862	724	661	523	368	206	56	9	0	0	0	327.9	862
13-May	0	0	0	0	19	110	258	419	578	703	788	841	861	838	776	673	532	373	214	56	10	0	0	0	335.4	861
14-May	0	0	0	0	20	112	258	421	575	700	789	844	859	838	779	680	539	383	224	60	12	0	0	0	337.2	859
15-May	0	0	0	0	22	119	267	432	585	709	797	849	863	838	739	511	286	186	157	73	6	0	0	0	309.9	863
16-May	0	0	0	1	31	161	258	459	610	737	822	874	884	865	804	703	563	410	248	67	15	0	0	0	354.7	884
17-May	0	0	0	0	29	136	289	452	606	727	813	874	859	852	734	649	499	413	250	66	16	0	0	0	344.3	874
18-May	0	0	0	1	29	135	287	452	605	729	819	875	892	871	812	713	571	416	249	69	15	0	0	0	355.9	892
19-May	0	0	0	1	31	140	292	455	609	731	819	874	890	865	803	705	565	411	251	67	19	0	0	0	355.3	890
20-May	0	0	0	1	31	138	290	453	606	729	818	871	882	863	800	703	563	408	248	71	20	0	0	0	353.9	882
21-May	0	0	0	1	31	139	290	454	606	729	813	865	885	863	803	706	569	414	251	68	18	0	0	0	354.4	885
22-May	0	0	0	1	31	132	284	443	596	713	798	855	863	838	782	687	553	408	245	70	20	1	0	0	346.6	863
23-May	0	0	0	2	37	144	288	448	601	722	811	866	879	856	792	691	552	400	242	73	21	0	0	0	351.0	879
24-May	0	0	0	2	37	141	290	450	597	715	800	850	864	825	767	468	395	372	227	76	22	0	0	0	329.1	864
25-May	0	0	0	1	34	87	289	438	579	487	540	308	424	369	420	467	66	95	90	73	19	2	0	0	199.5	579
26-May	0	0	0	3	47	108	310	473	624	746	830	880	887	863	823	703	572	423	263	80	29	1	0	0	361.0	887
27-May	0	0	0	2	37	142	270	420	546	674	643	337	257	197	140	111	69	87	107	62	35	1	0	0	172.4	674
28-May	0	0	0	2	32	168	309	271	587	738	836	891	903	876	819	720	584	438	279	85	32	2	0	0	357.1	903
29-May	0	0	0	4	55	167	314	472	624	745	829	886	902	874	815	714	575	421	265	87	29	1	0	0	365.9	902
30-May	0	0	0	3	43	151	297	452	608	728	809	866	880	847	788	690	555	410	258	91	33	2	0	0	354.6	880
31-May	0	0	0	3	44	106	276	176	358	160	206	92	153	112	290	405	210	238	127	96	9	0	0	0	127.5	405
		0.0	0.0	0.0	0.9	24.7	115.7	257.1	385.2	533.7	623.8	691.2	709.7	703.3	689.0	627.8	553.8	427.4	310.1	186.8	58.5	13.8	0.4	0.0	0.0	Diurnal Average
		0	0	0	4	55	168	314	473	624	746	836	891	903	876	823	720	584	438	279	96	35	2	0	0	Diurnal Maximum



WBEA
Hourly Averages

Global Radiation (GR) - W/m²
CNRL Horizon - May 2015





Wood Buffalo Environmental Association
Summary of Hour Averages

Wind Speed (WS) - km/h
CNRL Horizon - May 2015

Maximum Speed: 30 km/h on May 15 23:00	Maximum Daily Speed Average: 15.3 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 31 04:00	Minimum Daily Speed Average: 0.2 km/h on May 8	Hours of Data: 744
Maximum Diurnal Speed Average: 3.2 km/h at hour 19	Minimum Diurnal Speed Average: 0.8 km/h at hour 6	Hours of Missing Data: 0
Monthly Average Velocity: 0.7 km/h 72.9 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 8 Q ₃ = 11 P ₉₀ = 14 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-May	SW8	SW6	SSW8	S9	SSW11	SSW9	SSW13	SSW11	SSW13	SSW14	SW15	SW14	SW11	WNW9	W14	SSW9	WNW9	N10	SW4	SW7WNW12	NNW9	WNW3	W7	SW7.2	SW15	
2-May	WNW4	NW4	WNW6	SW7	W5	NW6	NNW9	N10	NNE11	NNE10	NNE11	NNE7	NNW9	N11	W6	NNW9	N14	NNE15	NNE11	NNW9	NNW11	N9	NNE10	NNE7	N7.4	NNE15
3-May	ENE2	NNW4	N5	W3	NW7	NW5	W4	WSW5	WNW6	NW8	NNW12	NNE9	NNE10	NNE11	NE10	NNE10	NNW11	NNW15	N9	NNE9	NE7	NNE7	N6	N4	N6.0	NNW15
4-May	NNW4	N4	NNE1	N3	N7	N8	NE5	ENE7	NE8	NE5	ENE6	N6	N4	NNE5	N6	ENE7	ENE8	ENE9	ENE10	NE12	NNE11	NNE12	NNE11	NNE10	NNE6.3	NE12
5-May	NNE11	NNE10	NNE9	NNE9	N9	N10	NNE12	NNE12	N13	N14	NNE16	N16	N15	NE14	NE10	E7	ENE7	SE7	ESE6	NE3	NE6	NNE6	N5	N6	NNE8.5	N16
6-May	N7	N8	N8	N12	N12	N12	N12	NNE11	NNE13	N14	NNE15	NE18	NNE17	NE16	NE18	ENE17	E12	E10	E10	ESE7	SE2	SSW3	WSW6	W7	NNE8.3	NE18
7-May	SW4	SSW6	SSW6	SSW6	SSW6	S6	SSE5	S7	S7	SSE4	NNE7	NE7	ENE6	ENE6	E9	E9	E9	E7	ESE8	ESE8	ENE6	E5	E5	SW5	ESE3.5	E9
8-May	W3	NE2	SE1	WSW2	WNW2	SSE2	S4	SSE5	SE4	SE6	ESE7	SE7	S4	ESE4	NW11	NW15	NW13	NE2	ENE8	E4	SE3	SE6	S1	NW6	ESE0.2	NW15
9-May	NW6	NNE6	NW6	N4	NNE1	NNE4	N3	N3	NNW5	SSE3	SSE4	SSE4	S7	SSW6	SW5	SSE6	S6	S7	SSE8	SE7	SE5	SSE5	NE3	NW7	SSE1.1	SSE8
10-May	NNW7	NNW7	N7	N6	NNW6	NNW6	N5	N4	N4	ENE6	NE6	ENE7	SE3	ENE5	E4	ENE5	SSE1	ESE3	ESE1	SE4	SE6	SSE5	SSW6	SSW4	NE2.1	ENE7
11-May	SSW2	S2	S8	S10	S12	S12	S13	S12	S11	SSE10	S7	SSE8	S3	S6	S4	SE2	ESE8	E5	SE6	SSE4	NE6	N6	N7	NNW6	S4.6	S13
12-May	NNW7	N7	N6	N6	N6	N5	NNW4	N4	N5	N5	E5	ESE4	E6	ESE9	ESE6	SE10	ESE4	SSE8	SSE9	SSE7	SE9	SE14	SSE15	SE14	ESE3.2	SSE15
13-May	SE9	S2	ESE2	ESE5	SE4	SSW4	S9	S12	S11	SSW11	SSW9	SSE9	S10	S8	S10	S10	S11	S16	S15	S11	S7	S9	S9	S8	S8.4	S16
14-May	S9	S10	SSW9	S9	S8	S9	S10	SSW11	SW12	SW15	SSW15	SSW16	SSW13	SSW12	SSW13	SSW11	S12	SSW12	S10	S9	SSW9	SSW9	SSW10	SSW11.0	SSW16	
15-May	SW11	SW10	SW8	S8	S7	S7	S6	SSW11	S12	S13	SSW13	SW13	SSW12	SW12	SW12	SW11	WSW9	N16	N28	N28	N24	N29	N30	N25	WNW3.8	N30
16-May	N19	N23	N24	N21	N20	NNE16	NNE17	NNE18	NNE18	NNE21	NNE20	NNE18	NNE18	NNE18	NE17	NNE17	NNE15	NNE13	NE13	NE10	NNE7	N6	N6	N5	NNE15.3	N24
17-May	NNW5	NNW4	WNW1	NW2	SSE1	SSW3	S6	SSE9	S11	S11	SSE10	SSE11	SSE11	SSE11	SSE11	SSE9	SE9	SE10	SSE9	SSE8	SSE7	SSE7	SSE7	S9	SSE6.4	SSE11
18-May	SSW5	WNW2	S4	S8	SSW10	S12	SSW13	S12	SSW12	SSW13	SSW13	SSW12	SSW11	SSW9	SSW8	SW7	SSW6	SW6	SSW7	SSW7	SSW8	SSW9	SW9	SW8	SSW8.6	SSW13
19-May	SW7	SSW8	SSW9	SSW10	SSW12	SSW10	S9	S9	SSW9	SSW10	SW10	S9	SSE9	SSE8	SSE9	S7	SSE8	S10	S9	S8	S7	SSW7	SW7	WSW6	S8.1	SSW12
20-May	SSW9	SSW10	SSW11	SSW10	SSW9	S10	S10	S10	S9	SSW9	SSW11	S11	SSW7	SSW8	S9	SSW10	S6	S4	SSE4	SSE1	SSE2	SSW5	WSW3	SSW5	SSW7.4	S11
21-May	SSW9	SW8	SSW7	SSW8	SSW9	SSW8	S10	S10	S9	S7	SSW10	SSW9	SW11	SW8	S6	S9	WSW4	SW5	SSW4	S6	S7	SSW8	WNW6	S2	SSW7.1	SW11
22-May	SW6	SSW9	SW5	SSW6	SSW5	S3	S4	ESE2	ENE4	NE8	NNE15	NNE18	NNE19	NNE17	NNE15	N16	N17	NNE17	NNE16	NNE13	NNE11	N10	N9	N7	NNE7.2	NNE19
23-May	N9	N9	N8	N8	N7	N8	N10	NNE9	N9	NNE10	NE8	NE8	NNE7	ENE4	ESE7	ENE5	ENE6	E5	E6	ESE4	ENE3	NNW7	N6	NNW6	NNE5.6	N10
24-May	NNW5	NNW3	WNW5	SSW5	SW7	S3	SSE4	ESE3	E2	S4	SE7	SSE7	ESE7	ENE9	E9	ENE4	N5	ENE4	NE7	E5	ENE4	NW5	NW6	NNW7	E1.4	E9
25-May	WNW2	S2	SW6	SSW3	SSW6	SSW5	S5	S7	ESE5	ESE8	ESE9	ENE6	SSE1	NE7	SE8	S13	NNW16	N6	N3	N9	N17	N16	N15	N14	NNE1.9	N17
26-May	N12	N12	N10	N10	NNE6	NNE5	NNE10	NNE7	NNE12	NE13	NE11	NE11	NE8	NE7	NNE3	NE9	NNE8	NNE9	NE11	NE10	NE7	NNE7	SE2	WNW4	NNE7.9	NE13
27-May	NW2	SSW4	WSW2	W2	SE2	SE1	E2	N1	SSE2	ENE5	ENE7	ENE5	NNE7	N23	N26	N21	N18	N14	N14	NNE21	N25	N21	N20	N18	N9.6	N26
28-May	N15	N13	N14	N16	N13	NNE10	N14	N16	N15	N14	NNE15	NNE15	NNE14	NNE15	NNE12	NE14	NNE13	NNE14	NNE13	NNE12	NNE7	NE7	ESE5	SSW3	NNE11.7	N16
29-May	WNW3	ESE3	SE5	SSW4	SSE2	SSE3	S5	S8	SSE8	SSW9	SSE8	SSE6	S8	SE9	ESE9	ESE9	SE8	SSE9	SSE9	SSE7	SSE7	SSE8	S10	SSE12	SSE6.1	SSE12
30-May	SSW6	SW6	SSW6	SSW8	SSW8	SSW9	S10	S9	S10	SSW10	SSW11	S10	SSE9	SSE10	SSE10	S9	SSE9	SSE10	SSE11	SE8	SE6	SE8	SSE11	S12	S8.2	S12
31-May	S10	SSW6	SSW5	SW1	NNW4	NNW3	SSE3	SSW4	SE5	SSE7	S14	SSE8	S6	SSE11	S12	SSW12	SW8	SSW5	SSE6	SSE9	SW9	WSW6	SW6	WSW6	S5.4	S14
WNW1.9 NW1.6WNW1.1WSW1.0WSW1.1SSW0.8 S1.2 S1.7 SSE1.2 SE1.2 ESE1.5 ESE2.0 E1.0 ENE2.6 E1.9 ESE2.0 NE1.9 ENE2.9 E3.2 ENE2.8 NE2.4 NNE1.8 N1.4 NW2.0																								Diurnal Average		
N19 N23 N24 N21 N20 NNE16 NNE17 NNE18 NNE18 NNE21 NNE20 NNE18 NNE19 N23 N26 N21 N18 NNE17 N28 N28 N25 N29 N30 N25																								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

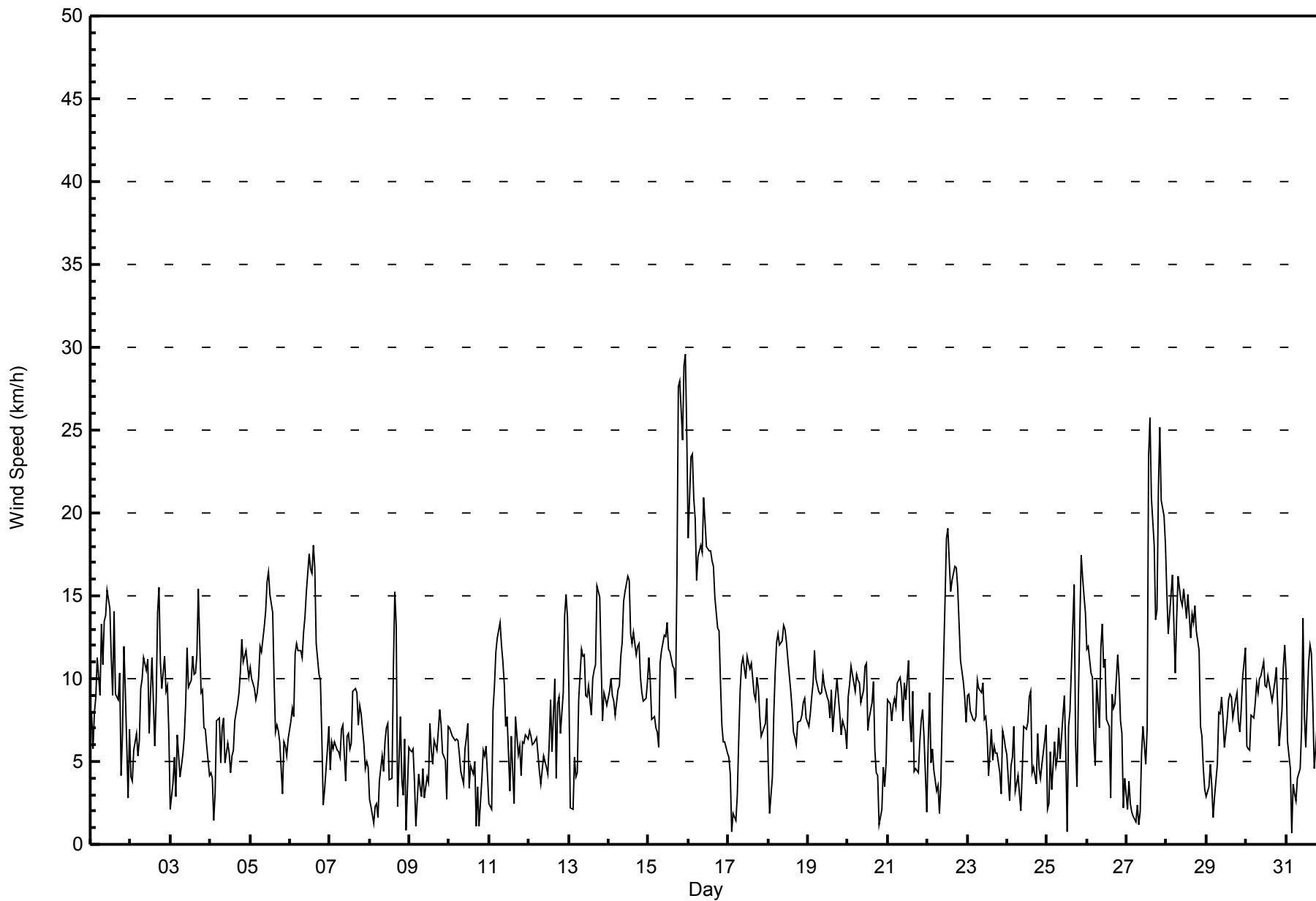
CNRL Horizon - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 744												
Maximum Value: 10 km/h on May 25 17:00														Hours of Data: 744												
Minimum Value: 0 km/h on May 17 01:00														Hours of Missing Data: 0												
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 1 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7														Hours of Calibration: 0												
														Percent Operational Time: 100.0												
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	2	2	1	2	3	3	3	3	4	4	5	5	4	5	5	4	6	5	5	1	4	3	2	2	6	
2-May	2	1	1	1	1	1	4	4	3	3	4	3	4	7	5	6	4	4	3	7	4	2	3	2	7	
3-May	1	1	1	1	1	1	2	2	3	5	4	3	3	4	3	3	6	4	3	3	2	2	1	1	6	
4-May	1	1	2	2	2	2	2	2	3	3	3	3	3	3	3	4	3	4	3	3	2	3	2	2	4	
5-May	2	2	2	1	2	2	3	3	3	3	4	4	4	4	4	2	2	2	3	2	1	1	1	2	4	
6-May	1	2	2	3	2	2	2	2	3	4	4	5	4	5	5	4	3	5	3	2	1	1	1	1	5	
7-May	1	1	1	1	1	1	1	2	2	2	3	4	3	4	3	4	3	3	3	2	1	2	1	3	4	
8-May	1	2	1	1	1	1	1	1	2	2	3	3	3	3	4	4	3	3	2	2	1	3	2	1	4	
9-May	1	1	1	1	2	2	1	1	1	2	2	2	4	3	3	3	3	3	2	2	1	1	2	1	4	
10-May	1	1	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	3	2	1	1	1	1	2	3	
11-May	1	2	1	1	1	2	3	3	3	3	3	4	3	4	4	3	3	3	3	1	2	1	1	1	4	
12-May	1	1	1	1	1	1	1	1	1	2	3	4	3	4	4	4	4	4	3	2	4	3	4	3	4	
13-May	3	1	1	1	1	1	3	3	3	3	3	4	4	4	4	5	5	4	4	3	1	2	1	1	5	
14-May	1	2	2	2	3	2	2	3	4	5	5	5	5	5	5	5	5	4	3	3	2	1	2	2	5	
15-May	3	3	2	1	1	1	3	3	3	3	5	5	5	5	5	5	4	4	7	7	7	6	8	8	7	8
16-May	5	7	7	6	5	5	5	5	5	5	5	5	5	6	5	4	5	4	4	3	2	1	1	1	7	
17-May	0	1	1	1	1	1	3	2	3	4	5	4	4	5	4	4	3	3	3	2	1	1	1	1	5	
18-May	1	1	2	1	2	3	3	3	3	4	4	5	5	4	4	4	3	3	3	2	1	1	1	1	5	
19-May	1	1	1	1	2	3	2	2	3	3	4	4	4	4	4	4	3	3	2	2	1	1	1	2	4	
20-May	2	2	1	1	1	2	2	2	2	4	4	4	5	5	5	4	4	3	3	2	1	2	2	2	5	
21-May	1	1	1	1	2	2	3	2	2	3	4	6	5	5	5	5	5	4	3	1	1	1	1	2	6	
22-May	2	2	2	2	2	1	1	1	2	3	6	5	6	5	5	5	6	5	4	4	3	2	2	1	6	
23-May	1	1	2	1	1	2	3	2	3	3	3	4	4	3	3	3	3	2	1	1	1	1	1	1	4	
24-May	1	1	1	2	1	2	1	1	2	2	3	3	6	4	4	3	3	3	3	1	1	1	1	1	6	
25-May	2	2	2	2	1	2	2	2	2	2	3	5	5	5	3	5	10	3	3	3	5	4	4	4	10	
26-May	3	3	2	2	1	2	2	2	3	4	4	5	4	4	4	3	4	3	3	3	2	1	1	1	5	
27-May	2	2	1	1	1	1	1	2	1	2	3	3	4	8	7	6	5	4	4	7	7	6	5	5	8	
28-May	4	3	4	4	4	3	4	4	4	5	5	5	5	5	5	4	4	4	4	4	3	1	1	1	5	
29-May	1	2	2	1	1	1	2	3	3	3	3	3	4	4	4	3	3	3	3	2	1	3	2	3	4	
30-May	2	1	1	1	1	2	2	3	3	3	4	4	4	4	4	5	4	4	3	3	1	2	2	2	5	
31-May	3	1	1	2	1	1	2	2	2	2	4	3	3	3	4	4	3	2	2	3	3	2	2	2	4	
														Diurnal Maximum												



WBEA
Hourly Averages

Wind Speed (WS) - km/h
CNRL Horizon - May 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
CNRL Horizon - May 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	179	24.06	24.06
6 - 11	414	55.65	79.70
12 - 19	132	17.74	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
Frequency Distribution

Wind Speed (WS) - km/h
CNRL Horizon - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	20	6	6	12	10	13	14	22	16	19	7	6	4	9	5	10	179
6 - 11	42	38	23	17	10	14	19	45	73	67	28	5	3	5	9	16	414
12 - 19	33	36	9	1	1	0	2	2	16	18	7	0	1	1	2	3	132
20 - 28	14	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17
29 - 38	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	111	83	38	30	21	27	35	69	105	104	42	11	8	15	16	29	744

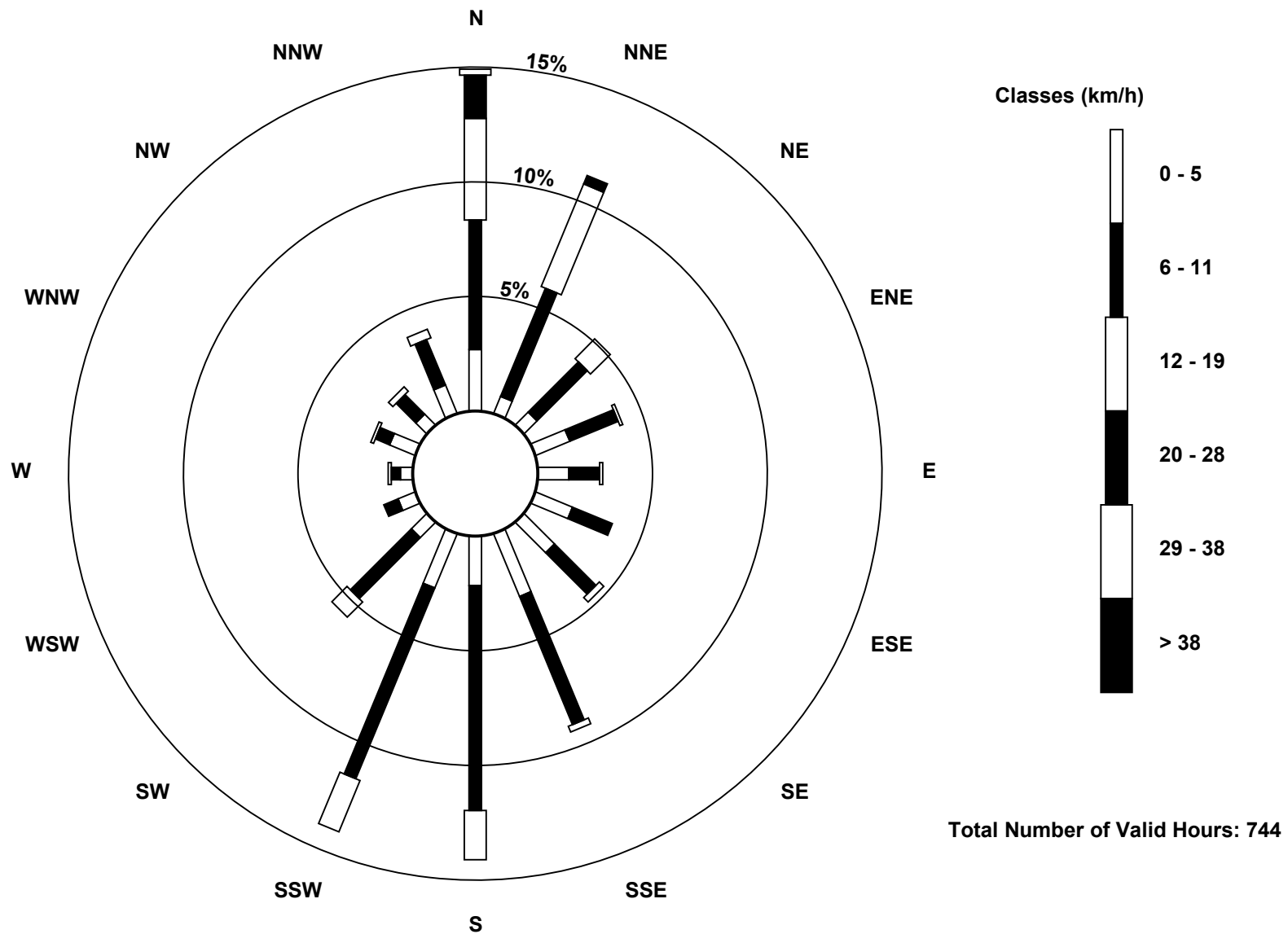
Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Wind Speed (WS) - km/h
CNRL Horizon (AMS 15)





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

CNRL Horizon - May 2015

Direction of Maximum Speed: 355 deg on May 15 23:00		Hours in Service: 744
Direction of Maximum Daily Speed Average: 16.8 deg on May 16		Hours of Data: 744
Direction of Minimum Speed: 229 deg on May 31 04:00		Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.2 deg on May 8		Percent Operational Time: 100.0
Monthly Average Direction: 206.8 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-May	220	216	201	190	206	200	202	196	206	206	225	224	226	293	279	212	284	11	220	218	291	330	283	279	232.0
2-May	296	323	301	235	273	317	344	1	16	15	12	30	346	1	279	347	2	14	16	329	327	7	21	18	352.3
3-May	77	343	5	272	307	308	267	245	282	310	348	33	24	13	35	30	346	335	2	17	46	14	3	5	355.4
4-May	330	2	22	9	360	2	37	62	53	45	75	4	356	30	357	73	69	63	67	42	30	22	18	14	33.1
5-May	20	20	18	13	8	10	17	18	10	10	12	8	4	38	55	97	78	125	117	55	49	16	7	2	24.5
6-May	356	4	1	7	11	5	6	12	12	7	24	34	21	45	53	59	89	99	83	114	140	208	256	262	30.4
7-May	221	207	196	203	197	191	165	181	179	148	18	46	70	72	80	84	83	93	113	105	77	84	99	227	121.1
8-May	259	40	126	257	284	161	173	163	132	124	109	138	174	120	314	306	314	38	60	85	136	139	188	306	118.5
9-May	323	20	317	8	32	13	10	356	328	160	157	150	172	193	229	155	171	171	148	139	141	163	47	325	154.5
10-May	347	344	359	355	346	344	359	355	10	73	54	73	135	74	97	71	164	106	109	144	131	149	203	198	45.3
11-May	199	169	191	189	186	183	182	182	183	166	190	162	174	186	173	127	106	100	146	159	39	355	2	342	170.7
12-May	348	7	2	354	350	10	338	352	1	4	99	108	81	105	106	135	108	158	167	161	133	145	148	146	107.4
13-May	145	172	108	115	131	195	178	182	190	204	204	163	181	185	183	187	189	171	176	169	189	184	174	181	178.2
14-May	178	186	192	184	180	180	186	203	216	220	210	203	194	201	210	193	198	185	195	190	186	193	200	219	197.2
15-May	226	226	215	174	176	183	187	195	179	176	206	220	226	234	229	225	237	2	356	358	358	355	355	2	296.0
16-May	3	355	4	4	1	18	17	19	18	20	30	13	14	23	34	28	16	28	55	52	29	8	359	352	16.8
17-May	334	327	300	322	167	200	174	165	183	177	158	165	157	168	157	156	141	137	151	149	155	160	164	185	163.2
18-May	210	292	179	190	196	188	192	188	192	211	206	209	206	205	206	230	196	214	195	192	197	201	218	225	202.1
19-May	220	208	193	203	196	193	191	190	202	204	218	182	163	156	163	182	161	173	180	185	176	198	219	246	191.1
20-May	205	195	200	201	195	181	185	180	184	201	200	190	210	197	179	198	184	170	167	150	160	208	242	201	193.0
21-May	207	220	198	192	195	193	182	180	177	172	194	204	221	229	189	191	240	225	200	181	188	207	285	191	200.0
22-May	217	213	219	207	203	181	183	122	69	40	20	20	22	13	18	11	10	12	21	16	15	3	1	1	14.5
23-May	350	350	358	1	6	9	9	18	8	29	37	43	32	71	105	68	75	86	97	103	57	346	351	327	24.3
24-May	329	332	300	204	214	180	158	108	88	175	138	164	106	77	90	60	352	77	45	85	60	324	310	336	83.9
25-May	297	174	228	209	207	198	178	176	122	107	118	58	158	49	125	190	328	349	351	10	358	3	359	3	19.6
26-May	7	8	6	4	19	18	21	19	26	36	35	47	51	47	20	52	27	25	41	38	50	23	132	300	27.6
27-May	314	193	243	260	132	146	87	359	152	65	62	65	13	7	1	1	8	9	1	12	10	1	4	358	8.5
28-May	355	3	7	4	6	16	358	2	5	7	20	20	20	30	23	35	24	28	24	18	31	44	120	202	15.9
29-May	296	123	137	203	149	154	188	188	154	196	150	165	177	124	108	118	142	163	163	154	160	168	176	168	158.8
30-May	199	228	208	203	205	198	182	180	191	204	195	177	168	166	162	172	150	153	147	144	141	146	159	171	175.4
31-May	172	193	203	229	342	335	156	197	138	163	176	163	186	166	186	192	221	206	148	154	227	253	232	254	189.7
296.2 310.6 291.0 250.9 247.8 207.7 173.9 169.2 154.6 142.1 113.0 105.3 99.1 66.3 87.3 104.7 39.6 70.6 85.0 74.0 41.2 15.1 348.9 308.9																									
Diurnal Average																									

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

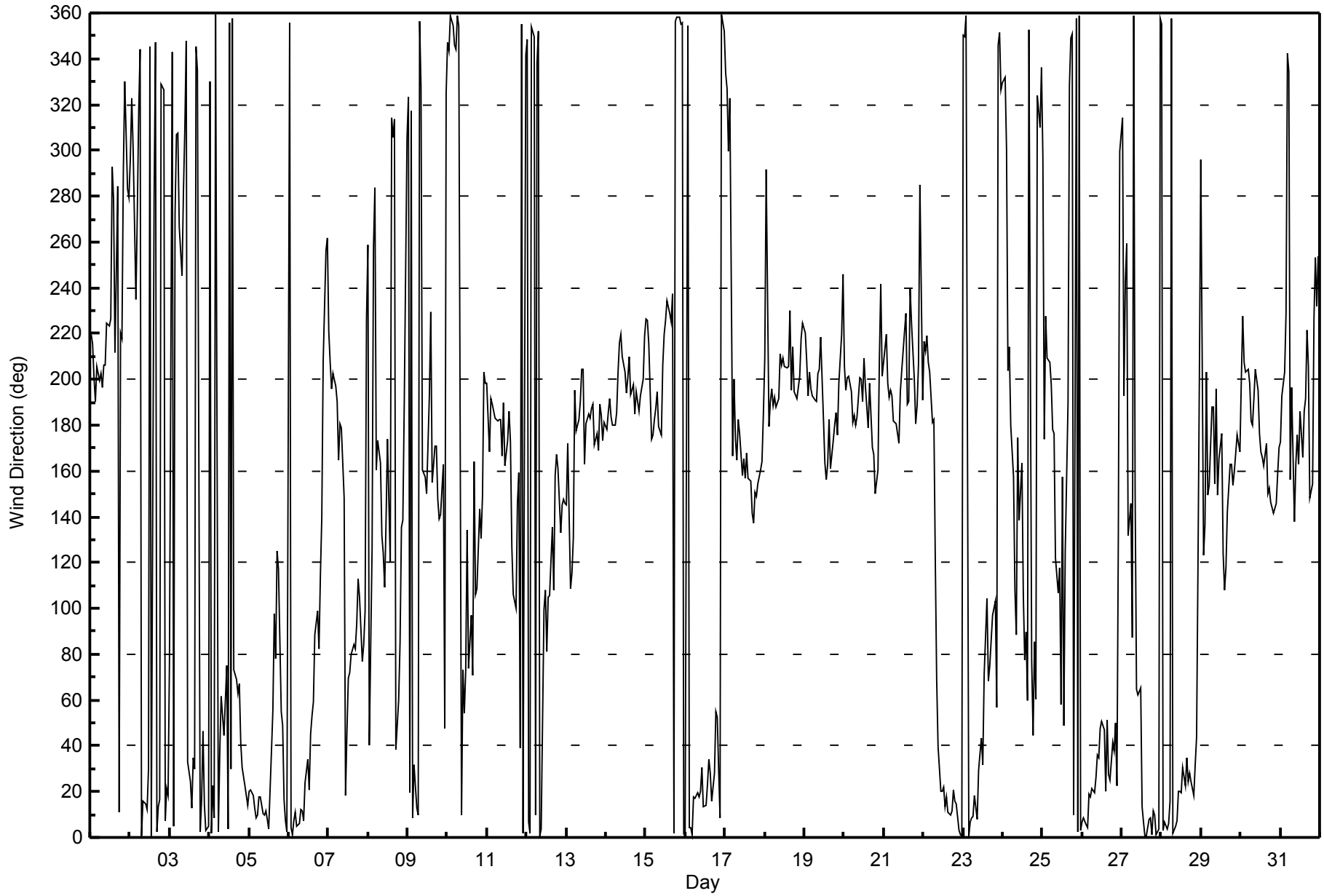
CNRL Horizon - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on May 26 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: 6 deg on May 24 05:00																									
Percentiles: P ₁ = 8 P ₁₀ = 11 Q ₁ = 17 Median = 24 Q ₃ = 40 P ₉₀ = 60 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-May	13	19	12	12	14	16	18	22	24	27	26	33	38	67	28	42	62	28	95	17	18	21	73	16	95
2-May	60	19	25	20	23	24	22	24	28	27	29	30	43	30	37	54	25	20	23	49	24	17	17	18	60
3-May	60	30	19	37	11	21	44	32	41	39	33	21	37	24	23	23	42	18	30	19	16	16	13	11	60
4-May	19	21	83	46	18	18	30	32	34	67	55	58	80	70	64	47	39	37	20	16	15	16	17	16	83
5-May	15	16	15	14	15	18	19	19	19	19	19	19	23	25	37	24	19	27	23	20	14	18	17	24	37
6-May	15	17	18	16	16	17	16	18	18	19	19	18	21	24	19	21	24	24	27	19	29	33	8	12	33
7-May	28	9	11	11	13	17	20	20	29	61	42	55	72	69	42	40	36	34	28	14	8	14	34	40	72
8-May	48	64	88	41	39	54	22	32	56	50	57	55	87	76	44	21	16	87	18	16	29	31	74	9	88
9-May	13	12	16	35	92	26	24	42	35	90	76	82	54	63	81	52	61	36	23	14	8	11	61	17	92
10-May	9	12	15	10	10	15	20	37	59	47	54	41	89	72	77	63	96	75	82	26	7	17	18	40	96
11-May	56	62	11	9	9	11	13	17	21	24	52	48	90	70	81	95	39	60	24	23	34	19	21	21	95
12-May	16	10	17	10	12	13	21	42	36	47	76	86	62	46	73	44	81	39	23	14	16	17	17	17	86
13-May	23	63	79	11	17	26	21	20	24	26	43	39	38	64	43	50	34	19	19	14	10	10	10	7	79
14-May	10	11	12	13	12	12	19	22	27	25	25	26	28	39	33	35	32	25	19	17	11	10	12	17	39
15-May	20	17	19	10	8	12	25	22	23	20	34	33	38	36	43	34	31	57	21	23	22	23	22	23	57
16-May	21	22	22	21	21	21	22	21	22	22	22	23	26	24	23	21	25	29	21	18	13	8	10	10	29
17-May	14	10	77	27	81	21	21	22	26	31	45	38	33	39	35	44	37	34	25	17	10	8	7	10	81
18-May	35	47	16	9	12	13	16	19	22	27	30	31	37	45	43	61	50	51	32	15	9	9	12	14	61
19-May	10	11	10	8	11	15	18	20	28	27	36	47	53	55	51	59	39	27	24	15	10	10	16	29	59
20-May	8	10	8	7	10	13	17	18	26	35	37	36	64	71	52	41	56	81	51	66	39	9	33	35	81
21-May	11	11	16	11	14	19	18	20	23	34	32	57	40	60	71	30	80	60	49	12	8	8	30	92	92
22-May	7	8	40	14	29	24	28	69	48	37	25	23	23	27	30	30	25	24	20	18	17	16	16	13	69
23-May	13	15	16	14	12	16	20	21	27	29	40	43	55	83	49	66	55	45	29	14	37	11	14	11	83
24-May	9	23	17	31	6	34	25	51	72	56	52	44	54	45	43	75	47	58	24	17	24	14	14	8	75
25-May	64	72	30	52	13	26	23	23	36	26	26	70	94	78	40	26	53	31	71	18	21	20	20	18	94
26-May	19	18	18	17	15	25	20	35	24	25	31	31	75	62	97	34	43	33	21	21	16	7	55	35	97
27-May	63	21	57	80	56	51	37	95	85	50	36	47	38	21	22	21	19	19	20	22	21	21	20	19	95
28-May	20	18	18	21	19	21	21	22	23	27	25	27	26	27	35	29	25	23	21	22	19	23	27	51	51
29-May	33	39	29	11	29	29	33	29	35	41	49	64	54	52	40	44	49	41	23	18	9	11	12	13	64
30-May	19	14	15	10	11	17	17	24	28	30	31	43	44	39	44	49	35	33	24	20	16	18	16	14	49
31-May	18	10	10	77	26	19	79	40	43	33	20	18	29	20	25	24	32	45	23	23	35	27	20	16	79
Diurnal Maximum																									



WBEA
Hourly Averages

Wind Direction (WD) - deg
CNRL Horizon - May 2015





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 13, 2015	Last Calibration	April 22, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	15:35
Gas Cert Reference	LL107945	Station temp.	21 Deg C
Cal Gas Concentration	50.3 ppm	Cal Gas Exp Date	06/11/2014
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG Make/Model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-622	NA
Analyzer IP address	192.168.1.43		Lamp voltage	844	NA
Calculated slope	0.998596	0.983194	Chamber temp	44.9	NA
Calculated intercept	0.517985	-0.137647	Pressure	703.0	NA
Analyzer Background	17.6	NA	Flow	0.424	NA
Analyzer Coefficient	0.966	NA	Intensity	91	NA

Analyzer make Thermo 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	0.0	----
as found span	5000	82.3	827.9	842.2	0.983
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	82.3	827.9	842.2	0.983
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.983

Corrected As found 842.2 Previous response 828.6 % change -1.6%

Notes:

Cal gas change after As Finds. Calibration continued on CAL(2) form

Calibration Performed By: Ryan Power



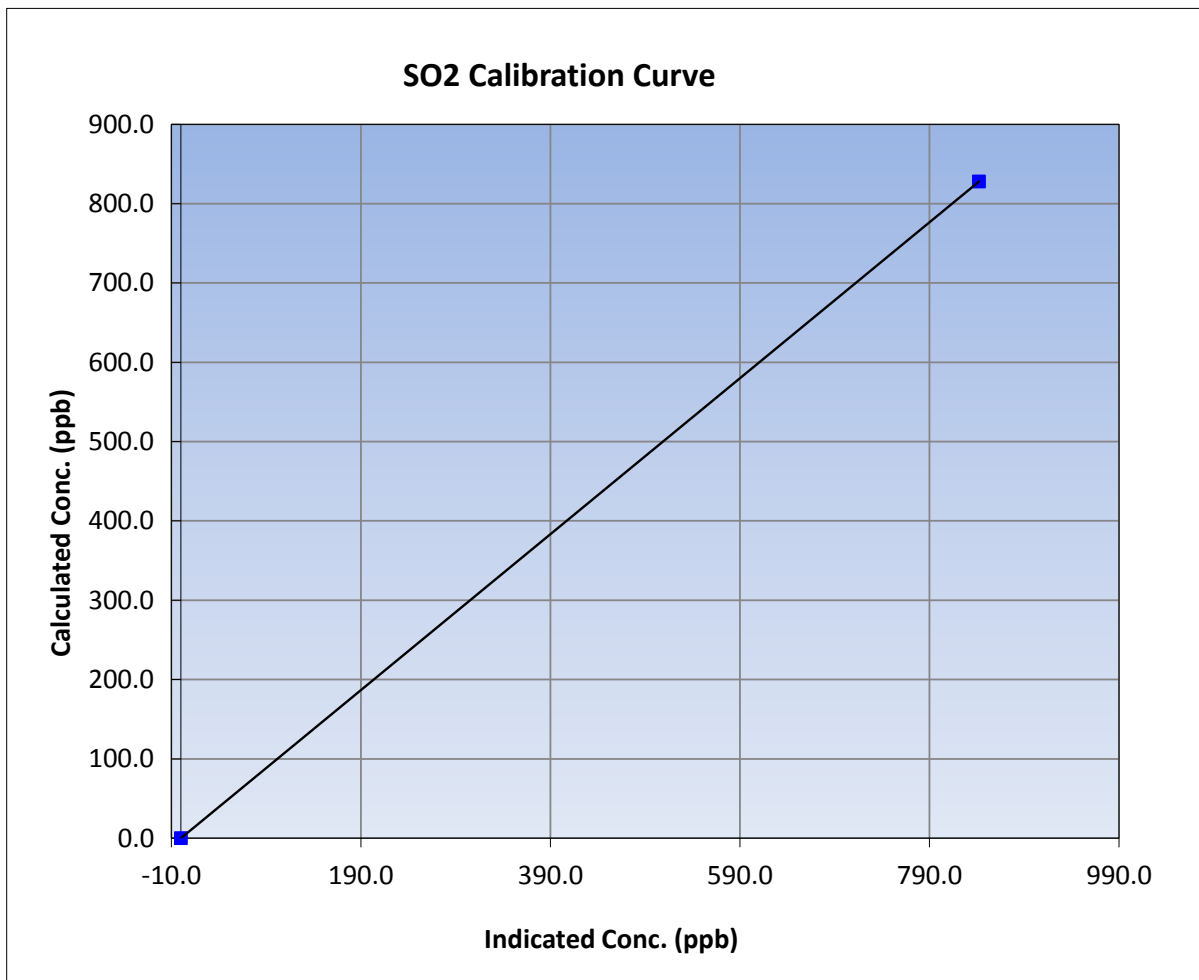
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 13, 2015	Previous Calibration	April 22, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:00	End Time (MST)	15:35
Analyzer make	Thermo 43i	Analyzer serial #	10710321322

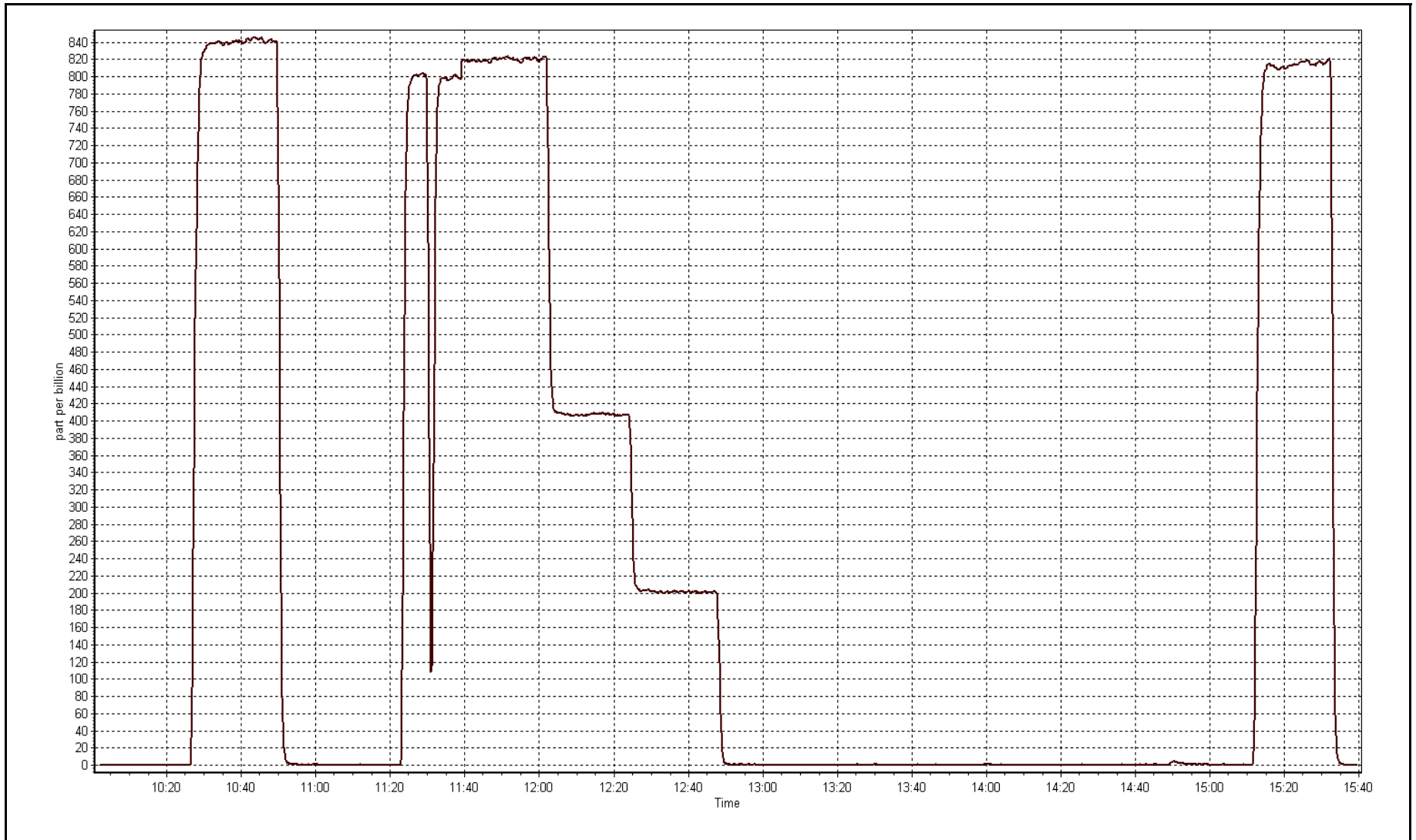
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	1.000000
827.9	842.2	0.9830		
			Slope	0.983194
			Intercept	-0.137647



SO2 Calibration Plot

Date: May 13, 2015





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 13, 2015	Last Calibration	April 22, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	15:35
Gas Cert Reference	S0002486	Station temp.	21 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26/09/2017
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG Make/Model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	NA	-622
Analyzer IP address	192.168.1.43		Lamp voltage	NA	844
Calculated slope	0.983194	0.996242	Chamber temp	NA	44.9
Calculated intercept	-0.137647	1.685493	Pressure	NA	706.3
Analyzer Background	NA	18.0	Flow	NA	0.427
Analyzer Coefficient	NA	0.990	Intensity	NA	91

Analyzer make Thermo 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	0.1	----
as found span	5000	81.8	818.0	802.3	1.020
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	81.8	818.0	820.3	0.997
second point	5000	40.9	409.0	407.8	1.003
third point	5000	20.4	204.0	201.4	1.013
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	81.8	818.0	814.4	1.004
Average Correction Factor					1.004

Corrected As found 802.2 Previous response 832.1 % change 3.7%

Notes:

Filter and calibration gas changed after As Found.

Calibration Performed By: Ryan Power



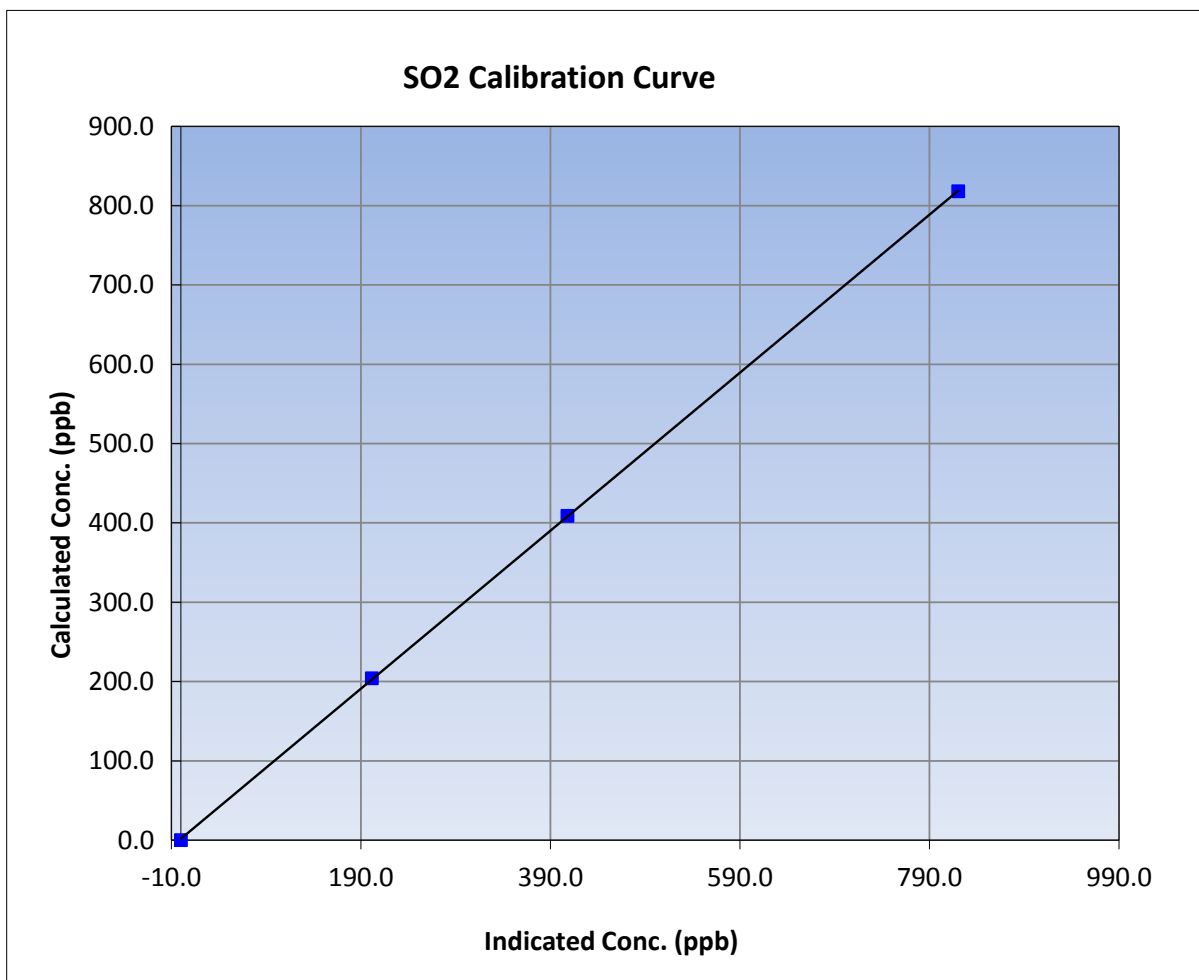
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 13, 2015	Previous Calibration	April 22, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:00	End Time (MST)	15:35
Analyzer make	Thermo 43i	Analyzer serial #	10710321322

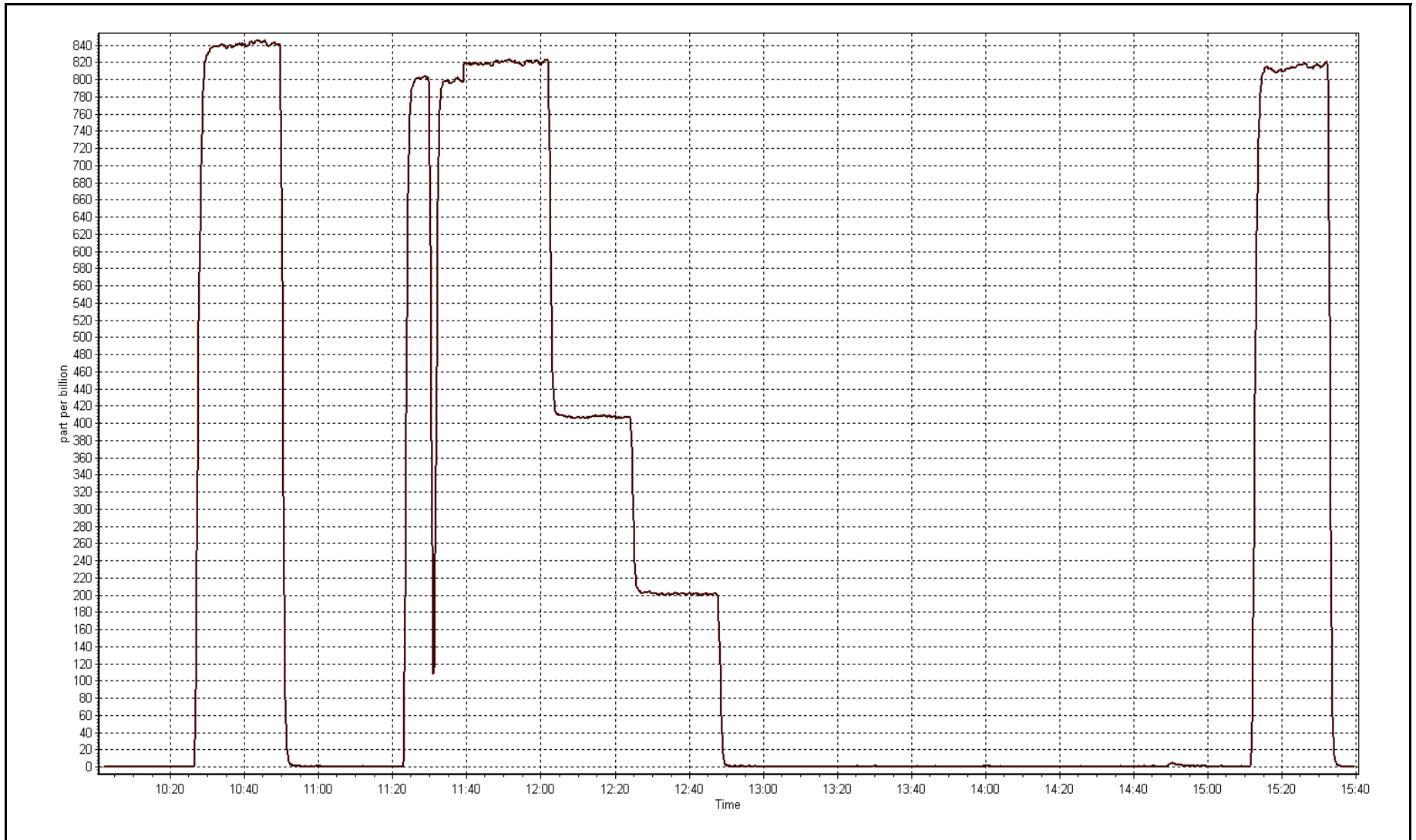
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999978
818.0	820.3	0.9972		
409.0	407.8	1.0030	Slope	0.996242
204.0	201.4	1.0129		
			Intercept	1.685493



SO2 Calibration Plot

Date: May 13, 2015





Wood Buffalo Environmental Association TRS Calibration Report

Station Information

Calibration Date	May 14, 2015	Last Calibration	April 21, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:50	End Time (MST)	13:20
Gas Cert Reference	LL155297	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	30/05/2013
Calibrator Make/Model	API T700	Serial Number	1223
Dil air Make/Model	API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S0002486 26/Sep/17

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-672	-672
Analyzer IP address	192.168.1.42		Lamp voltage	763	764
Calculated slope	1.001422	0.993327	Chamber temp	45	45
Calculated intercept	-0.276777	-0.105743	Pressure	691.8	687.6
Analyzer Background	9.1	9.1	Flow	0.421	0.417
Analyzer Coefficient	0.917	0.91	Intensity	89	91
			Converter temp.	809	810

Analyzer make/model	Thermo 43i	Analyzer serial #	0710321323
Converter make/model	CDN-101	Converter serial #	363

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.1	----
as found span	6000	46.2	80.1	80.7	0.992
SO2 scrubber check	6000	24.5	204.2	0.8	----
calibrator zero	6000	0.0	0.0	0.1	----
high point	6000	46.2	80.1	80.8	0.991
second point	6000	23.1	40.0	40.2	0.996
third point	6000	11.5	19.9	20.3	0.984
as left zero	6000	0.0	0.0	0.2	----
as left span	6000	46.2	80.1	80.8	0.991
Average Correction Factor					0.990

Corrected As found	80.6	Previous response	80.2	% change	-0.4%
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Notes:

Scrubber check after filter change. As Found Zero used as Calibrator Zero. Span with a small adjustment

Calibration Performed By: Ryan Power



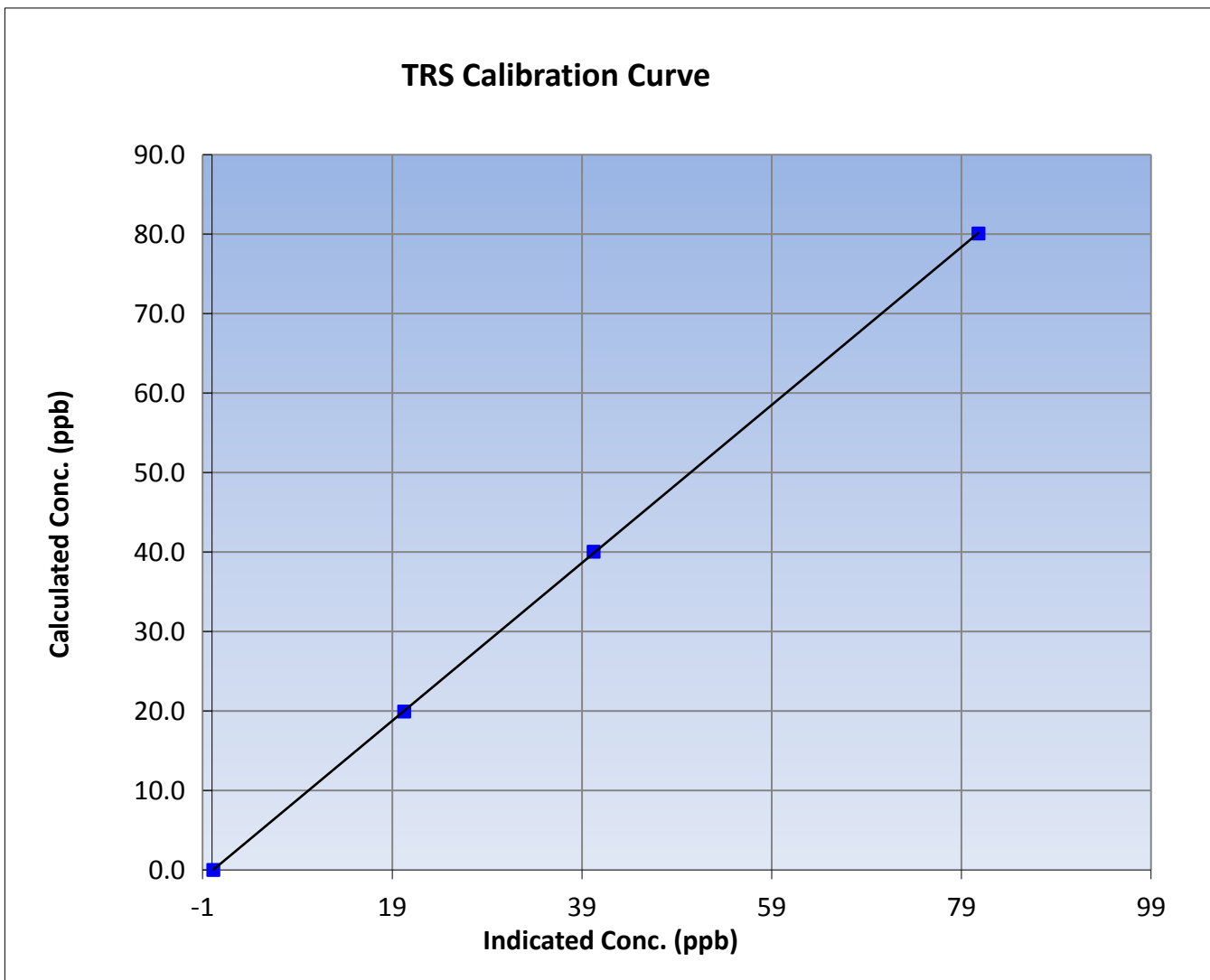
Wood Buffalo Environmental Association TRS Calibration Report

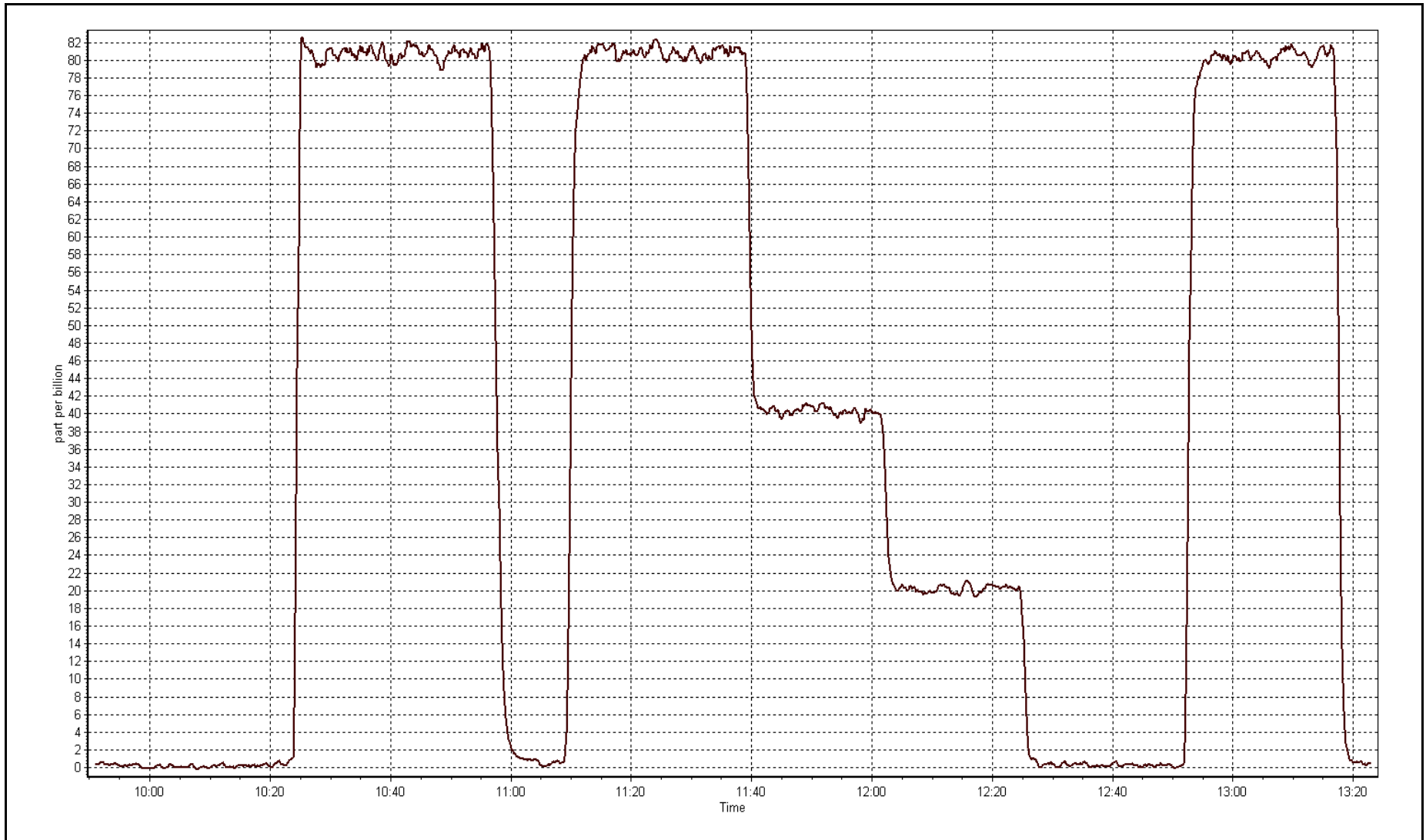
Station Information

Calibration Date	May 14, 2015	Previous Calibration	April 21, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:50	End Time (MST)	13:20
Analyzer make	Thermo 43i	Analyzer serial #	0710321323

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999985
80.1	80.8	0.9911		
40.0	40.2	0.9955	Slope	0.993327
19.9	20.3	0.9839		
			Intercept	-0.105743







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-13-15	Last Calibration	April-22-15
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	15:35
Gas Cert Reference	LL107945	Cal Gas Expiry Date	06/11/2014
CH4 Cal Gas Conc.	490 ppm	CH4 Equiv Conc.	1062.0 ppm
C3H8 Cal Gas Conc.	208 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG make/model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	Serial Number	2580

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.7	NA
Analyzer IP address	192.168.1.51		Air or Bypass Press	38.0	NA
Calculated slope	1.001600	0.942346	Fuel Pressure	26.3	NA
Calculated intercept	-0.045586	0.009423	Analyzer Coeff	0.28	NA
			Analyzer BKG	3.289	NA

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

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.15	----
as found span	5000	82.3	17.48	18.54	0.943
calibrator zero	5000	0.0	0.00	-0.01	----
high point	5000	82.3	17.48	18.54	0.943
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.943

Corrected As found	18.69	Previous response	17.50	% change	-6.4%
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Notes:

Cal gas change after As Finds. Calibration continued on CAL(2) form

Calibration Performed By: Ryan Power



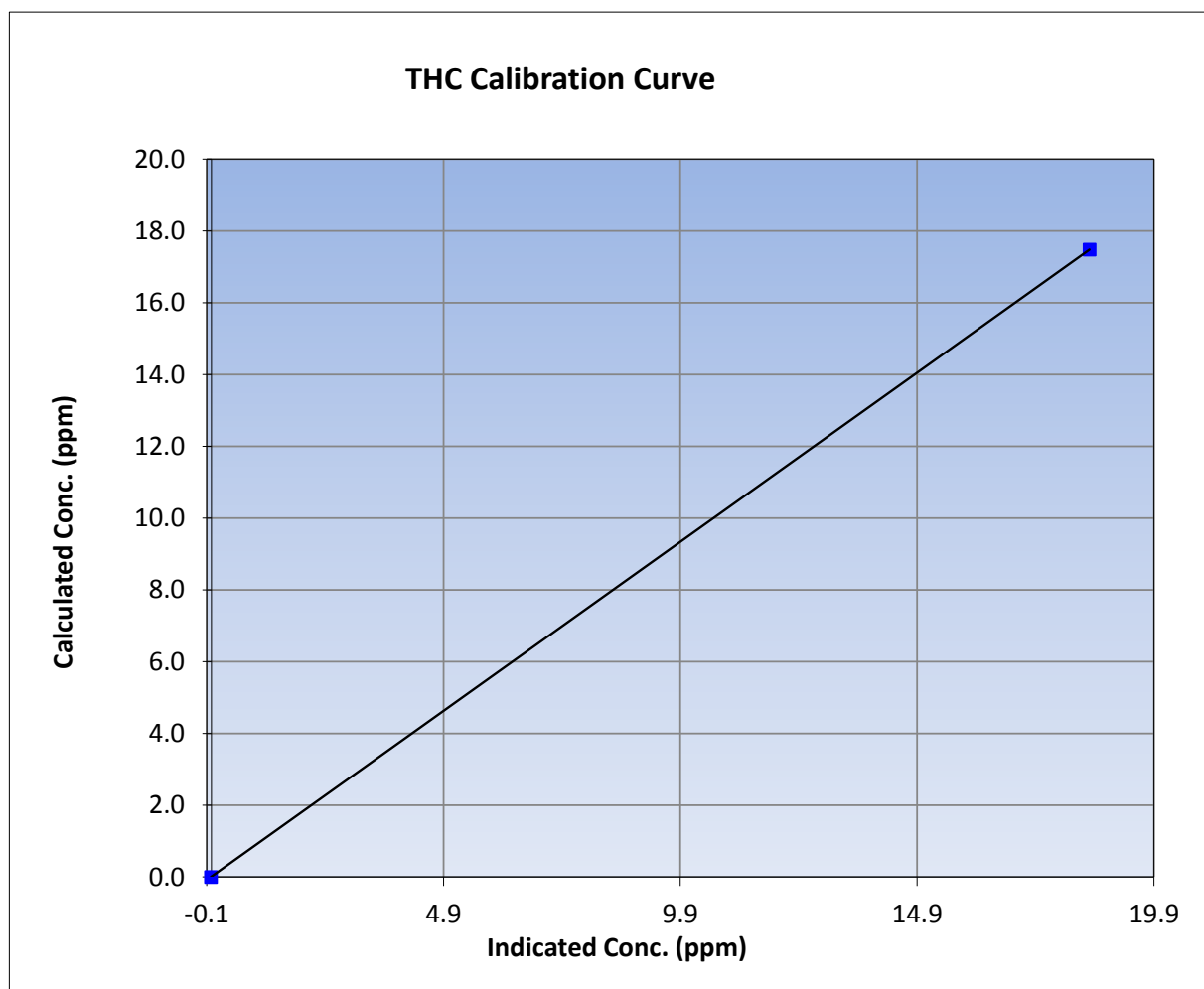
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 13, 2015	Previous Calibration	April 22, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:00	End Time (MST)	15:35
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295

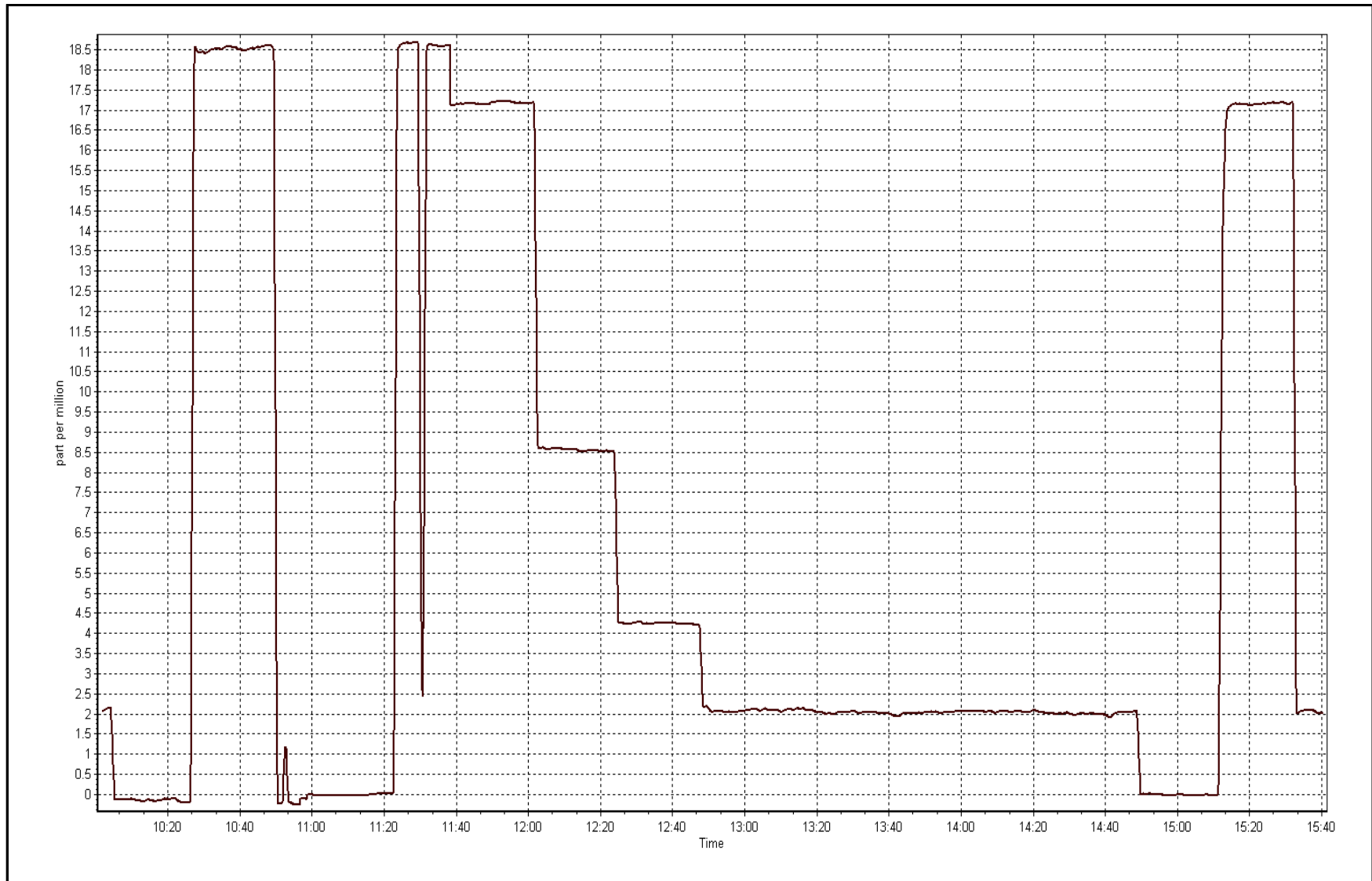
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	----	Correlation Coefficient	1.000000
17.48	18.54	0.9429		
			Slope	0.942346
			Intercept	0.009423



THC Calibration Plot

Date: May 13, 2015





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-13-15	Last Calibration	April-22-15
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	15:35
Gas Cert Reference	S0002486	Cal Gas Expiry Date	26/09/2017
CH4 Cal Gas Conc.	505 ppm	CH4 Equiv Conc.	1046.8 ppm
C3H8 Cal Gas Conc.	197 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG make/model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	Serial Number	2580

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	NA	8.7
Analyzer IP address	192.168.1.51		Air or Bypass Press	NA	38.0
Calculated slope	0.942346	0.995164	Fuel Pressure	NA	26.3
Calculated intercept	0.009423	0.035721	Analyzer Coeff	NA	0.02
			Analyzer BKG	NA	3.026

Analyzer make Thermo 51i-LT Analyzer serial # 1327059295

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.01	----
as found span	5000	81.8	17.12	18.63	0.919
calibrator zero	5000	0.0	0.00	-0.01	----
high point	5000	81.8	17.12	17.19	0.996
second point	5000	40.9	8.56	8.54	1.003
third point	5000	20.4	4.27	4.24	1.007
as left zero	5000	0.0	0.00	-0.02	----
as left span	5000	81.8	17.12	17.16	0.998
Average Correction Factor					1.002

Corrected As found 18.64 Previous response 18.16 % change -2.6%

Notes:

Filter and calibration gas changed after As Finds. High percent change due to annual pump change last month for preventative maintenance.

Calibration Performed By:

Ryan Power



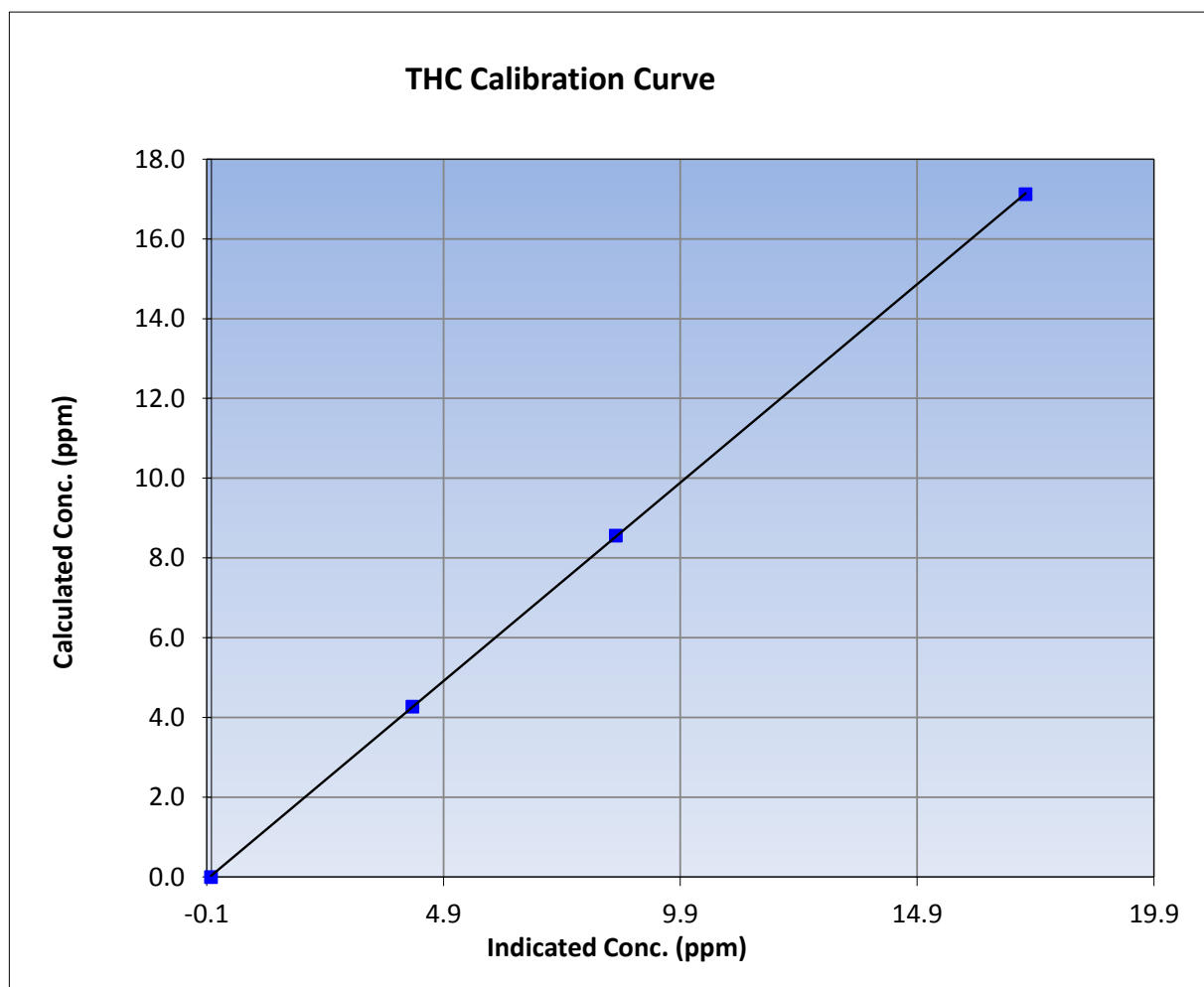
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 13, 2015	Previous Calibration	April 22, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:00	End Time (MST)	15:35
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295

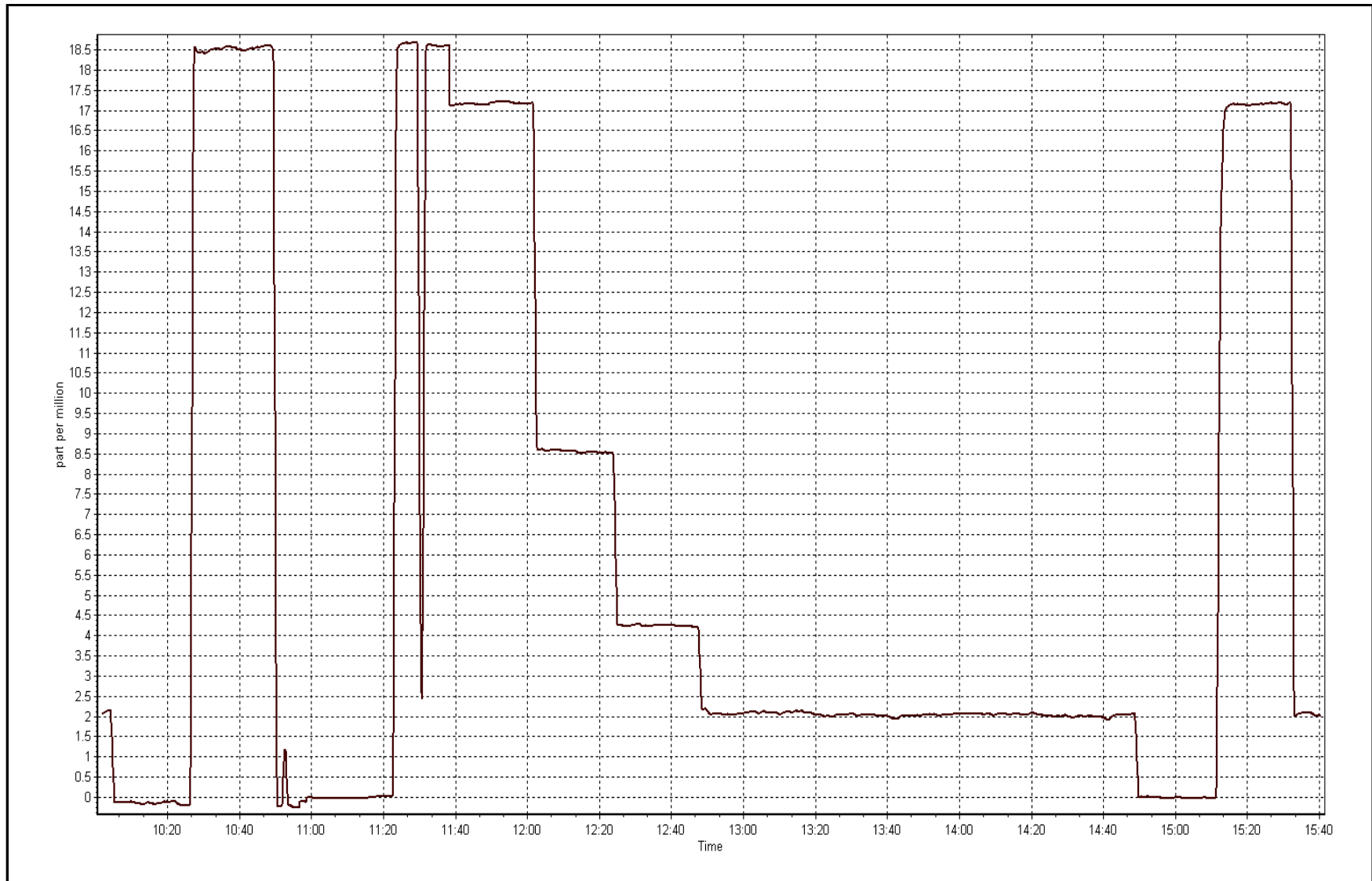
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	----	Correlation Coefficient	0.999988
17.12	17.19	0.9962		
8.56	8.54	1.0026	Slope	0.995164
4.27	4.24	1.0073		
			Intercept	0.035721



THC Calibration Plot

Date: May 13, 2015





Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 13, 2015	Previous Calibration	April 22, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	15:35
NO Cal Gas Conc	48.6 ppm	Gas Cert Reference	LL107945
NOx Cal Gas Conc	48.6 ppm	Cal Gas Expiry Date	06/11/2014
Calibrator	Teledyne API T700	Serial Number	1223
Zero air Generator	Teledyne API T701	Serial Number	1004

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2580
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998595	1.001349	0.996774
	Data Offset	0.332651	0.396779	-1.352615
Current Calibration	Data Slope	0.973763	0.976700	
	Data Offset	0.155802	0.117204	

Analyzer Information

Analyzer make/model	Termo 42i	Analyzer serial #	710321429
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.819		NA	
NOx coefficient	1.003		NA	
NO2 coefficient	1.000		NA	
NO bkgrnd	10.0		NA	
NOx bkgrnd	10.2		NA	
Chamber Temp	49.8	Deg C	NA	Deg C
Moly Temp	326	Deg C	NA	Deg C
PMT voltage	-784	V	NA	V
PMT Temp	-3	Deg C	NA	Deg C
O3 flow	ok	ccm	NA	ccm
R Cell press NO	164.1	mmHg	NA	mmHg
R Cell Press Nox	164.5	mmHg	NA	mmHg
NO sample flow	0.711	lpm	NA	lpm
Nox sample Flow	0.713	lpm	NA	lpm

Notes:

Cal gas change after As Found. Calibration data continues on CAL(2) form



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 13, 2015

Station Number:

AMS 15

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.0	----	----
as found span	5000	82.3	800.0	800.0	0.0	821.4	818.9	2.4	0.9740	0.9768
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	0.0	----	----
high point	5000	82.3	800.0	800.0	0.0	821.4	818.9	2.4	0.9740	0.9768
second point										
third point										
as left zero										
as left span										
Average Correction Factor									0.9740	0.9768

Corrected As found

NO_x= 821.2

NO= 818.8

Percent Change

NO_x= -2.5%

NO= -2.5%

Previous Response

NO_x= 800.7

NO= 798.5

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

82.30

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)										
2nd NO2 (200)										
3rd NO2 (100)										
4th NO2 (0)										
Average Correction Factor										

Calibration Performed By:

Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

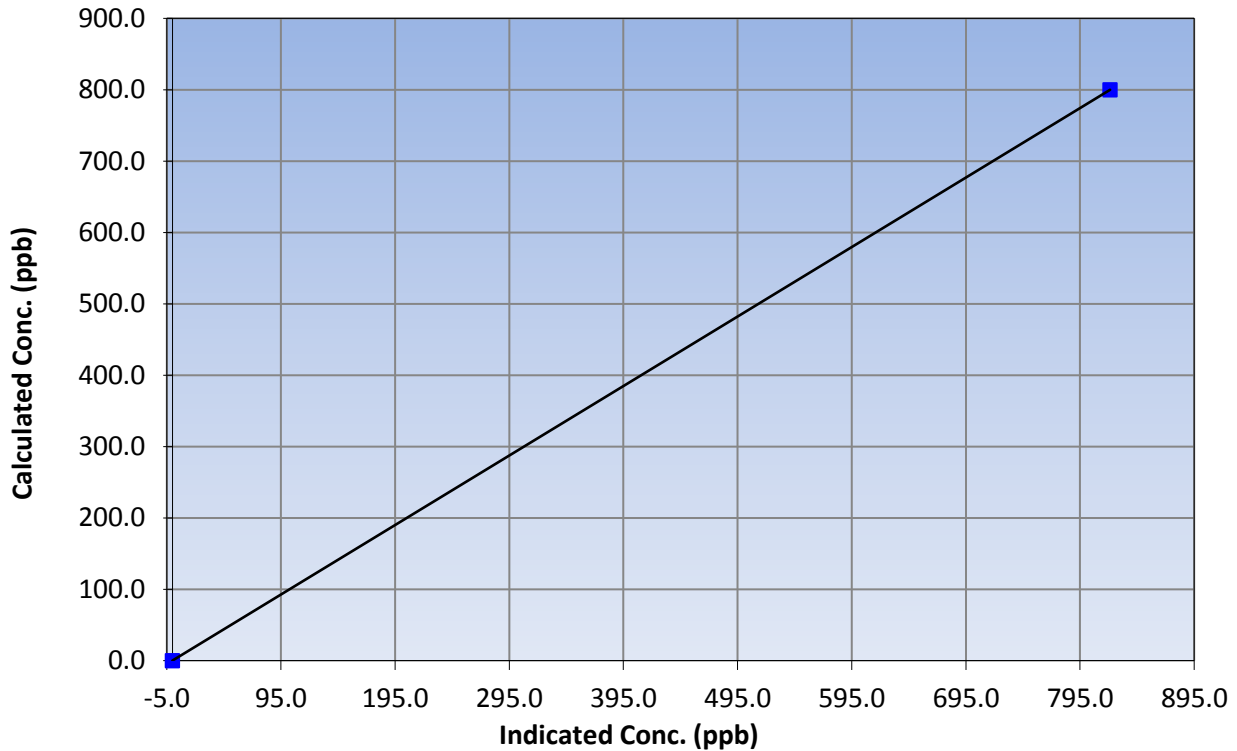
Station Information

Calibration Date	May 13, 2015	Previous Calibration	April 22, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:00	End Time (MST)	15:35
Analyzer make	Termo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	1.000000
800.0	821.4	0.9740		
			Slope	0.973763
			Intercept	0.155802

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

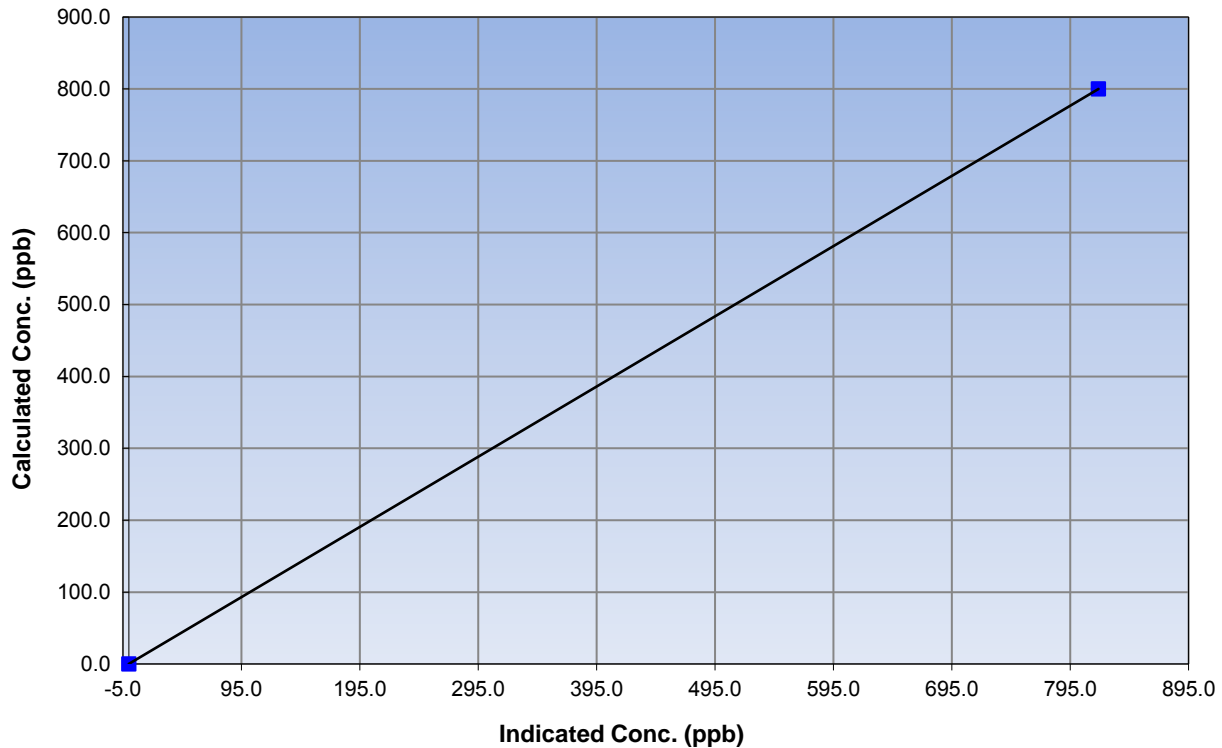
Station Information

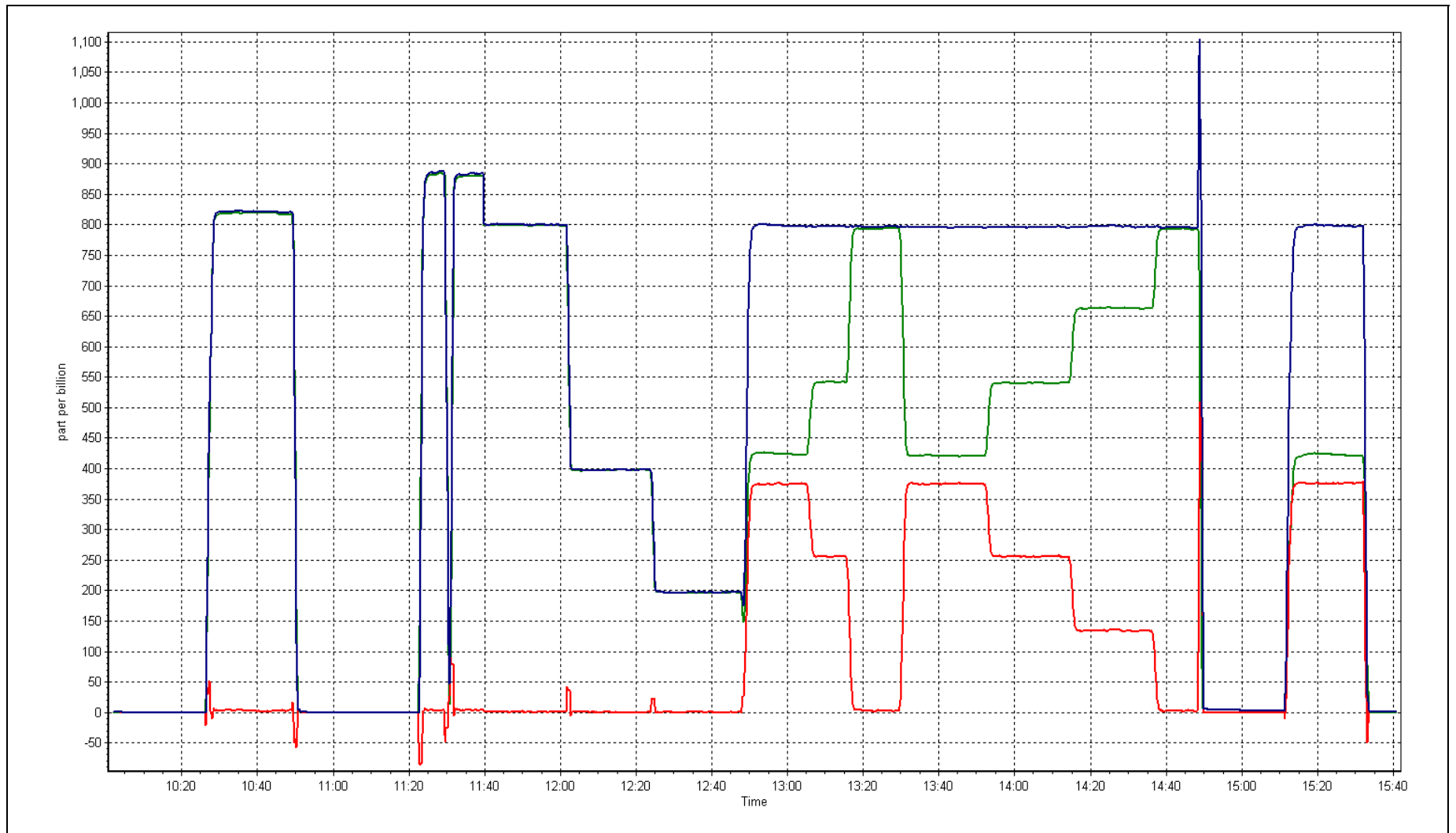
Calibration Date	May 13, 2015	Previous Calibration	April 22, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:00	End Time (MST)	15:35
Analyzer make	Termo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	1.000000
800.0	818.9	0.9768		
			Slope	0.976700
			Intercept	0.117204

NO Calibration Curve







Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 13, 2015	Previous Calibration	April 22, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	15:35
NO Cal Gas Conc	48.9 ppm	Gas Cert Reference	S0002486
NOx Cal Gas Conc	48.9 ppm	Cal Gas Expiry Date	26/09/2017
Calibrator	Teledyne API T700	Serial Number	1223
Zero air Generator	Teledyne API T701	Serial Number	1004

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2580
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.973763	0.976700	0.996774
	Data Offset	0.155802	0.117204	-1.352615
Current Calibration	Data Slope	0.999108	1.000460	0.995692
	Data Offset	1.560371	1.454331	-1.108707

Analyzer Information

Analyzer make/model	Termo 42i	Analyzer serial #	710321429
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	NA		0.745	
NOx coefficient	NA		1.001	
NO2 coefficient	NA		1.000	
NO bkgrnd	NA		9.2	
NOx bkgrnd	NA		9.4	
Chamber Temp	NA	Deg C	50.1	Deg C
Moly Temp	NA	Deg C	326.6	Deg C
PMT voltage	NA	V	-784	V
PMT Temp	NA	Deg C	-3.1	Deg C
O3 flow	NA	ccm	ok	ccm
R Cell press NO	NA	mmHg	166.2	mmHg
R Cell Press Nox	NA	mmHg	166.5	mmHg
NO sample flow	NA	lpm	0.719	lpm
Nox sample Flow	NA	lpm	0.720	lpm

Notes:

Filter and calibration gas changed after As Found.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 13, 2015

Station Number:

AMS 15

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	0.0	----	----
as found span	5000	81.8	800.0	800.0	0.0	886.0	882.4	3.6	0.9029	0.9066
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	0.0	----	----
high point	5000	81.8	800.0	800.0	0.0	799.9	798.8	1.1	1.0001	1.0015
second point	5000	40.9	400.0	400.0	0.0	397.9	397.9	0.1	1.0052	1.0053
third point	5000	20.4	199.5	199.5	0.0	196.8	196.5	0.3	1.0136	1.0152
as left zero	5000	0.0	0.0	0.0	0.0	3.0	3.0	0.0	----	----
as left span	5000	81.8	800.0	420.7	379.3	798.5	422.7	375.7	1.0019	0.9952
Average Correction Factor									1.0063	1.0074

Corrccted As found NO_x= 886.2 NO= 882.5 Percent Change NO_x= -7.3% NO= -7.2%
 Previous Response NO_x= 821.4 NO= 819.0

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 81.80 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	420.7	372.9	795.7	420.7	375.0	0.9892	1.0000	0.9943	100.6%
2nd NO2 (200)	----	540.1	253.5	795.7	540.1	255.6	0.9892	1.0000	0.9916	100.8%
3rd NO2 (100)	----	662.9	130.7	797.1	662.9	134.2	0.9875	1.0000	0.9740	102.7%
4th NO2 (0)	793.6	----	2.8	796.4	793.6	2.9	0.9883	1.0000	N/A	----
Average Correction Factor							0.9886	1.0000	0.9866	101.4%

Calibration Performed By: Ryan Power



Wood Buffalo Environmental Association

NO_x Calibration Summary

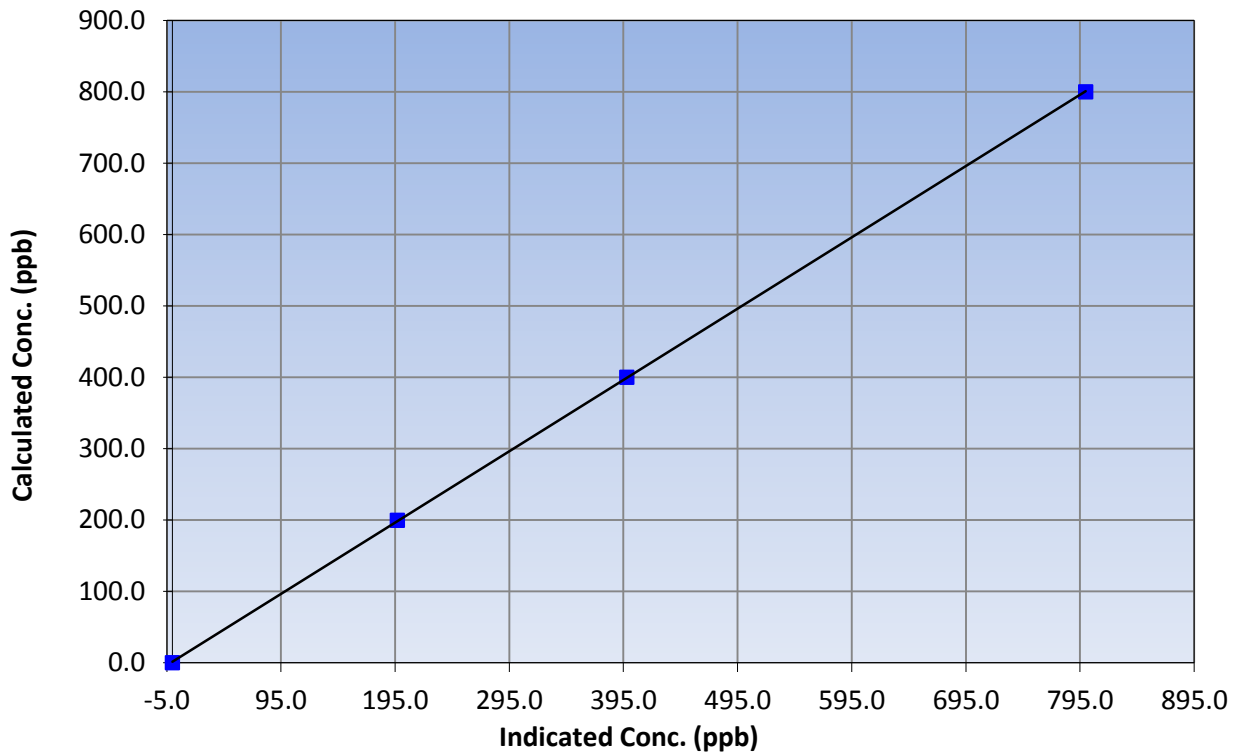
Station Information

Calibration Date	May 13, 2015	Previous Calibration	April 22, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:00	End Time (MST)	15:35
Analyzer make	Termo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999986
800.0	799.9	1.0001		
400.0	397.9	1.0052	Slope	0.999108
199.5	196.8	1.0136		
			Intercept	1.560371

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

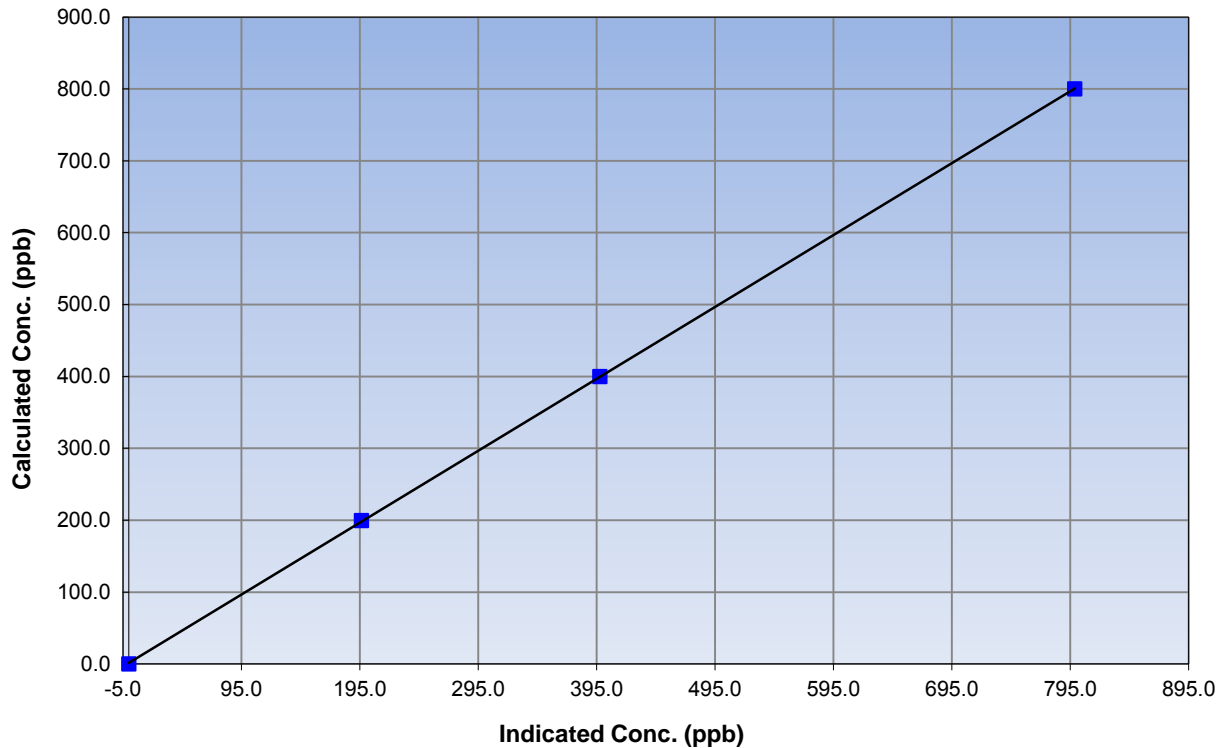
Station Information

Calibration Date	May 13, 2015	Previous Calibration	April 22, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:00	End Time (MST)	15:35
Analyzer make	Termo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999987
800.0	798.8	1.0015		
400.0	397.9	1.0053	Slope	1.000460
199.5	196.5	1.0152		
			Intercept	1.454331

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

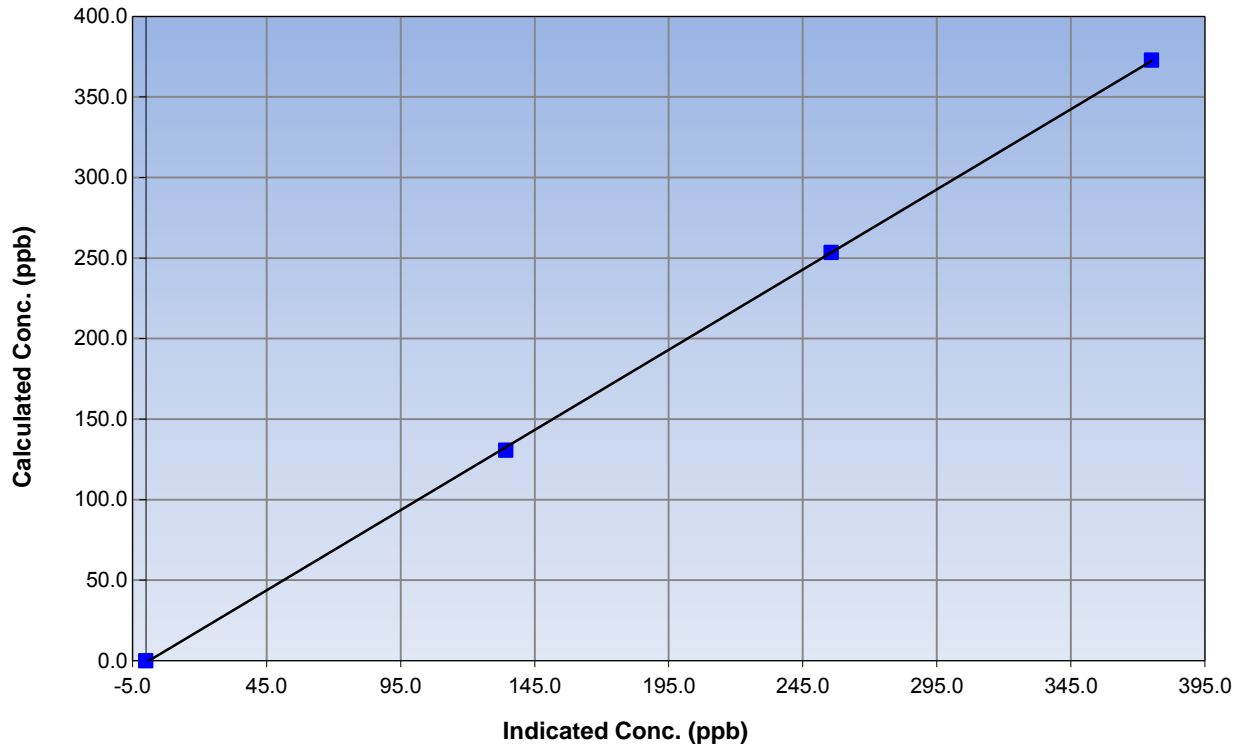
Station Information

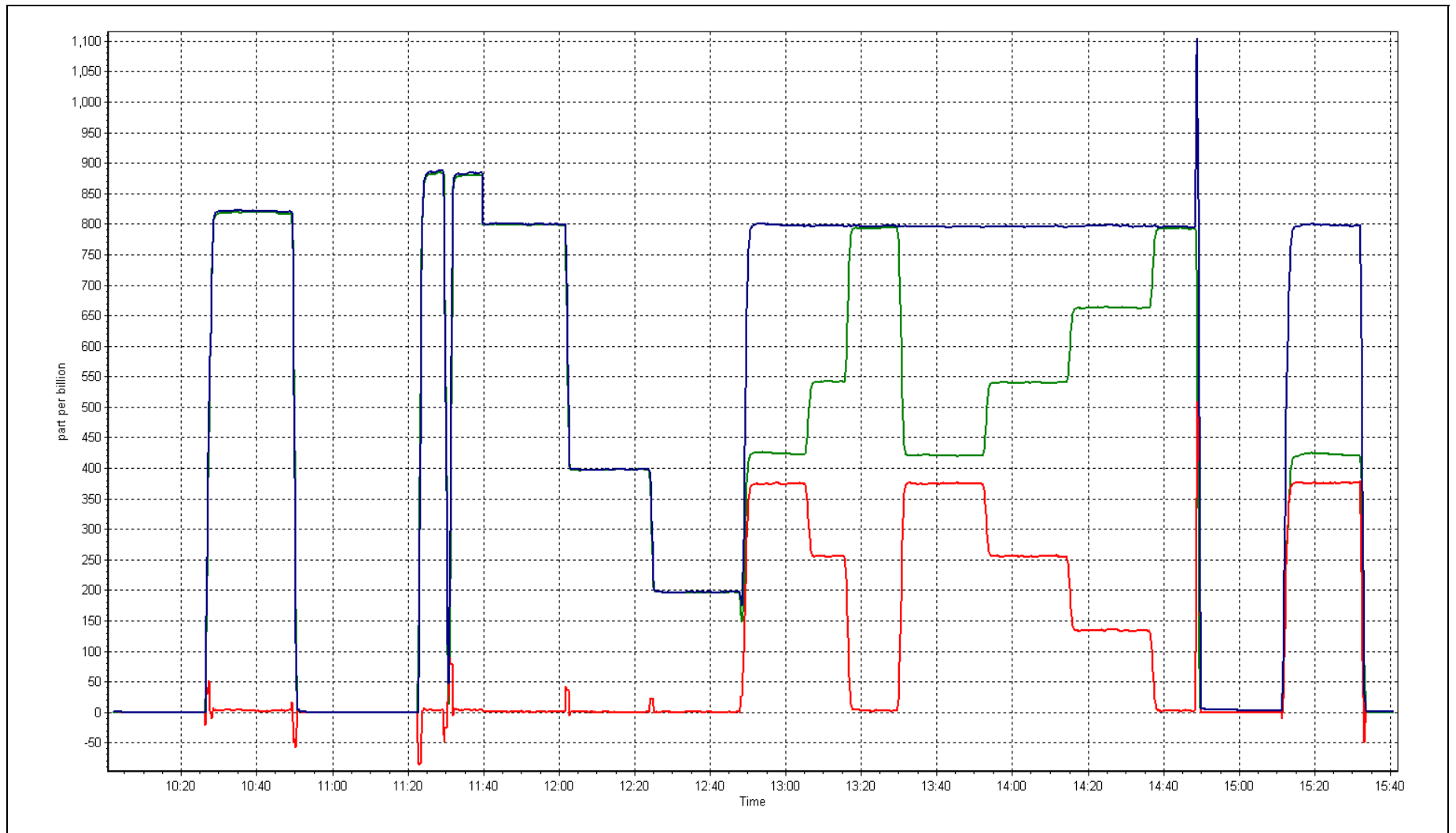
Calibration Date	May 13, 2015	Previous Calibration	April 22, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:00	End Time (MST)	15:35
Analyzer make	Termo 42i	Analyzer serial #	710321429

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999936
372.9	375.0	0.9943		
253.5	255.6	0.9916	Slope	0.995692
130.7	134.2	0.9740		
			Intercept	-1.108707

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CALIBRATION

STATION INFORMATION

Calibration Date:	<u>May 14, 2015</u>	Previous Calibration:	<u>April 8, 2015</u>
Station Name:	<u>CNRL Horizon</u>	Station Number:	<u>AMS 15</u>
Start Time (MST):	<u>13:15</u>	End Time (MST):	
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>1212</u>

SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number:	
Source SN:	
HEPA PN:	
Time Correct (MST):	
Parameters Checked:	<u>T1, T2, T2,T4, P3, Main Flow, Beta, Neph</u>

CALIBRATION DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	23.0	23.5	0.5	23.0
T2	26.0	na	na	26.0
T3	24.0	na	na	24.0
T4	23.0	na	na	23.0
RH (%)	20.0	na	na	20.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	975	978.0	3.0	975

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1000	0	1000	1000

Nephelometer Calibration

Parameter	As Found	Zeroed (Limit +/- 2.0ug/m3)	As Left
Analog	167		167
Neph	0.3		0.3
C14	13.4		13.4
Indicated Concentration (ug/m3)		no	
Offset 1	NA		NA
Offset 2	NA		NA

Leak Check (Quarterly)

Leak Check Date:	<u>May 14, 2015</u>	Previous Leak Check Date:	NA
	<u>Measured</u>	<u>Difference LPM (Limit +/- 0.42 LPM)</u>	
Flow without adaptor (LPM):	16.68	0.18	
Flow with adaptor [turn off pump first](LPM):	16.50		

Mass Foil Calibration (Annually)

Foil Calibration Date:	<u>NA</u>	Previous Foil Calibration:	NA
Zeroed?:			
Foil Mass:			<u>Mass foil set S/N:</u>
Previous Correction Factor:			
New Correction Factor:			

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	14/05/2015
Pump	Good	09/06/2014
Filter Tape	Good	09/06/2014
Mass Foil Cal Set	na	NA
HEPA filter	Good	09/06/2014

NOTES:

No adjustments.

Calibration Performed By: Ryan Power



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 16
SHELL MUSKEG RIVER
MAY 2015**

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

June 29, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
MAY 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	708	36	36	100.00	15	0	3	0
THC (ppm) Average	708	36	36	100.00	3.5	-	2.8	-
NO2 (ppb) Average	708	36	36	100.00	39	0	14	-
NO (ppb) Average	708	36	36	100.00	43	-	9	-
NOX (ppb) Average	708	36	36	100.00	82	-	18	-
PM2.5 (ug/m3) Average	726	0	18	97.58	217	-	44.8	4
Temperature 2 m (C) Average	744	0	0	100.00	28.2	-	19	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	87	-
Barometric Pressure (inHg) Average	744	0	0	100.00	29.5	-	29.4	-
Wind Speed 10 m (km/h) Average	740	0	4	99.46	32	-	20	-
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 - SHELL MUSKEG RIVER (AMS 16)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	708	1.3	2	-	0	0	0	0	1	4	15
THC (ppm) Average	708	2.3	0.3	-	1.8	2	2.1	2.3	2.4	2.6	3.5
NO2 (ppb) Average	708	7.9	7	-	0	1	2	5	11	19	39
NO (ppb) Average	708	2.7	4	-	0	0	0	1	4	8	43
NOX (ppb) Average	708	10.6	11	-	0	1	3	7	16	25	82
PM2.5 (ug/m3) Average	726	13.74	22.5	-	0.8	2.5	4	7.2	14.2	28.8	217
Temperature 2 m (C) Average	744	11.09	8	-	-4.7	1.3	4.5	10.1	16.8	23.4	28.2
Relative Humidity (%) Average	744	48.3	23	-	10	19	30	46	66	81	99
Barometric Pressure (inHg) Average	744	29.01	0.2	-	28.5	28.7	28.9	29	29.1	29.3	29.5
Wind Speed 10 m (km/h) Average	740	10.1	5	-	0	4	6	9	13	18	32
Wind Direction 10 m (deg) Average	740	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)
MAY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	06 May 2015 13:00	06 May 2015 15:00	3	Maintenance - Flow and zero check, sample head cleaning
PM2.5	25 May 2015 10:00	25 May 2015 13:00	4	Maintenance - Flow and zero check, sample head cleaning
PM2.5	26 May 2015 00:00	26 May 2015 10:00	11	Analyzer failure - sample filter broke
Wind Speed, Wind Direction	11 May 2015 20:00	11 May 2015 20:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	20 May 2015 20:00	20 May 2015 20:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	23 May 2015 20:00	23 May 2015 20:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	24 May 2015 18:00	24 May 2015 18:00	1	Flat line in sensor output signal



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 15 ppb on May 8 09:00	Maximum Daily Average: 3.5 ppb on May 8		Hours of Data:	708
Minimum Value: 0 ppb on May 1 20:00	Minimum Daily Average: 0.2 ppb on May 2		Hours of Missing Data:	36
Maximum Diurnal Average: 2.7 ppb at hour 9	Minimum Diurnal Average: 0.3 ppb at hour 3		Hours of Calibration:	36
Monthly Average: 1.3 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 4 P ₉₉ = 10		Percent Operational Time:	100.0

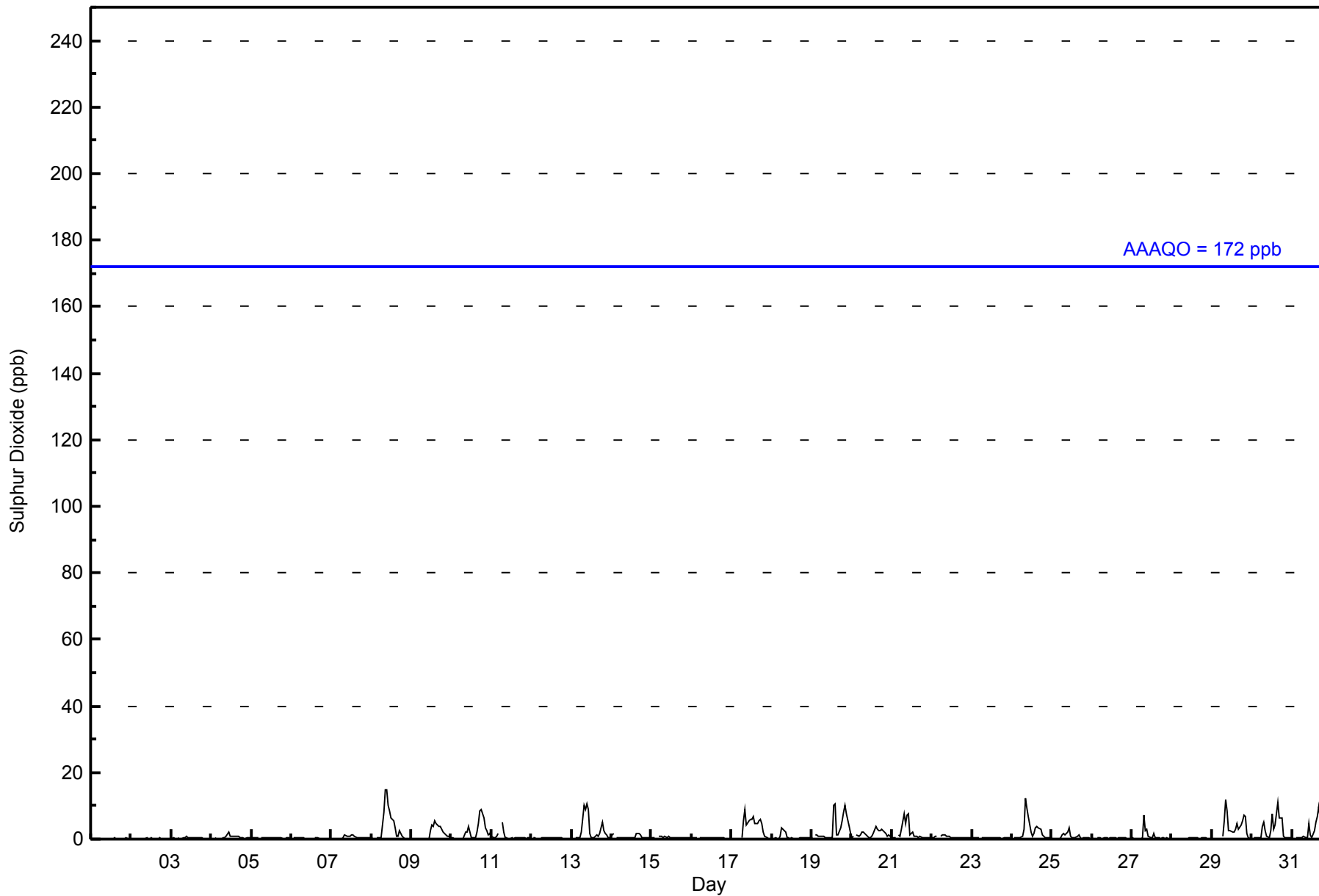
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1																						
2-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																					
3-May	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	0.3	1																					
4-May	0	0	0	0	Z	0	0	0	0	1	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	2																					
5-May	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																					
6-May	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0																					
7-May	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1																					
8-May	0	0	Z	0	0	0	0	8	15	15	10	9	6	6	3	1	1	3	1	0	0	0	0	0	0	3.5	15																					
9-May	0	0	0	Z	0	0	0	0	0	0	0	3	4	4	6	5	4	4	3	2	2	1	1	0	1.7	6																						
10-May	0	0	0	0	Z	0	0	0	2	2	4	2	1	0	0	2	5	8	9	6	4	2	1	1	2.3	9																						
11-May	1	0	0	1	2	Z	5	2	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0.7	5																						
12-May	Z	0	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																						
13-May	0	Z	0	0	0	1	2	10	9	11	9	2	1	1	1	1	1	2	5	3	2	1	0	1	2.7	11																						
14-May	1	2	Z	1	1	1	1	0	0	0	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0.6	2																						
15-May	0	0	0	Z	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0.5	1																						
16-May	0	0	0	0	Z	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1																						
17-May	0	0	0	0	0	Z	1	6	9	4	6	6	7	5	5	5	6	5	2	1	0	0	0	0	3.2	9																						
18-May	Z	0	0	0	0	1	4	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4																						
19-May	0	Z	1	1	1	1	1	1	1	0	0	0	0	10	11	1	1	3	5	8	10	8	4	2	3.1	11																						
20-May	1	1	Z	1	1	1	2	2	2	1	1	0	1	2	4	3	2	3	3	2	2	1	1	1	1.6	4																						
21-May	1	0	0	Z	1	1	3	8	5	7	8	1	2	1	1	1	1	1	1	1	1	1	1	1	1.9	8																						
22-May	0	0	1	1	Z	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.6	1																						
23-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
24-May	Z	0	0	0	0	0	1	3	12	9	7	2	1	2	3	4	3	3	1	1	1	0	0	0	2.4	12																						
25-May	0	Z	0	0	0	1	1	2	1	2	3	1	0	0	0	1	1	0	0	0	0	0	0	0	0.7	3																						
26-May	0	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-May	0	0	0	Z	0	0	0	7	3	3	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0.9	7																						
28-May	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																						
29-May	0	0	0	0	0	Z	1	5	12	8	2	3	2	2	3	5	3	4	6	7	7	2	0	0	3.2	12																						
30-May	Z	0	0	0	0	0	4	5	2	1	0	3	7	3	4	11	6	6	6	1	1	0	1	1	2.8	11																						
31-May	1	Z	1	1	1	0	1	1	1	1	5	1	1	3	5	7	10	6	6	1	1	1	1	1	2.3	10																						
																								0.3	0.3	0.3	0.4	0.4	0.4	1.0	2.2	2.7	2.4	2.1	1.3	1.3	1.6	1.7	1.7	1.7	1.8	1.8	1.3	1.1	0.7	0.5	0.4	Diurnal Average
																								1	2	1	1	2	1	5	10	15	15	10	9	7	10	11	11	10	8	9	8	10	8	4	2	Diurnal Maximum

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	701	99.01	99.01
11 - 20	7	0.99	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	35	80	98	54	17	14	16	39	105	108	53	25	12	9	18	14	697
11 - 20	0	0	0	0	0	0	0	0	0	4	2	0	0	1	0	0	7
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	35	80	98	54	17	14	16	39	105	112	55	25	12	10	18	14	704

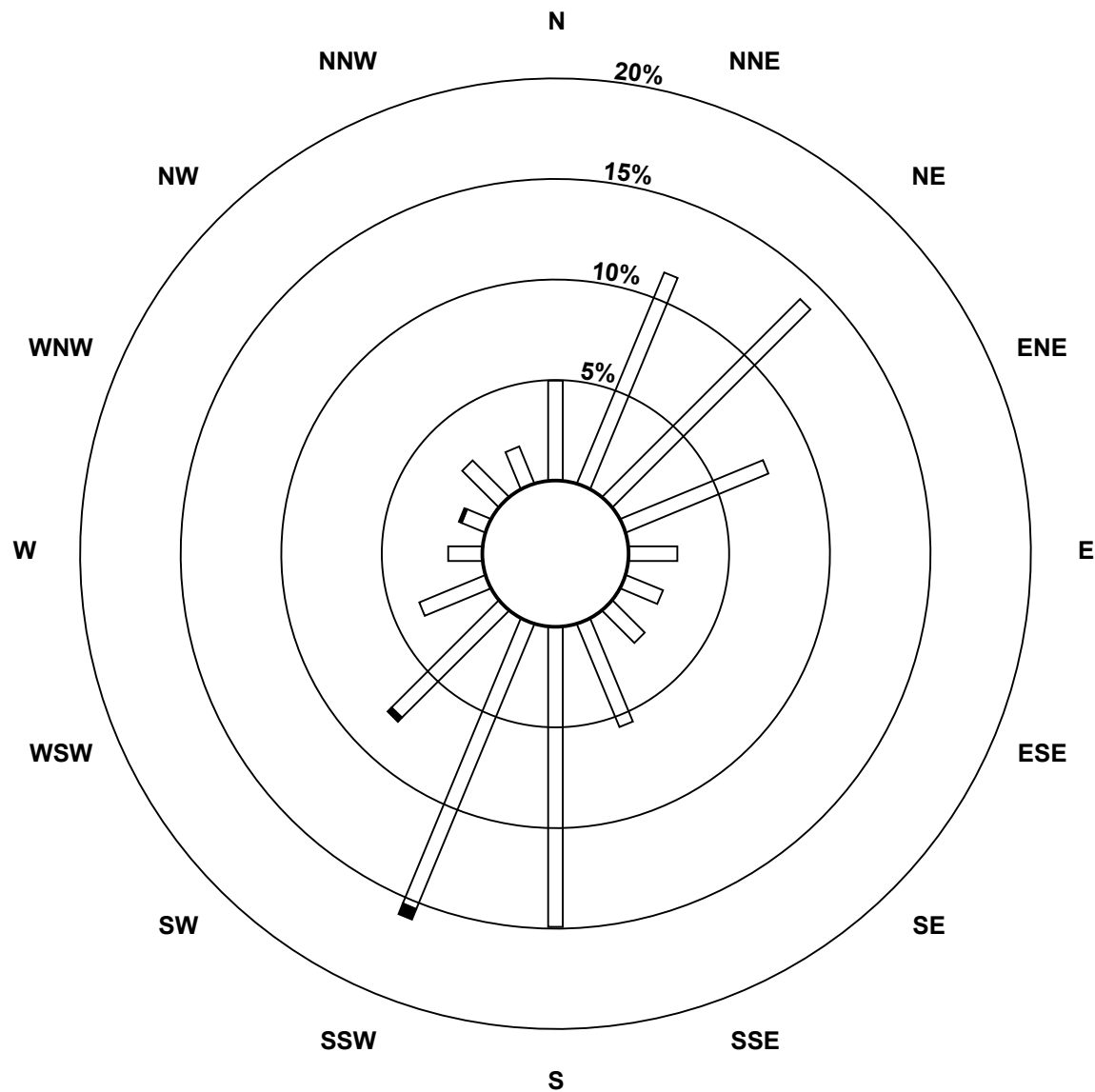
Total Number of Valid Hours: 704

Total Number of Hours: 744

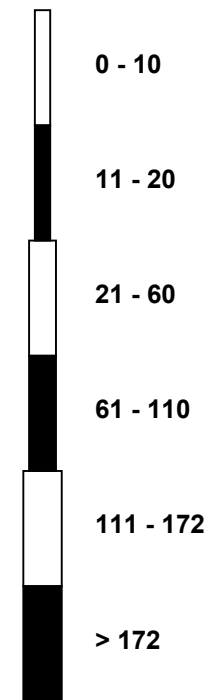


Wood Buffalo Environmental Association
Wind Rose May 2015

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River (AMS 16)



Classes (ppb)

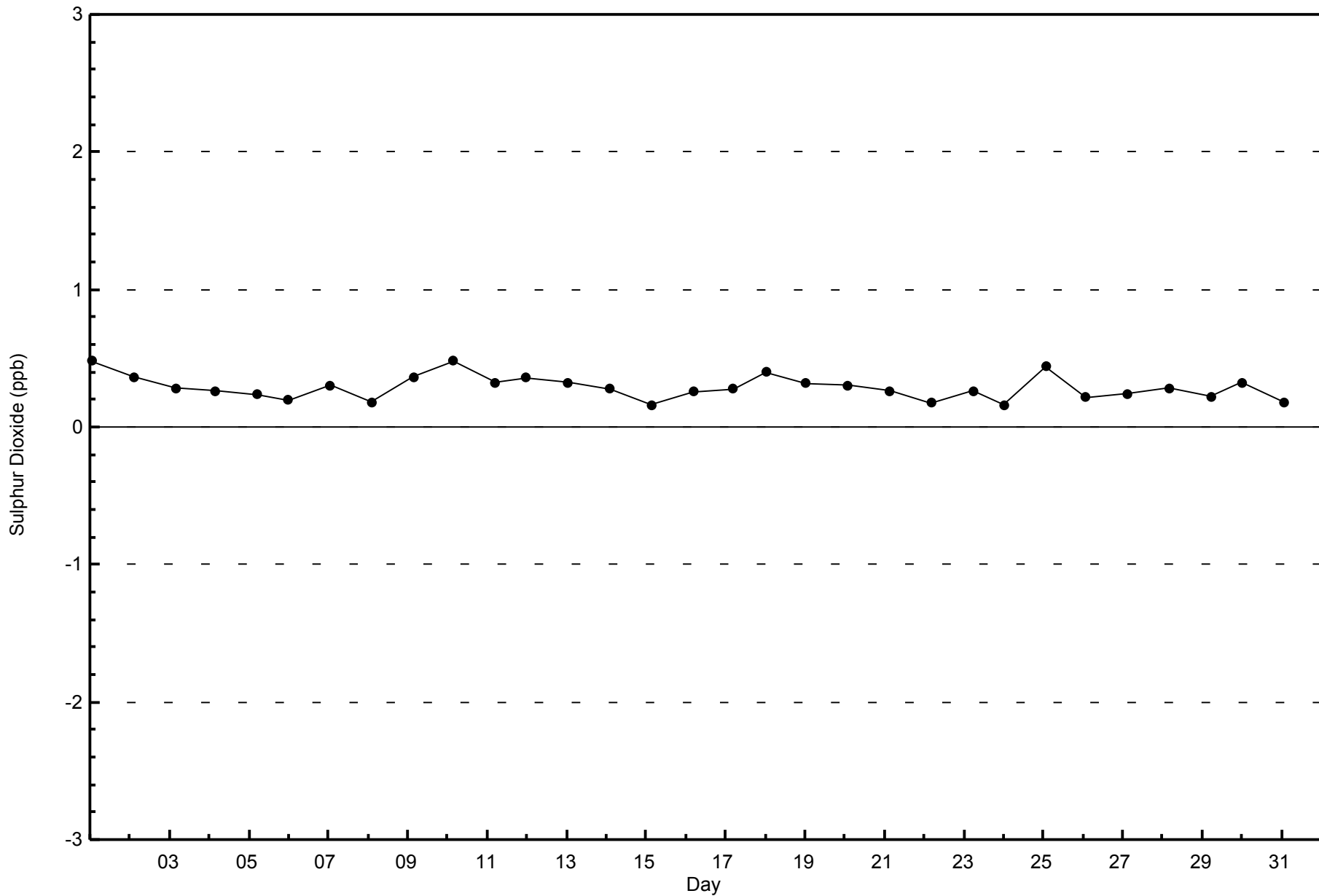


Total Number of Valid Hours: 704



WBEA
Zero Responses

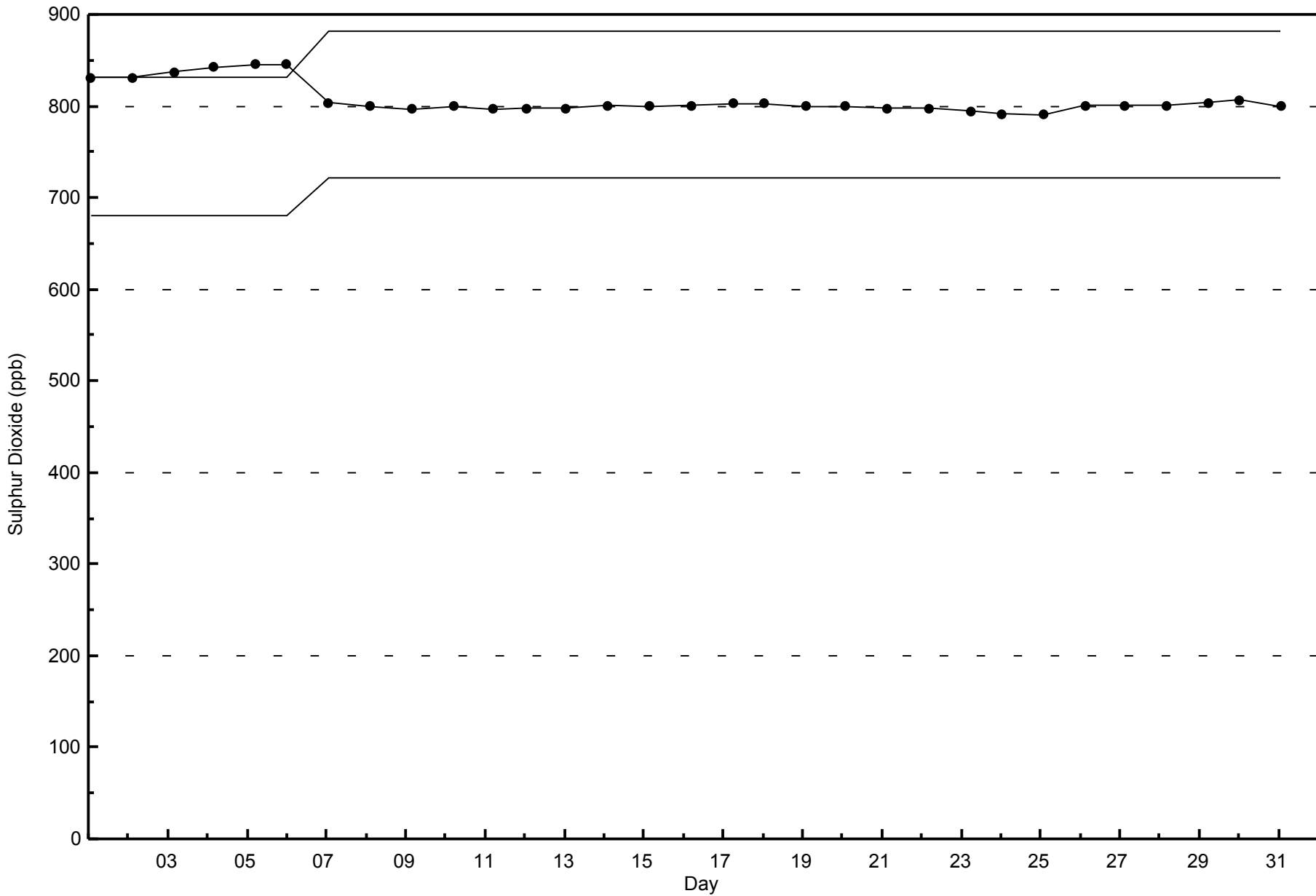
Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Shell Muskeg River - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

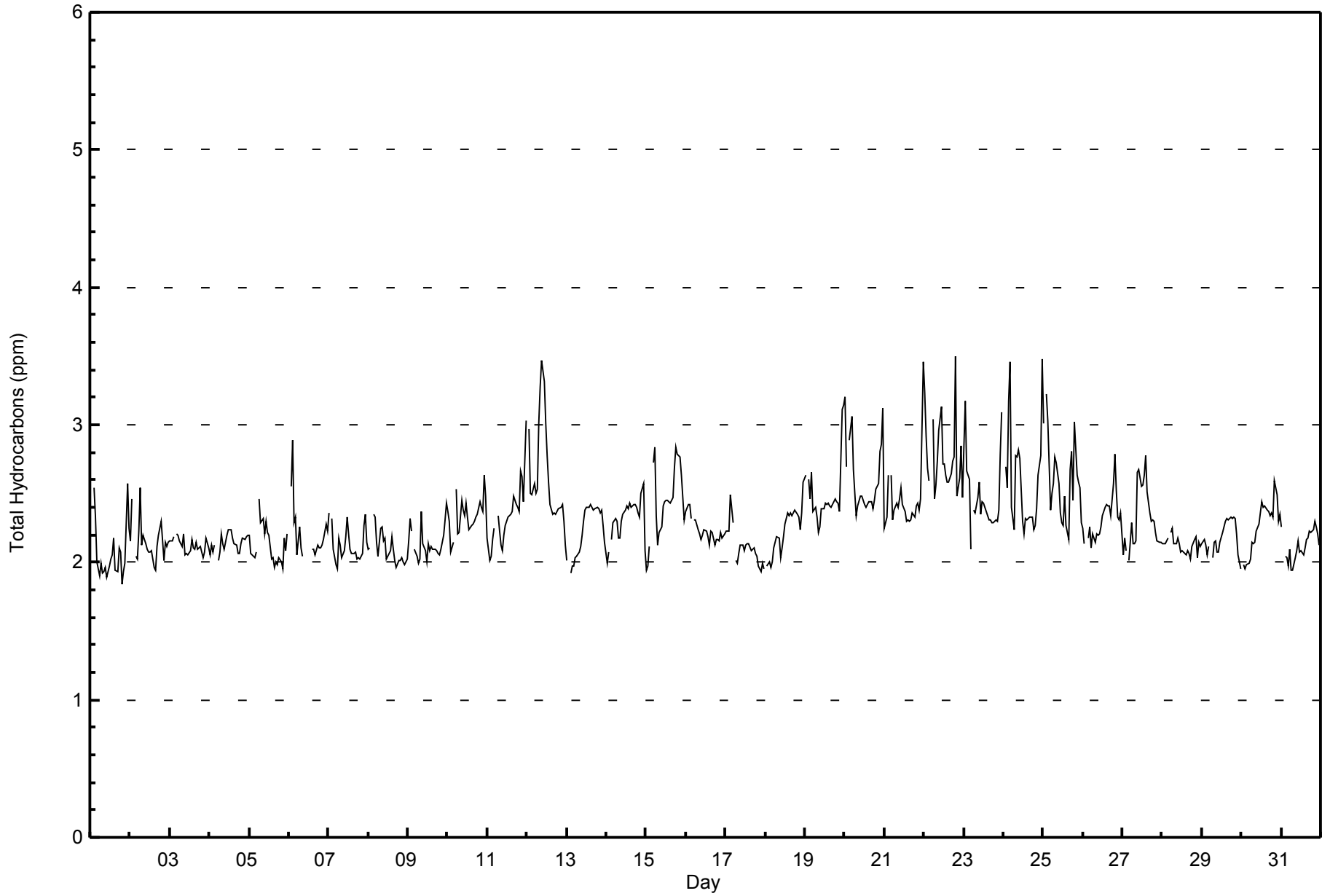
Shell Muskeg River - May 2015

Maximum Value: 3.5 ppm on May 22 20:00																	Maximum Daily Average: 2.8 ppm on May 22										Hours in Service: 744	
Minimum Value: 1.8 ppm on May 1 20:00																	Minimum Daily Average: 2.1 ppm on May 1										Hours of Data: 708	
Maximum Diurnal Average: 2.4 ppm at hour 24																	Minimum Diurnal Average: 2.2 ppm at hour 7										Hours of Missing Data: 36	
Monthly Average: 2.30 ppm																	Percentiles: P ₁ = 1.9 P ₁₀ = 2.0 Q ₁ = 2.1 Median = 2.3 Q ₃ = 2.4 P ₉₀ = 2.6 P ₉₉ = 3.3										Hours of Calibration: 36	
																											Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-May	2.2	Z	2.5	2.3	2.0	1.9	2.0	1.9	1.9	2.0	1.9	2.0	2.0	2.1	2.2	1.9	1.9	2.1	2.1	1.8	1.9	2.0	2.6	2.2	2.1	2.6		
2-May	2.2	2.5	Z	2.0	2.0	2.2	2.5	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0	1.9	2.1	2.2	2.2	2.3	2.0	2.1	2.1	2.1	2.1	2.1	2.5	
3-May	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.1	2.1	2.2		
4-May	2.1	2.1	2.1	2.1	Z	2.0	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2		
5-May	2.2	2.1	2.0	2.0	2.1	Z	2.5	2.3	2.3	2.2	2.3	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.2	2.1	2.2	2.1	2.5		
6-May	Z	2.6	2.9	2.3	2.3	2.1	2.3	2.1	2.0	C	C	C	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.9		
7-May	2.4	Z	2.3	2.1	2.0	1.9	2.2	2.1	2.0	2.1	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.3	2.3	2.1	2.1	2.4		
8-May	2.1	2.1	Z	2.3	2.3	2.1	2.0	2.3	2.3	2.2	2.2	2.0	2.0	2.1	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3		
9-May	2.2	2.3	2.2	Z	2.1	2.0	2.0	2.0	2.4	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.1	2.4		
10-May	2.4	2.3	2.1	2.1	Z	2.5	2.2	2.2	2.5	2.4	2.3	2.4	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.6	2.5	2.3	2.6		
11-May	2.2	2.0	2.0	2.2	2.3	Z	2.3	2.2	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.4	2.5	2.4	2.4	2.4	2.4	2.7	2.6	2.4	3.0	2.3	3.0	
12-May	Z	3.0	2.5	2.5	2.6	2.5	2.5	3.0	3.3	3.5	3.3	3.0	2.8	2.6	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.1	2.6	3.5		
13-May	2.0	Z	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.2	2.2	2.4		
14-May	2.0	2.1	Z	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.5	2.6	2.1	2.3	2.6		
15-May	1.9	2.0	2.1	Z	2.7	2.8	2.3	2.1	2.2	2.3	2.4	2.4	2.5	2.5	2.4	2.4	2.5	2.7	2.8	2.8	2.8	2.6	2.5	2.3	2.4	2.8		
16-May	2.4	2.4	2.4	2.3	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4		
17-May	2.2	2.2	2.2	2.5	2.3	Z	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	2.0	2.0	2.1	2.5		
18-May	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.0	2.1	2.2	2.3	2.4	2.3	2.4	2.3	2.4	2.4	2.4	2.3	2.2	2.4	2.6	2.2	2.6		
19-May	2.6	Z	2.6	2.5	2.7	2.4	2.4	2.3	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.4	2.4	3.1	3.1	2.5	3.1		
20-May	3.2	2.7	Z	2.9	3.1	2.7	2.5	2.3	2.4	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.6	2.8	2.9	3.1	2.6	3.2		
21-May	2.2	2.3	2.6	Z	2.6	2.3	2.4	2.4	2.4	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.4	2.4	2.5	3.5	2.4	3.5		
22-May	3.2	2.9	2.7	2.6	Z	3.0	2.5	2.6	2.7	3.0	3.1	2.7	2.7	2.6	2.6	2.6	2.6	2.7	2.8	3.5	2.5	2.6	2.9	2.5	2.8	3.5		
23-May	2.8	3.2	2.7	2.6	2.1	Z	2.4	2.4	2.5	2.6	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.8	3.1	2.5	3.2		
24-May	Z	2.7	2.5	3.2	3.5	2.4	2.2	2.8	2.8	2.8	2.8	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.4	2.6	2.8	3.5	2.6	3.5		
25-May	3.0	Z	3.2	3.0	2.4	2.5	2.6	2.8	2.7	2.6	2.4	2.3	2.3	2.5	2.3	2.2	2.7	2.8	2.4	3.0	2.6	2.6	2.5	2.3	2.6	3.2		
26-May	2.2	2.1	Z	2.2	2.3	2.1	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.3	2.6	2.8	2.5	2.3	2.3	2.4	2.3	2.8		
27-May	2.1	2.2	2.1	Z	2.0	2.3	2.1	2.1	2.2	2.7	2.7	2.6	2.6	2.6	2.8	2.5	2.4	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.3	2.8		
28-May	2.1	2.1	2.1	2.2	Z	2.2	2.3	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.2	2.0	2.1	2.1	2.1	2.3		
29-May	2.1	2.2	2.1	2.1	2.1	Z	2.0	2.1	2.2	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.0	2.2	2.3		
30-May	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.4	2.3	2.6	2.5	2.3	2.3	2.6		
31-May	2.3	Z	2.0	2.0	2.0	2.1	1.9	1.9	2.0	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.1	2.1	2.3		
																								Diurnal Average				
																								Diurnal Maximum				
Z - zerospan C - Calibration																												



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - May 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	92	12.99	12.99
2.1 - 3.0	598	84.46	97.46
3.1 - 10.0	18	2.54	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	1	6	13	4	1	2	14	20	10	7	5	1	2	5	1	92
2.1 - 3.0	35	78	89	40	12	13	14	25	79	100	47	20	11	8	12	11	594
3.1 - 10.0	0	1	3	1	1	0	0	0	6	2	1	0	0	0	1	2	18
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	35	80	98	54	17	14	16	39	105	112	55	25	12	10	18	14	704

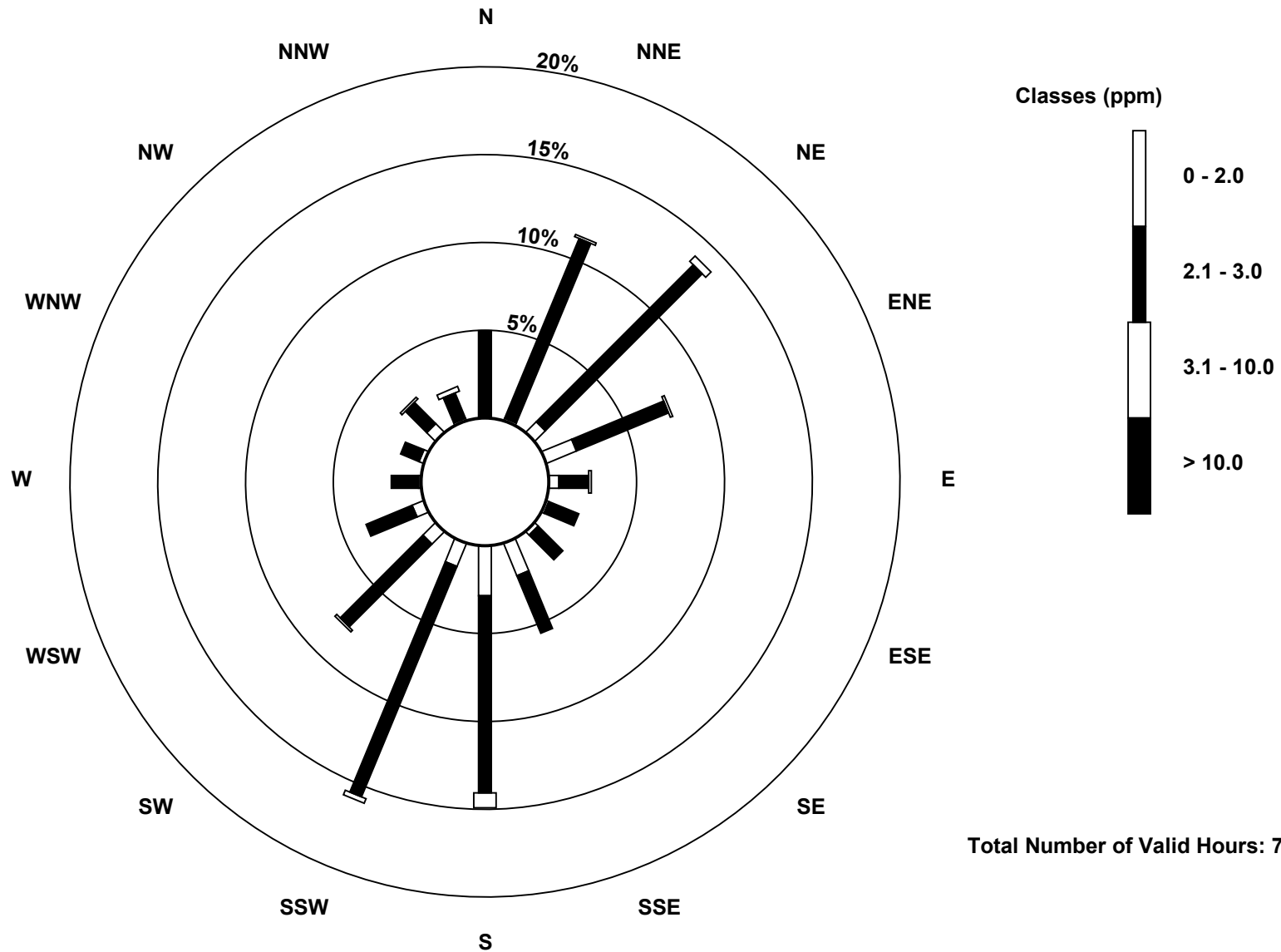
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

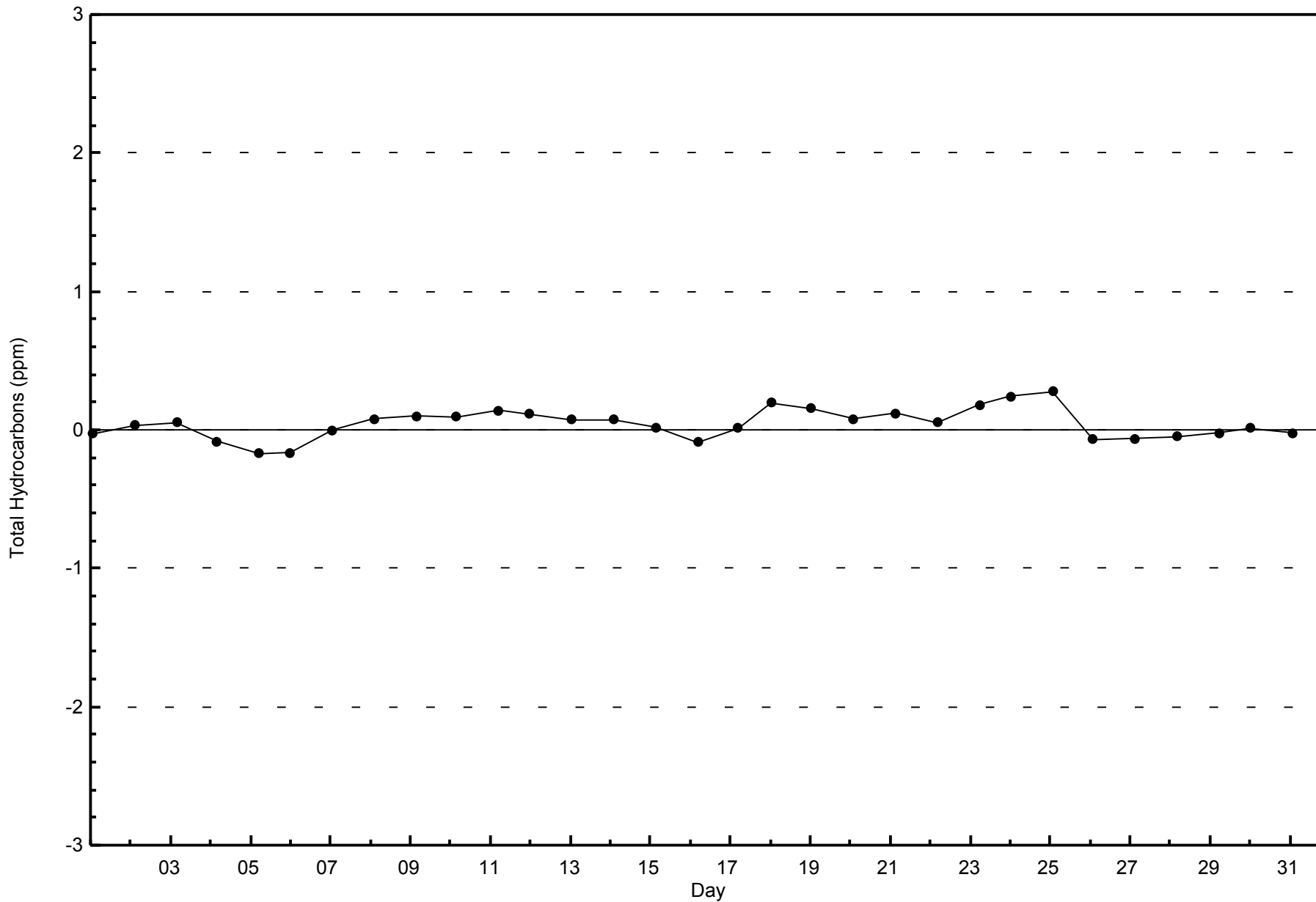
Total Hydrocarbons (THC) - ppm
Shell Muskeg River (AMS 16)





WBEA
Zero Responses

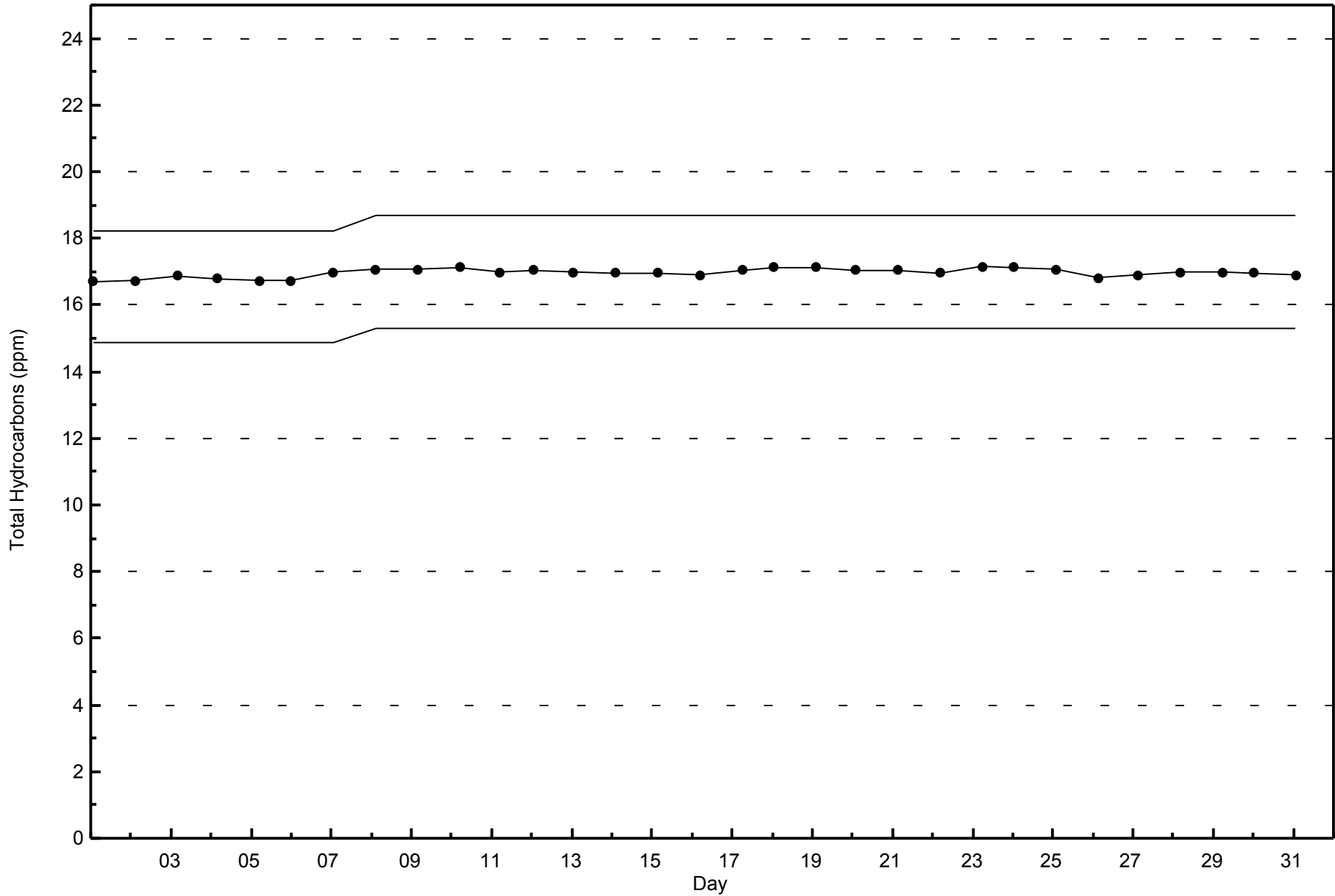
Total Hydrocarbons (THC) - ppm
Shell Muskeg River - May 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Shell Muskeg River - May 2015



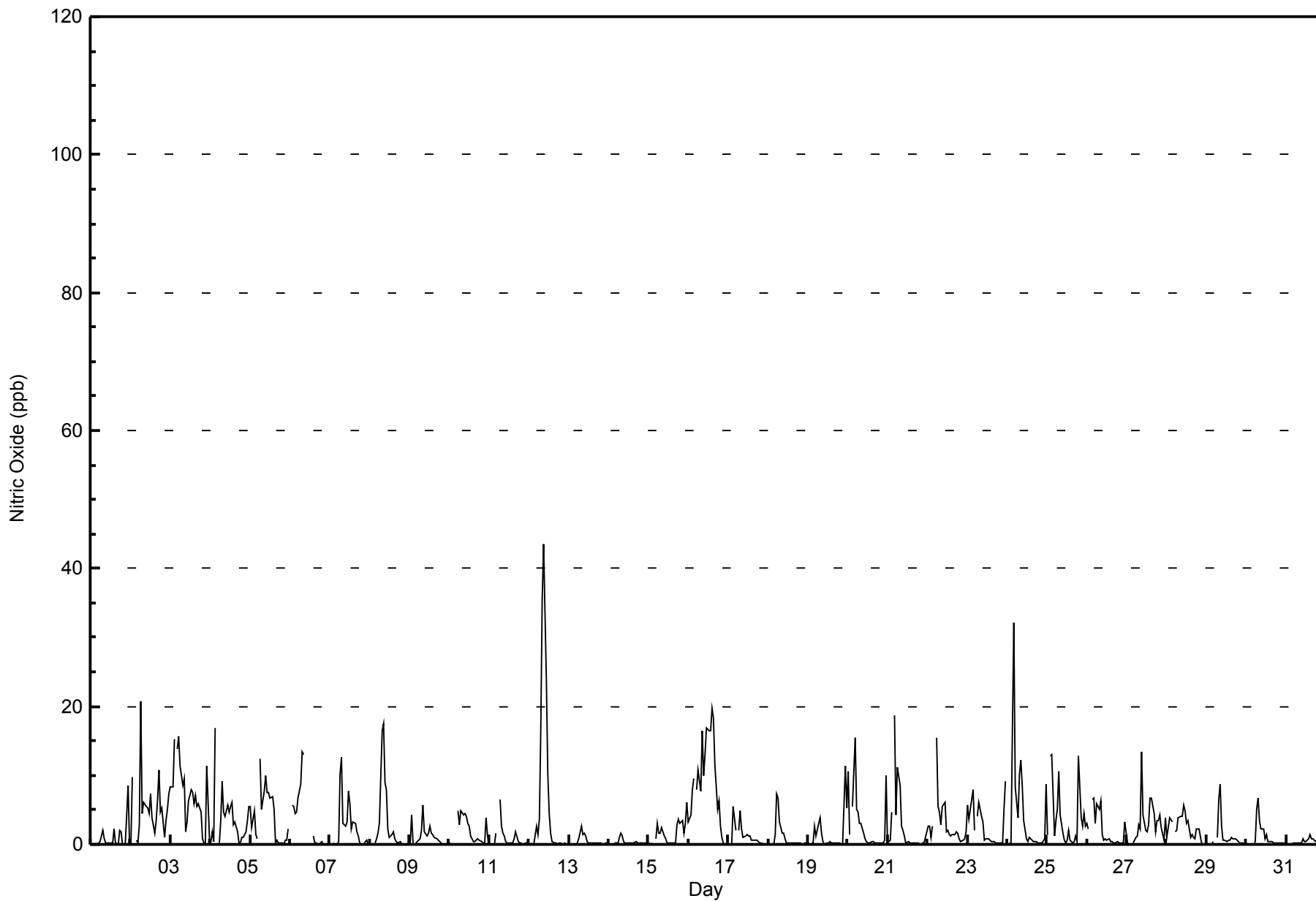


Maximum Value: 43 ppb on May 12 10:00																	Maximum Daily Average: 8.9 ppb on May 16										Hours in Service: 744	
Minimum Value: 0 ppb on May 10 03:00																	Minimum Daily Average: 0.3 ppb on May 14										Hours of Data: 708	
Maximum Diurnal Average: 6.2 ppb at hour 8																	Minimum Diurnal Average: 0.5 ppb at hour 22										Hours of Missing Data: 36	
Monthly Average: 2.7 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 4 P ₉₀ = 8 P ₉₉ = 18										Hours of Calibration: 36	
																	Percent Operational Time: 100.0											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-May	0	Z	0	0	0	0	1	2	1	0	0	0	0	0	2	0	0	2	2	0	0	0	9	0	0.9	9		
2-May	0	10	Z	1	0	3	21	5	6	6	5	5	7	4	2	3	7	11	5	5	1	4	5	7	5.3	21		
3-May	8	8	15	Z	14	16	11	8	10	2	3	6	8	8	6	7	5	6	5	1	0	0	11	1	6.9	16		
4-May	0	2	0	17	Z	0	4	9	5	4	6	5	6	6	3	3	2	0	0	1	1	2	3	6	3.7	17		
5-May	6	2	5	1	1	Z	13	5	8	10	8	7	7	7	5	0	1	0	0	0	0	1	1	2	3.9	13		
6-May	Z	6	5	5	5	7	9	13	13	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0	3.6	13		
7-May	0	Z	0	0	0	0	10	13	3	3	8	6	2	3	3	2	1	0	0	0	0	1	0	0	2.6	13		
8-May	0	0	Z	0	1	2	3	16	17	9	8	2	1	1	2	1	0	0	0	0	0	0	0	0	2.8	17		
9-May	0	4	0	Z	0	1	1	2	6	2	1	2	3	2	1	1	1	1	0	0	0	0	0	0	1.2	6		
10-May	0	0	0	0	Z	5	3	5	4	4	4	3	3	1	0	0	1	1	1	0	0	0	4	1	1.8	5		
11-May	0	0	0	0	2	Z	7	3	2	1	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0.8	7		
12-May	Z	0	0	0	3	1	4	17	35	43	24	10	5	2	0	0	0	0	0	0	0	0	0	0	6.3	43		
13-May	0	Z	0	0	0	0	1	3	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3		
14-May	0	0	Z	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2		
15-May	0	0	0	Z	1	3	2	2	2	1	1	0	0	0	0	0	0	3	4	3	3	2	3	6	1.6	6		
16-May	3	4	8	10	Z	8	11	8	17	10	13	17	16	16	20	18	12	5	6	3	1	0	0	0	8.9	20		
17-May	0	0	0	6	2	Z	2	5	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1.1	6		
18-May	Z	0	0	0	1	7	7	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	7		
19-May	0	Z	0	0	3	1	3	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	11	5	1.4	11		
20-May	11	1	Z	6	15	5	5	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	1	10	2.8	15		
21-May	0	1	5	Z	19	4	11	8	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	2	2.5	19		
22-May	3	3	1	3	Z	16	5	5	3	5	6	2	2	2	1	1	1	2	2	1	0	1	1	2	2.9	16		
23-May	6	4	5	8	2	Z	4	6	4	3	1	1	1	1	0	0	0	0	0	0	0	5	9	2.7	9			
24-May	Z	0	0	17	32	8	4	10	12	9	4	1	0	1	1	1	0	0	0	0	0	1	9	9	4.8	32		
25-May	1	Z	13	13	1	4	5	11	4	2	1	0	1	2	1	0	0	1	0	13	4	3	5	3	3.8	13		
26-May	3	2	Z	6	7	3	6	5	6	2	1	1	1	1	0	0	0	0	0	0	0	0	0	3	2.1	7		
27-May	0	0	0	Z	0	1	1	3	2	13	4	2	2	3	7	7	5	2	3	3	4	2	1	4	3.0	13		
28-May	1	2	4	3	Z	2	2	4	4	4	6	5	3	3	1	1	1	1	2	2	1	0	0	0	2.4	6		
29-May	0	0	0	0	0	Z	1	6	9	3	1	1	0	1	1	1	1	1	1	0	0	0	0	0	1.2	9		
30-May	Z	0	0	0	0	0	5	7	3	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	1.1	7		
31-May	0	Z	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	0	1	0	0	0	0	0.4	1		
																								Diurnal Average				
																								Diurnal Maximum				
1.7 2.0 2.4 3.7 4.2 3.8 5.2 6.2 6.1 4.9 3.6 2.7 2.5 2.2 2.0 1.8 1.4 1.3 1.1 1.2 0.6 0.5 2.0 2.3 11 10 15 17 32 16 21 17 35 43 24 17 16 16 20 18 12 11 6 13 4 4 11 10																												
Z - zerospan C - Calibration																												



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Shell Muskeg River - May 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Shell Muskeg River - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	99.29	99.29
21 - 40	4	0.56	99.86
41 - 80	1	0.14	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitric Oxide (NO) - ppb
Shell Muskeg River - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	34	80	98	54	17	14	16	39	104	112	55	25	12	10	17	12	699
21 - 40	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	4
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	35	80	98	54	17	14	16	39	105	112	55	25	12	10	18	14	704

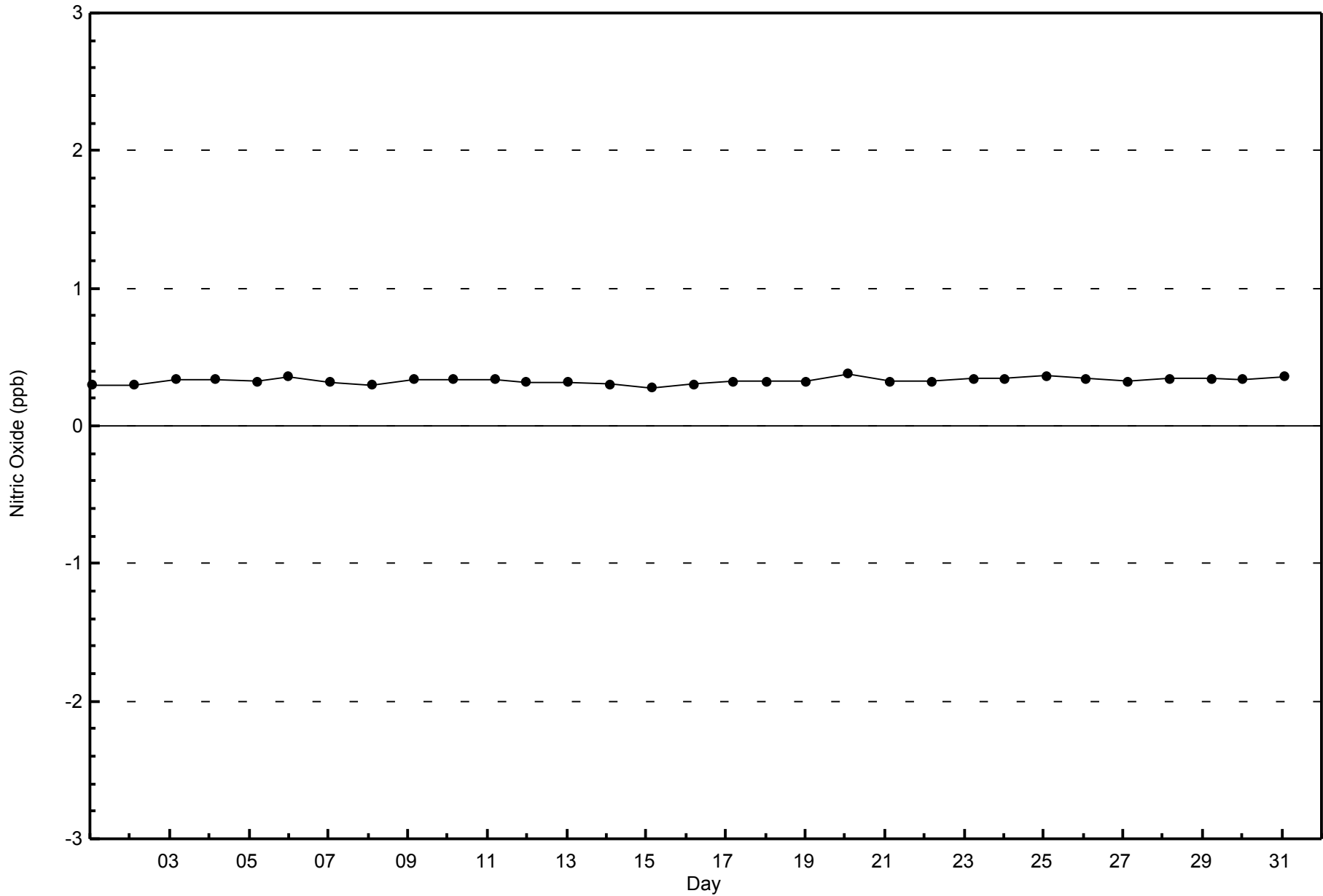
Total Number of Valid Hours: 704

Total Number of Hours: 744



WBEA
Zero Responses

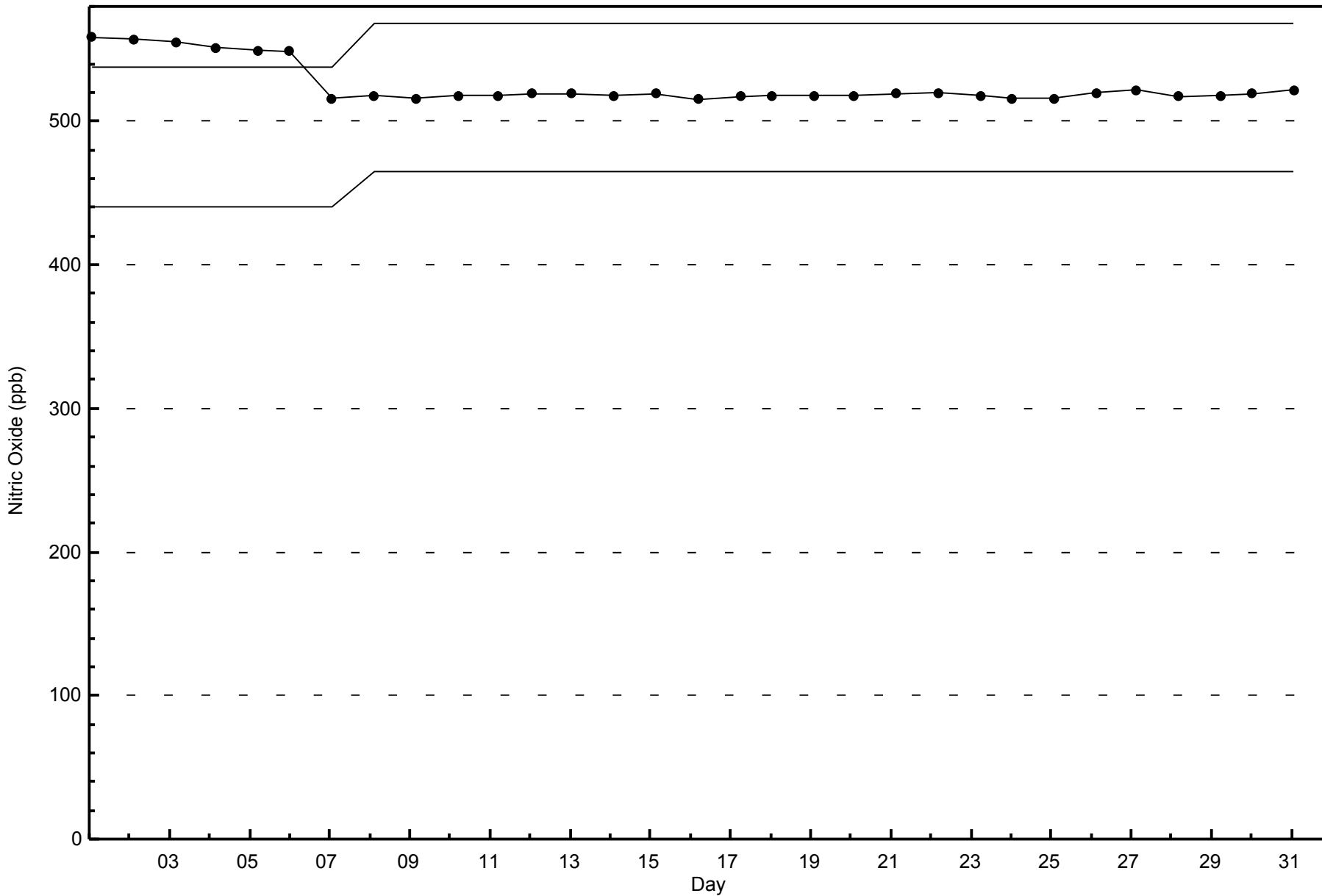
Nitric Oxide (NO) - ppb
Shell Muskeg River - May 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Shell Muskeg River - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

Shell Muskeg River - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 39 ppb on May 12 10:00	Maximum Daily Average: 13.6 ppb on May 25
Minimum Value: 0 ppb on May 13 03:00	Hours of Data: 708
Maximum Diurnal Average: 13.0 ppb at hour 4	Hours of Missing Data: 36
Monthly Average: 7.9 ppb	Hours of Calibration: 36
Minimum Daily Average: 2.7 ppb on May 13	Percent Operational Time: 100.0
Minimum Diurnal Average: 3.3 ppb at hour 16	
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 5 Q ₃ = 11 P ₉₀ = 19 P ₉₉ = 30	

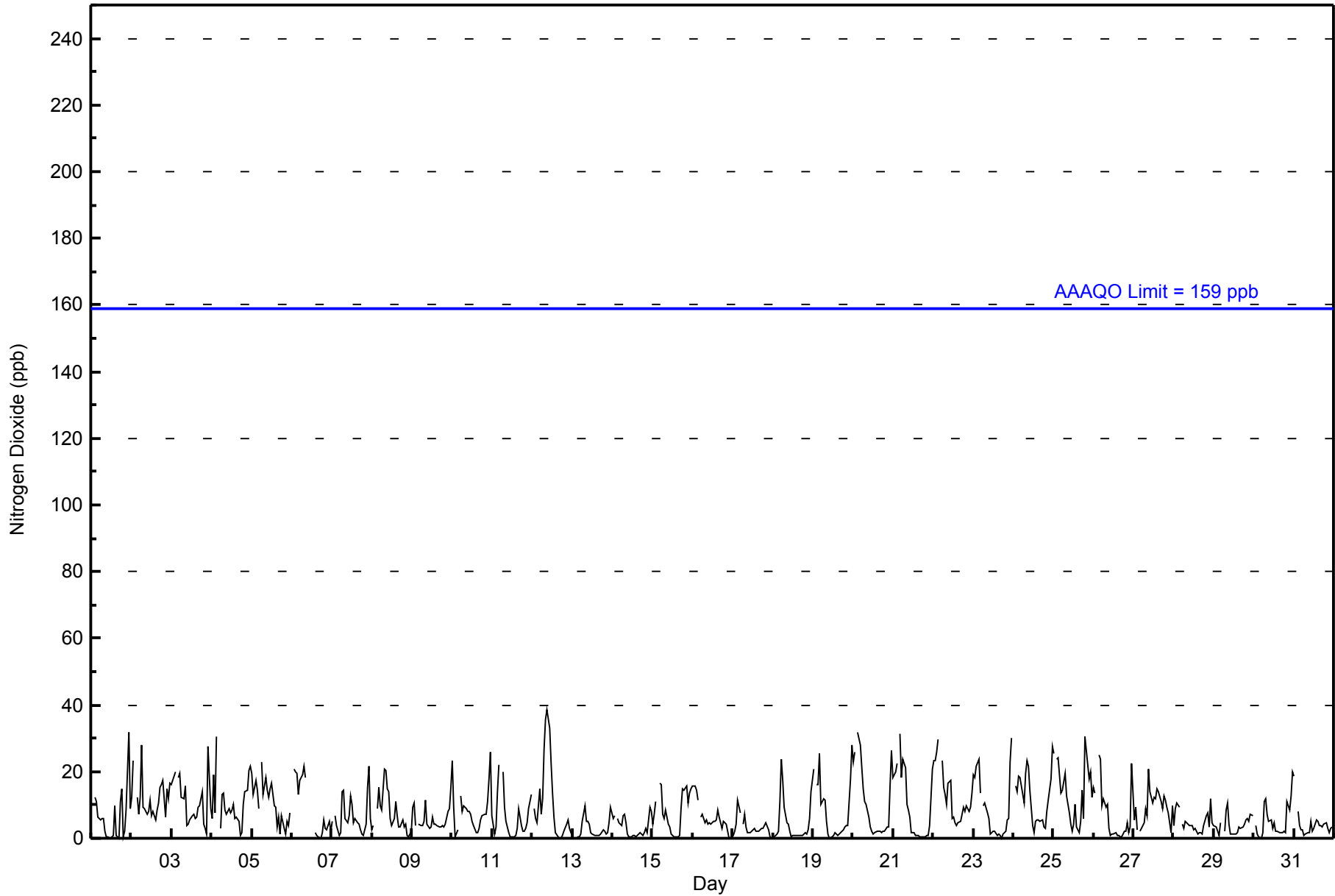
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	7	Z	12	11	6	5	6	6	2	1	0	0	0	1	10	1	0	11	15	0	2	8	32	9	6.3	32																							
2-May	12	23	Z	12	7	12	28	9	9	7	8	12	7	8	5	8	11	15	16	17	6	15	12	16	12.1	28																							
3-May	16	19	20	Z	18	20	12	12	16	4	4	5	7	7	6	7	9	10	14	4	3	1	27	9	10.9	27																							
4-May	6	19	8	31	Z	3	13	14	8	7	9	8	9	10	6	6	5	1	2	10	14	15	21	22	10.6	31																							
5-May	20	13	17	15	9	Z	23	13	18	14	12	15	17	10	9	3	6	1	7	3	1	5	4	8	10.6	23																							
6-May	Z	21	20	19	13	18	19	22	18	C	C	C	C	C	2	1	0	0	2	5	3	3	5	2	9.6	22																							
7-May	5	Z	7	4	1	2	14	15	6	5	7	13	10	5	6	5	4	2	1	1	4	15	21	6	6.9	21																							
8-May	3	4	Z	9	15	10	9	21	20	15	14	6	4	6	11	7	4	3	6	3	4	1	1	2	7.6	21																							
9-May	10	11	4	Z	4	4	4	5	11	4	3	4	6	4	4	4	3	3	4	4	4	8	9	15	5.7	15																							
10-May	23	10	1	3	Z	13	8	10	9	8	8	7	5	4	2	2	3	6	7	7	7	11	18	26	8.5	26																							
11-May	7	1	4	14	22	Z	20	9	5	3	2	0	0	0	1	3	9	4	2	2	3	5	9	13	6.0	22																							
12-May	Z	9	6	5	15	7	12	27	36	39	33	23	13	7	2	0	0	0	1	2	4	5	3	2	10.9	39																							
13-May	1	Z	0	0	0	1	5	10	5	5	4	2	1	1	1	1	1	1	1	3	2	1	2	5	9	2.7	10																						
14-May	6	7	Z	6	5	4	7	7	5	1	0	1	1	1	1	1	2	1	1	2	3	2	10	8	3.4	10																							
15-May	4	7	11	Z	17	16	7	6	8	4	4	1	1	1	1	1	1	9	15	15	16	11	14	15	7.9	17																							
16-May	16	16	14	12	Z	7	7	5	5	4	5	4	5	5	6	9	6	3	5	5	4	2	0	0	6.2	16																							
17-May	1	2	4	11	8	Z	4	7	4	2	2	2	3	2	2	3	3	3	3	4	5	2	1	0	3.3	11																							
18-May	Z	1	1	2	11	24	18	10	5	4	2	1	1	1	1	1	1	1	1	2	1	2	6	14	4.7	24																							
19-May	21	Z	16	16	25	10	12	12	5	1	0	0	1	2	1	1	1	2	3	3	4	4	18	28	8.1	28																							
20-May	23	26	Z	32	28	21	15	11	10	7	3	2	1	2	2	2	2	2	2	2	4	4	16	26	10.5	32																							
21-May	18	20	23	Z	31	18	24	21	10	9	7	2	2	1	1	1	1	1	0	1	1	1	4	21	9.3	31																							
22-May	23	23	26	30	Z	23	15	13	10	17	17	6	6	5	4	5	5	7	9	8	10	8	10	13	12.8	30																							
23-May	19	18	22	24	13	Z	10	11	8	6	1	2	2	2	1	1	1	0	1	2	5	6	23	30	9.1	30																							
24-May	Z	16	14	19	18	16	11	19	23	21	14	4	2	5	6	5	5	3	3	8	12	18	27	11.9	27																								
25-May	26	Z	24	24	14	14	17	19	13	8	4	2	4	10	3	2	5	14	6	30	22	18	20	12	13.6	30																							
26-May	15	14	Z	25	24	10	12	9	10	3	1	1	1	2	1	1	1	0	2	2	5	2	4	23	7.2	25																							
27-May	6	9	3	Z	2	4	5	9	7	21	14	11	12	12	15	14	11	9	13	11	9	8	2	10	9.3	21																							
28-May	4	9	11	9	Z	4	3	5	4	4	4	4	3	3	1	2	2	1	4	7	8	4	12	5	4.8	12																							
29-May	4	3	2	1	5	Z	2	9	11	4	1	1	1	1	2	3	3	4	4	6	6	5	7	7	4.0	11																							
30-May	Z	4	1	0	0	2	11	12	7	5	6	3	5	2	2	2	2	2	2	2	11	9	13	20	5.3	20																							
31-May	19	Z	8	4	3	3	1	1	2	2	5	2	3	5	5	4	4	3	4	5	3	2	3	4	4.0	19																							
																								12.0	12.1	10.7	13.0	12.1	10.4	11.4	11.5	10.1	7.8	6.5	4.8	4.4	4.1	3.8	3.3	3.5	4.0	5.1	5.5	5.8	6.2	11.1	12.9	Diurnal Average	
																								26	26	26	32	31	24	28	27	36	39	33	23	17	12	15	14	11	15	16	30	22	18	32	30	Diurnal Maximum	

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	652	92.09	92.09
21 - 40	56	7.91	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: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	29	76	93	51	15	11	16	38	90	106	53	25	12	7	16	10	648
21 - 40	6	4	5	3	2	3	0	1	15	6	2	0	0	3	2	4	56
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	35	80	98	54	17	14	16	39	105	112	55	25	12	10	18	14	704

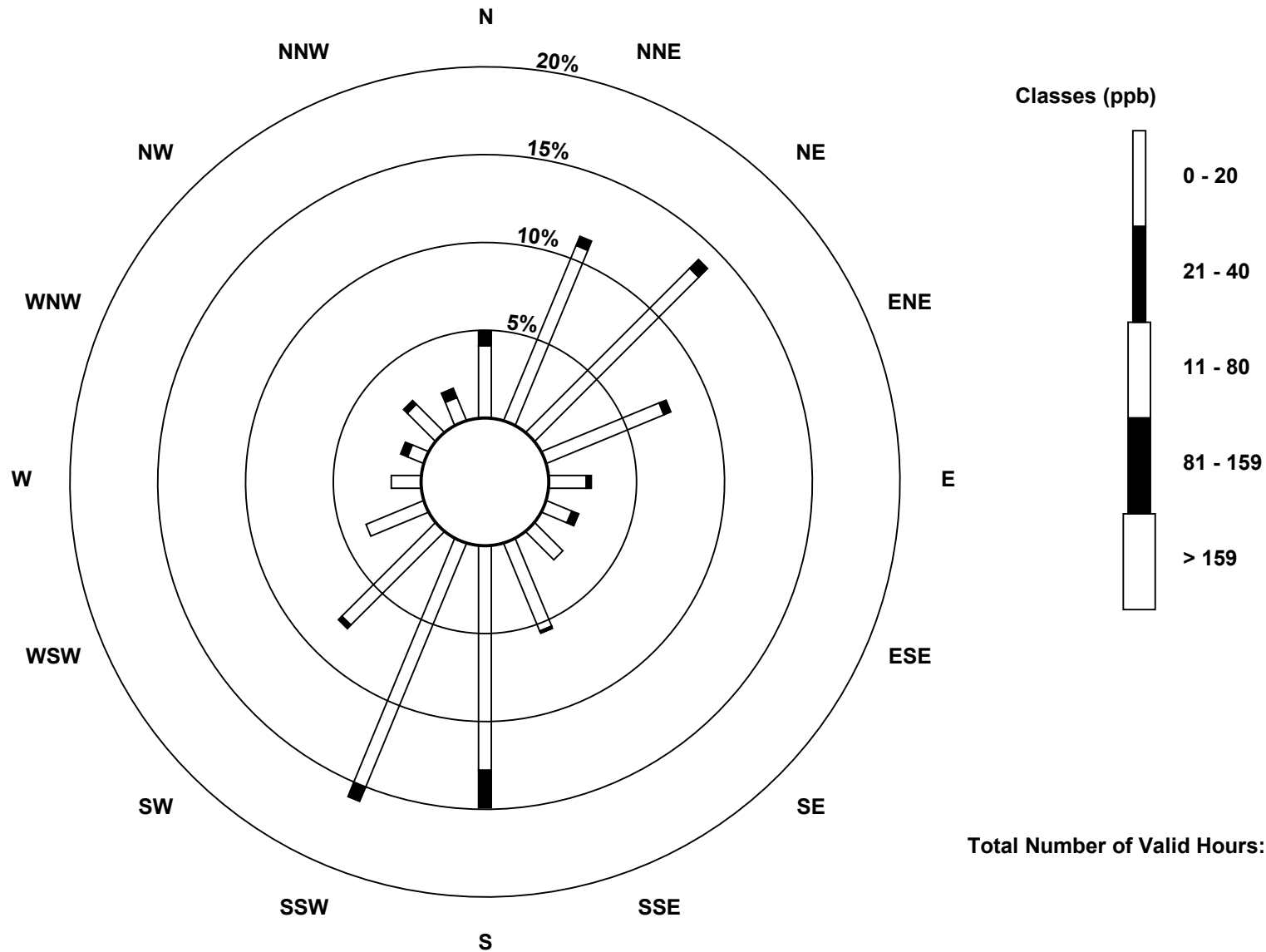
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

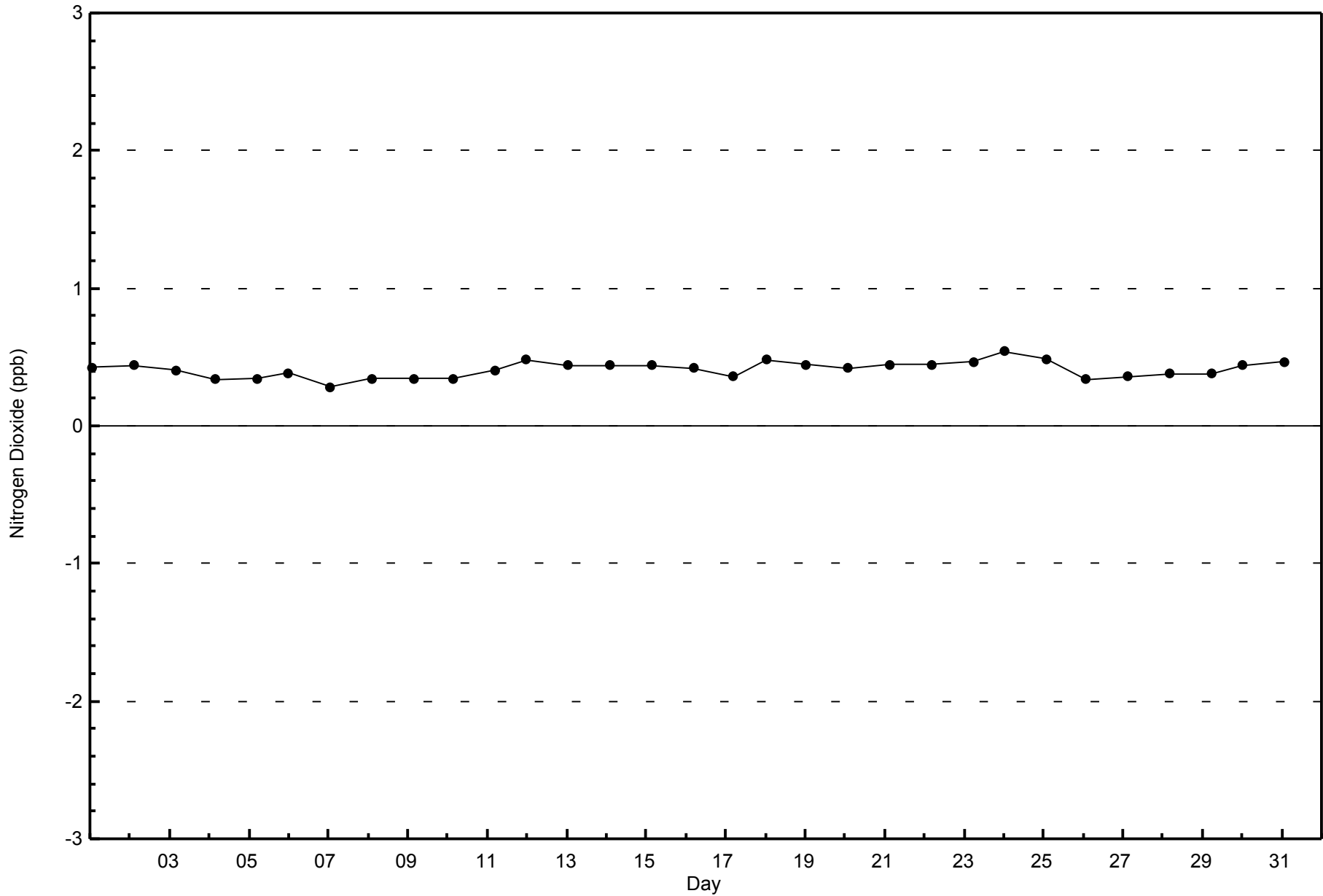
Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River (AMS 16)





WBEA
Zero Responses

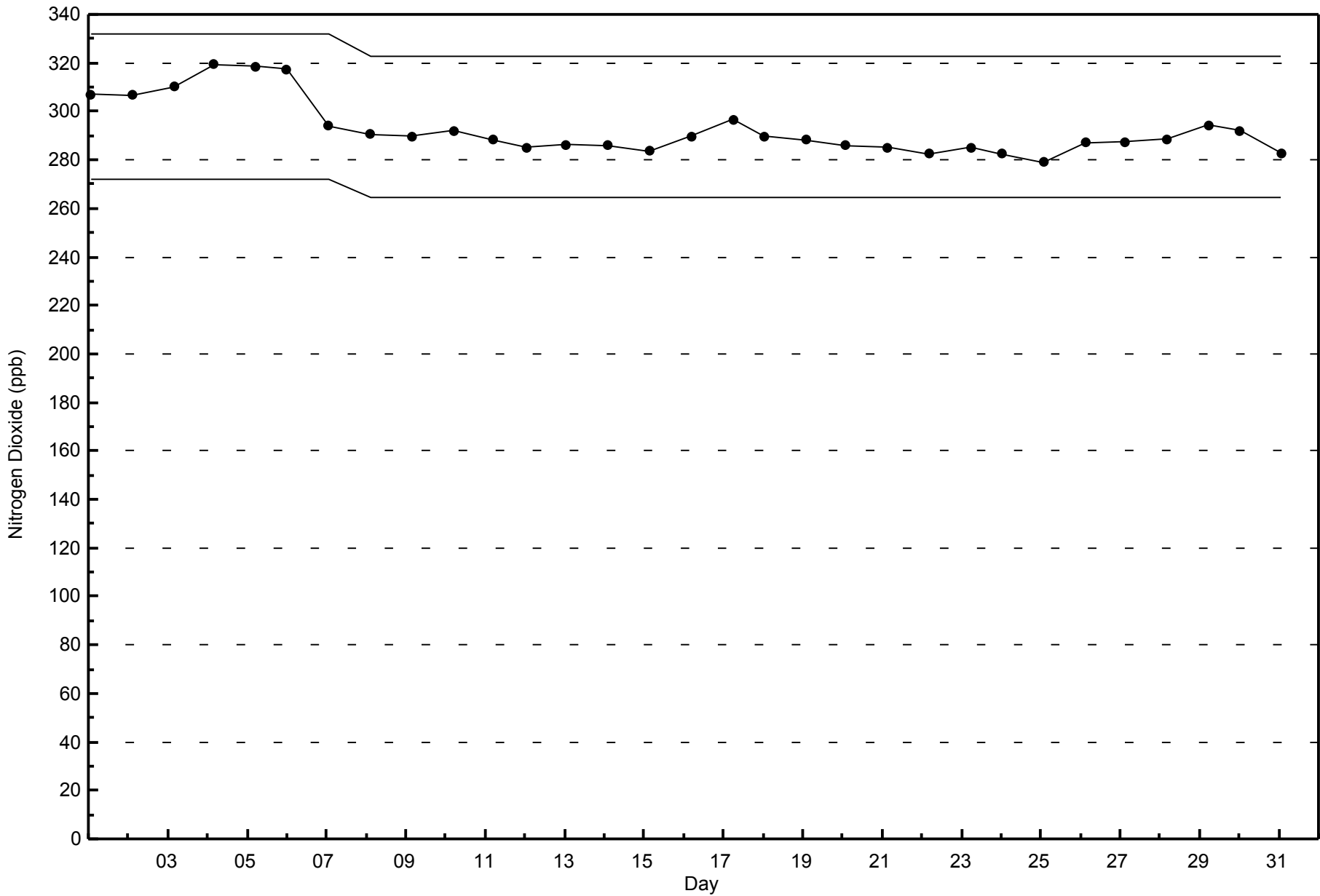
Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - May 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Shell Muskeg River - May 2015



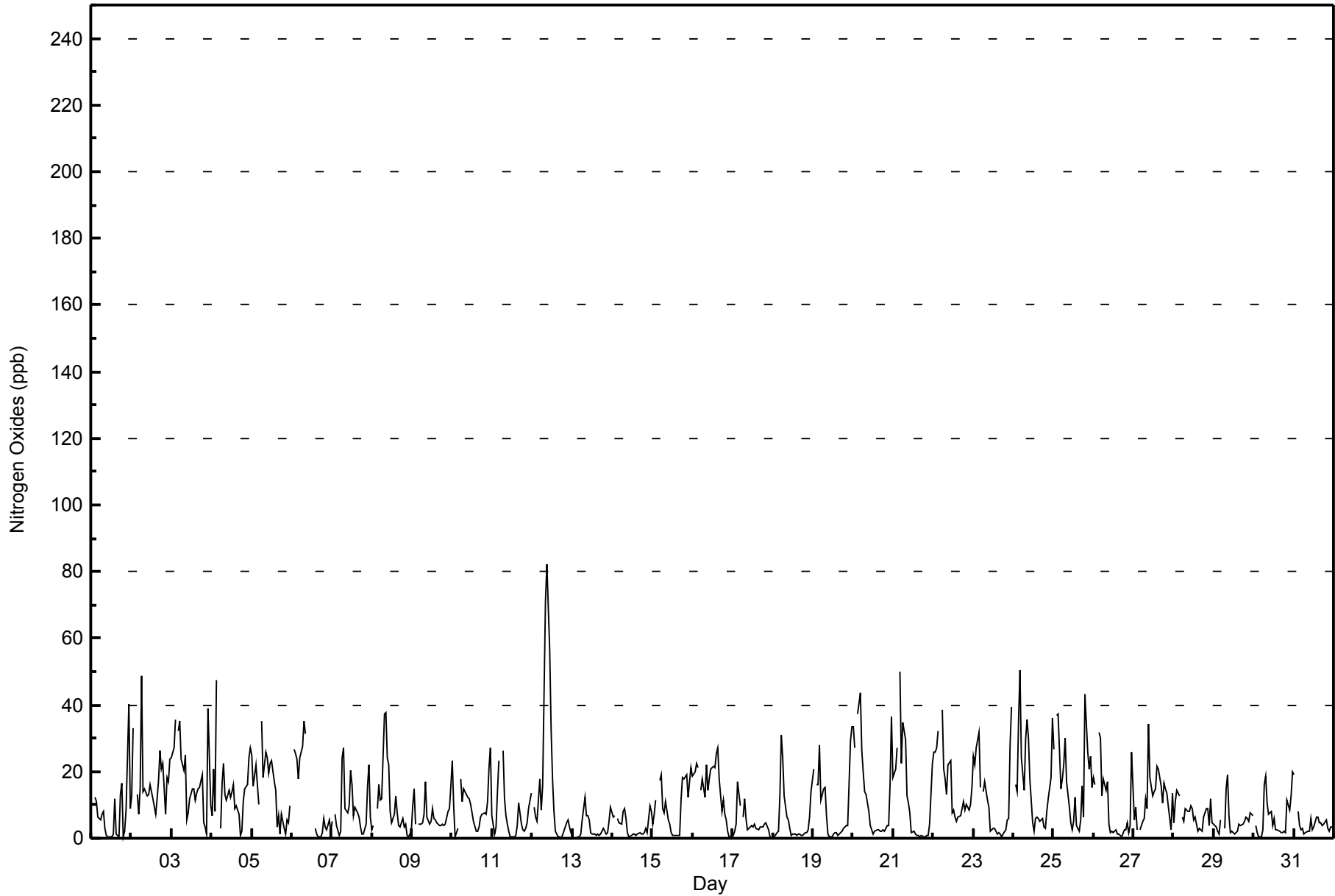


Maximum Value: 82 ppb on May 12 10:00																		Maximum Daily Average: 17.8 ppb on May 3																		Hours in Service: 744			
Minimum Value: 0 ppb on May 18 00:00																		Minimum Daily Average: 3.1 ppb on May 13																		Hours of Data: 708			
Maximum Diurnal Average: 17.7 ppb at hour 8																		Minimum Diurnal Average: 5.0 ppb at hour 17																		Hours of Missing Data: 36			
Monthly Average: 10.6 ppb																		Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 3 Median = 7 Q ₃ = 16 P ₉₀ = 25 P ₉₉ = 47																		Hours of Calibration: 36			
																																				Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24															
1-May	7	Z	12	11	6	6	7	8	3	1	1	0	0	1	12	1	0	13	17	0	2	9	40	9	7.2	40													
2-May	13	33	Z	13	7	15	49	14	15	13	13	16	14	12	7	12	17	26	21	22	7	18	17	24	17.3	49													
3-May	24	27	35	Z	32	35	24	20	25	6	8	12	15	15	12	14	15	15	19	5	3	1	39	10	17.8	39													
4-May	7	21	8	48	Z	3	17	23	13	11	14	12	14	16	9	10	7	1	2	11	15	16	24	27	14.3	48													
5-May	25	16	22	16	10	Z	35	18	26	24	20	22	23	17	15	4	7	1	7	3	1	6	5	10	14.5	35													
6-May	Z	27	26	24	18	24	28	35	31	C	C	C	C	C	3	1	1	0	2	6	3	3	5	2	13.2	35													
7-May	5	Z	7	4	1	2	24	27	9	7	10	20	16	7	9	8	6	4	1	1	4	16	22	6	9.5	27													
8-May	3	4	Z	9	16	11	12	37	38	24	22	8	5	7	13	7	4	3	6	4	4	1	1	2	10.5	38													
9-May	10	15	4	Z	4	4	5	7	17	6	4	5	9	6	6	5	4	4	4	4	4	8	9	16	6.9	17													
10-May	23	10	1	3	Z	18	11	15	13	12	12	10	8	5	2	2	4	6	7	8	7	11	21	27	10.3	27													
11-May	7	1	4	14	23	Z	26	12	7	4	2	1	0	0	1	4	11	4	3	2	3	5	9	13	6.8	26													
12-May	Z	9	6	5	18	8	16	44	71	82	57	33	18	8	2	1	0	0	1	2	4	6	3	2	17.2	82													
13-May	1	Z	0	1	0	1	6	12	7	7	6	2	1	1	1	1	1	1	1	3	2	1	2	5	9	3.1	12												
14-May	6	7	Z	6	5	4	8	9	6	2	1	1	1	1	1	1	2	1	1	2	3	2	10	8	3.8	10													
15-May	4	7	11	Z	17	19	9	7	11	6	4	1	1	1	1	1	1	1	11	18	18	19	12	17	21	9.5	21												
16-May	19	20	22	21	Z	14	18	12	22	14	18	21	21	21	25	27	18	8	11	7	6	2	0	0	15.2	27													
17-May	1	2	4	17	10	Z	6	12	6	2	3	4	3	4	3	3	3	4	3	4	5	2	1	0	4.5	17													
18-May	Z	1	2	2	13	31	24	13	6	6	3	1	1	1	1	1	1	1	1	2	2	2	6	14	5.9	31													
19-May	21	Z	16	16	28	11	15	15	7	1	0	0	1	2	2	1	1	2	3	3	4	4	29	33	9.5	33													
20-May	33	27	Z	37	44	26	20	14	13	8	Z	4	2	1	2	3	2	2	2	2	4	4	16	36	13.3	44													
21-May	18	21	27	Z	50	23	35	30	13	10	8	2	2	1	1	1	1	1	0	1	1	1	4	22	11.9	50													
22-May	26	26	27	32	Z	39	21	18	13	22	23	8	8	6	5	6	7	9	11	9	10	8	10	15	15.7	39													
23-May	25	22	27	32	15	Z	14	17	12	9	2	3	3	3	1	2	1	0	1	3	6	6	28	39	11.7	39													
24-May	Z	16	14	35	51	24	14	30	36	30	18	5	2	6	6	5	6	3	3	8	12	18	36	36	16.7	51													
25-May	27	Z	37	37	15	18	22	30	17	9	5	2	5	12	4	2	6	15	6	43	26	21	25	15	17.3	43													
26-May	18	16	Z	32	30	13	18	14	17	4	2	2	2	2	1	1	1	1	2	3	5	2	4	26	9.3	32													
27-May	6	9	3	Z	3	5	6	12	9	34	18	13	14	15	22	21	16	11	16	15	14	10	3	14	12.4	34													
28-May	5	11	15	13	Z	6	5	9	8	8	10	9	6	6	2	3	3	2	6	9	9	4	12	5	7.1	15													
29-May	4	3	2	1	5	Z	3	15	19	7	2	2	1	2	2	4	4	4	5	6	6	5	8	7	5.1	19													
30-May	Z	4	2	0	0	2	16	18	11	7	8	4	6	2	3	2	2	2	2	2	11	9	13	20	6.4	20													
31-May	19	Z	8	4	3	3	1	2	2	2	6	3	3	6	6	5	5	4	4	5	3	2	3	4	4.4	19													
																								Diurnal Average															
																								Diurnal Maximum															
13.7 14.1 13.1 16.6 16.3 14.1 16.6 17.7 16.2 12.7 10.0 7.5 6.9 6.4 5.8 5.1 5.0 5.3 6.2 6.6 6.5 6.7 13.1 15.3																																							
33 33 37 48 51 39 49 44 71 82 57 33 23 21 25 27 18 26 21 43 26 21 40 39																																							
Z - zerospan C - Calibration																																							



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	593	83.76	83.76
21 - 40	105	14.83	98.59
41 - 80	9	1.27	99.86
81 - 159	1	0.14	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	24	53	84	49	15	11	16	37	86	96	52	24	12	7	16	7	589
21 - 40	9	27	14	4	2	3	0	2	17	15	3	1	0	3	1	4	105
11 - 80	2	0	0	1	0	0	0	0	2	1	0	0	0	0	1	2	9
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	35	80	98	54	17	14	16	39	105	112	55	25	12	10	18	14	704

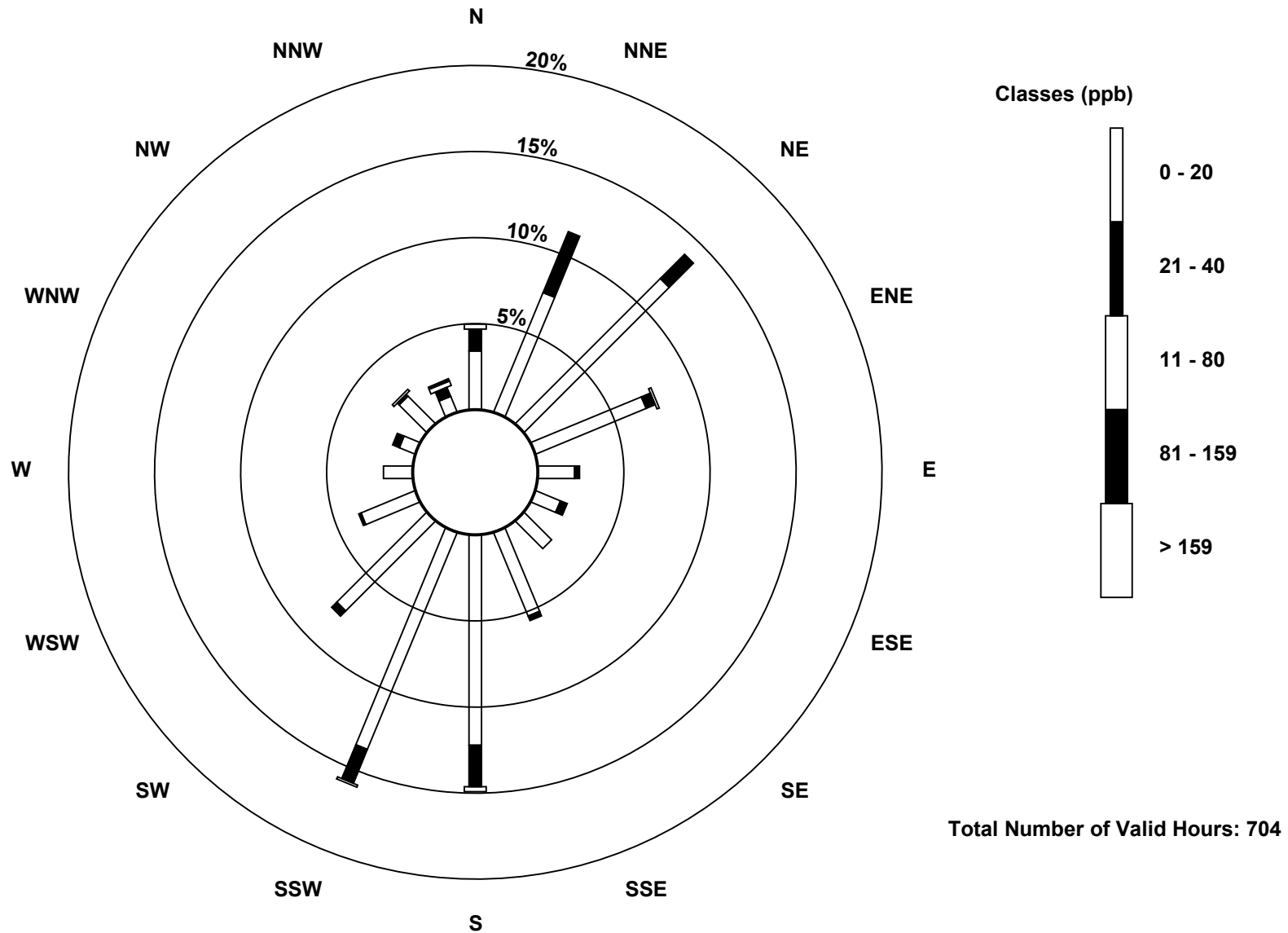
Total Number of Valid Hours: 704

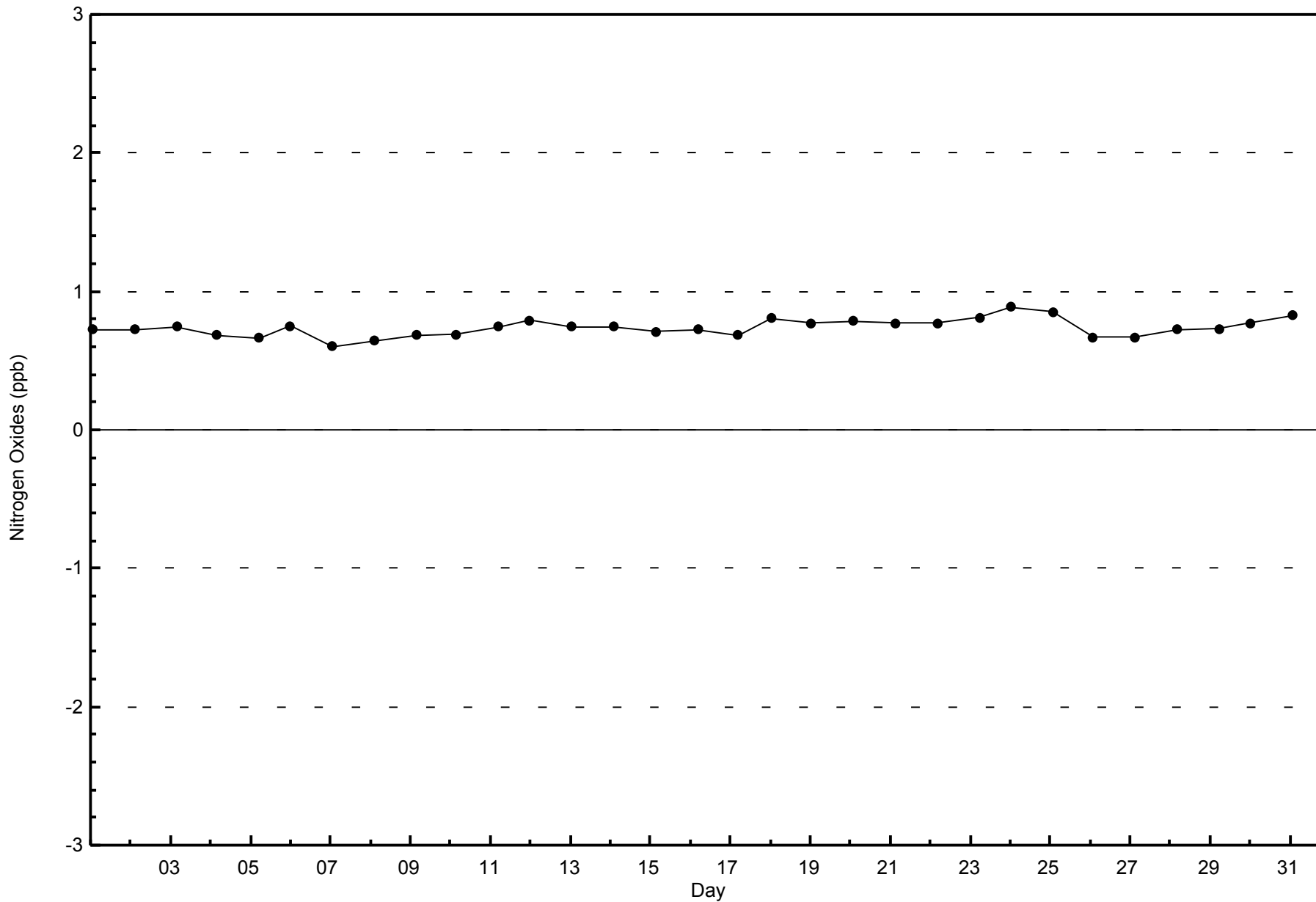
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River (AMS 16)

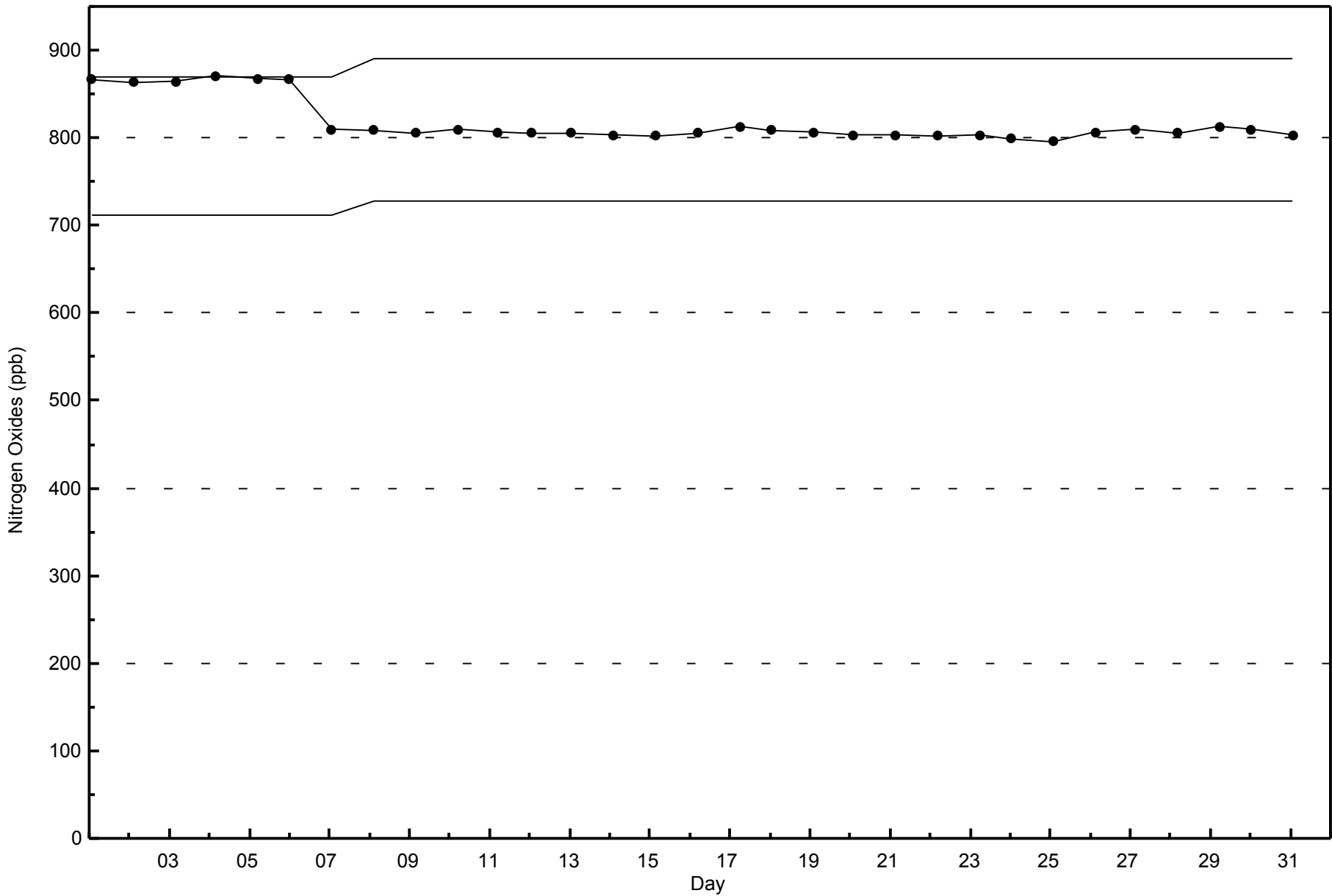






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Shell Muskeg River - May 2015





Number of Exceedences (AAAQO): 24-hr: 4	Hours in Service: 744
Maximum Value: 217.0 µg/m ³ on May 23 00:00	Maximum Daily Average: 44.8 µg/m ³ on May 22
Minimum Value: 0.8 µg/m ³ on May 16 18:00	Hours of Data: 726
Maximum Diurnal Average: 30.5 µg/m ³ at hour 24	Hours of Missing Data: 18
Monthly Average: 13.74 µg/m ³	Hours of Calibration: 0
Minimum Daily Average: 3.2 µg/m ³ on May 3	Percent Operational Time: 97.6
Minimum Diurnal Average: 7.4 µg/m ³ at hour 13	
Percentiles: P ₁ = 1.3 P ₁₀ = 2.5 Q ₁ = 4.0 Median = 7.2 Q ₃ = 14.2 P ₉₀ = 28.8 P ₉₉ = 111.2	

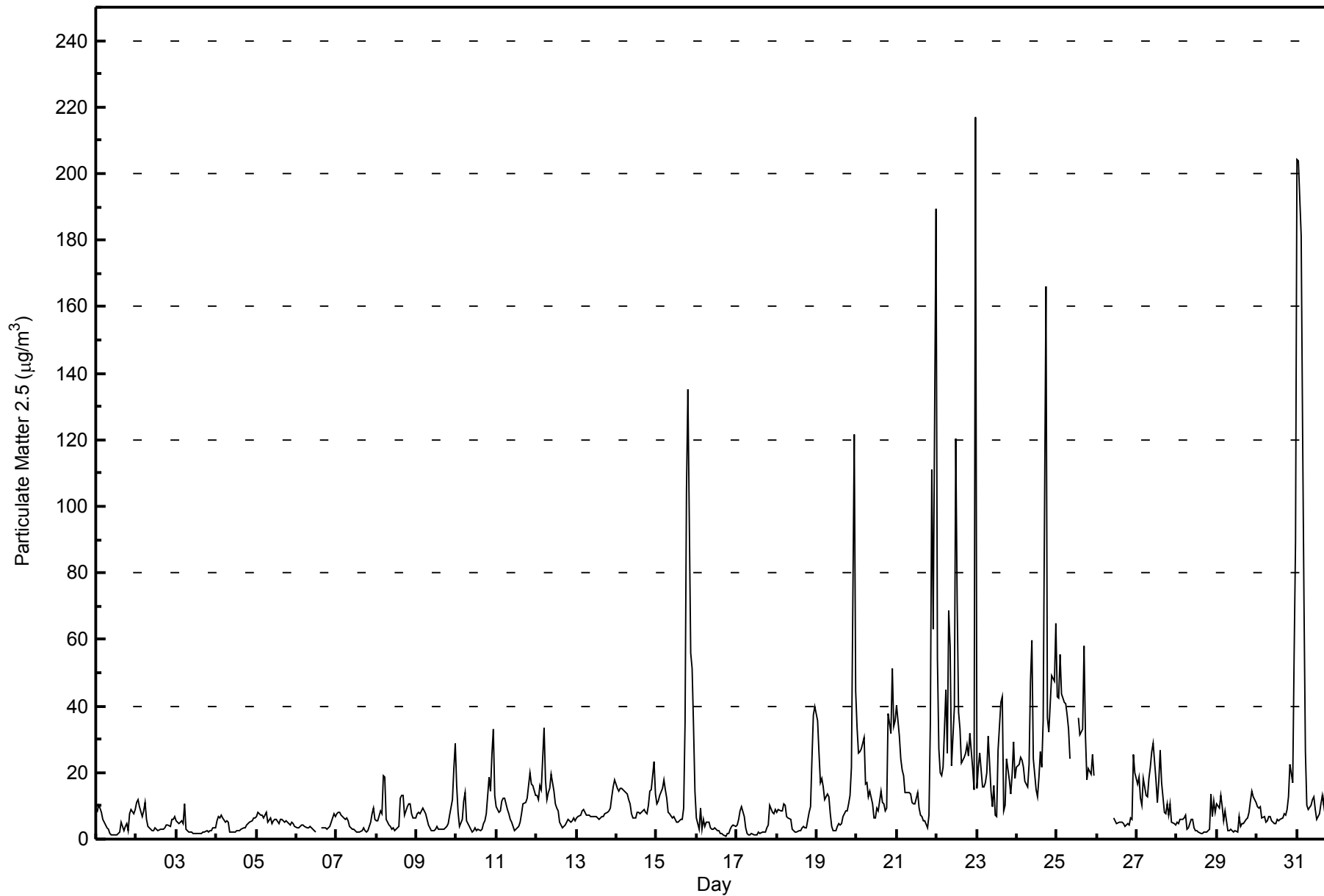
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	7.9	10.1	9.5	8.1	5.8	4.4	3.5	2.8	1.7	1.3	1.1	1.1	1.2	1.5	2.0	5.3	2.6	3.9	4.6	2.7	7.7	9.0	7.8	8.9	4.8	10.1	
2-May	11.1	11.9	9.6	7.0	8.5	11.1	6.0	3.8	3.3	2.7	2.4	3.2	2.9	2.4	2.9	3.0	3.0	3.2	4.3	4.4	4.0	5.9	5.8	6.9	5.4	11.9	
3-May	5.5	4.9	4.9	5.3	4.8	10.5	3.0	2.3	2.1	2.0	1.6	1.8	1.8	1.7	1.6	1.7	2.1	2.0	2.6	2.1	2.5	2.6	3.4	3.5	3.2	10.5	
4-May	5.3	6.7	6.4	7.1	6.6	5.2	5.6	4.9	2.1	2.1	2.2	2.2	2.3	2.4	2.5	2.9	3.4	3.3	4.1	4.8	5.0	5.7	6.3	6.2	4.4	7.1	
5-May	6.7	8.0	7.2	7.0	6.4	7.1	8.0	5.3	6.4	4.8	5.4	5.8	5.8	4.6	6.1	5.8	5.6	5.2	5.3	4.6	4.4	5.1	4.5	3.8	5.8	8.0	
6-May	3.4	3.6	3.7	4.3	4.3	3.9	3.2	3.2	3.7	3.2	3.0	2.2	M	M	M	3.4	3.2	3.3	3.2	3.4	3.6	5.1	7.5	6.9	3.9	7.5	
7-May	7.6	8.0	8.2	7.2	6.2	6.1	6.3	5.4	3.9	3.1	3.1	2.7	2.1	2.1	2.1	2.3	3.6	2.7	2.2	2.7	5.1	7.8	9.2	5.8	4.8	9.2	
8-May	5.7	5.3	8.5	7.8	19.0	18.7	6.0	4.3	3.9	2.8	3.4	2.3	3.0	3.8	12.3	13.2	12.9	7.0	9.7	10.4	10.5	7.7	6.5	6.5	8.0	19.0	
9-May	7.5	7.9	7.8	8.6	9.5	7.8	5.7	4.4	3.5	2.7	2.6	2.8	4.0	2.9	2.9	2.9	3.1	3.2	3.7	4.5	7.4	11.8	21.2	29.0	7.0	29.0	
10-May	16.2	7.9	4.0	5.9	11.4	14.1	5.3	4.5	2.8	2.2	2.5	3.2	2.7	2.9	2.6	3.1	4.5	5.4	7.7	18.6	14.3	25.5	32.9	13.2	8.9	32.9	
11-May	9.9	8.0	8.4	11.3	12.3	12.2	8.8	7.7	5.9	5.1	3.6	2.7	3.3	3.8	4.9	7.4	10.7	11.1	12.2	15.9	20.0	16.6	16.3	13.2	9.6	20.0	
12-May	13.0	11.8	16.0	15.0	33.5	17.6	11.7	13.8	15.2	19.5	14.2	10.8	9.4	8.6	5.0	3.5	3.9	4.1	5.0	5.8	5.1	5.4	6.6	5.6	10.8	33.5	
13-May	6.5	6.6	7.3	8.4	8.9	8.0	7.2	7.2	6.6	6.6	6.7	6.7	6.6	5.8	6.3	6.7	6.8	7.5	7.9	8.3	9.4	12.5	15.9	17.8	8.3	17.8	
14-May	15.2	14.3	15.5	15.4	14.8	14.2	13.4	11.9	10.6	7.5	6.2	6.4	7.8	8.2	7.7	7.9	9.1	8.2	7.7	10.0	14.3	14.8	23.3	13.6	11.6	23.3	
15-May	10.6	11.6	13.0	15.4	17.7	14.9	12.1	8.2	7.6	6.2	6.9	6.1	5.2	5.0	6.0	6.1	9.2	35.2	104.8	135.0	56.0	51.4	34.0	14.6	24.7	135.0	
16-May	6.4	2.8	9.3	3.0	6.1	3.8	5.2	5.3	3.4	2.8	3.1	3.3	2.5	2.6	1.9	1.7	1.3	0.8	1.5	1.7	2.8	3.9	4.3	3.7	3.5	9.3	
17-May	4.1	6.0	8.3	9.9	6.6	3.6	1.9	1.5	1.3	1.5	1.3	1.1	1.4	2.0	1.6	2.0	2.1	2.3	3.3	4.3	10.0	8.1	7.6	9.0	4.2	10.0	
18-May	8.2	9.0	8.3	8.5	10.6	10.4	6.9	6.6	6.1	3.1	2.6	2.0	2.2	2.6	2.5	3.2	3.9	3.4	3.5	7.9	9.8	24.2	37.4	39.8	9.3	39.8	
19-May	35.7	26.0	16.8	18.0	15.6	11.8	13.5	12.9	7.6	3.8	2.6	2.4	3.7	4.6	4.1	4.6	6.6	8.3	8.4	10.4	13.3	21.6	121.8	44.6	17.5	121.8	
20-May	33.5	26.0	26.3	27.1	30.4	16.7	17.1	12.8	14.5	10.7	6.2	6.2	9.4	8.5	14.5	10.9	10.4	8.4	9.4	37.5	31.6	51.1	33.8	35.4	20.4	51.1	
21-May	40.3	30.8	24.2	20.9	19.1	14.0	14.2	14.2	13.4	11.1	10.7	10.5	13.9	9.5	7.2	6.7	5.3	5.4	3.6	7.1	35.5	111.0	62.9	189.4	28.4	189.4	
22-May	54.4	27.2	19.8	19.1	21.7	45.1	26.0	68.6	57.9	22.2	39.3	120.3	71.1	38.2	32.9	22.9	24.7	25.9	28.4	24.9	31.8	21.0	15.0	217.0	44.8	217.0	
23-May	15.2	21.6	25.8	15.6	15.7	17.0	19.7	30.8	14.6	9.7	16.1	7.1	6.8	26.5	41.2	42.8	8.3	10.0	24.3	17.7	13.6	19.3	29.4	18.4	19.5	42.8	
24-May	21.8	22.5	24.4	23.9	21.7	17.5	15.8	22.3	47.5	59.6	24.3	14.8	12.9	18.8	26.1	21.7	35.5	166.2	36.3	32.3	40.7	49.0	47.6	65.0	36.2	166.2	
25-May	42.7	42.2	55.3	43.5	41.3	40.8	37.4	33.1	24.0	M	M	M	M	36.6	31.4	33.1	58.1	31.1	17.9	21.4	19.7	25.5	18.9	AF	34.4	58.1	
26-May	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	6.5	5.7	4.8	5.0	5.0	5.0	4.6	3.8	4.6	4.2	6.2	6.1	25.6	20.0	--	25.6
27-May	16.7	18.7	12.4	10.1	18.4	12.9	12.6	18.0	21.8	26.2	28.8	17.6	11.2	17.4	26.6	16.8	7.9	7.5	10.6	7.0	10.5	5.1	4.8	4.2	14.3	28.8	
28-May	5.2	4.8	5.8	6.1	6.4	7.1	2.8	3.6	5.9	5.8	3.3	2.4	2.4	2.3	1.9	1.8	2.1	2.1	2.3	2.8	13.4	6.8	11.4	8.1	4.9	13.4	
29-May	10.5	9.3	13.3	9.9	5.7	8.6	2.5	2.4	3.2	2.5	2.3	2.4	2.2	6.8	3.7	4.5	4.6	5.8	6.3	8.3	11.3	14.2	12.5	11.0	6.8	14.2	
30-May	9.6	9.1	9.9	6.3	6.8	5.2	5.7	6.8	6.7	5.6	4.8	4.8	5.8	5.4	6.0	6.2	7.8	7.3	8.7	12.6	22.6	16.9	54.9	89.6	13.5	89.6	
31-May	204.4	203.9	181.2	123.4	70.7	26.1	10.0	9.0	10.0	11.8	12.8	8.9	5.9	7.5	10.5	12.9	10.1	16.2	9.8	6.0	3.1	2.8	3.8	5.0	40.2	204.4	
21.4 19.6 19.0 16.0 15.5 13.2 9.9 11.2 10.6 8.6 7.7 9.0 7.4 8.3 9.4 8.8 8.9 13.2 11.7 14.2 14.4 18.5 22.4 30.5																								Diurnal Average			
204.4 203.9 181.2 123.4 70.7 45.1 37.4 68.6 57.9 59.6 39.3 120.3 71.1 38.2 41.2 42.8 58.1 166.2 104.8 135.0 56.0 111.0 121.8 217.0																								Diurnal Maximum			

M - Maintenance AF - Analyzer Failure
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m³



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River - May 2015





WBEA

Cumulative Frequency Distribution

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

Shell Muskeg River - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	260	35.81	35.81
6 - 15	303	41.74	77.55
16 - 25	72	9.92	87.47
26 - 80	77	10.61	98.07
> 81.0	13	1.79	99.86

Total Number of Valid Hours: 726

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Shell Muskeg River - May 2015

Concentration Ranges (μg/m ³)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	14	45	51	22	7	2	7	6	13	28	26	15	8	3	7	6	260
6 - 15	6	22	25	23	2	7	8	24	75	58	22	8	4	5	9	5	303
16 - 25	4	5	11	6	5	2	1	5	11	13	2	2	0	0	1	2	70
26 - 80	5	8	10	7	2	3	2	6	13	11	4	0	0	2	1	2	76
> 81.0	2	1	1	0	1	0	0	1	4	2	0	0	0	0	0	0	12
Totals	31	81	98	58	17	14	18	42	116	112	54	25	12	10	18	15	721

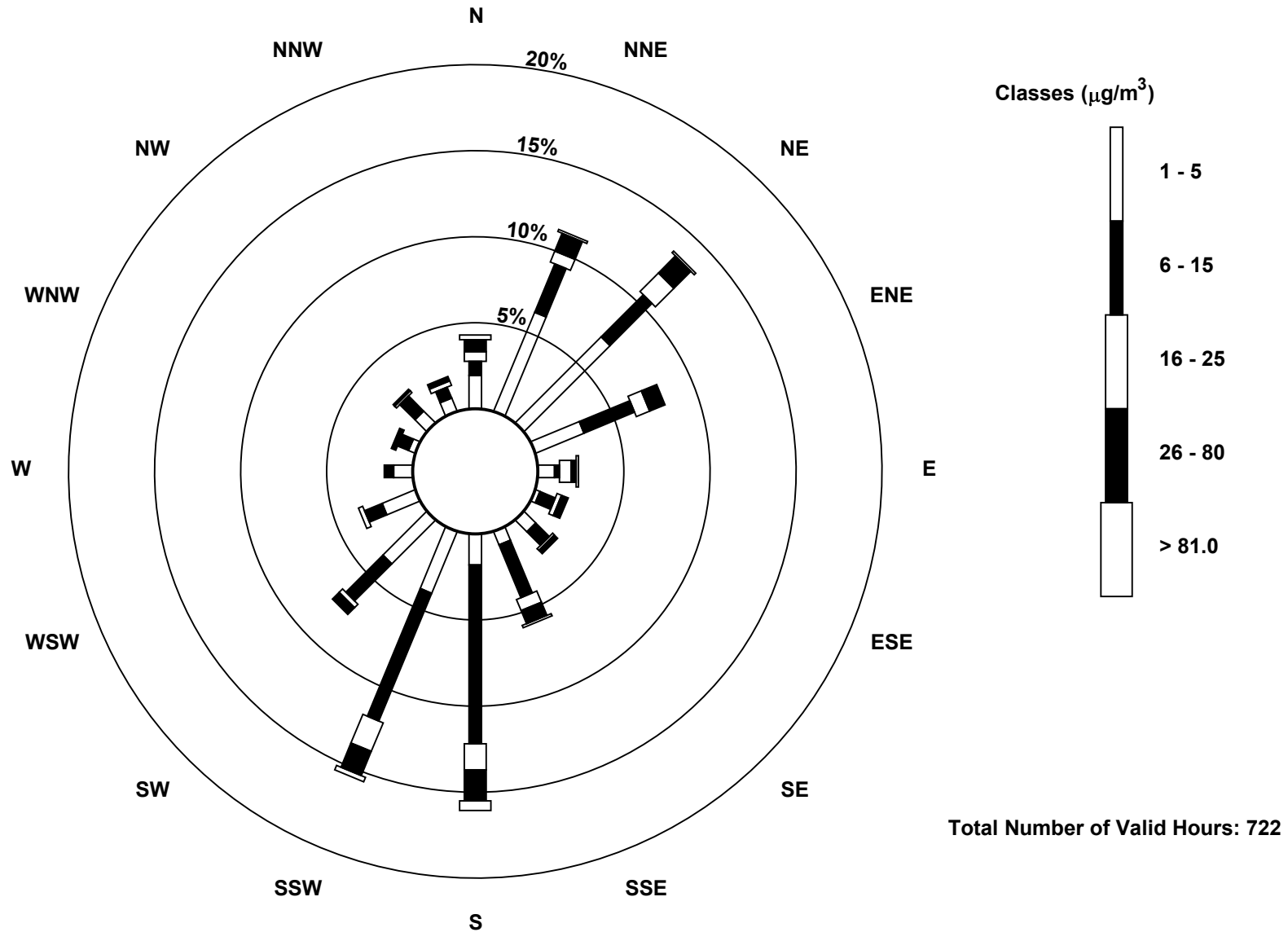
Total Number of Valid Hours: 722

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Shell Muskeg River (AMS 16)



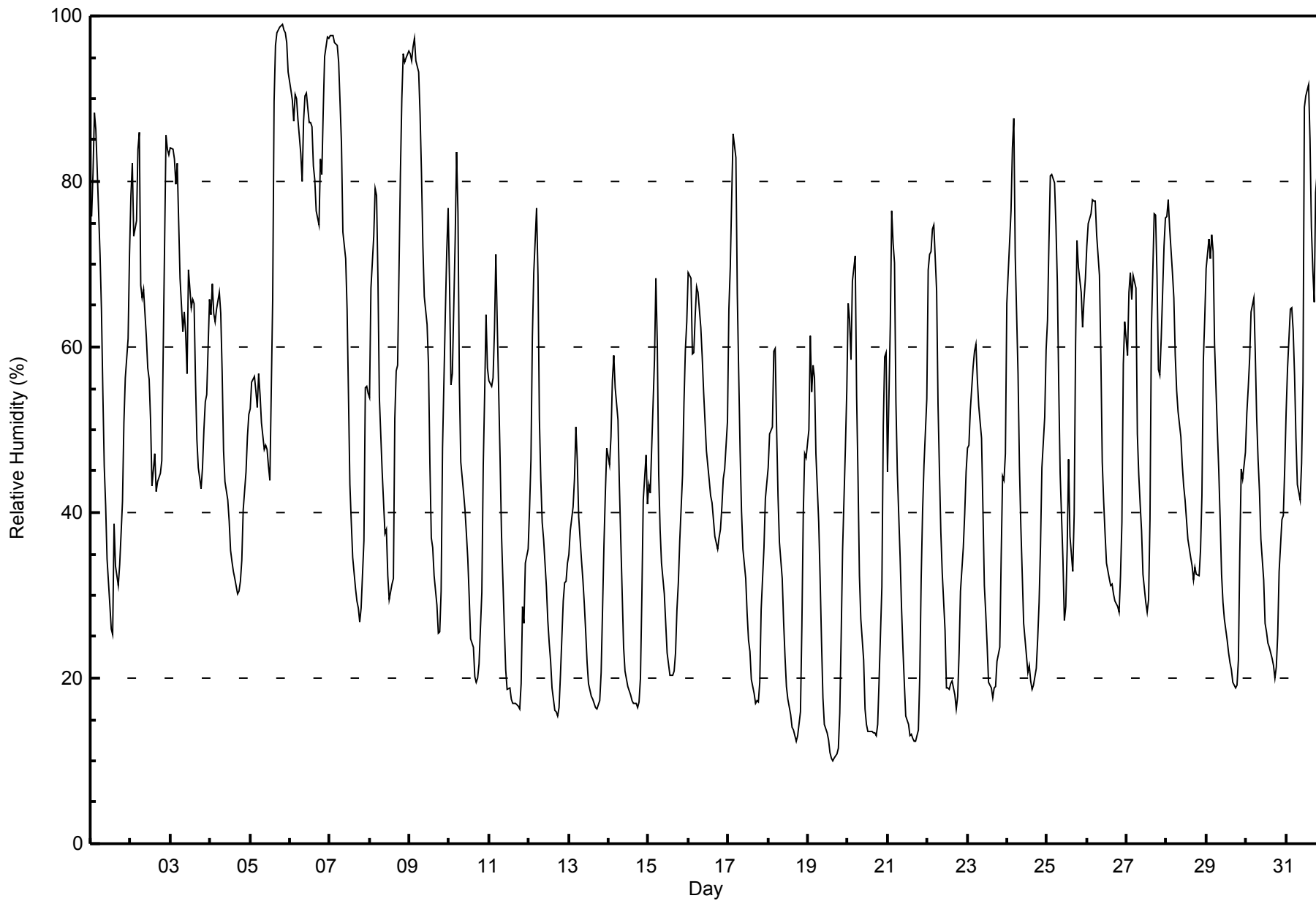


Maximum Value: 99 % on May 5 20:00														Maximum Daily Average: 86.8 % on May 6														Hours in Service: 744																					
Minimum Value: 10 % on May 19 16:00														Minimum Daily Average: 30.2 % on May 19														Hours of Data: 744																					
Maximum Diurnal Average: 72.5 % at hour 5														Minimum Diurnal Average: 32.2 % at hour 17														Hours of Missing Data: 0																					
Monthly Average: 48.3 %														Percentiles: P ₁ = 12 P ₁₀ = 19 Q ₁ = 30 Median = 46 Q ₃ = 66 P ₉₀ = 81 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-May	76	81	88	86	81	71	65	55	46	41	34	29	26	25	39	34	31	34	37	41	51	56	61	71	52.5	88																							
2-May	78	82	73	75	84	86	67	66	67	61	58	56	51	43	47	42	44	44	45	46	72	86	84	83	64.2	86																							
3-May	84	84	83	80	82	75	68	62	64	62	57	69	65	66	65	56	49	45	43	45	50	53	54	66	63.7	84																							
4-May	64	68	64	63	65	67	64	57	48	44	42	39	36	34	33	32	30	30	32	34	40	45	49	52	47.1	68																							
5-May	53	56	56	55	53	57	54	51	48	48	48	46	44	66	90	96	98	98	99	99	98	98	97	93	70.8	99																							
6-May	91	90	87	91	90	88	83	80	87	90	91	87	87	87	82	80	76	75	83	81	88	95	97	97	86.8	97																							
7-May	98	98	98	97	97	94	90	85	74	71	65	54	43	39	35	31	29	29	27	28	37	55	55	54	61.7	98																							
8-May	54	67	73	79	78	68	54	45	41	37	38	32	29	31	32	51	57	58	81	90	95	94	95	96	61.6	96																							
9-May	95	95	96	97	95	93	88	81	72	66	63	58	46	37	36	32	29	25	26	31	48	64	72	77	63.4	97																							
10-May	68	55	57	73	84	76	56	46	42	40	37	34	30	25	24	20	19	20	22	30	46	54	64	57	45.0	84																							
11-May	56	55	56	62	71	63	47	37	32	26	21	19	19	17	17	17	17	17	16	19	29	27	34	36	33.7	71																							
12-May	41	46	61	69	77	69	51	44	39	37	31	27	24	22	19	16	16	15	16	20	29	32	32	34	36.1	77																							
13-May	35	38	41	44	50	46	39	34	32	29	26	22	19	18	18	17	16	16	17	21	28	36	42	48	30.5	50																							
14-May	46	49	56	59	55	51	43	37	30	24	21	19	18	17	17	17	17	17	17	20	30	42	47	41	32.9	59																							
15-May	43	42	48	58	68	60	45	38	34	30	27	23	22	20	20	21	23	28	32	37	45	53	60	63	39.2	68																							
16-May	69	68	59	59	64	67	67	62	59	55	51	47	44	42	41	39	37	36	37	38	41	44	45	51	50.9	69																							
17-May	65	70	78	86	83	66	57	47	40	36	32	28	25	23	20	18	17	17	17	19	28	36	42	44	41.4	86																							
18-May	45	49	50	60	60	50	42	37	32	27	23	19	17	16	14	14	13	12	13	16	26	40	47	47	32.0	60																							
19-May	50	61	55	58	56	47	39	32	24	18	14	13	13	11	10	10	10	11	12	16	25	35	48	55	30.2	61																							
20-May	65	63	58	68	71	54	44	32	27	22	16	14	14	14	14	13	13	13	14	20	31	50	59	59	35.5	71																							
21-May	45	63	76	73	70	53	45	35	29	24	19	15	14	13	13	13	12	12	14	20	32	40	46	54	34.6	76																							
22-May	69	71	71	74	75	67	53	45	38	33	26	19	19	19	19	20	18	16	18	23	31	36	40	45	39.3	75																							
23-May	48	48	52	58	59	60	56	53	49	40	31	28	24	19	19	18	19	19	22	24	35	44	44	47	38.2	60																							
24-May	65	73	76	84	88	71	57	46	38	32	27	23	21	21	20	19	19	21	25	29	36	45	52	60	43.6	88																							
25-May	63	73	81	81	80	75	68	55	45	34	27	29	36	46	37	33	40	60	73	70	67	62	66	68	57.0	81																							
26-May	72	75	76	78	78	78	73	69	59	46	41	37	34	32	31	31	30	29	29	28	32	39	58	63	50.8	78																							
27-May	59	67	69	66	69	67	50	45	41	38	33	29	28	29	39	62	76	76	69	57	57	61	72	76	55.6	76																							
28-May	76	78	74	69	66	59	55	52	49	46	43	42	39	37	35	34	32	33	32	32	35	42	58	63	49.2	78																							
29-May	70	73	71	74	71	60	50	45	39	33	29	27	24	23	22	21	20	19	19	22	35	45	44	47	41.0	74																							
30-May	52	55	59	64	66	59	52	46	43	37	32	27	26	24	24	22	22	20	21	25	33	39	40	45	38.9	66																							
31-May	52	57	65	65	62	57	49	43	42	46	56	89	90	92	85	74	69	65	79	83	80	81	87	92	69.2	92																							
																								62.8	66.1	68.0	71.1	72.5	66.3	57.1	50.4	45.4	41.0	37.3	35.5	33.1	32.6	32.8	32.4	32.2	32.7	35.0	37.6	45.5	52.6	57.7	60.8	Diurnal Average	
																								98	98	98	97	97	94	90	85	87	90	91	89	90	92	90	96	98	98	99	99	98	98	97	97	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Shell Muskeg River - May 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Shell Muskeg River - May 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	95	12.77	12.77
20 - 40	208	27.96	40.73
40 - 60	211	28.36	69.09
60 - 80	148	19.89	88.98
80 - 100	82	11.02	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

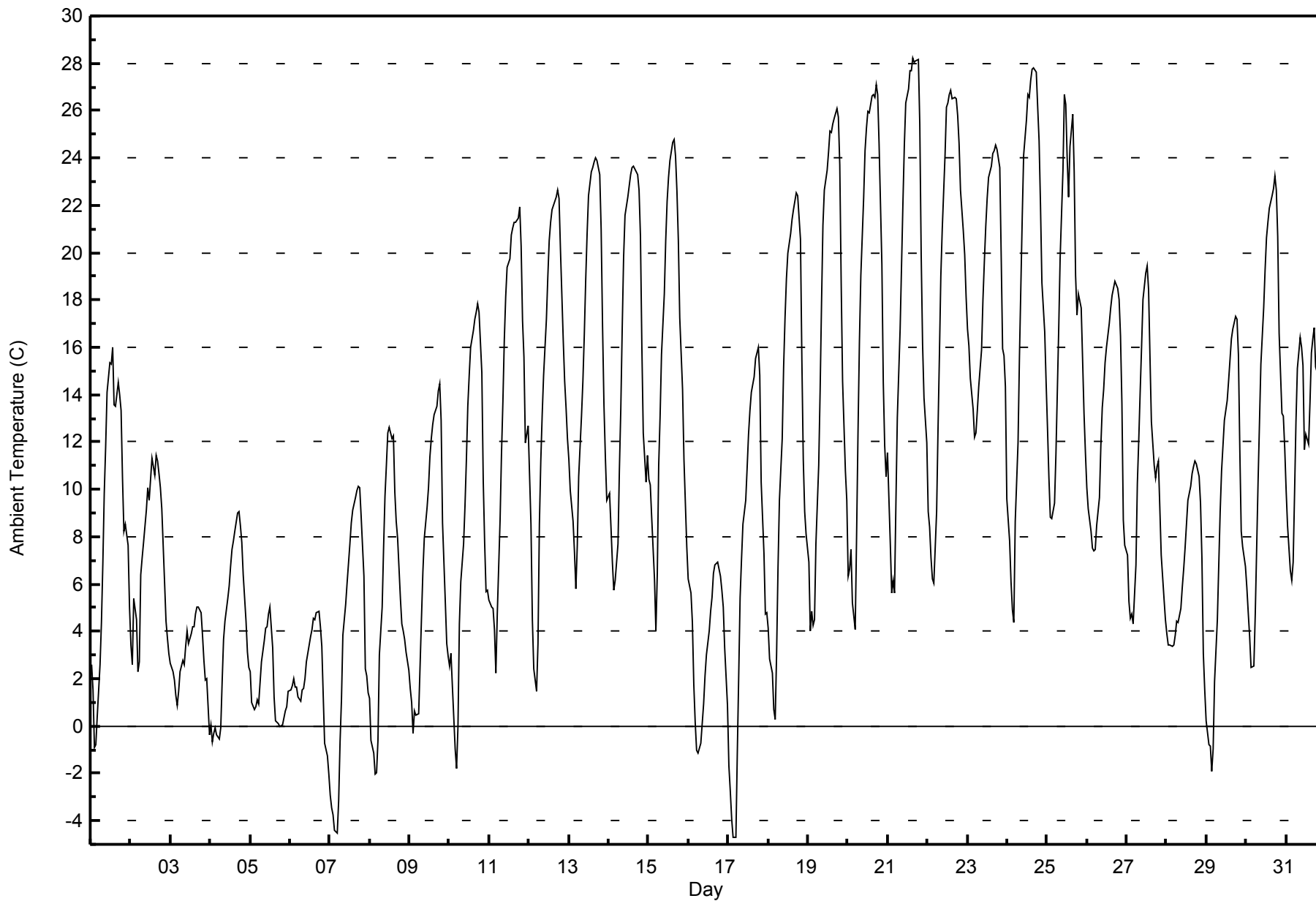


Maximum Value: 28.2 C on May 21 16:00		Maximum Daily Average: 19.0 C on May 22		Hours in Service: 744																																												
Minimum Value: -4.7 C on May 17 04:00		Minimum Daily Average: 1.7 C on May 5		Hours of Data: 744																																												
Maximum Diurnal Average: 17.2 C at hour 17		Minimum Diurnal Average: 2.7 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 11.09 C		Percentiles: P ₁ = -3.2 P ₁₀ = 1.3 Q ₁ = 4.5 Median = 10.1 Q ₃ = 16.8 P ₉₀ = 23.4 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-May	2.6	1.5	-0.9	-0.8	0.4	2.6	4.4	6.9	9.8	11.8	14.1	15.4	15.3	16.0	13.6	13.5	14.5	14.0	13.3	10.5	8.2	8.5	7.6	5.0	8.7	16.0																						
2-May	3.4	2.6	5.4	4.5	2.3	2.7	6.4	7.1	7.8	9.1	10.1	9.5	10.4	11.3	10.6	11.4	11.2	10.6	10.1	9.1	6.0	4.4	3.7	3.1	7.2	11.4																						
3-May	2.6	2.3	1.9	1.3	0.9	1.5	2.3	2.8	2.6	3.4	4.0	3.5	3.9	4.2	4.2	4.7	5.0	5.1	4.8	3.8	2.7	1.9	2.0	-0.4	3.0	5.1																						
4-May	0.0	-0.7	-0.3	-0.1	-0.4	-0.5	-0.1	1.9	3.6	4.4	5.4	5.9	6.8	7.4	7.8	8.2	9.0	9.1	8.5	7.8	6.4	4.5	3.1	2.5	4.2	9.1																						
5-May	2.3	1.0	0.7	0.8	1.1	0.9	1.8	2.7	3.6	4.1	4.2	4.8	5.0	3.3	1.2	0.2	0.1	0.1	0.0	0.1	0.4	0.6	0.8	1.5	1.7	5.0																						
6-May	1.5	1.7	2.0	1.6	1.7	1.2	1.1	1.5	1.6	2.0	2.7	3.4	3.8	4.1	4.5	4.5	4.8	4.8	4.2	3.3	1.3	-0.7	-1.3	-2.0	2.2	4.8																						
7-May	-2.9	-3.5	-3.8	-4.4	-4.6	-3.1	-0.7	1.1	3.8	5.1	6.1	6.9	7.7	8.6	9.1	9.7	9.9	10.1	10.0	8.9	6.3	2.4	2.1	1.4	3.6	10.1																						
8-May	1.2	-0.6	-1.2	-2.0	-2.0	-0.6	3.0	5.0	7.5	9.7	11.0	12.4	12.6	12.2	12.3	9.9	8.7	7.9	5.4	4.3	4.0	3.6	3.2	2.4	5.4	12.6																						
9-May	1.6	1.0	-0.3	0.6	0.5	0.5	2.5	4.5	6.5	8.0	9.2	10.1	11.4	12.1	12.7	13.1	13.5	14.2	14.5	12.9	8.6	5.2	3.5	2.9	7.1	14.5																						
10-May	2.5	3.1	1.7	-1.0	-1.8	0.0	4.3	6.1	7.7	9.3	11.2	13.5	14.8	16.0	16.7	17.2	17.5	17.8	17.5	14.9	10.3	7.8	5.7	5.8	9.1	17.8																						
11-May	5.3	5.0	5.0	4.1	2.2	4.7	8.7	11.5	13.7	16.3	18.1	19.4	19.8	20.8	21.0	21.3	21.3	21.5	21.9	20.3	17.2	15.6	12.0	12.7	14.1	21.9																						
12-May	10.6	8.6	4.5	2.4	1.4	3.5	8.5	11.2	13.2	14.8	17.2	19.0	20.5	21.3	21.8	22.2	22.3	22.7	22.3	20.2	16.3	14.6	13.4	12.2	14.4	22.7																						
13-May	11.3	9.9	8.7	7.3	5.8	7.6	10.5	13.1	14.6	16.5	18.9	20.8	22.4	23.4	23.6	23.8	24.0	23.9	23.3	21.0	16.9	13.6	11.4	9.5	15.9	24.0																						
14-May	9.8	8.4	6.9	5.7	6.2	7.7	10.9	13.4	16.8	19.8	21.6	22.4	22.8	23.3	23.6	23.7	23.4	23.3	22.7	20.7	16.0	12.4	10.3	11.4	16.0	23.7																						
15-May	10.5	10.2	8.8	6.2	4.0	6.5	11.0	13.1	15.7	18.2	20.5	22.2	23.2	23.9	24.6	24.8	24.1	22.6	20.5	17.2	14.2	11.2	9.4	7.6	15.4	24.8																						
16-May	6.2	5.6	4.4	1.7	0.2	-1.0	-1.1	-0.8	0.1	0.9	2.1	3.0	4.0	4.8	5.5	6.4	6.8	6.9	6.6	6.3	5.7	5.0	3.3	0.9	3.5	6.9																						
17-May	-1.7	-2.8	-3.9	-4.7	-4.7	-1.1	2.1	5.4	7.1	8.5	9.5	10.9	12.3	13.3	14.1	14.7	15.5	15.8	16.0	14.8	10.3	7.3	4.8	4.8	7.0	16.0																						
18-May	4.2	2.8	2.2	0.7	0.3	3.1	6.7	9.5	12.1	15.2	17.2	18.9	20.0	20.8	21.4	21.8	22.2	22.6	22.4	20.5	15.5	11.3	9.1	8.1	12.9	22.6																						
19-May	6.9	4.0	4.9	4.3	4.5	7.7	11.0	14.2	17.9	21.2	22.6	23.5	24.3	25.2	25.1	25.4	25.7	26.1	25.8	23.7	18.7	14.6	10.8	9.5	16.6	26.1																						
20-May	6.3	6.7	7.4	5.2	4.1	8.1	12.4	16.2	19.0	22.3	24.3	25.2	25.9	25.9	26.6	26.7	26.6	27.1	26.7	24.6	19.5	14.5	11.8	10.5	17.7	27.1																						
21-May	11.6	7.7	5.6	6.1	5.6	9.4	13.0	16.7	19.4	22.1	24.6	26.3	26.9	27.7	27.7	28.2	28.0	28.1	28.1	25.4	19.9	16.1	13.8	11.9	18.8	28.2																						
22-May	9.1	8.4	7.1	6.2	6.1	9.1	12.6	15.7	19.0	21.0	24.2	26.2	26.3	26.7	26.8	26.5	26.6	26.5	25.8	24.6	22.6	20.9	19.9	18.1	19.0	26.8																						
23-May	16.8	16.1	14.7	13.4	12.2	12.4	13.3	14.4	15.9	18.0	19.6	21.1	22.3	23.2	23.7	24.2	24.3	24.5	24.3	23.6	19.9	16.0	15.7	14.3	18.5	24.5																						
24-May	9.6	7.8	6.1	4.9	4.4	8.6	11.9	15.6	18.5	21.5	24.1	25.6	26.7	26.6	27.3	27.7	27.8	27.6	26.1	24.7	22.0	18.7	16.7	14.5	18.5	27.8																						
25-May	12.6	10.5	8.8	8.8	9.4	11.5	14.2	16.8	19.8	23.5	26.7	26.3	24.0	22.4	24.5	25.9	23.4	19.0	17.3	18.3	17.7	15.5	13.2	11.6	17.6	26.7																						
26-May	10.1	9.2	8.2	7.5	7.4	7.5	8.4	9.6	11.8	13.5	14.2	15.3	16.0	17.0	17.7	18.2	18.5	18.8	18.5	18.0	16.5	13.6	8.7	7.6	13.0	18.8																						
27-May	7.2	5.2	4.5	4.7	4.3	6.8	10.3	12.1	14.1	16.0	18.0	19.1	19.4	18.4	15.6	12.9	11.0	10.5	10.9	11.2	9.3	7.2	5.4	4.5	10.8	19.4																						
28-May	3.9	3.4	3.4	3.4	3.4	3.9	4.4	4.4	5.0	5.9	6.7	7.5	8.5	9.5	10.1	10.6	10.9	11.2	11.1	10.5	9.4	7.1	3.1	1.6	6.6	11.2																						
29-May	0.2	-0.8	-0.9	-1.9	-1.0	1.9	4.5	6.8	9.0	10.8	11.8	12.9	13.8	14.6	15.5	16.3	16.8	17.3	17.2	15.7	11.7	8.2	7.6	6.8	9.0	17.3																						
30-May	5.9	4.8	3.8	2.5	2.5	4.8	7.5	10.3	12.8	15.3	17.6	19.3	20.6	21.3	21.9	22.4	22.7	23.2	22.6	20.7	16.6	13.2	13.1	11.8	14.0	23.2																						
31-May	10.0	8.5	6.6	6.1	6.9	9.8	12.8	15.1	16.4	16.0	15.2	11.6	12.3	11.9	13.7	15.7	16.3	16.8	15.2	14.8	13.7	12.4	11.2	10.1	12.5	16.8																						
																								5.8	4.8	3.9	3.1	2.7	4.4	7.1	9.2	11.2	13.0	14.6	15.5	16.3	16.7	16.9	17.2	17.2	17.1	16.6	15.2	12.4	9.9	8.2	7.2	Diurnal Average
																								16.8	16.1	14.7	13.4	12.2	12.4	14.2	16.8	19.8	23.5	26.7	26.3	26.9	27.7	27.7	28.2	28.0	28.1	28.1	25.4	22.6	20.9	19.9	18.1	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Shell Muskeg River - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Shell Muskeg River - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	42	5.65	5.65
0 - 10	326	43.82	49.46
10 - 20	243	32.66	82.12
> 20	133	17.88	100.00

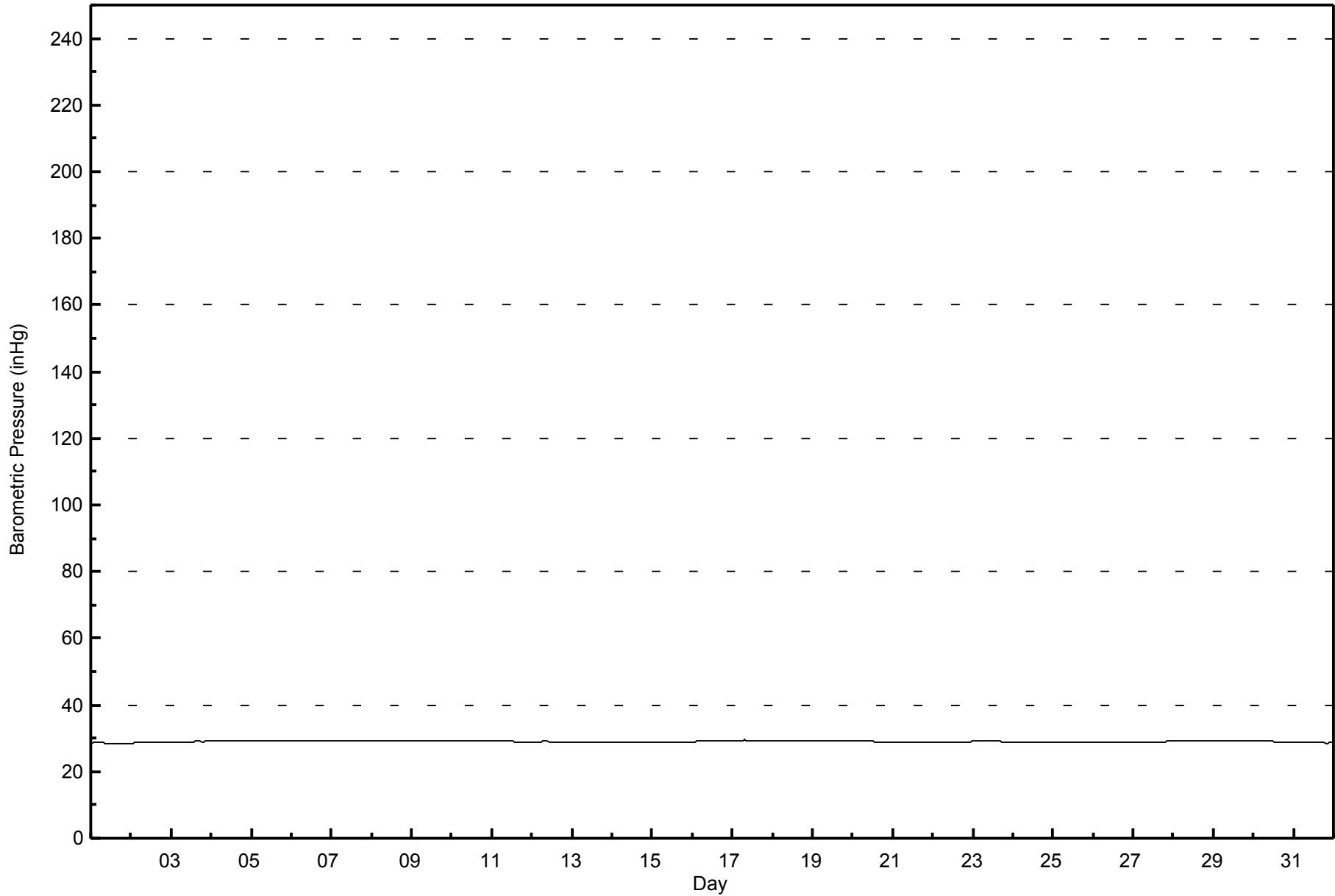
Total Number of Valid Hours: 744

Total Number of Hours: 744



WBEA
Hourly Averages

Barometric Pressure (BP) - inHg
Shell Muskeg River - May 2015





Maximum Speed: 32 km/h on May 27 21:00	Maximum Daily Speed Average: 19.1 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 24 17:00	Minimum Daily Speed Average: 0.4 km/h on May 8	Hours of Data: 740
Maximum Diurnal Speed Average: 4.9 km/h at hour 21	Minimum Diurnal Speed Average: 1.1 km/h at hour 7	Hours of Missing Data: 4
Monthly Average Velocity: 1.6 km/h 64.4 deg	Percentiles: P ₁ = 1 P ₁₀ = 4 Q ₁ = 6 Median = 9 Q ₃ = 13 P ₉₀ = 18 P ₉₉ = 26	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-May	S7	S4	S9	S9	S12	SSW10	SSW8	SSW13	SW18	SW18	SW19	WSW18	WSW17	WSW15	NW9	WSW13	SW12	NW8	N4	SSW7	WNW6	NW8	NW7	NW5	SW7.9	SW19	
2-May	NW7	NNW6	NNW8	NW4	NW2	NW3	N12	NNE17	NNE15	NNE14	NNE16	N17	NE17	NNE15	NW11	NNW11	N17	NNE19	NNE15	NNE15	NW20	N15	NNE19	NNE15	N11.9	NW20	
3-May	NNE13	N11	N13	N11	NNE9	N9	NNW8	NNW5	NNW4	WNW6	NW8	NE18	NE11	NNE14	NNE13	NE16	NNE15	N13	N12	ENE10	ENE10	ENE9	ENE11	ENE9	NNE9.1	NE18	
4-May	ENE9	ENE8	ENE9	ENE9	ENE10	ENE8	ENE5	NE4	NE7	ENE8	NNE9	NNE9	NE6	NE8	NE10	ENE4	ENE10	ENE12	ENE16	ENE16	ENE16	NE19	NE18	NE15	NE18	NE9.4	NE19
5-May	NE17	NE17	NE16	NE16	NE14	NNE12	NNE15	NE14	NNE15	NE17	NNE20	NNE17	NNE19	NE21	NE19	ENE13	ENE12	E6	E7	ENE9	ENE9	NE12	NE15	NE17	NE13.8	NE21	
6-May	NNE15	NNE15	NNE15	NNE15	NNE18	NNE17	NNE16	NNE15	NNE17	NNE17	NNE19	NE23	NE21	NE21	NE18	ENE15	ENE14	ENE11	ESE8	E5	S1	S4	S3	SW3	NE11.6	NE23	
7-May	SE4	S4	S5	S6	S7	S6	S7	SSW7	SSW8	SW9	WNW3	NE7	NE9	NE10	NE8	NE12	NE12	ENE12	E10	E7	E9	E9	ESE5	SSE5	ESE3.3	NE12	
8-May	SW4	SE3	SE4	SE6	SSE3	SW4	SSE4	S7	SW6	SSW5	NNW2	SW6	WSW2	NE6	NNW8	NW20	NNW22	WSW11	ENE11	ENE8	ESE7	SE11	SE4	NE5	SW0.4	WNW22	
9-May	NE5	NE10	ENE7	ENE11	ENE9	ENE5	ENE9	ENE4	NW4	WSW6	W6	W10	W10	WSW8	WSW8	WNW4	W6	S3	S3	SSE4	S4	SE4	E5	ENE5	NE0.4	ENE11	
10-May	E5	SW3	SE4	ESE3	ENE4	ENE4	E2	NNE4	NE6	NE5	NE5	NNE5	NNE6	NW7	W8	WSW8	W5	W6	WSW8	WSW2	ESE7	SE3	SSE6	SSE6	E0.5	WSW8	
11-May	SSE7	S8	SSW8	SSW9	SSW9	S9	S7	SSW8	SW12	SW11	WSW7	SW3	N2	SSW3	W3	NNW1	ENE5	ENE5	S5	AF	NE12	NE10	E9	NE10	S2.8	SW12	
12-May	NE9	NE9	ENE4	WNW1	E3	ESE3	ESE2	N2	NW5	NNW6	NNW6	WNW7	WNW9	W9	SSE4	SE5	ESE8	SE7	SE8	SSE8	SE14	SE16	SSE18	SSE15	SE3.0	SSE18	
13-May	SSE14	SSE11	SSE11	SSE7	SSE8	S8	S11	S13	SSW14	SSW15	SSW13	SSW13	SSW13	SSW14	SSW13	S12	S11	SSW11	S12	S10	S8	S9	S8	S9	S10.8	SSW15	
14-May	S10	S9	S7	S10	S8	S9	SSW10	SSW11	SW14	SW19	SW18	SW19	SSW17	SSW16	SSW13	SSW11	SW14	SW12	SSW11	SSW9	SSW8	SSW8	SSW10	SSW11	SSW11.5	SW19	
15-May	SSW10	SSW11	S9	S0	SSE6	S6	S3	SSW7	S9	S11	SW12	WSW18	WSW17	WSW13	WSW16	WSW14	WSW15	NNW10	N24	N28	N28	N28	N27	NNE28	WNW4.3	N28	
16-May	N22	N20	NNE27	NNE27	NNE25	N23	N21	N20	NNE22	NNE21	NNE18	NNE21	NE22	NE23	NE23	NE19	NE18	NE19	NE18	NE17	NE16	NE16	ENE14	ENE11	NNE19.1	NNE27	
17-May	ENE6	ESE4	S4	S6	SSE8	SSE7	S9	S16	S16	SSW12	SSW11	SSW11	SSW12	SW12	SSW11	SSW10	S9	SSW8	SSE8	SSE8	SSE6	SSE6	S10	S12	S8.3	S16	
18-May	S11	S9	SSW6	SSE6	S9	S9	SSW9	SSW12	SSW12	SW12	SW11	SW14	SSW12	SSW11	SSW10	SW10	SW9	SW5	SSW7	SSW8	SSW6	SSW8	SSW8	S7	SSW8.8	SW14	
19-May	S6	S8	S10	S9	S9	S7	SSW9	SSW11	SW12	SW15	SW11	WSW9	SSW6	S8	SSW8	SSW5	SSW5	SSW7	S7	S5	S4	SSW4	SSW7	S6	SSW7.3	SW15	
20-May	S9	SSW8	S9	S8	S9	S8	SSW5	SSW7	SSW8	SW9	SW10	SW11	SW13	SW9	WSW10	WSW11	W9	SW7	W6	AF	E3	SSE4	SSE4	SW6	SSW6.9	SW13	
21-May	SSW7	SSW6	SSW8	S8	SSW7	S7	SSW8	S9	SSW8	SSW7	SW10	SSW12	SSW12	SSW10	SSW9	SSW8	SW7	WSW4	SSW2	S3	SSW5	SSW6	SW4	E1	SSW6.8	SSW12	
22-May	S5	SSW5	S8	S6	S6	S4	SSW5	SW4	ENE2	ENE8	NE10	NNE16	NNE20	NNE17	NNE18	NE22	NNE21	NNE19	NE21	NE17	NE17	NE13	NE16	NE15	NE8.8	NE22	
23-May	NNE14	NNE15	NNE18	NE12	NE11	NE9	NE9	NE10	NE13	NE13	NE12	NE9	NE8	NE10	NE9	NE8	ENE6	E2	AF	ENE6	ENE8	NE9	NE9	NE9	NE9.7	NNE18	
24-May	ENE4	E2	SSE3	SSW4	S6	SSW5	SSW6	WSW4	WNW1	WNW2	NNE1	W2	ENE1	NE6	ENE4	NW4	ESE0	AF	ENE7	ENE5	ENE4	NE5	NE4	ENE2	E1.0	ENE7	
25-May	ESE2	SE2	S5	SW7	S7	S5	SSW5	SSW9	SSW5	S3	SW3	SW9	N3	NNW9	SSW5	SSW12	NW12	NNE17	N6	NNW11	N15	N16	N18	N22	NNW2.5	N22	
26-May	NNE19	NNE15	NNE14	N14	N13	NNE13	NNE9	NNE8	N6	NE16	NE18	NE14	NE14	NE10	NE8	NE14	NE12	NE14	NE14	NE16	NE12	ENE10	ESE5	ESE4	NE11.3	NNE19	
27-May	SE2	SSW4	SSW6	SW4	SW5	SSW2	S3	SSW3	ENE1	N3	NNE4	NNE5	N6	N19	NNE25	NNE23	NNE21	NNE15	NNE13	NNE27	NNE32	NNE26	NE28	NNE25	NNE10.2	NNE32	
28-May	NE26	NNE17	NNE16	NNE18	NNE17	NNE18	NNE17	NNE21	NNE19	NNE15	NNE17	NNE14	NE15	NE15	NE16	NE17	NE16	NE17	NNE15	NNE14	NE11	ENE11	ESE5	SE4	NNE14.7	NE26	
29-May	SE4	SSE3	SW5	S8	SSE4	SSE4	SSW6	SW7	SW9	SW9	SSW5	W7	SW5	E3	NW2	SSE6	SW5	SSW9	SSW8	SSW7	S6	SSE9	S9	S11	SSW5.4	S11	
30-May	S12	S11	S5	S7	S9	S8	S9	SSW8	SSW9	SW11	SW10	SSW12	S10	SSW11	SSW10	SSW10	SSW10	S12	S9	SSE9	SSE8	SSE10	SSE11	S8	S8.9	S12	
31-May	S9	S10	S8	SSE10	SSE9	SSE9	SSE11	S9	SSE10	S6	SSW16	S7	S8	S10	S11	S12	SSW10	SSW8	S8	S8	S10	SSW7	S5	SW5	S8.7	SSW16	

ENE3.0	E2.1	E1.7	E1.9	ESE2.3	ESE1.7	SE1.1	S1.4	SW1.4	WSW1.4	NNW1.6	NW1.6	N1.2	NNE2.1	NNE1.7	NNE1.4	N2.0	NE2.7	ENE3.3	ENE4.5	ENE4.9	ENE4.6	ENE4.2	ENE3.7	Diurnal Average	
NE26	N20	NNE27	NNE27	NNE25	N23	N21	NNE21	NNE22	NNE21	NNE20	NE23	NE22	NE23	NNE25	NNE23	WNW22	NNE19	N24	N28	NNE32	N28	NE28	NNE28	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

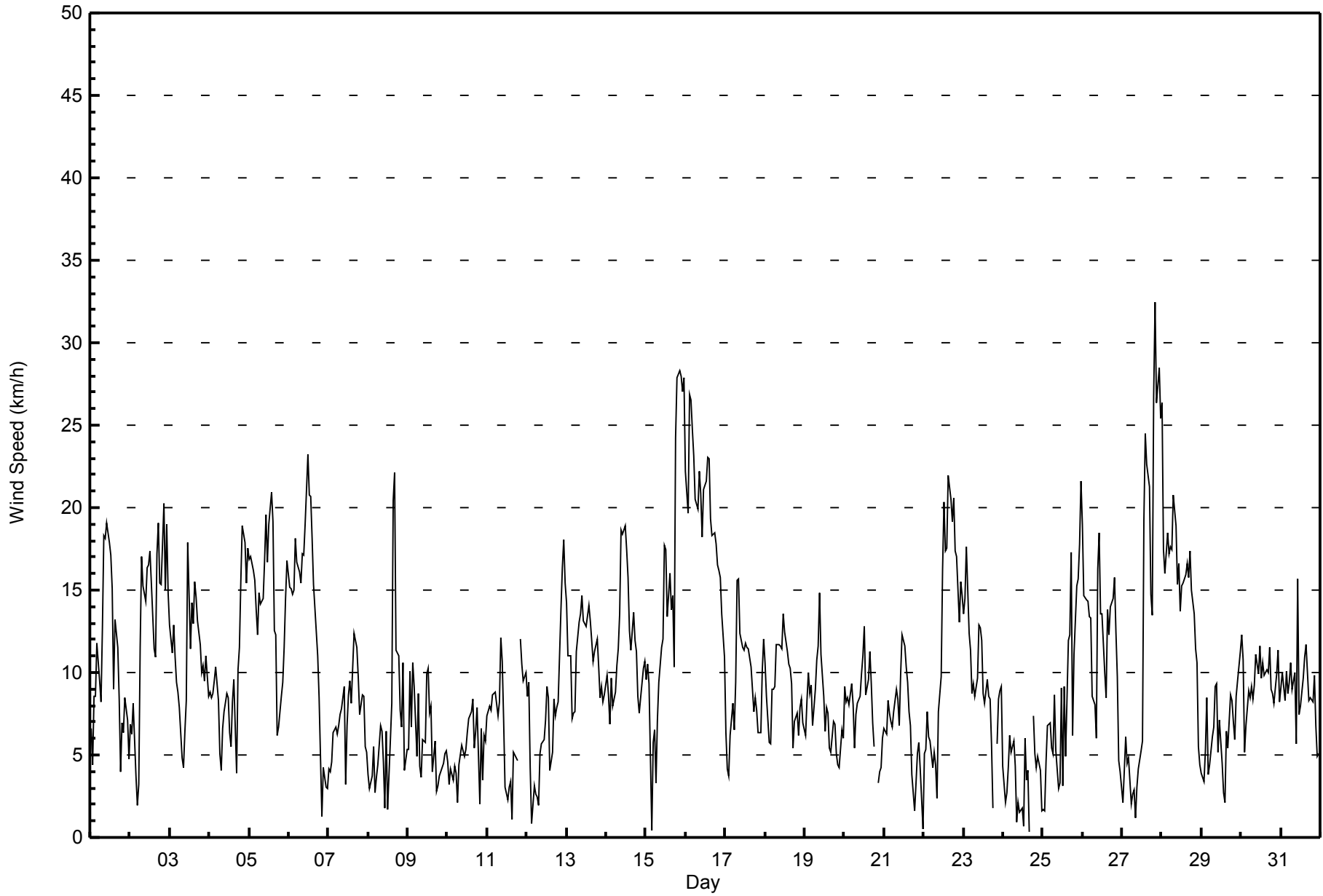
Wind Speed (WS) - km/h
Shell Muskeg River - May 2015

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Shell Muskeg River - May 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - May 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	160	21.62	21.62
6 - 11	340	45.95	67.57
12 - 19	197	26.62	94.19
20 - 28	42	5.68	99.86
29 - 38	1	0.14	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 740

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Shell Muskeg River - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	5	7	18	10	10	12	11	24	19	15	5	2	5	8	4	160
6 - 11	7	6	32	32	7	4	4	28	83	72	23	10	10	4	7	11	340
12 - 19	13	58	53	8	0	0	2	3	10	21	18	10	0	0	1	0	197
20 - 28	11	17	11	0	0	0	0	0	0	0	0	0	0	1	2	0	42
29 - 38	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	36	87	103	58	17	14	18	42	117	112	56	25	12	10	18	15	740

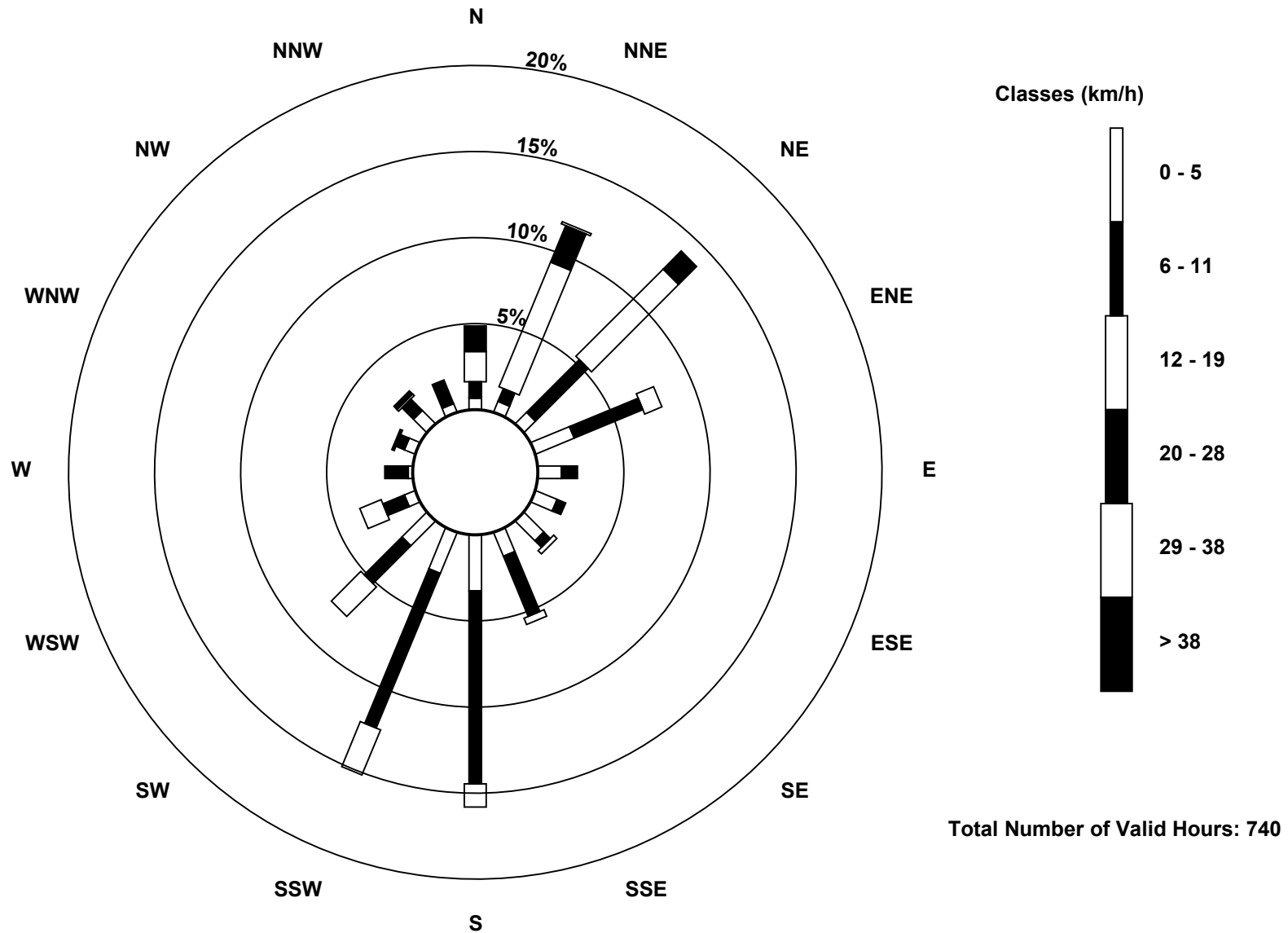
Total Number of Valid Hours: 740

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Wind Speed (WS) - km/h
Shell Muskeg River (AMS 16)





Wood Buffalo Environmental Association

Summary of Hour Averages

**Wind Direction (WD) - deg
Shell Muskeg River - May 2015**

Direction of Maximum Speed: 32 deg on May 27 21:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 28.9 deg on May 16	Hours of Data: 740
Direction of Minimum Speed: 117 deg on May 24 17:00	Hours of Missing Data: 4
Direction of Minimum Daily Speed Average: 0.4 deg on May 8	Percent Operational Time: 99.5
Monthly Average Direction: 204.7 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-May	190	175	181	186	183	196	198	204	226	223	224	240	251	244	326	257	235	318	349	210	286	318	323	313	234.4
2-May	326	328	332	309	304	315	6	20	22	25	21	7	38	16	324	333	11	22	16	20	318	8	20	15	6.3
3-May	19	1	10	3	15	355	333	340	337	285	317	51	49	27	33	34	15	6	5	66	69	65	59	76	23.2
4-May	68	68	67	60	60	71	73	42	50	66	21	16	47	4	43	54	64	76	65	58	51	50	51	44	53.4
5-May	43	45	48	52	53	25	25	37	20	38	25	20	23	41	48	70	65	87	89	64	57	49	48	46	43.0
6-May	30	25	25	20	24	17	12	15	14	17	26	45	46	53	52	71	76	75	123	97	169	173	175	232	38.6
7-May	137	172	190	178	184	190	178	193	211	231	289	39	38	48	36	50	41	68	101	91	80	89	103	147	101.5
8-May	215	125	140	139	150	227	155	179	215	204	327	228	256	53	343	321	301	238	62	75	111	127	129	51	215.0
9-May	37	51	76	60	57	63	60	68	322	242	260	268	261	250	245	293	269	180	173	167	178	145	89	74	43.6
10-May	99	220	144	122	77	75	88	31	41	56	43	29	27	316	259	254	264	268	243	246	105	126	147	150	88.1
11-May	162	183	194	194	193	191	187	195	218	228	246	218	351	203	259	347	62	68	172	AF	54	56	79	53	173.3
12-May	47	50	66	296	83	108	121	353	325	330	329	301	282	279	152	137	112	139	138	150	135	146	149	154	130.6
13-May	155	160	163	160	167	180	172	180	193	197	207	207	209	196	196	191	190	197	180	175	182	178	186	182	184.9
14-May	190	185	190	184	180	178	196	197	215	227	221	219	206	199	203	211	218	215	210	203	199	202	205	206	205.4
15-May	200	205	190	177	167	177	180	202	191	190	216	244	249	247	242	247	245	343	8	5	8	5	6	12	301.1
16-May	9	11	12	17	13	11	7	6	22	22	25	27	34	40	41	35	39	54	47	51	52	51	60	71	28.9
17-May	72	106	178	183	166	162	173	183	184	197	209	213	211	222	203	205	180	192	162	160	159	162	169	174	184.0
18-May	171	177	200	163	181	181	200	201	206	220	231	223	212	211	198	220	214	220	192	193	200	205	194	187	202.1
19-May	183	189	178	179	177	177	208	212	215	230	234	241	198	176	198	209	213	213	184	182	187	201	194	181	200.7
20-May	183	193	188	178	180	187	206	201	212	218	223	218	221	232	238	257	271	230	261	AF	84	168	165	216	212.6
21-May	196	198	194	180	202	191	196	187	206	203	219	197	203	205	209	213	218	240	210	190	192	204	214	91	202.0
22-May	185	193	186	174	186	173	195	217	63	62	42	25	28	31	33	41	29	24	35	42	54	47	40	48	42.9
23-May	33	27	31	45	52	41	34	45	50	37	37	40	46	47	50	53	52	59	91	AF	59	59	44	45	43.2
24-May	57	82	147	194	184	201	212	241	288	301	28	275	64	56	58	321	117	AF	64	60	67	51	40	75	81.1
25-May	105	145	174	219	175	180	193	203	193	191	217	231	11	341	197	212	310	16	4	348	3	6	8	8	336.2
26-May	13	30	19	6	6	22	13	23	351	40	48	44	51	45	54	52	44	55	42	45	55	74	117	116	37.6
27-May	142	192	204	230	232	206	175	213	74	357	32	25	9	8	13	15	19	23	19	26	32	27	37	27	22.9
28-May	38	22	13	12	18	32	27	26	27	16	20	30	34	34	44	47	43	47	28	19	43	75	123	130	32.2
29-May	126	160	226	173	161	156	195	220	215	215	211	268	224	92	314	168	214	210	192	194	184	164	183	181	194.1
30-May	173	175	177	171	173	175	186	196	207	225	223	202	190	211	200	208	204	174	173	157	149	157	168	185	186.6
31-May	180	180	174	160	157	152	162	176	157	183	201	187	188	190	182	181	194	192	182	175	189	195	189	217	180.3
78.3 86.3 94.7 100.8 112.2 116.1 138.7 181.3 218.7 245.3 296.6 311.7 5.0 16.7 25.3 15.7 5.4 48.0 64.4 60.5 59.0 69.0 72.9 66.7																									
Diurnal Average																									

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



Wood Buffalo Environmental Association
Summary of Hour Standard Deviations

Wind Direction (WD) - deg
Shell Muskeg River - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 101 deg on May 4 17:00	Hours of Data: 740
Minimum Value: 7 deg on May 17 00:00	Hours of Missing Data: 4
	Hours of Calibration: 0
	Percent Operational Time: 99.5
Percentiles: P ₁ = 8 P ₁₀ = 12 Q ₁ = 16 Median = 21 Q ₃ = 32 P ₉₀ = 52 P ₉₉ = 88	

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	25	53	11	17	15	17	22	20	19	23	18	21	18	45	37	37	27	53	58	16	45	27	35	35	58
2-May	14	20	17	64	50	50	24	13	15	18	20	21	20	27	35	42	24	18	17	14	26	18	16	18	64
3-May	21	23	19	20	15	22	29	53	58	33	48	9	18	22	23	22	23	31	23	22	7	8	11	11	58
4-May	10	12	12	10	11	27	28	51	36	36	33	54	66	73	44	17	101	30	16	10	9	9	10	9	101
5-May	11	11	11	10	14	12	14	18	14	16	14	14	16	19	15	14	10	31	19	12	11	9	10	10	31
6-May	16	14	14	13	12	14	15	15	15	16	14	12	11	15	12	19	19	20	28	21	63	37	51	27	63
7-May	14	22	17	8	12	13	15	21	30	25	75	42	40	37	33	20	22	25	22	15	8	11	23	20	75
8-May	32	57	31	17	29	24	21	24	36	62	97	57	100	38	53	20	23	52	20	16	16	21	60	14	100
9-May	32	12	20	10	10	31	12	26	54	40	60	32	31	49	40	70	39	70	39	18	23	12	38	39	70
10-May	28	82	22	27	19	19	33	24	22	14	29	45	45	33	42	27	45	43	13	64	10	24	18	13	82
11-May	17	15	14	11	12	14	24	26	18	23	41	83	83	91	85	85	75	44	28	AF	9	8	13	9	91
12-May	9	10	29	65	63	26	24	64	32	31	33	35	30	35	74	59	35	33	20	17	16	15	16	17	74
13-May	18	17	14	15	13	20	18	20	23	25	30	26	33	26	28	25	26	25	17	15	15	16	15	15	33
14-May	17	14	17	13	15	12	20	22	23	16	20	22	25	25	31	30	25	22	23	21	16	15	16	17	31
15-May	16	17	18	99	10	14	41	29	26	25	30	24	19	29	22	23	16	64	20	20	19	21	21	19	99
16-May	19	20	20	19	20	19	21	20	20	21	25	21	18	19	14	19	19	17	15	13	11	8	11	7	25
17-May	11	25	29	17	13	14	19	20	22	33	35	31	32	42	29	32	37	34	25	17	14	13	13	14	42
18-May	15	15	28	16	16	16	22	21	26	23	32	30	32	34	38	33	35	52	27	19	15	16	15	13	52
19-May	12	16	11	14	8	19	21	20	22	19	27	49	67	43	40	58	58	36	24	16	13	14	11	10	67
20-May	10	15	10	12	11	16	23	27	27	31	35	36	36	59	45	34	25	48	30	AF	20	29	22	14	59
21-May	16	13	12	11	14	20	16	24	28	33	28	38	36	36	51	41	36	39	51	21	16	16	51	84	84
22-May	33	43	15	26	20	12	24	31	51	14	26	24	18	23	24	13	18	20	15	11	9	12	13	11	51
23-May	12	12	9	14	8	13	17	17	12	14	14	20	26	34	18	22	17	39	50	AF	9	16	19	17	50
24-May	18	28	33	20	15	19	17	26	68	54	84	85	99	51	72	48	94	AF	30	15	53	20	28	60	99
25-May	68	72	20	22	16	21	22	27	30	38	39	32	91	54	68	27	55	37	54	25	19	20	20	19	91
26-May	20	20	23	18	20	18	26	34	49	19	14	36	20	44	39	18	18	14	14	12	12	14	38	38	49
27-May	70	55	18	21	11	64	60	65	84	62	31	42	42	23	20	20	19	21	24	22	14	19	12	17	84
28-May	12	21	22	21	20	18	22	20	20	29	28	34	27	28	19	20	17	16	24	24	29	13	21	21	34
29-May	32	46	18	20	19	20	30	33	32	41	65	48	83	86	85	60	62	29	27	21	20	16	17	17	86
30-May	16	17	21	16	13	16	23	26	29	24	33	36	42	36	42	34	39	27	26	19	15	16	16	17	42
31-May	16	15	17	15	19	16	17	26	26	32	24	21	22	22	22	25	25	26	21	20	21	23	20	36	36
	70	82	33	99	63	64	60	65	84	62	97	85	100	91	85	85	101	70	58	64	63	37	60	84	

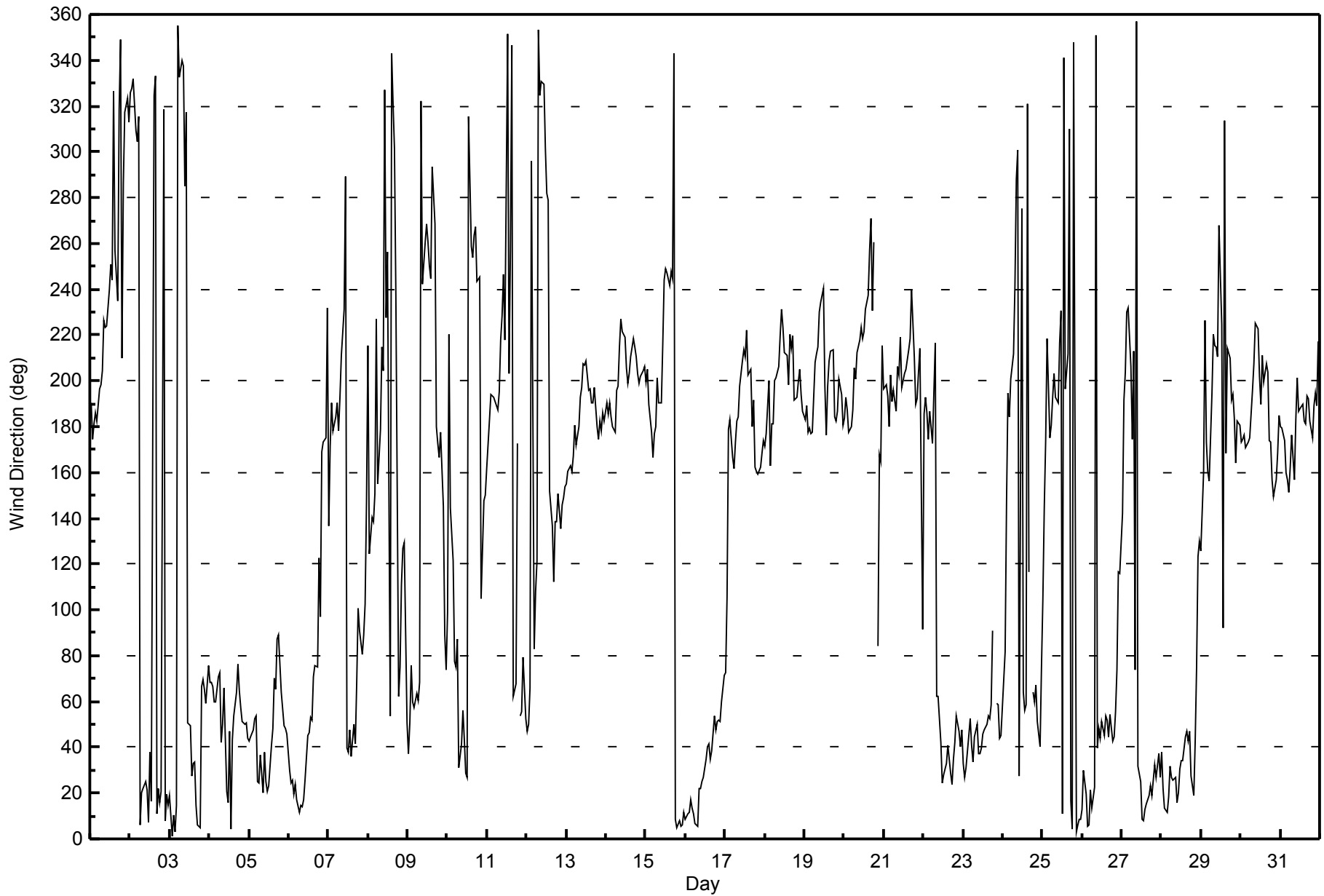
Diurnal Maximum

AF - Analyzer Failure



WBEA
Hourly Averages

Wind Direction (WD) - deg
Shell Muskeg River - May 2015





Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 6, 2015	Last Calibration	April 10, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	13:50
Gas Cert Reference	LL104193	Station temp.	22 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	12-Feb-18
Calibrator Make/Model	Sabio 4010	Serial Number	11081107
ZAG Make/Model	API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2632

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-710	-710
Analyzer IP address	192.168.1.43		Lamp voltage	819	815
Calculated slope	0.989228	0.999742	Chamber temp	45.3	45.3
Calculated intercept	3.834915	0.731291	Pressure	702.1	709.9
Analyzer Background	6.3	5.9	Flow	0.438	0.444
Analyzer Coefficient	1.228	1.210	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	0.0	----
as found span	5000	82.8	799.8	850.5	0.940
calibrator zero	5000	0.0	0.0	0.4	----
high point	5000	82.8	799.8	799.7	1.000
second point	5000	41.4	399.9	399.3	1.001
third point	5000	20.7	200.0	197.8	1.011
as left zero	5000	0.0	0.0	0.4	----
as left span	5000	82.8	799.8	806.0	0.992
Average Correction Factor					1.004

Corrected As found 850.5 Previous response 804.7 % change -5.4%

Notes:

Changed inlet filter after as founds. Adjusted span. Large percent change due to cal cylinder stabilization from new cylinder install last month.

Calibration Performed By:

Michael Martineau



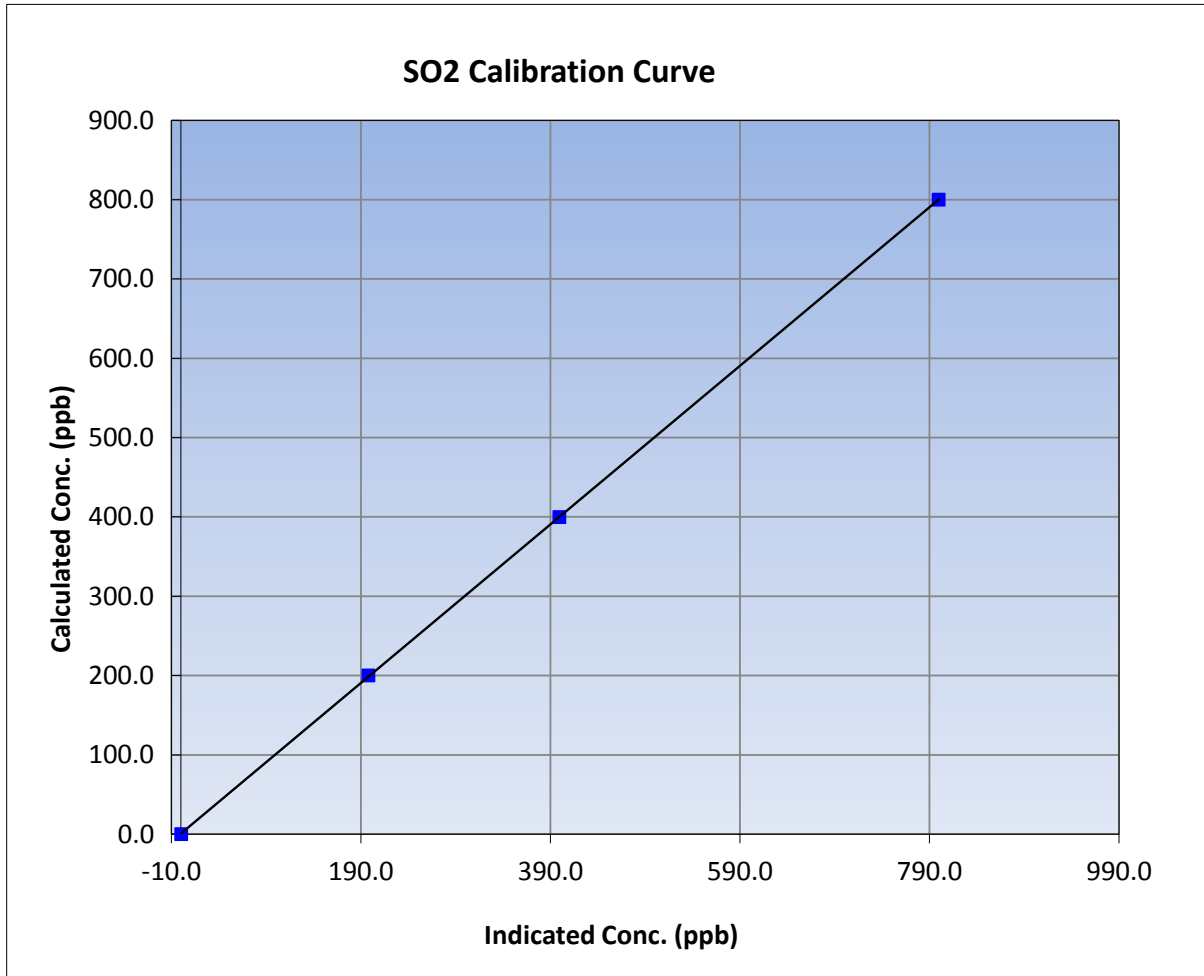
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 6, 2015	Previous Calibration	April 10, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:10	End Time (MST)	13:50
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

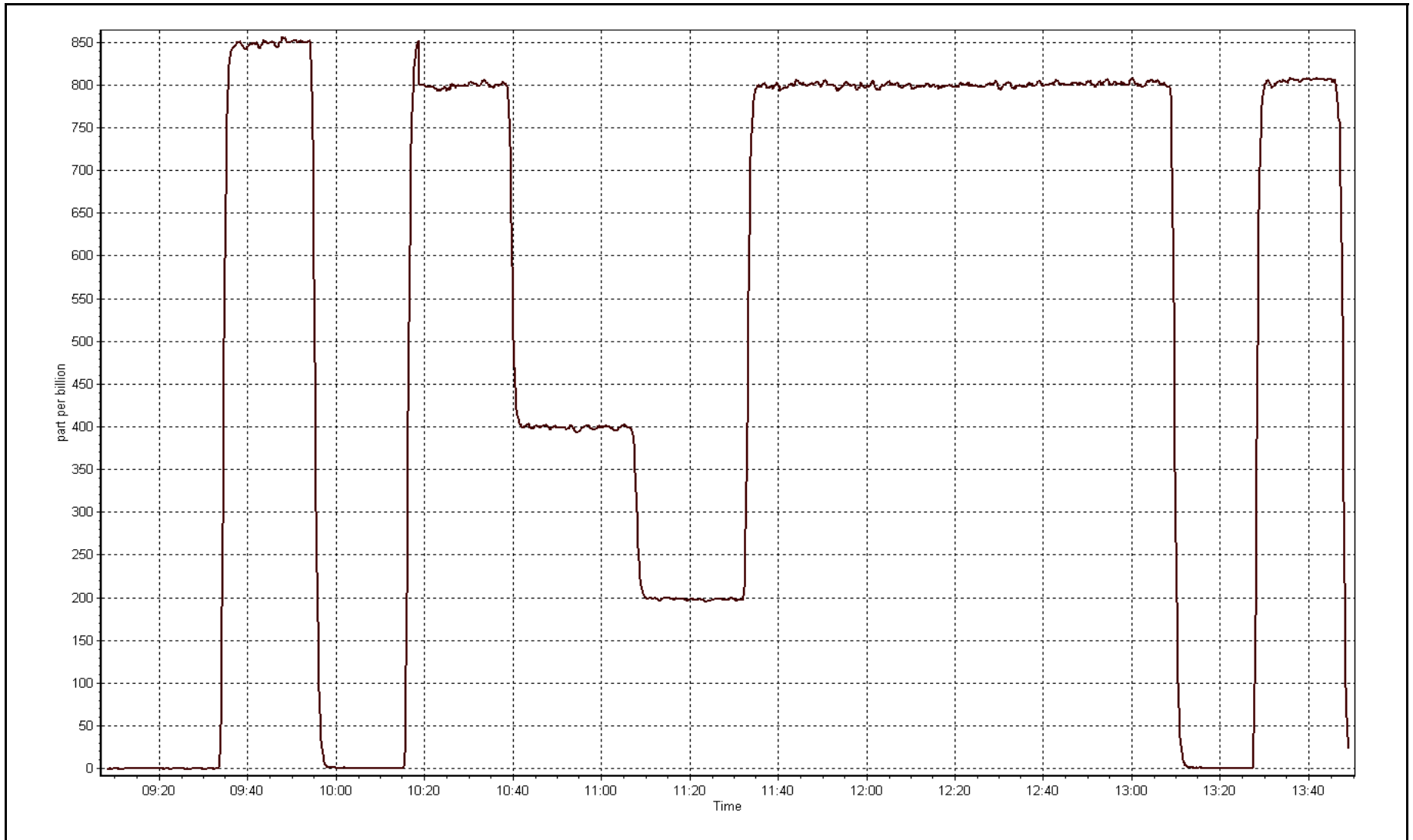
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999990
799.8	799.7	1.0002		
399.9	399.3	1.0015	Slope	0.999742
200.0	197.8	1.0109		
			Intercept	0.731291



SO2 Calibration Plot

Date: May 6, 2015





Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-06-15	Last Calibration	April-10-15
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	13:50
Gas Cert Reference	LL104193	Cal Gas Expiry Date	12-Feb-18
CH4 Cal Gas Conc.	487 ppm	CH4 Equiv Conc.	1017.8 ppm
C3H8 Cal Gas Conc.	193 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11081107
ZAG make/model	Teledyne API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	Serial Number	2632

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.8	34.8
Calculated slope	1.003659	1.004150	Fuel Pressure	24.2	24.2
Calculated intercept	-0.088606	-0.042052	Analyzer Coeff	4.280	4.317
			Analyzer BKG	2.75	2.700

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458
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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	-0.11	----
as found span	5000	82.8	16.85	16.50	1.021
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	82.8	16.85	16.81	1.003
second point	5000	41.4	8.43	8.45	0.997
third point	5000	20.7	4.21	4.27	0.987
as left zero	5000	0.0	0.00	0.04	----
as left span	5000	82.8	16.85	16.93	0.996
Average Correction Factor					0.996

Corrected As found	16.61	Previous response	16.88	% change	1.6%
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Notes:

Changed inlet filter after as founds. Adjusted zero and span.

Calibration Performed By:

Michael Martineau



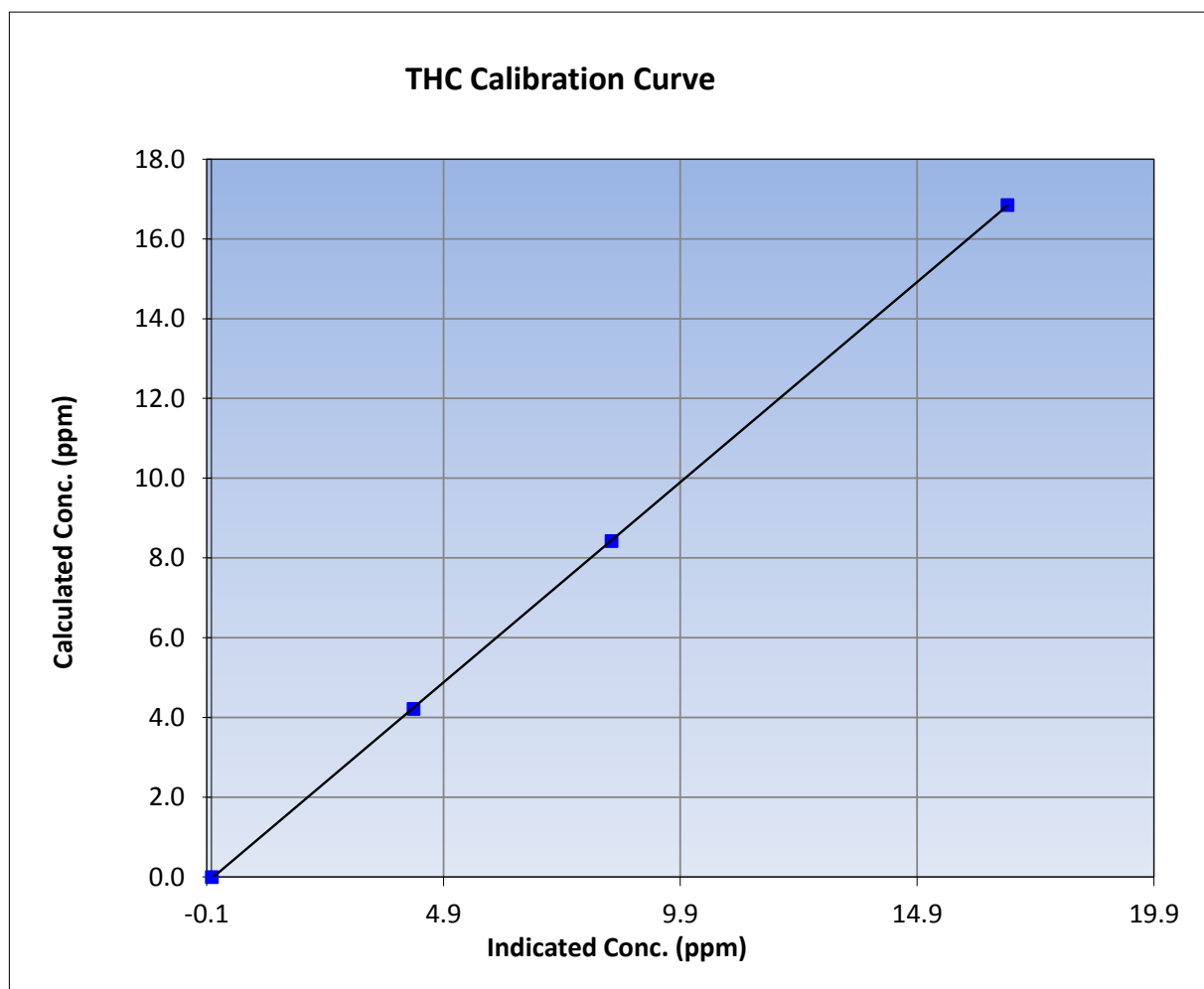
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 6, 2015	Previous Calibration	April 10, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:10	End Time (MST)	13:50
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

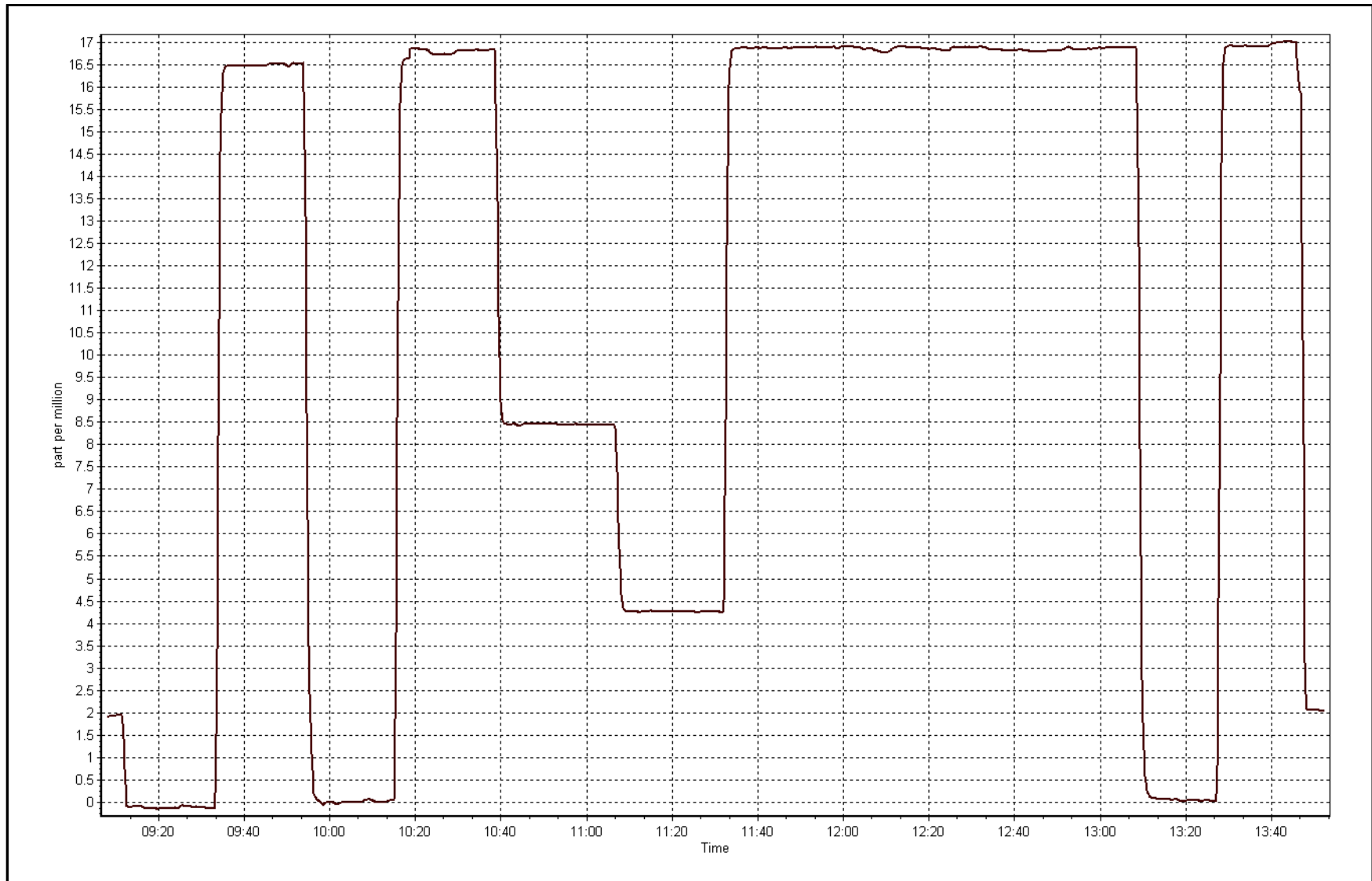
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999983
16.85	16.81	1.0026		
8.43	8.45	0.9973	Slope	1.004150
4.21	4.27	0.9868		
			Intercept	-0.042052



THC Calibration Plot

Date: May 6, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 6, 2015	Previous Calibration	April 10, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	13:50
NO Cal Gas Conc	48 ppm	Gas Cert Reference	LL104193
NOx Cal Gas Conc	48 ppm	Cal Gas Expiry Date	February 12, 2018
Calibrator	Sabio 4010	Serial Number	11081107
Zero air Generator	Teledyne API T701	Serial Number	2155

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2632
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.994548	0.993476	0.998579
	Data Offset	1.918191	2.502309	-1.238249
Current Calibration	Data Slope	1.001831	1.001434	1.008514
	Data Offset	-0.175946	0.340132	0.427632

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262593
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.827		0.767	
NOx coefficient	0.997		0.996	
NO2 coefficient	1.000		1.000	
NO bkgrnd	8.7		8.0	
NOx bkgrnd	8.7		8.0	
Chamber Temp	50.1	Deg C	50.4	Deg C
Moly Temp	326	Deg C	325	Deg C
PMT voltage	-774	V	-774	V
PMT Temp	-2.6	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	172.8	mmHg	173.7	mmHg
R Cell Press Nox	173.1	mmHg	173.7	mmHg
NO sample flow	0.856	lpm	0.871	lpm
Nox sample Flow	0.856	lpm	0.872	lpm

Notes:

Changed inlet filter after as founds. Large span adjust due to cal cylinder stabilization from last month cylinder replacement.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 6, 2015

Station Number:

AMS 16

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.5	0.3	0.1	----	----
as found span	5000	82.8	794.9	794.9	0.0	857.7	855.1	2.6	0.9267	0.9296
calibrator zero	5000	0.0	0.0	0.0	0.0	0.5	0.5	0.1	----	----
high point	5000	82.8	794.9	794.9	0.0	793.7	793.8	-0.1	1.0014	1.0013
second point	5000	41.4	397.4	397.4	0.0	396.9	396.1	0.8	1.0014	1.0034
third point	5000	20.7	198.7	198.7	0.0	198.1	197.3	0.8	1.0033	1.0072
as left zero	5000	0.0	0.0	0.0	0.0	0.7	0.4	0.3	----	----
as left span	5000	82.8	794.9	505.7	289.2	797.8	514.3	283.6	0.9963	0.9834
Average Correction Factor									1.0021	1.0040

Corrected As found

NO_x= 857.3

NO= 854.8

Percent Change

NO_x= -7.0%

NO= -6.7%

Previous Response

NO_x= 797.3

NO= 797.6

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

82.80

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO2 (300)	----	505.7	288.4	791.6	505.7	285.9	0.9878	1.0000	1.0087	99.1%
2nd NO2 (200)	----	598.2	195.9	791.9	598.2	193.7	0.9875	1.0000	1.0117	98.8%
3rd NO2 (100)	----	691.7	102.5	792.2	691.7	100.5	0.9871	1.0000	1.0193	98.1%
4th NO2 (0)	794.1	----	-0.7	793.4	794.1	-0.7	0.9855	1.0000	N/A	----
Average Correction Factor							0.9870	1.0000	1.0133	98.7%

Calibration Performed By:

Michael Martineau



Wood Buffalo Environmental Association

NO_x Calibration Summary

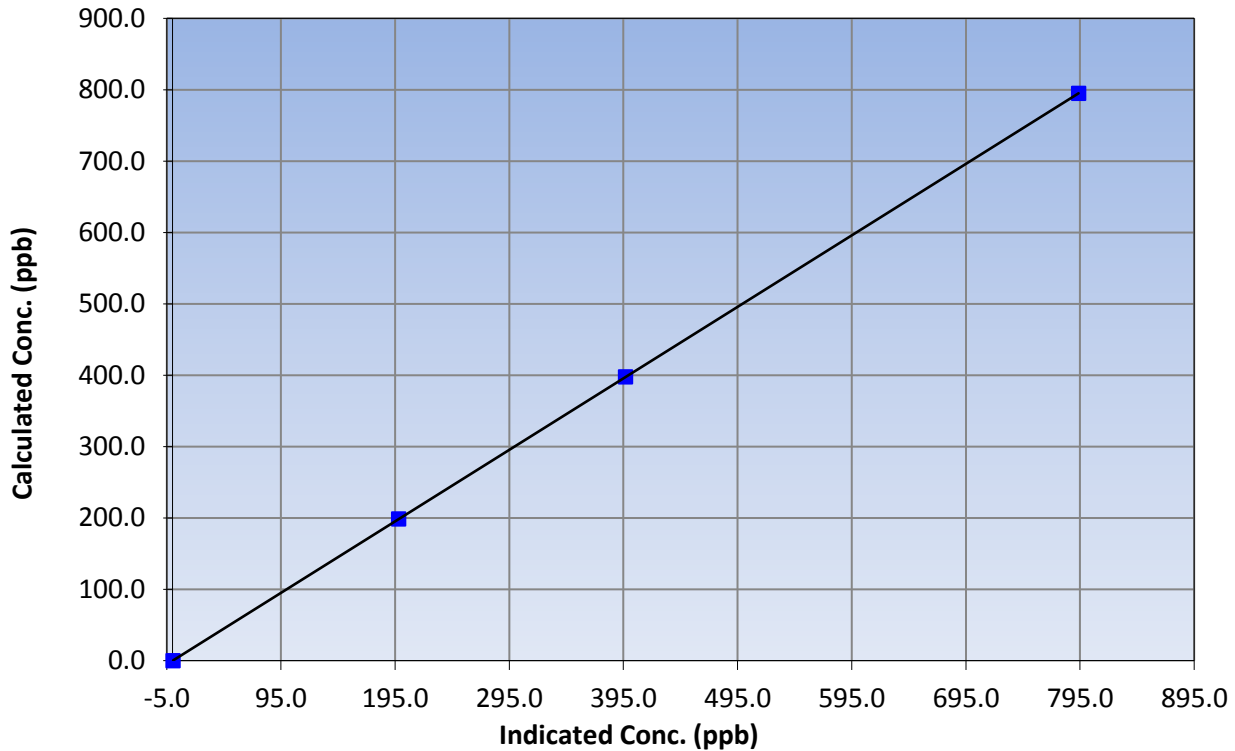
Station Information

Calibration Date	May 6, 2015	Previous Calibration	April 10, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:10	End Time (MST)	13:50
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999999
794.9	793.7	1.0014		
397.4	396.9	1.0014	Slope	1.001831
198.7	198.1	1.0033		
			Intercept	-0.175946

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

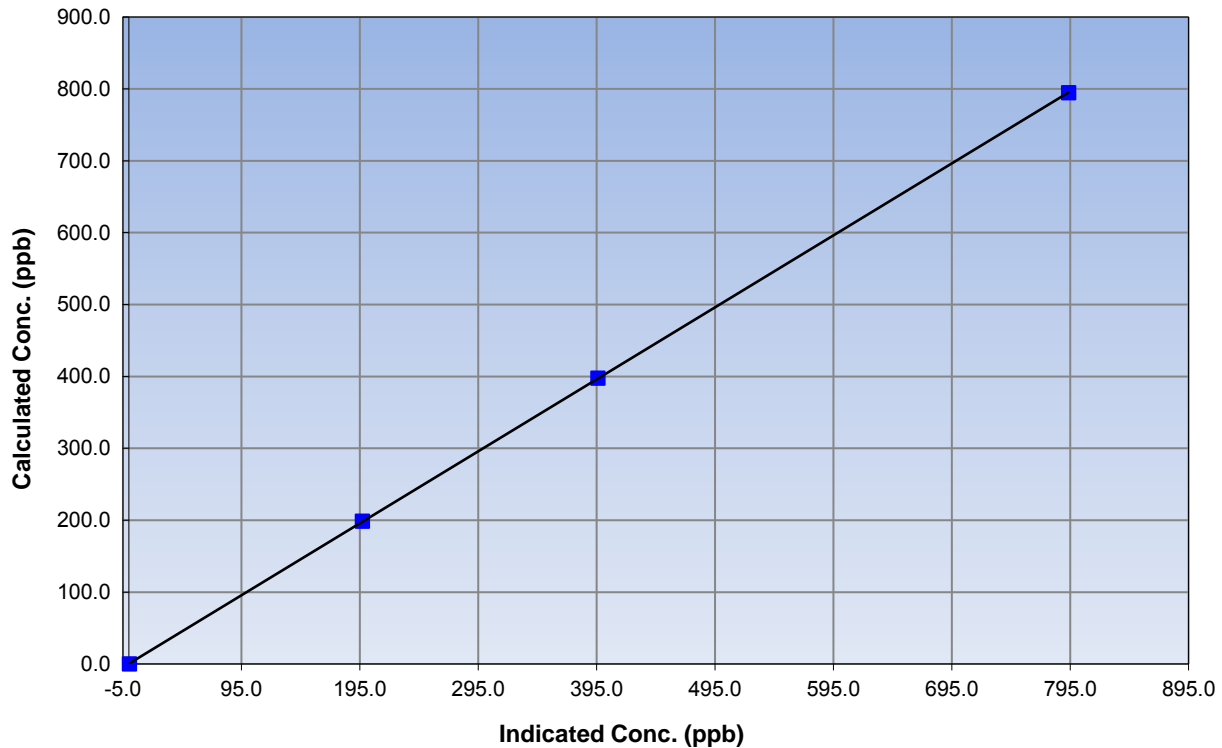
Station Information

Calibration Date	May 6, 2015	Previous Calibration	April 10, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:10	End Time (MST)	13:50
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	N/A	Correlation Coefficient	0.999995
794.9	793.8	1.0013		
397.4	396.1	1.0034	Slope	1.001434
198.7	197.3	1.0072		
			Intercept	0.340132

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

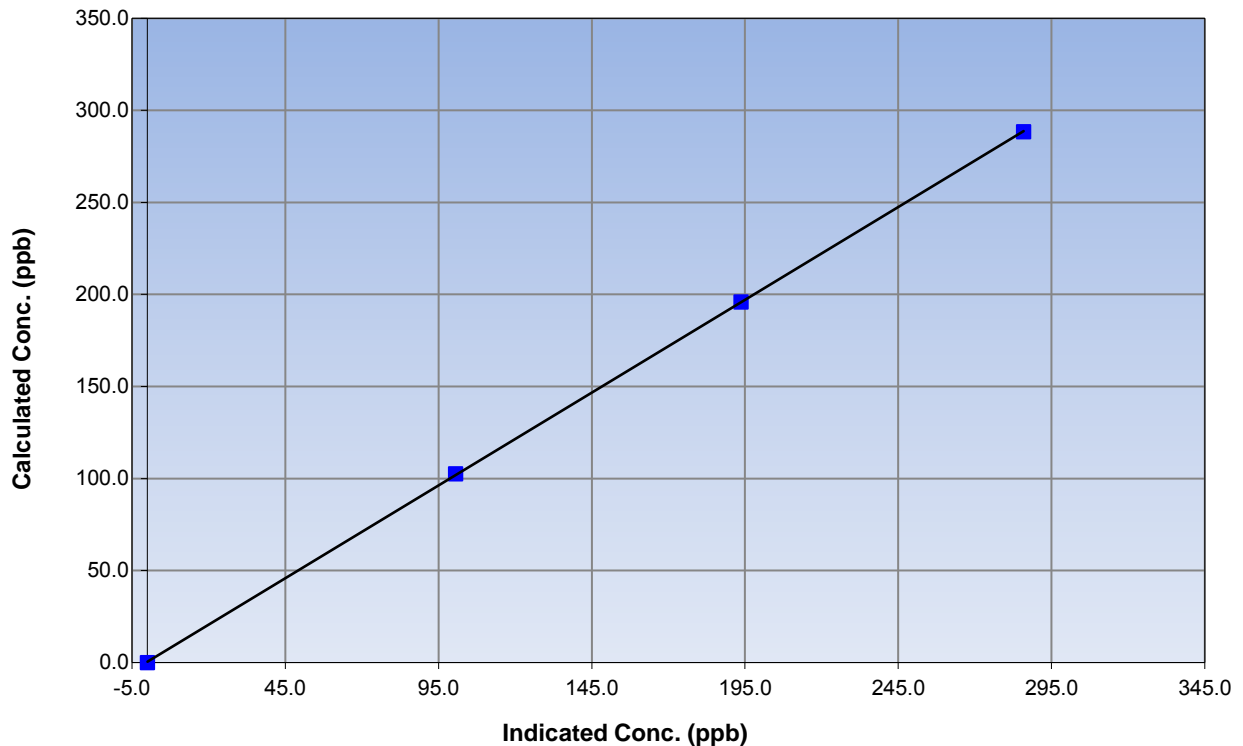
Station Information

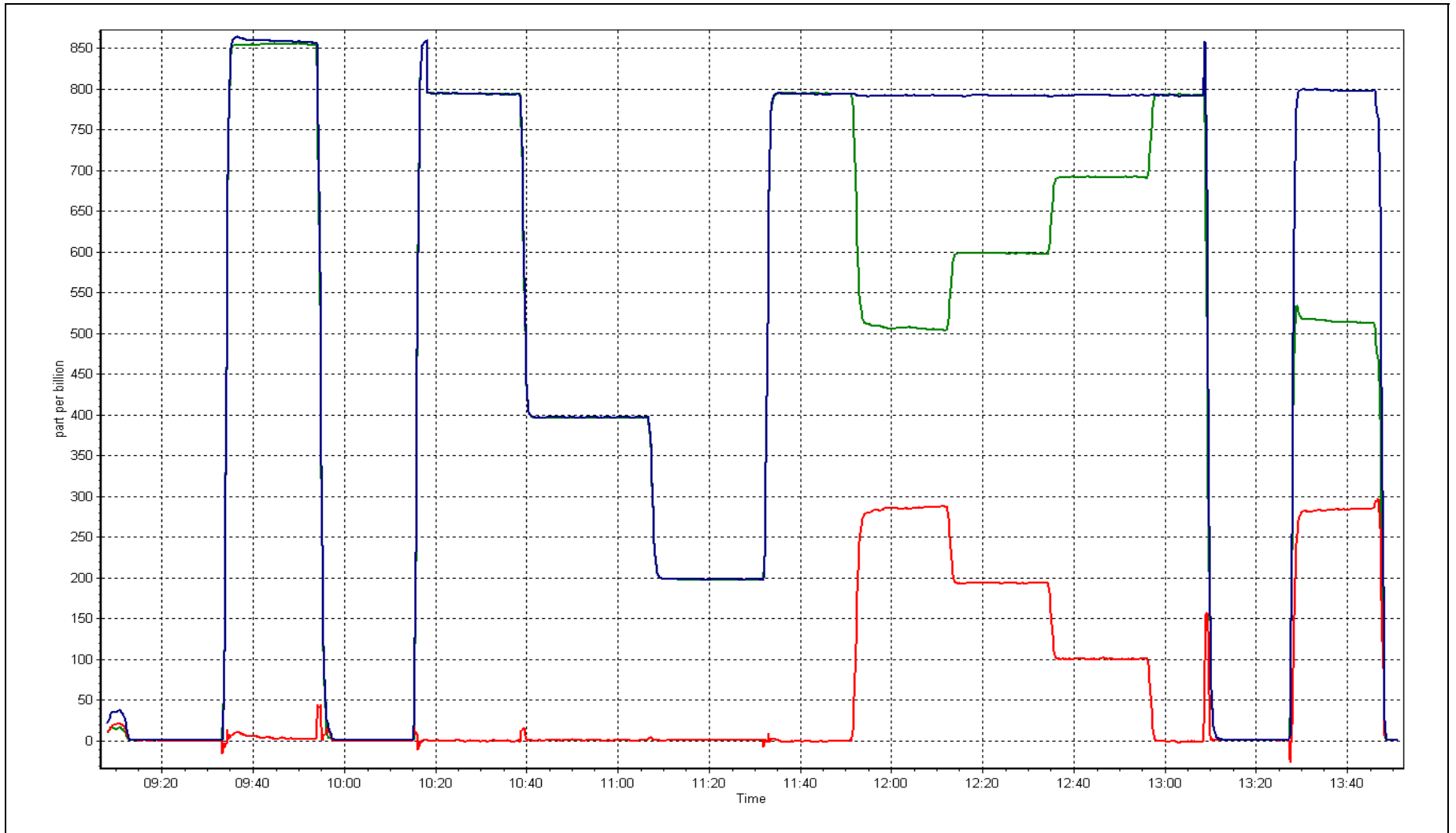
Calibration Date	May 6, 2015	Previous Calibration	April 10, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	9:10	End Time (MST)	13:50
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999982
288.4	285.9	1.0087		
195.9	193.7	1.0117	Slope	1.008514
102.5	100.5	1.0193		
			Intercept	0.427632

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CONFORMANCE TEST

STATION INFORMATION

Calibration Date:	<u>May 6, 2015</u>	Previous Calibration:	<u>April 10, 2015</u>
Station Name:	<u>Shell Muskeg River</u>	Station Number:	<u>AMS 16</u>
Start Time (MST):	<u>12:30</u>	End Time (MST):	<u>14:25</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>1019</u>

SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number:	<u>E-798</u>
Source SN:	<u>4142</u>
HEPA PN:	<u>12144</u>
Time Correct (MST):	<u>Yes</u>
Parameters Checked:	<u>T1, T2, T2,T4, P3, Main Flow, Beta, Neph</u>

AUDIT DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	4.3	4.4	0.1	4.3
T2	17.0	na	na	17.0
T3	21.0	na	na	21.0
T4	12.0	na	na	12.0
RH (%)	34.0	na	na	34.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	983	985.9	2.9	983

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1006	6		1000

Nephelometer Calibration

Parameter	As Found	adjusted (Limit +/- 2.0ug/m3)	As Left
Analog	522		525
Neph	6.2		-0.4
C14	3.3	yes	175.8
Indicated Concentration (ug/m3)	1		-0.4
Offset 1	514		522.4
Offset 2	66		66

Leak Check (Quarterly)

Leak Check Date:	<u>May 6, 2015</u>	Previous Leak Check Date:	<u>April 10, 2015</u>
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Measured

Difference LPM (Limit +/- 0.42 LPM)

Flow without adaptor (LPM):	16.67	
Flow with adaptor [turn off pump first](LPM):	16.49	0.18

Mass Foil Calibration (Annually)

Foil Calibration Date:	<u>n/a</u>	Previous Foil Calibration:	<u>n/a</u>
Zeroed?:	<u>NO</u>		
Foil Mass:	<u>1506</u>	Mass foil set S/N:	<u>12111</u>
Previous Correction Factor:	<u>5999</u>		
New Correction Factor:	<u>5999</u>		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Filter circles had a spot indicating an object; found a fly on tape after cleaning chamber and tape area. Zero'd nephelometer and performed leak check.

Audit Performed By: Michael Martineau



Wood Buffalo Environmental Association

SHARP CONFORMANCE TEST

STATION INFORMATION

Calibration Date:	<u>May 25, 2015</u>	Previous Calibration:	<u>May 6, 2015</u>
Station Name:	<u>Shell Muskeg River</u>	Station Number:	<u>AMS 16</u>
Start Time (MST):	<u>9:38</u>	End Time (MST):	<u>12:05</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	

SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number:	<u>E-798</u>
Source SN:	<u>4142</u>
HEPA PN:	<u>12144</u>
Time Correct (MST):	<u>Yes</u>
Parameters Checked:	<u>T1, P3, Main Flow, Beta, Neph</u>

AUDIT DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	27.0	27.0	0.0	27.0
T2	27.0	na	na	27.0
T3	27.0	na	na	27.0
T4	22.0	na	na	22.0
RH (%)	29.0	na	na	29.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	971	971.0	0.0	971

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1000	1006	6		1000

Nephelometer Calibration

Parameter	As Found	adjusted (Limit +/- 2.0ug/m3)	As Left
Analog	527		522
Neph	3.5		-0.6
C14	147.5	yes	135.5
Indicated Concentration (ug/m3)	2.7		-0.6
Offset 1	526		527.4
Offset 2	67.6		67.5

Leak Check (Quarterly)

Leak Check Date:	<u>May 25, 2015</u>	Previous Leak Check Date:	<u>May 6, 2015</u>
------------------	---------------------	---------------------------	--------------------

Measured

Difference LPM (Limit +/- 0.42 LPM)

Flow without adaptor (LPM):	16.80	
Flow with adaptor [turn off pump first](LPM):	16.72	0.08

Mass Foil Calibration (Annualy)

Foil Calibration Date:	<u>May 25, 2015</u>	Previous Foil Calibration:	<u>n/a</u>
Zeroed?:	<u>Yes</u>		
Foil Mass:	<u>1337</u>		
Previous Correction Factor:	<u>7029</u>	Mass foil set S/N:	<u>2518</u>
New Correction Factor:	<u>7067</u>		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Checked Nephelometer and tape, all clean, zero adjusted, cyclone head cleaned

Audit Performed By: Melissa Lemay



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY MONITORING PROGRAM MONTHLY REPORT

**AMS 17
WAPASU
MAY 2015**

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

June 29, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
MAY 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	37	37	100.00	12	0	3	0
H2S (ppb) Average	702	35	42	99.06	1	0	0	0
THC (ppm) Average	707	37	37	100.00	7	-	2.2	-
O3 (ppb) Average	710	34	34	100.00	68	0	53	-
NO2 (ppb) Average	705	37	39	99.73	28	0	5	-
NO (ppb) Average	705	37	39	99.73	7	-	1	-
NOX (ppb) Average	705	37	39	99.73	35	-	5	-
PM2.5 (ug/m3) Average	742	0	2	99.73	214.2	-	26.9	0
Temperature 2 m (C) Average	744	0	0	100.00	26.4	-	19.1	-
Relative Humidity (%) Average	744	0	0	100.00	99	-	93	-
Wind Speed 10 m (km/h) Average	738	0	6	99.19	19	-	12	-
Wind Direction 10 m (deg) Average	738	0	6	99.19	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	0.8	1	-	0	0	0	0	1	3	12
H2S (ppb) Average	702	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	707	2.02	0.2	-	1.8	1.9	2	2	2	2.1	7
O3 (ppb) Average	710	40.4	11	-	8	26	33	40	48	56	68
NO2 (ppb) Average	705	1.7	2	-	0	0	0	1	2	4	28
NO (ppb) Average	705	0.6	0	-	0	0	0	0	1	1	7
NOX (ppb) Average	705	2.3	3	-	0	1	1	1	3	5	35
PM2.5 (ug/m3) Average	742	5.91	11.6	-	0.3	1.6	2.3	3.6	6.4	10.2	214.2
Temperature 2 m (C) Average	744	10.12	7.9	-	-7.5	-0.3	3.8	9.4	16.1	21.3	26.4
Relative Humidity (%) Average	744	45.2	23	-	12	18	28	40	58	85	99
Wind Speed 10 m (km/h) Average	738	8.2	3	-	0	4	6	8	11	13	19
Wind Direction 10 m (deg) Average	738	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)
MAY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	04 May 2015 04:00	04 May 2015 04:00	1	Intermittent unstable operation - excessive baseline drift
H2S	05 May 2015 00:00	05 May 2015 01:00	2	Intermittent unstable operation - excessive baseline drift
H2S	14 May 2015 23:00	14 May 2015 23:00	1	Intermittent unstable operation - excessive baseline drift
H2S	18 May 2015 10:00	18 May 2015 11:00	2	Intermittent unstable operation - excessive baseline drift
H2S	28 May 2015 09:00	28 May 2015 09:00	1	Intermittent unstable operation - excessive baseline drift
NO2, NO, NOX	20 May 2015 11:00	20 May 2015 12:00	2	Maintenance - generated GPT points for O3 calibration
PM2.5	20 May 2015 11:00	20 May 2015 12:00	2	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	03 May 2015 02:00	03 May 2015 07:00	6	Flat line in sensor output signal



Summary of Hour Averages

Wapasu - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 12 ppb on May 22 07:00	Maximum Daily Average: 3.3 ppb on May 18		Hours of Data:	707
Minimum Value: 0 ppb on May 4 01:00	Minimum Daily Average: 0.1 ppb on May 6		Hours of Missing Data:	37
Maximum Diurnal Average: 2.1 ppb at hour 8	Minimum Diurnal Average: 0.3 ppb at hour 22		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 = 3 P ₉₉ = 7		Percent Operational Time:	100.0

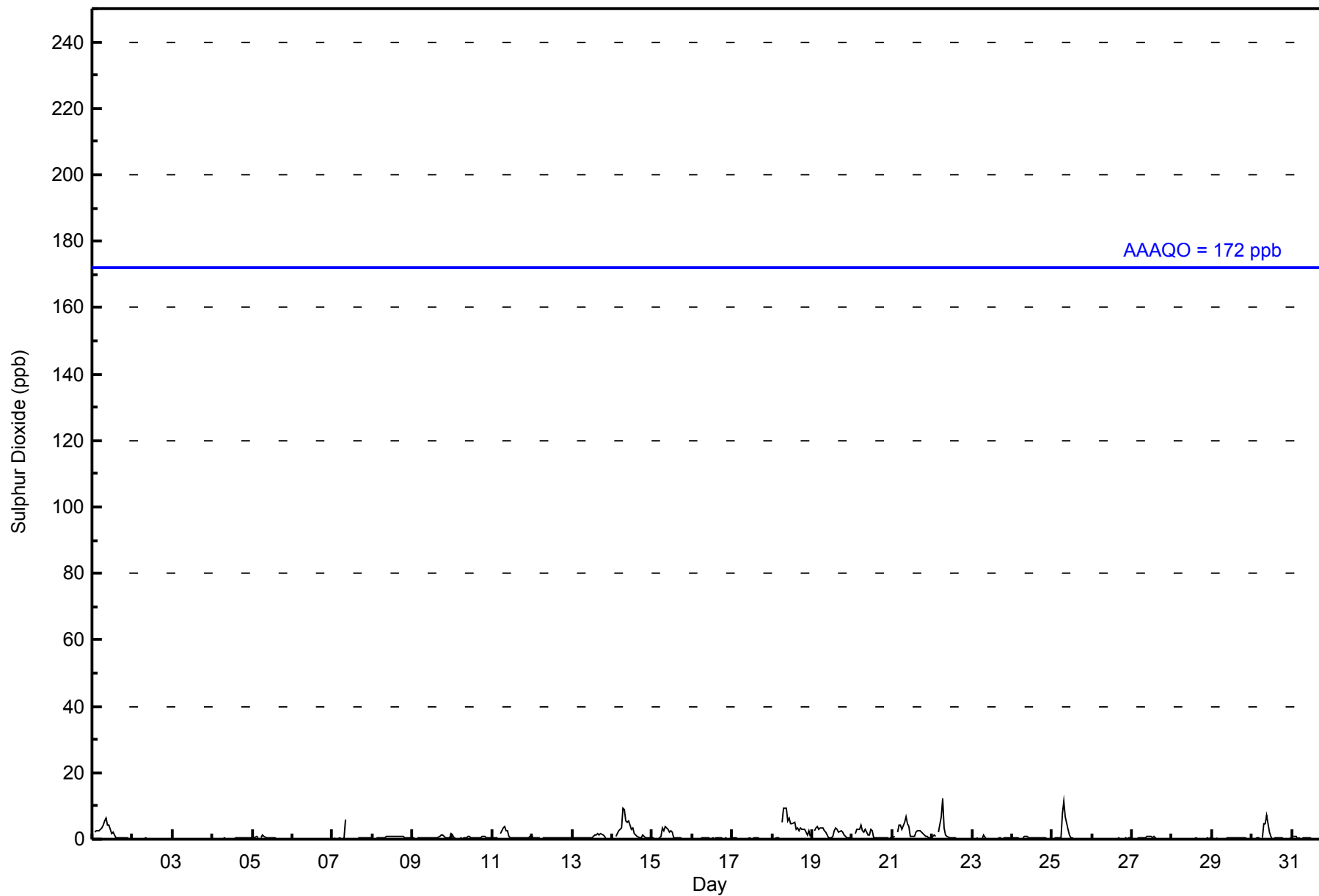
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	Z	2	3	2	2	4	4	5	6	4	4	2	2	1	0	0	0	0	0	0	0	0	0	0	2.0	6	
2-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
3-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
4-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
5-May	0	0	1	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
6-May	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	
7-May	Z	0	0	0	0	0	0	1	6	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	6	
8-May	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	1	
9-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0.5	2	
10-May	1	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0.5	1	
11-May	0	0	1	0	Z	2	3	4	3	2	1	0	0	0	0	0	1	0	0	0	0	1	1	1	1.0	4	
12-May	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	
13-May	Z	0	0	0	0	0	1	0	0	0	0	0	1	1	1	2	1	2	1	1	1	0	0	0	0.7	2	
14-May	0	Z	1	2	2	3	9	9	6	5	5	3	2	1	1	1	1	1	1	1	0	0	0	0	2.5	9	
15-May	0	0	Z	0	0	1	3	2	4	3	2	3	2	0	0	0	1	0	0	0	0	0	0	0	1.1	4	
16-May	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	
17-May	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	
18-May	0	0	0	0	0	Z	5	9	9	5	6	5	5	5	3	4	3	3	3	3	3	2	1	2	1	3.3	9
19-May	Z	2	3	4	3	3	3	3	2	1	1	1	1	2	3	3	2	3	2	1	1	0	1	0	2.0	4	
20-May	0	Z	2	3	3	4	3	2	3	1	1	3	3	0	0	0	1	0	1	0	0	0	0	0	1.4	4	
21-May	0	1	Z	2	4	4	3	5	7	5	4	1	1	1	2	3	2	2	2	1	1	1	1	1	2.3	7	
22-May	1	1	1	Z	2	7	12	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	12	
23-May	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
24-May	0	0	0	0	0	Z	0	1	1	1	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0.5	1	
25-May	Z	0	0	0	0	0	8	11	7	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.4	11	
26-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
27-May	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1	
28-May	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	
29-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
30-May	0	0	0	0	1	Z	0	4	5	7	2	1	0	0	0	0	0	0	0	0	0	0	0	1	1.0	7	
31-May	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Wapasu - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	705	99.72	99.72
11 - 20	2	0.28	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Wapasu - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	66	41	39	18	37	62	94	79	38	35	42	28	22	24	26	49	700
11 - 20	0	0	0	0	0	0	0	0	0	1	1	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	66	41	39	18	37	62	94	79	38	36	43	28	22	24	26	49	702

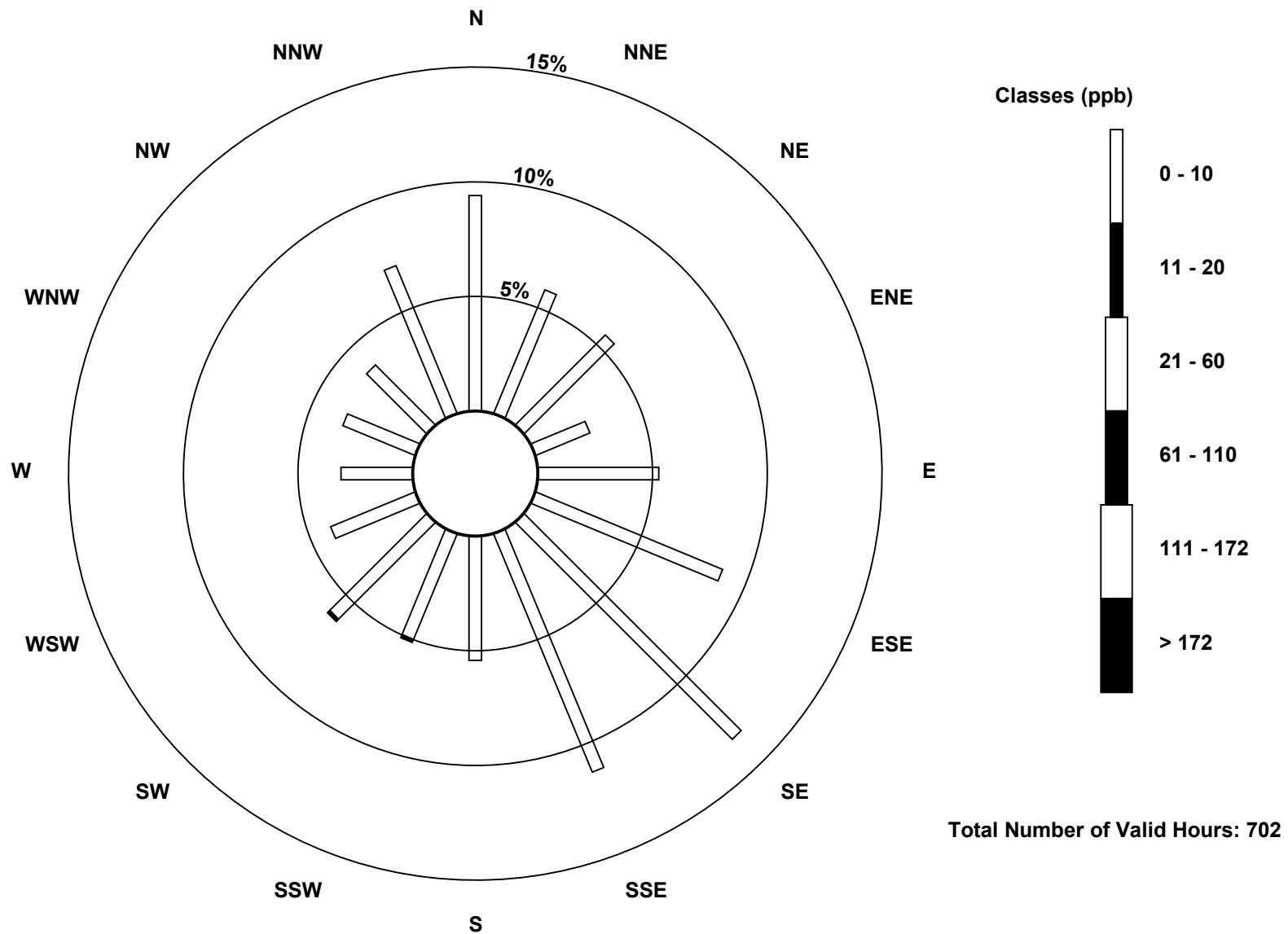
Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

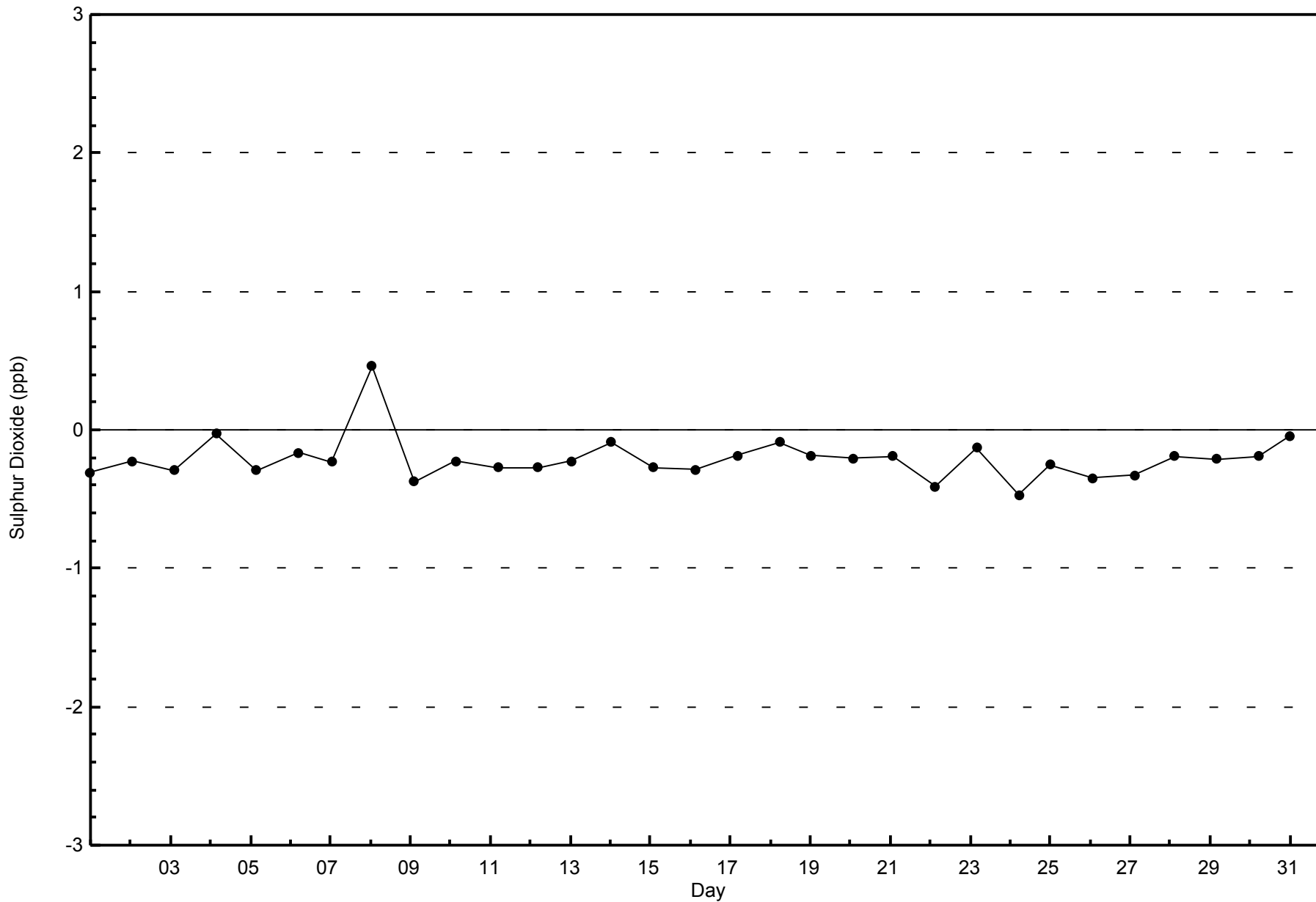
Sulphur Dioxide (SO₂) - ppb
Wapasu (AMS 17)





WBEA
Zero Responses

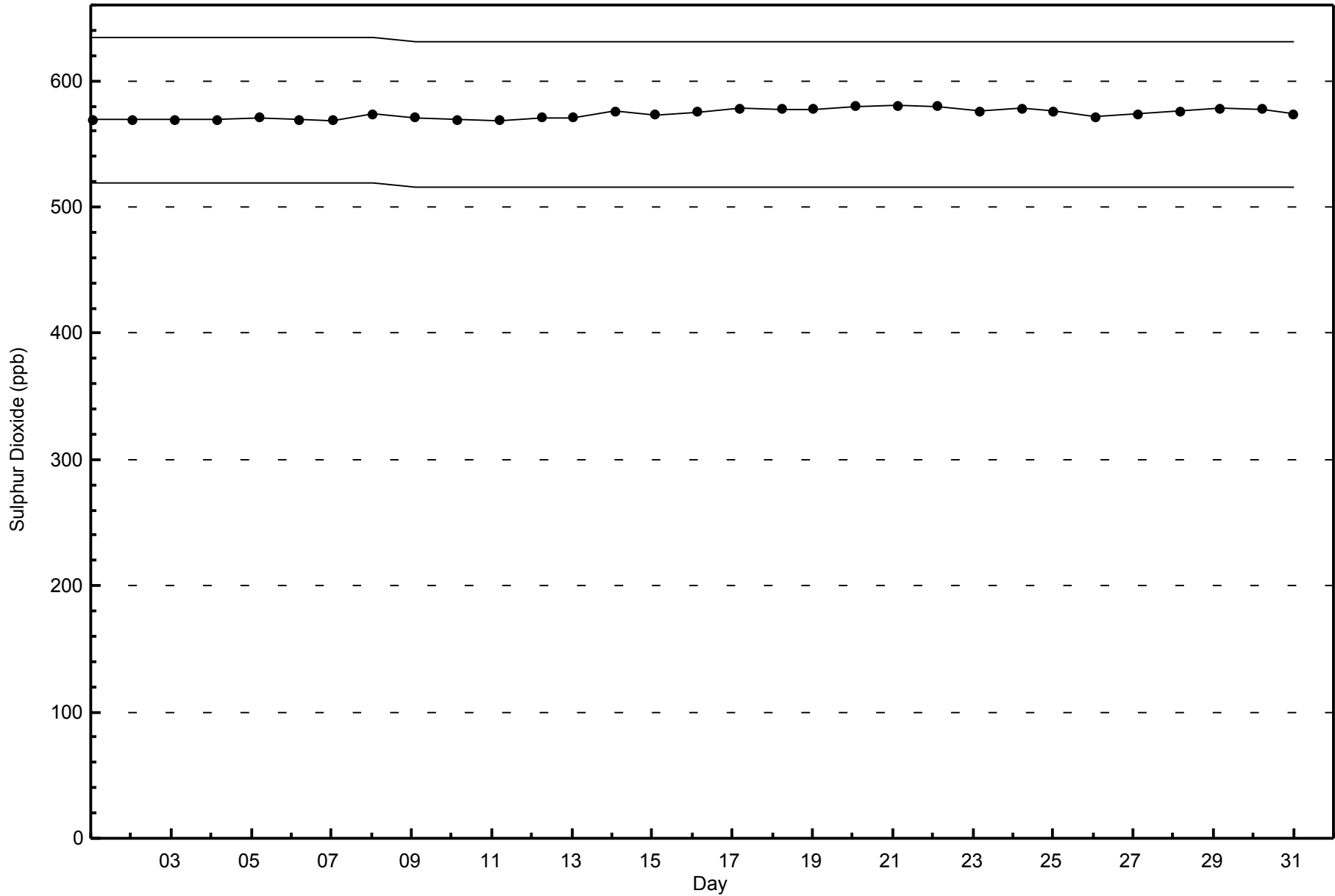
Sulphur Dioxide (SO₂) - ppb
Wapasu - May 2015





WBEA
Span Responses

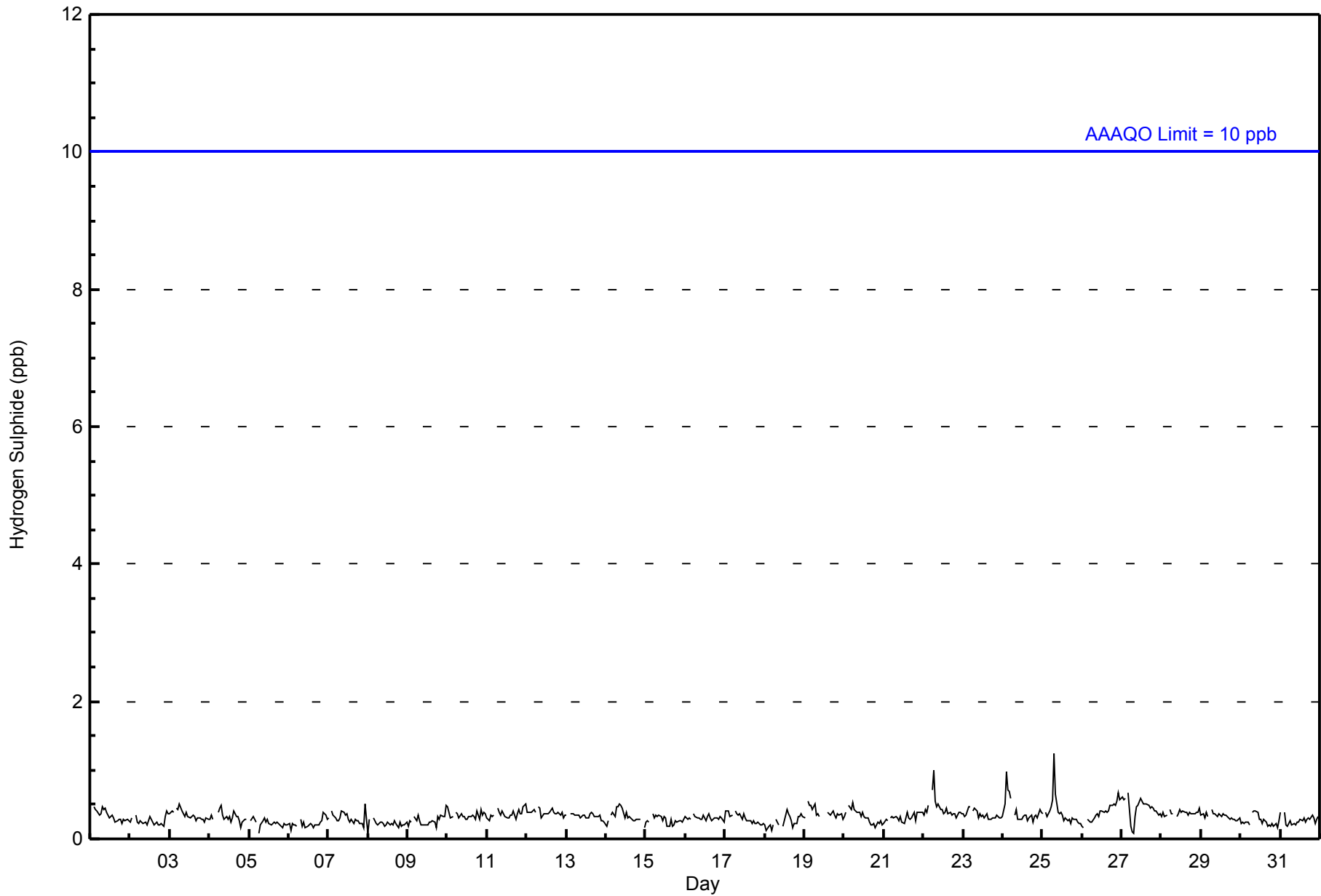
Sulphur Dioxide (SO₂) - ppb
Wapasu - May 2015





WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Wapasu - May 2015





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - May 2015

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
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Wapasu - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	66	41	38	19	34	62	95	79	35	35	41	25	22	25	26	54	697
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	66	41	38	19	34	62	95	79	35	35	41	25	22	25	26	54	697

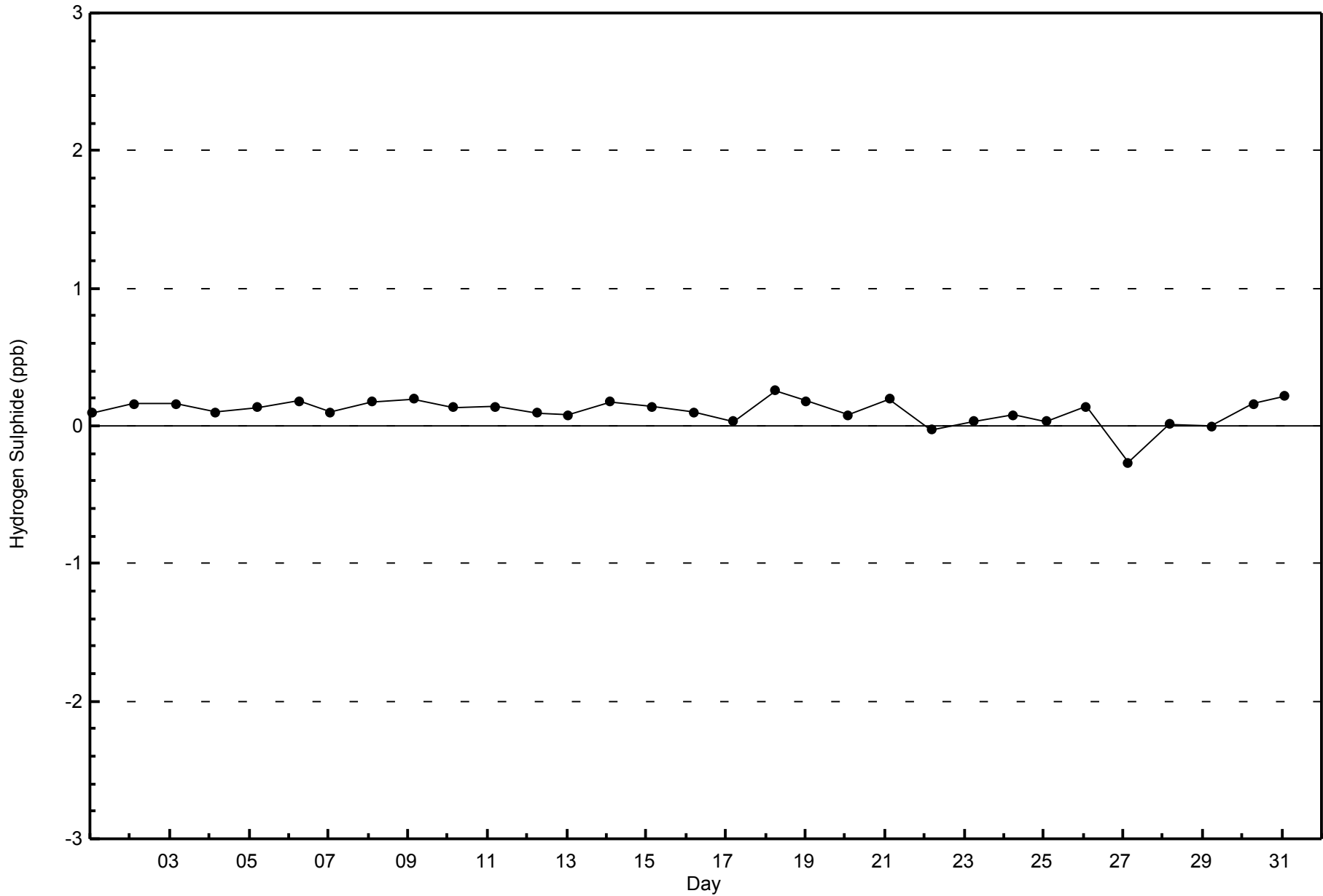
Total Number of Valid Hours: 697

Total Number of Hours: 744



WBEA
Zero Responses

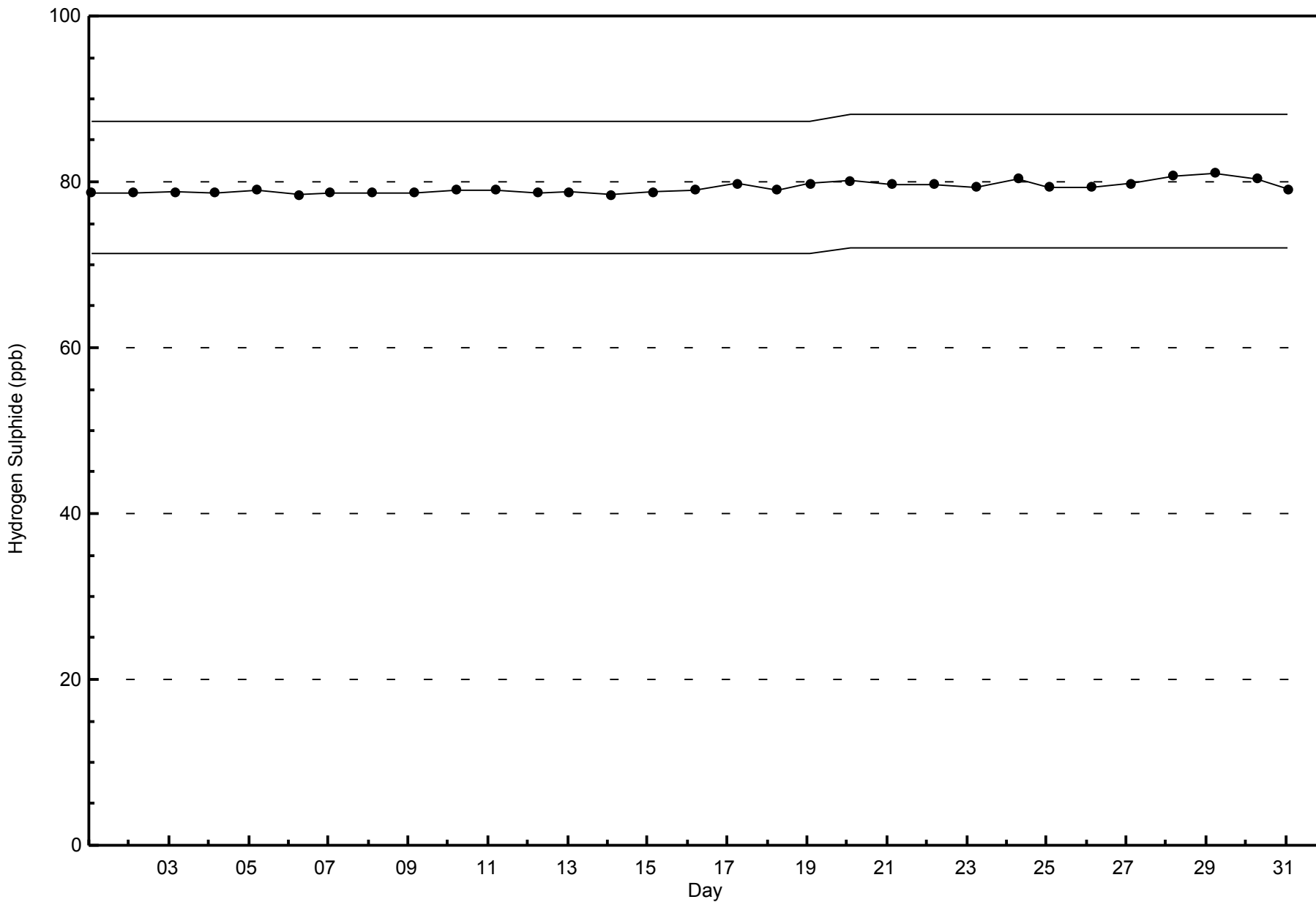
Hydrogen Sulphide (H₂S) - ppb
Wapasu - May 2015





WBEA
Span Responses

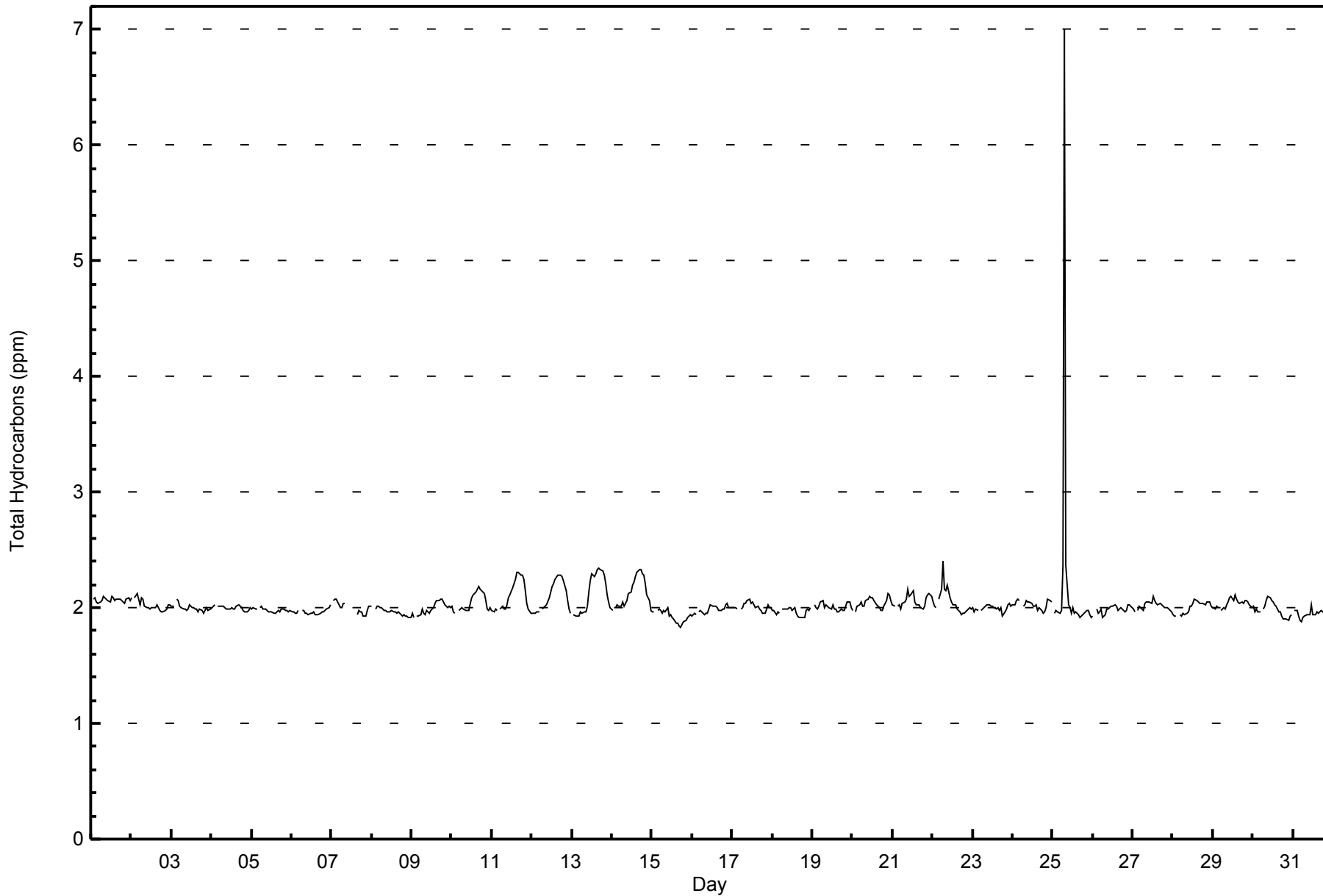
Hydrogen Sulphide (H₂S) - ppb
Wapasu - May 2015





WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Wapasu - May 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	552	78.08	78.08
2.1 - 3.0	154	21.78	99.86
3.1 - 10.0	1	0.14	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Wapasu - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	61	35	39	17	32	50	73	65	26	13	25	22	13	19	19	40	549
2.1 - 3.0	5	6	0	1	5	12	21	14	12	23	17	6	9	5	7	9	152
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	1	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	66	41	39	18	37	62	94	79	38	36	43	28	22	24	26	49	702

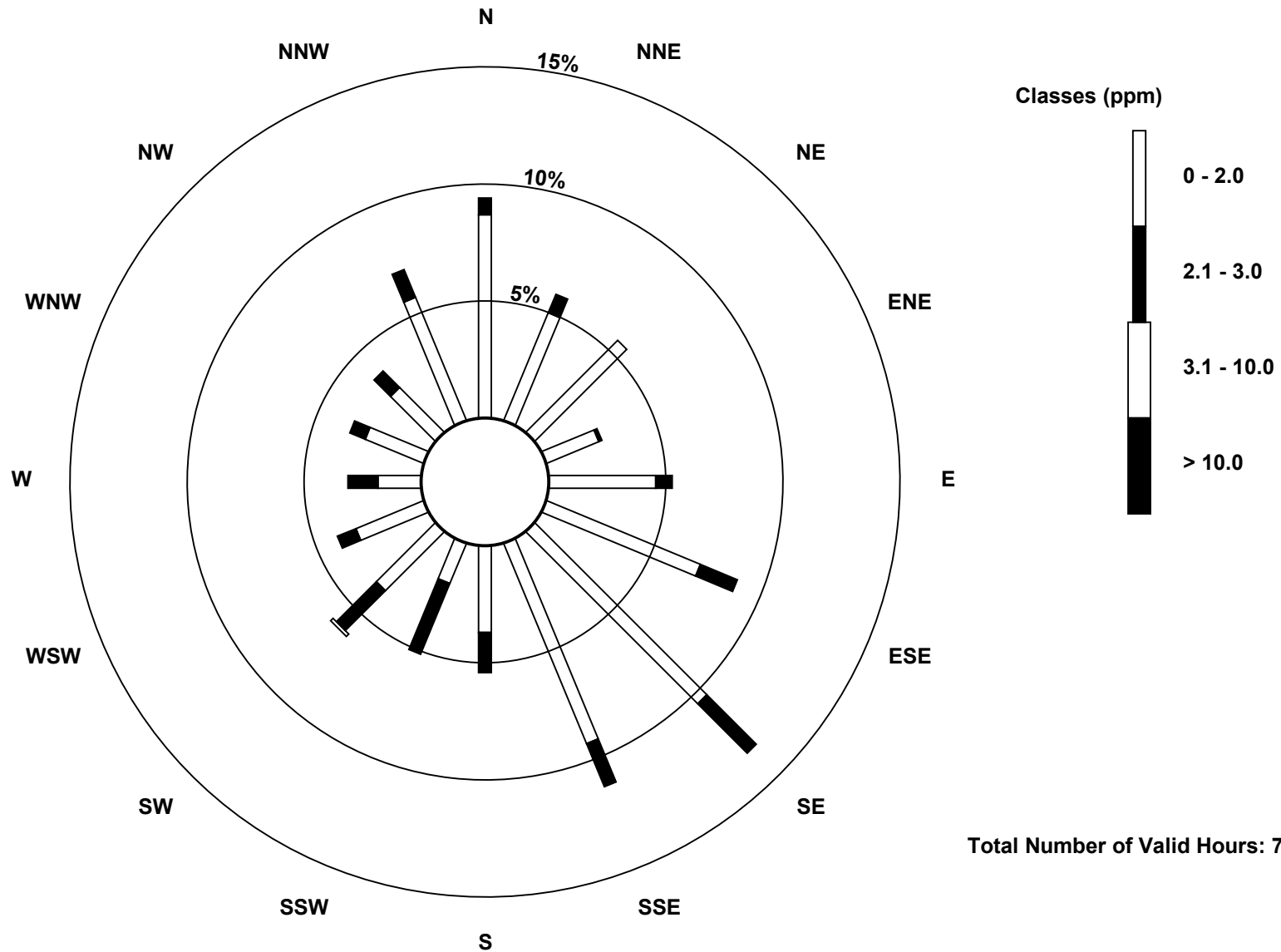
Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

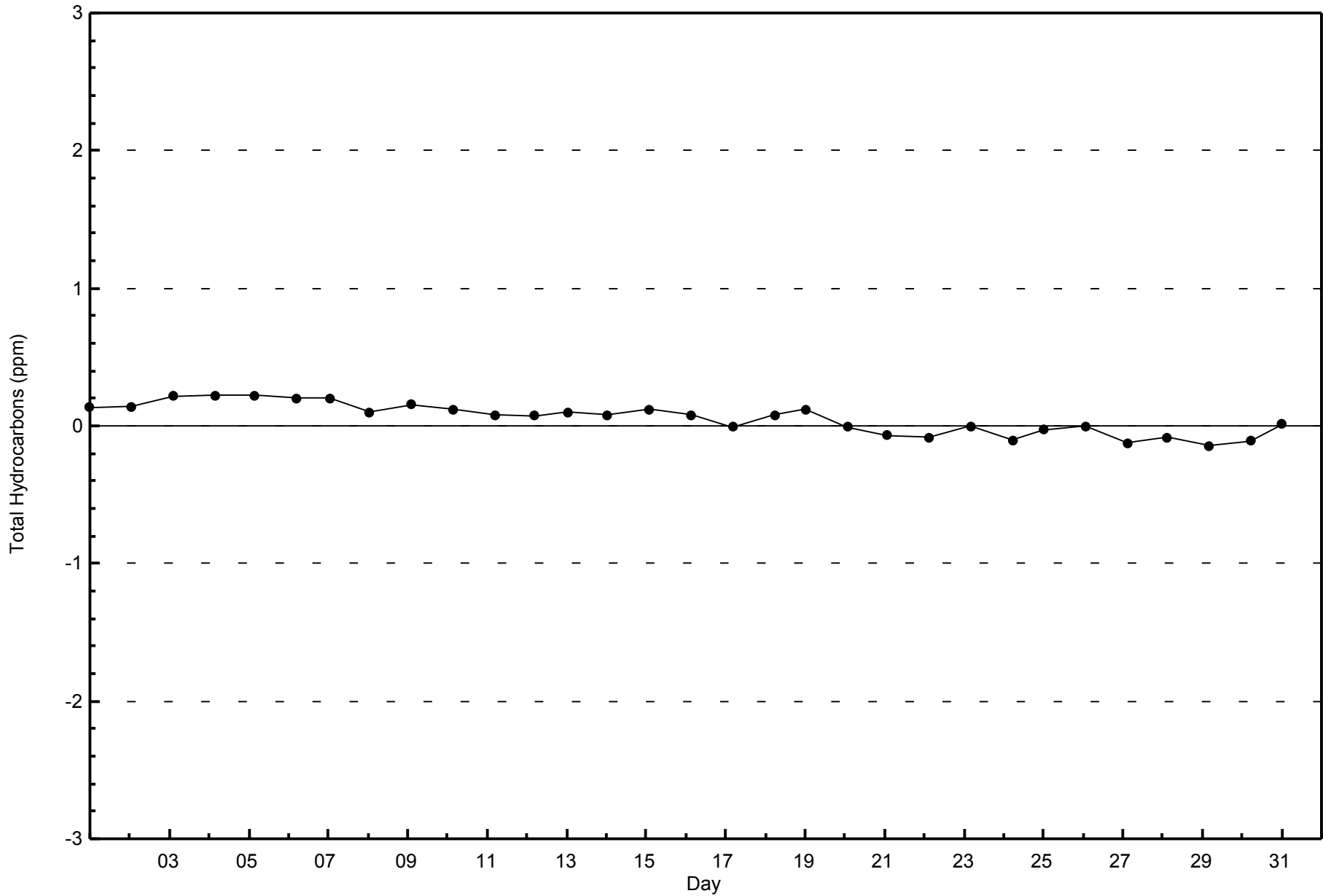
Total Hydrocarbons (THC) - ppm
Wapasu (AMS 17)





WBEA
Zero Responses

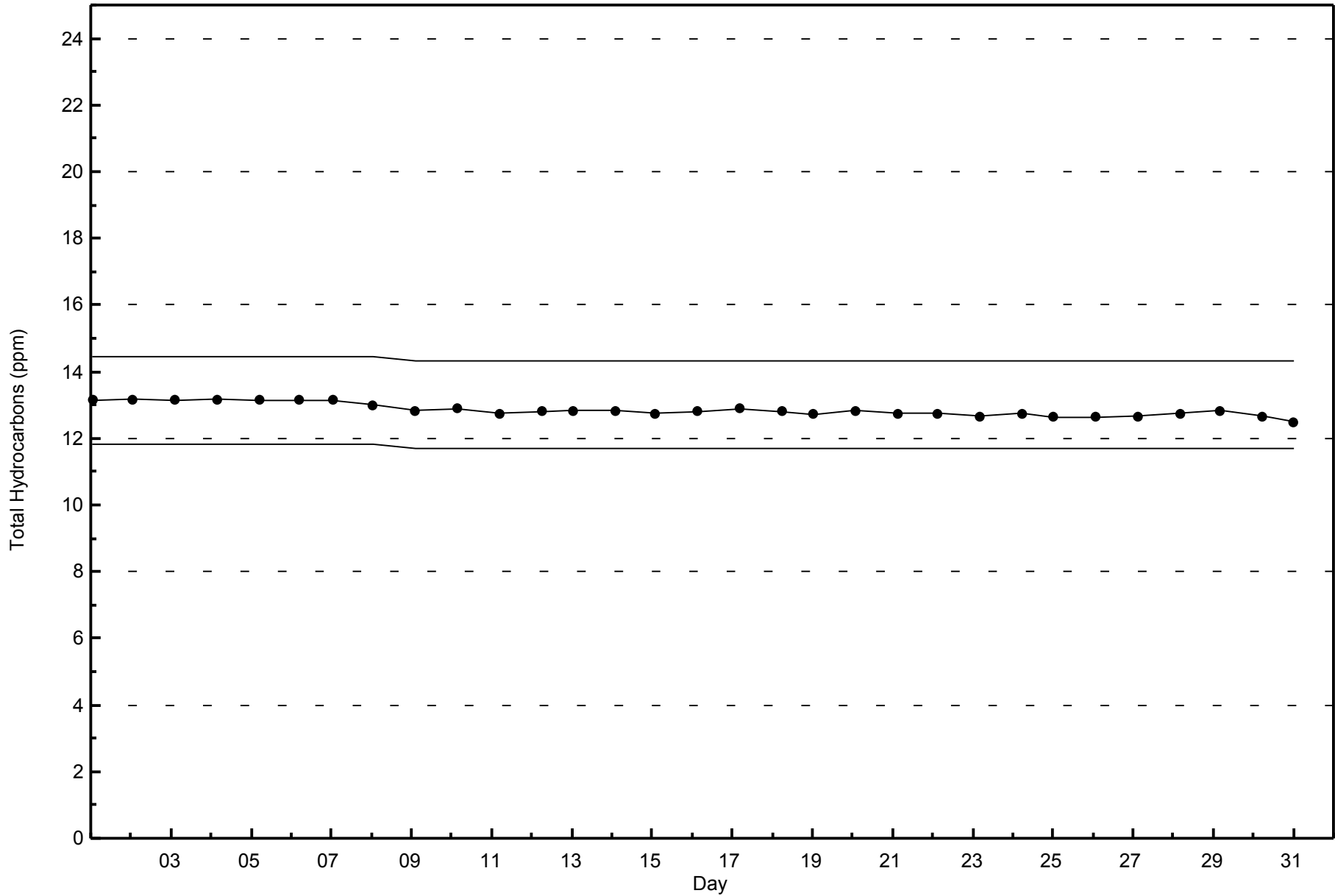
Total Hydrocarbons (THC) - ppm
Wapasu - May 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Wapasu - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O₃) - ppb

Wapasu - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 68 ppb on May 21 18:00	Maximum Daily Average: 52.8 ppb on May 13		Hours of Data:	710
Minimum Value: 8 ppb on May 7 02:00	Minimum Daily Average: 22.3 ppb on May 16		Hours of Missing Data:	34
Maximum Diurnal Average: 48.9 ppb at hour 17	Minimum Diurnal Average: 32.1 ppb at hour 5		Hours of Calibration:	34
Monthly Average: 40.4 ppb	Percentiles: P ₁ = 14 P ₁₀ = 26 Q ₁ = 33 Median = 40 Q ₃ = 48 P ₉₀ = 56 P ₉₉ = 64		Percent Operational Time:	100.0

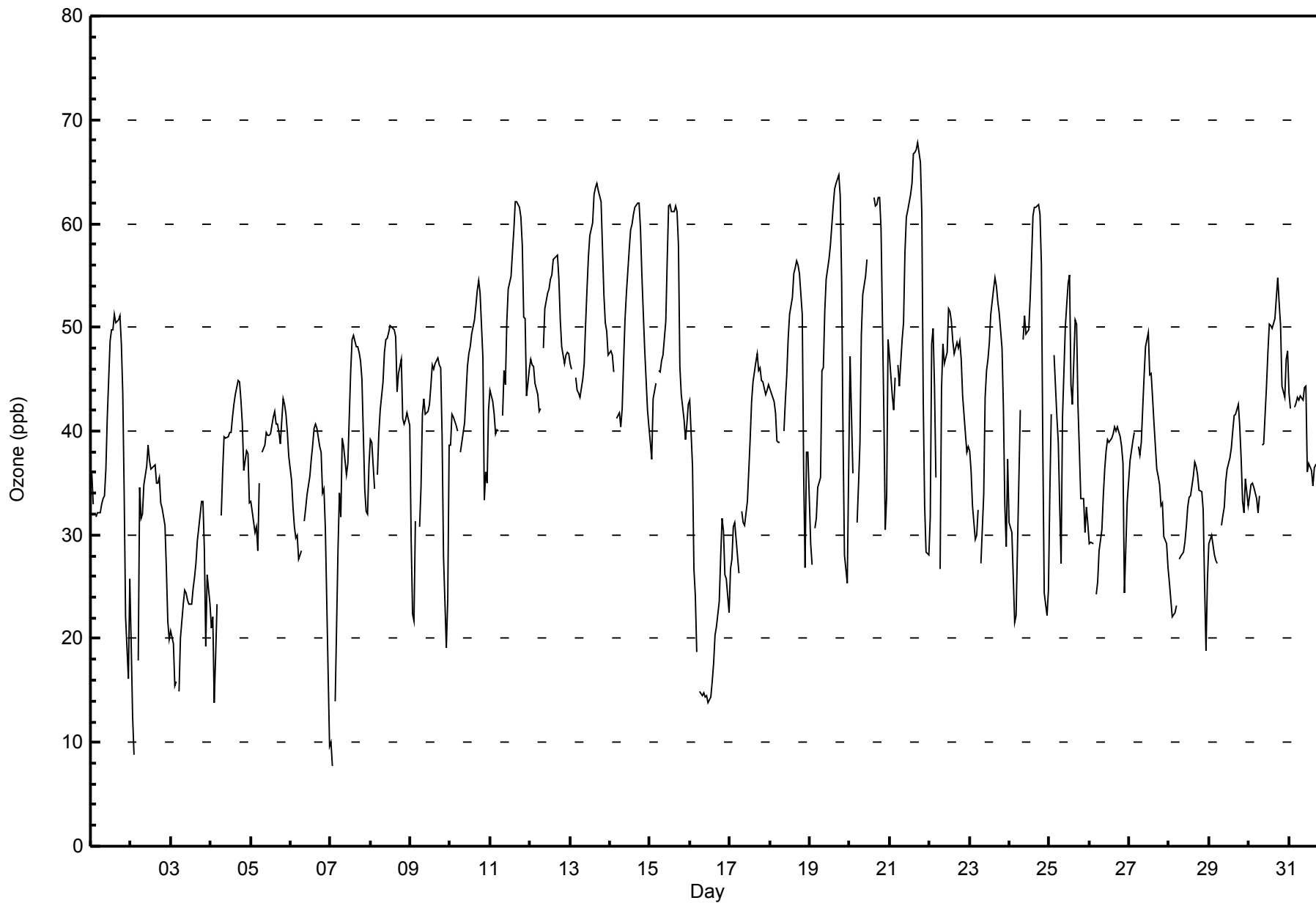
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	36	33	Z	32	32	32	33	33	34	36	41	49	50	50	51	50	51	51	48	44	34	22	16	26	38.5	51																							
2-May	19	13	9	Z	18	35	32	32	35	37	39	37	36	37	37	35	35	36	33	33	31	27	22	20	29.7	39																							
3-May	21	19	15	16	Z	15	20	23	25	24	24	23	23	25	26	27	29	31	33	33	29	19	26	23	23.9	33																							
4-May	21	22	14	18	23	Z	32	36	39	39	40	40	40	41	43	44	45	45	43	41	36	38	38	33	35.2	45																							
5-May	33	32	30	31	29	35	Z	38	39	40	40	40	40	41	42	41	41	40	39	43	43	42	40	38	38.0	43																							
6-May	35	33	31	30	30	28	28	Z	31	33	34	36	37	39	40	41	40	39	38	34	34	31	16	10	32.5	41																							
7-May	10	8	Z	14	29	34	32	39	38	36	37	41	46	49	49	48	48	48	47	45	34	32	32	37	36.2	49																							
8-May	39	39	34	Z	36	40	42	45	48	49	49	49	50	50	50	49	44	46	47	41	41	41	42	41	43.9	50																							
9-May	29	22	22	31	Z	31	35	42	43	42	42	43	44	46	46	47	47	46	46	39	28	19	24	39	37.1	47																							
10-May	39	42	41	41	40	Z	38	39	41	44	46	47	48	49	51	52	54	55	53	47	33	36	35	42	44.0	55																							
11-May	44	43	42	40	40	40	Z	42	46	44	51	54	55	57	59	62	62	62	61	58	51	51	43	46	50.0	62																							
12-May	47	46	46	45	43	42	42	Z	48	52	53	54	55	55	57	57	57	55	51	48	47	47	48	47	49.6	57																							
13-May	47	46	Z	45	44	44	43	45	47	50	54	57	59	60	63	63	64	63	62	58	53	51	50	47	52.8	64																							
14-May	48	47	46	Z	41	42	40	42	47	51	53	58	59	60	61	62	62	62	60	55	51	48	42	40	51.2	62																							
15-May	39	37	43	45	Z	46	46	47	47	51	56	62	62	61	61	62	61	58	46	44	41	39	41	43	49.4	62																							
16-May	43	37	27	24	19	Z	15	14	15	14	15	14	14	16	18	20	21	24	28	32	30	26	26	22	22.3	43																							
17-May	27	28	31	31	28	26	Z	32	31	31	33	36	39	43	45	47	47	46	46	45	45	44	44	44	37.8	47																							
18-May	44	44	43	42	39	39	39	Z	40	43	45	49	51	53	55	56	56	56	55	51	36	27	38	38	45.2	56																							
19-May	29	27	Z	31	32	35	35	46	46	51	55	56	58	60	62	63	64	65	63	55	39	28	25	36	46.1	65																							
20-May	47	42	36	Z	31	35	39	49	53	55	57	C	C	C	63	62	62	62	63	60	42	31	34	49	48.4	63																							
21-May	47	43	42	45	Z	46	44	49	50	57	61	61	63	64	67	67	67	68	66	61	43	33	28	28	52.2	68																							
22-May	32	48	50	44	35	Z	27	44	48	46	48	52	52	51	49	47	49	48	49	47	43	40	38	38	44.6	52																							
23-May	38	36	33	30	30	32	Z	27	34	43	46	47	49	51	54	55	54	53	51	48	42	33	29	37	41.4	55																							
24-May	31	30	26	22	22	29	42	Z	49	51	49	50	53	57	61	62	62	62	61	56	39	24	22	25	42.7	62																							
25-May	34	42	Z	47	41	39	33	27	41	50	52	54	55	44	43	51	50	42	38	34	33	30	33	31	41.1	55																							
26-May	29	29	29	Z	24	25	29	30	34	36	38	39	39	39	40	40	40	40	39	38	37	24	29	33	34.1	40																							
27-May	37	38	39	40	Z	39	38	39	42	45	48	49	45	46	43	41	36	36	35	33	33	30	29	27	38.6	49																							
28-May	25	24	22	22	23	Z	28	28	28	29	31	33	34	34	36	37	37	36	34	34	32	25	19	26	29.4	37																							
29-May	29	30	29	28	27	27	Z	31	32	33	35	36	37	38	40	41	42	43	40	37	33	32	35	33	34.4	43																							
30-May	34	35	35	35	33	32	34	Z	39	39	44	48	50	50	50	51	53	55	52	50	44	43	47	48	43.5	55																							
31-May	44	42	Z	42	43	43	43	43	43	44	44	36	37	36	35	36	37	37	35	32	34	40	35	24	38.5	44																							
																								34.8	34.1	32.6	33.4	32.1	35.0	34.9	37.1	39.8	41.8	43.8	45.0	46.0	46.7	48.1	48.9	48.9	48.5	47.2	44.3	38.5	34.0	33.0	34.6	Diurnal Average	
																								48	48	50	47	44	46	46	49	53	57	61	62	63	64	67	67	67	68	66	61	53	51	50	49	Diurnal Maximum	

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



WBEA
Hourly Averages

Ozone (O₃) - ppb
Wapasu - May 2015





WBEA
Cumulative Frequency Distribution

Ozone (O₃) - ppb
Wapasu - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	32	4.51	4.51
21 - 50	550	77.46	81.97
51 - 82	128	18.03	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 710

Total Number of Hours: 744



WBEA
Frequency Distribution

Ozone (O₃) - ppb
Wapasu - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	7	5	0	2	1	6	3	1	0	0	0	0	0	0	0	2	27
21 - 50	58	32	38	16	33	50	91	71	30	19	18	8	9	11	20	46	550
51 - 82	1	4	1	1	1	7	4	6	5	16	23	20	13	14	6	6	128
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	66	41	39	19	35	63	98	78	35	35	41	28	22	25	26	54	705

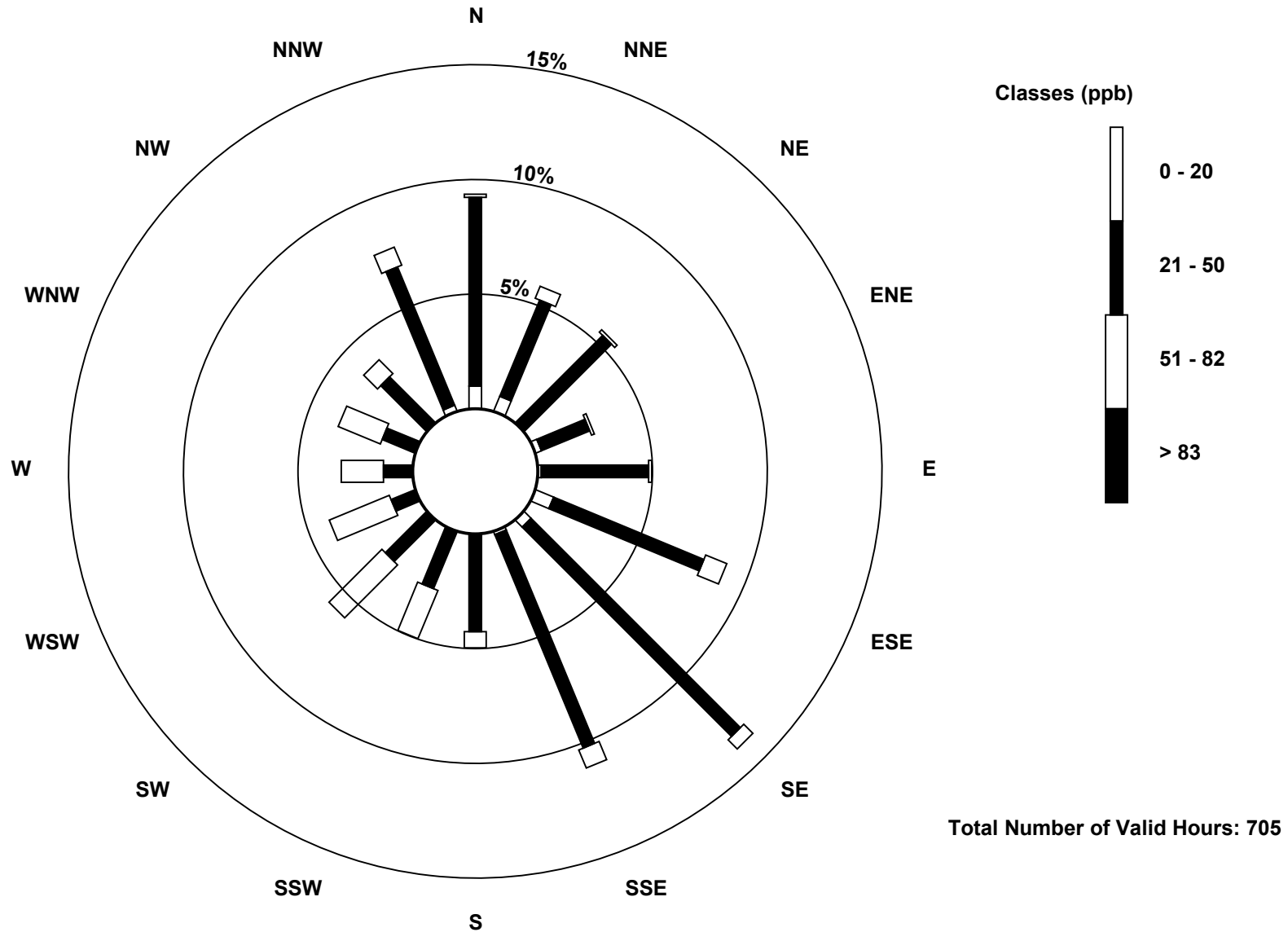
Total Number of Valid Hours: 705

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

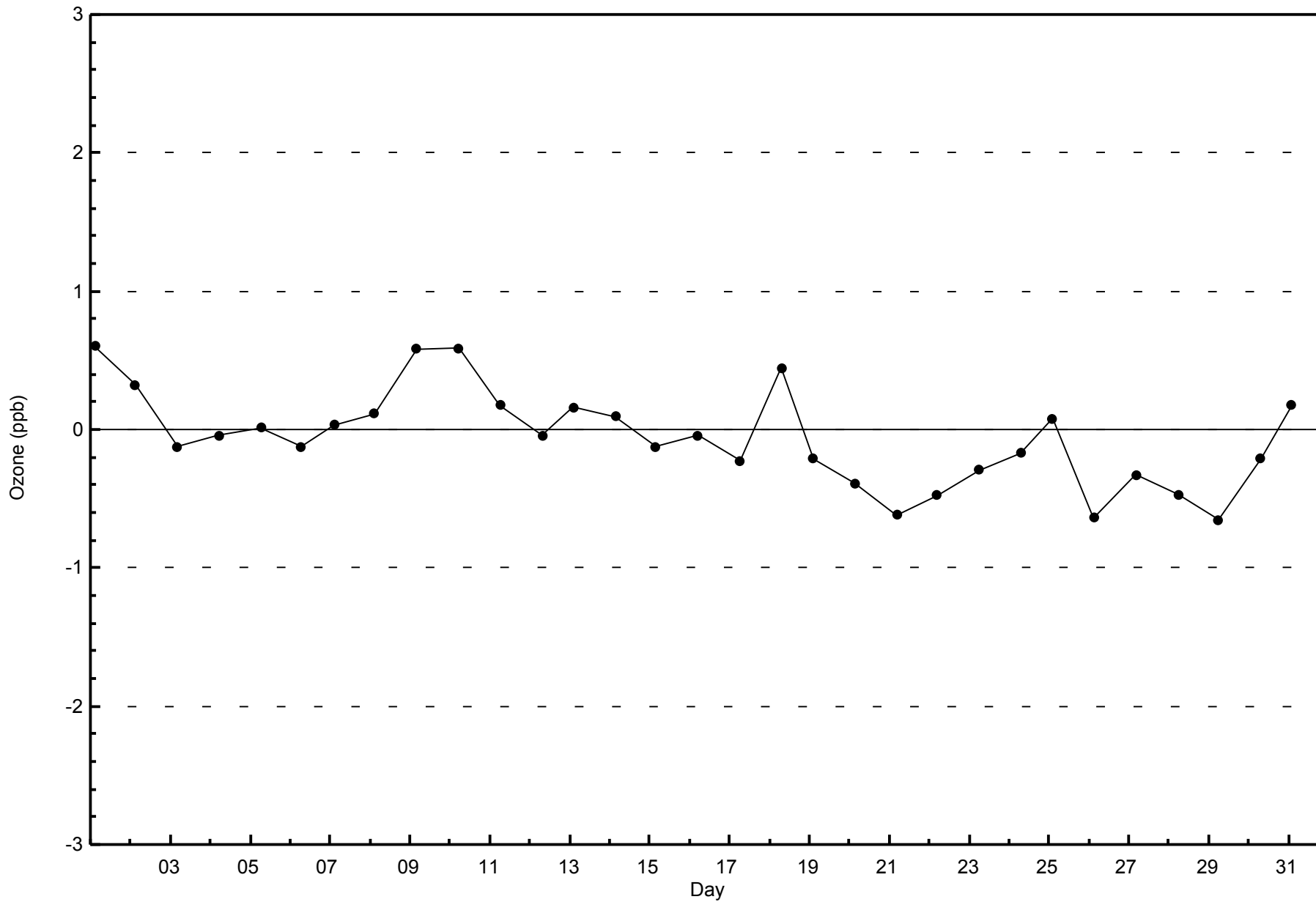
Ozone (O₃) - ppb
Wapasu (AMS 17)





WBEA
Zero Responses

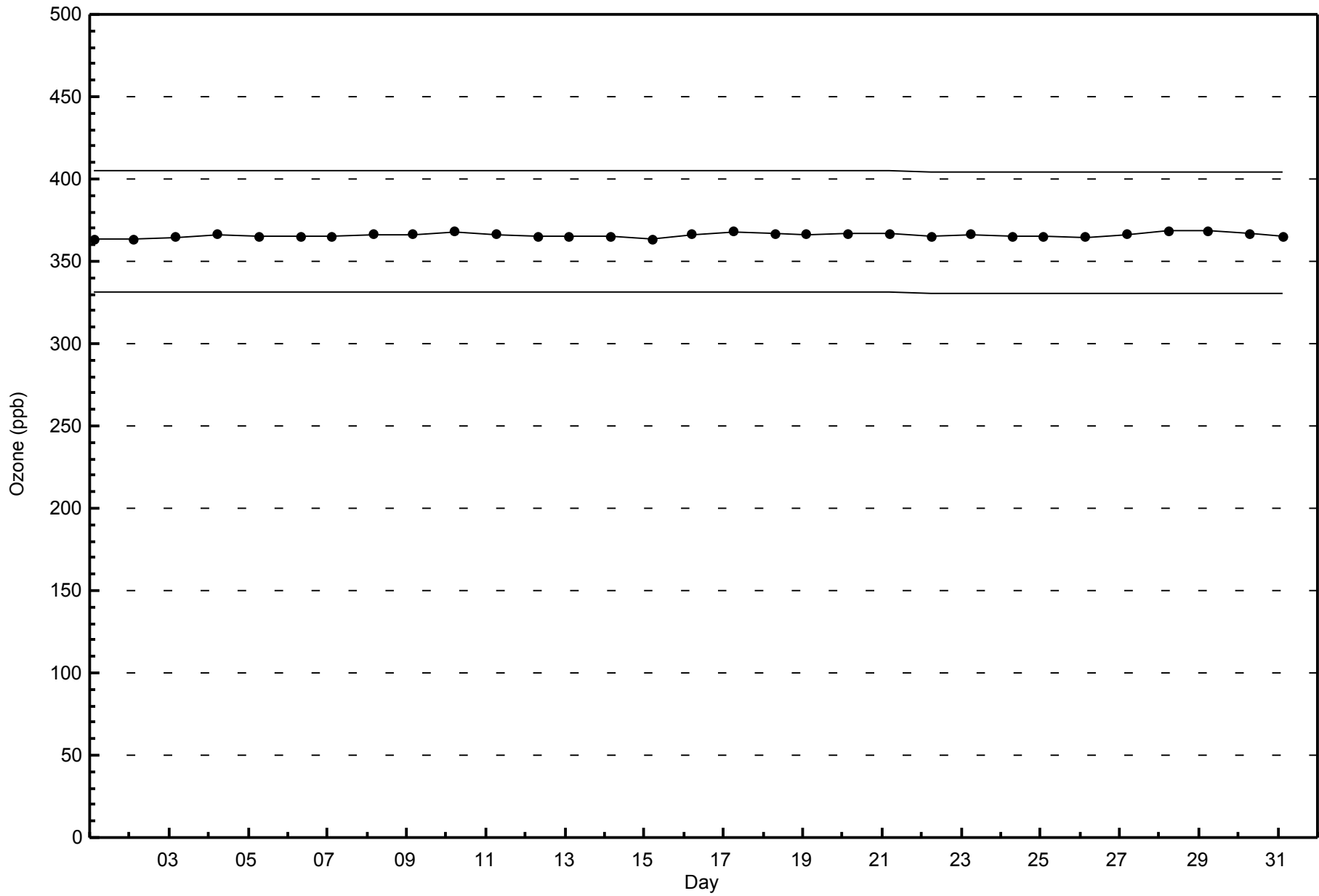
Ozone (O₃) - ppb
Wapasu - May 2015





WBEA
Span Responses

Ozone (O₃) - ppb
Wapasu - May 2015



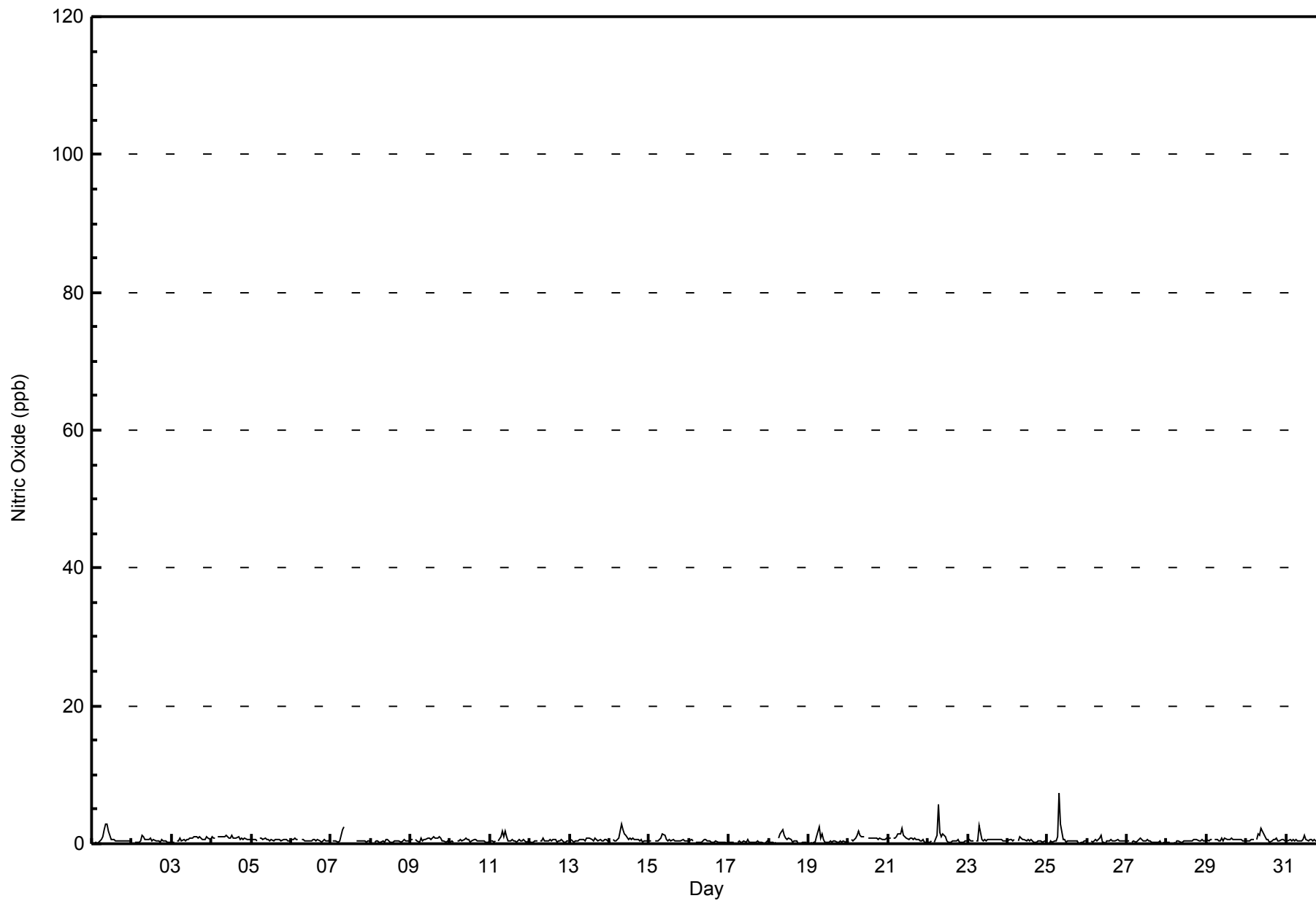


Maximum Value: 7 ppb on May 25 08:00																	Maximum Daily Average: 0.8 ppb on May 4																	Hours in Service: 744	
Minimum Value: 0 ppb on May 1 02:00																	Minimum Daily Average: 0.2 ppb on May 17																	Hours of Data: 705	
Maximum Diurnal Average: 1.2 ppb at hour 8																	Minimum Diurnal Average: 0.4 ppb at hour 24																	Hours of Missing Data: 39	
Monthly Average: 0.6 ppb																	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 1 P ₉₉ = 2																	Hours of Calibration: 37	
																	Percent Operational Time: 99.7																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-May	Z	0	0	0	0	1	1	2	3	3	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.7	3									
2-May	0	Z	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0.5	1									
3-May	0	0	Z	0	0	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1										
4-May	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1										
5-May	1	1	1	0	Z	1	1	1	1	1	1	0	1	0	1	1	1	1	1	0	1	1	1	0.6	1										
6-May	1	1	1	1	1	Z	1	1	0	0	0	0	0	1	1	0	1	0	0	1	1	0	0	0.5	1										
7-May	Z	0	0	0	0	0	1	2	2	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	2										
8-May	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	1	0	0	0.4	1										
9-May	1	1	Z	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	1										
10-May	0	0	0	Z	0	0	1	0	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0.4	1										
11-May	0	0	0	0	Z	0	1	2	1	2	1	1	0	1	0	0	0	1	0	0	1	0	0	0.6	2										
12-May	0	0	0	0	0	Z	0	0	1	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0.4	1										
13-May	Z	1	0	0	0	0	1	1	1	0	1	1	1	1	0	1	1	0	1	0	0	1	1	0.6	1										
14-May	0	Z	1	0	0	1	2	3	2	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0.8	3										
15-May	0	0	Z	0	0	0	1	1	1	1	1	1	1	0	1	0	0	0	0	0	1	0	0	0.6	1										
16-May	0	1	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1										
17-May	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1										
18-May	0	0	0	0	0	Z	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	2										
19-May	Z	0	0	0	0	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2										
20-May	0	Z	1	0	1	1	2	1	1	1	M	M	1	1	1	1	1	1	1	1	1	1	1	0.8	2										
21-May	1	1	Z	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0.8	2										
22-May	0	0	0	Z	0	1	6	2	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0.8	6										
23-May	0	1	0	0	Z	0	0	3	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0.6	3										
24-May	0	1	1	0	1	Z	0	1	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0.5	1										
25-May	Z	0	1	0	0	0	1	7	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.8	7										
26-May	1	Z	0	0	0	1	0	1	1	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0.5	1										
27-May	0	0	Z	0	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1										
28-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	1	0	0.4	1										
29-May	1	0	1	1	Z	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.6	1										
30-May	0	1	0	1	1	Z	1	2	1	2	1	1	1	1	0	0	1	1	1	1	0	0	1	0.7	2										
31-May	Z	0	1	0	1	0	1	0	0	0	1	1	1	0	1	1	1	1	1	0	0	0	1	0.5	1										
																								Diurnal Average											
																								Diurnal Maximum											
Z - zerospan C - Calibration M - Maintenance																																			



WBEA
Hourly Averages

Nitric Oxide (NO) - ppb
Wapasu - May 2015





WBEA
Cumulative Frequency Distribution

Nitric Oxide (NO) - ppb
Wapasu - May 2015

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
Frequency Distribution

Nitric Oxide (NO) - ppb
Wapasu - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	66	41	39	18	37	62	94	79	38	36	42	27	22	24	26	49	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	66	41	39	18	37	62	94	79	38	36	42	27	22	24	26	49	700

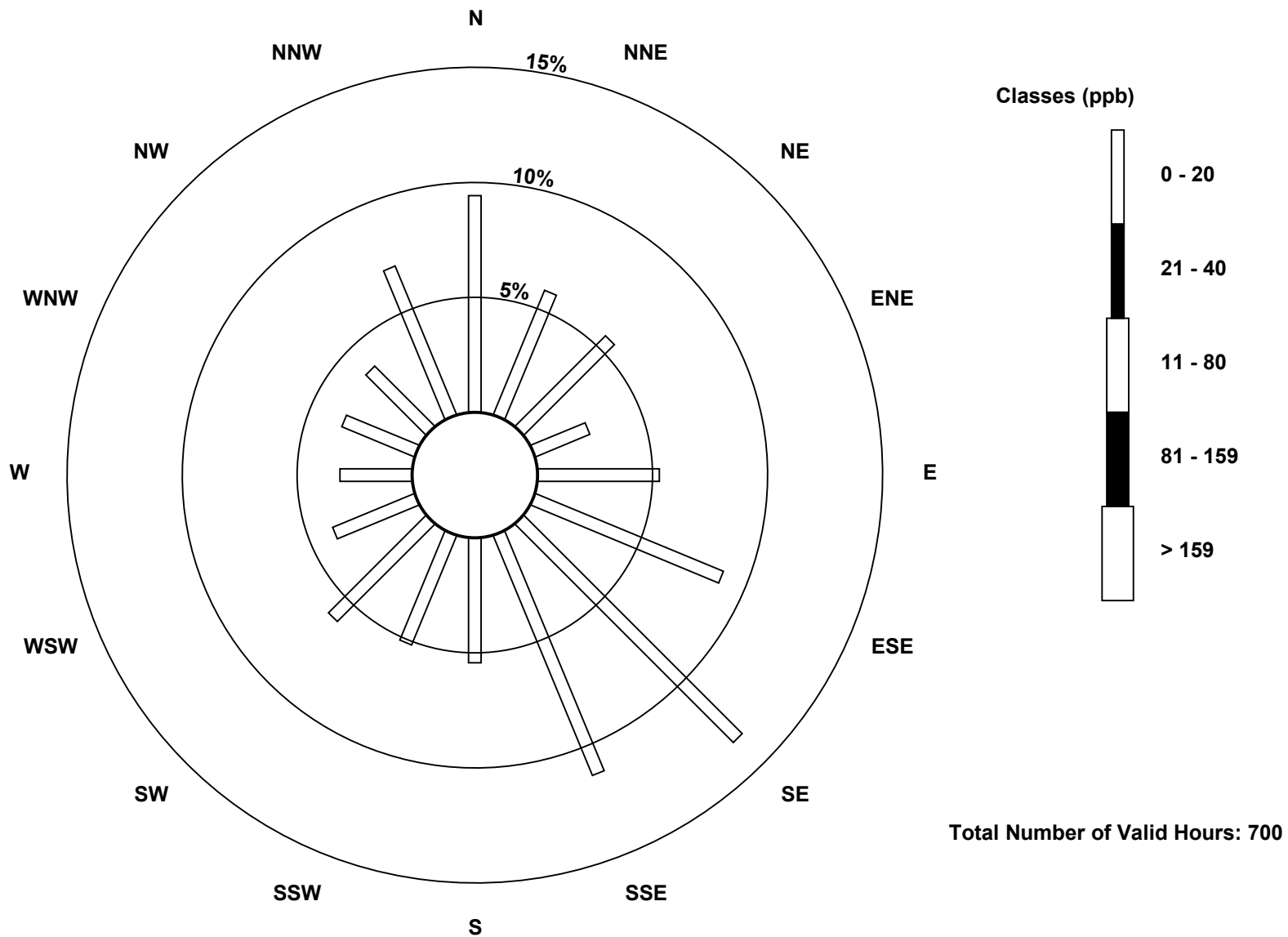
Total Number of Valid Hours: 700

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

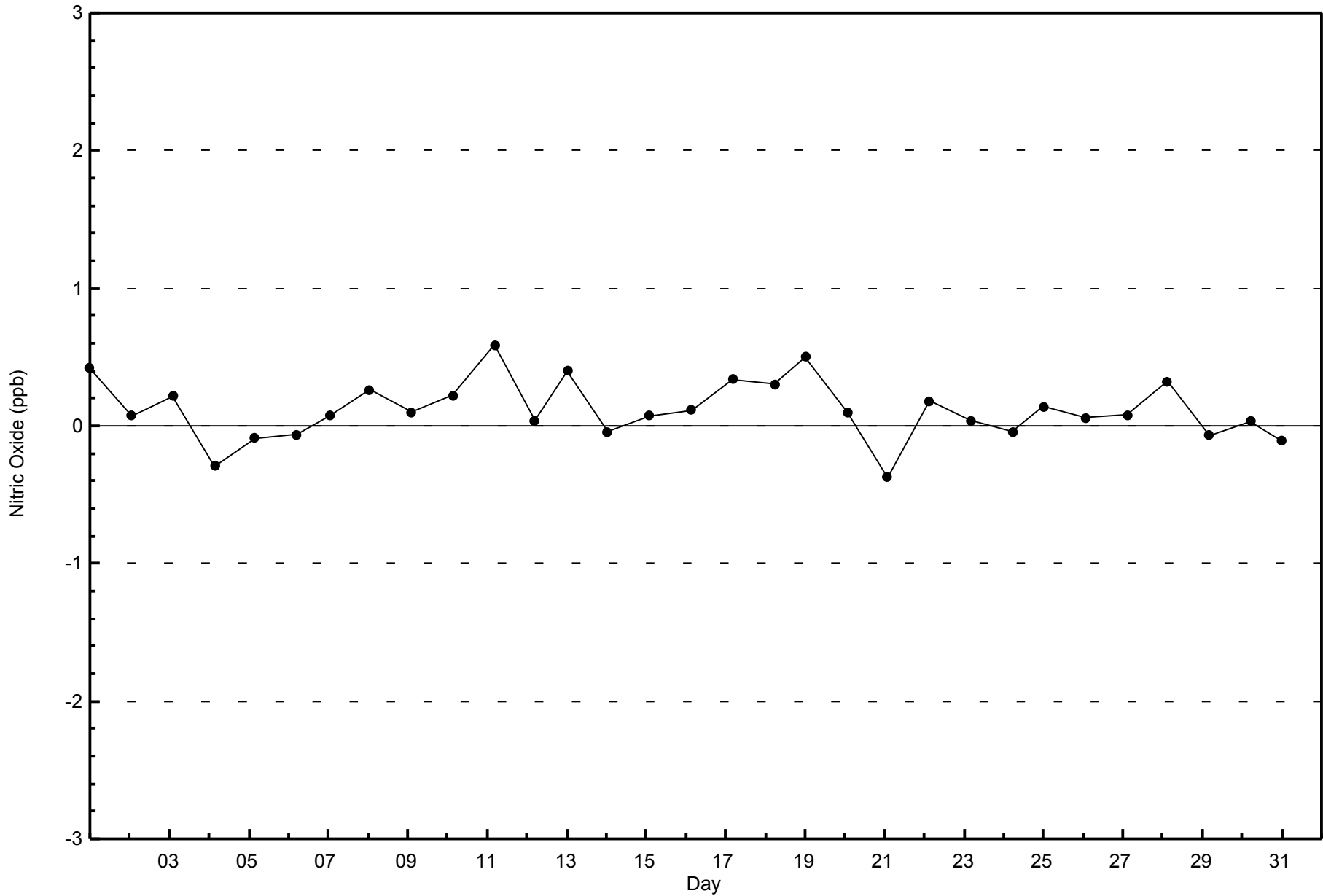
Nitric Oxide (NO) - ppb
Wapasu (AMS 17)





WBEA
Zero Responses

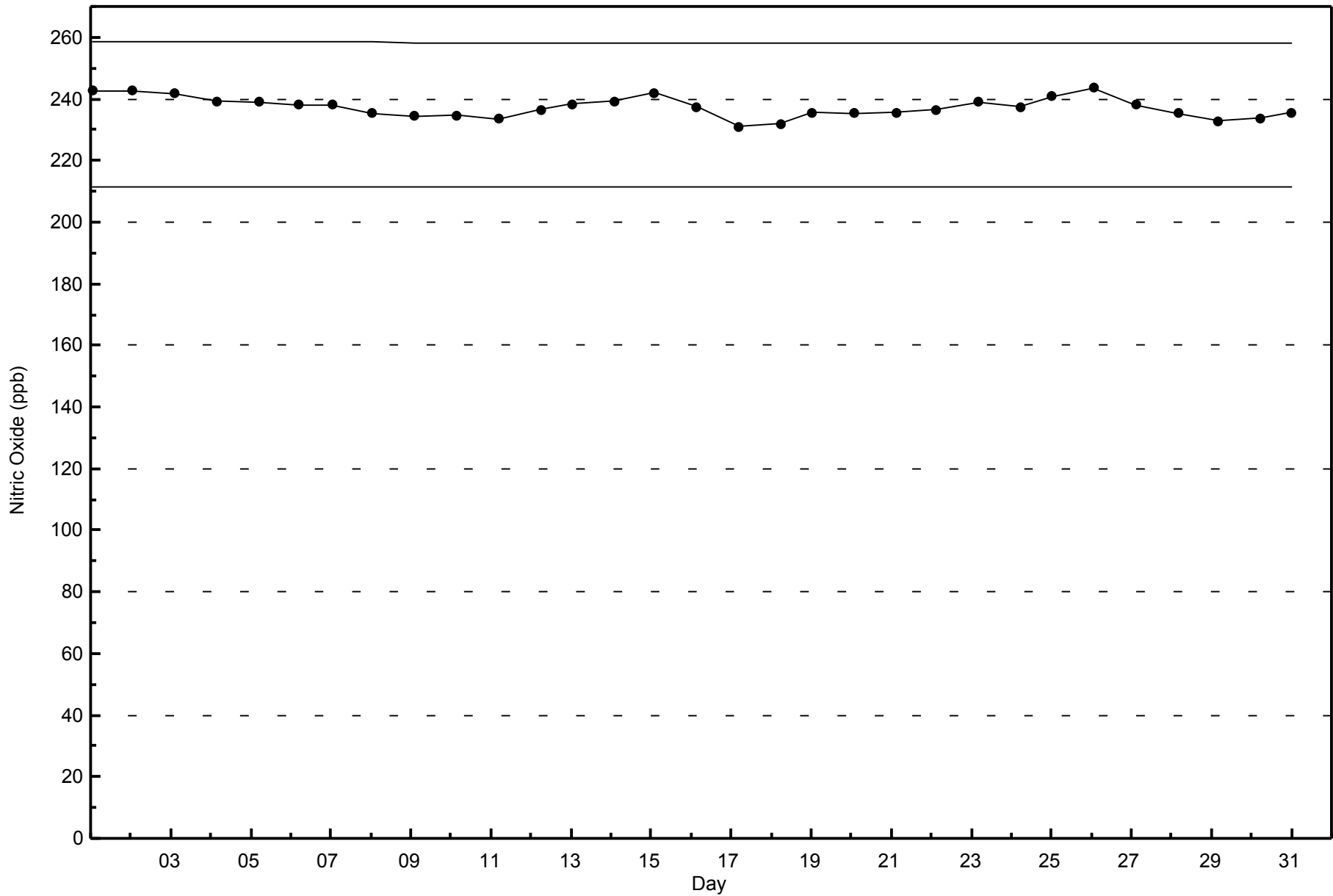
Nitric Oxide (NO) - ppb
Wapasu - May 2015





WBEA
Span Responses

Nitric Oxide (NO) - ppb
Wapasu - May 2015





Summary of Hour Averages

Wapasu - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 28 ppb on May 25 08:00	Maximum Daily Average: 4.9 ppb on May 19		Hours of Data:	705
Minimum Value: 0 ppb on May 3 21:00	Minimum Daily Average: 0.2 ppb on May 6		Hours of Missing Data:	39
Maximum Diurnal Average: 3.8 ppb at hour 8	Minimum Diurnal Average: 0.9 ppb at hour 22		Hours of Calibration:	37
Monthly Average: 1.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 2 P ₉₀ = 4 P ₉₉ = 11		Percent Operational Time:	99.7

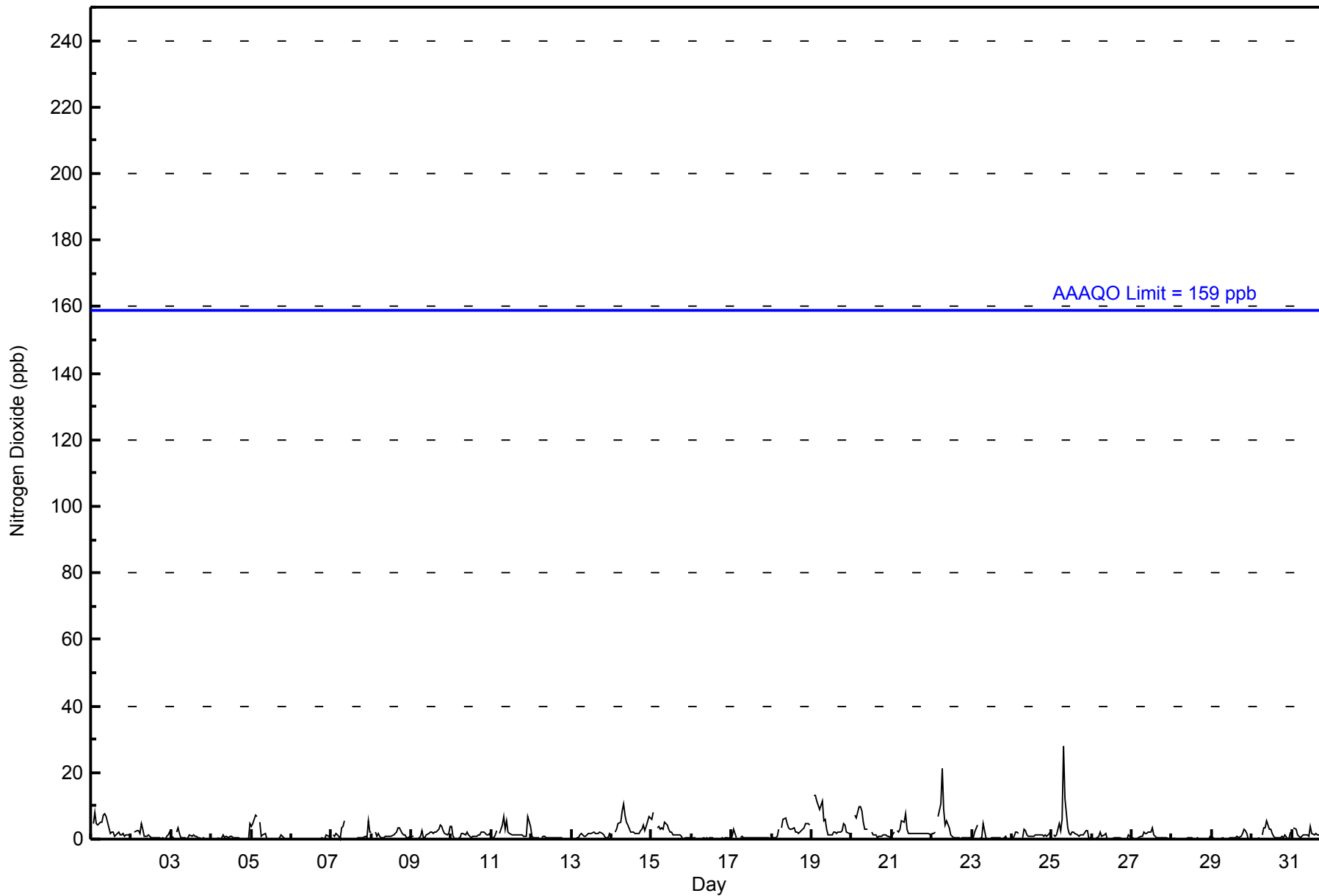
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	Z	5	8	5	4	5	5	7	8	7	5	2	2	2	1	1	2	1	1	2	1	1	1	1	3.4	8
2-May	1	Z	2	3	3	2	5	3	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	2	1.2	5
3-May	1	0	Z	2	4	2	1	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.8	4
4-May	0	0	0	Z	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	5	0.5	5
5-May	4	5	7	7	Z	5	1	1	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1.5	7
6-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.2	1
7-May	Z	1	1	2	1	0	3	4	5	C	C	C	C	C	C	0	1	0	0	0	1	0	5	2	--	5
8-May	2	Z	2	1	2	1	1	1	1	1	1	1	1	1	2	2	4	4	2	1	1	1	0	1	1.3	4
9-May	1	1	Z	0	0	1	3	1	1	1	2	2	2	2	2	2	3	4	4	3	2	1	2	4	1.8	4
10-May	4	1	0	Z	0	0	2	2	1	2	1	1	1	1	1	1	1	1	2	2	2	1	1	2	1.3	4
11-May	1	0	1	2	Z	2	4	7	3	5	2	2	1	1	1	1	1	1	1	1	1	1	7	4	2.2	7
12-May	1	1	1	1	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
13-May	Z	0	0	0	1	1	2	1	1	1	2	2	2	2	2	2	2	2	2	1	1	0	0	2	1.2	2
14-May	1	Z	2	3	5	5	9	11	7	5	4	2	2	2	2	2	3	3	4	3	4	7	7	4.0	11	
15-May	6	8	Z	3	4	3	3	3	5	4	3	2	2	1	1	1	1	1	1	0	0	0	0	0	2.4	8
16-May	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
17-May	1	3	2	0	Z	0	1	1	0	0	1	1	1	0	1	1	1	0	0	1	0	1	0	0	0.6	3
18-May	0	0	1	1	3	Z	3	6	6	5	4	3	3	3	2	2	2	2	2	3	5	5	5	4	3.0	6
19-May	Z	13	13	11	10	9	12	5	6	3	1	1	1	2	2	2	2	2	3	5	4	2	2	2	4.9	13
20-May	2	Z	7	6	10	10	9	5	3	3	M	M	2	1	1	1	1	1	1	1	1	1	1	0	3.1	10
21-May	1	2	Z	3	2	3	6	5	8	3	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2.4	8
22-May	2	2	2	Z	7	11	21	9	4	6	3	1	1	0	1	0	0	0	0	0	0	0	1	0	3.1	21
23-May	0	1	2	4	Z	0	0	5	0	0	0	0	0	0	1	1	1	1	0	0	1	0	0	0	0.8	5
24-May	0	1	2	2	2	Z	0	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1.3	3
25-May	Z	1	1	1	5	3	6	28	12	4	2	1	2	2	2	1	1	1	1	1	3	2	0	0	3.5	28
26-May	1	Z	1	0	1	2	1	1	2	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	0.6	2
27-May	1	0	Z	0	1	1	1	2	2	2	2	3	1	1	1	1	1	0	0	0	0	0	0	0	0.9	3
28-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
29-May	1	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	0	1	2	3	3	2	0	0	0.7	3
30-May	0	0	0	0	0	Z	1	3	3	5	3	3	2	1	1	1	1	1	1	1	1	0	1	2	1.3	5
31-May	Z	3	3	1	1	1	1	1	1	1	1	4	2	1	2	1	1	1	1	1	2	1	1	4	1.5	4
	1.1	1.9	2.3	2.3	2.4	2.6	3.2	3.8	2.8	2.1	1.5	1.3	1.2	1.1	1.0	0.9	1.0	1.1	1.1	1.2	1.1	0.9	1.4	1.6		Diurnal Average
	6	13	13	11	10	11	21	28	12	7	5	4	3	3	2	2	4	4	4	5	5	5	7	7		Diurnal Maximum

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wapasu - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	99.72	99.72
21 - 40	2	0.28	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Wapasu - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	66	41	39	18	37	62	94	79	38	35	41	27	22	24	26	49	698
21 - 40	0	0	0	0	0	0	0	0	0	1	1	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	66	41	39	18	37	62	94	79	38	36	42	27	22	24	26	49	700

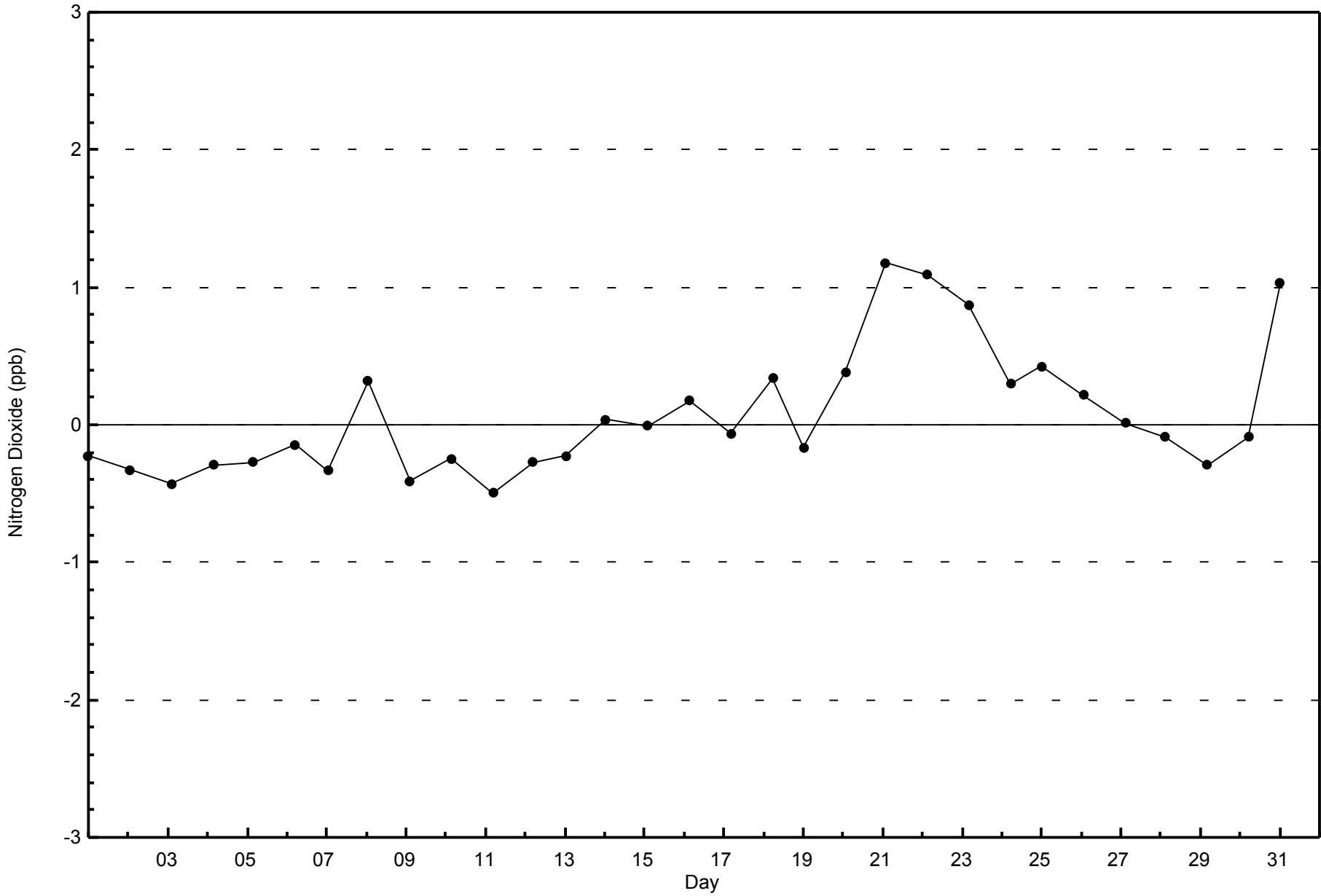
Total Number of Valid Hours: 700

Total Number of Hours: 744



WBEA
Zero Responses

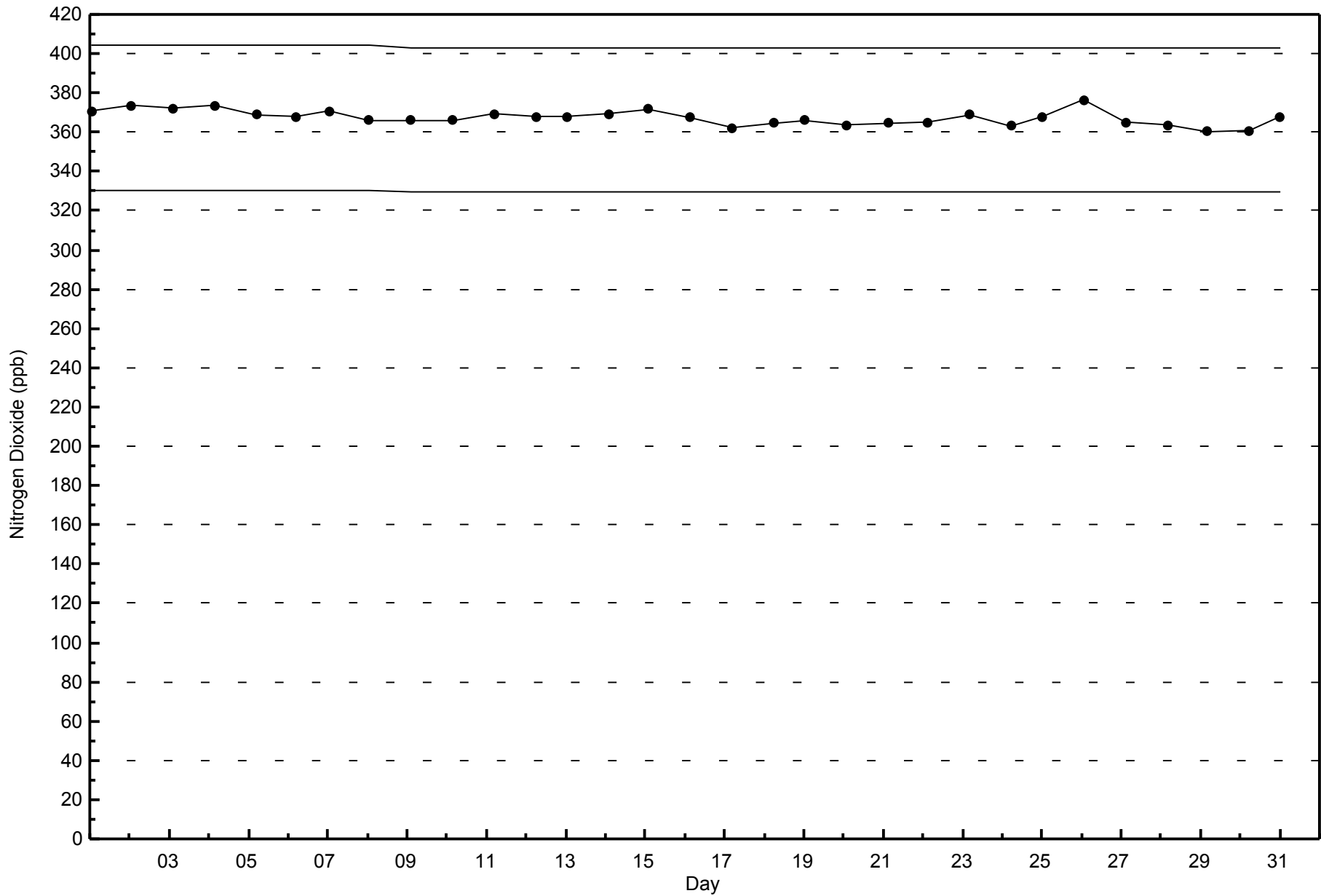
Nitrogen Dioxide (NO₂) - ppb
Wapasu - May 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Wapasu - May 2015





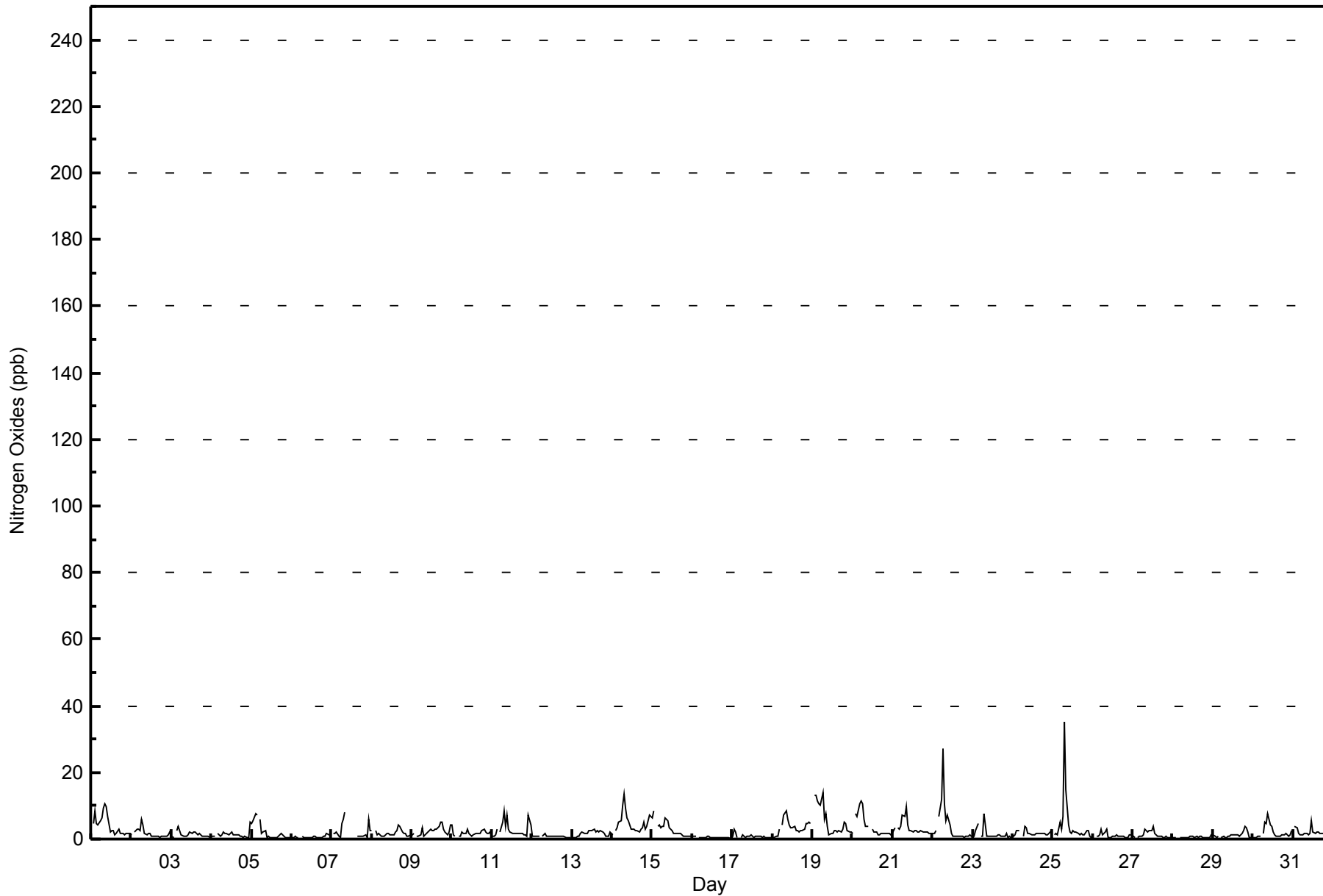
Maximum Value: 35 ppb on May 25 08:00																	Maximum Daily Average: 5.4 ppb on May 19																	Hours in Service: 744	
Minimum Value: 0 ppb on May 17 00:00																	Minimum Daily Average: 0.5 ppb on May 16																	Hours of Data: 705	
Maximum Diurnal Average: 5.0 ppb at hour 8																	Minimum Diurnal Average: 1.3 ppb at hour 22																	Hours of Missing Data: 39	
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 = 13																	Hours of Calibration: 37	
																																		Percent Operational Time: 99.7	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-May	Z	5	9	5	4	6	6	9	11	10	7	2	3	3	1	2	3	2	2	2	1	2	2	2	4.1	11									
2-May	1	Z	2	3	3	2	6	4	2	1	2	2	1	1	1	1	1	0	1	1	1	1	1	2	1.7	6									
3-May	1	1	Z	3	4	2	1	1	1	1	1	2	2	2	2	2	1	2	1	1	1	1	1	1	1.4	4									
4-May	1	1	1	Z	2	1	1	2	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	5	1.4	5									
5-May	5	5	8	7	Z	6	2	2	3	1	1	0	1	0	1	1	1	1	2	1	1	1	0	0	2.1	8									
6-May	1	1	1	1	1	Z	1	1	1	0	1	0	0	1	1	1	1	1	0	1	1	2	1	1	0.7	2									
7-May	Z	1	2	2	1	0	4	6	8	C	C	C	C	C	C	1	1	1	1	1	1	1	6	3	--	8									
8-May	2	Z	2	1	2	1	1	1	1	1	1	1	1	1	2	3	4	4	2	2	2	1	1	1	1.7	4									
9-May	1	2	Z	1	1	1	4	1	1	2	2	3	3	2	3	3	4	5	5	3	2	1	2	4	2.4	5									
10-May	4	1	1	Z	1	1	2	2	2	3	2	1	1	1	2	2	2	2	3	3	2	2	2	2	1.8	4									
11-May	1	1	1	3	Z	2	5	8	4	7	3	2	2	2	1	2	2	2	1	1	1	1	7	4	2.8	8									
12-May	1	1	1	1	1	Z	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0.8	2									
13-May	Z	1	0	1	1	2	2	2	2	2	3	3	3	3	2	3	2	3	2	2	1	1	1	2	1.8	3									
14-May	1	Z	3	3	5	6	10	13	9	6	5	3	3	3	3	3	2	3	3	5	3	4	7	7	4.9	13									
15-May	6	8	Z	4	4	3	4	4	6	6	4	3	3	2	2	2	2	2	1	1	1	1	1	1	3.0	8									
16-May	1	1	1	Z	0	0	1	1	1	1	1	1	1	0	0	0	1	0	1	0	0	0	0	0	0.5	1									
17-May	1	3	2	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.9	3									
18-May	0	1	1	1	3	Z	4	7	8	6	4	3	4	4	2	3	2	3	2	3	5	5	5	4	3.5	8									
19-May	Z	13	13	12	10	10	14	6	7	4	1	2	2	2	3	2	2	2	3	5	4	3	2	2	5.4	14									
20-May	2	Z	8	7	11	11	10	6	4	4	M	M	3	2	2	1	1	2	2	2	2	2	2	1	4.0	11									
21-May	2	3	Z	3	3	4	7	7	10	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3.2	10									
22-May	2	2	3	Z	7	12	27	10	5	7	4	2	1	1	1	1	1	1	1	1	1	1	1	1	3.9	27									
23-May	1	1	3	5	Z	1	1	7	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	0	1.4	7									
24-May	1	1	3	3	2	Z	1	4	3	2	2	1	1	1	2	2	1	2	2	2	1	1	2	3	1.8	4									
25-May	Z	1	1	1	5	3	7	35	15	4	2	2	3	2	2	1	1	2	1	1	3	3	1	1	4.3	35									
26-May	1	Z	1	1	1	3	1	2	3	0	0	0	1	1	1	1	1	1	1	0	1	0	1	1	1.1	3									
27-May	1	1	Z	0	1	1	1	3	3	2	3	2	4	2	1	1	1	1	1	1	1	0	0	0	1.3	4									
28-May	0	0	1	Z	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	0	1	0.6	1									
29-May	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	2	2	4	3	2	0	0	1.3	4									
30-May	0	1	1	1	1	Z	2	5	5	8	4	4	2	1	1	1	1	1	1	1	2	1	1	3	2.0	8									
31-May	Z	4	3	2	1	1	1	2	2	1	2	5	2	2	2	2	2	2	2	2	1	1	1	4	2.1	5									
																	Diurnal Average		Diurnal Maximum																
																	1.5		6																
																	2.3		13																
																	2.7		13																
																	2.7		12																
																	2.9		11																
																	3.1		12																
																	4.2		27																
																	5.0		35																
																	3.9		15																
																	3.0		10																
																	2.1		7																
																	1.8		5																
																	1.7		4																
																	1.6		4																
																	1.5		3																
																	1.5		3																
																	1.5		4																
																	1.6		5																
																	1.5		5																
																	1.6		5																
																	1.5		5																
																	1.3		5																
																	1.7		7																
																	2.0		7																

Z - zerospan C - Calibration M - Maintenance



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Wapasu - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	703	99.72	99.72
21 - 40	2	0.28	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 705

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Wapasu - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	66	41	39	18	37	62	94	79	38	35	41	27	22	24	26	49	698
21 - 40	0	0	0	0	0	0	0	0	0	1	1	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	66	41	39	18	37	62	94	79	38	36	42	27	22	24	26	49	700

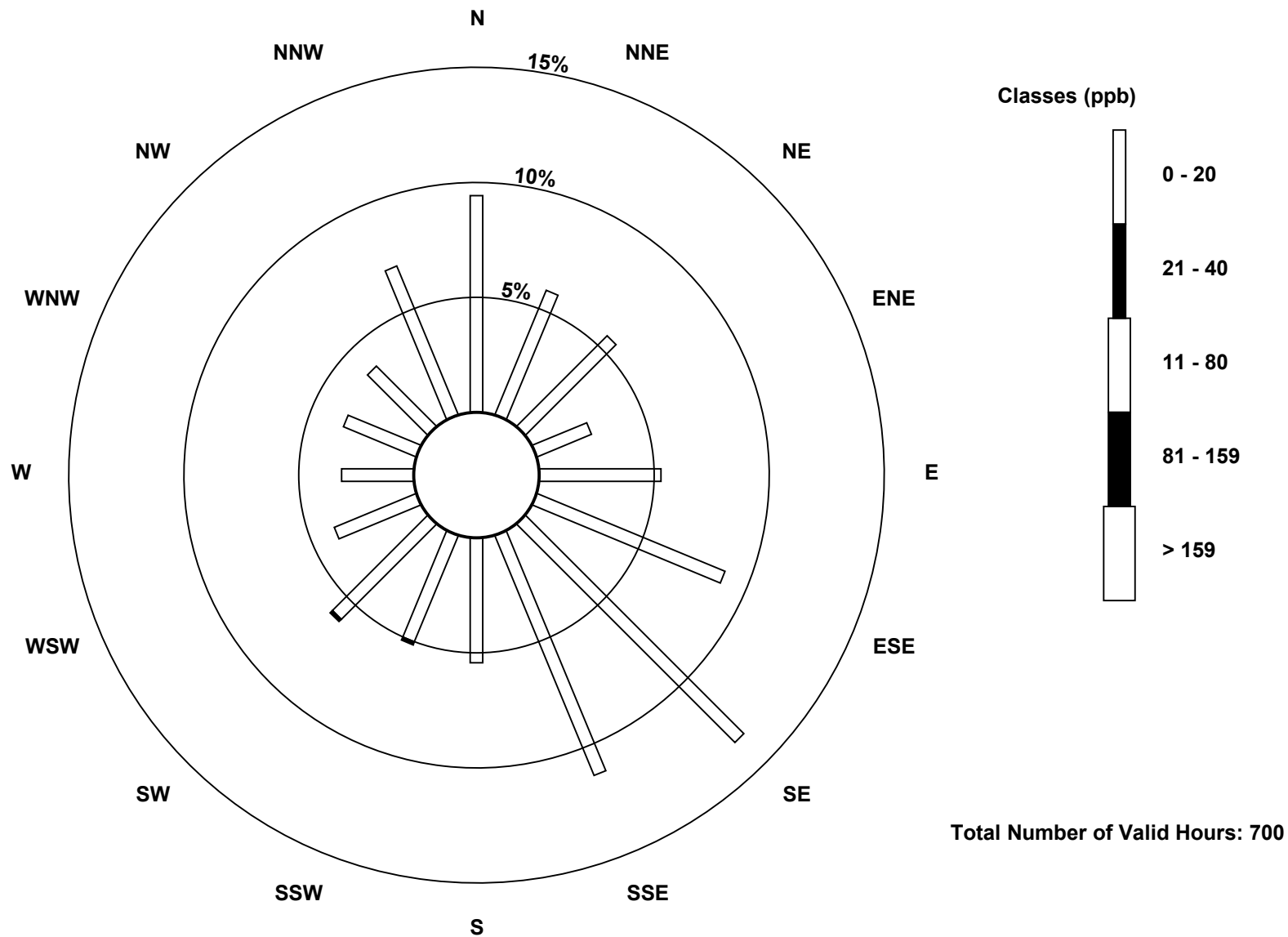
Total Number of Valid Hours: 700

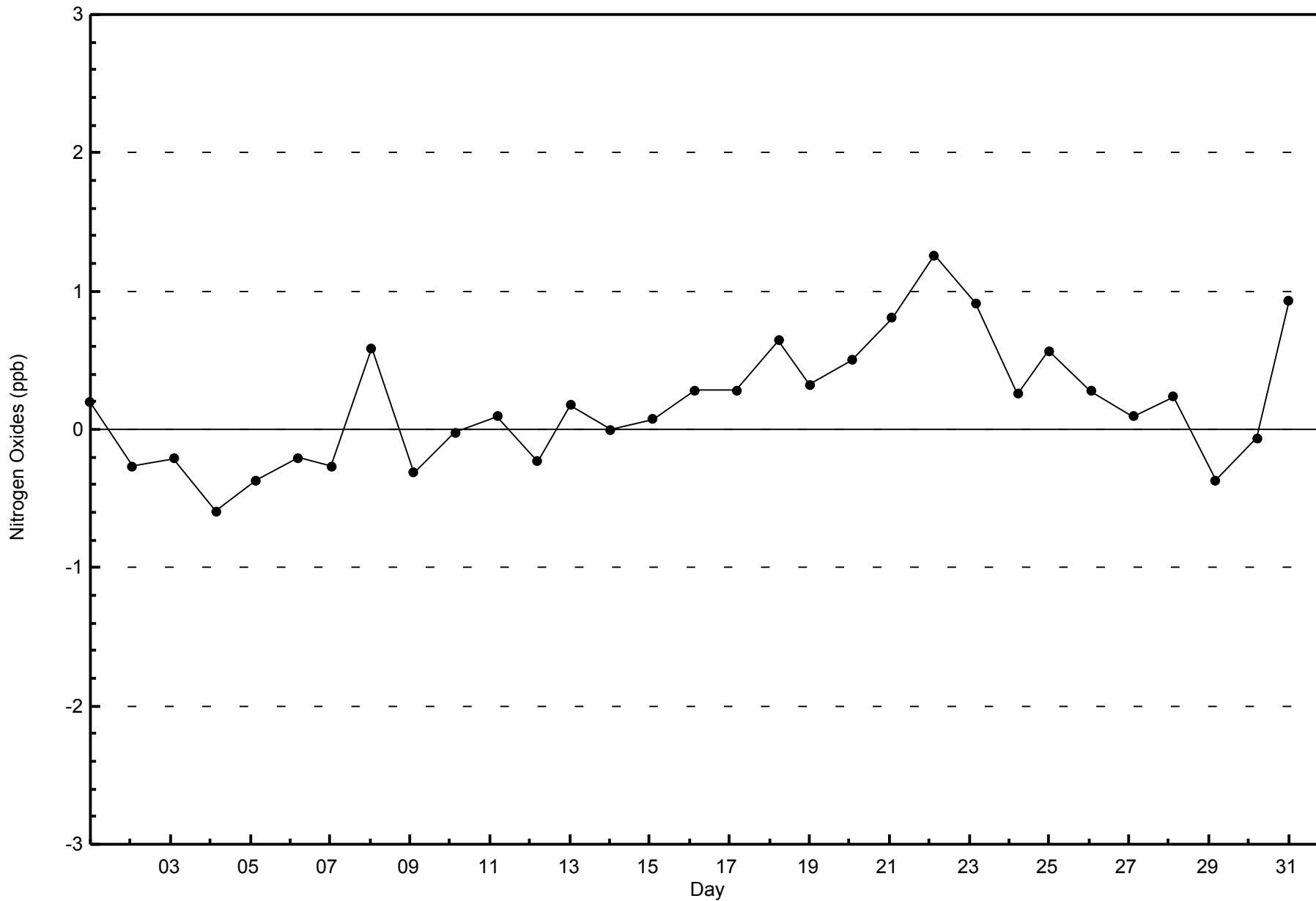
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Nitrogen Oxides (NO_x) - ppb
Wapasu (AMS 17)

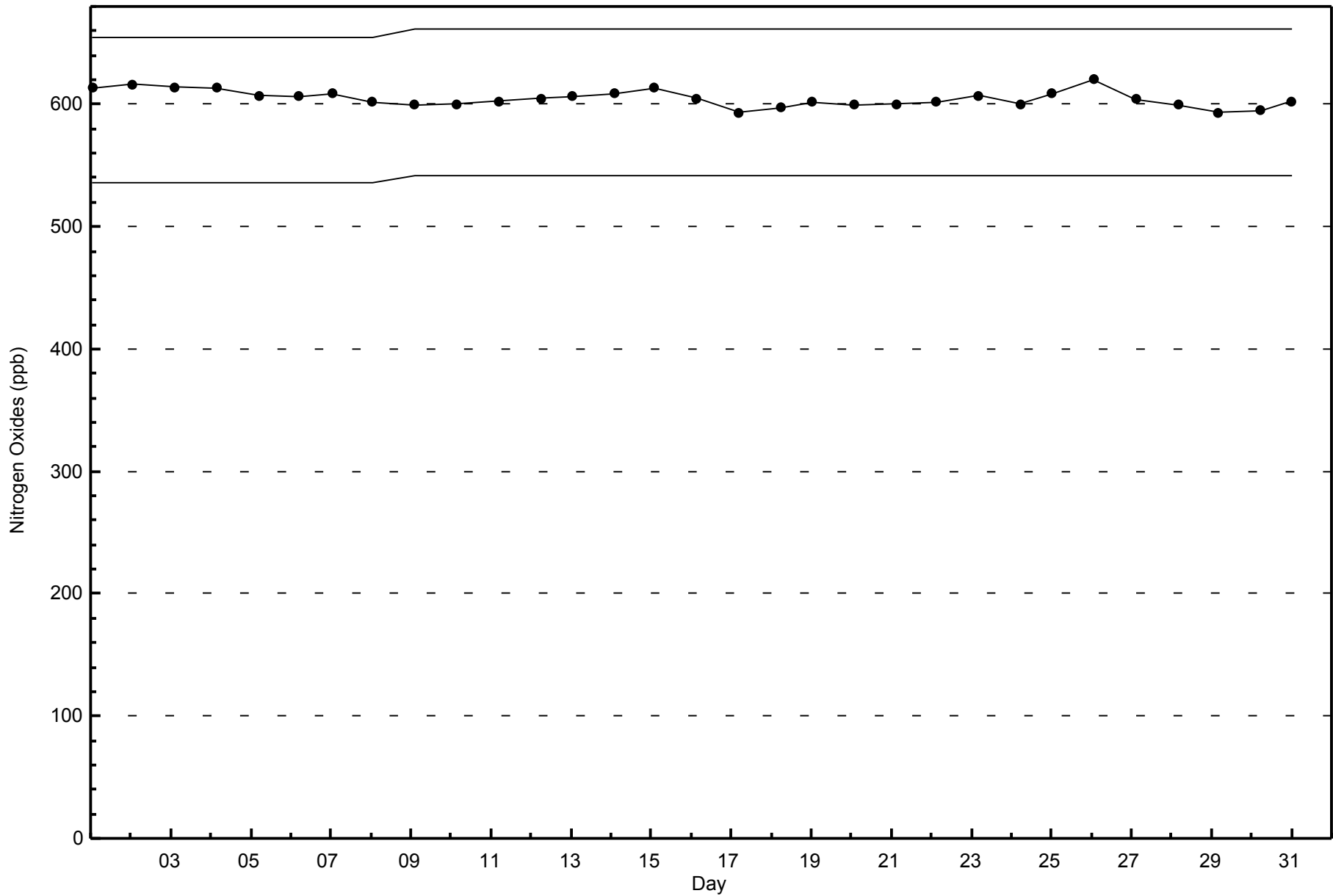






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Wapasu - May 2015





Summary of Hour Averages

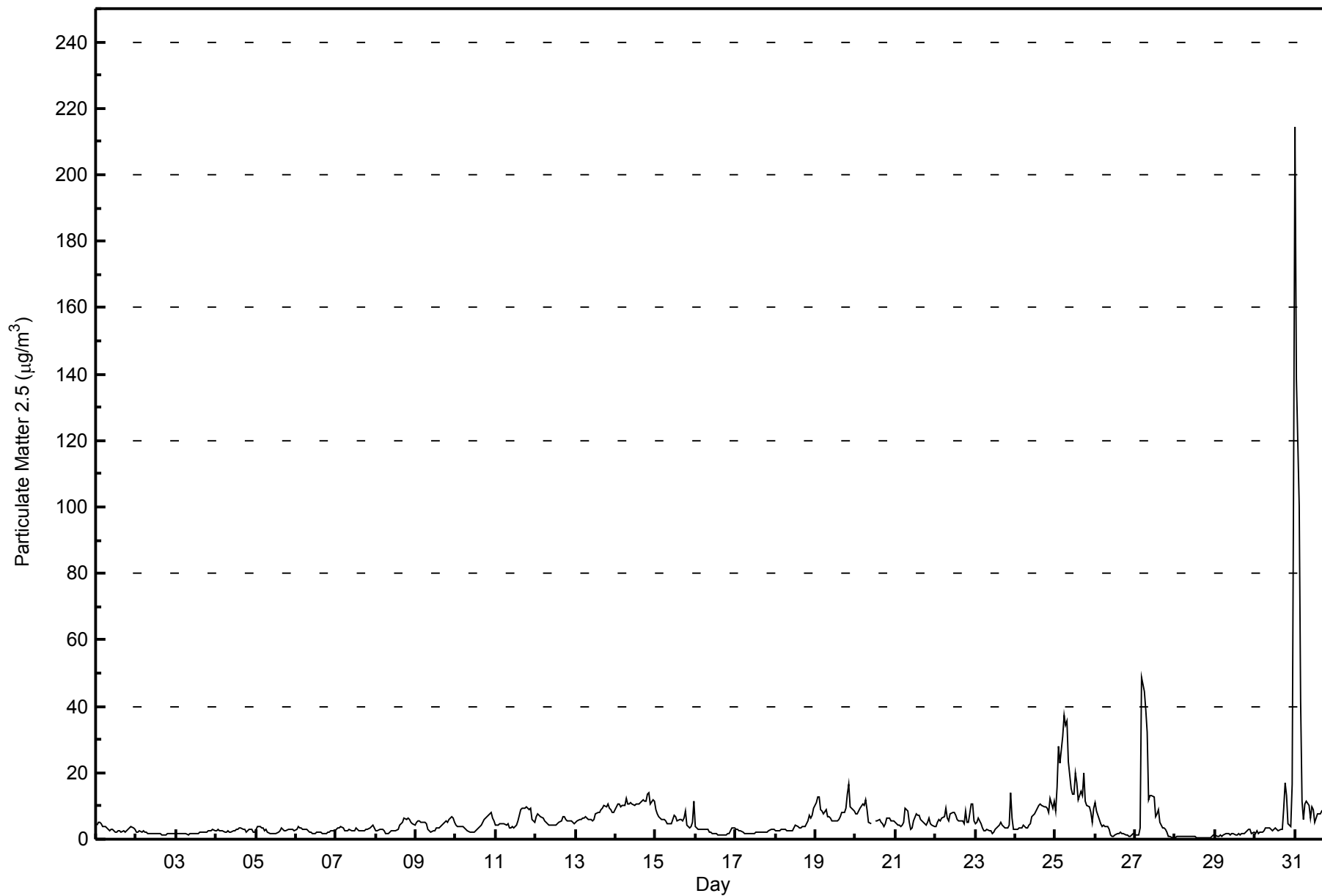
Wapasu - May 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 214.2 µg/m ³ on May 31 01:00		Maximum Daily Average: 26.9 µg/m ³ on May 31		Hours in Service: 744 Hours of Data: 742																																												
Minimum Value: 0.3 µg/m ³ on May 28 19:00 Maximum Diurnal Average: 11.3 µg/m ³ at hour 1 Monthly Average: 5.91 µg/m ³		Minimum Daily Average: 0.7 µg/m ³ on May 28 Minimum Diurnal Average: 4.1 µg/m ³ at hour 10 Percentiles: P ₁ = 0.4 P ₁₀ = 1.6 Q ₁ = 2.3 Median = 3.6 Q ₃ = 6.4 P ₉₀ = 10.2 P ₉₉ = 38.8		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-May	4.0	5.0	5.1	4.6	4.0	4.0	3.3	2.8	2.5	2.9	2.9	1.9	2.1	2.6	2.4	2.1	2.5	2.3	2.5	2.8	3.2	3.8	3.2	2.9	3.1	5.1																						
2-May	2.3	2.3	2.4	2.2	2.5	2.3	2.0	1.8	1.6	1.5	1.6	1.6	1.5	1.7	1.7	1.4	1.4	1.4	1.3	1.7	1.7	1.7	1.6	1.7	1.8	2.5																						
3-May	1.6	1.6	1.9	1.7	1.7	1.6	1.5	1.5	1.5	1.6	1.7	1.8	1.8	1.9	2.0	2.1	2.1	2.2	2.2	2.5	2.6	2.6	2.9	2.7	2.0	2.9																						
4-May	2.7	2.8	2.5	2.4	2.5	2.2	2.3	2.4	2.2	2.3	2.3	2.5	2.9	3.0	3.3	3.4	3.1	2.8	2.2	2.5	3.0	2.9	2.2	2.2	2.6	3.4																						
5-May	3.0	3.6	4.0	3.3	3.2	2.7	2.8	1.9	1.8	1.9	1.8	1.8	2.0	2.5	3.2	2.9	2.5	2.4	3.0	2.8	3.1	2.8	2.7	2.6	2.6	4.0																						
6-May	3.0	3.6	3.5	3.4	3.2	3.1	2.8	2.4	2.3	2.0	1.9	1.8	1.9	2.0	1.9	1.8	1.8	1.8	2.0	2.2	2.7	2.7	2.6	2.4	2.4	3.6																						
7-May	3.2	3.4	3.4	3.6	3.2	2.5	2.6	2.6	2.8	2.7	2.5	2.7	3.3	3.0	2.6	2.6	2.7	2.7	3.0	3.0	3.3	3.8	4.2	3.2	3.0	4.2																						
8-May	2.7	2.7	3.0	3.0	3.1	2.7	1.8	1.8	2.1	2.4	2.4	2.4	2.4	2.8	4.2	4.7	5.2	6.4	6.0	6.5	5.9	5.2	4.8	4.4	3.7	6.5																						
9-May	4.9	5.5	5.4	5.3	5.0	5.0	4.7	3.0	2.4	2.1	2.6	2.6	3.4	3.4	3.3	4.0	4.5	5.2	5.4	5.1	5.8	6.7	6.2	5.0	4.4	6.7																						
10-May	4.1	3.7	3.8	3.8	4.0	3.5	2.9	2.4	2.0	2.2	2.2	2.3	2.4	3.0	3.6	4.4	5.2	5.8	6.5	7.1	7.7	8.0	6.2	5.6	4.3	8.0																						
11-May	4.4	4.2	4.5	4.5	4.7	4.7	4.3	4.7	3.6	3.4	3.6	3.6	4.3	5.7	7.4	9.0	9.4	9.5	9.7	9.5	8.9	9.2	6.0	5.1	6.0	9.7																						
12-May	6.8	7.6	7.2	6.8	6.4	5.7	5.1	4.9	4.4	4.2	4.1	4.1	4.2	4.5	5.2	5.7	6.9	7.0	6.0	5.5	5.6	5.4	5.0	4.7	5.5	7.6																						
13-May	5.0	5.7	6.0	6.1	6.3	6.5	6.9	6.0	5.9	5.9	5.6	5.8	7.6	8.1	7.9	9.0	9.3	10.1	9.9	10.8	9.2	9.0	8.1	8.1	7.5	10.8																						
14-May	9.9	10.8	10.7	9.7	10.0	10.3	12.4	10.6	10.6	10.9	10.6	10.1	10.6	10.5	10.4	11.2	11.7	11.6	11.5	13.4	14.1	10.6	11.7	11.3	11.0	14.1																						
15-May	9.1	7.5	6.8	5.9	5.9	6.1	5.3	4.8	4.6	4.8	6.1	7.0	7.0	5.6	5.9	6.0	5.7	6.2	8.5	4.2	3.4	3.7	5.2	11.5	6.1	11.5																						
16-May	4.0	3.0	2.8	3.1	2.9	2.9	2.8	2.8	2.3	2.2	1.6	1.5	1.5	1.5	1.3	1.2	1.2	1.3	1.4	1.5	1.7	2.7	3.3	3.4	2.2	4.0																						
17-May	3.0	2.8	2.5	2.4	2.0	1.6	1.8	1.9	1.7	1.5	1.6	1.8	2.0	2.1	2.3	2.2	2.1	2.0	2.1	2.0	2.3	2.9	3.1	3.1	2.2	3.1																						
18-May	2.7	2.5	2.5	2.8	3.0	2.8	2.9	2.5	2.5	2.7	2.7	3.3	4.1	3.9	3.5	3.6	3.7	3.8	3.9	5.7	7.1	6.3	7.1	9.1	3.9	9.1																						
19-May	11.0	12.9	12.9	8.7	8.3	7.8	9.1	7.0	6.8	6.4	5.3	5.6	5.4	5.4	6.0	6.7	8.0	8.2	9.4	13.6	16.3	9.8	8.7	8.5	8.7	16.3																						
20-May	7.8	7.8	8.5	9.2	10.7	10.1	11.8	8.8	5.2	4.5	M	M	5.4	5.4	5.9	5.0	4.7	4.0	4.6	6.4	6.2	5.4	5.4	5.5	6.8	11.8																						
21-May	5.1	4.2	4.0	3.8	4.1	5.2	9.3	8.6	5.1	3.2	3.2	5.3	7.7	7.2	7.2	5.9	5.6	5.1	4.4	5.2	6.2	4.9	4.3	3.7	5.4	9.3																						
22-May	3.7	5.2	6.1	5.5	6.2	6.9	9.4	6.2	5.6	7.7	8.2	7.9	7.4	6.0	5.7	5.7	5.6	4.8	8.4	5.0	5.2	10.7	10.7	5.3	6.6	10.7																						
23-May	4.8	5.0	6.2	4.5	3.5	2.7	2.7	2.9	2.6	2.5	1.9	2.2	3.0	3.3	4.2	5.0	4.4	3.9	3.5	3.5	4.2	13.8	6.2	3.1	4.2	13.8																						
24-May	2.8	3.2	3.5	3.3	3.5	4.4	3.3	3.4	4.1	4.5	6.8	7.7	8.4	9.2	10.0	10.4	10.1	9.7	9.9	9.3	8.2	12.1	9.4	11.3	7.0	12.1																						
25-May	8.3	15.7	28.1	22.9	31.0	37.3	34.3	35.6	23.2	15.2	13.6	13.7	20.1	16.8	12.1	14.6	13.3	19.9	11.4	10.3	9.7	7.8	5.0	9.1	17.9	37.3																						
26-May	11.1	8.6	5.9	4.5	3.9	4.2	3.9	3.7	3.0	1.4	0.8	0.9	1.2	1.6	1.9	2.0	1.8	1.6	1.3	1.1	1.0	1.0	1.3	1.8	2.9	11.1																						
27-May	1.1	1.2	1.1	3.3	48.8	44.7	39.0	32.0	12.0	13.2	13.2	12.7	6.7	7.6	8.7	5.0	3.3	3.3	3.0	2.0	0.9	0.8	0.5	0.3	11.0	48.8																						
28-May	0.4	0.7	0.8	0.9	0.9	0.9	0.9	0.8	0.7	0.8	0.9	0.9	0.9	0.6	0.3	0.4	0.3	0.4	0.3	0.4	0.4	0.5	0.9	1.3	0.7	1.3																						
29-May	1.1	1.0	1.0	1.1	1.0	1.2	1.7	1.6	1.6	1.3	1.5	1.7	1.1	1.1	1.5	1.5	1.6	1.8	2.3	2.6	3.0	3.0	1.9	2.3	1.6	3.0																						
30-May	1.9	2.3	1.9	2.2	2.2	2.6	3.5	3.5	3.5	3.5	2.6	3.0	3.5	2.9	2.5	3.0	3.1	9.4	16.9	12.9	4.5	3.7	16.7	107.8	9.1	107.8																						
31-May	214.2	138.4	100.3	41.6	11.3	5.8	10.6	11.6	10.2	6.3	9.6	8.7	5.0	7.4	7.6	7.7	8.4	7.8	7.3	8.3	7.2	3.1	3.1	3.9	26.9	214.2																						
																								11.3	9.2	8.3	6.0	6.7	6.6	6.7	6.0	4.5	4.1	4.2	4.3	4.5	4.6	4.7	4.8	4.9	5.3	5.5	5.5	5.3	5.4	5.2	8.2	Diurnal Average
																								214.2	138.4	100.3	41.6	48.8	44.7	39.0	35.6	23.2	15.2	13.6	13.7	20.1	16.8	12.1	14.6	13.3	19.9	16.9	13.6	16.3	13.8	16.7	107.8	Diurnal Maximum
M - Maintenance																																																
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m ³																																																



WBEA
Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu - May 2015





WBEA

Cumulative Frequency Distribution

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

Wapasu - May 2015

Concentration Ranges ($\mu\text{g}/\text{m}^3$)	Number of Hours	%	Cumulative %
1 - 5	469	63.21	63.21
6 - 15	219	29.51	92.72
16 - 25	9	1.21	93.94
26 - 80	10	1.35	95.28
> 81.0	4	0.54	95.82

Total Number of Valid Hours: 742

Total Number of Hours: 744



WBEA
Frequency Distribution

Particulate Matter 2.5 (PM_{2.5}) - μg/m³
Wapasu - May 2015

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	44	33	36	17	28	48	61	37	25	19	23	15	11	16	16	34	463
6 - 15	11	4	2	2	10	15	34	41	13	17	18	11	11	8	8	14	219
16 - 25	0	0	0	0	0	0	4	1	0	0	0	1	0	1	2	0	9
26 - 80	0	0	0	0	0	0	4	5	0	0	1	0	0	0	0	0	10
> 81.0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	4
Totals	55	37	38	19	38	63	106	85	38	36	42	27	22	25	26	48	705

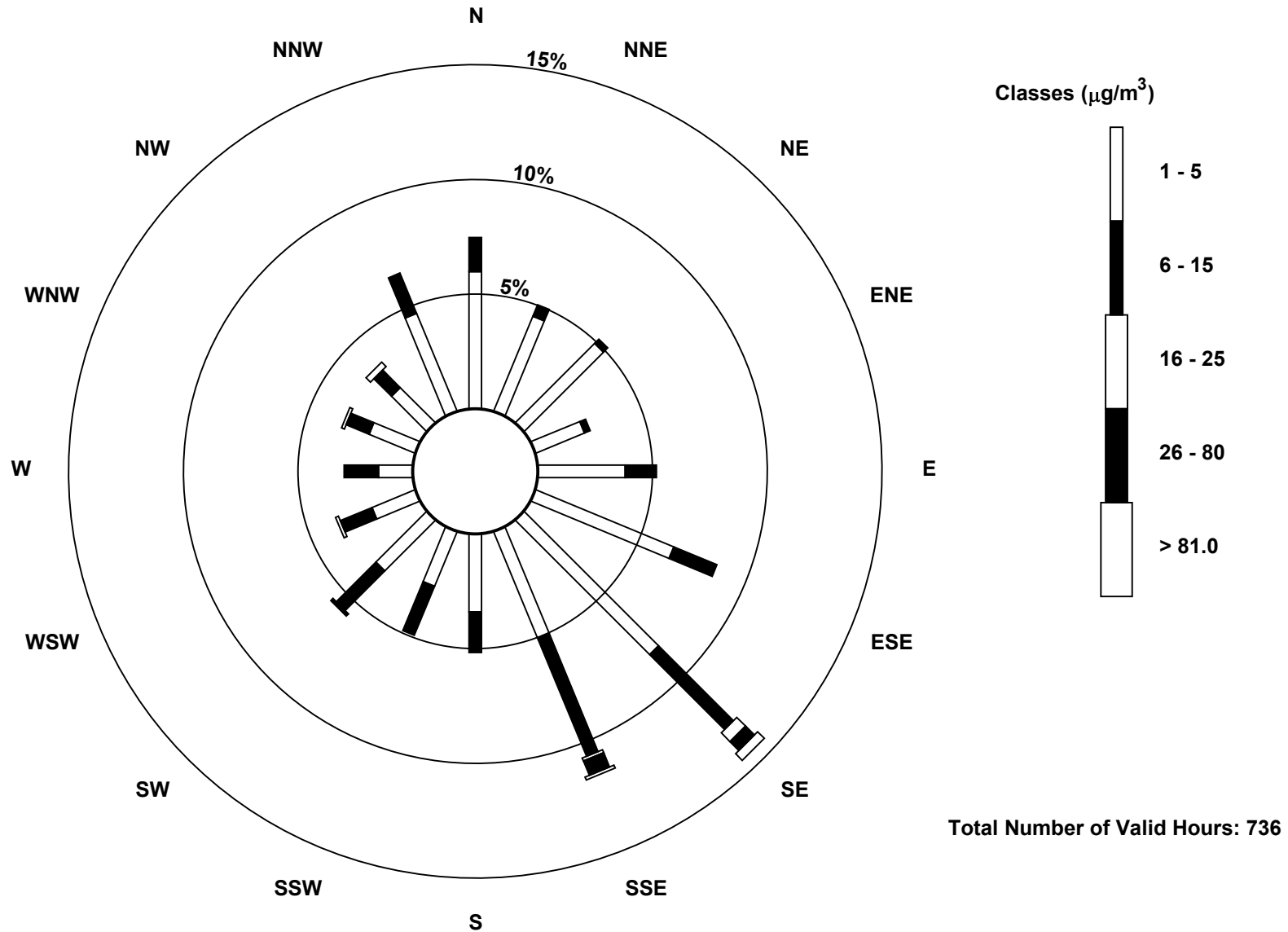
Total Number of Valid Hours: 736

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wapasu (AMS 17)



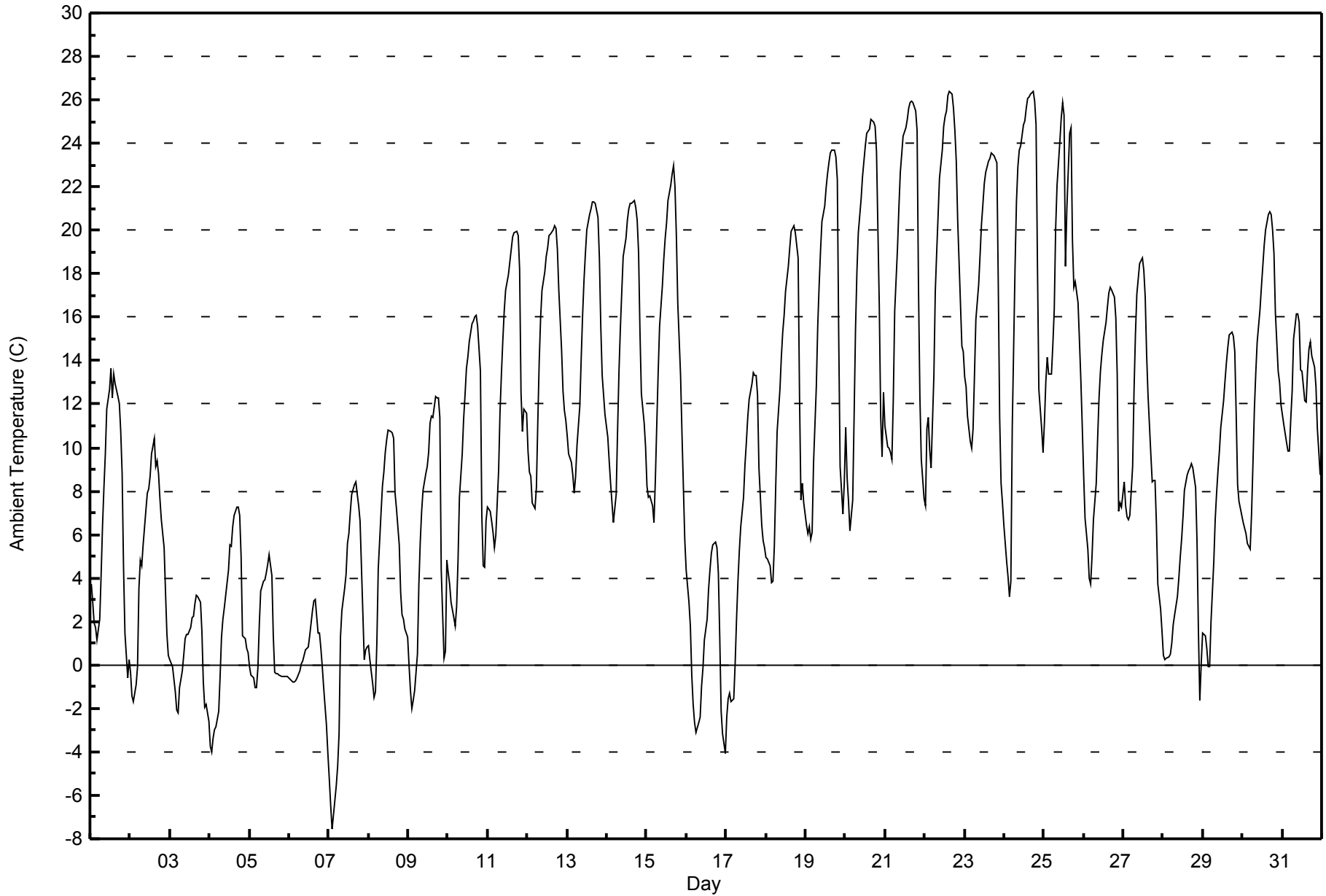


Maximum Value: 26.4 C on May 22 16:00		Maximum Daily Average: 19.1 C on May 22		Hours in Service: 744																																												
Minimum Value: -7.5 C on May 7 03:00		Minimum Daily Average: 0.2 C on May 6		Hours of Data: 744																																												
Maximum Diurnal Average: 15.7 C at hour 17		Minimum Diurnal Average: 3.5 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 10.12 C		Percentiles: P ₁ = -4.0 P ₁₀ = -0.3 Q ₁ = 3.8 Median = 9.4 Q ₃ = 16.1 P ₉₀ = 21.3 P ₉₉ = 26.0		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	3.7	2.9	1.9	1.8	1.2	2.1	4.2	6.4	8.1	9.7	11.8	12.6	13.6	12.3	13.4	12.9	12.3	12.0	10.7	8.8	4.5	1.4	-0.6	0.3	7.0	13.6																						
2-May	-0.3	-1.4	-1.7	-0.9	-0.1	3.5	4.8	4.6	5.5	7.2	7.9	8.1	8.7	9.7	10.4	9.1	9.4	8.8	7.6	6.7	5.4	3.3	1.4	0.5	4.9	10.4																						
3-May	0.2	-0.1	-0.6	-1.3	-2.1	-2.2	-1.1	-0.2	0.4	1.2	1.4	1.4	1.7	2.2	2.2	2.8	3.2	3.2	2.9	1.5	-0.8	-2.0	-1.8	-2.6	0.4	3.2																						
4-May	-3.7	-4.0	-3.4	-3.0	-2.8	-2.2	-0.6	1.3	2.1	2.6	3.8	4.4	5.5	5.5	6.4	6.8	7.3	7.3	6.9	5.0	1.3	1.2	0.7	0.6	2.0	7.3																						
5-May	-0.1	-0.5	-0.6	-1.1	-1.1	-0.2	1.8	3.4	3.8	3.9	4.2	4.6	5.1	4.1	1.3	-0.3	-0.4	-0.4	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	1.0	5.1																						
6-May	-0.6	-0.7	-0.8	-0.8	-0.7	-0.6	-0.3	0.1	0.2	0.4	0.7	0.8	1.3	1.9	2.5	2.9	3.0	1.5	1.5	0.7	-0.1	-1.1	-2.8	-4.1	0.2	3.0																						
7-May	-5.2	-6.5	-7.5	-6.9	-5.5	-4.7	-3.2	1.3	2.5	3.5	4.2	5.6	6.0	7.0	7.9	8.3	8.4	7.8	7.3	6.6	2.4	0.2	0.7	0.9	1.7	8.4																						
8-May	0.9	0.3	-0.9	-1.5	-1.2	1.0	4.4	7.0	8.2	8.9	9.8	10.4	10.8	10.8	10.7	10.5	7.9	7.2	5.5	3.4	2.3	2.1	1.7	1.3	5.1	10.8																						
9-May	0.0	-1.1	-2.0	-1.6	-1.2	0.5	3.6	5.6	7.0	8.0	8.8	9.1	9.8	11.1	11.4	11.4	12.4	12.3	12.3	11.4	4.3	0.3	0.6	4.8	5.8	12.4																						
10-May	4.2	3.7	2.9	2.1	1.8	2.7	4.8	7.7	9.7	11.3	12.4	13.6	14.2	14.8	15.7	15.8	16.0	16.1	15.6	13.5	6.9	4.6	4.5	6.6	9.2	16.1																						
11-May	7.3	7.1	6.6	6.1	5.4	6.0	9.0	11.6	13.4	15.0	16.3	17.3	17.9	18.5	19.1	19.7	19.9	20.0	19.8	18.2	12.6	10.8	11.8	11.6	13.4	20.0																						
12-May	9.8	8.9	8.7	7.5	7.2	8.2	11.2	13.9	16.0	17.2	18.1	18.8	19.2	19.8	19.8	20.0	20.2	20.1	19.1	17.2	14.5	12.6	11.7	11.3	14.6	20.2																						
13-May	10.6	9.7	9.3	8.7	7.9	8.7	10.1	11.9	14.1	16.1	17.7	18.9	20.0	20.7	21.0	21.3	21.3	21.2	20.6	18.7	15.6	13.3	12.4	11.5	15.1	21.3																						
14-May	10.5	9.4	8.3	7.4	6.5	7.8	10.8	13.5	15.5	17.2	18.8	19.6	20.5	21.0	21.2	21.2	21.3	21.0	20.5	19.0	15.3	12.5	11.1	10.0	15.0	21.3																						
15-May	8.2	7.7	7.8	7.3	6.6	8.6	11.1	13.5	15.6	17.4	18.7	19.6	20.3	21.4	22.1	22.6	22.9	22.0	19.8	16.6	13.3	10.7	8.3	5.8	14.5	22.9																						
16-May	4.3	2.9	1.8	-0.5	-1.8	-2.6	-3.1	-2.6	-2.4	-1.0	-0.1	1.1	2.1	3.4	4.4	5.1	5.5	5.6	5.4	4.3	1.3	-2.1	-3.2	-4.0	1.0	5.6																						
17-May	-2.4	-1.6	-1.3	-1.7	-1.6	0.1	2.1	3.8	5.3	6.3	7.7	9.2	10.2	11.4	12.2	12.9	13.5	13.3	13.3	12.4	9.1	6.4	5.7	5.4	6.3	13.5																						
18-May	5.0	4.9	4.5	3.8	3.8	5.4	8.2	10.7	12.7	14.2	15.3	16.1	17.2	18.3	19.2	19.9	20.1	20.2	19.9	18.7	12.4	7.6	8.3	7.5	12.2	20.2																						
19-May	6.4	6.0	6.4	5.8	6.1	9.2	12.8	15.6	17.4	19.0	20.4	21.1	22.0	22.6	23.1	23.6	23.7	23.7	23.3	22.4	15.1	9.1	6.9	8.4	15.4	23.7																						
20-May	10.9	8.6	7.5	6.2	7.6	11.5	15.4	18.1	19.9	21.4	22.5	23.2	23.9	24.5	24.6	25.1	25.0	25.0	24.8	23.6	16.5	11.4	9.6	12.5	17.5	25.1																						
21-May	11.0	10.1	10.0	9.7	9.4	12.2	16.3	19.2	21.1	22.6	23.5	24.3	24.7	25.1	25.6	25.9	25.9	25.9	25.5	24.6	17.4	12.4	9.5	7.6	18.3	25.9																						
22-May	7.3	10.8	11.4	9.9	9.1	13.3	17.2	19.0	20.6	22.4	23.7	24.8	25.3	25.5	26.2	26.4	26.2	25.6	24.6	23.2	20.5	16.6	14.7	14.4	19.1	26.4																						
23-May	13.2	12.8	11.5	10.3	10.0	10.9	13.3	15.9	17.5	18.8	20.3	21.2	22.1	22.6	23.1	23.3	23.6	23.5	23.4	23.1	17.6	11.4	8.3	7.5	16.9	23.6																						
24-May	6.4	4.8	4.1	3.1	3.8	10.9	18.3	21.3	22.9	23.7	23.9	24.9	25.1	25.6	26.0	26.1	26.3	26.4	25.9	24.8	18.4	12.7	10.9	9.8	17.8	26.4																						
25-May	11.2	13.1	14.2	13.4	13.4	14.7	16.4	20.1	22.1	24.1	25.2	25.8	25.3	18.3	21.0	24.4	24.7	19.6	17.4	17.6	16.7	14.9	13.1	11.0	18.2	25.8																						
26-May	8.7	6.8	5.3	4.0	3.7	5.0	6.7	8.4	10.4	12.3	13.5	14.3	15.0	15.8	16.5	17.1	17.4	17.3	16.9	16.0	13.3	7.1	7.5	7.3	11.1	17.4																						
27-May	8.5	7.4	6.8	6.7	6.9	9.1	12.6	15.2	17.1	17.8	18.5	18.8	18.1	16.9	14.3	12.4	9.7	8.4	8.5	8.5	6.5	3.7	2.6	1.5	10.7	18.8																						
28-May	0.4	0.3	0.3	0.4	0.5	1.0	1.9	2.3	3.1	3.9	4.9	5.8	6.8	8.0	8.8	8.9	9.1	9.3	9.1	8.2	5.7	1.6	-1.6	0.1	4.1	9.3																						
29-May	1.5	1.3	0.7	-0.1	-0.1	2.0	4.8	6.7	7.9	8.9	9.9	10.9	12.2	13.1	13.9	14.6	15.2	15.3	15.1	14.4	11.5	8.3	7.5	6.9	8.4	15.3																						
30-May	6.5	6.3	6.0	5.6	5.3	7.0	9.3	11.7	13.4	14.8	16.4	17.4	18.3	19.3	20.0	20.7	20.9	20.7	20.0	18.9	16.2	13.5	13.0	12.0	13.9	20.9																						
31-May	11.5	11.1	10.2	9.9	9.8	11.3	12.6	15.0	16.1	16.2	15.8	13.5	13.5	12.2	12.1	13.5	14.6	14.8	14.2	13.7	12.8	10.9	9.8	8.7	12.7	16.2																						
																								5.0	4.5	4.1	3.6	3.5	5.2	7.6	9.7	11.2	12.4	13.4	14.1	14.7	14.9	15.4	15.7	15.7	15.3	14.7	13.6	9.9	6.9	5.9	5.6	Diurnal Average
																								13.2	13.1	14.2	13.4	13.4	14.7	18.3	21.3	22.9	24.1	25.2	25.8	25.3	25.6	26.2	26.4	26.3	26.4	25.9	24.8	20.5	16.6	14.7	14.4	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Wapasu - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Wapasu - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	83	11.16	11.16
0 - 10	310	41.67	52.82
10 - 20	243	32.66	85.48
> 20	108	14.52	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

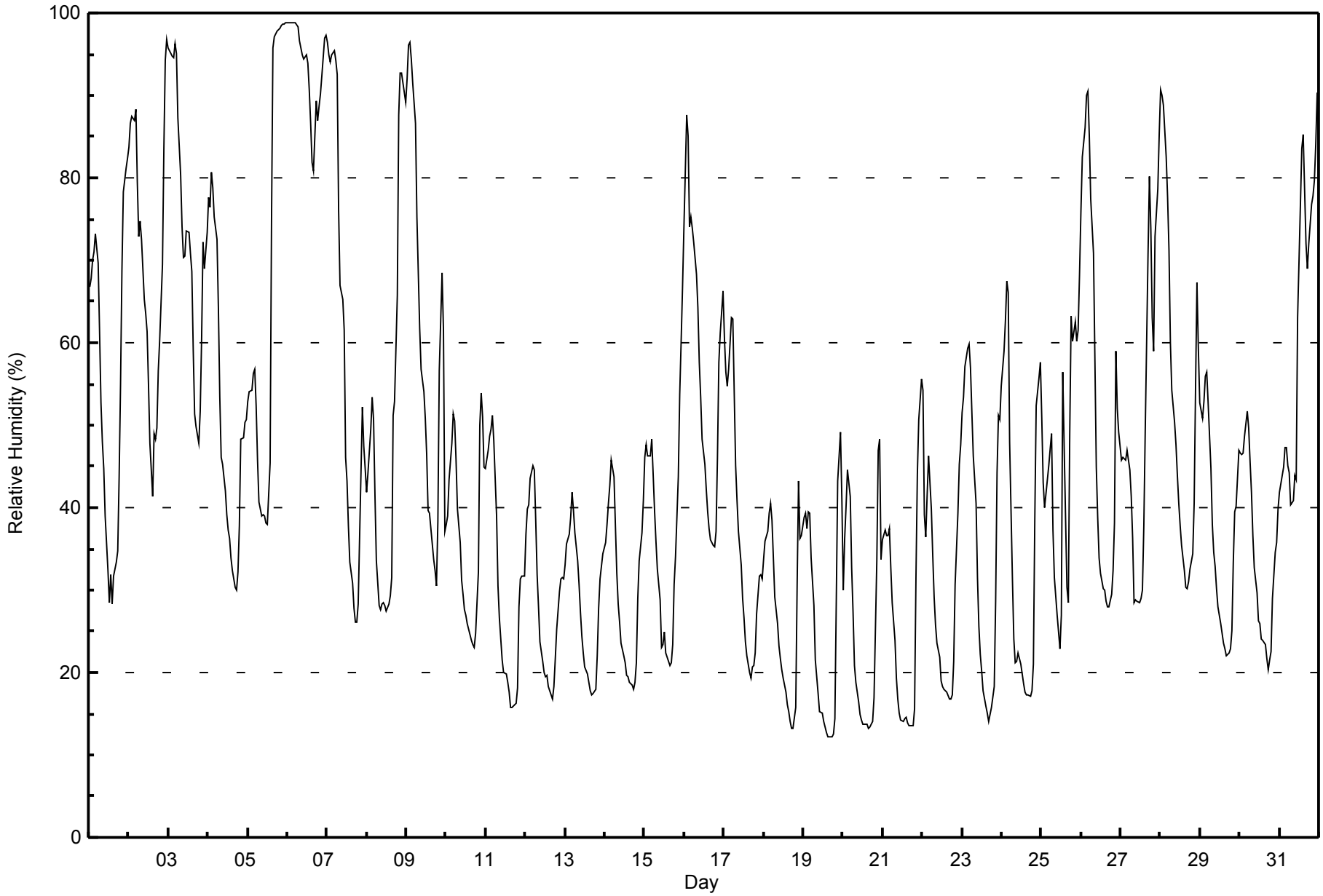


Maximum Value: 99 % on May 6 01:00											Maximum Daily Average: 93.5 % on May 6											Hours in Service: 744																											
Minimum Value: 12 % on May 19 17:00											Minimum Daily Average: 25.5 % on May 19											Hours of Data: 744																											
Maximum Diurnal Average: 61.1 % at hour 5											Minimum Diurnal Average: 31.9 % at hour 16											Hours of Missing Data: 0																											
Monthly Average: 45.2 %											Percentiles: P ₁ = 13 P ₁₀ = 18 Q ₁ = 28 Median = 40 Q ₃ = 58 P ₉₀ = 85 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-May	67	68	70	71	73	70	61	53	48	45	39	32	28	32	28	32	33	35	44	55	69	78	81	82	53.9	82																							
2-May	84	87	87	87	88	80	73	75	73	65	64	61	55	48	41	49	48	50	57	60	70	84	94	97	69.8	97																							
3-May	96	95	95	95	96	95	87	80	74	70	70	74	73	71	69	59	51	50	48	52	61	72	69	73	74.0	96																							
4-May	78	77	81	79	75	73	64	53	46	45	42	39	37	36	34	32	30	30	32	38	48	48	50	51	50.8	81																							
5-May	53	54	54	56	57	52	46	41	39	39	39	38	38	45	75	96	97	98	98	98	98	99	99	99	67.0	99																							
6-May	99	99	99	99	99	99	98	97	96	95	94	95	94	91	87	82	81	89	87	89	90	92	97	97	93.5	99																							
7-May	96	95	94	95	95	94	92	76	67	65	62	46	43	38	33	31	28	26	26	28	44	52	48	45	59.2	96																							
8-May	42	44	50	53	51	42	34	28	28	28	29	28	28	28	29	31	51	53	66	88	93	93	92	89	49.8	93																							
9-May	92	96	97	94	92	87	75	69	62	57	54	51	46	40	39	37	34	32	31	38	57	68	62	37	60.3	97																							
10-May	38	39	43	48	51	51	46	40	36	31	30	28	27	26	25	24	23	23	25	32	50	54	51	45	36.9	54																							
11-May	45	47	49	50	51	48	39	31	27	24	22	20	20	19	18	16	16	16	16	18	28	31	32	32	29.7	51																							
12-May	37	40	40	44	45	45	38	32	28	24	21	20	19	20	18	17	17	18	22	25	30	31	32	31	28.9	45																							
13-May	33	36	37	39	42	40	37	34	31	27	24	22	21	20	19	18	17	17	18	22	28	31	33	34	28.3	42																							
14-May	36	38	41	43	46	44	38	32	28	26	24	22	21	20	19	18	18	19	21	29	34	37	41	41	29.7	46																							
15-May	46	48	46	46	48	44	40	36	33	29	23	23	25	22	21	21	21	23	31	34	44	60	67	67	36.9	67																							
16-May	74	88	85	74	75	74	72	68	64	58	53	48	45	42	40	37	36	35	35	37	46	58	61	66	57.2	88																							
17-May	60	56	55	57	63	63	54	45	41	37	33	29	27	24	22	20	19	21	21	22	27	32	32	31	37.1	63																							
18-May	34	36	37	39	40	39	34	29	26	23	22	20	19	18	16	15	14	13	13	16	31	43	36	37	27.1	43																							
19-May	39	39	38	39	39	34	28	22	19	18	15	15	14	13	13	12	12	12	13	14	29	43	49	41	25.5	49																							
20-May	30	36	40	45	41	33	27	21	19	17	15	14	14	14	14	13	13	14	14	17	34	47	48	34	25.5	48																							
21-May	36	37	37	37	37	33	29	24	19	17	15	14	14	14	15	14	14	14	14	16	32	44	51	56	26.3	56																							
22-May	54	39	36	42	46	40	34	29	26	24	22	19	18	18	18	17	17	17	17	21	31	39	45	48	29.9	54																							
23-May	52	53	57	59	60	57	52	46	41	32	26	22	20	18	16	15	14	15	16	18	29	44	51	51	36.0	60																							
24-May	55	59	63	67	66	48	31	24	21	21	22	21	20	19	18	17	17	18	21	38	52	56	58	58	35.4	67																							
25-May	51	43	40	42	45	47	49	37	32	27	25	23	27	56	48	30	28	49	63	60	63	60	62	68	44.8	68																							
26-May	76	83	86	90	91	85	77	71	58	45	39	34	32	30	30	29	28	28	29	32	38	59	52	49	53.0	91																							
27-May	46	46	46	46	47	45	41	36	29	29	29	28	29	30	38	49	71	80	74	63	59	73	79	85	49.9	85																							
28-May	91	90	89	83	78	71	60	54	50	48	44	41	38	35	32	30	30	31	32	34	40	55	67	59	53.5	91																							
29-May	53	51	53	56	57	53	45	38	35	33	30	28	26	25	24	23	22	22	23	25	33	40	40	47	36.7	57																							
30-May	47	46	47	49	52	50	46	42	37	33	30	26	26	24	24	23	22	20	22	23	29	35	36	40	34.4	52																							
31-May	42	43	45	47	47	45	44	40	41	44	43	63	70	84	85	79	72	69	72	77	78	80	84	90	61.8	90																							
																								57.4	58.3	59.2	60.3	61.1	57.3	51.4	45.2	41.0	37.9	35.4	33.8	32.7	32.9	32.4	31.9	32.2	33.4	35.3	38.6	47.5	55.7	57.6	57.4	Diurnal Average	
																								99	99	99	99	99	99	98	97	96	95	94	95	94	91	87	96	97	98	98	98	98	99	99	99	99	Diurnal Maximum



WBEA
Hourly Averages

Relative Humidity (RH) - %
Wapasu - May 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Wapasu - May 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	96	12.90	12.90
20 - 40	277	37.23	50.13
40 - 60	195	26.21	76.34
60 - 80	89	11.96	88.31
80 - 100	87	11.69	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 19 km/h on May 16 00:00	Maximum Daily Speed Average: 11.4 km/h on May 31	Hours in Service: 744
Minimum Speed Value: 0 km/h on May 9 20:00	Minimum Daily Speed Average: 0.4 km/h on May 24	Hours of Data: 738
Maximum Diurnal Speed Average: 6.6 km/h at hour 3	Minimum Diurnal Speed Average: 1.1 km/h at hour 19	Hours of Missing Data: 6
Monthly Average Velocity: 1.5 km/h 121.2 deg	Percentiles: P ₁ = 2 P ₁₀ = 4 Q ₁ = 6 Median = 8 Q ₃ = 11 P ₉₀ = 13 P ₉₉ = 17	Percent Operational Time: 99.2

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	SSE8	SSE7	SSE7	SSE8	SSE8	S8	S9	SSW10	SSW11	SSW11	SW13	SW14	SW14	SW10	W13	W12	W10	SW8	N4	E5	SE4	SE5	ESE4	E4	SSW6.1	SW14
2-May	SSE1	ESE3	ESE4	N0	NNE4	NNW6	NW8	NNW8	NNW10	NNW10	NNW14	NNW16	NNW13	NNW13	N14	N12	N12	N10	NNE9	NNE6	NNE7	NNW12	NNW10	NNW8	N7.8	NNW16
3-May	N9	AF	AF	AF	AF	AF	AF	NW8	NW8	NW8	NW8	NNW7	N7	NNW9	NNW10	N10	NNW11	N9	N6	NNE4	ENE3	ENE3	NE4	E3	NNW6.1	NNW11
4-May	ENE3	ENE3	SE4	ENE3	NE4	ENE4	SE5	ESE5	WNW1	WSW3	N5	WNW5	NNW8	NNW6	NNW7	NNW5	NNE5	NNE6	NE6	NE7	ENE6	ENE10	E11	E12	NE3.3	E12
5-May	E12	E14	E16	E16	E15	E15	E12	E13	E10	ENE10	NE11	NE10	NNE9	NE11	NE11	NE10	NE9	NE3	NE4	NE7	NE6	NE6	NE7	NE6	ENE9.2	E16
6-May	NE6	NE5	NE5	NE4	NE4	NNE3	NNE2	NNE3	NNE4	NNE7	NNE10	NNE11	NNE10	NE12	NE13	ENE13	ENE10	ENE9	E9	E7	E6	SE3	ESE2	ESE2	NE6.0	NE13
7-May	NNW1	SE3	SE5	SE5	SE5	SE6	SE5	SSW5	SW7	WNW7	NNW5	N6	NNW5	NNW6	N7	NNW8	NNE8	NE10	NE6	NE5	E5	ESE6	ESE7	ESE7	ENE2.0	NE10
8-May	ESE7	SE6	SE5	ESE5	ESE6	ESE6	ESE8	SE9	SSE5	S5	SE4	SE5	ESE4	WSW3	W5	WNW6	NW11	NW4	WNW5	SE5	ESE7	ESE9	ESE14	ESE10	SE3.6	ESE14
9-May	E5	NE5	ENE5	E7	E7	E5	ESE7	SE6	S2	NW5	WNW7	W9	WNW9	WNW8	WNW9	NW3	NW5	W5	W2	NNE0	ESE3	E5	E7	ESE11	NE0.8	ESE11
10-May	ESE11	ESE14	ESE14	ESE12	ESE10	SE8	ESE6	ESE3	NE4	N4	WSW2	N3	NW4	W6	SW4	WNW7	NW6	W5	WNW6	NW3	E4	E7	ESE6	SE10	ESE2.6	ESE14
11-May	SE12	SE11	SSE10	SSE9	SSE7	SSE7	S7	SW8	SW9	WSW8	WNW8	NW5	WNW6	WNW6	W6	NNE6	NNE7	NNE5	N5	NNE5	ENE5	E9	E12	ESE13	SE1.7	ESE13
12-May	ESE12	ESE13	ESE11	ESE11	ESE10	ESE7	SE3	ESE6	ESE7	ESE9	ESE8	ESE10	SSE8	SE10	ESE10	ESE9	ESE9	ESE10	SE12	SE14	SE13	SE17	SE17	SE18	ESE10.4	SE18
13-May	SE18	SE17	SE17	SE15	SE13	SSE13	SSE13	S13	S12	S12	SSW12	SSW13	SSW12	SSW10	S9	SSW8	SSW8	SW7	SSE8	SSE9	SE10	SE11	SE12	SSE10	SSE10.6	SE18
14-May	SSE10	SSE9	S7	SSE7	SSE8	SSE8	S8	SSW11	SW12	SW14	SW14	SW14	SSW12	SSW12	SSW9	SSW9	SSW9	SSW9	SSW8	S7	S5	S5	SSE7	SSE7	SSW8.3	SW14
15-May	SSE7	SSE8	SSE9	SSE8	SSE8	SSE8	S8	S7	SSW8	SW9	SW12	WSW15	SW13	WSW13	SW14	WSW12	WSW11	W11	N14	N16	N17	N15	N17	N19	WSW3.6	N19
16-May	N14	N12	N12	N15	N14	N13	N14	N14	N15	N14	N14	N14	NNE14	NNE13	NNE13	NNE13	NNE12	NNE10	NE9	NE9	NE5	NE4	ENE4	E6	N10.8	N15
17-May	ESE8	ESE9	ESE9	SE9	SE11	SSE12	SSE12	SSE11	S10	SSW9	S9	S8	S9	SSE9	S8	SSW8	SSE7	SSE6	SSE8	SSE7	SE7	SE9	SE11	SE13	SSE8.2	SE13
18-May	SE12	SE12	SSE10	SE8	SSE8	SSE8	S8	S8	SSW9	SW11	SW11	SW12	WSW10	SW9	SW8	SW7	WSW8	W8	WSW7	SW5	SSE4	SE6	SE7	SE6	SSW6.1	SW12
19-May	SE6	SE6	SE7	SSE7	SSE7	SSE6	SSW7	SW9	SW11	WSW10	WSW8	WSW7	SSW6	WSW7	W5	WSW7	SW6	SW5	S6	SSW4	SE3	SE5	SE6	SE8	SSW4.7	SW11
20-May	SE7	SE6	SE6	SSE6	SE7	SE7	S5	SW8	WSW9	WSW9	WSW9	SW9	SW8	S9	SW8	SSW6	WSW7	SW4	SW5	WSW3	ESE2	SE5	ESE4	SE7	SSW4.7	WSW9
21-May	SE6	SE7	SE7	SE7	SE8	SE7	SSE6	S7	SW8	SW7	WSW10	SSW8	SSW11	SSW9	W8	WSW7	W8	WNW9	WNW8	WNW4	SE4	SE6	SE5	SSE5	SSW4.3	SSW11
22-May	SSE5	SE7	SE8	SE6	SE6	SSE4	SSW2	NNW7	NNW9	NNW10	NNW12	NNW13	NNW13	NNW14	NNW14	N12	N14	N14	N12	N11	NNE8	NE6	NE7	NE8	N5.8	N14
23-May	ENE7	E9	E10	E12	ESE11	ESE10	E5	NNW4	N7	NNE8	NNE7	N6	NNW7	NNW7	NW6	WNW9	WNW4	NE6	W1	NW2	NNE4	ENE5	E5	ENE6	NE3.7	E12
24-May	E5	ENE5	ESE4	SE5	SE6	SE6	ESE6	ESE5	NNE2	NNW5	W7	WNW6	W8	WNW6	NNW6	NW3	WNW7	WNW5	W4	NW3	ESE3	E4	E4	ESE5	NNE0.4	W8
25-May	SE6	SE6	SE8	SE7	SSE7	SSE7	SSE4	SW4	WSW7	W7	NW6	W7	WNW13	NW6	WSW6	WSW4	NW7	NW15	NW5	NNW4	NW9	N9	N8	N7	WNW2.4	NW15
26-May	NNW7	NNW7	N6	N4	NNW4	NNW5	NNW5	NW8	NNW10	N12	N11	NNW12	NNW11	NNW10	NNW7	N8	N7	N6	NE7	NE7	NNE5	E5	ESE8	ESE8	N5.8	N12
27-May	ESE11	SE10	SE10	SE9	SE9	SE9	SSE5	SSE4	S4	W2	NNW6	NNW10	N10	N14	N14	N12	NNE9	NNE8	NNE13	NNE14	NNE14	N12	N12	N12	NNE4.5	NNE14
28-May	N10	N9	N8	N9	N9	N9	N11	N11	N13	NNW13	NNW13	NNW13	N11	NNW13	N11	NNW11	NNE10	N9	NNE8	NE8	ENE6	ESE5	ESE4	ESE7	N8.3	NNW13
29-May	ESE10	ESE11	SE11	SE9	SE10	SE10	SSE10	S9	S7	SSE4	SSE3	S5	S6	S4	SSW1	W6	SW5	WSW6	SSW6	SSW5	SSE4	SSE8	SSE11	SE13	SSE6.0	SE13
30-May	SE14	SE15	SE15	SE13	SSE10	SSE9	S9	SSW8	SW10	WSW9	SSW8	SSW9	SSW9	S9	S9	S9	SSE11	SSE10	SSE9	SSE7	SE6	SE9	SE11	SE12	SSE8.8	SE15
31-May	SE13	SSE11	SE12	SE13	SE13	SE13	SE15	SSE17	SSE15	SSE13	SSE12	SSW10	SSE12	SSE14	SSE12	SSE13	SSE12	SSE13	SSE10	SSE10	S9	S7	SSE5	S5	SSE11.4	SSE17

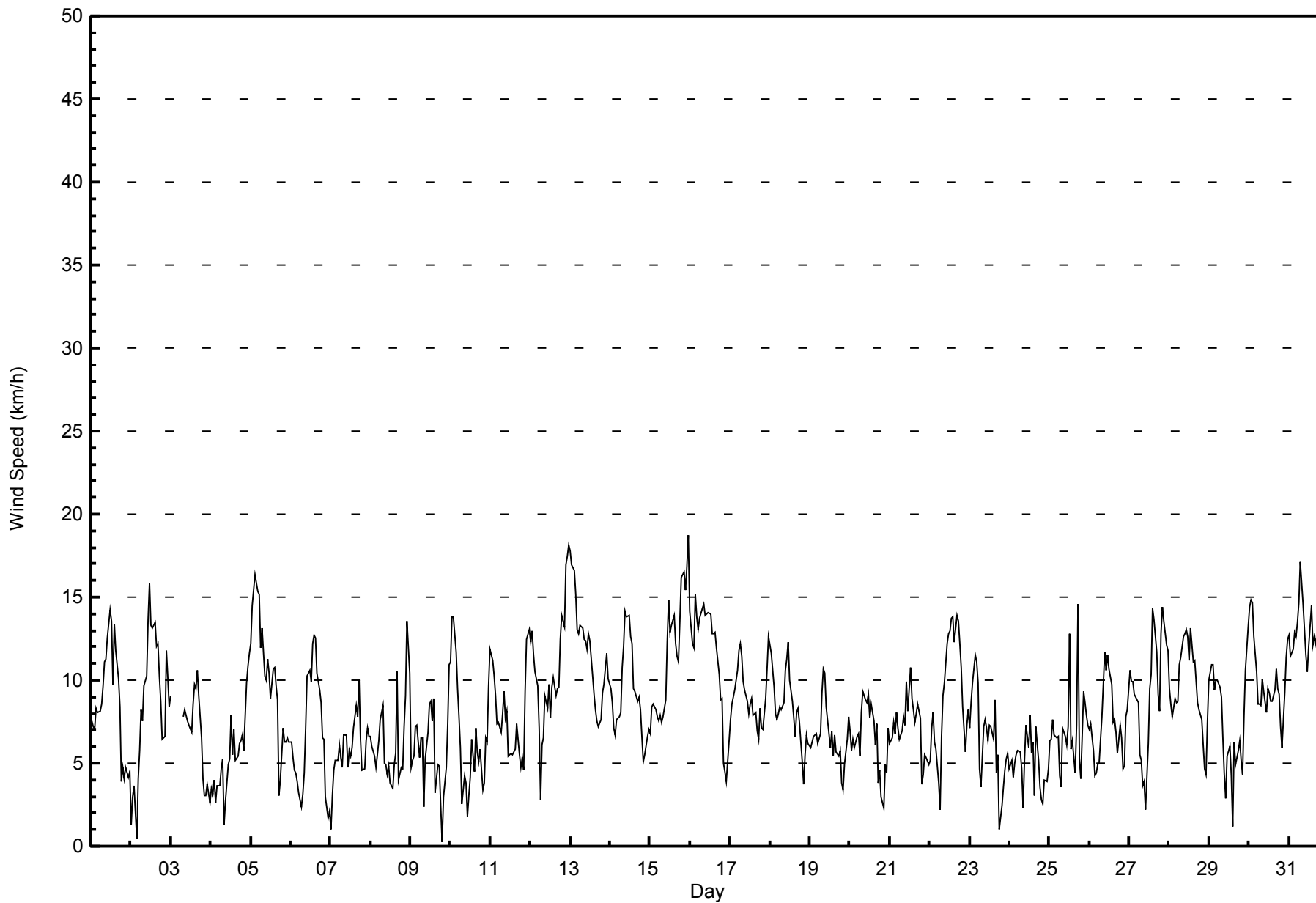
ESE5.5 ESE6.4 ESE6.6 ESE6.1 SE5.8 SE5.3 SSE4.2 S2.9 SW2.2 W2.3 W2.8 W3.3WNW3.3WNW2.3 NW2.9 NW2.5 NW2.3NNW1.9NNE1.1 ENE2.2 E3.3 E4.3 ESE5.0 ESE5.4	Diurnal Average
SE18 SE17 SE17 E16 E15 E15 SE15 SSE17 N15 SW14 N14NNW16 NNE14 SSE14 N14 N14 N14 NW15 N14 N16 N17 SE17 SE17 N19	Diurnal Maximum

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Wapasu - May 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Wapasu - May 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	172	23.31	23.31
6 - 11	422	57.18	80.49
12 - 19	144	19.51	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: 738

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Wapasu - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	7	13	13	11	14	18	21	14	9	5	7	5	7	7	11	10	172
6 - 11	31	21	24	8	13	41	58	56	26	27	24	20	13	17	14	29	422
12 - 19	32	8	2	1	11	7	27	15	3	4	12	3	2	1	1	15	144
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	70	42	39	20	38	66	106	85	38	36	43	28	22	25	26	54	738

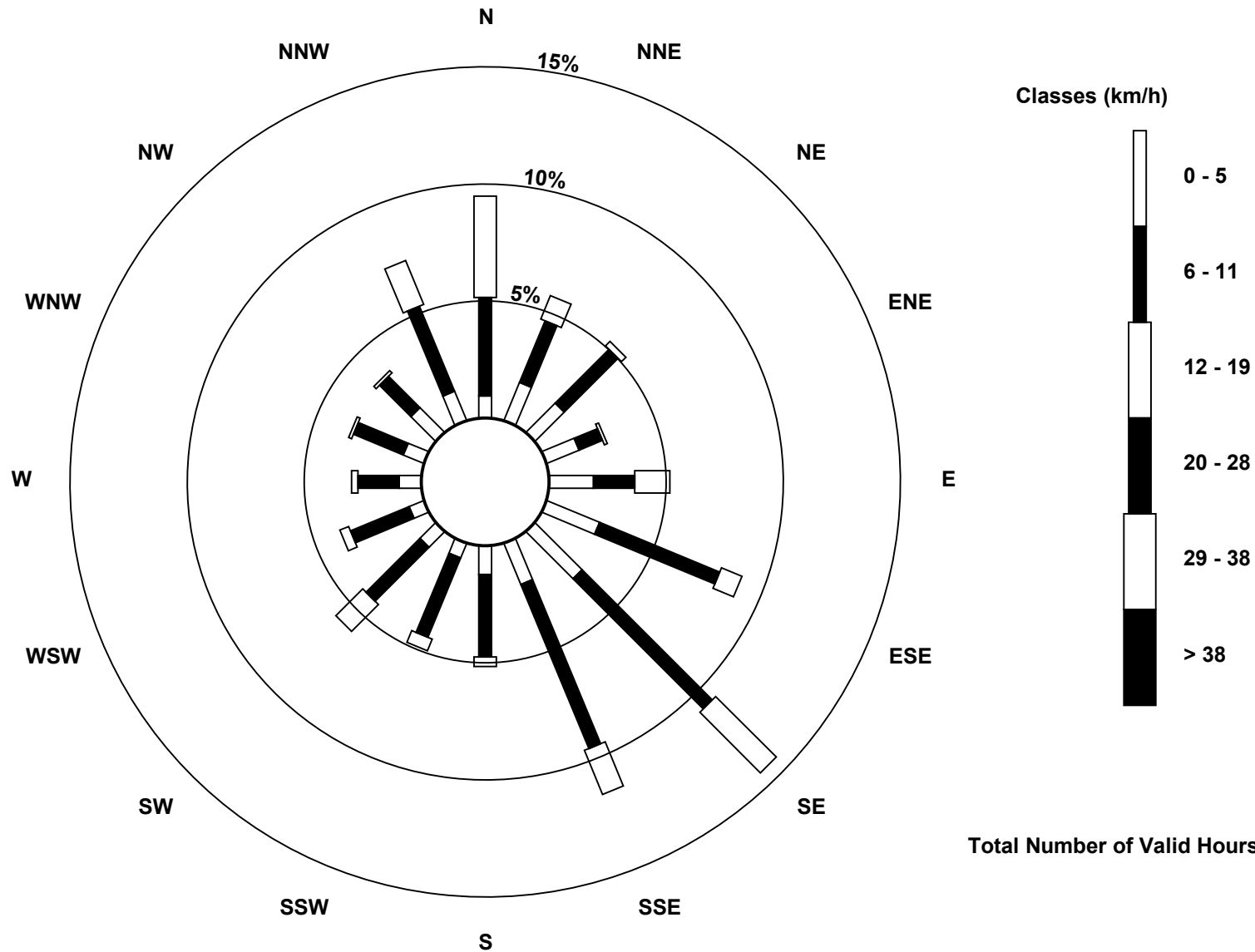
Total Number of Valid Hours: 738

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Wind Speed (WS) - km/h
Wapasu (AMS 17)





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Wapasu - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on May 25 13:00																	Hours in Service: 744 Hours of Data: 738 Hours of Missing Data: 6 Hours of Calibration: 0 Percent Operational Time: 99.2								
Minimum Value: 0 km/h on May 21 23:00																									
Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 4 P ₉₉ = 6																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-May	2	2	1	2	2	2	3	4	4	4	4	5	5	5	5	4	4	3	3	1	1	1	1	2	5
2-May	2	1	1	1	2	2	3	2	3	4	5	5	6	5	5	4	4	4	3	2	3	5	4	3	6
3-May	3	AF	AF	AF	AF	AF	AF	3	3	3	2	3	2	4	3	3	4	3	3	1	1	1	1	1	4
4-May	1	1	1	1	1	1	2	2	3	2	3	3	3	4	4	3	3	3	3	2	1	3	3	3	4
5-May	3	4	5	4	4	4	4	4	3	3	4	4	3	4	4	3	3	2	3	3	3	3	3	3	5
6-May	2	2	2	2	2	2	2	2	2	4	3	4	3	4	4	4	4	3	2	2	2	2	2	1	4
7-May	1	1	1	1	1	1	1	2	2	3	3	3	3	3	4	4	4	4	3	1	1	1	1	2	4
8-May	2	1	1	1	1	1	2	3	2	3	3	3	3	2	2	4	4	2	2	3	2	3	4	3	4
9-May	3	1	1	2	1	1	2	2	2	2	3	3	3	4	3	3	3	3	2	1	1	2	2	2	4
10-May	3	4	3	3	2	3	2	2	3	3	3	2	3	3	2	3	3	3	2	1	1	1	2	2	4
11-May	3	3	3	2	2	2	2	3	3	3	3	3	3	4	3	4	3	3	2	2	1	3	3	4	4
12-May	3	3	3	3	2	3	2	2	2	3	4	4	4	4	5	4	4	4	4	4	3	4	5	5	5
13-May	5	4	4	4	4	4	4	4	4	4	4	5	4	4	4	4	3	3	3	4	2	2	3	3	5
14-May	3	2	2	1	1	2	3	4	4	4	5	5	4	5	5	4	4	3	3	2	1	1	1	1	5
15-May	1	1	2	2	1	2	3	3	3	3	4	5	5	4	5	4	4	4	5	6	6	6	7	7	7
16-May	6	5	5	6	5	5	5	5	6	5	5	5	5	5	5	5	4	4	3	3	1	1	1	1	6
17-May	1	2	2	2	2	3	4	4	4	4	3	4	3	4	4	3	3	3	3	2	1	2	2	3	4
18-May	3	3	2	2	2	2	3	3	3	4	4	4	4	4	4	3	3	3	2	2	1	0	1	1	4
19-May	0	1	1	1	1	2	2	3	3	3	3	4	4	4	3	4	3	2	2	1	1	1	0	1	4
20-May	1	1	1	1	1	1	2	2	3	3	3	4	4	4	4	3	4	2	2	1	1	2	2	1	4
21-May	1	1	1	1	1	1	2	2	3	3	3	4	5	4	4	4	3	3	3	2	1	0	0	0	5
22-May	1	1	1	2	1	1	1	3	3	3	4	4	5	6	6	5	6	5	5	4	3	1	2	2	6
23-May	2	2	3	3	3	3	3	2	3	3	3	4	4	3	3	4	3	3	1	1	1	0	0	1	4
24-May	1	1	0	1	1	1	1	2	2	2	3	4	4	4	4	3	3	2	2	1	1	1	1	1	4
25-May	1	1	1	1	1	1	1	1	2	3	3	3	7	7	4	3	3	6	3	3	3	3	3	3	7
26-May	2	2	2	1	1	2	1	2	3	4	4	4	4	4	3	4	4	3	2	2	1	1	1	2	4
27-May	3	2	2	2	2	2	2	2	2	3	3	3	3	4	6	5	5	4	3	6	6	5	5	4	6
28-May	4	3	3	3	3	3	4	4	5	5	4	5	5	5	4	5	4	3	3	2	2	1	1	2	5
29-May	2	3	3	2	2	3	3	3	3	3	3	3	3	3	3	4	3	3	2	2	1	2	3	3	4
30-May	4	4	4	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	3	2	1	2	3	3	4
31-May	3	3	3	3	3	4	4	5	5	4	4	5	5	4	4	4	4	4	3	3	4	2	1	1	5
																	Diurnal Maximum								
AF - Analyzer Failure																									



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Wapasu - May 2015

Direction of Maximum Speed: 350 deg on May 16 00:00															Hours in Service: 744											
Direction of Maximum Daily Speed Average: 152.8 deg on May 31															Hours of Data: 738											
Direction of Minimum Speed: 27 deg on May 9 20:00										Direction of Minimum Daily Speed Average: 0.4 deg on May 24										Hours of Missing Data: 6						
Monthly Average Direction: 247.3 deg																									Percent Operational Time: 99.2	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	160	162	156	168	163	169	180	193	206	204	217	219	228	227	260	261	262	233	352	94	142	145	110	82	202.6
2-May	163	108	114	8	18	348	325	344	338	342	334	335	347	344	352	7	357	5	26	28	31	328	341	338	351.2
3-May	356	AF	AF	AF	AF	AF	AF	322	321	312	322	343	351	337	346	354	340	352	3	14	63	72	55	90	347.8
4-May	73	68	132	74	56	75	130	120	294	257	349	303	340	347	312	337	13	30	52	54	57	71	80	86	46.0
5-May	86	96	96	96	95	93	90	98	81	67	49	41	33	40	24	44	56	52	51	47	38	37	36	38	68.8
6-May	38	43	43	41	36	20	22	29	20	33	27	21	28	48	53	63	64	70	81	95	98	125	113	119	51.6
7-May	327	138	133	132	138	132	138	196	233	290	344	352	336	343	354	346	25	42	43	52	98	109	103	107	57.2
8-May	111	127	124	121	122	119	122	129	159	176	134	135	102	245	269	289	324	311	288	125	115	118	120	120	128.2
9-May	94	55	74	84	87	89	114	142	188	311	282	281	300	291	302	323	307	267	265	27	122	92	98	102	46.8
10-May	107	108	106	107	120	125	112	117	52	10	248	360	311	263	221	288	307	281	284	316	91	91	123	137	109.0
11-May	138	145	151	157	161	161	176	219	236	254	291	309	299	302	278	14	13	25	5	28	65	86	95	104	138.5
12-May	112	108	109	108	108	111	128	112	107	111	114	106	150	126	112	110	116	113	136	128	126	130	134	139	120.3
13-May	139	137	140	141	144	148	160	170	175	182	201	207	207	203	175	202	199	217	168	157	144	143	146	158	165.3
14-May	165	166	169	165	157	165	189	210	220	225	223	229	234	213	208	215	210	215	192	187	171	170	167	163	199.0
15-May	156	156	158	155	154	162	170	184	207	217	235	242	235	250	234	247	245	261	349	9	4	359	357	350	255.6
16-May	350	5	1	355	349	359	355	355	7	358	356	360	16	18	15	27	21	25	35	40	39	53	73	94	10.1
17-May	105	114	121	129	138	147	156	161	175	205	187	182	185	167	178	200	161	155	158	156	136	136	136	138	154.8
18-May	135	144	147	145	153	161	173	191	208	225	222	231	237	233	226	231	242	267	255	229	159	140	140	144	194.8
19-May	143	145	146	147	152	167	196	221	230	243	245	249	203	249	259	255	216	233	187	204	144	125	139	139	198.2
20-May	143	144	140	149	145	145	179	228	241	241	246	228	218	179	232	208	237	216	217	238	103	125	120	138	193.7
21-May	140	139	143	140	140	146	160	182	217	233	237	199	209	200	273	252	268	289	290	289	139	142	140	147	197.7
22-May	150	139	142	143	133	149	198	338	340	344	330	346	343	339	343	349	357	5	9	5	30	47	54	55	5.5
23-May	72	94	91	98	107	105	97	346	359	25	23	351	336	337	325	303	301	37	277	325	17	77	81	78	44.7
24-May	94	76	102	126	130	133	122	105	12	342	269	282	266	297	344	324	290	294	278	319	113	96	96	103	18.5
25-May	127	139	139	140	149	147	156	228	246	281	319	265	299	326	247	250	306	312	311	339	324	354	1	1	295.4
26-May	346	348	356	354	340	341	332	321	343	6	3	340	335	334	342	2	351	352	50	36	24	92	104	111	359.6
27-May	122	130	131	129	128	127	147	156	152	188	281	341	331	352	357	0	4	12	14	13	17	18	2	1	31.7
28-May	356	358	0	2	6	9	0	357	351	342	341	344	349	340	352	346	17	4	14	36	63	106	113	111	2.1
29-May	119	121	124	129	130	139	167	169	191	159	153	174	176	173	193	259	219	242	209	209	166	147	148	146	157.9
30-May	145	145	146	145	151	162	178	203	233	240	207	211	203	169	186	170	158	162	164	163	137	133	141	141	166.7
31-May	145	148	141	138	135	137	140	150	152	148	147	196	165	155	160	165	163	152	150	149	169	172	154	175	152.8

116.0 120.2 123.0 122.5 124.2 128.9 146.5 173.8 229.8 262.9 278.5 280.0 282.6 291.5 303.8 311.4 323.6 329.9 27.8 61.0 82.8 96.4 102.2 109.3

Diurnal Average

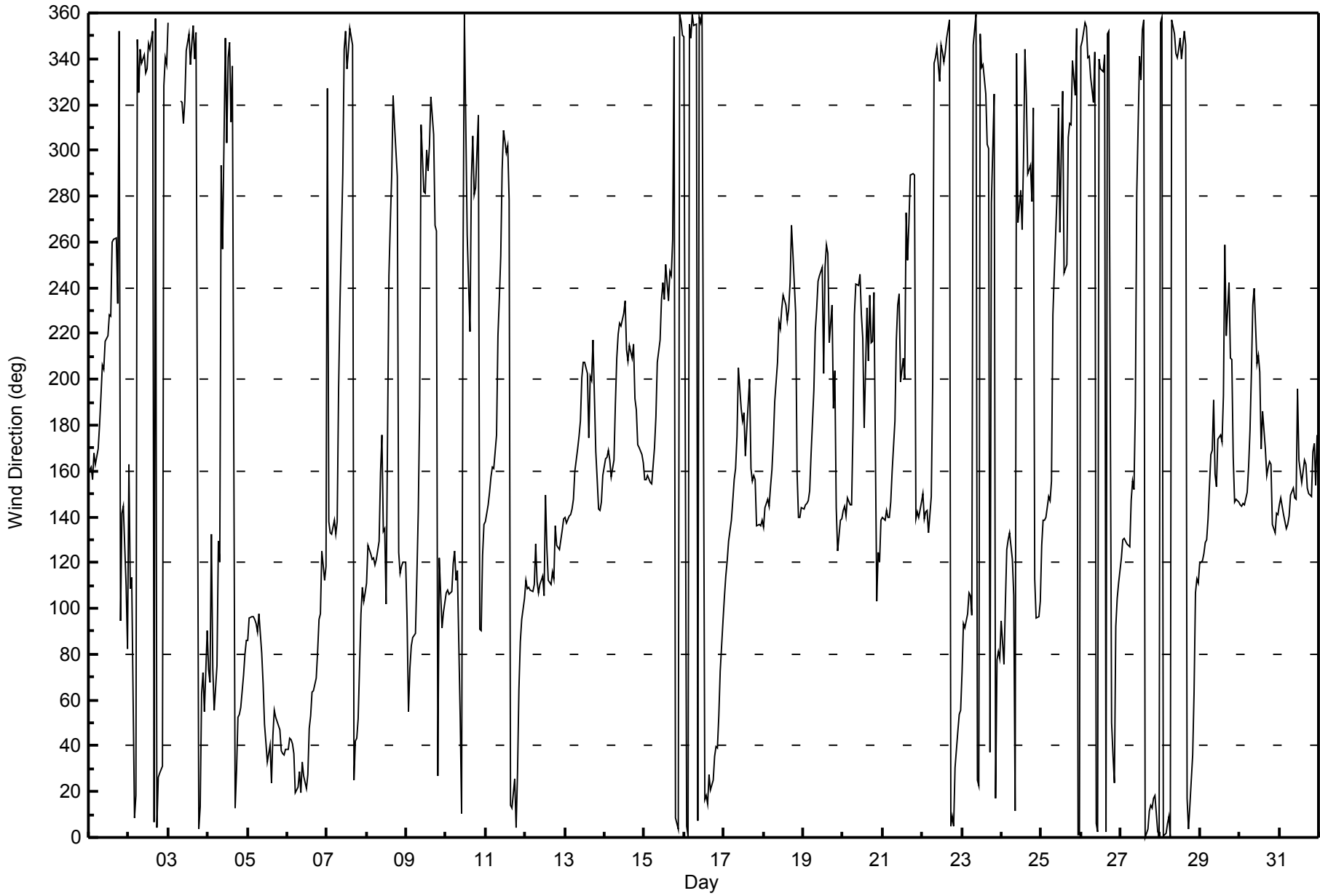
AF - Analyzer Failure

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



WBEA
Hourly Averages

Wind Direction (WD) - deg
Wapasu - May 2015





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Wapasu - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on May 23 19:00																			Hours in Service: 744 Hours of Data: 738 Hours of Missing Data: 6 Hours of Calibration: 0 Percent Operational Time: 99.2						
Minimum Value: 4 deg on May 21 23:00																									
Percentiles: P ₁ = 6 P ₁₀ = 14 Q ₁ = 21 Median = 33 Q ₃ = 44 P ₉₀ = 63 P ₉₉ = 87																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-May	21	21	19	26	23	26	32	40	36	36	37	35	36	37	39	36	39	34	68	30	23	14	30	24	68
2-May	78	36	23	83	46	28	26	34	31	37	33	31	42	38	40	39	40	40	35	29	32	30	29	33	83
3-May	36	AF	AF	AF	AF	AF	AF	32	31	37	34	40	46	42	37	41	40	42	45	29	28	29	15	26	46
4-May	21	26	14	34	27	23	29	52	101	95	62	74	58	77	65	74	66	52	39	21	15	21	21	21	101
5-May	21	20	19	20	21	22	24	24	26	26	27	30	37	31	31	26	23	24	24	25	26	27	26	25	37
6-May	23	23	23	24	24	31	27	29	33	29	29	31	33	27	26	28	31	25	24	16	16	72	60	63	72
7-May	71	20	5	7	8	9	14	45	37	45	70	62	64	74	65	47	47	29	29	20	16	17	14	18	74
8-May	18	11	17	15	10	13	17	27	64	65	79	66	77	72	54	52	31	70	48	48	21	17	19	16	79
9-May	37	16	11	12	12	14	18	32	82	61	57	46	32	57	33	88	68	57	69	64	21	24	12	16	88
10-May	17	18	18	19	18	55	24	74	68	75	98	90	82	63	83	46	63	65	43	32	11	10	17	15	98
11-May	17	21	23	25	23	25	31	35	29	39	38	82	65	80	71	70	53	51	57	28	14	13	17	20	82
12-May	18	18	18	18	17	37	71	32	40	38	51	41	62	40	40	52	40	36	24	18	18	17	20	21	71
13-May	20	19	20	19	22	23	28	33	34	37	37	38	37	44	46	53	52	49	32	31	19	17	21	25	53
14-May	28	25	24	21	15	25	40	32	30	25	35	31	35	42	49	47	45	37	36	31	17	17	17	16	49
15-May	11	13	17	16	16	24	33	39	42	41	30	34	34	33	33	36	33	43	39	38	38	39	39	37	43
16-May	39	35	40	39	35	38	36	38	38	39	38	40	40	43	42	38	39	41	38	24	16	9	13	9	43
17-May	12	13	15	15	17	22	31	34	39	39	48	68	50	48	54	42	43	42	29	25	12	13	16	17	68
18-May	17	21	20	16	20	25	32	35	37	31	37	33	47	50	54	56	48	39	38	26	17	5	7	7	56
19-May	6	7	9	8	11	23	34	32	27	31	45	63	74	74	72	68	63	63	44	25	25	12	4	6	74
20-May	9	9	9	6	9	13	35	29	27	34	48	49	62	49	65	63	59	65	51	44	63	12	20	7	65
21-May	9	6	7	8	5	11	23	33	35	42	36	54	44	49	47	57	52	36	32	46	11	4	4	4	57
22-May	9	9	8	10	9	19	59	33	35	39	37	39	40	41	38	45	41	40	38	38	29	18	17	19	59
23-May	22	19	26	20	20	21	45	69	48	52	57	66	61	57	61	41	85	60	105	52	30	8	8	9	105
24-May	18	11	30	13	10	8	16	42	83	54	51	58	62	70	75	87	51	48	71	61	24	16	16	15	87
25-May	9	9	7	8	10	12	24	49	29	51	55	50	44	97	66	69	55	25	52	54	23	36	35	33	97
26-May	35	37	36	27	24	34	35	29	38	41	45	41	39	52	62	60	59	71	33	30	19	20	11	15	71
27-May	17	15	15	14	14	15	42	41	74	71	91	54	32	38	38	38	37	39	37	36	36	36	36	37	91
28-May	39	37	36	35	36	37	39	40	38	39	38	38	45	37	44	45	47	47	40	32	17	18	27	15	47
29-May	17	16	17	16	15	21	33	37	58	69	89	69	62	77	105	62	68	59	45	37	22	17	21	21	105
30-May	22	22	21	22	24	28	35	36	30	37	49	42	48	54	52	43	36	45	32	28	18	12	17	18	54
31-May	22	23	20	17	19	20	21	23	28	25	30	39	32	27	29	31	34	28	26	23	32	32	22	24	39
78 37 40 83 46 55 71 74 101 95 98 90 82 97 105 88 85 71 105 64 63 72 60 63																									
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	May 7, 2015	Last Calibration	April 1, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	14:30
Gas Cert Reference	SA130010A	Station temp.	23 Deg C
Cal Gas Concentration	47.8 ppm	Cal Gas Exp Date	12-Dec-16
Calibrator Make/Model	API T700	Serial Number	493
ZAG Make/Model	API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 1000 ppb		PMT voltage	-702	-702
Analyzer IP address	192.168.1.43		Lamp voltage	889	887
Calculated slope	0.995019	0.991537	Chamber temp	45.1	44.9
Calculated intercept	0.525292	0.106835	Pressure	690.7	696.7
Analyzer Background	8.4	8.4	Flow	0.452	0.456
Analyzer Coefficient	0.802	0.808	Intensity	82	82

Analyzer make Thermo 43i Analyzer serial # 1218153459

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	----
as found span	5000	60.4	577.4	579.4	0.997
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	60.4	577.4	581.6	0.993
second point	5000	30.2	288.7	293.0	0.985
third point	5000	15.2	145.3	145.3	1.000
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	60.4	577.4	579.9	0.996
Average Correction Factor					0.993

Corrected As found 579.7 Previous response 579.8 % change 0.0%

Notes:

Filter changed after as founds. No adjustments made.

Calibration Performed By: Devin Russell



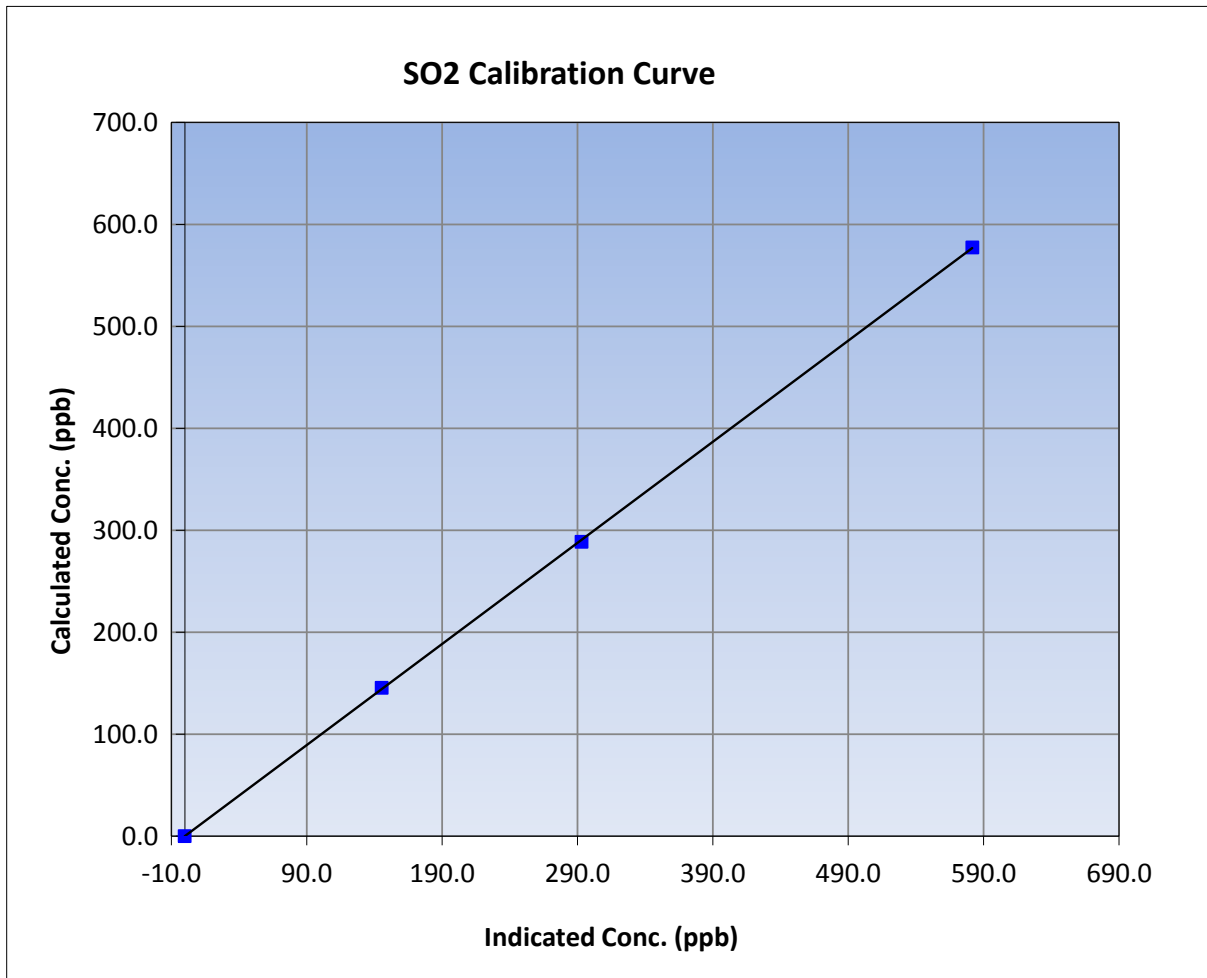
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 7, 2015	Previous Calibration	April 1, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:05	End Time (MST)	14:30
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

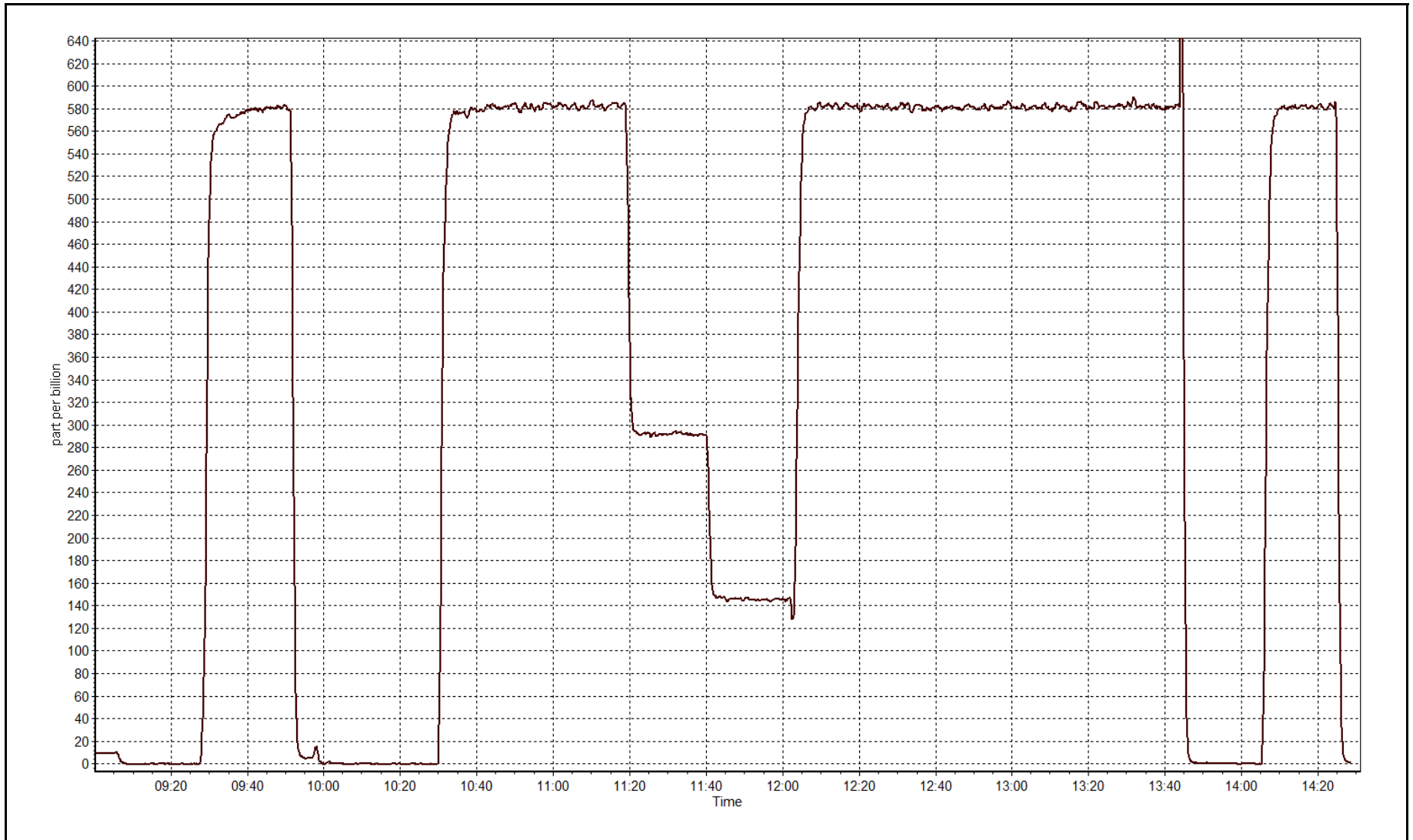
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999970
577.4	581.6	0.9929		
288.7	293.0	0.9854	Slope	0.991537
145.3	145.3	1.0002		
			Intercept	0.106835



SO2 Calibration Plot

Date: May 7, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 19, 2015	Last Calibration	April 2, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	13:25
Gas Cert Reference	CC107167	Station temp.	23 Deg C
Cal Gas Concentration	5.1 ppm	Cal Gas Exp Date	09-Sep-17
Calibrator Make/Model	API T700	Serial Number	997
ZAG air Make/Model	API 701	Serial Number	4227
DACS make/model	Campbell Scientific CR3000	Serial Number	6894
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	SA130010A 12/Dec/16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-651	-651
Analyzer IP address	192.168.1.42		Lamp voltage	813	812
Calculated slope	1.006686	1.000892	Chamber temp	45	45
Calculated intercept	-0.154233	-0.228940	Pressure	554.3	564.5
Analyzer Background	11.6	11.5	Flow	0.973	0.990
Analyzer Coefficient	0.842	0.842	Intensity	91	91
			Converter temp.	341	339

Analyzer make/model	Thermo 450i	Analyzer serial #	1218153583
Converter make/model	internal	Converter serial #	internal

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	78.5	80.1	80.2	0.999
SO2 scrubber check	5000	20.9	199.8	1.9	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	78.5	80.1	80.2	0.999
second point	5000	39.3	40.1	40.3	0.995
third point	5000	19.7	20.1	20.5	0.983
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	78.5	80.1	80.6	0.993
Average Correction Factor					0.992

Corrected As found	80.1	Previous response	79.7	% change	-0.5%
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Notes:

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

Calibration Performed By: Devin Russell



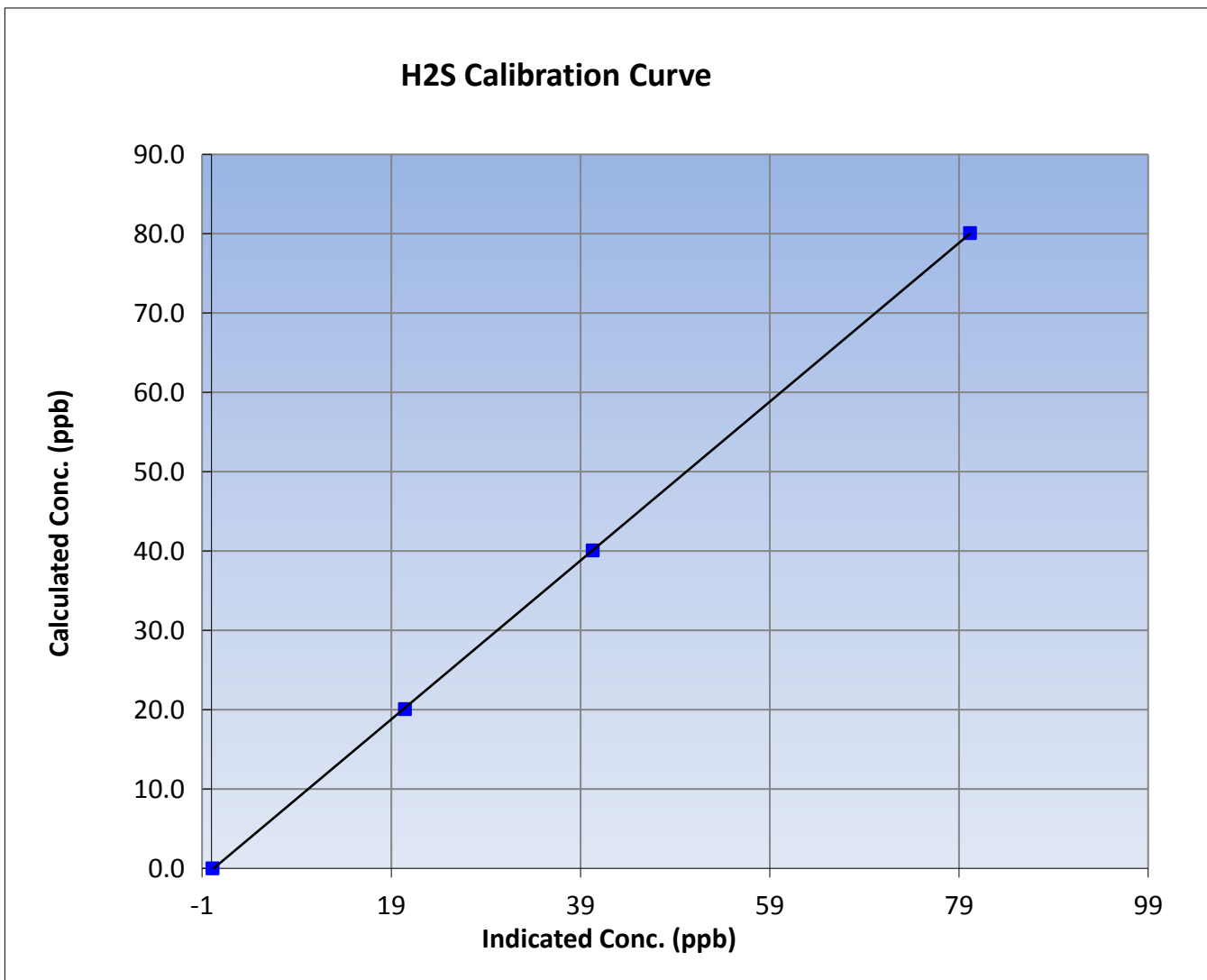
Wood Buffalo Environmental Association H2S Calibration Report

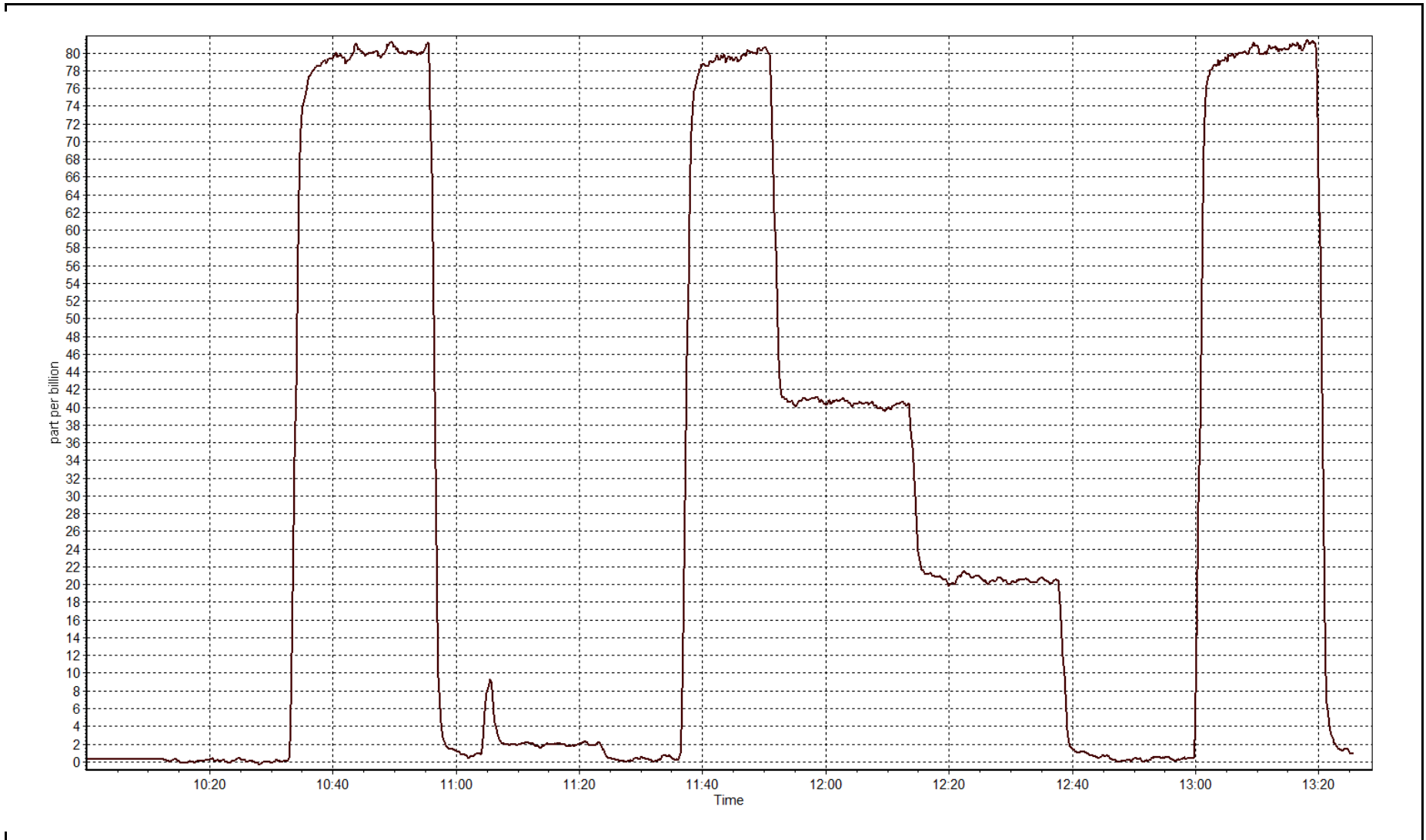
Station Information

Calibration Date	May 19, 2015	Previous Calibration	April 2, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:10	End Time (MST)	13:25
Analyzer make	Thermo 450i	Analyzer serial #	1218153583

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999989
80.1	80.2	0.9986		
40.1	40.3	0.9947	Slope	1.000892
20.1	20.5	0.9826		
			Intercept	-0.228940







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-07-15	Last Calibration	April-01-15
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	14:30
Gas Cert Reference	SA130010A	Cal Gas Expiry Date	12/12/2015
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm	Station temp.	23 Deg C
Calibrator Make/Model	API T700	Serial Number	493
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	40.1	40.8
Calculated slope	1.005599	1.005849	Fuel Pressure	24.8	24.8
Calculated intercept	-0.049441	-0.073525	Analyzer Coeff	5.0	5.0
			Analyzer BKG	2.700	2.850

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352
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Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.15	----
as found span	5000	60.4	13.19	13.22	0.998
calibrator zero	5000	0.0	0.00	0.04	----
high point	5000	60.4	13.19	13.17	1.002
second point	5000	30.2	6.60	6.66	0.991
third point	5000	15.2	3.32	3.40	0.977
as left zero				0.13	
as left span	5000	60.4	13.19	13.09	1.008
Average Correction Factor					0.990

Corrected As found	13.07	Previous response	13.17	% change	0.8%
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Notes:

Filter changed after as founds. H2 cylinder changed after as founds. Zero and span adjusted.

Calibration Performed By:

Devin Russell



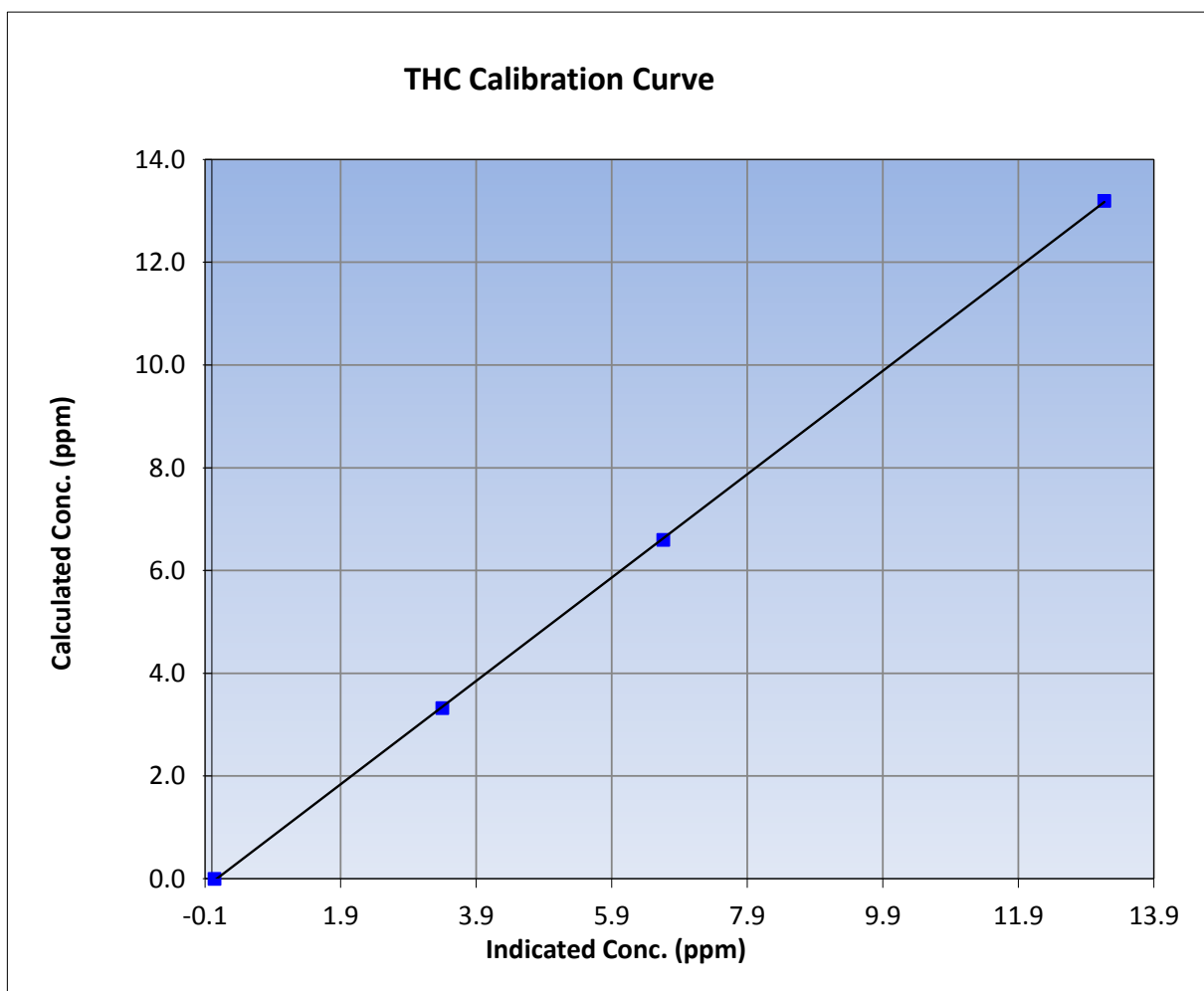
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 7, 2015	Previous Calibration	April 1, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:05	End Time (MST)	14:30
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

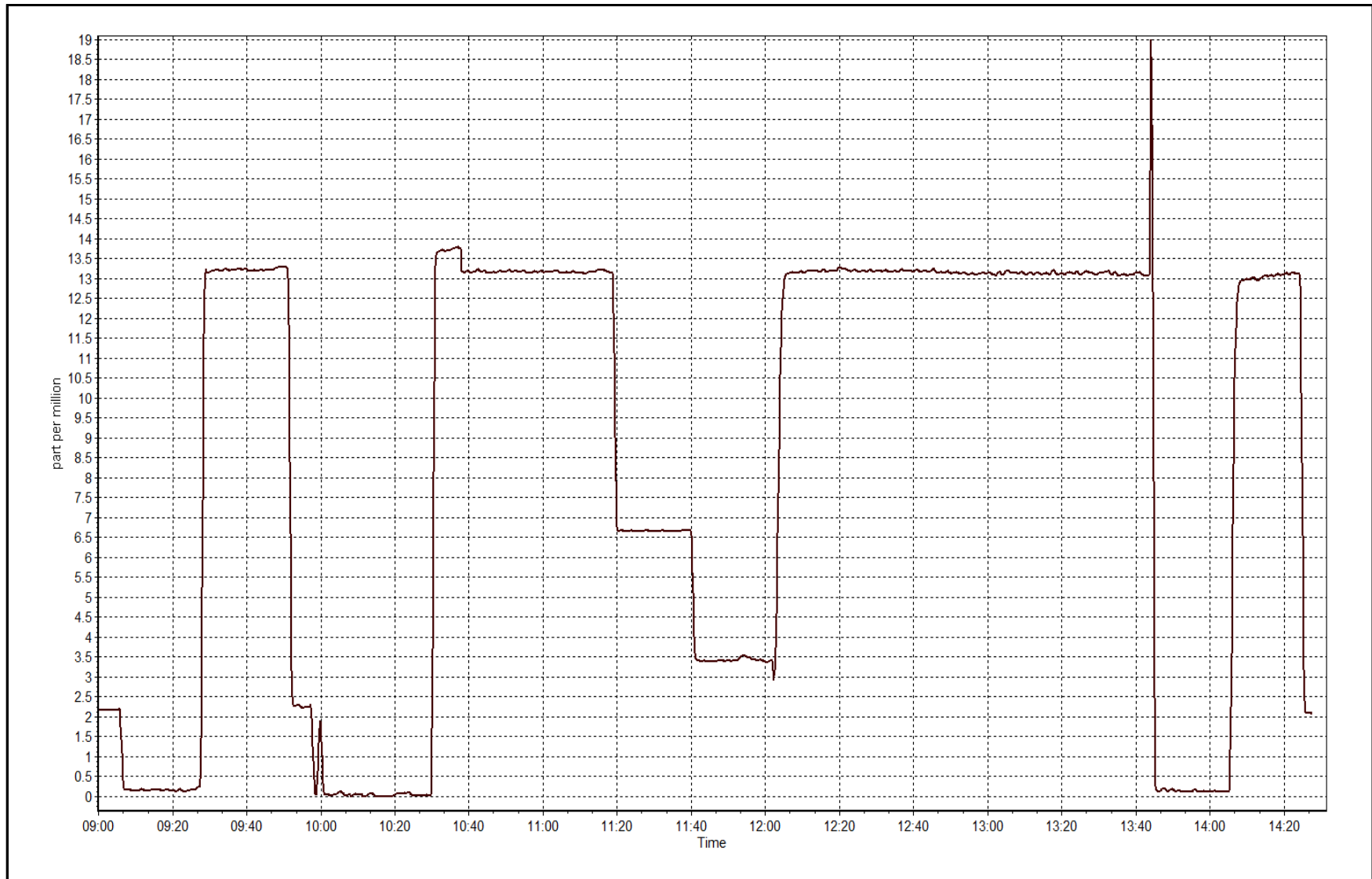
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.04	----	Correlation Coefficient	0.999968
13.19	13.17	1.0019		
6.60	6.66	0.9906	Slope	1.005849
3.32	3.40	0.9766		
			Intercept	-0.073525



THC Calibration Plot

Date: May 7, 2015





Wood Buffalo Environmental Association

O₃ Calibration Report

Station Information

Calibration Date	May 20, 2015	Previous Calibration	April 2, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	10:50	End Time (MST)	13:15
NO2 GPT Ref date	May-07-15	Transfer Standard	NOX GPT of May 7, 2015
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	997
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.0	25.0
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	0.992793	0.989063	Pressure	26.1	26.1
Calculated intercept	0.435543	-0.560221	Flow cell A	0.723	0.731
Analyzer Background	5.5	5.5	Flow cell B	0.741	0.743
Analyzer Coefficient	0.974	0.974	Cell A Intensity		
			Cell B Intensity		

Analyzer make	Teledyne API T400	Analyzer serial #	824
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Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	195.9/800	0.0	0.1	----
as found span	5000	713.9/1083.6	361.2	365.2	0.989
calibrator zero	5000	195.9/800	0.0	0.1	----
high point	5000	713.9/1083.6	361.2	365.2	0.989
second point	5000	495.5/973.5	242.7	246.5	0.985
third point	5000	261.2/846.7	124.5	127.0	0.981
as left zero	5000	195.9/800	0.0	0.3	----
as left span	5000	713.9/1083.6	361.2	366.5	0.986
Average Correction Factor					0.985

Corrected As found	365.2	Previous response	363.4	% change	-0.5%
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Notes:

Checked GPT reference on NOX prior to O₃ calibration; verified response to be within 1% from NOX cal performed May 7th.
 Changed filter after as founds. No adjustments made.

Calibration Performed By: Devin Russell



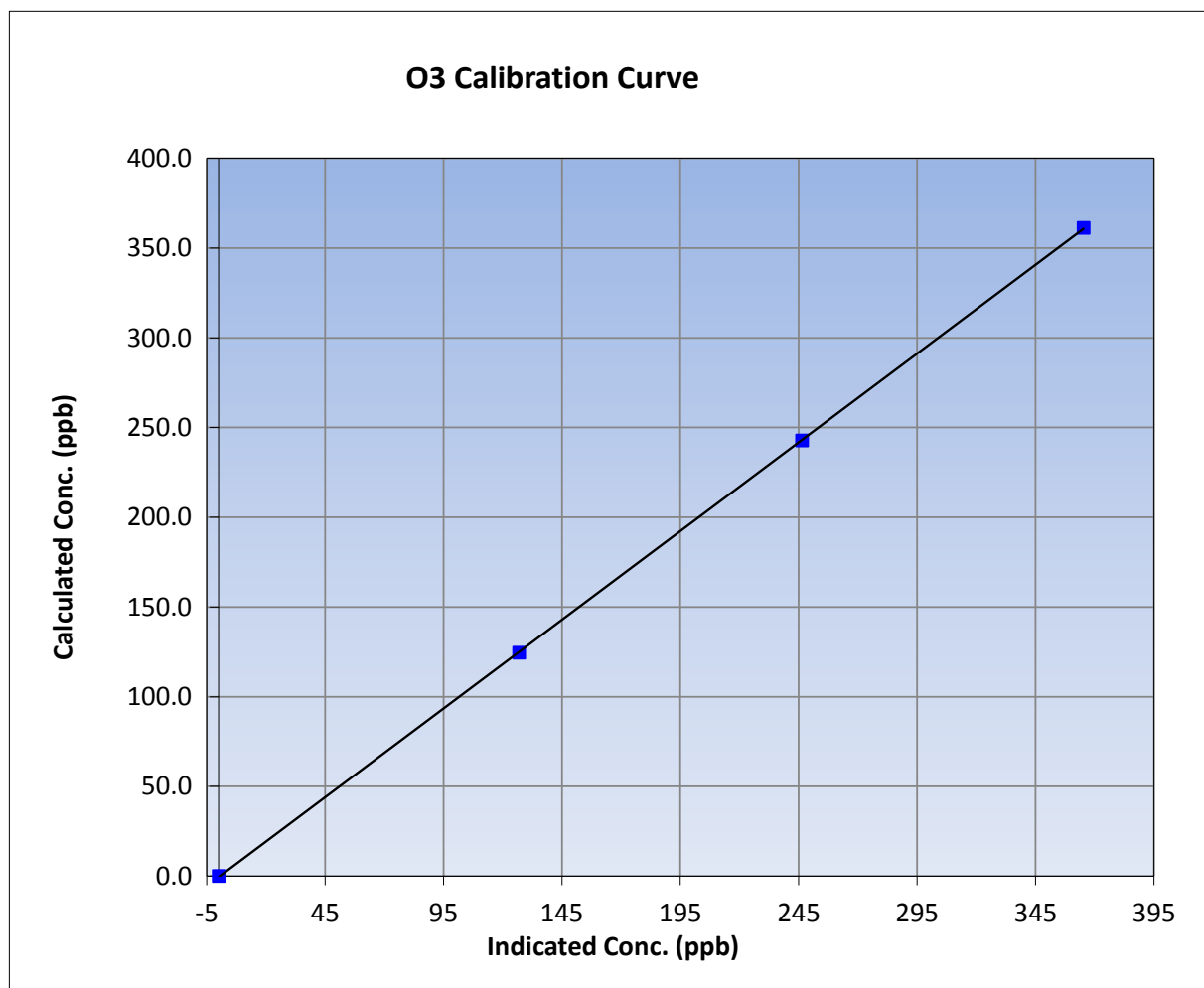
Wood Buffalo Environmental Association O3 Calibration Report

Station Information

Calibration Date	May-20-15	Previous Calibration	April 2, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	10:50	End Time (MST)	13:15
Analyzer make	Teledyne API T400	Analyzer serial #	824

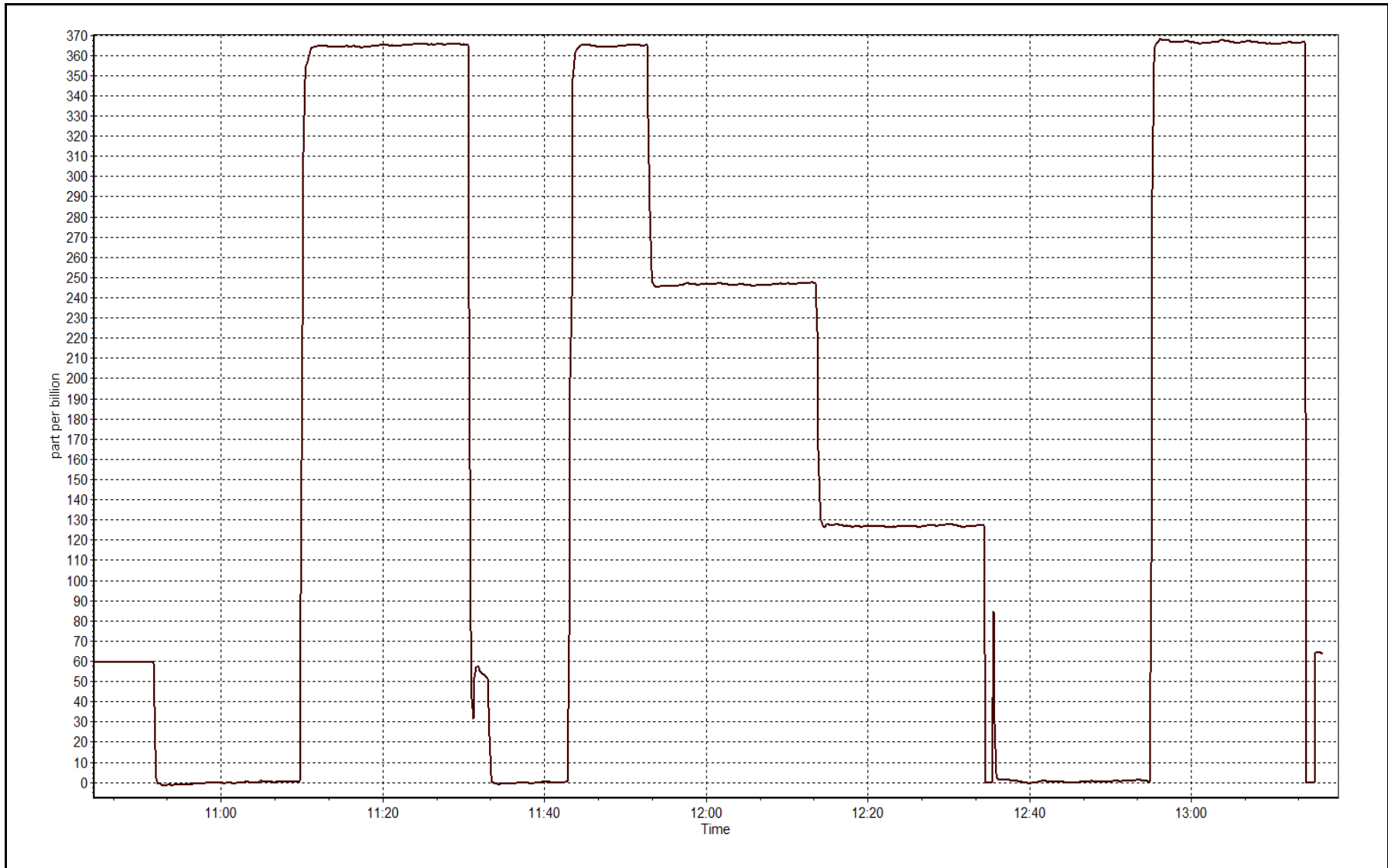
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999986
361.2	365.2	0.9889		
242.7	246.5	0.9848	Slope	0.989063
124.5	127.0	0.9805		
			Intercept	-0.560221



O3 Calibration Plot

Date: May 20, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 7, 2015	Previous Calibration	April 1, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	14:30
NO Cal Gas Conc	49.7 ppm	Gas Cert Reference	SA130010A
NOx Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	December 12, 2016
Calibrator	API T700	Serial Number	997
Zero air Generator	Teledyne API T701	Serial Number	4427

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.994753	0.998592	0.999985
	Data Offset	0.658760	0.245942	-0.492318
Current Calibration	Data Slope	0.997016	0.997914	0.992902
	Data Offset	0.914679	0.870802	-0.261381

Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	833
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.993		0.977	
NOx coefficient	0.993		0.978	
NO2 coefficient	1.000		1.000	
NO bkgrnd	-0.4		-0.4	
NOx bkgrnd	0.7		0.7	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	314.4	Deg C	315.6	Deg C
PMT voltage		V	12.6	mV
PMT Temp	7	Deg C	7	Deg C
O3 flow	ok	ccm	71	ccm
R Cell press NO	5.9	mmHg	6	mmHg
R Cell Press Nox	5.9	mmHg	6	mmHg
NO sample flow	0.44	lpm	0.448	lpm
Nox sample Flow	0.440	lpm	0.448	lpm

Notes:

Filter changed after as founds. Span adjusted. Nox and NO concentrations drifted apart; span adjusted again after first high point.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 7, 2015

Station Number:

AMS 17

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	0.3	-0.5	----	----
as found span	5000	60.4	600.4	600.4	0.0	607.9	607.5	0.5	0.9876	0.9883
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	0.3	-0.6	----	----
high point	5000	60.4	600.4	600.4	0.0	601.2	601.0	0.2	0.9987	0.9990
second point	5000	30.2	300.2	300.2	0.0	301.1	300.4	0.7	0.9970	0.9993
third point	5000	15.2	151.1	151.1	0.0	149.2	148.7	0.5	1.0130	1.0161
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	0.2	-0.3	----	----
as left span	5000	60.4	600.4	238.1	362.2	600.5	238.4	362.1	0.9998	0.9989
Average Correction Factor									1.0029	1.0048

Corrccted As found NO_x= 608.1 NO= 607.2 Percent Change NO_x= -0.9% NO= -1.0%
 Previous Response NO_x= 602.9 NO= 601.0

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 60.40 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.6			N/A	
1st NO2 (300)	----	238.1	361.2	601.8	238.1	363.6	0.9858	1.0000	0.9932	100.7%
2nd NO2 (200)	----	356.6	242.7	601.2	356.6	244.6	0.9867	1.0000	0.9923	100.8%
3rd NO2 (100)	----	474.8	124.5	601.8	474.8	127.0	0.9857	1.0000	0.9805	102.0%
4th NO2 (0)	599.3	----	1.0	600.4	599.3	1.0	0.9881	1.0000	N/A	----
Average Correction Factor							0.9866	1.0000	0.9887	101.1%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

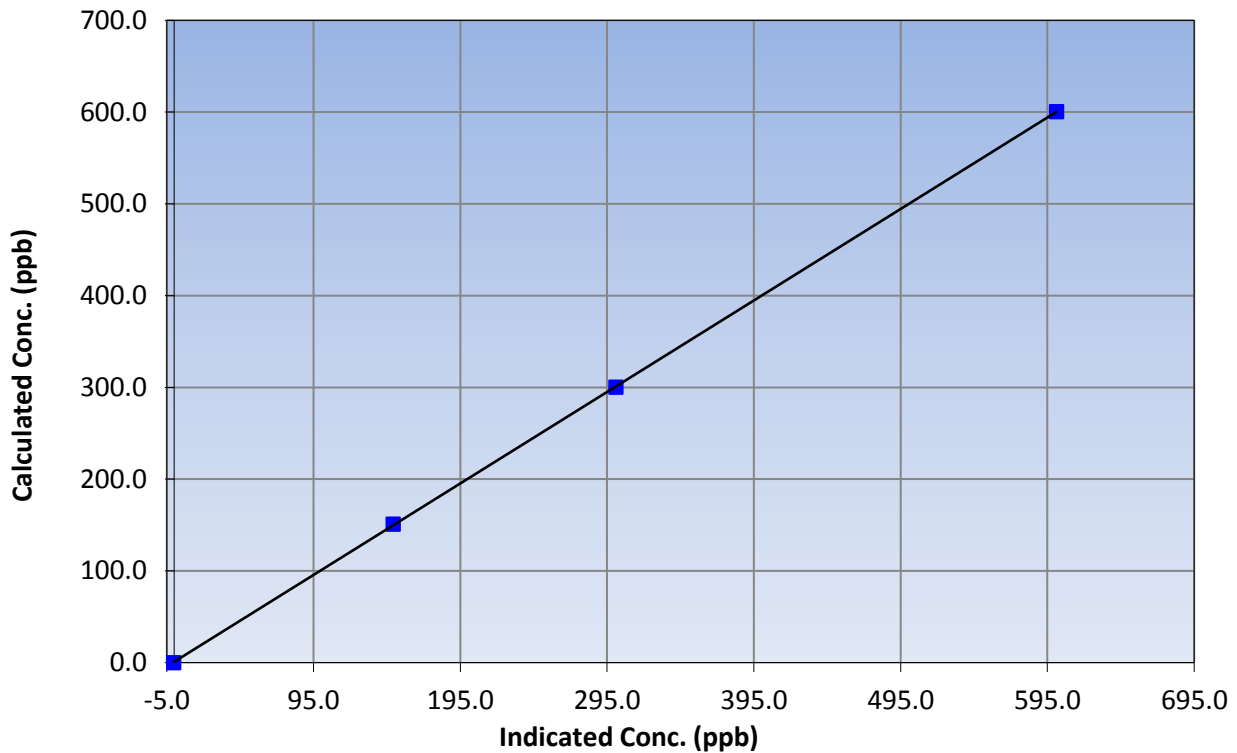
Station Information

Calibration Date	May 7, 2015	Previous Calibration	April 1, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:05	End Time (MST)	14:30
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999983
600.4	601.2	0.9987		
300.2	301.1	0.9970	Slope	0.997016
151.1	149.2	1.0130		
			Intercept	0.914679

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

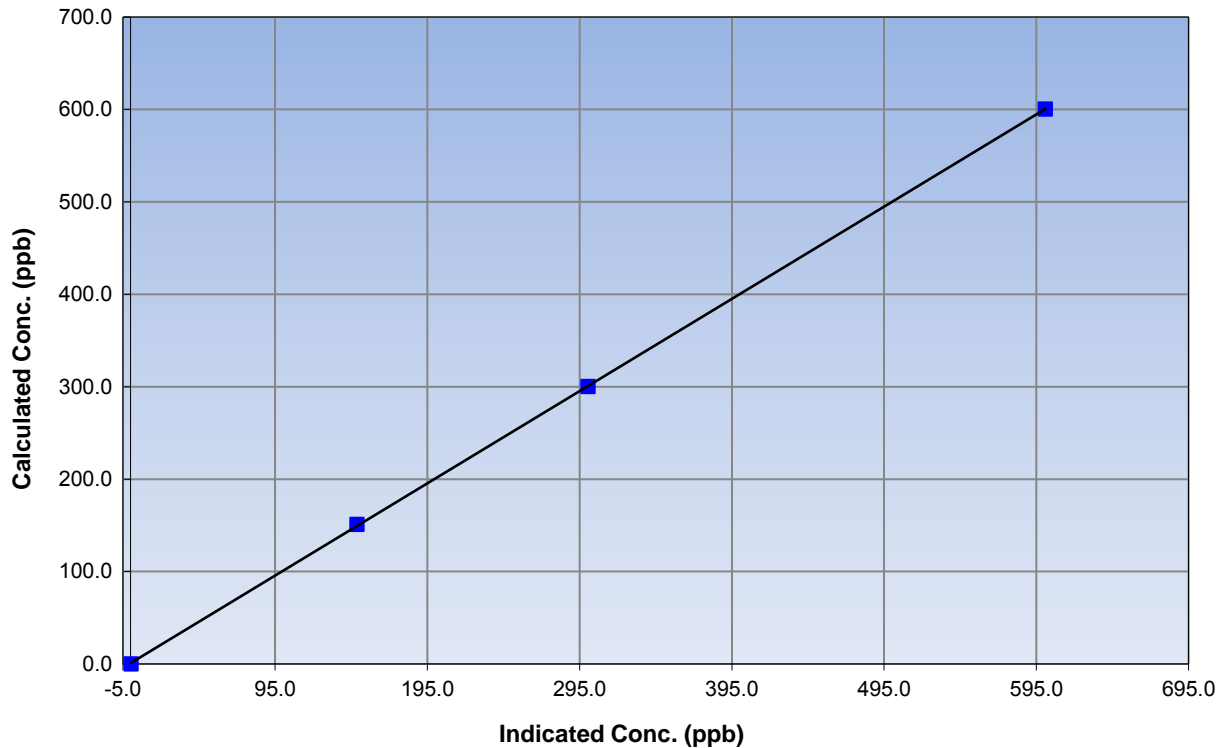
Station Information

Calibration Date	May 7, 2015	Previous Calibration	April 1, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:05	End Time (MST)	14:30
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999975
600.4	601.0	0.9990		
300.2	300.4	0.9993	Slope	0.997914
151.1	148.7	1.0161		
			Intercept	0.870802

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

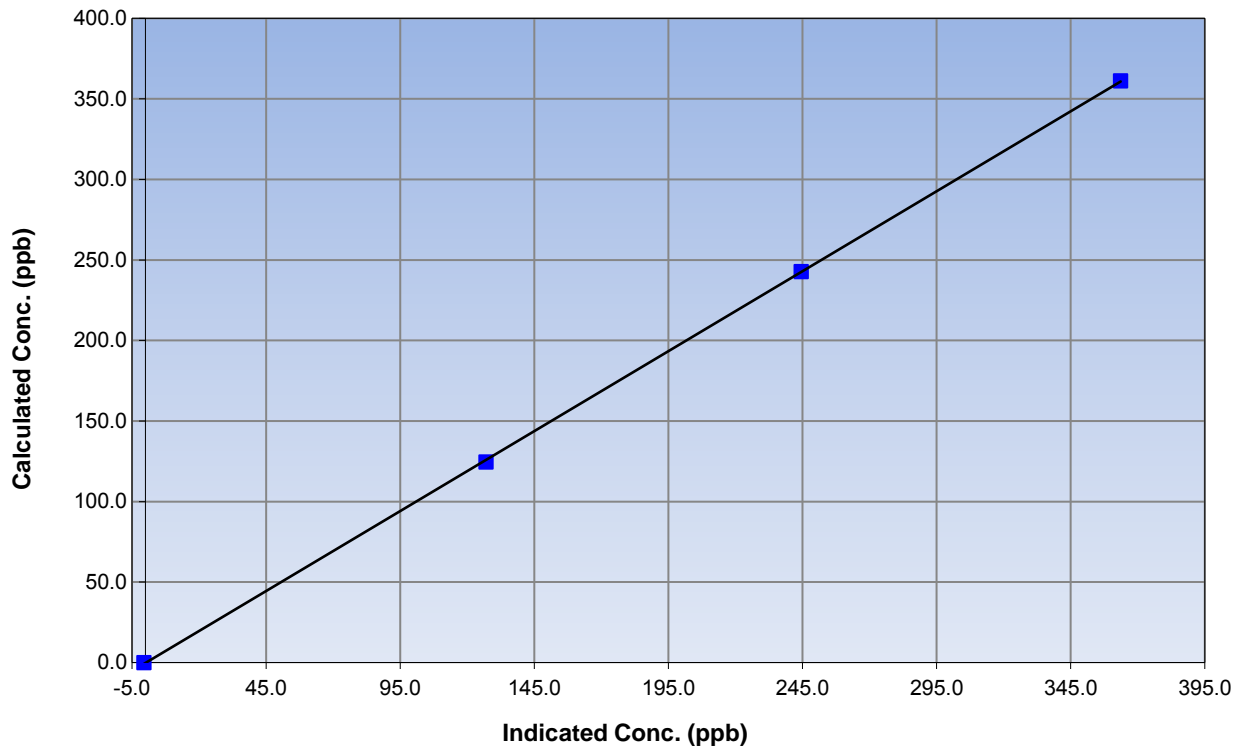
Station Information

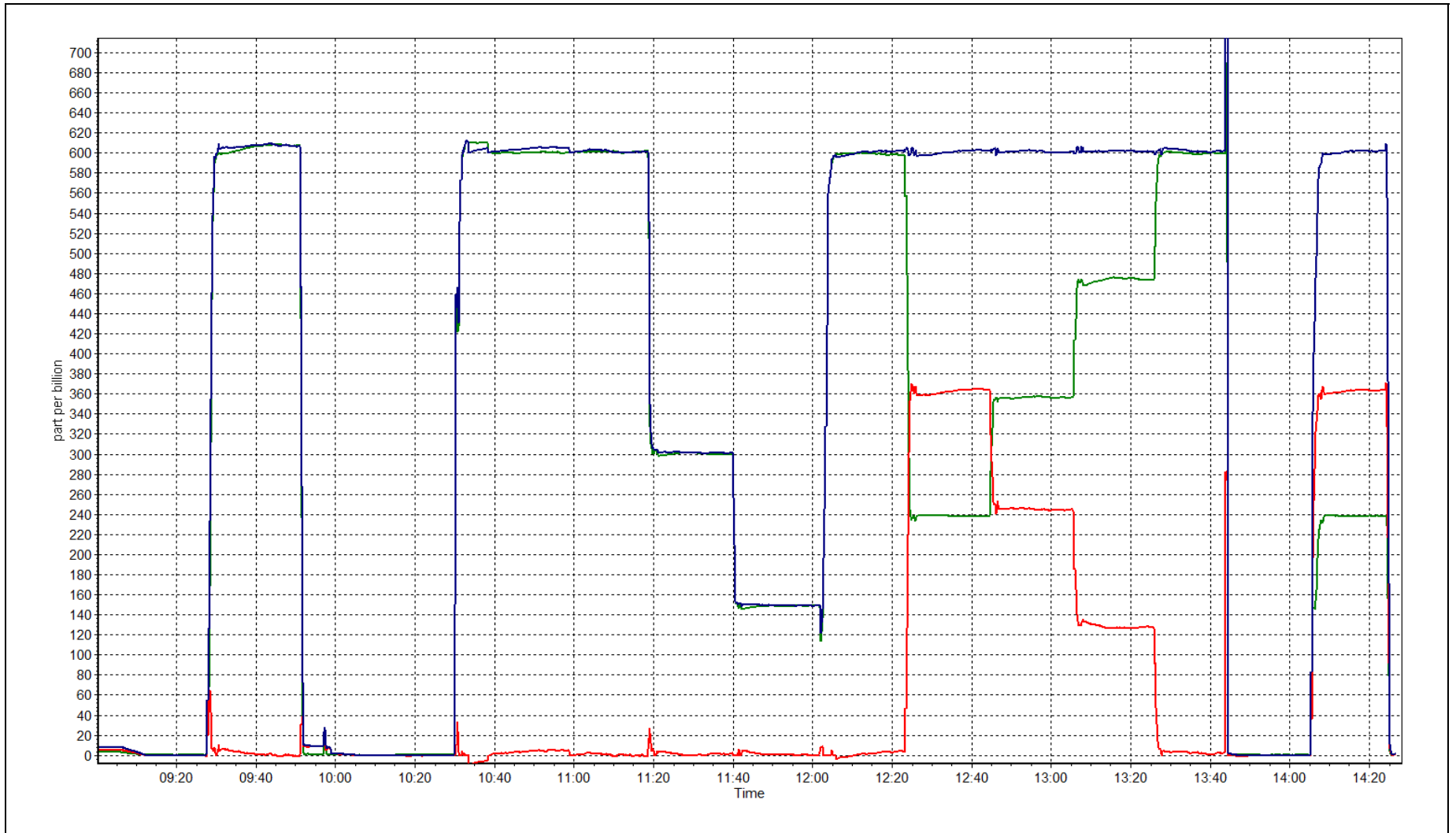
Calibration Date	May 7, 2015	Previous Calibration	April 1, 2015
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	9:05	End Time (MST)	14:30
Analyzer make	API T200	Analyzer serial #	833

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.6	N/A	Correlation Coefficient	0.999965
361.2	363.6	0.9932		
242.7	244.6	0.9923	Slope	0.992902
124.5	127.0	0.9805		
			Intercept	-0.261381

NO₂ Calibration Curve







Wood Buffalo Environmental Association

SHARP CONFORMANCE TEST

STATION INFORMATION

Calibration Date:	<u>May 20, 2015</u>	Previous Calibration:	<u>April 2, 2015</u>
Station Name:	<u>Wapasu</u>	Station Number:	<u>AMS 17</u>
Start Time (MST):	<u>10:25</u>	End Time (MST):	<u>11:30</u>
Calibrator Make/Model:	<u>Delta Cal</u>	Calibrator Serial Number:	<u>954</u>

SHARP INFORMATION

Particulate Fraction:	<u>PM2.5</u>
Make/Model:	<u>Thermo / SHARP 5030</u>
Serial Number:	<u>E-1107</u>
Source SN:	<u>2618</u>
HEPA PN:	<u>1337</u>
Time Correct (MST):	<u>Yes</u>
Parameters Checked:	<u>T1, T2, T2,T4, P3, Main Flow, Beta, Neph</u>

AUDIT DATA

Temperature (°C)

Sensor	Indicated	Measured	Difference (Limit +/- 2.0°C)	Final Indicated
T1	21.0	22.1	1.1	21.0
T2	23.0	na	na	23.0
T3	22.0	na	na	22.0
T4	25.0	na	na	25.0
RH (%)	14.0	na	na	14.0

Pressure (Hpa)

Sensor	Indicated	Measured	Difference (Limit +/- 13.33 hPa)	Final Indicated
P3	959	961.9	2.9	959

Main Flow (Lph)

Indicated	Measured	Difference LPH (Limit +/- 7% or 70 Lph)	Final Measured	Final Indicated
1002	1002	0	1002	1002

Nephelometer Calibration

Parameter	As Found	adjusted (Limit +/- 2.0ug/m3)	As Left
Analog	191		192
Neph	0.9		0
C14	10.3	yes	14.3
Indicated Concentration (ug/m3)	0.5		0
Offset 1	191.8		191.8
Offset 2	31.5		31.5

Leak Check (Quarterly)

Leak Check Date: _____ Previous Leak Check Date: _____

Measured

Difference LPM (Limit +/- 0.42 LPM)

Flow without adaptor (LPM): _____

Flow with adaptor [turn off pump first](LPM): _____

Mass Foil Calibration (Annually)

Foil Calibration Date:		Previous Foil Calibration:	
Zeroed?:	<u>NO</u>		
Foil Mass:	<u>1337</u>		
Previous Correction Factor:	<u>6775</u>	Mass foil set S/N:	
New Correction Factor:	<u>6924</u>		

INSPECTION DATA

Item	Condition	Date of install or rebuild
Cyclone	Good / cleaned	
Pump	Good	
Filter Tape	Good	
Mass Foil Cal Set	na	
HEPA filter	Good	

NOTES:

Nephelometer zeroed. Cyclone Head cleaned.

Audit Performed By: Devin Russell



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 19
SUNCOR FIREBAG
MAY 2015**

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

June 29, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)

MAY 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	707	37	37	100.00	27	0	2	0
H2S (ppb) Average	708	35	36	99.87	2	0	0	0
THC (ppm) Average	707	37	37	100.00	3	-	2.2	-
NO2 (ppb) Average	684	35	60	96.64	32	0	6	-
NO (ppb) Average	684	35	60	96.64	22	-	1	-
NOX (ppb) Average	684	35	60	96.64	48	-	7	-
Temperature 2 m (C) Average	744	0	0	100.00	25	-	19.2	-
Relative Humidity (%) Average	744	0	0	100.00	98	-	91	-
Wind Speed 10 m (km/h) Average	737	0	7	99.06	32	-	21	-
Wind Direction 10 m (deg) Average	737	0	7	99.06	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	707	0.9	2	-	0	0	0	0	1	2	27
H2S (ppb) Average	708	0.3	0	-	0	0	0	0	0	0	2
THC (ppm) Average	707	2.14	0.1	-	2	2.1	2.1	2.1	2.2	2.2	3
NO2 (ppb) Average	684	2.6	4	-	0	0	1	1	3	6	32
NO (ppb) Average	684	0.5	2	-	0	0	0	0	0	1	22
NOX (ppb) Average	684	3.1	5	-	0	0	1	2	3	7	48
Temperature 2 m (C) Average	744	9.89	7.6	-	-5.4	-0.3	3.5	9.8	15.7	20.6	25
Relative Humidity (%) Average	744	44.7	23	-	13	19	27	39	57	84	98
Wind Speed 10 m (km/h) Average	737	13	6	-	1	5	8	13	17	21	32
Wind Direction 10 m (deg) Average	737	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)
MAY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	26 May 2015 11:00	26 May 2015 11:00	1	Maintenance - Station operator on site
NO2, NO, NOX	26 May 2015 10:00	27 May 2015 10:00	25	Analyzer in maintenance mode to stabilize after repairs
Wind Speed, Wind Direction	07 May 2015 03:00	07 May 2015 07:00	5	Flat line in sensor output signal
Wind Speed, Wind Direction	09 May 2015 21:00	09 May 2015 21:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	20 May 2015 21:00	20 May 2015 21:00	1	Flat line in sensor output signal



Summary of Hour Averages

Firebag - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 27 ppb on May 25 08:00	Maximum Daily Average: 2.4 ppb on May 25		Hours of Data:	707
Minimum Value: 0 ppb on May 27 03:00	Minimum Daily Average: 0.2 ppb on May 17		Hours of Missing Data:	37
Maximum Diurnal Average: 2.5 ppb at hour 8	Minimum Diurnal Average: 0.4 ppb at hour 22		Hours of Calibration:	37
Monthly Average: 0.9 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 7		Percent Operational Time:	100.0

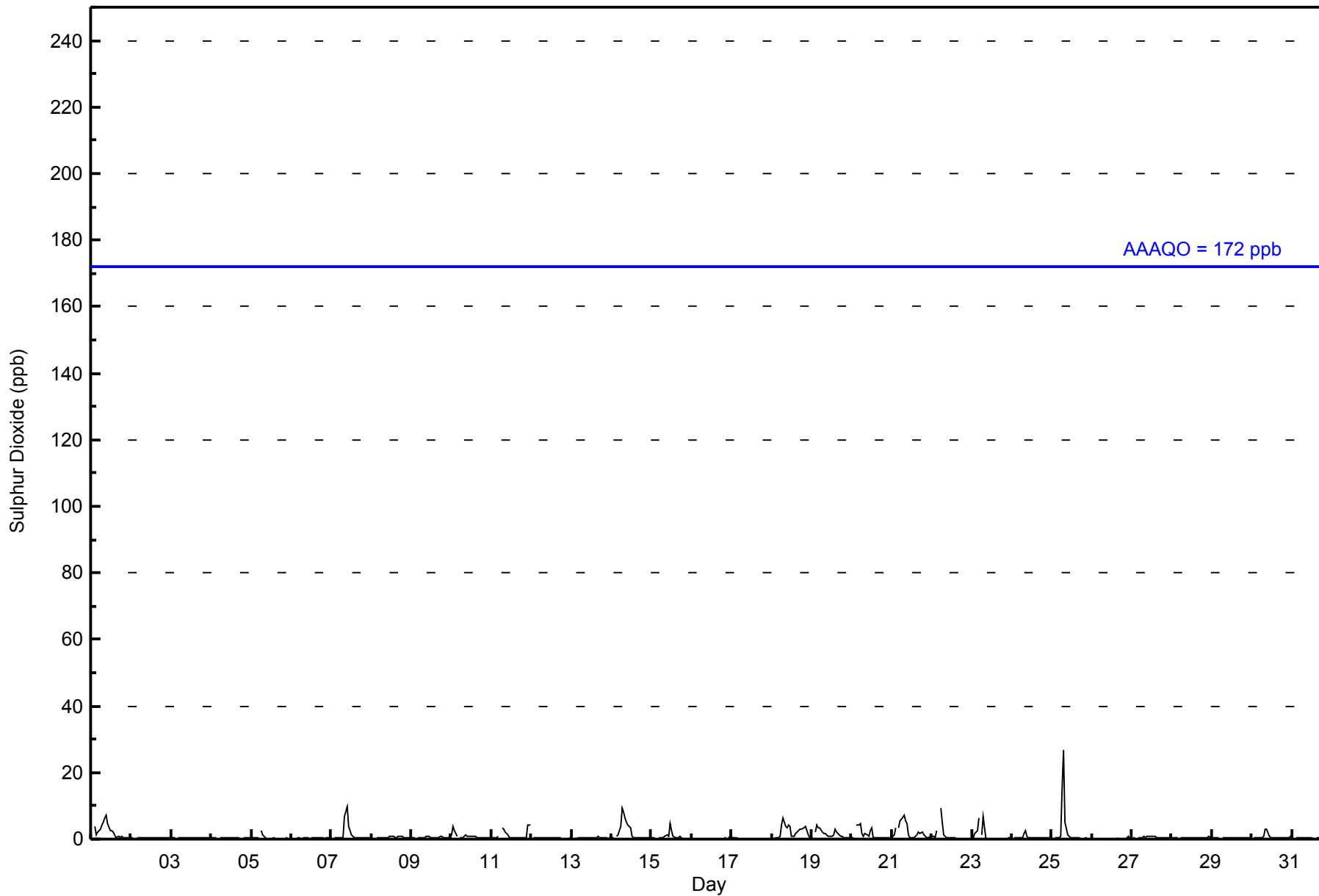
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	1	Z	4	1	2	3	4	5	6	7	5	2	2	2	1	0	1	1	1	0	1	0	0	0	2.2	7																							
2-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
3-May	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																							
4-May	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																							
5-May	0	0	0	0	0	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																							
6-May	Z	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																							
7-May	0	Z	0	0	0	0	0	0	7	10	4	3	1	1	0	0	0	0	0	0	0	0	0	0	1.3	10																							
8-May	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.5	1																							
9-May	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0.5	1																							
10-May	1	4	2	1	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	4																							
11-May	1	0	0	1	1	Z	4	3	2	2	1	1	1	0	0	0	0	0	0	0	0	1	4	4	1.2	4																							
12-May	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
13-May	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1																							
14-May	0	0	Z	1	1	4	9	8	6	5	4	3	1	1	0	1	0	0	0	0	0	0	0	0	2.1	9																							
15-May	0	0	0	Z	0	0	0	0	1	1	1	5	2	1	0	0	0	1	0	0	0	0	0	0	0.7	5																							
16-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1																							
17-May	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																							
18-May	Z	0	0	0	0	1	4	6	4	3	4	4	1	1	2	2	3	3	3	4	4	3	1	0	2.3	6																							
19-May	1	Z	2	4	3	4	2	2	2	1	1	1	1	1	3	2	2	1	1	1	0	0	0	0	1.5	4																							
20-May	0	0	Z	4	4	5	2	1	2	1	1	3	3	0	0	0	0	0	0	0	0	0	0	0	1.4	5																							
21-May	0	1	3	Z	3	5	6	7	6	4	1	0	0	0	1	1	2	2	2	1	1	0	0	1	2.2	7																							
22-May	1	1	0	2	Z	9	5	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	9																							
23-May	0	0	2	2	7	Z	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	7																							
24-May	Z	0	0	0	0	0	0	2	2	1	0	0	0	0	1	1	1	0	0	0	1	0	0	0	0.6	2																							
25-May	0	Z	0	0	1	1	15	27	5	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2.4	27																							
26-May	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	1	0	--	1																							
27-May	0	0	0	Z	0	0	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1																							
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1																							
29-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
30-May	Z	0	0	0	0	0	0	1	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.6	3																							
31-May	1	Z	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1																							
																								0.4	0.5	0.7	0.8	1.1	1.4	2.0	2.5	1.7	1.6	1.1	1.0	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.5	0.5	Diurnal Average
																								1	4	4	4	7	9	15	27	7	10	5	5	3	2	3	2	3	3	3	3	4	4	3	4	4	Diurnal Maximum

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Firebag - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	705	99.72	99.72
11 - 20	1	0.14	99.86
21 - 60	1	0.14	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
Firebag - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	60	61	52	33	21	48	42	45	65	51	71	56	26	11	15	41	698
11 - 20	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	60	61	52	33	21	48	42	45	65	51	72	56	26	12	15	41	700

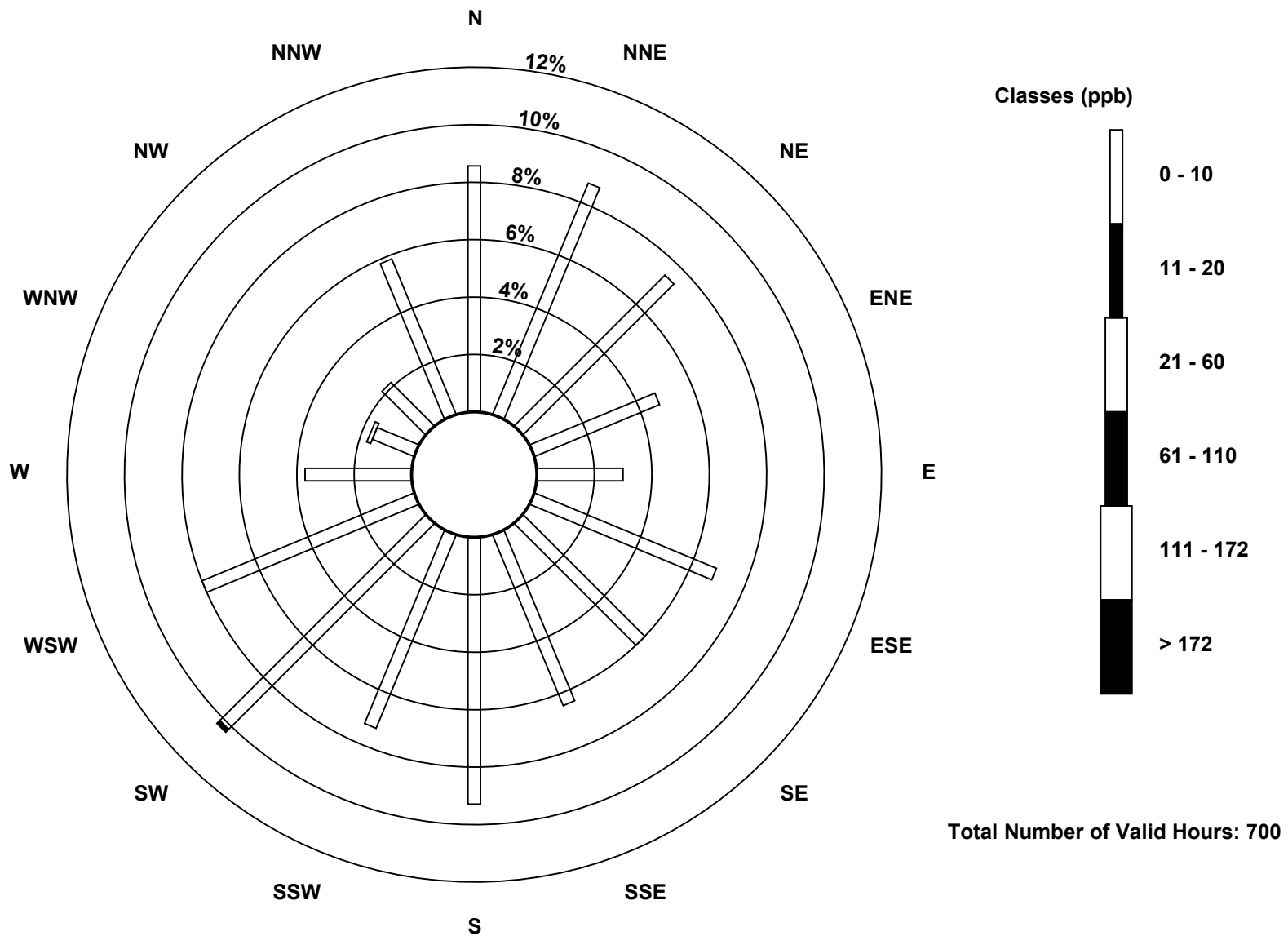
Total Number of Valid Hours: 700

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

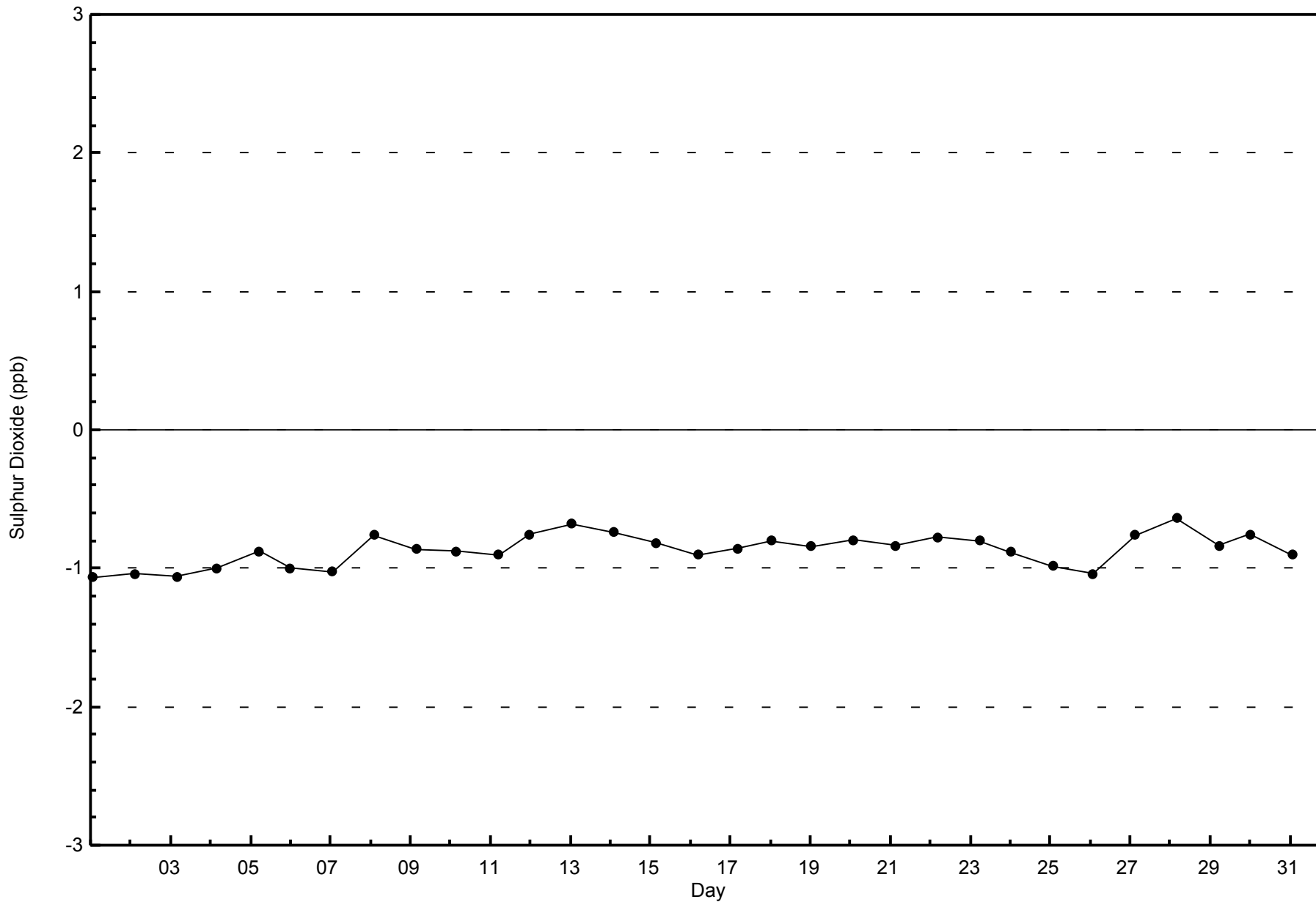
Sulphur Dioxide (SO₂) - ppb
Firebag (AMS 19)





WBEA
Zero Responses

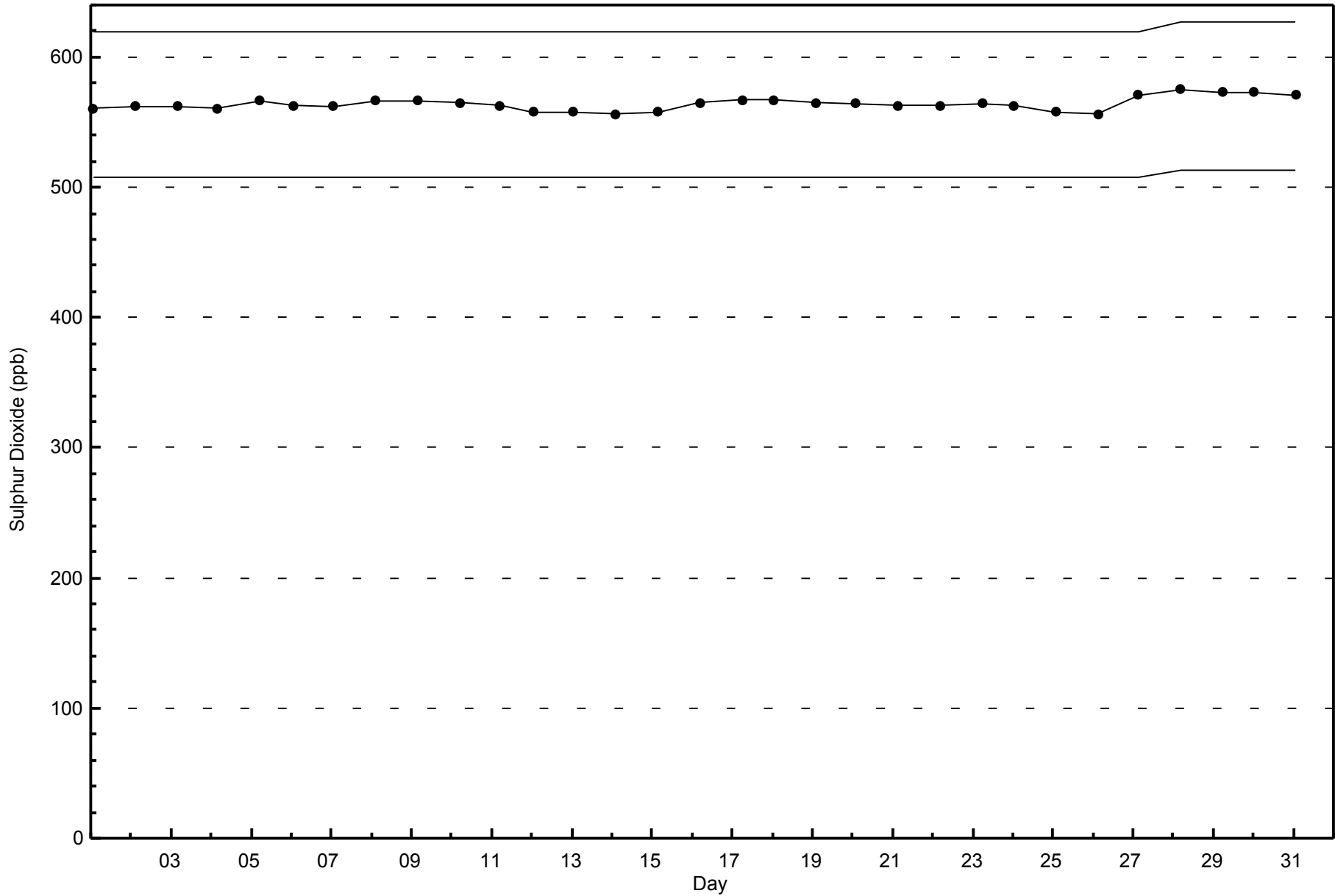
Sulphur Dioxide (SO₂) - ppb
Firebag - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
Firebag - May 2015





Summary of Hour Averages

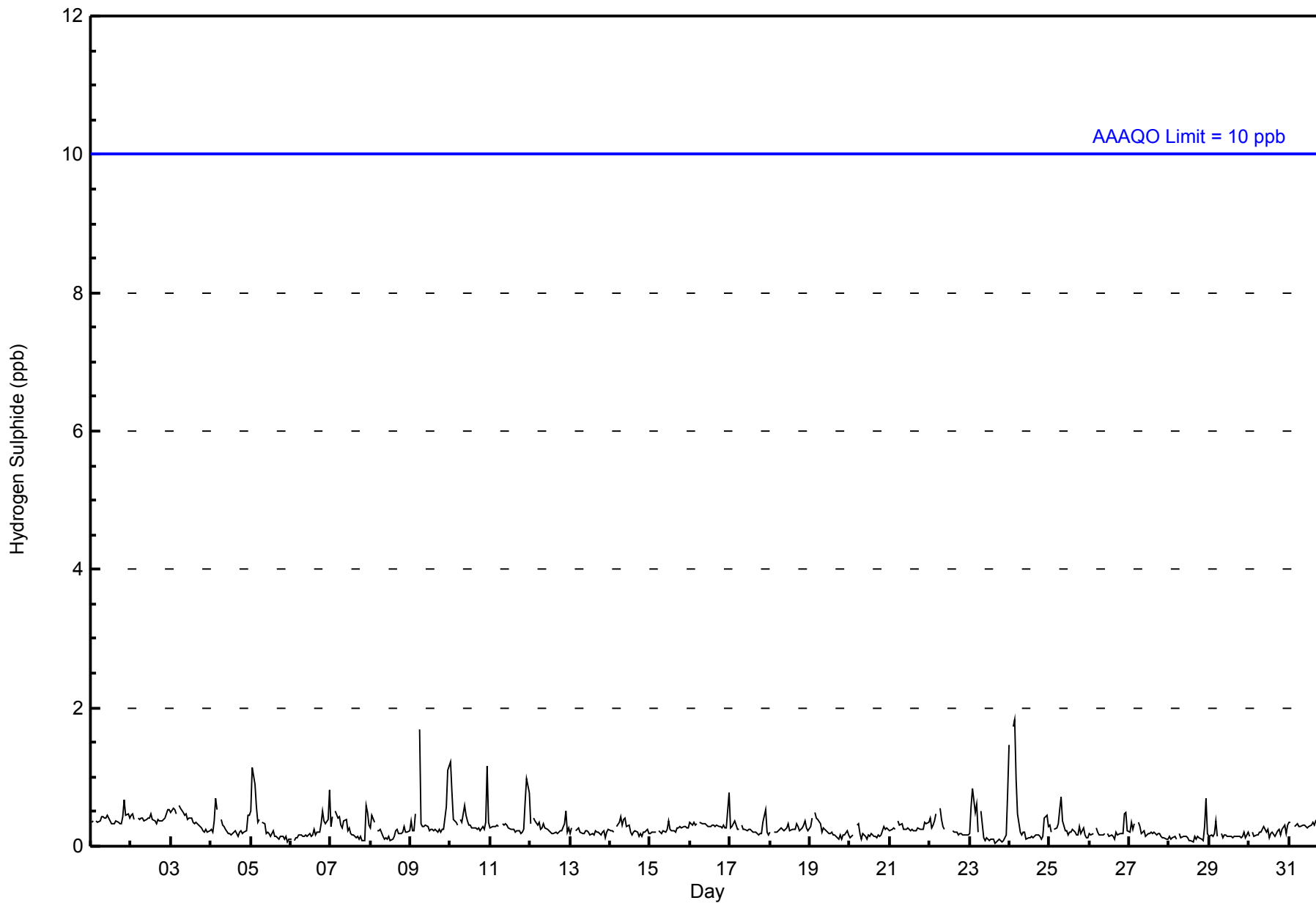
Firebag - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744																
Maximum Value: 2 ppb on May 24 04:00										Maximum Daily Average: 0.4 ppb on May 24										Hours of Data: 708						
Minimum Value: 0 ppb on May 23 16:00										Minimum Daily Average: 0.2 ppb on May 28										Hours of Missing Data: 36						
Maximum Diurnal Average: 0.4 ppb at hour 4										Minimum Diurnal Average: 0.2 ppb at hour 13										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: 99.9						
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-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1
2-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1
3-May	0	1	1	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
4-May	0	0	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
5-May	1	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
6-May	0	Z	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
7-May	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
8-May	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
9-May	0	0	0	0	Z	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	2
10-May	1	1	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1
11-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
12-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
13-May	0	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-May	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-May	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
16-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
17-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
18-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
19-May	0	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-May	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
21-May	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
22-May	0	0	0	0	0	Z	1	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	1
23-May	0	1	1	0	1	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
24-May	1	Z	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
25-May	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
26-May	0	0	0	Z	0	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
27-May	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
28-May	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1
29-May	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
30-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
0.3 0.3 0.4 0.4 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 0.2 0.2 0.2 0.2 0.3 0.4 0.3																								Diurnal Average		
1 1 2 2 1 2 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Firebag - May 2015





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Firebag - May 2015

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

Total Number of Valid Hours: 708

Total Number of Hours: 744



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
Firebag - May 2015

Concentration Ranges (ppb)	Wind Direction																
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Totals
0 - 2	61	63	53	33	20	48	42	46	65	52	73	55	25	13	15	38	702
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	61	63	53	33	20	48	42	46	65	52	73	55	25	13	15	38	702

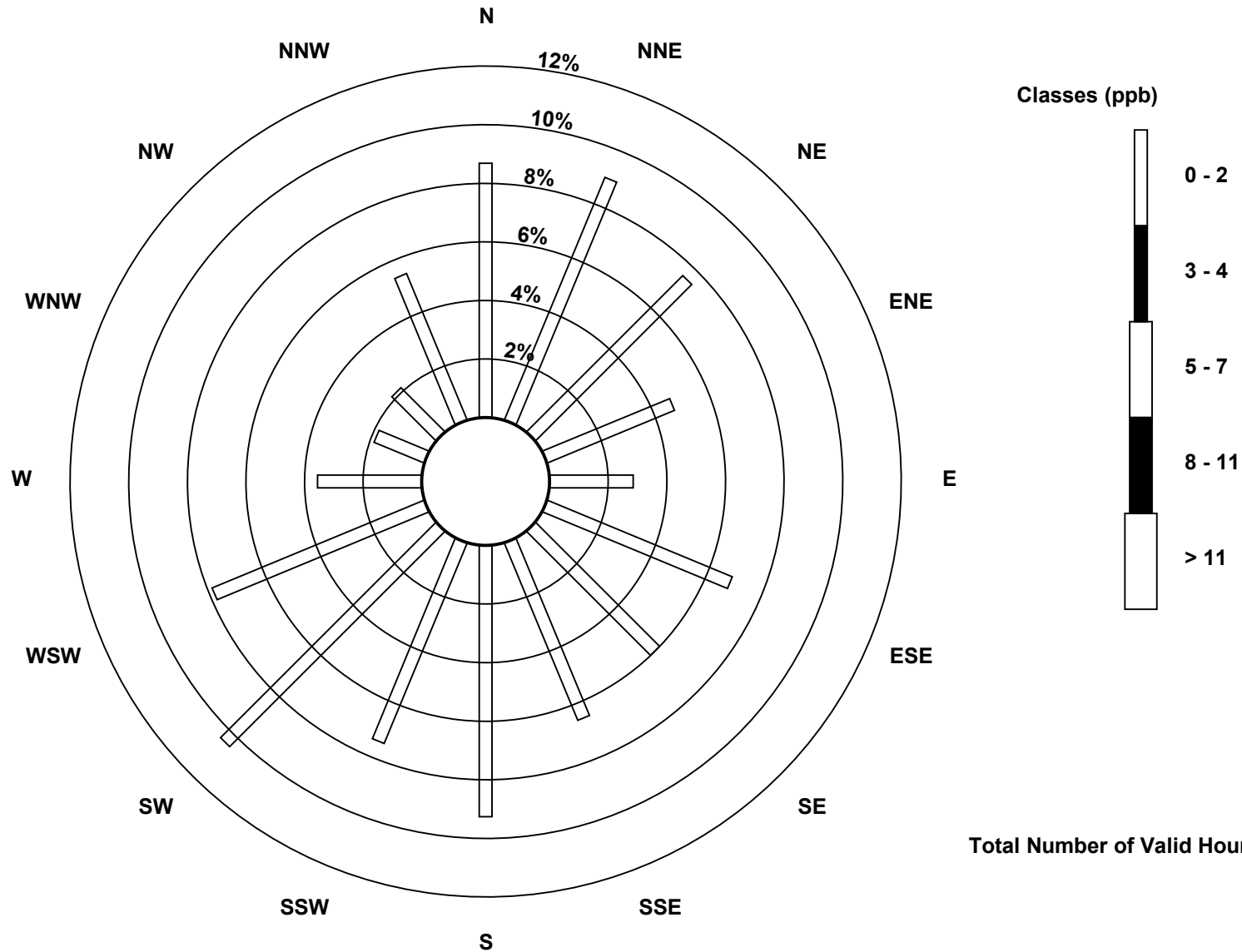
Total Number of Valid Hours: 702

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Hydrogen Sulphide (H₂S) - ppb
Firebag (AMS 19)

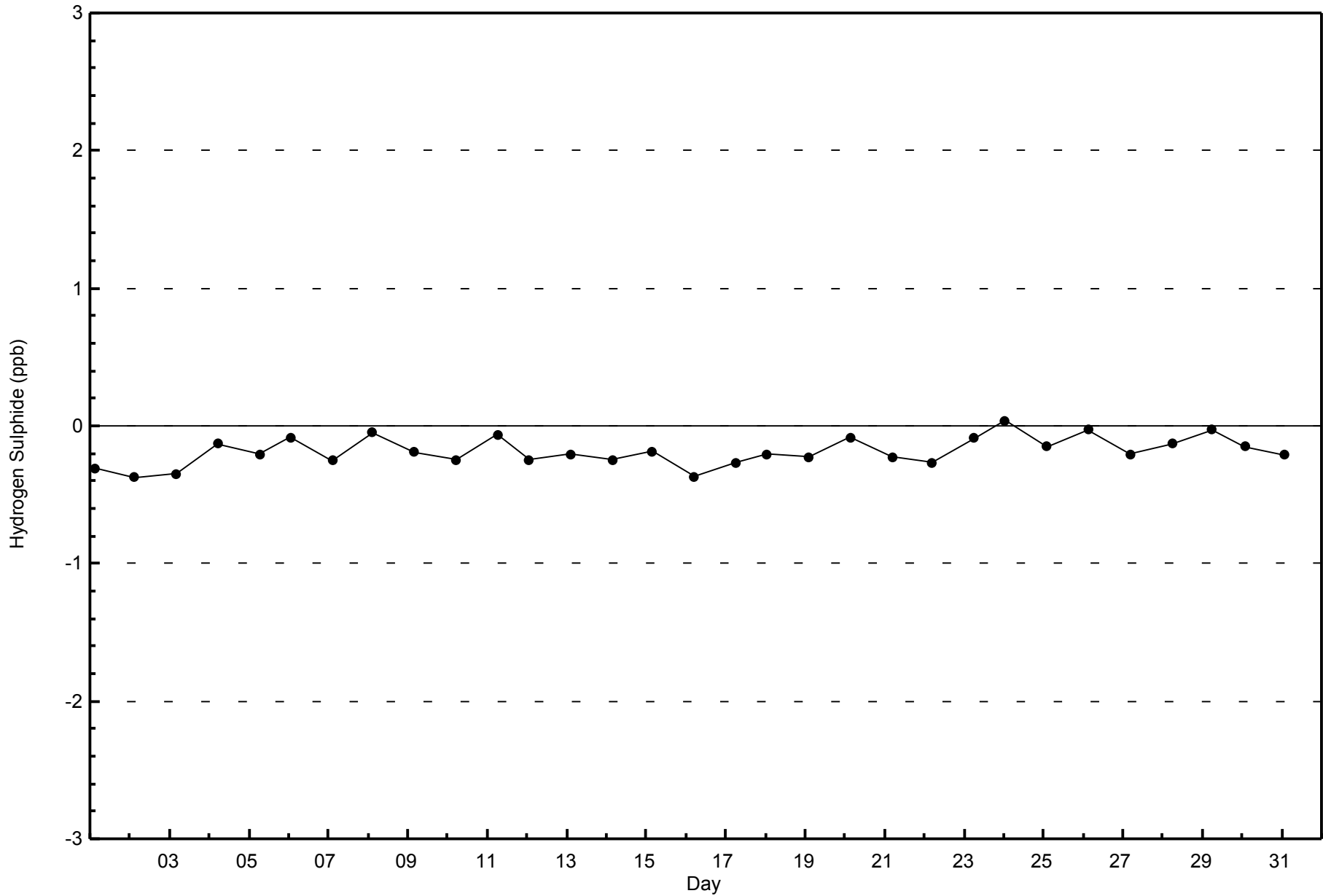


Total Number of Valid Hours: 702



WBEA
Zero Responses

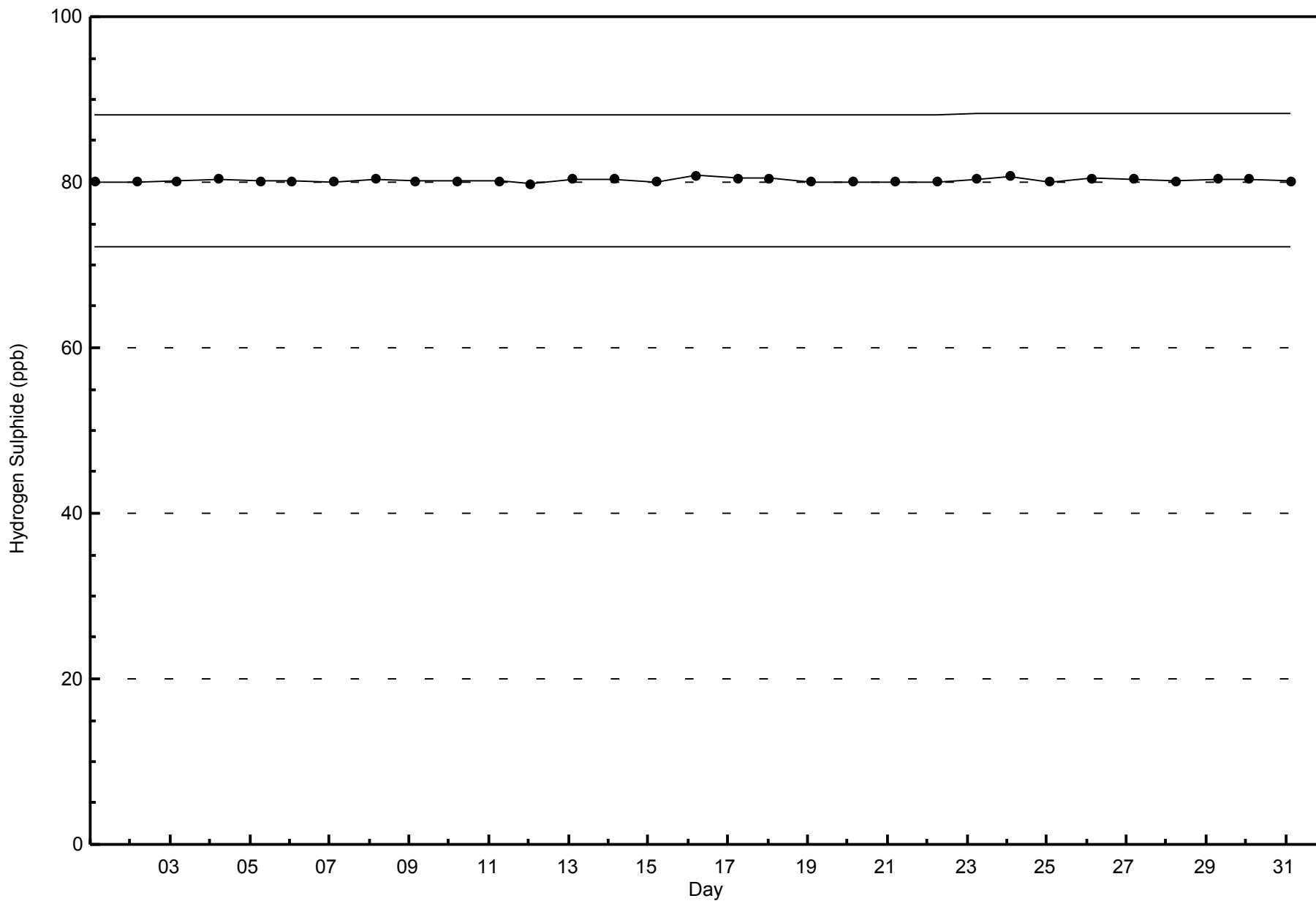
Hydrogen Sulphide (H₂S) - ppb
Firebag - May 2015





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
Firebag - May 2015



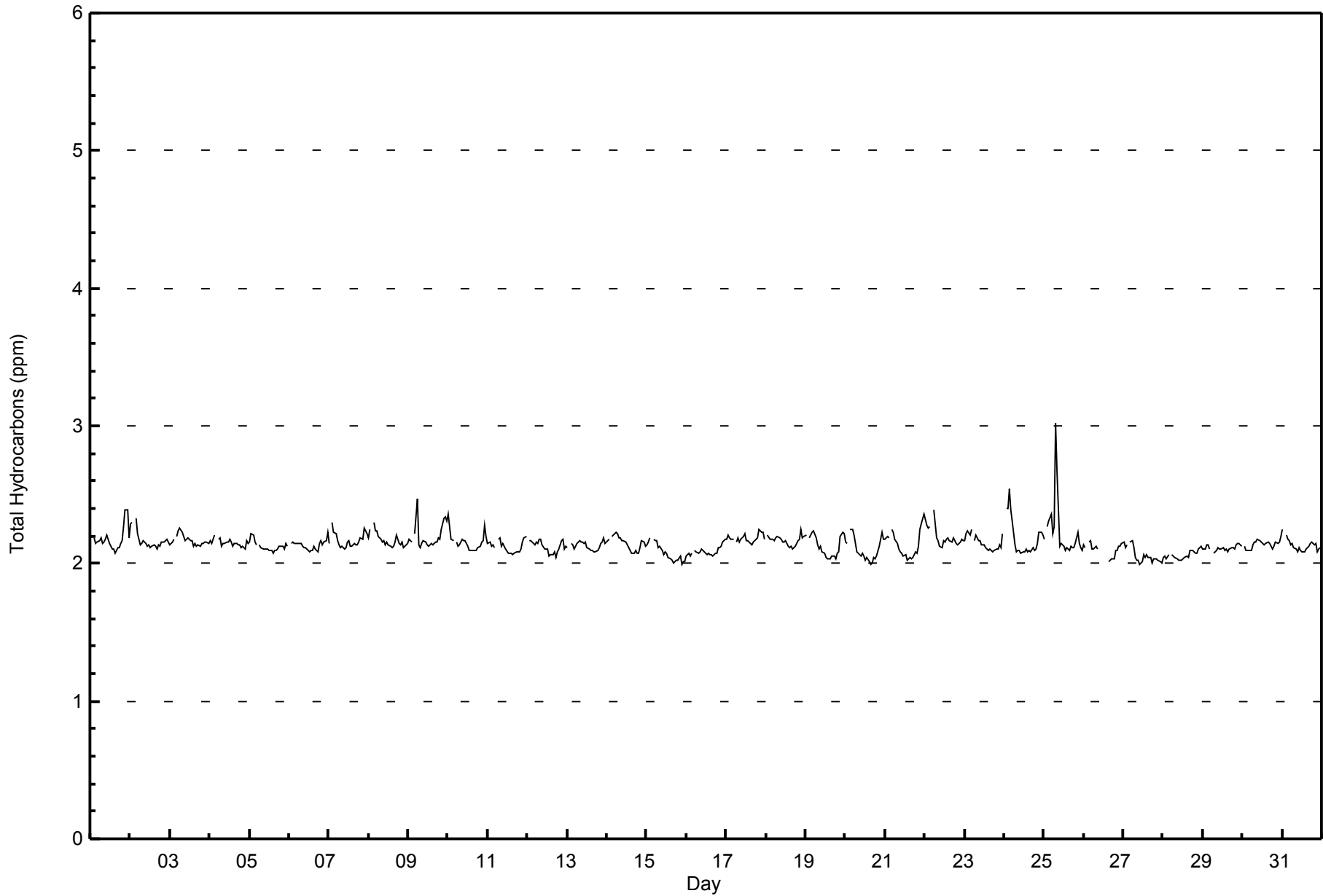


Maximum Value: 3.0 ppm on May 25 08:00																			Maximum Daily Average: 2.2 ppm on May 25						Hours in Service: 744	
Minimum Value: 2.0 ppm on May 27 11:00																			Minimum Daily Average: 2.1 ppm on May 27						Hours of Data: 707	
Maximum Diurnal Average: 2.2 ppm at hour 4																			Minimum Diurnal Average: 2.1 ppm at hour 16						Hours of Missing Data: 37	
Monthly Average: 2.14 ppm																			Percentiles: P ₁ = 2.0 P ₁₀ = 2.1 Q ₁ = 2.1 Median = 2.1 Q ₃ = 2.2 P ₉₀ = 2.2 P ₉₉ = 2.4						Hours of Calibration: 37	
																			Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	2.1	Z	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.4	2.2	2.2	2.4
2-May	2.3	2.3	Z	2.3	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3
3-May	2.1	2.2	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.3
4-May	2.2	2.1	2.2	2.2	Z	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	2.1	2.1	2.2
5-May	2.2	2.2	2.2	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	2.1	2.1	2.1	2.2
6-May	Z	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.2
7-May	2.1	Z	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3
8-May	2.2	2.2	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.2	2.3
9-May	2.2	2.2	2.2	Z	2.2	2.5	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	2.2	2.2	2.3	2.3	2.3	2.2	2.5
10-May	2.4	2.3	2.2	2.2	Z	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.2	2.2	2.4
11-May	2.1	2.2	2.1	2.1	2.1	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2
12-May	Z	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.2
13-May	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2
14-May	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2
15-May	2.1	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.2
16-May	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2
17-May	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
18-May	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2
19-May	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.2	2.2	2.2	2.1	2.2
20-May	2.2	2.1	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.1	2.2
21-May	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.3	2.4	2.1	2.4
22-May	2.3	2.3	2.3	2.3	Z	2.4	2.3	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.4
23-May	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2
24-May	Z	2.4	2.4	2.5	2.4	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.5
25-May	2.2	Z	2.3	2.3	2.4	2.2	2.3	3.0	2.7	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	3.0
26-May	2.1	2.1	Z	2.2	2.2	2.1	2.1	2.1	2.1	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	--	2.2
27-May	2.2	2.1	2.1	Z	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2
28-May	2.0	2.1	2.0	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
29-May	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
30-May	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.2
31-May	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan C - Calibration																										



WBEA
Hourly Averages

Total Hydrocarbons (THC) - ppm
Firebag - May 2015





WBEA
Cumulative Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - May 2015

Concentration Ranges (ppm)	Number of Hours	%	Cumulative %
0 - 2.0	60	8.49	8.49
2.1 - 3.0	647	91.51	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 744



WBEA
Frequency Distribution

Total Hydrocarbons (THC) - ppm
Firebag - May 2015

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	10	20	2	0	0	0	2	1	1	3	4	8	7	0	2	0	60
2.1 - 3.0	50	41	50	33	21	48	40	44	64	48	68	48	19	12	13	41	640
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	60	61	52	33	21	48	42	45	65	51	72	56	26	12	15	41	700

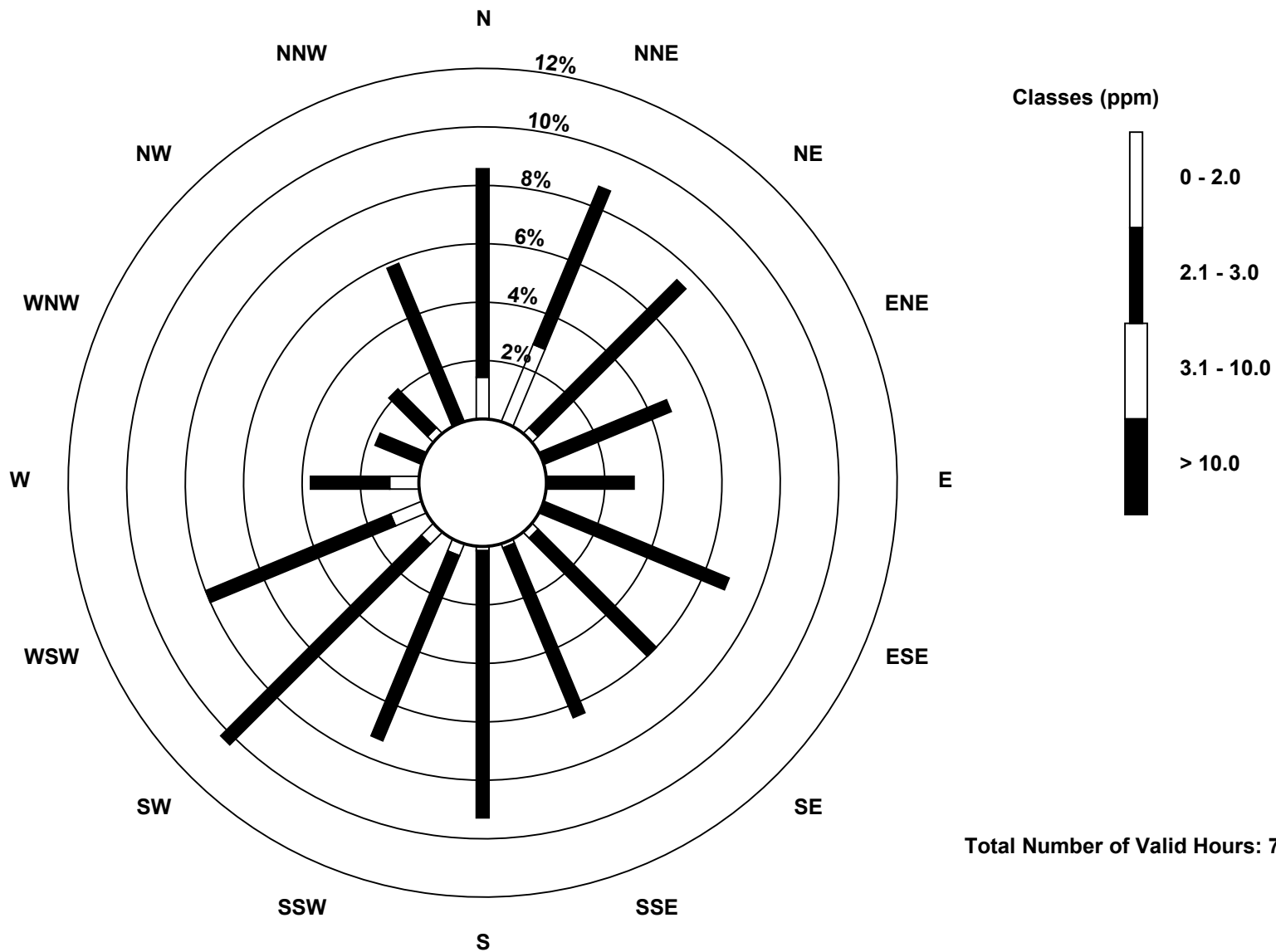
Total Number of Valid Hours: 700

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

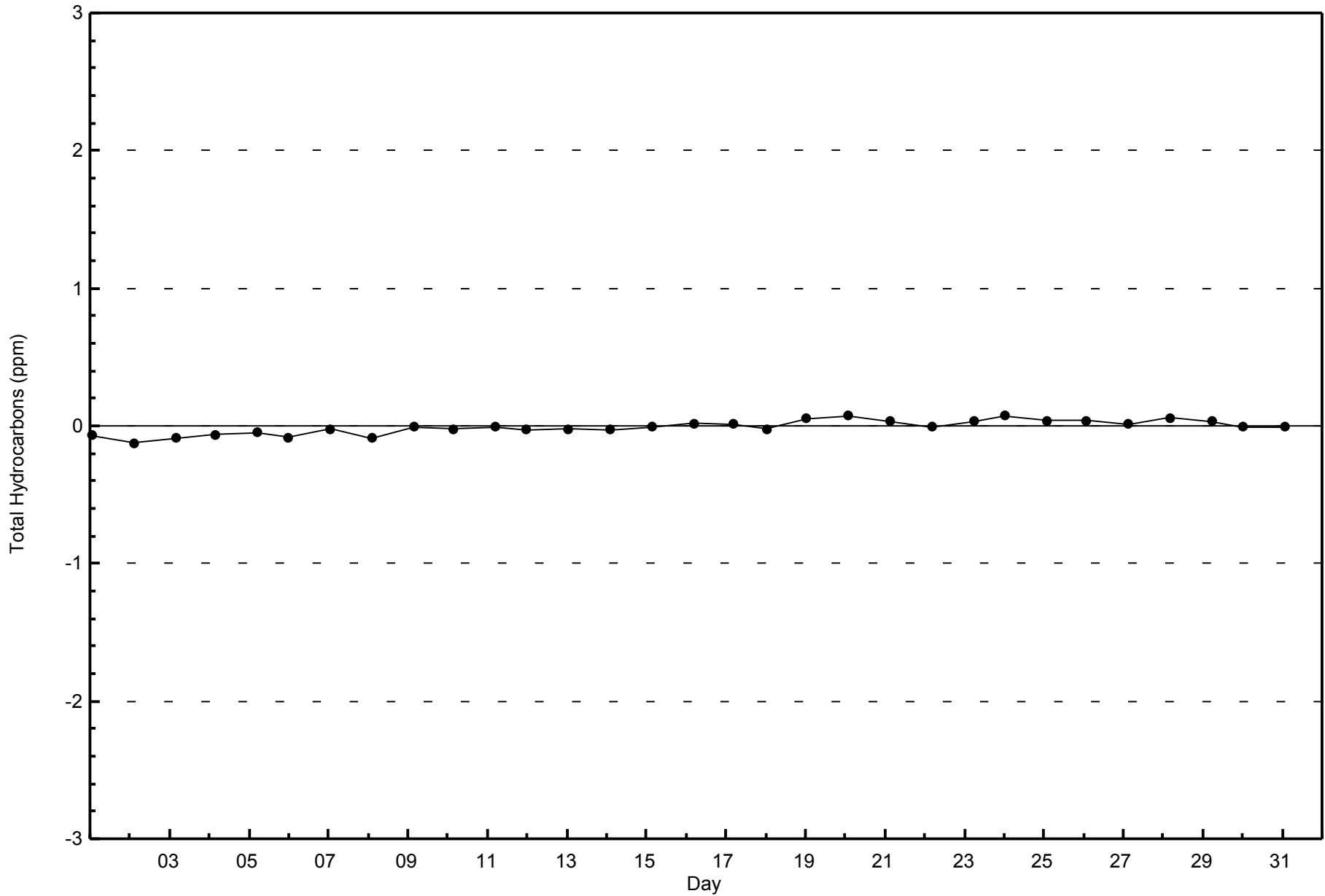
Total Hydrocarbons (THC) - ppm
Firebag (AMS 19)





WBEA
Zero Responses

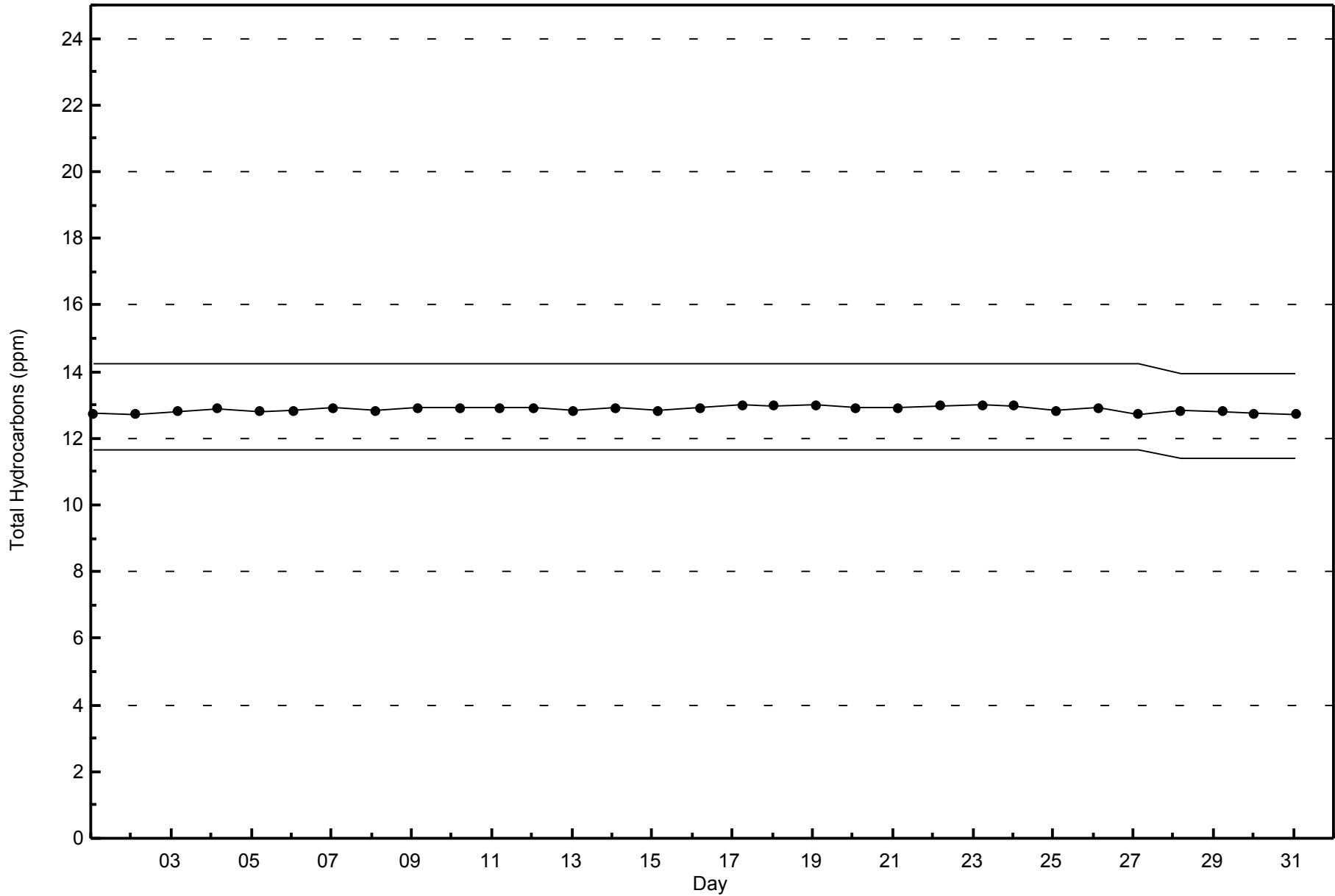
Total Hydrocarbons (THC) - ppm
Firebag - May 2015





WBEA
Span Responses

Total Hydrocarbons (THC) - ppm
Firebag - May 2015





Summary of Hour Averages

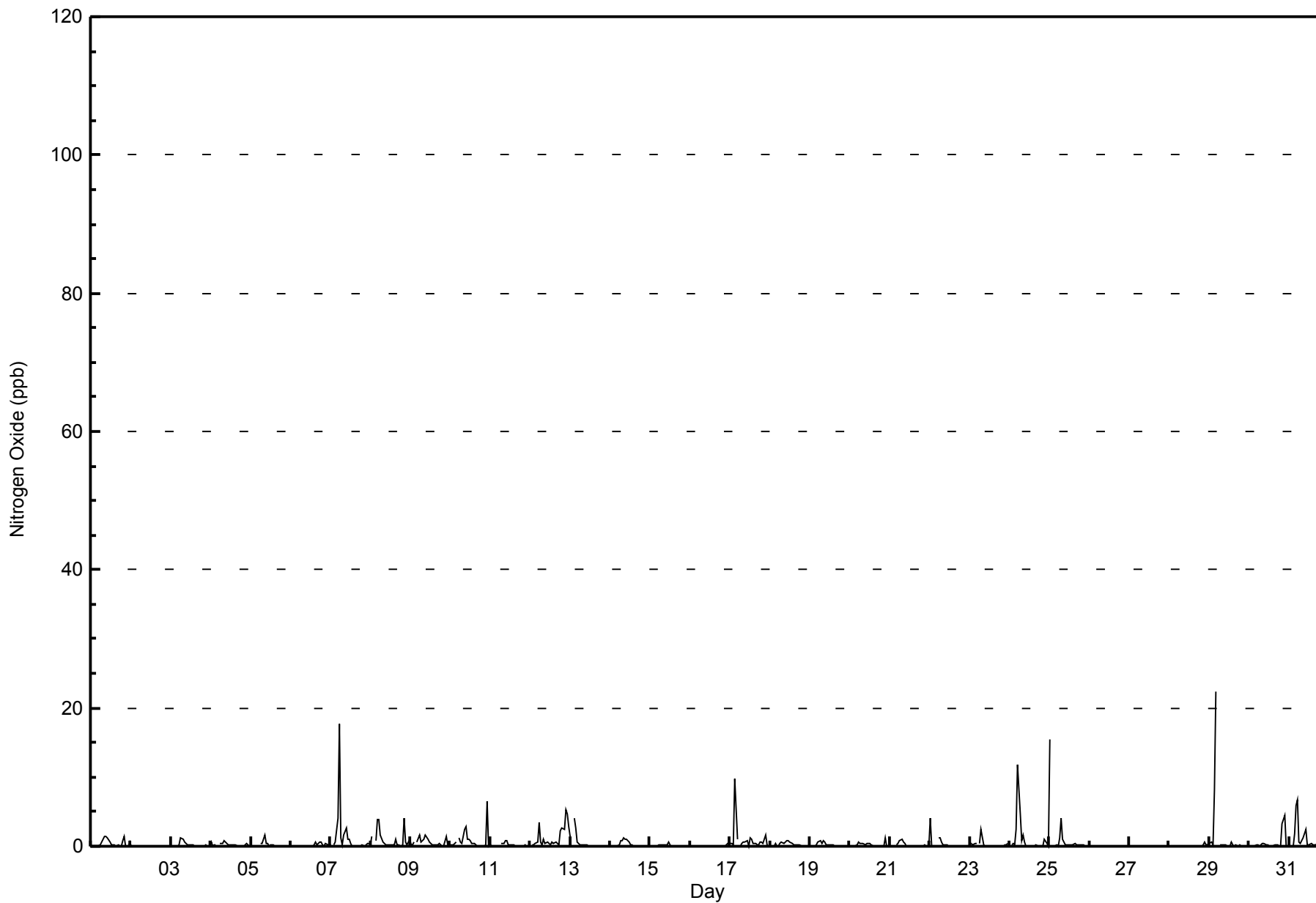
Firebag - May 2015

Maximum Value: 22 ppb on May 29 05:00														Maximum Daily Average: 1.5 ppb on May 29														Hours in Service: 744	
Minimum Value: 0 ppb on May 2 01:00														Minimum Daily Average: 0.0 ppb on May 2														Hours of Data: 684	
Maximum Diurnal Average: 2.1 ppb at hour 6														Minimum Diurnal Average: 0.1 ppb at hour 17														Hours of Missing Data: 60	
Monthly Average: 0.5 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 6														Hours of Calibration: 35	
																												Percent Operational Time: 96.6	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-May	0	Z	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	0	0	1	0.5	1			
2-May	0	0	Z	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-May	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
4-May	1	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
5-May	0	0	0	0	0	Z	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2			
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0.1	1			
7-May	0	Z	0	1	4	18	1	0	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.4	18			
8-May	0	1	Z	1	4	4	2	1	0	0	0	0	0	0	1	0	0	0	0	0	4	1	0	1	1.0	4			
9-May	0	0	1	Z	1	2	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0.5	2			
10-May	0	0	0	1	Z	1	1	0	2	3	1	1	1	0	0	0	0	0	0	0	0	0	7	0	0.9	7			
11-May	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
12-May	Z	0	0	0	1	3	1	0	1	0	1	0	0	1	0	1	0	0	2	3	2	5	5	3	1.3	5			
13-May	1	Z	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	4			
14-May	0	0	Z	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1			
15-May	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1			
16-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0	1			
17-May	0	0	0	10	1	Z	0	0	1	1	1	0	1	1	0	0	0	0	1	1	0	2	0	0	0.9	10			
18-May	Z	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1			
19-May	0	Z	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
20-May	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1			
21-May	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
22-May	4	0	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4			
23-May	0	0	0	0	0	Z	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2			
24-May	Z	0	0	0	3	12	5	1	2	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1.1	12			
25-May	15	Z	0	0	0	0	1	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	15			
26-May	0	0	Z	0	0	0	0	0	0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	0			
27-May	M	M	M	M	M	M	M	M	M	M	C	C	C	C	C	C	C	C	C	C	C	C	C	C	--	0			
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1	1			
29-May	0	1	0	8	22	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1.5	22			
30-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	0	0	0.5	5			
31-May	0	Z	0	2	6	7	1	0	1	2	2	0	0	1	0	0	0	0	0	0	0	0	0	0	1.0	7			
0.9 0.2 0.3 1.0 1.7 2.1 0.7 0.6 0.7 0.7 0.5 0.3 0.2 0.2 0.1 0.2 0.1 0.1 0.2 0.2 0.4 0.6 0.5 0.2																								Diurnal Average					
15 1 4 10 22 18 5 4 2 3 2 1 1 1 0 1 0 1 2 3 4 5 7 3																								Diurnal Maximum					
Z - zerospan			C - Calibration			M - Maintenance																							



WBEA
Hourly Averages

Nitrogen Oxide (NO) - ppb
Firebag - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
Firebag - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	683	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: 684

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxide (NO) - ppb
Firebag - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	57	58	49	33	20	48	39	38	64	50	72	56	26	12	14	40	676
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	57	58	49	33	20	48	39	39	64	50	72	56	26	12	14	40	677

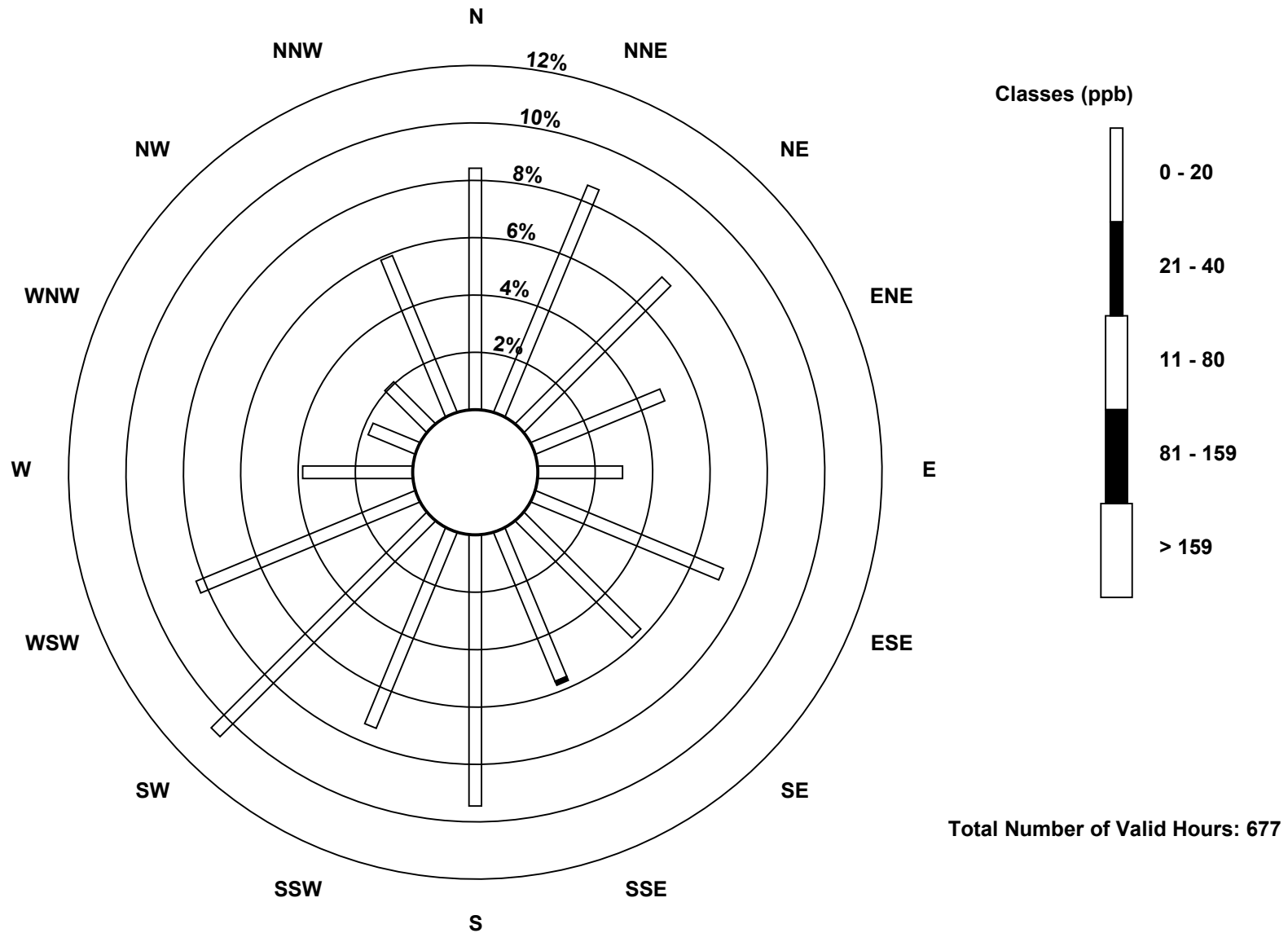
Total Number of Valid Hours: 677

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

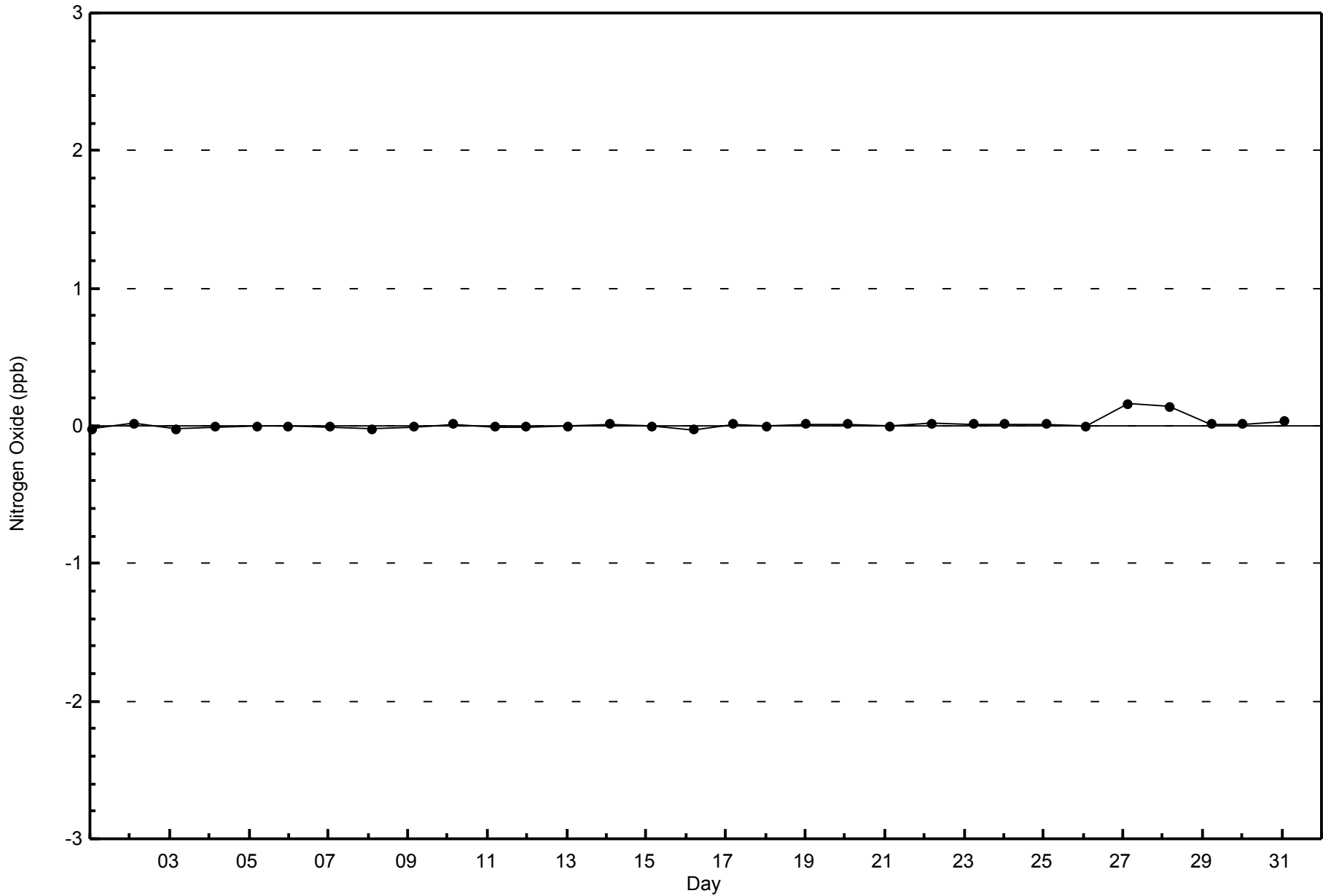
Nitrogen Oxide (NO) - ppb
Firebag (AMS 19)





WBEA
Zero Responses

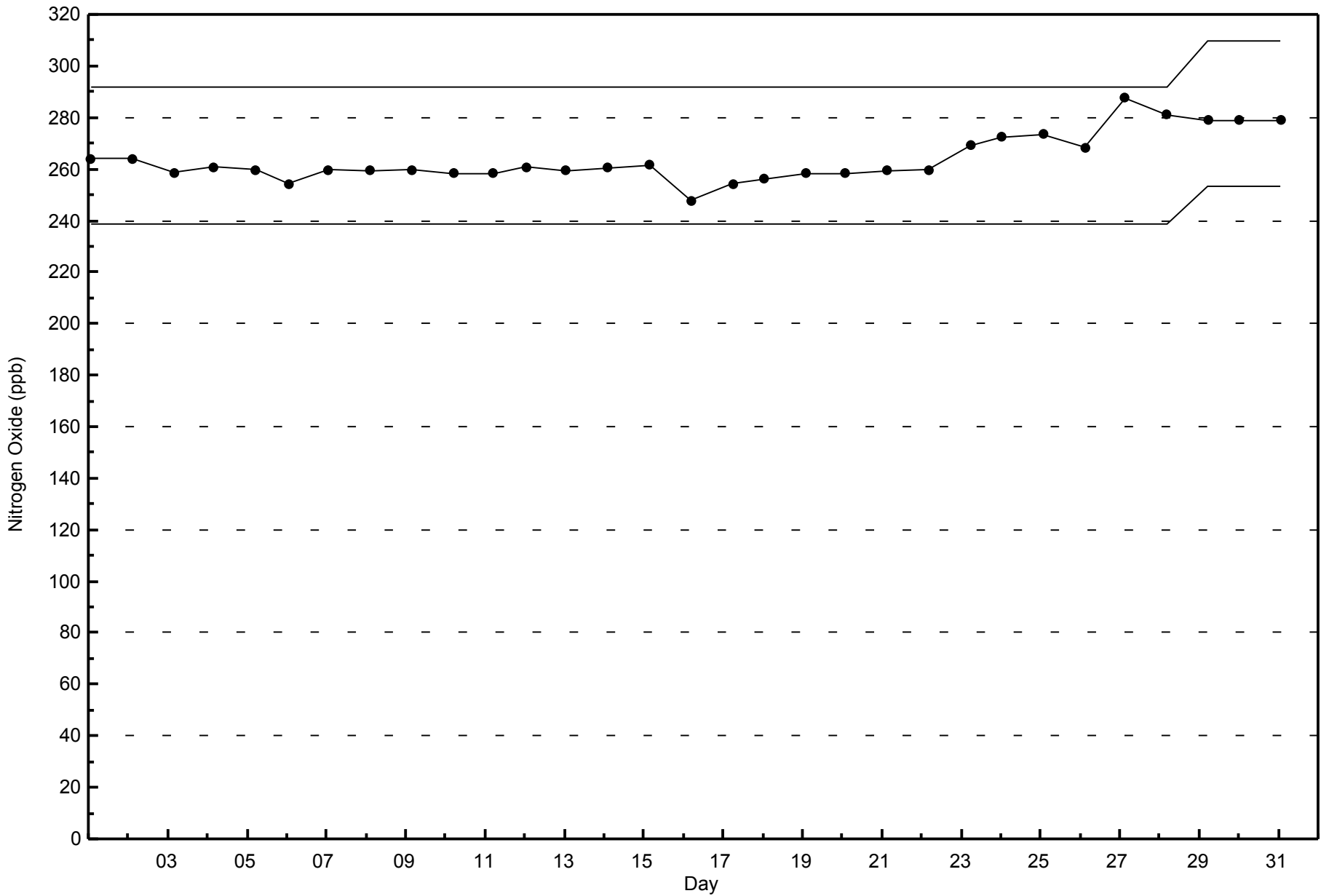
Nitrogen Oxide (NO) - ppb
Firebag - May 2015





WBEA
Span Responses

Nitrogen Oxide (NO) - ppb
Firebag - May 2015





Summary of Hour Averages

Firebag - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 32 ppb on May 25 01:00	Maximum Daily Average: 5.8 ppb on May 8
Minimum Value: 0 ppb on May 3 01:00	Hours of Data: 684
Maximum Diurnal Average: 6.5 ppb at hour 6	Hours of Missing Data: 60
Monthly Average: 2.6 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.4 ppb on May 16	Percent Operational Time: 96.6
Minimum Diurnal Average: 1.0 ppb at hour 15	
Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 3 P ₉₀ = 6 P ₉₉ = 18	

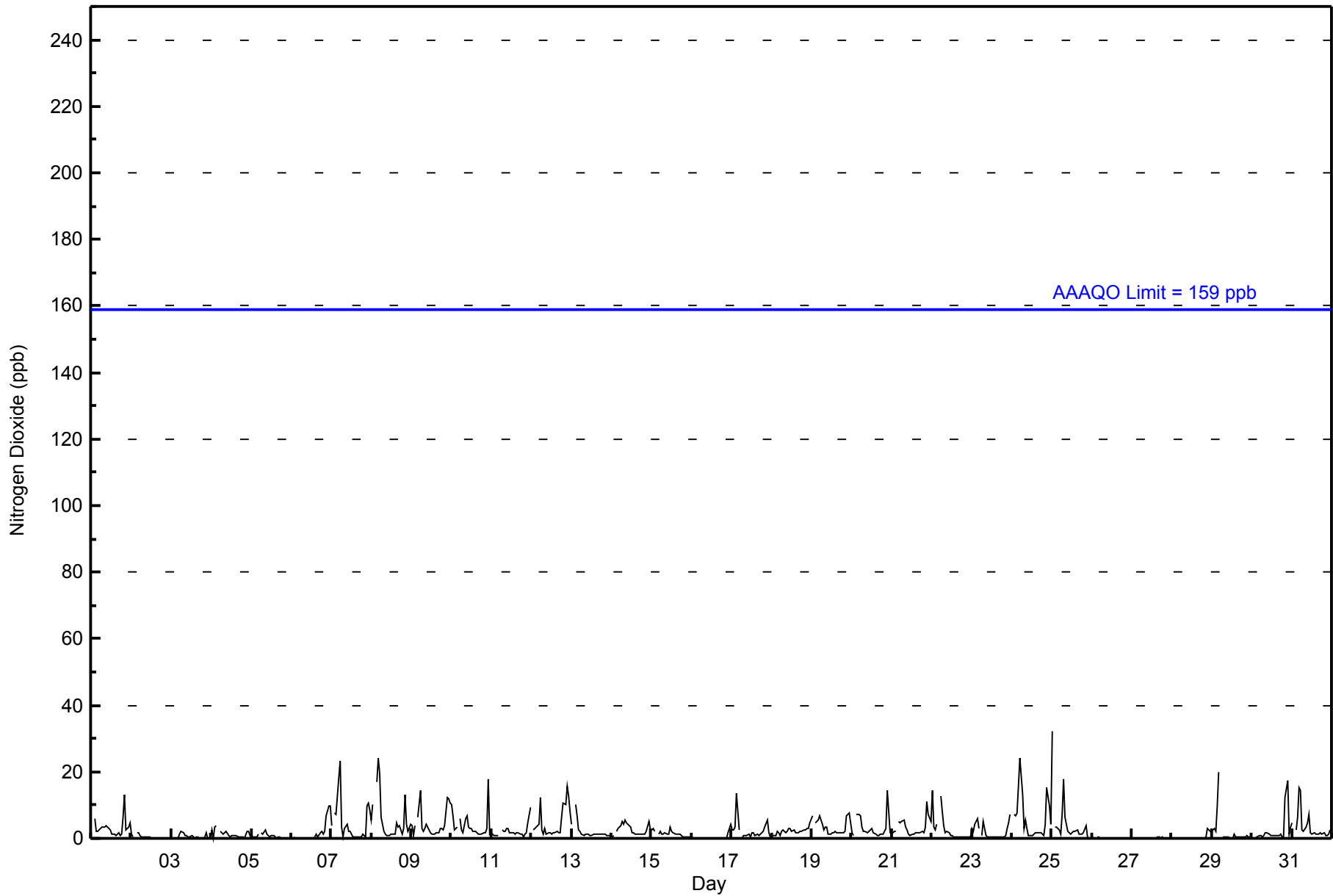
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	1	Z	6	2	2	3	4	3	4	4	4	2	1	1	1	1	2	1	1	6	13	3	3	5	3.2	13	
2-May	1	1	Z	2	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
3-May	0	0	0	Z	0	1	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	2	0	0	0.6	2	
4-May	2	0	4	4	Z	2	2	1	2	2	1	1	1	1	1	1	1	0	0	1	0	2	2	1	1.3	4	
5-May	1	1	1	1	1	Z	2	1	3	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0.7	3	
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	2	7	10	10	1.7	10	
7-May	4	Z	8	7	18	23	4	1	3	4	2	2	1	1	1	0	0	0	0	1	1	10	11	9	4.8	23	
8-May	6	10	Z	17	24	19	6	2	1	1	1	1	1	1	1	5	4	4	1	3	13	4	2	4	5.8	24	
9-May	4	1	4	Z	6	14	3	2	3	4	3	2	1	1	1	2	2	3	3	2	4	12	12	11	4.4	14	
10-May	10	7	2	3	Z	6	2	2	6	7	3	3	3	2	2	2	1	1	1	2	2	3	18	1	3.9	18	
11-May	2	1	1	1	1	Z	3	2	2	3	3	2	2	2	1	2	2	1	1	1	1	2	5	10	2.1	10	
12-May	Z	3	3	3	4	12	2	1	3	1	2	2	1	2	2	2	2	2	6	10	10	16	13	8	4.8	16	
13-May	4	Z	10	7	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2.0	10	
14-May	1	1	Z	2	3	4	5	4	5	4	4	2	2	2	1	1	1	1	1	1	1	2	5	3	2.6	5	
15-May	3	3	2	Z	1	2	1	1	2	1	1	3	2	2	2	1	1	1	1	1	1	0	0	0	1.4	3	
16-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0.4	4	
17-May	3	3	4	14	2	Z	0	1	1	1	1	0	2	2	1	1	1	1	2	2	3	6	2	1	2.2	14	
18-May	Z	1	1	2	2	1	2	3	2	2	3	3	2	2	2	2	2	2	2	2	2	3	3	3	5	2.2	5
19-May	7	Z	5	5	6	7	4	3	3	3	1	1	2	2	2	2	2	2	2	2	2	7	8	5	3.5	8	
20-May	2	1	Z	7	7	7	4	2	2	2	2	3	3	2	1	1	1	1	1	1	3	14	8	2	3.3	14	
21-May	1	2	2	Z	5	5	5	5	3	3	1	1	1	1	2	2	2	2	2	2	4	11	7	5	3.2	11	
22-May	15	4	3	4	Z	13	8	4	2	2	2	1	1	1	1	1	1	1	1	0	1	1	0	1	2.7	15	
23-May	3	2	4	6	3	Z	1	5	1	0	0	0	0	0	0	0	0	0	0	0	1	3	5	7	1.9	7	
24-May	Z	7	7	8	16	24	13	3	5	3	1	1	1	2	2	2	2	2	1	1	4	15	10	4	5.7	24	
25-May	32	Z	4	3	3	1	7	18	6	2	2	1	2	2	2	3	1	1	1	2	4	0	0	0	4.3	32	
26-May	0	0	Z	0	0	0	0	0	0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	0	
27-May	M	M	M	M	M	M	M	M	M	M	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0	
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	3	2	0.4	3	
29-May	2	3	2	10	20	Z	0	0	0	0	0	0	0	1	1	0	0	0	1	0	1	1	1	0	1.9	20	
30-May	Z	0	0	0	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	0	12	17	1	3	2.2	17
31-May	5	Z	3	7	15	14	3	2	3	5	7	2	1	2	1	1	1	2	1	2	1	1	1	2	3.6	15	
4.3 2.1 3.0 4.4 5.8 6.5 2.9 2.4 2.2 2.1 1.7 1.3 1.2 1.2 1.0 1.1 1.1 1.2 1.2 1.5 2.9 4.9 4.4 3.5																								Diurnal Average			
32 10 10 17 24 24 13 18 6 7 7 4 3 2 2 5 4 4 4 6 10 13 17 18 11																								Diurnal Maximum			

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Firebag - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Firebag - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	680	99.42	99.42
21 - 40	4	0.58	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: 684

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
Firebag - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	57	58	49	33	20	48	38	37	64	50	72	56	26	12	14	40	674
21 - 40	0	0	0	0	0	0	1	2	0	0	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	57	58	49	33	20	48	39	39	64	50	72	56	26	12	14	40	677

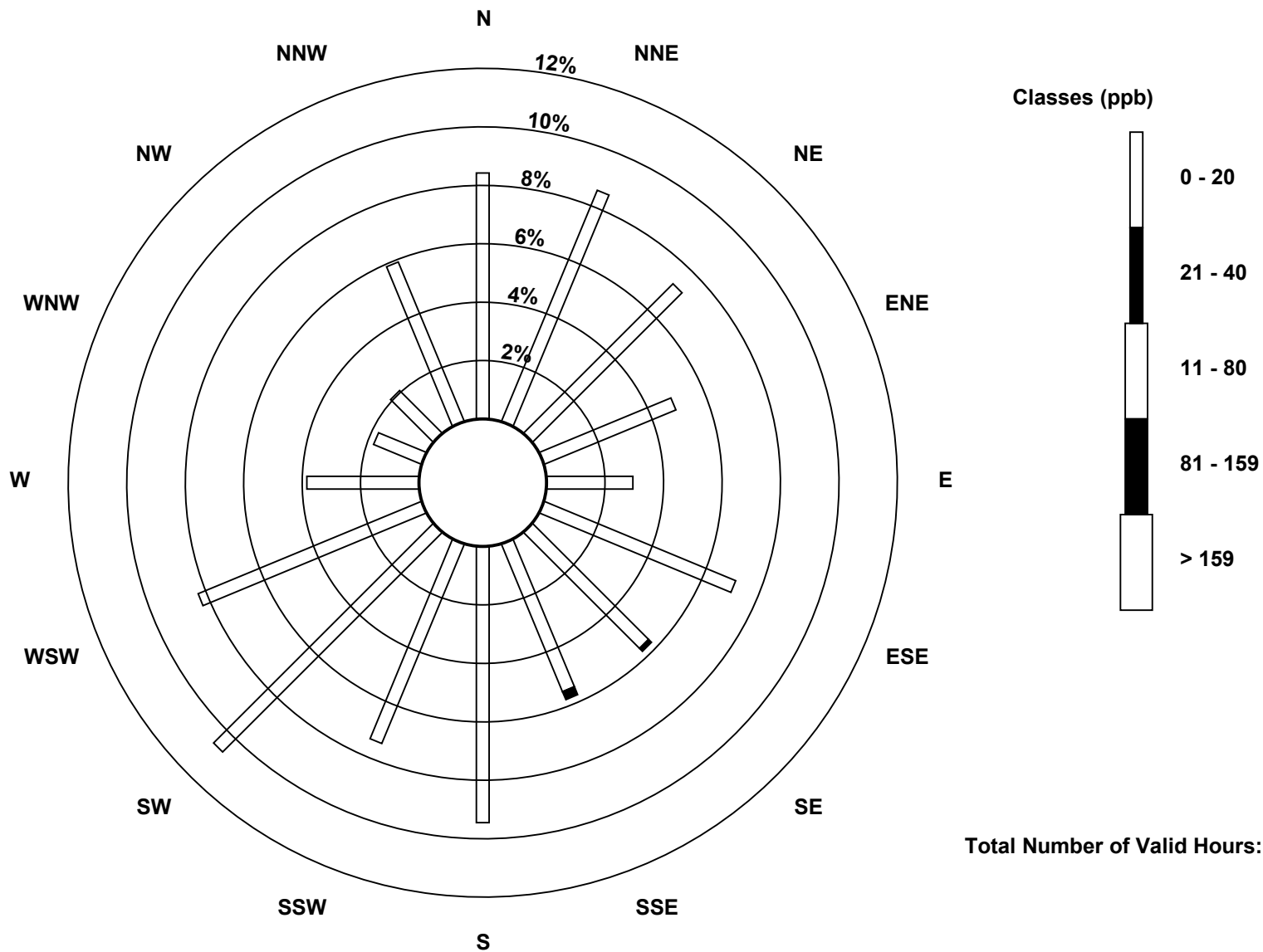
Total Number of Valid Hours: 677

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

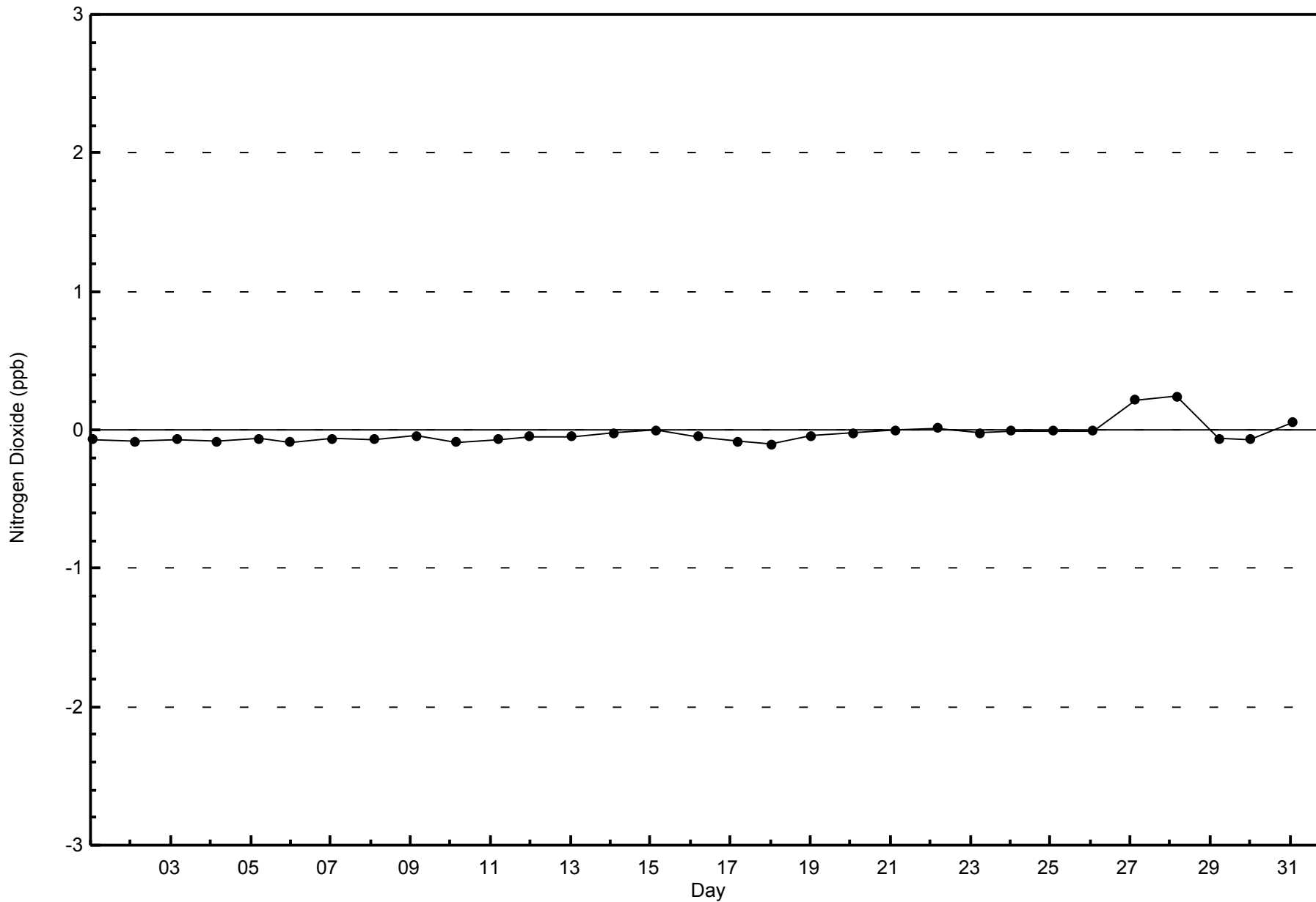
Nitrogen Dioxide (NO₂) - ppb
Firebag (AMS 19)





WBEA
Zero Responses

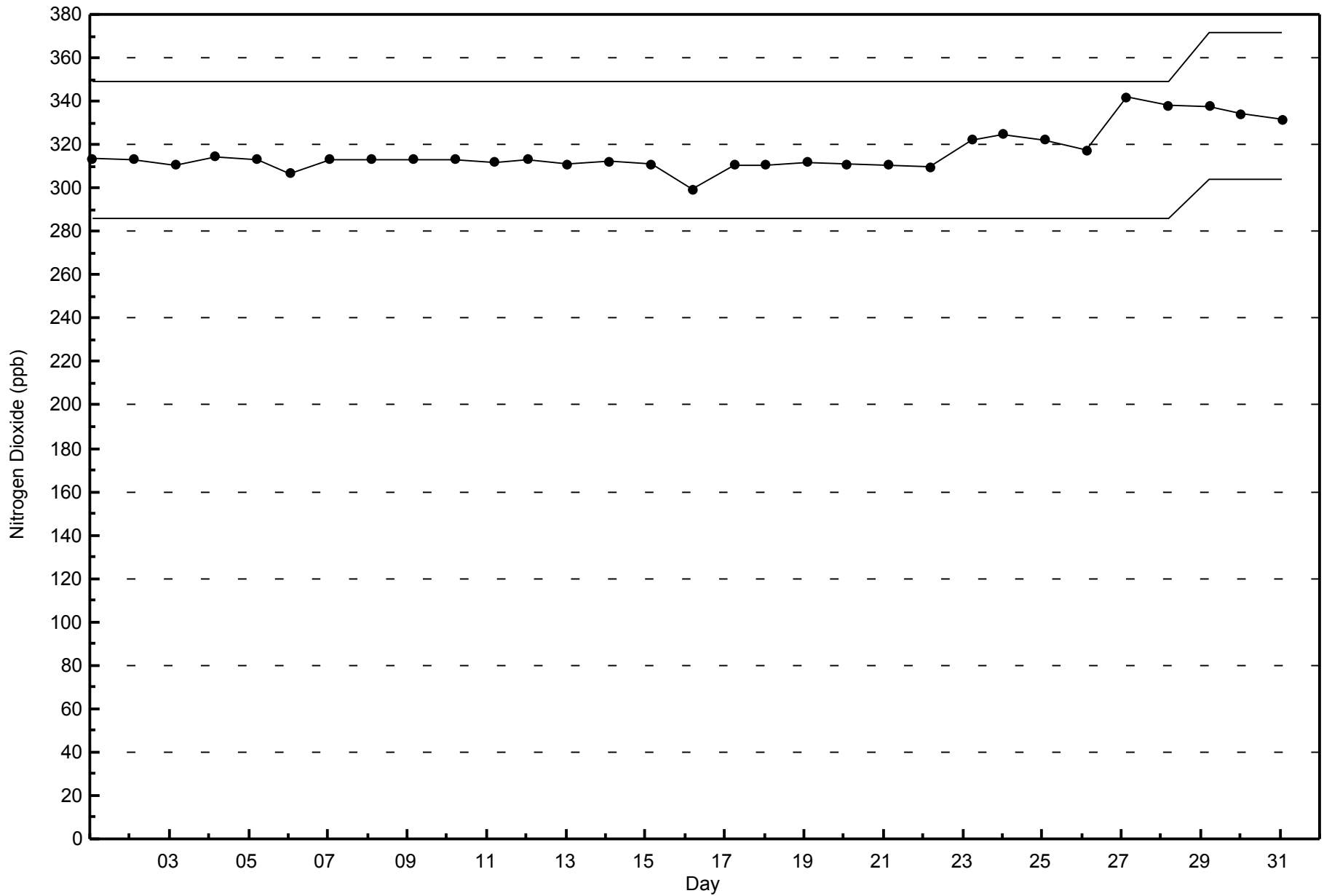
Nitrogen Dioxide (NO₂) - ppb
Firebag - May 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
Firebag - May 2015



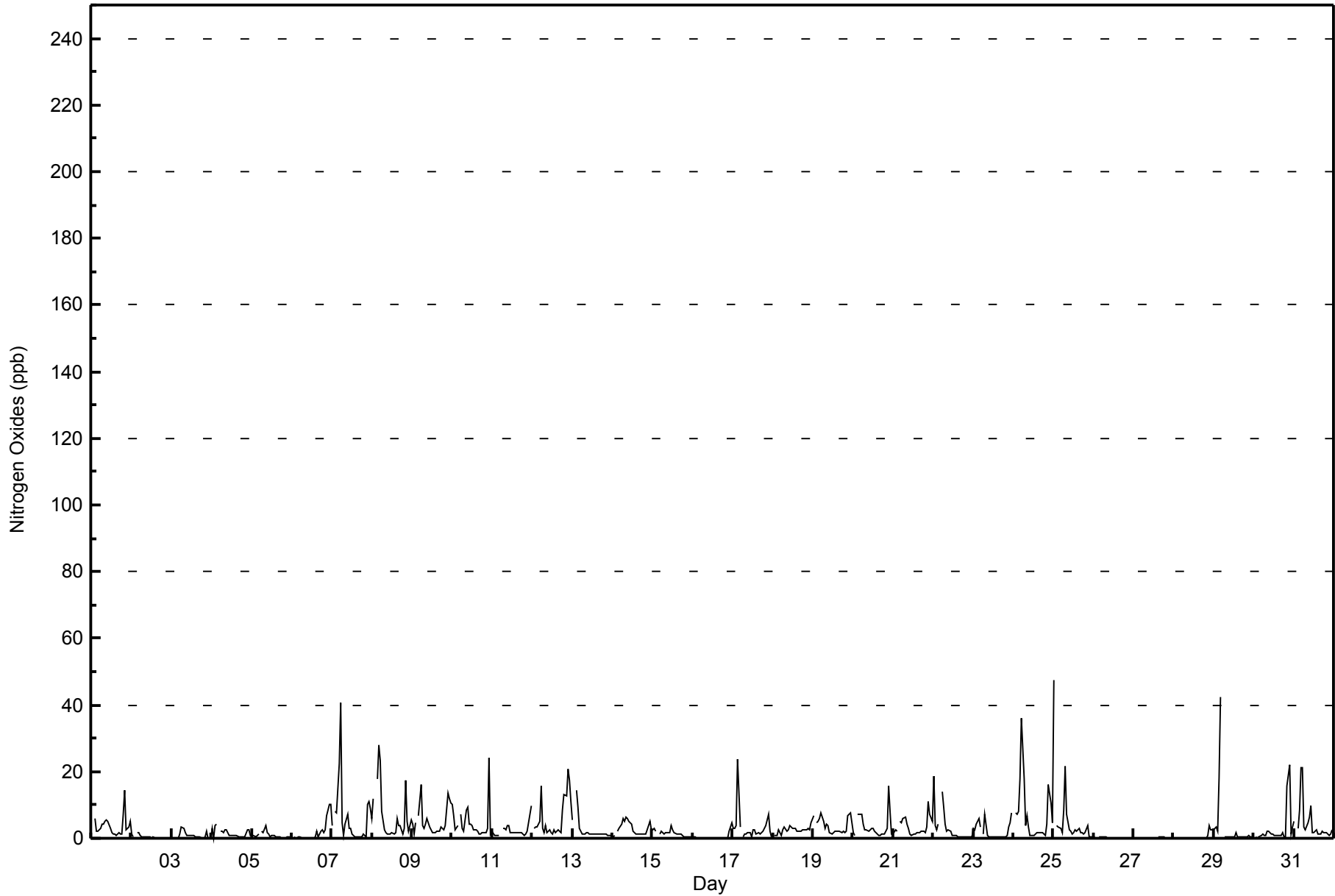


Maximum Value: 48 ppb on May 25 01:00														Maximum Daily Average: 6.8 ppb on May 24										Hours in Service: 744			
Minimum Value: 0 ppb on May 28 09:00														Minimum Daily Average: 0.4 ppb on May 16										Hours of Data: 684			
Maximum Diurnal Average: 8.6 ppb at hour 6														Minimum Diurnal Average: 1.2 ppb at hour 15										Hours of Missing Data: 60			
Monthly Average: 3.1 ppb														Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 7 P ₉₉ = 23										Hours of Calibration: 35			
																								Percent Operational Time: 96.6			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-May	1	Z	6	2	2	3	4	4	5	5	5	3	1	1	1	1	2	1	1	7	15	3	3	5	3.6	15	
2-May	1	1	Z	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2	
3-May	0	0	0	Z	0	1	3	3	1	1	1	1	1	1	0	0	0	0	0	0	0	2	0	0	0.8	3	
4-May	3	0	4	4	Z	2	2	2	2	3	1	1	1	1	1	1	1	0	0	1	0	3	3	1	1.5	4	
5-May	1	1	1	1	1	Z	2	2	4	2	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0.8	4	
6-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	2	3	2	2	7	10	10	1.8	10	
7-May	4	Z	8	8	23	41	5	1	4	7	3	3	1	1	0	0	0	0	0	1	1	10	11	9	6.2	41	
8-May	6	12	Z	18	28	23	8	3	2	1	1	1	2	1	2	6	4	4	1	3	17	5	2	5	6.7	28	
9-May	4	1	5	Z	7	16	4	3	4	6	4	2	2	2	2	2	2	3	3	2	4	14	12	11	4.9	16	
10-May	10	7	3	4	Z	7	3	2	8	9	4	4	4	2	2	2	1	1	1	2	2	3	24	1	4.7	24	
11-May	2	1	1	1	1	Z	3	3	3	4	4	2	2	2	1	2	2	2	1	1	1	2	5	10	2.3	10	
12-May	Z	3	3	4	5	16	3	2	4	2	2	2	1	2	2	3	2	2	9	13	13	21	17	11	6.1	21	
13-May	6	Z	14	10	3	2	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2.4	14	
14-May	1	1	Z	2	3	4	6	5	7	6	5	4	2	2	1	1	1	1	1	1	1	2	5	3	2.9	7	
15-May	3	3	2	Z	1	2	2	1	2	2	2	4	3	2	2	1	1	1	1	1	0	0	0	0	1.5	4	
16-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	0.4	5	
17-May	3	3	4	24	4	Z	0	1	1	2	2	0	3	2	1	2	1	2	2	3	4	7	2	1	3.2	24	
18-May	Z	1	1	3	2	1	2	3	2	3	4	3	3	3	2	2	2	2	2	3	3	3	3	5	2.4	5	
19-May	7	Z	5	5	6	7	5	3	4	4	2	1	2	2	2	2	2	2	2	2	2	7	7	5	3.7	7	
20-May	2	1	Z	7	7	7	4	3	3	2	3	3	3	2	1	1	1	1	1	1	3	16	8	1	3.5	16	
21-May	1	2	2	Z	5	5	6	6	4	3	1	1	1	1	2	2	2	2	2	2	3	11	7	5	3.4	11	
22-May	19	4	3	4	Z	14	10	4	2	2	2	1	1	1	1	1	1	1	0	0	0	0	0	0	3.1	19	
23-May	3	3	4	6	3	Z	1	7	1	0	0	0	0	0	0	0	0	0	0	0	1	3	5	8	2.1	8	
24-May	Z	8	7	8	18	36	18	4	7	4	1	1	1	1	2	2	2	2	1	1	4	16	10	4	6.8	36	
25-May	48	Z	4	3	3	2	8	22	7	2	2	1	2	2	2	3	1	2	1	2	4	0	0	0	5.3	48	
26-May	0	0	Z	0	0	0	0	0	0	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	--	0	
27-May	M	M	M	M	M	M	M	M	M	M	C	C	C	C	C	1	0	0	0	0	0	0	0	0	--	1	
28-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	3	3	0.5	4	
29-May	3	3	2	18	42	Z	0	0	1	0	1	0	0	2	1	0	1	0	1	0	1	1	1	0	3.4	42	
30-May	Z	0	0	0	1	1	1	1	2	2	1	1	1	1	1	1	1	1	2	0	0	16	22	1	3	2.6	22
31-May	5	Z	3	8	21	21	3	2	5	6	10	2	2	2	1	1	1	1	2	2	2	1	1	1	2	4.6	21
														5.2 2.3 3.2 5.4 7.5 8.6 3.5 3.0 2.9 2.8 2.2 1.6 1.4 1.4 1.2 1.3 1.2 1.3 1.3 1.3 1.7 3.4 5.5 4.8 3.7										Diurnal Average			
														48 12 14 24 42 41 18 22 8 9 10 4 4 3 2 6 4 4 4 9 13 17 22 24 11										Diurnal Maximum			
Z - zerospan			C - Calibration			M - Maintenance																					



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
Firebag - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Firebag - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	670	97.95	97.95
21 - 40	11	1.61	99.56
41 - 80	3	0.44	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 744



WBEA
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
Firebag - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	57	58	49	33	20	48	36	31	64	50	72	56	26	11	14	40	665
21 - 40	0	0	0	0	0	0	3	6	0	0	0	0	0	1	0	0	10
11 - 80	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	57	58	49	33	20	48	39	39	64	50	72	56	26	12	14	40	677

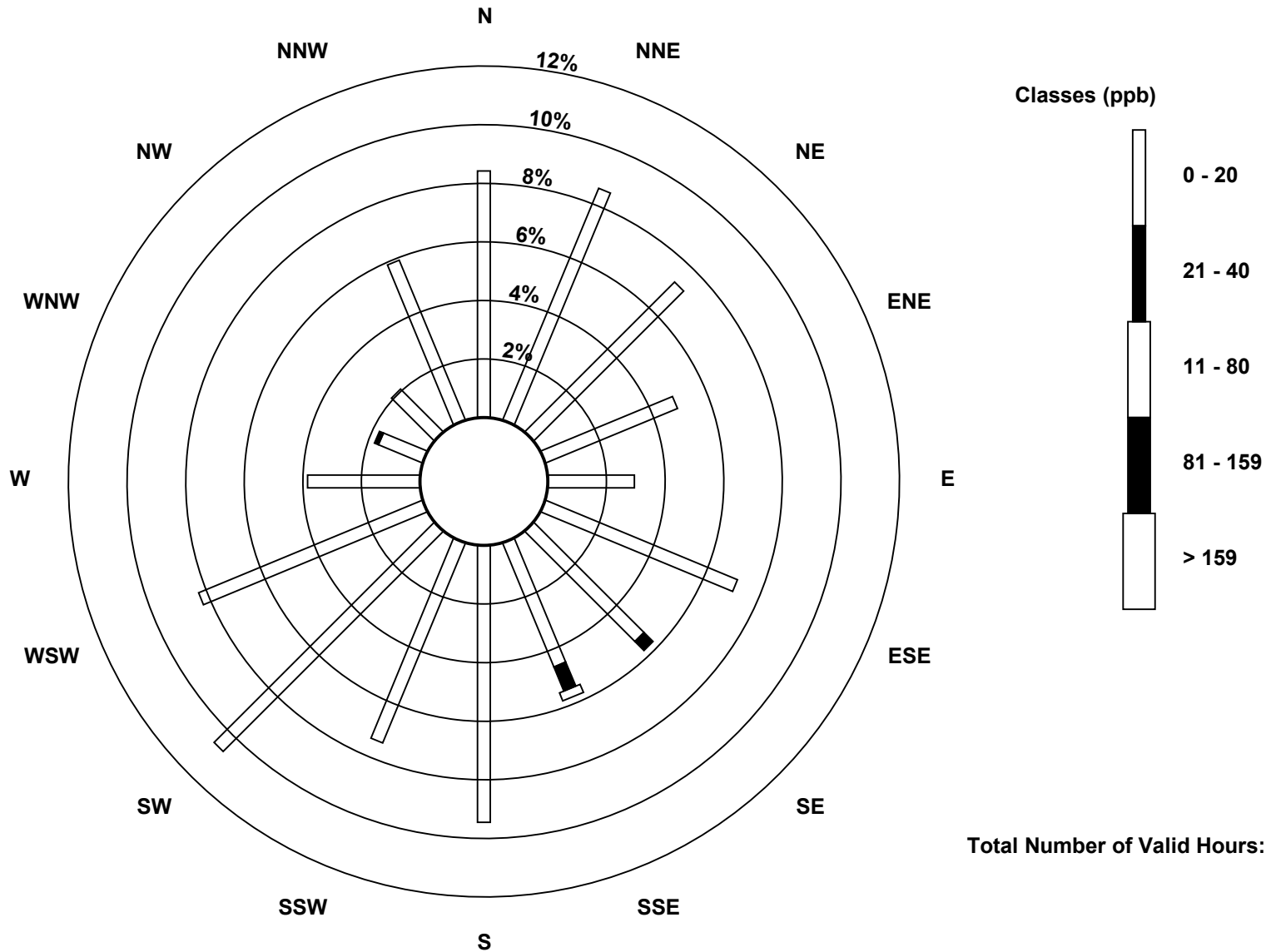
Total Number of Valid Hours: 677

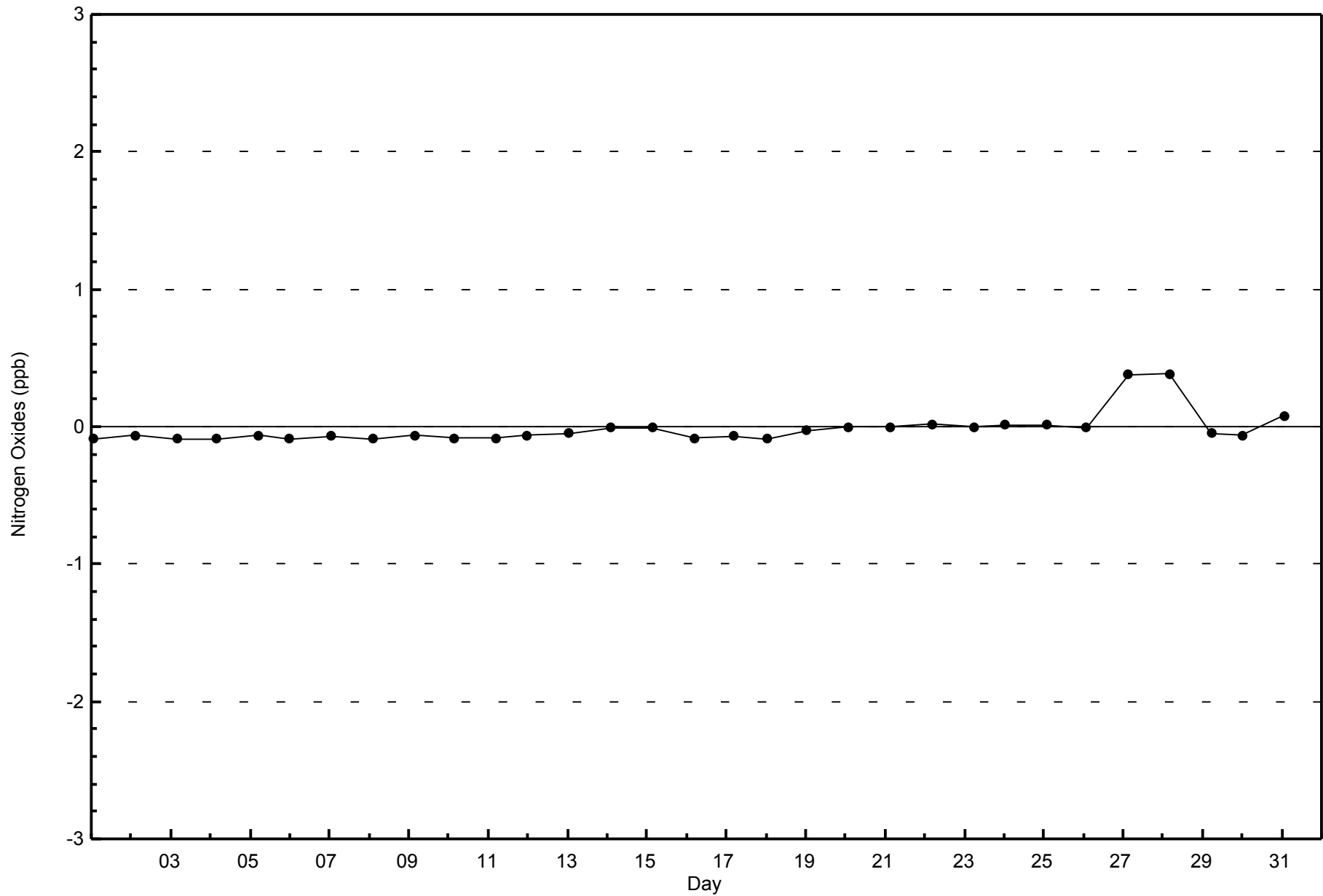
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Nitrogen Oxides (NO_x) - ppb
Firebag (AMS 19)

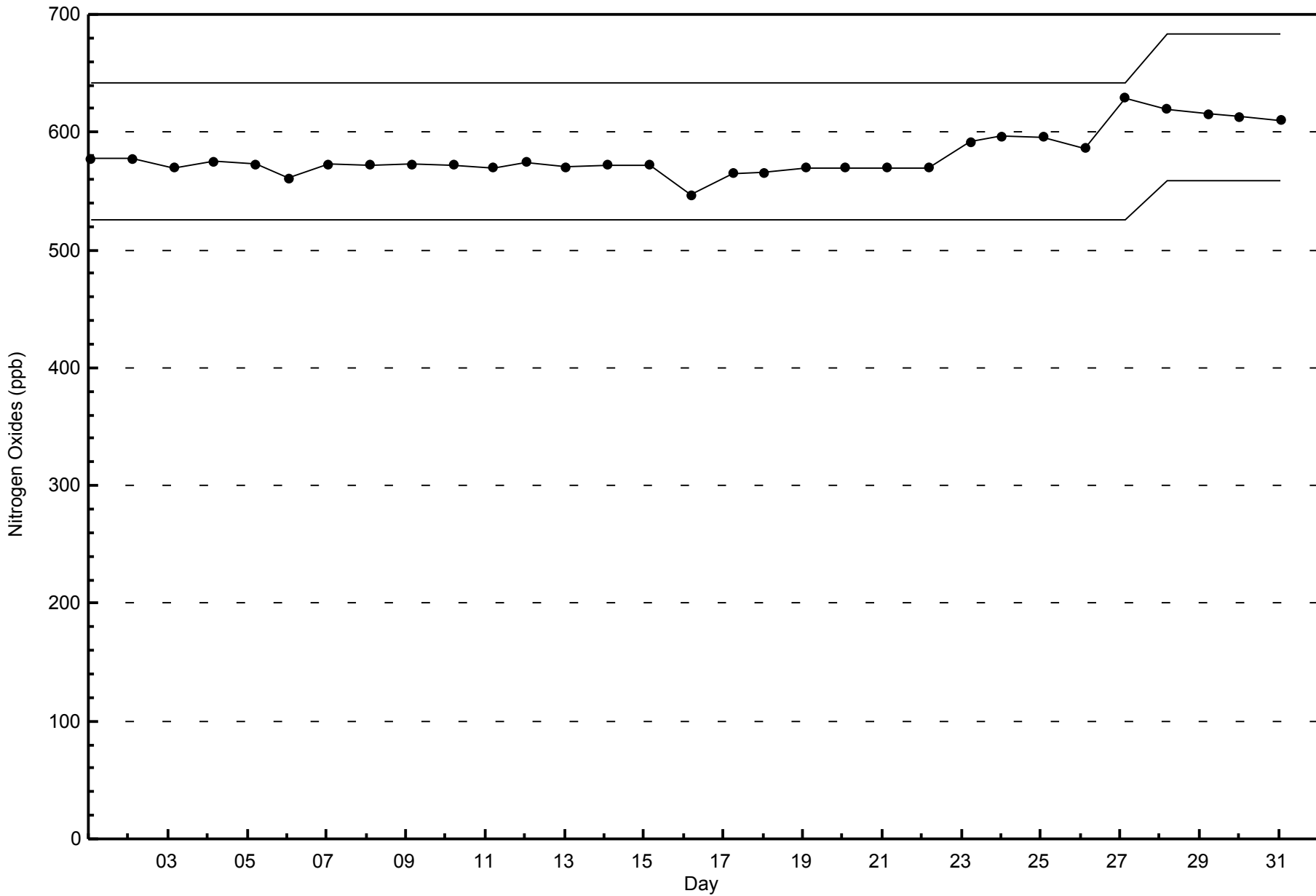






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
Firebag - May 2015



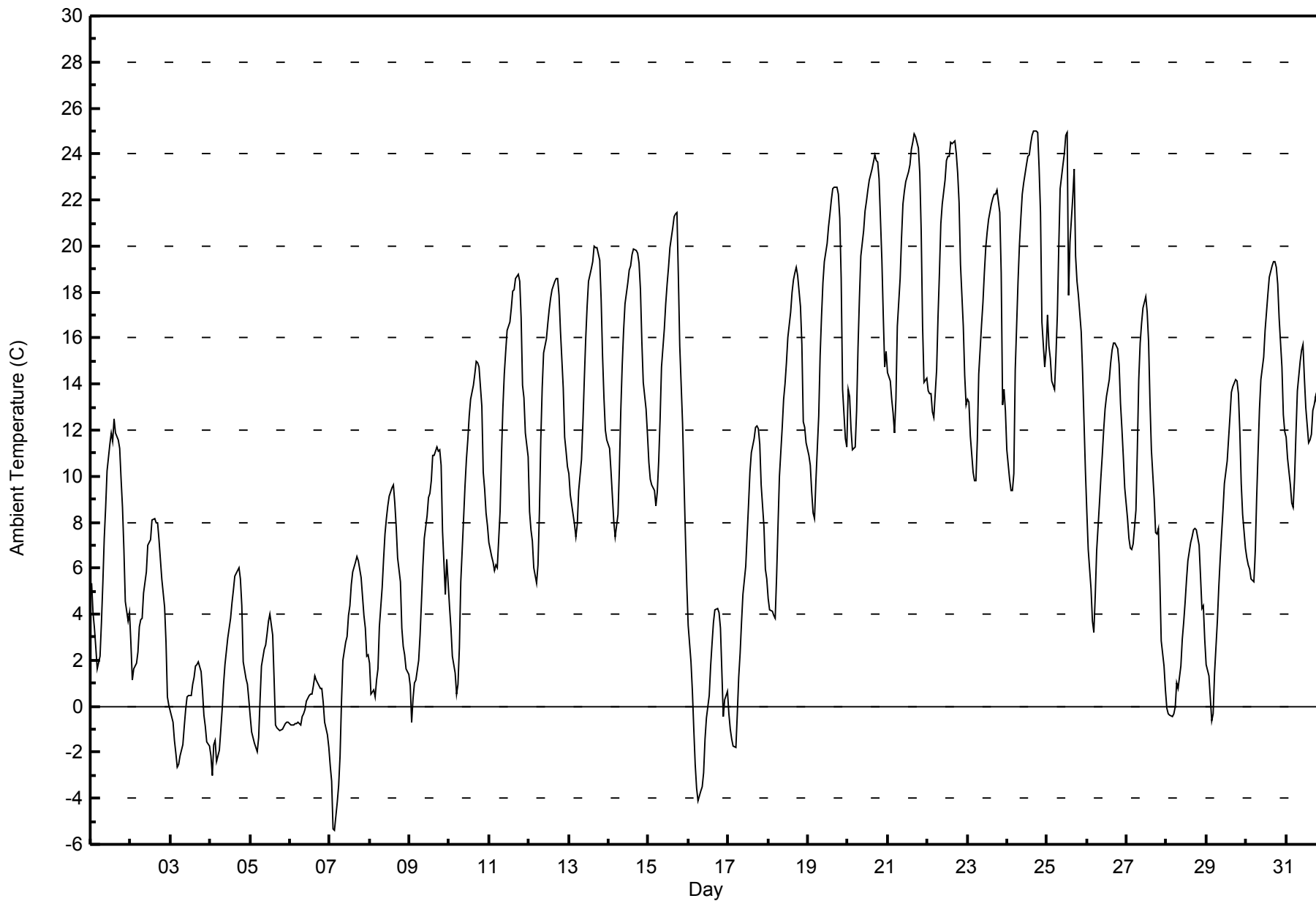


Maximum Value: 25.0 C on May 24 18:00		Maximum Daily Average: 19.2 C on May 21		Hours in Service: 744																																													
Minimum Value: -5.4 C on May 7 04:00		Minimum Daily Average: -0.3 C on May 3		Hours of Data: 744																																													
Maximum Diurnal Average: 14.4 C at hour 17		Minimum Diurnal Average: 4.2 C at hour 5		Hours of Missing Data: 0																																													
Monthly Average: 9.89 C		Percentiles: P ₁ = -3.5 P ₁₀ = -0.3 Q ₁ = 3.5 Median = 9.8 Q ₃ = 15.7 P ₉₀ = 20.6 P ₉₉ = 24.8		Hours of Calibration: 0																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	5.4	4.1	3.4	2.5	1.6	2.2	3.6	5.3	7.3	8.6	10.2	11.4	11.9	11.5	12.5	11.9	11.6	11.2	9.9	8.7	6.8	4.5	3.7	4.1	7.2	12.5																							
2-May	2.7	1.1	1.6	1.9	2.4	3.4	3.8	3.8	4.9	5.8	7.0	7.1	7.2	8.1	8.1	8.0	8.0	7.2	6.4	5.6	4.3	2.8	0.4	0.1	4.7	8.1																							
3-May	-0.2	-0.7	-1.5	-2.0	-2.7	-2.5	-2.1	-1.7	-0.9	-0.1	0.4	0.5	0.4	1.0	1.2	1.7	1.8	1.9	1.5	0.7	-0.4	-0.9	-1.6	-1.7	-0.3	1.9																							
4-May	-2.1	-3.0	-1.7	-1.5	-2.4	-1.9	-1.1	-0.2	1.0	1.8	3.0	3.4	3.8	4.5	5.1	5.7	5.9	6.0	5.5	4.4	1.9	1.2	0.9	0.3	1.7	6.0																							
5-May	-0.5	-1.1	-1.6	-1.8	-2.0	-1.4	0.3	1.7	2.5	2.7	3.2	3.7	4.0	3.1	1.2	-0.8	-0.9	-1.0	-1.1	-1.0	-0.9	-0.8	-0.7	-0.7	0.3	4.0																							
6-May	-0.8	-0.8	-0.8	-0.8	-0.8	-0.7	-0.8	-0.4	-0.3	-0.1	0.2	0.5	0.5	0.5	0.9	1.3	1.1	0.9	0.8	0.8	0.1	-0.7	-1.2	-1.8	-0.1	1.3																							
7-May	-2.6	-3.3	-5.3	-5.4	-4.2	-3.5	-2.1	0.1	2.0	2.8	3.0	4.0	4.4	5.3	5.8	6.2	6.5	6.4	6.0	5.6	3.9	3.4	2.2	2.3	1.8	6.5																							
8-May	1.9	0.5	0.7	0.4	1.2	1.6	3.5	5.2	6.4	7.5	8.2	8.7	9.1	9.5	9.6	8.8	7.8	6.5	5.4	3.4	2.6	2.2	1.6	1.4	4.7	9.6																							
9-May	0.9	-0.7	0.3	1.0	1.1	2.0	3.1	4.5	6.1	7.3	8.3	9.1	9.3	9.8	10.9	10.9	11.2	11.1	11.2	10.5	7.6	4.9	6.4	5.4	6.3	11.2																							
10-May	4.3	3.4	2.2	1.5	0.5	1.0	2.5	5.4	8.2	9.6	10.7	11.6	12.6	13.3	13.9	14.4	15.0	14.9	14.7	13.1	10.2	9.5	8.4	7.8	8.7	15.0																							
11-May	7.1	6.5	6.2	5.9	6.1	6.0	8.5	10.9	13.0	14.5	15.4	16.3	16.7	17.3	18.0	18.1	18.6	18.8	18.4	16.9	14.0	13.4	11.9	10.9	12.9	18.8																							
12-May	8.5	7.7	7.2	6.0	5.3	6.2	8.4	11.6	13.8	15.3	16.0	16.7	17.2	17.7	18.1	18.5	18.6	18.6	17.9	16.3	13.8	11.7	11.1	10.4	13.0	18.6																							
13-May	10.1	9.2	8.4	7.9	7.3	7.9	9.3	10.7	12.3	14.2	16.0	17.4	18.5	19.0	19.3	20.0	19.9	20.0	19.4	17.7	15.3	13.4	12.0	11.6	14.0	20.0																							
14-May	11.2	10.2	9.1	8.0	7.4	8.3	10.4	12.9	14.8	16.3	17.5	18.4	19.0	19.1	19.6	19.8	19.8	19.7	19.3	18.1	15.8	14.1	12.9	11.8	14.7	19.8																							
15-May	10.6	9.9	9.6	9.4	8.7	9.3	10.6	12.5	14.7	16.4	17.5	18.4	19.1	19.9	20.8	21.3	21.4	21.5	18.7	15.7	12.3	9.9	7.5	5.3	14.2	21.5																							
16-May	3.5	1.9	0.7	-1.0	-2.5	-3.6	-4.1	-3.7	-3.5	-2.9	-1.5	-0.5	0.5	1.7	2.7	3.6	4.2	4.3	4.1	3.4	1.5	-0.4	0.3	0.6	0.4	4.3																							
17-May	-0.3	-1.0	-1.4	-1.8	-1.8	-0.3	1.2	2.3	3.7	4.8	6.1	7.4	8.8	10.2	11.0	11.6	12.1	12.2	12.1	11.4	9.6	7.8	6.0	5.6	5.7	12.2																							
18-May	4.7	4.2	4.1	4.0	3.8	5.7	7.8	10.0	12.1	13.3	14.0	14.9	16.0	17.1	18.0	18.5	18.8	19.1	18.7	17.4	15.7	12.4	12.1	11.5	12.2	19.1																							
19-May	10.9	10.5	9.3	8.4	8.2	9.8	12.6	15.2	16.9	18.4	19.3	20.1	20.9	21.4	22.0	22.5	22.5	22.6	22.3	21.2	18.6	13.8	11.6	11.3	16.3	22.6																							
20-May	13.8	13.4	12.0	11.1	11.3	12.9	15.6	17.7	19.5	20.6	21.5	22.0	22.5	22.9	23.4	23.6	23.9	23.7	23.7	22.9	19.4	17.0	14.8	15.4	18.5	23.9																							
21-May	14.5	14.1	13.4	12.7	11.9	13.3	16.5	18.6	20.3	21.8	22.4	22.8	23.2	23.6	24.2	24.5	24.9	24.7	24.2	23.2	20.7	16.5	14.1	14.3	19.2	24.9																							
22-May	13.7	13.6	13.6	12.8	12.6	14.6	17.0	18.8	21.0	21.8	22.8	23.7	23.9	23.9	24.5	24.5	24.6	24.0	23.2	21.9	19.2	16.5	14.4	13.1	19.1	24.6																							
23-May	13.3	13.2	11.8	10.2	9.8	9.8	11.6	14.5	16.6	17.5	18.8	19.9	20.6	21.2	21.8	22.1	22.2	22.3	22.5	21.5	18.8	13.1	13.8	12.8	16.7	22.5																							
24-May	11.1	9.9	9.4	9.4	10.1	14.6	18.5	20.0	21.2	22.2	22.8	23.6	23.9	23.9	24.4	24.8	25.0	25.0	24.9	23.4	21.5	16.7	14.7	15.5	19.0	25.0																							
25-May	17.0	15.7	15.1	14.1	13.8	15.2	17.0	19.9	22.5	23.5	24.1	24.8	25.0	17.9	20.2	22.1	23.4	19.6	18.5	17.9	16.3	14.5	12.4	10.2	18.4	25.0																							
26-May	8.5	6.8	5.1	3.7	3.2	4.8	6.7	8.8	9.9	10.9	12.0	12.9	13.5	14.2	14.9	15.4	15.8	15.8	15.6	14.9	13.2	12.1	10.9	9.5	10.8	15.8																							
27-May	8.2	7.3	6.9	6.8	7.0	8.5	11.2	14.2	15.8	16.6	17.3	17.8	17.1	15.9	13.2	11.1	9.0	7.5	7.5	7.7	5.5	2.8	1.8	0.7	9.9	17.8																							
28-May	-0.1	-0.3	-0.4	-0.4	-0.3	0.0	1.0	0.7	1.7	2.9	3.6	4.5	5.4	6.4	7.1	7.4	7.6	7.8	7.6	7.0	5.7	4.2	4.4	2.9	3.6	7.8																							
29-May	1.8	1.4	0.3	-0.6	-0.3	1.4	3.7	5.2	6.4	7.5	8.5	9.7	10.6	11.6	12.6	13.7	13.9	14.2	14.1	13.6	11.9	9.7	8.4	6.9	7.7	14.2																							
30-May	6.4	6.1	6.0	5.6	5.4	6.7	9.1	11.0	12.9	14.2	15.2	16.3	17.1	17.9	18.6	19.1	19.3	19.3	19.1	18.3	16.9	14.7	12.7	12.0	13.3	19.3																							
31-May	11.7	10.8	9.6	8.8	8.7	9.9	11.9	13.7	15.0	15.5	15.7	14.2	13.0	11.5	11.6	11.8	12.8	13.1	13.5	12.6	11.8	10.1	9.6	8.8	11.9	15.7																							
																								6.3	5.5	4.9	4.4	4.2	5.2	6.9	8.7	10.3	11.3	12.2	12.9	13.4	13.6	14.0	14.3	14.4	14.2	13.7	12.7	10.8	8.7	7.7	7.0	Diurnal Average	
																								17.0	15.7	15.1	14.1	13.8	15.2	18.5	20.0	22.5	23.5	24.1	24.8	25.0	23.9	24.5	24.8	25.0	25.0	24.9	23.4	21.5	17.0	14.8	15.5		Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
Firebag - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
Firebag - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	81	10.89	10.89
0 - 10	300	40.32	51.21
10 - 20	284	38.17	89.38
> 20	79	10.62	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744

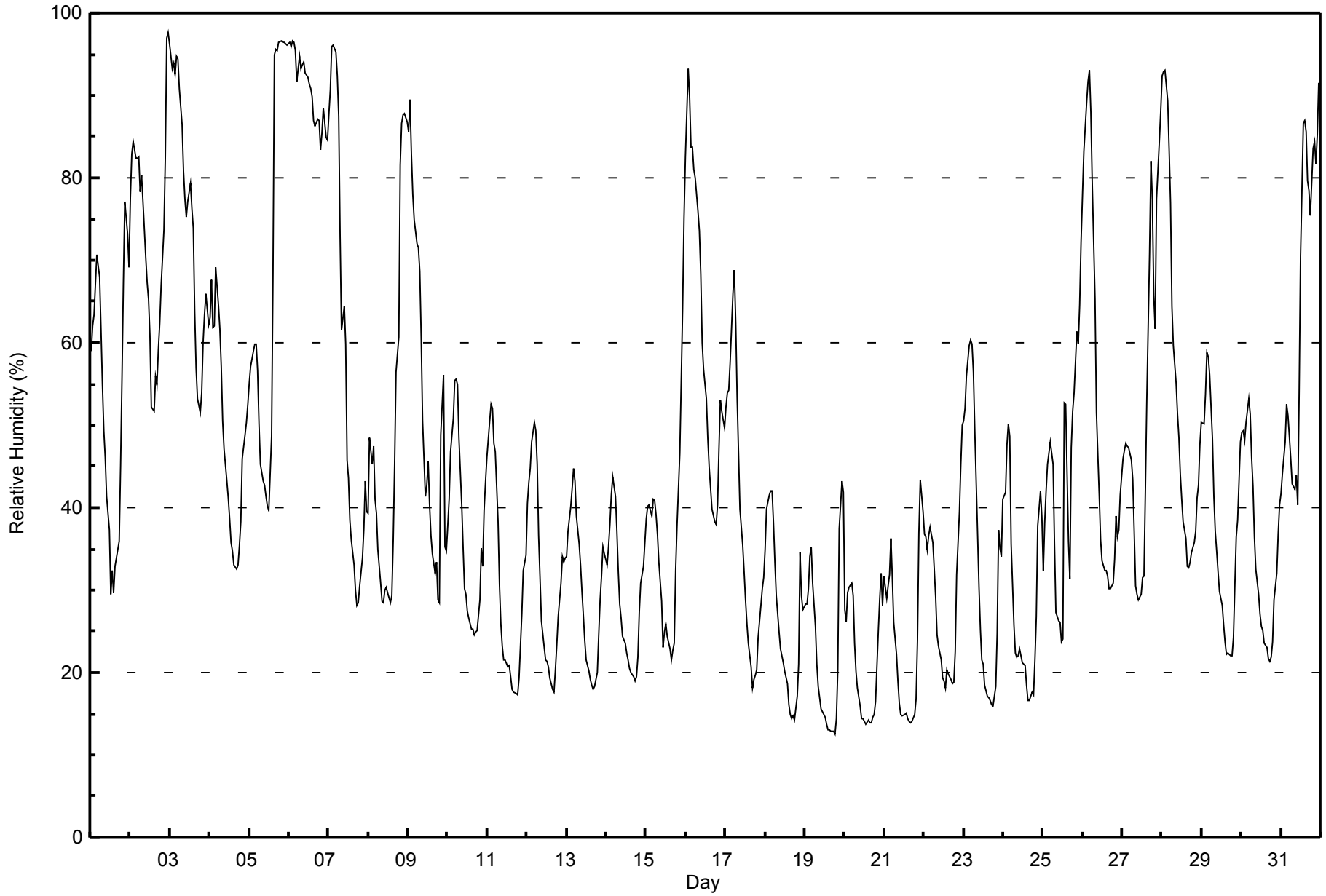


Maximum Value: 98 % on May 3 00:00														Maximum Daily Average: 90.8 % on May 6														Hours in Service: 744	
Minimum Value: 13 % on May 19 19:00														Minimum Daily Average: 21.3 % on May 20														Hours of Data: 744	
Maximum Diurnal Average: 59.4 % at hour 5														Minimum Diurnal Average: 33.6 % at hour 17														Hours of Missing Data: 0	
Monthly Average: 44.7 %														Percentiles: P ₁ = 14 P ₁₀ = 19 Q ₁ = 27 Median = 39 Q ₃ = 57 P ₉₀ = 84 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-May	59	62	63	67	71	68	61	55	49	46	41	37	30	32	30	33	35	36	45	56	67	77	73	69	52.6	77			
2-May	78	83	84	82	82	83	78	80	77	70	67	65	61	52	52	56	55	59	62	67	74	83	97	98	72.8	98			
3-May	96	93	94	93	95	94	91	86	81	77	75	77	79	76	74	64	57	53	51	54	60	63	66	62	75.6	96			
4-May	63	68	62	62	69	65	62	57	50	47	43	41	39	36	35	33	33	33	35	38	46	49	50	53	48.7	69			
5-May	55	57	59	60	60	57	50	45	43	43	41	40	40	49	69	95	96	95	96	97	96	96	96	96	68.0	97			
6-May	96	96	97	97	95	92	95	93	94	94	93	92	91	91	90	87	86	87	87	83	85	88	85	85	90.8	97			
7-May	88	91	96	96	95	92	87	73	62	64	60	46	44	38	36	33	30	28	29	31	34	37	43	40	57.2	96			
8-May	39	49	45	47	41	39	35	31	29	28	30	30	30	29	29	36	45	56	61	82	87	88	88	87	48.3	88			
9-May	86	90	83	78	75	72	72	69	61	51	41	43	46	40	37	34	32	33	29	28	49	56	35	35	53.0	90			
10-May	38	41	47	51	55	56	55	49	40	35	30	30	28	27	25	25	25	25	25	29	35	33	40	43	36.9	56			
11-May	46	50	52	52	48	47	38	31	26	23	22	21	21	19	18	18	17	17	19	23	27	32	34	30.2	52				
12-May	41	43	45	48	50	49	45	37	32	26	23	22	21	21	19	18	18	20	23	27	31	34	33	34	31.7	50			
13-May	34	37	40	42	45	43	39	36	33	30	27	24	22	20	19	18	18	18	20	25	29	32	35	34	30.0	45			
14-May	33	35	38	42	44	41	37	32	28	27	24	24	22	21	21	20	19	19	20	22	27	31	33	36	29.0	44			
15-May	39	40	40	39	41	41	39	37	33	29	23	25	26	24	23	22	23	24	32	38	47	55	64	75	36.6	75			
16-May	83	93	90	84	84	81	80	76	73	68	60	57	53	48	45	42	40	38	38	40	47	53	52	50	61.5	93			
17-May	52	54	54	58	66	69	62	53	47	40	35	32	29	26	24	21	18	19	20	20	24	28	30	32	38.0	69			
18-May	35	40	41	42	42	38	33	29	25	23	22	21	20	19	16	15	14	15	14	17	21	35	29	28	26.4	42			
19-May	28	28	30	34	35	31	26	21	18	17	16	15	15	14	13	13	13	13	13	14	20	37	43	42	22.9	43			
20-May	28	26	30	30	31	29	23	20	18	16	14	14	14	14	14	14	14	15	15	16	25	29	32	28	21.3	32			
21-May	32	29	30	32	36	31	26	22	19	16	15	15	15	14	14	14	14	15	17	24	37	43	39	23.6	43				
22-May	37	36	35	37	38	36	33	29	25	23	22	19	19	18	20	20	19	19	19	23	32	40	45	50	28.8	50			
23-May	51	52	56	60	60	60	56	49	37	30	25	22	21	18	17	17	16	16	18	25	37	35	34	34.6	60				
24-May	41	42	48	50	49	36	26	22	22	22	23	21	21	19	17	17	18	17	21	27	38	42	39	29.0	50				
25-May	32	38	42	45	48	47	45	36	27	26	26	24	24	53	53	36	31	47	52	54	61	60	65	72	43.5	72			
26-May	78	83	89	92	93	88	79	65	51	46	41	36	34	32	32	32	30	30	31	34	39	36	37	42	52.2	93			
27-May	46	47	48	47	47	46	43	37	30	29	29	29	32	32	42	53	71	82	77	66	62	77	84	88	51.9	88			
28-May	92	93	93	89	83	77	64	60	55	51	48	44	41	38	36	33	33	33	35	36	37	41	43	48	54.4	93			
29-May	50	50	54	59	58	56	48	41	37	35	32	30	28	26	24	22	22	22	22	24	31	36	38	48	37.3	59			
30-May	49	49	48	50	53	51	46	43	36	33	29	27	26	25	24	23	22	21	22	24	29	32	37	40	35.0	53			
31-May	42	44	48	52	51	49	46	43	42	44	40	54	70	87	87	86	80	78	75	84	84	82	85	91	64.4	91			
														53.7 56.1 57.5 58.6 59.4 56.9 52.4 47.0 42.0 39.1 36.1 34.7 34.2 34.3 34.1 33.8 33.6 35.0 35.9 38.8 44.4 50.0 52.0 53.2														Diurnal Average	
														96 96 97 97 95 94 95 93 94 94 93 92 91 91 90 95 96 95 96 96 97 96 96 97 98														Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
Firebag - May 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
Firebag - May 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	81	10.89	10.89
20 - 40	303	40.73	51.61
40 - 60	191	25.67	77.28
60 - 80	76	10.22	87.50
80 - 100	93	12.50	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 32 km/h on May 16 00:00	Maximum Daily Speed Average: 19.6 km/h on May 16	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 4 10:00	Minimum Daily Speed Average: 0.7 km/h on May 24	Hours of Data: 737
Maximum Diurnal Speed Average: 5.9 km/h at hour 24	Minimum Diurnal Speed Average: 2.6 km/h at hour 9	Hours of Missing Data: 7
Monthly Average Velocity: 0.7 km/h 153.2 deg	Percentiles: P ₁ = 2 P ₁₀ = 5 Q ₁ = 8 Median = 13 Q ₃ = 17 P ₉₀ = 21 P ₉₉ = 27	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-May	SSW15	SW15	SW13	SW18	SW16	SW16	SW16	SW18	SW19	SW21	SW22	SW20	SW23	WSW14	WSW17	WNW20	W16	SW14	W6	SE6	SSE4	SSW4	N2	ENE8	SW12.2	WSW23	
2-May	NE2	NNW7	WNW5	NW5	NNW11	N11	N14	N12	N17	N17	NNW18	N23	N24	N21	NNE22	NNE23	NNE23	NE19	NE15	NE11	NE9	NNW13	NNW16	N16	N13.8	N24	
3-May	N18	N18	N14	N16	NNW13	NNW15	NNW15	NNW12	NNW12	NNW13	NNW12	NNW11	NNW12	NNW11	N16	NNW17	N16	N16	N12	NNE8	NE5	ENE6	NE7	ENE7	N11.6	N18	
4-May	ENE7	NE8	ESE4	ESE4	ENE6	E7	ESE9	ESE8	ESE4	NNW1	NNW6	N6	N11	NNE10	N7	NNE8	NNE7	NE9	NE13	ENE12	ENE14	E16	ESE16	ENE6.8	ESE16		
5-May	ESE16	ESE18	ESE19	ESE20	ESE20	ESE19	ESE18	ESE16	E12	ENE13	ENE16	ENE18	ENE18	ENE17	NE21	NE18	ENE19	ENE15	NE12	NE16	NE16	NE15	NE14	NE14	ENE15.3	NE21	
6-May	NE14	ENE12	NE11	NE11	ENE10	NE11	NE10	NE11	NE14	NE15	NE18	NE19	NE22	NE20	ENE20	ENE18	ENE16	ENE16	E12	E13	ESE14	ESE8	ESE8	ESE7	ENE12.5	NE22	
7-May	ESE9	SE6	AF	AF	AF	AF	AF	WSW7	W9	NNW8	N10	N9	N11	NNE12	NNE13	N15	NNE12	NE14	NE10	ENE8	ENE9	ESE7	SE7	SE9	NE5.7	N15	
8-May	ESE11	SSE5	SSE7	SE6	SE9	SE10	SE8	SE12	SE9	SE7	S6	E3	E2	NNW3	SE3	ESE11	N9	N11	NNE8	ESE8	SSE10	SE10	SE16	SE13	SE5.9	SE16	
9-May	ESE6	ENE9	ENE10	E10	E8	ESE9	ESE9	SE8	S4	SW5	SW8	NW9	NNW12	WNW7	WNW10	NNW10	NNW9	NNW8	NW4	NNW4	AF	ESE4	ESE11	ESE15	ENE2.0	ESE15	
10-May	ESE15	ESE18	ESE16	ESE15	SE13	SE14	SE12	SE7	ESE6	ESE8	ESE4	SE3	WSW6	WSW7	NW2	SSW2	WSW2	NNW5	WVW7	NNW7	NE9	ENE11	SE10	S16	SE5.4	ESE18	
11-May	SSE17	S17	S17	SSW15	SW15	SW14	SW13	WSW15	W15	WNW14	NW10	WNW5	W6	W5	WNW7	NE5	NNW7	NNW4	N8	NE10	ENE9	E16	ESE16	ESE17	SW3.2	S17	
12-May	ESE14	ESE16	ESE15	ESE15	ESE15	SE14	SE13	SE15	SE14	SE12	SSE10	SSE11	SSE9	SSE12	SSE11	SSE11	SE10	SE13	SSE20	SSE18	SSE16	SSE18	SSE23	SSE24	SE14.0	SSE24	
13-May	SSE25	SSE22	SSE21	SSE21	S20	S17	SSW21	SSW24	SSW23	SSW21	SSW20	SSW22	SW20	WSW15	SW12	WSW11	SW10	WSW9	SSW13	S19	S16	S17	S17	SSW18	SSW16.6	SSE25	
14-May	SSW19	SW17	SW16	SW14	SW14	SW15	SW20	WSW20	WSW22	WSW23	WSW23	SW21	WSW18	SW19	SW13	SW14	SW13	SW15	SW15	SW12	SW11	SSW12	SW15	SW16	SW16.1	WSW23	
15-May	SW13	SW15	SSW15	SSW15	SW15	SSW15	SW15	SW15	SW15	WSW14	WSW16	WSW18	WSW21	WSW20	WSW18	W17	W16	W16	W16	N24	NNE30	NNE30	NNE29	NNE31	N32	W8.0	N32
16-May	N28	NNE23	NNE25	NNE26	NNE24	N26	NNE26	NNE26	NNE25	N26	N24	N24	NNE24	NNE23	NNE22	NNE21	NE19	NE18	NE17	NE13	NE8	NE9	E6	ESE8	NNE19.6	N28	
17-May	SE10	SE10	SE11	SSE13	S15	S16	S21	S20	S15	S12	S13	S13	S13	S11	SSW11	SSW12	SSW11	S11	S15	S14	SSE12	SSE14	SSE17	S18	S13.3	S21	
18-May	S15	S16	S15	S13	SSW13	SSW14	SW15	SW15	WSW15	WSW16	WSW17	SW16	WSW14	WSW11	WSW11	WSW11	WSW9	WSW11	W11	WSW8	SW7	SSW7	SSW9	SSW11	SW11.1	WSW17	
19-May	SW10	SW10	SW12	SW12	SW12	SW13	WSW15	WSW17	W18	W15	W11	WSW8	SW5	SW5	WSW7	W7	SSW5	W6	W7	WSW8	SW5	S5	S5	SSW8	WSW8.6	W18	
20-May	SSW10	SW10	SW11	WSW9	SW12	SW11	WSW11	W15	W15	W13	WSW11	WSW12	WSW11	SSW8	SW7	WSW6	WSW10	S3	NW5	WNW4	AF	SE5	S6	SSW10	WSW8.1	W15	
21-May	SSW9	SW10	SW11	SSW9	SSW7	SSW9	SW10	SW12	WSW13	WSW13	WSW12	WSW14	SW15	SW14	WSW12	WSW11	W9	WSW7	WNW7	NW7	WSW2	S4	S5	S5	SW8.3	SW15	
22-May	SSE7	S7	SSW10	SW11	SW9	W5	WNW6	NNW12	N14	N16	N17	NNW17	N19	N19	N18	NNE21	N25	N27	NNE25	NNE17	NE13	NE12	ENE11	ENE12	N10.0	N27	
23-May	ENE12	E13	E16	E17	ESE14	ESE16	ESE11	E6	NE12	NE11	NE9	NE6	N8	N6	NNW8	N6	NNE8	NNE7	N3	NE4	NE5	NE5	E5	E8	ENE6.6	E17	
24-May	ESE4	ESE5	E3	SSE4	SSE5	SSE4	SE7	SE4	W2	W4	NNW7	NW10	NW11	NNW8	NW5	WNW2	NW1	NNW2	NE7	ENE2	ESE3	SE5	SE8	ENE0.7	NW11		
25-May	SSE10	S9	S7	S6	SW8	SW8	SW6	WNW8	NW14	NW12	NNW12	W11	NW19	W23	WSW10	E1	NW9	NNW25	NNW15	N9	NNW14	N19	NNE18	NNE15	NW6.8	NNW25	
26-May	NNE15	NNE12	N8	NNE8	N6	N7	N8	N17	NNE22	NNE21	NNE17	NNE18	N17	N15	N14	N12	N13	NNE12	NE12	NE11	NE7	E9	SE8	SE11	NNE10.7	NNE22	
27-May	SSE12	SSE13	SSE13	SSE13	SSE12	SSE12	S9	SSW7	SE4	SSE5	N4	NW9	NNW15	NNE19	NNE26	NNE25	NNE25	NNE22	NNE19	NNE24	NNE27	NNE26	NNE25	NNE23	NNE8.6	NNE27	
28-May	NNE21	NNE17	NNE16	NNE15	NNE16	NNE18	NNE18	N21	NNE22	N19	N21	N19	NNE20	N20	NNE19	N18	NNE17	NNE17	NNE14	NE14	ENE10	E10	ESE9	SE10	NNE15.1	NNE22	
29-May	SE12	SE13	SE12	SSE10	SSE11	S15	S18	S15	SSW9	S4	SW6	E3	S3	SSE6	SSE3	SW5	SW5	SSW8	WSW6	SW11	SSW14	S14	S19	S19	S9.0	S19	
30-May	S20	S22	S22	S18	S16	SSW14	SSW15	SW14	WSW17	WSW13	SW10	SW11	SSW15	SSW15	SSW13	SSW16	S15	S15	SSW18	SSW12	SSE11	SSE13	S16	S19	SSW14.2	S22	
31-May	S21	S18	S17	SSE17	SSE17	SSE19	S21	S24	S24	S23	SSE23	SSW21	S22	S27	S26	S25	S23	S19	S18	S18	SSW15	SSW16	SW11	SW11	S19.2	S27	

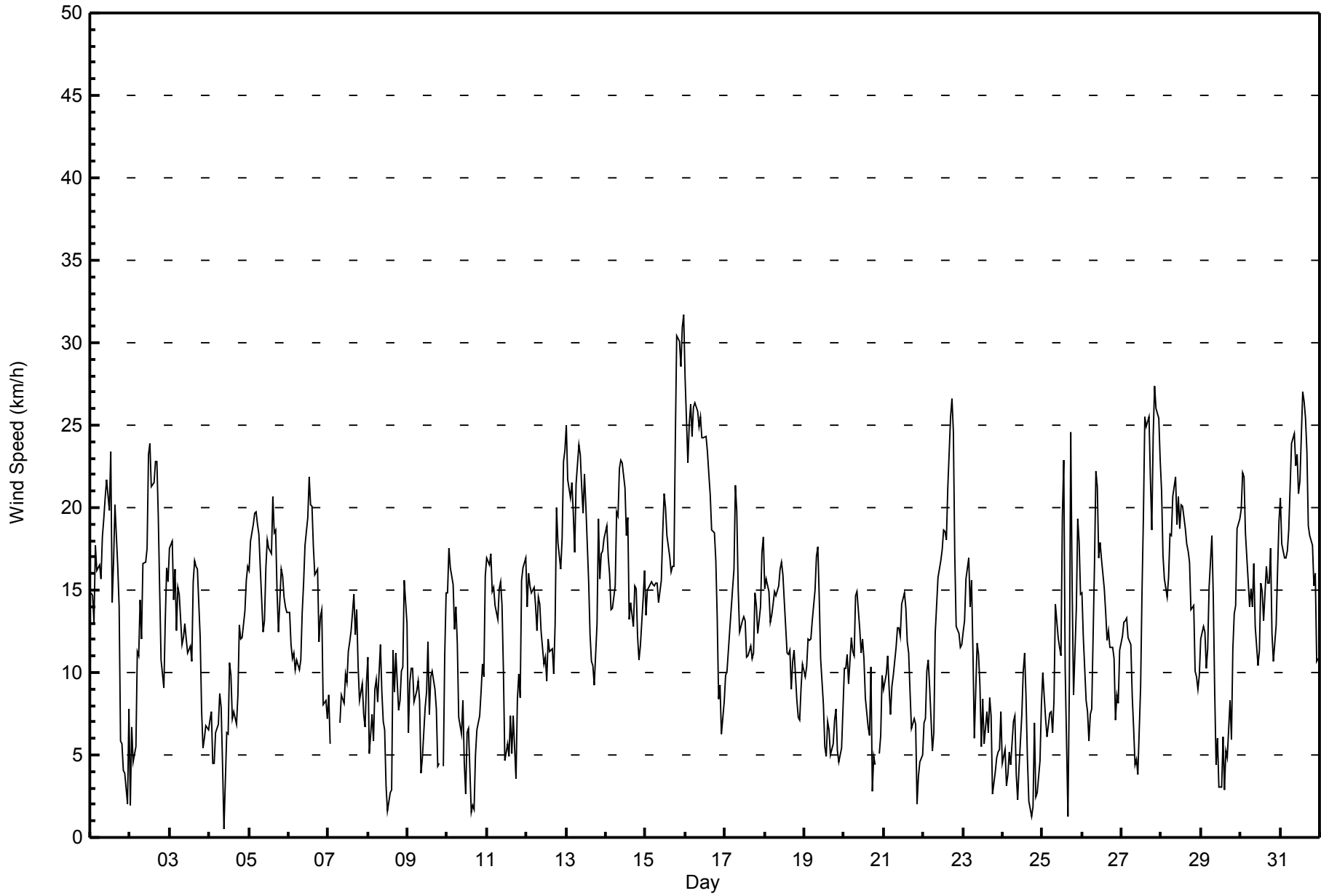
SE5.7 SSE5.4 SSE5.8 SSE5.1 SSE5.0 S4.8 S4.7 SW3.7 W2.0	NNW3.2	NNW3.4	NNW4.0	NW4.3	NW3.3	NNW3.3	NNW3.5	NNW3.7	N3.4	N3.5	ENE3.6	ENE3.9	E4.4	ESE5.1	SE5.9	Diurnal Average									
N28	NNE23	NNE25	NNE26	NNE24	N26	NNE26	NNE26	NNE25	N26	N24	N24	NNE24	S27	S26	S25	N25	N27	NNE25	NNE30	NNE30	NNE29	NNE31	N32	Diurnal Maximum	

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
Firebag - May 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
Firebag - May 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	77	10.45	10.45
6 - 11	237	32.16	42.61
12 - 19	321	43.55	86.16
20 - 28	97	13.16	99.32
29 - 38	5	0.68	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 737

Total Number of Hours: 744



WBEA
Frequency Distribution

Wind Speed (WS) - km/h
Firebag - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	0	6	1	6	8	6	7	9	3	6	2	4	4	5	7	77
6 - 11	18	8	20	15	8	19	24	13	9	18	23	24	10	7	7	14	237
12 - 19	29	24	24	17	8	23	14	19	38	26	42	23	11	1	3	19	321
20 - 28	14	30	3	1	0	2	0	9	15	7	6	7	1	1	0	1	97
29 - 38	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	65	66	53	34	22	52	44	48	71	54	77	56	26	13	15	41	737

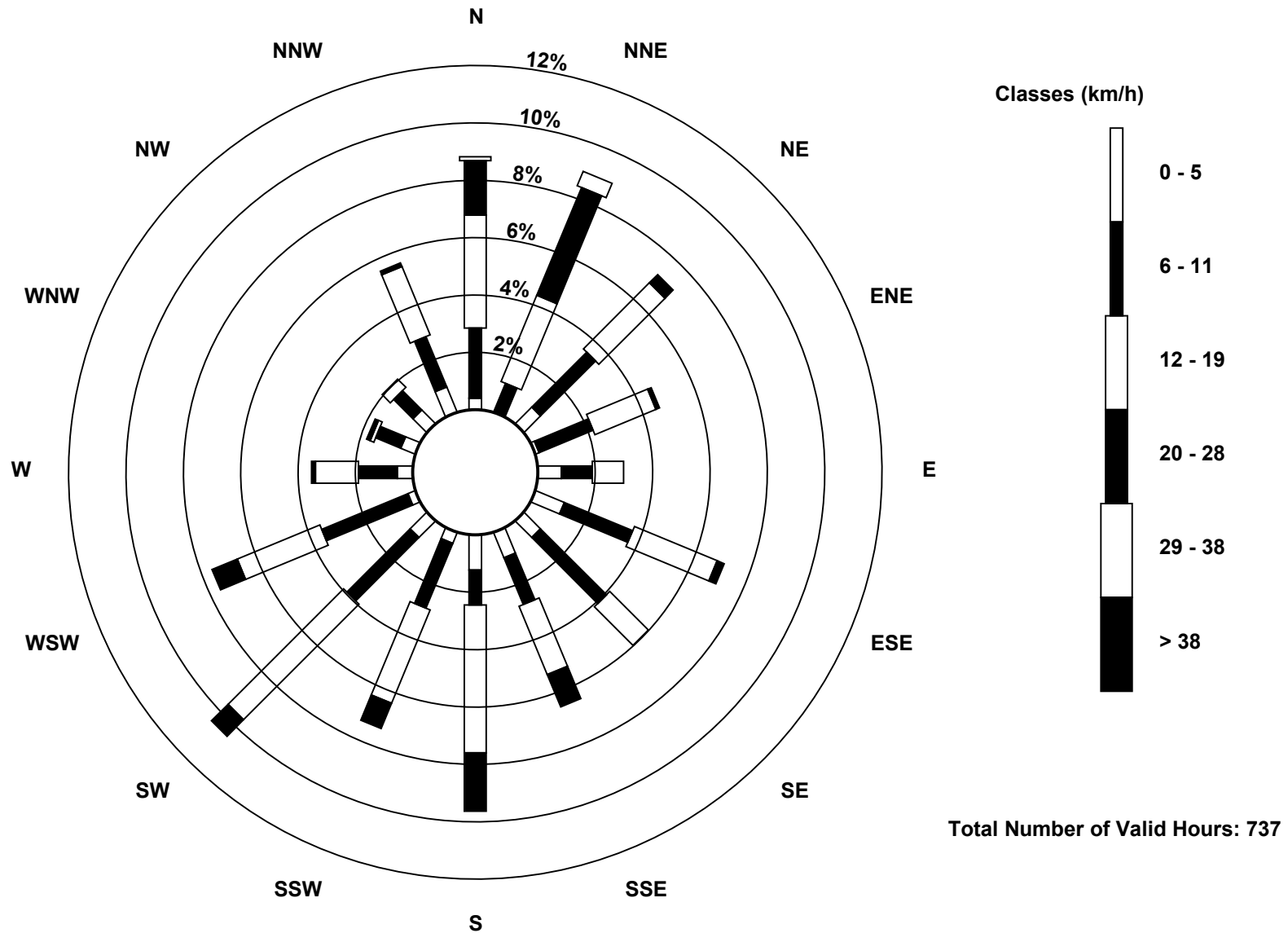
Total Number of Valid Hours: 737

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Wind Speed (WS) - km/h
Firebag (AMS 19)





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Firebag - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 15 km/h on May 25 14:00	Hours of Data: 737
Minimum Value: 0 km/h on May 24 05:00	Hours of Missing Data: 7
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 6	Hours of Calibration: 0
	Percent Operational Time: 99.1

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

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Firebag - May 2015

Direction of Maximum Speed: 11 deg on May 16 00:00	Hours in Service: 744
Direction of Maximum Daily Speed Average: 21.2 deg on May 16	Hours of Data: 737
Direction of Minimum Speed: 343 deg on May 4 10:00	Direction of Minimum Daily Speed Average: 0.7 deg on May 24
Direction of Minimum Speed: 343 deg on May 4 10:00	Hours of Missing Data: 7
Monthly Average Direction: 233.3 deg	Percent Operational Time: 99.1

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	206	214	214	216	218	219	222	226	232	231	234	236	236	246	257	291	264	236	270	130	155	197	349	72	231.9
2-May	36	331	290	326	347	356	349	352	7	2	347	352	9	6	16	12	26	37	35	38	40	337	346	349	4.4
3-May	358	1	354	358	340	337	340	331	336	329	328	335	342	328	353	346	351	0	9	17	51	58	54	59	352.0
4-May	63	50	111	102	58	79	110	122	120	343	348	11	5	22	1	16	29	45	46	63	61	77	96	104	61.5
5-May	104	102	103	104	104	108	111	108	92	68	74	58	69	68	53	54	65	63	45	51	47	48	54	56	76.4
6-May	48	60	52	56	60	56	46	40	38	41	39	36	44	50	60	74	66	77	85	100	112	121	116	115	61.7
7-May	118	127	AF	AF	AF	AF	AF	238	275	327	357	9	8	19	26	8	21	39	41	64	71	110	130	127	35.8
8-May	121	152	147	140	140	141	138	133	133	129	179	84	87	333	144	107	9	350	14	109	148	132	135	140	125.2
9-May	103	61	77	86	90	114	119	145	180	217	215	322	331	297	284	335	335	335	322	342	AF	103	116	113	64.0
10-May	116	116	120	121	125	125	130	130	120	109	114	131	252	255	317	202	241	332	303	330	39	77	141	176	123.8
11-May	168	178	189	199	215	216	232	256	269	288	309	294	279	280	290	41	335	342	359	42	61	97	105	112	214.9
12-May	122	118	122	121	116	125	124	125	133	139	147	152	165	154	155	148	142	126	161	151	148	150	159	164	141.2
13-May	167	162	163	165	173	184	192	200	196	199	209	210	226	240	224	256	224	237	203	178	175	177	181	192	192.8
14-May	202	216	222	231	230	224	230	244	254	255	246	236	242	226	227	231	224	226	231	225	216	212	215	218	230.0
15-May	218	217	213	212	215	211	214	220	238	241	249	254	253	256	268	266	267	264	4	24	17	16	14	11	278.4
16-May	6	21	19	13	20	11	15	17	15	354	9	11	20	24	28	22	37	40	38	42	42	45	93	118	21.2
17-May	134	136	141	155	173	183	185	178	186	179	178	190	175	185	192	197	197	176	177	171	168	168	167	173	174.6
18-May	172	176	180	191	196	207	217	228	240	245	242	234	239	254	246	242	248	249	276	252	225	199	198	209	222.7
19-May	219	222	222	228	228	233	245	258	270	271	279	243	235	220	244	266	213	259	260	238	222	190	187	195	240.3
20-May	204	216	222	242	226	229	249	263	270	267	253	242	239	203	229	242	247	180	321	296	AF	142	170	202	236.7
21-May	211	214	214	211	204	210	222	226	252	255	240	242	228	225	248	245	270	256	300	310	256	169	170	172	233.3
22-May	158	188	208	216	233	262	301	345	0	2	349	344	352	360	9	16	354	7	14	25	35	46	57	61	4.3
23-May	77	94	100	100	115	117	121	93	56	45	48	37	359	351	329	360	12	28	350	45	41	38	80	96	69.1
24-May	113	118	97	151	154	157	145	129	132	267	270	346	318	319	346	317	285	307	335	35	74	107	125	134	72.7
25-May	154	183	188	187	214	215	234	286	315	319	336	271	325	279	258	91	304	331	332	359	340	5	17	22	314.9
26-May	23	12	7	13	352	10	0	9	23	29	13	16	3	11	356	6	9	33	40	39	44	93	131	134	21.9
27-May	147	157	163	162	161	164	182	195	136	164	356	313	346	15	14	17	12	15	19	21	23	23	17	22	29.0
28-May	17	18	16	14	18	18	18	6	20	2	4	11	16	4	13	6	13	13	22	38	69	81	106	136	19.3
29-May	137	142	143	147	155	171	186	186	195	191	221	100	183	150	162	232	225	209	241	218	194	186	185	181	179.6
30-May	182	182	181	182	185	193	210	229	254	257	227	223	207	213	203	207	188	190	205	209	166	162	172	177	197.9
31-May	189	183	172	167	162	162	171	173	169	169	166	209	186	177	181	190	187	180	186	176	195	203	224	223	181.3

141.1 147.8 156.5 158.4 166.3 171.5 189.3 213.9 263.8 285.7 288.5 295.3 309.1 308.5 329.0 342.1 343.3 2.7 6.6 56.7 78.5 96.6 118.2 132.7

Diurnal Average

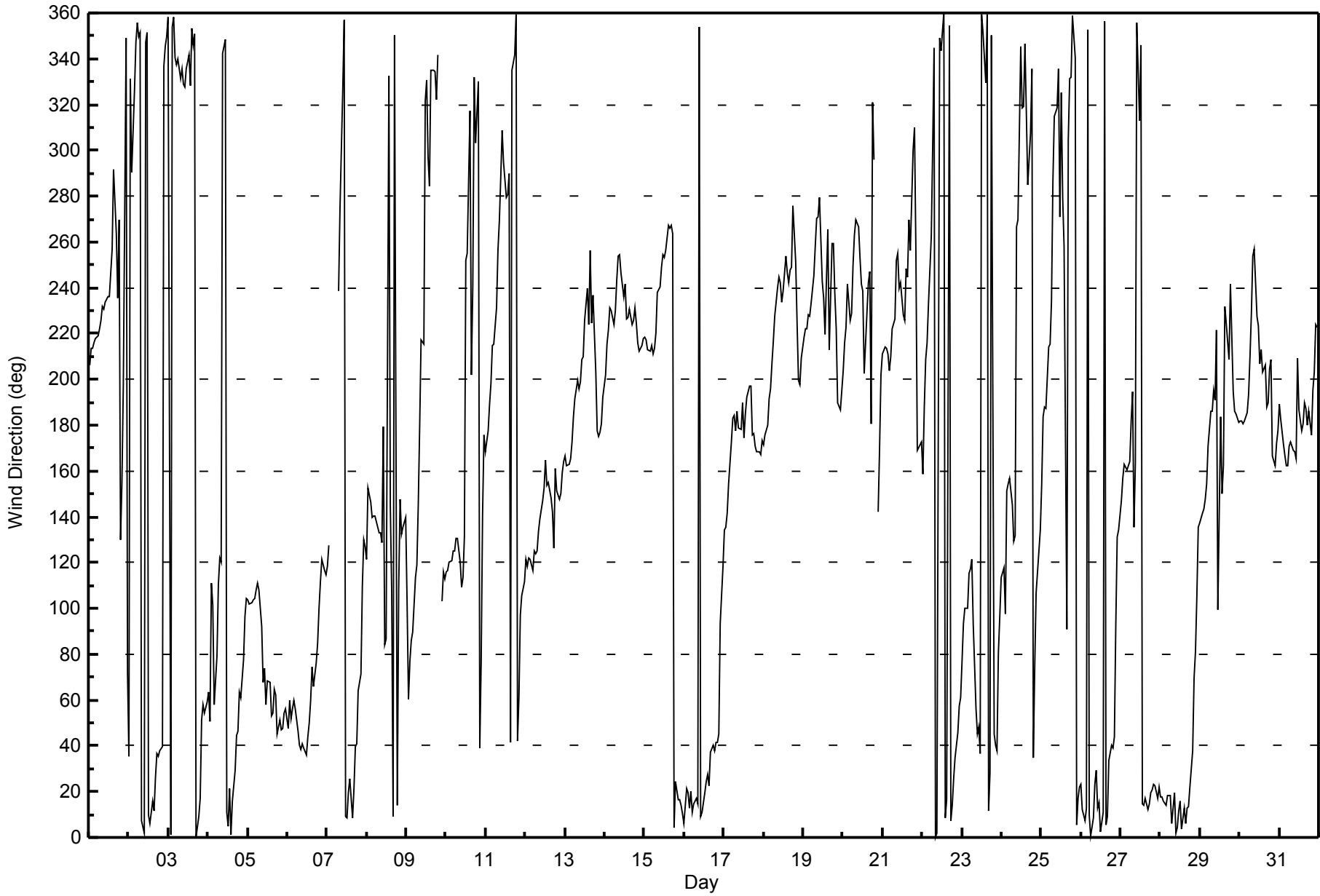
AF - Analyzer Failure

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



WBEA
Hourly Averages

Wind Direction (WD) - deg
Firebag - May 2015





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 101 deg on May 4 10:00	Hours of Data: 737
Minimum Value: 3 deg on May 18 23:00	Hours of Missing Data: 7
Percentiles: P ₁ = 5 P ₁₀ = 7 Q ₁ = 9 Median = 15 Q ₃ = 27 P ₉₀ = 49 P ₉₉ = 91	Hours of Calibration: 0
	Percent Operational Time: 99.1

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-May	7	7	7	8	7	7	9	11	15	14	14	20	20	46	38	23	23	18	59	53	18	17	75	11	75
2-May	43	19	21	20	17	13	11	18	17	23	21	19	15	19	18	16	18	15	10	13	11	19	10	12	43
3-May	15	14	12	12	11	11	12	16	17	20	19	24	20	31	18	19	21	19	20	11	13	16	7	5	31
4-May	11	5	31	37	9	17	25	25	71	101	58	77	38	53	76	58	60	46	13	10	7	12	12	10	101
5-May	10	10	10	10	10	10	11	11	18	14	15	15	14	24	13	9	9	10	9	9	8	8	8	8	24
6-May	8	9	8	9	9	11	8	11	11	9	9	11	10	11	12	17	12	14	14	14	8	12	7	7	17
7-May	8	11	AF	AF	AF	AF	AF	20	28	31	20	27	27	30	26	24	21	19	16	15	7	15	16	10	31
8-May	7	37	10	16	8	9	11	13	28	41	59	78	96	90	68	26	62	26	49	32	19	14	13	13	96
9-May	33	7	9	9	12	9	10	29	46	66	37	32	34	47	49	43	39	38	44	20	AF	39	11	9	66
10-May	8	9	9	9	10	10	11	18	30	28	66	86	57	59	88	96	96	71	40	15	25	12	24	7	96
11-May	7	9	6	6	7	6	11	13	15	20	35	88	71	84	55	78	47	68	33	9	7	15	9	10	88
12-May	9	8	9	9	8	10	10	12	15	31	35	42	50	44	38	31	47	31	13	10	10	10	9	8	50
13-May	8	9	8	8	9	11	9	9	10	14	17	18	20	25	27	33	34	31	27	8	7	7	8	7	34
14-May	7	9	6	7	7	8	8	12	12	13	15	18	21	23	37	29	29	18	15	9	6	7	6	7	37
15-May	6	7	7	8	8	7	9	12	16	22	26	19	18	25	27	24	20	18	28	14	13	12	14	15	28
16-May	15	12	11	13	11	14	13	14	17	15	16	19	18	18	18	17	18	18	13	11	5	5	20	16	20
17-May	11	11	9	11	8	8	9	9	18	29	27	24	25	38	29	32	27	25	13	8	7	7	6	7	38
18-May	7	7	7	6	5	7	8	13	16	20	19	27	28	35	43	33	43	23	20	10	9	5	3	7	43
19-May	7	9	6	5	6	6	9	12	12	20	35	59	72	72	67	68	68	57	30	18	18	5	4	6	72
20-May	6	7	7	8	6	7	10	12	14	22	34	39	45	57	90	76	28	81	29	17	AF	24	14	12	90
21-May	6	8	6	9	7	5	8	11	14	19	35	30	37	38	40	43	37	48	49	13	54	7	4	5	54
22-May	20	10	5	12	9	25	27	14	17	15	20	26	21	25	28	21	17	16	14	10	8	8	3	8	28
23-May	12	10	10	9	10	9	14	30	21	27	41	71	68	67	57	49	36	45	64	22	9	8	16	11	71
24-May	28	19	27	24	6	11	11	19	48	86	70	59	44	51	53	83	96	82	64	17	55	25	11	10	96
25-May	8	7	5	5	11	8	15	17	15	28	30	42	18	43	42	93	33	15	13	25	13	14	10	9	93
26-May	9	10	13	12	13	16	15	17	15	18	26	24	22	28	28	39	34	32	23	15	18	18	14	12	39
27-May	10	8	9	8	8	9	13	38	44	50	81	54	19	19	19	14	14	12	10	11	12	11	11	12	81
28-May	11	11	10	12	11	12	17	16	15	21	21	17	23	20	22	23	22	22	23	17	10	9	15	13	23
29-May	11	10	9	11	9	10	10	14	34	69	63	92	92	69	97	67	75	36	46	16	8	7	8	8	97
30-May	8	7	8	8	7	7	11	15	16	24	46	32	25	26	30	26	21	24	16	12	10	8	7	7	46
31-May	6	8	7	7	8	10	10	9	11	14	12	18	12	12	9	10	11	13	12	8	15	8	10	8	18
	43	37	31	37	17	25	27	38	71	101	81	92	96	90	97	96	96	82	64	53	55	39	75	16	

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association

SO2 Calibration Report

Station Information

Calibration Date	May 26, 2015	Last Calibration	April 22, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	14:35
Gas Cert Reference	SA130123A	Station temp.	Deg C
Cal Gas Concentration	49.3 ppm	Cal Gas Exp Date	December 12, 2016
Calibrator Make/Model	API T700	Serial Number	996
ZAG Make/Model	API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-606	-606
Analyzer IP address	192.168.1.43		Lamp voltage	800	797
Calculated slope	0.998591	0.996812	Chamber temp	45.0	44.9
Calculated intercept	-0.186280	0.175618	Pressure	784.7	686.2
Analyzer Background	8.4	8.5	Flow	0.448	0.447
Analyzer Coefficient	0.941	0.952	Intensity	90	90

Analyzer make Thermo 43i Analyzer serial # 1410661308

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-1.0	----
as found span	5000	58.3	574.8	564.9	1.018
calibrator zero	5000	0.0	0.0	-0.6	----
high point	5000	58.3	574.8	576.0	0.998
second point	5000	29.2	287.9	289.8	0.994
third point	5000	14.7	144.9	145.0	1.000
as left zero	5000	0.0	0.0	-0.5	----
as left span	5000	58.3	574.8	573.5	1.002
Average Correction Factor					0.997

Corrected As found 565.9 Previous response 575.8 % change 1.8%

Notes:

Filter changed after as founds. Span adjusted.

Calibration Performed By: Devin Russell



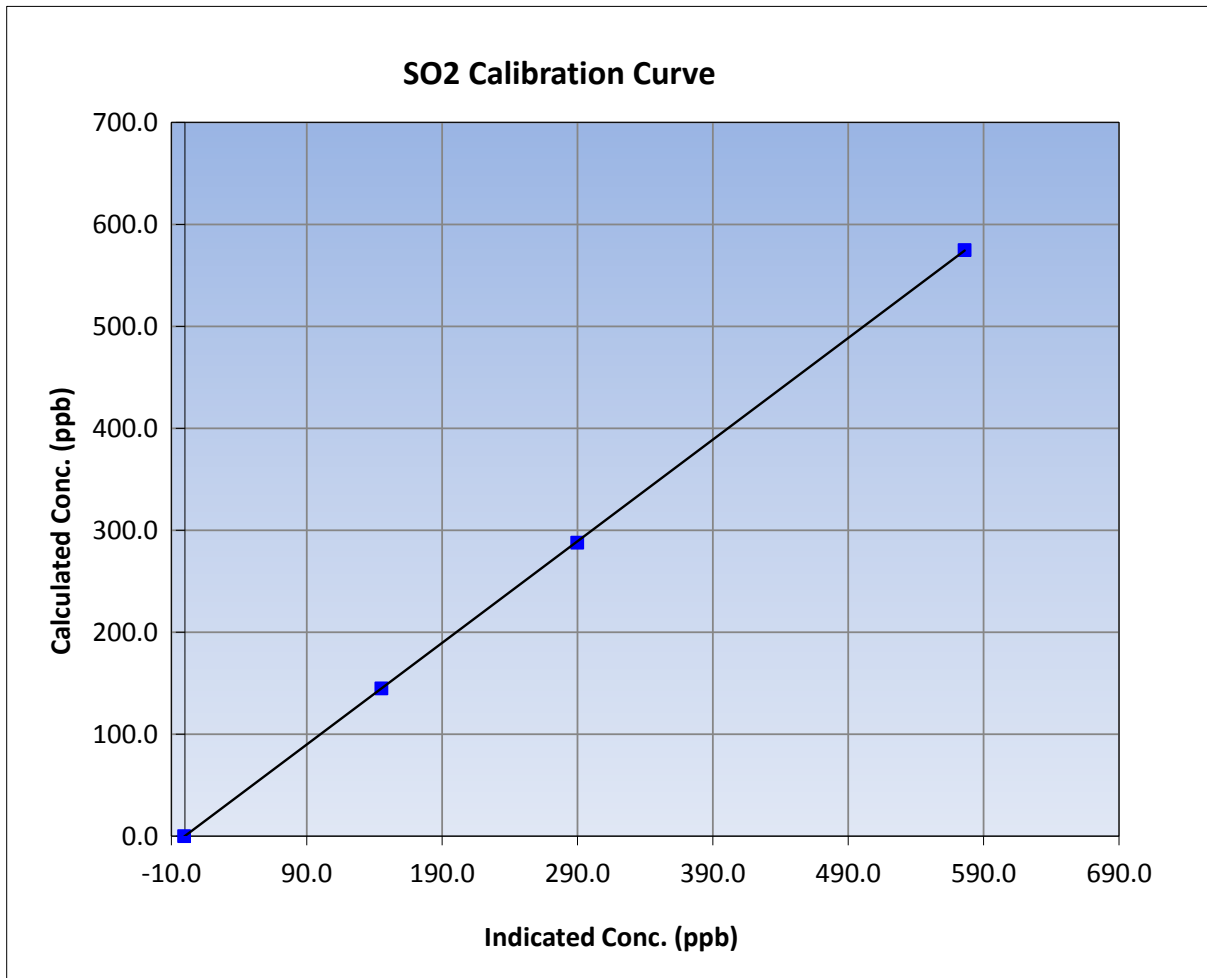
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 26, 2015	Previous Calibration	April 22, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:30	End Time (MST)	14:35
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

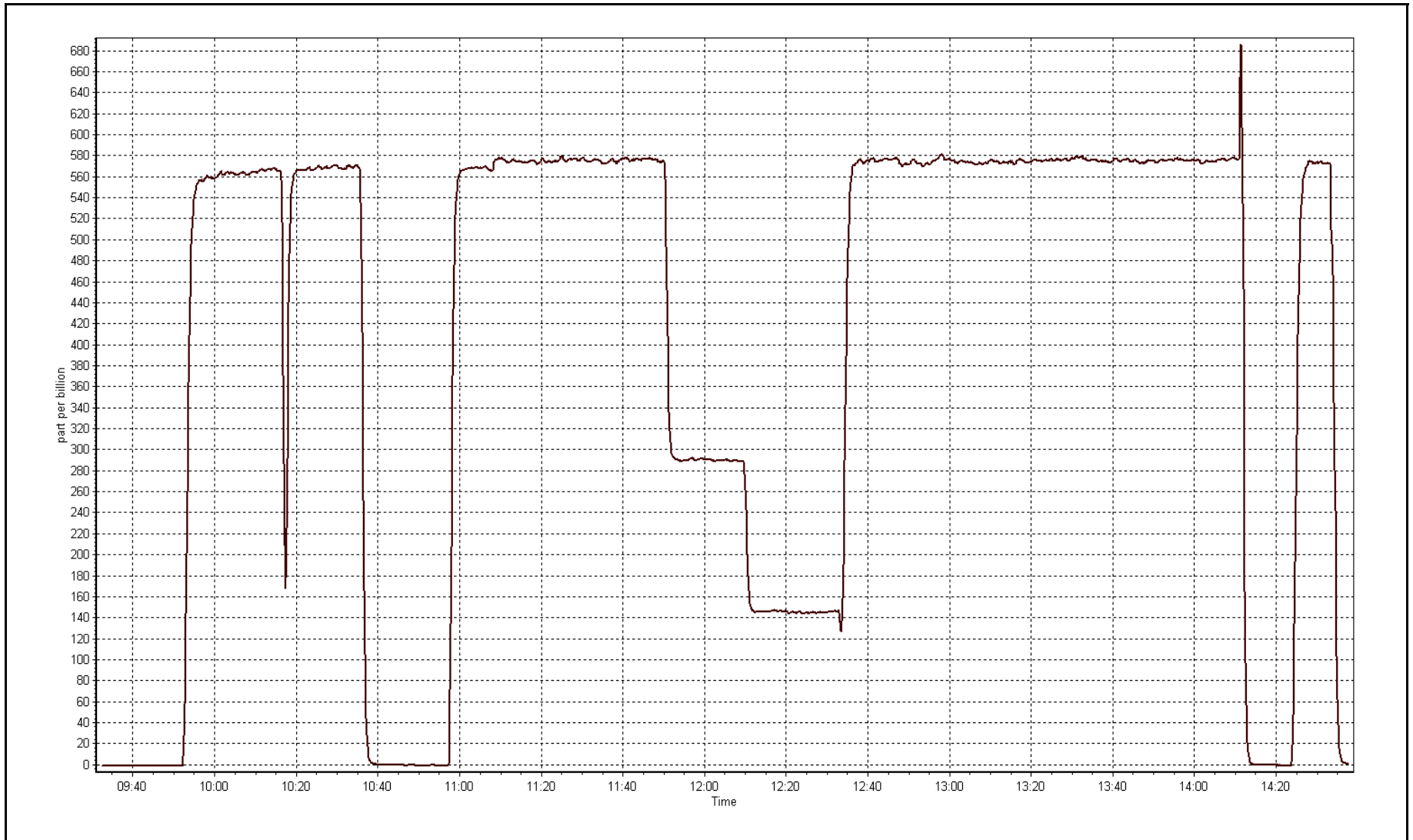
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.6	----	Correlation Coefficient	0.999991
574.8	576.0	0.9980		
287.9	289.8	0.9936	Slope	0.996812
144.9	145.0	0.9995		
			Intercept	0.175618



SO2 Calibration Plot

Date: May 26, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 22, 2015	Last Calibration	April 16, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:20	End Time (MST)	13:10
Gas Cert Reference	ALM066720	Station temp.	22 Deg C
Cal Gas Concentration	4.85 ppm	Cal Gas Exp Date	10/06/2014
Calibrator Make/Model	API T700	Serial Number	996
ZAG air Make/Model	API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	Serial Number	9037
SO2 gas concentration	49.3 ppm	SO2 gas cert/exp	SA130123A 12/Dec/16

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-574	-574
Analyzer IP address	192.168.1.42		Lamp voltage	923	925
Calculated slope	0.995931	0.998564	Chamber temp	45	45
Calculated intercept	0.121670	0.095784	Pressure	539.5	538.9
Analyzer Background	12.2	12.2	Flow	0.954	0.950
Analyzer Coefficient	1.083	1.083	Intensity	86	85
			Converter temp.	336	334
Analyzer make/model	Thermo 450i		Analyzer serial #	815129098	
Converter make/model	internal		Converter serial #	internal	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	----
as found span	5000	83.3	80.8	80.8	1.000
SO2 scrubber check	5000	15.2	149.9	1.0	----
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	83.3	80.8	80.8	1.000
second point	5000	41.7	40.4	40.5	0.998
third point	5000	21.0	20.4	20.3	1.003
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	83.3	80.8	81.2	0.995
Average Correction Factor					1.001

Corrected As found	80.9	Previous response	81.0	% change	0.1%
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Notes:

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

Calibration Performed By:

Devin Russell



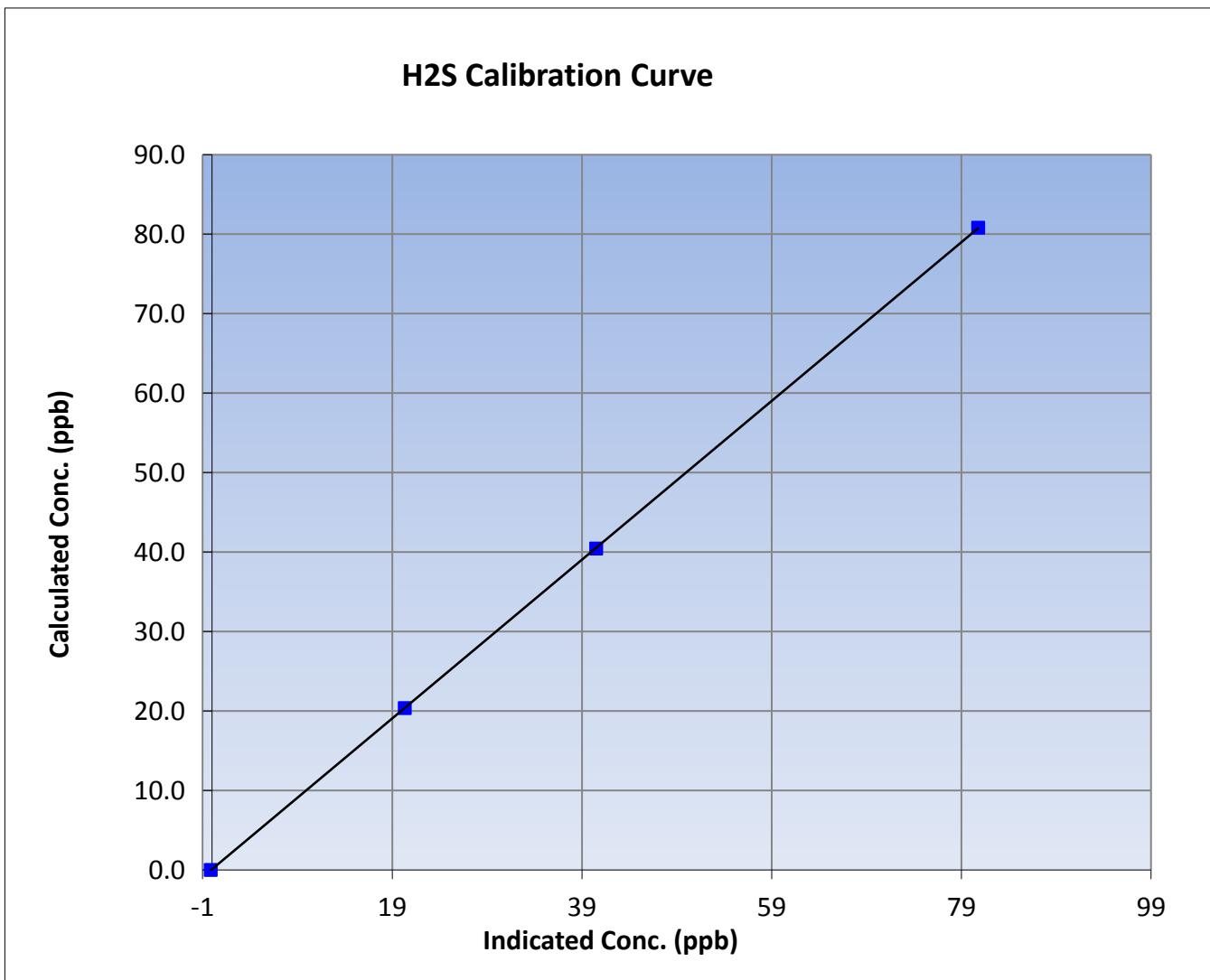
Wood Buffalo Environmental Association H2S Calibration Report

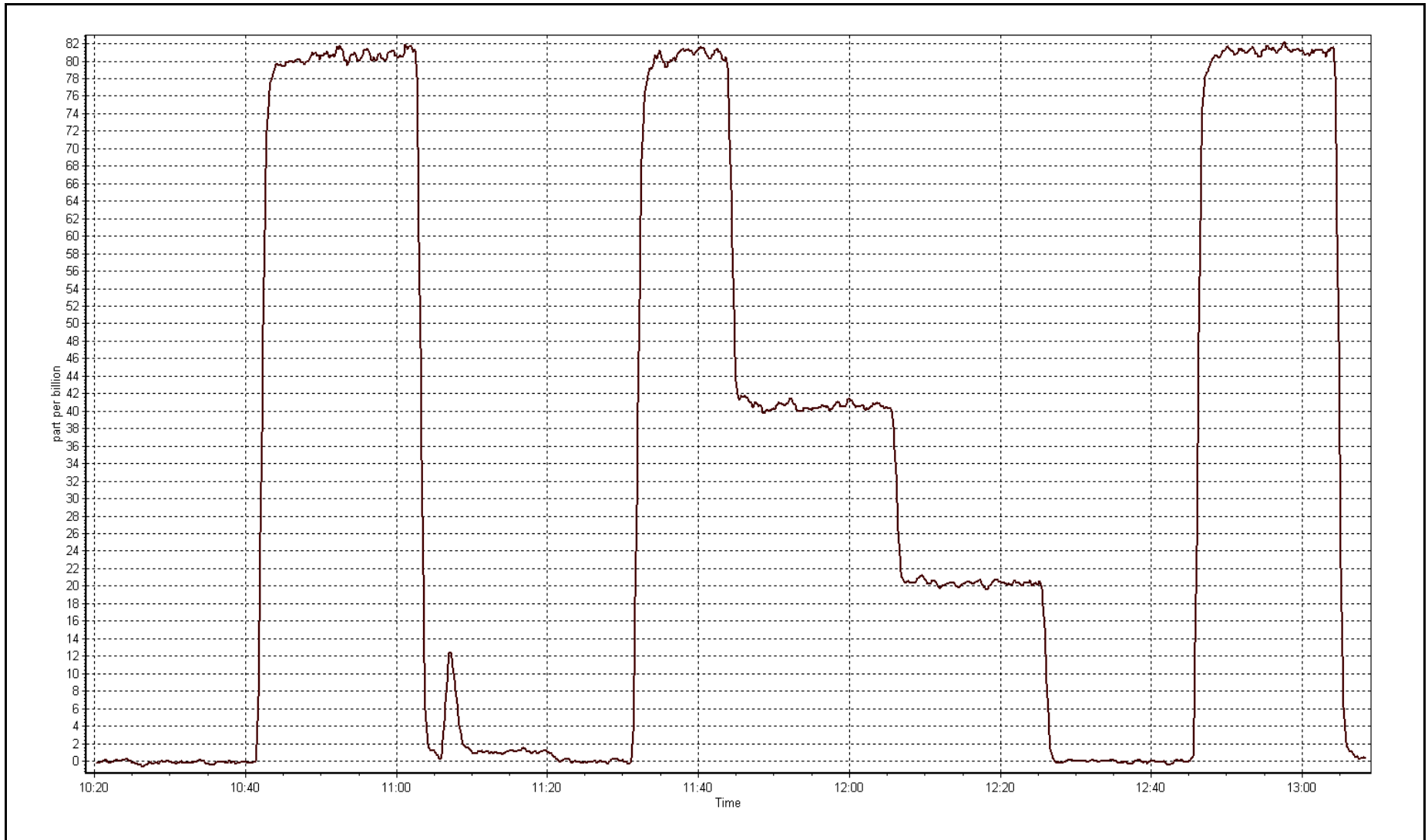
Station Information

Calibration Date	May 22, 2015	Previous Calibration	April 16, 2015
Station Name	AMS 19	Station Number	AMS 19
Start Time (MST)	10:20	End Time (MST)	13:10
Analyzer make	Thermo 450i	Analyzer serial #	815129098

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999996
80.8	80.8	1.0004		
40.4	40.5	0.9985	Slope	0.998564
20.4	20.3	1.0030		
			Intercept	0.095784







Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May-26-15	Last Calibration	April-13-15
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	13:35
Gas Cert Reference		Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
ZAG make/model	Teledyne API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	Serial Number	9037

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	0.990484	0.997037	Fuel Pressure	23.0	23.0
Calculated intercept	0.066877	0.015438	Analyzer Coeff	4.6	4.6
			Analyzer BKG	3.541	3.496
Analyzer make	Thermo 51i-LT		Analyzer serial #	1336160089	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.01	----
as found span	5000	58.3	12.74	12.88	0.989
calibrator zero	5000	0.0	0.00	-0.05	----
high point	5000	58.3	12.74	12.73	1.000
second point	5000	29.2	6.38	6.43	0.992
third point	5000	14.7	3.21	3.22	0.997
as left zero	5000	0.0	0.00	-0.10	----
as left span	5000	58.3	12.74	12.52	1.017
Average Correction Factor					0.997

Corrected As found	12.87	Previous response	12.79	% change	-0.6%
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Notes:

Filter changed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



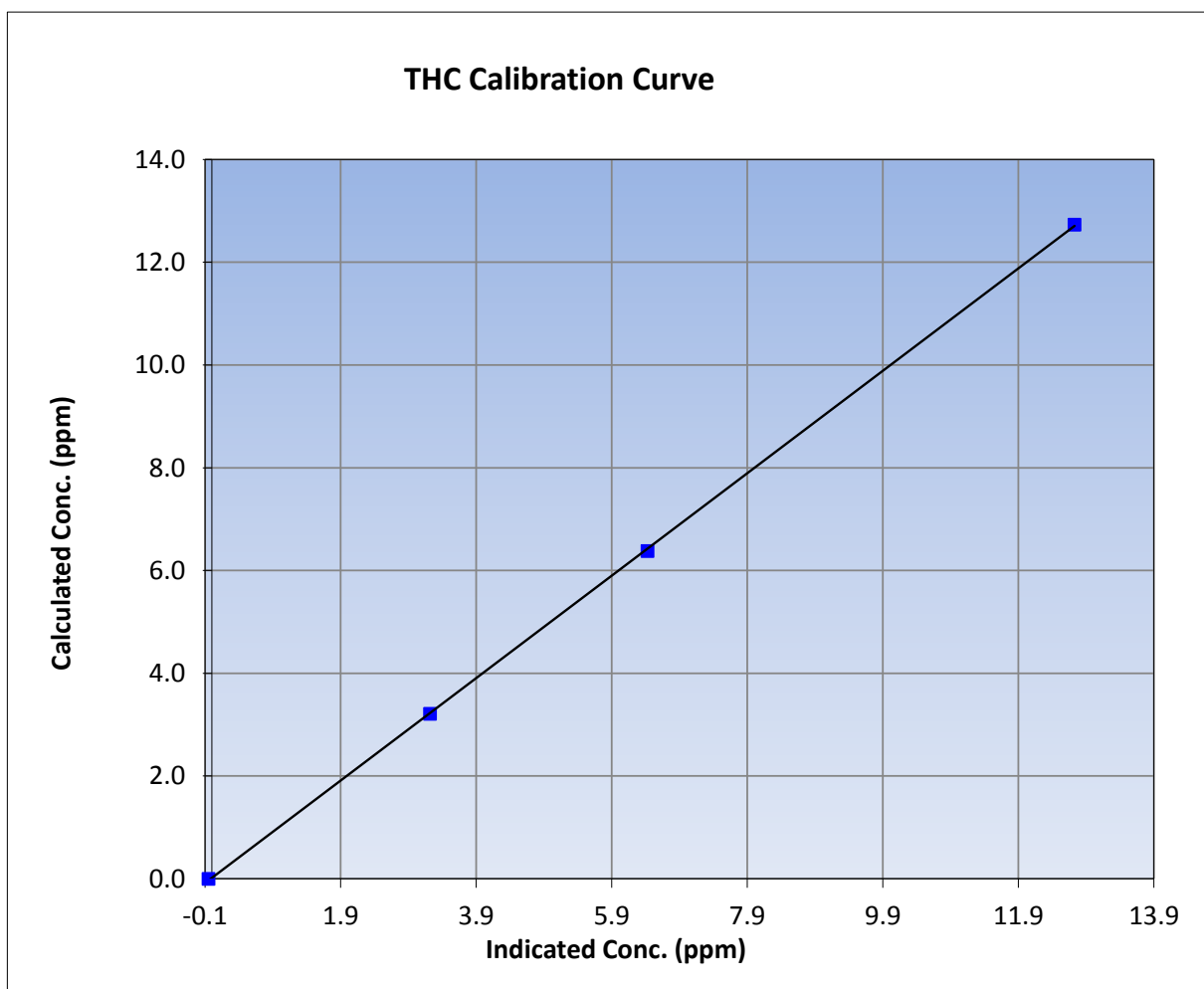
Wood Buffalo Environmental Association THC Calibration Report

Station Information

Calibration Date	May 26, 2015	Previous Calibration	April 13, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:30	End Time (MST)	13:35
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

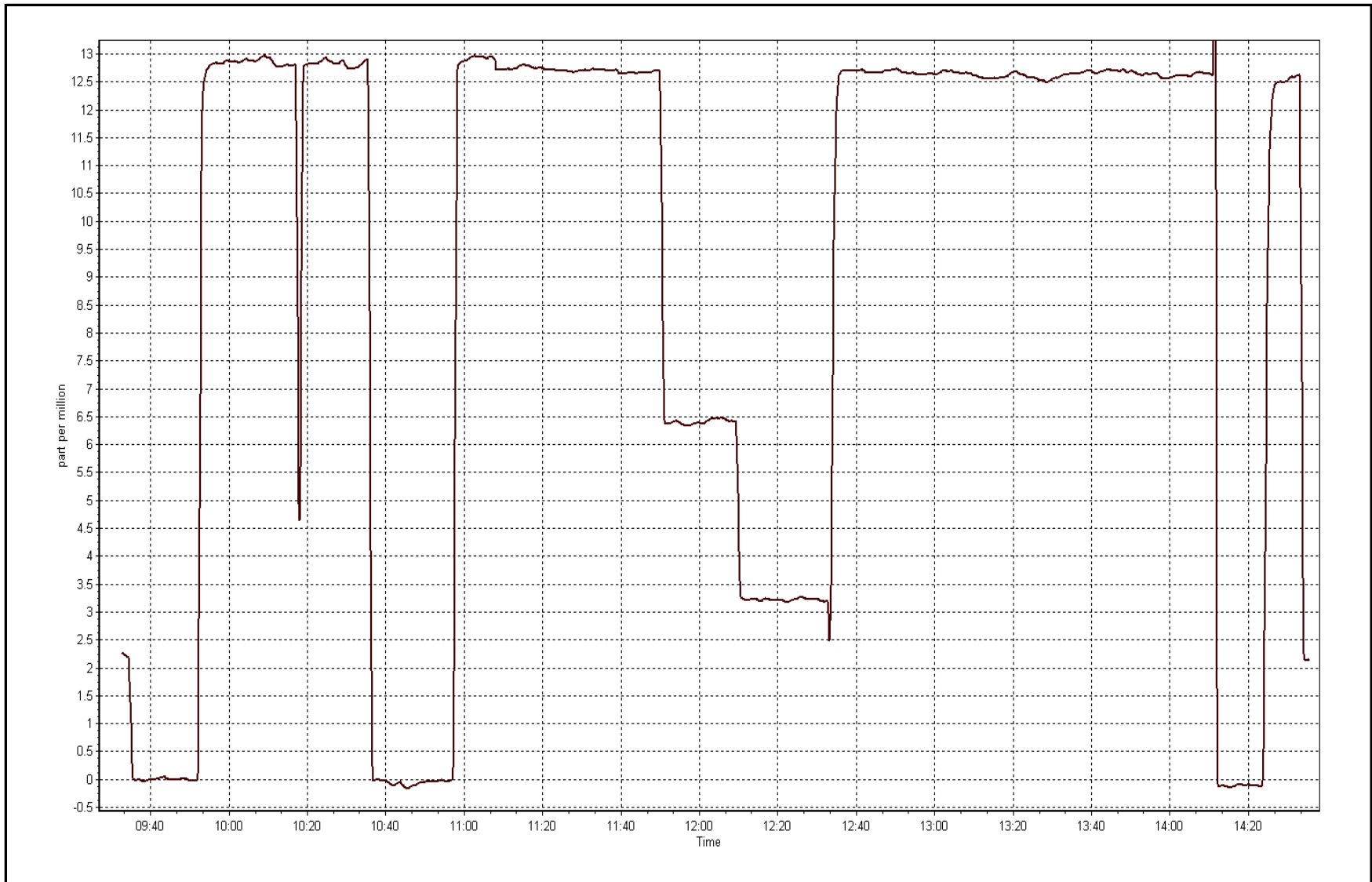
Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.05	----	Correlation Coefficient	0.999950
12.74	12.73	1.0004		
6.38	6.43	0.9920	Slope	0.997037
3.21	3.22	0.9973		
			Intercept	0.015438



THC Calibration Plot

Date: May 26, 2015





Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 26, 2015	Previous Calibration	April 22, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	14:35
NO Cal Gas Conc	51.5 ppm	Gas Cert Reference	SA130123A
NOx Cal Gas Conc	51.5 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	API T700	Serial Number	996
Zero air Generator	Teledyne API T701	Serial Number	4891

DACs Information

DACs make & model	Campbell Scientific CR3000	DACs serial No.	9037
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998802	1.000080	0.992229
	Data Offset	-0.945586	-0.628588	-1.094413
Current Calibration	Data Slope	0.997654	0.997733	1.035223
	Data Offset	-3.914464	-3.578982	-1.639576

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.924		1.042	
NOx coefficient	1.001		1.001	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.9		4.4	
NOx bkgrnd	4.0		4.5	
Chamber Temp	50.8	Deg C	50.3	Deg C
Moly Temp	326	Deg C	324.2	Deg C
PMT voltage	-780	V	-780.3	V
PMT Temp	-2.7	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	169.2	mmHg	186.2	mmHg
R Cell Press Nox	169.2	mmHg	186.2	mmHg
NO sample flow	0.605	lpm	0.53	lpm
Nox sample Flow	0.603	lpm	0.533	lpm

Notes:

Filter changed after as founds. Exhaust line was found to be rubbing against another pump and melted half way through. Cut off this section of line and moved the charcoal scrubber and Nox pump up to the next shelf. Span adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date: May 26, 2015 Station Number: AMS 19

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
as found span	5000	58.3	600.5	600.5	0.0	571.1	569.3	1.8	1.0515	1.0548
calibrator zero	5000	0.0	0.0	0.0	0.0	0.3	0.2	0.1	----	----
high point	5000	58.3	600.5	600.5	0.0	602.9	602.7	0.2	0.9960	0.9964
second point	5000	29.2	300.8	300.8	0.0	310.2	309.7	0.5	0.9695	0.9712
third point	5000	14.7	151.4	151.4	0.0	157.5	156.9	0.6	0.9615	0.9652
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.2	0.1	----	----
as left span	5000	58.3	600.5	281.0	319.5	610.0	280.9	330.5	0.9844	1.0004
Average Correction Factor									0.9757	0.9776

Corrected As found NO_x= 571.2 NO= 569.3 Percent Change NO_x= 5.4% NO= 5.6%
 Previous Response NO_x= 602.2 NO= 601.1

GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 58.30 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO2 (300)	----	281.0	333.0	612.0	281.0	326.0	0.9699	1.0000	1.0215	97.9%
2nd NO2 (200)	----	382.6	231.4	612.0	382.6	217.7	0.9699	1.0000	1.0628	94.1%
3rd NO2 (100)	----	502.0	112.0	612.0	502.0	115.9	0.9699	1.0000	0.9661	103.5%
4th NO2 (0)	614.0	----	1.0	615.0	614.0	1.0	0.9652	1.0000	N/A	----
Average Correction Factor							0.9687	1.0000	1.0168	98.5%

Calibration Performed By: Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

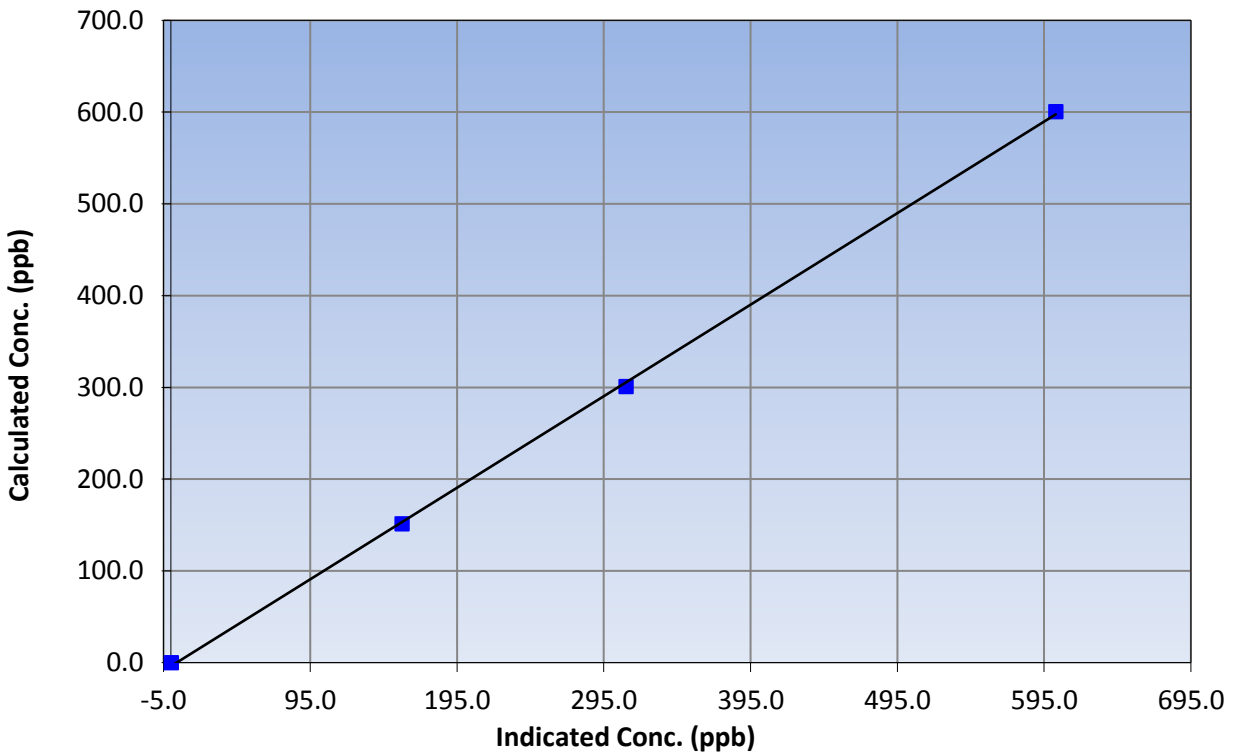
Station Information

Calibration Date	May 26, 2015	Previous Calibration	April 22, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:30	End Time (MST)	14:35
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999755
600.5	602.9	0.9960		
300.8	310.2	0.9695	Slope	0.997654
151.4	157.5	0.9615		
			Intercept	-3.914464

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

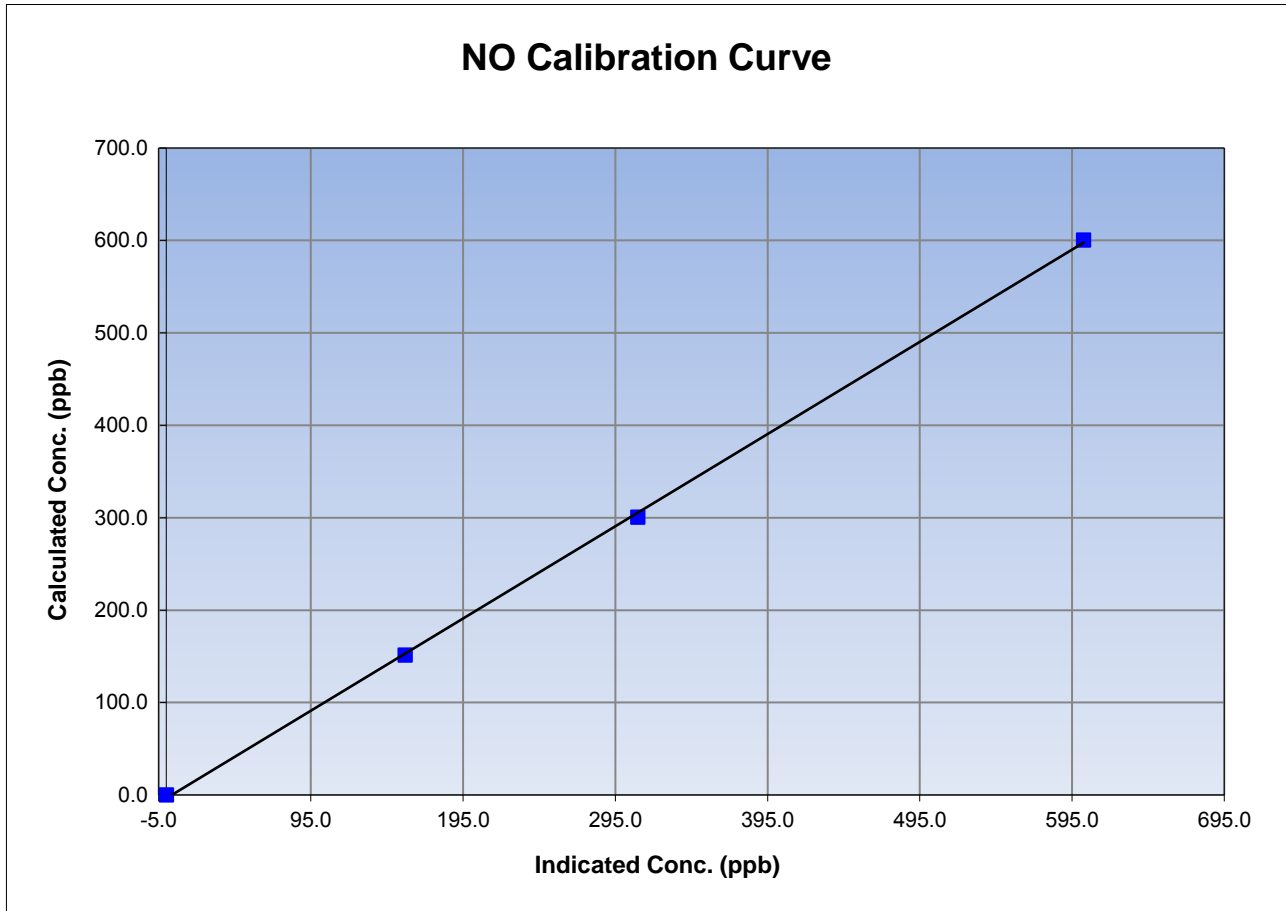
Station Information

Calibration Date	May 26, 2015	Previous Calibration	April 22, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:30	End Time (MST)	14:35
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	0.999781
600.5	602.7	0.9964		
300.8	309.7	0.9712	Slope	0.997733
151.4	156.9	0.9652		
			Intercept	-3.578982

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

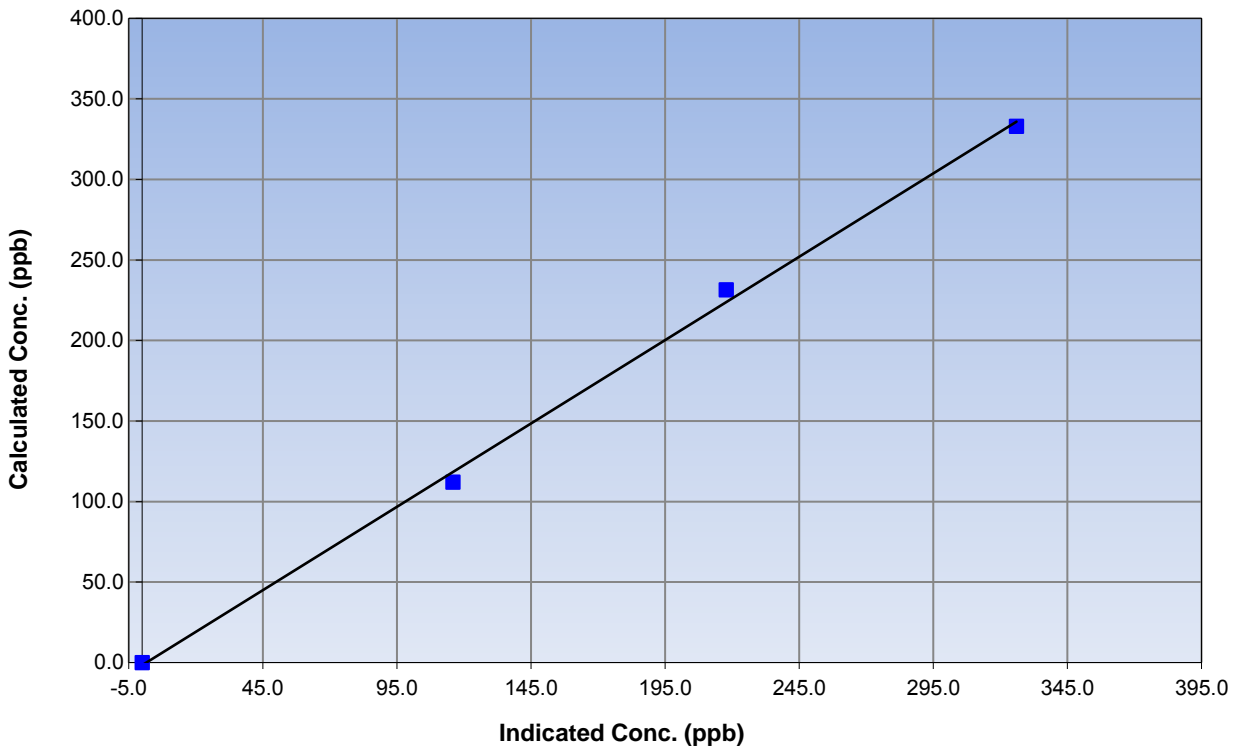
Station Information

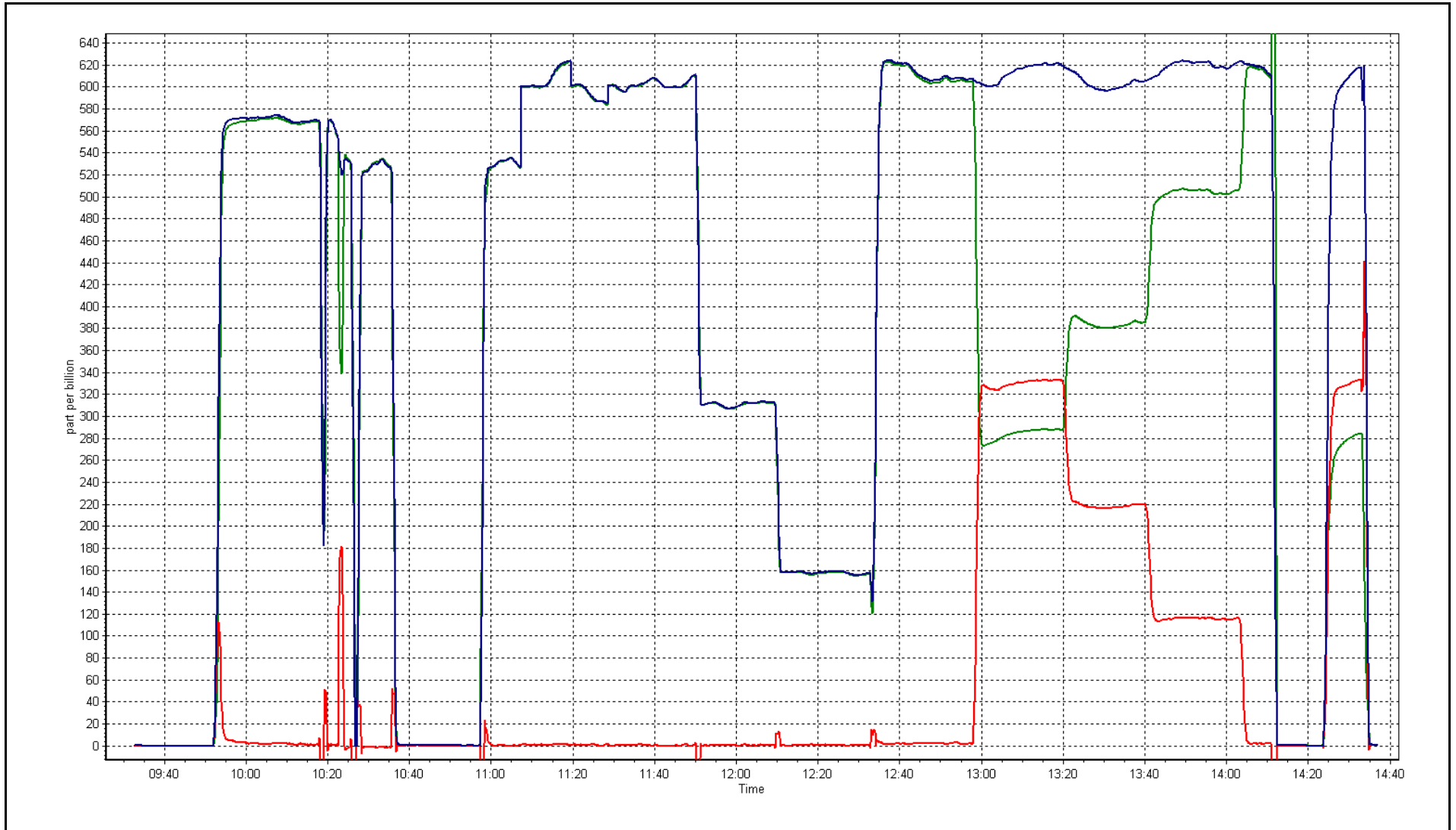
Calibration Date	May 26, 2015	Previous Calibration	April 22, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:30	End Time (MST)	14:35
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.998248
333.0	326.0	1.0215		
231.4	217.7	1.0628	Slope	1.035223
112.0	115.9	0.9661		
			Intercept	-1.639576

NO₂ Calibration Curve







Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 27, 2015	Previous Calibration	May 26, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:55	End Time (MST)	14:30
NO Cal Gas Conc	51.5 ppm	Gas Cert Reference	SA130123A
NOx Cal Gas Conc	51.5 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	API T700	Serial Number	996
Zero air Generator	Teledyne API T701	Serial Number	4891

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9037
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997654	0.997733	1.035223
	Data Offset	-3.914464	-3.578982	-1.639576
Current Calibration	Data Slope	0.999453	0.999861	1.020108
	Data Offset	-1.195290	-0.843410	-0.907039

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	1.042		0.867	
NOx coefficient	1.001		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.4		3.7	
NOx bkgrnd	4.5		3.8	
Chamber Temp	50.3	Deg C	50.6	Deg C
Moly Temp	324.2	Deg C	323.4	Deg C
PMT voltage	-780.3	V	-780	V
PMT Temp	-3.1	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	186.2	mmHg	160.8	mmHg
R Cell Press Nox	186.2	mmHg	160.8	mmHg
NO sample flow	0.53	lpm	0.649	lpm
Nox sample Flow	0.533	lpm	0.650	lpm

Notes:

Recalibration. Pump and Charcoal Scrubber changed after as founds. Second high NO point used for GPT portion. Span was adjusted.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 27, 2015

Station Number:

AMS 19

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as found span	5000	58.3	600.5	600.5	0.0	629.0	627.1	1.9	0.9547	0.9576
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
high point	5000	58.3	600.5	600.5	0.0	601.1	600.8	0.4	0.9989	0.9996
second point	5000	29.2	300.8	300.8	0.0	303.7	302.9	0.8	0.9904	0.9930
third point	5000	14.7	151.4	151.4	0.0	153.1	152.4	0.7	0.9890	0.9934
as left zero	5000	0.0	0.0	0.0	0.0	0.2	0.2	0.0	----	----
as left span	5000	58.3	600.5	278.6	321.9	609.4	281.8	327.6	0.9854	0.9889
Average Correction Factor									0.9928	0.9953

Corrected As found

NO_x= 629.0

NO= 627.1

Percent Change

NO_x= -3.7%

NO= -3.5%

Previous Response

NO_x= 605.8

NO= 605.4

GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

58.30

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	278.6	325.5	598.5	278.6	319.9	0.9917	1.0000	1.0174	98.3%
2nd NO2 (200)	----	383.4	220.7	599.7	383.4	216.3	0.9897	1.0000	1.0202	98.0%
3rd NO2 (100)	----	491.9	112.2	604.6	491.9	112.7	0.9818	1.0000	0.9956	100.4%
4th NO2 (0)	604.1	----	1.9	606.0	604.1	1.9	0.9796	1.0000	N/A	----
Average Correction Factor							0.9857	1.0000	1.0110	98.9%

Calibration Performed By:

Devin Russell



Wood Buffalo Environmental Association

NO_x Calibration Summary

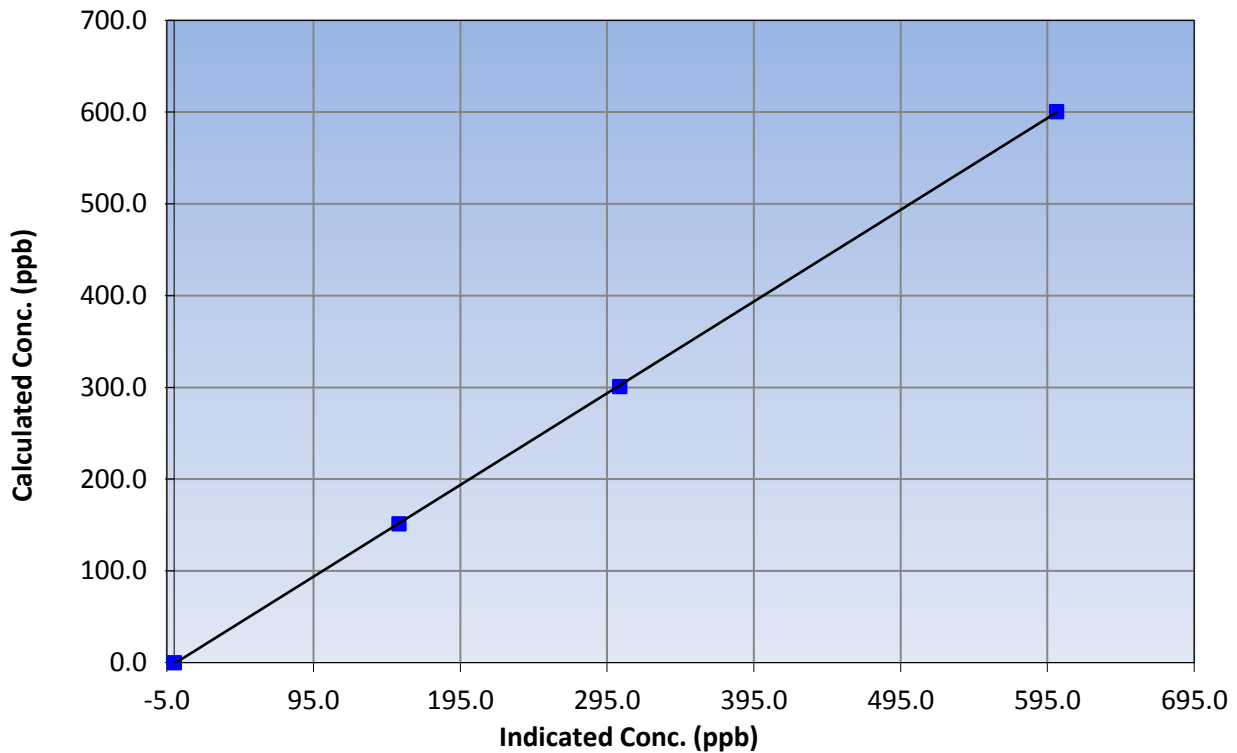
Station Information

Calibration Date	May 27, 2015	Previous Calibration	May 26, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:55	End Time (MST)	14:30
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	----	Correlation Coefficient	0.999977
600.5	601.1	0.9989		
300.8	303.7	0.9904	Slope	0.999453
151.4	153.1	0.9890		
			Intercept	-1.195290

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

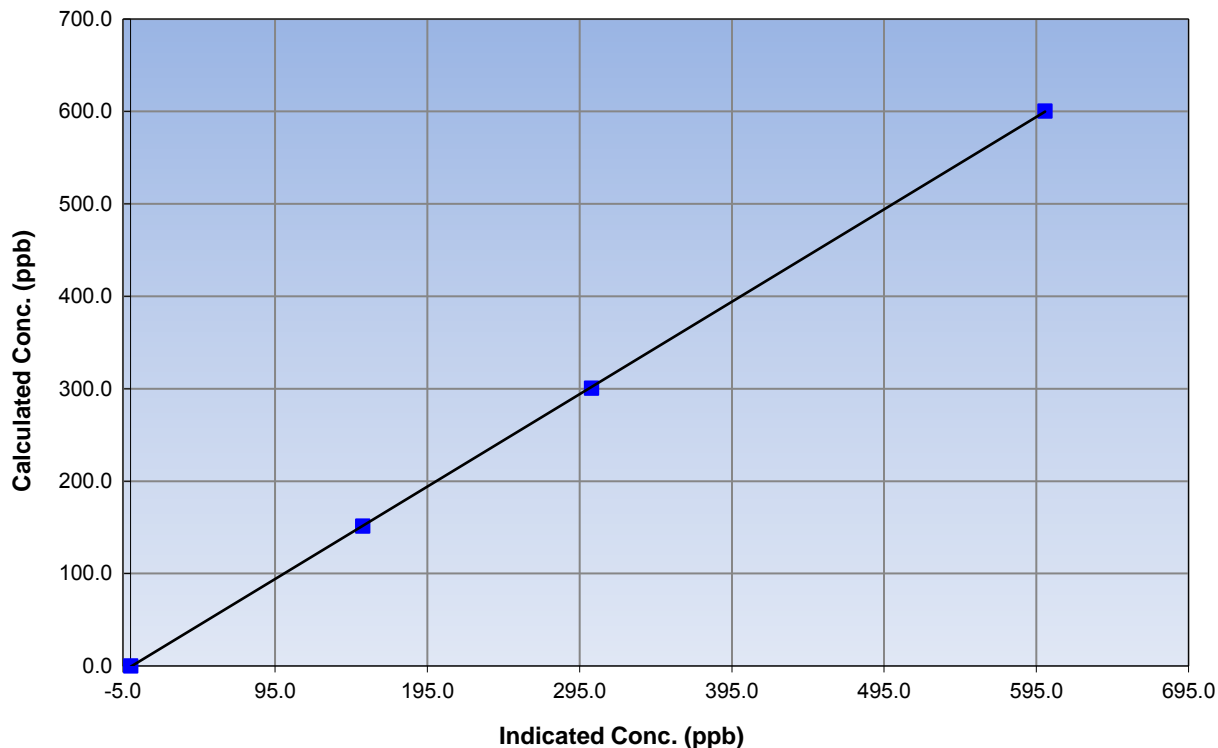
Station Information

Calibration Date	May 27, 2015	Previous Calibration	May 26, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:55	End Time (MST)	14:30
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	0.999987
600.5	600.8	0.9996		
300.8	302.9	0.9930	Slope	0.999861
151.4	152.4	0.9934		
			Intercept	-0.843410

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

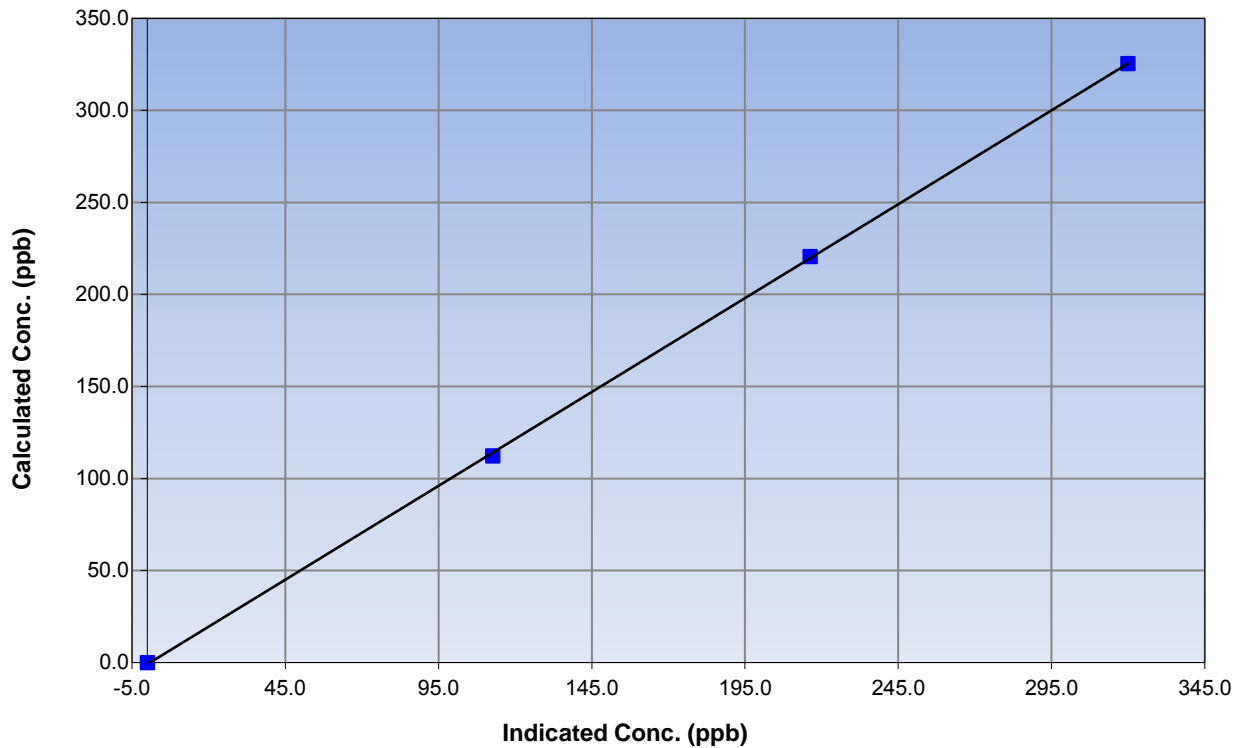
Station Information

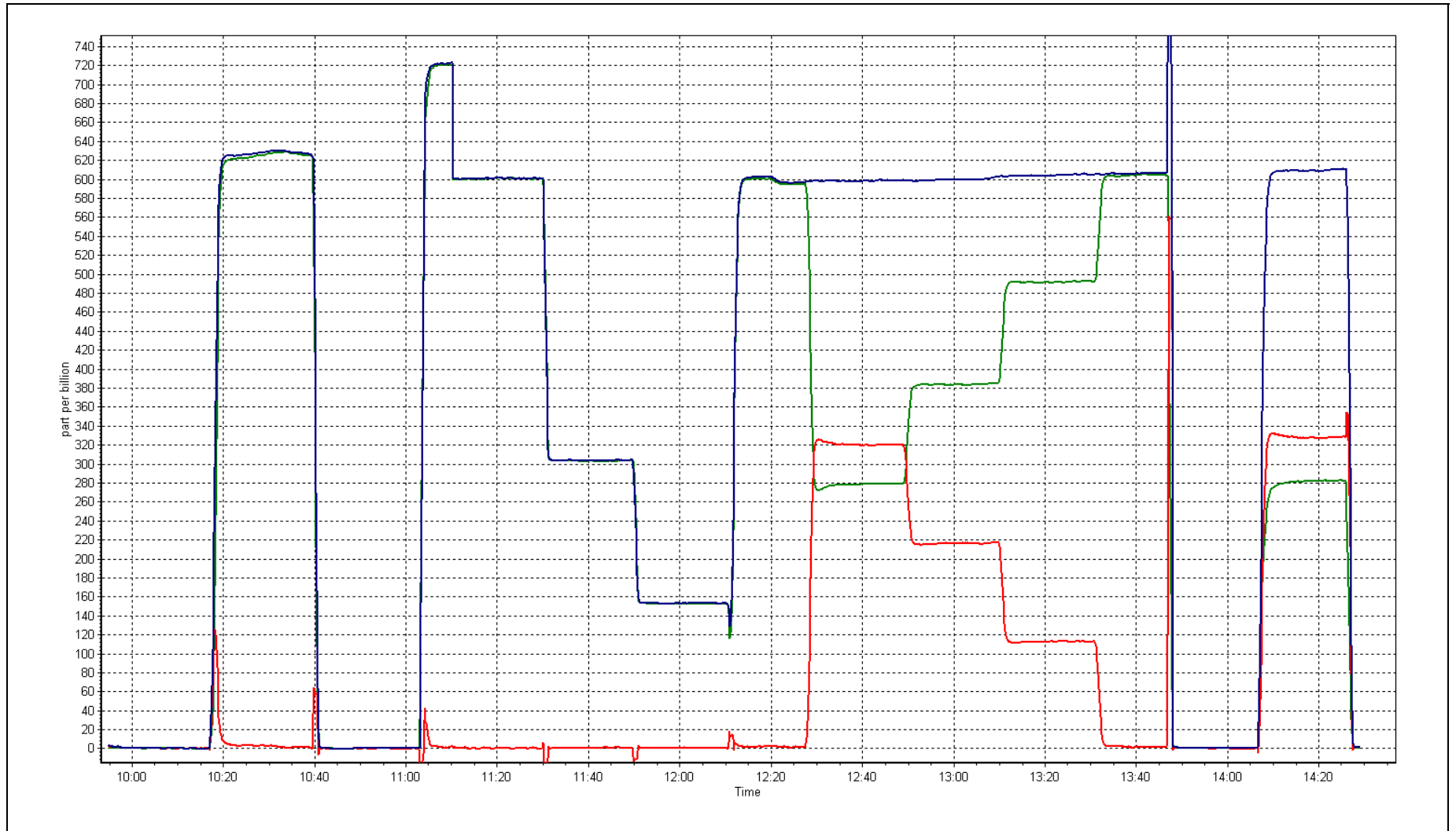
Calibration Date	May 27, 2015	Previous Calibration	May 26, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:55	End Time (MST)	14:30
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999913
325.5	319.9	1.0174		
220.7	216.3	1.0202	Slope	1.020108
112.2	112.7	0.9956		
			Intercept	-0.907039

NO₂ Calibration Curve







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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION

CONTINUOUS AMBIENT AIR QUALITY
MONITORING PROGRAM
MONTHLY REPORT

**AMS 502
CONOCOPHILLIPS
SURMONT
MAY 2015**

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

June 24, 2015



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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
MAY 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	654	38	90	93.01	8	0	2	0
H2S (ppb) Average	702	36	42	99.19	3	0	1	0
NO2 (ppb) Average	707	37	37	100.00	19	0	4	-
NO (ppb) Average	707	37	37	100.00	10	-	3	-
NOX (ppb) Average	707	37	37	100.00	22	-	6	-
Temperature 2 m (C) Average	744	0	0	100.00	25.5	-	21.2	-
Relative Humidity (%) Average	744	0	0	100.00	100	-	95.0	-
Wind Speed 10 m (km/h) Average	741	0	3	99.60	30	-	20.0	-
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 - CONOCOPHILLIPS SURMONT (AMS 502)
MAY 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	654	0.6	1	-	0	0	0	0	1	1	8
H2S (ppb) Average	702	0.3	0	-	0	0	0	0	0	1	3
NO2 (ppb) Average	707	1.7	2	-	0	0	1	1	2	4	19
NO (ppb) Average	707	1.1	1	-	0	0	0	1	1	2	10
NOX (ppb) Average	707	2.8	3	-	0	1	1	2	3	6	22
Temperature 2 m (C) Average	744	10.58	7.2	-	-2.1	0.4	4.8	10.2	16.5	21	25.5
Relative Humidity (%) Average	744	45.8	24	-	13	20	26	40	60	89	100
Wind Speed 10 m (km/h) Average	741	11.8	5	-	1	6	8	11	15	19	30
Wind Direction 10 m (deg) Average	741	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)
MAY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	05 May 2015 06:00	05 May 2015 17:00	12	Intermittent unstable operation - excessive baseline drift
SO2	11 May 2015 06:00	11 May 2015 09:00	4	Intermittent unstable operation - excessive baseline drift
SO2	17 May 2015 06:00	17 May 2015 17:00	12	Intermittent unstable operation - excessive baseline drift
SO2	23 May 2015 06:00	23 May 2015 17:00	12	Intermittent unstable operation - excessive baseline drift
SO2	29 May 2015 06:00	29 May 2015 17:00	12	Intermittent unstable operation - excessive baseline drift
H2S	13 May 2015 17:00	13 May 2015 17:00	1	Intermittent unstable operation - excessive baseline drift
H2S	20 May 2015 13:00	20 May 2015 13:00	1	Intermittent unstable operation - excessive baseline drift
H2S	23 May 2015 13:00	23 May 2015 13:00	1	Intermittent unstable operation - excessive baseline drift
H2S	26 May 2015 11:00	26 May 2015 13:00	3	Maintenance - sample manifold cleaned
Wind Speed, Wind Direction	03 May 2015 04:00	03 May 2015 06:00	3	Flat line in sensor output signal



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 8 ppb on May 25 16:00	Maximum Daily Average: 1.5 ppb on May 2		Hours of Data:	654
Minimum Value: 0 ppb on May 4 14:00	Minimum Daily Average: 0.1 ppb on May 4		Hours of Missing Data:	90
Maximum Diurnal Average: 1.2 ppb at hour 16	Minimum Diurnal Average: 0.3 ppb at hour 4		Hours of Calibration:	38
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		Percent Operational Time:	93.0

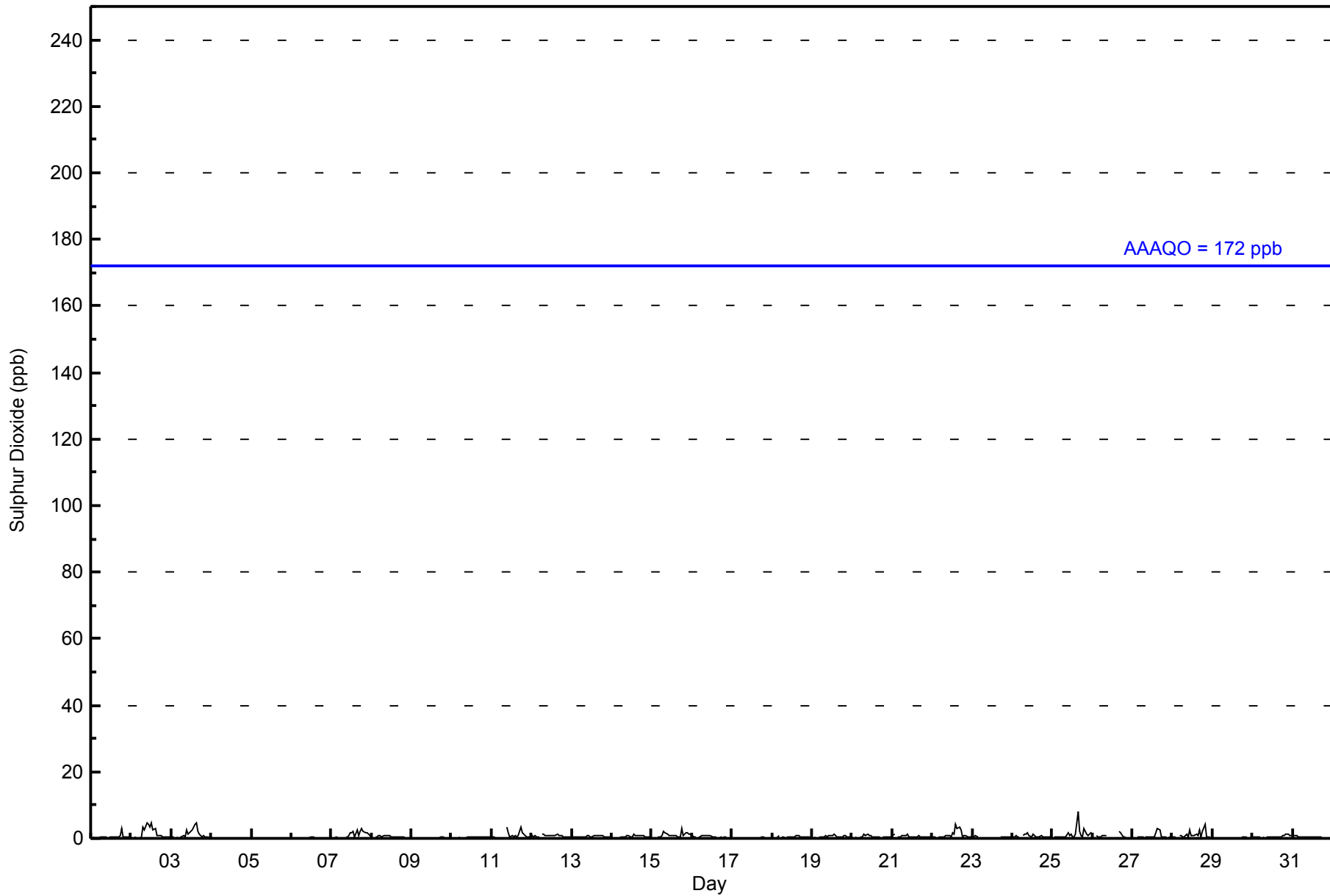
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	1	1	0	0	0.4	3																						
2-May	0	Z	0	0	0	0	0	4	3	4	4	3	5	3	3	1	1	1	1	0	0	0	0	0	1.5	5																						
3-May	0	0	Z	0	0	0	0	1	0	3	1	2	2	3	4	5	2	1	0	1	1	0	0	0	1.3	5																						
4-May	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																						
5-May	0	0	0	0	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	0	0	0	0	0	--	0																						
6-May	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																						
7-May	Z	0	0	0	0	0	0	0	0	1	2	2	2	1	2	1	2	2	3	2	2	2	1	1	1.0	3																						
8-May	1	Z	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1																						
9-May	0	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-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																						
11-May	0	0	0	0	Z	UO	UO	UO	UO	3	2	0	1	0	1	0	1	3	2	1	1	0	1	1	1.0	3																						
12-May	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.8	1																						
13-May	Z	0	1	1	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.6	1																						
14-May	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.5	1																						
15-May	0	0	Z	0	0	0	1	2	2	1	1	1	1	1	1	1	1	1	3	1	2	2	1	1	1.0	3																						
16-May	1	0	0	Z	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
17-May	0	0	0	0	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	0	0	0	0	0	--	0																						
18-May	0	0	0	0	1	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0.4	1																						
19-May	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	1	1	1	0	0	0	0.5	1																						
20-May	0	Z	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1																						
21-May	1	1	Z	1	0	0	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0.6	1																						
22-May	0	0	0	Z	0	0	0	0	1	1	1	1	2	1	4	3	3	2	1	1	1	0	0	0	1.1	4																						
23-May	1	1	1	0	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	0	0	0	1	0	--	1																						
24-May	0	0	1	0	1	Z	1	1	1	2	1	1	1	1	0	0	0	1	0	0	1	1	1	1	0.7	2																						
25-May	Z	1	0	0	0	0	1	0	0	2	1	1	0	0	1	8	2	1	0	3	1	1	1	2	1.2	8																						
26-May	1	Z	1	1	0	1	1	1	1	C	C	C	C	C	C	C	2	2	0	0	0	0	0	0	--	2																						
27-May	0	0	Z	0	0	0	0	0	0	0	0	1	1	0	2	3	3	1	0	0	0	0	0	0	0.6	3																						
28-May	0	0	0	Z	1	1	1	0	1	0	2	1	1	1	1	3	1	2	4	0	0	0	0	0	1.0	4																						
29-May	0	0	0	0	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	0	0	0	0	0	--	0																						
30-May	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																						
31-May	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																						
																								0.4	0.3	0.3	0.3	0.3	0.3	0.5	0.7	0.7	1.0	0.9	0.7	0.8	0.8	1.0	1.2	1.0	0.7	0.7	0.7	0.5	0.4	0.4	0.4	Diurnal Average
																								1	1	1	1	1	1	1	4	3	4	4	3	5	3	4	8	3	3	3	4	2	2	1	2	Diurnal Maximum

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



WBEA
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - May 2015





WBEA
Cumulative Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 10	654	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: 654

Total Number of Hours: 744



WBEA
Frequency Distribution

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	34	23	23	32	24	48	53	43	32	54	85	37	21	19	43	80	651
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	34	23	23	32	24	48	53	43	32	54	85	37	21	19	43	80	651

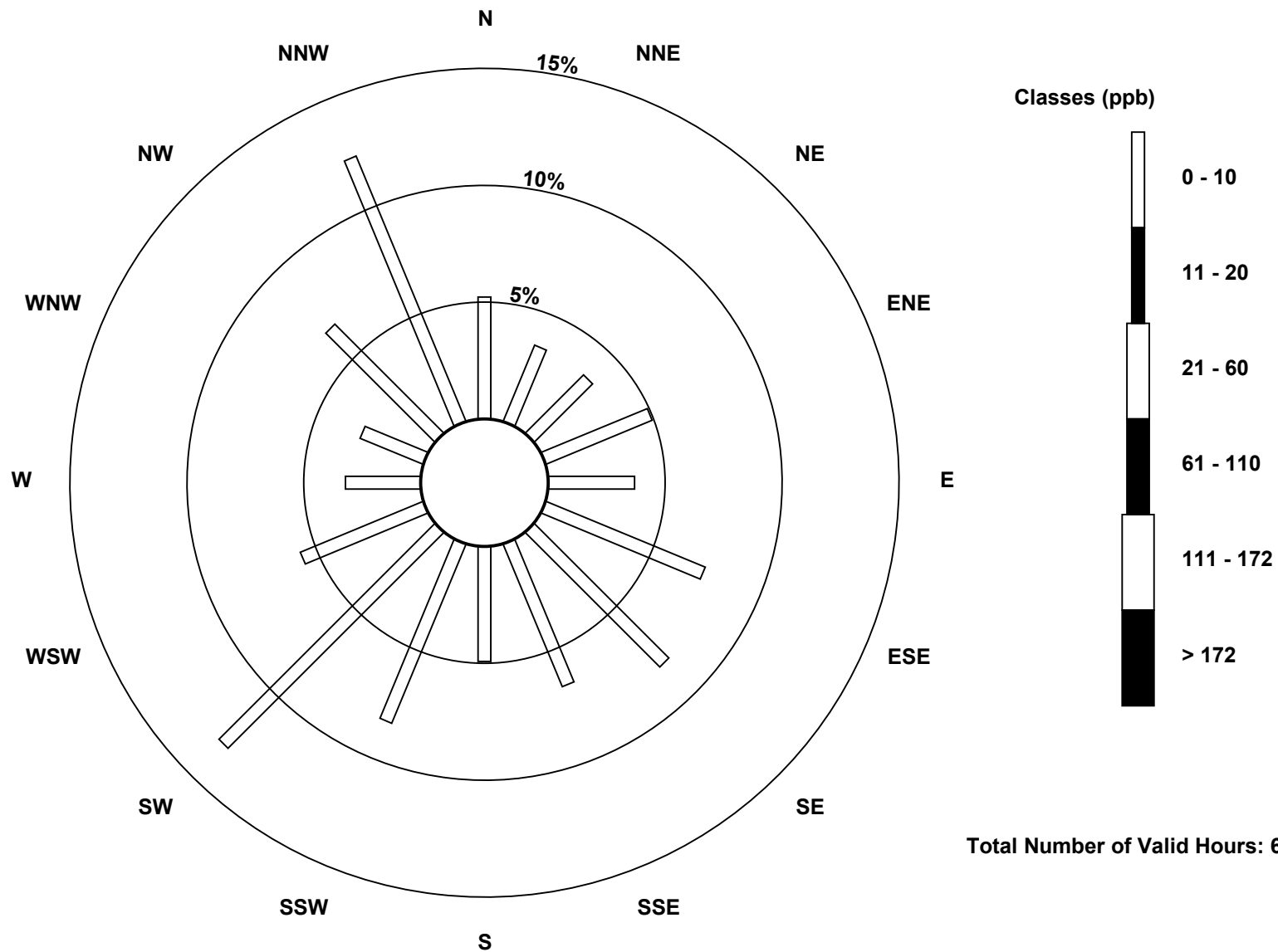
Total Number of Valid Hours: 651

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

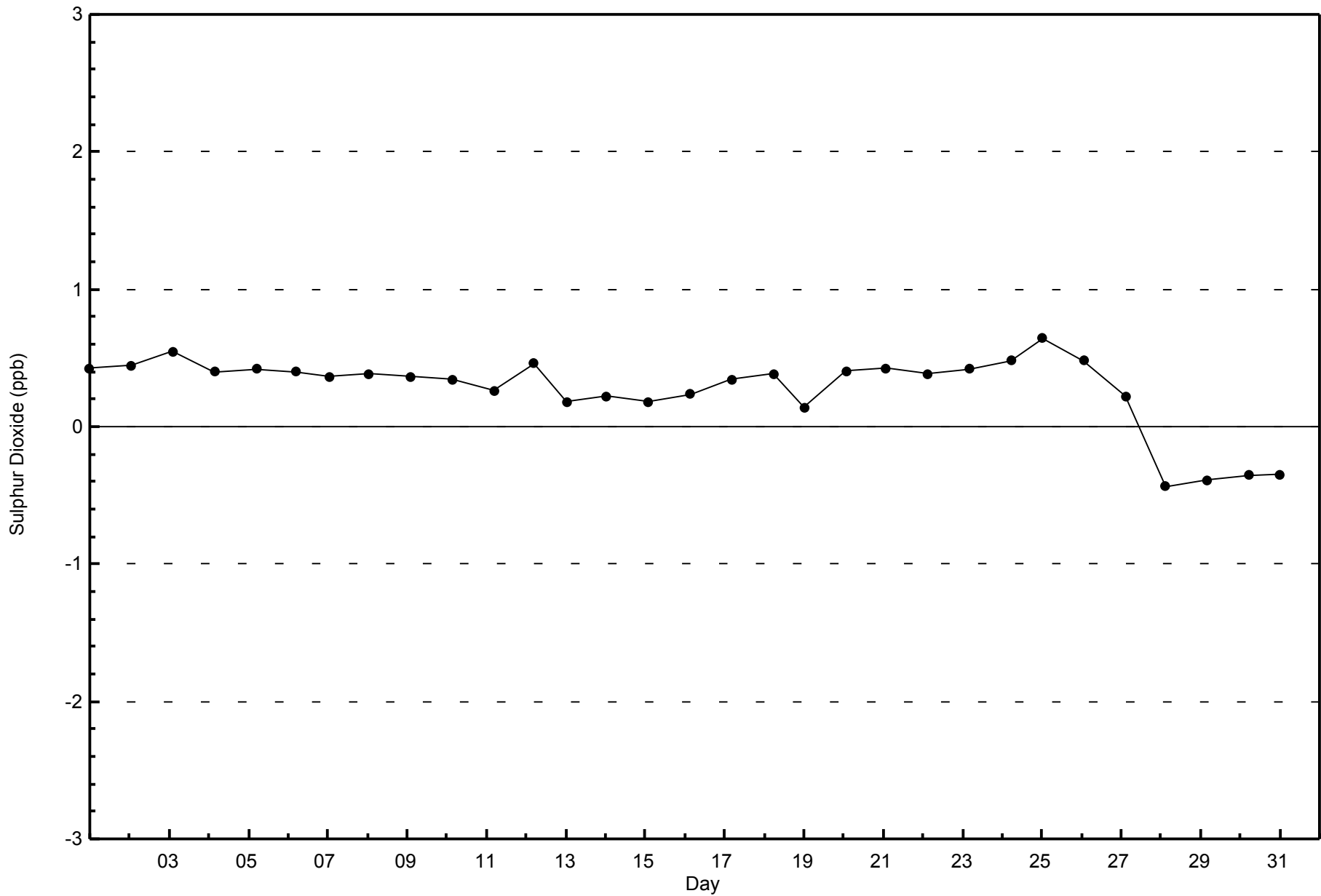
Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont (AMS502)





WBEA
Zero Responses

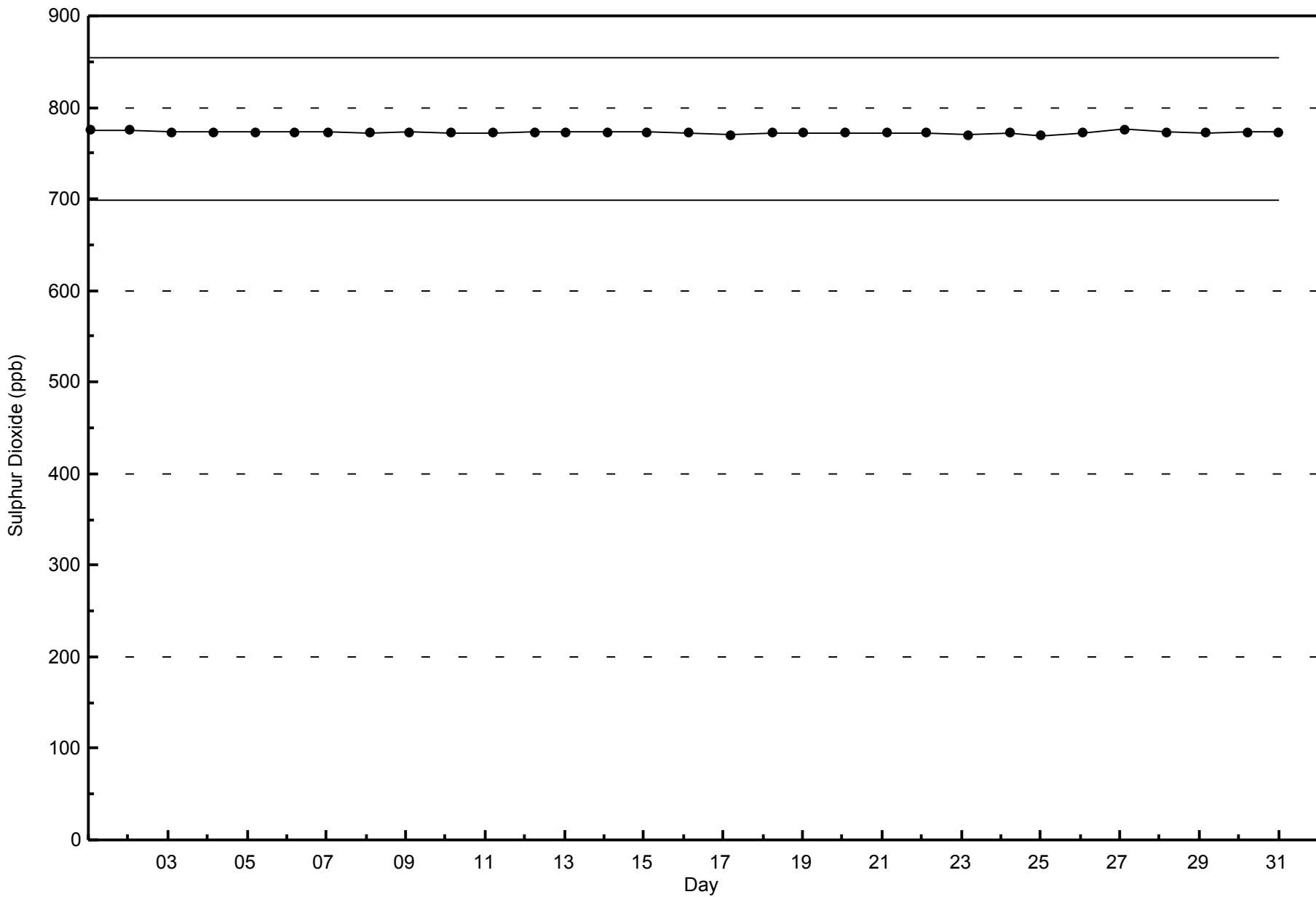
Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - May 2015





WBEA
Span Responses

Sulphur Dioxide (SO₂) - ppb
ConocoPhillips - Surmont - May 2015



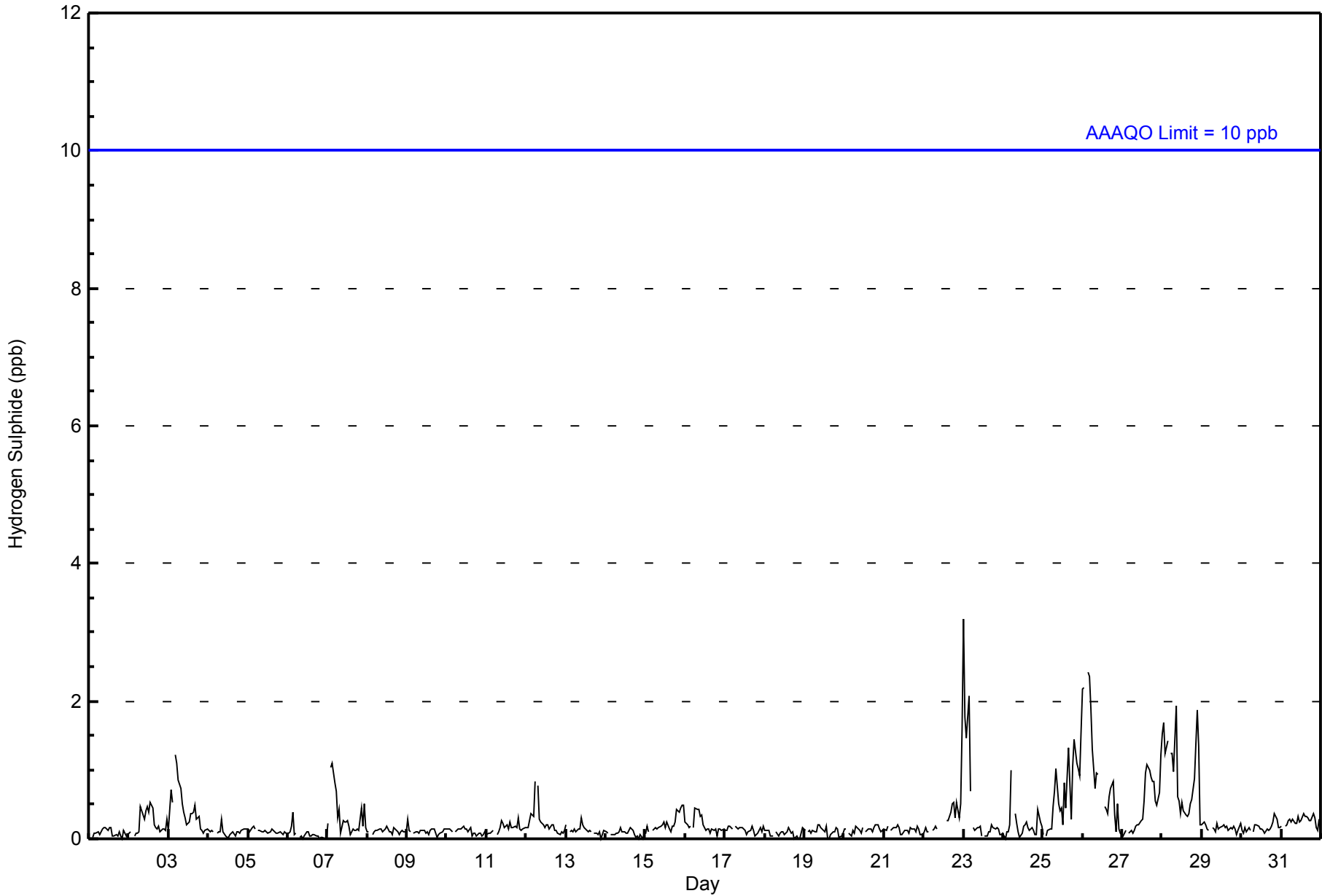


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 744										Daily Average	Daily Maximum					
Maximum Value: 3 ppb on May 23 01:00										Maximum Daily Average: 1.0 ppb on May 26												Hours of Data: 702				
Minimum Value: 0 ppb on May 1 21:00										Minimum Daily Average: 0.1 ppb on May 6										Hours of Missing Data: 42						
Maximum Diurnal Average: 0.4 ppb at hour 4										Minimum Diurnal Average: 0.2 ppb at hour 12										Hours of Calibration: 36						
Monthly Average: 0.3 ppb										Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 0 Q ₃ = 0 P ₉₀ = 1 P ₉₉ = 2										Percent Operational Time: 99.2						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-May	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
3-May	0	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
4-May	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
5-May	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
6-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-May	0	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1
8-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-May	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
10-May	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
11-May	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-May	0	0	0	0	0	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
13-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	UO	0	0	0	0	0	0	0	0.1	0
14-May	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-May	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
16-May	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
17-May	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
18-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-May	0	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-May	0	0	Z	0	0	0	0	0	0	0	0	0	UO	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-May	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
22-May	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	1	1	0	1	0	1	2	0.3	2
23-May	3	2	1	2	1	Z	0	0	0	0	0	0	UO	0	0	0	0	0	0	0	0	0	0	0	0.5	3
24-May	0	0	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
25-May	0	Z	0	0	0	0	0	1	1	0	0	0	0	1	0	1	1	0	1	1	1	1	1	2	0.7	2
26-May	2	2	Z	2	2	2	1	1	1	1	M	M	M	0	0	0	1	1	1	0	0	1	0	0	1.0	2
27-May	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	1	0.5	1
28-May	2	2	1	1	Z	1	1	1	2	1	1	0	1	0	0	0	1	1	1	1	1	2	1	0	0.9	2
29-May	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
30-May	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
31-May	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
																								0.3	0.3	
																								3	2	
Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation																								Diurnal Average		
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																								Diurnal Maximum		



WBEA
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - May 2015





WBEA
Cumulative Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 2	701	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: 702

Total Number of Hours: 744



WBEA
Frequency Distribution

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	36	34	28	33	31	58	56	42	35	52	88	38	22	19	42	85	699
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	36	34	28	33	31	58	56	42	35	52	88	38	22	19	43	85	700

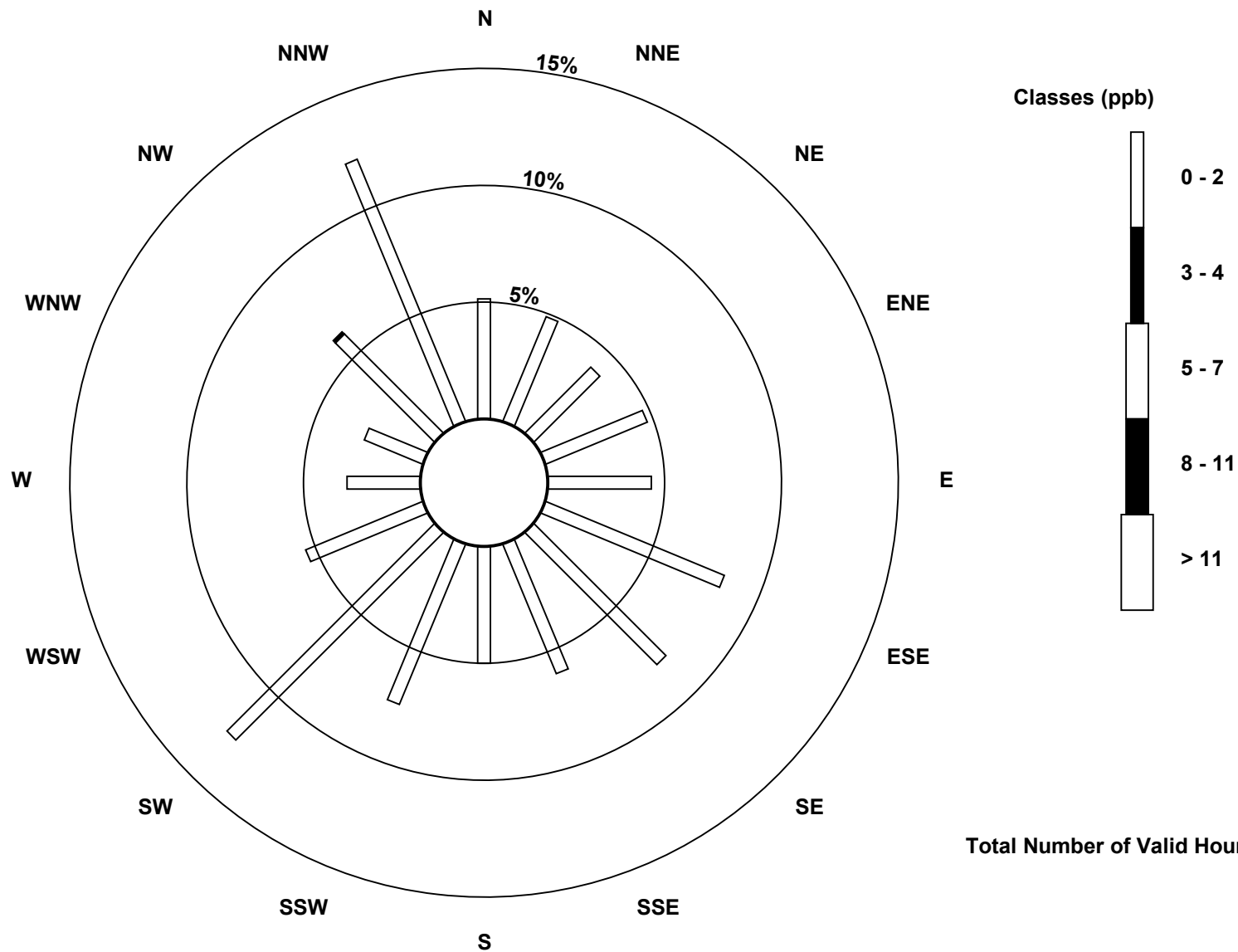
Total Number of Valid Hours: 700

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

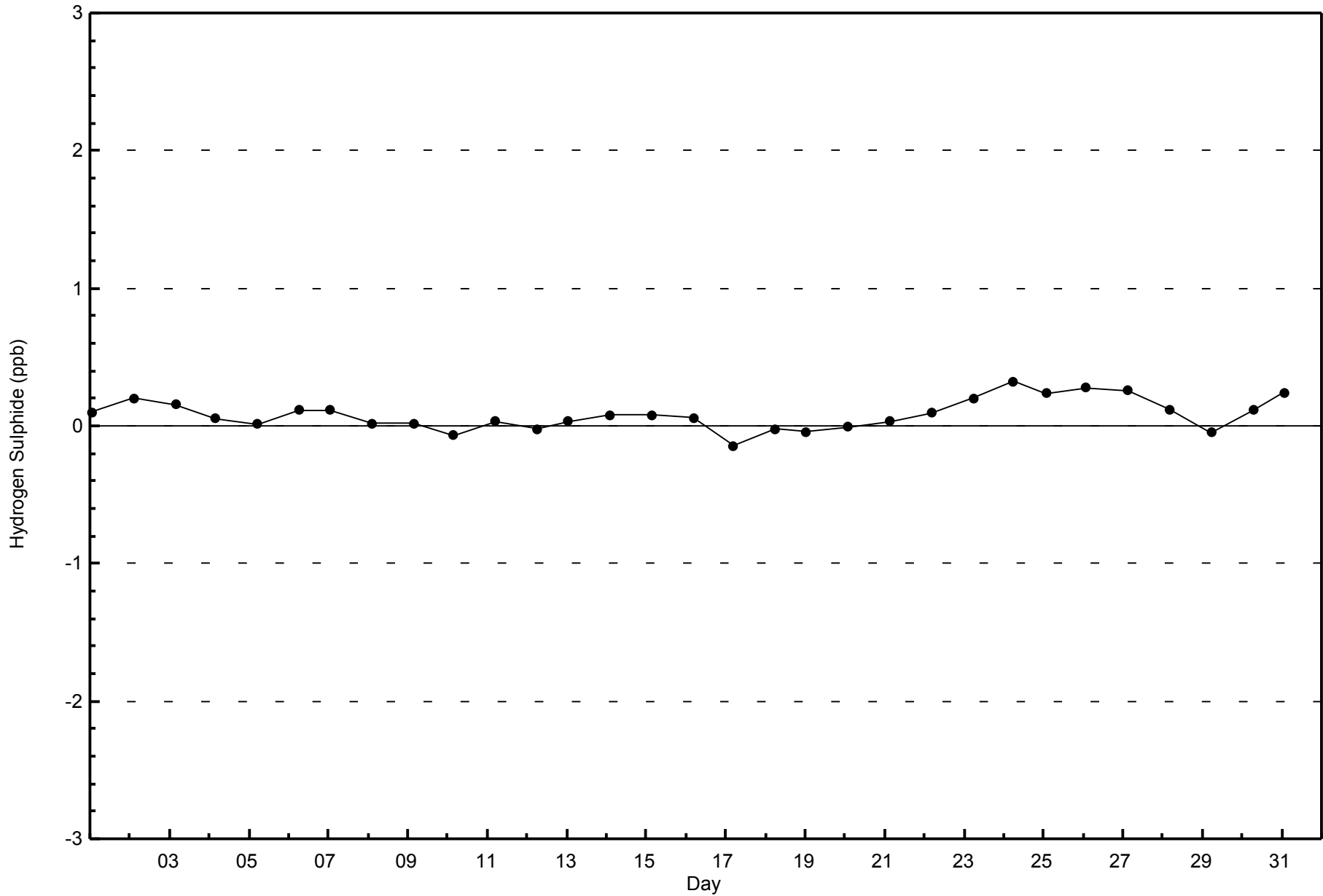
Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont (AMS502)





WBEA
Zero Responses

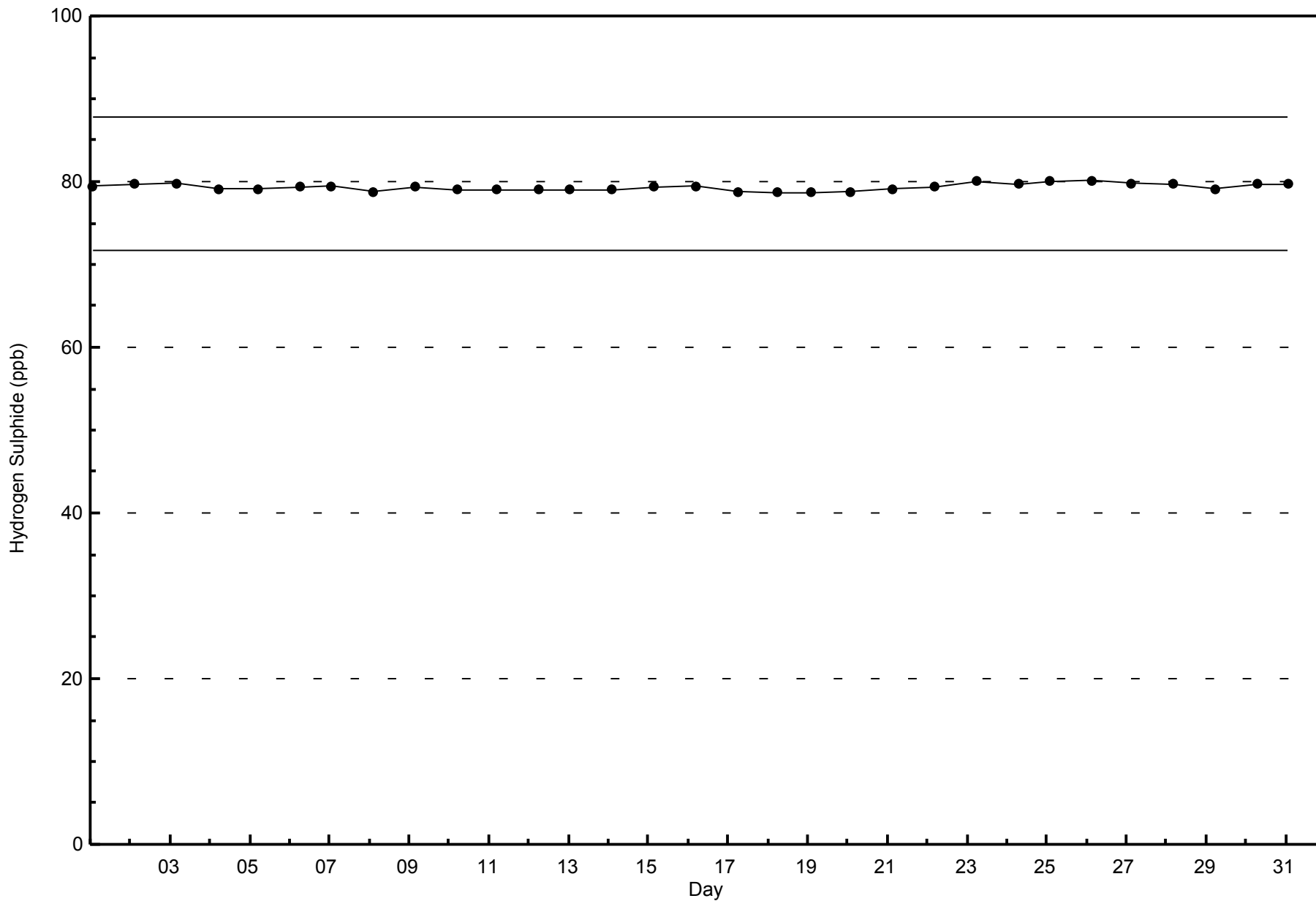
Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surrmont - May 2015





WBEA
Span Responses

Hydrogen Sulphide (H₂S) - ppb
ConocoPhillips - Surmont - May 2015



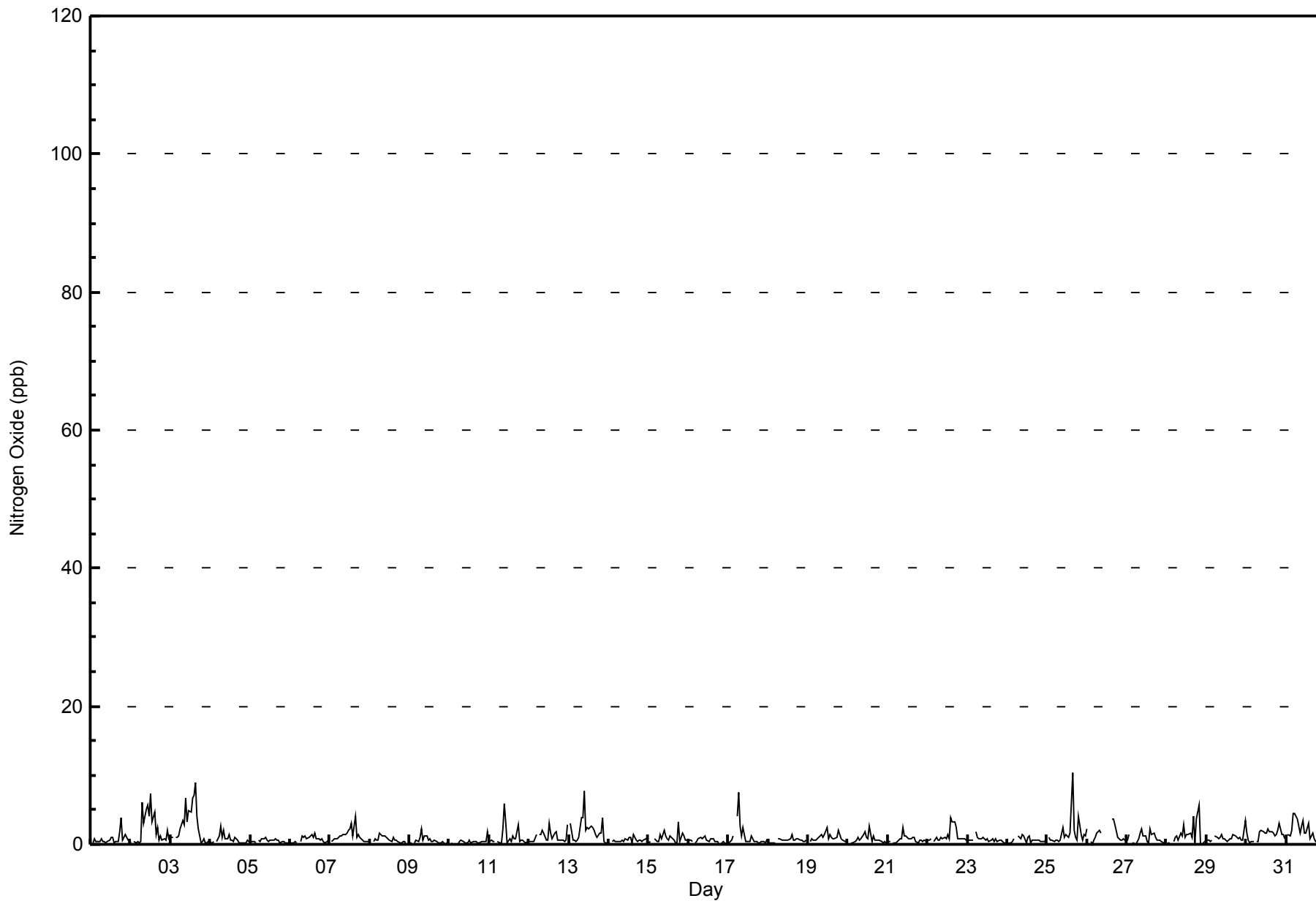


Maximum Value: 10 ppb on May 25 16:00		Maximum Daily Average: 2.8 ppb on May 3		Hours in Service: 744																																												
Minimum Value: 0 ppb on May 9 22:00		Minimum Daily Average: 0.4 ppb on May 10		Hours of Data: 707																																												
Maximum Diurnal Average: 2.0 ppb at hour 10		Minimum Diurnal Average: 0.5 ppb at hour 3		Hours of Missing Data: 37																																												
Monthly Average: 1.1 ppb		Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 0 Median = 1 Q ₃ = 1 P ₉₀ = 2 P ₉₉ = 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-May	Z	0	1	1	0	0	1	0	0	0	1	1	1	0	0	0	2	4	1	1	1	1	1	1	0.8	4																						
2-May	0	Z	0	0	0	0	0	6	3	5	6	4	7	3	5	1	2	1	1	1	1	1	2	1	2.2	7																						
3-May	1	1	Z	1	1	1	2	3	3	7	3	5	5	7	7	9	4	2	0	0	1	0	0	1	2.8	9																						
4-May	0	0	0	Z	0	1	3	1	2	1	1	2	1	1	0	1	1	0	0	0	0	0	1	0	0.7	3																						
5-May	0	0	0	0	Z	1	0	1	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0.5	1																						
6-May	0	0	0	0	0	Z	0	1	1	1	1	1	1	1	2	1	1	1	1	1	0	0	0	1	0.7	2																						
7-May	Z	0	1	1	1	1	1	1	1	1	2	2	2	3	1	4	1	1	1	1	0	0	0	0	1.3	4																						
8-May	0	Z	0	1	1	1	2	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0.7	2																						
9-May	0	0	Z	0	1	0	1	2	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0.6	2																						
10-May	0	0	0	Z	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0.4	2																						
11-May	0	1	0	0	Z	0	0	0	2	6	3	0	1	0	1	1	1	3	0	1	1	0	0	0	1.0	6																						
12-May	0	1	0	0	1	Z	1	1	2	2	1	1	3	2	1	2	2	1	1	1	1	0	1	3	1.1	3																						
13-May	Z	3	1	1	0	1	1	4	4	8	2	2	2	3	2	2	1	1	2	2	4	0	0	0	2.0	8																						
14-May	0	Z	0	1	0	0	0	1	1	0	1	1	1	1	0	2	1	0	1	1	0	1	1	1	0.6	2																						
15-May	0	0	Z	1	1	0	1	1	1	2	1	1	1	1	1	1	0	0	3	0	2	1	1	1	0.9	3																						
16-May	1	1	0	Z	0	0	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1																						
17-May	0	0	1	1	Z	4	7	3	1	2	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1.1	7																						
18-May	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0.6	1																						
19-May	Z	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2	1	1	1	0	0	1.0	2																						
20-May	0	Z	0	0	0	1	1	1	1	1	2	1	1	3	0	1	1	1	1	1	0	0	0	0	0.8	3																						
21-May	0	0	Z	0	0	0	0	1	1	2	1	1	1	1	1	1	1	0	0	1	1	0	1	0	0.7	2																						
22-May	1	1	1	Z	0	1	1	1	1	1	1	1	2	1	4	3	3	2	1	1	1	1	1	1	1.2	4																						
23-May	1	1	1	1	Z	2	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	0	0	0	0.7	2																						
24-May	0	0	0	0	1	Z	1	1	1	2	1	0	1	1	0	1	1	1	1	1	0	0	0	1	0.7	2																						
25-May	Z	1	1	1	0	1	1	0	1	2	1	1	1	1	2	10	2	1	1	4	1	1	1	1	1.6	10																						
26-May	2	Z	0	0	1	1	2	2	2	C	C	C	C	C	C	4	4	3	1	1	1	1	1	1	--	4																						
27-May	1	1	Z	0	0	0	0	1	2	2	1	1	0	0	2	1	2	1	1	1	1	0	0	0	0.8	2																						
28-May	0	0	0	Z	1	1	1	1	2	1	3	1	1	1	2	1	4	0	4	6	0	0	0	0	1.3	6																						
29-May	1	1	0	1	Z	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	3	1.0	3																						
30-May	2	1	0	0	0	Z	0	0	2	2	2	2	2	2	2	2	2	2	1	1	2	3	1	1	1.4	3																						
31-May	Z	1	1	2	4	4	4	4	2	3	3	2	2	3	1	1	2	1	0	1	1	1	1	1	1.9	4																						
																								0.5	0.6	0.5	0.5	0.6	1.0	1.2	1.4	1.4	2.0	1.5	1.2	1.4	1.4	1.4	1.8	1.3	0.9	0.9	0.9	0.8	0.5	0.5	0.7	Diurnal Average
																								2	3	1	2	4	4	7	6	4	8	6	5	7	7	7	10	4	3	4	6	4	1	2	3	Diurnal Maximum
Z - zerospan		C - Calibration																																														



WBEA
Hourly Averages

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - May 2015

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
Frequency Distribution

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	38	35	28	35	32	58	58	44	32	54	87	38	22	19	43	81	704
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	38	35	28	35	32	58	58	44	32	54	87	38	22	19	43	81	704

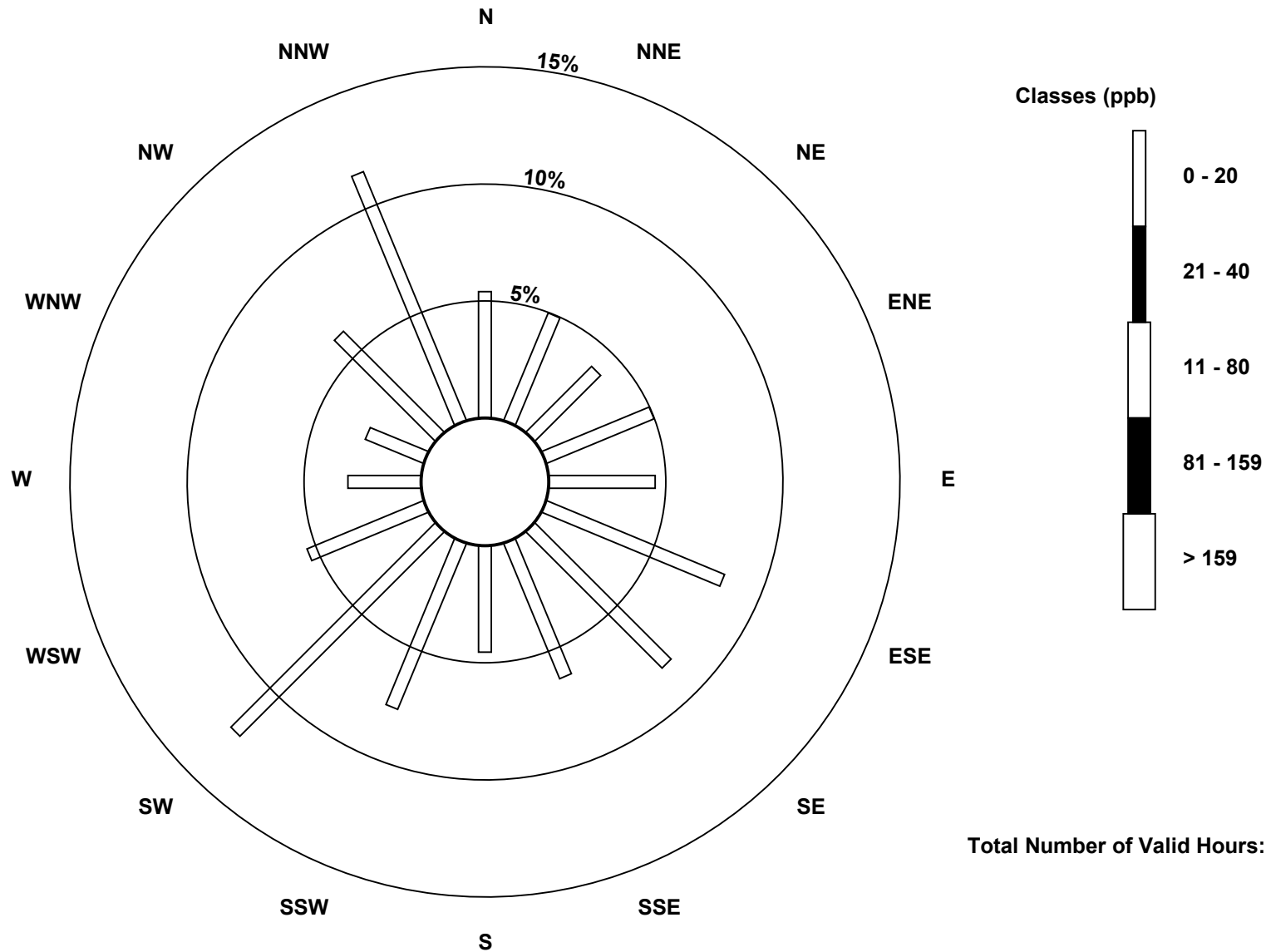
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

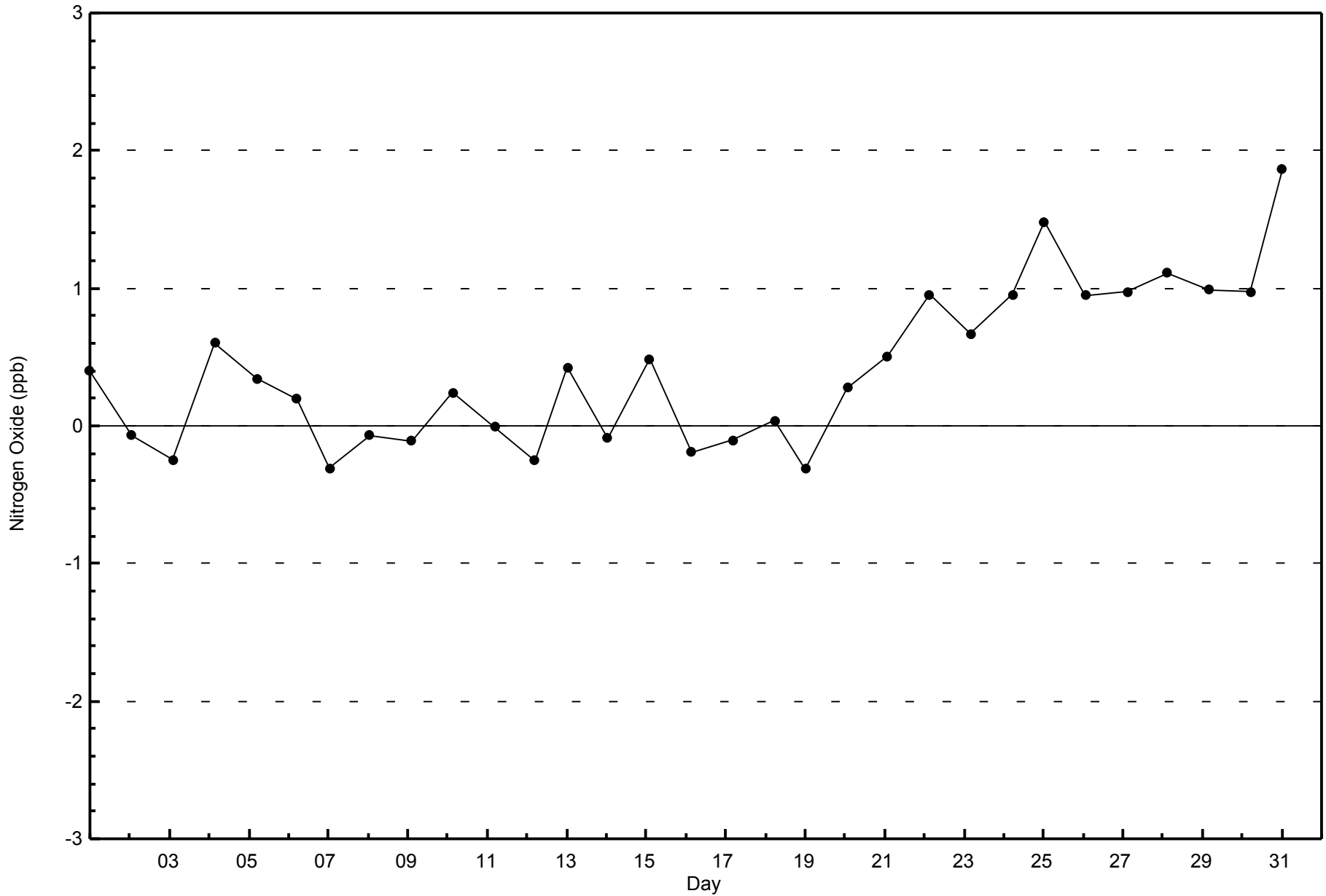
Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont (AMS502)





WBEA
Zero Responses

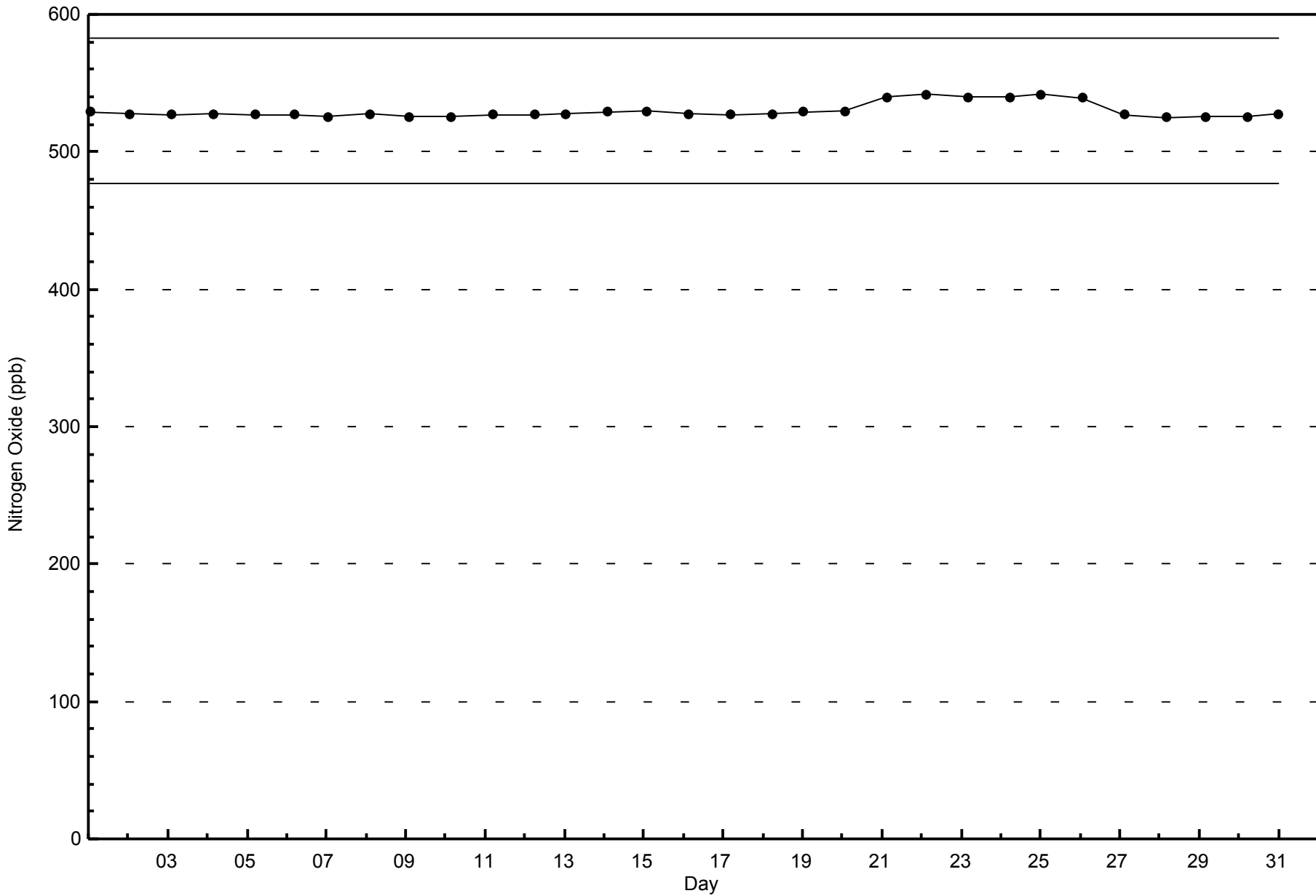
Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - May 2015





WBEA
Span Responses

Nitrogen Oxide (NO) - ppb
ConocoPhillips - Surmont - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO₂) - ppb

ConocoPhillips - Surmont - May 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	744
Maximum Value: 19 ppb on May 30 21:00	Maximum Daily Average: 4.1 ppb on May 31		Hours of Data:	707
Minimum Value: 0 ppb on May 10 01:00	Minimum Daily Average: 0.6 ppb on May 16		Hours of Missing Data:	37
Maximum Diurnal Average: 2.6 ppb at hour 24	Minimum Diurnal Average: 1.2 ppb at hour 3		Hours of Calibration:	37
Monthly Average: 1.7 ppb	Percentiles: P ₁ = 0 P ₁₀ = 0 Q ₁ = 1 Median = 1 Q ₃ = 2 P ₉₀ = 4 P ₉₉ = 9		Percent Operational Time:	100.0

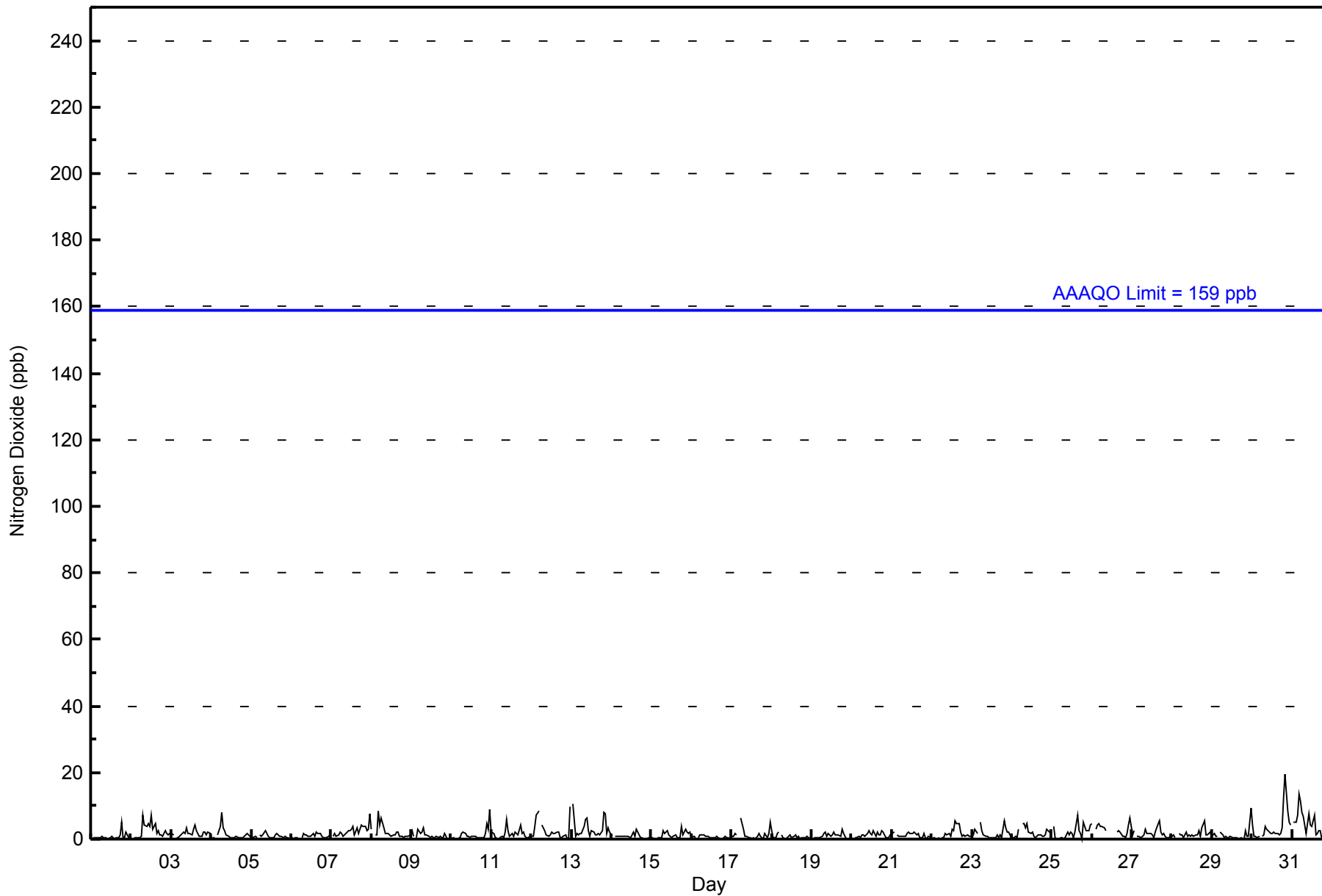
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-May	Z	1	1	1	0	1	1	1	1	1	0	1	1	0	0	0	0	1	5	0	1	2	1	0	0.7	5
2-May	0	Z	1	1	0	1	1	7	4	4	5	4	7	3	5	2	3	1	1	1	3	2	1	2	2.5	7
3-May	2	1	Z	0	0	1	1	2	2	3	2	2	1	3	4	2	2	1	1	2	2	1	2	2	1.7	4
4-May	0	0	1	Z	1	4	8	4	2	1	1	0	0	0	0	1	1	0	0	0	1	2	1	1	1.3	8
5-May	1	0	1	1	Z	1	1	1	3	2	1	0	1	1	1	2	1	1	1	1	1	0	0	0	0.9	3
6-May	0	0	0	0	0	Z	1	2	1	1	1	1	1	2	1	2	2	2	1	1	1	0	1	2	1.0	2
7-May	Z	1	2	1	1	2	2	1	1	2	3	3	3	4	1	4	2	3	4	4	4	3	3	8	2.6	8
8-May	3	Z	1	1	9	4	6	3	2	2	2	1	1	1	1	2	2	1	1	1	1	1	1	1	2.1	9
9-May	2	1	Z	1	3	2	2	3	1	1	1	1	1	0	1	1	1	1	0	1	2	0	0	1	1.1	3
10-May	0	1	1	Z	1	1	2	2	2	1	1	1	1	1	1	1	1	0	0	1	2	5	3	9	1.5	9
11-May	2	2	0	0	Z	0	1	0	2	6	2	1	2	1	2	2	1	4	2	2	1	0	1	1	1.5	6
12-May	1	1	4	7	9	Z	4	4	3	1	1	1	2	2	2	2	2	1	0	1	1	0	1	10	2.6	10
13-May	Z	11	1	2	1	2	2	4	6	6	3	1	3	2	1	1	2	1	3	8	8	2	3	2	3.2	11
14-May	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	1	3	1	1	1	0	0	0	0	0	0.8	3
15-May	0	1	Z	0	0	0	1	3	2	3	1	1	1	1	1	1	0	0	4	1	3	2	2	2	1.3	4
16-May	1	1	0	Z	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	1	1	1	1	0	0.6	1
17-May	1	1	2	1	Z	7	5	3	1	1	1	0	0	0	0	1	2	1	0	0	2	0	2	5	1.5	7
18-May	3	0	1	2	2	Z	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0.8	3
19-May	Z	1	1	1	1	1	1	2	2	1	2	1	1	2	1	1	1	1	3	2	1	0	0	1	1.1	3
20-May	1	Z	1	1	1	1	1	1	1	2	3	2	1	3	1	2	1	1	3	2	1	1	1	1	1.3	3
21-May	2	2	Z	1	1	1	1	1	1	2	2	2	2	2	2	1	2	0	1	2	0	0	1	1	1.3	2
22-May	0	0	0	Z	0	0	0	0	2	1	2	1	3	2	5	5	5	2	1	1	1	1	1	1	1.5	5
23-May	1	1	3	2	Z	5	3	1	1	1	1	1	0	1	1	1	1	1	1	5	3	2	2	1	1.6	5
24-May	1	0	1	1	3	Z	5	5	4	5	2	2	1	1	1	1	1	1	1	1	1	3	2	2	1.9	5
25-May	Z	4	0	0	0	0	1	0	0	2	1	2	2	1	2	7	3	2	0	5	3	2	3	4	1.9	7
26-May	5	Z	3	4	5	4	4	3	3	C	C	C	C	C	C	2	3	2	1	1	0	2	4	6	--	6
27-May	1	3	Z	1	1	1	1	1	3	2	2	2	1	0	2	4	6	2	1	2	1	1	1	1	1.6	6
28-May	1	1	1	Z	2	1	1	0	2	1	1	1	1	1	1	3	1	3	6	1	1	2	2	2	1.6	6
29-May	1	2	1	1	Z	2	1	1	1	1	0	1	0	0	1	1	0	1	0	0	3	1	1	9	1.2	9
30-May	4	1	1	1	1	Z	1	1	4	3	2	2	2	2	2	2	1	2	3	12	19	8	5	4	3.6	19
31-May	Z	5	5	7	14	12	8	7	2	5	8	4	4	7	1	2	3	3	0	0	0	0	0	0	4.1	14
																								Diurnal Average		
																								Diurnal Maximum		

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



WBEA
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - May 2015

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
Frequency Distribution

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	38	35	28	35	32	58	58	44	32	54	87	38	22	19	43	81	704
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	38	35	28	35	32	58	58	44	32	54	87	38	22	19	43	81	704

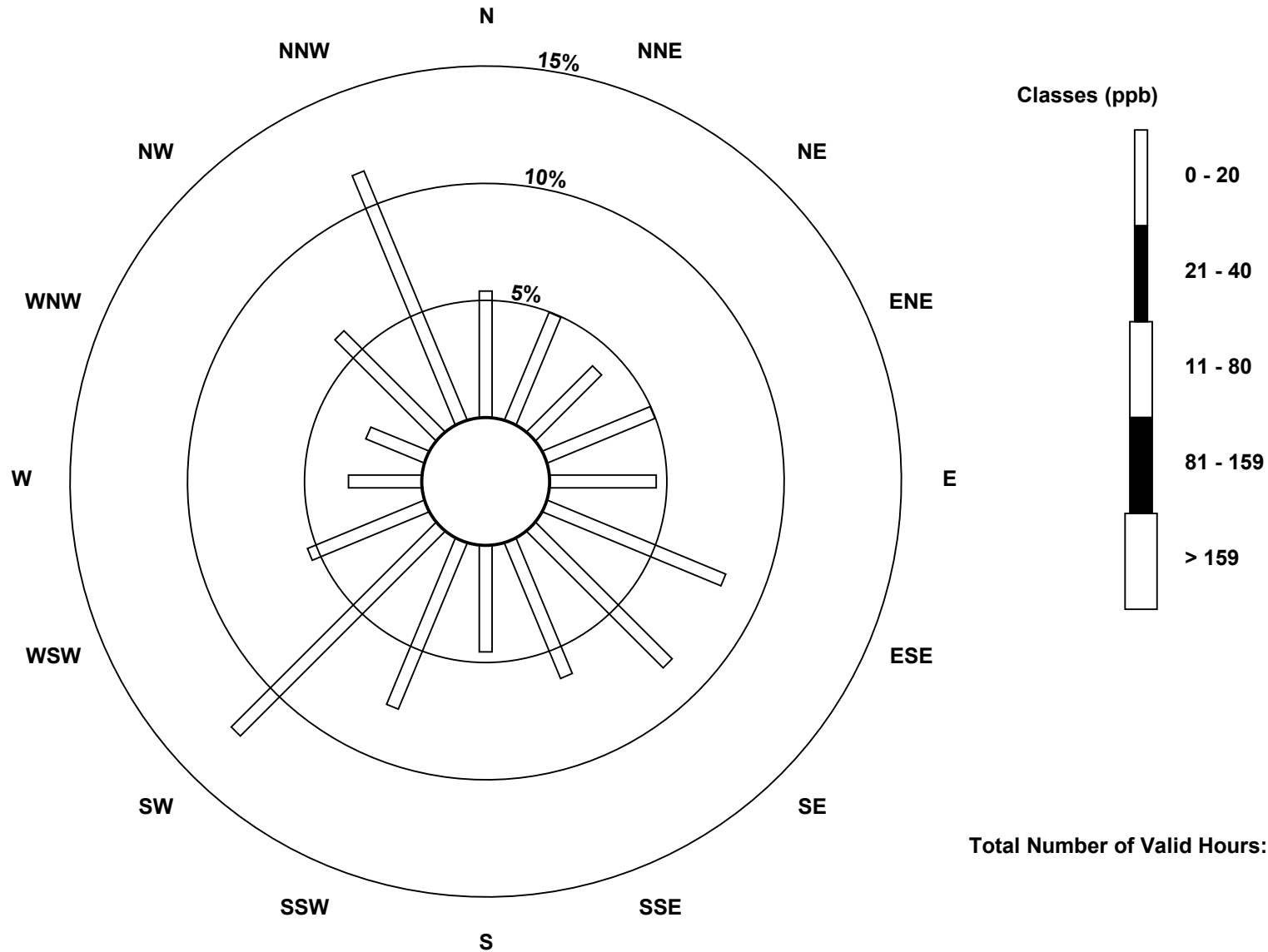
Total Number of Valid Hours: 704

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont (AMS502)

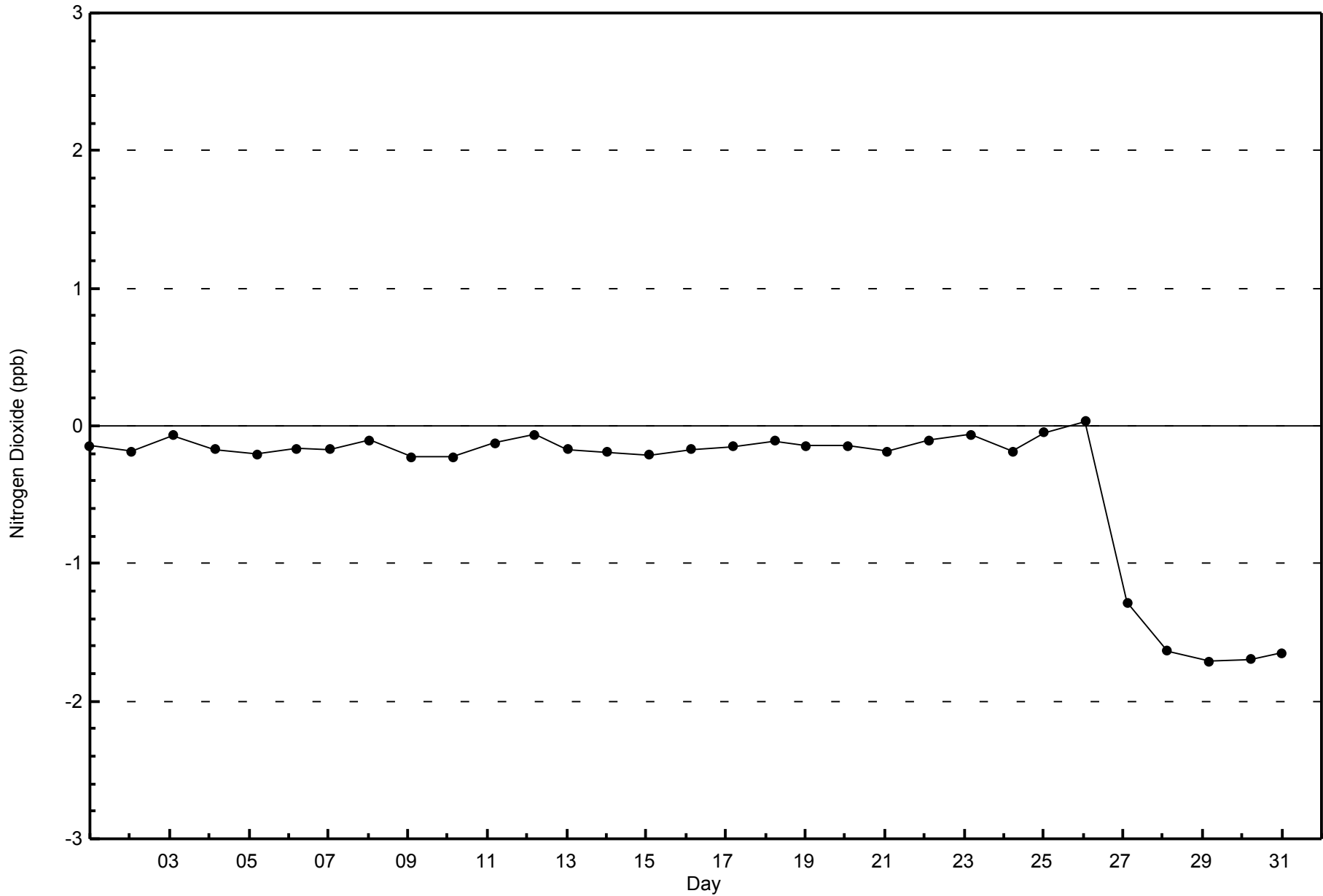


Total Number of Valid Hours: 704



WBEA
Zero Responses

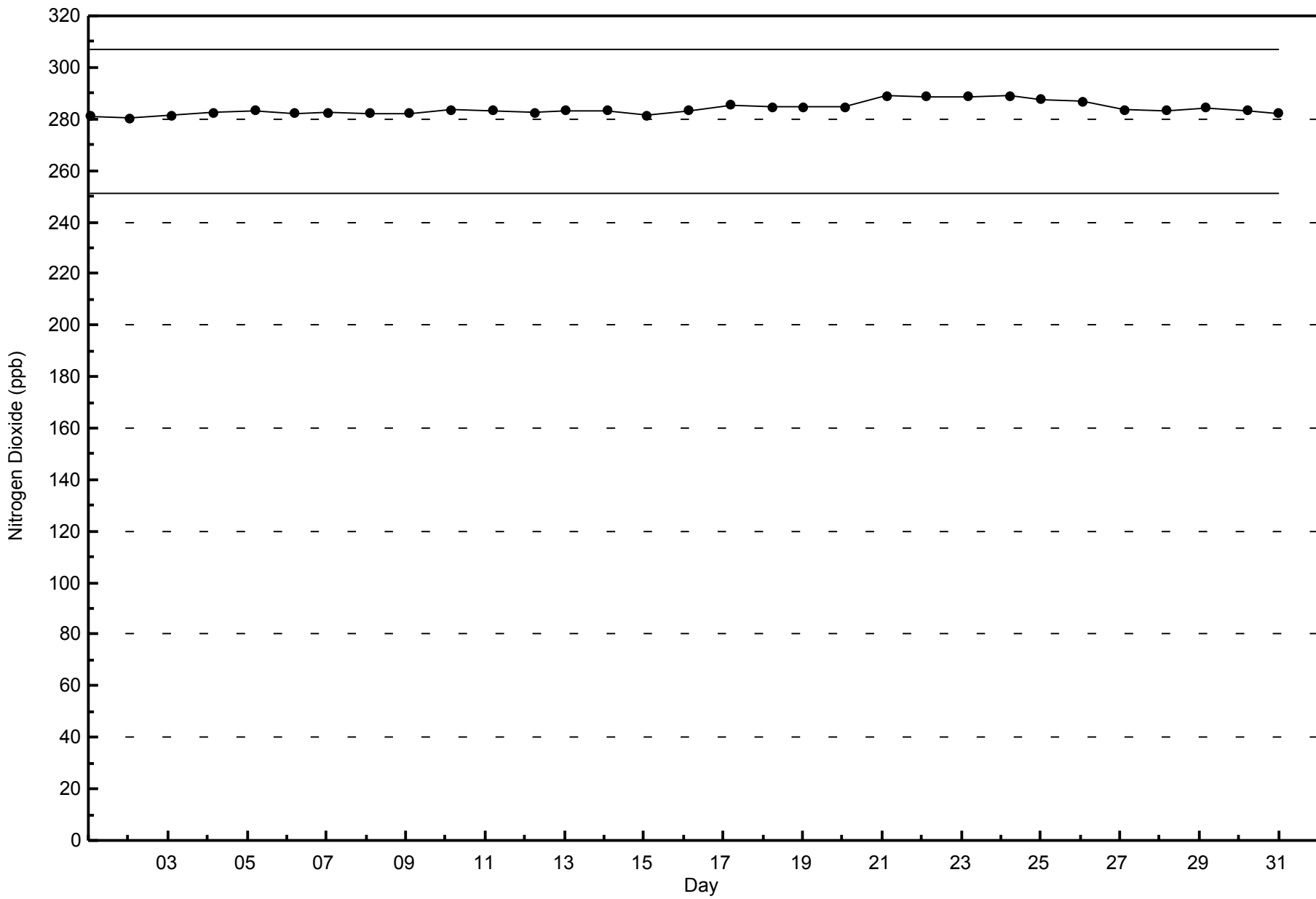
Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surmont - May 2015





WBEA
Span Responses

Nitrogen Dioxide (NO₂) - ppb
ConocoPhillips - Surrmont - May 2015



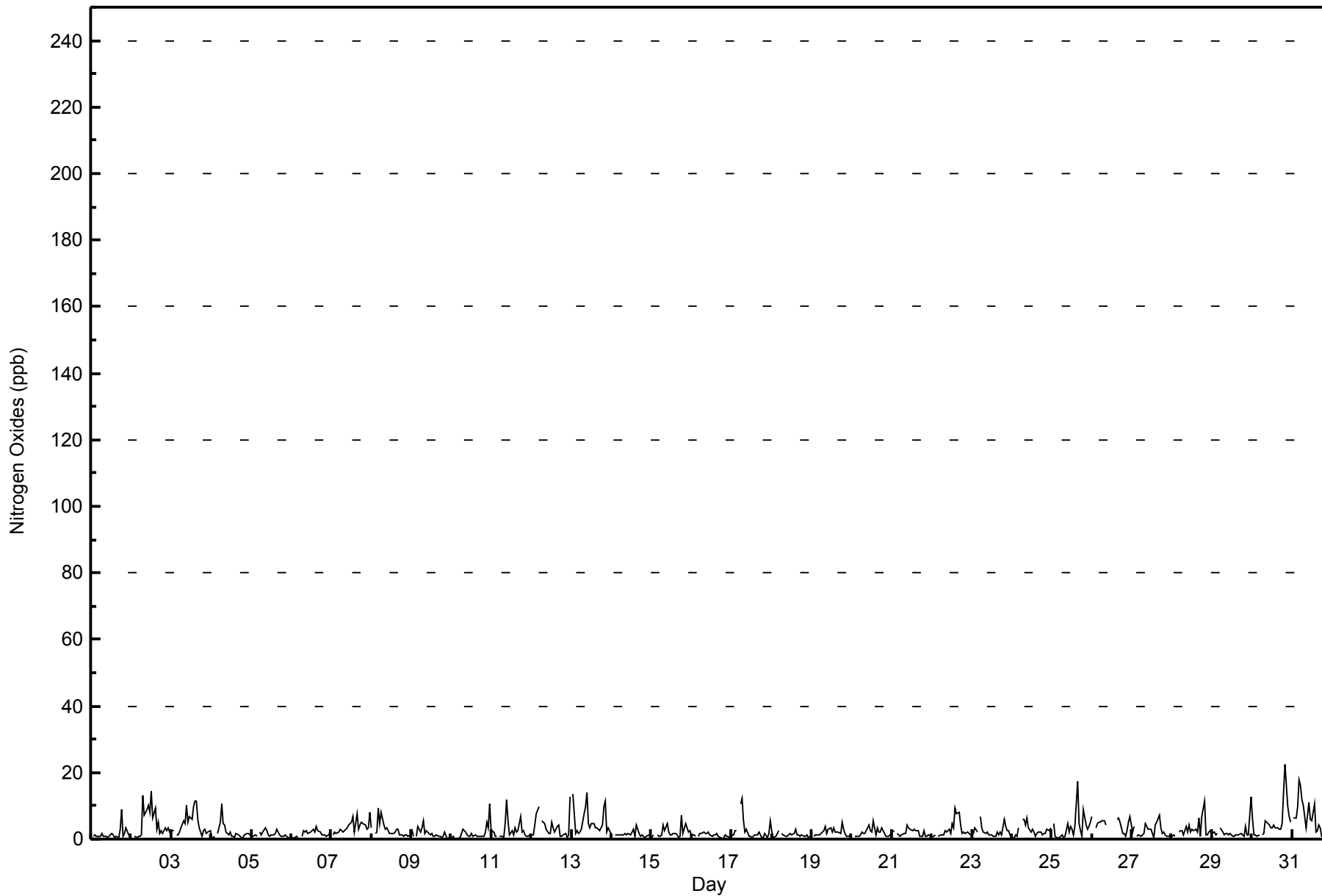


Maximum Value: 22 ppb on May 30 21:00										Maximum Daily Average: 6.0 ppb on May 31										Hours in Service: 744						
Minimum Value: 0 ppb on May 10 01:00										Minimum Daily Average: 1.1 ppb on May 16										Hours of Data: 707						
Maximum Diurnal Average: 4.0 ppb at hour 10										Minimum Diurnal Average: 1.7 ppb at hour 3										Hours of Missing Data: 37						
Monthly Average: 2.8 ppb										Percentiles: P ₁ = 0 P ₁₀ = 1 Q ₁ = 1 Median = 2 Q ₃ = 3 P ₉₀ = 6 P ₉₉ = 14										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-May	Z	1	1	1	1	1	1	1	1	1	1	2	1	0	1	1	3	9	1	2	3	1	1	1.5	9	
2-May	0	Z	1	1	1	1	1	13	7	9	10	8	14	6	9	3	5	2	3	2	3	2	3	2	4.7	14
3-May	3	2	Z	1	1	2	3	6	5	10	5	7	6	10	11	11	6	3	1	3	3	2	2	2	4.6	11
4-May	1	1	1	Z	2	5	11	4	4	2	1	2	1	1	1	2	1	1	0	0	1	2	2	1	2.0	11
5-May	1	1	1	1	Z	2	1	2	3	3	1	1	1	1	2	3	2	1	1	1	1	1	0	1.4	3	
6-May	1	0	0	1	1	Z	1	3	2	2	2	2	2	3	2	4	3	2	1	1	1	1	1	2	1.7	4
7-May	Z	1	2	2	2	3	3	2	3	3	4	5	5	7	2	8	3	4	5	5	4	3	3	8	3.8	8
8-May	3	Z	2	2	9	5	8	4	3	3	3	2	2	2	2	3	3	1	1	1	1	1	1	1	2.8	9
9-May	3	1	Z	1	4	2	3	6	2	3	2	1	2	1	1	1	1	1	1	1	2	0	0	1	1.6	6
10-May	0	1	1	Z	1	1	2	3	2	1	1	1	1	1	1	1	1	1	1	1	2	5	4	11	1.8	11
11-May	2	2	1	1	Z	1	1	1	5	12	6	1	3	1	3	2	2	7	2	3	1	1	1	1	2.6	12
12-May	1	1	4	8	10	Z	5	5	4	3	2	2	5	3	2	4	4	1	1	1	2	1	1	13	3.6	13
13-May	Z	14	2	2	2	2	3	8	10	14	5	3	5	5	4	3	3	2	4	10	11	2	4	3	5.2	14
14-May	1	Z	1	1	1	1	1	1	1	2	1	2	1	2	3	1	4	2	1	1	1	1	1	1	1.4	4
15-May	1	1	Z	1	1	1	1	4	2	5	2	1	1	2	2	1	1	1	7	2	5	3	2	3	2.2	7
16-May	1	1	1	Z	1	2	2	2	2	2	2	1	1	1	1	1	1	0	0	1	1	1	1	0	1.1	2
17-May	1	1	3	2	Z	11	12	6	2	3	1	1	0	1	1	1	2	1	0	0	2	1	2	6	2.6	12
18-May	3	1	1	2	2	Z	2	1	1	1	1	2	1	2	3	1	1	1	1	1	1	1	1	1	1.4	3
19-May	Z	1	1	1	1	1	2	3	4	2	3	3	2	3	2	2	2	2	5	3	2	1	1	1	2.1	5
20-May	1	Z	1	1	1	1	2	2	2	3	4	3	2	5	1	4	2	2	3	3	1	1	1	1	2.1	5
21-May	2	3	Z	2	1	1	1	2	2	4	3	3	3	3	3	2	3	1	1	3	1	1	1	1	2.0	4
22-May	1	1	1	Z	1	1	1	1	3	2	3	2	4	3	9	8	8	4	2	2	2	2	2	1	2.8	9
23-May	1	2	3	2	Z	7	4	2	2	2	1	1	1	1	2	1	2	1	6	4	2	3	1	2.3	7	
24-May	1	1	1	1	3	Z	6	6	4	6	3	2	3	2	1	1	2	2	1	2	2	3	3	3	2.6	6
25-May	Z	5	1	1	0	1	1	0	1	5	2	4	3	1	4	17	5	3	1	9	4	3	4	5	3.5	17
26-May	7	Z	3	4	5	5	5	5	4	C	C	C	C	C	C	6	6	5	2	2	1	2	5	7	--	7
27-May	2	4	Z	1	1	1	1	2	5	4	3	3	2	1	4	5	7	3	2	2	1	1	1	1	2.5	7
28-May	1	1	1	Z	2	2	3	1	4	2	4	2	3	3	3	2	6	1	7	11	1	1	2	3	2.9	11
29-May	2	2	1	2	Z	4	2	1	2	2	1	2	1	1	1	1	1	2	1	1	4	1	1	13	2.1	13
30-May	6	1	1	1	1	Z	1	2	6	5	4	3	4	4	3	4	3	3	5	14	22	10	7	5	5.0	22
31-May	Z	7	6	10	18	16	12	10	3	7	11	6	6	10	2	3	4	3	1	1	1	1	1	1	6.0	18
																								Diurnal Average		
																								Diurnal Maximum		
1.8 2.2 1.7 2.0 2.9 3.0 3.4 3.5 3.2 4.0 3.1 2.5 2.9 3.0 2.8 3.6 3.0 2.2 2.3 3.0 2.9 1.9 2.0 3.2																										
7 14 6 10 18 16 12 13 10 14 11 8 14 10 11 17 8 7 9 14 22 10 7 13																										
Z - zerospan C - Calibration																										



WBEA
Hourly Averages

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - May 2015





WBEA
Cumulative Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - May 2015

Concentration Ranges (ppb)	Number of Hours	%	Cumulative %
0 - 20	706	99.86	99.86
21 - 40	1	0.14	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
Frequency Distribution

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - May 2015

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	38	35	28	35	32	58	58	43	32	54	87	38	22	19	43	81	703
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	38	35	28	35	32	58	58	44	32	54	87	38	22	19	43	81	704

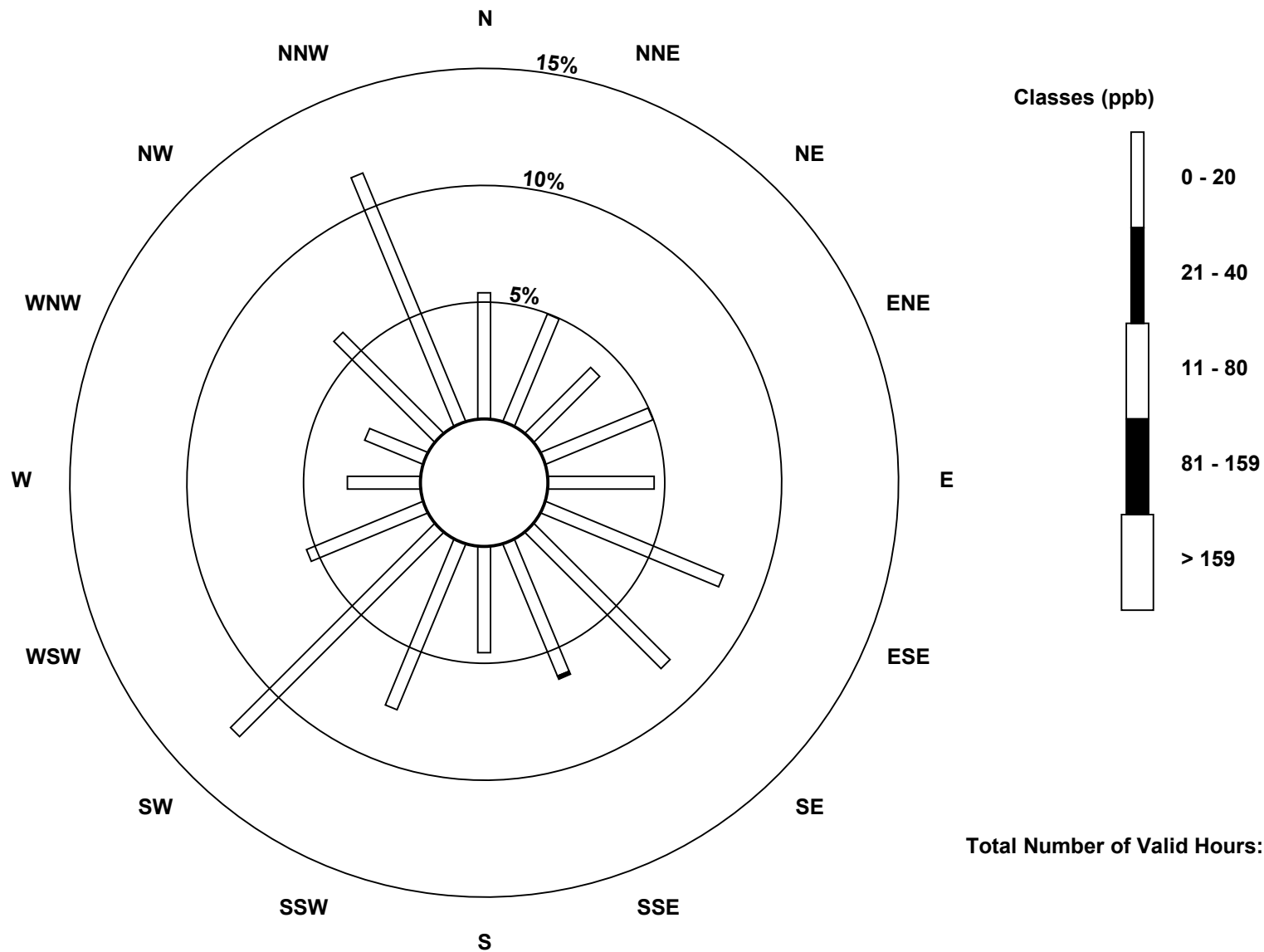
Total Number of Valid Hours: 704

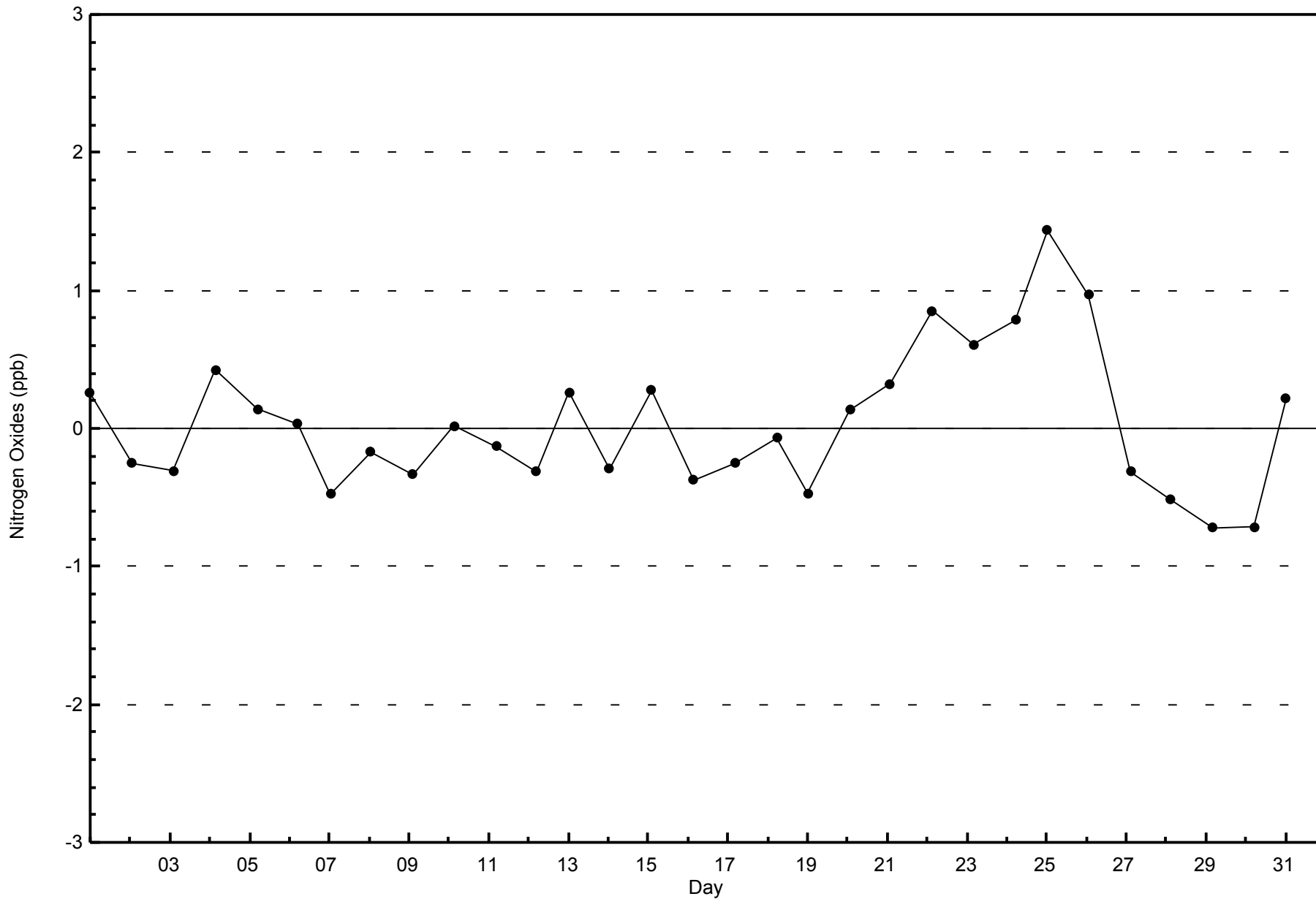
Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont (AMS502)

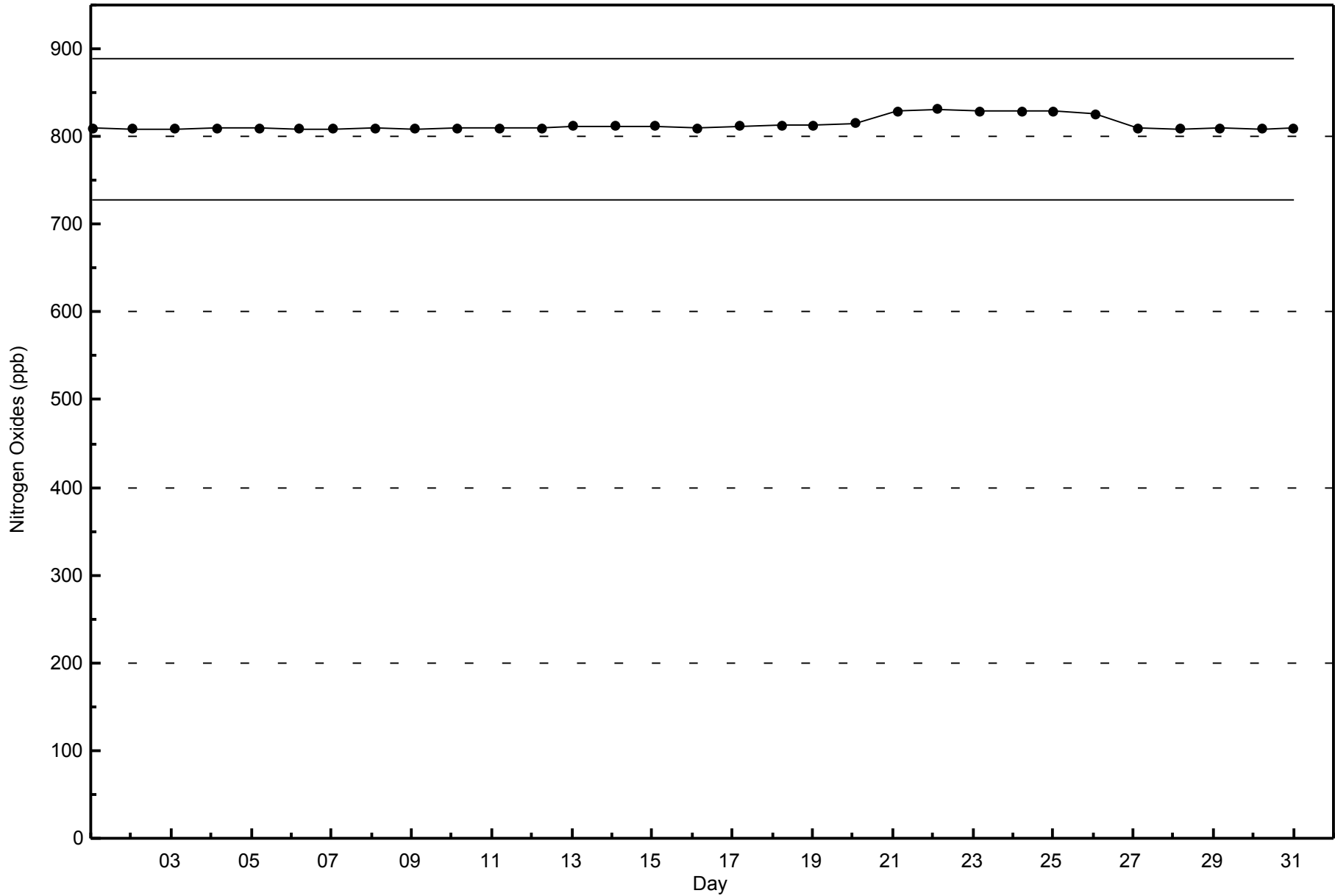






WBEA
Span Responses

Nitrogen Oxides (NO_x) - ppb
ConocoPhillips - Surmont - May 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Ambient Temperature (AT) - C

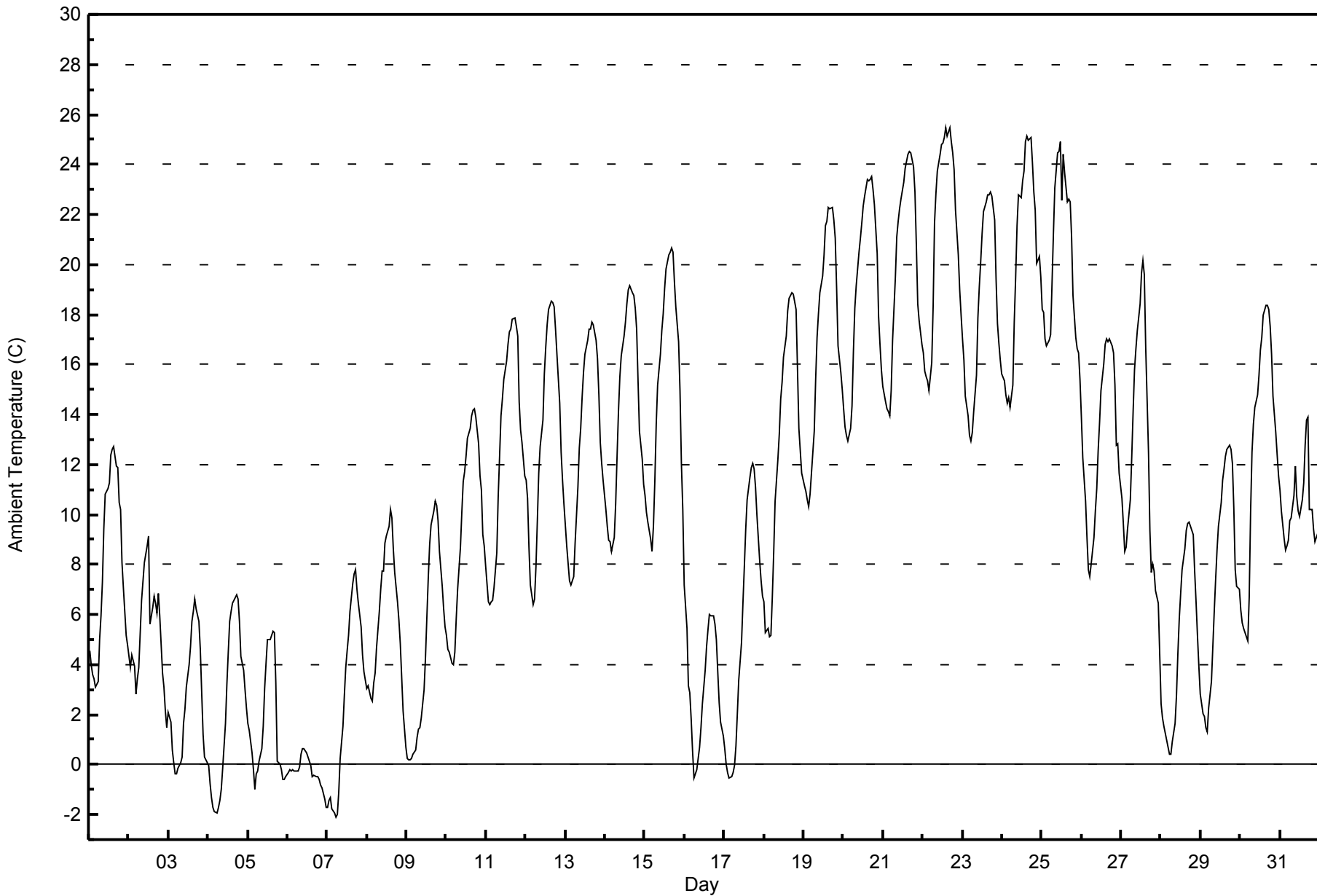
ConocoPhillips - Surmont - May 2015

Maximum Value: 25.5 C on May 22 17:00		Maximum Daily Average: 21.2 C on May 22		Hours in Service: 744																																												
Minimum Value: -2.1 C on May 7 06:00		Minimum Daily Average: -0.3 C on May 6		Hours of Data: 744																																												
Maximum Diurnal Average: 14.8 C at hour 16		Minimum Diurnal Average: 5.9 C at hour 5		Hours of Missing Data: 0																																												
Monthly Average: 10.58 C		Percentiles: P ₁ = -1.7 P ₁₀ = 0.4 Q ₁ = 4.8 Median = 10.2 Q ₃ = 16.5 P ₉₀ = 21.0 P ₉₉ = 24.8		Hours of Calibration: 0																																												
				Percent Operational Time: 100.0																																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-May	4.6	4.0	3.6	3.4	3.1	3.3	5.0	5.9	7.3	9.4	10.8	11.0	11.2	12.4	12.6	12.7	11.9	11.9	10.5	10.2	8.1	7.1	5.2	4.8	7.9	12.7																						
2-May	4.3	3.9	4.4	3.9	2.8	3.4	3.9	5.2	6.6	8.1	8.4	8.8	9.2	5.6	6.3	6.7	6.4	6.1	6.8	6.0	3.7	3.1	2.2	1.4	5.3	9.2																						
3-May	2.1	1.7	0.6	0.1	-0.4	-0.4	-0.1	0.1	0.3	1.6	2.2	3.1	4.0	4.7	5.7	6.1	6.6	6.3	5.7	4.6	2.9	1.2	0.3	0.1	2.5	6.6																						
4-May	0.0	-0.8	-1.3	-1.7	-1.9	-1.9	-1.7	-1.4	-1.0	-0.2	1.6	3.2	4.5	5.7	6.1	6.5	6.7	6.8	6.6	5.7	4.3	3.8	3.0	2.3	2.3	6.8																						
5-May	1.6	1.4	0.5	-0.2	-1.0	-0.3	-0.3	0.1	0.7	1.5	3.1	4.1	5.0	5.0	5.2	5.3	5.3	3.3	0.1	0.0	-0.2	-0.6	-0.6	-0.5	1.6	5.3																						
6-May	-0.3	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.1	0.4	0.6	0.7	0.5	0.3	0.1	0.0	-0.5	-0.4	-0.5	-0.5	-0.6	-0.8	-0.9	-1.4	-1.7	-0.3	0.7																						
7-May	-1.7	-1.5	-1.3	-1.7	-1.9	-2.1	-2.0	-1.1	0.2	1.5	2.8	3.9	4.6	5.2	6.1	7.2	7.6	7.8	7.0	6.4	5.5	4.4	3.7	3.4	2.7	7.8																						
8-May	3.0	3.2	2.6	2.6	3.3	3.7	4.6	6.1	7.0	7.7	7.8	8.8	9.1	9.5	10.2	9.9	8.6	7.7	6.5	5.8	4.8	3.5	2.1	0.7	5.8	10.2																						
9-May	0.2	0.2	0.2	0.3	0.4	0.6	1.1	1.4	1.5	1.9	3.0	4.3	5.9	7.5	8.8	9.6	10.2	10.5	10.3	9.7	8.5	7.1	6.2	5.5	4.8	10.5																						
10-May	5.2	4.6	4.5	4.0	4.0	4.5	5.8	7.0	8.7	10.1	11.3	11.7	12.3	13.1	13.5	13.9	14.1	14.2	13.9	12.9	11.5	11.0	9.2	8.7	9.6	14.2																						
11-May	8.0	6.5	6.4	6.5	6.6	7.0	8.5	10.7	12.3	14.0	14.6	15.4	16.1	16.8	17.3	17.4	17.8	17.9	17.5	17.1	14.5	13.4	12.9	11.6	12.8	17.9																						
12-May	11.4	10.6	8.7	7.2	6.4	6.6	7.9	9.7	11.6	12.7	13.8	15.6	16.7	17.6	18.2	18.5	18.5	18.3	17.4	16.4	14.4	12.5	11.3	10.4	13.0	18.5																						
13-May	9.6	8.7	7.3	7.2	7.4	7.5	8.8	11.1	12.7	13.4	14.7	15.7	16.4	17.0	17.4	17.4	17.7	17.6	16.9	16.2	14.8	12.9	12.0	11.4	13.0	17.7																						
14-May	10.2	9.5	9.0	8.9	8.5	9.1	10.4	12.3	14.1	15.5	16.3	17.1	17.7	18.4	19.0	19.2	18.9	18.7	18.2	17.4	15.3	13.3	12.2	11.2	14.2	19.2																						
15-May	10.8	10.1	9.7	9.0	8.5	9.5	11.3	13.6	15.2	16.4	17.4	18.1	19.0	19.8	20.4	20.5	20.7	20.5	19.3	18.3	16.9	15.0	12.0	10.2	15.1	20.7																						
16-May	7.2	5.4	3.1	2.9	1.8	0.5	-0.6	-0.2	0.3	0.7	1.5	2.4	3.8	4.7	5.4	6.0	6.0	5.9	5.6	5.0	3.7	2.5	1.7	1.1	3.2	7.2																						
17-May	0.6	0.0	-0.3	-0.5	-0.5	-0.3	-0.1	0.8	2.0	3.4	4.9	6.5	7.9	9.4	10.6	11.5	11.9	12.1	11.8	11.1	10.0	8.1	7.4	6.7	5.6	12.1																						
18-May	6.5	5.3	5.4	5.1	5.2	6.7	8.5	10.5	12.2	13.2	14.6	15.3	16.3	17.1	18.1	18.7	18.8	18.9	18.8	18.2	15.9	13.5	12.5	11.6	12.8	18.9																						
19-May	11.2	10.9	10.6	10.3	10.8	11.7	13.3	15.4	17.1	18.0	18.9	19.6	20.4	21.5	21.7	22.3	22.2	22.3	21.8	21.1	19.0	16.7	15.7	15.0	17.0	22.3																						
20-May	14.2	13.5	13.2	13.0	13.4	14.4	16.5	18.2	19.2	20.5	21.1	21.6	22.3	22.7	23.4	23.4	23.4	23.5	23.0	22.4	20.4	17.9	16.8	15.8	18.9	23.5																						
21-May	15.1	14.5	14.2	14.1	14.0	15.0	17.0	19.5	21.1	21.7	22.2	22.6	23.3	23.8	24.2	24.4	24.5	24.5	23.9	22.9	20.7	18.4	17.7	16.8	19.8	24.5																						
22-May	16.4	15.7	15.5	15.3	15.0	16.1	18.3	21.7	22.9	23.7	24.4	24.8	24.9	25.1	25.4	25.2	25.5	24.9	24.4	23.8	22.1	20.4	19.0	18.0	21.2	25.5																						
23-May	17.0	16.2	14.8	13.9	13.2	13.0	13.3	14.1	15.6	17.9	19.1	20.1	21.2	22.1	22.5	22.8	22.8	22.9	22.8	21.8	19.5	17.7	16.8	16.2	18.2	22.9																						
24-May	15.7	15.4	14.8	14.5	14.6	14.3	15.2	17.7	19.5	21.6	22.8	22.7	23.3	23.7	24.9	25.2	24.9	25.1	24.0	22.9	22.1	20.1	20.3	19.5	20.2	25.2																						
25-May	18.2	18.1	17.0	16.8	17.0	17.2	19.2	21.2	23.1	24.4	24.5	24.9	22.6	24.4	23.7	22.5	22.6	22.5	21.1	18.8	17.1	16.6	16.5	15.4	20.2	24.9																						
26-May	13.9	12.3	10.5	9.1	7.8	7.5	8.0	9.1	10.2	11.0	12.5	13.6	15.0	16.0	16.8	17.0	16.9	17.0	16.7	16.5	15.2	12.8	12.8	11.6	12.9	17.0																						
27-May	10.6	9.6	8.5	8.7	9.4	10.6	12.3	14.1	15.8	16.6	17.4	18.4	19.7	20.2	19.6	16.7	12.5	9.4	7.7	8.0	7.8	7.0	6.4	4.4	12.1	20.2																						
28-May	2.4	1.9	1.6	1.0	0.7	0.4	0.4	0.9	1.6	2.7	4.4	5.9	6.9	7.8	8.6	9.3	9.6	9.7	9.5	9.2	7.7	6.5	5.2	4.0	4.9	9.7																						
29-May	2.8	2.0	1.9	1.5	1.3	2.2	3.3	4.7	6.1	7.4	8.6	9.5	10.5	11.4	11.8	12.3	12.6	12.8	12.6	12.1	10.3	7.8	7.1	7.0	7.5	12.8																						
30-May	6.2	5.7	5.5	5.3	5.0	6.7	10.1	12.5	13.6	14.3	14.8	15.6	16.6	17.1	18.0	18.3	18.4	18.2	17.5	16.4	14.7	13.3	12.4	11.5	12.8	18.4																						
31-May	11.0	10.1	9.0	8.6	8.7	9.0	9.8	9.9	10.8	11.9	10.7	10.1	9.9	10.6	11.3	12.8	13.8	13.9	10.2	10.2	9.4	8.9	9.1	9.2	10.4	13.9																						
																								7.7	7.1	6.5	6.1	5.9	6.3	7.3	8.7	10.0	11.1	12.0	12.7	13.4	14.1	14.6	14.8	14.7	14.5	13.8	13.1	11.6	10.2	9.3	8.5	Diurnal Average
																								18.2	18.1	17.0	16.8	17.0	17.2	19.2	21.7	23.1	24.4	24.5	24.9	24.9	25.1	25.4	25.2	25.5	25.1	24.4	23.8	22.1	20.4	20.3	19.5	Diurnal Maximum



WBEA
Hourly Averages

Ambient Temperature (AT) - C
ConocoPhillips - Surmont - May 2015





WBEA
Cumulative Frequency Distribution

Ambient Temperature (AT) - C
ConocoPhillips - Surmont - May 2015

Concentration Ranges (C)	Number of Hours	%	Cumulative %
-50 - -20	0	0.00	0.00
-20 - 0	54	7.26	7.26
0 - 10	309	41.53	48.79
10 - 20	293	39.38	88.17
> 20	88	11.83	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

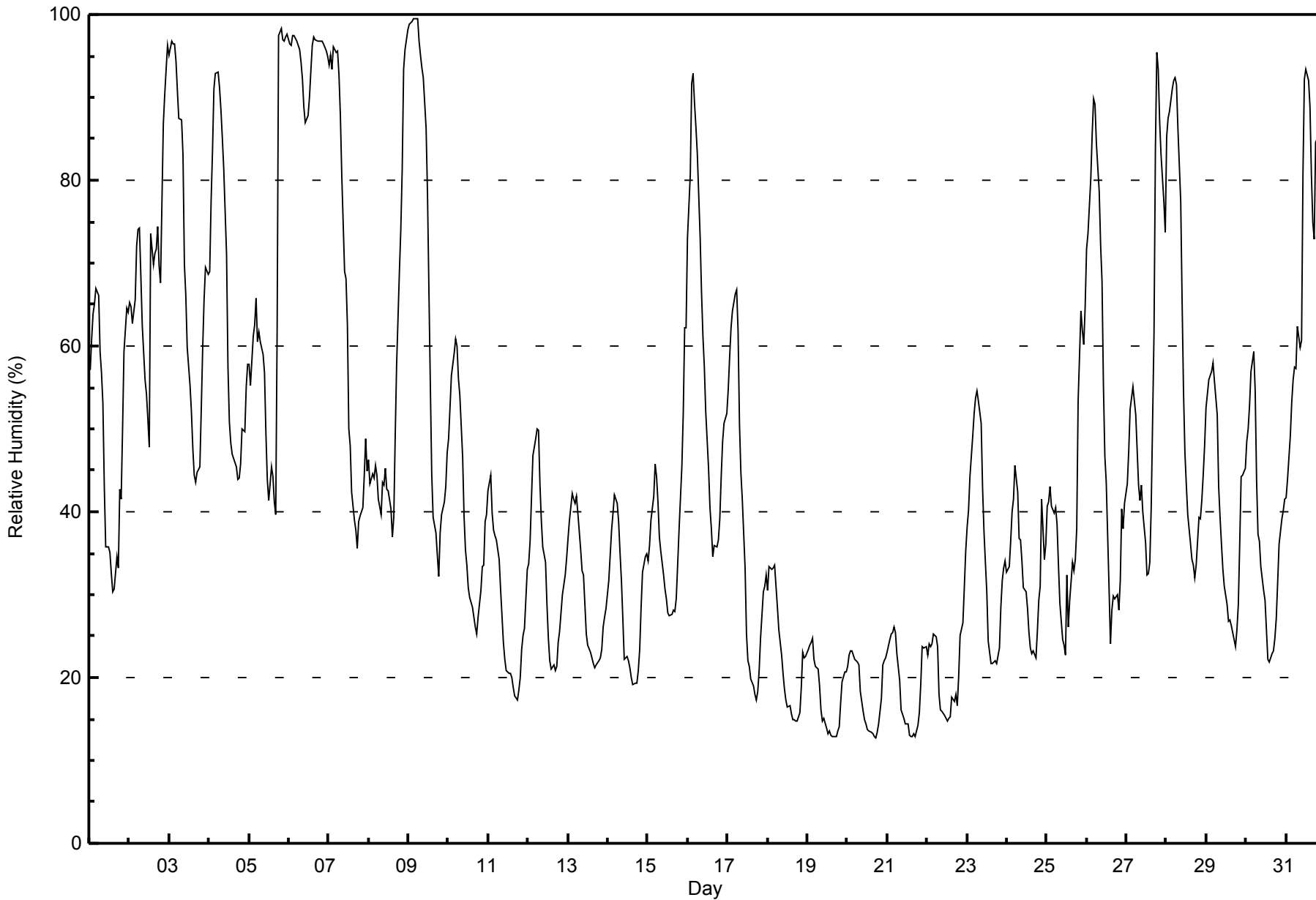
ConocoPhillips - Surmont - May 2015

Maximum Value: 100 % on May 9 05:00																			Maximum Daily Average: 94.8 % on May 6						Hours in Service: 744																								
Minimum Value: 13 % on May 20 18:00																			Minimum Daily Average: 17.7 % on May 19						Hours of Data: 744																								
Maximum Diurnal Average: 59.1 % at hour 5																			Minimum Diurnal Average: 33.0 % at hour 16						Hours of Missing Data: 0																								
Monthly Average: 45.8 %																			Percentiles: P ₁ = 13 P ₁₀ = 20 Q ₁ = 26 Median = 40 Q ₃ = 60 P ₉₀ = 89 P ₉₉ = 98						Hours of Calibration: 0																								
																									Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-May	57	61	64	65	67	66	59	57	53	43	36	36	35	33	30	31	35	33	43	41	50	59	65	64	49.3	67																							
2-May	65	65	63	66	72	74	74	69	62	56	54	51	48	74	70	71	72	74	70	68	87	90	93	96	70.2	96																							
3-May	95	97	96	96	94	91	87	87	83	70	66	60	55	52	48	44	44	45	45	52	60	66	69	69	69.7	97																							
4-May	69	77	84	91	93	93	91	88	85	81	71	58	51	48	47	46	45	44	44	46	50	50	55	58	65.2	93																							
5-May	58	55	61	63	66	61	62	61	59	57	50	44	41	45	44	41	40	62	97	98	97	97	97	98	64.7	98																							
6-May	96	96	97	97	97	97	96	94	92	89	87	88	90	93	96	97	97	97	97	97	97	96	96	95	94.8	97																							
7-May	94	95	93	96	95	96	93	88	81	69	68	62	50	48	42	39	38	36	39	39	41	44	49	45	64.2	96																							
8-May	46	43	45	44	46	44	41	40	44	43	45	43	43	40	37	39	49	58	69	74	81	93	96	98	54.2	98																							
9-May	99	99	99	99	100	99	97	95	94	92	86	78	67	55	45	39	37	35	32	37	40	41	43	47	69.1	100																							
10-May	49	53	56	59	61	60	56	54	47	40	35	34	31	30	28	27	26	25	27	31	33	33	39	40	40.6	61																							
11-May	42	44	40	38	37	37	34	31	28	24	22	21	20	21	20	19	18	17	18	20	23	25	26	33	27.5	44																							
12-May	34	36	42	47	49	50	50	43	39	36	34	29	25	22	21	21	21	21	24	26	30	31	32	34	33.2	50																							
13-May	37	39	42	42	41	42	40	35	33	32	29	25	24	23	22	22	21	21	22	22	23	26	27	28	30.0	42																							
14-May	32	35	38	40	42	41	39	35	32	27	22	22	22	21	20	19	19	19	21	23	29	33	35	35	29.2	42																							
15-May	34	36	39	42	46	44	41	37	35	32	31	30	28	27	28	28	28	30	34	38	45	52	62	62	37.8	62																							
16-May	73	81	92	93	89	86	83	73	66	61	58	52	45	41	38	35	36	36	37	39	44	48	51	52	58.7	93																							
17-May	55	59	62	64	66	67	62	51	45	42	33	25	22	21	20	19	18	17	18	21	25	30	31	32	37.7	67																							
18-May	31	33	33	33	34	31	28	26	23	20	19	17	16	17	16	15	15	15	15	16	19	23	22	22	22.4	34																							
19-May	23	24	24	25	22	21	21	19	16	15	15	14	13	14	13	13	13	13	14	14	17	20	21	21	17.7	25																							
20-May	21	23	23	23	22	22	22	21	18	16	15	14	14	14	13	13	13	13	13	14	17	22	22	22	18.0	23																							
21-May	23	25	25	25	26	25	23	20	16	16	15	14	14	13	13	13	13	13	14	16	19	24	24	24	18.9	26																							
22-May	23	24	24	24	25	25	24	18	16	16	15	15	15	15	15	18	17	18	17	20	25	27	31	35	20.9	35																							
23-May	38	40	44	49	52	54	55	53	51	43	38	34	30	24	22	22	22	22	22	24	28	32	33	34	36.0	55																							
24-May	33	33	36	40	41	46	42	37	37	34	31	30	28	25	24	23	23	22	26	29	31	41	34	36	32.7	46																							
25-May	41	41	43	41	40	40	38	33	29	25	24	23	32	26	29	34	33	34	38	53	64	62	60	65	39.5	65																							
26-May	72	74	80	86	90	89	84	79	72	68	55	47	44	31	24	28	30	29	30	28	32	40	38	41	53.8	90																							
27-May	43	47	52	54	55	52	48	43	41	43	40	36	32	33	34	41	62	84	95	93	87	83	77	74	56.3	95																							
28-May	85	88	88	91	92	92	91	86	77	65	54	47	43	40	36	34	34	32	34	39	39	41	44	48	59.3	92																							
29-May	52	56	56	57	58	56	52	43	39	36	33	31	29	27	27	26	25	24	26	29	36	44	44	45	39.7	58																							
30-May	49	50	53	57	59	55	44	37	36	33	30	29	26	22	22	23	23	25	27	32	36	39	40	42	37.0	59																							
31-May	42	44	49	53	56	57	57	62	60	61	81	92	93	92	89	81	75	73	85	86	86	85	84	84	71.9	93																							
																								52.0	53.9	56.3	58.1	59.1	58.5	56.0	52.1	48.7	44.7	41.7	38.8	36.4	35.1	33.3	33.0	33.6	35.1	38.4	40.8	44.9	48.3	49.7	50.9	Diurnal Average	
																								99	99	99	99	100	99	97	95	94	92	87	92	93	96	97	97	97	97	97	98	97	97	97	98	Diurnal Maximum	



WBEA
Hourly Averages

Relative Humidity (RH) - %
ConocoPhillips - Surmont - May 2015





WBEA
Cumulative Frequency Distribution

Relative Humidity (RH) - %
ConocoPhillips - Surmont - May 2015

Concentration Ranges (%)	Number of Hours	%	Cumulative %
0 - 20	77	10.35	10.35
20 - 40	297	39.92	50.27
40 - 60	184	24.73	75.00
60 - 80	75	10.08	85.08
80 - 100	111	14.92	100.00

Total Number of Valid Hours: 744

Total Number of Hours: 744



Maximum Speed: 30 km/h on May 27 17:00	Maximum Daily Speed Average: 19.2 km/h on May 1	Hours in Service: 744
Minimum Speed Value: 1 km/h on May 29 11:00	Minimum Daily Speed Average: 1.5 km/h on May 24	Hours of Data: 741
Maximum Diurnal Speed Average: 6.5 km/h at hour 5	Minimum Diurnal Speed Average: 0.7 km/h at hour 10	Hours of Missing Data: 3
Monthly Average Velocity: 1.6 km/h 257.6 deg	Percentiles: P ₁ = 2 P ₁₀ = 6 Q ₁ = 8 Median = 11 Q ₃ = 15 P ₉₀ = 19 P ₉₉ = 25	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-May	SW22	SW25	SW25	SW25	SW23	SW23	WSW23	WSW23	WSW22	SW21	SW21	WSW25	WSW23	SW21	SW22	SW21	SW18	WSW19	W13	SW7	WSW13	W12	SSW8	SW13	WSW19.2	SW25	
2-May	SW15	WSW20	WSW19	WSW15	W17	W19	W15	NW13	NW15	WNW16	NW18	NW21	WNW21	WNW23	NW12	NNE11	WNW7	W17	W13	NNE3	NE2	SSW4	W13	W10	WNW11.7	WNW23	
3-May	W14	NW17	NNW17	AF	AF	AF	NW15	NW11	NNW12	WNW14	NW12	W14	W15	WNW15	WNW16	W17	NW14	NW14	NNW13	N12	NNW11	N9	NNE7	NE7	NW11.4	NNW17	
4-May	ENE7	ENE7	NE9	NE7	ENE7	SE7	SE9	SE9	SE10	ESE11	E9	ENE7	NNE8	E6	ENE8	NE9	ENE9	NE9	ENE9	NE10	ENE7	E7	E9	ESE11	E7.1	ESE11	
5-May	ESE10	ENE10	ENE10	ENE9	ENE8	ENE11	NE10	NE10	NNE12	NNE16	NE21	ENE22	ENE24	NE21	NNE19	NNE23	NNE19	ENE13	NNE11	N17	NNW19	N20	N20	N18	NE13.6	ENE24	
6-May	N17	NNW17	NNW16	NNW14	NNW14	NNW14	NNW14	NNW16	NNW16	N17	N19	N19	N20	N18	N19	NNE18	NNE15	NNE14	NNE12	N14	N11	N11	NNE11	NNE7	N14.6	N20	
7-May	WNW2	WNW6	NW7	NNW11	NNW10	NNW10	NNW11	NNW10	N8	N5	NNE6	N6	NW11	NW8	NNW11	NW9	NNW7	NNW9	N13	N7	WNW3	W3	NW3	ENE2	NNW6.7	N13	
8-May	SSW5	SSW4	SSW6	S5	S4	S6	SSE6	SE7	ESE9	E8	E8	ESE4	ENE9	ESE9	ENE7	ESE8	E8	E13	ESE13	ESE9	NE9	NE10	NE11	NE7	ESE5.5	ESE13	
9-May	N5	NE7	ENE7	E7	ENE6	ENE8	E11	ENE12	E13	E11	ENE10	E10	E9	E7	NE3	ESE5	SE3	E5	ENE4	ESE6	S6	SSW8	SSW8	SSW10	E5.2	E13	
10-May	SSW10	SSW11	SW12	SW16	SW17	SW16	WSW3	NNE7	NE4	ENE6	NNE7	NE9	ENE8	NE9	NE6	ENE8	E8	E6	E9	ESE10	ESE8	SE10	SE11	SSE11	SE3.4	SW17	
11-May	S10	SSW10	SW14	SW17	SW21	SW21	SW20	WSW19	W16	NW7	N3	NNE6	N5	NNE6	NW6	NE6	N6	NNW7	N7	NW5	WSW9	WSW11	WSW11	W9	WSW6.3	SW21	
12-May	W12	W11	WNW10	WNW8	WNW7	NW8	NW10	NNW8	NE8	E10	ESE12	E11	E9	E8	ESE9	E14	ESE13	ESE18	ESE19	SE18	ESE13	SE21	SE19	SE19	ESE5.9	SE21	
13-May	SSE18	SSE16	SSE16	S15	S13	S14	S14	S11	SE12	SE16	SE13	SE14	SE11	SE12	ESE11	SSE7	SSE9	SSE10	SE13	SSE12	SSE11	S11	S11	S10	SSE12.0	SSE18	
14-May	SW13	SW19	SW22	SW23	SW24	SW25	SW24	WSW20	SW13	SSW10	SW10	S8	SW7	SSW10	S11	SSE13	S12	S12	S9	SSW8	SW9	SW12	SW12	SW12	SW13.5	SW25	
15-May	SW12	SSW12	SW13	SSW13	SSW12	SSW14	SW16	SSW13	SSW16	SW16	SSW13	SW12	SW13	SW14	SW14	WSW12	SW11	WSW8	W12	WNW8	WNW8	NW13	NNW22	NNW26	WSW9.7	NNW26	
16-May	NNW29	NNW26	NNW23	NNW22	NNW24	NNW24	NNW22	NNW25	NNW23	NNW23	NNW24	NNW24	N24	N22	N22	NNE21	NNE18	NNE16	NNE14	NNE12	NE8	ENE8	ENE8	E7	N17.8	NNW29	
17-May	ENE5	ESE6	SE9	SE12	SSE10	SE12	SE14	SE14	ESE12	ESE11	ESE10	ESE10	ESE10	ESE7	SSE6	E10	ESE9	SE9	ESE10	ESE8	ESE7	ESE9	SE11	S10	ESE9.1	SE14	
18-May	S11	SSW10	SSW9	SSW11	SSW12	SSW12	SSW13	SW12	SW10	SSW8	S6	SSE9	SSE8	S7	SW10	SW6	SSW6	SW8	WSW9	WSW8	SW8	SSW9	SW12	SW15	SSW8.8	SW15	
19-May	SW16	SW19	SW19	SW20	WSW19	WSW20	WSW18	WSW15	WSW10	SSW6	WSW8	SE4	SSE3	NE2	ESE4	ESE5	ESE8	SE6	SE9	SSE8	SSW7	SSW9	SW11	SW14	SW8.6	SW20	
20-May	SW15	SW15	SW15	SW16	SW17	SW14	WSW10	WSW11	WSW10	S2	SE8	SE8	SSE10	SSE10	SSW7	SSE10	SSE8	SSE8	SE9	SSE7	SSW7	SW8	SW9	SSW9	SSW7.8	SW17	
21-May	SW10	SW10	SW10	SW11	SW13	SW13	SW15	SW13	SW13	SSW8	SSE13	SSE12	SE10	SSE10	SSE11	SSW4	ESE6	S9	S10	SSW8	SSW7	SSW9	SSW9	SW12	SSW8.9	SW15	
22-May	SW13	SW13	SW13	SW12	SW11	SW10	SW8	SW9	W6	ENE2	ENE4	NE9	NNW6	N7	NNW11	NNW12	NW17	NW21	NNW15	NNW13	NNW13	NNW14	NNW12	NW10	WNW6.2	NW21	
23-May	NW10	NNW8	NNW7	NNW7	NNW7	N6	NNE6	NNE6	N7	NNE9	NNE12	NE7	NNE8	NNE10	N8	N6	NNE5	N8	NNE5	SE4	SSW7	SSW8	SSW8	SSW9	N4.1	NNE12	
24-May	SSW10	SSW10	SSW11	SSW11	SW13	NNW6	NNW6	NNE4	NE5	E4	NE6	ENE6	WNW3	NE3	SW7	NNW5	N7	ESE1	SSE4	ESE5	ESE6	WSW1	SE8	SE11	S1.5	SW13	
25-May	S9	SSE10	SSW9	SW11	SW15	SW15	WSW12	WSW17	W17	NW8	NNW10	ENE10	SW9	WSW16	NW7	NW22	WNW10	SW12	WSW18	NW18	NW11	W10	WNW11	NW15	W9.1	NW22	
26-May	NW18	NW17	NW18	NW17	NW17	NW15	NNW14	NNW13	NNW17	NNW15	NNW14	NNW14	NW13	NNW15	NNW15	NNW14	NW16	NW15	NNW13	NNW9	N4	NNW2	ENE3	ESE5	NNW12.5	NW18	
27-May	ESE6	ESE6	S5	S8	SSW11	SSW10	SSW9	S10	SE8	ESE11	ESE12	ESE16	SSE6	WSW16	W17	NNW30	NNW30	NNW23	NNW15	NNW11	NNW17	NNW15	NNW20	NNW20	NW4.3	NNW30	
28-May	NW21	NW22	NNW19	NNW18	NNW18	NNW17	NNW17	NNW17	NNW17	NNW18	NNW17	NNW18	NNW15	NNW17	NNW15	NNW14	NNW14	NW15	NNW16	NW15	NW15	NNW10	NW8	NNW6	N6	NNW15.2	NW22
29-May	ENE8	ESE8	SE9	SE9	SSE6	SE10	SE10	ESE10	ESE10	E8	E1	E3	E6	E5	E8	E7	ESE6	ESE10	ESE10	ESE9	ESE9	ESE13	SE13	SE14	ESE8.1	SE14	
30-May	SSE13	S14	S12	S11	S9	S9	SSW11	SSW10	SE11	SE12	SE13	SE12	SE14	SE16	SE12	ESE14	SE15	ESE15	SE17	SSE13	SSE13	SSE10	SSE12	SSE10	SSE11.5	SE17	
31-May	S10	SSE9	SSE8	SSE10	SSE13	SE15	SE15	SE15	SE19	SE17	SSE15	SSE16	SSE12	SSE13	S16	SSE13	SE15	SE11	WSW12	WSW19	SW8	SW14	SW18	WSW20	S10.7	WSW20	

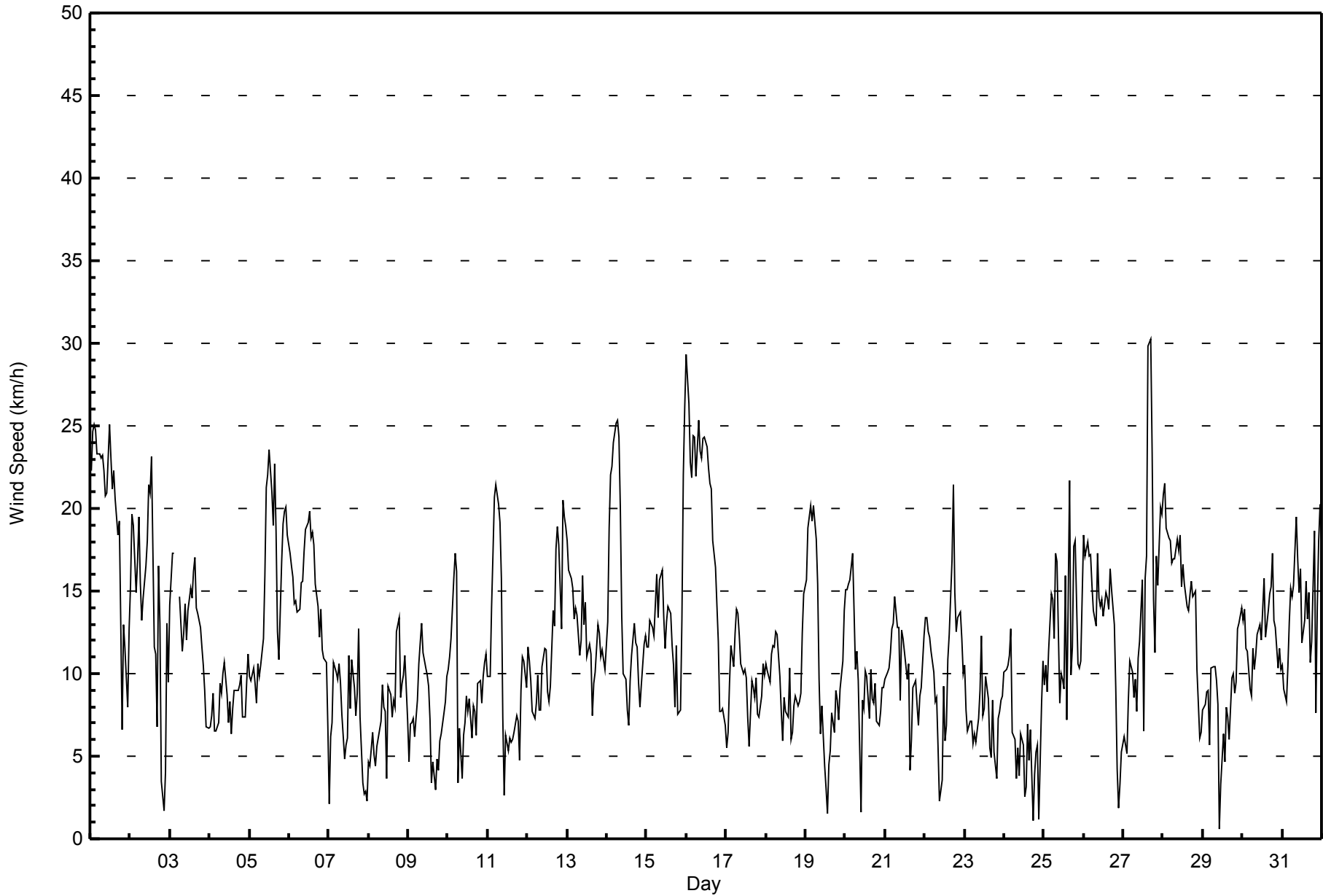
SW4.4	WSW4.8	WSW5.3	SW6.1	WSW6.3	WSW5.7	WSW5.1	WSW3.8	NNW2.0	NE0.7	NE2.1	NE2.2	NNE1.2	N1.2	NW1.9	N2.8	NNE2.2	NNE1.3	NE1.2	NNE1.0	NNW0.7	WSW1.4	SW1.7	SW2.9	Diurnal Average	
NNW29	NNW26	SW25	SW25	NNW24	SW25	SW25	NNW25	NNW23	NNW23	NNW24	WSW25	N24	WNW23	SW22	NNW30	NNW30	NNW23	ESE19	WSW19	NNW19	SE21	NNW22	NNW26	Diurnal Maximum	

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



WBEA
Hourly Averages

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - May 2015





WBEA
Cumulative Frequency Distribution

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - May 2015

Wind Speed Ranges (km/h)	Number of Hours	%	Cumulative %
0 - 5	56	7.56	7.56
6 - 11	351	47.37	54.93
12 - 19	265	35.76	90.69
20 - 28	66	8.91	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
Frequency Distribution

Wind Speed (WS) - km/h
ConocoPhillips - Surmont - May 2015

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	4	6	6	5	7	3	2	4	4	0	2	1	3	2	2	56
6 - 11	16	16	21	27	24	39	25	28	23	42	24	12	5	10	14	25	351
12 - 19	11	13	0	2	3	12	29	17	9	10	51	16	16	5	25	46	265
20 - 28	6	2	2	2	0	0	1	0	0	0	21	9	0	2	5	16	66
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	38	35	29	37	32	58	58	47	36	56	96	39	22	20	46	92	741

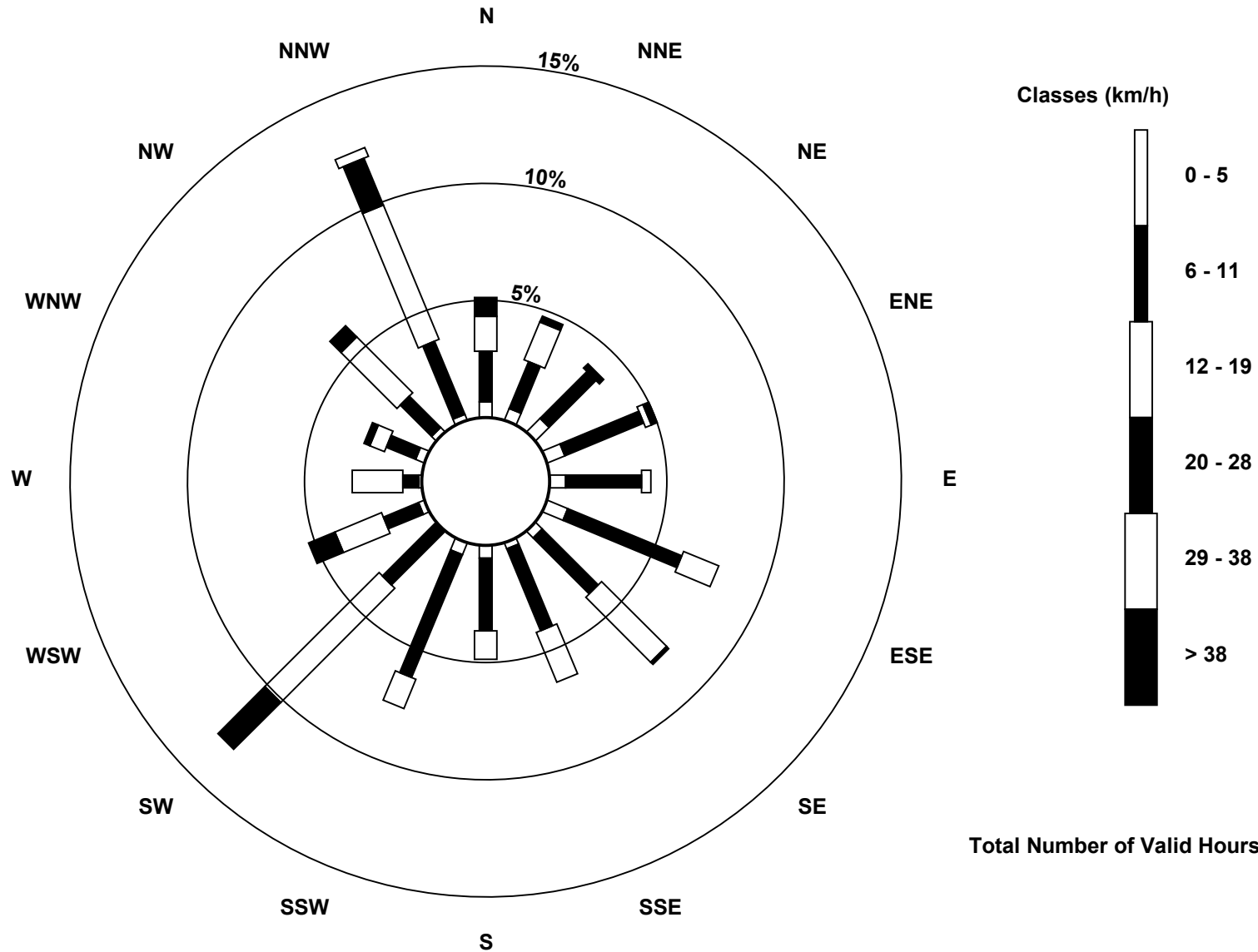
Total Number of Valid Hours: 741

Total Number of Hours: 744



Wood Buffalo Environmental Association
Wind Rose May 2015

Wind Speed (WS) - km/h
ConocoPhillips - Surmont (AMS502)





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

ConocoPhillips - Surmont - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 744
Maximum Value: 10 km/h on May 25 14:00	Hours of Data: 741
Minimum Value: 0 km/h on May 9 22:00	Hours of Missing Data: 3
Percentiles: P ₁ = 1 P ₁₀ = 1 Q ₁ = 2 Median = 3 Q ₃ = 4 P ₉₀ = 5 P ₉₉ = 7	Hours of Calibration: 0
	Percent Operational Time: 99.6

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

Diurnal Maximum

AF - Analyzer Failure



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

ConocoPhillips - Surmont - May 2015

Direction of Maximum Speed: 334 deg on May 27 17:00		Hours in Service:	744
Direction of Maximum Daily Speed Average: 236.7 deg on May 1		Hours of Data:	741
Direction of Minimum Speed: 93 deg on May 29 11:00		Hours of Missing Data:	3
Direction of Minimum Daily Speed Average: 1.5 deg on May 24		Percent Operational Time:	99.6
Monthly Average Direction: 270.2 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-May	231	233	231	234	234	235	239	237	241	233	233	244	243	234	232	231	227	239	280	228	248	270	205	226	236.7
2-May	229	237	256	255	260	271	274	310	325	300	308	319	301	300	312	24	295	261	272	31	39	210	265	280	284.0
3-May	275	324	330	AF	AF	AF	318	322	334	302	315	279	281	303	286	276	312	325	343	360	346	2	15	39	315.8
4-May	57	69	40	34	66	126	142	127	125	120	84	66	33	82	57	52	77	46	57	53	61	80	101	114	79.1
5-May	109	77	68	66	61	58	42	39	31	28	52	59	61	55	32	27	31	59	28	357	347	352	359	357	35.5
6-May	350	341	343	335	347	348	345	343	342	350	359	356	349	5	4	18	19	20	14	6	6	0	29	17	357.5
7-May	296	287	316	333	338	338	340	342	8	11	32	2	319	311	342	324	348	343	4	359	293	264	323	57	339.1
8-May	192	200	194	189	176	174	160	125	106	97	87	123	76	106	63	122	93	95	123	108	46	49	37	39	103.2
9-May	2	46	60	81	60	60	84	76	87	81	77	82	93	88	38	111	126	80	62	114	184	201	203	204	89.6
10-May	203	208	215	222	225	225	238	21	42	69	25	56	75	49	50	74	88	85	100	108	120	135	129	164	140.4
11-May	173	194	220	222	226	232	233	248	267	304	9	12	9	33	326	46	353	345	11	314	246	246	250	265	251.8
12-May	267	272	284	292	286	311	323	346	48	91	103	94	85	101	112	96	116	104	115	128	121	124	133	146	111.6
13-May	147	150	167	174	173	175	176	178	144	139	145	138	134	132	123	148	156	154	139	147	161	174	177	188	155.5
14-May	216	225	227	232	234	236	234	235	243	233	213	225	188	226	201	172	158	176	172	189	209	219	219	223	219.0
15-May	216	213	216	212	209	213	218	204	207	214	198	219	227	233	227	242	234	240	271	296	299	309	334	332	238.5
16-May	345	343	342	343	348	346	331	332	331	339	337	341	356	1	9	12	25	32	33	31	34	64	77	82	354.9
17-May	75	102	125	133	148	142	144	134	118	114	105	114	106	105	153	96	120	128	114	109	109	108	134	172	123.0
18-May	173	196	207	204	206	205	210	221	225	192	172	153	160	180	224	232	208	228	237	244	225	205	222	225	208.1
19-May	227	231	232	233	237	237	242	246	243	207	246	145	153	47	122	122	105	130	135	168	197	213	224	228	219.4
20-May	230	230	231	234	236	234	249	255	256	187	136	139	149	151	192	151	156	162	141	166	194	217	218	213	205.9
21-May	215	222	220	220	221	222	228	231	222	203	152	155	146	158	166	206	115	185	189	193	205	210	208	224	200.2
22-May	225	224	225	222	219	224	227	236	265	69	66	49	346	355	342	329	318	320	332	334	329	335	330	326	299.5
23-May	319	330	346	328	346	3	21	12	3	30	15	36	30	27	353	9	28	9	25	125	195	196	194	195	4.2
24-May	199	201	204	206	219	340	345	17	37	88	51	59	293	43	224	327	354	108	156	121	123	251	135	131	169.9
25-May	179	160	192	218	225	225	244	251	265	307	332	325	215	248	316	305	297	228	251	313	308	271	282	307	264.0
26-May	317	317	322	324	323	326	331	337	331	334	338	329	320	330	338	328	321	323	328	346	354	332	73	110	329.0
27-May	113	116	172	184	208	200	197	173	146	114	117	115	159	256	276	328	334	336	341	340	339	341	337	328	319.2
28-May	324	323	329	327	332	338	333	334	328	337	338	346	336	340	344	341	325	331	325	310	331	326	336	0	332.2
29-May	74	112	124	127	147	125	129	121	111	89	93	95	96	94	86	97	123	106	106	108	103	113	128	143	113.4
30-May	163	170	172	175	181	189	201	192	144	136	138	133	137	135	138	122	127	120	126	150	151	163	163	165	150.6
31-May	169	165	165	157	147	144	139	138	128	142	149	155	152	151	178	164	137	145	239	246	235	230	234	244	170.4

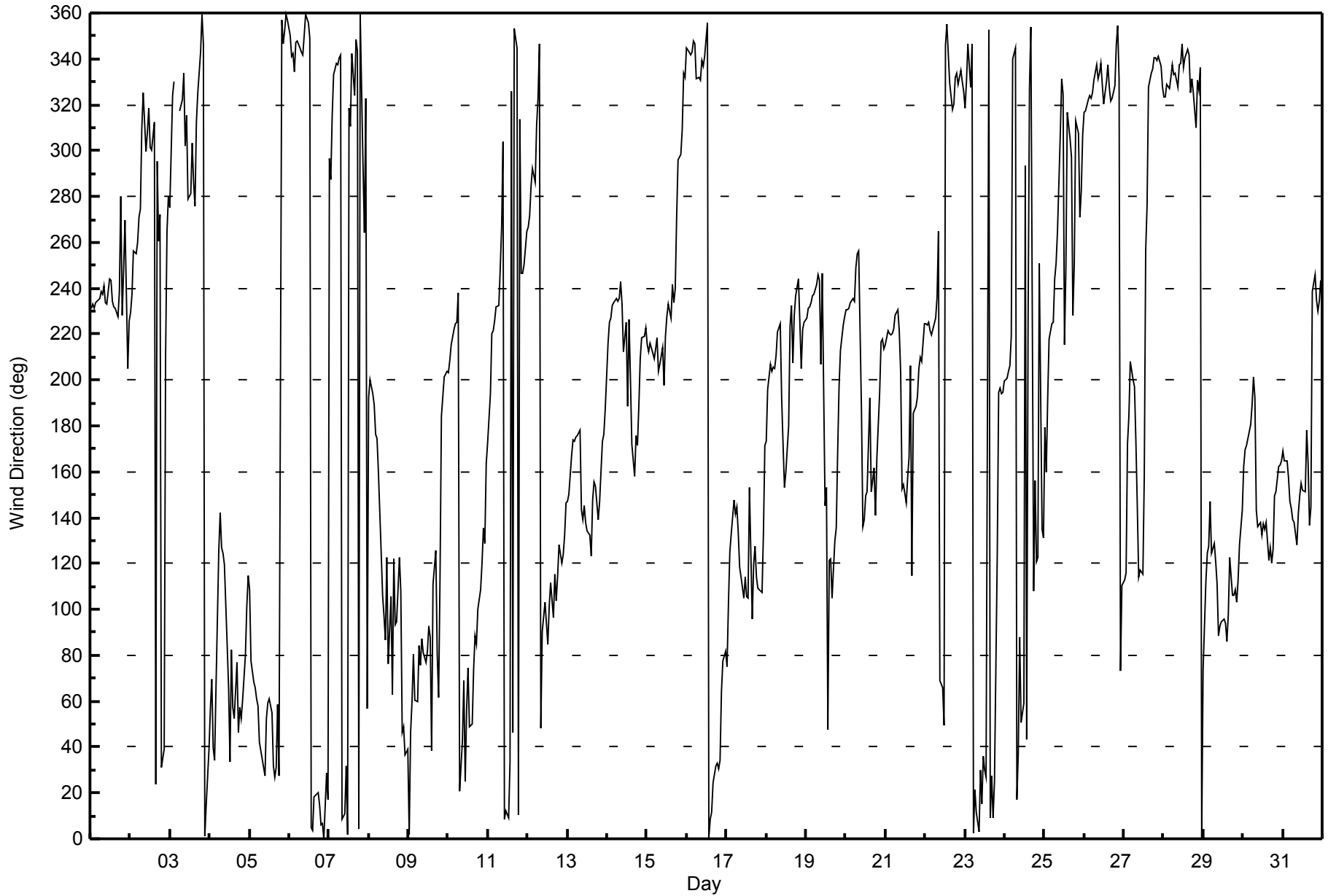
233.0 237.3 241.6 234.4 238.2 238.7 247.1 258.1 281.4 34.4 46.9 52.6 29.9 357.5 325.1 5.0 22.8 20.7 34.7 25.7 299.7 239.6 221.8 228.8
Diurnal Average

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



WBEA
Hourly Averages

Wind Direction (WD) - deg
ConocoPhillips - Surrmont - May 2015





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

ConocoPhillips - Surmont - May 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 106 deg on May 29 11:00		Hours in Service: 744 Hours of Data: 741 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6																							
Minimum Value: 3 deg on May 11 22:00																									
Percentiles: P ₁ = 6 P ₁₀ = 9 Q ₁ = 12 Median = 17 Q ₃ = 33 P ₉₀ = 57 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-May	8	8	8	7	7	8	9	9	13	19	22	17	16	20	17	16	17	25	16	21	29	30	10	10	30
2-May	6	10	10	14	12	9	9	22	22	26	23	17	21	24	25	36	60	12	30	72	79	57	34	30	79
3-May	12	12	14	AF	AF	AF	17	19	19	25	33	23	26	27	24	21	38	25	18	16	12	15	13	15	38
4-May	14	21	14	17	27	24	14	18	16	20	36	60	47	57	70	60	59	32	20	12	12	10	11	12	70
5-May	12	20	13	14	13	18	15	16	13	14	17	16	16	15	13	14	28	19	15	15	16	16	15	15	28
6-May	17	14	15	14	15	15	15	13	13	15	16	16	16	15	17	14	12	13	15	15	15	16	16	21	21
7-May	69	26	24	11	12	15	15	19	22	53	48	57	32	46	39	53	61	39	21	15	44	44	39	34	69
8-May	21	21	12	11	18	17	19	23	25	34	50	86	39	31	38	42	47	19	11	22	22	14	15	15	86
9-May	27	18	20	18	20	23	17	16	17	18	26	26	31	46	85	84	86	48	51	11	23	4	4	7	86
10-May	8	10	12	9	8	8	86	25	68	46	43	43	49	44	70	43	46	54	22	13	10	18	15	15	86
11-May	11	17	9	9	8	8	9	10	23	49	87	63	80	73	80	58	64	44	28	46	6	3	6	11	87
12-May	6	6	7	19	10	21	11	20	26	25	25	28	51	54	50	28	29	15	15	11	11	11	10	11	54
13-May	10	12	13	14	14	14	14	17	20	15	25	25	60	37	44	70	37	38	20	15	18	12	14	16	70
14-May	12	9	8	8	8	8	9	10	13	25	38	46	57	67	50	34	28	29	16	16	11	10	11	8	67
15-May	12	14	12	13	13	13	12	18	20	22	30	43	32	24	38	31	29	60	34	41	56	60	15	13	60
16-May	17	17	16	15	16	17	16	17	16	19	19	19	24	22	24	22	23	19	20	16	16	13	11	10	24
17-May	13	12	10	12	15	12	15	18	21	33	33	38	42	59	73	43	41	40	18	12	8	10	11	13	73
18-May	11	14	13	11	12	14	14	18	31	46	70	51	71	58	37	76	63	43	21	9	9	9	8	8	76
19-May	8	8	8	7	7	7	9	12	22	53	38	76	93	102	64	72	44	59	33	19	11	10	9	6	102
20-May	7	7	7	7	8	8	12	18	30	103	68	63	49	52	81	44	45	39	28	23	17	9	11	11	103
21-May	11	9	11	10	10	10	8	12	25	47	36	35	37	48	43	85	73	38	30	15	13	9	11	9	85
22-May	9	9	7	9	9	7	11	11	67	92	70	42	84	61	40	38	22	13	15	13	11	12	12	11	92
23-May	9	11	23	22	16	24	23	31	29	30	24	54	49	43	54	79	65	42	42	58	16	11	10	12	79
24-May	12	12	13	13	13	43	20	34	36	68	49	45	87	85	55	84	39	93	62	35	31	95	14	10	95
25-May	18	18	15	13	9	9	12	11	14	46	28	43	35	45	91	17	33	44	15	22	29	9	13	19	91
26-May	12	13	8	8	8	9	12	15	16	21	26	26	36	29	26	32	20	21	17	16	36	36	25	11	36
27-May	9	12	28	14	15	14	17	16	28	17	14	14	67	17	13	15	15	14	15	15	14	15	13	12	67
28-May	10	10	13	12	14	14	14	16	12	18	24	25	27	27	33	29	32	23	27	17	12	13	14	12	33
29-May	21	11	12	10	35	12	13	19	24	44	106	99	63	80	52	66	80	21	19	11	10	11	11	12	106
30-May	14	13	14	14	15	18	18	29	21	25	34	35	34	26	39	24	22	19	17	15	12	13	13	12	39
31-May	14	15	16	13	12	12	13	15	11	14	14	16	17	15	22	21	17	33	12	19	32	8	8	8	33
Diurnal Maximum																									
AF - Analyzer Failure																									



Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 26, 2015	Last Calibration	April 22, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Reason:	Routine		
Start Time (MST)	9:28	End Time (MST)	14:35
Gas Cert Reference	LL110503	Station temp.	23 Deg C
Cal Gas Concentration	51.1 ppm	Cal Gas Exp Date	April-1-2016
Calibrator Make/Model	API T700	Serial Number	522
ZAG Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882

Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	776	762
Analyzer IP address	192.168.1.43		Lamp voltage	2600	2527
Calculated slope	0.997201	1.004091	Chamber temp	50.0	49.9
Calculated intercept	0.017038	0.290761	Pressure	22.2	22.3
Analyzer Background	16.9	18.5	Flow	556.000	555.000
Analyzer Coefficient	1.011	1.012	Intensity	64	62

Analyzer make API T100 Analyzer serial # 598

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.5	----
as found span	5000	76.6	782.9	779.4	1.004
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	76.6	782.9	779.4	1.004
second point	5000	38.3	391.4	389.7	1.005
third point	5000	19.2	196.2	194.8	1.007
as left zero	5000	0.0	0.0	0.6	----
as left span	6000	92.0	783.5	768.0	1.020
Average Correction Factor					1.005

Corrected As found 778.9 Previous response 785.0 % change 0.8%

Notes:

Changed inlet filter after as founds. Adjusted zero.

Calibration Performed By: Asad Hidayat



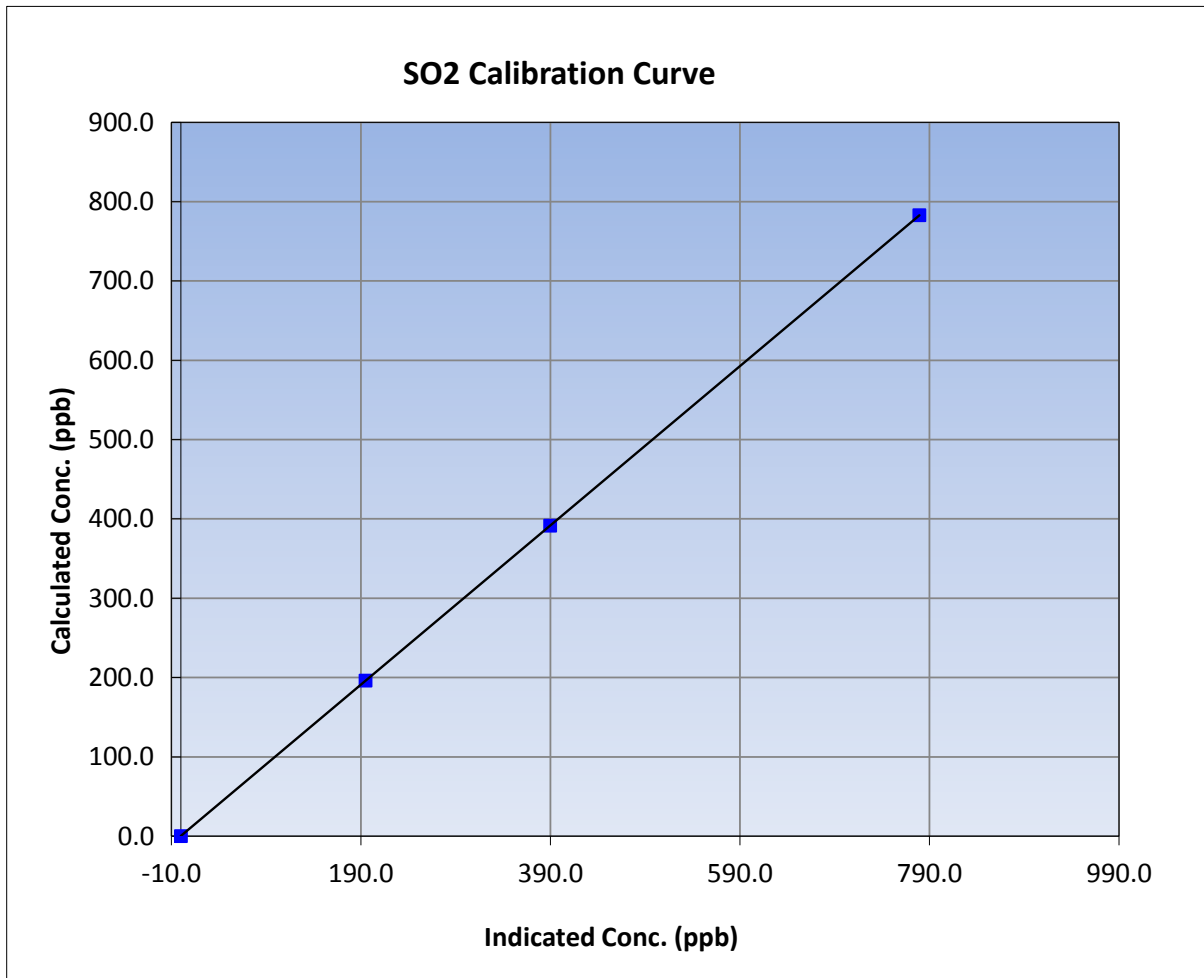
Wood Buffalo Environmental Association SO2 Calibration Report

Station Information

Calibration Date	May 26, 2015	Previous Calibration	April 22, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Start Time (MST)	9:28	End Time (MST)	14:35
Analyzer make	API T100	Analyzer serial #	598

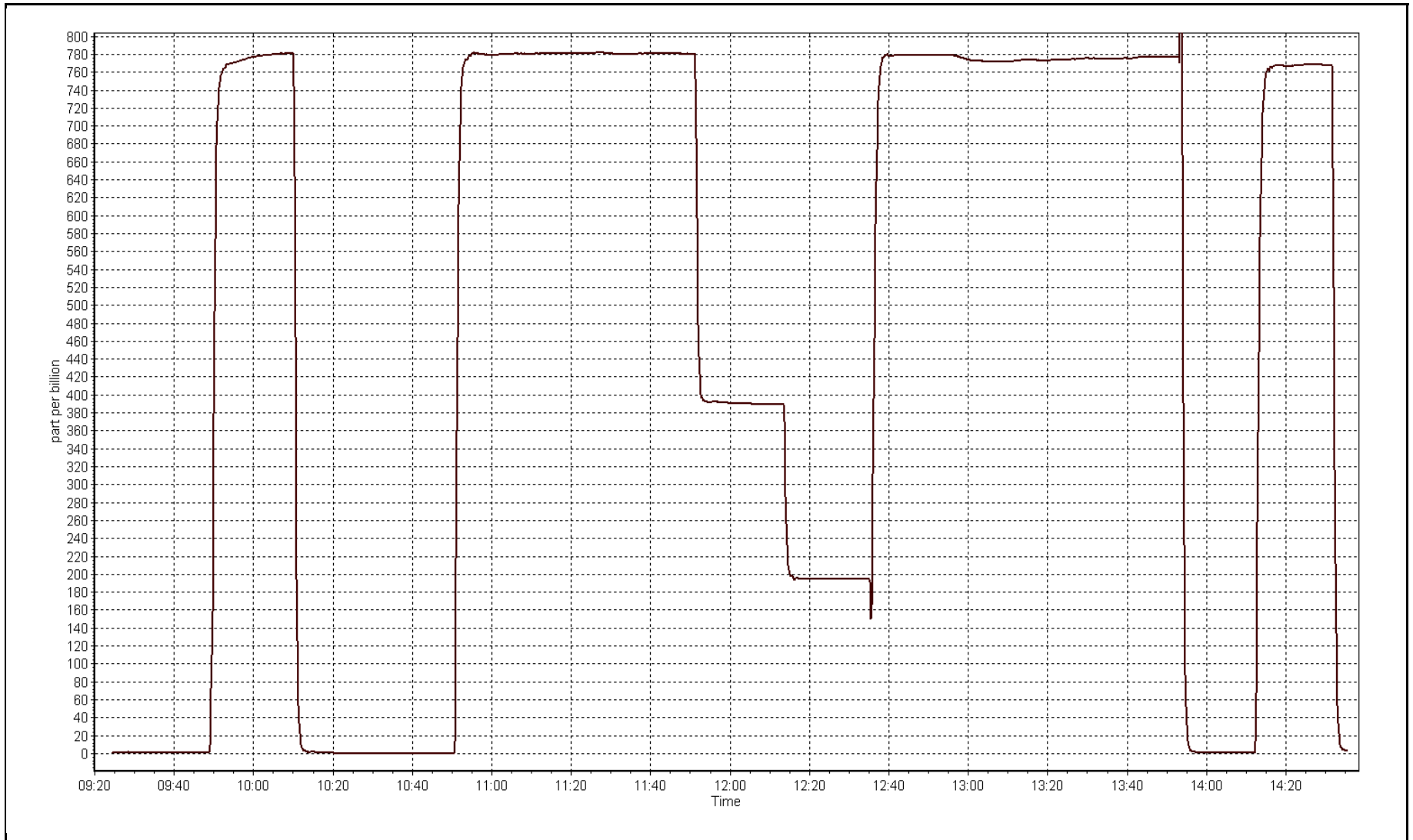
Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999999
782.9	779.4	1.0044		
391.4	389.7	1.0045	Slope	1.004091
196.2	194.8	1.0075		
			Intercept	0.290761



SO2 Calibration Plot

Date: May 26, 2015





Wood Buffalo Environmental Association H2S Calibration Report

Station Information

Calibration Date	May 22, 2015	Last Calibration	April 21, 2015
Station Name	ConocoPhillips-Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	9:30	End Time (MST)	13:55
Gas Cert Reference	LL34303	Station temp.	22 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	30 May, 2016
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	51.1 ppm	SO2 gas cert/exp	LL110503 April-1-2016

Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	9	85
Analyzer IP address	192.168.1.75		Lamp voltage	2566	2480
Calculated slope	0.999683	1.008776	Chamber temp	50	50
Calculated intercept	-0.079965	-0.085506	Pressure	22.7	22.7
Analyzer Background	19.3	19.3	Flow	558.000	561.000
Analyzer Coefficient	0.937	0.937	Intensity	57	55
			Converter temp.	317	315
Analyzer make/model	API T101		Analyzer serial #	197	
Converter make/model	N/A		Converter serial #	N/A	

Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	38.5	80.1	79.4	1.008
SO2 scrubber check	5000	19.6	200.3	3.8	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	38.5	80.1	79.4	1.008
second point	5000	19.3	40.1	39.8	1.008
third point	5000	12.0	25.0	25.0	0.999
as left zero	5000	0.0	0.0	0.3	----
as left span	5000	38.5	80.1	79.2	1.011
Average Correction Factor					1.005

Corrected As found	79.4	Previous response	80.2	% change	0.9%
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Notes:

Performed scrubber check before as founds, reading 3.3 ppb. Performed scrubber check again after replacing the Sox scrubber beads after as founds, reading 3.8 ppb. Changed inlet filter after as founds. No adjustments.

Calibration Performed By:

Asad Hidayat



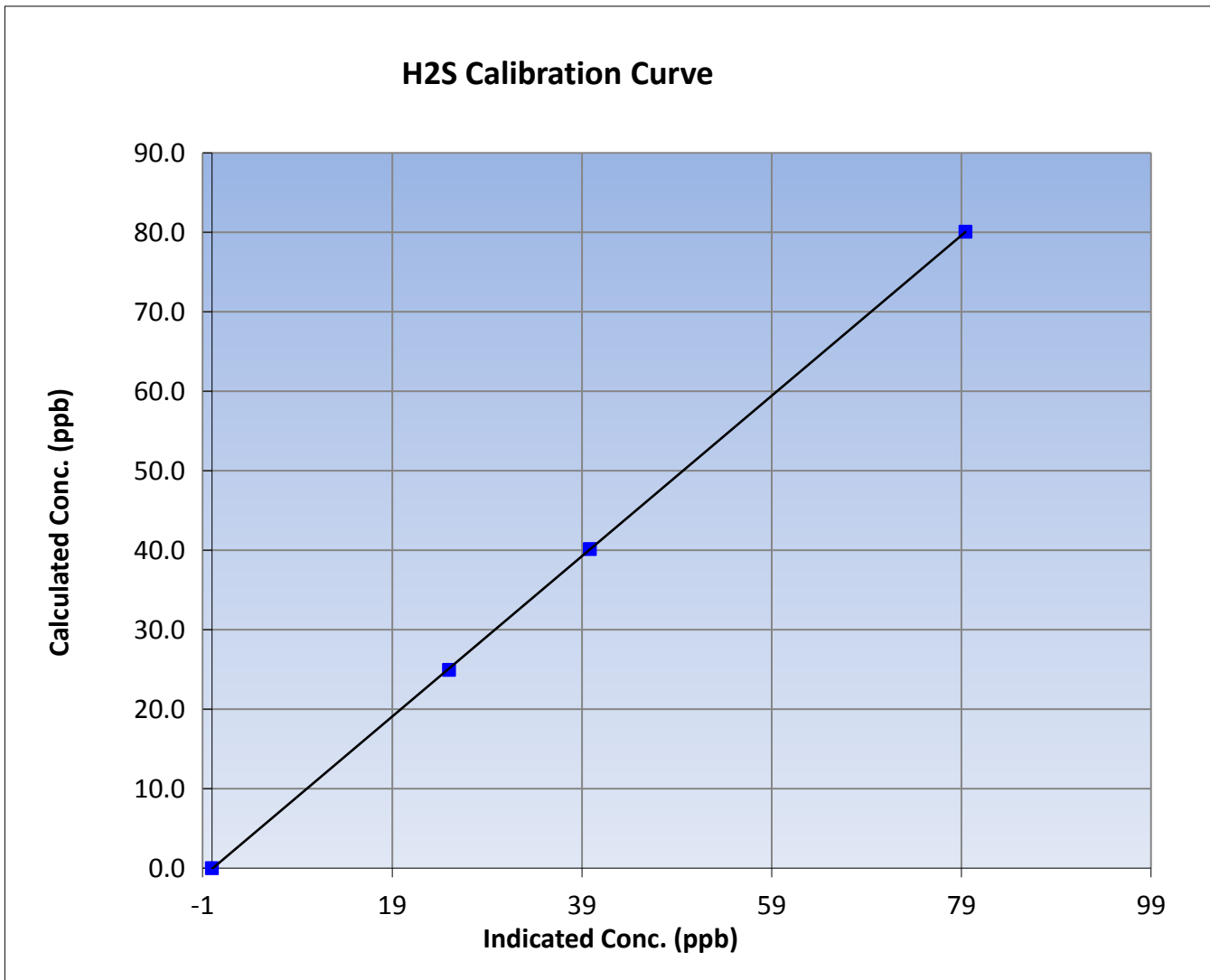
Wood Buffalo Environmental Association H2S Calibration Report

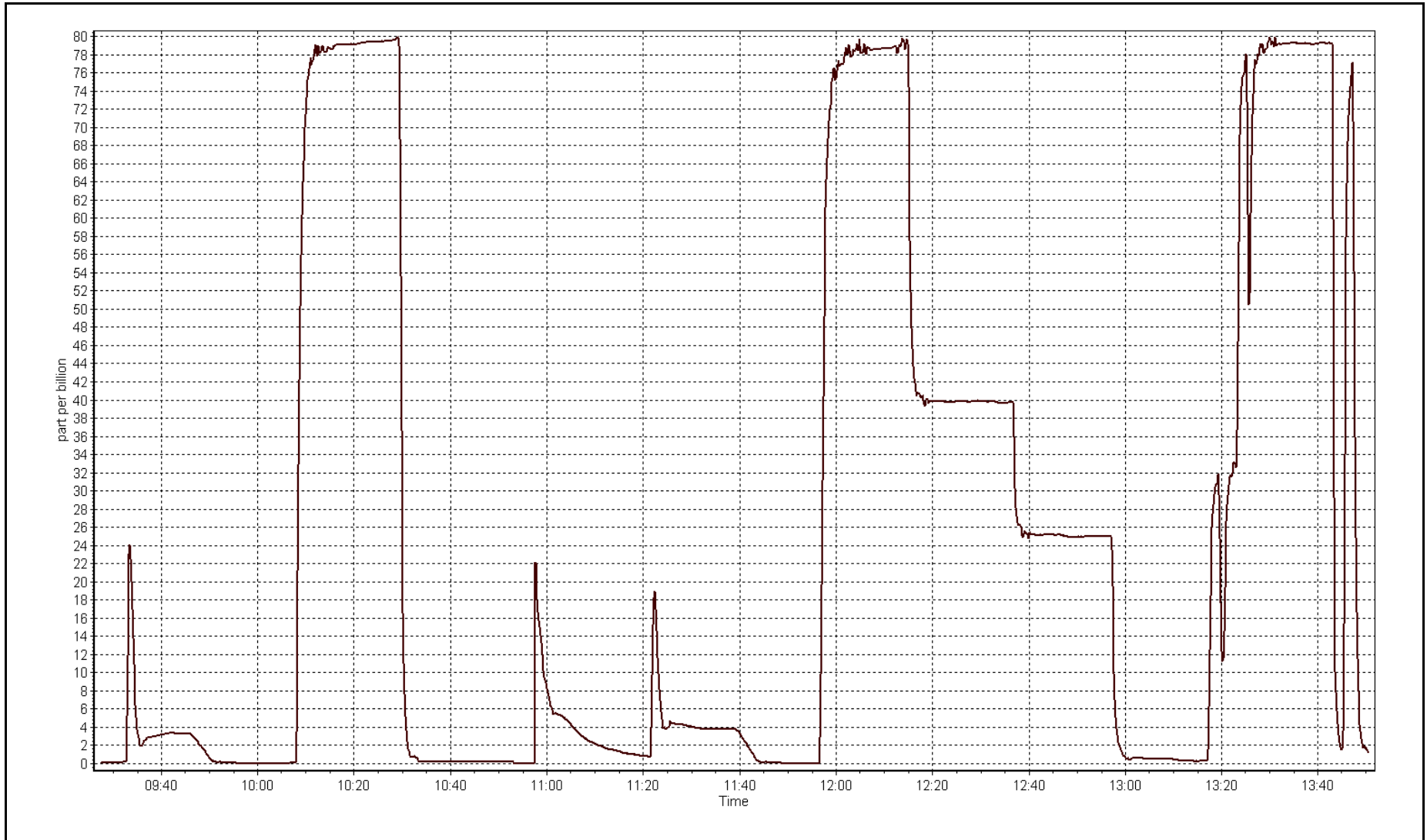
Station Information

Calibration Date	May 22, 2015	Previous Calibration	April 21, 2015
Station Name	AMS 502	Station Number	AMS 502
Start Time (MST)	9:30	End Time (MST)	13:55
Analyzer make	API T101	Analyzer serial #	197

Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999990
80.1	79.4	1.0081		
40.1	39.8	1.0076	Slope	1.008776
25.0	25.0	0.9992		
			Intercept	-0.085506







Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

Station Information

Calibration Date	May 26, 2015	Previous Calibration	April 22, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Reason:	Routine		
Start Time (MST)	9:28	End Time (MST)	14:35
NO Cal Gas Conc	52.2 ppm	Gas Cert Reference	LL110503
NOx Cal Gas Conc	52.2 ppm	Cal Gas Expiry Date	01-Apr-16
Calibrator	API T700	Serial Number	622
Zero air Generator	Teledyne API T701	Serial Number	4865

DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882
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Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.002643	1.001435	0.994135
	Data Offset	-0.112004	-0.195768	0.652608
Current Calibration	Data Slope	0.998278	0.998683	0.980838
	Data Offset	-0.142424	-1.193296	1.206103

Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.721		0.706	
NOx coefficient	0.997		1.001	
NO2 coefficient	1.000		1.000	
NO bkgrnd	4.9		4.8	
NOx bkgrnd	5.1		6.6	
Chamber Temp	50.6	Deg C	50.6	Deg C
Moly Temp	327.4	Deg C	327.6	Deg C
PMT voltage	-941	V	-940.9	V
PMT Temp	-2.7	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	206.7	mmHg	204.4	mmHg
R Cell Press Nox	206.7	mmHg	204.4	mmHg
NO sample flow	0.489	lpm	0.506	lpm
Nox sample Flow	0.489	lpm	0.506	lpm

Notes:

Changed inlet filter after as founds. Adjusted Nox zero. Adjusted Nox and NO span.



Wood Buffalo Environmental Association

NOX-NO-NO2 Calibration Report

Station Information

Calibration Date:

May 26, 2015

Station Number:

AMS 102

Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	2.0	1.4	0.7	----	----
as found span	5000	76.6	799.7	799.7	0.0	813.4	813.5	0.0	0.9831	0.9831
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	1.1	-1.2	----	----
high point	5000	76.6	799.7	799.7	0.0	801.1	801.9	-0.8	0.9983	0.9972
second point	5000	38.3	399.9	399.9	0.0	401.0	401.6	-0.6	0.9972	0.9957
third point	5000	19.2	200.4	200.4	0.0	201.0	202.0	-0.9	0.9973	0.9924
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	1.5	-1.6	----	----
as left span	6000	92.0	800.4	515.2	285.2	811.3	526.9	282.4	0.9866	0.9778
Average Correction Factor									0.9976	0.9951

Corrected As found
Previous Response

NO_x= 811.4
NO_x= 797.7

NO= 812.1
NO= 798.8

Percent Change

NO_x= -1.7%

NO= -1.6%

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 NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-1.2			N/A	
1st NO2 (300)	N/A	515.2	277.1	802.1	520.4	281.6	0.9832	0.9901	0.9839	101.6%
2nd NO2 (200)	N/A	599.5	192.8	802.0	607.3	194.7	0.9833	0.9872	0.9901	101.0%
3rd NO2 (100)	N/A	690.0	102.3	801.8	698.6	103.3	0.9836	0.9878	0.9906	100.9%
4th NO2 (0)	792.3	N/A	11.0	803.3	802.3	0.9	0.9817	0.9875	N/A	----
Average Correction Factor							0.9830	0.9881	0.9882	101.2%

Calibration Performed By:

Asad Hidayat



Wood Buffalo Environmental Association

NO_x Calibration Summary

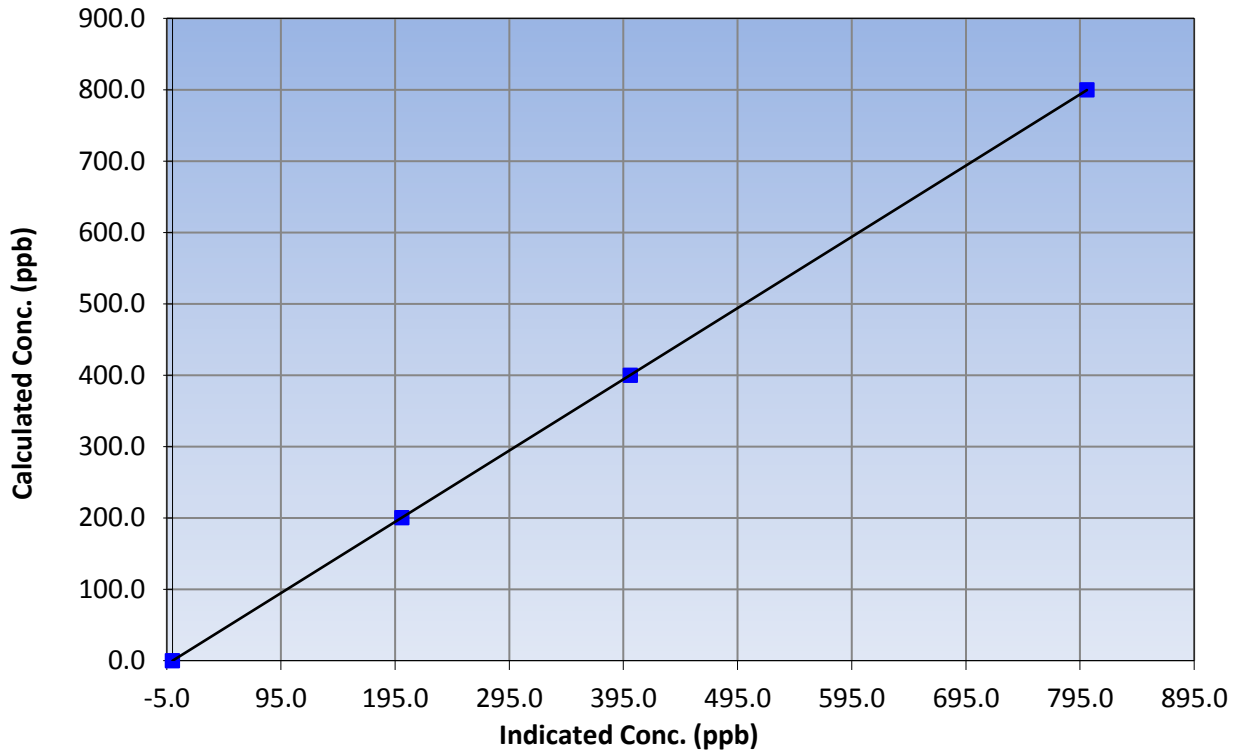
Station Information

Calibration Date	May 26, 2015	Previous Calibration	April 22, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Start Time (MST)	9:28	End Time (MST)	14:35
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	1.000000
799.7	801.1	0.9983		
399.9	401.0	0.9972	Slope	0.998278
200.4	201.0	0.9973		
			Intercept	-0.142424

NO_x Calibration Curve





Wood Buffalo Environmental Association

NO Calibration Summary

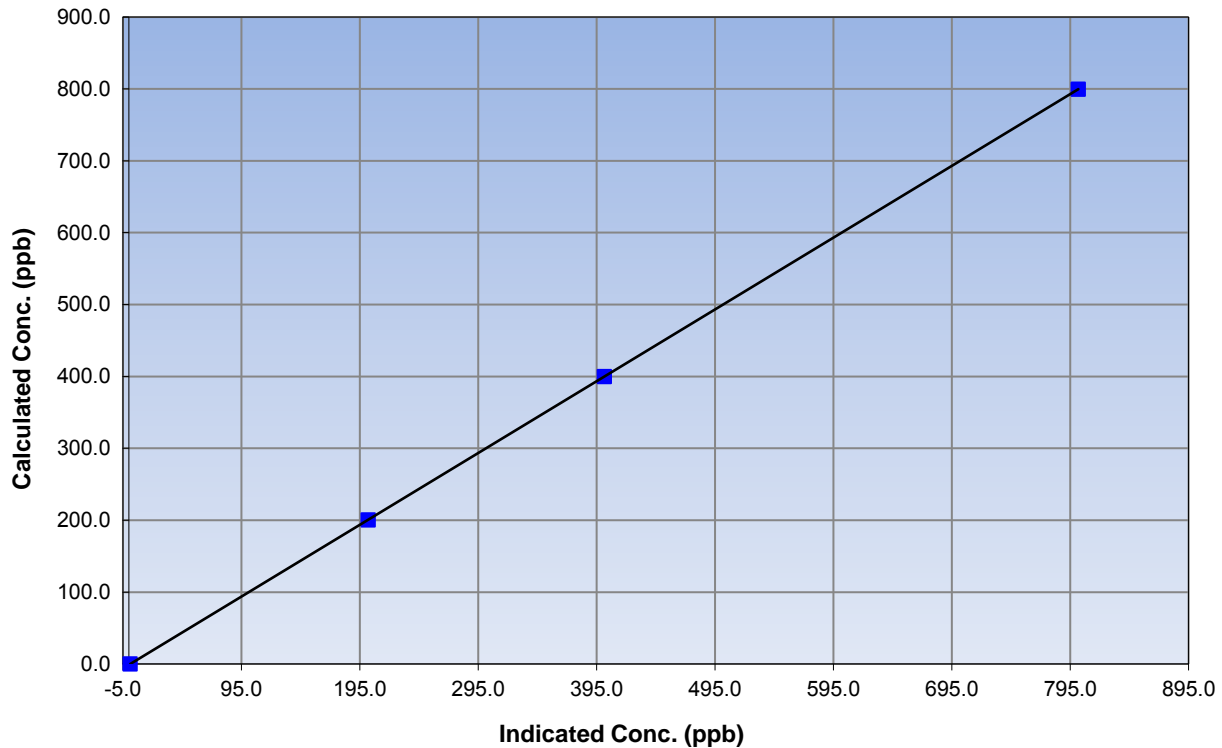
Station Information

Calibration Date	May 26, 2015	Previous Calibration	April 22, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Start Time (MST)	9:28	End Time (MST)	14:35
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	1.1	N/A	Correlation Coefficient	1.000000
799.7	801.9	0.9972		
399.9	401.6	0.9957	Slope	0.998683
200.4	202.0	0.9924		
			Intercept	-1.193296

NO Calibration Curve





Wood Buffalo Environmental Association

NO₂ Calibration Summary

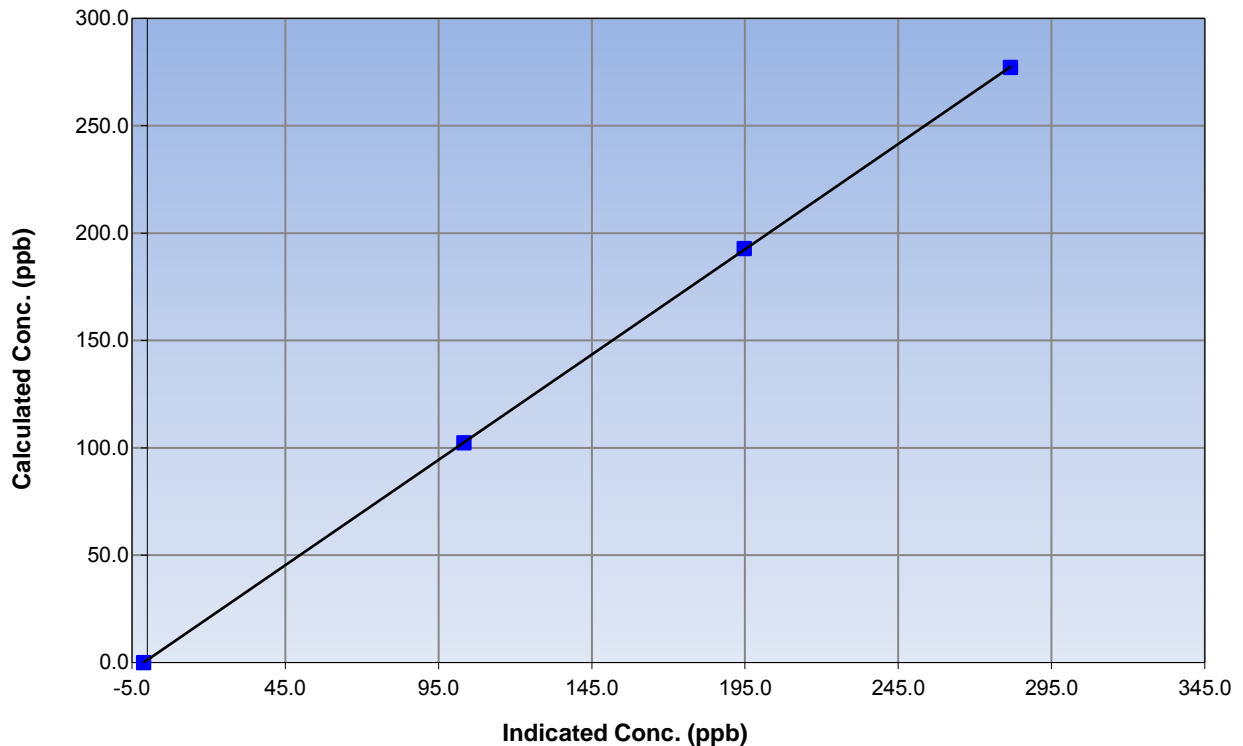
Station Information

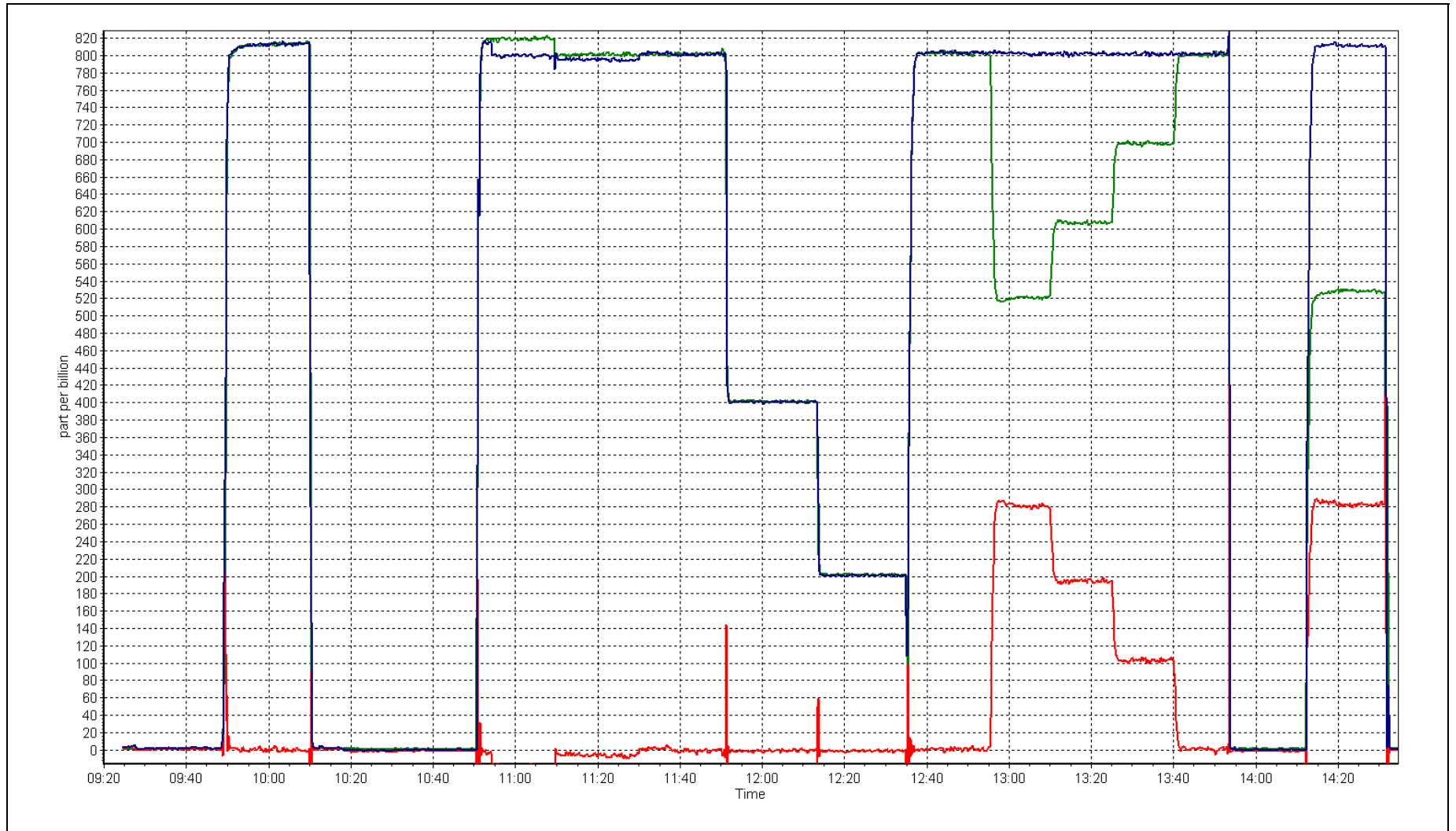
Calibration Date	May 26, 2015	Previous Calibration	April 22, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Start Time (MST)	9:28	End Time (MST)	14:35
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.2	N/A	Correlation Coefficient	0.999988
277.1	281.6	0.9839		
192.8	194.7	0.9901	Slope	0.980838
102.3	103.3	0.9906		
			Intercept	1.206103

NO₂ Calibration Curve







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