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September 18, 2016

RE: July 2016 Ambient Air Monitoring Monthly Reports

Attached are the monthly continuous ambient air monitoring reports for the LICA Airshed Zone's Cold Lake South, Maskwa, St. Lina, and Portable Air Monitoring System (located in Bonnyville) stations. These reports also contain complete data tables, sample log sheets, and chain of custody documents for the integrated monitoring programs including volatile organic compounds, polycyclic aromatic hydrocarbons, Partisol sampler (particulate matter mass), and passive samplers.

Should you have any questions, please don't hesitate to contact me directly at (780) 266-7068.

Respectfully,

A handwritten signature in blue ink that reads 'Michael Bisaga'.

Michael Bisaga

Airshed Program Manager
Lakeland Industry and Community Association

cc (email): LICA Office

(REVISION)

**AMBIENT AIR MONITORING MONTHLY DATA REPORT
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
COLD LAKE SOUTH SITE**

JOB #: 2833-2016-07-1-C

July 2016

Prepared for:

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
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Attention: MIKE BISAGA

DATE: **September 28, 2016**

This report supersedes all previous reports with the same Maxxam project number.

Prepared by:



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Project Manager Assistant, Customer Service, Air Services

Reviewed by:



Cheri Sinclair, B.Sc.
Supervisor, Customer Service, Air Services

SUMMARY

In July 2016, the Air Services Group of Maxxam Analytics conducted an ambient air monitoring program at the Cold Lake South Site of Lakeland Industry & Community Association, near Cold Lake, Alberta. Sampling was carried out to determine the concentrations of non-compliance parameters as requested by the Project Coordinator.

All data collected this month were within the objectives outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

The operational uptime for all analyzers and meteorological system were above the 90% requirement.

All Parameters: One hour of maximum instantaneous data is missing on July 27, at hour 07:00, due to a power failure. A repeat span check was performed on July 27, at hour 08:00, due to a sampling error.

PM 2.5: The first bi-monthly audit was performed on July 5. The TEOM unit failed a leak check during the second/annual maintenance audit on July 26. Twenty three hours of data are missing due to this event. Six hours of data were invalidated as the data was below -3 ug/m^3 .

The summary of results is presented on the following pages.

Any deviations or modifications made to the sampling or analytical methods are outlined in Section 1.0 Discussion. On this basis, Maxxam is issuing this completed report to Lakeland Industry & Community Association, Cold Lake South Site.

Should you have any questions concerning the results or if we can be of further assistance, please contact us at 403-219-3677 or toll-free at 1-800-386-7247.

Monthly Continuous Data Summary

Lakeland Industry & Community Association						MAXIMUM VALUES							OPERATIONAL TIME (%)
Cold Lake South Site						1-HOUR					24-HOUR		
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (KPH)	WIND DIRECTION (DEGREES)	READING	DAY	
	1-HR	24-HR	1-HR	24-HR									
SO2 (PPB)	172	48	0	0	0.1	1.1	24	9	9.6	WSW	0.3	24	99.9
TRS (PPB)	-	-	-	-	0.2	1.9	16	6	4.4	WSW	0.5	16	99.7
THC (PPM)	-	-	-	-	2.11	2.82	18	3	0.3	SW	2.32	18	99.9
NO2 (PPB)	159	-	0	-	1.8	7.2	17	3	3.4	W	3.2	7	99.9
NO (PPB)	-	-	-	-	0.3	6.9	14	14	6.8	NNE	1.0	6	99.9
NOX (PPB)	-	-	-	-	2.2	11.2	6	6	3.1	W	4.1	7	99.9
O3 (PPB)	82	-	0	-	21.5	47.9	29	18	4.5	WSW	28.0	3	99.9
PM2.5 (UG/M3)	80	30	0	0	5.4	33.4	9	20	3.5	ENE	14.5	17	96.1
RELATIVE HUMIDITY (%)	-	-	-	-	72	100	6, 7	VAR	VAR	VAR	91	5	100.0
AMBIENT TEMPERATURE (DEG C)	-	-	-	-	18.1	28.5	28	14	7.7	WSW	21.9	27	100.0
VECTOR WS (KPH)	-	-	-	-	4.9	16.5	21	13	-	W	8.0	21	100.0
VECTOR WD (DEG)	-	-	-	-	19 (NNE)	-	-	-	-	-	-	-	100.0

NA-NOT AVAILABLE VAR-VARIOUS

Exceedance Summary Report

SO₂ 1- Hour Exceedances

No Exceedances Recorded During the Month

SO₂ 24- Hour Exceedances

No Exceedances Recorded During the Month

NO₂ 1- Hour Exceedances

No Exceedances Recorded During the Month

PM_{2.5} 1- Hour Exceedances

No Exceedances Recorded During the Month

PM_{2.5} 24- Hour Exceedances

No Exceedances Recorded During the Month

O₃ 1- Hour Exceedances

No Exceedances Recorded During the Month

Passive Sampler Summary

	Sulphur Dioxide (in ppb)
Mean	0.4
Minimum	0.1
Maximum	1.4

Note: N/A

	Hydrogen Sulphide (in ppb)
Mean	0.20
Minimum	<0.02
Maximum	0.43

Note: N/A

	Nitrogen Dioxide (in ppb)
Mean	0.8
Minimum	0.1
Maximum	2.8

Note: N/A

	Ozone (in ppb)
Mean	28.21
Minimum	21.50
Maximum	38.80

Note: N/A

Volatile Organics (VOCs) Data Summary

Sample Collected Date	Maximum reading (PPB)	Volatile Organic Compound
July 5, 2016	5.7	Acetone
July 11, 2016	3.9	Acetone
July 17, 2016	1.9	Acetone
July 23, 2016	2.7	Acetone
July 29, 2016	5.4	Acetone

Note: NA

Polycyclic Aromatic Hydrocarbons (PAHs) Data Summary

Sample Collected Date	Maximum reading (ug)	Semi-Volatile Organic
July 5, 2016	0.16	Phenanthrene
July 11, 2016	0.24	Phenanthrene
July 17, 2016	0.32	Phenanthrene
July 23, 2016	0.17	Phenanthrene
July 29, 2016	0.26	Phenanthrene

Note: NA

Partisol Sampler Summary

Sample Collected Date	Concentration (mg)
July 5, 2016	0.037
July 11, 2016	0.097
July 17, 2016	0.310
July 23, 2016	0.068
July 29, 2016	0.069

Note: NA

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1.0 Discussion

This monthly report consists of data for parameters Sulphur Dioxide (SO₂), Total Reduced Sulphur (TRS), Total Hydrocarbon (THC), Oxides of Nitrogen (NO_x), Nitric Oxides (NO), Nitrogen Dioxide (NO₂), Ozone (O₃), Particulate Matter 2.5 (PM_{2.5}), Relative Humidity (RH), Ambient Temperature (AmbTPX), Wind Speed (WS), Wind Direction (WD) and Standard Deviation Wind Direction (STDWD). The results for the non-continuous Partisol, VOCs, PAHs and Passive monitoring program are also included in this report.

Sample filters for all continuous air monitors are changed before the calibration begins. The sample manifold is cleaned during the site visit each month.

Control checks, consisting of a zero and span, are conducted daily on all continuous air monitors. In place of the air sample, zero air (from scrubbed air or gas cylinders) is used for zero checks, and a known concentration of the pollutant being analyzed is used for span checks. These checks are controlled by automatic timers and valves. The total zero span cycle is completed within an hour, the commencement of the zero span cycle is at the beginning of the hour.

Multipoint calibrations are done a minimum of once a month for each continuous air monitor. An additional calibration is required under the following conditions: 1) within three days after the initial start-up and stabilization of a newly installed instrument, 2) prior to shut-down or moving of an instrument which has been working to specification, and 3) when major repair has been done on the instrument.

Time during the first multi-point calibration is not considered downtime (Data is flagged as C). If more than one calibration is performed during the month, the time during the additional calibration is considered as downtime (Data is flagged as C1).

Only one zero/span check is run per day. Time during the zero/span check is not considered as downtime (Data is flagged as S). If an extra zero/span check is performed, the time during the additional check is considered as downtime (Data is flagged as S1).

The AMD requires each instrument and accompanying data recording system to be operational 90% of the time (minimum), on a monthly basis.

All sampling, analysis, and QA/QC for this project was performed by Maxxam Analytics and complies with the Alberta Air Monitoring Directive.

Data contained in this monthly report has undergone the verification and validation based on the requirements of the AMD Chapter 6: Ambient Data Quality (August 3, 2016). The descriptions of the data verification and validation process can be found in Section 5 of this report. Instantaneous data, where applicable, is provided for reference purposes and has not undergone zero correction.

Hourly and minute data have been reviewed based on daily zero/span results and multi-point calibration results. Data may be considered invalid if a zero-corrected span check in excess of +/- 10% of the span concentration (established by the previous multi-point calibration) is encountered and/or significant differences in the calibration factor occurs (greater than 10%).

SULPHUR DIOXIDE (SO₂)

The routine monthly calibration was performed on July 7.

TOTAL REDUCED SULPHUR (TRS)

A shut-down calibration was performed on July 7 to replace the brass fitting on the teflon tubing with a stainless steel fitting. A successful post-repair calibration was completed afterwards. Both the shut-down and post-repair calibration results met AMD's requirements. The analyzer spanned high on July 8. A repeat span check was performed to assess the analyzer's functionality and the result was within acceptance limits.

TOTAL HYDROCARBONS (THC)

The routine monthly calibration was performed on July 8

NITROGEN DIOXIDE (NO₂)

The routine monthly calibration was performed on July 7.

OZONE (O₃)

The routine monthly calibration was performed on July 8

PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM_{2.5})

The first bi-monthly audit was performed on July 5. A second routine/annual maintenance audit was completed on July 26. During the annual audit, an unsuccessful leak check was performed on the TEOM unit following the installation of a new dryer. The channel was placed in "maintenance" mode overnight as the issue could not be resolved after several troubleshooting attempts. On July 27, the switch valve was rebuilt and the sample pass was re-assembled. A successful final leak check was completed afterwards. Twenty three hours of data are missing due to this event. The inlet filter and FDMS filter were replaced during both audits.

Data was corrected using Alberta Air Quality Guideline. If the data was between 0 to -3 ug/m³, the data was corrected to 0 ug/m³. If the data was below -3 ug/m³, the data was invalidated. Six hours of data were invalidated as the data were below -3 ug/m³ this month.

WIND SPEED (WS), WIND DIRECTION (WD) and STANDARD DEVIATION WIND DIRECTION (STDWD)

The wind system was working well throughout the month.

The wind system is reported as vector wind speed and vector wind direction. The wind direction data included in this report represents where the wind was coming from.

RELATIVE HUMIDITY (RH)

The humidity sensor was working well throughout the month.

AMBIENT TEMPERATURE (TPX)

The temperature sensor was working well throughout the month.

VOC SAMPLES

The sampler was programmed to run for 24 hours every 6th day, as per the NAPS (North American Pollution Surveillance Schedule).

Samples were collected on July 5, 11, 17, 23 and 29. Analytical results are included in this report. The VOC values are reported in ppb.

PAH SAMPLES

The sampler was programmed to run for 24 hours every 6th day per the NAPS (North American Pollution Surveillance Schedule).

Samples were collected on July 5, 11, 17, 23 and 29. Analytical results are included in this report. The PAH values are reported in µg.

PARTISOL SAMPLES

The sampler was programmed to run for 24 hours every 6th day per the NAPS (North American Pollution Surveillance Schedule).

Samples were collected on July 5, 11, 17, 23 and 29. Analytical results are included in this report. The Partisol values are reported in mg.

The routine Partisol sampler audit was completed on July 8.

PASSIVE SAMPLES

Data for station 12 and 25 are missing as the technician was not granted access. Due to damaged samplers, Station 18 and 27 were missing data for O3 and SO2, respectively, Analytical results are included in this report.

2.0 Project Personnel

Mike Bisaga was the contact for Lakeland Industry & Community Association and the Maxxam field sampling technician was Alexander Yakupov.

3.0 Plant Monthly Required AMD Summary

All data collected this month were within the objectives outlined in the AMD 2016.

The operational uptime for all analyzers and meteorological system were above the 90% requirement.

4.0 Calculations and Results

All calculations and reporting of results follow the method described in the AMD 2016.

5.0 Methods and Procedures

The following methods and procedures were used to complete the test program:

- Maxxam AIR SOP-00208: RM Young Monitor Calibration
- Maxxam AIR SOP-00210: Ambient TRS Monitoring
- Maxxam AIR SOP-00211: Ambient SO₂ Monitoring
- Maxxam AIR SOP-00212: Ambient O₃ Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO₂/NO_x Monitoring
- Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring
- Maxxam AIR SOP-00215: Team Operation
- Maxxam AIR SOP-00225: The Collection of VOCs in Ambient Air Using Canister and Xontech

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

- Sulphur Dioxide - Thermo 43i UV Fluorescent Analyzer
- Total Reduced Sulphur - Thermo 450i UV Fluorescent Analyzer
- Total Hydrocarbons - Thermo 51C FID Analyzer
- Oxides of Nitrogen - Thermo 42i Chemiluminescent Analyzer
- Ozone - Thermo 49i Photometric Analyzer
- Particulate Matter (PM_{2.5}) - R&P 1405F Teom Unit
- Wind System - Met One Unit
- Relative Humidity - Met One Unit
- Ambient Temperature - Met One Unit
- Datalogger - ESC 8832
- Partisol - R&P 2000H Unit

The following steps were used to complete the data verification and validation process:

Level 0 Preliminary Verification

Level 0 data are raw data obtained directly from the data acquisition system (DAS). Under the step of Level 0, these data undergo a certain amount of manual or automated screening and flagging. It included a) identification of periods of missing data; b) verification of time stamps against reference time; c) verification that instrument diagnostics/datalogger flags indicate normal operation; d) comparison of data to upper and lower limits; e) rate of change flagging indicating that data changed too rapidly or not at all; and f) verification that zero, span and multipoint performance checks are within specifications. This level of verification is performed on a daily basis.

Level 1 Primary Validation

Validation actions under the step of Level 1 include a) review of all screening flags assigned during preliminary verification; b) review of all supporting site information and documentation; c) review of operational acceptance limits for each parameter/analyzer; d) review of daily zero/span and monthly calibration results for all gaseous parameters; and e) application of any necessary adjustments to data (e.g. baseline adjustments, below zero adjustments). This level of validation is performed on a monthly basis.

Level 2 Final Validation

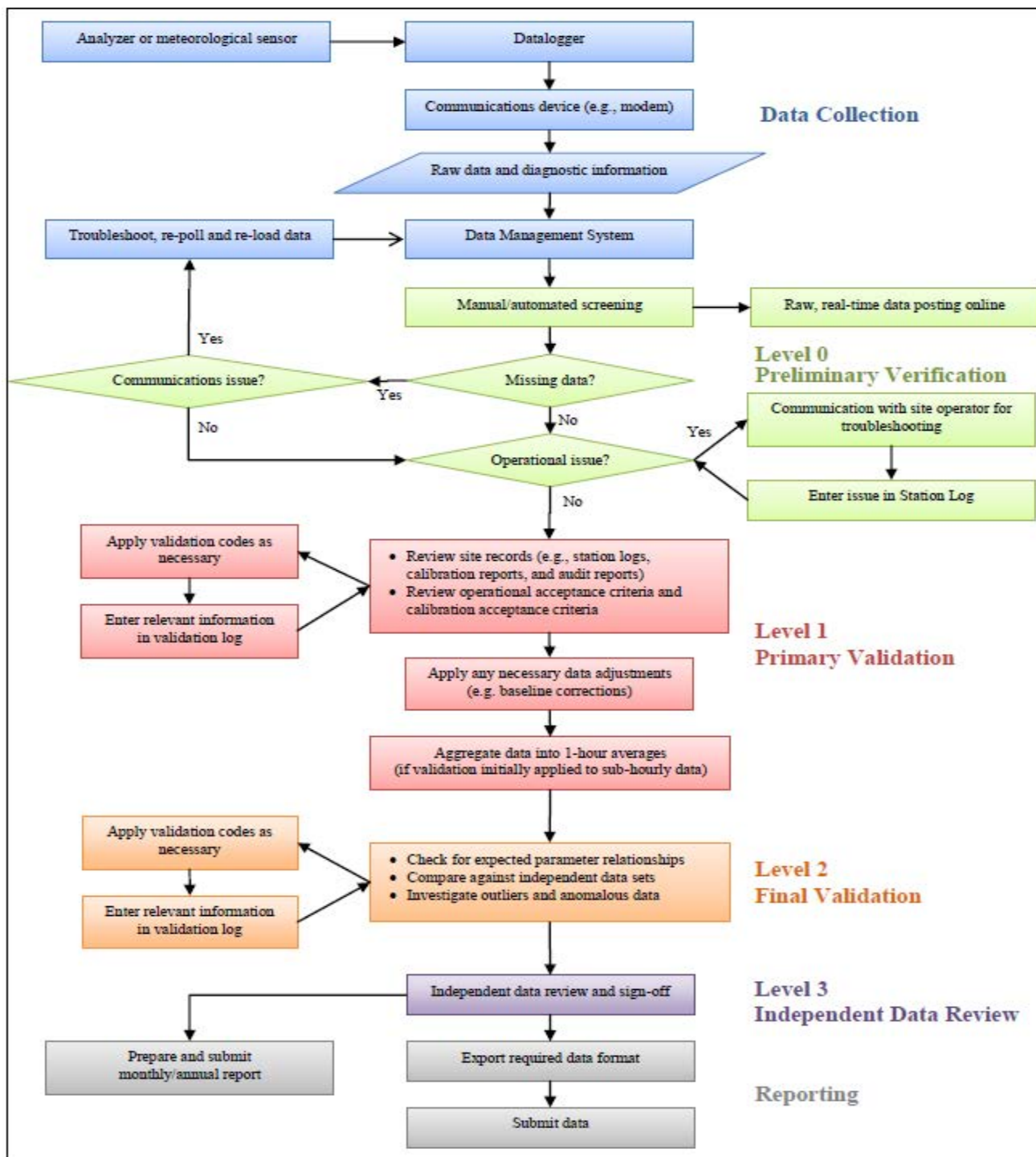
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

Level 3 Independent Data Review

Level 3 validation is the last step of data review, and it is completed by an individual that is independent of both field operations and primary data validation. A final independent QA review and endorsement is performed during this step before data is submitted to Alberta Environment.

Post-Final Validation

The Post-Final Validation step serves to re-evaluate the data that errors or omissions are discovered and/or suspected after the initial submittal of data. Any data issues or patterns which were not clear on a monthly basis are highlighted during this step. This validation is performed on an annual basis.

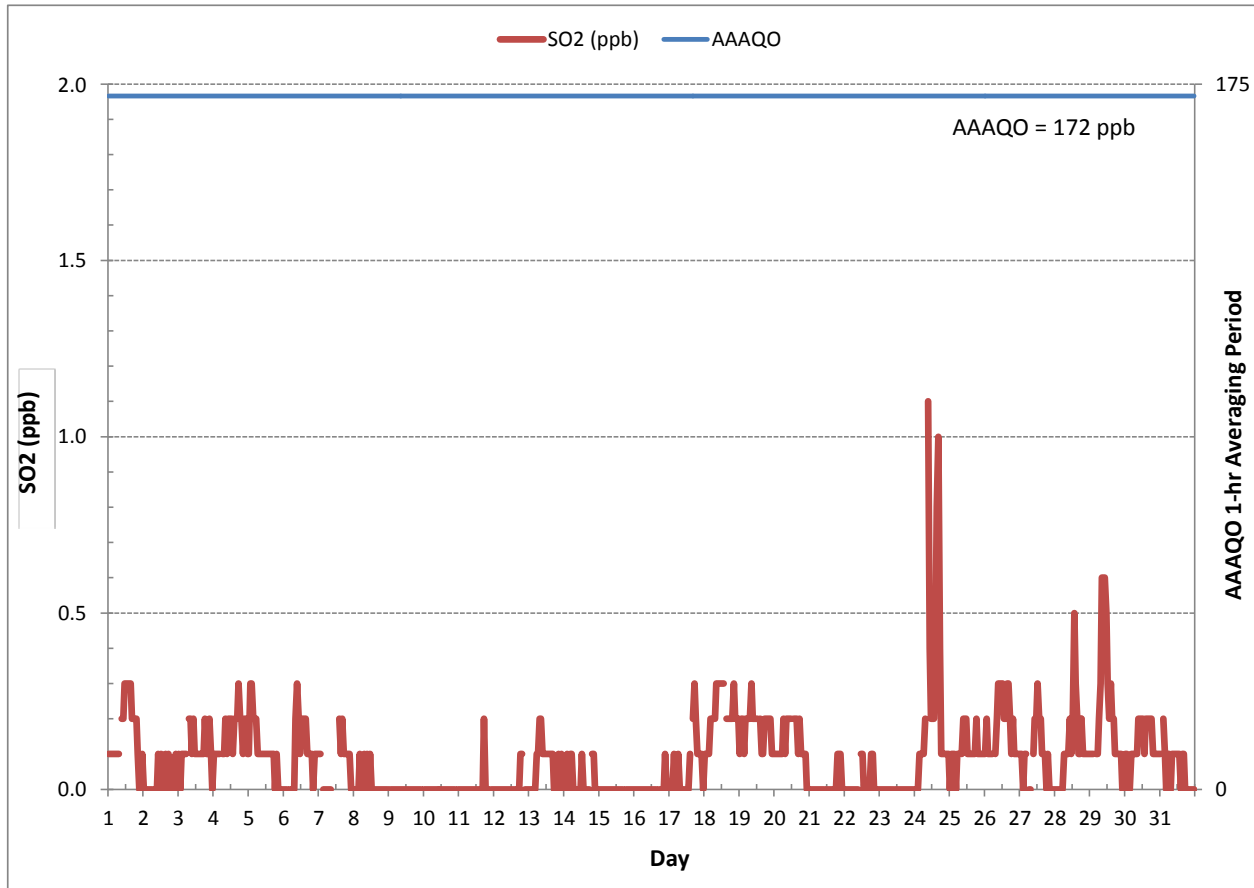


Source: Air Monitoring Directive (Aug 3, 2016), Chapter 6: Ambient Data Quality; Figure 1 Data Collection and Management Process Flow Chart

APPENDIX I
CONTINUOUS MONITORING DATA RESULTS

SULPHUR DIOXIDE

SULPHUR DIOXIDE (SO2) hourly averages in ppb





SULPHUR DIOXIDE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
DAY		MIN.																								MAX.	AVG.	RDGS.		
1	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.0	S	0.3	0.2	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.1	0.0	0.0	0.2	0.0	0.3	0.2	24	
2	0.0	0.0	0.3	0.2	0.0	0.2	0.0	S	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	24	
3	0.0	0.0	0.2	0.3	0.0	0.0	S	0.0	0.0	0.2	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.3	0.1	24	
4	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.2	0.0	0.1	0.1	0.0	0.0	0.3	0.0	24		
5	0.0	0.3	0.2	0.2	S	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.1	24	
6	0.0	0.0	0.0	S	0.1	0.0	0.0	0.0	0.2	0.3	0.2	0.2	0.1	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	24	
7	0.0	0.0	S	0.0	0.1	0.0	0.1	0.2	C	C	C	C	C	C	C	0.5	0.5	0.3	0.5	0.3	0.5	0.3	0.5	0.3	0.5	0.3	0.5	0.3	24	
8	0.3	S	0.4	0.4	0.5	0.2	0.3	0.5	0.3	0.5	0.3	0.5	0.5	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.3	0.3	0.3	0.2	0.5	0.4	24	
9	S	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.3	S	0.3	0.5	0.3	24	
10	0.5	0.3	0.5	0.3	0.3	0.3	0.3	0.5	0.3	0.3	0.3	0.3	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	S	0.3	0.5	0.4	24	
11	0.3	0.2	0.2	0.3	0.2	0.3	0.5	0.3	0.3	0.4	0.5	0.5	0.3	0.5	0.3	0.5	0.3	0.6	0.5	0.3	0.4	S	0.3	0.3	0.3	0.2	0.6	0.4	24	
12	0.4	0.3	0.3	0.4	0.3	0.5	0.3	0.6	0.3	0.3	0.3	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.9	0.5	S	0.5	0.3	0.3	0.9	0.4	24	
13	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.3	0.5	0.5	0.5	0.5	0.5	S	0.3	0.3	0.3	0.3	0.3	0.6	0.4	24	
14	0.3	0.5	0.3	0.5	0.5	0.3	0.3	0.3	0.3	0.5	0.3	0.3	0.5	0.3	0.5	0.3	0.3	S	0.3	0.3	0.6	0.6	0.6	0.5	0.3	0.6	0.4	24		
15	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.5	0.3	0.3	0.5	0.5	0.3	0.3	0.5	0.5	S	0.3	0.6	0.4	0.5	0.5	0.3	0.3	0.6	0.4	24		
16	0.3	0.3	0.3	0.4	0.5	0.5	0.3	0.3	0.4	0.5	0.5	0.5	0.3	0.4	0.5	0.5	S	0.5	0.5	0.3	0.5	0.6	0.3	0.5	0.3	0.6	0.4	24		
17	0.5	0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.5	0.6	S	0.6	0.8	0.6	0.5	0.5	0.5	0.3	0.3	0.3	0.8	0.5	24		
18	0.3	0.3	0.5	0.3	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	S	0.5	0.5	0.5	0.5	0.5	0.6	0.3	0.5	0.5	0.3	0.6	0.5	24	
19	0.3	0.3	0.5	0.5	0.3	0.6	0.5	0.5	0.6	0.5	0.5	0.3	0.5	S	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.5	0.3	0.3	0.6	0.5	24		
20	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.6	S	0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.6	0.4	24	
21	0.2	0.3	0.3	0.3	0.5	0.3	0.3	0.4	0.3	0.5	0.5	S	0.3	0.3	0.3	0.5	0.5	0.4	0.6	0.6	0.6	0.6	0.6	0.5	0.2	0.6	0.4	24		
22	0.3	0.3	0.5	0.5	0.3	0.5	0.5	0.3	0.6	0.5	S	0.6	0.5	0.5	0.5	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.5	0.3	0.6	0.4	24	
23	0.4	0.5	0.3	0.5	0.3	0.5	0.5	0.5	0.5	S	0.5	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.4	0.3	0.5	0.4	24		
24	0.5	0.3	0.3	0.3	0.3	0.3	0.5	0.5	S	1.6	0.8	0.6	0.8	0.5	0.8	1.2	1.3	0.8	0.5	0.5	0.5	0.3	0.5	0.3	0.3	0.5	0.3	1.6	0.6	24
25	0.5	0.3	0.3	0.5	0.3	0.5	0.3	S	0.5	0.5	0.6	0.6	0.5	0.3	0.5	0.5	0.3	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.6	0.4	24	
26	0.5	0.5	0.6	0.5	0.3	S	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.3	0.5	0.3	0.6	0.5	24		
27	0.5	0.5	0.3	0.6	0.4	S	0.0	P	S1	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.3	0.5	0.5	0.3	0.4	0.5	0.0	0.6	0.5	22		
28	0.5	0.5	0.3	0.3	S	0.3	0.3	0.5	0.5	0.3	0.5	0.6	0.6	0.9	0.8	0.5	0.3	0.5	0.5	0.3	0.5	0.5	0.3	0.3	0.3	0.3	0.9	0.5	24	
29	0.3	0.5	0.3	S	0.3	0.3	0.5	0.7	0.9	0.9	0.9	0.9	0.9	0.7	0.5	0.6	0.8	0.5	0.3	0.3	0.5	0.5	0.3	0.3	0.3	0.3	0.9	0.5	24	
30	0.3	0.5	S	0.3	0.3	0.5	0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.5	0.6	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.6	0.4	24	
31	0.3	S	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.3	0.5	0.3	24
HOURLY MAX		0.5	0.5	0.6	0.6	0.5	0.6	0.5	0.7	0.9	1.6	0.9	0.9	0.8	0.9	0.8	1.2	1.3	0.8	0.9	0.6	0.6	0.6	0.6	0.5					
HOURLY AVG		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3				

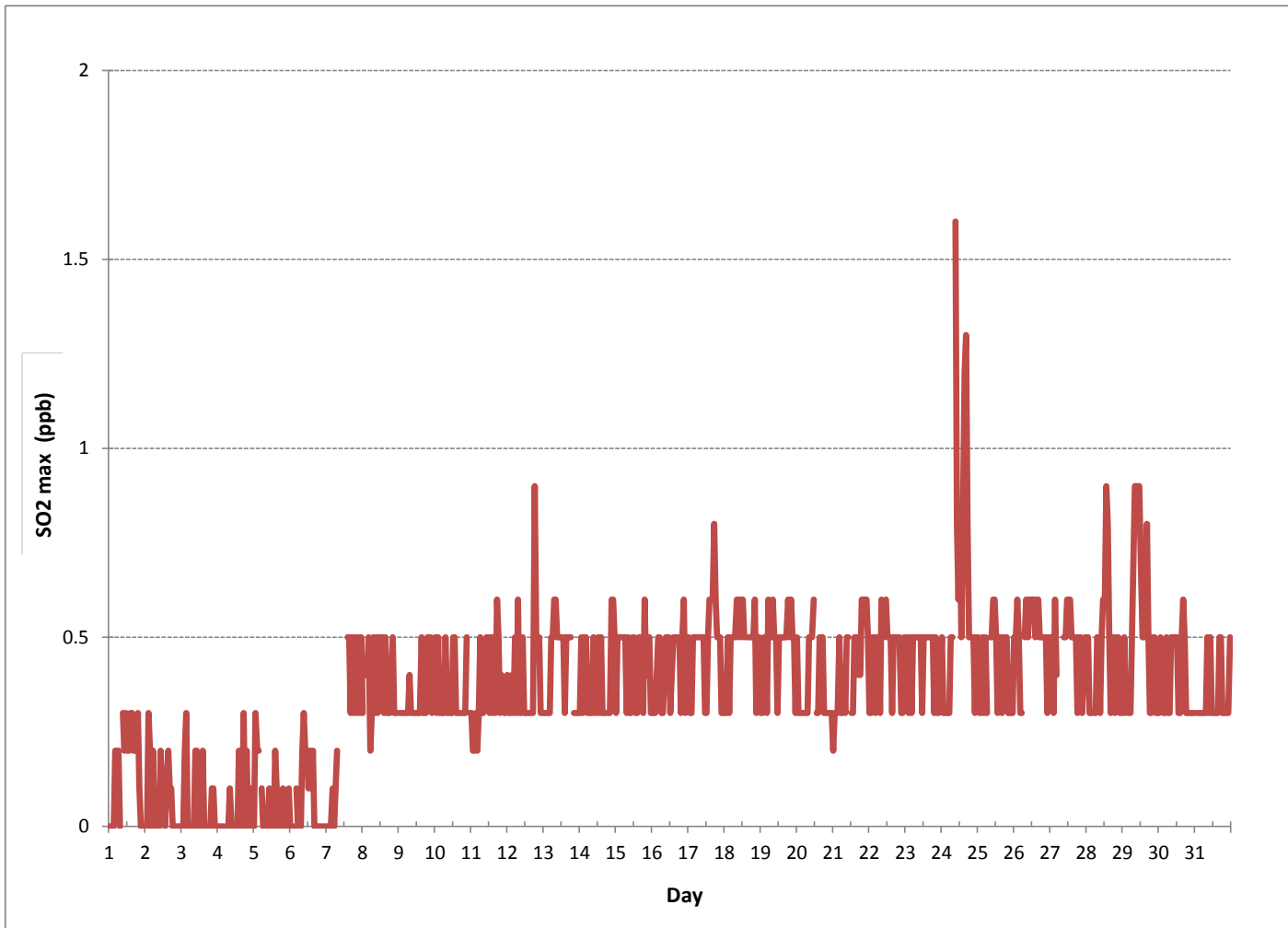
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

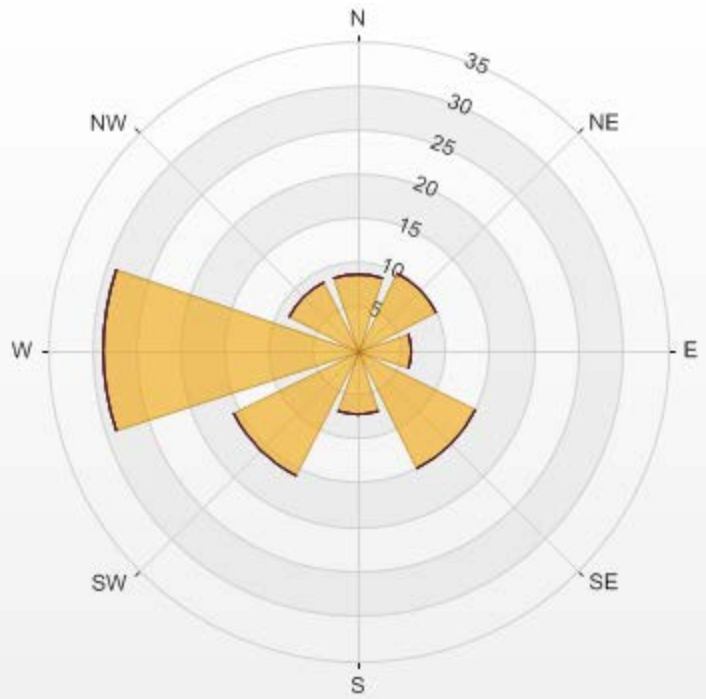
NUMBER OF NON-ZERO READINGS:	618
MAXIMUM INSTANTANEOUS VALUE:	1.6 PPB @ HOUR(S) 9 ON DAY(S) 24
VAR-VARIOUS	
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	6 HRS
OPERATIONAL TIME:	742 HRS
STANDARD DEVIATION:	0.20

SULPHUR DIOXIDE MAX instantaneous maximum in ppb



Wind: LICA COLD LAKE SOUTH Monitor: SO2 [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 95.03% Calm Avg: 0.00

Direction	0.0-20.0	20.0-60.0	60.0-110.0	110.0-170.0	170.0-340.0	>340.0	Total
N	8.77	0	0	0	0	0	8.77
NE	9.9	0	0	0	0	0	9.9
E	6.08	0	0	0	0	0	6.08
SE	14.85	0	0	0	0	0	14.85
S	7.21	0	0	0	0	0	7.21
SW	15.7	0	0	0	0	0	15.7
W	28.71	0	0	0	0	0	28.71
NW	8.77	0	0	0	0	0	8.77
Summary	100	0	0	0	0	0	100



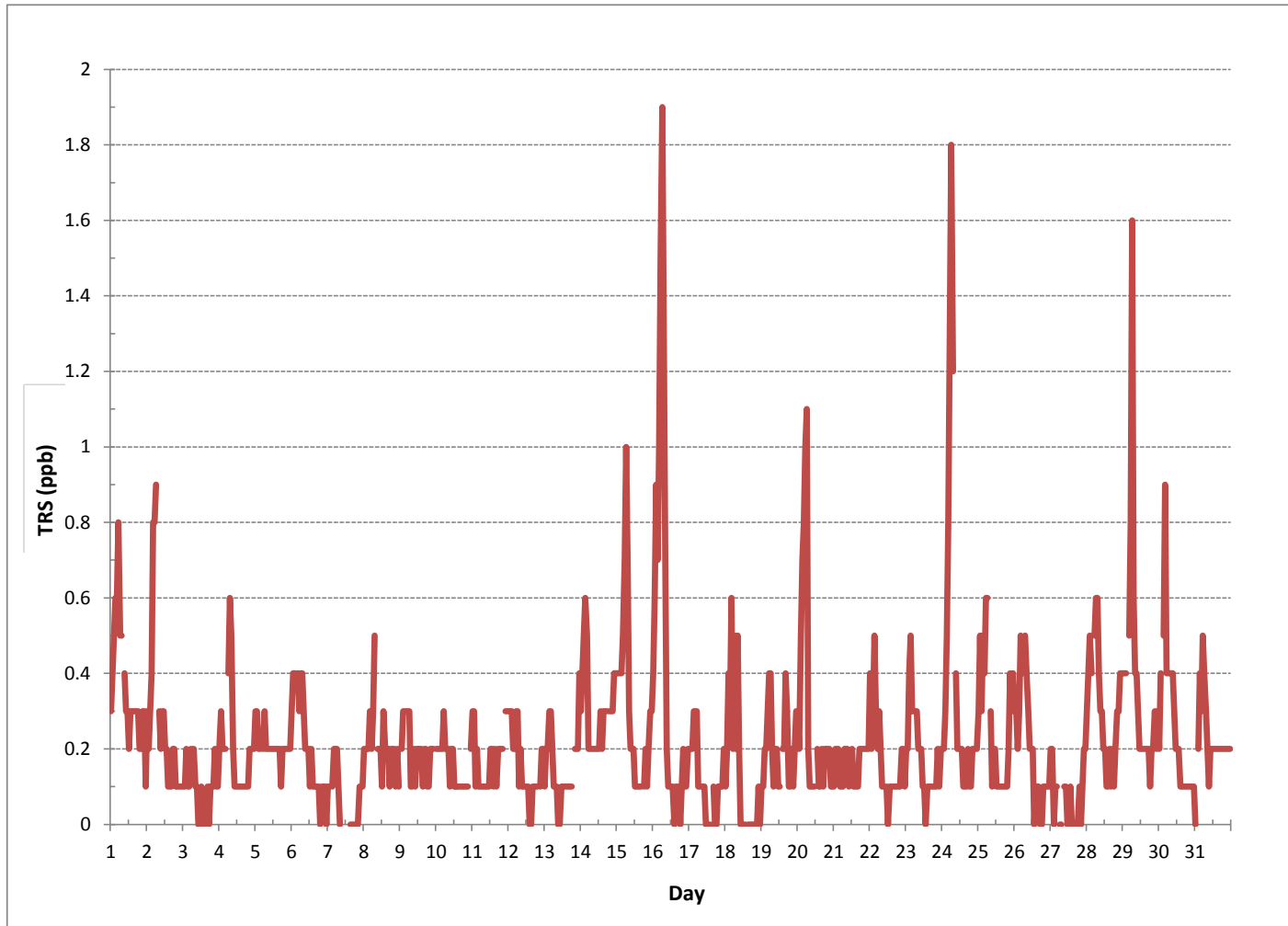
SO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 07/2016 Type: Span



■ Span Meas
 — Span Ref
 — Span Low
 — Span High

TOTAL REDUCED SULPHUR

TOTAL REDUCED SULPHUR (TRS) hourly averages in ppb





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

Cold Lake South Site - July 2016

TOTAL REDUCED SULPHUR MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
DAY	MIN.	MAX.	AVG.	RDGS.																									
1	0.8	0.8	0.8	1.1	1.3	1.2	1.0	0.9	S	0.8	0.7	0.8	0.6	0.6	0.8	0.7	0.6	0.6	0.6	0.6	0.5	0.6	0.7	0.5	0.5	1.3	0.8	24	
2	1.0	0.5	0.7	1.0	1.2	1.2	1.5	S	0.7	0.5	0.5	0.8	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.5	0.8	0.4	0.6	0.6	0.4	1.5	0.7	24	
3	0.6	0.6	0.8	0.5	0.6	0.7	S	0.6	0.7	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.7	0.6	0.8	0.5	0.8	0.6	24
4	0.8	0.9	0.7	0.7	0.8	S	0.9	1.1	1.0	0.6	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.7	0.7	0.5	0.6	0.7	0.6	0.6	0.5	1.1	0.7	24	
5	0.7	0.8	0.6	0.7	S	0.5	0.7	0.7	0.6	0.7	0.6	0.7	0.6	0.6	0.4	0.6	0.5	0.8	0.5	0.6	0.5	0.4	0.5	0.5	0.4	0.8	0.6	24	
6	0.7	0.8	0.7	S	0.8	0.7	0.7	0.8	0.6	0.8	0.6	0.5	0.5	0.5	0.6	0.6	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.8	0.6	24
7	0.6	0.5	S	0.7	0.7	0.7	0.7	0.8	C	C	C	C	C	C	C	C	0.6	0.7	0.5	0.6	0.5	0.6	0.7	0.6	0.8	0.5	0.8	0.6	24
8	0.6	S	0.7	0.7	0.8	0.7	0.6	S1	S1	0.6	0.8	0.5	0.6	0.7	0.8	0.6	0.5	0.6	0.6	0.5	0.5	0.6	0.7	0.5	0.5	0.8	0.6	22	
9	S	0.5	0.6	0.6	0.7	0.6	0.6	0.5	0.5	0.7	0.6	0.4	0.5	0.5	0.4	0.5	0.6	0.6	0.5	0.6	0.5	0.6	0.8	0.6	S	0.4	0.8	0.6	24
10	0.6	0.5	0.7	0.7	0.6	0.8	0.5	0.6	0.8	0.6	0.5	0.6	0.5	0.5	0.7	0.5	0.4	0.6	0.4	0.5	0.5	0.5	S	0.7	0.4	0.8	0.6	24	
11	0.8	0.6	0.5	0.6	0.5	0.5	0.4	0.5	0.7	0.5	0.6	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.6	S	0.7	0.6	0.4	0.8	0.6	24	
12	0.7	0.7	0.7	0.6	0.6	0.7	0.6	0.5	0.5	0.6	0.8	0.6	0.5	0.6	0.5	0.4	0.5	0.4	0.5	0.5	S	0.7	0.8	0.7	0.4	0.8	0.6	24	
13	0.7	0.8	0.8	0.8	0.9	0.9	0.6	0.5	0.6	0.6	0.4	0.6	0.6	0.5	0.5	0.5	0.6	0.5	0.6	S	0.8	0.6	0.8	0.7	0.4	0.9	0.6	24	
14	0.8	0.8	1.0	1.2	1.6	0.5	0.5	0.5	0.5	0.4	0.6	0.7	0.5	0.5	0.4	0.6	0.5	0.5	S	0.7	0.7	0.6	0.7	0.8	0.4	1.6	0.7	24	
15	0.9	1.0	0.7	0.7	1.2	1.6	1.5	1.4	0.7	0.5	0.6	0.6	0.5	0.6	0.5	0.5	0.5	S	0.5	0.7	0.5	0.7	0.9	0.8	0.5	1.6	0.8	24	
16	0.9	1.1	1.5	1.2	1.6	2.5	2.6	2.2	1.2	0.6	0.5	0.7	0.5	0.6	0.5	0.6	S	0.6	0.6	0.5	0.7	0.6	0.6	0.7	0.5	2.6	1.0	24	
17	0.9	0.8	0.7	0.8	0.8	0.8	0.6	0.6	0.6	0.5	0.6	0.5	0.5	0.6	0.6	S	0.5	0.5	0.5	0.7	0.6	0.6	0.6	0.9	0.5	0.9	0.6	24	
18	0.7	0.7	1.3	1.5	1.5	1.0	1.4	0.8	1.2	0.9	0.6	0.5	0.5	0.5	S	0.6	0.5	0.5	0.5	0.5	0.6	0.7	0.6	0.6	0.5	1.5	0.8	24	
19	0.6	0.7	0.8	0.7	0.8	1.1	1.0	0.7	0.7	0.7	0.7	0.6	0.7	S	0.6	0.6	0.9	1.0	0.5	0.5	0.5	0.6	0.6	0.8	0.5	1.1	0.7	24	
20	0.8	0.7	1.2	1.2	1.5	2.0	1.8	0.7	0.8	0.5	0.6	0.5	S	1.0	0.5	0.5	0.6	0.5	0.8	0.6	0.6	0.7	0.6	0.6	0.5	2.0	0.8	24	
21	0.6	0.6	0.7	0.7	0.5	0.6	0.5	0.8	0.6	0.6	0.6	S	0.6	0.5	0.4	0.5	0.6	0.6	0.7	0.7	1.0	0.7	0.7	0.7	0.4	1.0	0.6	24	
22	1.1	0.8	0.9	1.4	0.9	0.7	0.8	0.8	0.6	0.6	S	0.6	0.5	0.7	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.7	0.6	0.6	0.5	1.4	0.7	24	
23	0.6	0.6	0.9	0.8	0.6	0.8	0.9	0.7	0.7	S	0.5	0.6	0.5	0.4	0.5	0.5	0.6	0.5	0.6	0.5	0.5	0.7	0.5	0.8	0.4	0.9	0.6	24	
24	1.0	0.8	0.8	1.1	1.3	1.9	2.4	1.8	S	0.9	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.7	0.6	0.6	0.7	0.6	0.7	0.7	0.5	2.4	0.9	24	
25	0.7	1.1	0.8	1.6	0.9	1.1	1.0	S	0.8	0.7	0.8	0.5	0.7	0.5	0.6	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.8	0.9	1.3	0.5	1.6	0.8	24
26	1.1	1.2	0.8	1.1	1.1	0.9	S	1.1	1.1	0.9	0.7	0.9	0.8	0.7	0.7	0.6	0.7	0.5	0.7	0.6	0.8	0.7	0.8	0.6	0.5	1.2	0.8	24	
27	0.8	0.8	0.5	0.8	0.7	S	0.2	P	S1	0.8	0.8	0.6	0.7	0.8	0.7	0.6	0.6	0.7	0.6	0.7	0.6	0.7	0.8	0.8	0.2	0.8	0.7	22	
28	1.1	1.0	1.1	1.0	S	1.0	1.1	1.3	1.1	0.9	0.8	0.6	0.7	0.7	0.9	0.7	0.6	0.5	0.6	0.7	0.8	0.8	0.8	0.8	0.5	1.3	0.8	24	
29	0.8	0.7	0.8	S	1.0	1.9	2.0	1.5	0.8	0.8	0.8	0.7	0.7	0.5	0.7	0.6	0.7	0.6	0.5	0.6	0.7	0.6	0.8	0.8	0.5	2.0	0.9	24	
30	0.7	0.8	S	1.4	1.6	0.9	0.8	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.8	0.5	0.6	0.5	0.5	0.6	0.6	0.6	0.5	0.5	1.6	0.8	24	
31	0.5	S	0.6	0.9	0.8	0.9	1.0	0.8	0.6	0.5	0.6	0.7	0.5	0.7	0.6	0.6	0.7	0.6	0.6	0.5	0.7	0.7	0.5	0.6	0.5	1.0	0.7	24	
HOURLY MAX	1.1	1.2	1.5	1.6	1.6	2.5	2.6	2.2	1.2	0.9	0.8	0.9	0.8	1.0	0.9	0.8	0.9	1.0	0.8	0.7	1.0	0.8	0.9	1.3					
HOURLY AVG	0.8	0.8	0.8	0.9	1.0	1.0	1.0	0.9	0.8	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7				

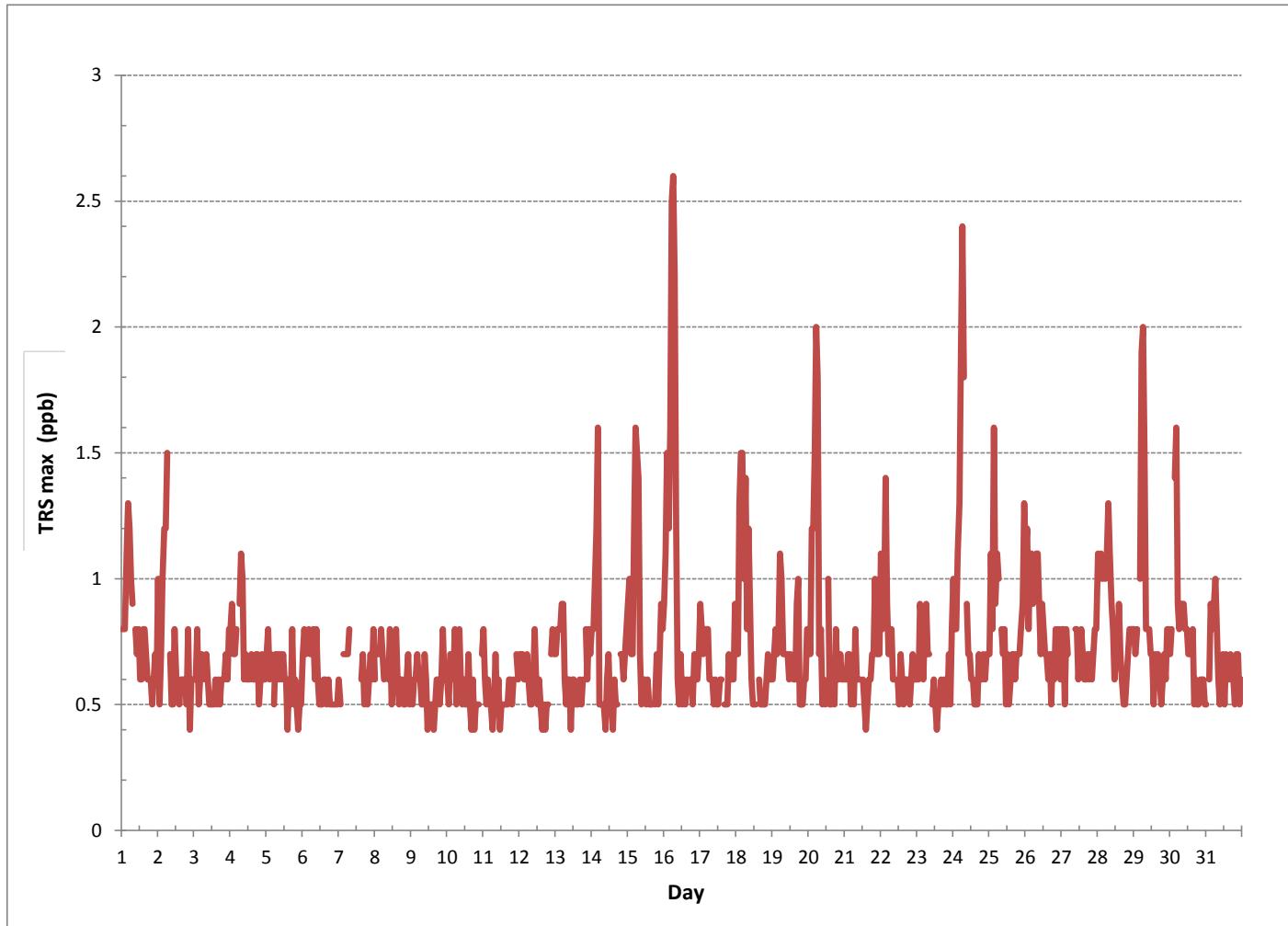
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

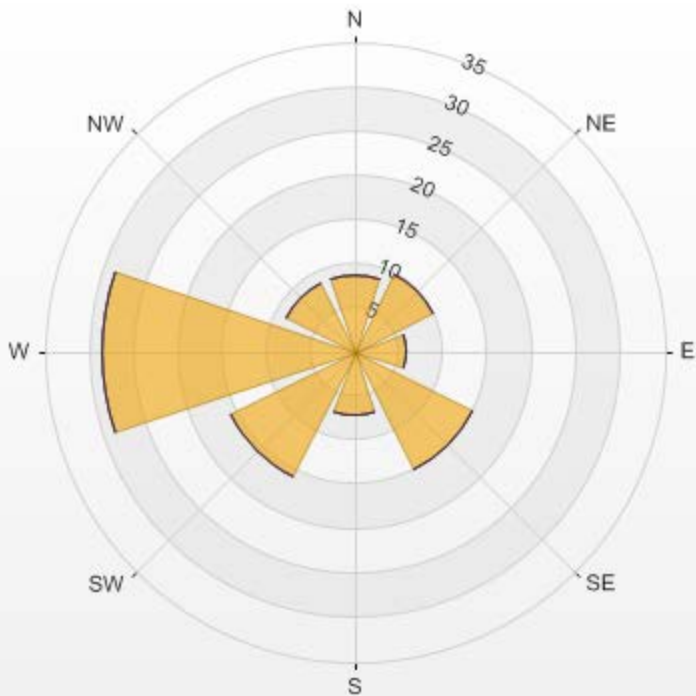
NUMBER OF NON-ZERO READINGS:	701
MAXIMUM INSTANTANEOUS VALUE:	2.6 PPB @ HOUR(S) 6 ON DAY(S) 16
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	7 HRS
OPERATIONAL TIME:	740 HRS
STANDARD DEVIATION:	0.27

TOTAL REDUCED SULPHUR MAX instantaneous maximum in ppb



Wind: LICA COLD LAKE SOUTH Monitor: TRS [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.76% Calm Avg: 0.00

Direction	0.0-3.0	3.0-10.0	10.0-50.0	>50.0	Total
N	8.79	0	0	0	8.79
NE	9.93	0	0	0	9.93
E	5.96	0	0	0	5.96
SE	14.89	0	0	0	14.89
S	7.23	0	0	0	7.23
SW	15.74	0	0	0	15.74
W	28.65	0	0	0	28.65
NW	8.79	0	0	0	8.79
Summary	100	0	0	0	100



% Icon Classes (ppb)							
100	0.0-3.0	0	3.0-10.0	0	10.0-50.0	0	>50.0

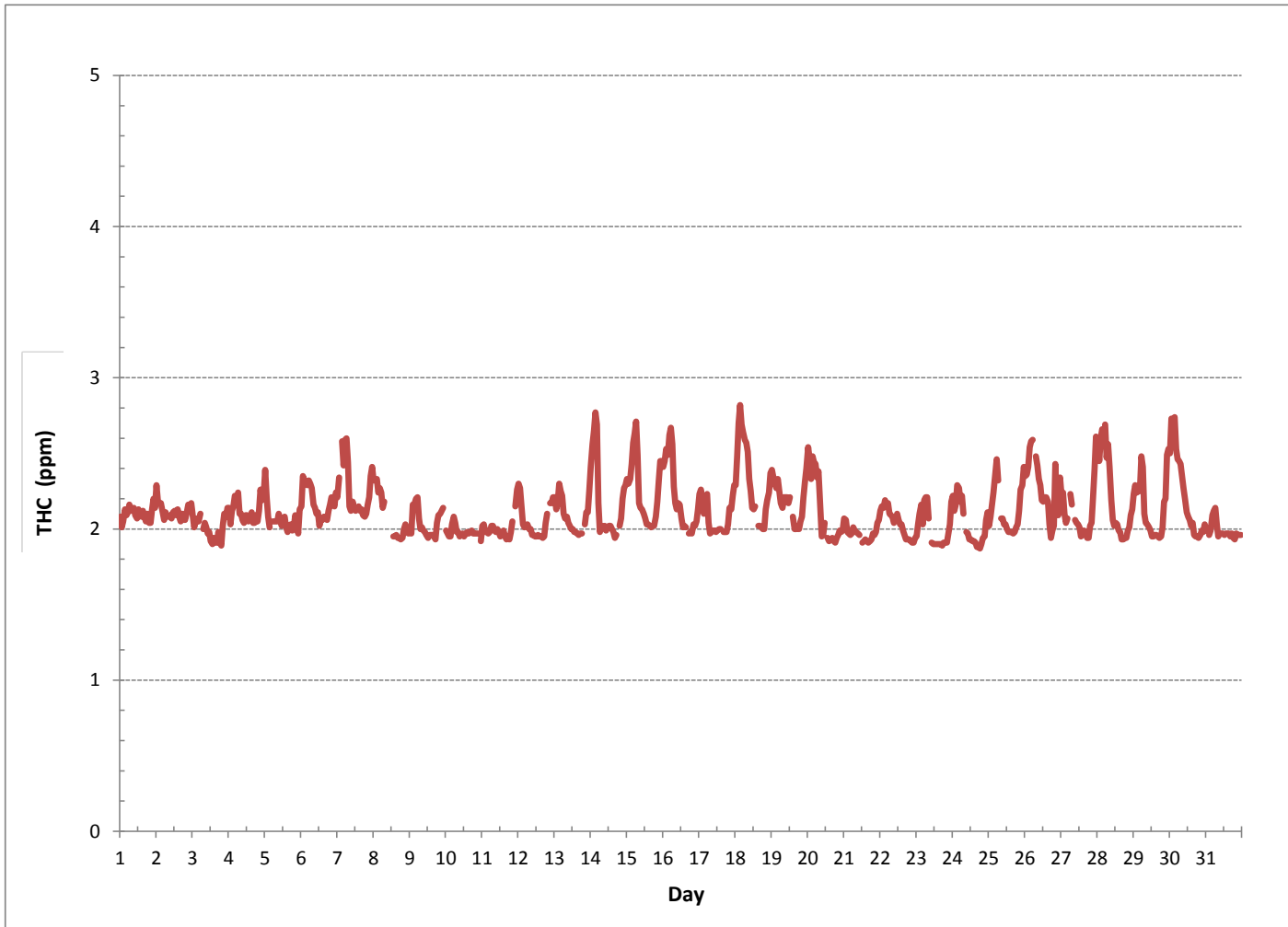
TRS[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 07/2016 Type: Span



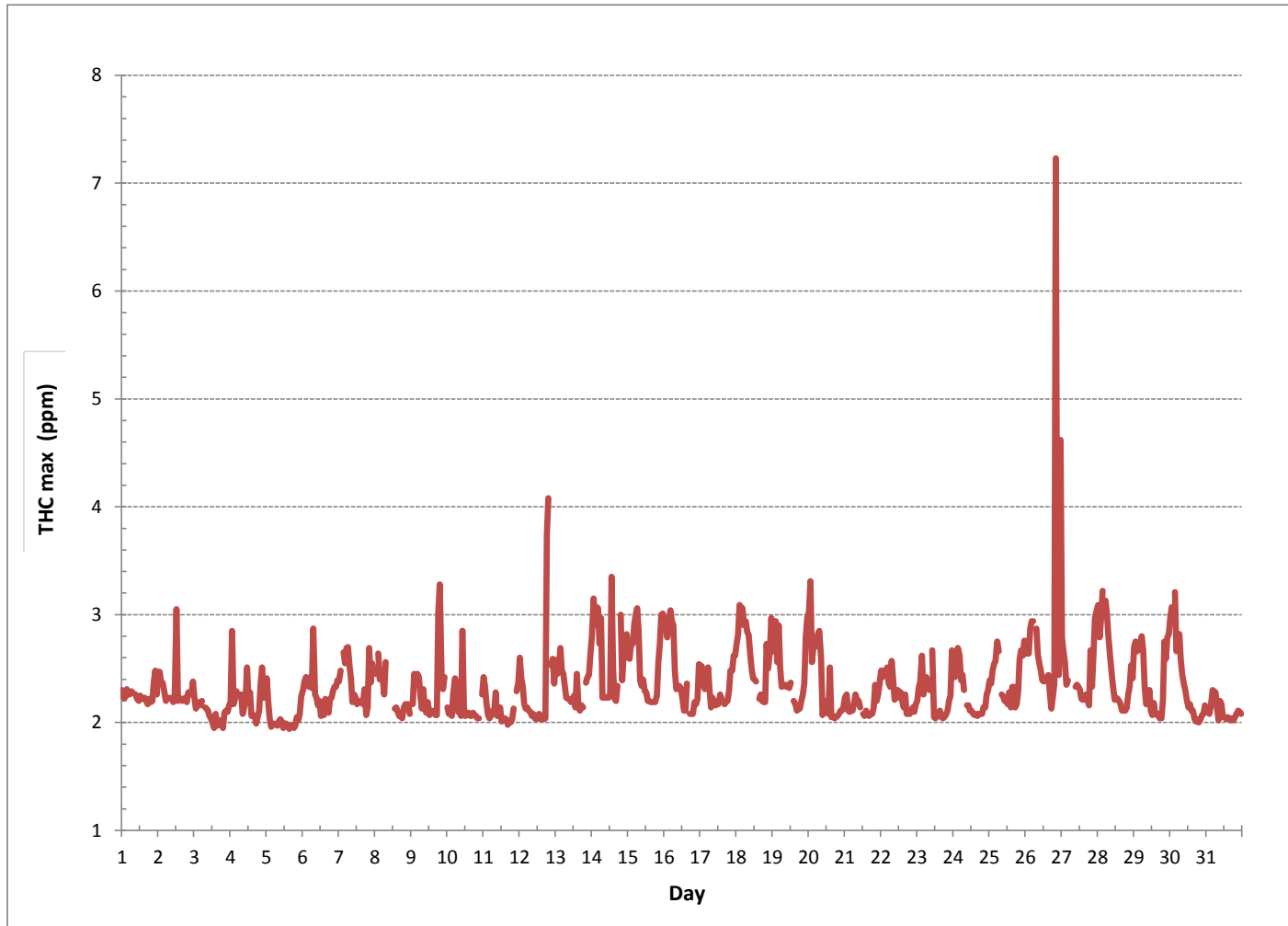
■ Span Meas
 — Span Ref
 — Span Low
 — Span High

TOTAL HYDROCARBON

TOTAL HYDROCARBONS (THC) hourly averages in ppm

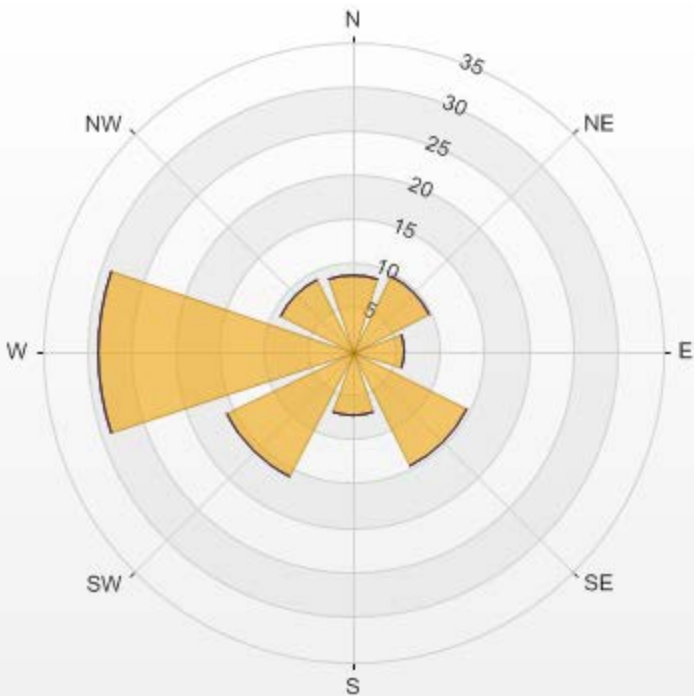


TOTAL HYDROCARBONS MAX instantaneous maximum in ppm



Wind: LICA COLD LAKE SOUTH Monitor: THC [ppm] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.89% Calm Avg: 0.00

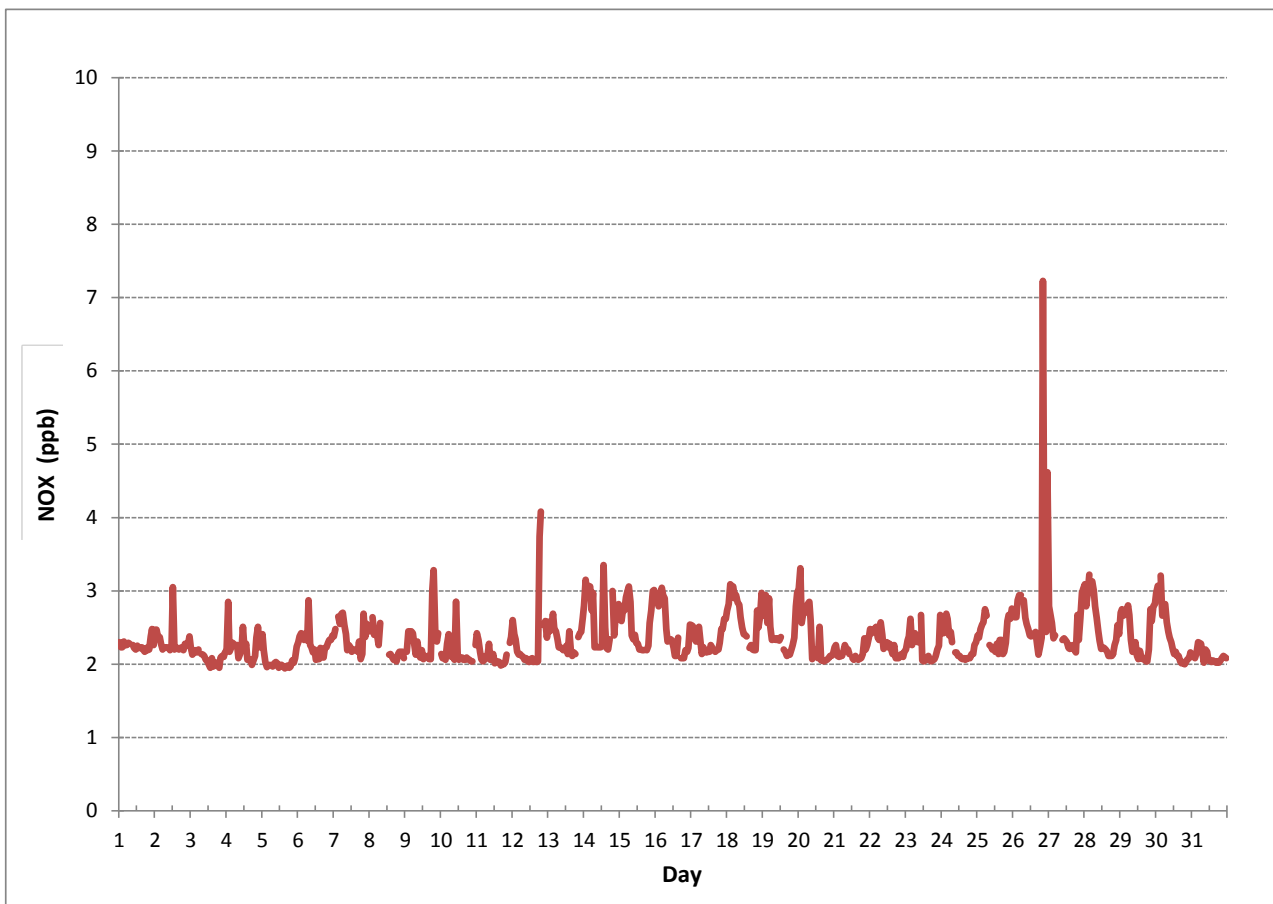
Direction	0.0-3.0	3.0-10.0	10.0-50.0	>50.0	Total
N	8.78	0	0	0	8.78
NE	9.63	0	0	0	9.63
E	5.95	0	0	0	5.95
SE	14.45	0	0	0	14.45
S	7.22	0	0	0	7.22
SW	15.86	0	0	0	15.86
W	28.9	0	0	0	28.9
NW	9.21	0	0	0	9.21
Summary	100	0	0	0	100



% Icon Classes (ppm)	100	0.0-3.0	0	3.0-10.0	0	10.0-50.0	0	>50.0
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OXIDES OF NITROGEN

OXIDES OF NITROGEN (NO_x) hourly averages in ppb





OXIDES OF NITROGEN MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
DAY	MIN.	MAX.	AVG.	RDGS.																									
1	1.7	1.7	1.2	1.5	2.5	3.7	6.2	7.2	S	6.2	2.0	1.6	2.8	1.1	6.7	1.9	4.3	1.5	1.3	2.3	1.5	10.9	2.8	5.9	1.1	10.9	3.4	24	
2	2.8	3.0	5.1	4.1	1.9	2.2	1.5	S	4.2	2.1	2.3	1.5	3.0	1.2	6.2	1.5	2.1	1.7	1.5	2.5	2.8	3.6	3.7	2.0	1.2	6.2	2.7	24	
3	1.8	1.6	1.6	2.0	8.8	2.6	S	2.5	1.3	1.6	7.1	6.2	1.1	0.8	9.2	1.6	3.4	3.3	4.1	3.2	4.2	5.9	4.2	4.4	0.8	9.2	3.6	24	
4	5.4	5.6	5.9	5.5	6.4	S	9.1	6.4	3.7	2.5	2.9	2.6	2.4	1.5	1.2	0.8	0.9	0.9	1.8	3.4	4.8	5.2	4.9	6.1	0.8	9.1	3.9	24	
5	6.6	5.1	3.4	2.2	S	3.4	1.9	2.1	7.3	3.4	5.2	4.8	2.8	2.5	2.3	1.6	1.1	1.2	1.7	1.3	1.5	1.5	2.0	2.3	1.1	7.3	2.9	24	
6	2.1	5.9	5.5	S	6.5	11.8	12.9	11.6	9.1	7.9	4.4	4.7	7.2	3.7	3.8	3.8	7.9	2.4	3.4	3.2	2.6	5.2	2.4	2.5	2.1	12.9	5.7	24	
7	3.2	2.5	S	6.1	8.1	10.9	10.8	8.3	C	C	C	C	C	C	C	C	C	C	C	2.4	3.0	3.8	11.9	4.5	4.6	2.4	11.9	6.2	24
8	5.5	S	4.0	4.1	5.8	5.0	4.8	4.7	2.9	2.5	3.4	2.9	2.3	3.7	7.5	4.3	2.9	4.2	2.3	1.9	3.0	4.2	3.9	3.3	1.9	7.5	3.9	24	
9	S	3.7	3.9	4.3	6.7	5.8	2.8	2.3	6.8	1.6	2.0	1.2	2.6	1.1	2.3	1.5	2.8	2.4	2.5	4.6	9.1	10.9	4.1	S	1.1	10.9	3.9	24	
10	4.8	3.0	2.0	3.4	2.5	2.6	5.6	1.3	4.8	2.4	2.4	1.9	3.7	4.7	1.9	2.1	2.6	3.6	1.6	4.3	2.1	2.1	S	3.0	1.3	5.6	3.0	24	
11	2.1	3.4	1.9	1.2	1.6	35.7	1.6	4.2	11.6	1.6	1.1	1.2	1.6	1.1	1.2	0.6	2.5	8.5	1.2	1.1	1.3	S	3.6	4.2	0.6	35.7	4.1	24	
12	3.7	3.7	3.0	2.5	3.2	3.4	3.6	8.8	1.7	6.8	1.3	1.5	2.1	8.8	1.2	0.9	1.0	0.9	25.7	35.6	S	3.0	4.7	4.1	0.9	35.6	5.7	24	
13	2.5	2.6	2.8	3.6	3.8	5.9	3.6	2.8	2.2	4.6	2.3	1.2	1.1	7.2	4.4	1.8	1.5	2.3	5.6	S	6.7	4.5	3.3	3.3	1.1	7.2	3.5	24	
14	3.6	3.4	5.1	4.7	5.0	4.8	2.1	2.1	1.7	9.2	0.9	3.3	2.5	26.7	63.8	1.1	2.3	2.9	S	3.4	3.8	3.7	4.2	14.3	0.9	63.8	7.6	24	
15	7.1	2.6	2.8	3.0	6.5	6.8	41.6	5.8	5.3	3.3	1.6	1.6	1.1	21.9	1.7	5.2	4.3	S	2.8	3.2	5.9	11.3	4.2	4.2	1.1	41.6	6.7	24	
16	3.6	3.4	3.5	3.9	4.2	4.3	4.5	3.7	3.4	1.9	3.3	2.6	1.7	1.8	1.2	1.6	S	2.6	1.8	2.1	3.0	3.8	3.9	3.4	1.2	4.5	3.0	24	
17	3.8	5.5	7.7	7.9	7.9	6.7	3.6	1.1	1.2	1.3	2.5	1.2	0.9	1.0	1.3	S	2.9	1.6	2.4	3.0	3.4	2.6	2.6	3.0	0.9	7.9	3.3	24	
18	4.2	3.7	4.2	4.4	2.9	4.1	5.8	5.0	4.8	3.0	3.0	2.6	2.5	1.7	S	2.9	8.4	4.4	1.5	1.5	3.7	3.3	3.4	4.1	1.5	8.4	3.7	24	
19	3.0	3.3	2.5	3.3	14.9	4.6	2.8	2.3	5.9	1.6	2.3	1.8	1.6	S	14.0	2.6	4.7	2.1	1.8	1.8	2.9	4.7	4.2	5.4	1.6	14.9	4.1	24	
20	4.8	4.8	3.7	4.3	13.1	7.9	7.9	8.8	7.7	5.3	5.2	5.4	S	4.2	4.2	5.5	2.3	1.8	2.4	2.3	2.8	2.9	3.5	3.3	1.8	13.1	5.0	24	
21	4.1	3.0	3.4	3.0	3.0	3.4	6.4	7.3	5.1	3.8	4.2	S	5.4	3.4	2.3	2.5	1.3	2.6	1.9	3.0	4.2	4.0	3.7	3.6	1.3	7.3	3.7	24	
22	3.0	5.9	4.7	2.5	8.6	6.2	9.3	22.3	4.6	2.1	S	3.5	3.4	5.8	2.4	5.8	2.8	1.2	1.1	1.3	1.2	2.8	2.6	2.1	1.1	22.3	4.6	24	
23	2.5	2.0	2.3	3.3	5.2	7.5	7.0	7.1	4.2	S	3.0	1.1	1.3	1.5	1.2	1.2	1.5	1.0	1.2	1.5	2.5	3.7	4.8	3.7	1.0	7.5	3.1	24	
24	4.2	3.6	2.9	2.8	4.1	3.3	2.9	2.5	S	5.1	2.3	1.6	1.9	1.5	1.3	1.6	2.0	1.5	1.6	2.1	3.2	3.2	3.0	3.3	1.3	5.1	2.7	24	
25	2.8	3.7	5.6	5.4	8.8	11.7	10.1	S	5.6	2.4	4.1	1.9	1.5	1.3	1.1	0.9	1.5	1.9	2.8	3.4	3.6	3.3	2.3	2.8	0.9	11.7	3.8	24	
26	3.2	4.3	4.7	4.1	3.6	21.7	S	16.3	13.5	5.9	15.7	2.6	18.0	21.7	1.6	3.3	3.6	2.0	5.6	14.8	5.5	3.6	3.2	2.3	1.6	21.7	7.9	24	
27	1.8	2.6	2.9	1.6	2.9	S	0.9	P	S1	5.9	2.4	2.6	4.6	4.6	1.6	2.3	1.6	1.9	1.7	2.8	4.6	5.1	4.2	3.9	0.9	5.9	3.0	22	
28	5.6	5.5	4.5	4.7	S	10.4	11.0	12.9	14.0	8.5	4.9	2.6	2.6	2.3	2.3	3.4	2.1	1.3	1.9	3.2	3.8	3.7	3.2	2.6	1.3	14.0	5.1	24	
29	4.1	4.1	2.9	S	7.3	4.8	5.0	11.3	3.7	3.4	4.1	2.5	1.6	1.9	3.7	3.7	3.7	2.7	1.5	2.9	15.5	3.8	3.8	3.3	1.5	15.5	4.4	24	
30	2.9	3.7	S	5.9	5.1	5.3	9.2	6.7	5.9	3.9	3.2	4.1	2.1	1.8	1.9	1.9	6.3	1.0	20.1	7.7	2.9	1.3	1.8	2.0	1.0	20.1	4.6	24	
31	1.6	S	3.8	1.9	2.3	7.0	7.0	4.0	6.4	5.2	1.8	2.0	2.0	3.8	1.6	0.9	1.2	1.8	1.5	2.0	1.8	1.8	1.9	1.8	0.9	7.0	2.8	24	
HOURLY MAX	7.1	5.9	7.7	7.9	14.9	35.7	41.6	22.3	14.0	9.2	15.7	6.2	18.0	26.7	63.8	5.8	8.4	8.5	25.7	35.6	15.5	11.9	4.9	14.3					
HOURLY AVG	3.6	3.7	3.7	3.7	5.6	7.4	6.9	6.5	5.5	4.0	3.5	2.6	3.0	5.0	5.3	2.4	2.9	2.3	3.6	4.3	3.9	4.6	3.5	3.8					

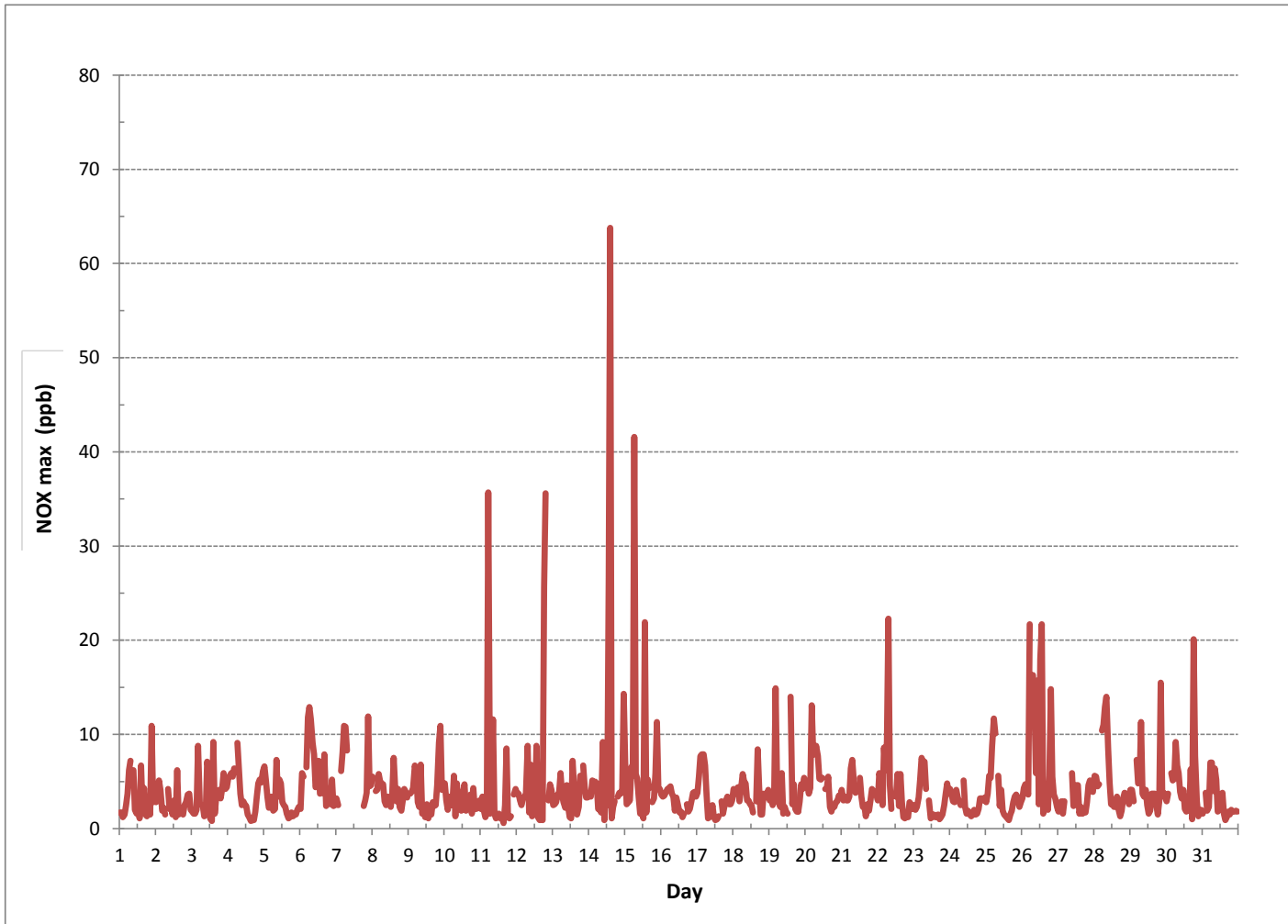
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

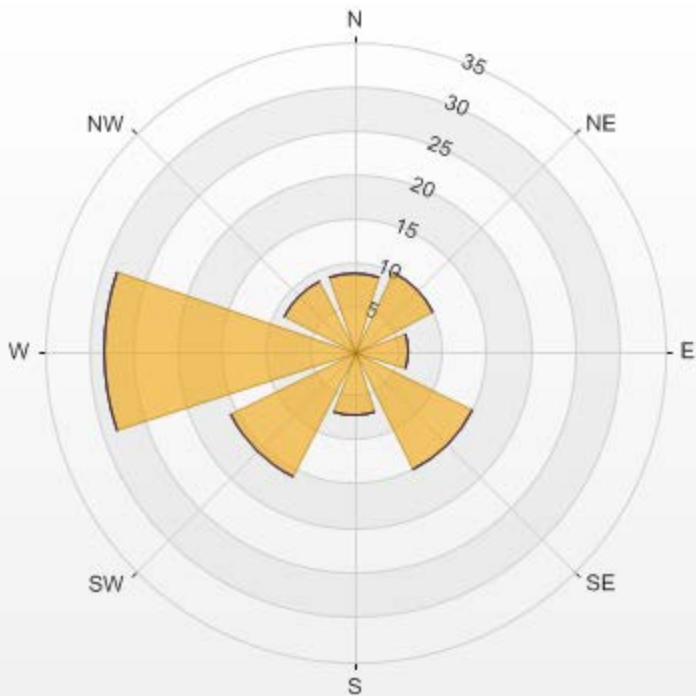
NUMBER OF NON-ZERO READINGS:	700
MAXIMUM INSTANTANEOUS VALUE:	63.8 PPB @ HOUR(S) 14 ON DAY(S) 14
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	10 HRS
STANDARD DEVIATION:	4.50
OPERATIONAL TIME:	742 HRS

OXIDES OF NITROGEN MAX instantaneous maximum in ppb



Wind: LICA COLD LAKE SOUTH Monitor: NOX [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.49% Calm Avg: 0.00

Direction	0.0-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	8.82	0	0	0	8.82
NE	9.96	0	0	0	9.96
E	6.12	0	0	0	6.12
SE	14.94	0	0	0	14.94
S	7.25	0	0	0	7.25
SW	15.79	0	0	0	15.79
W	28.31	0	0	0	28.31
NW	8.82	0	0	0	8.82
Summary	100	0	0	0	100



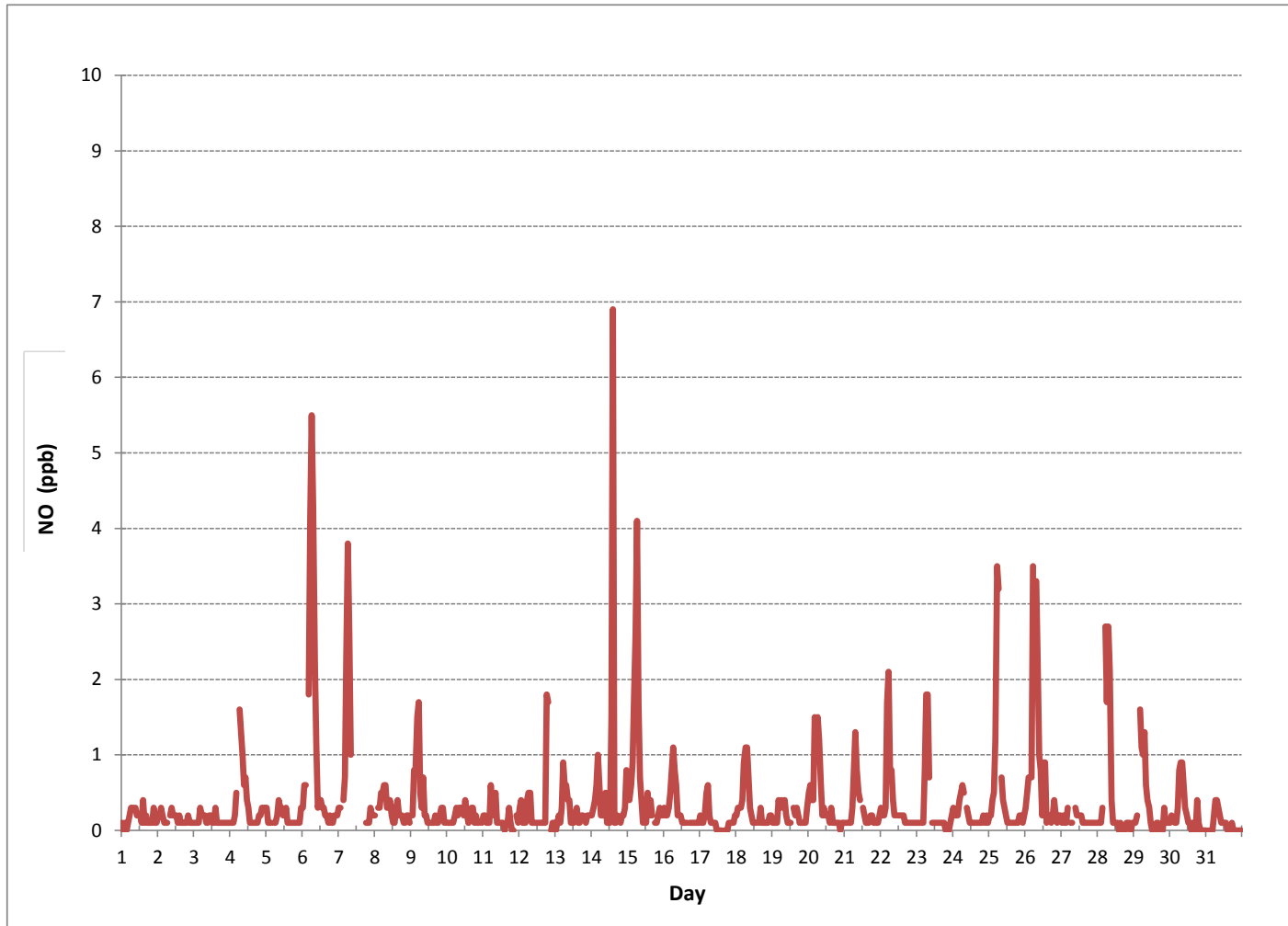
% Icon Classes (ppb)					
100		0.0-50.0	0		50.0-110.0
0		110.0-210.0	0		>210.0



Span Meas Span Ref Span Low Span High

NITRIC OXIDES

NITRIC OXIDE (NO) hourly averages in ppb





NITRIC OXIDE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
HOURLY MAX	HOURLY AVG	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.
DAY																													
1		0.2	0.2	0.1	0.2	0.3	0.5	3.1	2.1	S	2.7	0.4	0.4	2.0	0.2	4.8	0.4	2.7	1.3	0.3	0.8	0.1	5.7	0.3	1.9	0.1	5.7	1.3	24
2		0.4	0.4	1.3	0.4	0.3	0.4	0.4	S	2.4	0.5	0.7	0.5	0.9	0.3	3.3	0.4	0.7	0.3	0.1	0.3	1.9	0.9	0.7	0.1	0.1	3.3	0.8	24
3		0.1	0.1	0.1	0.1	1.5	0.4	S	0.7	0.3	0.3	3.5	2.3	0.3	0.2	6.4	0.7	0.1	0.2	0.4	0.7	0.1	0.1	0.1	0.1	0.1	6.4	0.8	24
4		0.3	0.3	0.3	0.3	0.8	S	2.8	1.8	1.3	1.1	1.5	0.9	0.8	0.4	0.3	0.2	0.1	0.3	0.3	0.3	0.4	0.6	0.9	0.9	0.1	2.8	0.7	24
5		0.9	0.2	0.2	0.2	S	0.2	0.2	0.4	3.6	0.5	1.3	1.3	0.5	0.5	0.5	0.4	0.3	0.9	0.3	0.1	0.1	0.4	0.9	0.1	3.6	0.6	24	
6		0.9	1.5	1.4	S	3.6	6.5	6.4	6.1	3.2	1.8	0.8	0.9	2.6	0.8	0.8	1.8	2.2	0.3	0.5	0.3	0.3	1.1	0.5	0.5	0.3	6.5	1.9	24
7		0.6	1.1	S	1.5	1.7	3.9	4.6	3.6	C	C	C	C	C	C	C	C	C	C	0.3	0.3	0.3	4.8	0.5	0.4	0.3	4.8	1.8	24
8		0.5	S	0.5	1.0	3.1	2.1	1.0	1.8	0.7	0.7	3.9	1.5	0.4	0.5	2.3	1.0	0.5	0.5	0.5	0.7	0.8	0.9	0.7	0.4	0.4	3.9	1.1	24
9		S	0.7	1.7	2.1	4.5	2.9	0.9	1.1	8.5	0.5	0.7	0.3	0.7	0.5	0.7	0.5	0.8	0.5	0.4	1.0	0.8	4.5	0.4	S	0.3	8.5	1.6	24
10		1.5	0.9	0.3	0.8	0.4	0.4	2.4	0.4	2.9	0.8	0.7	0.8	1.5	1.4	0.8	1.0	2.8	1.8	0.4	1.4	0.5	0.3	S	0.4	0.3	2.9	1.1	24
11		0.4	1.1	0.3	0.3	0.7	13.7	0.7	2.7	6.8	0.5	1.5	1.2	0.5	0.3	0.5	0.2	0.5	4.3	0.5	0.3	0.2	S	0.4	0.4	0.2	13.7	1.7	24
12		0.8	0.7	0.5	0.2	0.3	0.9	0.9	6.2	0.5	1.4	0.4	0.4	0.4	1.8	0.3	0.3	0.3	0.1	12.4	17.1	S	0.2	0.4	0.4	0.1	17.1	2.0	24
13		0.2	0.3	0.4	0.4	0.8	1.6	0.9	0.8	0.5	4.5	1.3	0.3	0.2	2.0	5.3	0.4	0.7	0.6	3.8	S	0.8	0.4	0.5	0.5	0.2	5.3	1.2	24
14		0.6	0.8	1.9	1.5	2.7	2.6	0.8	0.8	1.3	3.6	0.3	0.4	0.5	25.0	79.5	0.4	0.7	1.3	S	0.4	0.4	0.7	0.8	15.1	0.3	79.5	6.2	24
15		1.9	1.0	1.1	1.4	4.1	4.9	33.3	3.0	2.3	1.1	0.3	1.7	0.3	4.9	0.3	6.0	0.9	S	0.2	0.2	0.3	1.4	0.4	0.4	0.2	33.3	3.1	24
16		0.4	0.4	0.4	1.5	1.4	1.0	1.5	1.1	0.9	0.4	0.5	0.5	0.3	0.3	0.2	0.3	S	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.2	1.5	0.6	24
17		0.4	0.4	0.3	0.5	1.0	0.9	0.7	0.3	0.3	0.4	1.1	0.3	0.2	0.2	0.3	S	0.2	0.1	0.2	0.3	0.4	0.4	0.4	0.4	0.1	1.1	0.4	24
18		0.4	0.6	0.8	0.9	1.1	1.9	2.3	1.4	1.3	0.5	0.4	0.5	0.3	0.3	S	0.3	4.9	0.8	0.3	0.2	0.3	0.3	0.4	0.5	0.2	4.9	0.9	24
19		0.4	0.5	0.3	0.4	6.2	0.5	0.7	0.7	2.7	0.4	0.5	0.4	0.3	S	1.0	0.4	2.3	0.4	0.3	0.3	0.3	0.8	0.5	1.0	0.3	6.2	0.9	24
20		1.4	1.3	1.4	0.9	8.7	3.1	2.6	2.2	1.7	0.8	1.3	2.4	S	1.0	0.9	1.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	8.7	1.5	24
21		0.3	0.3	0.4	0.4	0.3	0.7	2.4	3.0	2.0	1.3	1.4	S	0.8	0.8	0.5	0.5	0.4	0.5	0.3	0.3	0.3	0.2	0.3	0.5	0.2	3.0	0.8	24
22		0.7	0.8	0.4	0.8	5.4	3.2	8.2	7.0	2.2	0.5	S	0.3	1.0	2.4	0.9	1.8	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	8.2	1.7	24
23		0.3	0.3	0.3	0.4	0.4	1.4	2.4	2.4	1.7	S	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.1	0.1	0.3	0.4	0.1	2.4	0.6	24
24		0.7	0.4	0.4	0.4	1.5	0.8	0.9	0.7	S	0.7	0.4	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.3	1.5	0.5	24
25		0.5	0.5	1.1	1.0	2.9	5.6	4.9	S	1.7	0.6	1.4	0.5	0.3	0.3	0.3	0.3	0.3	0.4	0.7	0.3	0.5	0.4	0.4	0.8	0.3	5.6	1.1	24
26		0.8	1.4	1.1	1.7	1.7	18.0	S	9.1	4.6	2.0	9.9	0.5	7.7	10.5	0.8	1.0	0.8	0.5	2.2	7.8	1.0	0.3	0.7	0.4	0.3	18.0	3.7	24
27		0.3	0.4	0.3	0.3	0.7	S	0.1	P	S1	0.4	0.4	0.5	0.7	0.8	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.1	0.8	0.4	22
28		0.4	0.4	0.7	0.9	S	5.3	4.6	4.3	4.4	1.8	1.1	0.4	1.1	0.3	0.4	1.1	0.4	0.2	0.3	0.5	0.4	0.5	0.3	0.5	0.2	5.3	1.3	24
29		0.4	0.5	0.9	S	3.9	2.0	1.5	7.1	0.9	0.9	1.9	0.4	0.3	0.4	0.9	1.9	0.9	0.3	0.1	0.2	5.1	0.4	0.3	0.5	0.1	7.1	1.4	24
30		0.7	0.7	S	0.6	0.3	0.7	4.0	1.6	1.5	1.9	1.0	1.1	0.5	0.3	0.3	0.4	1.4	0.3	9.8	2.3	0.8	0.3	0.4	0.2	0.2	9.8	1.4	24
31		0.2	S	0.3	0.3	0.3	0.7	4.0	0.8	3.1	2.4	0.3	0.5	0.4	0.9	0.3	0.3	0.3	0.4	0.3	0.3	0.2	0.1	0.3	0.3	0.1	3.1	0.6	24
HOURLY MAX		1.9	1.5	1.9	2.1	8.7	18.0	33.3	9.1	8.5	4.5	9.9	2.4	7.7	25.0	79.5	6.0	4.9	4.3	12.4	17.1	5.1	5.7	0.9	15.1				
HOURLY AVG		0.6	0.6	0.7	0.7	2.1	3.0	3.3	2.6	2.3	1.2	1.4	0.8	0.9	2.0	3.9	0.8	0.9	0.6	1.2	1.3	0.6	0.9	0.4	1.0				

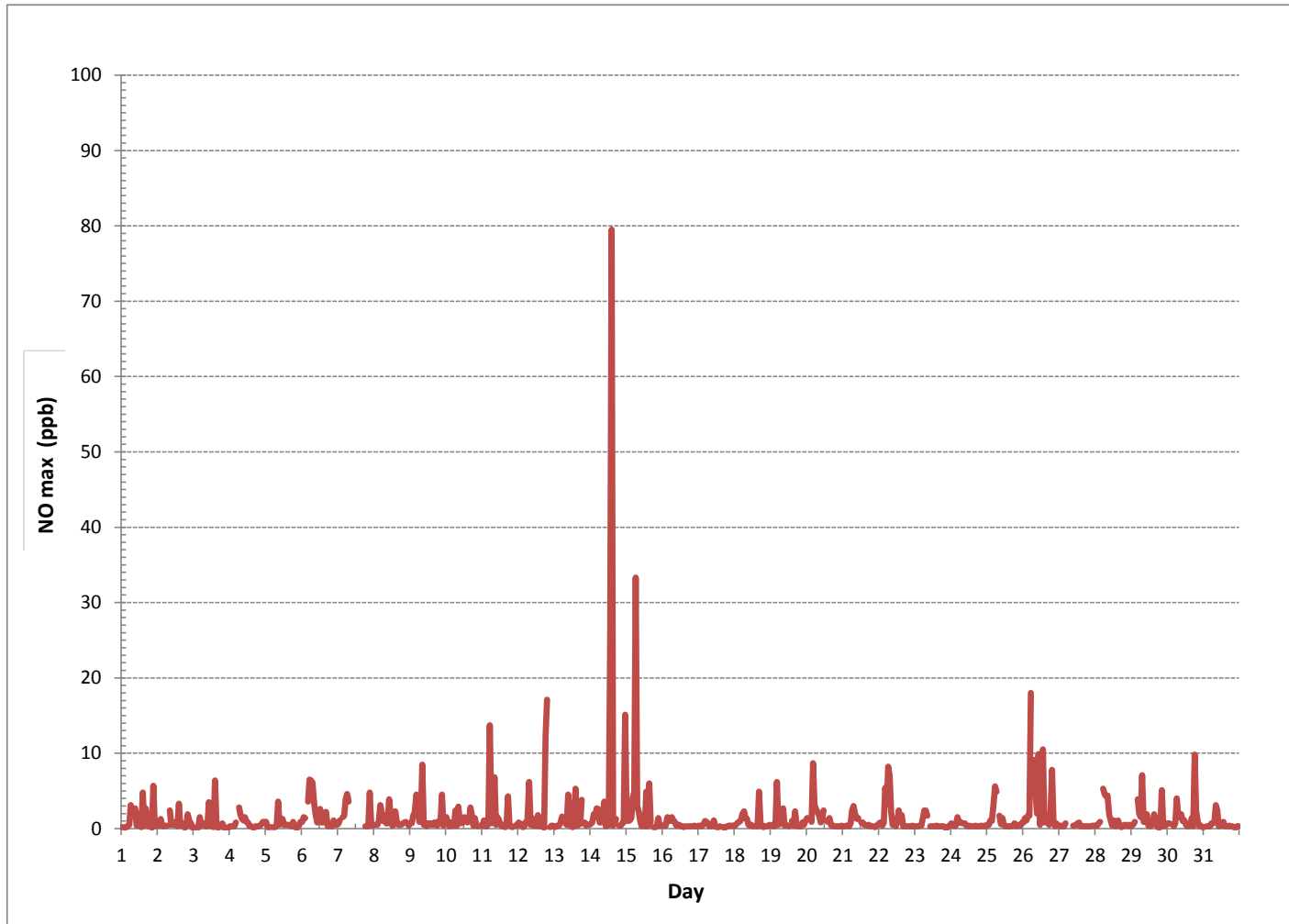
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

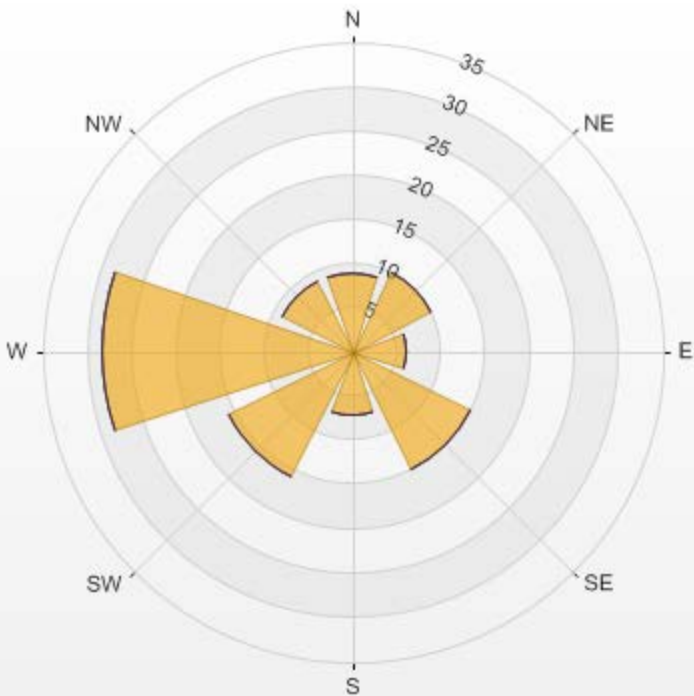
NUMBER OF NON-ZERO READINGS:	700
MAXIMUM INSTANTANEOUS VALUE:	79.5 PPB @ HOUR(S) 14 ON DAY(S) 14
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS OPERATIONAL TIME: 742 HRS
MONTHLY CALIBRATION TIME:	10 HRS
STANDARD DEVIATION:	3.84

NITRIC OXIDE MAX instantaneous maximum in ppb



Wind: LICA COLD LAKE SOUTH Monitor: NO [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.49% Calm Avg: 0.00

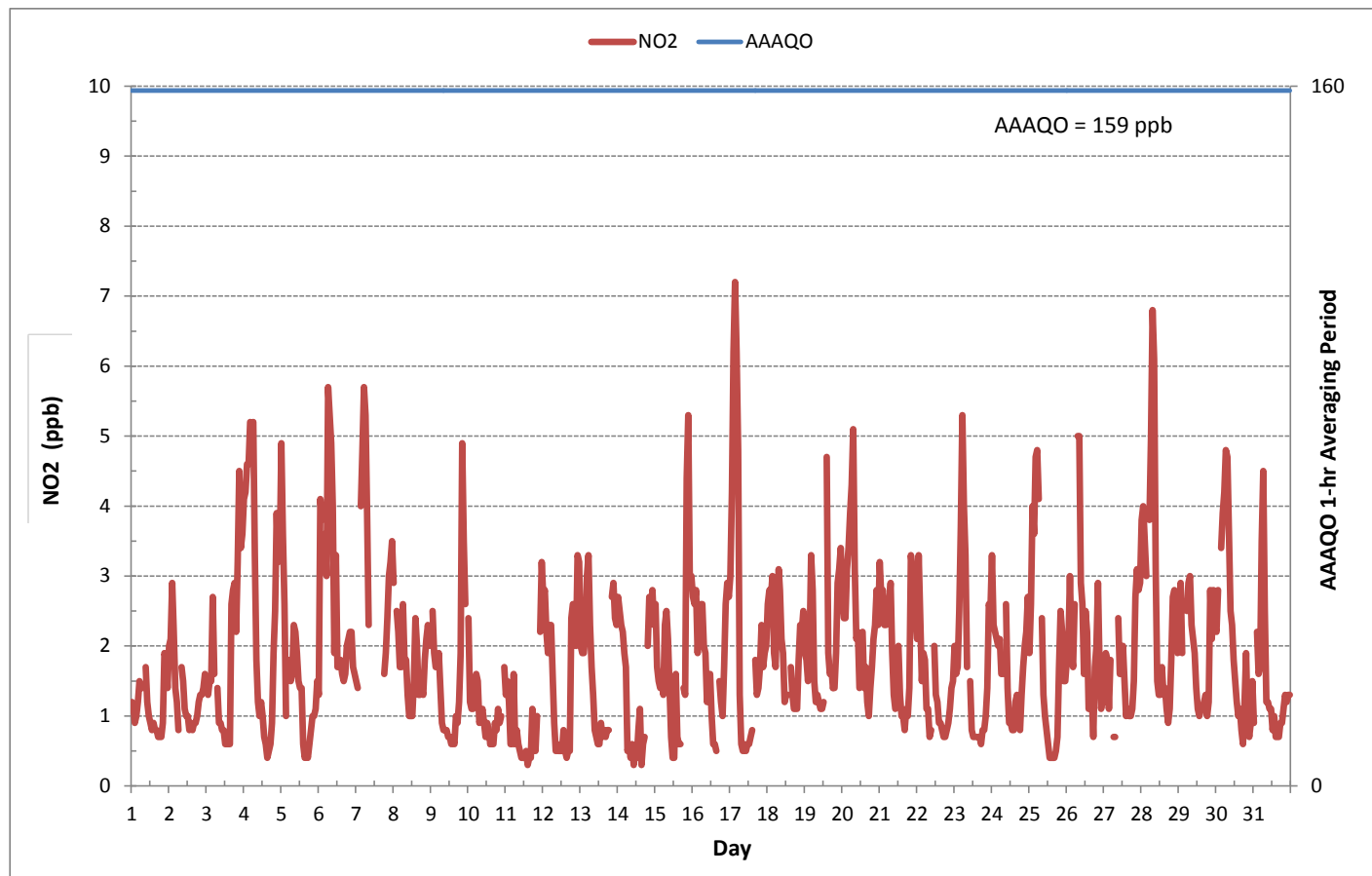
Direction	0.0-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	8.82	0	0	0	8.82
NE	9.96	0	0	0	9.96
E	6.12	0	0	0	6.12
SE	14.94	0	0	0	14.94
S	7.25	0	0	0	7.25
SW	15.79	0	0	0	15.79
W	28.31	0	0	0	28.31
NW	8.82	0	0	0	8.82
Summary	100	0	0	0	100



% Icon Classes (ppb)							
100	0.0-50.0	0	50.0-110.0	0	110.0-210.0	0	>210.0

NITROGEN DIOXIDE

NITROGEN DIOXIDE (NO2) hourly averages in ppb





NITROGEN DIOXIDE MAX instantaneous maximum in ppb

MST

DAY	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.
1	1.5	1.6	1.1	1.2	2.2	3.2	3.7	5.2	S	3.3	1.5	1.2	1.8	1.0	2.0	1.4	1.9	1.0	1.1	1.5	1.2	5.6	2.6	5.1	1.0	5.6	2.3	24
2	2.5	2.7	3.8	3.6	1.6	1.8	1.0	S	2.5	1.8	1.5	1.1	1.9	1.0	3.1	1.0	1.4	1.4	1.4	2.2	1.9	2.9	2.9	1.8	1.0	3.8	2.0	24
3	1.5	1.4	1.5	1.8	7.3	2.3	S	2.0	1.1	1.2	3.6	3.8	0.9	0.7	4.6	1.1	3.3	3.1	3.9	2.9	4.0	5.9	4.0	4.4	0.7	7.3	2.9	24
4	5.2	5.3	5.7	5.2	5.7	S	6.6	4.5	2.4	1.5	1.5	1.9	1.6	1.1	0.9	0.6	0.7	0.7	1.4	2.9	4.5	4.8	4.1	5.3	0.6	6.6	3.2	24
5	6.1	5.1	3.3	2.0	S	3.2	1.8	1.8	4.5	2.8	3.9	3.6	2.2	1.9	1.6	1.1	0.7	0.9	1.0	1.1	1.4	1.2	1.6	1.9	0.7	6.1	2.4	24
6	1.5	5.5	4.9	S	4.8	5.2	6.7	5.7	6.0	6.0	3.6	3.8	4.5	2.8	3.0	2.2	5.7	2.0	2.9	2.9	2.4	4.1	2.2	2.0	1.5	6.7	3.9	24
7	2.4	2.0	S	5.1	7.1	7.0	6.0	4.7	C	C	C	C	C	C	C	C	C	C	2.2	2.7	3.5	7.6	4.3	4.3	2.0	7.6	4.5	24
8	5.1	S	3.6	3.6	2.6	2.8	3.9	3.1	2.4	1.9	2.0	2.0	2.0	3.1	6.0	3.6	2.3	3.9	1.9	1.6	2.3	3.3	3.5	2.9	1.6	6.0	3.0	24
9	S	3.3	2.5	3.3	2.3	2.9	1.8	1.5	2.9	1.1	1.4	1.0	1.8	0.9	1.5	0.9	2.0	1.9	2.2	4.0	8.6	6.5	3.6	S	0.9	8.6	2.6	24
10	4.5	2.2	1.6	2.7	2.3	2.3	3.1	1.0	1.8	1.8	1.8	1.4	2.3	3.3	1.1	1.1	1.5	1.8	1.2	2.8	1.8	1.8	S	2.8	1.0	4.5	2.1	24
11	1.6	2.4	1.5	0.9	0.9	21.8	1.0	2.5	5.9	1.0	0.5	0.8	0.9	0.8	0.8	0.4	1.9	4.4	0.9	0.8	1.2	S	3.2	4.0	0.4	21.8	2.6	24
12	3.2	3.2	2.6	2.4	2.9	2.9	2.7	2.7	1.2	5.5	0.9	1.0	1.6	7.3	0.9	0.8	0.8	0.8	15.8	18.4	S	2.9	4.4	3.8	0.8	18.4	3.9	24
13	2.4	2.4	2.3	3.5	3.5	4.4	2.7	2.0	1.5	2.9	1.8	1.0	0.9	5.1	2.4	1.4	1.1	1.8	2.3	S	6.0	4.2	2.9	2.8	0.9	6.0	2.7	24
14	3.2	2.9	3.2	3.1	2.3	3.5	1.2	1.4	0.6	5.7	0.5	2.8	2.2	16.3	22.2	0.6	1.5	1.8	S	3.1	3.3	3.4	3.8	5.1	0.5	22.2	4.1	24
15	5.1	2.2	1.8	1.9	2.4	1.9	10.4	3.1	2.9	2.0	1.2	0.9	0.9	17.0	1.4	2.4	3.3	S	2.6	3.0	5.7	10.1	3.9	3.9	0.9	17.0	3.9	24
16	3.2	3.0	3.1	2.6	3.1	3.2	3.0	2.4	2.5	1.5	2.7	2.2	1.5	1.4	1.0	1.2	S	2.4	1.5	1.8	2.7	3.6	3.7	3.1	1.0	3.7	2.5	24
17	3.5	5.3	7.6	7.6	7.6	5.9	3.0	0.9	0.7	1.0	1.4	0.9	0.9	0.9	1.0	S	2.7	1.4	2.2	2.8	3.2	2.4	2.3	2.5	0.7	7.6	2.9	24
18	3.9	3.3	3.3	4.1	2.3	2.2	3.3	3.8	3.6	2.5	2.5	2.0	2.2	1.5	S	2.7	3.6	3.5	1.2	1.2	3.3	2.9	3.1	3.5	1.2	4.1	2.8	24
19	2.5	2.7	2.3	2.7	8.7	4.0	2.2	1.5	3.1	1.2	1.8	1.2	1.4	S	13.0	2.3	2.4	1.8	1.5	1.5	2.7	3.9	3.9	4.4	1.2	13.0	3.2	24
20	3.6	3.5	3.3	3.9	4.5	4.6	5.9	6.5	6.0	4.5	4.4	3.2	S	3.4	3.3	3.9	1.8	1.4	2.0	2.0	2.5	2.7	3.2	2.9	1.4	6.5	3.6	24
21	4.0	2.8	3.2	2.8	2.8	2.7	4.0	4.1	3.2	2.5	2.5	S	4.5	2.5	1.6	2.0	1.0	2.1	1.5	2.8	4.0	3.8	3.5	3.1	1.0	4.5	2.9	24
22	2.5	5.7	4.4	1.9	3.5	2.8	3.9	16.3	2.3	1.6	S	3.2	2.4	3.3	1.7	3.9	2.4	1.0	1.0	1.2	1.1	2.4	2.2	2.0	1.0	16.3	3.2	24
23	2.3	1.8	2.0	3.2	4.8	6.1	4.5	4.7	2.4	S	2.8	1.0	1.0	1.1	0.9	1.0	1.1	0.8	1.0	1.2	2.3	3.5	4.7	3.3	0.8	6.1	2.5	24
24	3.9	3.2	2.4	2.4	2.6	2.5	2.0	1.8	S	4.4	1.9	1.2	1.5	1.2	1.1	1.5	1.7	1.2	1.4	1.8	2.9	2.9	2.8	3.1	1.1	4.4	2.2	24
25	2.5	3.3	5.1	4.8	5.9	6.1	5.1	S	4.1	1.8	2.5	1.2	1.1	1.0	0.8	0.8	1.1	1.4	2.0	3.1	3.3	2.8	1.9	2.3	0.8	6.1	2.8	24
26	2.7	3.3	3.7	2.7	2.3	4.4	S	10.2	8.6	3.9	8.1	2.0	10.4	12.0	1.4	2.2	2.8	1.4	4.1	7.0	5.2	3.2	2.3	1.8	1.4	12.0	4.6	24
27	1.5	2.4	2.7	1.4	2.5	S	0.7	P	S1	5.6	1.9	2.0	3.9	3.8	1.4	1.9	1.4	1.6	1.5	2.4	4.4	4.9	3.9	3.6	0.7	5.6	2.6	22
28	5.3	5.2	4.1	4.0	S	5.2	7.0	8.8	9.7	6.8	3.7	2.2	1.6	1.9	1.9	2.3	1.6	1.1	1.6	2.5	3.6	3.2	2.8	2.3	1.1	9.7	3.8	24
29	3.8	3.8	2.4	S	3.5	3.6	3.3	5.3	2.7	2.5	2.4	2.0	1.2	1.5	2.7	2.0	2.5	2.2	1.2	2.7	10.5	3.6	3.5	2.9	1.2	10.5	3.1	24
30	2.5	3.3	S	5.6	4.8	4.8	5.5	5.2	4.8	2.7	2.4	3.1	1.8	1.5	1.5	1.5	4.9	0.8	10.7	5.3	2.2	1.0	1.4	1.9	0.8	10.7	3.4	24
31	1.4	S	3.6	1.7	1.9	6.4	6.3	3.5	3.2	2.7	1.4	1.5	1.5	2.8	1.2	0.8	1.0	1.2	1.2	1.8	1.5	1.5	1.7	1.5	0.8	6.4	2.2	24
HOURLY MAX	6.1	5.7	7.6	7.6	8.7	21.8	10.4	16.3	9.7	6.8	8.1	3.8	10.4	17.0	22.2	3.9	5.7	4.4	15.8	18.4	10.5	10.1	4.7	5.3				
HOURLY AVG	3.2	3.3	3.2	3.2	3.7	4.5	3.9	4.2	3.4	2.9	2.3	1.9	2.2	3.5	3.0	1.7	2.1	1.8	2.5	3.0	3.4	3.8	3.1	3.1				

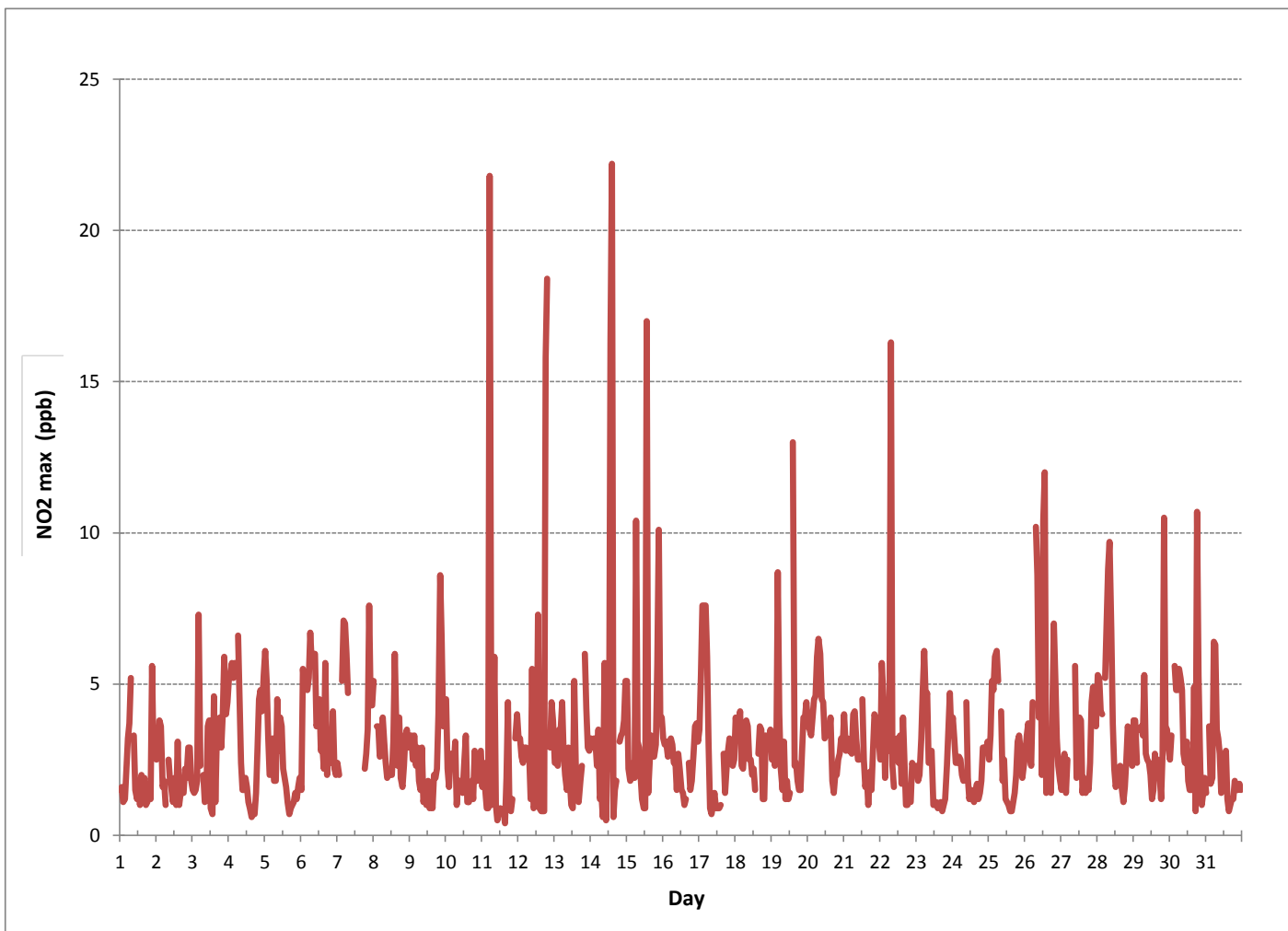
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

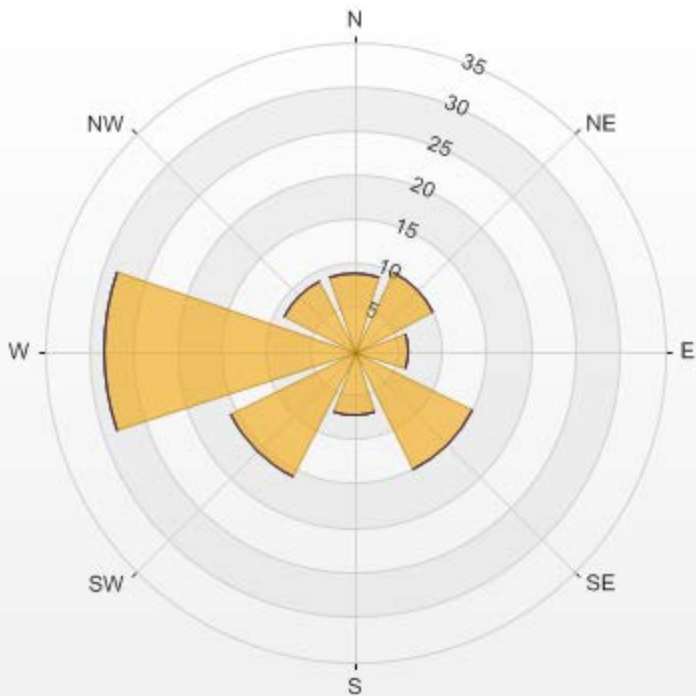
NUMBER OF NON-ZERO READINGS:	700					
MAXIMUM INSTANTANEOUS VALUE:	22.2	PPB	@ HOUR(S)	14	ON DAY(S)	14
	VAR-VARIOUS					
IZS CALIBRATION TIME:	32	HRS	OPERATIONAL TIME:	742	HRS	
MONTHLY CALIBRATION TIME:	10	HRS				
STANDARD DEVIATION:	2.36					

NITROGEN DIOXIDE MAX instantaneous maximum in ppb



Wind: LICA COLD LAKE SOUTH Monitor: NO2 [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.49% Calm Avg: 0.00

Direction	0.0-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	8.82	0	0	0	8.82
NE	9.96	0	0	0	9.96
E	6.12	0	0	0	6.12
SE	14.94	0	0	0	14.94
S	7.25	0	0	0	7.25
SW	15.79	0	0	0	15.79
W	28.31	0	0	0	28.31
NW	8.82	0	0	0	8.82
Summary	100	0	0	0	100



% Icon Classes (ppb)	
100	0.0-50.0
0	50.0-110.0
0	110.0-210.0
0	>210.0

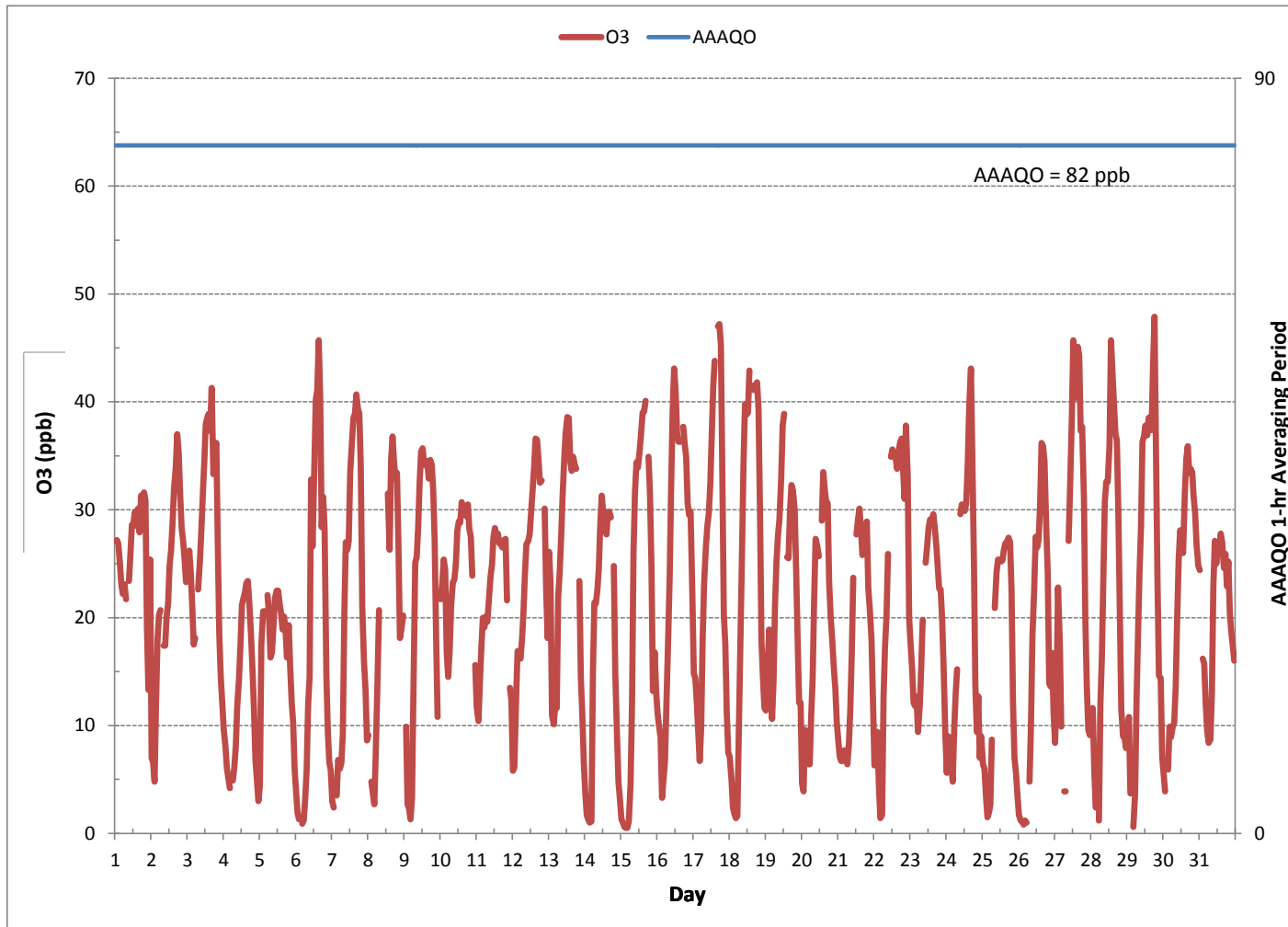
NO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 07/2016 Type: Span



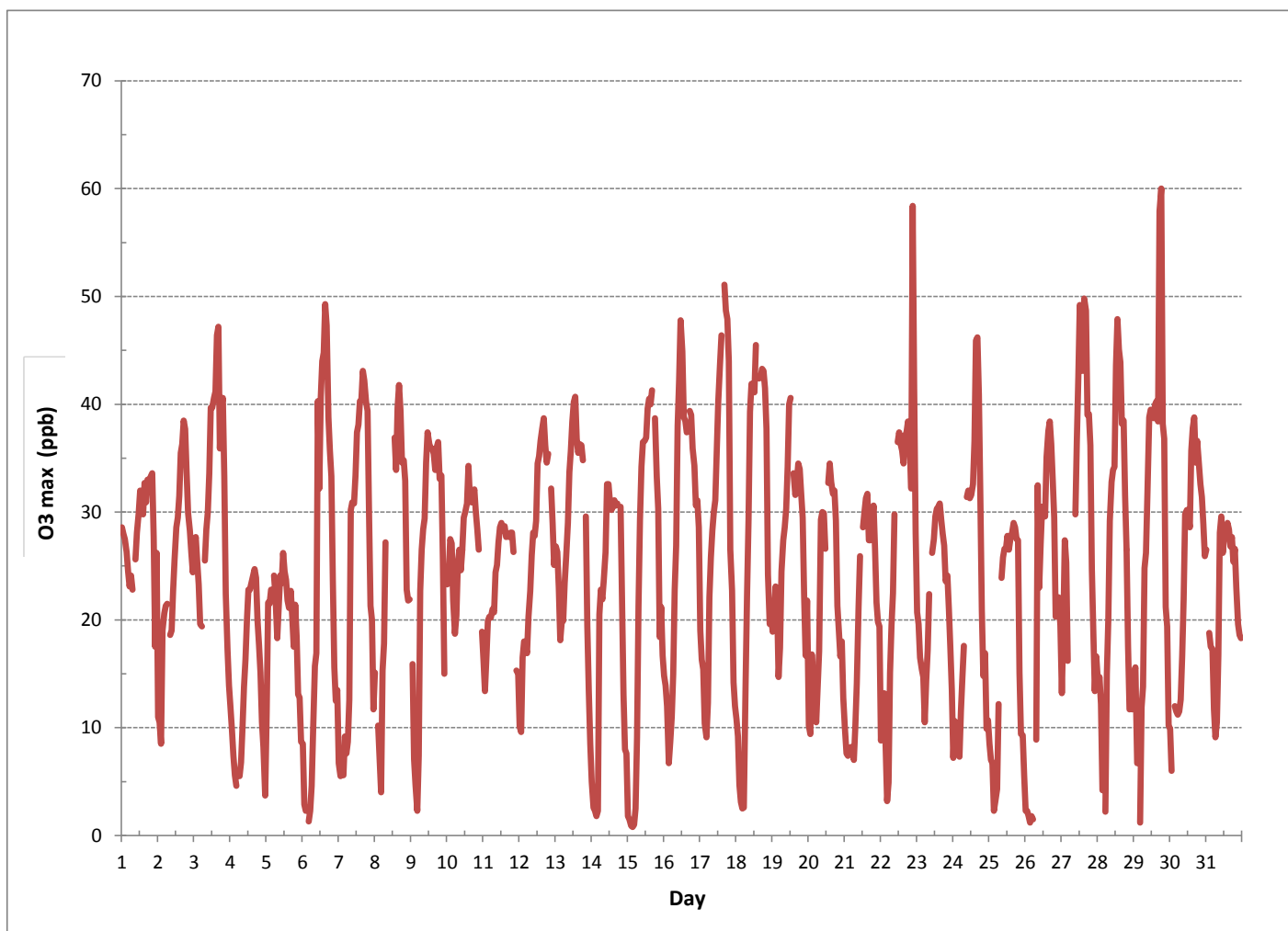
Span Meas Span Ref Span Low Span High

OZONE

OZONE (O3) hourly averages in ppb

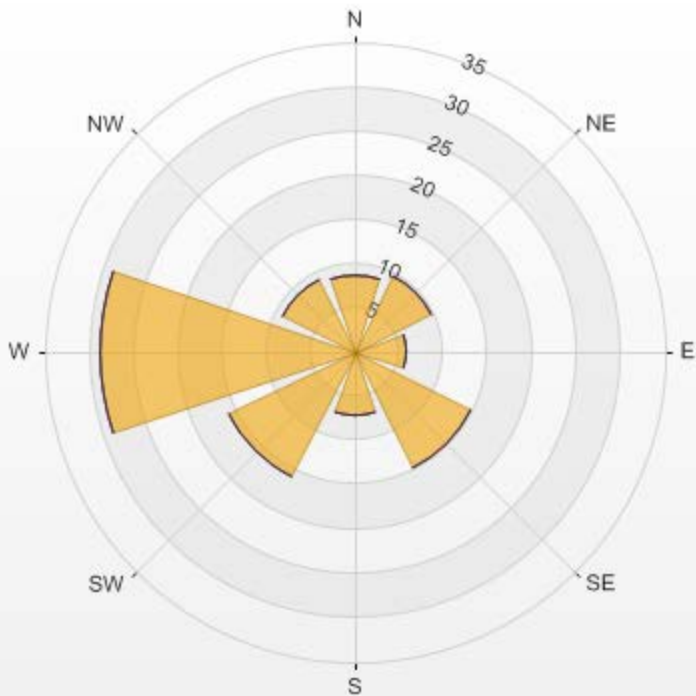


OZONE MAX instantaneous maximum in ppb



Wind: LICA COLD LAKE SOUTH Monitor: O3 [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 95.03% Calm Avg: 0.00

Direction	0.0-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	8.77	0	0	0	8.77
NE	9.62	0	0	0	9.62
E	5.94	0	0	0	5.94
SE	14.57	0	0	0	14.57
S	7.21	0	0	0	7.21
SW	15.84	0	0	0	15.84
W	28.85	0	0	0	28.85
NW	9.19	0	0	0	9.19
Summary	100	0	0	0	100



% Icon Classes (ppb)							
100	0.0-50.0	0	50.0-110.0	0	110.0-210.0	0	>210.0

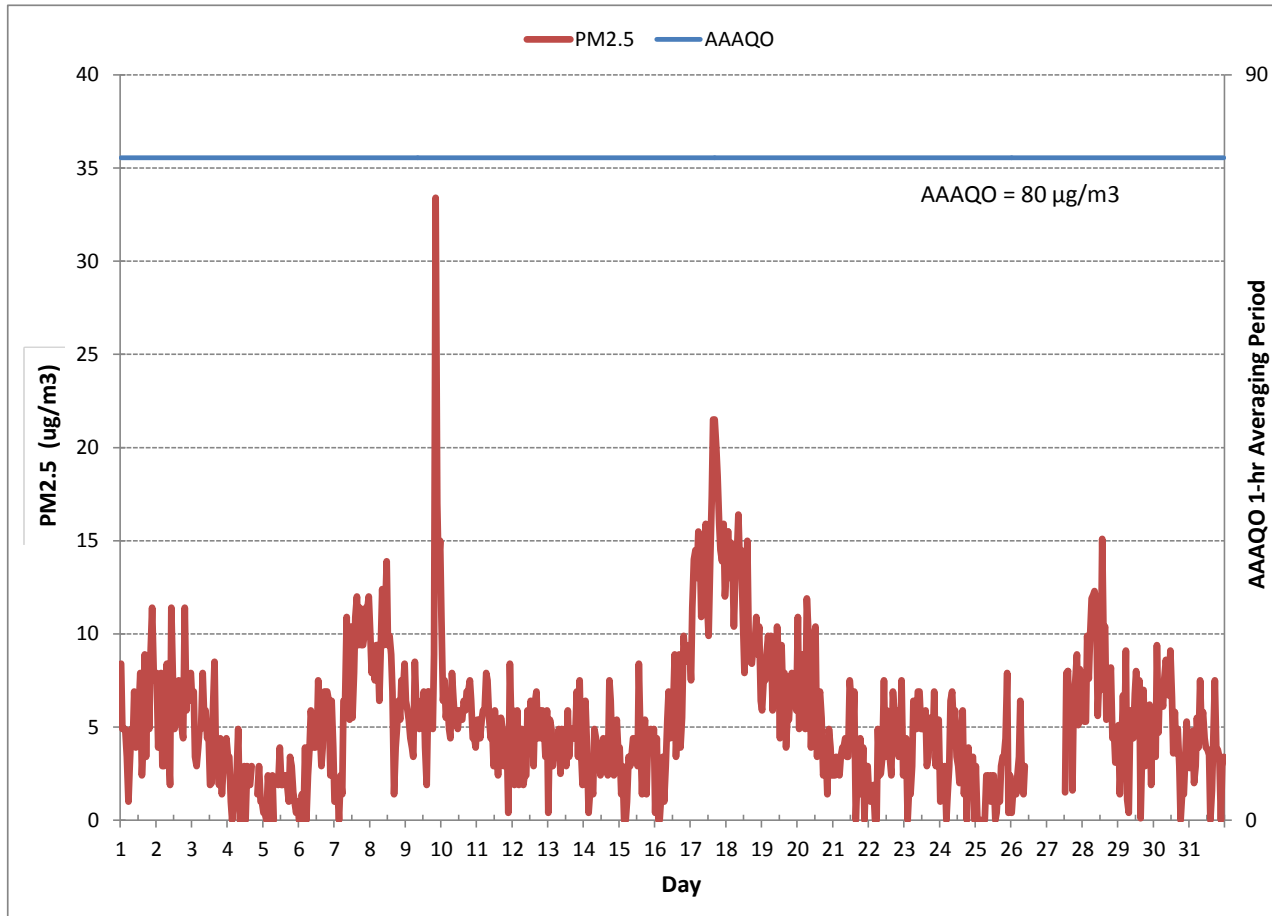
O3[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 07/2016 Type: Span



Span Meas Span Ref Span Low Span High

PARTICULATE MATTER 2.5

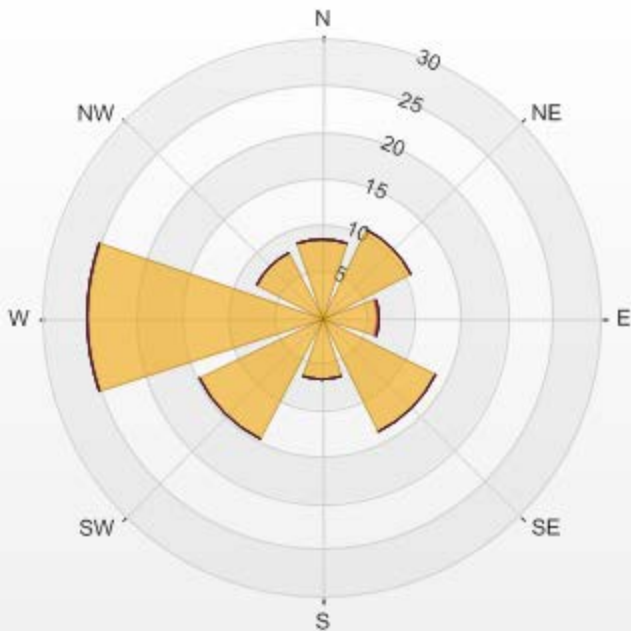
PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5) hourly averages in $\mu\text{g}/\text{m}^3$



Wind: LICA COLD LAKE SOUTH Monitor: PM25[ug/m3(L)] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 6.48% Valid Data: 95.43% Calm Avg: 0.00

Direction	0.5-30.0	30.0-60.0	60.0-80.0	80.0-120.0	120.0-240.0	>240.0	Total
N	8.59	0	0	0	0	0	8.59
NE	10.7	0	0	0	0	0	10.7
E	6.06	0.14	0	0	0	0	6.2
SE	13.8	0	0	0	0	0	13.8
S	6.62	0	0	0	0	0	6.62
SW	14.65	0	0	0	0	0	14.65
W	25.21	0	0	0	0	0	25.21
NW	7.75	0	0	0	0	0	7.75
Summary	93.38	0.14	0	0	0	0	93.52

LICA COLD LAKE SOUTH 2016/07/01 12:00 AM - 2016/07/31 11:00 PM Calm: 6.48% Calm Wind Avg Speed: 0.11(ug/m3(L))



% Icon Classes (ug/m3(L))

0 30.0-60.0

0 60.0-80.0

0 80.0-120.0

0 120.0-240.0

0 >240.0

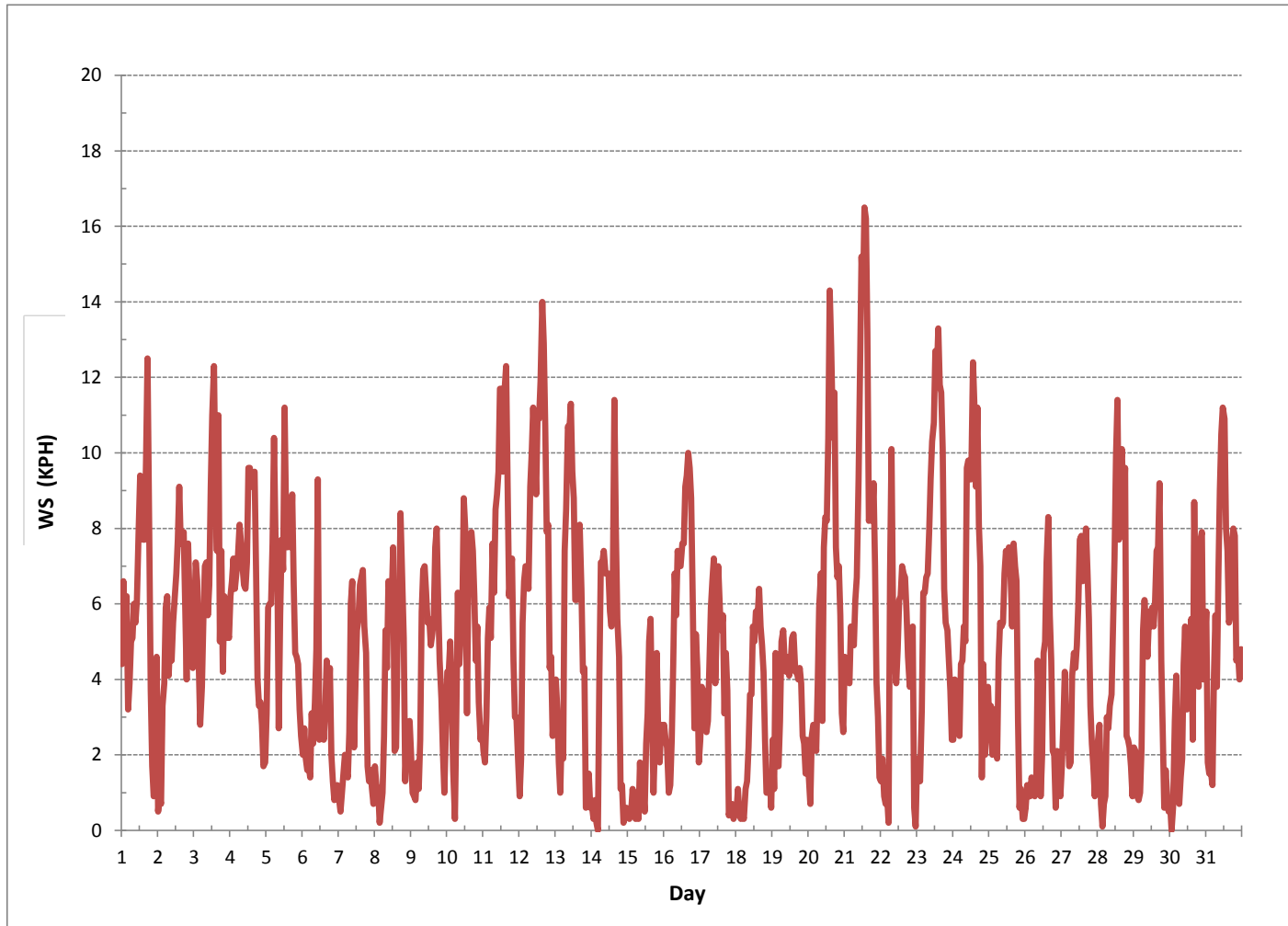
93 0.5-30.0

JOB #: 2833-2016-07-1-C

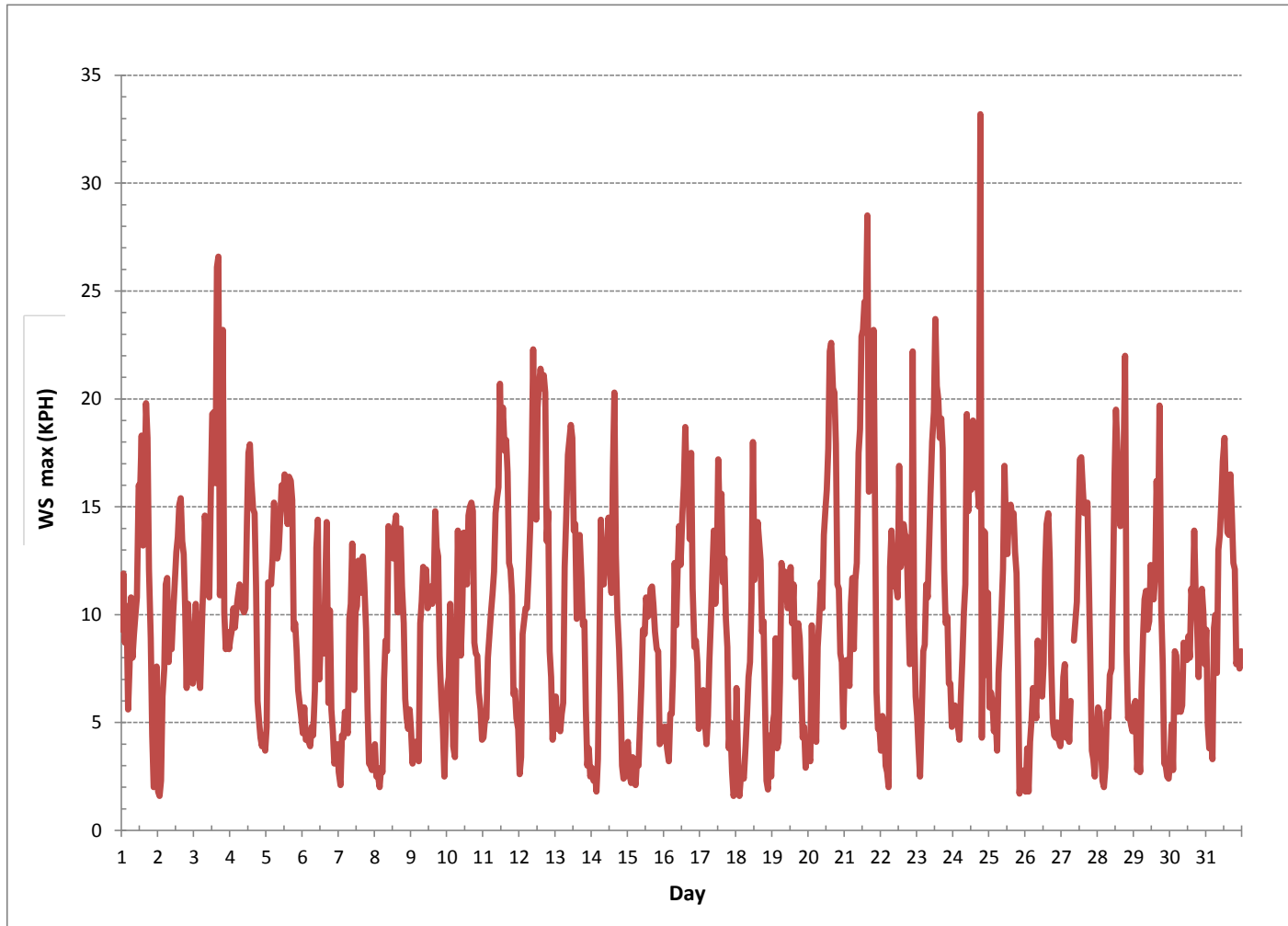
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WIND SPEED

WIND SPEED (WS) hourly averages in km/hr

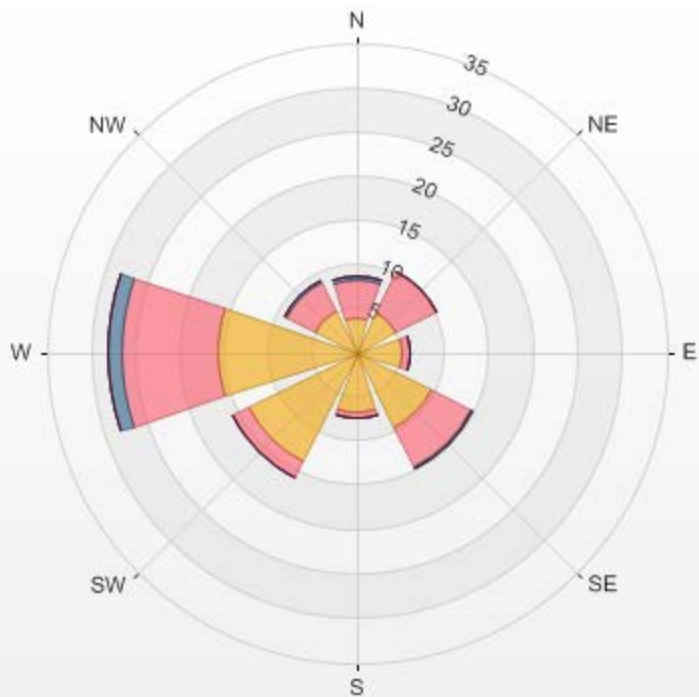


VECTOR WIND SPEED MAX instantaneous maximum in km/hr



Wind: LICA COLD LAKE SOUTH Monitor: WSP [kph] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 100.00% Calm Avg: 0.00

Direction	0.0-6.0	6.0-12.0	12.0-20.0	20.0-29.0	29.0-39.0	>39.0	Total
N	3.9	4.44	0.4	0	0	0	8.74
NE	4.97	5.24	0	0	0	0	10.21
E	5.11	0.94	0	0	0	0	6.05
SE	9.54	4.84	0.27	0	0	0	14.65
S	6.85	0.54	0	0	0	0	7.39
SW	13.71	2.02	0	0	0	0	15.73
W	15.59	11.02	1.48	0	0	0	28.09
NW	5.38	3.63	0.13	0	0	0	9.14
Summary	65.05	32.67	2.28	0	0	0	100



WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Site - July 2016

WIND DIRECTION (WD) hourly averages

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	24-HOUR AVG	RDGS.
DAY	HOUR START	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	QUADRANT	
1	ESE	SE	SE	SE	E	E	E	ESE	ESE	E	ENE	ESE	SE	SE	SE	SE	SE	SE	SE	SSE	S	SE	SE	E	ESE	24	
2	SE	ESE	ENE	SE	ESE	ESE	SE	ESE	SE	SE	SE	ESE	ESE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	24
3	SE	SE	SE	SE	ESE	ESE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SSE	W	NW	NE	WNW	WSW	WSW	WSW	W	SSE	24	
4	W	W	W	W	W	W	W	W	W	WNW	W	W	WNW	WNW	WNW	WNW	NNW	NW	WNW	WNW	WSW	W	W	W	W	W	24
5	WNW	NW	NW	WNW	WNW	W	W	WNW	NW	NNW	NW	NNW	NW	NNW	N	N	N	NNW	NNE	NNW	NNW	NNW	NNW	NNW	NNW	NNW	24
6	W	W	WSW	WSW	W	WSW	W	W	WSW	NNW	NNW	WSW	WNW	W	SW	SE	N	WSW	NW	NNW	WSW	SW	W	WSW	W	W	24
7	SE	WSW	WSW	NW	WSW	WSW	WSW	NNW	NW	NW	NW	WSW	W	WNW	W	W	W	WNW	WNW	SSW	SE	SE	S	ENE	W	24	
8	ESE	ESE	ESE	NNE	SSW	SSE	ESE	ENE	E	ESE	ESE	ENE	NE	S	SSE	ENE	NE	NNE	NNE	NE	ENE	SE	NE	NE	E	24	
9	NNE	ENE	W	S	WSW	NW	NNE	NE	NE	NNE	NNE	NNE	E	NE	ENE	ENE	E	E	ENE	ENE	E	E	ENE	E	NE	NE	24
10	ENE	ENE	E	ENE	ESE	W	ENE	E	E	ENE	ENE	ENE	NE	ESE	E	ESE	ENE	ENE	NE	NE	NE	NE	NE	NE	NNW	ENE	24
11	NNW	N	NE	NNE	NE	NE	NE	NE	NE	NE	NNE	NNE	NE	N	NNW	N	NNW	N	NNW	NNE	N	NW	NNW	WNW	NW	N	24
12	WSW	WNW	NNW	NNW	NNW	NNW	NNW	NNW	N	NNE	NNE	NNE	N	NE	NNE	N	NNW	NNW	N	NNW	NNW	NNW	NNW	NNW	NNW	NNW	24
13	NNW	NW	W	NW	NW	WNW	NNW	NNW	NNW	NNW	N	NNW	NNW	N	NE	NE	NE	ENE	NE	NE	NNW	SW	WSW	SE	NNW	24	
14	W	E	SSW	SSW	SW	ENE	NE	NE	NNE	NE	NNE	NE	NE	NE	NNE	NNE	ENE	ENE	NE	E	SW	WNW	SE	SW	NE	24	
15	SW	ESE	SE	WSW	W	NNW	NW	WNW	SSE	ENE	ESE	W	SSE	E	NNE	ENE	ENE	NE	SW	SW	WSW	SW	WSW	SW	SW	24	
16	WSW	WSW	WSW	SW	W	WSW	WSW	WSW	W	W	W	W	W	W	WNW	WNW	W	WNW	WNW	N	N	WNW	W	WNW	WSW	W	24
17	WSW	W	WNW	W	WNW	W	N	N	NNE	NE	NNE	N	NNW	NNW	NNE	NE	NNE	N	NNE	N	SSW	SSW	S	S	NNW	24	
18	S	SW	WSW	SW	WNW	ESE	SSE	SW	W	WSW	SW	SW	SW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	ESE	SE	ENE	SSW	24
19	SE	ESE	SE	ENE	E	ESE	SE	SE	SSE	S	SW	SW	SSW	S	WSW	SW	WSW	SW	SW	SW	SSW	SW	WSW	WSW	S	24	
20	SW	SSW	WSW	WSW	WSW	WSW	WSW	W	N	WNW	WSW	WSW	WSW	WSW	W	W	W	WNW	WNW	W	W	W	W	W	WSW	W	24
21	SW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	W	W	W	W	W	W	NW	WNW	W	W	NNW	NNW	WNW	WNW	WSW	W	24
22	WSW	N	NE	W	S	N	SE	SE	SSE	S	S	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	S	S	WSW	SSW	NW	SSW	24	
23	S	S	SW	WSW	WSW	WSW	W	W	WNW	WNW	WNW	WNW	W	WNW	W	W	WNW	WNW	WNW	WNW	W	W	WSW	SW	W	24	
24	SW	WSW	WSW	SW	SW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	SW	WNW	SSW	W	W	WSW	WSW	24
25	WSW	WSW	WSW	WSW	W	WSW	W	WNW	W	W	WNW	WNW	WNW	W	WNW	W	W	W	W	WSW	SSW	SE	SSE	SSW	W	24	
26	ESE	E	E	WSW	WSW	WNW	E	ESE	SE	ESE	S	S	SE	SE	SE	SE	SSE	SSW	SSE	SE	NNW	SSW	SE	SW	SSE	24	
27	SSE	SW	WSW	SSW	SE	SE	S	SW	SW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WNW	WNW	W	W	WSW	SW	WSW	W	WSW	24
28	WSW	W	WSW	NNE	SSE	WSW	WSW	SW	WSW	SW	WSW	W	WNW	WSW	SW	WSW	W	N	N	WSW	SSE	S	WSW	WSW	WSW	24	
29	WSW	WSW	SSE	SSE	SE	SW	WSW	W	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	NW	SSE	S	SSW	S	SW	24
30	SE	SE	NNE	WSW	WSW	W	N	SW	SW	SE	SE	SSE	SE	S	WSW	S	SE	SE	SE	ESE	SE	SE	SE	SE	SSE	24	
31	SE	SSE	SW	SSE	S	WSW	W	WNW	W	W	W	W	W	W	W	W	WNW	NW	W	W	W	WSW	WSW	WSW	WSW	WSW	24

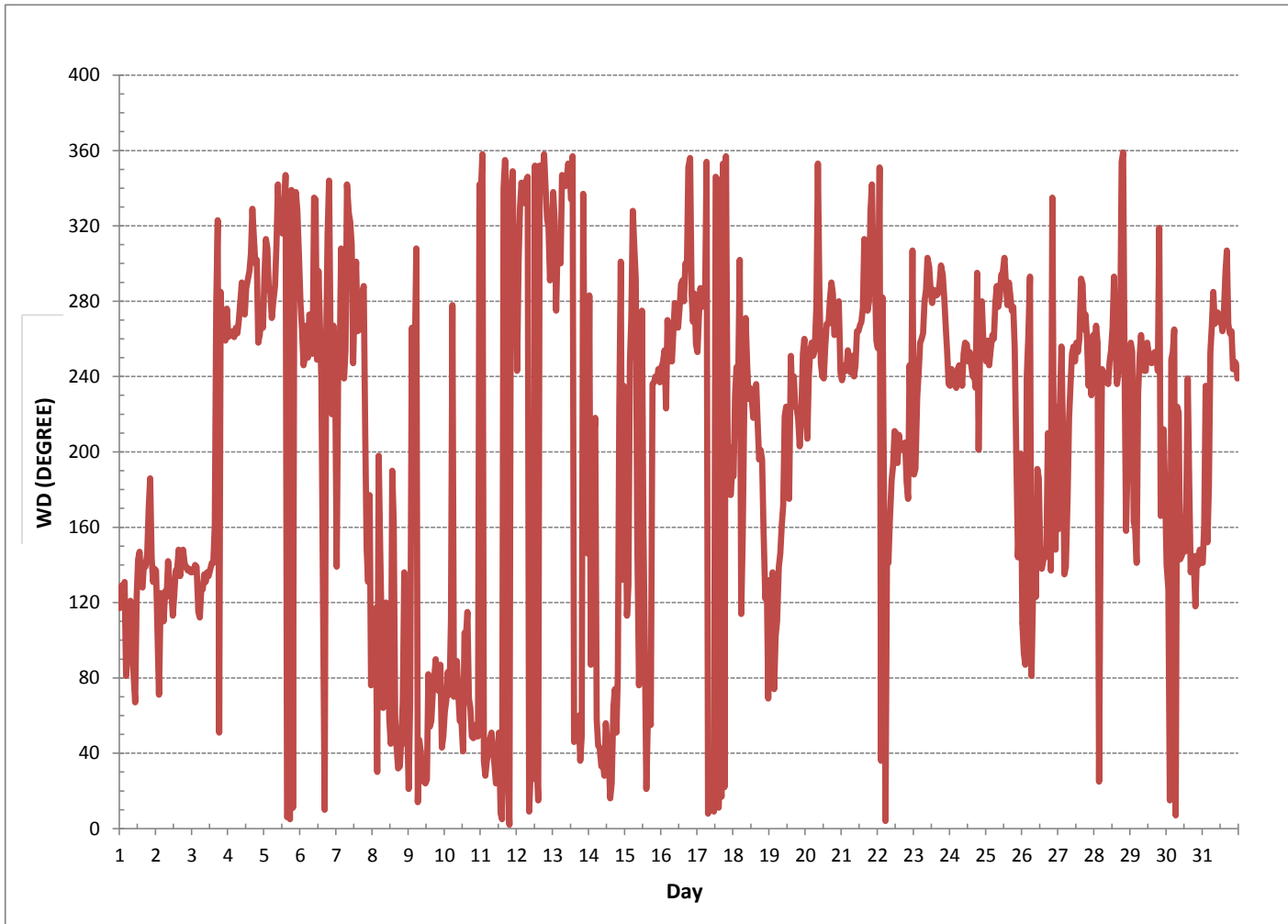
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	April 1, 2015
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	0	HRS	OPERATIONAL TIME:	744	HRS
STANDARD DEVIATION:	94.72		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	19 (NNE)	DEGREE

WIND DIRECTION (WD) hourly averages



STANDARD DEVIATION WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Site - July 2016

STANDARD DEVIATION WIND DIRECTION (STDWD) hourly averages in degrees

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	RDGS.	
HOUR START	HOUR END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59		
DAY																											
1		24	20	23	18	24	24	25	27	26	31	34	31	22	27	23	24	17	18	18	34	31	43	20	19	24	
2		30	23	61	17	22	22	25	26	16	28	27	28	27	27	21	27	23	15	24	26	11	13	14	12	24	
3		14	13	11	16	22	27	26	27	21	28	25	28	22	18	26	35	26	21	21	43	20	18	23	21	24	
4		16	16	16	18	17	17	18	19	23	26	24	27	25	24	26	21	18	17	16	13	13	16	34	27	24	
5		16	17	19	24	21	19	22	22	25	23	21	25	27	24	22	23	21	21	19	23	15	15	15	19	24	
6		16	17	24	45	29	39	18	26	26	23	19	45	48	52	55	53	33	28	23	47	41	38	54	59	24	
7		59	61	48	45	38	47	47	51	25	45	34	38	37	40	36	33	29	34	23	27	49	38	40	49	24	
8		29	32	41	38	42	62	45	24	31	28	33	34	26	38	42	27	23	21	23	24	40	33	21	24	24	
9		46	36	45	43	15	59	33	27	25	25	37	35	38	45	37	35	27	25	25	23	19	43	42	20	24	
10		18	19	21	24	32	39	23	24	25	23	24	23	27	39	30	26	26	21	22	23	21	21	25	17	24	
11		27	25	19	21	23	24	24	24	23	28	28	25	25	24	22	18	22	24	23	18	12	43	15	23	24	
12		28	18	12	17	14	14	20	22	23	26	24	26	25	24	26	22	21	26	19	15	16	14	16	16	24	
13		16	17	21	43	15	22	16	20	22	23	26	27	24	31	27	29	24	27	28	26	45	65	35	42	24	
14		63	70	51	58	50	20	22	24	25	31	30	31	40	42	40	25	27	30	28	47	43	50	58	52	24	
15		67	59	55	49	54	54	52	73	60	82	81	58	64	52	38	35	49	62	50	23	25	30	23	23	24	
16		21	28	27	51	58	33	23	24	28	26	32	35	31	34	27	26	23	20	22	19	39	19	19	54	24	
17		35	17	18	14	17	18	17	20	31	31	50	43	46	47	43	39	64	37	28	48	34	51	49	42	24	
18		54	70	69	51	46	60	55	63	61	50	57	47	48	41	41	37	39	42	41	41	35	30	31	54	24	
19		21	64	15	37	37	31	29	33	39	48	45	54	35	26	26	28	26	35	33	31	29	29	30	22	24	
20		40	53	42	24	34	29	32	20	20	27	24	26	28	24	24	23	24	24	20	18	17	20	22	25	24	
21		22	22	21	19	20	24	23	25	26	26	25	23	24	23	22	19	23	21	22	15	18	15	21	40	24	
22		39	36	51	48	53	83	17	14	35	48	53	46	46	46	37	42	43	41	40	39	35	49	45	64	24	
23		32	29	45	20	16	16	20	24	24	23	26	24	23	26	23	24	23	23	20	20	18	17	16	19	24	
24		26	15	22	22	25	17	26	25	32	28	27	28	29	26	26	25	25	26	43	47	33	69	28	21	24	
25		17	19	36	11	21	36	22	23	33	34	35	34	40	33	35	39	28	27	21	23	38	26	73	42	24	
26		35	29	34	70	51	74	48	62	25	33	57	55	21	30	29	20	29	36	39	47	54	41	44	57	24	
27		43	38	21	31	23	35	45	33	36	39	37	37	34	33	36	33	29	25	21	18	13	30	50	34	24	
28		38	28	73	38	48	41	25	32	36	37	31	29	28	24	34	27	23	29	23	37	29	42	46	57	24	
29		39	40	51	45	38	28	23	26	33	36	34	35	46	41	35	31	24	24	30	20	36	34	45	54	24	
30		65	55	62	45	23	53	47	49	51	32	24	40	35	36	29	49	19	22	20	19	12	12	30	22	24	
31		15	49	36	29	31	24	23	27	25	25	22	22	23	28	28	25	21	22	21	19	23	22	24	23	24	

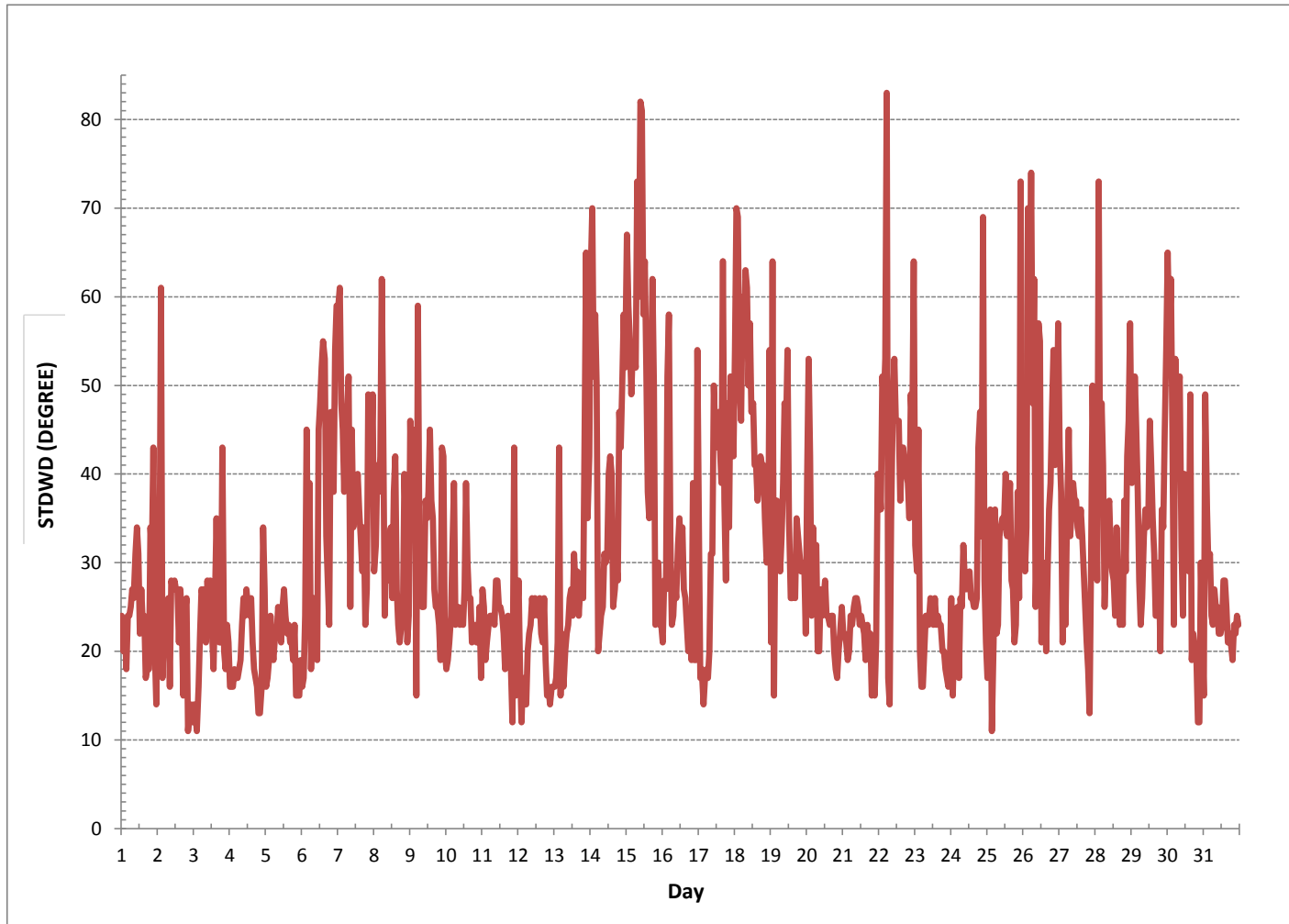
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION: April 1, 2015

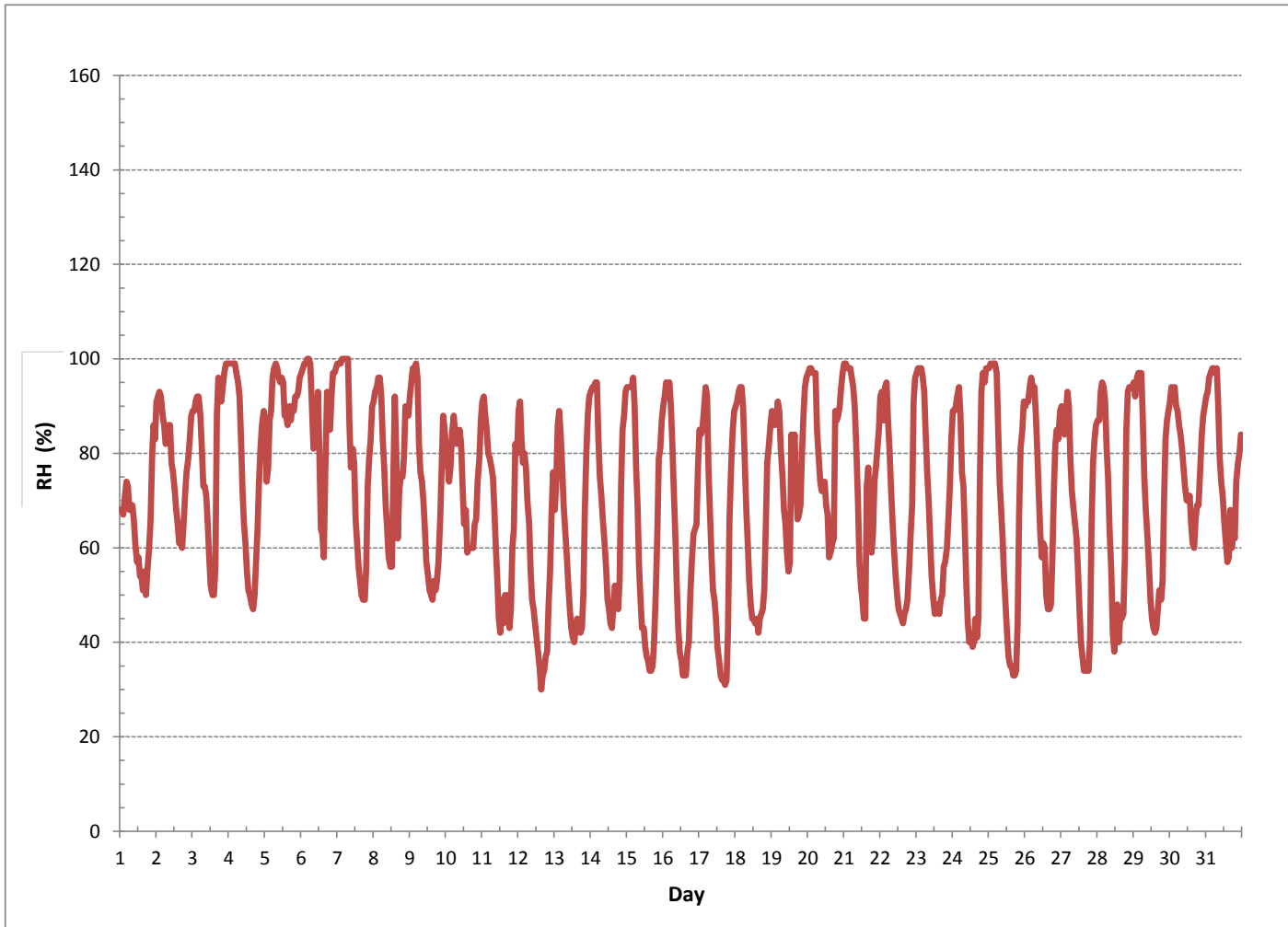
CALIBRATION TIME: 0 HRS OPERATIONAL TIME: 969 HRS

STANDARD DEVIATION WIND DIRECTION (STDWD) hourly averages in degrees



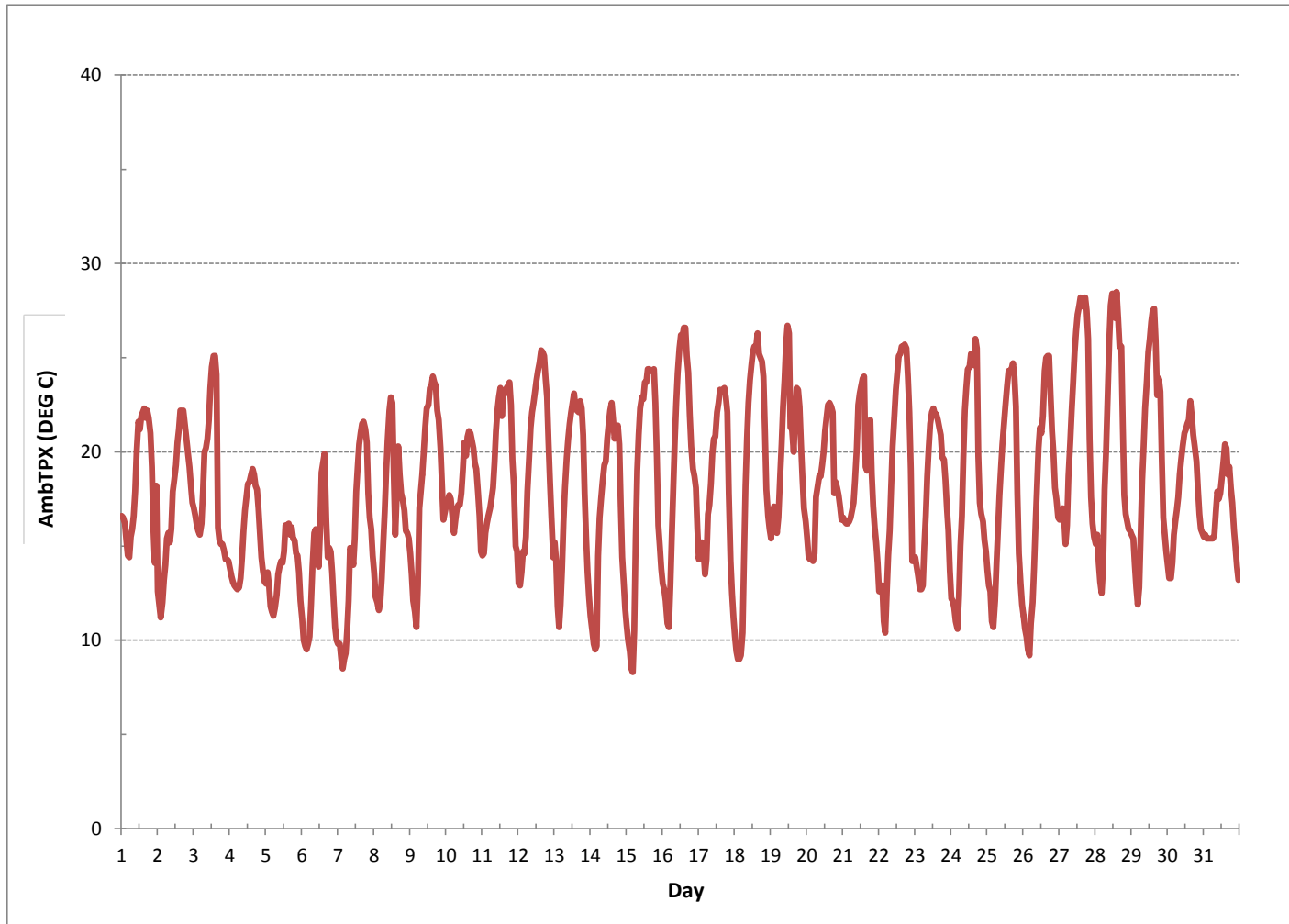
RELATIVE HUMIDITY

RELATIVE HUMIDITY (RH) hourly averages in %



AMBIENT TEMPERATURE

AMBIENT TEMPERATURE (AmbTPX) hourly averages in Degrees Celsius

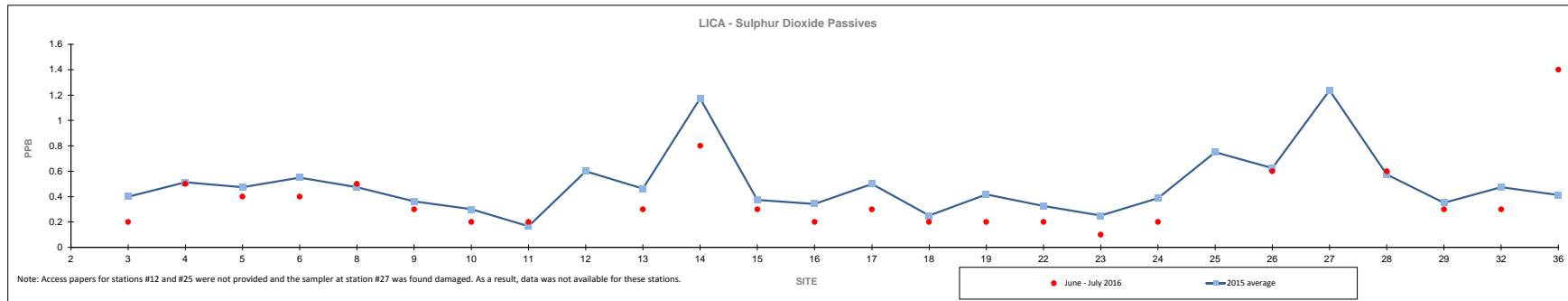


APPENDIX II
NON-CONTINUOUS MONITORING DATA RESULTS

PASSIVE RESULTS

Passive Summary Results for June - July 2016
Lakeland Industry & Community Association

		Sulphur Dioxide ppb																												June - July 2016	
		2015																												Reading	Site
Mean	2	3	4	5	6	8	9	10	11	12	13	14	15	16	17	18	19	22	23	24	25	26	27	28	29	32	36	0.4	-		
Minimum	NA	0.2	0.2	0.2	0.2	0.3	0.2	0.1	0.1	0.5	0.2	0.5	0.2	0.2	0.3	0.1	0.2	0.1	0.1	0.2	0.7	0.3	0.5	0.3	0.1	0.2	0.1	0.1	0.1	#23	
Maximum	NA	0.7	1.1	0.9	1.1	0.8	0.6	0.5	0.3	0.7	0.8	1.7	0.7	0.6	0.8	0.5	0.7	0.6	0.4	0.6	0.8	1.1	2.0	1.0	0.5	0.9	0.8	1.4	#36		



Lakeland Industry & Community Association SO₂ Passive Bubble Map

JUNE - JULY 2016

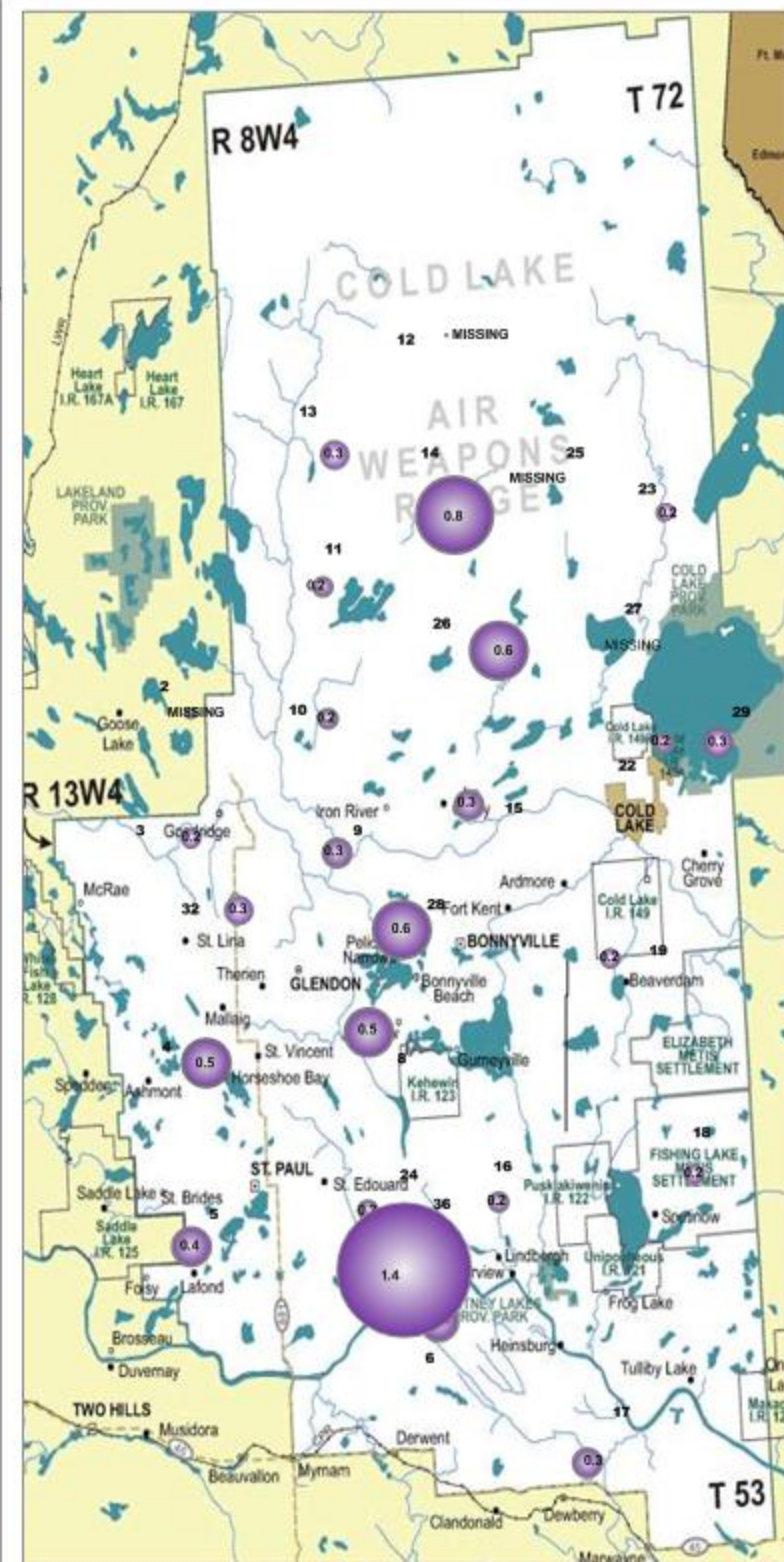
PASSIVE STATIONS

		DUPLICATE
2 – Sand River	MISSING	NA
3 – Therien	0.2 PPB	0.2 PPB
4 – Flat Lake	0.5 PPB	0.4 PPB
5 – Lake Eliza	0.4 PPB	NA
6 – Telegraph Creek	0.4 PPB	NA
8 – Muriel-Kehewin	0.5 PPB	NA
9 – Dupre	0.3 PPB	NA
10 – La Corey	0.2 PPB	NA
11 – Wolf Lake	0.2 PPB	NA
12 – Foster Creek	MISSING	NA
13 – Primrose	0.3 PPB	NA
14 – Maskwa	0.8 PPB	NA
15 – Ardmore	0.3 PPB	NA
16 – Frog Lake	0.2 PPB	NA
17 – Clear Range	0.3 PPB	NA
18 – Fishing Lake	0.2 PPB	NA
19 – Beaverdam	0.2 PPB	NA
22 – Cold Lake South	0.2 PPB	NA
23 – Medley-Martineau	0.1 PPB	NA
24 – Fort George	0.2 PPB	NA
25 – Burnt Lake	MISSING	NA
26 – Mahikan	0.6 PPB	NA
27 – Mahkeses	MISSING	NA
28 – Town of Bonnyville	0.6 PPB	NA
29 – Cold Lake South 2	0.3 PPB	NA
32 – St. Lina	0.3 PPB	NA
36 – Elk Point	1.5 PPB	1.3 PPB



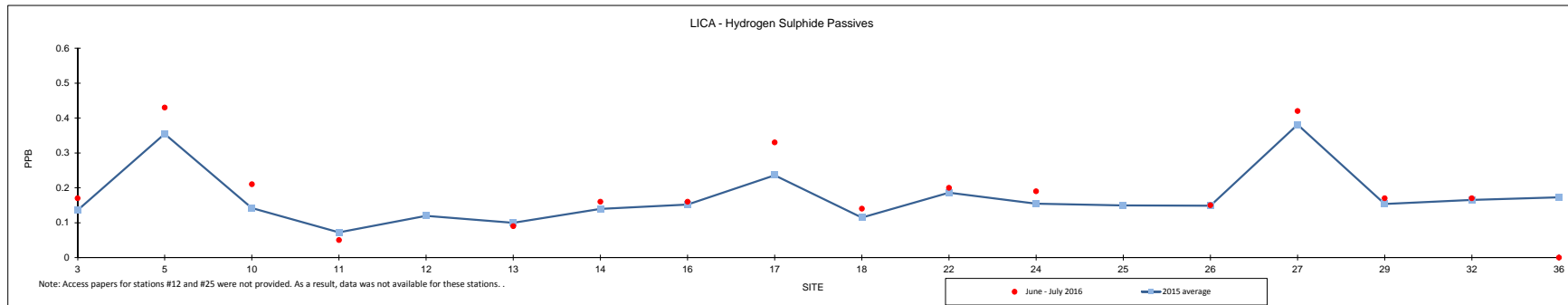
Summary

Minimum : 0.1 PPB – Medley-Martineau
 Maximum: 1.4 PPB – Elk Point (includes duplicate)
 Average: 0.4 PPB *Includes Duplicates



Passive Summary Results for June - July 2016
Lakeland Industry & Community Association

		Hydrogen Sulphide ppb																		June - July 2016	
		3	5	10	11	12	13	14	16	17	18	22	24	25	26	27	29	32	36	Reading	Site
Mean		0.14	0.36	0.14	0.07	0.12	0.10	0.14	0.15	0.24	0.12	0.19	0.16	0.15	0.15	0.38	0.15	0.17	0.17	0.20	-
Minimum		0.09	0.13	0.10	0.05	0.09	0.07	0.11	0.10	0.15	0.08	0.10	0.11	0.12	0.08	0.15	0.09	0.08	0.11	<0.02	#36
Maximum		0.22	0.86	0.20	0.10	0.15	0.14	0.19	0.22	0.46	0.15	0.43	0.25	0.18	0.24	0.87	0.27	0.30	0.28	0.43	#5

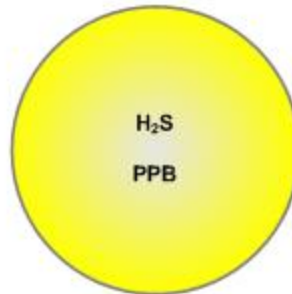


Lakeland Industry & Community Association H₂S Passive Bubble Map

JUNE - JULY 2016

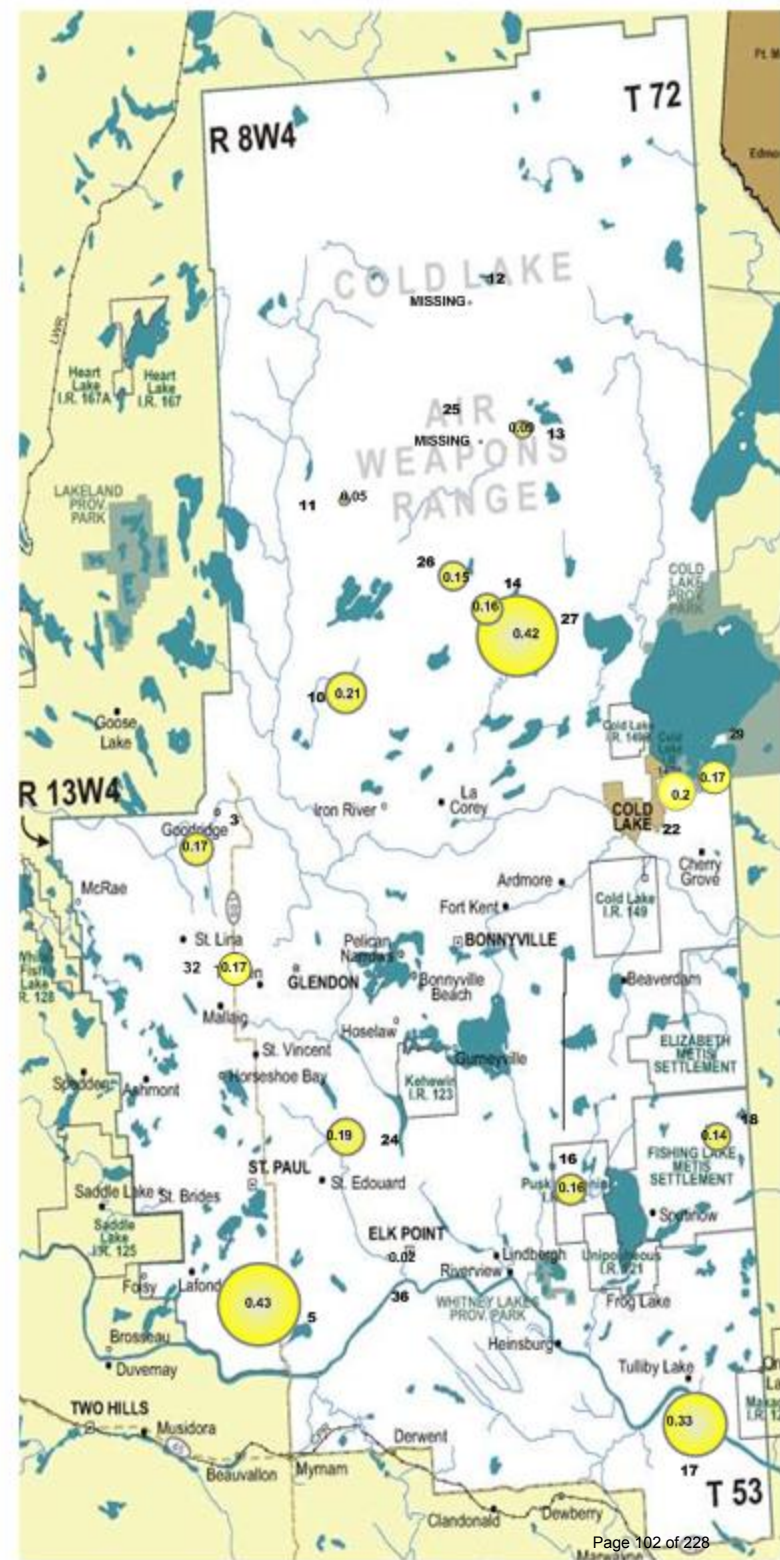
PASSIVE STATIONS

Station	Reading	Duplicate
3 - Therien	0.17 PPB	NA
5 - Lake Eliza	0.39 PPB	0.46 PPB
10 - La Corey	0.21 PPB	NA
11 - Wolf Lake	0.05 PPB	NA
12 - Foster Creek	MISSING	NA
13 - Primrose	0.09 PPB	NA
14 - Maskwa	0.16 PPB	NA
16 - Frog Lake	0.16 PPB	NA
17 - Clear Range	0.33 PPB	NA
18 - Fishing Lake	0.14 PPB	NA
22 - Cold Lake South	0.20 PPB	NA
24 - Fort George	0.19 PPB	NA
25 - Burnt Lake	MISSING	NA
26 - Mahihkan	0.15 PPB	NA
27 - Mahkeses	0.42 PPB	NA
29 - Cold Lake South 2	0.17 PPB	NA
32 - St. Lina	0.17 PPB	NA
36 - Elk Point	<0.02 PPB	NA



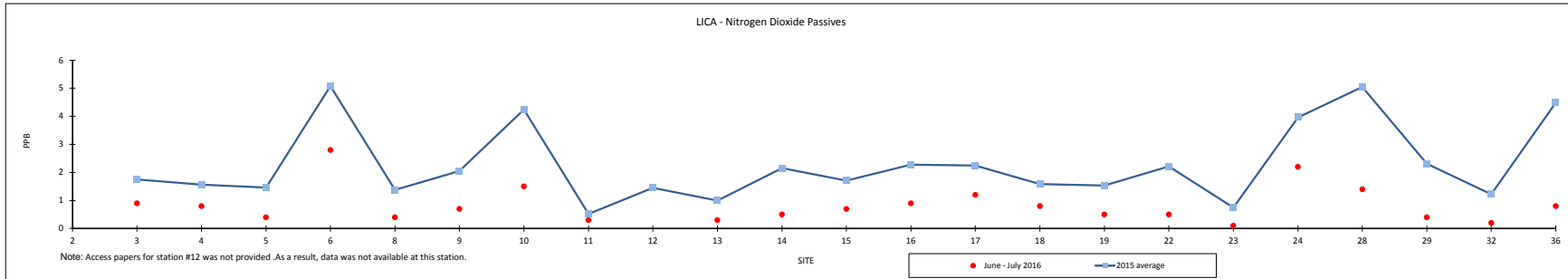
Summary

Minimum : < 0.02 PPB - Elk Point
 Maximum: 0.43 PPB - Lake Eliza (includes duplicate)
 Average: 0.20 PPB



Passive Summary Results for June - July 2016
Lakeland Industry & Community Association

		Nitrogen Dioxide ppb																				June - July 2016				
		2015																				Reading	Site			
Mean	2	3	4	5	6	8	9	10	11	12	13	14	15	16	17	18	19	22	23	24	28	29	32	36	0.8	-
	NA	1.8	1.6	1.5	5.1	1.4	2.1	4.2	0.5	1.5	1.0	2.2	1.7	2.3	2.3	1.6	1.5	2.2	0.8	4.0	5.1	2.3	1.2	4.5		
Minimum	NA	0.7	0.7	0.5	3.2	0.6	0.9	2.0	0.3	1.4	0.4	0.5	0.6	0.6	1.0	0.7	0.5	0.6	0.1	1.8	1.4	0.5	0.2	1.5	0.1	#23
Maximum	NA	4.5	3.5	3.8	8.8	4.0	4.8	9.0	0.8	1.5	2.1	5.1	3.5	4.8	3.4	3.7	3.8	7.0	1.9	7.3	10.7	6.0	4.0	11.2	2.8	#6

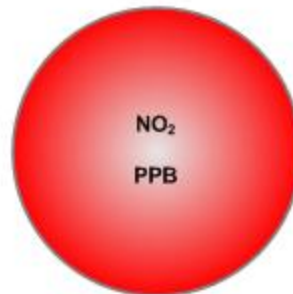


Lakeland Industry & Community Association NO₂ Passive Bubble Map

JUNE – JULY 2016

PASSIVE STATIONS

		DUPLICATE
2 – Sand River	MISSING	NA
3 – Therien	0.9 PPB	NA
4 – Flat Lake	0.8 PPB	NA
5 – Lake Eliza	0.4 PPB	NA
6 – Telegraph Creek	2.8 PPB	NA
8 – Muriel-Kehewin	0.4 PPB	NA
9 – Dupre	0.7 PPB	NA
10 – La Corey	1.5 PPB	NA
11 – Wolf Lake	0.3 PPB	NA
12 – Foster Creek	MISSING	NA
13 – Primrose	0.3 PPB	NA
14 – Maskwa	0.5 PPB	NA
15 – Ardmore	0.7 PPB	NA
16 – Frog Lake	0.9 PPB	NA
17 – Clear Range	1.2 PPB	NA
18 – Fishing Lake	0.8 PPB	NA
19 – Beaverdam	0.5 PPB	NA
22 – Cold Lake South	0.5 PPB	NA
23 – Medley-Martineau	0.1 PPB	NA
24 – Fort George	2.0 PPB	2.3 PPB
28 – Town of Bonnyville	1.3 PPB	1.4 PPB
29 – Cold Lake South 2	0.4 PPB	NA
32 – St. Lina	0.2 PPB	NA
36 – Elk Point	0.8 PPB	NA



Summary

Minimum : 0.1 PPB – Medley-Martineau

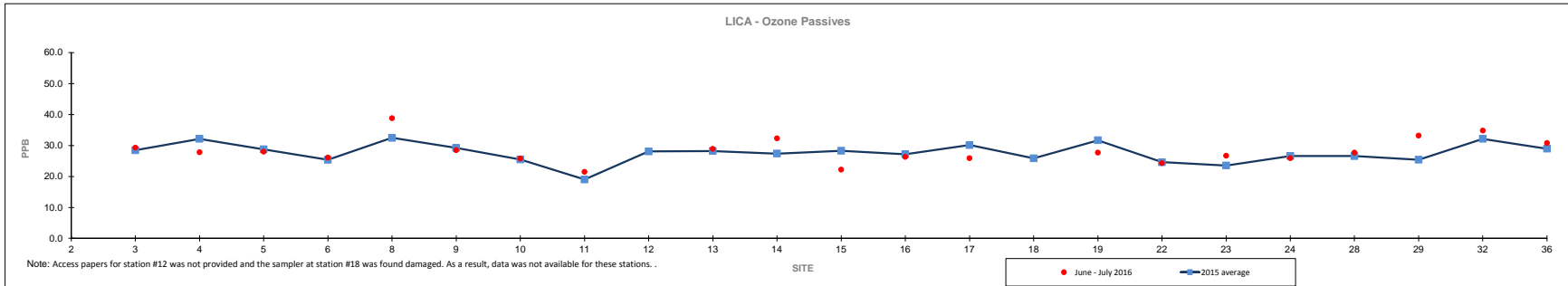
Maximum: 2.8 PPB – Telegraph Creek

Average: 0.8 PPB *Includes Duplicates



Passive Summary Results for June - July 2016
Lakeland Industry & Community Association

	Ozone ppb																												June - July 2016	
	2	3	4	5	6	8	9	10	11	12	13	14	15	16	17	18	19	22	23	24	28	29	32	36	Reading	Site				
Mean	NA	28.5	32.2	28.8	25.4	32.5	29.2	25.5	19.0	28.1	28.2	27.4	28.3	27.2	30.1	25.9	31.7	24.6	23.6	26.6	26.6	25.4	32.2	29.0	28.21	-				
Minimum	NA	21.1	24.8	20.5	17.3	25.5	18.4	16.6	14.5	28.1	20.4	20.3	18.2	19.2	20.6	16.3	24.6	18.7	15.0	17.6	17.7	19.0	24.4	18.6	21.50	#11				
Maximum	NA	36.5	39.1	36.3	35.3	42.3	40.1	35.6	22.9	28.1	37.2	33.5	39.3	42.4	42.2	36.9	36.8	29.5	31.9	34.0	40.5	33.0	42.2	37.6	38.80	#8				

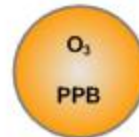


Lakeland Industry & Community Association O₃ Passive Bubble Map

JUNE - JULY 2016

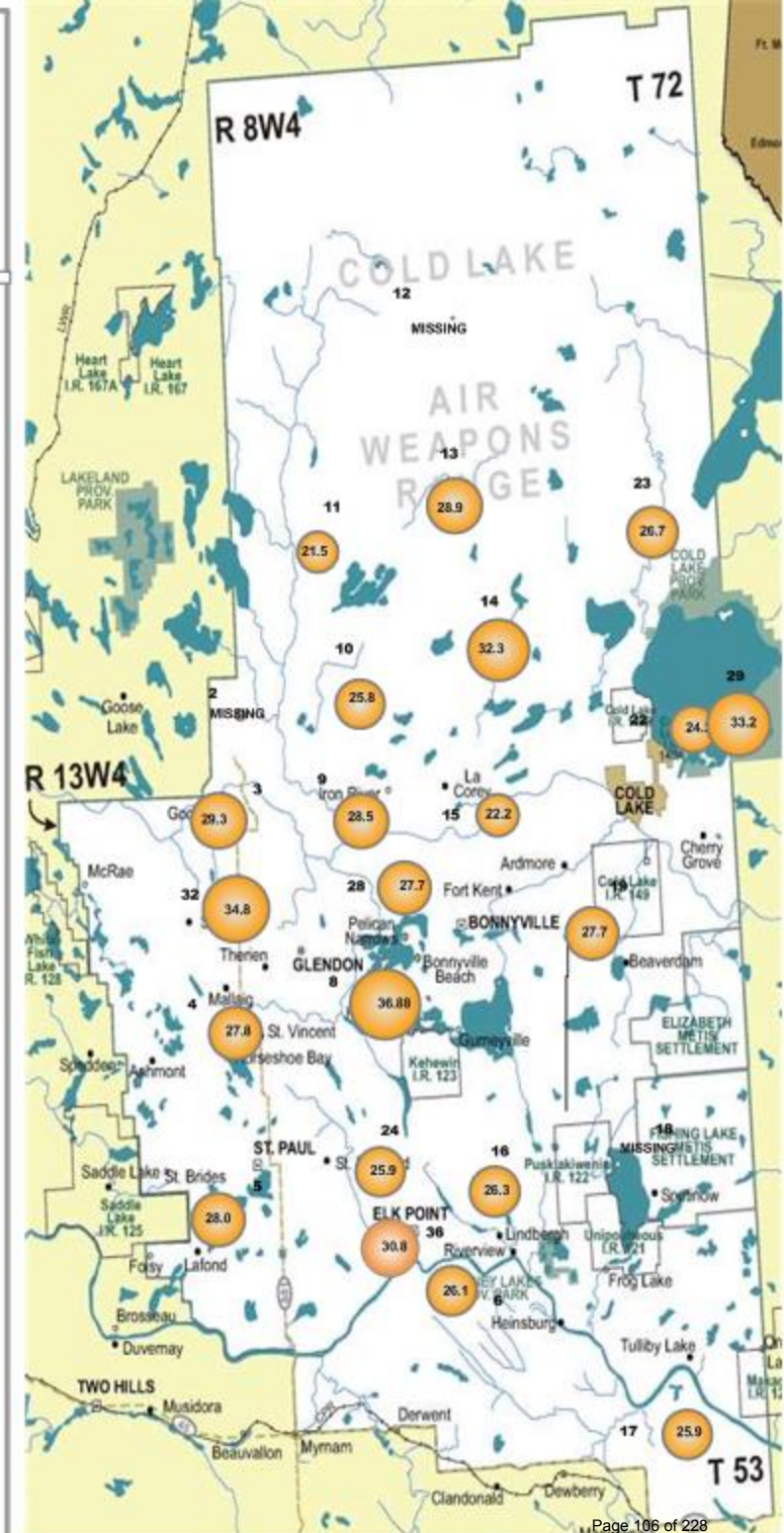
PASSIVE STATIONS

		DUPLICATE
2 – Sand River	MISSING	NA
3 – Therien	29.3 PPB	NA
4 – Flat Lake	27.8 PPB	NA
5 – Lake Eliza	28.0 PPB	NA
6 – Telegraph Creek	26.1 PPB	NA
8 – Muriel-Kehewin	38.8 PPB	NA
9 – Dupre	28.5 PPB	NA
10 – La Corey	25.8 PPB	NA
11 – Wolf Lake	21.5 PPB	NA
12 – Foster Creek	MISSING	NA
13 – Primrose	28.9 PPB	NA
14 – Maskwa	32.3 PPB	NA
15 – Ardmore	22.2 PPB	NA
16 – Frog Lake	26.3 PPB	NA
17 – Clear Range	25.9 PPB	NA
18 – Fishing Lake	MISSING	NA
19 – Beaverdam	27.7 PPB	NA
22 – Cold Lake South	24.3 PPB	NA
23 – Medley-Martineau	26.7 PPB	NA
24 – Fort George	24.8 PPB	26.9 PPB
28 – Town of Bonnyville	28.8 PPB	26.6 PPB
29 – Cold Lake South 2	33.2 PPB	NA
32 – St. Lina	34.8 PPB	NA
36 – Elk Point	30.8 PPB	NA



Summary

Minimum : 21.5 PPB – Wolf Lake
 Maximum: 38.8 PPB – Muriel-Kehewin
 Average: 28.21 PPB *Includes Duplicates



VOC RESULTS

Maxxam Analytics

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6167
 Location: Cold Lake South Canister ID: H 2825
 Station ID: LICA 01 Installation Date/Time (mst): June 30, 2016 @ 13:21
 Sample ID: LICA/VOC/CLS/July 5, 2016 Removal Date/Time (mst): July 8, 2016 @ 12:16

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>July 5, 2016</u>	<u>00:00</u>	<u>00:00 July 6, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>- 28.0</u>	<u>+ 23.3</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>6.52</u>	<u>24</u>

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) = - @ - mst
 Final leak check deployment vacuum (in. Hg) = - @ - mst
 Total leak rate = - psi over - minutes
 Timer reset to zero prior to sampling? YES (yes/no)
 Date of last flow calibration: June 7, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: May 3, 2016 (due every 6 months)

****Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required****

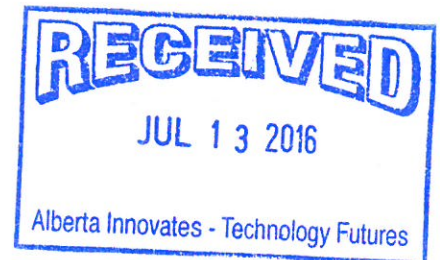
Comments: Date of last audit : June 1, 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: July 8, 2016

Sample ID: 16070132-003

Customer ID: LICA
 Cust Samp ID: LICA/VOC/CLS/July 5, 2016



Volatile Organics Data Results

Date: July 5, 2016
Canister ID: H2825

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.01
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	< 0.02
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	< 0.01
2,2-Dimethylbutane	< 0.01
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	< 0.02
2,4-Dimethylpentane	< 0.01
2-Methylheptane	< 0.01
2-Methylhexane	< 0.01
2-Methylpentane	< 0.01
3-Methylheptane	< 0.02
3-Methylhexane	< 0.02
3-Methylpentane	< 0.01
Acetone	5.7
Acrolein	< 0.3
Benzene	< 0.01
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	1.56
Carbon tetrachloride	0.09
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.02
Chloromethane	0.75
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	< 0.02
cis-2-Pentene	< 0.02
Cyclohexane	< 0.02
Cyclopentane	< 0.01
Dibromochloromethane	< 0.01
Ethanol	2.0
Ethyl acetate	< 0.4
Ethylbenzene	< 0.01
Freon-11	0.29
Freon-113	0.08

Volatile Organics Data Results

Date: July 5, 2016
Canister ID: H2825

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.02
Freon-12	0.57
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.41
Isopentane	0.25
Isoprene	0.26
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	< 0.03
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	0.4
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	< 0.01
Methylcyclopentane	< 0.02
Methylene chloride	< 0.3
n-Butane	0.08
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	< 0.01
n-Hexane	< 0.01
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	< 0.1
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	< 0.01
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.01
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	< 0.01
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Maxxam Analytics

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6167
 Location: Cold Lake South Canister ID: H3300
 Station ID: LICA 01 Installation Date/Time (mst): July 8, 2016 @ 12:16
 Sample ID: LICA/VOC/CLS/July 11, 2016 Removal Date/Time (mst): July 13, 2016 @ 09:45

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>July 11, 2016</u>	<u>00:00</u>	<u>00:00 July 12, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-28.0</u>	<u>+24.0</u>

Flow Settings		
Flow Reading (scm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>6.52</u>	<u>24</u>

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) = - @ - mst
 Final leak check deployment vacuum (in. Hg) = - @ - mst
 Total leak rate = - psi over - minutes
 Timer reset to zero prior to sampling? _____ (yes/no)
 Date of last flow calibration: June 1, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: May 3, 2016 (due every 6 months)

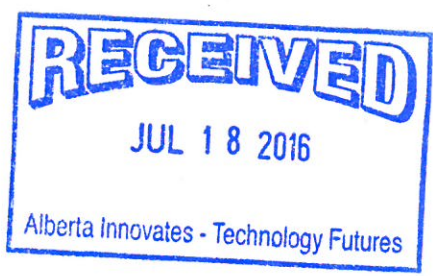
****Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required****

Comments: Date of last audit : June 1, 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: July 13, 2016

Sample ID: 16070204-003
Customer ID: LICA
Cust Samp ID: LICA/VOC/CLS/JULY 11, 2016



Volatile Organics Data Results

Date: July 11, 2016
Canister ID: H3300

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.01
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.24
1-Hexene	< 0.02
1-Pentene	0.01
2,2,4-Trimethylpentane	0.03
2,2-Dimethylbutane	< 0.01
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	0.04
2,4-Dimethylpentane	0.01
2-Methylheptane	0.01
2-Methylhexane	< 0.01
2-Methylpentane	0.06
3-Methylheptane	< 0.02
3-Methylhexane	0.11
3-Methylpentane	0.01
Acetone	3.9
Acrolein	0.3
Benzene	< 0.01
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	0.01
Carbon disulfide	0.06
Carbon tetrachloride	0.10
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.02
Chloromethane	0.55
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	< 0.02
cis-2-Pentene	< 0.02
Cyclohexane	< 0.02
Cyclopentane	< 0.01
Dibromochloromethane	< 0.01
Ethanol	2.5
Ethyl acetate	< 0.4
Ethylbenzene	< 0.01
Freon-11	0.23
Freon-113	0.05

Volatile Organics Data Results

Date: July 11, 2016
Canister ID: H3300

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.42
Hexachloro-1,3-butadiene	< 0.50
Isobutane	2.71
Isopentane	0.35
Isoprene	0.79
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	< 0.03
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	0.7
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.12
Methylcyclopentane	< 0.02
Methylene chloride	< 0.3
n-Butane	0.49
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.19
n-Hexane	0.02
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	< 0.1
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	0.01
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.05
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	< 0.01
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Maxxam Analytics

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6167
 Location: Cold Lake South Canister ID: 2521
 Station ID: LICA 01 Installation Date/Time (mst): July 13, 2016 @ 09:45
 Sample ID: LICA/VOC/CLS/July 17, 2016 Removal Date/Time (mst): July 18, 2016 @ 08:38

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>July 17, 2016</u>	<u>00:00</u>	<u>00:00 July 18, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-28.0</u>	<u>+23.8</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>6.52</u>	<u>24</u>

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) = — @ — mst
 Final leak check deployment vacuum (in. Hg) = — @ — mst
 Total leak rate = — psi over — minutes
 Timer reset to zero prior to sampling? YES (yes/no)
 Date of last flow calibration: June 1, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: May 3, 2016 (due every 6 months)

****Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required****

Comments: Date of last audit: June 1 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: July 18, 2016

Sample ID: 16070251-001

Customer ID: LICA
 Cust Samp ID: LICA/VOC/CLS/July 17, 2016



Volatile Organics Data Results

Date: July 17, 2016
Canister ID: 2521

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.01
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.20
1-Hexene	< 0.02
1-Pentene	0.01
2,2,4-Trimethylpentane	0.02
2,2-Dimethylbutane	< 0.01
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	< 0.02
2,4-Dimethylpentane	< 0.01
2-Methylheptane	< 0.01
2-Methylhexane	0.02
2-Methylpentane	0.05
3-Methylheptane	< 0.02
3-Methylhexane	< 0.02
3-Methylpentane	0.02
Acetone	1.9
Acrolein	< 0.3
Benzene	0.08
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	0.03
Carbon tetrachloride	0.09
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.03
Chloromethane	0.69
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	< 0.02
cis-2-Pentene	< 0.02
Cyclohexane	< 0.02
Cyclopentane	< 0.01
Dibromochloromethane	< 0.01
Ethanol	0.7
Ethyl acetate	< 0.4
Ethylbenzene	< 0.01
Freon-11	0.21
Freon-113	0.05

Volatile Organics Data Results

Date: July 17, 2016
 Canister ID: 2521

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.43
Hexachloro-1,3-butadiene	< 0.50
Isobutane	1.23
Isopentane	0.19
Isoprene	1.22
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	< 0.03
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	0.4
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.01
Methylcyclopentane	0.02
Methylene chloride	< 0.3
n-Butane	0.50
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.01
n-Hexane	0.03
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	< 0.1
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	< 0.01
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.06
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.02
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Maxxam Analytics

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6167
 Location: Cold Lake South Canister ID: 1688
 Station ID: LICA 01 Installation Date/Time (mst): July 18, 2016 @ 09:38
 Sample ID: LICA/VOC/CLS/July 23, 2016 Removal Date/Time (mst): July 26, 2016 @ 10:24

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>July 23, 2016</u>	<u>00:00</u>	<u>00:00</u> <u>July 24, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.2</u>	<u>+23.5</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>6.52</u>	<u>24.</u>

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) = - @ - mst
 Final leak check deployment vacuum (in. Hg) = - @ - mst
 Total leak rate = - psi over - minutes
 Timer reset to zero prior to sampling? YES (yes/no)
 Date of last flow calibration: June 1, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: May 3, 2016 (due every 6 months)

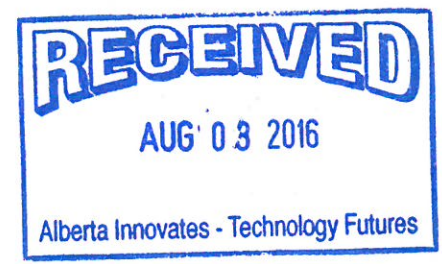
Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required

Comments: Date of last audit : June 1, 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: July 26, 2016

Sample ID: 16080015-003
Customer ID: LICA
Cust Samp ID: LICA/VOC/CLS/July 23, 2016



Volatile Organics Data Results

Date: July 23, 2016
Canister ID: 1686

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.01
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	< 0.02
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	0.01
2,2-Dimethylbutane	< 0.01
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	< 0.02
2,4-Dimethylpentane	< 0.01
2-Methylheptane	< 0.01
2-Methylhexane	< 0.01
2-Methylpentane	0.02
3-Methylheptane	< 0.02
3-Methylhexane	< 0.02
3-Methylpentane	0.01
Acetone	2.7
Acrolein	< 0.3
Benzene	< 0.01
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	0.02
Carbon tetrachloride	0.11
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	< 0.02
Chloromethane	< 0.02
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	< 0.02
cis-2-Pentene	< 0.02
Cyclohexane	0.05
Cyclopentane	< 0.01
Dibromochloromethane	< 0.01
Ethanol	0.8
Ethyl acetate	< 0.4
Ethylbenzene	< 0.01
Freon-11	0.24
Freon-113	0.05

Volatile Organics Data Results

Date: July 23, 2016
Canister ID: 1686

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	< 0.02
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.03
Isopentane	0.09
Isoprene	0.61
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	< 0.03
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.05
Methylcyclopentane	0.03
Methylene chloride	< 0.3
n-Butane	< 0.03
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.01
n-Hexane	< 0.01
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	< 0.1
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	< 0.01
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.03
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	< 0.01
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Maxxam Analytics

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6167
 Location: Cold Lake South Canister ID: 2443
 Station ID: LICA 01 Installation Date/Time (mst): July 26, 2016 @ 10:24
 Sample ID: LICA/VOC/CLS/July 29, 2016 Removal Date/Time (mst): Aug 2, 2016 @ 08:51

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>July 29, 2016</u>	<u>00:00</u>	<u>00:00</u> <u>July 30, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.2</u>	<u>+23.6</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>6.52</u>	<u>24</u>

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) = - @ - mst
 Final leak check deployment vacuum (in. Hg) = - @ - mst
 Total leak rate = - psi over - minutes
 Timer reset to zero prior to sampling? YES (yes/no)
 Date of last flow calibration: June 1, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: May 3, 2016 (due every 6 months)

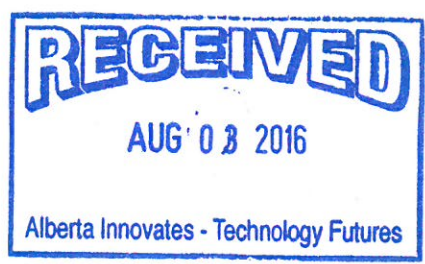
Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required

Comments: Date of last audit : June 1, 2016

There is no a pressure gauge on the canister. The data was taken from the sampler pressure gauge

Deployment Technician Signature: Alex Yakupov
 Collection Technician Signature: Alex Yakupov Date: Aug 2, 2016

Sample ID: 16080015-005
Customer ID: LICA
Cust Samp ID: LICA/VOC/CLS/July 29, 2016



Volatile Organics Data Results

Date: July 29, 2016
Canister ID: 2443

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	< 0.01
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.10
1-Hexene	< 0.02
1-Pentene	0.02
2,2,4-Trimethylpentane	0.01
2,2-Dimethylbutane	< 0.01
2,3,4-Trimethylpentane	0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	< 0.02
2,4-Dimethylpentane	< 0.01
2-Methylheptane	< 0.01
2-Methylhexane	< 0.01
2-Methylpentane	0.06
3-Methylheptane	< 0.02
3-Methylhexane	< 0.02
3-Methylpentane	0.03
Acetone	5.4
Acrolein	< 0.3
Benzene	0.02
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	0.01
Carbon disulfide	3.36
Carbon tetrachloride	0.08
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.02
Chloromethane	0.71
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	< 0.02
cis-2-Pentene	< 0.02
Cyclohexane	0.03
Cyclopentane	< 0.01
Dibromochloromethane	< 0.01
Ethanol	1.4
Ethyl acetate	< 0.4
Ethylbenzene	0.03
Freon-11	0.24
Freon-113	0.07

Volatile Organics Data Results

Date: July 29, 2016
Canister ID: 2443

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.54
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.29
Isopentane	0.23
Isoprene	1.71
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	0.04
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	0.8
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.05
Methylcyclopentane	0.04
Methylene chloride	< 0.3
n-Butane	0.26
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.02
n-Hexane	0.04
n-Nonane	0.02
n-Octane	< 0.02
n-Pentane	0.1
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	0.8
o-Ethyltoluene	0.01
o-Xylene	0.02
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.09
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.02
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

PAH RESULTS

Sample ID: 16070132-004

Customer ID: LICA

Cust Samp ID: LICA/PUF/CLS/July 5, 2016

Priority: Normal

ISCH PUF PLUS Sample Collection Data Sheet

Client:	<u>LICA</u>	Puf+ S/N:	<u>A13-02</u>
Location:	<u>Cold Lake South</u>	Motor S/N:	<u>1138/100-1020</u>
Station ID:	<u>LICA 01</u>	Installation Date/Time:	<u>June 30, 2016/13:15</u>
Field Sample ID:	<u>LICA/PUF/CLS/July 5, 2016</u>	Removal Date/Time:	<u>July 8, 2016/12:08</u>

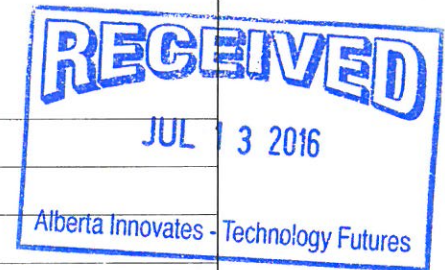
Sample Data Collection Information

Sample Date:	<u>July 5, 2016</u>	Average Pressure (mmHg)	<u>705</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q _{std})	<u>229</u>
End Time (mst):	<u>00:00 July 6, 2016</u>	Average Temperature (°C)	<u>15.0°</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (V _{std} m ³)	<u>330.19</u>

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average temperature appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average pressure appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Any error messages? (if yes list below)	YES	<input checked="" type="radio"/> NO
Sample duration 24 hours?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Date of last calibration/audit:	<u>June 1, 2016</u>	
Other observations?		



Deployed By:	<u>Alex Yakupov</u>	
Collected By:	<u>Alex Yakupov</u>	<u>Date July 8, 2016</u>

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: July 5, 2016
PUF S/N: A1302

PARAMETERS	CONCENTRATION (UG)
1-Methylnaphthalene	0.01
2-Methylnaphthalene	0.04
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.02
Acenaphthylene	< 0.01
Acridine	< 0.01
Anthracene	0.03
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	< 0.01
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	0.01
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.04
Fluorene	0.04
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.02
Perylene	< 0.01
Phenanthrene	0.16
Pyrene	0.03
Retene	0.02

TISCH PUF PLUS Sample Collection Data Sheet			
Client:	<u>LICA</u>	Puf+ S/N:	<u>TE-11</u>
Location:	<u>Cold Lake South</u>	Motor S/N:	<u>1138/100-1020</u>
Station ID:	<u>LICA 01</u>	Installation Date/Time:	<u>July 8, 2016/12:08</u>
Field Sample ID:	<u>LICA/PUF/CLS/July 11, 2016</u>	Removal Date/Time:	<u>July 13, 2016/09:39</u>
Sample Data Collection Information			
Sample Date:	<u>July 11, 2016</u>	Average Pressure (mmHg)	<u>704</u>
Start Time (mst):	<u>00:00 July 11, 2016</u>	Average Flow (Q _{std})	<u>229</u>
End Time (mst):	<u>00:00 July 12, 2016</u>	Average Temperature (°C)	<u>21.1°</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (Vstd m ³)	<u>330.21</u>
Sample Recovery Checklist			
(circle one)			
Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	<div style="border: 2px solid blue; padding: 10px; width: fit-content; margin: auto;"> <p style="font-size: 24px; font-weight: bold; margin: 0;">RECEIVED</p> <p style="font-size: 18px; margin: 0;">JUL 18 2016</p> <p style="font-size: 12px; margin: 0;">Alberta Innovates - Technology Futures</p> </div>
Average temperature appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Average pressure appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Any error messages? (if yes list below)	<input type="radio"/> YES	<input checked="" type="radio"/> NO	
Sample duration 24 hours?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Date of last calibration/audit:	<u>June 1, 2016</u>		
Other observations?	<u>n/a</u>		
Deployed By: <u>Alex Yakupov</u>			Sample ID: 16070204-004
Collected By: <u>Alex Yakupov</u>			Customer ID: <u>LICA</u>
Date: <u>July 13, 2016</u>			Cust Samp ID: <u>LICA/PUF/CLS/JULY 11, 2016</u>

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: July 11, 2016
PUF S/N: TE11

PARAMETERS	CONCENTRATION (UG)
1-Methylnaphthalene	0.05
2-Methylnaphthalene	0.08
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.05
Acenaphthylene	< 0.01
Acridine	< 0.01
Anthracene	0.02
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	< 0.01
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	< 0.01
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.06
Fluorene	0.09
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.03
Perylene	< 0.01
Phenanthrene	0.24
Pyrene	0.05
Retene	0.08

Sample ID: 16070251-002

AIR FCD-01321/2

Customer ID: LICA

Cust Samp ID: LICA/PUF/CLS/July 17, 2016

TISCH PUF PLUS Sample Collection Data Sheet

Client:	<u>LICA</u>	Puf+ S/N:	<u>P13-01</u>
Location:	<u>Cold Lake South</u>	Motor S/N:	<u>1138/100 - 1020</u>
Station ID:	<u>LICA 01</u>	Installation Date/Time:	<u>July 13, 2016/09:39</u>
Field Sample ID:	<u>LICA/PUF/CLS/July 17, 2016</u>	Removal Date/Time:	<u>July 18, 2016/08:52</u>

Sample Data Collection Information

Sample Date:	<u>July 17, 2016</u>	Average Pressure (mmHg)	<u>711</u>
Start Time (mst):	<u>00:00 July 17, 2016</u>	Average Flow (Q _{std})	<u>229</u>
End Time (mst):	<u>00:00 July 18, 2016</u>	Average Temperature (°C)	<u>20.2</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (V _{std} m ³)	<u>330.20</u>

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average temperature appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average pressure appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Any error messages? (if yes list below)	<input type="radio"/> YES	<input checked="" type="radio"/> NO
Sample duration 24 hours?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Date of last calibration/audit:	<u>June 1, 2016</u>	
Other observations?		



Deployed By:	<u>Alex Yakupov</u>	
Collected By:	<u>Alex Yakupov</u>	<u>Date: July 18, 2016</u>

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: July 17, 2016
PUF S/N: P1301

PARAMETERS	CONCENTRATION (UG)
1-Methylnaphthalene	0.07
2-Methylnaphthalene	0.12
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.09
Acenaphthylene	< 0.01
Acridine	< 0.01
Anthracene	0.02
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	< 0.01
Benzo(c)phenanthrene	0.02
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	< 0.01
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.06
Fluorene	0.11
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.06
Perylene	< 0.01
Phenanthrene	0.32
Pyrene	0.05
Retene	0.09

Sample ID: 16080015-004

Customer ID: LICA

Cust Samp ID: LICA/PUF/CLS/July 23, 2016

SCH PUF PLUS Sample Collection Data Sheet

Client:	<u>LICA</u>	Puf+ S/N:	<u>TE-01</u>
Location:	<u>Cold Lake South</u>	Motor S/N:	<u>1138/100-1020</u>
Station ID:	<u>LICA 01</u>	Installation Date/Time:	<u>July 18, 2016/08:52</u>
Field Sample ID:	<u>LICA/PUF/CLS/July 23, 2016</u>	Removal Date/Time:	<u>July 26, 2016/10:18</u>

Sample Data Collection Information

Sample Date:	<u>July 23, 2016</u>	Average Pressure (mmHg)	<u>708</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q _{std})	<u>229</u>
End Time (mst):	<u>00:00 July 24, 2016</u>	Average Temperature (°C)	<u>19.6</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (V _{std} m ³)	<u>330.22</u>

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average temperature appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average pressure appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Any error messages? (if yes list below)	<input type="radio"/> YES	<input checked="" type="radio"/> NO
Sample duration 24 hours?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Date of last calibration/audit:	<u>June 1, 2016</u>	
Other observations?	<u>n/a</u>	



Deployed By:	<u>Alex Yakupov</u>	
Collected By:	<u>Alex Yakupov</u>	<u>Date July 26, 2016</u>

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: July 23, 2016
PUF S/N: TE01

PARAMETERS	CONCENTRATION (UG)
1-Methylnaphthalene	0.03
2-Methylnaphthalene	0.05
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.04
Acenaphthylene	< 0.01
Acridine	< 0.01
Anthracene	0.01
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	< 0.01
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	< 0.01
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.05
Fluorene	0.06
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.02
Perylene	0.02
Phenanthrene	0.17
Pyrene	0.04
Retene	0.07

Sample ID: 16080015-006

Customer ID: LICA

Cust Samp ID: LICA/PUF/CLS/July 29, 2016

TISCH PUF PLUS Sample Collection Data Sheet

Client: LICA Puff S/N: TE-07
Location: Cold Lake South Motor S/N: 1138/100-1020
Station ID: LICA 01 Installation Date/Time: July 26, 2016/10:18
Field Sample ID: LICA/PUF/CLS/July 29, 2016 Removal Date/Time: Aug 2, 2016/09:02

Sample Data Collection Information

Sample Date: July 29, 2016 Average Pressure (mmHg) 709
Start Time (mst): 00:00 Average Flow (Q_{std}) 229
End Time (mst): 00:00 July 30, 2016 Average Temperature (°C) 22.2°
Elapsed Time (Hours): 24.0 Volume (V_{std} m³) 330.20

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ? YES NO
Average temperature appears correct? YES NO
Average pressure appears correct? YES NO
Any error messages? (if yes list below) YES NO
Sample duration 24 hours? YES NO
Date of last calibration/audit: June 1, 2016
Other observations?



Deployed By: Alex Yakupov
Collected By: Alex Yakupov Date: Aug 2, 2016

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: July 29, 2016
PUF S/N: TE07

PARAMETERS	CONCENTRATION (UG)
1-Methylnaphthalene	0.11
2-Methylnaphthalene	0.18
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.06
Acenaphthylene	< 0.01
Acridine	< 0.01
Anthracene	0.02
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	< 0.01
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	< 0.01
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.06
Fluorene	0.10
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.05
Perylene	0.02
Phenanthrene	0.26
Pyrene	0.05
Retene	0.07

PARTISOL RESULTS

Partisol Sample Data Sheet

Date Sampled: July 5, 2016
 Location: Cold Lake South
 Parameter: TSP PM10 **PM2.5**
 Filter #: P 602 44 03

PM2.5

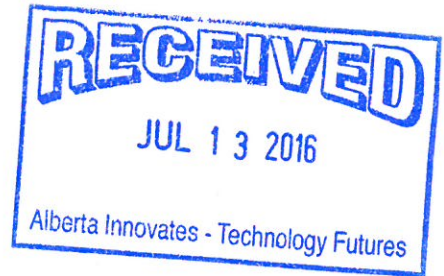
Start Time 00:00 July 5, 2016
 End Time 00:00 July 6, 2016
 Status OK
 Std Vol 23.300
 Valid Time 24:00
 Total Time 24.0

Sample ID: 16070131-001

Customer ID: LICA

Cust Samp ID: LICA Fit # P6024403

Priority: Normal



Comments: Weather Conditions, etc.

Sample inlet head cleaned on April 29, 2016
Date of last calibration: April 8, 2016

Technician Signature: Alex Yakupov

Date: July 8, 2016
 Time: 12:41

Programming

- 1) Make sure system is in "Stop Mode"
- 2) "ESC" to Time Screen then "Program"
- 3) Enter Beg 1 0:00
- 4) Enter Dur 24:00:00
- 5) Enter Beg D dd-Aug
- 6) Enter End D dd-Aug
- 7) "Stop/Run"

Note: Beginning & End
 Date should be same date

Sample ID: 16070203-001

AIR FCD-01318/2

Customer ID: LICA

Partisol Sample Data Sheet

Cust Samp ID: Flt # P6024402

Priority: Normal

Date Sampled: July 11, 2016

Location: Cold Lake South

Parameter: TSP PM10

PM2.5

Filter #: P 602 44 02

Start Time 00:00 July 11, 2016

End Time 00:00 July 12, 2016

Status OK

Std Vol 22.797

Valid Time 24:00

Total Time 24.0



Comments: Weather Conditions, etc.

n/a

Sample inlet head cleaned on July 8, 2016

Date of last calibration: July 8, 2016

Technician Signature: Alex Yakupov

Date: July 13, 2016

Time: 10:02

Programming

- 1) Make sure system is in "Stop Mode"
- 2) "ESC" to Time Screen then "Program"
- 3) Enter Beg 1 0:00
- 4) Enter Dur 24:00:00
- 5) Enter Beg D dd-Aug
- 6) Enter End D dd-Aug
- 7) "Stop/Run"

Note: Beginning & End Date should be same date

Sample ID: 16070250-001

AIR FCD-01318/2

Customer ID: LICA

Cust Samp ID: Flt #P6024411

Partisol Sample Data Sheet

Priority: Normal

Date Sampled: July 17, 2016

Location: Cold Lake South

Parameter: TSP PM10

PM2.5

Filter #: P602 44 11

Start Time 00:00 July 17, 2016

End Time 00:00 July 18, 2016

Status OK

Std Vol 23.113

Valid Time 24:00

Total Time 24.0



Comments: Weather Conditions, etc.

Sample inlet head cleaned on July 8, 2016
Date of last calibration: July 8, 2016

Technician Signature: Alex Yakupov
Date: July 18, 2016
Time: 09:06

- Programming
- 1) Make sure system is in "Stop Mode"
 - 2) "ESC" to Time Screen then "Program"
 - 3) Enter Beg 1 0:00
 - 4) Enter Dur 24:00:00
 - 5) Enter Beg D dd-Aug
 - 6) Enter End D dd-Aug
 - 7) "Stop/Run"

Note: Beginning & End Date should be same date

Sample ID: 16080014-001

AIR FCD-01318/2

Customer ID: LICA

Partisol Sample Data Sheet

Cust Samp ID: Flt # P6024412

Priority: Normal

Date Sampled: July 23, 2016

Location: Cold Lake South

Parameter: TSP PM10

PM2.5

Filter #: P602 44 12

Start Time 00:00 July 23, 2016

End Time 00:00 July 24, 2016

Status OK

Std Vol 23.054

Valid Time 24:00

Total Time 24.0



Comments: Weather Conditions, etc.

Sample inlet head cleaned on July 8, 2016
Date of last calibration: July 8, 2016

Technician Signature: Alex Yakupov
Date: July 26, 2016
Time: 10:45

Programming

- 1) Make sure system is in "Stop Mode"
- 2) "ESC" to Time Screen then "Program"
- 3) Enter Beg 1 0:00
- 4) Enter Dur 24:00:00
- 5) Enter Beg D dd-Aug
- 6) Enter End D dd-Aug
- 7) "Stop/Run"

Note: Beginning & End Date should be same date

Sample ID: 16080014-002

Customer ID: LICA

AIR FCD-01318/2

Cust Samp ID: Flt # P6024413

Partisol Sample Data Sheet

Priority: Normal

Date Sampled: July 29, 2016

Location: Cold Lake South

Parameter: TSP PM10

PM2.5

Filter #: P6024413

Start Time 00:00 July 29, 2016

End Time 00:00 July 30, 2016

Status OK

Std Vol 22.952

Valid Time 24:00

Total Time 24.0



Comments: Weather Conditions, etc.

Sample inlet head cleaned on July 8, 2016
Date of last calibration: July 8, 2016

Technician Signature: Alex Yakupov

Date: Aug 2, 2016

Time: 09:12

Programming

- 1) Make sure system is in "Stop Mode"
- 2) "ESC" to Time Screen then "Program"
- 3) Enter Beg 1 0:00
- 4) Enter Dur 24:00:00
- 5) Enter Beg D dd-Aug
- 6) Enter End D dd-Aug
- 7) "Stop/Run"

Note: Beginning & End Date should be same date

Partisol Sampler Results

Date	Filter NO.	Concentration (mg)
July 5	P6024403	0.037
July 11	P6024402	0.097
July 17	P6024411	0.310
July 23	P6024412	0.068
July 29	P6024413	0.069

APPENDIX III
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE



Thermo 43i Sulphur Dioxide Analyzer Calibration

Date: July 7, 2016	Barometric Pressure: 0.934 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Cold Lake South	Weather Conditions: A few clouds
Parameter: Sulphur Dioxide	Calibration Purpose: routine monthly
Start Time 24 hr. (mst): 8:53	Performed By/Reviewer: Alex Yakupov Tom Bourque
End Time 24 hr. (mst): 13:45	Cal Gas Expiry Date: December 2, 2023
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	
Serial Number: 806528242	Range ppb: 500
Last Calibration Date: June 3, 2016	As Found C.F.: 1.037
Previous C.F.: 1.000	New C.F.: 0.999

Calibrator: Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. #: LL119346 Cal Gas Conc. (ppm): 50.0	Standard Calibration Points for Ranges <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Sulphur Dioxide Standard Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td style="text-align: center;">380</td> </tr> <tr> <td>Mid</td> <td style="text-align: center;">180</td> </tr> <tr> <td>Low</td> <td style="text-align: center;">90</td> </tr> </tbody> </table>	Point	Sulphur Dioxide Standard Calibration Points	High	380	Mid	180	Low	90
Point	Sulphur Dioxide Standard Calibration Points								
High	380								
Mid	180								
Low	90								

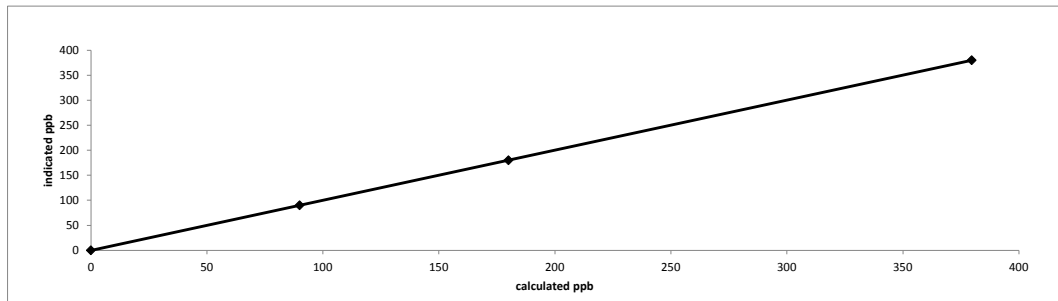
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	5000	0.00	5000	0.0	-0.3	N/A
as found high	4966	38.00	5004	379.7	366.0	1.037
adjusted zero	5000	0.00	5000	0.0	0.0	n/a
adjusted high	4966	38.00	5004	379.7	380.0	0.999
mid	4982	18.00	5000	180.0	180.0	1.000
low	4992	9.00	5001	90.0	90.0	1.000
calibrator zero	5000	0.00	5000	0.0	0.0	n/a
Average C.F.=						1.000

Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u>	LIMITS > or = 0.995
Slope = <u>0.999</u>	.95-1.05
b (Intercept as % of full scale) = <u>0.01%</u>	± 3% F.S.
% change in C.F. from last cal = <u>-3.66%</u>	± 10%

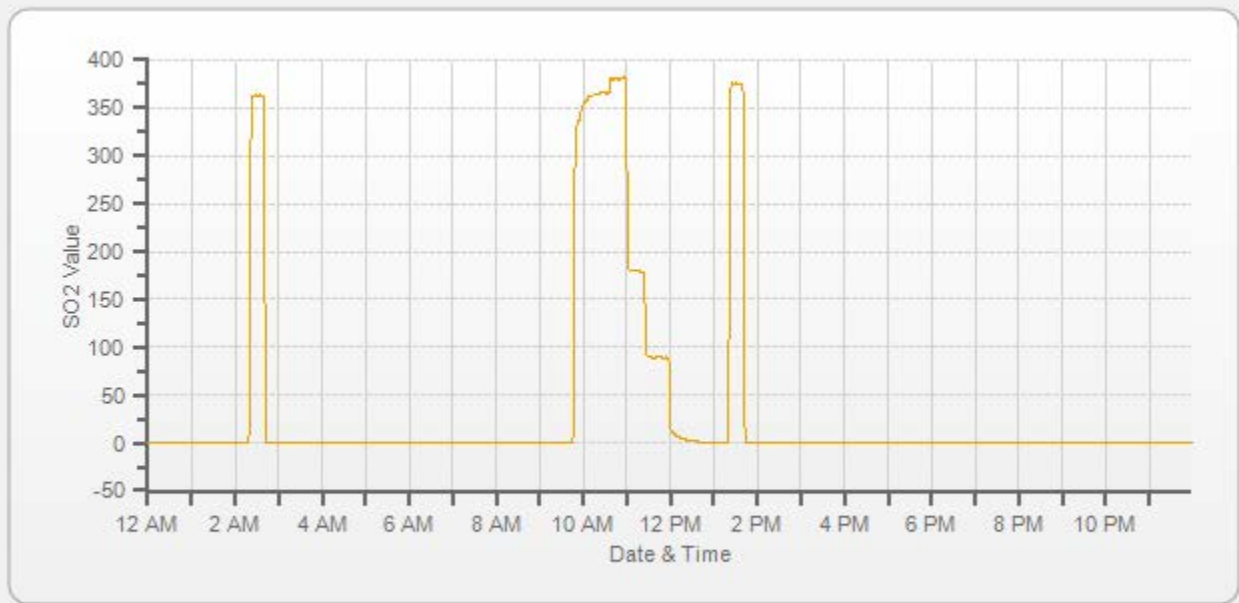
Thermo 43i Sulphur Dioxide Analyzer Calibration



As found:	As left:
BKG: 7.7	BKG: 7.7
COEF: 0.970	COEF: 1.006
PMT: -624.2	PMT: -624.2
FLASH: 755	FLASH: 754
INTERNAL: 27.2	INTERNAL: 27.4
CHAMBER: 45.1	CHAMBER: 45.1
PERM OVEN GAS: 45.0	PERM OVEN GAS: 45.0
PERM OVEN HEATER: 44.19	PERM OVEN HEATER: 44.19
PRESSURE: 677.4	PRESSURE: 677.4
SAMPLE FLOW: 0.474	SAMPLE FLOW: 0.747
LAMP INTENSITY: 98	LAMP INTENSITY: 97
CONVERTER: n/a	CONVERTER: n/a
CONVERTER SET: n/a	CONVERTER SET: n/a
Internal Span: 388.9	Internal Span: 375

Comments:

Sample inlet filter changed.



— SO2[ppb]

TOTAL REDUCED SULPHUR



Thermo 450i Total Reduced Sulphur Analyzer Calibration

Date: July 7, 2016	Barometric Pressure: 0.934 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Cold Lake South	Weather Conditions: A few clouds
Parameter: Total Reduced Sulphur	Calibration Purpose: shut down
Start Time 24 hr. (mst): 8:53	Performed By/Reviewer: Alex Yakupov Tom Bourque
End Time 24 hr. (mst): 10:53	Cal Gas Expiry Date: July 15, 2017
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): CDNova CDN-101 #501

Analyzer:	
Serial Number: 812728560	Range ppb: 100
Last Calibration Date: June 7, 2016	As Found C.F.: 1.027
Previous C.F.: 1.000	New C.F.: n/a

Calibrator:	Standard Calibration Points for Ranges								
Flow Meter ID's: n/a	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Total Reduced Sulphur Standard Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td style="text-align: center;">78</td> </tr> <tr> <td>Mid</td> <td style="text-align: center;">38</td> </tr> <tr> <td>Low</td> <td style="text-align: center;">19</td> </tr> </tbody> </table>	Point	Total Reduced Sulphur Standard Calibration Points	High	78	Mid	38	Low	19
Point		Total Reduced Sulphur Standard Calibration Points							
High		78							
Mid		38							
Low		19							
Make & Model: API 700									
Serial #: 829									
Cal Gas Cylinder I.D. #: LL36837									
Cal Gas Conc. (ppm): 10.0									

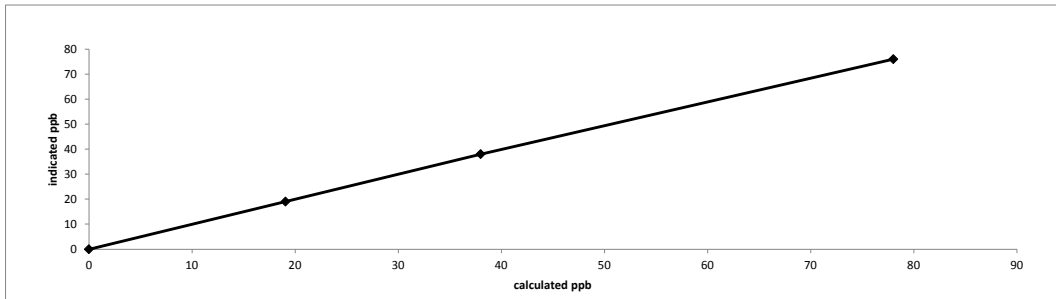
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration: (ppb)	Indicated Concentration: (ppb)	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	7501	0.00	7501	0.0	0.0	N/A
as found high	7440	58.50	7499	78.0	76.0	1.027
mid	7471	28.50	7500	38.0	38.0	1.000
low	7487	14.30	7501	19.1	19.0	1.003
Average C.F.=						1.010

Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u>	LIMITS > or = 0.995
Slope = <u>1.027</u>	0.90-1.10
b (Intercept as % of full scale) = <u>-0.38%</u>	± 3% F.S.
% change in C.F. from last cal = <u>-2.65%</u>	± 10%

Thermo 450i Total Reduced Sulphur Analyzer Calibration



As found:	As left:
BKG: <u>13.9</u>	BKG: <u>n/a</u>
COEF: <u>0.955</u>	COEF: <u>n/a</u>
PMT: <u>-651.2</u>	PMT: <u>n/a</u>
FLASH: <u>740</u>	FLASH: <u>n/a</u>
INTERNAL: <u>30.9</u>	INTERNAL: <u>n/a</u>
CHAMBER: <u>45.1</u>	CHAMBER: <u>n/a</u>
CONVERTER TEMP: <u>810</u>	CONVERTER TEMP: <u>n/a</u>
CONVERTER SET: <u>810</u>	CONVERTER SET: <u>n/a</u>
PERM OVEN GAS: <u>45.0</u>	PERM OVEN GAS: <u>n/a</u>
PERM OVEN HTR: <u>44.38</u>	PERM OVEN HTR: <u>n/a</u>
PRESSURE: <u>656.9</u>	PRESSURE: <u>n/a</u>
SAMPLE FLOW: <u>0.511</u>	SAMPLE FLOW: <u>n/a</u>
LAMP INTENSITY: <u>91</u>	LAMP INTENSITY: <u>n/a</u>
Internal Span: <u>34.27</u>	Internal Span: <u>n/a</u>

Comments:

No ZERO adjustment made. No High Point adjustment made. Shutdown calibration completed to replace a brass fitting on the Teflon tubing inside the oxidizer with a stainless steel fitting.



Thermo 450i Total Reduced Sulphur Analyzer Calibration

Date: July 7, 2016	Barometric Pressure: 0.934 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Cold Lake South	Weather Conditions: A few clouds
Parameter: Total Reduced Sulphur	Calibration Purpose: post repair
Start Time 24 hr. (mst): 11:04	Performed By/Reviewer: Alex Yakupov Tom Bourque
End Time 24 hr. (mst): 14:42	Cal Gas Expiry Date: July 15, 2017
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): CDNova CDN-101 #501

Analyzer:	
Serial Number: 812728560	Range ppb: 100
Last Calibration Date: n/a	As Found C.F.: n/a
Previous C.F.: n/a	New C.F.: 1.000

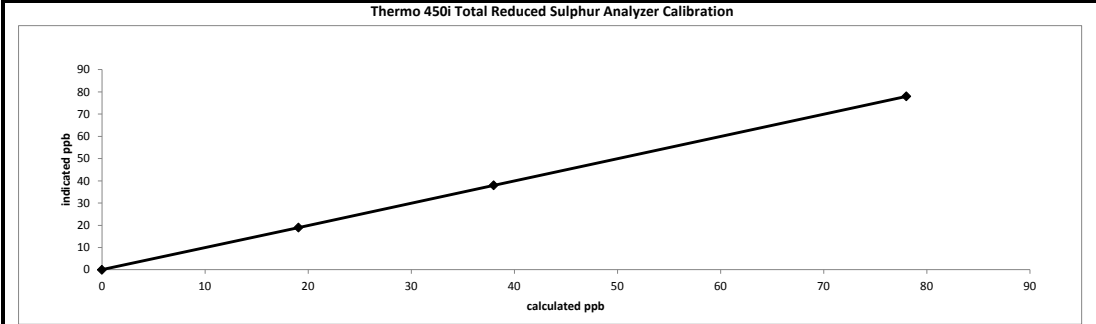
Calibrator:	Standard Calibration Points for Ranges								
Flow Meter ID's: n/a	<table border="1" style="margin-left: auto; margin-right: auto;"><tr><th>Point</th><th>Total Reduced Sulphur Standard Calibration Points</th></tr><tr><td>High</td><td>78</td></tr><tr><td>Mid</td><td>38</td></tr><tr><td>Low</td><td>19</td></tr></table>	Point	Total Reduced Sulphur Standard Calibration Points	High	78	Mid	38	Low	19
Point	Total Reduced Sulphur Standard Calibration Points								
High	78								
Mid	38								
Low	19								
Make & Model: API 700									
Serial #: 627									
Cal Gas Cylinder I.D. #: LL36837									
Cal Gas Conc. (ppm): 10.0									

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
adjusted zero	7501	0.00	7501	0.0	0.0	N/A
adjusted high	7440	58.50	7499	78.0	78.0	1.000
mid	7471	28.50	7500	38.0	38.0	1.000
low	7487	14.30	7501	19.1	19.0	1.003
calibrator zero	7501	0.00	7501	0.0	0.0	n/a
Average C.F.=						1.001

Linear Regression/Calibration Results:

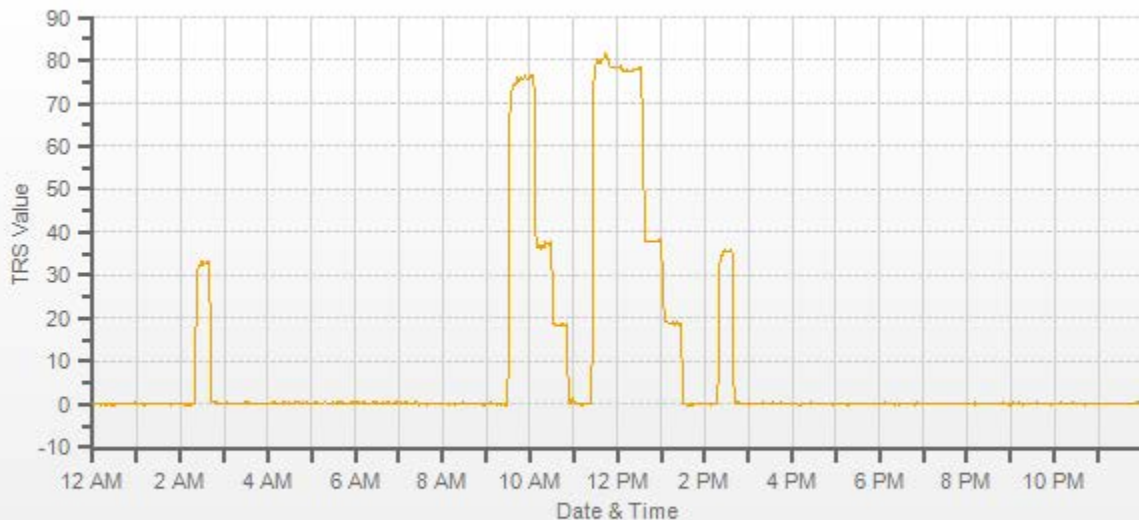
Correlation Coefficient = 1.000	LIMITS
Slope = 1.000	> or = 0.995
b (Intercept as % of full scale) = 0.02%	.95-1.05
% change in C.F. from last cal = n/a	± 3% F.S.
	± 10%



As found:	As left:
BKG: n/a	BKG: 13.2
COEF: n/a	COEF: 0.909
PMT: n/a	PMT: -651.2
FLASH: n/a	FLASH: 741
INTERNAL: n/a	INTERNAL: 30.5
CHAMBER: n/a	CHAMBER: 45.0
CONVERTER TEMP: n/a	CONVERTER TEMP: 810
CONVERTER SET: n/a	CONVERTER SET: 810
PERM OVEN GAS: n/a	PERM OVEN GAS: 45.0
PERM OVEN HTR: n/a	PERM OVEN HTR: 44.38
PRESSURE: n/a	PRESSURE: 656.3
SAMPLE FLOW: n/a	SAMPLE FLOW: 0.510
LAMP INTENSITY: n/a	LAMP INTENSITY: 92
Internal Span: n/a	Internal Span: 31.5

Comments:

Sample inlet filter changed. No ZERO adjustment made.



— TRS[ppb]

TOTAL HYDROCARBON



Thermo 51C Total Hydrocarbon Analyzer Calibration

Date: July 8, 2016
 Company/Airshed: LICA
 Location/Station Name: Cold Lake South
 Parameter: Total Hydrocarbon
 Start/End Time 24 hr. (mst): 8:15 / 12:18
 Calibration Method: Gas Dilution
 Barometric Pressure: 0.933 atm
 Station Temperature °C: 22
 Weather Conditions: Mix of sun and clouds
 Calibration Purpose: routine monthly
 Performed By/Reviewer: Alex Yakupov / Tom Bourque
 Cal Gas Expiry Date: November 25, 2023

Analyzer:
 Serial Number: 427408718
 Last Calibration Date: June 7, 2016
 Previous Cal High Point C.F.: 1.000
 Range ppm: 50
 As Found C.F.: 0.977
 New C.F.: 1.000

Calibrator:
 Flow Meter ID's: n/a
 Make & Model: API 700
 Serial #: 829
 Cal Gas Cylinder I.D. #: LL165372
 CH₄/C₂H₆ Cylinder Conc. (ppm): 606.0 / 212.0
 CH₄ as propane/total CH₄ equivalents (ppm): 583.0 / 1189.0
Standard Calibration Points for a Range of 50 ppm

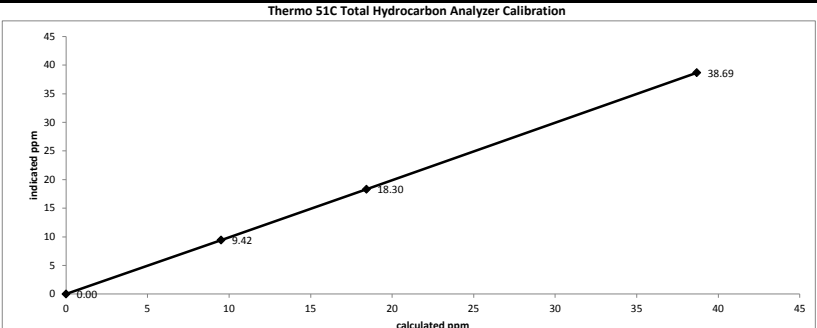
Point	Target ppm
High	38
Mid	18
Low	9

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration: (ppm)	Indicated Concentration: (ppm)	Correction Factors:
	Diluent	Cal Gas	Total			
as found zero	1999	0.00	1999	0.0	0.00	n/a
as found high	1933	65.00	1998	38.68	39.60	0.977
adjusted zero	1999	0.00	1999	0.00	0.00	n/a
adjusted high	1933	65.00	1998	38.68	38.69	1.000
mid	1969	31.00	2000	18.43	18.30	1.007
low	1985	16.00	2001	9.51	9.42	1.009
calibrator zero	1999	0.00	1999	0.0	0.00	n/a

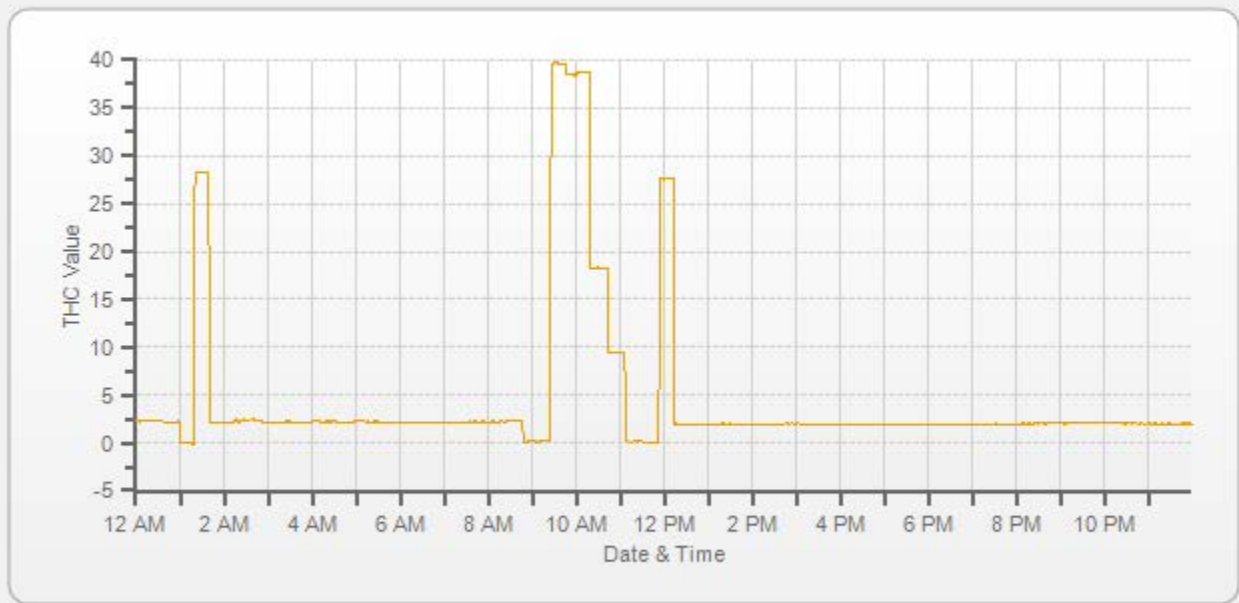
Average C.F.= 1.005

Linear Regression/Calibration Results:
 Correlation Coefficient = 1.000
 Slope = 0.999
 b (Intercept as % of full scale) = 0.13%
 % change in C.F. from last cal = 2.32%
LIMITS
 > or = 0.995
 .95-1.05
 ± 3% F.S.
 ± 10%



As found: H2 cylinder (psi): 1600 H2 cylinder reg set (psi): 22 Span Cylinder (psi): 800 Span Cylinder Reg Set (psi): 22 Zero Air Gen Pressure: 34 measurement alarms: None service alarms: None cnt: 1525 rng: 1 try: 1 flm: 182.7 det: 125.5 Flame: 182 Filter: 125 Base: 125 Sample psi: 06.51 Internal Air Pressure: 20 Internal Fuel Pressure: 14 Internal Pressure Gauge psi: 27 Internal Span: 27.98	As left: H2 cylinder (psi): 1600 H2 cylinder reg set (psi): 22 Span Cylinder (psi): 800 Span Cylinder Reg Set (psi): 22 Zero Air Gen Pressure: 34 measurement alarms: None service alarms: None cnt: 1561 rng: 1 try: 1 flm: 183.2 det: 125.8 Flame: 183 Filter: 125 Base: 125 Sample psi: 06.51 Internal Air Pressure: 20 Internal Fuel Pressure: 14 Internal Pressure Gauge psi: 27 Internal Span: 27.57
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Comments:
 Sample inlet filter changed. No ZERO adjustment made.



— THC[ppm]

NITROGEN DIOXIDE



Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: July 7, 2016	Barometric Pressure: 0.934 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Cold Lake South	Weather Conditions: A few clouds
Start/End Time 24 hr. (mst): 8:53 / 17:28	Calibration Purpose: routine monthly
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Alex Yakupov Tom Bourque
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: December 2, 2023

Analyzer:	Correction Factors:																
Serial Number: 1505664393	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">Previous C.F.:</td> <td style="text-align: center;">As Found C.F.:</td> <td style="text-align: center;">New C.F.:</td> </tr> <tr> <td>NO =</td> <td style="text-align: center;">1.000</td> <td style="text-align: center;">0.999</td> <td style="text-align: center;">0.999</td> </tr> <tr> <td>NO₂ =</td> <td style="text-align: center;">1.000</td> <td style="text-align: center;">1.000</td> <td style="text-align: center;">1.000</td> </tr> <tr> <td>NOx =</td> <td style="text-align: center;">1.000</td> <td style="text-align: center;">0.999</td> <td style="text-align: center;">0.999</td> </tr> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	0.999	0.999	NO ₂ =	1.000	1.000	1.000	NOx =	1.000	0.999	0.999
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	0.999	0.999														
NO ₂ =	1.000	1.000	1.000														
NOx =	1.000	0.999	0.999														
Last Calibration Date: June 7, 2016																	
Range ppb: 500																	

Calibrator:	Standard Calibration Points for a Range of: 500 ppb																								
Flow Meter ID's: n/a	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> <tr> <td>High</td> <td style="text-align: center;">380</td> <td style="text-align: center;">250</td> <td style="text-align: center;">n/a</td> </tr> <tr> <td>Mid</td> <td style="text-align: center;">180</td> <td style="text-align: center;">145</td> <td style="text-align: center;">n/a</td> </tr> <tr> <td>Low</td> <td style="text-align: center;">90</td> <td style="text-align: center;">50</td> <td style="text-align: center;">n/a</td> </tr> <tr> <td>Extra Point #1</td> <td style="text-align: center;">n/a</td> <td style="text-align: center;">n/a</td> <td style="text-align: center;">n/a</td> </tr> <tr> <td>Extra Point #2</td> <td style="text-align: center;">n/a</td> <td style="text-align: center;">n/a</td> <td style="text-align: center;">n/a</td> </tr> </table>	Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	380	250	n/a	Mid	180	145	n/a	Low	90	50	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point		Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																					
High		380	250	n/a																					
Mid		180	145	n/a																					
Low		90	50	n/a																					
Extra Point #1		n/a	n/a	n/a																					
Extra Point #2	n/a	n/a	n/a																						
Make & Model: API 700																									
Serial #: 627																									
Cal Gas Cylinder I.D. #: LL119346																									
NO/NOx Gas Conc. (ppm): 50.0 50.0																									

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	5000	0.0	5000	0	0	0.0	0.0	n/a	n/a
as found high	4966	38.00	5004	379.7	379.7	380.0	380.0	0.999	0.999
adjusted zero	5000	0.00	5000	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4966	38.00	5004	379.7	379.7	380.0	380.0	0.999	0.999
mid	4982	18.00	5000	180.0	180.0	181.0	181.0	0.994	0.994
low	4992	9.00	5001	90.0	90.0	90.0	90.0	1.000	1.000
calibrator zero	5000	0.00	5000	0	0	0.0	0.0	n/a	n/a
Average C.F.=								0.998	0.998

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO ₂	NO drop	NO ₂ gain	NO ₂ C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4966	38.00	5004	0.0	381.0	381.0	0.0	0.0	0.0	n/a
as found high NO2	4966	38.00	5004	240.0	131.0	381.0	250.0	250.0	250.0	1.000
adjusted high NO2	4966	38.00	5004	240.0	131.0	381.0	250.0	250.0	250.0	1.000
gpt mid	4966	38.00	5004	135.0	239.0	381.0	142.0	142.0	142.0	1.000
gpt low	4966	38.00	5004	45.0	330.0	381.0	51.0	51.0	51.0	1.000
Average NO ₂ C.F.=										1.000

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.999	0.999	1.000	.95-1.05
b (Intercept as % of full scale)=	0.03%	0.03%	0.00%	± 3% F.S.
% change in C.F. from last cal=	0.08%	0.08%	0.00%	± 10%
NO2 converter efficiency	n/a	n/a	1.00	0.96 to 1.04

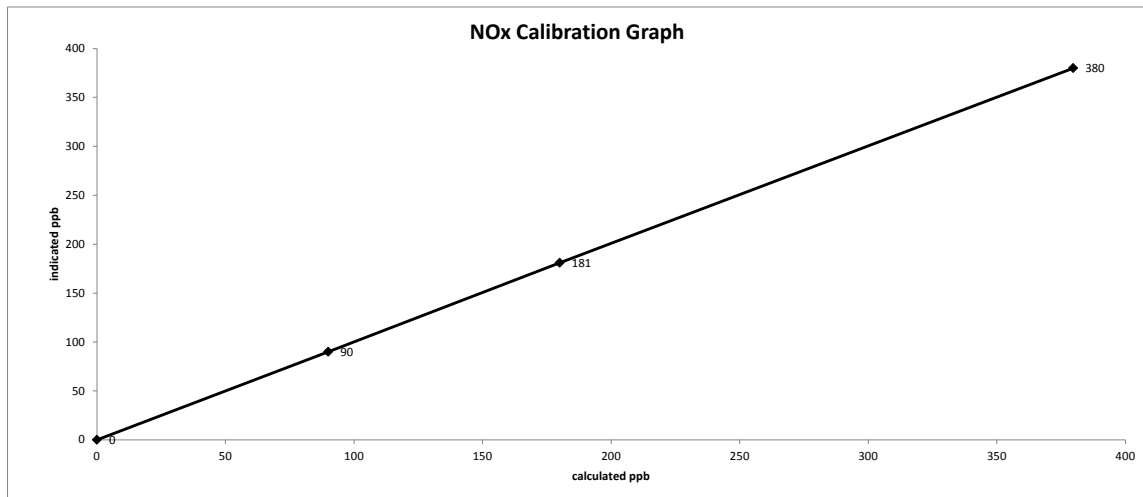
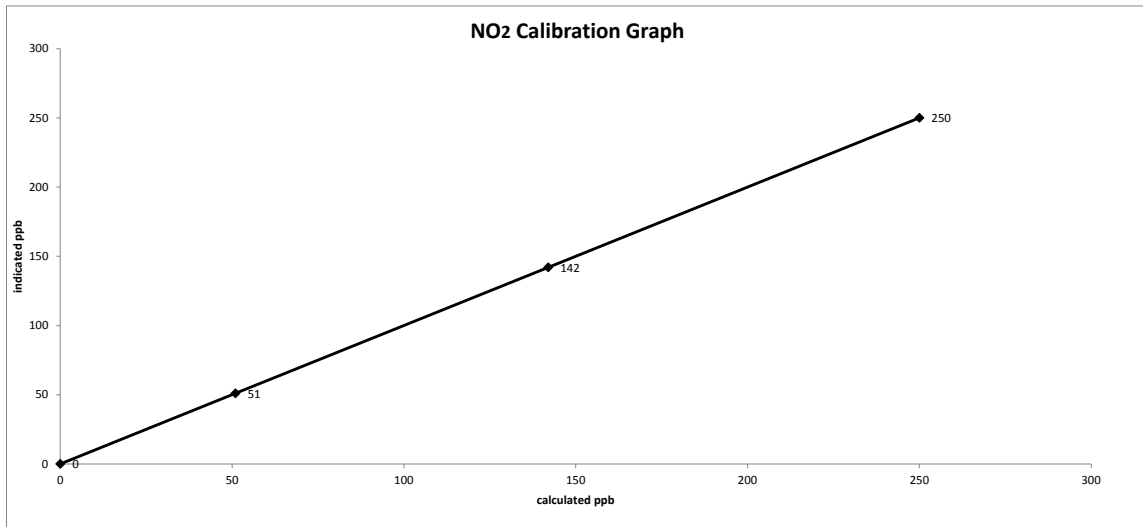
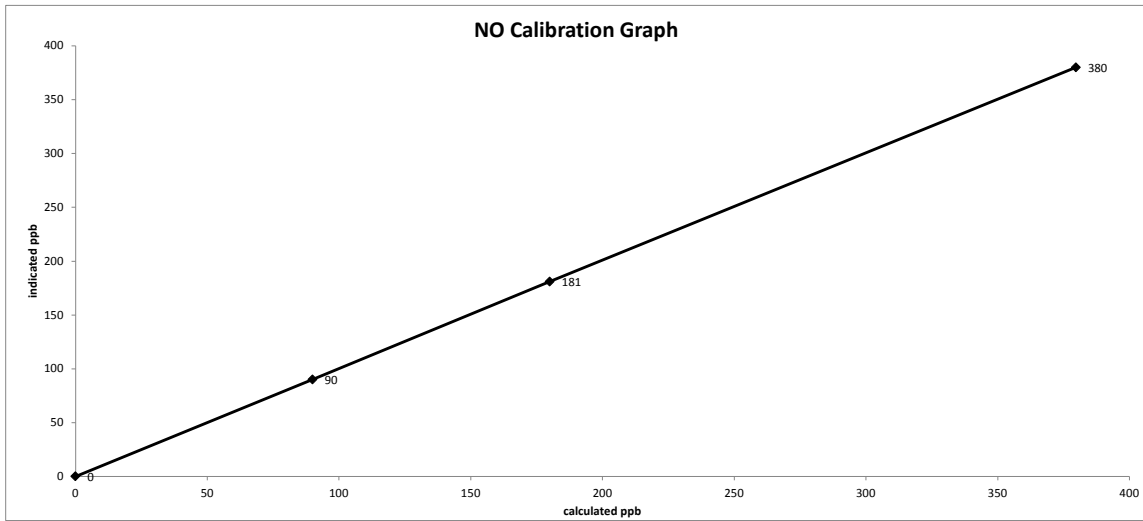
As found:	As left:
NO Bkg: 3.4	NO Bkg: 3.4
NOx Bkg: 3.5	NOx Bkg: 3.5
NO Coef: 1.025	NO Coef: 1.025
NO2 Coef: 1.000	NO2 Coef: 1.000
NOx Coef: 0.998	NOx Coef: 0.998
PMT: -854.7	PMT: -855.1
Internal: 23.9	Internal: 23.9
Chamber: 50.5	Chamber: 50.5
Cooler: -2.9	Cooler: -3.0
NO2 Converter: 325.0	NO2 Converter: 324.2
NO2 Converter Set: 325.0	NO2 Converter Set: 325.0
Pressure: 187.7	Pressure: 187.1
Flow: 0.785	Flow: 0.783
Ozonator Flow: OK	Ozonator Flow: OK
Internal Span NO: 2.0	Internal Span NO: 2.3
Internal Span NO2: 264.3	Internal Span NO2: 257
Internal Span NOx: 266.5	Internal Span NOx: 260

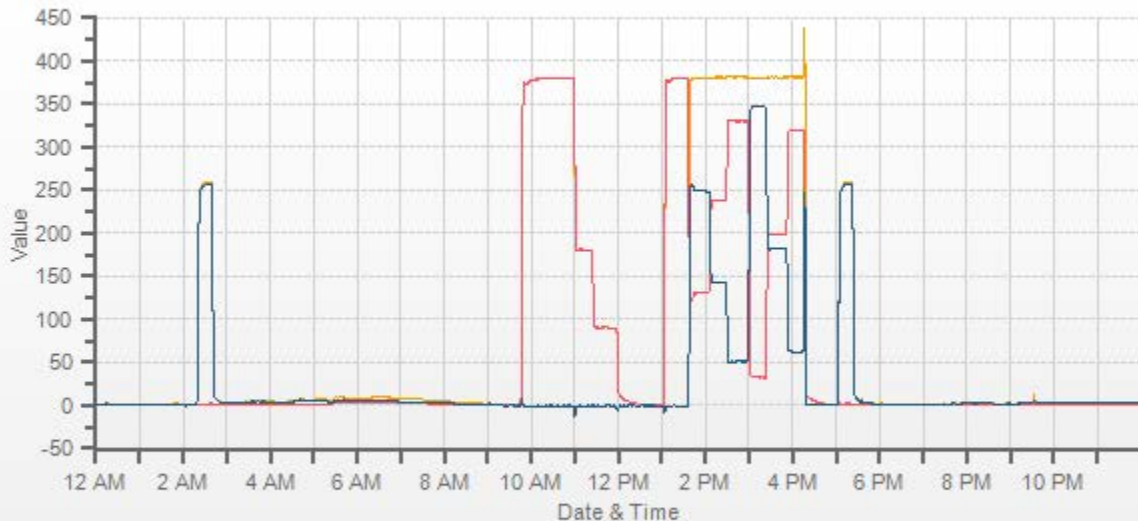
Comments:

Sample inlet filter changed. No High Point adjustment made. No ZERO adjustment made. No NO2 adjustment made. 15:00 - three GPT points for Ozone calibration were taken separately after the monthly calibration GPT part had been completed: Point #1: Cal setting - 338, NO - 33, NOx - 380, NO2 - 348, NO drop - 348, NO2 gain - 348, C.F.= 1.000; Point #2: Cal setting - 172, NO - 199, NOx - 381, NO2 - 182, NO drop - 182, NO2 gain - 182, C.F.= 1.000; Point #3: Cal setting - 54, NO - 319, NOx - 381, NO2 - 62, NO drop - 62, NO2 gain - 62, C.F.= 1.000.

Date: July 7, 2016
Company/Airshed: LICA
Location/Station Name: Cold Lake South

Start/End Time 24 hr. (mst): 8:53 / 17:28
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Gas Phase Titration





— NOx[ppb] — NO[ppb] — NO2[ppb]

OZONE



Thermo 49i Ozone Analyzer Calibration

Date:	July 8, 2016	Barometric Pressure:	0.933 atm
Company/Airshed:	LICA	Station Temperature °C:	22
Location/Station Name:	Cold Lake South	Weather Conditions:	Mix of sun and clouds
Start/End Time 24 hr. (mst):	8:15 / 12:29	Calibration Purpose:	routine monthly
Ozone Calibration Method:	Direct G.P.T.	Performed By/Reviewer:	Alex Yakupov Tom Bourque
G.P.T. Date:	July 7, 2016	Cal Gas Expiry Date:	n/a

Analyzer:	Serial Number:	700419951	Ozone Range ppb:	500
	Last Calibration Date:	June 7, 2016	As Found C.F.:	1.039
	Previous Cal High Point C.F.:	1.000	New C.F.:	0.997

Calibrator:	Flow Meter ID's:	n/a	Point	AMD Required Range of Ozone Calibration Points
	Make & Model:	API 700	High	300-400 ppb
	Serial #:	627	Mid	150-200 ppb
	Cal Gas Cylinder I.D. #:	n/a	Low	50-75 ppb

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

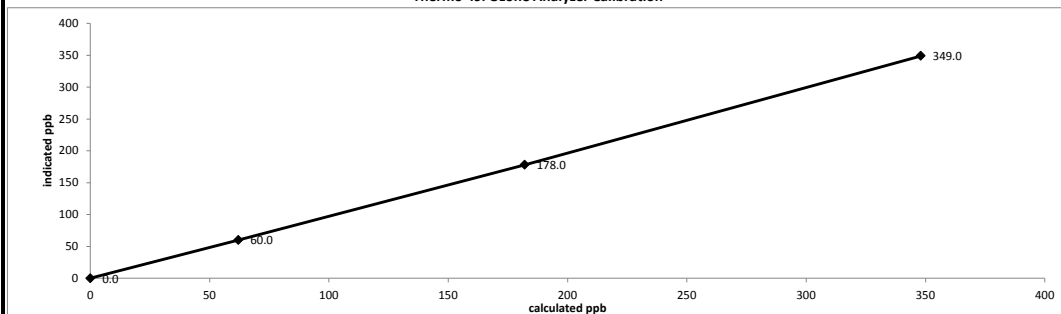
Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5001	5001	0.0	n/a	0.0	n/a
as found high	4877	4877	348.0	348.0	335.0	1.039
adjusted zero	5001	5001	0.0	0.0	0.0	n/a
adjusted high	4877	4877	348.0	348.0	349.0	0.997
mid	4877	4877	182.0	182.0	178.0	1.022
low	4877	4877	62.0	62.0	60.0	1.033
calibrator zero	5001	5001	0.0	n/a	0.0	n/a

Average C.F. = 1.018

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.996		.95-1.05
b (Intercept as % of full scale) =	0.35%		± 3% F.S.
% change in C.F. from last cal =	-3.88%		± 10%

Thermo 49i Ozone Analyzer Calibration



As found:

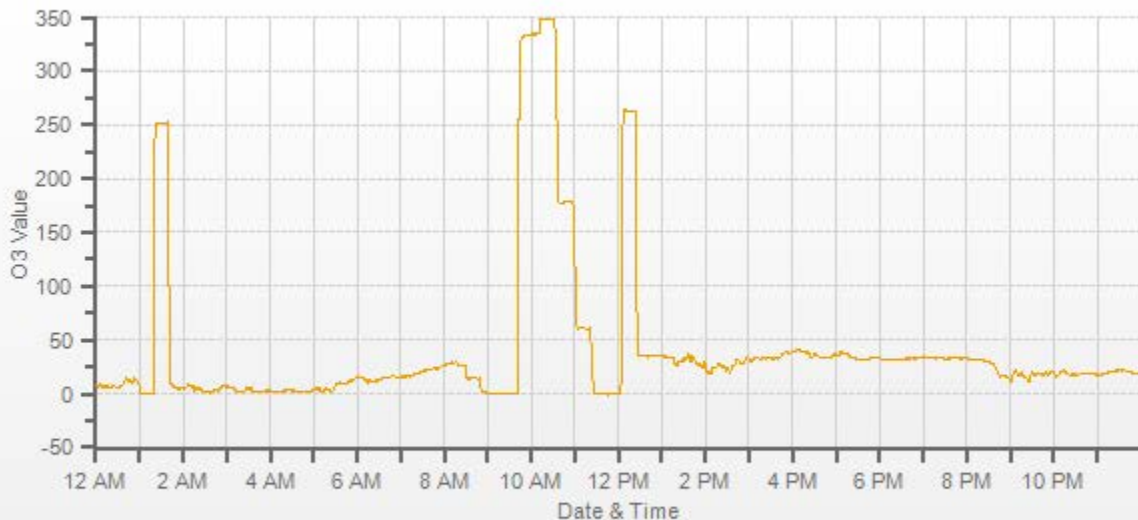
- O3 Bkg: 0.2
- O3 Coef: 1.010
- Photo Lamp: 8.7
- O3 Lamp: 9.0
- Bench: 27.5
- Bench Lamp: 53.5
- O3 Lamp: 67.4
- Pressure: 707.7
- Cell A lpm: 0.716
- Cell B lpm: 0.754
- O3 ppb: 1.5
- Cell A ppb: 1.0
- Cell B ppb: 2.0
- Cell A int: 54281
- Cell B int: 55127
- Internal Span: 253

As left:

- O3 Bkg: 0.1
- O3 Coef: 1.049
- Photo Lamp: 8.7
- O3 Lamp: 9.0
- Bench: 27.0
- Bench Lamp: 53.4
- O3 Lamp: 67.4
- Pressure: 707.4
- Cell A lpm: 0.715
- Cell B lpm: 0.755
- O3 ppb: 0.0
- Cell A ppb: 15.2
- Cell B ppb: -15.2
- Cell A int: 54164
- Cell B int: 54949
- Internal Span: 263

Comments:

Sample inlet filter changed. No ZERO adjustment made.



— O3[ppb]

PARTICULATE MATTER



R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: July 5, 2016
 Company: LICA
 Station Name/Location: Cold Lake South
 Previous Audit Date: June 30, 2016
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whitsitt
 Start Time (mst): 8:49
 End Time (mst): 9:36
 Calibration Purpose: Bi-monthly #1
 Weather Conditions: A few clouds and light rain showers

1400A Information and Status:

Serial Number: 1405A201620804 As Found Filter Loading %: 26.16
 Ko Factor: 14578 As Left Filter Loading %: 19.40
 Ambient Temperature °C: 13.55 As Found Noise: 0.003
 Ambient Pressure atm: 0.928 As Left Noise: 0.000
 Main Flow Reading lpm: 3.00 Pump Vacuum: 0.30
 Aux Flow Reading lpm: 13.67 Warnings: None

Reference Standards:

	Flow:	Pressure:	Temperature:
Make:	Dwyer	Fisher	Fisher
Model:	475 Mark III	FB1291	FB 1291
Serial Number:	#2	130168457	130168457
Calibration Date:	January 15, 2016	February 7, 2016	February 7, 2016

As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.11	0.00	0.11
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	-0.08	0.00	-0.08
	limit	0.60	0.60	0.60	0.60

As left leak check (same as above if as found passes):

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.11	0.00	0.11
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	-0.08	0.00	-0.08
	limit	0.60	0.60	0.60	0.60

As found temperature and pressure:

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: 13.6	1405F pressure atm: 0.928
reference temperature °C: 13.9	reference pressure: 0.928
difference °C: 0.4	difference: 0.000

As left temperature and pressure (same as above if as found adequate):

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: 13.9	1405F pressure atm: 0.928
reference temperature °C: 13.9	reference pressure: 0.928
difference °C: 0.0	difference: 0.000

As found flows:

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: 3.00	1400A total/aux flow lpm: 16.67
reference main flow lpm: 3.01	reference total/aux flow lpm: 16.65
difference lpm: 0.01	difference lpm: -0.02

As left flows (same as above if as found adequate):

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: 3.00	1400A total/aux flow lpm: 16.67
reference main flow lpm: 3.01	reference total/aux flow lpm: 16.65
difference lpm: 0.01	difference lpm: -0.02

K_o Audit:

Last K_o audit date: May 3, 2016
 1405F K_o factor: 14578
 Measured K_o factor: 14848.5000
 % difference: 1.86

Comments:

47 mm FDMS filter was changed. TEOM sample filter was changed.



R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: July 26, 2016
 Company: LICA
 Station Name/Location: Cold Lake South
 Previous Audit Date: July 5, 2016
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Tom Bourque
 Start Time (mst): 10:02
 End Time (mst): July 27, 2016 @ 12:24
 Calibration Purpose: Bi-monthly #2
 Weather Conditions: Mainly sunny

1400A Information and Status:

Serial Number: 1405A201620804 As Found Filter Loading %: 35.53
 Ko Factor: 14578 As Left Filter Loading %: 17.56
 Ambient Temperature °C: 23.65 As Found Noise: 0.003
 Ambient Pressure atm: 0.937 As Left Noise: 0.002
 Main Flow Reading lpm: 3.00 Pump Vacuum: 0.30
 Aux Flow Reading lpm: 13.67 Warnings: None

Reference Standards:

	Flow:	Pressure:	Temperature:
Make:	Dwyer	Fisher	Fisher
Model:	475 Mark III	FB1291	FB 1291
Serial Number:	#2	130168457	130168457
Calibration Date:	January 15, 2016	February 7, 2016	February 7, 2016

As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.11	0.00	0.11
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	-0.08	0.00	-0.08
	limit	0.60	0.60	0.60	0.60

As left leak check (same as above if as found passes):

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.11	0.00	0.00
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	-0.08	0.00	-0.08
	limit	0.60	0.60	0.60	0.60

As found temperature and pressure:

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: 23.7	1405F pressure atm: 0.937
reference temperature °C: 23.2	reference pressure: 0.937
difference °C: -0.4	difference: 0.000

As left temperature and pressure (same as above if as found adequate):

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: 24.0	1405F pressure atm: 0.943
reference temperature °C: 24.0	reference pressure: 0.943
difference °C: 0.0	difference: 0.000

As found flows:

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: 3.00	1400A total/aux flow lpm: 16.67
reference main flow lpm: 3.01	reference total/aux flow lpm: 16.64
difference lpm: 0.01	difference lpm: -0.03

As left flows (same as above if as found adequate):

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: 3.00	1400A total/aux flow lpm: 13.67
reference main flow lpm: 3.00	reference total/aux flow lpm: 13.67
difference lpm: 0.00	difference lpm: 0.00

K_o Audit:

Last K_o audit date: May 3, 2016
 1405F K_o factor: 14578
 Measured K_o factor: 14848.5000
 % difference: 1.86

Comments:

July 26: The TEOM channel was left in "M" mode overnight because a leak issue after the dryer change was not resolved. The troubleshooting will be continued on July 27. TEOM sample filter was changed and 47 mm FDMS filter was changed. PM 2.5/10 sample head was cleaned. A new dryer was installed, chiller was cleaned. July 27, 2016 - leak troubleshooting continued: switching valve was rebuilt and the sample pass was re-assembled. Final leak check - no leaks. Flows were calibrated. Annual maintenance completed.

WIND SYSTEM



Met One Instruments
1600 NW Washington Blvd.
Grants Pass, Oregon 97526
Telephone 541-471-7111
Facsimile 541-471-7116

Regional Service
3206 Main St. Suite 106
Rowlett, Texas 75088
Telephone 972-412-4715
Facsimile 972-412-4716

Sonic Wind Sensor Certificate of Calibration

Sensor Model No: 50.5H Sonic Sensor Serial No: F1644
 Customer: _____ P.O. No: _____ Sales Order: _____
 Final Calibration By: Kevin Ricks Calibration Date: 04-01-15
 Quality Control Inspected By: AJR Inspection Date: APR 03 2015
 New Unit Repair/Adjust Re-Calibration As Found
 Unit Within Tolerance as Found Unit Within Tolerance as Left

Calibration Equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal. Due
Digital Multimeter 1	Agilent/HP	34401A	MY41039534	4/11/2015
Digital Multimeter 2	Agilent/HP	34401A	US36094551	8/26/2015
Frequency Counter	Agilent/HP	53131A	MY40009285	5/22/2015
Standard Sensor	MOI	010C-1	P22383	7/11/2017
Temperature Probe	MOI	920005/PC8340	E3402	9/03/2015

Test 1: Average Wind Tunnel Speed: 3.08 Meters per Second FirmwareVersion: 3194-01 R2.62

WD Setting (Deg)	WD Output (Volts)	WD Indication (Deg)	WD Error (+/- 3 Deg)	WS Standard (m/s)	WS Output (Volts)	WS Indication (m/s)	WS Error (+/- .20 m/s)	Output Type:
30	.084	30.3	.3	3.06	.059	2.96	-.1	0 to 1 volt <input checked="" type="checkbox"/>
60	.165	59.3	-.7	3.07	.059	2.94	-.13	0 to 2.5 volt <input type="checkbox"/>
120	.334	120.2	.2	3.08	.059	2.94	-.14	0 to 5 volt <input type="checkbox"/>
150	.415	149.5	-.5	3.07	.059	2.94	-.13	RS-232 <input checked="" type="checkbox"/>
210	.583	210	0	3.08	.059	2.95	-.12	SDI-12 <input type="checkbox"/>
240	.668	240.3	.3	3.08	.06	2.98	-.1	RS-422 <input type="checkbox"/>
300	.834	300.4	.4	3.07	.06	3.02	-.04	RS-485 <input type="checkbox"/>
330	.916	329.8	-.2	3.09	.059	2.97	-.12	<input type="checkbox"/>

Test 2: Average Wind Tunnel Speed: 11.85 Meters per Second Output Range: 0-50 m/s

WD Setting (Deg)	WD Output (Volts)	WD Indication (Deg)	WD Error (+/- 3 Deg)	WS Standard (m/s)	WS Output (Volts)	WS Indication (m/s)	WS Error (+/- .24 m/s)	Test Items:
30	.081	29.3	-.7	11.79	.235	11.76	-.04	Array Alignment <input checked="" type="checkbox"/>
60	.165	59.5	-.5	11.85	.237	11.87	.01	Jumper Config <input checked="" type="checkbox"/>
120	.331	119.1	-.9	11.85	.236	11.81	-.03	Firmware Config <input checked="" type="checkbox"/>
150	.415	149.3	-.7	11.88	.236	11.8	-.08	Zero Calibration <input checked="" type="checkbox"/>
210	.582	209.5	-.5	11.81	.236	11.79	-.02	Low Speed Test OK <input checked="" type="checkbox"/>
240	.666	239.9	-.1	11.88	.235	11.73	-.16	High Speed Test OK <input checked="" type="checkbox"/>
300	.833	299.7	-.3	11.87	.235	11.73	-.13	Sensor Function <input checked="" type="checkbox"/>
330	.915	329.6	-.4	11.84	.238	11.9	.06	Physical Inspection <input checked="" type="checkbox"/>

The standards used for this calibration have accuracies equal to or greater than the instruments tested. These standards are on record and traceable to NIST to the extent allowed by the institute's calibration facility. Unless otherwise stated hereon, all instruments are calibrated to meet the manufacturer's published specifications. The calibration system complies with MIL-STD-45662A. Calibration performed by direct comparison to the above standard following test procedure: 50.5-6100 Rev E

PARTISOL SAMPLER



PARTISOL 2000 Audit

Date:	July 8, 2016	Weather Conditions:	Mix of sun and clouds
Company:	LICA	Start Time (mst):	12:54
Station:	Cold Lake South	End Time (mst):	14:01
Parameter:	PM 2.5	Performed By/Reviewer:	Alex Yakupov Tom Bourque

Sampler	Instrument Data
Make/Model:	R & P Temperature (°C) 21.5
Unit #	# 2873 Pressure (atm) 0.934
S/N:	2000B206140102 Set Flow (litres/min) 16.67

Reference Standards				
	Flow	Pressure	Temperature	Manometer
Make:	Dwyer	Fisher	Fisher	Dwyer
Model:	475 Mark III	FB1291	FB 1291	475 Mark III
Serial Number:	#2	130168457	130168457	#2
Calibration Date:	January 15, 2016	February 7, 2016	February 7, 2016	January 15, 2016

Temperature/Pressure/Flow Audit			
Reference Temperature: (±2 °C)	22.0	Δ °C	0.5
Reference Pressure: (±0.02 ATM)	0.934	Δ atm	0.000
Reference Flow (± 1.0 litres/min)	16.55	litres/min	0.12

mmHg

Flow Controller Valve Closed (V1): 23.0

Pump Valve Closed after 10 Secs. (V2): 23.0

1/2*V1=(VL): 11.5

Pass/Fail? Pass

Other Checks:

Rubber Seal Condition: OK

Inlet Head Cleanliness: Sample inlet head cleaned on July 8, 2016

Inline Filter Condition: OK

Status Alarms: OK

Insulating Jacket Condition: OK

Side Hoods and Dust Filters: OK

Location v.s. AMD: OK

Flow Setting Actual or Standard?: Actual

	As Found	As Left	% Change
Did the temperature require adjustment?	No	21.5	21.5
Did the ambient pressure require adjustment?	No	0.934	0.934
Did the ambient flow require adjustment?	No	16.55	16.55

Recommendations/Comments:

n/a

Calculations for Total Flow:

Enter Barometric Pressure in. Hg	27.96	$Q_a = m \sqrt{\frac{(\Delta P)(T_{amb})}{P_{amb}}} - b$
Barometric Pressure atm	0.934	
Enter Ambient Temperature °C	21	
Enter "m" variable	0.395	
Enter "b" variable	0.0089	
Enter Δp in. H ₂ O	5.57	
Actual Flow lpm=	16.55	

CALIBRATORS



Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2015-119

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>API 700</u>	Make/Model	<u>NA</u>
Serial Number	<u>627</u>	Serial Number	<u>NA</u>
Last Verification Date	<u>April 1 2015</u>	Temperature (°C)	<u>NA</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>NA</u>
NO/NOx Concentration	<u>50.3/50.3</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>
Pt. #3	<u>5000</u>		
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>
Pt. #3	<u>18.9</u>		

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5007	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5003	77.5	0.779	0.779	0.787	-0.001	0.786	1%	1%
5004	37.8	0.380	0.380	0.383	0.000	0.383	1%	1%
5001	18.9	0.190	0.190	0.191	0.000	0.191	1%	1%
Absolute Average Percent Difference							1%	1%

LINEAR REGRESSION ANALYSIS *y=mx+b (where x=calculated concentration, y=indicated concentration)*

NO	LIMITS	NOx
Correlation= 1.0000	≥ 0.990	Correlation= 1.0000
m (Slope)= 1.0106	0.90-1.10	m (Slope)= 1.0092
b (Intercept % of FS)= -0.0566	± 3% F.S.	b (Intercept % of FS)= -0.0368

Flow	O ₂ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5003	0	0.000	0.787	0.001	0.788	NO ₂	% Diff. Limit
5003	0.5	0.493	0.294	0.498	0.792	1%	± 10%
5003	0.25	0.256	0.531	0.262	0.792	2%	± 10%
5003	0.1	0.108	0.679	0.110	0.789	1%	± 10%
Absolute Average Percent Difference						1.2%	± 10%

LINEAR REGRESSION ANALYSIS *y=mx+b (where x=calculated concentration, y=indicated concentration)*

NO _x	LIMITS
Correlation= 1.0000	≥ 0.995
m (Slope)= 1.0089	0.90-1.10
b (Intercept % of FS)= 0.1591	± 3% F.S.

AENV Standards Audit Calibrator	NO _x Analyzer
Make/Model <u>Thermo 146i</u>	Make/Model <u>Thermo 42i</u>
Serial/AMU Number <u>1809</u>	Serial/AMU Number <u>1868</u>
	Last Calibration Date <u>February 1, 2016</u>
	Full Scale (ppm) <u>1</u>

COMMENTS: Flows not manually measured - calibration system audited as it is currently being operated.

Auditor: Shea Beaton
Operator Signature: [Signature]

Date: February 3, 2016
Location: McIntyre Center Edmonton

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>API 700</u>	Make/Model	<u>NA</u>
Serial Number	<u>829</u>	Serial Number	<u>NA</u>
Last Verification Date	<u>April 1, 2015</u>	Temperature (°C)	<u>NA</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>NA</u>
NO/NOx Concentration	<u>50.3/50.3</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>
		Pt. #3	<u>5000</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.7</u>
		Pt. #3	<u>18.8</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
4995	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5000	77.5	0.780	0.780	0.795	0.000	0.795	2%	2%
5001	37.7	0.379	0.379	0.388	0.001	0.389	2%	3%
4997	18.8	0.189	0.189	0.193	0.000	0.193	2%	2%
Absolute Average Percent Difference							2%	2%

LINEAR REGRESSION ANALYSIS *y=mx+b (where x=calculated concentration, y=indicated concentration)*

NO	LIMITS	NO _x
Correlation= 1.0000	≥ 0.990	Correlation= 1.0000
m (Slope)= 1.0193	0.90-1.10	m (Slope)= 1.0194
b (Intercept % of FS)= 0.0501	± 3% F.S.	b (Intercept % of FS)= 0.0709

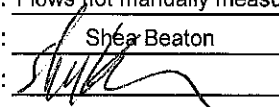
Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5000	0	0.000	0.793	0.001	0.794	NO ₂	% Diff. Limit
5000	0.5	0.533	0.260	0.537	0.797	1%	± 10%
5000	0.25	0.277	0.516	0.280	0.796	1%	± 10%
5000	0.095	0.115	0.678	0.114	0.792	-2%	± 10%
Absolute Average Percent Difference						0%	± 10%

LINEAR REGRESSION ANALYSIS *y=mx+b (where x=calculated concentration, y=indicated concentration)*

NO ₂	LIMITS
Correlation= 1.0000	≥ 0.995
m (Slope)= 1.0077	0.90-1.10
b (Intercept % of FS)= -0.0025	± 3% F.S.

AENV Standards Audit Calibrator	NO _x Analyzer
Make/Model <u>Thermo 146i</u>	Make/Model <u>Thermo 42i</u>
Serial/AMU Number <u>1809</u>	Serial/AMU Number <u>1868</u>
	Last Calibration Date <u>February 1, 2016</u>
	Full Scale (ppm) <u>1</u>

 COMMENTS: Flows not manually measured - calibration system audited as it is currently being operated.

 Auditor: Shea Beaton
 Operator Signature: 

 Date: February 3, 2016
 Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2015-116CGA

Company: Maxxam **Operator's Name:** Chris Wesson
Cylinder #: LL119346 **Concentration PPM:** 50.0 **Tolerance(%)** 2 **Certified By:** Air Liquide

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model: <u>Thermo146i</u>	Make/Model: <u>Bios DC-2</u>
Serial Number: <u>1809</u>	Serial Number: <u>Bios D</u>
Last Verification Date: <u>February 2, 2016</u>	Temp. °C: <u>24.5</u>
Gas Type: <u>SO2</u> Conc. <u>98.07</u>	B.P. <u>702mmHg</u>
Cylinder Number: <u>CAL016625</u>	

Reference Analyzer:
 Make/Model: Thermo 43C Serial/AMU Number: 1623
 Instrument Settings: Zero: 8.7 Span: 1.027 Range: 1.0
 Last Calibration: Date: 1-Feb-16 C.F. 1.000 Done By: SB

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
4952	0.0	0.000	0.00000	0.00000	0.000
4946	79.54	0.793	0.01608	62.183	49.3
4941	39.35	0.396	0.00796	125.565	49.7
4940	19.57	0.195	0.00396	252.427	49.2
Average Cylinder Concentration:					49.4

Previous Stated Concentration PPM: 50.0
 Percent variance from Stated: 1.2

Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:** SO2/NO blend 50.0ppm NO
 <=5% Outside Manufacturer Tolerance. Use manufacturers concentration
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Shea Beaton Date: February 2, 2016
 Operator Signature: [Signature] Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2014-251CGA

Company: Maxxam Operator's Name: Limin Li
 Cylinder #: LL36837 Concentration PPM: 10.0 Tolerance(%): 2 Certified By: Air Liquide

Reference Calibrator and Gas:

Make/Model: R&R MFC 201
 Serial Number: AMU 1690
 Last Verification Date: December 15, 2014
 Gas Type: H2S Conc. 20.43
 Cylinder Number: CAL015106

Flow Measurement Device:

Make/Model: Bios DC2
 Serial Number: AMU 1659
 Temp. °C: 23.0 C
 B.P.: 702 mmhg

Reference Analyzer:

Make/Model: Teco 45C Serial/AMU Number: 1624
 Instrument Settings: Zero: 6.4 Span: 1.160 Range: 0.1
 Last Calibration: Date: Dec15/14 C.F.: 1.000 Done By: Al Clark

Calibrator Flows (scem)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	0.0000	100.000	10.0
5099	38.5	0.0754	0.00755	132.442	10.0
5092	18.0	0.0349	0.00353	282.889	9.9
5066	9.2	0.0178	0.00182	550.652	9.8
Average Cylinder Concentration:					9.9

Previous Stated Concentration PPM: 10.0

Percent variance from Stated: 1.1

Meets Manufacturer Tolerance. Use manufacturers stated concentration COMMENTS: _____
 < =5% Outside Manufacturer Tolerance. Use manufacturers concentration _____
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder _____

Auditor: Al Clark
 Operator Signature: *Al Clark*

Date: December 16, 2014
 Location: McIntyre Center Edmonton



Calibration Gas Audit

CH4 / C3H8 Cylinder Gas

File No. 2015-092CGA

Company: Maxxam Operators name: Chris Wesson
Cylinder #: LL165372 Conc CH4 (PPM) 606/212 Tolerance (%) 0.5 Certified By: Praxair

Reference Calibrator and Gas:

Make/Model R&R MFC 201
Serial Number AMU 1698
Last Verification Date January 18, 2016
Gas Type CH4 Conc. 999.2
Cylinder Number D751932
Gas Type C3H8 Conc. 246.5
Cylinder Number XF0037998

Flow Measurement Device:

Make/Model Bios DC-2
Serial Number Bios D
Temp. °C 24.5
B.P. 688mmHg

Reference Analyzer:

Make/Model Thermo 55C Serial/AMU Number: 1643
Instrument Settings Zero: NA Span: NA Range: 20.0
Last Calibration: Date: 18-Jan-16 C.F. 1.000 Done By: SB

Calibrator Flows (scem)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	CH4	C3H8			CH4	C3H8
2568	0.00	0.00	0.00	0.02140	46.722	607	214
2630	56.29	12.99	12.62	0.02140	46.722	607	214
2588	19.73	4.62	4.50	0.00762	131.171	606	215
2580	9.69	2.29	2.24	0.00376	266.254	610	217
Average Cylinder Concentration:						608	215

CH4	C3H8
Previous Stated Concentration PPM: <u>606</u>	<u>212</u>
Percent variance from Stated: <u>0.3</u>	<u>1.6</u>

Cylinder gas tolerances based on CH4 only

Meets Manufacturer Tolerance. Use manufacturers stated concentration COMMENTS: _____
 <=5% Outside Manufacturer Tolerance. Use manufacturers concentration C3H8 manufacturers tolerance 1.1%
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Shea Beaton Date: January 19, 2016
Operator Signature: _____ Location: McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2015-115CGA

Company: Maxxam **Operators name:** Chris Wesson
Cylinder #: LL119346 **Conc (PPM)** 50.0/50.0 **Tolerance (%)** 2 **Certified By:** Air Liquide

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Thermo 146i</u>			Make/Model	<u>Bios DC-2</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>Bios D</u>
Last Verification Date	<u>February 2, 2016</u>			Temp. °C	<u>24.5</u>
Gas Type	<u>NO</u>	Conc.	<u>48.79</u>	B.P.	<u>702mmHg</u>
Cylinder Number	<u>CAL018024</u>				

Reference Analyzer:
Make/Model Thermo 42i **Serial/AMU Number:** 1868
Instrument Settings **Zero:** 4.2 **Span:** 1.014 **Range:** 1.0
Last Calibration: **Date:** 02-Feb-16 **C.F.** 1.000 **Done By:** SB

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
4952	0.0	0.000	0.000				
4946	79.54	0.809	0.809	0.01608	62.183	50.3	50.3
4941	39.35	0.403	0.402	0.00796	125.565	50.6	50.5
4940	19.57	0.200	0.200	0.00396	252.427	50.5	50.5
Average Cylinder Concentration:						50.5	50.4

	<u>NO</u>		<u>NOx</u>
Previous Stated Concentration PPM:	<u>50.0</u>		<u>50.0</u>
Percent variance from Stated:	<u>0.9</u>		<u>0.8</u>

Cylinder gas tolerances based on NO only

Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:** SO2/NO Blend 50.0PPM SO2
 < =5% Outside Manufacturer Tolerance. Use manufacturers concentration
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Shea Beaton **Date:** February 2, 2016
Operator Signature: [Signature] **Location:** McIntyre Center Edmonton

APPENDIX IV
ANALYTICAL RESULTS

PASSIVE SAMPLES

Your Project #: 2016/05/31 - 2016/07/28
Site Location: LICA

Attention:MICHAEL BISAGA

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
PO BOX 8237
5107W- 50TH STREET
BONNYVILLE, AB
CANADA T9N 2J5

Report Date: 2016/09/09
Report #: R2257108
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B663844

Received: 2016/08/03, 10:01

Sample Matrix: Air
Samples Received: 33

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
H2S Passive Analysis (1)	20	2016/08/11	2016/08/11	PTC SOP-00150	Tang.Passive H2S in
NO2 Passive Analysis (1)	25	2016/08/10	2016/08/11	PTC SOP-00148	Passive NO2 in ATM
O3 Passive Analysis (1)	25	2016/08/05	2016/08/11	PTC SOP-00197	EPA 300 R2.1
SO2 Passive Analysis (1)	29	2016/08/05	2016/08/11	PTC SOP-00149	Passive SO2 in Air

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) The detection limit is based on a 30 day sampling period.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Levi Manchak, Project Manager

Email: LManchak@maxxam.ca

Phone# (780)468-3536

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B663844
Report Date: 2016/09/09

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2016/05/31 - 2016/07/28
Site Location: LICA
Sampler Initials: AY

RESULTS OF CHEMICAL ANALYSES OF AIR

Maxxam ID		PD9304	PD9305	PD9307	PD9308	PD9309	PD9310	PD9311		
Sampling Date		2016/05/31 17:55	2016/05/31 14:36	2016/05/31 13:46	2016/05/31 12:21	2016/05/31 15:38	2016/05/31 19:15	2016/06/01 12:45		
	UNITS	3	4	5	6	8	9	10	RDL	QC Batch

Passive Monitoring										
Calculated H2S	ppb	0.17		0.39				0.21	0.02	8358772
Calculated NO2	ppb	0.9	0.8	0.4	2.8	0.4	0.7	1.5	0.1	8358113
Calculated O3	ppb	29.3	27.8	28.0	26.1	38.8	28.5	25.8	0.1	8352850
Calculated SO2	ppb	0.2	0.5	0.4	0.4	0.5	0.3	0.2	0.1	8352738
RDL = Reportable Detection Limit										

Maxxam ID		PD9312	PD9313	PD9314		PD9315	PD9316	PD9317		
Sampling Date		2015/11/30 15:50	2016/02/27 17:36	2016/06/01 10:17		2016/06/01 11:12	2016/05/31 19:53	2016/05/31 09:26		
	UNITS	11	12	13	QC Batch	14	15	16	RDL	QC Batch

Passive Monitoring										
Calculated H2S	ppb	0.05	MISSING	0.09	8358772	0.16		0.16	0.02	8358772
Calculated NO2	ppb	0.3	MISSING	0.3	8358113	0.5	0.7	0.9	0.1	8358113
Calculated O3	ppb	21.5	MISSING	28.9	8352850	32.3	22.2	26.3	0.1	8353025
Calculated SO2	ppb	0.2	MISSING	0.3	8352738	0.8	0.3	0.2	0.1	8352738
RDL = Reportable Detection Limit										

Maxxam ID		PD9318		PD9319	PD9320		PD9321	PD9322		
Sampling Date		2016/05/31 11:34		2016/05/31 10:06	2016/05/31 08:45		2016/05/31 14:37	2016/06/01 08:51		
	UNITS	17	QC Batch	18	19	QC Batch	22	23	RDL	QC Batch

Passive Monitoring										
Calculated H2S	ppb	0.33	8358772	0.14		8358772	0.20		0.02	8358772
Calculated NO2	ppb	1.2	8358113	0.8	0.5	8358108	0.5	0.1	0.1	8358108
Calculated O3	ppb	25.9	8353025	MISSING	27.7	8353025	24.3	26.7	0.1	8353025
Calculated SO2	ppb	0.3	8352738	0.2	0.2	8352738	0.2	0.1	0.1	8352747
RDL = Reportable Detection Limit										

Maxxam ID		PD9323	PD9324	PD9325	PD9326	PD9327	PD9328	PD9329		
Sampling Date		2016/05/31 12:56	2016/02/27 18:58	2016/06/01 10:55	2016/06/01 11:41	2016/05/31 18:47	2016/05/30 14:37	2016/05/31 17:04		
	UNITS	24	25	26	27	28	29	32	RDL	QC Batch

Passive Monitoring										
Calculated H2S	ppb	0.19	MISSING	0.15	0.42		0.17	0.17	0.02	8358772
Calculated NO2	ppb	2.0				1.3	0.4	0.2	0.1	8358108
Calculated O3	ppb	24.8				28.8	33.2	34.8	0.1	8353025
Calculated SO2	ppb	0.2	MISSING	0.6	MISSING	0.6	0.3	0.3	0.1	8352747
RDL = Reportable Detection Limit										

Maxxam Job #: B663844
Report Date: 2016/09/09

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2016/05/31 - 2016/07/28
Site Location: LICA
Sampler Initials: AY

RESULTS OF CHEMICAL ANALYSES OF AIR

Maxxam ID		PD9330	PD9333	PD9334	PD9335	PD9336	PD9338	PD9339		
Sampling Date		2016/05/31 17:16	2016/05/31 12:56	2016/05/31 18:47	2016/05/31 17:55	2016/05/31 14:36	2016/05/31 17:16	2016/05/31 13:46		
	UNITS	36	24 DUP	28 DUP	3 DUP	4 DUP	36 DUP	5 DUP	RDL	QC Batch

Passive Monitoring										
Calculated H2S	ppb	<0.02						0.46	0.02	8358772
Calculated NO2	ppb	0.8	2.3	1.4					0.1	8358108
Calculated O3	ppb	30.8	26.9	26.6					0.1	8353025
Calculated SO2	ppb	1.5			0.2	0.4	1.3		0.1	8352747

RDL = Reportable Detection Limit

Maxxam ID		PD9340		
Sampling Date		2016/06/01 12:45		
	UNITS	10 DUP	RDL	QC Batch

Passive Monitoring				
Calculated H2S	ppb	0.22	0.02	8358772
RDL = Reportable Detection Limit				

Maxxam Job #: B663844
Report Date: 2016/09/09

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2016/05/31 - 2016/07/28
Site Location: LICA
Sampler Initials: AY

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Job #: B663844
Report Date: 2016/09/09

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2016/05/31 - 2016/07/28
Site Location: LICA
Sampler Initials: AY

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8352738	OZ	Spiked Blank	Calculated SO2	2016/08/05		100	%	90 - 110
8352738	OZ	Method Blank	Calculated SO2	2016/08/05	<0.1		ppb	
8352747	OZ	Spiked Blank	Calculated SO2	2016/08/05		95	%	90 - 110
8352747	OZ	Method Blank	Calculated SO2	2016/08/05	<0.1		ppb	
8352850	YL6	Spiked Blank	Calculated O3	2016/08/05		100	%	90 - 110
8352850	YL6	Method Blank	Calculated O3	2016/08/05	<0.1		ppb	
8353025	YL6	Spiked Blank	Calculated O3	2016/08/05		99	%	90 - 110
8353025	YL6	Method Blank	Calculated O3	2016/08/05	<0.1		ppb	
8358108	YL6	Spiked Blank	Calculated NO2	2016/08/10		96	%	90 - 110
8358108	YL6	Method Blank	Calculated NO2	2016/08/10	<0.1		ppb	
8358113	YL6	Spiked Blank	Calculated NO2	2016/08/10		93	%	90 - 110
8358113	YL6	Method Blank	Calculated NO2	2016/08/10	<0.1		ppb	
8358772	LCH	Spiked Blank	Calculated H2S	2016/08/11		98	%	N/A

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

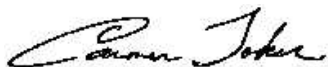
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Maxxam Job #: B663844
Report Date: 2016/09/09

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2016/05/31 - 2016/07/28
Site Location: LICA
Sampler Initials: AY

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Carmen Toker, CT, Manager Air Laboratory Services

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

VOCS SAMPLES

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 5, 2016	H2825	Ambient Air	05-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070132	REPORT CREATED:	27-Jul-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070132-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16
16070132-003	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Jul-16
16070132-003	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	15-Jul-16
16070132-003	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Jul-16
16070132-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Jul-16
16070132-003	1,2-Dichloroethane	I	0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Jul-16
16070132-003	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-003	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-003	1-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	2,2,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	2,3-Dimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16

Report certified by:	Graham Knox, Team Lead	On behalf of:	PJ Pretorius, Manager, Analysis and Testing Services	
Date:	July-27-16	Inquiries:	(780) 632 8455	E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 5, 2016	H2825	Ambient Air	05-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070132	REPORT CREATED:	27-Jul-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070132-003	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	2-Methylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	3-Methylhexane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	3-Methylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	Acetone		5.7	ppbv	0.4	AC-058	15-Jul-16
16070132-003	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Jul-16
16070132-003	Benzene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	Carbon disulfide		1.56	ppbv	0.01	AC-058	15-Jul-16
16070132-003	Carbon tetrachloride	I	0.09	ppbv	0.01	AC-058	15-Jul-16
16070132-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	Chloroform	I	0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	Chloromethane		0.75	ppbv	0.02	AC-058	15-Jul-16
16070132-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16
16070132-003	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	Cyclohexane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16

Report certified by:	Graham Knox, Team Lead	On behalf of:	PJ Pretorius, Manager, Analysis and Testing Services	
Date:	July-27-16	Inquiries:	(780) 632 8455	E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 5, 2016	H2825	Ambient Air	05-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070132	REPORT CREATED:	27-Jul-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070132-003	Cyclopentane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	Ethanol		2.0	ppbv	0.3	AC-058	15-Jul-16
16070132-003	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-003	Ethylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	Freon-11	I	0.29	ppbv	0.02	AC-058	15-Jul-16
16070132-003	Freon-113	I	0.08	ppbv	0.01	AC-058	15-Jul-16
16070132-003	Freon-114	I	0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	Freon-12		0.57	ppbv	0.02	AC-058	15-Jul-16
16070132-003	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	15-Jul-16
16070132-003	Isobutane		0.41	ppbv	0.02	AC-058	15-Jul-16
16070132-003	Isopentane	I	0.25	ppbv	0.03	AC-058	15-Jul-16
16070132-003	Isoprene	I	0.26	ppbv	0.01	AC-058	15-Jul-16
16070132-003	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-003	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	m,p-Xylene	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Jul-16
16070132-003	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16
16070132-003	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	15-Jul-16
16070132-003	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	15-Jul-16
16070132-003	Methyl ethyl ketone		0.4	ppbv	0.3	AC-058	15-Jul-16
16070132-003	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-003	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Jul-16
16070132-003	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Jul-16
16070132-003	Methylcyclohexane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	Methylcyclopentane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16

Report certified by:	Graham Knox, Team Lead	On behalf of:	PJ Pretorius, Manager, Analysis and Testing Services	
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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 5, 2016	H2825	Ambient Air	05-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070132	REPORT CREATED:	27-Jul-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070132-003	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Jul-16
16070132-003	n-Butane	I	0.08	ppbv	0.03	AC-058	15-Jul-16
16070132-003	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	15-Jul-16
16070132-003	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-003	n-Heptane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	n-Hexane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	n-Pentane	K, T, U	< 0.1	ppbv	0.1	AC-058	15-Jul-16
16070132-003	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Jul-16
16070132-003	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Jul-16
16070132-003	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Jul-16
16070132-003	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	o-Xylene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16
16070132-003	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Jul-16
16070132-003	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16
16070132-003	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16
16070132-003	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-003	Toluene	I	0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16
16070132-003	trans-2-Butene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-003	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-003	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16

Report certified by:	Graham Knox, Team Lead	On behalf of:	PJ Pretorius, Manager, Analysis and Testing Services	
Date:	July-27-16	Inquiries:	(780) 632 8455	E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 5, 2016	H2825	Ambient Air	05-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070132	REPORT CREATED:	27-Jul-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16070132-003	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	15-Jul-16
16070132-003	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	15-Jul-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: July-27-16	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/JULY 11, 2016	H3300	Ambient Air	11-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070204	REPORT CREATED:	17-Aug-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070204-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16
16070204-003	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	21-Jul-16
16070204-003	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	21-Jul-16
16070204-003	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	21-Jul-16
16070204-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	21-Jul-16
16070204-003	1,2-Dichloroethane	I	0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	21-Jul-16
16070204-003	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-003	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-003	1-Butene	I	0.24	ppbv	0.02	AC-058	21-Jul-16
16070204-003	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	1-Pentene	I	0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	2,2,4-Trimethylpentane	I	0.03	ppbv	0.01	AC-058	21-Jul-16
16070204-003	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	2,3-Dimethylpentane	I	0.04	ppbv	0.02	AC-058	21-Jul-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: August 17, 2016	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/JULY 11, 2016	H3300	Ambient Air	11-Jul-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16070204	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070204-003	2,4-Dimethylpentane	I	0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	2-Methylheptane	I	0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	2-Methylpentane	I	0.06	ppbv	0.01	AC-058	21-Jul-16
16070204-003	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	3-Methylhexane	I	0.11	ppbv	0.02	AC-058	21-Jul-16
16070204-003	3-Methylpentane	I	0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	Acetone		3.9	ppbv	0.4	AC-058	21-Jul-16
16070204-003	Acrolein		0.3	ppbv	0.3	AC-058	21-Jul-16
16070204-003	Benzene	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	Bromomethane	I	0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	Carbon disulfide	I	0.06	ppbv	0.01	AC-058	21-Jul-16
16070204-003	Carbon tetrachloride	I	0.10	ppbv	0.01	AC-058	21-Jul-16
16070204-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	Chloroform	I	0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	Chloromethane		0.55	ppbv	0.02	AC-058	21-Jul-16
16070204-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16
16070204-003	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	Cyclohexane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/JULY 11, 2016	H3300	Ambient Air	11-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070204	REPORT CREATED:	17-Aug-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070204-003	Cyclopentane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	Ethanol		2.5	ppbv	0.3	AC-058	21-Jul-16
16070204-003	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-003	Ethylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	Freon-11	I	0.23	ppbv	0.02	AC-058	21-Jul-16
16070204-003	Freon-113	I	0.05	ppbv	0.01	AC-058	21-Jul-16
16070204-003	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	Freon-12		0.42	ppbv	0.02	AC-058	21-Jul-16
16070204-003	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	21-Jul-16
16070204-003	Isobutane		2.71	ppbv	0.02	AC-058	21-Jul-16
16070204-003	Isopentane		0.35	ppbv	0.03	AC-058	21-Jul-16
16070204-003	Isoprene		0.79	ppbv	0.01	AC-058	21-Jul-16
16070204-003	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-003	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	m,p-Xylene	K, T, U	< 0.03	ppbv	0.03	AC-058	21-Jul-16
16070204-003	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16
16070204-003	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	21-Jul-16
16070204-003	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	21-Jul-16
16070204-003	Methyl ethyl ketone		0.7	ppbv	0.3	AC-058	21-Jul-16
16070204-003	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-003	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	21-Jul-16
16070204-003	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	21-Jul-16
16070204-003	Methylcyclohexane	I	0.12	ppbv	0.01	AC-058	21-Jul-16
16070204-003	Methylcyclopentane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/JULY 11, 2016	H3300	Ambient Air	11-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070204	REPORT CREATED:	17-Aug-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070204-003	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	21-Jul-16
16070204-003	n-Butane		0.49	ppbv	0.03	AC-058	21-Jul-16
16070204-003	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	21-Jul-16
16070204-003	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-003	n-Heptane	I	0.19	ppbv	0.01	AC-058	21-Jul-16
16070204-003	n-Hexane	I	0.02	ppbv	0.01	AC-058	21-Jul-16
16070204-003	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	n-Pentane	K, T, U	< 0.1	ppbv	0.1	AC-058	21-Jul-16
16070204-003	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	21-Jul-16
16070204-003	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	21-Jul-16
16070204-003	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	21-Jul-16
16070204-003	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	o-Xylene	I	0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16
16070204-003	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	21-Jul-16
16070204-003	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16
16070204-003	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16
16070204-003	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-003	Toluene	I	0.05	ppbv	0.01	AC-058	21-Jul-16
16070204-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16
16070204-003	trans-2-Butene	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-003	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-003	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: August 17, 2016	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/JULY 11, 2016	H3300	Ambient Air	11-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070204	REPORT CREATED:	17-Aug-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070204-003	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-003	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: August 17, 2016	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/July 17, 2016	2521	Ambient Air	17-Jul-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16070251	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070251-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070251-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Jul-16
16070251-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	22-Jul-16
16070251-001	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070251-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070251-001	1,2-Dichloroethane	I	0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	22-Jul-16
16070251-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-001	1-Butene	I	0.20	ppbv	0.02	AC-058	22-Jul-16
16070251-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	1-Pentene	I	0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	2,2,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	22-Jul-16
16070251-001	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	2,3-Dimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/July 17, 2016	2521	Ambient Air	17-Jul-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16070251	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070251-001	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	2-Methylhexane	I	0.02	ppbv	0.01	AC-058	22-Jul-16
16070251-001	2-Methylpentane	I	0.05	ppbv	0.01	AC-058	22-Jul-16
16070251-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	3-Methylhexane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	3-Methylpentane	I	0.02	ppbv	0.01	AC-058	22-Jul-16
16070251-001	Acetone		1.9	ppbv	0.4	AC-058	22-Jul-16
16070251-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	22-Jul-16
16070251-001	Benzene	I	0.08	ppbv	0.01	AC-058	22-Jul-16
16070251-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	Carbon disulfide	I	0.03	ppbv	0.01	AC-058	22-Jul-16
16070251-001	Carbon tetrachloride	I	0.09	ppbv	0.01	AC-058	22-Jul-16
16070251-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	Chloroform	I	0.03	ppbv	0.02	AC-058	22-Jul-16
16070251-001	Chloromethane		0.69	ppbv	0.02	AC-058	22-Jul-16
16070251-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070251-001	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	Cyclohexane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/July 17, 2016	2521	Ambient Air	17-Jul-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16070251	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070251-001	Cyclopentane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	Ethanol		0.7	ppbv	0.3	AC-058	22-Jul-16
16070251-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-001	Ethylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	Freon-11	I	0.21	ppbv	0.02	AC-058	22-Jul-16
16070251-001	Freon-113	I	0.05	ppbv	0.01	AC-058	22-Jul-16
16070251-001	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	Freon-12		0.43	ppbv	0.02	AC-058	22-Jul-16
16070251-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	22-Jul-16
16070251-001	Isobutane		1.23	ppbv	0.02	AC-058	22-Jul-16
16070251-001	Isopentane	I	0.19	ppbv	0.03	AC-058	22-Jul-16
16070251-001	Isoprene		1.22	ppbv	0.01	AC-058	22-Jul-16
16070251-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	m,p-Xylene	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070251-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070251-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	22-Jul-16
16070251-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	22-Jul-16
16070251-001	Methyl ethyl ketone		0.4	ppbv	0.3	AC-058	22-Jul-16
16070251-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	22-Jul-16
16070251-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070251-001	Methylcyclohexane	I	0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	Methylcyclopentane	I	0.02	ppbv	0.02	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 17, 2016	2521	Ambient Air	17-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070251	REPORT CREATED:	17-Aug-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070251-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	22-Jul-16
16070251-001	n-Butane		0.50	ppbv	0.03	AC-058	22-Jul-16
16070251-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	22-Jul-16
16070251-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-001	n-Heptane	I	0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	n-Hexane	I	0.03	ppbv	0.01	AC-058	22-Jul-16
16070251-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	n-Pentane	K, T, U	< 0.1	ppbv	0.1	AC-058	22-Jul-16
16070251-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Jul-16
16070251-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Jul-16
16070251-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Jul-16
16070251-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	o-Xylene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070251-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	22-Jul-16
16070251-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070251-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070251-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-001	Toluene	I	0.06	ppbv	0.01	AC-058	22-Jul-16
16070251-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070251-001	trans-2-Butene	I	0.02	ppbv	0.01	AC-058	22-Jul-16
16070251-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 17, 2016	2521	Ambient Air	17-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070251	REPORT CREATED:	17-Aug-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070251-001	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-001	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 23, 2016	1688	Ambient Air	23-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16
16080015-003	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	12-Aug-16
16080015-003	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	12-Aug-16
16080015-003	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	12-Aug-16
16080015-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	12-Aug-16
16080015-003	1,2-Dichloroethane	I	0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	12-Aug-16
16080015-003	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-003	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-003	1-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	2,2,4-Trimethylpentane	I	0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	2,3-Dimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: September-01-16	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 23, 2016	1688	Ambient Air	23-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-003	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	2-Methylpentane	I	0.02	ppbv	0.01	AC-058	12-Aug-16
16080015-003	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	3-Methylhexane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	3-Methylpentane	I	0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	Acetone		2.7	ppbv	0.4	AC-058	12-Aug-16
16080015-003	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	12-Aug-16
16080015-003	Benzene	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	Carbon disulfide	I	0.02	ppbv	0.01	AC-058	12-Aug-16
16080015-003	Carbon tetrachloride	I	0.11	ppbv	0.01	AC-058	12-Aug-16
16080015-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	Chloroform	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	Chloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16
16080015-003	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	Cyclohexane	I	0.05	ppbv	0.02	AC-058	12-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: September-01-16	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 23, 2016	1688	Ambient Air	23-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-003	Cyclopentane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	Ethanol		0.8	ppbv	0.3	AC-058	12-Aug-16
16080015-003	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-003	Ethylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	Freon-11	I	0.24	ppbv	0.02	AC-058	12-Aug-16
16080015-003	Freon-113	I	0.05	ppbv	0.01	AC-058	12-Aug-16
16080015-003	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	Freon-12	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	12-Aug-16
16080015-003	Isobutane	I	0.03	ppbv	0.02	AC-058	12-Aug-16
16080015-003	Isopentane	I	0.09	ppbv	0.03	AC-058	12-Aug-16
16080015-003	Isoprene		0.61	ppbv	0.01	AC-058	12-Aug-16
16080015-003	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-003	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	m,p-Xylene	K, T, U	< 0.03	ppbv	0.03	AC-058	12-Aug-16
16080015-003	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16
16080015-003	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	12-Aug-16
16080015-003	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	12-Aug-16
16080015-003	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	12-Aug-16
16080015-003	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-003	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	12-Aug-16
16080015-003	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	12-Aug-16
16080015-003	Methylcyclohexane	I	0.05	ppbv	0.01	AC-058	12-Aug-16
16080015-003	Methylcyclopentane	I	0.03	ppbv	0.02	AC-058	12-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: September-01-16	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 23, 2016	1688	Ambient Air	23-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-003	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	12-Aug-16
16080015-003	n-Butane	K, T, U	< 0.03	ppbv	0.03	AC-058	12-Aug-16
16080015-003	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	12-Aug-16
16080015-003	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-003	n-Heptane	I	0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	n-Hexane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	n-Pentane	K, T, U	< 0.1	ppbv	0.1	AC-058	12-Aug-16
16080015-003	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	12-Aug-16
16080015-003	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	12-Aug-16
16080015-003	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	12-Aug-16
16080015-003	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	o-Xylene	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16
16080015-003	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	12-Aug-16
16080015-003	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16
16080015-003	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16
16080015-003	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-003	Toluene	I	0.03	ppbv	0.01	AC-058	12-Aug-16
16080015-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16
16080015-003	trans-2-Butene	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-003	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-003	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: September-01-16	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 23, 2016	1688	Ambient Air	23-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16080015-003	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	12-Aug-16
16080015-003	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	12-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 29, 2016	2443	Ambient Air	29-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-005	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Aug-16
16080015-005	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	17-Aug-16
16080015-005	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	17-Aug-16
16080015-005	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Aug-16
16080015-005	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Aug-16
16080015-005	1,2-Dichloroethane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	17-Aug-16
16080015-005	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Aug-16
16080015-005	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Aug-16
16080015-005	1-Butene	I	0.10	ppbv	0.02	AC-058	17-Aug-16
16080015-005	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	1-Pentene	I	0.02	ppbv	0.01	AC-058	17-Aug-16
16080015-005	2,2,4-Trimethylpentane	I	0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	2,3,4-Trimethylpentane	I	0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	2,3-Dimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 29, 2016	2443	Ambient Air	29-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-005	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	2-Methylpentane	I	0.06	ppbv	0.01	AC-058	17-Aug-16
16080015-005	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	3-Methylhexane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	3-Methylpentane	I	0.03	ppbv	0.01	AC-058	17-Aug-16
16080015-005	Acetone		5.4	ppbv	0.4	AC-058	17-Aug-16
16080015-005	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	17-Aug-16
16080015-005	Benzene	I	0.02	ppbv	0.01	AC-058	17-Aug-16
16080015-005	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Aug-16
16080015-005	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	Bromomethane	I	0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	Carbon disulfide		3.36	ppbv	0.01	AC-058	17-Aug-16
16080015-005	Carbon tetrachloride	I	0.08	ppbv	0.01	AC-058	17-Aug-16
16080015-005	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	Chloroform	I	0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	Chloromethane		0.71	ppbv	0.02	AC-058	17-Aug-16
16080015-005	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Aug-16
16080015-005	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	Cyclohexane	I	0.03	ppbv	0.02	AC-058	17-Aug-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 29, 2016	2443	Ambient Air	29-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-005	Cyclopentane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	Ethanol		1.4	ppbv	0.3	AC-058	17-Aug-16
16080015-005	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Aug-16
16080015-005	Ethylbenzene	I	0.03	ppbv	0.01	AC-058	17-Aug-16
16080015-005	Freon-11	I	0.24	ppbv	0.02	AC-058	17-Aug-16
16080015-005	Freon-113	I	0.07	ppbv	0.01	AC-058	17-Aug-16
16080015-005	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	Freon-12		0.54	ppbv	0.02	AC-058	17-Aug-16
16080015-005	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	17-Aug-16
16080015-005	Isobutane	I	0.29	ppbv	0.02	AC-058	17-Aug-16
16080015-005	Isopentane	I	0.23	ppbv	0.03	AC-058	17-Aug-16
16080015-005	Isoprene		1.71	ppbv	0.01	AC-058	17-Aug-16
16080015-005	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Aug-16
16080015-005	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	m,p-Xylene	I	0.04	ppbv	0.03	AC-058	17-Aug-16
16080015-005	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Aug-16
16080015-005	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	17-Aug-16
16080015-005	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	17-Aug-16
16080015-005	Methyl ethyl ketone		0.8	ppbv	0.3	AC-058	17-Aug-16
16080015-005	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Aug-16
16080015-005	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	17-Aug-16
16080015-005	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Aug-16
16080015-005	Methylcyclohexane	I	0.05	ppbv	0.01	AC-058	17-Aug-16
16080015-005	Methylcyclopentane	I	0.04	ppbv	0.02	AC-058	17-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: September-01-16	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 29, 2016	2443	Ambient Air	29-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-005	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	17-Aug-16
16080015-005	n-Butane	I	0.26	ppbv	0.03	AC-058	17-Aug-16
16080015-005	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	17-Aug-16
16080015-005	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Aug-16
16080015-005	n-Heptane	I	0.02	ppbv	0.01	AC-058	17-Aug-16
16080015-005	n-Hexane	I	0.04	ppbv	0.01	AC-058	17-Aug-16
16080015-005	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	n-Pentane	I	0.1	ppbv	0.1	AC-058	17-Aug-16
16080015-005	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	17-Aug-16
16080015-005	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	17-Aug-16
16080015-005	Naphthalene		0.8	ppbv	0.5	AC-058	17-Aug-16
16080015-005	n-Nonane	I	0.02	ppbv	0.01	AC-058	17-Aug-16
16080015-005	o-Ethyltoluene	I	0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	o-Xylene	I	0.02	ppbv	0.01	AC-058	17-Aug-16
16080015-005	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Aug-16
16080015-005	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	17-Aug-16
16080015-005	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Aug-16
16080015-005	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Aug-16
16080015-005	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Aug-16
16080015-005	Toluene	I	0.09	ppbv	0.01	AC-058	17-Aug-16
16080015-005	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Aug-16
16080015-005	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Aug-16
16080015-005	trans-2-Butene	I	0.02	ppbv	0.01	AC-058	17-Aug-16
16080015-005	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Aug-16
16080015-005	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Aug-16

Report certified by:	Graham Knox, Team Lead	On behalf of:	PJ Pretorius, Manager, Analysis and Testing Services	
Date:	September-01-16	Inquiries:	(780) 632 8455	E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/July 29, 2016	2443	Ambient Air	29-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16080015-005	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	17-Aug-16
16080015-005	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	17-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: September-01-16	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

PAHS SAMPLES

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/CLS/July 5, 2016	A13-02	Air Filter	05-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070132	REPORT CREATED:	27-Jul-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070132-004	1-Methylnaphthalene		0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	2-Methylnaphthalene		0.04	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Acenaphthene		0.02	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Acenaphthylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Anthracene		0.03	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Benzo(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Benzo(a)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Benzo(e)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Chrysene		0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Fluoranthene		0.04	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Fluorene		0.04	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Naphthalene		0.02	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Phenanthrene		0.16	ug/puf	0.01	NA-017	15-Jul-16

Report certified by:	Graham Knox, Team Lead	On behalf of:	PJ Pretorius, Manager, Analysis and Testing Services	
Date:	July-27-16	Inquiries:	(780) 632 8455	E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/CLS/July 5, 2016	A13-02	Air Filter	05-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070132	REPORT CREATED:	27-Jul-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16070132-004	Pyrene		0.03 ug/puf	0.01	NA-017	15-Jul-16
16070132-004	Retene		0.02 ug/puf	0.01	NA-017	15-Jul-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: July-27-16	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/CLS/JULY 11, 2016	TE-11	Air Filter	11-Jul-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16070204	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070204-004	1-Methylnaphthalene		0.05	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	2-Methylnaphthalene		0.08	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Acenaphthene		0.05	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Acenaphthylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Anthracene		0.02	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Benzo(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Benzo(a)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Benzo(e)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Chrysene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Fluoranthene		0.06	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Fluorene		0.09	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Naphthalene		0.03	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Phenanthrene		0.24	ug/puf	0.01	NA-017	07-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: August 17, 2016	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/CLS/JULY 11, 2016	TE-11	Air Filter	11-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070204	REPORT CREATED:	17-Aug-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070204-004	Pyrene		0.05	ug/puf	0.01	NA-017	07-Aug-16
16070204-004	Retene		0.08	ug/puf	0.01	NA-017	07-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: August 17, 2016	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/CLS/July 17, 2016	P13-01	Air Filter	17-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070251	REPORT CREATED:	17-Aug-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070251-002	1-Methylnaphthalene		0.07	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	2-Methylnaphthalene		0.12	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Acenaphthene		0.09	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Acenaphthylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Anthracene		0.02	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Benzo(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Benzo(a)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Benzo(c)phenanthrene		0.02	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Benzo(e)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Chrysene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Fluoranthene		0.06	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Fluorene		0.11	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Naphthalene		0.06	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Phenanthrene		0.32	ug/puf	0.01	NA-017	07-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/CLS/July 17, 2016	P13-01	Air Filter	17-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16070251	REPORT CREATED:	17-Aug-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070251-002	Pyrene		0.05	ug/puf	0.01	NA-017	07-Aug-16
16070251-002	Retene		0.09	ug/puf	0.01	NA-017	07-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/CLS/July 23, 2016	TE-01	Air Filter	23-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-004	1-Methylnaphthalene		0.03	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	2-Methylnaphthalene		0.05	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Acenaphthene		0.04	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Acenaphthylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Anthracene		0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Benzo(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Benzo(a)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Benzo(e)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Chrysene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Fluoranthene		0.05	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Fluorene		0.06	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Naphthalene		0.02	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Perylene		0.02	ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Phenanthrene		0.17	ug/puf	0.01	NA-017	07-Aug-16

Report certified by:	Graham Knox, Team Lead	On behalf of:	PJ Pretorius, Manager, Analysis and Testing Services	
Date:	September-01-16	Inquiries:	(780) 632 8455	E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/CLS/July 23, 2016	TE-01	Air Filter	23-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16080015-004	Pyrene		0.04 ug/puf	0.01	NA-017	07-Aug-16
16080015-004	Retene		0.07 ug/puf	0.01	NA-017	07-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: September-01-16	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/CLS/July 29, 2016	TE-07	Air Filter	29-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-006	1-Methylnaphthalene		0.11	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	2-Methylnaphthalene		0.18	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Acenaphthene		0.06	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Acenaphthylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Anthracene		0.02	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Benzo(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Benzo(a)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Benzo(e)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Chrysene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Fluoranthene		0.06	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Fluorene		0.10	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Naphthalene		0.05	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Perylene		0.02	ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Phenanthrene		0.26	ug/puf	0.01	NA-017	07-Aug-16

Report certified by:	Graham Knox, Team Lead	On behalf of:	PJ Pretorius, Manager, Analysis and Testing Services	
Date:	September-01-16	Inquiries:	(780) 632 8455	E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/CLS/July 29, 2016	TE-07	Air Filter	29-Jul-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16080015-006	Pyrene		0.05 ug/puf	0.01	NA-017	07-Aug-16
16080015-006	Retene		0.07 ug/puf	0.01	NA-017	07-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: September-01-16	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

PARTISOL SAMPLES

<p>RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE</p> <p>Calgary AB T2E 6P8</p> <p>INVOICE: Charmaine Code 780 812-2182 PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5</p>	<p>CLIENT SAMPLE ID LICA Flt # P6024403</p> <p>CANISTER ID</p> <p>Matrix Air Filter</p> <p>Priority Normal</p> <p>DESCRIPTION: Cold Lake South</p> <p>DATE SAMPLED: 05-Jul-16 0:00</p> <p>REPORT CREATED: 17-Aug-16</p> <p>DATE RECEIVED: 13-Jul-16</p> <p>REPORT NUMBER: 16070131</p> <p>VERSION: Version 01</p>
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Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070131-001	Particulate Weight		0.037	mg	0.004	AC-029	18-Jul-16

Report certified by: Graham Knox, Team Lead **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@albertainnovates.ca

<p>RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE</p> <p>Calgary AB T2E 6P8</p> <p>INVOICE: Charmaine Code 780 812-2182 PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5</p>	<p>CLIENT SAMPLE ID Flt # P6024402</p> <p>CANISTER ID</p> <p>DESCRIPTION: Cold Lake South</p> <p>DATE SAMPLED: 11-Jul-16 0:00</p> <p>REPORT CREATED: 17-Aug-16</p>	<p>Matrix Air Filter</p> <p>DATE RECEIVED: 18-Jul-16</p> <p>REPORT NUMBER: 16070203</p> <p>VERSION: Version 01</p>	<p>Priority Normal</p>
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Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16070203-001	Particulate Weight		0.097 mg	0.004	AC-029	

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

<p>RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE</p> <p>Calgary AB T2E 6P8</p> <p>INVOICE: Charmaine Code 780 812-2182 PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5</p>	<p>CLIENT SAMPLE ID Flt #P6024411</p> <p>CANISTER ID</p> <p>DESCRIPTION: Cold Lake South</p> <p>DATE SAMPLED: 17-Jul-16 0:00</p> <p>REPORT CREATED: 17-Aug-16</p>	<p>Matrix Air Filter</p> <p>DATE RECEIVED: 20-Jul-16</p> <p>REPORT NUMBER: 16070250</p> <p>VERSION: Version 01</p>	<p>Priority Normal</p>
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Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16070250-001	Particulate Weight		0.310 mg	0.004	AC-029	26-Jul-16

Report certified by: Graham Knox, Team Lead **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@albertainnovates.ca

<p>RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE</p> <p>Calgary AB T2E 6P8</p> <p>INVOICE: Charmaine Code 780 812-2182 PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5</p>	<p>CLIENT SAMPLE ID Flt # P6024412</p> <p>CANISTER ID</p> <p>Matrix Air Filter</p> <p>Priority Normal</p> <p>DESCRIPTION: Cold Lake South</p> <p>DATE SAMPLED: 23-Jul-16 0:00</p> <p>REPORT CREATED: 17-Aug-16</p> <p>DATE RECEIVED: 03-Aug-16</p> <p>REPORT NUMBER: 16080014</p> <p>VERSION: Version 01</p>
--	--

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16080014-001	Particulate Weight		0.068 mg	0.004	AC-029	05-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID Flt # P6024413	CANISTER ID	Matrix Air Filter	DATE SAMPLED 29-Jul-16 0:00	
DESCRIPTION: Cold Lake South				
REPORT NUMBER: 16080014	REPORT CREATED: 17-Aug-16		VERSION: Version 01	

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16080014-002	Particulate Weight		0.069 mg	0.004	AC-029	05-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: August 17, 2016	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

APPENDIX V
REPORT CERTIFICATION FORM

Report Certification Form

Alberta Airshed (if applicable)	EPA Approval or Code of Practice Registration # (if applicable)
YES	NA
Company Name (if applicable)	Industrial Operation Name (if applicable)
Lakeland Industry & Community Association	Cold Lake South Site
Name of the Representative of the Person Responsible (Last, First, Middle)	Position / Title of the Representative of the Person Responsible
Bim Adeniji	Project Manager Assistant, Customer Service, Air Services
Is an External Party Certifying the Report? (If 'Yes', fill in the fields below for the external person.)	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Name of External Person Certifying the Report (Last, First, Middle)	Position / Title of External Person Certifying the Report
NA	NA
Company Name for the External Person Certifying the Report	Identification of Qualifications / Professional Designations of the External Person Certifying the Report
NA	NA

I certify that I have reviewed and verified the submitted report. I also certify that the report presented with this certification form is complete, accurate and representative of the monitoring results and timeframe.



Signature of the Representative of the Person Responsible / External Person Certifying the Report

07-09-2016




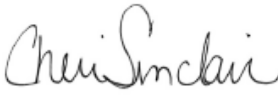
Report Issued Date (dd-mm-yyyy)

APPENDIX VI
DATA VALIDATION CERTIFICATION FORM



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2016-07-1- C</u>
Site: <u>Cold Lake South Site</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	 _____	Date <u>26-Aug-2016</u>
Level 1 Primary Validation	 _____	Date <u>26-Aug-2016</u>
Level 2 Final Validation	 _____	Date <u>07-Sep-2016</u>
Level 3 Independent Data Review	 _____	Date <u>07-Sep-2016</u>
Post-Final Validation	NA _____	Date NA _____

Notes
The Post-Final Validation step serves to re-evaluate the data that errors or omissions are discovered and/or suspected after the initial submittal of data. This validation is performed on an annual basis.

AMBIENT AIR MONITORING MONTHLY DATA REPORT
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
MASKWA SITE

JOB #: 2833-2016-07-30-C

July 2016


Prepared for:

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
BOX 8237, 5107W - 50 STREET
BONNYVILLE, ALBERTA
T9N 2J5

Attention: MIKE BISAGA


DATE: **September 8, 2016**

Prepared by:



Bim Adeniji,
Project Manager Assistant, Customer Service, Air Services

Reviewed by:



Thomas E. Bourque, C.Tech
Technical Specialist, Air Services

On Behalf of:

SUMMARY

In July 2016, the Air Services Group of Maxxam Analytics conducted an ambient air monitoring program at the Maskwa Site of Lakeland Industry & Community Association, near Cold Lake. Sampling was carried out to determine the concentrations of non-compliance parameters, as requested by the Project Coordinator.

All data collected this month were within the objectives outlined in the Air Monitoring Directive (Alberta Environment and Parks 2016).

The operational uptime for all analyzers and meteorological system were above the 90% requirement.

An internal station audit was conducted on July 14. Audit results are included in this report.

SO₂/H₂S/THC: Annual maintenance was performed on the analyzers. Due to these events, sixteen hours of data were discarded for SO₂, eighteen hours for H₂S and one hour for THC.

NO_x/NO/NO₂: The analyzer was replaced twice due to analyzer malfunction. One hour of data on July 25, at hour 08:00, was discarded due to these events.

The summary of results is presented on the following pages.

Any deviations or modifications made to the sampling or analytical methods are outlined in Section 1.0 Discussion. On this basis, Maxxam is issuing this completed report to Lakeland Industry & Community Association, Maskwa Site.

Should you have any questions concerning the results or if we can be of further assistance, please contact us at 403-219-3677 or toll-free at 1-800-386-7247.

Monthly Continuous Data Summary

Lakeland Industry & Community Association						MAXIMUM VALUES							OPERATIONAL TIME (%)
Maskwa Site						1-HOUR					24-HOUR		
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (KPH)	WIND DIRECTION (DEGREES)	READING	DAY	
	1-HR	24-HR	1-HR	24-HR									
SO2 (PPB)	172	48	0	0	0.2	4.8	13	5	3.7	NW	1.7	20	97.8
H2S (PPB)	10	3	0	0	0.2	2.4	28	7	0.4	WNW	0.8	3	97.6
THC (PPM)	-	-	-	-	2.07	2.81	28	7	0.4	WNW	2.22	18	99.9
NO2 (PPB)	159	-	0	-	1.8	13.6	15	6	2.0	NNE	3.7	5	99.9
NO (PPB)	-	-	-	-	0.7	32.9	15	6	2.0	NNE	2.2	5	99.9
NOX (PPB)	-	-	-	-	2.5	46.5	15	6	2.0	NNE	5.9	5	99.9
RELATIVE HUMIDITY (%)	-	-	-	-	72	94	VAR	VAR	VAR	VAR	85	6	100.0
BAROMETRIC PRESSURE (MILIBAR)	-	-	-	-	940	951	14	10	4.4	ENE	949	14	100.0
AMBIENT TEMPERATURE (DEG C)	-	-	-	-	17.5	28.8	28	14	7.2	SW	20.6	27	100.0
PRECIPITATION (MM)	-	-	-	-	0.1	6.2	6	15	3.7	NNE	0.5	6	100.0
VECTOR WS (KPH)	-	-	-	-	4.3	12.6	12	10	-	NNE	6.4	12	100.0
VECTOR WD (DEG)	-	-	-	-	19 (NNE)	-	-	-	-	-	-	-	100.0

NA-NOT AVAILABLE VAR-VARIOUS

Exceedance Summary Report

SO₂ 1- Hour Exceedances

No Exceedances Recorded During the Month

SO₂ 24- Hour Exceedances

No Exceedances Recorded During the Month

H₂S 1- Hour Exceedances

No Exceedances Recorded During the Month

H₂S 24- Hour Exceedances

No Exceedances Recorded During the Month

NO₂ 1- Hour Exceedances

No Exceedances Recorded During the Month

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1.0 Discussion

This monthly report consists of data for parameters Sulphur Dioxide (SO₂), Hydrogen Sulphide (H₂S), Total Hydrocarbon (THC), Oxides of Nitrogen (NO_x), Nitric Oxides (NO), Nitrogen Dioxide (NO₂), Relative Humidity (RH), Barometric Pressure (BP), Precipitation, Ambient Temperature (AmbTPX), Wind Speed (WS), Wind Direction (WD) and Standard Deviation Wind Direction (STDWD).

Sample filters for all continuous air monitors are changed before the calibration begins. The sample manifold is cleaned during the site visit each month.

Control checks, consisting of a zero and span, are conducted daily on all continuous air monitors. In place of the air sample, zero air (from scrubbed air or gas cylinders) is used for zero checks, and a known concentration of the pollutant being analyzed is used for span checks. These checks are controlled by automatic timers and valves. The total zero span cycle is completed within an hour, the commencement of the zero span cycle is at the beginning of the hour.

Multipoint calibrations are done a minimum of once a month for each continuous air monitor. An additional calibration is required under the following conditions: 1) within three days after the initial start-up and stabilization of a newly installed instrument, 2) prior to shut-down or moving of an instrument which has been working to specification, and 3) when major repair has been done on the instrument.

Time during the first multi-point calibration is not considered downtime (Data is flagged as C). If more than one calibration is performed during the month, the time during the additional calibration is considered as downtime (Data is flagged as C1).

Only one zero/span check is run per day. Time during the zero/span check is not considered as downtime (Data is flagged as S). If an extra zero/span check is performed, the time during the additional check is considered as downtime (Data is flagged as S1).

The AMD requires each instrument and accompanying data recording system to be operational 90% of the time (minimum), on a monthly basis.

All sampling, analysis, and QA/QC for this project was performed by Maxxam Analytics and complies with the Alberta Air Monitoring Directive.

Data contained in this monthly report has undergone the verification and validation based on the requirements of the AMD Chapter 6: Ambient Data Quality (August 3, 2016). The descriptions of the data verification and validation process can be found in Section 5 of this report. Instantaneous data, where applicable, is provided for reference purposes and has not undergone zero correction.

Hourly and minute data have been reviewed based on daily zero/span results and multi-point calibration results. Data may be considered invalid if a zero-corrected span check in excess of +/- 10% of the span concentration (established by the previous multi-point calibration) is encountered and/or significant differences in the calibration factor occurs (greater than 10%).

SULPHUR DIOXIDE (SO₂)

Annual maintenance was performed on the analyzer on July 20 after a shut-down calibration. The reaction cell, sample valve and manifold were cleaned. The sample pump was rebuilt and the sinter filters and O-rings were replaced. The UV lamp and high voltage power supply were adjusted to optimize the analyzer's sensitivity. The analyzer was allowed time to stabilize overnight and a post-repair calibration was completed on July 21. Both the shut-down and post-repair calibration results met AMD's requirements. Sixteen hours of data were discarded due to this event.

HYDROGEN SULPHIDE (H₂S)

Annual maintenance was performed on the analyzer on July 20 after a shut-down calibration. The reaction cell, sample valve and manifold were cleaned. The sample pump was rebuilt and the sinter filters and O-rings were replaced. The UV lamp and high voltage power supply were adjusted to optimize the analyzer's sensitivity. The analyzer was allowed time to stabilize overnight and a post-repair calibration was completed on July 21. Both the shut-down and post-repair calibration results met AMD's requirements. Eighteen hours of data were discarded due to this event.

An internal audit was completed on July 14. The audit report is included in Appendix III.

TOTAL HYDROCARBONS (THC)

A shut-down calibration was performed on July 21 prior to maintenance. The sample pump was rebuilt. The water drain filter assembly was changed and the pressure controller was adjusted. A successful post-repair calibration was completed the same day. Both the shut-down and post-repair calibration results met AMD's requirements. Hourly data on July 21, at hour 13:00, was discarded due to this event.

NITROGEN DIOXIDE (NO₂)

After a shut-down calibration on July 21, the Maxxam owned API 200A (S/N: 2166) analyzer was removed. The LICA owned API 200E (S/N: 592) was re-installed, as it was removed prior for maintenance purposes. The reaction cell, sample valve and manifold were cleaned. The O₃ scrubber was changed and the high voltage power supply was adjusted to optimize the analyzer's sensitivity. A successful installation calibration was completed afterwards.

The analyzer's response started to drift on July 21, as indicated in the daily zero/span checks. A station visit on July 25 revealed that the analyzer had a "Board Relay" warning displayed on the screen. It was determined that the analyzer be replaced again for maintenance. A successful removal calibration was performed on the API 200E (S/N: 592) analyzer and the API 200A (S/N: 2166) was installed. An installation calibration was performed the same day and the results met AMD's requirements. Hourly data on July 25, at hour 08:00, was discarded due to this event.

WIND SPEED (WS) and WIND DIRECTION (WD)

The wind system was working well throughout the month.

The wind system is reported as vector wind speed and vector wind direction. The wind direction data included in this report represents where the wind was coming from.

RELATIVE HUMIDITY (RH)

The humidity sensor was working well throughout the month.

BAROMETRIC PRESSURE (BP)

The pressure sensor was working well throughout the month.

PRECIPITATION

The rain gauge system was working well throughout the month.

AMBIENT TEMPERATURE (TPX)

The temperature sensor was working well throughout the month.

2.0 Project Personnel

Mike Bisaga was the contact for Lakeland Industry & Community Association and the Maxxam field sampling technician was Limin Li.

3.0 Plant Monthly Required AMD Summary

All data collected this month were within the objectives outlined in the AMD 2016.

The operational uptime for all analyzers and meteorological system were above the 90% requirement.

4.0 Calculations and Results

All calculations and reporting of results follow the methods described in the AMD, 2016.

5.0 Methods and Procedures

The following methods and procedures were used to complete the test program:

- Maxxam AIR SOP-00208: RM Young Monitor Calibration
- Maxxam AIR SOP-00209: Ambient H₂S Monitoring
- Maxxam AIR SOP-00211: Ambient SO₂ Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO₂/NO_x Monitoring
- Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring
- Maxxam AIR SOP-00242: Precipitation Collector Installation /Maintenance

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

- Sulphur Dioxide - API 101E UV Fluorescent Analyzer
- Hydrogen Sulphide - API 101E UV Fluorescent Analyzer
- Total Hydrocarbons - Thermo 51C FID Analyzer
- Oxides of Nitrogen - API 200A Chemiluminescent Analyzer
- Wind System - Met One Unit
- Relative Humidity - Met One Unit
- Barometric Pressure - Met One Unit
- Ambient Temperature - Met One Unit
- Precipitation - Met One Unit
- Datalogger - ESC 8832

The following steps were used to complete the data verification and validation process:

Level 0 Preliminary Verification

Level 0 data are raw data obtained directly from the data acquisition system (DAS). Under the step of Level 0, these data undergo a certain amount of manual or automated screening and flagging. It included a) identification of periods of missing data; b) verification of time stamps against reference time; c) verification that instrument diagnostics/datalogger flags indicate normal operation; d) comparison of data to upper and lower limits; e) rate of change flagging indicating that data changed too rapidly or not at all; and f) verification that zero, span and multipoint performance checks are within specifications. This level of verification is performed on a daily basis.

Level 1 Primary Validation

Validation actions under the step of Level 1 include a) review of all screening flags assigned during preliminary verification; b) review of all supporting site information and documentation; c) review of operational acceptance limits for each parameter/analyzer; d) review of daily zero/span and monthly calibration results for all gaseous parameters; and e) application of any necessary adjustments to data (e.g. baseline adjustments, below zero adjustments). This level of validation is performed on a monthly basis.

Level 2 Final Validation

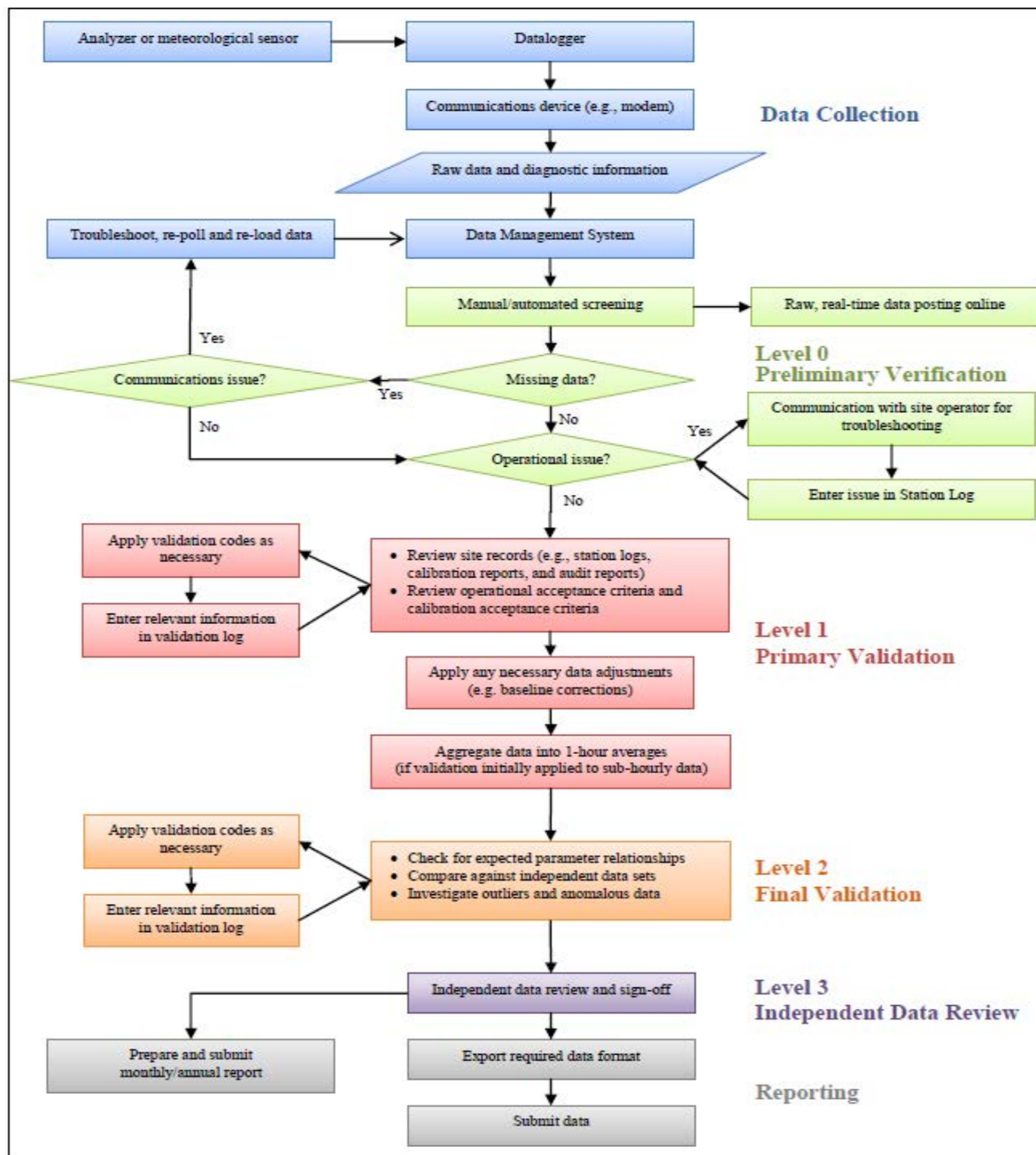
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

Level 3 Independent Data Review

Level 3 validation is the last step of data review, and it is completed by an individual that is independent of both field operations and primary data validation. A final independent QA review and endorsement is performed during this step before data is submitted to Alberta Environment.

Post-Final Validation

The Post-Final Validation step serves to re-evaluate the data that errors or omissions are discovered and/or suspected after the initial submittal of data. Any data issues or patterns which were not clear on a monthly basis are highlighted during this step. This validation is performed on an annual basis.



Source: Air Monitoring Directive (Aug 3, 2016), Chapter 6: Ambient Data Quality; Figure 1 Data Collection and Management Process Flow Chart

APPENDIX I
CONTINUOUS MONITORING DATA RESULTS

SULPHUR DIOXIDE

SULPHUR DIOXIDE (SO2) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
DAY	END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.	
1	0.0	0.7	2.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.6	1.1	0.4	0.6	S	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.4	24
2	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	0.9	0.9	S	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1	24
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.4	0.0	0.0	0.0	1.2	0.0	S	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.8	0.0	1.2	0.1	24	
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.6	2.1	0.6	0.0	S	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	24	
5	0.0	2.8	3.8	2.4	2.5	0.2	0.8	3.5	1.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.7	24	
6	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	S	0.0	1.1	1.7	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.2	24	
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	S	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	24	
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1	24	
10	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	24	
11	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
12	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
13	0.0	0.0	0.6	S	0.4	4.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.3	24	
14	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
15	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	1.4	2.2	0.1	0.0	0.0	0.0	0.3	0.9	0.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.3	24	
16	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	1.8	0.4	0.8	0.3	0.1	2.7	0.0	0.4	0.0	0.0	0.0	0.2	0.8	S	0.0	2.7	0.4	24		
17	0.3	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	2.5	0.2	24		
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	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	S	0.0	0.0	0.7	0.0	24		
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.7	1.2	0.0	1.2	0.1	24		
20	0.6	0.6	0.7	0.9	1.1	1.2	1.5	3.5	2.0	3.6	2.5	2.5	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	0.6	3.6	1.7	16	
21	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	0.0	0.0	0.4	0.5	1.2	0.9	S	0.0	0.7	2.4	0.0	0.0	2.4	0.6	16		
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.9	1.0	0.0	0.1	0.1	0.0	0.2	S	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.3	24		
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24		
25	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.9	2.5	0.8	3.0	1.8	0.2	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.4	24		
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.4	0.1	0.0	0.0	0.0	S	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.1	24		
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	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	
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.3	0.0	S	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	24		
29	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.6	S	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.1	24		
30	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	24		
31	0.1	0.2	0.0	0.0	0.0	0.0	0.3	0.5	S	0.0	0.0	0.0	0.0	0.0	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	24		
HOURLY MAX	0.6	2.8	3.8	2.4	2.5	4.8	1.5	3.5	2.5	3.6	3.0	2.5	1.1	1.7	0.7	2.7	1.2	0.9	0.0	2.9	0.7	2.4	0.8	1.2						
HOURLY AVG	0.0	0.2	0.2	0.2	0.1	0.2	0.2	0.5	0.4	0.4	0.3	0.2	0.2	0.2	0.1	0.2	0.1	0.2	0.0	0.1	0.0	0.1	0.1	0.1						

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

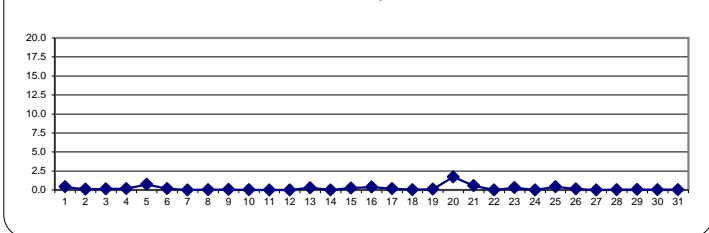
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	172	PPB	24-HR	48	PPB
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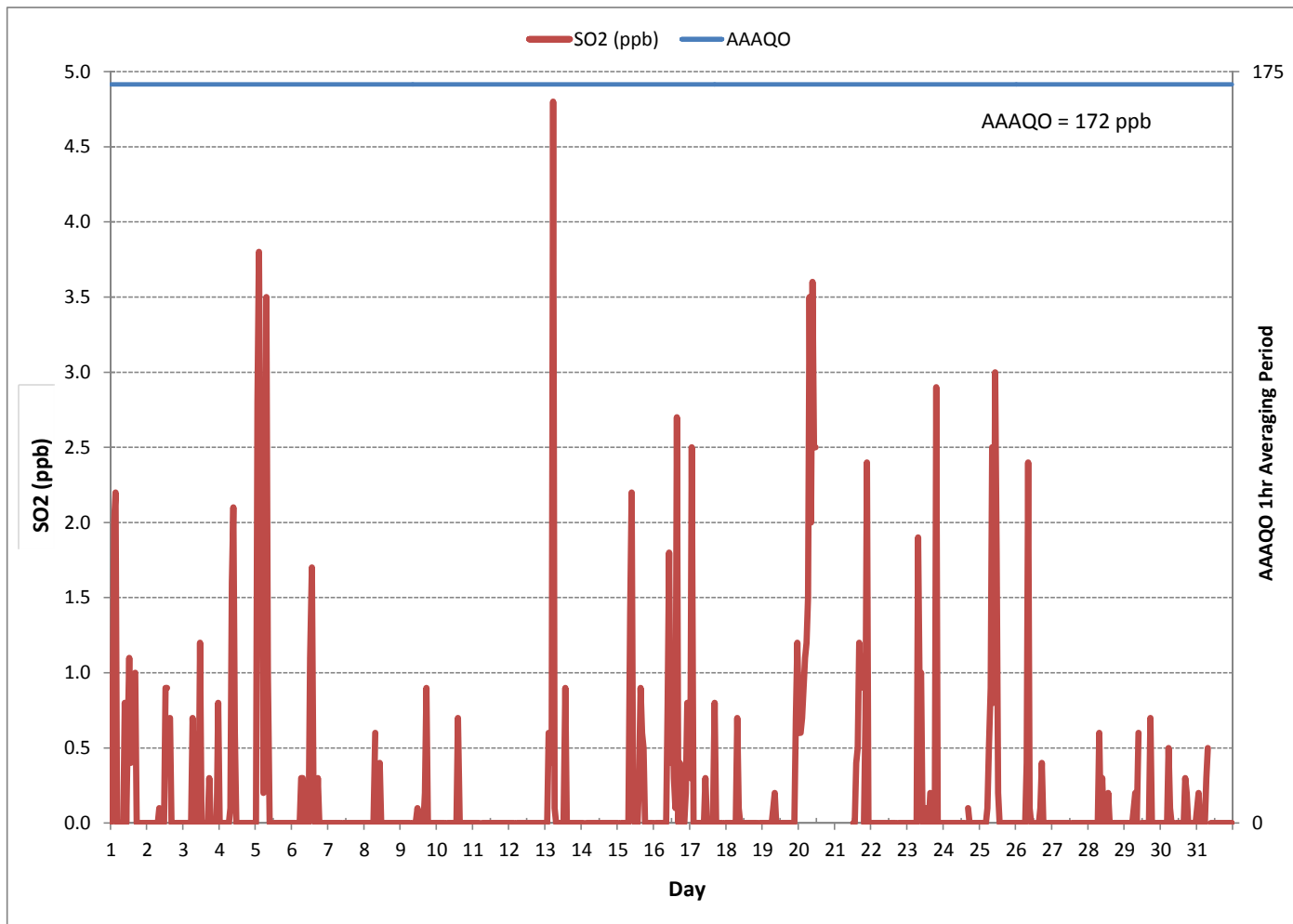
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDENCES:	0		
NUMBER OF 24-HR EXCEEDENCES:	0		
NUMBER OF NON-ZERO READINGS:	128		
MINIMUM 1-HR AVERAGE	0.0 PPB @ HOUR(S) VAR ON DAY(S) VAR		
MAXIMUM 1-HR AVERAGE:	4.8 PPB @ HOUR(S) 5 ON DAY(S) 13		
MAXIMUM 24-HR AVERAGE:	1.7 PPB ON DAY(S) 20		
	VAR-VARIOUS		
IZS CALIBRATION TIME:	31 HRS	OPERATIONAL TIME:	728 HRS
MONTHLY CALIBRATION TIME:	8 HRS	AMD OPERATION UPTIME:	97.8 %
STANDARD DEVIATION:	0.56	MONTHLY AVERAGE:	0.2 PPB

24 HOUR AVERAGES FOR July 2016



SULPHUR DIOXIDE (SO2) hourly averages in ppb





SULPHUR DIOXIDE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
DAY	MIN.	MAX.	AVG.	RDGS.																									
1	2.8	4.6	6.6	7.7	3.4	2.1	2.1	2.0	3.4	6.7	3.2	4.3	5.5	3.9	5.8	S	6.6	2.8	2.3	2.4	2.1	2.2	2.1	2.1	2.0	7.7	3.8	24	
2	2.1	2.2	2.0	2.0	2.1	2.1	3.5	4.5	4.6	3.3	4.7	4.2	5.6	6.5	S	7.6	2.7	3.0	2.6	2.7	2.6	2.6	2.7	2.8	2.0	7.6	3.4	24	
3	2.8	2.8	2.8	4.1	2.8	4.5	5.1	5.8	4.4	3.7	3.4	7.6	3.4	S	3.8	3.4	6.0	5.1	3.4	3.2	3.2	3.3	3.5	6.3	2.8	7.6	4.1	24	
4	3.7	3.6	3.4	3.2	3.2	3.4	3.7	4.0	7.0	6.7	5.6	3.2	S	2.8	2.9	3.1	3.2	3.0	4.0	3.2	5.3	3.4	3.1	3.2	2.8	7.0	3.8	24	
5	3.2	9.3	13.1	9.7	9.7	4.7	5.3	10.8	8.1	3.5	3.4	S	3.3	3.1	3.3	3.3	3.3	3.2	3.3	3.2	3.2	3.1	3.1	3.1	3.1	13.1	5.2	24	
6	3.2	3.1	3.2	3.2	3.2	3.4	4.2	3.9	3.6	3.2	S	3.8	7.1	8.8	5.3	3.7	4.5	5.3	3.4	3.4	3.5	3.4	3.2	3.2	3.1	8.8	4.0	24	
7	3.2	3.2	3.2	3.2	3.2	3.5	3.3	3.2	3.1	S	4.2	3.9	3.2	3.3	3.4	3.5	3.4	3.4	3.3	3.1	3.2	3.1	3.2	3.2	3.1	4.2	3.3	24	
8	3.2	3.2	3.2	3.3	3.2	3.2	3.2	8.3	S	5.7	6.3	3.5	3.6	3.4	3.4	3.3	3.9	3.8	3.2	3.2	3.2	3.6	3.9	3.2	3.2	8.3	3.8	24	
9	3.2	3.2	3.2	3.2	3.1	3.1	3.2	S	3.1	3.2	3.5	6.8	3.4	4.7	4.7	6.0	6.0	7.4	3.7	3.4	3.4	3.5	3.4	3.4	3.1	7.4	4.0	24	
10	3.4	3.4	3.4	3.4	3.6	3.6	S	3.7	3.7	3.7	3.8	3.7	3.7	4.0	6.0	4.6	3.6	3.7	3.6	3.9	3.9	3.7	3.8	3.8	3.4	6.0	3.8	24	
11	3.9	3.9	3.9	3.6	3.9	S	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	4.1	4.1	4.2	4.1	4.0	3.9	4.2	4.0	4.1	4.0	3.6	4.2	4.0	24	
12	3.9	4.1	3.9	4.0	S	4.0	4.0	4.0	4.0	4.1	4.0	3.9	3.9	3.9	3.9	3.9	3.9	3.9	4.0	3.9	4.0	3.9	4.0	3.9	3.9	4.1	4.0	24	
13	3.8	3.7	6.6	S	11.6	15.9	4.7	3.9	3.8	3.7	3.6	4.1	4.1	9.3	4.0	3.6	3.7	3.7	3.6	3.5	3.5	3.4	3.4	3.5	3.4	15.9	5.0	24	
14	3.4	3.4	S	3.2	3.3	3.2	3.2	3.4	3.1	3.2	3.5	3.2	3.4	3.2	4.8	3.5	4.5	4.2	3.4	3.5	3.4	3.4	3.3	3.2	3.1	4.8	3.5	24	
15	3.2	S	3.2	3.2	3.2	3.2	6.6	3.5	9.3	9.0	4.4	4.1	3.9	4.0	5.8	6.8	6.2	5.8	4.3	4.1	3.9	3.8	3.9	4.0	3.2	9.3	4.8	24	
16	S	3.9	3.9	4.0	4.0	4.0	3.9	4.5	5.0	6.0	8.5	5.6	12.3	7.1	6.4	19.6	4.3	13.6	13.4	4.1	5.0	5.5	7.3	S	3.9	19.6	6.9	24	
17	10.7	12.6	4.5	4.3	4.2	4.4	4.2	4.3	4.1	4.5	9.9	5.3	4.3	3.9	4.2	6.2	8.5	6.3	4.1	4.0	3.9	3.9	S	3.7	3.7	12.6	5.5	24	
18	3.8	3.7	3.6	3.9	3.8	3.9	4.9	6.5	5.0	5.2	4.3	4.3	4.2	4.2	4.1	4.1	4.3	4.1	4.2	4.5	S	4.2	4.5	3.6	6.5	4.3	24		
19	4.7	4.5	4.5	4.4	4.4	4.6	5.0	5.6	5.8	5.3	5.1	5.0	5.0	5.2	5.0	5.6	5.0	5.0	5.1	5.1	S	5.1	6.3	6.5	4.4	6.5	5.1	24	
20	5.6	5.2	5.2	5.0	5.0	5.0	5.0	13.5	5.3	10.2	5.7	C	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	5.0	13.5	6.4	16	
21	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	1.2	1.2	6.5	6.0	9.8	8.2	S	2.9	5.6	7.4	1.6	2.9	1.2	9.8	4.8	16
22	0.5	0.5	0.5	0.3	0.4	0.8	0.7	1.0	0.7	0.7	0.6	0.6	0.7	0.8	0.7	0.9	0.7	S	0.9	0.9	0.9	2.7	0.9	0.9	0.3	2.7	0.8	24	
23	0.8	1.2	1.1	1.0	1.4	1.4	1.1	9.8	6.0	4.8	2.2	7.5	8.6	1.0	1.0	7.1	S	1.4	4.6	12.2	1.9	0.8	0.9	0.8	0.8	12.2	3.4	24	
24	0.9	0.9	1.2	1.2	1.2	1.4	1.4	2.4	1.9	1.6	1.4	1.3	1.2	1.4	1.2	S	4.7	2.4	1.4	1.4	1.4	1.4	2.1	1.4	0.9	4.7	1.6	24	
25	1.3	1.4	1.2	1.2	1.2	4.0	2.8	6.1	10.3	5.2	10.7	6.8	5.6	3.6	S	2.0	6.8	2.2	1.6	1.4	1.6	1.5	1.6	1.5	1.2	10.7	3.5	24	
26	1.6	1.5	1.6	1.5	1.4	1.6	1.8	6.4	7.6	2.6	2.1	2.0	2.0	S	2.0	2.0	4.6	4.8	2.0	2.0	2.0	2.0	2.0	2.0	1.4	7.6	2.6	24	
27	1.8	2.1	1.9	1.8	1.8	1.9	2.0	2.1	2.4	2.3	2.6	S	2.5	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.4	2.3	1.8	2.6	2.2	24		
28	2.4	2.2	2.3	2.2	2.3	2.5	3.3	3.9	3.1	3.5	3.4	S	2.8	3.4	3.3	3.0	3.0	6.0	2.6	3.0	2.8	2.8	2.8	2.8	2.2	6.0	3.0	24	
29	2.8	3.0	2.8	2.8	3.0	3.4	3.9	4.0	3.7	4.8	S	3.4	3.5	3.4	3.4	3.4	3.5	5.1	3.6	3.4	3.7	3.5	3.4	3.4	2.8	5.1	3.5	24	
30	3.7	3.6	3.7	3.7	4.8	5.2	4.7	4.0	3.9	S	3.8	3.9	4.1	3.9	4.0	3.9	5.0	4.7	4.3	4.3	4.1	4.1	4.3	4.4	3.6	5.2	4.2	24	
31	4.9	5.0	4.2	4.2	4.3	4.3	7.8	6.5	S	4.5	4.3	4.4	4.3	4.4	4.4	4.5	4.4	4.4	4.3	4.3	4.4	4.5	4.4	4.4	4.2	7.8	4.7	24	
HOURLY MAX	10.7	12.6	13.1	9.7	11.6	15.9	7.8	13.5	10.3	10.2	10.7	7.6	12.3	9.3	6.5	19.6	9.8	13.6	13.4	12.2	5.6	7.4	7.3	6.5					
HOURLY AVG	3.3	3.6	3.6	3.4	3.5	3.7	3.7	5.0	4.6	4.5	4.4	4.2	4.2	4.0	3.9	4.7	4.6	4.6	3.7	3.5	3.3	3.4	3.3	3.3					

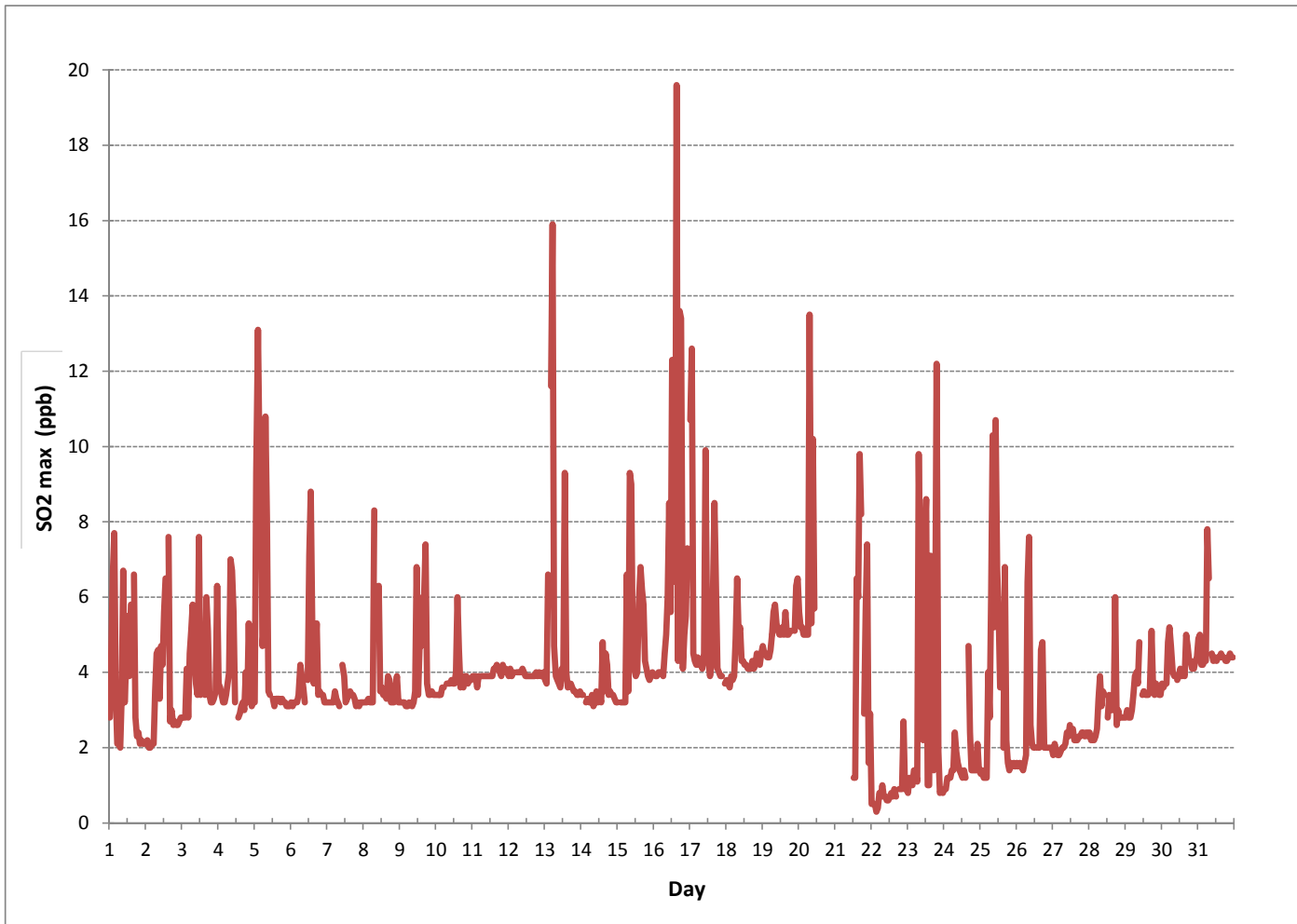
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

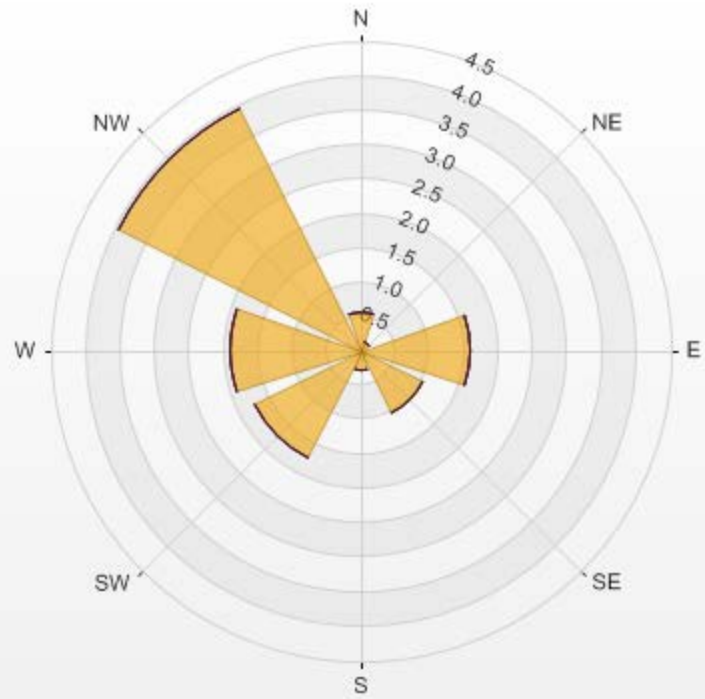
NUMBER OF NON-ZERO READINGS:	688
MAXIMUM INSTANTANEOUS VALUE:	19.6 PPB @ HOUR(S) 15 ON DAY(S) 16
VAR-VARIOUS	
IZS CALIBRATION TIME:	31 HRS
MONTHLY CALIBRATION TIME:	9 HRS
OPERATIONAL TIME:	728 HRS
STANDARD DEVIATION:	2.10

SULPHUR DIOXIDE MAX instantaneous maximum in ppb



Wind: LICA MASKWA Monitor: SO2 [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 88.82% Valid Data: 92.61% Calm Avg: 0.00

Direction	0.5-20.0	20.0-60.0	60.0-110.0	110.0-170.0	170.0-340.0	>340.0	Total
N	0.58	0	0	0	0	0	0.58
NE	0.15	0	0	0	0	0	0.15
E	1.6	0	0	0	0	0	1.6
SE	1.02	0	0	0	0	0	1.02
S	0.29	0	0	0	0	0	0.29
SW	1.74	0	0	0	0	0	1.74
W	1.89	0	0	0	0	0	1.89
NW	3.92	0	0	0	0	0	3.92
Summary	11.19	0	0	0	0	0	11.19



% Icon Classes (ppb)	11.2	0.0	0.0	0.0	0.0	0.0
0.5-20.0	20.0-60.0	60.0-110.0	110.0-170.0	170.0-340.0	>340.0	

SO2[ppb] Calibration: LICA MASKWA Monthly: 07/2016 Type: Span



■ Span Meas
 — Span Ref
 — Span Low
 — Span High

HYDROGEN SULPHIDE



HYDROGEN SULPHIDE (H2S) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
		0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.	
DAY																														
1		0.7	0.1	1.1	0.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	S	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.2	24
2		0.0	0.4	0.0	0.0	0.0	0.2	0.9	1.4	0.4	0.9	0.4	0.6	0.9	0.9	S	0.5	0.0	0.6	0.7	0.2	0.6	0.9	0.5	0.0	0.0	0.0	1.4	0.5	24
3		0.3	1.3	0.7	1.1	0.4	0.5	2.2	1.3	0.7	1.8	1.2	1.2	0.8	S	0.6	0.4	0.9	0.9	0.5	0.0	0.0	0.5	0.2	0.2	0.0	2.2	0.8	24	
4		0.2	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.3	0.0	24	
5		0.0	0.2	0.3	0.5	0.5	1.3	0.6	0.6	0.0	0.3	0.0	S	0.3	0.1	0.2	0.3	0.6	0.4	0.0	0.0	0.9	0.5	0.2	0.0	0.0	1.3	0.3	24	
6		0.0	0.1	0.2	0.4	0.8	0.3	0.4	0.5	0.5	0.0	S	0.0	0.5	0.1	0.2	0.9	0.7	0.5	0.1	0.8	0.3	0.7	0.2	0.4	0.0	0.9	0.4	24	
7		0.8	0.3	0.0	0.0	0.0	0.6	0.2	0.3	0.0	S	0.7	1.0	0.6	0.3	0.0	0.0	0.0	0.0	0.6	0.9	0.5	0.6	0.0	0.1	0.0	1.0	0.3	24	
8		0.7	2.1	0.2	0.0	0.0	0.0	0.0	0.0	S	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	2.1	0.1	24	
9		0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.2	0.3	0.0	0.3	0.1	24	
10		0.3	0.1	0.5	0.1	0.6	0.0	S	0.2	0.8	0.5	0.8	0.0	0.0	0.4	0.3	0.4	0.4	0.2	0.5	0.6	0.0	0.0	0.1	0.0	0.0	0.8	0.3	24	
11		0.0	0.0	0.1	0.0	0.0	S	0.0	0.0	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	0.3	0.1	0.0	0.0	0.3	0.0	24	
12		0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
13		0.8	0.2	0.2	S	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.1	24	
14		0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Q	Q	Q	Q	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.8	0.0	0.8	0.1	24		
15		0.7	S	0.2	0.6	0.4	0.6	1.2	0.1	0.1	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	1.2	0.2	24	
16		S	0.0	0.0	0.0	0.1	0.3	0.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	S	0.0	0.5	0.1	24	
17		0.0	0.0	0.0	0.3	0.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.7	0.1	24	
18		0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.2	0.0	0.0	24	
19		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.4	0.1	0.0	0.2	0.1	0.0	0.0	0.1	1.0	1.1	1.0	S	0.6	0.2	0.0	0.0	1.1	0.2	24	
20		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	0.0	0.0	16	
21		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14	
22		0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.3	0.2	0.0	0.0	0.3	0.0	24	
23		0.0	0.0	0.0	0.0	0.7	0.4	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.1	24	
24		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	S	0.3	0.3	0.5	0.0	0.0	0.5	0.5	0.0	0.0	0.5	0.1	24	
25		0.2	0.0	0.3	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.4	0.6	0.5	0.0	S	0.0	0.2	0.2	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.6	0.2	24	
26		0.6	0.1	0.6	1.2	0.8	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.2	24	
27		0.0	0.0	0.0	0.0	0.5	0.3	0.1	1.0	0.7	0.3	0.4	0.4	S	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	1.0	0.2	24	
28		0.0	0.0	0.5	0.2	0.3	0.7	2.2	2.4	0.4	0.3	0.0	S	0.7	0.5	0.0	0.4	0.4	0.6	0.0	0.0	0.0	0.1	0.0	0.0	0.0	2.4	0.4	24	
29		0.0	0.0	0.0	0.3	0.8	1.2	0.2	0.0	0.0	0.3	S	0.1	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	1.2	0.1	24	
30		0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	S	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	0.4	0.0	24	
31		0.0	0.0	0.0	0.3	0.7	0.0	0.5	0.5	S	0.0	0.0	0.5	0.2	0.0	0.0	0.0	0.0	0.3	0.2	0.1	0.0	0.5	0.0	0.0	0.0	0.7	0.2	24	
HOURLY MAX		0.8	2.1	1.1	1.2	1.1	1.3	2.2	2.4	0.8	1.8	1.2	1.2	0.9	0.9	0.6	0.9	0.9	1.0	1.1	1.0	1.0	0.9	0.9	0.5	0.8				
HOURLY AVG		0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.1					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

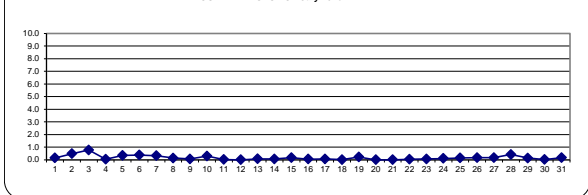
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 10 PPB 24-HR 3 PPB

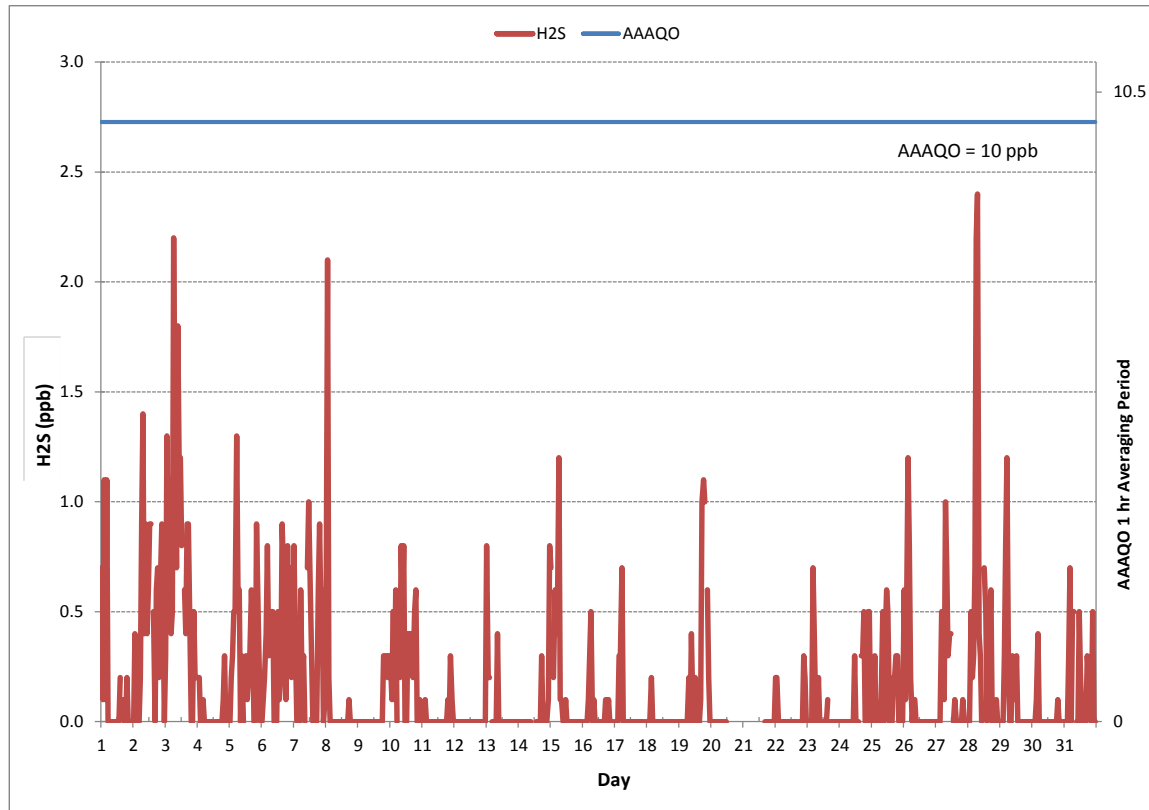
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDENCES:	0		
NUMBER OF 24-HR EXCEEDENCES:	0		
NUMBER OF NON-ZERO READINGS:	246		
MINIMUM 1-HR AVERAGE:	0.0 PPB @ HOUR(S) VAR ON DAY(S) ALL		
MAXIMUM 1-HR AVERAGE:	2.4 PPB @ HOUR(S) 7 ON DAY(S) 28		
MAXIMUM 24-HR AVERAGE:	0.8 PPB ON DAY(S) 3		
	VAR-VARIOUS		
I2S CALIBRATION TIME:	30 HRS	OPERATIONAL TIME:	726 HRS
MONTHLY CALIBRATION TIME:	10 HRS	AMD OPERATION UPTIME:	97.6 %
STANDARD DEVIATION:	0.32	MONTHLY AVERAGE:	0.2 PPB

24 HOUR AVERAGES FOR July 2016



HYDROGEN SULPHIDE (H2S) hourly averages in ppb



HYDROGEN SULPHIDE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
DAY	MIN.	MAX.	AVG.	RDGS.																									
1	3.0	1.8	3.5	2.1	3.5	0.7	1.2	1.2	0.9	0.8	1.2	1.5	1.3	1.5	1.5	S	1.5	1.0	1.4	1.5	1.2	0.9	0.6	1.2	0.6	3.5	1.5	24	
2	1.2	2.2	1.5	1.0	0.9	2.1	2.0	3.0	1.9	2.2	1.5	1.4	2.1	2.3	S	1.5	0.9	1.8	1.5	1.4	1.5	1.9	2.0	0.6	0.6	3.0	1.7	24	
3	1.4	3.6	1.6	2.6	2.0	2.3	3.4	3.2	2.5	3.8	1.9	2.1	1.9	S	1.8	1.3	1.7	1.7	1.7	0.9	1.4	1.5	1.2	1.6	0.9	3.8	2.0	24	
4	1.4	1.3	1.2	0.9	1.3	1.0	0.9	0.9	1.1	1.2	1.2	1.0	S	1.1	0.7	1.0	2.7	1.0	0.8	2.0	1.6	1.1	1.1	0.9	0.7	2.7	1.2	24	
5	1.3	1.4	1.7	1.8	1.7	2.8	1.8	1.7	1.0	1.5	0.9	S	1.7	1.4	1.4	1.1	1.6	1.6	1.4	1.2	2.1	2.1	1.1	0.8	0.8	2.8	1.5	24	
6	0.9	0.9	3.2	1.2	2.0	1.2	1.5	1.4	1.3	1.2	S	0.6	1.9	1.2	1.3	1.8	1.8	1.8	1.3	1.7	1.7	1.5	1.5	1.4	0.6	3.2	1.5	24	
7	1.8	0.9	0.9	0.4	1.2	1.1	0.9	0.8	0.6	S	2.0	2.4	1.3	1.2	0.5	0.3	1.0	1.0	1.7	2.4	2.5	2.0	1.2	1.6	0.3	2.5	1.3	24	
8	2.9	4.1	2.0	1.1	0.8	1.4	0.9	1.3	S	1.2	1.6	1.5	0.6	1.1	1.5	1.0	1.7	1.9	1.9	1.6	1.4	1.1	1.1	1.2	0.6	4.1	1.5	24	
9	1.9	1.6	0.9	1.4	0.9	1.6	1.6	S	1.2	1.1	1.1	1.2	1.3	1.2	0.3	1.2	1.1	1.2	1.6	1.9	1.5	1.4	1.2	1.1	0.3	1.9	1.3	24	
10	1.1	1.0	1.0	0.8	1.3	1.1	S	0.9	1.6	1.2	1.5	1.1	0.7	1.3	1.1	1.0	1.4	1.3	1.3	1.6	1.2	0.9	1.4	1.1	0.7	1.6	1.2	24	
11	1.4	1.2	1.2	1.2	0.8	S	0.7	1.3	1.1	1.0	3.2	1.0	0.8	0.5	0.8	0.7	1.4	1.4	1.1	1.4	1.2	1.8	2.1	1.3	0.5	3.2	1.2	24	
12	0.9	1.0	1.0	1.3	S	1.6	1.1	0.9	1.1	0.6	0.5	2.0	2.9	1.1	0.9	0.9	1.4	1.2	1.1	1.2	0.4	0.8	0.9	0.9	0.4	2.9	1.1	24	
13	3.6	3.3	1.7	S	1.1	1.3	0.9	1.3	2.1	1.8	1.3	1.5	1.4	0.4	0.7	1.4	0.9	0.7	0.7	1.2	1.4	1.5	1.5	1.0	0.4	3.6	1.4	24	
14	0.6	2.1	S	1.5	2.0	0.8	0.3	1.3	1.1	0.6	Q	Q	Q	0.8	0.6	0.6	0.6	1.2	1.2	0.3	0.6	0.2	0.7	0.9	0.2	2.1	0.9	24	
15	0.9	S	0.7	0.9	0.8	1.1	3.8	0.8	0.6	0.9	0.7	1.0	0.5	0.4	0.6	0.8	0.4	0.7	0.7	0.5	0.6	0.8	0.7	1.0	0.4	3.8	0.9	24	
16	S	0.7	1.1	1.2	1.3	2.0	1.8	1.3	1.7	0.9	0.8	1.0	1.1	0.8	1.2	1.3	0.8	2.9	2.2	1.8	1.7	1.2	1.3	S	0.7	2.9	1.4	24	
17	0.8	1.0	1.2	1.8	6.4	2.2	1.5	1.3	1.2	1.7	1.3	1.1	1.2	1.2	1.2	0.7	0.9	1.3	1.3	0.6	0.8	1.0	S	1.5	0.6	6.4	1.4	24	
18	1.2	1.1	1.1	1.6	1.7	1.0	1.2	1.6	3.5	1.1	0.9	1.0	1.7	1.5	1.5	1.4	1.0	1.0	1.1	1.1	1.2	S	0.9	1.1	0.9	3.5	1.3	24	
19	5.9	1.6	1.1	1.6	1.6	1.0	1.5	1.6	1.5	2.1	1.7	1.6	1.4	1.7	0.8	1.4	1.4	2.4	2.6	2.3	S	1.9	1.3	1.3	0.8	5.9	1.8	24	
20	1.3	0.9	1.2	1.4	1.6	1.8	1.2	1.5	1.1	1.1	1.4	C	C	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	0.9	1.8	13	16
21	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	C	1.2	0.8	0.5	0.4	0.6	0.7	0.6	0.7	0.4	1.2	0.7	14
22	0.9	0.8	0.7	0.6	0.2	0.1	1.6	0.4	0.8	0.8	0.6	0.8	0.1	0.6	0.3	0.1	0.5	S	0.9	0.7	1.0	1.1	1.2	0.0	0.0	1.6	0.6	24	
23	1.1	1.4	0.5	1.2	1.7	1.5	1.3	0.9	0.9	1.1	0.7	0.9	0.6	0.8	1.2	S	0.6	1.0	0.5	0.5	0.6	0.3	0.5	0.3	0.5	0.3	1.7	0.9	24
24	0.6	0.4	0.7	0.2	0.3	0.5	0.1	0.6	0.5	0.5	1.0	0.6	0.7	0.2	S	1.2	0.9	0.8	0.5	0.3	0.8	0.7	0.6	0.1	1.2	0.6	24		
25	0.7	0.4	1.0	0.0	0.2	0.3	0.0	1.1	1.1	0.0	0.9	0.8	0.6	0.5	S	0.2	0.3	0.3	0.8	0.4	0.7	0.2	0.3	0.5	0.0	1.1	0.5	24	
26	2.8	2.0	2.2	2.4	1.8	0.9	0.2	1.5	1.4	1.8	0.1	0.4	0.8	S	0.4	1.4	1.1	2.0	1.0	1.0	1.0	1.1	0.3	0.0	0.0	2.8	1.2	24	
27	0.0	0.5	0.7	0.5	1.2	0.9	1.2	1.4	1.5	0.9	0.8	0.8	S	0.6	0.5	1.8	0.1	0.4	0.0	0.3	0.6	0.0	0.0	0.1	0.0	1.8	0.6	24	
28	0.0	0.6	0.4	0.7	0.4	0.8	4.2	3.7	0.5	0.4	0.3	S	0.5	0.6	0.0	1.1	0.8	0.8	0.0	0.4	0.2	0.3	0.4	0.7	0.0	4.2	0.8	24	
29	0.6	0.6	0.9	1.1	1.7	1.8	0.9	0.7	0.4	0.7	S	0.8	1.0	0.5	0.8	0.3	0.0	0.7	0.7	0.0	0.3	0.3	1.4	1.3	0.0	1.8	0.8	24	
30	0.9	0.4	1.4	1.5	2.1	1.7	0.9	0.6	2.0	S	2.0	0.7	0.6	1.1	0.6	0.4	0.0	0.8	0.7	1.5	0.8	0.8	1.5	0.9	0.0	2.1	1.0	24	
31	0.2	0.7	0.6	1.4	1.6	0.7	1.7	1.5	S	0.7	0.9	1.3	1.0	0.7	2.2	0.1	0.0	1.6	1.1	1.3	0.5	1.3	1.1	0.7	0.0	2.2	1.0	24	
HOURLY MAX	5.9	4.1	3.5	2.6	6.4	2.8	4.2	3.7	3.5	3.8	3.2	2.4	2.9	2.3	2.2	1.8	2.7	2.9	2.6	2.4	2.5	2.1	2.1	1.6					
HOURLY AVG	1.4	1.4	1.3	1.2	1.5	1.3	1.4	1.4	1.3	1.2	1.2	1.2	1.2	1.0	0.9	1.0	1.0	1.2	1.1	1.1	1.1	1.1	1.0	0.9					

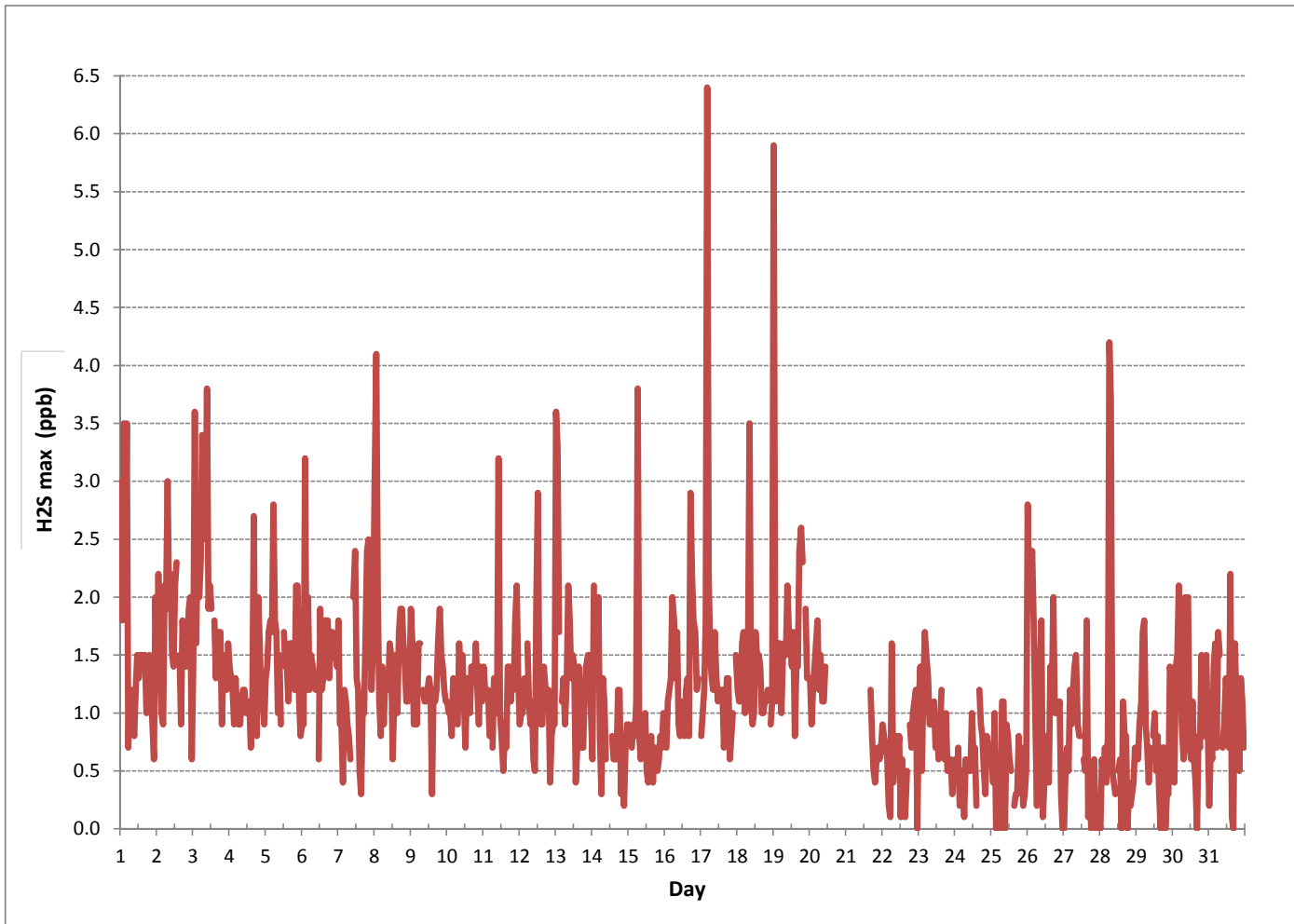
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

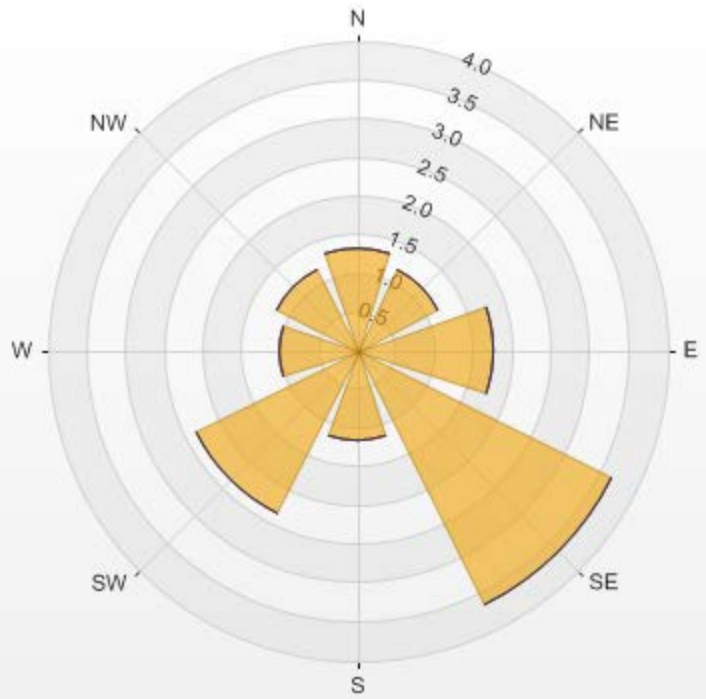
NUMBER OF NON-ZERO READINGS:	666
MAXIMUM INSTANTANEOUS VALUE:	6.4 PPB @ HOUR(S) 4 ON DAY(S) 17
	VAR-VARIOUS
IZS CALIBRATION TIME:	30 HRS
MONTHLY CALIBRATION TIME:	11 HRS
STANDARD DEVIATION:	0.71
OPERATIONAL TIME:	726 HRS

HYDROGEN SULPHIDE MAX instantaneous maximum in ppb



Wind: LICA MASKWA Monitor: H2S [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 86.38% Valid Data: 91.80% Calm Avg: 0.00

Direction	0.5-3.0	3.0-10.0	10.0-50.0	>50.0	Total
N	1.32	0	0	0	1.32
NE	1.17	0	0	0	1.17
E	1.76	0	0	0	1.76
SE	3.66	0	0	0	3.66
S	1.17	0	0	0	1.17
SW	2.34	0	0	0	2.34
W	1.02	0	0	0	1.02
NW	1.17	0	0	0	1.17
Summary	13.61	0	0	0	13.61



% Icon Classes (ppb)	13.6	0.0	0.0	0.0
0.5-3.0	0.5-3.0	3.0-10.0	10.0-50.0	>50.0

H2S[ppb] Calibration: LICA MASKWA Monthly: 07/2016 Type: Span



Span Meas Span Ref Span Low Span High

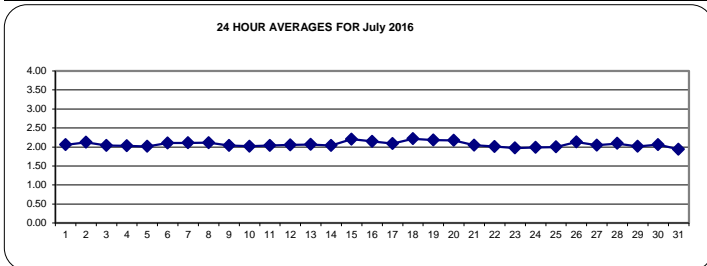
TOTAL HYDROCARBON

TOTAL HYDROCARBONS (THC) hourly averages in ppm

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.	
DAY	DAY	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
1	1	2.06	2.10	2.10	2.12	2.10	2.07	2.05	2.04	2.04	2.05	2.03	2.04	2.04	2.04	2.05	S	2.01	2.02	2.02	2.03	2.02	2.02	2.09	2.15	2.01	2.15	2.06	24	
2	2	2.18	2.21	2.22	2.34	2.35	2.27	2.09	2.06	2.04	2.04	2.04	2.05	2.04	2.05	S	2.08	2.09	2.08	2.08	2.09	2.12	2.11	2.13	2.12	2.04	2.35	2.13	24	
3	3	2.09	2.08	2.06	2.09	2.12	2.13	2.07	2.05	2.06	2.06	2.03	2.01	2.00	S	2.00	1.99	1.97	1.99	1.96	1.97	1.99	2.02	2.01	2.03	1.96	2.13	2.03	24	
4	4	2.03	2.06	1.99	2.00	2.01	2.03	2.02	2.05	2.12	2.11	2.01	1.98	S	1.99	1.98	1.99	2.00	1.98	2.02	2.03	2.05	2.05	2.10	2.08	1.98	2.12	2.03	24	
5	5	2.05	2.05	2.08	2.05	2.04	2.04	2.14	2.15	2.01	1.97	1.97	S	1.96	1.95	1.94	1.95	1.96	1.96	1.97	1.97	2.01	2.04	2.06	2.07	1.94	2.15	2.02	24	
6	6	2.09	2.13	2.17	2.21	2.23	2.30	2.33	2.35	2.25	2.08	S	1.98	1.98	2.00	2.00	1.97	1.97	1.97	1.98	2.03	2.03	2.06	2.10	2.13	1.97	2.35	2.10	24	
7	7	2.18	2.23	2.30	2.37	2.40	2.31	2.14	2.08	2.06	S	2.05	2.00	1.99	1.99	2.02	2.01	2.01	2.02	2.02	2.04	2.03	2.03	2.06	2.15	1.99	2.40	2.11	24	
8	8	2.22	2.32	2.42	2.33	2.24	2.29	2.22	2.06	S	2.04	2.04	2.01	1.99	1.99	2.02	2.00	2.04	2.01	1.99	2.01	2.04	2.06	2.11	2.12	1.99	2.42	2.11	24	
9	9	2.12	2.07	2.12	2.20	2.17	2.17	S	2.02	2.01	1.98	1.98	1.98	1.98	1.98	1.99	1.99	1.99	1.97	1.96	1.97	1.99	2.02	2.02	2.02	1.96	2.20	2.04	24	
10	10	2.07	2.03	2.02	2.02	2.03	2.06	S	2.02	1.99	1.97	1.97	1.98	1.99	1.99	2.00	1.99	1.98	1.97	1.97	1.99	2.01	2.12	2.12	2.13	1.97	2.13	2.02	24	
11	11	2.11	2.08	2.10	2.10	2.08	S	2.06	2.02	1.99	2.01	2.01	2.00	2.00	2.00	1.99	2.00	2.00	2.00	2.02	2.04	2.06	2.09	2.09	1.99	2.11	2.02	24		
12	12	2.08	2.13	2.09	2.09	S	2.10	2.08	2.01	2.00	2.00	2.00	2.00	2.03	2.04	2.03	2.02	2.02	2.02	2.03	2.04	2.05	2.08	2.12	2.14	2.00	2.14	2.05	24	
13	13	2.15	2.15	2.21	S	2.15	2.18	2.12	2.07	2.03	2.04	2.03	2.03	2.02	2.03	2.03	2.02	2.01	2.01	2.02	1.99	1.99	2.04	2.04	2.10	1.99	2.21	2.06	24	
14	14	2.19	2.12	S	2.11	2.10	2.10	2.04	2.01	1.99	1.99	2.02	2.01	2.00	2.00	2.00	2.00	2.00	2.00	2.01	2.02	2.02	2.03	2.05	2.11	1.99	2.19	2.04	24	
15	15	2.24	S	2.41	2.59	2.60	2.61	2.80	2.29	2.06	2.04	2.04	2.04	2.02	2.03	2.04	2.04	2.04	2.03	2.03	2.03	2.09	2.14	2.21	2.29	2.02	2.80	2.20	24	
16	16	S	2.27	2.21	2.24	2.30	2.39	2.43	2.36	2.13	2.13	2.07	2.04	2.04	2.03	2.04	2.07	2.01	2.07	2.02	2.01	2.07	2.11	2.16	S	2.01	2.43	2.15	24	
17	17	2.08	2.11	2.10	2.13	2.14	2.14	2.14	2.11	2.06	2.04	2.05	2.04	2.04	2.05	2.05	2.07	2.06	2.07	2.02	2.10	2.10	2.10	S	2.24	2.04	2.24	2.09	24	
18	18	2.34	2.34	2.30	2.52	2.75	2.40	2.42	2.35	2.23	2.12	2.11	2.15	2.08	2.10	2.07	2.07	2.05	2.06	2.06	2.06	2.06	S	2.12	2.26	2.05	2.75	2.22	24	
19	19	2.33	2.25	2.26	2.28	2.30	2.28	2.34	2.33	2.28	2.21	2.17	2.12	2.11	2.13	2.01	2.04	2.04	2.05	2.05	S	2.08	2.19	2.27	2.01	2.34	2.18	24		
20	20	2.31	2.35	2.48	2.59	2.58	2.66	2.47	2.20	1.98	1.99	2.01	2.03	2.02	1.99	1.94	2.41	2.05	2.04	2.01	S	1.99	1.97	1.98	2.00	1.94	2.66	2.18	24	
21	21	2.05	2.14	2.18	2.16	2.13	2.08	2.07	2.07	C	C	C	C	C	Y	C	C	C	C	1.95	1.92	1.95	1.98	2.02	1.97	2.02	1.92	2.18	2.05	23
22	22	2.01	2.02	2.02	1.99	2.05	2.18	2.07	2.02	2.02	2.03	2.03	1.99	2.05	2.01	1.98	2.01	2.00	S	1.96	1.97	1.98	1.98	1.95	1.95	1.95	2.18	2.01	24	
23	23	1.97	1.99	2.09	2.18	2.09	1.97	1.95	1.97	1.96	1.96	1.93	1.94	1.92	1.92	1.92	1.93	S	1.93	1.95	1.99	1.92	1.93	1.94	2.00	1.92	2.18	1.97	24	
24	24	2.04	2.02	2.04	2.03	2.06	2.13	2.11	2.22	2.16	2.05	1.94	1.91	1.89	1.91	1.91	S	1.91	1.92	1.85	1.86	1.89	1.91	1.99	1.97	1.85	2.22	1.99	24	
25	25	2.02	2.09	2.02	1.98	2.05	2.14	2.04	1.99	1.96	1.96	1.98	1.97	1.94	1.94	S	1.94	1.94	1.93	1.93	1.94	1.96	2.04	2.08	2.11	1.93	2.14	2.00	24	
26	26	2.15	2.20	2.21	2.21	2.22	2.43	2.47	2.36	2.22	2.06	2.09	2.21	2.03	S	2.06	2.11	2.14	2.11	1.99	1.87	1.91	1.95	2.00	2.06	1.87	2.47	2.13	24	
27	27	2.12	2.13	2.12	2.09	2.07	2.08	2.15	2.17	2.16	2.08	2.09	2.05	S	1.94	2.00	1.98	1.94	1.94	1.93	1.95	1.99	2.02	2.01	2.07	1.93	2.17	2.05	24	
28	28	2.16	2.14	2.13	2.19	2.25	2.35	2.74	2.81	2.14	2.09	2.05	S	1.93	1.95	1.94	1.92	1.90	1.90	1.88	1.89	1.89	1.93	1.96	1.97	1.88	2.81	2.09	24	
29	29	2.03	2.09	2.17	2.19	2.07	2.11	2.13	2.09	2.04	2.05	S	1.93	1.93	1.93	1.92	1.90	1.92	1.91	1.94	1.94	2.00	2.04	2.10	1.90	2.19	2.01	24		
30	30	2.16	2.24	2.29	2.25	2.24	2.09	2.06	2.07	2.03	S	2.22	2.14	2.08	2.01	1.98	1.95	1.95	1.98	1.95	1.95	1.94	1.92	1.94	1.93	1.92	2.29	2.06	24	
31	31	1.91	1.92	1.92	1.92	1.94	1.94	1.98	1.96	S	1.92	1.90	1.90	1.91	1.92	1.91	1.92	1.92	1.91	1.89	1.92	1.93	1.99	2.05	2.00	1.89	2.05	1.93	24	
HOURLY MAX		2.34	2.35	2.48	2.59	2.75	2.66	2.80	2.81	2.28	2.21	2.22	2.21	2.11	2.13	2.07	2.41	2.14	2.11	2.08	2.10	2.12	2.14	2.21	2.29					
HOURLY AVG		2.12	2.14	2.16	2.19	2.20	2.20	2.20	2.14	2.07	2.04	2.03	2.02	2.00	2.00	1.99	2.01	2.00	1.99	1.98	1.99	2.00	2.03	2.06	2.09					

STATUS FLAG CODES

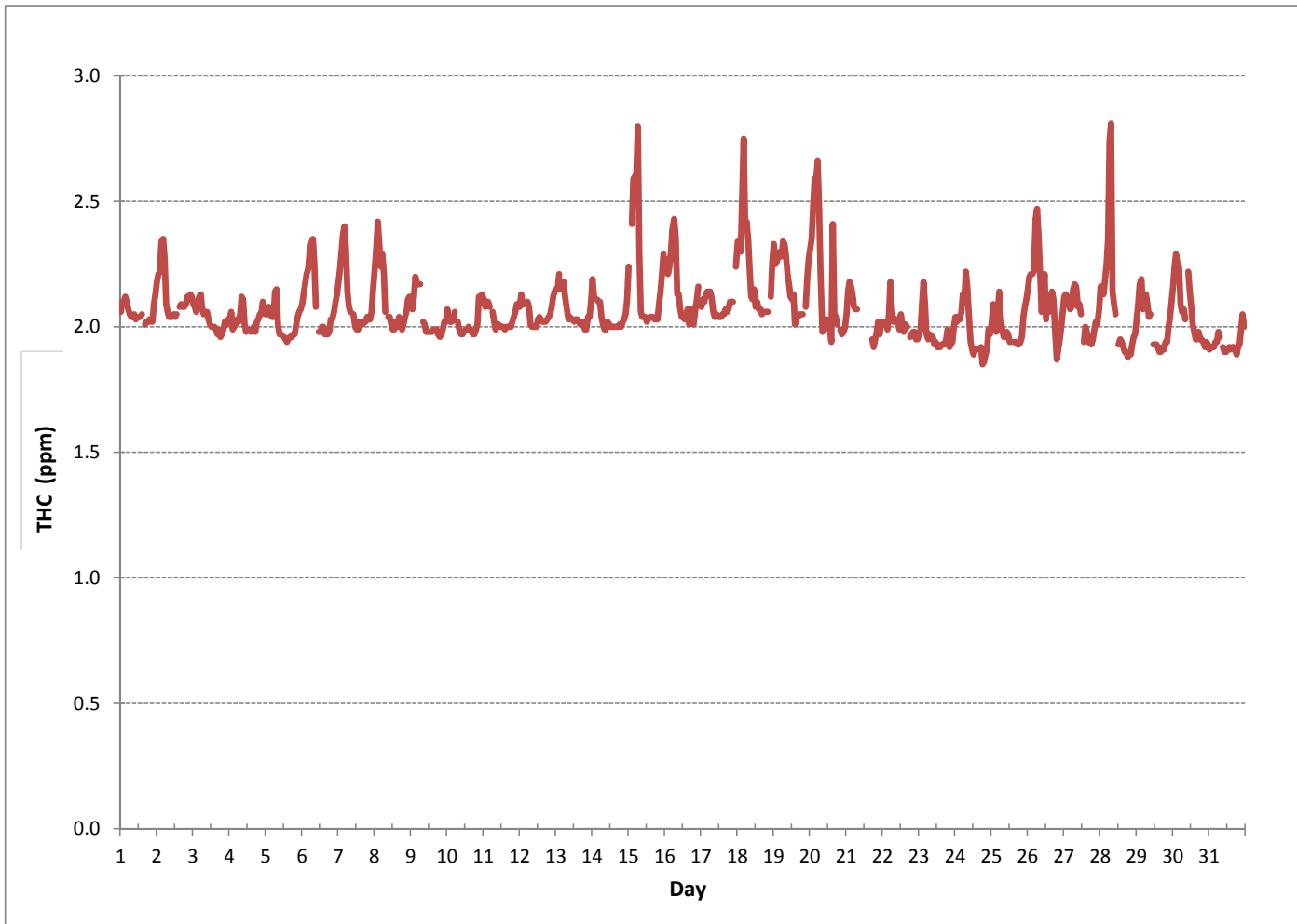
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	704			
MINIMUM 1-HR AVERAGE:	1.85	PPM @ HOUR(S)	18	ON DAY(S) 24
MAXIMUM 1-HR AVERAGE:	2.81	PPM @ HOUR(S)	7	ON DAY(S) 28
MAXIMUM 24-HR AVERAGE:	2.22	PPM		ON DAY(S) 18
				VAR-VARIOUS
IZS CALIBRATION TIME:	31	HRS	OPERATIONAL TIME:	743.00
MONTHLY CALIBRATION TIME:	8	HRS	AMD OPERATION UPTIME:	99.9 %
STANDARD DEVIATION:	0.13		MONTHLY AVERAGE:	2.07
				PPM

TOTAL HYDROCARBONS (THC) hourly averages in ppm





TOTAL HYDROCARBONS MAX instantaneous maximum in ppm

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.
HOUR START	HOUR END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59				
DAY 1		2.20	2.22	2.22	2.24	2.20	2.17	2.15	2.12	2.17	2.22	2.15	2.19	2.17	2.14	2.15	S	2.11	2.12	2.11	2.12	2.11	2.15	2.19	2.29	2.11	2.29	2.17	24
2		2.30	2.32	2.43	2.48	2.49	2.41	2.27	2.17	2.15	2.17	2.14	2.14	2.14	2.17	S	2.17	2.16	2.17	2.15	2.17	2.17	2.17	2.20	2.19	2.14	2.49	2.23	24
3		2.15	2.15	2.11	2.15	2.19	2.21	2.14	2.09	2.09	2.11	2.06	2.06	2.03	S	2.05	2.09	2.09	2.08	2.00	2.00	2.03	2.15	2.09	2.17	2.00	2.21	2.10	24
4		2.12	2.12	2.03	2.03	2.03	2.09	2.08	2.14	2.22	2.26	2.12	2.06	S	2.08	2.03	2.03	2.05	2.02	2.09	2.09	2.12	2.15	2.18	2.12	2.02	2.26	2.10	24
5		2.12	2.17	2.21	2.18	2.12	2.18	2.29	2.26	2.24	2.00	2.00	S	2.00	1.99	2.00	1.99	2.00	2.02	2.02	2.03	2.06	2.09	2.12	2.12	1.99	2.29	2.10	24
6		2.17	2.18	2.26	2.29	2.35	2.41	2.42	2.43	2.39	2.22	S	2.05	2.05	2.08	2.06	2.03	2.05	2.02	2.03	2.09	2.11	2.12	2.19	2.20	2.02	2.43	2.18	24
7		2.26	2.32	2.41	2.46	2.49	2.59	2.32	2.12	2.12	S	2.12	2.09	2.03	2.06	2.08	2.06	2.06	2.09	2.13	2.26	2.06	2.09	2.15	2.24	2.03	2.59	2.20	24
8		2.53	2.53	2.65	2.53	2.35	2.53	2.62	2.17	S	2.15	2.15	2.06	2.05	2.05	2.06	2.09	2.12	2.09	2.06	2.09	2.12	2.12	2.22	2.24	2.05	2.65	2.24	24
9		2.26	2.14	2.24	2.35	2.27	2.29	2.35	S	2.12	2.09	2.05	2.08	2.05	2.09	2.06	2.08	2.08	2.08	2.03	2.03	2.03	2.06	2.11	2.09	2.03	2.35	2.13	24
10		2.24	2.09	2.09	2.08	2.09	2.17	S	2.09	2.05	2.02	2.03	2.03	2.03	2.06	2.03	2.03	2.03	2.03	2.03	2.03	2.11	2.22	2.20	2.19	2.02	2.24	2.09	24
11		2.18	2.15	2.15	2.19	2.17	S	2.13	2.08	2.03	2.03	2.06	2.03	2.03	2.03	2.06	2.05	2.06	2.05	2.05	2.06	2.26	2.16	2.17	2.14	2.03	2.26	2.10	24
12		2.17	2.20	2.17	2.16	S	2.16	2.17	2.06	2.05	2.06	2.06	2.06	2.17	2.20	2.09	2.06	2.08	2.08	2.08	2.09	2.12	2.15	2.18	2.20	2.05	2.20	2.12	24
13		2.21	2.21	2.32	S	2.26	2.37	2.20	2.15	2.11	2.12	2.12	2.11	2.11	2.14	2.12	2.11	2.11	2.11	2.11	2.11	2.09	2.17	2.15	2.35	2.09	2.37	2.17	24
14		2.36	2.24	S	2.26	2.29	2.21	2.19	2.16	2.09	2.09	2.67	2.14	2.29	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.17	2.19	2.30	2.09	2.67	2.20	24
15		2.41	S	2.57	2.82	2.85	3.06	3.28	2.64	2.19	2.17	2.14	2.15	2.15	2.14	2.14	2.14	2.14	2.12	2.14	2.18	2.26	2.35	2.39	2.12	3.28	2.37	24	
16		S	2.38	2.36	2.38	2.43	2.54	2.53	2.58	2.22	2.26	2.21	2.14	2.21	2.15	2.19	2.29	2.09	2.62	2.11	2.09	2.22	2.29	2.36	S	2.09	2.62	2.30	24
17		2.24	2.26	2.18	2.20	2.22	2.21	2.20	2.19	2.15	2.15	2.13	2.14	2.12	2.17	2.13	2.14	2.20	2.15	2.17	2.20	2.18	2.18	S	2.39	2.12	2.39	2.19	24
18		2.43	2.44	2.41	3.17	3.09	2.62	2.59	2.59	2.34	2.27	2.21	2.26	2.18	2.20	2.17	2.14	2.12	2.14	2.15	2.13	2.14	S	2.19	2.59	2.12	3.17	2.37	24
19		2.55	2.32	2.35	2.50	2.37	2.39	2.46	2.40	2.39	2.32	2.27	2.22	2.20	2.20	2.11	2.29	2.09	2.12	2.11	2.11	S	2.16	2.27	2.33	2.09	2.55	2.28	24
20		2.39	2.43	2.62	2.65	2.73	2.74	2.65	2.79	2.08	2.08	2.12	2.12	2.10	2.12	2.00	5.70	4.68	3.73	2.45	S	2.06	2.03	2.02	2.06	2.00	5.70	2.62	24
21		2.09	2.21	2.21	2.21	2.18	2.12	2.11	2.12	C	C	C	C	C	Y	C	C	C	C	2.03	2.06	2.10	2.13	2.04	2.19	2.03	2.21	2.12	23
22		2.01	2.02	2.03	1.99	2.16	2.33	2.22	2.07	2.00	2.03	2.03	1.99	2.05	2.00	1.96	1.97	1.97	S	1.94	1.94	1.96	2.00	1.91	1.91	1.91	2.33	2.02	24
23		1.94	1.99	2.15	2.16	2.12	2.03	1.91	2.12	1.97	2.06	1.94	1.97	1.94	1.91	1.94	1.99	S	2.00	2.03	2.07	1.90	1.88	1.92	1.99	1.88	2.16	2.00	24
24		2.02	2.02	2.03	2.00	2.06	2.12	2.12	2.31	2.27	2.06	1.94	1.88	1.86	1.88	1.88	S	2.00	1.95	1.94	1.83	1.87	2.12	2.06	1.97	1.83	2.31	2.01	24
25		2.06	2.13	2.02	1.97	2.27	2.36	2.09	2.03	2.00	2.03	2.15	2.04	1.94	1.96	S	1.94	1.94	1.91	1.94	1.91	1.96	2.07	2.09	2.16	1.91	2.36	2.04	24
26		2.19	2.27	2.24	2.25	2.29	2.85	2.56	2.43	2.40	2.16	2.22	2.24	2.13	S	2.09	2.12	2.16	2.18	2.08	1.90	1.93	2.00	2.03	2.25	1.90	2.85	2.22	24
27		2.22	2.22	2.16	2.12	2.09	2.12	2.18	2.19	2.21	2.12	2.12	2.09	S	1.97	2.03	2.03	1.97	1.95	1.94	1.97	2.02	2.06	2.03	2.18	1.94	2.22	2.09	24
28		2.21	2.16	2.18	2.27	2.31	2.58	3.22	3.10	2.24	2.12	2.13	S	1.97	1.99	1.96	1.94	1.91	1.97	1.91	1.91	1.91	1.94	1.99	1.99	1.91	3.22	2.17	24
29		2.06	2.12	2.22	2.25	2.12	2.15	2.16	2.15	2.06	2.06	S	1.94	1.91	1.93	1.94	1.91	1.88	1.91	1.91	1.93	1.94	2.03	2.08	2.21	1.88	2.25	2.04	24
30		2.22	2.25	2.28	2.24	2.22	2.22	2.03	2.05	2.00	S	2.24	2.16	2.06	1.97	2.07	1.90	1.91	1.91	1.94	1.94	1.91	1.88	1.88	1.88	1.88	2.28	2.05	24
31		1.85	1.87	1.85	1.87	1.88	1.88	2.06	1.97	S	1.94	1.90	1.88	1.86	2.00	1.85	1.88	1.88	1.87	1.87	1.88	1.91	1.99	2.03	1.99	1.85	2.06	1.91	24
HOURLY MAX		2.55	2.53	2.65	3.17	3.09	3.06	3.28	3.10	2.40	2.32	2.67	2.26	2.29	2.20	2.19	5.70	4.68	3.73	2.45	2.26	2.26	2.29	2.36	2.59				
HOURLY AVG		2.21	2.20	2.24	2.28	2.29	2.34	2.32	2.26	2.16	2.12	2.12	2.08	2.07	2.06	2.05	2.19	2.14	2.12	2.05	2.04	2.06	2.10	2.12	2.18				

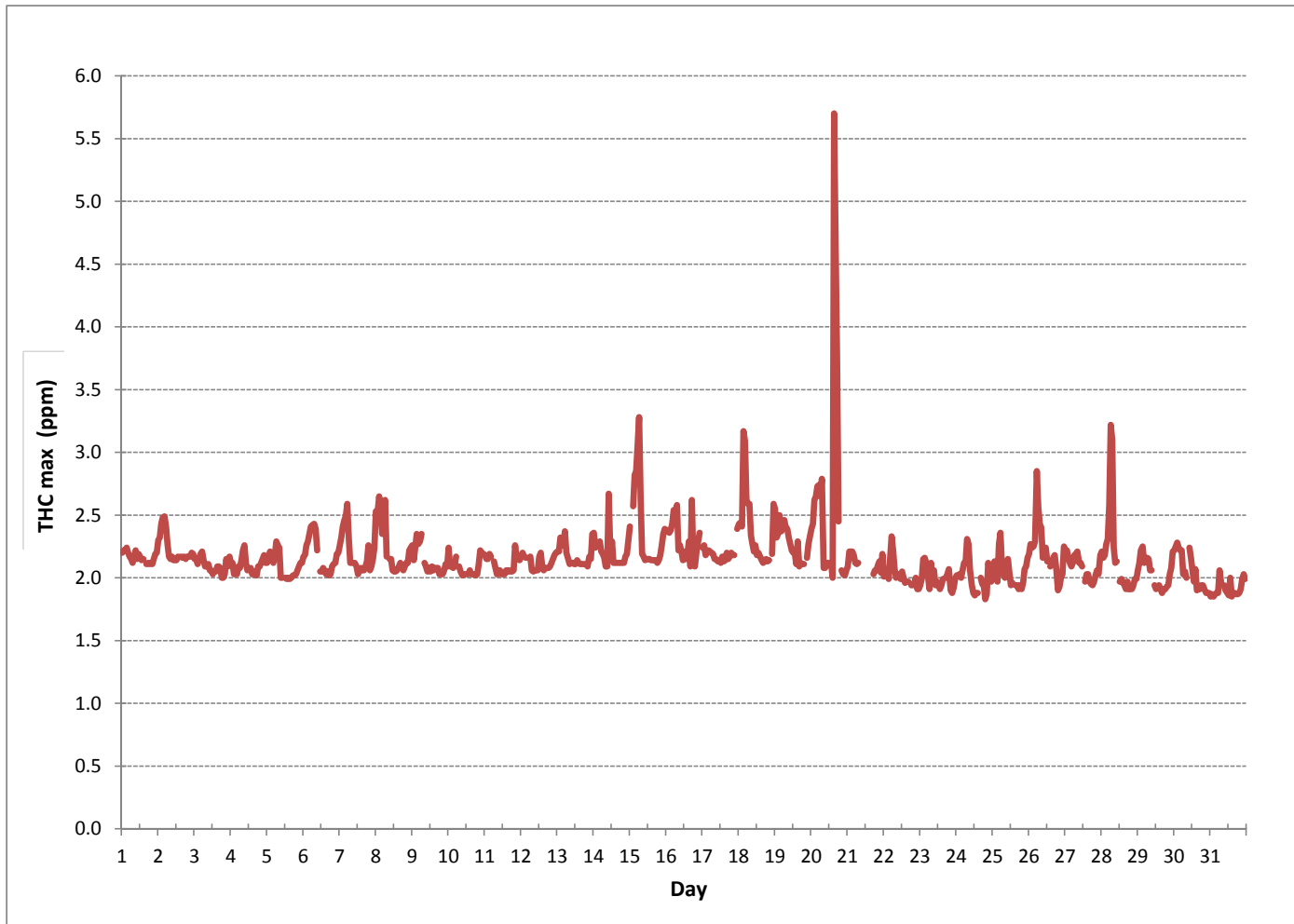
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

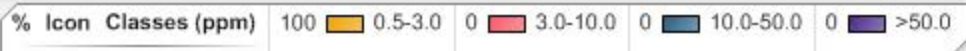
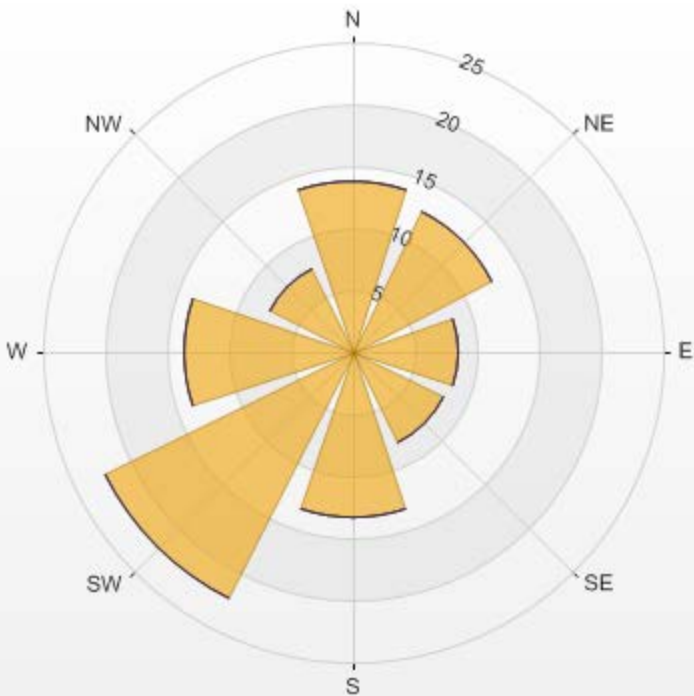
NUMBER OF NON-ZERO READINGS:	704				
MAXIMUM INSTANTANEOUS VALUE:	5.70	PPM	@ HOUR(S)	15	ON DAY(S) 20
				VAR-VARIOUS	
IZS CALIBRATION TIME:	31	HRS	OPERATIONAL TIME:	743.00	HRS
MONTHLY CALIBRATION TIME:	8	HRS			
STANDARD DEVIATION:	0.26				

TOTAL HYDROCARBONS MAX instantaneous maximum in ppm



Wind: LICA MASKWA Monitor: THC [ppm] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.62% Calm Avg: 0.00

Direction	0.5-3.0	3.0-10.0	10.0-50.0	>50.0	Total
N	13.78	0	0	0	13.78
NE	12.64	0	0	0	12.64
E	8.52	0	0	0	8.52
SE	8.24	0	0	0	8.24
S	13.35	0	0	0	13.35
SW	22.3	0	0	0	22.3
W	13.64	0	0	0	13.64
NW	7.53	0	0	0	7.53
Summary	100	0	0	0	100



THC[ppm] Calibration: LICA MASKWA Monthly: 07/2016 Type: Span



■ Span Meas
 — Span Ref
 — Span Low
 — Span High

OXIDES OF NITROGEN

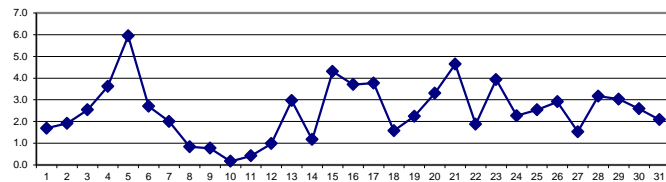
OXIDES OF NITROGEN (NOx) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.	
DAY	HOURLY MAX	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
1		1.8	3.1	5.1	4.6	1.6	0.7	0.7	0.6	1.4	1.9	0.8	1.7	1.8	1.3	1.5	S	2.5	0.9	0.8	1.1	1.0	1.0	1.3	1.7	0.6	5.1	1.7	24	
2		2.4	1.7	1.2	1.0	1.0	1.0	2.7	2.9	1.8	2.6	2.0	2.0	3.6	4.2	S	2.8	1.3	1.4	1.1	1.2	1.1	1.2	1.9	1.9	1.0	4.2	1.9	24	
3		1.9	1.5	1.2	2.3	1.6	2.0	2.3	2.3	1.4	1.4	0.8	2.8	1.2	S	0.8	0.7	3.8	6.8	1.5	1.7	0.9	2.6	7.5	9.3	0.7	9.3	2.5	24	
4		6.2	8.1	1.3	0.2	0.1	4.3	6.6	8.2	14.1	11.8	4.4	0.1	S	0.8	1.3	1.2	1.0	0.9	1.7	1.0	4.4	2.2	1.3	1.9	0.1	14.1	3.6	24	
5		2.8	12.7	17.8	20.5	21.0	10.1	9.4	25.0	5.4	2.4	1.2	S	0.6	0.5	1.1	0.6	0.6	0.6	0.5	0.5	0.6	0.7	1.4	0.7	0.5	25.0	5.9	24	
6		0.6	1.0	2.4	4.3	4.6	3.7	7.3	5.9	5.1	1.8	S	2.3	5.6	4.1	2.4	1.4	1.2	1.9	1.1	1.9	0.9	1.0	0.9	0.8	0.6	7.3	2.7	24	
7		1.0	2.1	2.2	1.6	1.4	4.4	5.0	3.0	3.6	S	9.2	3.9	0.6	0.9	1.2	1.0	0.7	0.7	0.6	0.7	0.6	0.6	0.6	0.5	0.5	9.2	2.0	24	
8		0.2	0.6	0.2	0.1	0.0	0.0	0.0	2.6	S	0.8	1.4	0.6	0.8	0.8	0.9	1.0	1.9	1.8	0.8	0.9	1.0	0.8	1.2	0.9	0.0	2.6	0.8	24	
9		0.9	0.6	0.6	0.8	0.6	1.1	0.8	S	0.7	0.5	0.6	1.3	0.7	0.8	0.8	1.1	1.2	1.8	0.5	0.6	0.5	0.3	0.6	0.3	0.3	1.8	0.8	24	
10		0.2	0.0	0.0	0.1	0.0	0.0	S	0.0	0.0	0.1	0.1	0.1	0.3	0.4	1.5	0.3	0.3	0.3	0.0	0.1	0.0	0.0	0.0	0.1	0.0	1.5	0.2	24	
11		0.2	0.4	0.9	0.7	0.7	S	0.6	1.3	0.3	0.4	0.6	0.6	0.6	0.5	0.4	0.6	0.4	0.1	0.2	0.1	0.0	0.0	0.0	0.1	0.0	1.3	0.4	24	
12		0.2	1.4	0.3	0.2	S	1.8	2.0	1.3	1.3	1.0	0.7	0.9	1.0	0.8	0.8	0.6	0.7	0.6	0.6	0.6	0.6	1.0	2.3	1.9	0.2	2.3	1.0	24	
13		1.6	1.7	10.0	S	7.7	22.0	5.2	3.3	1.9	1.7	1.3	1.5	1.4	4.1	0.9	0.6	0.7	0.4	0.6	0.3	0.2	0.2	0.2	0.6	0.2	22.0	3.0	24	
14		1.7	0.6	S	0.8	1.1	1.4	1.3	7.3	1.9	1.0	1.2	1.4	0.7	2.1	1.8	1.1	0.2	0.3	0.2	0.3	0.1	0.2	0.2	0.1	0.1	7.3	1.2	24	
15		0.2	S	0.7	1.2	1.9	1.5	46.5	3.2	5.9	5.0	3.0	1.3	2.5	2.1	3.1	3.7	2.5	2.1	1.4	1.2	1.1	2.3	2.7	4.0	0.2	46.5	4.3	24	
16		S	3.2	2.1	1.9	2.3	2.9	3.4	4.9	2.1	5.6	6.0	3.2	3.2	2.1	2.1	9.1	0.4	2.5	1.6	0.9	3.3	8.1	10.6	S	0.4	10.6	3.7	24	
17		4.1	9.9	2.4	2.3	2.0	6.6	10.8	7.9	3.4	2.4	3.7	2.2	2.1	1.9	3.2	2.0	4.5	2.5	4.4	3.8	1.3	1.2	S	2.1	1.2	10.8	3.8	24	
18		2.4	1.9	1.5	1.2	1.1	0.9	2.0	5.2	4.2	3.2	1.5	2.3	1.1	1.1	0.8	0.7	0.5	0.5	0.6	0.6	0.6	S	1.1	1.2	0.5	5.2	1.6	24	
19		2.2	1.9	1.7	1.3	1.2	1.5	12.8	2.4	2.3	0.9	0.8	0.7	0.7	1.2	1.0	1.7	1.1	0.8	1.5	0.8	S	1.3	5.0	6.8	0.7	12.8	2.2	24	
20		5.2	4.6	4.9	4.9	5.3	6.7	4.2	9.6	5.8	9.0	2.0	0.8	1.3	1.1	0.8	0.9	1.4	1.1	0.5	S	0.8	1.8	1.6	1.5	0.5	9.6	3.3	24	
21		1.1	3.8	2.7	2.2	1.7	4.0	1.5	1.5	C	C	C	C	C	C	C	C	C	C	C	C	C	6.5	14.6	9.1	7.0	1.1	14.6	4.6	24
22		0.8	0.6	0.6	0.3	0.2	7.2	6.8	2.0	0.9	0.9	1.1	0.7	1.1	0.7	0.8	0.8	0.7	S	0.9	0.8	0.8	10.1	3.5	0.7	0.2	10.1	1.9	24	
23		1.2	2.7	3.6	3.1	16.9	15.4	1.6	8.9	4.2	6.3	2.0	2.1	1.7	0.1	0.1	2.2	S	0.8	3.8	10.6	2.6	0.0	0.1	0.4	0.0	16.9	3.9	24	
24		0.8	0.5	2.4	2.2	1.8	4.5	4.0	9.0	4.7	2.4	0.6	0.9	0.0	1.0	0.3	S	3.8	0.5	0.3	0.4	0.6	1.1	7.1	3.2	0.0	9.0	2.3	24	
25		1.7	1.9	1.2	0.2	0.2	13.5	S	S	S1	5.2	C	C	C	C	C	C	C	C	C	C	C	0.3	0.7	0.5	0.2	13.5	2.5	23	
26		1.2	1.2	0.7	0.5	0.7	1.4	2.5	12.1	20.1	6.5	2.7	3.2	1.8	S	1.4	1.2	2.0	2.0	1.0	1.1	0.7	1.1	1.0	0.8	0.5	20.1	2.9	24	
27		0.6	0.9	2.4	2.0	1.7	1.7	2.7	3.0	2.1	1.4	1.4	1.6	S	1.2	1.3	1.4	1.1	1.2	1.0	1.1	1.1	1.2	1.3	1.8	0.6	3.0	1.5	24	
28		3.2	3.1	1.8	2.2	2.2	3.5	12.0	12.4	3.4	2.8	1.6	S	1.9	2.8	2.1	1.9	1.6	2.2	1.7	1.2	1.7	2.6	2.5	2.4	1.2	12.4	3.2	24	
29		2.3	5.2	3.8	3.2	2.5	4.0	7.5	4.9	3.4	4.9	S	1.7	2.3	2.4	2.3	2.2	1.8	4.1	2.2	2.4	2.0	1.7	1.5	1.4	1.4	7.5	3.0	24	
30		1.4	1.6	1.8	2.4	9.3	10.7	6.9	2.1	1.3	S	2.6	2.1	1.8	1.5	1.6	1.4	2.2	1.9	0.9	0.9	0.8	0.9	1.5	1.8	0.8	10.7	2.6	24	
31		2.4	2.6	1.0	0.6	0.5	1.5	11.0	5.2	S	0.9	1.2	1.9	1.6	1.7	1.6	1.3	1.2	1.0	0.8	0.7	1.7	2.8	2.0	0.5	11.0	2.1	24		
HOURLY MAX		6.2	12.7	17.8	20.5	21.0	22.0	46.5	25.0	20.1	11.8	9.2	3.9	5.6	4.2	3.2	9.1	4.5	6.8	4.4	10.6	6.5	14.6	10.6	9.3					
HOURLY AVG		1.8	2.7	2.6	2.3	3.1	4.7	6.2	5.4	3.8	3.0	2.0	1.6	1.6	1.6	1.4	1.6	1.5	1.5	1.1	1.3	1.3	2.1	2.4	1.9					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

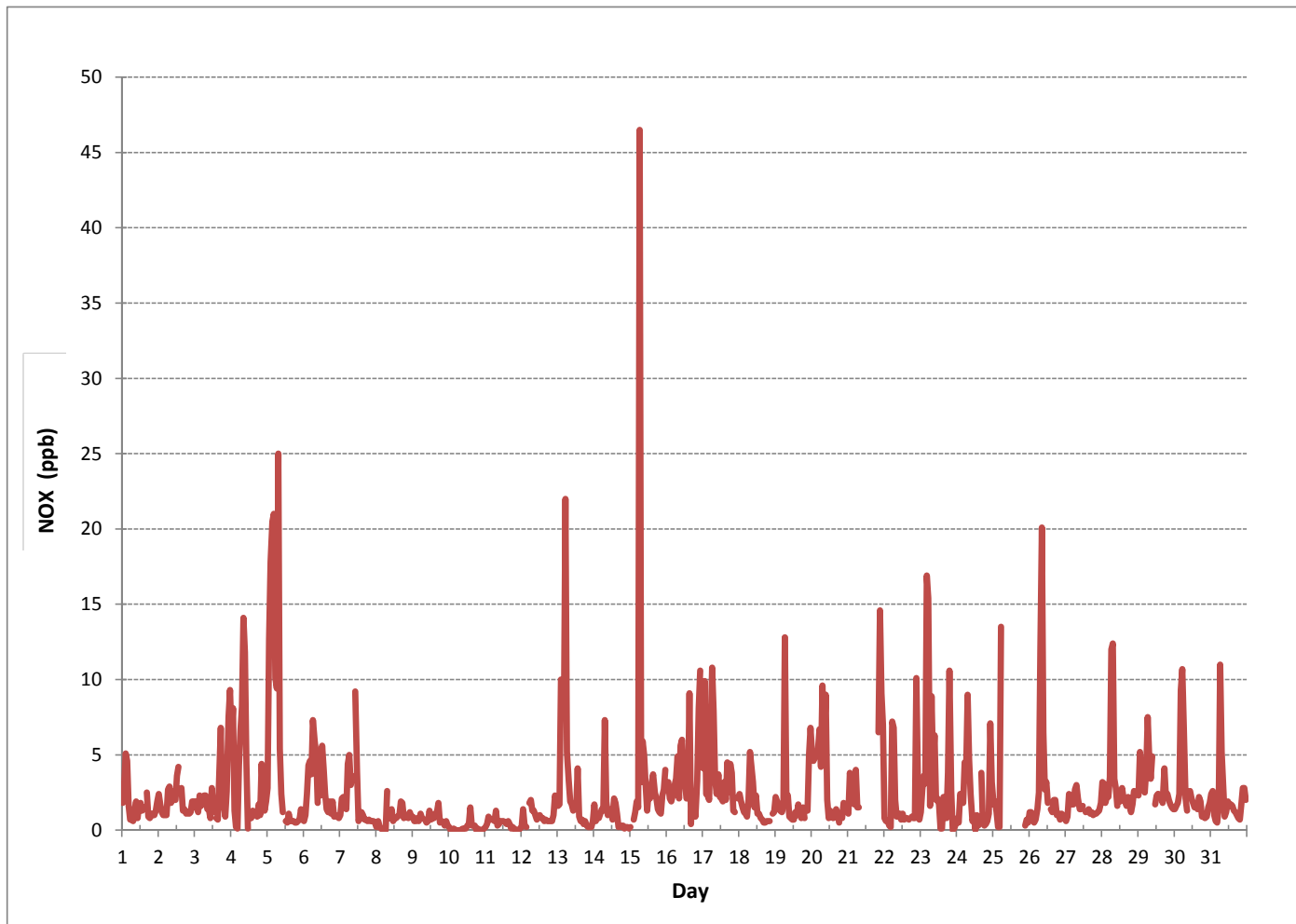
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	670			
MINIMUM 1-HR AVERAGE:	0.0 PPB	@ HOUR(S)	VAR	ON DAY(S)
MAXIMUM 1-HR AVERAGE:	46.5 PPB	@ HOUR(S)	6	15
MAXIMUM 24-HR AVERAGE:	5.9 PPB			5
				VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS	OPERATIONAL TIME:	743 HRS	
MONTHLY CALIBRATION TIME:	23 HRS	AMD OPERATION UPTIME:	99.9 %	
STANDARD DEVIATION:	3.49	MONTHLY AVERAGE:	2.5 PPB	

OXIDES OF NITROGEN (NOx) hourly averages in ppb





OXIDES OF NITROGEN MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR				
DAY	MIN.	MAX.	AVG.	RDGS.																												
1	4.7	7.1	7.6	7.7	3.0	0.6	0.6	0.6	2.4	4.7	1.2	1.8	3.5	1.8	3.0	S	3.5	1.2	0.6	0.6	0.6	0.6	0.6	0.7	2.4	0.6	7.7	2.6	24			
2	2.4	1.3	0.6	0.6	0.6	0.6	3.5	4.7	4.7	5.3	4.1	3.0	4.7	5.9	S	4.7	0.6	1.2	0.0	0.6	0.6	0.6	1.3	1.2	0.0	0.0	5.9	2.3	24			
3	1.2	1.2	0.6	4.7	1.2	2.4	3.0	3.5	1.2	1.2	0.6	4.7	1.2	S	1.8	0.6	21.8	21.8	2.4	2.4	0.6	7.1	13.6	25.3	0.6	25.3	5.4	24				
4	13.5	10.0	3.0	0.1	0.0	14.2	14.2	12.4	19.4	16.4	13.6	0.6	S	3.0	3.0	1.3	1.8	1.3	4.1	1.8	11.2	4.7	1.8	2.4	0.0	19.4	6.7	24				
5	4.7	23.5	35.8	44.1	44.1	15.3	17.6	47.0	19.4	3.5	1.8	S	0.6	0.0	16.4	0.1	0.6	0.6	0.0	0.0	0.6	0.6	1.3	0.6	0.0	47.0	12.1	24				
6	0.6	0.6	5.9	5.9	6.5	5.3	10.6	6.5	7.1	4.1	S	7.1	13.0	9.5	4.7	1.8	2.4	2.4	1.3	2.4	1.8	1.2	1.2	0.6	0.6	13.0	4.5	24				
7	1.8	3.0	3.0	1.8	1.8	12.4	10.6	5.3	5.3	S	11.2	10.0	1.2	1.3	1.8	1.3	1.2	1.2	0.6	1.3	1.2	0.7	1.2	0.6	0.6	12.4	3.5	24				
8	0.6	0.6	0.6	0.6	0.6	0.0	0.1	8.8	S	2.4	4.1	0.7	1.2	1.2	1.3	1.3	2.4	2.4	0.6	1.3	1.3	2.4	3.0	0.6	0.0	8.8	1.7	24				
9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	S	0.6	0.6	0.6	3.0	0.6	1.8	1.8	2.4	2.4	4.1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	4.1	1.1	24				
10	0.6	0.0	0.1	0.1	0.1	0.1	S	0.1	0.0	0.6	0.6	0.6	0.6	1.2	2.4	1.8	0.6	0.6	0.6	0.6	0.6	0.0	0.1	0.1	0.6	0.0	2.4	0.5	24			
11	0.6	0.6	1.3	1.3	1.3	S	1.2	2.4	0.6	0.6	1.3	1.3	0.6	1.2	1.8	1.8	1.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	2.4	1.0	24				
12	0.6	3.5	0.6	0.6	S	3.0	3.0	2.4	3.0	1.3	1.2	1.3	1.3	1.8	1.3	1.2	1.2	0.6	0.6	1.2	0.6	2.4	3.0	2.4	0.6	3.5	1.7	24				
13	2.4	2.4	18.2	S	32.3	51.7	9.4	4.7	3.0	3.0	1.8	4.1	3.6	13.0	1.8	1.2	2.4	0.6	0.6	0.6	0.6	0.6	0.6	1.2	0.6	51.7	6.9	24				
14	3.0	1.3	S	1.8	1.3	3.6	4.1	35.2	4.7	2.4	7.6	8.2	1.3	6.5	3.6	4.1	1.8	1.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	35.2	4.2	24			
15	0.6	S	1.3	1.8	3.0	3.0	506.4	6.5	8.2	7.6	4.1	3.0	5.3	4.1	6.5	7.7	3.6	3.0	1.8	1.3	1.8	3.5	4.7	4.7	0.6	506.4	25.8	24				
16	S	4.1	3.0	2.4	3.0	4.7	5.3	5.9	6.5	8.2	12.4	5.9	15.3	5.9	5.3	44.6	0.6	20.0	19.9	1.8	10.1	17.6	19.4	S	0.6	44.6	10.1	24				
17	25.3	27.6	3.0	3.0	2.4	34.1	37.1	17.6	6.5	4.7	12.4	4.1	3.0	3.0	6.5	5.9	9.4	5.9	10.6	7.7	1.8	1.3	S	2.4	1.3	37.1	10.2	24				
18	2.5	2.4	1.8	1.8	1.3	1.3	5.3	7.7	5.3	4.7	2.4	5.3	1.8	1.8	2.4	1.8	1.2	0.6	0.6	1.2	1.2	S	1.8	1.8	0.6	7.7	2.5	24				
19	3.5	2.4	1.8	1.8	1.3	16.5	88.1	3.0	3.0	2.4	1.3	1.8	1.8	1.8	1.8	4.7	1.3	1.8	2.4	1.3	S	1.8	8.2	7.7	1.3	88.1	7.0	24				
20	5.9	5.3	5.3	5.3	5.9	12.4	8.8	33.5	9.5	25.3	8.8	1.2	1.8	1.3	0.6	2.4	7.6	7.1	0.6	S	1.8	3.5	2.4	1.8	0.6	33.5	6.9	24				
21	1.8	4.1	3.0	2.4	1.8	28.8	1.8	1.8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	24.7	31.1	13.7	18.7	1.8	31.1	11.1	24		
22	1.5	1.3	1.1	0.8	0.8	79.7	49.5	21.0	1.6	1.6	2.0	1.6	1.9	1.4	1.5	1.4	1.4	S	2.6	1.6	1.4	20.3	10.4	1.5	0.8	79.7	9.0	24				
23	2.4	4.8	4.7	5.0	26.3	49.9	4.9	26.2	14.9	13.8	4.7	15.1	18.5	0.9	0.9	16.0	S	6.3	14.2	27.1	10.4	0.7	1.0	1.1	0.7	49.9	11.7	24				
24	1.8	1.7	5.1	4.1	3.7	8.1	6.8	42.2	9.0	4.1	1.9	25.2	0.9	39.1	1.2	S	12.1	3.7	1.3	1.6	2.0	2.9	15.4	5.6	0.9	42.2	8.7	24				
25	3.6	3.4	3.1	1.0	2.4	55.8	S	S	S1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	0.6	0.7	0.6	0.6	55.8	7.9	23	
26	1.3	1.3	0.6	0.6	0.6	2.4	4.7	29.9	32.3	13.6	3.0	3.0	2.4	S	1.2	1.2	4.7	3.5	0.6	1.2	0.6	1.2	1.2	0.6	0.6	32.3	4.9	24				
27	0.6	1.8	2.4	2.4	1.8	3.5	3.0	14.7	3.0	1.8	1.8	1.8	S	4.1	1.8	1.8	1.3	1.2	1.3	1.2	1.3	1.3	1.8	5.3	0.6	14.7	2.7	24				
28	5.3	3.5	3.0	2.5	3.0	7.7	42.3	20.6	7.7	4.1	2.4	S	2.4	4.1	2.5	2.4	2.4	8.2	1.8	1.8	2.4	3.0	3.5	3.5	1.8	42.3	6.1	24				
29	3.5	5.9	5.9	3.5	3.0	8.8	9.5	8.2	4.1	7.1	S	2.4	3.0	3.0	3.0	2.4	3.0	5.9	3.0	3.0	2.4	2.4	1.8	1.8	1.8	9.5	4.2	24				
30	1.8	1.8	2.4	3.5	23.5	26.4	13.0	4.1	2.4	S	3.5	3.0	2.4	2.4	2.4	2.4	3.0	2.5	1.8	1.8	1.8	1.8	2.4	3.5	1.8	26.4	4.9	24				
31	5.9	5.9	1.8	1.3	1.3	7.1	30.0	13.6	S	4.1	2.4	3.5	2.4	3.5	3.5	3.5	2.4	1.8	1.8	1.8	4.7	4.1	4.1	3.6	1.3	30.0	5.0	24				
HOURLY MAX	25.3	27.6	35.8	44.1	44.1	79.7	506.4	47.0	32.3	25.3	13.6	25.2	18.5	39.1	16.4	44.6	21.8	21.8	19.9	27.1	24.7	31.1	19.4	25.3								
HOURLY AVG	3.5	4.4	4.2	3.8	6.0	15.3	30.9	13.5	6.9	5.5	4.2	4.6	3.6	4.6	3.1	4.5	3.5	4.0	2.7	2.5	3.1	4.0	4.1	3.5								

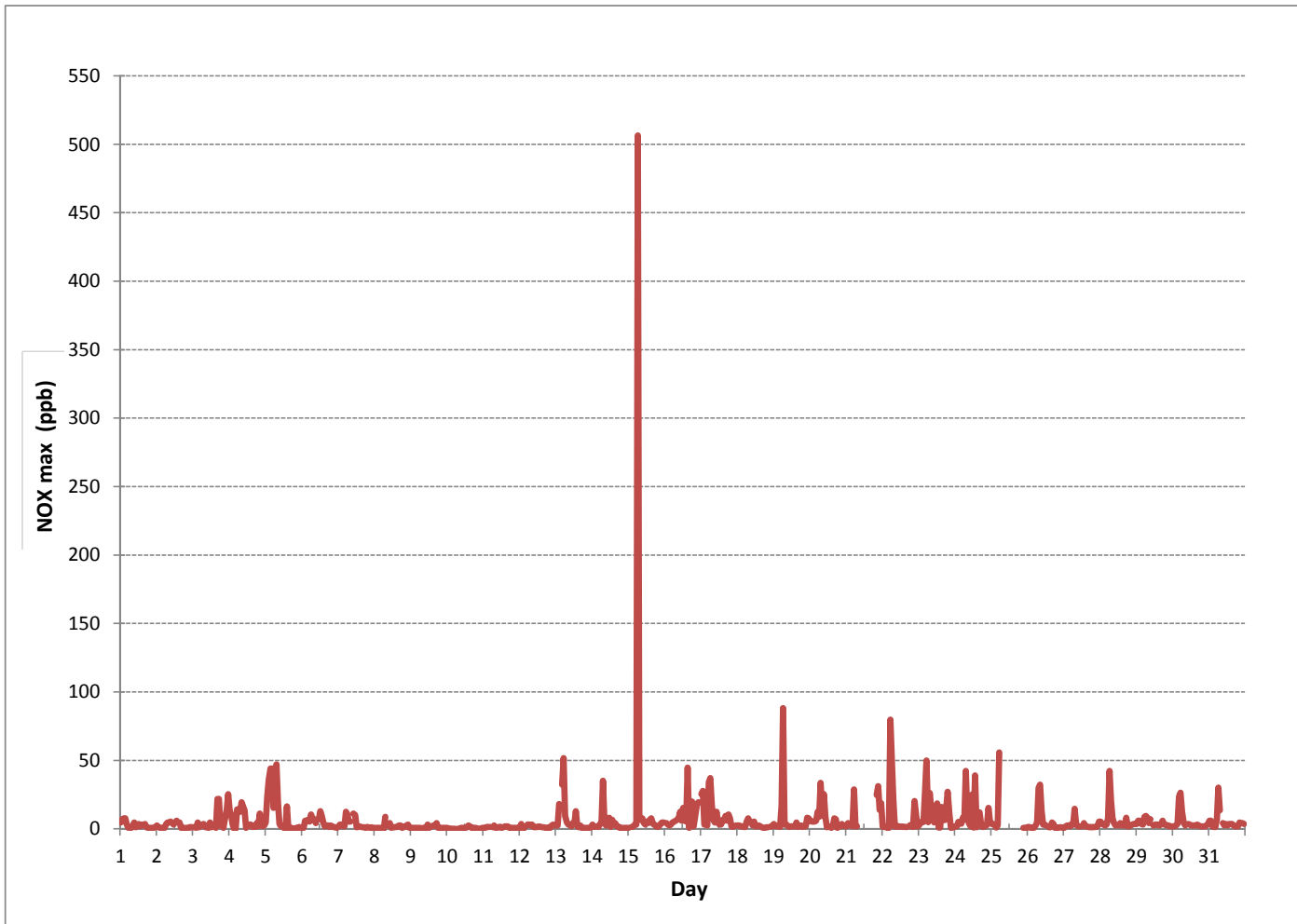
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

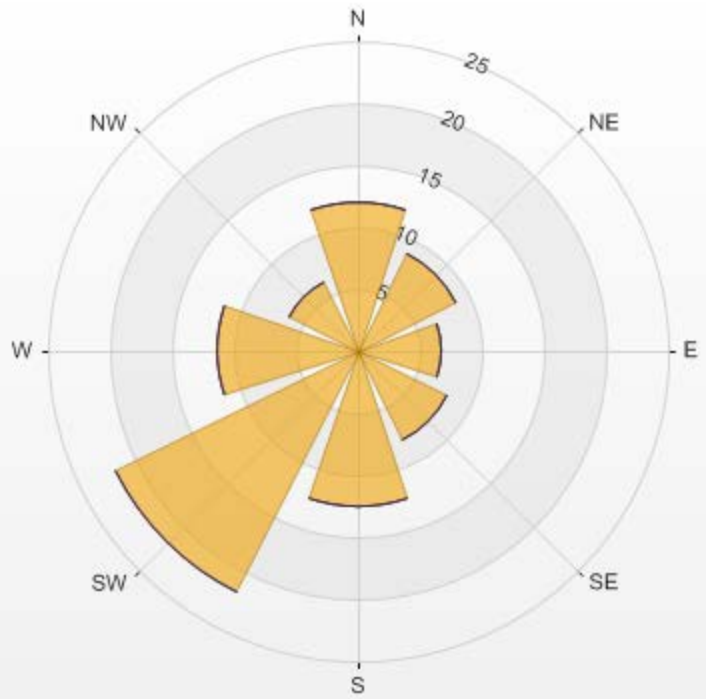
NUMBER OF NON-ZERO READINGS:	678
MAXIMUM INSTANTANEOUS VALUE:	506.4 PPB @ HOUR(S) 6 ON DAY(S) 15
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	24 HRS
STANDARD DEVIATION:	21.17
OPERATIONAL TIME:	743 HRS

OXIDES OF NITROGEN MAX instantaneous maximum in ppb



Wind: LICA MASKWA Monitor: NOX [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 12.35% Valid Data: 92.47% Calm Avg: 0.00

Direction	0.5-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	12.06	0	0	0	12.06
NE	8.87	0	0	0	8.87
E	6.83	0	0	0	6.83
SE	7.99	0	0	0	7.99
S	12.5	0	0	0	12.5
SW	21.8	0	0	0	21.8
W	11.34	0	0	0	11.34
NW	6.25	0	0	0	6.25
Summary	87.64	0	0	0	87.64



% Icon Classes (ppb)	88	0	0	0
0.5-50.0	88	0	0	0
50.0-110.0	0	0	0	0
110.0-210.0	0	0	0	0
>210.0	0	0	0	0

NOX[ppb] Calibration: LICA MASKWA Monthly: 07/2016 Type: Span



■ Span Meas
 — Span Ref
 — Span Low
 — Span High

NITRIC OXIDES

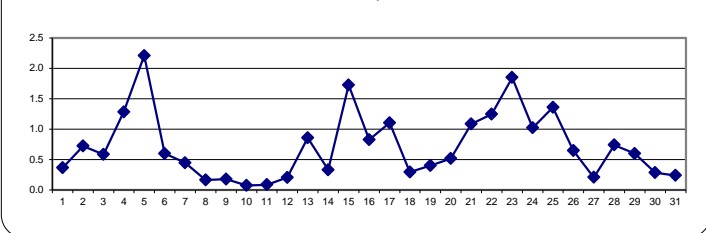
NITRIC OXIDE (NO) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.
DAY	HOURLY MAX	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59				
1	0.1	0.0	0.3	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.6	0.3	0.6	0.6	0.4	0.7	S	1.0	0.4	0.4	0.4	0.4	0.4	0.5	0.2	0.0	1.0	0.4	24
2	0.6	0.5	0.4	0.6	0.6	0.7	0.8	0.8	0.7	0.8	0.8	0.8	1.2	1.8	S	1.2	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	1.8	0.7	24	
3	0.5	0.3	0.4	0.4	0.4	0.6	0.8	0.8	0.4	0.4	0.4	1.0	0.5	S	0.4	0.3	0.5	0.8	0.3	0.2	0.1	0.2	0.5	3.3	0.1	3.3	0.6	24	
4	0.8	1.2	0.2	0.2	0.1	1.6	2.4	3.6	7.9	6.2	2.3	0.3	S	0.5	0.4	0.2	0.1	0.2	0.3	0.0	0.4	0.2	0.1	0.3	0.0	7.9	1.3	24	
5	0.0	3.3	6.1	9.4	8.9	1.7	3.6	14.3	2.1	0.6	0.1	S	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	14.3	2.2	24	
6	0.0	0.1	0.1	0.3	0.7	1.4	3.2	1.9	1.2	0.3	S	0.4	2.0	1.1	0.4	0.0	0.1	0.2	0.1	0.3	0.0	0.0	0.0	0.0	0.0	3.2	0.6	24	
7	0.0	0.2	0.1	0.1	0.3	1.4	1.5	0.6	0.8	S	2.6	1.3	0.1	0.2	0.3	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	2.6	0.4	24	
8	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.9	S	0.4	0.3	0.0	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.0	0.9	0.2	24
9	0.2	0.2	0.2	0.1	0.2	0.5	0.2	S	0.2	0.1	0.1	0.4	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.1	0.2	0.0	0.0	0.1	0.1	0.5	0.2	24	
10	0.1	0.0	0.0	0.0	0.2	0.1	S	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.5	0.1	24	
11	0.0	0.0	0.1	0.1	0.1	S	0.3	0.3	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.3	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.3	0.1	24
12	0.0	0.0	0.0	0.0	S	0.4	0.6	0.3	0.5	0.1	0.1	0.3	0.2	0.2	0.2	0.1	0.4	0.3	0.2	0.3	0.1	0.1	0.2	0.1	0.0	0.6	0.2	24	
13	0.0	0.2	1.6	S	1.5	9.5	1.3	0.9	0.4	0.5	0.3	0.5	0.5	1.4	0.3	0.2	0.0	0.0	0.2	0.2	0.1	0.1	0.0	0.0	0.0	9.5	0.9	24	
14	0.2	0.0	S	0.4	0.2	0.2	0.1	4.0	0.6	0.1	0.2	0.3	0.1	0.6	0.5	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	4.0	0.3	24	
15	0.0	S	0.0	0.0	0.0	0.1	32.9	0.8	1.5	1.1	0.3	0.0	0.4	0.1	0.5	0.6	0.3	0.2	0.3	0.2	0.1	0.2	0.0	0.1	0.0	32.9	1.7	24	
16	S	0.4	0.2	0.1	0.2	0.7	0.9	1.6	0.6	1.8	1.9	0.8	1.2	0.5	0.8	3.4	0.2	0.6	0.4	0.1	0.2	0.4	1.2	S	0.1	3.4	0.8	24	
17	0.8	3.4	0.0	0.1	0.1	2.9	5.0	3.6	1.0	0.8	1.2	0.5	0.5	0.4	0.9	0.5	1.0	0.6	0.5	0.6	0.3	0.3	S	0.4	0.0	5.0	1.1	24	
18	0.2	0.2	0.1	0.0	0.3	0.3	0.5	1.4	1.0	0.6	0.2	0.5	0.2	0.2	0.2	0.0	0.1	0.1	0.1	0.2	0.0	S	0.2	0.2	0.0	1.4	0.3	24	
19	0.0	0.0	0.0	0.0	0.0	0.3	7.1	0.5	0.6	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.3	0.0	S	0.0	0.0	0.0	0.0	0.0	7.1	0.4	24	
20	0.0	0.0	0.0	0.0	0.4	1.5	1.1	4.1	1.5	2.0	0.4	0.1	0.3	0.2	0.0	0.2	0.1	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	4.1	0.5	24	
21	0.0	0.0	0.0	0.0	0.0	2.2	0.1	0.1	C	C	C	C	C	C	C	C	C	C	C	C	C	2.8	5.1	1.2	1.5	0.0	5.1	1.1	24
22	0.7	0.9	0.9	0.7	0.6	5.8	4.9	1.7	1.0	0.9	1.0	0.8	0.8	0.8	0.9	0.8	0.7	S	0.9	0.8	0.8	1.0	0.7	0.6	0.6	5.8	1.2	24	
23	0.5	0.7	0.7	0.7	5.9	6.7	1.1	5.1	2.8	3.3	1.3	1.4	1.3	0.7	0.7	1.6	S	0.7	1.5	3.9	0.7	0.5	0.3	0.4	0.3	6.7	1.8	24	
24	0.5	0.4	0.6	0.4	0.4	1.5	1.7	4.3	2.3	1.2	0.5	0.9	0.4	1.0	0.4	S	1.5	0.6	0.5	0.5	0.5	0.4	2.3	0.7	0.4	4.3	1.0	24	
25	0.5	0.5	0.7	0.4	0.4	7.9	S	S	S	3.2	C	C	C	C	C	C	C	C	C	C	C	C	0.0	0.0	0.0	7.9	1.4	23	
26	0.0	0.0	0.0	0.0	0.0	0.4	0.4	5.1	7.5	1.1	0.0	0.4	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.5	0.6	24	
27	0.0	0.0	0.0	0.0	0.0	0.3	0.6	1.2	0.5	0.2	0.2	0.1	S	0.6	0.2	0.2	0.0	0.3	0.1	0.1	0.0	0.0	0.1	0.1	0.0	1.2	0.2	24	
28	0.1	0.1	0.0	0.1	0.1	1.4	7.7	5.4	0.7	0.3	0.0	S	0.1	0.0	0.2	0.0	0.0	0.1	0.4	0.0	0.2	0.0	0.0	0.1	0.0	7.7	0.7	24	
29	0.0	0.0	0.3	0.3	0.1	1.0	2.5	1.8	1.2	1.8	S	0.5	0.6	0.4	0.5	0.4	0.0	0.8	0.5	0.4	0.2	0.0	0.3	0.2	0.0	2.5	0.6	24	
30	0.1	0.4	0.2	0.0	1.5	1.7	1.1	0.3	0.3	S	0.5	0.2	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.3	24	
31	0.1	0.0	0.0	0.0	0.0	0.0	3.9	1.5	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.2	24	
HOURLY MAX	0.8	3.4	6.1	9.4	8.9	9.5	32.9	14.3	7.9	6.2	2.6	1.4	2.0	1.8	0.9	3.4	1.5	0.8	1.5	3.9	2.8	5.1	2.3	3.3					
HOURLY AVG	0.2	0.4	0.4	0.5	0.8	1.8	3.0	2.3	1.4	1.0	0.6	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3				

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

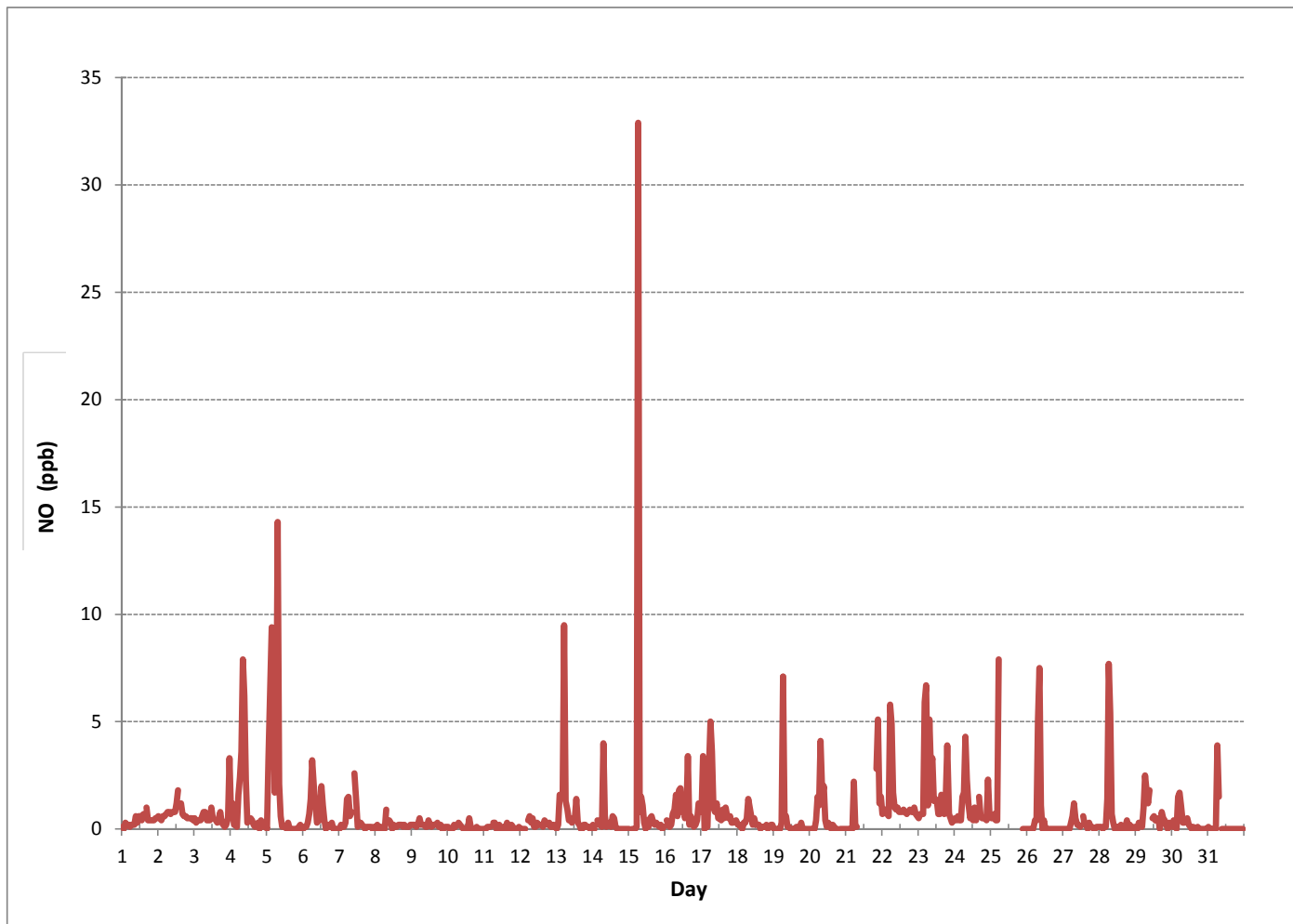
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	508			
MINIMUM 1-HR AVERAGE:	0.0	PPB @ HOUR(S)	VAR	ON DAY(S)
MAXIMUM 1-HR AVERAGE:	32.9	PPB @ HOUR(S)	6	15
MAXIMUM 24-HR AVERAGE:	2.2	PPB		5
				VAR-VARIOUS
IZS CALIBRATION TIME:	32	HRS	OPERATIONAL TIME:	743
MONTHLY CALIBRATION TIME:	23	HRS	AMD OPERATION UPTIME:	99.9
				%
STANDARD DEVIATION:	1.83		MONTHLY AVERAGE:	0.7
				PPB

NITRIC OXIDE (NO) hourly averages in ppb



NITRIC OXIDE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	RDGS.	
DAY	MIN.	MAX.	AVG.																								MIN.	MAX.	AVG.	RDGS.
1	0.0	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.2	1.4	0.2	0.2	0.8	0.2	0.8	S	0.8	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.2	24
2	0.2	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.8	0.8	0.2	0.8	2.0	S	1.4	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	24
3	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.8	0.2	0.0	0.0	1.4	0.2	S	0.2	0.0	3.2	2.6	0.2	0.0	0.0	0.2	0.8	10.8	0.0	10.8	0.9	24	24	
4	2.0	1.4	0.2	0.2	0.0	5.5	5.5	5.5	11.4	9.0	6.7	0.2	S	1.4	1.4	0.2	0.2	0.2	0.2	0.0	2.0	0.2	0.2	0.2	0.2	0.0	11.4	2.3	24	
5	0.8	7.3	15.4	23.7	23.7	3.7	8.4	30.1	9.6	0.8	0.2	S	0.2	0.0	9.0	0.0	0.0	0.2	0.2	0.0	0.2	0.2	0.2	0.2	0.2	0.0	30.1	5.8	24	
6	0.2	0.2	0.2	0.2	0.8	2.0	5.5	2.0	2.0	0.2	S	2.6	4.9	2.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.2	0.2	0.2	0.0	5.5	1.1	24	
7	0.2	0.2	0.2	0.2	0.2	3.8	2.6	0.8	0.8	S	3.2	3.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.8	0.8	24	
8	0.2	0.2	0.2	0.2	0.0	0.2	0.0	2.6	S	0.8	0.8	0.0	0.2	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.2	0.0	2.6	0.3	24	
9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	S	0.2	0.2	0.2	0.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.2	0.2	0.0	0.8	0.2	24	
10	0.2	0.0	0.0	0.2	0.2	0.2	S	0.2	0.2	0.2	0.0	0.0	0.2	0.2	0.8	0.2	0.2	0.0	0.0	0.2	0.2	0.0	0.2	0.0	0.2	0.0	0.8	0.2	24	
11	0.2	0.0	0.2	0.2	0.2	S	0.2	0.2	0.2	0.0	0.2	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.2	0.2	24	
12	0.2	0.2	0.2	0.2	S	0.2	0.2	0.8	0.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.8	0.3	24	
13	0.0	0.2	3.2	S	12.5	28.9	2.6	1.4	0.8	0.8	0.2	0.8	0.8	4.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.2	0.0	28.9	2.6	24	
14	0.2	0.2	S	0.2	0.2	0.8	0.8	21.4	2.0	0.8	2.6	2.6	0.2	2.6	0.8	1.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	21.4	1.7	24	
15	0.2	S	0.2	0.2	0.8	0.8	427.2	2.0	2.0	2.0	0.8	0.2	1.4	0.8	1.4	1.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	427.2	19.3	24	
16	S	0.2	0.2	0.2	0.2	0.8	1.4	2.0	2.0	2.6	3.7	1.4	4.9	1.4	1.4	24.3	0.2	4.9	4.9	0.2	0.2	2.0	4.3	S	0.2	24.3	2.9	24		
17	9.6	11.4	0.2	0.2	0.2	20.2	9.0	2.0	1.4	3.7	0.8	0.2	0.2	1.4	0.8	2.0	1.4	1.4	0.8	0.2	0.2	S	0.2	0.2	0.2	20.2	3.8	24		
18	0.2	0.2	0.2	0.2	0.2	0.2	1.4	2.0	0.8	0.8	0.2	1.4	0.2	0.2	0.8	0.2	0.2	0.2	0.2	0.2	0.2	S	0.2	0.2	0.2	2.0	0.5	24		
19	0.0	0.2	0.2	0.0	0.0	5.5	52.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	S	0.2	0.0	0.2	0.0	52.4	2.7	24		
20	0.0	0.2	0.2	0.2	0.2	3.7	3.2	18.4	2.6	8.4	1.4	0.2	0.2	0.2	0.2	0.8	0.2	0.2	0.0	S	0.2	0.2	0.0	0.2	0.0	18.4	1.8	24		
21	0.0	0.2	0.0	0.2	0.2	26.0	0.2	0.2	C	C	C	C	C	C	C	C	C	C	C	C	C	10.4	14.1	1.8	5.8	0.0	26.0	4.9	24	
22	1.2	1.4	1.2	1.1	1.0	72.1	34.6	17.2	1.6	1.4	1.5	1.3	1.4	1.4	1.5	1.3	1.4	S	1.6	1.4	1.4	3.2	1.4	1.2	1.0	72.1	6.6	24		
23	1.1	1.4	1.4	1.8	10.8	40.1	2.9	15.7	8.7	7.3	2.7	8.6	9.7	1.4	1.5	9.0	S	2.5	6.0	12.8	1.8	1.2	1.1	1.3	1.1	40.1	6.6	24		
24	1.4	1.5	1.7	1.4	1.3	4.1	3.6	34.6	5.3	2.5	1.5	14.9	1.5	27.1	1.2	S	4.5	2.2	1.5	1.5	1.4	1.4	6.8	1.8	1.2	34.6	5.4	24		
25	1.5	1.4	1.7	1.4	1.4	40.5	S	S	S1	C	C	C	C	C	C	C	C	C	C	C	C	C	0.2	0.2	0.0	40.5	5.4	23		
26	0.2	0.2	0.2	0.2	0.2	2.0	1.4	16.6	17.8	3.2	0.2	0.8	0.2	S	0.2	0.2	0.8	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	17.8	2.0	24		
27	0.2	0.2	0.2	0.0	0.2	1.4	0.8	3.2	0.8	0.2	0.2	0.2	S	1.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	3.2	0.5	24	
28	0.2	0.2	0.2	0.2	0.2	4.3	33.6	10.8	2.0	0.8	0.2	S	0.2	0.2	0.2	0.2	0.2	0.2	2.0	0.2	0.2	0.2	0.2	0.2	0.2	33.6	2.5	24		
29	0.2	0.2	0.2	0.2	0.2	2.0	3.2	3.2	1.4	2.0	S	0.8	0.2	0.2	0.2	0.2	0.8	0.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.2	0.7	24		
30	0.2	0.2	0.2	0.2	6.6	10.2	3.2	0.8	0.2	S	0.8	0.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	10.2	1.1	24		
31	0.2	0.2	0.2	0.2	2.0	17.8	6.6	S	1.4	0.2	0.8	0.2	1.4	0.8	0.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.8	0.8	0.2	17.8	1.6	24	
HOURLY MAX	9.6	11.4	15.4	23.7	23.7	72.1	427.2	34.6	17.8	9.0	6.7	14.9	9.7	27.1	9.0	24.3	4.5	4.9	6.0	12.8	10.4	14.1	6.8	10.8						
HOURLY AVG	0.7	1.0	1.0	1.1	2.1	9.4	21.8	7.2	2.8	1.8	1.2	1.7	1.1	1.9	0.9	1.6	0.6	0.7	0.7	0.7	0.7	0.7	0.9	0.7	0.8					

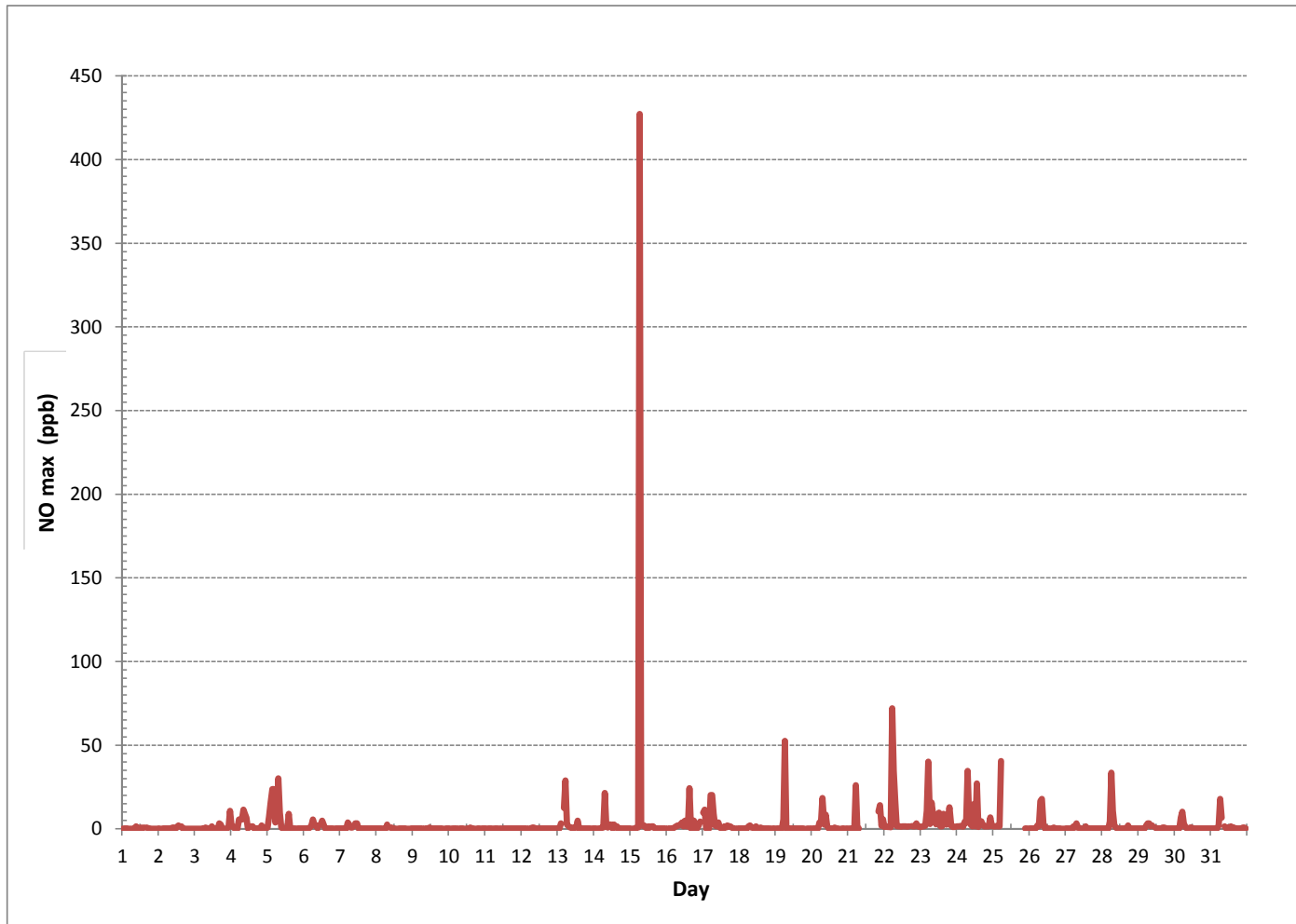
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

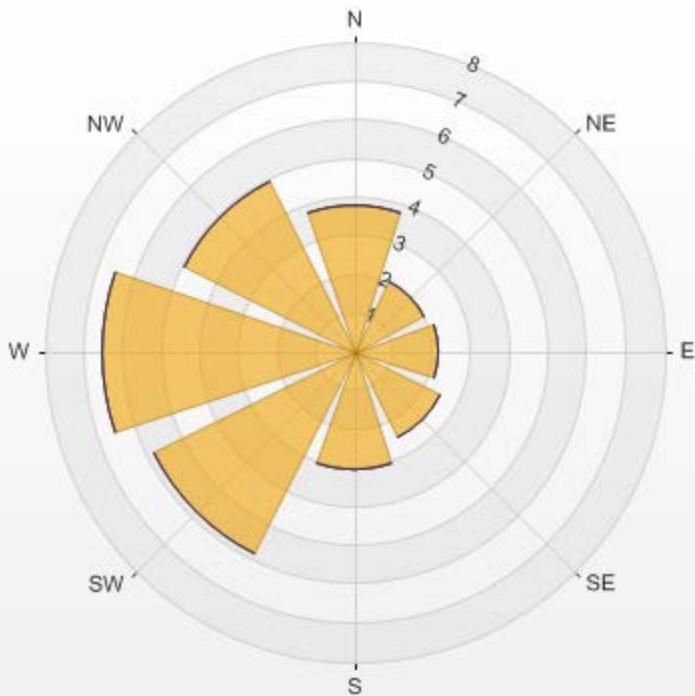
NUMBER OF NON-ZERO READINGS:	613
MAXIMUM INSTANTANEOUS VALUE:	427.2 PPB @ HOUR(S) 6 ON DAY(S) 15
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	24 HRS
STANDARD DEVIATION:	17.25
OPERATIONAL TIME:	743 HRS

NITRIC OXIDE MAX instantaneous maximum in ppb



Wind: LICA MASKWA Monitor: NO [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 69.19% Valid Data: 92.47% Calm Avg: 0.00

Direction	0.5-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	3.78	0	0	0	3.78
NE	2.03	0	0	0	2.03
E	2.18	0	0	0	2.18
SE	2.47	0	0	0	2.47
S	3.05	0	0	0	3.05
SW	5.81	0	0	0	5.81
W	6.54	0	0	0	6.54
NW	4.94	0	0	0	4.94
Summary	30.8	0	0	0	30.8



% Icon Classes (ppb)	31	0.5-50.0	0	50.0-110.0	0	110.0-210.0	0	>210.0
								

NITROGEN DIOXIDE

NITROGEN DIOXIDE (NO2) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.
DAY	HOURLY MAX	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59				
1	1.7	3.0	4.8	4.5	1.4	0.6	0.5	0.5	1.2	1.3	0.4	1.1	1.2	0.8	0.8	S	1.5	0.5	0.4	0.7	0.6	0.5	0.8	1.5	0.4	4.8	1.3	24	
2	1.8	1.2	0.9	0.4	0.4	0.4	1.9	2.1	1.1	1.7	1.1	1.2	2.4	2.4	S	1.6	0.6	0.8	0.6	0.7	0.6	0.7	1.4	1.5	0.4	2.4	1.2	24	
3	1.4	1.2	0.8	1.9	1.2	1.4	1.4	1.5	1.0	1.0	0.4	1.9	0.7	S	0.4	0.4	3.3	6.0	1.2	1.4	0.9	2.4	7.0	6.0	0.4	7.0	1.9	24	
4	5.5	6.9	1.0	0.0	0.0	2.6	4.2	4.6	6.2	5.6	2.0	0.0	S	0.2	0.8	1.0	0.9	0.7	1.4	1.0	3.9	2.0	1.2	1.6	0.0	6.9	2.3	24	
5	2.8	9.3	11.6	11.1	12.1	8.4	5.8	10.7	3.3	1.9	1.0	S	0.5	0.5	0.8	0.6	0.6	0.6	0.5	0.5	0.6	0.6	1.2	0.7	0.5	12.1	3.7	24	
6	0.6	0.8	2.3	3.9	3.9	2.3	4.1	3.9	3.9	1.5	S	1.9	3.6	3.0	2.0	1.3	1.1	1.7	1.0	1.7	0.9	1.0	0.9	0.7	0.6	4.1	2.1	24	
7	1.0	1.9	2.1	1.5	1.2	3.0	3.5	2.4	2.8	S	6.6	2.6	0.5	0.6	0.9	0.8	0.6	0.7	0.5	0.6	0.5	0.5	0.6	0.4	0.4	6.6	1.6	24	
8	0.2	0.4	0.2	0.1	0.0	0.0	0.0	1.7	S	0.4	1.1	0.6	0.7	0.8	0.8	0.8	1.7	1.6	0.7	0.7	0.9	0.8	1.2	0.6	0.0	1.7	0.7	24	
9	0.6	0.4	0.4	0.7	0.5	0.6	0.5	S	0.5	0.4	0.5	1.0	0.5	0.7	0.6	0.9	1.0	1.5	0.4	0.4	0.5	0.3	0.5	0.3	0.3	1.5	0.6	24	
10	0.2	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.1	0.1	0.3	0.4	1.0	0.2	0.3	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.1	24
11	0.2	0.4	0.8	0.7	0.6	S	0.3	1.0	0.3	0.4	0.4	0.6	0.5	0.5	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.0	0.3	24	
12	0.2	1.4	0.2	0.1	S	1.4	1.4	0.9	0.8	0.8	0.6	0.6	0.7	0.7	0.6	0.5	0.3	0.3	0.4	0.4	0.5	0.9	2.0	1.8	0.1	2.0	0.8	24	
13	1.6	1.5	8.3	S	6.2	12.6	3.9	2.4	1.4	1.2	1.0	1.0	0.9	2.8	0.5	0.4	0.7	0.4	0.4	0.1	0.1	0.1	0.2	0.5	0.1	12.6	2.1	24	
14	1.5	0.6	S	0.4	0.9	1.2	1.2	3.4	1.3	0.8	1.1	1.2	0.6	1.5	1.3	1.0	0.2	0.3	0.2	0.3	0.1	0.2	0.2	0.1	0.1	3.4	0.9	24	
15	0.2	S	0.7	1.2	1.9	1.4	13.6	2.4	4.3	3.9	2.7	1.3	2.1	2.0	2.6	3.1	2.2	1.9	1.1	0.9	1.0	2.1	2.7	3.8	0.2	13.6	2.6	24	
16	S	2.8	1.9	1.9	2.1	2.2	2.5	3.3	1.5	3.9	4.1	2.4	2.0	1.5	1.3	5.7	0.3	1.8	1.1	0.9	3.1	7.7	9.3	S	0.3	9.3	2.9	24	
17	3.3	6.6	2.4	2.2	1.9	3.6	5.7	4.3	2.3	1.6	2.5	1.7	1.5	1.4	2.3	1.4	3.4	1.9	3.8	3.2	1.0	0.9	S	1.7	0.9	6.6	2.6	24	
18	2.2	1.7	1.4	1.2	0.8	0.7	1.5	3.8	3.2	2.6	1.3	1.7	0.9	0.9	0.7	0.7	0.4	0.4	0.5	0.4	0.6	S	0.9	1.1	0.4	3.8	1.3	24	
19	2.2	1.9	1.6	1.3	1.2	1.3	5.7	1.9	1.7	0.8	0.6	0.6	0.7	1.2	0.9	1.6	0.9	0.8	1.2	0.8	S	1.3	5.0	6.8	0.6	6.8	1.8	24	
20	5.2	4.5	4.8	4.8	5.0	5.3	3.0	5.5	4.2	7.0	1.6	0.7	1.0	0.9	0.8	0.8	1.3	1.1	0.5	S	0.8	1.7	1.6	1.5	0.5	7.0	2.8	24	
21	1.1	3.8	2.7	2.2	1.7	1.8	1.4	1.3	C	C	C	C	C	C	C	C	C	C	C	C	C	3.7	9.5	7.9	5.5	1.1	9.5	3.6	24
22	0.1	0.0	0.0	0.0	0.0	1.4	1.9	0.3	0.0	0.0	0.1	0.0	0.3	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	9.0	2.8	0.2	0.0	9.0	0.7	24	
23	0.7	1.9	2.9	2.3	11.1	8.8	0.5	3.8	1.5	3.0	0.7	0.7	0.4	0.0	0.0	0.7	S	0.0	2.3	6.7	2.0	0.0	0.0	0.0	0.0	11.1	2.2	24	
24	0.3	0.1	1.8	1.8	1.4	3.0	2.2	4.7	2.4	1.3	0.2	0.1	0.0	0.1	0.0	S	2.3	0.0	0.0	0.0	0.1	0.6	4.8	2.5	0.0	4.8	1.3	24	
25	1.2	1.4	0.5	0.0	0.0	5.6	S	S	S1	2.0	C	C	C	C	C	C	C	C	C	C	C	0.3	0.7	0.5	0.0	5.6	1.2	23	
26	1.2	1.2	0.7	0.5	0.7	1.1	2.1	7.0	12.6	5.3	2.7	2.8	1.8	S	1.4	1.2	2.0	2.0	1.0	1.1	0.7	1.1	1.0	0.8	0.5	12.6	2.3	24	
27	0.6	0.9	2.4	2.0	1.7	1.4	2.1	1.8	1.6	1.2	1.2	1.4	S	0.7	1.1	1.2	1.0	0.9	0.9	1.0	1.1	1.1	1.2	1.8	0.6	2.4	1.3	24	
28	3.1	3.0	1.8	2.1	2.1	2.2	4.2	7.0	2.7	2.5	1.6	S	1.9	2.8	1.9	1.9	1.6	2.1	1.3	1.2	1.5	2.6	2.5	2.3	1.2	7.0	2.4	24	
29	2.3	5.2	3.6	2.9	2.4	3.0	5.0	3.1	2.2	3.0	S	1.2	1.7	2.0	1.8	1.8	1.7	3.3	1.7	2.0	1.8	1.7	1.1	1.3	1.1	5.2	2.4	24	
30	1.3	1.2	1.5	2.4	7.9	9.0	5.9	1.8	1.0	S	2.1	1.9	1.7	1.5	1.5	1.4	2.2	1.8	0.9	0.9	0.8	0.9	1.4	1.8	0.8	9.0	2.3	24	
31	2.4	2.6	1.0	0.6	0.5	1.5	7.1	3.6	S	0.9	1.2	1.9	1.6	1.7	1.6	1.3	1.2	1.0	0.8	0.7	1.7	2.8	2.8	2.0	0.5	7.1	1.8	24	
HOURLY MAX	5.5	9.3	11.6	11.1	12.1	12.6	13.6	10.7	12.6	7.0	6.6	2.8	3.6	3.0	2.6	5.7	3.4	6.0	3.8	6.7	3.9	9.5	9.3	6.8					
HOURLY AVG	1.6	2.3	2.2	1.8	2.4	2.9	3.2	3.1	2.4	2.0	1.4	1.2	1.1	1.2	1.0	1.2	1.2	1.2	0.9	1.0	1.0	1.8	2.1	1.6					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

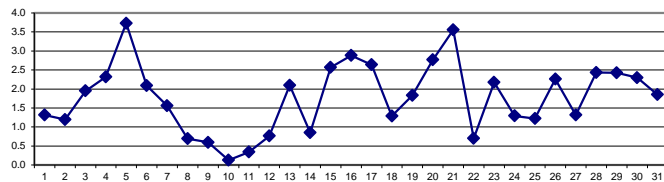
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 PPB

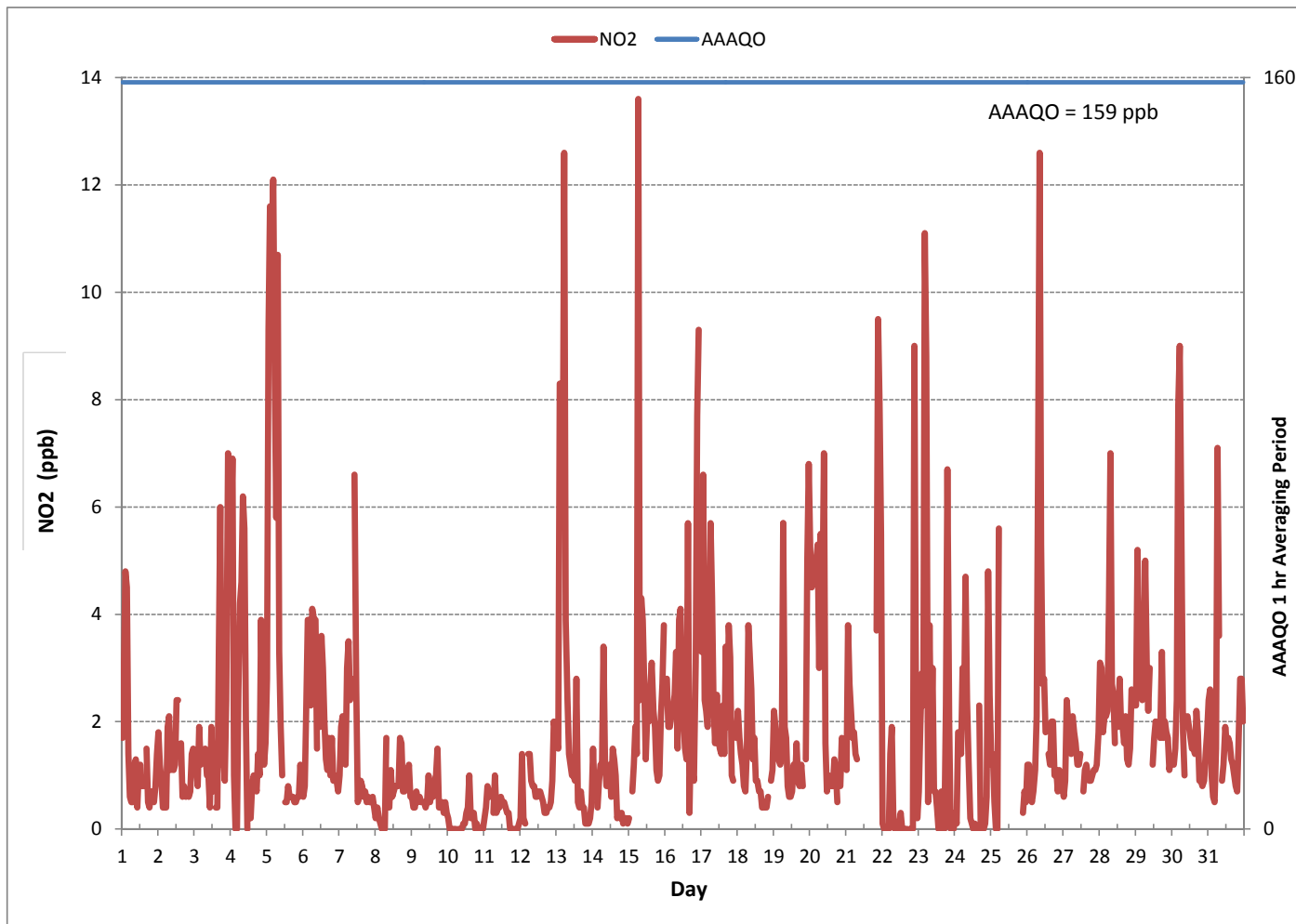
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDENCES:	0				
NUMBER OF NON-ZERO READINGS:	636				
MINIMUM 1-HR AVERAGE:	0.0	PPB	@ HOUR(S)	VAR	ON DAY(S)
MAXIMUM 1-HR AVERAGE:	13.6	PPB	@ HOUR(S)	6	15
MAXIMUM 24-HR AVERAGE:	3.7	PPB			5
					VAR-VARIOUS
IZS CALIBRATION TIME:	32	HRS	OPERATIONAL TIME:	743	HRS
MONTHLY CALIBRATION TIME:	23	HRS	AMD OPERATION UPTIME:	99.9	%
STANDARD DEVIATION:	2.00		MONTHLY AVERAGE:	1.8	PPB

24 HOUR AVERAGES FOR July 2016



NITROGEN DIOXIDE (NO2) hourly averages in ppb





NITROGEN DIOXIDE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR						
DAY	HR	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.					
1		4.8	7.1	7.7	7.7	3.1	0.7	0.7	0.7	1.9	3.1	1.3	1.9	3.0	1.9	2.5	S	2.5	1.3	0.7	1.3	0.7	0.7	1.3	2.5	0.7	7.7	2.6	24					
2		3.1	1.3	1.3	0.7	0.7	0.7	3.1	4.2	4.1	4.8	3.1	2.5	3.6	4.2	S	3.6	0.7	1.3	0.7	0.7	0.7	1.3	1.9	1.9	0.7	4.8	2.2	24					
3		1.9	1.9	0.7	4.8	1.9	1.9	2.5	2.5	1.3	1.3	0.7	3.6	0.7	S	1.3	0.7	18.9	18.9	3.0	2.5	1.3	7.1	12.5	14.7	0.7	18.9	4.6	24					
4		11.3	8.9	3.1	0.7	0.7	8.3	8.3	6.5	7.7	7.7	6.5	0.7	S	1.3	1.9	1.3	1.3	1.3	3.6	2.5	9.5	4.8	1.3	2.5	0.7	11.3	4.4	24					
5		4.8	16.5	20.6	20.6	20.1	12.5	8.9	17.1	10.7	2.5	1.3	S	0.2	0.7	7.1	0.7	0.7	0.7	0.7	0.7	0.7	1.3	0.7	1.3	0.2	20.6	6.5	24					
6		0.7	0.7	6.0	6.0	6.0	3.1	5.4	4.2	5.4	4.2	S	4.8	8.3	6.5	4.2	1.9	2.5	2.5	1.3	2.5	1.9	1.3	1.3	1.3	0.7	8.3	3.6	24					
7		1.9	3.1	3.7	1.9	1.9	8.3	7.7	4.8	4.2	S	8.3	7.1	0.7	1.3	1.9	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	0.7	8.3	3.0	24					
8		0.7	1.3	0.7	0.7	0.7	0.7	6.0	S	1.9	3.6	1.3	1.3	1.3	1.9	1.3	1.3	3.1	2.5	1.3	1.3	1.3	2.5	3.1	0.7	6.0	1.7	24						
9		0.8	0.7	0.7	0.7	0.7	0.7	0.7	S	0.7	0.7	0.7	1.9	0.7	1.3	1.3	1.9	2.5	4.1	1.3	0.7	0.7	0.7	0.7	0.7	0.7	4.1	1.1	24					
10		0.7	0.7	0.1	0.2	0.1	0.2	S	0.7	0.7	0.7	0.7	0.7	0.7	1.3	2.5	1.9	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.1	2.5	0.8	24					
11		0.7	0.7	1.3	1.3	1.3	S	1.3	1.9	0.7	0.7	1.3	1.3	1.3	1.3	1.3	1.9	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1.9	1.1	24					
12		0.7	4.2	0.7	0.7	S	2.5	2.5	1.9	1.9	1.3	1.3	1.3	1.3	1.9	1.3	1.3	0.7	0.7	0.7	1.3	0.7	2.5	3.1	2.5	0.7	4.2	1.6	24					
13		2.5	2.5	15.3	S	19.4	22.9	7.1	3.6	2.5	2.5	1.9	3.1	3.1	8.3	1.3	0.7	2.5	0.7	0.7	0.7	0.7	0.7	0.7	1.3	0.7	22.9	4.6	24					
14		3.1	1.3	S	1.3	1.3	3.1	3.1	17.1	3.1	1.9	5.3	5.4	1.3	4.2	2.5	3.0	1.3	1.3	0.7	0.7	0.7	0.8	0.7	0.7	0.7	17.1	2.8	24					
15		0.7	S	1.3	1.3	2.5	1.9	89.1	4.2	6.0	5.4	3.6	3.1	4.2	3.6	5.4	6.0	3.6	3.1	1.9	1.3	2.5	3.6	4.8	4.8	0.7	89.1	7.1	24					
16		S	3.6	3.1	2.5	3.1	3.6	4.2	4.8	4.2	6.0	8.9	4.2	10.1	4.2	3.6	23.6	0.8	14.8	14.8	1.9	10.1	15.3	15.3	S	0.8	23.6	7.4	24					
17		15.9	17.1	3.1	3.1	2.5	15.9	18.2	8.9	4.8	3.6	8.9	3.1	3.1	4.8	4.8	7.7	4.2	8.9	7.1	1.9	1.3	S	3.1	1.3	18.2	6.7	24						
18		3.1	2.5	1.9	1.9	1.3	1.3	3.7	6.0	4.2	4.2	1.9	3.6	1.9	1.3	1.9	0.7	1.3	0.7	1.3	1.3	S	1.3	1.9	0.7	6.0	2.2	24						
19		3.6	3.1	1.9	1.9	1.9	11.9	35.2	3.1	2.5	1.9	1.3	1.9	1.3	1.9	2.5	4.8	1.3	1.9	2.5	1.3	S	1.9	8.3	8.3	1.3	35.2	4.6	24					
20		6.5	5.4	5.4	5.4	6.0	8.3	5.4	14.7	7.1	17.7	7.1	1.3	1.3	1.3	1.3	1.3	7.1	6.5	0.7	S	1.9	3.6	3.0	1.9	0.7	17.7	5.2	24					
21		1.9	4.2	3.1	2.5	1.9	4.8	1.9	1.3	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	15.6	18.3	13.1	13.9	1.3	18.3	6.9	24
22		1.6	1.3	1.1	1.0	0.8	11.5	16.7	7.9	1.3	1.6	1.5	1.5	1.8	1.5	1.4	1.4	1.6	S	2.4	1.4	1.6	18.5	10.3	1.5	0.8	18.5	4.0	24					
23		2.6	4.6	4.8	4.3	17.1	17.3	3.3	12.0	7.0	7.6	3.4	7.4	9.9	0.9	0.9	8.1	S	4.7	9.4	15.5	9.8	0.8	1.0	1.3	0.8	17.3	6.7	24					
24		1.7	1.7	5.3	4.3	3.5	5.2	4.7	9.4	4.8	2.8	1.6	11.4	0.8	13.0	1.1	S	8.8	2.8	1.1	1.4	1.7	2.6	9.8	5.3	0.8	13.0	4.6	24					
25		3.6	3.4	2.8	1.0	2.3	17.1	S	S	S1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	0.7	1.3	1.3	0.7	17.1	3.7	23			
26		1.3	1.9	1.3	0.7	0.7	1.3	3.6	13.1	14.7	11.3	3.0	2.5	1.9	S	1.3	1.3	4.2	3.6	1.3	1.9	0.7	1.3	1.3	1.3	0.7	14.7	3.3	24					
27		0.7	1.9	2.5	2.5	1.9	2.5	2.5	11.9	1.9	1.9	1.9	1.9	S	2.5	1.9	1.9	1.3	1.3	1.3	1.3	1.3	1.3	1.9	5.4	0.7	11.9	2.4	24					
28		5.4	3.6	3.1	2.5	2.5	3.1	9.5	10.1	6.0	3.6	2.5	S	2.5	3.6	2.5	2.5	2.5	6.0	1.9	1.3	2.5	3.1	3.6	3.1	1.3	10.1	3.8	24					
29		3.6	6.0	6.0	3.6	3.1	6.5	6.5	5.4	3.1	4.8	S	2.5	2.5	3.0	2.5	2.5	2.5	4.8	2.5	2.5	2.5	1.9	1.9	1.9	1.9	6.5	3.6	24					
30		1.9	1.9	2.5	4.2	16.5	18.8	9.5	3.1	2.5	S	3.1	2.5	2.5	2.5	2.5	1.9	3.1	2.5	1.3	1.3	1.3	1.9	2.5	3.1	1.3	18.8	4.0	24					
31		5.4	5.4	1.9	1.3	1.3	4.8	11.9	6.5	S	2.5	1.9	2.5	2.5	2.5	2.5	3.1	1.9	1.9	1.9	1.3	4.2	3.6	3.6	3.1	1.3	11.9	3.4	24					
HOURLY MAX		15.9	17.1	20.6	20.6	20.1	22.9	89.1	17.1	14.7	17.7	8.9	11.4	10.1	13.0	7.1	23.6	18.9	18.9	14.8	15.5	15.6	18.5	15.3	14.7									
HOURLY AVG		3.2	4.0	3.8	3.0	4.2	6.7	9.6	6.7	4.3	4.0	3.2	3.1	2.7	3.0	2.4	3.2	3.1	3.5	2.4	2.1	2.8	3.5	3.8	3.1									

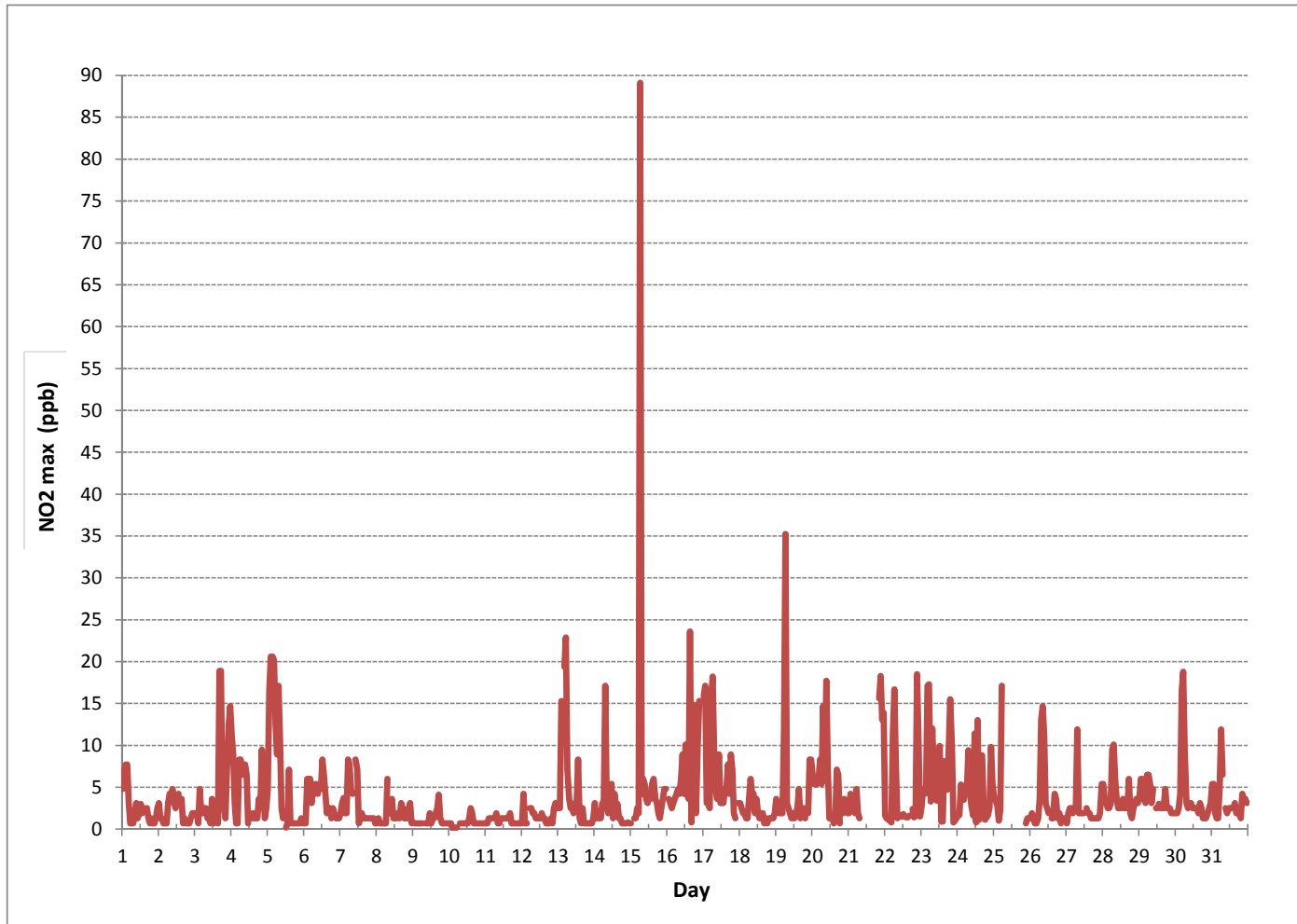
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

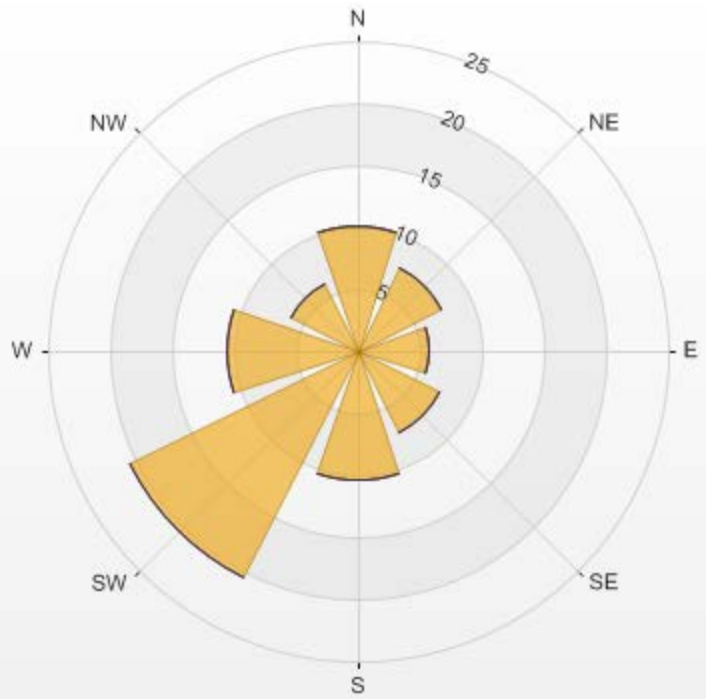
NUMBER OF NON-ZERO READINGS:	687
MAXIMUM INSTANTANEOUS VALUE:	89.1 PPB @ HOUR(S) 6 ON DAY(S) 15
VAR-VARIOUS	
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	24 HRS
STANDARD DEVIATION:	5.33
OPERATIONAL TIME:	743 HRS

NITROGEN DIOXIDE MAX instantaneous maximum in ppb



Wind: LICA MASKWA Monitor: NO2 [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 21.51% Valid Data: 92.47% Calm Avg: 0.00

Direction	0.5-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	10.03	0	0	0	10.03
NE	7.56	0	0	0	7.56
E	5.81	0	0	0	5.81
SE	7.41	0	0	0	7.41
S	10.47	0	0	0	10.47
SW	20.49	0	0	0	20.49
W	10.61	0	0	0	10.61
NW	6.1	0	0	0	6.1
Summary	78.48	0	0	0	78.48



% Icon Classes (ppb)	78	0	0	0
0.5-50.0				
50.0-110.0	0	0	0	0
110.0-210.0	0	0	0	0
>210.0	0	0	0	0

NO2[ppb] Calibration: LICA MASKWA Monthly: 07/2016 Type: Span



■ Span Meas
 — Span Ref
 — Span Low
 — Span High

WIND SPEED

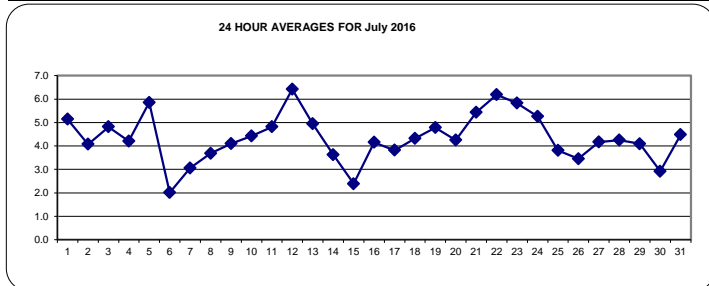
WIND SPEED (WS) hourly averages in km/hr

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
HOURLY START	HOURLY END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.
DAY																													
1		4.4	3.5	3.3	1.4	3.0	2.9	3.6	4.2	4.7	4.9	7.5	7.3	8.1	7.0	6.7	7.3	6.9	8.1	7.3	5.9	4.9	3.4	4.0	3.0	1.4	8.1	5.1	24
2		1.8	0.7	2.3	1.8	2.2	2.4	3.8	3.3	3.7	2.8	4.8	3.9	4.9	6.2	6.2	5.6	5.8	5.9	5.8	5.0	4.9	4.8	4.6	4.5	0.7	6.2	4.1	24
3		3.5	2.9	2.2	2.2	1.7	2.6	5.1	4.6	5.0	5.3	6.2	7.3	7.2	7.4	6.0	6.0	10.2	4.6	8.7	2.3	3.6	2.9	4.5	3.5	1.7	10.2	4.8	24
4		4.4	4.2	4.0	3.3	3.4	3.8	5.0	5.9	5.6	6.7	5.4	6.8	6.4	6.5	5.5	4.9	4.0	4.1	2.6	2.3	1.4	1.5	0.1	3.0	0.1	6.8	4.2	24
5		4.6	6.2	6.7	6.6	8.7	7.2	5.8	2.8	5.4	5.6	5.9	4.6	4.5	8.0	6.9	9.4	9.5	8.3	8.2	4.7	4.5	3.0	1.5	1.9	1.5	9.5	5.9	24
6		0.6	0.7	1.4	1.9	0.8	1.5	1.0	0.5	0.7	5.0	3.3	3.1	3.0	1.9	3.3	3.7	1.6	4.3	2.9	1.0	2.1	1.6	1.1	1.3	0.5	5.0	2.0	24
7		1.8	1.7	1.8	1.7	1.6	2.8	3.3	4.1	2.2	1.1	1.7	3.9	4.1	4.7	6.5	5.6	3.6	4.1	3.6	3.2	3.5	3.9	1.9	1.0	1.0	6.5	3.1	24
8		1.2	2.2	2.2	1.2	0.8	1.6	3.2	3.7	5.0	4.8	4.7	6.5	6.1	4.3	6.6	5.7	5.6	5.3	6.2	1.2	1.5	2.8	1.8	4.3	0.8	6.6	3.7	24
9		3.9	3.1	1.4	1.0	1.0	1.2	4.3	6.9	8.1	9.1	5.5	4.7	8.7	6.0	5.0	6.0	6.0	4.0	2.9	1.8	2.1	2.0	2.2	1.6	1.0	9.1	4.1	24
10		1.7	3.8	3.4	3.8	2.0	1.8	2.7	4.7	6.6	6.2	5.1	6.9	6.2	6.8	7.8	8.0	8.0	5.9	6.3	4.4	1.7	0.9	0.8	0.8	0.8	8.0	4.4	24
11		1.1	0.7	1.4	2.4	2.8	1.8	5.8	8.9	8.7	9.3	9.3	8.7	7.8	8.4	3.8	5.8	6.8	7.2	4.9	2.9	1.6	1.7	2.5	1.2	0.7	9.3	4.8	24
12		1.3	1.7	1.6	3.0	2.6	2.6	4.0	7.4	11.4	10.3	12.6	10.2	9.1	9.2	11.4	11.7	10.8	7.7	8.3	5.3	4.1	2.1	2.7	2.9	1.3	12.6	6.4	24
13		2.3	2.3	1.7	3.3	3.1	3.7	3.7	5.2	10.6	7.5	7.1	7.4	6.8	6.7	7.9	9.3	5.8	7.1	6.2	5.7	0.5	1.3	1.6	1.8	0.5	10.6	4.9	24
14		0.5	2.3	2.9	2.7	3.2	3.6	5.7	6.3	7.5	4.9	4.4	6.0	4.9	6.8	4.1	5.7	5.1	2.2	0.9	2.8	0.6	1.0	1.8	1.2	0.5	7.5	3.6	24
15		0.8	0.8	0.7	0.4	0.8	0.5	2.0	1.9	1.1	3.6	1.8	3.2	4.8	2.6	2.4	0.5	2.2	2.4	4.2	4.8	3.3	3.8	4.3	4.4	0.4	4.8	2.4	24
16		3.9	2.6	2.7	2.5	2.2	3.4	4.1	3.6	4.3	4.9	2.6	3.5	5.5	4.8	4.3	7.2	6.6	6.0	10.4	5.1	1.7	2.6	1.6	3.7	1.6	10.4	4.2	24
17		2.3	3.3	3.6	2.2	2.4	3.6	4.2	3.6	4.1	6.4	5.3	7.0	6.8	5.8	6.0	5.1	4.3	4.9	2.9	2.9	0.6	2.3	1.7	0.3	0.3	7.0	3.8	24
18		1.0	0.7	0.4	1.2	0.4	0.6	1.1	3.1	2.8	4.4	6.2	7.8	8.3	9.4	8.8	7.7	8.8	9.0	8.2	6.1	3.7	2.8	1.0	0.1	0.1	9.4	4.3	24
19		0.5	0.9	1.9	2.1	1.6	1.3	1.2	3.8	2.5	5.8	5.3	8.1	6.7	8.1	9.5	4.9	7.1	7.1	7.4	7.6	5.4	5.6	5.6	4.7	0.5	9.5	4.8	24
20		3.0	2.9	4.2	2.6	2.9	2.3	2.4	6.9	5.0	3.3	4.6	4.3	6.6	7.0	5.9	7.2	8.9	3.6	3.9	3.0	3.1	1.7	2.8	3.8	1.7	8.9	4.2	24
21		4.1	3.8	3.6	2.9	3.6	3.3	3.5	4.0	5.6	5.6	8.0	9.2	8.6	9.5	10.5	7.1	8.8	8.4	6.9	3.9	3.3	2.5	2.5	1.2	1.2	10.5	5.4	24
22		0.6	0.7	2.2	2.8	2.0	2.1	3.1	6.2	7.9	7.8	8.9	9.3	11.6	12.1	12.1	12.2	12.5	9.6	5.7	5.1	5.3	2.0	2.1	4.6	0.6	12.5	6.2	24
23		6.6	5.9	3.6	3.5	4.6	4.3	5.7	4.8	7.1	6.2	7.1	8.2	6.4	7.8	9.6	9.2	7.6	7.1	6.0	5.6	3.4	3.2	3.1	3.1	3.1	9.6	5.8	24
24		2.2	3.6	4.6	3.7	4.9	5.1	5.3	5.2	8.7	8.1	6.0	7.0	8.3	7.8	6.3	5.6	5.4	4.9	3.8	2.4	6.5	4.5	2.0	4.4	2.0	8.7	5.3	24
25		4.3	2.3	2.4	1.9	2.7	3.9	4.5	4.3	4.5	5.0	6.6	7.1	6.5	5.1	4.5	4.2	4.5	4.3	2.5	2.2	2.2	2.7	2.5	0.8	0.8	7.1	3.8	24
26		1.0	1.4	1.2	0.6	1.5	1.2	0.6	0.5	0.8	3.0	5.2	4.8	8.1	7.4	8.3	6.1	5.7	4.3	4.1	5.7	3.7	5.0	1.8	0.9	0.5	8.3	3.5	24
27		1.2	2.3	5.1	4.5	2.2	1.6	4.0	5.9	4.9	5.1	6.6	5.9	6.4	5.4	5.4	5.5	5.9	4.5	4.1	2.9	3.4	3.5	1.8	2.0	1.2	6.6	4.2	24
28		2.5	1.5	1.9	1.7	1.0	0.8	0.2	0.4	3.2	6.1	7.3	8.5	7.1	7.1	7.2	9.0	8.7	8.7	4.3	1.0	4.9	2.9	2.4	3.5	0.2	9.0	4.2	24
29		2.6	2.4	2.8	4.6	3.5	3.9	5.2	3.7	3.4	3.9	5.6	5.3	5.2	4.7	4.3	5.4	8.5	8.3	6.0	1.6	2.6	2.1	2.3	0.3	0.3	8.5	4.1	24
30		0.6	0.5	0.9	3.6	3.3	1.8	0.5	3.5	2.2	4.2	2.8	2.7	4.2	4.5	5.2	4.3	3.3	1.2	1.5	1.2	4.1	4.3	4.9	4.8	0.5	5.2	2.9	24
31		3.0	3.1	1.9	1.1	1.0	4.9	4.9	3.8	4.4	7.3	8.4	7.2	6.1	7.0	5.8	6.0	5.6	5.3	3.6	3.1	4.0	3.0	3.9	3.2	1.0	8.4	4.5	24
HOURLY MAX		6.6	6.2	6.7	6.6	8.7	7.2	5.8	8.9	11.4	10.3	12.6	10.2	11.6	12.1	12.1	12.2	12.5	9.6	10.4	7.6	6.5	5.6	5.6	4.8				
HOURLY AVG		2.4	2.4	2.6	2.5	2.5	2.7	3.5	4.3	5.1	5.6	5.9	6.3	6.6	6.6	6.6	6.5	6.6	5.8	5.2	3.6	3.2	2.8	2.5	2.5				

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

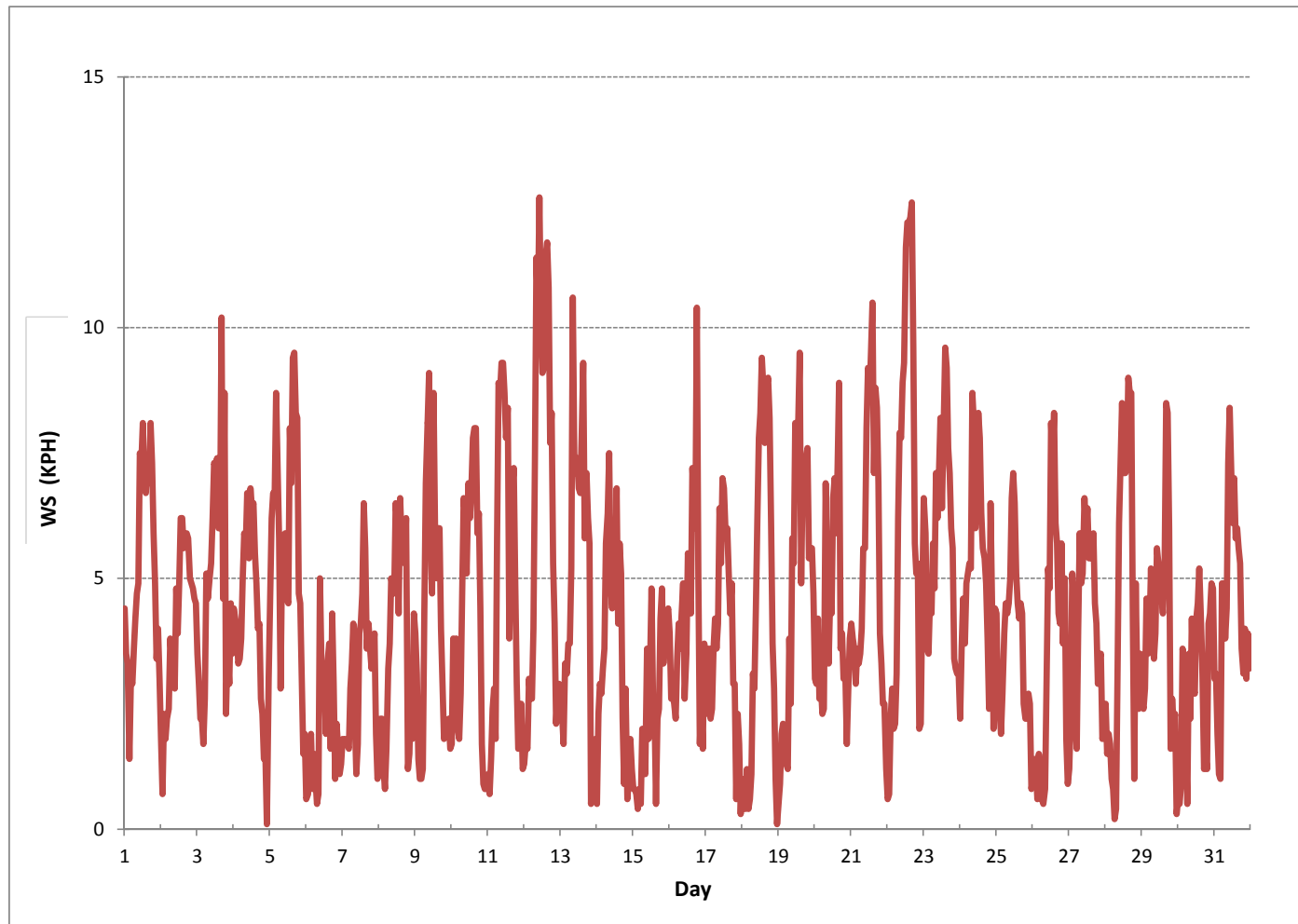
LAST CALIBRATION:	March 30, 2016
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	744
MINIMUM 1-HR AVERAGE:	0.1 KPH @ HOUR(S) 22 , 23 ON DAY(S) 4 , 18
MAXIMUM 1-HR AVERAGE:	12.6 KPH @ HOUR(S) 10 ON DAY(S) 12
MAXIMUM 24-HR AVERAGE:	6.4 KPH ON DAY(S) 12
	VAR-VARIOUS
MONTHLY CALIBRATION TIME:	0 HRS
OPERATIONAL TIME:	744 HRS
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	2.51
MONTHLY AVERAGE:	4.3 KPH

WIND SPEED (WS) hourly averages in km/hr



VECTOR WIND SPEED MAX instantaneous maximum in km/hr

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
HOURLY MAX	HOURLY AVG	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.	
DAY																														
1		15.9	12.6	16.6	11.5	11.8	10.0	10.9	12.8	13.5	27.5	28.1	31.9	31.4	33.0	28.8	35.4	24.6	26.4	26.2	21.4	15.5	8.0	8.3	7.5	7.5	35.4	19.6	24	
2		6.6	4.1	9.6	7.1	7.1	10.2	17.2	12.2	15.9	15.0	17.2	15.5	19.0	25.1	22.9	22.0	24.4	24.0	17.0	14.6	15.0	13.9	13.9	10.9	4.1	25.1	15.0	24	
3		13.3	14.8	11.3	9.6	6.9	13.5	18.3	18.5	16.1	22.9	21.8	32.1	29.2	29.9	24.6	48.5	44.4	20.7	24.3	23.7	11.9	13.3	20.7	19.4	6.9	48.5	21.2	24	
4		21.6	16.4	14.8	11.5	12.0	15.9	18.1	24.0	19.9	23.8	19.4	27.3	28.4	31.7	21.4	19.0	17.7	15.0	11.3	8.2	8.5	7.4	4.1	12.8	4.1	31.7	17.1	24	
5		20.5	22.7	23.1	24.4	32.1	26.1	25.2	21.7	27.5	21.4	34.8	52.0	21.0	28.2	27.3	25.3	24.2	26.4	23.1	21.4	15.0	11.5	6.7	9.8	6.7	52.0	23.8	24	
6		5.6	6.9	4.7	6.1	5.8	5.0	3.9	3.6	10.0	21.4	11.3	13.1	13.6	15.4	17.7	54.1	12.7	11.2	9.8	5.0	5.6	6.7	5.0	5.0	3.6	54.1	10.8	24	
7		6.5	5.2	5.4	4.5	5.0	12.8	10.9	13.5	10.7	9.8	6.3	13.9	15.7	20.5	23.6	21.1	15.7	17.6	10.4	11.3	7.1	6.3	6.1	8.8	4.5	23.6	11.2	24	
8		4.0	9.8	5.6	5.8	5.2	5.6	8.9	12.6	12.8	26.8	20.7	24.0	26.4	21.4	19.6	17.4	18.8	25.5	19.9	7.4	6.5	8.9	7.1	9.3	4.0	26.8	13.8	24	
9		10.7	9.8	5.0	4.7	3.6	5.0	11.8	17.2	21.1	24.9	24.5	22.1	26.3	24.7	21.9	25.0	31.1	25.2	13.8	8.0	6.1	6.9	6.7	5.6	3.6	31.1	15.1	24	
10		5.8	10.7	11.1	12.2	8.9	7.6	10.2	15.0	24.0	27.3	24.0	27.3	25.7	28.4	33.2	34.3	28.1	27.9	15.9	13.3	8.5	4.5	3.0	4.3	3.0	34.3	17.1	24	
11		4.7	5.0	5.2	7.6	9.3	10.0	12.4	23.4	26.9	29.6	27.6	26.9	27.6	49.7	39.0	30.1	32.5	25.7	20.1	14.8	8.0	5.6	9.6	7.1	4.7	49.7	19.1	24	
12		7.8	8.9	8.0	11.1	9.8	9.8	15.0	21.1	33.2	29.0	33.6	29.2	34.3	35.4	30.1	48.9	37.3	24.6	26.6	18.8	18.3	9.1	10.4	9.8	7.8	48.9	21.7	24	
13		9.3	9.3	9.3	13.1	14.8	13.9	16.2	22.4	30.2	28.0	28.9	23.4	26.3	28.4	35.4	29.2	31.2	22.0	17.0	26.4	5.0	9.1	6.9	3.9	3.9	35.4	19.2	24	
14		3.4	6.3	10.2	8.7	8.5	8.7	16.1	17.0	22.9	19.2	19.0	20.7	21.6	22.7	27.5	28.8	22.2	13.7	7.8	7.8	3.4	3.2	4.7	4.5	3.2	28.8	13.7	24	
15		3.9	3.5	4.0	3.4	10.2	3.9	5.2	6.3	11.1	13.9	8.2	13.9	19.2	12.4	17.0	14.6	14.4	11.7	13.0	15.9	14.4	9.8	10.7	9.6	3.4	19.2	10.4	24	
16		12.0	6.5	5.6	7.8	7.4	8.5	10.7	13.3	16.3	18.8	16.1	21.1	24.6	22.0	23.8	33.0	28.4	25.3	37.4	24.6	7.4	11.6	10.5	15.6	5.6	37.4	17.0	24	
17		13.3	15.2	14.1	10.7	8.9	12.2	14.6	12.0	12.4	21.6	22.2	29.7	27.1	23.3	20.5	29.5	19.2	19.8	9.1	10.0	7.4	3.9	3.9	2.6	2.6	29.7	15.1	24	
18		3.4	2.6	3.0	3.4	3.4	3.0	4.6	8.8	10.1	14.9	21.9	27.2	25.4	23.9	26.0	22.9	24.0	23.3	22.9	17.4	7.3	8.2	7.4	7.6	2.6	27.2	13.4	24	
19		3.9	4.8	11.1	7.8	6.1	5.4	10.7	13.7	14.8	17.2	19.0	23.3	24.0	28.6	48.3	14.8	16.6	16.8	19.6	17.9	10.9	13.1	13.3	12.8	3.9	48.3	15.6	24	
20		9.6	13.1	14.4	6.9	9.8	6.5	15.6	29.6	21.0	13.8	17.8	17.3	26.9	29.7	29.9	32.3	35.8	21.1	15.9	16.3	23.3	16.6	7.6	12.4	6.5	35.8	18.5	24	
21		13.5	13.5	12.8	12.6	15.5	12.6	15.0	15.2	22.5	22.7	31.2	42.6	43.3	38.9	55.5	36.0	31.4	36.3	40.8	21.4	14.8	14.6	13.3	11.1	11.1	55.5	24.5	24	
22		6.9	4.3	7.8	8.3	6.6	4.8	15.7	23.1	21.8	22.3	22.7	26.4	29.0	33.6	29.5	29.7	31.6	27.7	23.3	17.2	17.0	25.1	10.4	15.0	4.3	33.6	19.2	24	
23		19.9	15.7	19.4	16.1	21.4	20.1	24.7	21.6	24.9	22.9	43.9	31.9	27.3	37.8	34.5	38.2	32.8	30.8	26.6	38.0	19.4	13.7	6.7	9.6	6.7	43.9	24.9	24	
24		8.1	10.7	14.0	11.9	12.8	12.8	15.5	15.9	23.1	29.5	26.8	32.5	38.4	35.1	34.1	34.5	22.9	53.7	36.0	10.2	34.5	26.0	18.5	12.6	8.1	53.7	23.8	24	
25		11.5	10.7	9.1	9.3	10.0	12.2	19.4	20.3	16.3	21.4	26.8	36.5	24.4	28.6	20.5	25.9	20.7	18.3	11.4	7.6	5.7	5.1	5.3	4.4	4.4	36.5	15.9	24	
26		3.4	5.2	6.1	4.5	5.2	5.2	5.2	6.5	4.7	9.1	16.6	12.8	22.7	25.7	26.4	20.9	20.3	14.4	50.0	22.9	8.9	15.7	9.3	5.4	3.4	50.0	13.6	24	
27		6.1	8.7	14.8	12.6	7.8	6.7	12.2	15.9	14.4	14.2	17.1	19.3	21.0	22.8	20.4	18.0	25.6	17.7	15.7	9.5	9.1	8.9	5.2	11.1	5.2	25.6	14.0	24	
28		6.7	5.4	5.0	4.7	4.1	17.9	6.7	5.8	10.6	12.8	26.4	23.8	25.3	25.3	24.6	27.9	26.4	32.8	17.6	6.8	8.9	17.0	9.6	6.7	9.8	4.1	32.8	15.1	24
29		9.1	7.4	5.6	10.9	8.9	14.4	14.6	12.8	11.5	12.5	17.1	19.7	23.4	19.9	22.8	32.0	36.8	26.8	20.9	7.8	6.1	5.8	5.8	4.1	4.1	36.8	14.9	24	
30		4.1	5.0	3.6	12.4	13.9	17.4	7.8	10.4	11.3	14.8	8.9	9.1	11.3	14.1	20.3	14.4	12.6	6.3	8.2	4.7	11.8	13.7	15.2	14.4	3.6	20.3	11.1	24	
31		11.3	9.6	9.8	5.4	11.8	17.2	19.6	14.6	20.2	26.1	30.5	28.2	33.1	30.7	23.1	26.4	27.1	19.6	16.6	12.4	10.9	12.2	13.1	14.6	5.4	33.1	18.5	24	
HOURLY MAX		21.6	22.7	23.1	24.4	32.1	26.1	25.2	29.6	33.2	29.6	43.9	52.0	43.3	49.7	55.5	54.1	44.4	53.7	50.0	38.0	34.5	26.0	20.7	19.4					
HOURLY AVG		9.1	9.2	9.7	9.2	9.8	10.8	13.3	15.5	17.8	20.5	22.3	25.0	25.6	27.3	27.4	28.7	25.5	22.8	20.3	15.0	11.6	10.6	8.9	9.4					

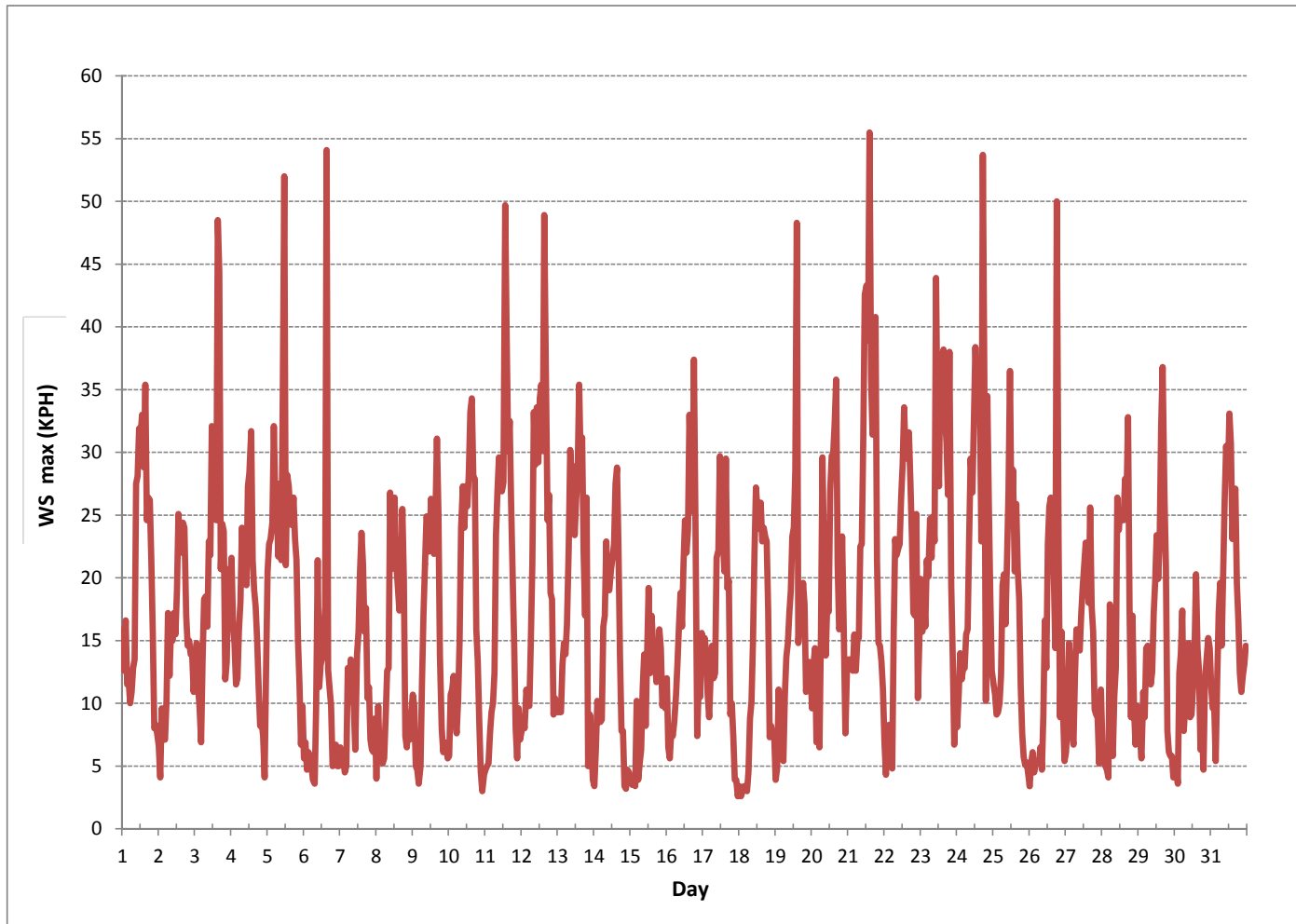
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

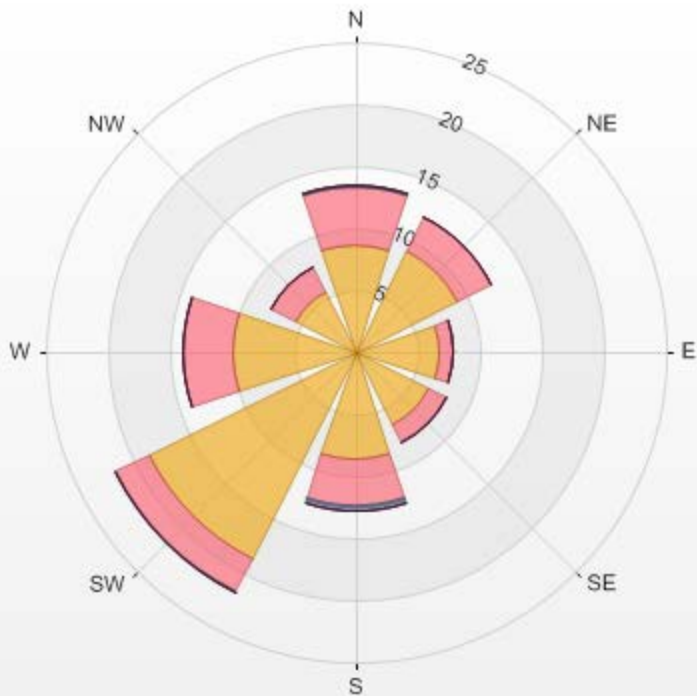
MAXIMUM INSTANTANEOUS VALUE:	55.5	KPH	@ HOUR(S)	14	ON DAY(S)	21	
VAR-VARIOUS							
OPERATIONAL TIME:						744	HRS

VECTOR WIND SPEED MAX instantaneous maximum in km/hr



Wind: LICA MASKWA Monitor: WSP [kph] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 1.88% Valid Data: 100.00% Calm Avg: 0.00

Direction	0.5-6.0	6.0-12.0	12.0-20.0	20.0-29.0	29.0-39.0	>39.0	Total
N	8.6	4.7	0.13	0	0	0	13.43
NE	9.14	3.09	0	0	0	0	12.23
E	6.72	1.21	0	0	0	0	7.93
SE	6.59	1.61	0	0	0	0	8.2
S	8.74	3.76	0.4	0	0	0	12.9
SW	18.68	2.96	0.13	0	0	0	21.77
W	9.95	4.03	0	0	0	0	13.98
NW	5.38	2.28	0	0	0	0	7.66
Summary	73.8	23.64	0.66	0	0	0	98.1



% Icon Classes (kph)	74	0.5-6.0	24	6.0-12.0	1	12.0-20.0	0	20.0-29.0	0	29.0-39.0	0	>39.0
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WIND DIRECTION



WIND DIRECTION (WD) hourly averages

MST	DAY	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	24-HOUR AVG	RDGS.
	HOUR START	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	QUADRANT	
1	ESE	ENE	E	ENE	ENE	ENE	ENE	ENE	E	E	ENE	E	ESE	ESE	E	ESE	ESE	SE	SE	SSE	S	SSE	SSE	SE	ESE	24	
2	SE	ENE	ENE	NE	NE	ENE	ESE	ESE	E	E	ENE	E	ESE	SE	SE	SE	ESE	SE	SE	SE	SE	SE	SE	SE	ESE	24	
3	SE	ESE	ESE	E	ENE	ENE	ESE	ESE	ESE	SE	SE	ESE	SE	ESE	SE	SE	SW	NW	NW	NE	WNW	SW	WSW	W	NW	ESE	24
4	W	W	W	W	WSW	W	W	W	WNW	WNW	W	WNW	W	WNW	W	W	W	W	NW	N	W	WNW	NNE	NNE	WNW	24	
5	NNW	NW	WNW	WNW	WNW	WNW	WNW	NNW	NNE	N	NNE	NNE	N	N	N	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNW	NNE	N	24	
6	WSW	NW	WSW	SSW	SW	SSW	SW	SW	WSW	NNE	SSW	W	NNW	NNW	W	NNE	SE	SSW	SW	SW	SW	S	S	SW	24		
7	SW	SW	SSW	SW	SW	NNW	NNE	N	NNE	NE	W	SW	WSW	WSW	SW	SW	SW	NE	E	ESE	SE	SE	SSE	E	SSW	24	
8	E	ESE	NNE	NE	ENE	NNE	NE	ENE	NE	NE	E	ENE	ENE	ENE	S	S	NNE	NE	NE	N	ENE	ESE	NNE	NNE	ENE	24	
9	ENE	ENE	N	NE	ESE	N	NNE	NE	NE	NE	ENE	E	NE	ENE	ENE	E	ESE	E	ENE	E	ENE	NE	NE	NE	ENE	24	
10	NNE	NE	NE	NE	NE	NNE	ENE	NE	NE	ENE	ENE	ENE	ENE	E	E	ENE	ENE	NE	NNE	NE	NNE	NNE	E	NE	NE	24	
11	E	ENE	NE	NNE	NNE	NNE	NE	NE	NNE	NE	NE	NE	NNE	NNE	N	NNE	N	NNE	N	NNE	N	NNW	NNE	NW	NNE	24	
12	W	NNW	NW	NNW	N	N	N	N	NNE	NNE	NNE	NNW	N	NNE	NNE	N	N	N	N	N	N	NNW	NNW	N	N	24	
13	NNW	NW	W	NW	NW	NW	NNW	N	NNE	N	NNW	N	NNW	NW	N	NNE	NNE	NNE	NNE	NE	E	S	SSW	SSW	NNW	24	
14	ENE	NE	NE	NE	NE	NE	NE	NE	NE	NE	ENE	NE	ENE	NE	SE	ENE	ENE	ENE	SE	S	SSE	SSE	S	S	ENE	24	
15	S	SSE	SSE	S	SSW	WSW	NNE	ENE	S	SSW	SSW	NNE	NNW	NW	SSW	ENE	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	24	
16	SSW	SW	SSW	SW	SSW	SW	SSW	WSW	W	WNW	WNW	WNW	WNW	WNW	NW	WNW	W	WNW	NNE	N	SW	WSW	WNW	NNW	W	24	
17	WNW	NW	N	NNW	NNW	N	N	N	NNE	NNW	NNW	N	NNW	N	NW	NW	NNW	N	N	NNW	SSE	SE	S	NNW	24		
18	SE	SSE	SW	SSW	SSW	ESE	NE	SSW	SW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	S	SSW	SSE	S	S	SSE	S	24	
19	NE	NE	E	NE	ENE	ENE	ESE	SSE	S	SSW	SSW	SSW	SSW	SSW	S	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	24	
20	SW	SSW	SSW	SSW	SW	SW	WNW	NNW	N	W	WSW	WSW	SW	W	W	WNW	W	W	W	WSW	WNW	W	SW	SW	WSW	24	
21	SW	SW	SW	WSW	SW	SW	WSW	SW	WSW	WSW	WSW	W	W	WNW	WNW	WNW	WNW	NW	NW	WNW	WNW	W	NNW	W	NNW	24	
22	N	ENE	ENE	E	E	NNE	SE	S	S	S	S	S	SSW	SSW	SSW	SSW	SSW	SSW	SSW	S	S	WNW	S	SSW	S	24	
23	SSW	SW	SW	WSW	W	W	W	NW	NW	WNW	WNW	WNW	W	W	WNW	WNW	W	WNW	WNW	WNW	WNW	WSW	SW	SW	W	24	
24	SW	SSW	SW	SW	SW	SW	SW	SSW	SSW	SW	WSW	WSW	WSW	WSW	WSW	WSW	W	WNW	W	WSW	WSW	SW	SSW	SW	SSW	24	
25	SW	W	SW	SW	W	WNW	WNW	WNW	WNW	WNW	NW	WNW	NNW	WNW	WNW	NW	W	W	WSW	SW	SSE	SSE	S	S	W	24	
26	SE	ESE	ENE	ENE	WSW	WSW	SSW	WSW	SE	SSW	S	S	S	SSE	SSE	SSE	SE	ESE	S	S	S	S	SSW	SE	SSE	24	
27	SE	SSW	SSW	SSW	SW	SE	SSW	SSW	S	SSW	S	SSW	SW	SW	SW	SSW	SW	WSW	WSW	SW	SSW	SSW	SSW	SSW	SSW	24	
28	SSW	SSW	S	SSW	SW	SSE	SE	WNW	SSW	SSW	SSW	SSW	SSW	SW	SW	SW	SSW	SW	N	NNE	NNE	S	SSW	SSW	SSW	24	
29	SSW	SW	SSW	SSW	SSW	SW	SW	SW	SW	SSW	SSW	SSW	SSW	SSW	SW	WSW	W	WSW	SW	SSW	S	SSE	S	S	NE	SSW	24
30	SE	NNE	ENE	SW	WSW	WSW	NE	NNE	SSE	SSE	SW	SSW	SSW	SSW	S	S	SSE	ESE	E	SSE	SSE	SSE	SSE	S	SSE	24	
31	SSE	S	S	SSW	SW	W	WNW	WNW	W	WNW	WNW	W	W	WNW	W	W	W	W	SW	SW	SW	WSW	SW	WSW	WSW	24	

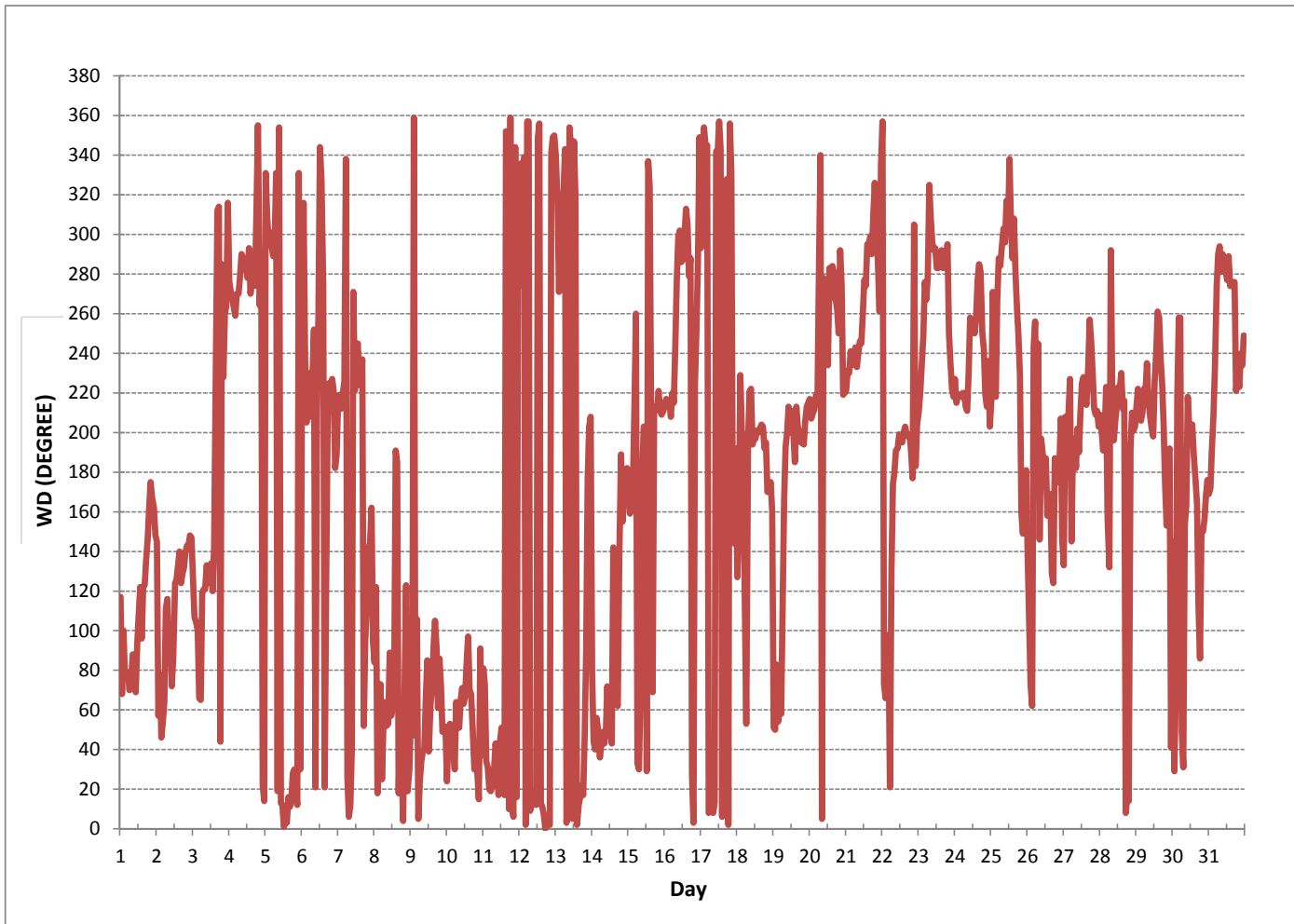
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	March 30, 2016
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	0	HRS	OPERATIONAL TIME:	744	HRS
STANDARD DEVIATION:	100.11		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	19 (NNE)	DEGREE

WIND DIRECTION (WD) hourly averages



STANDARD DEVIATION WIND DIRECTION



STANDARD DEVIATION WIND DIRECTION (STDWD) hourly averages in degrees

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	RDGS.
HOUR START	HOUR END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	
DAY 1		32	29	36	59	26	26	28	34	33	38	33	43	39	38	40	38	37	32	32	26	18	11	11	14	24
2		23	35	29	31	28	29	38	44	42	36	38	41	40	44	37	42	42	34	34	24	25	21	21	21	24
3		25	35	45	39	38	29	38	43	38	30	33	41	43	40	38	35	37	35	19	33	27	39	36	47	24
4		33	35	33	31	28	31	32	31	33	33	38	35	41	40	42	38	42	32	39	34	52	56	68	27	24
5		39	36	34	35	33	34	31	39	42	46	48	81	42	30	33	24	26	26	25	19	19	26	36	34	24
6		56	42	38	25	62	35	47	51	49	30	40	55	68	52	47	44	21	28	59	38	56	40	38	24	24
7		55	40	41	26	37	31	24	29	50	39	45	44	37	42	36	44	50	33	33	28	14	10	20	50	24
8		50	42	12	33	59	61	28	32	23	34	43	35	34	40	27	19	34	33	19	51	35	24	21	14	24
9		17	24	35	50	36	46	22	19	26	30	48	54	31	39	40	35	39	40	29	29	21	24	25	29	24
10		29	20	21	22	37	34	32	25	27	31	34	30	38	43	39	31	34	28	15	19	31	55	42	39	24
11		43	47	35	26	33	43	16	14	23	33	25	30	25	30	52	36	39	32	35	39	44	28	25	62	24
12		52	34	42	36	31	40	38	29	25	27	25	28	36	35	30	28	30	36	31	31	24	34	35	32	24
13		36	33	40	42	44	42	43	48	28	37	39	37	39	42	35	32	35	35	28	26	50	46	32	26	24
14		51	22	19	20	19	19	22	30	30	39	39	43	50	39	32	36	51	47	62	14	58	54	29	50	24
15		50	69	57	74	49	54	15	38	67	49	61	47	34	56	53	57	66	53	33	19	25	16	14	12	24
16		17	23	17	44	46	23	25	37	37	40	65	52	52	52	49	43	39	38	19	55	55	31	46	37	24
17		52	43	32	35	32	23	24	37	40	34	46	39	43	43	40	49	46	38	29	32	44	17	28	63	24
18		44	63	82	53	66	55	49	34	44	35	43	35	30	28	32	27	26	23	24	19	13	17	51	50	24
19		51	52	36	28	30	60	46	41	63	38	43	31	32	23	23	34	17	19	19	16	12	11	16	17	24
20		22	45	17	13	22	26	33	38	49	43	40	42	34	34	46	39	38	36	38	40	36	35	28	21	24
21		22	33	29	34	29	32	40	34	38	41	37	43	43	43	42	39	34	36	42	45	38	50	41	52	24
22		73	28	32	21	30	37	38	33	28	35	25	27	27	25	22	21	21	22	22	18	20	58	44	26	24
23		18	18	32	30	32	33	30	44	36	37	42	38	38	37	37	35	37	35	34	39	33	29	20	21	24
24		31	17	18	23	16	19	26	26	24	32	49	42	40	43	42	43	40	42	38	41	24	30	32	14	24
25		24	43	37	37	34	31	31	38	44	49	42	41	43	48	44	56	43	37	51	30	20	18	14	35	24
26		31	37	57	61	45	48	76	71	61	19	21	33	26	34	32	36	36	36	36	28	14	18	36	56	24
27		49	24	16	22	40	48	21	22	30	35	26	37	38	46	42	37	39	41	39	29	17	16	36	49	24
28		22	64	21	36	44	58	58	70	35	21	27	27	29	34	41	27	32	31	32	50	26	17	18	25	24
29		28	29	17	15	22	26	25	37	46	44	36	44	43	47	56	46	37	31	24	49	26	50	45	38	24
30		47	53	55	32	39	61	55	26	31	27	40	46	29	21	24	31	31	35	30	41	14	21	22	24	24
31		33	30	49	51	49	32	38	41	41	35	32	40	42	40	44	42	41	36	27	27	22	37	37	38	24

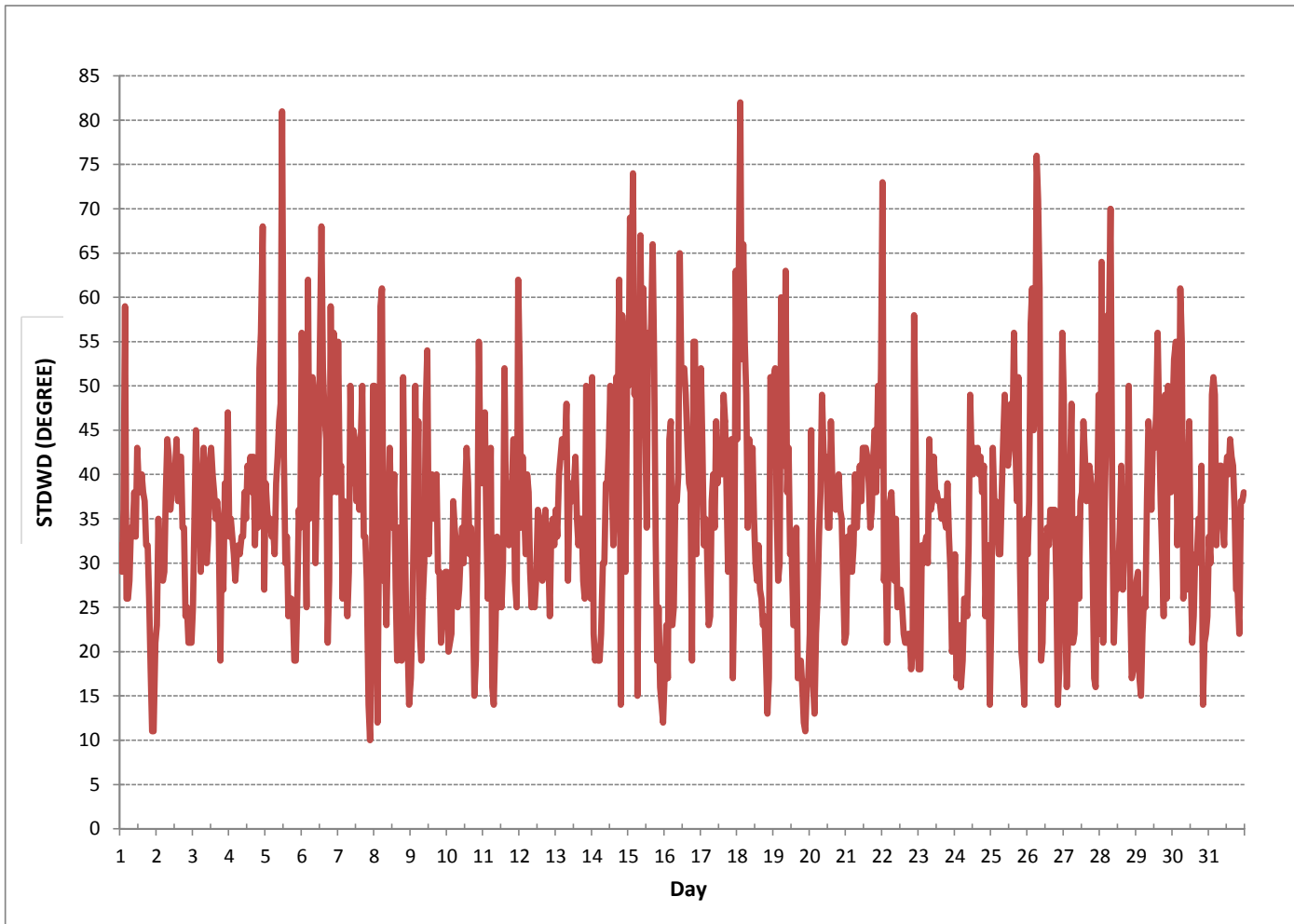
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION: March 30, 2016

CALIBRATION TIME: 0 HRS OPERATIONAL TIME: 1101 HRS

STANDARD DEVIATION WIND DIRECTION (STDWD) hourly averages in degrees



RELATIVE HUMIDITY

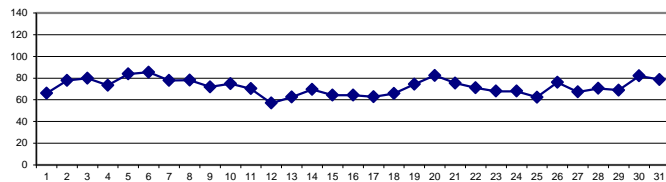
RELATIVE HUMIDITY (RH) hourly averages in %

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
HOURLY START	HOURLY END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.	
DAY																														
1		71	76	75	77	78	78	75	73	67	63	59	51	52	54	51	49	49	48	50	57	70	82	87	90	48	90	66	24	
2		91	92	93	93	93	93	89	83	79	77	72	74	69	60	63	63	58	61	63	72	76	80	84	87	58	93	78	24	
3		88	90	90	91	92	89	77	71	74	78	73	62	55	49	52	60	84	89	91	91	91	92	93	92	49	93	80	24	
4		92	92	93	93	93	93	90	86	79	68	63	58	55	51	52	53	54	57	62	65	69	77	84	83	51	93	73	24	
5		76	73	81	88	91	92	92	92	89	90	89	89	84	79	78	77	76	71	73	79	82	86	92	92	71	92	84	24	
6		93	93	93	93	93	94	93	88	88	88	89	82	64	55	54	73	89	85	85	88	90	93	93	93	54	94	85	24	
7		93	93	93	93	93	94	94	94	94	93	89	76	68	58	53	49	48	51	54	59	72	79	88	92	48	94	78	24	
8		92	93	93	93	93	92	85	75	78	70	60	55	51	54	68	76	78	71	72	78	82	86	89	92	51	93	78	24	
9		92	92	93	93	93	93	86	74	67	64	56	51	51	47	49	52	49	56	61	65	75	84	90	91	47	93	72	24	
10		92	88	83	83	85	86	85	82	77	74	72	67	61	51	50	54	49	65	69	68	82	89	91	93	49	93	75	24	
11		92	92	93	93	90	87	79	72	64	55	51	47	51	50	73	57	54	50	53	59	73	81	84	85	47	93	70	24	
12		89	86	90	84	86	78	68	60	52	49	44	43	41	38	33	34	33	34	36	44	48	62	66	68	33	90	57	24	
13		75	80	84	81	81	75	70	64	59	52	47	44	41	39	42	40	63	45	43	51	70	82	87	88	39	88	63	24	
14		91	92	91	91	92	85	78	70	65	62	54	51	42	52	53	51	43	49	51	63	74	84	91	92	42	92	69	24	
15		93	93	93	93	93	93	85	61	49	48	62	47	51	47	36	37	35	36	39	48	64	75	80	83	35	93	64	24	
16		86	90	92	93	93	91	80	69	59	48	37	35	32	32	31	36	37	43	51	64	88	88	87	82	31	93	64	24	
17		85	87	89	91	92	89	85	78	64	53	47	43	37	33	33	30	29	32	45	49	64	78	85	90	29	92	63	24	
18		91	92	93	93	93	93	86	67	53	43	41	42	42	44	43	46	44	46	49	54	69	78	88	89	41	93	66	24	
19		91	92	93	93	93	93	84	72	63	60	58	52	48	51	72	69	69	69	69	75	81	83	77	79	48	93	74	24	
20		86	88	90	92	93	93	82	78	76	75	76	75	69	78	74	70	70	86	81	84	87	89	92	93	69	93	82	24	
21		93	92	92	93	93	93	91	88	79	69	59	52	50	49	53	67	56	50	66	84	84	84	85	88	49	93	75	24	
22		91	92	93	93	93	92	88	77	70	64	58	52	49	47	46	48	50	50	58	60	70	83	92	91	46	93	71	24	
23		87	85	88	91	90	87	79	70	64	58	52	49	53	53	50	50	52	54	58	59	66	70	79	86	49	91	68	24	
24		88	90	87	86	87	82	75	71	62	53	42	41	37	37	39	43	50	46	77	79	85	89	91	93	37	93	68	24	
25		93	93	93	93	93	91	80	67	58	51	42	37	35	32	35	31	35	33	35	47	68	81	85	89	31	93	62	24	
26		91	92	92	93	93	92	88	82	72	71	72	66	56	51	48	50	52	56	69	82	89	88	90	93	48	93	76	24	
27		93	94	94	93	93	93	91	82	76	70	67	60	47	39	38	37	34	33	33	45	64	74	79	84	33	94	67	24	
28		86	91	92	93	93	93	88	64	54	51	45	40	54	50	43	44	45	55	74	84	88	88	90	86	40	93	70	24	
29		90	90	93	93	94	94	88	75	67	60	56	51	45	43	38	40	44	47	47	57	75	86	89	90	38	94	69	24	
30		92	93	93	91	86	86	87	86	85	84	77	73	71	71	77	76	70	75	75	79	85	83	86	86	70	93	82	24	
31		87	87	90	91	92	90	91	90	85	79	73	68	67	61	56	52	55	58	84	87	85	86	87	86	52	92	79	24	
HOURLY MAX		93	94	94	93	94	94	94	94	94	93	89	89	84	79	78	77	89	89	91	91	91	93	93	93					
HOURLY AVG		88.7	89.5	90.4	90.7	90.9	89.5	84.2	76.2	69.9	65.2	60.7	55.9	52.5	50.2	51.1	52.1	53.4	54.9	60.4	67.0	76.3	82.6	86.5	87.9					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

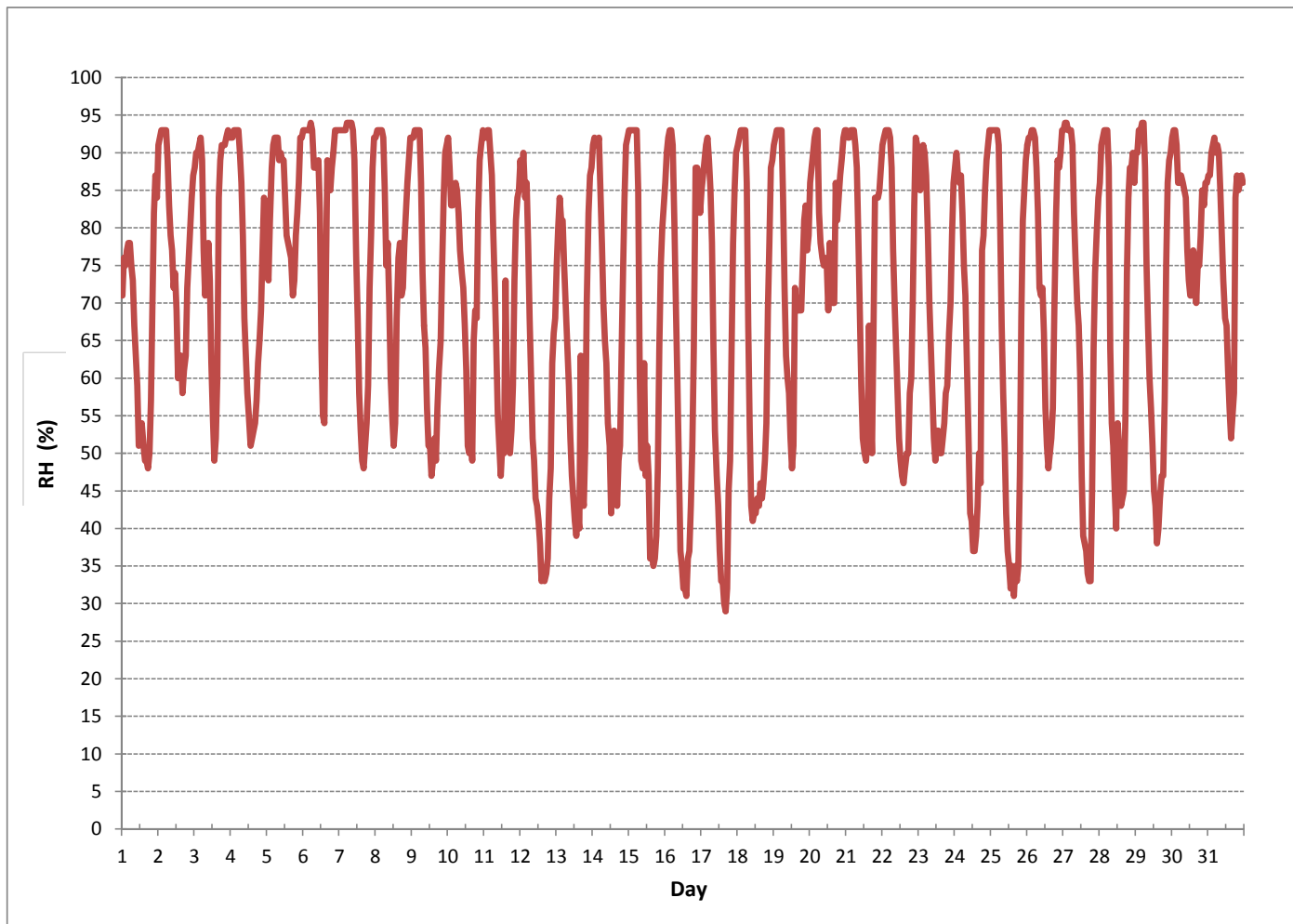
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	29	%	@ HOUR(S)	16	ON DAY(S)	17
MAXIMUM 1-HR AVERAGE:	94	%	@ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 24-HR AVERAGE:	85	%			ON DAY(S)	6
					VAR-VARIOUS	
OPERATIONAL TIME:						744 HRS
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	18.62					MONTHLY AVERAGE: 72 %

RELATIVE HUMIDITY (RH) hourly averages in %



BAROMETRIC PRESSURE

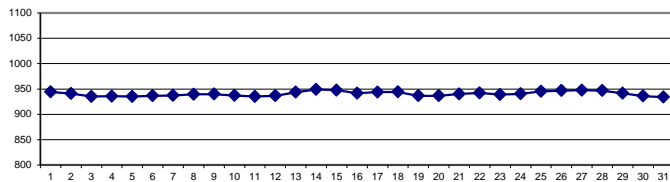
BAROMETRIC PRESSURE (BP) hourly averages in millibar

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR			
DAY	MIN.	MAX.	AVG.	RDGS.																											
1	945	945	944	944	944	944	944	944	944	945	945	945	945	945	944	944	944	944	943	943	943	943	943	942	942	942	942	945	944	24	
2	942	942	941	941	941	941	942	942	942	942	942	942	942	942	941	941	941	940	940	940	939	939	939	939	939	939	939	939	942	941	24
3	938	938	937	937	936	936	936	936	936	936	936	935	935	934	933	933	933	933	934	933	933	934	933	934	934	934	933	938	935	24	
4	934	934	934	934	934	934	935	935	935	935	935	936	937	936	937	937	937	937	936	936	936	936	936	936	936	936	936	934	937	936	24
5	936	936	935	935	934	934	934	934	934	934	934	935	935	935	935	935	935	936	936	936	937	937	937	937	937	937	934	937	935	24	
6	936	936	936	936	936	936	937	937	937	938	938	937	937	937	937	937	936	936	937	937	936	936	936	936	936	936	936	938	937	24	
7	936	936	935	935	936	936	936	937	937	937	937	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938	935	938	937	24	
8	938	938	938	938	938	939	939	940	940	940	940	940	940	940	939	940	940	939	940	940	940	940	940	939	939	939	938	940	939	24	
9	939	939	939	939	939	940	941	941	941	941	941	941	941	941	940	940	940	940	940	940	940	939	939	939	939	938	938	941	940	24	
10	938	938	938	937	937	937	938	938	938	938	938	937	937	937	937	937	937	937	937	937	937	936	936	936	936	935	935	938	937	24	
11	935	935	935	935	935	935	935	936	936	936	936	935	935	935	935	935	935	935	935	934	934	934	934	934	934	934	934	936	935	24	
12	934	934	935	934	935	935	936	936	936	936	936	936	936	937	937	937	936	936	937	937	937	937	938	938	939	939	939	934	939	936	24
13	939	939	940	940	941	942	942	943	943	944	944	944	944	945	945	945	945	945	945	945	946	946	946	946	946	946	939	946	944	24	
14	946	947	947	947	948	948	949	950	950	951	951	951	951	951	951	951	951	951	951	951	951	951	951	951	951	951	951	951	949	24	
15	949	949	949	949	949	949	949	950	950	950	950	949	949	949	948	947	947	946	946	945	945	945	944	944	944	944	944	950	948	24	
16	943	943	943	942	942	942	942	943	943	943	942	942	941	941	940	940	940	940	941	941	940	940	940	940	940	940	940	940	943	941	24
17	940	941	941	941	942	942	943	944	944	945	945	945	945	945	945	945	945	945	945	945	945	945	945	945	945	945	940	945	944	24	
18	945	945	944	944	945	945	945	946	946	946	946	946	946	945	945	944	944	943	943	942	942	942	941	941	940	940	946	944	24		
19	939	939	938	938	938	937	938	938	938	938	938	937	937	937	936	936	936	936	936	935	935	935	935	935	935	935	935	939	937	24	
20	935	935	935	935	935	935	936	936	936	936	937	937	937	937	937	937	937	937	937	937	937	937	938	938	938	938	935	938	937	24	
21	938	938	938	938	938	938	939	939	939	939	939	939	939	939	940	940	941	941	942	942	943	943	944	944	938	938	938	944	940	24	
22	944	944	944	944	944	944	945	945	945	945	944	944	943	942	941	941	940	939	938	938	938	938	938	938	938	938	938	945	942	24	
23	938	938	937	937	937	937	938	938	939	939	939	939	939	939	940	940	940	940	940	940	940	940	940	941	941	937	941	939	24		
24	941	940	940	940	940	941	941	941	941	941	941	941	941	940	940	940	940	939	939	939	939	940	940	941	941	939	941	940	24		
25	942	942	942	942	943	944	944	945	946	947	947	947	946	946	946	946	946	946	946	946	946	946	946	945	945	945	942	947	945	24	
26	945	945	946	945	946	947	947	947	948	948	948	948	948	948	948	947	947	946	946	946	946	946	946	946	946	946	945	948	947	24	
27	946	946	947	947	947	947	948	948	949	949	949	949	949	949	948	948	948	948	948	947	947	947	947	947	947	947	946	949	948	24	
28	947	947	947	947	947	947	947	948	948	948	948	948	947	947	946	946	945	947	947	946	945	945	945	945	945	945	945	948	947	24	
29	944	944	944	944	944	944	944	944	944	944	943	943	942	942	941	941	940	940	939	939	939	939	938	937	937	937	937	944	942	24	
30	937	936	936	936	937	937	936	936	936	937	937	937	937	937	936	936	936	936	935	935	935	935	935	935	935	935	935	937	936	24	
31	934	934	934	933	933	933	933	934	934	934	935	935	935	935	935	935	935	935	935	935	934	934	934	934	933	935	934	934	24		
HOURLY MAX	949	949	949	949	949	949	949	950	950	950	951	950	950	950	950	950	950	950	950	950	950	950	950	949	949	949	949	949	949	24	
HOURLY AVG	940	940	940	940	940	940	941	941	941	941	941	941	941	941	941	941	940	940	940	940	940	940	940	940	940	940	940	940	940	940	24

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

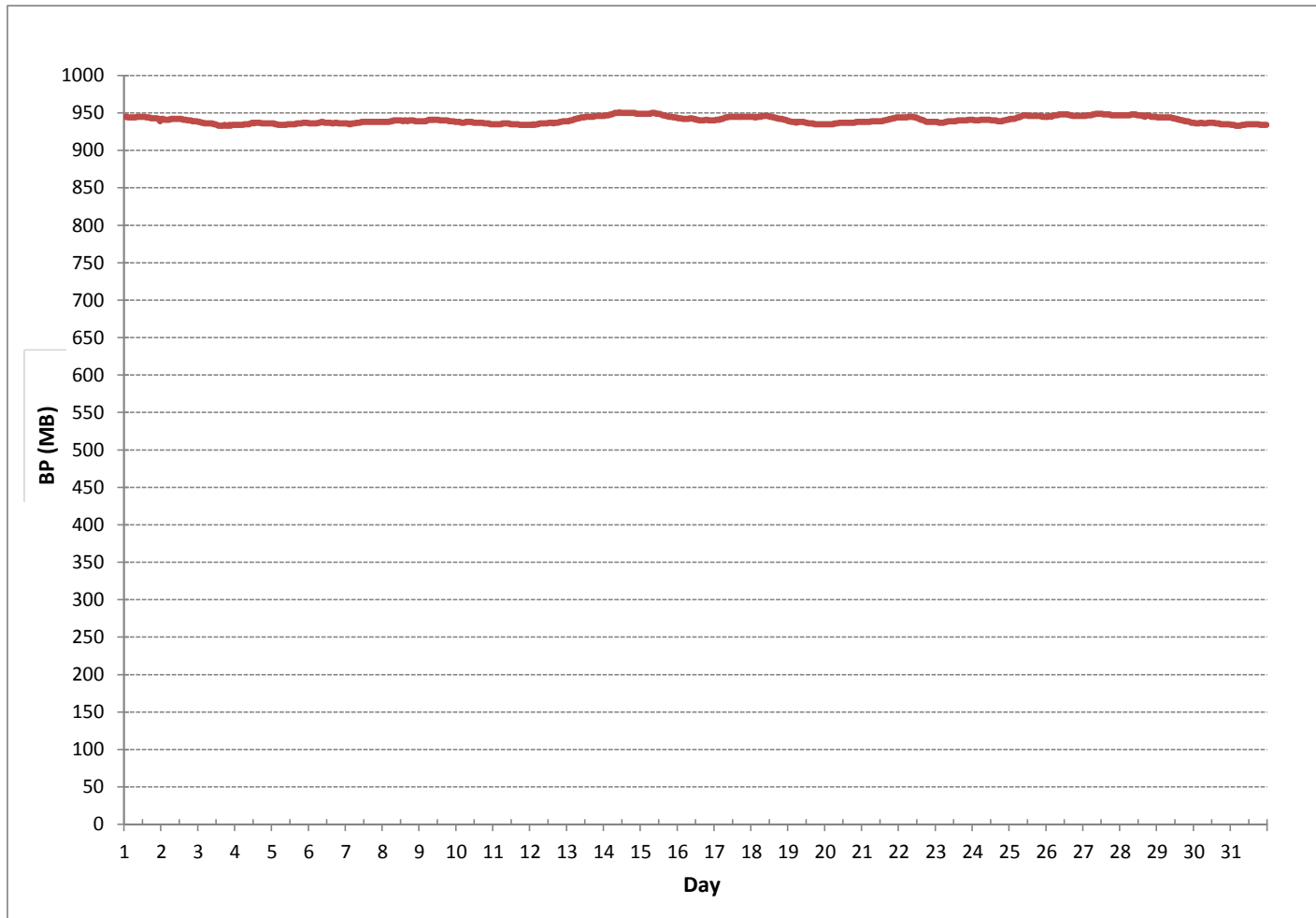
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	933	MB	@ HOUR(S)	VAR	ON DAY(S)	3 , 31
MAXIMUM 1-HR AVERAGE:	951	MB	@ HOUR(S)	10	ON DAY(S)	14
MAXIMUM 24-HR AVERAGE:	949	MB			ON DAY(S)	14
					VAR-VARIOUS	
OPERATIONAL TIME:					744	HRS
AMD OPERATION UPTIME:					100.0	%
STANDARD DEVIATION:	4.56			MONTHLY AVERAGE:	940	MB

BAROMETRIC PRESSURE (BP) hourly averages in millibar



AMBIENT TEMPERATURE

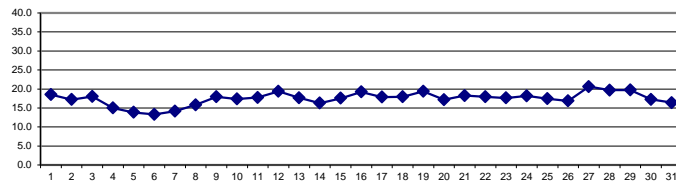
AMBIENT TEMPERATURE (AmbTPX) hourly averages in Degrees Celsius

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.
HOUR START	HOUR END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59				
DAY																													
1	15.5	14.6	14.8	14.2	13.5	13.7	15.0	16.1	17.7	19.7	21.0	23.8	23.7	23.1	23.9	24.2	23.8	24.1	23.1	21.1	18.1	14.9	13.1	12.0	12.0	12.0	24.2	18.5	24
2	11.2	9.9	9.5	9.1	9.5	11.2	14.9	16.0	16.8	17.7	19.2	18.9	20.2	23.2	22.1	22.8	24.4	23.0	22.2	19.9	18.9	18.3	17.4	16.6	9.1	24.4	17.2	24	
3	16.1	15.6	15.4	15.1	14.5	15.4	19.2	21.2	20.4	19.6	21.1	24.0	25.8	27.4	25.9	22.6	15.6	14.4	13.9	13.9	13.8	13.5	13.8	13.8	13.5	27.4	18.0	24	
4	13.3	12.5	12.1	11.9	12.0	12.2	12.4	12.7	13.6	15.3	17.3	17.8	17.9	18.9	18.9	18.6	18.8	18.2	17.5	16.3	14.7	13.0	11.8	12.1	11.8	18.9	15.0	24	
5	13.3	13.2	12.0	10.8	11.0	11.2	11.9	12.8	13.7	13.5	13.9	14.4	15.9	16.5	16.5	16.9	16.6	17.9	16.9	15.1	14.7	12.9	10.8	10.2	10.2	10.2	17.9	13.9	24
6	9.8	9.4	9.1	9.2	9.0	10.4	12.2	13.6	13.7	13.3	12.3	15.2	19.8	21.6	21.9	17.0	14.2	15.1	15.0	14.5	13.1	11.1	10.0	9.2	9.0	21.9	13.3	24	
7	9.2	8.8	7.7	7.0	6.8	8.7	9.9	10.8	11.1	12.3	13.8	16.2	18.2	20.1	21.0	21.5	22.0	21.6	20.9	19.7	15.9	14.1	11.5	10.4	6.8	22.0	14.1	24	
8	9.6	9.6	10.1	10.5	10.0	11.2	14.0	17.9	17.4	19.3	21.7	22.5	23.4	22.5	18.9	16.9	17.3	18.6	17.6	16.4	15.0	14.0	12.9	11.9	9.6	23.4	15.8	24	
9	11.9	11.4	10.5	9.7	9.3	11.3	14.6	17.4	19.8	21.1	23.5	25.2	24.1	25.4	24.8	24.0	24.5	22.0	20.7	19.5	17.0	14.8	13.8	13.9	9.3	25.4	17.9	24	
10	13.0	13.9	14.8	14.8	14.1	14.3	14.9	16.5	17.9	18.0	18.5	19.8	21.1	23.9	24.1	21.8	22.9	20.1	19.0	18.7	15.6	13.6	12.7	12.0	12.0	24.1	17.3	24	
11	12.0	11.3	11.0	11.8	12.5	13.7	15.6	17.5	19.7	21.8	22.2	22.9	21.7	22.4	19.2	23.0	22.8	23.2	21.9	21.1	17.6	15.0	13.3	12.6	11.0	23.2	17.7	24	
12	11.5	12.4	11.5	12.8	12.1	15.2	18.1	20.2	21.7	22.3	23.4	23.7	24.5	24.9	25.3	25.0	25.1	24.8	23.6	21.4	19.7	16.3	15.4	14.4	11.5	25.3	19.4	24	
13	12.8	11.5	10.6	11.5	11.5	13.8	15.9	18.4	19.5	21.2	21.9	22.3	23.5	24.7	23.6	23.9	20.6	23.1	22.5	20.1	15.6	12.9	11.4	11.1	10.6	24.7	17.7	24	
14	9.8	9.2	9.0	8.9	8.8	11.7	14.7	17.4	18.8	19.1	20.8	21.0	23.1	21.0	21.4	21.3	23.2	21.0	20.6	18.4	16.5	13.4	11.2	10.1	8.8	23.2	16.3	24	
15	9.3	8.5	7.8	7.1	6.9	9.8	13.5	19.4	22.2	22.7	19.5	22.8	21.2	22.0	25.9	25.0	25.6	25.3	24.1	21.8	18.3	15.1	14.1	13.4	6.9	25.9	17.6	24	
16	12.7	11.5	11.1	10.7	9.8	11.8	15.9	18.9	21.3	24.3	26.6	27.1	27.5	27.4	27.7	26.1	25.3	24.2	21.7	18.9	15.6	15.0	14.3	15.4	9.8	27.7	19.2	24	
17	15.0	14.9	14.2	13.2	12.8	14.3	15.2	16.5	18.9	20.5	21.7	22.2	23.2	23.8	23.4	24.5	24.5	23.5	19.7	18.9	15.5	12.2	10.5	8.9	8.9	24.5	17.8	24	
18	8.0	7.3	6.7	6.8	7.5	8.4	11.9	17.6	21.3	23.3	24.3	24.6	25.5	25.5	26.2	25.0	25.5	25.2	24.6	22.9	19.1	16.4	14.2	13.0	6.7	26.2	18.0	24	
19	12.3	11.8	11.8	11.9	11.2	12.3	17.4	21.4	23.6	24.8	25.5	27.1	27.7	26.0	19.9	20.6	21.4	22.8	22.8	21.5	19.3	17.7	17.2	17.2	11.2	27.7	19.4	24	
20	15.2	13.9	13.8	13.0	12.7	13.9	17.0	17.6	16.9	18.0	18.7	19.8	20.7	19.8	20.6	21.1	20.8	17.7	19.1	18.5	17.3	15.9	15.2	15.2	12.7	21.1	17.2	24	
21	15.4	15.8	15.8	15.7	15.6	15.7	16.1	16.6	18.4	20.8	22.8	24.1	24.6	24.2	22.9	18.7	22.2	22.8	18.8	15.7	15.1	14.4	13.6	12.3	12.3	24.6	18.3	24	
22	11.2	10.3	9.4	8.8	7.9	8.7	12.5	16.1	18.1	19.9	21.6	23.1	24.2	24.8	25.4	25.1	24.9	25.2	22.8	22.7	20.1	17.3	15.1	14.6	7.9	25.4	17.9	24	
23	14.5	14.2	13.2	12.4	12.4	12.6	14.8	17.4	19.6	21.7	22.8	22.5	21.1	21.1	22.2	21.7	21.1	20.4	19.1	19.2	17.2	15.9	13.8	12.0	12.0	22.8	17.6	24	
24	11.1	10.8	11.3	11.4	11.1	12.4	14.6	16.2	19.1	22.0	24.2	24.6	25.9	26.6	26.2	25.3	24.6	24.5	18.5	17.9	16.7	15.1	13.9	12.4	10.8	26.6	18.2	24	
25	12.6	11.7	10.0	9.0	8.8	10.6	13.0	16.5	19.1	20.9	22.5	23.7	24.1	25.4	23.9	25.3	23.8	24.7	23.9	20.3	15.4	12.7	11.4	10.0	8.8	25.4	17.5	24	
26	9.2	8.4	7.9	7.6	8.6	10.8	12.5	14.7	18.1	18.2	18.7	20.6	22.3	24.0	25.6	26.1	25.9	24.3	20.5	17.9	16.7	16.2	15.6	14.1	7.6	26.1	16.9	24	
27	13.2	12.7	14.1	14.1	13.2	12.9	15.8	18.7	20.6	22.5	23.8	25.9	27.3	28.1	28.6	28.7	28.7	28.4	27.3	23.9	19.7	17.1	15.3	14.2	12.7	28.7	20.6	24	
28	13.8	12.5	11.9	11.4	11.0	12.2	15.4	21.8	25.0	26.3	27.6	28.0	24.7	27.1	28.8	27.8	27.4	22.4	18.3	16.8	16.1	15.8	15.0	15.3	11.0	28.8	19.7	24	
29	14.7	14.1	12.8	12.7	12.8	13.4	14.7	18.0	20.6	23.0	24.3	25.7	27.1	27.6	28.6	28.0	27.2	24.8	24.3	21.5	17.1	14.4	13.0	12.3	12.3	28.6	19.7	24	
30	11.5	11.1	11.2	13.5	15.4	16.0	16.1	16.4	17.6	18.4	20.0	20.8	21.1	20.4	19.2	20.0	20.7	19.9	19.9	19.1	17.2	16.7	15.9	15.7	11.1	21.1	17.2	24	
31	15.3	15.3	14.9	14.7	14.7	14.7	14.7	14.8	16.3	17.6	17.5	18.3	18.3	19.8	20.7	21.7	20.5	19.5	15.8	15.0	14.0	13.3	13.1	13.1	13.1	13.1	21.7	16.4	24
HOURLY MAX	16.1	15.8	15.8	15.7	15.6	16.0	19.2	21.8	25.0	26.3	27.6	28.0	27.7	28.1	28.8	28.7	28.4	27.3	23.9	20.1	18.3	17.7	17.2						
HOURLY AVG	12.4	11.9	11.5	11.3	11.2	12.4	14.7	17.0	18.7	20.0	21.1	22.2	22.9	23.5	23.3	22.9	22.6	22.0	20.5	19.0	16.7	14.8	13.6	12.9					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

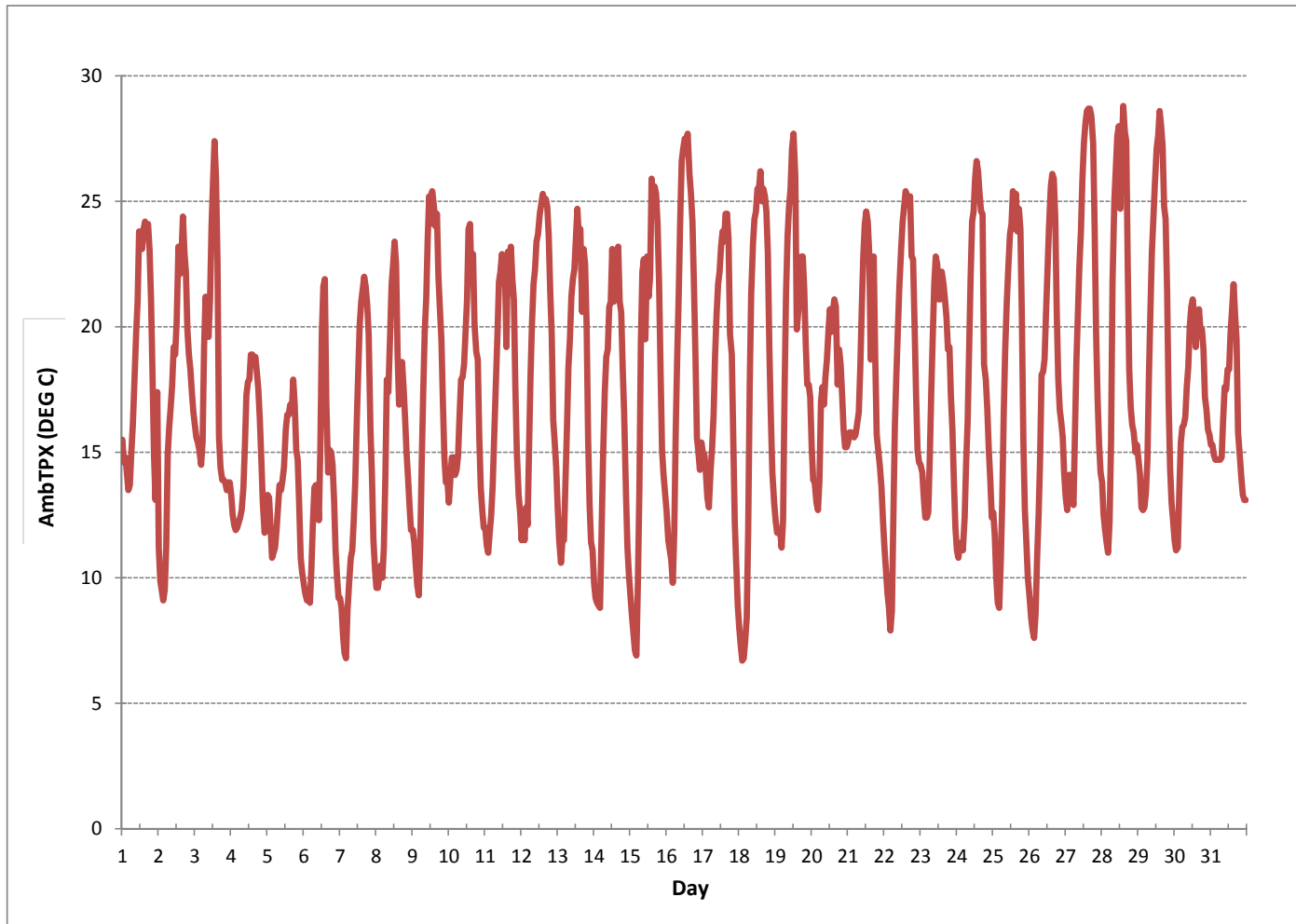
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	6.7	°C	@ HOUR(S)	2	ON DAY(S)	18
MAXIMUM 1-HR AVERAGE:	28.8	°C	@ HOUR(S)	14	ON DAY(S)	28
MAXIMUM 24-HR AVERAGE:	20.6	°C			ON DAY(S)	27
					VAR-VARIOUS	
OPERATIONAL TIME:					744	HRS
AMD OPERATION UPTIME:					100.0	%
STANDARD DEVIATION:	5.22		MONTHLY AVERAGE:		17.5	°C

AMBIENT TEMPERATURE (AmbTPX) hourly averages in Degrees Celsius



PRECIPITATION

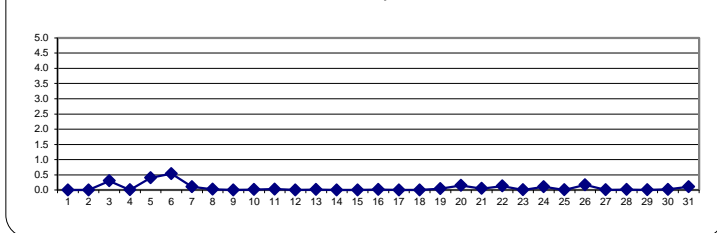
PRECIPITATION hourly averages (mm)

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
HOURLY START	HOURLY END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.	
DAY																														
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	0.0	0.0	0.0	0.0	24	
2		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	
3		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	0.9	3.9	1.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.3	24
4		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	0.0	0.0	0.0	0.0	0.1	0.0	24	
5		0.0	0.0	1.0	1.9	3.3	1.1	0.5	0.2	0.0	0.3	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.4	24	
6		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.7	0.6	3.0	0.1	0.0	0.0	0.0	6.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	6.2	0.5	24	
7		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.4	1.1	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	1.4	0.1	24	
8		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	24	
9		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
10		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24	
11		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	24	
12		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
13		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24	
14		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
15		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
16		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	24	
17		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
18		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
19		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	24	
20		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.0	1.4	0.1	0.0	0.0	0.5	0.9	0.1	0.1	0.0	1.4	0.2	24	
21		0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.1	24	
22		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	3.2	0.1	24	
23		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	0.0	0.0	0.0	0.1	0.0	24	
24		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2	0.6	0.0	1.3	0.0	0.1	0.0	0.0	1.3	0.1	24		
25		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	0.0	0.1	0.0	24	
26		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.2	24	
27		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	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24	
28		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24	
29		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	0.0	0.0	0.0	0.0	0.1	0.0	24	
30		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	24	
31		0.0	0.0	0.1	0.0	0.0	0.0	1.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.1	24	
HOURLY MAX		0.0	0.1	1.0	1.9	3.3	1.1	1.3	0.2	2.7	1.1	3.0	0.5	0.0	0.5	1.1	6.2	1.4	3.9	1.9	2.5	1.3	3.2	0.1	0.1					
HOURLY AVG		0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.0					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

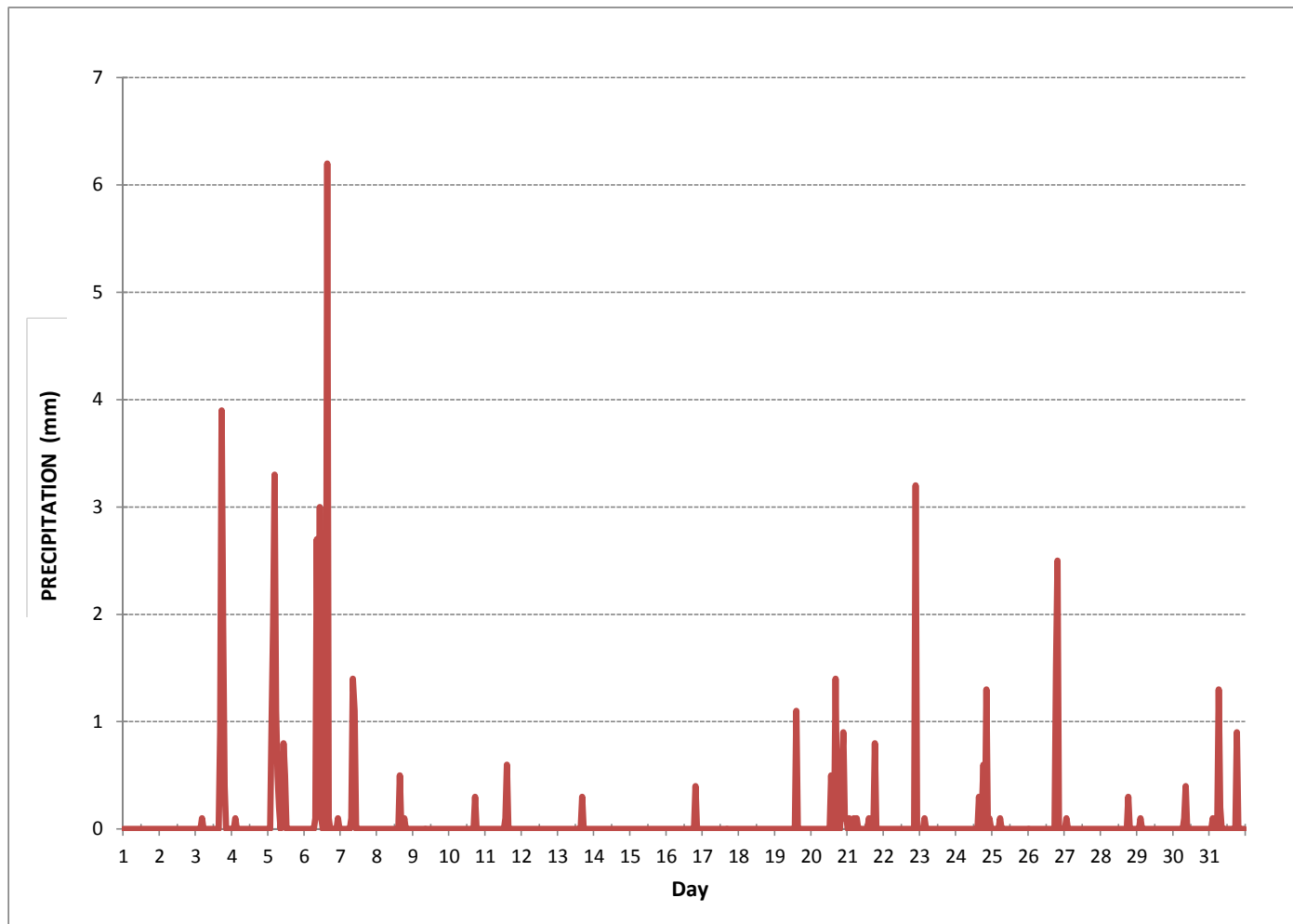
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	0.0	MM	@ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	6.2	MM	@ HOUR(S)	15	ON DAY(S)	6
MAXIMUM 24-HR AVERAGE:	0.5	MM			ON DAY(S)	6
MONTHLY TOTAL	54.1	MM			VAR-VARIOUS	
OPERATIONAL TIME:					744	HRS
AMD OPERATION UPTIME:					100.0	%
STANDARD DEVIATION:	0.41				MONTHLY AVERAGE:	0.1 MM

PRECIPITATION hourly averages (mm)



APPENDIX II
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE



API 101E Sulphur Dioxide Analyzer Calibration

Date: July 20, 2016	Barometric Pressure: 27.66 inHg
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Maskwa	Weather Conditions: A few clouds and light rain showers
Parameter: Sulphur Dioxide	Calibration Purpose: shut down
Start Time 24 hr. (mst): 12:00	Performed By/Reviewer: Limin Li Trina Whitsitt
End Time 24 hr. (mst): 14:15	Cal Gas Expiry Date: December 25, 2018
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	
Serial Number: 508	Range ppb: 1000
Last Calibration Date: June 15, 2016	As Found C.F.: 0.960
Previous C.F.: 0.997	New C.F.: n/a

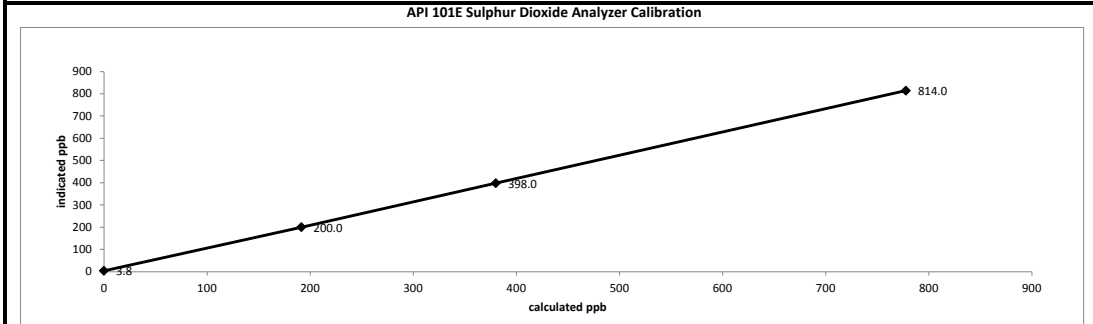
Calibrator:	Standard Calibration Points for Ranges								
Flow Meter ID's: n/a	<table border="1" style="margin: auto;"> <thead> <tr> <th>Point</th> <th>Sulphur Dioxide Standard Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> </tr> <tr> <td>Mid</td> <td>380</td> </tr> <tr> <td>Low</td> <td>190</td> </tr> </tbody> </table>	Point	Sulphur Dioxide Standard Calibration Points	High	780	Mid	380	Low	190
Point		Sulphur Dioxide Standard Calibration Points							
High		780							
Mid		380							
Low		190							
Make & Model: Sabio 2010									
Serial #: 17200415									
Cal Gas Cylinder I.D. #: BLM002756T									
Cal Gas Conc. (ppm): 49.9									

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	5029	0.00	5029	0.0	3.8	N/A
as found high	4951	78.40	5029	777.9	814.0	0.960
mid	4990	38.30	5028	380.1	398.0	0.964
low	5009	19.30	5028	191.5	200.0	0.976
Average C.F.=						0.967

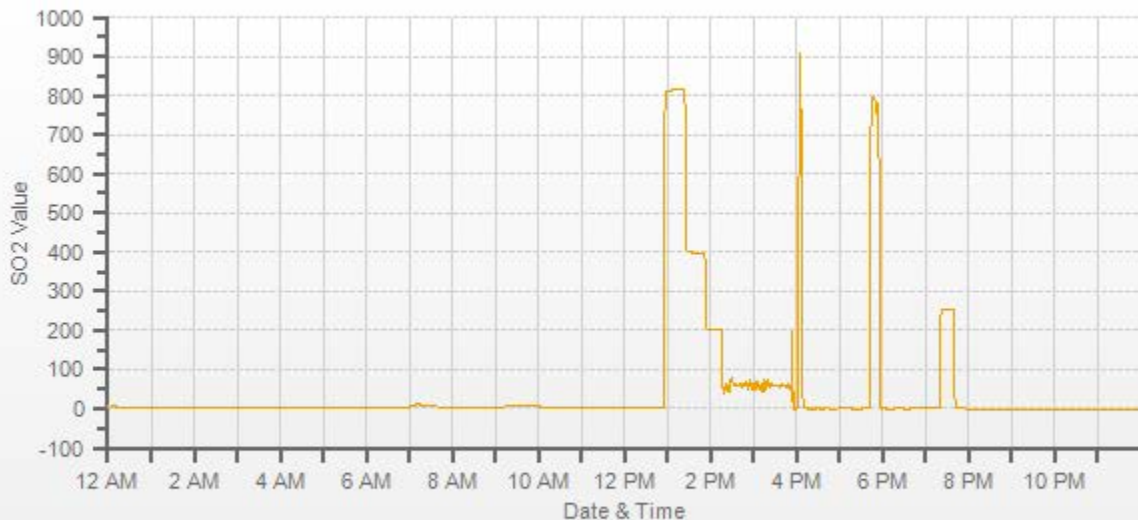
Linear Regression/Calibration Results:

Correlation Coefficient = 1.000	LIMITS > or = 0.995
Slope = 0.959	0.90-1.10
b (Intercept as % of full scale) = -0.20%	± 3% F.S.
% change in C.F. from last cal = 3.70%	± 10%



As found:	As left:
SLOPE: 1.016	SLOPE: n/a
OFFSET: 103.7	OFFSET: n/a
HVPS: 479	HVPS: n/a
RCELL TEMP: 50.0	RCELL TEMP: n/a
BOX TEMP: 29.1	BOX TEMP: n/a
PMT TEMP: 7.7	PMT TEMP: n/a
IZS TEMP: 45.0	IZS TEMP: n/a
Converter Temp: n/a	Converter Temp: n/a
PRES: 24.5	PRES: n/a
SAMP FL: 589	SAMP FL: n/a
UV LAMP: 3103	UV LAMP: n/a
LAMP RATIO: 88.7	LAMP RATIO: n/a
STR. LGT: 52.6	STR. LGT: n/a
DRK PMT: 9.9	DRK PMT: n/a
DRK LMP: -0.8	DRK LMP: n/a
Internal Span: 271	Internal Span: n/a

Comments:
 Shutdown complete for annual maintenance. Clean reaction cell. Clean sample valve. Clean manifold. Sinter filters and o-rings changed. Rebuilt pump. Change 214nm filter. Adjust UV lamp and HVSP. Calibrate pressure, flow rate.



— SO2[ppb]



API 101E Sulphur Dioxide Analyzer Calibration

Date: July 21, 2016	Barometric Pressure: 27.72 inHg
Company/Airshed: LICA	Station Temperature °C: 23
Location/Station Name: Maskwa	Weather Conditions: Mainly sunny
Parameter: Sulphur Dioxide	Calibration Purpose: post repair
Start Time 24 hr. (mst): 8:30	Performed By/Reviewer: Limin Li Trina Whitsitt
End Time 24 hr. (mst): 11:55	Cal Gas Expiry Date: December 25, 2018
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer: Serial Number: 508 Last Calibration Date: June 15, 2016 Previous C.F.: 0.997	Range ppb: 1000 As Found C.F.: n/a New C.F.: 1.000
--	--

Calibrator: Flow Meter ID's: n/a Make & Model: Sabio 2010 Serial #: 17200415 Cal Gas Cylinder I.D. #: BLM002756T Cal Gas Conc. (ppm): 49.9	Standard Calibration Points for Ranges <table border="1" style="margin: auto;"> <thead> <tr> <th>Point</th> <th>Sulphur Dioxide Standard Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> </tr> <tr> <td>Mid</td> <td>380</td> </tr> <tr> <td>Low</td> <td>190</td> </tr> </tbody> </table>	Point	Sulphur Dioxide Standard Calibration Points	High	780	Mid	380	Low	190
Point	Sulphur Dioxide Standard Calibration Points								
High	780								
Mid	380								
Low	190								

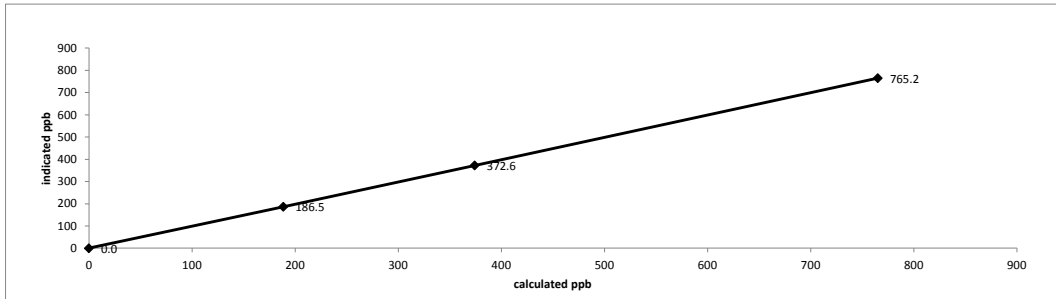
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
adjusted zero	5029	0.00	5029	0.0	0.0	N/A
adjusted high	4951	77.10	5028	765.2	765.2	1.000
mid	4990	37.70	5028	374.2	372.6	1.004
low	5010	19.00	5029	188.5	186.5	1.011
calibrator zero	5029	0.00	5029	0.0	0.0	n/a
Average C.F.=						1.005

Linear Regression/Calibration Results:

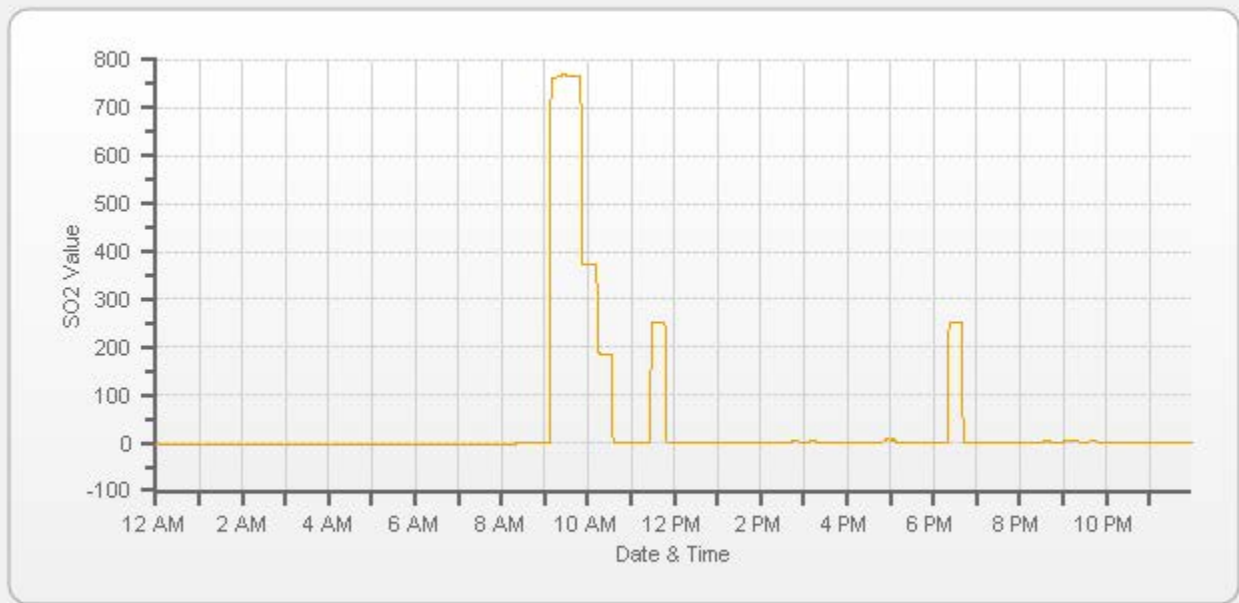
Correlation Coefficient = 1.000	LIMITS > or = 0.995
Slope = 0.999	.95-1.05
b (Intercept as % of full scale) = 0.11%	± 3% F.S.
% change in C.F. from last cal = n/a	± 10%

API 101E Sulphur Dioxide Analyzer Calibration



As found:	As left:
SLOPE: n/a	SLOPE: 0.981
OFFSET: n/a	OFFSET: 74.4
HVPS: n/a	HVPS: 467
RCELL TEMP: n/a	RCELL TEMP: 50.0
BOX TEMP: n/a	BOX TEMP: 31.2
PMT TEMP: n/a	PMT TEMP: 7.7
IZS TEMP: n/a	IZS TEMP: 45.0
Converter Temp: n/a	Converter Temp: n/a
PRES: n/a	PRES: 24.1
SAMP FL: n/a	SAMP FL: 615
UV LAMP: n/a	UV LAMP: 3891
LAMP RATIO: n/a	LAMP RATIO: 106.8
STR. LGT: n/a	STR. LGT: 36.5
DRK PMT: n/a	DRK PMT: 10.2
DRK LMP: n/a	DRK LMP: -0.1
Internal Span: n/a	Internal Span: 252.3

Comments:
 Shutdown calibration to complete annual maintenance. Clean reaction cell. Clean sample valve. Clean manifold. Sinter filters and o-rings changed. Rebuilt pump. Change 214nm filter. Adjust UV lamp and HVSP. Calibrate pressure, flow rate. Sample filter changed.



— SO2[ppb]

HYDROGEN SULPHIDE



API 101E Hydrogen Sulphide Analyzer Calibration

Date: July 20, 2016	Barometric Pressure: 27.67 inHg
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Maskwa	Weather Conditions: A few clouds and light rain showers
Parameter: Hydrogen Sulphide	Calibration Purpose: shut down
Start Time 24 hr. (mst): 12:00	Performed By/Reviewer: Limin Li Trina Whitsitt
End Time 24 hr. (mst): 14:35	Cal Gas Expiry Date: January 6, 2018
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	
Serial Number: 511	Range ppb: 100
Last Calibration Date: June 15, 2016	As Found C.F.: 1.013
Previous C.F.: 0.999	New C.F.: n/a

Calibrator:	Standard Calibration Points for Ranges								
Flow Meter ID's: n/a	<table border="1" style="margin: auto;"> <thead> <tr> <th>Point</th> <th>Hydrogen Sulphide Standard Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>78</td> </tr> <tr> <td>Mid</td> <td>38</td> </tr> <tr> <td>Low</td> <td>19</td> </tr> </tbody> </table>	Point	Hydrogen Sulphide Standard Calibration Points	High	78	Mid	38	Low	19
Point		Hydrogen Sulphide Standard Calibration Points							
High		78							
Mid		38							
Low	19								
Make & Model: SABIO 2010									
Serial #: 042531101 (911)									
Cal Gas Cylinder I.D. #: BLM002508									
Cal Gas Conc. (ppm): 10.2									

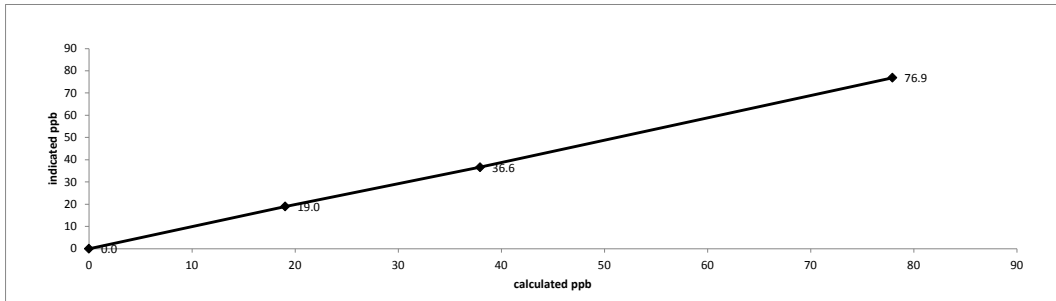
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	7500	0.00	7500	0.0	0.0	N/A
as found high	7443	57.30	7500	77.9	76.9	1.013
mid	7473	27.90	7501	37.9	36.6	1.037
low	7486	14.00	7500	19.0	19.0	1.002
Average C.F. =						1.017

Linear Regression/Calibration Results:

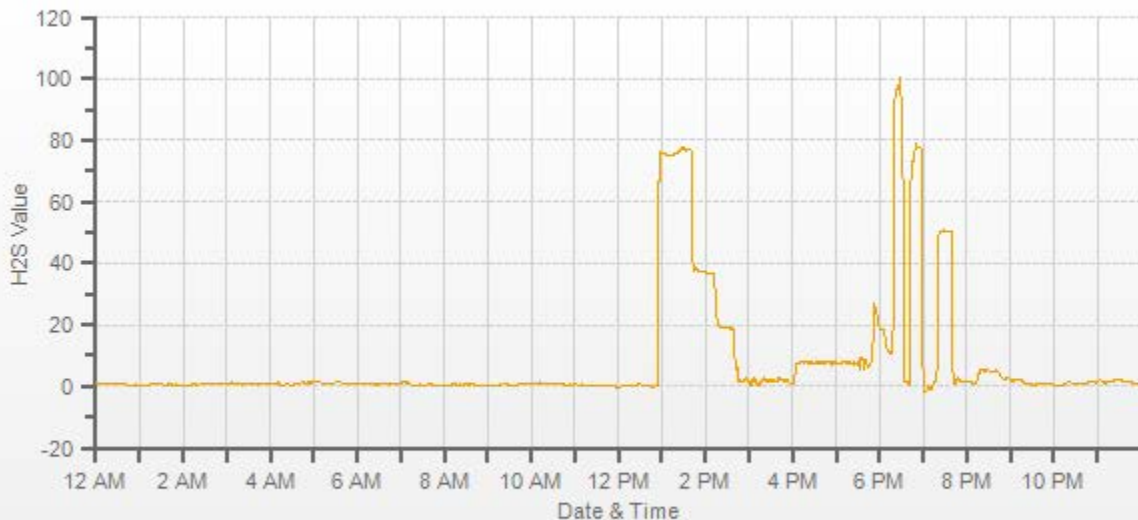
Correlation Coefficient =	1.000	LIMITS
Slope =	1.015	> or = 0.995
b (Intercept as % of full scale) =	0.10%	0.90-1.10
% change in C.F. from last cal =	-1.43%	± 3% F.S.
		± 10%

API 101E Hydrogen Sulphide Analyzer Calibration



As found:	As left:
SLOPE: 0.934	SLOPE: n/a
OFFSET: 49.9	OFFSET: n/a
HVPS: 616	HVPS: n/a
RCELL TEMP: 50.0	RCELL TEMP: n/a
BOX TEMP: 30.9	BOX TEMP: n/a
PMT TEMP: 7.8	PMT TEMP: n/a
IZS TEMP: 45.0	IZS TEMP: n/a
Converter Temp: 315.5	Converter Temp: n/a
PRES: 27	PRES: n/a
SAMP FL: 641	SAMP FL: n/a
UV LAMP: 3046	UV LAMP: n/a
LAMP RATIO: 95.2	LAMP RATIO: n/a
STR. LGT	STR. LGT: n/a
DRK PMT: 35.5	DRK PMT: n/a
DRK LMP: 6.7	DRK LMP: n/a
Internal Span: 51	Internal Span: n/a

Comments:
 Shutdown calibration complete for annual maintenance. Clean reaction cell. Clean sample valve (Very dirty). Clean manifold. Sinter filters and o-rings changed. Rebuilt pump. Change 214nm filter. Adjust UV lamp and HVSP. Calibrate pressure, flow rate.



— H2S[ppb]



API 101E Hydrogen Sulphide Analyzer Calibration

Date: July 21, 2016	Barometric Pressure: 27.72 inHg
Company/Airshed: LICA	Station Temperature °C: 23
Location/Station Name: Maskwa	Weather Conditions: Mainly sunny
Parameter: Hydrogen Sulphide	Calibration Purpose: post repair
Start Time 24 hr. (mst): 10:30	Performed By/Reviewer: Limin Li Trina Whitsitt
End Time 24 hr. (mst): 15:20	Cal Gas Expiry Date: January 6, 2018
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	Range ppb: 100
Serial Number: 511	As Found C.F.: n/a
Last Calibration Date: June 15, 2016	New C.F.: 0.999
Previous C.F.: 0.999	

Calibrator:	Standard Calibration Points for Ranges								
Flow Meter ID's: n/a	<table border="1" style="margin: auto;"> <thead> <tr> <th>Point</th> <th>Hydrogen Sulphide Standard Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>78</td> </tr> <tr> <td>Mid</td> <td>38</td> </tr> <tr> <td>Low</td> <td>19</td> </tr> </tbody> </table>	Point	Hydrogen Sulphide Standard Calibration Points	High	78	Mid	38	Low	19
Point		Hydrogen Sulphide Standard Calibration Points							
High		78							
Mid		38							
Low		19							
Make & Model: API700									
Serial #: 627									
Cal Gas Cylinder I.D. #: BLM002508									
Cal Gas Conc. (ppm): 10.2									

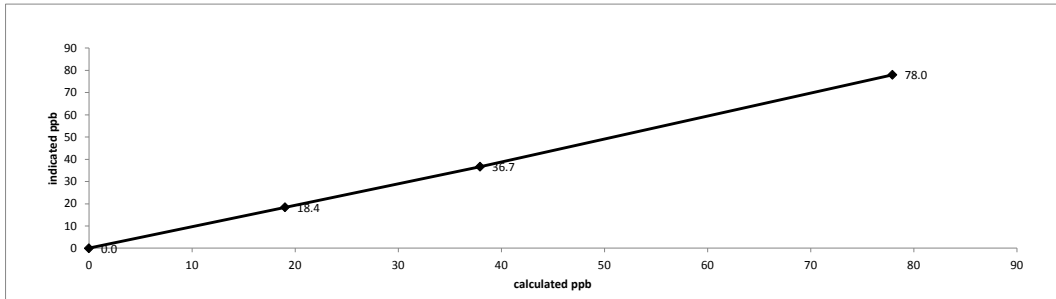
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
adjusted zero	7500	0.00	7500	0.0	0.0	N/A
adjusted high	7442	57.30	7499	77.9	78.0	0.999
mid	7473	27.90	7501	37.9	36.7	1.034
low	7491	14.00	7505	19.0	18.4	1.034
calibrator zero	7475	0.00	7475	0.0	-0.3	n/a
Average C.F.=						1.022

Linear Regression/Calibration Results:

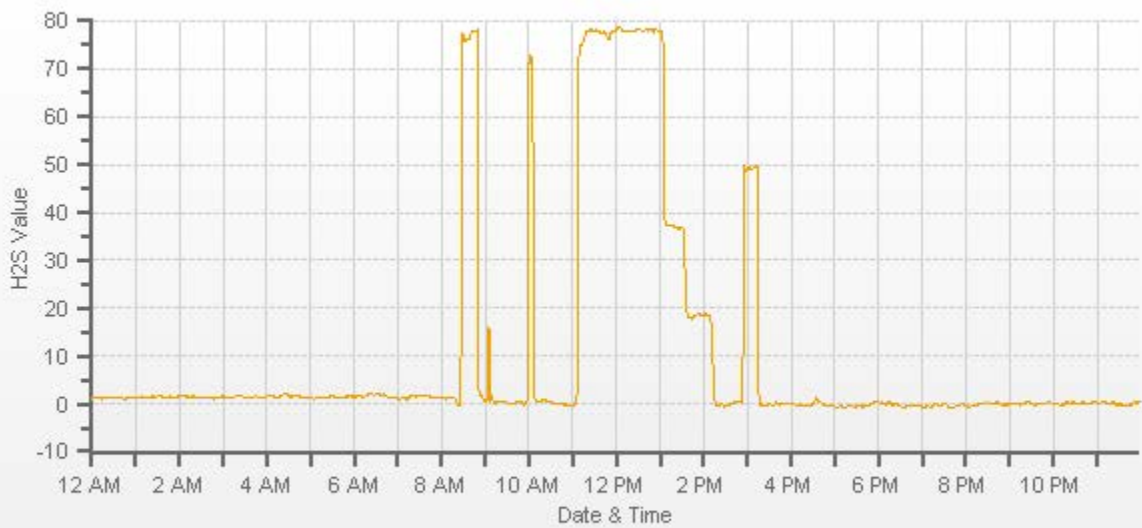
Correlation Coefficient = 1.000	LIMITS > or = 0.995
Slope = 0.998	.95-1.05
b (Intercept as % of full scale) = 0.53%	± 3% F.S.
% change in C.F. from last cal = n/a	± 10%

API 101E Hydrogen Sulphide Analyzer Calibration



<p style="text-align: center;">As found:</p> SLOPE: n/a OFFSET: n/a HVPS: n/a RCELL TEMP: n/a BOX TEMP: n/a PMT TEMP: n/a IZS TEMP: n/a Converter Temp: n/a PRES: n/a SAMP FL: n/a UV LAMP: n/a LAMP RATIO: n/a STR. LGT: n/a DRK PMT: n/a DRK LMP: n/a Internal Span: n/a	<p style="text-align: center;">As left:</p> SLOPE: 0.975 OFFSET: 50.8 HVPS: 600 RCELL TEMP: 50.0 BOX TEMP: 31.3 PMT TEMP: 7.8 IZS TEMP: 45.0 Converter Temp: 315.5 PRES: 21.7 SAMP FL: 573 UV LAMP: 3421 LAMP RATIO: 101.6 STR. LGT: 24.8 DRK PMT: 39.1 DRK LMP: 7.5 Internal Span: 51
--	--

Comments:
 Shutdown calibration complete for annual maintenance. Clean reaction cell. Clean sample valve (Very dirty). Clean manifold. Sinter filters and o-rings changed. Rebuilt pump. Change 214nm filter. Adjust UV lamp and HVSP. Calibrate pressure, flow rate. Sample filter changed.



— H2S[ppb]

TOTAL HYDROCARBON



Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	July 21, 2016	Barometric Pressure:	27.72 inHg
Company/Airshed:	LICA	Station Temperature °C:	23
Location/Station Name:	Maskwa	Weather Conditions:	A few clouds
Parameter:	Total Hydrocarbon	Calibration Purpose:	shut down
Start/End Time 24 hr. (mst):	09:35 / 13:08	Performed By/Reviewer:	Limin Li / Trina Whitsitt
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	July 7, 2022

Analyzer:	Serial Number:	436609738	Range ppm:	50
	Last Calibration Date:	June 16, 2016	As Found C.F.:	0.960
	Previous Cal High Point C.F.:	1.000	New C.F.:	n/a

Calibrator:	Flow Meter ID's:	n/a	Standard Calibration Points for a Range of 50 ppm								
	Make & Model:	Sabio 2010									
	Serial #:	042531101 (911)									
	Cal Gas Cylinder I.D. #:	LL83638									
	CH ₄ /C ₂ H ₆ Cylinder Conc. (ppm):	582.0 203.0	<table border="1"> <tr><th>Point</th><th>Target ppm</th></tr> <tr><td>High</td><td>38</td></tr> <tr><td>Mid</td><td>18</td></tr> <tr><td>Low</td><td>9</td></tr> </table>	Point	Target ppm	High	38	Mid	18	Low	9
Point	Target ppm										
High	38										
Mid	18										
Low	9										
	CH ₄ as propane/total CH ₄ equivalents (ppm):	558.3 1140.3									

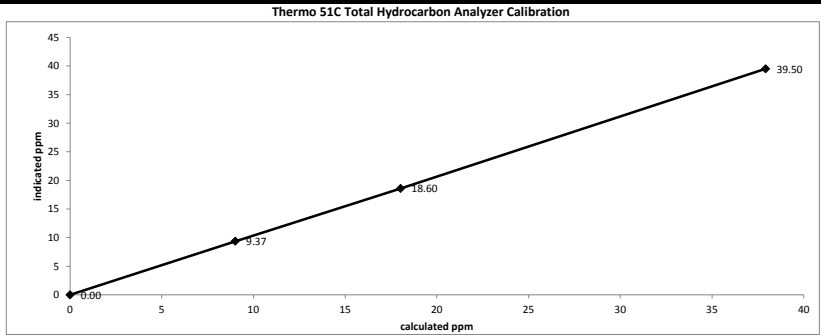
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	Diluent	Cal Gas	Total	(ppm)	(ppm)	
as found zero	1999	0.00	1999	0.0	0.00	n/a
as found high	1936	66.60	2003	37.92	39.50	0.960
mid	1968	31.60	2000	18.02	18.60	0.969
low	1984	15.80	2000	9.01	9.37	0.961

Average C.F.= 0.963

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	> or = 0.995
Slope =	0.960	.95-1.05
b (Intercept as % of full scale) =	0.08%	± 3% F.S.
% change in C.F. from last cal =	4.00%	± 10%



As found:

H2 cylinder (psi): 1000
 H2 cylinder reg set (psi): 22
 Span Cylinder (psi): 1050
 Span Cylinder Reg Set (psi): 23
 Zero Air Gen Pressure: 35
 measurement alarms: None
 service alarms: None
 cnt: 2654
 rng: 1
 try: 0
 flm: 185.8
 det: 125.6
 Flame: 185
 Filter: 125
 Base: 125
 Sample psi: 7.52
 Internal Air Pressure: 20
 Internal Fuel Pressure: 12
 Intenal Pressure Gauge psi: 28
 Internal Span: 28.59

As left:

H2 cylinder (psi): 1000
 H2 cylinder reg set (psi): 22
 Span Cylinder (psi): 1050
 Span Cylinder Reg Set (psi): 23
 Zero Air Gen Pressure: 35
 measurement alarms: None
 service alarms: None
 cnt: 2654
 rng: 1
 try: 0
 flm: 185.7
 det: 125.3
 Flame: 185
 Filter: 125
 Base: 125
 Sample psi: 7.52
 Internal Air Pressure: 20
 Internal Fuel Pressure: 12
 Intenal Pressure Gauge psi: 28
 Internal Span: 28.59

Comments:

After the shutdown calibration, the THC inside pump was rebuilt. The zero air supply water drainage bowl was changed. The pressure controller in the zero air was adjusted.



Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	July 21, 2016	Barometric Pressure:	27.72 inHg
Company/Airshed:	LICA	Station Temperature °C:	23
Location/Station Name:	Maskwa	Weather Conditions:	A few clouds
Parameter:	Total Hydrocarbon	Calibration Purpose:	post repair
Start/End Time 24 hr. (mst):	14:00/16:45	Performed By/Reviewer:	Limin Li Trina Whitsitt
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	July 7, 2022

Analyzer:	Serial Number:	436609738	Range ppm:	50
	Last Calibration Date:	June 16, 2016	As Found C.F.:	n/a
	Previous Cal High Point C.F.:	1.000	New C.F.:	0.999

Calibrator:	Flow Meter ID's:	n/a	Standard Calibration Points for a Range of 50 ppm								
	Make & Model:	Sabio 2010									
	Serial #:	042531101 (911)									
	Cal Gas Cylinder I.D. #:	LL83638									
	CH ₄ /C ₂ H ₆ Cylinder Conc. (ppm):	582.0 203.0	<table border="1"> <tr><th>Point</th><th>Target ppm</th></tr> <tr><td>High</td><td>38</td></tr> <tr><td>Mid</td><td>18</td></tr> <tr><td>Low</td><td>9</td></tr> </table>	Point	Target ppm	High	38	Mid	18	Low	9
Point	Target ppm										
High	38										
Mid	18										
Low	9										
	CH ₄ as propane/total CH ₄ equivalents (ppm):	558.3 1140.3									

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	Diluent	Cal Gas	Total	(ppm)	(ppm)	
adjusted zero	1999	0.00	1999	0.0	0.00	n/a
adjusted high	1933	66.60	2000	37.98	38.00	0.999
mid	1968	31.60	2000	18.02	18.00	1.001
low	1984	15.80	2000	9.01	9.04	0.997
calibrator zero	1999	0.00	1999	0.00	-0.01	n/a

Average C.F. = 0.999

Linear Regression/Calibration Results:

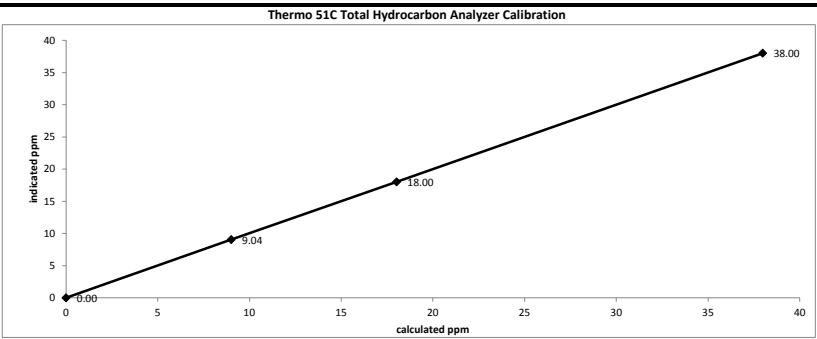
LIMITS

Correlation Coefficient = 1.000 > or = 0.995

Slope = 1.000 .95-1.05

b (Intercept as % of full scale) = -0.01% ± 3% F.S.

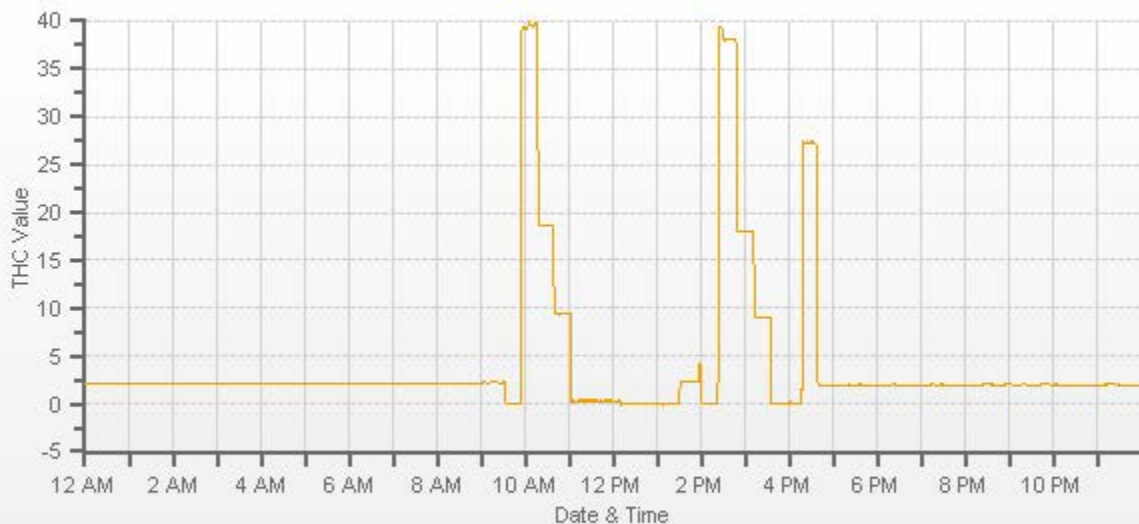
% change in C.F. from last cal = n/a ± 10%



As found:	As left:
H2 cylinder (psi): 1000	H2 cylinder (psi): 1000
H2 cylinder reg set (psi): 22	H2 cylinder reg set (psi): 22
Span Cylinder (psi): 1050	Span Cylinder (psi): 1050
Span Cylinder Reg Set (psi): 23	Span Cylinder Reg Set (psi): 23
Zero Air Gen Pressure: 35	Zero Air Gen Pressure: 35
measurement alarms: None	measurement alarms: None
service alarms: None	service alarms: None
cnt: 2654	cnt: 2654
rng: 1	rng: 1
try: 0	try: 0
flm: 185.8	flm: 185.7
det: 125.6	det: 125.3
Flame: 185	Flame: 185
Filter: 125	Filter: 125
Base: 125	Base: 125
Sample psi: 7.52	Sample psi: 7.52
Internal Air Pressure: 20	Internal Air Pressure: 20
Internal Fuel Pressure: 12	Internal Fuel Pressure: 12
Intenal Pressure Gauge psi: 28	Intenal Pressure Gauge psi: 28
Internal Span: 28.59	Internal Span: 27.3

Comments:

After the shutdown calibration, the THC inside pump was rebuilt. The zero air supply water drainage bowl was changed. The pressure controller in zero air was adjusted.



— THC[ppm]

NITROGEN DIOXIDE



API 200A NO-NO2-NOx Analyzer Calibration

Date: July 21, 2016	Barometric Pressure: 27.72 inHg
Company/Airshed: LICA	Station Temperature °C: 23
Location/Station Name: Maskwa	Weather Conditions: Mainly sunny
Start/End Time 24 hr. (mst): 08:30 / 13:00	Calibration Purpose: shut down
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Limin Li Trina Whitsitt
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: December 25, 2018

Analyzer: Serial Number: 2166 Last Calibration Date: June 25, 2016 Range ppb: 1000	Correction Factors: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>NO =</td> <td>1.000</td> <td>1.025</td> <td>n/a</td> </tr> <tr> <td>NO₂ =</td> <td>1.000</td> <td>1.004</td> <td>n/a</td> </tr> <tr> <td>NOx =</td> <td>1.000</td> <td>1.020</td> <td>n/a</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	1.025	n/a	NO ₂ =	1.000	1.004	n/a	NOx =	1.000	1.020	n/a
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	1.025	n/a														
NO ₂ =	1.000	1.004	n/a														
NOx =	1.000	1.020	n/a														

Calibrator: Flow Meter ID's: n/a Make & Model: Sabio 2010 Serial #: 17200415 Cal Gas Cylinder I.D. #: BLM002756T NO/NOx Gas Conc. (ppm): 50.7 50.7	Standard Calibration Points for a Range of: 1000 ppb <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> <td>500</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>275</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>190</td> <td>100</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	5029	0.0	5029	0	0	-0.4	0.6	n/a	n/a
as found high	4951	77.1	5028	777.4	777.4	758.0	763.0	1.025	1.020
mid	4990	37.70	5028	380.2	380.2	366.0	369.0	1.038	1.032
low	5010	19.00	5029	191.5	191.5	181.0	183.0	1.056	1.050
Average C.F.=								1.040	1.034

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO ₂	NO drop	NO ₂ gain	NO ₂ C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4951	77.10	5028	0.0	757.0	760.0	3.0	-0.4	3.0	
as found high NO2	4951	77.10	5028	520.0	247.0	758.0	511.0	510.0	508.0	1.004
gpt mid	4951	77.10	5028	280.0	490.0	757.0	267.0	267.0	264.0	1.011
gpt low	4951	77.10	5028	100.0	667.0	758.0	91.0	90.0	88.0	1.023
Average NO₂ C.F.=										1.013

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.023	1.018	1.008	0.90-1.10
b (Intercept as % of full scale)=	-0.35%	-0.25%	0.08%	± 3% F.S.
% change in C.F. from last cal=	-2.51%	-0.39%	-1.97%	± 10%
NO ₂ converter efficiency			1.00	0.96 to 1.04

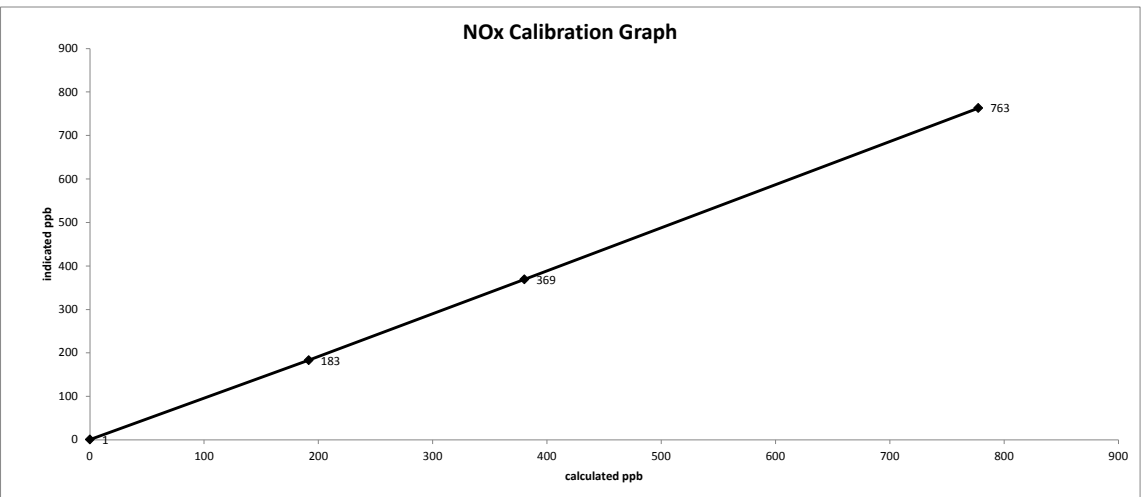
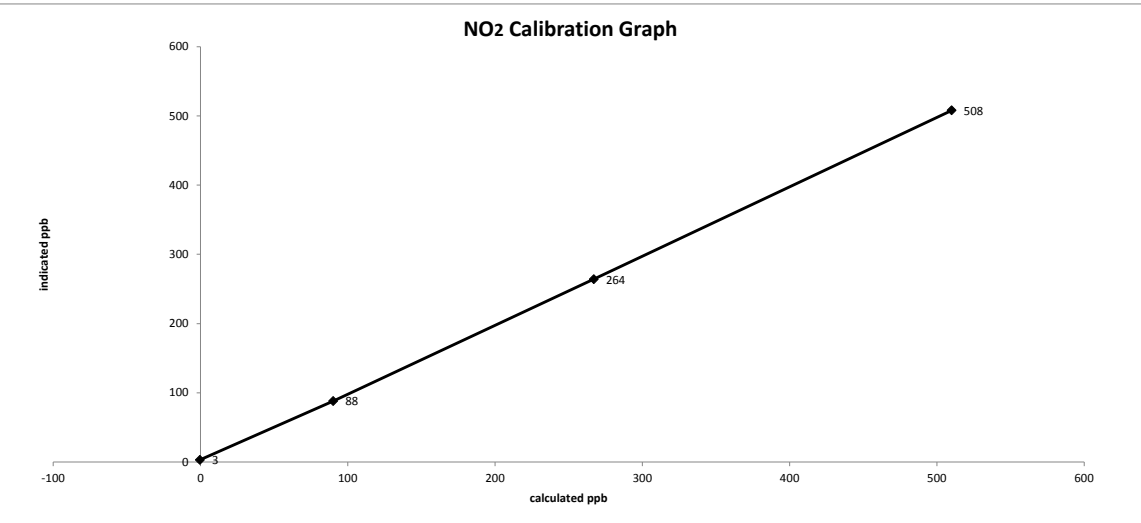
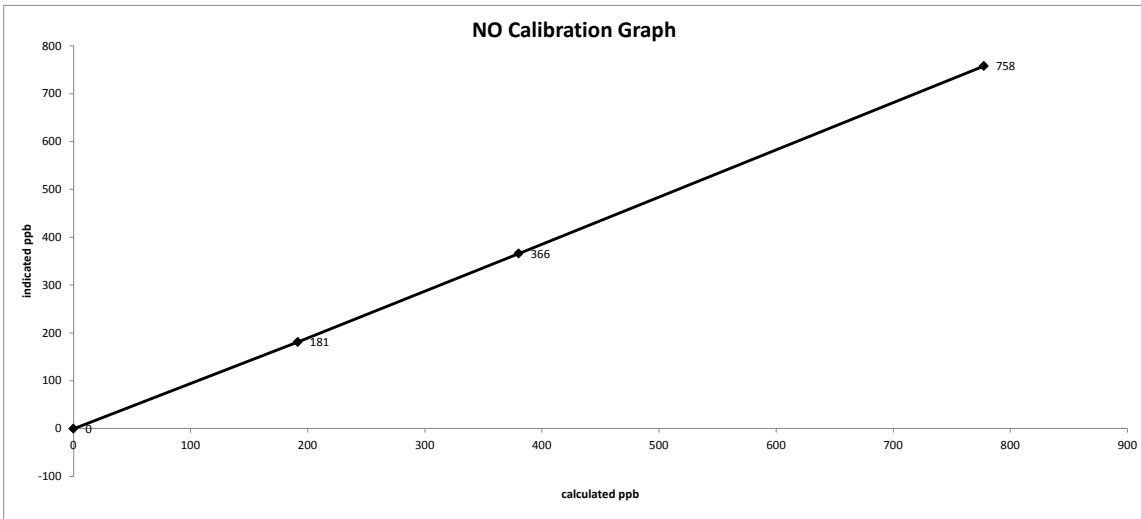
As found: NOx SLOPE: 1.001 NOx OFFS: -0.6 NO SLOPE: 0.985 NO OFFS: -1.8 SAMP FLW: 513 OZONE FL: 77 NORM PMT: -3.8 AZERO: 15.9 HVPS: 716 DCPS: 2628 RCELL: 50.6 BOX TEMP: 27.7 IZS TEMP: 45 MOLY TEMP: 315.6 RCEL: 5.1 SAMP: 27.8 Internal Span NO: 7.5 Internal Span NO ₂ : 451.5 Internal Span NOx: 459.1	As left: NOx SLOPE: n/a NOx OFFS: n/a NO SLOPE: n/a NO OFFS: n/a SAMP FLW: n/a OZONE FL: n/a NORM PMT: n/a AZERO: n/a HVPS: n/a DCPS: n/a RCELL: n/a BOX TEMP: n/a IZS TEMP: n/a MOLY TEMP: n/a RCEL: n/a SAMP: n/a Internal Span NO: n/a Internal Span NO ₂ : n/a Internal Span NOx: n/a
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Comments:

After shutdown calibration, Maxxam API200A NOx analyzer was removed. LICA API200E NOx analyzer was re-installed. O3 scrubber was changed.

Date: July 21, 2016
Company/Airshed: LICA
Location/Station Name: Maskwa

Start/End Time 24 hr. (mst): 08:30 / 13:00
Calibration Purpose: shut down
Calibration Method: Gas Dilution & Gas Phase Titration





API 200E NO-NO2-NOx Analyzer Calibration

Date: July 21, 2016	Barometric Pressure: 27.72 inHg
Company/Airshed: LICA	Station Temperature °C: 23
Location/Station Name: Maskwa	Weather Conditions: Mainly sunny
Start/End Time 24 hr. (mst): 13:50 / 19:25	Calibration Purpose: installation
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Limin Li Trina Whitsitt
Calibration Method: Gas Dilution & Varying UV Lamp Power	Cal Gas Expiry Date: December 25, 2018

Analyzer:	Correction Factors:
Serial Number: 592	Previous C.F.: As Found C.F.: New C.F.:
Last Calibration Date: n/a	NO = n/a n/a 0.999
Range ppb: 1000	NO ₂ = n/a n/a 0.998
	NOx = n/a n/a 0.999

Calibrator:	Standard Calibration Points for a Range of: 1000 ppb																								
Flow Meter ID's: n/a																									
Make & Model: Sabio 2010																									
Serial #: 17200415																									
Cal Gas Cylinder I.D. #: BLM002756T																									
NO/NOx Gas Conc. (ppm): 50.7 50.7																									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> <td>500</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>275</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>190</td> <td>100</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
adjusted zero	5029	0.0	5029	0	0	0.0	0.0	n/a	n/a
adjusted high	4951	77.1	5028	777.4	777.4	778.0	778.0	0.999	0.999
mid	4991	37.70	5029	380.1	380.1	382.0	382.0	0.995	0.995
low	5010	19.00	5029	191.5	191.5	192.0	193.0	0.998	0.992
calibrator zero	5029	0.00	5029	0.0	0.0	1.0	2.0	n/a	n/a
Average C.F.=								0.997	0.996

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO ₂	NO drop	NO ₂ gain	NO ₂ C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4951	77.10	5028	0.0	778.0	780.0	780.0	2.0	0.0	2.0
adjusted high NO2	4951	77.10	5028	510.0	270.0	781.0	511.0	508.0	509.0	0.998
gpt mid	4951	77.10	5028	275.0	510.0	780.0	270.0	268.0	268.0	1.000
gpt low	4951	77.10	5028	100.0	689.0	781.0	92.0	89.0	90.0	0.989
Average NO₂ C.F.=										0.996

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.999	1.000	1.002	.95-1.05
b (Intercept as % of full scale) =	0.05%	0.09%	0.14%	± 3% F.S.
% change in C.F. from last cal =	n/a	n/a	n/a	± 10%
NO2 converter efficiency			0.99	0.96 to 1.04

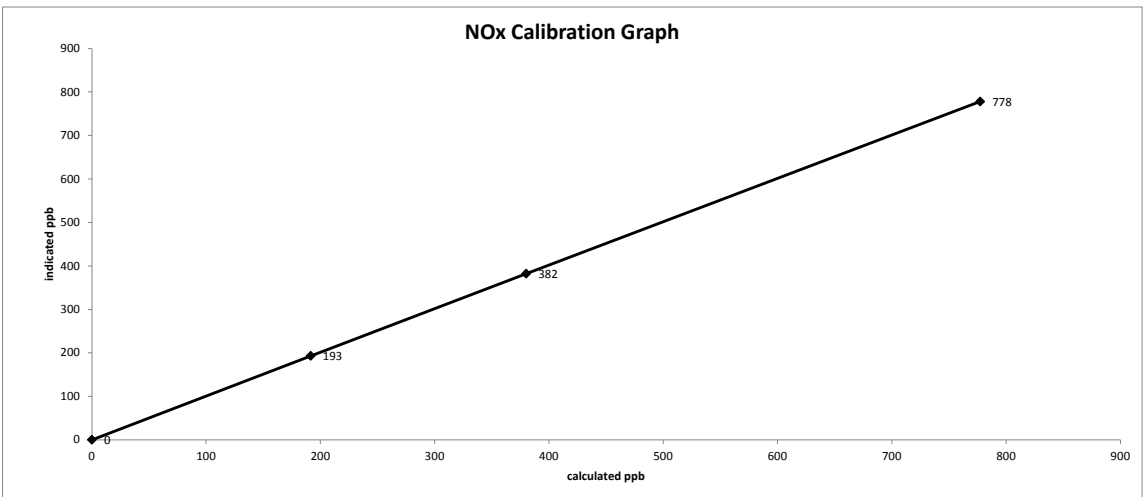
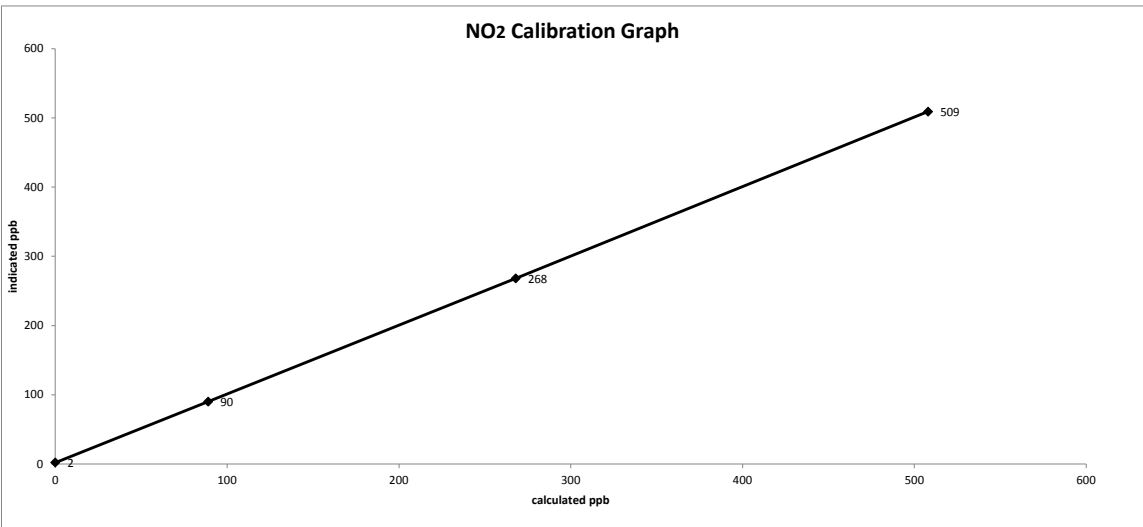
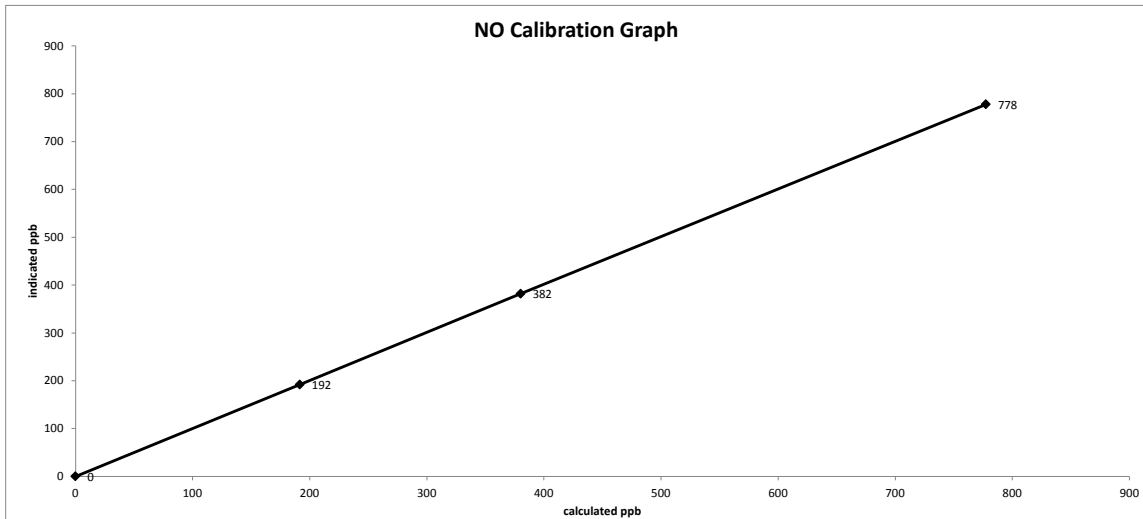
As found:	As left:
NOx SLOPE: n/a	NOx SLOPE: 1.016
NOx OFFS: n/a	NOx OFFS: 1.8
NO SLOPE: n/a	NO SLOPE: 1.015
NO OFFS: n/a	NO OFFS: -0.2
SAMP FLW: n/a	SAMP FLW: 461
OZONE FL: n/a	OZONE FL: 74
PMT: n/a	PMT: 34.3
NORM PMT: n/a	NORM PMT: 4.4
AZERO: n/a	AZERO: 28.4
HVPS: n/a	HVPS: 661
RCELL TEMP: n/a	RCELL TEMP: 50.0
BOX TEMP: n/a	BOX TEMP: 27.9
PMT TEMP: n/a	PMT TEMP: 6.9
IZS TEMP: n/a	IZS TEMP: 40.3
MOLY TEMP: n/a	MOLY TEMP: 315
RCEL: n/a	RCEL: 4.5
SAMP: n/a	SAMP: 27
Internal Span NO: n/a	Internal Span NO: 10.1
Internal Span NO2: n/a	Internal Span NO2: 400.5
Internal Span NOx: n/a	Internal Span NOx: 409.9

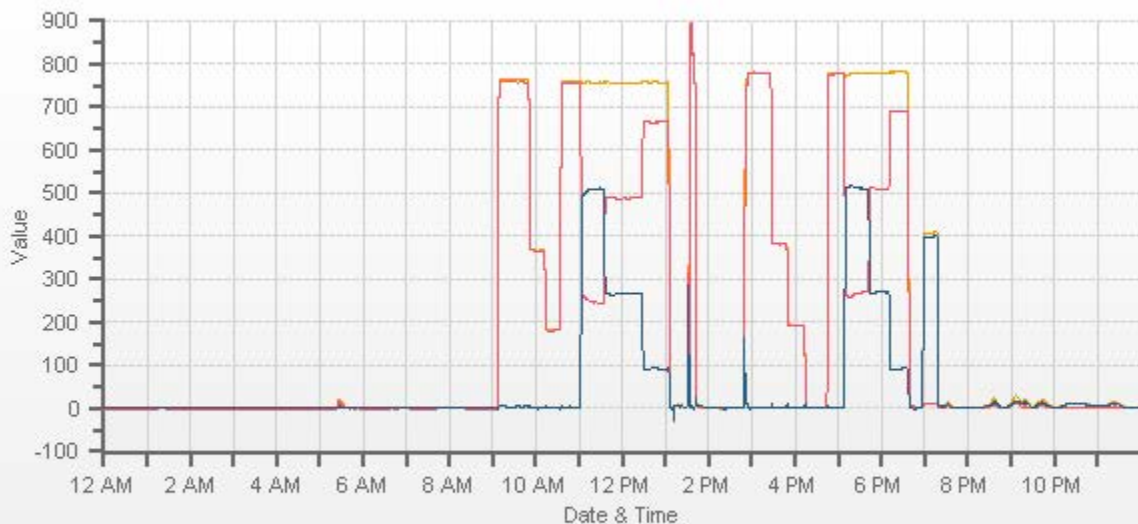
Comments:

Pressure and flow calibrated. Reaction cell cleaned. Sample valve changed. Orifice clean. Manifold clean. Azero valve clean. HVSP adjusted.

Date: July 21, 2016
Company/Airshed: LICA
Location/Station Name: Maskwa

Start/End Time 24 hr. (mst): 13:50 / 19:25
Calibration Purpose: installation
Calibration Method: Gas Dilution & Varying UV Lamp Power





— NOX[ppb] — NO[ppb] — NO2[ppb]



API 200E NO-NO2-NOx Analyzer Calibration

Date: July 25, 2016	Barometric Pressure: 0.935 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Maskwa	Weather Conditions: Mainly sunny
Start/End Time 24 hr. (mst): 9:57 / 14:35	Calibration Purpose: shut down
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Alex Yakupov Tom Bourque
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: December 2, 2023

Analyzer:	Correction Factors:												
Serial Number: 592	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 33%;">Previous C.F.:</th> <th style="width: 33%;">As Found C.F.:</th> <th style="width: 33%;">New C.F.:</th> </tr> <tr> <td>NO = 0.999</td> <td>1.010</td> <td>n/a</td> </tr> <tr> <td>NO₂ = 0.998</td> <td>0.998</td> <td>n/a</td> </tr> <tr> <td>NOx = 0.999</td> <td>1.007</td> <td>n/a</td> </tr> </table>	Previous C.F.:	As Found C.F.:	New C.F.:	NO = 0.999	1.010	n/a	NO ₂ = 0.998	0.998	n/a	NOx = 0.999	1.007	n/a
Previous C.F.:	As Found C.F.:	New C.F.:											
NO = 0.999	1.010	n/a											
NO ₂ = 0.998	0.998	n/a											
NOx = 0.999	1.007	n/a											
Last Calibration Date: July 21, 2016													
Range ppb: 1000													

Calibrator:	Standard Calibration Points for a Range of: 1000 ppb																								
Flow Meter ID's: n/a																									
Make & Model: API Model 700																									
Serial #: 627																									
Cal Gas Cylinder I.D. #: LL119346																									
NO/NOx Gas Conc. (ppm): 50.0 50.0																									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> <tr> <td>High</td> <td>780</td> <td>500</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>275</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>190</td> <td>100</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </table>	Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	5000	0.0	5000	0	0	1.0	2.0	n/a	n/a
as found high	4924	78.0	5002	779.7	779.7	773.0	776.0	1.010	1.007
mid	4966	38.00	5004	379.7	379.7	377.0	378.0	1.010	1.010
low	4982	19.00	5001	190.0	190.0	190.0	190.0	1.005	1.010
Average C.F.=								1.008	1.009

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO ₂	NO drop	NO ₂ gain	NO ₂ C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4924	78.00	5002	0.0	775.0	775.0	1.0	1.0	1.0	
as found high NO2	4798	78.00	4876	490.0	278.0	777.0	499.0	497.0	498.0	0.998
gpt mid	4798	78.00	4876	275.0	496.0	775.0	279.0	278.0	278.0	1.004
gpt low	4798	78.00	4876	95.0	681.0	775.0	95.0	94.0	94.0	1.000
Average NO₂ C.F.=									1.001	

Linear Regression/Calibration Results:

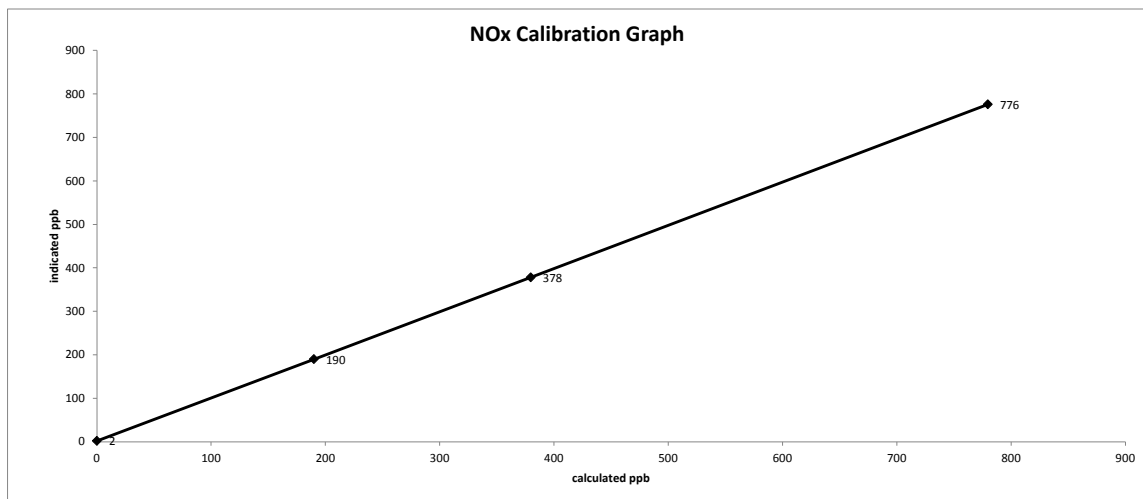
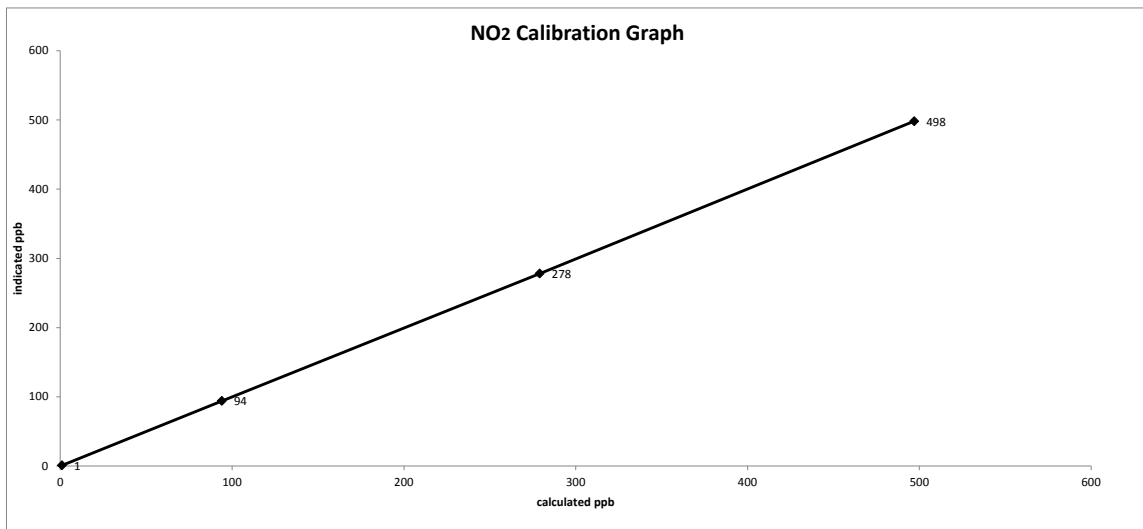
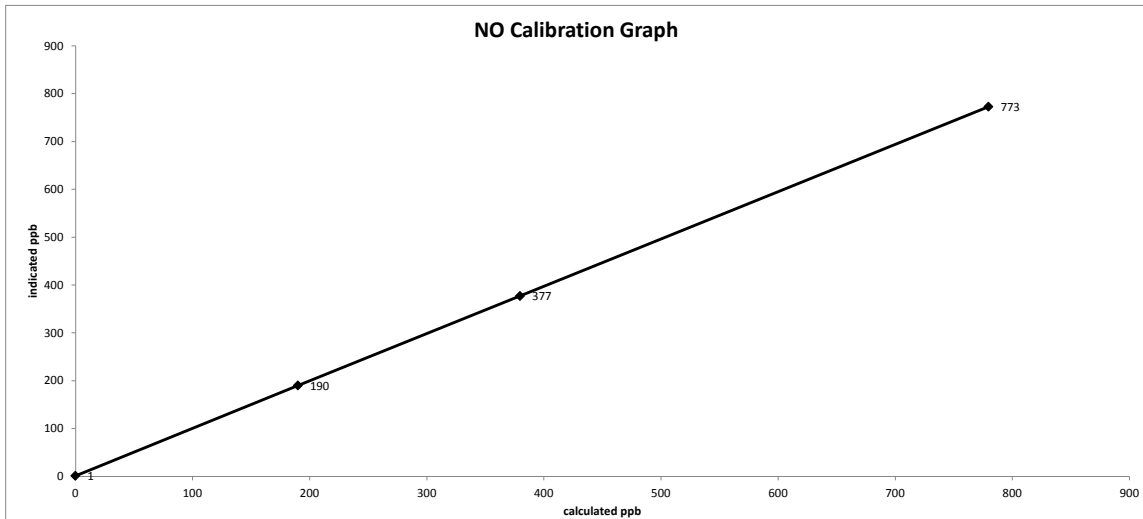
	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.010	1.007	0.998	0.90-1.10
b (Intercept as % of full scale)=	0.14%	0.16%	-0.03%	± 3% F.S.
% change in C.F. from last cal=	-1.10%	0.00%	-0.84%	± 10%
NO ₂ converter efficiency			1.00	0.96 to 1.04

<p style="text-align: center;">As found:</p> NOx SLOPE: 1.016 NOx OFFS: 1.8 NO SLOPE: 1.015 NO OFFS: -0.2 SAMP FLW: 462 OZONE FL: 74 PMT: 40.2 NORM PMT: 15.2 AZERO: 21.4 HVPS: 662 RCELL TEMP: 50.0 BOX TEMP: 28.0 PMT TEMP: 6.9 IZS TEMP: 40.0 MOLY TEMP: 313.8 RCEL: 4.5 SAMP: 26.5 Internal Span NO: 10.1 Internal Span NO2: 400.5 Internal Span NOx: 409.9	<p style="text-align: center;">As left:</p> NOx SLOPE: n/a NOx OFFS: n/a NO SLOPE: n/a NO OFFS: n/a SAMP FLW: n/a OZONE FL: n/a PMT: n/a NORM PMT: n/a AZERO: n/a HVPS: n/a RCELL TEMP: n/a BOX TEMP: n/a PMT TEMP: n/a IZS TEMP: n/a MOLY TEMP: n/a RCEL: n/a SAMP: n/a Internal Span NO: n/a Internal Span NO2: n/a Internal Span NOx: n/a
---	--

Comments:
 Shutdown calibration completed to replace the analyzer because of SPAN issue. The analyzer was found with "Board Relay warning". 10:35 - Stability performance check with High Point of GPT sequence to make sure the analyzer has not failed. Readings are stable. Shutdown calibration started after the check.

Date: July 25, 2016
Company/Airshed: LICA
Location/Station Name: Maskwa

Start/End Time 24 hr. (mst): 9:57 / 14:35
Calibration Purpose: shut down
Calibration Method: Gas Dilution & Gas Phase Titration





API 200A NO-NO2-NOx Analyzer Calibration

Date: July 25, 2016	Barometric Pressure: 0.935 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Maskwa	Weather Conditions: Mainly sunny
Start/End Time 24 hr. (mst): 15:02 / 20:55	Calibration Purpose: installation
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Alex Yakupov Tom Bourque
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: December 2, 2023

Analyzer:	Correction Factors:												
Serial Number: 2166	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 33%;">Previous C.F.:</th> <th style="width: 33%;">As Found C.F.:</th> <th style="width: 33%;">New C.F.:</th> </tr> <tr> <td style="text-align: center;">NO = n/a</td> <td style="text-align: center;">n/a</td> <td style="text-align: center;">1.001</td> </tr> <tr> <td style="text-align: center;">NO₂ = n/a</td> <td style="text-align: center;">n/a</td> <td style="text-align: center;">1.000</td> </tr> <tr> <td style="text-align: center;">NOx = n/a</td> <td style="text-align: center;">n/a</td> <td style="text-align: center;">1.001</td> </tr> </table>	Previous C.F.:	As Found C.F.:	New C.F.:	NO = n/a	n/a	1.001	NO ₂ = n/a	n/a	1.000	NOx = n/a	n/a	1.001
Previous C.F.:	As Found C.F.:	New C.F.:											
NO = n/a	n/a	1.001											
NO ₂ = n/a	n/a	1.000											
NOx = n/a	n/a	1.001											
Last Calibration Date: n/a													
Range ppb: 1000													

Calibrator:	Standard Calibration Points for a Range of: 1000 ppb																								
Flow Meter ID's: n/a																									
Make & Model: API Model 700																									
Serial #: 627																									
Cal Gas Cylinder I.D. #: LL119346																									
NO/NOx Gas Conc. (ppm): 50.0 50.0																									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td style="text-align: center;">780</td> <td style="text-align: center;">500</td> <td style="text-align: center;">n/a</td> </tr> <tr> <td>Mid</td> <td style="text-align: center;">380</td> <td style="text-align: center;">275</td> <td style="text-align: center;">n/a</td> </tr> <tr> <td>Low</td> <td style="text-align: center;">190</td> <td style="text-align: center;">100</td> <td style="text-align: center;">n/a</td> </tr> <tr> <td>Extra Point #1</td> <td style="text-align: center;">n/a</td> <td style="text-align: center;">n/a</td> <td style="text-align: center;">n/a</td> </tr> <tr> <td>Extra Point #2</td> <td style="text-align: center;">n/a</td> <td style="text-align: center;">n/a</td> <td style="text-align: center;">n/a</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
adjusted zero	5000	0.0	5000	0	0	0.0	0.0	n/a	n/a
adjusted high	4924	78.0	5002	779.7	779.7	779.0	779.0	1.001	1.001
mid	4966	38.00	5004	379.7	379.7	373.0	373.0	1.018	1.018
low	4982	19.00	5001	190.0	190.0	184.0	184.0	1.032	1.032
calibrator zero	5000	0.00	5000	0.0	0.0	0.0	0.0	n/a	n/a
Average C.F.=								1.017	1.017

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO ₂	NO drop	NO ₂ gain	NO ₂ C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4924	78.00	5002	0.0	777.0	777.0	0.0	0.0	0.0	n/a
adjusted high NO2	4798	78.00	4876	490.0	268.0	777.0	509.0	509.0	509.0	1.000
gpt mid	4798	78.00	4876	260.0	503.0	777.0	274.0	274.0	274.0	1.000
gpt low	4798	78.00	4876	95.0	682.0	777.0	94.0	95.0	94.0	1.011
Average NO₂ C.F.=									1.004	

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.999	0.999	0.999	.95-1.05
b (Intercept as % of full scale)=	-0.36%	-0.36%	-0.04%	± 3% F.S.
% change in C.F. from last cal=	n/a	n/a	n/a	± 10%
NO2 converter efficiency	n/a	n/a	1.00	0.96 to 1.04

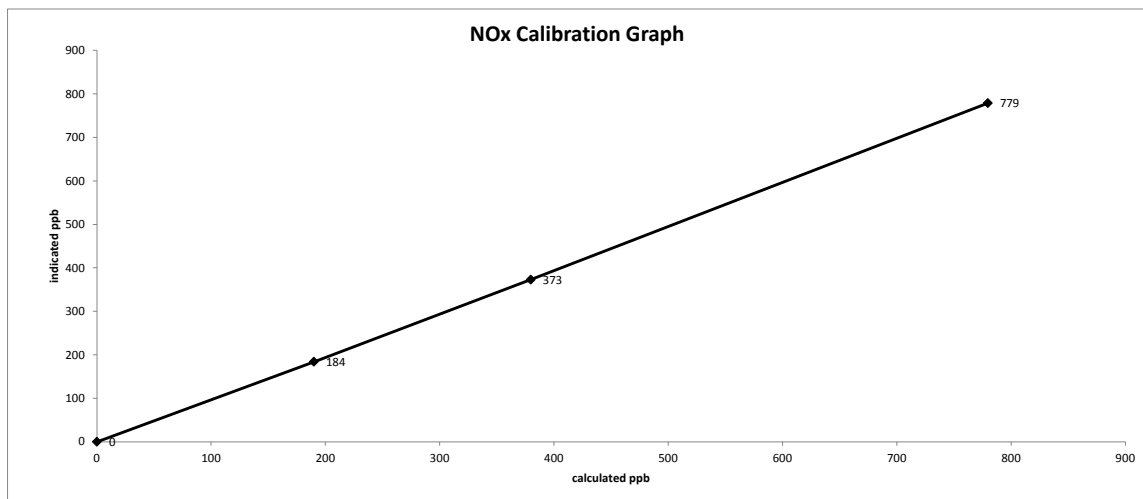
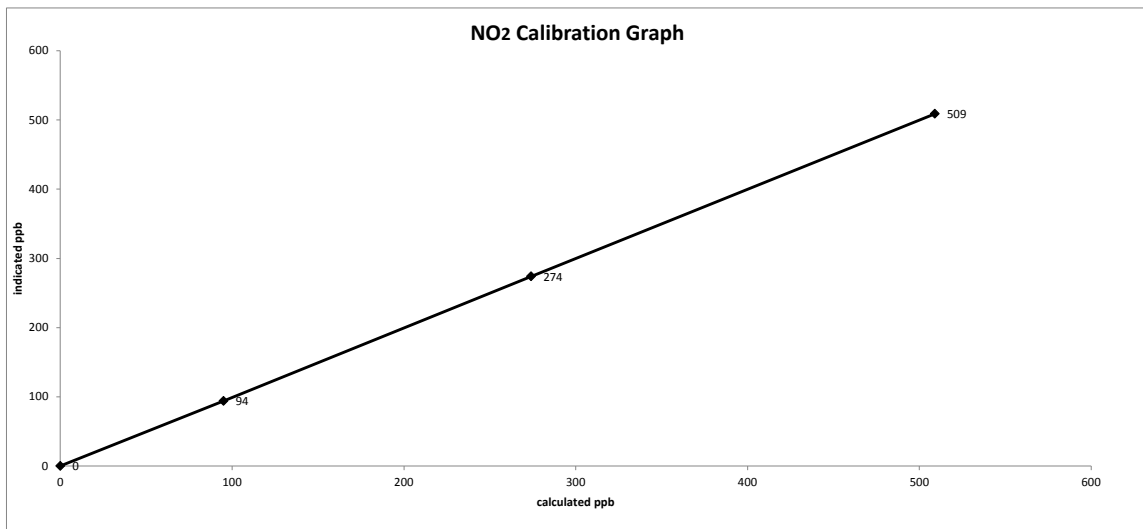
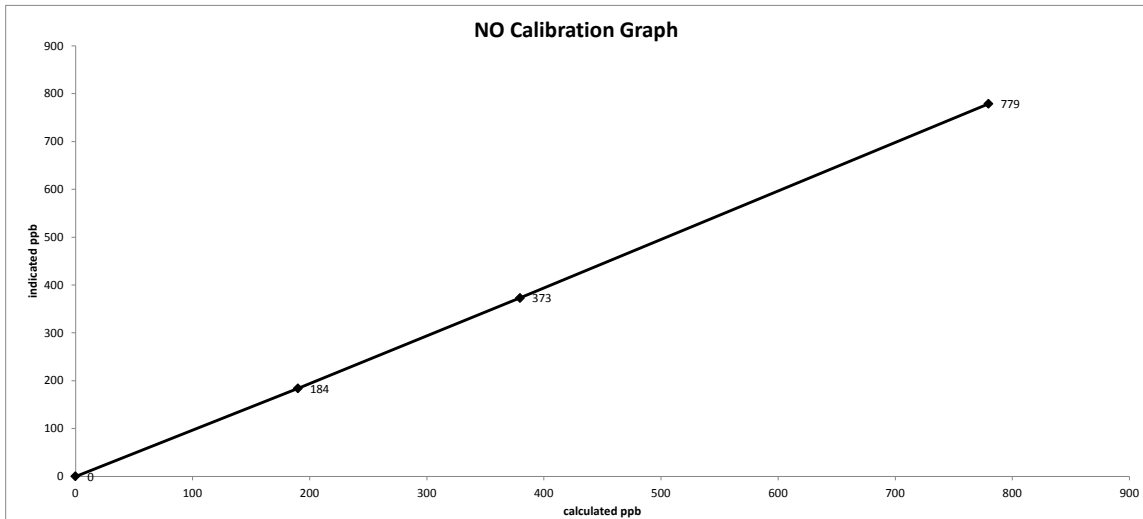
As found:	As left:
NOx SLOPE: n/a	NOx SLOPE: 1.025
NOx OFFS: n/a	NOx OFFS: -1.1
NO SLOPE: n/a	NO SLOPE: 1.011
NO OFFS: n/a	NO OFFS: -2.0
SAMP FLW: n/a	SAMP FLW: 516
OZONE FL: n/a	OZONE FL: 78
NORM PMT: n/a	NORM PMT: 0.4
AZERO: n/a	AZERO: 15.6
HVPS: n/a	HVPS: 716
DCPS: n/a	DCPS: 2620
RCELL: n/a	RCELL: 50.3
BOX TEMP: n/a	BOX TEMP: 28.3
IZS TEMP: n/a	IZS TEMP: 45.0
MOLY TEMP: n/a	MOLY TEMP: 316.0
RCEL: n/a	RCEL: 5.0
SAMP: n/a	SAMP: 27.9
Internal Span NO: n/a	Internal Span NO: 6.9
Internal Span NO2: n/a	Internal Span NO2: 398.5
Internal Span NOx: n/a	Internal Span NOx: 405.6

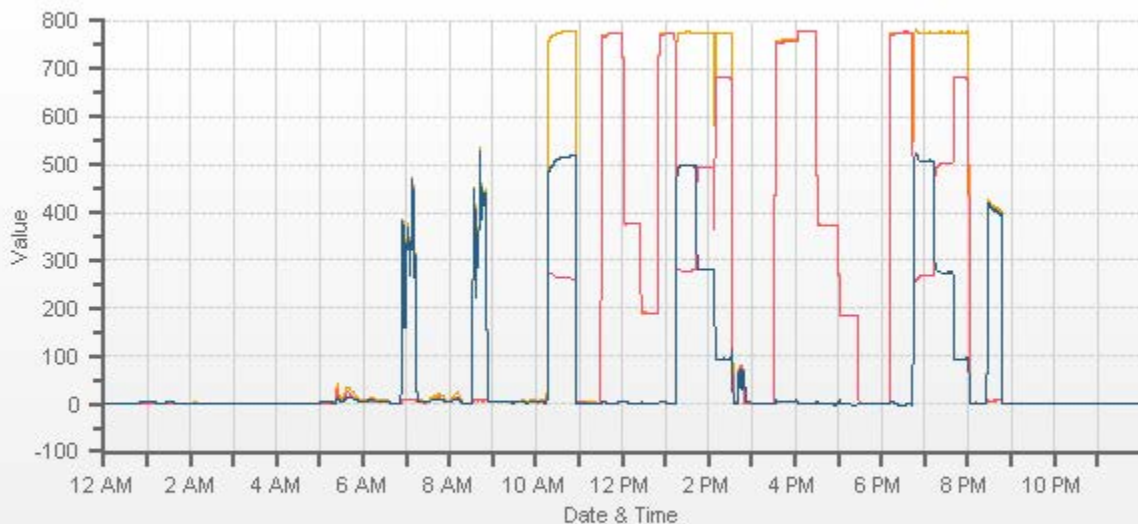
Comments:

Sample inlet filter was changed. The analyzer installed to replace LICA NOx #592 because of unstable SPAN readings. The #592 will be sent for repair. No NO2 adjustment made.

Date: July 25, 2016
Company/Airshed: LICA
Location/Station Name: Maskwa

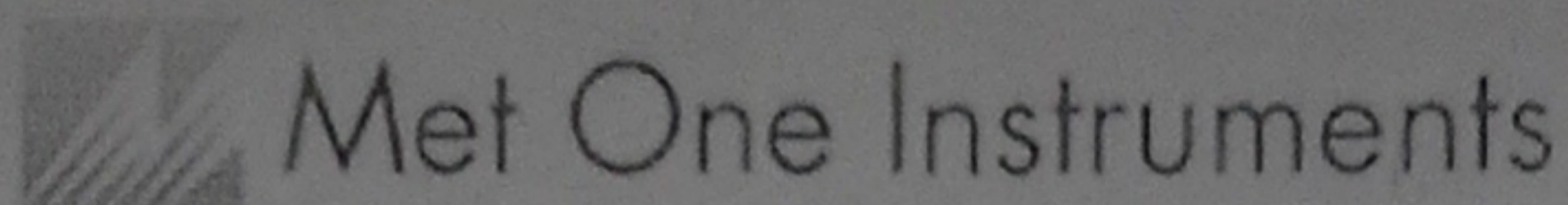
Start/End Time 24 hr. (mst): 15:02 / 20:55
Calibration Purpose: installation
Calibration Method: Gas Dilution & Gas Phase Titration





— NOX[ppb] — NO[ppb] — NO2[ppb]

WIND SYSTEM



Sonic Wind Sensor Certificate of Calibration

Sensor Model No.: 50.5H Sensor Serial No.: H10703
Sensor Output Swing 0V - 1.0V Sensor Output Range: 0 - 50.0 MPS
Customer: Maxxam Analytics Sales Order No.: 115035
Tested per PO: 35-62828 Calibration Date: 03/30/2016
Calibrated by: David Frith *DF*

QC Inspection

Byron Dawson

Instrument Condition Within Tolerance: As Found As Left
Corrective Action: No Adjustment Adjust Repair
Preventative Maintenance

As Found Test Date: N/A As Left Test Date: 03/30/2016

Quality Control Manual Revision: September 16, 2013 MP42201 Rev. G.

All Work Performed per Customer Purchase Order Requirements.

Calibration Document No. 50.5-6100

Test Equipment Used for Calibration of Instruments

Description	Manufacturer	Model No.	Serial No.	Cal Date	Cal Due	Voltage Accuracy	Time Base Accuracy
Data Acquisition	Campbell Scientific	CR1000	6569	4/06/2015	4/06/2018	+/- 3mV	< 6 ppm
NIST Cupset	Met One Instruments	170-41	3309	4/24/2012	4/24/2017	Accuracy < 0.15 mph or 1% WS	

Environmental Data: Temperature 65 to 80 Deg F Vibration none

Humidity 20 to 70% Radiation none

The standards used for calibration have accuracies equal to or greater than the instruments tested. These standards are on record and are traceable to NIST to the extent allowed by the institute's calibration facility. Unless otherwise stated heron, all instruments are calibrated to meet the manufacturer's published specifications. The calibration system complies with MIL-STD-45662A (8/1/88). Instrument's accuracy meets the requirements of Regulatory Guide 1.23 (2/72). Compliant with IS) 9001:2008 requirements

CALIBRATORS

Company Maxxam Operator: Christopher Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>N/A</u>
Serial Number	<u>17200415</u>	Serial Number	<u>N/A</u>
Last Verification Date	<u>May 2015</u>	Temperature (°C)	<u>N/A</u>
NO Cylinder S/N	<u>LL42475</u>	Barometric Pressure	<u>N/A</u>
NO/NOx Concentration	<u>48.5/48.5</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>
Pt. #3	<u>5000</u>		
Gas Flow (sccm)			
Pt. #1	<u>80</u>	Pt. #2	<u>40</u>
Pt. #3	<u>20</u>		

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5029	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5030	80.6	0.777	0.777	0.805	-0.005	0.800	4%	3%
5025	39.4	0.380	0.380	0.394	-0.002	0.392	4%	3%
5028	19.8	0.191	0.191	0.198	-0.001	0.197	4%	3%
Absolute Average Percent Difference							3.65%	3.09%

LINEAR REGRESSION ANALYSIS

 $y=mx+b$ (where x=calculated concentration, y=indicated concentration)

NO	LIMITS	NOx
Correlation= 1.0000	≥ 0.990	Correlation= 1.0000
m (Slope)= 1.0360	0.90-1.10	m (Slope)= 1.0295
b (Intercept % of FS)= 0.0110	± 3% F.S.	b (Intercept % of FS)= 0.0293

Flow	O ₂ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5030	Lamp C.	0.000	0.804	-0.004	0.800	NO ₂	% Diff. Limit
5030	1.388	0.495	0.309	0.491	0.800	0%	± 10%
5030	0.745	0.241	0.563	0.239	0.802	1%	± 10%
5030	0.367	0.091	0.713	0.089	0.801	2%	± 10%
Absolute Average Percent Difference						1%	± 10%

LINEAR REGRESSION ANALYSIS

 $y=mx+b$ (where x=calculated concentration, y=indicated concentration)

NO ₂	LIMITS
Correlation= 1.0000	≥ 0.995
m (Slope)= 0.9988	0.90-1.10
b (Intercept % of FS)= -0.2760	± 3% F.S.

AENV Standards Audit Calibrator		NO _x Analyzer	
Make/Model	<u>Teco 146i</u>	Make/Model	<u>Teco 42i</u>
Serial/AMU Number	<u>AMU 1809</u>	Serial/AMU Number	<u>AMU 1868</u>
		Last Calibration Date	<u>May 18, 2016</u>
		Full Scale (ppm)	<u>1.0</u>

 COMMENTS: Contains 50.3 ppm SO₂. Flows not measured as per Chapter 7, Section 5 of AMD.

 Auditor: AI Clark
 Operator Signature: *Christopher Wesson*

 Date: May 18, 2016
 Location: McIntyre Center Edmonton



Calibrator Performance Audit

Hydrogen Sulphide (by Cylinder Dilution)

File No. 2015-117

Company: Maxxam

Operator: Chris Wesson

Calibrator:
 Make/Model API 700
 Serial Number 831
 Last Verification Date April 2, 2015
 H₂S Cylinder Conc. 10.3 - CGA Feb 2, 16
 H₂S Cylinder S/N BLM002197

Flow Measurement Device:
 Make/Model NA
 Serial Number NA
 Temperature (°C) NA
 Barometric Pressure NA

Flow Measurements

Pt. No. 1 56.8 Pt. No. 2 27.7 Pt. No. 3 13.8

Calibrator Flow (scem)	Calculated Concentration (ppm)	Indicated Concentration (ppm)	% Difference	
			vs Audit Gas	% Diff. Limit
Zero Air	0.0000	0.0000		
7502	0.0780	0.0772	-1%	± 10%
7500	0.0380	0.0372	-2%	± 10%
7502	0.0191	0.0183	-4%	± 10%
Absolute Average Percent Difference			2%	± 10%

LINEAR REGRESSION ANALYSIS
y=mx+b (where x=calculated concentration, y=indicated concentration)

<u>H₂S</u>		<u>LIMITS</u>
Correlation=	1.0000	≥ 0.995
m (Slope)=	0.9919	0.90-1.10
b (Intercept % of FS)=	-0.3259	± 3% F.S.

<u>AENV Standards</u>	<u>H₂S Analyzer</u>
Audit Calibrator	Make/Model <u>Thermo 450i</u>
Make/Model <u>R&R MFC 201</u>	Serial/AMU Number <u>1980</u>
Serial/AMU Number <u>1690</u>	Last Calibration Date <u>February 1, 2016</u>
	Full Scale (ppm) <u>0.1</u>

COMMENTS: Flows are not measured at each pt - AMD not being followed as per chapter 7 section 5
- Conducted audit as analyzer is being used in the field

Auditor: Shea Beaton Date: February 2, 2016
 Operator Signature: [Signature] Location: McIntyre Center Edmonton



Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2015-122

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>NA</u>
Serial Number	<u>42531101</u>	Serial Number	<u>NA</u>
Last Verification Date	<u>January 19, 2016</u>	Temperature (°C)	<u>NA</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>NA</u>
NO/NOx Concentration	<u>50.3/50.3</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>
		Pt. #3	<u>5000</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>
		Pt. #3	<u>18.9</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
4998	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5001	77.5	0.779	0.779	0.787	0.000	0.787	1%	1%
5001	37.8	0.380	0.380	0.383	0.000	0.383	1%	1%
5000	18.9	0.190	0.190	0.191	0.000	0.191	1%	1%
Absolute Average Percent Difference							1%	1%

NO				LIMITS		NO _x	
Correlation=	1.0000	≥	0.990	Correlation=	1.0000		
m (Slope)=	1.0106	0.90-1.10		m (Slope)=	1.0106		
b (Intercept % of FS)=	-0.0566	± 3% F.S.		b (Intercept % of FS)=	-0.0566		

y=mx+b (where x=calculated concentration, y=indicated concentration)

Flow	O ₂ Conc	NO Decrease	NO	NO ₂	NO _x	% Diff. Vs Audit gas	
5001	0	0.000	0.787	0.001	0.788	NO ₂	% Diff. Limit
5001	1.75v	0.538	0.249	0.542	0.791	1%	± 10%
5001	0.9v	0.271	0.516	0.274	0.790	1%	± 10%
5001	0.35v	0.100	0.687	0.102	0.790	1%	± 10%
Absolute Average Percent Difference						0.8%	± 10%

NO ₂		LIMITS	
Correlation=	1.0000	≥	0.995
m (Slope)=	1.0054	0.90-1.10	
b (Intercept % of FS)=	0.1281	± 3% F.S.	

y=mx+b (where x=calculated concentration, y=indicated concentration)

AENV Standards Audit Calibrator		NO _x Analyzer	
Make/Model	<u>Thermo 146i</u>	Make/Model	<u>Thermo 42i</u>
Serial/AMU Number	<u>1809</u>	Serial/AMU Number	<u>1868</u>
		Last Calibration Date	<u>February 1, 2016</u>
		Full Scale (ppm)	<u>1</u>

COMMENTS: Flows not manually measured - calibration system audited as it is currently being operated.

Auditor: Shea Beaton
Operator Signature: [Signature]

Date: February 4, 2016
Location: McIntyre Center Edmonton



Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2015-119

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>API 700</u>	Make/Model	<u>NA</u>
Serial Number	<u>627</u>	Serial Number	<u>NA</u>
Last Verification Date	<u>April 1 2015</u>	Temperature (°C)	<u>NA</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>NA</u>
NO/NOx Concentration	<u>50.3/50.3</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>
Pt. #3	<u>5000</u>		
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>
Pt. #3	<u>18.9</u>		

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5007	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5003	77.5	0.779	0.779	0.787	-0.001	0.786	1%	1%
5004	37.8	0.380	0.380	0.383	0.000	0.383	1%	1%
5001	18.9	0.190	0.190	0.191	0.000	0.191	1%	1%
Absolute Average Percent Difference							1%	1%

LINEAR REGRESSION ANALYSIS *y=mx+b (where x=calculated concentration, y=indicated concentration)*

NO	LIMITS	NOx
Correlation= 1.0000	≥ 0.990	Correlation= 1.0000
m (Slope)= 1.0106	0.90-1.10	m (Slope)= 1.0092
b (Intercept % of FS)= -0.0566	± 3% F.S.	b (Intercept % of FS)= -0.0368

Flow	O ₂ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5003	0	0.000	0.787	0.001	0.788	NO ₂	% Diff. Limit
5003	0.5	0.493	0.294	0.498	0.792	1%	± 10%
5003	0.25	0.256	0.531	0.262	0.792	2%	± 10%
5003	0.1	0.108	0.679	0.110	0.789	1%	± 10%
Absolute Average Percent Difference						1.2%	± 10%

LINEAR REGRESSION ANALYSIS *y=mx+b (where x=calculated concentration, y=indicated concentration)*

NO _x	LIMITS
Correlation= 1.0000	≥ 0.995
m (Slope)= 1.0089	0.90-1.10
b (Intercept % of FS)= 0.1591	± 3% F.S.

AENV Standards Audit Calibrator	NO _x Analyzer
Make/Model <u>Thermo 146i</u>	Make/Model <u>Thermo 42i</u>
Serial/AMU Number <u>1809</u>	Serial/AMU Number <u>1868</u>
	Last Calibration Date <u>February 1, 2016</u>
	Full Scale (ppm) <u>1</u>

COMMENTS: Flows not manually measured - calibration system audited as it is currently being operated.

Auditor: Shea Beaton
Operator Signature: [Signature]

Date: February 3, 2016
Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2015-342CGA

Company: Maxxam **Operator's Name:** Limin Li
Cylinder #: BLM002756T **Concentration PPM:** 49.9 **Tolerance(%)** 2 **Certified By:** Air Liquide

Reference Calibrator and Gas:

Make/Model: R&R MFC 201
 Serial Number: AMU 1690
 Last Verification Date: March 31, 2015
 Gas Type: SO2 Conc. 98.57
 Cylinder Number: CAL016720

Flow Measurement Device:

Make/Model: Bios DC2
 Serial Number: AMU 1659
 Temp. °C: 22.5 C
 B.P. 690 mmHg

Reference Analyzer:

Make/Model: Teco 43C Serial/AMU Number: 1623
 Instrument Settings: Zero: 7.9 Span: 1.028 Range: 1.0
 Last Calibration: Date: Mar 31/15 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.000	0.01660	60.242	49.5
4976	82.6	0.821	0.01660	60.242	49.5
4993	41.0	0.410	0.00821	121.780	49.9
4977	20.2	0.202	0.00406	246.386	49.8
Average Cylinder Concentration:					49.7

Previous Stated Concentration PPM: 49.9

Percent variance from Stated: 0.4

Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:** _____
 <=5% Outside Manufacturer Tolerance. Use manufacturers concentration _____
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder _____

Auditor: Al Clark
 Operator Signature: *Al Clark*

Date: March 31, 2015
 Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2014-250CGA

Company: Maxxam Operator's Name: Limin Li
Cylinder #: LL74267 Concentration PPM: 9.88 Tolerance(%): 2 Certified By: Air Liquide

Reference Calibrator and Gas:

Make/Model: R&R MFC 201
Serial Number: AMU 1690
Last Verification Date: December 15, 2014
Gas Type: H2S Conc. 20.43
Cylinder Number: CAL015106

Flow Measurement Device:

Make/Model: Bios DC2
Serial Number: AMU 1659
Temp. °C: 23.0 C
B.P.: 702 mmhg

Reference Analyzer:

Make/Model: Teco 45C Serial/AMU Number: 1624
Instrument Settings: Zero: 6.4 Span: 1.160 Range: 0.1
Last Calibration: Date: Dec15/14 C.F.: 1.000 Done By: AI Clark

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	0.00755	282.889	9.67
5099	38.5	0.0731	0.00755	132.442	9.68
5092	18.0	0.0342	0.00353	282.889	9.67
5066	9.2	0.0173	0.00182	550.652	9.53
Average Cylinder Concentration:					9.63

Previous Stated Concentration PPM: 9.88

Percent variance from Stated: 2.6

Meets Manufacturer Tolerance. Use manufacturers stated concentration COMMENTS: _____
 < =5% Outside Manufacturer Tolerance. Use manufacturers concentration
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: AI Clark
Operator Signature: *AI Clark*

Date: December 16, 2014
Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2015-338CGA

Company: Maxxam **Operator's Name:** Limin Li
Cylinder #: BLM002508 **Concentration PPM:** 10.2 **Tolerance(%):** 2 **Certified By:** Air Liquide

Reference Calibrator and Gas:

Make/Model: R&R MFC 201
 Serial Number: AMU1690
 Last Verification Date: March 31, 2015
 Gas Type: H2S Conc. 20.43
 Cylinder Number: CAL015106

Flow Measurement Device:

Make/Model: Bios DC2
 Serial Number: AMU 1659
 Temp. °C: 23.0 C
 B.P.: 689 mmhg

Reference Analyzer:

Make/Model: Teco 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 14.5 Span: 1.035 Range: 0.1
 Last Calibration: Date: Mar 31/15 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	0.0000	0.0000	0.0000
5080	38.2	0.0725	0.00752	132.984	9.6
5078	17.9	0.0340	0.00353	283.687	9.6
5066	9.1	0.0170	0.00180	556.703	9.5
Average Cylinder Concentration:					9.6

Previous Stated Concentration PPM: 10.2

Percent variance from Stated: 6.0

Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:** _____

<=5% Outside Manufacturer Tolerance. Use manufacturers concentration _____

> 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder _____

Auditor: Al Clark

Date: March 31, 2015

Operator Signature: *Limin Li*

Location: McIntyre Center Edmonton



Praxair
 5700 South Alameda Street
 Los Angeles, CA 90058
 Tel: (323) 585-2154 Fax: (714) 542-6689
 PGVPID: F22014

DocNumber: 000068924

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

MAXXAM ANALYTICS INC *NA*
 9372 49TH ST
 EDMONTON AB T6B 2L

Praxair Order Number: 21137117
 Customer P. O. Number: 35-55963
 Customer Reference Number:

Fill Date: 7/1/2014
 Part Number: NI ME600P2E-AQ
 Lot Number: 109418203
 Cylinder Style & Outlet: AQ CGA 350
 Cylinder Pressure & Volume: 2200 psig 78 cu. ft.

Certified Concentration:

Expiration Date:	7/7/2022	NIST Traceable
Cylinder Number:	LL83638	Analytical Uncertainty:
582 ppm	METHANE	± 1.5 %
203 ppm	PROPANE	± 0.9 %
Balance	NITROGEN	

Certification Information: Certification Date: 7/7/2014 Term: 96 Months Expiration Date: 7/7/2022

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1. Component: METHANE

Requested Concentration: 600 ppm
 Certified Concentration: 582 ppm
 Instrument Used: MKS Multigas 2031 FTIR
 Analytical Method: Fourier Transform Infrared
 Last Multipoint Calibration: 6/24/2014

Reference Standard Type: GMIS
 Ref. Std. Cylinder #: CC139480
 Ref. Std. Conc: 246 ppm
 Ref. Std. Traceable to SRM #: 2751
 SRM Sample #: 212-09-AL
 SRM Cylinder #: SX-20000

First Analysis Data:		Date: 7/7/2014	
Z: 0	R: 249.5	C: 589.4	Conc: 581.21
R: 249.5	Z: 0	C: 589	Conc: 580.82
Z: 0	C: 592	R: 249.4	Conc: 583.77
UOM: ppm	Mean Test Assay:	581.93 ppm	

Second Analysis Data:		Date:	
Z: 0	R: 0	C: 0	Conc: 0
R: 0	Z: 0	C: 0	Conc: 0
Z: 0	C: 0	R: 0	Conc: 0
UOM: ppm	Mean Test Assay:	0 ppm	

2. Component: PROPANE

Requested Concentration: 200 ppm
 Certified Concentration: 203 ppm
 Instrument Used: MKS Multigas 2031 FTIR
 Analytical Method: Fourier Transform Infrared
 Last Multipoint Calibration: 6/24/2014

Reference Standard Type: GMIS
 Ref. Std. Cylinder #: CC 163442
 Ref. Std. Conc: 265.8 ppm
 Ref. Std. Traceable to SRM #: vs 2644a
 SRM Sample #: 101-C-45
 SRM Cylinder #: XF003829B

First Analysis Data:		Date: 7/7/2014	
Z: 0	R: 273.6	C: 208.4	Conc: 202.43
R: 273.7	Z: 0	C: 208.6	Conc: 202.63
Z: 0	C: 208.5	R: 273.6	Conc: 202.53
UOM: ppm	Mean Test Assay:	202.53 ppm	

Second Analysis Data:		Date:	
Z: 0	R: 0	C: 0	Conc: 0
R: 0	Z: 0	C: 0	Conc: 0
Z: 0	C: 0	R: 0	Conc: 0
UOM: ppm	Mean Test Assay:	0 ppm	

Analyzed by:

Jack Fu

Certified by:

Ying Yu

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Praxair Distribution, Inc., arising out of the use of the information contained herein exceed the fee established for providing such information.



Calibration Gas Audit

NO Cylinder Gas

File No. 2015-343CGA

Company: Maxxam **Operators name:** Limin Li
Cylinder #: BLM002756T **Conc (PPM)** 50.7/50.7 **Tolerance (%)** 2 **Certified By:** Air Liquide

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Teco 146i</u>			Make/Model	<u>Bios DC2</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>AMU 1659</u>
Last Verification Date	<u>March 31, 2015</u>			Temp. °C	<u>22.5 C</u>
Gas Type	<u>NO</u>	Conc.	<u>48.79</u>	B.P.	<u>690 mmhg</u>
Cylinder Number	<u>CAL018024</u>				

Reference Analyzer:
Make/Model Teco 42i **Serial/AMU Number:** 1868
Instrument Settings **Zero:** 4.2 **Span:** 1.008 **Range:** 1.0
Last Calibration: **Date:** Mar 31/15 **C.F.** 1.000 **Done By:** Al Clark

Calibrator Flows (scm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
5000	0.0	0.000	0.000	0.01660	60.242	50.7	49.5
4976	82.6	0.842	0.822	0.01660	60.242	50.7	49.5
4993	41.0	0.420	0.410	0.00821	121.780	51.1	49.9
4977	20.2	0.208	0.205	0.00406	246.386	51.2	50.5
Average Cylinder Concentration:						51.0	50.0

<u>NO</u>	<u>NOx</u>
Previous Stated Concentration PPM: <u>50.7</u>	<u>50.7</u>
Percent variance from Stated: <u>0.7</u>	<u>1.4</u>

Cylinder gas tolerances based on NO only

Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:** _____
 < =5% Outside Manufacturer Tolerance. Use manufacturers concentration Contains 49.9 ppm SO2 in cylinder
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Al Clark **Date:** March 31, 2015
Operator Signature: *Al Clark* **Location:** McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2015-115CGA

Company: Maxxam **Operators name:** Chris Wesson
Cylinder #: LL119346 **Conc (PPM)** 50.0/50.0 **Tolerance (%)** 2 **Certified By:** Air Liquide

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Thermo 146i</u>			Make/Model	<u>Bios DC-2</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>Bios D</u>
Last Verification Date	<u>February 2, 2016</u>			Temp. °C	<u>24.5</u>
Gas Type	<u>NO</u>	Conc.	<u>48.79</u>	B.P.	<u>702mmHg</u>
Cylinder Number	<u>CAL018024</u>				

Reference Analyzer:
 Make/Model Thermo 42i Serial/AMU Number: 1868
 Instrument Settings Zero: 4.2 Span: 1.014 Range: 1.0
 Last Calibration: Date: 02-Feb-16 C.F. 1.000 Done By: SB

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
4952	0.0	0.000	0.000				
4946	79.54	0.809	0.809	0.01608	62.183	50.3	50.3
4941	39.35	0.403	0.402	0.00796	125.565	50.6	50.5
4940	19.57	0.200	0.200	0.00396	252.427	50.5	50.5
Average Cylinder Concentration:						50.5	50.4

	<u>NO</u>		<u>NOx</u>
Previous Stated Concentration PPM:	<u>50.0</u>		<u>50.0</u>
Percent variance from Stated:	<u>0.9</u>		<u>0.8</u>

Cylinder gas tolerances based on NO only

- Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS: SO2/NO Blend 50.0PPM SO2**
- < =5% Outside Manufacturer Tolerance. Use manufacturers concentration
- > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Shea Beaton Date: February 2, 2016
 Operator Signature: [Signature] Location: McIntyre Center Edmonton

APPENDIX III
INTERNAL AUDIT RESULTS

COMPANY: LICA PLANT: Maskwa DATE: July 14, 2016

Station Location: x,y Coordinates: _____
 Elevation (m): _____
 Declination: _____

GENERAL	Yes	No	n/a	Comments:
Has site location changed from previous audit?		x		
Is site secure?	x			
Are station operating conditions adequate?	x			needs grass trimmed badly
Last twelve month's of calibrations available?	x			
All applicable SOP's available in station?	x			online
Site documentation up to date?		x		Mike Bisaga's responsibility

DATA ACQUISITION	Yes	No	n/a	Comments:
Are strip charts in use?		x		
Is a digital data logger in use?	x			
Is a telemetry system for data acquisition in use?	x			

TRAILER COMPONENTS	Yes	No	n/a	Comments:
Is a glass sampling manifold installed?	x			
Is sampling manifold clean and free of chips and	x			
Is a trap in place?	x			
Are spare manifold ports capped?	x			
Is manifold pump properly installed and operative?	x			
If horizontal, is the manifold mounted at a slight			x	
Do sample lines extend halfway into manifold?	x			
Are monitor sampling lines connected to manifold?	x			
Are sampling lines clean?	x			lines from analyzer to manifold were dusty
Are monitors properly mounted and secure?	x			
Are monitors properly exhausted from room or	x			
Are zero and span systems operational?	x			

Meteorological	Yes	No	n/a	Comments:
Is wind equipment properly oriented?	x			
Is the wind equipment functioning properly?	x			

	Indicated Value:	Audit Value:	% Difference	Scalar Difference:
Station Temperature °C	21	21	0.00	0.00
Barometric Pressure	n/a			
Wind Speed (kph)	n/a	n/a		n/a
Wind Direction (Deg)	n/a	n/a		n/a
Relative Humidity %	n/a	n/a		n/a
Ambient Temperature °C	n/a	n/a		#VALUE!
Solar Radiation kW/m ²	n/a	n/a		n/a
Precipitation (Tipping Bucket mm)	n/a	n/a		n/a

Recommendations: Pumps should be fastened down or at least placed on a shelf that has a lip.
 Long grass outside station needs to be cut asap.

AUDITOR: Tom Bourque



API 101E Hydrogen Sulphide Analyzer Calibration

Date: July 14, 2016	Barometric Pressure: n/a
Company/Airshed: LICA	Station Temperature °C: 21
Location/Station Name: Maskwa	Weather Conditions: Mainly sunny
Parameter: Hydrogen Sulphide	Calibration Purpose: Audit
Start Time 24 hr. (mst): 10:09	Performed By/Reviewer: Tom Bourque Tom Bourque
End Time 24 hr. (mst): 12:07	Cal Gas Expiry Date: July 15, 2017
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	
Serial Number: 511	Range ppb: 100
Last Calibration Date: June 15, 2016	As Found C.F.: 0.988
Previous C.F.: 0.999	New C.F.: n/a

Calibrator:	Standard Calibration Points for Ranges								
Flow Meter ID's: n/a	<table border="1" style="margin: auto;"> <thead> <tr> <th>Point</th> <th>Hydrogen Sulphide Standard Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>78</td> </tr> <tr> <td>Mid</td> <td>38</td> </tr> <tr> <td>Low</td> <td>19</td> </tr> </tbody> </table>	Point	Hydrogen Sulphide Standard Calibration Points	High	78	Mid	38	Low	19
Point		Hydrogen Sulphide Standard Calibration Points							
High		78							
Mid		38							
Low		19							
Make & Model: API 700									
Serial #: 831									
Cal Gas Cylinder I.D. #: LL74267									
Cal Gas Conc. (ppm): 9.88									

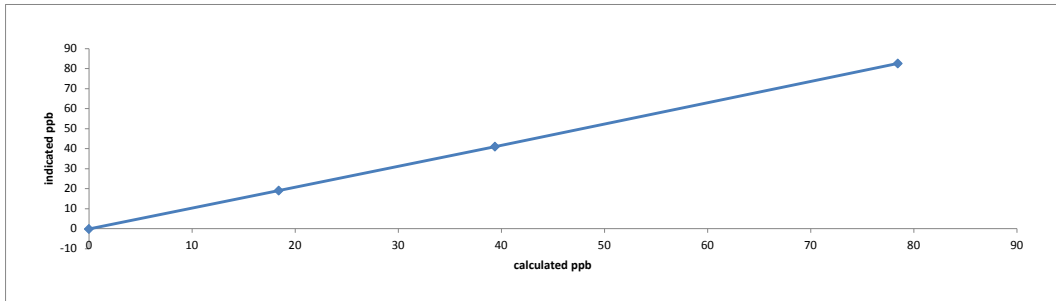
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	7500	0.00	7500	0.0	-0.7	N/A
as found high	7493	60.00	7553	78.5	78.7	0.988
mid	7498	30.00	7528	39.4	38.9	0.994
low	7495	14.00	7509	18.4	17.9	0.990
Average C.F. =						0.991

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS
Slope =	0.989	> or = 0.995
b (Intercept as % of full scale) =	0.75%	0.90-1.10
% change in C.F. from last cal =	1.05%	± 3% F.S.
		± 10%

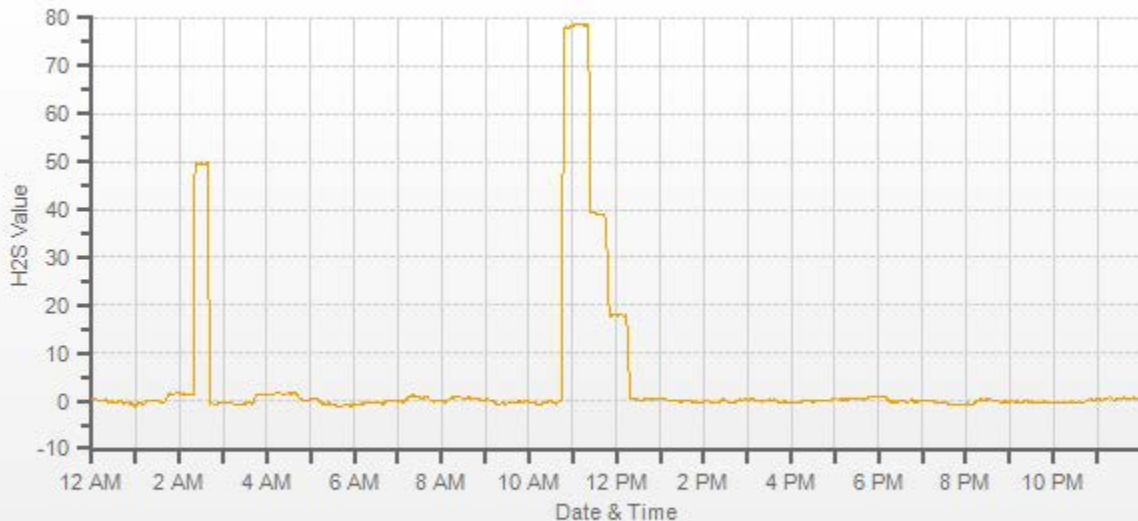
API 101E Hydrogen Sulphide Analyzer Calibration



As found:	As left:
SLOPE: .934	SLOPE: n/a
OFFSET: 49.9	OFFSET: n/a
HVPS: 616	HVPS: n/a
RCELL TEMP: 50.0	RCELL TEMP: n/a
BOX TEMP: 29.8	BOX TEMP: n/a
PMT TEMP: 7.8	PMT TEMP: n/a
IZS TEMP: 45.0	IZS TEMP: n/a
Converter Temp: 315.4	Converter Temp: n/a
PRES: 27.8	PRES: n/a
SAMP FL: 660	SAMP FL: n/a
UV LAMP: 3055	UV LAMP: n/a
LAMP RATIO: 95.4 %	LAMP RATIO: n/a
STR. LGT: 23.3	STR. LGT: n/a
DRK PMT: 36.5	DRK PMT: n/a
DRK LMP: 6.9	DRK LMP: n/a
Internal Span: 51	Internal Span: n/a

Comments:

Use source testing SO2 in N2 50.2 ppm cylinder # DT0008954 for scrubber challenge run 791 ppb SO2, based on AEP scrubber challenge protocol of duplicating SO2 calibration high point, run 791 ppb for 15 minutes (10:28-10:43), result = -0.04 ppb, no adjustments made to analyzer



— H2S[ppb]

APPENDIX IV
REPORT CERTIFICATION FORM

Report Certification Form

Alberta Airshed (if applicable)	EPA Approval or Code of Practice Registration # (if applicable)
YES	NA
Company Name (if applicable)	Industrial Operation Name (if applicable)
Lakeland Industry & Community Association	Maskwa Site
Name of the Representative of the Person Responsible (Last, First, Middle)	Position / Title of the Representative of the Person Responsible
Bim Adeniji	Project Manager Assistant, Customer Service, Air Services
Is an External Party Certifying the Report? (If 'Yes', fill in the fields below for the external person.)	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Name of External Person Certifying the Report (Last, First, Middle)	Position / Title of External Person Certifying the Report
NA	NA
Company Name for the External Person Certifying the Report	Identification of Qualifications / Professional Designations of the External Person Certifying the Report
NA	NA

I certify that I have reviewed and verified the submitted report. I also certify that the report presented with this certification form is complete, accurate and representative of the monitoring results and timeframe.



Signature of the Representative of the Person Responsible / External Person Certifying the Report

29-Aug-2016




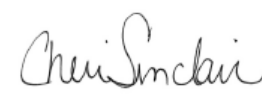
Report Issued Date (dd-mm-yyyy)

APPENDIX V
DATA VALIDATION CERTIFICATION FORM



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2016-07-30- C</u>
Site: <u>Maskwa Site</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	 _____	Date <u>23-Aug-2016</u>
Level 1 Primary Validation	 _____	Date <u>23-Aug-2016</u>
Level 2 Final Validation	 _____	Date <u>29-Aug-2016</u>
Level 3 Independent Data Review	 _____	Date <u>06-Sep-2016</u>
Post-Final Validation	<u>NA</u> _____	Date <u>NA</u> _____

Notes
The Post-Final Validation step serves to re-evaluate the data that errors or omissions are discovered and/or suspected after the initial submittal of data. This validation is performed on an annual basis.



MAXXAM
ANALYTICS #1 2080
39 Ave. NE Calgary,
AB
T2E6P7

maxxam.ca
Toll Free 800-386-7247
Fax 403-219-3673

AMBIENT AIR MONITORING MONTHLY DATA REPORT
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
ST. LINA SITE

JOB #: 2833-2016-07-31-C

July 2016

Prepared for:

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
BOX 8237, 5107W - 50 STREET
BONNYVILLE, ALBERTA
T9N 2J5

Attention: MIKE BISAGA

DATE: **September 7, 2016**

Prepared by:

Bim Adeniji, M.Sc.
Project Manager Assistant, Customer Service, Air Services

Reviewed by:

Cheri Sinclair, B.Sc.
Supervisor, Customer Service, Air Services

SUMMARY

In July 2016, the Air Services Group of Maxxam Analytics conducted an ambient air monitoring program at the St. Lina Site of Lakeland Industry & Community Association, near St. Paul. Sampling was carried out to determine the concentrations of non-compliance parameters, as requested by the Project Coordinator.

All data collected this month were within the objectives outlined in the Air Monitoring Directive (Alberta Environment and Parks 2016).

The operational uptime for all analyzers and meteorological system were above the 90% requirement.

Gas Parameters (excluding O₃): Annual maintenance was performed on the analyzers.

All Parameters (excluding THC): Five hours of maximum instantaneous data collected between July 2 and July 26 were invalidated due to reoccurring power failures. Hourly data is missing on July 28 at hour 17:00 due to a power failure.

THC: Six hours of maximum instantaneous data collected between July 2 and July 28 were invalidated due to brief power failures. Two hours of hourly data were invalidated on July 28 at hours 17:00 and 18:00 as the analyzer was recovering from a brief power outage.

PM 2.5: The TEOM unit failed to recover from a power outage on July 3. Troubleshooting was performed on July 4 and a post-repair audit was completed afterwards. Twenty hours of data are missing due to this issue. Fourteen hours of data were invalidated as the data was below -3 ug/m³. Annual maintenance was performed on the TEOM unit on July 20.

NOX/NO/NO₂: The analyzer spanned high on July 17. This was immediately followed by an additional span check but the results were still outside acceptance limits. A scheduled annual maintenance was performed on the analyzer following a shut-down calibration on July 18. The analyzer was allowed time to stabilize overnight and a post-repair calibration was completed on July 19. Fifteen hours of data are missing due to this event.

The summary of results is presented on the following pages.

Any deviations or modifications made to the sampling or analytical methods are outlined in Section 1.0 Discussion. On this basis, Maxxam is issuing this completed report to Lakeland Industry & Community Association, St. Lina Site.

Should you have any questions concerning the results or if we can be of further assistance, please contact us at 403-219-3677 or toll-free at 1-800-386-7247.

Monthly Continuous Data Summary

Lakeland Industry & Community Association						MAXIMUM VALUES							OPERATIONAL TIME (%)
St. Lina Site						1-HOUR					24-HOUR		
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (KPH)	WIND DIRECTION (DEGREES)	READING	DAY	
	1-HR	24-HR	1-HR	24-HR									
SO2 (PPB)	172	48	0	0	0.0	2.2	24	13	20.8	SW	0.3	19	96.9
H2S (PPB)	10	3	0	0	0.1	2.4	22	3	2.3	SSW	0.8	19	97.2
THC (PPM)	-	-	-	-	1.88	2.28	19, 19	5, 6	3.9 5.1	S SSW	2.05	19	97.4
NO2 (PPB)	159	-	0	-	0.9	7.0	9	2	6.7	NNE	2.3	9	97.7
NO (PPB)	-	-	-	-	0.0	1.5	24	7	6.9	SSW	0.3	18	97.7
NOX (PPB)	-	-	-	-	1.0	7.0	9	2	6.7	NNE	2.3	9	97.7
O3 (PPB)	82	-	0	-	26.1	47.1	19	12	8.0	SW	36.3	18	99.9
PM2.5 (UG/M3)	80	30	0	0	5.5	52.9	27	23	6.9	SW	14.1	18	95.4
RELATIVE HUMIDITY (%)	-	-	-	-	69	92	9	3, 4	5.9 6.3	N NNE	85	3	99.9
BAROMETRIC PRESSURE (MILIBAR)	-	-	-	-	931	941	14	VAR	VAR	VAR	939	14	99.9
AMBIENT TEMPERATURE (DEG C)	-	-	-	-	18.1	28.5	19	15	16.6	SW	22.4	19	99.9
PRECIPITATION (MM)	-	-	-	-	0.1	20.8	3	14	12.1	W	1.2	3	99.9
VECTOR WS (KPH)	-	-	-	-	8.1	24.9	20	15	-	WSW	13.6	21	99.9
VECTOR WD (DEG)	-	-	-	-	19 (NNE)	-	-	-	-	-	-	-	99.9

NA-NOT AVAILABLE VAR-VARIOUS

Exceedance Summary Report

SO₂ 1- Hour Exceedances

No Exceedances Recorded During the Month

SO₂ 24- Hour Exceedances

No Exceedances Recorded During the Month

H₂S 1- Hour Exceedances

No Exceedances Recorded During the Month

H₂S 24- Hour Exceedances

No Exceedances Recorded During the Month

NO₂ 1- Hour Exceedances

No Exceedances Recorded During the Month

PM_{2.5} 1- Hour Exceedances

No Exceedances Recorded During the Month

PM_{2.5} 24- Hour Exceedances

No Exceedances Recorded During the Month

O₃ 1- Hour Exceedances

No Exceedances Recorded During the Month

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1.0 Discussion

This monthly report consists of data for parameters Sulphur Dioxide (SO₂), Hydrogen Sulphide (H₂S), Total Hydrocarbon (THC), Oxides of Nitrogen (NO_x), Nitric Oxides (NO), Nitrogen Dioxide (NO₂), Ozone (O₃), Particulate Matter 2.5 (PM_{2.5}), Relative Humidity (RH), Barometric Pressure (BP), Precipitation, Ambient Temperature (AmbTPX), Wind Speed (WS), Wind Direction (WD) and Standard Deviation Wind Direction (STDWD).

Sample filters for all continuous air monitors are changed before the calibration begins. The sample manifold is cleaned during the site visit each month.

Control checks, consisting of a zero and span, are conducted daily on all continuous air monitors. In place of the air sample, zero air (from scrubbed air or gas cylinders) is used for zero checks, and a known concentration of the pollutant being analyzed is used for span checks. These checks are controlled by automatic timers and valves. The total zero span cycle is completed within an hour, the commencement of the zero span cycle is at the beginning of the hour.

Multipoint calibrations are done a minimum of once a month for each continuous air monitor. An additional calibration is required under the following conditions: 1) within three days after the initial start-up and stabilization of a newly installed instrument, 2) prior to shut-down or moving of an instrument which has been working to specification, and 3) when major repair has been done on the instrument.

Time during the first multi-point calibration is not considered downtime (Data is flagged as C). If more than one calibration is performed during the month, the time during the additional calibration is considered as downtime (Data is flagged as C1).

Only one zero/span check is run per day. Time during the zero/span check is not considered as downtime (Data is flagged as S). If an extra zero/span check is performed, the time during the additional check is considered as downtime (Data is flagged as S1).

The AMD requires each instrument and accompanying data recording system to be operational 90% of the time (minimum), on a monthly basis.

All sampling, analysis, and QA/QC for this project was performed by Maxxam Analytics and complies with the Alberta Air Monitoring Directive.

Data contained in this monthly report has undergone the verification and validation based on the requirements of the AMD Chapter 6: Ambient Data Quality (August 3, 2016). The descriptions of the data verification and validation process can be found in Section 5 of this report. Instantaneous data, where applicable, is provided for reference purposes and has not undergone zero correction.

Hourly and minute data have been reviewed based on daily zero/span results and multi-point calibration results. Data may be considered invalid if a zero-corrected span check in excess of +/- 10% of the span concentration (established by the previous multi-point calibration) is encountered and/or significant differences in the calibration factor occurs (greater than 10%).

SULPHUR DIOXIDE (SO₂)

Annual maintenance was performed on the analyzer following a shut-down calibration on July 19. The reaction cell, sample valve and manifold were cleaned. The sample pump was rebuilt. The sinter filters and O-rings were replaced. The UV lamp and High Voltage Power Supply were adjusted to optimize the analyzer's sensitivity. The analyzer was allowed time to stabilize overnight and a post-repair calibration was completed on July 20. Both the shut-down and post-repair calibration results met AMD's requirements. Twenty two hours of data are missing due to this event.

HYDROGEN SULPHIDE (H₂S)

Annual maintenance was performed on the analyzer following a shut-down calibration on July 19. The reaction cell, sample valve and manifold were cleaned. The sample pump was rebuilt. The sinter filters and O-rings were replaced. The UV lamp and High Voltage Power Supply were adjusted to optimize the analyzer's sensitivity. The analyzer was allowed time to stabilize overnight and a post-repair calibration was completed on July 20. Both the shut-down and post-repair calibration results met AMD's requirements. Twenty hours of data are missing due to this event.

TOTAL HYDROCARBONS (THC)

Annual maintenance was performed on the analyzer following a shut-down calibration on July 19. The reaction cell, sample valve and manifold were cleaned. The sample pump was rebuilt. The sinter filters and O-rings were replaced. The UV lamp and High Voltage Power Supply were adjusted to optimize the analyzer's sensitivity. The analyzer was allowed time to stabilize overnight and a post-repair calibration was completed on July 20. Both the shut-down and post-repair calibration results met AMD's requirements. Seventeen hours of data are missing due to this event.

NITROGEN DIOXIDE (NO₂)

The analyzer spanned high on July 17. This was immediately followed by an additional span check but the results were still outside the acceptance limits. The scheduled annual maintenance was performed on the analyzer following a shut-down calibration on July 18. The reaction cell, sample valve and manifold were cleaned. The sample pump was rebuilt. The sinter filters and O-rings were replaced. The UV lamp and High Voltage Power Supply were adjusted to optimize the analyzer's sensitivity. The analyzer was allowed time to stabilize overnight and a post-repair calibration was completed on July 19. Both the shut-down and post-repair calibration results met AMD's requirements. Fifteen hours of data are missing due to this event.

OZONE (O₃)

The routine monthly calibration was performed on July 20. One hour of data is missing on July 28 at hour 17:00 due to a power failure.

PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5)

The TEOM unit failed to recover from a thunderstorm induced power outage on July 3. A visit was made to the station on July 4 and it was discovered that the unit had an "unrecoverable error" message displayed on the screen. Troubleshooting/maintenance was performed to resolve the issue. A new cooler fan was installed and a successful post-repair audit was completed afterwards. Twenty hours of data are missing due to this issue. The second bi-monthly audit and annual maintenance were completed on July 20. The chiller and sample inlet heads were cleaned and the flows were calibrated. The inlet filter and FDMS filter were replaced during both audits. Data was corrected using Alberta Air Quality Guidelines. Data between 0 and -3 ug/m3, was corrected to 0 ug/m3. Data collected below -3 ug/m3 was invalidated. Fourteen hours of data were invalidated as the data was below -3 ug/m3 this month.

WIND SPEED (WS), WIND DIRECTION (WD) and STANDARD DEVIATION WIND DIRECTION (STDWD)

The wind system is reported as vector wind speed and vector wind direction. The wind direction data included in this report represents where the wind was coming from. One hour of maximum instantaneous data was discarded on July 18 at hour 07:00 as it was anomalous. An additional five hours of maximum instantaneous data were discarded due to brief power failures. One hour of hourly data was discarded on July 28 at hour 17:00 due to a power failure.

RELATIVE HUMIDITY (RH)

One hour of data is missing on July 28 at hour 17:00 due to a power failure.

BAROMETRIC PRESSURE (BP)

One hour of data is missing on July 28 at hour 17:00 due to a power failure.

PRECIPITATION

One hour of data is missing on July 28 at hour 17:00 due to a power failure.

AMBIENT TEMPERATURE (TPX)

One hour of data is missing on July 28 at hour 17:00 due to a power failure.

2.0 Project Personnel

Mike Bisaga was the contact for Lakeland Industry & Community Association and the Maxxam field sampling technician was Alexander Yakupov.

3.0 Plant Monthly Required AMD Summary

All data collected this month were within the objectives outlined in the AMD 2016.

The operational uptime for all analyzers and meteorological system were above the 90% requirement.

4.0 Calculations and Results

All calculations and reporting of results follow the methods described in the AMD, 2016.

5.0 Methods and Procedures

The following methods and procedures were used to complete the test program:

- Maxxam AIR SOP-00208: RM Young Monitor Calibration
- Maxxam AIR SOP-00209: Ambient H₂S Monitoring
- Maxxam AIR SOP-00211: Ambient SO₂ Monitoring
- Maxxam AIR SOP-00212: Ambient O₃ Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO₂/NO_x Monitoring
- Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring
- Maxxam AIR SOP-00215: Teom Operation
- Maxxam AIR SOP-00242: Precipitation Collector Installation /Maintenance

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

- Sulphur Dioxide - API 100E UV Fluorescent Analyzer
- Hydrogen Sulphide - API 101E UV Fluorescent Analyzer
- Total Hydrocarbons - Thermo 51C FID Analyzer
- Oxides of Nitrogen - API 200E Chemiluminescent Analyzer
- Ozone - Thermo 49i Photometric Analyzer
- Particulate Matter (PM_{2.5}) - R&P 1405F Teom Unit
- Wind System - Met One Unit
- Relative Humidity - Met One Unit
- Barometric Pressure - Met One Unit
- Ambient Temperature - Met One Unit
- Precipitation - Met One Unit
- Datalogger - ESC 8832

The following steps were used to complete the data verification and validation process:

Level 0 Preliminary Verification

Level 0 data are raw data obtained directly from the data acquisition system (DAS). Under the step of Level 0, these data undergo a certain amount of manual or automated screening and flagging. It included a) identification of periods of missing data; b) verification of time stamps against reference time; c) verification that instrument diagnostics/datalogger flags indicate normal operation; d) comparison of data to upper and lower limits; e) rate of change flagging indicating that data changed too rapidly or not at all; and f) verification that zero, span and multipoint performance checks are within specifications. This level of verification is performed on a daily basis.

Level 1 Primary Validation

Validation actions under the step of Level 1 include a) review of all screening flags assigned during preliminary verification; b) review of all supporting site information and documentation; c) review of operational acceptance limits for each parameter/analyzer; d) review of daily zero/span and monthly calibration results for all gaseous parameters; and e) application of any necessary adjustments to data (e.g. baseline adjustments, below zero adjustments). This level of validation is performed on a monthly basis.

Level 2 Final Validation

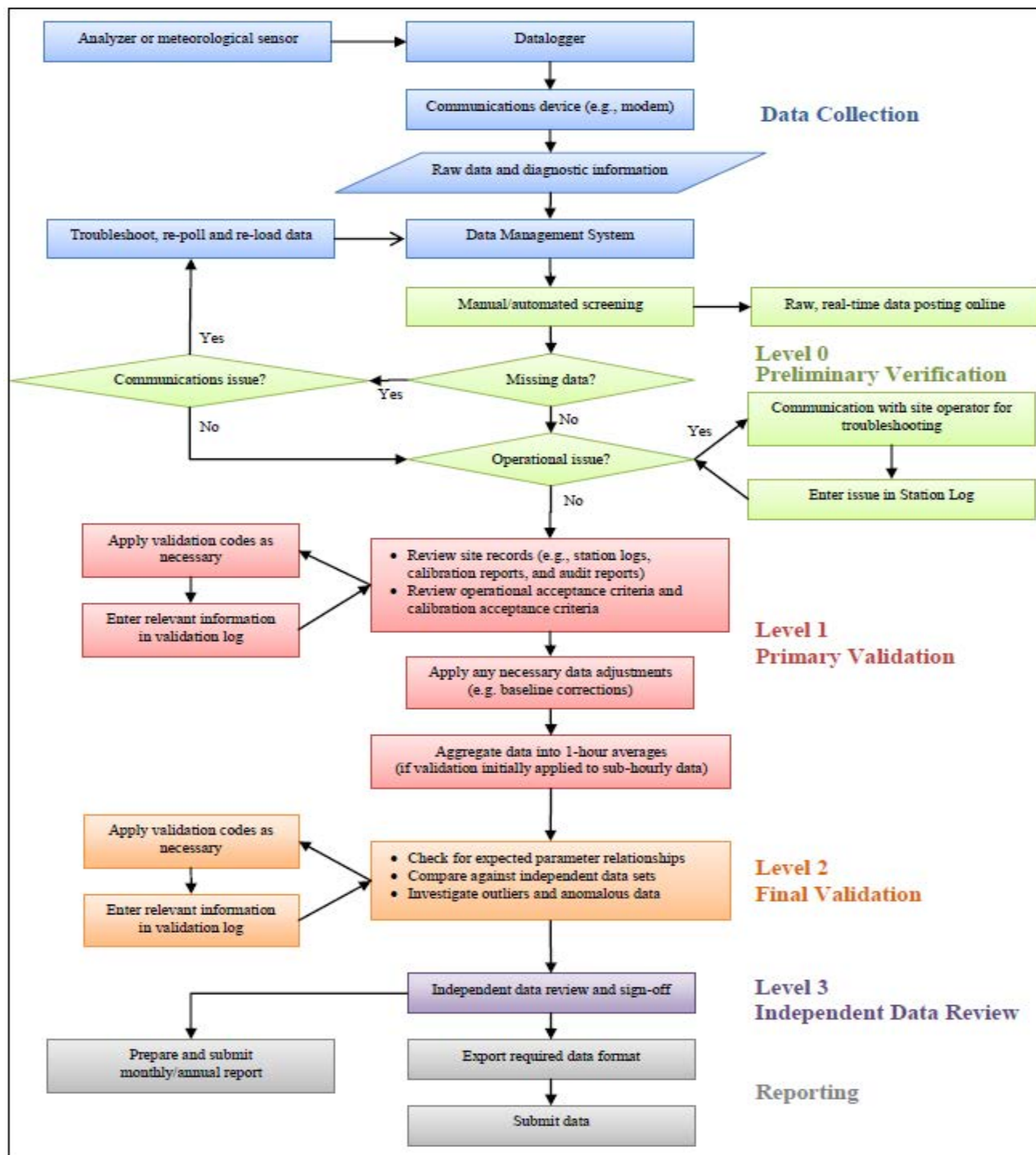
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

Level 3 Independent Data Review

Level 3 validation is the last step of data review, and it is completed by an individual that is independent of both field operations and primary data validation. A final independent QA review and endorsement is performed during this step before data is submitted to Alberta Environment.

Post-Final Validation

The Post-Final Validation step serves to re-evaluate the data that errors or omissions are discovered and/or suspected after the initial submittal of data. Any data issues or patterns which were not clear on a monthly basis are highlighted during this step. This validation is performed on an annual basis.



Source: Air Monitoring Directive (Aug 3, 2016), Chapter 6: Ambient Data Quality; Figure 1 Data Collection and Management Process Flow Chart

APPENDIX I
CONTINUOUS MONITORING DATA RESULTS

SULPHUR DIOXIDE

SULPHUR DIOXIDE (SO2) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.	
HOUR START	HOUR END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
DAY																														
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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
2		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
4		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	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
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	S	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
6		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	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
7		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	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
8		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	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
9		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	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
10		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	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
11		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	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
12		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
13		0.0	0.0	0.0	0.0	0.0	0.0	0.2	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	24
14		0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
15		0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
16		0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
17		0.0	0.0	0.0	S	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	24
18		0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
19		0.0	S	0.0	0.0	0.1	0.2	0.3	0.6	0.8	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	0.0	0.8	0.3	14
20		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	12	
21		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	24	
22		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	24	
23		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
24		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.3	2.2	0.6	0.5	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	2.2	0.2	24	
25		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
26		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
27		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.5	0.5	0.3	0.0	0.0	0.5	0.1	24	
28		0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	S	0.0	P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	23	
29		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	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
30		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	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
31		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	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
HOURLY MAX		0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.6	0.8	0.0	0.4	0.0	0.3	2.2	0.6	0.5	0.0	0.0	0.0	0.0	0.5	0.5	0.3	0.0					
HOURLY AVG		0.0	0.0	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					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

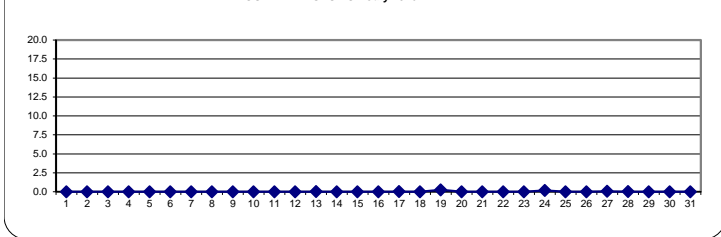
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	172	PPB	24-HR	48	PPB
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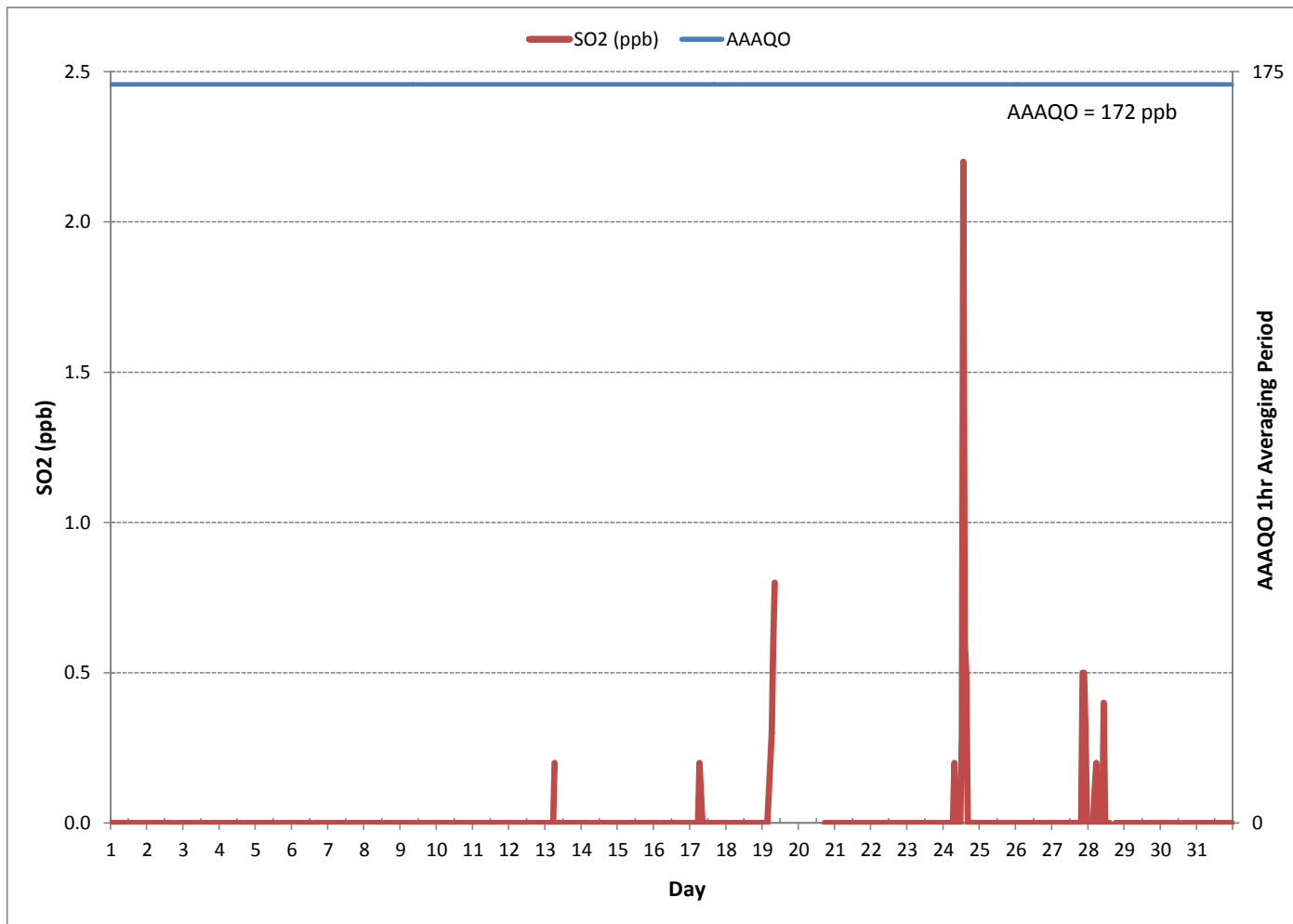
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDENCES:	0		
NUMBER OF 24-HR EXCEEDENCES:	0		
NUMBER OF NON-ZERO READINGS:	19		
MINIMUM 1-HR AVERAGE:	0.0 PPB @ HOUR(S) VAR ON DAY(S) ALL		
MAXIMUM 1-HR AVERAGE:	2.2 PPB @ HOUR(S) 13 ON DAY(S) 24		
MAXIMUM 24-HR AVERAGE:	0.3 PPB ON DAY(S) 19		
	VAR-VARIOUS		
IZS CALIBRATION TIME:	31 HRS	OPERATIONAL TIME:	721 HRS
MONTHLY CALIBRATION TIME:	10 HRS	AMD OPERATION UPTIME:	96.9 %
STANDARD DEVIATION:	0.11	MONTHLY AVERAGE:	0.0 PPB

24 HOUR AVERAGES FOR July 2016



SULPHUR DIOXIDE (SO2) hourly averages in ppb





SULPHUR DIOXIDE MAX instantaneous maximum in ppb

MST

HOUR START	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.	
HOUR END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
DAY 1	2.8	2.7	2.7	2.7	2.8	2.7	2.8	3.0	2.8	2.9	3.0	2.8	2.9	2.8	2.9	2.8	2.8	2.9	S	2.9	2.9	2.8	2.9	2.7	3.0	2.8	24		
2	3.0	2.9	2.9	3.2	3.2	3.1	3.1	P	2.9	2.8	3.1	3.1	3.1	3.1	3.2	3.2	3.2	3.2	S	3.3	3.3	3.3	3.4	3.4	2.8	3.4	3.1	23	
3	3.4	3.5	3.5	3.5	3.4	3.5	3.5	3.4	3.5	3.6	3.5	3.8	3.8	3.7	3.7	3.7	3.9	S	3.7	3.7	3.7	3.7	3.6	3.6	3.4	3.9	3.6	24	
4	3.5	3.5	3.3	3.5	3.4	3.7	3.7	3.7	3.6	3.5	3.4	3.6	3.4	3.5	3.5	3.3	S	3.4	3.7	3.4	3.5	3.7	3.7	3.6	3.3	3.7	3.5	24	
5	3.6	3.6	3.6	3.4	3.6	3.6	3.3	3.5	3.5	3.4	3.3	3.7	3.3	3.6	3.4	S	3.7	3.9	3.8	3.5	3.5	3.5	3.4	3.5	3.3	3.9	3.5	24	
6	3.4	3.5	3.4	3.5	3.3	3.3	3.3	3.2	3.4	3.6	3.4	3.5	3.5	3.4	S	P	3.4	3.5	3.5	3.5	3.5	3.5	3.5	3.6	3.2	3.6	3.4	23	
7	3.5	3.4	3.4	3.5	3.4	3.5	3.5	3.4	3.4	3.4	3.5	3.7	3.7	3.5	S	3.5	3.6	3.5	3.7	3.7	3.6	3.6	3.5	3.6	3.7	3.4	3.7	3.5	24
8	3.8	3.8	3.8	3.6	3.5	3.5	3.4	3.4	3.4	3.9	3.9	3.9	S	P	3.8	3.6	3.7	3.4	3.5	3.7	3.5	3.6	3.4	3.5	3.4	3.9	3.6	23	
9	3.7	3.5	3.7	3.7	3.7	3.8	3.8	3.8	3.7	3.7	3.8	S	3.8	3.8	3.8	3.6	3.7	3.7	3.6	3.8	3.7	3.6	3.7	3.7	3.5	3.8	3.7	24	
10	3.7	3.9	3.9	3.9	4.0	3.8	3.8	3.9	3.9	3.9	S	3.8	4.0	4.1	3.9	3.9	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.9	3.9	3.7	4.1	3.9	24
11	4.0	3.8	3.9	3.9	4.0	4.0	4.0	4.3	3.9	S	4.1	4.2	4.2	4.2	4.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.0	3.8	4.3	4.1	24	
12	3.9	4.0	4.0	4.0	4.0	4.0	4.2	4.1	S	3.9	4.1	4.0	4.1	4.1	4.3	4.2	4.2	4.1	4.1	3.9	3.8	3.8	3.8	3.8	3.8	4.3	4.0	24	
13	3.7	3.7	3.7	3.7	3.7	4.1	4.2	S	3.7	3.6	3.7	3.5	3.5	3.6	3.5	3.5	3.5	3.5	3.5	3.4	3.5	3.5	3.4	3.4	3.5	3.4	4.2	3.6	24
14	3.6	3.4	3.5	3.4	3.3	3.4	S	3.1	3.2	3.1	3.2	3.2	3.2	3.1	3.3	3.2	3.2	3.1	3.2	3.1	3.3	3.3	3.4	3.5	3.1	3.6	3.3	24	
15	3.3	3.3	3.4	3.3	3.4	S	3.1	3.3	3.4	3.4	3.5	3.3	3.2	3.3	3.5	3.4	3.7	3.7	3.6	3.7	3.7	3.7	3.6	3.6	3.1	3.7	3.5	24	
16	3.8	3.9	4.0	3.9	S	3.9	4.0	4.0	4.1	4.1	4.2	4.2	4.3	4.2	4.2	4.3	4.1	4.3	4.3	4.3	4.2	4.1	4.3	4.2	3.8	4.3	4.1	24	
17	4.0	4.1	4.2	S	4.4	4.7	4.9	4.8	4.6	4.2	4.3	4.1	4.0	4.2	4.1	4.0	4.1	4.3	4.2	4.1	4.3	4.2	4.1	4.4	4.5	4.0	4.9	4.3	24
18	4.1	3.9	S	4.1	4.1	4.1	4.2	4.1	4.1	4.0	4.0	4.3	4.2	4.5	4.6	4.5	4.5	4.5	4.5	4.5	5.0	5.0	5.0	4.7	3.9	5.0	4.4	24	
19	4.6	S	4.5	4.5	4.7	4.5	4.7	4.7	C	C	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	4.5	4.7	4.6	14	
20	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	1.7	1.4	1.5	1.5	1.5	S	1.4	1.7	1.5	12	
21	1.2	1.3	1.2	1.2	1.2	1.6	1.4	1.6	1.3	1.6	1.5	1.5	1.5	1.5	1.4	1.1	1.1	1.2	1.2	1.3	1.0	1.2	S	1.0	1.0	1.6	1.3	24	
22	1.0	1.0	1.0	1.0	0.9	1.0	1.2	1.2	1.2	1.7	1.5	1.8	1.2	1.5	1.2	1.6	1.6	1.6	1.8	1.9	1.4	S	1.5	1.3	0.9	1.9	1.4	24	
23	1.4	1.3	1.4	1.3	1.3	1.5	1.5	1.3	1.5	1.6	1.5	1.5	1.4	1.5	1.5	1.5	1.5	1.5	1.4	1.5	S	1.3	1.3	1.2	1.2	1.6	1.4	24	
24	1.3	1.2	1.2	1.2	1.2	1.5	1.4	2.6	2.2	1.7	1.6	1.7	3.5	4.7	3.5	2.8	2.4	1.7	1.6	S	1.5	1.5	1.3	1.5	1.2	4.7	1.9	24	
25	1.5	1.2	1.2	1.2	1.3	1.2	1.2	1.3	1.3	1.0	1.0	1.1	1.0	1.2	1.2	1.1	1.0	1.2	S	1.1	1.2	1.1	1.1	1.2	1.0	1.5	1.2	24	
26	1.2	1.0	1.1	1.0	1.2	0.9	0.9	1.1	0.9	1.0	1.2	1.2	1.3	1.3	1.3	1.3	1.3	S	1.2	P	1.2	1.2	1.2	1.0	0.9	1.3	1.1	23	
27	0.9	1.0	1.0	1.2	1.0	1.0	1.0	1.5	1.7	1.5	1.3	1.2	1.3	1.3	1.3	1.3	S	1.3	1.4	1.7	2.5	2.5	2.1	1.9	0.9	2.5	1.4	24	
28	1.7	1.7	1.5	1.9	2.1	2.1	1.8	1.6	1.5	2.0	2.3	1.8	1.3	1.2	1.5	S	1.2	P	1.5	1.3	1.2	1.3	1.4	1.3	1.2	2.3	1.6	23	
29	1.2	1.2	1.2	1.2	1.7	1.4	1.5	2.1	2.1	2.1	1.9	2.0	1.7	1.7	S	2.0	2.1	2.3	2.1	2.1	1.8	1.9	2.0	2.1	1.2	2.3	1.8	24	
30	2.2	2.2	2.1	2.1	2.1	2.2	2.1	1.9	2.2	2.1	2.3	2.2	2.1	S	2.2	2.1	2.3	2.1	2.1	2.1	2.1	2.1	2.0	2.2	2.1	1.9	2.3	2.1	24
31	2.0	2.1	2.0	2.2	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	S	2.0	2.1	2.2	2.1	2.1	2.2	2.1	2.3	1.9	2.1	1.9	1.9	2.3	2.1	24	
HOURLY MAX	4.6	4.1	4.5	4.5	4.7	4.7	4.9	4.8	4.6	4.2	4.3	4.3	4.3	4.7	4.6	4.5	4.5	4.5	4.5	4.5	5.0	5.0	5.0	4.7					
HOURLY AVG	2.8	2.7	2.8	2.8	2.8	2.9	2.9	2.9	2.8	2.8	2.9	2.9	2.9	3.0	3.0	2.9	3.0	3.0	2.9	3.0	2.9	2.9	2.9	2.9					

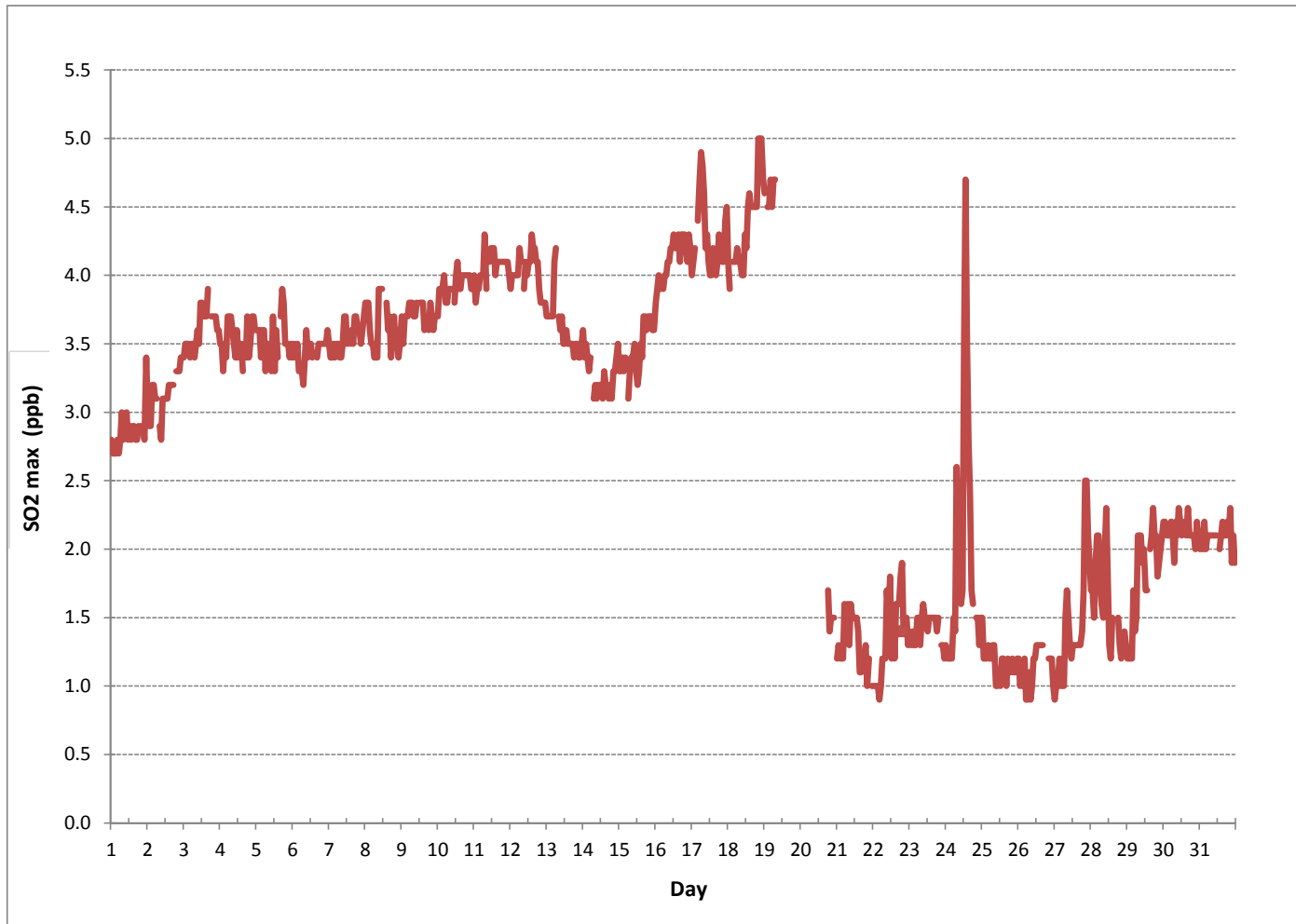
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

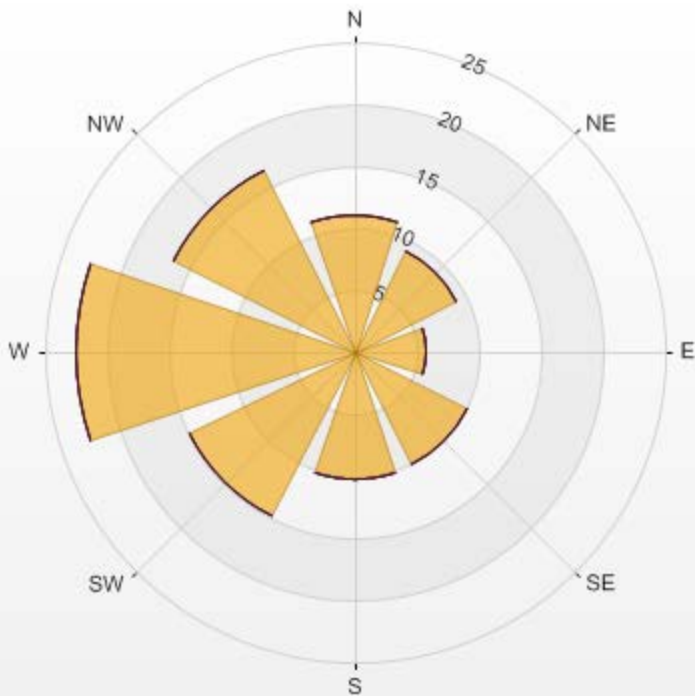
NUMBER OF NON-ZERO READINGS:	674
MAXIMUM INSTANTANEOUS VALUE:	5.0 PPB @ HOUR(S) VAR ON DAY(S) 18
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 HRS
MONTHLY CALIBRATION TIME:	12 HRS
STANDARD DEVIATION:	1.12
OPERATIONAL TIME:	717 HRS

SULPHUR DIOXIDE MAX instantaneous maximum in ppb



Wind: LICA ST. LINA Monitor: SO2 [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 91.40% Calm Avg: 0.00

Direction	0.0-20.0	20.0-60.0	60.0-110.0	110.0-170.0	170.0-340.0	>340.0	Total
N	11.03	0	0	0	0	0	11.03
NE	9.12	0	0	0	0	0	9.12
E	5.88	0	0	0	0	0	5.88
SE	10	0	0	0	0	0	10
S	10.29	0	0	0	0	0	10.29
SW	14.85	0	0	0	0	0	14.85
W	22.5	0	0	0	0	0	22.5
NW	16.32	0	0	0	0	0	16.32
Summary	100	0	0	0	0	0	100



% Icon Classes (ppb)	100	0.0-20.0	0	20.0-60.0	0	60.0-110.0	0	110.0-170.0	0	170.0-340.0	0	>340.0
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SO2[ppb] Calibration: LICA ST. LINA Monthly: 07/2016 Type: Span



■ Span Meas
 — Span Ref
 — Span Low
 — Span High

HYDROGEN SULPHIDE



HYDROGEN SULPHIDE (H2S) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
DAY	HR	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.	
1	1	0.0	0.0	0.5	0.4	0.0	0.0	0.8	2.1	1.1	0.9	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	2.1	0.3	24	
1	2	0.0	0.0	0.0	0.1	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24
1	3	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24
1	4	0.3	0.0	0.1	2.3	0.9	0.3	0.5	0.6	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.2	24
1	5	0.0	0.1	0.1	0.2	0.5	0.3	0.3	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	24
1	6	0.0	0.0	0.0	0.0	0.2	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	24
1	7	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	24	
1	8	0.0	0.2	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	0.3	0.0	24
1	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
1	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
1	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
1	12	0.0	0.0	0.2	0.4	0.6	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.6	0.1	24	
1	13	0.0	0.0	0.0	0.3	0.4	0.4	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	0.4	0.1	24	
1	14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
1	15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	24	
1	16	0.0	0.0	0.0	1.7	0.0	1.9	1.2	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	1.9	0.2	24	
1	17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
1	18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	24	
1	19	0.0	0.0	0.1	0.7	1.1	1.3	1.3	1.4	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.8	13	
1	20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
1	21	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	24	
1	22	0.0	0.0	0.3	2.4	1.6	0.8	1.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	2.4	0.3	24	
1	23	0.1	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	0.0	0.0	0.1	0.0	0.1	0.0	24
1	24	0.9	0.9	0.1	0.7	1.5	2.0	1.6	2.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	2.2	0.5	24	
1	25	0.0	0.0	0.0	0.0	0.5	0.5	0.7	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	0.7	0.1	24	
1	26	0.4	0.6	1.0	1.0	0.6	0.4	0.4	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	1.0	0.2	24	
1	27	0.1	0.2	0.3	0.4	0.9	1.2	1.3	1.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	1.6	0.3	24	
1	28	0.3	0.9	1.3	1.8	1.1	1.6	1.6	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.4	23	
1	29	0.1	0.0	0.3	1.2	0.7	0.9	0.9	0.7	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	0.0	1.2	0.3	24	
1	30	1.3	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.1	24	
1	31	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	24	
HOURLY MAX		1.3	1.6	1.3	2.4	1.6	2.0	1.6	2.2	1.1	0.9	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8					
HOURLY AVG		0.1	0.2	0.1	0.5	0.4	0.4	0.5	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

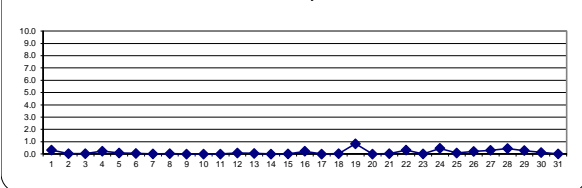
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	10	PPB	24-HR	3	PPB
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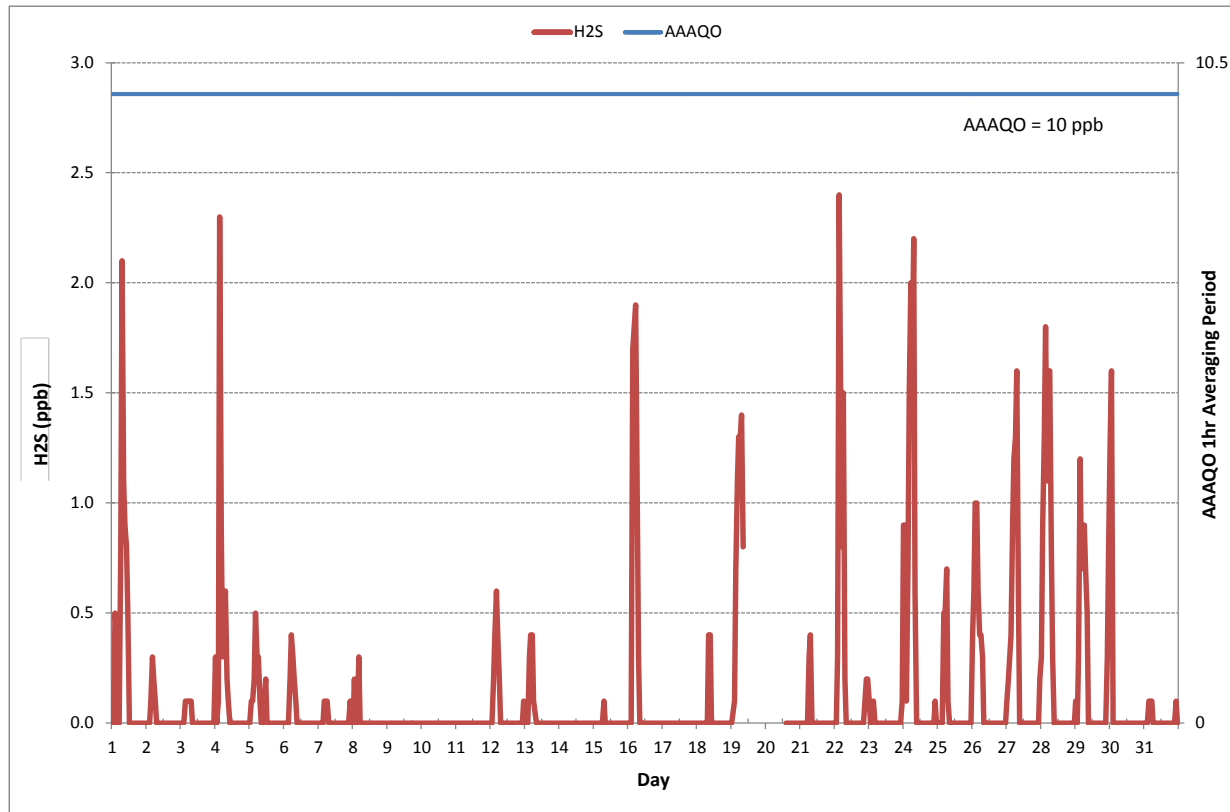
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDENCES:	0						
NUMBER OF 24-HR EXCEEDENCES:	0						
NUMBER OF NON-ZERO READINGS:	141						
MINIMUM 1-HR AVERAGE:	0.0	PPB	@ HOUR(S)	VAR	ON DAY(S)	ALL	
MAXIMUM 1-HR AVERAGE:	2.4	PPB	@ HOUR(S)	3	ON DAY(S)	22	
MAXIMUM 24-HR AVERAGE:	0.8	PPB				ON DAY(S)	19
VAR-VARIOUS							
IZS CALIBRATION TIME:	31	HRS	OPERATIONAL TIME:			723	HRS
MONTHLY CALIBRATION TIME:	9	HRS	AMD OPERATION UPTIME:			97.2	%
STANDARD DEVIATION:	0.35	MONTHLY AVERAGE:			0.1	PPB	

24 HOUR AVERAGES FOR July 2016



HYDROGEN SULPHIDE (H2S) hourly averages in ppb





HYDROGEN SULPHIDE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
		0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.	
DAY																														
1		0.7	0.8	1.8	1.7	0.9	1.2	2.7	3.4	2.4	2.1	2.2	1.5	1.2	0.8	0.8	0.8	0.8	0.9	0.9	S	0.9	1.0	1.0	1.1	0.7	3.4	1.4	24	
2		1.0	1.0	1.1	1.1	1.4	1.3	1.2	P	1.1	1.0	1.1	1.1	1.0	0.9	0.9	0.9	1.0	0.9	S	0.9	1.1	1.0	1.0	1.1	0.9	1.4	1.1	23	
3		1.1	1.2	1.2	1.3	1.3	1.3	1.5	1.7	1.1	1.2	1.1	1.2	1.2	1.1	1.3	1.4	1.2	S	1.1	1.1	1.2	1.2	1.2	1.4	1.1	1.7	1.2	24	
4		1.8	1.7	1.7	5.6	3.9	1.6	1.9	1.9	1.6	1.4	1.2	1.0	1.0	1.1	1.0	1.0	S	1.0	1.0	0.9	1.0	1.0	1.2	1.2	0.9	5.6	1.6	24	
5		1.2	1.2	1.3	1.4	2.1	1.6	1.5	1.3	1.1	1.1	1.3	1.3	1.2	1.1	1.0	S	0.9	1.0	1.0	1.1	1.1	1.1	1.0	1.0	0.9	2.1	1.2	24	
6		1.1	1.2	1.2	1.3	1.6	1.6	1.5	1.4	1.3	1.1	1.1	1.1	1.0	0.9	S	P	1.0	1.0	1.0	1.0	1.3	1.1	1.2	1.2	0.9	1.6	1.2	23	
7		1.2	1.3	1.2	1.4	1.5	1.5	1.4	1.3	1.1	1.0	1.0	1.1	1.1	S	1.1	1.0	1.0	1.0	1.0	1.1	1.0	1.1	1.2	1.7	1.3	1.0	1.7	1.2	24
8		2.1	2.2	1.4	1.1	2.2	1.3	1.4	1.2	1.2	1.3	1.3	1.2	S	P	1.1	1.1	1.1	1.0	1.0	1.1	1.1	1.1	1.1	1.0	1.0	2.2	1.3	23	
9		1.1	0.9	1.1	1.0	1.1	1.0	1.0	1.1	1.0	1.1	0.9	S	0.9	1.0	0.9	0.9	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.1	0.9	1.1	1.0	24	
10		1.2	1.1	1.2	1.3	1.4	1.3	1.3	1.3	1.3	1.3	S	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.2	1.2	1.0	1.4	1.2	24	
11		1.2	1.2	1.2	1.1	1.1	1.2	1.2	1.1	1.2	S	1.1	1.1	1.2	1.2	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.1	1.3	1.2	24	
12		1.4	1.2	1.7	1.9	2.0	1.8	1.6	1.2	S	1.1	1.2	1.2	1.1	1.0	1.0	1.1	1.2	1.0	1.0	1.1	1.1	1.2	1.2	1.2	1.0	2.0	1.3	24	
13		1.2	1.1	1.2	1.5	1.6	1.8	1.5	S	0.9	0.9	0.8	0.8	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.8	0.9	0.9	1.0	0.8	1.8	1.0	24
14		0.9	1.0	0.9	0.9	0.8	0.9	S	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.7	0.7	0.8	0.8	0.7	0.7	0.6	0.8	0.6	1.0	0.8	24	
15		0.8	0.8	0.8	0.8	0.7	S	0.9	1.3	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.9	0.9	0.9	1.1	1.1	1.1	0.7	1.3	0.9	24	
16		1.1	1.2	1.1	3.6	S	3.3	2.7	1.7	1.6	1.3	1.2	1.1	1.1	1.0	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.2	1.3	1.3	1.0	3.6	1.5	24	
17		1.3	1.4	1.3	S	1.3	1.3	1.1	1.1	1.0	0.9	1.0	0.9	0.9	0.9	1.0	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	1.4	1.0	24	
18		1.0	0.9	S	0.9	0.9	1.0	1.2	1.3	2.0	2.0	1.0	1.0	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.2	1.2	1.3	1.2	1.4	0.9	2.0	1.2	24	
19		1.2	S	1.4	2.3	2.2	2.5	2.3	2.3	C	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1.2	2.5	2.0	13	
20		Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.4	0.4	S	0.4	0.6	0.5	15	
21		0.4	0.4	0.5	0.8	0.3	0.6	1.6	1.5	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	S	0.1	0.0	1.6	0.4	24	
22		0.2	0.2	2.2	3.9	2.8	1.8	2.1	1.1	0.4	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.2	0.0	S	0.6	0.6	0.0	3.9	0.7	24	
23		0.4	0.1	0.3	0.3	0.2	0.2	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.4	0.4	0.0	0.4	0.1	24	
24		1.6	1.2	0.7	1.4	1.9	2.6	2.2	2.8	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.2	0.3	0.0	0.0	2.8	0.7	24	
25		0.0	0.0	0.1	0.1	0.8	0.6	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.1	24	
26		0.7	0.4	0.9	0.9	0.6	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	P	0.0	0.0	0.0	0.0	0.0	0.9	0.2	23	
27		0.0	0.0	0.2	0.4	0.9	1.2	1.4	1.5	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.5	0.3	24	
28		0.8	1.0	1.2	2.0	2.3	1.6	2.1	0.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.6	23	
29		0.0	0.0	1.0	2.8	0.6	1.1	1.0	0.9	0.6	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.4	0.0	2.8	0.4	24	
30		1.8	1.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.2	24	
31		0.0	0.0	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.3	0.1	24	
HOURLY MAX		2.1	2.2	2.2	5.6	3.9	3.3	2.7	3.4	2.4	2.1	2.2	1.5	1.2	1.2	1.3	1.4	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.7	1.4				
HOURLY AVG		1.0	0.9	1.0	1.5	1.3	1.3	1.4	1.2	0.9	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8				

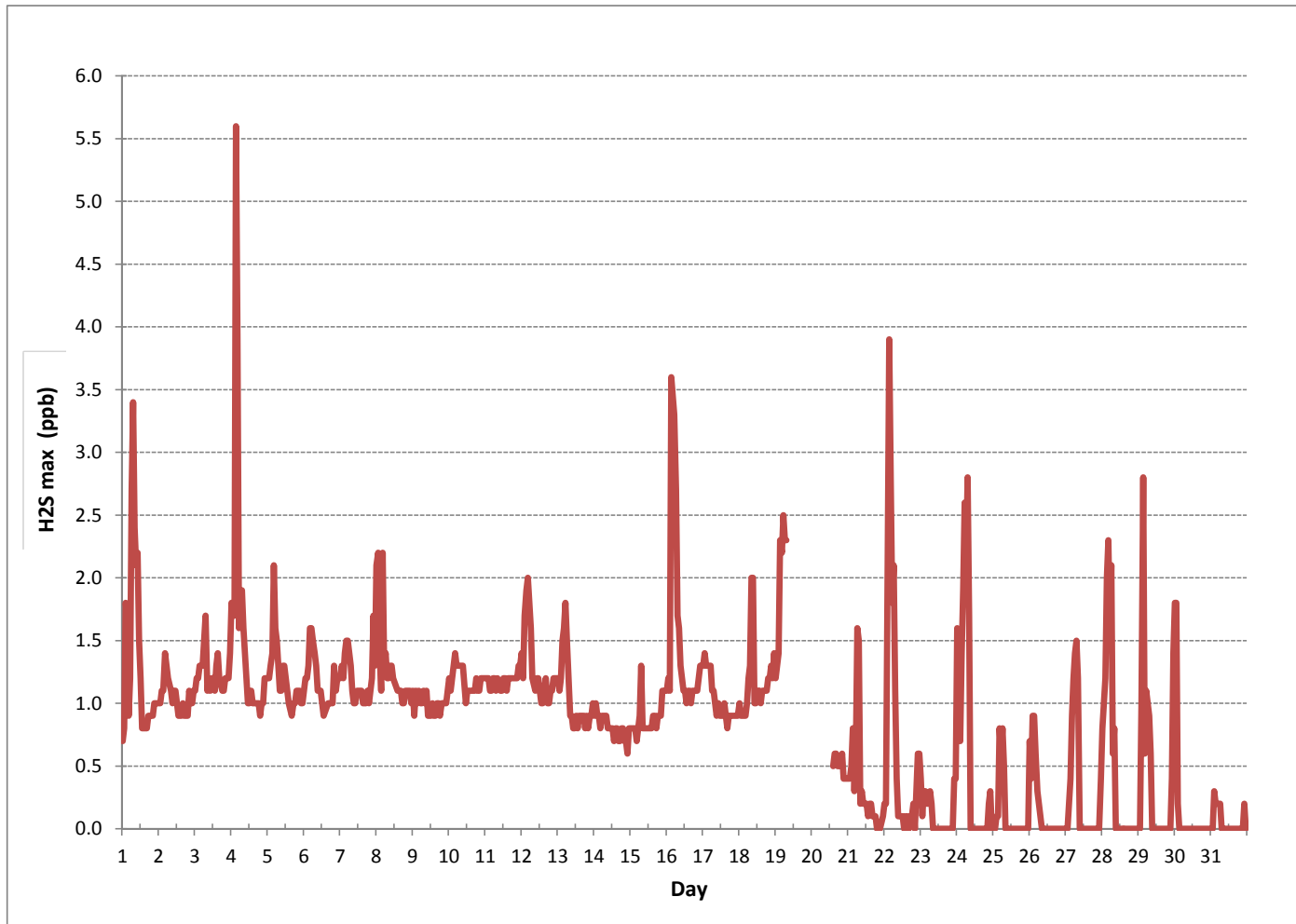
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	537
MAXIMUM INSTANTANEOUS VALUE:	5.6 PPB @ HOUR(S) 3 ON DAY(S) 4
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 HRS
MONTHLY CALIBRATION TIME:	10 HRS
STANDARD DEVIATION:	0.67
OPERATIONAL TIME:	719 HRS

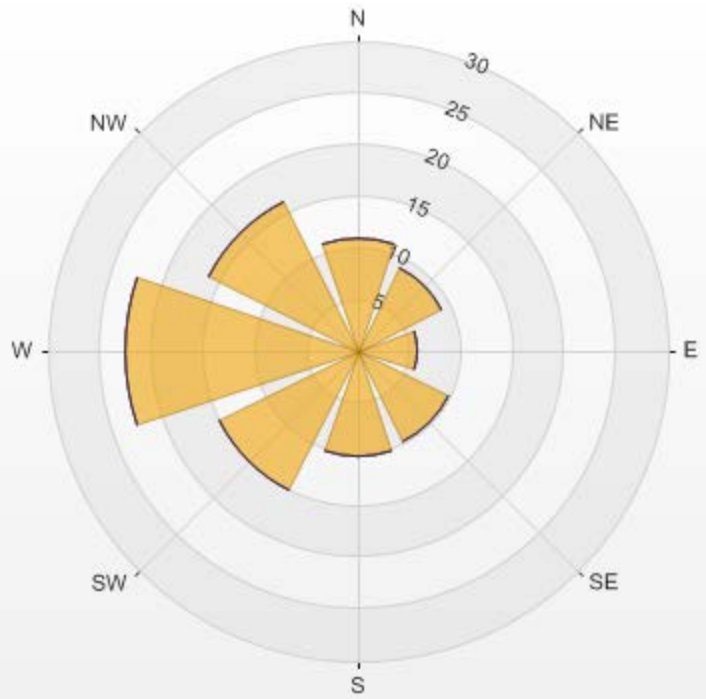
HYDROGEN SULPHIDE MAX instantaneous maximum in ppb



Wind: LICA ST. LINA Monitor: H2S [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 91.80% Calm Avg: 0.00

Direction	0.0-3.0	3.0-10.0	10.0-50.0	>50.0	Total
N	10.98	0	0	0	10.98
NE	9.08	0	0	0	9.08
E	5.86	0	0	0	5.86
SE	9.96	0	0	0	9.96
S	10.25	0	0	0	10.25
SW	15.08	0	0	0	15.08
W	22.55	0	0	0	22.55
NW	16.25	0	0	0	16.25
Summary	100	0	0	0	100

0



% Icon Classes (ppb)	100	0.0-3.0	0	3.0-10.0	0	10.0-50.0	0	>50.0
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H2S[ppb] Calibration: LICA ST. LINA Monthly: 07/2016 Type: Span



Span Meas Span Ref Span Low Span High

TOTAL HYDROCARBON



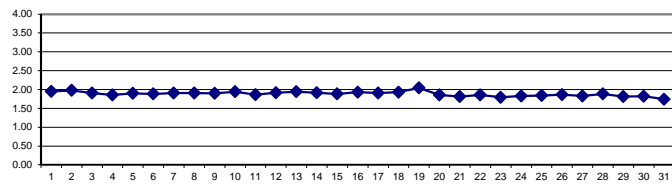
TOTAL HYDROCARBONS (THC) hourly averages in ppm

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
HOURLY MAX	HOURLY AVG	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.	
DAY																														
1		1.93	1.92	1.91	1.93	1.90	2.03	2.24	2.16	2.12	2.11	2.00	1.96	1.85	1.83	1.85	1.84	1.87	1.86	1.83	S	1.87	1.90	1.94	1.97	1.83	2.24	1.95	24	
2		2.01	2.08	2.13	2.15	2.22	2.22	2.04	1.99	1.88	1.89	1.90	1.89	1.89	1.88	1.88	1.87	1.88	1.87	S	1.85	1.93	1.96	2.01	2.06	1.85	2.22	1.98	24	
3		2.01	2.00	2.06	2.07	2.07	2.06	2.07	1.83	1.89	1.91	1.84	1.88	1.83	1.81	1.80	1.83	1.83	S	1.81	1.85	1.84	1.83	1.84	1.79	1.79	2.07	1.90	24	
4		1.80	1.80	1.81	1.84	1.85	1.86	1.87	1.85	1.82	1.86	1.86	1.85	1.85	1.84	1.85	1.85	S	1.84	1.84	1.86	2.02	1.88	1.90	1.93	1.80	2.02	1.86	24	
5		1.91	1.92	1.95	1.94	1.95	1.92	1.91	1.80	1.77	1.81	1.85	1.86	1.86	2.13	1.96	S	1.87	1.88	1.90	1.91	1.92	1.85	1.83	1.92	1.77	2.13	1.90	24	
6		1.97	1.93	2.10	1.95	2.05	1.91	1.83	1.93	1.91	1.87	1.90	1.85	1.82	1.82	S	1.83	1.88	1.83	1.83	1.83	1.85	1.83	1.80	1.80	1.80	2.10	1.88	24	
7		1.84	1.88	2.13	1.92	2.00	2.02	1.96	1.97	1.89	1.92	1.88	1.85	1.86	S	1.82	1.84	1.83	1.84	1.98	1.83	1.92	1.86	1.89	1.85	1.82	2.13	1.90	24	
8		1.85	1.98	1.81	1.73	1.92	1.78	2.01	2.03	1.99	2.02	1.97	1.91	S	1.90	1.84	1.82	1.84	1.88	1.85	1.88	1.93	1.91	1.92	2.00	1.73	2.03	1.90	24	
9		2.11	2.09	2.14	2.00	1.92	1.83	1.91	1.92	1.85	1.84	1.90	S	1.84	1.83	1.81	1.80	1.80	1.81	1.79	1.82	1.83	1.93	1.95	1.98	1.79	2.14	1.90	24	
10		2.03	2.16	2.12	2.00	2.04	2.09	2.23	2.14	2.02	1.95	S	1.81	1.79	1.81	1.80	1.80	1.81	1.80	1.82	1.86	1.85	1.88	1.89	1.90	1.79	2.23	1.94	24	
11		1.85	1.85	1.84	1.82	1.88	1.87	1.87	1.87	1.88	S	1.83	1.80	1.83	1.85	1.81	1.84	1.84	1.87	1.85	1.92	1.90	1.94	1.92	1.90	1.80	1.94	1.86	24	
12		1.86	1.88	1.97	1.98	2.01	2.01	1.98	1.93	S	1.88	1.82	1.82	1.83	1.85	1.83	1.83	1.84	1.84	1.85	1.97	1.98	1.97	2.07	1.98	1.82	2.07	1.91	24	
13		1.98	1.92	2.08	2.08	1.90	1.95	1.87	S	1.88	1.86	1.87	1.87	1.87	1.85	1.87	1.90	1.91	1.95	2.05	2.02	1.98	2.20	1.97	1.85	2.20	1.94	24		
14		1.96	1.93	1.92	1.94	1.97	1.90	S	1.93	1.98	1.94	1.94	1.90	1.89	1.88	1.88	1.88	1.85	1.87	1.90	1.90	1.94	1.89	1.86	1.85	1.98	1.91	24		
15		1.87	1.89	1.88	1.86	1.82	S	1.93	1.97	1.92	1.89	1.90	1.86	1.83	1.84	1.84	1.84	1.87	1.85	1.89	1.91	1.88	1.90	1.88	1.95	1.82	1.97	1.88	24	
16		1.88	1.96	2.01	2.11	S	2.11	2.00	1.96	1.99	1.92	1.90	1.86	1.84	1.84	1.85	1.88	1.87	1.87	1.89	1.83	1.93	1.94	1.97	1.95	1.83	2.11	1.93	24	
17		1.91	1.97	1.87	S	1.91	1.93	1.92	1.92	1.90	1.89	1.90	1.88	1.88	1.86	1.88	1.87	1.87	1.88	1.88	1.91	1.94	1.95	1.91	2.00	1.86	2.00	1.91	24	
18		1.96	1.90	S	1.93	1.93	1.96	2.14	2.24	2.08	1.96	1.89	1.86	1.87	1.84	1.81	1.80	1.78	2.15	1.77	1.81	1.93	1.92	1.93	1.94	1.77	2.24	1.93	24	
19		2.00	S	2.15	2.27	2.26	2.28	2.28	2.17	1.97	1.86	1.82	1.75	1.73	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	1.73	2.28	2.05	16	
20		Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	1.89	1.86	1.85	1.83	1.86	1.88	1.88	1.86	1.84	1.83	S	1.83	1.89	1.86	15	
21		1.82	1.83	1.83	1.83	1.82	1.82	1.85	1.82	1.80	1.80	1.78	1.78	1.78	1.77	1.80	1.81	1.78	1.81	1.81	1.82	1.81	1.90	S	1.87	1.77	1.90	1.81	24	
22		1.94	2.03	2.01	1.86	1.85	2.01	1.97	1.86	1.86	1.83	1.81	1.81	1.80	1.81	1.80	1.79	1.79	1.77	1.78	1.81	1.82	S	1.82	1.79	1.77	2.03	1.85	24	
23		1.80	1.78	1.79	1.79	1.78	1.81	1.85	1.89	1.82	1.78	1.77	1.77	1.75	1.76	1.76	1.75	1.77	1.79	1.80	1.84	S	1.80	1.78	1.82	1.75	1.89	1.79	24	
24		1.84	1.82	1.87	1.89	1.87	1.93	1.99	2.00	1.94	1.81	1.77	1.79	1.77	1.76	1.75	1.73	1.76	1.81	S	1.78	1.83	1.78	1.78	1.73	2.00	1.83	24		
25		1.79	1.90	1.92	1.88	1.89	1.85	1.96	1.94	1.87	1.83	1.82	1.80	1.79	1.79	1.81	1.80	1.78	1.81	S	1.76	1.87	1.81	1.82	1.83	1.76	1.96	1.84	24	
26		1.90	1.92	1.95	1.96	1.96	2.01	2.05	2.13	2.08	1.90	1.79	1.75	1.77	1.86	1.87	1.78	1.74	S	1.74	1.60	1.76	1.76	1.78	1.76	1.60	2.13	1.86	24	
27		1.78	1.75	1.77	1.82	1.85	1.91	1.94	1.91	1.87	1.88	1.84	1.79	1.78	1.75	1.76	1.76	S	1.76	1.81	1.81	1.84	1.89	1.87	1.92	1.75	1.94	1.83	24	
28		1.93	1.97	2.04	1.97	1.93	2.05	2.17	2.11	2.04	1.95	1.85	1.80	1.75	1.74	1.71	S	1.70	P	R	1.78	1.78	1.78	1.75	1.74	1.70	2.17	1.88	22	
29		1.73	1.74	1.75	1.80	1.80	1.74	1.80	1.89	1.90	1.88	1.84	1.81	1.78	1.75	S	1.71	1.75	1.76	1.76	1.78	1.83	1.88	1.97	2.01	1.71	2.01	1.81	24	
30		2.02	2.03	1.86	1.81	1.80	1.99	1.85	1.83	1.79	1.81	1.82	1.90	1.85	S	1.72	1.69	1.70	1.69	1.72	1.77	1.84	1.80	1.80	1.80	1.69	2.03	1.82	24	
31		1.78	1.76	1.76	1.75	1.81	1.80	1.78	1.76	1.73	1.73	1.72	1.73	S	1.71	1.71	1.73	1.72	1.72	1.72	1.71	1.71	1.75	1.75	1.75	1.71	1.81	1.74	24	
HOURLY MAX		2.11	2.16	2.15	2.27	2.26	2.28	2.28	2.24	2.12	2.11	2.00	1.96	1.90	2.13	1.96	1.88	1.90	2.15	1.98	2.05	2.02	1.98	2.20	2.06					
HOURLY AVG		1.90	1.92	1.95	1.93	1.93	1.95	1.97	1.96	1.91	1.88	1.85	1.83	1.82	1.83	1.82	1.81	1.81	1.84	1.83	1.84	1.87	1.88	1.89	1.89					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

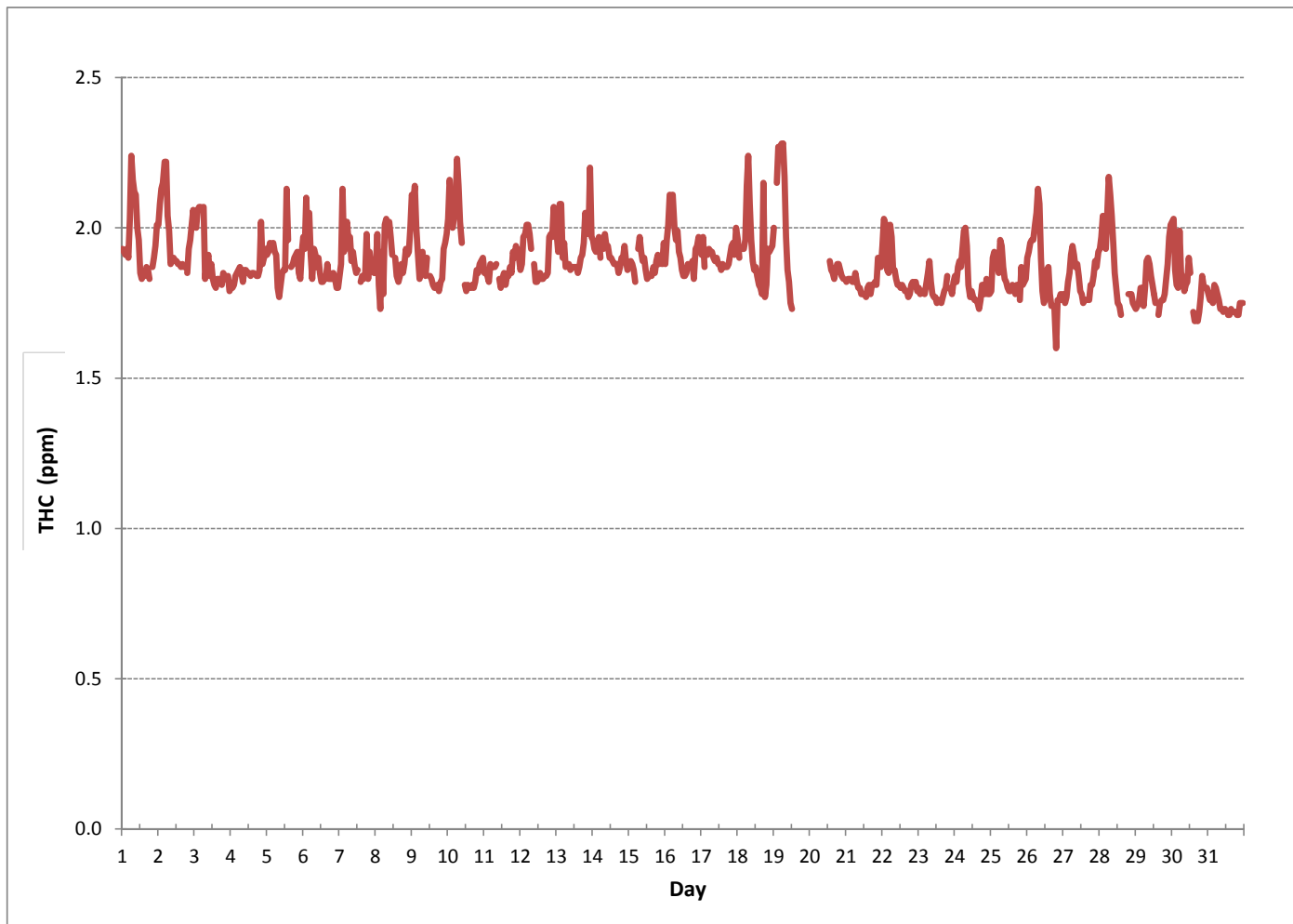
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	687				
MINIMUM 1-HR AVERAGE:	1.60	PPM @ HOUR(S)	19	ON DAY(S)	26
MAXIMUM 1-HR AVERAGE:	2.28	PPM @ HOUR(S)	5 , 6	ON DAY(S)	19 , 19
MAXIMUM 24-HR AVERAGE:	2.05	PPM		ON DAY(S)	19
				VAR-VARIOUS	
IZS CALIBRATION TIME:	31	HRS	OPERATIONAL TIME:	725.00	HRS
MONTHLY CALIBRATION TIME:	7	HRS	AMD OPERATION UPTIME:	97.4	%
STANDARD DEVIATION:	0.10		MONTHLY AVERAGE:	1.88	PPM

TOTAL HYDROCARBONS (THC) hourly averages in ppm





TOTAL HYDROCARBONS MAX instantaneous maximum in ppm

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
DAY	MIN.	MAX.	AVG.	RDGS.																									
1	3.32	2.33	2.58	2.11	1.99	2.80	2.35	2.24	2.17	2.18	2.09	2.02	1.95	1.88	1.89	1.89	1.91	1.92	1.88	S	1.91	1.95	1.99	2.01	1.88	3.32	2.15	24	
2	2.06	2.14	2.15	2.26	2.29	2.32	2.38	P	1.91	1.92	1.91	1.91	1.89	1.89	1.89	1.88	1.89	1.86	S	1.91	1.95	1.97	2.03	2.05	1.86	2.38	2.02	23	
3	2.01	1.99	2.05	2.05	2.05	2.04	2.08	1.85	1.91	1.89	1.83	1.86	1.80	1.98	1.85	1.92	2.11	S	1.83	1.89	1.93	1.89	1.98	1.74	1.74	2.11	1.94	24	
4	1.76	1.77	1.76	1.83	1.83	1.86	1.94	2.23	1.88	1.89	1.90	1.88	1.86	1.89	1.86	1.83	S	1.94	1.80	2.05	2.51	2.04	1.88	2.38	1.76	2.51	1.94	24	
5	1.88	1.89	2.03	2.05	2.26	2.14	2.00	1.86	1.77	1.86	1.91	1.89	1.89	6.63	2.48	S	2.03	2.01	2.18	2.23	2.25	2.05	1.82	3.14	1.77	6.63	2.27	24	
6	3.76	2.69	3.01	2.66	2.85	2.53	1.89	2.29	2.64	2.39	2.35	2.03	1.83	2.09	S	P	2.54	1.97	1.82	1.83	1.83	1.83	1.83	1.79	1.80	1.79	3.76	2.29	23
7	1.83	2.55	4.00	2.50	3.79	3.17	2.02	2.30	1.92	1.95	1.97	1.83	1.88	S	1.80	1.99	1.83	2.06	4.30	1.89	5.21	1.89	2.21	1.86	1.80	5.21	2.47	24	
8	2.26	2.14	1.95	1.93	2.04	1.81	2.11	2.12	1.99	2.08	2.08	1.92	S	P	1.88	1.83	2.44	2.08	2.17	3.00	2.61	2.15	2.14	2.14	1.81	3.00	2.13	23	
9	2.14	2.35	2.24	2.32	2.14	1.86	1.94	2.01	1.88	1.86	1.92	S	1.86	1.85	1.82	1.80	1.82	1.83	1.80	1.83	1.86	1.95	2.01	2.02	1.80	2.35	1.96	24	
10	2.08	2.20	2.17	2.14	2.08	3.51	5.82	2.15	2.11	2.01	S	1.85	1.79	1.80	1.80	1.80	1.82	1.80	2.15	1.89	1.85	1.89	1.91	1.92	1.79	5.82	2.20	24	
11	1.85	1.85	1.85	1.83	1.86	1.89	1.88	1.88	1.88	S	2.24	1.80	2.02	2.03	2.01	2.61	2.54	2.60	2.47	2.29	2.11	2.12	2.18	2.08	1.80	2.61	2.08	24	
12	1.97	2.22	2.42	2.35	2.38	2.51	2.21	2.23	S	2.05	1.89	1.95	1.88	1.98	1.83	1.89	1.86	1.86	2.06	2.35	2.41	2.21	2.40	2.32	1.83	2.51	2.14	24	
13	3.03	1.98	3.20	3.17	1.96	2.83	1.98	S	1.93	1.91	1.92	2.03	2.17	2.06	1.92	2.05	2.20	2.11	2.26	2.57	2.42	2.35	4.47	2.99	1.91	4.47	2.41	24	
14	2.14	1.98	1.95	2.01	2.01	1.98	S	2.03	2.12	2.06	2.20	1.97	1.98	2.03	1.95	2.20	2.32	1.94	1.98	2.14	2.27	2.21	2.20	2.20	1.94	2.32	2.08	24	
15	2.36	2.11	2.01	1.99	1.98	S	2.06	2.11	2.08	2.01	2.02	1.99	1.99	1.93	1.93	1.95	1.95	1.98	1.98	1.98	2.20	1.97	1.98	2.85	1.93	2.85	2.06	24	
16	2.08	2.67	3.23	2.26	S	2.23	2.11	2.24	2.32	2.11	2.48	2.15	1.92	2.11	2.04	2.15	2.06	2.21	2.77	2.20	5.54	2.36	2.43	2.42	1.92	5.54	2.44	24	
17	2.18	2.99	1.93	S	2.11	2.50	1.98	2.23	1.96	1.92	2.17	2.12	2.17	2.17	2.39	2.01	2.08	2.23	1.95	1.97	2.01	2.14	1.98	2.06	1.92	2.99	2.14	24	
18	2.08	1.98	S	1.98	1.98	2.11	2.83	2.75	2.17	2.06	1.92	1.89	1.92	1.88	1.83	1.89	5.17	1.89	1.86	2.06	1.96	2.00	1.98	1.83	5.17	2.18	24		
19	2.09	S	2.32	2.30	2.27	2.32	2.32	2.24	2.26	2.06	2.94	1.86	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	1.86	2.94	2.27	16	
20	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	2.06	2.11	2.08	2.02	2.05	2.23	2.11	2.08	2.08	2.06	S	2.02	2.23	2.09	15
21	2.12	2.08	2.08	2.09	2.08	2.11	2.12	2.11	2.14	2.11	2.06	2.08	2.06	2.06	2.11	2.14	2.08	2.12	2.14	2.17	2.14	2.35	S	2.23	2.06	2.35	2.12	24	
22	2.36	2.61	2.72	2.17	2.17	2.35	2.32	2.15	2.15	2.14	2.09	2.09	2.09	2.08	2.08	2.06	2.04	2.02	2.04	2.08	2.08	S	2.12	2.05	2.02	2.72	2.18	24	
23	2.08	2.05	2.05	2.06	2.05	2.12	2.14	2.20	2.12	2.11	2.08	2.08	2.03	2.06	2.05	2.05	2.06	2.09	2.11	2.18	S	2.18	2.09	2.14	2.03	2.20	2.09	24	
24	2.17	2.11	2.17	2.18	2.17	2.23	2.32	2.29	2.29	2.14	2.08	2.08	2.06	2.05	2.04	2.04	2.01	2.04	2.11	S	2.08	2.26	2.08	2.08	2.01	2.32	2.13	24	
25	2.09	2.35	2.29	2.29	2.29	2.20	2.29	2.30	2.20	2.17	2.15	2.14	2.12	2.14	2.15	2.14	2.11	2.17	S	2.12	2.29	2.17	2.20	2.21	2.09	2.35	2.20	24	
26	2.26	2.29	2.30	2.32	2.32	2.41	2.48	2.72	2.75	2.39	2.17	2.11	2.14	2.26	2.26	2.15	2.11	S	2.09	P	2.29	2.14	2.14	2.14	2.09	2.75	2.28	23	
27	2.14	2.12	2.17	2.20	2.27	2.29	2.32	2.29	2.26	2.26	2.24	2.18	2.17	2.14	2.14	2.14	S	2.14	2.24	2.26	2.24	2.29	2.26	2.35	2.12	2.35	2.22	24	
28	2.35	2.41	2.44	2.38	2.41	2.47	2.60	2.53	2.45	2.35	2.29	2.20	2.15	2.12	2.09	S	2.08	P	R	2.15	2.17	2.20	2.12	2.11	2.08	2.60	2.29	22	
29	2.08	2.09	2.11	2.15	2.12	2.08	2.18	2.20	2.22	2.20	2.15	2.12	2.08	2.06	S	2.01	2.05	2.05	2.05	2.09	2.14	2.21	2.29	2.36	2.01	2.36	2.13	24	
30	2.35	2.39	2.20	2.12	2.14	2.45	2.33	2.17	2.11	2.12	2.17	2.24	2.23	S	2.04	1.98	2.00	1.98	2.05	2.12	2.18	2.12	2.13	2.11	1.98	2.45	2.16	24	
31	2.14	2.11	2.12	2.07	2.15	2.12	2.14	2.11	2.06	2.05	2.06	2.05	S	2.05	2.05	2.08	2.06	2.06	2.05	2.04	2.05	2.09	2.09	2.08	2.04	2.15	2.08	24	
HOURLY MAX	3.76	2.99	4.00	3.17	3.79	3.51	5.82	2.75	2.75	2.39	2.94	2.24	2.23	6.63	2.48	2.61	2.54	5.17	4.30	3.00	5.54	2.36	4.47	3.14					
HOURLY AVG	2.23	2.22	2.33	2.20	2.21	2.32	2.32	2.21	2.13	2.08	2.11	2.01	2.00	2.20	2.01	2.02	2.07	2.16	2.16	2.12	2.37	2.10	2.17	2.20					

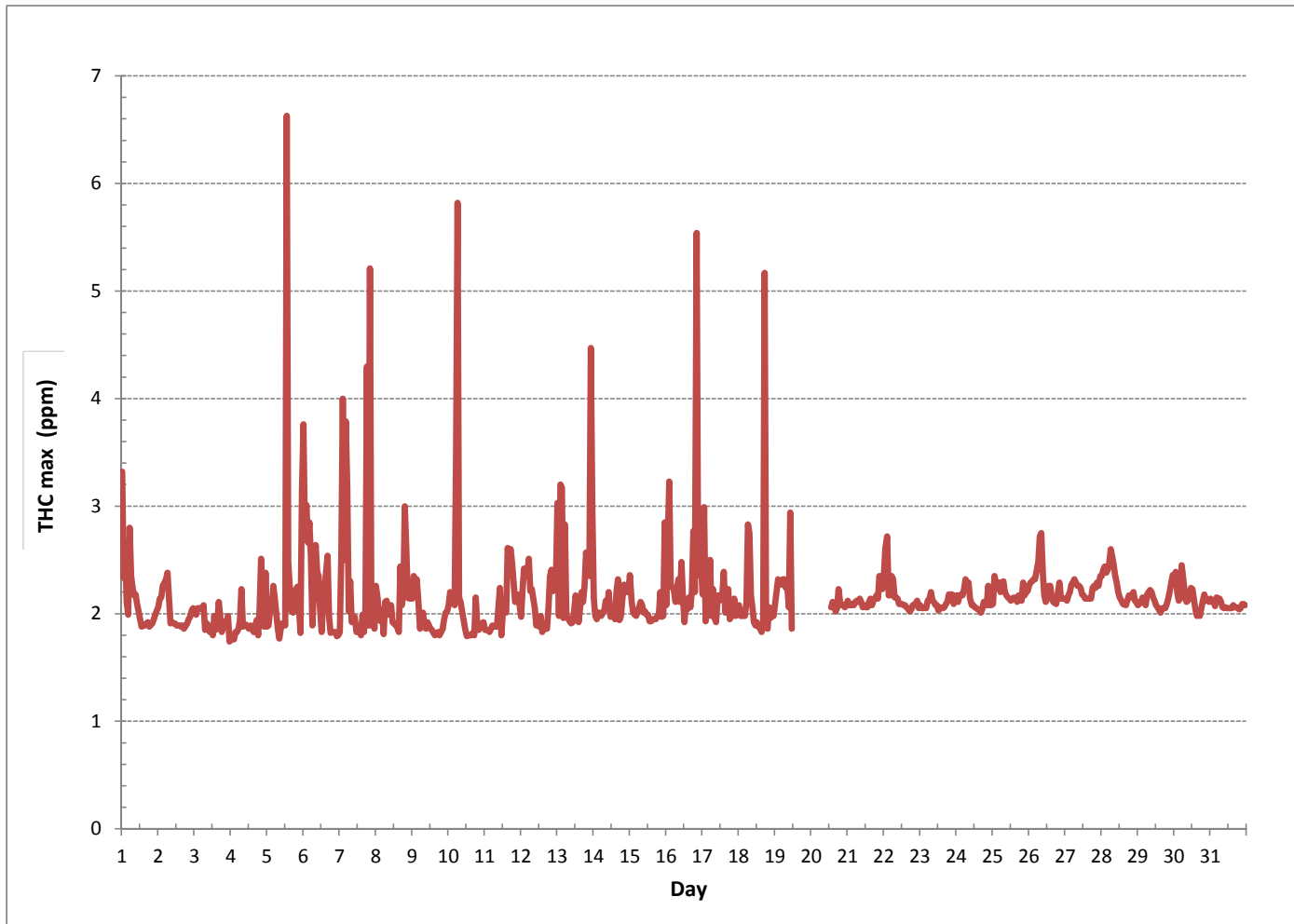
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

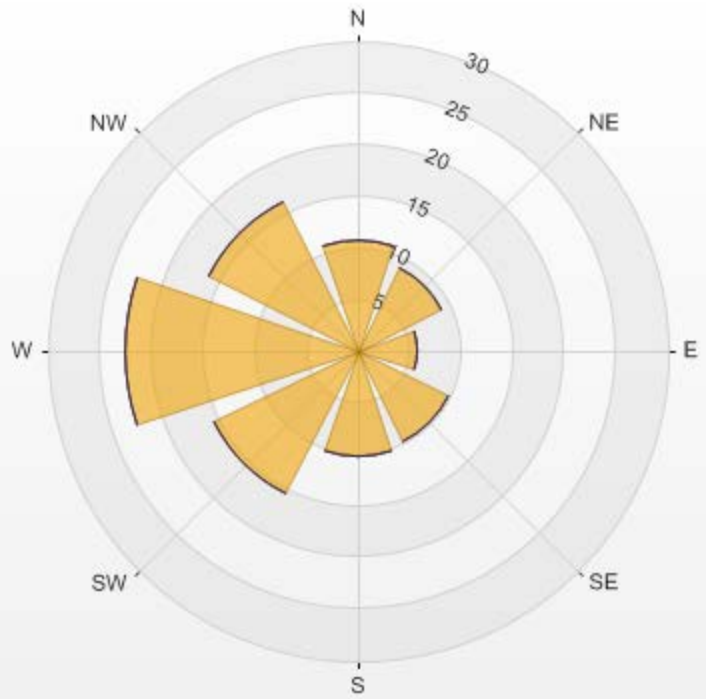
NUMBER OF NON-ZERO READINGS:	682
MAXIMUM INSTANTANEOUS VALUE:	6.63 PPM @ HOUR(S) 13 ON DAY(S) 5
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 HRS
MONTHLY CALIBRATION TIME:	8 HRS
OPERATIONAL TIME:	721.00 HRS
STANDARD DEVIATION:	0.42

TOTAL HYDROCARBONS MAX instantaneous maximum in ppm



Wind: LICA ST. LINA Monitor: THC [ppm] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 92.34% Calm Avg: 0.00

Direction	0.0-3.0	3.0-10.0	10.0-50.0	>50.0	Total
N	10.77	0	0	0	10.77
NE	9.02	0	0	0	9.02
E	5.82	0	0	0	5.82
SE	9.9	0	0	0	9.9
S	10.19	0	0	0	10.19
SW	15.57	0	0	0	15.57
W	22.56	0	0	0	22.56
NW	16.16	0	0	0	16.16
Summary	100	0	0	0	100



% Icon Classes (ppm)					
100	0.0-3.0	0	3.0-10.0	0	10.0-50.0
				0	>50.0

THC[ppm] Calibration: LICA ST. LINA Monthly: 07/2016 Type: Span



■ Span Meas
 — Span Ref
 — Span Low
 — Span High

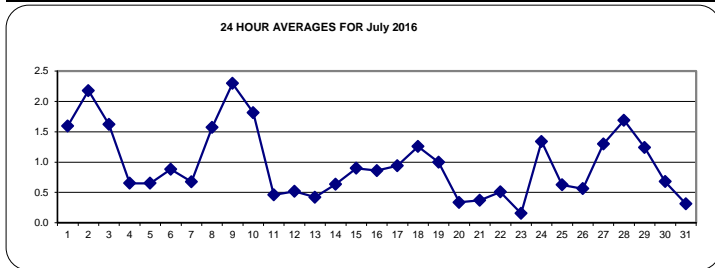
OXIDES OF NITROGEN

OXIDES OF NITROGEN (NOx) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.	
DAY	1	1.1	1.4	1.1	1.6	1.5	2.9	3.6	2.4	2.6	2.7	1.7	1.1	0.7	0.5	0.6	0.7	0.7	0.6	0.7	S	1.7	1.9	2.2	2.7	0.5	3.6	1.6	24	
2	2	3.3	3.4	3.6	3.6	4.0	3.8	2.4	1.8	1.6	1.6	1.5	1.3	1.3	0.8	1.3	1.3	1.3	1.2	S	1.2	1.6	2.0	2.7	3.5	0.8	4.0	2.2	24	
3	3	2.9	2.7	3.2	2.9	3.0	2.8	2.5	2.6	1.7	1.3	1.2	0.6	0.8	1.9	1.4	1.3	1.0	S	1.2	0.8	0.2	0.5	0.4	0.4	0.2	3.2	1.6	24	
4	4	0.8	1.0	1.1	1.3	0.6	1.2	1.4	0.9	1.1	0.0	0.0	0.2	0.1	0.2	0.1	0.3	S	0.6	0.4	1.2	0.7	0.4	0.7	0.7	0.0	1.4	0.7	24	
5	5	0.5	0.8	0.7	1.0	0.8	0.8	0.6	0.5	0.1	0.0	0.3	0.6	0.5	0.7	0.3	S	0.9	0.7	0.7	0.7	0.6	1.0	1.1	1.1	0.0	1.1	0.7	24	
6	6	0.9	0.7	0.7	0.8	0.8	1.6	1.0	0.6	0.6	0.3	0.5	0.6	0.8	0.3	S	0.9	0.8	0.9	1.0	2.0	1.0	2.3	0.7	0.5	0.3	2.3	0.9	24	
7	7	0.9	0.6	0.7	0.7	0.7	0.7	0.5	0.5	0.3	0.8	0.9	0.3	0.3	S	0.7	0.4	0.1	0.3	0.8	0.7	0.7	1.1	1.3	1.5	0.1	1.5	0.7	24	
8	8	0.7	1.1	1.7	1.4	1.4	1.3	3.0	1.0	1.7	2.4	1.7	1.1	S	1.5	1.5	1.0	1.3	1.5	1.7	1.3	1.4	1.5	1.8	3.1	0.7	3.1	1.6	24	
9	9	5.8	5.4	7.0	6.1	3.2	3.0	3.2	2.6	1.4	0.8	1.7	S	1.4	0.9	0.3	0.2	0.3	0.6	0.6	0.6	1.0	2.2	2.0	2.5	0.2	7.0	2.3	24	
10	10	4.3	5.6	5.1	3.1	2.5	2.2	2.9	4.3	2.9	2.0	S	1.0	0.6	0.7	0.4	0.4	0.1	0.3	0.7	1.2	0.5	0.3	0.4	0.2	0.1	5.6	1.8	24	
11	11	0.3	0.4	0.7	0.8	1.2	0.7	0.8	0.9	1.1	S	0.5	0.0	0.4	0.4	0.2	0.9	0.0	0.3	0.2	0.2	0.0	0.1	0.3	0.2	0.0	1.2	0.5	24	
12	12	0.3	0.5	0.8	1.1	0.9	1.6	1.0	1.1	S	1.0	0.6	0.2	0.2	0.2	0.2	0.1	0.4	0.5	0.4	0.1	0.0	0.1	0.2	0.4	0.0	1.6	0.5	24	
13	13	0.4	0.4	0.2	0.8	0.6	0.9	1.3	S	0.7	0.1	0.4	0.2	0.3	0.2	0.0	0.2	0.2	0.0	0.0	0.0	0.4	1.2	0.8	0.4	0.0	1.3	0.4	24	
14	14	0.5	0.2	0.3	0.3	0.8	0.9	S	3.4	1.2	0.8	1.1	0.3	0.4	0.0	0.2	0.8	0.5	0.2	0.1	0.7	1.0	0.5	0.0	0.4	0.0	3.4	0.6	24	
15	15	0.2	0.6	0.5	0.7	1.4	S	1.8	2.4	1.3	1.1	0.6	0.0	0.8	0.0	0.2	0.4	1.0	0.5	1.0	1.8	1.3	0.8	1.1	1.2	0.0	2.4	0.9	24	
16	16	1.0	1.5	1.4	1.7	S	1.5	1.5	1.4	0.8	1.3	0.7	0.7	0.5	0.7	0.3	0.7	0.5	0.8	0.6	0.5	0.4	0.3	0.5	0.5	0.3	1.7	0.9	24	
17	17	0.8	0.9	1.0	S	1.6	1.4	S1	1.3	1.1	0.9	0.8	0.7	0.5	0.6	0.7	0.4	0.4	0.9	0.5	0.9	0.9	0.6	0.8	3.0	0.4	3.0	0.9	23	
18	18	3.0	1.2	S	2.0	1.4	1.3	1.1	1.8	1.2	0.7	0.4	0.6	0.4	C	C	C	C	C	C	Y	Y	Y	Y	Y	Y	0.4	3.0	1.3	18
19	19	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	C	C	0.0	0.1	0.9	1.9	2.2	1.1	0.8	0.0	2.2	1.0	15	
20	20	S	0.6	0.1	0.8	0.8	0.5	0.6	0.2	0.0	0.3	0.8	0.1	0.3	0.3	0.1	0.2	0.2	0.0	0.0	0.1	0.5	0.6	0.3	S	0.0	0.8	0.3	24	
21	21	0.6	0.6	0.5	0.4	0.2	0.2	0.4	0.4	0.3	0.2	0.2	0.4	0.6	0.9	0.5	0.2	0.6	0.2	0.0	0.5	0.2	0.2	S	0.2	0.0	0.9	0.4	24	
22	22	0.1	0.3	0.3	0.7	0.6	0.9	1.5	0.9	0.4	0.2	0.3	0.3	0.1	0.2	0.2	0.4	0.6	0.9	0.4	0.5	0.6	S	0.4	0.9	0.1	1.5	0.5	24	
23	23	1.1	0.6	0.3	0.3	0.0	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	S	0.2	0.2	0.2	0.0	1.1	0.2	24	
24	24	0.6	0.8	0.7	0.6	0.9	1.6	1.9	5.3	4.0	1.1	0.5	0.7	0.8	2.4	1.3	1.5	1.2	0.8	0.6	S	0.4	1.1	1.2	0.8	0.4	5.3	1.3	24	
25	25	0.8	0.8	0.7	0.7	0.9	0.7	0.8	0.9	0.7	0.5	0.4	0.6	0.4	0.2	0.2	0.5	0.6	0.6	S	0.4	1.0	0.7	0.6	0.7	0.2	1.0	0.6	24	
26	26	1.0	0.7	0.8	0.8	0.9	0.9	0.8	1.7	1.0	0.5	0.2	0.0	0.1	0.4	0.3	0.6	0.1	S	0.1	0.2	0.1	0.7	0.5	0.5	0.0	1.7	0.6	24	
27	27	0.6	0.5	0.9	1.0	1.2	1.6	1.6	2.0	1.4	1.3	1.1	1.0	0.6	0.5	0.7	0.6	S	0.5	0.9	1.4	2.3	2.8	2.8	2.6	0.5	2.8	1.3	24	
28	28	2.2	2.8	2.9	3.2	3.1	4.3	3.0	2.7	2.3	2.2	2.4	0.8	0.4	0.2	0.4	S	0.1	P	0.0	0.5	0.8	1.0	0.9	0.9	0.0	4.3	1.7	23	
29	29	0.9	1.0	1.2	1.1	1.5	2.0	2.3	2.0	2.4	1.8	1.6	1.0	1.1	1.1	S	1.0	0.4	0.6	0.6	1.2	0.8	0.8	0.9	1.2	0.4	2.4	1.2	24	
30	30	1.5	1.7	1.1	0.6	0.7	0.8	0.9	0.6	0.6	0.6	0.7	0.7	0.7	S	0.4	0.5	0.2	0.3	0.3	0.7	1.1	0.3	0.3	0.3	0.2	1.7	0.7	24	
31	31	0.3	0.4	0.3	0.6	0.5	0.4	0.4	0.4	0.1	0.0	0.2	0.2	S	0.2	0.3	0.2	0.1	0.2	0.0	0.1	0.3	0.7	0.7	0.6	0.0	0.7	0.3	24	
HOURLY MAX		5.8	5.6	7.0	6.1	4.0	4.3	3.6	5.3	4.0	2.7	2.4	1.3	1.4	2.4	1.5	1.5	1.3	1.5	1.7	2.0	2.3	2.8	2.8	3.5					
HOURLY AVG		1.3	1.3	1.4	1.4	1.3	1.5	1.5	1.6	1.2	0.9	0.8	0.5	0.5	0.6	0.5	0.6	0.5	0.5	0.5	0.7	0.8	1.0	0.9	1.1					

STATUS FLAG CODES

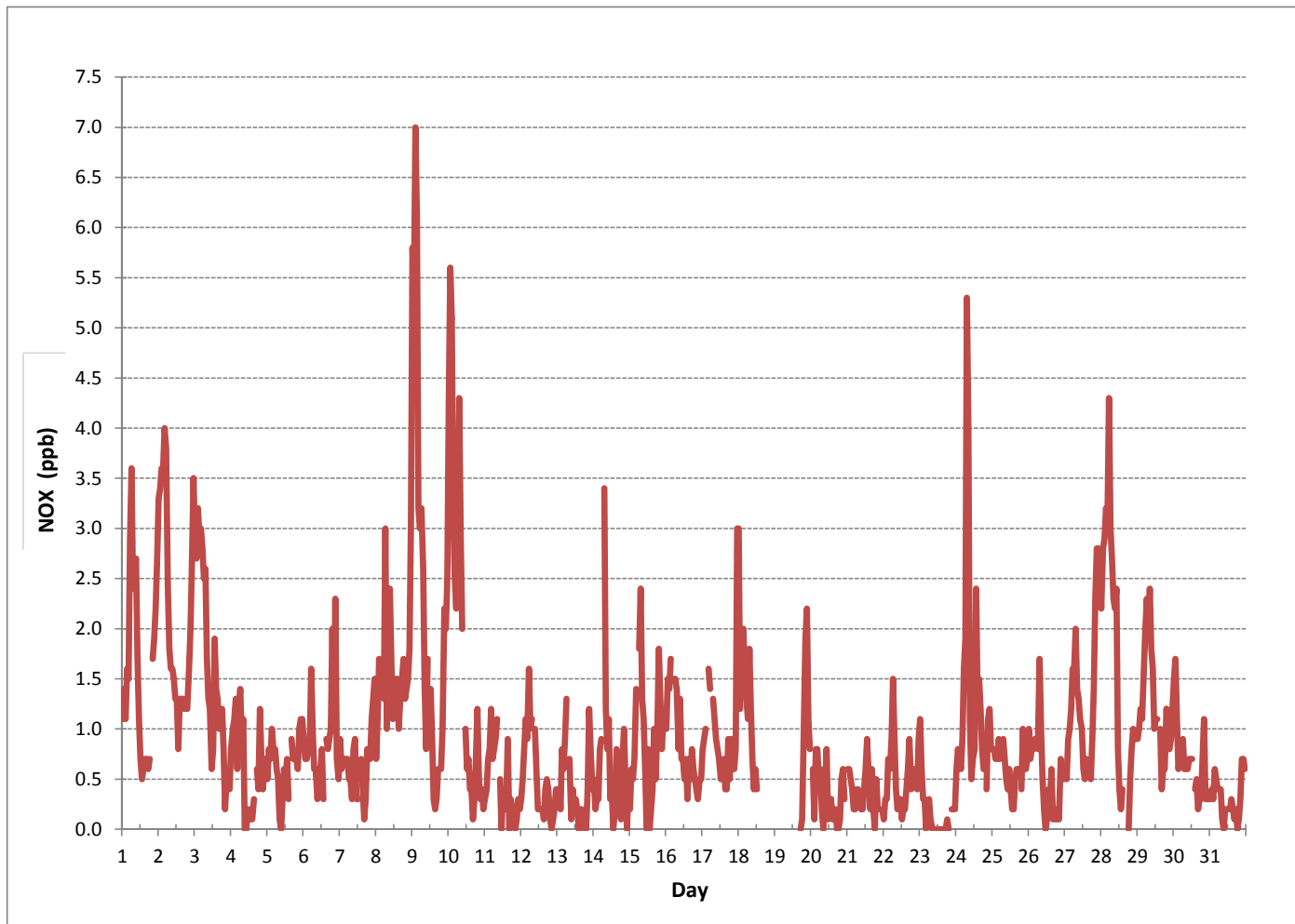
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	647				
MINIMUM 1-HR AVERAGE:	0.0	PPB @ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 1-HR AVERAGE:	7.0	PPB @ HOUR(S)	2	ON DAY(S)	9
MAXIMUM 24-HR AVERAGE:	2.3	PPB		ON DAY(S)	9
				VAR-VARIOUS	
IZS CALIBRATION TIME:	31	HRS	OPERATIONAL TIME:	727	HRS
MONTHLY CALIBRATION TIME:	13	HRS	AMD OPERATION UPTIME:	97.7	%
STANDARD DEVIATION:	0.94		MONTHLY AVERAGE:	1.0	PPB

OXIDES OF NITROGEN (NOx) hourly averages in ppb





OXIDES OF NITROGEN MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
DAY	MIN.	MAX.	AVG.	RDGS.																									
1	1.6	2.0	1.5	1.9	2.0	3.6	3.9	3.4	3.3	7.7	8.3	1.3	0.8	0.5	0.6	0.7	0.6	0.6	0.6	S	1.5	1.7	2.3	2.6	0.5	8.3	2.3	24	
2	3.5	3.2	3.6	3.3	4.3	3.9	2.7	P	1.3	1.5	1.7	1.3	1.1	0.6	1.0	0.9	1.0	1.0	S	1.1	1.2	1.9	3.1	3.4	0.6	4.3	2.1	23	
3	2.9	2.7	3.0	2.9	3.0	3.2	2.7	2.8	2.1	1.7	1.8	1.3	1.7	2.4	2.8	3.5	1.5	S	1.5	1.3	0.4	0.7	0.7	0.6	0.4	3.5	2.1	24	
4	1.6	1.6	1.3	1.3	0.9	1.8	2.0	1.5	1.9	0.6	0.0	1.3	0.2	0.6	0.4	1.7	S	0.9	0.7	1.3	1.1	0.6	0.8	0.6	0.0	2.0	1.1	24	
5	0.6	0.9	0.9	0.9	0.7	0.6	0.9	0.7	0.0	0.0	0.0	0.4	0.6	1.1	0.2	S	1.1	11.5	4.8	1.1	0.8	1.1	0.9	0.9	0.0	11.5	1.3	24	
6	0.9	0.8	0.6	0.8	0.7	3.8	1.0	1.4	2.5	0.6	0.6	0.9	0.8	0.4	S	P	2.2	1.2	5.5	6.1	2.7	46.1	1.1	0.8	0.4	46.1	3.7	23	
7	1.3	1.1	1.2	0.9	1.4	1.1	0.9	0.9	0.7	1.4	2.6	0.9	1.3	S	1.2	0.8	0.4	0.7	2.0	1.2	0.9	1.4	1.6	1.7	0.4	2.6	1.2	24	
8	1.1	1.3	1.9	1.3	1.3	1.8	3.4	2.5	1.7	2.2	2.2	1.0	S	P	1.3	0.9	1.3	2.2	2.5	1.2	1.5	1.3	1.6	5.1	0.9	5.1	1.8	23	
9	5.9	6.6	7.4	6.5	3.7	4.0	3.3	2.8	1.9	0.9	2.0	S	1.8	1.0	0.5	0.5	0.4	0.8	0.4	0.5	1.1	2.4	2.1	3.2	0.4	7.4	2.6	24	
10	4.7	6.1	5.4	3.7	2.4	2.3	4.0	4.3	3.4	2.6	S	1.2	0.4	0.8	0.4	0.4	0.2	0.2	1.5	2.2	1.6	0.2	0.4	0.2	0.2	6.1	2.1	24	
11	0.7	0.7	1.0	0.9	1.6	1.0	1.0	1.2	1.3	S	1.2	0.4	1.7	1.1	1.1	3.7	0.4	0.5	0.7	0.7	0.6	0.1	0.6	0.4	0.1	3.7	1.0	24	
12	0.4	0.6	0.9	1.4	1.0	3.5	1.3	3.4	S	2.3	1.1	0.8	0.3	0.9	0.5	0.4	0.8	0.7	1.5	0.3	0.7	0.6	0.5	0.6	0.3	3.5	1.1	24	
13	0.7	0.5	0.3	2.9	0.9	1.1	1.6	S	1.4	0.2	0.7	0.4	1.0	0.6	0.1	1.0	1.4	0.7	0.9	0.2	0.6	22.3	1.3	0.5	0.1	22.3	1.8	24	
14	0.8	0.4	0.4	0.7	1.1	1.3	S	3.8	2.3	2.0	1.3	0.7	0.6	0.1	0.6	4.7	3.9	1.6	0.5	1.1	1.5	0.8	0.1	0.8	0.1	4.7	1.4	24	
15	0.6	0.9	0.9	1.1	1.9	S	3.0	2.9	1.6	1.3	0.9	0.1	22.3	0.1	0.5	1.0	3.3	0.6	1.7	5.7	3.5	1.0	1.0	1.2	0.1	22.3	2.5	24	
16	0.7	1.3	3.1	3.4	S	1.1	2.6	23.3	0.8	3.3	1.1	0.9	1.1	0.6	0.8	17.3	1.5	1.5	0.5	0.9	1.3	0.4	0.5	0.8	0.4	23.3	3.0	24	
17	0.7	1.0	1.1	S	1.8	1.6	S1	S1	1.1	1.2	2.2	1.3	1.3	1.5	3.4	0.7	0.5	3.1	3.1	1.3	1.3	0.7	1.0	3.7	0.5	3.7	1.6	22	
18	5.1	2.1	S	2.8	1.6	1.9	1.4	4.7	1.8	1.5	1.0	1.3	1.3	C	C	C	C	C	Y	Y	Y	Y	Y	Y	1.0	5.1	2.2	18	
19	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	C	C	0.7	1.4	2.2	4.6	10.1	1.9	1.5	0.7	10.1	3.2	15	
20	S	1.3	1.1	1.5	1.2	1.1	3.8	2.9	2.1	2.2	4.5	1.1	1.4	0.8	2.6	1.9	0.9	0.2	0.1	0.7	3.4	4.7	0.4	S	0.1	4.7	1.8	24	
21	0.8	0.8	0.8	0.9	0.6	0.3	2.1	0.7	0.6	0.4	0.7	11.1	2.4	22.9	2.0	1.7	2.8	1.0	0.4	2.6	0.4	0.6	S	0.5	0.3	22.9	2.5	24	
22	0.4	1.2	1.0	1.3	0.9	2.4	2.8	1.5	1.1	0.6	0.8	0.8	0.6	1.4	0.7	0.9	1.7	3.2	1.5	2.3	2.3	S	0.9	2.0	0.4	3.2	1.4	24	
23	2.0	1.2	1.0	0.9	0.6	0.7	1.1	0.6	1.1	0.4	0.6	0.3	0.0	0.4	0.3	0.6	0.4	0.3	1.7	1.2	S	0.7	0.7	0.7	0.0	2.0	0.8	24	
24	1.1	1.2	1.0	1.1	1.4	2.0	3.9	6.3	5.9	2.0	0.9	1.1	1.6	3.2	2.0	2.8	13.3	2.5	2.0	S	1.1	1.5	2.1	0.9	0.9	13.3	2.6	24	
25	1.0	1.0	0.9	1.0	1.0	0.9	1.2	2.0	1.5	0.9	0.7	1.2	1.1	0.6	0.9	2.0	2.5	2.0	S	0.8	1.7	0.9	0.9	1.2	0.6	2.5	1.2	24	
26	1.3	1.1	1.3	1.3	1.5	1.5	1.3	5.1	1.6	1.2	0.9	0.9	1.5	1.7	1.0	3.7	0.9	S	2.8	P	1.0	2.6	1.3	1.7	0.9	5.1	1.7	23	
27	2.0	1.2	1.7	1.6	2.1	4.0	3.7	4.9	1.8	2.2	3.2	2.0	3.5	1.2	2.3	1.5	S	1.4	3.6	5.1	2.9	3.8	6.5	3.0	1.2	6.5	2.8	24	
28	2.7	5.4	3.7	4.0	4.3	9.0	4.4	5.2	3.7	3.5	4.0	2.1	2.2	1.4	3.0	S	1.2	P	1.3	1.5	1.6	1.9	1.7	1.5	1.2	9.0	3.2	23	
29	1.5	1.7	1.8	2.1	2.2	4.3	28.7	3.7	4.9	2.7	27.1	1.7	2.8	3.3	S	2.3	1.0	1.3	1.2	3.2	1.3	1.3	1.8	1.8	1.0	28.7	4.5	24	
30	2.2	2.4	1.9	1.3	2.3	1.5	1.6	1.3	1.3	1.3	1.4	2.4	1.3	S	1.1	1.1	0.9	0.9	0.9	2.9	2.0	0.8	1.1	1.1	0.8	2.9	1.5	24	
31	1.0	1.0	1.0	1.1	1.1	1.0	1.1	1.0	0.7	0.8	0.9	1.0	S	1.0	1.6	1.1	1.1	0.9	0.6	1.5	1.1	1.4	1.7	1.2	0.6	1.7	1.1	24	
HOURLY MAX	5.9	6.6	7.4	6.5	4.3	9.0	28.7	23.3	5.9	7.7	27.1	11.1	22.3	22.9	3.4	17.3	13.3	11.5	5.5	6.1	4.6	46.1	6.5	5.1					
HOURLY AVG	1.7	1.8	1.8	1.9	1.7	2.3	3.3	3.5	1.9	1.7	2.6	1.4	2.0	1.9	1.2	2.2	1.7	1.6	1.6	1.9	1.6	1.9	1.6	3.9	1.4	1.5			

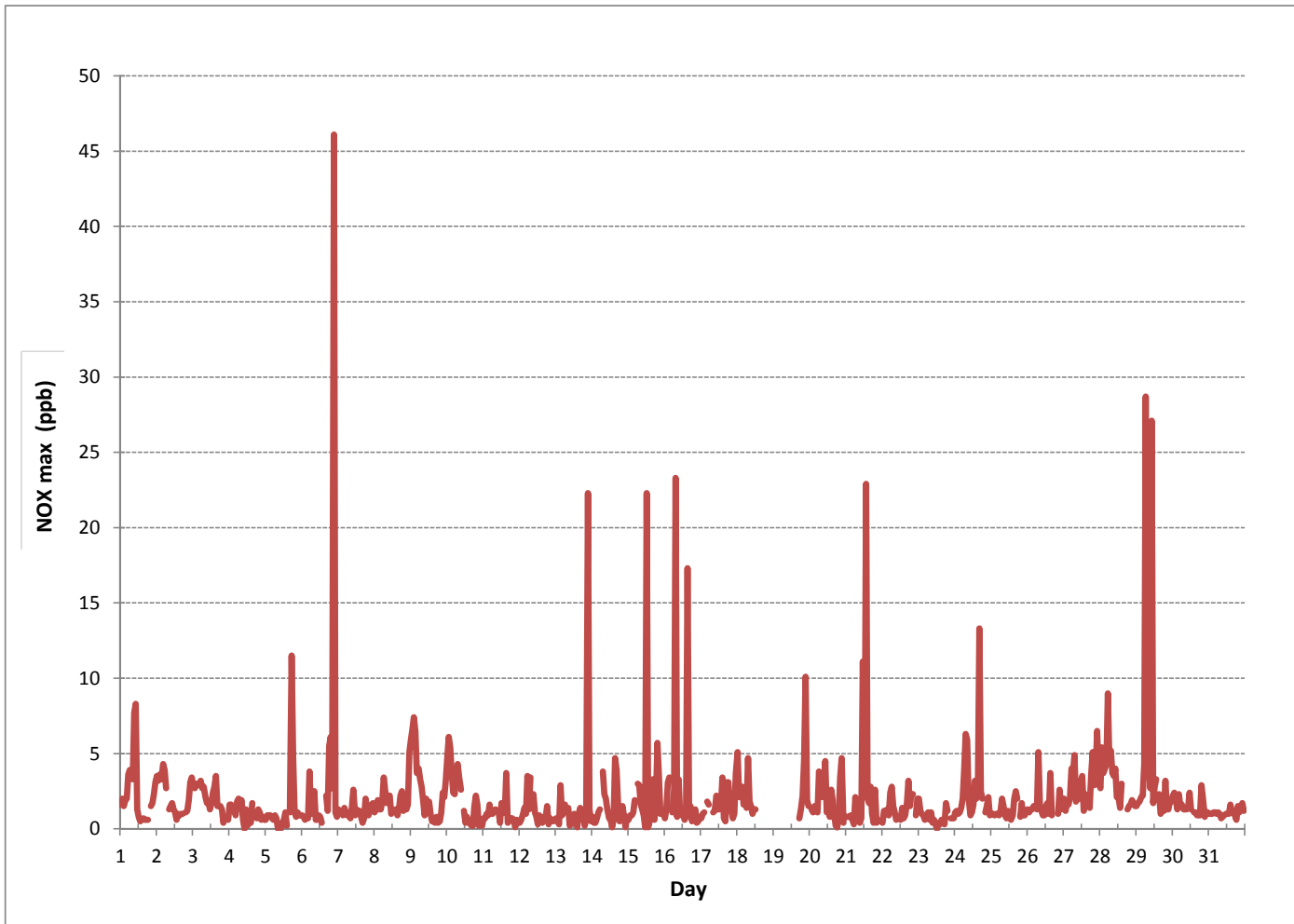
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

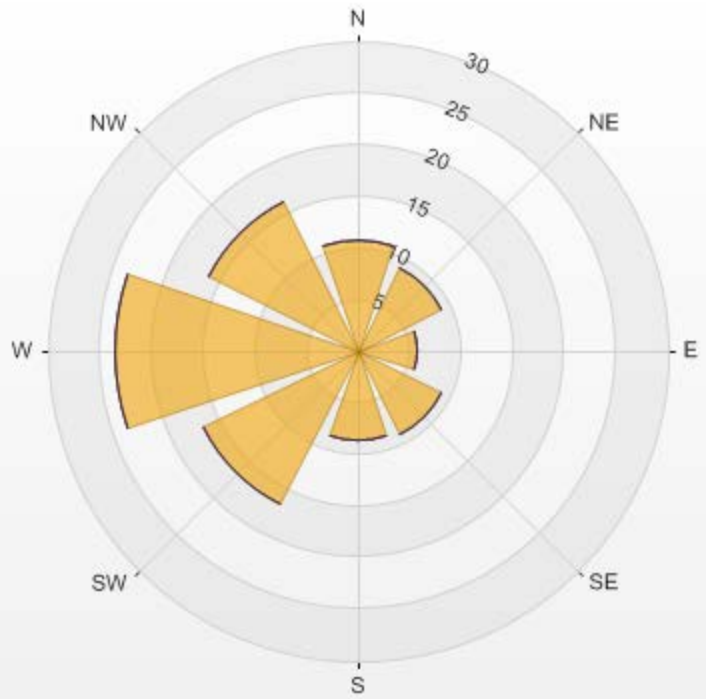
NUMBER OF NON-ZERO READINGS:	673
MAXIMUM INSTANTANEOUS VALUE:	46.1 PPB @ HOUR(S) 21 ON DAY(S) 6
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 HRS
MONTHLY CALIBRATION TIME:	13 HRS
STANDARD DEVIATION:	3.17
OPERATIONAL TIME:	722 HRS

OXIDES OF NITROGEN MAX instantaneous maximum in ppb



Wind: LICA ST. LINA Monitor: NOX [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 91.80% Calm Avg: 0.00

Direction	0.0-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	10.83	0	0	0	10.83
NE	9.08	0	0	0	9.08
E	5.86	0	0	0	5.86
SE	9.08	0	0	0	9.08
S	8.64	0	0	0	8.64
SW	16.69	0	0	0	16.69
W	23.57	0	0	0	23.57
NW	16.25	0	0	0	16.25
Summary	100	0	0	0	100



% Icon Classes (ppb)							
100	0.0-50.0	0	50.0-110.0	0	110.0-210.0	0	>210.0

NOX[ppb] Calibration: LICA ST. LINA Monthly: 07/2016 Type: Span



■ Span Meas
 — Span Ref
 — Span Low
 — Span High

NITRIC OXIDES

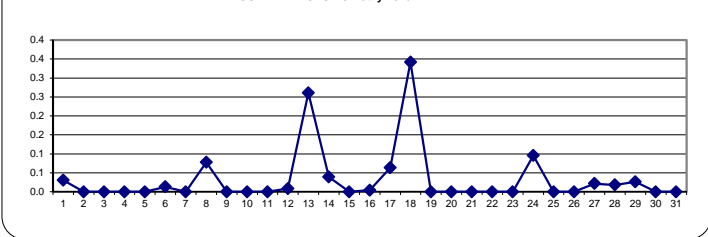
NITRIC OXIDE (NO) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.	
DAY	HR	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	24
2	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
3	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
4	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
5	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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
6	6	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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	24
7	7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	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
8	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.0	S	0.5	0.3	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	24
9	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	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
10	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	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
11	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	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
12	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	24
13	13	0.3	0.3	0.1	0.4	0.4	0.6	0.8	S	0.7	0.1	0.4	0.2	0.3	0.2	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.2	0.5	0.2	0.0	0.0	0.8	0.3	24
14	14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	24
15	15	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
16	16	0.0	0.0	0.0	0.0	S	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	0.1	0.0	24
17	17	0.0	0.0	0.0	S	0.0	0.0	S1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.3	0.1	23
18	18	0.5	0.5	S	0.9	0.4	0.3	0.3	0.6	0.2	0.0	0.1	0.3	0.0	C	C	C	C	C	C	Y	Y	Y	Y	Y	Y	0.0	0.9	0.3	18
19	19	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15
20	20	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	24
21	21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	24
22	22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	24
23	23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	24
24	24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.1	24
25	25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
26	26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
27	27	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	24
28	28	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	23
29	29	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.3	0.0	0.0	0.0	0.0	0.0	S	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	24
30	30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	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
31	31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	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
HOURLY MAX		0.5	0.5	0.1	0.9	0.4	0.6	0.8	1.5	0.7	0.6	0.4	0.3	0.3	0.5	0.3	0.2	0.1	0.3	0.0	0.2	0.2	0.5	0.2	0.2					
HOURLY AVG		0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

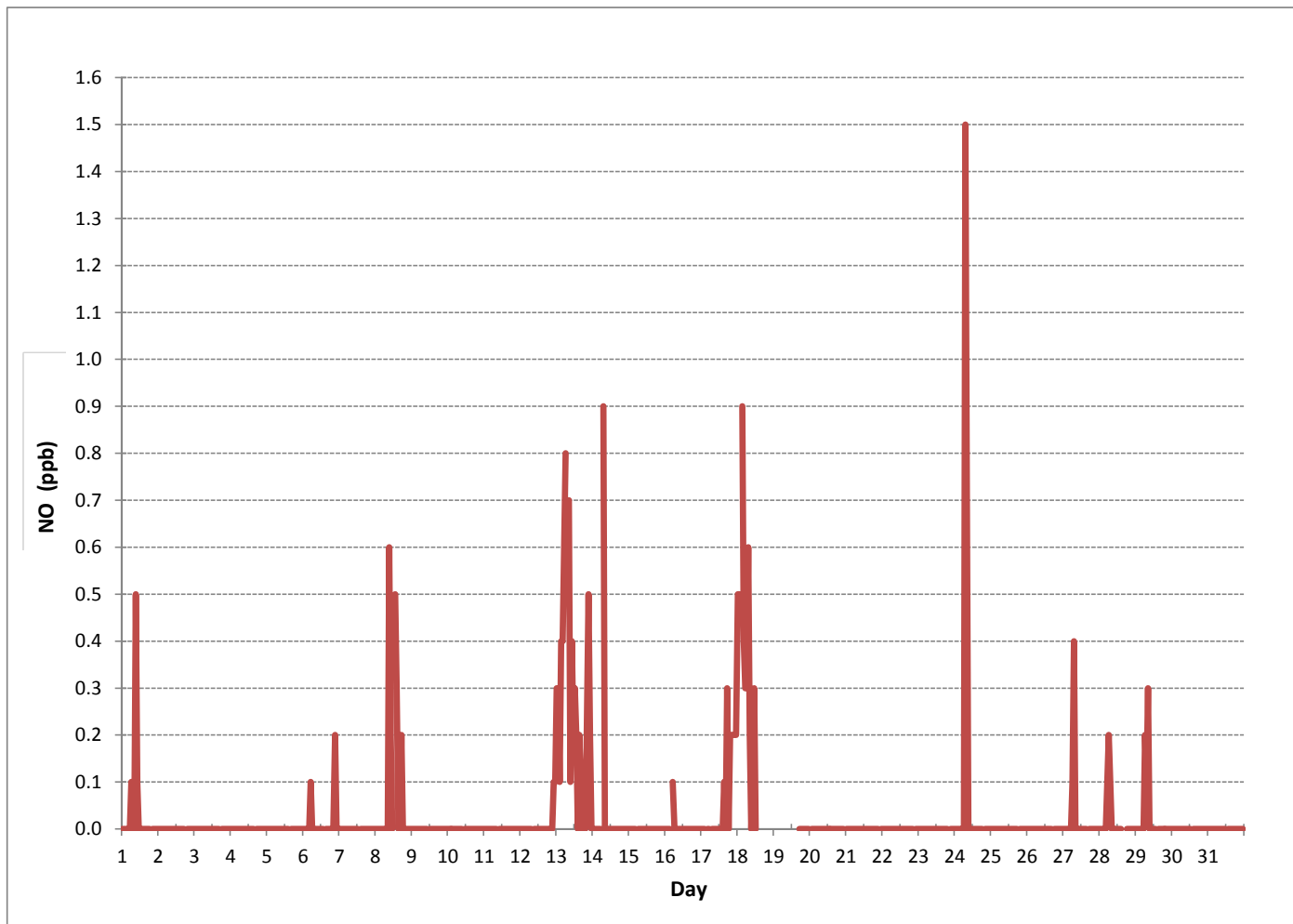
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	59				
MINIMUM 1-HR AVERAGE:	0.0	PPB @ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	1.5	PPB @ HOUR(S)	7	ON DAY(S)	24
MAXIMUM 24-HR AVERAGE:	0.3	PPB		ON DAY(S)	18
				VAR-VARIOUS	
IZS CALIBRATION TIME:	31	HRS	OPERATIONAL TIME:	727	HRS
MONTHLY CALIBRATION TIME:	13	HRS	AMD OPERATION UPTIME:	97.7	%
STANDARD DEVIATION:	0.12		MONTHLY AVERAGE:	0.0	PPB

NITRIC OXIDE (NO) hourly averages in ppb





NITRIC OXIDE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.	
DAY	HR	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
1		1.0	0.9	1.1	1.0	0.7	1.4	1.3	1.5	1.5	7.2	7.7	1.0	1.1	0.9	1.0	1.2	0.6	0.7	0.7	S	1.0	0.9	1.1	1.0	0.6	7.7	1.6	24	
2		1.0	1.3	1.0	1.0	1.0	1.0	1.3	P	1.3	1.4	1.0	1.0	1.0	0.7	1.0	1.2	1.3	0.9	S	1.0	1.1	0.8	1.3	1.1	0.7	1.4	1.1	23	
3		0.9	0.9	1.2	0.9	1.5	1.2	1.2	1.1	1.1	1.1	1.5	1.0	1.4	1.6	1.3	1.6	1.1	S	1.3	1.3	0.8	0.9	1.1	0.8	0.8	1.6	1.2	24	
4		1.1	1.1	0.9	1.1	0.6	1.2	1.5	1.9	2.0	1.3	0.6	1.9	1.2	1.1	1.1	1.8	S	1.1	1.0	1.5	1.1	1.2	0.7	1.0	0.6	2.0	1.2	24	
5		0.9	1.2	1.1	1.1	0.7	0.9	0.9	1.2	0.6	1.0	0.7	1.1	1.3	1.2	1.0	S	1.6	7.8	2.7	1.1	0.9	1.0	0.7	1.1	0.6	7.8	1.4	24	
6		1.3	0.9	0.9	0.9	1.0	2.9	1.3	1.5	1.7	1.1	1.1	1.3	1.3	0.7	S	P	1.3	1.3	1.7	2.0	1.4	30.9	1.0	0.9	0.7	30.9	2.7	23	
7		1.0	0.7	0.9	0.9	1.0	1.0	1.0	1.1	0.8	1.2	1.3	0.9	1.2	S	1.4	1.1	0.7	1.1	1.1	1.1	0.6	0.8	0.9	0.9	0.6	1.4	1.0	24	
8		1.0	1.2	1.4	1.3	1.1	1.2	0.9	0.7	1.4	1.6	1.1	1.1	S	P	1.3	0.9	1.1	1.6	1.1	1.1	1.1	0.9	1.0	1.1	0.7	1.6	1.1	23	
9		1.1	0.8	1.3	1.3	0.9	1.5	1.3	1.8	1.4	0.9	1.1	S	1.4	1.2	0.7	1.0	0.9	1.0	0.8	0.7	1.3	1.2	1.1	0.9	0.7	1.8	1.1	24	
10		1.1	0.7	1.2	1.1	0.7	0.9	1.9	1.6	1.5	1.9	S	1.1	0.8	1.4	1.0	1.0	1.1	1.1	1.0	1.3	1.2	0.9	1.1	0.8	0.7	1.9	1.1	24	
11		1.1	1.3	1.3	1.0	1.3	1.1	1.5	1.4	1.4	S	1.6	0.7	2.1	1.4	1.1	2.7	1.0	1.1	1.1	1.3	0.9	1.1	1.1	0.9	0.7	2.7	1.3	24	
12		0.7	1.0	0.9	1.3	0.9	2.5	1.4	2.6	S	2.0	1.2	0.9	1.3	1.3	1.0	0.9	1.2	0.9	1.2	1.0	1.0	1.0	1.0	1.1	0.7	2.6	1.2	24	
13		1.0	0.9	0.8	1.8	1.0	1.1	1.1	S	1.4	0.8	1.4	1.1	1.6	1.1	1.0	1.1	1.3	0.9	1.0	1.0	1.1	10.7	1.2	0.9	0.8	10.7	1.5	24	
14		1.1	1.1	0.7	1.0	1.1	1.0	S	2.4	1.5	1.3	1.1	1.1	1.0	0.8	0.8	3.2	2.3	0.9	1.1	1.1	1.3	1.2	0.9	1.1	0.7	3.2	1.3	24	
15		1.1	1.2	1.0	1.0	1.1	S	1.7	1.3	1.1	1.0	0.8	0.5	18.4	0.8	0.7	1.1	1.7	0.9	1.1	2.4	2.0	0.9	0.9	0.9	0.5	18.4	1.9	24	
16		0.9	1.1	1.4	1.3	S	1.3	1.8	11.5	0.8	2.6	1.5	0.8	1.1	0.9	0.8	10.1	1.3	1.1	1.1	1.1	1.0	0.7	0.9	0.9	0.7	11.5	2.0	24	
17		0.9	0.9	0.9	S	1.3	0.9	S1	S1	1.0	1.0	1.8	1.6	1.1	1.0	2.2	0.9	0.9	2.2	2.2	0.8	0.9	0.9	0.6	0.5	0.5	2.2	1.2	22	
18		0.8	0.8	S	1.2	0.8	0.9	0.9	2.0	0.8	0.9	0.8	1.2	1.1	C	C	C	C	C	C	Y	Y	Y	Y	Y	Y	0.8	2.0	1.0	18
19		Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	C	C	0.4	0.5	0.6	0.6	2.2	0.3	0.3	0.3	2.2	0.7	15	
20		S	0.6	0.5	0.5	0.5	0.5	2.2	2.2	1.0	1.1	3.0	0.7	0.9	0.9	1.4	1.3	0.7	0.4	0.6	0.9	3.2	2.9	0.8	S	0.4	3.2	1.2	24	
21		0.7	0.7	0.7	0.6	0.7	0.5	1.5	0.8	0.7	0.8	1.1	6.1	2.2	13.8	1.6	1.3	2.4	1.1	0.9	1.7	0.9	0.9	S	0.8	0.5	13.8	1.8	24	
22		0.9	1.1	0.9	1.1	0.7	1.4	1.3	0.8	1.1	0.7	0.8	0.9	0.8	1.1	0.8	1.0	1.0	1.5	0.9	1.1	1.0	S	0.9	0.8	0.7	1.5	1.0	24	
23		0.9	0.8	1.0	1.0	1.0	1.0	0.9	1.0	1.4	0.7	0.9	1.0	0.7	1.0	0.7	1.1	0.9	0.8	1.4	1.1	S	1.2	0.8	1.0	0.7	1.4	1.0	24	
24		1.1	1.0	0.9	0.8	1.1	1.0	2.1	3.2	2.9	1.1	1.0	1.1	0.9	1.5	1.5	1.3	5.7	1.8	1.2	S	1.0	1.0	1.3	0.8	0.8	5.7	1.5	24	
25		0.9	0.9	1.1	0.8	1.0	1.5	1.6	2.4	1.6	1.2	1.1	1.4	1.7	1.0	1.0	2.0	2.0	1.5	S	1.1	1.0	0.9	0.7	1.0	0.7	2.4	1.3	24	
26		1.0	1.0	1.1	1.1	1.2	1.1	1.1	2.4	1.1	1.1	1.1	1.1	1.1	1.2	0.9	1.8	1.1	S	1.7	P	1.1	1.4	1.2	1.2	0.9	2.4	1.2	23	
27		1.3	0.9	1.1	1.0	1.0	2.7	2.6	4.2	1.1	1.3	2.1	1.7	2.1	1.2	1.5	1.3	S	1.3	1.3	2.3	1.2	1.1	2.4	0.9	0.9	4.2	1.6	24	
28		0.9	2.0	1.1	1.1	0.9	3.4	2.3	2.0	1.5	1.5	1.6	1.1	1.3	1.3	1.8	S	1.0	P	0.8	1.1	1.1	1.1	1.1	1.1	0.8	3.4	1.4	23	
29		1.1	1.1	1.2	1.1	1.2	2.9	17.4	2.4	3.5	2.0	12.5	1.2	1.4	1.9	S	2.0	1.1	1.1	1.1	1.1	1.1	0.9	1.1	0.9	0.9	17.4	2.7	24	
30		1.1	1.1	0.9	1.1	1.3	1.1	1.2	1.1	1.1	1.3	1.2	1.5	1.3	S	1.2	1.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.9	1.5	1.2	24	
31		1.2	1.2	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.3	1.1	S	1.6	1.6	1.3	1.3	1.3	1.2	1.4	1.2	1.4	1.3	1.2	1.0	1.6	1.2	24	
HOURLY MAX		1.3	2.0	1.4	1.8	1.5	3.4	17.4	11.5	3.5	7.2	12.5	6.1	18.4	13.8	2.2	10.1	5.7	7.8	2.7	2.4	3.2	30.9	2.4	1.2					
HOURLY AVG		1.0	1.0	1.0	1.1	1.0	1.4	2.0	2.1	1.4	1.5	1.9	1.3	1.9	1.6	1.2	1.8	1.4	1.4	1.2	1.2	1.1	2.5	1.0	0.9					

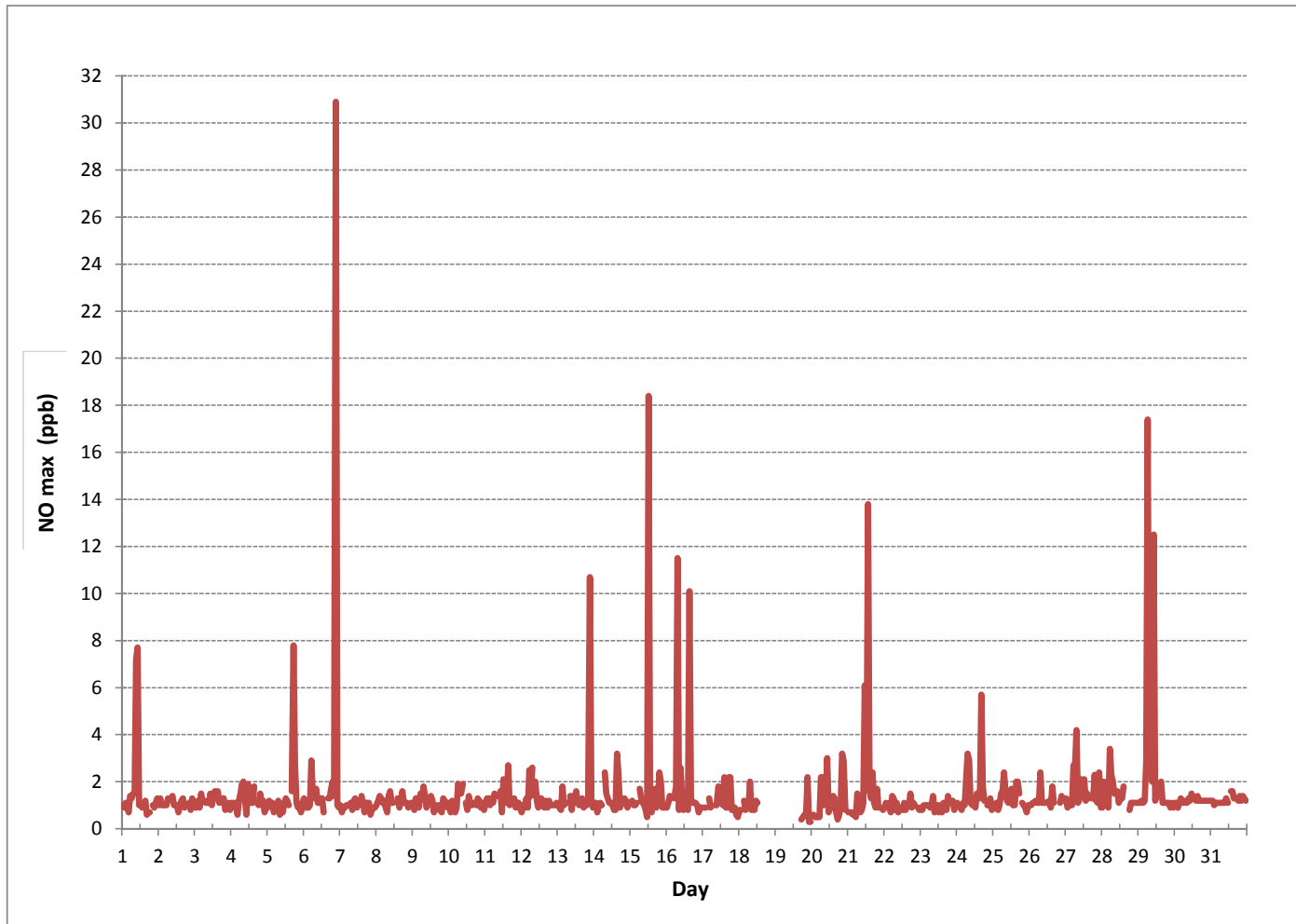
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

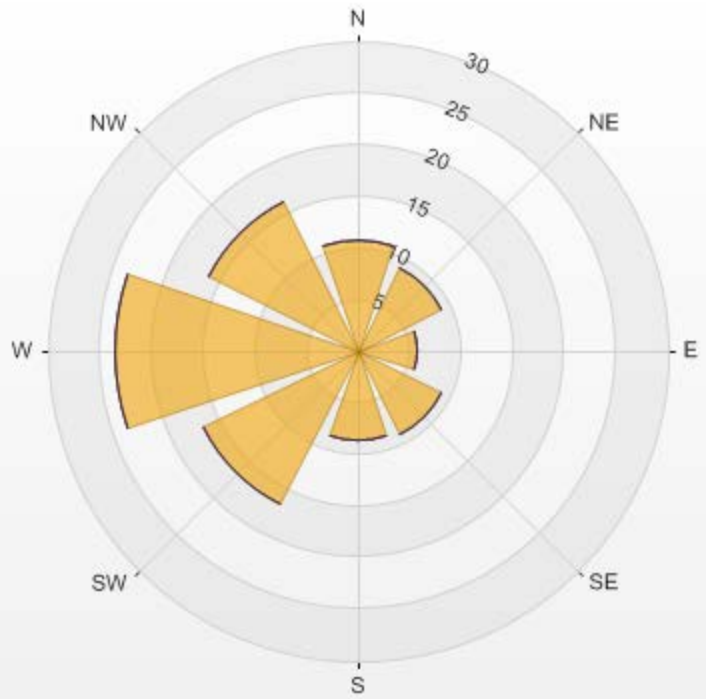
NUMBER OF NON-ZERO READINGS:	678
MAXIMUM INSTANTANEOUS VALUE:	30.9 PPB @ HOUR(S) 21 ON DAY(S) 6
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 HRS
MONTHLY CALIBRATION TIME:	13 HRS
OPERATIONAL TIME:	722 HRS
STANDARD DEVIATION:	1.84

NITRIC OXIDE MAX instantaneous maximum in ppb



Wind: LICA ST. LINA Monitor: NO [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 91.80% Calm Avg: 0.00

Direction	0.0-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	10.83	0	0	0	10.83
NE	9.08	0	0	0	9.08
E	5.86	0	0	0	5.86
SE	9.08	0	0	0	9.08
S	8.64	0	0	0	8.64
SW	16.69	0	0	0	16.69
W	23.57	0	0	0	23.57
NW	16.25	0	0	0	16.25
Summary	100	0	0	0	100



% Icon Classes (ppb)							
100	 0.0-50.0	0	 50.0-110.0	0	 110.0-210.0	0	 >210.0

NITROGEN DIOXIDE

NITROGEN DIOXIDE (NO2) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
DAY	MIN.	MAX.	AVG.	RDGS.																									
1	1.1	1.4	1.1	1.6	1.5	2.9	3.5	2.4	2.6	2.2	1.6	1.1	0.7	0.5	0.6	0.7	0.7	0.6	0.7	S	1.7	1.9	2.2	2.7	0.5	3.5	1.6	24	
2	3.3	3.4	3.6	3.6	4.0	3.8	2.4	1.8	1.6	1.6	1.5	1.3	1.3	0.8	1.3	1.3	1.3	1.2	S	1.2	1.6	2.0	2.7	3.5	0.8	4.0	2.2	24	
3	2.9	2.7	3.2	2.9	3.0	2.8	2.5	2.6	1.7	1.3	1.2	0.6	0.8	1.9	1.4	1.3	1.0	S	1.2	0.8	0.2	0.5	0.4	0.4	0.2	3.2	1.6	24	
4	0.8	1.0	1.1	1.3	0.6	1.2	1.4	0.9	1.1	0.0	0.0	0.2	0.1	0.2	0.1	0.3	S	0.6	0.4	1.2	0.7	0.4	0.7	0.7	0.0	1.4	0.7	24	
5	0.5	0.8	0.7	1.0	0.8	0.8	0.6	0.5	0.1	0.0	0.3	0.6	0.5	0.7	0.3	S	0.9	0.7	0.7	0.7	0.6	1.0	1.1	1.1	0.0	1.1	0.7	24	
6	0.9	0.7	0.7	0.8	0.8	1.5	1.0	0.6	0.6	0.3	0.5	0.6	0.8	0.3	S	0.9	0.8	0.9	1.0	2.0	1.0	2.1	0.7	0.5	0.3	2.1	0.9	24	
7	0.9	0.6	0.7	0.7	0.7	0.7	0.5	0.5	0.3	0.8	0.9	0.3	S	0.7	0.4	0.1	0.3	0.8	0.7	0.7	1.1	1.3	1.5	0.1	1.5	0.7	24		
8	0.7	1.1	1.7	1.4	1.4	1.3	3.0	1.0	1.6	1.7	1.5	1.1	S	1.0	1.2	1.0	1.3	1.7	1.3	1.4	1.5	1.8	3.1	0.7	3.1	1.5	24		
9	5.8	5.4	7.0	6.1	3.2	3.0	3.2	2.6	1.4	0.8	1.7	S	1.4	0.9	0.3	0.2	0.3	0.6	0.6	0.6	1.0	2.2	2.0	2.5	0.2	7.0	2.3	24	
10	4.3	5.6	5.1	3.1	2.5	2.2	2.9	4.3	2.9	2.0	S	1.0	0.6	0.7	0.4	0.4	0.1	0.3	0.7	1.2	0.5	0.3	0.4	0.2	0.1	5.6	1.8	24	
11	0.3	0.4	0.7	0.8	1.2	0.7	0.8	0.9	1.1	S	0.5	0.0	0.4	0.4	0.2	0.9	0.0	0.3	0.2	0.2	0.0	0.1	0.3	0.2	0.0	1.2	0.5	24	
12	0.3	0.5	0.8	1.1	0.9	1.6	1.0	1.1	S	1.0	0.6	0.2	0.2	0.2	0.2	0.1	0.4	0.5	0.4	0.1	0.0	0.1	0.1	0.3	0.0	1.6	0.5	24	
13	0.1	0.1	0.1	0.4	0.3	0.3	0.5	S	0.0	0.0	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	0.6	0.4	0.0	0.8	0.2	24
14	0.5	0.2	0.3	0.3	0.8	0.9	S	2.5	1.2	0.8	1.1	0.3	0.4	0.0	0.2	0.8	0.5	0.2	0.1	0.7	1.0	0.5	0.0	0.4	0.0	2.5	0.6	24	
15	0.2	0.6	0.5	0.7	1.4	S	1.8	2.4	1.3	1.1	0.6	0.0	0.8	0.0	0.2	0.4	1.0	0.5	1.0	1.8	1.3	0.8	1.1	1.2	0.0	2.4	0.9	24	
16	1.0	1.5	1.4	1.7	S	1.4	1.5	1.4	0.8	1.3	0.7	0.7	0.5	0.7	0.3	0.7	0.5	0.8	0.6	0.5	0.4	0.3	0.5	0.5	0.3	1.7	0.9	24	
17	0.8	0.9	1.0	S	1.6	1.4	S1	1.3	1.1	0.9	0.8	0.7	0.5	0.6	0.7	0.4	0.3	0.6	0.5	0.7	0.7	0.4	0.6	2.8	0.3	2.8	0.9	23	
18	2.5	0.7	S	1.1	1.0	1.0	0.8	1.2	0.9	0.7	0.3	0.3	0.4	C	C	C	C	C	C	Y	Y	Y	Y	Y	Y	0.3	2.5	0.9	18
19	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	C	C	0.0	0.1	0.9	1.9	2.2	1.1	0.8	0.0	2.2	1.0	15	
20	S	0.6	0.1	0.8	0.8	0.5	0.6	0.2	0.0	0.3	0.8	0.1	0.3	0.3	0.1	0.2	0.2	0.0	0.0	0.1	0.5	0.6	0.3	S	0.0	0.8	0.3	24	
21	0.6	0.6	0.5	0.4	0.2	0.2	0.4	0.4	0.3	0.2	0.2	0.4	0.6	0.9	0.5	0.2	0.6	0.2	0.0	0.5	0.2	0.2	S	0.2	0.0	0.9	0.4	24	
22	0.1	0.3	0.3	0.7	0.6	0.9	1.5	0.9	0.4	0.2	0.3	0.3	0.1	0.2	0.2	0.4	0.6	0.9	0.4	0.5	0.6	S	0.4	0.9	0.1	1.5	0.5	24	
23	1.1	0.6	0.3	0.3	0.0	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	S	0.2	0.2	0.2	0.0	1.1	0.2	24	
24	0.6	0.8	0.7	0.6	0.9	1.6	1.9	3.8	3.3	1.1	0.5	0.7	0.8	2.4	1.3	1.5	1.2	0.8	0.6	S	0.4	1.1	1.2	0.8	0.4	3.8	1.2	24	
25	0.8	0.8	0.7	0.7	0.9	0.7	0.8	0.9	0.7	0.5	0.4	0.6	0.4	0.2	0.2	0.5	0.6	0.6	S	0.4	1.0	0.7	0.6	0.7	0.2	1.0	0.6	24	
26	1.0	0.7	0.8	0.8	0.9	0.9	0.8	1.6	1.0	0.5	0.2	0.0	0.1	0.4	0.3	0.6	0.1	S	0.1	0.2	0.1	0.7	0.5	0.5	0.0	1.6	0.6	24	
27	0.6	0.5	0.9	1.0	1.2	1.6	1.6	1.7	1.4	1.3	1.1	1.0	0.6	0.5	0.7	0.6	S	0.5	0.9	1.4	2.3	2.8	2.8	2.6	0.5	2.8	1.3	24	
28	2.2	2.8	2.9	3.2	3.1	4.3	2.8	2.7	2.3	2.2	2.4	0.8	0.4	0.2	0.4	S	0.1	P	0.0	0.5	0.8	1.0	0.9	0.9	0.0	4.3	1.7	23	
29	0.9	1.0	1.2	1.1	1.5	2.0	2.1	1.8	2.1	1.8	1.6	1.0	1.1	1.1	S	1.0	0.4	0.6	0.6	1.2	0.8	0.8	0.9	1.2	0.4	2.1	1.2	24	
30	1.5	1.7	1.1	0.6	0.7	0.8	0.9	0.6	0.6	0.6	0.7	0.7	0.7	S	0.4	0.5	0.2	0.3	0.3	0.7	1.1	0.3	0.3	0.3	0.2	1.7	0.7	24	
31	0.3	0.4	0.3	0.6	0.5	0.4	0.4	0.4	0.1	0.0	0.2	0.2	S	0.2	0.3	0.2	0.1	0.2	0.0	0.1	0.3	0.7	0.7	0.6	0.0	0.7	0.3	24	
HOURLY MAX	5.8	5.6	7.0	6.1	4.0	4.3	3.5	4.3	3.3	2.2	2.4	1.3	1.4	2.4	1.4	1.5	1.3	1.3	1.7	2.0	2.3	2.8	2.8	3.5					
HOURLY AVG	1.3	1.3	1.4	1.4	1.3	1.4	1.5	1.5	1.1	0.9	0.8	0.5	0.5	0.6	0.5	0.6	0.5	0.5	0.5	0.7	0.8	0.9	0.9	1.1					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

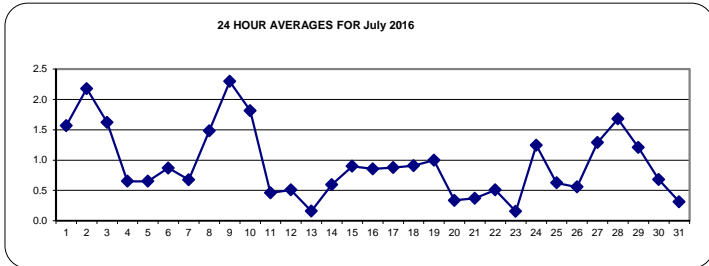
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 PPB

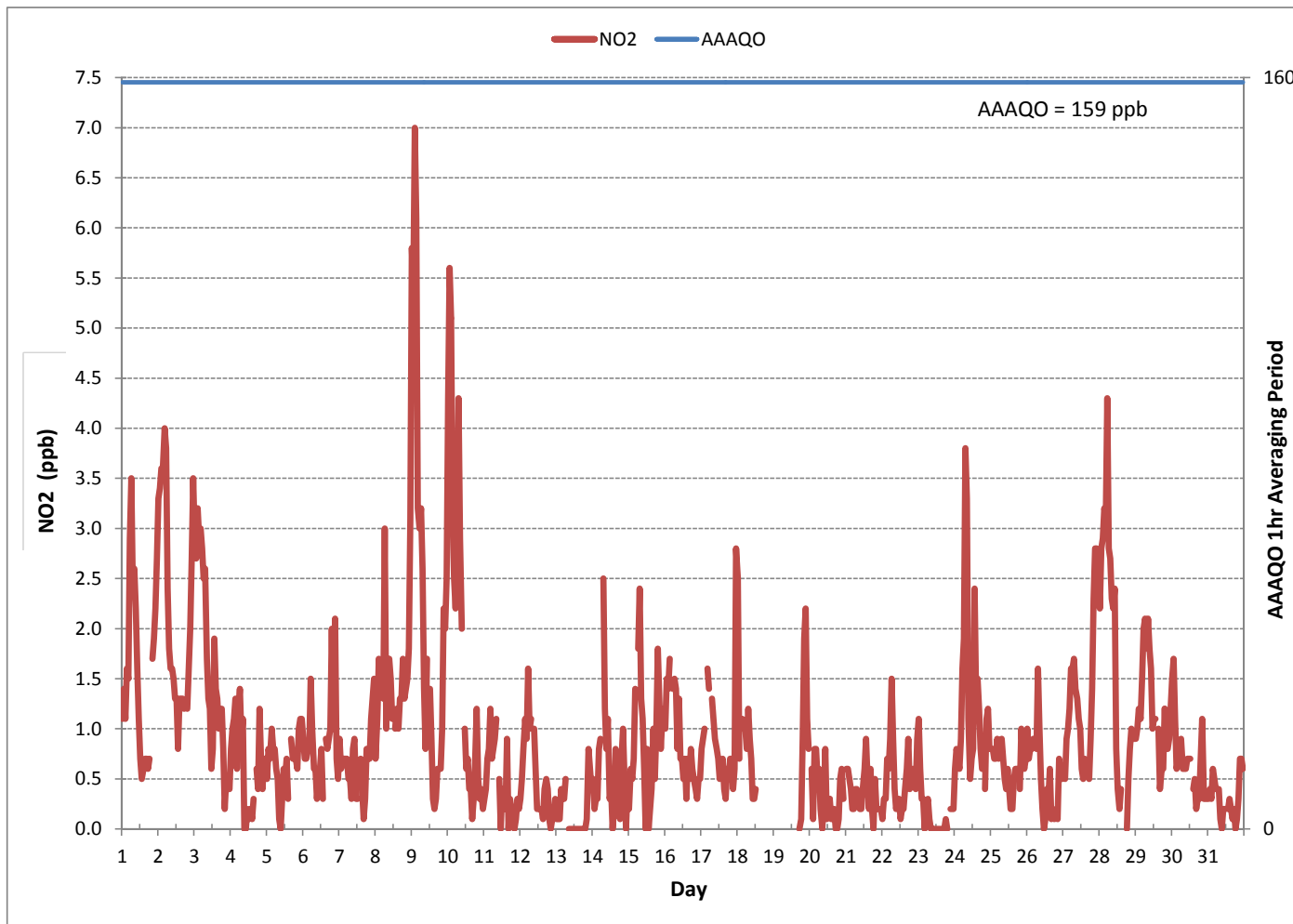
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDENCES:	0					
NUMBER OF NON-ZERO READINGS:	639					
MINIMUM 1-HR AVERAGE:	0.0	PPB	@ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 1-HR AVERAGE:	7.0	PPB	@ HOUR(S)	2	ON DAY(S)	9
MAXIMUM 24-HR AVERAGE:	2.3	PPB			ON DAY(S)	9
					VAR-VARIOUS	
IZS CALIBRATION TIME:	31	HRS	OPERATIONAL TIME:	727	HRS	
MONTHLY CALIBRATION TIME:	13	HRS	AMD OPERATION UPTIME:	97.7	%	
STANDARD DEVIATION:	0.92		MONTHLY AVERAGE:	0.9	PPB	

24 HOUR AVERAGES FOR July 2016



NITROGEN DIOXIDE (NO2) hourly averages in ppb





NITROGEN DIOXIDE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
HOUR START	HOUR END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.	
DAY																														
1		0.9	1.3	0.7	1.3	1.5	2.6	2.9	1.9	1.9	1.5	1.7	0.4	0.2	0.2	0.0	0.1	0.3	0.1	0.1	S	0.9	1.5	1.6	2.0	0.0	2.9	1.1	24	
2		2.8	3.1	2.8	2.6	3.6	3.3	1.8	P	0.6	0.8	0.7	0.4	0.5	0.4	0.4	0.5	0.2	0.5	S	0.4	0.7	1.6	2.4	2.8	0.2	3.6	1.5	23	
3		2.2	2.2	2.6	2.8	2.2	2.2	2.1	2.4	1.7	0.8	0.4	0.5	0.6	1.6	2.0	2.2	0.9	S	0.7	0.5	0.0	0.2	0.2	0.0	0.0	2.8	1.3	24	
4		0.6	0.6	0.7	0.8	0.9	1.0	0.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.8	0.6	0.0	0.2	0.0	0.0	1.0	0.3	24	
5		0.0	0.0	0.3	0.4	0.2	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	S	0.0	4.3	1.9	0.1	0.2	0.4	0.4	0.5	0.0	4.3	0.4	24	
6		0.2	0.2	0.2	0.2	0.3	1.1	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.2	S	P	1.3	0.3	4.0	4.6	1.6	18.8	0.4	0.4	0.0	18.8	1.6	23	
7		0.6	0.7	0.3	0.6	0.7	0.4	0.2	0.3	0.2	0.9	1.7	0.2	0.2	S	0.2	0.0	0.0	0.4	1.3	0.4	0.4	0.9	1.4	1.0	0.0	1.7	0.6	24	
8		0.4	0.8	0.9	0.6	0.9	0.7	2.6	1.6	1.1	1.5	1.3	0.6	S	P	0.5	0.3	0.9	0.8	1.6	0.5	0.7	0.7	1.0	4.6	0.3	4.6	1.1	23	
9		5.2	6.1	6.7	5.8	2.8	2.4	2.3	2.0	0.7	0.4	0.9	S	0.9	0.4	0.1	0.0	0.0	0.1	0.4	2.0	1.6	2.4	0.0	0.0	6.7	1.9	24		
10		4.1	5.6	4.6	2.9	2.1	1.5	2.4	3.1	2.4	1.4	S	0.6	0.0	0.0	0.0	0.0	0.0	0.7	1.2	0.6	0.0	0.4	0.2	0.0	5.6	1.5	24		
11		0.0	0.0	0.2	0.4	1.1	0.3	0.3	0.4	0.3	S	0.2	0.0	0.0	0.0	0.1	1.3	0.0	0.1	0.0	0.4	0.0	0.0	0.0	0.2	0.0	1.3	0.2	24	
12		0.3	0.3	0.6	0.6	0.6	1.4	0.3	1.0	S	0.6	0.2	0.2	0.0	0.0	0.0	0.2	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.3	24	
13		0.1	0.1	0.2	1.1	0.4	0.6	0.6	S	0.2	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.2	0.0	0.0	13.7	0.6	0.4	0.0	13.7	0.8	24	
14		0.5	0.1	0.1	0.3	0.5	0.8	S	1.7	1.5	1.0	0.7	0.3	0.1	0.0	0.2	1.6	2.0	1.0	0.3	0.4	0.7	0.4	0.0	0.0	0.0	2.0	0.6	24	
15		0.2	0.4	0.3	0.5	1.3	S	1.9	1.8	0.9	0.6	0.4	0.0	8.6	0.0	0.0	0.1	1.7	0.2	0.7	3.4	1.7	0.4	0.4	0.6	0.0	8.6	1.1	24	
16		0.3	0.8	1.8	1.9	S	0.2	0.6	14.3	0.2	0.6	0.0	0.1	0.4	0.0	0.2	7.0	0.3	0.4	0.0	0.0	0.5	0.0	0.1	0.4	0.0	14.3	1.3	24	
17		0.2	0.7	0.6	S	1.0	0.9	S1	S1	0.6	0.4	0.5	0.0	0.2	0.2	1.3	0.0	0.0	0.9	1.1	0.7	0.4	0.2	0.6	3.4	0.0	3.4	0.7	22	
18		4.4	1.6	S	1.7	1.2	1.2	1.1	2.6	0.7	0.6	0.0	0.1	0.2	C	C	C	C	C	Y	Y	Y	Y	Y	Y	0.0	4.4	1.3	18	
19		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	C	0.6	0.9	2.2	4.2	8.0	2.0	1.6	0.6	8.0	2.8	15	
20		S	1.0	1.4	1.7	1.2	1.2	1.8	1.0	1.7	1.8	2.0	0.7	0.6	0.4	1.5	0.7	0.5	0.2	0.2	0.3	0.9	2.3	0.6	S	0.2	2.3	1.1	24	
21		0.8	0.7	1.0	0.7	0.4	0.5	1.1	0.5	0.5	0.4	0.4	7.1	1.1	11.5	0.8	0.8	0.8	0.5	0.2	1.4	0.4	0.4	S	0.4	0.2	11.5	1.4	24	
22		0.3	0.7	0.6	0.8	0.9	1.2	1.5	1.0	0.7	0.5	0.5	0.5	0.2	0.8	0.5	0.5	1.0	2.0	0.9	1.6	1.8	S	0.9	1.7	0.2	2.0	0.9	24	
23		1.9	0.9	0.7	0.5	0.2	0.5	0.6	0.3	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.6	S	0.1	0.4	0.4	0.0	1.9	0.3	24		
24		0.9	0.7	0.6	0.8	1.0	1.6	2.6	3.8	3.7	1.4	0.4	0.7	1.0	2.4	1.3	1.9	8.5	1.2	1.2	S	0.5	1.4	1.2	0.7	0.4	8.5	1.7	24	
25		0.7	0.7	0.6	0.8	0.8	0.5	0.4	0.5	0.4	0.4	0.3	0.4	0.1	0.4	0.3	0.6	1.0	0.8	S	0.5	1.1	0.5	0.6	0.8	0.1	1.1	0.6	24	
26		0.8	0.8	0.8	0.9	0.9	1.2	3.2	1.5	0.9	0.4	0.4	0.4	0.9	0.9	0.6	2.5	0.6	S	1.3	P	0.5	1.7	0.9	1.1	0.4	3.2	1.1	23	
27		1.5	0.9	1.2	1.3	1.7	2.2	1.7	1.4	1.3	1.5	1.5	1.1	1.5	0.5	1.3	0.6	S	0.6	2.6	3.0	2.8	3.4	4.5	2.8	0.5	4.5	1.8	24	
28		2.5	4.0	3.1	3.6	4.0	6.2	2.8	3.4	2.4	2.4	2.8	1.5	1.1	0.6	1.5	S	0.6	P	1.2	1.1	1.2	1.3	1.2	1.2	0.6	6.2	2.3	23	
29		1.2	1.3	1.4	1.5	1.7	2.2	15.6	1.8	2.1	1.6	16.0	1.3	2.0	1.9	S	1.2	0.7	1.2	0.9	2.8	1.1	1.2	1.5	1.5	0.7	16.0	2.8	24	
30		2.0	2.0	1.5	0.9	1.7	1.0	1.2	0.7	0.9	0.6	0.7	1.5	0.9	S	0.5	0.5	0.5	0.5	0.5	2.4	1.6	0.6	0.7	0.5	0.5	2.4	1.0	24	
31		0.6	0.7	0.7	0.7	0.7	0.8	0.4	0.4	0.4	0.3	0.4	S	0.2	0.7	0.2	0.6	0.2	0.2	0.7	0.7	0.8	1.1	0.9	0.2	1.1	0.6	24		
HOURLY MAX		5.2	6.1	6.7	5.8	4.0	6.2	15.6	14.3	3.7	2.4	16.0	7.1	8.6	11.5	2.0	7.0	8.5	4.3	4.0	4.6	4.2	18.8	4.5	4.6					
HOURLY AVG		1.2	1.3	1.3	1.3	1.3	1.4	1.8	1.9	1.0	0.8	1.2	0.7	0.8	0.9	0.5	0.9	0.8	0.6	0.8	1.1	0.9	2.2	0.9	1.1					

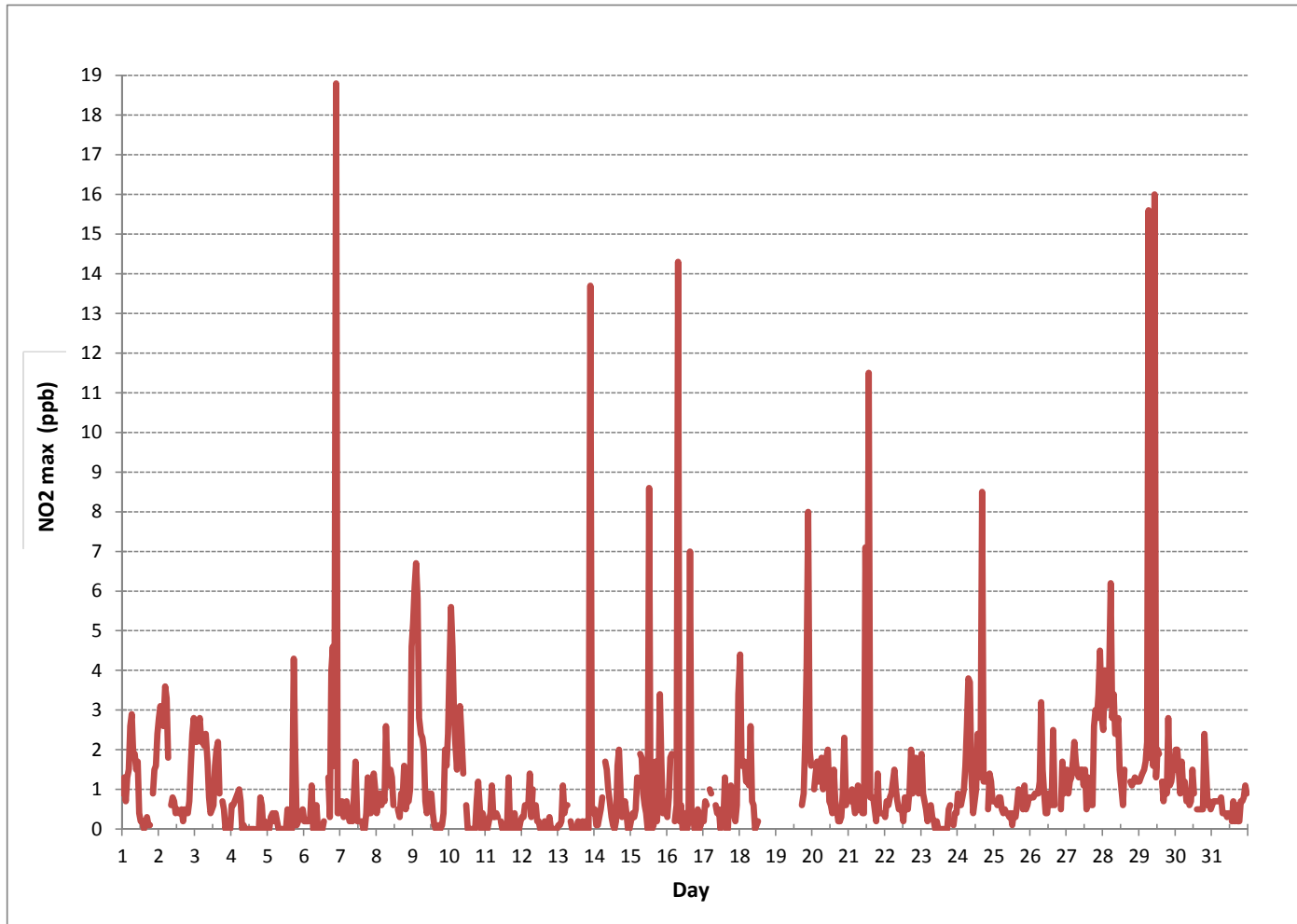
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

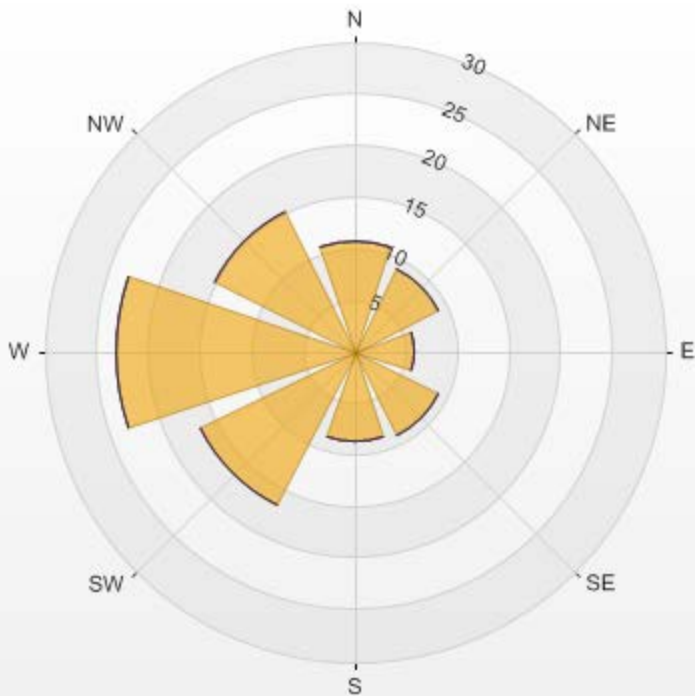
NUMBER OF NON-ZERO READINGS:	584
MAXIMUM INSTANTANEOUS VALUE:	18.8 PPB @ HOUR(S) 21 ON DAY(S) 6
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 HRS
MONTHLY CALIBRATION TIME:	13 HRS
STANDARD DEVIATION:	1.77
OPERATIONAL TIME:	722 HRS

NITROGEN DIOXIDE MAX instantaneous maximum in ppb



Wind: LICA ST. LINA Monitor: NO2 [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 1.46% Valid Data: 91.80% Calm Avg: 0.00

Direction	0.0-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	10.83	0	0	0	10.83
NE	9.08	0	0	0	9.08
E	5.86	0	0	0	5.86
SE	9.08	0	0	0	9.08
S	8.64	0	0	0	8.64
SW	16.69	0	0	0	16.69
W	23.13	0	0	0	23.13
NW	15.23	0	0	0	15.23
Summary	98.54	0	0	0	98.54



% Icon Classes (ppb)



NO2[ppb] Calibration: LICA ST. LINA Monthly: 07/2016 Type: Span



Span Meas Span Ref Span Low Span High

OZONE

OZONE (O3) hourly averages in ppb

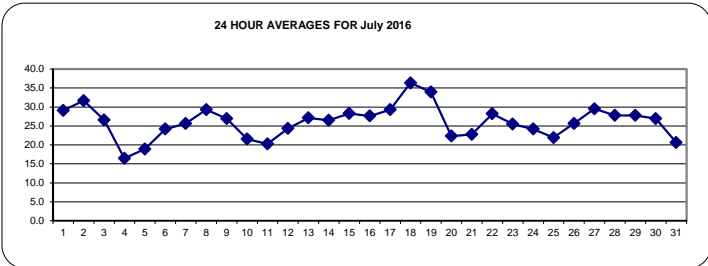
MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
HR START	HR END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.	
DAY																														
1		36.8	30.8	32.5	25.0	28.4	23.9	13.7	16.3	18.2	19.6	24.1	27.3	36.1	39.5	39.8	38.6	32.6	31.7	35.5	S	31.4	30.6	29.8	27.3	13.7	39.8	29.1	24	
2		25.2	24.6	22.5	20.0	16.5	18.4	23.5	27.7	35.7	36.2	36.0	38.4	37.9	40.4	40.3	41.4	42.0	39.4	S	39.4	35.9	32.5	29.0	25.3	16.5	42.0	31.7	24	
3		25.6	25.1	22.1	19.7	18.5	17.6	17.3	34.1	32.0	31.0	36.9	34.2	42.7	42.5	42.2	34.6	30.4	S	25.0	19.9	17.1	15.4	14.5	12.9	12.9	42.7	26.6	24	
4		10.1	11.2	9.2	9.3	11.1	11.1	11.8	12.8	14.5	17.5	21.0	21.4	22.9	23.3	22.9	22.3	S	21.3	20.3	17.8	19.1	18.5	15.1	14.8	9.2	23.3	16.5	24	
5		13.6	12.3	10.8	10.2	8.8	12.2	16.3	22.6	23.7	21.0	16.2	15.1	15.5	17.1	23.3	S	25.8	27.9	29.8	28.1	24.7	22.6	20.7	16.7	8.8	29.8	18.9	24	
6		15.4	14.9	14.2	12.7	11.8	11.4	10.4	13.3	17.1	20.2	22.1	22.4	33.3	36.1	S	40.6	37.8	37.4	39.0	30.8	30.4	26.4	28.0	30.6	10.4	40.6	24.2	24	
7		26.6	25.5	23.1	18.6	17.1	13.6	14.6	18.3	20.6	22.6	33.2	36.4	36.4	S	34.8	35.2	34.5	32.9	26.4	23.5	24.2	21.5	22.1	28.5	13.6	36.4	25.7	24	
8		32.1	22.0	29.3	35.9	22.3	28.2	18.9	22.5	24.2	25.7	33.4	37.5	S	35.8	34.5	33.0	34.9	37.1	35.5	28.4	29.7	27.4	26.9	19.4	18.9	37.5	29.3	24	
9		14.1	13.6	11.4	13.4	15.6	17.7	18.9	20.2	26.3	30.6	38.8	S	44.4	43.1	39.3	38.2	37.0	34.9	32.9	30.5	29.9	25.8	22.8	20.7	11.4	44.4	27.0	24	
10		16.3	14.2	15.0	17.2	15.1	13.0	10.4	11.6	14.2	22.2	S	38.1	34.5	32.9	33.0	33.0	30.4	29.6	24.1	22.3	22.1	18.8	15.0	13.1	10.4	38.1	21.6	24	
11		12.7	14.0	14.1	14.8	15.5	15.7	15.3	15.0	14.6	S	21.4	25.8	23.4	24.5	24.7	24.8	21.0	20.8	22.1	28.2	27.9	25.9	23.7	19.9	12.7	28.2	20.3	24	
12		18.1	19.5	14.4	11.2	10.4	11.5	13.0	18.0	S	22.4	24.9	25.8	28.2	30.7	33.1	34.2	39.2	39.6	36.5	32.2	27.4	24.7	22.9	22.1	10.4	39.6	24.3	24	
13		22.6	26.3	24.3	18.7	19.6	19.4	22.3	S	27.0	30.1	31.9	31.8	32.0	32.2	33.1	32.6	31.9	29.1	29.4	28.9	26.8	24.6	24.1	25.4	18.7	33.1	27.1	24	
14		25.2	26.2	25.5	24.0	21.5	19.3	S	18.8	20.8	24.1	29.7	33.1	35.7	31.8	27.8	29.9	27.8	28.8	25.6	24.9	24.4	25.0	31.2	29.3	18.8	35.7	26.5	24	
15		28.9	28.3	28.4	27.2	26.7	S	20.8	22.5	25.7	29.2	30.7	28.9	28.9	29.9	31.7	29.6	32.6	34.6	36.2	31.7	24.3	23.7	25.4	25.0	20.8	36.2	28.3	24	
16		25.9	22.3	26.3	13.1	S	10.9	15.1	20.9	25.6	26.4	28.2	30.8	32.6	35.6	36.9	35.4	36.1	33.5	34.6	31.8	32.3	31.1	25.2	25.2	10.9	36.9	27.6	24	
17		27.0	25.5	25.3	S	19.7	17.8	18.3	17.8	20.5	23.5	25.3	28.1	29.9	31.0	32.9	35.8	35.4	35.6	38.7	36.8	36.5	36.9	38.7	37.3	17.8	38.7	29.3	24	
18		36.1	36.6	S	36.4	37.0	34.5	29.4	30.3	31.7	30.7	29.6	33.4	36.8	38.1	40.3	42.5	41.8	42.3	40.7	40.5	38.1	38.2	36.0	34.9	29.4	42.5	36.3	24	
19		33.0	S	28.1	24.7	23.1	20.8	19.9	21.8	31.1	37.9	36.6	46.0	47.1	43.0	38.4	37.5	38.0	39.1	38.7	39.5	37.4	33.6	34.4	31.2	19.9	47.1	34.0	24	
20		S	26.9	25.4	16.0	18.8	21.7	20.8	21.4	23.3	23.0	24.4	30.0	C	C	C	C	C	25.2	23.9	21.9	20.2	19.1	17.7	S	16.0	30.0	22.3	24	
21		16.2	14.9	14.2	14.1	15.4	14.7	14.0	17.2	20.7	24.2	26.5	28.7	29.9	31.8	27.9	25.5	24.8	28.0	30.9	29.3	26.6	24.8	S	23.2	14.0	31.8	22.8	24	
22		23.6	23.1	17.6	20.7	19.9	15.0	13.9	21.6	24.8	27.3	29.3	30.3	30.6	30.4	33.7	36.8	38.0	37.9	39.2	36.3	37.4	S	32.6	29.3	13.9	39.2	28.2	24	
23		28.8	29.1	26.8	25.1	25.9	23.4	22.4	22.2	24.2	26.3	28.8	30.4	29.2	27.9	27.6	26.6	26.0	25.2	24.9	23.9	S	22.3	20.5	19.4	19.4	30.4	25.5	24	
24		16.9	16.6	17.8	17.1	16.6	13.9	13.6	15.5	24.0	29.6	29.4	32.2	36.4	43.7	40.1	40.6	35.6	27.8	24.2	S	20.9	13.6	14.4	15.6	13.6	43.7	24.2	24	
25		13.7	13.1	15.0	13.4	12.1	12.8	13.0	16.9	21.9	23.8	25.6	26.3	28.0	27.1	26.2	27.2	27.5	28.2	S	27.3	24.4	26.4	27.4	27.2	12.1	28.2	21.9	24	
26		23.2	23.2	21.7	20.1	19.9	17.7	15.3	16.9	18.3	22.4	26.1	30.3	31.8	32.7	33.4	32.2	32.2	S	31.7	31.3	29.9	26.7	26.3	26.5	15.3	33.4	25.6	24	
27		25.0	24.5	22.8	20.9	17.4	14.2	14.6	15.7	25.4	30.4	32.4	34.4	35.1	35.8	34.6	33.3	S	33.5	31.7	31.4	44.0	44.8	42.1	35.4	14.2	44.8	29.5	24	
28		35.0	26.3	19.7	22.2	23.6	17.7	13.5	19.7	24.7	31.8	36.5	35.5	33.4	33.2	34.7	S	32.3	P	32.9	32.2	30.4	26.6	25.2	24.9	13.5	36.5	27.8	23	
29		25.1	27.3	22.9	19.5	14.5	14.6	15.7	18.4	20.1	28.7	37.0	40.5	41.3	37.9	S	32.5	30.7	33.9	31.0	31.5	32.5	28.9	27.3	26.8	14.5	41.3	27.8	24	
30		26.4	22.9	25.4	28.2	26.5	21.1	22.1	19.8	22.1	24.8	24.7	22.3	24.0	S	31.8	33.5	33.9	33.4	31.2	28.7	25.3	32.5	30.8	28.8	19.8	33.9	27.0	24	
31		26.4	23.5	21.0	18.0	16.4	15.6	15.4	16.6	20.6	20.3	21.6	23.8	S	23.1	25.1	24.4	25.3	22.0	23.3	25.1	19.3	16.9	15.3	14.9	14.9	26.4	20.6	24	
HOURLY MAX		36.8	36.6	32.5	36.4	37.0	34.5	29.4	34.1	35.7	37.9	38.8	46.0	47.1	43.7	42.2	42.5	42.0	42.3	40.7	40.5	44.0	44.8	42.1	37.3					
HOURLY AVG		23.5	22.1	20.9	19.6	18.9	17.3	16.8	19.5	23.1	26.1	28.7	30.6	32.8	33.3	33.0	33.3	32.7	31.8	30.9	29.5	28.4	26.2	25.5	24.4					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

OBJECTIVE LIMIT:

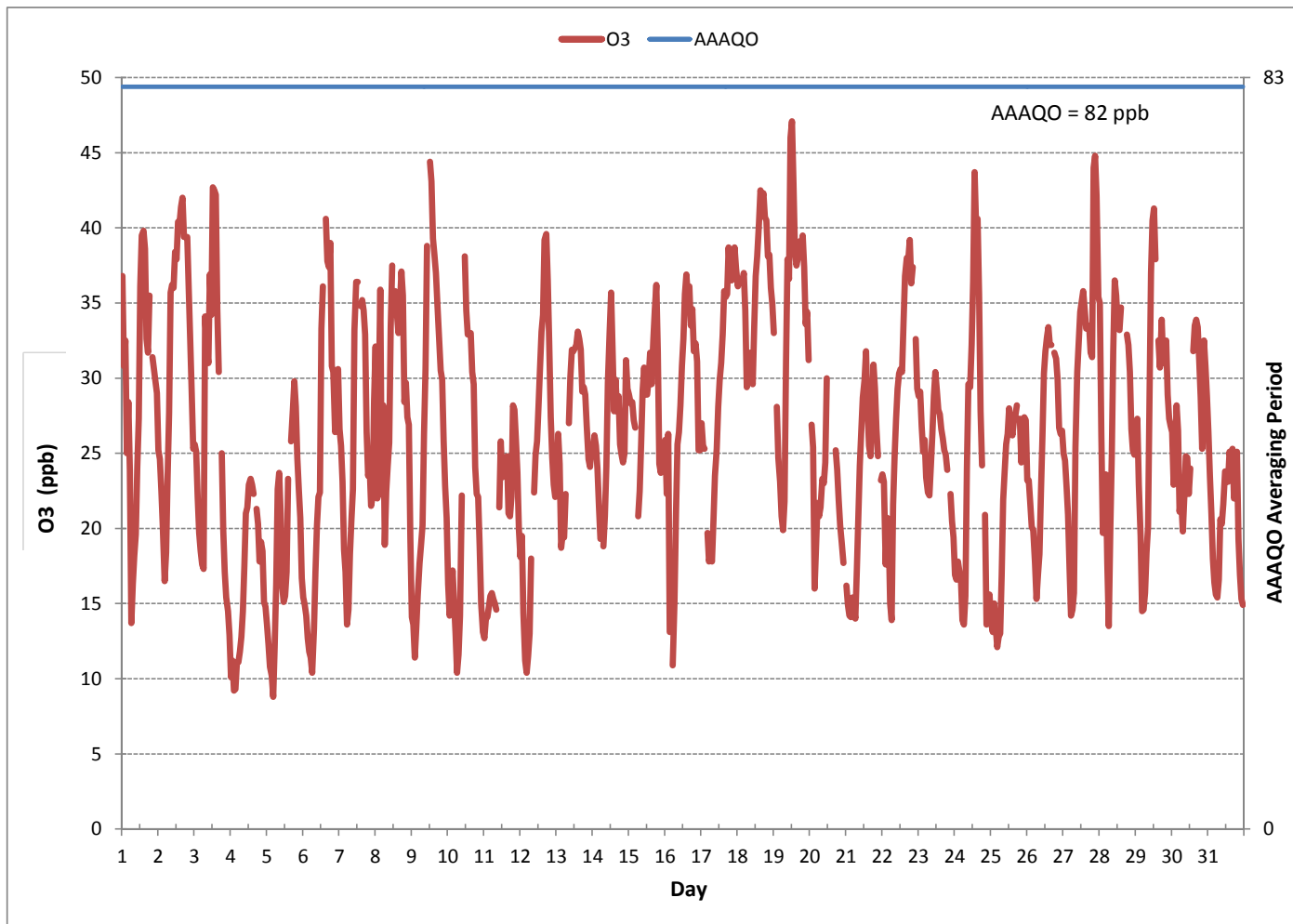
ALBERTA ENVIRONMENT: 1-HR 82 PPB



MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDENCES:	0					
NUMBER OF NON-ZERO READINGS:	706					
MINIMUM 1-HR AVERAGE:	8.8	PPB	@ HOUR(S)	4	ON DAY(S)	5
MAXIMUM 1-HR AVERAGE:	47.1	PPB	@ HOUR(S)	12	ON DAY(S)	19
MAXIMUM 24-HR AVERAGE:	36.3	PPB			ON DAY(S)	18
					VAR-VARIOUS	
IZS CALIBRATION TIME:	32	HRS	OPERATIONAL TIME:	743	HRS	
MONTHLY CALIBRATION TIME:	5	HRS	AMD OPERATION UPTIME:	99.9	%	
STANDARD DEVIATION:	8.02		MONTHLY AVERAGE:	26.1	PPB	

OZONE (O3) hourly averages in ppb





OZONE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
HOUR START	HOUR END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.
DAY																													
1		41.5	36.3	39.6	29.4	30.6	31.3	15.1	17.9	18.8	25.0	26.5	29.7	37.5	40.3	42.1	40.5	37.6	34.4	36.5	S	32.2	31.0	30.5	28.2	15.1	42.1	31.8	24
2		26.4	25.0	23.1	21.0	17.8	22.6	25.5	P	38.4	37.2	37.9	40.2	39.9	41.9	41.7	43.1	43.9	41.4	S	40.7	36.2	35.1	30.0	26.1	17.8	43.9	33.4	23
3		26.1	25.6	23.8	20.0	19.0	18.2	30.9	36.9	39.8	37.4	38.8	36.9	45.0	45.7	46.3	36.3	32.4	S	27.0	22.3	17.8	15.8	14.7	13.9	13.9	46.3	29.2	24
4		11.6	11.6	11.0	9.4	12.1	11.5	12.7	13.2	16.0	20.1	22.7	22.2	23.7	23.9	23.5	22.7	S	21.8	20.9	19.7	19.7	19.8	16.0	15.2	9.4	23.9	17.4	24
5		14.4	12.9	11.2	10.7	10.0	16.4	23.5	23.5	23.8	23.1	18.4	15.4	17.0	19.6	25.5	S	28.4	31.2	31.0	29.4	26.0	22.9	21.8	19.1	10.0	31.2	20.7	24
6		16.8	16.0	15.6	14.3	12.3	12.6	11.0	15.3	20.6	21.1	25.0	27.2	37.0	37.9	S	P	41.1	40.7	41.0	35.8	33.2	29.8	30.4	31.7	11.0	41.1	25.7	23
7		28.9	27.1	24.0	23.1	20.5	15.7	16.7	20.7	22.1	27.6	36.8	38.4	37.9	S	36.0	37.1	36.0	34.6	29.6	25.6	26.4	22.9	27.9	34.4	15.7	38.4	28.3	24
8		38.5	24.1	39.8	40.2	34.2	31.7	21.9	25.0	25.7	27.6	37.5	38.5	S	P	36.2	36.2	38.8	38.4	41.4	31.9	32.4	30.3	27.9	24.4	21.9	41.4	32.8	23
9		15.5	14.3	12.7	16.0	17.9	18.6	20.6	24.4	30.0	35.6	41.8	S	45.8	45.5	41.1	39.8	39.0	37.3	33.9	32.2	31.3	28.4	23.4	22.2	12.7	45.8	29.0	24
10		19.2	14.8	16.3	24.8	16.6	16.6	12.3	12.5	15.8	34.6	S	45.2	40.2	34.0	34.6	34.2	32.5	31.8	30.1	24.4	23.4	20.5	16.4	13.6	12.3	45.2	24.5	24
11		13.6	15.1	15.1	15.9	16.1	16.1	15.3	16.2	17.3	S	23.6	27.2	25.7	25.2	28.9	29.2	23.2	23.9	25.0	29.5	28.4	26.1	24.4	21.4	13.6	29.5	21.8	24
12		19.1	19.5	17.4	12.0	10.9	12.1	17.4	19.8	S	24.2	26.4	26.8	29.7	33.5	35.0	37.4	41.5	40.6	38.5	33.9	29.6	25.6	23.4	22.6	10.9	41.5	26.0	24
13		23.8	26.8	27.1	19.7	21.3	22.0	24.6	S	27.7	31.7	32.4	32.7	32.8	33.7	34.0	33.4	33.8	29.8	30.4	29.8	27.8	25.2	25.4	27.2	19.7	34.0	28.4	24
14		25.9	27.1	26.4	24.6	23.1	19.8	S	20.5	21.8	26.4	32.4	35.6	36.8	35.6	33.1	32.2	30.9	33.8	28.1	26.8	26.1	29.8	33.8	31.7	19.8	36.8	28.8	24
15		30.6	30.0	28.9	28.4	28.2	S	22.3	25.1	28.4	31.7	31.7	31.7	30.8	32.6	33.7	31.9	34.8	36.0	37.6	37.2	26.4	25.0	27.1	26.3	22.3	37.6	30.3	24
16		26.4	26.5	28.5	22.5	S	13.7	18.3	24.6	28.6	28.2	30.8	32.5	33.7	37.5	38.7	37.1	37.0	36.9	35.4	34.8	35.8	32.2	28.4	27.0	13.7	38.7	30.2	24
17		27.4	26.0	26.1	S	20.9	18.7	19.0	19.8	24.6	24.7	27.1	31.1	30.7	32.7	35.0	37.1	36.7	38.1	39.3	39.2	37.5	38.5	40.0	39.4	18.7	40.0	30.9	24
18		37.3	37.1	S	37.3	37.5	36.0	33.2	43.1	33.5	32.6	30.6	37.5	38.4	39.7	42.3	44.0	43.7	43.8	42.3	41.9	38.5	38.5	37.1	35.8	30.6	44.0	38.3	24
19		34.3	S	29.8	25.7	24.7	22.7	21.9	25.1	36.6	43.7	45.7	48.5	52.6	46.7	40.7	38.2	39.4	39.9	39.7	42.3	41.7	35.2	35.7	33.0	21.9	52.6	36.7	24
20		S	28.5	28.5	18.1	21.4	22.6	22.1	22.3	24.8	24.2	26.5	32.9	C	C	C	C	C	C	24.3	22.9	20.8	20.2	18.2	S	18.1	32.9	23.6	24
21		18.2	15.5	15.3	14.6	16.0	15.7	15.6	18.8	22.1	25.5	28.3	29.3	32.2	32.9	30.8	30.5	26.8	29.9	31.8	30.5	28.2	25.6	S	25.1	14.6	32.9	24.3	24
22		24.1	24.1	23.4	24.2	22.9	19.0	18.1	24.3	26.4	29.6	30.8	30.8	31.7	32.4	35.3	38.2	39.3	39.0	40.3	38.4	41.0	S	35.7	33.6	18.1	41.0	30.5	24
23		33.2	31.1	28.1	26.2	26.5	24.7	23.1	23.3	25.3	27.2	31.2	31.3	30.4	29.1	29.1	27.3	29.3	25.6	25.5	24.6	S	23.0	22.1	20.0	20.0	33.2	26.7	24
24		19.0	17.6	18.1	17.9	17.9	15.6	14.6	17.1	29.7	30.7	32.0	33.4	43.1	46.0	45.8	42.2	42.8	31.1	25.9	S	23.5	19.4	15.9	16.8	14.6	46.0	26.8	24
25		15.3	13.6	18.6	17.0	14.1	14.1	14.8	21.3	23.3	25.4	26.9	27.6	29.7	28.1	27.6	28.1	28.8	29.2	S	29.4	26.0	26.7	27.9	28.0	13.6	29.7	23.5	24
26		24.7	24.3	23.1	20.6	20.4	20.1	17.9	19.0	29.6	27.7	28.8	32.4	33.1	34.8	34.8	34.0	34.2	S	33.1	P	30.9	28.5	27.2	27.7	17.9	34.8	27.6	23
27		27.1	25.2	24.4	22.2	21.3	16.6	15.6	20.9	30.5	32.7	34.6	35.8	36.4	36.6	36.2	33.8	S	34.3	33.7	36.1	47.9	47.9	43.8	37.5	15.6	47.9	31.8	24
28		37.3	32.7	21.0	28.5	30.5	21.5	19.0	24.0	29.2	34.7	37.6	36.8	35.9	35.1	36.1	S	34.0	P	36.0	35.3	33.2	29.3	26.6	26.1	19.0	37.6	30.9	23
29		28.0	29.2	25.7	23.8	16.0	16.4	17.7	20.0	23.9	33.9	39.9	43.4	44.1	40.8	S	34.3	32.5	38.8	32.7	32.7	33.3	31.2	28.1	27.8	16.0	44.1	30.2	24
30		28.4	24.3	28.4	29.8	29.8	27.9	24.7	24.7	25.1	27.7	27.4	24.3	25.6	S	35.3	36.4	36.2	34.7	32.2	30.4	27.3	33.7	31.1	30.4	24.3	36.4	29.4	24
31		27.7	24.7	23.1	19.5	16.9	16.0	17.6	18.3	22.7	20.9	23.3	24.9	S	24.7	26.3	25.9	28.4	23.3	27.7	28.0	22.7	17.7	16.4	15.3	15.3	28.4	22.3	24
HOURLY MAX		41.5	37.1	39.8	40.2	37.5	36.0	33.2	43.1	39.8	43.7	45.7	48.5	52.6	46.7	46.3	44.0	43.9	43.8	42.3	42.3	47.9	47.9	43.8	39.4				
HOURLY AVG		25.3	23.6	23.1	21.9	20.9	19.6	19.4	22.0	26.1	29.1	31.1	32.7	34.9	35.1	35.2	34.9	35.0	34.1	32.8	31.6	30.2	27.9	26.9	26.1				

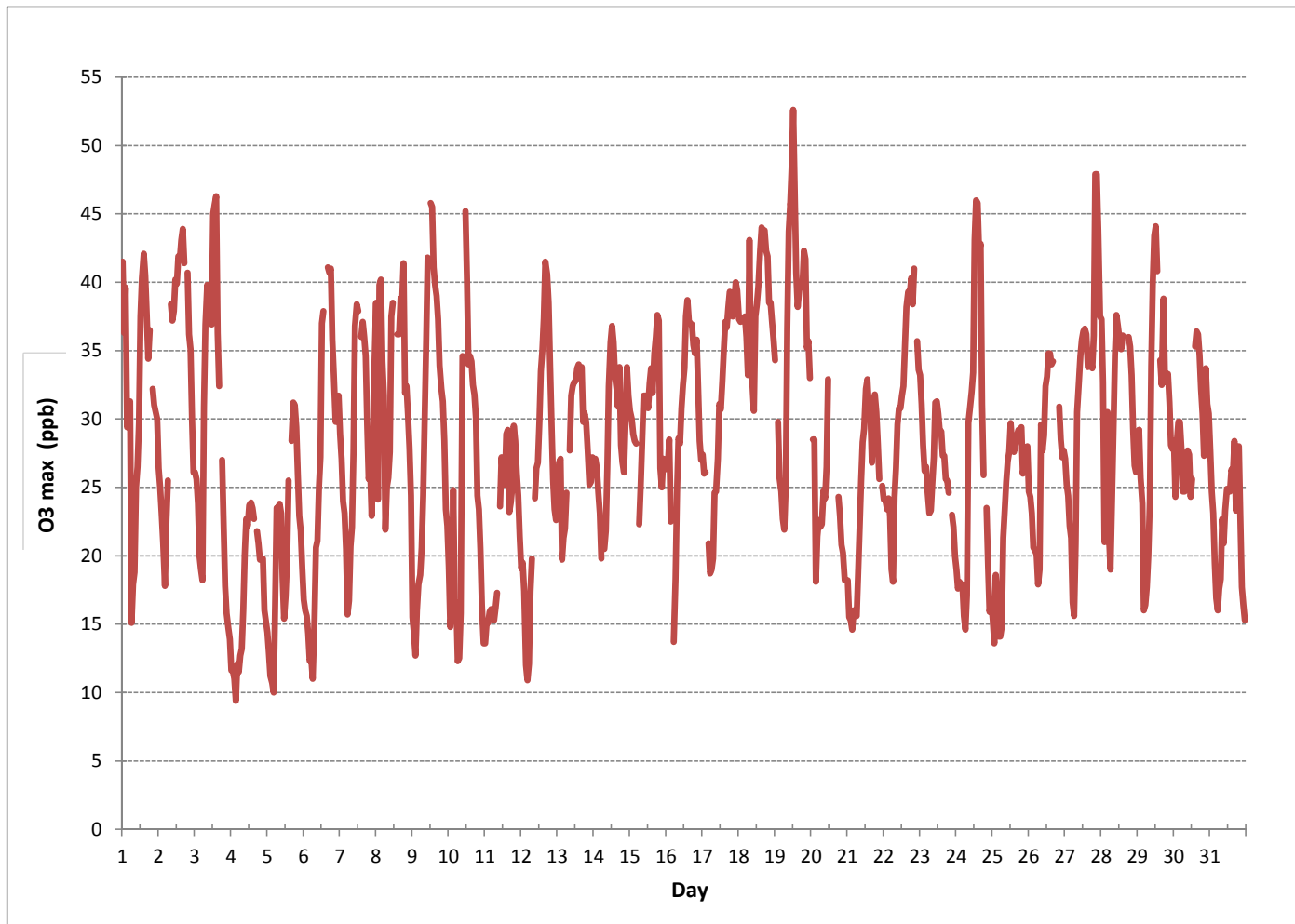
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

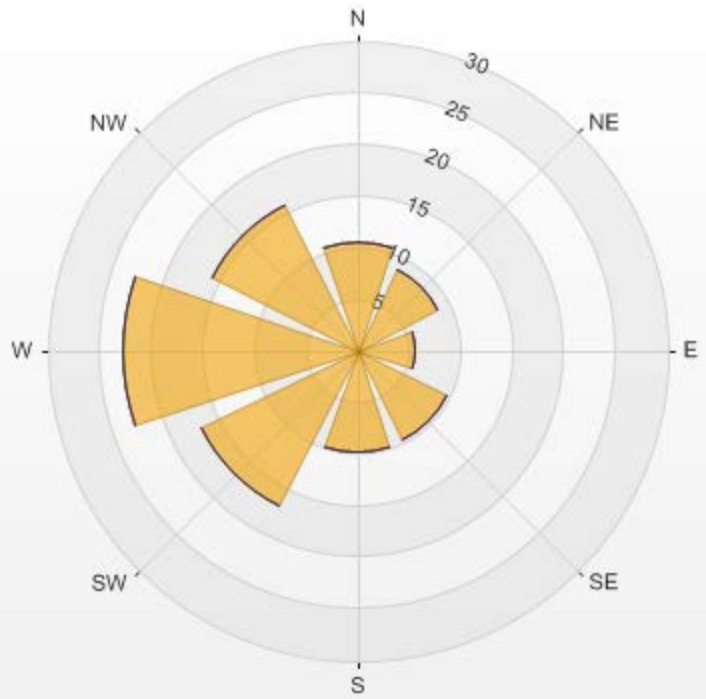
NUMBER OF NON-ZERO READINGS:	701
MAXIMUM INSTANTANEOUS VALUE:	52.6 PPB @ HOUR(S) 12 ON DAY(S) 19
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	6 HRS
STANDARD DEVIATION:	8.33
OPERATIONAL TIME:	739 HRS

OZONE MAX instantaneous maximum in ppb



Wind: LICA ST. LINA Monitor: O3 [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.89% Calm Avg: 0.00

Direction	0.0-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	10.62	0	0	0	10.62
NE	8.78	0	0	0	8.78
E	5.67	0	0	0	5.67
SE	9.63	0	0	0	9.63
S	9.92	0	0	0	9.92
SW	16.86	0	0	0	16.86
W	22.8	0	0	0	22.8
NW	15.72	0	0	0	15.72
Summary	100	0	0	0	100



% Icon Classes (ppb)					
100	0.0-50.0	0	50.0-110.0	0	110.0-210.0
		0	>210.0		

O3[ppb] Calibration: LICA ST. LINA Monthly: 07/2016 Type: Span



Span Meas Span Ref Span Low Span High

PARTICULATE MATTER 2.5

PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5) hourly averages in µg/m3

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
DAY	HR	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.
1	1	9.0	3.4	3.9	5.4	5.9	5.9	0.0	2.9	3.4	5.9	2.4	5.4	6.9	2.4	4.4	1.9	5.0	5.9	4.4	1.9	4.4	5.9	5.4	10.4	0.0	10.4	4.7	24
2	2	14.0	15.5	10.4	13.4	10.9	9.5	9.5	0.0	0.0	0.4	8.4	0.0	13.4	6.1	0.5	2.9	X	6.9	2.4	0.0	5.0	2.4	5.4	2.9	0.0	15.5	6.1	23
3	3	0.9	5.4	5.9	9.5	5.9	9.5	5.0	2.5	1.9	0.4	0.0	12.9	13.4	X	X	X	X	X	X	X	X	X	X	X	0.0	13.4	5.6	13
4	4	X	X	X	X	X	X	X	X	X	C	C	C	0.0	2.1	2.3	0.0	1.5	0.0	4.0	0.0	0.0	5.0	4.9	0.0	0.0	5.0	1.7	15
5	5	0.5	0.4	3.9	1.1	3.9	6.4	1.9	2.9	0.4	1.9	2.4	0.4	0.0	3.4	1.4	5.9	1.9	7.9	10.4	8.0	11.5	10.3	8.0	8.4	0.0	11.5	4.3	24
6	6	6.4	6.4	2.9	4.0	2.9	9.8	5.0	8.4	5.9	2.5	7.5	5.4	7.5	10.5	5.0	0.0	8.6	8.4	8.4	5.3	3.8	4.1	5.8	8.3	0.0	10.5	6.0	24
7	7	10.0	5.5	6.4	9.9	6.0	4.9	7.1	8.8	6.4	6.6	3.9	6.9	10.0	9.5	6.0	8.4	10.7	7.5	9.1	8.5	11.3	9.4	7.9	10.0	3.9	11.3	7.9	24
8	8	10.9	10.8	10.5	8.4	7.9	7.4	5.9	9.5	8.9	7.5	4.8	9.2	8.9	0.0	0.0	0.7	3.9	2.8	1.9	3.9	2.9	4.4	6.9	0.0	10.9	5.9	24	
9	9	8.4	3.4	7.9	9.4	9.0	7.5	6.9	2.9	5.9	9.9	9.5	5.9	9.0	6.9	4.4	5.4	1.9	5.9	3.4	0.0	3.9	2.9	3.9	5.0	0.0	9.9	5.8	24
10	10	2.9	1.9	6.4	3.9	3.4	5.9	2.9	8.4	6.9	2.9	2.9	0.9	1.4	0.0	0.0	2.4	5.9	4.4	1.9	4.0	2.4	0.0	0.4	0.0	0.0	8.4	3.0	24
11	11	5.0	5.0	3.4	5.4	9.0	5.4	4.4	4.4	5.9	5.4	5.0	3.4	0.9	3.4	5.9	9.0	2.9	5.4	0.9	0.9	2.4	4.0	2.9	3.4	0.9	9.0	4.3	24
12	12	5.0	5.0	6.4	5.9	8.4	5.9	3.9	5.4	5.0	5.0	7.9	2.4	0.0	5.9	5.4	2.9	0.9	5.0	2.9	0.0	4.0	2.9	6.4	3.9	0.0	8.4	4.4	24
13	13	5.0	2.9	2.4	1.9	4.4	4.4	5.9	0.4	2.4	5.0	5.4	0.0	4.4	4.0	0.0	0.0	9.0	10.9	4.4	5.4	5.0	3.9	2.4	1.9	0.0	10.9	3.8	24
14	14	6.4	5.4	2.9	4.0	5.0	9.0	2.4	2.9	10.4	6.9	6.9	0.4	0.0	0.0	0.0	6.9	0.4	0.0	3.4	0.9	1.4	0.4	2.4	3.5	0.0	10.4	3.4	24
15	15	0.4	4.4	0.0	2.4	5.0	2.4	2.4	5.0	4.4	0.0	1.4	1.9	0.0	0.0	0.0	6.9	0.4	0.9	3.5	2.9	2.4	2.9	4.4	0.0	6.9	2.3	24	
16	16	1.4	3.4	0.0	2.9	3.4	2.4	2.9	3.9	6.4	2.9	2.4	3.5	4.0	3.4	6.4	4.4	5.9	6.4	8.4	9.9	5.9	5.4	6.9	11.4	0.0	11.4	4.7	24
17	17	10.9	13.0	11.4	12.4	13.4	12.0	14.5	9.4	11.4	14.5	9.9	8.4	9.0	3.9	6.9	8.4	7.9	18.9	15.5	22.4	24.5	26.4	28.9	22.4	3.9	28.9	14.0	24
18	18	20.5	18.0	20.5	22.9	25.5	23.9	23.4	22.9	19.9	16.0	11.9	1.9	10.9	5.9	5.9	7.9	8.4	4.9	9.0	11.4	8.4	14.5	15.5	9.0	1.9	25.5	14.1	24
19	19	9.9	11.4	8.4	8.4	6.9	8.4	7.9	6.9	7.5	4.4	6.9	7.9	7.5	5.9	6.4	5.4	7.9	6.9	6.4	12.4	9.9	9.5	11.9	9.4	4.4	12.4	8.1	24
20	20	12.4	9.0	9.9	12.4	11.9	8.4	9.0	11.9	6.9	C	C	C	C	C	X	0.0	0.0	0.9	0.0	5.9	0.0	14.0	X	0.4	0.0	14.0	6.6	22
21	21	X	2.4	5.0	2.9	5.0	3.9	4.5	5.4	0.4	0.0	X	9.9	5.0	2.9	7.5	11.9	X	5.4	X	3.5	5.0	0.9	5.0	1.4	0.0	11.9	4.4	20
22	22	5.4	0.0	6.4	X	1.9	3.9	0.4	1.4	5.0	4.5	X	6.4	0.0	3.0	5.0	4.5	6.4	5.4	5.4	4.0	1.4	9.0	3.9	0.4	0.0	9.0	3.8	22
23	23	2.9	2.9	5.0	6.9	1.9	5.0	2.4	4.0	4.0	5.4	4.5	10.4	14.0	0.0	7.5	11.4	X	7.9	4.5	7.5	4.5	6.4	6.9	3.4	0.0	14.0	5.6	23
24	24	5.9	3.4	14.5	7.9	4.4	5.9	7.5	7.5	4.5	4.5	6.9	3.4	2.4	7.9	6.4	5.4	0.9	5.4	1.4	0.0	16.4	3.9	2.9	1.4	0.0	16.4	5.4	24
25	25	0.9	1.9	2.4	1.4	0.4	5.0	0.0	0.9	0.0	0.0	0.0	1.9	0.4	5.4	4.5	0.9	9.5	0.9	10.9	5.4	0.9	2.9	2.4	1.4	0.0	10.9	2.5	24
26	26	4.5	4.5	4.5	4.0	4.5	2.4	1.9	4.0	7.9	0.0	5.9	X	1.5	2.9	2.4	0.0	0.4	0.9	0.0	0.0	0.0	1.9	3.9	5.9	0.0	7.9	2.8	23
27	27	2.9	4.5	0.0	3.9	1.4	0.0	2.9	3.5	0.0	5.4	7.9	7.9	5.4	4.0	5.0	6.9	5.4	3.5	5.0	2.9	13.0	18.9	16.9	52.9	0.0	52.9	7.5	24
28	28	24.4	11.9	11.9	7.5	16.4	4.0	16.4	8.5	7.5	11.4	9.5	2.9	4.5	0.0	0.9	1.9	1.9	P	0.0	3.4	2.4	X	12.0	7.9	0.0	24.4	7.6	22
29	29	8.4	1.4	3.5	1.9	7.9	1.4	1.9	2.4	5.4	5.0	4.5	0.9	1.4	9.0	6.9	4.9	5.0	5.9	5.4	9.9	6.4	4.5	4.0	3.4	0.9	9.9	4.6	24
30	30	2.4	16.0	0.0	0.0	0.0	4.5	0.0	4.5	0.9	8.4	4.0	5.0	2.4	1.9	2.4	4.5	8.4	6.4	1.9	4.5	3.5	8.4	6.4	4.5	0.0	16.0	4.2	24
31	31	3.4	2.4	1.9	4.0	0.9	4.5	2.9	5.4	0.9	0.0	X	3.5	1.4	0.0	0.0	0.0	1.4	X	2.4	0.0	0.0	2.4	1.5	0.0	0.0	5.4	1.8	22
HOURLY MAX		24.4	18.0	20.5	22.9	25.5	23.9	23.4	22.9	19.9	16.0	11.9	12.9	14.0	10.5	7.5	11.9	10.7	18.9	15.5	22.4	24.5	26.4	28.9	52.9				
HOURLY AVG		6.9	6.1	6.0	6.3	6.4	6.3	5.4	5.6	5.2	4.9	5.5	4.6	4.9	3.8	3.8	4.1	4.6	5.5	4.7	4.8	5.5	6.5	6.6	6.8				

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	P	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	G	- POWER FAILURE

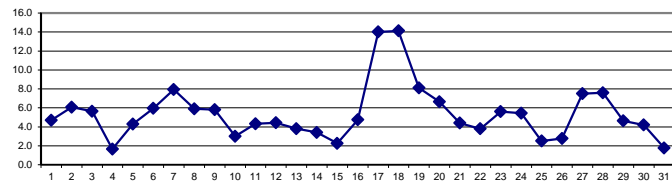
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 80 µg/m3 24-HR 30 µg/m3

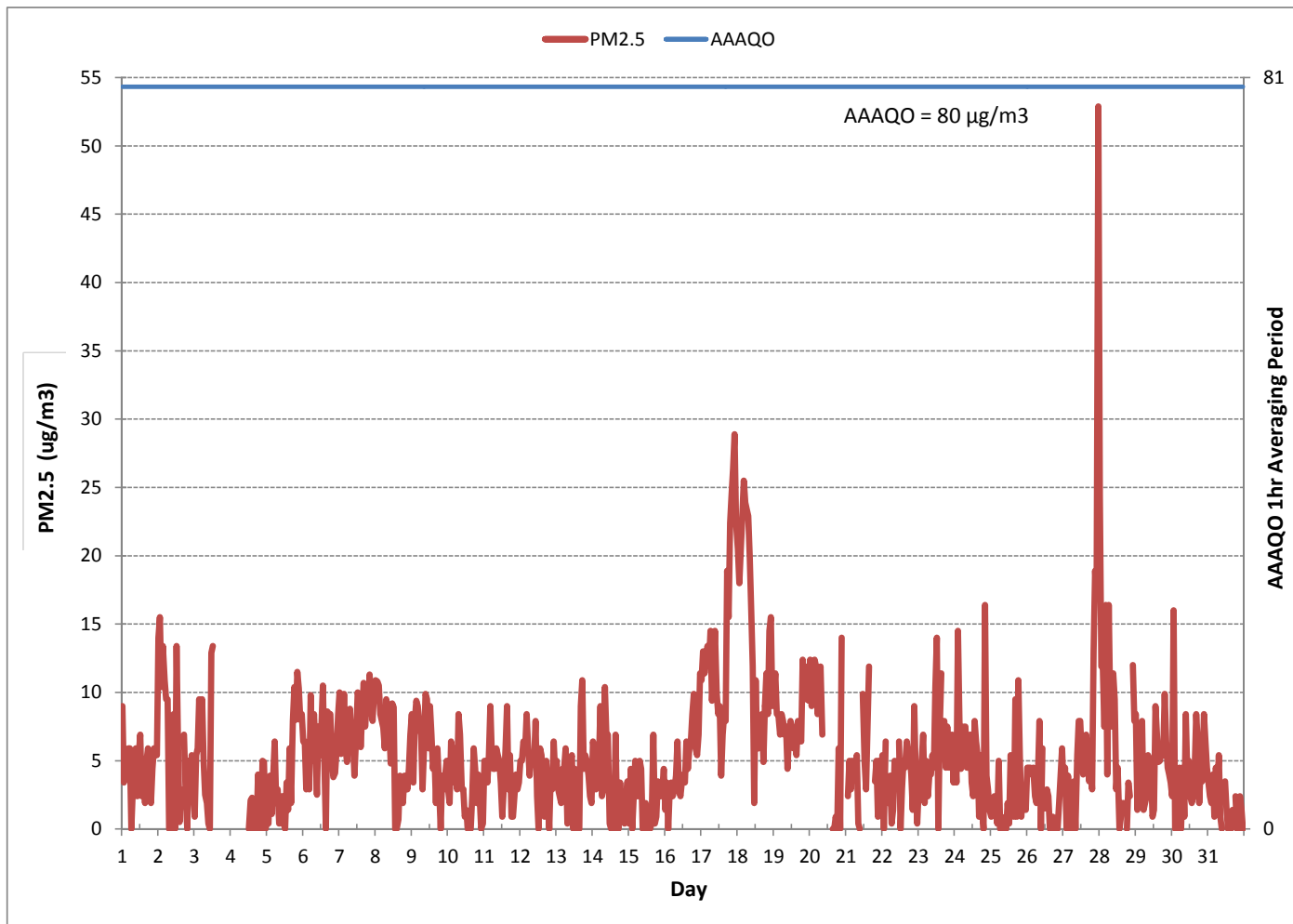
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDENCES:	0
NUMBER OF 24-HR EXCEEDENCES:	0
NUMBER OF NON-ZERO READINGS:	631
MINIMUM 1-HR AVERAGE:	0.0 µg/m3 @ HOUR(S) VAR ON DAY(S) VAR
MAXIMUM 1-HR AVERAGE:	52.9 µg/m3 @ HOUR(S) 23 ON DAY(S) 27
MAXIMUM 24-HR AVERAGE:	14.1 µg/m3 ON DAY(S) 18
	VAR-VARIOUS
MONTHLY CALIBRATION TIME:	9 HRS
OPERATIONAL TIME:	710 HRS
AMD OPERATION UPTIME:	95.4 %
STANDARD DEVIATION:	4.87
MONTHLY AVERAGE:	5.5 µg/m3

24 HOUR AVERAGES FOR July 2016



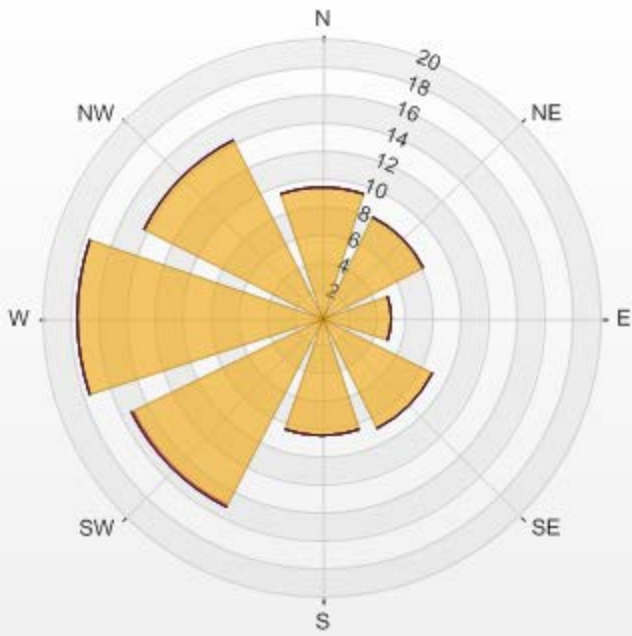
PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5) hourly averages in $\mu\text{g}/\text{m}^3$



Wind: LICA ST. LINA Monitor: PM25 [ug/m3(L)] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 13.12% Valid Data: 94.22% Calm Avg: 0.00

Direction	0.5-30.0	30.0-60.0	60.0-80.0	80.0-120.0	120.0-240.0	>240.0	Total
N	9.42	0	0	0	0	0	9.42
NE	8.13	0	0	0	0	0	8.13
E	4.99	0	0	0	0	0	4.99
SE	8.84	0	0	0	0	0	8.84
S	8.42	0	0	0	0	0	8.42
SW	15.12	0.14	0	0	0	0	15.26
W	17.55	0	0	0	0	0	17.55
NW	14.27	0	0	0	0	0	14.27
Summary	86.74	0.14	0	0	0	0	86.88

LICA ST. LINA 2016/07/01 12:00 AM - 2016/07/31 11:00 PM Calm: 13.12% Calm Wind Avg Speed: 0.11 (ug/m3(L))



% Icon Classes (ug/m3(L))	0	30.0-60.0	60.0-80.0	80.0-120.0	120.0-240.0	>240.0
87						
	0.5-30.0	30.0-60.0	60.0-80.0	80.0-120.0	120.0-240.0	>240.0

WIND SPEED

WIND SPEED (WS) hourly averages in km/hr

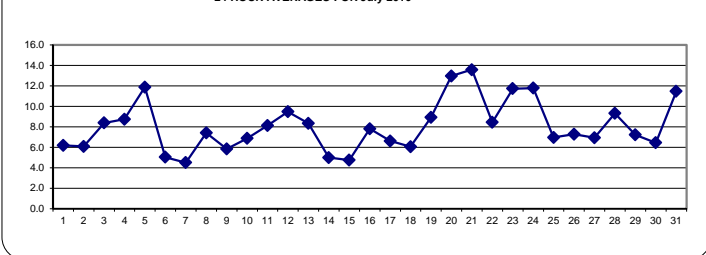
MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR								
DAY	MIN.	MAX.	AVG.	RDGS.																									MIN.	MAX.	AVG.	RDGS.				
1	1.0	0.7	3.1	4.1	3.6	4.4	4.5	4.4	3.1	2.5	6.5	8.3	9.4	8.4	6.3	7.2	7.8	8.2	11.3	8.7	8.0	9.1	9.0	8.5	0.7	11.3	6.2	24								
2	8.9	8.4	6.4	4.2	5.5	7.6	5.0	6.3	5.9	4.2	3.3	3.5	4.3	4.7	6.5	7.5	6.7	5.0	8.5	6.6	5.2	7.4	7.3	7.1	3.3	8.9	6.1	24								
3	7.2	8.0	8.6	7.6	7.2	6.1	10.4	5.8	5.8	9.7	12.1	12.1	5.5	7.4	12.1	7.7	5.6	9.9	10.8	9.0	8.7	8.7	7.6	7.6	5.5	12.1	8.4	24								
4	7.7	9.6	8.1	8.8	7.7	9.1	8.5	6.4	6.9	9.6	12.7	12.5	12.8	13.6	11.9	11.0	8.0	8.5	6.4	3.6	5.2	6.3	7.7	7.2	3.6	13.6	8.7	24								
5	8.5	9.6	6.9	5.6	6.1	7.5	11.4	14.7	15.7	14.7	14.1	15.4	14.1	14.5	15.3	18.6	17.1	15.2	12.7	11.7	9.3	10.4	9.2	6.5	5.6	18.6	11.9	24								
6	5.4	5.8	6.3	5.8	6.3	4.4	4.7	3.3	3.8	4.9	4.5	7.5	5.4	1.7	7.4	5.1	3.1	2.5	3.1	4.2	6.5	6.0	7.3	5.8	1.7	7.5	5.0	24								
7	5.3	6.2	6.7	4.8	5.7	4.6	2.0	2.8	6.1	7.0	4.9	4.0	7.0	8.1	4.8	2.5	1.7	3.0	2.6	3.5	3.1	4.8	4.2	2.8	1.7	8.1	4.5	24								
8	1.6	6.6	3.8	3.2	7.3	5.9	7.1	7.6	7.4	7.8	8.7	8.2	7.7	7.7	12.0	11.3	9.8	12.0	5.6	5.0	7.2	8.7	7.2	8.0	1.6	12.0	7.4	24								
9	7.2	7.3	6.7	5.9	6.3	4.6	3.6	4.0	6.0	5.7	3.7	6.3	6.9	6.4	6.8	6.2	4.8	4.1	5.5	6.2	6.0	6.9	6.3	6.7	3.6	7.3	5.8	24								
10	6.6	7.4	8.6	8.0	5.1	2.0	3.2	6.4	5.1	6.9	8.2	6.9	7.9	10.4	8.8	9.8	7.7	6.9	4.8	5.1	6.9	7.4	7.0	7.6	2.0	10.4	6.9	24								
11	7.9	9.3	7.9	8.1	7.4	7.7	8.3	7.9	5.4	6.4	8.2	7.1	9.8	12.1	8.8	8.5	5.9	2.0	8.0	8.3	10.9	10.7	9.7	8.4	2.0	12.1	8.1	24								
12	8.7	8.4	8.8	8.6	9.1	8.1	7.0	6.2	7.1	10.0	10.1	12.3	11.3	11.7	13.1	11.6	12.7	11.0	8.7	8.2	8.8	9.2	7.9	8.6	6.2	13.1	9.5	24								
13	7.5	7.4	6.5	7.8	8.8	8.0	6.6	8.8	10.3	11.0	12.0	10.2	9.4	8.7	9.9	7.2	9.1	10.4	9.1	7.0	6.6	6.8	4.9	5.9	4.9	12.0	8.3	24								
14	6.9	7.3	6.4	6.5	5.7	7.2	6.9	5.8	5.3	6.1	5.3	4.8	4.9	5.5	0.9	2.1	1.1	4.7	3.7	3.3	4.7	4.4	5.5	4.9	0.9	7.3	5.0	24								
15	3.6	3.0	1.9	5.5	6.4	4.8	4.7	4.7	4.6	4.3	2.6	6.0	4.6	1.1	2.3	5.5	3.9	3.8	5.8	5.1	7.0	8.2	7.8	6.8	1.1	8.2	4.8	24								
16	8.0	6.3	5.9	5.0	5.8	5.9	6.5	4.9	6.1	5.1	5.5	4.7	9.6	11.2	11.3	10.6	10.3	7.7	7.0	10.8	9.5	10.6	9.8	9.3	4.7	11.3	7.8	24								
17	9.1	8.7	8.3	6.5	8.5	8.4	6.9	7.5	5.7	5.2	5.0	5.5	7.6	7.5	6.5	8.2	7.6	6.4	6.6	4.3	4.2	4.5	5.1	5.0	4.2	9.1	6.6	24								
18	3.8	2.2	3.1	3.7	4.4	4.5	3.9	4.1	5.2	4.9	7.4	7.8	7.5	7.6	8.2	8.2	8.9	7.6	6.1	4.7	7.2	7.1	8.7	8.5	2.2	8.9	6.1	24								
19	7.5	7.3	7.7	7.9	5.0	3.9	5.1	3.7	5.4	3.6	6.7	5.3	8.0	12.4	13.9	16.6	18.8	19.4	16.9	9.6	6.6	6.1	8.4	8.0	3.6	19.4	8.9	24								
20	7.3	6.4	6.1	7.1	10.8	10.4	9.4	10.3	9.2	11.0	9.5	13.3	17.0	21.4	22.1	24.9	17.6	19.1	17.6	14.5	13.3	10.2	10.8	12.0	6.1	24.9	13.0	24								
21	9.6	9.8	10.9	10.9	9.7	11.9	11.7	17.1	19.6	19.6	22.9	24.6	24.4	22.9	15.0	10.5	9.8	13.2	15.6	8.0	6.9	7.3	6.8	7.3	6.8	24.6	13.6	24								
22	6.9	6.3	3.6	2.3	4.8	4.3	6.2	9.3	10.4	9.6	11.0	13.3	13.8	11.7	14.6	13.4	12.9	11.4	10.1	5.4	2.4	6.3	7.2	5.6	2.3	14.6	8.5	24								
23	8.5	8.9	8.7	10.3	10.6	10.0	9.9	7.9	13.9	14.8	14.8	18.3	17.7	16.5	15.1	18.5	14.3	12.3	11.5	8.3	6.6	6.8	8.4	9.0	6.6	18.5	11.7	24								
24	7.0	8.2	8.0	8.5	6.1	5.2	5.5	6.9	9.9	14.9	19.4	18.9	20.7	20.8	24.3	20.1	23.7	12.6	6.7	10.1	7.5	2.5	6.8	8.6	2.5	24.3	11.8	24								
25	8.8	8.3	6.2	6.4	6.8	8.8	8.7	6.9	9.4	8.9	6.1	6.8	8.3	8.2	6.0	7.6	5.9	3.2	0.9	3.9	7.2	7.9	7.9	7.8	0.9	9.4	7.0	24								
26	8.9	9.5	9.1	10.1	8.1	4.2	4.4	0.4	4.5	3.2	5.7	8.2	9.8	9.1	9.2	8.5	7.6	8.3	7.5	7.9	9.3	7.2	7.1	6.8	0.4	10.1	7.3	24								
27	7.1	8.5	8.2	6.5	6.3	6.2	6.8	5.4	3.2	2.0	3.4	7.3	8.8	12.1	10.8	9.5	8.9	6.5	4.6	4.2	8.5	7.1	7.4	6.9	2.0	12.1	6.9	24								
28	7.2	6.4	7.6	5.8	5.5	5.7	5.1	4.0	5.9	10.0	17.1	19.4	17.6	14.7	15.9	10.6	9.0	P	10.2	3.5	6.4	10.2	7.7	9.0	3.5	19.4	9.3	23								
29	10.1	11.2	7.7	6.9	6.5	8.4	6.6	6.2	8.5	6.3	7.2	5.3	6.2	8.7	12.7	6.6	5.0	3.2	4.4	4.9	7.0	8.6	7.4	7.7	3.2	12.7	7.2	24								
30	9.3	10.9	16.7	12.2	3.8	3.9	5.9	3.6	5.8	2.6	2.8	3.5	2.1	2.2	5.7	6.0	6.8	5.8	4.6	5.6	4.5	10.8	10.1	9.3	2.1	16.7	6.4	24								
31	7.5	5.7	6.6	8.4	8.3	8.5	10.2	10.6	11.9	12.5	15.4	14.1	15.6	17.0	15.8	13.8	13.5	13.0	13.6	11.6	9.8	11.5	10.1	10.6	5.7	17.0	11.5	24								
HOURLY MAX	10.1	11.2	16.7	12.2	10.8	11.9	11.7	17.1	19.6	19.6	22.9	24.6	24.4	22.9	24.3	24.9	23.7	19.4	17.6	14.5	13.3	11.5	10.8	12.0												
HOURLY AVG	7.1	7.4	7.1	6.9	6.7	6.5	6.7	6.6	7.5	7.9	8.9	9.7	10.2	10.5	10.8	10.2	9.2	8.6	8.1	6.9	7.1	7.7	7.7	7.5												

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	August 28, 2014
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

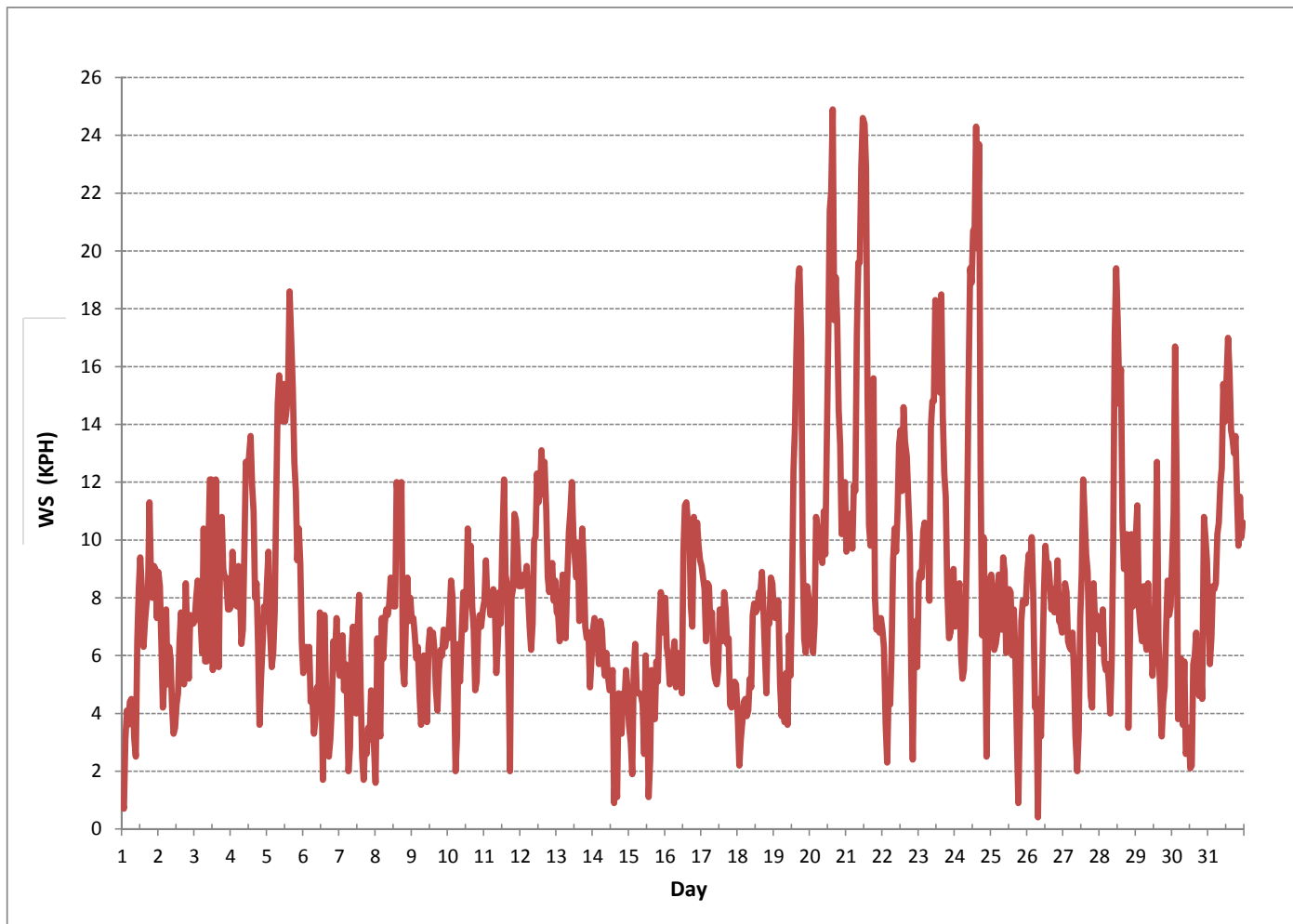
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	743
MINIMUM 1-HR AVERAGE	0.4 KPH @ HOUR(S) 7 ON DAY(S) 26
MAXIMUM 1-HR AVERAGE:	24.9 KPH @ HOUR(S) 15 ON DAY(S) 20
MAXIMUM 24-HR AVERAGE:	13.6 KPH ON DAY(S) 21
	VAR-VARIOUS
MONTHLY CALIBRATION TIME:	0 HRS
	OPERATIONAL TIME: 743 HRS
	AMD OPERATION UPTIME: 99.9 %
STANDARD DEVIATION:	3.91
	MONTHLY AVERAGE: 8.1 KPH

WIND SPEED (WS) hourly averages in km/hr





VECTOR WIND SPEED MAX instantaneous maximum in km/hr

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
DAY	MIN.	MAX.	AVG.	RDGS.																									
1	6.2	8.0	7.9	8.2	8.2	12.1	13.9	13.7	9.2	12.7	19.1	20.4	23.0	19.5	15.8	26.9	25.8	27.3	33.2	20.6	19.1	17.3	19.3	18.3	6.2	33.2	16.9	24	
2	18.2	20.9	14.5	10.1	12.8	21.3	17.5	P	16.9	11.6	14.3	14.8	20.2	16.0	18.3	19.3	19.6	17.8	30.2	19.1	11.5	14.9	17.3	15.9	10.1	30.2	17.1	23	
3	15.8	18.8	19.7	18.0	17.2	17.4	34.2	34.8	17.9	23.2	27.1	34.7	33.1	61.5	63.6	30.7	28.3	25.3	24.3	22.6	19.8	21.7	18.1	15.6	15.6	63.6	26.8	24	
4	11.2	16.7	12.2	12.6	15.0	16.8	20.9	18.0	19.5	24.0	27.3	31.7	31.9	44.2	34.5	29.3	28.0	27.0	22.5	9.6	9.9	9.5	12.6	14.1	9.5	44.2	20.8	24	
5	16.1	19.2	18.5	13.1	14.4	25.3	37.1	38.3	35.1	36.8	35.3	41.4	39.3	38.5	43.7	53.0	47.6	45.2	30.3	28.8	24.0	24.6	24.4	19.0	13.1	53.0	31.2	24	
6	13.0	12.8	14.4	13.0	13.5	11.4	10.5	9.8	13.6	16.4	19.4	29.1	18.6	18.2	19.3	P	21.0	25.6	12.1	10.7	13.4	11.8	12.2	10.5	9.8	29.1	15.2	23	
7	8.0	10.4	11.9	11.7	13.0	12.8	15.4	13.7	20.7	19.8	15.0	19.0	17.5	26.6	22.8	15.8	11.4	7.2	9.5	8.0	7.1	10.4	6.5	6.5	6.5	26.6	13.4	24	
8	13.5	12.1	8.5	7.8	19.0	14.2	13.9	16.8	20.8	23.7	28.1	24.7	22.1	P	40.2	31.4	31.6	30.1	23.3	22.5	13.7	17.4	19.2	19.8	7.8	40.2	20.6	23	
9	15.0	16.6	14.6	12.9	13.5	11.3	10.7	14.7	18.0	19.5	20.0	20.6	21.5	20.4	29.2	20.4	15.3	15.3	28.7	22.1	15.5	14.7	12.4	14.7	10.7	29.2	17.4	24	
10	14.4	17.7	21.4	19.3	13.1	8.9	14.2	17.7	14.1	18.5	23.2	20.6	27.6	28.2	25.6	26.9	34.3	23.4	9.5	13.2	17.2	17.8	16.1	16.8	8.9	34.3	19.2	24	
11	19.8	25.1	18.3	19.4	18.3	19.6	25.5	19.8	14.8	19.6	27.5	26.7	26.0	35.6	40.4	31.9	35.5	11.2	26.8	23.5	24.2	24.0	28.1	18.5	11.2	40.4	24.2	24	
12	18.8	22.9	19.0	19.2	19.0	16.3	17.0	16.2	16.7	24.9	31.5	33.3	35.9	33.9	42.2	36.7	40.3	33.5	25.2	22.7	21.4	22.5	16.6	18.1	16.2	42.2	25.2	24	
13	15.7	17.5	13.1	16.1	16.3	16.1	23.6	26.0	34.8	33.3	34.2	32.8	29.5	31.0	33.9	26.6	24.9	27.3	23.8	19.0	16.8	16.8	12.8	13.3	12.8	34.8	23.1	24	
14	16.1	15.7	13.3	13.0	11.6	20.9	19.3	16.8	21.8	21.8	28.2	19.5	23.1	32.4	12.0	12.7	17.7	22.9	10.0	6.3	7.6	7.6	7.2	6.3	6.3	32.4	16.1	24	
15	7.0	4.8	5.2	6.8	8.3	9.2	10.1	13.6	13.2	16.7	12.3	17.6	13.4	13.6	14.2	15.4	18.0	14.3	16.2	23.0	22.5	12.2	15.7	14.2	4.8	23.0	13.2	24	
16	14.2	12.7	12.3	9.2	11.0	9.8	12.1	15.6	17.8	14.6	17.5	19.2	24.8	31.4	31.3	37.6	32.1	29.3	18.9	47.1	20.4	19.5	21.8	20.6	9.2	47.1	20.9	24	
17	20.0	18.9	18.2	14.5	16.9	19.1	18.8	24.7	16.6	20.4	16.0	18.0	23.9	27.6	27.1	31.7	29.6	25.6	18.4	9.8	7.0	8.2	7.1	7.0	7.0	31.7	18.5	24	
18	5.8	4.4	5.1	5.5	6.4	8.8	10.8	X	15.4	28.1	25.0	27.0	29.5	27.8	32.5	29.8	34.4	29.4	21.2	13.8	13.2	12.3	16.7	16.9	4.4	34.4	18.3	23	
19	13.1	13.4	15.6	13.4	10.9	11.9	14.5	12.5	14.1	13.6	18.1	18.5	21.9	29.4	35.8	43.4	40.9	37.0	34.4	26.5	14.9	12.9	13.9	11.7	10.9	43.4	20.5	24	
20	15.5	10.3	12.6	11.7	20.6	21.0	22.3	24.5	22.7	25.6	21.4	35.7	41.1	48.6	47.1	65.6	50.9	45.4	55.2	32.1	26.1	21.8	19.7	22.8	10.3	65.6	30.0	24	
21	20.1	18.4	20.4	19.9	19.3	22.3	22.5	35.9	42.9	54.1	48.4	50.8	60.2	56.4	46.2	45.0	24.3	34.5	42.0	28.9	18.8	16.4	14.6	14.4	14.4	60.2	32.4	24	
22	15.5	11.8	9.4	5.8	8.7	8.9	17.9	28.2	29.9	27.8	35.5	39.6	38.8	35.0	46.6	36.8	35.5	36.4	26.5	31.1	31.9	13.1	18.5	13.7	5.8	46.6	25.1	24	
23	15.7	20.7	15.9	18.8	20.3	21.4	23.4	23.2	45.3	37.9	40.9	57.5	49.7	41.8	46.6	47.2	47.0	37.6	30.4	21.8	18.5	13.5	12.0	13.5	12.0	57.5	30.0	24	
24	10.9	14.0	11.5	14.6	11.1	13.1	14.0	23.2	26.9	28.7	38.3	50.5	45.7	44.8	50.5	47.7	54.9	36.6	23.9	59.6	33.8	17.4	18.1	15.5	10.9	59.6	29.4	24	
25	16.5	17.0	14.6	13.7	13.2	18.6	17.9	18.3	23.2	21.2	19.5	21.7	24.0	24.7	24.7	22.5	16.4	10.9	9.4	9.8	11.8	12.2	13.3	13.8	9.4	24.7	17.0	24	
26	14.6	15.5	17.5	19.8	17.9	7.9	11.3	11.3	13.6	16.4	21.6	30.2	31.3	29.4	26.7	32.8	27.8	28.0	29.1	P	27.9	16.6	18.4	18.1	7.9	32.8	21.0	23	
27	17.7	16.5	17.0	13.9	13.5	13.3	17.1	14.7	12.0	14.7	18.4	27.3	24.1	38.9	29.7	27.8	27.5	18.1	12.5	13.7	14.4	15.0	12.2	9.6	9.6	38.9	18.3	24	
28	10.0	9.1	14.4	10.9	11.4	7.8	8.9	11.4	15.5	26.2	40.9	36.4	33.7	30.4	34.6	23.0	33.9	P	37.5	25.7	30.3	25.5	20.9	14.8	7.8	40.9	22.3	23	
29	13.6	21.1	13.0	15.0	16.1	15.6	17.6	16.8	18.1	16.8	18.4	20.4	19.9	25.8	29.7	34.3	19.9	21.5	13.8	8.5	12.1	14.5	13.7	15.0	8.5	34.3	18.0	24	
30	17.2	37.1	41.6	33.3	15.0	9.5	9.8	9.1	15.6	12.4	10.2	9.4	6.9	12.5	19.2	16.1	25.8	15.5	13.1	11.5	26.7	27.6	25.5	24.2	6.9	41.6	18.5	24	
31	19.2	15.0	14.1	18.2	20.0	22.2	27.2	23.7	28.1	41.8	35.5	33.8	32.3	44.8	38.4	40.4	42.1	34.2	36.2	22.0	18.7	23.2	17.8	18.7	14.1	44.8	27.8	24	
HOURLY MAX	20.1	37.1	41.6	33.3	20.6	25.3	37.1	38.3	45.3	54.1	48.4	57.5	60.2	61.5	63.6	65.6	54.9	45.4	55.2	59.6	33.8	27.6	28.1	24.2					
HOURLY AVG	14.5	16.0	15.0	14.2	14.4	15.0	17.7	19.4	20.8	23.3	25.4	28.5	28.7	32.3	33.0	32.0	30.4	26.4	24.1	21.1	18.4	16.5	16.2	15.3					

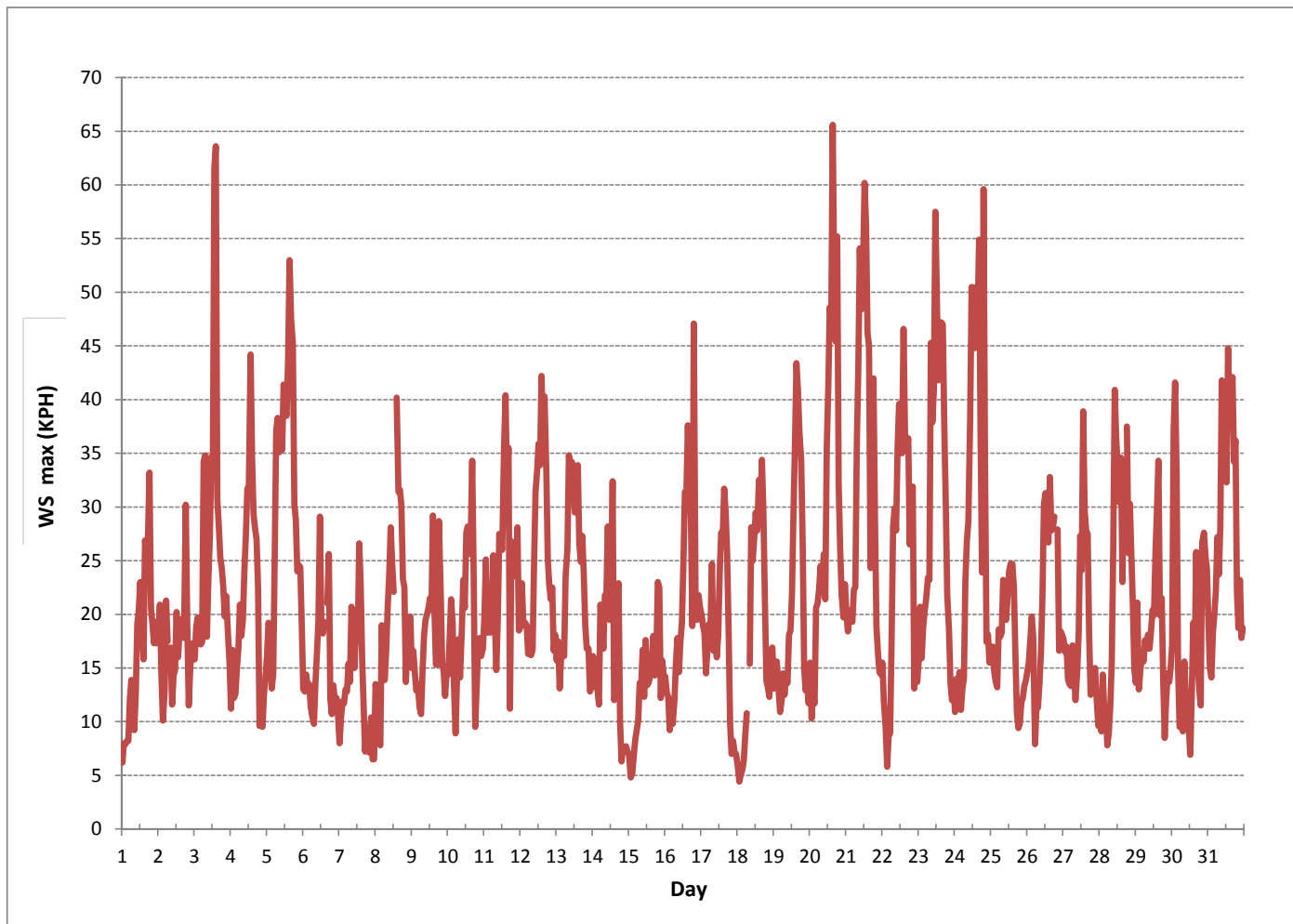
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

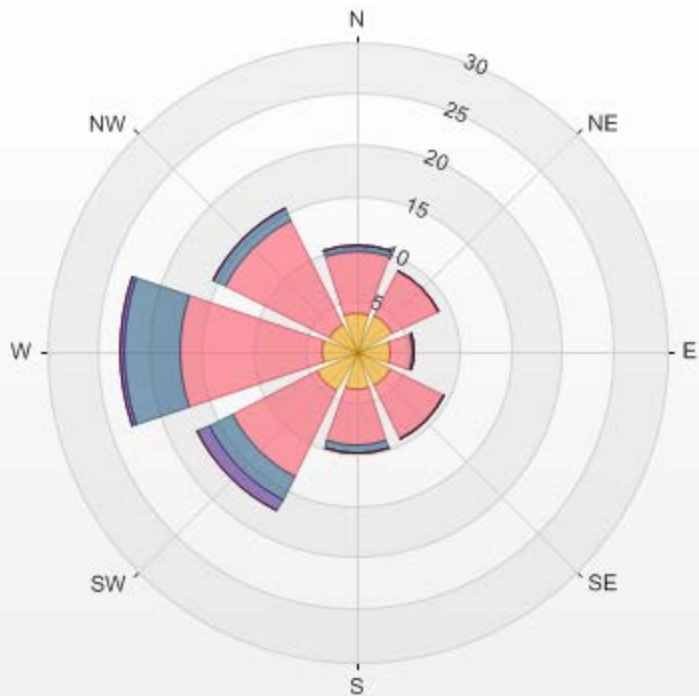
MAXIMUM INSTANTANEOUS VALUE:	65.6	KPH	@ HOUR(S)	15	ON DAY(S)	20
					VAR-VARIOUS	
OPERATIONAL TIME:				738	HRS	

VECTOR WIND SPEED MAX instantaneous maximum in km/hr



Wind: LICA ST. LINA Monitor: WSP [kph] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 99.87% Calm Avg: 0.00

Direction	0.0-6.0	6.0-12.0	12.0-20.0	20.0-29.0	29.0-39.0	>39.0	Total
N	3.77	6.06	0.54	0	0	0	10.37
NE	3.9	4.98	0	0	0	0	8.88
E	3.23	2.15	0.27	0	0	0	5.65
SE	3.63	5.79	0.13	0	0	0	9.55
S	3.63	5.52	0.67	0	0	0	9.82
SW	4.31	9.15	2.56	1.21	0	0	17.23
W	3.36	13.73	5.38	0.4	0	0	22.87
NW	2.96	11.17	1.48	0	0	0	15.61
Summary	28.79	58.55	11.03	1.61	0	0	100



% Icon Classes (kph)	29	59	11	2	0	0
0.0-6.0	0.0-6.0	6.0-12.0	12.0-20.0	20.0-29.0	29.0-39.0	>39.0

WIND DIRECTION



WIND DIRECTION (WD) hourly averages

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	24-HOUR AVG	RDGS.	
DAY	QUADRANT																									QUADRANT	RDGS.	
1		NW	W	WSW	NE	NNE	NNE	ENE	ENE	SE	NE	NE	E	ESE	SE	SE	ESE	SE	SE	SE	SE	ESE	ESE	ESE	ESE	E	24	
2		ESE	ESE	SE	SSE	E	ESE	SE	SSE	SE	SSE	S	S	S	SE	ESE	ESE	ESE	SE	SSE	SE	ESE	ESE	ESE	SE	SE	24	
3		SE	SE	SE	SE	SE	SE	SE	SE	SE	ESE	ESE	ESE	ESE	W	W	NNW	W	W	W	W	W	W	W	W	W	24	
4		WSW	W	WSW	WSW	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	24	
5		W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	24	
6		NW	NW	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	24	
7		SW	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	24	
8		ENE	SSE	SE	NE	SE	E	ENE	ENE	ENE	NE	ENE	ENE	E	E	ENE	NNE	N	NW	NNW	ESE	NE	ENE	NE	NNE	ENE	24	
9		NNE	NNE	NNE	N	NNE	N	N	N	NNE	NE	NE	NE	NE	NE	ENE	ESE	E	ENE	NE	NE	NE	NE	NE	NE	NE	24	
10		NE	NE	NE	NE	NE	ENE	N	NE	NE	NE	NE	NE	NE	NE	ENE	NE	ENE	NE	N	NNW	NNW	N	N	N	NE	24	
11		N	N	N	NNE	N	N	N	NNE	N	N	NNW	NNW	NW	NW	N	NW	NW	N	NW	W	W	W	W	W	NNW	24	
12		NW	NNW	NW	NW	NW	NW	NW	NW	NW	NW	NNW	NNW	NNW	NW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NW	24
13		NW	NNW	NW	NW	NW	NW	NNW	NNW	NNW	NNW	N	NNW	NW	NNW	NNW	NNW	NW	W	W	W	W	W	W	W	NNW	24	
14		NNW	N	N	N	NNE	NNE	NNE	NNE	N	NNW	N	NNE	NNE	N	E	WSW	NNW	S	E	NE	NE	ENE	E	ESE	NNE	24	
15		ESE	ENE	NNE	NNE	NNE	NNE	ENE	E	E	ESE	SSE	ESE	ESE	SW	SSW	SSW	SE	S	SSW	SW	WSW	WSW	W	SE	24		
16		W	WSW	W	SW	SSW	SW	SW	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	24	
17		NW	NW	NNW	NW	NW	NNW	N	NNW	N	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	24	
18		NE	ESE	SSW	SW	SSW	SSE	SE	SSE	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	24	
19		SE	SE	SE	S	SSW	S	SSW	SW	W	WSW	WSW	WSW	SW	WSW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	24	
20		W	WSW	SW	SW	WSW	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	24	
21		WSW	WSW	WSW	WSW	WSW	WSW	SW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	W	W	W	W	W	W	W	W	W	W	W	24	
22		W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	24	
23		WSW	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	24	
24		SW	SW	WSW	SW	SW	S	S	SSW	SW	WSW	WSW	SW	SW	SW	SW	SW	SW	SW	W	W	W	W	W	W	W	24	
25		W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	24	
26		SSE	SSE	SSE	SSE	S	ENE	NE	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	24	
27		SW	SW	SW	S	SSW	SSW	SSW	SW	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	24	
28		WSW	SW	SW	WSW	WSW	SW	SW	SSW	SSW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	23	
29		SW	WSW	WSW	S	SSW	SW	SSW	SSW	WSW	SW	WSW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	24	
30		SSE	SSW	W	W	W	N	NE	E	SE	S	NW	W	W	W	W	W	W	W	W	W	W	W	W	W	W	24	
31		NW	NW	WSW	WSW	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	24	

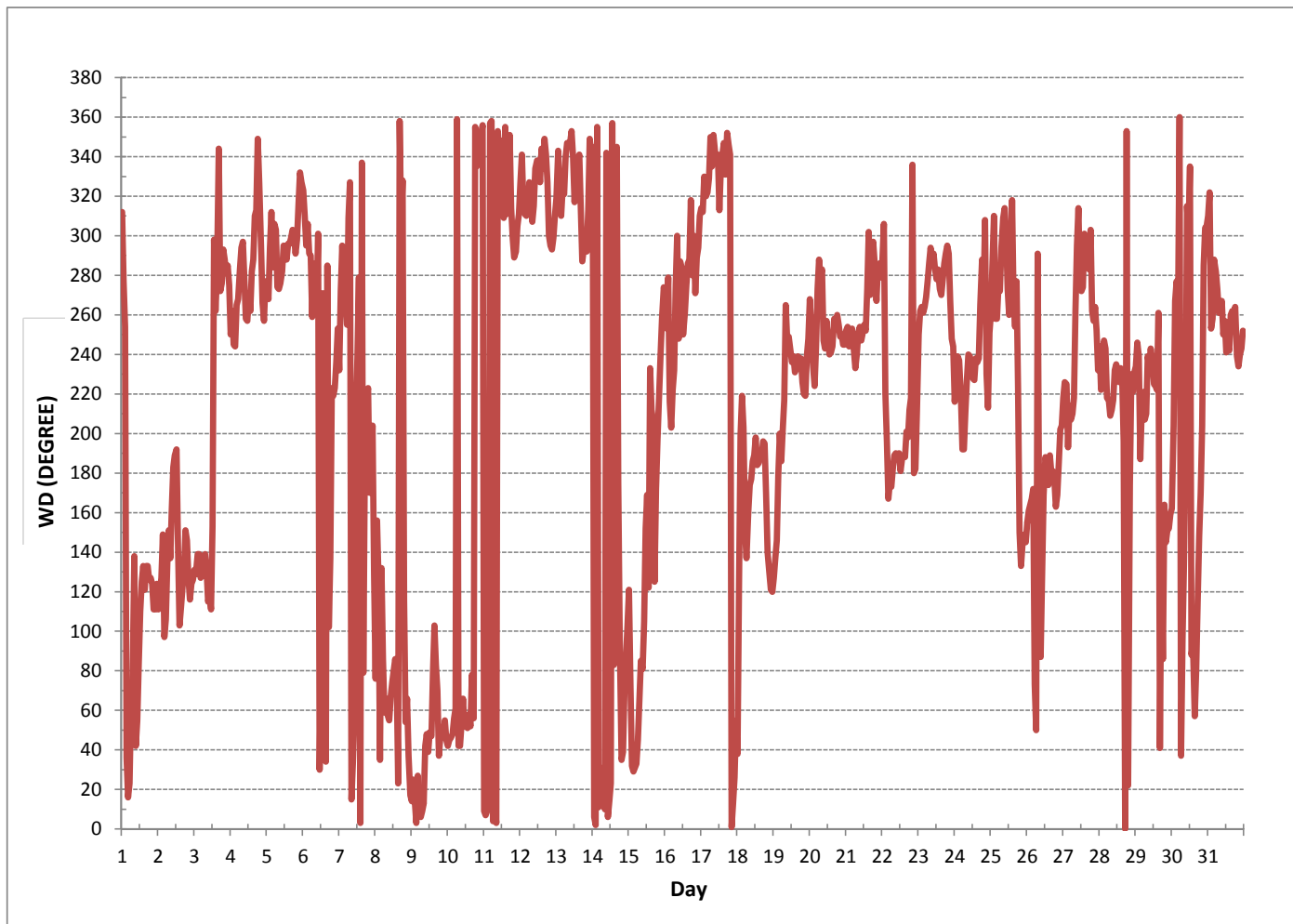
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	August 28, 2014
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	0	HRS	OPERATIONAL TIME:	743	HRS
STANDARD DEVIATION:	96.03		AMD OPERATION UPTIME:	99.9	%
			MONTHLY AVERAGE:	19 (NNE)	DEGREE

WIND DIRECTION (WD) hourly averages



STANDARD DEVIATION WIND DIRECTION



STANDARD DEVIATION WIND DIRECTION (STDWD) hourly averages in degrees

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	RDGS.	
HOUR START	HOUR END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59		
DAY																											
1		59	27	17	13	11	14	22	25	27	40	33	25	21	24	23	23	17	18	18	16	12	12	12	12	12	24
2		13	13	13	13	15	20	27	21	28	25	38	50	49	31	30	25	24	32	18	14	12	12	16	17	24	24
3		17	16	15	16	16	18	19	49	25	18	20	22	35	29	24	40	42	23	17	17	16	15	16	14	24	24
4		6	10	4	4	11	13	17	18	21	21	20	18	20	22	23	24	26	22	20	17	10	7	6	12	24	24
5		12	12	25	16	17	17	18	17	17	17	17	18	20	18	19	18	19	18	17	18	18	16	17	16	24	24
6		14	12	13	15	15	15	15	27	33	33	36	27	35	59	26	23	24	30	31	15	13	9	6	8	24	24
7		8	8	11	33	18	25	27	44	21	20	35	53	28	30	47	54	45	19	29	25	18	14	5	21	24	24
8		14	11	10	38	15	12	15	17	20	24	25	24	31	22	17	17	19	15	36	26	12	14	14	14	24	24
9		13	13	13	14	12	17	25	29	27	35	49	33	31	34	33	34	27	22	25	17	15	11	13	13	24	24
10		13	13	15	16	16	38	18	19	19	21	24	25	29	25	27	26	21	26	13	16	21	17	14	14	24	24
11		14	14	15	15	21	17	16	18	20	22	21	28	22	19	28	17	20	37	15	15	15	15	16	14	24	24
12		14	17	13	13	13	12	17	21	20	22	26	23	23	24	22	23	22	20	20	15	14	14	14	14	24	24
13		14	13	19	12	12	13	20	20	22	27	21	24	26	27	23	26	21	19	18	13	15	17	17	13	24	24
14		14	18	13	13	13	16	19	21	31	27	36	41	49	38	49	51	38	38	21	15	7	11	5	12	24	24
15		13	12	22	3	5	11	15	24	30	37	44	28	26	52	66	28	36	43	21	23	14	6	12	11	24	24
16		10	15	11	16	13	8	10	23	23	35	30	51	25	25	25	24	22	22	16	18	15	12	14	15	24	24
17		14	14	15	15	12	16	19	21	24	28	33	36	31	34	33	23	24	24	21	15	8	8	6	5	24	24
18		7	9	9	6	6	11	17	22	23	37	33	30	34	33	34	30	30	29	28	18	10	8	10	11	24	24
19		9	9	9	10	12	19	21	29	28	38	27	42	28	20	22	17	14	14	13	14	14	11	6	5	24	24
20		12	8	12	8	8	13	17	18	20	18	18	19	15	14	16	14	15	14	15	13	10	9	10	10	24	24
21		11	10	9	9	11	9	12	13	14	17	15	16	17	17	19	20	19	20	19	17	13	13	15	13	24	24
22		12	11	15	25	7	19	15	20	22	26	25	24	23	25	23	24	24	24	22	30	31	16	16	14	24	24
23		10	10	11	9	11	12	16	19	19	20	20	20	20	19	19	19	21	19	20	17	16	13	5	4	24	24
24		7	6	4	5	10	15	20	23	22	14	14	16	16	15	13	17	13	18	20	15	24	31	14	8	24	24
25		9	11	14	9	12	14	15	20	22	21	36	39	31	35	38	28	35	43	39	7	9	8	8	12	24	24
26		8	10	11	9	11	19	23	46	43	30	22	24	24	26	22	27	20	26	17	14	13	15	19	17	24	24
27		14	9	9	11	12	12	17	25	31	52	48	37	33	27	25	31	23	26	20	21	8	10	7	3	24	24
28		5	7	6	10	9	8	9	20	24	21	18	12	14	17	15	22	24	P	20	31	31	17	15	8	23	24
29		4	6	10	13	16	12	20	22	20	24	25	35	31	28	21	36	17	35	25	14	9	10	11	11	24	24
30		10	16	15	18	44	32	9	33	25	42	52	21	36	53	34	28	27	22	18	10	17	17	19	18	24	24
31		18	18	14	14	18	17	17	16	17	17	15	19	17	17	18	19	18	17	16	14	10	10	9	10	24	24

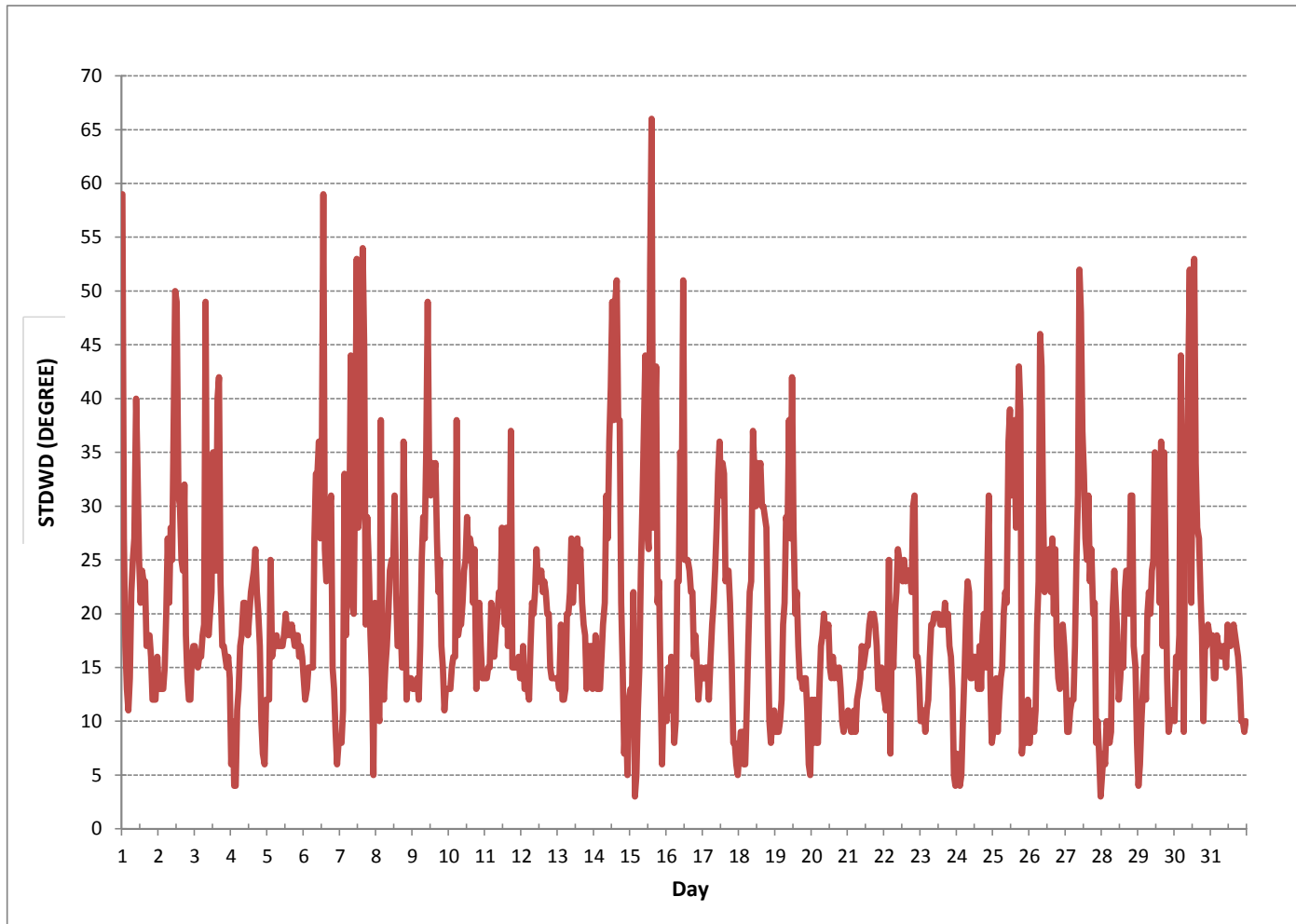
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION: August 28, 2014

CALIBRATION TIME: 0 HRS OPERATIONAL TIME: 614 HRS

STANDARD DEVIATION WIND DIRECTION (STDWD) hourly averages in degrees



RELATIVE HUMIDITY

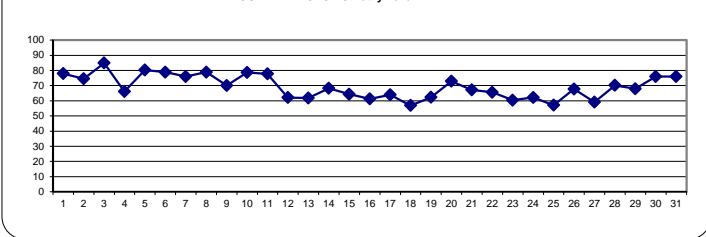
RELATIVE HUMIDITY (RH) hourly averages in %

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
DAY	HRG.	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.	
1		80	84	85	87	88	85	84	80	77	74	69	71	68	67	68	69	82	74	69	73	79	83	85	87	67	88	78	24	
2		88	88	89	89	90	90	88	81	70	72	69	63	59	60	58	59	61	64	63	67	73	80	83	86	58	90	75	24	
3		88	89	90	91	91	89	90	89	85	78	68	69	60	64	88	89	90	90	90	89	89	90	90	90	60	91	85	24	
4		90	91	91	91	91	89	84	79	71	62	54	49	43	41	41	40	43	47	54	61	62	66	74	74	40	91	66	24	
5		75	77	79	80	83	83	87	88	87	85	82	79	75	75	72	69	69	71	78	81	86	87	87	90	69	90	80	24	
6		91	91	90	90	91	91	90	83	76	71	66	81	69	58	55	60	64	74	77	79	82	87	89	88	55	91	79	24	
7		89	91	91	90	91	90	87	86	84	79	63	58	57	53	55	53	57	62	70	73	80	87	89	86	53	91	76	24	
8		79	89	88	82	87	83	85	80	71	65	61	59	54	65	79	78	77	80	85	88	89	89	89	90	54	90	79	24	
9		91	91	91	92	92	90	78	75	70	65	56	52	52	50	49	49	51	54	58	65	70	78	80	82	49	92	70	24	
10		85	87	87	86	88	89	89	88	87	84	78	70	62	59	54	53	61	66	82	82	83	87	90	90	53	90	79	24	
11		90	90	89	89	87	86	84	82	81	71	67	58	59	60	63	83	83	77	71	72	77	80	82	84	58	90	78	24	
12		85	81	86	89	90	87	76	66	64	57	53	50	47	45	42	41	35	38	41	48	59	66	71	73	35	90	62	24	
13		75	70	74	83	83	77	67	61	60	53	50	48	47	48	47	46	49	50	53	58	63	70	75	75	46	83	62	24	
14		77	76	77	79	81	80	76	71	66	61	57	51	45	51	64	50	51	71	76	75	78	79	70	74	45	81	68	24	
15		74	75	75	83	85	80	72	66	61	55	55	55	54	49	43	48	46	45	49	58	74	79	79	83	43	85	64	24	
16		80	84	80	88	90	88	74	63	57	50	46	42	40	34	32	34	34	45	47	61	74	70	77	80	32	90	61	24	
17		80	83	85	86	88	87	79	77	70	63	58	52	49	47	46	44	44	48	48	53	60	65	64	60	44	88	64	24	
18		58	58	59	65	64	64	60	60	57	56	55	52	49	49	46	46	45	46	50	54	63	67	71	71	45	71	57	24	
19		74	76	81	84	85	82	74	67	58	54	51	52	50	43	40	38	43	44	45	54	70	78	77	75	38	85	62	24	
20		74	78	79	87	84	79	78	74	74	70	67	65	68	60	55	55	73	69	70	73	76	79	81	81	55	87	73	24	
21		84	86	86	85	83	81	79	71	63	53	49	46	44	42	49	68	67	57	53	61	70	75	78	81	42	86	67	24	
22		80	81	83	85	85	85	79	72	66	58	54	51	48	49	47	46	43	46	47	57	75	78	78	81	43	85	66	24	
23		83	80	73	73	71	74	67	63	56	51	46	45	45	45	47	46	48	51	52	56	62	67	72	74	45	83	60	24	
24		78	81	80	82	82	80	78	66	55	45	41	41	38	38	37	35	35	45	56	62	80	86	87	84	35	87	62	24	
25		84	85	83	85	88	82	74	67	60	53	45	41	36	34	33	34	37	36	42	44	54	54	58	60	33	88	57	24	
26		66	66	68	71	72	75	76	71	85	86	69	61	58	57	56	54	56	56	61	62	69	76	77	78	54	86	68	24	
27		80	81	82	86	89	87	75	69	61	54	46	35	32	32	33	32	34	39	48	64	71	74	82	32	89	59	24		
28		81	86	88	87	83	85	76	67	64	61	54	51	50	48	45	45	50	P	60	81	86	88	89	88	45	89	70	23	
29		88	86	87	89	91	91	79	73	69	59	53	50	46	46	45	47	62	52	62	63	67	73	76	76	45	91	68	24	
30		76	78	79	85	88	90	89	87	82	72	72	75	74	67	59	56	58	64	71	77	81	78	80	83	56	90	76	24	
31		86	87	88	89	90	90	89	87	82	79	71	64	63	58	53	56	64	65	63	65	77	83	87	88	53	90	76	24	
HOURLY MAX		91	91	91	92	92	91	90	89	87	86	82	81	75	75	88	89	90	90	90	89	89	90	90	90	90				
HOURLY AVG		80.9	82.1	82.7	84.8	85.5	84.2	79.5	74.5	70.0	64.4	58.9	56.0	52.9	51.4	51.6	52.4	55.2	57.4	60.7	65.8	73.3	77.3	79.3	80.5					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

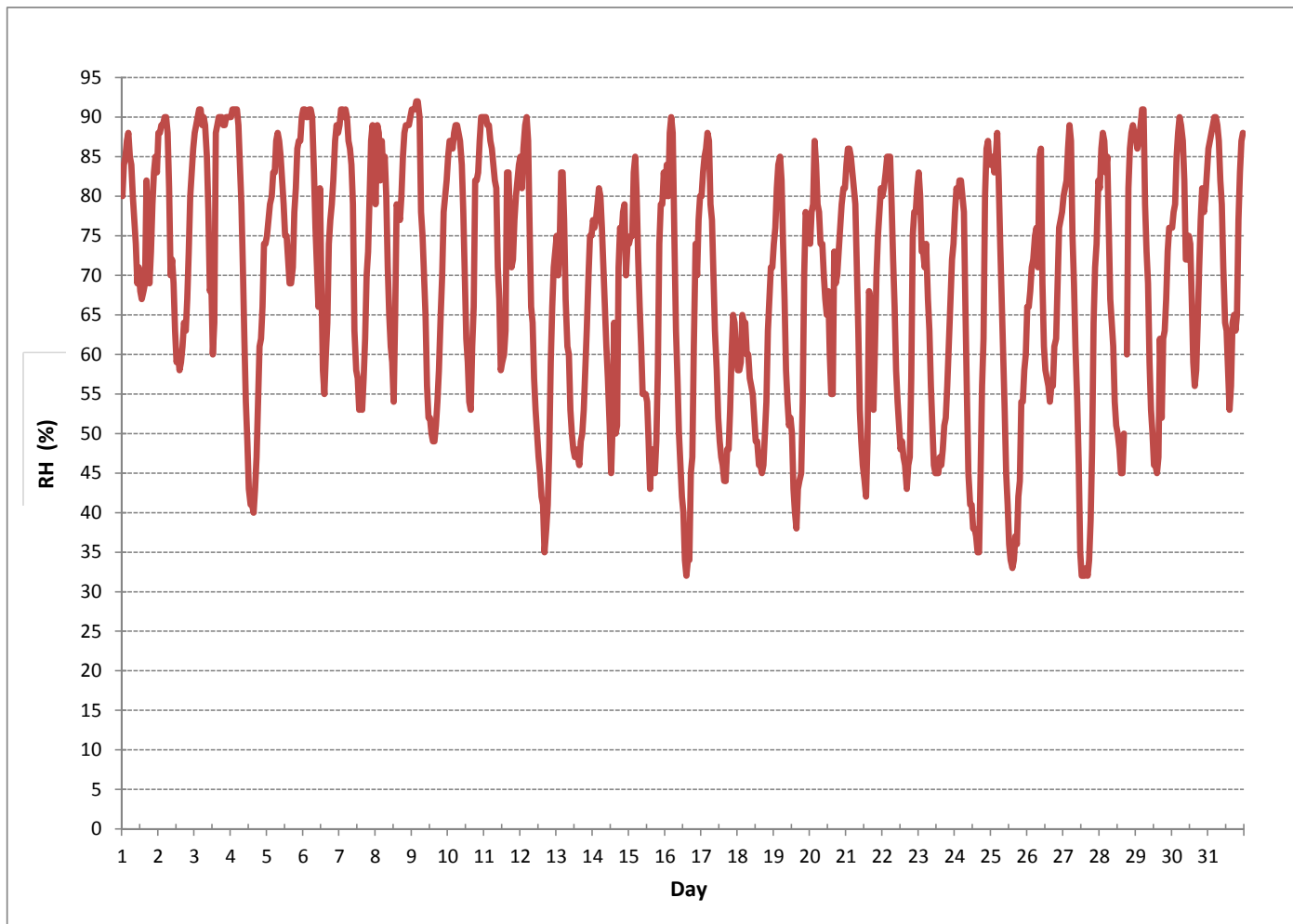
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	32	%	@ HOUR(S)	14 , VAR	ON DAY(S)	16 , 27
MAXIMUM 1-HR AVERAGE:	92	%	@ HOUR(S)	3 , 4	ON DAY(S)	9
MAXIMUM 24-HR AVERAGE:	85	%			ON DAY(S)	3
					VAR-VARIOUS	
OPERATIONAL TIME:					743	HRS
AMD OPERATION UPTIME:					99.9	%
STANDARD DEVIATION:	15.87				MONTHLY AVERAGE:	69 %

RELATIVE HUMIDITY (RH) hourly averages in %



BAROMETRIC PRESSURE

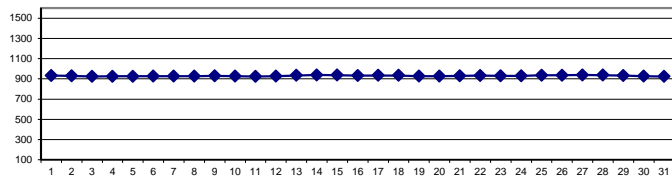
BAROMETRIC PRESSURE (BP) hourly averages in millibar

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR			
DAY	MIN.	MAX.	AVG.	RDGS.																											
1	934	933	933	933	932	932	933	933	933	933	934	934	934	934	934	934	933	933	933	933	933	932	931	931	931	931	931	934	933	24	
2	931	931	930	930	930	930	930	930	930	931	931	931	932	932	932	931	931	931	930	930	930	929	928	927	927	927	927	927	927	927	24
3	927	926	926	925	925	925	924	924	924	924	924	924	924	923	923	922	922	922	923	924	924	923	924	924	924	924	922	927	924	24	
4	924	924	924	923	924	924	924	924	925	925	926	926	927	927	927	927	927	927	927	927	926	926	926	926	925	925	923	927	926	24	
5	925	925	925	925	925	925	925	925	925	925	925	925	925	926	926	926	926	926	926	926	926	926	926	926	926	925	925	927	926	24	
6	926	926	926	926	926	926	926	926	927	927	928	928	927	927	927	928	927	926	927	927	927	927	926	925	925	925	925	925	928	927	24
7	925	925	925	925	925	925	925	926	927	927	928	928	928	929	929	929	929	929	928	928	929	929	928	927	927	927	925	929	927	24	
8	927	927	927	927	927	927	927	928	928	929	930	930	930	930	929	928	928	928	928	929	928	928	928	928	928	928	927	930	928	24	
9	928	928	928	928	928	928	929	930	930	931	931	931	931	931	931	931	931	931	930	930	930	929	929	928	928	928	928	931	930	24	
10	927	926	926	926	926	926	926	926	927	927	927	927	927	927	927	927	927	927	927	926	926	926	925	925	925	925	925	927	926	24	
11	924	924	924	924	924	924	925	925	926	926	926	926	926	926	926	926	925	925	925	925	925	925	924	924	924	924	924	926	925	24	
12	924	924	924	924	924	924	925	926	927	927	927	927	928	928	929	929	929	929	929	929	929	930	929	929	929	929	924	930	927	24	
13	929	929	930	930	930	931	932	933	934	934	935	936	936	936	936	936	936	936	937	937	937	936	936	936	936	936	929	937	934	24	
14	936	936	936	936	936	937	938	938	939	940	940	941	941	941	940	941	941	940	939	939	939	938	938	938	938	936	941	939	24		
15	938	938	938	938	938	938	938	939	939	940	939	939	939	938	938	938	938	938	937	937	937	936	934	934	933	933	940	938	24		
16	933	933	932	932	931	931	932	933	933	933	933	933	933	933	932	932	932	932	932	931	930	930	930	930	930	930	930	933	932	24	
17	930	930	930	931	931	932	932	933	934	935	935	936	936	936	936	936	936	937	937	937	936	935	935	934	934	930	937	934	24		
18	934	934	934	934	934	935	935	936	936	936	936	936	936	935	935	935	934	934	934	933	932	931	930	930	930	930	936	934	24		
19	929	928	928	927	927	927	928	928	929	929	928	928	928	928	928	928	928	928	928	927	927	926	926	926	926	926	926	929	928	24	
20	926	925	925	925	925	925	926	926	927	928	928	928	928	928	929	929	928	928	928	928	928	928	928	928	928	929	925	929	927	24	
21	928	928	928	929	928	929	929	929	929	930	930	931	931	931	931	931	931	932	933	933	933	933	933	933	933	928	933	931	24		
22	933	933	934	933	933	933	933	934	934	934	934	934	933	933	932	932	931	930	930	929	928	927	927	928	927	927	934	932	24		
23	928	928	928	927	927	927	928	929	929	930	930	930	931	931	931	931	931	931	931	931	932	931	931	931	931	927	932	930	24		
24	930	930	930	930	930	930	930	931	931	932	932	932	932	931	931	931	931	931	931	931	931	930	930	931	931	930	932	931	24		
25	931	932	932	932	932	933	934	935	936	936	937	937	937	938	938	937	938	938	937	938	938	937	936	935	935	931	938	935	24		
26	935	935	935	935	935	936	936	937	937	936	937	937	937	938	938	938	938	937	937	936	937	936	936	936	936	935	938	936	24		
27	936	936	936	935	935	936	936	938	939	939	940	940	940	940	940	940	940	940	940	940	939	938	938	938	935	940	938	24			
28	937	937	937	936	936	937	937	938	939	939	939	939	939	938	938	937	P	937	936	935	935	934	934	934	934	939	937	23			
29	933	933	933	932	932	933	933	933	934	934	934	934	934	933	933	933	932	932	931	931	929	928	928	927	927	934	932	24			
30	927	927	927	926	926	925	925	926	926	927	927	927	927	927	927	927	926	926	926	926	925	925	924	924	924	924	927	926	24		
31	923	923	923	923	923	923	923	924	924	924	925	925	925	926	926	926	926	926	926	926	926	925	924	924	924	923	926	925	24		
HOURLY MAX	938	938	938	938	938	938	938	939	939	940	940	941	941	941	941	940	941	941	940	940	940	939	938	938	938						
HOURLY AVG	930	929	929	929	929	929	930	930	931	931	932	932	932	932	932	931	931	931	931	931	931	930	930	930	930						

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

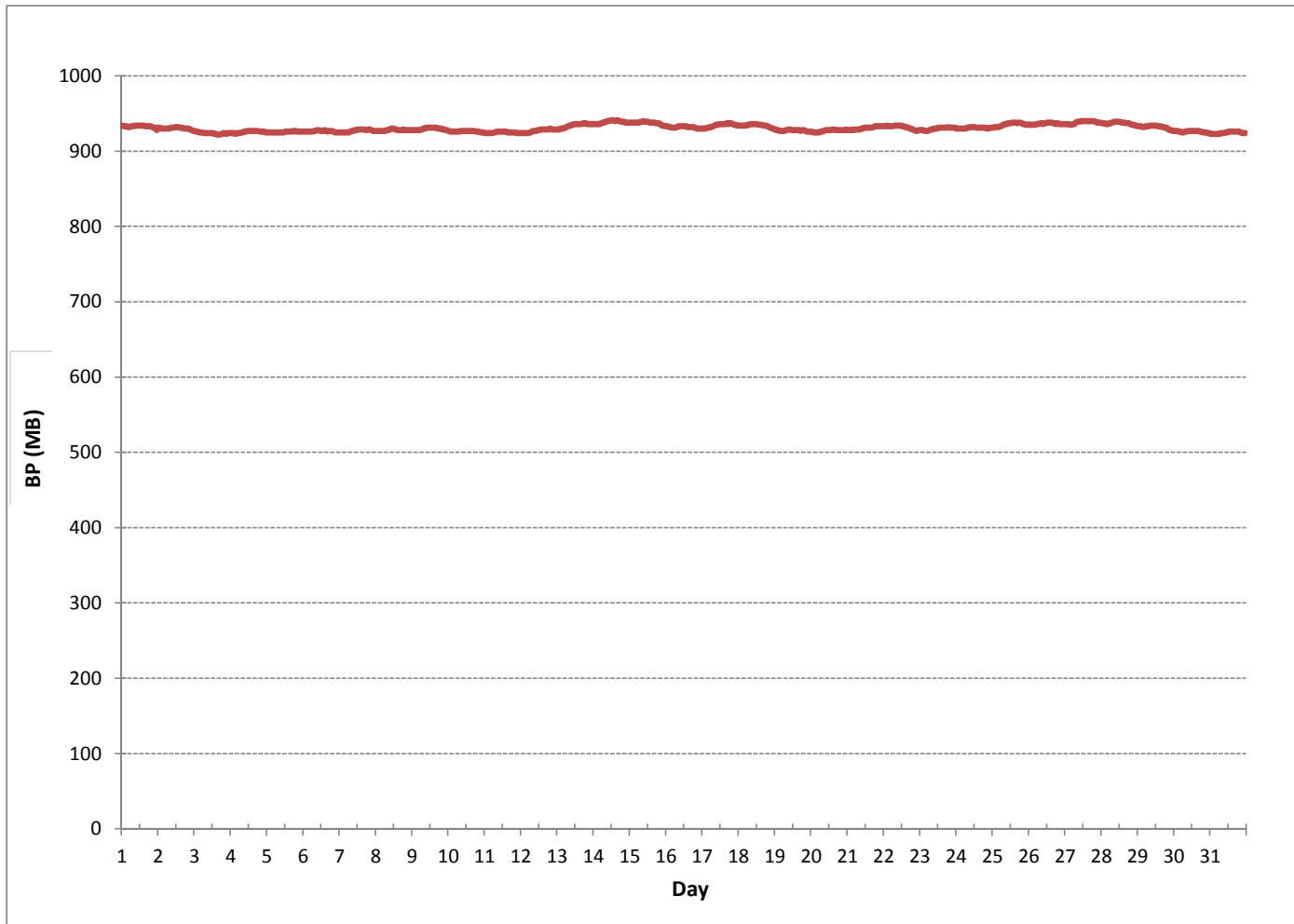
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	922	MB	@ HOUR(S)	VAR	ON DAY(S)	3
MAXIMUM 1-HR AVERAGE:	941	MB	@ HOUR(S)	VAR	ON DAY(S)	14
MAXIMUM 24-HR AVERAGE:	939	MB			ON DAY(S)	14
					VAR-VARIOUS	
				OPERATIONAL TIME:		743 HRS
				AMD OPERATION UPTIME:		99.9 %
STANDARD DEVIATION:	4.62			MONTHLY AVERAGE:		931 MB

BAROMETRIC PRESSURE (BP) hourly averages in millibar



AMBIENT TEMPERATURE

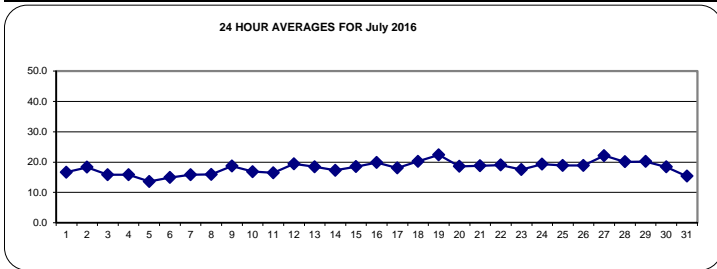
AMBIENT TEMPERATURE (AmbTPX) hourly averages in Degrees Celsius

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.
DAY	DAY	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.
1	1	15.4	14.9	14.7	14.3	14.1	14.4	14.7	15.6	16.3	17.6	19.5	18.9	18.9	19.3	19.4	19.7	17.3	18.1	18.6	17.6	16.3	15.2	14.7	14.3	14.1	19.7	16.7	24
2	2	14.1	14.0	13.7	13.7	13.3	13.3	14.4	16.2	19.2	18.5	19.9	21.2	23.2	22.1	23.5	22.8	22.4	21.5	21.2	19.8	19.2	18.2	17.4	16.7	13.3	23.5	18.3	24
3	3	16.5	16.2	15.8	15.4	15.5	16.4	15.8	14.7	16.0	18.6	21.5	22.3	22.9	19.4	13.1	13.3	13.9	13.8	13.8	13.8	13.4	12.9	12.6	12.1	12.1	22.9	15.8	24
4	4	11.3	11.0	10.5	10.3	10.7	11.6	12.1	13.2	15.1	17.1	18.7	19.4	20.4	20.9	21.0	21.6	21.1	20.1	18.5	17.0	15.9	15.2	14.2	13.9	10.3	21.6	15.9	24
5	5	13.5	13.1	12.5	12.1	11.6	11.7	11.2	10.7	10.9	11.7	13.3	13.7	15.2	15.9	16.8	17.6	17.2	17.3	15.4	14.5	13.5	13.1	12.6	12.0	10.7	17.6	13.6	24
6	6	11.6	11.9	11.9	12.0	12.0	12.5	13.0	15.3	16.9	18.1	19.3	15.8	17.6	20.4	21.8	17.8	17.1	15.6	14.9	14.5	13.5	12.1	11.5	11.4	11.4	21.8	14.9	24
7	7	10.7	11.1	11.3	10.7	10.5	10.8	13.2	13.7	14.0	14.6	17.6	19.4	20.5	21.6	21.3	21.2	20.4	19.4	19.2	18.7	16.8	15.2	14.3	14.2	10.5	21.6	15.9	24
8	8	14.0	12.7	13.0	13.5	12.3	13.7	13.8	15.7	18.7	21.8	23.1	23.6	25.0	21.5	17.0	16.4	15.7	14.4	14.3	13.5	13.1	12.8	12.7	12.9	12.3	25.0	16.0	24
9	9	11.9	11.6	11.3	11.2	11.1	12.8	16.6	18.6	20.3	21.7	22.7	23.8	23.5	24.4	24.9	24.3	23.7	23.2	22.9	20.3	18.6	16.9	16.5	16.0	11.1	24.9	18.7	24
10	10	15.2	14.4	14.5	14.6	14.4	14.6	15.0	15.2	15.5	16.2	17.3	19.3	20.9	21.5	22.7	22.7	20.2	19.4	16.4	16.3	15.4	14.5	14.3	14.2	14.2	22.7	16.9	24
11	11	13.5	13.0	12.5	12.3	13.0	13.6	14.6	15.2	16.4	18.9	19.6	21.2	22.3	22.0	21.2	16.3	16.5	18.1	19.3	16.7	15.3	14.8	14.7	14.4	12.3	22.3	16.5	24
12	12	14.4	15.1	13.7	12.8	12.3	13.1	16.3	19.5	20.8	22.2	23.4	23.6	24.4	24.5	24.4	23.9	24.5	23.4	22.9	21.6	19.3	17.7	16.8	16.0	12.3	24.5	19.4	24
13	13	14.9	14.7	13.5	12.0	11.7	13.2	16.7	18.9	20.1	21.1	21.9	22.6	23.2	22.6	22.7	22.8	22.0	22.4	21.6	19.6	18.4	16.5	14.9	14.5	11.7	23.2	18.4	24
14	14	14.0	13.6	13.1	12.8	12.3	12.8	14.4	16.6	18.8	20.6	21.7	22.3	23.5	22.4	20.0	22.7	22.4	17.6	17.6	16.7	15.3	14.8	15.0	14.4	12.3	23.5	17.3	24
15	15	14.7	14.5	14.4	12.8	12.1	13.8	17.2	19.4	20.7	22.0	21.3	20.9	20.7	21.9	24.3	23.9	23.6	22.8	21.5	20.1	16.9	15.2	14.8	14.1	12.1	24.3	18.5	24
16	16	14.5	13.3	13.9	12.3	11.1	12.3	16.8	20.6	21.9	24.2	25.1	25.8	26.1	26.6	26.4	26.2	26.2	24.1	23.4	20.0	16.8	17.2	16.2	15.2	11.1	26.6	19.8	24
17	17	14.8	13.9	13.4	13.0	12.6	13.2	16.0	16.7	18.3	19.5	21.0	21.6	22.7	23.1	22.7	22.8	22.7	21.5	21.1	19.6	17.2	15.6	15.1	15.2	12.6	23.1	18.1	24
18	18	15.6	15.4	15.3	14.1	14.4	15.3	17.7	18.8	20.3	22.1	23.1	23.4	24.4	24.3	24.6	24.4	25.1	24.6	23.5	22.5	20.5	19.3	18.7	18.3	14.1	25.1	20.2	24
19	19	17.7	17.1	16.5	16.0	15.7	16.9	19.9	22.8	25.1	25.8	26.5	26.7	27.1	27.7	28.4	28.5	26.6	26.2	25.8	24.4	21.0	18.8	18.4	17.8	15.7	28.5	22.4	24
20	20	17.6	16.5	16.2	14.4	14.6	15.8	16.6	18.1	18.0	19.4	20.7	20.9	20.1	21.9	23.5	23.5	19.8	20.0	19.9	18.8	18.3	17.5	17.0	16.7	14.4	23.5	18.6	24
21	21	16.3	16.2	16.0	15.7	15.7	15.9	16.5	18.3	19.4	22.3	23.7	23.5	24.0	24.3	22.9	19.8	20.2	21.0	20.3	18.4	16.6	15.4	14.5	13.7	13.7	24.3	18.8	24
22	22	13.5	13.5	13.2	12.7	12.5	12.7	14.7	17.0	19.0	21.1	22.4	23.1	23.7	24.4	25.5	25.5	26.4	25.8	25.1	22.8	16.5	15.8	15.3	14.7	12.5	26.4	19.0	24
23	23	14.2	14.6	14.8	13.9	13.6	13.3	15.6	17.9	19.8	20.6	21.5	20.7	20.9	20.7	20.3	20.8	20.3	19.7	19.6	18.5	16.5	15.4	14.2	13.4	13.3	21.5	17.5	24
24	24	12.3	11.7	11.9	11.4	11.3	12.0	13.4	18.3	22.5	24.2	24.8	25.8	26.7	26.6	26.4	27.6	27.2	24.7	22.0	20.3	16.6	15.6	15.3	15.0	11.3	27.6	19.3	24
25	25	14.5	13.9	13.2	12.3	11.3	12.2	14.5	17.1	18.6	20.3	22.3	23.2	23.6	24.7	25.0	24.4	23.9	24.4	22.6	21.5	18.8	17.9	17.3	16.6	11.3	25.0	18.9	24
26	26	15.6	15.5	15.5	14.4	13.9	13.7	14.6	16.4	14.2	16.1	21.1	22.2	23.1	24.4	24.7	25.3	23.8	24.5	22.5	21.4	19.7	18.0	17.1	16.3	13.7	25.3	18.9	24
27	27	15.7	15.2	14.6	13.9	13.3	14.3	18.4	21.4	24.0	25.8	27.0	27.7	28.3	28.0	28.2	28.4	28.4	27.9	26.5	25.1	22.0	20.5	19.4	17.5	13.3	28.4	22.1	24
28	28	17.1	16.0	15.2	15.2	15.8	16.0	19.1	22.6	24.1	24.9	25.7	25.1	25.1	25.6	26.2	26.9	25.5	P	20.2	16.4	15.2	15.1	15.0	14.3	14.3	26.9	20.1	23
29	29	13.6	13.6	12.9	12.2	11.7	12.7	16.7	19.2	20.8	22.8	24.2	25.7	26.9	27.6	28.1	27.3	22.9	25.6	22.7	22.1	19.9	19.1	18.6	18.2	11.7	28.1	20.2	24
30	30	17.9	17.6	17.1	15.6	14.7	14.5	14.8	15.9	17.7	20.8	20.5	19.9	20.3	22.2	23.0	23.8	23.6	21.5	19.9	18.4	17.8	15.5	14.6	14.1	14.1	23.8	18.4	24
31	31	13.7	13.5	13.6	13.6	13.4	13.4	13.6	14.1	14.5	14.6	16.9	17.9	19.0	20.4	20.7	19.3	16.9	18.0	16.9	16.3	14.0	12.5	11.3	10.8	10.8	20.7	15.4	24
HOURLY MAX		17.9	17.6	17.1	16.0	15.8	16.9	19.9	22.8	25.1	25.8	27.0	27.7	28.3	28.0	28.4	28.5	28.4	27.9	26.5	25.1	22.0	20.5	19.4	18.3				
HOURLY AVG		14.5	14.2	13.9	13.3	13.0	13.6	15.4	17.2	18.6	20.2	21.5	22.0	22.7	23.0	22.9	22.6	21.9	21.2	20.3	18.9	17.0	15.9	15.3	14.8				

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

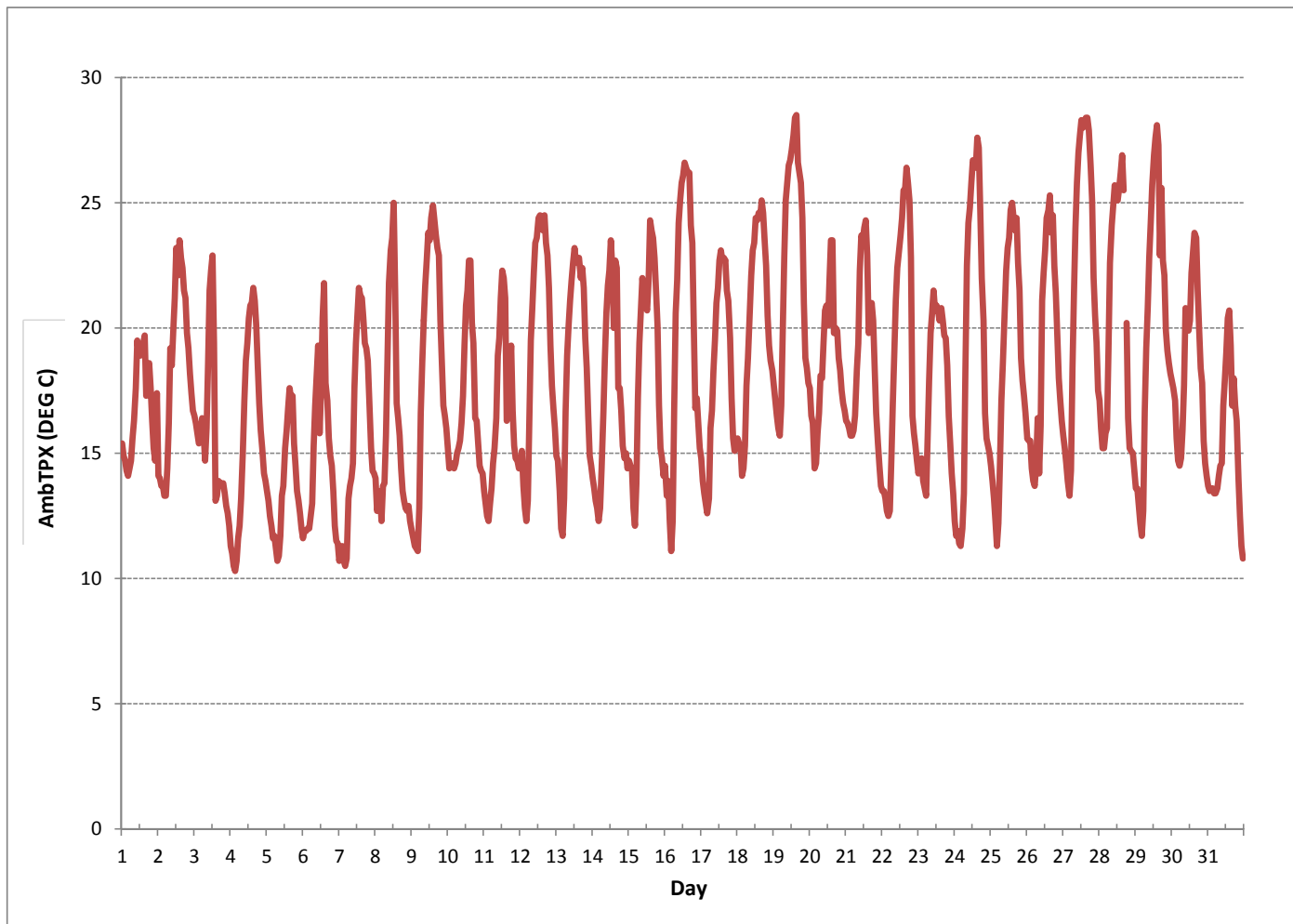
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	10.3	°C	@ HOUR(S)	3	ON DAY(S)	4
MAXIMUM 1-HR AVERAGE:	28.5	°C	@ HOUR(S)	15	ON DAY(S)	19
MAXIMUM 24-HR AVERAGE:	22.4	°C			ON DAY(S)	19
					VAR-VARIOUS	
OPERATIONAL TIME:					743	HRS
AMD OPERATION UPTIME:					99.9	%
STANDARD DEVIATION:	4.41				MONTHLY AVERAGE:	18.1 °C

AMBIENT TEMPERATURE (AmbTPX) hourly averages in Degrees Celsius



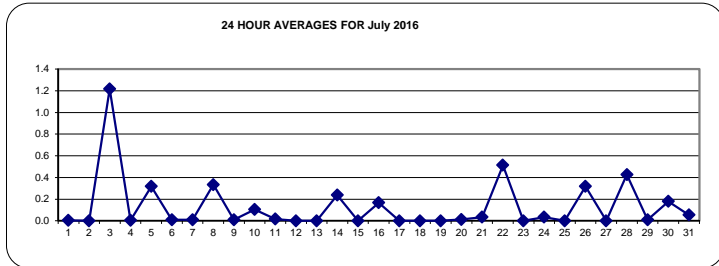
PRECIPITATION

PRECIPITATION hourly averages (mm)

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
DAY	MIN.	MAX.	AVG.	RDGS.																										
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	0.0	0.0	0.1	0.0	24	
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
3	0.0	0.0	0.0	0.0	0.0	0.0	4.3	1.1	0.0	0.0	0.0	0.0	0.0	0.1	20.8	1.8	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.8	1.2	24
4	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	0.0	0.0	0.0	0.1	0.0	24	
5	0.0	0.0	0.0	0.0	0.0	0.6	3.4	3.2	0.3	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	3.4	0.3	24
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24	
7	0.0	0.1	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	0.0	0.0	0.0	0.1	0.0	24	
8	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	0.6	1.2	0.0	0.3	1.1	3.5	1.2	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.3	24	
9	0.0	0.1	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	0.0	0.0	0.0	0.1	0.0	24	
10	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.1	24	
11	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24	
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.1	5.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.2	24	
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.2	0.0	0.0	0.0	3.8	0.2	24	
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	24	
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	24	
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.2	0.0	0.1	0.0	12.2	0.5	24	
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.1	0.0	0.7	0.0	24	
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	6.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.3	24	
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	P	6.0	3.6	0.2	0.0	0.0	0.0	0.0	6.0	0.4	23	
29	0.0	0.1	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	0.0	0.0	0.1	0.0	24	
30	0.0	0.0	2.8	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	2.8	0.2	24	
31	0.1	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.1	24	
HOURLY MAX	0.1	0.1	2.8	1.4	0.1	0.6	4.3	3.2	6.0	0.6	0.0	0.1	0.0	0.6	20.8	1.8	1.0	5.0	3.5	6.0	12.2	0.2	0.1	0.1						
HOURLY AVG	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.7	0.1	0.0	0.3	0.1	0.4	0.5	0.0	0.0	0.0						

STATUS FLAG CODES

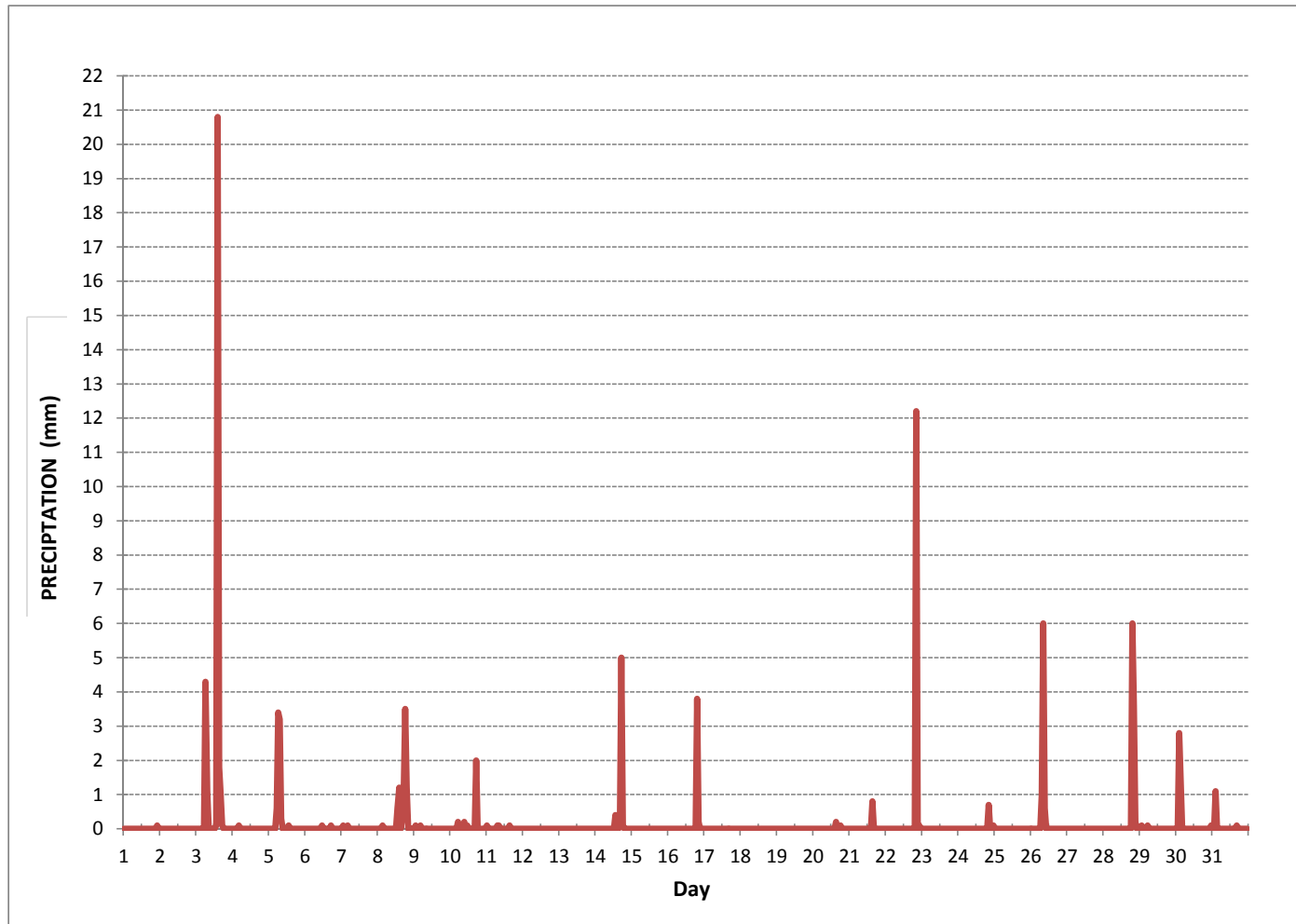
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	0.0	MM	@ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	20.8	MM	@ HOUR(S)	14	ON DAY(S)	3
MAXIMUM 24-HR AVERAGE:	1.2	MM			ON DAY(S)	3
MONTHLY TOTAL	95.6	MM			VAR-VARIOUS	
OPERATIONAL TIME:					743	HRS
AMD OPERATION UPTIME:					99.9	%
STANDARD DEVIATION:	1.02				MONTHLY AVERAGE:	0.1
						MM

PRECIPITATION hourly averages (mm)



APPENDIX II
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE



API 100E Sulphur Dioxide Analyzer Calibration

Date: July 19, 2016	Barometric Pressure: 0.916 atm
Company/Airshed: LICA	Station Temperature °C: 24
Location/Station Name: St. Lina	Weather Conditions: Mainly sunny
Parameter: Sulphur Dioxide	Calibration Purpose: shut down
Start Time 24 hr. (mst): 9:06	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
End Time 24 hr. (mst): 12:57	Cal Gas Expiry Date: December 2, 2023
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	
Serial Number: 468	Range ppb: 1000
Last Calibration Date: June 17, 2016	As Found C.F.: 0.986
Previous C.F.: 1.003	New C.F.: n/a

Calibrator:		Standard Calibration Points for Ranges	
Flow Meter ID's: n/a		Point	Sulphur Dioxide Standard Calibration Points
Make & Model: API 700		High	780
Serial #: 627		Mid	380
Cal Gas Cylinder I.D. #: LL119346		Low	190
Cal Gas Conc. (ppm): 50.0			

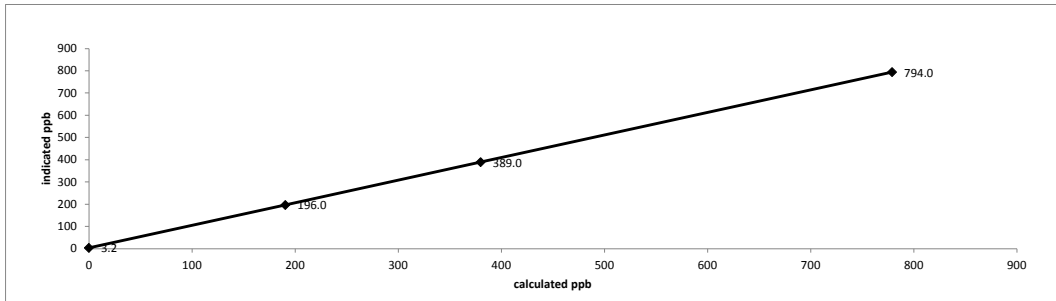
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	5000	0.00	5000	0.0	3.2	N/A
as found high	4925	78.00	5003	779.5	794.0	0.986
mid	4966	38.00	5004	379.7	389.0	0.984
low	4983	19.00	5002	189.9	196.0	0.985
Average C.F.=						0.985

Linear Regression/Calibration Results:

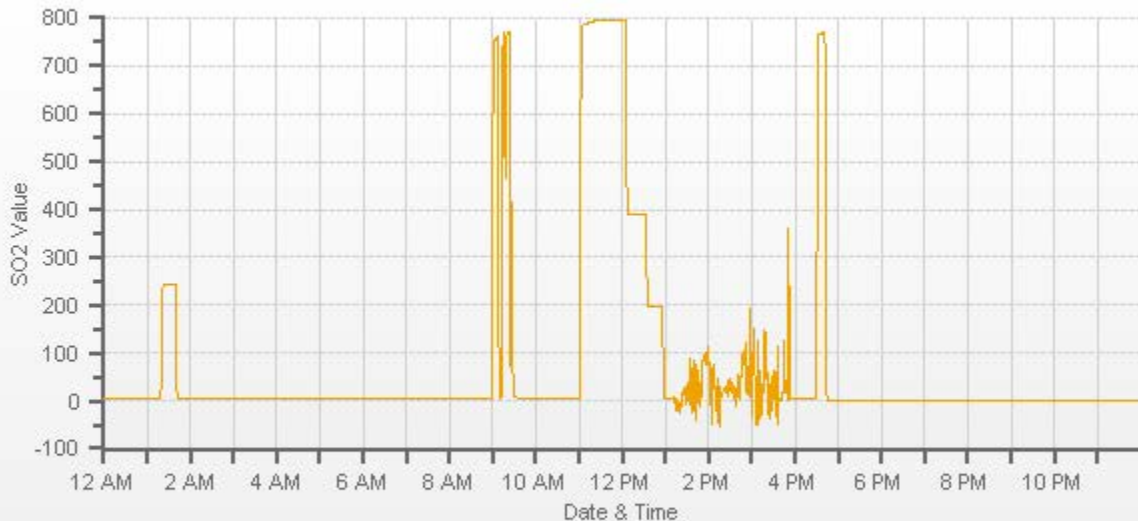
Correlation Coefficient =	1.000	LIMITS
Slope =	0.986	> or = 0.995
b (Intercept as % of full scale)=	-0.33%	0.90-1.10
% change in C.F. from last cal=	1.72%	± 3% F.S.
		± 10%

API 100E Sulphur Dioxide Analyzer Calibration



As found:		As left:	
SLOPE:	1.006	SLOPE:	n/a
OFFSET:	103.7	OFFSET:	n/a
HVPS:	647	HVPS:	n/a
RCCELL TEMP:	50.0	RCCELL TEMP:	n/a
BOX TEMP:	31.3	BOX TEMP:	n/a
PMT TEMP:	7.8	PMT TEMP:	n/a
IZS TEMP:	40.0	IZS TEMP:	n/a
PRES:	23.8	PRES:	n/a
SAMP FL:	570	SAMP FL:	n/a
NORM PMT:	117.6	NORM PMT:	n/a
UV LAMP:	3258.0	UV LAMP:	n/a
LAMP RATIO:	93.1	LAMP RATIO:	n/a
STR. LGT	52.2	STR. LGT	n/a
DRK PMT:	5.5	DRK PMT:	n/a
DRK LMP:	6.8	DRK LMP:	n/a
Internal Span:	234	Internal Span:	n/a

Comments:
 Shutdown calibration completed for yearly maintenance. No ZERO adjustment made. No High Point adjustment made.



— SO2[ppb]



API 100E Sulphur Dioxide Analyzer Calibration

Date: July 20, 2016	Barometric Pressure: 0.917 atm
Company/Airshed: LICA	Station Temperature °C: 23
Location/Station Name: St. Lina	Weather Conditions: A few clouds
Parameter: Sulphur Dioxide	Calibration Purpose: post repair
Start Time 24 hr. (mst): 12:28	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
End Time 24 hr. (mst): 17:10	Cal Gas Expiry Date: December 2, 2023
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	
Serial Number: 468	Range ppb: 1000
Last Calibration Date: n/a	As Found C.F.: n/a
Previous C.F.: n/a	New C.F.: 0.999

Calibrator:	Standard Calibration Points for Ranges								
Flow Meter ID's: n/a	<table border="1" style="margin: auto;"> <tr><th>Point</th><th>Sulphur Dioxide Standard Calibration Points</th></tr> <tr><td>High</td><td>780</td></tr> <tr><td>Mid</td><td>380</td></tr> <tr><td>Low</td><td>190</td></tr> </table>	Point	Sulphur Dioxide Standard Calibration Points	High	780	Mid	380	Low	190
Point	Sulphur Dioxide Standard Calibration Points								
High	780								
Mid	380								
Low	190								
Make & Model: API 700									
Serial #: 627									
Cal Gas Cylinder I.D. #: LL119346									
Cal Gas Conc. (ppm): 50.0									

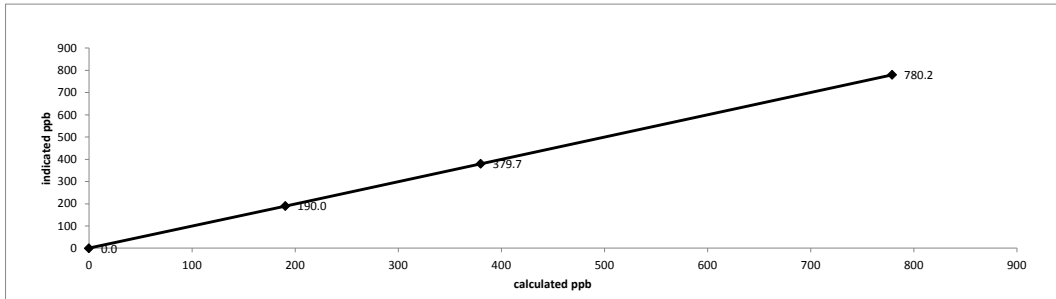
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
adjusted zero	5000	0.00	5000	0.0	0.0	N/A
adjusted high	4924	78.00	5002	779.7	780.2	0.999
mid	4966	38.00	5004	379.7	379.7	1.000
low	4981	19.00	5000	190.0	190.0	1.000
calibrator zero	5000	0.00	5000	0.0	0.0	n/a
Average C.F.=						1.000

Linear Regression/Calibration Results:

Correlation Coefficient = 1.000	LIMITS
Slope = 0.999	> or = 0.995
b (Intercept as % of full scale) = 0.01%	.95-1.05
% change in C.F. from last cal = n/a	± 3% F.S.
	± 10%

API 100E Sulphur Dioxide Analyzer Calibration



As found:

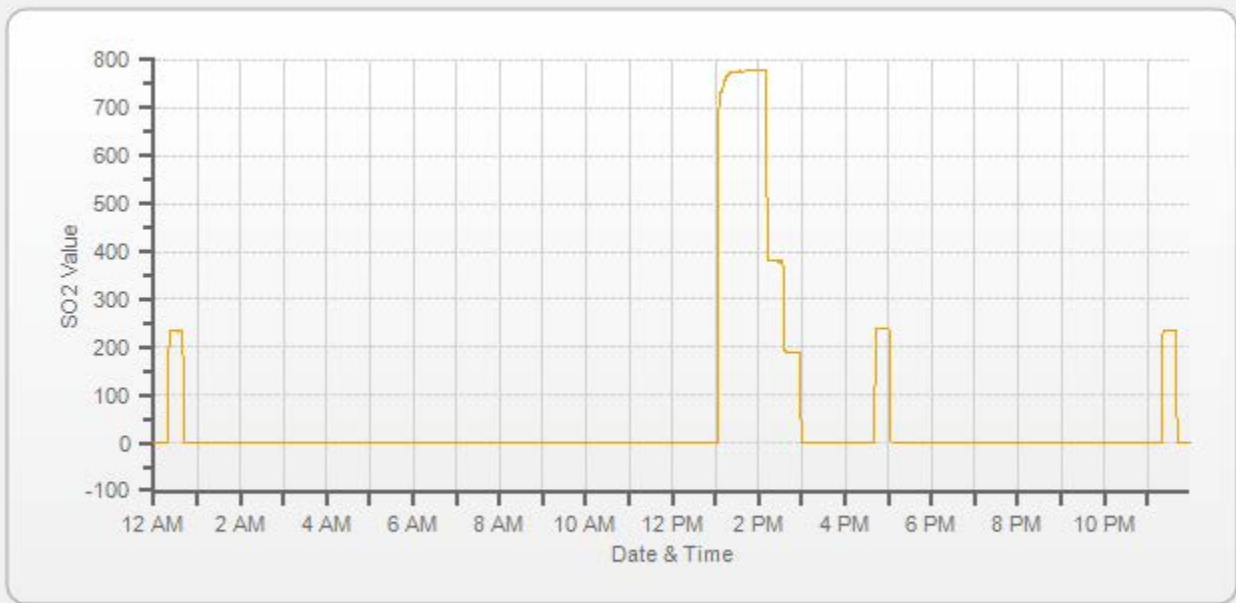
SLOPE:	n/a
OFFSET:	n/a
HVPS:	n/a
RCELL TEMP:	n/a
BOX TEMP:	n/a
PMT TEMP:	n/a
IZS TEMP:	n/a
PRES:	n/a
SAMP FL:	n/a
NORM PMT:	n/a
UV LAMP:	n/a
LAMP RATIO:	n/a
STR. LGT	n/a
DRK PMT:	n/a
DRK LMP:	n/a
Internal Span:	n/a

As left:

SLOPE:	1.022
OFFSET:	106.2
HVPS:	651
RCELL TEMP:	50.0
BOX TEMP:	31.0
PMT TEMP:	7.8
IZS TEMP:	40.0
PRES:	24
SAMP FL:	619
NORM PMT:	106.3
UV LAMP:	3273.0
LAMP RATIO:	100.4
STR. LGT	54.2
DRK PMT:	6.3
DRK LMP:	6.9
Internal Span:	237

Comments:

Post-repair calibration completed after yearly maintenance. Sample inlet filter changed.



— SO2[ppb]

HYDROGEN SULPHIDE



API 101E Hydrogen Sulphide Analyzer Calibration

Date: July 19, 2016	Barometric Pressure: 0.916 atm
Company/Airshed: LICA	Station Temperature °C: 24
Location/Station Name: St. Lina	Weather Conditions: Mainly sunny
Parameter: Hydrogen Sulphide	Calibration Purpose: shut down
Start Time 24 hr. (mst): 9:06	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
End Time 24 hr. (mst): 12:45	Cal Gas Expiry Date: July 15, 2017
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	
Serial Number: 509	Range ppb: 100
Last Calibration Date: June 17, 2016	As Found C.F.: 1.003
Previous C.F.: 1.000	New C.F.: n/a

Calibrator: Flow Meter ID's: n/a Make & Model: SABIO 2010 D Serial #: 11900613 Cal Gas Cylinder I.D. #: LL36837 Cal Gas Conc. (ppm): 10.0	Standard Calibration Points for Ranges <table border="1" style="margin: auto;"> <thead> <tr> <th>Point</th> <th>Hydrogen Sulphide Standard Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>78</td> </tr> <tr> <td>Mid</td> <td>38</td> </tr> <tr> <td>Low</td> <td>19</td> </tr> </tbody> </table>	Point	Hydrogen Sulphide Standard Calibration Points	High	78	Mid	38	Low	19
Point	Hydrogen Sulphide Standard Calibration Points								
High	78								
Mid	38								
Low	19								

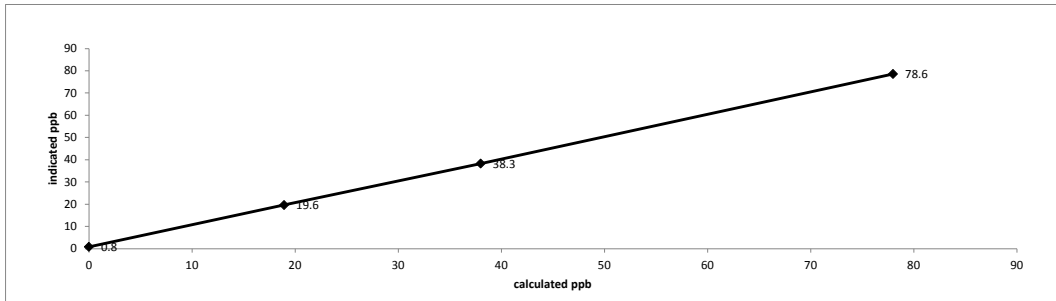
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	7500	0.00	7500	0.0	0.8	N/A
as found high	7442	58.50	7501	78.0	78.6	1.003
mid	7471	28.50	7500	38.0	38.3	1.013
low	7487	14.20	7501	18.9	19.6	1.007
Average C.F. =						1.008

Linear Regression/Calibration Results:

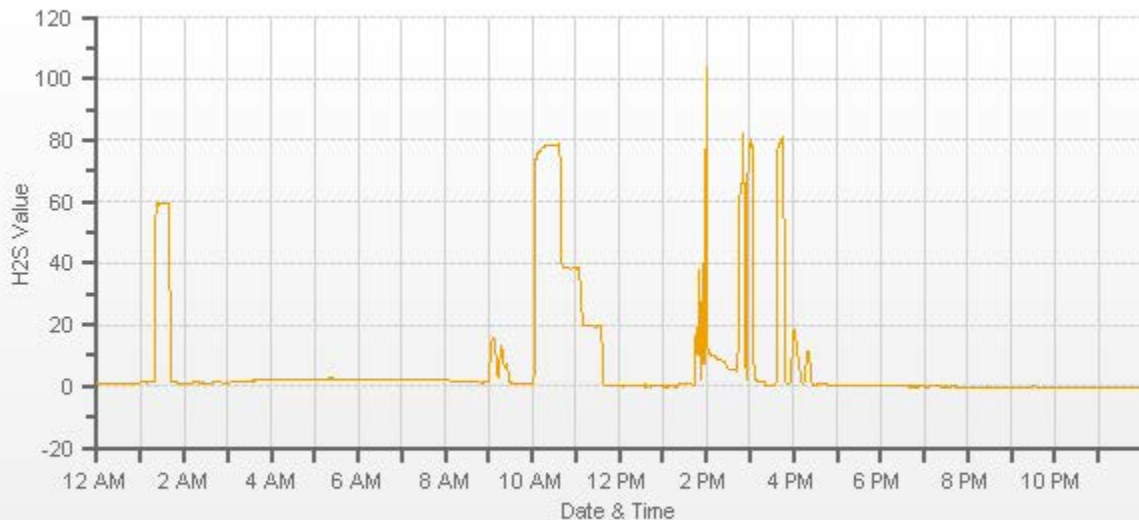
Correlation Coefficient =	1.000	LIMITS
Slope =	1.003	> or = 0.995
b (Intercept as % of full scale) =	-0.68%	0.90-1.10
% change in C.F. from last cal =	-0.25%	± 3% F.S.
		± 10%

API 101E Hydrogen Sulphide Analyzer Calibration



As found: SLOPE: 1.092 OFFSET: 37.3 HVPS: 651 RCELL TEMP: 50.0 BOX TEMP: 32.3 PMT TEMP: 7.9 IZS TEMP: 48.0 Converter Temp: 315.5 PRES: 20.2 SAMP FL: 513 UV LAMP: 3092.3 LAMP RATIO: 88.5 STR. LGT: 20.4 DRK PMT: 0.2 DRK LMP: 0.2 Internal Span: 56.8	As left: SLOPE: n/a OFFSET: n/a HVPS: n/a RCELL TEMP: n/a BOX TEMP: n/a PMT TEMP: n/a IZS TEMP: n/a Converter Temp: n/a PRES: n/a SAMP FL: n/a UV LAMP: n/a LAMP RATIO: n/a STR. LGT: n/a DRK PMT: n/a DRK LMP: n/a Internal Span: n/a
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Comments: Shutdown calibration completed to perform yearly maintenance. No ZERO adjustment made. No High Point adjustment made.



— H2S[ppb]



API 101E Hydrogen Sulphide Analyzer Calibration

Date: July 20, 2016	Barometric Pressure: 0.917 atm
Company/Airshed: LICA	Station Temperature °C: 23
Location/Station Name: St. Lina	Weather Conditions: A few clouds
Parameter: Hydrogen Sulphide	Calibration Purpose: post repair
Start Time 24 hr. (mst): 9:09	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
End Time 24 hr. (mst): 13:25	Cal Gas Expiry Date: July 15, 2017
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	
Serial Number: 509	Range ppb: 100
Last Calibration Date: n/a	As Found C.F.: n/a
Previous C.F.: n/a	New C.F.: 1.000

Calibrator:	Standard Calibration Points for Ranges								
Flow Meter ID's: n/a	<table border="1" style="margin: auto;"> <thead> <tr> <th>Point</th> <th>Hydrogen Sulphide Standard Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>78</td> </tr> <tr> <td>Mid</td> <td>38</td> </tr> <tr> <td>Low</td> <td>19</td> </tr> </tbody> </table>	Point	Hydrogen Sulphide Standard Calibration Points	High	78	Mid	38	Low	19
Point		Hydrogen Sulphide Standard Calibration Points							
High		78							
Mid		38							
Low	19								
Make & Model: SABIO 2010 D									
Serial #: 11900613									
Cal Gas Cylinder I.D. # : LL36837									
Cal Gas Conc. (ppm): 10.0									

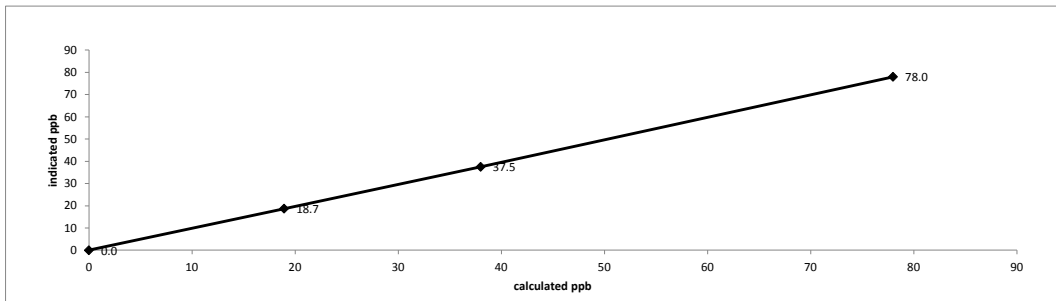
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
adjusted zero	7500	0.00	7500	0.0	0.0	N/A
adjusted high	7442	58.50	7501	78.0	78.0	1.000
mid	7472	28.50	7501	38.0	37.5	1.013
low	7486	14.20	7500	18.9	18.7	1.012
calibrator zero	7500	0.00	7500	0.0	0.0	n/a
Average C.F.=						1.009

Linear Regression/Calibration Results:

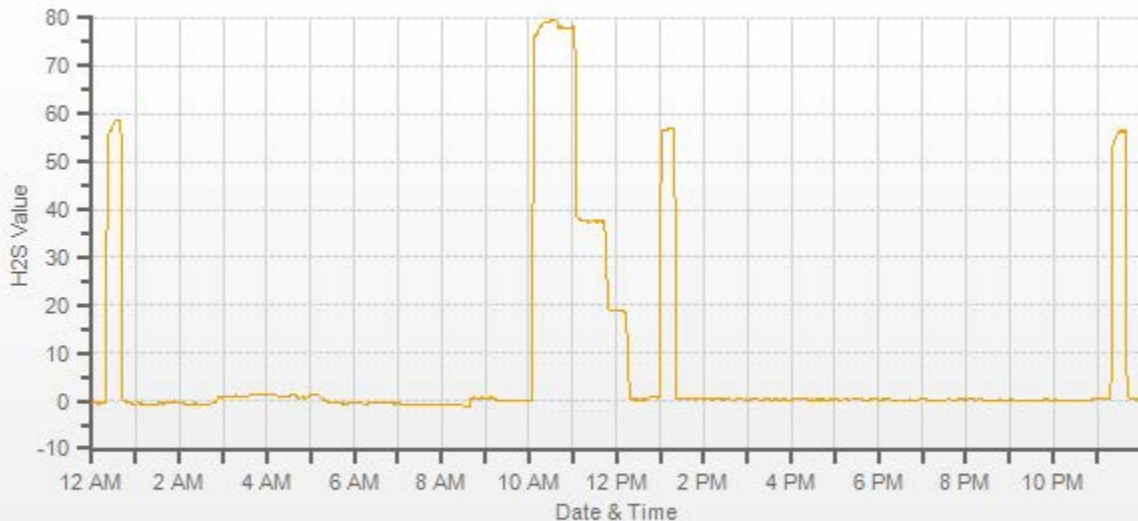
Correlation Coefficient = 1.000	LIMITS
Slope = 0.999	> or = 0.995
b (Intercept as % of full scale)= 0.20%	.95-1.05
% change in C.F. from last cal= n/a	± 3% F.S.
	± 10%

API 101E Hydrogen Sulphide Analyzer Calibration



As found:	As left:
SLOPE: n/a	SLOPE: 0.940
OFFSET: n/a	OFFSET: 52.8
HVPS: n/a	HVPS: 675
RCELL TEMP: n/a	RCELL TEMP: 50.0
BOX TEMP: n/a	BOX TEMP: 31.7
PMT TEMP: n/a	PMT TEMP: 8.0
IZS TEMP: n/a	IZS TEMP: 48.0
Converter Temp: n/a	Converter Temp: 314.4
PRES: n/a	PRES: 20.4
SAMP FL: n/a	SAMP FL: 559
UV LAMP: n/a	UV LAMP: 3786.5
LAMP RATIO: n/a	LAMP RATIO: 101.4
STR. LGT: n/a	STR. LGT: 24.8
DRK PMT: n/a	DRK PMT: 0.4
DRK LMP: n/a	DRK LMP: 0.5
Internal Span: n/a	Internal Span: 56.8

Comments:
 Post-repair calibration completed after yearly maintenance. Zero Air scrubber changed, SO2 scrubber renewed, reaction cell and manifold cleaned, factory calibration completed. Sample inlet filter changed. SO2 scrubber tested with 780 ppb of SO2/NOx mix. Response is 18 ppb.



— H2S[ppb]

TOTAL HYDROCARBON



Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	July 19, 2016	Barometric Pressure:	0.916 atm
Company/Airshed:	LICA	Station Temperature °C:	24
Location/Station Name:	St. Lina	Weather Conditions:	Mainly sunny
Parameter:	Total Hydrocarbon	Calibration Purpose:	shut down
Start/End Time 24 hr. (mst):	12:46 / 14:30	Performed By/Reviewer:	Alex Yakupov / Trina Whitsitt
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 25, 2023

Analyzer:	Serial Number:	51CLT-77021-384	Range ppm:	50
	Last Calibration Date:	June 20, 2016	As Found C.F.:	0.992
	Previous Cal High Point C.F.:	1.002	New C.F.:	n/a

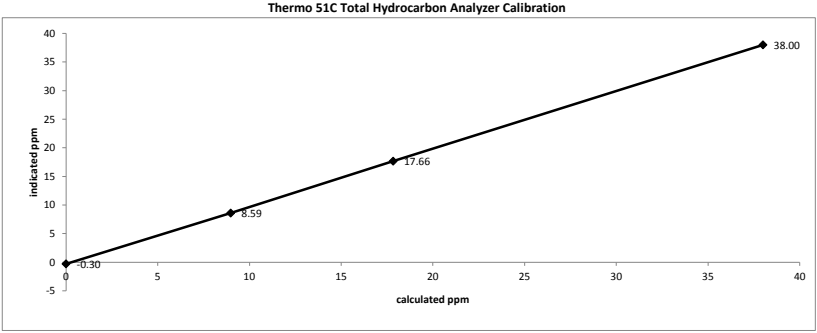
Calibrator:	Flow Meter ID's:	n/a	Standard Calibration Points for a Range of 50 ppm								
	Make & Model:	SABIO 2010 D									
	Serial #:	11900613									
	Cal Gas Cylinder I.D. #:	LL165372									
	CH ₄ /C ₂ H ₆ Cylinder Conc. (ppm):	606.0 / 212.0	<table border="1"> <tr> <th>Point</th> <th>Target ppm</th> </tr> <tr> <td>High</td> <td>38</td> </tr> <tr> <td>Mid</td> <td>18</td> </tr> <tr> <td>Low</td> <td>9</td> </tr> </table>	Point	Target ppm	High	38	Mid	18	Low	9
Point	Target ppm										
High	38										
Mid	18										
Low	9										
	CH ₄ as propane/total CH ₄ equivalents (ppm):	583.0 / 1189.0									

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	Diluent	Cal Gas	Total	(ppm)	(ppm)	
as found zero	1999	0.00	1999	0.0	-0.30	n/a
as found high	1936	63.90	2000	37.99	38.00	0.992
mid	1970	30.00	2000	17.84	17.66	0.993
low	1985	15.10	2000	8.98	8.59	1.010
Average C.F. =						0.998

Linear Regression/Calibration Results:

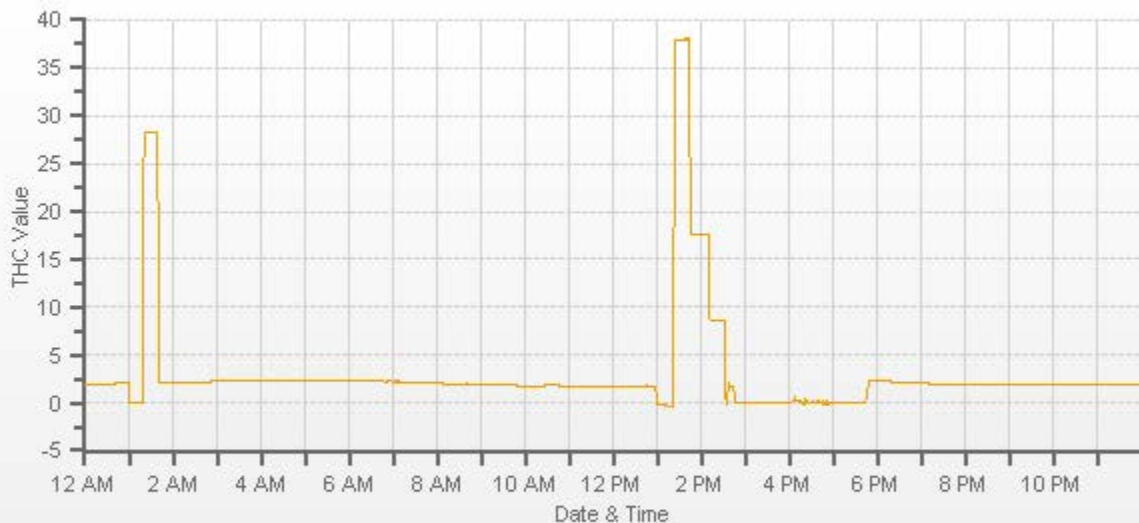
Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.991		.95-1.05
b (Intercept as % of full scale) =	0.73%		± 3% F.S.
% change in C.F. from last cal =	1.01%		± 10%



As found:	As left:
H2 cylinder (psi): 1100	H2 cylinder (psi): n/a
H2 cylinder reg set (psi): 22	H2 cylinder reg set (psi): n/a
Span Cylinder (psi): 800	Span Cylinder (psi): n/a
Span Cylinder Reg Set (psi): 22	Span Cylinder Reg Set (psi): n/a
Zero Air Gen Pressure: 42	Zero Air Gen Pressure: n/a
measurement alarms: None	measurement alarms: n/a
service alarms: None	service alarms: n/a
cnt: 1654	cnt: n/a
rng: 1	rng: n/a
try: 2	try: n/a
flm: 187.2	flm: n/a
det: 125.1	det: n/a
Flame: 187	Flame: n/a
Filter: 125	Filter: n/a
Base: 125	Base: n/a
Sample psi: 06.90	Sample psi: n/a
Internal Air Pressure: 19	Internal Air Pressure: n/a
Internal Fuel Pressure: 13	Internal Fuel Pressure: n/a
Intenal Pressure Gauge psi: 27	Intenal Pressure Gauge psi: n/a
Internal Span: 28.33	Internal Span: n/a

Comments:

No ZERO adjustment made. No High Point adjustment made. Shutdown calibration completed to perform yearly maintenance.



— THC[ppm]



Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	July 20, 2016	Barometric Pressure:	0.917 atm
Company/Airshed:	LICA	Station Temperature °C:	23
Location/Station Name:	St. Lina	Weather Conditions:	A few clouds
Parameter:	Total Hydrocarbon	Calibration Purpose:	post repair
Start/End Time 24 hr. (mst):	9:09 / 12:55	Performed By/Reviewer:	Alex Yakupov / Trina Whitsitt
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 25, 2023

Analyzer:	Serial Number:	51CLT-77021-384	Range ppm:	50
	Last Calibration Date:	n/a	As Found C.F.:	n/a
	Previous Cal High Point C.F.:	n/a	New C.F.:	1.002

Calibrator:	Flow Meter ID's:	n/a	Standard Calibration Points for a Range of 50 ppm
	Make & Model:	API 700	
	Serial #:	627	
	Cal Gas Cylinder I.D. #:	LL165372	
CH ₄ /C ₂ H ₆ Cylinder Conc. (ppm):	606.0	212.0	
CH ₄ as propane/total CH ₄ equivalents (ppm):	583.0	1189.0	

Point	Target ppm
High	38
Mid	18
Low	9

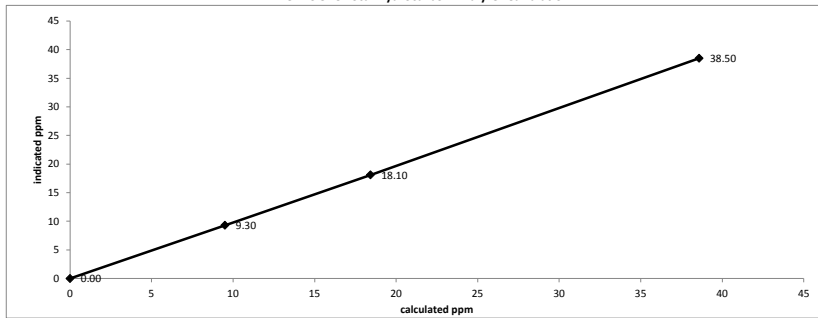
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Diluent	Cal Gas	Total	(ppm)	(ppm)	
adjusted zero	2000	0.00	2000	0.0	0.00	n/a
adjusted high	1938	65.00	2003	38.58	38.50	1.002
mid	1969	31.00	2000	18.43	18.10	1.018
low	1986	16.00	2002	9.50	9.30	1.022
calibrator zero	2000	0.00	2000	0.00	0.00	n/a
Average C.F. =						1.014

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.001		.95-1.05
b (Intercept as % of full scale) =	0.27%		± 3% F.S.
% change in C.F. from last cal =	n/a		± 10%

Thermo 51C Total Hydrocarbon Analyzer Calibration



As found:

H2 cylinder (psi): n/a

H2 cylinder reg set (psi): n/a

Span Cylinder (psi): n/a

Span Cylinder Reg Set (psi): n/a

Zero Air Gen Pressure: n/a

measurement alarms: n/a

service alarms: n/a

cnt: n/a

rng: n/a

try: n/a

flm: n/a

det: n/a

Flame: n/a

Filter: n/a

Base: n/a

Sample psi: n/a

Internal Air Pressure: n/a

Internal Fuel Pressure: n/a

Intenal Pressure Gauge psi: n/a

Internal Span: n/a

As left:

H2 cylinder (psi): 1100

H2 cylinder reg set (psi): 22

Span Cylinder (psi): 800

Span Cylinder Reg Set (psi): 22

Zero Air Gen Pressure: 42

measurement alarms: None

service alarms: None

cnt: 1542

rng: 1

try: 0

flm: 182.7

det: 125.4

Flame: 182

Filter: 125

Base: 125

Sample psi: 06.92

Internal Air Pressure: 18

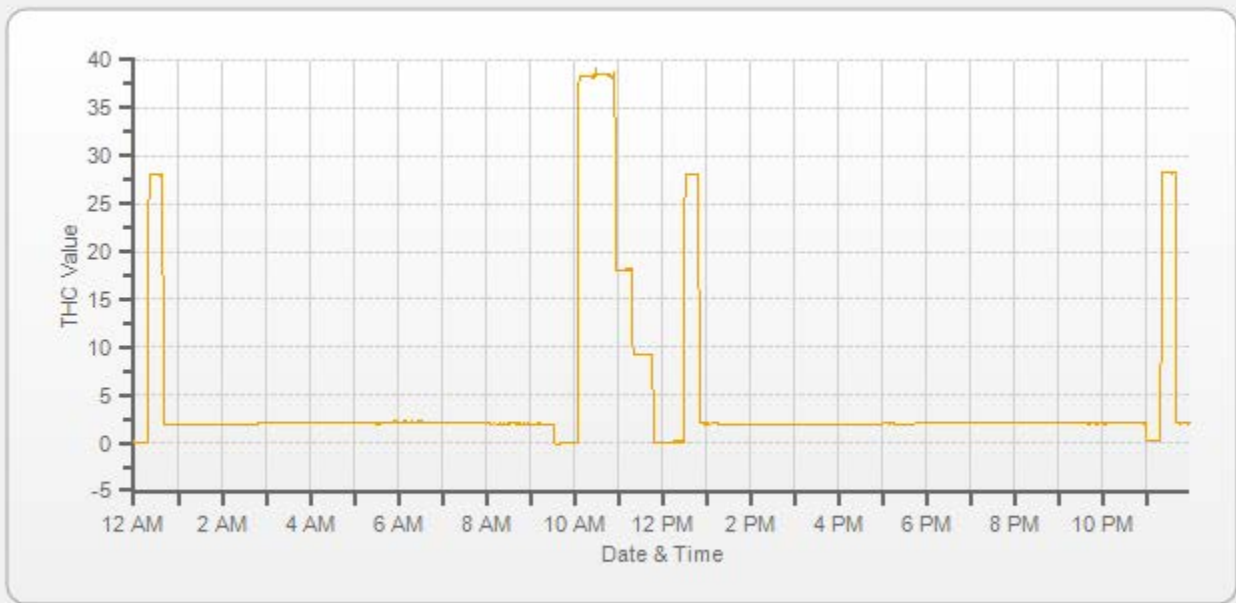
Internal Fuel Pressure: 13

Intenal Pressure Gauge psi: 27

Internal Span: 28.13

Comments:

Sample inlet filter changed. Post-repair calibration completed after yearly maintenance. Internal sample pump rebuilt. Tubing cleaned and purged, damaged tubing replaced.



— THC[ppm]

NITROGEN DIOXIDE



API 200E NO-NO2-NOx Analyzer Calibration

Date: July 18, 2016	Barometric Pressure: 0.923 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: St. Lina	Weather Conditions: Mix of sun and clouds
Start/End Time 24 hr. (mst): 13:01 / 17:09	Calibration Purpose: shut down
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: December 2, 2023

Analyzer:	Correction Factors:												
Serial Number: 594	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 33%;">Previous C.F.:</th> <th style="width: 33%;">As Found C.F.:</th> <th style="width: 33%;">New C.F.:</th> </tr> <tr> <td>NO = 0.998</td> <td>0.971</td> <td>n/a</td> </tr> <tr> <td>NO₂ = 1.004</td> <td>0.996</td> <td>n/a</td> </tr> <tr> <td>NOx = 0.997</td> <td>0.965</td> <td>n/a</td> </tr> </table>	Previous C.F.:	As Found C.F.:	New C.F.:	NO = 0.998	0.971	n/a	NO ₂ = 1.004	0.996	n/a	NOx = 0.997	0.965	n/a
Previous C.F.:	As Found C.F.:	New C.F.:											
NO = 0.998	0.971	n/a											
NO ₂ = 1.004	0.996	n/a											
NOx = 0.997	0.965	n/a											
Last Calibration Date: June 28, 2016													
Range ppb: 1000													

Calibrator:	Standard Calibration Points for a Range of: 1000 ppb																								
Flow Meter ID's: n/a																									
Make & Model: API 700																									
Serial #: 627																									
Cal Gas Cylinder I.D. #: LL119346																									
NO/NOx Gas Conc. (ppm): 50.0 50.0																									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> <tr> <td>High</td> <td>780</td> <td>500</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>275</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>190</td> <td>100</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </table>	Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	5000	0.0	5000	0	0	0.0	3.0	n/a	n/a
as found high	4924	78.0	5002	779.7	779.7	803.0	811.0	0.971	0.965
mid	4966	38.00	5004	379.7	379.7	391.0	394.0	0.971	0.971
low	4981	19.00	5000	190.0	190.0	195.0	198.0	0.974	0.974
Average C.F.=								0.972	0.970

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO ₂	NO drop	NO ₂ gain	NO ₂ C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4924	78.00	5002	0.0	811.0	815.0	3.0	0.0	3.0	
as found high NO2	4924	78.00	5002	510.0	318.0	817.0	498.0	493.0	495.0	0.996
gpt mid	4924	78.00	5002	275.0	536.0	814.0	277.0	275.0	274.0	1.004
gpt low	4924	78.00	5002	95.0	712.0	812.0	100.0	99.0	97.0	1.021
Average NO₂ C.F.=										1.007

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.971	0.964	0.999	0.90-1.10
b (Intercept as % of full scale)=	-0.03%	0.17%	0.04%	± 3% F.S.
% change in C.F. from last cal=	2.71%	0.80%	3.21%	± 10%
NO ₂ converter efficiency			1.01	0.96 to 1.04

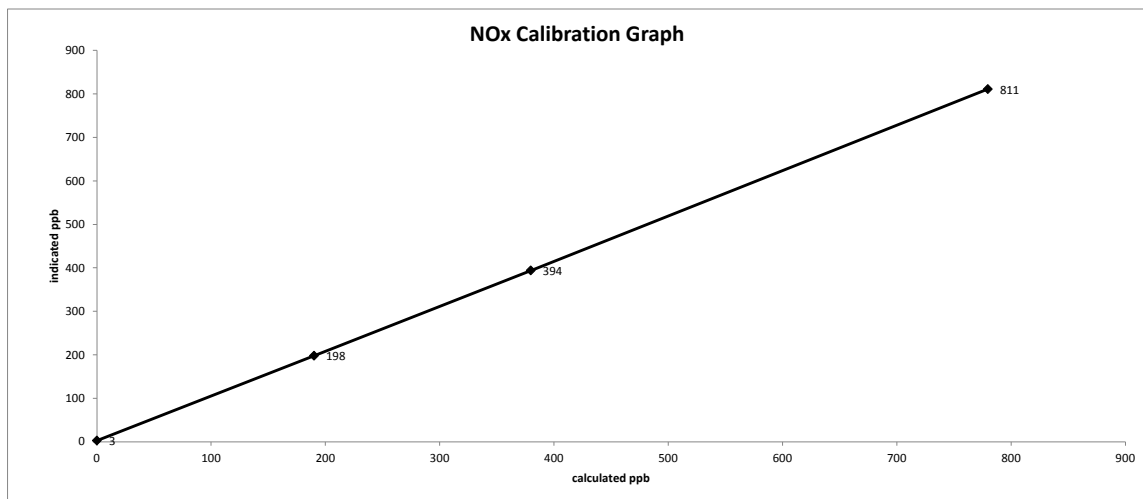
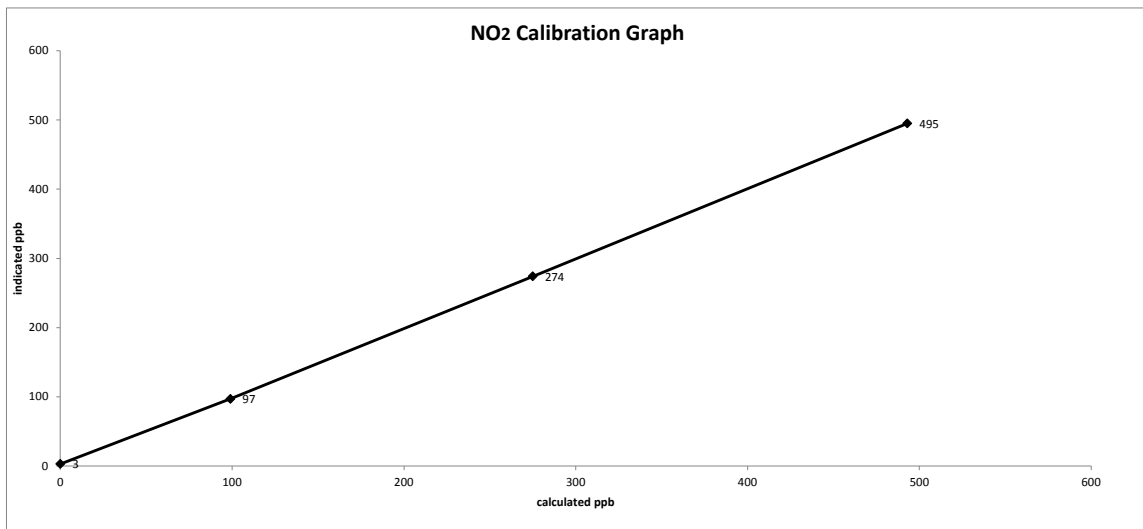
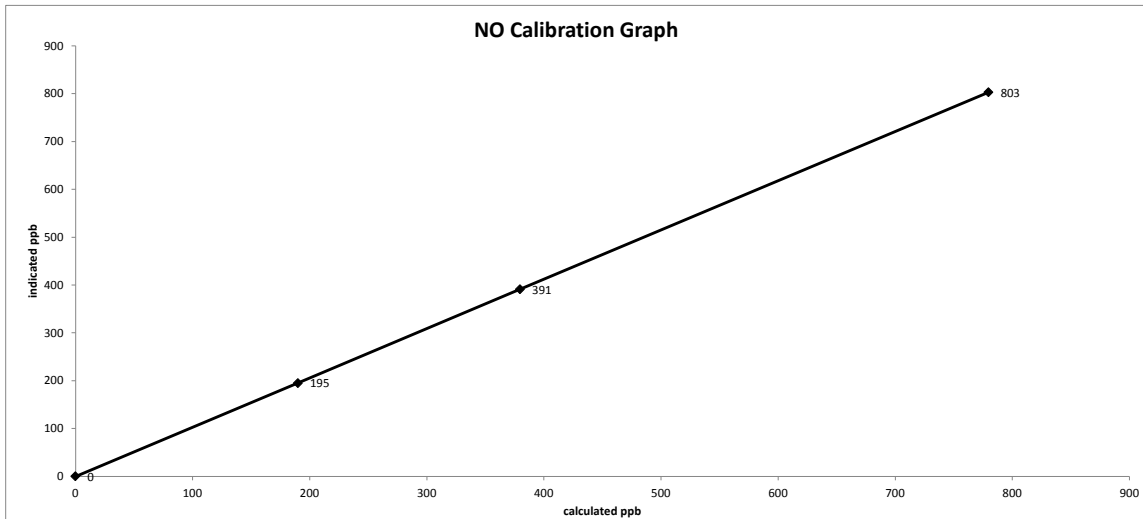
As found:	As left:
NOx SLOPE: 0.991	NOx SLOPE: n/a
NOx OFFS: 0.8	NOx OFFS: n/a
NO SLOPE: 0.984	NO SLOPE: n/a
NO OFFS: -1.4	NO OFFS: n/a
SAMP FLW: 455	SAMP FLW: n/a
OZONE FL: 78	OZONE FL: n/a
PMT: 24.6	PMT: n/a
NORM PMT: -0.4	NORM PMT: n/a
AZERO: 18.0	AZERO: n/a
HVPS: 771	HVPS: n/a
RCELL TEMP: 50.0	RCELL TEMP: n/a
BOX TEMP: 35.0	BOX TEMP: n/a
PMT TEMP: 6.7	PMT TEMP: n/a
IZS TEMP: 45.3	IZS TEMP: n/a
MOLY TEMP: 316.4	MOLY TEMP: n/a
RCEL: 7.8	RCEL: n/a
SAMP: 26.9	SAMP: n/a
Internal Span NO: 8.2	Internal Span NO: n/a
Internal Span NO ₂ : 510	Internal Span NO ₂ : n/a
Internal Span NOx: 519	Internal Span NOx: n/a

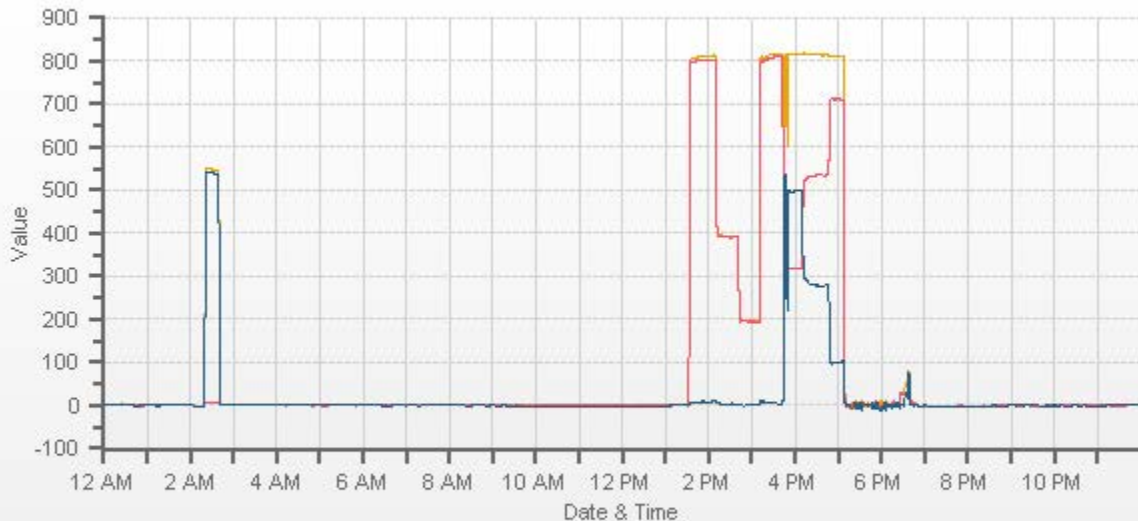
Comments:

Shutdown calibration completed for yearly maintenance and to rebuild a sample pump. No ZERO adjustment made. No High Point adjustment made. No NO₂ adjustment made. Reason: ZS check for SPAN was over 10%. Yearly maintenance required. After shutdown calibration a sample pump was rebuilt.

Date: July 18, 2016
Company/Airshed: LICA
Location/Station Name: St. Lina

Start/End Time 24 hr. (mst): 13:01 / 17:09
Calibration Purpose: shut down
Calibration Method: Gas Dilution & Gas Phase Titration





— NOX[ppb] — NO[ppb] — NO2[ppb]



API 200E NO-NO2-NOx Analyzer Calibration

Date: July 19, 2016	Barometric Pressure: 0.916 atm
Company/Airshed: LICA	Station Temperature °C: 24
Location/Station Name: St. Lina	Weather Conditions: Mainly sunny
Start/End Time 24 hr. (mst): 9:06 / 16:15	Calibration Purpose: post repair
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: December 2, 2023

Analyzer:	Correction Factors:												
Serial Number: 594	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 33%;">Previous C.F.:</th> <th style="width: 33%;">As Found C.F.:</th> <th style="width: 33%;">New C.F.:</th> </tr> <tr> <td>NO = n/a</td> <td>n/a</td> <td>1.000</td> </tr> <tr> <td>NO₂ = n/a</td> <td>n/a</td> <td>1.000</td> </tr> <tr> <td>NOx = n/a</td> <td>n/a</td> <td>1.000</td> </tr> </table>	Previous C.F.:	As Found C.F.:	New C.F.:	NO = n/a	n/a	1.000	NO ₂ = n/a	n/a	1.000	NOx = n/a	n/a	1.000
Previous C.F.:	As Found C.F.:	New C.F.:											
NO = n/a	n/a	1.000											
NO ₂ = n/a	n/a	1.000											
NOx = n/a	n/a	1.000											
Last Calibration Date: n/a													
Range ppb: 1000													

Calibrator:	Standard Calibration Points for a Range of: 1000 ppb																								
Flow Meter ID's: n/a	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> <td>500</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>275</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>190</td> <td>100</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point		Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																					
High		780	500	n/a																					
Mid		380	275	n/a																					
Low		190	100	n/a																					
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						
Make & Model: API 700																									
Serial #: 627																									
Cal Gas Cylinder I.D. #: LL119346																									
NO/NOx Gas Conc. (ppm): 50.0 50.0																									

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
adjusted zero	5000	0.0	5000	0	0	0.0	0.0	n/a	n/a
adjusted high	4925	78.0	5003	779.5	779.5	779.3	779.5	1.000	1.000
mid	4966	38.00	5004	379.7	379.7	379.3	379.6	1.001	1.000
low	4983	19.00	5002	189.9	189.9	189.5	189.4	1.002	1.003
calibrator zero	5000	0.00	5000	0.0	0.0	0.0	0.0	n/a	n/a
Average C.F.=								1.001	1.001

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO ₂	NO drop	NO ₂ gain	NO ₂ C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4925	78.00	5003	0.0	782.0	781.0	781.0	-1.0	0.0	-1.0
adjusted high NO2	4925	78.00	5003	500.0	279.0	782.0	502.0	503.0	503.0	1.000
gpt mid	4925	78.00	5003	275.0	504.0	782.0	276.0	278.0	277.0	1.004
gpt low	4925	78.00	5003	100.0	685.0	784.0	98.0	97.0	99.0	0.980
Average NO₂ C.F.=										0.994

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.000	1.000	1.001	.95-1.05
b (Intercept as % of full scale) =	-0.02%	-0.02%	0.01%	± 3% F.S.
% change in C.F. from last cal =	n/a	n/a	n/a	± 10%
NO2 converter efficiency			0.99	0.96 to 1.04

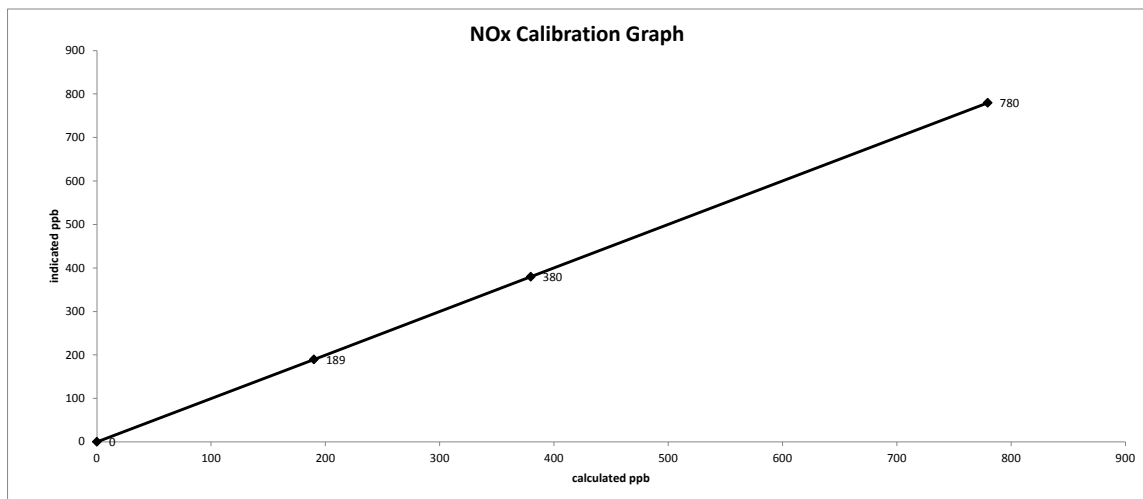
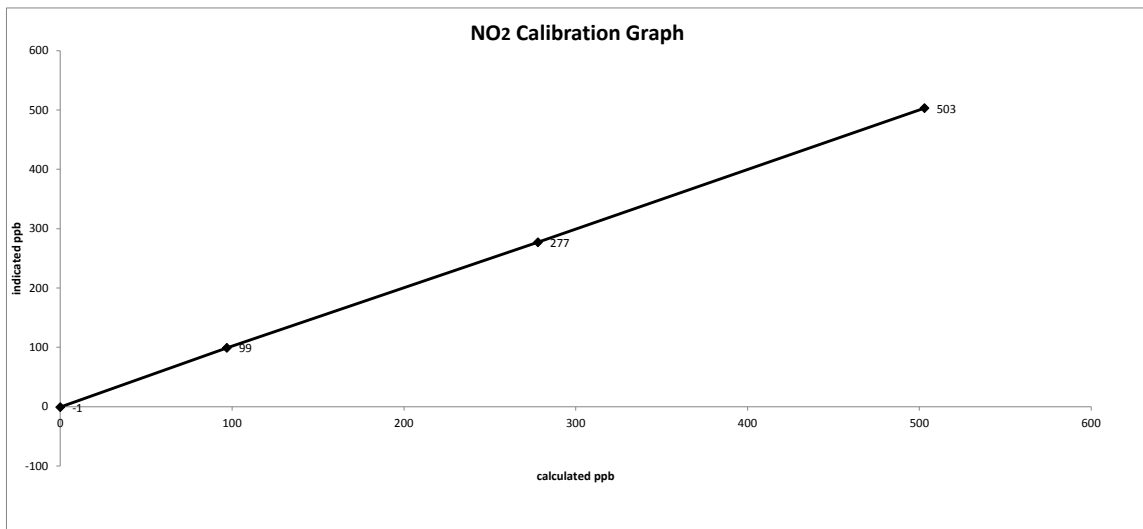
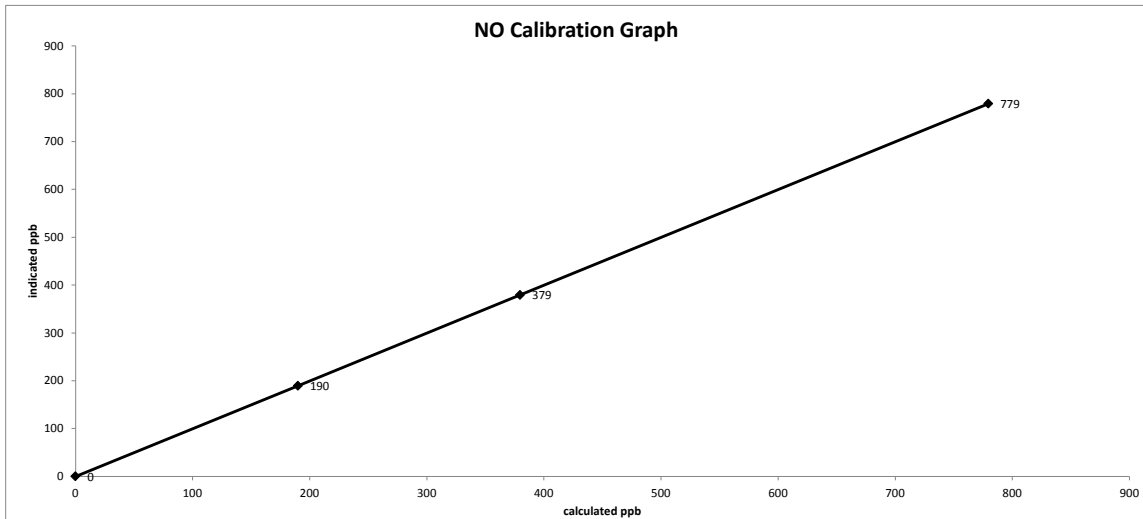
As found:	As left:
NOx SLOPE: n/a	NOx SLOPE: 0.958
NOx OFFS: n/a	NOx OFFS: 0.5
NO SLOPE: n/a	NO SLOPE: 0.960
NO OFFS: n/a	NO OFFS: -0.8
SAMP FLW: n/a	SAMP FLW: 480
OZONE FL: n/a	OZONE FL: 77
PMT: n/a	PMT: 21.8
NORM PMT: n/a	NORM PMT: -0.3
AZERO: n/a	AZERO: 21.3
HVPS: n/a	HVPS: 767
RCELL TEMP: n/a	RCELL TEMP: 50.0
BOX TEMP: n/a	BOX TEMP: 36.5
PMT TEMP: n/a	PMT TEMP: 6.8
IZS TEMP: n/a	IZS TEMP: 45.0
MOLY TEMP: n/a	MOLY TEMP: 315.8
RCEL: n/a	RCEL: 5.0
SAMP: n/a	SAMP: 26.3
Internal Span NO: n/a	Internal Span NO: 8.5
Internal Span NO2: n/a	Internal Span NO2: 482
Internal Span NOx: n/a	Internal Span NOx: 490

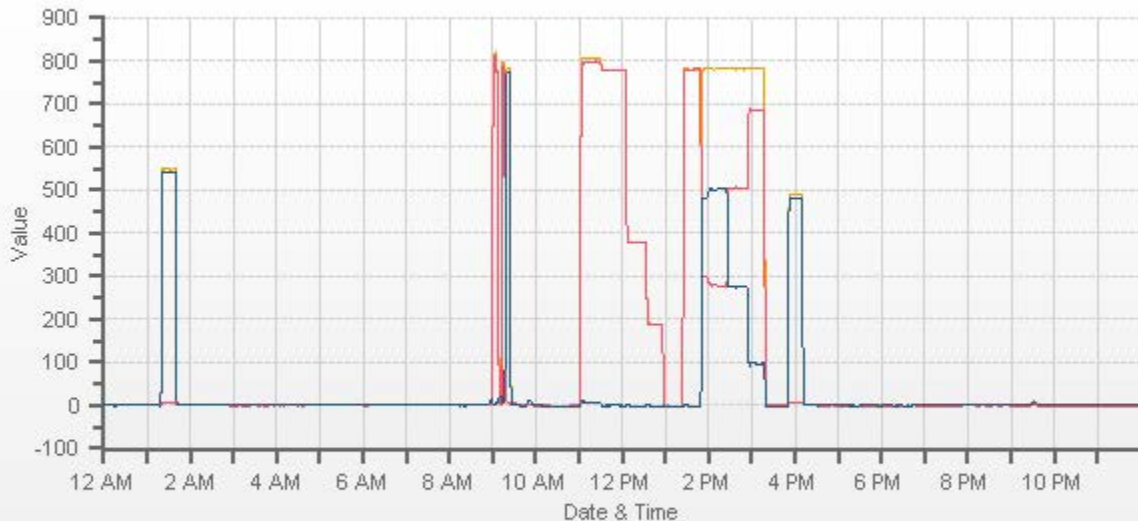
Comments:

Yearly maintenance conducted and post-repair calibration completed. Sample inlet filter changed. No NO2 adjustment made.

Date: July 19, 2016
Company/Airshed: LICA
Location/Station Name: St. Lina

Start/End Time 24 hr. (mst): 9:06 / 16:15
Calibration Purpose: post repair
Calibration Method: Gas Dilution & Gas Phase Titration





— NOX[ppb] — NO[ppb] — NO2[ppb]

OZONE



Thermo 49i Ozone Analyzer Calibration

Date:	July 20, 2016	Barometric Pressure:	0.917 atm
Company/Airshed:	LICA	Station Temperature °C:	23
Location/Station Name:	St. Lina	Weather Conditions:	A few clouds
Start/End Time 24 hr. (mst):	12:40 / 17:10	Calibration Purpose:	routine monthly
Ozone Calibration Method:	Varying UV Lamp Power	Performed By/Reviewer:	Alex Yakupov Trina Whitsitt
G.P.T. Date:	n/a-done by Varying UV Lamp Power	Cal Gas Expiry Date:	n/a

Analyzer:	Serial Number:	1002240371	Ozone Range ppb:	500
	Last Calibration Date:	June 20, 2016	As Found C.F.:	0.987
	Previous Cal High Point C.F.:	1.000	New C.F.:	0.997

Calibrator:	Flow Meter ID's:	n/a	Point	AMD Required Range of Ozone Calibration Points
	Make & Model:	SABIO 2010 D	High	300-400 ppb
	Serial #:	11900613	Mid	150-200 ppb
	Cal Gas Cylinder I.D. #:	n/a	Low	50-75 ppb

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

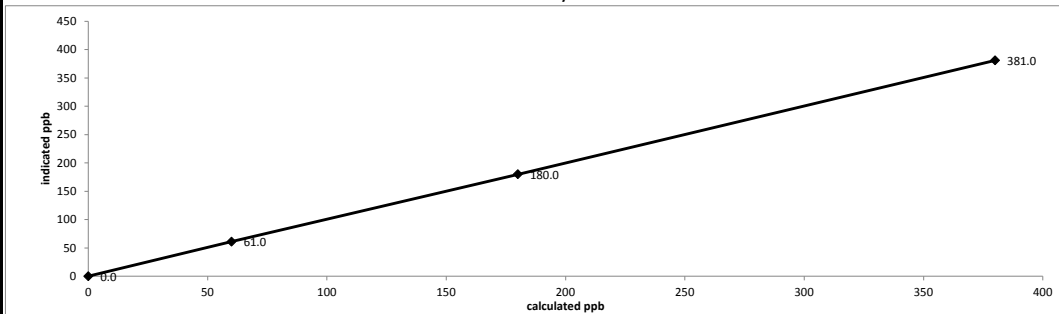
Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5000	5000	0.0	n/a	-1.0	n/a
as found high	5000	5000	380.0	380.0	384.0	0.987
adjusted zero	5000	5000	0.0	0.0	0.0	n/a
adjusted high	5000	5000	380.0	380.0	381.0	0.997
mid	5000	5000	180.0	180.0	180.0	1.000
low	5000	5000	60.0	60.0	61.0	0.984
calibrator zero	5000	5000	0.0	n/a	0.0	n/a

Average C.F. = 0.994

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.998		.95-1.05
b (Intercept as % of full scale) =	-0.05%		± 3% F.S.
% change in C.F. from last cal =	1.30%		± 10%

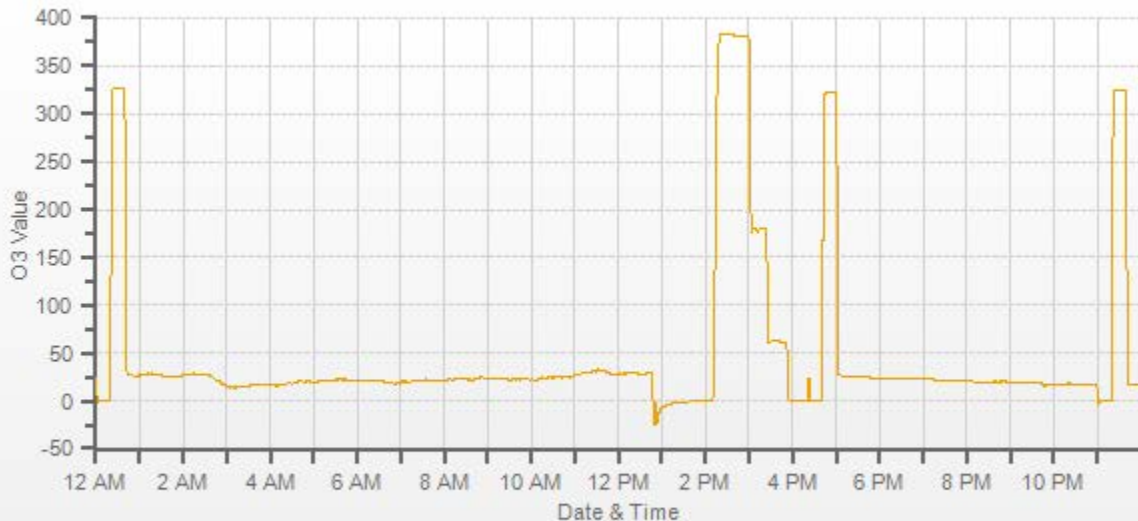
Thermo 49i Ozone Analyzer Calibration



As found:	As left:
O3 Bkg: 0.2	O3 Bkg: 0.0
O3 Coef: 0.997	O3 Coef: 0.970
Photo Lamp: 9.4	Photo Lamp: 9.4
O3 Lamp: 7.8	O3 Lamp: 7.8
Bench: 29.3	Bench: 29.9
Bench Lamp: 53.6	Bench Lamp: 53.6
O3 Lamp: 67.9	O3 Lamp: 67.9
Pressure: 675.2	Pressure: 675.2
Cell A lpm: 0.725	Cell A lpm: 0.725
Cell B lpm: 0.721	Cell B lpm: 0.721
O3 ppb: -1.7	O3 ppb: 0.1
Cell A ppb: -1.3	Cell A ppb: 5.5
Cell B ppb: -2.1	Cell B ppb: -5.6
Cell A int: 57757	Cell A int: 55746
Cell B int: 72795	Cell B int: 72781
Internal Span: 325.5	Internal Span: 322

Comments:

Sample inlet filter changed. ZERO air pump was rebuilt. ZERO Air scrubber charcoal renewed.



— O3[ppb]

PARTICULATE MATTER



R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: July 4, 2016
 Company: LICA
 Station Name/Location: St. Lina
 Previous Audit Date: June 28, 2016
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whatsitt
 Start Time (mst): 9:45
 End Time (mst): 12:10
 Calibration Purpose: post repair
 Weather Conditions: Mix of sun and clouds

1400A Information and Status:

Serial Number: 1405A208301003 As Found Filter Loading %: n/a
 Ko Factor: 13125.0 As Left Filter Loading %: 27.98
 Ambient Temperature °C: 20.7 As Found Noise: n/a
 Ambient Pressure atm: 0.916 As Left Noise: 0.000
 Main Flow Reading lpm: 3.00 Pump Vacuum: 0.25
 Aux Flow Reading lpm: 13.67 Warnings: Unrecoverable Error

Reference Standards:

	Flow:	Pressure:	Temperature:
Make:	<u>Dwyer</u>	<u>Fisher</u>	<u>Fisher</u>
Model:	<u>475 Mark III</u>	<u>FB 1291</u>	<u>FB 1291</u>
Serial Number:	<u>#2</u>	<u>130168457</u>	<u>130168457</u>
Calibration Date:	<u>January 15, 2016</u>	<u>February 17, 2016</u>	<u>February 17, 2016</u>

As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>
	limit	<u>0.15</u>	0.15	<u>0.15</u>	0.15
Bypass Flow	actual	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>
	limit	<u>0.60</u>	0.60	<u>0.60</u>	0.60

As left leak check (same as above if as found passes):

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	<u>0.00</u>	<u>-0.17</u>	<u>0.00</u>	<u>-0.17</u>
	limit	<u>0.15</u>	0.15	<u>0.15</u>	0.15
Bypass Flow	actual	<u>0.01</u>	<u>-1.73</u>	<u>0.01</u>	<u>-1.73</u>
	limit	<u>0.60</u>	0.60	<u>0.60</u>	0.60

As found temperature and pressure:

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: <u>n/a</u>	1405F pressure atm: <u>n/a</u>
reference temperature °C: <u>n/a</u>	reference pressure: <u>n/a</u>
difference °C: <u>#VALUE!</u>	difference: <u>#VALUE!</u>

As left temperature and pressure (same as above if as found adequate):

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: <u>20.7</u>	1405F pressure atm: <u>0.916</u>
reference temperature °C: <u>20.7</u>	reference pressure: <u>0.916</u>
difference °C: <u>0.0</u>	difference: <u>0.000</u>

As found flows:

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: <u>n/a</u>	1400A total/aux flow lpm: <u>n/a</u>
reference main flow lpm: <u>n/a</u>	reference total/aux flow lpm: <u>n/a</u>
difference lpm: <u>#VALUE!</u>	difference lpm: <u>#VALUE!</u>

As left flows (same as above if as found adequate):

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: <u>3.00</u>	1400A total/aux flow lpm: <u>16.67</u>
reference main flow lpm: <u>3.01</u>	reference total/aux flow lpm: <u>16.51</u>
difference lpm: <u>0.01</u>	difference lpm: <u>-0.16</u>

K_o Audit:

Last K_o audit date: May 13, 2016
 1405F K_o factor: 13125.0
 Measured K_o factor: 13229.8000
 % difference: 0.80

Comments:

The TEOM was found with "UNRECOVERABLE ERROR" on the screen. It failed after a thunderstorm on Sunday, July 3, at 14:00. 47 mm FDMS filter changed. PM 10/2.5 sample inlet head cleaned. A new cooler fan installed to replace the broken fan.



R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: July 20, 2016
Company: LICA
Station Name/Location: St. Lina
Previous Audit Date: July 4, 2016
Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whatsitt
Start Time (mst): 9:16
End Time (mst): 13:21
Calibration Purpose: Bi-monthly #2
Weather Conditions: A few clouds

1400A Information and Status:

Serial Number: <u>1405A208301003</u>	As Found Filter Loading %: <u>38.24</u>
Ko Factor: <u>13125.0</u>	As Left Filter Loading %: <u>18.38</u>
Ambient Temperature °C: <u>20.56</u>	As Found Noise: <u>0.002</u>
Ambient Pressure atm: <u>0.917</u>	As Left Noise: <u>0.000</u>
Main Flow Reading lpm: <u>3.00</u>	Pump Vacuum: <u>0.26</u>
Aux Flow Reading lpm: <u>13.67</u>	Warnings: <u>None</u>

Reference Standards:

	Flow:	Pressure:	Temperature:
Make:	<u>Dwyer</u>	<u>Fisher</u>	<u>Fisher</u>
Model:	<u>475 Mark III</u>	<u>FB 1291</u>	<u>FB 1291</u>
Serial Number:	<u>#2</u>	<u>130168457</u>	<u>130168457</u>
Calibration Date:	<u>January 15, 2016</u>	<u>February 17, 2016</u>	<u>February 17, 2016</u>

As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	-0.17	0.00	-0.17
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	-0.01	-1.72	0.00	-1.73
	limit	0.60	0.60	0.60	0.60

As left leak check (same as above if as found passes):

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	-0.17	0.00	-0.17
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	-0.01	-1.72	0.01	-1.73
	limit	0.60	0.60	0.60	0.60

As found temperature and pressure:

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: <u>20.6</u>	1405F pressure atm: <u>0.917</u>
reference temperature °C: <u>20.5</u>	reference pressure: <u>0.917</u>
difference °C: <u>-0.1</u>	difference : <u>0.000</u>

As left temperature and pressure (same as above if as found adequate):

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: <u>20.5</u>	1405F pressure atm: <u>0.917</u>
reference temperature °C: <u>20.5</u>	reference pressure: <u>0.917</u>
difference °C: <u>0.0</u>	difference : <u>0.000</u>

As found flows:

main flow tolerance 3.00 lpm +/- 0.20 lpm 1405F main flow lpm: <u>3.00</u> reference main flow lpm: <u>3.05</u> difference lpm: <u>0.05</u>	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7% 1400A total/aux flow lpm: <u>16.67</u> reference total/aux flow lpm: <u>16.98</u> difference lpm: <u>0.31</u>
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As left flows (same as above if as found adequate):

main flow tolerance 3.00 lpm +/- 0.20 lpm 1405F main flow lpm: <u>3.00</u> reference main flow lpm: <u>3.00</u> difference lpm: <u>0.00</u>	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7% 1400A total/aux flow lpm: <u>13.67</u> reference total/aux flow lpm: <u>13.68</u> difference lpm: <u>0.01</u>
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K_o Audit:

Last K_o audit date: May 13, 2016
1405F K_o factor: 13125.0
Measured K_o factor: 13229.8000
% difference: 0.80

Comments:

By-monthly #2 audit and yearly maintenance completed. Chiller was cleaned. PM 2.5/10 sample inlet head was cleaned. TEOM sample filter was changed and 47 mm FDMS filter was changed. Flows were calibrated.

WIND SYSTEM

Met One Instruments

3206 Main St., Suite 106
Regional Service Center
Rowlett, TX. 75088

Wind Tunnel Calibration Data Sheet

50.5-6100

NIST Cup Model No. 170.41

Serial No. 3309

NIST Sensor Model No. 50.1B

Serial No. 1263

Average wind speed this test in mps 11.19

WD Setting Degrees	WD Output Volts	WD Reading Degrees	WD Error +/- 3 Deg	WS Standard mps	WS Output Volts	WS Reading mps	WS Error +/- 0.24 MPS
30.0	0.082	29.6	-0.4	11.21	0.224	11.19	-0.02
60.0	0.164	59.0	-1.0	11.17	0.227	11.33	0.16
120.0	0.331	119.1	-0.9	11.08	0.221	11.06	-0.02
150.0	0.420	151.3	1.3	11.29	0.222	11.11	-0.18
210.0	0.582	209.4	-0.6	11.25	0.223	11.16	-0.09
240.0	0.665	239.4	-0.6	11.18	0.226	11.32	0.14
300.0	0.835	300.5	0.5	11.16	0.224	11.18	0.02
330.0	0.917	330.0	0.0	11.18	0.223	11.15	-0.03

Average wind speed this test in mps 2.21

WD Setting Degrees	WD Output Volts	WD Reading Degrees	WD Error +/- 3 Deg	WS Standard mps	WS Output Volts	WS Reading mps	WS Error +/- 0.20 MPS
30.0	0.081	29.3	-0.7	2.18	0.042	2.08	-0.10
60.0	0.163	58.5	-1.5	2.20	0.043	2.14	-0.06
120.0	0.332	119.6	-0.4	2.21	0.042	2.08	-0.13
150.0	0.417	150.3	0.3	2.22	0.042	2.07	-0.15
210.0	0.584	210.1	0.1	2.20	0.042	2.12	-0.08
240.0	0.666	239.8	-0.2	2.23	0.042	2.10	-0.13
300.0	0.835	300.6	0.6	2.22	0.043	2.18	-0.04
330.0	0.917	330.0	0.0	2.21	0.043	2.17	-0.04

Instrument Test Condition As Found As Left

Sensor Model No.: 50.5H

Sensor Serial No.: H12635

Sensor Output Swing: 0V - 1.0V

Sensor Output Range 0 - 50 MPS

Customer: Maxxam Analytics

Sales Order No.: 104703

Tested per PO: 35-56587

Calibration Date: 08/28/2014

Calibrated by: David Frith *DF*

QC Inspection

Dylan Dawson

CALIBRATORS



Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2015-119

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>API 700</u>	Make/Model	<u>NA</u>
Serial Number	<u>627</u>	Serial Number	<u>NA</u>
Last Verification Date	<u>April 1 2015</u>	Temperature (°C)	<u>NA</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>NA</u>
NO/NOx Concentration	<u>50.3/50.3</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>
		Pt. #3	<u>5000</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>
		Pt. #3	<u>18.9</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5007	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5003	77.5	0.779	0.779	0.787	-0.001	0.786	1%	1%
5004	37.8	0.380	0.380	0.383	0.000	0.383	1%	1%
5001	18.9	0.190	0.190	0.191	0.000	0.191	1%	1%
Absolute Average Percent Difference							1%	1%

LINEAR REGRESSION ANALYSIS *y=mx+b (where x=calculated concentration, y=indicated concentration)*

NO	LIMITS	NOx
Correlation= 1.0000	≥ 0.990	Correlation= 1.0000
m (Slope)= 1.0106	0.90-1.10	m (Slope)= 1.0092
b (Intercept % of FS)= -0.0566	± 3% F.S.	b (Intercept % of FS)= -0.0368

Flow	O ₂ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5003	0	0.000	0.787	0.001	0.788	NO ₂	% Diff. Limit
5003	0.5	0.493	0.294	0.498	0.792	1%	± 10%
5003	0.25	0.256	0.531	0.262	0.792	2%	± 10%
5003	0.1	0.108	0.679	0.110	0.789	1%	± 10%
Absolute Average Percent Difference						1.2%	± 10%

LINEAR REGRESSION ANALYSIS *y=mx+b (where x=calculated concentration, y=indicated concentration)*

NO _x	LIMITS
Correlation= 1.0000	≥ 0.995
m (Slope)= 1.0089	0.90-1.10
b (Intercept % of FS)= 0.1591	± 3% F.S.

AENV Standards Audit Calibrator	NO _x Analyzer
Make/Model <u>Thermo 146i</u>	Make/Model <u>Thermo 42i</u>
Serial/AMU Number <u>1809</u>	Serial/AMU Number <u>1868</u>
	Last Calibration Date <u>February 1, 2016</u>
	Full Scale (ppm) <u>1</u>

COMMENTS: Flows not manually measured - calibration system audited as it is currently being operated.

Auditor: Shea Beaton
Operator Signature: [Signature]

Date: February 3, 2016
Location: McIntyre Center Edmonton



Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2015-165

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>None</u>
Serial Number	<u>11900613</u>	Serial Number	<u>None</u>
Last Verification Date	<u>April 1, 2015</u>	Temperature (°C)	<u>23.5</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>706 mmHg</u>
NO/NOx Concentration	<u>50.3ppm/50.3ppm</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5001</u>	Pt. #2	<u>5000</u>
		Pt. #3	<u>5000</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>
		Pt. #3	<u>18.9</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
4999	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5001	77.5	0.779	0.779	0.775	0.000	0.775	-1%	-1%
5000	37.8	0.380	0.380	0.376	0.001	0.377	-1%	-1%
5000	18.9	0.190	0.190	0.188	0.001	0.189	-1%	-1%
Absolute Average Percent Difference							1%	1%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
NO		LIMITS		NO _x			
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000		
m (Slope)=	0.9950	0.90-1.10		m (Slope)=	0.9946		
b (Intercept % of FS)=	-0.0773	± 3% F.S.		b (Intercept % of FS)=	-0.0167		

Flow	O ₂ Conc	NO Decrease	NO	NO ₂	NO _x	% Diff. Vs Audit gas	
5001	0	0.000	0.772	0.000	0.772	NO ₂	% Diff. Limit
5001	0.51	0.507	0.265	0.506	0.772	0%	± 10%
5001	0.25	0.252	0.520	0.254	0.773	1%	± 10%
5001	0.1	0.110	0.662	0.109	0.772	-1%	± 10%
Absolute Average Percent Difference						0.1%	± 10%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
NO ₂		LIMITS					
Correlation=	1.0000	≥ 0.995					
m (Slope)=	0.9992	0.90-1.10					
b (Intercept % of FS)=	0.0171	± 3% F.S.					

AENV Standards		NO _x Analyzer	
Audit Calibrator			
Make/Model	<u>Thermo 146i</u>	Make/Model	<u>Thermo 42i</u>
Serial/AMU Number	<u>1809</u>	Serial/AMU Number	<u>1868</u>
		Last Calibration Date	<u>March 28, 2016</u>
		Full Scale (ppm)	<u>1</u>

COMMENTS: NO Cyl has 49.9ppb SO2 - Flows Not Manually Measured

Auditor: Shea Beaton
 Operator Signature: [Signature]

Date: March 31, 2016
 Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2015-116CGA

Company: Maxxam Operator's Name: Chris Wesson
 Cylinder #: LL119346 Concentration PPM: 50.0 Tolerance(%) 2 Certified By: Air Liquide

Reference Calibrator and Gas:

Make/Model: Thermo146i
 Serial Number: 1809
 Last Verification Date: February 2, 2016
 Gas Type: SO2 Conc. 98.07
 Cylinder Number: CAL016625

Flow Measurement Device:

Make/Model: Bios DC-2
 Serial Number: Bios D
 Temp. °C: 24.5
 B.P. 702mmHg

Reference Analyzer:

Make/Model: Thermo 43C Serial/AMU Number: 1623
 Instrument Settings: Zero: 8.7 Span: 1.027 Range: 1.0
 Last Calibration: Date: 1-Feb-16 C.F. 1.000 Done By: SB

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
4952	0.0	0.000	0.000	50.0	50.0
4946	79.54	0.793	0.01608	62.183	49.3
4941	39.35	0.396	0.00796	125.565	49.7
4940	19.57	0.195	0.00396	252.427	49.2
Average Cylinder Concentration:					49.4

Previous Stated Concentration PPM: 50.0

Percent variance from Stated: 1.2

Meets Manufacturer Tolerance. Use manufacturers stated concentration COMMENTS: SO2/NO blend 50.0ppm NO
 <=5% Outside Manufacturer Tolerance. Use manufacturers concentration
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Shea Beaton
 Operator Signature: [Signature]

Date: February 2, 2016
 Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2014-251CGA

Company: Maxxam Operator's Name: Limin Li
Cylinder #: LL36837 Concentration PPM: 10.0 Tolerance(%): 2 Certified By: Air Liquide

Reference Calibrator and Gas:

Make/Model: R&R MFC 201
Serial Number: AMU 1690
Last Verification Date: December 15, 2014
Gas Type: H2S Conc. 20.43
Cylinder Number: CAL015106

Flow Measurement Device:

Make/Model: Bios DC2
Serial Number: AMU 1659
Temp. °C: 23.0 C
B.P.: 702 mmhg

Reference Analyzer:

Make/Model: Teco 45C Serial/AMU Number: 1624
Instrument Settings: Zero: 6.4 Span: 1.160 Range: 0.1
Last Calibration: Date: Dec15/14 C.F.: 1.000 Done By: Al Clark

Calibrator Flows (scem)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	0.0000	100.000	10.0
5099	38.5	0.0754	0.00755	132.442	10.0
5092	18.0	0.0349	0.00353	282.889	9.9
5066	9.2	0.0178	0.00182	550.652	9.8
Average Cylinder Concentration:					9.9

Previous Stated Concentration PPM: 10.0

Percent variance from Stated: 1.1

Meets Manufacturer Tolerance. Use manufacturers stated concentration COMMENTS: _____
 < =5% Outside Manufacturer Tolerance. Use manufacturers concentration _____
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder _____

Auditor: Al Clark
Operator Signature: *Al Clark*

Date: December 16, 2014
Location: McIntyre Center Edmonton



Calibration Gas Audit

CH4 / C3H8 Cylinder Gas

File No. 2015-092CGA

Company: Maxxam Operators name: Chris Wesson
 Cylinder #: LL165372 Conc CH4 (PPM) 606/212 Tolerance (%) 0.5 Certified By: Praxair

Reference Calibrator and Gas:

Make/Model R&R MFC 201
 Serial Number AMU 1698
 Last Verification Date January 18, 2016

Gas Type	<u>CH4</u>	Conc.	<u>999.2</u>
Cylinder Number	<u>D751932</u>		
Gas Type	<u>C3H8</u>	Conc.	<u>246.5</u>
Cylinder Number	<u>XF0037998</u>		

Flow Measurement Device:

Make/Model Bios DC-2
 Serial Number Bios D
 Temp. °C 24.5
 B.P. 688mmHg

Reference Analyzer:

Make/Model Thermo 55C Serial/AMU Number: 1643
 Instrument Settings Zero: NA Span: NA Range: 20.0
 Last Calibration: Date: 18-Jan-16 C.F. 1.000 Done By: SB

Calibrator Flows (scem)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	CH4	C3H8			CH4	C3H8
2568	0.00	0.00	0.00	0.02140	46.722	607	214
2630	56.29	12.99	12.62	0.02140	46.722	607	214
2588	19.73	4.62	4.50	0.00762	131.171	606	215
2580	9.69	2.29	2.24	0.00376	266.254	610	217
Average Cylinder Concentration:						608	215

CH4	C3H8
Previous Stated Concentration PPM: <u>606</u>	<u>212</u>
Percent variance from Stated: <u>0.3</u>	<u>1.6</u>

Cylinder gas tolerances based on CH4 only

Meets Manufacturer Tolerance. Use manufacturers stated concentration COMMENTS: _____
 <=5% Outside Manufacturer Tolerance. Use manufacturers concentration C3H8 manufacturers tolerance 1.1%
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Shea Beaton
 Operator Signature: _____

Date: January 19, 2016
 Location: McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2015-115CGA

Company: Maxxam **Operators name:** Chris Wesson
Cylinder #: LL119346 **Conc (PPM)** 50.0/50.0 **Tolerance (%)** 2 **Certified By:** Air Liquide

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Thermo 146i</u>			Make/Model	<u>Bios DC-2</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>Bios D</u>
Last Verification Date	<u>February 2, 2016</u>			Temp. °C	<u>24.5</u>
Gas Type	<u>NO</u>	Conc.	<u>48.79</u>	B.P.	<u>702mmHg</u>
Cylinder Number	<u>CAL018024</u>				

Reference Analyzer:

Make/Model	<u>Thermo 42i</u>	Serial/AMU Number:	<u>1868</u>
Instrument Settings	Zero: <u>4.2</u>	Span:	<u>1.014</u> Range: <u>1.0</u>
Last Calibration:	Date: <u>02-Feb-16</u>	C.F.	<u>1.000</u> Done By: <u>SB</u>

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
4952	0.0	0.000	0.000				
4946	79.54	0.809	0.809	0.01608	62.183	50.3	50.3
4941	39.35	0.403	0.402	0.00796	125.565	50.6	50.5
4940	19.57	0.200	0.200	0.00396	252.427	50.5	50.5
Average Cylinder Concentration:						50.5	50.4

NO	NOx
Previous Stated Concentration PPM: <u>50.0</u>	<u>50.0</u>
Percent variance from Stated: <u>0.9</u>	<u>0.8</u>

Cylinder gas tolerances based on NO only

- Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS: SO2/NO Blend 50.0PPM SO2**
- < =5% Outside Manufacturer Tolerance. Use manufacturers concentration
- > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Shea Beaton Date: February 2, 2016
 Operator Signature: [Signature] Location: McIntyre Center Edmonton

***APPENDIX III
REPORT CERTIFICATION FORM***

Report Certification Form

Alberta Airshed (if applicable)	EPA Approval or Code of Practice Registration # (if applicable)
YES	NA
Company Name (if applicable)	Industrial Operation Name (if applicable)
Lakeland Industry & Community Association	St. Lina Site
Name of the Representative of the Person Responsible (Last, First, Middle)	Position / Title of the Representative of the Person Responsible
Bim Adeniji	Project Manager Assistant, Customer Service, Air Services
Is an External Party Certifying the Report? (If 'Yes', fill in the fields below for the external person.)	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Name of External Person Certifying the Report (Last, First, Middle)	Position / Title of External Person Certifying the Report
NA	NA
Company Name for the External Person Certifying the Report	Identification of Qualifications / Professional Designations of the External Person Certifying the Report
NA	NA

I certify that I have reviewed and verified the submitted report. I also certify that the report presented with this certification form is complete, accurate and representative of the monitoring results and timeframe.



Signature of the Representative of the Person Responsible / External Person Certifying the Report

01-09-2016




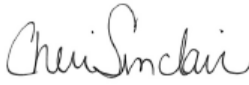
Report Issued Date (dd-mm-yyyy)

***APPENDIX IV
DATA VALIDATION CERTIFICATION FORM***



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2016-07-31- C</u>
Site: <u>St. Lina Site</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	 _____	Date <u>24-08-2016</u>
Level 1 Primary Validation	 _____	Date <u>24-08-2016</u>
Level 2 Final Validation	 _____	Date <u>01-09-2016</u>
Level 3 Independent Data Review	 _____	Date <u>06-09-2016</u>
Post-Final Validation	<u>NA</u> _____	Date <u>NA</u> _____

Notes
The Post-Final Validation step serves to re-evaluate the data that errors or omissions are discovered and/or suspected after the initial submittal of data. This validation is performed on an annual basis.

**AMBIENT AIR MONITORING MONTHLY DATA REPORT
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
BONNYVILLE**

JOB #: 2833-2016-07-37-C

July 2016

Prepared for:

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
BOX 8237, 5107W - 50 STREET
BONNYVILLE, ALBERTA
T9N 2J5

Attention: MIKE BISAGA

DATE: **September 9, 2016**

Prepared by:



Bim Adeniji,
Project Manager Assistant, Customer Service, Air Services

Reviewed by:



Cheri Sinclair, B.Sc.
Supervisor, Customer Service, Air Services

SUMMARY

In July 2016, the Air Services Group of Maxxam Analytics conducted an ambient air monitoring program at Bonnyville of Lakeland Industry & Community Association, near Bonnyville, Alberta. Sampling was carried out to determine the concentrations of non-compliance parameters, as requested by the Project Coordinator.

All data collected this month, with the exception of H₂S, were within the objectives outlined in the Air Monitoring Directive (Alberta Environment and Parks 2016).

Forty-six 1-hr and nine 24-hr exceedances were recorded for H₂S this month. The exceedances were reported to AEP, in accordance with *A Guide To Release Reporting* (Alberta Environmental Protection and Enhancement Act). Details are recorded in the Exceedance Summary Report.

The operational uptime for all analyzers and meteorological system were above the 90% requirement.

H₂S: An internal audit was completed on July 13. The audit report is included in Appendix V.

THC/CH₄/NMHC: On July 10, the analyzer recorded low concentrations due to a malfunctioning valve actuator. Sixty two hours of data were discarded due to this event.

The summary of results is presented on the following pages.

Any deviations or modifications made to the sampling or analytical methods are outlined in Section 1.0 Discussion. On this basis, Maxxam is issuing this completed report to Lakeland Industry & Community Association, Bonnyville.

Should you have any questions concerning the results or if we can be of further assistance, please contact us at 403-219-3677 or toll-free at 1-800-386-7247.

Monthly Continuous Data Summary

Lakeland Industry & Community Association Bonnyville						MAXIMUM VALUES							OPERATIONAL TIME (%)
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	1-HOUR			24-HOUR		
	1-HR	24-HR	1-HR	24-HR				HOUR	WIND SPEED (KPH)	WIND DIRECTION (DEGREES)	READING	DAY	
SO2 (PPB)	172	48	0	0	0.0	3.7	13	6	6.6	NW	0.3	13	100.0
H2S (PPB)	10	3	46	9	2.2	36.5	18	5	1.2	SW	7.4	16	100.0
THC (PPM)	-	-	-	-	2.08	3.07	19	5	3.4	NNW	2.32	19	91.3
CH4 (PPM)	-	-	-	-	2.08	3.01	19	5	3.4	NNW	2.29	19	91.3
NMHC (PPM)	-	-	-	-	0.01	0.35	1	5	8.0	ENE	0.03	19	91.3
NO2 (PPB)	159	-	0	-	3.3	11.9	26	6	2.1	N	5.5	26	99.1
NO (PPB)	-	-	-	-	0.7	13.8	26	8	0.4	ESE	2.8	26	99.1
NOX (PPB)	-	-	-	-	4.0	23.8	26	8	0.4	ESE	8.3	26	99.1
O3 (PPB)	82	-	0	-	23.7	45.3	2	16	7.9	SE	28.6	2, 28	100.0
PM2.5 (UG/M3)	80	30	0	0	6.4	28.6	17, 18	22, 4	0.3 0.8	NW WSW	17.1	17	99.7
VECTOR WS (KPH)	-	-	-	-	6.9	20.4	24	14	-	SSW	10.6	24	100.0
VECTOR WD (DEG)	-	-	-	-	19 (NNE)	-	-	-	-	-	-	-	100.0

NA-NOT AVAILABLE VAR-VARIOUS

Exceedance Summary Report

SO₂ 1- Hour Exceedances

No Exceedances Recorded During the Month

SO₂ 24- Hour Exceedances

No Exceedances Recorded During the Month

H₂S 1- Hour Exceedances

DATE	TIME (MST)	READING (ppb)	WS (kph)	WD (sector)	AEP Ref#
July 15	1	12.2	0.7	SSE	313866
July 15	3	10.8	0.3	NW	313866
July 15	4	11.1	1.2	WNW	313866
July 15	5	14.6	0.2	W	313866
July 15	6	11.5	0.5	WSW	313866
July 15	23	10.4	5.1	SW	313866
July 16	0	12.3	6.3	SW	313905
July 16	1	20.9	5.9	SW	313905
July 16	2	20.3	2.3	SW	313905
July 16	3	29.3	5.8	SW	313905
July 16	4	26.3	7.3	SSW	313905
July 16	5	23.4	5.5	SSW	313905
July 16	6	19.0	7.3	SW	313905
July 17	23	10.8	6.1	NW	313905
July 18	2	19.9	1.9	WSW	313944
July 18	3	18.1	2.3	W	313944
July 18	4	26.8	0.8	WSW	313944
July 18	5	35.7	1.2	SW	313944
July 18	6	15.3	1.6	WSW	313944
July 19	22	11.6	7.4	SW	314090
July 20	0	14.3	5.1	SSW	314042
July 20	1	26.7	5.6	SW	314042
July 20	2	24.5	6.3	SSW	314042
July 20	3	30.1	6.2	SSW	314042
July 20	4	30.4	5.8	SW	314042
July 20	5	17.6	3.8	SW	314042
July 22	3	12.5	0.3	E	314139
July 24	2	20.6	7.2	SSW	314195
July 24	3	21.0	7.4	SSW	314195
July 24	4	19.4	7.7	SSW	314195
July 24	5	18.5	8.2	SSW	314195
July 24	6	10.6	7.8	SSW	314195

Exceedance Summary Report

H₂S 1- Hour Exceedances

DATE	TIME (MST)	READING (ppb)	WS (kph)	WD (sector)	AEP Ref#
July 25	4	17.4	4.9	SW	314207
July 27	4	16.4	1	SSE	314309
July 27	6	16.0	2	S	314309
July 28	0	10.5	5.7	SSW	314363
July 28	2	10.6	5	SSW	314363
July 28	3	16.7	6.3	SSW	314363
July 28	4	18.5	6.5	SW	314363
July 28	5	19.4	6.6	SW	314363
July 28	6	13.4	5.6	SSW	314363
July 29	2	14.7	3.9	SSW	314404
July 29	3	20.9	10.3	SSW	314404
July 29	4	17.8	7.2	SW	314404
July 29	5	16.4	7.8	SW	314404
July 30	1	15	3	SSE	314452

H₂S 24- Hour Exceedances

DATE	READING (ppb)	WS (kph)	WD (sector)
July 15	4.6	4.4	NNW
July 16	7.4	7.1	NNW
July 18	6.5	6.1	WNW
July 19	3.3	6.5	N
July 20	6.8	8.5	WNW
July 24	5.2	10.6	NW
July 27	3.6	5.5	NNW
July 28	4.6	7.6	NNW
July 29	4.6	6.2	NNW

NO₂ 1- Hour Exceedances

No Exceedances Recorded During the Month

PM_{2.5} 1- Hour Exceedances

No Exceedances Recorded During the Month

PM_{2.5} 24- Hour Exceedances

No Exceedances Recorded During the Month

O₃ 1- Hour Exceedances

No Exceedances Recorded During the Month

Volatile Organics (VOCs) Data Summary

Sample Collected Date	Maximum reading (PPB)	Volatile Organic Compound
July 5, 2016	4.3	Acetone
July 11, 2016	2.2	Acetone
July 17, 2016	3.22	Isobutane
July 23, 2016	2.8	Acetone
July 29, 2016	4.8	Acetone

Note: NA

Polycyclic Aromatic Hydrocarbons (PAHs) Data Summary

Sample Collected Date	Maximum reading (ug)	Semi-Volatile Organic
July 5, 2016	0.23	Phenanthrene
July 11, 2016	0.26	Phenanthrene
July 17, 2016	0.37	Phenanthrene
July 23, 2016	0.34	Phenanthrene
July 29, 2016	0.26	Phenanthrene

Note: NA

Volatile Organics (VOCs) Data Summary - NMHC Canister System

Sample Collected Date	Maximum reading (PPB)	Volatile Organic Compound
July 1, 2016	14.0	n-Butane
July 15, 2016	5.30	n-Butane
July 19, 2016	8.1	Ethanol

Note: NA

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1.0 Discussion

This monthly report consists of data for parameters Sulphur Dioxide (SO₂), Hydrogen Sulphide (H₂S), Total Hydrocarbon (THC), Methane (CH₄), Non-Methane Hydrocarbon (NMHC), Oxides of Nitrogen (NO_x), Nitric Oxides (NO), Nitrogen Dioxide (NO₂), Ozone (O₃), Particulate Matter 2.5 (PM_{2.5}), Wind Speed (WS), Wind Direction (WD) and Standard Deviation Wind Direction (STDWD). The results for the non-continuous VOCs, PAHs and NMHC monitoring programs are also included in this report.

Sample filters for all continuous air monitors are changed before the calibration begins. The sample manifold is cleaned during the site visit each month.

Control checks, consisting of a zero and span, are conducted daily on all continuous air monitors. In place of the air sample, zero air (from scrubbed air or gas cylinders) is used for zero checks, and a known concentration of the pollutant being analyzed is used for span checks. These checks are controlled by automatic timers and valves. The total zero span cycle is completed within an hour, the commencement of the zero span cycle is at the beginning of the hour.

Multipoint calibrations are done a minimum of once a month for each continuous air monitor. An additional calibration is required under the following conditions: 1) within three days after the initial start-up and stabilization of a newly installed instrument, 2) prior to shut-down or moving of an instrument which has been working to specification, and 3) when major repair has been done on the instrument.

Time during the first multi-point calibration is not considered downtime (Data is flagged as C). If more than one calibration is performed during the month, the time during the additional calibration is considered as downtime (Data is flagged as C1).

Only one zero/span check is run per day. Time during the zero/span check is not considered as downtime (Data is flagged as S). If an extra zero/span check is performed, the time during the additional check is considered as downtime (Data is flagged as S1).

The AMD requires each instrument and accompanying data recording system to be operational 90% of the time (minimum), on a monthly basis.

All sampling, analysis, and QA/QC for this project was performed by Maxxam Analytics and complies with the Alberta Air Monitoring Directive.

Data contained in this monthly report has undergone the verification and validation based on the requirements of the AMD Chapter 6: Ambient Data Quality (August 3, 2016). The descriptions of the data verification and validation process can be found in Section 5 of this report. Instantaneous data, where applicable, is provided for reference purposes and has not undergone zero correction.

Hourly and minute data have been reviewed based on daily zero/span results and multi-point calibration results. Data may be considered invalid if a zero-corrected span check in excess of +/- 10% of the span concentration (established by the previous multi-point calibration) is encountered and/or significant differences in the calibration factor occurs (greater than 10%).

SULPHUR DIOXIDE (SO₂)

The analyzer was working well throughout the month. The routine monthly calibration was performed on July 12.

HYDROGEN SULPHIDE (H₂S)

A shut-down calibration was performed on July 14 prior to routine maintenance. Maintenance was performed on the SO₂ scrubber unit and the sample inlet filter was changed. The output voltage was calibrated and a successful post-repair calibration was completed afterwards. Both the shut-down and post-repair calibration results met AMD's requirements. An internal audit was completed on July 13. The audit report is included in Appendix V.

TOTAL HYDROCARBONS (THC), METHANE (CH₄), and NON-METHANE HYDROCARBONS (NMHC)

On July 10, the analyzer recorded low concentrations due to an equipment malfunction. The minute data was reviewed for the entire month of July and concentrations of < 1.86 ppm were invalidated. This set point of < 1.86 ppm was determined based on historical monthly averages. Sixty two hours of data were discarded due to this event. The valve was replaced on August 3. The routine monthly calibration was performed on July 12. The analyzer spanned low on July 13. A repeat span check was performed on July 14 and the result was within acceptance limits. The analyzer spanned low again on July 15. The span check was repeated on July 16 to assess the analyzer's functionality and the result was within acceptable range.

NITROGEN DIOXIDE (NO₂)

The routine monthly calibration was performed on July 12 during which the analyzer displayed unstable readings during the low gas phase titration sequence. A repeat calibration was completed on July 13 and the calibration result met AMD's requirements.

OZONE (O₃)

The analyzer was working well throughout the month. The routine monthly calibration was performed on July 12.

PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM_{2.5})

Two routine audits were performed this month; one was completed on July 4 and the other audit was performed on July 27. The inlet filter and FDMS filter were replaced during both audits. Data was corrected using Alberta Air Quality Guidelines. Data between 0 and -3 ug/m³ was corrected to 0 ug/m³. Data collected below -3 ug/m³ was invalidated. Two hours of data were discarded as the data was below -3 ug/m³.

WIND SPEED (WS), WIND DIRECTION (WD) and STANDARD DEVIATION WIND DIRECTION (STDWD)

The wind system was working well throughout the month.

The wind system is reported as vector wind speed and vector wind direction. The wind direction data included in this report represents where the wind was coming from.

VOC SAMPLES

The sampler was programmed to run for 24 hours, every 6th day, as per the NAPS (North American Pollution Surveillance Schedule).

Samples were collected on July 5, 11, 17, 23 and 29. Analytical results are included in this report. The VOC values are reported in ppb.

PAH SAMPLES

The sampler was programmed to run for 24 hours, every 6th day, as per the NAPS (North American Pollution Surveillance Schedule).

Samples were collected on July 5, 11, 17, 23 and 29. Analytical results are included in this report. The PAH values are reported in µg.

NMHC CANISTER SAMPLES

The NMHC canister sampler is triggered when the 5-minute average concentration of NMHC is above 0.30 ppm. Sample is collected over a one hour period when the canister is triggered.

Three canister events were recorded this month: concentrations of 1.77 ppm on July 1 at 17:30, 0.32 ppm on July 15 at 06:00 and 0.54 ppm on July 19 at 07:20. Analytical results are included in this report. NMHC canister values are reported in ppb.

2.0 Project Personnel

Mike Bisaga was the contact for Lakeland Industry & Community Association and the Maxxam field sampling technician was Alexander Yakupov.

3.0 Plant Monthly Required AMD Summary

All data collected this month, with the exception of H₂S, were within the objectives outlined in the Air Monitoring Directive (Alberta Environment and Parks 2016).

Forty-six 1-hr and nine 24-hr exceedances were recorded for H₂S this month. The exceedances were reported to AEP. Details are recorded in the Exceedance Summary Report.

The operational uptime for all analyzers and meteorological system were above the 90% requirement.

4.0 Calculations and Results

All calculations and reporting of results follow the methods described in the AMD 2016.

5.0 Methods and Procedures

The following methods and procedures were used to complete the test program:

- Maxxam AIR SOP-00001 - Methane, Non-Methane Hydrocarbon Analyzer Monitoring
- Maxxam AIR SOP-00208: RM Young Monitor Calibration
- Maxxam AIR SOP-00209: Ambient H₂S Monitoring
- Maxxam AIR SOP-00211: Ambient SO₂ Monitoring
- Maxxam AIR SOP-00212: Ambient O₃ Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO₂/NO_x Monitoring
- Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring
- Maxxam AIR SOP-00215: Teom Operation
- Maxxam AIR SOP-00225: The Collection of VOCs in Ambient Air Using Canister and Xontech

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

- Sulphur Dioxide - API 100E UV Fluorescent Analyzer
- Hydrogen Sulphide - API 101E UV Fluorescent Analyzer
- Methane, Non-Methane Hydrocarbon - Thermo 55i FID Analyzer
- Oxides of Nitrogen - API 200E Chemiluminescent Analyzer
- Ozone - Thermo 49i Photometric Analyzer
- Particulate Matter (PM_{2.5}) - R&P 1405F Teom Unit
- Wind System - RM Young Unit
- Datalogger - ESC 8832

The following steps were used to complete the data verification and validation process:

Level 0 Preliminary Verification

Level 0 data are raw data obtained directly from the data acquisition system (DAS). Under the step of Level 0, these data undergo a certain amount of manual or automated screening and flagging. It included a) identification of periods of missing data; b) verification of time stamps against reference time; c) verification that instrument diagnostics/datalogger flags indicate normal operation; d) comparison of data to upper and lower limits; e) rate of change flagging indicating that data changed too rapidly or not at all; and f) verification that zero, span and multipoint performance checks are within specifications. This level of verification is performed on a daily basis.

Level 1 Primary Validation

Validation actions under the step of Level 1 include a) review of all screening flags assigned during preliminary verification; b) review of all supporting site information and documentation; c) review of operational acceptance limits for each parameter/analyzer; d) review of daily zero/span and monthly calibration results for all gaseous parameters; and e) application of any necessary adjustments to data (e.g. baseline adjustments, below zero adjustments). This level of validation is performed on a monthly basis.

Level 2 Final Validation

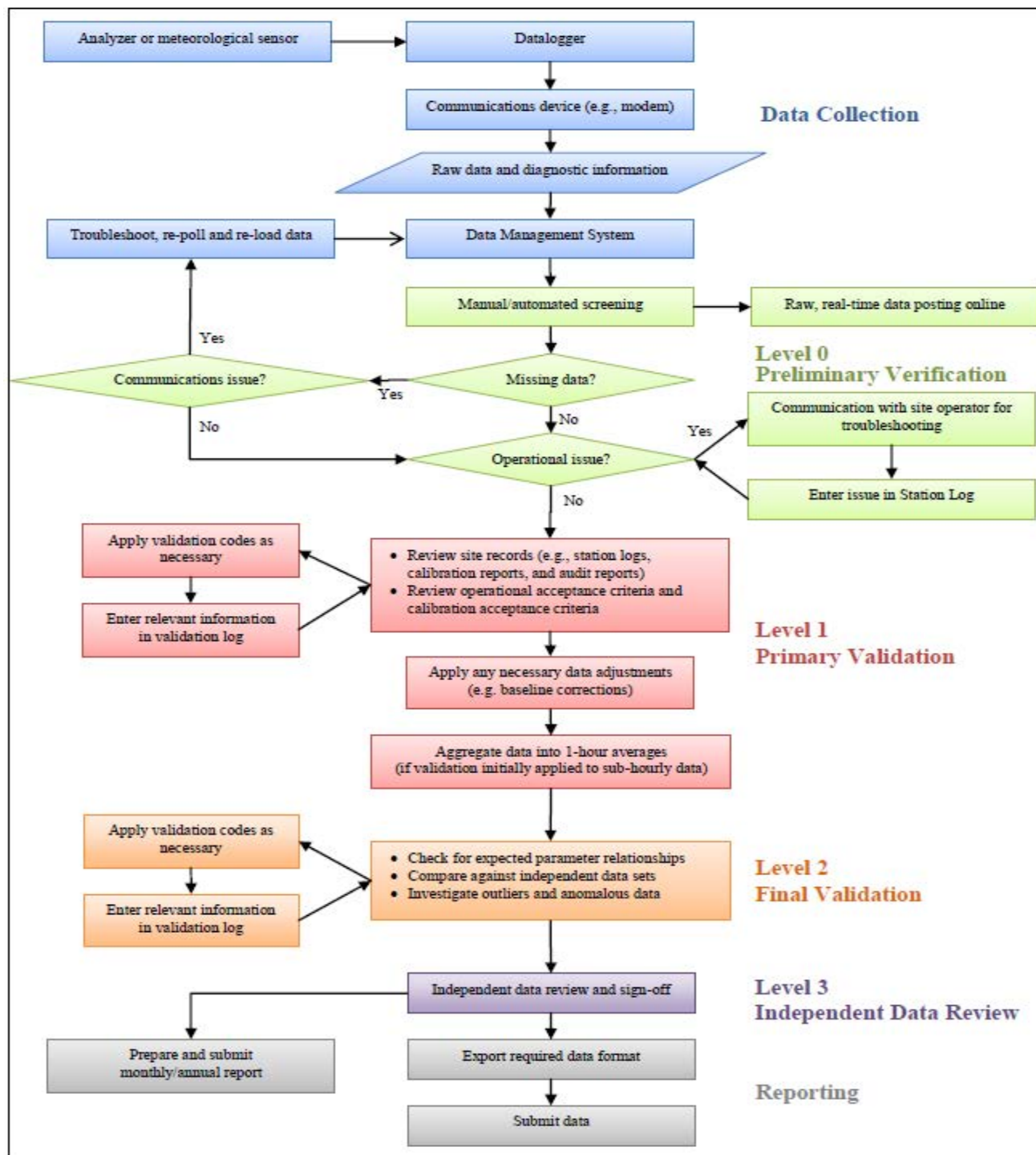
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

Level 3 Independent Data Review

Level 3 validation is the last step of data review, and it is completed by an individual that is independent of both field operations and primary data validation. A final independent QA review and endorsement is performed during this step before data is submitted to Alberta Environment.

Post-Final Validation

The Post-Final Validation step serves to re-evaluate the data that errors or omissions are discovered and/or suspected after the initial submittal of data. Any data issues or patterns which were not clear on a monthly basis are highlighted during this step. This validation is performed on an annual basis.



Source: Air Monitoring Directive (Aug 3, 2016), Chapter 6: Ambient Data Quality; Figure 1 Data Collection and Management Process Flow Chart

APPENDIX I
CONTINUOUS MONITORING DATA RESULTS

SULPHUR DIOXIDE

SULPHUR DIOXIDE (SO₂) hourly averages in ppb

MST																								DAILY	DAILY	24-HOUR			
HOURLY START	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	MIN.	MAX.	AVG.	RDGS.	
HOURLY END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
DAY																													
1	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	24
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	24
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	24	
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	24
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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	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
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	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
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	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
12	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	24	
13	0.0	0.0	0.0	0.0	0.0	2.0	3.7	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	3.7	0.3	24	
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	24
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	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
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	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
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	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
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	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
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	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
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.9	0.0	S	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1	24
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	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
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	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
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
28	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
29	0.0	0.0	0.0	0.0	0.0	S	0.0	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	24
30	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
31	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24
HOURLY MAX	0.0	0.0	0.0	0.0	0.0	2.0	3.7	1.9	0.6	0.9	0.1	0.1	0.1	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
HOURLY AVG	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

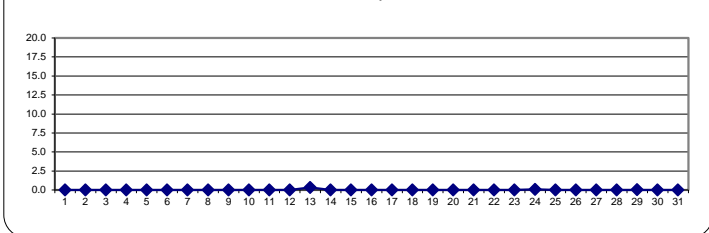
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	172	PPB	24-HR	48	PPB
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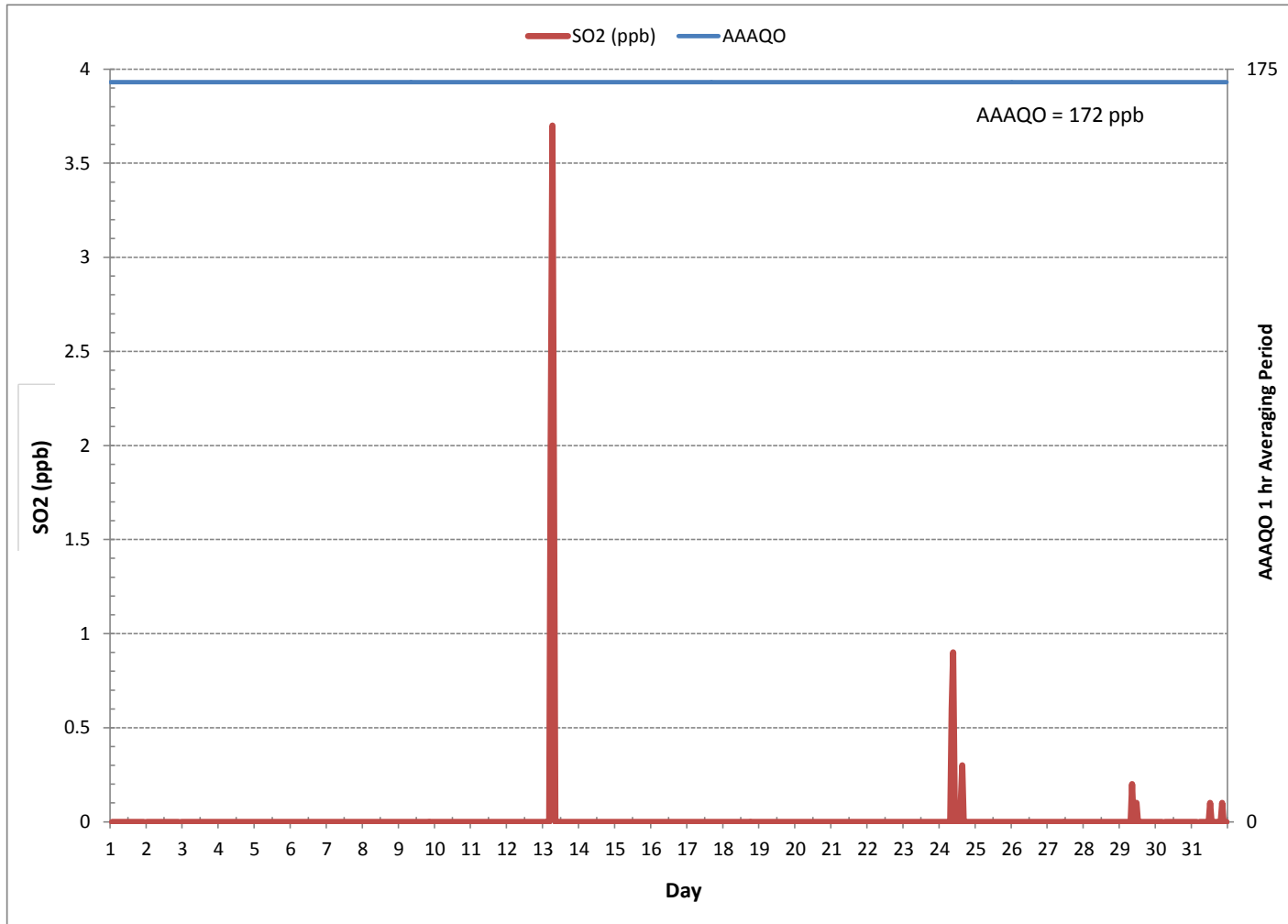
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDENCES:	0					
NUMBER OF 24-HR EXCEEDENCES:	0					
NUMBER OF NON-ZERO READINGS:	12					
MINIMUM 1-HR AVERAGE	0.0	PPB	@ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	3.7	PPB	@ HOUR(S)	6	ON DAY(S)	13
MAXIMUM 24-HR AVERAGE:	0.3	PPB			ON DAY(S)	13
					VAR-VARIOUS	
IZS CALIBRATION TIME:	32	HRS	OPERATIONAL TIME:	744	HRS	
MONTHLY CALIBRATION TIME:	5	HRS	AMD OPERATION UPTIME:	100.0	%	
STANDARD DEVIATION:	0.18		MONTHLY AVERAGE:	0.0	PPB	

24 HOUR AVERAGES FOR July 2016



SULPHUR DIOXIDE (SO2) hourly averages in ppb





SULPHUR DIOXIDE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
DAY	MIN.	MAX.	AVG.	RDGS.																										
1	S	2.3	2.3	2.6	2.6	2.4	2.5	2.5	2.6	2.5	2.5	2.5	2.5	2.9	3.1	3.1	2.7	2.7	2.7	2.9	2.8	2.7	2.8	S	2.3	3.1	2.6	24		
2		2.9	2.9	2.7	2.7	2.7	2.8	2.9	3.0	2.9	3.1	2.9	2.5	2.7	3.0	2.7	2.7	2.8	2.8	2.8	2.8	S	3.1	2.5	3.1	2.8	24			
3		3.0	3.1	3.0	3.2	3.1	3.2	3.3	3.3	3.4	3.4	3.5	3.3	3.3	3.3	3.4	3.2	3.0	3.2	3.4	3.2	3.1	S	3.3	3.5	3.0	3.5	3.2	24	
4		3.5	3.3	3.1	3.3	3.3	3.3	3.4	3.3	3.3	3.5	3.5	3.4	3.5	3.4	3.5	3.4	3.4	3.2	3.4	3.2	S	3.4	3.1	3.2	3.1	3.5	3.3	24	
5		3.3	3.4	5.3	3.2	3.2	3.0	3.0	3.4	3.4	3.5	3.4	3.3	3.4	3.6	3.6	3.5	3.5	3.7	3.5	S	3.0	3.5	3.5	3.7	3.0	5.3	3.5	24	
6		3.5	3.2	3.1	3.3	3.5	3.3	3.2	3.4	3.2	3.3	3.7	3.5	3.5	3.7	3.5	3.4	3.5	3.5	S	3.5	3.5	3.6	3.3	3.3	3.1	3.7	3.4	24	
7		3.1	3.0	2.9	2.9	3.0	3.1	3.1	3.1	3.5	3.3	3.1	2.8	3.0	3.1	3.0	2.9	2.9	S	2.8	2.8	3.0	3.1	3.1	3.3	2.8	3.5	3.0	24	
8		3.1	3.1	3.1	3.2	3.2	3.1	3.2	3.1	3.3	3.3	3.0	2.9	3.2	3.1	3.2	3.3	S	3.6	3.9	3.3	3.1	3.1	3.1	3.2	2.9	3.9	3.2	24	
9		3.0	2.9	2.8	3.2	3.1	3.9	5.6	3.7	3.5	3.3	3.3	3.0	3.1	3.0	3.2	S	3.0	3.1	3.3	3.3	3.2	3.1	3.1	3.2	2.8	5.6	3.3	24	
10		3.3	3.3	3.3	3.4	3.3	3.4	3.1	3.3	3.2	3.2	3.1	3.2	3.3	3.3	S	3.1	3.1	3.3	3.3	3.1	3.3	3.3	3.3	3.3	3.1	3.4	3.3	24	
11		3.3	3.7	3.9	3.7	3.7	3.9	4.0	3.9	3.5	3.5	3.5	3.6	3.5	S	3.9	3.7	4.2	3.7	4.0	4.0	3.8	3.9	4.1	4.4	3.3	4.4	3.8	24	
12		4.1	4.0	4.1	4.1	4.3	6.8	7.8	4.1	C	C	C	C	C	1.3	1.4	1.3	1.3	1.5	1.6	1.4	1.5	1.4	S	1.3	7.8	3.1	24		
13		1.3	1.3	1.0	1.0	1.0	7.5	7.4	5.3	1.2	3.0	3.3	0.6	2.2	0.8	0.9	0.8	0.9	0.6	0.8	0.8	0.6	0.7	S	0.5	0.5	7.5	1.9	24	
14		0.6	0.4	0.5	0.8	0.8	0.9	1.2	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	S	0.0	0.0	0.0	1.2	0.3	24	
15		0.3	0.3	0.2	0.2	0.2	0.3	0.5	0.4	0.1	0.2	0.1	0.2	0.4	0.5	0.5	0.8	0.8	0.7	0.9	0.9	S	0.6	0.8	1.1	0.1	1.1	0.5	24	
16		1.1	1.1	1.2	0.8	1.2	1.0	1.0	1.5	1.6	1.3	1.4	1.4	1.4	1.2	1.1	1.3	1.2	1.4	1.7	S	1.3	1.3	1.2	1.4	0.8	1.7	1.3	24	
17		1.5	1.5	1.3	1.4	1.4	1.4	1.4	1.5	1.5	1.4	1.1	1.0	1.0	1.0	1.2	1.2	1.2	1.2	S	0.7	0.9	0.8	0.9	1.0	0.7	1.5	1.2	24	
18		1.1	1.3	1.0	1.0	1.0	1.0	1.3	1.1	1.0	1.1	1.0	1.2	1.3	1.3	1.3	1.4	1.4	S	1.2	1.3	1.3	1.9	1.4	1.6	1.0	1.9	1.2	24	
19		1.7	1.7	1.8	1.6	1.7	1.5	1.6	1.6	1.7	1.6	1.8	1.6	1.6	1.4	1.3	1.4	S	1.3	1.4	1.8	1.7	1.5	1.3	1.4	1.3	1.8	1.6	24	
20		1.8	1.7	1.6	1.5	1.4	1.5	1.3	1.4	1.5	1.3	1.5	1.3	1.3	1.2	1.2	S	1.4	1.2	1.3	1.5	1.2	1.3	1.3	1.2	1.2	1.8	1.4	24	
21		1.3	1.3	1.2	1.1	1.0	1.2	1.2	1.1	1.4	1.4	1.7	1.8	1.7	1.5	S	1.1	1.2	1.3	1.2	1.2	1.0	1.2	0.9	1.1	0.9	1.8	1.3	24	
22		0.9	0.9	0.9	0.8	0.6	1.2	1.1	1.3	1.1	1.5	1.4	1.3	1.4	S	1.3	1.3	1.6	1.8	1.8	2.0	1.6	1.5	1.5	1.5	0.6	2.0	1.3	24	
23		1.7	1.7	1.7	1.7	1.6	1.5	1.5	1.7	1.3	1.4	1.4	1.5	S	1.5	1.5	1.5	1.4	1.5	1.5	1.3	1.3	1.5	1.4	1.5	1.3	1.7	1.5	24	
24		1.4	1.2	1.1	1.0	0.8	1.1	1.3	2.3	4.5	4.0	1.7	S	1.3	1.5	2.3	2.5	2.3	2.0	1.7	1.4	1.4	1.7	1.3	1.3	0.8	4.5	1.8	24	
25		1.4	1.5	1.2	1.3	1.2	1.2	1.1	1.5	0.9	0.9	S	0.8	0.9	0.7	0.7	0.6	0.8	1.0	1.0	0.9	1.0	0.9	0.7	0.7	0.6	1.5	1.0	24	
26		0.8	0.9	0.8	1.0	0.8	0.9	1.0	1.2	1.4	S	0.3	1.7	1.1	1.0	1.3	1.0	1.1	1.1	1.1	1.0	0.9	0.9	0.7	0.6	0.3	1.7	1.0	24	
27		0.7	0.6	0.6	0.5	0.4	0.6	0.6	0.7	S	0.7	0.8	0.9	0.8	0.5	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.9	1.1	0.9	0.4	1.1	0.7	24	
28		1.0	1.1	1.2	1.2	1.1	1.2	1.3	S	1.0	1.1	1.6	2.3	2.4	1.2	1.0	1.3	1.3	1.2	0.9	0.8	0.8	1.2	1.1	1.1	0.8	2.4	1.2	24	
29		0.9	1.0	0.8	0.7	0.6	0.7	S	1.2	1.7	1.7	1.7	1.5	1.4	1.3	1.3	1.5	1.4	1.2	1.2	1.5	1.3	1.5	1.5	1.2	0.6	1.7	1.3	24	
30		1.3	1.5	1.5	1.4	1.4	S	1.5	2.1	1.5	1.7	1.7	1.7	1.6	1.5	1.8	1.7	1.6	1.8	1.7	1.5	1.8	1.9	1.9	1.6	1.3	2.1	1.6	24	
31		1.6	1.7	1.9	1.7	S	1.9	2.1	2.0	2.0	2.0	1.9	1.9	2.3	2.1	1.9	2.1	1.9	2.0	1.9	2.0	2.0	2.1	2.0	2.1	1.6	2.3	2.0	24	
HOURLY MAX		4.1	4.0	5.3	4.1	4.3	7.5	7.8	5.3	4.5	4.0	3.7	3.6	3.5	3.7	3.9	3.7	4.2	3.7	4.0	4.0	3.8	3.9	4.1	4.4					
HOURLY AVG		2.0	2.0	2.0	1.9	1.9	2.3	2.4	2.3	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	1.9	1.9				

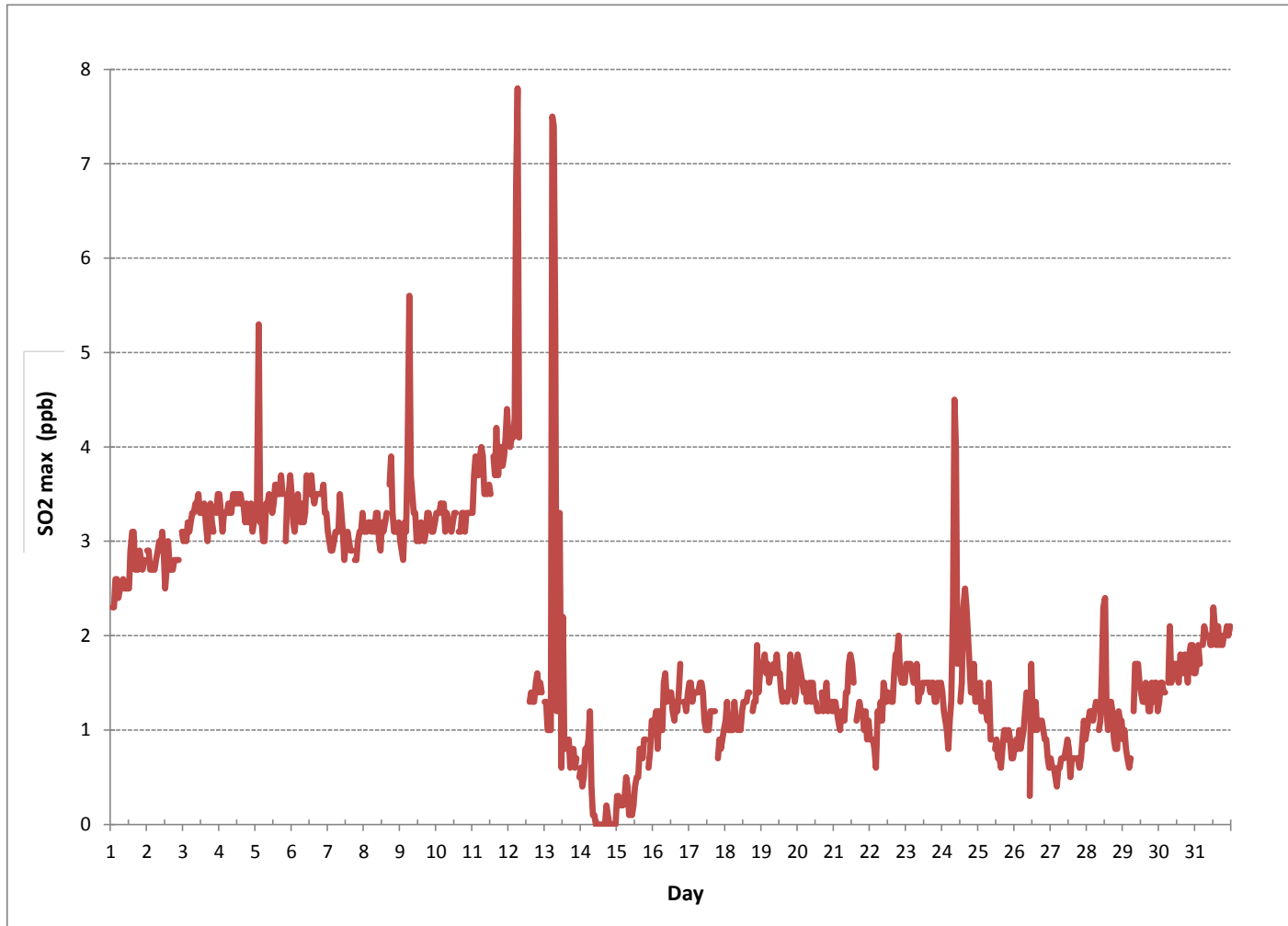
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

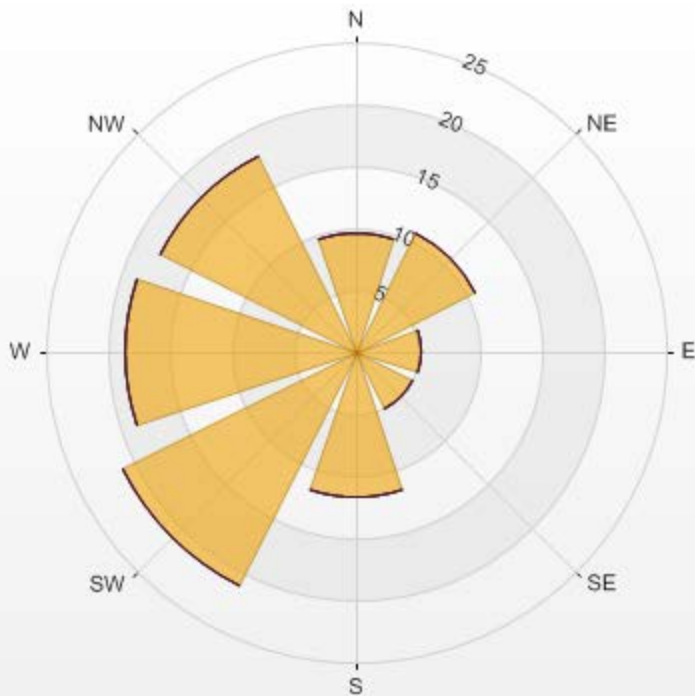
NUMBER OF NON-ZERO READINGS:	695
MAXIMUM INSTANTANEOUS VALUE:	7.8 PPB @ HOUR(S) 6 ON DAY(S) 12
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	6 HRS
STANDARD DEVIATION:	1.17
OPERATIONAL TIME:	744 HRS

SULPHUR DIOXIDE MAX instantaneous maximum in ppb



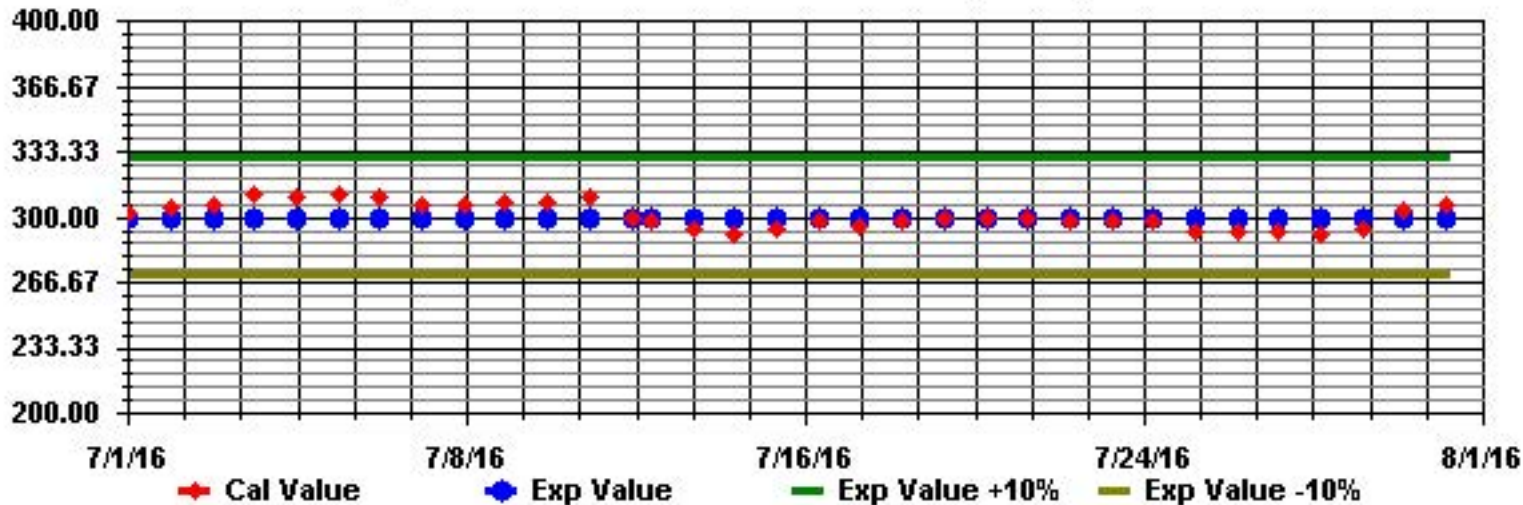
Wind: LICA Bonnyville Monitor: SO2 [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 95.03% Calm Avg: 0.00

Direction	0.0-20.0	20.0-60.0	60.0-110.0	110.0-170.0	170.0-340.0	>340.0	Total
N	9.62	0	0	0	0	0	9.62
NE	10.75	0	0	0	0	0	10.75
E	5.37	0	0	0	0	0	5.37
SE	5.09	0	0	0	0	0	5.09
S	11.74	0	0	0	0	0	11.74
SW	21.07	0	0	0	0	0	21.07
W	18.67	0	0	0	0	0	18.67
NW	17.68	0	0	0	0	0	17.68
Summary	100	0	0	0	0	0	100



% Icon Classes (ppb)	100	0.0-20.0	0	20.0-60.0	0	60.0-110.0	0	110.0-170.0	0	170.0-340.0	0	>340.0

Calibration Graph for Site: BONNYVIL Parameter: SO2_ Sequence: SO2 Phase: SPAN



HYDROGEN SULPHIDE



HYDROGEN SULPHIDE (H2S) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
HOUR START	HOUR END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.	
DAY																														
1		S	1.1	0.9	1.6	1.5	1.3	2.0	2.1	1.0	0.2	0.3	0.2	0.0	0.0	0.1	0.3	0.2	0.5	0.7	0.3	0.8	1.5	2.9	S	0.0	2.9	0.9	24	
2		2.8	2.9	1.1	4.9	5.7	4.7	4.2	2.8	0.7	0.6	0.2	0.2	0.3	0.1	0.5	0.5	0.2	0.5	0.7	1.1	0.9	2.5	S	1.2	0.1	5.7	1.7	24	
3		1.6	3.4	4.5	3.1	1.4	1.3	1.1	0.4	0.1	3.4	0.7	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	S	0.1	0.0	0.0	4.5	0.9	24
4		0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	2.0	1.4	4.1	0.0	4.1	0.4	24	
5		0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.1	S	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24	
6		0.0	0.0	1.9	0.1	0.6	0.2	1.5	0.0	0.0	0.0	0.2	0.0	0.3	0.1	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	1.1	0.0	1.9	0.3	24	
7		4.8	2.4	5.6	3.9	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.3	0.4	1.1	1.8	2.0	3.4	0.0	5.6	1.2	24	
8		7.2	5.7	3.0	2.3	4.1	2.5	1.7	0.7	0.1	0.1	0.5	0.5	0.5	0.7	0.3	0.3	S	0.2	0.2	0.1	0.4	0.3	0.1	0.0	0.0	7.2	1.4	24	
9		0.1	0.3	0.1	0.3	0.6	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.2	0.3	0.2	0.3	0.5	0.0	0.6	0.2	24
10		0.3	0.4	0.3	0.0	0.8	0.7	1.6	0.6	0.1	0.1	0.0	0.0	0.0	0.0	S	0.3	0.3	0.2	0.4	0.2	0.5	0.3	0.3	0.5	0.0	1.6	0.3	24	
11		0.3	0.1	0.3	0.4	0.5	0.4	0.4	0.1	0.0	0.2	0.4	0.1	0.2	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	24	
12		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	24
13		0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	Q	Q	Q	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	S	0.3	0.0	0.3	0.0	24
14		0.8	0.4	0.4	0.7	0.8	0.9	0.4	0.4	0.3	C	C	C	C	C	C	C	C	C	C	0.0	0.0	0.0	S	4.3	7.0	0.0	7.0	1.2	24
15		1.0	12.6	9.7	11.2	11.5	15.0	11.9	6.3	6.6	1.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	S	4.1	4.9	10.4	0.0	15.0	4.6	24		
16		13.1	21.7	21.1	30.1	27.1	24.2	19.8	3.2	0.8	0.7	0.6	0.6	0.6	0.4	0.3	0.4	0.4	0.7	0.4	S	0.0	0.5	2.4	0.1	30.1	7.4	24		
17		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	S	0.0	0.2	0.6	4.6	10.8	0.0	10.8	0.7	24		
18		2.3	10.0	20.7	18.9	27.6	36.5	16.1	7.9	2.9	1.0	0.5	0.6	0.2	0.5	0.6	0.5	0.5	S	0.0	0.5	0.7	0.5	0.2	0.7	0.0	36.5	6.5	24	
19		1.8	1.0	2.3	3.3	3.4	2.6	6.1	2.9	2.6	1.0	0.6	0.0	0.0	0.3	1.9	1.9	S	3.1	6.2	5.8	1.4	7.2	11.6	9.8	0.0	11.6	3.3	24	
20		14.3	26.7	24.5	30.1	30.4	17.6	8.8	0.1	0.2	0.0	0.2	0.1	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	2.4	0.0	30.4	6.8	24
21		6.3	4.9	2.5	3.0	1.0	1.9	2.6	3.1	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	1.1	24	
22		2.5	3.3	1.7	12.5	5.6	3.1	6.8	3.4	0.4	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.6	1.0	1.9	3.1	2.4	0.0	12.5	2.1	24	
23		2.4	5.8	2.3	0.3	0.0	7.7	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	4.6	0.0	7.7	1.1	24	
24		8.8	8.1	20.7	21.1	19.5	18.6	10.7	5.6	1.7	0.2	0.0	S	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.9	3.5	0.6	0.0	21.1	5.2	24	
25		3.2	2.1	0.0	5.0	17.4	3.3	0.0	0.0	0.0	0.0	S	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.7	5.2	9.2	8.7	0.0	17.4	2.4	24	
26		6.0	3.4	8.5	7.6	5.2	1.3	6.7	1.3	1.9	S	0.4	1.2	0.6	0.2	0.2	0.1	0.0	0.5	1.0	1.9	1.3	4.1	1.0	1.3	0.0	8.5	2.4	24	
27		1.7	2.9	3.5	4.8	16.7	7.0	16.3	2.7	S	0.6	0.5	0.3	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	2.4	8.0	8.3	7.9	0.0	16.7	3.6	24	
28		10.8	6.2	10.9	17.0	18.8	19.7	13.7	S	1.5	0.8	0.3	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.7	0.1	1.7	2.2	2.2	0.0	19.7	4.6	24	
29		5.4	4.1	14.9	21.1	18.0	16.6	S	3.2	1.6	0.4	0.5	0.4	0.0	0.0	0.2	0.3	0.0	1.3	1.1	1.1	3.8	7.0	2.7	2.8	0.0	21.1	4.6	24	
30		8.2	15.5	8.9	1.7	0.3	S	0.5	8.9	3.6	2.0	0.7	0.3	0.4	0.4	0.8	0.4	0.0	0.4	0.1	0.0	0.2	1.4	3.7	1.7	0.0	15.5	2.6	24	
31		2.8	4.4	5.2	0.3	S	0.3	0.1	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.1	1.3	1.6	0.0	5.2	0.8	24	
HOURLY MAX		14.3	26.7	24.5	30.1	30.4	36.5	19.8	8.9	6.6	3.4	0.7	1.2	0.6	0.7	1.9	1.9	0.5	3.1	6.2	5.8	3.8	8.0	11.6	10.8					
HOURLY AVG		3.6	4.8	5.7	6.6	7.4	6.3	4.4	1.9	0.9	0.4	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.3	0.4	0.5	0.6	1.8	2.5	3.0					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

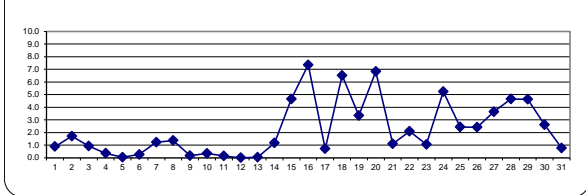
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 10 PPB 24-HR 3 PPB

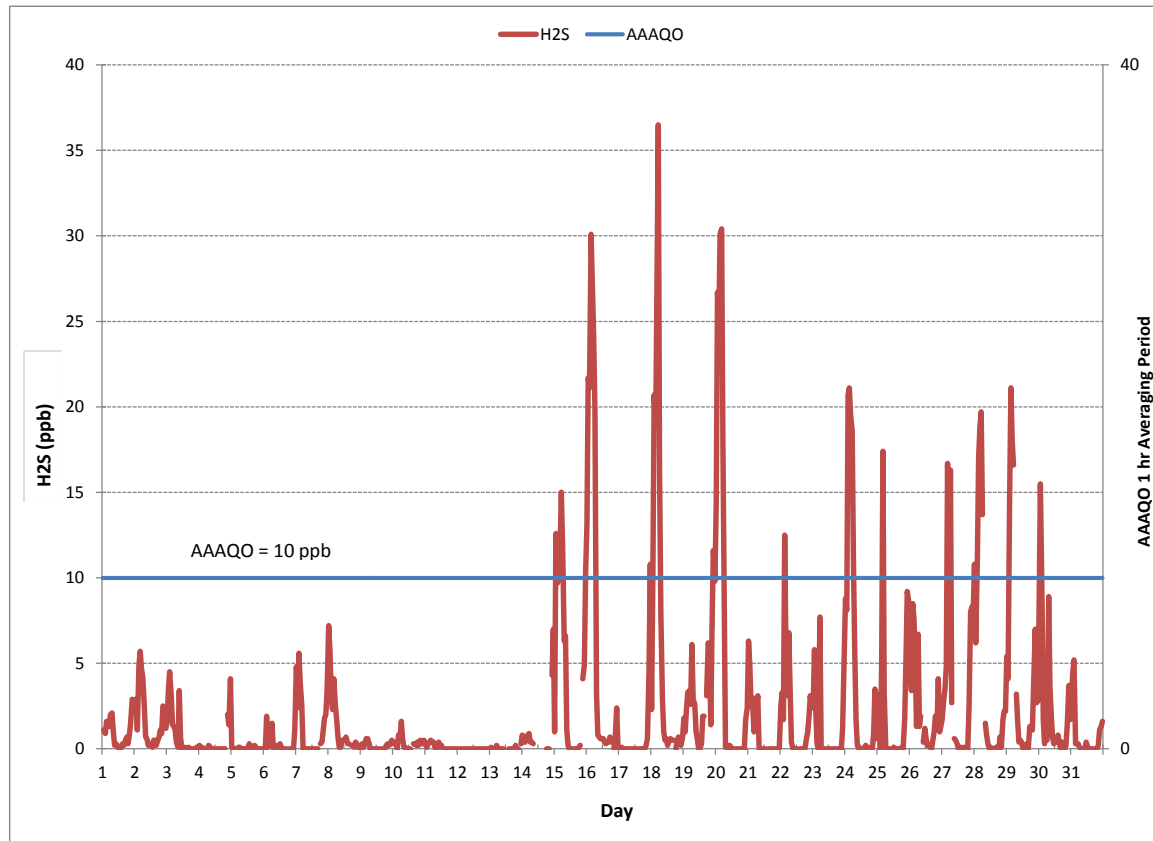
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDENCES:	46		
NUMBER OF 24-HR EXCEEDENCES:	9		
NUMBER OF NON-ZERO READINGS:	432		
MINIMUM 1-HR AVERAGE:	0.0 PPB @ HOUR(S) VAR ON DAY(S) VAR		
MAXIMUM 1-HR AVERAGE:	36.5 PPB @ HOUR(S) 5 ON DAY(S) 18		
MAXIMUM 24-HR AVERAGE:	7.4 PPB ON DAY(S) 16		
	VAR-VARIOUS		
I2S CALIBRATION TIME:	32 HRS	OPERATIONAL TIME:	744 HRS
MONTHLY CALIBRATION TIME:	9 HRS	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	4.95	MONTHLY AVERAGE:	2.2 PPB

24 HOUR AVERAGES FOR July 2016



HYDROGEN SULPHIDE (H2S) hourly averages in ppb



HYDROGEN SULPHIDE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
DAY	MIN.	MAX.	AVG.	RDGS.																										
1	S	1.2	1.4	2.2	2.2	2.2	2.6	2.8	1.5	0.6	0.5	0.3	0.3	0.3	0.5	0.5	0.7	0.7	1.2	0.8	1.7	3.2	5.2	S	0.3	5.2	1.5	24		
2		5.1	4.5	3.1	7.6	8.5	7.9	5.4	4.2	1.2	0.9	0.5	0.2	0.6	0.6	0.8	0.7	0.6	0.9	0.9	1.6	1.2	6.1	S	3.7	0.2	8.5	2.9	24	
3		5.3	7.6	12.5	6.8	2.4	2.4	2.1	1.3	3.1	17.9	3.3	0.6	0.7	1.3	0.8	0.8	1.8	0.3	0.4	0.4	0.6	S	0.7	0.9	0.3	17.9	3.2	24	
4		0.8	0.5	0.6	0.7	0.8	0.5	0.7	0.7	0.8	0.4	0.7	0.5	0.3	0.2	0.4	0.6	2.4	0.5	0.0	0.0	S	4.7	4.0	8.6	0.0	8.6	1.3	24	
5		0.6	0.3	0.4	0.3	0.5	0.5	0.4	0.3	0.4	0.2	0.4	0.5	0.3	0.8	0.5	0.8	0.4	0.6	0.5	S	0.3	0.3	0.2	0.2	0.2	0.8	0.4	24	
6		0.5	0.3	6.7	1.3	1.5	1.0	5.0	3.7	0.4	0.4	0.8	0.6	1.3	0.8	0.5	0.3	0.3	0.8	S	0.8	0.5	0.8	0.5	5.2	0.3	6.7	1.5	24	
7		11.2	4.6	9.3	7.8	7.1	1.9	0.7	0.3	0.3	0.4	0.2	0.3	0.0	0.0	0.1	0.2	0.3	S	0.3	0.7	1.2	2.6	2.9	4.7	0.0	11.2	2.5	24	
8		13.5	12.3	4.7	3.4	5.2	4.1	3.5	1.9	0.3	0.3	0.6	0.5	1.4	2.3	0.3	0.4	S	0.6	0.5	0.5	3.0	1.0	0.5	0.2	0.2	13.5	2.7	24	
9		1.0	1.0	0.4	0.6	1.4	1.1	0.7	0.5	0.4	0.1	0.1	0.3	0.4	0.4	0.4	S	0.3	0.2	0.2	0.7	0.7	0.8	1.0	0.8	0.1	1.4	0.6	24	
10		0.7	0.8	0.8	0.5	1.5	1.4	2.4	1.7	0.7	0.4	0.5	0.2	0.4	0.2	S	0.6	0.5	0.4	0.8	0.6	0.9	0.5	0.7	0.8	0.2	2.4	0.8	24	
11		1.0	0.5	0.9	0.7	0.7	0.6	0.7	0.6	0.3	0.4	0.6	0.3	0.7	S	0.9	0.3	0.7	0.6	0.5	0.5	0.6	1.1	1.0	0.7	0.3	1.1	0.6	24	
12		0.6	0.5	0.5	0.7	0.8	0.5	0.4	0.3	0.6	0.8	0.7	0.2	0.5	0.6	0.4	0.7	0.7	0.5	0.6	0.2	0.5	0.6	S	0.2	0.8	0.5	24		
13		0.4	0.4	0.2	0.3	0.5	0.7	0.2	0.5	0.2	0.0	0.5	Q	Q	Q	Q	0.1	0.1	0.1	0.1	0.2	0.8	0.7	0.2	S	0.6	0.0	0.8	0.3	24
14		2.0	0.3	0.5	0.5	0.8	0.7	0.4	0.2	0.1	C	C	C	C	C	C	C	C	C	C	0.0	0.0	0.2	S	13.3	12.4	0.0	13.3	2.2	24
15		3.6	30.2	24.6	27.7	22.8	38.6	48.4	10.1	11.0	4.0	0.3	1.6	0.1	0.2	0.2	0.0	0.0	0.1	0.5	0.5	S	6.6	6.9	18.3	0.0	48.4	11.1	24	
16		16.3	34.0	38.4	34.0	33.0	82.2	28.7	13.4	0.4	0.3	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.0	S	0.0	4.3	10.2	0.3	0.0	82.2	12.9	24	
17		0.1	0.0	0.3	0.1	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	S	0.0	0.0	0.0	2.9	7.3	17.9	0.0	17.9	1.2	24	
18		9.7	28.8	31.2	36.2	46.9	57.7	52.5	15.1	4.7	0.8	0.1	0.2	0.1	0.0	0.6	2.3	0.5	S	0.2	1.3	1.7	1.8	1.6	1.4	0.0	57.7	12.8	24	
19		3.6	1.4	4.3	4.7	4.4	4.2	23.6	4.5	4.1	1.6	1.2	0.1	0.3	2.0	4.1	3.3	S	5.3	7.9	8.0	4.6	12.1	17.8	18.5	0.1	23.6	6.2	24	
20		25.2	49.5	31.8	48.2	42.7	39.1	19.9	0.6	0.5	0.3	0.8	0.5	0.3	0.1	0.3	S	0.5	0.0	0.1	0.0	0.0	0.0	5.8	7.4	0.0	49.5	11.9	24	
21		9.2	8.5	4.1	4.5	4.4	7.6	5.6	6.6	0.1	0.3	0.4	0.2	0.0	0.0	S	0.1	0.1	0.2	0.1	0.0	0.3	0.1	0.0	0.2	0.0	9.2	2.3	24	
22		8.8	10.7	6.4	29.1	9.4	6.0	12.4	8.2	2.4	0.2	0.2	0.5	0.2	S	0.3	0.1	0.1	0.2	0.1	1.4	2.3	6.6	7.5	6.1	0.1	29.1	5.2	24	
23		5.6	11.3	4.5	1.0	0.5	25.3	0.4	0.4	0.3	0.1	0.1	0.2	S	0.0	0.2	0.2	0.0	0.1	0.2	0.3	0.0	0.2	4.5	10.3	0.0	25.3	2.9	24	
24		20.5	23.1	25.5	24.1	28.1	22.3	17.4	7.9	4.0	0.5	0.2	S	0.2	0.6	0.0	0.7	0.8	0.6	0.4	0.7	0.7	3.6	5.8	4.0	0.0	28.1	8.3	24	
25		8.4	5.4	0.5	14.4	29.9	23.9	0.3	0.5	0.0	0.3	S	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.0	7.3	10.9	19.4	16.0	0.0	29.9	6.0	24	
26		18.0	5.0	18.2	9.7	7.5	1.8	70.6	4.7	5.5	S	1.4	3.9	2.1	0.4	0.2	0.2	0.3	0.6	1.6	4.9	2.3	10.6	1.4	2.4	0.2	70.6	7.5	24	
27		2.7	8.9	5.5	7.5	40.2	14.8	45.2	9.8	S	0.6	0.4	0.3	0.3	0.0	0.1	0.1	0.0	0.1	0.0	0.0	11.5	11.4	12.6	15.3	0.0	45.2	8.1	24	
28		20.2	14.8	33.2	23.8	28.7	25.0	24.4	S	4.9	1.3	0.5	0.3	0.2	0.1	0.0	0.1	0.4	0.1	0.0	3.1	3.4	5.3	5.3	7.5	0.0	33.2	8.8	24	
29		21.3	4.9	28.3	26.2	27.2	25.4	S	8.9	3.6	0.6	1.1	0.5	0.2	0.2	0.3	0.5	0.2	8.1	2.3	1.8	8.5	13.0	8.4	3.0	0.2	28.3	8.5	24	
30		22.1	44.8	17.0	7.1	0.5	S	13.9	16.7	5.9	5.4	1.3	0.8	1.1	1.2	2.3	1.8	0.7	1.8	0.6	0.3	0.6	3.3	6.5	5.7	0.3	44.8	7.0	24	
31		5.3	6.4	9.9	0.8	S	1.0	0.6	0.2	0.8	0.7	1.0	1.4	0.9	0.6	0.5	0.4	0.5	0.7	0.6	0.7	1.1	2.3	2.1	3.7	0.2	9.9	1.8	24	
HOURLY MAX		25.2	49.5	38.4	48.2	46.9	82.2	70.6	16.7	11.0	17.9	3.3	3.9	2.1	2.3	4.1	3.3	2.4	8.1	7.9	8.0	11.5	13.0	19.4	18.5					
HOURLY AVG		8.1	10.4	10.5	10.7	12.0	13.3	13.0	4.2	1.9	1.4	0.6	0.6	0.5	0.5	0.5	0.6	0.5	0.9	0.7	1.1	1.9	4.0	5.3	6.1					

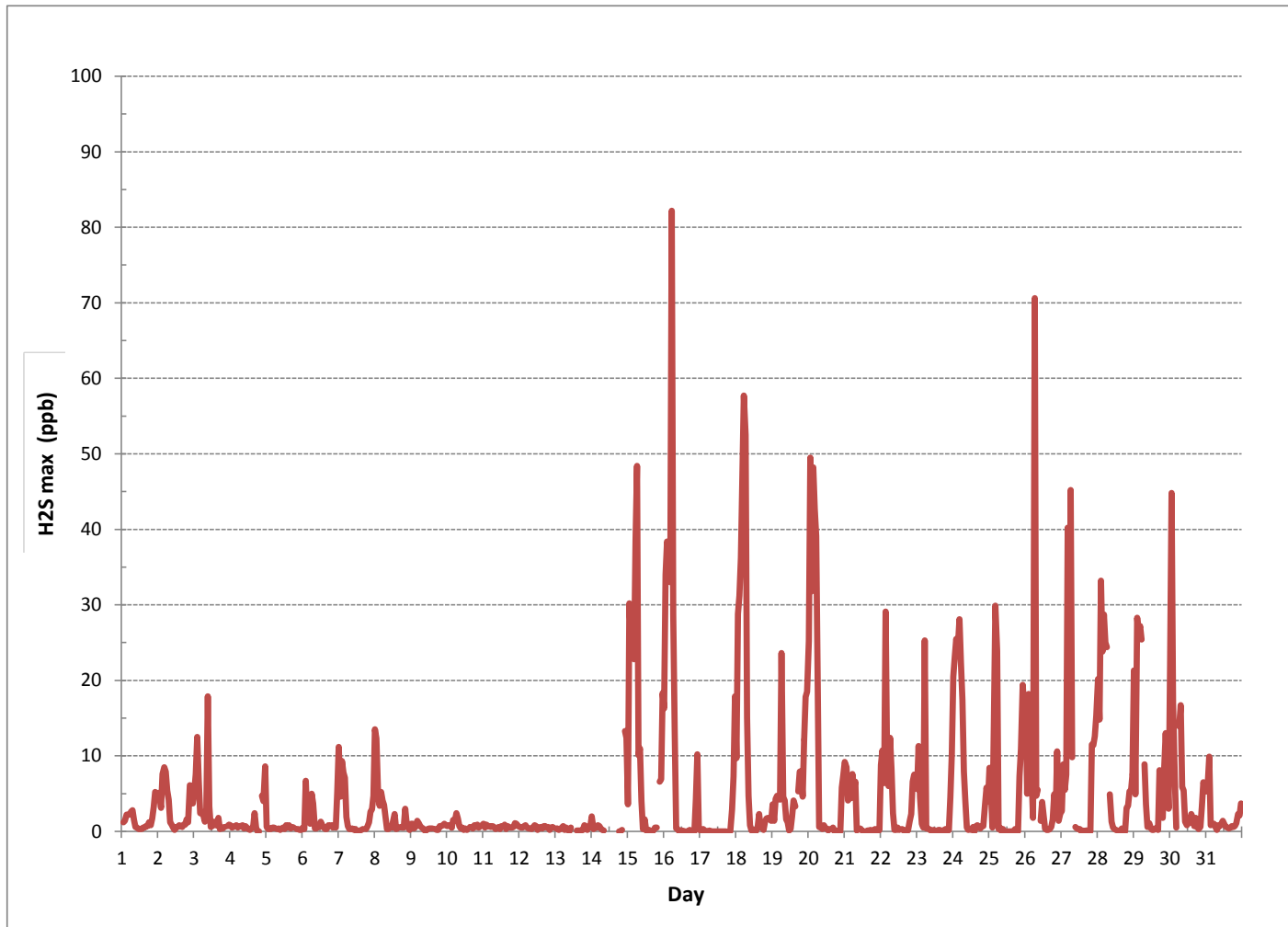
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

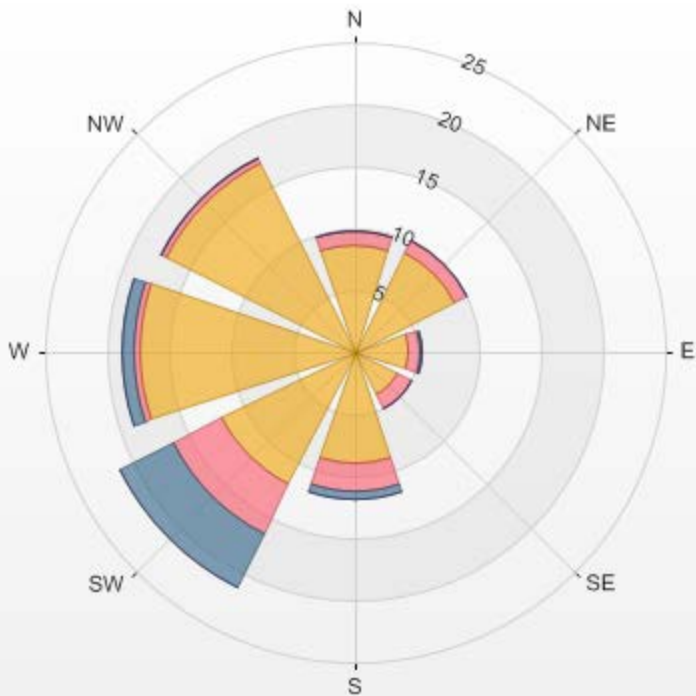
NUMBER OF NON-ZERO READINGS:	641
MAXIMUM INSTANTANEOUS VALUE:	82.2 PPB @ HOUR(S) 5 ON DAY(S) 16
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	9 HRS
STANDARD DEVIATION:	9.55
OPERATIONAL TIME:	744 HRS

HYDROGEN SULPHIDE MAX instantaneous maximum in ppb



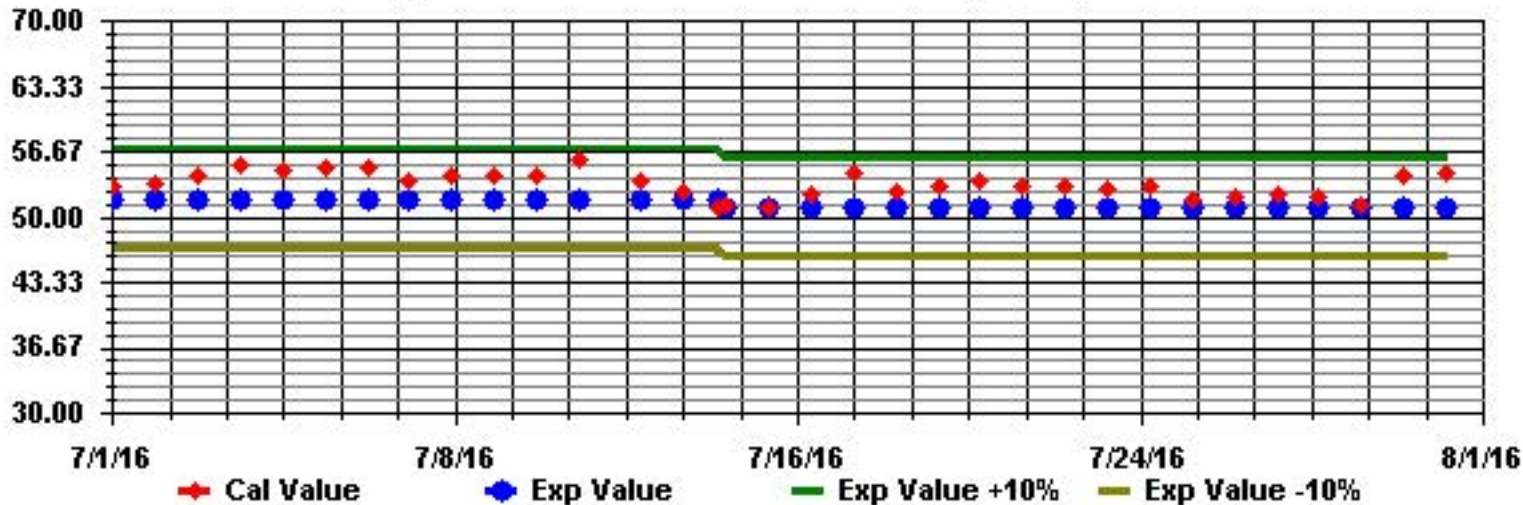
Wind: LICA Bonnyville Monitor: H2S [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.09% Calm Avg: 0.00

Direction	0.0-3.0	3.0-10.0	10.0-50.0	>50.0	Total
N	8.57	1.14	0	0	9.71
NE	9	1.14	0	0	10.14
E	4.43	0.86	0.14	0	5.43
SE	3.86	1.29	0	0	5.15
S	9	2.29	0.57	0	11.86
SW	12	4.43	4.86	0	21.29
W	17.29	0.57	1	0	18.86
NW	17	0.43	0.14	0	17.57
Summary	81.15	12.15	6.71	0	100



% Icon Classes (ppb)	81	12	7	0
	 0.0-3.0	 3.0-10.0	 10.0-50.0	 >50.0

Calibration Graph for Site: BONNYVIL Parameter: H2S_ Sequence: H2S Phase: SPAN



TOTAL HYDROCARBON

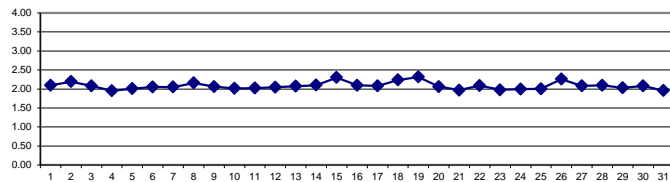
TOTAL HYDROCARBONS (THC) hourly averages in ppm

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
DAY	MIN.	MAX.	AVG.	RDGS.																									
1	S	2.23	2.25	2.19	2.18	2.56	2.20	2.19	2.11	2.05	2.05	2.03	2.03	2.00	1.98	2.01	1.99	1.99	1.96	1.96	1.96	1.99	2.07	2.10	S	1.96	2.56	2.10	24
2		2.26	2.34	2.51	2.54	2.46	2.47	2.30	2.27	2.18	2.07	2.07	2.06	2.08	2.08	2.07	2.07	2.07	2.08	2.07	2.07	2.07	2.09	S	2.17	2.06	2.54	2.19	24
3		2.22	2.17	2.16	2.21	2.18	2.32	2.31	2.24	2.26	2.28	2.16	2.03	1.96	1.93	1.98	1.93	1.93	1.97	1.93	1.92	1.89	S	1.93	1.95	1.89	2.32	2.08	24
4		1.97	1.97	1.96	1.95	1.99	1.96	1.96	1.98	1.99	1.97	1.97	1.92	1.90	1.90	1.89	1.89	1.89	1.88	1.90	1.95	S	2.08	2.05	2.02	1.88	2.08	1.95	24
5		2.00	2.48	2.53	2.17	2.03	1.99	1.95	1.93	1.92	1.92	1.94	1.93	1.93	1.95	1.97	1.93	1.87	1.88	1.91	S	1.95	1.95	2.05	1.96	1.87	2.53	2.01	24
6		2.05	2.13	2.15	2.16	2.28	2.39	2.24	2.06	1.99	1.94	1.95	1.99	1.99	1.95	1.92	1.94	1.95	1.95	S	1.96	1.97	1.99	2.17	2.11	1.92	2.39	2.05	24
7		2.18	2.22	2.21	2.21	2.21	2.16	2.23	2.14	2.17	1.96	1.95	1.95	1.94	1.93	1.93	1.93	1.93	S	1.93	1.95	1.99	1.98	1.99	2.02	1.93	2.23	2.05	24
8		2.10	2.35	2.49	2.60	2.62	2.61	2.48	2.34	2.12	2.04	2.02	1.99	1.96	1.94	1.93	1.88	S	1.96	1.96	2.04	2.05	2.01	2.05	2.09	1.88	2.62	2.16	24
9		2.08	2.12	2.09	2.19	2.27	2.29	2.27	2.11	2.08	1.94	1.96	1.94	1.88	1.94	1.95	S	1.97	1.96	1.91	1.90	2.06	2.10	2.20	2.15	1.88	2.29	2.06	24
10		2.13	2.15	2.06	2.03	2.07	2.04	2.09	2.03	2.02	1.96	1.94	1.91	X	1.88	S	1.95	X	X	1.88	1.90	1.96	1.98	2.16	2.19	1.88	2.19	2.02	21
11		2.21	2.18	2.28	2.10	2.09	2.06	2.08	2.06	1.97	1.92	1.91	1.93	1.91	S	1.90	X	X	1.89	1.92	X	1.94	X	2.04	1.99	1.89	2.28	2.02	20
12		2.09	2.15	2.16	2.21	2.16	2.06	2.00	1.99	C	C	C	C	C	2.00	2.01	1.99	1.92	1.99	1.96	2.01	1.97	2.09	2.04	S	1.92	2.21	2.04	24
13		2.31	2.31	2.29	2.27	2.36	2.24	2.25	2.06	2.00	1.95	1.93	1.95	1.94	1.94	1.95	1.93	1.94	1.94	1.94	1.99	X	2.08	S	X	1.93	2.36	2.07	22
14		2.24	2.34	2.34	2.31	2.29	2.35	S1	2.04	2.02	1.99	1.97	1.94	1.94	1.94	1.92	1.93	1.96	1.97	1.99	2.02	2.03	S	2.29	2.35	1.92	2.35	2.10	23
15		2.45	2.51	2.67	2.86	2.63	2.69	2.75	2.68	2.31	2.08	2.08	2.00	1.97	1.99	X	1.99	2.02	2.07	2.08	2.12	S	2.14	2.18	X	1.97	2.86	2.30	22
16		2.21	2.22	2.27	2.28	2.32	2.27	S1	S1	2.09	2.08	2.04	2.01	X	1.99	1.95	1.95	1.93	1.96	S	X	X	2.08	2.08	1.93	2.32	2.10	19	
17		2.23	X	2.20	2.20	2.16	2.18	2.18	2.07	2.03	2.03	2.05	2.04	1.99	1.96	1.96	1.95	1.97	S	2.01	2.05	2.07	2.23	2.22	1.95	2.23	2.08	23	
18		2.22	2.40	2.36	2.40	2.49	2.54	2.52	2.38	2.22	2.10	2.10	2.16	2.05	2.00	1.97	1.97	1.97	S	X	X	2.12	X	2.29	2.42	1.97	2.54	2.23	21
19		2.41	2.36	2.55	2.94	2.95	3.07	2.82	2.71	2.35	2.22	2.09	2.03	2.03	2.06	1.97	2.00	S	2.05	2.06	2.10	2.08	2.15	2.14	2.16	1.97	3.07	2.32	24
20		2.16	2.26	2.17	2.16	2.24	2.21	2.14	2.18	2.17	2.11	2.03	2.03	1.99	1.95	1.97	S	1.91	1.94	1.95	1.93	1.91	1.95	2.00	2.02	1.91	2.26	2.06	24
21		X	2.00	2.02	2.03	2.03	1.99	1.98	1.98	1.96	1.94	1.93	1.93	1.91	1.91	S	1.92	1.92	1.92	1.95	1.93	1.94	2.01	2.03	2.05	1.91	2.05	1.97	23
22		2.18	2.17	2.23	2.16	2.22	2.24	2.23	2.11	2.03	2.05	2.13	2.06	2.01	S	2.08	2.06	2.01	2.03	1.99	2.04	2.05	1.99	1.95	1.98	1.95	2.24	2.09	24
23		1.98	2.01	2.02	1.98	1.97	2.00	1.99	2.01	2.02	1.97	1.98	1.99	S	1.96	1.95	1.97	1.96	1.97	1.96	1.95	1.94	1.94	1.95	1.98	1.94	2.02	1.98	24
24		2.06	2.03	2.07	2.07	2.03	2.07	2.08	2.05	2.00	1.97	X	S	1.93	X	1.95	1.95	X	1.94	1.90	1.93	X	X	1.95	1.95	1.90	2.08	2.00	19
25		1.97	2.03	2.05	2.16	2.16	X	2.09	2.02	1.99	2.00	S	1.93	1.95	1.94	1.94	1.92	1.86	1.89	1.88	X	X	2.07	2.02	2.16	1.86	2.16	2.00	21
26		2.36	2.32	2.43	2.94	2.82	2.68	2.48	2.55	2.61	S	2.07	2.06	2.05	2.14	2.11	1.99	1.98	1.98	2.06	2.09	X	1.95	1.99	2.03	1.95	2.94	2.26	23
27		2.02	2.02	2.03	X	2.35	2.52	2.46	2.21	S	2.24	2.11	1.96	1.91	1.90	X	1.93	1.90	1.89	1.89	1.90	2.11	2.10	2.07	2.11	1.89	2.52	2.08	22
28		2.06	2.19	2.24	2.15	2.25	2.27	2.15	S	2.09	2.07	2.01	1.98	1.93	X	X	X	1.88	X	X	X	X	X	X	X	1.88	2.27	2.10	14
29		1.99	X	X	2.29	2.29	2.12	S	1.98	1.95	1.94	1.92	1.91	1.92	1.89	1.89	1.90	X	1.89	1.89	1.98	2.05	2.15	2.19	2.52	1.89	2.52	2.03	21
30		2.43	2.32	2.46	2.07	1.95	S	2.03	X	1.97	X	1.96	1.98	1.95	X	1.91	X	X	X	1.89	X	X	X	X	X	1.89	2.46	2.08	13
31		2.00	X	X	X	S	2.00	2.01	2.02	1.98	X	1.93	1.96	1.95	1.94	1.92	X	1.92	1.93	1.93	1.90	X	X	1.94	X	1.90	2.02	1.96	16
HOURLY MAX		2.45	2.51	2.67	2.94	2.95	3.07	2.82	2.71	2.61	2.28	2.16	2.16	2.08	2.14	2.11	2.07	2.07	2.08	2.08	2.12	2.12	2.15	2.29	2.52				
HOURLY AVG		2.16	2.21	2.25	2.27	2.27	2.29	2.22	2.16	2.09	2.03	2.01	1.99	1.97	1.96	1.96	1.96	1.94	1.96	1.95	1.98	2.01	2.04	2.08	2.11				

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

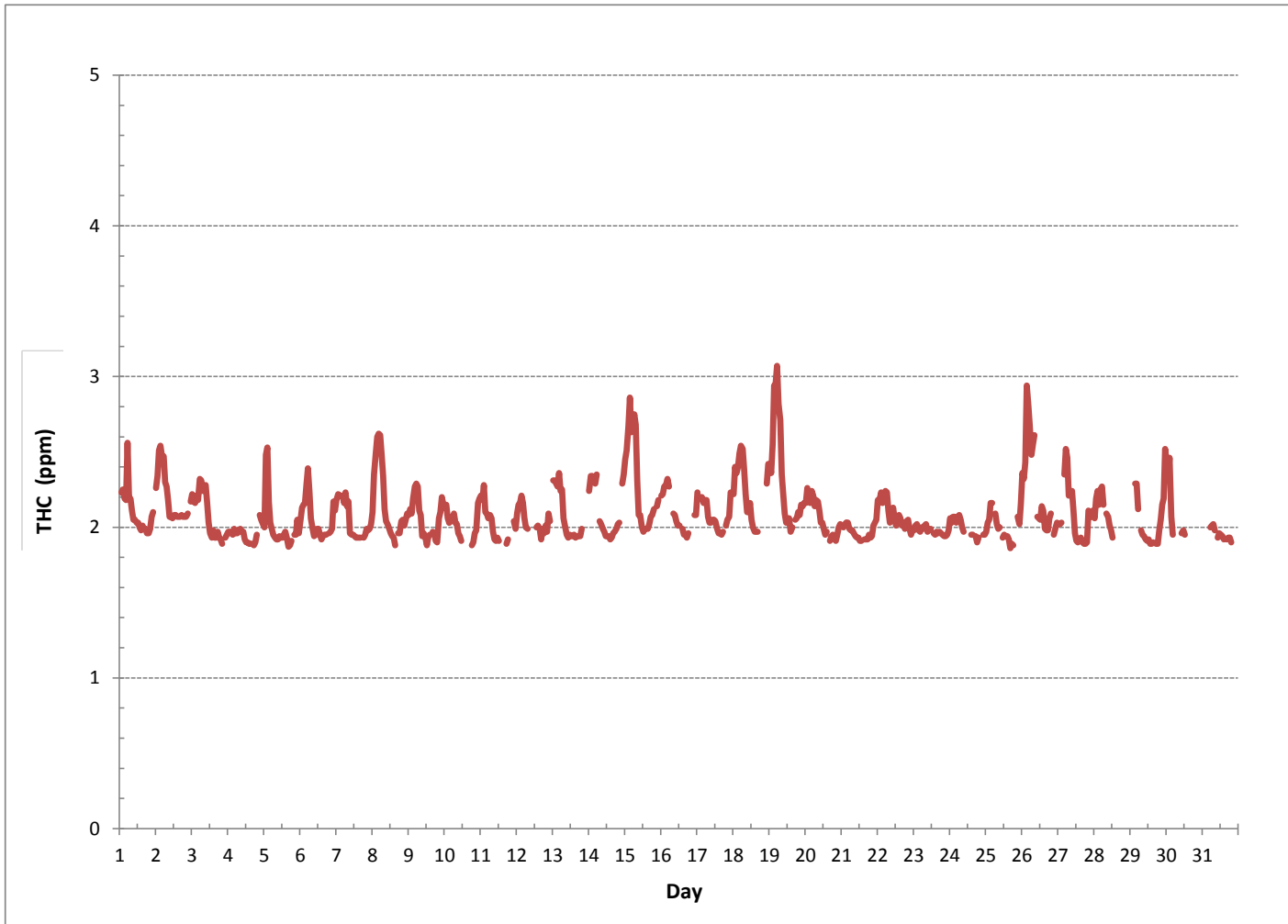
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	642			
MINIMUM 1-HR AVERAGE:	1.86	PPM @ HOUR(S)	16	ON DAY(S) 25
MAXIMUM 1-HR AVERAGE:	3.07	PPM @ HOUR(S)	5	ON DAY(S) 19
MAXIMUM 24-HR AVERAGE:	2.32	PPM		ON DAY(S) 19
				VAR-VARIOUS
IZS CALIBRATION TIME:	32	HRS	OPERATIONAL TIME:	679.00 HRS
MONTHLY CALIBRATION TIME:	5	HRS	AMD OPERATION UPTIME:	91.3 %
STANDARD DEVIATION:	0.19		MONTHLY AVERAGE:	2.08 PPM

TOTAL HYDROCARBONS (THC) hourly averages in ppm





TOTAL HYDROCARBONS MAX instantaneous maximum in ppm

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
		0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.
DAY	1	S	2.31	2.35	2.35	2.33	4.62	2.32	2.38	2.33	2.33	2.24	2.13	2.22	2.13	2.21	2.71	2.17	2.10	2.04	2.05	2.08	2.43	2.28	S	2.04	4.62	2.37	24
2	2.84	2.68	2.69	2.86	2.62	2.98	2.63	2.43	2.41	2.23	2.48	2.25	2.25	2.44	2.17	2.19	2.22	2.23	2.14	2.15	2.12	2.18	S	2.44	2.12	2.98	2.42	24	
3	2.60	2.44	2.38	2.49	2.37	2.45	2.56	2.37	2.40	2.90	2.41	2.20	2.23	1.98	2.07	1.98	2.00	2.00	1.96	1.98	1.93	S	2.00	2.06	1.93	2.90	2.25	24	
4	2.00	2.01	2.00	2.00	2.12	2.01	2.10	2.12	2.02	2.13	2.01	1.97	1.93	1.94	1.93	1.93	1.93	1.94	1.97	1.99	S	2.16	2.14	2.09	1.93	2.16	2.02	24	
5	2.18	2.76	2.69	2.28	2.07	2.10	2.02	2.06	2.06	2.02	2.06	1.97	1.97	2.09	2.61	2.52	1.92	1.92	1.96	S	2.00	2.00	2.68	2.02	1.92	2.76	2.17	24	
6	2.13	2.29	2.31	2.31	2.50	2.55	2.43	2.18	2.18	2.00	2.03	2.09	2.05	2.02	1.99	2.18	2.00	2.10	S	2.12	2.06	2.21	2.75	2.51	1.99	2.75	2.22	24	
7	2.96	2.36	2.32	2.27	2.41	2.35	2.46	2.31	2.45	2.07	2.12	2.08	2.00	1.96	1.96	1.98	1.98	S	2.00	2.01	2.05	2.09	2.05	2.14	1.96	2.96	2.19	24	
8	2.25	4.08	2.78	2.74	2.99	2.84	2.90	2.47	2.25	2.16	2.27	2.11	2.38	2.02	1.99	1.94	S	2.00	2.12	2.22	2.32	2.05	2.17	2.15	1.94	4.08	2.40	24	
9	2.24	2.19	2.22	2.33	2.41	2.49	2.67	2.15	2.18	2.13	2.08	2.16	1.92	2.15	2.15	S	2.10	2.29	1.96	2.07	2.26	2.33	2.36	2.40	1.92	2.67	2.23	24	
10	2.21	2.40	2.16	2.08	2.49	2.17	2.22	2.18	2.10	2.05	1.98	1.97	X	1.92	S	2.09	X	X	1.92	2.02	2.01	2.11	2.28	2.34	1.92	2.49	2.14	21	
11	2.38	2.22	2.44	2.20	2.24	2.12	2.17	2.15	2.02	1.95	1.95	2.00	2.11	S	1.97	X	X	1.96	2.00	X	2.00	X	2.08	2.04	1.95	2.44	2.11	20	
12	2.17	2.19	2.21	2.27	2.31	2.17	2.09	2.08	C	C	C	C	C	2.16	2.04	2.02	2.05	2.12	2.07	2.03	2.04	2.15	2.15	S	2.02	2.31	2.13	24	
13	2.40	2.46	2.42	2.40	2.41	2.37	2.34	2.13	2.09	2.00	1.97	2.02	2.00	2.02	2.02	2.06	2.01	2.08	2.04	2.11	X	2.30	S	X	1.97	2.46	2.17	22	
14	2.40	2.54	2.53	2.48	2.50	2.44	S1	S1	2.07	2.08	2.04	1.97	2.09	1.96	2.07	1.98	2.04	2.04	2.20	2.16	2.10	S	2.56	2.72	1.96	2.72	2.24	22	
15	2.58	2.88	3.04	3.07	2.81	2.95	3.07	3.01	2.49	2.43	2.23	2.08	2.09	2.07	X	2.07	2.16	2.15	2.15	2.23	S	2.21	2.25	X	2.07	3.07	2.48	22	
16	2.31	2.37	2.39	2.46	2.49	2.46	S1	S1	2.22	2.15	2.14	2.10	2.07	X	2.05	2.02	2.03	2.02	2.09	S	X	X	2.26	2.22	2.02	2.49	2.21	19	
17	2.35	X	2.39	2.34	2.28	2.32	2.29	2.20	2.15	2.11	2.11	2.10	2.12	2.31	2.03	2.04	2.03	2.06	S	2.09	2.19	2.13	2.59	2.48	2.03	2.59	2.21	23	
18	2.35	2.68	2.57	2.54	2.73	2.86	2.92	2.53	2.38	2.21	2.20	2.33	2.11	2.05	2.04	2.08	2.07	S	X	X	2.29	X	2.95	2.78	2.04	2.95	2.43	21	
19	2.63	2.73	3.16	3.25	3.48	3.34	3.06	3.57	2.58	2.39	2.24	2.40	2.08	2.44	2.05	2.07	S	2.62	2.23	2.17	2.81	2.27	2.29	2.33	2.05	3.57	2.62	24	
20	2.35	2.42	2.43	2.31	2.41	2.35	2.27	2.27	2.25	2.21	2.16	2.13	2.19	2.04	2.06	S	1.97	2.03	2.06	2.01	1.99	2.04	2.10	2.10	1.97	2.43	2.18	24	
21	X	2.15	2.20	2.28	2.12	2.08	2.06	2.12	2.06	2.02	1.99	2.00	2.02	2.10	S	2.00	1.98	2.04	2.03	1.99	2.02	2.18	2.12	2.12	1.98	2.28	2.08	23	
22	2.39	2.33	2.37	2.37	2.71	2.56	2.38	2.27	2.13	2.20	2.32	2.19	2.10	S	2.23	2.12	2.08	2.08	2.22	2.14	2.17	2.25	2.06	2.07	2.06	2.71	2.25	24	
23	2.08	2.10	2.10	2.09	2.08	2.11	2.08	2.08	2.08	2.08	2.04	2.21	S	2.00	2.05	2.06	2.01	2.01	2.00	2.00	2.02	2.04	2.17	2.11	2.00	2.21	2.07	24	
24	2.17	2.12	2.17	2.29	2.13	2.17	2.18	2.16	2.11	2.07	X	S	2.02	X	2.02	2.02	X	2.02	1.99	2.04	X	X	2.07	2.04	1.99	2.29	2.10	19	
25	2.08	2.12	2.21	2.27	2.30	X	2.17	2.12	2.22	2.08	S	2.01	2.04	2.02	2.02	2.12	1.99	2.02	2.16	X	X	2.60	2.39	2.48	1.99	2.60	2.17	21	
26	2.65	2.48	2.85	3.32	3.26	3.00	3.09	3.36	2.89	S	2.27	2.25	2.13	2.29	2.25	2.11	2.05	2.09	2.24	2.33	X	2.12	2.12	2.14	2.05	3.36	2.51	23	
27	2.10	2.12	2.17	X	3.15	2.79	3.22	2.36	S	2.32	2.27	2.08	2.03	2.00	X	2.01	2.01	2.01	2.00	2.07	2.64	2.33	2.23	2.32	2.00	3.22	2.30	22	
28	2.25	2.53	2.45	2.41	2.39	2.40	2.33	S	2.29	2.24	2.12	2.25	2.07	X	X	X	1.99	X	X	X	X	X	X	X	1.99	2.53	2.29	14	
29	2.43	X	X	2.61	2.44	2.23	S	2.06	2.06	2.05	2.04	2.02	2.00	1.96	2.03	2.06	X	2.07	2.02	2.23	2.25	2.47	2.52	2.79	1.96	2.79	2.22	21	
30	2.85	3.21	3.26	2.35	2.03	S	2.25	X	2.07	X	2.06	2.11	2.06	X	2.11	X	X	2.07	X	2.07	X	X	X	X	X	2.03	3.26	2.37	13
31	2.14	X	X	X	S	2.20	2.10	2.07	2.04	X	2.04	2.02	2.02	2.00	2.02	X	2.02	X	2.03	2.02	X	X	2.07	X	2.00	2.20	2.05	16	
HOURLY MAX	2.96	4.08	3.26	3.32	3.48	4.62	3.22	3.57	2.89	2.90	2.48	2.40	2.38	2.44	2.61	2.71	2.22	2.62	2.24	2.33	2.81	2.60	2.95	2.79					
HOURLY AVG	2.36	2.47	2.46	2.45	2.49	2.53	2.44	2.34	2.23	2.17	2.14	2.11	2.08	2.08	2.08	2.09	2.03	2.08	2.06	2.09	2.16	2.21	2.28	2.29					

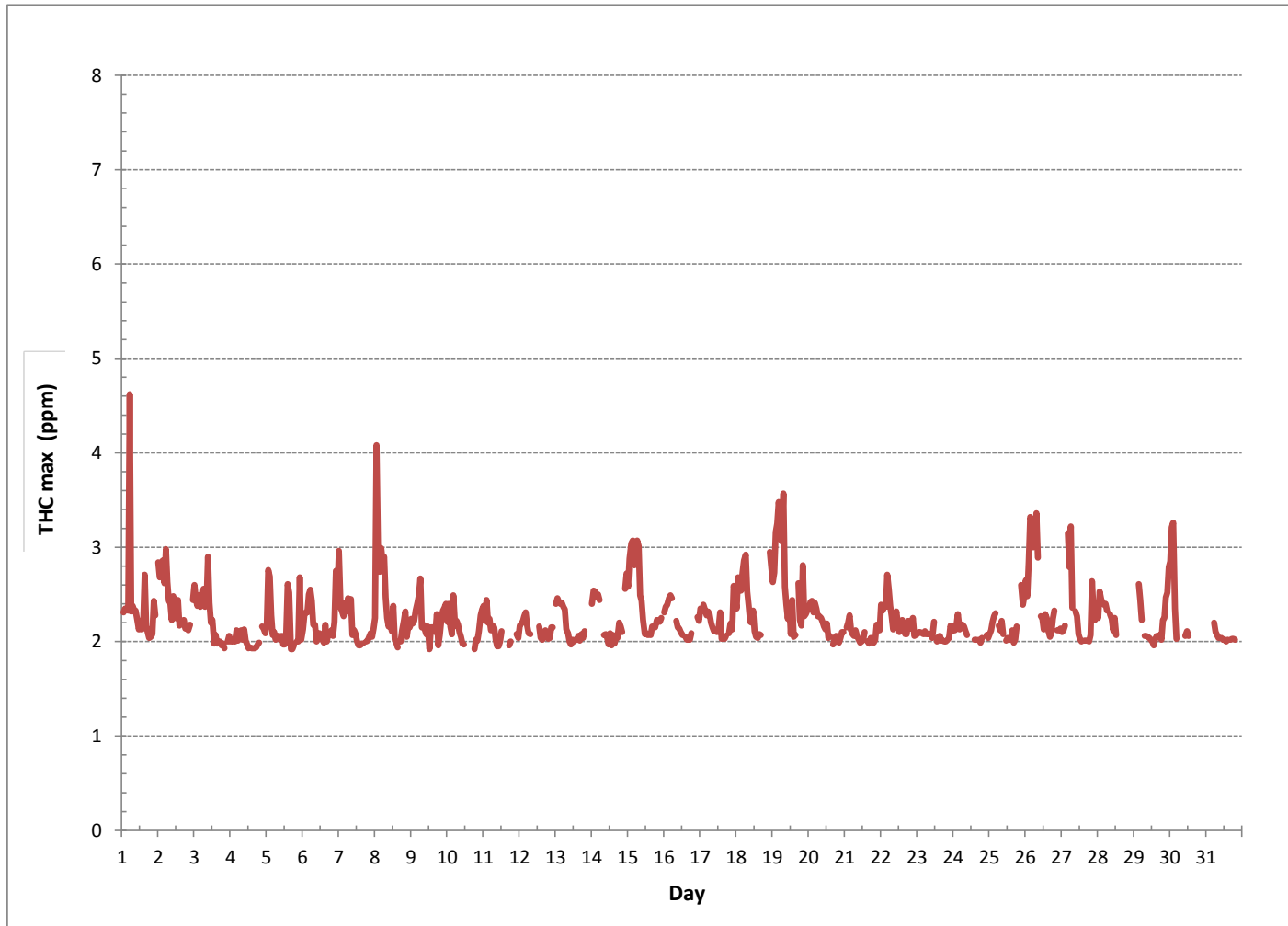
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

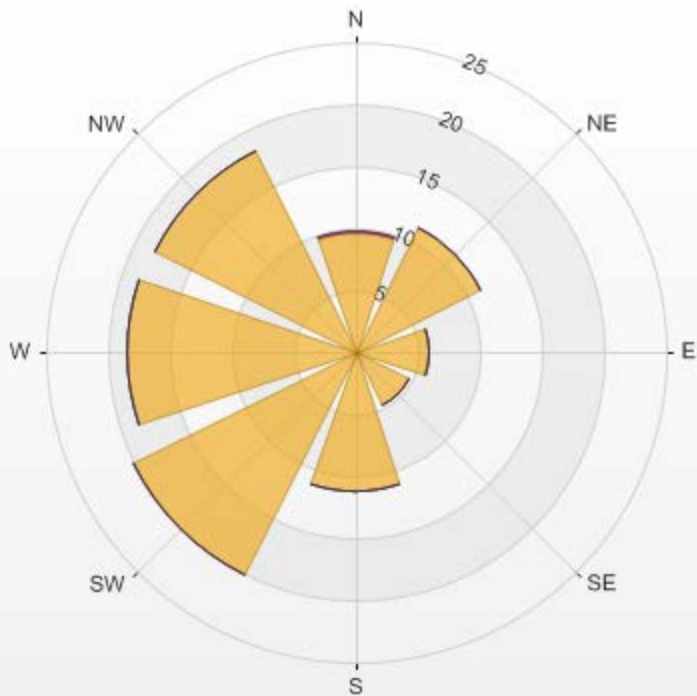
NUMBER OF NON-ZERO READINGS:	641				
MAXIMUM INSTANTANEOUS VALUE:	4.62	PPM	@ HOUR(S)	5	ON DAY(S) 1
				VAR-VARIOUS	
IZS CALIBRATION TIME:	32	HRS	OPERATIONAL TIME:	678.00	HRS
MONTHLY CALIBRATION TIME:	5	HRS			
STANDARD DEVIATION:	0.30				

TOTAL HYDROCARBONS MAX instantaneous maximum in ppm

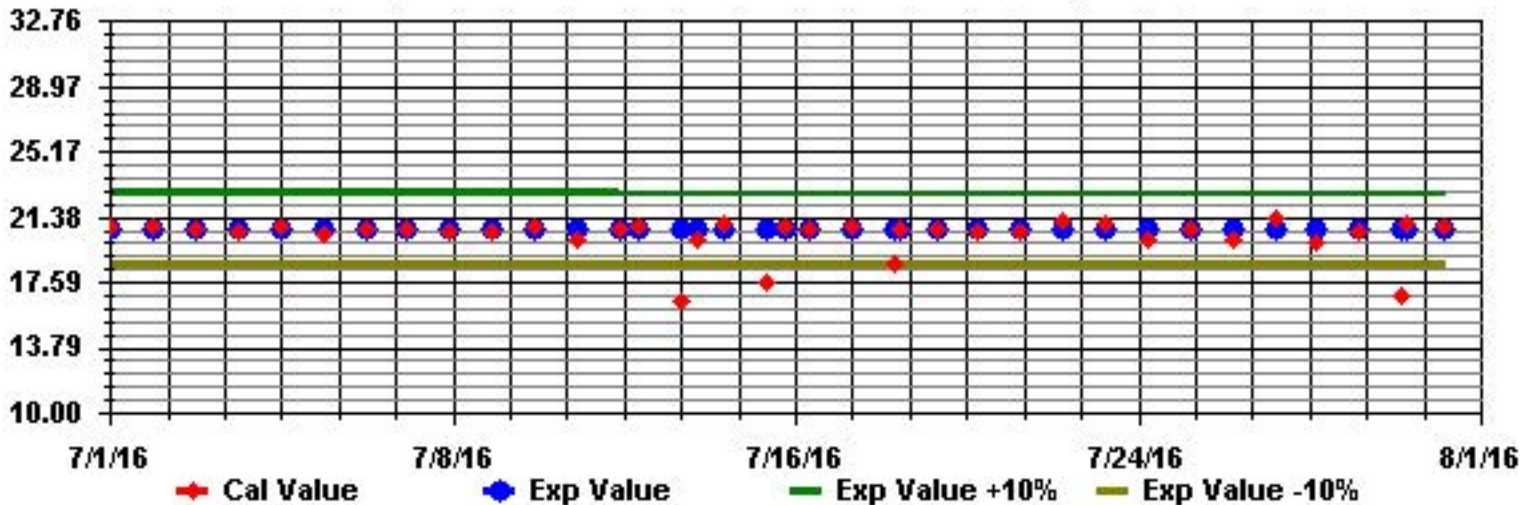


Wind: LICA Bonnyville Monitor: THC55 [ppm] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 86.29% Calm Avg: 0.00

Direction	0.0-3.0	3.0-10.0	10.0-50.0	>50.0	Total
N	9.66	0.16	0	0	9.82
NE	11.21	0	0	0	11.21
E	5.92	0	0	0	5.92
SE	4.83	0	0	0	4.83
S	11.37	0	0	0	11.37
SW	20.09	0	0	0	20.09
W	18.54	0	0	0	18.54
NW	18.22	0	0	0	18.22
Summary	100	0.16	0	0	100



Calibration Graph for Site: BONNYVIL Parameter: THC55 Sequence: THC55 Phase: SPAN



METHANE

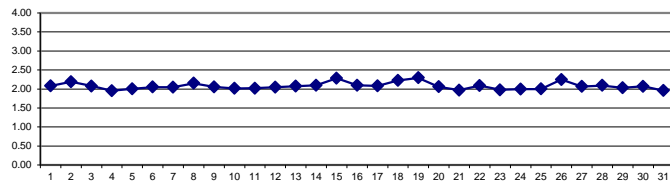
METHANE (CH4) hourly averages in ppm

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
DAY	MIN.	MAX.	AVG.	RDGS.																									
1	S	2.23	2.25	2.19	2.18	2.21	2.20	2.18	2.11	2.05	2.04	2.03	2.03	2.00	1.97	2.00	1.99	1.99	1.96	1.96	1.96	1.99	2.06	2.10	S	1.96	2.25	2.08	24
2		2.25	2.33	2.47	2.49	2.45	2.46	2.30	2.27	2.17	2.07	2.06	2.06	2.07	2.08	2.07	2.07	2.07	2.08	2.07	2.07	2.07	2.09	S	2.17	2.06	2.49	2.19	24
3		2.22	2.17	2.16	2.21	2.18	2.32	2.31	2.24	2.25	2.20	2.14	2.03	1.96	1.93	1.98	1.93	1.93	1.97	1.93	1.92	1.89	S	1.93	1.95	1.89	2.32	2.08	24
4		1.97	1.97	1.96	1.95	1.99	1.96	1.96	1.97	1.99	1.96	1.97	1.92	1.90	1.90	1.89	1.89	1.89	1.88	1.90	1.95	S	2.08	2.05	2.02	1.88	2.08	1.95	24
5		2.00	2.47	2.52	2.17	2.03	1.99	1.95	1.92	1.92	1.92	1.94	1.93	1.93	1.95	1.93	1.89	1.87	1.88	1.91	S	1.95	1.95	2.04	1.96	1.87	2.52	2.00	24
6		2.05	2.13	2.15	2.16	2.27	2.36	2.23	2.04	1.98	1.94	1.95	1.99	1.99	1.95	1.92	1.93	1.95	1.95	S	1.96	1.97	1.99	2.15	2.10	1.92	2.36	2.05	24
7		2.17	2.22	2.21	2.21	2.14	2.22	2.14	2.17	1.96	1.95	1.95	1.94	1.93	1.93	1.93	1.93	S	1.93	1.95	1.99	1.98	1.99	2.02	1.93	2.22	2.05	24	
8		2.10	2.33	2.47	2.58	2.59	2.57	2.47	2.34	2.12	2.04	2.02	1.99	1.95	1.94	1.93	1.88	S	1.96	1.96	2.04	2.05	2.01	2.05	2.09	1.88	2.59	2.15	24
9		2.08	2.12	2.09	2.19	2.26	2.28	2.22	2.11	2.08	1.93	1.96	1.94	1.88	1.93	1.95	S	1.97	1.94	1.91	1.90	2.06	2.09	2.20	2.14	1.88	2.28	2.05	24
10		2.13	2.14	2.06	2.03	2.07	2.04	2.09	2.03	2.02	1.96	1.94	1.91	X	1.88	S	1.95	X	X	1.88	1.90	1.96	1.98	2.16	2.18	1.88	2.18	2.02	21
11		2.21	2.18	2.27	2.10	2.09	2.06	2.08	2.06	1.97	1.92	1.91	1.93	1.90	S	1.90	X	X	1.89	1.92	X	1.94	X	2.04	1.99	1.89	2.27	2.02	20
12		2.09	2.15	2.16	2.21	2.16	2.06	2.00	1.99	C	C	C	C	C	2.00	2.01	1.99	1.92	1.99	1.96	2.01	1.97	2.09	2.04	S	1.92	2.21	2.04	24
13		2.31	2.31	2.27	2.27	2.36	2.24	2.25	2.06	2.00	1.95	1.93	1.95	1.94	1.94	1.95	1.93	1.94	1.94	1.94	1.99	X	2.08	S	X	1.93	2.36	2.07	22
14		2.23	2.33	2.34	2.30	2.28	2.35	S1	2.04	2.02	1.99	1.97	1.94	1.94	1.94	1.92	1.93	1.96	1.97	1.99	2.02	2.03	S	2.26	2.34	1.92	2.35	2.10	23
15		2.43	2.45	2.65	2.80	2.63	2.61	2.67	2.59	2.31	2.07	2.08	2.00	1.97	1.99	X	1.99	2.02	2.07	2.08	2.12	S	2.14	2.18	X	1.97	2.80	2.28	22
16		2.21	2.22	2.27	2.28	2.32	2.27	S1	S1	2.09	2.08	2.04	2.01	2.01	X	1.99	1.95	1.95	1.93	1.96	S	X	X	2.08	2.07	1.93	2.32	2.10	19
17		2.23	X	2.19	2.19	2.16	2.18	2.18	2.07	2.03	2.03	2.05	2.05	2.03	1.99	1.96	1.96	1.95	1.97	S	2.01	2.05	2.07	2.21	2.21	1.95	2.23	2.08	23
18		2.22	2.35	2.35	2.40	2.48	2.53	2.51	2.38	2.22	2.10	2.10	2.16	2.05	2.00	1.97	1.97	1.97	S	X	X	2.11	X	2.25	2.39	1.97	2.53	2.23	21
19		2.39	2.34	2.52	2.90	2.88	3.01	2.79	2.52	2.32	2.21	2.08	2.01	2.03	2.06	1.97	2.00	S	2.04	2.05	2.10	2.06	2.14	2.14	2.16	1.97	3.01	2.29	24
20		2.15	2.25	2.17	2.15	2.24	2.21	2.14	2.16	2.17	2.11	2.03	2.03	1.99	1.95	1.97	S	1.91	1.94	1.95	1.93	1.91	1.95	2.00	2.02	1.91	2.25	2.06	24
21		X	2.00	2.02	2.02	2.03	1.99	1.98	1.98	1.96	1.94	1.93	1.93	1.91	1.91	S	1.92	1.92	1.92	1.95	1.93	1.94	2.01	2.03	2.05	1.91	2.05	1.97	23
22		2.18	2.17	2.22	2.15	2.21	2.22	2.23	2.11	2.03	2.05	2.13	2.06	2.01	S	2.08	2.06	2.01	2.03	1.99	2.04	2.05	1.99	1.95	1.98	1.95	2.23	2.08	24
23		1.98	2.01	2.02	1.98	1.97	2.00	1.99	2.01	2.02	1.97	1.98	1.98	S	1.96	1.95	1.96	1.96	1.97	1.96	1.95	1.94	1.94	1.95	1.98	1.94	2.02	1.98	24
24		2.06	2.03	2.07	2.07	2.03	2.07	2.08	2.05	2.00	1.97	X	S	1.93	X	1.95	1.95	X	1.94	1.90	1.93	X	X	1.95	1.95	1.90	2.08	2.00	19
25		1.97	2.03	2.05	2.16	2.16	X	2.09	2.02	1.98	2.00	S	1.93	1.95	1.94	1.94	1.92	1.86	1.89	1.87	X	X	2.07	2.02	2.14	1.86	2.16	2.00	21
26		2.29	2.32	2.43	2.89	2.80	2.66	2.44	2.52	2.57	S	2.07	2.06	2.05	2.14	2.10	1.99	1.97	1.98	2.06	2.08	X	1.95	1.99	2.03	1.95	2.89	2.25	23
27		2.02	2.02	2.03	X	2.31	2.41	2.40	2.21	S	2.24	2.10	1.96	1.91	1.90	X	1.93	1.90	1.89	1.89	1.90	2.10	2.09	2.07	2.10	1.89	2.41	2.07	22
28		2.06	2.16	2.20	2.14	2.25	2.27	2.15	S	2.08	2.07	2.01	1.98	1.93	X	X	X	1.88	X	X	X	X	X	X	X	1.88	2.27	2.09	14
29		1.98	X	X	2.29	2.29	2.12	S	1.98	1.95	1.94	1.92	1.91	1.92	1.89	1.89	1.90	X	1.89	1.89	1.98	2.04	2.12	2.18	2.45	1.89	2.45	2.03	21
30		2.37	2.31	2.43	2.07	1.95	S	2.02	X	1.97	X	1.96	1.98	1.95	X	1.91	X	X	X	1.89	X	X	X	X	X	1.89	2.43	2.07	13
31		2.00	X	X	X	S	2.00	2.01	2.02	1.98	X	1.93	1.96	1.95	1.94	1.92	X	1.92	1.93	1.93	1.90	X	X	1.94	X	1.90	2.02	1.96	16
HOURLY MAX		2.43	2.47	2.65	2.90	2.88	3.01	2.79	2.59	2.57	2.24	2.14	2.16	2.07	2.14	2.10	2.07	2.07	2.08	2.08	2.12	2.11	2.14	2.26	2.45				
HOURLY AVG		2.15	2.21	2.24	2.26	2.26	2.26	2.21	2.14	2.09	2.02	2.01	1.99	1.97	1.96	1.96	1.95	1.94	1.96	1.95	1.98	2.00	2.04	2.07	2.10				

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

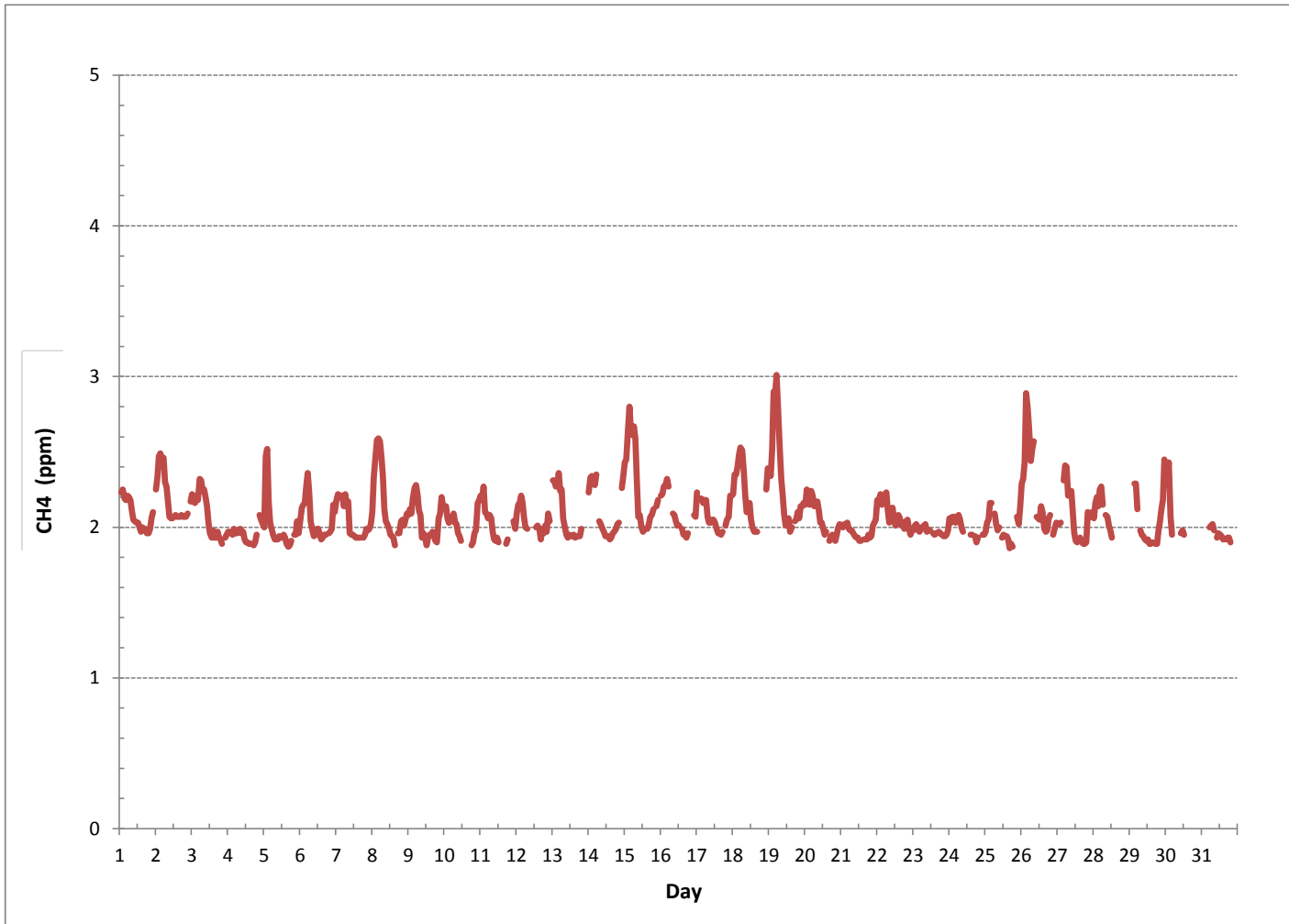
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	642			
MINIMUM 1-HR AVERAGE:	1.86	PPM @ HOUR(S)	16	ON DAY(S) 25
MAXIMUM 1-HR AVERAGE:	3.01	PPM @ HOUR(S)	5	ON DAY(S) 19
MAXIMUM 24-HR AVERAGE:	2.29	PPM		ON DAY(S) 19
				VAR-VARIOUS
IZS CALIBRATION TIME:	32	HRS	OPERATIONAL TIME:	679.00 HRS
MONTHLY CALIBRATION TIME:	5	HRS	AMD OPERATION UPTIME:	91.3 %
STANDARD DEVIATION:	0.18		MONTHLY AVERAGE:	2.08 PPM

METHANE (CH₄) hourly averages in ppm





METHANE MAX instantaneous maximum in ppm

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
DAY	MIN.	MAX.	AVG.	RDGS.																									
1	S	2.31	2.33	2.27	2.33	2.27	2.30	2.37	2.32	2.32	2.15	2.14	2.22	2.09	2.03	2.16	2.11	2.07	2.04	2.06	2.08	2.32	2.28	S	2.03	2.37	2.21	24	
2		2.74	2.59	2.54	2.86	2.60	2.90	2.57	2.40	2.28	2.24	2.15	2.26	2.26	2.44	2.17	2.16	2.22	2.16	2.15	2.15	2.13	2.18	S	2.44	2.13	2.90	2.37	24
3		2.50	2.38	2.37	2.47	2.36	2.41	2.56	2.37	2.40	2.38	2.31	2.19	2.13	1.98	2.07	1.98	2.00	2.00	1.97	1.97	1.93	S	1.98	2.00	1.93	2.56	2.20	24
4		2.01	2.01	1.99	2.01	2.03	2.02	2.01	2.05	2.03	2.02	2.01	1.97	1.93	1.94	1.93	1.93	1.93	1.94	1.97	1.98	S	2.17	2.14	2.10	1.93	2.17	2.01	24
5		2.18	2.66	2.69	2.29	2.07	2.09	2.03	1.96	1.98	1.97	2.00	1.97	1.98	1.99	1.96	1.95	1.93	1.92	1.96	S	2.00	2.00	2.54	2.03	1.92	2.69	2.09	24
6		2.13	2.22	2.26	2.23	2.39	2.45	2.38	2.12	2.06	1.99	2.02	2.10	2.04	2.02	1.99	1.97	2.00	2.11	S	2.01	2.02	2.14	2.64	2.40	1.97	2.64	2.16	24
7		2.87	2.34	2.31	2.28	2.28	2.21	2.35	2.31	2.44	2.07	2.12	2.09	2.00	1.96	1.96	1.98	1.98	S	2.00	2.01	2.05	2.10	2.05	2.14	1.96	2.87	2.17	24
8		2.21	3.82	2.74	2.69	2.87	2.74	2.89	2.46	2.22	2.16	2.28	2.12	2.30	2.01	1.99	1.94	S	2.01	2.03	2.09	2.23	2.05	2.11	2.15	1.94	3.82	2.35	24
9		2.17	2.19	2.15	2.27	2.35	2.36	2.31	2.15	2.18	2.00	2.09	2.00	1.92	2.09	2.16	S	2.11	2.15	1.97	2.08	2.25	2.25	2.35	2.25	1.92	2.36	2.17	24
10		2.21	2.24	2.16	2.10	2.50	2.17	2.22	2.18	2.11	2.04	1.98	1.98	X	1.92	S	2.10	X	X	1.92	1.95	2.01	2.08	2.28	2.24	1.92	2.50	2.12	21
11		2.36	2.22	2.36	2.20	2.17	2.14	2.13	2.15	2.02	1.95	1.95	2.00	1.98	S	1.97	X	X	1.95	1.99	X	1.99	X	2.08	2.05	1.95	2.36	2.09	20
12		2.17	2.19	2.21	2.28	2.23	2.17	2.08	2.10	C	C	C	C	C	2.03	2.04	2.03	2.05	2.04	2.05	2.15	2.15	S	2.03	2.08	2.12	2.12	2.12	24
13		2.40	2.37	2.37	2.37	2.41	2.37	2.35	2.14	2.10	2.01	1.98	2.02	2.00	2.03	2.03	2.07	2.01	2.09	2.05	2.12	X	2.31	S	X	1.98	2.41	2.17	22
14		2.39	2.54	2.53	2.49	2.48	2.44	S1	S1	2.09	2.09	2.05	1.98	1.96	1.97	2.02	1.97	2.05	2.05	2.20	2.16	2.11	S	2.57	2.72	1.96	2.72	2.23	22
15		2.58	2.72	3.03	2.98	2.81	2.67	2.75	2.82	2.49	2.19	2.24	2.06	2.09	2.07	X	2.07	2.16	2.15	2.15	2.23	S	2.21	2.25	X	2.06	3.03	2.42	22
16		2.31	2.37	2.39	2.45	2.50	2.45	S1	S1	2.23	2.15	2.15	2.11	2.08	X	2.05	2.01	2.02	1.98	2.01	S	X	X	2.26	2.17	1.98	2.50	2.21	19
17		2.36	X	2.27	2.28	2.25	2.29	2.30	2.20	2.15	2.12	2.12	2.11	2.11	2.13	2.03	2.04	2.03	2.06	S	2.10	2.19	2.14	2.45	2.41	2.03	2.45	2.19	23
18		2.36	2.50	2.47	2.54	2.60	2.75	2.82	2.51	2.38	2.21	2.20	2.25	2.12	2.05	2.05	2.09	2.07	S	X	X	2.27	X	2.80	2.70	2.05	2.82	2.39	21
19		2.56	2.62	3.10	3.11	3.19	3.25	3.01	2.98	2.49	2.33	2.20	2.17	2.09	2.44	2.05	2.08	S	2.14	2.14	2.17	2.15	2.22	2.29	2.35	2.05	3.25	2.48	24
20		2.35	2.42	2.42	2.30	2.41	2.35	2.28	2.28	2.26	2.21	2.11	2.15	2.11	2.04	2.05	S	1.98	2.03	2.05	2.01	1.99	2.05	2.08	2.12	1.98	2.42	2.18	24
21		X	2.11	2.12	2.08	2.12	2.08	2.07	2.09	2.05	2.02	1.99	2.01	2.01	1.96	S	2.00	1.98	2.03	2.02	1.98	2.03	2.18	2.13	2.13	1.96	2.18	2.05	23
22		2.35	2.29	2.32	2.37	2.63	2.44	2.38	2.28	2.15	2.20	2.25	2.19	2.11	S	2.23	2.13	2.09	2.09	2.08	2.15	2.17	2.25	2.06	2.07	2.06	2.63	2.23	24
23		2.09	2.11	2.11	2.10	2.09	2.12	2.08	2.08	2.08	2.08	2.03	2.02	S	1.99	2.00	2.00	2.01	2.02	2.01	2.00	2.03	2.04	2.07	2.12	1.99	2.12	2.06	24
24		2.17	2.12	2.17	2.19	2.13	2.17	2.18	2.16	2.13	2.08	X	S	2.02	X	2.03	2.02	X	2.02	1.99	2.05	X	X	2.07	2.05	1.99	2.19	2.10	19
25		2.09	2.12	2.20	2.27	2.30	X	2.18	2.14	2.05	2.09	S	2.01	2.04	2.03	2.02	2.02	1.98	2.02	2.00	X	X	2.47	2.28	2.48	1.98	2.48	2.14	21
26		2.47	2.48	2.85	3.29	3.26	2.93	2.94	3.19	2.78	S	2.28	2.25	2.15	2.30	2.26	2.12	2.06	2.10	2.20	2.25	X	2.13	2.13	2.15	2.06	3.29	2.48	23
27		2.11	2.13	2.18	X	3.06	2.61	2.97	2.36	S	2.32	2.28	2.09	2.04	2.00	X	2.02	2.02	2.01	2.00	2.01	2.54	2.34	2.24	2.28	2.00	3.06	2.27	22
28		2.21	2.45	2.41	2.37	2.39	2.39	2.33	S	2.27	2.19	2.13	2.10	2.07	X	X	X	1.99	X	X	X	X	X	X	X	1.99	2.45	2.25	14
29		2.32	X	X	2.46	2.43	2.24	S	2.06	2.06	2.05	2.05	2.02	2.01	1.97	2.04	2.07	X	2.03	2.02	2.15	2.23	2.37	2.51	2.71	1.97	2.71	2.19	21
30		2.72	3.11	3.18	2.34	2.04	S	2.26	X	2.07	X	2.06	2.13	2.06	X	2.12	X	X	X	2.01	X	X	X	X	X	2.01	3.18	2.34	13
31		2.14	X	X	X	S	2.07	2.11	2.07	2.04	X	2.04	2.03	2.02	2.00	2.02	X	2.03	2.03	2.03	2.01	X	X	2.07	X	2.00	2.14	2.05	16
HOURLY MAX		2.87	3.82	3.18	3.29	3.26	3.25	3.01	3.19	2.78	2.38	2.31	2.26	2.30	2.44	2.26	2.16	2.22	2.16	2.20	2.25	2.54	2.47	2.80	2.72				
HOURLY AVG		2.33	2.42	2.42	2.41	2.44	2.40	2.39	2.30	2.20	2.13	2.12	2.09	2.07	2.06	2.05	2.04	2.03	2.05	2.04	2.07	2.12	2.19	2.25	2.26				

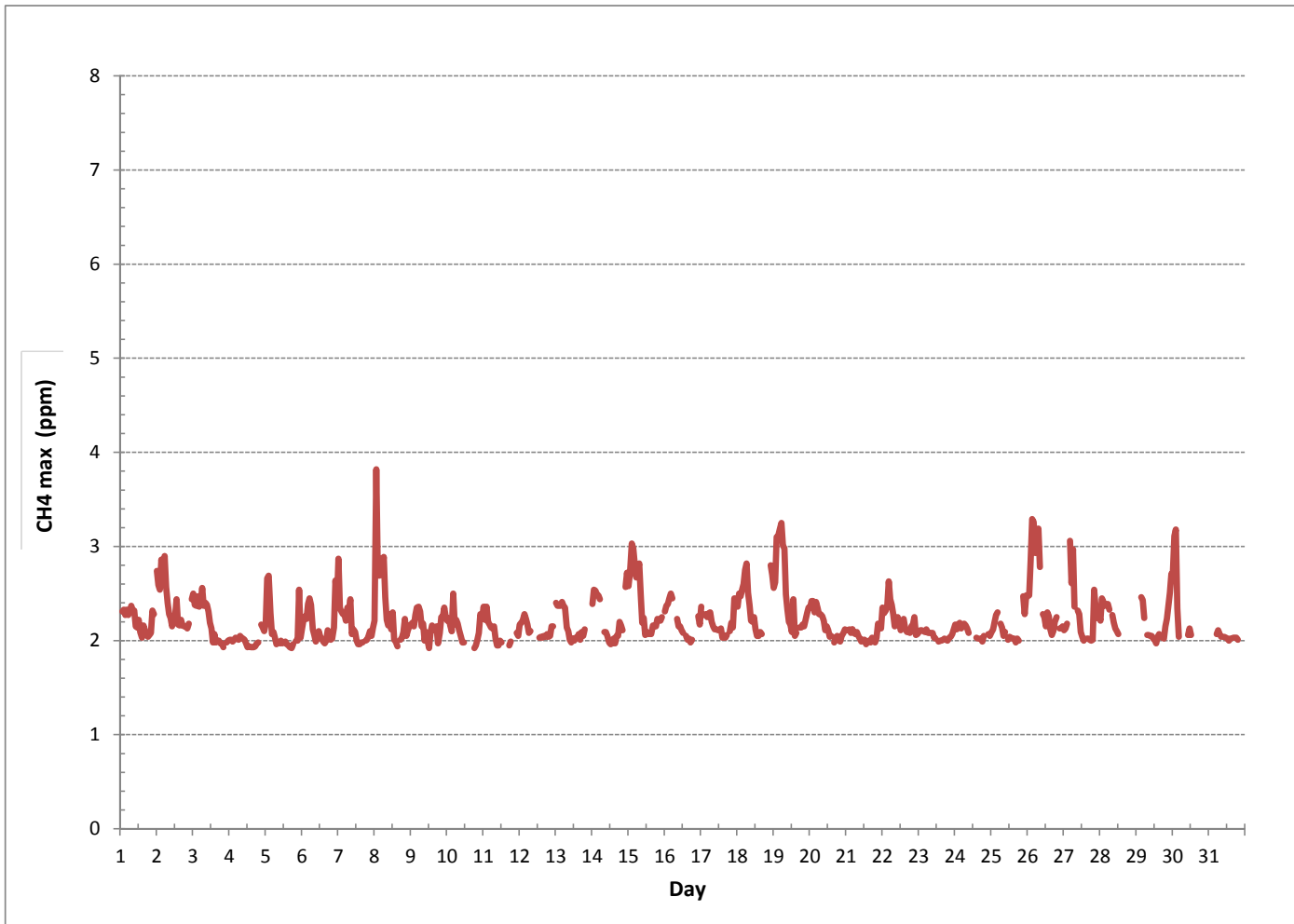
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

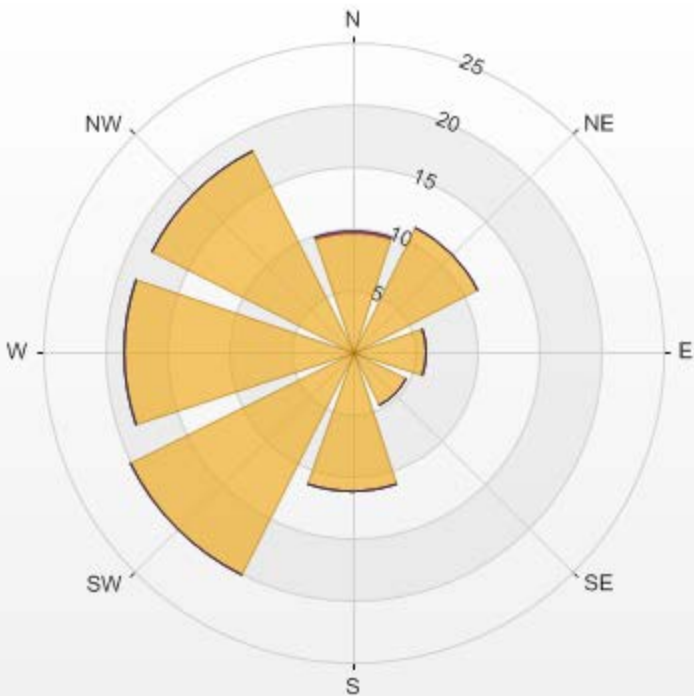
NUMBER OF NON-ZERO READINGS:	641
MAXIMUM INSTANTANEOUS VALUE:	3.82 PPM @ HOUR(S) 1 ON DAY(S) 8
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	5 HRS
STANDARD DEVIATION:	0.25
OPERATIONAL TIME:	678.00 HRS

METHANE MAX instantaneous maximum in ppm

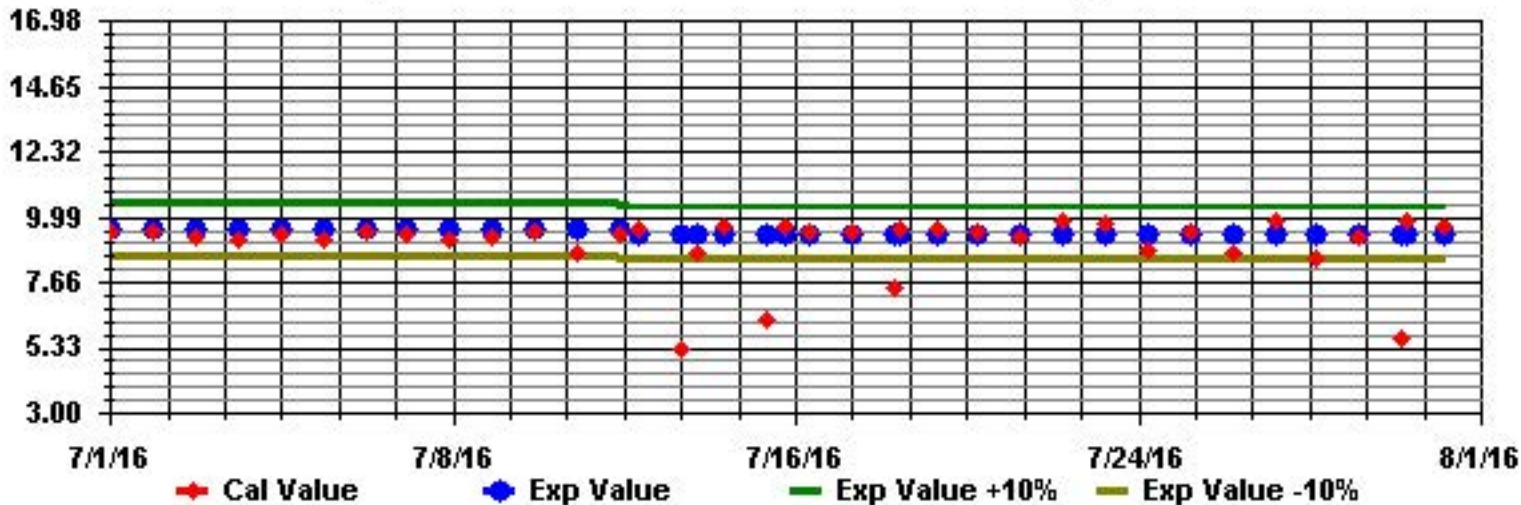


Wind: LICA Bonnyville Monitor: CH4 [ppm] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 86.29% Calm Avg: 0.00

Direction	0.0-3.0	3.0-10.0	10.0-50.0	>50.0	Total
N	9.66	0.16	0	0	9.82
NE	11.21	0	0	0	11.21
E	5.92	0	0	0	5.92
SE	4.83	0	0	0	4.83
S	11.37	0	0	0	11.37
SW	20.09	0	0	0	20.09
W	18.54	0	0	0	18.54
NW	18.22	0	0	0	18.22
Summary	100	0.16	0	0	100



Calibration Graph for Site: BONNYVIL Parameter: METHANE Sequence: THC55 Phase: SPAN



NON-METHANE HYDROCARBON

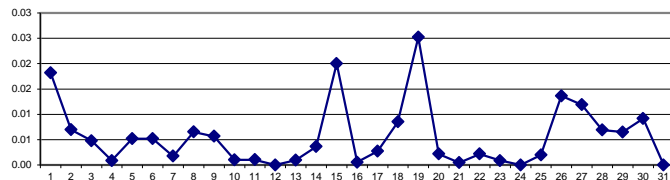
NON-METHANE HYDROCARBONS (NMHC) hourly averages in ppm

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.		
DAY	HR	END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
1	S		0.00	0.00	0.00	0.00	0.35	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	S	0.00	0.35	0.02	24		
2			0.01	0.01	0.04	0.05	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.05	0.01	24	
3			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.08	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.08	0.00	24	
4			0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.01	0.00	0.00	24	
5			0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.00	S	0.00	0.00	0.01	0.00	0.00	0.04	0.01	0.00	24	
6			0.00	0.00	0.00	0.00	0.01	0.03	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	S	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.03	0.01	0.00	24	
7			0.01	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	24	
8			0.00	0.02	0.02	0.02	0.03	0.04	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.00	24	
9			0.00	0.00	0.00	0.00	0.01	0.01	0.05	0.00	0.00	0.01	0.00	0.00	0.01	0.00	S	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.05	0.01	0.00	24	
10			0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	X	0.00	S	0.00	X	X	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	21	
11			0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	S	0.00	X	X	0.00	0.00	X	0.00	X	0.00	0.00	0.01	0.00	0.00	0.00	20	
12			0.00	0.00	0.00	0.00	0.00	0.00	0.00	C	C	C	C	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	24
13			0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	X	0.00	S	X	0.00	0.02	0.00	22	
14			0.01	0.01	0.00	0.01	0.01	0.00	S1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.03	0.01	0.00	0.03	0.00	0.00	23	
15			0.02	0.06	0.02	0.06	0.00	0.08	0.08	0.09	0.00	0.01	0.00	0.00	0.00	X	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	X	0.00	0.09	0.02	22	
16			0.00	0.00	0.00	0.00	0.00	S1	S1	0.00	0.00	0.00	0.00	0.00	0.00	X	0.00	0.00	0.00	0.00	0.00	S	X	X	0.00	0.01	0.00	0.01	0.00	19	
17			0.00	X	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.02	0.00	0.00	23	
18			0.00	0.05	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	X	X	0.01	X	0.04	0.03	0.00	0.05	0.01	0.00	21	
19			0.02	0.02	0.03	0.04	0.07	0.06	0.03	0.19	0.03	0.01	0.01	0.02	0.00	0.00	0.00	S	0.01	0.01	0.00	0.02	0.01	0.00	0.00	0.00	0.19	0.03	0.00	24	
20			0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	24	
21			X	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	23	
22			0.00	0.00	0.01	0.01	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	24	
23			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	S	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	24	
24			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	X	S	0.00	X	0.00	0.00	X	0.00	0.00	0.00	0.00	X	X	0.00	0.00	0.00	0.00	0.00	19	
25			0.00	0.00	0.00	0.00	X	0.00	0.00	0.01	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	X	X	0.00	0.00	0.02	0.00	0.02	0.00	0.00	21	
26			0.07	0.00	0.00	0.05	0.02	0.02	0.04	0.03	0.04	S	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.01	X	0.00	0.00	0.00	0.00	0.07	0.01	0.00	23	
27			0.00	0.00	0.00	X	0.04	0.11	0.06	0.00	S	0.00	0.01	0.00	0.00	0.00	X	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.11	0.01	0.00	22	
28			0.00	0.03	0.04	0.01	0.00	0.00	0.00	S	0.01	0.00	0.00	0.00	0.00	X	X	X	0.00	X	X	X	X	X	X	X	0.00	0.04	0.01	14	
29			0.01	X	X	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	X	0.00	0.00	0.01	0.03	0.01	0.07	0.00	0.07	0.01	0.00	21	
30			0.06	0.01	0.03	0.00	0.00	S	0.01	X	0.00	X	0.00	0.00	0.00	X	X	X	X	0.00	X	X	X	X	X	X	0.00	0.06	0.01	13	
31			0.00	X	X	X	S	0.00	0.00	0.00	X	0.00	0.00	0.00	0.00	X	0.00	0.00	0.00	0.00	0.00	X	X	X	X	0.00	0.00	0.00	0.00	16	
HOURLY MAX			0.07	0.06	0.04	0.06	0.07	0.35	0.08	0.19	0.04	0.08	0.02	0.02	0.01	0.01	0.04	0.04	0.01	0.02	0.01	0.01	0.02	0.03	0.04	0.07					
HOURLY AVG			0.01	0.01	0.01	0.01	0.01	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

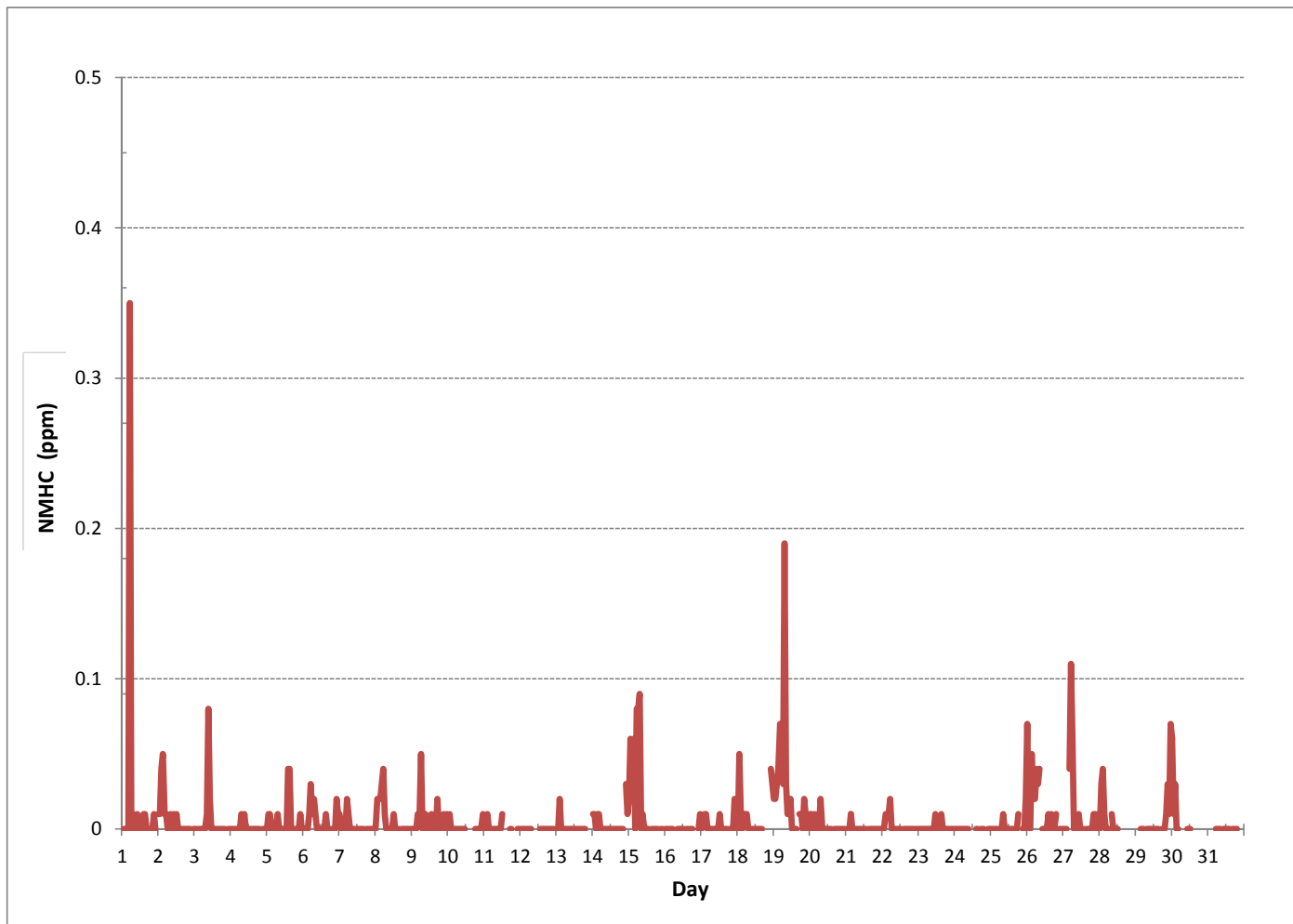
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	145				
MINIMUM 1-HR AVERAGE:	0.00	PPM @ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	0.35	PPM @ HOUR(S)	5	ON DAY(S)	1
MAXIMUM 24-HR AVERAGE:	0.03	PPM		ON DAY(S)	19
				VAR-VARIOUS	
IZS CALIBRATION TIME:	32	HRS	OPERATIONAL TIME:	679.00	HRS
MONTHLY CALIBRATION TIME:	5	HRS	AMD OPERATION UPTIME:	91.3	%
STANDARD DEVIATION:	0.02		MONTHLY AVERAGE:	0.01	PPM

NON-METHANE HYDROCARBONS (NMHC) hourly averages in ppm





NON-METHANE HYDROCARBONS MAX instantaneous maximum in ppm

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
DAY	MIN.	MAX.	AVG.	RDGS.																										
1	S	0.06	0.11	0.11	0.00	2.41	0.08	0.14	0.18	0.00	0.12	0.00	0.00	0.16	0.24	0.68	0.14	0.14	0.00	0.00	0.00	0.12	0.09	S	0.00	2.41	0.22	24		
2		0.14	0.12	0.19	0.16	0.12	0.14	0.13	0.12	0.21	0.12	0.37	0.00	0.10	0.00	0.00	0.13	0.00	0.15	0.00	0.00	0.00	0.05	S	0.13	0.00	0.37	0.10	24	
3		0.12	0.08	0.00	0.09	0.00	0.10	0.00	0.01	0.14	0.93	0.20	0.10	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.07	0.12	0.00	0.93	0.09	24	
4		0.00	0.00	0.00	0.00	0.16	0.00	0.14	0.15	0.00	0.13	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	S	0.03	0.00	0.04	0.00	0.16	0.03	24	
5		0.00	0.10	0.12	0.00	0.00	0.09	0.00	0.14	0.14	0.10	0.10	0.00	0.00	0.10	0.69	0.66	0.00	0.00	0.00	S	0.05	0.00	0.13	0.00	0.00	0.69	0.11	24	
6		0.00	0.19	0.07	0.09	0.12	0.12	0.13	0.18	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.05	S	0.14	0.12	0.14	0.15	0.13	0.00	0.24	0.09	24	
7		0.08	0.11	0.00	0.00	0.17	0.16	0.16	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.03	24	
8		0.07	0.26	0.13	0.13	0.14	0.17	0.15	0.09	0.10	0.05	0.00	0.10	0.13	0.00	0.00	0.00	S	0.00	0.08	0.14	0.10	0.00	0.13	0.00	0.00	0.26	0.09	24	
9		0.12	0.00	0.07	0.09	0.11	0.18	0.38	0.00	0.00	0.23	0.00	0.16	0.00	0.20	0.07	S	0.00	0.35	0.00	0.00	0.11	0.14	0.12	0.24	0.00	0.38	0.11	24	
10		0.07	0.19	0.00	0.00	0.07	0.00	0.12	0.00	0.07	0.00	0.00	0.00	X	0.00	S	0.00	X	X	0.00	0.10	0.00	0.11	0.09	0.17	0.00	0.19	0.05	21	
11		0.10	0.00	0.12	0.00	0.07	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.18	S	0.00	X	X	0.00	0.00	X	0.00	X	0.00	0.00	0.00	0.18	0.03	20	
12		0.00	0.00	0.00	0.00	0.14	0.00	0.12	0.17	C	C	C	C	C	0.13	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.06	S	0.00	0.17	0.04	24	
13		0.00	0.10	0.14	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	X	0.00	S	X	0.00	0.14	0.02	22	
14		0.16	0.12	0.10	0.08	0.10	0.00	S1	S1	0.00	0.00	0.00	0.00	0.15	0.00	0.08	0.00	0.00	0.00	0.00	0.00	S	0.22	0.10	0.00	0.22	0.05	22		
15		0.12	0.17	0.17	0.18	0.08	0.30	0.37	0.26	0.07	0.28	0.04	0.08	0.14	0.12	X	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	X	0.00	0.37	0.11	22	
16		0.00	0.00	0.00	0.12	0.00	0.06	S1	S1	0.00	0.00	0.00	0.08	0.08	X	0.00	0.10	0.00	0.09	0.15	S	X	X	0.08	0.11	0.00	0.15	0.05	19	
17		0.05	X	0.15	0.14	0.11	0.10	0.10	0.07	0.00	0.00	0.00	0.12	0.18	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.16	0.18	0.00	0.18	0.06	23		
18		0.00	0.19	0.22	0.06	0.16	0.11	0.12	0.14	0.00	0.04	0.00	0.10	0.00	0.00	0.43	0.00	S	X	X	0.17	X	0.15	0.12	0.00	0.43	0.10	21		
19		0.18	0.12	0.16	0.15	0.29	0.23	0.13	0.91	0.13	0.08	0.14	0.38	0.00	0.00	0.00	0.00	S	0.57	0.16	0.00	0.71	0.15	0.10	0.17	0.00	0.91	0.21	24	
20		0.10	0.12	0.00	0.13	0.11	0.06	0.10	0.11	0.06	0.10	0.17	0.00	0.18	0.00	0.00	S	0.00	0.08	0.10	0.00	0.00	0.04	0.15	0.07	0.00	0.18	0.07	24	
21		X	0.13	0.12	0.22	0.08	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.17	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.04	23	
22		0.08	0.09	0.10	0.09	0.12	0.12	0.06	0.00	0.00	0.00	0.07	0.00	0.00	S	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.11	0.00	0.00	0.00	0.15	0.04	24	
23		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	S	0.00	0.10	0.11	0.00	0.00	0.00	0.00	0.14	0.00	0.12	0.00	0.00	0.20	0.03	24	
24		0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	X	S	0.00	X	0.09	0.00	X	0.00	0.00	0.00	X	X	0.00	0.00	0.00	0.10	0.01	19	
25		0.02	0.09	0.11	0.00	0.00	X	0.00	0.00	0.21	0.00	S	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.26	X	X	0.13	0.15	0.14	0.00	0.26	0.06	21	
26		0.22	0.06	0.07	0.16	0.12	0.18	0.16	0.17	0.16	S	0.00	0.00	0.00	0.00	0.11	0.00	0.15	0.00	0.07	0.12	X	0.07	0.05	0.06	0.00	0.22	0.09	23	
27		0.00	0.00	0.00	X	0.26	0.21	0.25	0.00	S	0.00	0.12	0.00	0.00	0.00	X	0.00	0.00	0.00	0.00	0.07	0.15	0.13	0.13	0.14	0.00	0.26	0.07	22	
28		0.10	0.14	0.15	0.17	0.00	0.08	0.10	S	0.12	0.15	0.06	0.16	0.00	X	X	X	0.00	X	X	X	X	X	X	X	X	0.00	0.17	0.09	14
29		0.11	X	X	0.16	0.00	0.00	S	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.12	X	0.09	0.00	0.17	0.14	0.17	0.17	0.19	0.00	0.19	0.07	21		
30		0.24	0.15	0.18	0.17	0.00	S	0.18	X	0.00	X	0.00	0.00	0.00	X	0.00	X	X	0.15	X	X	X	X	X	X	0.00	0.24	0.09	13	
31		0.03	X	X	X	S	0.19	0.03	0.00	0.00	X	0.00	0.00	0.00	0.00	0.00	X	0.00	0.00	0.00	0.00	X	X	0.00	X	0.00	0.19	0.02	16	
HOURLY MAX		0.24	0.26	0.22	0.22	0.29	2.41	0.38	0.91	0.21	0.93	0.37	0.38	0.18	0.20	0.69	0.68	0.15	0.57	0.26	0.17	0.71	0.17	0.22	0.24					
HOURLY AVG		0.07	0.09	0.09	0.09	0.08	0.17	0.11	0.11	0.06	0.08	0.05	0.05	0.04	0.04	0.05	0.11	0.01	0.06	0.04	0.03	0.08	0.06	0.09	0.09					

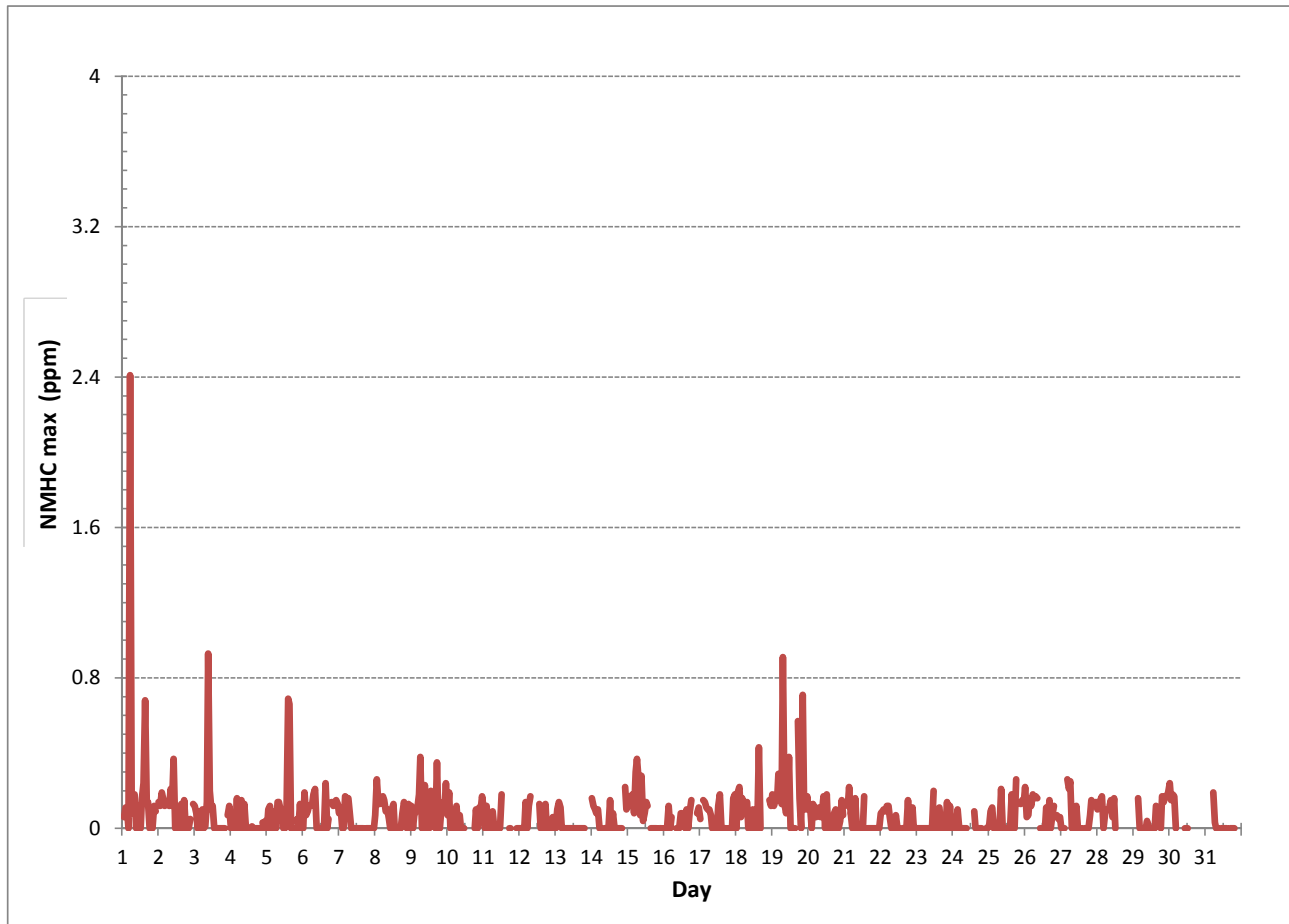
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

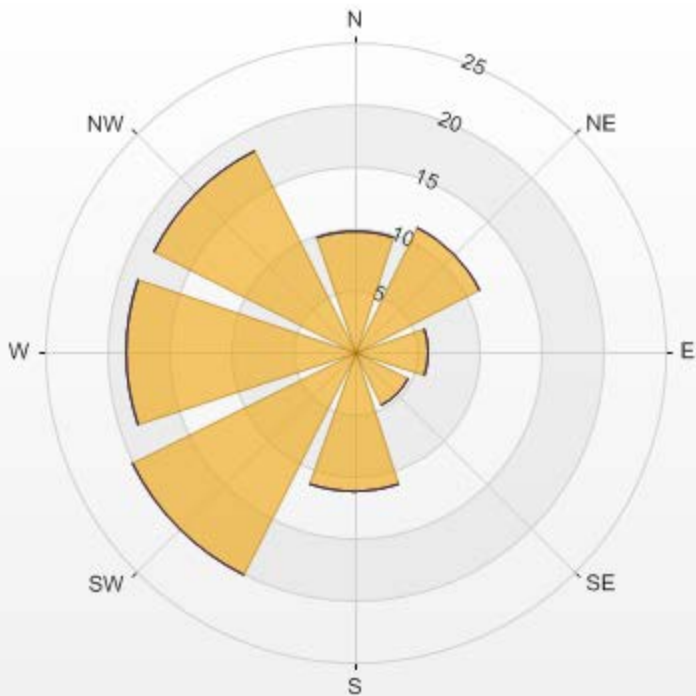
NUMBER OF NON-ZERO READINGS:	313
MAXIMUM INSTANTANEOUS VALUE:	2.41 PPM @ HOUR(S) 5 ON DAY(S) 1
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	5 HRS
OPERATIONAL TIME:	678.00 HRS
STANDARD DEVIATION:	0.14

NON-METHANE HYDROCARBONS MAX instantaneous maximum in ppm

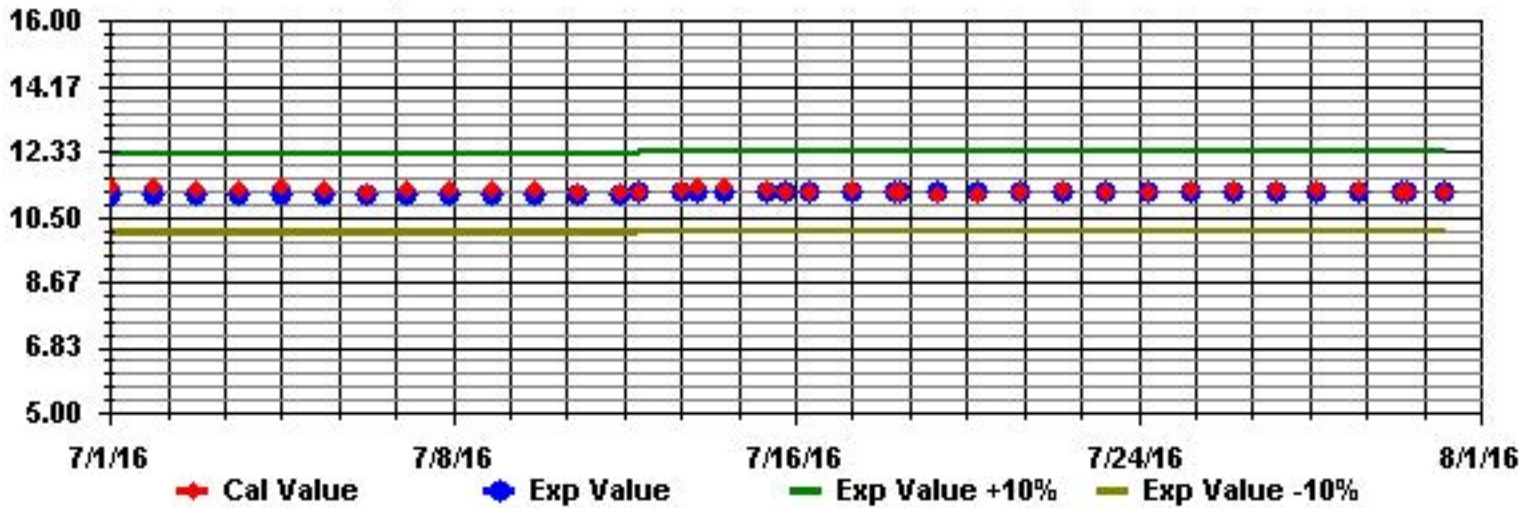


Wind: LICA Bonnyville Monitor: NMHC [ppm] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 86.29% Calm Avg: 0.00

Direction	0.0-3.0	3.0-10.0	10.0-50.0	>50.0	Total
N	9.81	0	0	0	9.81
NE	11.21	0	0	0	11.21
E	5.92	0	0	0	5.92
SE	4.83	0	0	0	4.83
S	11.37	0	0	0	11.37
SW	20.09	0	0	0	20.09
W	18.54	0	0	0	18.54
NW	18.22	0	0	0	18.22
Summary	100	0	0	0	100



Calibration Graph for Site: BONNYVIL Parameter: NMHC Sequence: THC55 Phase: SPAN



OXIDES OF NITROGEN

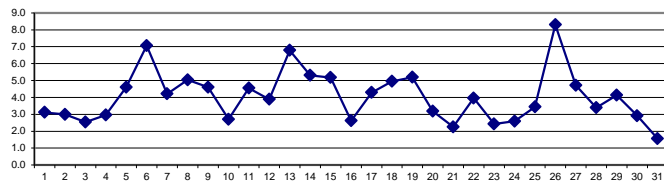
OXIDES OF NITROGEN (NOx) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.
DAY	DAY	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59				
1	S	3.9	3.3	4.0	4.0	3.7	3.2	2.7	2.2	2.1	2.9	2.1	1.7	3.0	3.1	4.9	2.0	1.3	1.9	2.0	3.4	5.8	5.4	S	1.3	5.8	3.1	24	
2		4.4	4.7	7.0	5.4	5.4	4.5	3.8	3.3	2.7	2.6	2.5	2.4	1.6	1.6	1.7	1.4	1.4	1.0	1.2	1.3	3.0	2.7	S	3.1	1.0	7.0	3.0	24
3		3.1	2.8	1.8	2.0	2.3	4.5	2.6	2.4	3.7	5.1	3.4	1.9	2.0	1.2	1.8	1.9	2.3	3.0	2.1	2.7	1.8	S	2.2	1.9	1.2	5.1	2.5	24
4		1.6	1.6	1.7	1.5	2.4	3.7	3.8	4.1	3.6	3.3	2.6	1.8	3.0	1.8	1.5	1.5	1.7	1.9	2.5	3.8	S	7.2	7.6	4.0	1.5	7.6	3.0	24
5		3.6	11.7	12.7	5.3	3.7	5.2	2.9	3.4	3.5	3.9	3.8	3.0	3.3	4.1	3.6	4.4	3.1	2.9	4.1	S	4.1	4.4	4.2	4.8	2.9	12.7	4.6	24
6		5.0	6.6	8.0	11.1	14.2	18.2	8.8	7.6	5.9	4.0	5.8	10.4	8.5	7.5	4.4	4.1	2.8	5.2	S	3.4	2.8	3.7	6.3	8.2	2.8	18.2	7.1	24
7		3.7	7.1	3.2	2.2	5.3	9.1	11.3	7.0	10.0	3.3	2.3	2.9	2.0	1.4	1.4	1.8	1.5	S	2.4	3.1	4.6	5.4	2.5	3.4	1.4	11.3	4.2	24
8		4.2	5.7	8.1	6.4	7.7	9.4	7.4	6.1	3.8	3.2	3.6	3.3	3.9	4.7	4.3	2.8	S	3.9	4.4	5.5	6.8	3.7	3.7	3.3	2.8	9.4	5.0	24
9		2.9	3.8	5.5	6.9	9.6	15.7	14.9	6.7	4.1	1.9	1.8	1.6	1.8	1.3	S	2.1	2.3	2.9	3.1	3.4	3.6	4.0	4.1	1.3	15.7	4.6	24	
10		3.7	2.5	2.2	2.1	2.5	2.2	2.1	2.3	2.2	2.2	2.0	1.6	1.5	1.4	S	2.4	2.3	2.8	2.4	2.5	2.4	4.4	6.4	6.2	1.4	6.4	2.7	24
11		6.7	6.1	9.5	6.4	6.2	8.2	9.2	7.9	2.8	2.0	2.2	2.8	3.6	S	5.0	3.7	3.2	2.3	2.6	2.1	2.5	3.4	3.5	2.6	2.0	9.5	4.5	24
12		3.2	3.7	5.2	5.8	5.4	8.8	8.5	5.0	C	C	C	C	C	C	C	C	2.0	0.8	0.6	1.2	2.4	3.1	2.6	S	0.6	8.8	3.9	24
13		6.9	7.2	7.4	7.8	11.2	14.9	17.0	9.8	3.2	2.9	3.6	C1	C1	C1	C1	C1	C1	C1	2.3	2.3	2.3	3.6	S	6.1	2.3	17.0	6.8	17
14		7.6	10.1	8.3	9.4	11.1	11.8	7.1	3.1	3.3	2.4	2.2	1.7	1.9	2.0	1.5	3.5	2.3	3.8	3.2	2.9	3.7	S	8.4	10.8	1.5	11.8	5.3	24
15		11.3	8.9	10.7	8.9	6.4	10.4	13.2	14.6	6.4	2.3	1.8	1.7	1.8	2.0	3.4	1.6	2.0	1.4	1.2	2.0	S	3.0	1.9	2.1	1.2	14.6	5.2	24
16		2.2	2.3	2.2	3.2	3.3	2.8	3.0	2.0	6.7	2.9	1.3	1.7	1.4	1.1	1.2	1.2	1.9	2.4	2.4	S	4.5	3.7	3.6	3.2	1.1	6.7	2.6	24
17		6.2	5.6	4.9	4.4	4.2	6.4	6.2	4.4	5.0	4.1	3.5	2.6	2.4	1.6	1.8	1.4	1.4	1.7	S	4.7	5.0	5.9	6.3	8.9	1.4	8.9	4.3	24
18		4.2	4.9	7.0	4.8	7.8	14.8	13.8	6.8	5.5	2.8	2.0	3.3	2.1	1.7	1.9	2.7	1.6	S	3.0	5.4	2.8	4.1	5.8	5.0	1.6	14.8	4.9	24
19		4.6	3.2	4.3	7.6	13.3	10.8	10.8	7.3	5.5	3.4	2.1	2.2	3.1	1.9	2.3	3.9	S	4.9	5.1	4.8	3.5	6.4	4.3	4.1	1.9	13.3	5.2	24
20		5.2	4.3	5.4	3.6	4.5	4.7	3.3	4.6	5.1	4.2	2.0	2.5	1.6	1.6	1.8	S	3.8	2.3	2.0	1.5	2.7	1.8	2.2	2.4	1.5	5.4	3.2	24
21		2.2	2.0	1.3	1.2	1.8	3.0	1.7	3.1	1.8	1.5	1.4	1.7	1.4	1.3	S	3.0	2.4	2.5	2.0	2.1	3.9	3.8	3.5	3.3	1.2	3.9	2.3	24
22		5.1	6.9	8.5	6.0	5.3	5.3	5.5	3.2	3.3	3.1	3.9	2.1	S	3.5	2.5	2.4	4.8	2.2	2.6	2.0	2.5	2.0	3.0	2.0	2.0	8.5	4.0	24
23		3.0	4.0	1.8	1.5	2.4	3.3	2.1	2.6	2.6	2.4	2.3	2.0	S	2.0	1.3	1.6	2.0	2.0	1.6	2.3	3.2	2.2	2.2	5.3	1.3	5.3	2.4	24
24		5.6	2.1	1.8	1.0	1.9	1.8	6.7	3.8	3.2	3.1	1.4	S	2.1	1.9	1.8	3.7	2.1	2.0	1.5	2.6	3.1	1.5	2.7	2.2	1.0	6.7	2.6	24
25		2.9	2.9	2.6	4.7	3.9	6.9	5.0	4.4	2.7	3.2	S	2.7	1.6	1.6	3.2	1.8	1.8	1.3	1.7	4.6	5.9	5.0	4.7	3.9	1.3	6.9	3.4	24
26		4.2	4.4	5.0	8.1	9.9	11.6	16.7	16.2	23.8	S	8.4	22.0	9.1	11.1	5.7	4.2	3.9	3.2	6.1	5.2	2.5	2.8	3.6	3.2	2.5	23.8	8.3	24
27		2.4	2.1	2.5	4.9	4.5	22.5	11.4	4.6	S	5.8	4.4	3.2	3.2	2.2	1.9	2.5	2.1	2.3	2.6	3.4	11.1	3.5	2.4	2.9	1.9	22.5	4.7	24
28		4.4	4.2	9.2	9.8	3.8	4.1	4.4	S	3.9	3.8	3.2	3.7	2.8	2.4	1.8	2.0	1.7	1.9	1.9	2.4	2.4	1.2	1.6	1.4	1.2	9.8	3.4	24
29		2.3	3.3	4.7	5.4	4.0	2.1	S	3.4	3.4	2.9	2.9	3.1	3.1	2.6	2.2	2.2	3.7	6.8	2.6	3.4	13.6	3.3	4.6	9.4	2.1	13.6	4.1	24
30		6.0	4.3	3.9	2.3	2.2	S	3.9	3.5	2.1	2.0	2.0	2.1	3.0	2.4	3.0	1.8	1.8	1.5	2.4	3.6	5.5	3.8	1.8	2.2	1.5	6.0	2.9	24
31		2.3	1.9	2.1	2.1	S	2.6	2.9	2.6	1.9	1.7	1.1	0.9	1.3	1.1	1.1	1.1	1.5	1.2	0.9	1.2	1.1	1.3	1.0	1.0	0.9	2.9	1.6	24
HOURLY MAX		11.3	11.7	12.7	11.1	14.2	22.5	17.0	16.2	23.8	5.8	8.4	22.0	9.1	11.1	5.7	4.9	3.9	6.8	6.1	5.5	13.6	7.2	8.4	10.8				
HOURLY AVG		4.4	4.7	5.2	5.0	5.7	7.8	7.1	5.4	4.6	3.0	2.8	3.4	2.7	2.6	2.5	2.6	2.2	2.6	2.5	3.0	4.0	3.7	3.8	4.2				

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

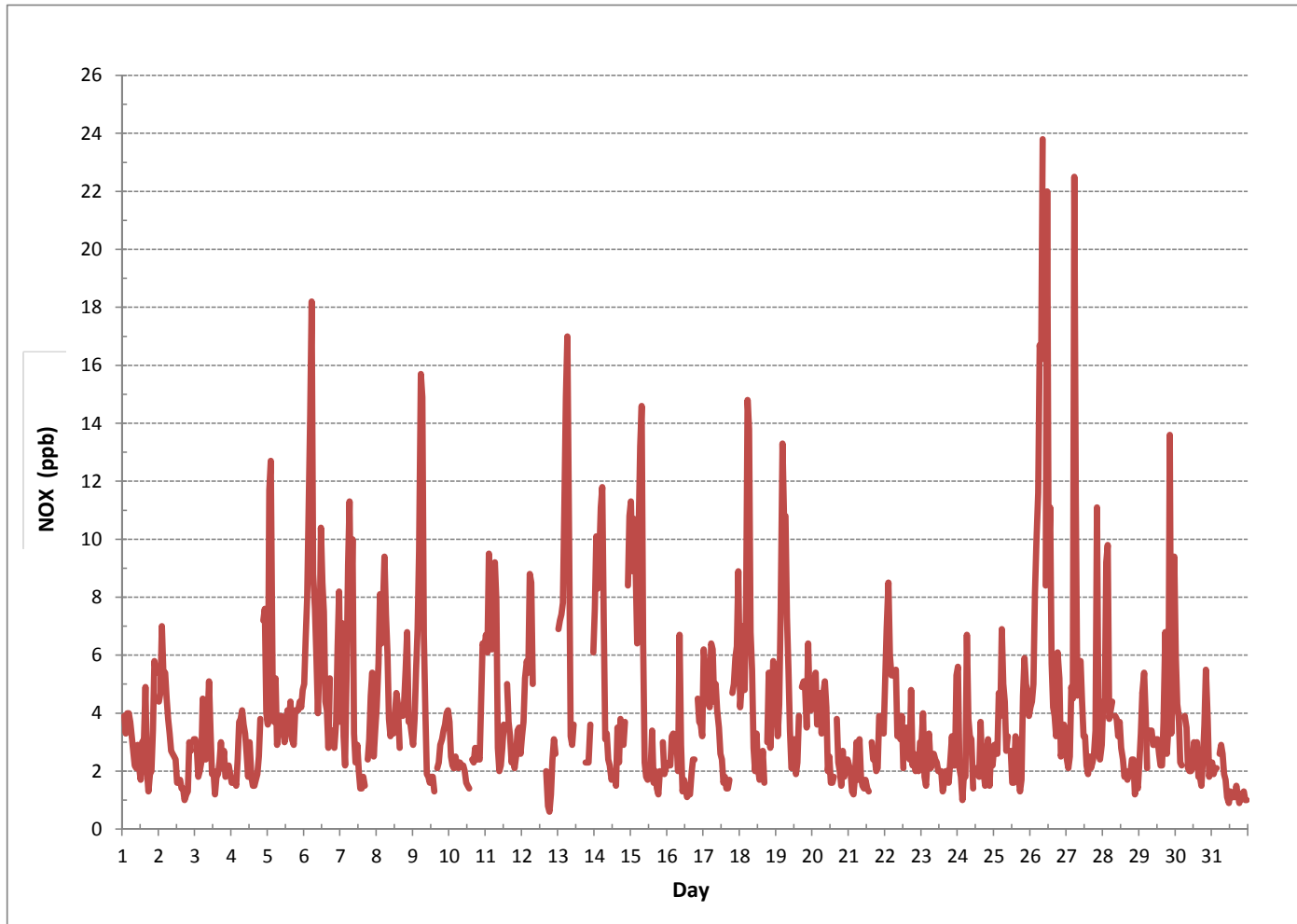
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	697		
MINIMUM 1-HR AVERAGE:	0.6 PPB	@ HOUR(S)	18 ON DAY(S) 12
MAXIMUM 1-HR AVERAGE:	23.8 PPB	@ HOUR(S)	8 ON DAY(S) 26
MAXIMUM 24-HR AVERAGE:	8.3 PPB		ON DAY(S) 26
			VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS	OPERATIONAL TIME:	737 HRS
MONTHLY CALIBRATION TIME:	8 HRS	AMD OPERATION UPTIME:	99.1 %
STANDARD DEVIATION:	3.03	MONTHLY AVERAGE:	4.0 PPB

OXIDES OF NITROGEN (NOx) hourly averages in ppb





OXIDES OF NITROGEN MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
DAY	MIN.	MAX.	AVG.	RDGS.																										
1	S	4.3	3.5	4.3	4.7	5.7	4.1	3.4	3.1	2.5	11.6	11.4	3.0	6.3	15.0	14.5	3.4	2.5	3.0	2.9	5.8	8.6	9.2	S	2.5	15.0	6.0	24		
2		21.6	6.2	9.3	7.7	7.7	4.9	5.6	4.1	3.4	3.2	22.6	18.0	3.7	2.3	10.9	2.7	3.0	1.6	3.7	4.5	5.0	18.5	S	4.0	1.6	22.6	7.6	24	
3		23.5	42.3	2.6	2.5	4.4	5.9	2.7	3.0	4.9	9.5	11.9	3.7	4.1	2.6	14.5	2.8	2.9	3.9	2.5	3.1	2.4	S	2.7	2.5	2.4	42.3	7.0	24	
4		1.9	1.9	2.0	1.8	3.8	5.9	6.2	5.1	5.4	5.8	5.6	3.5	7.1	2.5	2.2	2.2	2.8	2.7	3.5	5.0	S	10.3	9.9	5.7	1.8	10.3	4.5	24	
5		5.8	15.4	15.7	7.3	5.6	6.5	5.4	4.9	4.3	5.0	4.8	3.5	5.0	5.3	5.5	15.9	4.4	4.9	5.5	S	4.9	5.4	5.1	6.9	3.5	15.9	6.7	24	
6		5.7	7.0	12.5	15.8	17.5	25.9	23.2	9.6	46.8	29.2	36.7	13.9	34.4	64.3	45.0	15.2	11.3	29.1	S	5.5	4.3	6.8	11.0	12.5	4.3	64.3	21.0	24	
7		6.0	18.2	4.5	3.3	11.3	17.0	16.5	19.0	18.5	4.7	3.9	5.0	3.9	2.1	2.1	3.7	3.5	S	4.1	4.7	20.9	14.9	5.6	14.7	2.1	20.9	9.0	24	
8		7.4	11.1	9.7	7.6	15.3	13.7	35.4	7.6	5.2	4.0	8.9	7.2	21.2	7.2	7.0	4.8	S	4.3	6.1	6.2	11.7	5.0	5.9	4.7	4.0	35.4	9.4	24	
9		3.1	6.1	7.7	9.2	12.5	17.7	19.6	8.8	5.1	3.0	2.6	2.3	1.9	2.7	1.7	S	2.9	3.0	3.8	5.2	3.9	6.3	5.6	5.6	1.7	19.6	6.1	24	
10		5.3	3.0	2.5	2.5	3.3	3.9	2.4	2.7	4.1	4.4	3.1	2.0	1.9	1.5	S	3.9	2.6	3.8	3.2	3.9	3.9	7.6	8.2	6.8	1.5	8.2	3.8	24	
11		8.5	6.9	11.0	8.2	6.6	9.9	10.4	10.6	4.4	2.1	2.5	3.5	4.4	S	7.8	6.0	5.5	2.6	3.2	2.4	2.8	3.7	5.1	2.7	2.1	11.0	5.7	24	
12		3.3	3.9	5.8	6.8	7.0	17.9	18.6	7.1	C	C	C	C	C	C	C	C	C	6.8	4.2	4.2	5.3	5.8	6.4	7.3	S	3.3	18.6	7.4	24
13		7.7	8.4	9.9	12.7	14.5	23.0	22.8	15.7	4.8	5.8	6.8	C1	C1	C1	C1	C1	C1	C1	19.5	27.7	6.6	7.7	S	8.0	4.8	27.7	12.6	17	
14		10.2	11.3	10.3	12.4	13.9	15.8	12.3	5.9	6.7	5.0	3.9	3.7	8.1	4.2	4.5	6.5	4.5	7.3	5.2	6.3	6.5	S	24.8	28.8	3.7	28.8	9.5	24	
15		13.7	14.5	15.0	10.6	10.5	14.8	22.9	26.6	35.1	17.3	14.0	5.3	14.1	24.5	27.1	4.2	20.7	3.5	2.8	4.4	S	5.4	3.3	4.3	2.8	35.1	13.7	24	
16		3.8	3.1	3.0	20.6	4.6	4.7	4.1	4.8	11.5	8.4	3.1	5.0	14.9	11.4	2.3	2.3	3.1	4.3	4.4	S	6.5	5.4	4.7	4.5	2.3	20.6	6.1	24	
17		8.9	8.1	6.0	5.5	5.7	8.2	9.7	6.3	6.1	5.2	4.5	4.2	4.0	2.9	2.9	2.7	2.2	2.8	S	6.2	7.8	8.4	12.3	16.3	2.2	16.3	6.4	24	
18		6.4	7.0	13.0	7.9	21.9	27.7	37.2	8.9	8.7	4.6	4.1	20.3	12.5	12.7	11.3	8.4	18.1	S	6.4	21.7	5.0	6.6	9.6	8.0	4.1	37.2	12.5	24	
19		5.7	4.6	8.4	12.2	16.1	15.5	14.8	16.7	8.3	6.4	4.3	14.3	8.0	3.7	14.3	23.2	S	9.6	9.9	24.6	8.6	11.0	7.8	5.7	3.7	24.6	11.0	24	
20		12.7	7.9	20.7	5.5	8.7	8.9	5.4	6.1	8.0	6.6	4.2	14.6	3.4	3.3	3.5	S	7.8	4.4	9.6	3.4	4.6	3.4	4.7	4.8	3.3	20.7	7.1	24	
21		4.3	3.7	2.5	2.3	3.5	30.0	3.5	5.0	3.8	2.7	3.4	3.0	3.2	3.7	S	5.7	3.9	4.4	3.3	4.1	5.9	5.7	5.0	4.7	2.3	30.0	5.1	24	
22		10.6	11.0	11.0	10.3	8.1	12.1	8.6	20.2	15.4	27.4	5.9	14.4	6.6	S	21.8	4.4	5.1	19.3	8.7	19.0	3.7	4.5	3.8	5.4	3.7	27.4	11.2	24	
23		4.8	6.7	4.3	2.5	3.5	5.8	2.9	4.1	4.0	3.4	3.9	3.1	S	3.9	2.6	3.1	3.7	4.0	3.0	5.0	4.7	4.5	10.8	20.8	2.5	20.8	5.0	24	
24		10.7	7.3	4.7	2.3	5.2	3.6	37.6	7.0	13.0	5.1	3.1	S	3.7	4.0	3.4	17.9	22.0	3.9	3.2	5.4	9.5	4.1	8.8	3.8	2.3	37.6	8.2	24	
25		6.6	8.6	5.1	7.1	9.2	15.2	7.6	7.6	4.8	5.4	S	6.4	11.8	3.5	18.0	3.9	3.3	2.7	5.3	9.4	45.6	32.4	82.8	7.8	2.7	82.8	13.5	24	
26		7.4	6.4	8.1	11.6	12.7	13.9	53.6	65.9	93.6	S	31.4	104.9	37.3	58.6	37.7	25.2	27.1	18.3	41.0	19.6	19.4	4.9	8.8	6.0	4.9	104.9	31.0	24	
27		6.2	4.9	6.0	8.3	41.9	36.5	32.2	31.9	S	29.9	13.4	19.0	20.3	4.9	3.4	14.1	5.1	4.4	4.3	7.6	54.6	7.3	3.9	4.1	3.4	54.6	15.8	24	
28		24.9	6.0	44.4	44.6	6.7	5.5	6.1	S	9.1	9.0	6.2	7.9	4.5	5.7	3.4	18.2	4.5	4.8	3.5	17.0	4.5	2.9	3.9	3.3	2.9	44.6	10.7	24	
29		5.2	5.7	17.1	14.4	5.7	4.1	S	6.2	6.4	4.5	5.2	6.0	6.1	4.4	10.6	3.4	11.9	25.8	6.0	12.9	32.5	5.9	7.6	13.8	3.4	32.5	9.6	24	
30		9.2	6.2	5.4	3.8	3.0	S	7.0	7.9	4.4	4.2	4.3	4.2	6.4	6.0	28.1	16.2	25.6	3.7	3.7	8.3	16.1	7.5	3.9	4.2	3.0	28.1	8.2	24	
31		4.1	2.8	4.1	3.2	S	4.4	4.0	4.2	2.8	2.9	10.1	2.2	2.5	2.0	2.7	2.3	3.3	2.1	2.0	2.4	2.4	12.5	2.4	2.5	2.0	12.5	3.6	24	
HOURLY MAX		24.9	42.3	44.4	44.6	41.9	36.5	53.6	65.9	93.6	29.9	36.7	104.9	37.3	64.3	45.0	25.2	27.1	29.1	41.0	27.7	54.6	32.4	82.8	28.8					
HOURLY AVG		8.5	8.4	9.2	8.9	9.8	12.8	14.7	11.2	12.1	7.8	8.5	11.2	9.2	9.5	11.5	8.6	7.9	6.7	6.4	8.7	10.9	8.1	9.8	7.7					

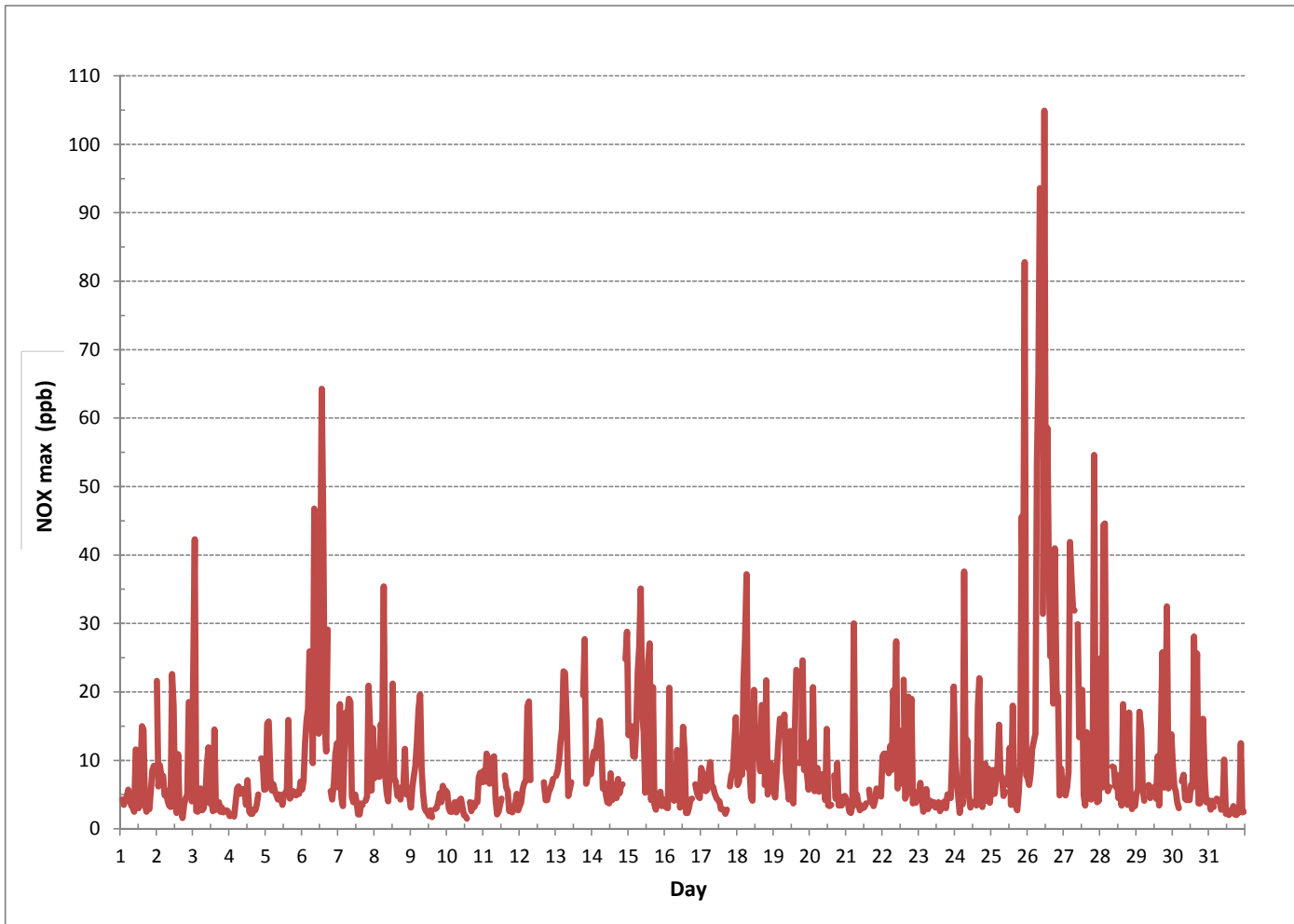
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

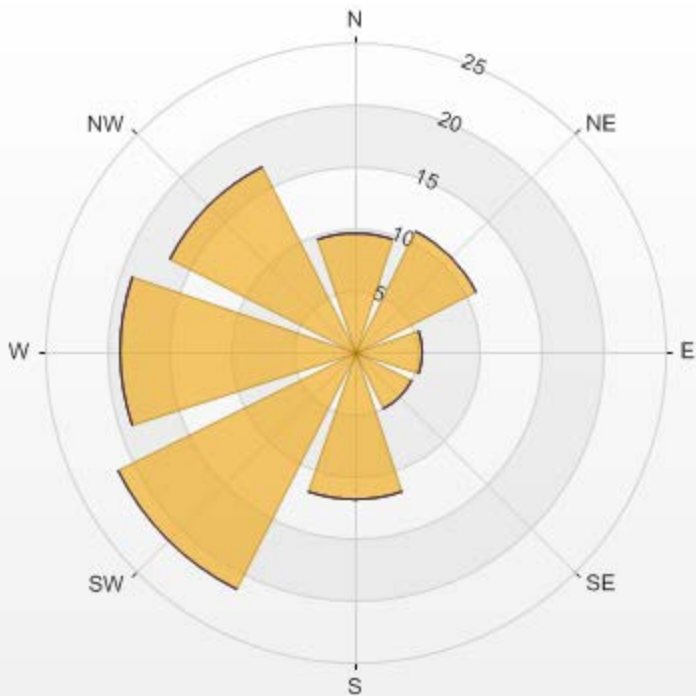
NUMBER OF NON-ZERO READINGS:	697
MAXIMUM INSTANTANEOUS VALUE:	104.9 PPB @ HOUR(S) 11 ON DAY(S) 26
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	8 HRS
STANDARD DEVIATION:	10.57
OPERATIONAL TIME:	737 HRS

OXIDES OF NITROGEN MAX instantaneous maximum in ppb



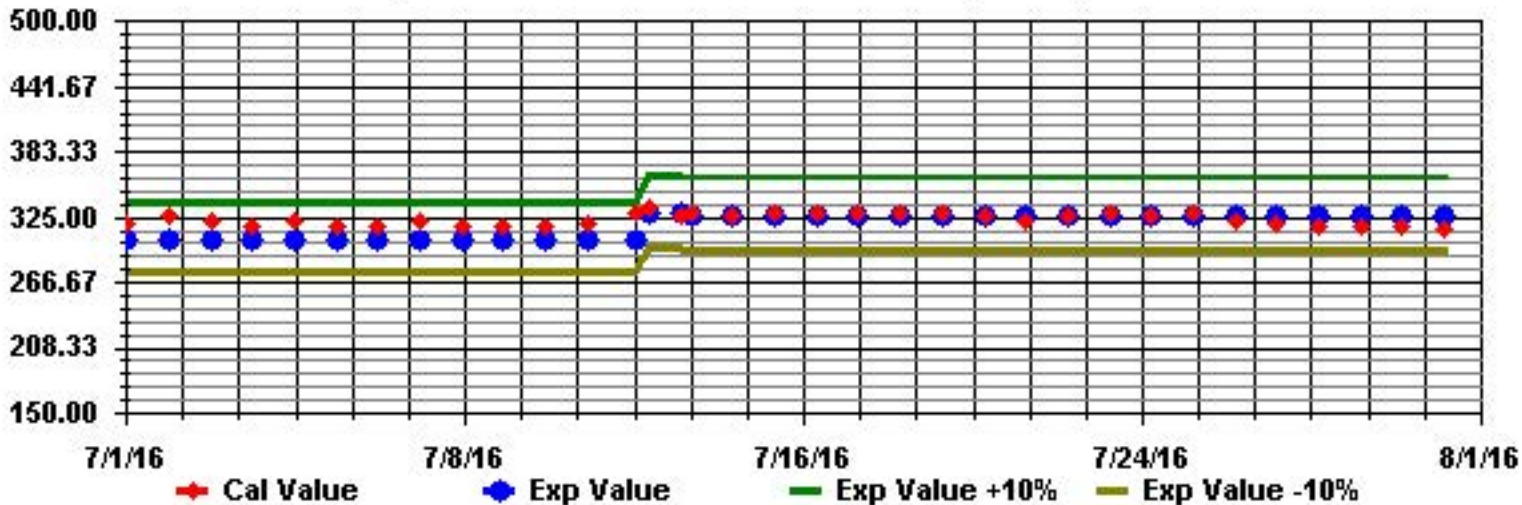
Wind: LICA Bonnyville Monitor: NOX [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 93.68% Calm Avg: 0.00

Direction	0.0-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	9.61	0	0	0	9.61
NE	10.9	0	0	0	10.9
E	5.45	0	0	0	5.45
SE	5.16	0	0	0	5.16
S	11.91	0	0	0	11.91
SW	21.38	0	0	0	21.38
W	18.94	0	0	0	18.94
NW	16.64	0	0	0	16.64
Summary	100	0	0	0	100



% Icon Classes (ppb)		100	0	0	0	0
0.0-50.0	50.0-110.0	110.0-210.0	>210.0			

Calibration Graph for Site: BONNYVIL Parameter: NOX_ Sequence: NO2 Phase: SPAN



NITRIC OXIDES

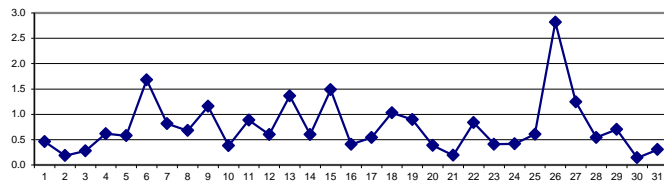
NITRIC OXIDE (NO) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.
DAY	DAY	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59				
1	S	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	0.9	0.5	0.2	0.9	1.0	2.5	0.5	0.2	0.4	0.3	0.5	1.0	0.4	S	0.0	2.5	0.5	24
2		0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.4	0.4	0.4	0.5	0.5	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.5	0.4	S	0.1	0.0	0.0	0.5	0.2	24
3		0.3	0.5	0.0	0.0	0.1	0.8	0.4	0.0	0.3	1.4	1.0	0.4	0.6	0.1	0.4	0.0	0.0	0.1	0.0	0.0	0.0	S	0.0	0.0	0.0	1.4	0.3	24
4		0.0	0.0	0.0	0.0	0.0	0.5	1.1	1.5	1.5	1.3	1.0	0.6	1.5	0.9	0.6	0.5	0.5	0.5	0.6	S	0.8	0.2	0.1	0.0	1.5	0.6	24	
5		0.0	1.1	1.5	0.0	0.0	0.8	0.1	0.6	0.5	0.9	0.6	0.6	0.5	1.0	0.6	1.1	0.5	0.6	1.0	S	0.4	0.2	0.3	0.4	0.0	1.5	0.6	24
6		0.2	0.1	0.2	0.8	3.0	7.3	3.4	2.7	2.2	1.6	1.9	2.8	2.8	3.0	1.4	2.1	0.9	0.8	S	0.8	0.1	0.0	0.2	0.3	0.0	7.3	1.7	24
7		0.0	0.1	0.0	0.0	0.4	1.9	3.4	2.6	3.6	0.9	0.5	1.1	0.6	0.5	0.5	0.6	0.4	S	0.6	0.3	0.6	0.1	0.0	0.0	0.0	3.6	0.8	24
8		0.0	0.1	0.4	0.0	0.6	1.6	1.8	1.9	1.2	0.8	1.2	0.9	1.0	0.8	0.9	0.5	S	0.8	0.4	0.2	0.4	0.0	0.1	0.0	0.0	1.9	0.7	24
9		0.0	0.2	0.1	0.3	1.6	6.4	7.4	3.0	1.5	0.5	0.5	0.4	0.4	0.5	0.2	S	0.6	0.6	0.7	0.7	0.3	0.2	0.2	0.3	0.0	7.4	1.2	24
10		0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.0	0.4	0.4	0.4	0.4	0.6	0.5	S	1.3	0.9	0.9	0.6	0.6	0.3	0.4	0.3	0.3	0.0	1.3	0.4	24
11		0.3	0.3	0.6	0.5	0.9	1.8	2.3	3.0	1.2	1.0	1.0	1.0	1.2	S	1.8	1.4	0.9	0.5	0.4	0.0	0.2	0.0	0.0	0.0	0.0	3.0	0.9	24
12		0.0	0.0	0.0	0.1	0.3	2.9	3.8	1.9	C	C	C	C	C	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	3.8	0.6	24
13		0.4	0.3	0.6	0.5	1.0	4.2	6.9	4.1	1.1	1.2	1.5	C1	C1	C1	C1	C1	C1	C1	0.0	0.0	0.0	0.0	S	0.0	6.9	1.4	17	
14		0.0	0.1	0.0	0.2	0.4	2.3	2.1	0.8	1.2	0.6	0.5	0.2	0.4	0.2	0.2	0.6	0.3	0.7	0.2	0.3	0.3	S	0.8	1.4	0.0	2.3	0.6	24
15		1.0	0.4	1.4	1.1	0.8	4.2	7.2	7.8	2.9	0.7	0.4	0.5	0.5	0.9	1.5	0.6	0.8	0.3	0.1	0.3	S	0.5	0.0	0.2	0.0	7.8	1.5	24
16		0.1	0.0	0.0	0.1	0.0	0.4	1.0	0.5	2.4	1.0	0.2	0.5	0.5	0.2	0.2	0.2	0.4	0.3	0.0	S	0.4	0.3	0.2	0.4	0.0	2.4	0.4	24
17		0.5	0.3	0.1	0.0	0.2	1.0	1.7	1.2	1.3	1.1	1.0	0.8	0.7	0.4	0.5	0.3	0.3	0.3	S	0.4	0.2	0.2	0.0	0.0	0.0	1.7	0.5	24
18		0.0	0.0	0.0	0.0	1.2	5.1	5.4	1.8	1.4	0.7	0.5	1.2	0.5	0.5	0.5	1.1	0.7	S	0.5	1.0	0.4	0.5	0.7	0.0	0.0	5.4	1.0	24
19		0.0	0.0	0.0	0.4	1.6	2.7	4.1	2.1	1.5	0.7	0.2	0.3	0.9	0.2	0.5	1.5	S	1.2	0.8	0.8	0.4	0.7	0.0	0.0	0.0	4.1	0.9	24
20		0.0	0.0	0.6	0.0	0.0	0.6	0.5	0.9	1.0	0.9	0.4	0.8	0.4	0.3	0.6	S	0.6	0.7	0.3	0.0	0.2	0.0	0.0	0.1	0.0	1.0	0.4	24
21		0.0	0.0	0.0	0.0	0.0	0.3	0.0	1.0	0.5	0.3	0.2	0.3	0.1	0.1	S	0.7	0.3	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.2	24
22		0.0	0.0	0.1	0.0	0.0	0.9	2.0	2.0	1.4	1.2	1.0	1.5	0.6	S	1.5	1.1	0.8	1.9	0.8	1.0	0.2	0.4	0.4	0.4	0.0	2.0	0.8	24
23		0.4	0.4	0.1	0.0	0.0	0.6	0.5	0.9	1.1	1.0	1.0	0.9	S	0.4	0.1	0.2	0.3	0.3	0.2	0.2	0.0	0.0	0.0	0.8	0.0	1.1	0.4	24
24		0.3	0.0	0.0	0.0	0.0	3.0	1.0	0.7	0.5	0.2	S	0.7	0.3	0.2	0.8	0.6	0.5	0.1	0.3	0.0	0.0	0.3	0.1	0.0	0.0	3.0	0.4	24
25		0.0	0.0	0.0	0.1	0.6	2.0	1.7	1.6	0.9	1.2	S	0.8	0.1	0.1	0.6	0.1	0.1	0.0	0.4	1.3	0.6	1.7	0.0	0.0	0.0	2.0	0.6	24
26		0.0	0.0	0.0	0.5	1.5	1.9	4.8	6.3	13.8	S	2.8	12.8	3.9	5.2	2.6	1.8	1.4	0.9	2.1	1.5	0.3	0.4	0.2	0.1	0.0	13.8	2.8	24
27		0.0	0.0	0.0	0.0	0.3	11.8	4.9	2.0	S	2.1	1.3	0.7	1.0	0.4	0.2	0.7	0.2	0.0	0.0	0.1	2.7	0.2	0.0	0.0	0.0	11.8	1.2	24
28		0.0	0.0	2.6	2.0	0.0	0.2	0.9	S	1.1	1.4	0.6	0.9	0.4	0.7	0.2	0.5	0.4	0.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	2.6	0.5	24
29		0.0	0.0	0.4	0.0	0.0	0.0	S	1.4	1.1	0.7	0.8	1.1	1.1	1.0	0.7	0.3	0.2	1.7	0.7	0.6	2.8	0.1	0.2	1.2	0.0	2.8	0.7	24
30		0.2	0.2	0.0	0.0	0.0	S	0.0	0.1	0.0	0.0	0.1	0.1	0.6	0.1	0.9	0.3	0.4	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.9	0.1	24
31		0.0	0.0	0.0	0.0	S	0.2	0.4	0.6	0.5	0.6	0.3	0.4	0.5	0.4	0.5	0.4	0.5	0.4	0.2	0.2	0.1	0.5	0.2	0.1	0.0	0.6	0.3	24
HOURLY MAX		1.0	1.1	2.6	2.0	3.0	11.8	7.4	7.8	13.8	2.1	2.8	12.8	3.9	5.2	2.6	2.5	1.4	1.9	2.1	1.5	2.8	1.0	1.7	1.4				
HOURLY AVG		0.1	0.1	0.3	0.2	0.5	2.1	2.4	1.8	1.6	0.9	0.8	1.2	0.8	0.7	0.7	0.8	0.5	0.5	0.4	0.4	0.4	0.3	0.2	0.2				

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

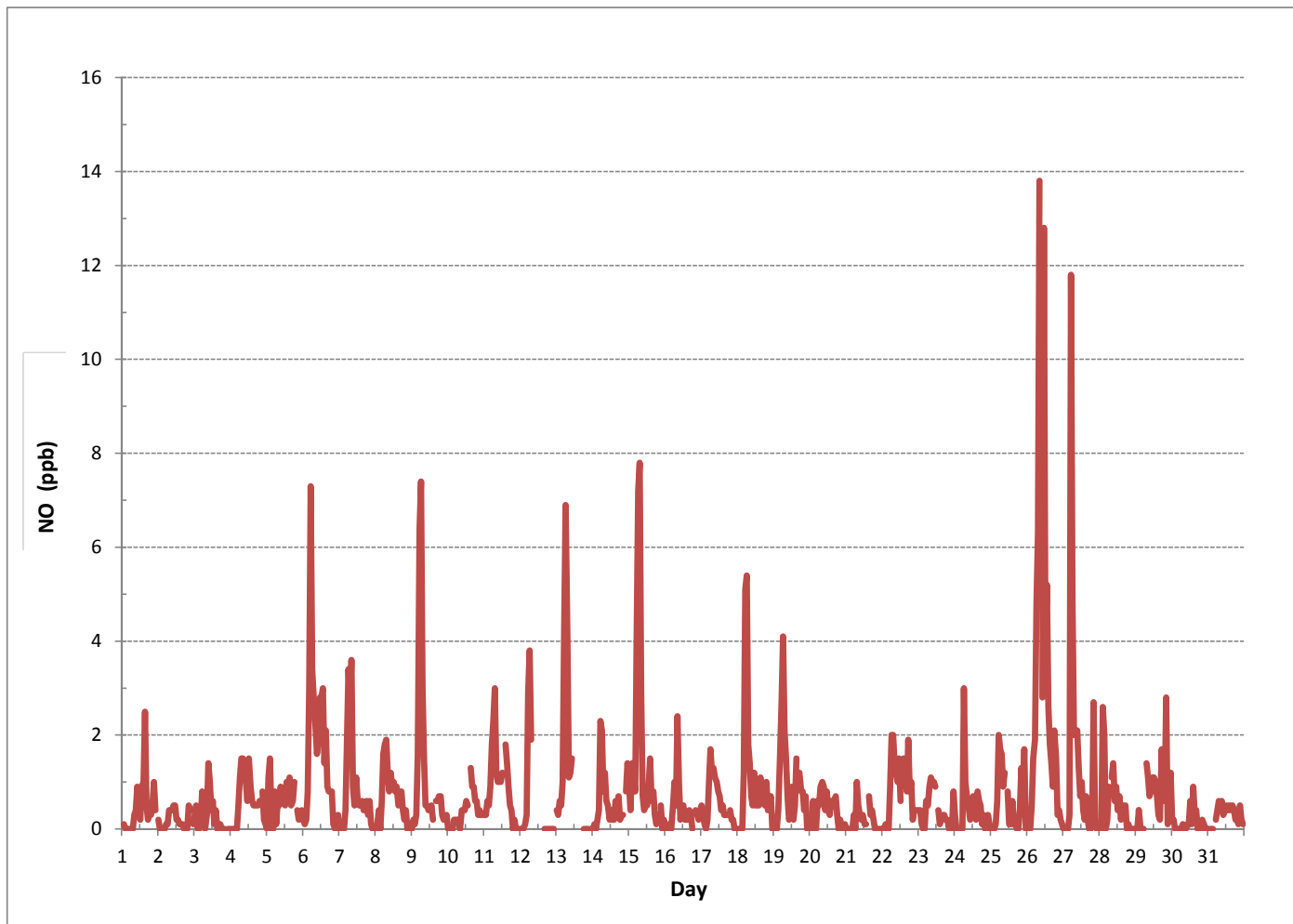
24 HOUR AVERAGES FOR July 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	532			
MINIMUM 1-HR AVERAGE:	0.0	PPB @ HOUR(S)	VAR	ON DAY(S) ALL
MAXIMUM 1-HR AVERAGE:	13.8	PPB @ HOUR(S)	8	ON DAY(S) 26
MAXIMUM 24-HR AVERAGE:	2.8	PPB		ON DAY(S) 26
				VAR-VARIOUS
IZS CALIBRATION TIME:	32	HRS	OPERATIONAL TIME:	737
MONTHLY CALIBRATION TIME:	8	HRS	AMD OPERATION UPTIME:	99.1
				%
STANDARD DEVIATION:	1.31		MONTHLY AVERAGE:	0.7
				PPB

NITRIC OXIDE (NO) hourly averages in ppb





NITRIC OXIDE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
HOURLY MAX	HOURLY AVG	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.	
DAY																														
1		S	1.5	1.0	1.2	1.2	1.1	1.2	1.4	1.9	1.9	5.3	5.8	2.1	4.0	8.8	9.3	2.3	2.4	2.3	2.1	3.0	3.9	3.5	S	1.0	9.3	3.1	24	
2		10.9	1.1	1.4	1.0	2.0	1.3	1.7	2.5	2.1	1.8	11.9	9.0	2.3	1.8	4.5	2.0	2.3	1.2	2.3	1.9	2.5	7.3	S	1.6	1.0	11.9	3.3	24	
3		12.4	24.3	1.1	1.1	1.3	2.5	1.9	1.3	3.5	6.3	6.8	3.1	3.1	1.7	15.5	1.1	1.1	1.4	1.3	1.3	1.2	S	1.6	1.0	1.0	24.3	4.2	24	
4		0.8	1.0	1.0	1.0	1.2	2.5	2.7	2.7	3.4	3.5	3.6	2.5	5.7	2.2	1.9	1.9	2.3	1.7	1.9	1.7	S	3.1	2.2	1.3	0.8	5.7	2.3	24	
5		1.3	3.5	3.8	1.2	1.2	2.7	1.9	2.3	1.8	2.2	2.2	1.9	1.7	2.5	1.7	10.7	2.0	2.1	2.9	S	1.5	1.3	1.7	1.4	1.2	10.7	2.4	24	
6		1.3	1.2	2.0	3.8	7.6	12.8	14.6	4.6	23.5	17.7	24.1	5.0	18.7	24.9	13.1	11.2	9.5	11.4	S	2.1	2.1	1.6	2.3	2.2	1.2	24.9	9.4	24	
7		2.2	2.7	1.2	1.0	3.4	9.5	6.4	18.5	9.0	2.6	2.2	2.7	2.2	2.1	1.7	2.5	2.3	S	1.8	2.0	12.3	1.7	1.2	10.3	1.0	18.5	4.4	24	
8		1.3	2.0	1.9	1.3	4.4	4.7	19.1	3.4	3.1	2.1	11.8	4.5	9.3	2.4	2.3	S	2.2	1.7	1.3	2.7	1.3	1.9	1.6	1.3	19.1	3.9	24		
9		1.2	2.4	1.4	1.4	4.1	9.7	11.3	5.2	3.2	1.8	1.7	1.7	1.4	1.9	1.5	S	1.9	2.0	1.9	2.5	1.4	2.6	1.5	2.0	1.2	11.3	2.9	24	
10		1.9	1.2	0.9	1.0	1.9	1.3	1.2	1.3	1.0	2.1	1.8	1.6	1.6	S	3.1	2.1	1.7	1.5	1.9	1.6	1.2	1.1	1.2	0.9	3.1	1.6	24		
11		1.3	1.4	2.1	1.7	2.3	3.5	3.9	5.3	2.4	1.9	1.9	2.4	2.5	S	5.2	3.8	3.2	1.7	2.0	1.4	1.3	1.0	1.2	1.0	1.0	5.3	2.4	24	
12		1.0	1.1	1.1	1.3	1.7	10.2	10.9	4.3	C	C	C	C	C	C	C	C	3.8	1.7	1.3	1.6	1.5	1.4	1.3	S	1.0	10.9	2.9	24	
13		1.3	1.2	2.7	1.2	2.7	9.6	10.4	7.8	2.1	2.5	3.1	C1	C1	C1	C1	C1	C1	C1	9.1	15.6	1.6	2.1	S	1.7	1.2	15.6	4.7	17	
14		1.6	1.6	1.6	2.7	2.9	5.5	4.6	3.1	4.2	2.7	2.2	2.0	5.2	1.9	1.9	2.8	2.3	2.6	1.9	2.7	2.3	S	10.3	11.6	1.6	11.6	3.5	24	
15		3.2	2.4	3.8	2.6	3.1	7.4	15.1	16.3	22.0	7.7	5.2	3.0	4.4	15.5	17.0	2.7	11.3	2.1	1.5	2.3	S	2.0	1.3	2.0	1.3	22.0	6.7	24	
16		1.5	1.0	1.0	11.8	1.1	2.1	2.3	2.1	5.6	3.7	1.6	3.0	11.0	3.9	1.8	1.4	1.5	1.5	1.2	S	1.9	1.2	1.0	1.9	1.0	11.8	2.8	24	
17		1.4	1.2	1.0	1.0	1.1	2.5	3.2	2.2	2.6	1.9	2.0	2.0	2.3	1.9	1.8	1.3	1.1	1.5	S	1.9	1.4	1.4	1.3	1.2	1.0	3.2	1.7	24	
18		1.0	0.8	0.9	1.2	9.3	14.1	22.6	3.9	3.7	2.3	1.9	14.3	3.0	6.8	7.4	3.9	23.4	S	1.8	12.0	2.4	2.3	3.3	1.8	0.8	23.4	6.3	24	
19		1.0	0.9	1.4	2.3	3.7	4.9	6.8	7.3	3.5	3.0	2.3	9.4	11.0	1.7	9.4	13.5	S	3.6	3.7	12.2	3.7	2.9	1.2	1.3	0.9	13.5	4.8	24	
20		1.4	1.1	5.6	0.9	1.6	2.5	2.4	2.3	2.5	2.5	2.1	5.0	2.4	2.0	2.3	S	2.6	2.3	7.8	1.4	1.9	1.4	1.3	2.8	0.9	7.8	2.5	24	
21		1.1	1.1	0.9	1.2	1.3	17.4	1.8	2.8	2.6	1.9	2.4	1.9	1.6	1.5	S	2.5	1.9	2.2	1.6	1.3	1.4	1.4	1.2	1.1	0.9	17.4	2.4	24	
22		1.0	1.0	1.6	1.8	1.4	4.8	4.7	12.1	11.3	12.4	3.8	10.7	3.7	S	12.2	2.5	2.6	10.5	2.7	14.1	1.1	1.5	1.4	1.3	1.0	14.1	5.2	24	
23		1.2	1.2	1.2	0.8	1.1	1.5	1.4	2.1	2.3	2.0	2.0	1.7	S	2.1	1.6	1.7	1.9	1.7	1.8	1.7	1.3	1.6	5.0	23.4	0.8	23.4	2.7	24	
24		3.0	1.2	1.5	0.8	2.4	2.1	23.1	3.9	4.0	2.3	1.9	S	2.0	2.2	1.7	9.7	11.9	2.1	1.4	2.0	1.3	1.3	1.8	1.2	0.8	23.1	3.7	24	
25		1.2	1.3	1.4	1.4	3.8	6.1	3.5	3.3	2.3	2.8	S	3.8	8.8	2.1	8.6	2.0	1.8	1.4	1.4	1.4	3.6	22.4	15.7	68.1	1.4	1.2	68.1	7.3	24
26		1.4	1.3	1.3	3.2	4.4	4.6	39.7	31.7	58.1	S	10.2	85.4	18.6	35.6	31.1	13.5	15.5	8.5	18.4	13.8	6.1	2.4	1.3	1.2	1.2	85.4	17.7	24	
27		1.1	1.1	1.1	1.1	8.9	23.6	18.1	19.7	S	10.5	4.1	8.1	10.2	2.3	1.5	15.7	8.3	1.3	1.3	1.6	37.7	2.5	1.2	1.2	1.1	37.7	7.9	24	
28		5.6	1.3	23.2	20.1	2.3	1.6	2.7	S	4.1	4.0	2.7	3.7	1.9	3.0	1.7	10.0	2.7	3.0	1.6	10.0	2.0	1.2	1.0	0.9	0.9	23.2	4.8	24	
29		0.8	1.1	6.2	2.8	1.4	1.5	S	3.9	5.1	2.1	2.5	4.1	3.6	2.7	4.5	2.1	1.7	8.8	2.9	3.6	9.4	1.5	2.1	4.6	0.8	9.4	3.4	24	
30		1.5	2.0	1.6	1.0	1.0	S	2.3	2.5	1.5	2.0	2.3	2.1	3.2	1.7	16.5	7.6	17.2	1.6	1.3	1.5	12.1	2.7	1.0	1.0	1.0	17.2	3.8	24	
31		1.8	1.0	1.5	0.9	S	1.2	1.3	1.6	1.6	1.7	2.2	2.2	1.7	1.2	2.0	1.6	2.1	1.4	1.4	1.1	0.9	6.1	1.2	1.6	0.9	6.1	1.7	24	
HOURLY MAX		12.4	24.3	23.2	20.1	9.3	23.6	39.7	31.7	58.1	17.7	24.1	85.4	18.7	35.6	31.1	15.7	23.4	11.4	18.4	15.6	37.7	15.7	68.1	23.4					
HOURLY AVG		2.3	2.2	2.5	2.4	2.9	5.8	8.1	6.0	6.7	3.9	4.4	7.2	5.2	4.9	6.6	5.3	5.1	3.1	2.9	4.2	4.9	2.7	4.3	3.0					

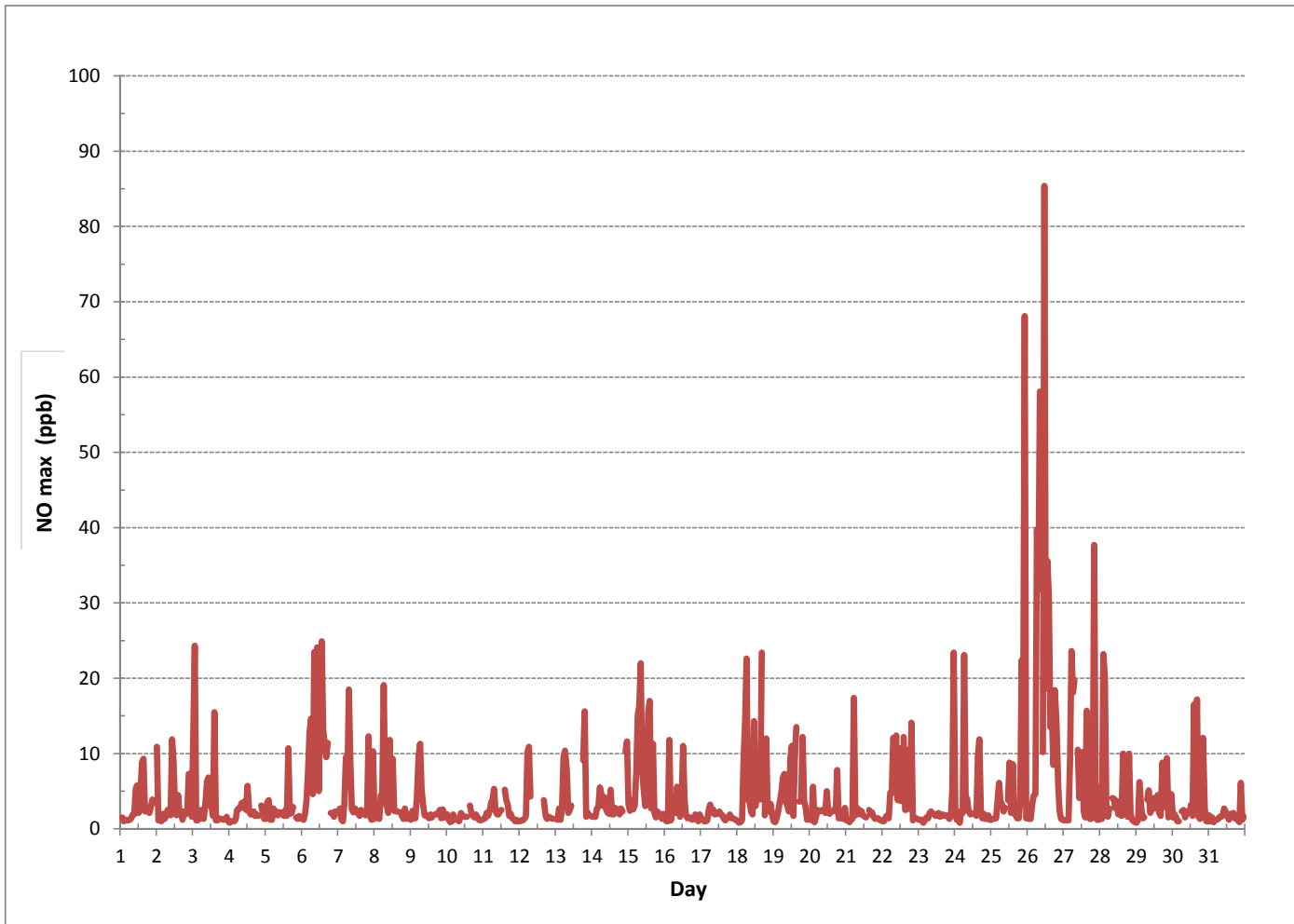
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

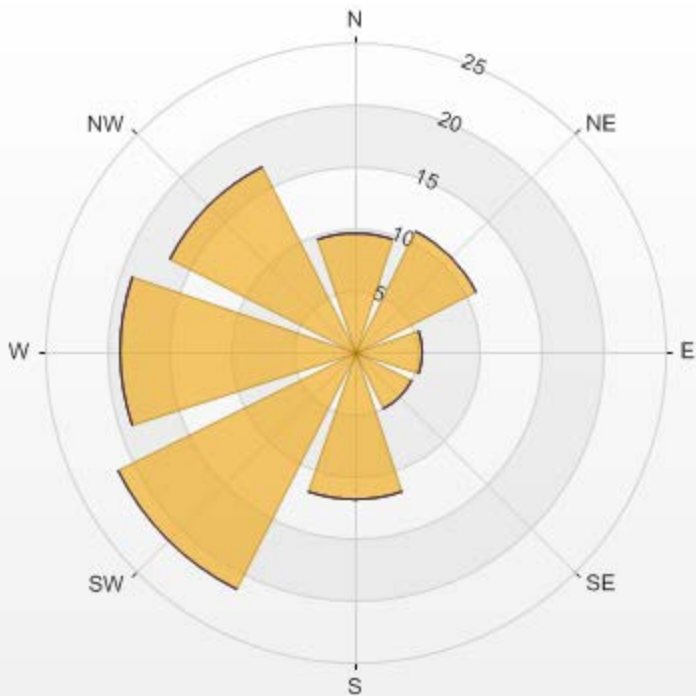
NUMBER OF NON-ZERO READINGS:	697
MAXIMUM INSTANTANEOUS VALUE:	85.4 PPB @ HOUR(S) 11 ON DAY(S) 26
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	8 HRS
STANDARD DEVIATION:	6.85
OPERATIONAL TIME:	737 HRS

NITRIC OXIDE MAX instantaneous maximum in ppb



Wind: LICA Bonnyville Monitor: NO [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 93.68% Calm Avg: 0.00

Direction	0.0-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	9.61	0	0	0	9.61
NE	10.9	0	0	0	10.9
E	5.45	0	0	0	5.45
SE	5.16	0	0	0	5.16
S	11.91	0	0	0	11.91
SW	21.38	0	0	0	21.38
W	18.94	0	0	0	18.94
NW	16.64	0	0	0	16.64
Summary	100	0	0	0	100



% Icon Classes (ppb)							
100	 0.0-50.0	0	 50.0-110.0	0	 110.0-210.0	0	 >210.0

NITROGEN DIOXIDE

NITROGEN DIOXIDE (NO2) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HOUR AVG.	RDGS.	
DAY	HR	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
1	S	3.8	3.3	4.0	4.0	3.7	3.2	2.7	1.9	1.7	2.0	1.6	1.5	2.1	2.1	2.4	1.5	1.1	1.5	1.7	2.9	4.8	5.0	S	1.1	5.0	2.7	24		
2		4.2	4.7	7.0	5.4	5.4	4.4	3.7	2.9	2.3	2.2	2.0	1.9	1.4	1.4	1.6	1.3	1.3	1.0	1.2	1.3	2.5	2.3	S	3.0	1.0	7.0	2.8	24	
3		2.8	2.3	1.8	2.0	2.2	3.7	2.2	2.4	3.4	3.7	2.4	1.5	1.4	1.1	1.4	1.9	2.3	2.9	2.1	2.7	1.8	S	2.2	1.9	1.1	3.7	2.3	24	
4		1.6	1.6	1.7	1.5	2.4	3.2	2.7	2.6	2.1	2.0	1.6	1.2	1.5	0.9	0.9	1.0	1.2	1.4	2.0	3.2	S	6.4	7.4	3.9	0.9	7.4	2.3	24	
5		3.6	10.6	11.2	5.3	3.7	4.4	2.8	2.8	3.0	3.0	3.2	2.4	2.8	3.1	3.0	3.3	2.6	2.3	3.1	S	3.7	4.2	3.9	4.4	2.3	11.2	4.0	24	
6		4.8	6.5	7.8	10.3	11.2	10.9	5.4	4.9	3.7	2.4	3.9	7.6	5.7	4.5	3.0	2.0	1.9	4.4	S	2.6	2.7	3.7	6.1	7.9	1.9	11.2	5.4	24	
7		3.7	7.0	3.2	2.2	4.9	7.2	7.9	4.4	6.4	2.4	1.8	1.8	1.4	0.9	0.9	1.2	1.1	S	1.8	2.8	4.0	5.3	2.5	3.4	0.9	7.9	3.4	24	
8		4.2	5.6	7.7	6.4	7.1	7.8	5.6	4.2	2.6	2.4	2.4	2.4	2.9	3.9	3.4	2.3	S	3.1	4.0	5.3	6.4	3.7	3.6	3.3	2.3	7.8	4.4	24	
9		2.9	3.6	5.4	6.6	8.0	9.3	7.5	3.7	2.6	1.4	1.3	1.2	1.4	1.3	1.1	S	1.5	1.7	2.2	2.4	3.1	3.4	3.8	3.8	1.1	9.3	3.4	24	
10		3.7	2.5	2.2	2.1	2.3	2.0	1.9	2.1	2.2	1.8	1.6	1.2	0.9	0.9	S	1.1	1.4	1.9	1.8	1.9	2.1	4.0	6.1	5.9	0.9	6.1	2.3	24	
11		6.4	5.8	8.9	5.9	5.3	6.4	6.9	4.9	1.6	1.0	1.2	1.8	2.4	S	3.2	2.3	2.3	1.8	2.2	2.1	2.3	3.4	3.5	2.6	1.0	8.9	3.7	24	
12		3.2	3.7	5.2	5.7	5.1	5.9	4.7	3.1	C	C	C	C	C	C	C	C	C	2.0	0.8	0.6	1.2	2.4	3.1	2.6	S	0.6	5.9	3.3	24
13		6.5	6.9	6.8	7.3	10.2	10.7	10.1	5.7	2.1	1.7	2.1	C1	C1	C1	C1	C1	C1	C1	2.3	2.3	2.3	3.6	S	6.1	1.7	10.7	5.4	17	
14		7.6	10.0	8.3	9.2	10.7	9.5	5.0	2.3	2.1	1.8	1.7	1.5	1.5	1.8	1.3	2.9	2.0	3.1	3.0	2.6	3.4	S	7.6	9.4	1.3	10.7	4.7	24	
15		10.3	8.5	9.3	7.8	5.6	6.2	6.0	6.8	3.5	1.6	1.4	1.2	1.3	1.1	1.9	1.0	1.2	1.1	1.1	1.7	S	2.5	1.9	1.9	1.0	10.3	3.7	24	
16		2.1	2.3	2.2	3.1	3.3	2.4	2.0	1.5	4.3	1.9	1.1	1.2	0.9	0.9	1.0	1.0	1.5	2.1	2.4	S	4.1	3.4	3.4	2.8	0.9	4.3	2.2	24	
17		5.7	5.3	4.8	4.4	4.0	5.4	4.5	3.2	3.7	3.0	2.5	1.8	1.7	1.2	1.3	1.1	1.1	1.4	S	4.3	4.8	5.7	6.3	8.9	1.1	8.9	3.7	24	
18		4.2	4.9	7.0	4.8	6.6	9.7	8.4	5.0	4.1	2.1	1.5	2.1	1.6	1.2	1.4	1.6	0.9	S	2.5	4.4	2.4	3.6	5.1	5.0	0.9	9.7	3.9	24	
19		4.6	3.2	4.3	7.2	11.7	8.1	6.7	5.2	4.0	2.7	1.9	1.9	2.2	1.7	1.8	2.4	S	3.7	4.3	4.0	3.1	5.7	4.3	4.1	1.7	11.7	4.3	24	
20		5.2	4.3	4.8	3.6	4.5	4.1	2.8	3.7	4.1	3.3	1.6	1.7	1.2	1.3	1.2	S	3.2	1.6	1.7	1.5	2.5	1.8	2.2	2.3	1.2	5.2	2.8	24	
21		2.2	2.0	1.3	1.2	1.8	2.7	1.7	2.1	1.3	1.2	1.2	1.4	1.3	1.2	S	2.3	2.1	2.1	1.8	2.1	3.9	3.8	3.5	3.3	1.2	3.9	2.1	24	
22		5.1	6.9	8.4	6.0	5.3	4.4	3.3	3.5	1.8	2.1	2.1	2.4	1.5	S	2.0	1.4	1.6	2.9	1.4	1.6	1.8	2.1	1.6	2.6	1.4	8.4	3.1	24	
23		2.6	3.6	1.7	1.5	2.4	2.7	1.6	1.7	1.5	1.4	1.3	1.1	S	1.6	1.2	1.4	1.7	1.7	1.4	2.1	3.2	2.2	2.2	4.5	1.1	4.5	2.0	24	
24		5.3	2.1	1.8	1.0	1.9	1.8	3.7	2.8	2.5	2.6	1.2	S	1.4	1.6	1.6	2.9	1.5	1.5	1.4	2.3	3.1	1.5	2.4	2.1	1.0	5.3	2.2	24	
25		2.9	2.9	2.6	4.6	3.3	4.9	3.3	2.8	1.8	2.0	S	1.9	1.5	1.5	2.6	1.7	1.7	1.3	1.7	4.2	4.6	4.4	3.0	3.9	1.3	4.9	2.8	24	
26		4.2	4.4	5.0	7.6	8.4	9.7	11.9	9.9	10.0	S	5.6	9.2	5.2	5.9	3.1	2.4	2.5	2.3	4.0	3.7	2.2	2.4	3.4	3.1	2.2	11.9	5.5	24	
27		2.4	2.1	2.5	4.9	4.2	10.7	6.5	2.6	S	3.7	3.1	2.5	2.2	1.8	1.7	1.8	1.9	2.3	2.6	3.3	8.4	3.3	2.4	2.9	1.7	10.7	3.5	24	
28		4.4	4.2	6.6	7.8	3.8	3.9	3.5	S	2.8	2.4	2.6	2.8	2.4	1.7	1.6	1.5	1.3	1.4	1.9	2.3	2.4	1.2	1.6	1.4	1.2	7.8	2.8	24	
29		2.3	3.3	4.3	5.4	4.0	2.1	S	2.0	2.3	2.2	2.1	2.0	2.0	1.6	1.5	1.9	3.5	5.1	1.9	2.8	10.8	3.2	4.4	8.2	1.5	10.8	3.4	24	
30		5.8	4.1	3.9	2.3	2.2	S	3.9	3.4	2.1	2.0	1.9	2.0	2.4	2.3	2.1	1.5	1.4	1.5	2.4	3.6	5.3	3.7	1.8	2.2	1.4	5.8	2.8	24	
31		2.3	1.9	2.1	2.1	S	2.4	2.5	2.0	1.4	1.1	0.8	0.5	0.8	0.7	0.6	0.7	1.0	0.8	0.7	1.0	1.0	0.8	0.8	0.9	0.5	2.5	1.3	24	
HOURLY MAX		10.3	10.6	11.2	10.3	11.7	10.9	11.9	9.9	10.0	3.7	5.6	9.2	5.7	5.9	3.4	3.3	3.5	5.1	4.3	5.3	10.8	6.4	7.6	9.4					
HOURLY AVG		4.2	4.5	4.9	4.8	5.2	5.7	4.7	3.6	3.0	2.2	2.0	2.2	1.9	1.8	1.8	1.8	1.8	2.1	2.1	2.7	3.6	3.4	3.6	4.0					

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

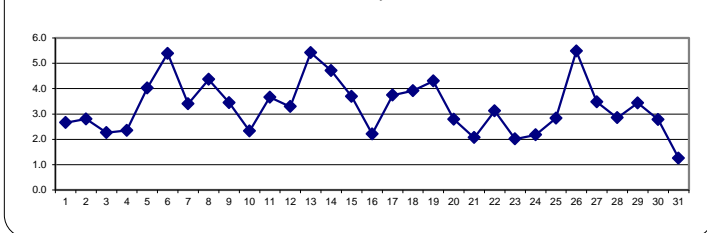
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 PPB

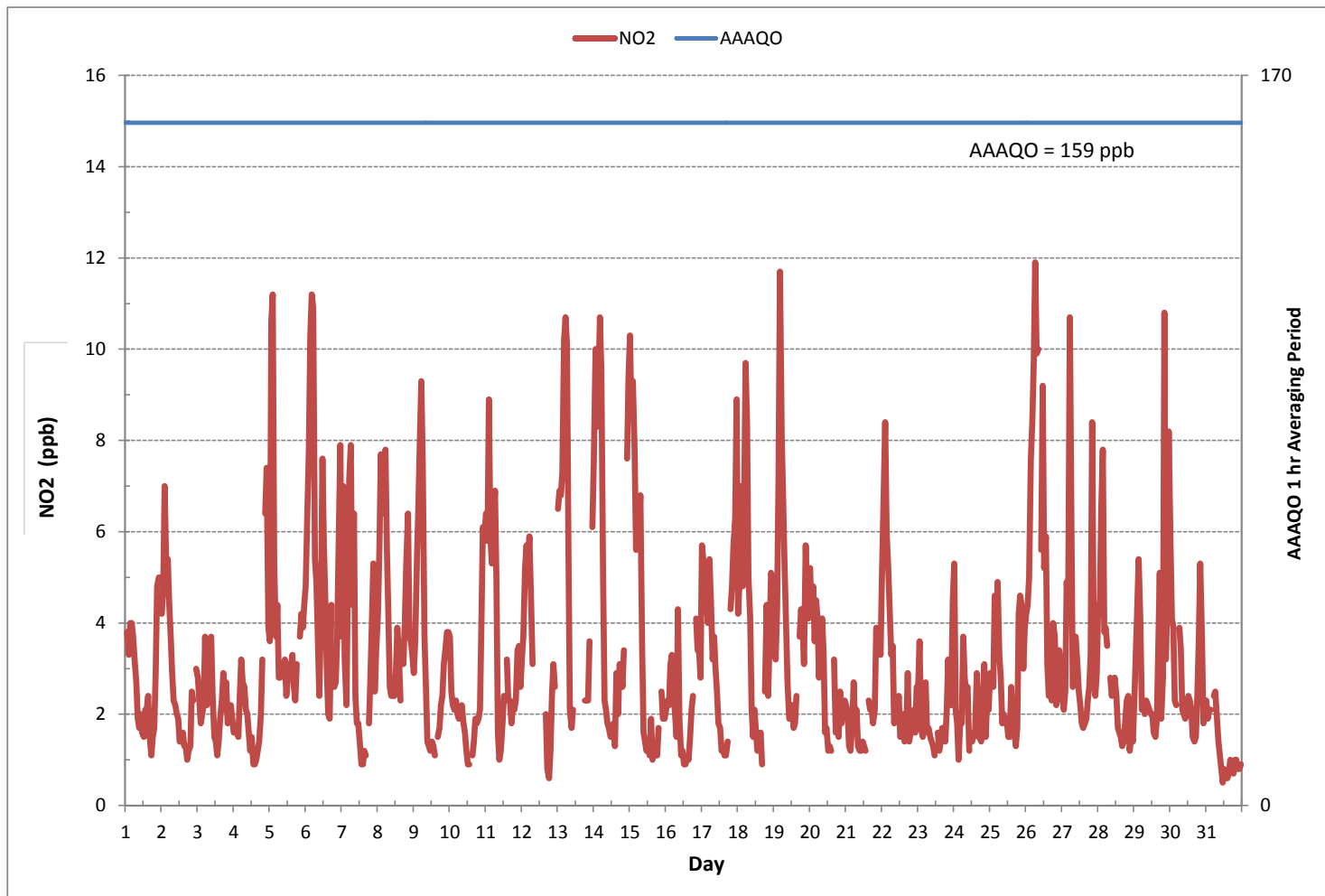
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDENCES:	0				
NUMBER OF NON-ZERO READINGS:	697				
MINIMUM 1-HR AVERAGE:	0.5 PPB	@ HOUR(S)	11	ON DAY(S)	31
MAXIMUM 1-HR AVERAGE:	11.9 PPB	@ HOUR(S)	6	ON DAY(S)	26
MAXIMUM 24-HR AVERAGE:	5.5 PPB			ON DAY(S)	26
				VAR-VARIOUS	
IZS CALIBRATION TIME:	32 HRS	OPERATIONAL TIME:	737 HRS		
MONTHLY CALIBRATION TIME:	8 HRS	AMD OPERATION UPTIME:	99.1 %		
STANDARD DEVIATION:	2.20	MONTHLY AVERAGE:	3.3 PPB		

24 HOUR AVERAGES FOR July 2016



NITROGEN DIOXIDE (NO₂) hourly averages in ppb





NITROGEN DIOXIDE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
DAY	MIN.	MAX.	AVG.	RDGS.																									
1	S	4.1	3.4	3.9	4.1	5.1	3.1	2.4	1.6	1.6	6.7	6.1	1.4	3.1	8.9	11.7	2.1	0.9	1.9	1.8	3.7	6.2	6.3	S	0.9	11.7	4.1	24	
2	15.0	5.5	8.5	6.7	5.7	3.9	4.2	2.7	2.3	2.1	13.7	14.1	2.2	1.5	7.6	1.6	1.7	1.2	2.4	2.9	3.6	14.3	S	3.3	1.2	15.0	5.5	24	
3	11.5	20.6	2.3	2.1	3.7	4.5	2.0	2.7	3.7	6.0	7.5	1.5	1.7	1.5	8.2	2.2	2.4	3.1	2.0	2.6	1.5	S	1.7	2.0	1.5	20.6	4.2	24	
4	1.5	1.4	1.4	1.1	2.7	3.5	3.6	2.7	2.1	2.8	2.7	1.3	2.0	0.9	0.8	1.1	1.5	1.5	2.1	3.9	S	8.3	8.5	5.0	0.8	8.5	2.7	24	
5	5.0	12.3	12.3	6.4	4.9	4.4	4.1	2.9	3.1	3.1	3.3	2.3	3.9	3.3	4.6	5.9	3.6	2.9	3.3	S	3.9	4.8	4.0	6.0	2.3	12.3	4.8	24	
6	4.9	6.2	10.9	11.9	11.9	12.8	11.9	5.6	26.7	11.7	17.0	9.3	22.6	39.3	41.6	10.8	8.1	18.0	S	4.0	3.0	5.4	9.5	10.7	3.0	41.6	13.6	24	
7	4.5	15.7	3.6	2.6	8.2	10.9	10.1	7.5	9.9	2.7	2.5	3.3	2.1	1.1	1.2	1.6	2.0	S	2.8	3.4	10.0	13.7	5.2	8.4	1.1	15.7	5.8	24	
8	6.4	9.4	8.2	6.9	11.1	9.4	16.7	4.8	3.0	2.5	3.6	4.0	16.2	5.8	5.7	3.2	S	3.0	5.3	5.1	9.2	4.0	4.3	3.8	2.5	16.7	6.6	24	
9	2.5	4.0	6.7	8.2	9.0	9.6	8.4	4.3	3.0	1.9	1.7	1.0	1.1	1.3	1.0	S	1.7	2.2	2.6	3.3	3.3	4.1	4.5	4.5	1.0	9.6	3.9	24	
10	4.0	2.3	2.1	1.8	2.0	2.9	1.5	2.1	3.4	2.7	1.5	0.9	0.8	0.8	S	1.5	1.1	2.5	2.0	2.7	2.6	6.6	7.2	6.2	0.8	7.2	2.7	24	
11	7.8	5.7	9.5	7.4	5.7	6.7	7.1	5.9	2.3	0.8	1.2	1.9	2.5	S	3.8	2.7	2.7	1.7	2.2	1.8	2.1	3.3	4.6	2.4	0.8	9.5	4.0	24	
12	3.1	3.6	5.3	5.6	5.9	7.8	8.0	3.5	C	C	C	C	C	C	C	C	C	3.6	3.1	3.3	4.6	5.0	5.7	6.8	S	3.1	8.0	5.0	24
13	7.2	7.5	7.5	11.5	12.3	13.9	13.1	8.1	3.1	4.0	4.6	C1	C1	C1	C1	C1	C1	C1	11.5	12.4	5.5	6.3	S	7.1	3.1	13.9	8.5	17	
14	9.1	10.4	9.4	10.1	11.7	10.7	8.0	3.3	3.4	3.1	2.5	2.3	3.8	2.9	3.3	4.7	3.0	5.3	3.8	4.3	5.0	S	14.3	17.5	2.3	17.5	6.6	24	
15	11.2	12.3	11.5	8.4	8.4	7.6	8.2	10.6	13.9	10.2	10.5	2.7	10.1	8.8	13.2	2.2	9.9	2.6	1.5	3.5	S	3.9	2.5	2.8	1.5	13.9	7.7	24	
16	2.7	2.6	2.6	9.0	4.1	2.7	2.4	3.2	6.5	5.3	2.2	2.6	9.0	8.3	2.2	1.6	2.2	3.2	3.8	S	5.2	4.7	4.1	3.5	1.6	9.0	4.1	24	
17	7.9	7.4	5.6	5.0	5.0	6.0	6.6	4.6	4.3	3.9	3.1	2.7	2.5	2.0	2.2	1.8	1.5	1.8	S	5.4	7.0	7.6	11.4	15.7	1.5	15.7	5.3	24	
18	6.1	6.9	12.5	7.0	13.3	13.8	14.9	5.9	5.7	3.3	2.7	6.2	10.2	8.4	8.1	5.1	6.8	S	5.2	13.5	3.2	5.6	6.8	7.6	2.7	14.9	7.8	24	
19	5.3	4.1	7.4	9.9	13.0	11.5	8.2	12.1	5.7	4.1	2.9	7.5	3.9	3.0	5.2	15.7	S	6.5	7.1	13.1	5.4	9.8	6.9	5.3	2.9	15.7	7.5	24	
20	11.9	7.3	15.0	5.0	7.3	7.0	4.1	4.7	5.8	4.8	2.5	9.8	1.7	1.9	2.1	S	5.7	3.1	7.6	2.5	3.6	2.4	3.8	3.2	1.7	15.0	5.3	24	
21	3.5	2.8	1.9	1.7	2.9	16.5	2.6	2.5	1.8	1.6	1.7	1.8	2.0	2.6	S	3.7	2.6	2.9	2.2	3.3	5.5	5.2	4.5	4.0	1.6	16.5	3.5	24	
22	9.9	10.4	9.9	9.0	7.2	7.6	4.3	10.7	4.3	17.5	3.1	9.6	3.5	S	11.7	2.8	3.1	11.9	6.6	6.4	3.5	3.7	3.0	4.6	2.8	17.5	7.1	24	
23	4.4	5.8	4.1	2.3	3.4	4.8	2.3	2.6	2.6	2.1	2.5	1.9	S	2.3	1.8	2.3	2.5	2.9	2.0	4.0	3.9	3.7	9.5	9.3	1.8	9.5	3.6	24	
24	9.2	6.2	4.1	2.1	3.2	2.1	17.7	4.0	9.7	3.3	2.1	S	2.2	2.5	2.5	10.9	12.5	2.5	2.3	4.3	8.8	3.3	7.4	3.4	2.1	17.7	5.5	24	
25	6.1	7.6	4.1	6.0	5.9	9.2	5.1	4.7	2.9	3.2	S	3.1	7.9	2.0	9.5	2.6	2.1	1.8	4.4	6.2	23.0	17.1	16.5	7.0	1.8	23.0	6.9	24	
26	6.6	5.9	7.0	8.6	9.5	11.0	20.2	39.8	36.1	S	21.2	30.4	20.7	23.0	10.4	14.9	13.1	13.2	25.2	11.6	13.6	4.3	7.8	5.3	4.3	39.8	15.6	24	
27	6.0	4.4	5.5	7.6	35.1	14.1	14.0	14.3	S	19.6	9.6	11.9	14.4	3.0	2.1	2.4	3.3	3.5	3.5	6.5	22.0	5.7	3.1	3.7	2.1	35.1	9.4	24	
28	19.5	5.1	24.2	24.6	4.9	4.4	4.1	S	5.6	5.6	4.2	4.6	3.6	3.5	2.5	9.6	2.3	3.3	2.4	14.3	4.3	2.2	3.2	2.7	2.2	24.6	7.0	24	
29	4.7	5.1	10.9	11.9	5.1	3.1	S	2.9	4.8	3.2	3.9	3.2	3.3	2.5	7.8	8.7	10.5	17.1	3.6	10.3	23.3	5.1	5.9	9.7	2.5	23.3	7.0	24	
30	8.1	5.5	4.9	3.5	2.5	S	5.3	5.6	3.2	3.1	2.7	2.5	4.2	5.0	12.7	10.1	8.4	2.9	3.1	7.2	7.6	5.0	3.3	3.7	2.5	12.7	5.2	24	
31	3.1	2.5	2.8	2.7	S	3.5	3.3	3.1	2.1	1.7	8.7	1.3	2.0	1.3	1.5	1.3	1.9	1.5	1.5	1.7	1.7	8.8	1.5	1.5	1.3	8.8	2.7	24	
HOURLY MAX	19.5	20.6	24.2	24.6	35.1	16.5	20.2	39.8	36.1	19.6	21.2	30.4	22.6	39.3	41.6	15.7	13.1	18.0	25.2	14.3	23.3	17.1	16.5	17.5					
HOURLY AVG	7.0	6.8	7.3	6.8	7.7	7.7	7.5	6.3	6.3	4.7	5.2	5.4	5.8	5.2	6.7	5.1	4.4	4.5	4.4	5.7	6.9	6.2	6.1	5.9					

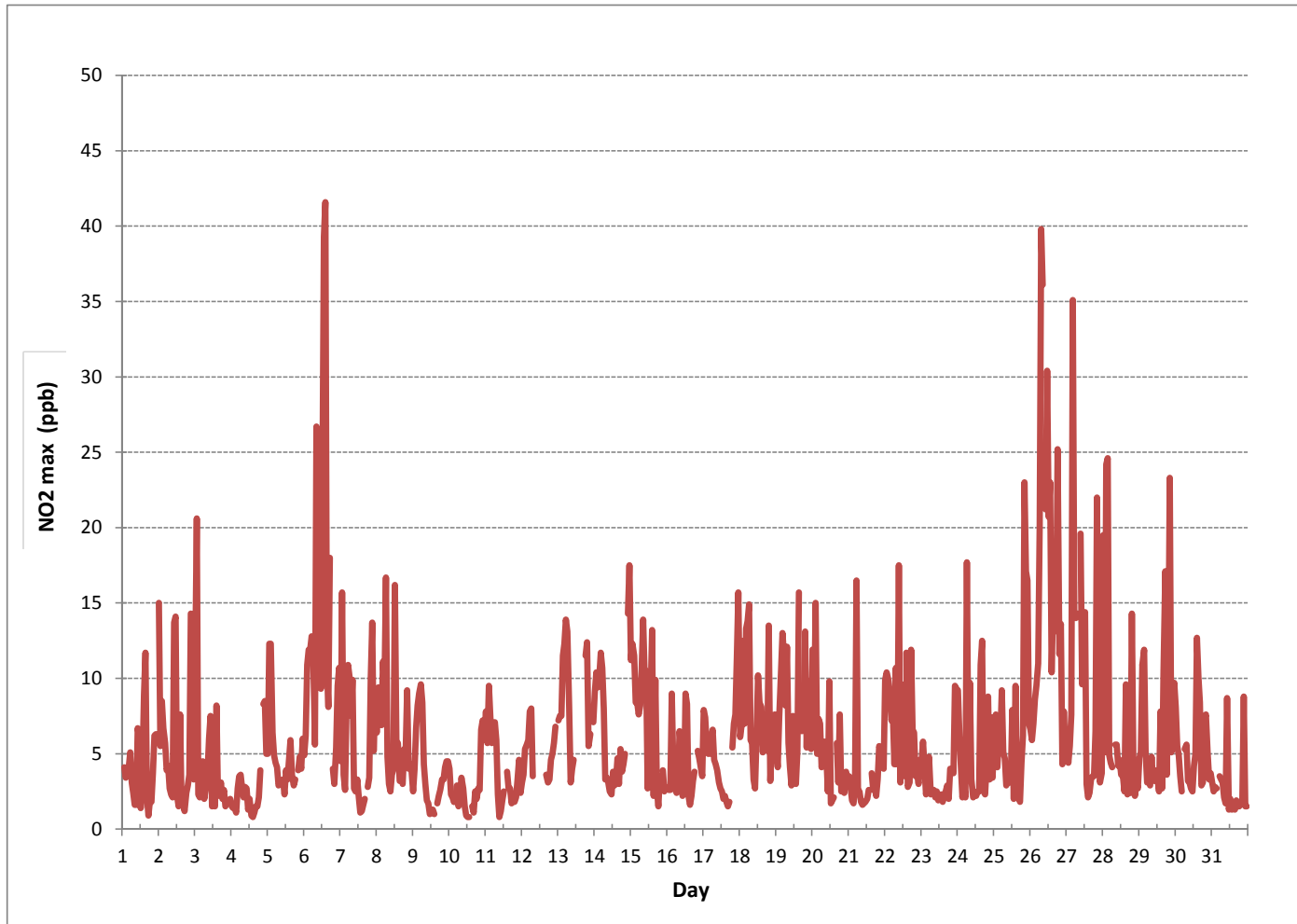
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

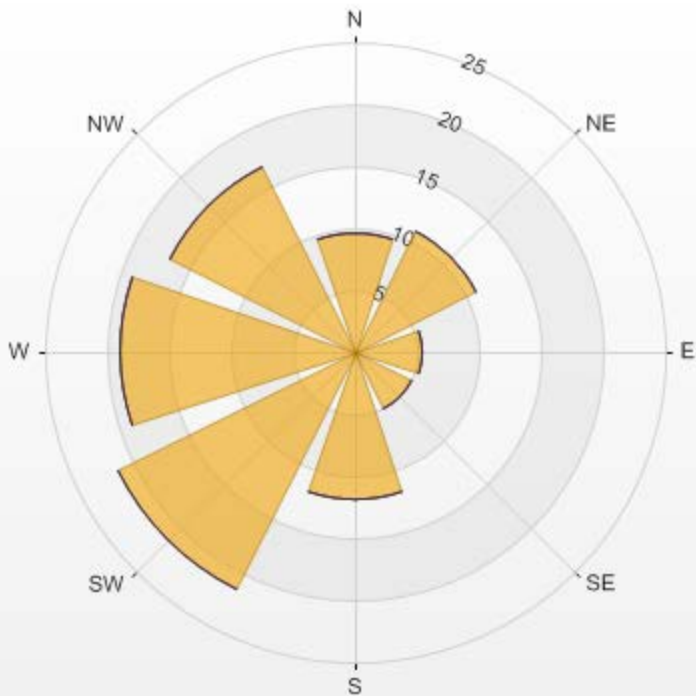
NUMBER OF NON-ZERO READINGS:	697
MAXIMUM INSTANTANEOUS VALUE:	41.6 PPB @ HOUR(S) 14 ON DAY(S) 6
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	8 HRS
STANDARD DEVIATION:	5.30
OPERATIONAL TIME:	737 HRS

NITROGEN DIOXIDE MAX instantaneous maximum in ppb



Wind: LICA Bonnyville Monitor: NO2 [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 93.68% Calm Avg: 0.00

Direction	0.0-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	9.61	0	0	0	9.61
NE	10.9	0	0	0	10.9
E	5.45	0	0	0	5.45
SE	5.16	0	0	0	5.16
S	11.91	0	0	0	11.91
SW	21.38	0	0	0	21.38
W	18.94	0	0	0	18.94
NW	16.64	0	0	0	16.64
Summary	100	0	0	0	100



% Icon Classes (ppb)							
100	 0.0-50.0	0	 50.0-110.0	0	 110.0-210.0	0	 >210.0

Calibration Graph for Site: BONNYVIL Parameter: NO2_ Sequence: NO2 Phase: SPAN



OZONE

OZONE (O3) hourly averages in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR	
DAY	MIN.	MAX.	AVG.	RDGS.																									
1	S	20.0	18.0	18.3	16.9	18.0	18.3	19.0	23.5	25.6	27.0	30.4	29.5	30.1	34.5	32.1	32.4	32.1	35.3	35.1	32.1	29.4	S	16.9	35.9	27.0	24		
2		26.7	21.8	14.7	16.1	14.4	15.2	16.8	17.1	18.3	26.7	32.1	34.0	32.5	35.3	38.7	44.1	45.3	42.2	40.9	37.5	32.4	29.7	S	25.8	14.4	45.3	28.6	24
3		27.3	26.8	25.2	23.4	20.5	13.9	18.1	19.3	14.1	21.0	28.0	31.8	37.4	40.4	41.3	40.8	37.5	32.8	35.8	28.0	23.6	S	14.6	12.8	12.8	41.3	26.7	24
4		11.0	10.5	10.6	11.4	11.5	10.1	10.3	10.4	13.0	16.0	19.0	21.9	22.5	23.1	23.3	24.2	24.0	23.4	22.5	18.6	S	12.9	10.9	11.3	10.1	24.2	16.2	24
5		11.3	2.5	3.2	12.4	13.8	16.0	21.9	25.1	21.3	18.0	22.1	26.5	25.0	17.8	19.3	23.1	26.1	22.3	16.8	S	18.3	16.8	15.4	13.4	2.5	26.5	17.8	24
6		11.1	9.3	7.9	6.1	5.2	4.9	8.4	13.5	18.7	22.2	20.7	20.4	27.0	30.1	34.6	37.7	40.4	38.5	S	38.1	32.7	26.9	19.0	16.4	4.9	40.4	21.3	24
7		18.2	16.8	18.0	16.9	10.1	11.7	14.0	20.0	17.9	29.2	33.0	36.6	40.4	39.9	38.2	38.6	39.2	S	38.3	35.3	25.6	24.7	27.4	23.2	10.1	40.4	26.7	24
8		18.3	16.4	8.4	11.5	12.1	10.6	17.0	17.0	21.5	30.4	33.7	34.4	36.4	34.3	34.7	37.5	S	31.8	30.4	21.7	22.1	27.6	22.5	19.3	8.4	37.5	23.9	24
9		17.4	15.7	12.4	7.2	5.6	5.2	8.3	15.6	23.9	29.2	33.2	35.2	38.3	38.1	36.0	S	34.7	32.9	29.6	28.3	27.2	24.5	18.8	17.3	5.2	38.3	23.2	24
10		16.0	15.8	15.0	16.3	17.7	16.6	16.5	24.0	28.5	33.8	27.7	27.3	28.7	29.7	S	29.2	29.2	28.4	27.1	25.8	24.7	20.2	14.6	11.7	11.7	33.8	22.8	24
11		9.6	9.9	6.7	9.6	10.3	11.8	11.9	15.7	21.8	24.3	27.7	26.9	24.7	S	23.7	27.7	28.9	27.9	24.7	23.6	22.1	18.8	17.5	15.6	6.7	28.9	19.2	24
12		12.9	10.8	9.1	9.2	9.9	9.4	12.7	16.8	22.4	26.0	27.5	27.5	28.2	30.9	32.9	33.2	35.8	36.2	35.1	32.6	30.0	29.9	28.4	S	9.1	36.2	23.8	24
13		20.8	20.4	18.8	16.6	14.7	13.4	13.9	19.1	26.5	28.7	30.3	31.7	32.6	35.4	35.6	37.1	33.7	32.3	33.6	30.4	28.2	24.8	S	17.2	13.4	37.1	25.9	24
14		15.1	11.2	11.2	9.8	8.6	10.5	16.0	19.4	21.7	C	C	C	C	C	30.2	27.2	29.3	27.3	25.8	24.7	23.6	S	11.6	11.2	8.6	30.2	18.6	24
15		4.6	5.5	2.2	1.6	3.5	4.0	5.7	10.6	18.8	29.5	32.1	32.3	32.1	32.5	33.2	35.0	34.4	34.4	34.2	32.1	S	23.2	20.6	19.3	1.6	35.0	20.9	24
16		18.5	16.7	15.9	13.1	11.2	13.3	14.5	22.0	23.6	29.6	32.8	34.0	35.1	34.8	36.4	36.9	35.3	33.3	33.4	S	25.9	24.5	23.7	23.4	11.2	36.9	25.6	24
17		17.3	16.7	17.2	16.1	14.7	11.6	11.3	16.8	17.4	20.9	24.4	26.8	30.2	33.4	37.6	40.2	43.1	42.3	S	33.1	29.4	27.5	20.6	16.1	11.3	43.1	24.6	24
18		19.5	13.9	14.7	14.8	9.3	6.7	13.8	22.0	28.5	33.9	35.2	37.3	35.9	36.0	36.5	39.0	40.1	S	39.8	36.7	37.0	31.7	26.5	24.4	6.7	40.1	27.5	24
19		21.6	23.1	19.4	10.4	6.0	7.1	11.3	22.9	28.2	32.7	40.1	44.0	42.6	41.3	39.3	33.3	S	30.9	29.8	29.9	32.8	27.8	28.5	27.7	6.0	44.0	27.4	24
20		23.6	20.8	17.7	16.5	14.7	16.1	17.3	18.5	19.6	22.2	26.5	25.9	27.8	31.3	32.0	S	25.8	23.9	23.3	22.2	21.0	17.5	14.3	13.1	13.1	32.0	21.4	24
21		13.5	13.3	14.3	13.5	13.2	13.2	14.1	13.5	17.3	21.4	24.6	26.8	27.9	29.1	S	28.0	28.8	29.0	29.0	28.2	23.8	19.7	19.3	18.4	13.2	29.1	20.9	24
22		16.6	13.1	8.7	9.8	13.3	14.8	15.7	19.3	25.7	30.0	33.2	33.9	33.8	S	34.8	35.7	36.8	37.1	36.5	35.5	30.6	40.8	37.1	31.8	8.7	40.8	27.2	24
23		30.6	27.8	25.4	24.1	22.7	20.0	21.9	21.5	23.3	26.1	26.8	27.7	S	28.4	28.0	26.0	24.5	23.7	24.5	21.8	19.6	19.6	18.5	14.2	14.2	30.6	23.8	24
24		12.1	14.7	14.5	15.4	15.5	14.7	14.1	16.1	25.8	31.6	29.4	S	30.1	32.1	40.0	39.9	33.7	30.0	24.0	22.0	19.6	19.5	15.7	13.1	12.1	40.0	22.8	24
25		12.2	10.5	8.6	8.7	9.6	9.0	13.5	18.8	23.0	24.3	S	26.5	28.6	29.3	27.2	27.7	27.9	28.4	28.4	23.9	20.9	17.5	18.3	15.5	8.6	29.3	19.9	24
26		11.7	13.1	8.9	4.2	3.9	4.8	8.3	7.6	9.5	S	23.1	19.6	27.1	32.1	34.9	36.1	37.0	33.9	29.2	26.6	33.7	25.3	23.5	23.2	3.9	37.0	20.8	24
27		25.9	24.4	23.2	18.9	13.8	3.7	11.4	17.3	S	26.4	35.0	37.9	35.9	35.5	35.1	34.9	34.8	36.1	35.2	31.6	21.8	21.7	26.0	27.6	3.7	37.9	26.7	24
28		26.9	22.0	18.3	18.3	19.0	16.2	16.5	S	26.9	29.1	34.8	43.1	41.7	36.3	35.2	34.8	33.5	31.5	29.0	28.0	28.3	33.7	29.5	25.6	16.2	43.1	28.6	24
29		22.2	16.1	14.1	13.7	14.9	17.1	S	23.1	28.3	33.0	36.1	36.5	38.2	37.1	38.1	38.8	37.4	40.0	33.4	26.2	17.3	22.6	18.7	7.7	7.7	40.0	26.5	24
30		15.0	18.2	18.9	24.2	27.8	S	22.0	23.0	25.1	27.4	31.3	33.4	31.9	30.1	32.4	34.3	32.8	31.0	27.6	25.3	20.4	22.6	25.5	22.5	15.0	34.3	26.2	24
31		19.6	18.7	17.5	18.2	S	13.8	14.1	19.1	22.6	21.7	21.9	23.4	24.2	25.4	24.5	24.9	24.9	22.5	22.1	23.0	21.8	20.3	18.7	16.0	13.8	25.4	20.8	24
HOURLY MAX		30.6	27.8	25.4	24.2	27.8	20.0	22.0	25.1	28.5	33.9	40.1	44.0	42.6	41.3	41.3	44.1	45.3	42.3	40.9	38.1	37.0	40.8	37.1	31.8				
HOURLY AVG		17.6	16.0	14.2	13.8	12.8	11.8	14.3	18.1	21.9	26.6	29.3	30.8	31.9	32.5	33.4	33.7	33.4	31.6	30.2	28.5	25.8	24.3	21.2	18.4				

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

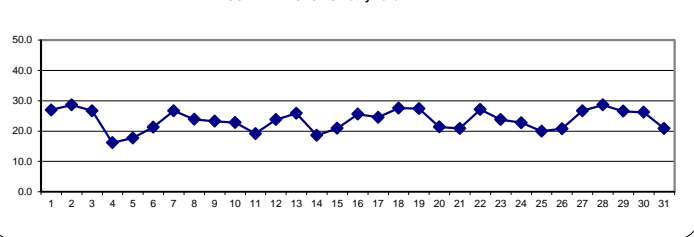
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 82 PPB

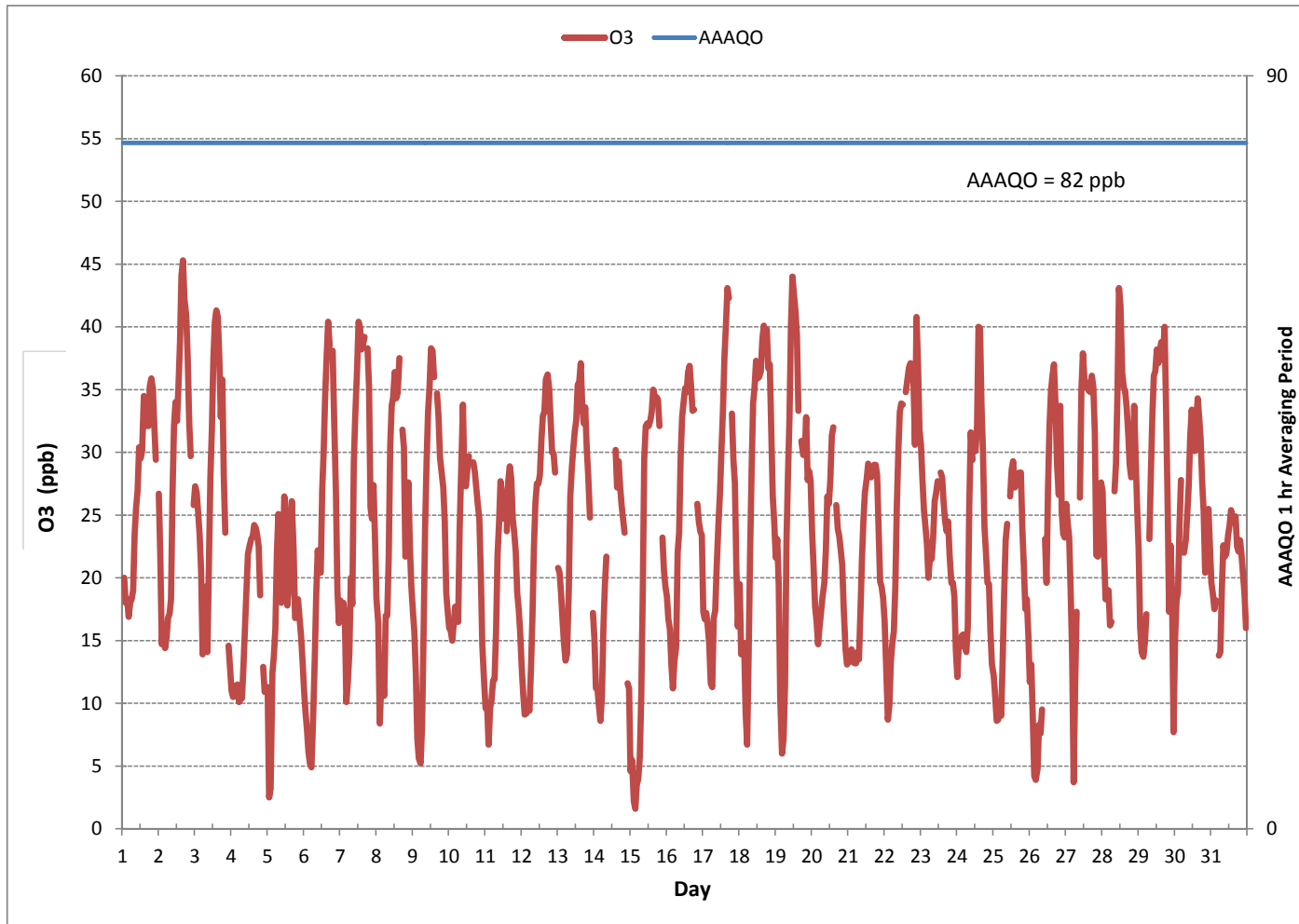
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDENCES:	0					
NUMBER OF NON-ZERO READINGS:	707					
MINIMUM 1-HR AVERAGE:	1.6	PPB	@ HOUR(S)	3	ON DAY(S)	15
MAXIMUM 1-HR AVERAGE:	45.3	PPB	@ HOUR(S)	16	ON DAY(S)	2
MAXIMUM 24-HR AVERAGE:	28.6	PPB			ON DAY(S)	2, 28
					VAR-VARIOUS	
IZS CALIBRATION TIME:	32	HRS	OPERATIONAL TIME:	744	HRS	
MONTHLY CALIBRATION TIME:	5	HRS	AMD OPERATION UPTIME:	100.0	%	
STANDARD DEVIATION:	9.26		MONTHLY AVERAGE:	23.7	PPB	

24 HOUR AVERAGES FOR July 2016



OZONE (O3) hourly averages in ppb





OZONE MAX instantaneous maximum in ppb

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
DAY	MIN.	MAX.	AVG.	RDGS.																										
1	S	22.1	19.1	19.7	17.4	18.5	18.3	21.6	24.1	26.6	28.1	33.1	32.0	31.3	38.2	33.4	32.9	33.7	36.8	36.6	36.2	33.8	31.3	S	17.4	38.2	28.4	24		
2		28.0	26.1	16.5	18.9	17.3	16.5	18.8	18.8	23.3	31.8	35.4	35.6	35.6	38.2	42.6	47.7	47.0	44.1	42.5	40.0	35.4	30.9	S	26.9	16.5	47.7	31.2	24	
3		28.8	28.8	25.7	23.9	23.1	16.4	19.7	20.7	17.0	38.6	39.9	36.1	40.3	41.8	42.9	43.5	40.6	34.9	38.3	32.4	26.1	S	15.4	13.2	13.2	43.5	29.9	24	
4		11.7	10.6	11.1	11.7	12.4	10.8	10.8	11.5	14.5	16.8	20.4	22.8	23.4	23.3	24.0	24.5	25.4	24.1	24.0	19.5	S	15.8	13.2	12.4	10.6	25.4	17.2	24	
5		13.0	6.4	9.4	14.7	15.6	18.3	26.1	28.0	23.1	20.4	26.9	28.0	28.2	20.4	21.3	29.7	28.8	26.3	17.7	S	20.1	18.6	16.2	16.0	6.4	29.7	20.6	24	
6		12.7	10.0	10.0	7.6	7.0	5.7	10.5	18.0	24.9	24.3	22.8	24.9	33.4	35.2	36.2	40.0	44.7	43.5	S	46.7	35.0	32.6	22.3	21.3	5.7	49.7	24.8	24	
7		20.5	21.8	19.5	19.1	12.9	14.9	18.1	22.8	22.6	35.3	36.1	38.3	42.9	41.2	39.9	39.9	40.7	S	40.2	38.8	29.7	28.5	30.7	27.3	12.9	42.9	29.6	24	
8		20.7	21.8	12.3	12.7	14.2	14.9	21.9	20.7	26.3	34.3	35.6	37.8	42.7	40.9	40.3	40.2	S	34.6	34.0	24.0	30.4	30.3	25.5	21.1	12.3	42.7	27.7	24	
9		19.5	16.7	15.1	11.1	6.7	5.9	11.8	18.3	27.0	31.3	35.0	38.3	40.2	39.9	37.5	S	35.6	35.1	31.5	30.0	29.2	25.5	21.9	19.2	5.9	40.2	25.3	24	
10		16.7	16.4	15.9	17.0	18.6	17.7	20.1	28.8	32.6	38.4	34.4	28.2	29.7	30.7	S	31.2	31.3	31.0	28.2	27.8	26.6	23.3	15.2	13.8	13.8	38.4	24.9	24	
11		10.6	10.8	7.9	10.4	11.7	13.2	13.9	20.4	24.0	25.4	29.7	29.0	27.0	S	28.2	31.0	30.4	29.5	27.5	24.4	23.1	21.5	18.3	17.7	7.9	31.0	21.1	24	
12		14.2	11.7	10.1	10.3	10.5	11.2	15.2	20.7	25.2	27.8	29.1	29.4	30.0	33.4	34.5	35.6	37.6	37.2	36.6	35.7	30.9	32.3	30.6	S	10.1	37.6	25.6	24	
13		22.8	21.4	20.1	19.1	16.8	17.0	17.8	23.5	29.0	29.7	32.8	32.9	35.0	37.4	38.8	38.4	37.8	34.5	36.0	35.0	30.9	30.4	S	18.0	16.8	38.8	28.5	24	
14		18.0	13.1	12.3	11.4	9.9	13.7	19.9	21.0	23.7	C	C	C	C	C	33.4	30.0	31.7	29.8	27.9	26.3	25.4	S	16.2	17.3	9.9	33.4	21.2	24	
15		8.1	7.9	5.5	2.6	5.1	5.4	6.9	15.7	26.1	31.3	33.2	33.2	33.4	33.7	35.9	36.2	36.2	35.6	35.0	35.2	S	25.1	22.5	20.1	2.6	36.2	23.0	24	
16		19.7	17.8	17.0	16.4	13.1	14.2	16.5	25.7	26.9	32.5	34.3	35.4	36.5	36.3	38.3	38.4	36.8	35.6	34.9	S	27.6	26.6	25.7	24.9	13.1	38.4	27.4	24	
17		21.3	18.6	17.9	17.1	16.5	12.9	13.5	18.3	19.2	23.3	25.7	29.9	31.3	42.0	41.0	41.6	45.5	43.6	S	36.9	32.6	30.7	24.5	24.8	12.9	45.5	27.3	24	
18		23.7	15.9	19.4	18.5	13.2	11.1	22.1	23.7	32.9	35.4	37.5	39.8	37.6	37.1	37.8	41.3	41.6	S	41.9	41.0	38.8	35.4	29.9	26.4	11.1	41.9	30.5	24	
19		23.5	25.1	25.4	14.4	7.6	8.5	20.0	29.8	30.0	36.1	43.0	45.9	44.7	43.5	44.5	35.9	S	33.5	32.2	32.6	34.9	30.9	29.4	28.4	7.6	45.9	30.4	24	
20		28.4	23.7	20.7	17.6	17.0	18.0	19.7	19.4	20.7	24.1	28.4	29.0	30.0	32.5	32.9	S	27.8	25.6	25.4	23.2	24.5	19.7	16.8	14.4	14.4	32.9	23.5	24	
21		15.3	13.5	14.9	14.2	13.8	13.9	14.7	14.7	20.1	23.7	26.1	27.5	29.0	30.0	S	29.9	29.9	29.9	30.2	29.7	26.6	21.9	20.4	19.5	13.5	30.2	22.1	24	
22		19.2	15.7	10.3	13.0	14.7	16.2	16.7	24.3	28.5	31.3	34.7	35.0	35.1	S	36.5	36.6	38.3	39.3	38.2	37.5	33.4	44.1	40.0	34.7	10.3	44.1	29.3	24	
23		32.9	32.8	28.0	25.5	23.4	22.8	23.3	22.8	25.4	26.9	28.0	29.0	S	29.5	29.2	27.5	25.8	24.6	25.7	23.8	20.8	21.6	20.2	15.7	15.7	32.9	25.4	24	
24		15.0	16.4	15.7	16.2	16.5	15.4	15.7	21.8	30.0	33.8	32.6	S	31.0	34.7	45.3	45.1	42.6	32.5	32.0	23.5	23.7	22.8	19.5	15.9	15.0	45.3	26.0	24	
25		13.9	12.6	10.3	10.5	11.2	12.3	16.2	22.6	24.0	26.1	S	27.8	30.9	31.2	28.4	28.8	29.1	30.0	30.3	26.7	23.8	21.4	20.7	20.7	10.3	31.2	22.2	24	
26		17.4	15.9	12.1	12.1	5.8	8.2	12.0	11.4	13.3	S	27.6	26.6	30.7	36.9	37.1	38.8	38.7	37.5	33.1	29.0	46.4	32.1	27.5	25.8	5.8	46.4	25.0	24	
27		27.7	25.8	25.7	22.8	21.1	11.2	16.0	19.4	S	31.2	40.2	42.0	37.2	37.1	36.2	36.3	36.1	37.4	37.1	35.0	29.2	26.4	28.5	29.4	11.2	42.0	30.0	24	
28		29.2	28.0	25.2	23.5	20.7	19.3	21.0	S	28.4	31.0	40.2	47.4	47.6	37.6	36.5	36.2	35.0	33.2	31.6	30.7	30.2	36.3	33.5	28.4	19.3	47.6	31.8	24	
29		24.7	22.2	20.1	17.4	17.1	18.3	S	26.6	31.5	35.3	37.9	38.1	45.0	39.5	40.2	41.0	45.0	47.3	37.8	31.6	29.3	27.2	24.4	11.4	11.4	47.3	30.8	24	
30		19.1	22.3	21.4	27.4	29.3	S	23.3	25.4	26.7	32.0	32.3	35.9	36.5	35.4	35.9	36.9	34.7	33.4	29.1	28.1	23.3	26.6	29.7	25.2	19.1	36.9	29.1	24	
31		21.3	20.5	19.1	19.2	S	15.4	17.0	21.8	24.3	23.3	24.1	24.8	25.3	26.3	25.8	27.2	26.3	24.6	23.9	24.1	23.3	22.2	21.1	16.8	15.4	27.2	22.5	24	
HOURLY MAX		32.9	32.8	28.0	27.4	29.3	22.8	26.1	29.8	32.9	38.6	43.0	47.4	47.6	43.5	45.3	47.7	47.0	47.3	42.5	46.7	46.4	44.1	40.0	34.7					
HOURLY AVG		19.9	18.5	16.6	16.0	14.7	13.9	17.3	21.3	24.8	29.6	32.1	33.2	34.6	34.9	35.8	36.0	35.7	33.9	32.4	31.2	29.2	27.4	23.8	20.9					

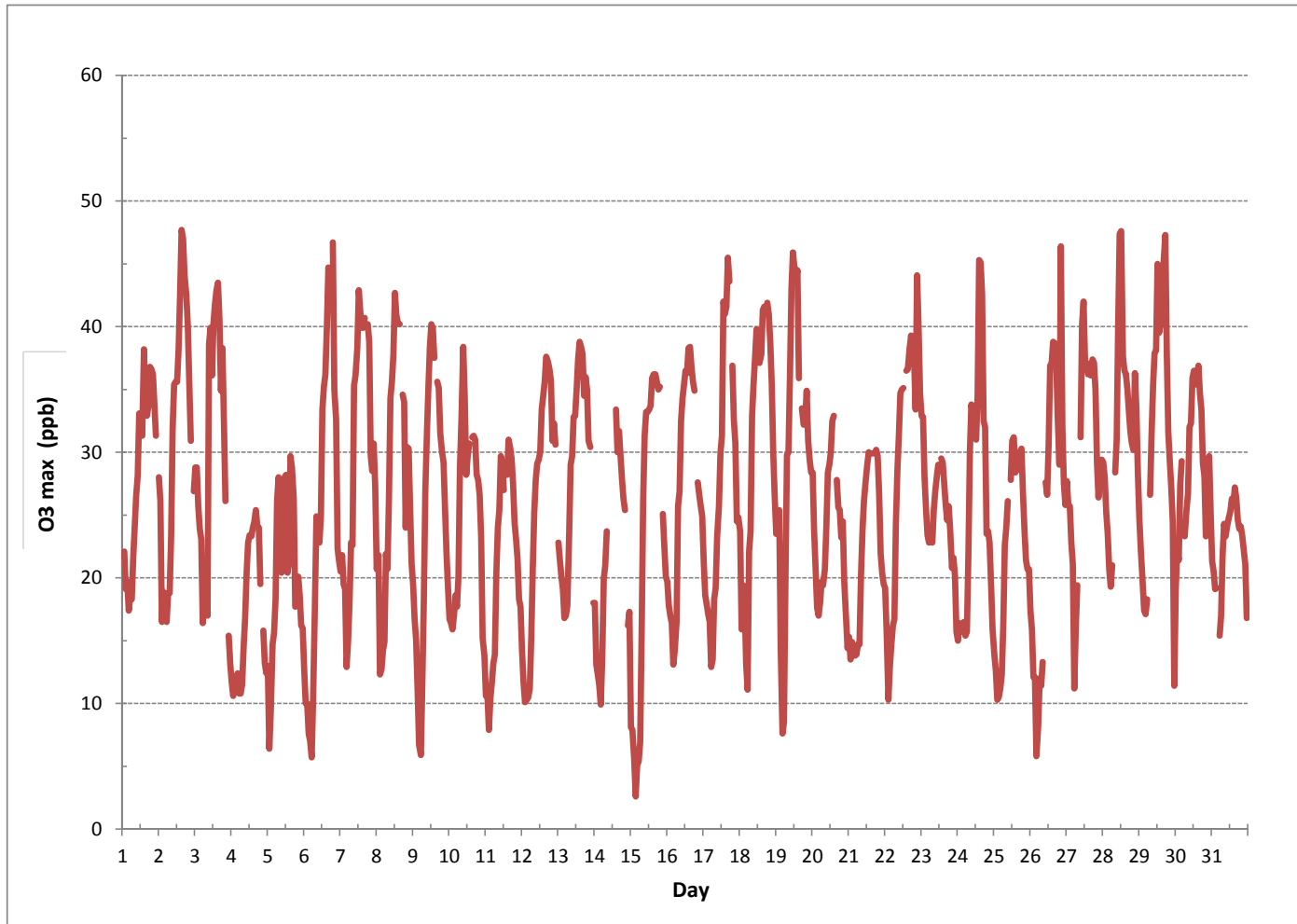
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

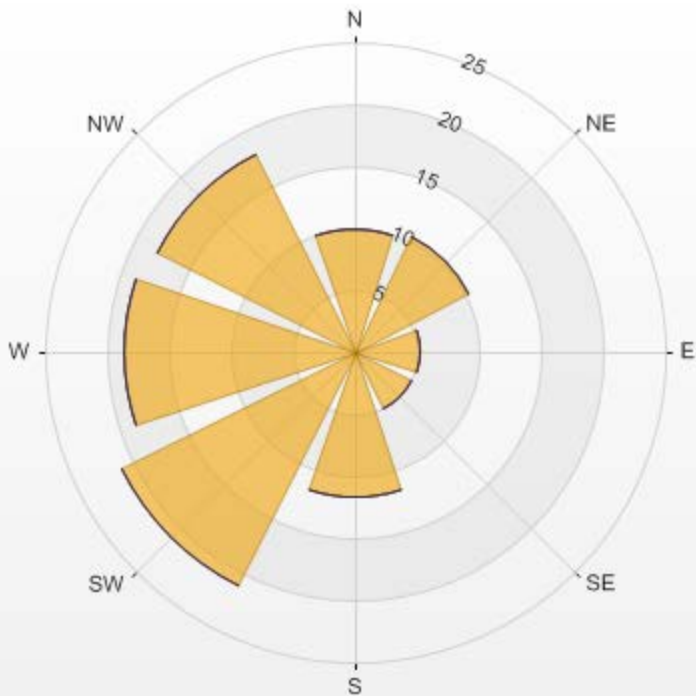
NUMBER OF NON-ZERO READINGS:	707
MAXIMUM INSTANTANEOUS VALUE:	47.7 PPB @ HOUR(S) 15 ON DAY(S) 2
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 HRS
MONTHLY CALIBRATION TIME:	5 HRS
STANDARD DEVIATION:	9.47
OPERATIONAL TIME:	744 HRS

OZONE MAX instantaneous maximum in ppb



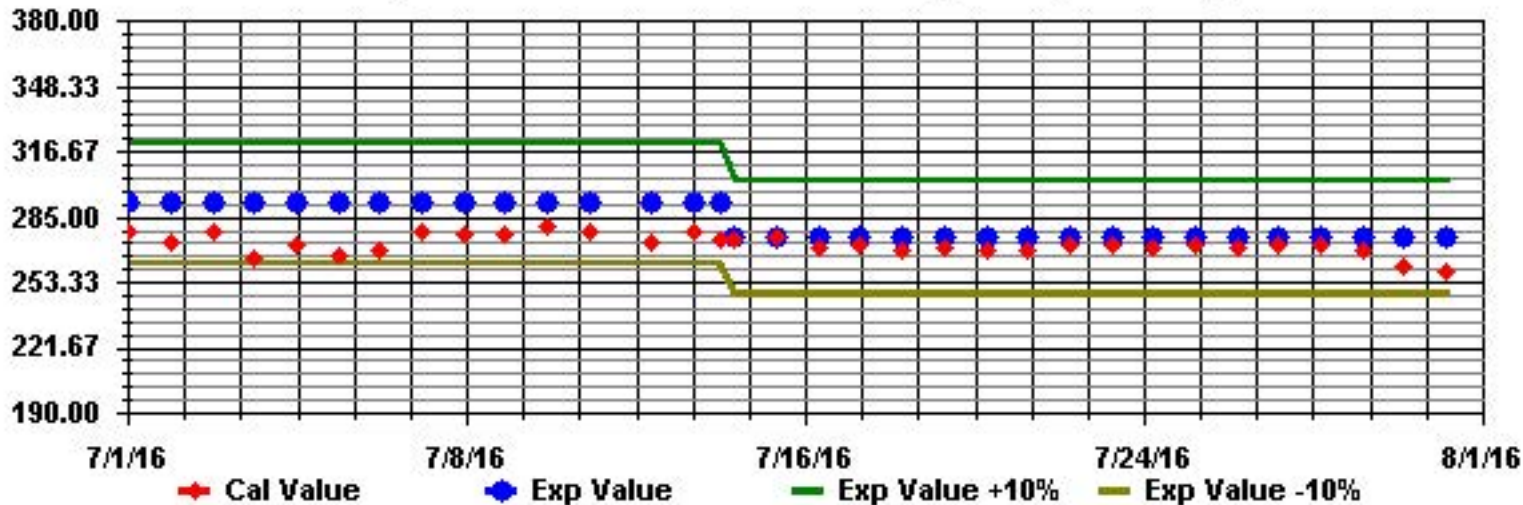
Wind: LICA Bonnyville Monitor: O3 [ppb] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 95.03% Calm Avg: 0.00

Direction	0.0-50.0	50.0-110.0	110.0-210.0	>210.0	Total
N	9.9	0	0	0	9.9
NE	10.33	0	0	0	10.33
E	5.37	0	0	0	5.37
SE	5.09	0	0	0	5.09
S	11.74	0	0	0	11.74
SW	21.07	0	0	0	21.07
W	18.67	0	0	0	18.67
NW	17.82	0	0	0	17.82
Summary	100	0	0	0	100



% Icon Classes (ppb)							
100	0-50.0	0	50.0-110.0	0	110.0-210.0	0	>210.0

Calibration Graph for Site: BONNYVIL Parameter: O3_ Sequence: O3_NEW Phase: SPAN



PARTICULATE MATTER 2.5

PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5) hourly averages in µg/m3

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR					
DAY	MIN.	MAX.	AVG.	RDGS.																													
1	4.0	2.2	9.0	7.7	0.0	3.1	6.6	6.2	7.7	5.1	5.1	5.7	2.5	9.1	7.1	4.7	6.2	7.4	5.7	4.9	10.3	9.2	15.8	16.6	0.0	16.6	6.7	24					
2	14.1	11.6	10.5	6.2	12.2	5.1	9.7	7.5	12.9	14.3	9.3	6.1	5.1	3.3	8.3	9.8	9.4	6.7	7.2	4.6	7.2	6.5	4.9	5.8	3.3	14.3	8.3	24					
3	9.2	1.9	3.9	8.7	6.2	8.8	5.2	9.6	8.6	7.6	3.1	4.0	5.6	3.8	8.2	3.5	6.8	8.5	X	3.8	0.4	2.5	5.0	0.5	0.4	9.6	5.5	23					
4	0.0	1.1	3.4	2.2	6.2	1.0	4.1	5.4	0.5	1.9	3.4	3.5	3.6	0.6	C	C	C	0.7	1.5	2.9	2.8	1.6	3.1	0.6	0.0	6.2	2.4	24					
5	2.9	0.6	3.1	6.0	3.4	2.2	2.4	1.0	X	3.0	4.5	2.2	6.6	2.4	7.2	3.4	0.4	6.4	1.6	8.3	4.9	2.9	2.2	4.8	0.4	8.3	3.6	23					
6	2.9	0.0	0.0	2.2	7.5	5.4	1.1	7.9	10.0	6.6	5.4	6.4	6.1	3.6	6.9	7.7	4.2	6.9	9.6	2.6	3.6	4.9	13.4	8.4	0.0	13.4	5.6	24					
7	6.6	8.4	4.6	4.1	4.4	6.9	7.9	7.9	7.1	7.4	6.9	3.9	11.0	12.4	7.9	13.1	6.0	11.3	9.6	1.6	10.4	8.4	8.4	9.3	1.6	13.1	7.7	24					
8	9.1	8.6	11.8	9.3	4.5	8.5	5.9	11.0	8.2	13.7	11.4	11.7	9.3	10.9	11.3	1.4	7.2	7.3	10.9	9.6	5.8	8.6	4.1	7.1	1.4	13.7	8.6	24					
9	7.2	6.2	8.1	4.1	8.1	8.7	2.1	6.6	7.1	6.1	6.1	4.6	5.6	2.6	1.1	6.1	5.6	0.0	2.1	7.1	2.6	8.1	7.2	6.2	0.0	8.7	5.4	24					
10	4.7	8.7	7.7	8.1	7.2	7.2	6.6	3.1	4.7	5.6	6.6	5.1	0.0	3.1	5.1	3.6	2.6	5.1	4.1	7.1	2.6	7.2	5.1	7.7	0.0	8.7	5.4	24					
11	4.7	10.6	6.6	6.6	4.6	5.6	7.7	9.1	8.6	8.1	3.6	4.1	7.6	16.6	2.6	4.1	1.1	3.1	3.1	6.6	8.1	5.1	7.1	2.2	1.1	16.6	6.1	24					
12	5.1	9.2	6.2	8.7	8.1	3.1	5.6	6.1	6.1	7.1	8.6	13.1	9.6	6.1	9.1	4.1	3.1	0.0	4.6	6.1	10.1	5.1	10.6	11.6	0.0	13.1	7.0	24					
13	9.6	7.7	13.1	4.1	6.2	12.7	3.6	5.6	8.1	3.1	5.6	5.6	3.1	0.0	5.1	6.1	1.6	7.1	3.6	7.1	11.1	9.6	2.1	6.1	0.0	13.1	6.2	24					
14	4.7	12.1	1.6	3.6	5.1	8.6	2.1	2.1	5.1	1.6	7.1	2.1	8.1	3.1	5.1	0.0	3.1	6.6	4.1	6.6	4.6	16.1	7.7	2.6	0.0	16.1	5.1	24					
15	7.7	2.2	7.7	5.1	3.2	9.1	4.6	7.6	1.6	2.1	2.1	4.1	4.1	5.1	0.0	2.6	3.6	3.6	2.6	3.1	7.1	6.1	3.1	8.6	0.0	9.1	4.4	24					
16	9.1	1.6	6.2	7.2	3.1	0.7	0.1	1.6	9.6	7.1	9.1	6.6	11.6	9.6	5.6	8.1	7.1	7.1	10.6	2.6	6.1	14.6	8.1	0.1	14.6	6.6	24						
17	6.1	15.1	12.1	14.6	16.1	18.6	17.1	13.1	15.1	10.6	15.6	14.6	19.1	13.1	19.6	13.6	15.1	18.1	20.6	23.1	21.6	21.1	28.6	28.2	6.1	28.6	17.1	24					
18	24.1	23.6	21.7	21.6	28.6	27.6	18.1	22.1	19.1	14.1	13.6	16.1	15.6	13.6	10.1	11.1	9.1	7.6	7.6	9.1	12.1	10.1	8.6	16.1	7.6	28.6	15.9	24					
19	15.1	7.2	10.6	12.7	14.1	6.6	8.6	7.6	4.1	7.6	8.6	5.6	10.1	8.6	7.1	9.1	8.6	4.6	7.1	10.6	8.6	8.1	8.6	5.6	4.1	15.1	8.5	24					
20	6.1	10.1	10.6	10.1	9.1	14.1	16.6	16.1	11.6	8.6	7.6	12.6	7.6	5.6	8.1	5.1	7.1	3.1	7.1	0.0	2.6	0.0	7.1	0.0	16.6	7.8	24						
21	4.6	4.7	0.7	2.6	4.7	2.2	2.2	5.6	3.1	6.6	7.1	4.6	4.1	5.6	6.6	6.6	0.0	4.6	5.1	1.6	1.6	0.0	0.0	7.7	0.0	7.7	3.8	24					
22	3.1	0.7	6.6	3.6	0.1	1.6	5.1	5.6	1.1	3.1	4.1	6.1	9.1	3.1	5.6	2.6	4.1	3.6	6.1	5.1	5.6	0.0	10.6	4.1	0.0	10.6	4.2	24					
23	4.1	0.7	2.6	8.1	6.2	7.2	6.1	9.1	1.1	3.6	6.1	4.6	2.1	3.6	0.6	8.6	1.6	3.1	1.1	13.1	2.1	7.1	9.1	7.7	0.6	13.1	5.0	24					
24	1.6	7.7	8.7	8.2	7.2	5.6	2.2	6.1	0.6	7.1	2.6	3.6	4.6	5.6	2.6	4.1	5.1	3.6	2.1	2.6	0.1	2.1	0.0	0.0	0.0	8.7	3.9	24					
25	3.1	5.1	2.2	3.6	3.2	5.1	2.6	4.1	2.6	1.6	0.0	0.0	0.1	1.1	3.1	5.1	5.1	0.0	4.7	8.1	8.1	1.6	2.6	3.6	0.0	8.1	3.2	24					
26	0.1	4.7	0.1	6.2	3.2	2.6	8.7	4.1	7.2	5.1	0.0	8.1	4.1	10.6	9.6	6.1	3.6	9.6	8.1	3.6	7.6	1.1	2.1	3.6	0.0	10.6	5.0	24					
27	4.1	5.1	5.1	0.7	2.2	10.1	8.1	4.1	8.6	13.1	7.1	13.1	9.6	7.1	1.6	C	C	10.6	5.6	2.1	11.1	20.2	6.6	9.6	0.7	20.2	7.5	24					
28	9.6	10.1	10.1	13.7	11.2	11.1	10.1	9.6	13.6	8.1	7.1	10.6	7.1	4.6	5.1	1.1	4.6	9.6	8.1	1.1	7.6	6.6	3.1	4.7	1.1	13.7	7.8	24					
29	6.6	1.6	2.6	4.1	5.1	4.1	0.1	9.1	6.1	3.1	0.6	0.0	8.6	2.6	7.6	3.6	7.1	12.6	4.6	6.1	7.7	7.2	4.1	6.6	0.0	12.6	5.1	24					
30	1.6	4.7	0.0	6.6	3.1	3.6	4.7	9.6	4.6	7.1	9.1	5.1	2.1	1.1	0.0	3.1	5.1	4.6	0.0	0.6	9.6	9.1	5.6	1.6	0.0	9.6	4.3	24					
31	8.1	2.6	0.0	4.7	4.7	2.2	3.2	0.6	1.6	4.6	2.1	1.1	0.6	2.6	1.6	1.6	2.6	0.0	6.1	4.6	2.2	4.7	3.1	0.7	0.0	8.1	2.7	24					
HOURLY MAX	24.1	23.6	21.7	21.6	28.6	27.6	18.1	22.1	19.1	14.3	15.6	16.1	19.1	16.6	19.6	13.6	15.1	18.1	20.6	23.1	21.6	21.1	28.6	28.2									
HOURLY AVG	6.4	6.3	6.4	6.9	6.7	7.1	6.1	7.3	6.9	6.6	6.1	6.3	6.6	5.8	6.0	5.4	5.1	5.9	5.7	5.9	6.5	6.7	6.7	6.9									

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

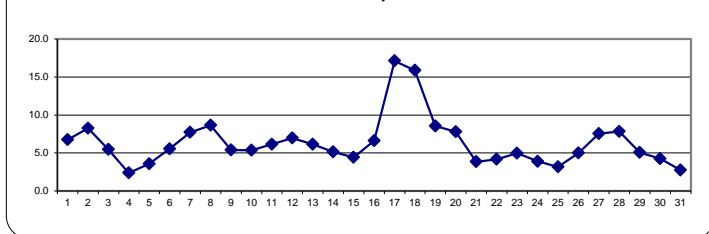
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 80 µg/m3 24-HR 30 µg/m3

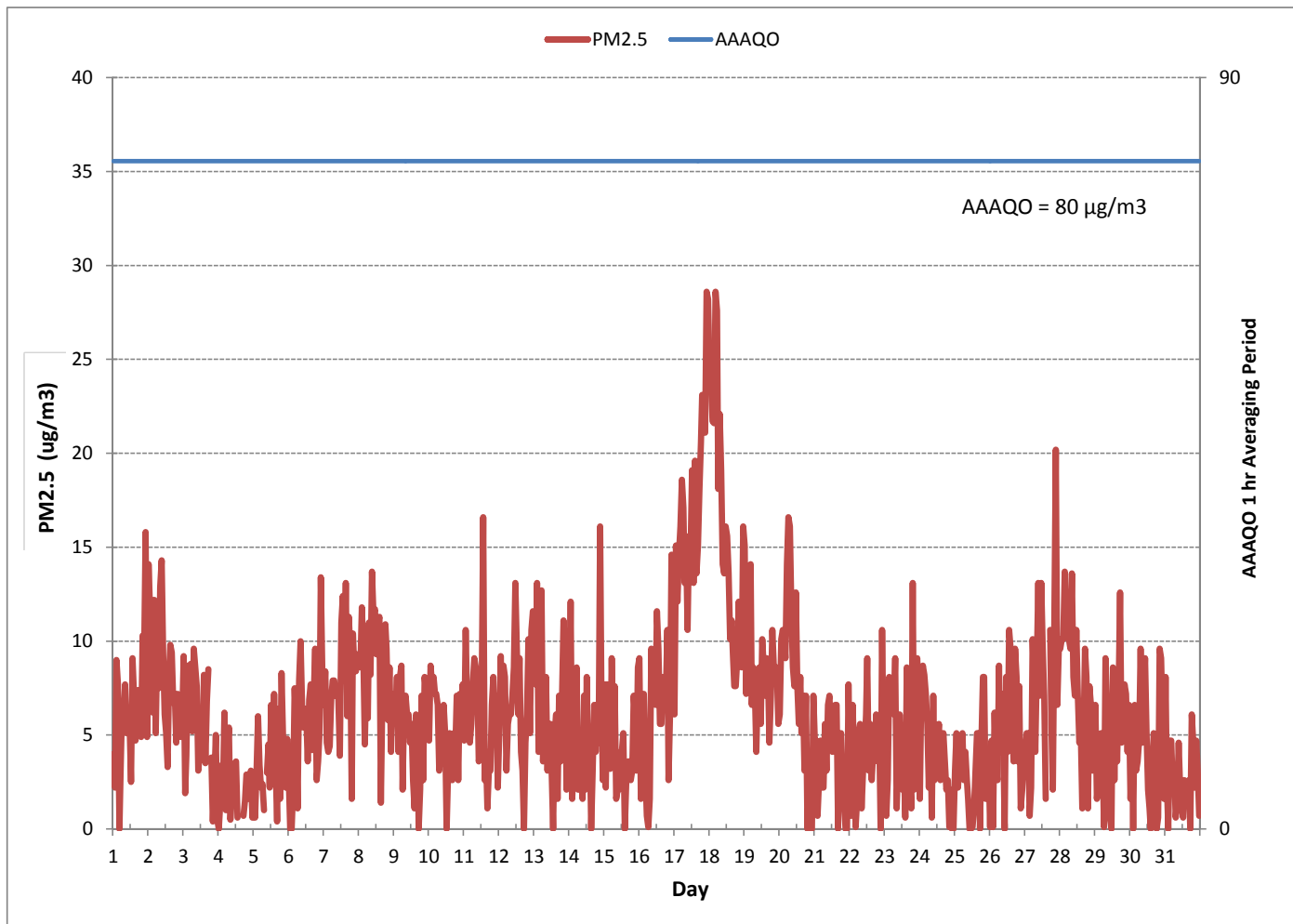
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDENCES:	0			
NUMBER OF 24-HR EXCEEDENCES:	0			
NUMBER OF NON-ZERO READINGS:	708			
MINIMUM 1-HR AVERAGE:	0.0 µg/m3 @ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 1-HR AVERAGE:	28.6 µg/m3 @ HOUR(S)	22, 4	ON DAY(S)	17, 18
MAXIMUM 24-HR AVERAGE:	17.1 µg/m3		ON DAY(S)	17
			VAR-VARIOUS	
MONTHLY CALIBRATION TIME:	5 HRS	OPERATIONAL TIME:	742 HRS	
		AMD OPERATION UPTIME:	99.7 %	
STANDARD DEVIATION:	4.53	MONTHLY AVERAGE:	6.4 µg/m3	

24 HOUR AVERAGES FOR July 2016

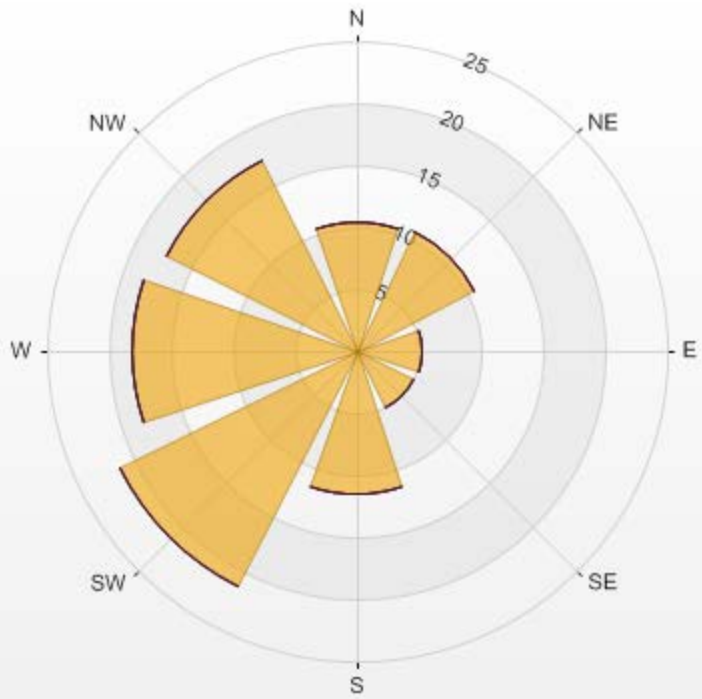


PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5) hourly averages in $\mu\text{g}/\text{m}^3$



Wind: LICA Bonnyville Monitor: PM25 [ug/m3(L)] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 99.06% Calm Avg: 0.00

Direction	0.0-30.0	30.0-60.0	60.0-80.0	80.0-120.0	120.0-240.0	>240.0	Total
N	10.45	0	0	0	0	0	10.45
NE	10.72	0	0	0	0	0	10.72
E	5.29	0	0	0	0	0	5.29
SE	5.16	0	0	0	0	0	5.16
S	11.67	0	0	0	0	0	11.67
SW	21.3	0	0	0	0	0	21.3
W	18.18	0	0	0	0	0	18.18
NW	17.23	0	0	0	0	0	17.23
Summary	100	0	0	0	0	0	100



% Icon Classes (ug/m3(L))	100	0.0-30.0	0	30.0-60.0	0	60.0-80.0	0	80.0-120.0	0	120.0-240.0	0	>240.0

WIND SPEED

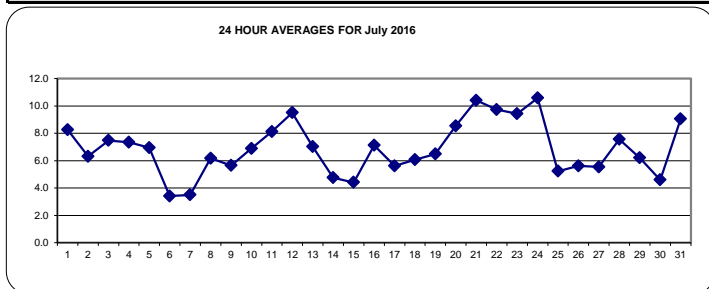
WIND SPEED (WS) hourly averages in km/hr

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR									
DAY	MIN.	MAX.	AVG.	RDGS.																									MIN.	MAX.	AVG.	RDGS.					
1	4.8	3.0	6.5	5.5	6.4	8.0	7.5	5.8	5.8	5.6	7.4	7.9	9.7	12.1	16.3	14.3	11.8	13.1	12.7	10.7	7.8	5.2	5.0	5.0	3.0	16.3	8.3	24									
2	5.4	4.3	2.5	5.3	3.2	3.1	4.1	5.3	3.5	4.7	4.0	6.0	7.7	8.4	9.4	7.5	7.9	11.9	8.8	9.5	9.0	7.8	6.2	6.1	2.5	11.9	6.3	24									
3	5.3	7.1	6.5	6.2	4.2	6.0	7.2	4.0	3.7	4.6	9.7	10.3	10.5	12.6	10.3	17.9	6.8	9.9	2.8	7.2	6.2	7.8	6.7	6.0	2.8	17.9	7.5	24									
4	5.8	4.9	6.1	7.6	6.6	6.7	8.7	7.8	8.5	8.2	8.3	10.2	9.4	12.3	11.4	12.0	10.8	8.8	6.4	3.5	2.9	1.7	2.8	4.8	1.7	12.3	7.3	24									
5	4.8	2.8	3.9	6.3	6.8	11.0	12.3	12.1	11.1	8.7	8.0	9.8	6.5	7.7	5.8	6.5	7.3	9.5	6.9	5.0	2.1	3.0	4.9	3.9	2.1	12.3	6.9	24									
6	3.6	3.9	1.8	3.7	3.3	2.0	2.2	2.7	2.3	3.0	6.3	4.8	5.2	4.6	3.5	5.0	4.6	2.0	4.4	5.9	4.9	1.3	0.8	0.2	0.2	6.3	3.4	24									
7	1.4	1.9	3.4	3.0	1.0	1.6	1.7	0.6	8.0	6.6	1.5	3.7	2.3	4.2	3.0	1.1	4.0	6.8	5.4	4.2	7.1	2.1	5.4	4.0	0.6	8.0	3.5	24									
8	1.3	0.9	3.7	1.8	1.0	3.1	5.8	6.8	8.4	9.1	8.5	8.5	10.7	9.1	9.3	8.7	8.2	9.5	8.8	4.0	5.2	3.9	5.9	5.9	0.9	10.7	6.2	24									
9	5.3	3.7	3.4	3.9	2.4	3.0	3.0	4.3	5.9	8.2	5.3	5.3	6.8	7.1	8.4	8.1	7.2	8.2	8.3	8.1	6.1	4.3	5.5	4.9	2.4	8.4	5.7	24									
10	5.1	4.8	5.2	5.0	6.0	6.0	5.2	4.0	5.2	4.0	5.2	7.2	9.9	10.7	11.7	12.1	8.0	8.6	8.2	8.1	7.3	6.0	5.6	4.3	6.1	4.0	12.1	6.9	24								
11	5.9	6.7	5.5	6.2	6.0	7.3	6.6	7.0	8.8	7.8	12.3	11.1	8.6	11.0	9.6	10.2	12.7	10.1	9.2	8.7	7.6	5.0	5.8	5.3	5.0	12.7	8.1	24									
12	5.7	5.5	6.7	8.0	7.2	6.3	8.2	9.1	11.0	13.1	13.2	12.8	11.5	12.6	15.4	14.8	13.1	12.4	10.7	7.4	5.6	5.9	6.2	5.9	5.5	15.4	9.5	24									
13	5.7	5.6	3.2	3.4	6.0	6.7	6.6	8.0	10.1	10.7	11.9	12.3	12.5	10.6	9.1	9.7	9.7	7.7	5.2	3.5	4.5	3.4	1.2	1.5	1.2	12.5	7.0	24									
14	3.3	3.7	3.7	2.4	2.9	3.8	6.6	7.3	7.1	6.7	6.9	5.7	6.0	4.8	5.6	7.3	10.2	8.5	4.8	3.5	1.1	0.3	1.1	0.8	0.3	10.2	4.8	24									
15	1.1	0.7	1.7	0.3	1.2	0.2	0.5	1.7	2.3	3.1	3.4	4.5	5.2	5.8	6.1	5.1	8.1	12.6	10.5	8.5	7.1	6.0	5.2	5.1	0.2	12.6	4.4	24									
16	6.3	5.9	2.3	5.8	7.3	5.5	7.3	5.7	5.8	6.3	9.1	9.2	12.7	10.8	7.7	9.8	14.3	9.1	8.3	7.5	3.0	3.6	2.6	4.9	2.3	14.3	7.1	24									
17	5.2	4.1	5.7	5.7	6.1	5.6	6.5	7.2	7.7	5.7	7.0	5.4	5.1	3.6	8.1	8.8	8.3	8.4	7.7	4.9	4.6	2.1	0.3	1.2	0.3	8.8	5.6	24									
18	2.4	0.5	1.9	2.3	0.8	1.2	1.6	1.0	0.9	2.4	7.3	9.1	10.3	9.6	10.7	11.9	13.4	15.1	13.6	9.2	5.6	4.5	5.4	5.1	0.5	15.1	6.1	24									
19	3.3	3.1	2.4	1.6	2.1	3.4	0.9	0.3	1.7	1.6	2.7	1.9	4.5	19.7	14.0	7.1	13.4	14.7	14.7	13.1	9.9	7.2	7.4	4.9	0.3	19.7	6.5	24									
20	5.1	5.6	6.3	6.2	5.8	3.8	5.2	8.7	8.1	7.2	11.7	13.4	12.7	14.8	17.2	13.2	7.2	11.9	8.6	9.0	7.6	5.5	4.7	5.4	3.8	17.2	8.5	24									
21	7.8	6.5	6.6	9.4	7.7	6.5	8.7	9.2	13.0	14.2	14.5	15.6	16.6	16.0	14.5	15.8	13.7	12.7	12.1	10.4	5.0	4.8	4.8	3.7	3.7	16.6	10.4	24									
22	1.2	0.3	0.2	0.3	3.0	4.5	6.9	8.8	11.5	12.0	11.5	11.9	14.3	13.1	14.1	18.2	17.4	16.3	14.0	14.7	10.5	10.3	11.1	7.3	0.2	18.2	9.7	24									
23	8.4	7.3	6.3	6.7	6.3	5.7	6.5	9.8	13.1	13.3	12.0	12.7	13.4	13.3	13.1	12.9	12.5	11.7	12.8	8.3	5.3	5.0	4.4	5.4	4.4	13.4	9.4	24									
24	4.7	6.1	7.2	7.4	7.7	8.2	7.8	9.6	14.0	13.7	12.8	13.6	15.7	16.0	20.4	14.8	19.6	20.1	8.7	1.0	8.6	2.1	11.1	3.2	1.0	20.4	10.6	24									
25	4.7	3.0	3.7	4.0	4.9	3.3	5.3	7.9	8.7	7.9	8.4	7.2	7.0	6.1	8.4	8.1	6.2	5.1	3.7	2.3	3.4	2.4	3.3	0.6	0.6	8.7	5.2	24									
26	0.4	3.3	0.3	2.0	3.8	4.8	2.1	3.0	0.4	5.6	2.7	7.2	9.4	10.0	10.2	10.0	12.7	10.7	7.0	3.6	12.4	5.4	3.4	4.5	0.3	12.7	5.6	24									
27	8.9	6.6	6.4	2.8	1.0	0.3	2.0	7.7	7.1	4.3	3.4	6.2	7.9	6.6	7.9	8.8	7.7	9.1	6.5	4.6	1.8	4.1	5.9	5.5	0.3	9.1	5.5	24									
28	5.7	0.8	5.0	6.3	6.5	6.6	5.6	4.4	2.5	4.6	8.6	13.8	14.0	11.8	11.5	11.6	13.9	10.9	11.4	5.6	7.3	6.5	3.9	2.8	0.8	14.0	7.6	24									
29	3.1	0.8	3.9	10.3	7.2	7.8	8.4	6.2	5.6	6.1	4.5	7.1	6.6	8.8	9.1	7.6	11.1	11.5	6.4	4.5	4.3	4.6	1.7	1.9	0.8	11.5	6.2	24									
30	2.9	2.8	4.9	9.0	7.2	4.0	0.5	2.9	2.2	3.3	3.0	4.7	7.3	14.8	5.9	5.2	4.8	0.8	3.7	2.3	2.4	4.4	6.6	4.7	0.5	14.8	4.6	24									
31	4.5	5.9	5.2	7.6	7.3	7.5	7.1	8.5	9.1	10.8	12.9	11.7	11.3	10.9	14.1	10.4	10.7	10.6	9.0	8.2	7.4	8.1	9.8	8.6	4.5	14.1	9.1	24									
HOURLY MAX	8.9	7.3	7.2	10.3	7.7	11.0	12.3	12.1	14.0	14.2	14.5	15.6	16.6	19.7	20.4	18.2	19.6	20.1	14.7	14.7	12.4	10.3	11.1	8.6													
HOURLY AVG	4.5	3.9	4.3	5.0	4.8	5.0	5.4	6.1	6.8	7.2	7.9	8.8	9.4	10.3	10.4	10.0	10.3	10.2	8.4	6.7	5.9	4.6	5.0	4.4													

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

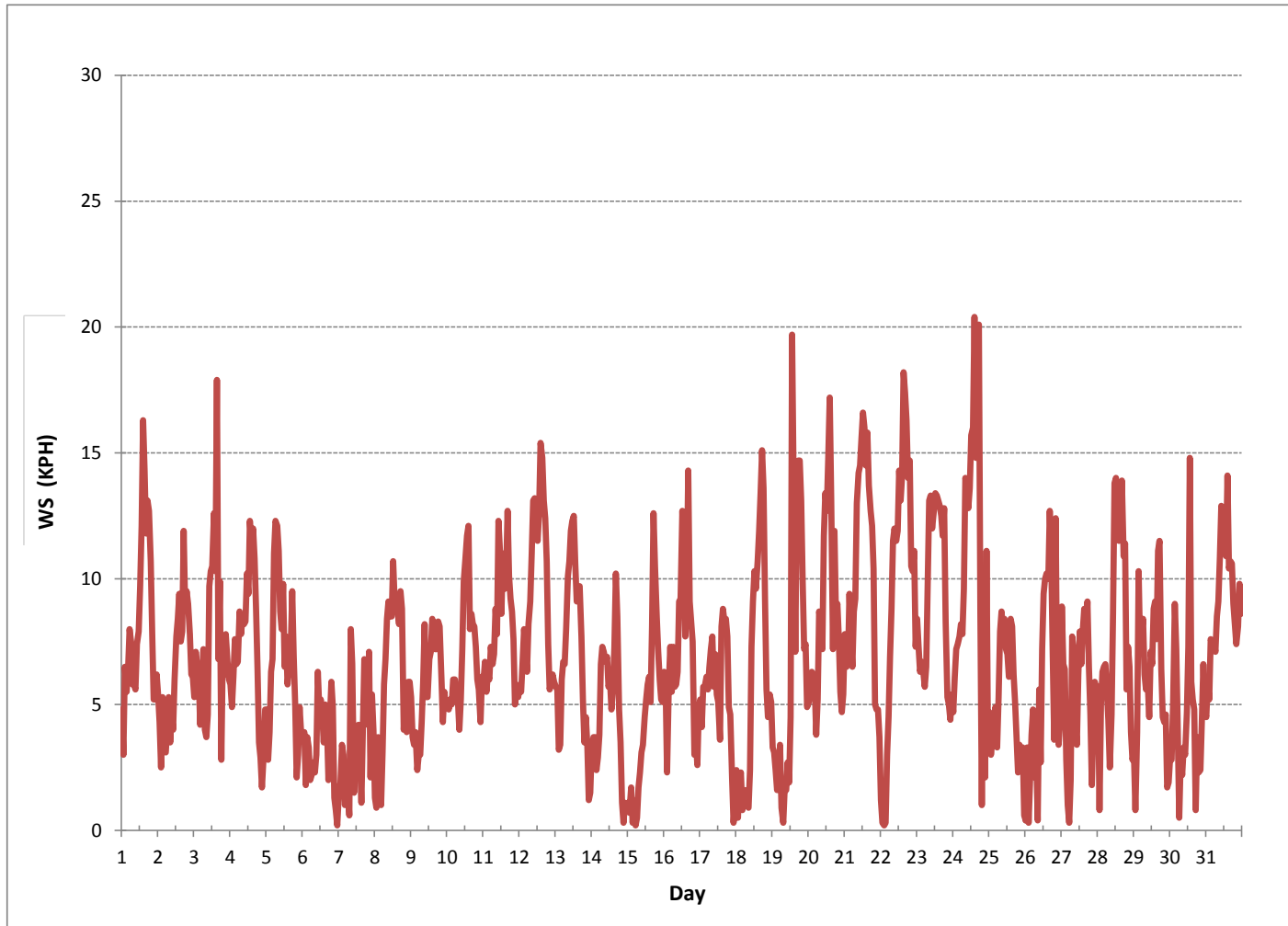
LAST CALIBRATION:	January 26, 2016
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	744
MINIMUM 1-HR AVERAGE:	0.2 KPH @ HOUR(S) VAR ON DAY(S) VAR
MAXIMUM 1-HR AVERAGE:	20.4 KPH @ HOUR(S) 14 ON DAY(S) 24
MAXIMUM 24-HR AVERAGE:	10.6 KPH VAR-VARIOUS ON DAY(S) 24
MONTHLY CALIBRATION TIME:	0 HRS OPERATIONAL TIME: 744 HRS
	AMD OPERATION UPTIME: 100.0 %
STANDARD DEVIATION:	3.81 MONTHLY AVERAGE: 6.9 KPH

WIND SPEED (WS) hourly averages in km/hr





VECTOR WIND SPEED MAX instantaneous maximum in km/hr

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HOUR		
HOURLY MAX	HOURLY AVG	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	RDGS.	
DAY																														
1		10.3	10.0	15.7	12.6	15.0	17.9	16.5	15.4	15.0	18.7	20.1	20.0	25.3	31.5	33.7	32.3	26.8	30.4	26.5	21.9	18.0	11.0	12.3	11.8	10.0	33.7	19.5	24	
2		11.6	9.3	8.0	11.9	10.0	9.9	11.5	13.3	9.4	15.2	15.5	19.8	18.2	22.4	23.3	18.7	20.4	24.0	16.2	20.4	16.8	18.6	16.9	12.4	8.0	24.0	15.6	24	
3		15.6	17.8	16.5	14.5	11.7	14.8	17.1	11.3	9.9	17.0	22.3	24.1	21.5	25.3	43.0	58.2	18.4	26.7	36.2	23.2	17.5	24.1	17.1	17.7	9.9	58.2	21.7	24	
4		13.7	17.6	17.4	21.0	20.4	16.1	22.0	19.9	21.8	20.5	19.8	25.1	29.4	29.7	26.7	28.5	25.7	20.8	13.0	7.7	7.5	5.2	8.0	9.6	5.2	29.7	18.6	24	
5		16.2	9.1	12.4	15.0	19.6	26.4	30.1	32.9	29.0	23.0	25.5	23.1	30.9	19.1	17.0	18.8	26.0	26.8	16.2	16.0	10.6	9.2	11.8	8.8	8.8	32.9	19.7	24	
6		7.6	9.1	7.7	9.3	10.1	7.0	6.9	6.8	8.6	9.2	32.4	14.8	13.1	13.2	13.9	11.5	36.1	20.8	17.0	14.5	13.2	7.0	5.8	3.6	3.6	36.1	12.5	24	
7		6.9	7.9	6.7	9.0	8.2	11.3	8.0	6.6	21.8	21.7	11.4	8.6	18.4	17.8	14.7	11.9	12.9	16.4	12.7	15.5	14.2	7.9	10.2	11.0	6.6	21.8	12.2	24	
8		8.4	5.8	8.5	9.1	7.4	10.8	15.4	16.7	19.0	20.0	23.0	26.5	38.8	25.1	22.2	21.7	21.6	30.9	21.7	13.7	19.8	16.3	15.1	15.6	5.8	38.8	18.0	24	
9		13.2	8.8	8.3	7.9	6.8	8.8	8.3	9.9	13.7	18.4	19.6	16.5	20.2	22.8	24.1	18.9	22.8	17.6	20.8	21.0	16.8	11.3	12.3	9.9	6.8	24.1	14.9	24	
10		11.5	11.7	12.6	10.9	14.5	14.5	12.7	16.8	15.6	14.2	18.1	22.9	26.3	28.7	33.1	20.9	25.4	30.1	20.2	22.6	11.7	18.2	11.4	7.7	10.3	7.7	33.1	17.7	24
11		13.6	14.7	11.8	11.8	13.4	14.9	13.2	16.6	20.8	22.9	32.3	35.6	23.9	34.4	44.5	28.4	31.4	22.7	21.2	17.9	18.3	10.7	12.5	13.5	10.7	44.5	20.9	24	
12		13.5	12.3	18.3	17.7	17.4	14.5	20.2	25.0	25.0	31.7	30.3	31.3	25.7	31.5	40.6	34.4	29.3	29.4	26.5	18.6	12.0	13.7	14.0	14.7	12.0	40.6	22.8	24	
13		11.8	10.2	9.3	9.1	12.9	15.0	17.2	17.0	26.1	23.6	27.0	29.4	28.3	25.4	22.7	28.3	24.2	18.5	22.6	11.7	18.2	11.4	14.7	5.8	5.8	29.4	18.4	24	
14		8.7	8.9	8.6	7.4	6.5	12.0	18.3	17.2	17.9	18.7	18.8	19.4	25.4	18.3	21.7	21.4	22.3	22.1	12.7	9.3	5.4	4.4	8.6	6.9	4.4	25.4	14.2	24	
15		5.7	5.3	4.1	2.2	5.2	3.3	7.1	9.1	6.9	17.2	15.0	9.7	11.3	15.0	14.2	15.4	22.0	23.5	19.3	16.0	16.0	13.4	14.2	12.4	2.2	23.5	11.8	24	
16		11.3	10.2	7.5	10.1	15.1	10.7	14.5	12.9	13.0	16.7	20.1	22.1	24.0	21.1	22.9	29.0	43.5	20.4	18.4	20.9	22.0	9.9	10.0	12.2	7.5	43.5	17.4	24	
17		11.7	11.9	12.9	14.1	13.8	11.9	14.6	16.6	16.5	11.9	15.9	15.2	15.2	18.6	19.6	23.0	20.8	18.9	15.9	11.4	8.4	5.3	2.8	9.8	2.8	23.0	14.0	24	
18		6.4	3.9	6.2	5.9	5.7	7.6	5.8	6.7	6.3	8.0	18.9	25.0	20.9	26.5	22.9	24.5	25.5	27.0	25.1	18.9	11.1	9.4	12.6	11.4	3.9	27.0	14.3	24	
19		7.6	9.6	10.6	7.2	8.1	8.9	9.2	7.4	7.5	6.8	8.7	10.9	20.6	47.1	33.3	17.2	25.2	27.2	28.7	22.3	16.4	12.5	11.8	10.0	6.8	47.1	15.6	24	
20		13.6	9.7	12.0	11.2	12.7	9.0	15.1	23.3	21.0	23.6	27.9	25.7	31.7	37.5	35.9	36.4	28.5	25.9	30.9	26.4	33.1	14.2	11.3	11.8	9.0	37.5	22.0	24	
21		16.6	13.3	16.5	23.9	20.0	15.9	20.4	21.3	27.6	32.0	36.9	39.4	39.6	45.1	42.5	46.4	36.9	32.1	30.9	26.5	15.2	12.7	10.1	9.7	9.7	46.4	26.3	24	
22		5.9	3.0	2.1	6.1	9.3	10.3	14.4	20.0	23.6	23.3	23.3	23.4	29.3	26.7	33.4	33.0	33.9	30.0	26.8	25.6	23.6	42.5	25.3	18.4	2.1	42.5	21.4	24	
23		17.2	15.3	14.5	20.6	16.6	17.4	18.9	31.7	31.8	31.4	31.0	30.6	31.4	36.1	35.1	34.5	34.1	30.9	36.2	26.4	12.3	13.0	11.8	11.8	11.8	36.2	24.6	24	
24		11.1	11.7	13.0	13.3	13.1	12.8	13.8	23.1	28.6	29.6	27.9	31.2	37.8	36.6	44.8	33.0	46.4	37.4	45.1	4.7	46.0	19.9	22.9	15.3	4.7	46.4	25.8	24	
25		10.6	9.7	13.5	10.9	8.3	10.0	15.5	18.4	20.3	21.7	20.9	23.2	22.0	19.4	22.5	26.1	20.5	12.3	10.6	9.0	8.6	8.2	8.0	6.9	6.9	26.1	14.9	24	
26		7.8	10.4	8.9	8.3	22.3	12.0	12.6	10.6	7.0	14.0	14.5	16.8	21.0	22.0	23.4	20.7	25.2	19.7	14.2	9.0	34.9	16.5	17.7	10.6	7.0	34.9	15.8	24	
27		18.9	16.0	14.1	8.5	6.4	2.8	8.0	14.0	14.0	11.3	9.3	16.5	21.0	21.4	22.2	24.6	20.2	21.7	18.6	11.5	5.8	11.2	10.1	9.7	2.8	24.6	14.1	24	
28		10.0	14.4	10.4	11.2	11.8	10.9	12.2	7.8	6.2	15.6	19.3	30.9	32.8	30.6	29.2	25.7	25.4	27.3	35.3	18.6	18.1	26.3	14.9	11.5	6.2	35.3	19.0	24	
29		12.8	4.0	19.2	18.6	14.9	16.9	19.7	13.6	12.9	13.1	12.2	16.4	17.6	21.3	20.5	20.4	43.3	28.8	16.5	10.1	9.7	10.4	9.9	6.3	4.0	43.3	16.2	24	
30		9.0	8.4	32.2	23.8	22.2	13.3	9.4	9.3	8.7	9.7	7.4	12.4	14.1	28.0	15.7	11.8	12.7	6.8	8.6	8.8	7.8	12.3	16.1	15.5	6.8	32.2	13.5	24	
31		10.3	10.5	12.2	22.0	18.4	23.1	19.1	26.1	24.0	28.6	28.8	27.9	29.7	27.5	31.4	27.3	31.1	25.6	23.3	23.2	18.4	19.7	20.7	22.3	10.3	31.4	23.0	24	
HOURLY MAX		18.9	17.8	32.2	23.9	22.3	26.4	30.1	32.9	31.8	32.0	36.9	39.4	39.6	47.1	44.8	58.2	46.4	37.4	45.1	26.5	46.0	42.5	25.3	22.3					
HOURLY AVG		11.3	10.3	12.0	12.4	12.8	12.6	14.4	16.0	17.1	19.0	21.1	22.4	24.7	26.6	27.4	25.9	27.0	24.3	22.2	16.9	16.4	13.5	12.8	11.5					

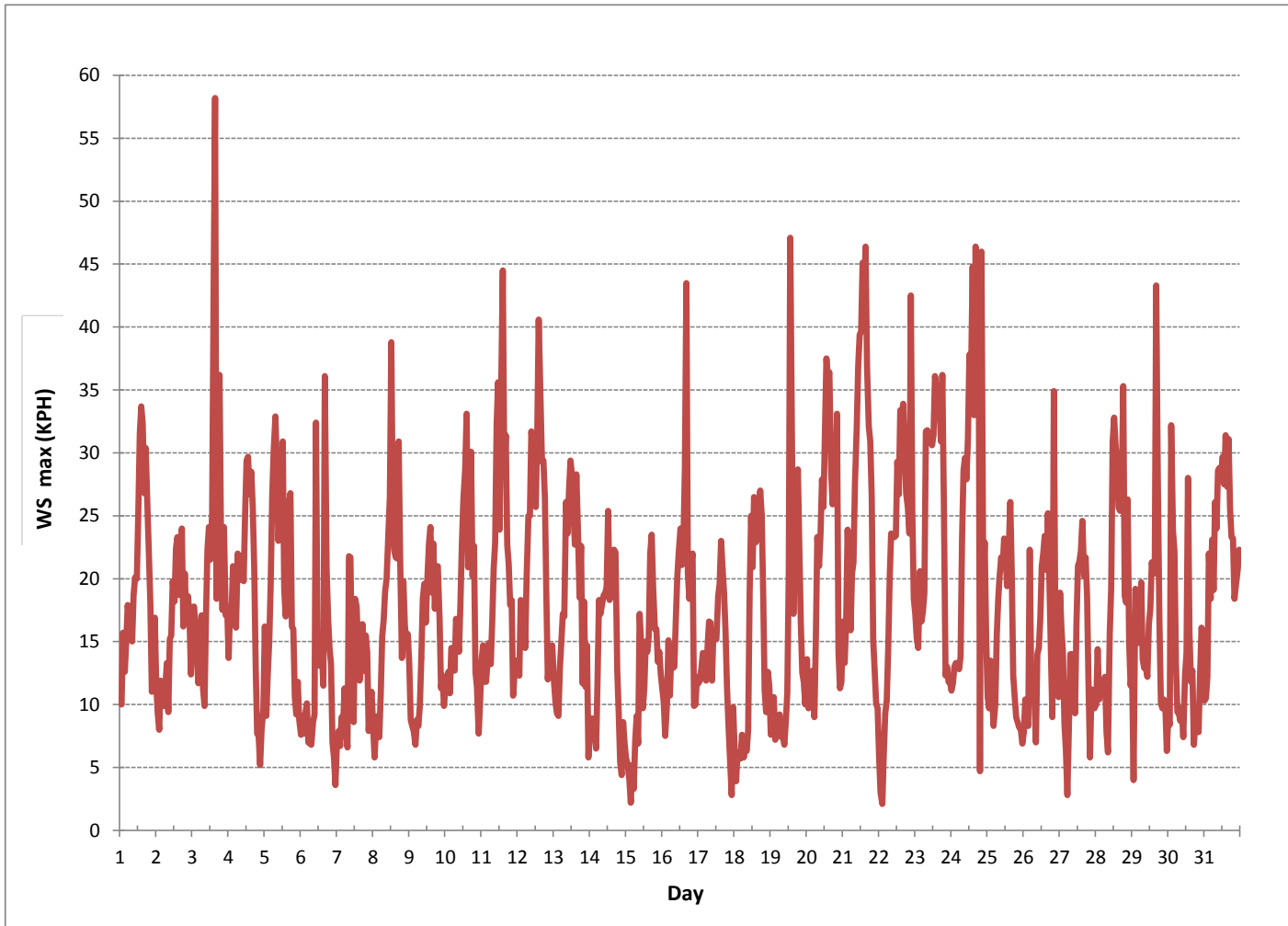
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

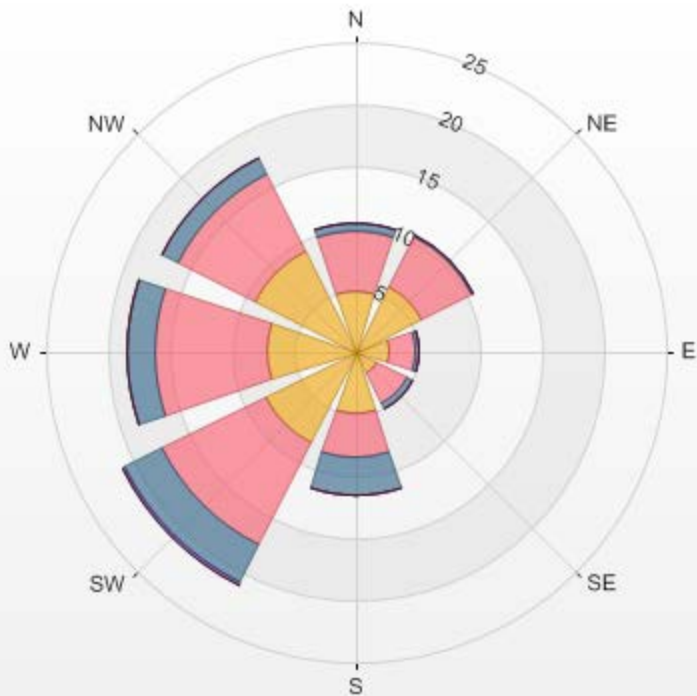
MAXIMUM INSTANTANEOUS VALUE:	58.2	KPH	@ HOUR(S)	15	ON DAY(S)	3
					VAR-VARIOUS	
OPERATIONAL TIME:				744	HRS	

VECTOR WIND SPEED MAX instantaneous maximum in km/hr



Wind: LICA Bonnyville Monitor: WSP [kph] Monthly: 07/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 100.00% Calm Avg: 0.00

Direction	0.0-6.0	6.0-12.0	12.0-20.0	20.0-29.0	29.0-39.0	>39.0	Total
N	4.84	4.84	0.67	0	0	0	10.35
NE	5.91	4.57	0.13	0	0	0	10.61
E	2.82	2.02	0.4	0	0	0	5.24
SE	1.88	2.82	0.4	0	0	0	5.1
S	4.97	3.63	2.96	0	0	0	11.56
SW	8.2	9.27	3.36	0.27	0	0	21.1
W	7.12	9.14	2.28	0	0	0	18.54
NW	9.14	6.85	1.48	0	0	0	17.47
Summary	44.88	43.14	11.68	0.27	0	0	100



% Icon	Classes (kph)	45	43	12	0	0	0
	0.0-6.0		6.0-12.0		12.0-20.0		20.0-29.0
	29.0-39.0		>39.0				

WIND DIRECTION



WIND DIRECTION (WD) hourly averages

DAY	MST																								24-HOUR AVG	RDGS.
	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00		
1	ENE	NE	NE	NE	NE	ENE	NE	ENE	E	NE	NE	ENE	ENE	E	ESE	ESE	ESE	SE	SE	ESE	ESE	ESE	E	ESE	E	24
2	E	NE	NNE	NE	NE	ENE	NE	ENE	NE	ENE	ENE	ESE	ESE	ESE	E	ESE	SE	SSE	SSE	SE	ESE	SE	ESE	E	E	24
3	ESE	ESE	ESE	ESE	ENE	NE	ENE	ENE	ENE	ESE	E	ESE	SE	SE	SSE	W	W	NNE	W	W	W	W	W	W	E	24
4	W	W	WSW	WSW	W	W	W	WNW	WNW	W	W	WSW	W	W	WNW	NW	NW	NW	NNW	NW	WNW	W	W	WSW	W	24
5	WNW	NW	WNW	WNW	WNW	WNW	W	W	W	W	NW	NW	W	W	W	WNW	NNW	NNW	NNW	N	NNW	NW	NNW	NW	WNW	24
6	NW	NW	W	WNW	WNW	WNW	WSW	WNW	W	W	N	NE	SSE	S	SSW	S	NW	NW	SE	SW	WSW	NNW	N	ENE	WNW	24
7	SE	SW	SW	SW	W	WNW	W	WSW	NNW	N	NNE	S	NW	NW	NW	W	WNW	SW	SW	SW	SSW	SW	S	S	WSW	24
8	SSE	SE	NE	NE	NE	ENE	E	NNE	NE	NE	ENE	ENE	E	NNE	NNW	N	NNE	NNE	NNW	NW	ENE	NNE	N	N	NE	24
9	NNE	N	NNW	NNW	NNW	NNW	NNW	NNW	NNE	NE	N	NNE	NNE	ENE	ENE	ENE	ENE	ENE	NNE	ENE	ENE	NNE	NNE	NNE	NNE	24
10	NNE	NNE	NNE	NNE	NE	ENE	ENE	NE	NE	NE	NNE	NE	NNE	NE	NE	ENE	NE	NE	NNE	NNE	N	NNW	NNW	NNW	NNE	24
11	NNW	NNW	NNW	NNW	NNW	N	NNW	N	N	NNE	N	NNW	NNW	N	NNW	N	NNW	NW	NW	NW	NW	NW	NW	NW	NNW	24
12	NW	NW	NW	NW	NW	NNW	NW	NNW	NNW	NNW	NNW	NNW	NNW	NW	NNW	NW	NNW	NNW	NNW	NNW	NW	NW	NW	NW	NW	24
13	NW	NW	NW	WNW	NW	NW	NW	NW	NW	NW	NW	NW	NNW	NNW	NW	WNW	NNW	NW	NE	SW	NW	NNW	WNW	NW	NW	24
14	NW	NNW	NNW	NNW	NNW	NNW	NNE	NNE	NNE	NNE	NNE	NE	NNE	N	N	NNE	NNE	NE	ENE	ENE	N	SSW	W	N	24	
15	NNW	SSE	NW	NW	WNW	W	WSW	N	SSW	ESE	SSE	SSW	SSW	SSW	S	SSW	S	S	SSW	SSW	SSW	SSW	SSW	SSW	SSW	24
16	SW	SW	SW	SW	SSW	SSW	SW	WSW	WNW	WSW	SW	SW	SSW	SW	WSW	W	NW	WNW	WNW	NNW	NNE	W	W	WNW	WSW	24
17	WNW	WNW	WNW	NW	NW	NW	NNW	N	NNW	NNW	WNW	W	W	W	NNW	NNW	NW	NNW	NNW	NW	NNW	NW	NW	WSW	NW	24
18	WNW	WNW	WSW	W	WSW	SW	WSW	SSW	SSW	S	S	SSW	SSW	S	S	S	S	S	SSW	SSW	S	SSW	SSW	SSW	SSW	24
19	ENE	ESE	ENE	NNE	NNE	NNW	N	NNW	SSE	S	SSW	S	S	SSE	S	S	SSW	SSW	S	SSW	SSW	SSW	SSW	SSW	S	24
20	SSW	SW	SSW	SSW	SW	SW	WSW	WNW	WNW	WSW	SW	SSW	SW	SW	SW	WSW	W	SW	W	WSW	W	WSW	WSW	WSW	WSW	24
21	SW	SW	WSW	SW	WSW	WSW	SW	SW	SW	SW	SW	WSW	WSW	WSW	WSW	WSW	WNW	WNW	W	W	W	WNW	NW	NW	WSW	24
22	W	W	NW	E	ENE	E	SE	SSE	S	S	S	S	S	S	SSE	S	S	S	S	S	S	SSE	SE	SSE	SW	24
23	SW	SW	WSW	WSW	WSW	SW	WSW	W	WNW	WNW	W	W	W	W	W	W	W	W	W	W	WNW	W	W	WSW	SW	24
24	SW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	NW	WSW	WNW	W	SSW	WNW	24
25	SSW	WSW	WNW	SW	SW	W	W	W	WNW	WNW	NW	W	SW	WSW	W	W	WNW	NW	NW	WNW	S	SSW	SSE	SW	W	24
26	ESE	ENE	SSW	NW	NNW	WNW	N	NNE	ESE	SW	SSW	ESE	SE	SSE	SSE	SSE	S	S	SSE	SE	S	S	SW	SSW	SSE	24
27	S	S	S	SSW	SSE	NNW	S	S	SSW	S	S	SW	SW	WSW	W	W	W	W	WNW	WNW	WSW	SSW	SW	SSW	SW	24
28	SSW	WNW	SSW	SSW	SW	SW	SSW	SW	SSW	SSW	SW	SW	SW	WSW	WSW	SW	SSW	SW	NNW	W	W	SW	WSW	SW	SW	24
29	S	NNW	SSW	SSW	SW	SW	SW	SW	SW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSE	ENE	NNE	SSW	24
30	ESE	SSE	SW	WSW	W	WNW	NE	SSW	SSE	SSE	SSW	SSW	S	SE	SE	SSE	SSE	NW	NNW	NE	SE	SE	SW	S	24	
31	SW	SW	SW	W	W	W	W	W	W	WSW	WSW	WSW	WSW	WSW	SW	WSW	WSW	SW	WSW	WSW	WSW	SW	SW	SW	WSW	24

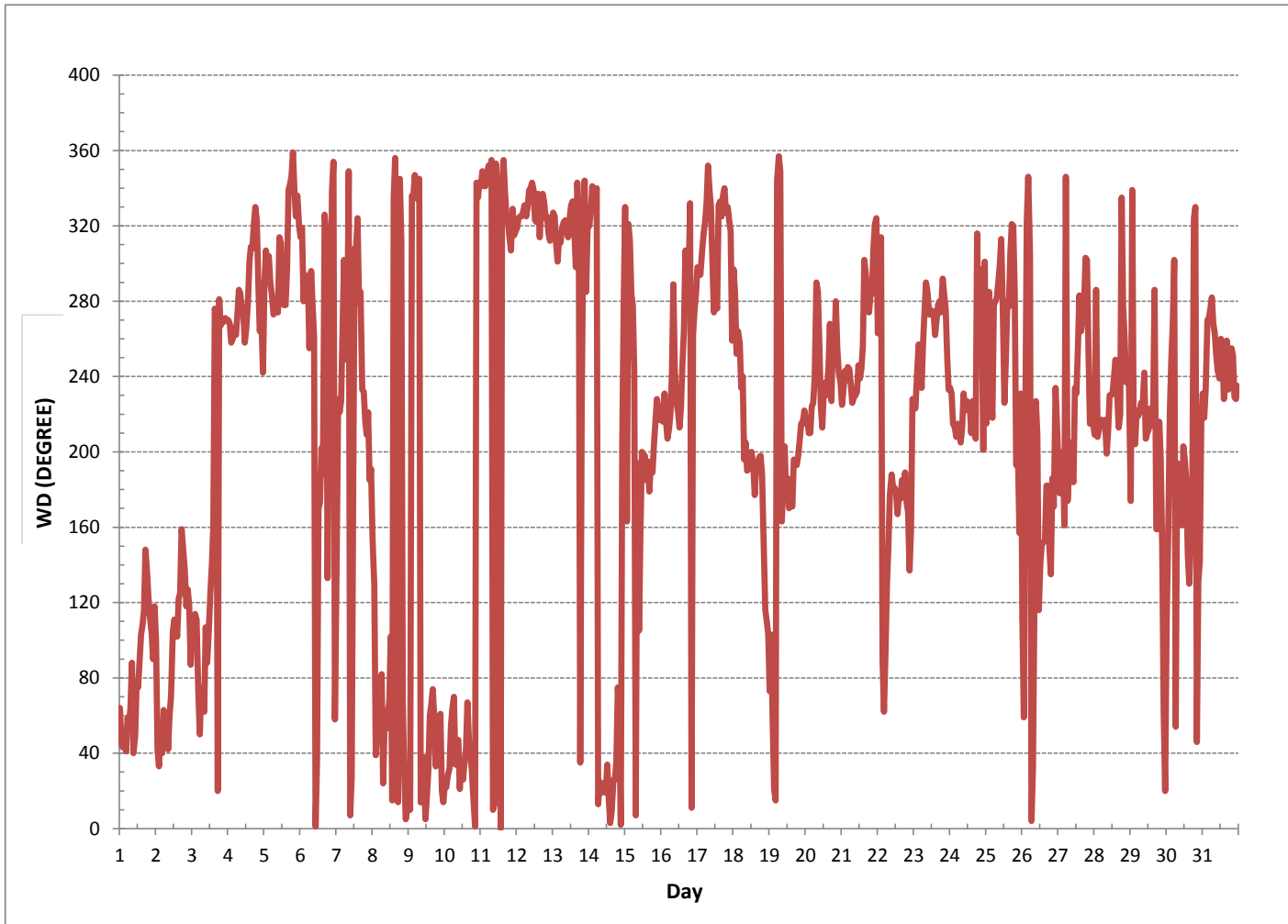
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	January 26, 2016
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	0	HRS	OPERATIONAL TIME:	744	HRS
STANDARD DEVIATION:	98.42		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	19 (NNE)	DEGREE

WIND DIRECTION (WD) hourly averages



STANDARD DEVIATION WIND DIRECTION



STANDARD DEVIATION WIND DIRECTION (STDWD) hourly averages in degrees

MST		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	RDGS.	
HOUR START	HOUR END	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59		
DAY																											
1		18	17	13	13	15	17	17	23	26	30	31	24	25	23	17	18	19	18	17	15	15	14	14	14	24	
2		19	12	12	13	20	20	19	21	27	35	51	37	23	25	23	27	20	14	16	13	14	15	18	16	24	
3		19	18	20	17	18	16	20	19	25	38	16	22	22	15	28	19	24	20	37	19	17	17	17	18	24	
4		16	18	18	19	18	18	17	16	18	18	21	20	23	21	20	20	19	17	12	9	9	10	11	15	24	
5		21	11	11	15	16	17	20	20	18	19	21	16	24	19	17	16	17	16	12	19	25	13	12	8	24	
6		9	8	18	10	9	8	18	11	25	20	20	29	46	22	38	18	28	52	39	18	19	18	14	15	24	
7		36	25	17	18	22	13	21	44	18	19	30	32	37	46	39	52	42	21	18	21	10	22	16	14	24	
8		45	37	14	25	35	16	19	20	21	24	26	26	27	21	20	18	20	20	18	17	20	24	13	16	24	
9		17	14	7	7	10	11	12	18	22	23	31	30	30	31	28	28	30	23	21	21	21	21	14	14	24	
10		16	16	16	15	19	20	21	20	21	23	19	21	24	23	21	26	24	21	20	19	16	8	5	8	24	
11		10	10	10	11	10	14	13	16	20	25	22	19	17	22	16	18	17	16	16	15	15	12	14	13	24	
12		13	12	12	13	13	13	15	15	16	18	19	19	20	19	19	18	18	16	14	13	12	12	13	12	24	
13		11	10	10	11	13	14	15	18	19	20	21	20	19	20	22	21	20	19	30	41	15	18	30	8	24	
14		15	9	8	6	6	13	19	22	25	26	28	30	36	42	42	27	23	22	25	25	26	17	21	30	24	
15		6	42	7	5	14	9	25	33	45	52	60	26	26	34	19	42	19	13	13	11	14	15	20	18	24	
16		12	12	15	10	10	15	13	19	20	24	21	21	16	19	25	23	19	17	16	15	26	12	12	14	24	
17		14	13	12	13	13	12	13	17	14	18	17	27	30	36	22	22	19	17	13	11	7	8	11	12	24	
18		5	13	9	10	19	26	18	60	49	41	20	21	17	18	17	15	12	14	11	10	16	21	15	19	24	
19		23	31	27	25	25	16	20	54	66	40	37	71	21	14	13	15	11	12	11	8	7	9	12	12	24	
20		16	11	10	10	10	15	17	17	17	21	15	14	19	19	18	24	19	16	22	22	19	18	15	15	24	
21		13	14	17	16	18	17	16	14	15	16	19	21	20	21	22	19	19	20	20	17	15	12	11	7	24	
22		10	2	6	66	31	21	18	17	15	13	15	16	15	16	17	14	13	13	12	9	28	32	19	17	24	
23		14	12	16	19	19	17	19	19	18	19	22	20	20	21	22	21	19	18	20	14	14	15	14	12	24	
24		13	12	8	9	8	8	11	11	12	17	18	19	17	18	13	16	14	14	16	13	18	32	11	23	24	
25		15	10	14	16	11	14	18	17	20	23	24	31	32	36	25	29	28	26	15	15	24	44	35	46	24	
26		51	30	47	23	16	13	44	33	45	18	28	22	18	16	15	19	14	12	12	41	20	41	16	17	24	
27		11	13	15	24	36	1	38	12	13	21	45	30	30	31	23	22	24	19	15	10	11	15	11	10	24	
28		8	27	10	8	10	10	12	14	28	20	17	17	17	21	21	16	13	19	18	26	20	27	28	17	24	
29		37	13	19	9	11	12	13	16	21	20	25	24	22	23	20	17	23	39	19	14	12	26	25	21	24	
30		31	35	39	19	20	14	46	33	66	44	43	23	15	10	19	24	22	42	11	12	26	21	19	22	24	
31		13	13	17	18	17	18	17	20	21	20	20	21	21	22	17	20	23	16	18	20	17	15	14	17	24	

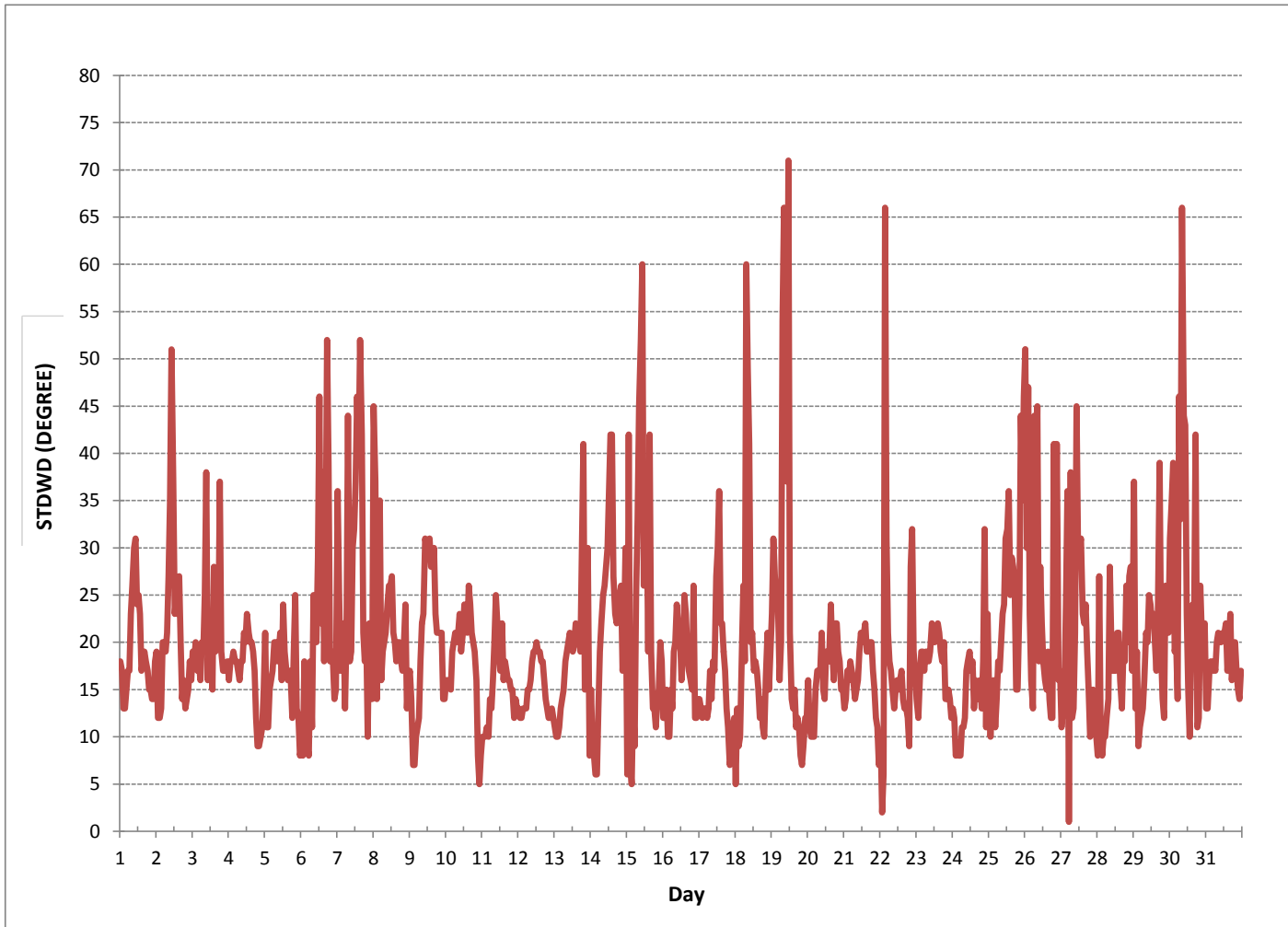
STATUS FLAG CODES

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C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION: January 26, 2016

CALIBRATION TIME: 0 HRS OPERATIONAL TIME: 613 HRS

STANDARD DEVIATION WIND DIRECTION (STDWD) hourly averages in degrees



APPENDIX II
NON-CONTINUOUS MONITORING DATA RESULTS

VOC RESULTS

Maxxam Analytics

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6200
 Location: Bonnyville - AER Canister ID: S.A.Y. 15001
 Station ID: LICA 37 Installation Date/Time (mst): June 30, 2016 @ 10:27
 Sample ID: LICA/VOC/Bonnyville/July 5, 2016 Removal Date/Time (mst): July 6, 2016 @ 15:18

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>July 5, 2016</u>	<u>00:00</u>	<u>00:00 July 6, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>- 28.0</u>	<u>+ 19.0</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>4.94</u>	<u>26</u>

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) = — @ — mst
 Final leak check deployment vacuum (in. Hg) = — @ — mst
 Total leak rate = — psi over — minutes
 Timer reset to zero prior to sampling? YES (yes/no)
 Date of last flow calibration: April 5, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: April 5, 2016 (due every 6 months)

Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required

Comments: Date of last audit : April 5, 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: July 6, 2016

Sample ID: 16070132-001

Customer ID: LICA
 Cust Samp ID: LICA/VOC/Bonnyville/July 5, 2016



Volatile Organics Data Results

Date: July 5, 2016
Canister ID: 15001

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.02
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.04
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	0.03
2,2-Dimethylbutane	< 0.01
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	0.03
2,4-Dimethylpentane	< 0.01
2-Methylheptane	< 0.01
2-Methylhexane	< 0.01
2-Methylpentane	0.07
3-Methylheptane	< 0.02
3-Methylhexane	0.03
3-Methylpentane	0.04
Acetone	4.3
Acrolein	< 0.3
Benzene	0.04
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	0.03
Carbon disulfide	0.10
Carbon tetrachloride	0.09
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.02
Chloromethane	0.78
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.05
cis-2-Pentene	< 0.02
Cyclohexane	0.04
Cyclopentane	0.02
Dibromochloromethane	< 0.01
Ethanol	2.3
Ethyl acetate	< 0.4
Ethylbenzene	0.01
Freon-11	0.29
Freon-113	0.08

Volatile Organics Data Results

Date: July 5, 2016
Canister ID: 15001

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.02
Freon-12	0.62
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.36
Isopentane	0.53
Isoprene	0.17
Isopropyl alcohol	0.6
Isopropylbenzene	< 0.01
m,p-Xylene	0.05
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.04
Methylcyclopentane	0.05
Methylene chloride	< 0.3
n-Butane	0.79
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.03
n-Hexane	0.05
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.2
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	0.02
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.10
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.05
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Maxxam Analytics

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6200
 Location: Bonnyville - AER Canister ID: 2665
 Station ID: LICA 37 Installation Date/Time (mst): July 6, 2016 @ 15:18
 Sample ID: LICA/VOC/Bonnyville/July 11, 2016 Removal Date/Time (mst): July 13, 2016 @ 11:14

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>July 11, 2016</u>	<u>00:00</u>	<u>00:00</u> <u>July 12, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.1</u>	<u>+20.0</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>4.94</u>	<u>26</u>

(June 30, 2016 :) Deployment/Collection and Maintenance Checklist
 Initial leak check deployment vacuum (in. Hg) = -28.0 @ 10:27 mst
 Final leak check deployment vacuum (in. Hg) = -28.0 @ 17:20 mst
(July 4, 2016) Total leak rate = 0.0 psi over 4 days -minutes A.X.
 Timer reset to zero prior to sampling? YES (yes/no)
 Date of last flow calibration: July 4, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: April 5, 2016 (due every 6 months)

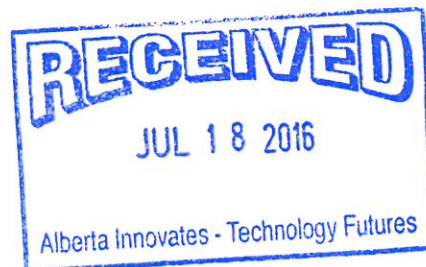
Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required

Comments: Date of last audit: July 4, 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: July 13, 2016

Sample ID: 16070204-001
 Customer ID: LICA
 Cust Samp ID: LICA/VOC/Bonnyville/July 11, 2016



Volatile Organics Data Results

Date: July 11, 2016
Canister ID: 2665

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.01
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.16
1-Hexene	< 0.02
1-Pentene	0.01
2,2,4-Trimethylpentane	< 0.01
2,2-Dimethylbutane	0.01
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	0.02
2,3-Dimethylpentane	0.03
2,4-Dimethylpentane	< 0.01
2-Methylheptane	< 0.01
2-Methylhexane	< 0.01
2-Methylpentane	0.05
3-Methylheptane	< 0.02
3-Methylhexane	0.04
3-Methylpentane	0.03
Acetone	2.2
Acrolein	< 0.3
Benzene	0.04
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	0.02
Carbon disulfide	0.12
Carbon tetrachloride	0.09
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.02
Chloromethane	0.76
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	< 0.02
cis-2-Pentene	< 0.02
Cyclohexane	0.06
Cyclopentane	0.03
Dibromochloromethane	< 0.01
Ethanol	1.7
Ethyl acetate	< 0.4
Ethylbenzene	0.01
Freon-11	0.24
Freon-113	0.06

Volatile Organics Data Results

Date: July 11, 2016
Canister ID: 2665

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.42
Hexachloro-1,3-butadiene	< 0.50
Isobutane	2.16
Isopentane	0.34
Isoprene	0.60
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	0.03
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.07
Methylcyclopentane	0.07
Methylene chloride	< 0.3
n-Butane	0.90
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.03
n-Hexane	0.04
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.2
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	0.02
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.05
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.01
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Maxxam Analytics

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6200
 Location: Bonnyville - AER Canister ID: 1149
 Station ID: LICA-37 Installation Date/Time (mst): July 13, 2016 @ 11:14
 Sample ID: LICA/VOC/Bonnyville/July 17, 2016 Removal Date/Time (mst): July 18, 2016 @ 10:58

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
July 17, 2016	00:00	00:00 July 18, 2016	24.0

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
- 27.2	+ 18.1

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
10.0	4.94	26

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) = - @ - mst
 Final leak check deployment vacuum (in. Hg) = - @ - mst
 Total leak rate = - psi over - minutes
 Timer reset to zero prior to sampling? YES (yes/no)
 Date of last flow calibration: July 4, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: April 5, 2016 (due every 6 months)

Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required

Comments: Date of last audit : July 4, 2016

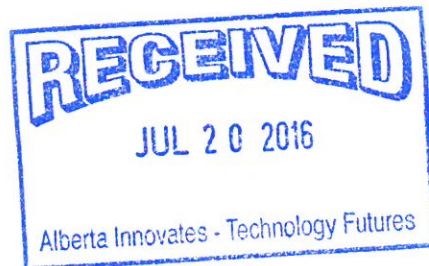
Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: July 18, 2016 A.Y.

Sample ID: 16070251-003

Customer ID: LICA

Cust Samp ID: LICA/VOC/Bonnyville/July 17, 2016



Volatile Organics Data Results

Date: July 17, 2016
Canister ID: 1149

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.13
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.52
1-Hexene	< 0.02
1-Pentene	0.02
2,2,4-Trimethylpentane	< 0.01
2,2-Dimethylbutane	0.04
2,3,4-Trimethylpentane	0.02
2,3-Dimethylbutane	0.21
2,3-Dimethylpentane	0.07
2,4-Dimethylpentane	0.02
2-Methylheptane	0.02
2-Methylhexane	< 0.01
2-Methylpentane	0.09
3-Methylheptane	< 0.02
3-Methylhexane	0.08
3-Methylpentane	0.12
Acetone	3.2
Acrolein	< 0.3
Benzene	0.61
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	1.86
Carbon tetrachloride	0.10
Chlorobenzene	< 0.02
Chloroethane	0.05
Chloroform	0.02
Chloromethane	0.72
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.03
cis-2-Pentene	< 0.02
Cyclohexane	0.12
Cyclopentane	0.04
Dibromochloromethane	< 0.01
Ethanol	1.2
Ethyl acetate	< 0.4
Ethylbenzene	0.02
Freon-11	0.20
Freon-113	0.06

Volatile Organics Data Results

Date: July 17, 2016
Canister ID: 1149

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.38
Hexachloro-1,3-butadiene	< 0.50
Isobutane	3.22
Isopentane	0.49
Isoprene	0.57
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	0.06
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	0.9
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.10
Methylcyclopentane	0.13
Methylene chloride	< 0.3
n-Butane	0.88
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.10
n-Hexane	0.09
n-Nonane	0.01
n-Octane	0.03
n-Pentane	0.1
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	1.1
o-Ethyltoluene	< 0.01
o-Xylene	0.03
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.17
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.06
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Maxxam Analytics

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6200
 Location: Bonnyville - AER Canister ID: 14703
 Station ID: LICA-37 Installation Date/Time (mst): July 18, 2016 @ 10:58
 Sample ID: LICA/VOC/Bonnyville/July 23, 2016 Removal Date/Time (mst): July 27, 2016 @ 14:35

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>July 23, 2016</u>	<u>00:00</u>	<u>00:00</u> <u>July 24, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-28.0</u>	<u>+18.7</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>4.94</u>	<u>26</u>

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) = — @ — mst
 Final leak check deployment vacuum (in. Hg) = — @ — mst
 Total leak rate = — psi over — minutes
 Timer reset to zero prior to sampling? YES (yes/no)
 Date of last flow calibration: July 4, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: April 5, 2016 (due every 6 months)

Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required

Comments: Date of last audit: July 4, 2016

NB! The canister was received 11 days before the expiry date. It was used 4 days before the expiring date. It was exchanged 1 day before the expiring date.

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: July 27, 2016

Sample ID: 16080015-001

Customer ID: LICA

Cust Samp ID: LICA/VOC/Bonnyville/July 23, 2016



Volatile Organics Data Results

Date: July 23, 2016
Canister ID: 14703

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	0.07
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.02
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	0.03
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	< 0.02
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	0.05
2,2-Dimethylbutane	< 0.01
2,3,4-Trimethylpentane	0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	< 0.02
2,4-Dimethylpentane	< 0.01
2-Methylheptane	< 0.01
2-Methylhexane	< 0.01
2-Methylpentane	0.03
3-Methylheptane	< 0.02
3-Methylhexane	< 0.02
3-Methylpentane	0.02
Acetone	2.8
Acrolein	< 0.3
Benzene	0.04
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	0.87
Carbon tetrachloride	0.13
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.03
Chloromethane	0.43
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	< 0.02
cis-2-Pentene	< 0.02
Cyclohexane	< 0.02
Cyclopentane	< 0.01
Dibromochloromethane	< 0.01
Ethanol	1.2
Ethyl acetate	< 0.4
Ethylbenzene	0.02
Freon-11	0.33
Freon-113	0.07

Volatile Organics Data Results

Date: July 23, 2016
Canister ID: 14703

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.51
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.14
Isopentane	0.15
Isoprene	0.09
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	0.08
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.02
Methylcyclopentane	< 0.02
Methylene chloride	< 0.3
n-Butane	0.16
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.04
n-Hexane	0.03
n-Nonane	0.01
n-Octane	0.03
n-Pentane	< 0.1
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	0.02
o-Xylene	0.04
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.15
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	< 0.01
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Maxxam Analytics

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6200
 Location: Bonnyville AER Canister ID: 14993
 Station ID: LICA 37 Installation Date/Time (mst): July 27, 2016 @ 14:35
 Sample ID: LICA/VOC/Bonnyville/July 29, 2016 Removal Date/Time (mst): Aug 2, 2016 @ 15:45

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>July 29, 2016</u>	<u>00:00</u>	<u>00:00</u> <u>July 30, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>- 28.0</u>	<u>+ 18.5</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>4.94</u>	<u>26</u>

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) = — @ — mst
 Final leak check deployment vacuum (in. Hg) = — @ — mst
 Total leak rate = — psi over — minutes
 Timer reset to zero prior to sampling? YES (yes/no)
 Date of last flow calibration: July 4, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: April 5, 2016 (due every 6 months)

Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required

Comments: Date of last audit: July 4, 2016

The canister does not have a pressure gauge. The data was taken from the sampler gauge.

The canister was received on July 27, 2016. It was evacuated on May 3, 2016. It was installed 6 days before the expiry date. It was sampled 3 days before the expiry date.

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Aug 2, 2016

Sample ID: 16080034-001

Customer ID: LICA
 Cust Samp ID: LICA/VOC/Bonnyville/July 29, 2016



Volatile Organics Data Results

Date: July 29, 2016
Canister ID: 14993

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	< 0.01
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	< 0.02
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	0.02
2,2-Dimethylbutane	< 0.01
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	< 0.02
2,4-Dimethylpentane	< 0.01
2-Methylheptane	< 0.01
2-Methylhexane	< 0.01
2-Methylpentane	0.04
3-Methylheptane	< 0.02
3-Methylhexane	< 0.02
3-Methylpentane	0.02
Acetone	4.8
Acrolein	< 0.3
Benzene	0.02
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	0.05
Carbon tetrachloride	0.09
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	< 0.02
Chloromethane	0.54
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	< 0.02
cis-2-Pentene	< 0.02
Cyclohexane	< 0.02
Cyclopentane	< 0.01
Dibromochloromethane	< 0.01
Ethanol	1.6
Ethyl acetate	< 0.4
Ethylbenzene	0.02
Freon-11	0.28
Freon-113	0.07

Volatile Organics Data Results

Date: July 29, 2016
Canister ID: 14993

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.58
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.21
Isopentane	0.19
Isoprene	0.15
Isopropyl alcohol	0.6
Isopropylbenzene	< 0.01
m,p-Xylene	< 0.03
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.02
Methylcyclopentane	0.03
Methylene chloride	< 0.3
n-Butane	0.23
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.02
n-Hexane	0.04
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.1
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	0.01
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.05
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	< 0.01
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

PAH RESULTS

Sample ID: 16070132-002

Customer ID: LICA
Cust Samp ID: LICA/PUF/Bonnyville/July 5, 2016

TISCH PUF PLUS Sample Collection Data Sheet

Client:	<u>LICA</u>	Puf+ S/N:	<u>TE-05</u>
Location:	<u>Bonnyville - AER</u>	Motor S/N:	<u>1139/100-1015</u>
Station ID:	<u>LICA-37</u>	Installation Date/Time:	<u>June 30, 2016/10:43</u>
Field Sample ID:	<u>LICA/PUF/Bonnyville/July 5, 2016</u>	Removal Date/Time:	<u>July 6, 2016/15:40</u>

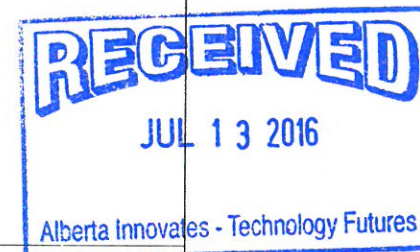
Sample Data Collection Information

Sample Date:	<u>July 5, 2016</u>	Average Pressure (mmHg)	<u>699</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q _{std})	<u>22.9</u>
End Time (mst):	<u>00:00 July 6, 2016</u>	Average Temperature (°C)	<u>14.3°</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (Vstd m ³)	<u>330.17</u>

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average temperature appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average pressure appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Any error messages? (if yes list below)	<input type="radio"/> YES	<input checked="" type="radio"/> NO
Sample duration 24 hours?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Date of last calibration/audit:	<u>April 5, 2016</u>	
Other observations?		



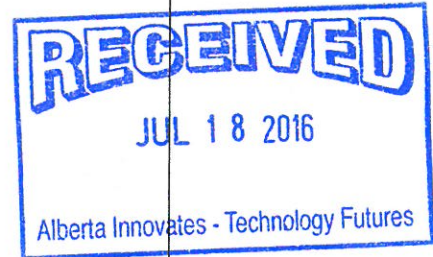
Deployed By:	<u>Alex Yakupov</u>	
Collected By:	<u>Alex Yakupov</u>	<u>Date: July 6, 2016</u>

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: July 5, 2016
PUF S/N: TE05

PARAMETERS	CONCENTRATION (UG)
1-Methylnaphthalene	0.02
2-Methylnaphthalene	0.06
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	< 0.01
Acenaphthylene	< 0.01
Acridine	< 0.01
Anthracene	0.04
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	< 0.01
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	0.02
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.07
Fluorene	0.04
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.02
Perylene	< 0.01
Phenanthrene	0.23
Pyrene	0.07
Retene	0.05

TISCH PUF PLUS Sample Collection Data Sheet			
Client:	<u>LICA</u>	Puf+ S/N:	<u>9702</u>
Location:	<u>Bonnyville - AER</u>	Motor S/N:	<u>1139 / 100-1015</u>
Station ID:	<u>LICA-37</u>	Installation Date/Time:	<u>July 6, 2016 / 15:40</u>
Field Sample ID:	<u>LICA/PUF/Bonnyville/July 11 2016</u>	Removal Date/Time:	<u>July 13, 2016 / 13:10</u>
Sample Data Collection Information			
Sample Date:	<u>July 11, 2016</u>	Average Pressure (mmHg)	<u>697</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q _{std})	<u>229</u>
End Time (mst):	<u>00:00 July 12, 2016</u>	Average Temperature (°C)	<u>18.4°</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (Vstd m ³)	<u>330.19</u>
Sample Recovery Checklist			
(circle one)			
Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Average temperature appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Average pressure appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Any error messages? (if yes list below)	<input type="radio"/> YES	<input checked="" type="radio"/> NO	
Sample duration 24 hours?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Date of last calibration/audit:	<u>July 4, 2016</u>		
Other observations?	_____		
Deployed By:	<u>Alex Yakupov</u>		
Collected By:	<u>Alex Yakupov</u>		<u>Date: July 13, 2016</u>



Sample ID: 16070204-002

Customer ID: LICA
 Cust Samp ID: LICA/PUF/Bonnyville/July 11, 2016

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: July 11, 2016
PUF S/N: 9702

PARAMETERS	CONCENTRATION (UG)
1-Methylnaphthalene	0.04
2-Methylnaphthalene	0.06
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.03
Acenaphthylene	< 0.01
Acridine	< 0.01
Anthracene	0.01
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	< 0.01
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	< 0.01
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.08
Fluorene	0.07
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.03
Perylene	< 0.01
Phenanthrene	0.26
Pyrene	0.06
Retene	0.09

Sample ID: 16070251-004

AIR FCD-01321/2

Customer ID: LICA
Cust Samp ID: LICA/PUF/Bonnyville/July 17, 2016

TISCH PUF PLUS Sample Collection Data Sheet

Client:	<u>LICA</u>	Puf+ S/N:	<u>(A.Y.) 19-7E-09</u>
Location:	<u>Bonnyville - AER</u>	Motor S/N:	<u>1139/100-1015</u>
Station ID:	<u>LICA-37</u>	Installation Date/Time:	<u>July 13, 2016 / 13:10</u>
Field Sample ID:	<u>LICA/PUF/Bonnyville/July 17, 2016</u>	Removal Date/Time:	<u>July 18, 2016 / 11:07</u>

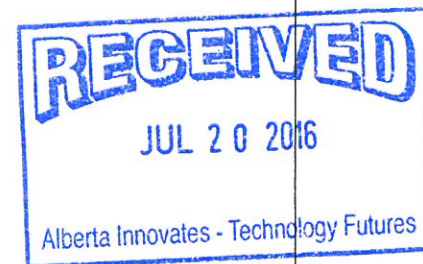
Sample Data Collection Information

Sample Date:	<u>July 17, 2016</u>	Average Pressure (mmHg)	<u>703</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q _{std})	<u>229</u>
End Time (mst):	<u>July 18, 2016 / 00:00</u>	Average Temperature (°C)	<u>18.5°</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (V _{std} m ³):	<u>330.18</u>

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average temperature appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average pressure appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Any error messages? (if yes list below)	<input type="radio"/> YES	<input checked="" type="radio"/> NO
Sample duration 24 hours?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Date of last calibration/audit:	<u>July 4, 2016</u>	
Other observations?		



Deployed By: Alex Yakupov

Collected By: Alex Yakupov Date: July 18, 2016

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: July 17, 2016
PUF S/N: TE09

PARAMETERS	CONCENTRATION (UG)
1-Methylnaphthalene	0.05
2-Methylnaphthalene	0.08
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.04
Acenaphthylene	0.09
Acridine	< 0.01
Anthracene	0.04
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	0.03
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	0.02
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.12
Fluorene	0.10
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.04
Perylene	< 0.01
Phenanthrene	0.37
Pyrene	0.08
Retene	0.25

Sample ID: 16080015-002

Customer ID: LICA
Cust Samp ID: LICA/PUF/Bonnyville/July 23, 2016

TISCH PUF PLUS Sample Collection Data Sheet

Client: LICA Puf+ S/N: TE-02
Location: Bonnyville - AER Motor S/N: 1139/100-1015
Station ID: LICA-37 Installation Date/Time: July 18, 2016/11:07
Field Sample ID: LICA/PUF/Bonnyville/July 23, 2016 Removal Date/Time: July 27, 2016/14:34

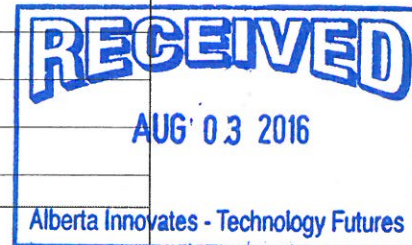
Sample Data Collection Information

Sample Date: July 23, 2016 Average Pressure (mmHg) 700
Start Time (mst): 00:00 Average Flow (Q_{std}) 229
End Time (mst): 00:00 July 24, 2016 Average Temperature (°C) 18.3°
Elapsed Time (Hours): 24.0 Volume (Vstd m³) 330.19

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ? YES NO
Average temperature appears correct? YES NO
Average pressure appears correct? YES NO
Any error messages? (if yes list below) YES NO
Sample duration 24 hours? YES NO
Date of last calibration/audit: July 4, 2016
Other observations?



Deployed By: Alex Yakupov
Collected By: Alex Yakupov Date: July 27, 2016

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: July 23 , 2016
PUF S/N: TE02

PARAMETERS	CONCENTRATION (UG)
1-Methylnaphthalene	0.04
2-Methylnaphthalene	0.07
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.03
Acenaphthylene	0.07
Acridine	< 0.01
Anthracene	0.06
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	0.02
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	0.02
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.15
Fluorene	0.10
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.04
Perylene	0.01
Phenanthrene	0.34
Pyrene	0.10
Retene	0.12

Sample ID: 16080034-002

Customer ID: LICA

Cust Samp ID: LICA/PUF/Bonnyville/July 29, 2016

TISCH PUF PLUS Sample Collection Data Sheet

Client:	<u>LICA</u>	Puf+ S/N:	<u>TE-04</u>
Location:	<u>Bonnyville - AER</u>	Motor S/N:	<u>1139/100-1015</u>
Station ID:	<u>LICA 37</u>	Installation Date/Time:	<u>July 27, 2016 / 14:34</u>
Field Sample ID:	<u>LICA/PUF/Bonnyville/July 29, 2016</u>	Removal Date/Time:	<u>Aug 2, 2016 / 15:51</u>

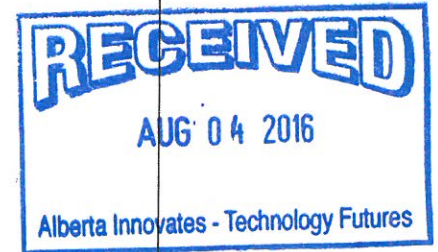
Sample Data Collection Information

Sample Date:	<u>July 29, 2016</u>	Average Pressure (mmHg)	<u>702</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q _{std})	<u>229</u>
End Time (mst):	<u>00:00 July 30, 2016</u>	Average Temperature (°C)	<u>19.8°</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (V _{std} m ³)	<u>330.20</u>

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	NO
Average temperature appears correct?	<input checked="" type="radio"/> YES	NO
Average pressure appears correct?	<input checked="" type="radio"/> YES	NO
Any error messages? (if yes list below)	YES	<input checked="" type="radio"/> NO
Sample duration 24 hours?	<input checked="" type="radio"/> YES	NO
Date of last calibration/audit:	<u>July 4, 2016</u>	
Other observations?		



Deployed By: Alex Yakupov

Collected By: Alex Yakupov Date Aug 2, 2016

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: July 29, 2016
PUF S/N: TE04

PARAMETERS	CONCENTRATION (UG)
1-Methylnaphthalene	0.06
2-Methylnaphthalene	0.12
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.04
Acenaphthylene	0.06
Acridine	< 0.01
Anthracene	0.02
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	0.01
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	< 0.01
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.09
Fluorene	0.08
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.08
Perylene	0.03
Phenanthrene	0.26
Pyrene	0.06
Retene	0.08

NMHC CANISTER RESULTS

Sample ID: 16070035-001

AIR FGD-01320/2



Customer ID: LICA
Cust Samp ID: LICA/NMHC-
VOC/Bonnyville/July 1, 2016

Maxxam

VOC Sample Collection Data Sheet

Client: LICA Sampler S/N: n/a
 Location: Bonnyville - AER Canister ID: H 3280
 Station ID: LICA 37 Canister Installation Date/Time: June 30, 2016 / 10:10
 Field Sample ID: LICA/NMHC-VOC/Bonnyville/July 1, 2016 Canister Removal Date/Time: July 4, 2016 / 17:01

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
July 1, 2016	05:35	n/a	n/a

Flow Settings		
Meter Reading (sccm)	Pot Set Pt.	Pump Pressure Setting (psig)
n/a	n/a	n/a

Canister Information	
Initial Canister Vacuum (inHg)	Final Canister Pressure (psig)
- 28.0	- 4.0

vacuum in Hg (A.X.)

Canister valve open prior to sampling?: YES / NO
 Timer set to 0.00 minutes prior to sampling? YES / NO - n/a
 Canister valve closed prior to disconnection?: YES / NO

Comments: NMHC - canister

Technician Signature: Alex Yakupov Date: July 4, 2016

Volatile Organics Data Results (NMHC Canister System)

Date: July 1, 2016
Canister ID: H3280

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.03
1,1,2,2-Tetrachloroethane	< 0.03
1,1,2-Trichloroethane	< 0.03
1,1-Dichloroethane	< 0.03
1,1-Dichloroethylene	< 0.05
1,2,3-Trimethylbenzene	< 0.06
1,2,4-Trichlorobenzene	< 1.0
1,2,4-Trimethylbenzene	0.07
1,2-Dibromoethane	< 0.03
1,2-Dichlorobenzene	< 0.04
1,2-Dichloroethane	0.07
1,2-Dichloropropane	0.02
1,3,5-Trimethylbenzene	< 0.03
1,3-Butadiene	< 0.03
1,3-Dichlorobenzene	< 0.4
1,4-Dichlorobenzene	< 0.5
1,4-Dioxane	< 0.5
1-Butene	0.22
1-Hexene	0.03
1-Pentene	0.24
2,2,4-Trimethylpentane	0.16
2,2-Dimethylbutane	0.11
2,3,4-Trimethylpentane	0.02
2,3-Dimethylbutane	0.18
2,3-Dimethylpentane	0.15
2,4-Dimethylpentane	0.08
2-Methylheptane	0.04
2-Methylhexane	< 0.01
2-Methylpentane	1.17
3-Methylheptane	0.03
3-Methylhexane	0.22
3-Methylpentane	0.60
Acetone	6.3
Acrolein	< 0.4
Benzene	0.24
Benzyl chloride	< 0.5
Bromodichloromethane	< 0.03
Bromoform	< 0.03
Bromomethane	< 0.01
Carbon disulfide	0.57
Carbon tetrachloride	0.07
Chlorobenzene	< 0.03
Chloroethane	0.10
Chloroform	0.03
Chloromethane	0.19
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.05
cis-2-Butene	0.21
cis-2-Pentene	0.27
Cyclohexane	0.17
Cyclopentane	0.18
Dibromochloromethane	< 0.01
Ethanol	11.0
Ethyl acetate	< 0.5
Ethylbenzene	0.05
Freon-11	0.23
Freon-113	0.06

Volatile Organics Data Results (NMHC Canister System)

Date: July 1, 2016
Canister ID: H3280

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.03
Freon-12	< 0.03
Hexachloro-1,3-butadiene	< 0.63
Isobutane	2.36
Isopentane	9.02
Isoprene	0.40
Isopropyl alcohol	< 0.5
Isopropylbenzene	< 0.01
m,p-Xylene	0.15
m-Diethylbenzene	< 0.05
m-Ethyltoluene	< 0.10
Methyl butyl ketone	< 0.63
Methyl ethyl ketone	0.7
Methyl isobutyl ketone	< 0.5
Methyl methacrylate	< 0.09
Methyl tert butyl ether	< 0.04
Methylcyclohexane	0.19
Methylcyclopentane	0.46
Methylene chloride	0.5
n-Butane	14.0
n-Decane	< 0.08
n-Dodecane	< 0.5
n-Heptane	0.20
n-Hexane	0.60
n-Nonane	< 0.01
n-Octane	< 0.03
n-Pentane	3.5
n-Propylbenzene	< 0.06
n-Undecane	< 0.6
Naphthalene	< 0.6
o-Ethyltoluene	< 0.01
o-Xylene	0.05
p-Diethylbenzene	< 0.05
p-Ethyltoluene	< 0.09
Styrene	< 0.05
Tetrachloroethylene	< 0.05
Tetrahydrofuran	< 0.5
Toluene	0.47
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.05
trans-2-Butene	0.15
trans-2-Pentene	0.52
Trichloroethylene	0.06
Vinyl acetate	< 0.5
Vinyl chloride	< 0.03

Sample ID: 16070277-001

AIR FCD-01320/2

Customer ID: LICA
Cust Samp ID: LICA/NMHC-
VOC/Bonnyville/July 15,
2016

Maxxam

VOC Sample Collection Data Sheet

Client: LICA
Location: Bonnyville - AER
Station ID: LICA 37
Field Sample ID: LICA/NMHC - VOC/Bonnyville /
July 15, 2016

Sampler S/N: n/a
Canister ID: 14735
Canister Installation Date/Time: July 4, 2016 / 17:01
Canister Removal Date/Time: July 15, 2016 / 09:16

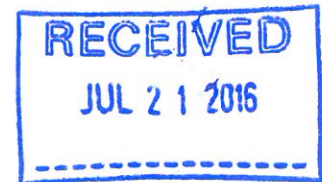
Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
<u>July 15, 2016</u>	<u>06:00</u>	<u>n/a</u>	<u>n/a</u>

Flow Settings		
Meter Reading (scm)	Pot Set Pt.	Pump Pressure Setting (psig)
<u>n/a</u>	<u>n/a</u>	<u>n/a</u>

Canister Information	
Initial Canister Vacuum (inHg)	Final Canister Pressure (psig)
<u>-27.1</u>	<u>-5.0</u>

Vacuum in Hg (A-X.)

Canister valve open prior to sampling?: YES / NO
Timer set to 0.00 minutes prior to sampling? YES / NO - n/a
Canister valve closed prior to disconnection?: YES / NO



Comments: NMHC - canister

Technician Signature: Alex Yakupov Date: July 15, 2016
09:16

Volatile Organics Data Results (NMHC Canister System)

Date: July 15, 2016
Canister ID: 14735

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.03
1,1,2,2-Tetrachloroethane	< 0.03
1,1,2-Trichloroethane	< 0.03
1,1-Dichloroethane	< 0.03
1,1-Dichloroethylene	< 0.05
1,2,3-Trimethylbenzene	< 0.06
1,2,4-Trichlorobenzene	< 1.0
1,2,4-Trimethylbenzene	0.04
1,2-Dibromoethane	< 0.03
1,2-Dichlorobenzene	< 0.04
1,2-Dichloroethane	< 0.01
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.03
1,3-Butadiene	< 0.03
1,3-Dichlorobenzene	< 0.4
1,4-Dichlorobenzene	< 0.5
1,4-Dioxane	< 0.5
1-Butene	0.26
1-Hexene	< 0.03
1-Pentene	0.05
2,2,4-Trimethylpentane	0.07
2,2-Dimethylbutane	0.04
2,3,4-Trimethylpentane	0.06
2,3-Dimethylbutane	0.09
2,3-Dimethylpentane	0.09
2,4-Dimethylpentane	0.04
2-Methylheptane	0.02
2-Methylhexane	< 0.01
2-Methylpentane	0.27
3-Methylheptane	< 0.03
3-Methylhexane	0.07
3-Methylpentane	0.16
Acetone	4.2
Acrolein	< 0.4
Benzene	0.14
Benzyl chloride	< 0.5
Bromodichloromethane	< 0.03
Bromoform	< 0.03
Bromomethane	< 0.01
Carbon disulfide	0.13
Carbon tetrachloride	0.09
Chlorobenzene	< 0.03
Chloroethane	< 0.03
Chloroform	0.03
Chloromethane	0.64
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.05
cis-2-Butene	< 0.03
cis-2-Pentene	0.03
Cyclohexane	0.16
Cyclopentane	0.09
Dibromochloromethane	< 0.01
Ethanol	1.6
Ethyl acetate	< 0.5
Ethylbenzene	0.04
Freon-11	0.24
Freon-113	0.05

Volatile Organics Data Results (NMHC Canister System)

Date: July 15, 2016
Canister ID: 14735

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.03
Freon-12	0.25
Hexachloro-1,3-butadiene	< 0.63
Isobutane	3.56
Isopentane	2.33
Isoprene	0.36
Isopropyl alcohol	< 0.5
Isopropylbenzene	< 0.01
m,p-Xylene	0.17
m-Diethylbenzene	< 0.05
m-Ethyltoluene	< 0.10
Methyl butyl ketone	< 0.63
Methyl ethyl ketone	0.5
Methyl isobutyl ketone	< 0.5
Methyl methacrylate	< 0.09
Methyl tert butyl ether	< 0.04
Methylcyclohexane	0.18
Methylcyclopentane	0.24
Methylene chloride	< 0.4
n-Butane	5.30
n-Decane	< 0.08
n-Dodecane	< 0.5
n-Heptane	0.07
n-Hexane	0.19
n-Nonane	0.02
n-Octane	< 0.03
n-Pentane	0.9
n-Propylbenzene	< 0.06
n-Undecane	< 0.6
Naphthalene	< 0.6
o-Ethyltoluene	< 0.01
o-Xylene	0.04
p-Diethylbenzene	< 0.05
p-Ethyltoluene	< 0.09
Styrene	< 0.05
Tetrachloroethylene	< 0.05
Tetrahydrofuran	< 0.5
Toluene	0.25
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.05
trans-2-Butene	0.04
trans-2-Pentene	0.05
Trichloroethylene	< 0.05
Vinyl acetate	< 0.5
Vinyl chloride	< 0.03

Sample ID: 16070304-001

AIR FCD-01320/2

Customer ID: LICA
Cust Samp ID: LICA/NMHC-
VOC/Bonnyville/July 19,
2016

Maxxam

VOC Sample Collection Data Sheet



Client: LICA Sampler S/N: n/a
Location: Bonnyville - AER Canister ID: S5622
Station ID: LICA 37 Canister Installation Date/Time: July 15, 2016 / 09:16
Field Sample ID: LICA/NMHC - VOC/Bonnyville/July 19, 2016 Canister Removal Date/Time: July 20, 2016 / 18:34

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
<u>July 19, 2016</u>	<u>07:20</u>	<u>n/a</u>	<u>n/a</u>

Flow Settings		
Meter Reading (sccm)	Pot Set Pt.	Pump Pressure Setting (psig)
<u>n/a</u>	<u>n/a</u>	<u>n/a</u>

Canister Information	
Initial Canister Vacuum (inHg)	Final Canister Pressure (psig)
<u>-27.2</u>	<u>-2.1</u>

vacuum in Hg (A.Y.)

Canister valve open prior to sampling?: YES / NO
Timer set to 0.00 minutes prior to sampling? YES / NO n/a
Canister valve closed prior to disconnection?: YES / NO

Comments: NMHC - canister

Technician Signature: Alex Yakupov Date: July 20, 2016

Volatile Organics Data Results (NMHC Canister System)

Date: July 19, 2016
Canister ID: SS622

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.05
1,2,3-Trimethylbenzene	< 0.06
1,2,4-Trichlorobenzene	< 1.0
1,2,4-Trimethylbenzene	0.06
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.04
1,2-Dichloroethane	0.02
1,2-Dichloropropane	0.02
1,3,5-Trimethylbenzene	0.03
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.4
1,4-Dichlorobenzene	< 0.5
1,4-Dioxane	< 0.5
1-Butene	0.11
1-Hexene	0.05
1-Pentene	0.10
2,2,4-Trimethylpentane	0.11
2,2-Dimethylbutane	0.04
2,3,4-Trimethylpentane	0.02
2,3-Dimethylbutane	0.16
2,3-Dimethylpentane	0.12
2,4-Dimethylpentane	0.05
2-Methylheptane	0.02
2-Methylhexane	< 0.01
2-Methylpentane	0.51
3-Methylheptane	< 0.02
3-Methylhexane	0.11
3-Methylpentane	0.28
Acetone	3.0
Acrolein	< 0.4
Benzene	0.15
Benzyl chloride	< 0.5
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	0.02
Carbon disulfide	0.19
Carbon tetrachloride	0.10
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.03
Chloromethane	0.57
cis-1,2-Dichloroethene	0.02
cis-1,3-Dichloropropene	< 0.05
cis-2-Butene	0.10
cis-2-Pentene	0.07
Cyclohexane	0.14
Cyclopentane	0.10
Dibromochloromethane	< 0.01
Ethanol	8.1
Ethyl acetate	< 0.5
Ethylbenzene	0.05
Freon-11	0.25
Freon-113	0.06

Volatile Organics Data Results (NMHC Canister System)

Date: July 19, 2016
Canister ID: SS622

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.26
Hexachloro-1,3-butadiene	< 0.62
Isobutane	1.72
Isopentane	4.26
Isoprene	0.17
Isopropyl alcohol	0.5
Isopropylbenzene	< 0.01
m,p-Xylene	0.15
m-Diethylbenzene	< 0.05
m-Ethyltoluene	< 0.10
Methyl butyl ketone	< 0.62
Methyl ethyl ketone	0.7
Methyl isobutyl ketone	< 0.5
Methyl methacrylate	< 0.09
Methyl tert butyl ether	< 0.04
Methylcyclohexane	0.11
Methylcyclopentane	0.23
Methylene chloride	< 0.4
n-Butane	7.29
n-Decane	< 0.07
n-Dodecane	< 0.5
n-Heptane	0.11
n-Hexane	0.29
n-Nonane	0.02
n-Octane	0.02
n-Pentane	1.8
n-Propylbenzene	< 0.06
n-Undecane	< 0.6
Naphthalene	< 0.6
o-Ethyltoluene	0.01
o-Xylene	0.06
p-Diethylbenzene	< 0.05
p-Ethyltoluene	< 0.09
Styrene	< 0.05
Tetrachloroethylene	< 0.05
Tetrahydrofuran	< 0.5
Toluene	0.17
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.05
trans-2-Butene	< 0.01
trans-2-Pentene	0.12
Trichloroethylene	< 0.05
Vinyl acetate	< 0.5
Vinyl chloride	< 0.02

APPENDIX III
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE



API 100E Sulphur Dioxide Analyzer Calibration

Date: July 12, 2016	Barometric Pressure: 0.930 atm
Company/Airshed: LICA	Station Temperature °C: 21
Location/Station Name: Bonnyville - AER	Weather Conditions: Mainly sunny
Parameter: Sulphur Dioxide	Calibration Purpose: routine monthly
Start Time 24 hr. (mst): 8:33	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
End Time 24 hr. (mst): 13:14	Cal Gas Expiry Date: December 2, 2023
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	
Serial Number: 467	Range ppb: 1000
Last Calibration Date: June 2, 2016	As Found C.F.: 0.976
Previous C.F.: 0.996	New C.F.: 0.996

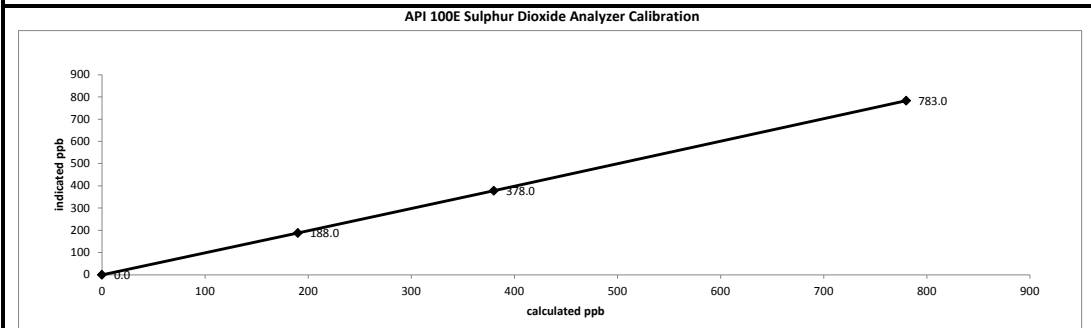
Calibrator:	Standard Calibration Points for Ranges								
Flow Meter ID's: n/a	<table border="1" style="margin: auto;"> <thead> <tr> <th>Point</th> <th>Sulphur Dioxide Standard Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> </tr> <tr> <td>Mid</td> <td>380</td> </tr> <tr> <td>Low</td> <td>190</td> </tr> </tbody> </table>	Point	Sulphur Dioxide Standard Calibration Points	High	780	Mid	380	Low	190
Point		Sulphur Dioxide Standard Calibration Points							
High		780							
Mid		380							
Low		190							
Make & Model: SABIO 2010 D									
Serial #: 11900613									
Cal Gas Cylinder I.D. #: LL119346									
Cal Gas Conc. (ppm): 50.0									

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	5000	0.00	5000	0.0	1.0	N/A
as found high	4922	78.00	5000	780.0	800.0	0.976
adjusted zero	5000	0.00	5000	0.0	0.0	n/a
adjusted high	4922	78.00	5000	780.0	783.0	0.996
mid	4961	38.00	4999	380.1	378.0	1.005
low	4980	19.00	4999	190.0	188.0	1.011
calibrator zero	5000	0.00	5000	0.0	0.0	n/a
Average C.F.=						1.004

Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u>	LIMITS
Slope = <u>0.995</u>	> or = 0.995
b (Intercept as % of full scale) = <u>0.18%</u>	.95-1.05
% change in C.F. from last cal = <u>1.99%</u>	± 3% F.S.
	± 10%

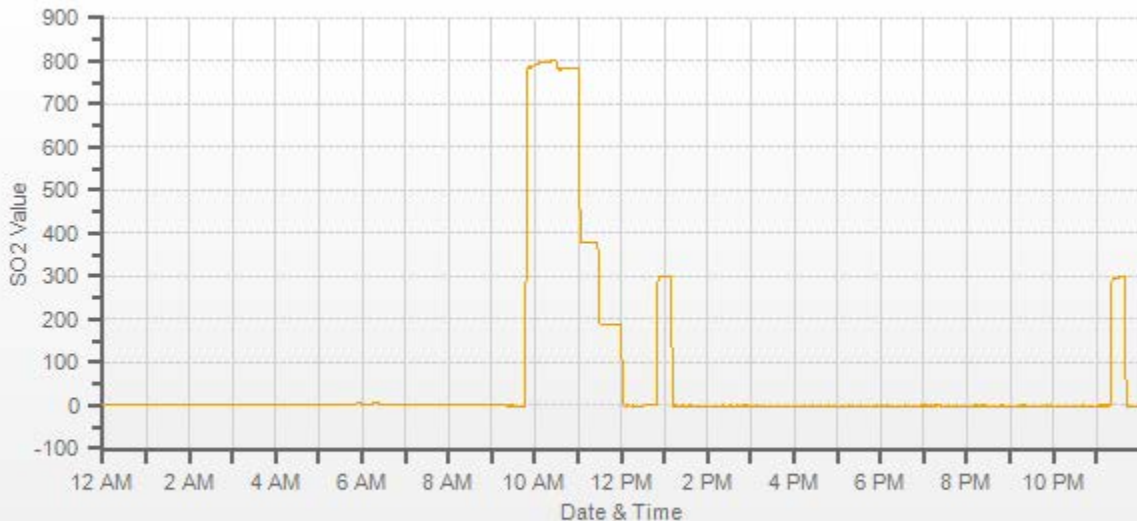


<p style="text-align: center;">As found:</p> SLOPE: <u>1.138</u> OFFSET: <u>117.5</u> HVPS: <u>512</u> RCCELL TEMP: <u>50.0</u> BOX TEMP: <u>30.7</u> PMT TEMP: <u>8.1</u> IZS TEMP: <u>45.0</u> PRES: <u>24.5</u> SAMP FL: <u>621</u> NORM PMT: <u>122.0</u> UV LAMP: <u>2736.6</u> LAMP RATIO: <u>91</u> STR. LGT: <u>66.9</u> DRK PMT: <u>15.1</u> DRK LMP: <u>2.7</u> Internal Span: <u>300</u>	<p style="text-align: center;">As left:</p> SLOPE: <u>1.114</u> OFFSET: <u>122.2</u> HVPS: <u>512</u> RCCELL TEMP: <u>50.0</u> BOX TEMP: <u>33.2</u> PMT TEMP: <u>8.1</u> IZS TEMP: <u>45.0</u> PRES: <u>24.5</u> SAMP FL: <u>619</u> NORM PMT: <u>122.1</u> UV LAMP: <u>2736.2</u> LAMP RATIO: <u>91</u> STR. LGT: <u>68.1</u> DRK PMT: <u>15.3</u> DRK LMP: <u>2.6</u> Internal Span: <u>300</u>
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Comments:

Sample inlet filter changed. The EV has not changed after post-calibration ZS check. Charcoal of the ZERO Air filter was renewed .

SO2[ppb] Station: LICA Bonnyville Daily: 2016/07/12 Type: AVG 1 Min. [1 Min.]



— SO2[ppb]

HYDROGEN SULPHIDE



API 101E Hydrogen Sulphide Analyzer Calibration

Date: July 14, 2016	Barometric Pressure: 0.941 atm
Company/Airshed: LICA	Station Temperature °C: 21
Location/Station Name: Bonnyville AER	Weather Conditions: Sunny
Parameter: Hydrogen Sulphide	Calibration Purpose: shut down
Start Time 24 hr. (mst): 9:14	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
End Time 24 hr. (mst): 11:15	Cal Gas Expiry Date: July 15, 2017
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	
Serial Number: 510	Range ppb: 100
Last Calibration Date: June 9, 2016	As Found C.F.: 0.971
Previous C.F.: 0.995	New C.F.: n/a

Calibrator:		Standard Calibration Points for Ranges	
Flow Meter ID's: n/a		Point	Hydrogen Sulphide Standard Calibration Points
Make & Model: API 700		High	78
Serial #: 627		Mid	38
Cal Gas Cylinder I.D. #: LL36837		Low	19
Cal Gas Conc. (ppm): 10.0			

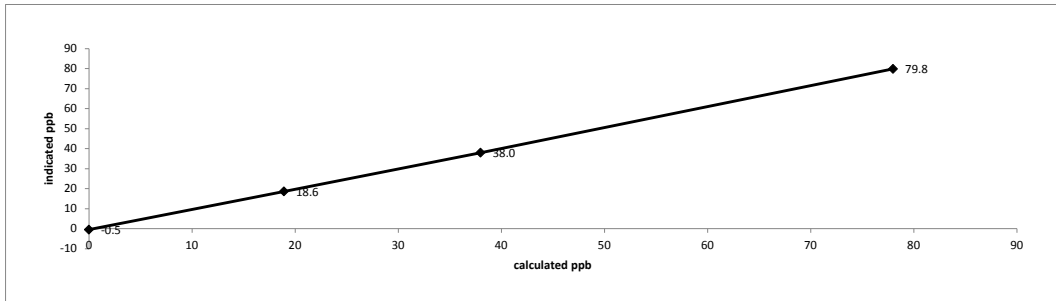
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	7498	0.00	7498	0.0	-0.5	N/A
as found high	7442	58.50	7501	78.0	79.8	0.971
mid	7474	28.50	7503	38.0	38.0	0.987
low	7492	14.20	7506	18.9	18.6	0.990
Average C.F. =						0.983

Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u>	LIMITS
Slope = <u>0.970</u>	> or = 0.995
b (Intercept as % of full scale) = <u>0.76%</u>	0.90-1.10
% change in C.F. from last cal = <u>2.38%</u>	± 3% F.S.
	± 10%

API 101E Hydrogen Sulphide Analyzer Calibration



<p>As found:</p> SLOPE: <u>1.137</u> OFFSET: <u>33.0</u> HVPS: <u>526</u> RCELL TEMP: <u>50.0</u> BOX TEMP: <u>29.5</u> PMT TEMP: <u>8.4</u> IZS TEMP: <u>45.0</u> Converter Temp: <u>315.0</u> PRES: <u>21.7</u> SAMP FL: <u>567</u> UV LAMP: <u>2505.4</u> LAMP RATIO: <u>79</u> STR. LGT: <u>18.8</u> DRK PMT: <u>34.6</u> DRK LMP: <u>-2.0</u> Internal Span: <u>51.9</u>	<p>As left:</p> SLOPE: <u>n/a</u> OFFSET: <u>n/a</u> HVPS: <u>n/a</u> RCELL TEMP: <u>n/a</u> BOX TEMP: <u>n/a</u> PMT TEMP: <u>n/a</u> IZS TEMP: <u>n/a</u> Converter Temp: <u>n/a</u> PRES: <u>n/a</u> SAMP FL: <u>n/a</u> UV LAMP: <u>n/a</u> LAMP RATIO: <u>n/a</u> STR. LGT: <u>n/a</u> DRK PMT: <u>n/a</u> DRK LMP: <u>n/a</u> Internal Span: <u>n/a</u>
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Comments:
 Shutdown calibration completed to renew SO2 scrubber beads. No ZERO adjustment made. No High Point adjustment made.



API 101E Hydrogen Sulphide Analyzer Calibration

Date: July 14, 2016	Barometric Pressure: 0.941 atm
Company/Airshed: LICA	Station Temperature °C: 21
Location/Station Name: Bonnyville AER	Weather Conditions: Sunny
Parameter: Hydrogen Sulphide	Calibration Purpose: post repair
Start Time 24 hr. (mst): 11:40	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
End Time 24 hr. (mst): 17:16	Cal Gas Expiry Date: July 15, 2017
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	
Serial Number: 510	Range ppb: 100
Last Calibration Date: n/a	As Found C.F.: n/a
Previous C.F.: n/a	New C.F.: 0.997

Calibrator:	Standard Calibration Points for Ranges								
Flow Meter ID's: n/a	<table border="1" style="margin: auto;"> <thead> <tr> <th>Point</th> <th>Hydrogen Sulphide Standard Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>78</td> </tr> <tr> <td>Mid</td> <td>38</td> </tr> <tr> <td>Low</td> <td>19</td> </tr> </tbody> </table>	Point	Hydrogen Sulphide Standard Calibration Points	High	78	Mid	38	Low	19
Point		Hydrogen Sulphide Standard Calibration Points							
High		78							
Mid		38							
Low	19								
Make & Model: API 700									
Serial #: 627									
Cal Gas Cylinder I.D. # : LL36837									
Cal Gas Conc. (ppm): 10.0									

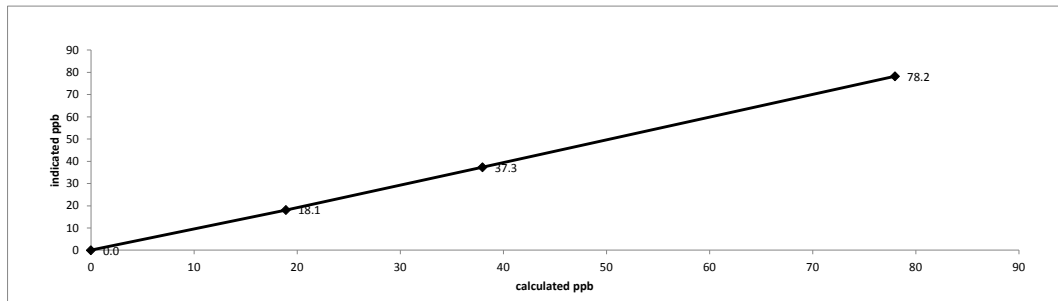
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
adjusted zero	7498	0.00	7498	0.0	0.0	N/A
adjusted high	7442	58.50	7501	78.0	78.2	0.997
mid	7474	28.50	7503	38.0	37.3	1.018
low	7493	14.20	7507	18.9	18.1	1.045
calibrator zero	7498	0.00	7498	0.0	0.0	n/a
Average C.F.=						1.020

Linear Regression/Calibration Results:

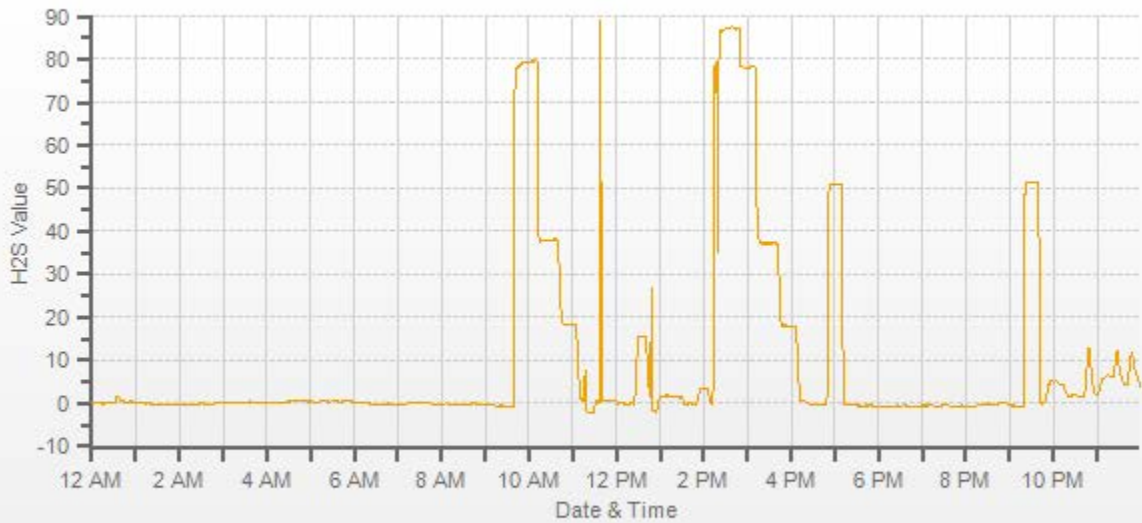
Correlation Coefficient = 1.000	LIMITS
Slope = 0.994	> or = 0.995
b (Intercept as % of full scale)= 0.51%	.95-1.05
% change in C.F. from last cal= n/a	± 3% F.S.
	± 10%

API 101E Hydrogen Sulphide Analyzer Calibration



As found:	As left:
SLOPE: n/a	SLOPE: 1.045
OFFSET: n/a	OFFSET: 36.7
HVPS: n/a	HVPS: 526
RCELL TEMP: n/a	RCELL TEMP: 50.0
BOX TEMP: n/a	BOX TEMP: 31.2
PMT TEMP: n/a	PMT TEMP: 8.4
IZS TEMP: n/a	IZS TEMP: 45.0
Converter Temp: n/a	Converter Temp: 315.0
PRES: n/a	PRES: 21.6
SAMP FL: n/a	SAMP FL: 564
UV LAMP: n/a	UV LAMP: 2326.9
LAMP RATIO: n/a	LAMP RATIO: 73.4
STR. LGT: n/a	STR. LGT: 19.2
DRK PMT: n/a	DRK PMT: 36.6
DRK LMP: n/a	DRK LMP: -2.1
Internal Span: n/a	Internal Span: 51.0

Comments:
 Post-repair calibration performed after SO2 scrubber beads had been renewed. SO2 scrubber was tested (13:51 - 14:09) with SO2/NOx gas mix of 780 ppb SO2 concentration: response was 3.6 ppb. Sample inlet filter changed. Output voltage was calibrated. 14:18 - gas pressure was adjusted.



— H2S[ppb]

TOTAL HYDROCARBON



Thermo 55i Methane/Non-Methane Analyzer Calibration

Date: July 12, 2016	Barometric Pressure: 0.930 atm
Company/Airshed: LICA	Station Temperature °C: 21
Location/Station Name: Bonnyville - AER	Weather Conditions: Mainly sunny
Parameter: CH ₄ / NMHC / THC	Calibration Purpose: routine monthly
Start/End Time 24 hr. (mst): 8:33 / 12:26	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
Calibration Method: Gas Dilution	Cal Gas Expiry Date: November 25, 2023

Analyzer:		Correction Factors:		
Serial Number: 1236656107		Previous C.F.:	As Found C.F.:	New C.F.:
Last Calibration Date: June 2, 2016		CH ₄ = 1.000	1.036	1.004
Range ppm: 20 CH ₄ /20 NMHC/40 THC		NMHC = 0.997	0.991	0.999
		THC = 0.998	1.013	1.001

Calibrator:		Standard Calibration Points for Analyzer Range of 20/20/40 ppm			
Flow Meter ID's: n/a		Point	CH ₄	NMHC	THC
Make & Model: API 700		High	13.00	13.00	26.00
Serial #: 627		Mid	7.00	7.00	14.00
Cal Gas Cylinder I.D. #: LL165372		Low	3.00	3.00	6.00
CH ₄ Cylinder Conc. = 606.0 212.0 =C ₃ H ₈ Cylinder Conc.					
CH ₄ as C ₃ H ₈ = 583.0 1189.0 =total CH ₄ equivalent					

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

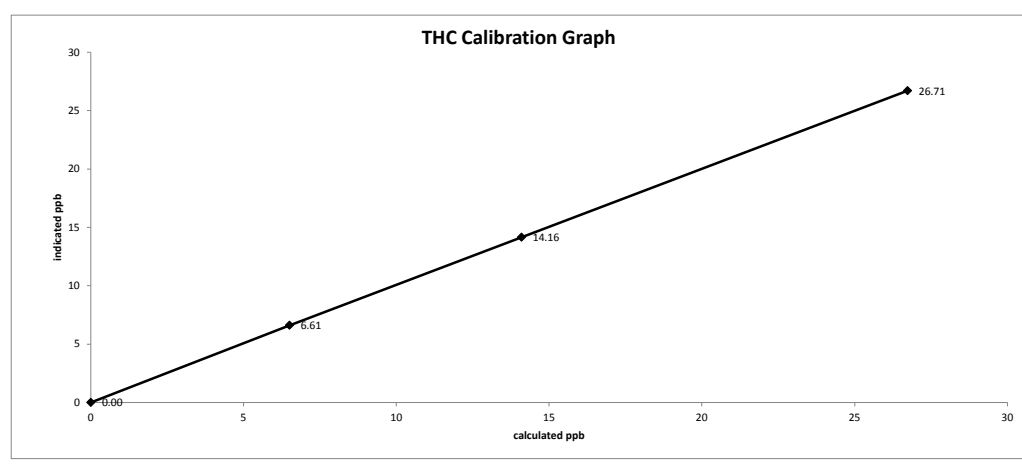
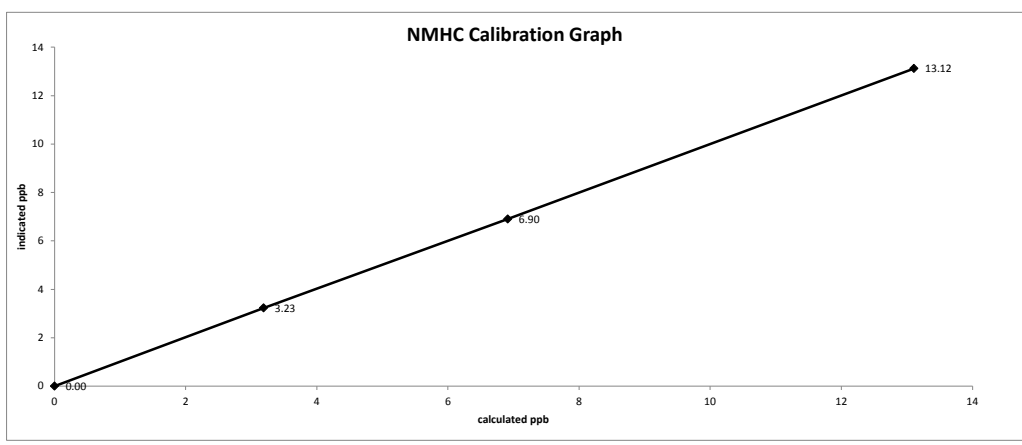
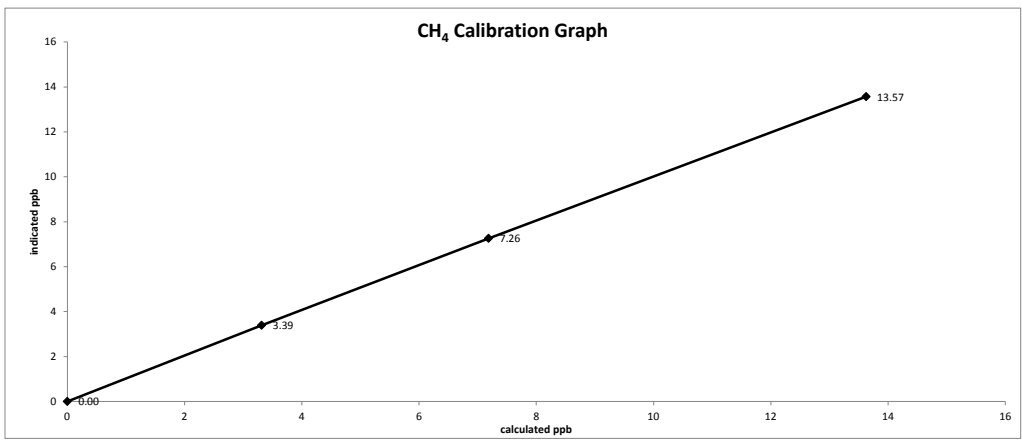
Calibrator Flow Rates (cc/min)				Calculated CH ₄ (ppm)	Calculated NMHC (ppm)	Calculated THC (ppm)	Indicated CH ₄ (ppm)	Indicated NMHC (ppm)	Indicated THC (ppm)	Correction Factors:		
Point	Diluent	Cal Gas	Total Flow							CH ₄	NMHC	THC
as found zero	2000	0.00	2000	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
as found high	2000	46.00	2046	13.62	13.11	26.73	13.15	13.22	26.40	1.036	0.991	1.013
adjusted zero	2000	0.00	2000	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
adjusted high	2000	46.00	2046	13.62	13.11	26.73	13.57	13.12	26.71	1.004	0.999	1.001
mid	2000	24.00	2024	7.19	6.91	14.10	7.26	6.90	14.16	0.990	1.002	0.996
low	2000	11.00	2011	3.31	3.19	6.50	3.39	3.23	6.61	0.978	0.987	0.984
calibrator zero	2000	0.00	2000	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
										Average C.F. =		
										0.991	0.996	0.993

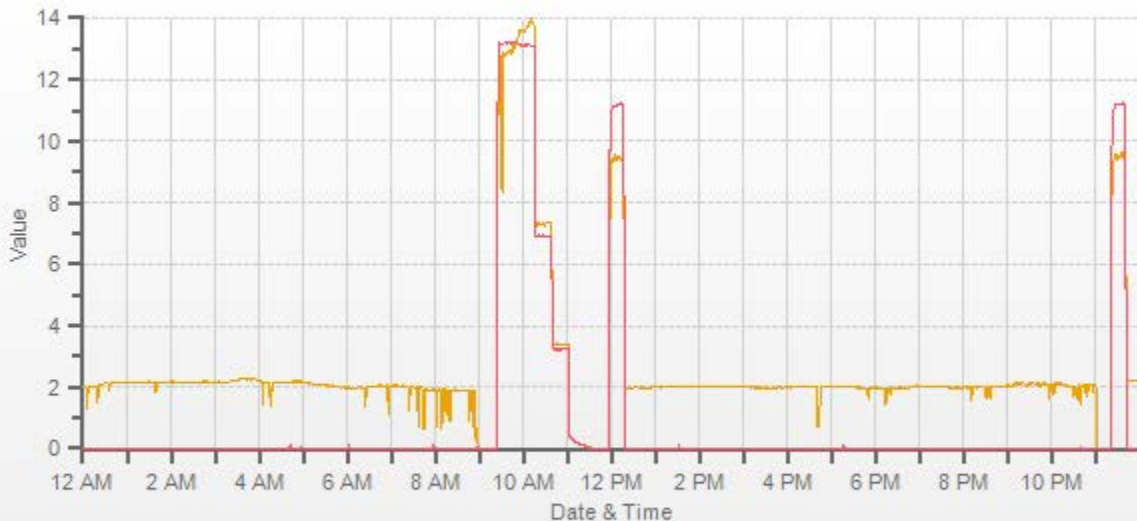
Linear Regression/Calibration Results:						
	CH ₄	NMHC	THC	LIMITS		
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995		
Slope =	0.995	1.000	0.998	.95-1.05		
b (Intercept as % of full scale) =	0.28%	0.06%	0.15%	± 3% F.S.		
% change in C.F. from last cal =	-3.61%	0.55%	-1.46%	± 10%		

As found:		As left:	
Interface Board Voltages:	Bias Supply: -292.8	Calibration History cnt'd:	NM Peak Area: 0
Temperatures:	Detector Oven: 175.1	Crucial Settings:	Methane Start: n/a
	Filter: 175.1		Methane End: n/a
	Column Oven: 75.1		Backflush: n/a
Cylinder Pressures/reg.:	Internal: 31.2	Run History>1:	NMHC Start: n/a
	Carrier: 2200 50		NMHC End: n/a
	Fuel: 1800 50		Date: July 12, 2016
Internal Pressures:	Span Gas: 800 22	Time: 09:06	CH ₄ PK HT: 0
	Zero Air Generator: 45	CH ₄ RT: 8.0	CH ₄ Baseline: 2510
	Carrier: 31.1	CH ₄ LOD: 63	CH ₄ SD: 21
FID Status:	Fuel: 40.3	CH ₄ CONC: 0.0	NM PK HT: 0
	Air: 32.4	NM Peak Area: 0	NM CONC: 0.0
	Status: LIT	NM Base Start: 2284	NM Base End: 2296
Flame and Power Stats:	Counts: 26812	NM LOD: 7	NM Start IDX: 37
	Flame: 366.0	NM End IDX: 58	NM Max Slope: 5.4e-01
	Det Base: 175.0	NM Min Slope: -4.1e-01	NM PT Count: 0
Flame and Power Stats:	Det Base: 175.0	Previous CH ₄ : 9.55	Previous NMHC: 11.16
	Last Power On: June 17, 2016	New CH ₄ : 9.4	New NMHC: 11.22
	Flameouts: 1	Previous THC: 20.73	New THC: 20.66
Calibration History:	Det Oven at Start: 149.7	Daily Zero/Span Values:	
	Col Oven at Start: 70.1		
	Time: 0.0		
Comments:	Type: ERROR		
	Status: ERROR		
	Check/Adjust: Adjust		
Comments:	CH ₄ Span Conc: 0.0		
	CH ₄ SP Ratio: 0		
	CH ₄ RT: 0.0		
Comments:	CH ₄ PK IDX: 0		
	CH ₄ PK HT: 0		
	NM Span Conc: 0.0		
Comments:	NM SP Ratio: 0		

Sample inlet filter changed. No ZERO adjustment made.

Date:	July 12, 2016	Start/End Time 24 hr. (mst):	8:33 / 12:26
Company/Airshed:	LICA	Calibration Purpose:	routine monthly
Location/Station Name:	Bonnyville - AER	Calibration Method:	Gas Dilution





— CH4[ppm] — NMHC[ppm]

NITROGEN DIOXIDE



API 200E NO-NO2-NOx Analyzer Calibration

Date: July 12, 2016	Barometric Pressure: 0.930 atm
Company/Airshed: LICA	Station Temperature °C: 21
Location/Station Name: Bonnyville - AER	Weather Conditions: Mainly sunny
Start/End Time 24 hr. (mst): 8:33 / 15:44	Calibration Purpose: routine monthly
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
Calibration Method: Gas Dilution & Varying UV Lamp Power	Cal Gas Expiry Date: December 2, 2023

Analyzer: Serial Number: 593 Last Calibration Date: June 27, 2016 Range ppb: 1000	Correction Factors: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>NO =</td> <td>1.000</td> <td>1.032</td> <td>0.997</td> </tr> <tr> <td>NO₂ =</td> <td>0.996</td> <td>1.000</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>0.998</td> <td>1.030</td> <td>0.997</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	1.032	0.997	NO ₂ =	0.996	1.000	1.000	NOx =	0.998	1.030	0.997
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	1.032	0.997														
NO ₂ =	0.996	1.000	1.000														
NOx =	0.998	1.030	0.997														

Calibrator: Flow Meter ID's: n/a Make & Model: SABIO 2010 D Serial #: 11900613 Cal Gas Cylinder I.D. #: LL119346 NO/NOx Gas Conc. (ppm): 50.0 50.0	Standard Calibration Points for a Range of: 1000 ppb <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> <td>500</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>275</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>190</td> <td>100</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	5000	0.0	5000	0	0	1.0	0.0	n/a	n/a
as found high	4922	78.0	5000	780.0	780.0	757.0	757.0	1.032	1.030
adjusted zero	5000	0.00	5000	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4922	78.00	5000	780.0	780.0	782.0	782.0	0.997	0.997
mid	4961	38.00	4999	380.1	380.1	381.0	381.0	0.998	0.998
low	4980	19.00	4999	190.0	190.0	191.0	191.0	0.995	0.995
calibrator zero	5000	0.00	5000	0	0	0.0	0.0	n/a	n/a
Average C.F.=								0.997	0.997

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO ₂	NO drop	NO ₂ gain	NO ₂ C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4922	78.00	5000	0.0	785.0	785.0	0.0	0.0	0.0	
as found high NO2	4922	78.00	5000	505.0	285.0	786.0	500.0	500.0	500.0	1.000
adjusted high NO2	4922	78.00	5000	505.0	285.0	786.0	500.0	500.0	500.0	1.000
gpt mid	4922	78.00	5000	277.0	503.0	785.0	282.0	282.0	282.0	1.000
gpt low	4922	78.00	5000	95.0	683.0	782.0	100.0	102.0	100.0	1.020
Average NO₂ C.F.=										1.007

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.998	0.998	0.998	.95-1.05
b (Intercept as % of full scale) =	0.02%	0.02%	-0.09%	± 3% F.S.
% change in C.F. from last cal =	-3.17%	-3.24%	-0.40%	± 10%
NO2 converter efficiency			1.01	0.96 to 1.04

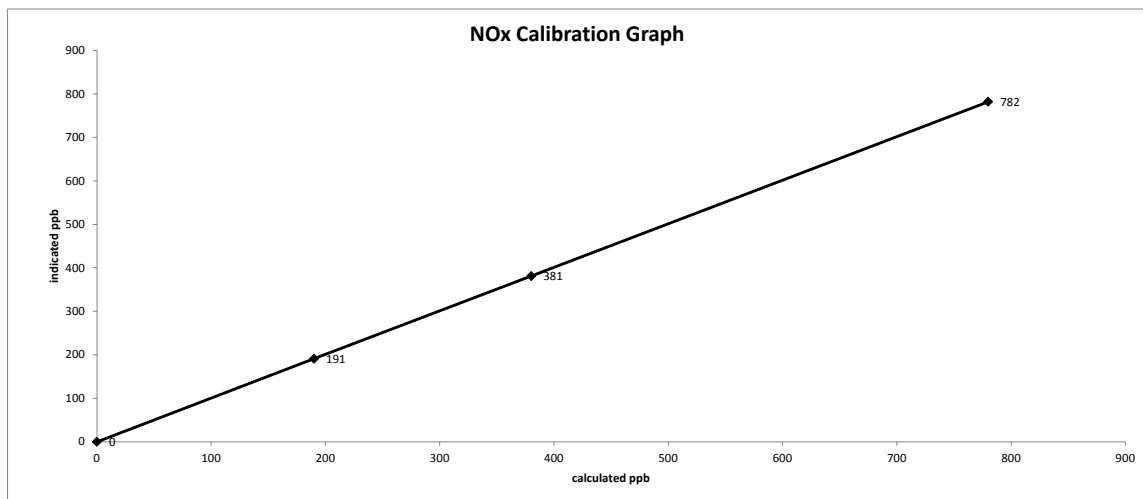
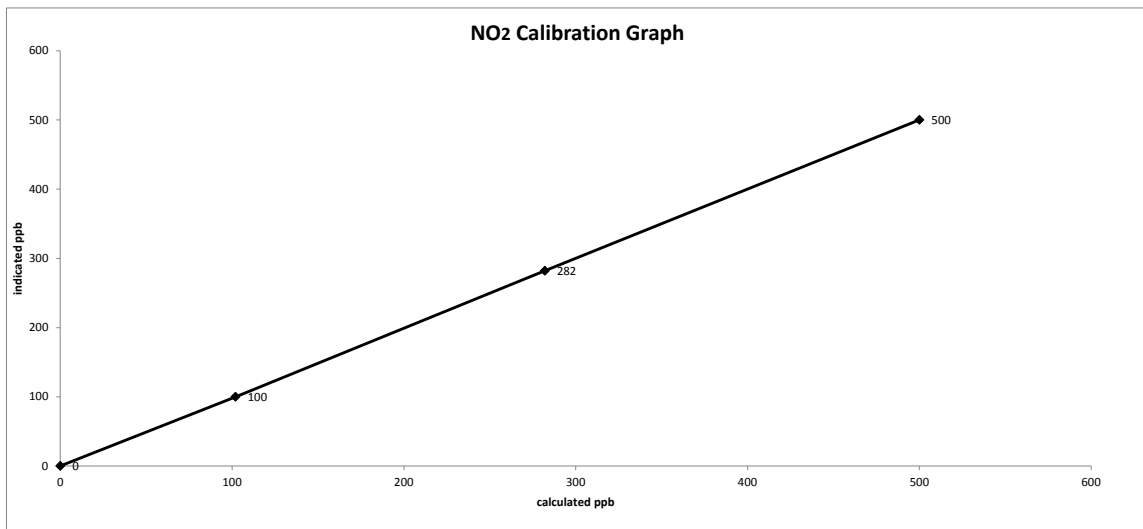
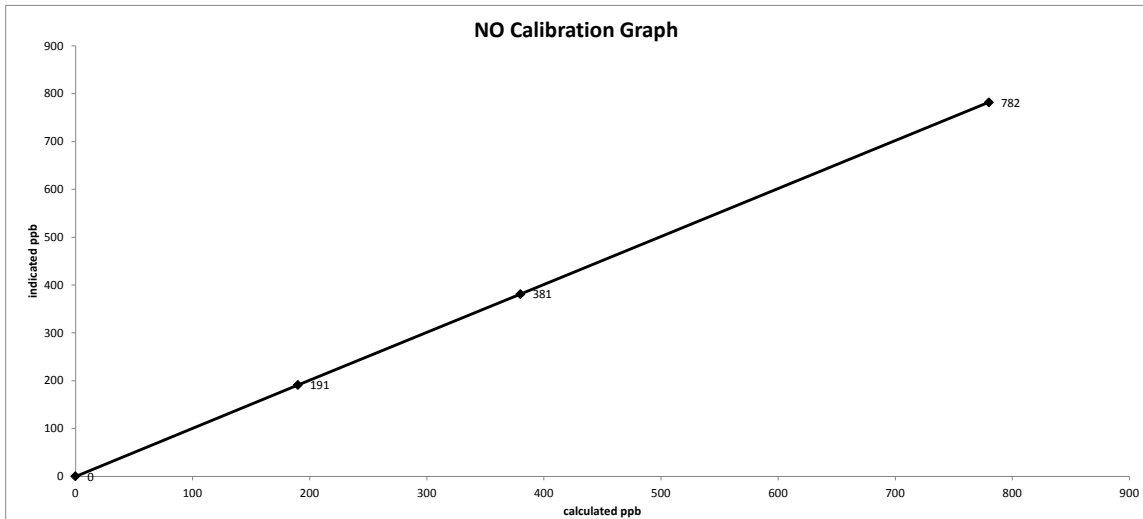
As found:	As left:
NOx SLOPE: 1.089	NOx SLOPE: 1.120
NOx OFFS: 2.3	NOx OFFS: 0.8
NO SLOPE: 1.087	NO SLOPE: 1.120
NO OFFS: -0.8	NO OFFS: -0.6
SAMP FLW: 480	SAMP FLW: 481
OZONE FL: 77	OZONE FL: 77
PMT: 5.6	PMT: 9.4
NORM PMT: 2.2	NORM PMT: 0.4
AZERO: 7.1	AZERO: 7.2
HVPS: 662	HVPS: 662
RCELL TEMP: 50.0	RCELL TEMP: 50.0
BOX TEMP: 29.1	BOX TEMP: 31.5
PMT TEMP: 6.7	PMT TEMP: 6.7
IZS TEMP: 45.0	IZS TEMP: 45.1
MOLY TEMP: 315.7	MOLY TEMP: 315.0
RCEL: 7.1	RCEL: 7.1
SAMP: 27.4	SAMP: 27.2
Internal Span NO: 8.4	Internal Span NO: 8.7
Internal Span NO2: 298	Internal Span NO2: 320
Internal Span NOx: 306	Internal Span NOx: 329

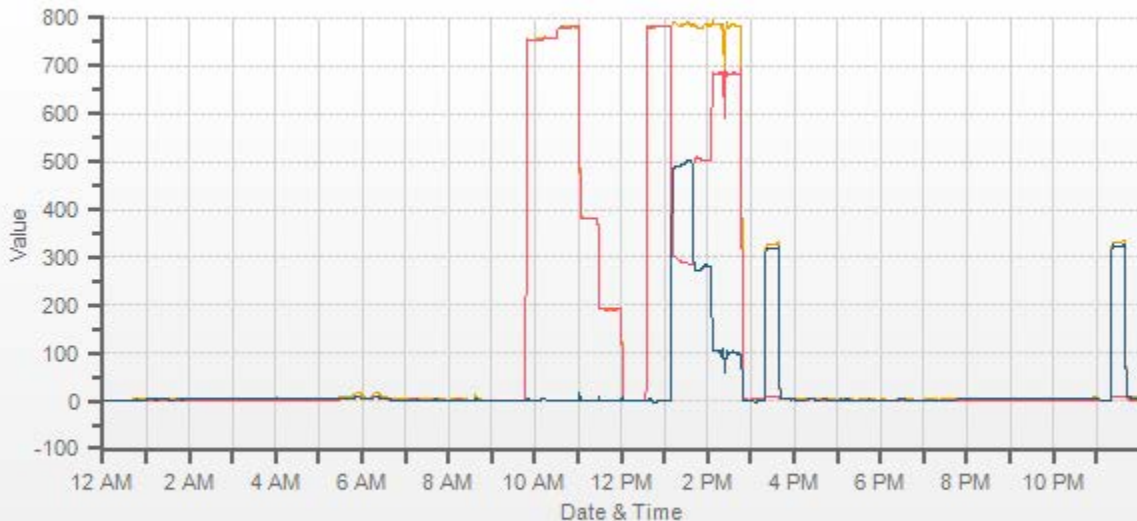
Comments:

Sample inlet filter changed. No NO2 adjustment made. 14:19 - at Low GPT point some unstable readings started. GPT low point was stopped and calibrator was restarted again for the LOW GPT sequence. Low point starts at 14:28.

Date: July 12, 2016
Company/Airshed: LICA
Location/Station Name: Bonnyville - AER

Start/End Time 24 hr. (mst): 8:33 / 15:44
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Varying UV Lamp Power





— NOX[ppb] — NO[ppb] — NO2[ppb]



API 200E NO-NO2-NOx Analyzer Calibration

Date: July 13, 2016	Barometric Pressure: 0.938 atm
Company/Airshed: LICA	Station Temperature °C: 21
Location/Station Name: Bonnyville - AER	Weather Conditions: Mainly sunny
Start/End Time 24 hr. (mst): 11:17 / 17:58	Calibration Purpose: routine monthly
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
Calibration Method: Gas Dilution & Varying UV Lamp Power	Cal Gas Expiry Date: December 2, 2023

Analyzer: Serial Number: 593 Last Calibration Date: July 12, 2016 Range ppb: 1000	Correction Factors: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>NO =</td> <td>0.997</td> <td>1.000</td> <td>1.001</td> </tr> <tr> <td>NO₂ =</td> <td>1.000</td> <td>1.000</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>0.997</td> <td>0.999</td> <td>1.001</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	0.997	1.000	1.001	NO ₂ =	1.000	1.000	1.000	NOx =	0.997	0.999	1.001
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	0.997	1.000	1.001														
NO ₂ =	1.000	1.000	1.000														
NOx =	0.997	0.999	1.001														

Calibrator: Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. #: LL119346 NO/NOx Gas Conc. (ppm): 50.0 50.0	Standard Calibration Points for a Range of: 1000 ppb <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> <td>500</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>275</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>190</td> <td>100</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	5000	0.0	5000	0	0	0.0	0.0	n/a	n/a
as found high	4922	78.0	5000	780.0	780.0	780.0	781.0	1.000	0.999
adjusted zero	5000	0.00	5000	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4922	78.00	5000	780.0	780.0	779.0	779.0	1.001	1.001
mid	4965	38.00	5003	379.8	379.8	380.0	380.0	0.999	0.999
low	4980	19.00	4999	190.0	190.0	191.0	191.0	0.995	0.995
calibrator zero	5000	0.00	5000	0	0	1.0	1.0	n/a	n/a
Average C.F.=								0.999	0.999

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO ₂	NO drop	NO ₂ gain	NO ₂ C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4925	78.00	5003	0.0	786.0	785.0	-1.0	0.0	-1.0	
as found high NO2	4925	78.00	5003	510.0	278.0	785.0	507.0	508.0	508.0	1.000
adjusted high NO2	4925	78.00	5003	510.0	278.0	785.0	507.0	508.0	508.0	1.000
gpt mid	4925	78.00	5003	275.0	512.0	788.0	275.0	274.0	276.0	0.993
gpt low	4925	78.00	5003	100.0	689.0	787.0	98.0	97.0	99.0	0.980
Average NO₂ C.F.=										0.991

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.002	1.002	0.999	.95-1.05
b (Intercept as % of full scale) =	0.06%	0.06%	0.06%	± 3% F.S.
% change in C.F. from last cal =	-0.30%	-0.17%	0.00%	± 10%
NO2 converter efficiency			0.99	0.96 to 1.04

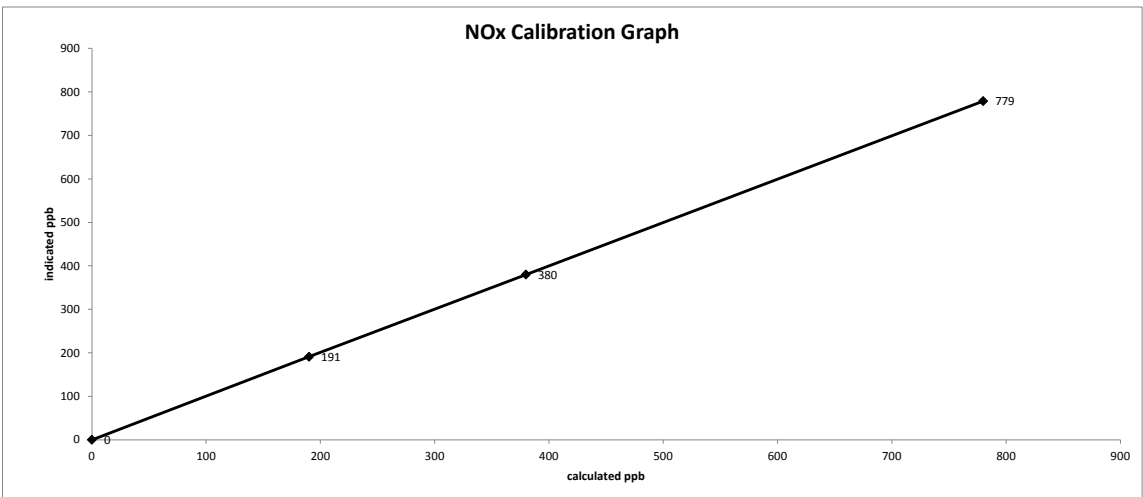
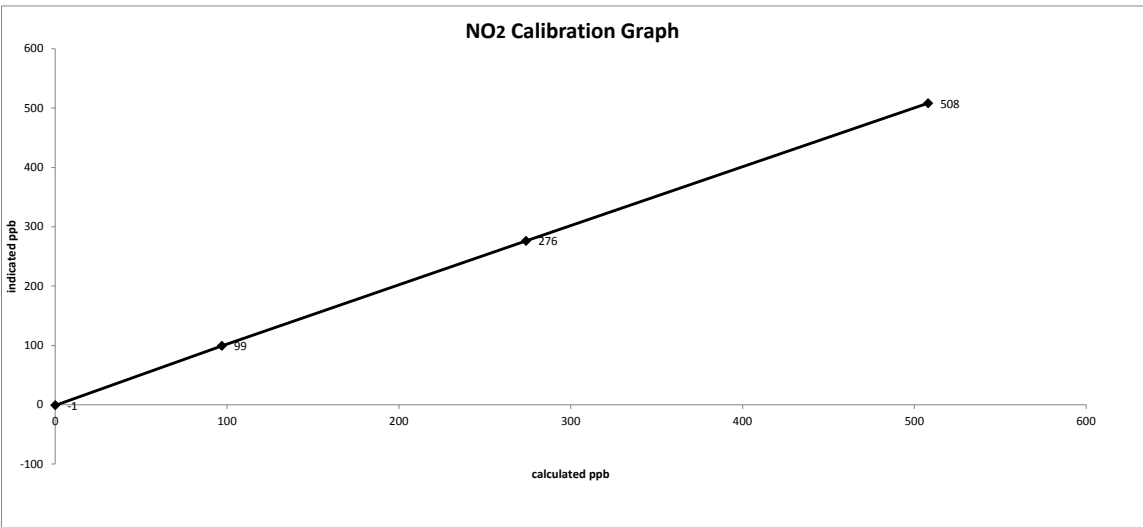
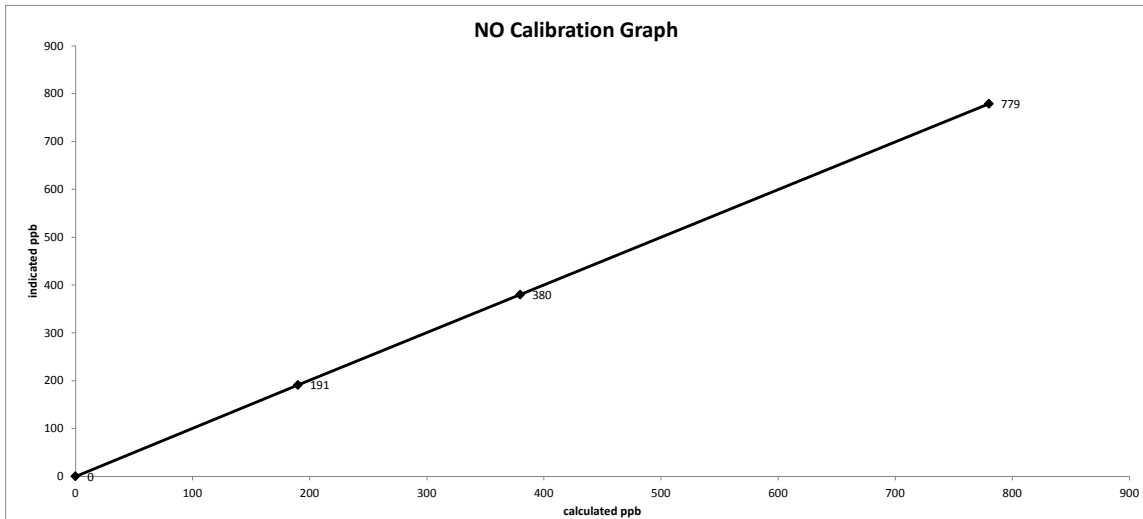
As found:	As left:
NOx SLOPE: 1.120	NOx SLOPE: 1.116
NOx OFFS: 0.8	NOx OFFS: 0.8
NO SLOPE: 1.120	NO SLOPE: 1.116
NO OFFS: -0.6	NO OFFS: -0.6
SAMP FLW: 485	SAMP FLW: 485
OZONE FL: 77	OZONE FL: 78
PMT: 9.0	PMT: 8.0
NORM PMT: 0.1	NORM PMT: 5.2
AZERO: 7.5	AZERO: 7.6
HVPS: 662	HVPS: 662
RCELL TEMP: 50.0	RCELL TEMP: 50.0
BOX TEMP: 30.1	BOX TEMP: 31.5
PMT TEMP: 6.7	PMT TEMP: 6.7
IZS TEMP: 45.3	IZS TEMP: 45.1
MOLY TEMP: 315.8	MOLY TEMP: 315.6
RCEL: 7.1	RCEL: 7.1
SAMP: 27.5	SAMP: 27.7
Internal Span NO: 8.7	Internal Span NO: 8.8
Internal Span NO2: 320	Internal Span NO2: 318
Internal Span NOx: 329	Internal Span NOx: 327

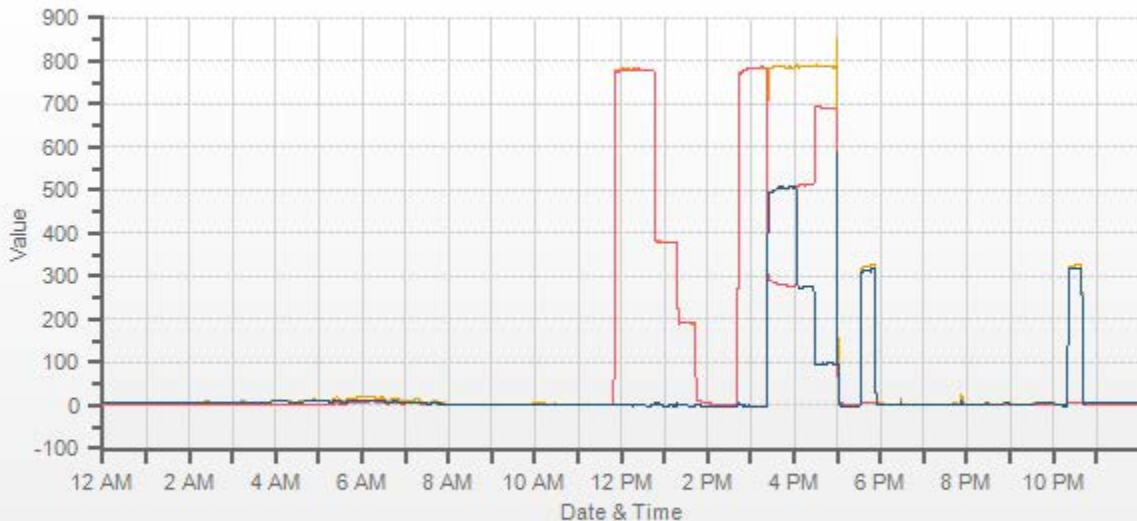
Comments:

Sample inlet filter changed on July 12, 2016. No NO2 adjustment made. Repeat calibration required by Daily Report because GPT points showed some instability. No ZERO adjustment made.

Date: July 13, 2016
Company/Airshed: LICA
Location/Station Name: Bonnyville - AER

Start/End Time 24 hr. (mst): 11:17 / 17:58
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Varying UV Lamp Power





— NOX[ppb] — NO[ppb] — NO2[ppb]

OZONE



Thermo 49i Ozone Analyzer Calibration

Date:	July 14, 2016	Barometric Pressure:	0.941 atm
Company/Airshed:	LICA	Station Temperature °C:	21
Location/Station Name:	Bonnyville - AER	Weather Conditions:	Sunny
Start/End Time 24 hr. (mst):	9:14 / 13:23	Calibration Purpose:	routine monthly
Ozone Calibration Method:	Varying UV Lamp Power	Performed By/Reviewer:	Alex Yakupov Trina Whitsitt
G.P.T. Date:	n/a-done by Varying UV Lamp Power	Cal Gas Expiry Date:	n/a

Analyzer:	Serial Number:	1002240372	Ozone Range ppb:	500
	Last Calibration Date:	June 2, 2016	As Found C.F.:	0.987
	Previous Cal High Point C.F.:	1.000	New C.F.:	1.000

Calibrator:	Flow Meter ID's:	n/a	Point	AMD Required Range of Ozone Calibration Points
	Make & Model:	SABIO 2010 D	High	300-400 ppb
	Serial #:	11900613	Mid	150-200 ppb
	Cal Gas Cylinder I.D. #:	n/a	Low	50-75 ppb

ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

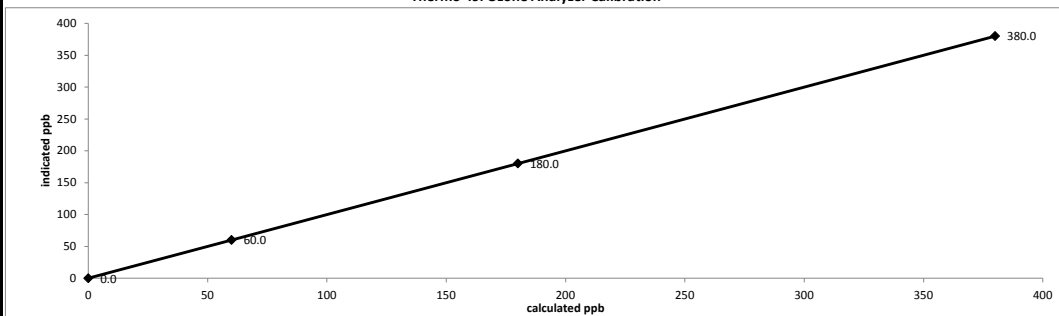
Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5000	5000	0.0	n/a	0.0	n/a
as found high	5000	5000	380.0	380.0	385.0	0.987
adjusted zero	5000	5000	0.0	0.0	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	180.0	180.0	180.0	1.000
low	5000	5000	60.0	60.0	60.0	1.000
calibrator zero	5000	5000	0.0	n/a	0.0	n/a

Average C.F.= 1.000

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.000		.95-1.05
b (Intercept as % of full scale)=	0.00%		± 3% F.S.
% change in C.F. from last cal=	1.30%		± 10%

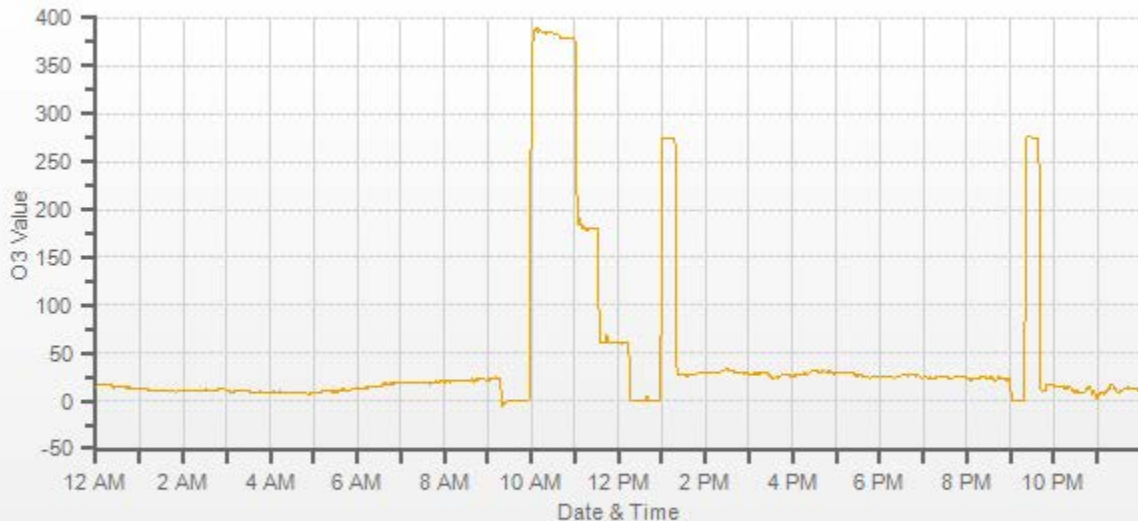
Thermo 49i Ozone Analyzer Calibration



As found:	O3 Bkg:	-0.1	As left:	O3 Bkg:	0.1
	O3 Coef:	0.995		O3 Coef:	0.985
	Photo Lamp:	14.2		Photo Lamp:	14.2
	O3 Lamp:	5.8		O3 Lamp:	5.8
	Bench:	28.5		Bench:	29.4
	Bench Lamp:	54.1		Bench Lamp:	54.0
	O3 Lamp:	68.1		O3 Lamp:	68.1
	Pressure:	706.6		Pressure:	707.2
	Cell A lpm:	0.754		Cell A lpm:	0.754
	Cell B lpm:	0.764		Cell B lpm:	0.764
	O3 ppb:	0.1		O3 ppb:	0.1
	Cell A ppb:	-0.3		Cell A ppb:	0.1
	Cell B ppb:	0.1		Cell B ppb:	0.1
	Cell A int:	88163		Cell A int:	88160
	Cell B int:	86082		Cell B int:	86083
	Internal Span:	291.7		Internal Span:	275

Comments:

Sample inlet filter changed. No ZERO adjustment made. ZERO Air pump rebuilt.



— O3[ppb]

PARTICULATE MATTER



R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: July 4, 2016
 Company: LICA
 Station Name/Location: Bonnyville
 Previous Audit Date: June 14, 2016
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whitsitt
 Start Time (mst): 14:19
 End Time (mst): 16:08
 Calibration Purpose: Bi-monthly #1
 Weather Conditions: Mix of sun and clouds

1400A Information and Status:

Serial Number: 1405A207691003 As Found Filter Loading %: 35.12
 Ko Factor: 15635 As Left Filter Loading %: 19.20
 Ambient Temperature °C: 20.56 As Found Noise: 0.003
 Ambient Pressure atm: 0.928 As Left Noise: 0.000
 Main Flow Reading lpm: 3.00 Pump Vacuum: 0.32
 Aux Flow Reading lpm: 13.67 Warnings: None

Reference Standards:

	Flow:	Pressure:	Temperature:
Make:	Dwyer	Fisher	Fisher
Model:	475 Mark III	FB1291	FB1291
Serial Number:	#2	130168457	130168457
Calibration Date:	January 15, 2016	February 7, 2016	February 7, 2016

As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.07	0.00	0.07
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.01	-0.57	-0.01	-0.56
	limit	0.60	0.60	0.60	0.60

As left leak check (same as above if as found passes):

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.07	0.00	0.07
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.01	-0.57	-0.01	-0.56
	limit	0.60	0.60	0.60	0.60

As found temperature and pressure:

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: 20.6	1405F pressure atm: 0.928
reference temperature °C: 20.8	reference pressure: 0.931
difference °C: 0.2	difference: -0.003

As left temperature and pressure (same as above if as found adequate):

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: 20.6	1405F pressure atm: 0.931
reference temperature °C: 20.8	reference pressure: 0.931
difference °C: 0.2	difference: 0.000

As found flows:

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: 3.00	1400A total/aux flow lpm: 16.67
reference main flow lpm: 3.00	reference total/aux flow lpm: 16.64
difference lpm: 0.00	difference lpm: -0.03

As left flows (same as above if as found adequate):

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: 3.00	1400A total/aux flow lpm: 16.67
reference main flow lpm: 3.00	reference total/aux flow lpm: 16.64
difference lpm: 0.00	difference lpm: -0.03

K_o Audit:

Last K_o audit date: May 6, 2016
 1405F K_o factor: 15635
 Measured K_o factor: 15833.6000
 % difference: 1.28

Comments:

TEOM sample filter changed. 47 mm FDMS filter changed. Sample inlet head PM 2.5/10 cleaned.



R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: July 27, 2016
 Company: LICA
 Station Name/Location: Bonnyville
 Previous Audit Date: July 4, 2016
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Tom Bourque
 Start Time (mst): 15:20
 End Time (mst): 16:25
 Calibration Purpose: Bi-monthly #2
 Weather Conditions: Mainly sunny

1400A Information and Status:

Serial Number: 1405A207691003 As Found Filter Loading %: 29.61
 Ko Factor: 15635 As Left Filter Loading %: 17.18
 Ambient Temperature °C: 28.57 As Found Noise: 0.005
 Ambient Pressure atm: 0.942 As Left Noise: 0.000
 Main Flow Reading lpm: 3.00 Pump Vacuum: 0.32
 Aux Flow Reading lpm: 13.67 Warnings: None

Reference Standards:

	Flow:	Pressure:	Temperature:
Make:	<u>Dwyer</u>	<u>Fisher</u>	<u>Fisher</u>
Model:	<u>475 Mark III</u>	<u>FB1291</u>	<u>FB1291</u>
Serial Number:	<u>#2</u>	<u>130168457</u>	<u>130168457</u>
Calibration Date:	<u>January 15, 2016</u>	<u>February 7, 2016</u>	<u>February 7, 2016</u>

As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.07	0.00	0.07
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	-0.57	0.00	-0.57
	limit	0.60	0.60	0.60	0.60

As left leak check (same as above if as found passes):

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.07	0.00	0.07
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	-0.57	0.00	-0.57
	limit	0.60	0.60	0.60	0.60

As found temperature and pressure:

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: <u>28.6</u>	1405F pressure atm: <u>0.942</u>
reference temperature °C: <u>28.3</u>	reference pressure: <u>0.942</u>
difference °C: <u>-0.3</u>	difference: <u>0.000</u>

As left temperature and pressure (same as above if as found adequate):

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: <u>28.3</u>	1405F pressure atm: <u>0.942</u>
reference temperature °C: <u>28.3</u>	reference pressure: <u>0.942</u>
difference °C: <u>0.0</u>	difference: <u>0.000</u>

As found flows:

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: <u>3.00</u>	1400A total/aux flow lpm: <u>16.67</u>
reference main flow lpm: <u>3.05</u>	reference total/aux flow lpm: <u>16.84</u>
difference lpm: <u>0.05</u>	difference lpm: <u>0.17</u>

As left flows (same as above if as found adequate):

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: <u>3.00</u>	1400A total/aux flow lpm: <u>16.67</u>
reference main flow lpm: <u>3.05</u>	reference total/aux flow lpm: <u>16.84</u>
difference lpm: <u>0.05</u>	difference lpm: <u>0.17</u>

K_o Audit:

Last K_o audit date: May 16, 2016
 1405F K_o factor: 15635
 Measured K_o factor: 15719.6000
 % difference: 0.55

Comments:

TEOM sample filter changed. 47 mm FDMS filter changed. Sample inlet head PM 2.5/10 cleaned.

WIND SYSTEM



Meteorological Sensor Audit

Station Information

Company:	<u>LICA</u>	Performed By:	<u>Limin Li</u>
Location:	<u>Bonnyville (in Calgary shop)</u>	Reason:	<u>Annual maintenance</u>
Audit Date:	<u>26-Jan-16</u>	Start Time (mst):	<u>11:00</u>
Previous Audit Date:	<u>NA</u>	End Time (mst):	<u>15:00</u>

Wind Speed

Sensor make:	<u>R. M. Young</u>	Sensor height:	<u>n/a</u>
Sensor model:	<u>5103VK</u>	Serial Number:	<u>56589</u>
Calibrator:	<u>Young 18802</u>	Variable speed motor:	<u>CA 03309</u>
Voltage range:	<u>0-1</u>	Output signal range:	<u>200KPH</u>

Wind Speed Audit Data

RPM	Wind Speed Actual	Indicated WS - CW	Indicated WS-CCW	Correction Factor
0	0.0	0.032	0.032	-
1000	17.6	17.66	17.64	1.00
2000	35.28	35.3	35.29	1.00
3000	52.92	52.99	52.99	1.00
4000	70.56	70.66	70.65	1.00
5000	88.2	88.35	88.33	1.00
6000	105.84	106	106	1.00
7000	123.48	123.7	123.7	1.00
8000	141.12	141.4	141.3	1.00
9000	158.76	159.1	159.1	1.00
10000	176.4	176.7	176.7	1.00
Average Correction Factor:				1.00

Wind Direction

Sensor make:	<u>R. M. Young</u>	Sensor height:	<u>n/a</u>
Sensor model:	<u>5103VK</u>	Serial Number:	<u>56589</u>
Calibrator:	<u>Young 18802</u>	Variable speed motor:	<u>CA 03309</u>
Voltage range:	<u>0-1</u>	Output signal range:	<u>0-360DEG</u>

Wind Direction Audit Data

Wind Direction	Indicated	Correction Factor
0	0.5	NA
45	44.9	1.00
90	92.0	0.98
135	136.5	0.99
180	180.6	1.00
225	224.4	1.00
270	270.3	1.00
315	312.2	1.01
359	355.0	1.01
Average Correction Factor:		1.00

Remarks: Annual maintenance. Changed 05163PG, 05124VG bearings. 05131D, 05133B & 05135D

Audit Performed by: Limin Li

VOC SAMPLER

Maxxam Analytics

XONTECK FLOW RATE VERIFICATION/CALIBRATION

Client: <u>LICA</u>	Date: <u>July 4, 2016</u>
Location: <u>Bonnyville</u>	Last Cal. Date: <u>April 5, 2016</u>
Station ID: <u>LICA 37</u>	Start Time 24 hr. (mst): <u>16:12</u>
Sampler s/n: <u>6200</u>	End Time 24 hr. (mst): <u>16:39</u>
Purpose: <u>Routine Quarterly</u>	Performed By/Reviewer: <u>Alex Yakupov</u> <u>Trina Whatsitt</u>

Pressure Standard:	Flow Standard:
Make/Model: <u>Fisher Scientific/FB61291</u>	<u>Dwyer/Series 475 Mark III</u>
S/N or ID#: <u>130168457</u>	<u>#2</u>
Certification Date: <u>February 7, 2016</u>	<u>January 15, 2016</u>

The desired flow rate can be calculated using the equation provided by USEPA Method T0-14 Section 9.1.3.1.

$$F = \frac{(P \times V)}{(T \times 60)} = \frac{1.61 \times 6000}{24 \times 60} = \boxed{6.71 \text{ cc/min}} = \text{target flow rate}$$

where;

F= flow rate in cc/min
P= final canister in atmosphere absolute
V= volume of canister in c.c.
T= sampling period in hours
bp= barometric pressure in atmospheres

enter:

bp 0.931 atm
P= 1.61146 (atm)+.68046
V= 6000 cubic centimetres
T= 24 hours

XONTECK QUARTERLY FLOW VERIFICATION/CALIBRATION

FLOW RATE VERIFICATION

<u>Volumetric Flow rate</u> =	n/a (cc/min)	As found pot setting =	4.94
Target Flow Rate (cc/min) =	6.71		
% Difference =	n/a		#VALUE!

FLOW RATE CALIBRATION

<u>Volumetric Flow rate</u> =	n/a (cc/min)	Adjusted pot setting =	4.94
Target Flow Rate (cc/min) =	6.71		
% Difference =	n/a		#VALUE!

XONTECK MAINTENANCE

Item:	Most Recent Date Completed:
1. Replace sample line and fittings from sampler to canister every 6 months.	<u>April 5, 2016</u>
2. Purge line from manifold--> sampler with zero air every 6 months.	<u>April 5, 2016</u>
3. Sample system cleaning every 2 years.	<u>April 5, 2016</u>
4. Perform 12 hour leak check procedure every 6 months.	<u>April 5, 2016</u>

COMMENTS:

PUF SAMPLER



TISCH PUF PLUS SAMPLER AUDIT

Date:	July 4, 2016	PUF PLUS Serial #:	100-1015
Company/Airshed:	LICA	Performed By/Reviewer:	Alex Yakupov Trina Whitsitt
Location/Station Name:	Bonnyville	Weather Conditions:	Mix of sun and clouds
Reference Standards:	Flow:	Pressure:	Temperature:
Make:	Dwyer	Fisher Scientific	Fisher Scientific
Model:	Series 475 Mark III	FB61291	FB61291
Serial Number:	#2	130168457	130168457
Calibration Date:	January 15, 2016	February 7, 2016	February 7, 2016

TISCH PUF PLUS PRESSURE AND TEMPERATURE AUDIT

AS FOUND Reference Barometric Pressure (mmHg):	705.06	AS FOUND Reference Temperature (°C):	21.0
AS FOUND PUF PLUS Barometric Pressure (mmHg):	700	AS FOUND PUF PLUS Temperature (°C):	21.7
% Difference (+/- 2% max.):	0.72%	% Difference (+/- 2 °C max.):	-0.7
IF THE PRESSURE DEVIATES BY MORE THAN +/- 2% A FLOW CALIBRATION IS REQUIRED		**IF THE TEMPERATURE DEVIATES BY MORE THAN +/- 2 °C A FLOW CALIBRATION IS REQUIRED**	

TISCH PUF PLUS FLOW AUDIT

Flow Audit Calculations:

Calibrated Orifice Certification Date:	October 12, 2015
Enter Barometric Pressure from refrence (inHg)	27.76
Barometric Pressure (mmHg)	705.1
Enter Ambient Temperature from reference °C	21.0
Enter "m" variable from calibrated orifice	6.07570
Enter "b" variable from calibrated orifice	-0.03578
Enter Δp in. H ₂ O	2.02
Standardized Flow lpm=	232.67
Flow Set Point lpm=	230.00
% Difference (+/- 2% max.)=	-1.16%
IF THE FLOW DEVIATES BY MORE THAN +/- 2% A FLOW CALIBRATION IS REQUIRED	

TISCH PUF PLUS PRESSURE CALIBRATION

Reference Barometric Pressure AFTER CALIBRATION (mmHg):	n/a
PUF Barometric Pressure AFTER CALIBRATION (mmHg):	n/a
% Difference:	n/a
Max 2.0%	

Calibration Point (mmHg):	Δp (in. H ₂ O) required for target barometric pressure:	As Found barometric pressure (mmHg):	As Left barometric pressure (mmHg):	% Difference vs. Calibration Target:
745.06	1.57	n/a	n/a	n/a
725.06	0.79	n/a	n/a	n/a
705.06	0.00	n/a	n/a	n/a
685.06	-0.79	n/a	n/a	n/a
665.06	-1.57	n/a	n/a	n/a
% Difference (+/- 2% max.)=				n/a

TISCH PUF PLUS TEMPERATURE CALIBRATION

Temperature Calibrator Certification Date:	n/a
Reference Temperature AFTER CALIBRATION (°C):	n/a
TISCH PUF PLUS Temperature AFTER CALIBRATION (°C):	n/a
Difference (°C):	#VALUE!
Max 2.0 °C	

Calibration Point (°C):	As Found (°C)	As Left (°C)	+/- Difference (°C)
20	n/a	n/a	n/a
-20	n/a	n/a	n/a
40	n/a	n/a	n/a
0	n/a	n/a	n/a
-30	n/a	n/a	n/a
% Difference (+/- 2 °C max.)			n/a

TISCH PUF PLUS FLOW CALIBRATION

Flow Calibration Calculations:

Calibrated Orifice Certification Date:	n/a
Enter Barometric Pressure from refrence (inHg)	n/a
Barometric Pressure (mmHg)	n/a
Enter Ambient Temperature from reference °C	n/a
Enter "m" variable from calibrated orifice	n/a
Enter "b" variable from calibrated orifice	n/a
Enter Δp in. H ₂ O	n/a
Standardized Flow lpm=	n/a
Flow Set Point lpm=	230.00
% Difference (+/- 2% max.)=	n/a
IF THE FLOW DEVIATES BY MORE THAN +/- 2% A FLOW CALIBRATION IS REQUIRED	

R, A1 and A0 Factors:

	As Found/As Left Pressure:	As Found/As Left Temperature:	As Found/As Left Flow:
A0	15312.7500	-11845.5546	-0.2483
A1	22.5779	0.2990	17.6252
R	0.0000	0.0000	0.0000

Notes:

Audit started: 16:43 (SMT), audit finished: 17:10 (SMT)

CALIBRATORS



Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2015-165

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>None</u>
Serial Number	<u>11900613</u>	Serial Number	<u>None</u>
Last Verification Date	<u>April 1, 2015</u>	Temperature (°C)	<u>23.5</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>706 mmHg</u>
NO/NOx Concentration	<u>50.3ppm/50.3ppm</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5001</u>	Pt. #2	<u>5000</u>
		Pt. #3	<u>5000</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>
		Pt. #3	<u>18.9</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
4999	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5001	77.5	0.779	0.779	0.775	0.000	0.775	-1%	-1%
5000	37.8	0.380	0.380	0.376	0.001	0.377	-1%	-1%
5000	18.9	0.190	0.190	0.188	0.001	0.189	-1%	-1%
Absolute Average Percent Difference							1%	1%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
NO		LIMITS		NO _x			
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000		
m (Slope)=	0.9950	0.90-1.10		m (Slope)=	0.9946		
b (Intercept % of FS)=	-0.0773	± 3% F.S.		b (Intercept % of FS)=	-0.0167		

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NO _x	% Diff. Vs Audit gas	
5001	0	0.000	0.772	0.000	0.772	NO ₂	% Diff. Limit
5001	0.51	0.507	0.265	0.506	0.772	0%	± 10%
5001	0.25	0.252	0.520	0.254	0.773	1%	± 10%
5001	0.1	0.110	0.662	0.109	0.772	-1%	± 10%
Absolute Average Percent Difference						0.1%	± 10%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
NO ₂		LIMITS					
Correlation=	1.0000	≥ 0.995					
m (Slope)=	0.9992	0.90-1.10					
b (Intercept % of FS)=	0.0171	± 3% F.S.					

AENV Standards		NO _x Analyzer	
Audit Calibrator			
Make/Model	<u>Thermo 146i</u>	Make/Model	<u>Thermo 42i</u>
Serial/AMU Number	<u>1809</u>	Serial/AMU Number	<u>1868</u>
		Last Calibration Date	<u>March 28, 2016</u>
		Full Scale (ppm)	<u>1</u>

COMMENTS: NO Cyl has 49.9ppb SO2 - Flows Not Manually Measured

Auditor: Shea Beaton
 Operator Signature: [Signature]

Date: March 31, 2016
 Location: McIntyre Center Edmonton



Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2015-119

Company <u>Maxxam</u>		Operator: <u>Chris Wesson</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>API 700</u>	Make/Model	<u>NA</u>
Serial Number	<u>627</u>	Serial Number	<u>NA</u>
Last Verification Date	<u>April 1 2015</u>	Temperature (°C)	<u>NA</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>NA</u>
NO/NOx Concentration	<u>50.3/50.3</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>
		Pt. #3	<u>5000</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>
		Pt. #3	<u>18.9</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5007	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5003	77.5	0.779	0.779	0.787	-0.001	0.786	1%	1%
5004	37.8	0.380	0.380	0.383	0.000	0.383	1%	1%
5001	18.9	0.190	0.190	0.191	0.000	0.191	1%	1%
Absolute Average Percent Difference							1%	1%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
NO		LIMITS		NOx			
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000		
m (Slope)=	1.0106	0.90-1.10		m (Slope)=	1.0092		
b (Intercept % of FS)=	-0.0566	± 3% F.S.		b (Intercept % of FS)=	-0.0368		

Flow	O ₂ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5003	0	0.000	0.787	0.001	0.788	NO ₂	% Diff. Limit
5003	0.5	0.493	0.294	0.498	0.792	1%	± 10%
5003	0.25	0.256	0.531	0.262	0.792	2%	± 10%
5003	0.1	0.108	0.679	0.110	0.789	1%	± 10%
Absolute Average Percent Difference						1.2%	± 10%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
NO₂		LIMITS					
Correlation=	1.0000	≥ 0.995					
m (Slope)=	1.0089	0.90-1.10					
b (Intercept % of FS)=	0.1591	± 3% F.S.					

AENV Standards	NO_x Analyzer
Audit Calibrator	
Make/Model	<u>Thermo 146i</u>
Serial/AMU Number	<u>1809</u>
	Make/Model
	<u>Thermo 42i</u>
	Serial/AMU Number
	<u>1868</u>
	Last Calibration Date
	<u>February 1, 2016</u>
	Full Scale (ppm)
	<u>1</u>

COMMENTS: Flows not manually measured - calibration system audited as it is currently being operated.

Auditor: Shea Beaton
 Operator Signature: [Signature]

Date: February 3, 2016
 Location: McIntyre Center Edmonton



Calibrator Performance Audit

Hydrogen Sulphide (by Cylinder Dilution)

File No. 2015-117

Company: Maxxam

Operator: Chris Wesson

Calibrator:
 Make/Model API 700
 Serial Number 831
 Last Verification Date April 2, 2015
 H₂S Cylinder Conc. 10.3 - CGA Feb 2, 16
 H₂S Cylinder S/N BLM002197

Flow Measurement Device:
 Make/Model NA
 Serial Number NA
 Temperature (°C) NA
 Barometric Pressure NA

Flow Measurements

Pt. No. 1 56.8 Pt. No. 2 27.7 Pt. No. 3 13.8

Calibrator Flow (scem)	Calculated Concentration (ppm)	Indicated Concentration (ppm)	% Difference	
			vs Audit Gas	% Diff. Limit
Zero Air	0.0000	0.0000		
7502	0.0780	0.0772	-1%	± 10%
7500	0.0380	0.0372	-2%	± 10%
7502	0.0191	0.0183	-4%	± 10%
Absolute Average Percent Difference			2%	± 10%

LINEAR REGRESSION ANALYSIS

y=mx+b (where x=calculated concentration, y=indicated concentration)

<u>H₂S</u>		<u>LIMITS</u>
Correlation=	1.0000	≥ 0.995
m (Slope)=	0.9919	0.90-1.10
b (Intercept % of FS)=	-0.3259	± 3% F.S.

AENV Standards

Audit Calibrator
 Make/Model R&R MFC 201
 Serial/AMU Number 1690

H₂S Analyzer

Make/Model Thermo 450i
 Serial/AMU Number 1980
 Last Calibration Date February 1, 2016
 Full Scale (ppm) 0.1

COMMENTS: Flows are not measured at each pt - AMD not being followed as per chapter 7 section 5
- Conducted audit as analyzer is being used in the field

Auditor: Shea Beaton
 Operator Signature: [Signature]

Date: February 2, 2016
 Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2015-116CGA

Company: Maxxam **Operator's Name:** Chris Wesson
Cylinder #: LL119346 **Concentration PPM:** 50.0 **Tolerance(%):** 2 **Certified By:** Air Liquide

Reference Calibrator and Gas: Make/Model: <u>Thermo146i</u> Serial Number: <u>1809</u> Last Verification Date: <u>February 2, 2016</u> Gas Type: <u>SO2</u> Conc. <u>98.07</u> Cylinder Number: <u>CAL016625</u>	Flow Measurement Device: Make/Model: <u>Bios DC-2</u> Serial Number: <u>Bios D</u> Temp. °C: <u>24.5</u> B.P. <u>702mmHg</u>
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Reference Analyzer:
 Make/Model: Thermo 43C Serial/AMU Number: 1623
 Instrument Settings: Zero: 8.7 Span: 1.027 Range: 1.0
 Last Calibration: Date: 1-Feb-16 C.F. 1.000 Done By: SB

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
4952	0.0	0.000	0.01608	62.183	49.3
4946	79.54	0.793	0.01608	62.183	49.3
4941	39.35	0.396	0.00796	125.565	49.7
4940	19.57	0.195	0.00396	252.427	49.2
Average Cylinder Concentration:					49.4

Previous Stated Concentration PPM: 50.0
 Percent variance from Stated: 1.2

Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:** SO2/NO blend 50.0ppm NO
 <=5% Outside Manufacturer Tolerance. Use manufacturers concentration
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Shea Beaton
 Operator Signature: *[Signature]*

Date: February 2, 2016
 Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2014-251CGA

Company: Maxxam Operator's Name: Limin Li
 Cylinder #: LL36837 Concentration PPM: 10.0 Tolerance(%): 2 Certified By: Air Liquide

Reference Calibrator and Gas:
 Make/Model: R&R MFC 201
 Serial Number: AMU 1690
 Last Verification Date: December 15, 2014
 Gas Type: H2S Conc. 20.43
 Cylinder Number: CAL015106

Flow Measurement Device:
 Make/Model: Bios DC2
 Serial Number: AMU 1659
 Temp. °C: 23.0 C
 B.P.: 702 mmhg

Reference Analyzer:
 Make/Model: Teco 45C Serial/AMU Number: 1624
 Instrument Settings: Zero: 6.4 Span: 1.160 Range: 0.1
 Last Calibration: Date: Dec15/14 C.F.: 1.000 Done By: Al Clark

Calibrator Flows (scem)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	0.00755	132.442	10.0
5099	38.5	0.0754	0.00755	132.442	10.0
5092	18.0	0.0349	0.00353	282.889	9.9
5066	9.2	0.0178	0.00182	550.652	9.8
Average Cylinder Concentration:					9.9

Previous Stated Concentration PPM: 10.0

Percent variance from Stated: 1.1

Meets Manufacturer Tolerance. Use manufacturers stated concentration COMMENTS: _____
 < =5% Outside Manufacturer Tolerance. Use manufacturers concentration _____
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder _____

Auditor: Al Clark
 Operator Signature: *Al Clark*

Date: December 16, 2014
 Location: McIntyre Center Edmonton



Calibration Gas Audit

CH4 / C3H8 Cylinder Gas

File No. 2015-092CGA

Company: Maxxam Operators name: Chris Wesson
Cylinder #: LL165372 Conc CH4 (PPM) 606/212 Tolerance (%) 0.5 Certified By: Praxair

Reference Calibrator and Gas:

Make/Model R&R MFC 201
Serial Number AMU 1698
Last Verification Date January 18, 2016
Gas Type CH4 Conc. 999.2
Cylinder Number D751932
Gas Type C3H8 Conc. 246.5
Cylinder Number XF0037998

Flow Measurement Device:

Make/Model Bios DC-2
Serial Number Blos D
Temp. °C 24.5
B.P. 688mmHg

Reference Analyzer:

Make/Model Thermo 55C Serial/AMU Number: 1643
Instrument Settings Zero: NA Span: NA Range: 20.0
Last Calibration: Date: 18-Jan-16 C.F. 1.000 Done By: SB

Calibrator Flows (scem)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	CH4	C3H8			CH4	C3H8
2568	0.00	0.00	0.00	0.02140	46.722	607	214
2630	56.29	12.99	12.62	0.02140	46.722	607	214
2588	19.73	4.62	4.50	0.00762	131.171	606	215
2580	9.69	2.29	2.24	0.00376	266.254	610	217
Average Cylinder Concentration:						608	215

CH4	C3H8
Previous Stated Concentration PPM: <u>606</u>	<u>212</u>
Percent variance from Stated: <u>0.3</u>	<u>1.6</u>

Cylinder gas tolerances based on CH4 only

Meets Manufacturer Tolerance. Use manufacturers stated concentration COMMENTS: _____
 <=5% Outside Manufacturer Tolerance. Use manufacturers concentration C3H8 manufacturers tolerance 1.1%
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Shea Beaton
Operator Signature: _____

Date: January 19, 2016
Location: McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2015-115CGA

Company: Maxxam **Operators name:** Chris Wesson
Cylinder #: LL119346 **Conc (PPM)** 50.0/50.0 **Tolerance (%)** 2 **Certified By:** Air Liquide

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Thermo 146i</u>			Make/Model	<u>Bios DC-2</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>Bios D</u>
Last Verification Date	<u>February 2, 2016</u>			Temp. °C	<u>24.5</u>
Gas Type	<u>NO</u>	Conc.	<u>48.79</u>	B.P.	<u>702mmHg</u>
Cylinder Number	<u>CAL018024</u>				

Reference Analyzer:
Make/Model Thermo 42i **Serial/AMU Number:** 1868
Instrument Settings **Zero:** 4.2 **Span:** 1.014 **Range:** 1.0
Last Calibration: **Date:** 02-Feb-16 **C.F.** 1.000 **Done By:** SB

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
4952	0.0	0.000	0.000				
4946	79.54	0.809	0.809	0.01608	62.183	50.3	50.3
4941	39.35	0.403	0.402	0.00796	125.565	50.6	50.5
4940	19.57	0.200	0.200	0.00396	252.427	50.5	50.5
Average Cylinder Concentration:						50.5	50.4

	<u>NO</u>		<u>NOx</u>
Previous Stated Concentration PPM:	<u>50.0</u>		<u>50.0</u>
Percent variance from Stated:	<u>0.9</u>		<u>0.8</u>

Cylinder gas tolerances based on NO only

- Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:** SO2/NO Blend 50.0PPM SO2
- < =5% Outside Manufacturer Tolerance. Use manufacturers concentration
- > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Shea Beaton **Date:** February 2, 2016
Operator Signature: [Signature] **Location:** McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2014-250CGA

Company: Maxxam Operator's Name: Limin Li
Cylinder #: LL74267 Concentration PPM: 9.88 Tolerance(%): 2 Certified By: Air Liquide

Reference Calibrator and Gas:

Make/Model: R&R MFC 201
Serial Number: AMU 1690
Last Verification Date: December 15, 2014
Gas Type: H2S Conc. 20.43
Cylinder Number: CAL015106

Flow Measurement Device:

Make/Model: Bios DC2
Serial Number: AMU 1659
Temp. °C: 23.0 C
B.P.: 702 mmhg

Reference Analyzer:

Make/Model: Teco 45C Serial/AMU Number: 1624
Instrument Settings: Zero: 6.4 Span: 1.160 Range: 0.1
Last Calibration: Date: Dec15/14 C.F.: 1.000 Done By: AI Clark

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	0.00755	282.889	9.67
5099	38.5	0.0731	0.00755	132.442	9.68
5092	18.0	0.0342	0.00353	282.889	9.67
5066	9.2	0.0173	0.00182	550.652	9.53
Average Cylinder Concentration:					9.63

Previous Stated Concentration PPM: 9.88

Percent variance from Stated: 2.6

Meets Manufacturer Tolerance. Use manufacturers stated concentration COMMENTS: _____
 < =5% Outside Manufacturer Tolerance. Use manufacturers concentration
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: AI Clark Date: December 16, 2014
Operator Signature: [Signature] Location: McIntyre Center Edmonton

APPENDIX IV
ANALYTICAL RESULTS

VOC SAMPLES

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/Bonnyville/July 5, 2016	15001	Ambient Air	05-Jul-16	0:00
DESCRIPTION:	Bonnyville AER			
REPORT NUMBER:	16070132	REPORT CREATED:	27-Jul-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070132-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16
16070132-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Jul-16
16070132-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	15-Jul-16
16070132-001	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Jul-16
16070132-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Jul-16
16070132-001	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	15-Jul-16
16070132-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Jul-16
16070132-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-001	1-Butene	I	0.04	ppbv	0.02	AC-058	15-Jul-16
16070132-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-001	2,2,4-Trimethylpentane	I	0.03	ppbv	0.01	AC-058	15-Jul-16
16070132-001	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-001	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-001	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	2,3-Dimethylpentane	I	0.03	ppbv	0.02	AC-058	15-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: July-27-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/July 5, 2016	15001	Ambient Air	05-Jul-16 0:00
DESCRIPTION:	Bonnyville AER		
REPORT NUMBER:	16070132	REPORT CREATED:	27-Jul-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070132-001	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-001	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-001	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-001	2-Methylpentane	I	0.07	ppbv	0.01	AC-058	15-Jul-16
16070132-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	3-Methylhexane	I	0.03	ppbv	0.02	AC-058	15-Jul-16
16070132-001	3-Methylpentane	I	0.04	ppbv	0.01	AC-058	15-Jul-16
16070132-001	Acetone		4.3	ppbv	0.4	AC-058	15-Jul-16
16070132-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Jul-16
16070132-001	Benzene	I	0.04	ppbv	0.01	AC-058	15-Jul-16
16070132-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	Bromomethane	I	0.03	ppbv	0.01	AC-058	15-Jul-16
16070132-001	Carbon disulfide	I	0.10	ppbv	0.01	AC-058	15-Jul-16
16070132-001	Carbon tetrachloride	I	0.09	ppbv	0.01	AC-058	15-Jul-16
16070132-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	Chloroform	I	0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	Chloromethane		0.78	ppbv	0.02	AC-058	15-Jul-16
16070132-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16
16070132-001	cis-2-Butene	I	0.05	ppbv	0.02	AC-058	15-Jul-16
16070132-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	Cyclohexane	I	0.04	ppbv	0.02	AC-058	15-Jul-16

Report certified by:	Graham Knox, Team Lead	On behalf of:	PJ Pretorius, Manager, Analysis and Testing Services
Date:	July-27-16	Inquiries:	(780) 632 8455
		E-mail:	EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/Bonnyville/July 5, 2016	15001	Ambient Air	05-Jul-16	0:00
DESCRIPTION:	Bonnyville AER			
REPORT NUMBER:	16070132	REPORT CREATED:	27-Jul-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070132-001	Cyclopentane	I	0.02	ppbv	0.01	AC-058	15-Jul-16
16070132-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-001	Ethanol		2.3	ppbv	0.3	AC-058	15-Jul-16
16070132-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-001	Ethylbenzene	I	0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-001	Freon-11	I	0.29	ppbv	0.02	AC-058	15-Jul-16
16070132-001	Freon-113	I	0.08	ppbv	0.01	AC-058	15-Jul-16
16070132-001	Freon-114	I	0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	Freon-12		0.62	ppbv	0.02	AC-058	15-Jul-16
16070132-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	15-Jul-16
16070132-001	Isobutane		0.36	ppbv	0.02	AC-058	15-Jul-16
16070132-001	Isopentane		0.53	ppbv	0.03	AC-058	15-Jul-16
16070132-001	Isoprene	I	0.17	ppbv	0.01	AC-058	15-Jul-16
16070132-001	Isopropyl alcohol		0.6	ppbv	0.4	AC-058	15-Jul-16
16070132-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-001	m,p-Xylene	I	0.05	ppbv	0.03	AC-058	15-Jul-16
16070132-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16
16070132-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	15-Jul-16
16070132-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	15-Jul-16
16070132-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Jul-16
16070132-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Jul-16
16070132-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Jul-16
16070132-001	Methylcyclohexane	I	0.04	ppbv	0.01	AC-058	15-Jul-16
16070132-001	Methylcyclopentane	I	0.05	ppbv	0.02	AC-058	15-Jul-16

Report certified by:	Graham Knox, Team Lead	On behalf of:	PJ Pretorius, Manager, Analysis and Testing Services	
Date:	July-27-16	Inquiries:	(780) 632 8455	E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/July 5, 2016	15001	Ambient Air	05-Jul-16 0:00
DESCRIPTION:	Bonnyville AER		
REPORT NUMBER:	16070132	REPORT CREATED:	27-Jul-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070132-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Jul-16
16070132-001	n-Butane		0.79	ppbv	0.03	AC-058	15-Jul-16
16070132-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	15-Jul-16
16070132-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-001	n-Heptane	I	0.03	ppbv	0.01	AC-058	15-Jul-16
16070132-001	n-Hexane	I	0.05	ppbv	0.01	AC-058	15-Jul-16
16070132-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	n-Pentane	I	0.2	ppbv	0.1	AC-058	15-Jul-16
16070132-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Jul-16
16070132-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Jul-16
16070132-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Jul-16
16070132-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-001	o-Xylene	I	0.02	ppbv	0.01	AC-058	15-Jul-16
16070132-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16
16070132-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Jul-16
16070132-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16
16070132-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16
16070132-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Jul-16
16070132-001	Toluene	I	0.10	ppbv	0.01	AC-058	15-Jul-16
16070132-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Jul-16
16070132-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16
16070132-001	trans-2-Butene	I	0.05	ppbv	0.01	AC-058	15-Jul-16
16070132-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Jul-16
16070132-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Jul-16

Report certified by:	Graham Knox, Team Lead	On behalf of:	PJ Pretorius, Manager, Analysis and Testing Services
Date:	July-27-16	Inquiries:	(780) 632 8455
		E-mail:	EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/Bonnyville/July 5, 2016	15001	Ambient Air	05-Jul-16	0:00
DESCRIPTION:	Bonnyville AER			
REPORT NUMBER:	16070132	REPORT CREATED:	27-Jul-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16070132-001	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	15-Jul-16
16070132-001	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	15-Jul-16

Report certified by:	Graham Knox, Team Lead	On behalf of:	PJ Pretorius, Manager, Analysis and Testing Services		
Date:	July-27-16	Inquiries:	(780) 632 8455	E-mail:	EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/July 11, 2016	2665	Ambient Air	11-Jul-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16070204	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070204-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16
16070204-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	21-Jul-16
16070204-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	21-Jul-16
16070204-001	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	21-Jul-16
16070204-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	21-Jul-16
16070204-001	1,2-Dichloroethane	I	0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	21-Jul-16
16070204-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-001	1-Butene	I	0.16	ppbv	0.02	AC-058	21-Jul-16
16070204-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	1-Pentene	I	0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	2,2,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	2,2-Dimethylbutane	I	0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	2,3-Dimethylbutane	I	0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	2,3-Dimethylpentane	I	0.03	ppbv	0.02	AC-058	21-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

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E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/July 11, 2016	2665	Ambient Air	11-Jul-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16070204	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070204-001	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	2-Methylpentane	I	0.05	ppbv	0.01	AC-058	21-Jul-16
16070204-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	3-Methylhexane	I	0.04	ppbv	0.02	AC-058	21-Jul-16
16070204-001	3-Methylpentane	I	0.03	ppbv	0.01	AC-058	21-Jul-16
16070204-001	Acetone		2.2	ppbv	0.4	AC-058	21-Jul-16
16070204-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	21-Jul-16
16070204-001	Benzene	I	0.04	ppbv	0.01	AC-058	21-Jul-16
16070204-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	Bromomethane	I	0.02	ppbv	0.01	AC-058	21-Jul-16
16070204-001	Carbon disulfide	I	0.12	ppbv	0.01	AC-058	21-Jul-16
16070204-001	Carbon tetrachloride	I	0.09	ppbv	0.01	AC-058	21-Jul-16
16070204-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	Chloroform	I	0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	Chloromethane		0.76	ppbv	0.02	AC-058	21-Jul-16
16070204-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16
16070204-001	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	Cyclohexane	I	0.06	ppbv	0.02	AC-058	21-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/July 11, 2016	2665	Ambient Air	11-Jul-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16070204	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070204-001	Cyclopentane	I	0.03	ppbv	0.01	AC-058	21-Jul-16
16070204-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	Ethanol		1.7	ppbv	0.3	AC-058	21-Jul-16
16070204-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-001	Ethylbenzene	I	0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	Freon-11	I	0.24	ppbv	0.02	AC-058	21-Jul-16
16070204-001	Freon-113	I	0.06	ppbv	0.01	AC-058	21-Jul-16
16070204-001	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	Freon-12		0.42	ppbv	0.02	AC-058	21-Jul-16
16070204-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	21-Jul-16
16070204-001	Isobutane		2.16	ppbv	0.02	AC-058	21-Jul-16
16070204-001	Isopentane		0.34	ppbv	0.03	AC-058	21-Jul-16
16070204-001	Isoprene		0.60	ppbv	0.01	AC-058	21-Jul-16
16070204-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	m,p-Xylene	I	0.03	ppbv	0.03	AC-058	21-Jul-16
16070204-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16
16070204-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	21-Jul-16
16070204-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	21-Jul-16
16070204-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	21-Jul-16
16070204-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	21-Jul-16
16070204-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	21-Jul-16
16070204-001	Methylcyclohexane	I	0.07	ppbv	0.01	AC-058	21-Jul-16
16070204-001	Methylcyclopentane	I	0.07	ppbv	0.02	AC-058	21-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/July 11, 2016	2665	Ambient Air	11-Jul-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16070204	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070204-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	21-Jul-16
16070204-001	n-Butane		0.90	ppbv	0.03	AC-058	21-Jul-16
16070204-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	21-Jul-16
16070204-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-001	n-Heptane	I	0.03	ppbv	0.01	AC-058	21-Jul-16
16070204-001	n-Hexane	I	0.04	ppbv	0.01	AC-058	21-Jul-16
16070204-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	n-Pentane	I	0.2	ppbv	0.1	AC-058	21-Jul-16
16070204-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	21-Jul-16
16070204-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	21-Jul-16
16070204-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	21-Jul-16
16070204-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	o-Xylene	I	0.02	ppbv	0.01	AC-058	21-Jul-16
16070204-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16
16070204-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	21-Jul-16
16070204-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16
16070204-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16
16070204-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	21-Jul-16
16070204-001	Toluene	I	0.05	ppbv	0.01	AC-058	21-Jul-16
16070204-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16
16070204-001	trans-2-Butene	I	0.01	ppbv	0.01	AC-058	21-Jul-16
16070204-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	21-Jul-16
16070204-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	21-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/July 11, 2016	2665	Ambient Air	11-Jul-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16070204	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16070204-001	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	21-Jul-16
16070204-001	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	21-Jul-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: August 17, 2016	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/July 17, 2016	1149	Ambient Air	17-Jul-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16070251	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070251-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070251-003	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Jul-16
16070251-003	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	22-Jul-16
16070251-003	1,2,4-Trimethylbenzene	I	0.03	ppbv	0.03	AC-058	22-Jul-16
16070251-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070251-003	1,2-Dichloroethane	I	0.13	ppbv	0.01	AC-058	22-Jul-16
16070251-003	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-003	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	22-Jul-16
16070251-003	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-003	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-003	1-Butene		0.52	ppbv	0.02	AC-058	22-Jul-16
16070251-003	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	1-Pentene	I	0.02	ppbv	0.01	AC-058	22-Jul-16
16070251-003	2,2,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-003	2,2-Dimethylbutane	I	0.04	ppbv	0.01	AC-058	22-Jul-16
16070251-003	2,3,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	22-Jul-16
16070251-003	2,3-Dimethylbutane	I	0.21	ppbv	0.02	AC-058	22-Jul-16
16070251-003	2,3-Dimethylpentane	I	0.07	ppbv	0.02	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/July 17, 2016	1149	Ambient Air	17-Jul-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16070251	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070251-003	2,4-Dimethylpentane	I	0.02	ppbv	0.01	AC-058	22-Jul-16
16070251-003	2-Methylheptane	I	0.02	ppbv	0.01	AC-058	22-Jul-16
16070251-003	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-003	2-Methylpentane	I	0.09	ppbv	0.01	AC-058	22-Jul-16
16070251-003	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	3-Methylhexane	I	0.08	ppbv	0.02	AC-058	22-Jul-16
16070251-003	3-Methylpentane	I	0.12	ppbv	0.01	AC-058	22-Jul-16
16070251-003	Acetone		3.2	ppbv	0.4	AC-058	22-Jul-16
16070251-003	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	22-Jul-16
16070251-003	Benzene		0.61	ppbv	0.01	AC-058	22-Jul-16
16070251-003	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-003	Carbon disulfide		1.86	ppbv	0.01	AC-058	22-Jul-16
16070251-003	Carbon tetrachloride	I	0.10	ppbv	0.01	AC-058	22-Jul-16
16070251-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	Chloroethane	I	0.05	ppbv	0.02	AC-058	22-Jul-16
16070251-003	Chloroform	I	0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	Chloromethane		0.72	ppbv	0.02	AC-058	22-Jul-16
16070251-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-003	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070251-003	cis-2-Butene	I	0.03	ppbv	0.02	AC-058	22-Jul-16
16070251-003	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	Cyclohexane	I	0.12	ppbv	0.02	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/July 17, 2016	1149	Ambient Air	17-Jul-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16070251	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070251-003	Cyclopentane	I	0.04	ppbv	0.01	AC-058	22-Jul-16
16070251-003	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-003	Ethanol		1.2	ppbv	0.3	AC-058	22-Jul-16
16070251-003	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-003	Ethylbenzene	I	0.02	ppbv	0.01	AC-058	22-Jul-16
16070251-003	Freon-11	I	0.20	ppbv	0.02	AC-058	22-Jul-16
16070251-003	Freon-113	I	0.06	ppbv	0.01	AC-058	22-Jul-16
16070251-003	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	Freon-12		0.38	ppbv	0.02	AC-058	22-Jul-16
16070251-003	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	22-Jul-16
16070251-003	Isobutane		3.22	ppbv	0.02	AC-058	22-Jul-16
16070251-003	Isopentane		0.49	ppbv	0.03	AC-058	22-Jul-16
16070251-003	Isoprene		0.57	ppbv	0.01	AC-058	22-Jul-16
16070251-003	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-003	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-003	m,p-Xylene	I	0.06	ppbv	0.03	AC-058	22-Jul-16
16070251-003	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070251-003	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	22-Jul-16
16070251-003	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	22-Jul-16
16070251-003	Methyl ethyl ketone		0.9	ppbv	0.3	AC-058	22-Jul-16
16070251-003	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-003	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	22-Jul-16
16070251-003	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070251-003	Methylcyclohexane	I	0.10	ppbv	0.01	AC-058	22-Jul-16
16070251-003	Methylcyclopentane	I	0.13	ppbv	0.02	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/July 17, 2016	1149	Ambient Air	17-Jul-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16070251	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070251-003	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	22-Jul-16
16070251-003	n-Butane		0.88	ppbv	0.03	AC-058	22-Jul-16
16070251-003	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	22-Jul-16
16070251-003	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-003	n-Heptane	I	0.10	ppbv	0.01	AC-058	22-Jul-16
16070251-003	n-Hexane	I	0.09	ppbv	0.01	AC-058	22-Jul-16
16070251-003	n-Octane	I	0.03	ppbv	0.02	AC-058	22-Jul-16
16070251-003	n-Pentane	I	0.1	ppbv	0.1	AC-058	22-Jul-16
16070251-003	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Jul-16
16070251-003	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Jul-16
16070251-003	Naphthalene		1.1	ppbv	0.5	AC-058	22-Jul-16
16070251-003	n-Nonane	I	0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-003	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-003	o-Xylene	I	0.03	ppbv	0.01	AC-058	22-Jul-16
16070251-003	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070251-003	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	22-Jul-16
16070251-003	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070251-003	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070251-003	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070251-003	Toluene	I	0.17	ppbv	0.01	AC-058	22-Jul-16
16070251-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070251-003	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070251-003	trans-2-Butene	I	0.06	ppbv	0.01	AC-058	22-Jul-16
16070251-003	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Jul-16
16070251-003	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/July 17, 2016	1149	Ambient Air	17-Jul-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16070251	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16070251-003	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	22-Jul-16
16070251-003	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

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E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/Bonnyville/July 23, 2016	14703	Ambient Air	23-Jul-16	0:00
DESCRIPTION:	Bonnyville- AER			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16
16080015-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	12-Aug-16
16080015-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	12-Aug-16
16080015-001	1,2,4-Trimethylbenzene	I	0.07	ppbv	0.03	AC-058	12-Aug-16
16080015-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	12-Aug-16
16080015-001	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	12-Aug-16
16080015-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	1,3,5-Trimethylbenzene	I	0.03	ppbv	0.02	AC-058	12-Aug-16
16080015-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	12-Aug-16
16080015-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-001	1-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	2,2,4-Trimethylpentane	I	0.05	ppbv	0.01	AC-058	12-Aug-16
16080015-001	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	2,3,4-Trimethylpentane	I	0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	2,3-Dimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: September-01-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/July 23, 2016	14703	Ambient Air	23-Jul-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-001	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	2-Methylpentane	I	0.03	ppbv	0.01	AC-058	12-Aug-16
16080015-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	3-Methylhexane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	3-Methylpentane	I	0.02	ppbv	0.01	AC-058	12-Aug-16
16080015-001	Acetone		2.8	ppbv	0.4	AC-058	12-Aug-16
16080015-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	12-Aug-16
16080015-001	Benzene	I	0.04	ppbv	0.01	AC-058	12-Aug-16
16080015-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	Carbon disulfide		0.87	ppbv	0.01	AC-058	12-Aug-16
16080015-001	Carbon tetrachloride	I	0.13	ppbv	0.01	AC-058	12-Aug-16
16080015-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	Chloroform	I	0.03	ppbv	0.02	AC-058	12-Aug-16
16080015-001	Chloromethane		0.43	ppbv	0.02	AC-058	12-Aug-16
16080015-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16
16080015-001	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	Cyclohexane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: September-01-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/July 23, 2016	14703	Ambient Air	23-Jul-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-001	Cyclopentane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	Ethanol		1.2	ppbv	0.3	AC-058	12-Aug-16
16080015-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-001	Ethylbenzene	I	0.02	ppbv	0.01	AC-058	12-Aug-16
16080015-001	Freon-11		0.33	ppbv	0.02	AC-058	12-Aug-16
16080015-001	Freon-113	I	0.07	ppbv	0.01	AC-058	12-Aug-16
16080015-001	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	Freon-12		0.51	ppbv	0.02	AC-058	12-Aug-16
16080015-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	12-Aug-16
16080015-001	Isobutane	I	0.14	ppbv	0.02	AC-058	12-Aug-16
16080015-001	Isopentane	I	0.15	ppbv	0.03	AC-058	12-Aug-16
16080015-001	Isoprene	I	0.09	ppbv	0.01	AC-058	12-Aug-16
16080015-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	m,p-Xylene	I	0.08	ppbv	0.03	AC-058	12-Aug-16
16080015-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16
16080015-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	12-Aug-16
16080015-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	12-Aug-16
16080015-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	12-Aug-16
16080015-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	12-Aug-16
16080015-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	12-Aug-16
16080015-001	Methylcyclohexane	I	0.02	ppbv	0.01	AC-058	12-Aug-16
16080015-001	Methylcyclopentane	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: September-01-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/July 23, 2016	14703	Ambient Air	23-Jul-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	12-Aug-16
16080015-001	n-Butane	I	0.16	ppbv	0.03	AC-058	12-Aug-16
16080015-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	12-Aug-16
16080015-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-001	n-Heptane	I	0.04	ppbv	0.01	AC-058	12-Aug-16
16080015-001	n-Hexane	I	0.03	ppbv	0.01	AC-058	12-Aug-16
16080015-001	n-Octane	I	0.03	ppbv	0.02	AC-058	12-Aug-16
16080015-001	n-Pentane	K, T, U	< 0.1	ppbv	0.1	AC-058	12-Aug-16
16080015-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	12-Aug-16
16080015-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	12-Aug-16
16080015-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	12-Aug-16
16080015-001	n-Nonane	I	0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	o-Ethyltoluene	I	0.02	ppbv	0.01	AC-058	12-Aug-16
16080015-001	o-Xylene	I	0.04	ppbv	0.01	AC-058	12-Aug-16
16080015-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16
16080015-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	12-Aug-16
16080015-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16
16080015-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16
16080015-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	12-Aug-16
16080015-001	Toluene	I	0.15	ppbv	0.01	AC-058	12-Aug-16
16080015-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16
16080015-001	trans-2-Butene	K, T, U	< 0.01	ppbv	0.01	AC-058	12-Aug-16
16080015-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	12-Aug-16
16080015-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	12-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: September-01-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/July 23, 2016	14703	Ambient Air	23-Jul-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16080015-001	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	12-Aug-16
16080015-001	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	12-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: September-01-16	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/July 29, 2016	14993	Ambient Air	29-Jul-16 0:00
DESCRIPTION:	Bonnyville AER		
REPORT NUMBER:	16080034	REPORT CREATED:	07-Sep-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080034-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Aug-16
16080034-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	16-Aug-16
16080034-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	16-Aug-16
16080034-001	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Aug-16
16080034-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Aug-16
16080034-001	1,2-Dichloroethane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	16-Aug-16
16080034-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Aug-16
16080034-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Aug-16
16080034-001	1-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	2,2,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	16-Aug-16
16080034-001	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	2,3-Dimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: September 7, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/July 29, 2016	14993	Ambient Air	29-Jul-16 0:00
DESCRIPTION:	Bonnyville AER		
REPORT NUMBER:	16080034	REPORT CREATED:	07-Sep-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080034-001	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	2-Methylpentane	I	0.04	ppbv	0.01	AC-058	16-Aug-16
16080034-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	3-Methylhexane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	3-Methylpentane	I	0.02	ppbv	0.01	AC-058	16-Aug-16
16080034-001	Acetone		4.8	ppbv	0.4	AC-058	16-Aug-16
16080034-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	16-Aug-16
16080034-001	Benzene	I	0.02	ppbv	0.01	AC-058	16-Aug-16
16080034-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Aug-16
16080034-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	Carbon disulfide	I	0.05	ppbv	0.01	AC-058	16-Aug-16
16080034-001	Carbon tetrachloride	I	0.09	ppbv	0.01	AC-058	16-Aug-16
16080034-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	Chloroform	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	Chloromethane		0.54	ppbv	0.02	AC-058	16-Aug-16
16080034-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Aug-16
16080034-001	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	Cyclohexane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: September 7, 2016	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/July 29, 2016	14993	Ambient Air	29-Jul-16 0:00
DESCRIPTION:	Bonnyville AER		
REPORT NUMBER:	16080034	REPORT CREATED:	07-Sep-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080034-001	Cyclopentane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	Ethanol		1.6	ppbv	0.3	AC-058	16-Aug-16
16080034-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Aug-16
16080034-001	Ethylbenzene	I	0.02	ppbv	0.01	AC-058	16-Aug-16
16080034-001	Freon-11	I	0.28	ppbv	0.02	AC-058	16-Aug-16
16080034-001	Freon-113	I	0.07	ppbv	0.01	AC-058	16-Aug-16
16080034-001	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	Freon-12		0.58	ppbv	0.02	AC-058	16-Aug-16
16080034-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	16-Aug-16
16080034-001	Isobutane	I	0.21	ppbv	0.02	AC-058	16-Aug-16
16080034-001	Isopentane	I	0.19	ppbv	0.03	AC-058	16-Aug-16
16080034-001	Isoprene	I	0.15	ppbv	0.01	AC-058	16-Aug-16
16080034-001	Isopropyl alcohol		0.6	ppbv	0.4	AC-058	16-Aug-16
16080034-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	m,p-Xylene	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Aug-16
16080034-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Aug-16
16080034-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	16-Aug-16
16080034-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	16-Aug-16
16080034-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	16-Aug-16
16080034-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Aug-16
16080034-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	16-Aug-16
16080034-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Aug-16
16080034-001	Methylcyclohexane	I	0.02	ppbv	0.01	AC-058	16-Aug-16
16080034-001	Methylcyclopentane	I	0.03	ppbv	0.02	AC-058	16-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: September 7, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/July 29, 2016	14993	Ambient Air	29-Jul-16 0:00
DESCRIPTION:	Bonnyville AER		
REPORT NUMBER:	16080034	REPORT CREATED:	07-Sep-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080034-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	16-Aug-16
16080034-001	n-Butane	I	0.23	ppbv	0.03	AC-058	16-Aug-16
16080034-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	16-Aug-16
16080034-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Aug-16
16080034-001	n-Heptane	I	0.02	ppbv	0.01	AC-058	16-Aug-16
16080034-001	n-Hexane	I	0.04	ppbv	0.01	AC-058	16-Aug-16
16080034-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	n-Pentane	I	0.1	ppbv	0.1	AC-058	16-Aug-16
16080034-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	16-Aug-16
16080034-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	16-Aug-16
16080034-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	16-Aug-16
16080034-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	o-Xylene	I	0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Aug-16
16080034-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	16-Aug-16
16080034-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Aug-16
16080034-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Aug-16
16080034-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Aug-16
16080034-001	Toluene	I	0.05	ppbv	0.01	AC-058	16-Aug-16
16080034-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Aug-16
16080034-001	trans-2-Butene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Aug-16
16080034-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16
16080034-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: September 7, 2016	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
.ICA/VOC/Bonnyville/July 29, 2016	14993	Ambient Air	29-Jul-16	0:00
DESCRIPTION:	Bonnyville AER			
REPORT NUMBER:	16080034	REPORT CREATED:	07-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080034-001	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Aug-16
16080034-001	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: September 7, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

PAH SAMPLES

RESULTS:	Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE		CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
	Calgary AB	T2E 6P8	ICA/PUF/Bonnyville/July 5, 201	TE-05	Air Filter	Normal
INVOICE:	Charmaine Code	780 812-2182	DESCRIPTION:	Bonnyville AER		
	PO Box 8237 5107W-50 St Bonnyville AB	T9N 2J5	DATE SAMPLED:	05-Jul-16	0:00	DATE RECEIVED:
			REPORT CREATED:	27-Jul-16	REPORT NUMBER:	16070132
					VERSION:	Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070132-002	1-Methylnaphthalene		0.02	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	2-Methylnaphthalene		0.06	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Acenaphthene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Acenaphthylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Anthracene		0.04	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Benzo(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Benzo(a)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Benzo(e)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Chrysene		0.02	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: July-27-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/Bonnyville/July 5, 2016	TE-05	Air Filter	05-Jul-16	0:00
DESCRIPTION:	Bonnyville AER			
REPORT NUMBER:	16070132	REPORT CREATED:	27-Jul-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070132-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Fluoranthene		0.07	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Fluorene		0.04	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Naphthalene		0.02	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Phenanthrene		0.23	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Pyrene		0.07	ug/puf	0.01	NA-017	15-Jul-16
16070132-002	Retene		0.05	ug/puf	0.01	NA-017	15-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: July-27-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE Calgary AB T2E 6P8	CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
	CA/PUF/Bonnyville/July 11, 201	9702	Air Filter	Normal
INVOICE: Charmaine Code 780 812-2182 PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5	DESCRIPTION: Bonnyville - AER			
	DATE SAMPLED: 11-Jul-16	0:00	DATE RECEIVED: 18-Jul-16	
	REPORT CREATED: 17-Aug-16		REPORT NUMBER: 16070204	
			VERSION: Version 01	

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070204-002	1-Methylnaphthalene		0.04	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	2-Methylnaphthalene		0.06	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Acenaphthene		0.03	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Acenaphthylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Anthracene		0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Benzo(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Benzo(a)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Benzo(e)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Chrysene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/Bonnyville/July 11, 2016	9702	Air Filter	11-Jul-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16070204	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070204-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Fluoranthene		0.08	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Fluorene		0.07	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Naphthalene		0.03	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Phenanthrene		0.26	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Pyrene		0.06	ug/puf	0.01	NA-017	07-Aug-16
16070204-002	Retene		0.09	ug/puf	0.01	NA-017	07-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE Calgary AB T2E 6P8	CLIENT SAMPLE ID CA/PUF/Bonnyville/July 17, 201	CANISTER ID TE-09	Matrix Air Filter	Priority Normal
	DESCRIPTION: Bonnyville- AER			
INVOICE: Charmaine Code 780 812-2182 PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5	DATE SAMPLED: 17-Jul-16	0:00	DATE RECEIVED: 20-Jul-16	
	REPORT CREATED: 17-Aug-16		REPORT NUMBER: 16070251	
			VERSION: Version 01	

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070251-004	1-Methylnaphthalene		0.05	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	2-Methylnaphthalene		0.08	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Acenaphthene		0.04	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Acenaphthylene		0.09	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Anthracene		0.04	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Benzo(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Benzo(a)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Benzo(b,j,k)fluoranthene		0.03	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Benzo(e)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Chrysene		0.02	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/Bonnyville/July 17, 2016	TE-09	Air Filter	17-Jul-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16070251	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070251-004	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Fluoranthene		0.12	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Fluorene		0.10	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Naphthalene		0.04	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Phenanthrene		0.37	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Pyrene		0.08	ug/puf	0.01	NA-017	07-Aug-16
16070251-004	Retene		0.25	ug/puf	0.01	NA-017	07-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

RESULTS:	Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE		CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
	Calgary AB	T2E 6P8	CA/PUF/Bonnyville/July 23, 20:	TE-02	Air Filter	Normal
INVOICE:	Charmaine Code	780 812-2182	DESCRIPTION:	Bonnyville- AER		
	PO Box 8237		DATE SAMPLED:	23-Jul-16	0:00	DATE RECEIVED: 03-Aug-16
	5107W-50 St		REPORT CREATED:	01-Sep-16		REPORT NUMBER: 16080015
	Bonnyville AB	T9N 2J5				VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-002	1-Methylnaphthalene		0.04	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	2-Methylnaphthalene		0.07	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Acenaphthene		0.03	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Acenaphthylene		0.07	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Anthracene		0.06	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Benzo(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Benzo(a)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Benzo(b,j,k)fluoranthene		0.02	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Benzo(e)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Chrysene		0.02	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: September-01-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/Bonnyville/July 23, 2016	TE-02	Air Filter	23-Jul-16	0:00
DESCRIPTION:	Bonnyville- AER			
REPORT NUMBER:	16080015	REPORT CREATED:	01-Sep-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080015-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Fluoranthene		0.15	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Fluorene		0.10	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Naphthalene		0.04	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Perylene		0.01	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Phenanthrene		0.34	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Pyrene		0.10	ug/puf	0.01	NA-017	07-Aug-16
16080015-002	Retene		0.12	ug/puf	0.01	NA-017	07-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: September-01-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE Calgary AB T2E 6P8	CLIENT SAMPLE ID CA/PUF/Bonnyville/July 29, 201	CANISTER ID TE-04	Matrix Air Filter	Priority Normal
	DESCRIPTION: Bonnyville AER			
INVOICE: Charmaine Code 780 812-2182 PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5	DATE SAMPLED: 29-Jul-16	0:00	DATE RECEIVED: 04-Aug-16	
	REPORT CREATED: 07-Sep-16		REPORT NUMBER: 16080034	
			VERSION: Version 01	

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080034-002	1-Methylnaphthalene		0.06	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	2-Methylnaphthalene		0.12	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Acenaphthene		0.04	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Acenaphthylene		0.06	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Anthracene		0.02	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Benzo(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Benzo(a)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Benzo(b,j,k)fluoranthene		0.01	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Benzo(e)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Chrysene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: September 7, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/Bonnyville/July 29, 2016	TE-04	Air Filter	29-Jul-16 0:00
DESCRIPTION:	Bonnyville AER		
REPORT NUMBER:	16080034	REPORT CREATED:	07-Sep-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16080034-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Fluoranthene		0.09	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Fluorene		0.08	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Naphthalene		0.08	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Perylene		0.03	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Phenanthrene		0.26	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Pyrene		0.06	ug/puf	0.01	NA-017	07-Aug-16
16080034-002	Retene		0.08	ug/puf	0.01	NA-017	07-Aug-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: September 7, 2016	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

NMHC CANISTER SAMPLES

RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE Calgary AB T2E 6P8	CLIENT SAMPLE ID NMHC- VOC/Bonnyville/July 1,	CANISTER ID H3280	Matrix Ambient Air	Priority Normal
	DESCRIPTION: Bonnyville-AER			
INVOICE: Charmaine Code 780 812-2182 PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5	DATE SAMPLED: 01-Jul-16 5:35	DATE RECEIVED: 06-Jul-16	REPORT NUMBER: 16070035	
	REPORT CREATED: 28-Jul-16	VERSION: Version 01		

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16070035-001	1,1,1-Trichloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	14-Jul-16
16070035-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	14-Jul-16
16070035-001	1,1,2-Trichloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	14-Jul-16
16070035-001	1,1-Dichloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	14-Jul-16
16070035-001	1,1-Dichloroethylene	K, T, U	< 0.05 ppbv	0.05	AC-058	14-Jul-16
16070035-001	1,2,3-Trimethylbenzene	K, T, U	< 0.06 ppbv	0.06	AC-058	14-Jul-16
16070035-001	1,2,4-Trichlorobenzene	K, T, U	< 1.0 ppbv	1.0	AC-058	14-Jul-16
16070035-001	1,2,4-Trimethylbenzene	I	0.07 ppbv	0.04	AC-058	14-Jul-16
16070035-001	1,2-Dibromoethane	K, T, U	< 0.03 ppbv	0.03	AC-058	14-Jul-16
16070035-001	1,2-Dichlorobenzene	K, T, U	< 0.04 ppbv	0.04	AC-058	14-Jul-16
16070035-001	1,2-Dichloroethane	I	0.07 ppbv	0.01	AC-058	14-Jul-16
16070035-001	1,2-Dichloropropane	I	0.02 ppbv	0.01	AC-058	14-Jul-16
16070035-001	1,3,5-Trimethylbenzene	K, T, U	< 0.03 ppbv	0.03	AC-058	14-Jul-16
16070035-001	1,3-Butadiene	K, T, U	< 0.03 ppbv	0.03	AC-058	14-Jul-16
16070035-001	1,3-Dichlorobenzene	K, T, U	< 0.4 ppbv	0.4	AC-058	14-Jul-16
16070035-001	1,4-Dichlorobenzene	K, T, U	< 0.5 ppbv	0.5	AC-058	14-Jul-16
16070035-001	1,4-Dioxane	K, T, U	< 0.5 ppbv	0.5	AC-058	14-Jul-16
16070035-001	1-Butene	I	0.22 ppbv	0.03	AC-058	14-Jul-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: July-28-16	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\\NMHC- VOC/Bonnyville/July 1, 2	H3280	Ambient Air	01-Jul-16 5:35
DESCRIPTION:	Bonnyville-AER		
REPORT NUMBER:	16070035	REPORT CREATED:	28-Jul-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070035-001	1-Hexene	I	0.03	ppbv	0.03	AC-058	14-Jul-16
16070035-001	1-Pentene	I	0.24	ppbv	0.01	AC-058	14-Jul-16
16070035-001	2,2,4-Trimethylpentane	I	0.16	ppbv	0.01	AC-058	14-Jul-16
16070035-001	2,2-Dimethylbutane	I	0.11	ppbv	0.01	AC-058	14-Jul-16
16070035-001	2,3,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	14-Jul-16
16070035-001	2,3-Dimethylbutane	I	0.18	ppbv	0.03	AC-058	14-Jul-16
16070035-001	2,3-Dimethylpentane	I	0.15	ppbv	0.03	AC-058	14-Jul-16
16070035-001	2,4-Dimethylpentane	I	0.08	ppbv	0.01	AC-058	14-Jul-16
16070035-001	2-Methylheptane	I	0.04	ppbv	0.01	AC-058	14-Jul-16
16070035-001	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	14-Jul-16
16070035-001	2-Methylpentane		1.17	ppbv	0.01	AC-058	14-Jul-16
16070035-001	3-Methylheptane	I	0.03	ppbv	0.03	AC-058	14-Jul-16
16070035-001	3-Methylhexane	I	0.22	ppbv	0.03	AC-058	14-Jul-16
16070035-001	3-Methylpentane		0.60	ppbv	0.01	AC-058	14-Jul-16
16070035-001	Acetone		6.3	ppbv	0.5	AC-058	14-Jul-16
16070035-001	Acrolein	K, T, U	< 0.4	ppbv	0.4	AC-058	14-Jul-16
16070035-001	Benzene	I	0.24	ppbv	0.01	AC-058	14-Jul-16
16070035-001	Benzyl chloride	K, T, U	< 0.5	ppbv	0.5	AC-058	14-Jul-16
16070035-001	Bromodichloromethane	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Jul-16
16070035-001	Bromoform	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Jul-16
16070035-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	14-Jul-16
16070035-001	Carbon disulfide		0.57	ppbv	0.01	AC-058	14-Jul-16
16070035-001	Carbon tetrachloride	I	0.07	ppbv	0.01	AC-058	14-Jul-16
16070035-001	Chlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Jul-16
16070035-001	Chloroethane	I	0.10	ppbv	0.03	AC-058	14-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: July-28-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\\NMHC- VOC/Bonnyville/July 1, 2	H3280	Ambient Air	01-Jul-16 5:35
DESCRIPTION:	Bonnyville-AER		
REPORT NUMBER:	16070035	REPORT CREATED:	28-Jul-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070035-001	Chloroform	I	0.03	ppbv	0.03	AC-058	14-Jul-16
16070035-001	Chloromethane	I	0.19	ppbv	0.03	AC-058	14-Jul-16
16070035-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	14-Jul-16
16070035-001	cis-1,3-Dichloropropene	K, T, U	< 0.05	ppbv	0.05	AC-058	14-Jul-16
16070035-001	cis-2-Butene	I	0.21	ppbv	0.03	AC-058	14-Jul-16
16070035-001	cis-2-Pentene	I	0.27	ppbv	0.03	AC-058	14-Jul-16
16070035-001	Cyclohexane	I	0.17	ppbv	0.03	AC-058	14-Jul-16
16070035-001	Cyclopentane	I	0.18	ppbv	0.01	AC-058	14-Jul-16
16070035-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	14-Jul-16
16070035-001	Ethanol		11.0	ppbv	0.4	AC-058	14-Jul-16
16070035-001	Ethyl acetate	K, T, U	< 0.5	ppbv	0.5	AC-058	14-Jul-16
16070035-001	Ethylbenzene	I	0.05	ppbv	0.01	AC-058	14-Jul-16
16070035-001	Freon-11	I	0.23	ppbv	0.03	AC-058	14-Jul-16
16070035-001	Freon-113	I	0.06	ppbv	0.01	AC-058	14-Jul-16
16070035-001	Freon-114	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Jul-16
16070035-001	Freon-12	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Jul-16
16070035-001	Hexachloro-1,3-butadiene	K, T, U	< 0.63	ppbv	0.63	AC-058	14-Jul-16
16070035-001	Isobutane		2.36	ppbv	0.03	AC-058	14-Jul-16
16070035-001	Isopentane		9.02	ppbv	0.04	AC-058	14-Jul-16
16070035-001	Isoprene		0.40	ppbv	0.01	AC-058	14-Jul-16
16070035-001	Isopropyl alcohol	K, T, U	< 0.5	ppbv	0.5	AC-058	14-Jul-16
16070035-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	14-Jul-16
16070035-001	m,p-Xylene	I	0.15	ppbv	0.04	AC-058	14-Jul-16
16070035-001	m-Diethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	14-Jul-16
16070035-001	m-Ethyltoluene	K, T, U	< 0.10	ppbv	0.10	AC-058	14-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: July-28-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\\NMHC- VOC/Bonnyville/July 1, 2	H3280	Ambient Air	01-Jul-16 5:35
DESCRIPTION:	Bonnyville-AER		
REPORT NUMBER:	16070035	REPORT CREATED:	28-Jul-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070035-001	Methyl butyl ketone	K, T, U	< 0.63	ppbv	0.63	AC-058	14-Jul-16
16070035-001	Methyl ethyl ketone		0.7	ppbv	0.4	AC-058	14-Jul-16
16070035-001	Methyl isobutyl ketone	K, T, U	< 0.5	ppbv	0.5	AC-058	14-Jul-16
16070035-001	Methyl methacrylate	K, T, U	< 0.09	ppbv	0.09	AC-058	14-Jul-16
16070035-001	Methyl tert butyl ether	K, T, U	< 0.04	ppbv	0.04	AC-058	14-Jul-16
16070035-001	Methylcyclohexane	I	0.19	ppbv	0.01	AC-058	14-Jul-16
16070035-001	Methylcyclopentane		0.46	ppbv	0.03	AC-058	14-Jul-16
16070035-001	Methylene chloride		0.5	ppbv	0.4	AC-058	14-Jul-16
16070035-001	n-Butane		14.0	ppbv	0.04	AC-058	14-Jul-16
16070035-001	n-Decane	K, T, U	< 0.08	ppbv	0.08	AC-058	14-Jul-16
16070035-001	n-Dodecane	K, T, U	< 0.5	ppbv	0.5	AC-058	14-Jul-16
16070035-001	n-Heptane	I	0.20	ppbv	0.01	AC-058	14-Jul-16
16070035-001	n-Hexane		0.60	ppbv	0.01	AC-058	14-Jul-16
16070035-001	n-Octane	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Jul-16
16070035-001	n-Pentane		3.5	ppbv	0.1	AC-058	14-Jul-16
16070035-001	n-Propylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	14-Jul-16
16070035-001	n-Undecane	K, T, U	< 0.6	ppbv	0.6	AC-058	14-Jul-16
16070035-001	Naphthalene	K, T, U	< 0.6	ppbv	0.6	AC-058	14-Jul-16
16070035-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	14-Jul-16
16070035-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	14-Jul-16
16070035-001	o-Xylene	I	0.05	ppbv	0.01	AC-058	14-Jul-16
16070035-001	p-Diethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	14-Jul-16
16070035-001	p-Ethyltoluene	K, T, U	< 0.09	ppbv	0.09	AC-058	14-Jul-16
16070035-001	Styrene	K, T, U	< 0.05	ppbv	0.05	AC-058	14-Jul-16
16070035-001	Tetrachloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	14-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: July-28-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\\NMHC- VOC/Bonnyville/July 1, 2	H3280	Ambient Air	01-Jul-16 5:35
DESCRIPTION:	Bonnyville-AER		
REPORT NUMBER:	16070035	REPORT CREATED:	28-Jul-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16070035-001	Tetrahydrofuran	K, T, U	< 0.5 ppbv	0.5	AC-058	14-Jul-16
16070035-001	Toluene		0.47 ppbv	0.01	AC-058	14-Jul-16
16070035-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01 ppbv	0.01	AC-058	14-Jul-16
16070035-001	trans-1,3-Dichloropropylene	K, T, U	< 0.05 ppbv	0.05	AC-058	14-Jul-16
16070035-001	trans-2-Butene	I	0.15 ppbv	0.01	AC-058	14-Jul-16
16070035-001	trans-2-Pentene		0.52 ppbv	0.03	AC-058	14-Jul-16
16070035-001	Trichloroethylene	I	0.06 ppbv	0.05	AC-058	14-Jul-16
16070035-001	Vinyl acetate	K, T, U	< 0.5 ppbv	0.5	AC-058	14-Jul-16
16070035-001	Vinyl chloride	K, T, U	< 0.03 ppbv	0.03	AC-058	14-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: July-28-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE Calgary AB T2E 6P8	CLIENT SAMPLE ID VMHC-VOC/Bonnyville/July 15,	CANISTER ID 14735	Matrix Ambient Air	Priority Normal
	DESCRIPTION: Bonnyville- AER			
INVOICE: Charmaine Code 780 812-2182 PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5	DATE SAMPLED: 15-Jul-16 6:00	DATE RECEIVED: 21-Jul-16		
	REPORT CREATED: 16-Aug-16	REPORT NUMBER: 16070277		
		VERSION: Version 01		

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070277-001	1,1,1-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	1,1,2-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	1,1-Dichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	1,1-Dichloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Jul-16
16070277-001	1,2,3-Trimethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	22-Jul-16
16070277-001	1,2,4-Trichlorobenzene	K, T, U	< 1.0	ppbv	1.0	AC-058	22-Jul-16
16070277-001	1,2,4-Trimethylbenzene	I	0.04	ppbv	0.04	AC-058	22-Jul-16
16070277-001	1,2-Dibromoethane	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	1,2-Dichlorobenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070277-001	1,2-Dichloroethane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070277-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070277-001	1,3,5-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	1,3-Butadiene	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	1,3-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070277-001	1,4-Dichlorobenzene	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Jul-16
16070277-001	1,4-Dioxane	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Jul-16
16070277-001	1-Butene	I	0.26	ppbv	0.03	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 16, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC-VOC/Bonnyville/July 15, 2	14735	Ambient Air	15-Jul-16 6:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16070277	REPORT CREATED:	16-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070277-001	1-Hexene	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	1-Pentene	I	0.05	ppbv	0.01	AC-058	22-Jul-16
16070277-001	2,2,4-Trimethylpentane	I	0.07	ppbv	0.01	AC-058	22-Jul-16
16070277-001	2,2-Dimethylbutane	I	0.04	ppbv	0.01	AC-058	22-Jul-16
16070277-001	2,3,4-Trimethylpentane	I	0.06	ppbv	0.01	AC-058	22-Jul-16
16070277-001	2,3-Dimethylbutane	I	0.09	ppbv	0.03	AC-058	22-Jul-16
16070277-001	2,3-Dimethylpentane	I	0.09	ppbv	0.03	AC-058	22-Jul-16
16070277-001	2,4-Dimethylpentane	I	0.04	ppbv	0.01	AC-058	22-Jul-16
16070277-001	2-Methylheptane	I	0.02	ppbv	0.01	AC-058	22-Jul-16
16070277-001	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070277-001	2-Methylpentane	I	0.27	ppbv	0.01	AC-058	22-Jul-16
16070277-001	3-Methylheptane	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	3-Methylhexane	I	0.07	ppbv	0.03	AC-058	22-Jul-16
16070277-001	3-Methylpentane	I	0.16	ppbv	0.01	AC-058	22-Jul-16
16070277-001	Acetone		4.2	ppbv	0.5	AC-058	22-Jul-16
16070277-001	Acrolein	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070277-001	Benzene	I	0.14	ppbv	0.01	AC-058	22-Jul-16
16070277-001	Benzyl chloride	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Jul-16
16070277-001	Bromodichloromethane	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	Bromoform	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070277-001	Carbon disulfide	I	0.13	ppbv	0.01	AC-058	22-Jul-16
16070277-001	Carbon tetrachloride	I	0.09	ppbv	0.01	AC-058	22-Jul-16
16070277-001	Chlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	Chloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead	On behalf of: PJ Pretorius, Manager, Analysis and Testing Services
Date: August 16, 2016	Inquiries: (780) 632 8455 E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
./NMHC-VOC/Bonnyville/July 15, 2	14735	Ambient Air	15-Jul-16 6:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16070277	REPORT CREATED:	16-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070277-001	Chloroform	I	0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	Chloromethane		0.64	ppbv	0.03	AC-058	22-Jul-16
16070277-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070277-001	cis-1,3-Dichloropropene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Jul-16
16070277-001	cis-2-Butene	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	cis-2-Pentene	I	0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	Cyclohexane	I	0.16	ppbv	0.03	AC-058	22-Jul-16
16070277-001	Cyclopentane	I	0.09	ppbv	0.01	AC-058	22-Jul-16
16070277-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070277-001	Ethanol		1.6	ppbv	0.4	AC-058	22-Jul-16
16070277-001	Ethyl acetate	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Jul-16
16070277-001	Ethylbenzene	I	0.04	ppbv	0.01	AC-058	22-Jul-16
16070277-001	Freon-11	I	0.24	ppbv	0.03	AC-058	22-Jul-16
16070277-001	Freon-113	I	0.05	ppbv	0.01	AC-058	22-Jul-16
16070277-001	Freon-114	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	Freon-12	I	0.25	ppbv	0.03	AC-058	22-Jul-16
16070277-001	Hexachloro-1,3-butadiene	K, T, U	< 0.63	ppbv	0.63	AC-058	22-Jul-16
16070277-001	Isobutane		3.56	ppbv	0.03	AC-058	22-Jul-16
16070277-001	Isopentane		2.33	ppbv	0.04	AC-058	22-Jul-16
16070277-001	Isoprene	I	0.36	ppbv	0.01	AC-058	22-Jul-16
16070277-001	Isopropyl alcohol	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Jul-16
16070277-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070277-001	m,p-Xylene	I	0.17	ppbv	0.04	AC-058	22-Jul-16
16070277-001	m-Diethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Jul-16
16070277-001	m-Ethyltoluene	K, T, U	< 0.10	ppbv	0.10	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 16, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
./NMHC-VOC/Bonnyville/July 15, 2	14735	Ambient Air	15-Jul-16 6:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16070277	REPORT CREATED:	16-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070277-001	Methyl butyl ketone	K, T, U	< 0.63	ppbv	0.63	AC-058	22-Jul-16
16070277-001	Methyl ethyl ketone		0.5	ppbv	0.4	AC-058	22-Jul-16
16070277-001	Methyl isobutyl ketone	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Jul-16
16070277-001	Methyl methacrylate	K, T, U	< 0.09	ppbv	0.09	AC-058	22-Jul-16
16070277-001	Methyl tert butyl ether	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Jul-16
16070277-001	Methylcyclohexane	I	0.18	ppbv	0.01	AC-058	22-Jul-16
16070277-001	Methylcyclopentane	I	0.24	ppbv	0.03	AC-058	22-Jul-16
16070277-001	Methylene chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Jul-16
16070277-001	n-Butane		5.30	ppbv	0.04	AC-058	22-Jul-16
16070277-001	n-Decane	K, T, U	< 0.08	ppbv	0.08	AC-058	22-Jul-16
16070277-001	n-Dodecane	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Jul-16
16070277-001	n-Heptane	I	0.07	ppbv	0.01	AC-058	22-Jul-16
16070277-001	n-Hexane	I	0.19	ppbv	0.01	AC-058	22-Jul-16
16070277-001	n-Octane	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16
16070277-001	n-Pentane		0.9	ppbv	0.1	AC-058	22-Jul-16
16070277-001	n-Propylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	22-Jul-16
16070277-001	n-Undecane	K, T, U	< 0.6	ppbv	0.6	AC-058	22-Jul-16
16070277-001	Naphthalene	K, T, U	< 0.6	ppbv	0.6	AC-058	22-Jul-16
16070277-001	n-Nonane	I	0.02	ppbv	0.01	AC-058	22-Jul-16
16070277-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070277-001	o-Xylene	I	0.04	ppbv	0.01	AC-058	22-Jul-16
16070277-001	p-Diethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Jul-16
16070277-001	p-Ethyltoluene	K, T, U	< 0.09	ppbv	0.09	AC-058	22-Jul-16
16070277-001	Styrene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Jul-16
16070277-001	Tetrachloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 16, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC-VOC/Bonnyville/July 15, 2	14735	Ambient Air	15-Jul-16 6:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16070277	REPORT CREATED:	16-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070277-001	Tetrahydrofuran	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Jul-16
16070277-001	Toluene	I	0.25	ppbv	0.01	AC-058	22-Jul-16
16070277-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Jul-16
16070277-001	trans-1,3-Dichloropropylene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Jul-16
16070277-001	trans-2-Butene	I	0.04	ppbv	0.01	AC-058	22-Jul-16
16070277-001	trans-2-Pentene	I	0.05	ppbv	0.03	AC-058	22-Jul-16
16070277-001	Trichloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Jul-16
16070277-001	Vinyl acetate	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Jul-16
16070277-001	Vinyl chloride	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 16, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE Calgary AB T2E 6P8	CLIENT SAMPLE ID VMHC-VOC/Bonnyville/July 19,	CANISTER ID S5622	Matrix Ambient Air	Priority Normal
	DESCRIPTION: Bonnyville- AER			
INVOICE: Charmaine Code 780 812-2182 PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5	DATE SAMPLED: 19-Jul-16 7:20	DATE RECEIVED: 22-Jul-16		
	REPORT CREATED: 17-Aug-16	REPORT NUMBER: 16070304		
		VERSION: Version 01		

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070304-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	30-Jul-16
16070304-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	30-Jul-16
16070304-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	30-Jul-16
16070304-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	30-Jul-16
16070304-001	1,1-Dichloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	30-Jul-16
16070304-001	1,2,3-Trimethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	30-Jul-16
16070304-001	1,2,4-Trichlorobenzene	K, T, U	< 1.0	ppbv	1.0	AC-058	30-Jul-16
16070304-001	1,2,4-Trimethylbenzene	I	0.06	ppbv	0.04	AC-058	30-Jul-16
16070304-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	30-Jul-16
16070304-001	1,2-Dichlorobenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	30-Jul-16
16070304-001	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	30-Jul-16
16070304-001	1,2-Dichloropropane	I	0.02	ppbv	0.01	AC-058	30-Jul-16
16070304-001	1,3,5-Trimethylbenzene	I	0.03	ppbv	0.02	AC-058	30-Jul-16
16070304-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	30-Jul-16
16070304-001	1,3-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	30-Jul-16
16070304-001	1,4-Dichlorobenzene	K, T, U	< 0.5	ppbv	0.5	AC-058	30-Jul-16
16070304-001	1,4-Dioxane	K, T, U	< 0.5	ppbv	0.5	AC-058	30-Jul-16
16070304-001	1-Butene	I	0.11	ppbv	0.02	AC-058	30-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
./NMHC-VOC/Bonnyville/July 19, 2	S5622	Ambient Air	19-Jul-16 7:20
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16070304	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070304-001	1-Hexene	I	0.05	ppbv	0.02	AC-058	30-Jul-16
16070304-001	1-Pentene	I	0.10	ppbv	0.01	AC-058	30-Jul-16
16070304-001	2,2,4-Trimethylpentane	I	0.11	ppbv	0.01	AC-058	30-Jul-16
16070304-001	2,2-Dimethylbutane	I	0.04	ppbv	0.01	AC-058	30-Jul-16
16070304-001	2,3,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	30-Jul-16
16070304-001	2,3-Dimethylbutane	I	0.16	ppbv	0.02	AC-058	30-Jul-16
16070304-001	2,3-Dimethylpentane	I	0.12	ppbv	0.02	AC-058	30-Jul-16
16070304-001	2,4-Dimethylpentane	I	0.05	ppbv	0.01	AC-058	30-Jul-16
16070304-001	2-Methylheptane	I	0.02	ppbv	0.01	AC-058	30-Jul-16
16070304-001	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	30-Jul-16
16070304-001	2-Methylpentane		0.51	ppbv	0.01	AC-058	30-Jul-16
16070304-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	30-Jul-16
16070304-001	3-Methylhexane	I	0.11	ppbv	0.02	AC-058	30-Jul-16
16070304-001	3-Methylpentane	I	0.28	ppbv	0.01	AC-058	30-Jul-16
16070304-001	Acetone		3.0	ppbv	0.5	AC-058	30-Jul-16
16070304-001	Acrolein	K, T, U	< 0.4	ppbv	0.4	AC-058	30-Jul-16
16070304-001	Benzene	I	0.15	ppbv	0.01	AC-058	30-Jul-16
16070304-001	Benzyl chloride	K, T, U	< 0.5	ppbv	0.5	AC-058	30-Jul-16
16070304-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	30-Jul-16
16070304-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	30-Jul-16
16070304-001	Bromomethane	I	0.02	ppbv	0.01	AC-058	30-Jul-16
16070304-001	Carbon disulfide	I	0.19	ppbv	0.01	AC-058	30-Jul-16
16070304-001	Carbon tetrachloride	I	0.10	ppbv	0.01	AC-058	30-Jul-16
16070304-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	30-Jul-16
16070304-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	30-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

E-mail: EAS.Results@albertainnovates.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
./NMHC-VOC/Bonnyville/July 19, 2	S5622	Ambient Air	19-Jul-16 7:20
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16070304	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070304-001	Chloroform	I	0.03	ppbv	0.02	AC-058	30-Jul-16
16070304-001	Chloromethane		0.57	ppbv	0.02	AC-058	30-Jul-16
16070304-001	cis-1,2-Dichloroethene	I	0.02	ppbv	0.01	AC-058	30-Jul-16
16070304-001	cis-1,3-Dichloropropene	K, T, U	< 0.05	ppbv	0.05	AC-058	30-Jul-16
16070304-001	cis-2-Butene	I	0.10	ppbv	0.02	AC-058	30-Jul-16
16070304-001	cis-2-Pentene	I	0.07	ppbv	0.02	AC-058	30-Jul-16
16070304-001	Cyclohexane	I	0.14	ppbv	0.02	AC-058	30-Jul-16
16070304-001	Cyclopentane	I	0.10	ppbv	0.01	AC-058	30-Jul-16
16070304-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	30-Jul-16
16070304-001	Ethanol		8.1	ppbv	0.4	AC-058	30-Jul-16
16070304-001	Ethyl acetate	K, T, U	< 0.5	ppbv	0.5	AC-058	30-Jul-16
16070304-001	Ethylbenzene	I	0.05	ppbv	0.01	AC-058	30-Jul-16
16070304-001	Freon-11	I	0.25	ppbv	0.02	AC-058	30-Jul-16
16070304-001	Freon-113	I	0.06	ppbv	0.01	AC-058	30-Jul-16
16070304-001	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	30-Jul-16
16070304-001	Freon-12	I	0.26	ppbv	0.02	AC-058	30-Jul-16
16070304-001	Hexachloro-1,3-butadiene	K, T, U	< 0.62	ppbv	0.62	AC-058	30-Jul-16
16070304-001	Isobutane		1.72	ppbv	0.02	AC-058	30-Jul-16
16070304-001	Isopentane		4.26	ppbv	0.04	AC-058	30-Jul-16
16070304-001	Isoprene	I	0.17	ppbv	0.01	AC-058	30-Jul-16
16070304-001	Isopropyl alcohol		0.5	ppbv	0.5	AC-058	30-Jul-16
16070304-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	30-Jul-16
16070304-001	m,p-Xylene	I	0.15	ppbv	0.04	AC-058	30-Jul-16
16070304-001	m-Diethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	30-Jul-16
16070304-001	m-Ethyltoluene	K, T, U	< 0.10	ppbv	0.10	AC-058	30-Jul-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
./NMHC-VOC/Bonnyville/July 19, 2	S5622	Ambient Air	19-Jul-16 7:20
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16070304	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070304-001	Methyl butyl ketone	K, T, U	< 0.62	ppbv	0.62	AC-058	30-Jul-16
16070304-001	Methyl ethyl ketone		0.7	ppbv	0.4	AC-058	30-Jul-16
16070304-001	Methyl isobutyl ketone	K, T, U	< 0.5	ppbv	0.5	AC-058	30-Jul-16
16070304-001	Methyl methacrylate	K, T, U	< 0.09	ppbv	0.09	AC-058	30-Jul-16
16070304-001	Methyl tert butyl ether	K, T, U	< 0.04	ppbv	0.04	AC-058	30-Jul-16
16070304-001	Methylcyclohexane	I	0.11	ppbv	0.01	AC-058	30-Jul-16
16070304-001	Methylcyclopentane	I	0.23	ppbv	0.02	AC-058	30-Jul-16
16070304-001	Methylene chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	30-Jul-16
16070304-001	n-Butane		7.29	ppbv	0.04	AC-058	30-Jul-16
16070304-001	n-Decane	K, T, U	< 0.07	ppbv	0.07	AC-058	30-Jul-16
16070304-001	n-Dodecane	K, T, U	< 0.5	ppbv	0.5	AC-058	30-Jul-16
16070304-001	n-Heptane	I	0.11	ppbv	0.01	AC-058	30-Jul-16
16070304-001	n-Hexane	I	0.29	ppbv	0.01	AC-058	30-Jul-16
16070304-001	n-Octane	I	0.02	ppbv	0.02	AC-058	30-Jul-16
16070304-001	n-Pentane		1.8	ppbv	0.1	AC-058	30-Jul-16
16070304-001	n-Propylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	30-Jul-16
16070304-001	n-Undecane	K, T, U	< 0.6	ppbv	0.6	AC-058	30-Jul-16
16070304-001	Naphthalene	K, T, U	< 0.6	ppbv	0.6	AC-058	30-Jul-16
16070304-001	n-Nonane	I	0.02	ppbv	0.01	AC-058	30-Jul-16
16070304-001	o-Ethyltoluene	I	0.01	ppbv	0.01	AC-058	30-Jul-16
16070304-001	o-Xylene	I	0.06	ppbv	0.01	AC-058	30-Jul-16
16070304-001	p-Diethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	30-Jul-16
16070304-001	p-Ethyltoluene	K, T, U	< 0.09	ppbv	0.09	AC-058	30-Jul-16
16070304-001	Styrene	K, T, U	< 0.05	ppbv	0.05	AC-058	30-Jul-16
16070304-001	Tetrachloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	30-Jul-16

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DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16070304	REPORT CREATED:	17-Aug-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16070304-001	Tetrahydrofuran	K, T, U	< 0.5	ppbv	0.5	AC-058	30-Jul-16
16070304-001	Toluene	I	0.17	ppbv	0.01	AC-058	30-Jul-16
16070304-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	30-Jul-16
16070304-001	trans-1,3-Dichloropropylene	K, T, U	< 0.05	ppbv	0.05	AC-058	30-Jul-16
16070304-001	trans-2-Butene	K, T, U	< 0.01	ppbv	0.01	AC-058	30-Jul-16
16070304-001	trans-2-Pentene	I	0.12	ppbv	0.02	AC-058	30-Jul-16
16070304-001	Trichloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	30-Jul-16
16070304-001	Vinyl acetate	K, T, U	< 0.5	ppbv	0.5	AC-058	30-Jul-16
16070304-001	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	30-Jul-16

Report certified by: Graham Knox, Team Lead

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: August 17, 2016

Inquiries: (780) 632 8455

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APPENDIX V
INTERNAL AUDIT RESULTS



API 101E Hydrogen Sulphide Analyzer Calibration

Date: July 13, 2016	Barometric Pressure: 0.938 atm
Company/Airshed: LICA	Station Temperature °C: 21
Location/Station Name: Bonnyville - AER	Weather Conditions: Mainly sunny
Parameter: Hydrogen Sulphide	Calibration Purpose: shut down
Start Time 24 hr. (mst): 11:36	Performed By/Reviewer: Tom Bourque Trina Whitsitt
End Time 24 hr. (mst): 15:29	Cal Gas Expiry Date: July 15, 2017
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	
Serial Number: 510	Range ppb: 100
Last Calibration Date: June 9, 2016	As Found C.F.: 0.949
Previous C.F.: 0.995	New C.F.: n/a

Calibrator:	Standard Calibration Points for Ranges								
Flow Meter ID's: n/a	<table border="1" style="margin: auto;"> <thead> <tr> <th>Point</th> <th>Hydrogen Sulphide Standard Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>78</td> </tr> <tr> <td>Mid</td> <td>38</td> </tr> <tr> <td>Low</td> <td>19</td> </tr> </tbody> </table>	Point	Hydrogen Sulphide Standard Calibration Points	High	78	Mid	38	Low	19
Point		Hydrogen Sulphide Standard Calibration Points							
High		78							
Mid		38							
Low		19							
Make & Model: API 700									
Serial #: 831									
Cal Gas Cylinder I.D. #: LL74267									
Cal Gas Conc. (ppm): 9.9									

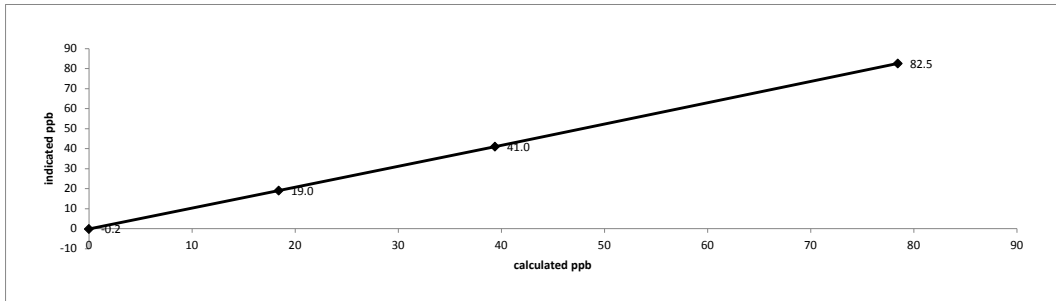
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	7500	0.00	7500	0.0	-0.2	N/A
as found high	7496	60.00	7556	78.5	82.5	0.949
mid	7496	30.00	7526	39.4	41.0	0.956
low	7497	14.00	7511	18.4	19.0	0.959
Average C.F. =						0.955

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS
Slope =	0.948	> or = 0.995
b (Intercept as % of full scale) =	0.33%	0.90-1.10
% change in C.F. from last cal =	4.66%	± 3% F.S.
		± 10%

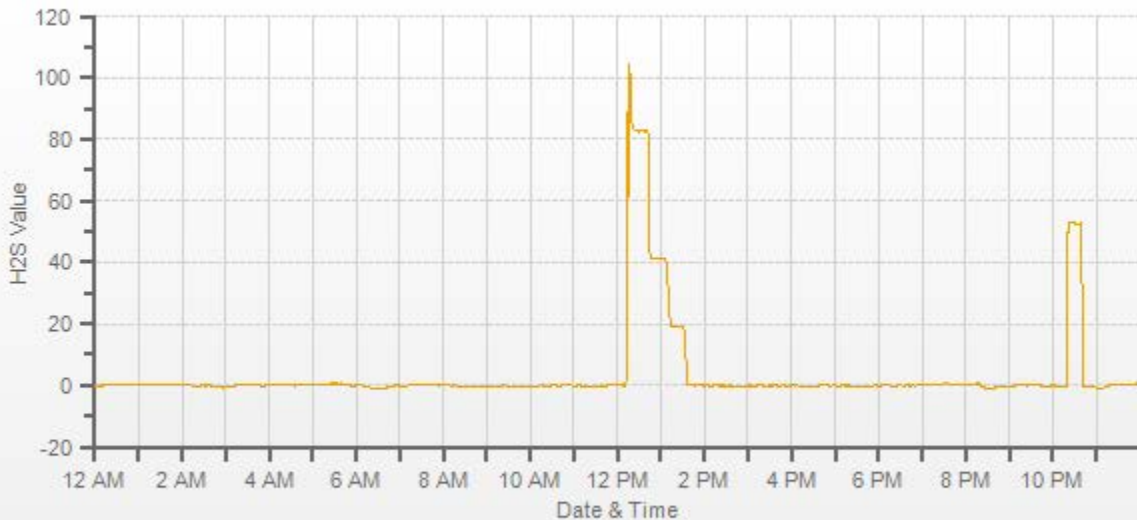
API 101E Hydrogen Sulphide Analyzer Calibration



As found:	As left:
SLOPE: 1.137	SLOPE: 1.137
OFFSET: 33.0	OFFSET: 33.0
HVPS: 526	HVPS: 526
RCELL TEMP: 50.0	RCELL TEMP: 50.0
BOX TEMP: 31.4	BOX TEMP: 33.0
PMT TEMP: 8.4	PMT TEMP: 8.4
IZS TEMP: 45.0	IZS TEMP: 45.0
Converter Temp: 314.8	Converter Temp: 314.9
PRES: 21.6	PRES: 21.4
SAMP FL: 565	SAMP FL: 560
UV LAMP: 2503.9	UV LAMP: 2504.2
LAMP RATIO: 78.9	LAMP RATIO: 78.9
STR. LGT: 18.8	STR. LGT: 18.8
DRK PMT: 34.4	DRK PMT: 35.1
DRK LMP: -1.9	DRK LMP: -2.0
Internal Span: 51.9	Internal Span: 51.9

Comments:

Audit calibration. SO2 scrubber test (11:54 - 11:12). SO2 concentration is 780 ppb. Response - 0.0 ppb.



— H2S[ppb]

APPENDIX VI
REPORT CERTIFICATION FORM

Report Certification Form

Alberta Airshed (if applicable)	EPA Approval or Code of Practice Registration # (if applicable)
YES	NA
Company Name (if applicable)	Industrial Operation Name (if applicable)
Lakeland Industry & Community Association	Bonnyville
Name of the Representative of the Person Responsible (Last, First, Middle)	Position / Title of the Representative of the Person Responsible
Bim Adeniji	Project Manager Assistant, Customer Service, Air Services
Is an External Party Certifying the Report? (If 'Yes', fill in the fields below for the external person.)	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Name of External Person Certifying the Report (Last, First, Middle)	Position / Title of External Person Certifying the Report
NA	NA
Company Name for the External Person Certifying the Report	Identification of Qualifications / Professional Designations of the External Person Certifying the Report
NA	NA

I certify that I have reviewed and verified the submitted report. I also certify that the report presented with this certification form is complete, accurate and representative of the monitoring results and timeframe.



Signature of the Representative of the Person Responsible / External Person Certifying the Report

09-09-2016




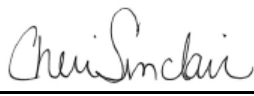
Report Issued Date (dd-mm-yyyy)

APPENDIX VII
DATA VALIDATION CERTIFICATION FORM



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2016-07-37- C</u>
Site: <u>Bonnyville</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	 _____	Date <u>29-Aug-2016</u>
Level 1 Primary Validation	 _____	Date <u>29-Aug-2016</u>
Level 2 Final Validation	 _____	Date <u>09-Sep-2016</u>
Level 3 Independent Data Review	 _____	Date <u>09-Sep-2016</u>
Post-Final Validation	NA _____	Date NA _____

Notes
The Post-Final Validation step serves to re-evaluate the data that errors or omissions are discovered and/or suspected after the initial submittal of data. This validation is performed on an annual basis.