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AMBIENT AIR MONITORING MONTHLY DATA REPORT
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
COLD LAKE CONTINUOUS MONITORING STATION

JOB #: 2833-2016-11-1-C

November 2016

Prepared for:

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

Attention: MIKE BISAGA

DATE: **January 09, 2017**

Prepared by:

A handwritten signature in blue ink, appearing to read "Wunmi Adekanmbi".

Wunmi Adekanmbi, M.Sc., EPT
Project Manager, Customer Service, Air Services

Reviewed by:

A handwritten signature in blue ink, appearing to read "Cheri Sinclair".

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

SUMMARY

In November 2016, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the Cold Lake Continuous Monitoring Station, near Bonnyville, Alberta. The monitoring station provides continuous meteorological measurements and air quality data for non-compliance parameters, as requested by the Lakeland Industry & Community Association.

All data collected this month was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above the 90% requirement.

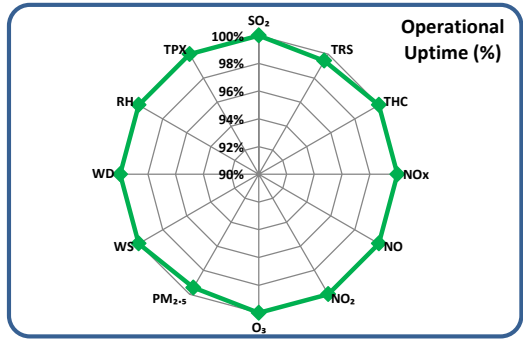
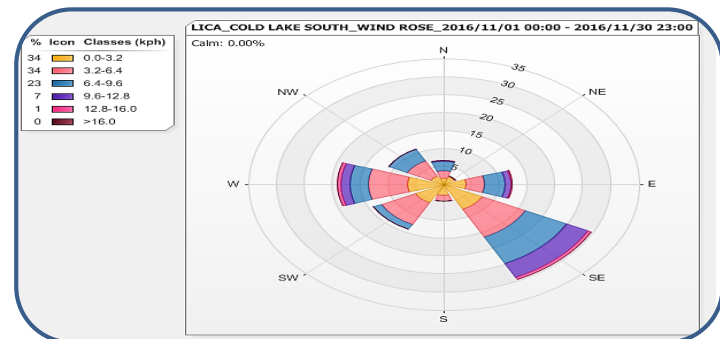
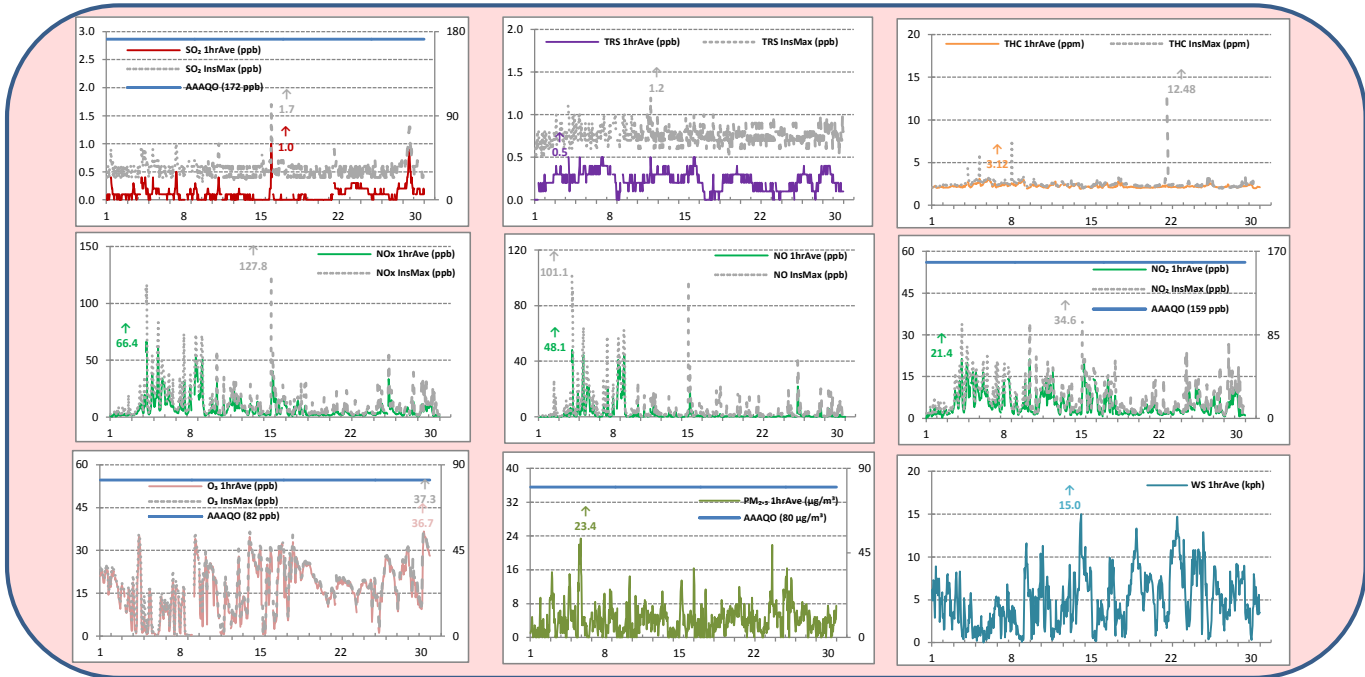
- **TRS:** Four hours of downtime were recorded on November 9, due to a repeat calibration, performed for quality assurance purposes.
- **PM_{2.5}:** Four hours of data were recorded this month at concentrations less than $-3 \mu\text{g}/\text{m}^3$, rendering the data invalid.
- **Non-Continuous Data:** Due to an equipment malfunction, there was no sample collected for PAH analysis on November 14. The passive sampler at station #11 was found damaged, therefore no data was obtained.

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 Analytics is issuing this completed report to Lakeland Industry & Community Association, Cold Lake Continuous Monitoring Station.

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.

Pollutants		Monthly Records		1-Hour Records					24-Hour Records			
Name	Unit	Avg. Conc.	Uptime	Maximum			AAAQO Objective	Exceed. Hours	Maximum		AAAQO Objective	Exceed. Days
				Conc.	Date	Hour			Conc.	Date		
SO ₂	ppb	0.1	100.0%	1.0	November 16	13	172	0	0.4	November 29	48	0
TRS	ppb	0.2	99.4%	0.5	VAR	VAR	-	-	0.4	November 7, 16	-	-
THC	ppm	2.24	100.0%	3.12	November 6	2	-	-	2.60	November 5	-	-
NOx	ppb	7.1	100.0%	66.4	November 4	7	-	-	23.3	November 5, 8	-	-
NO	ppb	2.3	100.0%	48.1	November 4	7	-	-	14.4	November 8	-	-
NO ₂	ppb	4.8	100.0%	21.4	November 4	8	159	0	10.5	November 5	-	-
O ₃	ppb	16.1	100.0%	36.7	November 30	10	82	0	26.0	November 30	-	-
PM _{2.5}	µg/m ³	4.2	99.4%	23.4	November 5	22	80	0	8.4	November 26	30	0
WS	%	1.0	100.0%	15.0	November 14	15	-	-	11.0	November 23	-	-
WD	degree	177 (S)	100.0%	-	-	-	-	-	-	-	-	-
RH	mm	81	100.0%	100	November 24, 25	VAR, 0	-	-	96	November 24	-	-
AmbTPX	°C	-0.1	100.0%	16.5	November 4	14	-	-	5.6	November 9	-	-



Monthly Update

- * All sampling, analysis, and QA/QC for this project was performed by Maxxam Analytics and complies with the Alberta Air Monitoring Directive.
- * All data collected this month were within the objectives outlined in the AMD 2016 and AAAQO 2016.
- * The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above 90%.

Operational Issues

- **TRS:** Four hours of downtime were recorded on November 9, due to a repeat calibration, performed for quality assurance purposes.
- **PM_{2.5}:** Four hours of data were recorded this month at concentrations less than -3 µg/m³, rendering the data invalid.
- **Non-Continuous Data:** Due to an equipment malfunction, there was no sample collected for PAH analysis on November 14. The passive sampler at station #11 was found damaged, therefore no data was obtained.

Monthly Continuous Data Summary

Lakeland Industry & Community Association Cold Lake Continuous Monitoring Station						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 (sector)	READING	DAY	
SO ₂ (ppb)	172	48	0	0	0.1	1.0	16	13	4.5	SW	0.4	29	100.0
TRS (ppb)	-	-	-	-	0.2	0.5	VAR	VAR	VAR	VAR	0.4	7, 16	99.4
THC (ppm)	-	-	-	-	2.24	3.12	6	2	0.9	SW	2.60	5	100.0
NO ₂ (ppb)	159	-	0	-	4.8	21.4	4	8	2.7	SE	10.5	5	100.0
NO (ppb)	-	-	-	-	2.3	48.1	4	7	1.3	SE	14.4	8	100.0
NO _x (ppb)	-	-	-	-	7.1	66.4	4	7	1.3	SE	23.3	5, 8	100.0
O ₃ (ppb)	82	-	0	-	16.1	36.7	30	10	8.0	SE	26.0	30	100.0
PM _{2.5} (µg/m ³)	80	30	0	0	4.2	23.4	5	22	0.9	E	8.4	26	99.4
RELATIVE HUMIDITY (%)	-	-	-	-	81	100	24, 25	VAR, 0	VAR 9.0	VAR SE	96	24	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	-0.1	16.5	4	14	4.4	S	5.6	9	100.0
VECTOR WS (kph)	-	-	-	-	1.0	15.0	14	15	-	W	11.0	23	100.0
VECTOR WD (sec)	-	-	-	-	177 (S)	-	-	-	-	-	-	-	100.0

NA-NOT AVAILABLE VAR-VARIOUS

Exceedance Summary Report

SO₂ 1-Hour Exceedances

Measured concentrations of sulphur dioxide were below the 1-hour AAAQO of 172 ppb.

SO₂ 24-Hour Exceedances

Measured concentrations of sulphur dioxide were below the 24-hour AAAQO of 48.0 ppb.

NO₂ 1-Hour Exceedances

Measured concentrations of nitrogen dioxide were below the 1-hour AAAQO of 159 ppb.

PM_{2.5} 1-Hour Exceedances

Measured concentrations of fine particulate matter were below the 1-hour AAAQO of 80 µg/m³.

PM_{2.5} 24-Hour Exceedances

Measured concentrations of fine particulate matter were below the 24-hour AAAQO of 30 µg/m³.

O₃ 1-Hour Exceedances

Measured concentrations of ozone were below the 1-hour AAAQO of 82 ppb.

In accordance with EPEA and the Substance Release Regulation.

In accordance with A Guide to Release Reporting and the Alberta Ambient Air Quality Objectives and Guidelines Summary.

Passive Sampler Summary

	Sulphur Dioxide (ppb)
Mean	0.4
Minimum	0.1
Maximum	1.1

Note: Access papers for stations #12 and #25 were not provided. As a result, data was not available for these stations. The sampler at station #36 was moved to station #38.

	Hydrogen Sulphide (ppb)
Mean	0.15
Minimum	0.05
Maximum	0.55

Note: Access papers for stations #12 and #25 were not provided. As a result, data was not available for these stations. The sampler at station #36 was moved to station #38.

	Nitrogen Dioxide (ppb)
Mean	2.3
Minimum	0.4
Maximum	5.0

Note: Access papers for station #12 were not provided. As a result, data was not available for this station. The sampler at station #36 was moved to station #38.

	Ozone (ppb)
Mean	18.40
Minimum	15.30
Maximum	22.90

Note: Access papers for station #12 were not provided. As a result, data was not available for this station. The sampler at station #36 was moved to station #38.

Volatile Organics (VOCs) Data Summary

Sample Collection Date	Maximum Reading (ppb)	Volatile Organic Compound
November 2, 2016	1.6	Acetone
November 8, 2016	2.45	n-Butane
November 14, 2016	4.8	Ethanol
November 20, 2016	0.75	Freon-12
November 26, 2016	2.96	n-Butane

Note: NA

Polycyclic Aromatic Hydrocarbons (PAHs) Data Summary

Sample Collection Date	Maximum Reading ($\mu\text{g}/\text{puf}$)	Semi-Volatile Organic
November 2, 2016	0.08	Indeno(1,2,3-cd)pyrene
November 8, 2016	0.56	2-Methylnaphthalene
November 14, 2016	-	-
November 20, 2016	0.17	Phenanthrene
November 26, 2016	0.49	Retene

Note: Due to an equipment malfunction, sample was not collected on November 14.

Partisol Sampler Summary

Sample Collection Date	Concentration (mg)
November 2, 2016	0.062
November 8, 2016	0.064
November 14, 2016	0.046
November 20, 2016	0.113
November 26, 2016	0.219

Note:

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1.0 Discussion

This monthly report consists of continuous monitoring results for the following 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, at a minimum, for each monthly monitoring period.

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/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%).

Trailer inspection was conducted on November 8. No issues were identified.

SULPHUR DIOXIDE (SO₂)

The routine monthly calibration was performed on November 8. There were no operational issues that impacted hourly data this month. Two hours of maximum instantaneous data were invalidated on November 15, at hour 12:00 and November 18, at hour 00:00, due to brief power outages.

TOTAL REDUCED SULPHUR (TRS)

The routine monthly calibration was performed on November 8. The calibration was repeated on November 9 for quality assurance purposes, resulting in four hours of recorded downtime. Two hours of maximum instantaneous data were invalidated on November 15, at hour 12:00 and November 18, at hour 00:00, due to brief power outages.

TOTAL HYDROCARBONS (THC)

The routine monthly calibration was performed on November 9. There were no operational issues that impacted hourly data this month. Two hours of maximum instantaneous data were invalidated on November 15, at hour 12:00 and November 18, at hour 00:00, due to brief power outages.

NITROGEN DIOXIDE (NO₂)

The routine monthly calibration was performed on November 8. There were no operational issues that impacted hourly data this month. Two hours of maximum instantaneous data were invalidated on November 15, at hour 12:00 and November 18, at hour 00:00, due to brief power outages.

OZONE (O₃)

The routine monthly calibration was performed on November 9. There were no operational issues that impacted hourly data this month. Two hours of maximum instantaneous data were invalidated on November 15, at hour 12:00 and November 18, at hour 00:00, due to brief power outages.

PARTICULATE MATTER < 2.5 MICRONS (PM_{2.5})

Two routine TEOM audits were performed this month: one was completed on November 8 and the other audit was performed on November 25. Both the inlet filter and the FDMS filter were replaced during the audits. Data was corrected in accordance with AMD (2016), Chapter 6, Table 2, *Zero Adjustment Criteria*. Data recorded between 0 and -3 µg/m³ was corrected to 0 µg/m³. Data recorded below -3 µg/m³ was invalidated. Four hours of data were invalidated as the data was below -3 µg/m³ this month.

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

The wind data is reported as vector wind speed and vector wind direction. Wind direction is defined as the direction from which the wind is blowing from and is measured in degrees from true north.

There were no operational issues that impacted hourly data this month. Two hours of maximum instantaneous data were invalidated on November 15, at hour 12:00 and November 18, at hour 00:00, due to brief power outages.

RELATIVE HUMIDITY (RH)

There were no operational issues that impacted data this month.

AMBIENT TEMPERATURE (AmbTPX)

There were no operational issues that impacted data this month.

VOC 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 November 2, 8, 14, 20 and 26. Analytical results are included in this report.

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 November 2, 8, 20 and 26. Due to an equipment malfunction, there was no sample collected on November 14. Analytical results are included in this report.

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 November 2, 8, 14, 20 and 26. Analytical results are included in this report.

PASSIVE SAMPLES

Samples were collected over the months of October and November, as scheduled. Samples were not collected at stations #12 and #25 as access documents were not provided by client. There was no sample collected at station #11 as the sampler was found damaged. 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 technician was Alexander Yakupov.

3.0 Plant Monthly Required AMD Summary

All data collected this month was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems 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 monitoring program:

- Maxxam AIR SOP-00209: Ambient Sulphur 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 - 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
- VOC - XONTECH 910A Gaseous Air Sampler
- PAH - TISCH PUF Plus Sampler 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

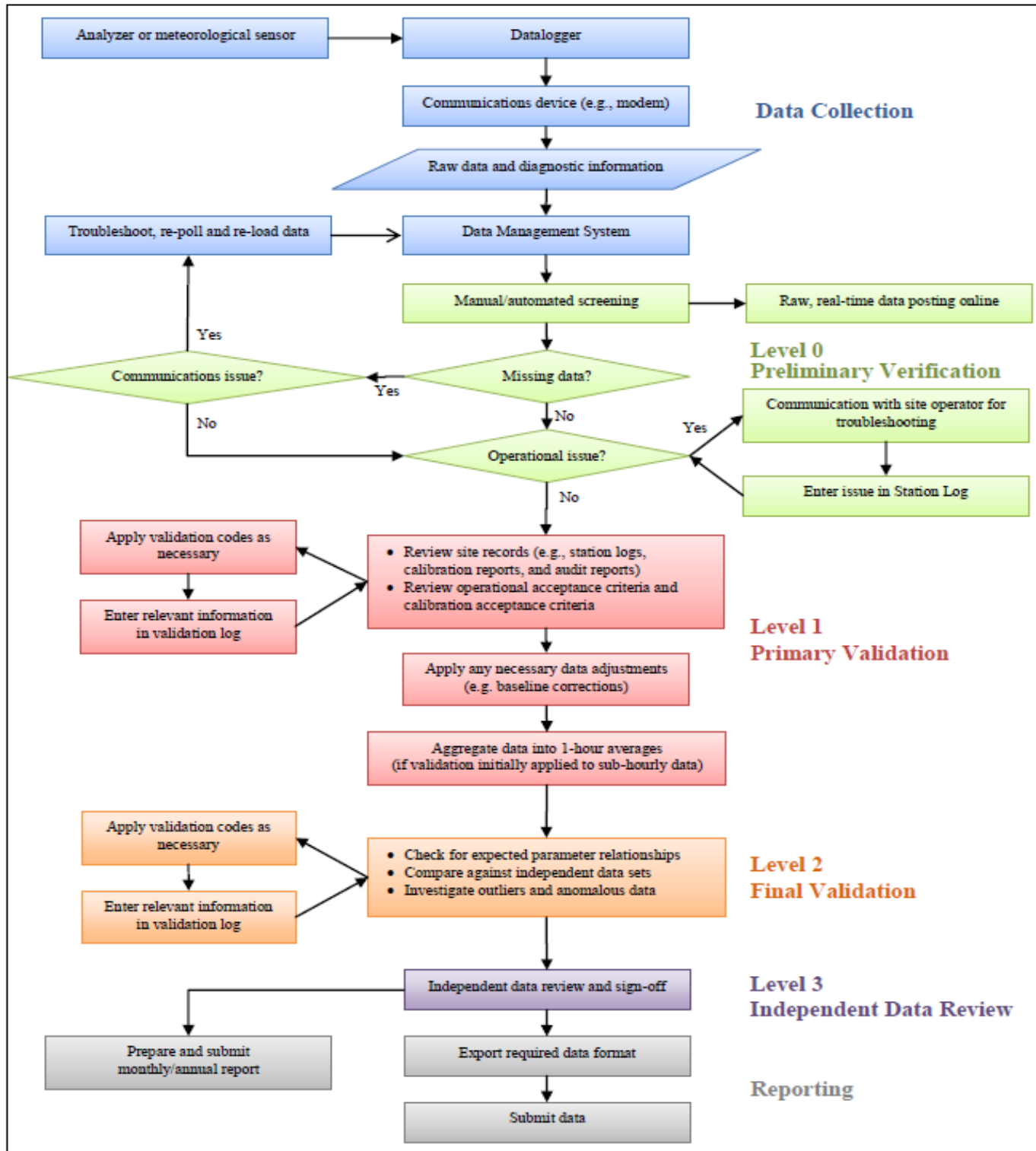
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

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.

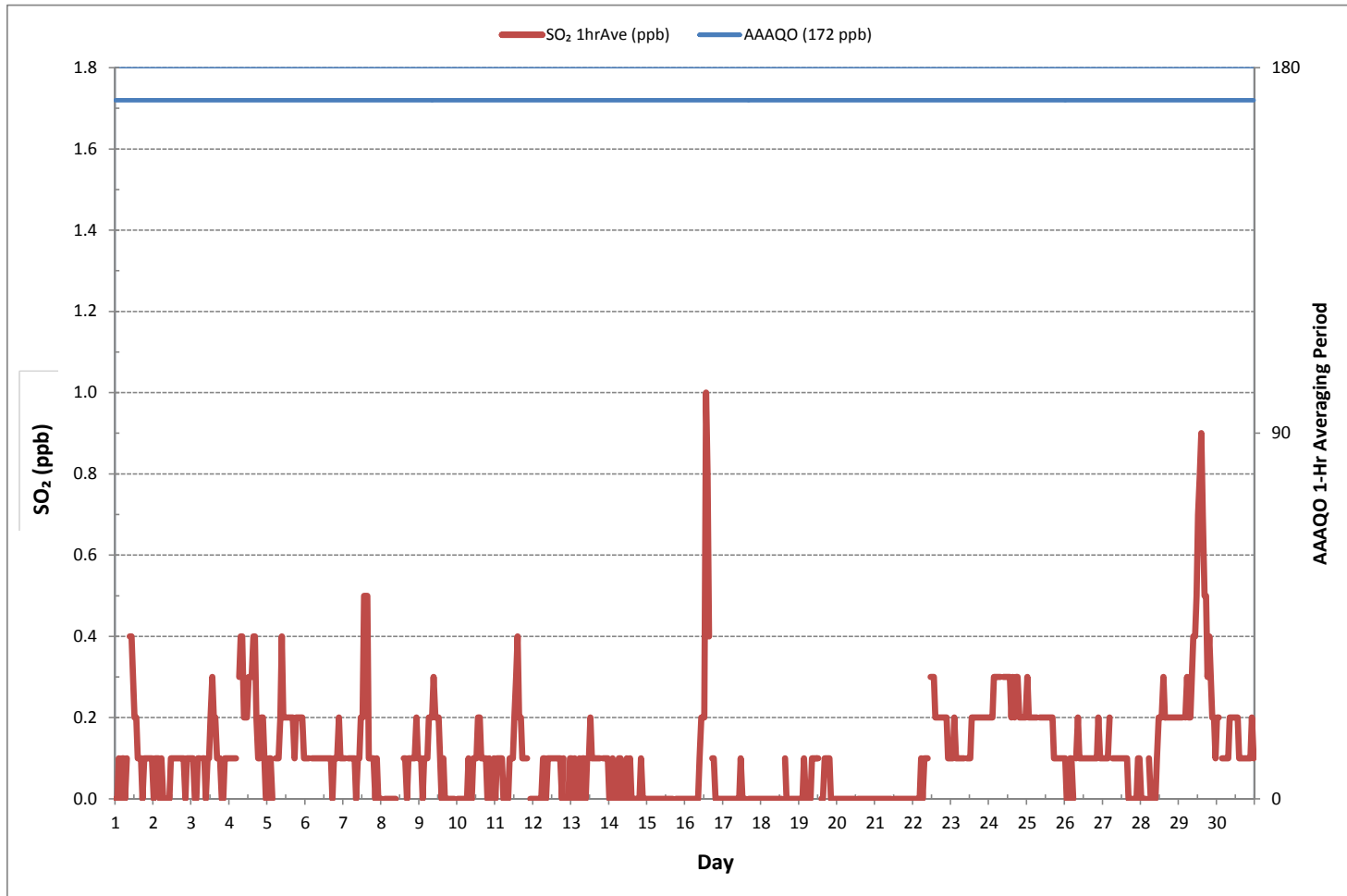


Source: Air Monitoring Directive (Aug 3, 2016), Chapter 6, Ambient Data Quality; Figure 1 Data Collection and Management Process Flow Chart

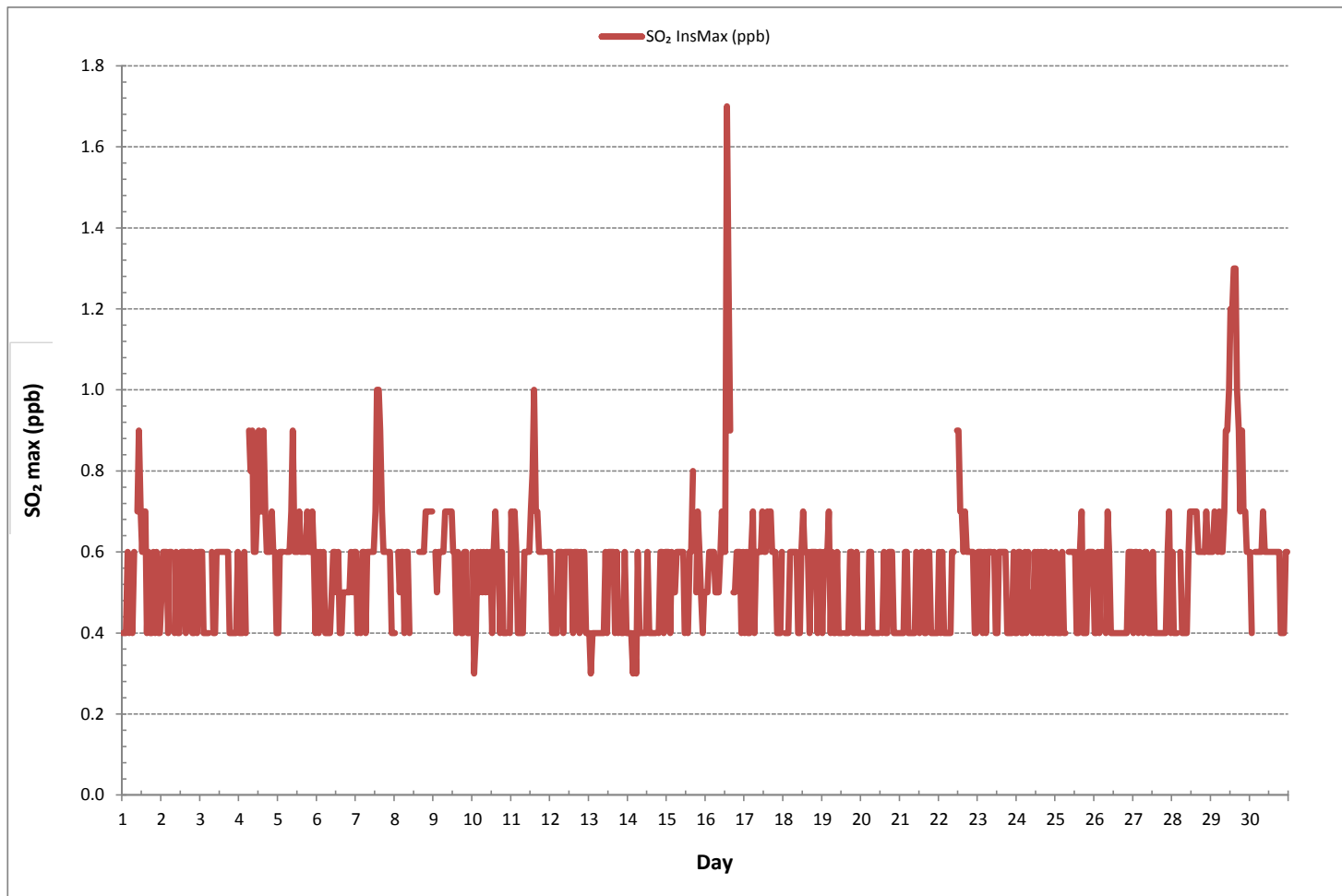
APPENDIX I
CONTINUOUS MONITORING DATA RESULTS

SULPHUR DIOXIDE

SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)



SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)

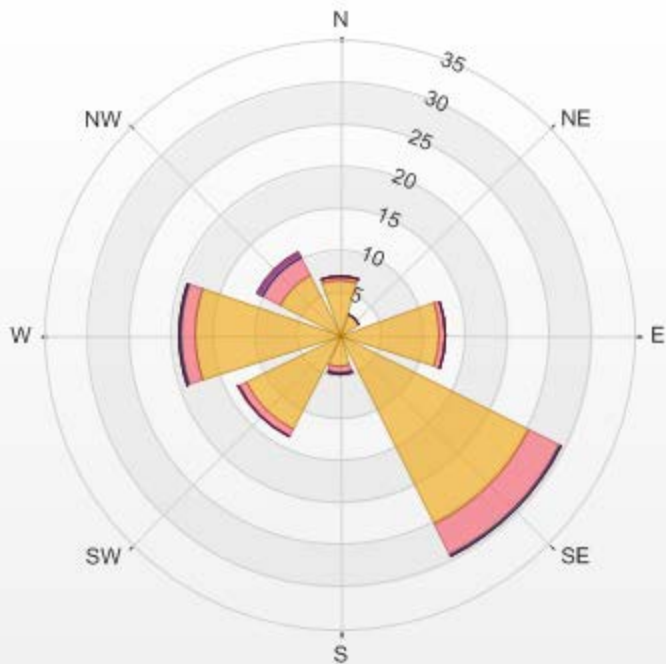


Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-SO2[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.72% Calm Avg: 0.00 [ppb]

Direction	0.0-0.2	0.2-0.4	0.4-0.7	0.7-0.9	0.9-1.1	>1.1	Total
N	6.45	0.59	0	0	0	0	7.04
NE	2.64	0	0	0	0	0	2.64
E	11.88	0.59	0	0	0	0	12.47
SE	25.07	4.11	0.15	0	0	0	29.33
S	3.81	0.59	0.29	0	0	0	4.69
SW	12.46	1.03	0	0	0.15	0	13.64
W	17.16	1.61	0.29	0.15	0	0	19.21
NW	8.06	2.2	0.15	0.44	0.15	0	11
Summary	87.53	10.72	0.88	0.59	0.3	0	100

% Icon	Classes (ppb)	88	 0.0-0.2	11	 0.2-0.4	1	 0.4-0.7	1	 0.7-0.9	0	 0.9-1.1	0	 >1.1
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LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-SO2[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



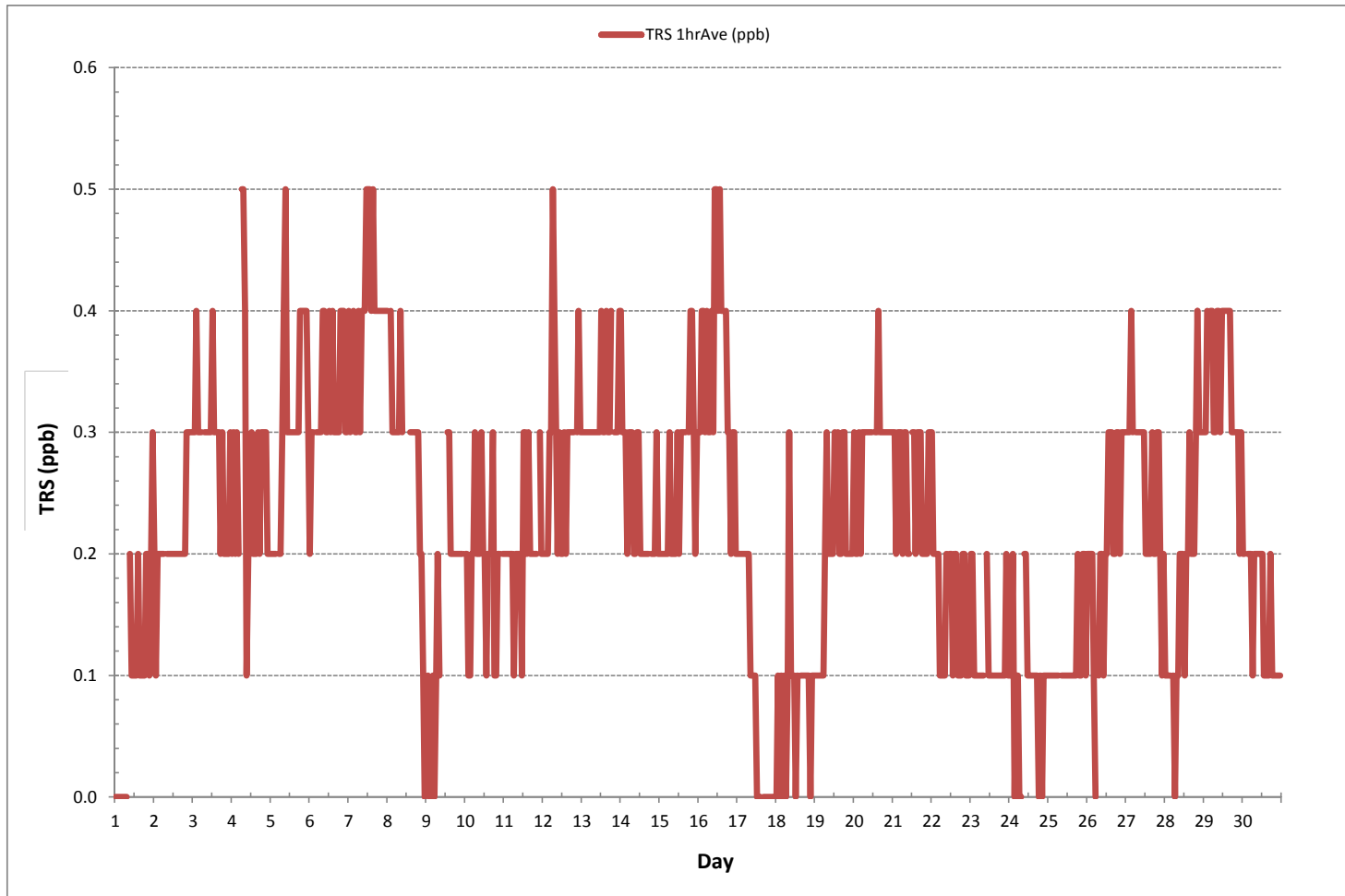
SO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 2016/11 Type: Span



Span Meas Span Ref Span Low Span High

TOTAL REDUCED SULPHUR

TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)





TOTAL REDUCED SULPHUR Instantaneous Maximum (TRS ppb)

Table with 28 columns (HR START, HR END, 24 hours of readings, DAILY MIN, DAILY MAX, 24-HR AVG, RDGS.) and 30 rows (DAY 1-30, HOURLY MAX, HOURLY AVG).

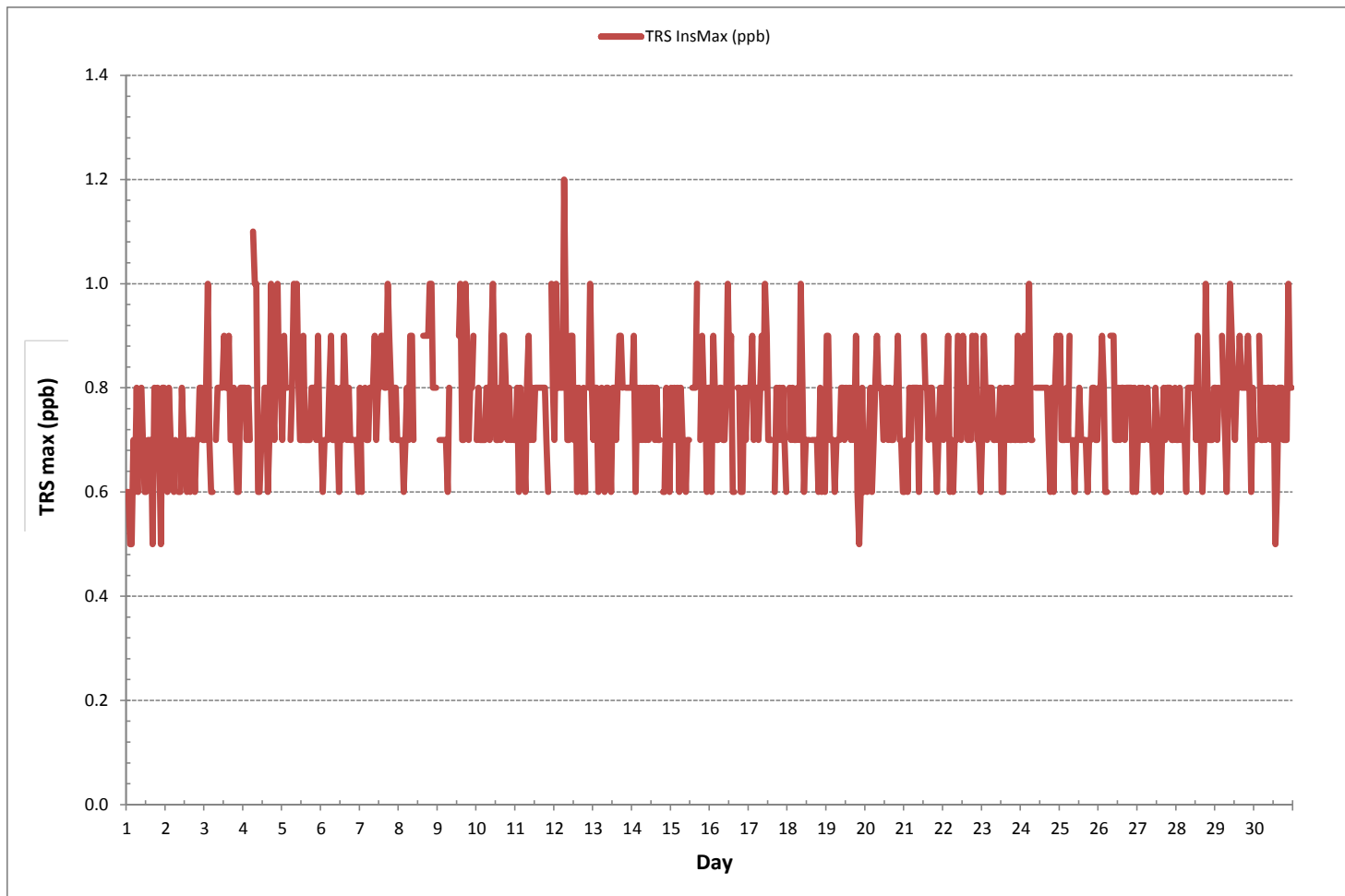
STATUS FLAG CODES

Table with 2 columns listing codes and their meanings: C, C1, Y, S, S1, Q, R, X, G, P.

MONTHLY SUMMARY

Summary table with 2 columns: LABEL and VALUE. Includes: NUMBER OF NON-ZERO READINGS: 677, MAXIMUM INSTANTANEOUS VALUE: 1.2 ppb @ HOUR(S) 6 ON DAY(S) 12, IZS CALIBRATION TIME: 31 hrs, OPERATIONAL TIME: 713 hrs.

TOTAL REDUCED SULPHUR Instantaneous Maximum (TRS ppb)



Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-TRS[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.03% Calm Avg: 0.00 [ppb]

Direction	0-0.183	0.183-0.367	0.367-0.55	>0.6	Total
N	2.36	4.43	0.15	0	6.94
NE	0.3	1.62	0.74	0	2.66
E	1.03	10.49	1.03	0	12.55
SE	15.95	11.82	1.77	0	29.54
S	1.77	2.66	0.3	0	4.73
SW	2.95	9.01	1.48	0	13.44
W	6.2	11.67	1.18	0	19.05
NW	4.73	5.02	1.33	0	11.08
Summary	35.29	56.72	7.98	0	100

% Icon Classes (ppb)

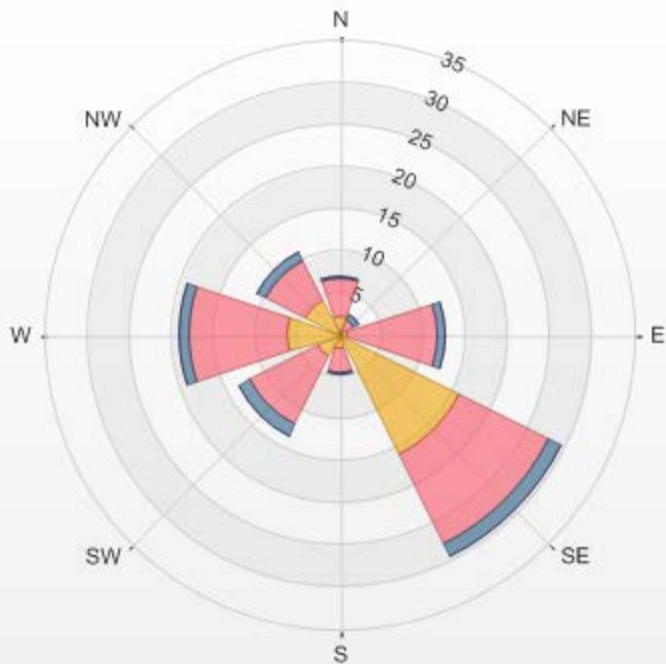
35 0-0.183

57 0.183-0.367

8 0.367-0.55

0 >0.6

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-TRS[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%





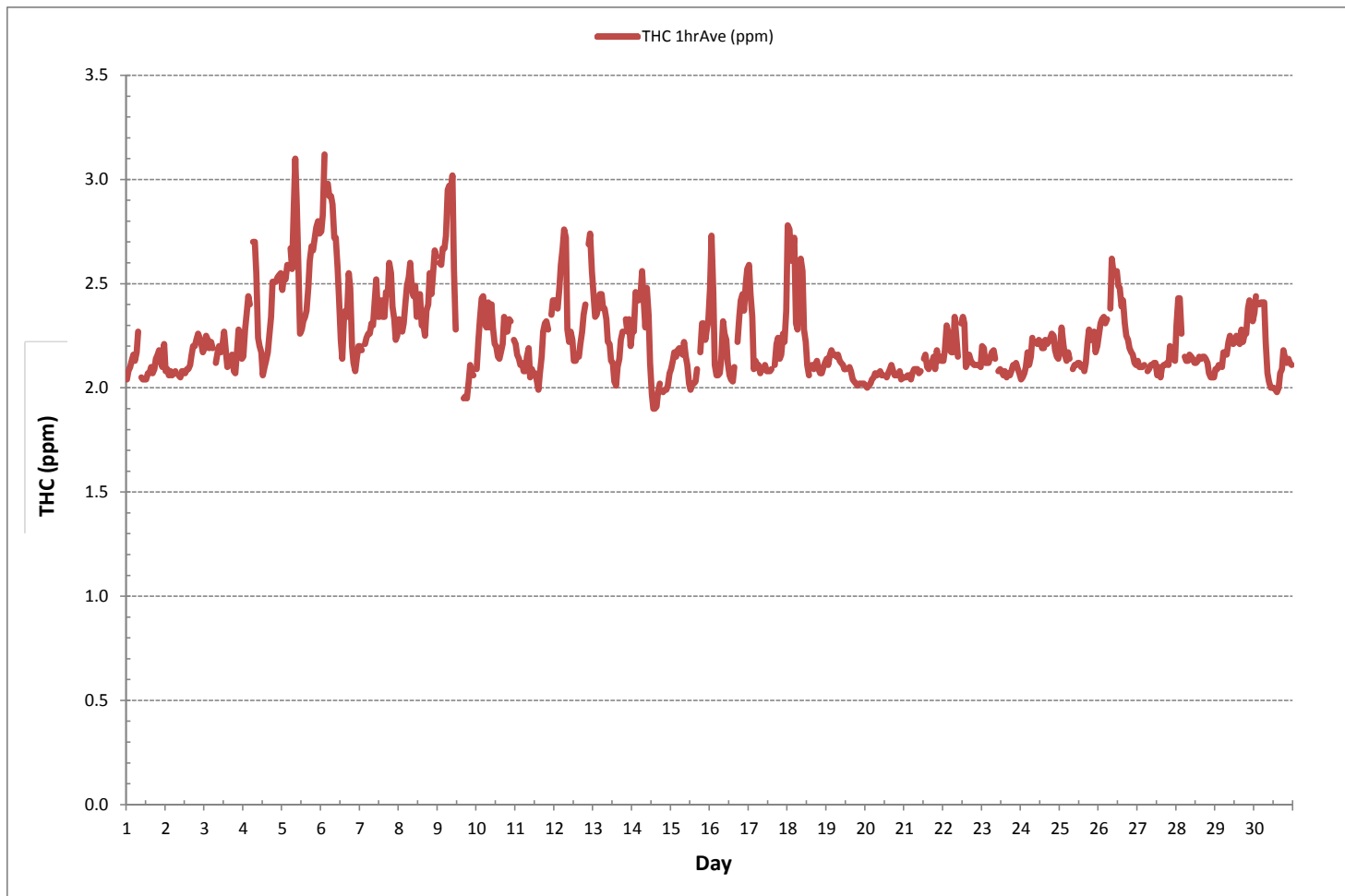
■ Span Meas
 — Span Ref
 — Span Low
 — Span High

TOTAL HYDROCARBON

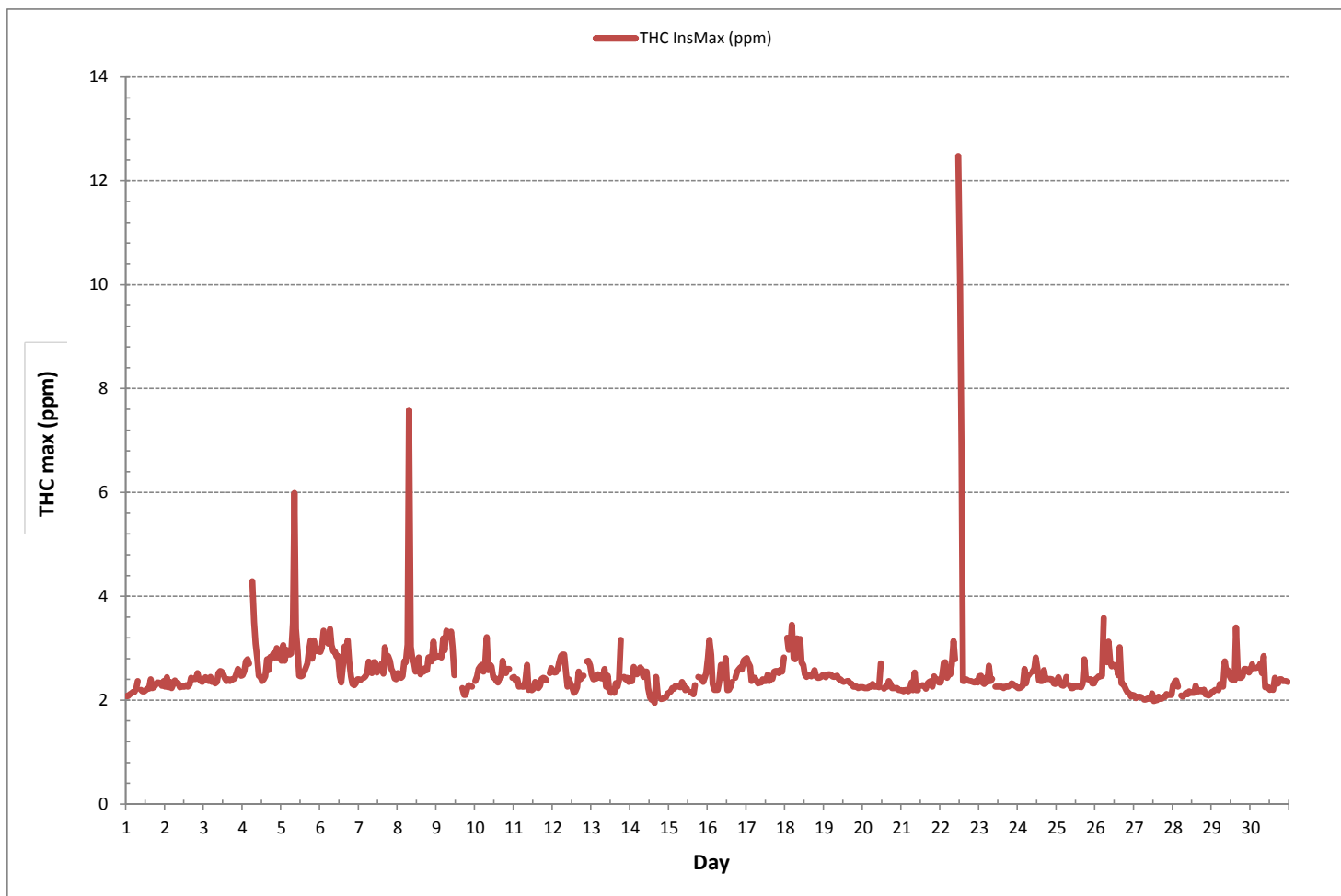


LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake Continuous Monitoring Station - November 2016

TOTAL HYDROCARBONS Hourly Averages (THC ppm)



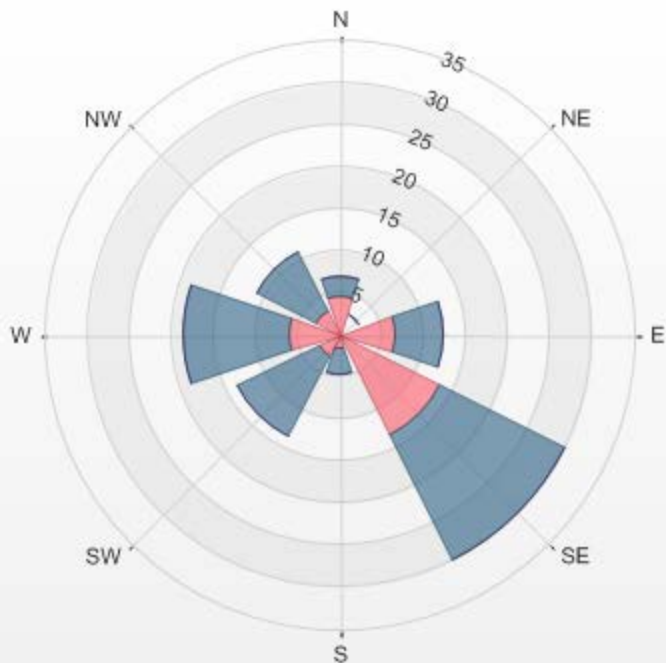
TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)



Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-THC[ppm] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.86% Calm Avg: 0.00 [ppm]

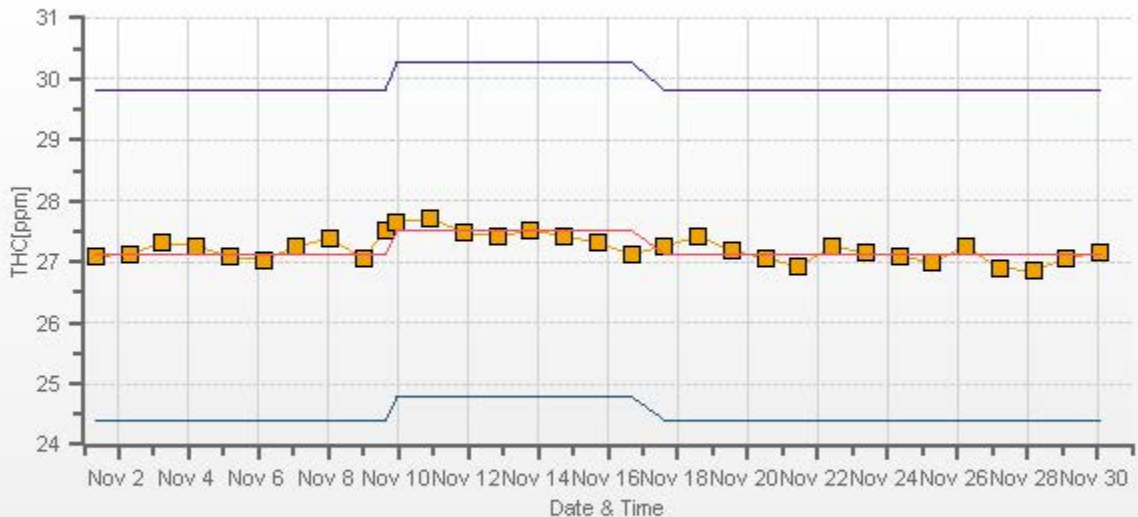
Direction	0.0-1.1	1.1-2.1	2.1-3.2	>3.2	Total
N	0	4.69	2.34	0	7.03
NE	0	0.15	2.49	0	2.64
E	0	6.73	5.71	0	12.44
SE	0	13.18	16.69	0	29.87
S	0	1.76	3.07	0	4.83
SW	0	2.78	10.83	0	13.61
W	0	6	12.59	0	18.59
NW	0	3.22	7.76	0	10.98
Summary	0	38.51	61.48	0	100

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-THC[ppm] 01/11/2016 00:00 - 30/11/2016 23:00
 Calm: 0.00%



% Icon Classes (ppm) 0 0.0-1.1 39 1.1-2.1 61 2.1-3.2 0 >3.2

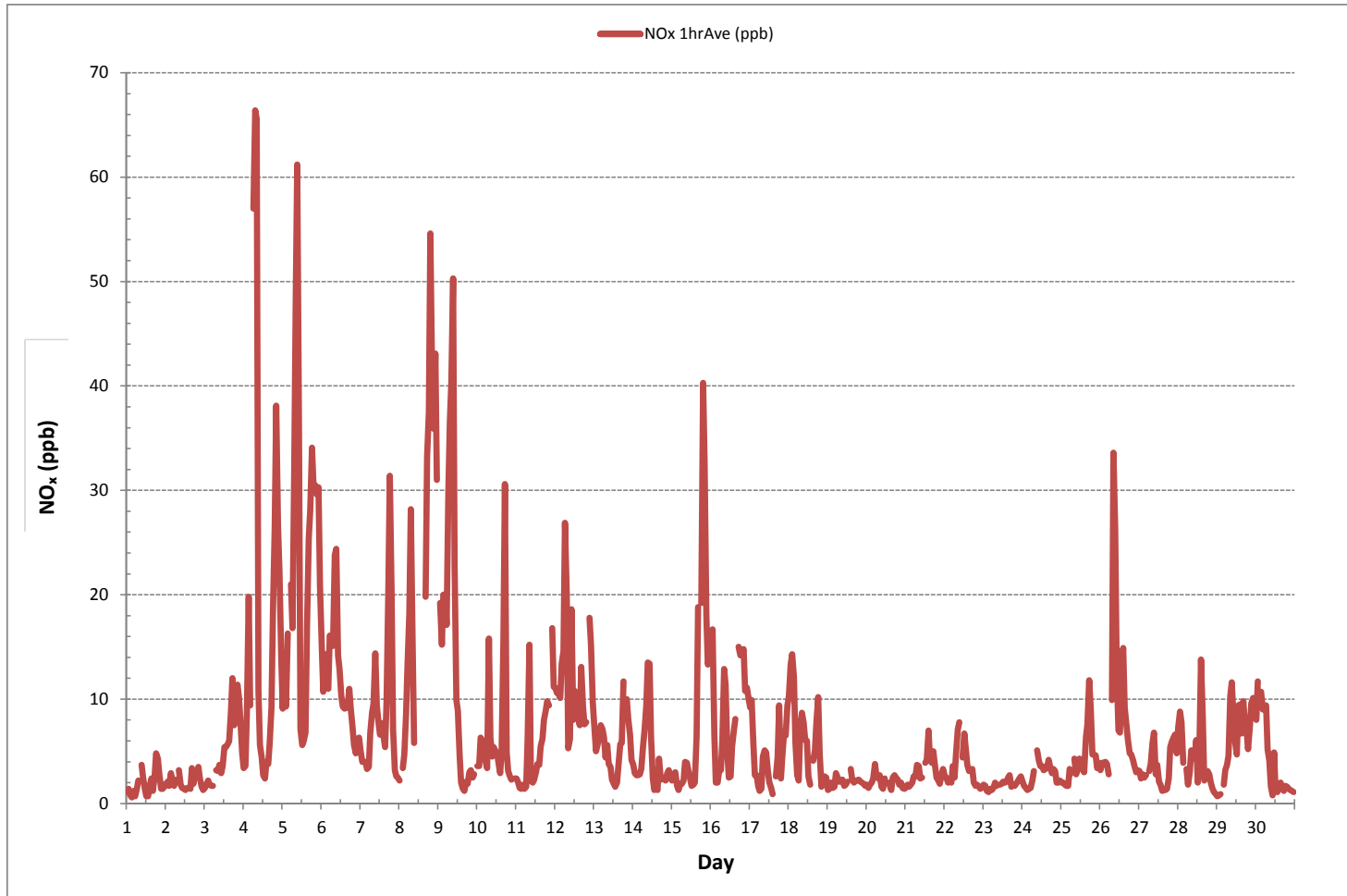
THC[ppm] Calibration: LICA COLD LAKE SOUTH Monthly: 2016/11 Type: Span



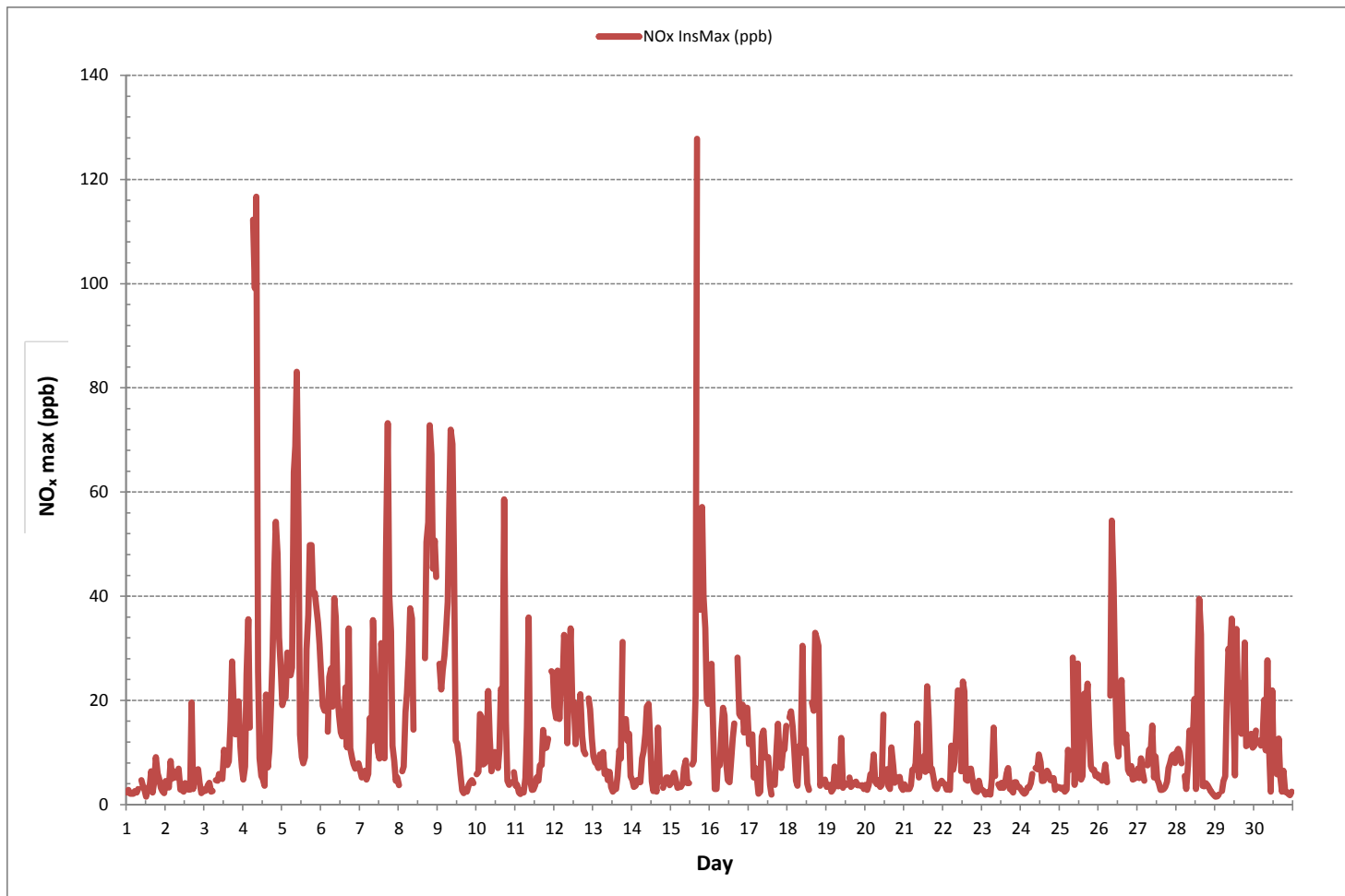
■ Span Meas
 — Span Ref
 — Span Low
 — Span High

OXIDES OF NITROGEN

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)



OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)

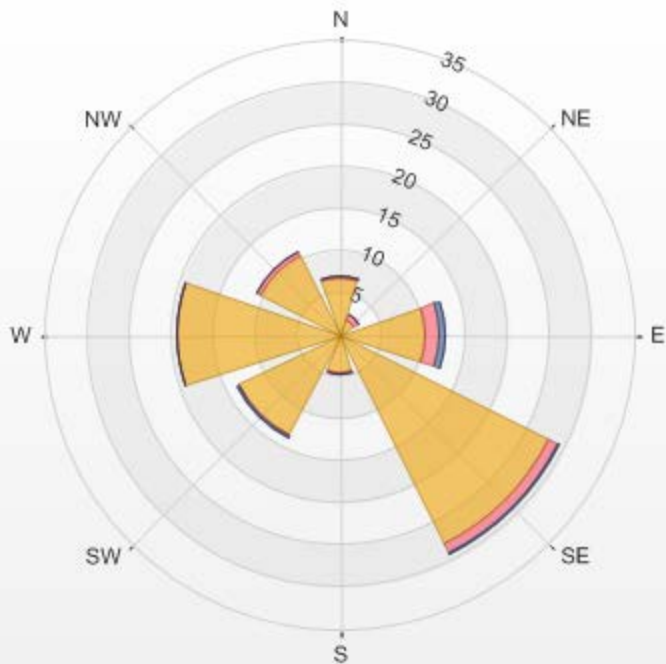


Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NOX[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr
 Calm: 0.00% Valid Data: 94.58% Calm Avg: 0.00 [ppb]

Direction	0.0-22.2	22.2-44.3	44.3-66.5	>66.5	Total
N	6.75	0.29	0	0	7.04
NE	1.91	0.73	0	0	2.64
E	10.13	1.76	0.59	0	12.48
SE	27.75	1.17	0.29	0	29.21
S	4.55	0.15	0	0	4.7
SW	13.36	0.15	0.15	0	13.66
W	19.24	0	0	0	19.24
NW	10.57	0.44	0	0	11.01
Summary	94.26	4.69	1.03	0	100

% Icon Classes (ppb) 94 0.0-22.2 5 22.2-44.3 1 44.3-66.5 0 >66.5

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NOX[ppb] 01/11/2016 00:00 - 30/11/2016 23:00
Calm: 0.00%



NOX[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 2016/11 Type: Span



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

NITRIC OXIDES



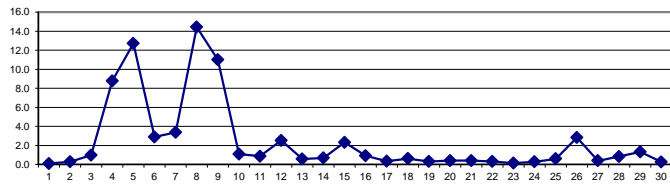
NITRIC OXIDE Hourly Averages (NO ppb)

Table with columns for HR START (MST), HR END (MST), DAY, and hourly NO ppb readings from 0:00 to 23:59. Includes summary rows for HOURLY MAX and HOURLY AVG.

STATUS FLAG CODES

Legend table mapping status codes (C, C1, Y, S, S1, Q, R, X, G, P) to their respective meanings like MONTHLY CALIBRATION, REPEAT CALIBRATION, etc.

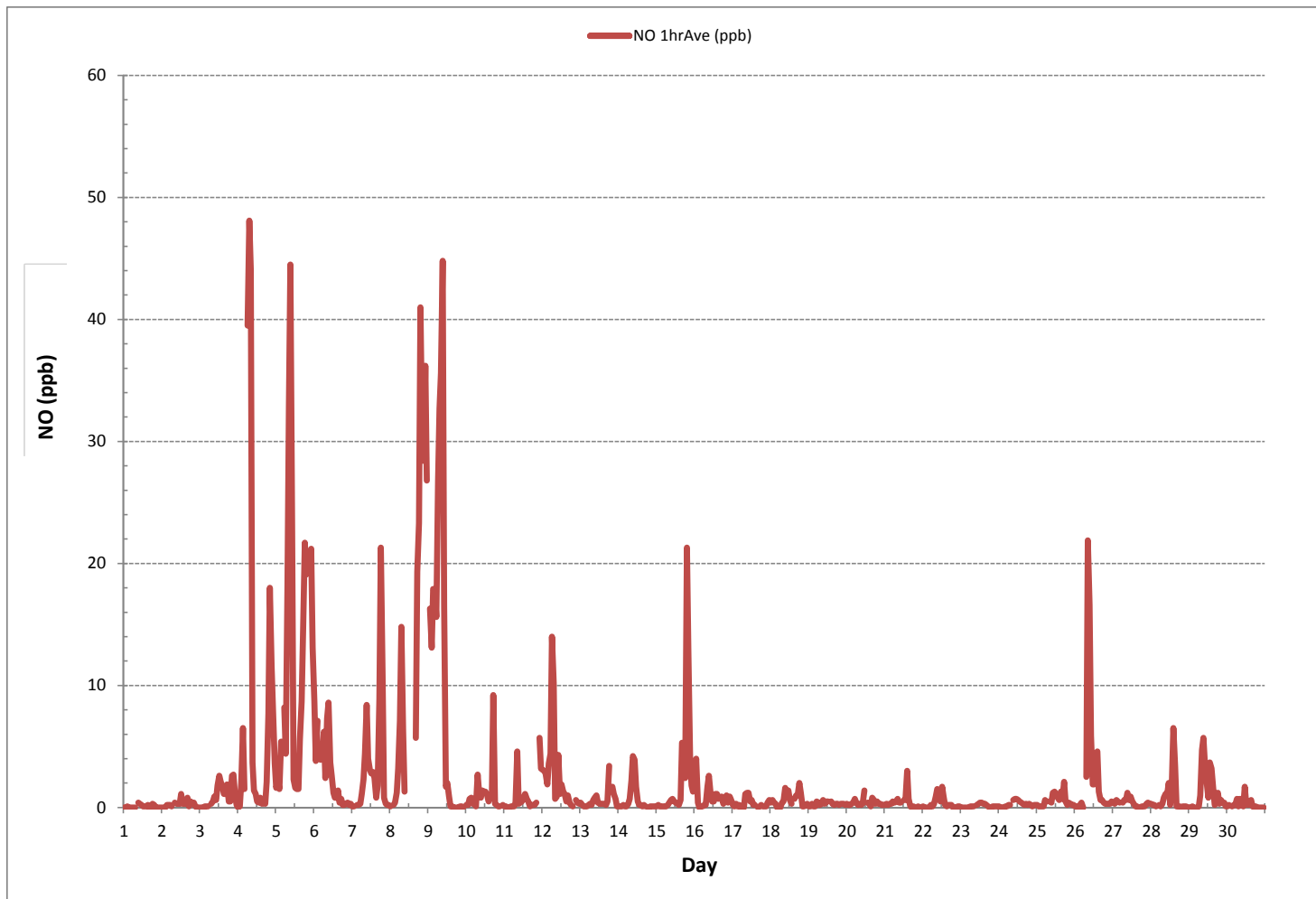
24 HR AVERAGES November 2016



MONTHLY SUMMARY

Summary table listing statistics: NUMBER OF NON-ZERO READINGS (606), MINIMUM/MAXIMUM 1-HR and 24-HR AVERAGES, IZS CALIBRATION TIME, MONTHLY CALIBRATION TIME, STANDARD DEVIATION, OPERATIONAL TIME, and MONTHLY AVERAGE.

NITRIC OXIDE Hourly Averages (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake Continuous Monitoring Station - November 2016

NITRIC OXIDE Instantaneous Maximum (NO ppb)

Table with 30 rows (DAY 1-30) and 28 columns (HR START (MST) 0:00-23:00, DAILY MIN., DAILY MAX., 24-HR AVG., RDGS.). Contains nitric oxide concentration data with status flags (S, C, P) indicating calibration, maintenance, or power issues.

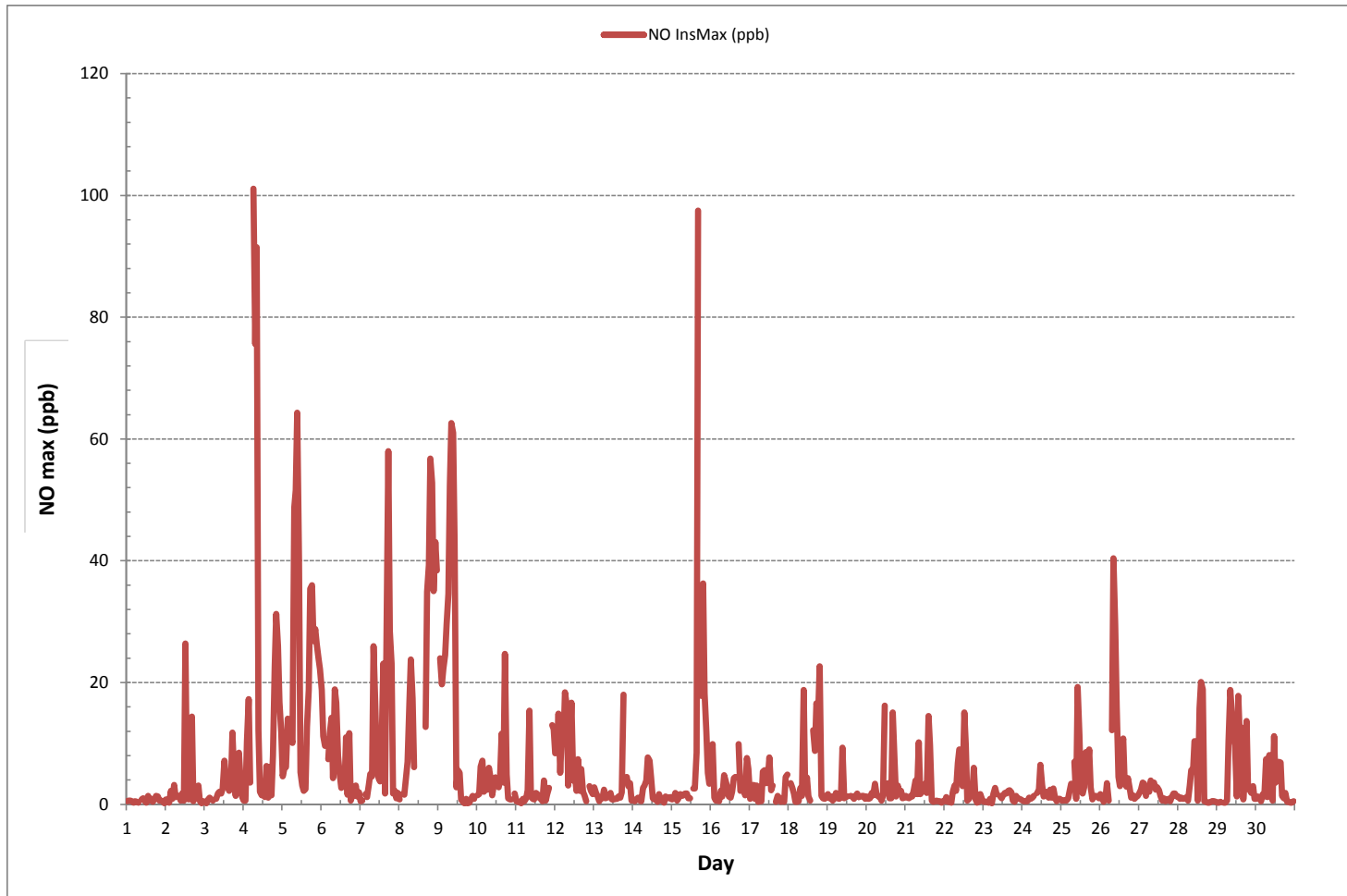
STATUS FLAG CODES

Legend for status flag codes: C - MONTHLY CALIBRATION, C1 - REPEAT CALIBRATION, Y - MAINTENANCE, S - DAILY ZERO/SPAN CHECK, S1 - REPEAT ZERO/SPAN CHECK, Q - QUALITY ASSURANCE, R - RECOVERY, X - MACHINE MALFUNCTION, G - OUT FOR REPAIR, P - POWER FAILURE.

MONTHLY SUMMARY

Summary statistics for the month: NUMBER OF NON-ZERO READINGS: 681, MAXIMUM INSTANTANEOUS VALUE: 101.1 ppb @ HOUR(S) 6 ON DAY(S) 4, VARIOUS (VAR-VARIOUS), IZS CALIBRATION TIME: 31 hrs, MONTHLY CALIBRATION TIME: 6 hrs, STANDARD DEVIATION: 11.5, OPERATIONAL TIME: 718 hrs.

NITRIC OXIDE Instantaneous Maximum (NO ppb)

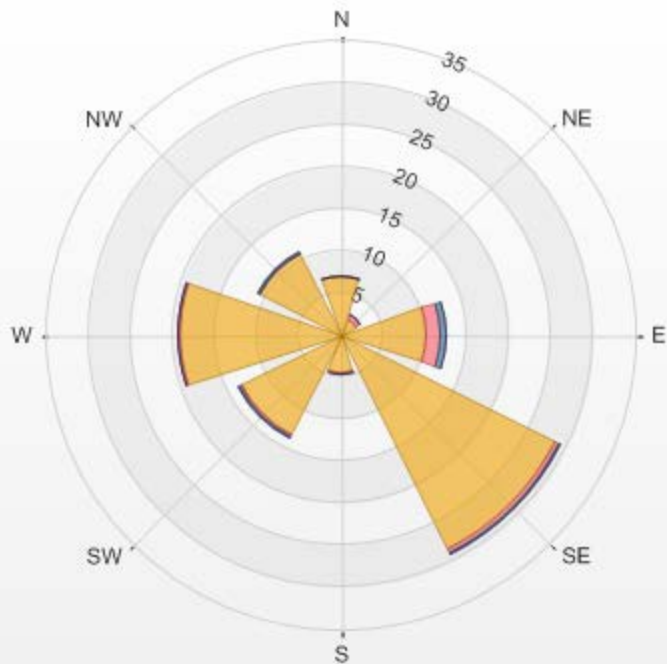


Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.58% Calm Avg: 0.00 [ppb]

Direction	0.0-16.1	16.1-32.1	32.1-48.2	>48.2	Total
N	6.9	0	0.15	0	7.05
NE	2.06	0.59	0	0	2.65
E	10.28	1.47	0.73	0	12.48
SE	28.49	0.44	0.29	0	29.22
S	4.55	0.15	0	0	4.7
SW	13.22	0.29	0.15	0	13.66
W	19.09	0.15	0	0	19.24
NW	10.72	0.15	0.15	0	11.02
Summary	95.31	3.24	1.47	0	100

% Icon Classes (ppb) 95 0.0-16.1 3 16.1-32.1 1 32.1-48.2 0 >48.2

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



NITROGEN DIOXIDE

NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)

HR START (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-HR AVG.	RDGS.
HR END (MST)	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	1.1	1.3	0.8	0.6	1.2	0.7	1.4	2.1	S	3.3	2.2	1.2	0.7	0.7	1.5	2.1	1.2	2.6	4.5	4.0	2.8	1.4	1.4	1.8	0.6	4.5	1.8	24
2	1.9	2.1	1.7	2.7	2.1	1.5	2.2	S	2.8	1.5	1.2	1.1	0.2	1.2	1.2	1.1	2.7	1.9	2.4	2.3	3.2	2.3	1.6	1.3	0.2	3.2	1.8	24
3	1.4	1.8	2.1	1.7	1.6	1.7	S	2.9	2.6	2.7	2.3	1.9	2.9	3.3	3.9	4.9	7.7	10.1	7.1	9.1	8.8	7.5	6.5	4.6	1.4	10.1	4.3	24
4	3.4	3.5	6.9	13.4	7.8	S	17.5	18.3	21.4	7.1	4.2	3.3	2.2	2.0	3.2	3.5	5.4	8.9	16.4	18.8	20.0	15.0	14.3	10.4	2.0	21.4	9.9	24
5	7.5	11.5	7.8	10.9	S	12.8	12.5	13.9	15.3	16.7	12.7	4.8	4.0	4.5	5.3	11.2	16.6	13.6	12.4	11.3	10.8	9.5	9.1	7.8	4.0	16.7	10.5	24
6	6.4	6.9	7.2	S	7.1	11.0	9.5	12.7	16.5	15.7	10.6	10.4	9.0	8.4	8.3	7.8	8.8	10.3	8.9	7.0	5.4	4.4	5.8	6.0	4.4	16.5	8.9	24
7	5.0	3.9	S	3.8	3.1	3.2	5.7	6.5	5.2	6.1	5.4	4.6	3.8	4.9	4.3	4.6	7.9	11.5	10.1	9.4	6.2	2.9	2.4	2.3	2.3	11.5	5.3	24
8	2.0	S	3.1	4.3	7.4	10.2	11.1	13.3	9.1	4.5	C	C	C	C	C	C	14.1	13.9	14.2	13.6	10.7	7.5	6.9	4.2	2.0	14.2	8.8	24
9	S	2.8	2.1	2.1	2.3	1.5	3.2	3.9	4.8	5.5	6.3	8.2	6.9	3.7	1.9	1.3	1.2	2.0	1.9	3.0	3.2	2.4	2.7	S	1.2	8.2	3.3	24
10	3.4	3.5	5.6	5.3	5.0	3.6	3.3	13.1	5.1	3.6	4.0	3.6	3.6	2.9	2.4	4.1	14.7	21.3	4.6	2.9	2.4	2.2	S	2.3	2.2	21.3	5.3	24
11	2.3	2.0	1.5	1.4	1.8	1.4	1.5	6.0	10.6	1.9	1.6	1.8	2.2	2.7	3.0	5.0	6.0	7.7	8.7	9.6	9.0	S	11.2	8.0	1.4	11.2	4.6	24
12	8.0	7.7	7.8	8.2	9.8	10.2	12.9	9.9	4.6	5.3	14.3	6.9	8.9	7.6	7.1	7.0	12.2	8.9	7.4	7.7	S	17.3	14.8	9.4	4.6	17.3	9.3	24
13	7.1	4.8	5.5	6.3	7.4	6.9	6.0	4.2	5.0	3.1	2.5	1.9	1.6	1.3	1.7	3.4	5.5	5.3	8.3	S	8.3	7.0	5.9	4.1	1.3	8.3	4.9	24
14	3.6	2.8	2.6	2.5	2.7	3.2	5.2	6.3	7.2	9.3	9.5	4.7	2.0	1.1	1.4	1.2	4.1	2.2	S	2.4	2.1	2.7	3.1	2.2	1.1	9.5	3.7	24
15	2.1	2.7	2.8	1.6	1.2	1.8	1.8	2.0	3.6	3.3	2.5	1.9	1.4	1.5	1.8	5.8	13.5	S	16.8	19.0	20.0	13.9	11.5	12.6	1.2	20.0	6.3	24
16	12.0	12.7	6.2	1.9	1.9	3.0	3.0	5.8	11.2	8.9	3.6	2.0	2.1	4.3	5.8	7.5	S	14.1	13.9	13.6	13.8	10.4	10.2	9.6	1.9	14.1	7.7	24
17	9.1	9.8	5.4	2.6	2.5	1.7	1.2	1.3	3.4	3.9	3.7	2.5	1.4	1.2	0.7	S	2.5	4.4	9.2	2.3	4.5	6.8	6.1	8.9	0.7	9.8	4.1	24
18	9.9	12.7	13.9	11.8	5.9	2.7	2.1	7.2	8.1	6.2	5.1	4.5	2.0	1.5	S	3.4	4.1	6.7	8.2	3.6	1.5	2.1	2.4	2.2	1.5	13.9	5.6	24
19	1.2	1.3	1.7	1.4	1.4	2.4	2.1	1.8	1.9	1.7	1.4	1.4	1.6	S	2.8	1.9	1.7	1.9	1.9	2.0	1.8	1.7	1.6	1.5	1.2	2.8	1.7	24
20	1.6	1.3	1.6	1.7	2.1	3.1	2.2	2.2	2.4	1.4	1.1	1.0	S	1.6	1.5	1.2	1.7	2.1	2.2	1.8	1.5	1.6	1.2	1.1	1.0	3.1	1.7	24
21	1.3	1.5	1.4	1.4	1.7	2.1	2.2	3.2	2.9	2.0	2.1	S	3.3	3.6	4.1	3.5	3.8	5.0	3.5	2.5	2.1	1.9	2.8	3.3	1.3	5.0	2.7	24
22	2.5	2.4	2.0	2.3	2.0	3.3	2.4	4.5	6.2	6.3	S	3.9	5.0	4.3	3.5	3.0	3.0	3.0	1.7	1.7	1.8	1.6	1.3	1.5	1.3	6.3	3.0	24
23	1.8	1.7	1.2	1.1	1.4	1.3	1.4	1.9	1.6	S	1.6	1.6	1.7	1.6	1.8	2.2	2.5	1.6	1.8	1.7	1.8	2.0	2.3	2.4	1.1	2.5	1.7	24
24	2.0	1.7	1.4	1.3	1.3	1.4	2.0	3.0	S	4.5	3.4	2.9	2.9	2.7	2.9	3.1	3.9	3.2	2.8	3.0	2.9	1.9	1.9	2.0	1.3	4.5	2.5	24
25	1.9	1.9	1.7	1.5	1.6	2.7	2.5	S	3.8	2.4	2.3	3.0	3.1	2.4	2.4	5.0	6.9	9.7	8.7	4.6	4.3	4.3	3.2	3.7	1.5	9.7	3.6	24
26	3.1	3.7	3.9	3.8	3.4	2.8	S	7.4	11.7	9.6	6.9	5.1	5.0	9.0	10.3	7.9	6.9	5.5	4.5	4.3	3.9	3.3	2.7	2.7	2.7	11.7	5.5	24
27	2.7	2.1	2.3	1.9	2.3	S	2.7	3.2	5.2	5.6	2.3	2.9	1.6	1.5	1.1	1.2	1.2	1.4	2.3	5.3	5.8	6.0	6.2	4.5	1.1	6.2	3.1	24
28	7.0	8.6	7.6	3.8	S	3.1	1.7	2.7	4.4	3.7	3.2	4.1	1.8	3.7	7.3	4.9	2.2	2.5	3.0	2.7	2.0	1.3	1.0	0.9	0.9	8.6	3.6	24
29	0.7	0.8	0.8	S	1.7	3.2	3.6	3.6	5.5	5.9	4.8	3.9	3.9	5.7	6.2	4.9	9.6	7.4	5.8	4.9	6.7	9.2	9.7	8.3	0.7	9.7	5.1	24
30	7.9	11.5	S	10.5	8.8	9.1	8.7	5.0	3.4	1.5	0.7	3.2	1.0	1.0	1.0	1.3	1.5	1.2	1.6	1.5	1.4	1.3	1.2	1.0	0.7	11.5	3.7	24
HOURLY MAX	12.0	12.7	13.9	13.4	9.8	12.8	17.5	18.3	21.4	16.7	14.3	10.4	9.0	9.0	10.3	11.2	16.6	21.3	16.8	19.0	20.0	17.3	14.8	12.6				
HOURLY AVG	4.1	4.5	3.9	4.0	3.5	4.0	4.7	6.0	6.6	5.3	4.3	3.5	3.1	3.2	3.5	4.1	6.0	6.5	6.7	6.1	5.8	5.2	5.2	4.5				

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

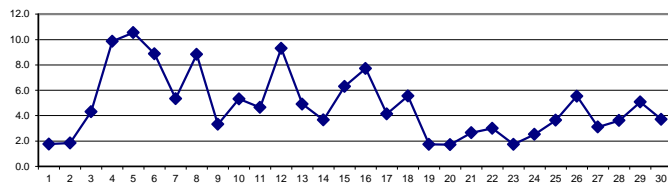
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

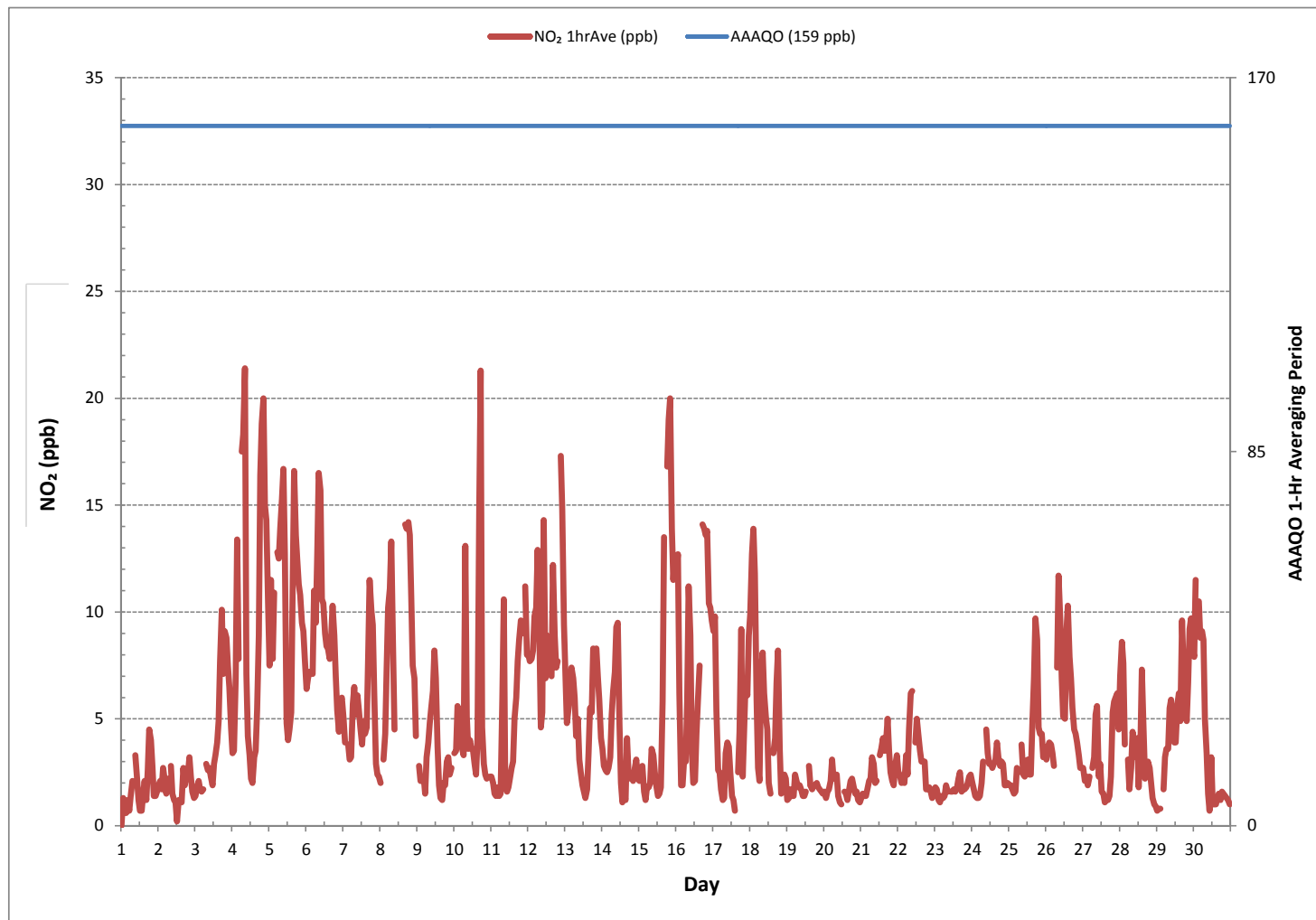
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	683				
MINIMUM 1-HR AVERAGE:	0.2 ppb	@ HOUR(S)	12	ON DAY(S)	2
MAXIMUM 1-HR AVERAGE:	21.4 ppb	@ HOUR(S)	8	ON DAY(S)	4
MAXIMUM 24-HR AVERAGE:	10.5 ppb			ON DAY(S)	5
				VAR-VARIOUS	
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	720 hrs		
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	100.0 %		
STANDARD DEVIATION:	3.9	MONTHLY AVERAGE:	4.8 ppb		

24 HR AVERAGES November 2016



NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake Continuous Monitoring Station - November 2016

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)

HR START (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-HR AVG.	RDGS.
HR END (MST)	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	1.8	2.2	1.6	1.4	1.9	1.9	1.9	2.8	S	4.1	2.7	2.2	1.1	1.9	2.3	5.3	2.0	4.4	7.6	5.2	4.2	2.4	2.2	2.6	1.1	7.6	2.9	24
2	3.8	3.9	2.9	6.3	4.1	3.1	4.0	S	5.6	2.2	1.9	1.8	2.0	2.3	2.0	2.0	5.6	2.4	4.4	3.9	4.5	3.9	1.9	2.3	1.8	6.3	3.3	24
3	2.2	2.3	2.9	3.1	2.0	2.0	S	3.8	3.2	3.9	3.5	2.7	4.2	4.5	5.6	6.2	13.8	16.3	13.7	12.5	13.6	12.5	8.5	6.1	2.0	16.3	6.5	24
4	4.4	6.9	14.6	19.0	12.5	S	25.6	23.4	34.0	13.6	6.7	4.0	3.8	2.7	14.8	6.4	9.4	17.9	21.3	22.7	25.9	23.3	19.0	15.8	2.7	34.0	15.1	24
5	14.4	14.6	16.3	15.3	S	15.4	16.1	17.5	18.7	21.0	16.2	8.0	6.2	5.6	6.8	17.7	18.3	17.7	15.9	13.9	13.5	11.6	11.0	9.9	5.6	21.0	14.0	24
6	10.6	10.5	9.3	S	10.7	12.9	14.5	16.1	20.9	19.7	13.1	12.0	11.3	9.8	11.5	11.9	10.4	22.4	10.2	8.7	7.0	5.9	7.2	6.6	5.9	22.4	11.9	24
7	6.4	4.8	S	5.6	4.0	4.6	11.4	8.1	10.1	7.5	8.3	5.9	5.1	19.7	9.6	7.3	20.7	19.5	14.0	12.7	9.4	6.1	3.5	3.5	3.5	20.7	9.0	24
8	2.8	S	4.8	6.8	13.4	15.3	14.1	17.8	19.8	9.0	C	C	C	C	C	C	16.0	18.6	17.1	16.6	15.4	10.2	8.6	5.9	2.8	19.8	12.5	24
9	S	3.6	2.8	3.1	4.9	3.1	5.7	5.8	9.4	8.0	8.3	9.6	8.7	5.1	4.9	2.2	1.8	2.7	2.3	3.3	3.9	3.5	3.3	S	1.8	9.6	4.8	24
10	4.6	4.8	11.4	10.8	6.5	5.9	7.6	16.7	8.6	4.9	5.9	5.6	5.7	4.2	5.6	10.5	19.7	34.5	12.3	3.9	3.2	3.6	S	4.4	3.2	34.5	8.7	24
11	3.2	3.3	1.9	1.6	2.3	1.9	4.0	12.5	22.3	3.3	1.9	2.2	2.4	3.9	3.8	6.9	7.1	10.6	10.3	10.6	11.4	S	13.9	13.1	1.6	22.3	6.7	24
12	10.7	11.4	12.2	11.1	14.1	13.5	15.4	12.1	8.6	18.6	20.6	14.9	14.5	9.3	9.7	11.4	16.1	12.3	9.6	9.3	S	18.2	17.1	12.3	8.6	20.6	13.2	24
13	8.0	6.1	6.9	8.6	7.6	8.0	5.6	5.9	3.9	4.4	2.7	1.8	2.0	2.4	4.9	9.8	8.0	13.5	S	11.8	9.7	10.3	4.8	1.8	13.5	6.7	24	
14	4.1	3.1	2.9	3.5	3.8	4.0	6.6	7.8	10.1	11.4	12.3	9.7	3.7	1.8	2.7	2.0	13.5	4.1	S	3.0	3.8	4.1	4.3	2.8	1.8	13.5	5.4	24
15	3.3	4.5	5.3	3.8	2.3	2.4	2.5	2.9	5.5	7.0	3.1	2.9	P	5.6	5.8	12.5	34.6	S	20.1	21.5	22.7	22.4	15.0	16.6	2.3	34.6	10.1	23
16	14.9	17.1	12.3	2.5	2.5	8.0	6.8	13.0	15.0	13.1	5.9	3.3	3.2	6.1	9.0	11.4	S	18.0	16.9	15.1	16.7	13.2	12.3	13.3	2.5	18.0	10.9	24
17	11.0	10.7	10.7	4.3	5.2	4.8	1.6	1.9	8.9	8.6	6.5	6.4	3.8	2.4	1.5	S	3.5	10.3	14.5	8.0	6.9	10.0	8.1	11.9	1.5	14.5	7.0	24
18	P	14.4	15.8	14.1	10.5	4.1	3.3	10.2	9.4	13.1	7.7	6.4	2.8	2.0	S	11.3	13.0	16.3	21.2	12.8	2.9	3.6	3.6	4.0	2.0	21.2	9.2	23
19	2.0	2.5	2.8	1.9	2.2	5.4	3.2	2.7	2.8	6.7	2.3	3.2	2.8	S	4.3	2.5	3.0	2.8	2.9	3.1	3.1	2.5	2.7	2.2	1.9	6.7	3.0	24
20	2.5	2.0	2.7	4.1	4.0	7.4	3.6	3.1	3.5	2.7	2.0	4.2	S	3.2	2.5	1.9	3.2	3.2	3.1	3.1	3.2	3.1	2.4	1.6	1.6	7.4	3.1	24
21	2.5	2.3	2.0	2.2	2.4	5.1	3.5	6.1	7.1	3.9	5.2	S	5.9	4.4	8.5	8.2	6.2	6.6	4.4	2.9	2.7	3.5	3.7	4.3	2.0	8.5	4.5	24
22	3.6	3.6	2.7	3.2	2.4	9.7	3.8	6.6	8.0	12.9	S	5.5	12.7	14.0	4.2	3.6	5.4	4.9	2.7	2.2	2.3	2.0	2.8	2.3	2.0	14.0	5.3	24
23	2.4	2.2	1.5	1.6	1.9	1.5	3.3	14.5	3.9	S	2.5	2.2	3.3	2.2	2.4	3.9	4.8	1.9	2.2	2.0	3.1	3.2	2.8	2.9	1.5	14.5	3.1	24
24	2.3	2.0	1.8	1.8	2.2	2.2	3.2	4.5	S	6.0	4.9	3.9	4.9	3.2	3.6	4.0	5.3	4.1	3.5	3.8	4.3	2.3	2.3	2.5	1.8	6.0	3.4	24
25	2.5	2.3	2.5	2.0	2.2	8.8	4.4	S	21.8	2.9	11.3	24.2	4.6	2.9	3.5	13.0	13.7	14.4	13.3	6.7	5.3	5.3	4.3	4.9	2.0	24.2	7.7	24
26	3.7	4.7	4.4	4.8	5.3	3.6	S	11.5	15.2	13.0	9.4	7.2	6.3	11.5	14.1	11.0	9.7	9.3	5.7	5.3	5.8	4.1	4.0	4.1	3.6	15.2	7.6	24
27	4.9	3.1	5.3	3.2	3.3	S	5.6	6.5	8.4	12.1	4.1	6.7	3.0	3.0	2.2	2.0	2.4	2.7	4.1	6.7	6.7	7.6	8.0	6.9	2.0	12.1	5.2	24
28	9.3	9.9	9.2	7.1	S	4.3	2.4	4.4	9.3	7.8	6.1	10.9	2.5	12.2	19.2	16.1	3.1	3.2	3.8	3.3	2.7	2.2	1.6	1.5	1.5	19.2	6.6	24
29	1.2	1.2	1.5	S	2.3	4.3	4.9	8.9	13.4	13.1	26.6	11.3	4.5	17.0	11.8	10.6	13.4	11.1	17.1	8.9	9.4	10.6	12.0	9.9	1.2	26.6	9.8	24
30	10.3	13.5	S	12.2	9.8	11.5	13.6	9.3	19.5	6.9	1.9	13.1	6.3	7.4	4.4	6.1	4.1	2.0	4.5	2.2	1.9	1.8	1.5	2.0	1.5	19.5	7.2	24
HOURLY MAX	14.9	17.1	16.3	19.0	14.1	15.4	25.6	23.4	34.0	21.0	26.6	24.2	14.5	19.7	19.2	17.7	34.6	34.5	21.3	22.7	25.9	23.3	19.0	16.6				
HOURLY AVG	5.5	6.0	6.1	5.8	5.3	6.2	7.2	9.1	11.7	9.0	7.3	6.9	5.1	6.1	6.4	7.6	10.0	10.4	10.1	8.1	7.8	7.3	6.8	6.2				

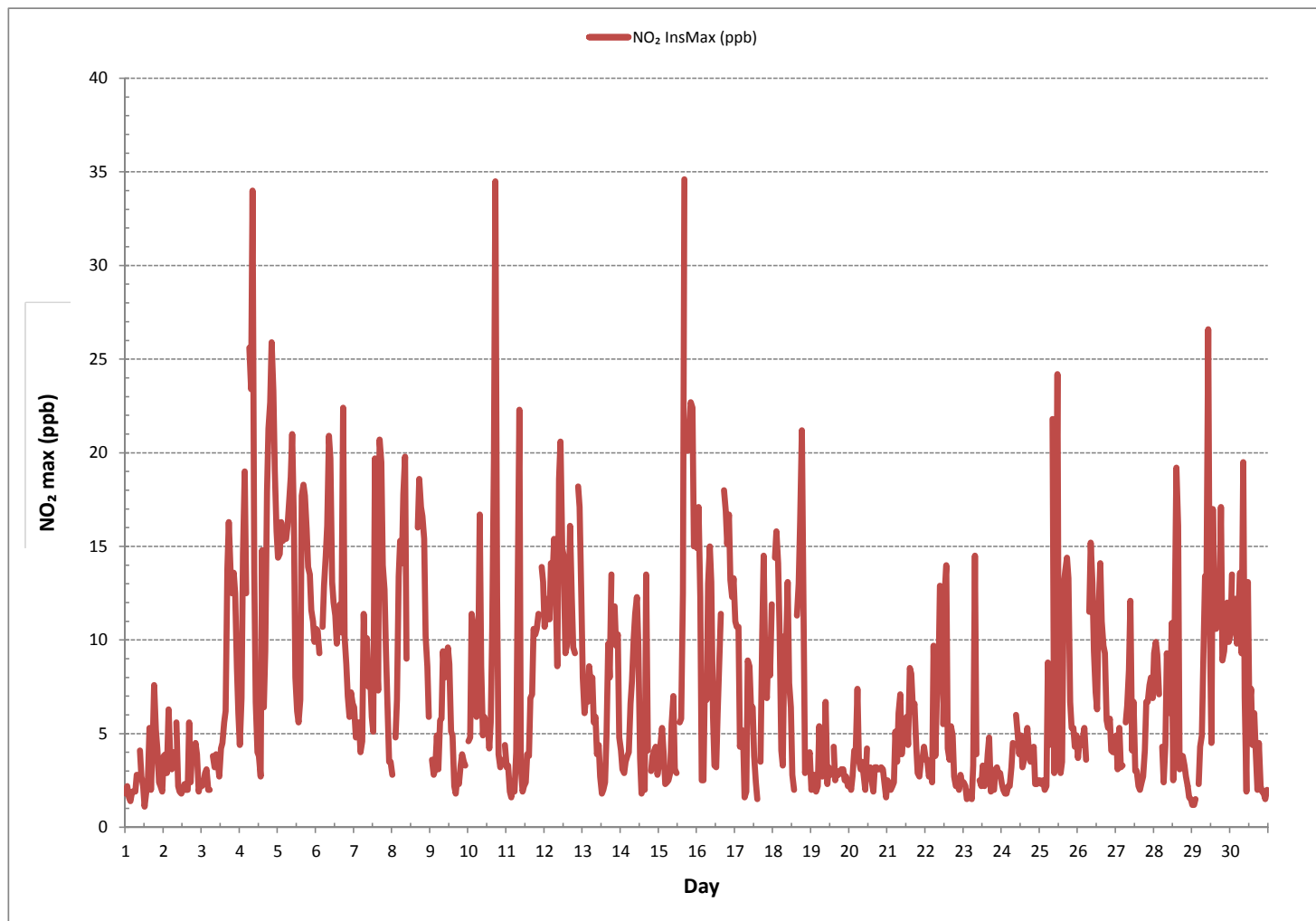
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	681
MAXIMUM INSTANTANEOUS VALUE:	34.6 ppb @ HOUR(S) 16 ON DAY(S) 15
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	6 hrs
STANDARD DEVIATION:	5.6
OPERATIONAL TIME:	718 hrs

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)

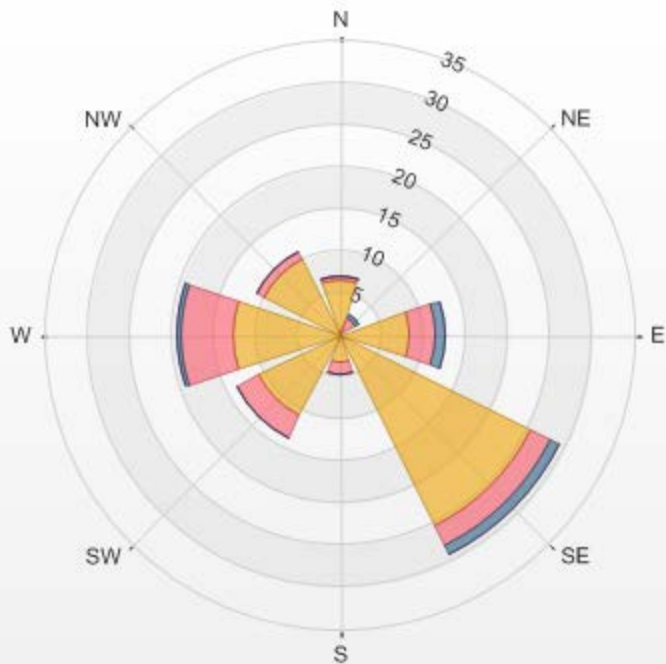


Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO2[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.58% Calm Avg: 0.00 [ppb]

Direction	0.0-7.1	7.1-14.2	14.2-21.3	>21.3	Total
N	6.46	0.44	0.15	0	7.05
NE	0.29	1.91	0.44	0	2.64
E	8.37	3.08	1.03	0	12.48
SE	25.4	2.64	1.17	0	29.21
S	3.23	1.47	0	0	4.7
SW	10.72	2.94	0	0	13.66
W	12.78	6.17	0.29	0	19.24
NW	10.13	0.88	0	0	11.01
Summary	77.38	19.53	3.08	0	100

% Icon Classes (ppb) 77 0.0-7.1 20 7.1-14.2 3 14.2-21.3 0 >21.3

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO2[ppb] 01/11/2016 00:00 - 30/11/2016 23:00
Calm: 0.00%

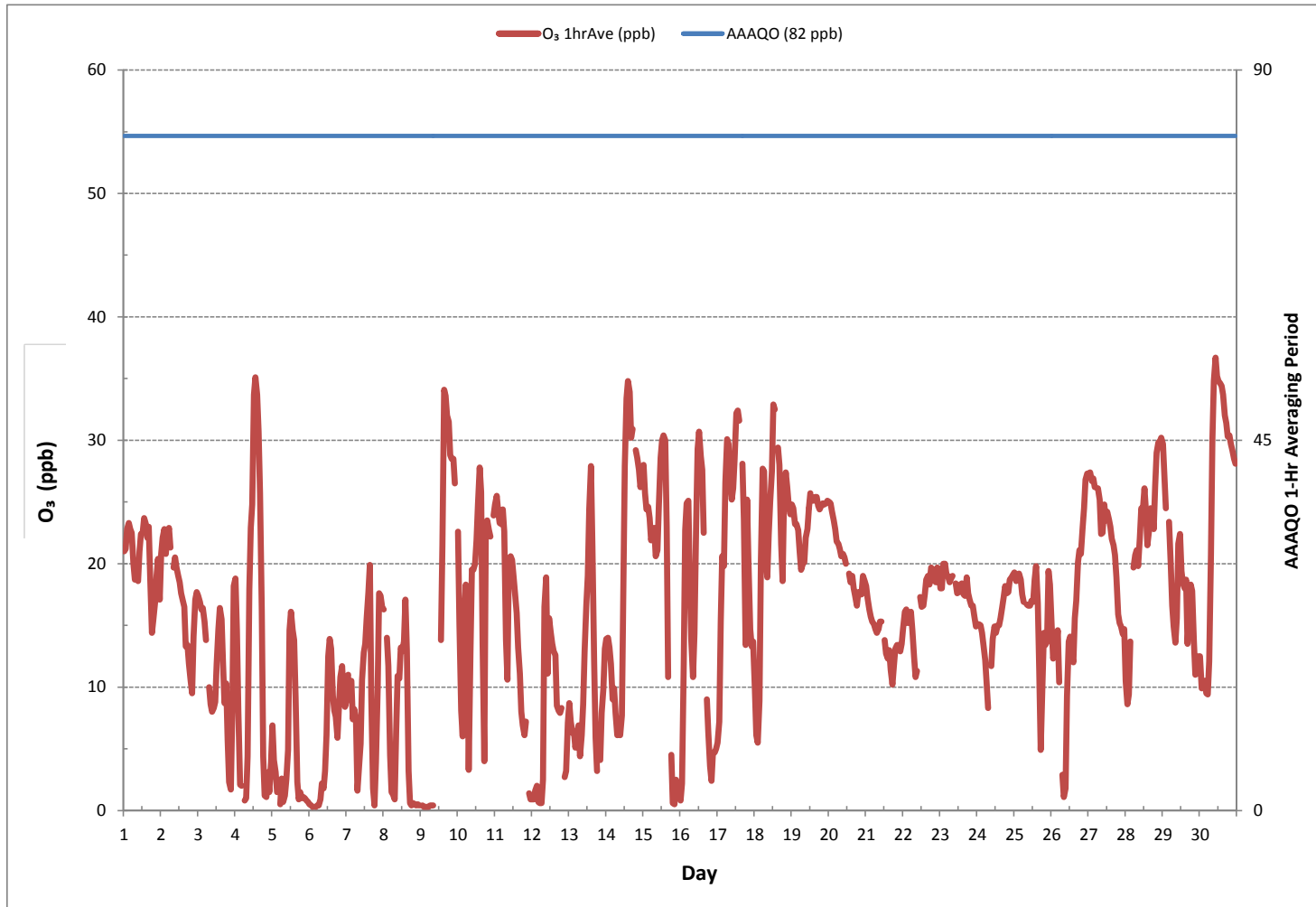




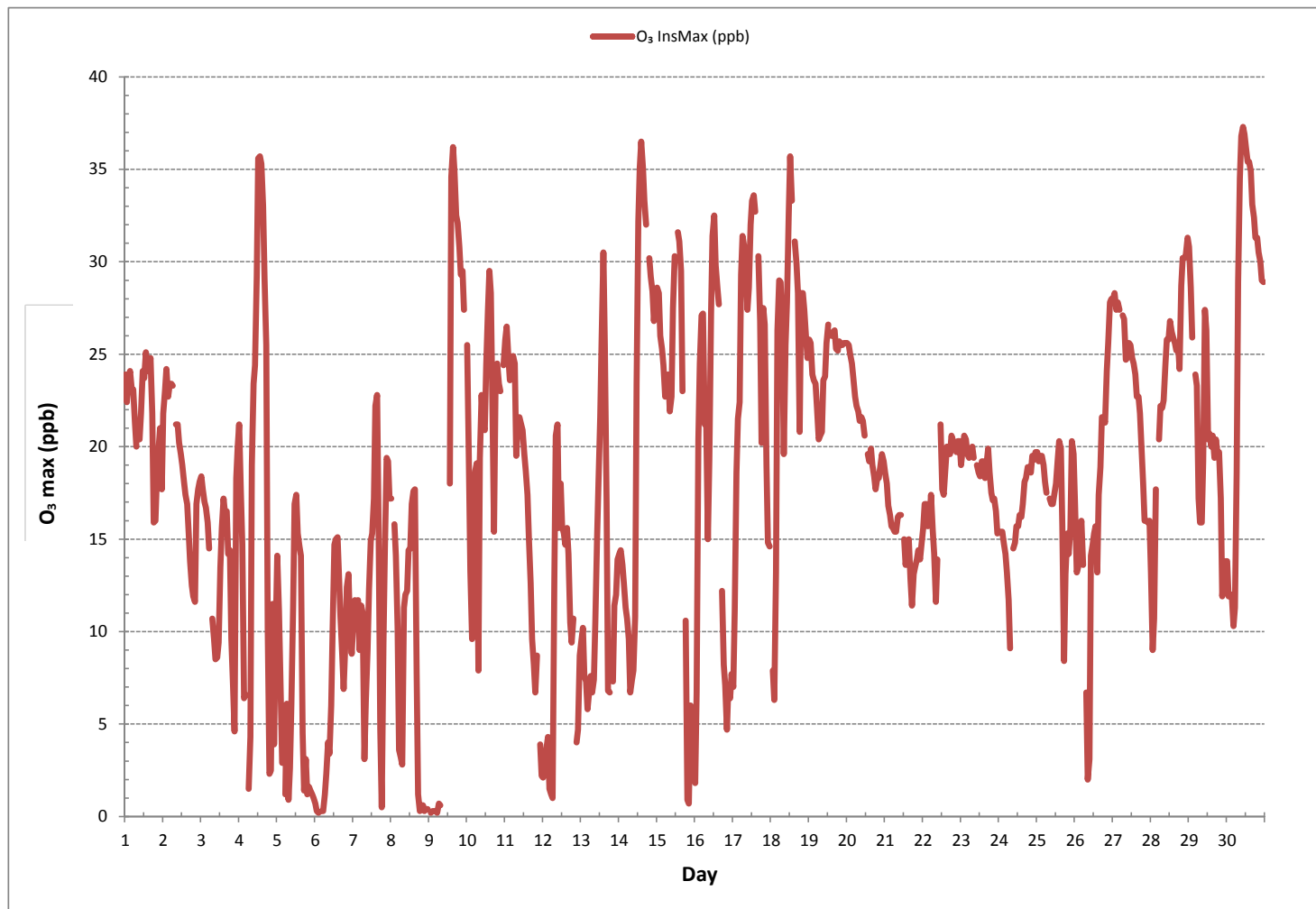
■ Span Meas
 — Span Ref
 — Span Low
 — Span High

OZONE

OZONE Hourly Averages (O₃ ppb)



OZONE Instantaneous Maximum (O₃ ppb)



Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-O3[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.72% Calm Avg: 0.00 [ppb]

Direction	0.0-12.3	12.3-24.5	24.5-36.8	>36.8	Total
N	1.03	4.11	1.76	0	6.9
NE	2.05	0.29	0.29	0	2.63
E	4.11	5.13	3.23	0	12.47
SE	6.3	20.53	3.08	0	29.91
S	2.05	1.32	1.47	0	4.84
SW	6.3	5.72	1.32	0	13.34
W	7.62	7.48	3.81	0	18.91
NW	1.03	8.06	1.91	0	11
Summary	30.49	52.64	16.87	0	100

% Icon Classes (ppb)

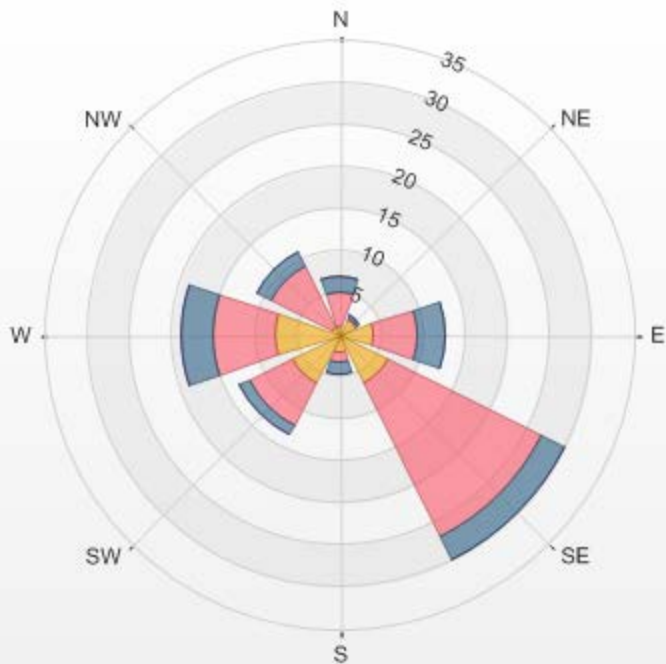
30 0.0-12.3

53 12.3-24.5

17 24.5-36.8

0 >36.8

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-O3[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%

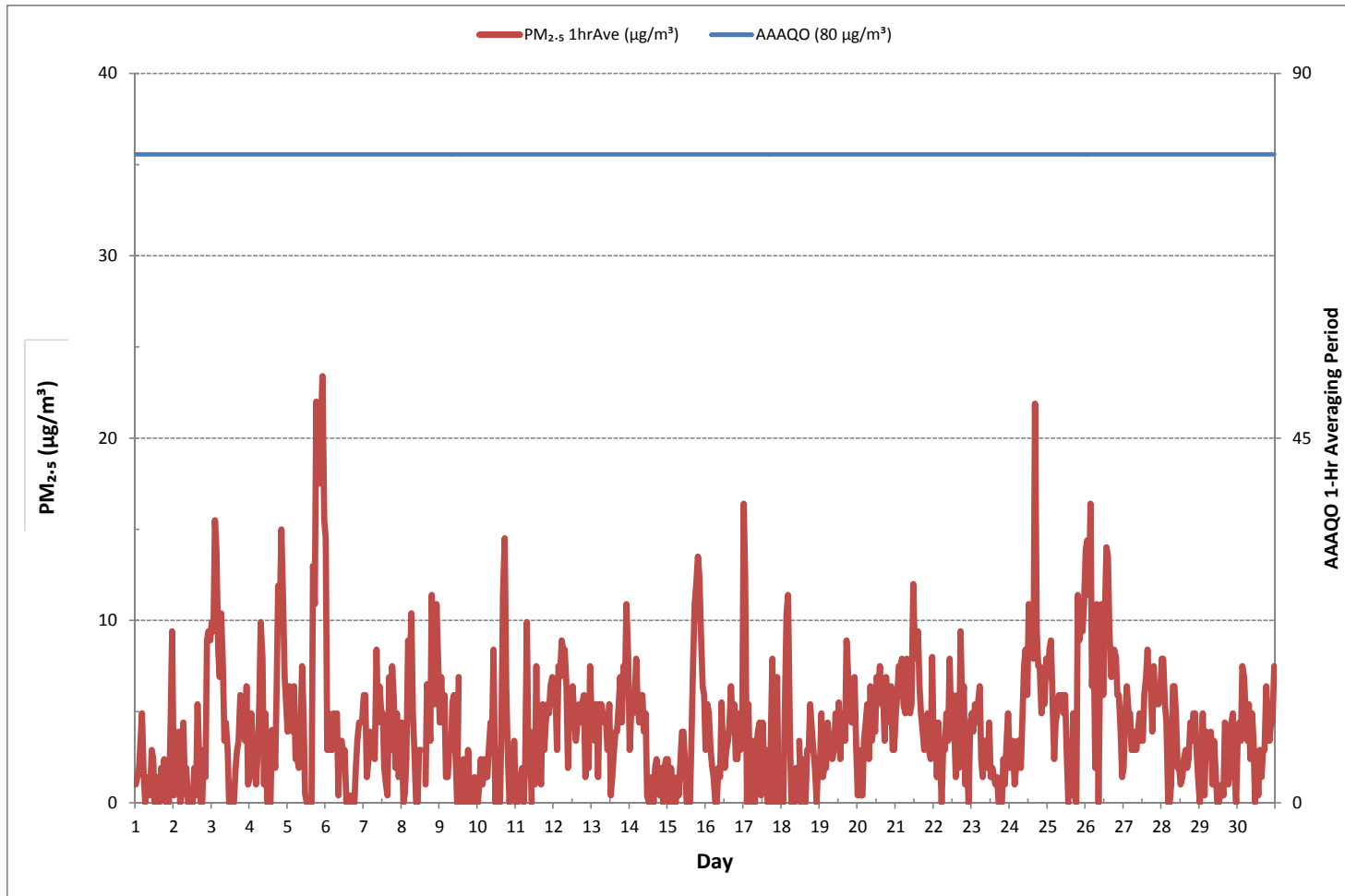




■ Span Meas
 — Span Ref
 — Span Low
 — Span High






PARTICULATE MATTER 2.5

PARTICULATE MATTER < 2.5 MICRONS Hourly Averages (PM_{2.5} µg/m³)

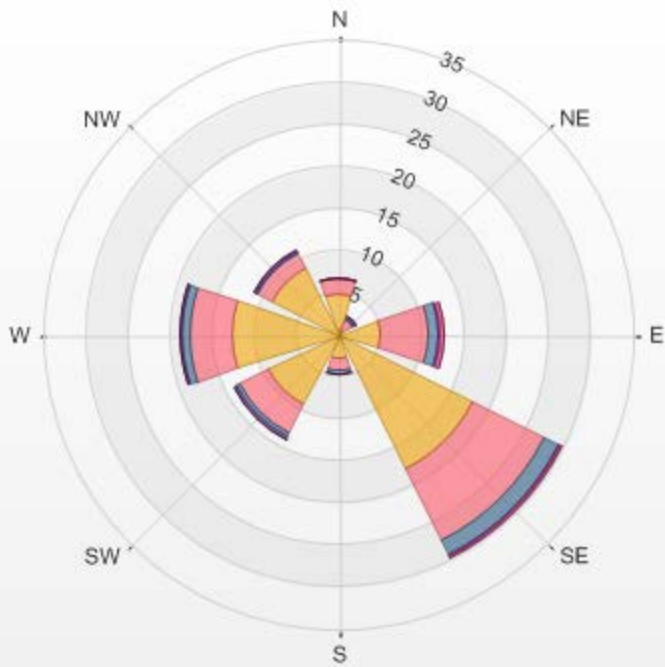


Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-PM25[ug/m3(L)] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 98.75% Calm Avg: 0.00 [ug/m3(L)]

Direction	0.0-4.7	4.7-9.4	9.4-14.1	14.1-18.8	18.8-23.5	>23.5	Total
N	4.78	1.97	0	0	0	0	6.75
NE	0.56	1.41	0.28	0.14	0	0	2.39
E	5.06	5.63	1.27	0.14	0.42	0	12.52
SE	17.72	9.56	1.83	0.42	0.14	0	29.67
S	2.81	1.41	0.42	0	0	0	4.64
SW	9.28	3.8	0.56	0.28	0	0	13.92
W	12.66	5.06	0.84	0.28	0	0	18.84
NW	9	1.69	0.42	0.14	0	0	11.25
Summary	61.87	30.53	5.62	1.4	0.56	0	100

% Icon	Classes (ug/m3(L))	62		0.0-4.7	31		4.7-9.4	6		9.4-14.1	1		14.1-18.8	1		18.8-23.5	0		>23.5
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LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-PM25[ug/m3(L)] 01/11/2016 00:00 - 30/11/2016 23:00
Calm: 0.00%



WIND SPEED



WIND SPEED Hourly Averages (WS kph)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY																												
1	6.2	4.9	6.2	7.3	7.2	5.1	2.9	5.3	8.9	7.2	5.8	7.5	6.7	5.5	6.5	7.5	6.1	2.4	4.3	5.1	5.2	4.5	5.9	3.5	2.4	8.9	5.0	24
2	2.9	3.3	1.5	1.6	4.1	5.4	4.8	4.9	6.4	7.8	8.0	5.7	6.8	6.5	7.0	6.2	3.1	5.0	3.4	2.8	1.5	2.7	3.0	3.6	1.5	8.0	3.6	24
3	3.0	2.8	4.5	5.7	7.2	8.2	7.2	5.4	4.1	2.8	2.3	4.4	7.6	8.3	7.2	3.4	2.1	1.3	0.7	1.1	1.4	0.4	5.2	4.7	0.4	8.3	2.4	24
4	3.2	2.6	0.6	1.4	1.2	1.3	1.7	1.3	2.7	2.3	4.4	2.9	5.5	5.8	4.4	3.5	1.8	0.5	0.6	1.0	1.2	1.9	0.6	1.3	0.5	5.8	1.5	24
5	1.9	1.3	0.2	1.4	0.7	2.0	0.9	1.6	1.7	1.4	0.8	2.8	3.1	1.7	1.1	1.1	0.0	1.3	1.4	0.7	0.4	0.9	0.3	0.0	3.1	0.6	24	
6	1.5	1.8	0.9	0.6	2.5	0.5	1.2	3.4	1.1	1.2	1.1	2.7	2.9	2.8	3.3	1.7	2.9	4.1	3.9	5.0	5.2	5.4	5.0	4.8	0.5	5.4	2.5	24
7	4.2	5.2	5.3	4.3	3.1	4.4	1.9	0.5	1.0	2.9	4.1	3.1	4.2	3.5	3.6	2.8	0.6	1.7	1.3	2.8	3.0	6.8	4.3	5.5	0.5	6.8	2.1	24
8	5.9	2.5	3.8	2.5	1.3	1.4	1.5	1.5	4.3	2.4	3.0	4.0	4.1	2.2	3.8	2.4	2.3	0.9	1.4	2.0	1.5	1.1	0.9	0.5	0.5	5.9	2.1	24
9	0.4	0.8	0.4	0.5	0.4	0.1	0.8	0.3	0.3	0.5	5.3	8.7	7.5	8.6	10.6	11.6	9.0	9.2	8.4	5.4	5.9	5.5	6.1	6.2	0.1	11.6	4.4	24
10	4.5	3.4	0.4	1.9	5.9	6.3	2.6	1.0	4.2	3.8	4.3	5.4	3.7	2.3	5.2	4.1	2.0	2.5	6.3	5.1	6.6	7.1	10.4	9.5	0.4	10.4	2.7	24
11	5.3	8.5	9.6	11.3	8.3	4.1	1.8	1.3	3.5	6.5	6.5	7.4	7.7	6.2	3.9	6.6	4.7	4.8	5.0	3.8	0.7	0.9	0.8	0.7	11.3	3.2	24	
12	0.3	1.7	1.0	0.6	1.3	1.6	1.6	1.7	4.9	2.0	2.1	1.2	2.0	2.6	2.1	1.6	1.0	1.7	2.1	3.5	4.4	3.7	4.4	6.6	0.3	6.6	0.3	24
13	5.8	2.2	4.1	3.7	4.8	4.8	4.4	3.0	5.1	3.6	5.3	5.2	6.4	7.6	9.1	6.0	1.2	1.2	1.8	3.3	2.5	3.3	5.0	8.2	1.2	9.1	3.2	24
14	7.4	8.2	7.2	5.0	2.2	4.5	4.5	5.2	6.3	6.3	6.1	8.0	11.2	13.9	14.2	15.0	10.3	10.0	9.9	10.0	9.7	8.7	7.9	9.4	2.2	15.0	6.4	24
15	11.2	8.0	7.2	8.0	8.1	6.3	6.0	6.4	6.3	6.1	7.3	8.8	8.1	8.3	5.9	2.8	0.7	0.5	0.8	0.9	0.7	1.4	0.2	0.4	0.2	11.2	4.7	24
16	0.2	1.2	2.5	5.0	4.5	2.7	2.1	2.5	4.0	2.9	3.4	4.9	2.6	4.5	3.9	3.1	3.1	2.8	1.9	1.9	2.2	1.5	1.5	3.0	0.2	5.0	1.9	24
17	2.7	3.7	4.0	6.4	4.2	9.2	9.9	9.7	6.7	5.7	5.7	7.0	9.7	7.3	8.8	7.2	5.3	2.6	0.8	4.8	2.1	2.5	2.7	3.2	0.8	9.9	4.6	24
18	3.9	3.2	3.6	2.8	4.6	3.9	3.2	3.2	3.2	0.7	1.4	2.4	3.1	3.6	2.4	0.6	1.8	1.0	1.6	4.6	5.5	5.3	4.3	5.4	0.6	5.5	0.5	24
19	6.7	6.3	5.6	6.1	7.3	6.8	9.2	8.3	8.3	8.5	9.5	10.7	9.8	10.6	10.6	12.4	13.3	13.3	11.1	10.5	8.6	8.6	9.1	8.8	5.6	13.3	8.9	24
20	9.2	8.8	7.5	5.8	5.7	5.6	5.8	3.9	3.7	4.4	5.6	8.2	7.7	6.1	6.9	7.9	5.9	6.1	6.8	7.7	7.0	7.2	8.1	7.6	3.7	9.2	6.4	24
21	7.9	7.4	7.3	7.0	6.7	5.6	4.7	4.5	4.5	3.5	0.8	0.9	2.6	1.4	3.5	5.4	6.5	6.9	7.0	7.3	7.0	5.1	7.8	7.6	0.8	7.9	2.2	24
22	6.8	6.9	5.1	4.1	4.8	4.6	2.5	2.5	2.7	2.2	3.1	1.7	2.9	3.6	2.5	3.2	3.4	7.0	8.1	10.4	10.8	10.0	9.2	9.9	1.7	10.8	0.9	24
23	10.1	11.9	11.9	11.3	11.8	11.3	11.3	13.0	12.1	14.6	14.7	12.8	12.7	12.4	12.3	10.7	9.7	10.2	8.6	9.3	8.5	6.7	6.4	9.5	6.4	14.7	11.0	24
24	12.0	9.6	8.5	6.5	4.6	3.5	2.2	1.5	2.9	4.8	4.1	3.4	1.9	2.4	2.7	4.0	5.7	6.8	9.7	6.7	9.0	10.8	8.5	8.0	1.5	12.0	4.7	24
25	9.0	10.8	9.6	9.3	9.0	6.6	8.4	9.9	10.9	10.1	10.6	10.5	8.0	9.7	7.6	4.3	1.0	1.7	8.9	12.9	11.3	10.1	10.6	9.2	1.0	12.9	4.6	24
26	6.8	5.5	6.9	4.5	3.6	2.0	0.4	0.4	1.1	1.1	0.7	1.3	2.1	2.6	4.4	5.2	5.1	6.8	7.5	8.9	8.3	8.9	8.4	6.7	0.4	8.9	2.3	24
27	5.6	6.4	6.9	7.1	5.7	6.3	5.9	4.9	3.4	3.9	5.1	5.7	5.3	4.3	4.4	2.1	2.1	1.4	2.7	5.0	5.2	3.2	3.0	2.8	1.4	7.1	2.4	24
28	2.7	3.6	3.6	3.5	3.9	3.1	8.3	5.5	4.6	6.0	7.2	6.7	6.7	6.4	5.4	5.1	3.7	4.9	4.9	8.4	9.2	7.7	9.1	8.3	2.7	9.2	5.3	24
29	8.3	7.2	5.6	6.3	7.1	7.2	7.4	7.3	6.9	8.3	7.9	7.6	7.4	9.0	6.7	3.5	2.7	3.0	3.8	2.9	4.5	4.1	3.6	2.3	2.3	9.0	5.3	24
30	3.6	4.0	1.8	1.0	0.5	0.3	1.5	2.0	3.9	4.3	8.0	7.2	4.5	5.9	6.5	6.3	4.2	4.1	3.3	5.3	3.3	5.6	3.5	3.5	0.3	8.0	3.5	24
HOURLY MAX	12.0	11.9	11.9	11.3	11.8	11.3	11.3	13.0	12.1	14.6	14.7	12.8	12.7	13.9	14.2	15.0	13.3	13.3	11.1	12.9	11.3	10.8	10.6	9.9				
HOURLY AVG	1.3	1.3	1.4	1.4	1.0	0.8	0.8	0.7	1.1	1.1	1.2	1.1	1.5	1.7	1.7	1.2	0.9	1.0	1.0	0.9	0.9	1.4	1.1	1.5				

STATUS FLAG CODES

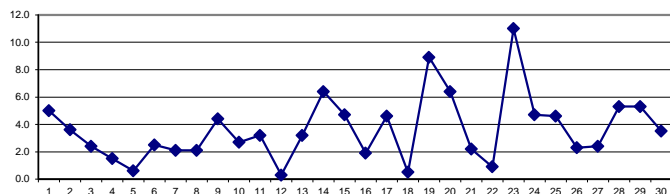
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	April 1, 2015
DECLINATION :	MAGNETIC DECLINATION 14 DEGREE EAST

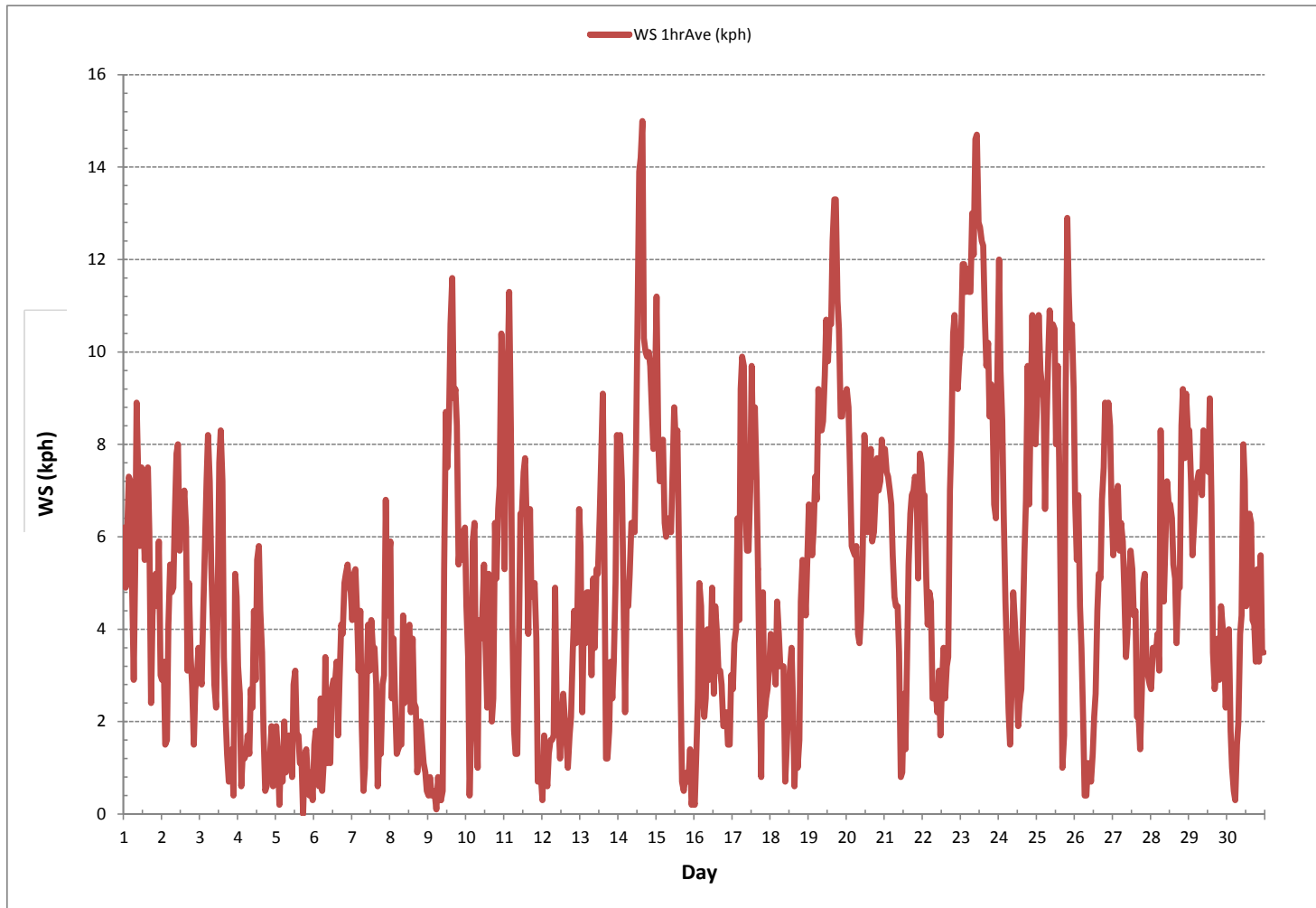
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	719
MINIMUM 1-HR AVERAGE	0.0 kph @ HOUR(S) 17 ON DAY(S) 5
MAXIMUM 1-HR AVERAGE:	15.0 kph @ HOUR(S) 15 ON DAY(S) 14
MAXIMUM 24-HR AVERAGE:	11.0 kph ON DAY(S) 23
	VAR-VARIOUS
MONTHLY CALIBRATION TIME:	0 hrs
	OPERATIONAL TIME: 720 hrs
	AMD OPERATION UPTIME: 100.0 %
STANDARD DEVIATION:	3.1
	MONTHLY AVERAGE: 1.0 kph

24 HR AVERAGES November 2016



WIND SPEED Hourly Averages (WS kph)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake Continuous Monitoring Station - November 2016

WIND SPEED Instantaneous Maximum (WS kph)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY 1	10.6	7.3	9.0	11.7	11.7	7.7	5.8	11.3	14.3	11.6	10.7	14.2	11.2	9.1	11.0	11.6	11.1	5.4	7.0	7.8	8.1	7.8	9.4	6.0	5.4	14.3	9.6	24
2	5.3	6.9	4.7	5.5	7.7	9.2	9.1	7.5	13.0	14.1	13.0	10.0	10.9	10.5	11.4	10.3	7.5	8.1	5.4	5.8	3.5	6.8	6.3	7.7	3.5	14.1	8.3	24
3	7.2	7.5	8.3	10.1	12.2	13.0	10.5	11.0	6.6	6.5	5.9	9.8	13.4	13.8	13.2	6.3	3.1	3.1	4.0	3.3	3.9	2.6	9.2	8.1	2.6	13.8	8.0	24
4	5.8	5.8	6.0	4.0	2.8	4.1	5.0	5.2	6.1	7.3	8.0	6.3	11.8	10.7	8.0	9.3	4.4	3.0	2.1	3.5	4.5	5.5	2.7	3.0	2.1	11.8	5.6	24
5	5.5	3.3	3.8	5.6	3.6	6.1	3.8	3.4	4.3	3.9	3.9	6.6	6.8	5.9	3.6	3.2	4.0	4.0	3.4	4.5	2.8	3.5	4.6	5.0	2.8	6.8	4.4	24
6	11.0	5.3	4.0	3.8	6.9	5.5	4.7	8.8	4.9	3.0	2.7	4.6	4.3	5.1	6.3	4.6	6.6	6.2	7.4	6.3	7.8	7.0	6.3	6.2	2.7	11.0	5.8	24
7	6.3	7.2	8.0	8.3	4.6	6.9	6.9	2.3	2.9	5.2	6.7	8.5	7.4	8.1	7.1	7.4	2.1	3.8	2.4	5.5	5.8	9.7	7.7	9.2	2.1	9.7	6.3	24
8	9.4	4.8	6.1	7.1	3.8	3.8	3.1	3.5	7.3	6.0	5.3	7.2	8.0	7.1	8.2	5.9	4.7	5.0	4.4	3.5	4.0	2.9	3.1	3.2	2.9	9.4	5.3	24
9	3.2	3.0	2.7	4.7	2.1	3.5	3.8	3.3	4.2	2.8	12.0	12.0	12.0	12.6	19.8	18.1	14.1	13.1	13.4	8.4	8.7	7.7	8.1	8.5	2.1	19.8	8.4	24
10	7.9	5.5	2.4	4.9	8.7	9.0	7.1	3.1	7.5	7.6	8.1	9.0	7.2	6.2	8.2	8.3	4.2	5.9	9.0	8.8	9.3	11.6	14.3	14.1	2.4	14.3	7.8	24
11	10.9	12.6	14.8	14.4	12.5	9.0	6.9	3.9	7.2	7.0	13.8	11.0	10.7	13.2	10.3	6.5	9.5	8.2	6.5	8.1	7.0	3.5	2.1	4.1	2.1	14.8	8.9	24
12	2.8	4.2	2.8	2.9	3.3	3.3	3.5	5.0	6.6	5.6	3.6	2.6	3.8	4.3	3.7	4.8	5.3	5.2	5.1	5.2	6.4	7.6	6.1	10.1	2.6	10.1	4.7	24
13	8.2	7.4	6.7	7.0	6.8	7.2	7.0	6.6	7.2	7.8	11.3	9.3	10.2	10.8	16.2	11.9	4.5	2.7	3.7	4.9	4.0	4.8	9.8	10.6	2.7	16.2	7.8	24
14	10.1	10.4	11.5	8.2	5.6	9.0	7.6	7.5	10.8	9.1	8.9	13.6	16.5	23.2	24.3	21.7	15.9	16.5	14.8	14.1	12.3	12.1	10.6	13.3	5.6	24.3	12.8	24
15	14.5	12.3	11.8	12.3	12.1	9.3	10.2	11.2	10.0	9.5	13.1	13.0	P	15.9	12.2	5.3	2.6	2.6	2.3	2.3	2.6	3.5	1.9	2.2	1.9	15.9	8.4	23
16	1.1	4.0	5.2	8.1	7.9	6.3	3.8	4.4	5.8	4.1	6.4	8.1	6.7	7.9	7.0	4.8	5.0	4.0	3.2	4.9	3.7	3.6	4.4	5.2	1.1	8.1	5.2	24
17	4.4	4.9	5.7	9.7	7.9	14.4	14.4	15.3	10.2	10.5	11.3	15.1	16.6	15.7	13.9	11.4	9.3	5.3	4.9	6.6	4.7	3.7	4.5	6.4	3.7	16.6	9.5	24
18	P	6.0	5.7	5.0	6.6	6.0	5.9	5.0	4.8	3.4	3.9	6.6	7.7	8.3	7.2	4.1	3.4	2.5	3.4	6.8	10.2	9.3	9.5	8.4	2.5	10.2	6.1	23
19	13.1	12.7	9.4	11.6	12.5	12.5	14.9	13.1	13.2	14.6	14.3	17.1	15.6	17.2	18.7	20.7	18.9	20.0	18.4	15.8	14.1	14.5	14.6	13.6	9.4	20.7	15.0	24
20	14.1	12.9	12.0	10.5	10.7	10.0	9.6	6.6	6.8	7.7	11.0	14.6	13.3	9.8	12.1	16.4	10.5	9.9	13.3	12.2	13.6	13.6	13.7	11.5	6.6	16.4	11.5	24
21	11.8	12.3	12.3	11.4	11.1	10.5	9.9	8.3	7.3	8.2	5.5	5.4	5.7	4.6	8.1	9.8	11.8	10.6	10.8	11.8	10.3	9.8	11.4	11.8	4.6	12.3	9.6	24
22	10.2	11.6	9.2	7.2	7.5	9.7	4.5	3.6	4.7	4.7	9.1	8.2	7.9	5.9	6.7	9.5	5.8	11.7	12.4	15.3	15.5	17.9	16.1	14.3	3.6	17.9	9.6	24
23	13.6	19.8	16.9	18.5	18.8	18.2	19.2	20.7	18.2	19.7	22.6	18.6	20.0	21.6	21.2	19.6	16.7	17.2	15.3	13.5	13.2	12.3	11.6	15.0	11.6	22.6	17.6	24
24	18.0	13.2	12.5	10.9	7.1	5.3	4.5	3.8	5.7	7.9	7.6	7.2	6.8	8.9	8.0	7.4	11.1	11.5	17.5	13.8	16.6	15.7	13.2	11.1	3.8	18.0	10.2	24
25	14.8	16.6	18.8	14.8	15.2	11.4	15.2	15.1	18.0	15.9	18.9	14.8	13.1	15.8	13.9	7.5	3.0	4.2	16.4	22.7	16.9	15.2	14.0	15.0	3.0	22.7	14.5	24
26	10.0	8.6	9.9	8.7	5.5	4.3	5.2	3.9	2.2	2.6	3.6	3.6	4.2	5.7	7.1	9.0	9.4	12.4	11.5	15.0	13.2	13.3	14.3	10.2	2.2	15.0	8.1	24
27	8.1	9.1	11.3	11.6	8.5	11.9	8.7	9.0	7.2	6.8	9.6	9.9	11.1	9.3	9.1	5.9	4.2	4.2	6.0	8.7	7.5	5.5	4.2	5.1	4.2	11.9	8.0	24
28	5.2	5.9	6.6	6.3	7.1	5.2	14.7	9.6	7.0	10.2	11.0	9.9	11.1	10.6	9.8	8.8	6.9	8.4	11.4	15.4	17.0	11.1	13.9	12.6	5.2	17.0	9.8	24
29	14.6	14.1	10.7	13.6	12.1	10.5	13.2	11.2	10.8	12.7	13.3	12.3	14.9	15.2	11.4	8.0	5.2	6.3	6.3	7.1	8.0	6.8	6.3	5.2	5.2	15.2	10.4	24
30	7.4	7.4	3.5	2.8	3.6	4.4	4.2	6.9	9.6	9.3	13.1	14.3	9.9	10.8	12.8	12.6	8.1	7.6	8.2	10.4	10.1	10.5	11.3	9.2	2.8	14.3	8.7	24
HOURLY MAX	18.0	19.8	18.8	18.5	18.8	18.2	19.2	20.7	18.2	19.7	22.6	18.6	20.0	23.2	24.3	21.7	18.9	20.0	18.4	22.7	17.0	17.9	16.1	15.0				
HOURLY AVG	9.1	8.8	8.4	8.7	8.2	8.2	8.1	7.7	8.1	8.2	9.6	10.1	10.3	10.8	11.0	9.7	7.6	7.6	8.3	9.1	8.8	8.6	8.8	8.9				

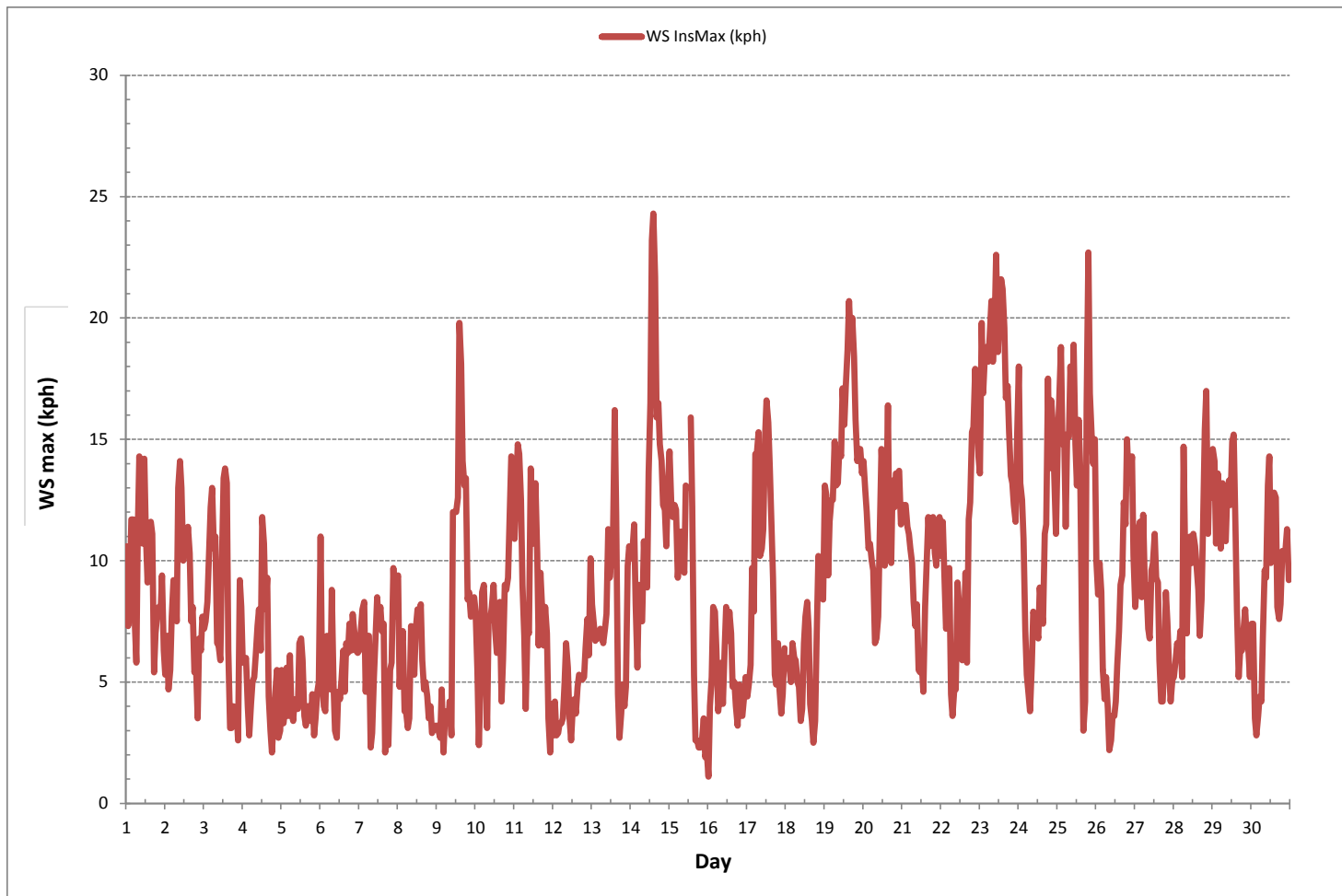
STATUS FLAG CODES

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

MAXIMUM INSTANTANEOUS VALUE:	24.3	kph	@ HOUR(S)	14	ON DAY(S)	14
					VAR-VARIOUS	
OPERATIONAL TIME:					718	hrs

WIND SPEED Instantaneous Maximum (WS kph)

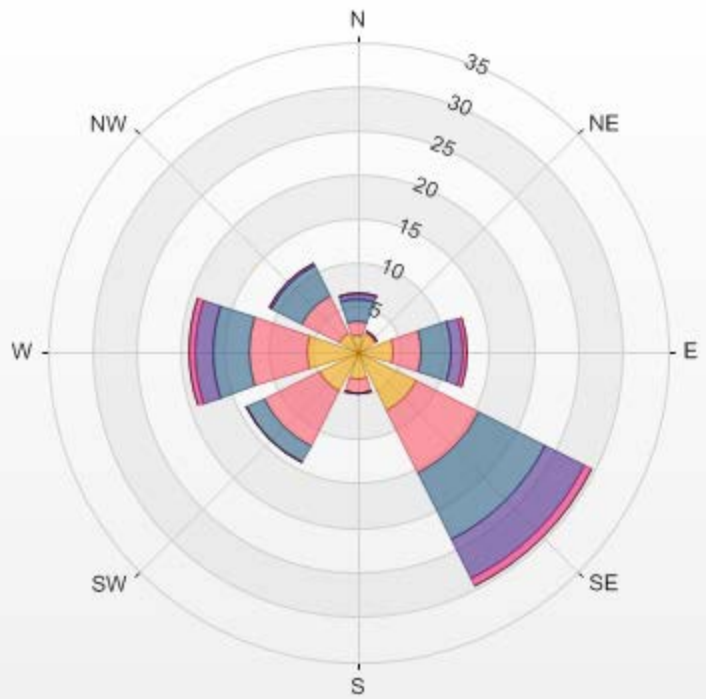


Wind: LICA COLD LAKE SOUTH Monitor: WSP [kph] Monthly: 11/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 100.00% Calm Avg: 0.00 [kph]

Direction	0.0-3.0	3.0-6.0	6.0-9.1	9.1-12.1	12.1-15.1	>15.1	Total
N	1.81	1.67	2.5	0.69	0	0	6.67
NE	2.36	0.14	0	0	0	0	2.5
E	4.17	3.06	3.47	1.25	0.42	0	12.37
SE	7.5	7.92	8.19	5	0.97	0	29.58
S	3.06	1.67	0	0	0	0	4.73
SW	4.86	7.08	2.08	0	0	0	14.02
W	5.83	6.39	4.17	2.08	0.56	0	19.03
NW	2.36	4.86	3.75	0.14	0	0	11.11
Summary	31.95	32.79	24.16	9.16	1.95	0	100

% Icon Classes (kph) 32 0.0-3.0 33 3.0-6.0 24 6.0-9.1 9 9.1-12.1 2 12.1-15.1 0 >15.1

LICA COLD LAKE SOUTH 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake Continuous Monitoring Station - November 2016

WIND DIRECTION Hourly Averages (WD)

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

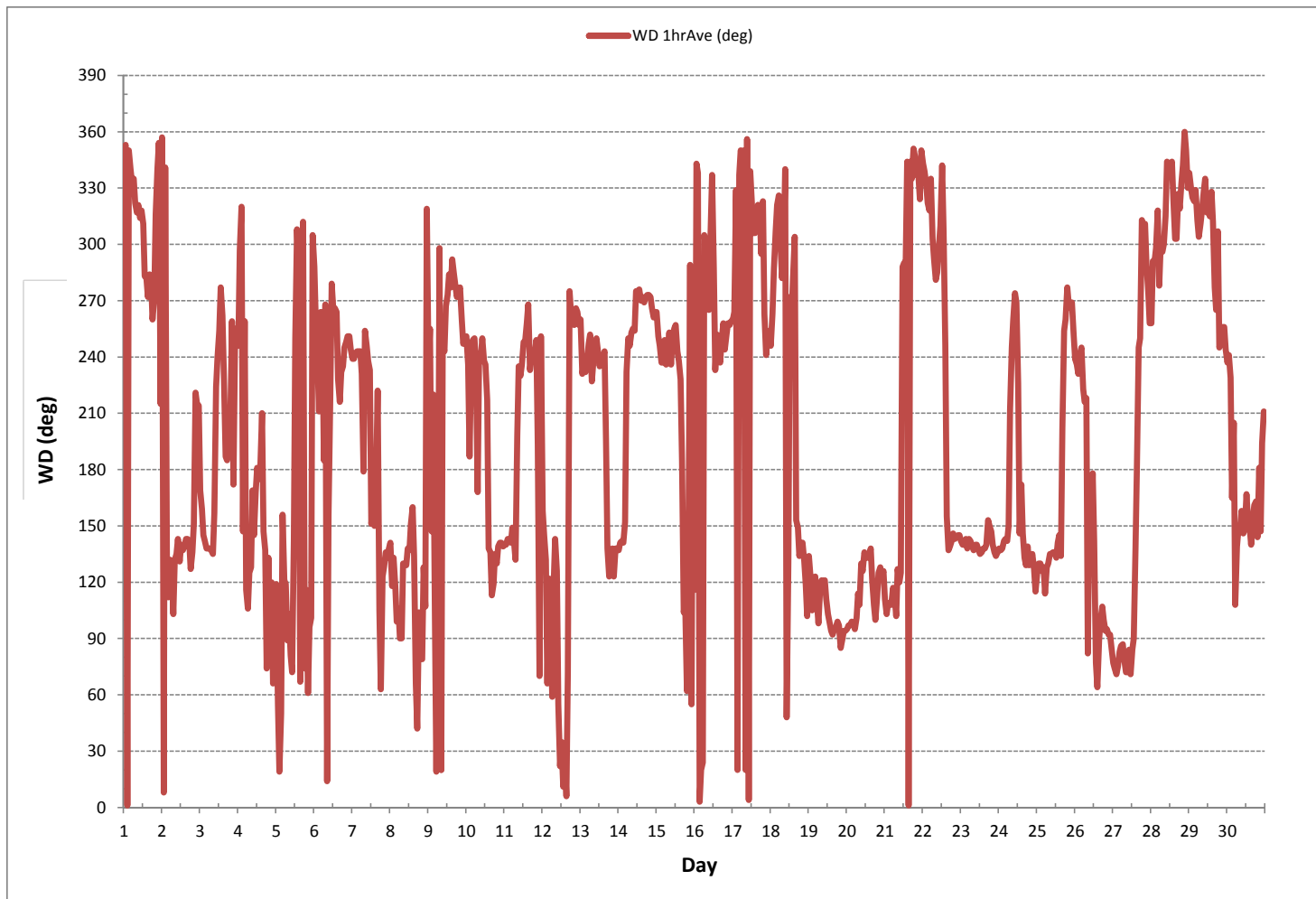
STATUS FLAG CODES

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 14 DEGREE EAST

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	720	hrs
STANDARD DEVIATION:	86.5		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	177	(S)

WIND DIRECTION Hourly Averages (WD)



STANDARD DEVIATION WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake Continuous Monitoring Station - November 2016

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)

HR START (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.	
HR END (MST)	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	16	16	16	12	13	20	16	15	19	26	21	21	28	23	21	21	22	17	19	15	14	16	18	24	
2	29	28	41	33	22	19	21	21	20	20	18	23	18	19	16	15	33	15	19	18	45	36	39	32	24	
3	33	42	19	16	17	13	17	21	18	46	41	26	26	23	21	22	27	41	61	47	49	61	22	18	24	
4	28	15	29	30	43	43	28	64	31	51	28	38	39	41	40	36	47	53	56	66	47	31	57	44	24	
5	26	44	53	33	49	33	60	27	29	25	56	34	37	53	36	42	56	78	28	48	64	73	68	53	24	
6	46	55	64	53	39	56	44	33	37	32	46	23	18	20	23	38	29	13	16	14	11	11	11	12	24	
7	13	14	16	15	17	21	22	39	23	26	22	33	27	34	28	44	43	18	29	21	20	14	20	17	24	
8	14	22	28	29	56	39	34	39	16	34	33	28	25	42	32	36	23	64	56	26	33	47	40	66	24	
9	59	49	59	59	53	56	56	70	55	46	43	17	21	21	19	20	19	19	18	21	19	16	14	13	24	
10	13	18	66	55	14	15	43	33	20	25	24	22	33	43	18	15	28	25	13	18	15	15	15	14	24	
11	28	15	15	12	22	40	71	50	44	31	27	21	20	20	21	22	14	16	14	14	28	43	50	49	24	
12	33	33	46	52	30	40	26	40	14	39	27	28	20	18	22	39	54	50	34	18	15	17	16	14	24	
13	13	37	18	17	14	15	15	21	14	23	23	20	21	20	21	20	42	32	26	17	23	16	18	12	24	
14	16	12	13	17	37	23	17	18	17	19	19	22	21	21	21	19	18	19	19	18	18	18	17	17	24	
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16	63	41	34	19	21	26	27	20	13	17	24	22	33	27	25	16	12	10	15	13	12	25	31	9	24	
17	17	14	13	17	24	17	17	19	18	20	21	25	19	27	20	14	11	14	40	11	29	9	17	17	24	
18	16	23	18	15	11	15	15	19	17	58	41	40	51	34	59	72	20	43	19	12	13	19	23	21	24	
19	18	22	23	23	22	23	21	25	24	25	24	24	22	21	19	21	19	20	20	19	20	19	19	19	24	
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28	24	19	19	18	15	18	19	19	17	14	18	17	22	18	18	21	24	15	13	16	18	18	19	20	24	
29	18	16	15	14	15	14	16	15	15	16	16	17	19	16	17	17	21	21	18	44	17	22	19	20	24	
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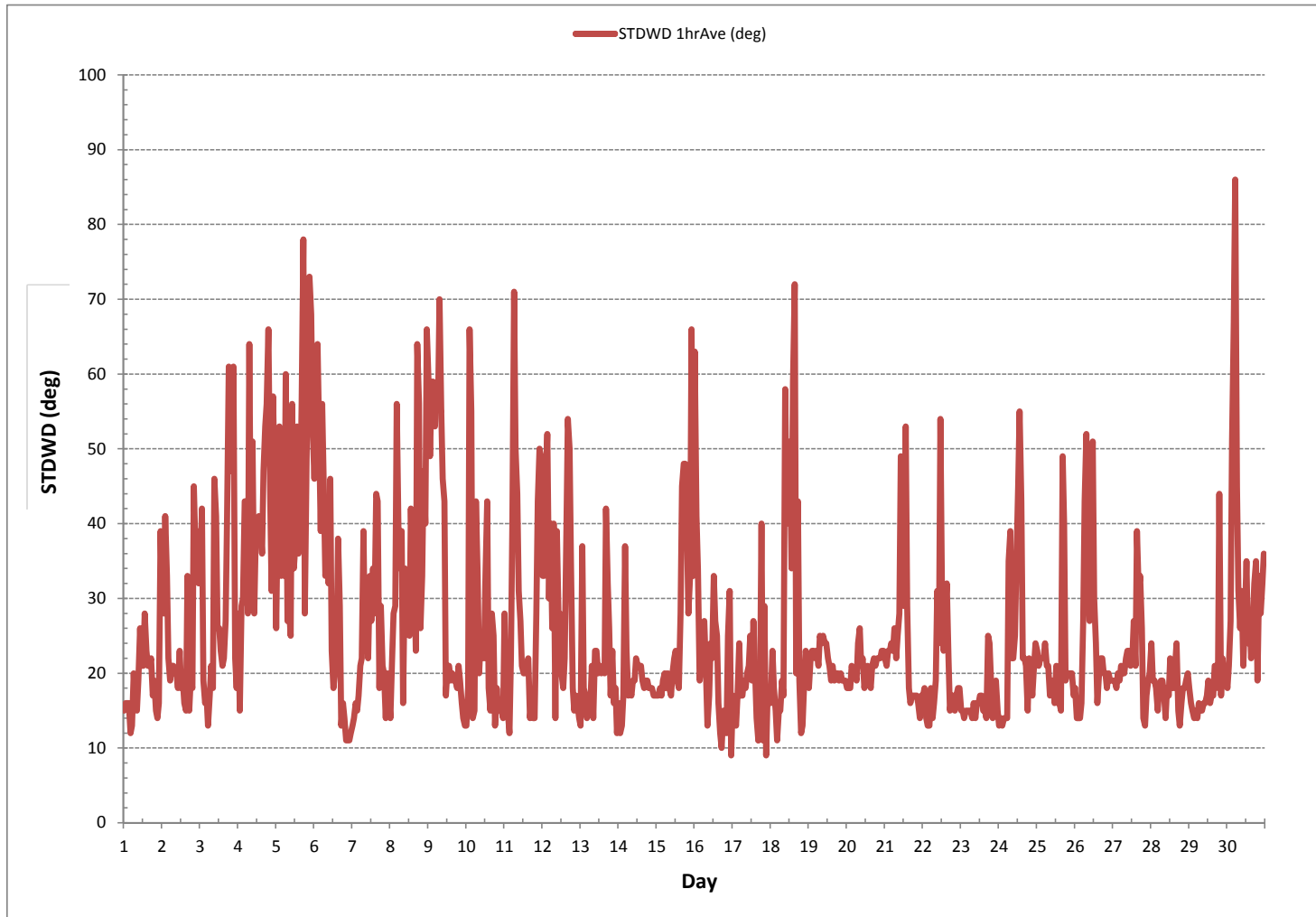
STATUS FLAG CODES

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
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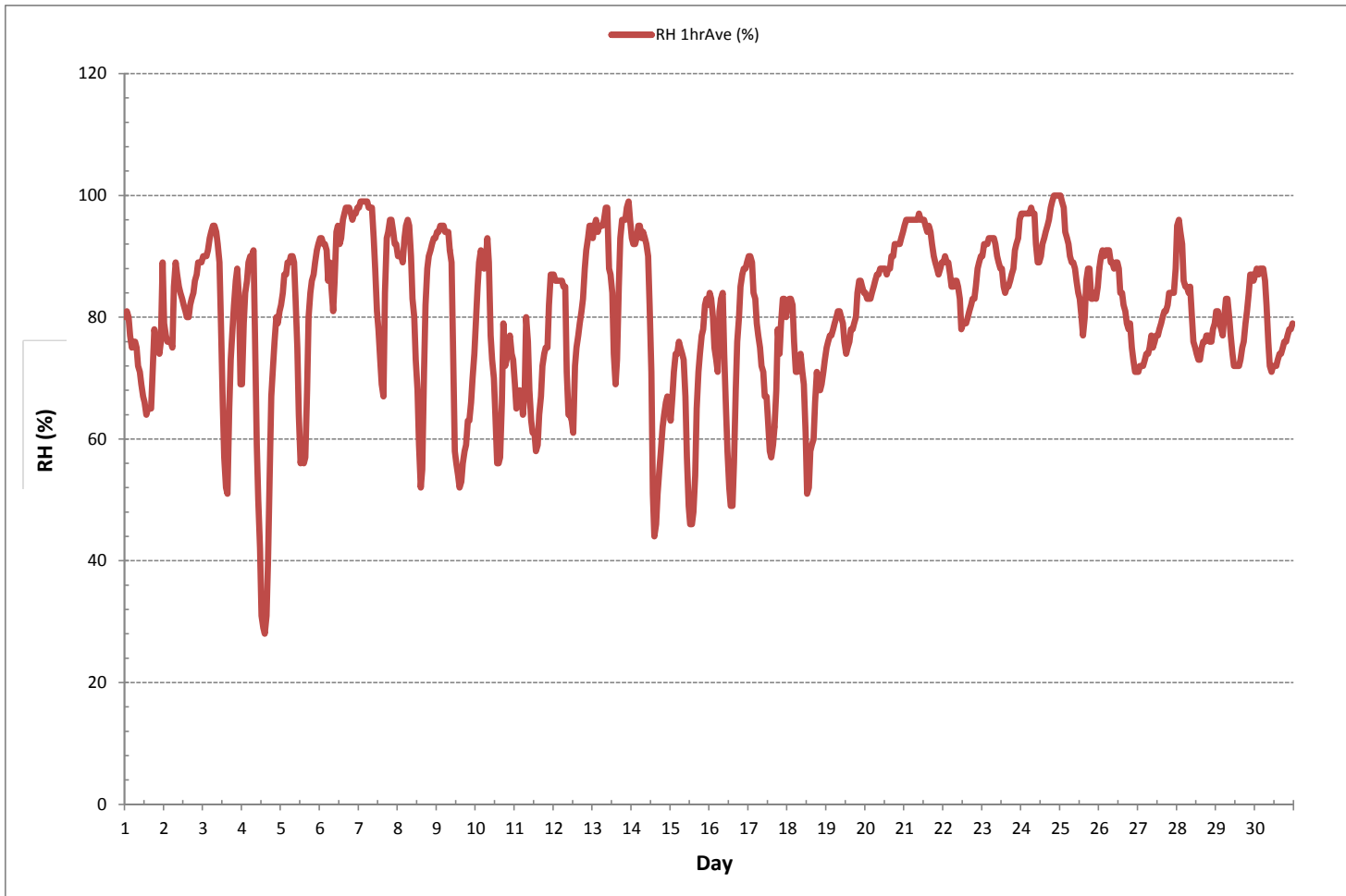
CALIBRATION TIME:	0 hrs	OPERATIONAL TIME:	720 hrs
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STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



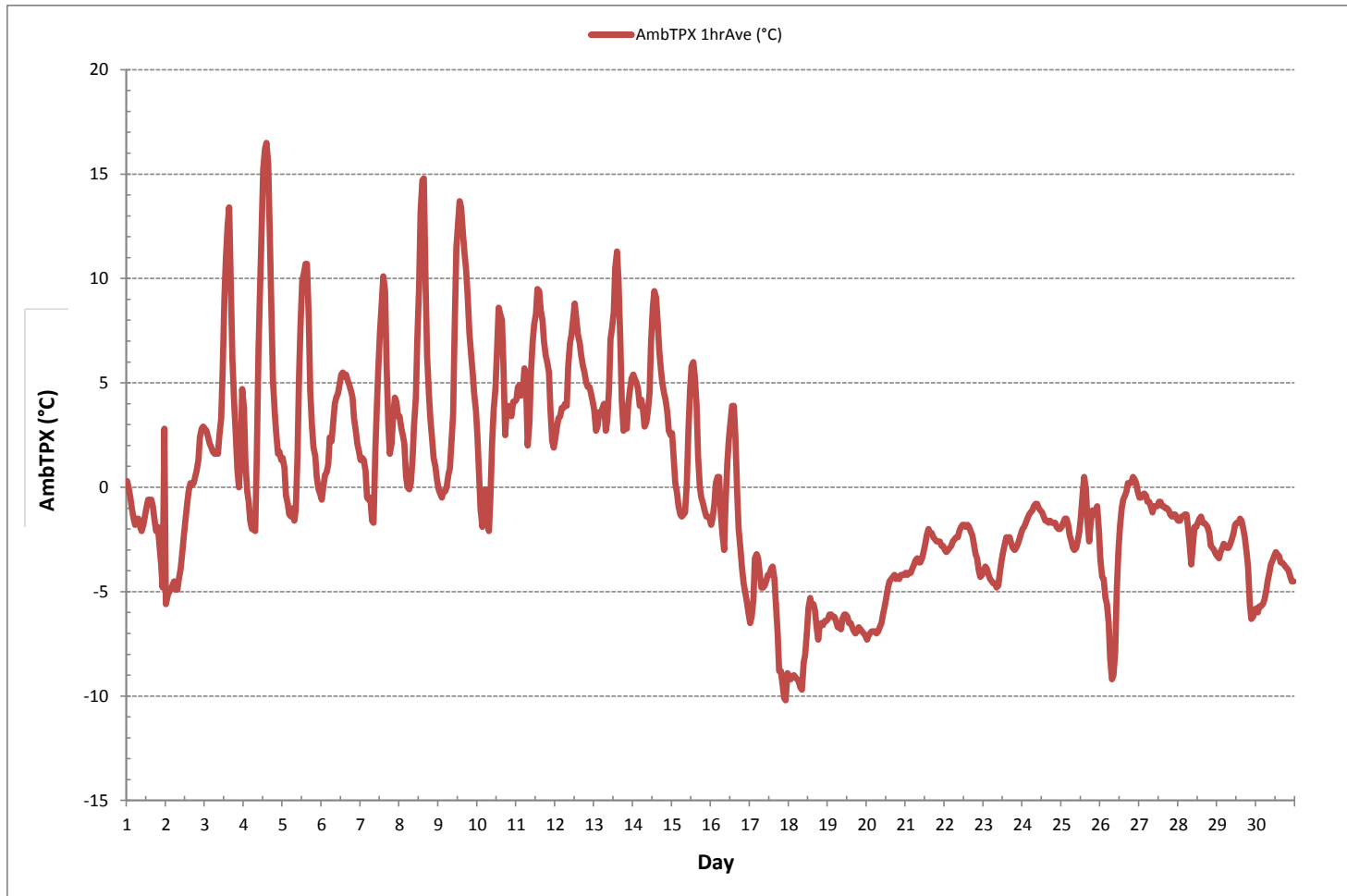
RELATIVE HUMIDITY

RELATIVE HUMIDITY Hourly Averages (RH %)



AMBIENT TEMPERATURE

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

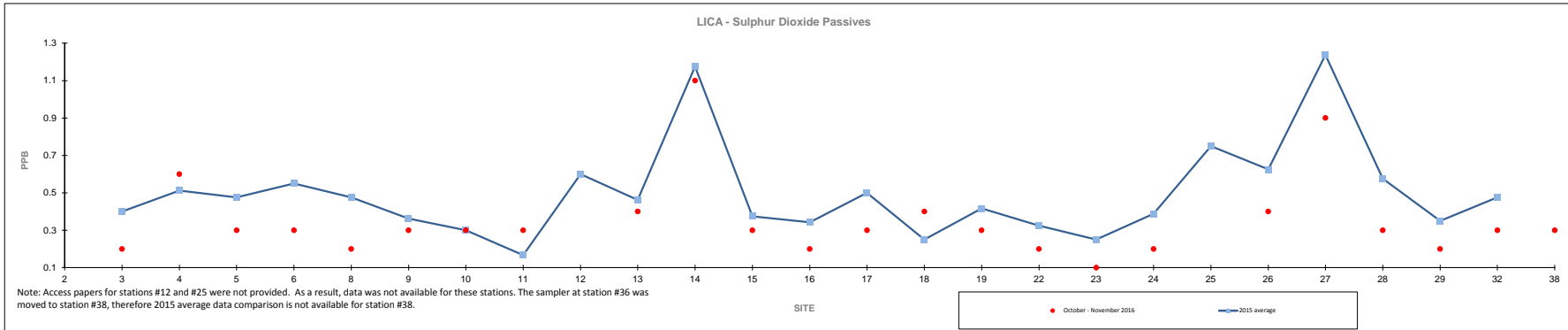


APPENDIX II
NON-CONTINUOUS MONITORING DATA RESULTS

PASSIVE RESULTS

Passive Summary Results for October - November 2016 Lakeland Industry & Community Association

	Sulphur Dioxide ppb																												October - November 2016	
	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	Reading	Site	
Mean	NA	0.4	0.5	0.5	0.6	0.5	0.4	0.3	0.2	0.6	0.5	1.2	0.4	0.3	0.5	0.3	0.4	0.3	0.3	0.4	0.8	0.6	1.2	0.6	0.4	0.5	0.4	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	0.3	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	#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	1.1	#14	

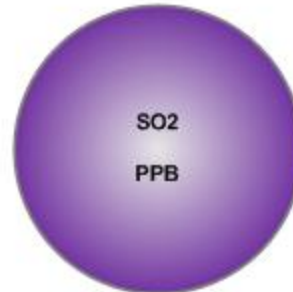


Lakeland Industry & Community Association SO₂ Passive Bubble Map

OCTOBER - NOVEMBER 2016

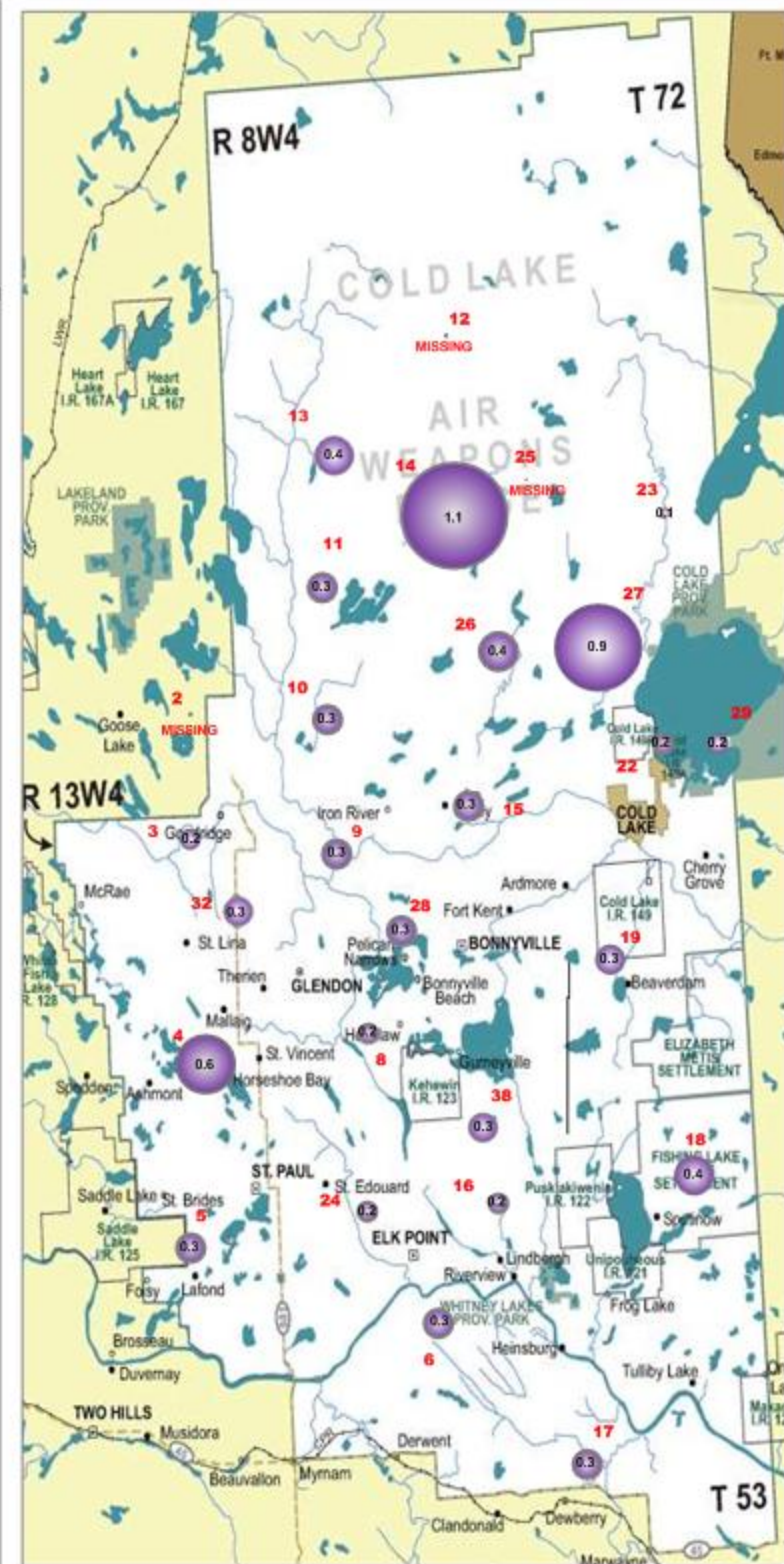
PASSIVE STATIONS

		DUPLICATE
2 – Sand River	MISSING	NA
3 – Therien	0.2 PPB	NA
4 – Flat Lake	0.6 PPB	NA
5 – Lake Eliza	0.3 PPB	NA
6 – Telegraph Creek	0.3 PPB	NA
8 – Muriel-Kehewin	0.2 PPB	NA
9 – Dupre	0.3 PPB	0.3 PPB
10 – La Corey	0.3 PPB	0.3 PPB
11 – Wolf Lake	0.3 PPB	NA
12 – Foster Creek	MISSING	NA
13 – Primrose	0.4 PPB	NA
14 – Maskwa	1.1 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	0.4 PPB	NA
19 – Beaverdam	0.3 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	0.4 PPB	NA
27 – Mahkeses	0.9 PPB	NA
28 – Town of Bonnyville	0.3 PPB	NA
29 – Cold Lake South 2	0.2 PPB	NA
32 – St. Lina	0.3 PPB	NA
38 – Bonnyville	0.3 PPB	NA



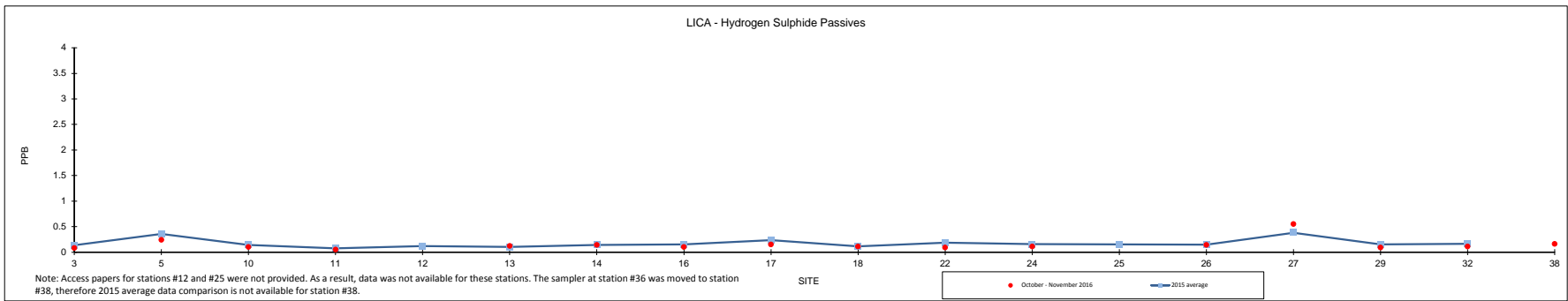
Summary

Minimum : 0.1 PPB – Medley-Martineau
 Maximum: 1.1 PPB – Maskwa
 Average: 0.4 PPB *Includes Duplicates



Passive Summary Results for October - November 2016 Lakeland Industry & Community Association

		Hydrogen Sulphide ppb																	October - November 2016			
		3	5	10	11	12	13	14	2015	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	0.15	-	
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	0.05	#11	
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	0.55	#27	

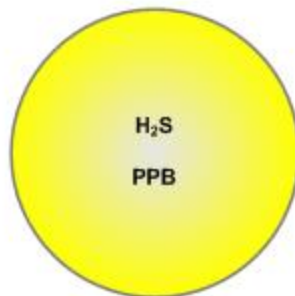


Lakeland Industry & Community Association H₂S Passive Bubble Map

OCTOBER - NOVEMBER 2016

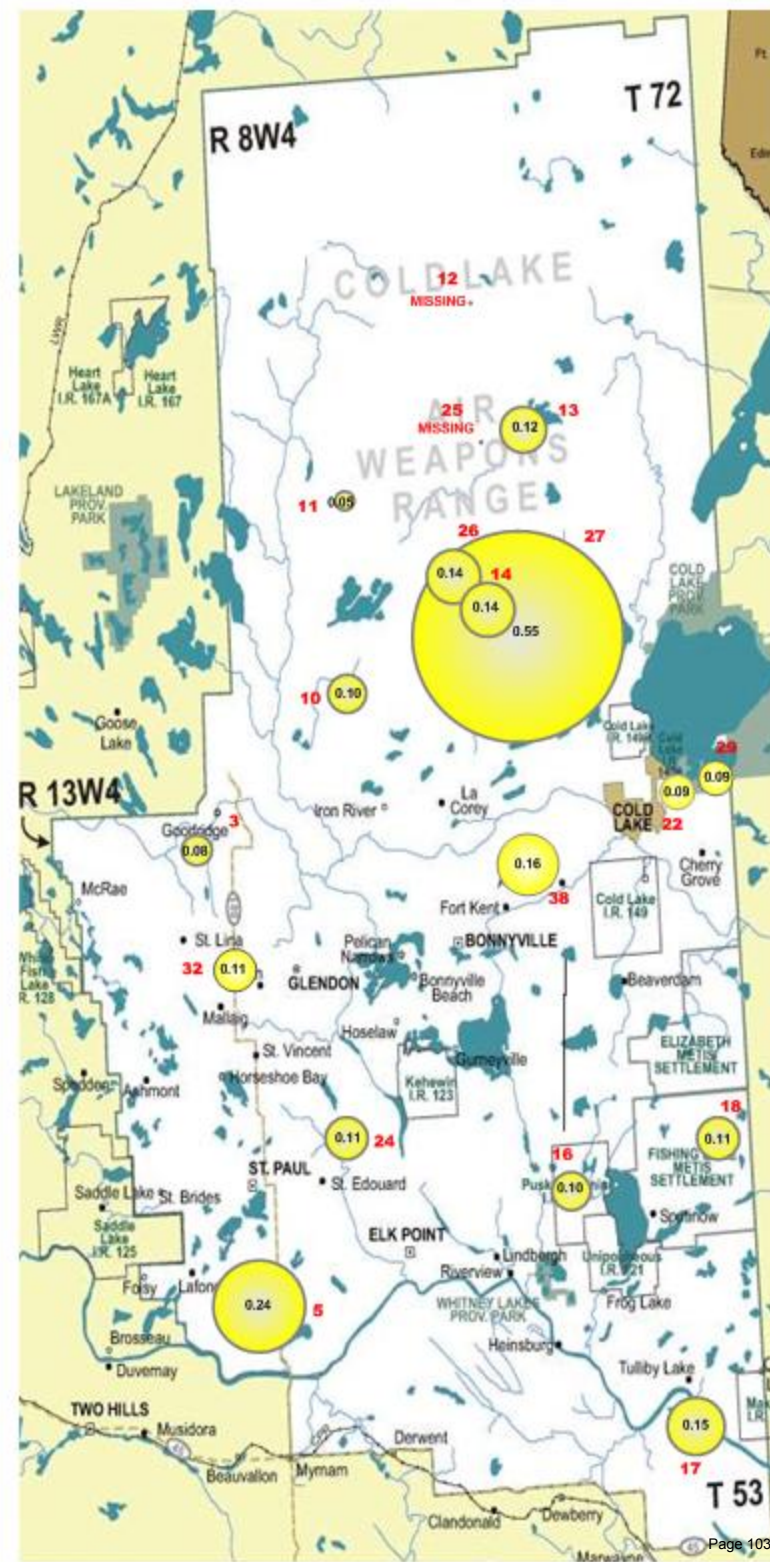
PASSIVE STATIONS

Station Number	Concentration	Duplicate
3 - Therien	0.08 PPB	NA
5 - Lake Eliza	0.24 PPB	NA
10 - La Corey	0.10 PPB	NA
11 - Wolf Lake	0.05 PPB	NA
12 - Foster Creek	MISSING	NA
13 - Primrose	0.12 PPB	NA
14 - Maskwa	0.15 PPB	0.13 PPB
16 - Frog Lake	0.10 PPB	0.10 PPB
17 - Clear Range	0.15 PPB	NA
18 - Fishing Lake	0.11 PPB	NA
22 - Cold Lake South	0.09 PPB	NA
24 - Fort George	0.11 PPB	NA
25 - Burnt Lake	MISSING	NA
26 - Mahihkan	0.14 PPB	NA
27 - Mahkeses	0.55 PPB	NA
29 - Cold Lake South 2	0.09 PPB	NA
32 - St. Lina	0.11 PPB	NA
38 - Bonnyville	0.16 PPB	NA



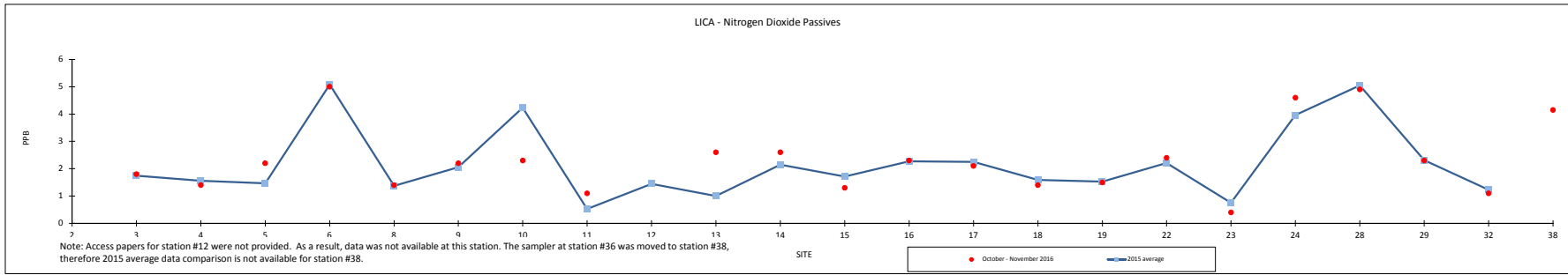
Summary

Minimum : 0.05 PPB - Wolf Lake
 Maximum: 0.55 PPB - Mahkeses
 Average: 0.15 PPB *Includes Duplicates



Passive Summary Results for October - November 2016 Lakeland Industry & Community Association

	Nitrogen Dioxide ppb																																				October - November 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	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	2.3	-												
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	0.4	#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	5.0	#6												



Lakeland Industry & Community Association NO₂ Passive Bubble Map

OCTOBER - NOVEMBER 2016

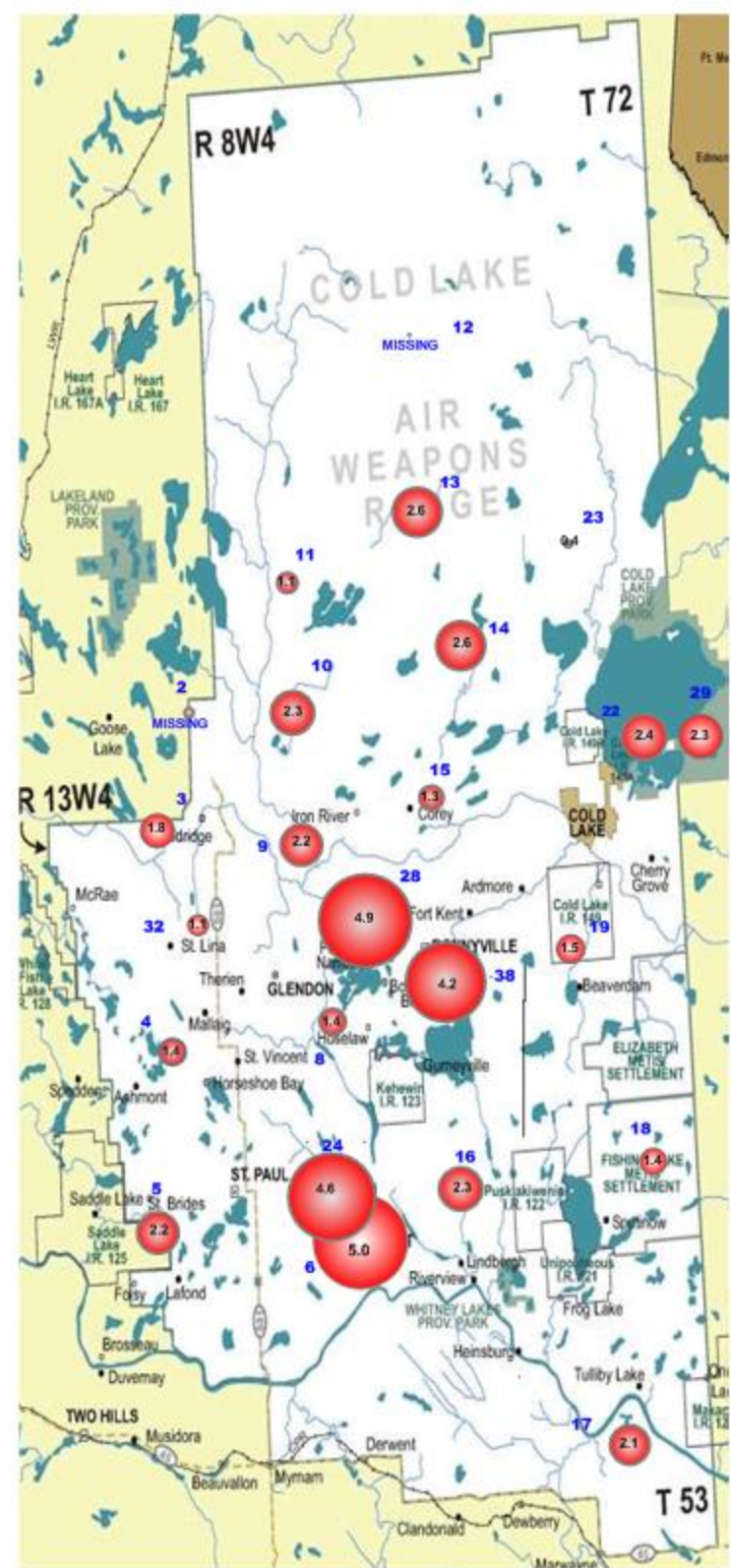
PASSIVE STATIONS

	PASSIVE STATIONS	DUPLICATE	
2	Sand River	MISSING	NA
3	Therien	1.8 PPB	1.8 ppb
4	Flat Lake	1.4 PPB	NA
5	Lake Eliza	2.2 PPB	NA
6	Telegraph Creek	5.0 PPB	NA
8	Muriel-Kehewin	1.4 PPB	NA
9	Dupre	2.2 PPB	NA
10	La Corey	2.3 PPB	NA
11	Wolf Lake	1.1 PPB	NA
12	Foster Creek	MISSING	NA
13	Primrose	2.6 PPB	NA
14	Maskwa	2.6 PPB	NA
15	Ardmore	1.3 PPB	NA
16	Frog Lake	2.3 PPB	NA
17	Clear Range	2.1 PPB	NA
18	Fishing Lake	1.4 PPB	NA
19	Beaverdam	1.5 PPB	NA
22	Cold Lake South	2.4 PPB	NA
23	Medley-Martineau	0.4 PPB	NA
24	Fort George	4.6 PPB	NA
28	Town of Bonnyville	4.9 PPB	NA
29	Cold Lake South 2	2.3 PPB	NA
32	St. Lina	1.1 PPB	NA
38	Bonnyville	4.4 PPB	3.9 PPB



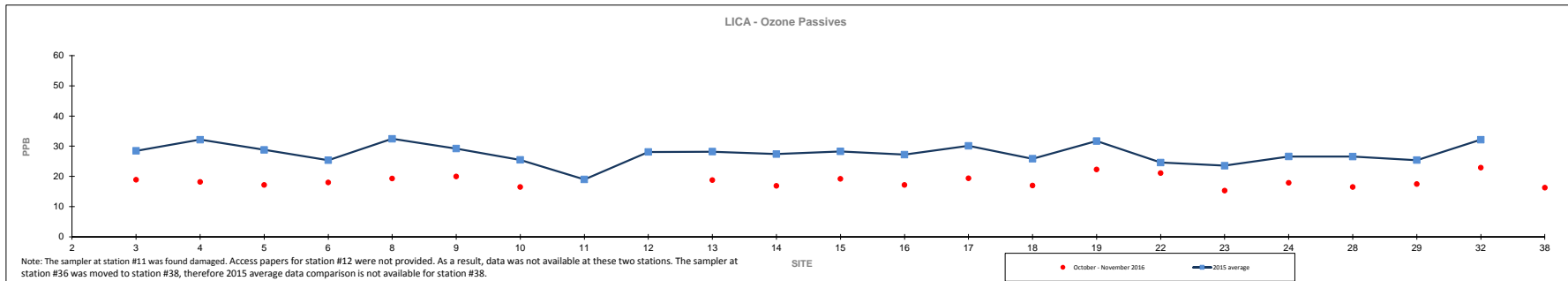
Summary

Minimum : 0.4 PPB – Medley-Martineau
 Maximum: 5.0 PPB – Telegraph Creek
 Average: 2.3 PPB *Includes Duplicates



Passive Summary Results for October - November 2016 Lakeland Industry & Community Association

	Ozone ppb																												October - November 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	18.4	-				
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	15.3	#23				
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	22.9	#32				



Lakeland Industry & Community Association O₃ Passive Bubble Map

OCOTOBER – NOVEMBER 2016

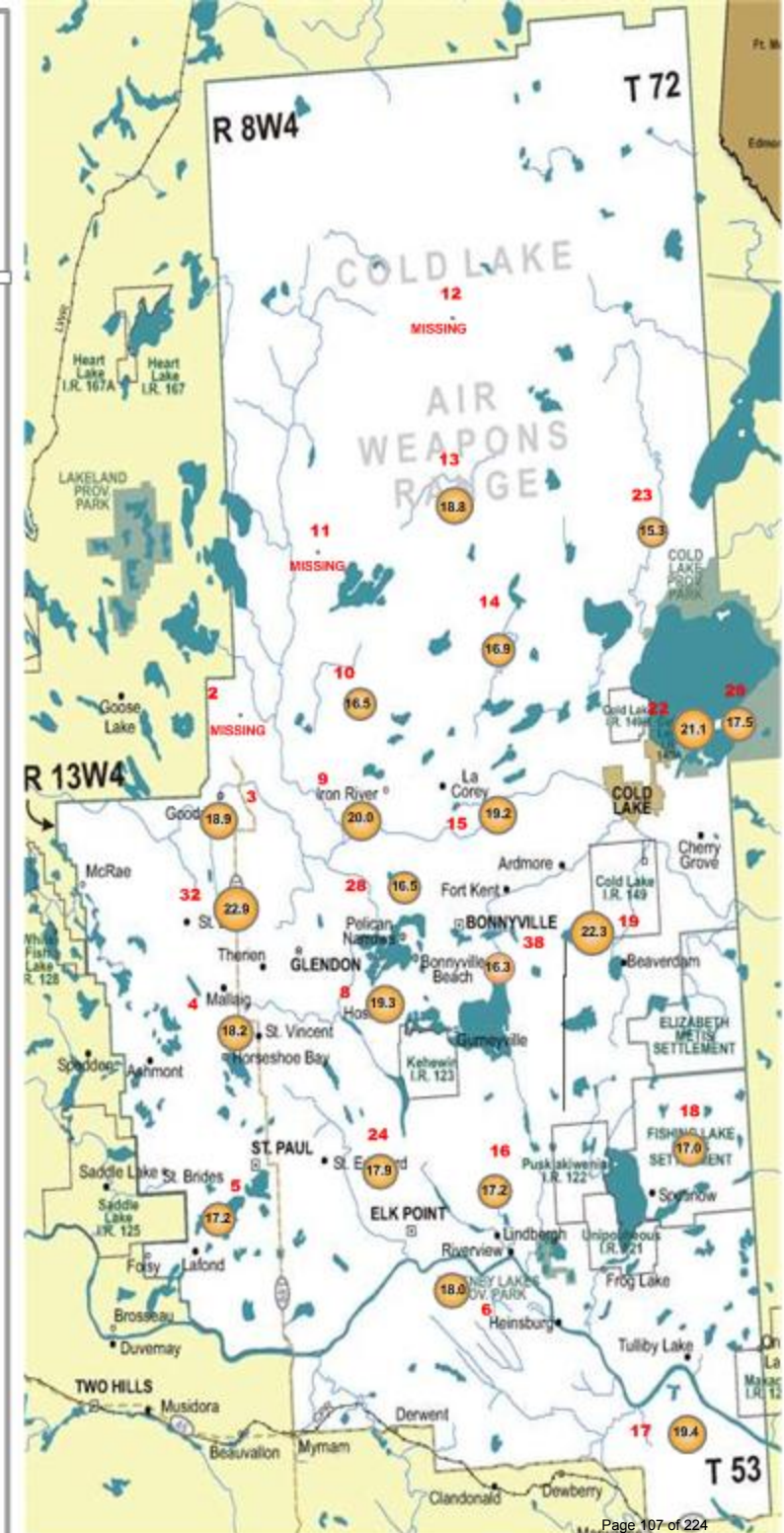
PASSIVE STATIONS

		DUPLICATE
2 – Sand River	MISSING	NA
3 – Therien	18.2 PPB	19.6 PPB
4 – Flat Lake	18.2 PPB	NA
5 – Lake Eliza	17.2 PPB	NA
6 – Telegraph Creek	18.0 PPB	NA
8 – Muriel-Kehewin	19.3 PPB	NA
9 – Dupre	20.0 PPB	NA
10 – La Corey	16.5 PPB	NA
11 – Wolf Lake	MISSING	NA
12 – Foster Creek	MISSING	NA
13 – Primrose	18.8 PPB	NA
14 – Maskwa	16.9 PPB	NA
15 – Ardmore	19.2 PPB	NA
16 – Frog Lake	17.2 PPB	NA
17 – Clear Range	19.4 PPB	NA
18 – Fishing Lake	17.0 PPB	NA
19 – Beaverdam	22.3 PPB	NA
22 – Cold Lake South	21.1 PPB	NA
23 – Medley-Martineau	15.3 PPB	NA
24 – Fort George	17.9 PPB	NA
28 – Town of Bonnyville	16.5 PPB	NA
29 – Cold Lake South 2	17.5 PPB	NA
32 – St. Lina	22.9 PPB	NA
38 – Bonnyville	16.0 PPB	16.6 PPB



Summary

Minimum : 15.3 PPB – Medley-Martineau
 Maximum: 22.9 PPB – St. Lina
 Average: 18.4 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: 14703
 Station ID: LICA 01 Installation Date/Time (mst): Oct 28, 2016 @ 08:24
 Sample ID: LICA/VOC/CLS/Nov 2, 2016 Removal Date/Time (mst): Nov 04, 2016 @ 09:10

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>Oct 27, (A.Y) Nov 2, 2016</u>	<u>00:00</u>	<u>00:00 Nov 3, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.0</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: Sep 02, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: May 03, 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: Sep 02, 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: [Signature] Date: Nov 04, 2016

Sample ID: 16110059-001

Customer ID: LICA
 Cust Samp ID: LICAVOC/CLS/Nov 2,

Priority: Normal



Volatile Organics Data Results

Date: November 2, 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	< 0.03
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	0.03
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	0.04
3-Methylheptane	< 0.02
3-Methylhexane	< 0.02
3-Methylpentane	0.03
Acetone	1.60
Acrolein	< 0.3
Benzene	0.06
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	0.02
Carbon disulfide	0.05
Carbon tetrachloride	0.13
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.03
Chloromethane	0.52
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	0.90
Ethyl acetate	< 0.4
Ethylbenzene	0.02
Freon-11	0.38

Volatile Organics Data Results

Date: November 2, 2016
Canister ID: 14703

PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.07
Freon-114	0.03
Freon-12	0.75
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.60
Isopentane	0.26
Isoprene	< 0.01
Isopropyl alcohol	1.30
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	0.02
Methylcyclopentane	0.02
Methylene chloride	< 0.3
n-Butane	0.48
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.01
n-Hexane	0.05
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.10
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
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	0.06
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

Sample ID: 16110116-004

AIR FCD-01320/2



Customer ID: LICA

Cust Samp ID: LICA/VOC/CLS/Nov 8,

Maxxam

Priority: Normal

VOC Sample Collection Data Sheet

Client: LICA
Location: COLD LAKE SOUTH
Station ID: LICA 01
Field Sample ID: LICA/VOC/CLS/ NOV 08, 2016

Sampler S/N: 6167
Canister ID: S5624
Canister Installation Date/Time: NOV 04, 2016 @ 09:10
Canister Removal Date/Time: NOV 09, 2016 @ 11:17

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
<u>NOV 08, 2016</u>	<u>00:00</u>	<u>24:00</u>	<u>24</u>

Flow Settings		
Meter Reading (sccm)	Pot Set Pt.	Pump Pressure Setting (psig)
<u>10.0</u>	<u>6.52</u>	<u>24</u>

Canister Information	
Initial Canister Vacuum (inHg)	Final Canister Pressure (psig)
<u>-28</u>	<u>+23.4</u>

Canister valve open prior to sampling?: YES / NO
Timer set to 0.00 minutes prior to sampling? YES / NO
Canister valve closed prior to disconnection?: YES / NO

Comments: Sample line and fitting replaced on NOV 09, 2016

Technician Signature: Installed by [Signature]
Collected by Alex Yakupov

Date: Nov 09, 2016
Time: 11:17

Volatile Organics Data Results

Date: November 8, 2016
Canister ID: S5624

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	0.05
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	0.04
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.14
1-Hexene	< 0.02
1-Pentene	0.02
2,2,4-Trimethylpentane	0.07
2,2-Dimethylbutane	0.02
2,3,4-Trimethylpentane	0.02
2,3-Dimethylbutane	0.06
2,3-Dimethylpentane	0.10
2,4-Dimethylpentane	0.04
2-Methylheptane	0.03
2-Methylhexane	0.09
2-Methylpentane	0.19
3-Methylheptane	< 0.02
3-Methylhexane	0.08
3-Methylpentane	0.13
Acetone	1.70
Acrolein	< 0.3
Benzene	0.17
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	0.02
Carbon disulfide	0.03
Carbon tetrachloride	0.14
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.05
Chloromethane	0.49
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.03
cis-2-Pentene	< 0.02
Cyclohexane	0.06
Cyclopentane	0.03
Dibromochloromethane	< 0.01
Ethanol	1.10
Ethyl acetate	< 0.4
Ethylbenzene	0.05
Freon-11	0.38

Volatile Organics Data Results

Date: November 8, 2016
Canister ID: S5624

PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.08
Freon-114	0.02
Freon-12	0.78
Hexachloro-1,3-butadiene	< 0.50
Isobutane	1.36
Isopentane	0.93
Isoprene	0.02
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	0.18
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	0.12
Methylcyclopentane	0.13
Methylene chloride	< 0.3
n-Butane	2.45
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.07
n-Hexane	0.18
n-Nonane	0.01
n-Octane	0.02
n-Pentane	0.50
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	0.01
o-Xylene	0.07
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.31
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.04
trans-2-Pentene	0.03
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: 2534
 Station ID: LICA 01 Installation Date/Time (mst): Nov 09, 2016 @ 11:24
 Sample ID: LICA/VOC/CLS/Nov 14, 2016 Removal Date/Time (mst): Nov 16, 2016 @ 16:14

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>Nov 14, 2016</u>	<u>00:00</u>	<u>00:00</u> <u>Nov 15, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.0</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>24.0</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: Sep 02, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: Nov 09, 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 : Sep 02, 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Nov 16, 2016



Sample ID: 16110212-002
Customer ID: LICA
Cust Samp ID: LICA/VOC/CLS/Nov 14, 20165

Volatile Organics Data Results

Date: November 14, 2016
Canister ID: 2534

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	0.07
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	< 0.01
2,2-Dimethylbutane	0.02
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	0.03
2,3-Dimethylpentane	0.03
2,4-Dimethylpentane	< 0.01
2-Methylheptane	0.01
2-Methylhexane	0.02
2-Methylpentane	0.08
3-Methylheptane	< 0.02
3-Methylhexane	0.03
3-Methylpentane	0.05
Acetone	3.30
Acrolein	< 0.3
Benzene	0.06
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	1.22
Carbon tetrachloride	0.12
Chlorobenzene	< 0.02
Chloroethane	0.11
Chloroform	0.03
Chloromethane	0.52
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	4.80
Ethyl acetate	< 0.4
Ethylbenzene	< 0.01
Freon-11	0.32

Volatile Organics Data Results

Date: November 14, 2016
Canister ID: 2534

PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.07
Freon-114	0.02
Freon-12	0.67
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.78
Isopentane	0.45
Isoprene	< 0.01
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	0.09
Methylcyclopentane	0.07
Methylene chloride	< 0.3
n-Butane	0.97
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.03
n-Hexane	0.07
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.30
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 A.Y.
 Location: Cold Lake South Canister ID: 8 56389
 Station ID: LICA 01 Installation Date/Time (mst): Nov 16, 2016 @ 16:14
 Sample ID: LICA/VOC/CLS/NOV 20, 2016 Removal Date/Time (mst): NOV 21, 2016 @ 09:41

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>Nov 20, 2016</u>	<u>00:00</u>	<u>00:00 Nov 21, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.0</u>	<u>+23.4</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>6.52</u>	<u>24.0</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: Sep 02, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: NOV 09, 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: Sep 02, 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Nov 21, 2016

Sample ID: 16110222-005

Customer ID: LICA
 Cust Samp ID: LICA/VOC/CLS/Nov 20, 2016



Volatile Organics Data Results

Date: November 20, 2016
Canister ID: S5639

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2-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	< 0.01
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	0.03
3-Methylheptane	< 0.02
3-Methylhexane	< 0.02
3-Methylpentane	0.02
Acetone	0.70
Acrolein	< 0.3
Benzene	0.06
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	< 0.01
Carbon tetrachloride	0.13
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.03
Chloromethane	0.47
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	0.30
Ethyl acetate	< 0.4
Ethylbenzene	< 0.01
Freon-11	0.37

Volatile Organics Data Results

Date: November 20, 2016
Canister ID: S5639

PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.09
Freon-114	0.02
Freon-12	0.75
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.27
Isopentane	0.15
Isoprene	< 0.01
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	0.01
Methylcyclopentane	< 0.02
Methylene chloride	< 0.3
n-Butane	0.53
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	0.10
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	0.04
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: S 5620
 Station ID: LICA 01 Installation Date/Time (mst): Nov 21, 2016 @ 09:41
 Sample ID: LICA/VOC/CLS/Nov 26, 2016 Removal Date/Time (mst): Nov 28, 2016 @ 09:52

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>Nov 26, 2016</u>	<u>00:00</u>	<u>00:00</u> <u>Nov 27, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>- 27.0</u>	<u>+ 21.3</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>6.52</u>	<u>24.0</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: Sep 02, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: Nov 09, 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: Sep 02, 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Nov 28, 2016

Sample ID: 16110258-003

Customer ID: LICA
 Cust Samp ID: LICA/VOC/CLS/Nov 26, 2016



Volatile Organics Data Results

Date: November 26, 2016
Canister ID: S5620

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	0.04
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.13
1-Hexene	< 0.02
1-Pentene	0.02
2,2,4-Trimethylpentane	0.05
2,2-Dimethylbutane	0.02
2,3,4-Trimethylpentane	0.02
2,3-Dimethylbutane	0.04
2,3-Dimethylpentane	0.07
2,4-Dimethylpentane	0.02
2-Methylheptane	0.02
2-Methylhexane	0.06
2-Methylpentane	0.14
3-Methylheptane	< 0.02
3-Methylhexane	0.05
3-Methylpentane	0.09
Acetone	1.2
Acrolein	< 0.3
Benzene	0.19
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	0.4
Carbon tetrachloride	0.12
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.03
Chloromethane	0.49
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.08
cis-2-Pentene	< 0.02
Cyclohexane	0.05
Cyclopentane	0.05
Dibromochloromethane	< 0.01
Ethanol	1
Ethyl acetate	< 0.4
Ethylbenzene	0.03
Freon-11	0.36
Freon-113	0.06

Volatile Organics Data Results

Date: November 26, 2016
Canister ID: S5620

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.02
Freon-12	0.72
Hexachloro-1,3-butadiene	< 0.50
Isobutane	1.82
Isopentane	0.94
Isoprene	< 0.01
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	0.09
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	0.08
Methylcyclopentane	0.1
Methylene chloride	< 0.3
n-Butane	2.96
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.06
n-Hexane	0.13
n-Nonane	< 0.01
n-Octane	0.02
n-Pentane	0.5
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	0.04
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.18
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.03
trans-2-Pentene	0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

PAH RESULTS

Sample ID: 16110059-002

Customer ID: LICA

Cust Samp ID: LICA/PUF/CLS/Nov 2, 2016

Priority: Normal

SCH 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>Oct 28, 2016/08:34</u>
Field Sample ID:	<u>LICA/PUF/CLS/Nov 2, 2016</u>	Removal Date/Time:	<u>Nov 04, 2016/09:35</u>

Sample Data Collection Information

Sample Date:	<u>Nov 2, 2016</u>	Average Pressure (mmHg)	<u>712</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q _{std})	<u>229</u>
End Time (mst):	<u>00:00 Nov 3, 2016</u>	Average Temperature (°C)	<u>-0.9</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 ?	<u>YES</u>	NO
Average temperature appears correct?	<u>YES</u>	NO
Average pressure appears correct?	<u>YES</u>	NO
Any error messages? (if yes list below)	YES	<u>NO</u>
Sample duration 24 hours?	<u>YES</u>	NO
Date of last calibration/audit:	<u>Sep 02, 2016</u>	
Other observations?		



Deployed By: Alex Yankov

Collected By: [Signature] Date: Nov 04, 2016

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: November 2, 2016
PUF S/N: A13-02

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	< 0.01
2-Methylnaphthalene	0.03
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	< 0.01
Acenaphthylene	< 0.01
Acridine	< 0.01
Anthracene	< 0.01
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	0.02
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	< 0.01
Fluorene	0.02
Indeno(1,2,3-cd)pyrene	0.08
Naphthalene	0.02
Perylene	< 0.01
Phenanthrene	0.07
Pyrene	< 0.01
Retene	< 0.01



Sample ID: 16110116-005

Customer ID: LICA
 Cust Samp ID: LICA/PUF/CLS/Nov 8, 2016

Maxxam

Priority: Normal

Hi-Vol PUF+ Sample Collection Data Sheet

Client: LICA
 Location: COLD LAKE SOUTH
 Station ID: CLA LICA 01
 Field Sample ID: ICA/PUF/CLS/NOV 08, 2016

Nov 04, 2016
 Puf+ S/N: CU-A13-02 TE 05
 Motor S/N: 1138/100-1020
 Installation Date/Time: NOV 04, 2016 /
 Removal Date/Time: Nov 09, 2016 / 10:59 ←?

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
NOV 08, 2016	00:00	24:00	24:00

PUF and QFF Information			
Date Received	Date Shipped	Puf Expiration Date	QFF Prep Date
n/a	n/a	n/a	n/a

Set Flow Rate (slpm): 230

Date of Last Calibration: Sep 02, 2016

Sampling Data			
Average Pressure (mmHg)	Average Flow (Qstd slpm)	Average Temperature (°C)	Volume (Vstd m ³)
710	229	5.5°	330.21

Time set correctly prior to sampling? YES / NO
 Timer set correctly prior to sampling? YES / NO
 Sampling data saved to memory card after sampling? YES / NO

Comments: n/a

Technician Signature: Installed by Chris Wesson
Collected by Alex Yakupov Date: Nov 09, 2016
 Time: 10:59

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: November 8, 2016
PUF S/N: TE05

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.33
2-Methylnaphthalene	0.56
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.06
Acenaphthylene	0.30
Acridine	< 0.01
Anthracene	0.04
Benzo(a)anthracene	0.03
Benzo(a)pyrene	0.02
Benzo(b,j,k)fluoranthene	< 0.01
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	0.02
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	0.14
Indeno(1,2,3-cd)pyrene	0.05
Naphthalene	0.39
Perylene	< 0.01
Phenanthrene	0.43
Pyrene	0.08
Retene	0.11

TISCH 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>Nov 16, 2016/16:07</u>
Field Sample ID:	<u>LICA/PUF/CLS/Nov 20, 2016</u>	Removal Date/Time:	<u>Nov 21, 2016/09:51</u>
Sample Data Collection Information			
Sample Date:	<u>Nov 20, 2016</u>	Average Pressure (mmHg)	<u>712</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q _{std})	<u>229</u>
End Time (mst):	<u>00:00 Nov 21, 2016</u>	Average Temperature (°C)	<u>-5.1</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (V _{std} m ³)	<u>330.21</u>
Sample Recovery Checklist			
(circle one)			
Flow Rate 230 slpm +/- 0.2 slpm ?	<u>YES</u>	NO	
Average temperature appears correct?	<u>YES</u>	NO	
Average pressure appears correct?	<u>YES</u>	NO	
Any error messages? (if yes list below)	YES	<u>NO</u>	
Sample duration 24 hours?	<u>YES</u>	NO	
Date of last calibration/audit:	<u>Sep 02, 2016</u>		
Other observations?	<u>n/a</u>		
<div style="border: 2px solid blue; padding: 5px; display: inline-block;"> <p style="margin: 0; font-weight: bold; color: blue;">RECEIVED</p> <p style="margin: 0; color: red;">NOV 22 2016</p> </div>			
<p>Sample ID: 16110222-006</p> <p>Customer ID: LICA</p> <p>Cust Samp ID: LICA/PUF/CLS/Nov 20, 2016</p>			
Deployed By:	<u>Alex Yakupov</u>		
Collected By:	<u>Alex Yakupov</u>	<u>Date: Nov 21, 2016</u>	

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: November 20, 2016
PUF S/N: TE-01

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.06
2-Methylnaphthalene	0.09
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.05
Acenaphthylene	0.05
Acridine	< 0.01
Anthracene	< 0.01
Benzo(a)anthracene	0.03
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	0.05
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	0.07
Fluorene	0.04
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.06
Perylene	< 0.01
Phenanthrene	0.17
Pyrene	0.09
Retene	0.04



TISCH PUF PLUS Sample Collection Data Sheet			
Client:	<u>LICA</u>	Puf+ S/N:	<u>9801</u>
Location:	<u>Cold Lane South</u>	Motor S/N:	<u>1138/100-1020</u>
Station ID:	<u>LICA 01</u>	Installation Date/Time:	<u>Nov 21, 2016/09:51</u>
Field Sample ID:	<u>LICA/PUF/CLS/NOV 26, 2016</u>	Removal Date/Time:	<u>Nov 28, 2016 / 09:44</u>
Sample Data Collection Information			
Sample Date:	<u>Nov 26, 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 Nov 27, 2016</u>	Average Temperature (°C)	<u>-2.4°</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (Vstd 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)	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>Sep 02, 2016</u>		
Other observations?	<u>n/a</u>		
Sample ID: 16110258-004 Customer ID: LICA Cust Samp ID: LICA/PUF/CLS/Nov 26, 2016			
Deployed By:	<u>Alex Yakupov</u>		
Collected By:	<u>Alex Yakupov</u>	<u>Date: Nov 28, 2016</u>	

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: November 26, 2016
PUF S/N: 9801

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.16
2-Methylnaphthalene	0.28
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.13
Acenaphthylene	0.14
Acridine	< 0.01
Anthracene	0.07
Benzo(a)anthracene	0.06
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	0.08
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	0.03
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.17
Fluorene	0.16
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.24
Perylene	< 0.01
Phenanthrene	0.47
Pyrene	0.19
Retene	0.49

PARTISOL RESULTS

Partisol Sample Data Sheet

Date Sampled: Nov 2, 2016
Location: Cold Lake South
Parameter: TSP PM10
Filter #: P 603 13 41

PM2.5



Start Time 00:00 NOV 2, 2016
End Time 00:00 NOV 3, 2016
Status OK
Std Vol 24.872
Valid Time 24:00
Total Time 24.0

Sample ID: 16110057-001
Customer ID: LICA
Cust Samp ID: LICA Fit #P6031341
Priority: Normal

Comments: Weather Conditions, etc.

Light snow / Fog
Sample inlet head was cleared on Oct 24, 2016
Date of last audit: Oct 24, 2016

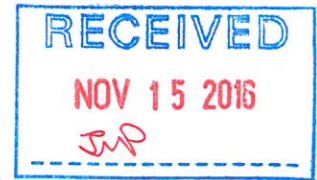
Technician Signature: Alex Yakupov
Date:
Time:

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 Sample Data Sheet



Date Sampled: Nov 08, 2016
Location: COLD LAKE SOUTH
Parameter: TSP PM10
Filter #: P6031342

PM2.5

Sample ID: 16110118-001

Customer ID: LICA
Cust Samp ID: LICA Fit # P6031342

Priority: Normal

Start Time 00:00
End Time 24:00
Status OK
Std Vol 24.224
Valid Time 24.0
Total Time 24:00

Comments: Weather Conditions, etc.

n/a

Sample inlet head cleaned on Oct 24, 2016

Date of last calibration: Oct 24, 2016

Technician Signature:

Installed by: [Signature]

Retrieved by: Alex Yakupov

Date: Nov 09, 2016

Time: 10:47

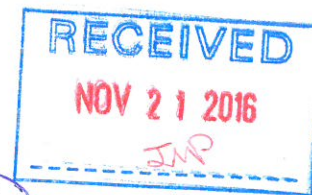
Programming

- 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"
- 8) **Make Sure it is left in RUN mode**

Note: Beginning & End
Date should be same date

Partisol Sample Data Sheet

Date Sampled: Nov 14, 2016
 Location: Cold Lake South
 Parameter: TSP PM10
 Filter #: P 603 1343
 Start Time 00:00 Nov 14, 2016
 End Time 00:00 Nov 15, 2016
 Status OK
 Std Vol 23.928
 Valid Time 24:00
 Total Time 24.0



PM2.5

Sample ID: 16110216-001
 Customer ID: LICA
 Cust Samp ID: LICA Fil #P6031343
 Priority: Normal

Comments: Weather Conditions, etc.

Sample inlet head cleaned on Oct 24, 2016
Date of last calibration : Oct 24, 2016

Technician Signature: Alex Yakupov
 Date: Nov 16, 2016
 Time: 18:36

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 Sample Data Sheet

Date Sampled: Nov 20, 2016

Location: Cold Lake South

Parameter: TSP PM10

PM2.5

Filter #: P 603 B 44

Start Time 00:00 Nov 20, 2016

End Time 00:00 Nov 21, 2016

Status OK

Std Vol 25.124

Valid Time 24:00

Total Time 24.0

Sample ID: 16110221-001

Customer ID: LICA

Cust Samp ID: LICA Flt# P6031344

Priority: Normal



Comments: Weather Conditions, etc.

Sample inlet cleaned on Oct 24, 2016

Date of last calibration: Oct 24, 2016

Technician Signature: Alex Yakupov

Date: Nov 21, 2016

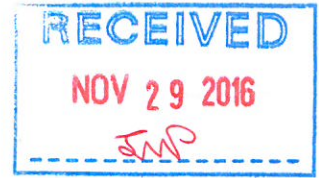
Time: 09:56

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 Sample Data Sheet



Date Sampled: Nov 26, 2016
Location: Cold Lake South
Parameter: TSP PM10
Filter #: P619 30 28

PM2.5

Sample ID: 16110261-001

Customer ID: LICA
Cust Samp ID: LICA Fit #P6193028

Priority: Normal

Start Time 00:00 Nov 26, 2016
End Time 00:00 Nov 27, 2016
Status OK
Std Vol 24.807
Valid Time 24:00
Total Time 24.0

Comments: Weather Conditions, etc.

n/a
Sample inlet cleaned on Oct 24, 2016
Date of last calibration: Oct 24, 2016

Technician Signature: Alex Yakupov
Date: Nov 28, 2016
Time: 10:12

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)
November 2	P6031341	0.062
November 8	P6031342	0.064
November 14	P6031343	0.046
November 20	P6031344	0.113
November 26	P6193028	0.219

APPENDIX III
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE



Thermo 43i Sulphur Dioxide Analyzer Calibration

Date: November 8, 2016 Company/Airshed: LICA Location/Station Name: Cold Lake South Parameter: Sulphur Dioxide Start Time 24 hr. (mst): 10:07 End Time 24 hr. (mst): 14:04 Calibration Method: Gas Dilution	Barometric Pressure: 0.935 atm Station Temperature °C: 23 Weather Conditions: A few clouds Calibration Purpose: routine monthly Performed By/Reviewer: Alex Yakupov / Trina Whitsitt <input checked="" type="checkbox"/> Skip Cal Gas Expiry Date: July 18, 2019 Converter Model & s/n (if applicable): n/a
--	--

Analyzer: ID# or Serial Number: 806528242 Last Calibration Date: October 4, 2016 Previous C.F.: 0.999	Range ppb: 500 As Found C.F.: 1.013 New C.F.: 1.000 Station SO2 Analyzer Range? 500 ppb
--	--

Calibrator: Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. #: LL104222 Cal Gas Conc. (ppm): 50.6	Standard Calibration Points for Ranges <table border="1" style="margin: auto;"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>380</td></tr> <tr><td>Mid</td><td>180</td></tr> <tr><td>Low</td><td>90</td></tr> </table>	Point	ppb	High	380	Mid	180	Low	90	SO₂ Scrubber Check (10 mins.) Start/End Time 24 hr.: Target Concentration (ppb): 380 Result (ppb): 3 Zero Corrected Result (ppb): 3 **warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**
Point	ppb									
High	380									
Mid	180									
Low	90									

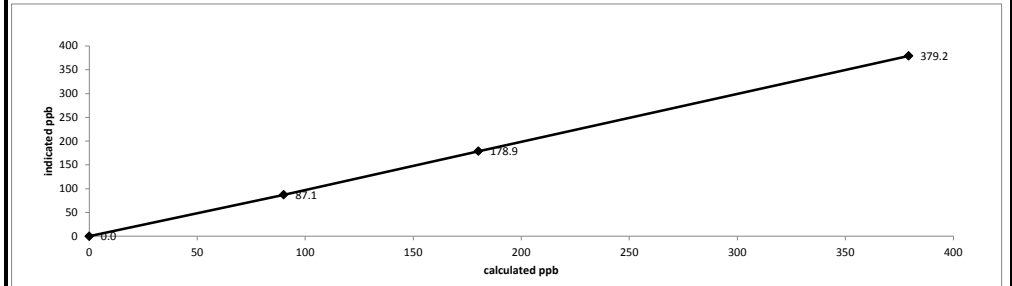
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

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	0.0	n/a
as found high	4965	37.50	5003	379.3	374.3	1.013
adjusted zero	5000	0.00	5000	0.0	0.0	n/a
adjusted high	4965	37.50	5003	379.3	379.2	1.000
mid	4981	17.80	4999	180.2	178.9	1.007
low	4992	8.90	5001	90.1	87.1	1.034
calibrator zero	5000	0.00	5000	0.0	0.0	n/a
Average C.F. =						1.014

Linear Regression/Calibration Results:

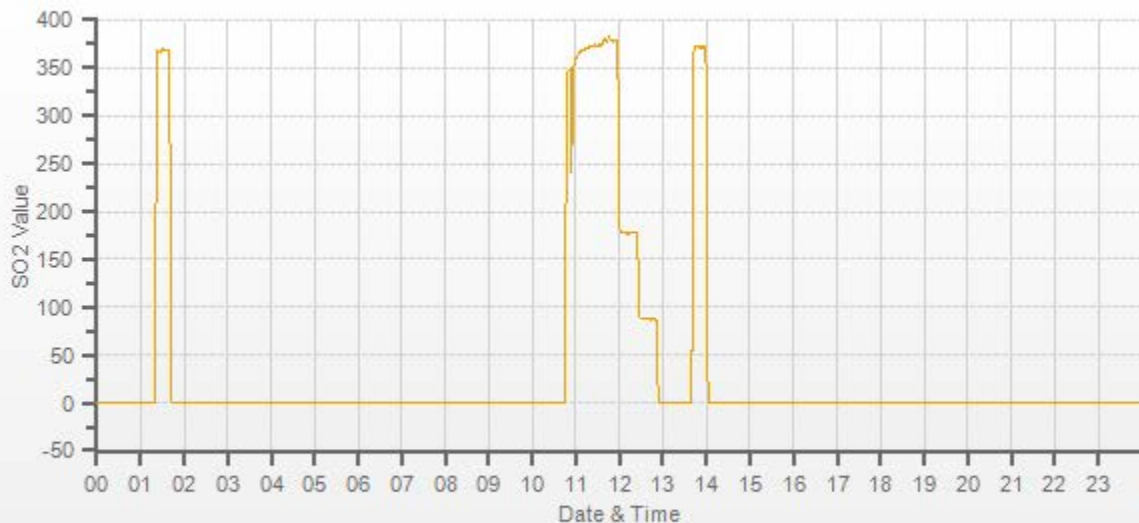
Correlation Coefficient = 1.000 Slope = 0.998 b (Intercept as % of full scale) = 0.29% % change in C.F. from last cal = -1.44%	LIMITS > or = 0.995 .95-1.05 ± 3% F.S. ± 10%
---	---

Thermo 43i Sulphur Dioxide Analyzer Calibration



As found: BKG: 7.8 COEF: 0.972 PMT: -624.2 FLASH: 771 INTERNAL: 28.9 CHAMBER: 45.0 PERM OVEN GAS: 45.01 PERM OVEN HEATER: 44.20 PRESSURE: 678.6 SAMPLE FLOW: 0.474 LAMP INTENSITY: 96 CONVERTER: n/a CONVERTER SET: n/a Expected Value: 374.0	As left: BKG: 7.9 COEF: 0.973 PMT: -624.2 FLASH: 771 INTERNAL: 28.2 CHAMBER: 45.0 PERM OVEN GAS: 44.99 PERM OVEN HEATER: 44.18 PRESSURE: 678.0 SAMPLE FLOW: 0.473 LAMP INTENSITY: 96 CONVERTER: n/a CONVERTER SET: n/a Expected Value: 371.0
--	---

Comments:
 The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned.
 No zero adjustment was required/made. As found zero value copied to adjusted zero value for linearity calculation purposes.



— SO2[ppb]

TOTAL REDUCED SULPHUR



Thermo 450i Total Reduced Sulphur Analyzer Calibration

Date:	November 8, 2016	Barometric Pressure:	0.935 atm
Company/Airshed:	LICA	Station Temperature °C:	23
Location/Station Name:	Cold Lake South	Weather Conditions:	A few clouds
Parameter:	Total Reduced Sulphur	Calibration Purpose:	routine monthly
Start Time 24 hr. (mst):	10:07	Performed By/Reviewer:	Alex Yakupov / Trina Whitsitt
End Time 24 hr. (mst):	14:04	Cal Gas Expiry Date:	June 14, 2019
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	CDNova CDN-101 #501

Analyzer:	ID# or Serial Number: 812728560	Range ppb:	100	Station SO2 Analyzer Range?	
	Last Calibration Date: October 4, 2016	As Found C.F.:	1.064		500 ppb
	Previous C.F.:	1.000	New C.F.:	1.000	

Calibrator:	Flow Meter ID's:	n/a	Standard Calibration Points for Ranges	SO ₂ Scrubber Check (10 mins.)
	Make & Model:	SABIO 2010 D	Point	ppb
	Serial #:	11900613	High	78
	Cal Gas Cylinder I.D. #:	EY 0000654	Mid	38
	Cal Gas Conc. (ppm):	10.2	Low	19
				Start/End Time 24 hr.: 10:40/10:58
				Target Concentration (ppb): 380
				Result (ppb): 0.1
				Zero Corrected Result (ppb): 0
				warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb

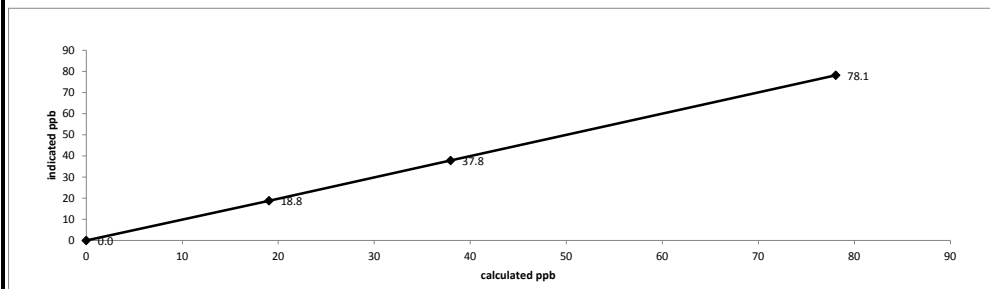
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration: (ppb)	Indicated Concentration: (ppb)	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	7500	0.00	7500	0.0	0.0	n/a
as found high	7442	57.40	7499	78.1	73.4	1.064
adjusted zero	7500	0.00	7500	0.0	0.0	n/a
adjusted high	7442	57.40	7499	78.1	78.1	1.000
mid	7471	27.90	7499	37.9	37.8	1.004
low	7485	14.00	7499	19.0	18.8	1.013
calibrator zero	7500	0.00	7500	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) =	0.13%		± 3% F.S.
% change in C.F. from last cal =	-6.36%		± 10%

Thermo 450i Total Reduced Sulphur Analyzer Calibration



As found:	BKG: 13.9	As left:	BKG: 14.9
	COEF: 0.944		COEF: 1.010
	PMT: -650.8		PMT: -650.8
	FLASH: 740		FLASH: 740
	INTERNAL: 31.7		INTERNAL: 31.4
	CHAMBER: 45.0		CHAMBER: 45.0
	CONVERTER TEMP: 825		CONVERTER TEMP: 825
	CONVERTER SET: 825		CONVERTER SET: 825
	PERM OVEN GAS: 45.0		PERM OVEN GAS: 44.99
	PERM OVEN HTR: 44.38		PERM OVEN HTR: 44.37
	PRESSURE: 654.1		PRESSURE: 655.7
	SAMPLE FLOW: 0.511		SAMPLE FLOW: 0.510
	LAMP INTENSITY: 92		LAMP INTENSITY: 92
	Expected Value: 37.7		Expected Value: 40.3

Comments:

The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned.
 No zero adjustment was required/made. As found zero value copied to adjusted zero value for linearity calculation purposes.



— TRS[ppb]



Thermo 450i Total Reduced Sulphur Analyzer Calibration

Date:	November 9, 2016	Barometric Pressure:	0.933 atm
Company/Airshed:	LICA	Station Temperature °C:	23
Location/Station Name:	Cold Lake South	Weather Conditions:	A few clouds
Parameter:	Total Reduced Sulphur	Calibration Purpose:	repeat
Start Time 24 hr. (mst):	8:57	Performed By/Reviewer:	Alex Yakupov Trina Whitsitt
End Time 24 hr. (mst):	12:46	Cal Gas Expiry Date:	June 14, 2019
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	CDNova CDN-101 #501

Analyzer:	ID# or Serial Number: 812728560	Range ppb:	100	Station SO2 Analyzer Range?	
	Last Calibration Date: November 8, 2016	As Found C.F.:	0.982	500	ppb
	Previous C.F.:	1.000	New C.F.:	0.988	

Calibrator:	Flow Meter ID's:	n/a	Standard Calibration Points for Ranges	SO ₂ Scrubber Check (10 mins.)	
	Make & Model:	API 700	Point	ppb	
	Serial #:	627	High	78	
	Cal Gas Cylinder I.D. #:	EY 0000654	Mid	38	
	Cal Gas Conc. (ppm):	10.2	Low	19	
				Start/End Time 24 hr.:	
				Target Concentration (ppb):	380
				Result (ppb):	
				Zero Corrected Result (ppb):	0
				warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb	

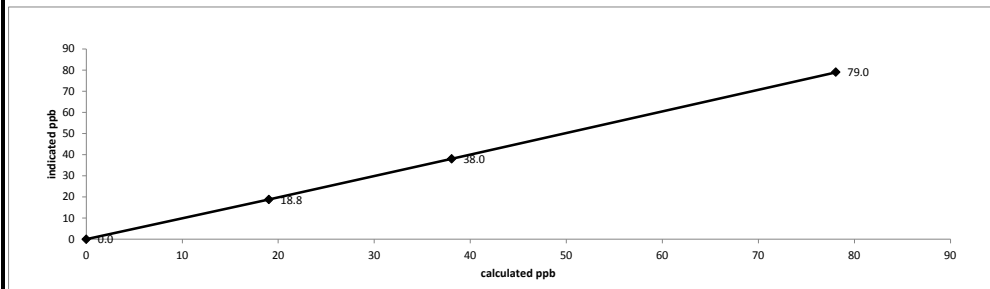
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration: (ppb)	Indicated Concentration: (ppb)	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	7498	0.00	7498	0.0	0.0	n/a
as found high	7442	57.40	7499	78.1	79.5	0.982
adjusted zero	7498	0.00	7498	0.0	0.0	n/a
adjusted high	7442	57.40	7499	78.1	79.0	0.988
mid	7475	28.00	7503	38.1	38.0	1.002
low	7490	14.00	7504	19.0	18.8	1.012
calibrator zero	7498	0.00	7498	0.0	0.0	n/a
Average C.F. =						1.001

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.987		.95-1.05
b (Intercept as % of full scale) =	0.29%		± 3% F.S.
% change in C.F. from last cal =	1.80%		± 10%

Thermo 450i Total Reduced Sulphur Analyzer Calibration



As found:

BKG:	13.9
COEF:	0.944
PMT:	-650.8
FLASH:	741
INTERNAL:	31.2
CHAMBER:	45.0
CONVERTER TEMP:	825
CONVERTER SET:	825
PERM OVEN GAS:	45.0
PERM OVEN HTR:	44.38
PRESSURE:	655.2
SAMPLE FLOW:	0.511
LAMP INTENSITY:	92
Expected Value:	40.3

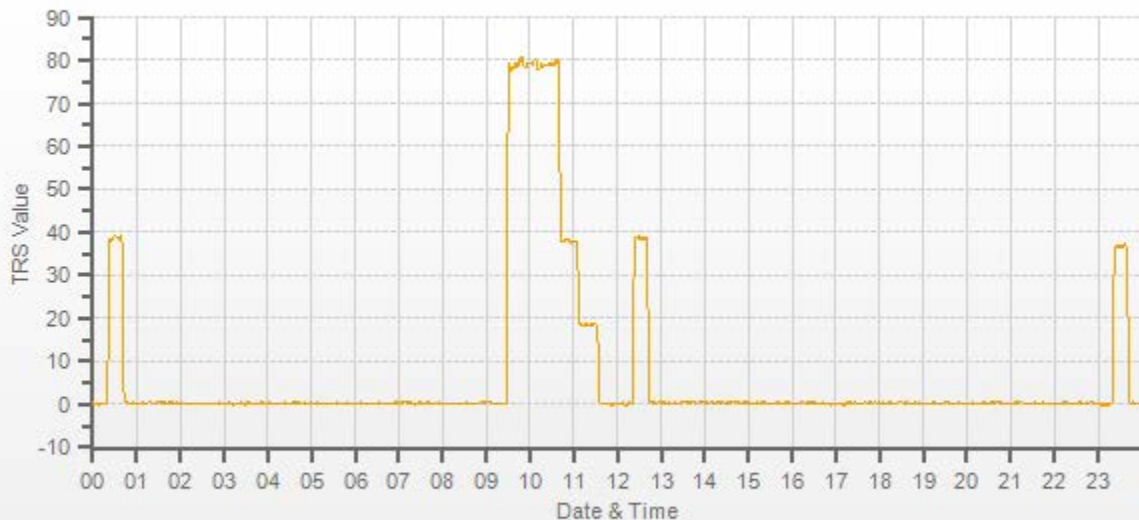
As left:

BKG:	14.4
COEF:	0.974
PMT:	-650.8
FLASH:	741
INTERNAL:	31.0
CHAMBER:	45.0
CONVERTER TEMP:	825
CONVERTER SET:	825
PERM OVEN GAS:	45.0
PERM OVEN HTR:	44.38
PRESSURE:	655.0
SAMPLE FLOW:	0.510
LAMP INTENSITY:	92
Expected Value:	38.0

Comments:

No zero adjustment was required/made. As found zero value copied to adjusted zero value for linearity calculation purposes.

Repeat calibration completed because the As Found High Point response during monthly calibration was found unstable.



— TRS[ppb]

TOTAL HYDROCARBON



Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	November 9, 2016	Barometric Pressure:	0.933 atm
Company/Airshed:	LUCA	Station Temperature °C:	23
Location/Station Name:	Cold Lake South	Weather Conditions:	A few clouds
Parameter:	Total Hydrocarbon	Calibration Purpose:	routine monthly
Start/End Time 24 hr. (mst):	12:02 / 15:34	Performed By/Reviewer:	Alex Yakupov / Trina Whitsitt
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 25, 2023

Analyzer:	ID# or Serial Number:	427408718	Range ppm:	50
	Last Calibration Date:	October 20, 2016	As Found C.F.:	1.007
	Previous Cal High Point C.F.:	1.000	New C.F.:	1.000

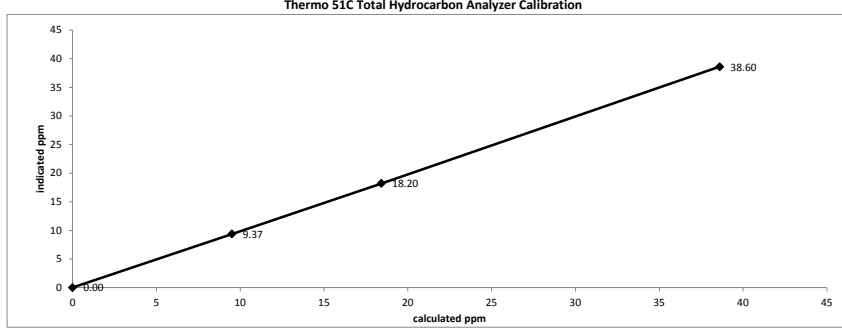
Calibrator:	Flow Meter ID's:	n/a	Standard Calibration Points for a Range of: 50 ppm
	Make & Model:	API 700	
	Serial #:	627	
	Cal Gas Cylinder I.D. #:	LL165372	
	CH ₄ /C ₃ H ₈ Cylinder Conc. (ppm):	606.0 212.0	
	CH ₄ as propane/total CH ₄ equivalents (ppm):	583.0 1189.0	

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

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	0.10	n/a
as found high	1937	65.00	2002	38.60	38.43	1.007
adjusted zero	1999	0.00	1999	0.00	0.00	n/a
adjusted high	1937	65.00	2002	38.60	38.60	1.000
mid	1970	31.00	2001	18.42	18.20	1.012
low	1985	16.00	2001	9.51	9.37	1.015
calibrator zero	1999	0.00	1999	0.0	0.00	n/a
Average C.F. =						1.009

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.999		.95-1.05
b (Intercept as % of full scale) =	0.20%		± 3% F.S.
% change in C.F. from last cal =	-0.71%		± 10%



<p>As found:</p> <p>H2 cylinder (psi): 1100</p> <p>H2 cylinder reg set (psi): 22</p> <p>Span Cylinder (psi): 300</p> <p>Span Cylinder Reg Set (psi): 22</p> <p>Zero Air Gen Pressure: 36</p> <p>measurement alarms: None</p> <p>service alarms: None</p> <p>cnt: 1220</p> <p>rng: 1</p> <p>try: 2</p> <p>flm: 178.2</p> <p>det: 125.3</p> <p>Flame: 178</p> <p>Filter: 125</p> <p>Base: 125</p> <p>Sample psi: 06.51</p> <p>Internal Air Pressure: 20</p> <p>Internal Fuel Pressure: 14</p> <p>Measured Flow: 0.9393</p> <p>Expected Value: 27.12</p>	<p>As left:</p> <p>H2 cylinder (psi): 1100</p> <p>H2 cylinder reg set (psi): 22</p> <p>Span Cylinder (psi): 300</p> <p>Span Cylinder Reg Set (psi): 22</p> <p>Zero Air Gen Pressure: 36</p> <p>measurement alarms: None</p> <p>service alarms: None</p> <p>cnt: 1221</p> <p>rng: 1</p> <p>try: 2</p> <p>flm: 178.6</p> <p>det: 125.5</p> <p>Flame: 178</p> <p>Filter: 125</p> <p>Base: 125</p> <p>Sample psi: 06.51</p> <p>Internal Air Pressure: 20</p> <p>Internal Fuel Pressure: 14</p> <p>Measured Flow: 0.9388</p> <p>Expected Value: 27.53</p>
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Comments:
 The analyzer sample inlet filter was changed.

The analyzer cooling fan filter(s) were cleaned.



— THC[ppm]

NITROGEN DIOXIDE



Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: November 8, 2016	Barometric Pressure: 0.935 atm
Company/Airshed: LICA	Station Temperature °C: 23
Location/Station Name: Cold Lake South	Weather Conditions: A few clouds
Start/End Time 24 hr. (mst): 10:07 / 15:58	Calibration Purpose: routine monthly
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: July 18, 2019

Analyzer: ID# or Serial Number: 1505664393 Last Calibration Date: October 4, 2016 Range ppb: 500	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>0.999</td> <td>1.005</td> <td>0.998</td> </tr> <tr> <td>NO₂ =</td> <td>1.004</td> <td>1.000</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>0.999</td> <td>1.003</td> <td>0.998</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	0.999	1.005	0.998	NO ₂ =	1.004	1.000	1.000	NOx =	0.999	1.003	0.998
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	0.999	1.005	0.998														
NO ₂ =	1.004	1.000	1.000														
NOx =	0.999	1.003	0.998														

Calibrator: Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. #: LL104222 NO/NOx Gas Conc. (ppm): 50.7 50.7	Standard Calibration Points for a Range of: 500 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>380</td> <td>250</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>180</td> <td>145</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>90</td> <td>50</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	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																						

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	4965	37.5	5003	380.1	380.1	378.0	379.0	1.005	1.003
adjusted zero	5000	0.00	5000	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4965	37.50	5003	380.1	380.1	381.0	381.0	0.998	0.998
mid	4981	17.80	4999	180.5	180.5	181.0	181.0	0.997	0.997
low	4992	8.90	5001	90.2	90.2	90.3	90.1	0.999	1.001
calibrator zero	5000	0.00	5000	0	0	0.0	0.0	n/a	n/a
Average C.F. =								0.998	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	4965	37.50	5003	0.0	381.0	381.0	0.0	0.0	0.0	
as found high NO2	4840	37.50	4878	240.0	126.0	381.0	255.0	255.0	255.0	1.000
adjusted high NO2	4840	37.50	4878	240.0	126.0	381.0	255.0	255.0	255.0	1.000
gpt mid	4840	37.50	4878	140.0	235.0	381.0	147.0	146.0	147.0	0.993
gpt low	4840	37.50	4878	45.0	332.0	382.0	49.0	49.0	49.0	1.000
Average NO ₂ C.F. =										0.998

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.997	0.997	0.999	.95-1.05
b (Intercept as % of full scale)=	-0.01%	-0.03%	0.03%	± 3% F.S.
% change in C.F. from last cal=	-0.65%	-0.38%	0.40%	± 10%
NO ₂ converter efficiency			1.00	0.96 to 1.04

As found:	As left:
NO Bkg: 3.5	NO Bkg: 3.5
NOx Bkg: 3.6	NOx Bkg: 3.6
NO Coef: 1.014	NO Coef: 1.018
NO ₂ Coef: 1.000	NO ₂ Coef: 1.000
NOx Coef: 1.000	NOx Coef: 0.998
PMT: -854.7	PMT: -854.7
Internal: 25.6	Internal: 25.4
Chamber: 50.1	Chamber: 50.2
Cooler: -3.1	Cooler: -3.1
NO ₂ Converter: 326.6	NO ₂ Converter: 326.3
NO ₂ Converter Set: 325.0	NO ₂ Converter Set: 325.0
Pressure: 180.2	Pressure: 179.9
Flow: 0.778	Flow: 0.777
Ozonator Flow: OK	Ozonator Flow: OK
Expected Value NO: 2.60	Expected Value NO: 2.40
Expected Value NO ₂ : 266.00	Expected Value NO ₂ : 273.00
Expected Value NOx: 269.00	Expected Value NOx: 276.00

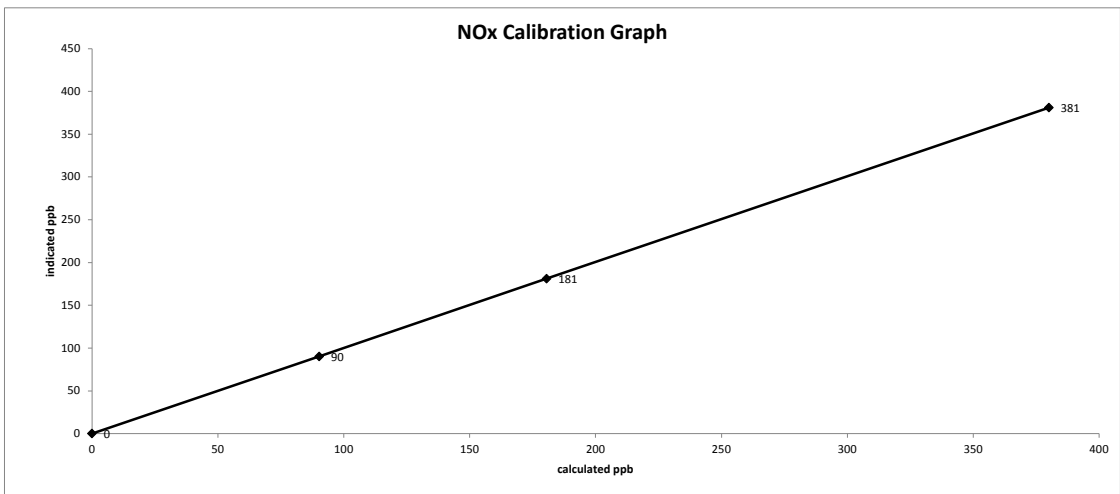
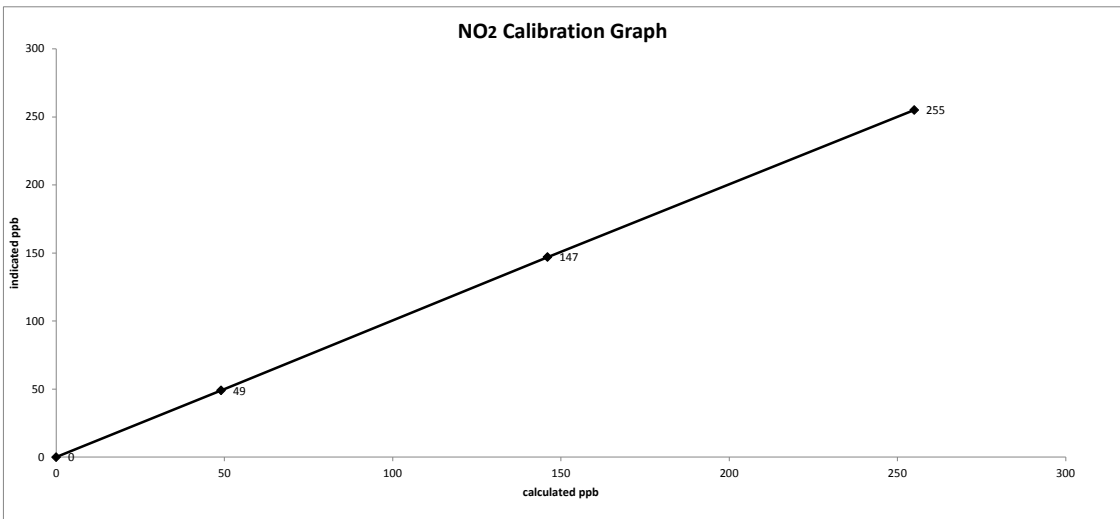
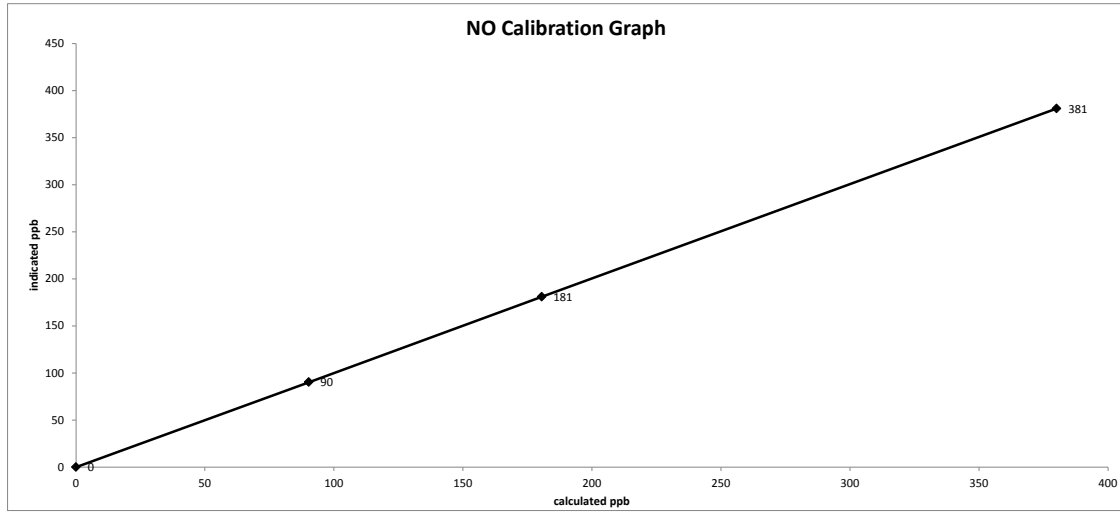
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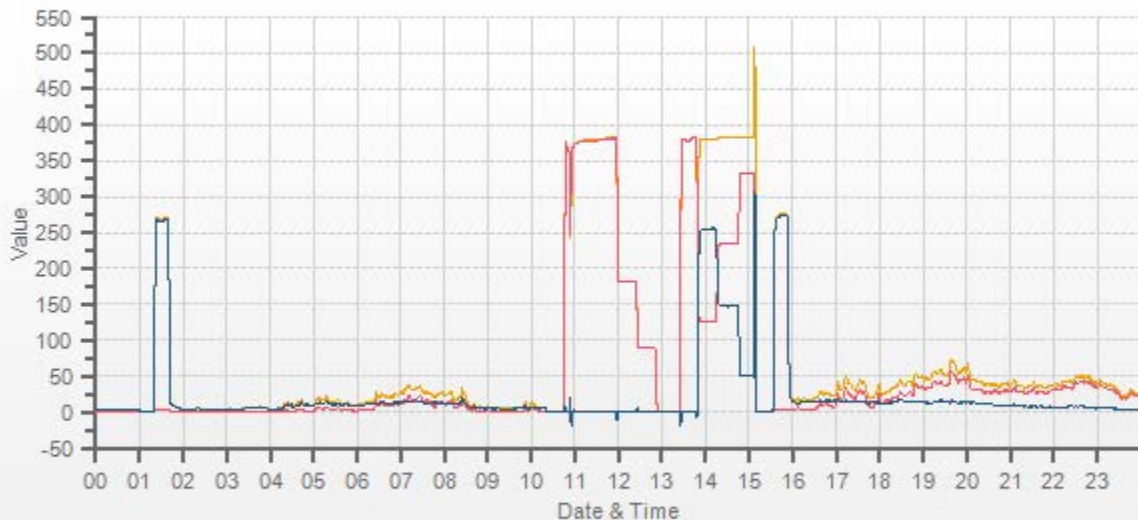
The analyzer sample inlet filter was changed. No high point NO₂ adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.

No zero adjustment was required/made. As found zero values were copied to adjusted zero values for linearity calculation purposes. The analyzer cooling fan filter(s) were cleaned.

Date: November 8, 2016
Company/Airshed: LICA
Location/Station Name: Cold Lake South

Start/End Time 24 hr. (mst): 10:07 / 15:58
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Gas Phase Titration





— NOx[ppb] — NO[ppb] — NO2[ppb]

OZONE

Maxxam Thermo 49i Ozone Analyzer Calibration

A Bureau Veritas Group Company

Date: November 9, 2016
Company/Airshed: LICA
Location/Station Name: Cold Lake South
Start/End Time 24 hr. (mst): 8:57 / 12:51
Ozone Calibration Method: Varying UV Lamp Power
G.P.T. Date: n/a-done by Varying UV Lamp Power
Barometric Pressure: 0.933 atm
Station Temperature °C: 23
Weather Conditions: A few clouds
Calibration Purpose: routine monthly
Performed By/Reviewer: Alex Yakupov / Trina Whitsitt
Cal Gas Expiry Date: n/a

Analyzer:
ID# or Serial Number: 700419591
Last Calibration Date: October 3, 2016
Previous Cal High Point C.F.: 1.000
Ozone Range ppb: 500
As Found C.F.: 1.001
New C.F.: 1.000

Calibrator:
Flow Meter ID's: n/a
Make & Model: SABIO 2010 D
Serial #: 11900613
Cal Gas Cylinder I.D. #: n/a

Point	AMD Required Range of Ozone Calibration Points
High	300-400 ppb
Mid	150-200 ppb
Low	50-75 ppb

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

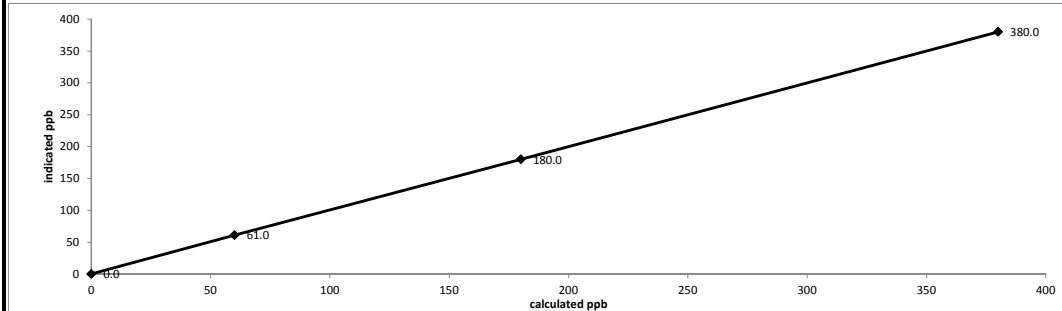
Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5000	5000	0.0	n/a	0.4	n/a
as found high	5000	5000	380.0	380.0	380.0	1.001
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	61.0	0.984
calibrator zero	5000	5000	0.0	n/a	0.0	n/a
Average C.F.=						0.995

Linear Regression/Calibration Results:

Correlation Coefficient = 1.000
Slope = 1.001
b (Intercept as % of full scale)= -0.08%
% change in C.F. from last cal= -0.11%

LIMITS
> or = 0.995
.95-1.05
± 3% F.S.
± 10%

Thermo 49i Ozone Analyzer Calibration



As found:

O3 Bkg: 0.2
 O3 Coef: 1.000
 Photo Lamp: 9.6
 O3 Lamp: 9.0
 Bench: 28.1
 Bench Lamp: 53.5
 O3 Lamp: 67.4
 Pressure: 703.2
 Cell A lpm: 0.715
 Cell B lpm: 0.754
 O3 ppb: 0.9
 Cell A ppb: 2.7
 Cell B ppb: -0.9
 Cell A int: 90209
 Expected Value: 259.0

As left:

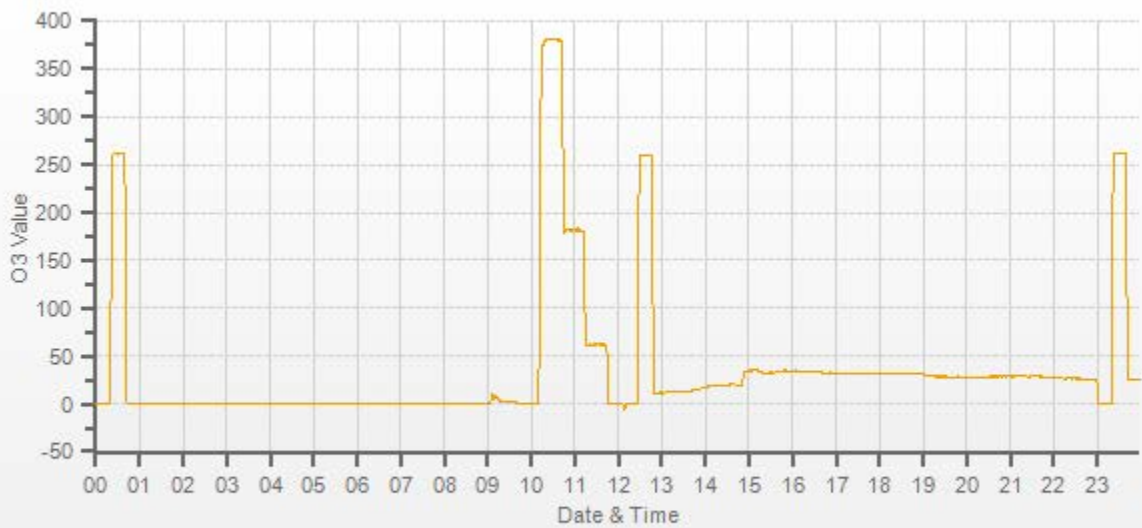
O3 Bkg: 0.1
 O3 Coef: 1.000
 Photo Lamp: 9.6
 O3 Lamp: 9.0
 Bench: 28.1
 Bench Lamp: 53.4
 O3 Lamp: 67.4
 Pressure: 704.1
 Cell A lpm: 0.715
 Cell B lpm: 0.755
 O3 ppb: 0.1
 Cell A ppb: 2.9
 Cell B ppb: -2.7
 Cell A int: 90186
 Expected Value: 260.0

Comments:

The analyzer sample inlet filter was changed.

The analyzer cooling fan filter(s) were cleaned.

No High Point adjustment made.



— O3[ppb]

PARTICULATE MATTER



R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: November 8, 2016
 Company: LICA
 Station Name/Location: Cold Lake South
 Previous Audit Date: October 26, 2016
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whitsitt
 Start Time (mst): 13:40
 End Time (mst): 14:47
 Calibration Purpose: Bi-monthly #1
 Weather Conditions: A few clouds

1400A Information and Status:

ID# or Serial Number: 1405A201620804 As Found Filter Loading %: 30.02
 Ko Factor: 14578 As Left Filter Loading %: 18.42
 Ambient Temperature °C: 14.85 As Found Noise: 0.004
 Ambient Pressure atm: 0.935 As Left Noise: 0.000
 Main Flow Reading lpm: 3.00 Pump Vacuum: 0.31
 Aux Flow Reading lpm: 13.67 Warnings: None

Reference Standards:

	Flow:	Pressure:	Temperature:
Make:	<u>Dwyer</u>	<u>BRUNTON</u>	<u>BRUNTON</u>
Model:	<u>475 Mark III</u>	<u>BIO</u>	<u>BIO</u>
Serial Number:	<u>#2</u>	<u>BPO 14</u>	<u>BPO 14</u>
Calibration Date:	<u>January 15, 2016</u>	<u>July 7, 2016</u>	<u>July 7, 2016</u>

As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.01	0.12	0.01	0.12
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	0.20	0.00	0.20
	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	0.01	0.12	0.01	0.12
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	0.20	0.00	0.20
	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>14.9</u>	1405F pressure atm:	<u>0.935</u>
reference temperature °C:	<u>14.5</u>	reference pressure:	<u>0.935</u>
difference °C:	<u>-0.4</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>14.5</u>	1405F pressure atm:	<u>0.935</u>
reference temperature °C:	<u>14.5</u>	reference pressure:	<u>0.935</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>3.00</u>	reference total/aux flow lpm: <u>16.63</u>
difference lpm: <u>0.00</u>	difference lpm: <u>-0.04</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>3.00</u>	reference total/aux flow lpm: <u>16.63</u>
difference lpm: <u>0.00</u>	difference lpm: <u>-0.04</u>

K_o Audit:

Last K_o audit date: August 8, 2016
 1405F K_o factor: 14578
 Measured K_o factor: 14731.5000
 % difference: 1.05

Comments:

The TEOM sample filter was changed. The TEOM intake head and associated sharp cut components were cleaned.
 The bypass (auxillary) flow filter was changed.



R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: November 25, 2016
 Company: LICA
 Station Name/Location: Cold Lake South
 Previous Audit Date: November 8, 2016
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whitsitt
 Start Time (mst): 14:13
 End Time (mst): 14:56
 Calibration Purpose: Bi-monthly #2
 Weather Conditions: Clear

1400A Information and Status:

ID# or Serial Number: 1405A201620804 As Found Filter Loading %: 28.39
 Ko Factor: 14578 As Left Filter Loading %: 17.17
 Ambient Temperature °C: 0.17 As Found Noise: 0.003
 Ambient Pressure atm: 0.922 As Left Noise: 0.000
 Main Flow Reading lpm: 3.00 Pump Vacuum: 0.33
 Aux Flow Reading lpm: 13.67 Warnings: None

Reference Standards:

	Flow:	Pressure:	Temperature:
Make:	<u>Dwyer</u>	<u>BRUNTON</u>	<u>BRUNTON</u>
Model:	<u>475 Mark III</u>	<u>BIO</u>	<u>BIO</u>
Serial Number:	<u>#2</u>	<u>BPO 14</u>	<u>BPO 14</u>
Calibration Date:	<u>January 15, 2016</u>	<u>July 7, 2016</u>	<u>July 7, 2016</u>

As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.12	0.00	0.12
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	0.20	0.00	0.20
	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	0.12	0.00	0.12
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	0.20	0.00	0.20
	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>0.2</u>	1405F pressure atm:	<u>0.922</u>
reference temperature °C:	<u>0.4</u>	reference pressure:	<u>0.925</u>
difference °C:	<u>0.2</u>	difference:	<u>-0.003</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>0.4</u>	1405F pressure atm:	<u>0.925</u>
reference temperature °C:	<u>0.4</u>	reference pressure:	<u>0.925</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>2.98</u>	reference total/aux flow lpm: <u>16.65</u>
difference lpm: <u>-0.02</u>	difference lpm: <u>-0.02</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>2.98</u>	reference total/aux flow lpm: <u>16.65</u>
difference lpm: <u>-0.02</u>	difference lpm: <u>-0.02</u>

K_o Audit:

Last K_o audit date: November 25, 2016
 1405F K_o factor: 14578
 Measured K_o factor: 14754.1000
 % difference: 1.21

Comments:

The TEOM sample filter was changed. The TEOM intake head and associated sharp cut components were cleaned.
 The bypass (auxillary) flow filter was changed.

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

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

OZONE

File No. 2015-163

Company: MaxxamOperator: Chris Wesson

Calibrator:
 Make/Model Sabio 2010D
 Serial Number 11900613
 Oven Temperature 49.8
 Last Verification Date May 21, 2015

Flow Measurement Device:
 Make/Model NA
 Serial Number NA
 Temperature (°C) 24
 Barometric Pressure 700 mmHg

Flow Measurements

Pt. No. 1 5000 Pt. No. 2 5000 Pt. No. 3 5000

Calibrator Flow (scm)	Calculated Concentration (ppm)	Indicated Concentration (ppm)	% Difference	
			vs Audit Gas	% Diff. Limit
4999	0.000	-0.001		
5000	0.381	0.385	1%	± 10%
5000	0.180	0.182	2%	± 10%
5000	0.090	0.091	2%	± 10%
Absolute Average Percent Difference			2%	± 10%

LINEAR REGRESSION ANALYSIS

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

O₃ **LIMITS**
 Correlation= 1.0000 ≥ **0.995**
 m (Slope)= 1.0119 **0.90-1.10**
 b (Intercept % of FS)= -0.0724 ± **3% F.S.**

AENV Standards

Audit Calibrator
 Make/Model Thermo 49i PS
 Serial/AMU Number 1808
 Ozone Standard Thermo 49i PS 1808

Ozone Analyzer

Make/Model Thermo 49i
 Serial/AMU Number 1843
 Last Calibration Date March 30, 2016
 Full Scale (ppm) 0.5

COMMENTS: _____

Auditor: Shea BeatonDate: March 30, 2016

Operator Signature: _____

Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2016-335CGA

Company: Maxxam **Operator's Name:** Russell Kirchner
Cylinder #: LL104222 **Concentration PPM:** 50.6 **Tolerance(%)** 1 **Certified By:** Praxair
Expiry Date: July 2019

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model: <u>R&R MFC 201</u>	Make/Model: <u>Bios DC2</u>
Serial Number: <u>AMU 1690</u>	Serial Number: <u>AMY 1659</u>
Last Verification Date: <u>October 19, 2016</u>	Temp. °C: <u>24.5 C</u>
Gas Type: <u>SO2</u> Conc. <u>98.07</u>	B.P. <u>706 mmhg</u>
Cylinder Number: <u>CA:016625</u>	
Expiry Date: <u>January 2019</u>	

Reference Analyzer:
Make/Model: Teco 43C **Serial/AMU Number:** 1623
Instrument Settings: **Zero:** 9.2 **Span:** 1.024 **Range:** 1.0
Last Calibration: **Date:** Oct 19/16 **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	0.0000	0.0000	0.000
4935	82.0	0.830	0.01662	60.183	50.0
4968	40.8	0.412	0.00821	121.765	50.2
4955	20.2	0.203	0.00408	245.297	49.8
Average Cylinder Concentration:					50.0

Previous Stated Concentration PPM: 50.6

Percent variance from Stated: 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: October 19, 2016
Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2016-334CGA

Company: Maxxam **Operator's Name:** Russell Kirchner

Cylinder #: EY0000654 Concentration PPM: 10.2 Tolerance(%): 2 Certified By: Praxair

Expiry Date: June 2019

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model: <u>R&R MFC 201</u>	Make/Model: <u>Bios DC2</u>
Serial Number: <u>AMU 1690</u>	Serial Number: <u>AMU 1659</u>
Last Verification Date: <u>October 19, 2016</u>	Temp. °C: <u>24.0 C</u>
Gas Type: <u>H2S</u> Conc. <u>20.43</u>	B.P. <u>706 mmhg</u>
Cylinder Number: <u>CAL015584</u>	
Expiry Date: <u>January 2019</u>	

Reference Analyzer:

Make/Model: Teco 450i Serial/AMU Number: 1980

Instrument Settings: Zero: 16.6 Span: 1.231 Range: 0.1

Last Calibration: Date: Oct 19/16 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	0.0
5050	38.0	0.0764	0.00752	132.895	10.2
5050	17.8	0.0355	0.00352	283.708	10.1
5023	9.1	0.0182	0.00181	551.978	10.0
Average Cylinder Concentration:					10.1

Previous Stated Concentration PPM: 10.2

Percent variance from Stated: 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 Date: October 19, 2016

Operator Signature: *Al Clark* 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 Date: January 19, 2016
Operator Signature: _____ Location: McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2016-336CGA

Company: Maxxam **Operators name:** Russell Kirchner

Cylinder #: LL104222 Conc (PPM) 50.7/50.9 Tolerance (%) 1 Certified By: Praxair

Expiry Date: July 2019

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>October 19, 2019</u>			Temp. °C	<u>24.5 C</u>
Gas Type	<u>NO</u>	Conc.	<u>48.79</u>	B.P.	<u>706 mmhg</u>
Cylinder Number	<u>CAL018188</u>				
Expiry Date	<u>March 2019</u>				

Reference Analyzer:

Make/Model Teco 42i Serial/AMU Number: 1868

Instrument Settings Zero: 4.4 Span: 1.080 Range: 1.0

Last Calibration: Date: Oct 18/16 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
5000	0.0	0.000	0.000				
4935	82.0	0.838	0.837	0.017	60.183	50.4	50.4
4968	40.8	0.417	0.417	0.008	121.765	50.8	50.8
4955	20.2	0.207	0.207	0.004	245.297	50.8	50.8
Average Cylinder Concentration:						50.7	50.6

<u>NO</u>	<u>NOx</u>
Previous Stated Concentration PPM: <u>50.7</u>	<u>50.9</u>
Percent variance from Stated: <u>0</u>	<u>1</u>

Cylinder gas tolerances based on NO only

Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:**

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration Contains 50.6 ppm SO2.

> 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Al Clark Date: October 19, 2016

Operator Signature: *Al Clark* Location: McIntyre Center Edmonton

APPENDIX IV
ANALYTICAL RESULTS

PASSIVE SAMPLES

Your Project #: 2016/09/30 - 2016/11/29
Site Location: LICA

Attention:MICHAEL BISAGA

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

Report Date: 2016/12/14
Report #: R2317372
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6A8194
Received: 2016/12/02, 09:44

Sample Matrix: Air
Samples Received: 33

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
H2S Passive Analysis (1)	20	2016/12/13	2016/12/14	PTC SOP-00150	Tang.Passive H2S in
NO2 Passive Analysis (1)	11	2016/12/05	2016/12/14	PTC SOP-00148	Passive NO2 in ATM
NO2 Passive Analysis (1)	14	2016/12/06	2016/12/14	PTC SOP-00148	Passive NO2 in ATM
O3 Passive Analysis (1)	10	2016/12/06	2016/12/14	PTC SOP-00197	EPA 300 R2.1
O3 Passive Analysis (1)	15	2016/12/07	2016/12/14	PTC SOP-00197	EPA 300 R2.1
SO2 Passive Analysis (1)	29	2016/12/05	2016/12/14	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 #: B6A8194
Report Date: 2016/12/14

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2016/09/30 - 2016/11/29
Site Location: LICA
Sampler Initials: AY

RESULTS OF CHEMICAL ANALYSES OF AIR

Maxxam ID		QE3126	QE3127	QE3128	QE3129	QE3130	QE3131	QE3132		
Sampling Date		2016/09/29 14:29	2016/09/30 11:15	2016/09/30 12:11	2016/09/30 13:41	2016/09/30 10:05	2016/09/29 16:16	2016/09/29 13:22		
	UNITS	3	4	5	6	8	9	10	RDL	QC Batch

Passive Monitoring

Calculated H2S	ppb	0.08		0.24				0.10	0.02	8502444
Calculated NO2	ppb	1.8	1.4	2.2	5.0	1.4	2.2	2.3	0.1	8493766
Calculated O3	ppb	18.2	18.2	17.2	18.0	19.3	20.0	16.5	0.1	8495322
Calculated SO2	ppb	0.2	0.6	0.3	0.3	0.2	0.3	0.3	0.1	8494262

RDL = Reportable Detection Limit

Maxxam ID		QE3135	QE3136	QE3137		QE3138		QE3139		
Sampling Date		2016/09/29 12:38	2016/02/27 17:36	2016/09/29 11:09		2016/09/29 10:28		2016/09/29 17:53		
	UNITS	11	12	13	QC Batch	14	QC Batch	15	RDL	QC Batch

Passive Monitoring

Calculated H2S	ppb	0.05	MISSING	0.12	8502444	0.15	8502444		0.02	8502444
Calculated NO2	ppb	1.1	MISSING	2.6	8493766	2.6	8493766	1.3	0.1	8495197
Calculated O3	ppb	MISSING	MISSING	18.8	8495322	16.9	8496509	19.2	0.1	8496509
Calculated SO2	ppb	0.3	MISSING	0.4	8494262	1.1	8494262	0.3	0.1	8494262

RDL = Reportable Detection Limit

Maxxam ID		QE3140	QE3141	QE3142	QE3143		QE3144	QE3145		
Sampling Date		2016/09/30 16:56	2016/09/30 16:02	2016/09/30 14:40	2016/09/30 17:32		2016/09/30 08:39	2016/09/30 08:56		
	UNITS	16	17	18	19	QC Batch	22	23	RDL	QC Batch

Passive Monitoring

Calculated H2S	ppb	0.10	0.15	0.11		8502444	0.09		0.02	8502444
Calculated NO2	ppb	2.3	2.1	1.4	1.5	8495197	2.4	0.4	0.1	8495197
Calculated O3	ppb	17.2	19.4	17.0	22.3	8496509	21.1	15.3	0.1	8496509
Calculated SO2	ppb	0.2	0.3	0.4	0.3	8494262	0.2	0.1	0.1	8494259

RDL = Reportable Detection Limit

Maxxam ID		QE3146	QE3147	QE3148	QE3150	QE3151	QE3152	QE3153		
Sampling Date		2016/09/30 12:51	2016/02/27 18:58	2016/09/29 10:44	2016/09/29 10:01	2016/09/29 16:41	2016/09/30 08:42	2016/09/29 15:07		
	UNITS	24	25	26	27	28	29	32	RDL	QC Batch

Passive Monitoring

Calculated H2S	ppb	0.11	MISSING	0.14	0.55		0.09	0.11	0.02	8502444
Calculated NO2	ppb	4.6				4.9	2.3	1.1	0.1	8495197
Calculated O3	ppb	17.9				16.5	17.5	22.9	0.1	8496509
Calculated SO2	ppb	0.2	MISSING	0.4	0.9	0.3	0.2	0.3	0.1	8494259

RDL = Reportable Detection Limit

Maxxam Job #: B6A8194
Report Date: 2016/12/14

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2016/09/30 - 2016/11/29
Site Location: LICA
Sampler Initials: AY

RESULTS OF CHEMICAL ANALYSES OF AIR

Maxxam ID		QE3154		QE3157		QE3158	QE3159	QE3160		
Sampling Date		2016/09/29 17:08		2016/09/29 14:29		2016/09/29 17:08	2016/09/29 16:16	2016/09/29 13:22		
	UNITS	38	QC Batch	3 DUP	QC Batch	38 DUP	9 DUP	10 DUP	RDL	QC Batch

Passive Monitoring										
Calculated H2S	ppb	0.16	8502444		8502444				0.02	8502444
Calculated NO2	ppb	4.4	8495197	1.8	8493766	3.9			0.1	8495197
Calculated O3	ppb	16.0	8496509	19.6	8496509	16.6			0.1	8496509
Calculated SO2	ppb	0.3	8494259				0.3	0.3	0.1	8494262
RDL = Reportable Detection Limit										

Maxxam ID		QE3161	QE3162	QE3163		
Sampling Date		2016/09/29 12:38	2016/09/29 10:28	2016/09/30 16:56		
	UNITS	11 DUP	14 DUP	16 DUP	RDL	QC Batch

Passive Monitoring						
Calculated H2S	ppb		0.13	0.10	0.02	8502444
Calculated SO2	ppb	0.3			0.1	8494262
RDL = Reportable Detection Limit						

Maxxam Job #: B6A8194
Report Date: 2016/12/14

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2016/09/30 - 2016/11/29
Site Location: LICA
Sampler Initials: AY

GENERAL COMMENTS

Sample QE3135 [11] : O3 sample not present in station during sample retrieval.

Sample QE3136 [12] : Site inaccessible during sample retrieval.

Sample QE3147 [25] : Site inaccessible during sample retrieval.

Results relate only to the items tested.

Maxxam Job #: B6A8194
Report Date: 2016/12/14

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2016/09/30 - 2016/11/29
Site Location: LICA
Sampler Initials: AY

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8493766	IK2	Spiked Blank	Calculated NO2	2016/12/05		96	%	90 - 110
8493766	IK2	Method Blank	Calculated NO2	2016/12/05	<0.1		ppb	
8494259	SS6	Spiked Blank	Calculated SO2	2016/12/05		101	%	90 - 110
8494259	SS6	Method Blank	Calculated SO2	2016/12/05	<0.1		ppb	
8494262	SS6	Spiked Blank	Calculated SO2	2016/12/05		100	%	90 - 110
8494262	SS6	Method Blank	Calculated SO2	2016/12/05	<0.1		ppb	
8495197	IK2	Spiked Blank	Calculated NO2	2016/12/06		98	%	90 - 110
8495197	IK2	Method Blank	Calculated NO2	2016/12/06	<0.1		ppb	
8495322	SS6	Spiked Blank	Calculated O3	2016/12/06		99	%	90 - 110
8495322	SS6	Method Blank	Calculated O3	2016/12/06	<0.1		ppb	
8496509	SS6	Spiked Blank	Calculated O3	2016/12/07		97	%	90 - 110
8496509	SS6	Method Blank	Calculated O3	2016/12/07	<0.1		ppb	
8502444	LCH	Spiked Blank	Calculated H2S	2016/12/13		99	%	90 - 110

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 #: B6A8194
Report Date: 2016/12/14

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2016/09/30 - 2016/11/29
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).



Linda Lin, Supervisor, Centre for Passive Sampling Technology

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/Nov 2, 2016	14703	Ambient Air	02-Nov-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110059-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16
16110059-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	16-Nov-16
16110059-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	16-Nov-16
16110059-001	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-001	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	16-Nov-16
16110059-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	16-Nov-16
16110059-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-001	1-Butene	I	0.03	ppbv	0.02	AC-058	16-Nov-16
16110059-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	2,2,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	2,3-Dimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/Nov 2, 2016	14703	Ambient Air	02-Nov-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110059-001	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	2-Methylheptane	I	0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	2-Methylpentane	I	0.04	ppbv	0.01	AC-058	16-Nov-16
16110059-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	3-Methylhexane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	3-Methylpentane	I	0.03	ppbv	0.01	AC-058	16-Nov-16
16110059-001	Acetone		1.6	ppbv	0.4	AC-058	16-Nov-16
16110059-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	16-Nov-16
16110059-001	Benzene	I	0.06	ppbv	0.01	AC-058	16-Nov-16
16110059-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	Bromomethane	I	0.02	ppbv	0.01	AC-058	16-Nov-16
16110059-001	Carbon disulfide	I	0.05	ppbv	0.01	AC-058	16-Nov-16
16110059-001	Carbon tetrachloride	I	0.13	ppbv	0.01	AC-058	16-Nov-16
16110059-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	Chloroform	I	0.03	ppbv	0.02	AC-058	16-Nov-16
16110059-001	Chloromethane		0.52	ppbv	0.02	AC-058	16-Nov-16
16110059-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16
16110059-001	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	Cyclohexane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/Nov 2, 2016	14703	Ambient Air	02-Nov-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110059-001	Cyclopentane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	Ethanol		0.9	ppbv	0.3	AC-058	16-Nov-16
16110059-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-001	Ethylbenzene	I	0.02	ppbv	0.01	AC-058	16-Nov-16
16110059-001	Freon-11		0.38	ppbv	0.02	AC-058	16-Nov-16
16110059-001	Freon-113	I	0.07	ppbv	0.01	AC-058	16-Nov-16
16110059-001	Freon-114	I	0.03	ppbv	0.02	AC-058	16-Nov-16
16110059-001	Freon-12		0.75	ppbv	0.02	AC-058	16-Nov-16
16110059-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	16-Nov-16
16110059-001	Isobutane		0.60	ppbv	0.02	AC-058	16-Nov-16
16110059-001	Isopentane	I	0.26	ppbv	0.03	AC-058	16-Nov-16
16110059-001	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	Isopropyl alcohol		1.3	ppbv	0.4	AC-058	16-Nov-16
16110059-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	m,p-Xylene	I	0.05	ppbv	0.03	AC-058	16-Nov-16
16110059-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16
16110059-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	16-Nov-16
16110059-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	16-Nov-16
16110059-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	16-Nov-16
16110059-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	16-Nov-16
16110059-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-001	Methylcyclohexane	I	0.02	ppbv	0.01	AC-058	16-Nov-16
16110059-001	Methylcyclopentane	I	0.02	ppbv	0.02	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 2, 2016	14703	Ambient Air	02-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110059-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	16-Nov-16
16110059-001	n-Butane		0.48	ppbv	0.03	AC-058	16-Nov-16
16110059-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	16-Nov-16
16110059-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-001	n-Heptane	I	0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	n-Hexane	I	0.05	ppbv	0.01	AC-058	16-Nov-16
16110059-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	n-Pentane	I	0.1	ppbv	0.1	AC-058	16-Nov-16
16110059-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	16-Nov-16
16110059-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	16-Nov-16
16110059-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	16-Nov-16
16110059-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	o-Ethyltoluene	I	0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	o-Xylene	I	0.03	ppbv	0.01	AC-058	16-Nov-16
16110059-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16
16110059-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	16-Nov-16
16110059-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16
16110059-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16
16110059-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-001	Toluene	I	0.06	ppbv	0.01	AC-058	16-Nov-16
16110059-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16
16110059-001	trans-2-Butene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca



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 Vegreville, Alberta
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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/Nov 2, 2016	14703	Ambient Air	02-Nov-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110059-001	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-001	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/Nov 8, 2016	S5624	Ambient Air	08-Nov-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110116-004	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16
16110116-004	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	18-Nov-16
16110116-004	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	18-Nov-16
16110116-004	1,2,4-Trimethylbenzene	I	0.05	ppbv	0.03	AC-058	18-Nov-16
16110116-004	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	18-Nov-16
16110116-004	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	18-Nov-16
16110116-004	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-004	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	1,3-Butadiene	I	0.04	ppbv	0.02	AC-058	18-Nov-16
16110116-004	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	18-Nov-16
16110116-004	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-004	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-004	1-Butene	I	0.14	ppbv	0.02	AC-058	18-Nov-16
16110116-004	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	1-Pentene	I	0.02	ppbv	0.01	AC-058	18-Nov-16
16110116-004	2,2,4-Trimethylpentane	I	0.07	ppbv	0.01	AC-058	18-Nov-16
16110116-004	2,2-Dimethylbutane	I	0.02	ppbv	0.01	AC-058	18-Nov-16
16110116-004	2,3,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	18-Nov-16
16110116-004	2,3-Dimethylbutane	I	0.06	ppbv	0.02	AC-058	18-Nov-16
16110116-004	2,3-Dimethylpentane	I	0.10	ppbv	0.02	AC-058	18-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/Nov 8, 2016	S5624	Ambient Air	08-Nov-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110116-004	2,4-Dimethylpentane	I	0.04	ppbv	0.01	AC-058	18-Nov-16
16110116-004	2-Methylheptane	I	0.03	ppbv	0.01	AC-058	18-Nov-16
16110116-004	2-Methylhexane	I	0.09	ppbv	0.01	AC-058	18-Nov-16
16110116-004	2-Methylpentane	I	0.19	ppbv	0.01	AC-058	18-Nov-16
16110116-004	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	3-Methylhexane	I	0.08	ppbv	0.02	AC-058	18-Nov-16
16110116-004	3-Methylpentane	I	0.13	ppbv	0.01	AC-058	18-Nov-16
16110116-004	Acetone		1.7	ppbv	0.4	AC-058	18-Nov-16
16110116-004	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	18-Nov-16
16110116-004	Benzene	I	0.17	ppbv	0.01	AC-058	18-Nov-16
16110116-004	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-004	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	Bromomethane	I	0.02	ppbv	0.01	AC-058	18-Nov-16
16110116-004	Carbon disulfide	I	0.03	ppbv	0.01	AC-058	18-Nov-16
16110116-004	Carbon tetrachloride	I	0.14	ppbv	0.01	AC-058	18-Nov-16
16110116-004	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	Chloroform	I	0.05	ppbv	0.02	AC-058	18-Nov-16
16110116-004	Chloromethane		0.49	ppbv	0.02	AC-058	18-Nov-16
16110116-004	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-004	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16
16110116-004	cis-2-Butene	I	0.03	ppbv	0.02	AC-058	18-Nov-16
16110116-004	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	Cyclohexane	I	0.06	ppbv	0.02	AC-058	18-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 8, 2016	S5624	Ambient Air	08-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110116-004	Cyclopentane	I	0.03	ppbv	0.01	AC-058	18-Nov-16
16110116-004	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-004	Ethanol		1.1	ppbv	0.3	AC-058	18-Nov-16
16110116-004	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-004	Ethylbenzene	I	0.05	ppbv	0.01	AC-058	18-Nov-16
16110116-004	Freon-11		0.38	ppbv	0.02	AC-058	18-Nov-16
16110116-004	Freon-113	I	0.08	ppbv	0.01	AC-058	18-Nov-16
16110116-004	Freon-114	I	0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	Freon-12		0.78	ppbv	0.02	AC-058	18-Nov-16
16110116-004	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	18-Nov-16
16110116-004	Isobutane		1.36	ppbv	0.02	AC-058	18-Nov-16
16110116-004	Isopentane		0.93	ppbv	0.03	AC-058	18-Nov-16
16110116-004	Isoprene	I	0.02	ppbv	0.01	AC-058	18-Nov-16
16110116-004	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-004	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-004	m,p-Xylene	I	0.18	ppbv	0.03	AC-058	18-Nov-16
16110116-004	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16
16110116-004	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	18-Nov-16
16110116-004	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	18-Nov-16
16110116-004	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	18-Nov-16
16110116-004	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-004	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	18-Nov-16
16110116-004	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	18-Nov-16
16110116-004	Methylcyclohexane	I	0.12	ppbv	0.01	AC-058	18-Nov-16
16110116-004	Methylcyclopentane	I	0.13	ppbv	0.02	AC-058	18-Nov-16

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 8, 2016	S5624	Ambient Air	08-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110116-004	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	18-Nov-16
16110116-004	n-Butane		2.45	ppbv	0.03	AC-058	18-Nov-16
16110116-004	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	18-Nov-16
16110116-004	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-004	n-Heptane	I	0.07	ppbv	0.01	AC-058	18-Nov-16
16110116-004	n-Hexane	I	0.18	ppbv	0.01	AC-058	18-Nov-16
16110116-004	n-Octane	I	0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-004	n-Pentane		0.5	ppbv	0.1	AC-058	18-Nov-16
16110116-004	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	18-Nov-16
16110116-004	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	18-Nov-16
16110116-004	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	18-Nov-16
16110116-004	n-Nonane	I	0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-004	o-Ethyltoluene	I	0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-004	o-Xylene	I	0.07	ppbv	0.01	AC-058	18-Nov-16
16110116-004	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16
16110116-004	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	18-Nov-16
16110116-004	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16
16110116-004	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16
16110116-004	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-004	Toluene		0.31	ppbv	0.01	AC-058	18-Nov-16
16110116-004	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-004	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16
16110116-004	trans-2-Butene	I	0.04	ppbv	0.01	AC-058	18-Nov-16
16110116-004	trans-2-Pentene	I	0.03	ppbv	0.02	AC-058	18-Nov-16
16110116-004	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/CLS/Nov 8, 2016	S5624	Ambient Air	08-Nov-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110116-004	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	18-Nov-16
16110116-004	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	18-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 14, 20165	2534	Ambient Air	14-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110212	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110212-002	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110212-002	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	25-Nov-16
16110212-002	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	25-Nov-16
16110212-002	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110212-002	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110212-002	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110212-002	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110212-002	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110212-002	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110212-002	1-Butene	I	0.07	ppbv	0.02	AC-058	25-Nov-16
16110212-002	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	2,2,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	2,2-Dimethylbutane	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110212-002	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	2,3-Dimethylbutane	I	0.03	ppbv	0.02	AC-058	25-Nov-16
16110212-002	2,3-Dimethylpentane	I	0.03	ppbv	0.02	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 14, 20165	2534	Ambient Air	14-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110212	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110212-002	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	2-Methylheptane	I	0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	2-Methylhexane	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110212-002	2-Methylpentane	I	0.08	ppbv	0.01	AC-058	25-Nov-16
16110212-002	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	3-Methylhexane	I	0.03	ppbv	0.02	AC-058	25-Nov-16
16110212-002	3-Methylpentane	I	0.05	ppbv	0.01	AC-058	25-Nov-16
16110212-002	Acetone		3.3	ppbv	0.4	AC-058	25-Nov-16
16110212-002	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110212-002	Benzene	I	0.06	ppbv	0.01	AC-058	25-Nov-16
16110212-002	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110212-002	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	Carbon disulfide		1.22	ppbv	0.01	AC-058	25-Nov-16
16110212-002	Carbon tetrachloride	I	0.12	ppbv	0.01	AC-058	25-Nov-16
16110212-002	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	Chloroethane	I	0.11	ppbv	0.02	AC-058	25-Nov-16
16110212-002	Chloroform	I	0.03	ppbv	0.02	AC-058	25-Nov-16
16110212-002	Chloromethane		0.52	ppbv	0.02	AC-058	25-Nov-16
16110212-002	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110212-002	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	Cyclohexane	I	0.06	ppbv	0.02	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 14, 20165	2534	Ambient Air	14-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110212	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110212-002	Cyclopentane	I	0.03	ppbv	0.01	AC-058	25-Nov-16
16110212-002	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	Ethanol		4.8	ppbv	0.3	AC-058	25-Nov-16
16110212-002	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110212-002	Ethylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	Freon-11		0.32	ppbv	0.02	AC-058	25-Nov-16
16110212-002	Freon-113	I	0.07	ppbv	0.01	AC-058	25-Nov-16
16110212-002	Freon-114	I	0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	Freon-12		0.67	ppbv	0.02	AC-058	25-Nov-16
16110212-002	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	25-Nov-16
16110212-002	Isobutane		0.78	ppbv	0.02	AC-058	25-Nov-16
16110212-002	Isopentane		0.45	ppbv	0.03	AC-058	25-Nov-16
16110212-002	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110212-002	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	m,p-Xylene	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110212-002	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110212-002	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	25-Nov-16
16110212-002	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	25-Nov-16
16110212-002	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110212-002	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110212-002	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	25-Nov-16
16110212-002	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110212-002	Methylcyclohexane	I	0.09	ppbv	0.01	AC-058	25-Nov-16
16110212-002	Methylcyclopentane	I	0.07	ppbv	0.02	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 14, 20165	2534	Ambient Air	14-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110212	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110212-002	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110212-002	n-Butane		0.97	ppbv	0.03	AC-058	25-Nov-16
16110212-002	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	25-Nov-16
16110212-002	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110212-002	n-Heptane	I	0.03	ppbv	0.01	AC-058	25-Nov-16
16110212-002	n-Hexane	I	0.07	ppbv	0.01	AC-058	25-Nov-16
16110212-002	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	n-Pentane	I	0.3	ppbv	0.1	AC-058	25-Nov-16
16110212-002	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	25-Nov-16
16110212-002	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	25-Nov-16
16110212-002	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	25-Nov-16
16110212-002	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	o-Xylene	I	0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110212-002	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	25-Nov-16
16110212-002	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110212-002	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110212-002	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110212-002	Toluene	I	0.05	ppbv	0.01	AC-058	25-Nov-16
16110212-002	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110212-002	trans-2-Butene	I	0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-002	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110212-002	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 14, 20165	2534	Ambient Air	14-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110212	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110212-002	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	25-Nov-16
16110212-002	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 20, 2016	S5639	Ambient Air	20-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110222-005	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-005	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	25-Nov-16
16110222-005	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	25-Nov-16
16110222-005	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110222-005	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110222-005	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110222-005	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110222-005	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-005	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-005	1-Butene	I	0.04	ppbv	0.02	AC-058	25-Nov-16
16110222-005	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	2,2,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	2,3-Dimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 20, 2016	S5639	Ambient Air	20-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110222-005	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	2-Methylhexane	I	0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	2-Methylpentane	I	0.03	ppbv	0.01	AC-058	25-Nov-16
16110222-005	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	3-Methylhexane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	3-Methylpentane	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110222-005	Acetone		0.7	ppbv	0.4	AC-058	25-Nov-16
16110222-005	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110222-005	Benzene	I	0.06	ppbv	0.01	AC-058	25-Nov-16
16110222-005	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-005	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	Carbon disulfide	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	Carbon tetrachloride	I	0.13	ppbv	0.01	AC-058	25-Nov-16
16110222-005	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	Chloroform	I	0.03	ppbv	0.02	AC-058	25-Nov-16
16110222-005	Chloromethane		0.47	ppbv	0.02	AC-058	25-Nov-16
16110222-005	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-005	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	Cyclohexane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 20, 2016	S5639	Ambient Air	20-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110222-005	Cyclopentane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	Ethanol		0.3	ppbv	0.3	AC-058	25-Nov-16
16110222-005	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-005	Ethylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	Freon-11		0.37	ppbv	0.02	AC-058	25-Nov-16
16110222-005	Freon-113	I	0.09	ppbv	0.01	AC-058	25-Nov-16
16110222-005	Freon-114	I	0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	Freon-12		0.75	ppbv	0.02	AC-058	25-Nov-16
16110222-005	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	25-Nov-16
16110222-005	Isobutane		0.27	ppbv	0.02	AC-058	25-Nov-16
16110222-005	Isopentane	I	0.15	ppbv	0.03	AC-058	25-Nov-16
16110222-005	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-005	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	m,p-Xylene	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110222-005	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-005	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	25-Nov-16
16110222-005	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	25-Nov-16
16110222-005	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110222-005	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-005	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	25-Nov-16
16110222-005	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110222-005	Methylcyclohexane	I	0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	Methylcyclopentane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 20, 2016	S5639	Ambient Air	20-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110222-005	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110222-005	n-Butane		0.53	ppbv	0.03	AC-058	25-Nov-16
16110222-005	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	25-Nov-16
16110222-005	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-005	n-Heptane	I	0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	n-Hexane	I	0.03	ppbv	0.01	AC-058	25-Nov-16
16110222-005	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	n-Pentane	I	0.1	ppbv	0.1	AC-058	25-Nov-16
16110222-005	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	25-Nov-16
16110222-005	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	25-Nov-16
16110222-005	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	25-Nov-16
16110222-005	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	o-Xylene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-005	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	25-Nov-16
16110222-005	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-005	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-005	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-005	Toluene	I	0.04	ppbv	0.01	AC-058	25-Nov-16
16110222-005	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-005	trans-2-Butene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-005	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-005	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 20, 2016	S5639	Ambient Air	20-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110222-005	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	25-Nov-16
16110222-005	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 26, 2016	S5620	Ambient Air	26-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110258-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-003	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	08-Dec-16
16110258-003	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	08-Dec-16
16110258-003	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16110258-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16110258-003	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16110258-003	1,2-Dichloropropane	I	0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-003	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	1,3-Butadiene	I	0.04	ppbv	0.02	AC-058	08-Dec-16
16110258-003	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16110258-003	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-003	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-003	1-Butene	I	0.13	ppbv	0.02	AC-058	08-Dec-16
16110258-003	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	1-Pentene	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16110258-003	2,2,4-Trimethylpentane	I	0.05	ppbv	0.01	AC-058	08-Dec-16
16110258-003	2,2-Dimethylbutane	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16110258-003	2,3,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16110258-003	2,3-Dimethylbutane	I	0.04	ppbv	0.02	AC-058	08-Dec-16
16110258-003	2,3-Dimethylpentane	I	0.07	ppbv	0.02	AC-058	08-Dec-16

Report certified by: Graham Knox, Team Lead

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

Date: January-03-17

Inquiries: (780) 632 8455

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 26, 2016	S5620	Ambient Air	26-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110258-003	2,4-Dimethylpentane	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16110258-003	2-Methylheptane	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16110258-003	2-Methylhexane	I	0.06	ppbv	0.01	AC-058	08-Dec-16
16110258-003	2-Methylpentane	I	0.14	ppbv	0.01	AC-058	08-Dec-16
16110258-003	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	3-Methylhexane	I	0.05	ppbv	0.02	AC-058	08-Dec-16
16110258-003	3-Methylpentane	I	0.09	ppbv	0.01	AC-058	08-Dec-16
16110258-003	Acetone		1.2	ppbv	0.4	AC-058	08-Dec-16
16110258-003	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16110258-003	Benzene	I	0.19	ppbv	0.01	AC-058	08-Dec-16
16110258-003	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-003	Carbon disulfide		0.40	ppbv	0.01	AC-058	08-Dec-16
16110258-003	Carbon tetrachloride	I	0.12	ppbv	0.01	AC-058	08-Dec-16
16110258-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	Chloroform	I	0.03	ppbv	0.02	AC-058	08-Dec-16
16110258-003	Chloromethane		0.49	ppbv	0.02	AC-058	08-Dec-16
16110258-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-003	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-003	cis-2-Butene	I	0.08	ppbv	0.02	AC-058	08-Dec-16
16110258-003	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	Cyclohexane	I	0.05	ppbv	0.02	AC-058	08-Dec-16

Report certified by:	Graham Knox, Team Lead	On behalf of:	PJ Pretorius, Manager, Analysis and Testing Services
Date:	January-03-17	Inquiries:	(780) 632 8455
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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 26, 2016	S5620	Ambient Air	26-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110258-003	Cyclopentane	I	0.05	ppbv	0.01	AC-058	08-Dec-16
16110258-003	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-003	Ethanol		1.0	ppbv	0.3	AC-058	08-Dec-16
16110258-003	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-003	Ethylbenzene	I	0.03	ppbv	0.01	AC-058	08-Dec-16
16110258-003	Freon-11		0.36	ppbv	0.02	AC-058	08-Dec-16
16110258-003	Freon-113	I	0.06	ppbv	0.01	AC-058	08-Dec-16
16110258-003	Freon-114	I	0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	Freon-12		0.72	ppbv	0.02	AC-058	08-Dec-16
16110258-003	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	08-Dec-16
16110258-003	Isobutane		1.82	ppbv	0.02	AC-058	08-Dec-16
16110258-003	Isopentane		0.94	ppbv	0.03	AC-058	08-Dec-16
16110258-003	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-003	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-003	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-003	m,p-Xylene	I	0.09	ppbv	0.03	AC-058	08-Dec-16
16110258-003	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-003	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	08-Dec-16
16110258-003	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	08-Dec-16
16110258-003	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16110258-003	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-003	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	08-Dec-16
16110258-003	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16110258-003	Methylcyclohexane	I	0.08	ppbv	0.01	AC-058	08-Dec-16
16110258-003	Methylcyclopentane	I	0.10	ppbv	0.02	AC-058	08-Dec-16

Report certified by:	Graham Knox, Team Lead	On behalf of:	PJ Pretorius, Manager, Analysis and Testing Services
Date:	January-03-17	Inquiries:	(780) 632 8455
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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 26, 2016	S5620	Ambient Air	26-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110258-003	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16110258-003	n-Butane		2.96	ppbv	0.03	AC-058	08-Dec-16
16110258-003	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	08-Dec-16
16110258-003	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-003	n-Heptane	I	0.06	ppbv	0.01	AC-058	08-Dec-16
16110258-003	n-Hexane	I	0.13	ppbv	0.01	AC-058	08-Dec-16
16110258-003	n-Octane	I	0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	n-Pentane		0.5	ppbv	0.1	AC-058	08-Dec-16
16110258-003	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	08-Dec-16
16110258-003	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	08-Dec-16
16110258-003	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	08-Dec-16
16110258-003	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-003	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-003	o-Xylene	I	0.04	ppbv	0.01	AC-058	08-Dec-16
16110258-003	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-003	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	08-Dec-16
16110258-003	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-003	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-003	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-003	Toluene	I	0.18	ppbv	0.01	AC-058	08-Dec-16
16110258-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-003	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-003	trans-2-Butene	I	0.03	ppbv	0.01	AC-058	08-Dec-16
16110258-003	trans-2-Pentene	I	0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-003	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16

Report certified by: Graham Knox, Team Lead

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

Date: January-03-17

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Nov 26, 2016	S5620	Ambient Air	26-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110258-003	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	08-Dec-16
16110258-003	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	08-Dec-16

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

Date: January-03-17

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PAHS SAMPLES

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/CLS/Nov 2, 2016	A13-02	Air Filter	02-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110059-002	1-Methylnaphthalene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	2-Methylnaphthalene		0.03 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	3-Methylcholanthrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Acenaphthene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Acenaphthylene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Acridine	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Anthracene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Benzo(a)anthracene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Benzo(a)pyrene		0.02 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Benzo(c)phenanthrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Benzo(e)pyrene		0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Benzo(ghi)perylene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Chrysene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Dibenzo(ah)anthracene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Fluoranthene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Fluorene		0.02 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Indeno(1,2,3-cd)pyrene		0.08 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Naphthalene		0.02 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Perylene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Phenanthrene		0.07 ug/puf	0.01	NA-017	27-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID LICA/PUF/CLS/Nov 2, 2016	CANISTER ID A13-02	Matrix Air Filter	DATE SAMPLED 02-Nov-16 0:00
DESCRIPTION: Cold Lake South			
REPORT NUMBER: 16110059	REPORT CREATED: 20-Dec-16		VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110059-002	Pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110059-002	Retene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/CLS/Nov 8, 2016	TE05	Air Filter	08-Nov-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110116-005	1-Methylnaphthalene		0.33	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	2-Methylnaphthalene		0.56	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Acenaphthene		0.06	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Acenaphthylene		0.30	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Anthracene		0.04	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Benzo(a)anthracene		0.03	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Benzo(a)pyrene		0.02	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Benzo(e)pyrene		0.02	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Chrysene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Fluoranthene		0.09	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Fluorene		0.14	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Indeno(1,2,3-cd)pyrene		0.05	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Naphthalene		0.39	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Phenanthrene		0.43	ug/puf	0.01	NA-017	27-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/CLS/Nov 8, 2016	TE05	Air Filter	08-Nov-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110116-005	Pyrene		0.08 ug/puf	0.01	NA-017	27-Nov-16
16110116-005	Retene		0.11 ug/puf	0.01	NA-017	27-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/CLS/Nov 20, 2016	TE-01	Air Filter	20-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110222-006	1-Methylnaphthalene		0.06 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	2-Methylnaphthalene		0.09 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	3-Methylcholanthrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Acenaphthene		0.05 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Acenaphthylene		0.05 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Acridine	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Anthracene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Benzo(a)anthracene		0.03 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Benzo(a)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Benzo(b,j,k)fluoranthene		0.05 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Benzo(c)phenanthrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Benzo(e)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Benzo(ghi)perylene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Chrysene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Dibenzo(a,h)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Dibenzo(a,i)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Dibenzo(a,l)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Dibenzo(ah)anthracene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Fluoranthene		0.07 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Fluorene		0.04 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Naphthalene		0.06 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Perylene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Phenanthrene		0.17 ug/puf	0.01	NA-017	11-Dec-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca



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 Vegreville, Alberta
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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/CLS/Nov 20, 2016	TE-01	Air Filter	20-Nov-16 0:00
DESCRIPTION:	Cold Lake South		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110222-006	Pyrene		0.09 ug/puf	0.01	NA-017	11-Dec-16
16110222-006	Retene		0.04 ug/puf	0.01	NA-017	11-Dec-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/CLS/Nov 26, 2016	9801	Air Filter	26-Nov-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110258-004	1-Methylnaphthalene		0.16	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	2-Methylnaphthalene		0.28	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Acenaphthene		0.13	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Acenaphthylene		0.14	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Anthracene		0.07	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Benzo(a)anthracene		0.06	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Benzo(a)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Benzo(b,j,k)fluoranthene		0.08	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Benzo(e)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Chrysene		0.03	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Fluoranthene		0.17	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Fluorene		0.16	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Naphthalene		0.24	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Phenanthrene		0.47	ug/puf	0.01	NA-017	11-Dec-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: January-03-17

Inquiries: (780) 632 8455

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/PUF/CLS/Nov 26, 2016	9801	Air Filter	26-Nov-16	0:00
DESCRIPTION:	Cold Lake South			
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110258-004	Pyrene		0.19 ug/puf	0.01	NA-017	11-Dec-16
16110258-004	Retene		0.49 ug/puf	0.01	NA-017	11-Dec-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: January-03-17

Inquiries: (780) 632 8455

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PARTISOL SAMPLES



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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

<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 #P6031341</p> <p>CANISTER ID</p> <p>Matrix Air Filter</p> <p>Priority Normal</p> <p>DESCRIPTION: Cold Lake South</p> <p>DATE SAMPLED: 02-Nov-16 0:00</p> <p>REPORT CREATED: 06-Dec-16</p> <p>DATE RECEIVED: 08-Nov-16</p> <p>REPORT NUMBER: 16110057</p> <p>VERSION: Version 01</p>
---	---

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110057-001	Particulate Weight		0.062	mg	0.004	AC-029	09-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: Tuesday, December 06, 2016 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca



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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

<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 # P6031342</p> <p>CANISTER ID</p> <p>Matrix Air Filter</p> <p>Priority Normal</p> <p>DESCRIPTION: Cold Lake South</p> <p>DATE SAMPLED: 08-Nov-16 0:00</p> <p>REPORT CREATED: 06-Dec-16</p> <p>DATE RECEIVED: 15-Nov-16</p> <p>REPORT NUMBER: 16110118</p> <p>VERSION: Version 01</p>
---	--

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110118-001	Particulate Weight		0.064	mg	0.004	AC-029	21-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: Tuesday, December 06, 2016 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca



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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

<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 #P6031343</p> <p>CANISTER ID</p> <p>Matrix Air Filter</p> <p>Priority Normal</p> <p>DESCRIPTION: Cold Lake South</p> <p>DATE SAMPLED: 14-Nov-16 0:00</p> <p>REPORT CREATED: 06-Dec-16</p> <p>DATE RECEIVED: 21-Nov-16</p> <p>REPORT NUMBER: 16110216</p> <p>VERSION: Version 01</p>
---	---

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110216-001	Particulate Weight		0.046	mg	0.004	AC-029	30-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: Tuesday, December 06, 2016 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca



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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

<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# P6031344</p> <p>CANISTER ID</p> <p>Matrix Air Filter</p> <p>Priority Normal</p> <p>DESCRIPTION: Cold Lake South</p> <p>DATE SAMPLED: 20-Nov-16 0:00</p> <p>REPORT CREATED: 06-Dec-16</p> <p>DATE RECEIVED: 22-Nov-16</p> <p>REPORT NUMBER: 16110221</p> <p>VERSION: Version 01</p>
---	---

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110221-001	Particulate Weight		0.113	mg	0.004	AC-029	30-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: Tuesday, December 06, 2016 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca



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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

<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 #P6193028</p> <p>CANISTER ID</p> <p>Matrix Air Filter</p> <p>Priority Normal</p> <p>DESCRIPTION: Cold Lake South</p> <p>DATE SAMPLED: 26-Nov-16 0:00</p> <p>REPORT CREATED: 06-Dec-16</p> <p>DATE RECEIVED: 29-Nov-16</p> <p>REPORT NUMBER: 16110261</p> <p>VERSION: Version 01</p>
---	---

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110261-001	Particulate Weight		0.219	mg	0.004	AC-029	30-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: Tuesday, December 06, 2016 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.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 Continuous Monitoring Station
Name of the Representative of the Person Responsible (Last, First, Middle)	Position / Title of the Representative of the Person Responsible
Wunmi Adekanmbi	Project Manager, 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

09/01/2017





Report Issued Date (dd-mm-yyyy)

APPENDIX VI
DATA VALIDATION CERTIFICATION FORM



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2016-11-1-C</u>
Site: <u>Cold Lake Continuous Monitoring Station</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u></u>	Date <u>20-DEC-2016</u>
Level 1 Primary Validation	<u></u>	Date <u>21-DEC-2016</u>
Level 2 Final Validation	<u></u>	Date <u>28-DEC-2016</u>
Level 3 Independent Data Review	<u></u>	Date <u>09-JAN-2017</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.



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

JOB #: 2833-2016-11-30-C


November 2016

Prepared for:


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

Attention: MIKE BISAGA

DATE: **January 05, 2017**

Prepared by: 

Wunmi Adekanmbi, M.Sc., EPt.
Project Manager, Customer Service, Air Services

Reviewed by: 

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

SUMMARY

In November 2016, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the Maskwa Continuous Monitoring Station, near Bonnyville, Alberta. The monitoring station provides continuous meteorological measurements and air quality data for non-compliance parameters, as requested by Lakeland Industry & Community Association.

All data collected this month was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above the 90% requirement.

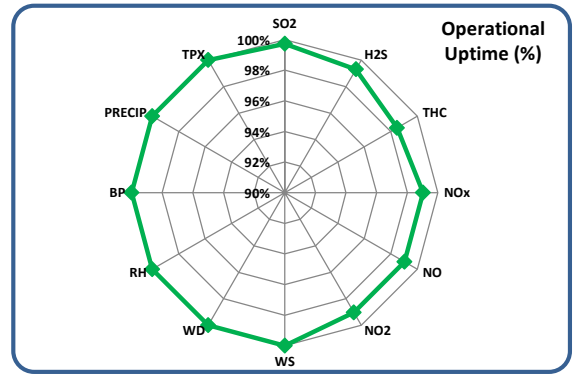
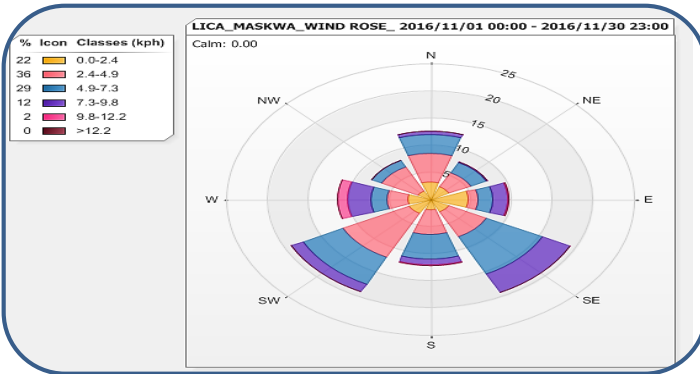
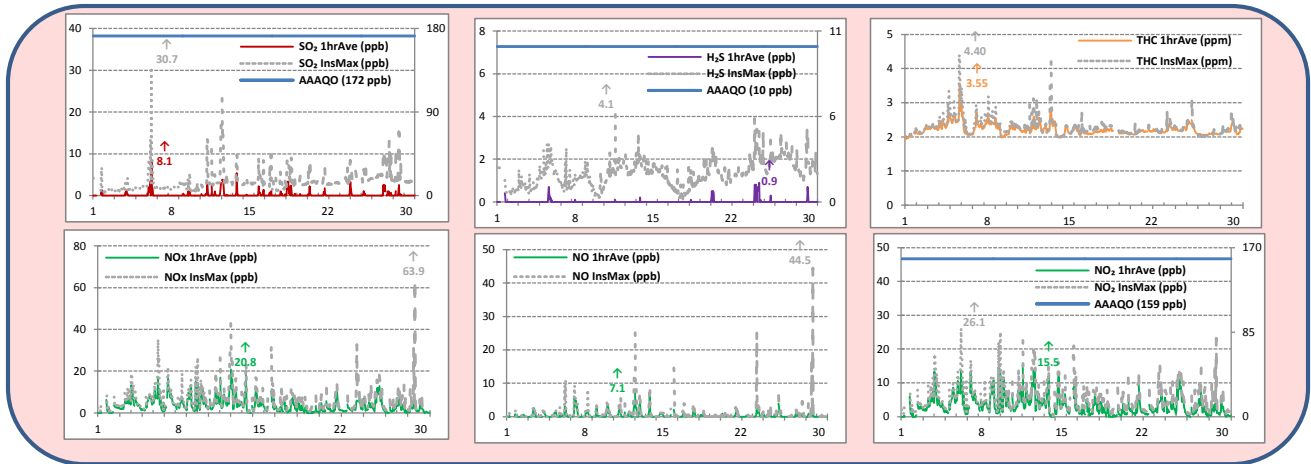
- **SO₂**: Two hours of downtime were recorded on November 1 due to a maintenance event.
- **H₂S**: Five hours of downtime were recorded this month. Two hours of the downtime are a result of a maintenance event that occurred on November 1. The other three hours were attributed to additional quality checks performed to address zero and span drift occurrences.
- **THC**: Eleven hours of downtime were recorded on November 19 due to an analyzer flame-out event.
- **NO₂**: Seven hours of downtime were recorded this month due to additional quality checks performed to address a span drift occurrence.

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 Analytics is issuing this completed report to Lakeland Industry & Community Association, Maskwa Continuous Monitoring Station.

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.

Pollutants		Monthly Records		1-Hour Records					24-Hour Records			
Name	Unit	Avg. Conc.	Uptime	Maximum			AAAQO Objective	Exceed. Hours	Maximum		AAAQO Objective	Exceed. Days
				Conc.	Date	Hour			Conc.	Date		
SO ₂	ppb	0.2	99.7%	8.1	November 6	10	172	0	1.0	November 6	48	0
H ₂ S	ppb	0.0	99.3%	0.9	November 25	12	10	0	0.2	November 25	3	0
THC	ppm	2.21	98.5%	3.55	November 5	20	-	-	2.63	November 5	-	-
NO _x	ppb	3.6	99.0%	20.8	November 13	0	-	-	6.7	November 13	-	-
NO	ppb	0.4	99.0%	7.1	November 13	0	-	-	1.4	November 7	-	-
NO ₂	ppb	3.2	99.0%	15.5	November 12	1	159	0	5.7	November 6	-	-
WS	kph	0.9	100.0%	12.1	November 14	13	-	-	7.3	November 19	-	-
WD	degree	181 (S)	100.0%	-	-	-	-	-	-	-	-	-
RH	%	78	100.0%	92	November 14, 14	1, 4	-	-	89	November 24	-	-
BP	mbar	938	100.0%	955	November 10, 18	VAR	-	-	953	November 18	-	-
PRECIP	mm	0.0	100.0%	1.1	November 19	21	-	-	0.1	November 6, 19	-	-
AmbTPX	°C	-0.5	100.0%	16.4	November 4	14	-	-	7.6	November 9	-	-



Monthly Update

- * All sampling, analysis, and QA/QC for this project was performed by Maxxam Analytics and complies with the Alberta Air Monitoring Directive.
- * All data collected this month were within the objectives outlined in the AMD 2016 and AAAQO 2016.
- * The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above 90%.

Operational Issues

- **SO₂:** Two hours of downtime were recorded on November 1, due to a maintenance event.
- **H₂S:** Five hours of downtime were recorded this month. Two hours are a result of a maintenance event that occurred on November 1. The other three hours were attributed to additional quality checks performed to address zero and span drift occurrences.
- **THC:** Eleven hours of downtime were recorded on November 19, due to an analyzer flame-out event.
- **NO₂:** Seven hours of downtime were recorded this month, due to additional quality checks performed to address a span drift occurrence.

Monthly Continuous Data Summary

Lakeland Industry & Community Association Maskwa Continuous Monitoring Station						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 (sector)	READING	DAY	
SO ₂ (ppb)	172	48	0	0	0.2	8.1	6	10	3.3	WNW	1.0	6	99.7
H ₂ S (ppb)	10	3	0	0	0.0	0.9	25	12	6.5	ESE	0.2	25	99.3
THC (ppm)	-	-	-	-	2.21	3.55	5	20	1.3	ESE	2.63	5	98.5
NO ₂ (ppb)	159	-	0	-	3.2	15.5	12	1	2.5	SW	5.7	6	99.0
NO (ppb)	-	-	-	-	0.4	7.1	13	0	5.1	WNW	1.4	7	99.0
NO _x (ppb)	-	-	-	-	3.6	20.8	13	0	5.1	WNW	6.7	13	99.0
RELATIVE HUMIDITY (%)	-	-	-	-	78	92	14, 14	1, 4	2.9 4.6	SE S	89	24	100.0
BAROMETRIC PRESSURE (millibar)	-	-	-	-	938	955	10, 18	VAR	VAR	VAR	953	18	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	-0.5	16.4	4	14	5.0	S	7.6	9	100.0
PRECIPITATION (mm)	-	-	-	-	0.0	1.1	19	21	7.9	E	0.1	6, 19	100.0
VECTOR WS (kph)	-	-	-	-	0.9	12.1	14	13	-	WNW	7.3	19	100.0
VECTOR WD (sec)	-	-	-	-	181 (S)	-	-	-	-	-	-	-	100.0

NA-NOT AVAILABLE VAR-VARIOUS

Exceedance Summary Report

SO₂ 1-Hour Exceedances

Measured concentrations of sulphur dioxide were below the 1-hour AAAQO of 172 ppb.

SO₂ 24-Hour Exceedances

Measured concentrations of sulphur dioxide were below the 24-hour AAAQO of 48.0 ppb.

H₂S 1-Hour Exceedances

Measured concentrations of hydrogen sulphide were below the 1-hour AAAQO of 10 ppb.

H₂S 24-Hour Exceedances

Measured concentrations of hydrogen sulphide were below the 24-hour AAAQO of 3 ppb.

NO₂ 1-Hour Exceedances

Measured concentrations of nitrogen dioxide were below the 1-hour AAAQO of 159 ppb.

In accordance with EPEA and the Substance Release Regulation.

In accordance with A Guide to Release Reporting and the Alberta Ambient Air Quality Objectives and Guidelines Summary.

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1.0 Discussion

This monthly report consists of continuous monitoring results for the following 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, at a minimum, for each monthly monitoring period.

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/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)

A shut-down calibration was performed on November 1, prior to scheduled maintenance. Leak and flow checks were performed on the zero/span system, the charcoal was renewed and the sample pump was exchanged. UV lamp and hardware calibrations were also completed. A successful post-repair calibration was completed afterwards. Two hours of downtime were recorded due to this maintenance event.

Maximum instantaneous data, collected on November 18 at 00:00, was invalidated due to a brief power outage.

HYDROGEN SULPHIDE (H₂S)

A shut-down calibration was performed on November 1, prior to scheduled maintenance. Leak and flow checks were performed on the zero/span system, the charcoal was renewed and the sample pump was inspected. UV lamp and hardware calibrations were also completed. A successful post-repair calibration was completed afterwards. Two hours of downtime were recorded due to this maintenance event.

The analyzer spanned towards the lower acceptance limit on November 18. A repeat zero/span check was performed on November 19 to assess and correct the drift. One hour of downtime was recorded as a result of the additional quality check.

An as-found response check was conducted on November 28, to assess a zero drift occurrence. Two hours of downtime were recorded as a result of the additional quality check.

Maximum instantaneous data, collected on November 18 at 00:00, was invalidated due to a brief power outage.

TOTAL HYDROCARBONS (THC)

The routine monthly calibration was performed on November 1. Eleven hours of downtime were recorded on November 19, due to an analyzer flame-out event.

Maximum instantaneous data, collected on November 18 at 00:00, was invalidated due to a brief power outage.

NITROGEN DIOXIDE (NO₂)

A shut-down calibration was performed on November 1, prior to scheduled maintenance. The sample pump was checked and a hardware calibration was completed. A successful post-repair calibration was completed afterwards. This event did not result in any downtime.

The analyzer began spanning towards the upper acceptance limit on November 5. A repeat zero/span check, performed on November 6, confirmed the drift. A repeat full calibration was completed on November 16, after which the expected span value was updated. As the calibrations and zero/span checks met AMD requirements, no data was invalidated. However, seven hours of downtime were recorded due to the additional quality checks.

Maximum instantaneous data, collected on November 18 at 00:00, was invalidated due to a brief power outage.

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

Wind data is reported as vector wind speed and vector wind direction. Wind direction is defined as the direction from which the wind is blowing from and is measured in degrees from true north.

There were no operational issues that impacted hourly data this month. Maximum instantaneous data, collected on November 18 at 00:00, was invalidated due to a brief power outage.

RELATIVE HUMIDITY (RH)

No operational issues were identified this month.

BAROMETRIC PRESSURE (BP)

No operational issues were identified this month.

PRECIPITATION

The routine quarterly rain gauge audit was conducted on November 14. No issues were identified.

AMBIENT TEMPERATURE (AmbTPX)

No operational issues were identified this month.

2.0 Project Personnel

Mike Bisaga was the contact for Lakeland Industry & Community Association and the Maxxam field technicians were Christopher Wesson and Alexander Yakupov.

3.0 Plant Monthly Required AMD Summary

All data collected this month was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems 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 monitoring program:

- Maxxam AIR SOP-00209: Ambient Sulphur 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 100E 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

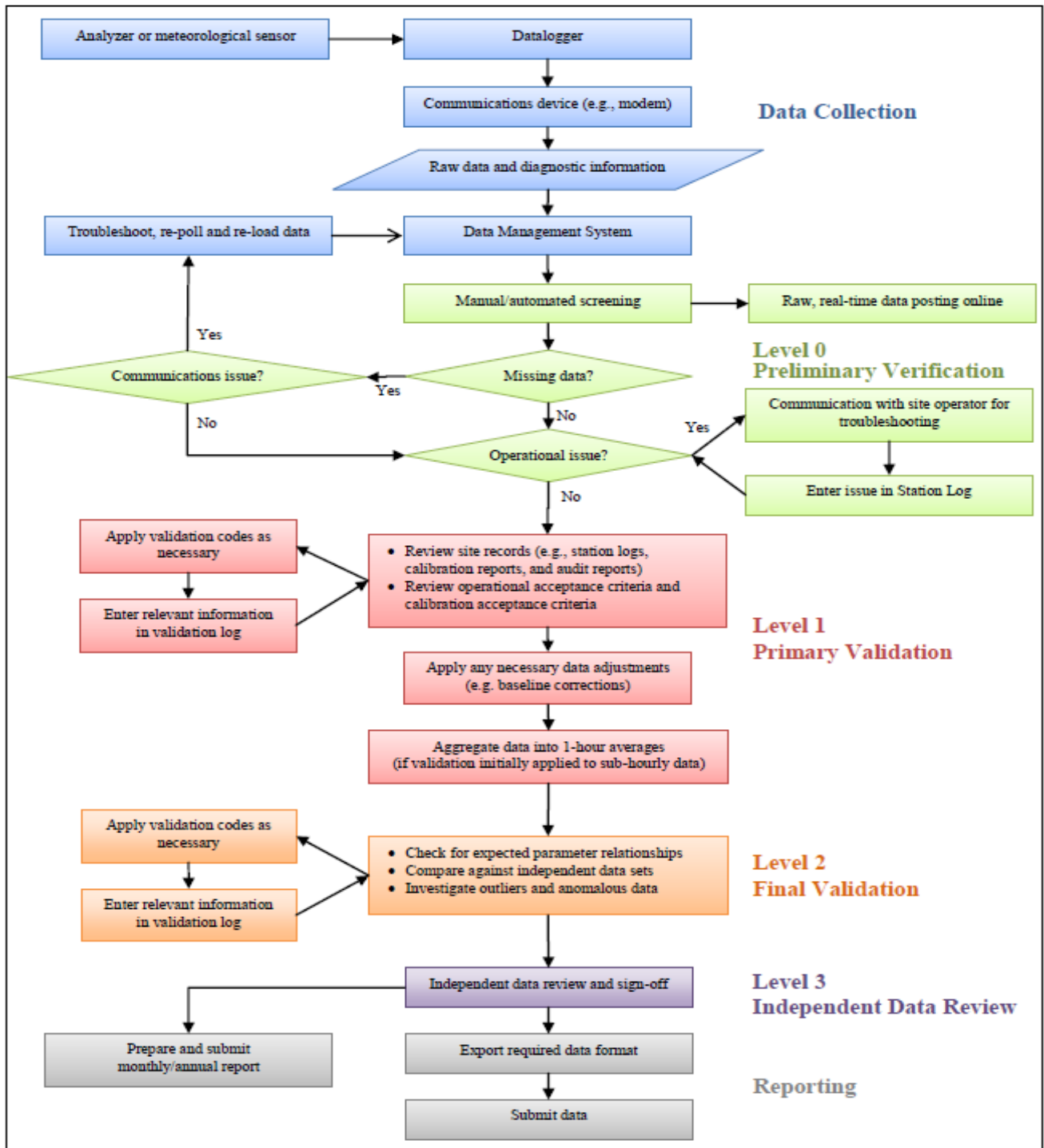
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

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 Hourly Averages (SO2 ppb)

Table with 30 rows (DAY 1-30) and 28 columns (HR START (MST) 0:00-23:00, DAILY MIN., DAILY MAX., 24-HR AVG., RDGS.). Contains hourly SO2 readings and flags (C, Y, S) with summary rows for HOURLY MAX and HOURLY AVG.

STATUS FLAG CODES

Legend table for status flag codes: C (MONTHLY CALIBRATION), C1 (REPEAT CALIBRATION), Y (MAINTENANCE), S (DAILY ZERO/SPAN CHECK), S1 (REPEAT ZERO/SPAN CHECK), Q (QUALITY ASSURANCE), R (RECOVERY), X (MACHINE MALFUNCTION), G (OUT FOR REPAIR), P (POWER FAILURE).

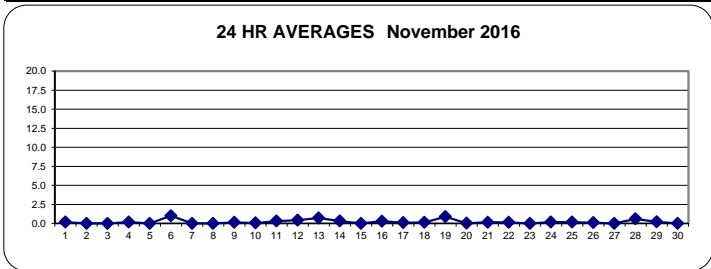
OBJECTIVE LIMIT:

Table for ALBERTA ENVIRONMENT limits: 1-HR 172 ppb, 24-HR 48 ppb.

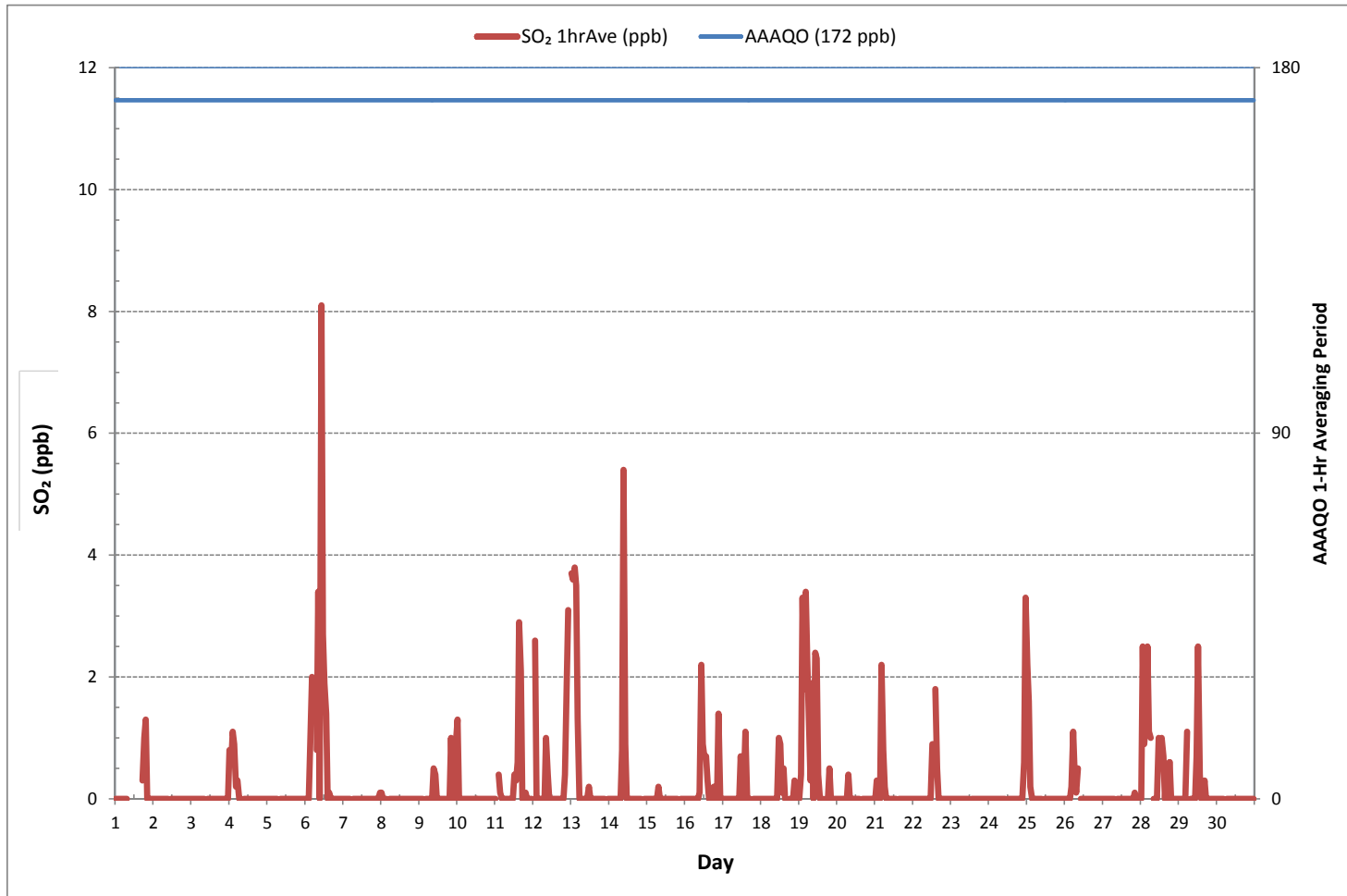
MONTHLY SUMMARY

Summary table with 4 columns: Metric, Value, Unit, and Additional Info. Includes metrics like NUMBER OF 1-HR EXCEEDANCES (0), NUMBER OF 24-HR EXCEEDANCES (0), NUMBER OF NON-ZERO READINGS (114), MINIMUM 1-HR AVERAGE (0.0 ppb), MAXIMUM 1-HR AVERAGE (8.1 ppb), MAXIMUM 24-HR AVERAGE (1.0 ppb), IZS CALIBRATION TIME (30 hrs), MONTHLY CALIBRATION TIME (7 hrs), OPERATIONAL TIME (718 hrs), AMD OPERATION UPTIME (99.7 %), STANDARD DEVIATION (0.7), and MONTHLY AVERAGE (0.2 ppb).

24 HR AVERAGES November 2016



SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)





SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)

HR START (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-HR AVG.	RDGS.
HR END (MST)	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	4.2	4.0	3.8	3.9	4.0	3.9	4.1	4.0	C	C	C	Y	Y	C	C	C	C	1.2	5.6	6.7	2.1	1.0	1.0	0.8	0.8	6.7	3.4	22
2	0.7	1.4	1.0	0.8	0.9	1.1	1.0	0.9	0.8	1.1	S	1.4	1.8	1.6	1.6	1.4	1.4	1.6	1.2	1.0	1.1	1.0	1.0	0.8	0.7	1.8	1.2	24
3	1.1	1.1	1.1	1.3	1.2	1.2	1.4	1.0	1.3	S	1.0	1.4	1.6	1.4	1.8	1.6	1.3	1.0	1.3	1.3	1.3	2.1	1.6	1.3	1.0	2.1	1.3	24
4	3.6	3.5	3.2	3.2	2.8	4.2	1.0	1.2	S	1.5	1.5	1.4	1.4	1.7	1.4	1.6	1.4	1.3	1.3	1.3	1.5	1.3	1.4	1.9	1.0	4.2	1.9	24
5	1.6	1.7	1.7	1.6	1.9	1.9	1.9	S	1.7	1.8	2.1	2.2	2.2	2.2	2.5	2.2	2.3	2.1	2.1	2.2	2.2	2.2	2.4	2.4	1.6	2.5	2.0	24
6	2.2	2.5	3.4	5.1	8.3	7.6	S	6.2	13.3	2.8	30.7	10.0	9.2	6.2	2.8	3.1	2.3	1.8	1.9	1.6	1.6	1.6	2.2	1.6	1.6	30.7	5.6	24
7	1.4	1.4	1.3	1.3	1.3	S	1.7	1.6	1.4	1.2	1.5	1.6	1.6	1.6	2.4	2.4	1.6	1.5	1.5	1.6	1.9	2.0	1.9	2.1	1.2	2.4	1.6	24
8	2.2	1.6	1.4	1.5	S	1.5	1.5	1.6	1.7	1.6	1.7	2.0	2.0	2.1	1.9	1.9	1.8	1.8	1.9	2.1	1.9	1.9	2.0	2.0	1.4	2.2	1.8	24
9	1.9	2.0	3.3	S	2.9	2.2	2.3	2.4	2.5	3.1	3.3	2.6	2.6	2.9	3.4	1.8	1.8	1.6	1.6	3.1	4.0	1.7	1.4	4.5	1.4	4.5	2.6	24
10	5.3	1.4	S	1.1	1.0	0.8	1.0	1.0	0.8	1.6	1.8	1.3	1.1	1.0	2.1	1.9	1.3	3.2	1.8	1.2	1.6	1.9	1.6	1.4	0.8	5.3	1.6	24
11	2.0	S	2.6	2.4	2.0	2.2	2.1	2.2	2.2	2.2	2.3	2.8	3.2	2.9	3.4	13.7	13.1	3.0	2.7	3.0	2.7	3.4	3.4	2.4	2.0	13.7	3.6	24
12	S	11.1	3.1	2.6	2.5	2.7	3.0	3.2	5.0	4.0	2.9	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.2	5.9	10.7	17.6	S	2.5	17.6	4.6	24
13	23.3	15.0	16.2	12.0	6.7	3.8	2.7	2.4	2.4	3.7	4.5	5.2	2.7	2.5	2.5	2.4	2.4	2.4	2.7	2.7	3.0	3.2	S	2.6	2.4	23.3	5.5	24
14	2.9	3.3	3.2	3.0	3.2	3.4	3.5	3.3	7.1	9.7	9.4	3.4	3.2	3.2	3.1	3.2	3.1	3.0	3.0	2.9	2.7	S	2.6	2.6	2.6	9.7	3.8	24
15	2.7	2.8	2.7	3.2	3.7	3.7	4.2	4.2	3.5	3.0	2.6	2.6	2.7	3.4	3.3	3.0	3.0	3.0	2.7	3.0	S	2.7	2.9	3.0	2.6	4.2	3.1	24
16	3.0	3.0	3.0	3.1	2.9	2.8	2.8	2.6	2.9	4.2	9.0	5.3	4.8	5.6	3.7	3.5	3.2	2.7	5.2	S	2.4	8.4	2.8	2.8	2.4	9.0	3.9	24
17	2.8	2.7	2.6	2.4	2.0	2.0	1.9	2.0	2.2	2.1	2.0	7.2	3.7	4.1	10.8	2.0	1.6	1.5	S	3.4	2.1	1.6	1.4	1.4	1.4	10.8	2.8	24
18	P	4.2	1.2	1.2	1.2	1.3	1.3	1.3	1.4	1.3	4.8	5.6	3.4	3.0	3.2	2.3	1.8	S	1.6	1.6	1.6	3.8	3.2	1.6	1.2	5.6	2.4	23
19	1.5	6.6	8.3	7.7	8.2	7.6	6.4	4.1	6.2	3.2	7.0	9.0	7.8	3.3	2.7	2.2	S	2.4	3.5	3.8	2.8	2.4	2.4	2.4	1.5	9.0	4.8	24
20	2.5	2.7	2.4	2.4	2.7	3.7	3.5	4.7	2.7	2.7	2.6	2.4	2.6	2.6	2.6	S	2.7	2.7	2.7	2.7	2.8	2.7	2.9	2.9	2.4	4.7	2.8	24
21	2.9	5.8	3.5	3.7	8.4	8.2	4.8	3.3	3.2	3.2	3.3	3.2	3.3	3.5	S	3.4	3.3	3.2	3.1	3.0	2.9	3.3	3.4	3.2	2.9	8.4	3.9	24
22	3.0	2.6	2.7	3.0	3.0	2.7	2.7	2.5	2.6	2.9	3.6	3.7	5.8	S	6.5	4.1	3.9	3.0	2.6	2.6	2.7	2.7	2.9	2.7	2.5	6.5	3.2	24
23	2.8	2.7	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.7	2.8	S	3.0	3.0	3.1	3.0	3.1	3.0	3.2	3.2	2.9	2.9	3.1	2.6	3.2	2.9	24
24	3.0	3.1	3.0	3.0	3.2	3.0	2.9	2.7	2.6	2.6	2.9	S	4.0	4.4	4.0	3.2	3.4	6.6	2.9	3.4	4.7	3.2	6.4	8.5	2.6	8.5	3.8	24
25	8.1	7.6	6.2	4.1	3.5	3.8	3.6	3.8	3.5	4.2	S	5.9	5.4	4.1	4.1	3.9	3.7	3.6	3.8	3.6	3.5	3.5	3.4	3.4	3.4	8.1	4.4	24
26	3.7	3.7	4.1	3.2	5.2	6.0	6.3	4.5	4.6	S	6.4	4.0	3.7	4.3	4.3	4.1	3.6	3.7	3.8	4.0	4.0	4.1	4.1	4.1	3.2	6.4	4.3	24
27	4.0	4.0	4.0	4.0	4.2	4.1	4.2	4.3	S	4.3	4.3	4.3	4.3	5.0	4.2	4.5	5.2	5.3	4.6	5.1	5.2	4.8	5.1	4.7	4.0	5.3	4.5	24
28	5.4	10.1	8.4	10.8	9.4	7.8	6.2	S	8.6	4.3	6.0	8.4	8.0	8.9	13.1	6.0	9.3	4.5	10.9	3.8	3.7	3.6	3.7	3.7	3.6	13.1	7.2	24
29	3.6	3.5	3.4	3.4	4.5	11.1	S	3.6	3.6	3.6	4.3	11.6	15.3	14.5	3.8	4.0	7.7	3.5	3.2	3.2	3.1	3.0	3.0	3.0	3.0	15.3	5.4	24
30	3.0	3.0	3.4	3.3	3.2	S	3.4	3.2	3.3	3.4	3.2	3.3	3.2	3.3	3.6	3.4	3.3	3.5	3.4	3.3	3.3	3.2	3.2	3.2	3.0	3.6	3.3	24
HOURLY MAX	23.3	15.0	16.2	12.0	9.4	11.1	6.4	6.2	13.3	9.7	30.7	11.6	15.3	14.5	13.1	13.7	13.1	6.6	10.9	6.7	5.9	10.7	17.6	8.5				
HOURLY AVG	3.7	4.1	3.7	3.5	3.7	3.8	3.0	2.9	3.5	3.0	4.7	4.2	4.1	3.8	3.7	3.3	3.4	2.8	3.1	2.9	2.8	3.1	3.2	2.8				

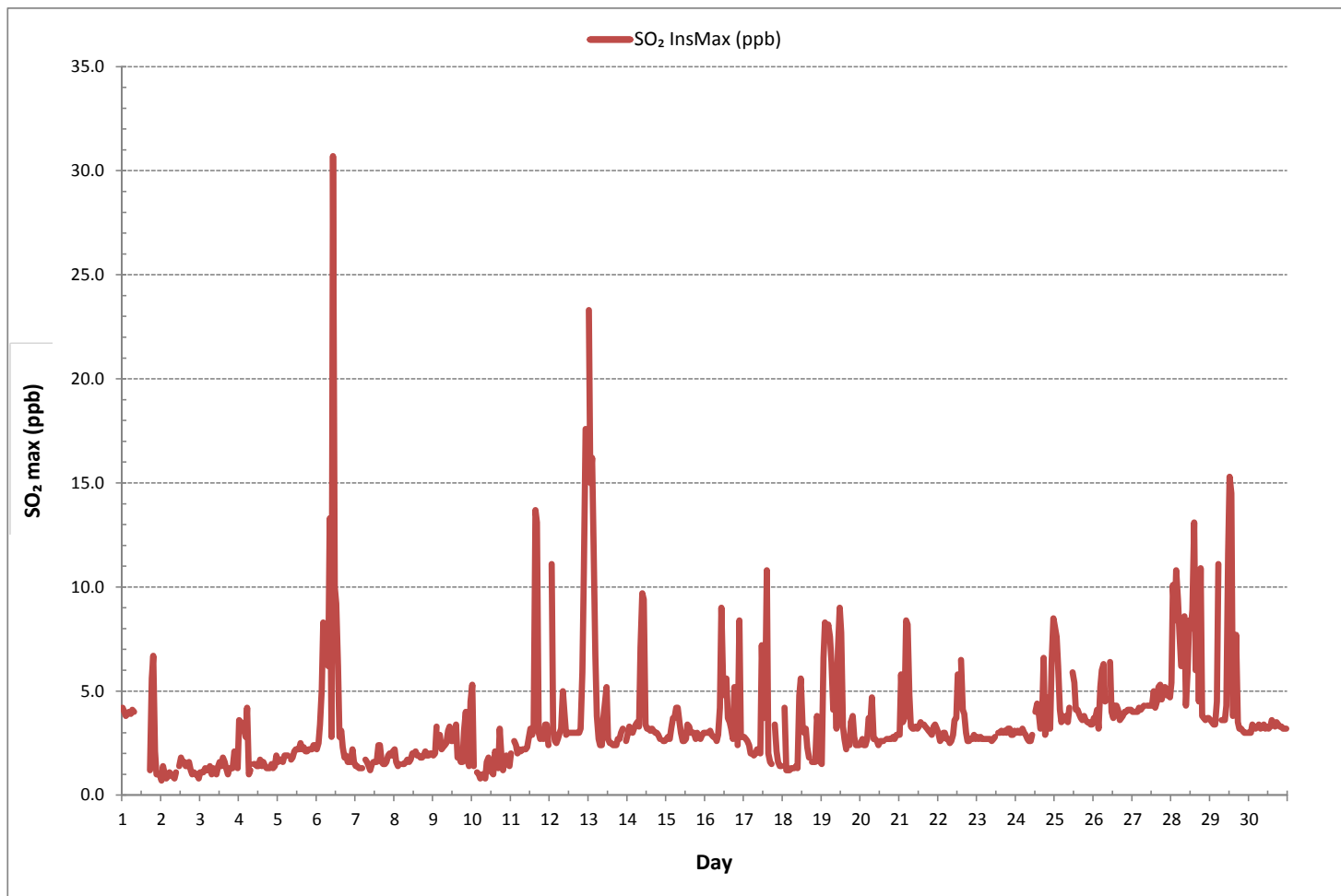
STATUS FLAG CODES

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:	680
MAXIMUM INSTANTANEOUS VALUE:	30.7 ppb @ HOUR(S) 10 ON DAY(S) 6
VAR-VARIOUS	
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	2.6
OPERATIONAL TIME:	717 hrs

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)

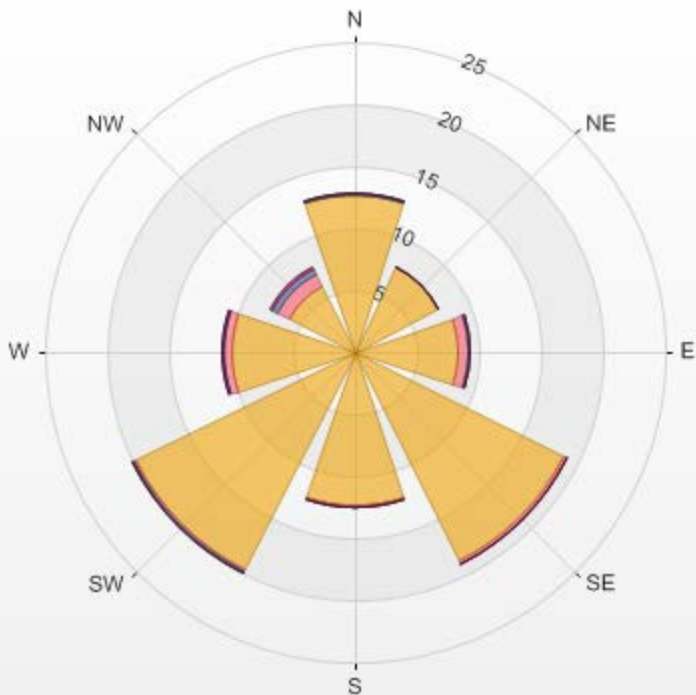


Wind: LICA MASKWA Poll.: LICA MASKWA-SO2[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr
 Calm: 0.00% Valid Data: 94.44% Calm Avg: 0.00 [ppb]

Direction	0.0-1.6	1.6-3.3	3.3-4.9	4.9-6.6	6.6-8.2	>8.2	Total
N	12.65	0	0.15	0	0	0	12.8
NE	7.65	0	0	0	0	0	7.65
E	8.38	0.88	0.15	0	0	0	9.41
SE	18.82	0.44	0	0	0	0	19.26
S	12.35	0.15	0	0	0	0	12.5
SW	19.71	0.15	0.15	0	0	0	20.01
W	10	0.59	0	0.15	0	0	10.74
NW	5.88	1.18	0.44	0	0.15	0	7.65
Summary	95.44	3.39	0.89	0.15	0.15	0	100

% Icon Classes (ppb)	95	0.0-1.6	3	1.6-3.3	1	3.3-4.9	0	4.9-6.6	0	6.6-8.2	0	>8.2
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LICA MASKWA Poll.: LICA MASKWA-SO₂[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



SO₂[ppb] Calibration: LICA MASKWA Monthly: 2016/11 Type: Span



Span Meas Span Ref Span Low Span High

HYDROGEN SULPHIDE

HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)

HR START (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-HR	RDGS.		
HR END (MST)	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.			
DAY 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C	C	C	Y	Y	C	C	C	C	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	22
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	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
4	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
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.7	0.4	0.2	0.1	0.0	0.7	0.1	24	
6	0.2	0.0	0.1	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	24
7	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
8	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	0.0	0.0	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	24
9	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	0.0	24
10	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
11	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	0.0	24
12	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	0.0	0.0	0.0	S	0.0	0.1	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	S	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	0.2	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	0.0	0.0	0.2	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	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	0.0	0.0	S	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	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	S	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	0.1	0.0	0.0	0.0	0.0	S1	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	0.1	0.0	23
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	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	0.2	0.5	0.2	0.0	0.5	0.4	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	0.5	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	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
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	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	0.0	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
25	0.0	0.0	0.8	0.7	0.0	0.8	0.6	0.7	0.0	0.0	0.0	S	0.5	0.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.2	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	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	24
27	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
28	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	C1	C1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22
29	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	0.0	24
30	0.1	0.7	0.3	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	0.7	0.0	0.0	24
HOURLY MAX	0.2	0.7	0.8	0.7	0.0	0.8	0.6	0.7	0.0	0.2	0.0	0.5	0.9	0.0	0.3	0.1	0.0	0.4	0.4	0.3	0.7	0.4	0.2	0.1						
HOURLY AVG	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						

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

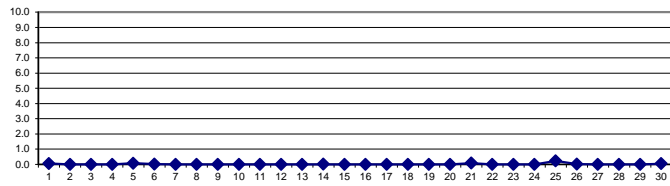
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	10	ppb	24-HR	3	ppb
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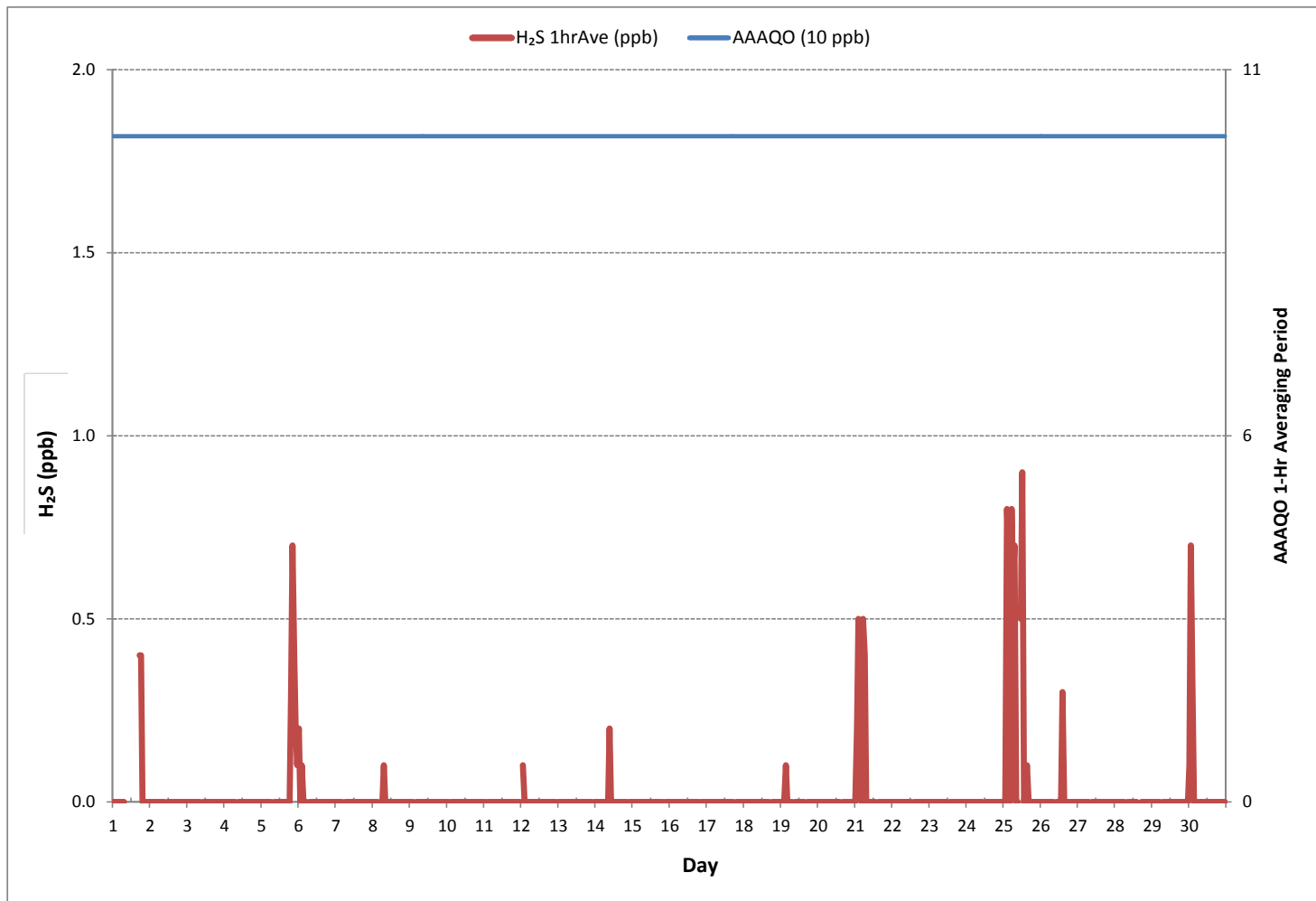
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF 24-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	30					
MINIMUM 1-HR AVERAGE:	0.0	ppb	@ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	0.9	ppb	@ HOUR(S)	12	ON DAY(S)	25
MAXIMUM 24-HR AVERAGE:	0.2	ppb			ON DAY(S)	25
					VAR-VARIOUS	
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	715	hrs	
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	99.3	%	
STANDARD DEVIATION:	0.1		MONTHLY AVERAGE:	0.0	ppb	

24 HR AVERAGES November 2016



HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)





HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)

HR START (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-HR AVG.	RDGS.
HR END (MST)	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	1.6	1.6	1.6	1.6	1.5	1.6	1.4	1.4	C	C	C	Y	Y	C	C	C	C	1.0	0.8	0.7	0.6	0.4	0.4	0.6	0.4	1.6	1.1	22
2	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.4	0.3	0.5	S	0.6	0.5	0.5	0.5	0.4	0.6	0.5	0.6	0.5	0.5	0.6	0.5	0.6	0.3	0.6	0.5	24
3	0.5	1.5	0.7	0.7	0.8	0.6	0.7	1.2	0.8	S	0.8	0.7	0.7	0.7	0.7	0.9	0.5	0.6	0.5	0.7	0.6	0.7	0.6	0.4	0.4	1.5	0.7	24
4	0.7	1.3	0.6	0.6	0.4	0.6	0.6	0.7	S	0.9	0.6	0.5	0.6	0.8	0.7	0.7	0.7	0.6	1.1	1.2	1.2	1.0	1.0	1.1	0.4	1.3	0.8	24
5	1.7	1.3	1.3	1.1	1.3	1.4	1.4	S	2.4	1.2	1.4	1.5	1.3	1.8	1.5	1.5	2.7	2.3	1.6	2.2	2.7	2.4	2.2	1.7	1.1	2.7	1.7	24
6	2.4	2.6	1.8	1.9	2.0	1.6	S	1.3	1.5	1.4	1.5	1.4	1.5	1.5	1.3	1.3	1.3	1.0	1.1	1.0	0.9	0.9	1.0	0.9	0.9	2.6	1.4	24
7	0.7	0.8	0.6	0.7	0.6	S	0.5	0.8	0.7	1.9	0.7	2.5	0.7	0.5	0.5	0.8	1.0	0.7	0.6	1.5	0.8	0.5	0.6	0.7	0.5	2.5	0.8	24
8	0.6	0.8	0.9	1.1	S	0.8	1.0	1.3	1.1	1.1	1.1	0.9	1.0	1.1	1.2	1.1	1.1	1.2	1.3	1.2	1.3	1.1	1.0	1.1	0.6	1.3	1.1	24
9	1.4	1.3	1.3	S	1.2	1.1	1.9	1.2	1.2	1.4	1.4	1.9	1.1	1.1	1.1	0.8	1.2	0.8	0.8	0.7	0.8	0.5	0.5	0.7	0.5	1.9	1.1	24
10	0.8	0.4	S	0.3	0.5	0.3	0.4	0.3	0.2	0.4	0.4	0.4	0.3	0.2	0.3	0.4	1.3	1.4	0.9	0.4	0.4	0.3	0.5	0.6	0.2	1.4	0.5	24
11	0.8	S	0.9	0.9	0.9	1.0	1.1	1.1	1.1	1.7	1.7	1.2	1.1	2.3	1.2	1.6	1.5	1.2	1.3	1.4	1.6	1.3	1.3	2.0	0.8	2.3	1.3	24
12	S	4.1	1.2	1.3	1.3	1.3	1.4	1.6	1.5	2.2	2.0	1.6	1.6	1.7	1.6	1.6	1.5	1.6	1.7	1.8	1.8	2.0	2.2	S	1.2	4.1	1.8	24
13	2.2	1.7	1.7	1.6	1.4	1.2	1.3	1.4	1.2	1.3	1.4	1.3	1.2	1.5	1.2	1.3	1.3	1.4	1.4	1.5	1.4	2.2	S	1.6	1.2	2.2	1.5	24
14	2.2	2.3	1.9	1.8	1.9	3.2	1.8	2.2	2.1	2.3	1.8	1.9	1.7	1.6	1.7	1.7	1.7	2.1	2.3	2.0	1.5	S	1.9	1.8	1.5	3.2	2.0	24
15	1.3	1.4	1.2	1.9	1.3	1.3	1.5	1.5	1.3	1.4	1.5	1.2	1.4	1.4	1.8	1.5	1.8	1.7	1.5	1.6	S	1.6	1.5	1.7	1.2	1.9	1.5	24
16	1.6	1.5	1.4	1.6	1.7	1.4	1.3	1.4	1.4	1.4	1.7	1.4	1.2	1.3	1.3	1.3	1.4	1.1	1.6	S	1.2	1.1	1.8	1.1	1.1	1.8	1.4	24
17	0.9	0.8	1.0	0.8	0.8	0.7	0.8	0.9	0.8	0.6	0.5	0.6	0.5	0.7	0.6	0.4	0.6	0.4	S	0.5	0.4	1.5	0.5	0.4	0.4	1.5	0.7	24
18	P	0.2	0.2	0.2	0.8	0.3	0.4	0.1	0.1	0.1	0.8	0.4	0.4	0.4	0.2	0.3	S	0.4	0.4	0.4	0.6	1.8	0.5	0.1	1.8	0.4	23	
19	1.2	1.3	1.2	1.5	0.7	1.1	1.1	0.6	S1	1.4	0.9	0.7	0.6	0.8	0.9	0.7	S	0.9	0.9	1.1	1.0	1.2	0.8	1.0	0.6	1.5	1.0	23
20	1.0	1.0	1.0	1.0	1.0	1.1	1.2	1.3	1.5	2.2	1.1	1.0	1.1	1.1	2.4	S	1.3	1.8	1.3	1.3	1.3	1.2	1.7	2.0	1.0	2.4	1.3	24
21	1.9	1.9	2.3	2.5	1.9	2.5	2.4	1.8	1.6	1.6	1.7	2.3	1.6	1.5	S	1.4	1.5	1.4	1.3	1.3	1.3	1.4	1.2	1.3	1.2	2.5	1.7	24
22	1.2	1.0	1.0	1.0	1.1	1.1	1.1	1.6	1.0	0.9	0.9	0.8	1.1	S	1.1	1.4	1.7	1.2	0.9	1.1	0.9	1.0	1.0	1.0	0.8	1.7	1.1	24
23	1.0	1.1	1.1	1.2	1.2	1.1	1.3	1.3	1.3	1.2	1.3	1.3	S	1.4	1.6	1.3	1.3	1.2	1.3	1.3	1.3	1.3	1.2	1.3	1.0	1.6	1.3	24
24	1.4	1.3	1.2	1.2	1.3	1.3	1.2	1.4	1.2	1.2	1.2	S	1.4	1.5	1.8	2.2	1.9	1.6	1.9	1.6	1.9	1.3	2.1	1.5	1.2	2.2	1.5	24
25	1.6	2.1	3.9	3.3	2.1	3.1	3.1	3.4	2.1	2.1	S	3.3	3.3	1.9	1.8	2.3	1.9	1.8	2.3	1.7	1.7	3.3	1.6	1.4	1.4	3.9	2.4	24
26	1.5	1.5	1.5	1.5	1.4	1.4	1.3	1.5	1.6	S	1.9	1.7	1.7	1.5	2.9	1.8	1.7	1.7	2.5	1.9	1.8	1.7	1.9	1.9	1.3	2.9	1.7	24
27	2.0	2.0	2.1	1.9	2.1	2.0	2.0	2.1	S	2.1	2.1	2.2	2.1	3.3	2.3	2.5	2.3	2.3	2.4	2.2	2.3	2.2	2.4	2.4	1.9	3.3	2.2	24
28	2.4	2.8	2.4	2.5	2.2	2.1	2.3	S	2.0	2.0	2.0	2.2	2.0	2.0	2.6	C1	C1	1.7	1.7	1.6	1.6	1.5	1.5	1.6	1.5	2.8	2.0	22
29	1.4	2.4	1.6	1.6	1.4	1.5	S	1.4	1.3	1.2	1.6	1.3	1.3	1.3	1.3	1.3	1.0	1.2	1.2	1.2	1.1	1.1	2.7	2.3	1.0	2.7	1.5	24
30	3.5	3.3	2.1	1.8	1.8	S	1.6	1.3	1.4	1.4	1.5	1.3	1.9	1.4	1.5	1.4	1.4	1.4	1.4	2.4	1.3	1.4	1.4	1.3	1.3	3.5	1.7	24
HOURLY MAX	3.5	4.1	3.9	3.3	2.2	3.2	3.1	3.4	2.4	2.3	2.1	3.3	3.3	3.3	2.9	2.5	2.7	2.3	2.5	2.4	2.7	3.3	2.7	2.4				
HOURLY AVG	1.4	1.6	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.4	1.3	1.4	1.2	1.3	1.4	1.3	1.4	1.3	1.3	1.3	1.2	1.3	1.3	1.3				

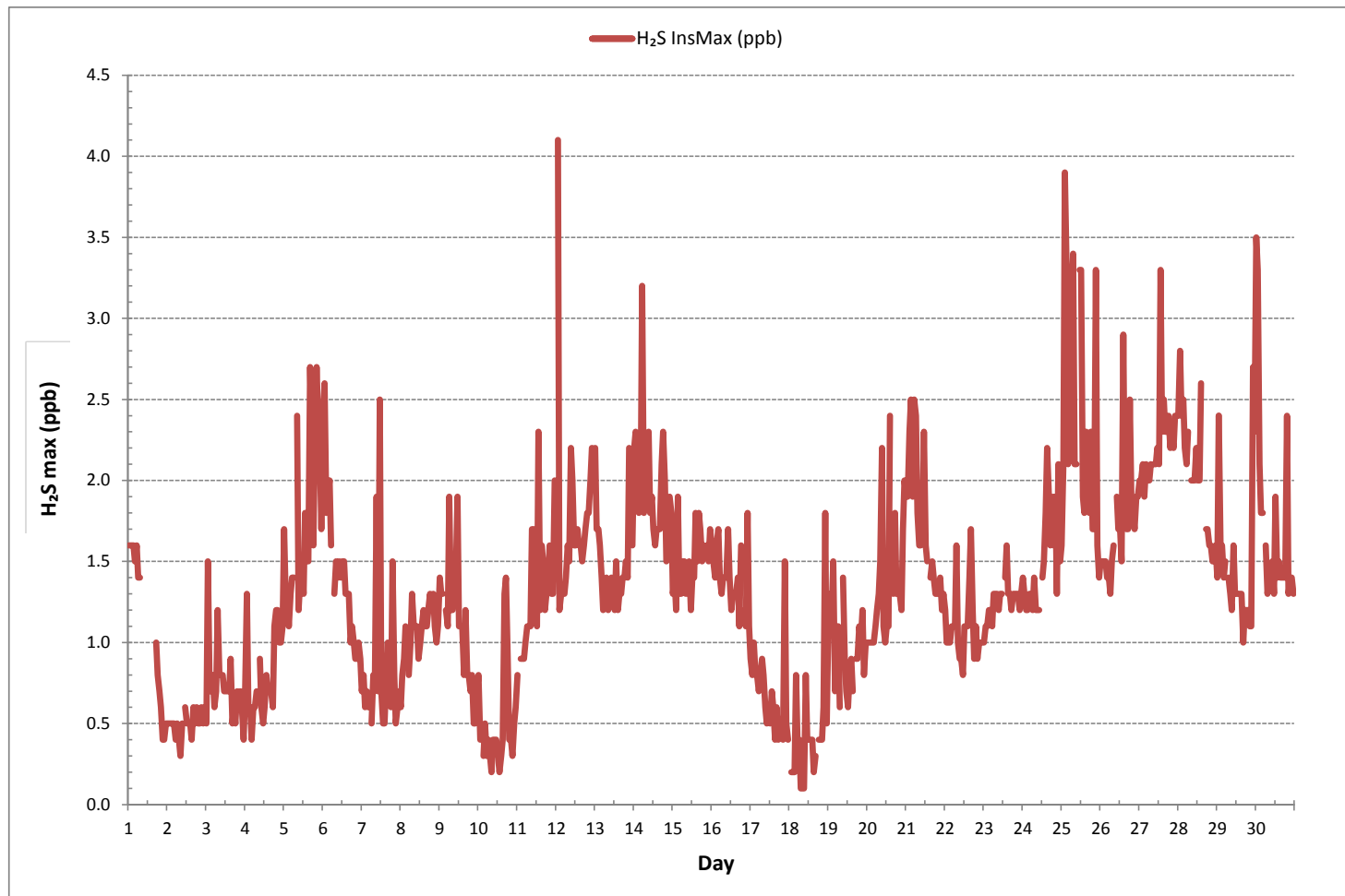
STATUS FLAG CODES

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:	677
MAXIMUM INSTANTANEOUS VALUE:	4.1 ppb @ HOUR(S) 1 ON DAY(S) 12
	VAR-VARIOUS
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	0.6
OPERATIONAL TIME:	714 hrs

HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)



Wind: LICA MASKWA Poll.: LICA MASKWA-H2S[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.03% Calm Avg: 0.00 [ppb]

Direction	0.0-0.3	0.3-0.7	0.7-1.0	>1.0	Total
N	12.56	0	0	0	12.56
NE	7.68	0	0	0	7.68
E	9.16	0.15	0	0	9.31
SE	17.58	1.18	0.59	0	19.35
S	12.56	0	0	0	12.56
SW	20.09	0	0	0	20.09
W	10.49	0.15	0.15	0	10.79
NW	7.53	0.15	0	0	7.68
Summary	97.65	1.63	0.74	0	100

% Icon Classes (ppb)

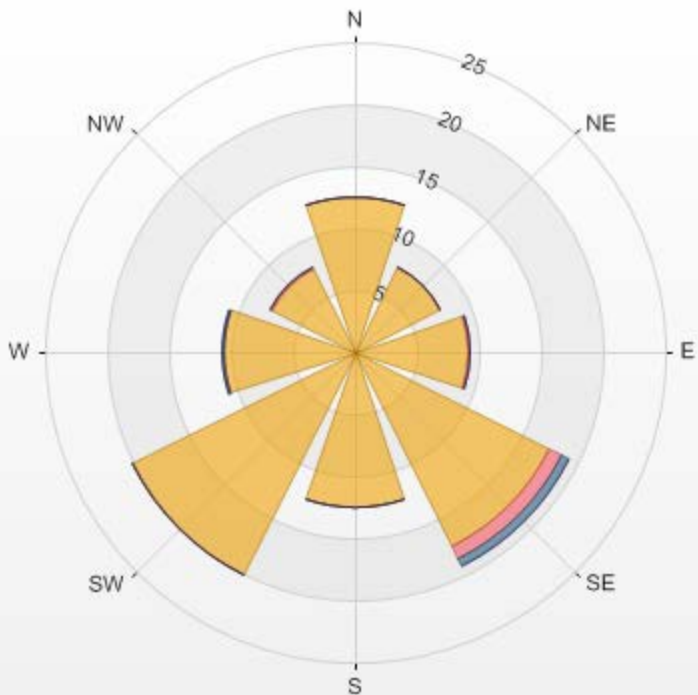
98 0.0-0.3

2 0.3-0.7

1 0.7-1.0

0 >1.0

LICA MASKWA Poll.: LICA MASKWA-H2S[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



H2S[ppb] Calibration: LICA MASKWA Monthly: 2016/11 Type: Span



Span Meas Span Ref Span Low Span High

TOTAL HYDROCARBON



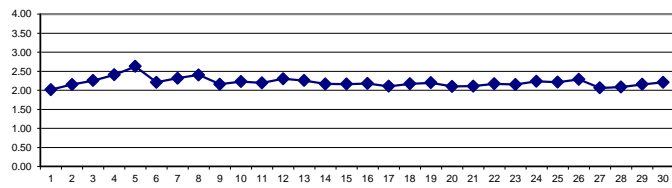
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (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-HR AVG.	RDGS.		
HR END (MST)	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	1.93	1.94	1.94	1.95	1.95	1.97	1.97	1.97	2.03	2.02	2.04	2.05	2.04	2.04	2.03	C	C	C	C	2.10	2.10	2.09	2.10	2.11	1.93	2.11	2.02	24		
2	2.11	2.10	2.10	2.09	2.09	2.09	2.10	2.08	2.08	2.08	S	2.09	2.11	2.12	2.13	2.14	2.17	2.20	2.21	2.29	2.33	2.29	2.26	2.22	2.08	2.33	2.15	24		
3	2.22	2.24	2.26	2.29	2.26	2.22	2.25	2.25	2.27	S	2.30	2.36	2.36	2.28	2.24	2.23	2.29	2.25	2.25	2.27	2.20	2.22	2.20	2.22	2.20	2.36	2.26	24		
4	2.47	2.48	2.42	2.41	2.31	2.26	2.22	2.37	S	2.45	2.36	2.36	2.34	2.28	2.26	2.27	2.32	2.34	2.36	2.53	2.44	2.70	2.72	2.68	2.22	2.72	2.41	24		
5	2.54	2.52	2.51	2.41	2.40	2.44	2.53	S	2.59	2.59	2.63	2.48	2.42	2.43	2.45	2.44	2.45	2.47	2.50	3.11	3.55	3.23	2.99	2.75	2.40	3.55	2.63	24		
6	2.94	2.60	2.65	2.54	2.46	2.18	S	2.11	2.16	2.10	2.19	2.07	2.09	2.07	2.05	2.06	2.08	2.06	2.06	2.08	2.06	2.07	2.07	2.06	2.05	2.94	2.21	24		
7	2.07	2.10	2.18	2.20	2.23	S	2.28	2.56	2.72	2.50	2.40	2.37	2.33	2.32	2.28	2.30	2.37	2.40	2.40	2.33	2.24	2.22	2.27	2.26	2.07	2.72	2.32	24		
8	2.26	2.31	2.34	2.40	S	2.38	2.51	2.45	2.43	2.69	2.52	2.38	2.36	2.38	2.38	2.36	2.38	2.38	2.36	2.39	2.42	2.42	2.38	2.37	2.36	2.43	2.26	2.69	2.40	24
9	2.55	2.54	2.26	S	2.28	2.29	2.23	2.23	2.36	2.37	2.32	2.03	2.00	1.98	1.98	1.99	2.00	2.00	2.00	2.03	2.06	2.03	2.04	2.08	1.98	2.55	2.16	24		
10	2.08	2.06	S	2.07	2.07	2.08	2.19	2.25	2.23	2.31	2.34	2.34	2.29	2.22	2.29	2.24	2.22	2.28	2.20	2.30	2.36	2.37	2.28	2.26	2.06	2.37	2.23	24		
11	2.26	S	2.27	2.24	2.22	2.19	2.19	2.17	2.16	2.17	2.14	2.16	2.18	2.16	2.19	2.22	2.13	2.12	2.16	2.23	2.25	2.23	2.20	2.21	2.12	2.27	2.19	24		
12	S	2.25	2.10	2.13	2.15	2.17	2.32	2.37	2.25	2.51	2.60	2.42	2.27	2.22	2.24	2.21	2.30	2.30	2.27	2.26	2.30	2.56	2.45	S	2.10	2.60	2.30	24		
13	2.41	2.26	2.18	2.15	2.11	2.11	2.17	2.25	2.25	2.25	2.25	2.30	2.31	2.13	2.12	2.14	2.18	2.23	2.21	2.18	2.23	2.71	S	2.75	2.11	2.75	2.26	24		
14	2.54	2.39	2.32	2.33	2.38	2.42	2.46	2.45	2.27	2.17	2.03	2.01	2.00	1.99	2.01	1.99	2.00	2.00	2.01	2.01	2.02	S	2.03	2.04	1.99	2.54	2.17	24		
15	2.04	2.04	2.05	2.08	2.12	2.25	2.31	2.34	2.31	2.30	2.19	2.15	2.12	2.11	2.12	2.11	2.11	2.11	2.13	2.14	S	2.19	2.18	2.23	2.04	2.34	2.16	24		
16	2.35	2.33	2.28	2.27	2.25	2.22	2.18	2.21	2.16	2.20	2.20	2.07	2.06	2.04	2.07	2.10	2.28	2.18	2.24	S	2.11	2.18	2.10	2.09	2.04	2.35	2.18	24		
17	2.11	2.12	2.13	2.10	2.08	2.07	2.08	2.10	2.10	2.10	2.08	2.08	2.08	2.08	2.09	2.10	2.09	2.10	S	2.13	2.14	2.16	2.15	2.17	2.07	2.17	2.11	24		
18	2.18	2.15	2.13	2.14	2.15	2.14	2.16	2.17	2.17	2.20	2.19	2.20	2.15	2.14	2.14	2.18	2.23	S	2.16	2.15	2.18	2.23	2.21	2.20	2.13	2.23	2.17	24		
19	2.23	2.19	2.18	2.19	2.22	2.22	2.23	2.24	2.22	2.17	2.18	2.18	X	X	X	X	X	X	X	X	X	X	X	X	2.13	2.13	2.24	2.20	13	
20	2.10	2.10	2.10	2.10	2.10	2.12	2.10	2.10	2.10	2.12	2.11	2.11	2.11	2.12	2.12	S	2.12	2.09	2.09	2.09	2.09	2.09	2.08	2.08	2.08	2.12	2.10	24		
21	2.08	2.09	2.09	2.08	2.08	2.07	2.07	2.07	2.06	2.07	2.11	2.08	2.08	2.10	S	2.10	2.11	2.13	2.17	2.17	2.15	2.16	2.18	2.19	2.06	2.19	2.11	24		
22	2.18	2.17	2.19	2.20	2.16	2.14	2.15	2.16	2.17	2.16	2.16	2.16	2.16	S	2.20	2.21	2.19	2.17	2.17	2.17	2.15	2.17	2.17	2.16	2.14	2.21	2.17	24		
23	2.17	2.23	2.22	2.19	2.17	2.17	2.19	2.20	2.18	2.16	2.16	2.13	S	2.12	2.11	2.11	2.10	2.11	2.11	2.14	2.15	2.15	2.14	2.13	2.10	2.23	2.15	24		
24	2.12	2.13	2.14	2.15	2.18	2.19	2.46	2.17	2.23	2.28	2.32	S	2.35	2.31	2.30	2.26	2.27	2.21	2.19	2.21	2.22	2.23	2.25	2.24	2.12	2.46	2.24	24		
25	2.19	2.23	2.27	2.23	2.20	2.19	2.18	2.18	2.18	2.18	S	2.18	2.18	2.18	2.18	2.18	2.24	2.27	2.28	2.29	2.29	2.26	2.19	2.19	2.18	2.29	2.21	24		
26	2.22	2.36	2.45	2.40	2.39	2.45	2.42	2.38	2.38	S	2.49	2.45	2.29	2.29	2.28	2.24	2.23	2.18	2.16	2.12	2.11	2.10	2.09	2.07	2.07	2.49	2.28	24		
27	2.07	2.07	2.08	2.09	2.09	2.08	2.06	2.06	S	2.06	2.06	2.06	2.06	2.05	2.05	2.05	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.08	2.05	2.09	2.06	24		
28	2.11	2.09	2.08	2.08	2.09	2.09	2.14	S	2.09	2.10	2.12	2.10	2.10	2.09	2.09	2.10	2.09	2.08	2.07	2.07	2.07	2.07	2.07	2.08	2.07	2.14	2.09	24		
29	2.09	2.10	2.10	2.10	2.11	2.14	S	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.18	2.16	2.15	2.16	2.15	2.15	2.16	2.21	2.36	2.09	2.36	2.16	24	
30	2.37	2.41	2.51	2.34	2.33	S	2.16	2.16	2.19	2.18	2.10	2.07	2.08	2.08	2.10	2.09	2.13	2.13	2.21	2.25	2.24	2.22	2.23	2.25	2.07	2.51	2.21	24		
HOURLY MAX	2.94	2.60	2.65	2.54	2.46	2.45	2.53	2.56	2.72	2.69	2.63	2.48	2.42	2.43	2.45	2.44	2.45	2.47	2.50	3.11	3.55	3.23	2.99	2.75						
HOURLY AVG	2.24	2.23	2.23	2.21	2.19	2.19	2.23	2.22	2.23	2.24	2.24	2.19	2.18	2.16	2.17	2.17	2.19	2.19	2.19	2.22	2.24	2.27	2.22	2.23						

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 HR AVERAGES November 2016



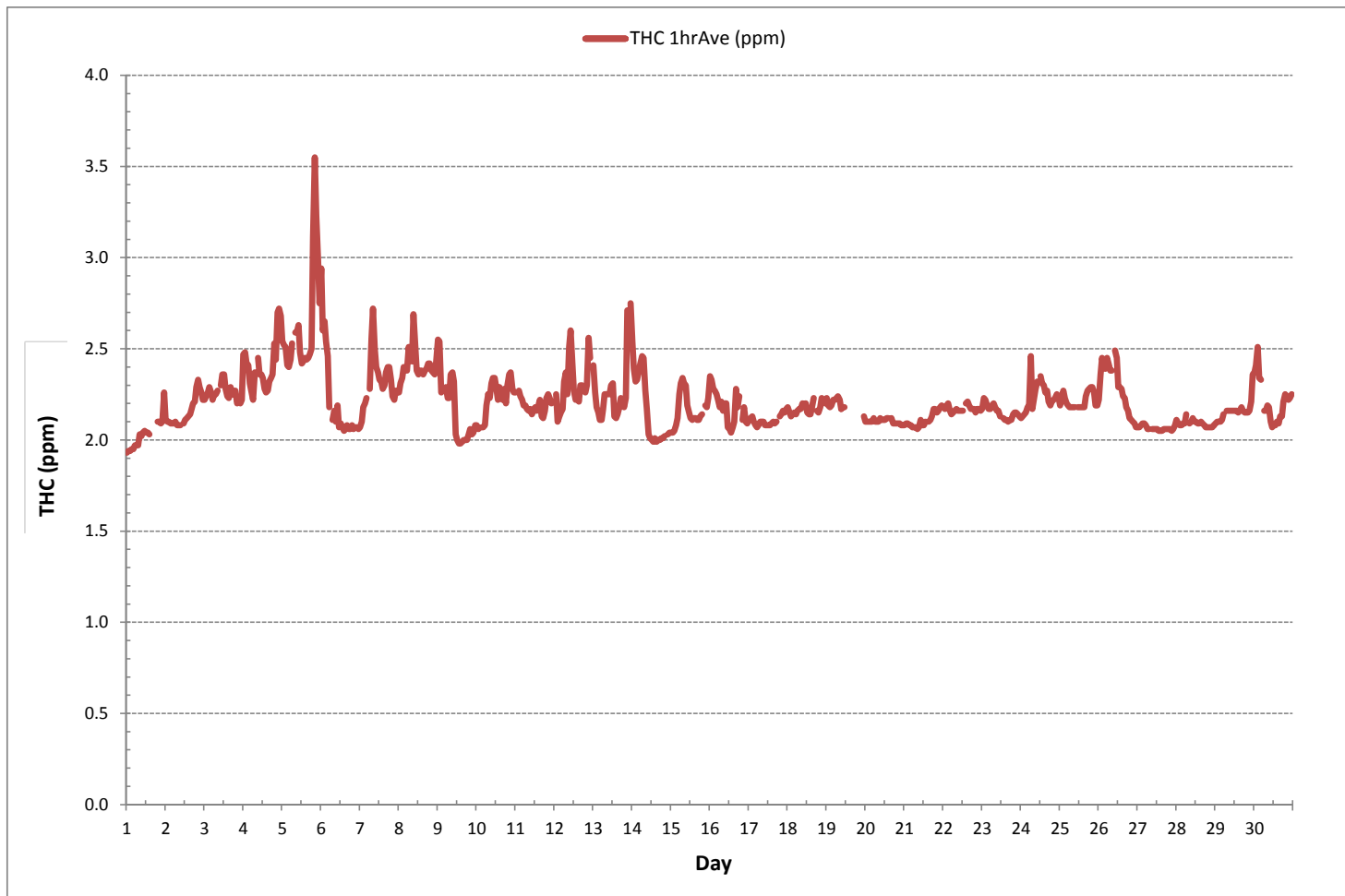
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	676		
MINIMUM 1-HR AVERAGE:	1.93 ppm	@ HOUR(S)	0 ON DAY(S)
MAXIMUM 1-HR AVERAGE:	3.55 ppm	@ HOUR(S)	20 ON DAY(S)
MAXIMUM 24-HR AVERAGE:	2.63 ppm		5 ON DAY(S)
			VAR-VARIOUS
IZS CALIBRATION TIME:	29 hrs	OPERATIONAL TIME:	709 hrs
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	98.5 %
STANDARD DEVIATION:	0.16	MONTHLY AVERAGE:	2.21 ppm



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2016

TOTAL HYDROCARBONS Hourly Averages (THC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2016

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY																													
1	2.01	2.01	2.01	2.02	2.02	2.04	2.04	2.06	2.05	2.04	2.07	S	2.08	2.09	2.07	C	C	C	C	C	2.15	2.11	2.12	2.17	2.01	2.17	2.06	24	
2	2.20	2.15	2.15	2.12	2.14	2.12	2.15	2.12	2.09	2.09	S	2.11	2.14	2.17	2.15	2.17	2.20	2.23	2.24	2.36	2.36	2.32	2.30	2.24	2.09	2.36	2.19	24	
3	2.26	2.27	2.29	2.30	2.29	2.24	2.29	2.29	2.30	S	2.36	2.39	2.39	2.33	2.32	2.26	2.35	2.32	2.29	2.32	2.26	2.26	2.24	2.29	2.24	2.39	2.30	24	
4	2.57	2.60	2.49	2.45	2.41	2.35	2.43	2.54	S	2.70	2.41	2.41	2.38	2.33	2.30	2.32	2.35	2.38	2.51	3.00	2.57	3.34	3.15	3.06	2.30	3.34	2.57	24	
5	2.79	2.72	2.65	2.49	2.45	2.54	2.60	S	3.03	2.68	2.72	2.75	2.43	2.43	2.46	2.44	2.46	2.46	2.57	4.40	4.27	3.50	3.15	2.96	2.43	4.40	2.82	24	
6	3.45	3.15	2.92	2.82	2.73	2.23	S	2.12	2.54	2.17	2.29	2.12	2.12	2.12	2.14	2.09	2.11	2.08	2.12	2.12	2.09	2.10	2.12	2.09	2.08	3.45	2.34	24	
7	2.11	2.15	2.27	2.26	2.42	S	2.38	2.94	2.92	2.60	2.48	2.43	2.41	2.41	2.41	2.39	2.42	2.51	2.60	2.51	2.29	2.29	2.32	2.30	2.11	2.94	2.43	24	
8	2.30	2.41	2.75	2.76	S	2.61	2.63	2.57	2.67	3.18	3.09	2.41	2.41	2.41	2.41	2.39	2.61	2.52	2.76	2.61	2.46	2.41	2.39	2.64	2.30	3.18	2.58	24	
9	2.68	2.88	2.60	S	2.39	2.39	2.27	2.32	2.42	2.42	2.43	2.12	2.04	2.03	2.04	2.04	2.05	2.05	2.07	2.10	2.17	2.09	2.09	2.24	2.03	2.88	2.26	24	
10	2.23	2.15	S	2.15	2.15	2.15	2.29	2.32	2.30	2.44	2.43	2.44	2.41	2.30	2.38	2.33	2.29	2.38	2.32	2.41	2.41	2.42	2.33	2.30	2.15	2.44	2.32	24	
11	2.30	S	2.30	2.27	2.26	2.23	2.23	2.20	2.18	2.20	2.20	2.20	2.21	2.18	2.23	2.46	2.26	2.14	2.24	2.26	2.32	2.30	2.23	2.27	2.14	2.46	2.25	24	
12	S	2.94	2.15	2.20	2.18	2.20	2.71	2.54	2.41	3.12	3.06	2.64	2.38	2.27	2.30	2.26	3.13	2.43	2.29	2.35	2.39	2.75	2.60	S	2.15	3.13	2.51	24	
13	2.54	2.43	2.38	2.18	2.14	2.14	2.23	2.30	2.29	2.27	2.29	2.36	2.39	2.18	2.12	2.17	2.23	2.26	2.26	2.23	2.27	3.66	S	4.21	2.12	4.21	2.41	24	
14	2.80	2.55	2.42	2.41	2.41	2.46	2.48	2.48	2.36	2.38	2.05	2.02	2.04	1.99	2.08	1.98	1.98	1.99	1.99	1.99	2.01	S	2.01	2.01	1.98	2.80	2.21	24	
15	2.02	2.03	2.04	2.07	2.17	2.26	2.32	2.33	2.32	2.31	2.21	2.14	2.11	2.09	2.10	2.10	2.10	2.10	2.12	2.17	S	2.20	2.20	2.43	2.02	2.43	2.17	24	
16	2.41	2.38	2.33	2.32	2.30	2.24	2.20	2.26	2.20	2.26	2.38	2.09	2.09	2.08	2.24	2.15	2.75	2.26	2.33	S	2.15	2.29	2.15	2.12	2.08	2.75	2.26	24	
17	2.15	2.15	2.17	2.17	2.14	2.12	2.14	2.17	2.20	2.32	2.32	2.17	2.18	2.24	2.24	2.24	2.17	2.20	S	2.23	2.23	2.31	2.23	2.26	2.12	2.32	2.20	24	
18	P	2.29	2.23	2.23	2.24	2.23	2.23	2.26	2.26	2.31	2.38	2.43	2.24	2.23	2.23	2.30	2.36	S	2.26	2.24	2.28	2.33	2.32	2.29	2.23	2.43	2.28	23	
19	2.31	2.27	2.26	2.32	2.32	2.31	2.33	2.33	2.32	2.23	2.29	2.29	X	X	X	X	X	X	X	X	X	X	X	X	2.18	2.18	2.33	2.29	13
20	2.15	2.17	2.14	2.14	2.17	2.17	2.17	2.17	2.14	2.17	2.14	2.14	2.12	2.15	2.14	S	2.14	2.12	2.12	2.12	2.11	2.09	2.09	2.09	2.09	2.09	2.17	2.14	24
21	2.09	2.12	2.11	2.09	2.12	2.09	2.11	2.09	2.08	2.12	2.43	2.09	2.09	2.14	S	2.12	2.14	2.17	2.21	2.20	2.17	2.20	2.23	2.23	2.08	2.43	2.15	24	
22	2.21	2.21	2.23	2.23	2.20	2.18	2.20	2.21	2.23	2.21	2.20	2.21	2.21	S	2.26	2.35	2.24	2.21	2.23	2.21	2.20	2.21	2.20	2.20	2.18	2.35	2.22	24	
23	2.21	2.26	2.26	2.23	2.21	2.20	2.20	2.23	2.23	2.18	2.18	2.17	S	2.14	2.12	2.12	2.12	2.14	2.15	2.23	2.17	2.17	2.17	2.15	2.12	2.26	2.18	24	
24	2.15	2.15	2.17	2.18	2.30	2.33	2.78	2.22	2.30	2.32	2.36	S	2.52	2.39	2.41	2.32	2.35	2.30	2.21	2.23	2.24	2.24	2.33	2.30	2.15	2.78	2.31	24	
25	2.26	2.27	2.29	2.26	2.21	2.20	2.20	2.18	2.17	2.18	S	2.20	2.20	2.17	2.18	2.20	2.27	2.29	2.30	2.30	2.30	2.30	2.21	2.20	2.17	2.30	2.23	24	
26	2.27	2.46	2.49	2.43	2.43	2.48	2.46	2.41	2.41	S	2.88	3.10	2.32	2.39	2.32	2.30	2.23	2.17	2.20	2.12	2.11	2.08	2.06	2.06	2.06	3.10	2.36	24	
27	2.04	2.05	2.05	2.07	2.06	2.05	2.03	2.01	S	2.01	2.02	2.02	2.01	2.03	2.01	2.01	2.03	2.04	2.04	2.05	2.02	2.02	2.03	2.08	2.01	2.08	2.03	24	
28	2.11	2.08	2.08	2.09	2.09	2.09	S	2.07	2.07	2.22	2.14	2.11	2.09	2.12	2.12	2.12	2.12	2.09	2.07	2.07	2.07	2.07	2.07	2.09	2.07	2.22	2.10	24	
29	2.09	2.11	2.11	2.12	2.12	2.30	S	2.18	2.18	2.18	2.17	2.17	2.18	2.20	2.17	2.18	2.26	2.20	2.17	2.18	2.20	2.26	2.32	2.68	2.09	2.68	2.21	24	
30	2.46	2.54	2.64	2.41	2.36	S	2.29	2.18	2.21	2.29	2.26	2.17	2.14	2.15	2.18	2.11	2.33	2.24	2.35	2.36	2.38	2.38	2.30	2.38	2.11	2.64	2.31	24	
HOURLY MAX	3.45	3.15	2.92	2.82	2.73	2.61	2.78	2.94	3.03	3.18	3.09	3.10	2.52	2.43	2.46	2.46	3.13	2.52	2.76	4.40	4.27	3.66	3.15	4.21					
HOURLY AVG	2.33	2.34	2.31	2.27	2.26	2.25	2.31	2.29	2.32	2.34	2.37	2.28	2.23	2.20	2.22	2.22	2.29	2.23	2.26	2.35	2.31	2.38	2.28	2.36					

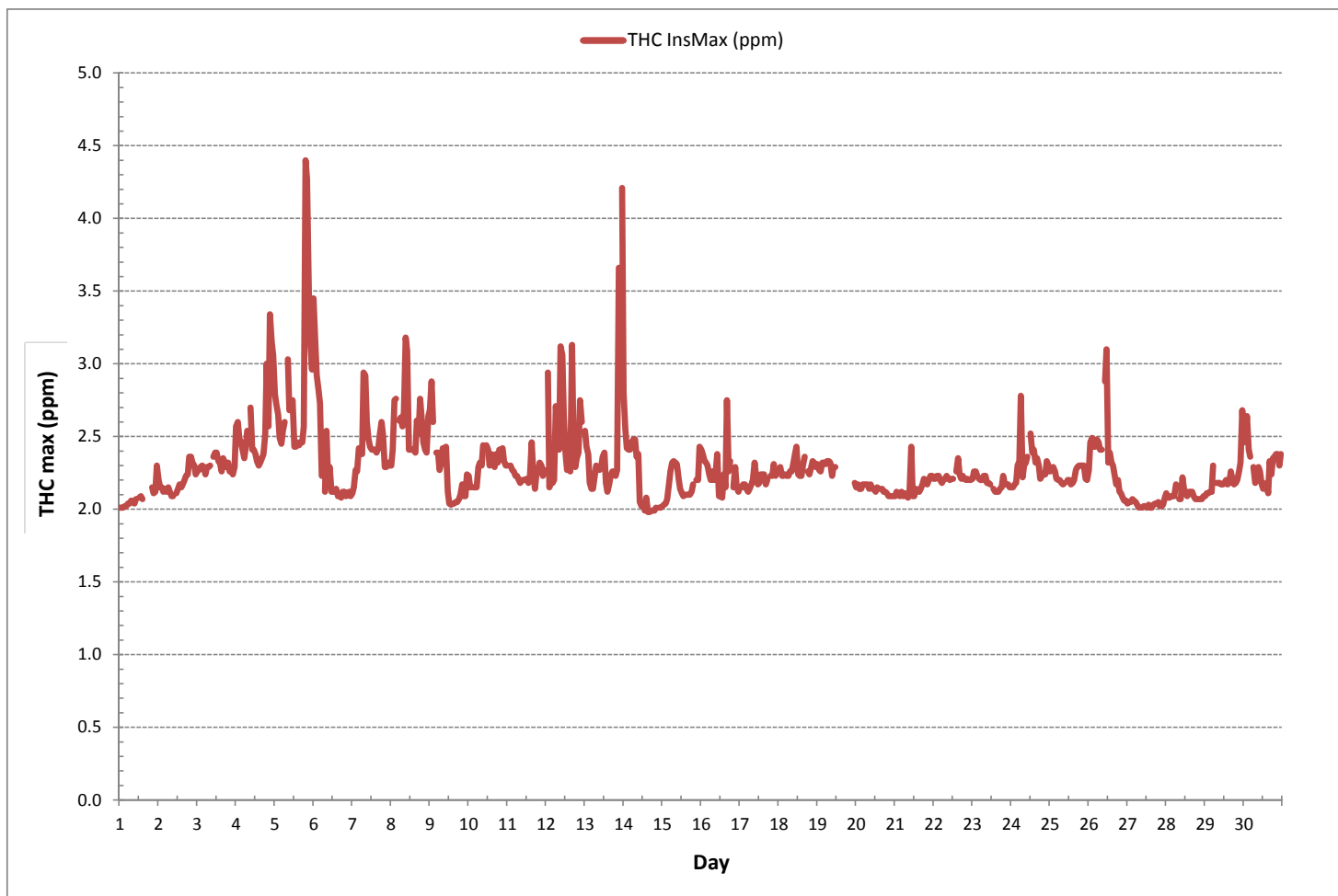
STATUS FLAG CODES

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:	4.40 ppm @ HOUR(S) 19 ON DAY(S) 5
	VAR-VARIOUS
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	708 hrs
STANDARD DEVIATION:	0.26

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

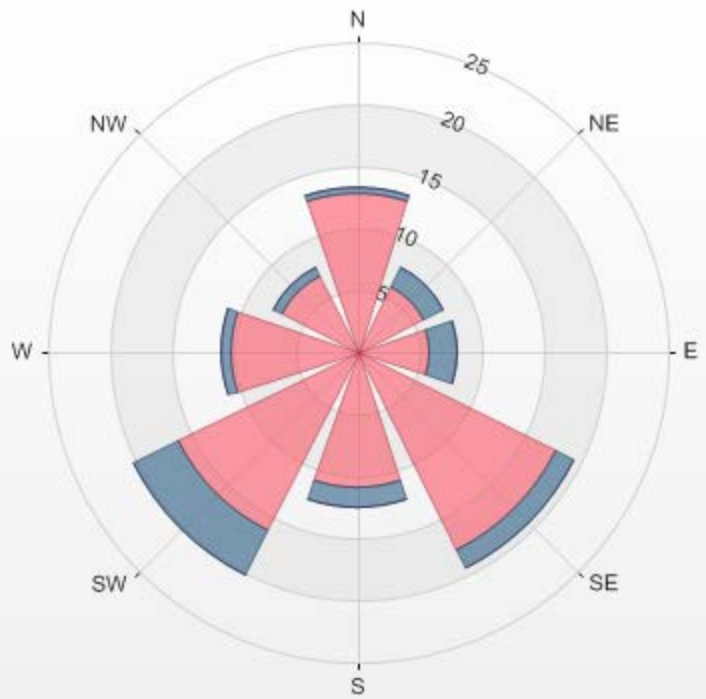


Wind: LICA MASKWA Poll.: LICA MASKWA-THC[ppm] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 93.47% Calm Avg: 0.00 [ppm]

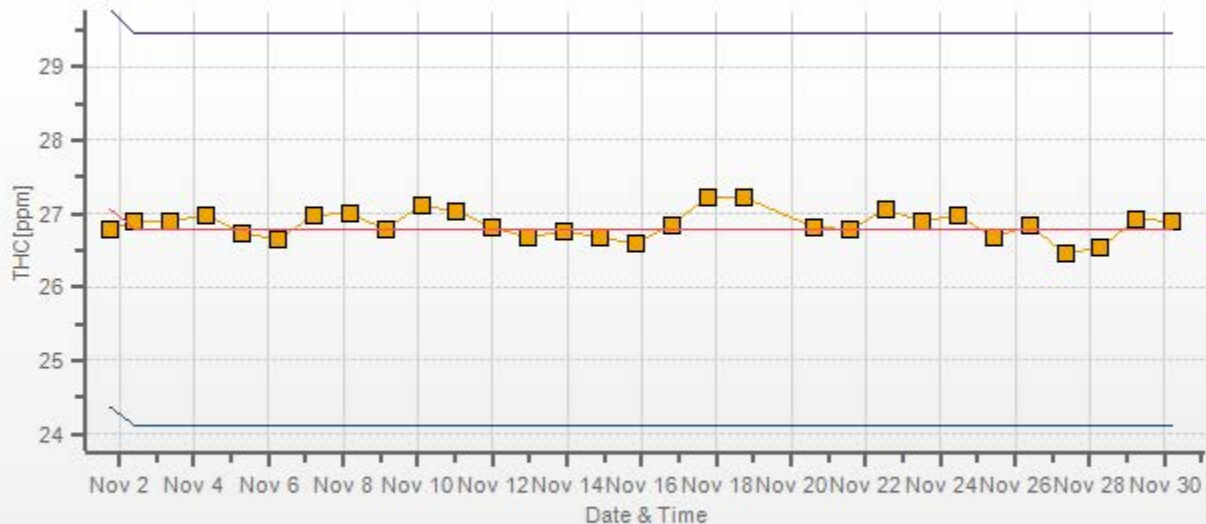
Direction	0.0-1.2	1.2-2.4	2.4-3.6	>3.6	Total
N	0	12.78	0.45	0	13.23
NE	0	5.94	1.78	0	7.72
E	0	5.79	2.23	0	8.02
SE	0	17.98	1.49	0	19.47
S	0	11	1.63	0	12.63
SW	0	16.2	4.01	0	20.21
W	0	10.25	0.74	0	10.99
NW	0	6.84	0.89	0	7.73
Summary	0	86.78	13.22	0	100

% Icon Classes (ppm)	0	0.0-1.2	87	1.2-2.4	13	2.4-3.6	0	>3.6
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LICA MASKWA Poll.: LICA MASKWA-THC[ppm] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



THC[ppm] Calibration: LICA MASKWA Monthly: 2016/11 Type: Span



Span Meas Span Ref Span Low Span High

OXIDES OF NITROGEN



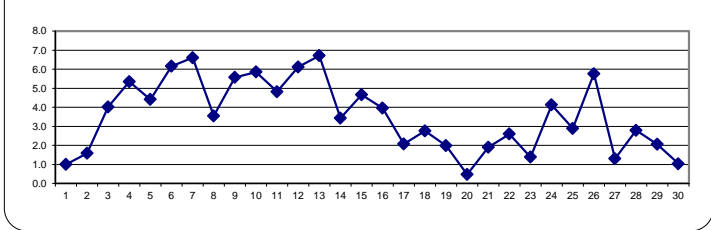
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

HR START (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-HR AVG.	RDGS.
HR END (MST)	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	0.2	0.0	0.0	0.0	0.0	0.0	0.5	0.0	C	C	C	C	C	C	C	C	C	C	6.2	4.0	0.9	0.7	0.7	0.7	0.0	6.2	1.0	24
2	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	S	3.7	3.1	2.9	2.7	2.6	2.7	3.0	2.4	2.5	2.8	2.5	2.2	1.9	0.0	3.7	1.6	24
3	2.1	2.0	1.8	2.0	2.3	1.8	1.8	2.0	3.0	S	5.6	4.6	5.8	4.6	4.6	4.8	7.0	4.9	4.5	5.4	5.2	8.2	4.5	4.0	1.8	8.2	4.0	24
4	13.4	12.4	12.0	11.3	6.4	5.9	4.0	3.4	S	7.2	5.7	4.8	5.0	4.0	3.4	3.5	3.8	3.9	3.5	2.4	2.5	1.6	1.3	1.5	1.3	13.4	5.3	24
5	1.8	1.5	1.5	1.6	1.7	1.1	1.3	S	4.0	2.4	3.1	5.3	5.6	6.2	6.9	7.2	8.2	8.6	7.3	6.9	5.5	4.0	4.0	5.8	1.1	8.6	4.4	24
6	4.8	4.8	7.7	11.2	9.5	6.9	S	9.2	S1	6.8	16.8	8.4	11.5	8.2	3.8	7.8	6.7	2.4	1.5	1.3	0.6	0.8	4.0	0.8	0.6	16.8	6.2	23
7	0.7	1.2	2.8	2.5	2.8	S	7.2	14.8	16.7	11.8	10.4	11.3	8.2	7.4	9.2	7.0	7.3	6.2	4.9	3.9	3.9	4.0	3.7	4.0	0.7	16.7	6.6	24
8	3.6	3.2	2.2	1.7	S	4.4	2.7	2.8	2.3	2.9	4.4	4.8	5.0	5.3	6.4	5.8	4.7	4.2	4.0	2.7	2.5	2.3	2.0	1.7	1.7	6.4	3.5	24
9	1.2	2.5	6.7	S	9.8	7.4	6.6	6.9	10.0	13.2	12.1	3.2	2.6	2.3	2.3	1.0	1.3	0.9	4.9	14.8	2.2	1.2	14.1	0.9	14.8	5.6	24	
10	14.4	2.4	S	5.0	5.8	1.3	5.9	12.5	6.7	8.0	11.3	10.4	7.0	4.1	7.5	5.1	4.8	7.1	3.0	2.6	2.7	3.3	2.1	1.7	1.3	14.4	5.9	24
11	2.5	S	6.5	3.7	2.5	1.6	1.6	1.6	1.9	2.6	2.9	4.1	5.7	4.4	6.8	9.9	9.1	4.3	5.0	8.7	7.7	7.5	6.0	4.3	1.6	9.9	4.8	24
12	S	16.8	4.1	3.1	2.3	2.5	2.7	4.1	6.9	8.8	7.6	7.4	5.5	4.6	4.1	3.7	3.4	5.0	5.0	4.1	7.7	12.3	12.9	S	2.3	16.8	6.1	24
13	20.8	12.3	11.5	16.3	8.1	1.7	2.1	5.0	5.1	7.4	8.3	11.0	6.5	2.9	2.8	3.2	3.2	4.4	4.6	3.3	4.3	4.2	S	5.4	1.7	20.8	6.7	24
14	4.2	3.7	3.2	2.5	3.5	4.2	9.2	10.0	8.7	18.2	3.9	1.0	0.7	0.2	0.1	0.4	0.5	0.0	0.0	0.0	0.0	S	3.3	1.3	0.0	18.2	3.4	24
15	0.9	0.7	0.7	2.3	3.3	7.9	10.4	12.4	8.9	7.2	4.4	3.4	3.0	3.1	3.6	4.2	5.2	3.4	4.4	4.1	S	6.7	3.8	3.2	0.7	12.4	4.7	24
16	2.9	2.4	1.8	1.4	1.5	0.9	0.8	1.3	3.0	C1	C1	C1	C1	C1	C1	10.2	9.8	5.4	9.4	7.5	2.4	6.7	1.7	2.2	0.8	10.2	4.0	18
17	2.6	2.7	3.2	1.8	0.9	0.8	0.8	1.3	1.3	1.1	0.6	2.8	1.5	3.2	3.1	1.2	0.6	0.7	S	4.1	5.2	5.0	1.5	1.7	0.6	5.2	2.1	24
18	3.2	3.3	0.5	0.2	0.7	0.5	1.0	1.1	1.3	0.8	2.7	6.3	6.1	4.8	7.2	4.8	3.8	S	4.6	2.6	1.6	3.7	1.7	0.8	0.2	7.2	2.8	24
19	1.2	1.8	4.7	2.9	4.5	3.6	2.3	1.2	3.1	1.4	3.5	3.6	1.4	1.2	1.0	0.0	S	2.8	1.0	3.2	1.2	0.0	0.0	0.0	0.0	4.7	2.0	24
20	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.1	0.3	0.0	0.2	0.5	0.6	0.8	S	3.3	1.3	0.8	0.6	0.6	0.5	0.5	0.1	0.0	3.3	0.5	24
21	0.3	2.3	1.4	1.2	4.7	2.6	1.9	0.7	0.6	1.1	1.4	0.6	0.6	1.2	S	5.7	2.8	2.2	2.4	1.8	1.9	1.7	2.5	2.0	0.3	5.7	1.9	24
22	1.3	0.9	0.9	1.1	1.1	0.9	0.4	1.1	2.4	1.2	2.7	3.4	8.0	S	10.7	7.1	5.0	2.9	2.0	1.6	1.2	1.3	1.3	1.2	0.4	10.7	2.6	24
23	1.2	1.2	1.2	0.9	0.6	0.7	0.7	0.9	0.7	0.6	1.0	1.1	S	4.1	2.3	2.2	2.4	1.9	1.6	1.4	1.3	1.1	1.1	1.5	0.6	4.1	1.4	24
24	1.8	1.8	1.7	1.8	2.4	1.5	1.3	2.6	5.5	6.0	5.6	S	9.2	9.6	9.5	4.9	6.3	4.2	2.0	2.0	2.6	1.5	4.4	6.7	1.3	9.6	4.1	24
25	5.9	5.0	4.8	3.4	1.0	2.1	2.1	1.9	1.3	1.6	S	5.2	3.8	2.9	2.6	2.8	4.7	3.9	2.7	2.3	2.1	2.1	1.3	0.9	0.9	5.9	2.9	24
26	1.8	5.5	8.6	4.9	8.6	12.0	8.8	8.9	12.0	S	12.8	9.5	6.1	5.5	7.8	6.1	4.0	2.6	2.2	1.4	1.5	0.9	0.7	0.4	0.4	12.8	5.8	24
27	0.2	0.1	0.2	0.3	0.3	0.0	0.0	S	2.7	1.1	0.8	0.6	0.7	0.6	0.9	3.2	3.1	1.0	2.9	3.1	1.8	3.2	3.1	0.0	0.0	3.2	1.3	24
28	3.9	6.3	3.4	5.8	4.7	3.7	9.6	S	3.7	1.3	1.3	3.4	4.0	3.2	2.2	1.7	1.9	0.5	1.4	0.3	0.0	0.2	0.9	0.7	0.0	9.6	2.8	24
29	0.8	0.4	0.4	0.2	0.5	3.3	S	3.5	2.2	1.9	2.1	3.0	6.0	3.0	2.5	6.5	4.0	1.0	1.2	1.2	0.6	0.9	0.9	0.2	6.5	2.1	24	
30	1.2	1.5	4.6	3.0	2.5	S	3.0	1.8	1.7	1.3	0.4	0.3	0.0	0.0	0.3	0.4	0.6	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.0	4.6	1.0	24
HOURLY MAX	20.8	16.8	12.0	16.3	9.8	12.0	10.4	14.8	16.7	18.2	16.8	11.3	11.5	9.6	10.7	10.2	9.8	8.6	9.4	8.7	14.8	12.3	12.9	14.1				
HOURLY AVG	3.4	3.4	3.4	3.2	3.2	2.8	3.2	4.0	4.4	4.5	5.1	4.6	4.6	3.7	4.3	4.3	4.3	3.3	3.1	3.0	3.0	3.0	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

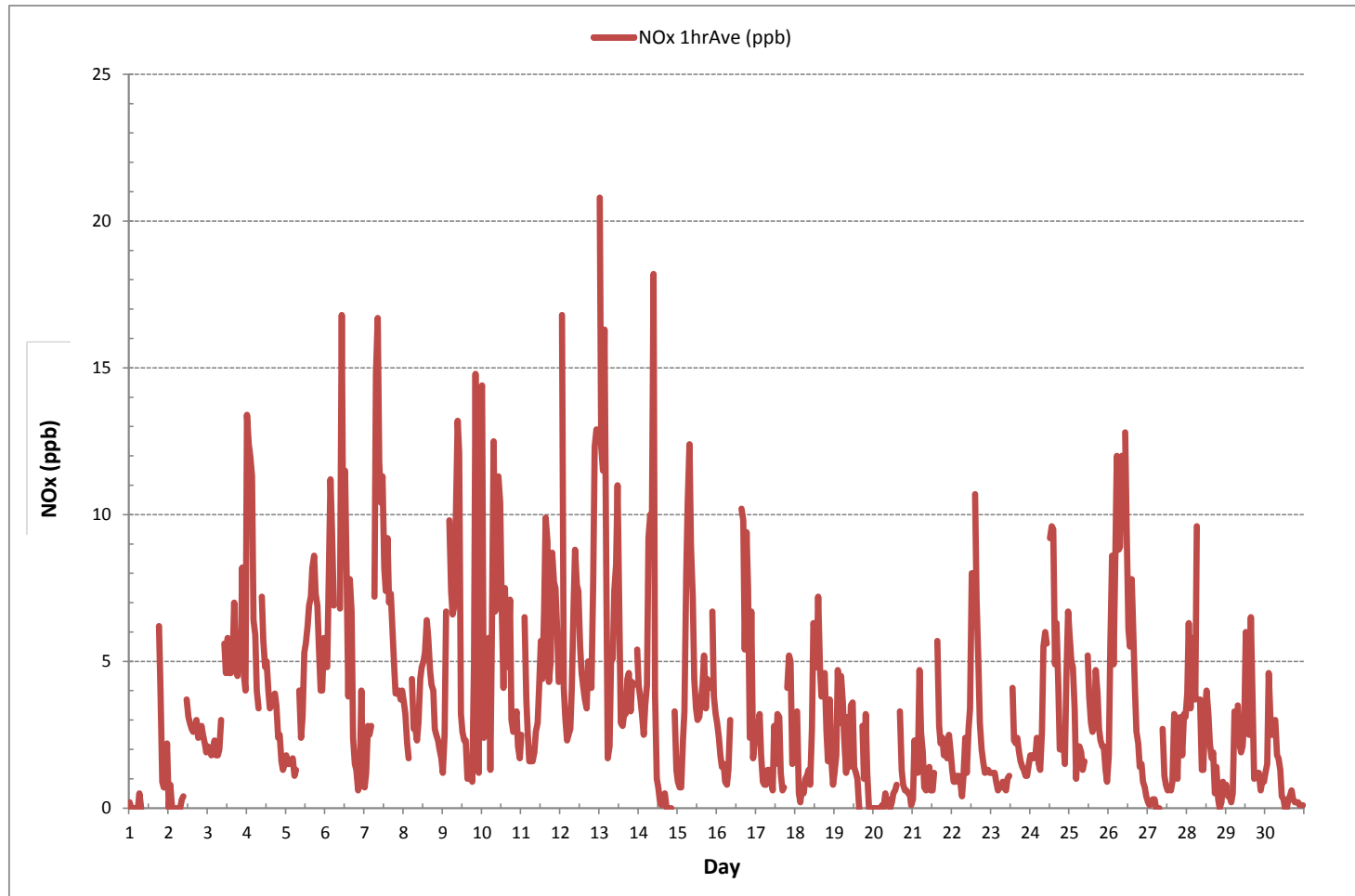
24 HR AVERAGES November 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	640				
MINIMUM 1-HR AVERAGE:	0.0 ppb	@ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 1-HR AVERAGE:	20.8 ppb	@ HOUR(S)	0	ON DAY(S)	13
MAXIMUM 24-HR AVERAGE:	6.7 ppb			ON DAY(S)	13
				VAR-VARIOUS	
IZS CALIBRATION TIME:	29 hrs	OPERATIONAL TIME:	713 hrs		
MONTHLY CALIBRATION TIME:	10 hrs	AMD OPERATION UPTIME:	99.0 %		
STANDARD DEVIATION:	3.3	MONTHLY AVERAGE:	3.6 ppb		

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)





OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)

HR START (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-HR AVG.	RDGS.	
HR END (MST)	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	2.4	0.6	0.6	0.6	0.6	0.6	3.5	1.8	C	C	C	C	C	C	C	C	C	C	C	8.2	2.4	1.8	1.2	1.2	0.6	8.2	2.0	24	
2	0.6	2.4	1.8	0.6	0.6	0.6	1.3	1.2	1.8	1.8	S	7.6	4.7	3.5	3.5	4.1	3.5	4.7	3.5	3.5	3.5	3.5	3.0	3.0	0.6	7.6	2.8	24	
3	3.0	3.0	2.4	3.5	3.0	2.4	2.4	3.0	4.1	S	9.4	5.9	7.1	5.9	7.1	7.1	11.8	5.9	5.9	6.5	7.1	11.8	7.6	5.3	2.4	11.8	5.7	24	
4	18.2	18.8	14.1	14.1	9.4	12.9	5.3	4.7	S	10.0	7.6	6.5	5.9	5.3	4.1	4.7	4.7	4.7	4.1	3.5	3.0	2.4	2.4	2.4	2.4	2.4	18.8	7.3	24
5	2.4	2.4	1.8	1.8	2.4	2.4	2.4	S	7.6	3.0	5.9	6.5	6.5	7.1	8.2	7.7	9.4	9.4	8.2	8.2	6.5	5.3	5.3	8.2	1.8	9.4	5.6	24	
6	5.9	5.9	10.0	14.6	11.8	9.4	S	15.2	S1	14.1	35.2	23.5	26.9	14.1	7.6	11.2	10.0	4.7	3.0	3.0	1.8	1.8	11.8	1.3	1.3	35.2	11.0	23	
7	1.2	1.8	4.1	3.0	3.5	S	11.2	21.2	21.8	13.5	11.8	11.8	10.0	8.8	12.4	7.6	8.8	7.1	5.9	4.7	4.1	4.1	4.7	4.7	1.2	21.8	8.2	24	
8	4.1	4.1	2.4	2.4	S	7.1	3.0	3.5	3.0	5.3	6.5	5.9	5.9	5.9	18.8	7.7	5.3	4.7	5.3	3.5	3.0	2.4	2.4	1.8	1.8	18.8	5.0	24	
9	1.3	5.3	11.2	S	11.2	8.8	8.2	7.7	11.8	14.2	15.8	4.7	4.7	5.9	5.9	1.8	1.8	2.4	1.3	12.4	22.3	11.8	3.0	22.3	1.3	22.3	8.5	24	
10	26.4	6.5	S	9.4	11.8	1.8	10.6	15.8	8.8	13.0	13.5	11.8	8.8	5.3	10.0	7.1	5.9	8.8	7.1	3.0	3.5	4.1	2.4	2.4	1.8	26.4	8.6	24	
11	3.0	S	10.6	4.7	3.0	2.4	1.8	1.8	2.4	3.5	4.1	5.3	7.7	5.9	8.2	18.2	19.4	5.3	8.2	9.4	8.8	9.4	9.4	5.3	1.8	19.4	6.9	24	
12	S	26.4	7.7	4.1	3.5	3.0	5.3	5.3	8.2	11.8	8.2	8.8	6.5	4.7	4.7	4.1	4.1	5.9	8.8	5.9	17.0	20.0	29.3	S	3.0	29.3	9.2	24	
13	42.8	24.7	26.4	26.4	14.6	4.1	3.5	6.5	6.5	10.0	14.6	16.4	9.4	4.1	3.6	4.1	4.7	5.3	5.9	4.7	5.9	6.5	S	10.0	3.5	42.8	11.3	24	
14	5.9	5.3	4.1	3.5	4.1	8.8	12.4	13.5	17.0	23.5	15.2	2.4	1.8	1.2	0.6	1.2	1.3	0.6	0.6	0.6	0.6	S	7.1	2.4	0.6	23.5	5.8	24	
15	1.8	1.3	1.2	4.7	9.4	9.4	17.0	16.4	13.5	8.8	5.9	4.1	3.5	4.7	4.7	7.0	9.4	4.7	5.9	5.3	S	11.8	4.7	4.1	1.2	17.0	6.9	24	
16	3.5	3.0	2.4	2.4	3.0	1.8	1.3	3.0	7.7	C1	C1	C1	C1	C1	29.9	31.7	7.1	14.1	13.0	3.6	12.4	4.7	3.0	1.3	31.7	8.2	18		
17	3.0	3.6	3.6	3.0	1.3	1.2	1.8	1.8	1.8	1.8	1.8	8.2	4.7	7.0	12.9	3.6	1.2	1.8	S	5.9	9.4	8.2	2.4	2.4	1.2	12.9	4.0	24	
18	P	8.2	1.3	1.2	1.3	1.3	1.8	1.8	2.4	2.4	9.4	11.8	9.4	8.8	9.4	6.5	5.3	S	8.2	4.7	3.6	7.1	4.7	2.4	1.2	11.8	5.1	23	
19	2.4	6.4	8.2	6.5	7.6	7.0	5.9	3.6	6.5	4.1	6.4	8.2	5.9	3.0	3.0	1.2	S	7.6	4.1	4.7	3.6	1.8	1.2	1.2	1.2	8.2	4.8	24	
20	1.3	1.2	1.2	0.6	1.2	1.8	1.8	3.0	1.8	1.8	1.2	1.8	1.8	2.4	2.4	S	8.2	3.0	2.4	1.8	1.8	1.8	2.4	1.8	0.6	8.2	2.1	24	
21	2.4	5.9	4.7	4.1	8.8	6.4	4.7	2.4	1.8	3.0	4.1	1.8	1.8	4.1	S	11.8	5.3	3.5	3.5	3.5	3.0	3.5	4.1	3.6	1.8	11.8	4.3	24	
22	3.5	1.8	1.8	2.4	2.4	1.8	1.2	3.5	4.7	3.0	7.1	8.8	12.4	S	13.5	8.2	7.1	4.1	3.0	2.4	2.4	2.4	2.4	2.4	1.2	13.5	4.4	24	
23	2.4	2.4	2.4	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.4	S	8.2	3.5	3.0	3.5	3.0	3.5	3.0	2.4	2.4	2.4	1.8	1.8	2.4	1.8	8.2	2.5	24
24	2.4	2.4	2.4	2.4	3.5	3.0	3.0	5.9	11.2	32.8	8.2	S	18.2	14.1	13.5	6.5	8.2	8.8	3.0	3.5	5.3	3.0	8.2	8.2	2.4	32.8	7.7	24	
25	9.4	8.2	7.6	6.4	3.5	4.7	4.1	4.1	2.4	3.5	S	8.8	5.9	4.7	4.1	4.1	14.1	5.9	4.7	4.1	3.5	4.1	3.5	2.4	2.4	14.1	5.4	24	
26	5.3	10.0	12.4	7.7	13.5	15.8	14.7	12.4	14.7	S	18.2	15.2	9.4	7.1	11.8	11.8	5.9	4.7	3.5	3.0	3.0	2.4	1.8	1.8	1.8	1.8	18.2	9.0	24
27	1.3	1.3	1.2	1.2	1.2	0.6	0.6	0.6	S	6.4	1.8	1.8	1.2	1.8	1.8	1.8	7.6	7.7	2.4	4.1	4.7	2.4	4.1	4.1	0.6	7.7	2.7	24	
28	6.5	10.0	8.2	11.8	8.2	7.1	15.2	S	6.5	2.4	3.5	8.2	7.7	9.4	10.6	13.5	6.4	1.8	7.0	1.8	0.6	1.2	1.8	1.8	0.6	15.2	6.6	24	
29	1.8	1.3	1.2	1.2	1.8	14.7	S	7.6	3.0	3.0	3.5	10.6	31.1	21.2	4.7	63.9	7.7	1.8	2.4	1.8	1.8	1.2	2.4	1.8	1.2	63.9	8.3	24	
30	1.8	3.6	6.5	4.1	3.6	S	7.1	3.0	3.0	2.4	1.3	1.2	1.2	1.8	1.8	1.8	1.8	1.8	1.8	1.2	1.8	1.2	1.2	1.2	1.2	1.2	7.1	2.4	24
HOURLY MAX	42.8	26.4	26.4	26.4	14.6	15.8	17.0	21.2	21.8	32.8	35.2	23.5	31.1	21.2	18.8	63.9	31.7	9.4	14.1	13.0	22.3	20.0	29.3	22.3					
HOURLY AVG	5.9	6.1	5.6	5.2	5.2	5.1	5.5	6.1	6.8	7.7	8.5	7.8	8.2	6.5	7.1	9.3	7.6	4.9	4.9	4.7	4.8	5.2	4.9	4.0					

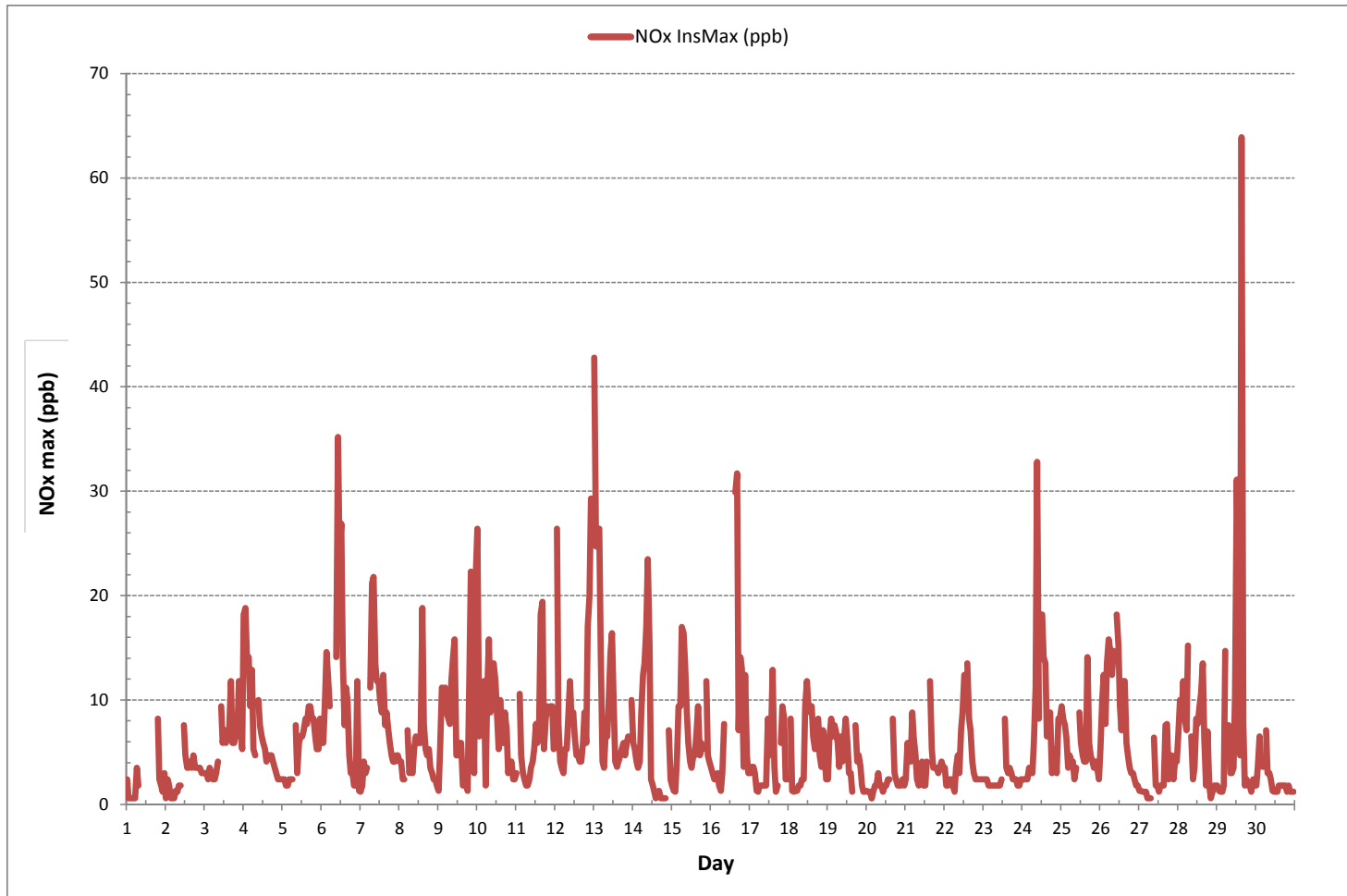
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	672
MAXIMUM INSTANTANEOUS VALUE:	63.9 ppb @ HOUR(S) 15 ON DAY(S) 29
VAR-VARIOUS	
IZS CALIBRATION TIME:	29 hrs
MONTHLY CALIBRATION TIME:	11 hrs
STANDARD DEVIATION:	5.9
OPERATIONAL TIME:	712 hrs

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)

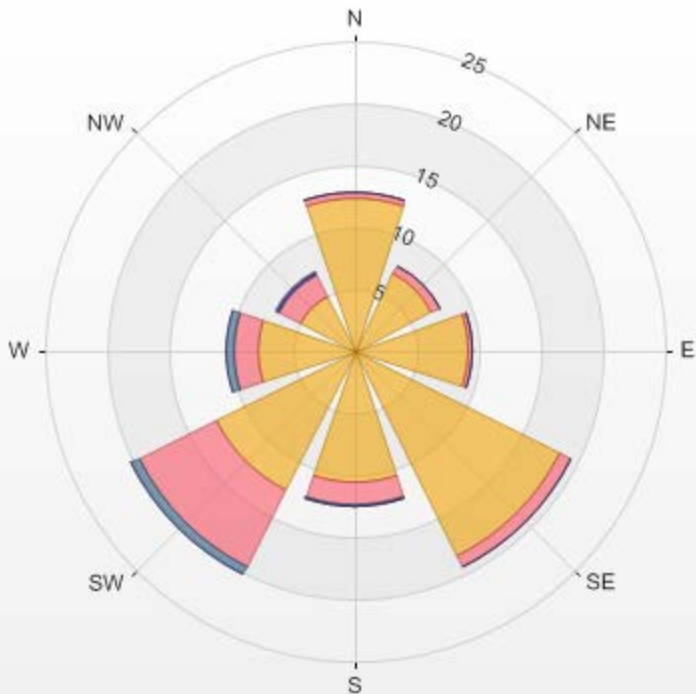


Wind: LICA MASKWA Poll.: LICA MASKWA-NOX[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 93.33% Calm Avg: 0.00 [ppb]

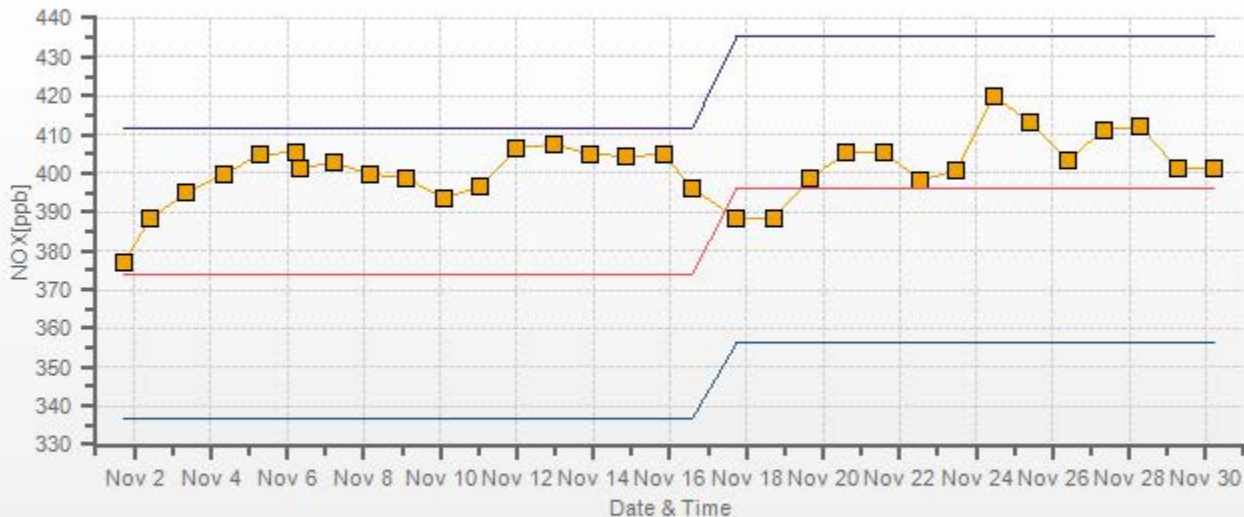
Direction	0.0-7.0	7.0-13.9	13.9-20.9	>20.9	Total
N	12.35	0.45	0	0	12.8
NE	6.99	0.74	0	0	7.73
E	9.23	0.3	0	0	9.53
SE	18.6	0.89	0	0	19.49
S	10.57	1.93	0.15	0	12.65
SW	12.5	6.99	0.74	0	20.23
W	7.89	1.93	0.6	0	10.42
NW	4.91	1.93	0.15	0.15	7.14
Summary	83.04	15.16	1.64	0.15	100

% Icon	Classes (ppb)	83	 0.0-7.0	15	 7.0-13.9	2	 13.9-20.9	0	 >20.9
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LICA MASKWA Poll.: LICA MASKWA-NOX[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



NOX[ppb] Calibration: LICA MASKWA Monthly: 2016/11 Type: Span



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

NITRIC OXIDES

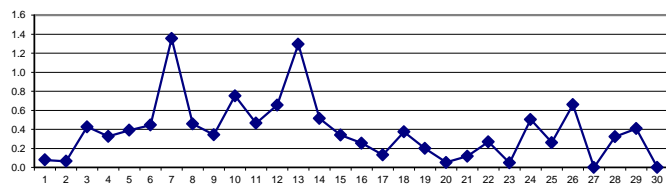
NITRIC OXIDE Hourly Averages (NO ppb)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23						
1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	C	C	C	C	C	C	C	C	C	C	0.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.1	24
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	0.0	0.6	0.4	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	24
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	S	0.6	1.6	2.6	1.6	1.4	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.4	24
4	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	S	1.5	1.3	1.2	1.3	0.9	0.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.3	24
5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	S	0.1	0.5	0.8	1.2	1.2	1.3	1.5	1.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	1.5	0.4	24
6	0.0	0.0	0.2	0.6	0.1	0.1	S	0.2	S1	0.0	3.1	1.1	2.3	0.7	0.3	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	3.1	0.4	23	
7	0.0	0.0	0.0	0.0	0.0	S	0.1	1.5	5.6	4.7	4.5	4.8	3.1	2.6	2.9	1.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	1.4	24	
8	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.1	1.1	1.3	1.2	1.4	1.7	2.1	1.1	0.2	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.5	24	
9	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	1.0	2.4	2.8	0.4	0.3	0.2	0.1	0.1	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.3	0.0	2.8	0.3	24	
10	0.4	0.0	S	0.0	0.1	0.0	0.0	1.0	0.8	2.1	3.7	3.3	2.4	1.1	1.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.8	24	
11	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.6	1.1	2.0	1.6	1.4	2.3	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.5	24	
12	S	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.2	1.4	1.5	1.2	0.6	0.2	0.0	0.0	0.3	0.0	0.0	0.7	2.3	3.6	S	0.0	3.6	0.7	24	
13	7.1	2.7	2.7	2.4	0.4	0.0	0.0	0.0	0.7	2.3	3.5	4.1	2.2	0.8	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	7.1	1.3	24	
14	0.0	0.0	0.0	0.0	0.0	0.1	0.6	1.6	2.3	6.2	0.7	0.2	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	6.2	0.5	24	
15	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.7	1.2	1.2	1.1	0.7	0.7	0.0	0.4	0.2	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	1.2	0.3	24	
16	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	C1	C1	C1	C1	C1	C1	C1	2.1	1.2	0.0	0.4	0.1	0.0	0.2	0.0	0.0	0.0	2.1	0.3	18	
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.4	0.8	1.0	0.1	0.0	0.0	S	0.1	0.0	0.0	0.1	0.0	0.0	0.0	1.0	0.1	24	
18	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	2.1	2.3	1.4	1.2	0.4	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.4	24	
19	0.0	0.0	0.2	0.1	0.5	0.4	0.3	0.2	0.4	0.1	0.8	1.3	0.3	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	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	0.2	0.2	0.5	0.3	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	24	
21	0.0	0.3	0.0	0.1	0.9	0.1	0.0	0.0	0.0	0.2	0.4	0.0	0.0	0.2	S	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1	24	
22	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	1.1	1.0	1.7	S	1.2	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.3	24	
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	S	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	24	
24	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.7	2.1	1.0	S	1.5	2.0	1.7	0.5	0.2	0.2	0.0	0.0	0.0	0.0	0.4	1.1	0.0	2.1	0.5	24	
25	0.7	0.5	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.2	S	0.8	0.9	0.6	0.6	0.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.3	24	
26	0.0	0.0	0.3	0.0	0.3	1.0	0.6	0.4	1.4	S	3.9	2.9	1.4	1.2	1.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.7	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	0.1	1.1	0.3	0.6	0.8	0.2	0.4	S	0.4	0.0	0.1	0.7	0.9	0.6	0.4	0.3	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.3	24	
29	0.0	0.0	0.0	0.0	0.2	0.9	S	0.0	0.0	0.1	0.6	1.0	2.2	1.1	0.6	2.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.4	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
HOURLY MAX	7.1	2.7	2.7	2.4	0.9	1.0	0.6	1.6	5.6	6.2	4.5	4.8	3.1	2.6	2.9	2.3	1.2	0.2	0.4	0.7	0.7	2.3	3.6	1.1					
HOURLY AVG	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.6	1.0	1.3	1.2	1.2	0.9	0.8	0.6	0.2	0.0	0.0	0.0	0.0	0.1	0.2	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

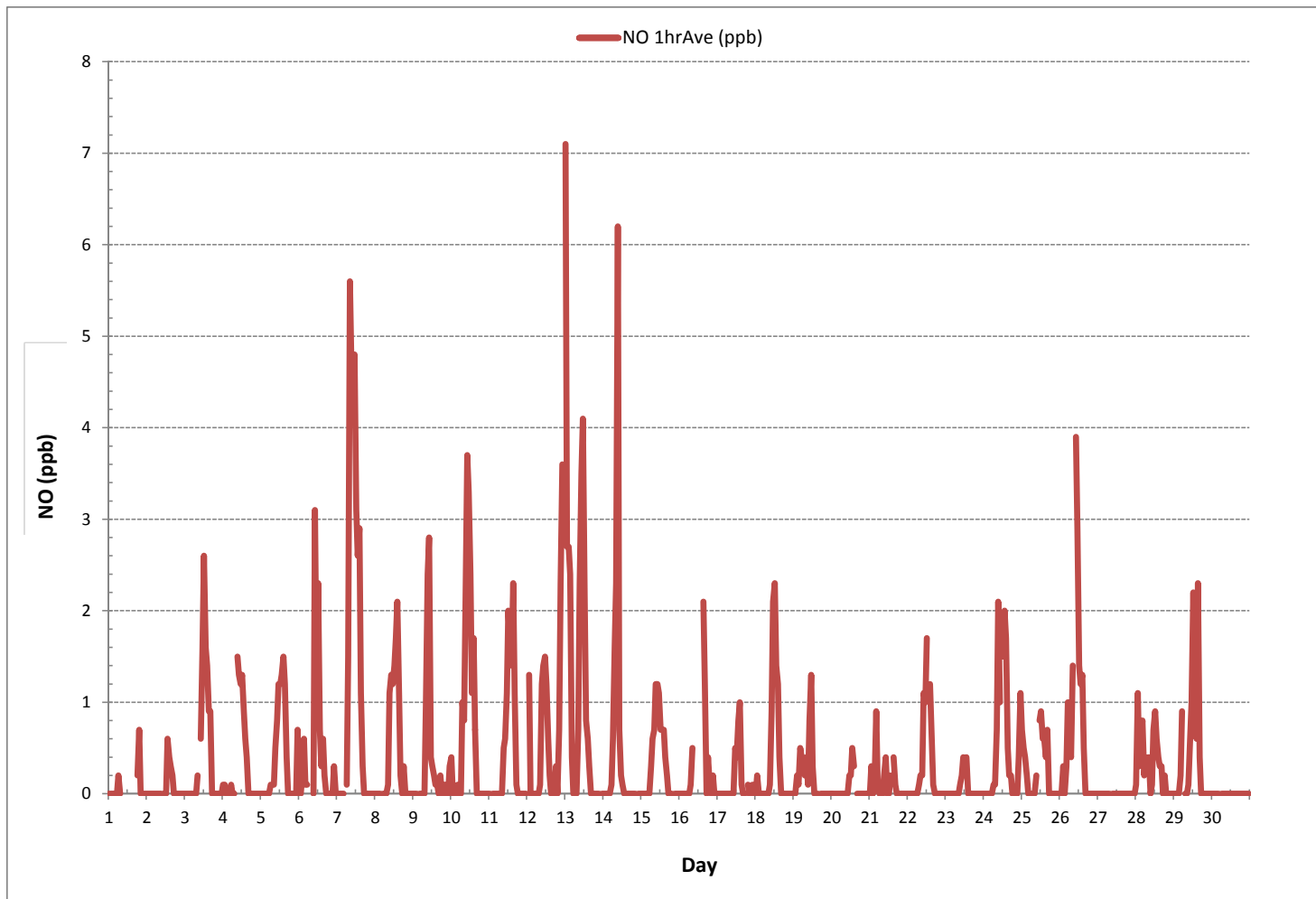
24 HR AVERAGES November 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	266				
MINIMUM 1-HR AVERAGE:	0.0 ppb	@ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	7.1 ppb	@ HOUR(S)	0	ON DAY(S)	13
MAXIMUM 24-HR AVERAGE:	1.4 ppb			ON DAY(S)	7
				VAR-VARIOUS	
IZS CALIBRATION TIME:	29 hrs	OPERATIONAL TIME:	713 hrs		
MONTHLY CALIBRATION TIME:	10 hrs	AMD OPERATION UPTIME:	99.0 %		
STANDARD DEVIATION:	0.8	MONTHLY AVERAGE:	0.4 ppb		

NITRIC OXIDE Hourly Averages (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2016

NITRIC OXIDE Instantaneous Maximum (NO ppb)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY 1	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.5	C	C	C	C	C	C	C	C	C	C	C	1.7	0.0	0.0	0.0	0.0	0.0	1.7	0.3	24
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	S	0.0	0.5	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	24
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	S	0.5	2.3	2.8	2.3	1.7	1.7	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.6	24
4	0.5	0.5	0.0	0.0	0.0	0.5	0.0	0.5	S	1.7	1.7	1.1	1.7	1.1	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.4	24
5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	S	0.5	0.5	1.1	1.7	1.7	1.7	1.7	1.7	0.5	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	2.8	0.6	24
6	0.0	0.0	0.5	1.1	0.5	0.5	S	0.5	S1	0.0	9.3	4.6	11.0	1.7	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	11.0	1.5	23
7	0.0	0.0	0.0	0.0	0.0	S	0.5	4.6	9.3	5.8	5.7	5.2	3.9	2.8	4.6	1.7	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3	1.9	24
8	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.5	2.3	2.3	1.7	1.7	1.7	8.1	2.3	0.5	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	8.1	1.0	24
9	0.0	0.0	0.0	S	0.0	0.0	0.0	1.7	2.8	3.9	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	3.9	0.6	24
10	1.1	0.0	S	0.5	0.5	0.0	0.0	2.3	1.1	4.6	4.6	3.9	2.8	1.6	2.3	1.1	0.5	0.0	0.5	0.0	0.5	0.0	0.0	0.0	0.0	4.6	1.2	24
11	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	1.1	3.4	2.3	1.7	5.8	5.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	0.9	24
12	S	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.7	1.7	1.1	1.1	0.5	0.5	0.0	0.0	1.1	0.5	2.8	6.3	12.8	S	0.0	0.0	12.8	1.6	24
13	25.1	9.2	9.3	6.9	1.1	0.0	0.0	0.0	1.1	3.9	6.3	6.9	2.8	1.1	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	25.1	3.2	24
14	0.0	0.0	0.0	0.0	0.0	0.5	1.1	2.8	5.8	8.7	3.4	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	8.7	1.0	24
15	0.0	0.0	0.0	0.0	0.0	0.5	1.7	1.6	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	1.7	0.6	24
16	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.3	C1	C1	C1	C1	C1	C1	C1	14.6	10.5	0.0	1.1	0.5	0.0	0.5	0.0	0.0	0.0	14.6	1.7	18
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.1	1.7	3.9	0.5	0.0	0.0	S	0.5	0.5	0.5	0.5	0.0	0.0	3.9	0.5	24
18	P	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.8	3.9	2.8	2.8	1.1	0.5	0.0	S	0.0	0.0	0.0	0.5	0.5	0.0	0.0	3.9	0.7	23
19	0.0	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.7	2.3	1.7	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.4	24
20	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	24
21	0.0	0.5	0.0	0.5	1.7	0.5	0.0	0.0	0.5	1.1	0.0	0.0	0.5	S	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.3	24
22	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5	2.8	1.7	2.8	S	1.7	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.5	24
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5	S	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	24
24	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.8	25.1	1.7	S	3.4	2.8	2.8	0.5	0.5	1.1	0.0	0.0	0.0	0.0	1.1	1.1	0.0	0.0	25.1	1.9	24
25	1.7	1.1	1.1	0.5	0.5	0.0	0.5	0.5	0.5	0.5	S	1.7	1.1	0.5	0.5	0.5	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.6	24
26	0.0	0.0	0.5	0.0	0.5	1.7	1.1	0.5	2.3	S	6.3	3.9	1.7	1.1	1.7	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	1.0	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	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	24
28	0.5	2.3	1.1	2.3	1.7	0.5	0.5	S	1.1	0.0	0.5	1.7	1.7	1.7	2.8	4.6	1.1	0.5	1.1	0.0	0.0	0.0	0.0	0.0	0.0	4.6	1.1	24
29	0.0	0.0	0.0	0.0	0.5	3.9	S	0.0	0.0	0.5	0.5	3.9	16.3	8.7	0.5	44.5	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.5	3.5	24
30	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	24
HOURLY MAX	25.1	9.2	9.3	6.9	1.7	3.9	1.7	4.6	9.3	25.1	9.3	6.9	16.3	8.7	8.1	44.5	10.5	1.1	1.1	1.7	2.8	6.3	12.8	2.8				
HOURLY AVG	1.0	0.6	0.5	0.4	0.3	0.3	0.3	0.5	1.2	2.4	2.3	2.0	2.5	1.5	1.5	3.1	1.1	0.1	0.2	0.1	0.1	0.3	0.6	0.2				

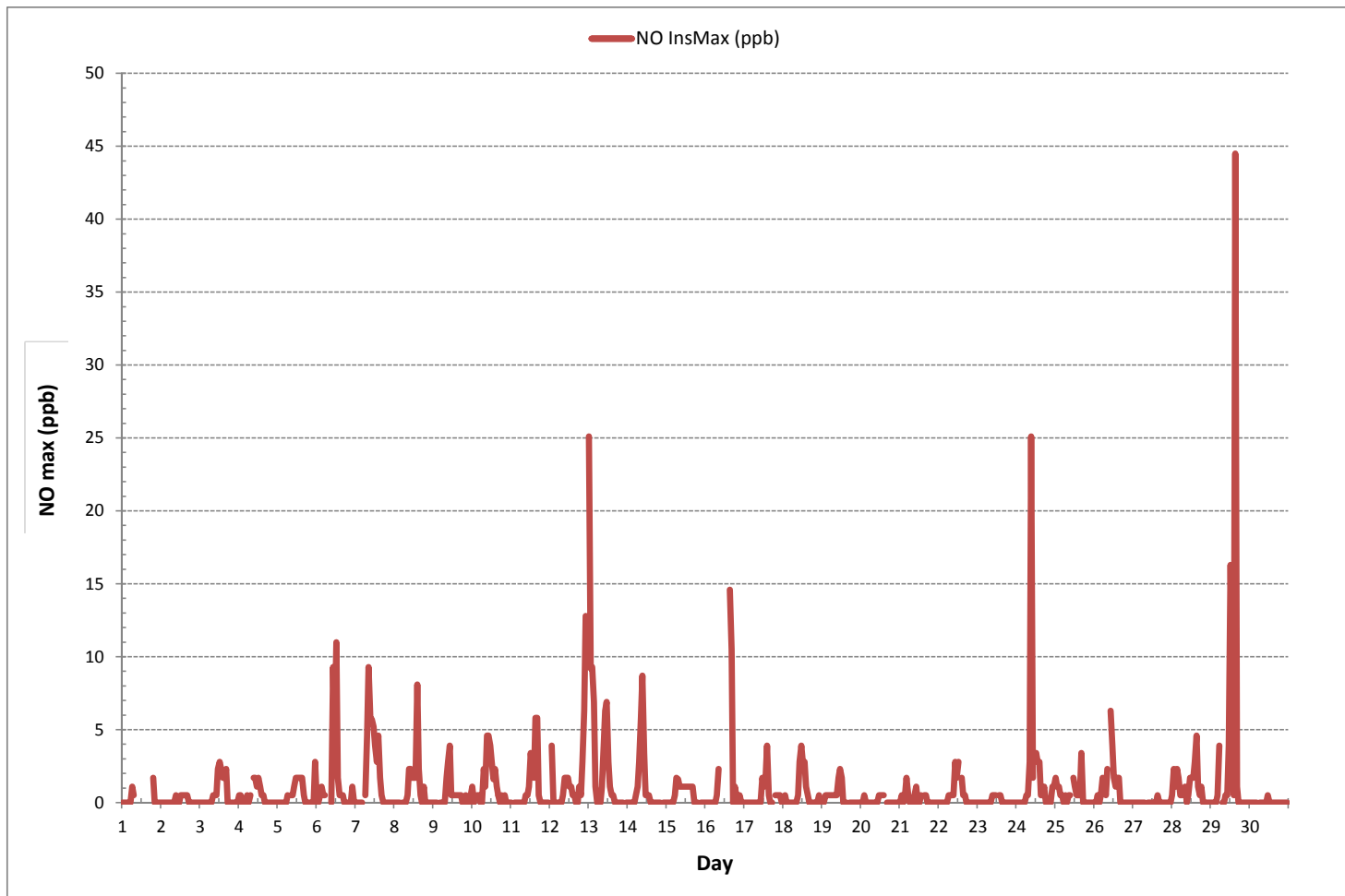
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	290
MAXIMUM INSTANTANEOUS VALUE:	44.5 ppb @ HOUR(S) 15 ON DAY(S) 29
	VAR-VARIOUS
IZS CALIBRATION TIME:	29 hrs
MONTHLY CALIBRATION TIME:	11 hrs
OPERATIONAL TIME:	712 hrs
STANDARD DEVIATION:	2.8

NITRIC OXIDE Instantaneous Maximum (NO ppb)



Wind: LICA MASKWA Poll.: LICA MASKWA-NO[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 93.33% Calm Avg: 0.00 [ppb]

Direction	0.0-2.4	2.4-4.8	4.8-7.2	>7.2	Total
N	12.8	0	0	0	12.8
NE	7.74	0	0	0	7.74
E	9.52	0	0	0	9.52
SE	19.49	0	0	0	19.49
S	11.9	0.74	0	0	12.64
SW	18.6	1.49	0.15	0	20.24
W	10.27	0	0.15	0	10.42
NW	6.4	0.6	0.15	0	7.15
Summary	96.72	2.83	0.45	0	100

% Icon Classes (ppb)

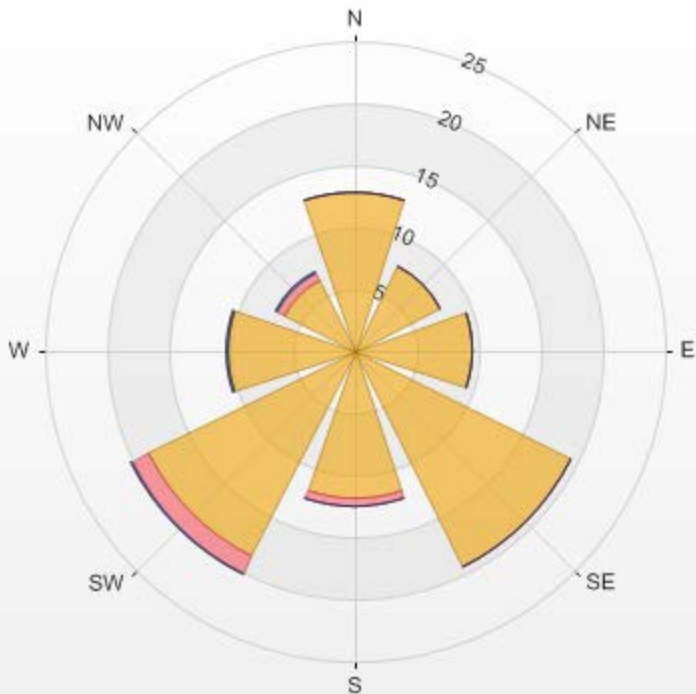
97 0.0-2.4

3 2.4-4.8

0 4.8-7.2

0 >7.2

LICA MASKWA Poll.: LICA MASKWA-NO[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



NITROGEN DIOXIDE

NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY 1	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0	C	C	C	C	C	C	C	C	C	C	6.0	3.3	0.9	0.7	0.7	0.7	0.0	6.0	0.9	24
2	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	S	3.7	3.1	2.3	2.3	2.3	2.5	3.0	2.4	2.5	2.8	2.5	2.2	1.9	0.0	3.7	1.5	24
3	2.1	2.0	1.8	2.0	2.3	1.8	1.8	2.0	2.8	S	5.0	2.9	3.2	3.0	3.3	3.9	6.1	4.9	4.5	5.4	5.2	8.2	4.5	4.0	1.8	8.2	3.6	24
4	13.3	12.3	12.0	11.3	6.4	5.8	4.0	3.4	S	5.7	4.4	3.6	3.7	3.1	2.8	3.1	3.8	3.9	3.5	2.4	2.5	1.6	1.3	1.5	1.3	13.3	5.0	24
5	1.8	1.5	1.5	1.6	1.7	1.0	1.2	S	3.9	1.9	2.3	4.1	4.4	4.9	5.4	6.0	7.9	8.6	7.2	6.9	5.5	4.0	4.0	5.1	1.0	8.6	4.0	24
6	4.8	4.7	7.6	10.6	9.4	6.9	S	8.9	S1	6.8	13.7	7.4	9.2	7.5	3.5	7.2	6.5	2.4	1.5	1.3	0.6	0.8	3.6	0.8	0.6	13.7	5.7	23
7	0.7	1.2	2.8	2.5	2.8	S	7.1	13.3	11.1	7.0	5.9	6.5	5.1	4.8	6.2	5.9	7.0	6.2	4.9	3.9	3.9	4.0	3.7	4.0	0.7	13.3	5.2	24
8	3.6	3.2	2.2	1.7	S	4.4	2.7	2.8	2.2	1.8	3.1	3.6	3.7	3.6	4.3	4.7	4.6	4.2	3.7	2.7	2.5	2.3	2.0	1.7	1.7	4.7	3.1	24
9	1.2	2.5	6.7	S	9.8	7.4	6.6	6.9	9.0	10.8	9.3	2.8	2.3	2.1	2.1	1.0	1.0	1.1	0.9	4.9	14.7	2.2	1.2	13.8	0.9	14.7	5.2	24
10	14.0	2.4	S	5.0	5.7	1.3	5.9	11.5	6.0	5.9	7.6	7.1	4.6	3.0	5.8	4.4	4.8	7.1	3.0	2.6	2.7	3.3	2.1	1.7	1.3	14.0	5.1	24
11	2.5	S	6.5	3.7	2.5	1.6	1.6	1.6	1.9	2.1	2.4	3.0	3.7	2.9	5.4	7.6	8.0	4.2	5.0	8.7	7.7	7.5	6.0	4.3	1.6	8.7	4.4	24
12	S	15.5	4.1	3.1	2.3	2.5	2.7	4.1	6.9	7.7	6.2	6.0	4.3	4.0	3.9	3.6	3.4	5.0	4.7	4.1	7.0	10.0	9.3	S	2.3	15.5	5.5	24
13	13.7	9.6	8.8	14.0	7.7	1.7	2.1	5.0	4.4	5.1	4.8	6.9	4.3	2.1	2.2	2.9	3.2	4.4	4.6	3.3	4.3	4.1	S	5.4	1.7	14.0	5.4	24
14	4.2	3.7	3.2	2.5	3.4	4.2	8.5	8.4	6.5	12.0	3.2	0.9	0.5	0.1	0.0	0.4	0.5	0.0	0.0	0.0	S	3.3	1.3	0.0	12.0	2.9	24	
15	0.9	0.7	0.7	2.3	3.3	7.9	10.1	11.9	8.2	6.0	3.2	2.3	2.3	2.4	2.9	3.8	5.0	3.4	4.4	4.1	S	6.7	3.8	3.2	0.7	11.9	4.3	24
16	2.9	2.4	1.8	1.4	1.5	0.9	0.8	1.2	2.5	C1	C1	C1	C1	C1	C1	8.1	8.6	5.4	9.1	7.3	2.4	6.4	1.7	2.2	0.8	9.1	3.7	18
17	2.6	2.7	3.2	1.8	0.9	0.8	0.8	1.3	1.3	1.1	0.5	2.2	1.1	2.4	2.0	1.0	0.6	0.6	S	4.0	5.2	4.9	1.4	1.7	0.5	5.2	1.9	24
18	3.2	3.0	0.5	0.2	0.6	0.5	1.0	1.1	1.3	0.7	1.8	4.2	3.8	3.5	6.0	4.3	3.7	S	4.6	2.6	1.6	3.7	1.7	0.8	0.2	6.0	2.4	24
19	1.2	1.8	4.4	2.7	4.0	3.2	2.0	1.0	2.7	1.3	2.7	2.3	1.1	1.1	1.0	0.0	S	2.8	1.0	3.2	1.2	0.0	0.0	0.0	0.0	4.4	1.8	24
20	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.1	0.3	0.0	0.0	0.2	0.1	0.5	S	3.3	1.3	0.8	0.6	0.6	0.5	0.5	0.1	0.0	3.3	0.4	24
21	0.3	2.0	1.4	1.1	3.8	2.5	1.9	0.7	0.6	0.9	1.0	0.6	0.6	1.1	S	5.3	2.8	2.2	2.4	1.8	1.9	1.7	2.5	2.0	0.3	5.3	1.8	24
22	1.3	0.9	0.9	1.1	1.1	0.9	0.4	1.0	2.2	1.0	1.6	2.4	6.3	S	9.5	6.5	4.9	2.9	2.0	1.6	1.2	1.3	1.3	1.2	0.4	9.5	2.3	24
23	1.2	1.2	1.2	0.9	0.6	0.6	0.7	0.9	0.7	0.5	0.8	0.7	S	3.6	2.3	2.1	2.3	1.9	1.6	1.4	1.3	1.1	1.1	1.5	0.5	3.6	1.3	24
24	1.8	1.7	1.7	1.8	2.4	1.5	1.2	2.4	4.8	3.8	4.6	S	7.7	7.7	7.7	4.4	6.1	4.0	2.0	2.0	2.6	1.5	4.0	5.6	1.2	7.7	3.6	24
25	5.1	4.5	4.4	3.2	1.0	2.1	2.1	1.9	1.3	1.4	S	4.4	2.9	2.3	2.1	2.4	4.0	3.9	2.7	2.3	2.1	2.1	1.3	0.9	0.9	5.1	2.6	24
26	1.8	5.5	8.3	4.9	8.2	11.1	8.2	8.5	10.6	S	9.0	6.6	4.7	4.3	6.5	5.6	4.0	2.6	2.2	1.4	1.4	0.9	0.7	0.4	0.4	11.1	5.1	24
27	0.2	0.1	0.2	0.3	0.3	0.0	0.0	S	2.7	1.1	0.7	0.6	0.7	0.6	0.8	3.2	3.1	1.0	2.9	3.1	1.8	1.8	3.2	3.1	0.0	3.2	1.3	24
28	3.7	5.2	3.2	5.2	3.8	3.5	9.2	S	3.4	1.3	1.2	2.7	3.1	2.6	1.7	1.4	1.6	0.5	1.2	0.3	0.0	0.2	0.9	0.7	0.0	9.2	2.5	24
29	0.8	0.4	0.4	0.2	0.4	2.5	S	3.5	2.2	1.8	1.5	2.0	3.7	1.9	1.9	4.2	3.6	1.0	1.2	1.2	1.1	0.6	0.9	0.9	0.2	4.2	1.6	24
30	1.2	1.5	4.6	3.0	2.5	S	3.0	1.8	1.7	1.3	0.4	0.3	0.0	0.0	0.3	0.4	0.6	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.0	4.6	1.0	24
HOURLY MAX	14.0	15.5	12.0	14.0	9.8	11.1	10.1	13.3	11.1	12.0	13.7	7.4	9.2	7.7	9.5	8.1	8.6	8.6	9.1	8.7	14.7	10.0	9.3	13.8				
HOURLY AVG	3.1	3.2	3.2	3.0	3.0	2.7	3.1	3.8	3.8	3.5	3.7	3.3	3.3	2.9	3.4	3.7	4.1	3.2	3.0	3.0	3.0	2.9	2.4	2.4				

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

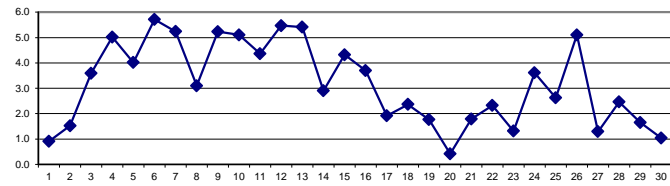
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

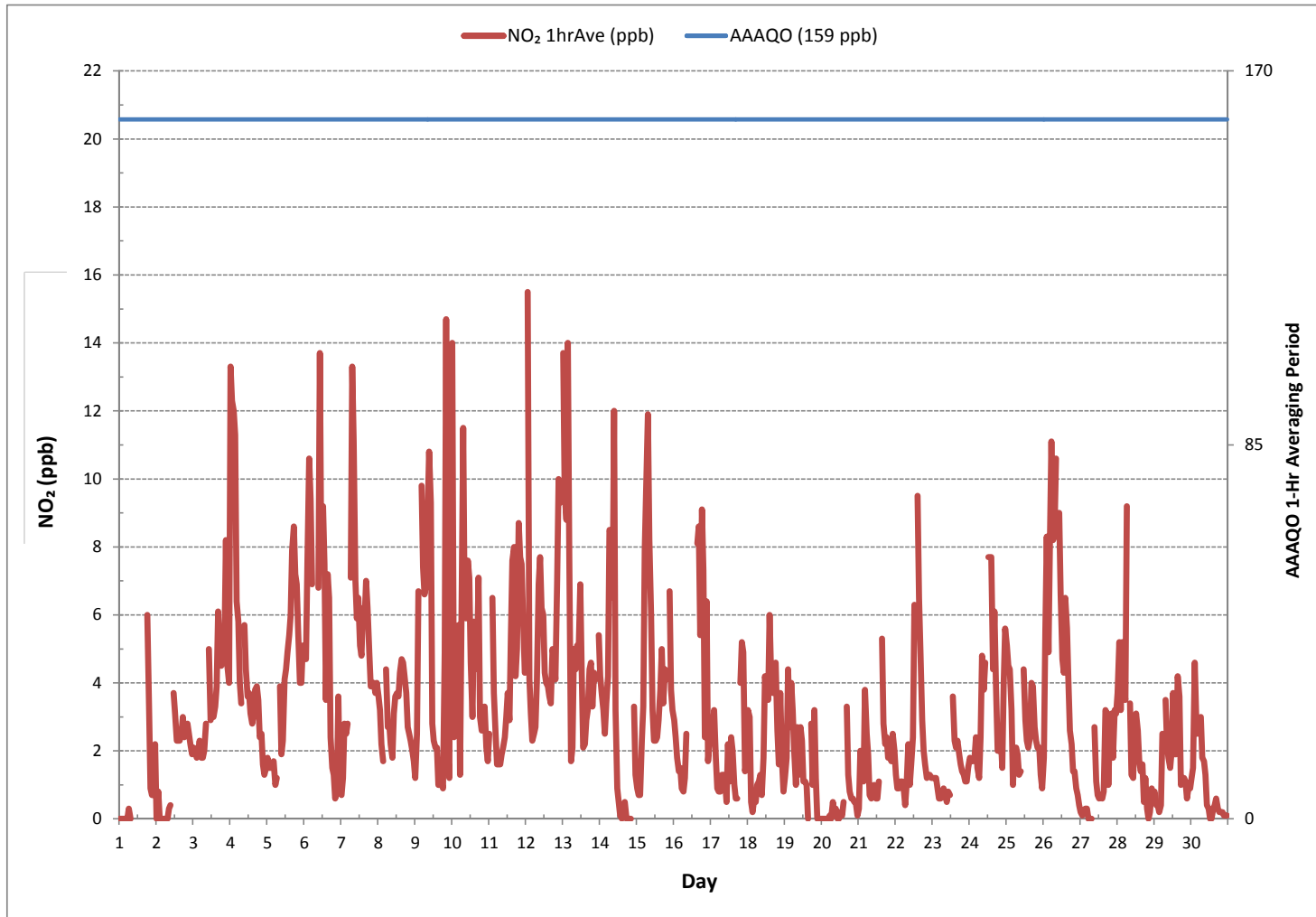
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	638					
MINIMUM 1-HR AVERAGE:	0.0	ppb	@ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 1-HR AVERAGE:	15.5	ppb	@ HOUR(S)	1	ON DAY(S)	12
MAXIMUM 24-HR AVERAGE:	5.7	ppb			ON DAY(S)	6
					VAR-VARIOUS	
IZS CALIBRATION TIME:	29	hrs	OPERATIONAL TIME:	713	hrs	
MONTHLY CALIBRATION TIME:	10	hrs	AMD OPERATION UPTIME:	99.0	%	
STANDARD DEVIATION:	2.8		MONTHLY AVERAGE:	3.2	ppb	

24 HR AVERAGES November 2016



NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)





NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)

HR START (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-HR AVG.	RDGS.	
HR END (MST)	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	2.1	0.9	0.9	0.9	0.9	0.9	2.7	1.5	C	C	C	C	C	C	C	C	C	C	C	6.7	2.7	1.5	1.5	1.5	0.9	6.7	1.9	24	
2	0.9	2.7	1.5	0.9	0.9	0.9	1.5	1.5	1.5	1.5	S	7.9	4.4	4.4	3.3	3.3	3.3	3.8	4.4	3.3	3.8	3.8	3.3	3.3	2.7	0.9	7.9	2.8	24
3	3.2	2.7	2.7	3.3	3.3	2.7	2.7	2.7	3.8	S	9.1	4.4	4.4	3.8	5.6	5.0	9.1	6.2	5.6	6.2	6.7	11.5	7.9	5.6	2.7	11.5	5.1	24	
4	18.5	18.5	14.4	13.9	9.7	12.7	5.0	5.0	S	9.1	6.2	5.0	4.9	4.4	3.8	4.4	4.9	4.9	4.4	3.3	3.3	3.3	2.7	2.1	2.7	2.1	18.5	7.1	24
5	2.7	2.1	2.1	2.1	2.1	2.1	2.1	S	7.9	2.7	4.4	5.6	5.6	5.6	6.2	6.7	9.1	9.7	8.5	7.9	6.7	5.0	5.6	6.2	2.1	9.7	5.2	24	
6	5.6	6.1	10.3	13.3	12.1	9.1	S	14.9	S1	13.8	26.1	19.1	17.3	12.7	7.3	10.3	9.7	5.0	3.3	2.7	1.5	1.5	10.3	1.5	1.5	26.1	9.7	23	
7	1.5	1.5	3.8	3.3	3.3	S	10.9	16.7	15.6	8.5	6.7	6.7	6.2	6.2	7.3	6.7	7.9	7.3	6.2	4.4	4.4	4.4	4.4	4.4	1.5	16.7	6.4	24	
8	4.3	4.4	2.7	2.1	S	6.7	3.3	3.8	3.3	3.3	4.4	4.4	4.4	3.8	10.9	5.6	5.0	4.9	4.4	3.3	3.3	2.7	2.7	2.1	2.1	10.9	4.2	24	
9	1.5	5.0	10.9	S	11.5	8.5	7.9	7.9	10.3	11.5	11.5	3.8	3.8	5.6	5.0	1.5	1.5	1.5	0.9	12.1	22.0	12.0	2.7	21.4	0.9	22.0	7.8	24	
10	25.0	6.2	S	9.7	12.1	2.1	10.9	13.9	8.5	8.5	9.1	7.9	6.2	4.4	7.9	6.2	6.1	8.5	7.3	3.3	3.3	4.4	2.7	2.1	2.1	25.0	7.7	24	
11	3.2	S	10.3	5.0	3.3	2.1	2.1	2.1	2.7	3.3	3.3	3.8	4.4	3.8	6.7	12.7	13.9	5.0	7.9	9.7	8.5	9.1	9.1	5.6	2.1	13.9	6.0	24	
12	S	22.6	7.9	4.4	3.2	3.3	5.6	5.6	7.9	10.3	6.7	6.7	5.6	4.4	4.4	4.4	6.2	7.9	5.6	14.4	13.8	16.7	S	3.2	22.6	7.8	24		
13	19.7	15.5	17.9	19.7	13.9	4.4	3.8	6.2	6.2	6.2	7.9	9.7	6.7	2.7	2.7	3.8	4.9	5.0	5.6	4.4	5.6	6.7	S	10.3	2.7	19.7	8.2	24	
14	5.6	5.6	4.4	3.8	4.4	8.5	10.9	10.9	10.9	15.0	12.1	2.1	1.5	0.9	0.9	1.5	1.5	0.9	0.9	0.3	0.9	S	7.3	2.7	0.3	15.0	4.9	24	
15	1.5	1.5	1.5	4.4	9.1	9.1	16.2	14.9	12.7	7.3	5.0	3.3	2.7	3.8	4.4	6.1	8.5	4.4	5.6	5.6	S	12.1	5.0	3.8	1.5	16.2	6.5	24	
16	3.8	3.3	2.7	2.1	3.3	1.5	1.5	2.7	5.6	C1	C1	C1	C1	C1	C1	17.3	20.9	6.7	13.3	12.7	3.8	12.1	4.9	2.7	1.5	20.9	6.7	18	
17	3.3	3.3	3.8	3.3	1.5	1.5	1.5	1.5	2.1	1.5	2.1	6.2	3.8	4.9	9.1	3.2	0.9	1.5	S	6.2	9.1	8.5	2.1	2.1	0.9	9.1	3.6	24	
18	P	7.3	1.5	1.5	1.5	1.5	2.1	2.1	2.1	1.5	6.7	7.9	6.7	7.3	7.9	6.2	5.6	S	8.5	4.4	3.3	6.7	4.4	2.1	1.5	8.5	4.5	23	
19	2.7	6.7	7.9	6.2	7.3	6.2	5.6	3.3	6.2	4.4	5.6	5.6	4.4	2.7	2.7	1.5	S	7.9	3.8	5.0	3.8	1.5	0.9	0.9	0.9	7.9	4.5	24	
20	0.9	1.5	0.9	0.9	0.9	2.1	2.1	2.7	2.1	2.1	1.5	1.5	1.5	2.1	2.1	S	8.5	3.3	2.7	2.1	2.1	1.5	2.1	2.1	0.9	8.5	2.1	24	
21	2.7	5.6	4.4	3.8	7.3	5.6	4.4	2.1	2.1	2.7	3.3	1.5	2.1	3.3	S	11.5	5.0	3.8	3.8	3.3	3.3	3.3	4.4	3.3	1.5	11.5	4.0	24	
22	3.3	2.1	2.1	2.7	2.7	2.1	1.5	2.7	4.4	2.7	4.4	7.3	9.7	S	12.1	7.9	6.7	4.4	3.3	2.7	2.1	2.1	2.1	2.1	1.5	12.1	4.1	24	
23	2.1	2.1	2.1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.1	S	7.9	3.3	3.2	3.3	3.3	2.7	2.7	2.7	2.1	2.1	2.7	1.5	7.9	2.5	24	
24	2.7	2.7	2.7	2.7	3.3	2.7	2.7	4.9	7.9	13.3	6.7	S	15.0	10.9	10.9	5.6	7.9	7.9	2.7	3.3	5.0	3.2	6.7	7.3	2.7	15.0	6.0	24	
25	7.9	7.3	6.7	6.2	3.3	4.4	3.8	4.4	2.7	3.2	S	8.5	5.0	3.8	3.8	4.4	10.3	6.2	4.4	4.4	3.8	3.8	3.2	2.7	2.7	10.3	5.0	24	
26	5.0	9.7	12.1	7.9	12.7	14.4	13.9	12.1	13.3	S	12.7	10.9	7.3	6.2	10.3	10.3	5.6	4.4	3.8	3.3	3.3	2.1	2.1	1.5	1.5	14.4	8.0	24	
27	1.5	0.9	0.9	0.9	0.9	0.9	0.9	S	6.2	2.1	1.5	1.5	1.5	1.5	2.1	2.1	7.9	7.9	2.1	4.4	4.4	2.7	4.4	4.4	0.9	7.9	2.7	24	
28	6.2	7.9	6.7	9.7	6.7	6.2	15.0	S	6.2	2.1	3.2	6.7	6.2	7.9	7.9	9.1	5.0	1.5	5.6	2.1	0.9	0.9	2.1	1.5	0.9	15.0	5.5	24	
29	2.1	0.9	1.5	0.9	1.5	10.3	S	7.3	3.3	2.7	3.2	6.7	16.1	12.7	3.8	23.2	6.7	2.1	2.1	2.1	2.1	2.1	1.5	2.1	0.9	23.2	5.1	24	
30	2.1	3.8	6.2	4.4	3.8	S	7.3	3.3	2.7	2.7	1.5	0.9	0.9	1.5	1.5	1.5	2.1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0.9	7.3	2.5	24	
HOURLY MAX	25.0	22.6	17.9	19.7	13.9	14.4	16.2	16.7	15.6	15.0	26.1	19.1	17.3	12.7	12.1	23.2	20.9	9.7	13.3	12.7	22.0	13.8	16.7	21.4					
HOURLY AVG	5.1	5.5	5.3	4.9	5.1	4.8	5.3	5.7	5.9	5.7	6.4	5.8	5.9	5.1	5.7	6.6	6.7	4.9	4.7	4.7	4.8	5.0	4.4	3.8					

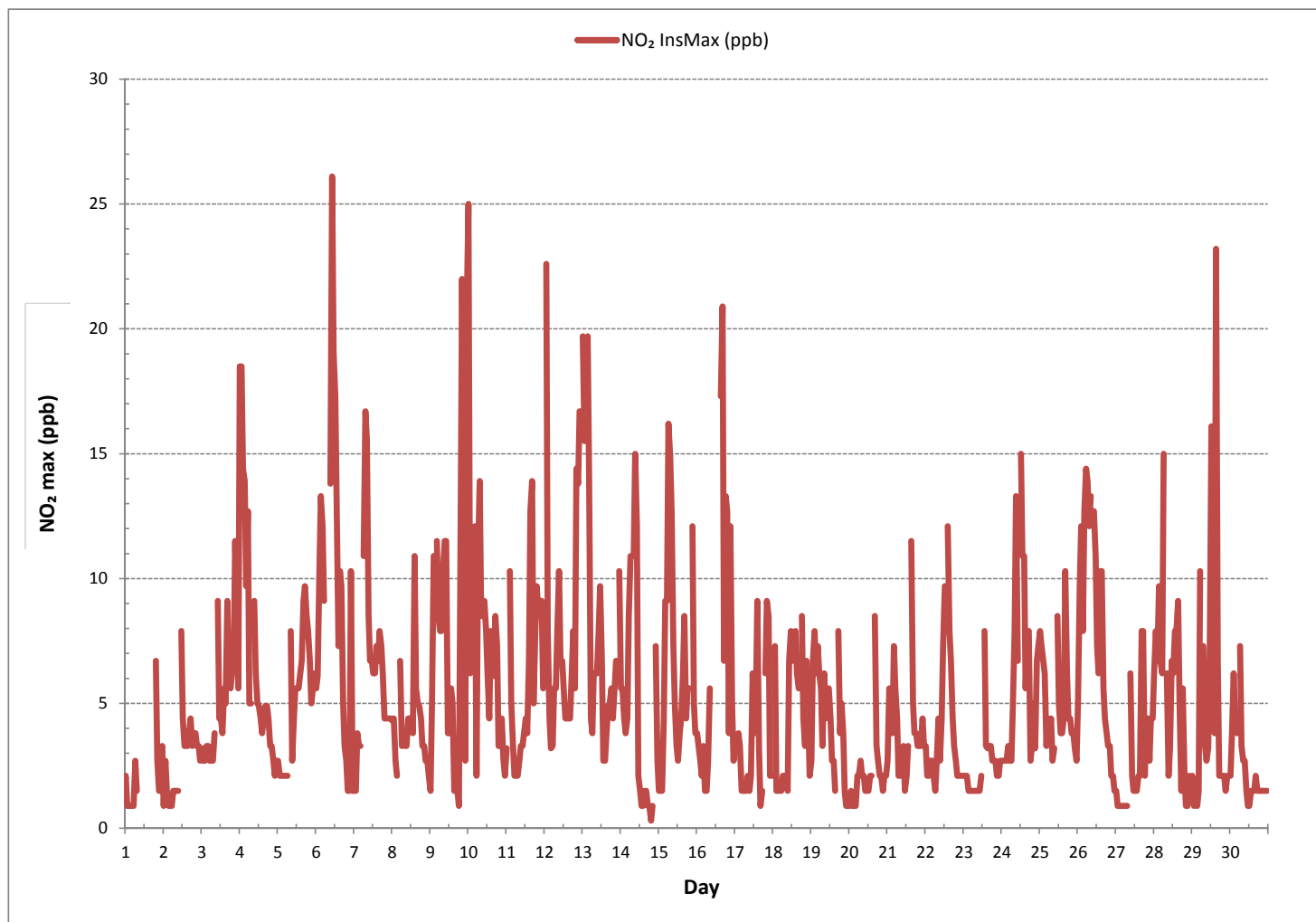
STATUS FLAG CODES

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:	672
MAXIMUM INSTANTANEOUS VALUE:	26.1 ppb @ HOUR(S) 10 ON DAY(S) 6
VAR-VARIOUS	
IZS CALIBRATION TIME:	29 hrs
MONTHLY CALIBRATION TIME:	11 hrs
STANDARD DEVIATION:	4.2
OPERATIONAL TIME:	712 hrs

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)

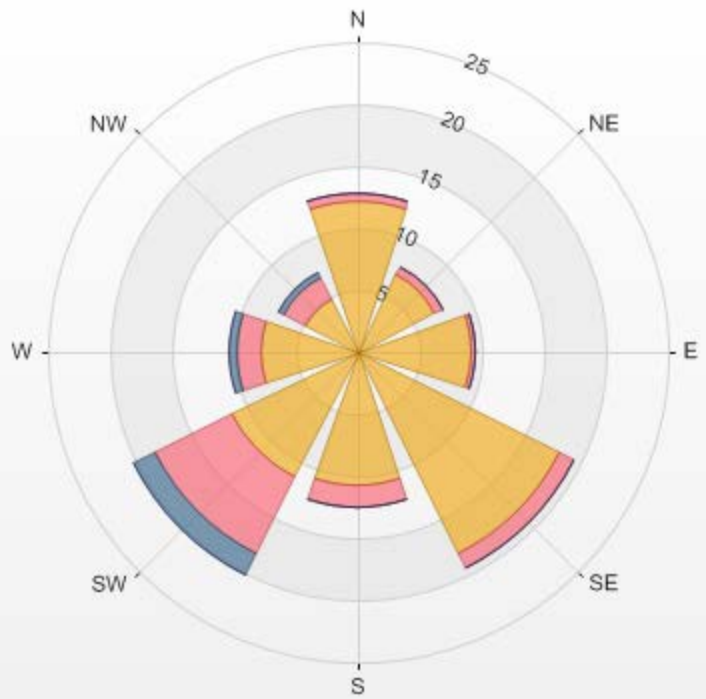


Wind: LICA MASKWA Poll.: LICA MASKWA-NO2[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr
 Calm: 0.00% Valid Data: 93.33% Calm Avg: 0.00 [ppb]

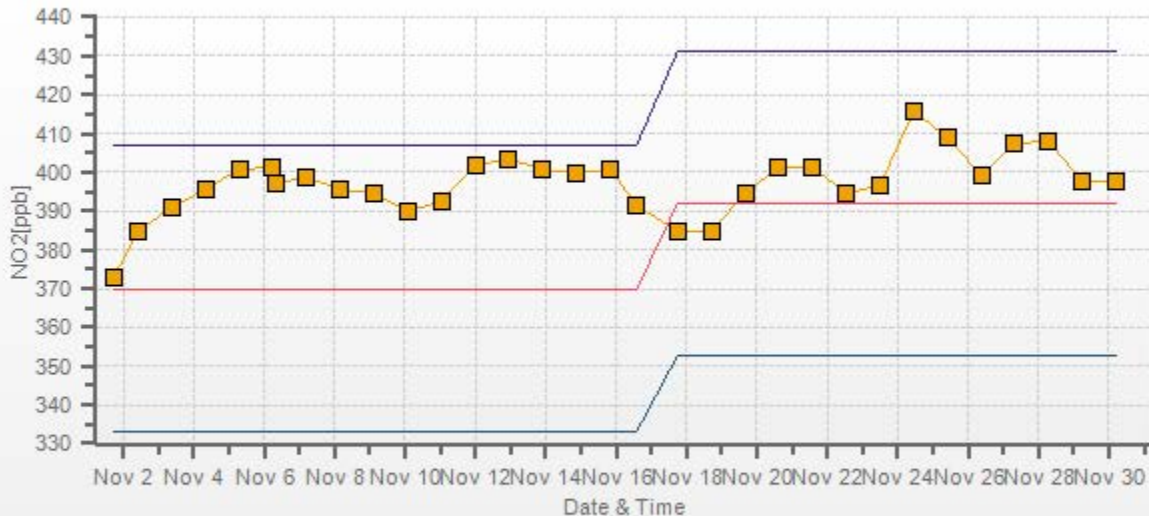
Direction	0.0-5.2	5.2-10.4	10.4-15.6	>15.6	Total
N	12.2	0.6	0	0	12.8
NE	6.99	0.74	0	0	7.73
E	9.23	0.3	0	0	9.53
SE	18.3	1.19	0	0	19.49
S	10.86	1.79	0	0	12.65
SW	11.31	6.99	1.93	0	20.23
W	7.89	1.93	0.6	0	10.42
NW	4.76	1.93	0.45	0	7.14
Summary	81.54	15.47	2.98	0	100

% Icon	Classes (ppb)	82	 0.0-5.2	15	 5.2-10.4	3	 10.4-15.6	0	 >15.6
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LICA MASKWA Poll.: LICA MASKWA-NO2[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



NO2[ppb] Calibration: LICA MASKWA Monthly: 2016/11 Type: Span



Span Meas Span Ref Span Low Span High

WIND SPEED



WIND SPEED Hourly Averages (WS kph)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY																												
1	5.2	5.6	6.4	5.9	5.1	4.1	3.8	5.5	5.1	4.8	4.3	5.0	4.6	6.2	5.0	6.0	4.4	2.1	2.4	3.9	3.8	3.8	2.3	2.2	2.1	6.4	3.6	24
2	4.0	5.4	3.5	2.3	2.1	2.8	1.4	3.9	4.6	4.7	5.7	5.2	5.0	4.1	3.5	3.0	1.6	0.8	1.0	1.8	4.1	4.9	5.5	6.4	0.8	6.4	2.1	24
3	5.2	5.0	4.7	5.0	5.0	5.1	5.1	4.7	4.5	5.1	4.1	7.0	5.2	5.6	4.8	7.1	4.9	7.2	8.0	5.3	4.6	2.4	4.1	5.7	2.4	8.0	4.4	24
4	6.4	7.5	5.2	5.6	5.9	2.5	1.7	1.8	0.9	1.0	8.7	7.5	5.4	5.6	5.0	5.7	5.7	1.5	1.3	1.9	1.2	1.1	0.5	0.3	0.3	8.7	3.1	24
5	1.9	1.7	1.2	1.0	2.5	1.0	0.4	0.5	1.0	0.8	1.9	2.7	4.4	2.6	4.3	3.0	1.9	0.5	1.2	1.7	1.3	0.6	1.9	1.0	0.4	4.4	0.7	24
6	1.5	0.5	1.5	2.0	3.1	2.7	0.4	2.8	2.1	1.1	3.3	1.5	1.7	1.7	2.0	1.4	2.6	2.6	3.2	3.3	2.8	3.6	4.7	3.4	0.4	4.7	1.8	24
7	2.8	2.9	4.6	4.0	1.9	2.4	5.1	6.1	5.5	5.8	4.7	3.2	4.3	5.0	3.3	3.8	2.3	5.6	3.2	6.0	7.4	7.6	5.9	5.1	1.9	7.6	3.9	24
8	3.3	2.2	2.2	2.3	3.1	2.2	1.4	1.5	1.1	0.1	4.6	3.7	4.2	3.4	3.6	3.3	2.0	0.1	1.2	1.9	0.6	0.7	0.6	0.7	0.1	4.6	1.2	24
9	2.9	4.3	4.4	6.6	6.7	9.3	7.9	7.4	9.2	9.2	4.7	8.4	10.1	8.7	7.4	10.1	8.0	7.6	7.2	7.9	7.6	5.9	6.6	6.8	2.9	10.1	6.0	24
10	4.9	4.5	4.1	2.5	2.7	3.2	4.6	3.5	3.0	5.9	4.1	3.9	3.4	2.3	4.9	5.1	3.3	2.7	4.9	8.1	7.7	8.0	8.7	6.7	2.3	8.7	3.3	24
11	6.8	8.6	7.8	9.9	7.7	5.3	4.5	5.9	7.0	3.1	5.4	5.3	5.6	5.3	3.3	4.7	4.0	3.2	4.6	3.7	2.2	1.9	2.7	2.2	1.9	9.9	3.9	24
12	2.3	2.5	1.5	1.6	1.2	0.3	0.8	2.1	2.5	2.8	2.3	4.0	3.7	3.3	3.6	2.0	1.9	0.6	1.6	2.3	4.1	4.3	5.1	5.5	0.3	5.5	0.7	24
13	5.1	3.0	4.7	2.5	3.0	2.7	3.6	3.4	3.7	4.8	5.4	4.8	6.3	6.7	6.6	7.2	5.6	6.1	5.7	4.4	4.9	2.4	2.7	2.7	2.4	7.2	3.4	24
14	2.1	2.9	2.0	1.8	4.6	4.9	2.9	4.2	6.4	7.7	10.3	10.2	11.7	12.1	11.7	7.9	9.7	10.2	9.7	10.3	9.4	7.6	6.0	5.2	1.8	12.1	6.1	24
15	7.6	7.6	6.0	4.9	5.8	6.5	5.8	6.8	5.2	4.7	5.0	6.3	5.3	5.0	4.8	3.0	3.0	3.3	1.8	1.3	2.0	1.7	0.7	0.9	0.7	7.6	3.7	24
16	0.6	0.8	1.2	1.3	1.4	0.4	1.5	2.2	1.2	2.6	4.1	2.8	2.8	2.9	2.7	2.3	1.3	1.1	2.2	1.7	1.2	2.3	3.1	3.1	0.4	4.1	1.6	24
17	2.8	1.9	2.5	5.4	9.0	7.8	7.3	7.7	7.5	5.2	5.4	4.8	5.6	5.9	5.3	4.0	4.1	2.9	3.1	1.8	1.6	3.3	3.4	3.0	1.6	9.0	3.5	24
18	2.1	2.9	3.8	4.4	2.5	0.4	0.5	2.3	3.1	2.4	1.4	1.3	3.2	3.6	2.6	1.8	1.3	1.6	1.5	1.7	3.0	3.5	4.4	4.5	0.4	4.5	0.4	24
19	4.4	4.4	5.9	5.6	5.4	5.3	6.4	7.1	6.9	7.2	8.3	10.9	9.4	9.2	8.4	9.1	9.0	9.3	9.0	8.0	7.7	7.9	7.5	6.4	4.4	10.9	7.3	24
20	6.0	5.4	4.7	3.9	3.4	3.9	4.0	2.8	2.7	3.3	4.3	5.4	4.5	3.5	4.6	5.1	6.0	6.5	6.3	6.5	8.1	7.6	6.8	8.4	2.7	8.4	4.6	24
21	8.0	6.6	6.9	6.3	5.5	4.6	4.5	3.8	2.3	1.6	3.1	4.5	4.0	5.2	5.0	5.4	5.7	5.7	5.8	5.7	5.0	4.9	4.8	4.7	1.6	8.0	2.6	24
22	5.4	4.1	4.1	4.3	4.1	1.9	1.6	1.7	1.1	2.1	2.8	2.2	2.6	2.5	1.2	2.6	2.9	5.4	6.5	6.4	8.9	7.9	8.4	8.1	1.1	8.9	1.2	24
23	7.0	7.1	7.0	7.2	8.4	7.3	7.6	6.7	7.4	8.2	7.7	7.9	8.2	9.0	7.7	6.9	6.8	6.2	7.5	7.8	6.7	6.0	6.8	6.5	6.0	9.0	7.2	24
24	6.1	4.2	4.4	4.9	3.2	3.3	3.6	2.7	2.0	2.6	3.0	3.0	4.1	3.1	3.6	3.2	3.5	4.6	5.9	5.0	5.4	6.0	5.2	7.8	2.0	7.8	3.5	24
25	7.8	6.3	7.3	8.8	7.8	7.2	8.7	7.6	6.6	5.4	5.4	6.1	6.5	5.4	3.2	2.5	0.8	2.0	7.8	8.9	8.6	8.8	7.4	4.8	0.8	8.9	2.5	24
26	4.7	5.8	6.9	8.8	5.5	6.2	8.0	5.1	4.3	0.4	2.6	5.6	4.0	2.8	3.6	4.5	4.2	4.8	4.9	6.2	6.6	6.2	6.5	6.1	0.4	8.8	1.4	24
27	6.3	6.0	7.0	7.3	7.1	5.9	5.3	6.4	5.7	4.8	5.4	6.4	5.8	4.8	2.7	2.6	2.3	2.3	3.3	3.0	2.4	0.9	2.1	3.0	0.9	7.3	3.8	24
28	3.6	4.2	4.1	2.4	3.2	4.7	4.2	4.3	4.8	4.3	3.5	4.0	4.0	4.1	4.0	3.6	3.2	4.1	6.0	5.1	5.3	5.9	5.2	5.1	2.4	6.0	3.9	24
29	5.1	4.8	2.9	3.8	4.7	4.2	4.0	4.1	4.1	4.8	4.7	4.9	5.3	4.6	3.0	1.6	2.9	3.5	1.2	0.7	0.9	0.4	1.6	1.8	0.4	5.3	2.9	24
30	1.4	1.7	0.6	0.8	0.4	1.8	3.2	4.6	4.1	5.5	5.6	7.5	6.5	6.0	5.9	5.4	5.4	5.0	5.3	5.3	5.5	4.1	5.8	5.2	0.4	7.5	4.0	24
HOURLY MAX	8.0	8.6	7.8	9.9	9.0	9.3	8.7	7.7	9.2	9.2	10.3	10.9	11.7	12.1	11.7	10.1	9.7	10.2	9.7	10.3	9.4	8.8	8.7	8.4				
HOURLY AVG	0.5	0.6	0.8	1.2	1.0	1.1	1.3	1.1	0.9	1.0	1.4	1.4	1.4	1.1	1.2	1.1	0.7	1.0	1.0	0.9	1.2	1.0	0.9	1.1				

STATUS FLAG CODES

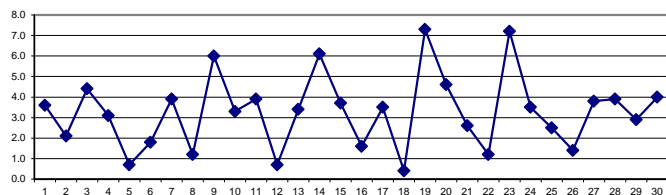
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

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

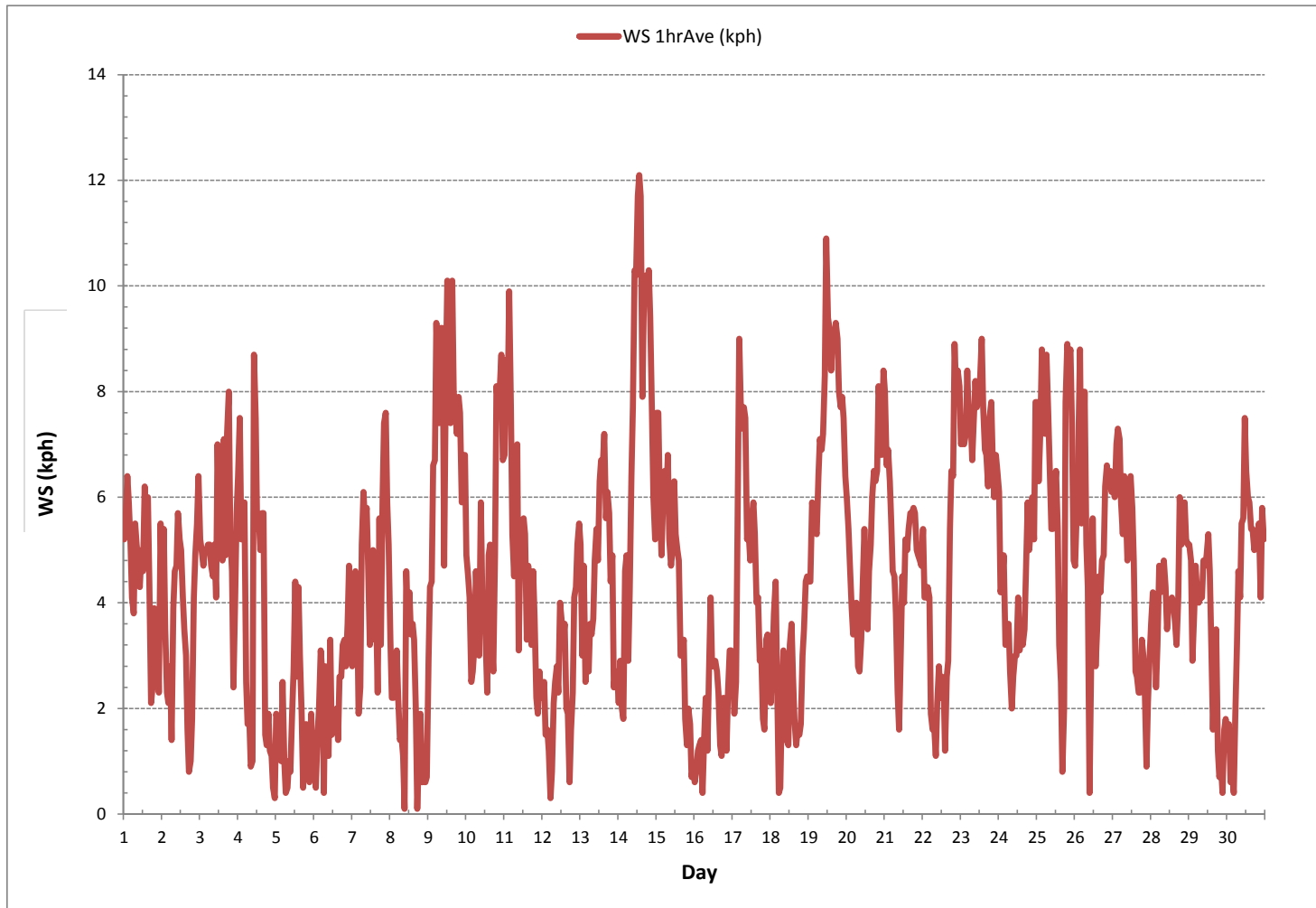
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	720
MINIMUM 1-HR AVERAGE:	0.1 kph @ HOUR(S) 9 , 17 ON DAY(S) 8 , 8
MAXIMUM 1-HR AVERAGE:	12.1 kph @ HOUR(S) 13 ON DAY(S) 14
MAXIMUM 24-HR AVERAGE:	7.3 kph ON DAY(S) 19
	VAR-VARIOUS
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	720 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	2.3
MONTHLY AVERAGE:	0.9 kph

24 HR AVERAGES November 2016



WIND SPEED Hourly Averages (WS kph)





WIND SPEED Instantaneous Maximum (WS kph)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY 1	12.9	13.7	16.8	17.0	13.7	15.1	13.7	23.3	17.5	15.9	17.7	19.2	15.0	21.2	22.3	20.8	16.2	11.0	15.5	17.7	12.9	11.6	11.1	10.7	10.7	23.3	15.9	24
2	12.2	12.3	14.2	12.4	10.0	14.0	11.6	14.0	16.3	15.7	16.2	14.2	15.7	14.6	12.7	11.3	9.8	8.9	10.7	7.0	10.2	14.2	19.9	16.6	7.0	19.9	13.1	24
3	14.2	17.0	14.2	17.0	16.2	19.9	15.4	16.0	12.5	16.6	13.1	19.4	17.5	21.6	15.0	15.7	12.8	20.5	20.1	12.6	13.3	10.4	16.1	17.9	10.4	21.6	16.0	24
4	17.0	16.7	14.0	17.5	13.5	11.5	9.6	8.0	6.5	16.6	28.4	18.8	16.4	17.2	15.9	19.2	16.4	8.7	7.4	5.9	4.4	9.2	7.6	13.3	4.4	28.4	13.3	24
5	9.3	10.0	6.1	10.0	11.8	5.6	9.1	9.2	11.6	9.6	11.6	12.9	14.6	10.4	11.8	10.4	7.8	9.6	5.2	5.0	9.3	10.4	9.9	5.0	5.0	14.6	9.4	24
6	11.3	3.6	7.6	6.3	10.4	9.1	7.4	11.3	10.7	5.2	14.2	7.4	8.5	6.9	7.5	5.7	12.2	9.3	7.8	12.0	10.7	12.6	15.5	11.8	3.6	15.5	9.4	24
7	9.8	8.9	10.7	8.1	6.4	10.9	11.1	14.6	14.6	15.7	15.5	9.8	11.5	12.0	10.0	10.7	7.6	15.0	9.7	16.4	21.8	20.5	15.7	15.9	6.4	21.8	12.6	24
8	14.6	11.1	10.2	10.9	11.6	11.6	10.2	5.5	9.7	7.4	21.6	14.2	11.1	11.3	12.4	8.9	6.9	8.3	4.1	6.7	5.6	4.3	4.1	18.8	4.1	21.6	10.0	24
9	23.3	21.3	14.2	17.0	17.2	20.1	24.0	16.4	18.3	22.3	19.2	32.1	34.3	27.5	29.5	39.6	31.0	27.5	29.3	25.1	23.2	18.4	19.5	21.6	14.2	39.6	23.8	24
10	18.8	14.8	13.3	11.6	8.9	9.3	11.8	10.2	14.8	14.5	9.7	8.9	9.6	7.6	12.2	14.4	11.3	8.0	19.9	20.5	19.9	25.3	27.8	23.2	7.6	27.8	14.4	24
11	21.6	24.6	24.8	32.6	28.4	19.7	15.5	18.6	23.4	13.1	20.1	15.9	19.2	15.9	14.4	17.9	15.9	11.3	12.1	12.1	8.7	13.3	10.9	8.9	8.7	32.6	17.5	24
12	10.4	7.6	5.6	5.8	3.0	3.2	3.6	15.9	19.2	9.6	5.1	8.6	8.0	8.0	8.3	6.7	5.2	5.4	6.1	8.5	14.4	13.7	17.2	17.2	3.0	19.2	9.0	24
13	23.8	12.0	16.5	10.3	10.9	8.7	8.0	8.7	11.6	16.1	12.6	15.0	18.3	17.5	17.7	19.9	13.1	14.7	13.6	12.3	12.0	10.2	6.3	6.3	6.3	23.8	13.2	24
14	6.9	13.7	10.7	8.9	14.8	18.4	12.4	15.9	21.2	29.4	34.9	37.6	44.0	44.8	44.2	31.9	35.4	39.4	36.1	32.4	31.3	37.0	21.6	20.3	6.9	44.8	26.8	24
15	34.2	26.1	19.7	17.7	15.3	14.8	15.3	18.4	18.4	13.9	16.1	20.3	20.8	15.6	18.1	8.0	7.4	8.9	7.6	3.0	11.3	11.3	2.6	10.5	2.6	34.2	14.8	24
16	2.9	9.6	10.0	3.7	10.7	2.8	10.2	10.2	10.0	11.9	13.7	11.8	11.5	10.0	12.0	12.2	9.3	9.8	11.1	10.9	11.6	11.9	13.5	12.4	2.8	13.7	10.2	24
17	11.6	12.4	12.0	16.8	25.6	24.8	19.0	24.7	20.3	13.5	22.9	22.3	21.2	21.1	22.7	19.4	14.8	13.5	12.9	11.3	19.6	9.8	12.4	12.2	9.8	25.6	17.4	24
18	P	13.3	12.7	13.7	18.4	9.6	19.8	12.9	12.2	10.5	11.3	12.4	16.4	13.6	14.0	10.9	10.0	11.6	10.7	10.9	12.3	14.8	14.4	15.1	9.6	19.8	13.1	23
19	16.4	16.4	17.0	18.9	21.1	23.0	24.5	27.1	25.8	23.8	32.0	37.1	32.5	34.4	32.0	31.3	30.2	33.9	34.6	30.5	25.0	30.6	26.3	24.9	16.4	37.1	27.1	24
20	20.6	25.6	19.2	13.0	17.9	19.0	16.8	16.8	11.8	10.9	13.8	14.5	12.0	15.1	19.2	14.4	19.2	22.5	23.6	21.9	26.5	26.9	23.0	26.5	10.9	26.9	18.8	24
21	28.0	30.0	28.2	27.3	23.9	17.0	16.4	15.1	11.1	10.2	13.1	14.4	14.6	13.2	14.8	17.0	19.7	16.4	17.7	18.1	15.7	15.9	20.2	19.7	10.2	30.0	18.2	24
22	16.6	13.7	14.8	21.4	15.1	12.2	10.7	8.4	10.7	10.2	11.3	10.5	10.7	10.7	11.6	11.3	13.6	16.0	17.9	21.4	30.0	24.5	25.6	23.0	8.4	30.0	15.5	24
23	24.5	21.5	26.3	23.4	28.6	26.2	23.8	24.5	26.5	26.5	29.0	24.1	28.0	31.7	25.6	24.5	19.9	21.6	21.0	23.5	19.2	18.4	18.8	21.2	18.4	31.7	24.1	24
24	17.2	15.5	13.5	15.9	12.3	9.2	9.8	8.0	10.0	14.2	11.1	10.0	11.3	11.3	11.2	11.1	19.9	18.4	19.0	15.5	25.8	21.2	20.5	35.7	8.0	35.7	15.3	24
25	29.2	23.4	25.1	30.9	26.2	24.7	28.0	24.5	25.4	19.8	25.2	21.2	20.1	20.5	13.1	15.1	6.9	15.3	30.4	34.6	28.1	35.7	33.1	21.2	6.9	35.7	24.1	24
26	13.1	15.7	15.1	18.8	15.4	15.7	18.4	14.4	9.6	10.0	9.8	14.2	10.7	10.3	13.7	13.5	15.1	14.6	14.8	28.2	25.6	19.9	22.5	19.9	9.6	28.2	15.8	24
27	17.5	22.3	23.4	23.2	27.8	20.1	16.8	18.4	18.4	14.9	19.4	21.0	15.1	14.0	14.4	10.7	11.3	11.3	11.8	9.9	9.7	9.6	10.9	10.9	9.6	27.8	16.0	24
28	13.5	16.4	14.4	12.4	14.2	20.7	19.8	21.0	19.4	14.8	19.0	15.9	15.5	13.1	16.5	12.1	14.0	16.4	20.6	18.1	21.9	21.4	22.5	21.9	12.1	22.5	17.3	24
29	20.0	16.4	13.5	16.6	18.1	17.5	14.2	14.6	14.3	15.8	16.2	22.7	17.0	16.4	11.3	10.9	14.4	12.2	10.7	10.9	8.7	15.5	20.4	8.7	8.7	22.7	14.9	24
30	14.9	34.4	10.2	12.2	10.9	10.2	12.0	14.9	14.0	18.4	26.5	20.6	17.9	20.3	17.0	15.9	16.9	15.3	17.0	15.7	14.4	12.0	16.6	16.6	10.2	34.4	16.5	24
HOURLY MAX	34.2	34.4	28.2	32.6	28.6	26.2	28.0	27.1	26.5	29.4	34.9	37.6	44.0	44.8	44.2	39.6	35.4	39.4	36.1	34.6	31.3	37.0	33.1	35.7				
HOURLY AVG	16.8	16.7	15.1	15.7	15.9	14.8	14.6	15.4	15.5	14.9	17.7	17.6	17.3	16.9	16.7	15.7	14.8	15.2	16.0	16.0	16.8	17.0	16.9	16.9				

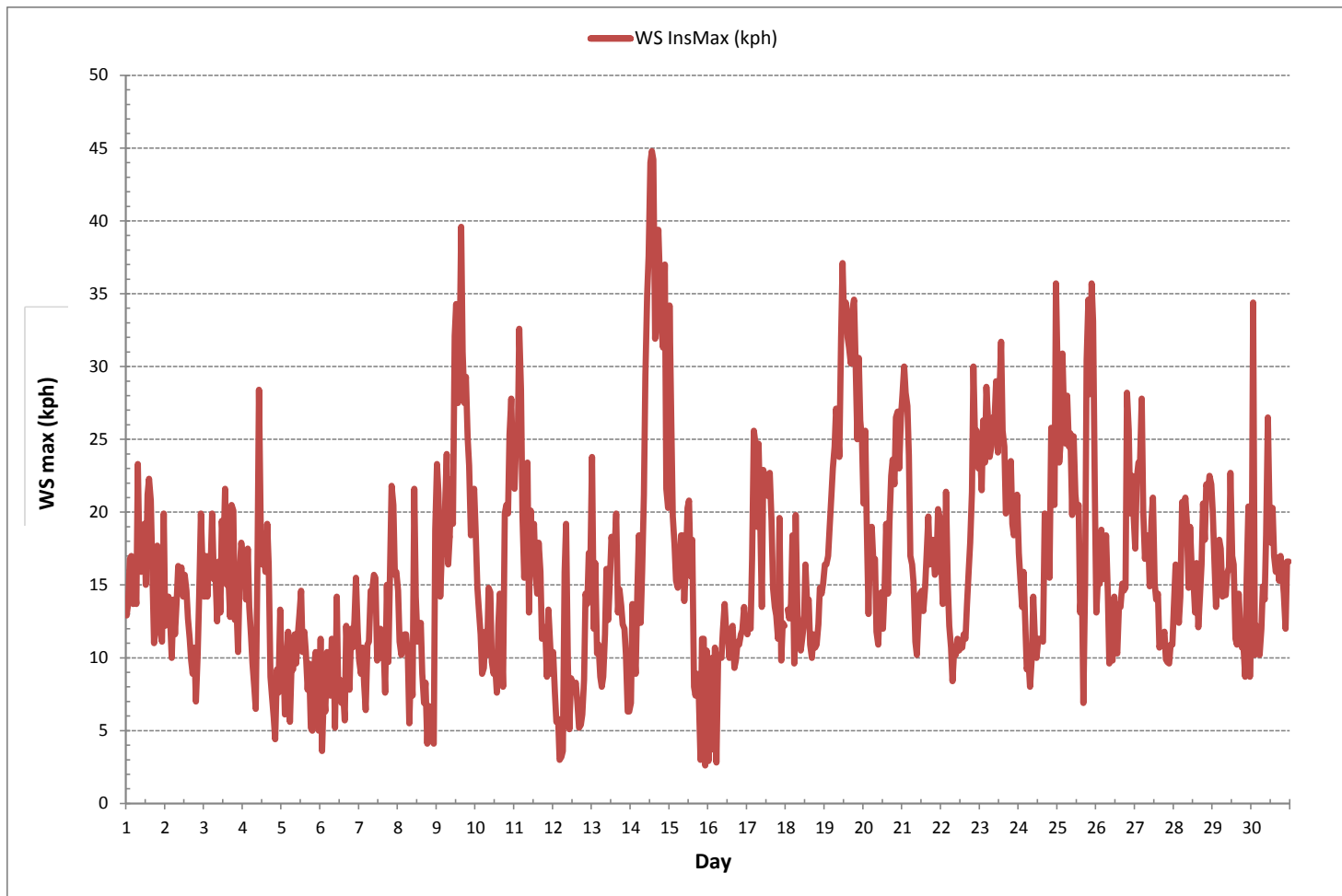
STATUS FLAG CODES

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

MAXIMUM INSTANTANEOUS VALUE:	44.8	kph	@ HOUR(S)	13	ON DAY(S)	14
					VAR-VARIOUS	
OPERATIONAL TIME:					719	hrs

WIND SPEED Instantaneous Maximum (WS kph)

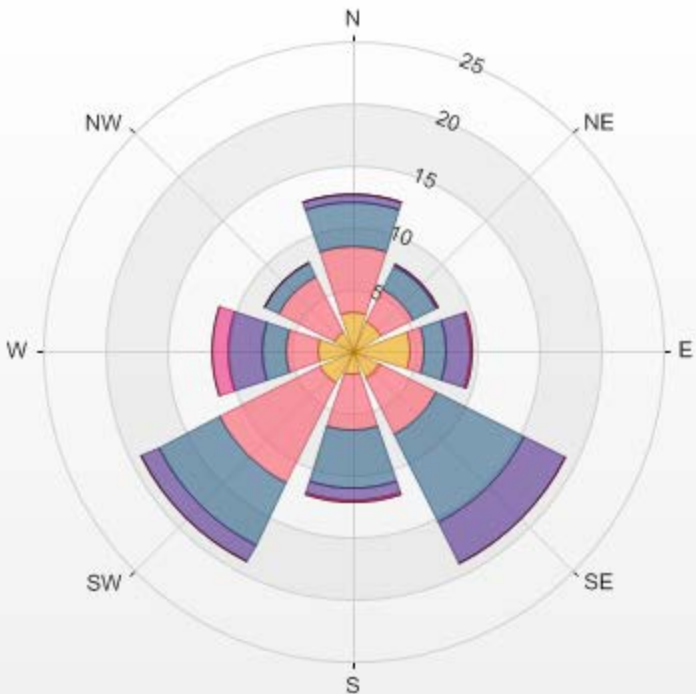


Wind: LICA MASKWA Monitor: WSP [kph] Monthly: 11/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 100.00% Calm Avg: 0.00 [kph]

Direction	0.0-2.4	2.4-4.9	4.9-7.3	7.3-9.8	9.8-12.2	>12.2	Total
N	3.19	5.28	3.47	0.69	0	0	12.63
NE	2.64	2.92	2.08	0.14	0	0	7.78
E	4.72	1.11	1.81	1.94	0.14	0	9.72
SE	2.5	5.14	7.78	3.75	0	0	19.17
S	1.94	4.58	4.58	0.97	0.14	0	12.21
SW	2.92	9.03	5.56	1.53	0	0	19.04
W	2.78	2.64	1.94	2.78	1.25	0	11.39
NW	1.67	5	1.39	0	0	0	8.06
Summary	22.36	35.7	28.61	11.8	1.53	0	100

% Icon Classes (kph)	22	0.0-2.4	36	2.4-4.9	29	4.9-7.3	12	7.3-9.8	2	9.8-12.2	0	>12.2
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LICA MASKWA 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2016

WIND DIRECTION Hourly Averages (WD)

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

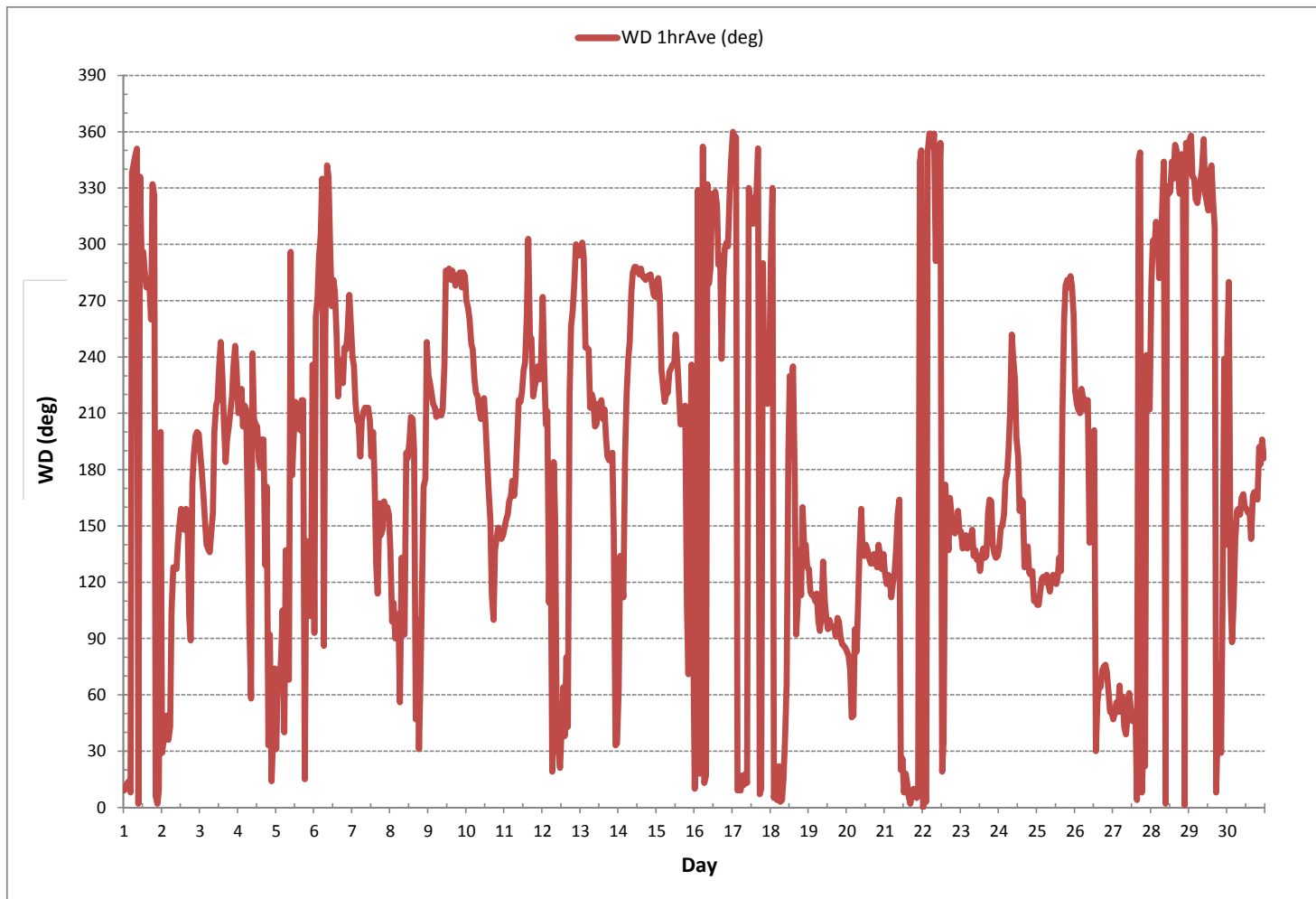
STATUS FLAG CODES

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:	720	hrs
STANDARD DEVIATION:	95.6		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	181	(S)

WIND DIRECTION Hourly Averages (WD)



STANDARD DEVIATION WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2016

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)

HR START (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.		
HR END (MST)	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	20	20	20	20	22	36	43	35	37	35	41	41	39	33	35	33	29	37	48	45	28	24	38	32	24		
2	23	18	22	28	24	35	45	27	34	33	28	26	30	29	36	29	36	64	49	40	25	22	23	21	24		
3	24	26	26	26	29	27	30	28	29	30	34	27	30	34	29	15	20	17	17	15	22	45	29	28	24		
4	17	13	21	15	15	37	58	31	49	42	19	21	26	25	23	18	31	52	21	48	65	38	50	24	24		
5	36	46	51	64	26	50	49	61	47	56	70	58	30	33	27	39	46	57	46	54	65	45	54	65	24		
6	52	72	35	22	25	36	69	41	30	35	26	46	42	43	35	49	20	24	21	26	27	27	25	24	24		
7	24	24	14	11	37	25	11	16	18	22	28	29	29	25	33	22	20	19	23	20	22	22	22	26	24		
8	32	44	36	36	29	41	52	38	48	82	26	33	26	30	26	21	43	64	40	35	30	58	53	63	24		
9	32	25	17	15	15	13	19	14	13	17	28	27	27	25	26	25	27	26	26	24	26	25	25	26	24		
10	27	27	26	33	28	20	13	22	21	16	19	19	33	42	26	19	17	19	30	24	23	23	24	27	24		
11	22	22	23	26	26	29	32	24	27	43	31	29	33	31	33	31	30	32	19	18	26	44	22	24	24		
12	31	31	44	47	34	72	43	59	55	33	23	14	20	22	19	23	27	29	36	37	30	33	29	26	24		
13	25	43	28	35	30	24	18	13	22	18	17	28	20	23	21	17	11	14	14	17	17	32	22	30	24		
14	38	32	54	34	20	31	29	24	30	28	28	28	29	29	27	29	30	26	26	23	25	27	27	30	24		
15	26	25	30	22	19	16	18	18	27	30	33	33	36	33	22	21	12	19	28	26	21	49	55	34	24		
16	45	31	24	30	33	63	28	16	20	19	20	38	41	41	40	28	46	27	23	45	52	37	42	36	24		
17	28	35	26	22	20	26	19	23	19	24	32	38	37	39	37	37	36	35	21	41	55	13	21	31	24		
18	48	38	26	22	28	63	58	30	21	27	43	51	43	37	37	44	30	24	31	29	28	27	25	23	24		
19	28	27	27	29	30	29	30	27	31	27	32	27	29	28	29	28	29	28	26	25	30	28	29	27	26	24	
20	27	28	28	28	23	28	29	39	36	34	30	26	30	32	28	26	28	28	29	30	28	29	36	28	24		
21	30	33	31	29	33	34	35	33	32	45	31	27	28	24	24	26	27	24	21	25	29	26	38	30	24		
22	27	25	26	34	29	37	33	39	56	42	46	42	38	34	60	42	41	24	24	28	26	26	23	26	24		
23	29	28	28	29	28	27	28	30	28	31	32	30	31	25	30	30	28	26	27	27	27	29	25	24	24		
24	27	29	29	26	26	24	24	29	39	30	30	43	26	45	29	34	34	30	28	32	34	36	35	29	24		
25	29	29	31	30	31	31	25	29	29	34	33	32	29	32	30	45	49	28	27	30	29	29	31	33	24		
26	21	15	14	15	21	18	16	19	17	55	16	15	21	35	19	20	23	22	28	25	27	23	22	21	24		
27	20	21	23	22	24	24	24	23	19	25	30	27	25	33	40	31	40	40	25	19	33	56	32	19	24		
28	33	34	31	43	39	30	33	35	36	31	40	37	35	35	34	33	41	40	36	35	39	33	31	38	24		
29	33	27	39	37	38	38	38	37	34	33	34	44	38	37	38	40	31	30	46	52	27	24	30	28	24		
30	63	70	77	72	82	39	24	25	24	26	30	27	27	28	26	25	23	28	27	29	25	29	22	23	24		

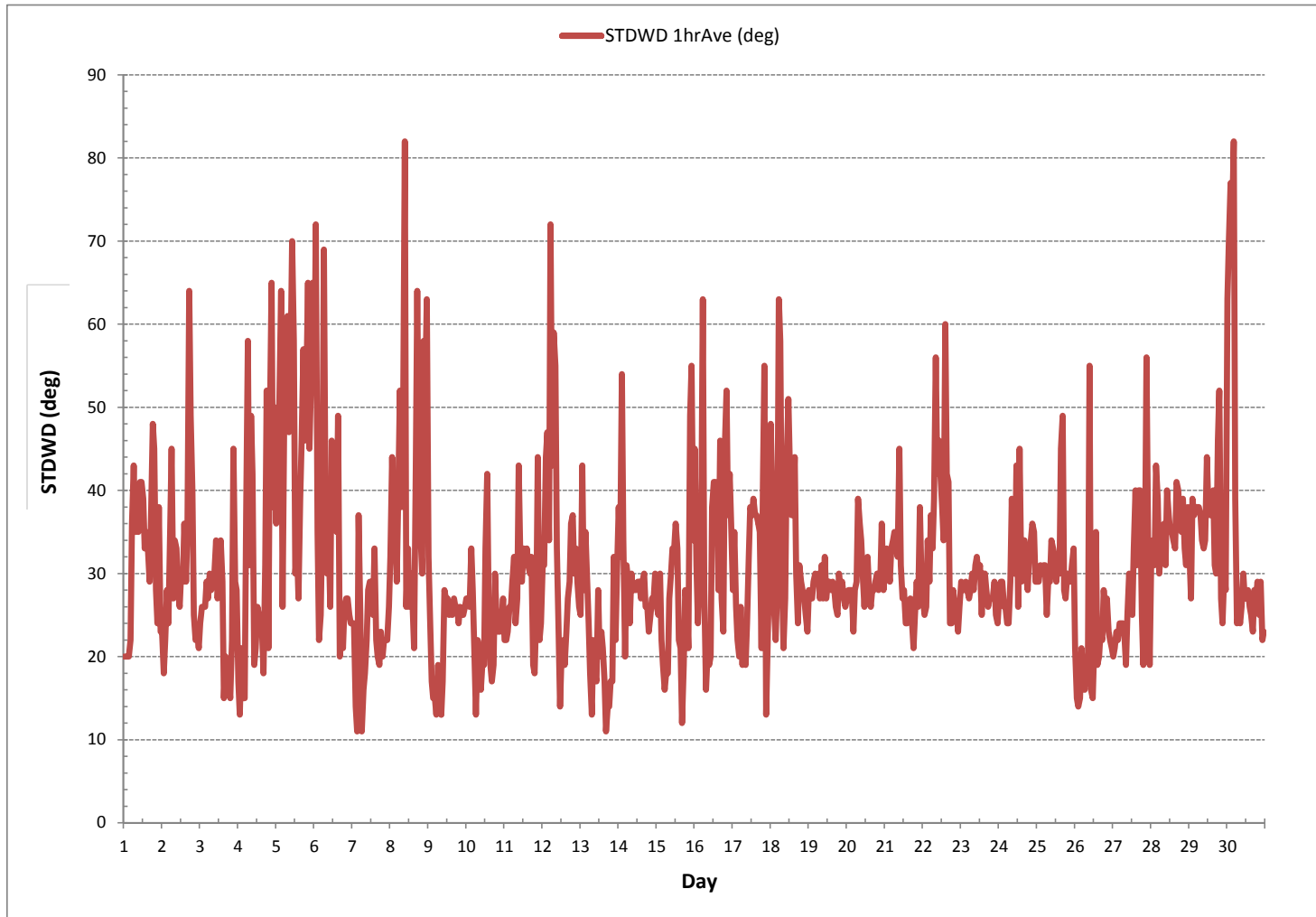
STATUS FLAG CODES

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: March 30, 2016

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 720 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



RELATIVE HUMIDITY



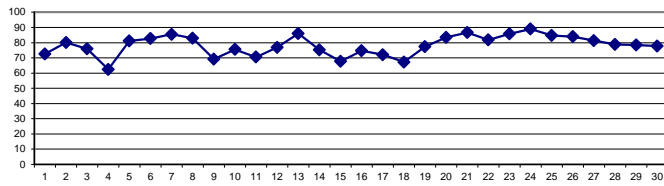
RELATIVE HUMIDITY Hourly Averages (RH %)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY 1	79	78	76	76	75	74	74	74	72	71	68	66	66	67	67	61	68	74	73	73	74	75	78	81	61	81	73	24
2	78	76	74	75	77	78	78	79	81	80	78	78	78	78	78	79	82	81	82	83	86	87	88	88	74	88	80	24
3	88	88	88	88	89	90	90	91	91	89	87	79	69	58	55	58	68	69	63	67	68	75	61	54	54	91	76	24
4	60	65	64	67	67	70	79	83	83	65	48	44	41	36	32	35	44	55	68	73	78	81	81	78	32	83	62	24
5	83	86	88	89	90	90	90	90	90	89	86	67	62	61	59	58	69	79	83	86	87	87	88	89	58	90	81	24
6	90	90	89	83	78	73	74	69	67	72	70	79	85	87	87	88	89	86	86	87	89	90	90	67	90	83	24	
7	91	91	91	91	91	91	91	91	91	90	84	80	73	73	70	75	86	87	86	89	85	85	85	85	70	91	86	24
8	84	88	89	90	90	91	90	90	90	90	81	69	66	61	59	62	77	84	88	90	90	91	91	59	91	83	24	
9	91	91	87	78	76	74	74	74	71	66	64	55	55	57	56	58	61	63	65	65	69	71	73	55	91	69	24	
10	75	78	79	83	87	88	87	88	89	81	73	69	61	53	53	61	73	83	82	74	74	75	73	74	53	89	76	24
11	73	67	68	67	69	70	74	73	72	70	67	67	65	59	62	64	67	72	73	75	78	83	78	80	59	83	71	24
12	76	72	73	76	78	80	81	80	67	72	75	77	71	69	69	72	75	77	80	86	87	85	84	83	67	87	77	24
13	84	85	83	86	88	86	88	90	91	88	88	90	85	76	75	78	84	89	88	88	88	88	89	90	75	91	86	24
14	91	92	91	91	92	91	90	91	90	84	80	77	63	49	50	56	56	60	64	67	69	71	72	69	49	92	75	24
15	65	66	68	71	74	76	76	76	73	66	58	54	51	49	51	58	66	70	69	76	78	78	80	49	80	68	24	
16	81	82	81	82	84	86	86	87	87	80	68	58	52	48	51	60	69	75	78	78	81	82	79	79	48	87	75	24
17	81	84	83	82	77	75	75	73	70	70	68	65	62	58	55	59	63	69	72	77	80	81	77	74	55	84	72	24
18	76	75	68	65	68	74	73	74	70	69	65	54	52	56	60	61	64	69	73	70	68	69	70	71	52	76	67	24
19	72	72	75	77	78	78	79	80	80	79	77	73	70	72	74	77	77	78	80	81	82	82	82	82	70	82	77	24
20	83	82	82	82	83	82	82	83	83	83	82	79	80	80	80	83	85	86	87	87	86	87	88	87	79	88	83	24
21	87	88	88	88	88	88	88	88	88	87	87	87	87	87	86	86	86	86	85	84	84	85	85	86	84	88	87	24
22	86	86	84	83	83	82	82	82	83	82	78	77	77	78	79	80	81	81	82	82	82	83	85	86	77	86	82	24
23	86	87	87	87	87	87	87	87	87	86	85	84	83	83	83	83	84	84	85	85	86	87	88	89	83	89	86	24
24	89	89	89	89	89	89	90	90	90	89	87	87	87	87	88	89	89	89	90	90	90	90	90	90	87	90	89	24
25	90	90	90	89	89	88	87	87	87	85	83	80	80	76	73	81	86	88	87	83	83	84	83	84	73	90	85	24
26	86	88	87	87	87	87	87	87	87	86	85	83	82	80	81	81	83	83	83	79	78	81	83	84	78	88	84	24
27	83	82	80	79	81	83	82	81	81	81	79	78	78	79	79	80	81	81	82	82	82	84	87	88	78	88	81	24
28	88	86	85	84	83	83	83	81	78	77	76	74	73	74	74	76	76	77	76	76	76	77	78	80	73	88	79	24
29	80	78	77	77	79	82	82	80	79	77	74	73	73	72	70	76	79	79	84	85	83	82	82	81	70	85	79	24
30	82	83	83	84	84	85	85	83	81	76	73	71	70	70	71	73	74	75	75	76	77	77	78	79	70	85	78	24
HOURLY MAX	91	92	91	91	92	91	91	91	91	90	88	90	87	87	88	89	89	89	90	90	90	90	91	91				
HOURLY AVG	82	82	82	82	82	82	83	83	82	79	76	72	70	68	68	70	75	78	79	80	80	82	81	82				

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

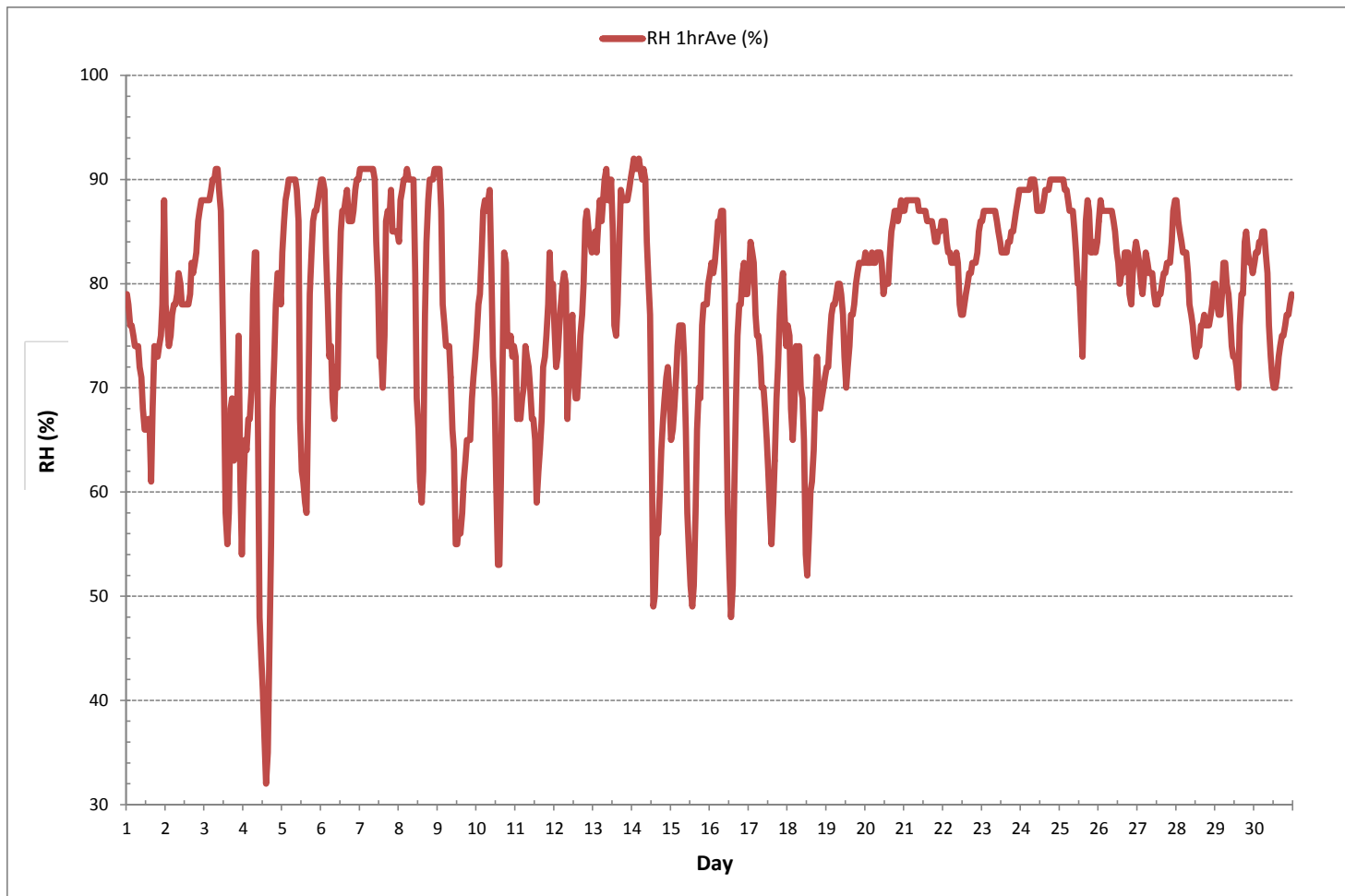
24 HR AVERAGES November 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	32	%	@ HOUR(S)	14	ON DAY(S)	4
MAXIMUM 1-HR AVERAGE:	92	%	@ HOUR(S)	1, 4	ON DAY(S)	14, 14
MAXIMUM 24-HR AVERAGE:	89	%			ON DAY(S)	24
					VAR-VARIOUS	
			OPERATIONAL TIME:			720 hrs
			AMD OPERATION UPTIME:			100.0 %
STANDARD DEVIATION:	10.1		MONTHLY AVERAGE:			78 %

RELATIVE HUMIDITY Hourly Averages (RH %)



BAROMETRIC PRESSURE



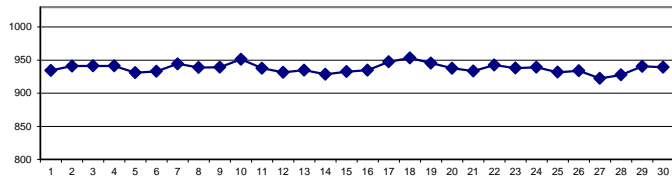
BAROMETRIC PRESSURE Hourly Averages (BP mbar)

HR START (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-HR AVG.	RDGS.	
HR END (MST)	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	929	929	930	930	931	931	931	932	933	933	934	934	935	935	935	936	936	937	937	938	939	940	940	940	929	940	934	24	
2	940	940	940	940	940	941	941	941	941	941	941	941	941	941	941	941	941	941	941	941	942	942	942	942	940	942	941	24	
3	942	942	941	941	940	940	939	939	939	940	940	941	941	942	942	942	942	942	942	942	942	942	942	943	939	943	941	24	
4	943	943	944	943	944	943	943	942	942	943	943	943	943	942	942	942	941	940	939	939	938	938	937	937	937	944	941	24	
5	936	935	935	934	934	933	933	932	932	932	932	931	931	931	930	930	929	928	928	928	928	927	927	928	927	936	931	24	
6	928	928	929	929	930	930	930	931	931	932	932	933	933	933	934	934	934	935	936	937	937	938	938	939	928	939	933	24	
7	940	940	941	941	942	942	943	943	944	945	946	946	946	947	947	947	947	946	946	946	946	945	945	944	940	947	944	24	
8	944	943	942	942	941	941	940	940	940	939	939	939	939	939	939	938	937	937	936	936	935	935	935	935	935	944	939	24	
9	935	935	935	935	936	935	935	935	936	936	937	937	938	939	940	941	941	942	943	944	945	946	947	947	935	947	939	24	
10	948	949	950	950	951	951	952	952	952	953	955	955	955	955	954	953	952	951	950	950	950	949	947	946	946	955	951	24	
11	945	944	943	941	940	939	937	936	936	936	936	936	936	936	936	936	937	937	937	937	937	937	936	936	937	936	945	938	24
12	937	937	936	936	935	934	934	933	933	932	932	931	930	929	929	928	928	928	928	929	929	929	930	930	931	928	937	932	24
13	931	932	933	934	934	935	936	936	937	937	937	937	937	938	937	936	936	935	935	934	933	932	931	930	930	938	935	24	
14	929	928	928	927	927	927	926	926	926	927	927	928	928	928	928	928	929	929	930	931	931	931	932	932	926	933	929	24	
15	933	933	934	934	934	934	934	933	934	934	934	934	934	934	934	933	932	931	931	931	930	930	930	930	930	930	934	933	24
16	930	930	930	930	931	931	932	932	933	934	935	935	936	936	937	937	937	937	937	938	938	939	940	940	930	940	935	24	
17	941	941	942	943	944	944	945	946	946	947	947	948	948	948	949	949	950	950	951	951	951	952	952	952	941	952	947	24	
18	953	953	954	954	954	954	954	954	955	955	955	955	955	954	954	953	953	952	952	952	952	951	951	951	951	955	953	24	
19	951	951	950	949	949	949	948	948	948	947	947	946	945	945	944	943	943	943	942	942	941	941	940	940	940	951	946	24	
20	940	939	939	939	939	939	939	939	939	939	939	938	938	938	937	937	937	937	936	936	935	935	935	935	935	940	938	24	
21	934	933	933	932	932	932	932	931	932	932	932	932	932	932	933	934	934	935	935	936	937	937	938	931	938	933	24		
22	938	939	940	940	941	941	942	942	943	944	944	944	944	944	944	944	945	944	944	944	943	943	943	942	938	945	943	24	
23	942	941	941	940	940	939	939	939	938	938	938	937	937	936	936	936	936	936	937	937	937	937	937	937	936	942	938	24	
24	938	938	938	938	939	939	939	940	940	940	941	941	941	940	940	941	941	940	940	939	939	939	938	937	937	941	939	24	
25	937	936	936	935	934	933	932	932	931	930	930	929	928	928	929	928	929	929	931	932	932	933	934	935	928	937	932	24	
26	935	936	936	937	937	937	937	937	937	936	936	936	936	935	934	933	933	932	931	931	931	930	929	928	927	937	934	24	
27	927	926	926	925	924	923	923	923	923	922	922	922	921	921	921	921	921	921	921	921	921	920	921	921	921	920	927	922	24
28	921	922	922	922	923	923	924	925	926	926	927	927	928	928	929	930	930	931	932	932	933	933	934	935	921	935	928	24	
29	935	936	937	937	938	939	939	940	941	941	942	942	942	943	943	943	943	943	943	943	943	942	942	942	942	935	943	941	24
30	942	942	941	941	941	940	940	940	939	939	939	939	939	938	938	938	938	938	938	938	938	938	938	938	938	938	942	939	24
HOURLY MAX	953	953	954	954	954	954	954	954	955	955	955	955	955	955	954	953	953	953	952	952	952	952	952	952	952	952	952	24	
HOURLY AVG	937	937	938	937	938	937	937	937	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938	938	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

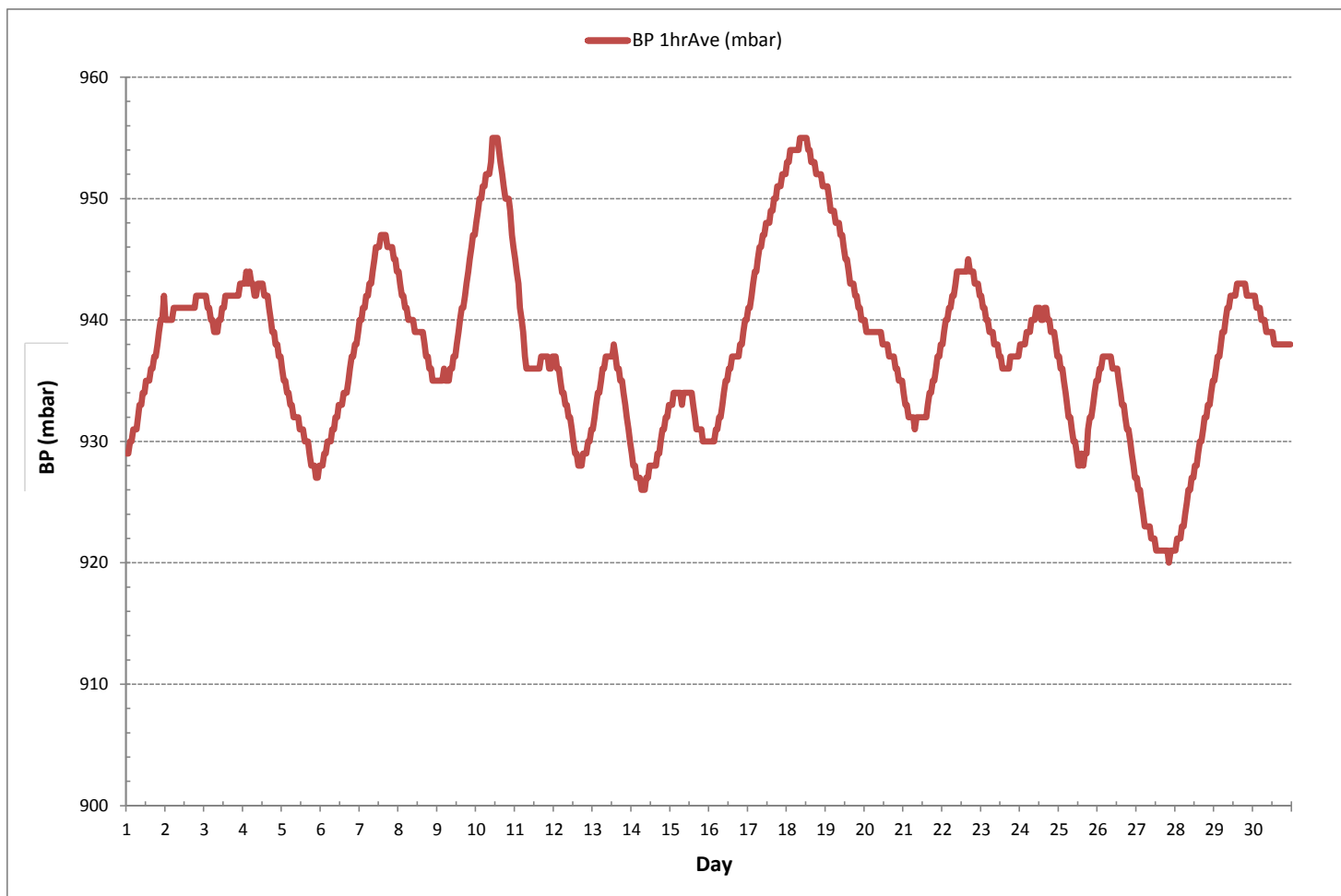
24 HR AVERAGES November 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	920 mbar	@ HOUR(S)	20	ON DAY(S)	27
MAXIMUM 1-HR AVERAGE:	955 mbar	@ HOUR(S)	VAR	ON DAY(S)	10 , 18
MAXIMUM 24-HR AVERAGE:	953 mbar			ON DAY(S)	18
				VAR-VARIOUS	
OPERATIONAL TIME:				720	hrs
AMD OPERATION UPTIME:				100.0	%
STANDARD DEVIATION:	7.2	MONTHLY AVERAGE:		938	mbar

BAROMETRIC PRESSURE Hourly Averages (BP mbar)



AMBIENT TEMPERATURE



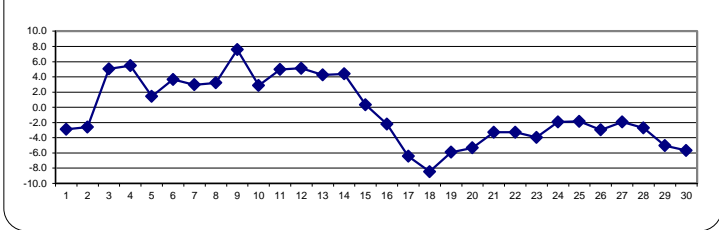
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY 1	-1.1	-1.6	-1.9	-2.0	-2.3	-2.4	-2.7	-3.1	-3.0	-2.6	-2.2	-1.5	-1.2	-1.1	-0.8	-0.5	-2.2	-2.8	-3.0	-3.8	-4.9	-6.4	-7.5	-8.6	-8.6	-0.5	-2.9	24	
2	-7.4	-7.4	-7.2	-7.0	-6.8	-6.1	-5.2	-4.7	-4.2	-3.0	-2.1	-1.7	-1.6	-1.0	-0.3	-0.5	-1.1	-0.6	-0.3	0.2	0.9	1.3	1.6	1.9	-7.4	1.9	-2.6	24	
3	1.9	1.8	1.7	1.6	1.4	1.2	1.1	1.1	1.5	2.1	2.6	5.2	8.2	11.3	12.3	10.9	7.9	7.2	8.1	6.5	6.3	4.6	6.7	8.3	1.1	12.3	5.1	24	
4	6.7	4.8	4.6	3.5	3.5	2.1	-0.4	-1.5	-0.9	5.1	9.4	11.1	12.9	15.1	16.4	14.1	10.8	7.6	3.6	2.0	0.9	-0.6	-0.4	0.8	-1.5	16.4	5.5	24	
5	0.2	-1.1	-1.7	-1.5	-1.3	-2.0	-2.3	-2.5	-2.2	0.2	2.2	6.5	7.2	7.8	8.5	8.8	5.9	3.0	1.4	0.5	-0.1	-0.9	-1.3	-1.1	-2.5	8.8	1.4	24	
6	-1.1	0.3	1.1	2.3	3.4	4.7	4.2	5.1	5.6	5.3	6.1	5.8	5.4	5.5	5.5	5.4	4.7	4.4	4.2	3.6	2.3	1.6	1.6	1.0	-1.1	6.1	3.7	24	
7	0.5	0.2	0.3	-0.3	-1.4	-2.4	-1.6	-0.6	-0.6	1.1	3.5	5.6	7.9	8.2	9.1	7.8	4.1	4.3	2.9	3.1	5.2	5.2	4.8	4.2	-2.4	9.1	3.0	24	
8	3.5	1.5	0.5	0.1	-0.5	-0.3	-0.7	-0.8	-0.5	0.9	3.9	6.9	8.5	11.0	12.8	12.0	7.4	4.5	2.9	2.1	1.3	0.7	0.1	-0.5	-0.8	12.8	3.2	24	
9	-0.7	1.4	5.1	6.7	6.9	7.4	7.3	7.2	7.8	8.8	9.7	12.1	13.0	12.7	12.6	11.1	10.1	9.0	7.6	6.7	6.2	5.0	4.5	4.0	-0.7	13.0	7.6	24	
10	3.2	2.2	1.8	0.5	-0.4	-0.9	-0.9	-2.1	-1.7	1.5	3.9	5.0	7.7	9.9	9.6	6.9	3.2	0.2	1.6	3.7	3.7	3.4	3.6	3.2	-2.1	9.9	2.9	24	
11	3.2	4.1	4.1	4.6	4.5	4.3	3.0	3.4	3.8	4.7	6.0	6.2	7.4	9.4	8.8	7.9	6.9	5.3	4.7	3.5	2.1	3.2	3.0	2.1	9.4	5.0	24		
12	4.1	5.6	5.1	4.5	4.2	4.0	3.7	3.7	6.4	5.5	5.9	6.1	6.9	7.3	6.7	6.1	5.4	5.0	4.8	4.4	4.4	4.7	4.4	4.0	3.7	7.3	5.1	24	
13	3.5	2.9	3.9	2.9	2.5	3.2	2.4	1.2	1.6	3.2	4.0	4.8	6.9	9.2	9.9	8.5	6.1	5.1	5.2	4.7	5.3	3.6	1.1	0.6	0.6	9.9	4.3	24	
14	1.3	2.9	3.3	2.6	3.7	3.6	3.1	2.5	3.2	5.5	6.5	7.1	8.6	8.8	8.5	6.5	5.6	4.7	4.2	3.7	3.3	2.7	1.9	1.7	1.3	8.8	4.4	24	
15	2.0	1.5	0.9	-0.2	-1.2	-1.8	-2.1	-2.1	-1.7	0.4	2.7	3.8	5.2	5.8	4.9	2.4	0.1	-1.1	-0.5	-1.9	-2.2	-2.2	-2.3	-2.4	-2.4	-2.4	5.8	0.3	24
16	-2.7	-2.9	-2.9	-3.2	-4.1	-4.4	-4.8	-5.7	-5.4	-1.9	0.8	2.5	3.8	4.7	3.7	0.9	-1.8	-3.7	-4.0	-4.0	-4.8	-4.7	-4.0	-4.3	-5.7	4.7	-2.2	24	
17	-5.3	-6.2	-5.0	-4.2	-4.1	-4.9	-5.3	-5.3	-5.5	-5.2	-5.0	-4.9	-4.7	-3.5	-3.9	-5.6	-6.9	-8.5	-9.7	-10.8	-11.8	-10.8	-9.1	-8.5	-11.8	-3.5	-6.4	24	
18	-9.0	-8.8	-9.3	-10.2	-11.3	-12.3	-11.7	-11.4	-10.8	-10.1	-8.9	-6.7	-5.5	-5.8	-6.5	-6.6	-6.8	-8.4	-8.9	-7.4	-6.9	-6.8	-6.6	-6.4	-12.3	-5.5	-8.5	24	
19	-6.2	-6.1	-6.0	-5.7	-5.7	-5.8	-5.8	-5.7	-5.7	-5.6	-5.3	-4.7	-4.4	-5.1	-5.6	-5.8	-6.1	-6.6	-6.7	-6.6	-6.5	-6.5	-6.7	-6.8	-6.8	-4.4	-5.9	24	
20	-6.8	-6.5	-6.3	-6.5	-6.5	-6.1	-6.0	-5.8	-5.8	-5.8	-5.3	-4.6	-4.5	-4.2	-4.0	-4.4	-4.8	-5.1	-5.0	-4.7	-4.7	-5.0	-4.9	-4.7	-6.8	-4.0	-5.3	24	
21	-4.7	-4.4	-4.1	-3.9	-3.6	-3.3	-3.2	-3.2	-3.0	-2.7	-2.6	-2.6	-2.6	-2.6	-2.9	-3.1	-3.2	-3.2	-3.2	-3.2	-3.4	-3.4	-3.4	-3.5	-4.7	-2.6	-3.3	24	
22	-3.7	-3.5	-3.4	-3.2	-3.2	-3.1	-3.2	-3.0	-2.9	-2.6	-2.5	-2.6	-2.6	-2.7	-2.8	-3.0	-3.1	-3.2	-3.2	-3.2	-3.4	-3.9	-4.1	-4.7	-5.0	-2.5	-3.3	24	
23	-4.9	-4.6	-4.4	-4.3	-4.6	-4.8	-4.9	-5.0	-5.0	-4.4	-3.9	-3.2	-3.2	-3.0	-3.2	-3.2	-3.2	-3.2	-3.4	-3.6	-3.6	-3.4	-3.2	-2.9	-5.0	-2.9	-4.0	24	
24	-2.6	-2.3	-2.1	-2.0	-1.9	-1.7	-1.7	-1.7	-1.6	-1.5	-1.4	-1.3	-1.4	-1.5	-1.9	-2.4	-2.7	-2.7	-2.4	-2.3	-2.0	-1.9	-1.8	-1.5	-2.7	-1.3	-1.9	24	
25	-1.7	-1.5	-1.6	-1.8	-2.0	-2.3	-2.7	-3.1	-3.3	-3.0	-2.3	-1.0	-0.9	0.3	1.2	-1.2	-2.7	-3.5	-1.9	-1.8	-1.8	-1.5	-1.5	-2.5	-3.5	1.2	-1.8	24	
26	-3.7	-4.8	-5.0	-5.4	-5.6	-5.8	-5.5	-6.1	-6.3	-5.8	-3.6	-3.1	-2.4	-1.4	-0.9	-1.2	-1.1	-0.6	-0.2	0.1	0.3	-0.4	-1.2	-1.8	-6.3	0.3	-3.0	24	
27	-1.9	-2.1	-1.8	-1.9	-2.0	-2.3	-2.3	-2.4	-2.7	-2.4	-1.6	-1.4	-1.3	-1.3	-1.4	-1.5	-1.7	-1.8	-2.0	-2.0	-2.2	-2.3	-2.3	-2.3	-2.7	-1.3	-1.9	24	
28	-2.1	-1.9	-1.9	-1.9	-1.9	-2.3	-3.3	-3.0	-3.0	-3.1	-2.8	-2.4	-2.1	-2.1	-2.3	-2.4	-2.5	-2.7	-3.1	-3.5	-3.5	-3.6	-3.8	-3.9	-3.9	-1.9	-2.7	24	
29	-4.0	-3.7	-3.5	-3.4	-3.5	-3.6	-3.5	-3.4	-3.5	-3.3	-2.6	-2.2	-2.1	-1.9	-1.5	-3.4	-4.0	-4.5	-7.7	-9.0	-10.5	-11.7	-12.1	-12.3	-12.3	-1.5	-5.0	24	
30	-10.6	-9.0	-8.3	-7.8	-7.5	-7.0	-6.1	-5.8	-5.5	-4.9	-4.3	-3.9	-3.7	-3.7	-3.8	-4.1	-4.5	-4.7	-4.8	-5.0	-5.1	-5.2	-5.4	-5.5	-10.6	-3.7	-5.7	24	
HOURLY MAX	6.7	5.6	5.1	6.7	6.9	7.4	7.3	7.2	7.8	8.8	9.7	12.1	13.0	15.1	16.4	14.1	10.8	9.0	8.1	6.7	6.3	5.2	6.7	8.3					
HOURLY AVG	-1.7	-1.6	-1.5	-1.6	-1.7	-1.8	-2.0	-2.1	-1.8	-0.8	0.3	1.3	2.2	2.9	3.0	2.0	0.7	-0.2	-0.6	-0.9	-1.1	-1.5	-1.6	-1.7					

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

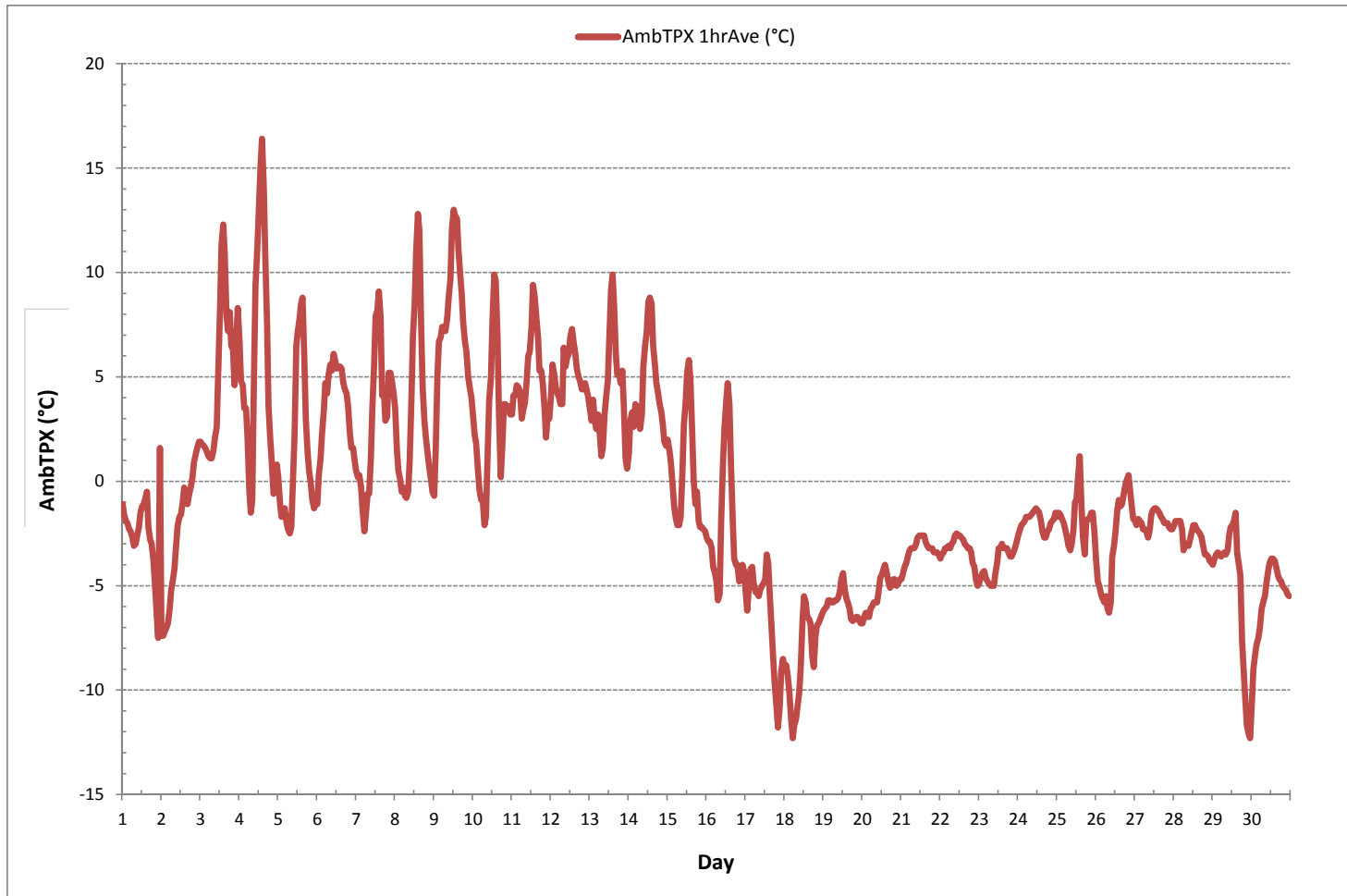
24 HR AVERAGES November 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-12.3 °C	@ HOUR(S)	5 , 23	ON DAY(S)	18 , 29
MAXIMUM 1-HR AVERAGE:	16.4 °C	@ HOUR(S)	14	ON DAY(S)	4
MAXIMUM 24-HR AVERAGE:	7.6 °C			ON DAY(S)	9
				VAR-VARIOUS	
OPERATIONAL TIME:				720	hrs
AMD OPERATION UPTIME:				100.0	%
STANDARD DEVIATION:	5.0	MONTHLY AVERAGE:		-0.5	°C

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



PRECIPITATION



PRECIPITATION Hourly Averages (mm)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	
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	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	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	0.6	0.5	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	0.6	0.1	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	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	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	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	0.0	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	0.0	0.0	0.0	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	0.0	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	0.0	0.0	0.0	0.4	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	C	0.0	0.0	0.0	0.0	0.0	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	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	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	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	0.1	0.0	0.0	1.1	0.1	0.1	0.0	1.1	0.1	0.1	24
20	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	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	0.0	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	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	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	0.1	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
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	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	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.6	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.4	0.1	1.1	0.1	0.1	0.0	0.0	0.0	0.0	24
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	0.0	0.0	0.0	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

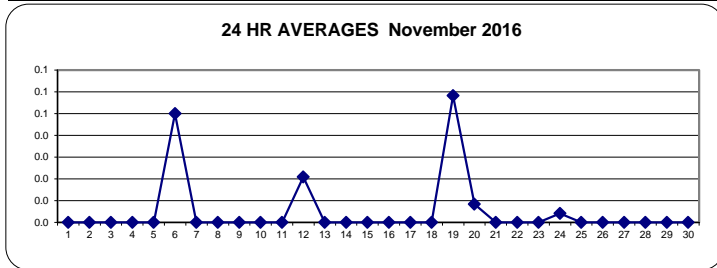
STATUS FLAG CODES

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

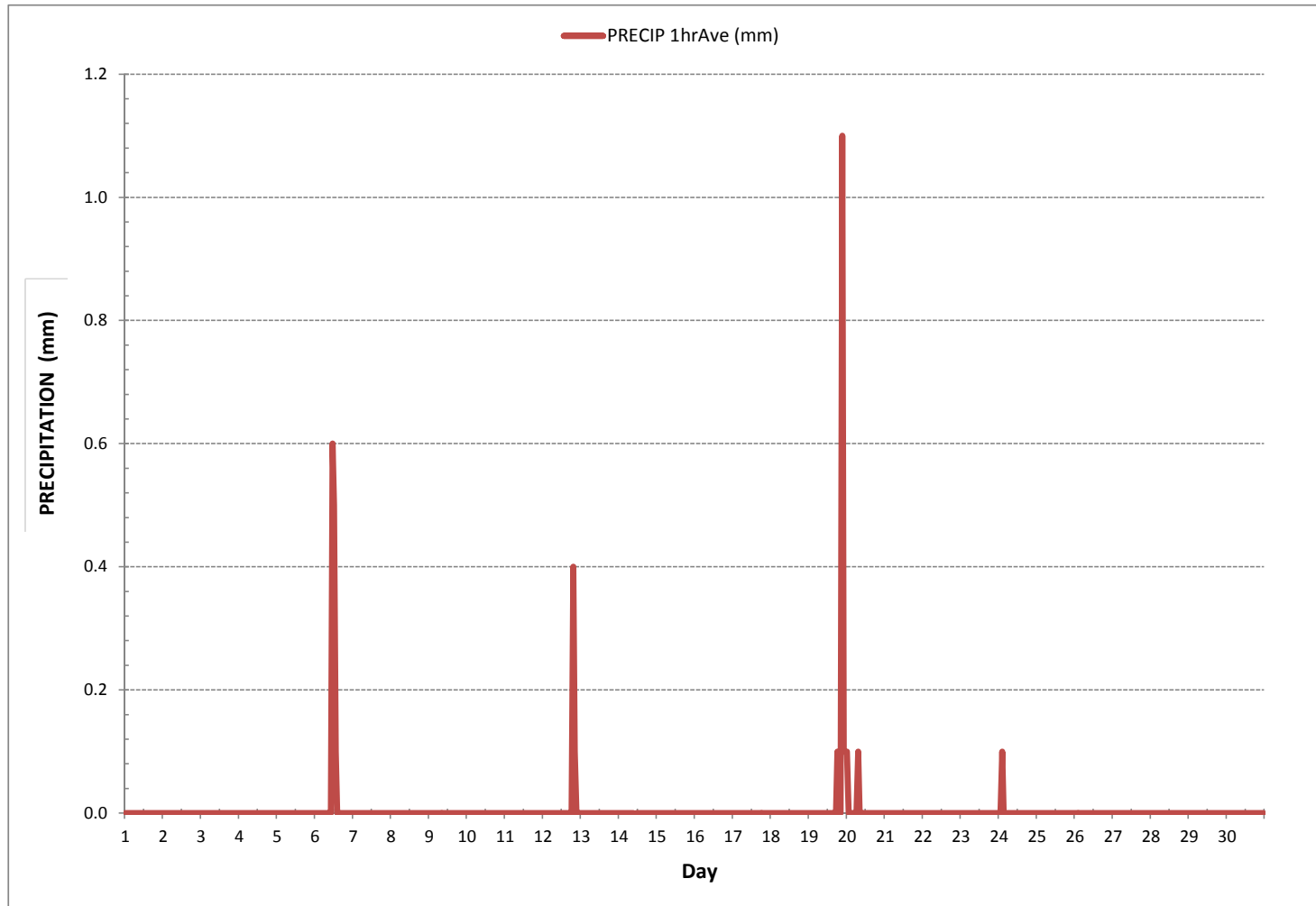
MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	0.0	mm	@ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	1.1	mm	@ HOUR(S)	21	ON DAY(S)	19
MAXIMUM 24-HR AVERAGE:	0.1	mm			ON DAY(S)	6, 19
MONTHLY TOTAL	3.4	mm			VAR-VARIOUS	
OPERATIONAL TIME:						720 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	0.1				MONTHLY AVERAGE:	0.0 mm

24 HR AVERAGES November 2016



PRECIPITATION Hourly Averages (mm)



APPENDIX II
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE



API 100E Sulphur Dioxide Analyzer Calibration

Date: November 1, 2016	Barometric Pressure: 27.54 inHg
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Maskwa	Weather Conditions: Cloudy & overcast
Parameter: Sulphur Dioxide	Calibration Purpose: shut down
Start Time 24 hr. (mst): 8:27	Performed By/Reviewer: Chris Wesson Trina Whitsitt
End Time 24 hr. (mst): 10:15	Cal Gas Expiry Date: December 2, 2023
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	Range ppb: 1000	Station SO2 Analyzer Range?
ID# or Serial Number: 508	As Found C.F.: 0.998	500 ppb
Last Calibration Date: October 19, 2016	New C.F.: n/a	
Previous C.F.: 1.000		

Calibrator:	Standard Calibration Points for Ranges	SO₂ Scrubber Check (10 mins.)								
Flow Meter ID's: n/a	<table border="1" style="width: 100%; border-collapse: collapse;"><tr><th>Point</th><th>ppb</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	ppb	High	780	Mid	380	Low	190	Start/End Time 24 hr.:
Point	ppb									
High	780									
Mid	380									
Low	190									
Make & Model: Sabio 2010		Target Concentration (ppb): 380								
Serial #: 17100415		Result (ppb): 3								
Cal Gas Cylinder I.D. #: LL119317		Zero Corrected Result (ppb): 0								
Cal Gas Conc. (ppm): 49.9		**warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**								

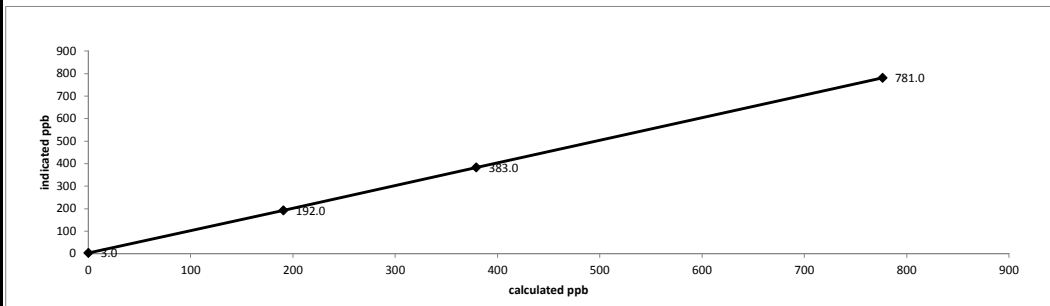
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	5001	0.00	5001	0.0	3.0	N/A
as found high	4923	77.80	5001	776.3	781.0	0.998
mid	4962	38.00	5000	379.2	383.0	0.998
low	4981	19.10	5000	190.6	192.0	1.009
Average C.F. =						1.001

Linear Regression/Calibration Results:

Correlation Coefficient = 1.000	LIMITS
Slope = 0.997	> or = 0.995
b (Intercept as % of full scale) = -0.22%	0.90-1.10
% change in C.F. from last cal = 0.22%	± 3% F.S.
	± 10%

API 100E Sulphur Dioxide Analyzer Calibration



As found:	As left:
SLOPE: 1.017	SLOPE: n/a
OFFSET: 110.5	OFFSET: n/a
HVPS: 467	HVPS: n/a
RCELL TEMP: 50.0	RCELL TEMP: n/a
BOX TEMP: 30.9	BOX TEMP: n/a
PMT TEMP: 7.7	PMT TEMP: n/a
IZS TEMP: 45.0	IZS TEMP: n/a
PRES: 24.3	PRES: n/a
SAMP FL: 616	SAMP FL: n/a
NORM PMT: 115.1	NORM PMT: n/a
UV LAMP: 2970	UV LAMP: n/a
LAMP RATIO: 81.5	LAMP RATIO: n/a
STR. LGT: 56.2	STR. LGT: n/a
DRK PMT: 10.1	DRK PMT: n/a
DRK LMP: -0.4	DRK LMP: n/a
Expected Value: 476.0	Expected Value: n/a

Comments:

Shut-down prior to hardware calibration / pump change



API 100E Sulphur Dioxide Analyzer Calibration

Date: November 1, 2016	Barometric Pressure: 27.52 inHg
Company/Airshed: LICA	Station Temperature °C: 23
Location/Station Name: Maskwa	Weather Conditions: Cloudy & overcast
Parameter: Sulphur Dioxide	Calibration Purpose: post repair
Start Time 24 hr. (mst): 13:25	Performed By/Reviewer: Chris Wesson Trina Whitsitt
Last Calibration Date: 16:23	Cal Gas Expiry Date: December 2, 2023
Calibration Method: Gas Dilution	<input type="checkbox"/> Skip Converter Model & s/n (if applicable): n/a

Analyzer: ID# or Serial Number: 508	Range ppb: 1000	Station SO2 Analyzer Range? 500 ppb
Last Calibration Date: n/a	As Found C.F.: n/a	
Previous C.F.: n/a	New C.F.: 1.000	

Calibrator: Flow Meter ID's: n/a Make & Model: Sabio 2010 Serial #: 17100415 Cal Gas Cylinder I.D. #: LL119317 Cal Gas Conc. (ppm): 49.9	Standard Calibration Points for Ranges <table border="1" style="margin: auto;"> <tr><th>Point</th><th>ppb</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	ppb	High	780	Mid	380	Low	190	SO2 Scrubber Check (10 mins.) Start/End Time 24 hr.: Target Concentration (ppb): 380 Result (ppb): 3 Zero Corrected Result (ppb): 3 **warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**
Point	ppb									
High	780									
Mid	380									
Low	190									

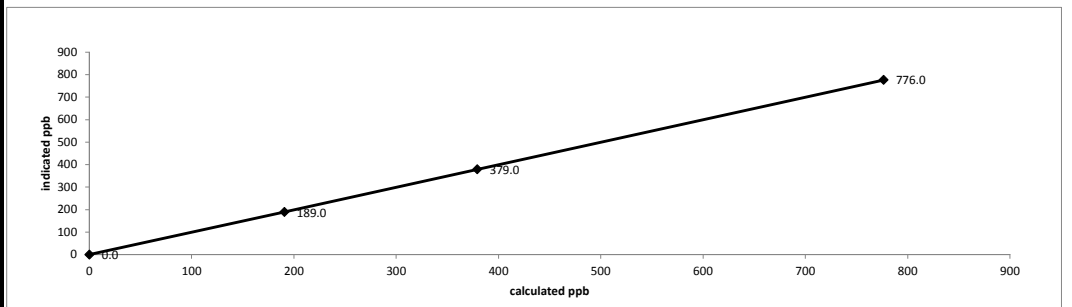
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
adjusted zero	5001	0.00	5001	0.0	0.0	N/A
adjusted high	4923	77.80	5001	776.3	776.0	1.000
mid	4962	38.00	5000	379.2	379.0	1.001
low	4981	19.10	5000	190.6	189.0	1.009
calibrator zero	5002	0.00	5002	0.0	0.0	n/a
Average C.F.=						1.003

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	
Slope =	1.000	> or = 0.995	
b (Intercept as % of full scale)=	0.06%	.95-1.05	
% change in C.F. from last cal=	n/a	± 3% F.S.	
		± 10%	

API 100E Sulphur Dioxide Analyzer Calibration

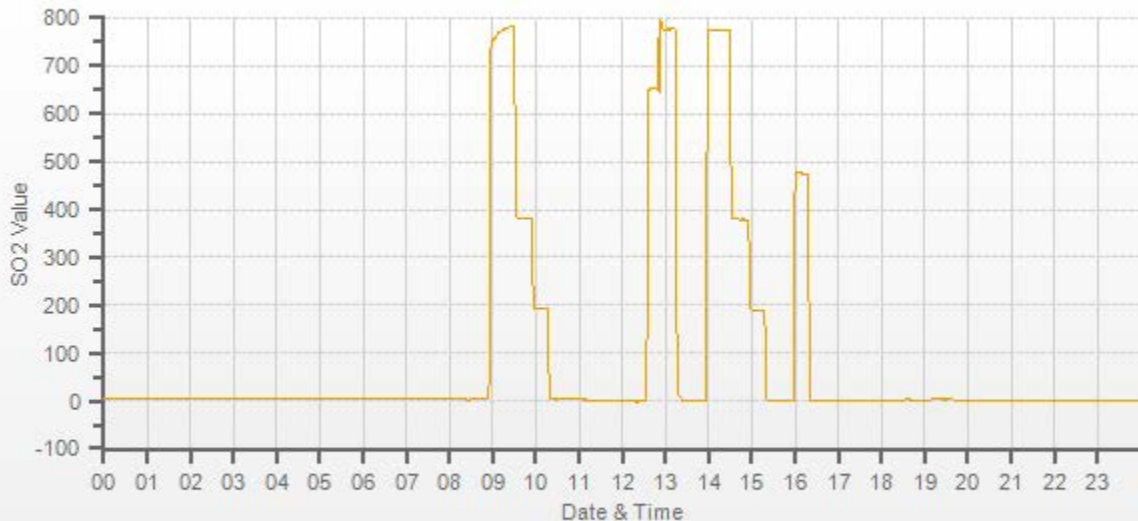


As found: SLOPE: 0.998 OFFSET: 117.1 HVPS: 479 RCELL TEMP: 50.0 BOX TEMP: 30.1 PMT TEMP: 7.7 IZS TEMP: 45.0 PRES: 24.4 SAMP FL: 617 NORM PMT: 115.8 UV LAMP: 2967 LAMP RATIO: 99.9 STR. LGT: 58.4 DRK PMT: 10.5 DRK LMP: -0.4 Expected Value: 476.0	As left: SLOPE: 0.999 OFFSET: 115.5 HVPS: 479 RCELL TEMP: 50.0 BOX TEMP: 31.5 PMT TEMP: 7.6 IZS TEMP: 45.0 PRES: 24.4 SAMP FL: 618 NORM PMT: 115.6 UV LAMP: 2976 LAMP RATIO: 100.2 STR. LGT: 57.7 DRK PMT: 10.7 DRK LMP: -0.4 Expected Value: 475.0
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Comments:

The analyzer sample inlet filter was changed.

Post-repair following hardware calibration and pump change.



— SO2[ppb]

HYDROGEN SULPHIDE



API 101E Hydrogen Sulphide Analyzer Calibration

Date: November 1, 2016	Barometric Pressure: 27.54 inHg
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Maskwa	Weather Conditions: Cloudy & overcast
Parameter: Hydrogen Sulphide	Calibration Purpose: shut down
Start Time 24 hr. (mst): 8:27	Performed By/Reviewer: Chris Wesson Trina Whitsitt
End Time 24 hr. (mst): 10:39	Cal Gas Expiry Date: December 1, 2018
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): Internal

Analyzer:	Station SO2 Analyzer Range?
ID# or Serial Number: 722	Range ppb: 100
Last Calibration Date: October 19, 2016	As Found C.F.: 1.002 1000 ppb
Previous C.F.: 1.000	New C.F.: n/a

Calibrator:	Standard Calibration Points for Ranges	SO₂ Scrubber Check (10 mins.)								
Flow Meter ID's: n/a	<table border="1" style="width: 100%; border-collapse: collapse;"><tr><th>Point</th><th>ppb</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	ppb	High	78	Mid	38	Low	19	Start/End Time 24 hr.: 08:53/09:04
Point	ppb									
High	78									
Mid	38									
Low	19									
Make & Model: API 700		Target Concentration (ppb): 780								
Serial #: 829		Result (ppb): 1.4								
Cal Gas Cylinder I.D. #: BLM001927		Zero Corrected Result (ppb): 1								
Cal Gas Conc. (ppm): 10.3		**warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**								

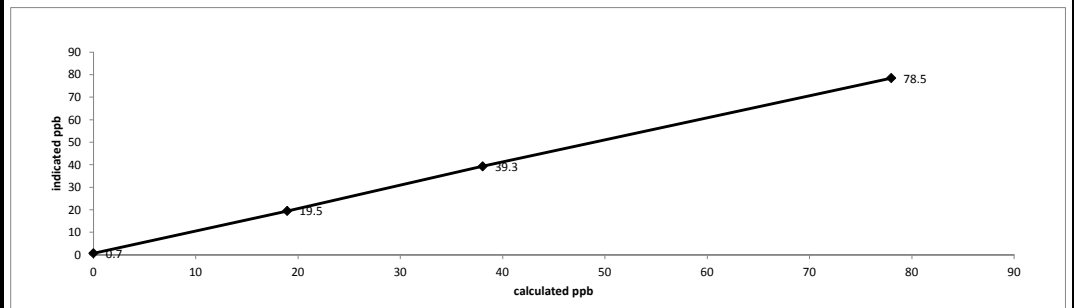
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	7501	0.00	7501	0.0	0.7	N/A
as found high	7445	56.80	7502	78.0	78.5	1.002
mid	7471	27.70	7499	38.0	39.3	0.986
low	7487	13.80	7501	18.9	19.5	1.008
Average C.F. =						0.999

Linear Regression/Calibration Results:

Correlation Coefficient = 1.000	LIMITS
Slope = 1.001	> or = 0.995
b (Intercept as % of full scale) = -0.79%	0.90-1.10
% change in C.F. from last cal = -0.24%	± 3% F.S.
	± 10%

API 101E Hydrogen Sulphide Analyzer Calibration



As found:	As left:
SLOPE: 0.852	SLOPE: n/a
OFFSET: 91.7	OFFSET: n/a
HVPS: 590	HVPS: n/a
RCELL TEMP: 50.0	RCELL TEMP: n/a
BOX TEMP: 30.9	BOX TEMP: n/a
PMT TEMP: 8.2	PMT TEMP: n/a
IZS TEMP: 48.0	IZS TEMP: n/a
Converter Temp: 314.9	Converter Temp: n/a
PRES: 23.0	PRES: n/a
SAMP FL: 613	SAMP FL: n/a
UV LAMP: 3318	UV LAMP: n/a
LAMP RATIO: 104.4	LAMP RATIO: n/a
STR. LGT: 39.0	STR. LGT: n/a
DRK PMT: 26.1	DRK PMT: n/a
DRK LMP: 3.4	DRK LMP: n/a
Expected Value: 61.4	Expected Value: n/a

Comments:

Shut-down prior to hardware calibration



API 101E Hydrogen Sulphide Analyzer Calibration

Date: November 1, 2016	Barometric Pressure: 27.52 inHg
Company/Airshed: LICA	Station Temperature °C: 23
Location/Station Name: Maskwa	Weather Conditions: Cloudy & overcast
Parameter: Hydrogen Sulphide	Calibration Purpose: post repair
Start Time 24 hr. (mst): 13:25	Performed By/Reviewer: Chris Wesson Trina Whitsitt
End Time 24 hr. (mst): 16:32	Cal Gas Expiry Date: December 1, 2018
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): Internal

Analyzer: ID# or Serial Number: 722	Range ppb: 100	Station SO2 Analyzer Range?
Last Calibration Date: n/a	As Found C.F.: n/a	1000 ppb
Previous C.F.: n/a	New C.F.: 1.000	

Calibrator: Flow Meter ID's: n/a Make & Model: API 700 Serial #: 829 Cal Gas Cylinder I.D. #: BLM001927 Cal Gas Conc. (ppm): 10.3	Standard Calibration Points for Ranges <table border="1" style="margin: auto;"> <tr><th>Point</th><th>ppb</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	ppb	High	78	Mid	38	Low	19	SO2 Scrubber Check (10 mins.) Start/End Time 24 hr.: 08:53/09:04 Target Concentration (ppb): 780 Result (ppb): 1.4 Zero Corrected Result (ppb): 1 **warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**
Point	ppb									
High	78									
Mid	38									
Low	19									

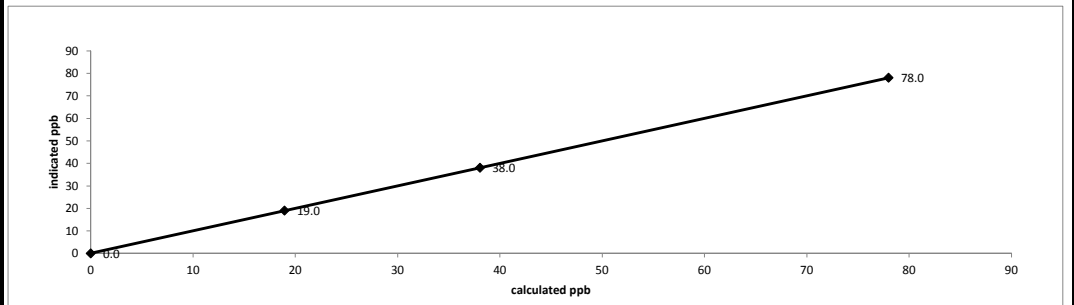
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
	Diluent	Cal Gas	Total	(ppb)	(ppb)	
adjusted zero	7501	0.00	7501	0.0	0.0	N/A
adjusted high	7444	56.80	7501	78.0	78.0	1.000
mid	7471	27.70	7499	38.0	38.0	1.001
low	7487	13.80	7501	18.9	19.0	0.997
calibrator zero	7501	0.00	7501	0.0	1.0	n/a
Average C.F. =						1.000

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000		LIMITS
Slope =	1.000		> 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%

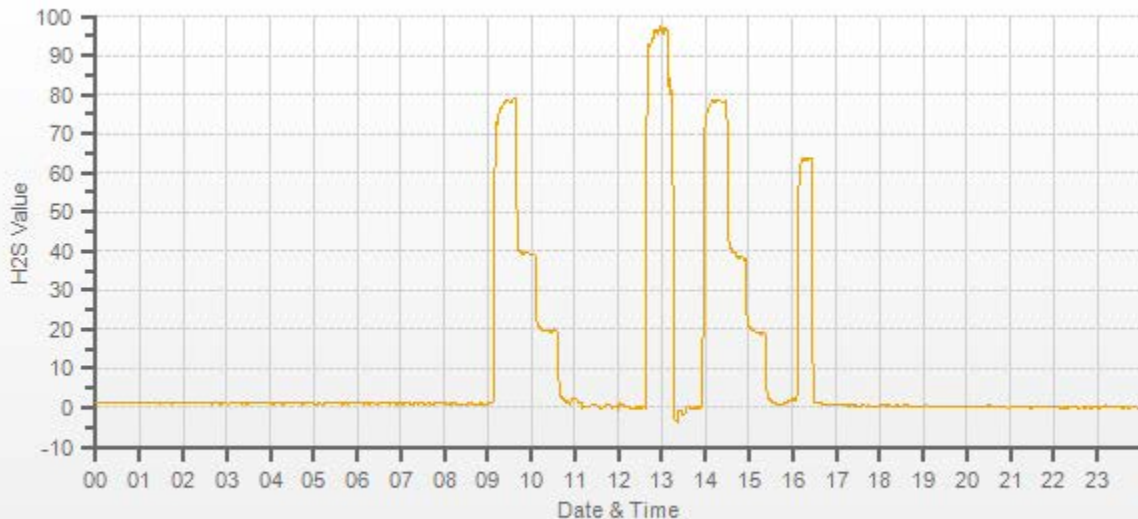
API 101E Hydrogen Sulphide Analyzer Calibration



As found: SLOPE: 0.967 OFFSET: 86.5 HVPS: 583 RCELL TEMP: 50.0 BOX TEMP: 30.5 PMT TEMP: 8.2 IZS TEMP: 48.0 Converter Temp: 314.7 PRES: 23.1 SAMP FL: 612 UV LAMP: 3317 LAMP RATIO: 100.2 STR. LGT: 41.8 DRK PMT: 25.5 DRK LMP: 3.5 Expected Value: 61.4	As left: SLOPE: 0.938 OFFSET: 83.0 HVPS: 583 RCELL TEMP: 50.0 BOX TEMP: 30.8 PMT TEMP: 8.2 IZS TEMP: 48.0 Converter Temp: 315.1 PRES: 23.1 SAMP FL: 612 UV LAMP: 3315 LAMP RATIO: 100.1 STR. LGT: 38.9 DRK PMT: 24.7 DRK LMP: 3.5 Expected Value: 63.7
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Comments:
The analyzer sample inlet filter was changed.

Post-repair following hardware calibration.



— H2S[ppb]



API 101E Hydrogen Sulphide Analyzer Calibration

Date: <u>November 28, 2016</u>	Barometric Pressure: <u>0.921 atm</u>
Company/Airshed: <u>LICA</u>	Station Temperature °C: <u>22</u>
Location/Station Name: <u>Maskwa</u>	Weather Conditions: <u>A few clouds</u>
Parameter: <u>Hydrogen Sulphide</u>	Calibration Purpose: <u>as found</u>
Start Time 24 hr. (mst): <u>15:35</u>	Performed By/Reviewer: <u>Alex Yakupov</u> not yet reviewed
End Time 24 hr. (mst): <u>16:20</u>	Cal Gas Expiry Date: <u>n/a</u>
Calibration Method: <u>Gas Dilution</u>	Converter Model & s/n (if applicable): <u>n/a</u>

Analyzer:	Range ppb: <u>100</u>
ID# or Serial Number: <u>722</u>	As Found C.F.: <u>#VALUE!</u>
Last Calibration Date: <u>November 1, 2016</u>	New C.F.: <u>n/a</u>
Previous C.F.: <u>1.000</u>	

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

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	1.3	n/a
as found high		n/a				#VALUE!
Average C.F.=						n/a

Linear Regression/Calibration Results:

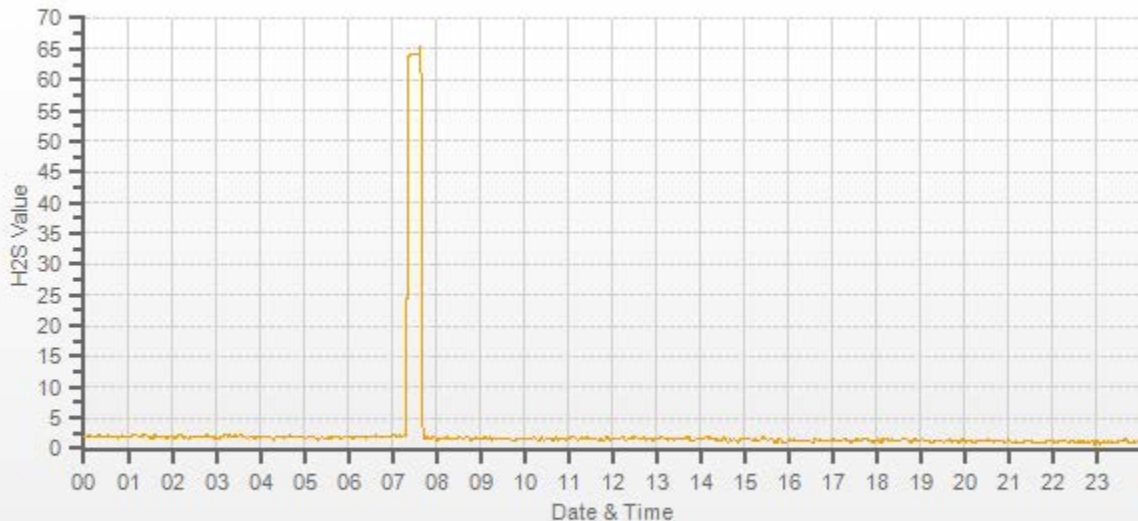
Correlation Coefficient = <u>n/a</u>	LIMITS > or = 0.995
Slope = <u>n/a</u>	.95-1.05
b (Intercept as % of full scale) = <u>n/a</u>	± 3% F.S.
% change in C.F. from last cal = <u>#VALUE!</u>	± 10%

<table style="width: 100%; border-collapse: collapse;"> <tr><td>SLOPE:</td><td><u>0.938</u></td></tr> <tr><td>OFFSET:</td><td><u>83.0</u></td></tr> <tr><td>HVPS:</td><td><u>583</u></td></tr> <tr><td>RCELL TEMP:</td><td><u>50.0</u></td></tr> <tr><td>BOX TEMP:</td><td><u>31.2</u></td></tr> <tr><td>PMT TEMP:</td><td><u>8.2</u></td></tr> <tr><td>IZS TEMP:</td><td><u>48.0</u></td></tr> <tr><td>Converter Temp:</td><td><u>314.8</u></td></tr> <tr><td>PRES:</td><td><u>22.9</u></td></tr> <tr><td>SAMP FL:</td><td><u>608</u></td></tr> <tr><td>UV LAMP:</td><td><u>3312.1</u></td></tr> <tr><td>LAMP RATIO:</td><td><u>100.1</u></td></tr> <tr><td>STR. LGT</td><td><u>38.9</u></td></tr> <tr><td>DRK PMT:</td><td><u>24.0</u></td></tr> <tr><td>DRK LMP:</td><td><u>3.5</u></td></tr> <tr><td>Expected Value:</td><td><u>63.7</u></td></tr> </table>	SLOPE:	<u>0.938</u>	OFFSET:	<u>83.0</u>	HVPS:	<u>583</u>	RCELL TEMP:	<u>50.0</u>	BOX TEMP:	<u>31.2</u>	PMT TEMP:	<u>8.2</u>	IZS TEMP:	<u>48.0</u>	Converter Temp:	<u>314.8</u>	PRES:	<u>22.9</u>	SAMP FL:	<u>608</u>	UV LAMP:	<u>3312.1</u>	LAMP RATIO:	<u>100.1</u>	STR. LGT	<u>38.9</u>	DRK PMT:	<u>24.0</u>	DRK LMP:	<u>3.5</u>	Expected Value:	<u>63.7</u>	<table style="width: 100%; border-collapse: collapse;"> <tr><td>SLOPE:</td><td><u>0.938</u></td></tr> <tr><td>OFFSET:</td><td><u>83.0</u></td></tr> <tr><td>HVPS:</td><td><u>583</u></td></tr> <tr><td>RCELL TEMP:</td><td><u>50.0</u></td></tr> <tr><td>BOX TEMP:</td><td><u>31.3</u></td></tr> <tr><td>PMT TEMP:</td><td><u>8.2</u></td></tr> <tr><td>IZS TEMP:</td><td><u>48.0</u></td></tr> <tr><td>Converter Temp:</td><td><u>315.2</u></td></tr> <tr><td>PRES:</td><td><u>22.9</u></td></tr> <tr><td>SAMP FL:</td><td><u>608</u></td></tr> <tr><td>UV LAMP:</td><td><u>3323.4</u></td></tr> <tr><td>LAMP RATIO:</td><td><u>100.5</u></td></tr> <tr><td>STR. LGT</td><td><u>38.9</u></td></tr> <tr><td>DRK PMT:</td><td><u>23.9</u></td></tr> <tr><td>DRK LMP:</td><td><u>3.4</u></td></tr> <tr><td>Expected Value:</td><td><u>63.7</u></td></tr> </table>	SLOPE:	<u>0.938</u>	OFFSET:	<u>83.0</u>	HVPS:	<u>583</u>	RCELL TEMP:	<u>50.0</u>	BOX TEMP:	<u>31.3</u>	PMT TEMP:	<u>8.2</u>	IZS TEMP:	<u>48.0</u>	Converter Temp:	<u>315.2</u>	PRES:	<u>22.9</u>	SAMP FL:	<u>608</u>	UV LAMP:	<u>3323.4</u>	LAMP RATIO:	<u>100.5</u>	STR. LGT	<u>38.9</u>	DRK PMT:	<u>23.9</u>	DRK LMP:	<u>3.4</u>	Expected Value:	<u>63.7</u>
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Expected Value:	<u>63.7</u>																																																																

Comments:

No zero adjustment was required/made. As found zero value copied to adjusted zero value for linearity calculation purposes.

As Found ZERO check was required to verify ZERO settings of the analyzer after higher response (2.3 ppb) during daily ZS check



— H2S[ppb]

TOTAL HYDROCARBON



Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	November 1, 2016	Barometric Pressure:	27.51 inHg
Company/Airshed:	UCA	Station Temperature °C:	23
Location/Station Name:	Maskwa	Weather Conditions:	Mainly clear
Parameter:	Total Hydrocarbon	Calibration Purpose:	routine monthly
Start/End Time 24 hr. (mst):	15:55 / 19:11	Performed By/Reviewer:	Chris Wesson / Trina Whitsitt
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 25, 2023

Analyzer:	ID# or Serial Number:	436609738	Range ppm:	50
	Last Calibration Date:	October 12, 2016	As Found C.F.:	0.998
	Previous Cal High Point C.F.:	1.000	New C.F.:	1.000

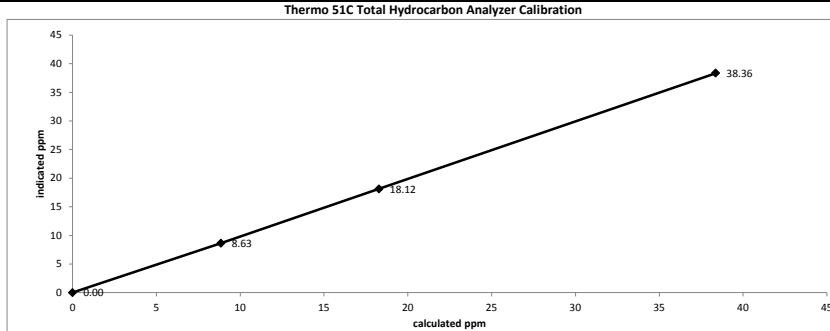
Calibrator:	Flow Meter ID's:	n/a	Standard Calibration Points for a Range of: 50 ppm
	Make & Model:	API 700	
	Serial #:	829	
	Cal Gas Cylinder I.D. #:	LL86139	
	CH ₄ /C ₃ H ₈ Cylinder Conc. (ppm):	599.0 211.0	
	CH ₄ as propane/total CH ₄ equivalents (ppm):	580.3 1179.3	

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)	
as found zero	2001	0.00	2001	0.0	-0.03	n/a
as found high	1933	65.00	1998	38.36	38.40	0.998
adjusted zero	2001	0.00	2001	0.00	0.00	n/a
adjusted high	1933	65.00	1998	38.36	38.36	1.000
mid	1969	31.00	2000	18.28	18.12	1.009
low	1984	15.00	1999	8.85	8.63	1.025
calibrator zero	2001	0.00	2001	0.0	0.01	n/a
Average C.F. =						1.011

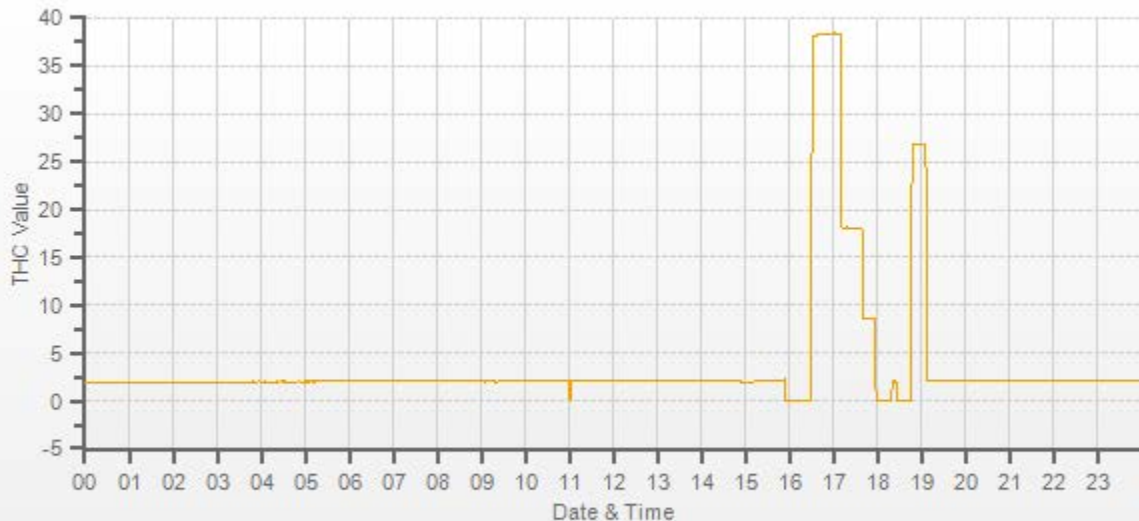
Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS
Slope =	0.998	> or = 0.995
b (Intercept as % of full scale) =	0.24%	.95-1.05
% change in C.F. from last cal =	0.17%	± 3% F.S.
		± 10%



<p>As found:</p> <p>H2 cylinder (psi): 250</p> <p>H2 cylinder reg set (psi): 22</p> <p>Span Cylinder (psi): 2000</p> <p>Span Cylinder Reg Set (psi): 25</p> <p>Zero Air Gen Pressure: 38</p> <p>measurement alarms: None</p> <p>service alarms: None</p> <p>cnt: 1067</p> <p>rng: 1</p> <p>try: 5</p> <p>flm: 186.1</p> <p>det: 125.9</p> <p>Flame: 186</p> <p>Filter: 125</p> <p>Base: 125</p> <p>Sample psi: 7.50</p> <p>Internal Air Pressure: 20</p> <p>Internal Fuel Pressure: 12</p> <p>Measured Flow: 883 cc/min</p> <p>Expected Value: 27.07</p>	<p>As left:</p> <p>H2 cylinder (psi): 2000</p> <p>H2 cylinder reg set (psi): 22</p> <p>Span Cylinder (psi): 2000</p> <p>Span Cylinder Reg Set (psi): 25</p> <p>Zero Air Gen Pressure: 38</p> <p>measurement alarms: None</p> <p>service alarms: None</p> <p>cnt: 1080</p> <p>rng: 1</p> <p>try: 5</p> <p>flm: 186.6</p> <p>det: 125.1</p> <p>Flame: 186</p> <p>Filter: 125</p> <p>Base: 125</p> <p>Sample psi: 7.50</p> <p>Internal Air Pressure: 20</p> <p>Internal Fuel Pressure: 12</p> <p>Measured Flow: 889 cc/min</p> <p>Expected Value: 26.79</p>
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Comments:
 The analyzer sample inlet filter was changed.
 A new hydrogen cylinder was installed.
 The analyzer cooling fan filter(s) were cleaned.



— THC[ppm]

NITROGEN DIOXIDE



API 200A NO-NO2-NOx Analyzer Calibration

Date: November 1, 2016 Company/Airshed: LICA Location/Station Name: Maskwa Start/End Time 24 hr. (mst): 08:27 / 12:09 G.P.T. to be used for Ozone? No Calibration Method: Gas Dilution & Gas Phase Titration	Barometric Pressure: 27.54 inHg Station Temperature °C: 22 Weather Conditions: Mainly cloudy with clear breaks Calibration Purpose: shut down Performed By/Reviewer: Chris Wesson Trina Whatsitt Cal Gas Expiry Date: December 2, 2023
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Analyzer: ID# or Serial Number: 1899 Last Calibration Date: October 19, 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>0.993</td> <td>n/a</td> </tr> <tr> <td>NO₂ =</td> <td>1.000</td> <td>1.000</td> <td>n/a</td> </tr> <tr> <td>NOx =</td> <td>1.000</td> <td>0.993</td> <td>n/a</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	0.993	n/a	NO ₂ =	1.000	1.000	n/a	NOx =	1.000	0.993	n/a
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	0.993	n/a														
NO ₂ =	1.000	1.000	n/a														
NOx =	1.000	0.993	n/a														

Calibrator: Flow Meter ID's: n/a Make & Model: Sabio 2010 Serial #: 17100415 Cal Gas Cylinder I.D. #: LL119317 NO/NOx Gas Conc. (ppm): 50.3 50.3	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

Point	Diluent	Cal Gas	Total Flow	Calculated NO (ppb)	Calculated NOx (ppb)	Indicated NO (ppb)	Indicated NOx (ppb)	NO C.F.	NOx C.F.
as found zero	5001	0.0	5001	0	0	0.0	0.0	n/a	n/a
as found high	4923	77.8	5001	782.5	782.5	788.0	788.0	0.993	0.993
mid	4962	38.00	5000	382.3	382.3	378.0	378.0	1.011	1.011
low	4981	19.10	5000	192.1	192.1	186.0	187.0	1.033	1.027
Average C.F.=								1.012	1.011

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

Point	Diluent	Cal Gas	Total Flow	Calibrator Setting (volts or ppb)	Indicated NO (ppb)	Indicated NOx (ppb)	Indicated NO ₂ (ppb)	NO drop (ppb)	NO ₂ gain (ppb)	NO ₂ C.F. (ppb)
NOx reference	4923	77.80	5001	0.0	786.0	787.0	1.0	0.0	1.0	n/a
as found high NO ₂	4923	77.80	5001	500.0	283.0	787.0	504.0	503.0	503.0	1.000
gpt mid	4923	77.80	5001	275.0	514.0	786.0	273.0	272.0	272.0	1.000
gpt low	4923	77.80	5001	95.0	696.0	785.0	89.0	90.0	88.0	1.023
Average NO₂ C.F.=										1.008

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.991	0.991	1.000	0.90-1.10
b (Intercept as % of full scale)=	-0.44%	-0.40%	-0.03%	± 3% F.S.
% change in C.F. from last cal=	0.69%	0.00%	0.69%	± 10%
NO ₂ converter efficiency			1.00	0.96 to 1.04

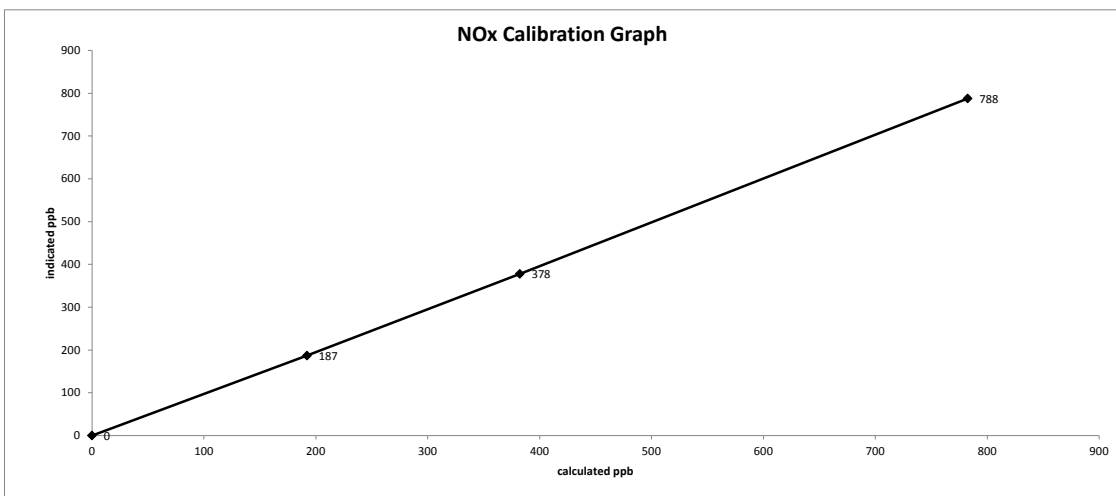
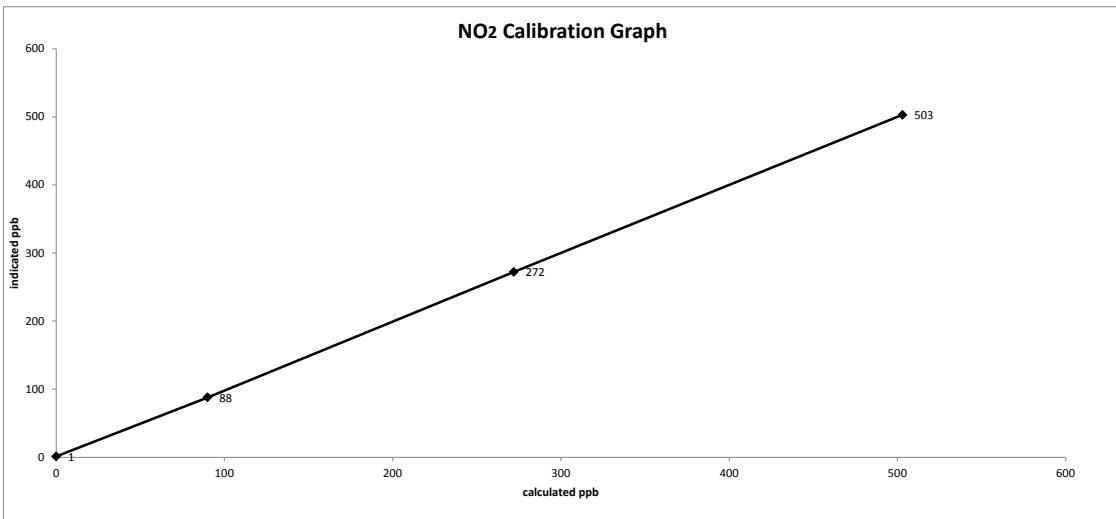
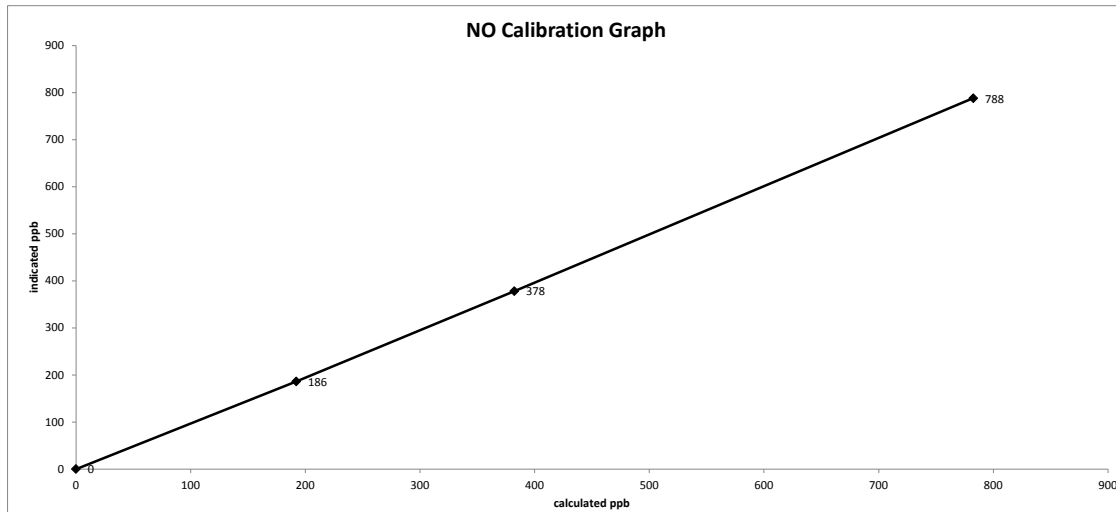
As found: NOx SLOPE: 1.278 NOx OFFS: 0.2 NO SLOPE: 1.293 NO OFFS: 0.6 SAMP FLW: 543 OZONE FL: 77 NORM PMT: 1.0 AZERO: 22.0 HVPS: 662 DCPS: 2580 RCELL: 50.4 BOX TEMP: 28.5 IZS TEMP: 45.1 MOLY TEMP: 316.6 RCEL: 5.6 SAMP: 25.5 0 PMT Temp =7.0 Expected Value NO: 4.00 Expected Value NO ₂ : 370.00 Expected Value NOx: 374.00	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 0 n/a Expected Value NO: n/a Expected Value NO ₂ : n/a Expected Value NOx: n/a
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Comments:

Shut-down prior to hardware calibration.

Date: November 1, 2016
Company/Airshed: LICA
Location/Station Name: Maskwa

Start/End Time 24 hr. (mst): 08:27 / 12:09
Calibration Purpose: shut down
Calibration Method: Gas Dilution & Gas Phase Titration





API 200A NO-NO2-NOx Analyzer Calibration

Date: November 1, 2016
Company/Airshed: LICA
Location/Station Name: Maskwa
Start/End Time 24 hr. (mst): 13:25 / 18:13
G.P.T. to be used for Ozone? No
Calibration Method: Gas Dilution & Gas Phase Titration

Barometric Pressure: 27.52 inHg
Station Temperature °C: 23
Weather Conditions: Mainly cloudy with clear breaks
Calibration Purpose: post repair
Performed By/Reviewer: Chris Wesson / Trina Whitsitt
Cal Gas Expiry Date: December 2, 2023

Analyzer:

ID# or Serial Number: 1899
Last Calibration Date: n/a
Range ppb: 1000

Correction Factors:

	Previous C.F.:	As Found C.F.:	New C.F.:
NO =	n/a	n/a	0.999
NO ₂ =	n/a	n/a	1.002
NOx =	n/a	n/a	0.999

Calibrator:

Flow Meter ID's: n/a
Make & Model: Sabio 2010
Serial #: 17100415
Cal Gas Cylinder I.D. #: LL119317
NO/NOx Gas Conc. (ppm): 50.3 | 50.3

Standard Calibration Points for a Range of: 1000 ppb

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

Point	Calibrator Flow Rates (cc/min)			Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
adjusted zero	5001	0.0	5001	0	0	0.0	0.0	n/a	n/a
adjusted high	4923	77.8	5001	782.5	782.5	783.0	783.0	0.999	0.999
mid	4962	38.00	5000	382.3	382.3	379.0	378.0	1.009	1.011
low	4981	19.10	5000	192.1	192.1	186.0	186.0	1.033	1.033
calibrator zero	5001	0.00	5001	0.0	0.0	0.0	0.0	n/a	n/a
Average C.F.=								1.014	1.015

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

Point	Calibrator Flow Rates (cc/min)			Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO ₂	NO drop	NO ₂ gain	NO ₂ C.F.
	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4923	77.80	5001	0.0	786.0	782.0	-4.0	0.0	-4.0	
adjusted high NO2	4923	77.80	5001	500.0	281.0	781.0	500.0	505.0	504.0	1.002
gpt mid	4923	77.80	5001	275.0	511.0	781.0	270.0	275.0	274.0	1.004
gpt low	4923	77.80	5001	95.0	690.0	781.0	91.0	96.0	95.0	1.011
Average NO₂ C.F.=								1.005		

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.997	0.997	0.996	.95-1.05
b (Intercept as % of full scale)=	-0.32%	-0.34%	-0.27%	± 3% F.S.
% change in C.F. from last cal=	n/a	n/a	n/a	± 10%
NO2 converter efficiency			1.00	0.96 to 1.04

As found:

NOx SLOPE: 0.960
 NOx OFFS: 0.3
 NO SLOPE: 0.972
 NO OFFS: -0.3
 SAMP FLW: 550
 OZONE FL: 78
 NORM PMT: -1.0
 AZERO: 22.8
 HVPS: 686
 DCPS: 2573
 RCELL: 50.2
 BOX TEMP: 27.7
 IZS TEMP: 45.0
 MOLY TEMP: 316.0
 RCEL: 5.6
 SAMP: 25.7
 0 PMT Temp =7.3
 Expected Value NO: 4.00
 Expected Value NO₂: 370.00
 Expected Value NOx: 374.00

As left:

NOx SLOPE: 0.970
 NOx OFFS: -0.2
 NO SLOPE: 0.987
 NO OFFS: -0.8
 SAMP FLW: 551
 OZONE FL: 78
 NORM PMT: 0.5
 AZERO: 23.1
 HVPS: 686
 DCPS: 2572
 RCELL: 51.0
 BOX TEMP: 29.2
 IZS TEMP: 45.3
 MOLY TEMP: 314.5
 RCEL: 5.6
 SAMP: 26.5
 0 PMT Temp = 7.0
 Expected Value NO: 4.00
 Expected Value NO₂: 370.00
 Expected Value NOx: 374.00

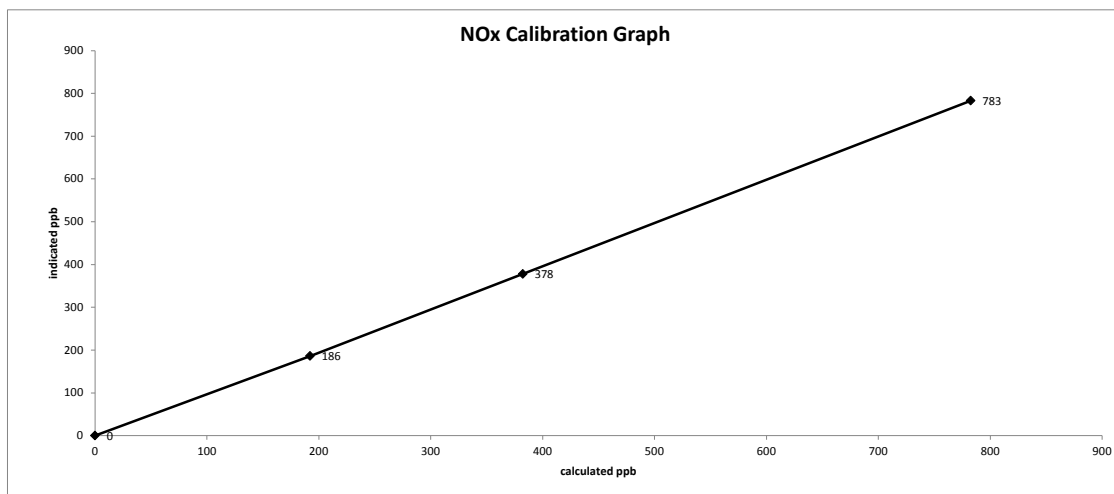
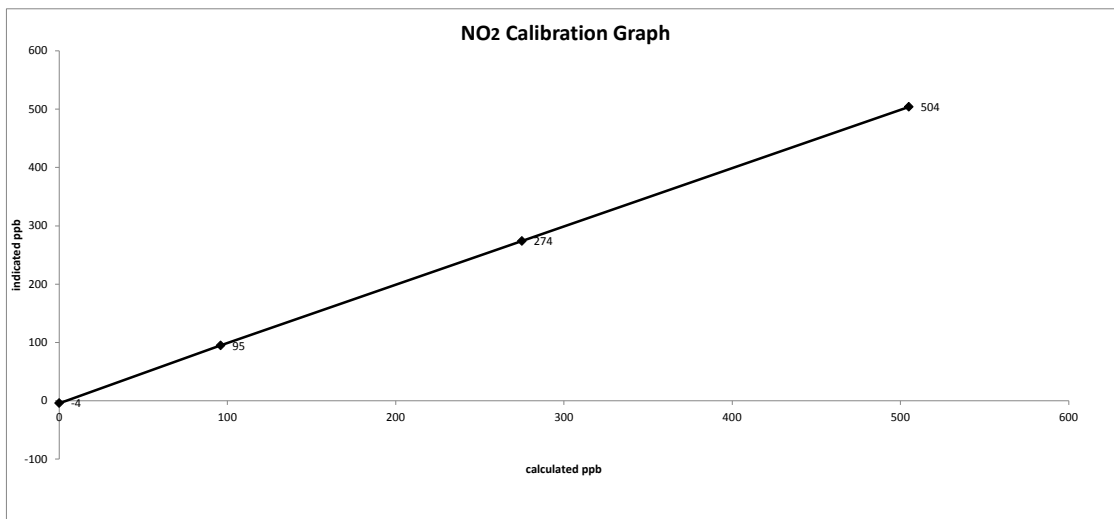
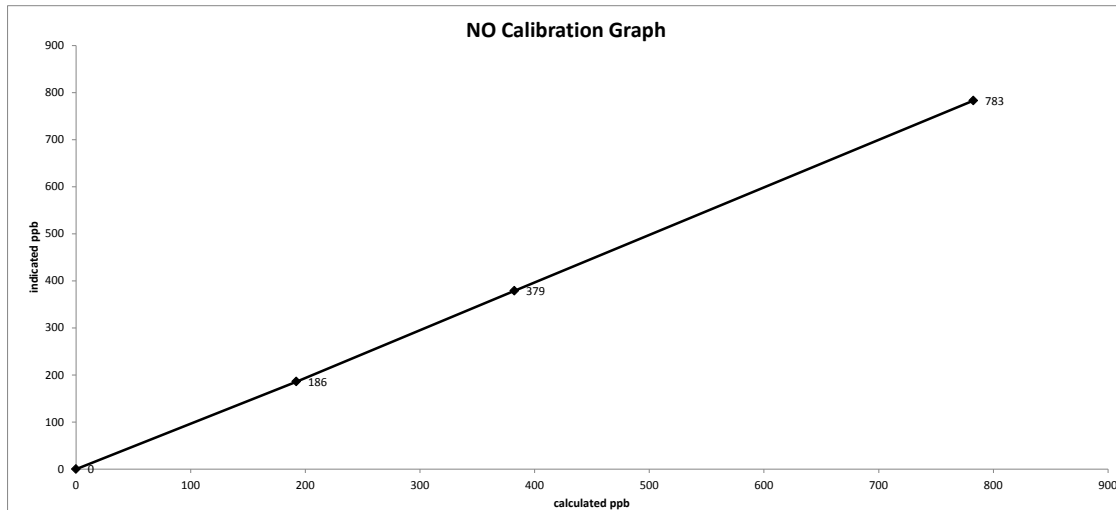
Comments:

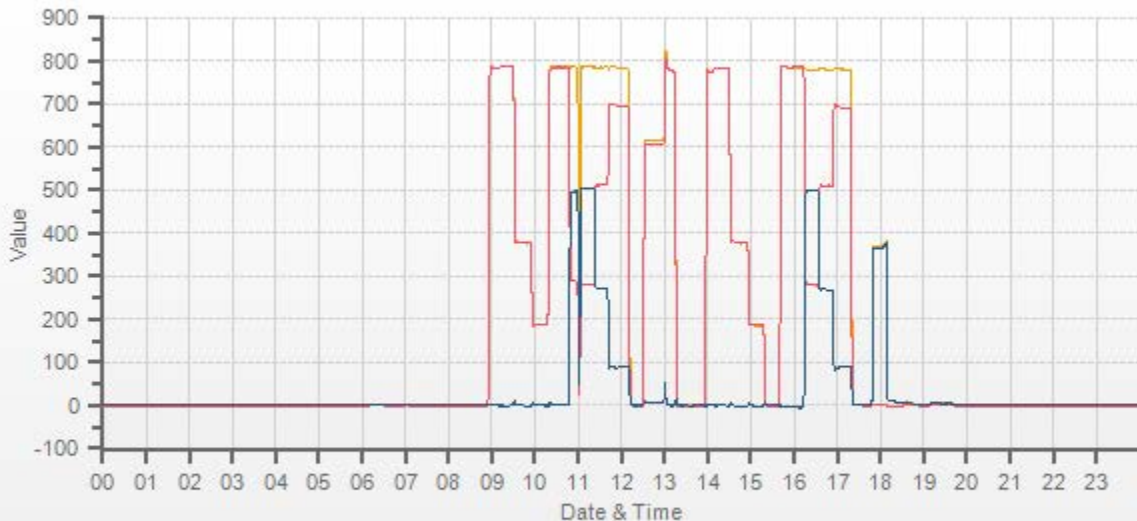
The analyzer sample inlet filter was changed.

Post-repair following hardware calibration.

Date: November 1, 2016
Company/Airshed: LICA
Location/Station Name: Maskwa

Start/End Time 24 hr. (mst): 13:25 / 18:13
Calibration Purpose: post repair
Calibration Method: Gas Dilution & Gas Phase Titration





— NOx[ppb] — NO[ppb] — NO2[ppb]



API 200A NO-NO2-NOx Analyzer Calibration

Date: November 16, 2016 Company/Airshed: LICA Location/Station Name: Maskwa Start/End Time 24 hr. (mst): 9:29 / 14:43 G.P.T. to be used for Ozone? No Calibration Method: Gas Dilution & Gas Phase Titration	Barometric Pressure: 0.933 atm Station Temperature °C: 22 Weather Conditions: Mainly cloudy with sunny breaks Calibration Purpose: repeat Performed By/Reviewer: Alex Yakupov Trina Whitsitt Cal Gas Expiry Date: July 18, 2019
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Analyzer: ID# or Serial Number: 1899 Last Calibration Date: November 1, 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>0.999</td> <td>0.986</td> <td>1.000</td> </tr> <tr> <td>NO₂ =</td> <td>1.002</td> <td>1.000</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>0.999</td> <td>0.991</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	0.999	0.986	1.000	NO ₂ =	1.002	1.000	1.000	NOx =	0.999	0.991	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	0.999	0.986	1.000														
NO ₂ =	1.002	1.000	1.000														
NOx =	0.999	0.991	1.000														

Calibrator: Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. #: LL104222 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

Point	Diluent	Cal Gas	Total Flow	Calculated NO (ppb)	Calculated NOx (ppb)	Indicated NO (ppb)	Indicated NOx (ppb)	NO C.F.	NOx C.F.
as found zero	5000	0.0	5000	0	0	0.0	0.0	n/a	n/a
as found high	4924	76.9	5001	779.6	779.6	791.0	787.0	0.986	0.991
adjusted zero	5000	0.00	5000	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4924	76.90	5001	779.6	779.6	780.0	780.0	1.000	1.000
mid	4965	37.50	5003	380.1	380.1	374.0	374.0	1.016	1.016
low	4981	18.80	5000	190.6	190.6	184.0	184.0	1.036	1.036
calibrator zero	5000	0.00	5000	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

Point	Diluent	Cal Gas	Total Flow	Calibrator Setting (volts or ppb)	Indicated NO (ppb)	Indicated NOx (ppb)	Indicated NO ₂ (ppb)	NO drop (ppb)	NO ₂ gain (ppb)	NO ₂ C.F.
NOx reference	4924	76.90	5001	0.0	781.0	778.0	-3.0	0.0	-3.0	
as found high NO2	4800	76.90	4877	475.0	278.0	778.0	500.0	503.0	503.0	1.000
adjusted high NO2	4800	76.90	4877	475.0	278.0	778.0	500.0	503.0	503.0	1.000
gpt mid	4800	76.90	4877	260.0	503.0	781.0	277.0	278.0	280.0	0.993
gpt low	4800	76.90	4877	90.0	686.0	781.0	94.0	95.0	97.0	0.979
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 =	0.997	0.997	0.996	.95-1.05
b (Intercept as % of full scale)=	-0.40%	-0.40%	-0.05%	± 3% F.S.
% change in C.F. from last cal=	1.34%	0.84%	0.20%	± 10%
NO ₂ converter efficiency	0.99			0.96 to 1.04

As found:	As left:
NOx SLOPE: 0.970	NOx SLOPE: 0.961
NOx OFFS: -0.2	NOx OFFS: -0.2
NO SLOPE: 0.987	NO SLOPE: 0.974
NO OFFS: -0.8	NO OFFS: -0.8
SAMP FLW: 550	SAMP FLW: 550
OZONE FL: 78	OZONE FL: 77
NORM PMT: -0.9	NORM PMT: 0.1
AZERO: 22.2	AZERO: 22.5
HVPS: 686	HVPS: 686
DCPS: 2574	DCPS: 2572
RCELL: 50.5	RCELL: 50.2
BOX TEMP: 26.8	BOX TEMP: 29.6
IZS TEMP: 45.0	IZS TEMP: 45.0
MOLY TEMP: 314.3	MOLY TEMP: 314.4
RCEL: 5.6	RCEL: 5.6
SAMP: 26.4	SAMP: 26.4
Expected Value NO: 4.00	Expected Value NO: 3.90
Expected Value NO ₂ : 370.00	Expected Value NO ₂ : 392.00
Expected Value NOx: 374.00	Expected Value NOx: 396.00

Comments:

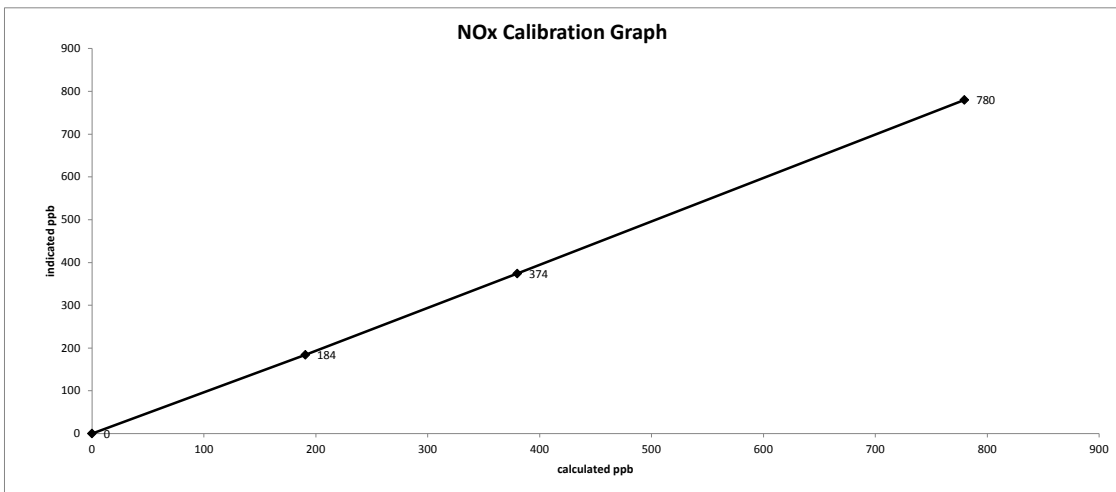
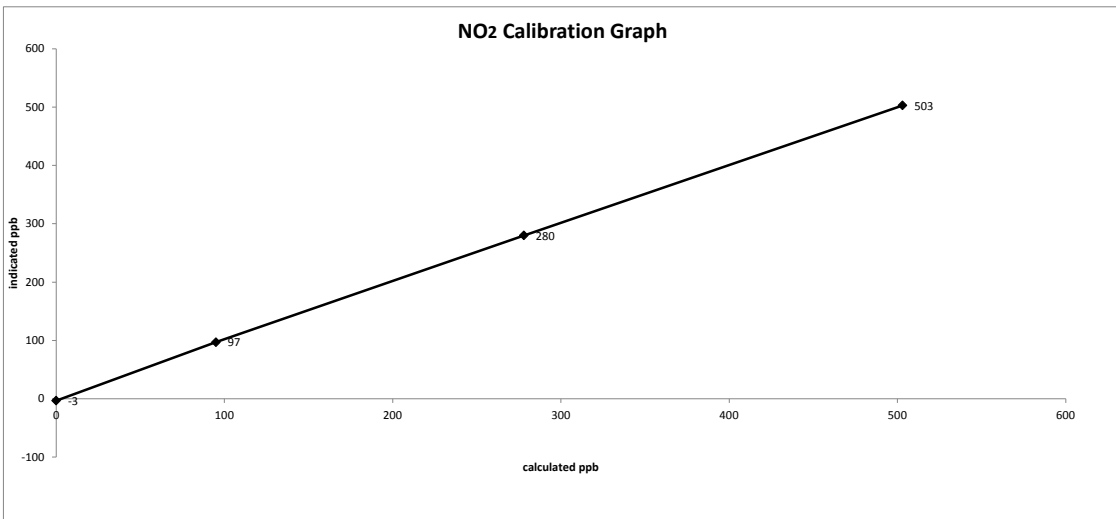
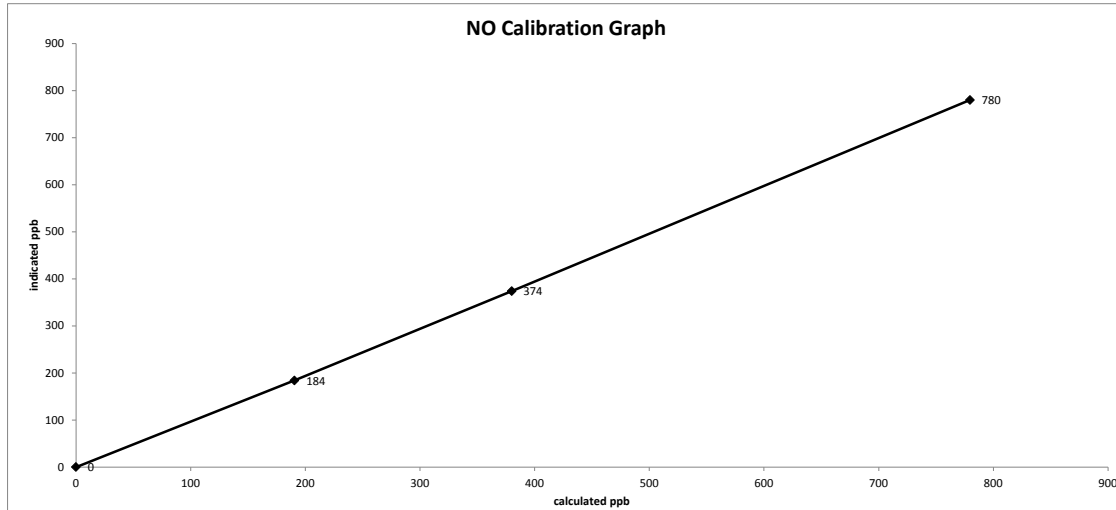
No high point NO₂ adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.

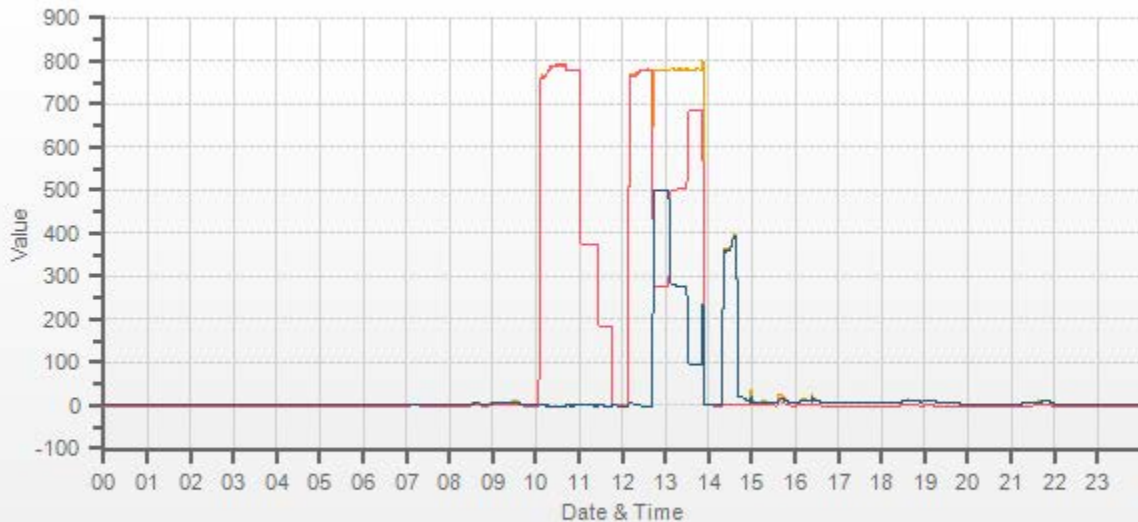
No zero adjustment was required/made. As found zero values were copied to adjusted zero values for linearity calculation purposes.

Repeat calibration required to correct the EV. According to a daily report, SPAN readings during daily ZERO/SPAN checks have drifted over 8% since the installation calibration. A full repeat calibration required to correct the EV.

Date: November 16, 2016
Company/Airshed: LICA
Location/Station Name: Maskwa

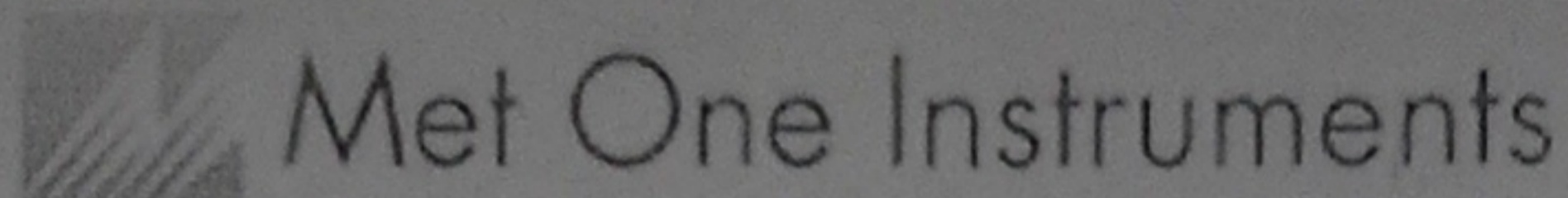
Start/End Time 24 hr. (mst): 9:29 / 14:43
Calibration Purpose: repeat
Calibration Method: Gas Dilution & Gas Phase Titration





— 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 <u>0V - 1.0V</u>	Sensor Output Range: <u>0 - 50.0 MPS</u>
Customer: <u>Maxxam Analytics</u>	Sales Order No.: <u>115035</u>
Tested per PO: <u>35-62828</u>	Calibration Date: <u>03/30/2016</u>
Calibrated by: <u>David Frith</u> <i>DF</i>	QC Inspection: <u><i>Byron Dawson</i></u>

Instrument Condition Within Tolerance:	As Found	<u> </u>	As Left	<u>X</u>
Corrective Action:	No Adjustment	<u> </u>	Adjust	<u>X</u>
			Repair	<u> </u>
	Preventative Maintenance	<u> </u>		

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

METEOROLOGICAL SYSTEM CHECK



Meteorological System Checklist

Performed by: Alex Yakupov
Station: **Maskwa**
Start: 10:24 End: 11:05

PRECIPITATION SENSOR CHECK

	YES	NO
Is the sensor Level?	YES	
Is the heater operating properly?	YES	
Are the bucket drain holes clean?	YES	
Is the inner screen on the housing? (screen should be on between July and September)		NO
Is the upper screen on the housing? (screen should be on between July and September)		NO
Is the housing clean?	YES	
Is the area around the housing clean and free from obstacle?	YES	
Is the tipping sensor working properly?	YES	
Test with water (10:47 - 10:48 test: 2.0 mm)	PASS	

Comments: the rain gauge has been tested with water. Response is timely and accurate.

No issues.

Field Technician: Alexander Yakupov

November 14, 2016

CALIBRATORS

Company <u>Maxxam</u>		Operator: <u>Christopher Wesson</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>N/A</u>
Serial Number	<u>17100415</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
5000	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5001	80.7	0.783	0.783	0.810	-0.004	0.806	3%	3%
5001	39.4	0.382	0.382	0.395	-0.001	0.393	3%	3%
5000	19.8	0.192	0.192	0.198	0.000	0.198	3%	3%
Absolute Average Percent Difference							3%	3%

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)=	1.0347	0.90-1.10		m (Slope)=	1.0292
b (Intercept % of FS)=	-0.0283	± 3% F.S.		b (Intercept % of FS)=	0.0098

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5001	Lamp C.	0.000	0.808	-0.004	0.804	NO ₂	% Diff. Limit
5001	1.316	0.476	0.332	0.472	0.804	0%	± 10%
5001	0.696	0.234	0.574	0.231	0.805	0%	± 10%
5001	0.392	0.089	0.719	0.086	0.805	1%	± 10%
Absolute Average Percent Difference						1%	± 10%

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

NO₂		LIMITS	
Correlation=	1.0000	≥ 0.995	
m (Slope)=	0.9994	0.90-1.10	
b (Intercept % of FS)=	-0.3382	± 3% F.S.	

AENV Standards	NO_x Analyzer
Audit Calibrator	
Make/Model	<u>Teco 146i</u>
Serial/AMU Number	<u>AMU 1809</u>
	Make/Model
	<u>Teco 42i</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: Al Clark
 Operator Signature: *Al Clark*

Date: May 18, 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: [Signature]

 Date: February 3, 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				<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>			
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		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>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. 2015-114CGA

Company: Maxxam Operator's Name: Chris Wesson
Cylinder #: LL119317 Concentration PPM: 49.9 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				
4945	0.00	0.000	0.000	0.000	0.000
4937	78.87	0.789	0.01598	62.597	49.4
4956	39.38	0.392	0.00795	125.851	49.3
4940	19.50	0.193	0.00395	253.333	48.9
Average Cylinder Concentration:					49.2

Previous Stated Concentration PPM: 49.9

Percent variance from Stated: 1.4

Meets Manufacturer Tolerance. Use manufacturers stated concentration COMMENTS: SO2/NO blend 50.3ppm 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. 2015-109CGA

Company: Maxxam Operator's Name: Chris Wesson
 Cylinder #: BLM001927 Concentration PPM: 10.3 Tolerance(%) 2 Certified By: Air Liquide

Reference Calibrator and Gas:

Make/Model: R&R MFC 201
 Serial Number: AMU 1690
 Last Verification Date: February 2, 2016
 Gas Type: H2S Conc. 20.43
 Cylinder Number: CAL015584

Flow Measurement Device:

Make/Model: Bios DC-2
 Serial Number: Bios D
 Temp. °C: 24.5
 B.P. 702mmHg

Reference Analyzer:

Make/Model: Thermo 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 15.3 Span: 1.126 Range: 0.1
 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				
5025	0.0	0.000	0.00748	283.417	10.4
5058	37.84	0.078	0.00748	133.668	10.4
5059	17.85	0.036	0.00353	283.417	10.3
5031	9.15	0.019	0.00182	549.836	10.2
Average Cylinder Concentration:					10.3

Previous Stated Concentration PPM: 10.3

Percent variance from Stated: 0.1

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: Shea Beaton
 Operator Signature: [Signature]

Date: February 2, 2016
 Location: McIntyre Center Edmonton



Calibration Gas Audit

CH4 / C3H8 Cylinder Gas

File No. 2015-091CGA

Company: Maxxam Operators name: Chris Wesson
Cylinder #: LL86139 Conc CH4 (PPM) 599/211 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 23
B.P. 599mmHg

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 (scm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	CH4	C3H8			CH4	C3H8
2583	0.00	0.00	0.00	0.02145	46.621	597	213
2635	56.52	12.80	12.59	0.02145	46.621	597	213
2592	19.72	4.54	4.49	0.00761	131.440	597	215
2584	9.69	2.25	2.24	0.00375	266.667	600	217
Average Cylinder Concentration:						598	215

	CH4	C3H8
Previous Stated Concentration PPM:	<u>599</u>	<u>211</u>
Percent variance from Stated:	<u>0.2</u>	<u>1.9</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. 2015-113CGA

Company: Maxxam **Operators name:** Chris Wesson
Cylinder #: LL119317 **Conc (PPM)** 50.3/50.3 **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 (scm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
4945	0.0	0.000	0.000				
4937	78.87	0.801	0.803	0.01598	62.597	50.1	50.3
4956	39.38	0.399	0.399	0.00795	125.851	50.2	50.2
4940	19.50	0.198	0.198	0.00395	253.333	50.2	50.2
Average Cylinder Concentration:						50.2	50.2

	<u>NO</u>		<u>NOx</u>
Previous Stated Concentration PPM:	<u>50.3</u>		<u>50.3</u>
Percent variance from Stated:	<u>0.3</u>		<u>0.2</u>

Cylinder gas tolerances based on NO only

Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS: SO2/NO Blend 49.9PPM 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

NO Cylinder Gas

File No. 2016-336CGA

Company: Maxxam **Operators name:** Russell Kirchner
Cylinder #: LL104222 **Conc (PPM)** 50.7/50.9 **Tolerance (%)** 1 **Certified By:** Praxair
Expiry Date: July 2019

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>October 19, 2019</u>			Temp. °C	<u>24.5 C</u>
Gas Type	<u>NO</u>	Conc.	<u>48.79</u>	B.P.	<u>706 mmhg</u>
Cylinder Number	<u>CAL018188</u>				
Expiry Date	<u>March 2019</u>				

Reference Analyzer:
Make/Model Teco 42i **Serial/AMU Number:** 1868
Instrument Settings **Zero:** 4.4 **Span:** 1.080 **Range:** 1.0
Last Calibration: **Date:** Oct 18/16 **C.F.** 1.000 **Done By:** Al Clark

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
5000	0.0	0.000	0.000				
4935	82.0	0.838	0.837	0.017	60.183	50.4	50.4
4968	40.8	0.417	0.417	0.008	121.765	50.8	50.8
4955	20.2	0.207	0.207	0.004	245.297	50.8	50.8
Average Cylinder Concentration:						50.7	50.6

	<u>NO</u>	<u>NOx</u>
Previous Stated Concentration PPM:	<u>50.7</u>	<u>50.9</u>
Percent variance from Stated:	<u>0</u>	<u>1</u>

Cylinder gas tolerances based on NO only
 Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:**
 < =5% Outside Manufacturer Tolerance. Use manufacturers concentration Contains 50.6 ppm SO2.
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Al Clark **Date:** October 19, 2016
Operator Signature: *Al Clark* **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	Maskwa Continuous Monitoring Station
Name of the Representative of the Person Responsible (Last, First, Middle)	Position / Title of the Representative of the Person Responsible
Wunmi Adekanmbi	Project Manager, 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

28-12-2016

Report Issued Date (dd-mm-yyyy)

APPENDIX IV
DATA VALIDATION CERTIFICATION FORM



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2016-11-30-C</u>
Site: <u>Maskwa Continuous Monitoring Station</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<hr style="width: 100%;"/>	Date <u>13-Dec-16</u>
Level 1 Primary Validation	<hr style="width: 100%;"/>	Date <u>13-Dec-16</u>
Level 2 Final Validation	<hr style="width: 100%;"/>	Date <u>28-Dec-16</u>
Level 3 Independent Data Review	<hr style="width: 100%;"/>	Date <u>04-Jan-17</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.



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AMBIENT AIR MONITORING MONTHLY DATA REPORT
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
ST. LINA CONTINUOUS MONITORING STATION

JOB #: 2833-2016-11-31-C

November 2016

Prepared for:

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

Attention: MIKE BISAGA

DATE: **JANUARY 04, 2017**

Prepared by:

A handwritten signature in blue ink, appearing to read "Wunmi Adekanmbi".

Wunmi Adekanmbi, M.Sc., EPt.
Project Manager, Customer Service, Air Services

Reviewed by:

A handwritten signature in black ink, appearing to read "Cheri Sinclair".

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

SUMMARY

In November 2016, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the St. Lina Continuous Monitoring Station, near Bonnyville, Alberta. The monitoring station provides continuous meteorological measurements and air quality data for non-compliance parameters, as requested by Lakeland Industry and Community Association.

All data collected this month was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above the 90% requirement.

- **PM_{2.5}**: Fourteen hours of data were recorded at concentrations less than $-3.0 \mu\text{g}/\text{m}^3$, rendering the data invalid.
- **Wind System**: Thirty-nine hours of data, collected between November 20 and November 22, were invalidated due to an ice/snow build-up that affected the functionality of the wind system.

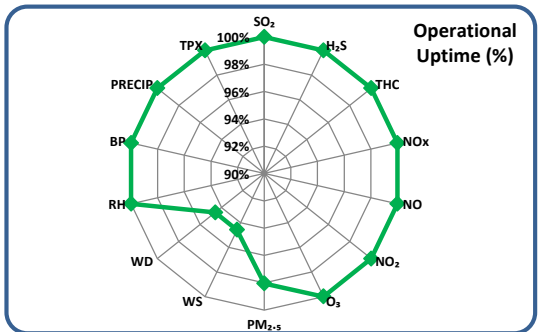
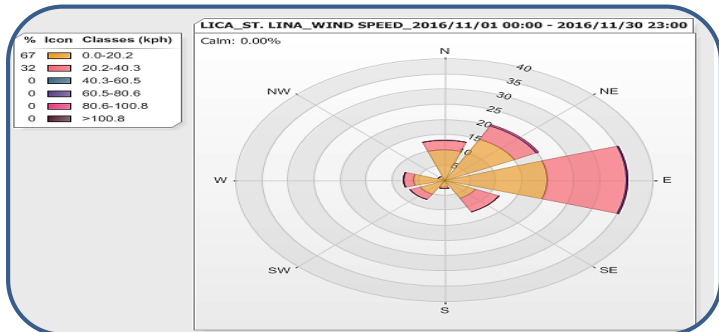
The summary of results is presented on the following pages.

Any deviations or modifications made to the sampling or analytical methods are outlined in Section 1.0, Discussion. On this basis, Maxxam Analytics is issuing this completed report to Lakeland Industry & Community Association, St. Lina Continuous Monitoring Station.

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.

Lakeland Industry & Community Association - St. Lina Site November 2016 Monthly Report Summary

Pollutants		Monthly Records		1-Hour Records					24-Hour Records			
Name	Unit	Avg. Conc.	Uptime	Maximum			AAAQO Objective	Exceed. Hours	Maximum		AAAQO Objective	Exceed. Days
				Conc.	Date	Hour			Conc.	Date		
SO ₂	ppb	0.1	100.0%	2.2	November 12	3	172	0	0.5	November 12	48	0
H ₂ S	ppb	0.0	100.0%	0.0	ALL	ALL	10	0	0.0	ALL	3	0
THC	ppm	2.06	100.0%	2.47	November 18	3	-	-	2.26	November 25	-	-
NO _x	ppb	2.4	100.0%	13.4	November 12	3	-	-	5.9	November 24	-	-
NO	ppb	0.2	100.0%	4.2	November 24	12	-	-	0.9	November 24	-	-
NO ₂	ppb	2.2	100.0%	13.3	November 12	3	159	0	5.0	November 12, 24	-	-
O ₃	ppb	20.9	100.0%	37.6	November 9	16	82	0	29.0	November 30	-	-
PM _{2.5}	µg/m ³	4.4	98.1%	25.9	November 29	22	80	0	10.8	November 24	30	0
WS	kph	9.1	94.6%	100.7	November 7	9	-	-	20.6	November 28	-	-
WD	degree	76 (ENE)	94.6%	-	-	-	-	-	-	-	-	-
RH	%	75	100.0%	90	VAR	VAR	-	-	87	VAR	-	-
BP	mbar	925	100.0%	942	November 10	VAR	-	-	939	November 10, 18	-	-
PRECIP	mm	0.0	100.0%	1.3	November 6	11	-	-	0.1	November 6, 12	-	-
AmbTPX	°C	0.3	100.0%	16.6	November 8	14	-	-	9.1	November 9	-	-



Monthly Update

- * All sampling, analysis, and QA/QC for this project was performed by Maxxam Analytics and complies with the Alberta Air Monitoring Directive.
- * All data collected this month were within the objectives outlined in the AMD 2016 and AAAQO 2016.
- * The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above 90%.

Operational Issues

- **PM_{2.5}**: Fourteen hours of data were recorded at concentrations less than -3.0 µg/m³, rendering the data invalid.
- **Wind System**: Thirty-nine hours of data, collected between November 20 and November 22, were invalidated due to an ice/snow build-up that affected the functionality of the wind system.

Monthly Continuous Data Summary

Lakeland Industry & Community Association St. Lina Continuous Monitoring Station						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 (sector)	READING	DAY	
SO ₂ (ppb)	172	48	0	0	0.1	2.2	12	3	11.4	NNE	0.5	12	100.0
H ₂ S (ppb)	10	3	0	0	0.0	0.0	ALL	ALL	VAR	VAR	0.0	ALL	100.0
THC (ppm)	-	-	-	-	2.06	2.47	18	3	19.0	ENE	2.26	25	100.0
NO ₂ (ppb)	159	-	0	-	2.2	13.3	12	3	11.4	NNE	5.0	12, 24	100.0
NO (ppb)	-	-	-	-	0.2	4.2	24	12	15.8	WSW	0.9	24	100.0
NO _x (ppb)	-	-	-	-	2.4	13.4	12	3	11.4	NNE	5.9	24	100.0
O ₃ (ppb)	82	-	0	-	20.9	37.6	9	16	16.4	NE	29.0	30	100.0
PM _{2.5} (µg/m ³)	80	30	0	0	4.4	25.9	29	22	18.9	N	10.8	24	98.1
RELATIVE HUMIDITY (%)	-	-	-	-	75	90	VAR	VAR	VAR	VAR	87	VAR	100.0
BAROMETRIC PRESSURE (millibar)	-	-	-	-	925	942	10	VAR	VAR	VAR	939	10, 18	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	0.3	16.6	8	14	21.8	ESE	9.1	9	100.0
PRECIPITATION (mm)	-	-	-	-	0.0	1.3	6	11	22.1	ENE	0.1	6, 12	100.0
VECTOR WS (kph)	-	-	-	-	9.1	100.7	7	9	-	NNE	20.6	28	94.6
VECTOR WD (sec)	-	-	-	-	76 (ENE)	-	-	-	-	-	-	-	94.6

NA-NOT AVAILABLE VAR-VARIOUS

Exceedance Summary Report

SO₂ 1-Hour Exceedances

Measured concentrations of sulphur dioxide were below the 1-hour AAAQO of 172 ppb.

SO₂ 24-Hour Exceedances

Measured concentrations of sulphur dioxide were below the 24-hour AAAQO of 48.0 ppb.

H₂S 1-Hour Exceedances

Measured concentrations of hydrogen sulphide were below the 1-hour AAAQO of 10 ppb.

H₂S 24-Hour Exceedances

Measured concentrations of hydrogen sulphide were below the 24-hour AAAQO of 3 ppb.

NO₂ 1-Hour Exceedances

Measured concentrations of nitrogen dioxide were below the 1-hour AAAQO of 159 ppb.

PM_{2.5} 1-Hour Exceedances

Measured concentrations of fine particulate matter were below the 1-hour AAAQO of 80 µg/m³.

PM_{2.5} 24-Hour Exceedances

Measured concentrations of fine particulate matter were below the 24-hour AAAQO of 30 µg/m³.

O₃ 1-Hour Exceedances

Measured concentrations of ozone were below the 1-hour AAAQO of 82 ppb.

In accordance with EPEA and the Substance Release Regulation.

In accordance with A Guide to Release Reporting and the Alberta Ambient Air Quality Objectives and Guidelines Summary.

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1.0 Discussion

This monthly report consists of continuous monitoring data for the following 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, at a minimum, for each monthly monitoring period.

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/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 November 2. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on November 18 at 00:00 was invalidated due to a brief power outage.

HYDROGEN SULPHIDE (H₂S)

The routine monthly calibration was performed on November 2. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on November 18 at 00:00 was invalidated due to a brief power outage.

TOTAL HYDROCARBONS (THC)

The routine monthly calibration was performed on November 2. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on November 18 at 00:00 was invalidated due to a brief power outage.

NITROGEN DIOXIDE (NO₂)

The routine monthly calibration was performed on November 2. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on November 18 at 00:00 was invalidated due to a brief power outage.

OZONE (O₃)

The routine monthly calibration was performed on November 2. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on November 18 at 00:00 was invalidated due to a brief power outage.

PARTICULATE MATTER < 2.5 MICRONS (PM_{2.5})

Two routine audits were performed this month: one was completed on November 13 and the other audit was performed on November 22. The sample filter was replaced on November 22.

Data was corrected in accordance with AMD (2016), Chapter 6, Table 2, *Zero Adjustment Criteria*. Data recorded between 0 and -3.0 µg/m³ was corrected to 0 µg/m³. Data recorded below -3.0 µg/m³ was invalidated. Fourteen hours of data were invalidated as the data was below -3.0 µg/m³ this month.

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

The wind data is reported as vector wind speed and vector wind direction. Wind direction is defined as the direction from which the wind is blowing from and is measured in degrees from true north.

Thirty-nine hours of data, collected between November 20 and November 22, were invalidated due to an ice/snow build-up that affected the functionality of the wind system.

Maximum instantaneous data collected on November 18 at 00:00 was invalidated due to a brief power outage.

RELATIVE HUMIDITY (RH)

No operational issues were identified this month.

BAROMETRIC PRESSURE (BP)

No operational issues were identified this month.

PRECIPITATION

The routine quarterly rain gauge audit was conducted on November 22. No issues were identified.

AMBIENT TEMPERATURE (AmbTPX)

No operational issues were identified this month.

2.0 Project Personnel

Mike Bisaga was the contact for Lakeland Industry & Community Association and the Maxxam field technicians were Christopher Wesson and Alexander Yakupov.

3.0 Plant Monthly Required AMD Summary

All data collected this month was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems 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 monitoring program:

- Maxxam AIR SOP-00209: Ambient Sulphur 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

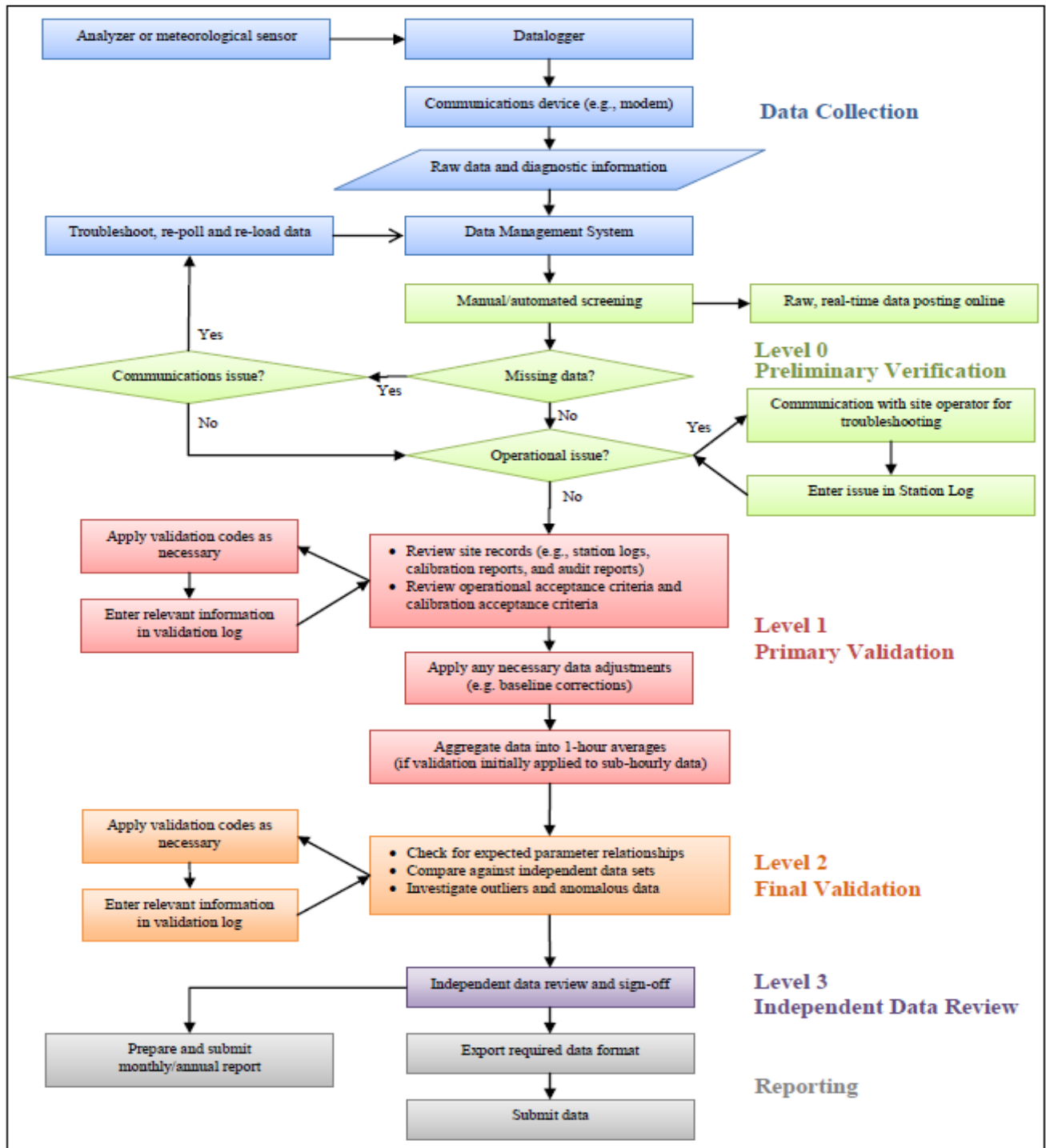
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

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 Hourly Averages (SO₂ ppb)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY 1	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
2	0.0	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	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	S	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.8	0.4	0.0	0.0	0.0	0.2	0.0	0.8	0.1	24	
4	1.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.3	0.3	0.5	0.4	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.2	24
5	0.0	0.0	0.0	0.1	0.0	0.0	0.2	S	0.0	0.0	0.0	0.0	0.1	0.6	1.1	1.0	0.7	0.2	0.1	0.2	0.2	0.2	0.1	0.0	0.0	1.1	0.2	24	
6	1.4	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.1	24	
7	0.0	0.0	0.0	0.0	0.0	S	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	0.1	0.0	24	
8	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	24	
9	0.0	0.0	0.0	S	0.1	0.4	0.4	0.6	1.5	1.5	0.3	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	1.5	0.2	24	
10	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	
11	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.7	0.7	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.7	0.1	24
12	S	2.1	1.9	2.2	1.4	0.5	0.0	0.0	0.0	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.1	0.1	0.0	S	0.0	2.2	0.5	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	0.1	0.1	0.0	0.0	0.8	0.8	0.4	S	0.2	0.0	0.8	0.1	24		
14	0.2	0.4	0.9	0.8	0.8	1.3	0.8	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.0	0.0	S	0.0	0.0	1.3	0.3	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	0.1	0.2	0.3	0.4	0.9	1.2	S	0.9	0.9	0.7	1.2	0.2	24		
16	0.2	0.2	0.2	0.2	0.1	0.1	0.0	0.0	0.1	0.3	0.4	0.8	1.0	0.9	0.6	0.9	0.8	0.8	0.6	S	0.0	0.0	0.0	0.0	1.0	0.4	24		
17	0.0	0.0	0.0	0.0	0.3	0.4	0.4	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	0.4	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	S	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	S	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	0.2	0.2	0.1	0.0	0.2	0.0	24	
21	0.0	0.1	0.2	0.0	0.1	0.2	0.1	0.1	0.1	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	0.2	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	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	
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	24	
24	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.8	0.2	0.2	0.3	S	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	0.8	0.1	24	
25	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.2	0.1	0.2	S	0.2	0.4	0.5	0.3	0.3	0.4	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	24	
26	0.0	0.0	0.0	0.5	0.5	0.3	0.4	0.7	1.1	S	0.9	1.2	1.1	0.7	0.4	0.2	0.4	0.1	0.2	0.1	0.0	0.1	0.1	0.1	0.0	1.2	0.4	24	
27	0.1	0.0	0.1	0.1	0.0	0.0	0.0	S	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	24	
28	0.3	0.2	0.0	0.1	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	0.3	0.0	24	
29	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	
30	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.1	24	
HOURLY MAX	1.4	2.1	1.9	2.2	1.4	1.3	0.8	0.8	1.5	1.5	0.9	1.2	1.1	0.9	1.1	1.0	0.8	0.8	0.9	1.2	0.8	0.9	0.9	0.7					
HOURLY AVG	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	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

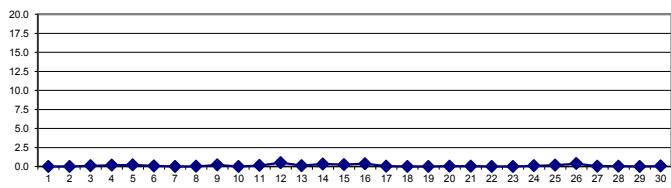
OBJECTIVE LIMIT:

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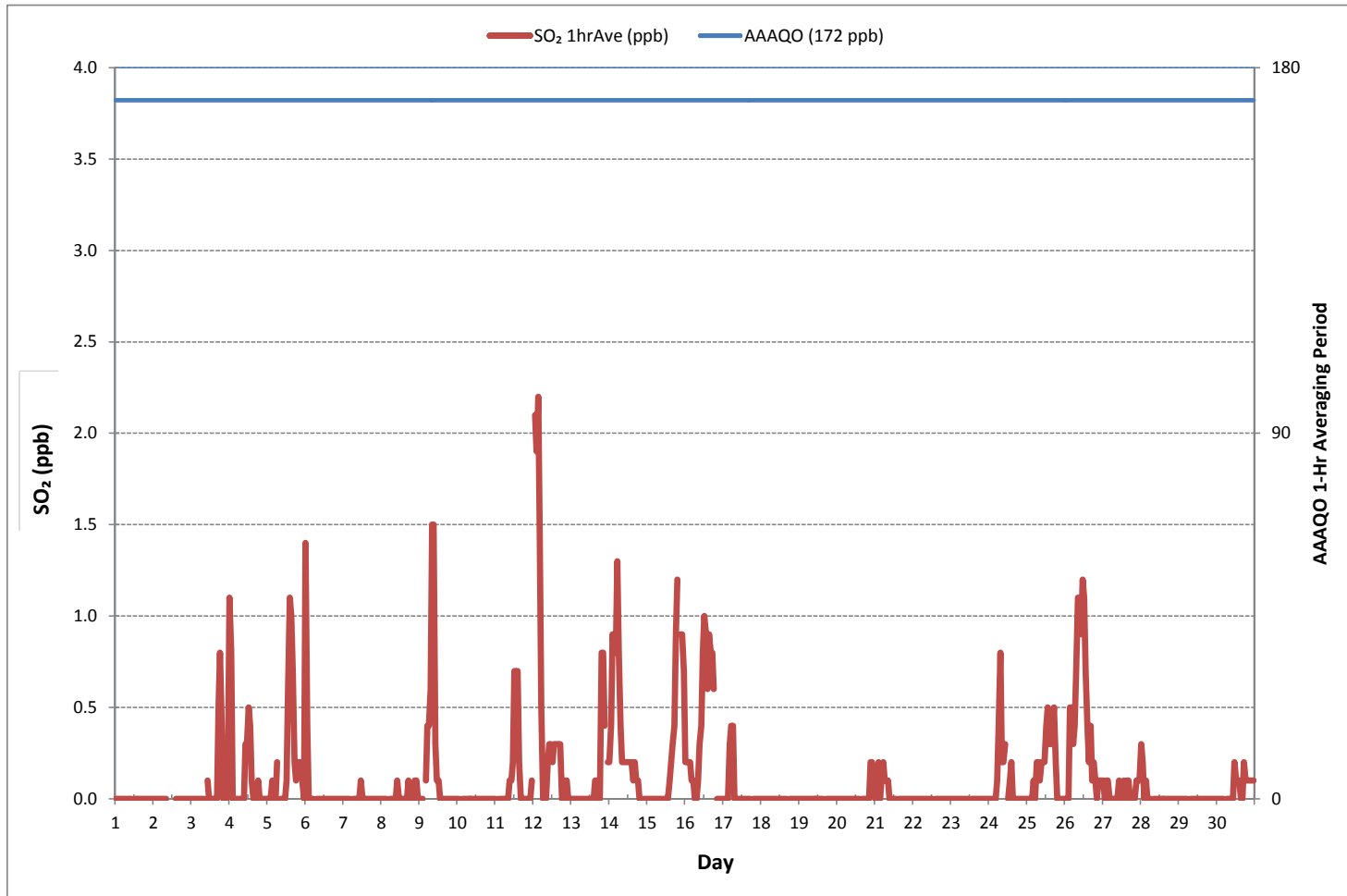
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF 24-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	194					
MINIMUM 1-HR AVERAGE:	0.0	ppb	@ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	2.2	ppb	@ HOUR(S)	3	ON DAY(S)	12
MAXIMUM 24-HR AVERAGE:	0.5	ppb			ON DAY(S)	12
					VAR-VARIOUS	
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	720	hrs	
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:	100.0	%	
STANDARD DEVIATION:	0.3		MONTHLY AVERAGE:	0.1	ppb	

24 HR AVERAGES November 2016



SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2016

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)

HR START (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-HR AVG.	RDGS.
HR END (MST)	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	1.9	1.8	2.0	1.8	1.7	1.9	1.6	1.9	1.6	1.6	1.5	S	1.5	1.5	1.6	1.4	1.3	1.3	1.3	1.3	1.2	1.3	1.2	1.4	1.2	2.0	1.5	24
2	1.3	1.2	1.0	1.2	1.4	1.3	1.2	1.0	1.2	C	C	C	C	C	1.6	1.6	1.7	1.9	1.7	1.7	1.7	1.8	1.7	1.9	1.0	1.9	1.5	24
3	2.1	1.9	1.7	2.1	1.8	1.8	1.9	2.0	2.0	S	2.5	2.3	1.8	1.8	1.8	1.9	2.3	2.5	2.7	2.7	2.1	2.1	2.1	2.3	1.7	2.7	2.1	24
4	3.5	3.5	1.8	1.8	1.6	1.8	1.7	1.9	S	2.1	2.9	2.6	2.7	2.6	2.6	2.1	2.0	2.5	2.6	2.3	2.2	2.4	2.2	2.3	1.6	3.5	2.3	24
5	2.5	2.7	2.8	3.0	3.1	2.9	3.2	S	2.6	3.0	3.0	3.0	3.2	4.1	4.3	4.0	3.7	3.1	3.2	3.5	3.4	3.2	3.3	3.1	2.5	4.3	3.2	24
6	4.7	4.2	2.9	2.9	2.8	2.5	S	2.5	2.8	2.5	2.7	2.6	2.9	2.6	2.7	2.5	2.4	2.3	2.3	2.1	2.1	2.3	2.2	1.9	1.9	4.7	2.7	24
7	1.9	1.9	1.8	1.8	1.8	S	1.5	1.8	2.0	1.7	1.9	2.3	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.2	1.5	2.3	1.9	24
8	1.9	2.0	2.1	2.1	S	2.1	2.2	2.1	2.3	2.4	2.5	2.3	2.4	2.4	2.3	2.6	2.6	2.7	2.6	2.5	2.7	2.9	2.6	2.6	1.9	2.9	2.4	24
9	2.5	2.6	2.5	S	3.2	3.1	3.1	3.2	4.3	4.3	2.9	2.5	2.4	2.4	2.2	2.3	2.1	1.8	1.9	2.0	1.9	1.8	1.6	1.6	1.6	4.3	2.5	24
10	1.5	1.5	S	1.3	1.3	1.2	1.3	1.2	1.2	1.2	1.2	1.2	1.5	2.1	1.8	1.8	1.7	1.9	1.5	1.8	1.9	2.0	1.8	1.9	1.2	2.1	1.6	24
11	1.9	S	2.1	2.4	2.3	2.4	2.6	2.4	2.6	2.7	2.8	3.0	3.4	3.5	3.4	3.2	2.5	2.9	2.5	2.6	2.5	2.6	2.8	3.2	1.9	3.5	2.7	24
12	S	5.7	5.1	6.2	5.2	3.5	3.1	2.9	3.0	3.3	3.5	3.5	3.5	3.3	3.3	3.3	3.4	3.4	3.0	3.1	3.3	3.1	3.1	S	2.9	6.2	3.7	24
13	3.0	3.0	2.9	2.8	2.6	2.7	2.8	2.7	2.4	2.5	2.7	2.7	2.9	3.0	3.4	3.2	3.0	3.5	4.0	3.6	S	3.4	2.4	4.0	3.0	3.0	2.4	24
14	3.4	4.0	4.1	3.9	3.9	4.4	4.3	3.5	3.3	3.3	3.2	3.5	3.3	3.4	3.4	3.4	3.4	3.1	3.3	3.0	2.9	S	2.7	3.1	2.7	4.4	3.5	24
15	2.8	3.1	2.9	2.9	2.7	2.7	2.6	2.8	2.8	2.8	2.8	2.9	2.9	3.2	3.3	3.4	3.4	3.7	4.4	4.3	S	4.3	4.0	4.0	2.6	4.4	3.2	24
16	3.4	3.3	3.6	3.3	3.2	3.2	3.0	2.9	2.9	3.7	3.7	3.7	3.9	4.0	3.5	3.8	3.8	3.6	3.1	S	2.8	2.7	2.6	2.6	2.6	4.0	3.3	24
17	2.5	2.4	2.4	2.3	2.7	2.7	2.7	2.2	1.9	2.1	2.0	1.9	1.7	1.9	1.6	1.6	1.7	1.9	S	1.4	1.7	1.5	1.5	1.4	1.4	2.7	2.0	24
18	P	1.6	1.6	1.4	1.4	1.5	1.5	1.4	1.3	1.3	1.3	1.4	1.3	1.3	1.3	1.6	S	1.4	1.4	1.6	1.6	1.6	1.5	1.8	1.3	1.8	1.4	23
19	1.8	1.9	2.1	2.1	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.5	2.3	2.4	2.6	2.5	S	2.4	2.5	2.4	2.6	2.6	2.5	2.4	1.8	2.6	2.3	24
20	2.5	2.6	2.6	2.7	2.5	2.4	2.6	2.7	2.5	2.4	2.6	2.6	2.6	2.7	2.7	S	2.7	2.8	3.0	3.1	3.1	3.4	3.4	3.1	2.4	3.4	2.8	24
21	3.1	3.3	3.3	3.0	3.4	3.3	3.3	3.4	3.4	3.3	3.3	3.3	3.2	3.1	S	2.9	3.1	3.0	3.3	2.9	2.9	3.0	2.8	2.7	2.7	3.4	3.1	24
22	2.7	2.7	2.7	2.8	2.7	2.5	2.5	2.6	2.4	2.6	2.5	2.5	2.5	S	2.5	2.5	2.4	2.3	2.4	2.5	2.6	2.6	3.1	2.7	2.3	3.1	2.6	24
23	2.6	2.7	2.7	2.8	2.7	2.9	3.0	2.9	3.0	3.1	3.0	3.0	S	3.1	3.0	3.2	3.1	3.0	3.0	3.0	3.0	2.9	2.9	3.0	2.6	3.2	2.9	24
24	3.0	3.1	2.9	2.9	2.9	3.3	3.5	3.7	3.4	3.3	3.2	S	3.0	3.3	3.4	3.0	3.0	2.7	2.9	3.3	3.4	3.3	3.3	3.4	2.7	3.7	3.2	24
25	3.5	3.5	3.6	3.7	3.8	3.8	4.0	4.1	3.9	4.1	S	4.0	4.1	4.3	4.1	3.9	4.0	4.0	3.9	3.5	3.4	3.3	3.2	3.1	3.1	4.3	3.8	24
26	3.1	3.3	3.6	3.8	3.9	3.7	3.9	4.7	5.3	S	4.6	4.6	4.6	4.2	3.9	3.8	4.1	4.0	3.9	3.9	4.0	4.1	4.0	4.2	3.1	5.3	4.1	24
27	4.2	4.1	4.3	4.3	4.3	4.6	4.3	4.4	S	4.5	4.7	4.5	4.5	4.5	4.3	4.5	4.5	4.4	4.4	4.5	4.5	4.3	4.6	4.5	4.1	4.7	4.4	24
28	4.7	4.7	4.3	4.5	4.3	4.4	4.1	S	4.2	4.1	4.1	4.0	4.0	4.0	3.8	3.8	3.9	3.7	3.7	3.5	3.7	3.6	3.5	3.6	3.5	4.7	4.0	24
29	3.3	3.3	3.3	3.3	3.3	3.1	S	2.7	2.9	2.9	2.8	2.7	2.8	2.7	2.8	2.7	2.8	2.7	2.6	2.9	2.8	2.8	2.7	2.8	2.6	3.3	2.9	24
30	2.8	3.1	3.1	3.4	3.0	S	3.2	3.0	3.2	3.1	3.0	3.3	3.3	3.3	3.4	3.0	3.0	3.3	3.4	3.3	3.4	3.3	3.3	3.5	2.8	3.5	3.2	24
HOURLY MAX	4.7	5.7	5.1	6.2	5.2	4.6	4.3	4.7	5.3	4.5	4.7	4.6	4.6	4.5	4.3	4.5	4.5	4.4	4.4	4.5	4.5	4.3	4.6	4.5				
HOURLY AVG	2.8	2.9	2.8	2.8	2.8	2.8	2.7	2.7	2.7	2.8	2.8	2.9	2.9	3.0	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7	2.7				

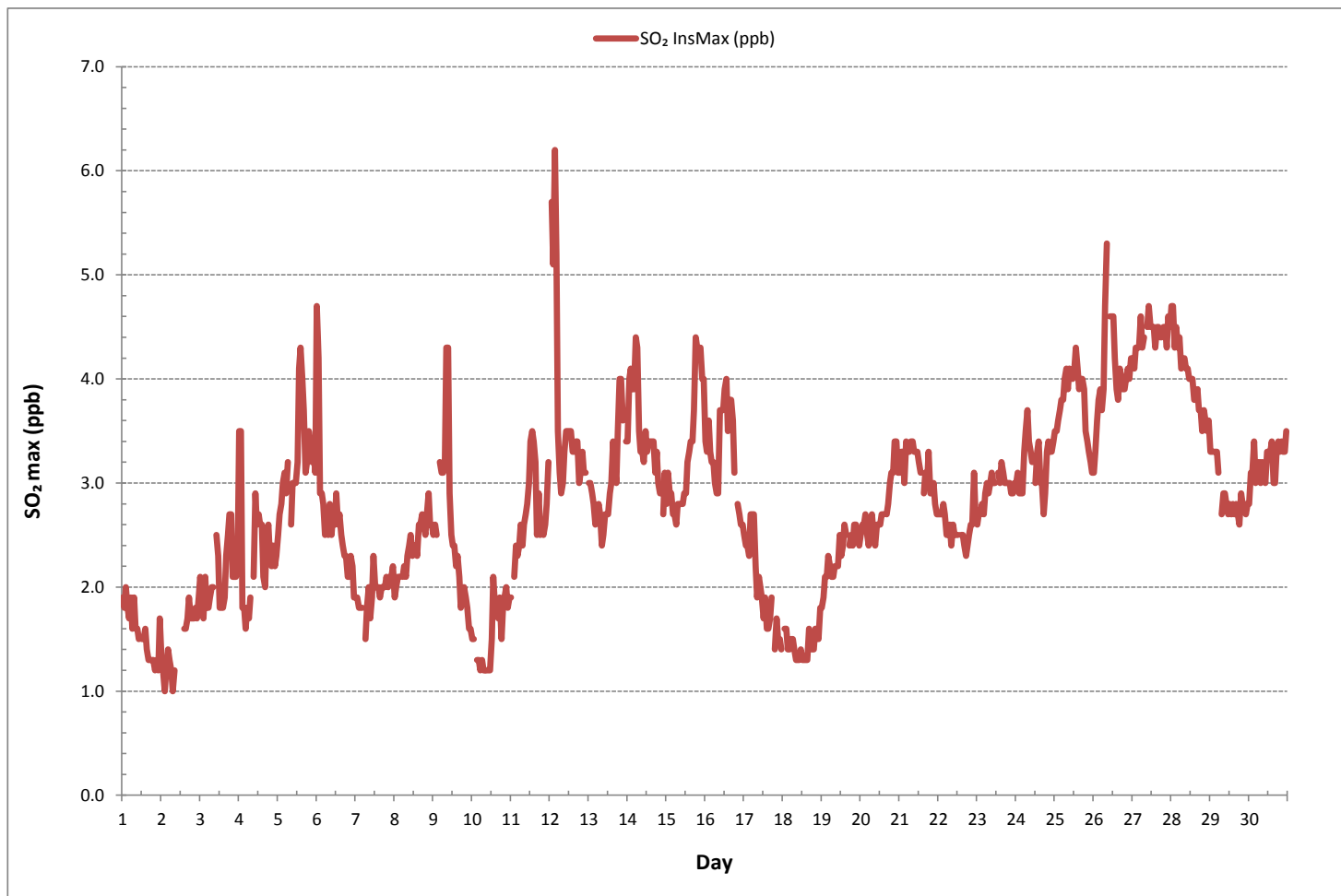
STATUS FLAG CODES

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:	684
MAXIMUM INSTANTANEOUS VALUE:	6.2 ppb @ HOUR(S) 3 ON DAY(S) 12
	VAR-VARIOUS
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	0.9
OPERATIONAL TIME:	719 hrs

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)

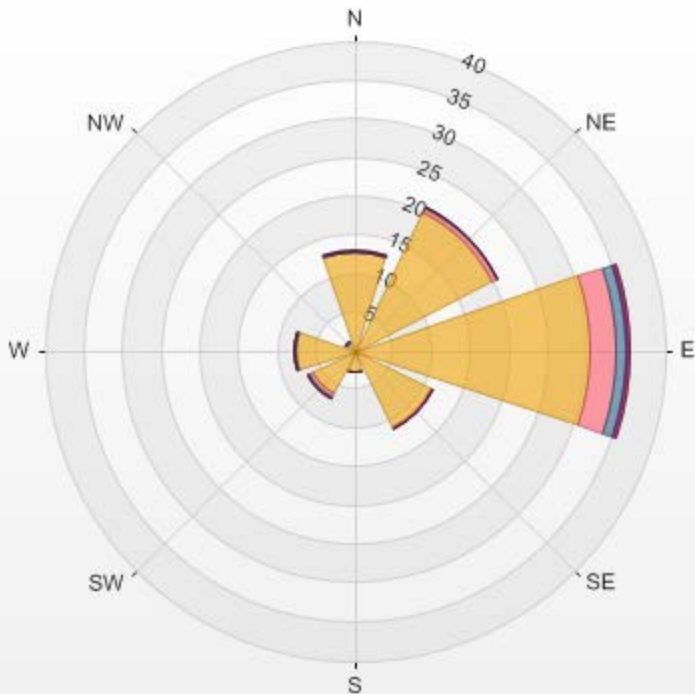


Wind: LICA ST. LINA Poll.: LICA ST. LINA-SO2[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 89.72% Calm Avg: 0.00 [ppb]

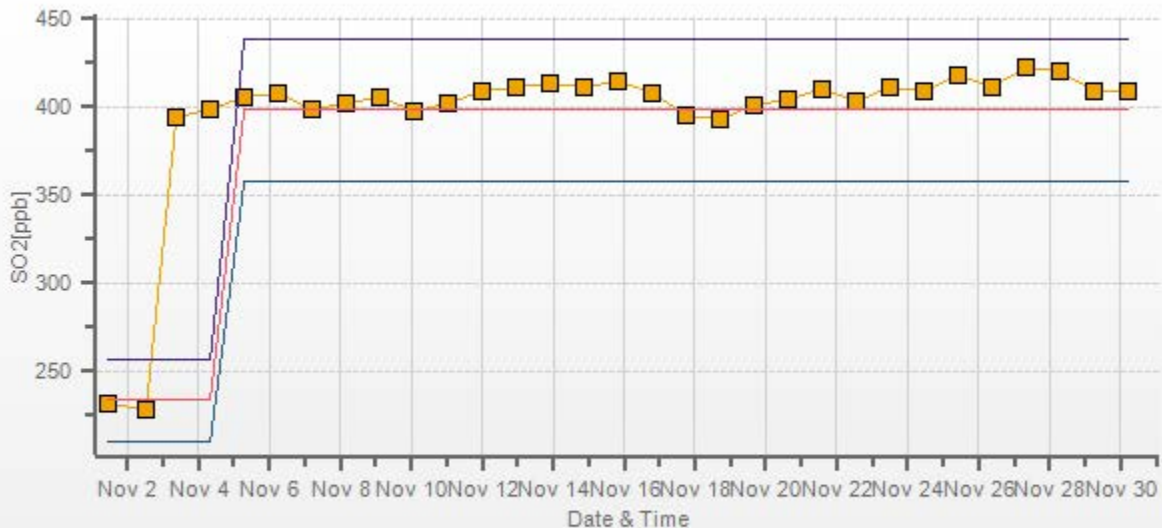
Direction	0.0-0.5	0.5-0.9	0.9-1.4	1.4-1.8	1.8-2.3	>2.3	Total
N	12.69	0.15	0	0.15	0.15	0	13.14
NE	19.97	0.62	0.15	0	0	0	20.74
E	30.5	3.25	1.24	0.31	0.31	0	35.61
SE	11.15	0.31	0	0	0	0	11.46
S	2.79	0	0	0	0	0	2.79
SW	6.19	0.46	0.31	0	0	0	6.96
W	7.74	0	0.15	0	0	0	7.89
NW	1.08	0.15	0.15	0	0	0	1.38
Summary	92.11	4.94	2	0.46	0.46	0	100

% Icon	Classes (ppb)	92		0.0-0.5	5		0.5-0.9	2		0.9-1.4	0		1.4-1.8	0		1.8-2.3	0		>2.3
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LICA ST. LINA Poll.: LICA ST. LINA-SO₂[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



SO2[ppb] Calibration: LICA ST. LINA Monthly: 2016/11 Type: Span



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

HYDROGEN SULPHIDE



HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY																													
1	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
2	0.0	0.0	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	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	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
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	0.0	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	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	24
6	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
7	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
8	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
9	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
10	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
11	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
12	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
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	S	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	0.0	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
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	S	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	S	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	0.0	S	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	S	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	0.0	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
25	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
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	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	24
29	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
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
HOURLY MAX	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	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

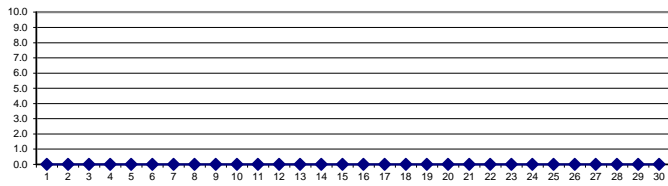
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	10	ppb	24-HR	3	ppb
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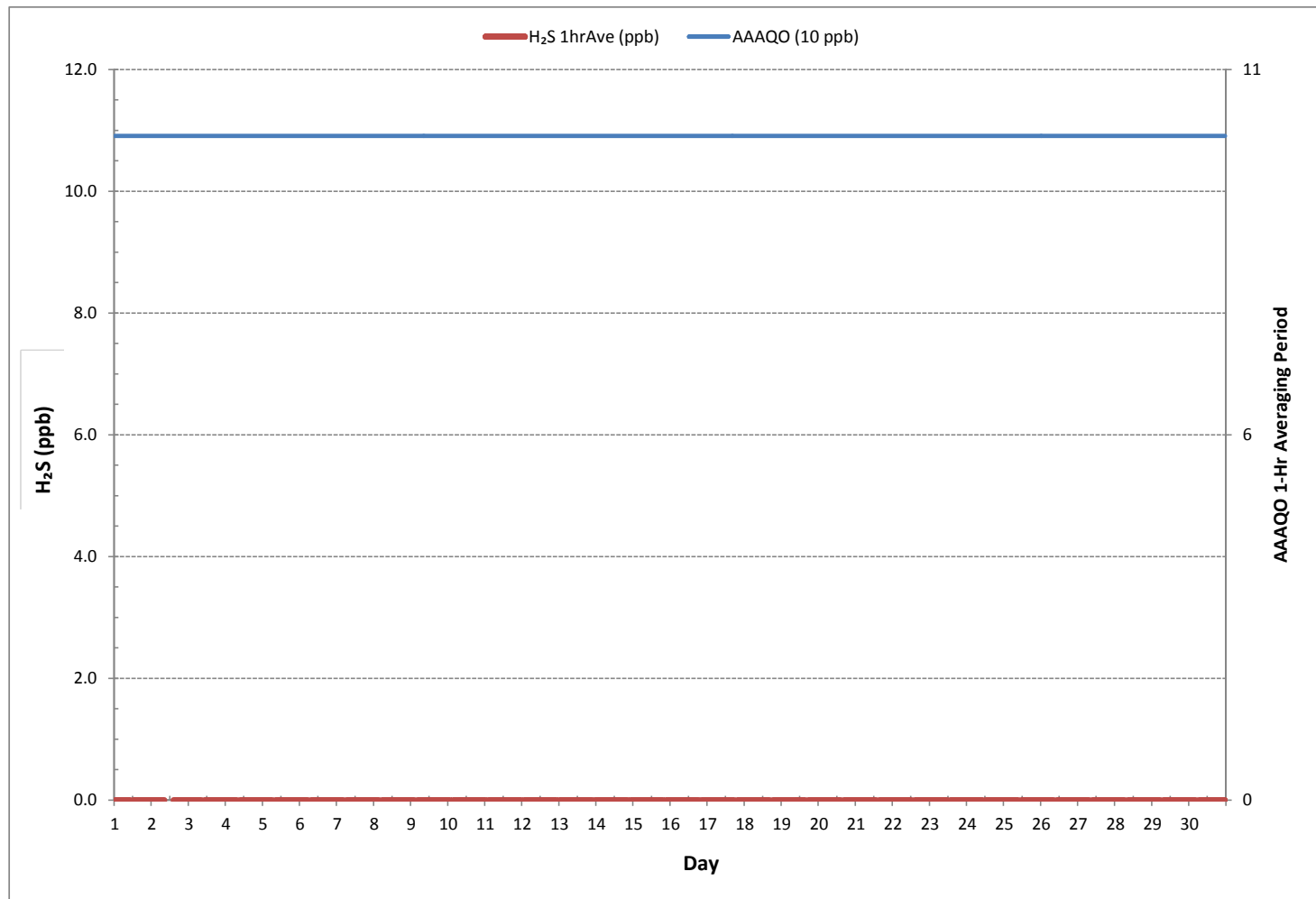
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF 24-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	0					
MINIMUM 1-HR AVERAGE:	0.0	ppb	@ HOUR(S)	ALL	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	0.0	ppb	@ HOUR(S)	ALL	ON DAY(S)	ALL
MAXIMUM 24-HR AVERAGE:	0.0	ppb			ON DAY(S)	ALL
					VAR-VARIOUS	
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	720	hrs	
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:	100.0	%	
STANDARD DEVIATION:	0.0		MONTHLY AVERAGE:	0.0	ppb	

24 HR AVERAGES November 2016



HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)





HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)

HR START (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-HR AVG.	RDGS.	
HR END (MST)	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	0.4	0.4	0.4	0.3	0.3	0.4	0.3	0.2	0.3	0.3	0.2	S	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.0	0.0	0.2	0.0	0.4	0.2	24	
2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	C	C	C	C	C	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.0	1.0	0.5	24
3	1.0	1.0	1.0	0.9	0.9	0.9	1.0	1.0	1.0	S	1.0	1.0	0.9	0.8	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8	1.0	0.9	24
4	0.8	0.8	0.8	0.8	0.8	0.9	1.0	0.9	S	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.2	1.2	0.8	1.2	1.0	24
5	1.2	1.2	1.2	1.2	1.2	1.2	1.2	S	1.3	1.2	1.3	1.3	1.3	1.3	1.4	1.5	1.5	1.4	1.4	1.5	1.5	1.4	1.5	1.4	1.2	1.5	1.3	24	
6	1.3	1.3	1.3	1.3	1.3	1.3	S	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.2	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.9	1.3	1.2	24
7	0.9	0.9	0.9	0.8	1.1	S	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.8	0.8	0.8	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.9	0.8	1.1	0.9	24
8	0.9	0.9	0.9	0.9	S	1.0	0.9	1.0	1.1	1.6	1.1	1.6	1.0	1.1	1.1	1.1	1.2	1.2	1.1	1.2	1.1	1.2	1.1	1.2	0.9	1.6	1.1	24	
9	1.2	1.2	1.1	S	1.1	1.2	1.2	1.2	1.2	1.3	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.7	0.8	0.7	0.6	0.6	0.6	1.3	1.0	24
10	0.7	0.6	S	0.5	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.6	0.6	0.5	0.6	0.7	0.7	0.6	0.8	0.8	0.9	0.9	0.8	0.5	0.9	0.6	24	
11	0.9	S	1.0	1.0	1.1	1.0	1.1	1.1	1.3	1.2	1.2	1.3	1.3	1.4	1.3	1.3	1.4	1.0	1.3	1.3	1.3	1.2	1.1	1.1	0.9	1.4	1.2	24	
12	S	1.2	1.3	1.4	1.2	1.3	1.3	1.2	1.3	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.4	1.5	1.4	1.4	1.4	S	1.2	1.5	1.4	24	
13	1.4	1.4	1.4	1.2	1.2	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.1	1.3	1.2	1.3	1.4	1.4	1.4	1.4	1.4	S	1.4	1.1	1.4	1.3	24	
14	1.4	1.5	1.5	1.6	1.6	1.6	1.6	1.5	1.6	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.4	1.3	1.3	1.3	1.4	S	1.2	1.1	1.1	1.6	1.4	24	
15	1.2	1.1	1.2	1.1	1.1	1.3	1.2	1.2	1.2	1.3	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.4	1.5	1.4	S	1.4	1.4	1.3	1.1	1.5	1.3	24	
16	1.4	1.4	1.4	1.3	1.3	1.2	1.3	1.3	1.3	1.2	1.3	1.2	1.2	1.1	1.2	1.1	1.1	1.1	1.1	S	0.9	0.9	0.9	1.0	0.9	1.4	1.2	24	
17	0.9	1.0	0.9	0.8	1.0	0.9	0.9	0.8	0.8	0.7	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.7	S	0.6	0.6	0.6	0.5	0.5	0.5	1.0	0.7	24	
18	P	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.6	S	0.6	0.7	0.6	0.6	0.6	0.7	0.4	0.7	0.5	23	
19	0.6	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	1.0	S	1.0	0.9	1.0	1.1	1.0	1.1	1.0	0.6	1.1	0.9	24	
20	1.1	1.0	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.2	S	1.2	1.2	1.3	1.2	1.3	1.2	1.3	1.2	1.0	1.3	1.1	24	
21	1.3	1.4	1.4	1.4	1.3	1.5	1.5	1.3	1.4	1.4	1.4	1.4	1.4	S	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.5	1.3	24	
22	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	0.9	0.9	0.9	1.0	0.9	S	1.0	1.0	0.9	1.0	1.1	1.1	1.0	1.2	1.2	1.1	0.9	1.2	1.0	24	
23	1.2	1.1	1.1	1.2	1.2	1.3	1.2	1.2	1.3	1.2	1.2	1.4	S	1.3	1.3	1.3	1.4	1.3	1.4	1.3	1.3	1.3	1.3	1.2	1.1	1.4	1.3	24	
24	1.2	1.3	1.2	1.2	1.2	1.3	1.2	1.2	1.2	1.2	1.4	S	1.4	1.4	1.4	1.3	1.4	1.4	1.3	1.3	1.4	1.4	1.4	1.5	1.2	1.5	1.3	24	
25	1.4	1.5	1.5	1.6	1.5	1.6	1.6	1.7	1.7	1.7	S	1.7	1.8	1.7	1.6	1.6	1.7	1.6	1.5	1.4	1.5	1.4	1.4	1.4	1.4	1.4	1.8	1.6	24
26	1.4	1.3	1.4	1.4	1.4	1.4	1.3	1.3	1.4	S	1.4	1.4	1.3	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.7	1.6	1.6	1.7	1.3	1.7	1.5	24
27	1.5	1.6	1.7	1.8	1.8	1.8	1.8	1.8	S	1.9	1.9	1.8	1.9	1.9	1.8	1.8	1.9	1.9	1.8	1.9	1.9	1.8	1.8	1.9	1.5	1.9	1.8	24	
28	1.8	1.9	1.8	1.8	1.8	1.8	1.7	S	1.7	1.6	1.6	1.7	1.6	1.5	1.6	1.6	1.5	1.5	1.9	1.5	1.4	1.4	1.3	1.3	1.3	1.3	1.9	1.6	24
29	1.3	1.3	1.3	1.3	1.2	1.2	S	1.1	1.1	1.1	1.1	1.0	1.0	1.1	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.3	1.1	24	
30	1.2	1.1	1.1	1.1	1.1	S	1.3	1.2	1.2	1.3	1.2	1.2	1.2	1.2	1.2	1.4	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.3	1.1	1.4	1.2	24	
HOURLY MAX	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.9	1.9	1.8	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9				
HOURLY AVG	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.1	1.2	1.1	1.2	1.1	1.2	1.1	1.1	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1				

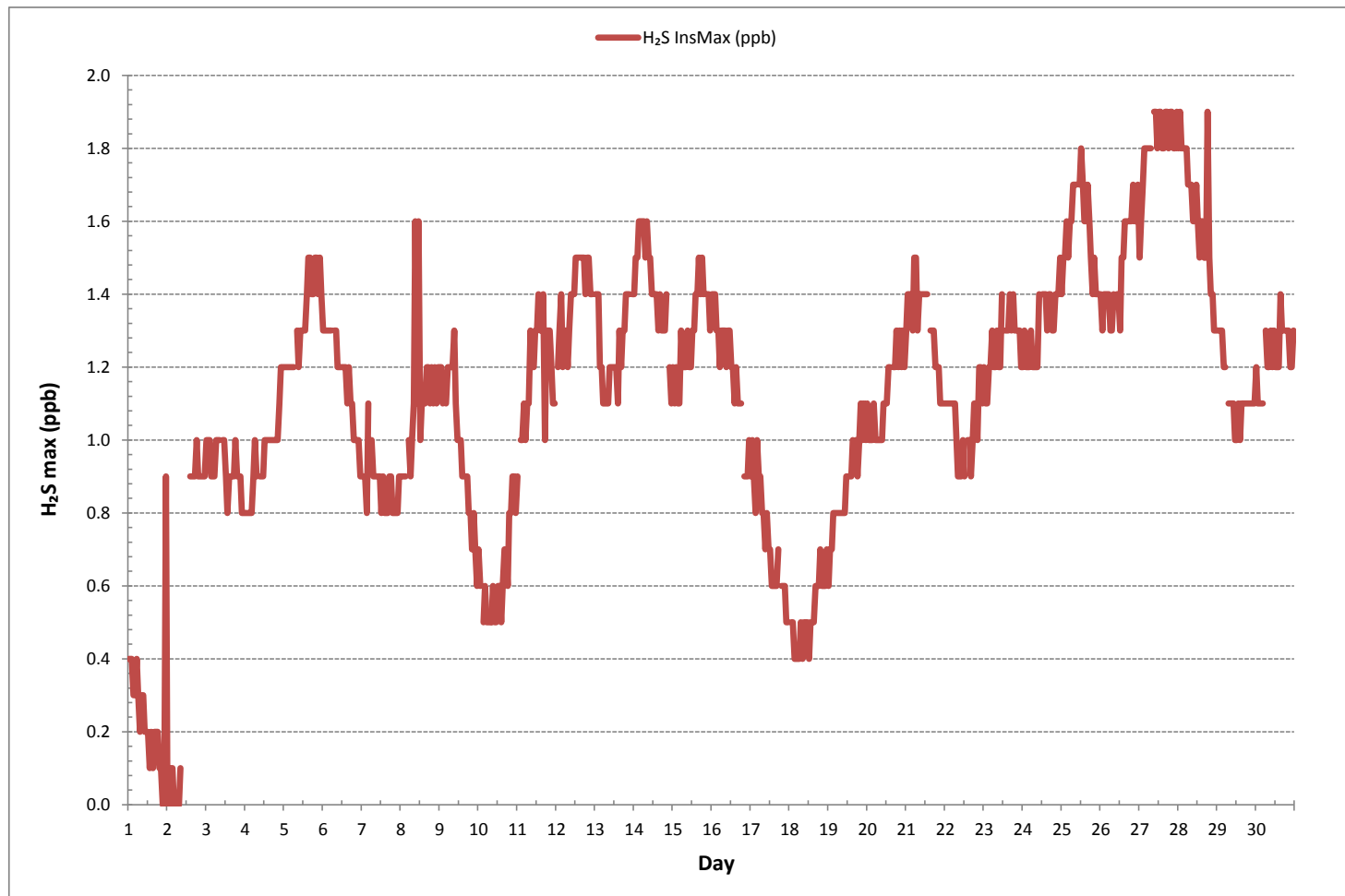
STATUS FLAG CODES

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:	676
MAXIMUM INSTANTANEOUS VALUE:	1.9 ppb @ HOUR(S) VAR ON DAY(S) 27, 28
	VAR-VARIOUS
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	0.4
OPERATIONAL TIME:	719 hrs

HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)



Wind: LICA ST. LINA Poll.: LICA ST. LINA-H2S[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 89.72% Calm Avg: 0.00 [ppb]

Direction	0-0.033	0.033-0.067	0.067-0.1	>0.1	Total
N	13.16	0	0	0	13.16
NE	20.74	0	0	0	20.74
E	35.6	0	0	0	35.6
SE	11.46	0	0	0	11.46
S	2.79	0	0	0	2.79
SW	6.97	0	0	0	6.97
W	7.89	0	0	0	7.89
NW	1.39	0	0	0	1.39
Summary	100	0	0	0	100

% Icon Classes (ppb)

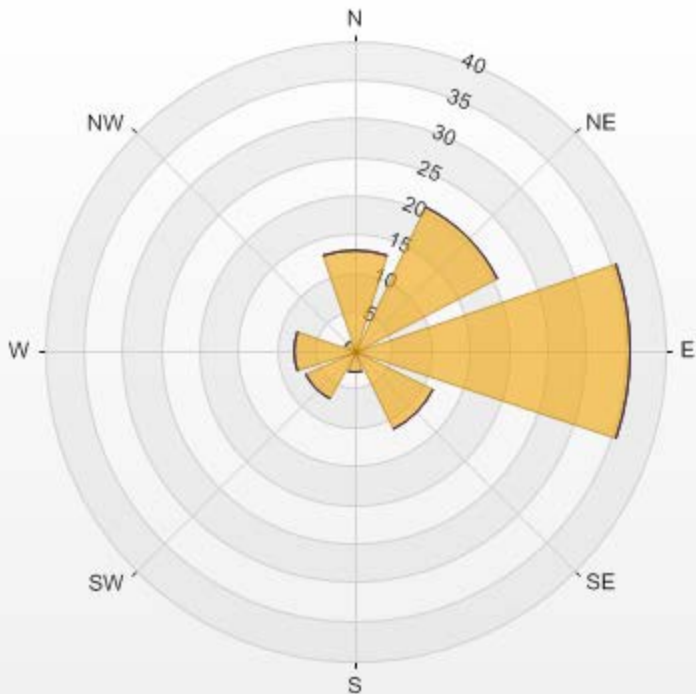
100 0-0.033

0 0.033-0.067

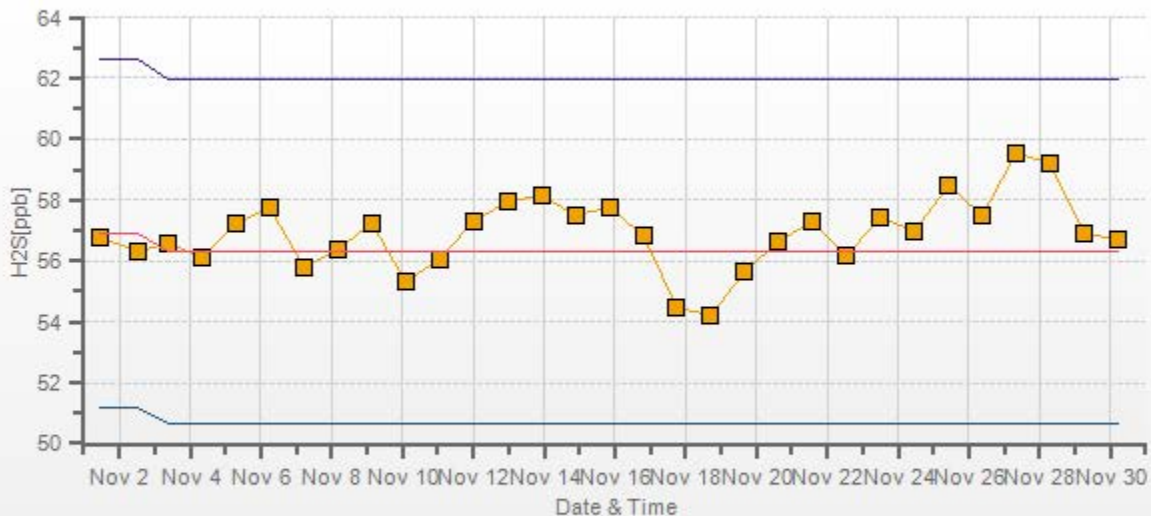
0 0.067-0.1

0 >0.1

LICA ST. LINA Poll.: LICA ST. LINA-H2S[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



H2S[ppb] Calibration: LICA ST. LINA Monthly: 2016/11 Type: Span



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

TOTAL HYDROCARBON



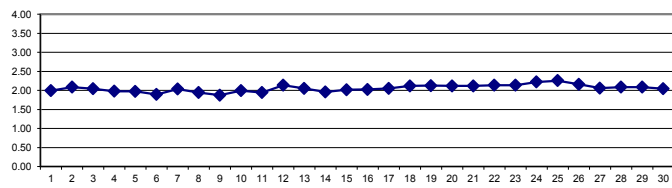
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY 1	1.92	1.93	1.94	1.96	1.97	1.99	2.00	2.04	2.04	2.05	2.05	S	1.94	1.95	1.96	1.96	2.00	2.00	2.05	2.11	2.03	1.98	1.97	1.97	1.92	2.11	1.99	24
2	2.05	2.14	2.05	2.02	2.00	2.04	2.01	2.02	2.06	2.02	1.98	2.10	C	C	C	C	2.33	2.27	2.19	2.16	2.12	2.10	2.07	2.07	1.98	2.33	2.09	24
3	2.04	2.06	2.09	2.08	2.08	2.08	2.09	2.11	2.12	S	2.11	2.07	2.05	2.02	2.03	2.02	1.99	2.00	2.00	2.01	1.98	1.98	1.99	2.01	1.98	2.12	2.04	24
4	2.00	1.99	2.00	2.00	2.01	2.00	1.99	1.96	S	1.96	1.96	1.95	1.95	2.00	1.98	1.99	1.96	1.95	1.96	1.96	1.94	1.97	2.00	2.01	1.94	2.01	1.98	24
5	2.02	2.07	2.12	2.16	2.11	2.07	1.99	S	2.04	1.99	2.00	1.97	1.97	1.96	1.92	1.91	1.90	1.91	1.87	1.86	1.86	1.86	1.90	1.91	1.86	2.16	1.97	24
6	1.91	1.91	1.90	1.92	1.94	1.92	S	1.88	1.88	1.92	1.92	1.89	1.92	1.86	1.90	1.85	1.84	1.85	1.89	1.90	1.91	1.90	1.84	1.87	1.84	1.96	1.89	24
7	1.95	1.97	1.98	2.02	2.11	S	2.19	2.16	2.13	2.09	2.04	2.01	1.98	1.96	1.98	2.01	2.06	2.00	2.06	2.08	2.04	2.01	2.01	2.00	1.95	2.19	2.04	24
8	2.01	2.01	2.03	2.03	S	2.05	2.04	2.02	2.03	2.02	1.99	1.92	1.89	1.86	1.85	1.84	1.85	1.88	1.90	1.89	1.88	1.89	1.90	1.93	1.84	2.05	1.94	24
9	1.91	1.90	1.89	S	1.89	1.90	1.90	1.89	1.91	1.94	1.80	1.78	1.85	1.86	1.85	1.83	1.83	1.86	1.82	1.85	1.91	1.93	1.89	1.90	1.78	1.94	1.87	24
10	1.93	1.87	S	1.90	1.93	1.96	1.97	1.97	1.98	2.02	2.05	2.04	1.99	1.97	1.94	1.94	1.97	2.07	2.09	2.11	2.06	2.04	2.05	2.03	1.87	2.11	1.99	24
11	1.98	S	1.93	1.90	1.87	1.86	1.84	1.82	1.81	1.87	1.84	1.86	1.87	1.90	1.94	1.99	2.02	2.04	2.05	2.05	2.07	2.00	2.08	2.06	1.81	2.08	1.94	24
12	S	2.04	2.25	2.17	1.99	1.96	1.88	1.88	2.05	2.35	2.29	2.24	2.20	2.29	2.16	2.22	2.23	2.34	2.22	2.14	2.10	2.06	2.02	S	1.88	2.35	2.14	24
13	2.01	2.00	1.98	1.94	1.99	1.98	1.99	2.03	2.06	2.11	2.12	2.14	2.18	2.08	2.06	2.03	2.08	2.08	2.05	2.09	2.06	2.06	S	2.14	1.94	2.18	2.05	24
14	2.10	2.01	1.99	2.06	2.06	2.03	1.97	2.00	1.99	1.94	1.89	1.90	1.89	1.90	1.90	1.91	1.93	1.94	1.96	1.91	1.90	S	1.94	1.93	1.89	2.10	1.96	24
15	1.94	1.96	1.96	1.97	1.97	1.99	2.01	2.01	2.00	2.01	2.03	2.02	2.01	2.03	2.03	2.05	2.04	2.05	2.01	1.99	S	2.02	2.09	2.16	1.94	2.16	2.02	24
16	2.10	2.07	2.00	1.94	1.95	1.95	1.98	2.02	2.02	2.00	2.01	2.01	1.99	2.02	2.08	2.14	1.99	2.04	2.06	S	2.09	2.06	2.02	2.04	1.94	2.14	2.03	24
17	2.07	2.06	2.02	2.03	2.03	2.05	2.05	2.04	2.05	2.06	2.05	2.14	2.05	2.08	2.03	2.09	2.05	2.17	S	1.97	1.98	2.00	2.01	2.04	1.97	2.17	2.05	24
18	2.14	2.12	2.12	2.47	2.03	2.04	2.05	2.09	2.09	2.09	2.09	2.06	2.03	2.01	2.01	2.00	2.01	S	2.13	2.21	2.22	2.23	2.21	2.23	2.00	2.47	2.12	24
19	2.28	2.30	2.28	2.37	2.32	2.25	2.21	2.19	2.15	2.12	2.09	2.10	2.08	2.08	2.04	2.03	S	2.00	2.00	1.98	2.00	2.03	2.00	2.00	1.98	2.37	2.13	24
20	2.00	2.01	1.99	2.01	2.03	2.03	2.03	2.04	2.06	2.06	2.05	2.09	2.14	2.28	2.25	S	2.20	2.22	2.22	2.24	2.19	2.19	2.19	2.16	1.99	2.28	2.12	24
21	2.13	2.16	2.13	2.12	2.11	2.12	2.14	2.12	2.13	2.13	2.14	2.14	2.12	2.12	S	2.12	2.12	2.10	2.10	2.10	2.08	2.06	2.09	2.10	2.06	2.16	2.12	24
22	2.12	2.11	2.11	2.10	2.11	2.13	2.14	2.13	2.14	2.12	2.14	2.10	2.08	S	2.00	2.03	2.03	2.14	2.21	2.19	2.21	2.26	2.25	2.23	2.00	2.26	2.13	24
23	2.22	2.17	2.18	2.14	2.13	2.13	2.21	2.26	2.25	2.21	2.16	2.14	S	2.10	2.12	2.10	2.12	2.12	2.11	2.09	2.02	2.03	2.02	2.08	2.02	2.26	2.14	24
24	2.13	2.14	2.13	2.12	2.14	2.14	2.12	2.12	2.15	2.16	2.20	S	2.19	2.20	2.19	2.18	2.23	2.40	2.39	2.31	2.38	2.33	2.35	2.42	2.12	2.42	2.22	24
25	2.46	2.37	2.35	2.38	2.38	2.40	2.39	2.38	2.38	2.32	S	2.22	2.21	2.14	2.05	2.03	2.07	2.16	2.23	2.17	2.16	2.17	2.20	2.25	2.03	2.46	2.26	24
26	2.25	2.20	2.18	2.19	2.17	2.17	2.16	2.15	2.13	S	2.13	2.10	2.04	2.14	2.21	2.27	2.29	2.23	2.22	2.14	2.08	2.08	2.10	2.09	2.04	2.29	2.16	24
27	2.08	2.08	2.05	2.07	2.04	2.02	2.03	2.09	S	2.20	2.12	2.04	2.03	2.01	2.04	2.06	2.07	2.10	2.04	2.04	2.02	2.04	2.04	2.03	2.01	2.20	2.06	24
28	2.06	2.03	2.05	2.04	2.09	2.11	2.13	S	2.10	2.09	2.07	2.03	2.00	2.02	2.04	2.07	2.08	2.11	2.17	2.18	2.18	2.18	2.13	2.04	2.00	2.18	2.09	24
29	2.02	2.01	2.00	2.00	2.10	2.09	S	2.11	2.06	2.10	2.08	2.05	2.09	2.12	2.10	2.30	2.13	2.08	2.09	2.09	2.15	2.09	2.06	2.02	2.00	2.30	2.08	24
30	2.01	2.02	2.01	2.00	2.00	S	2.00	2.03	2.07	2.08	2.07	2.05	2.05	2.06	2.04	2.04	2.05	2.07	2.06	2.08	2.07	2.05	2.08	2.09	2.00	2.09	2.05	24
HOURLY MAX	2.46	2.37	2.35	2.47	2.38	2.40	2.39	2.38	2.38	2.35	2.29	2.24	2.21	2.29	2.25	2.30	2.33	2.40	2.39	2.31	2.38	2.33	2.35	2.42				
HOURLY AVG	2.06	2.06	2.06	2.07	2.05	2.05	2.05	2.06	2.07	2.07	2.05	2.04	2.03	2.04	2.03	2.04	2.05	2.08	2.07	2.07	2.06	2.06	2.05	2.06				

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 HR AVERAGES November 2016



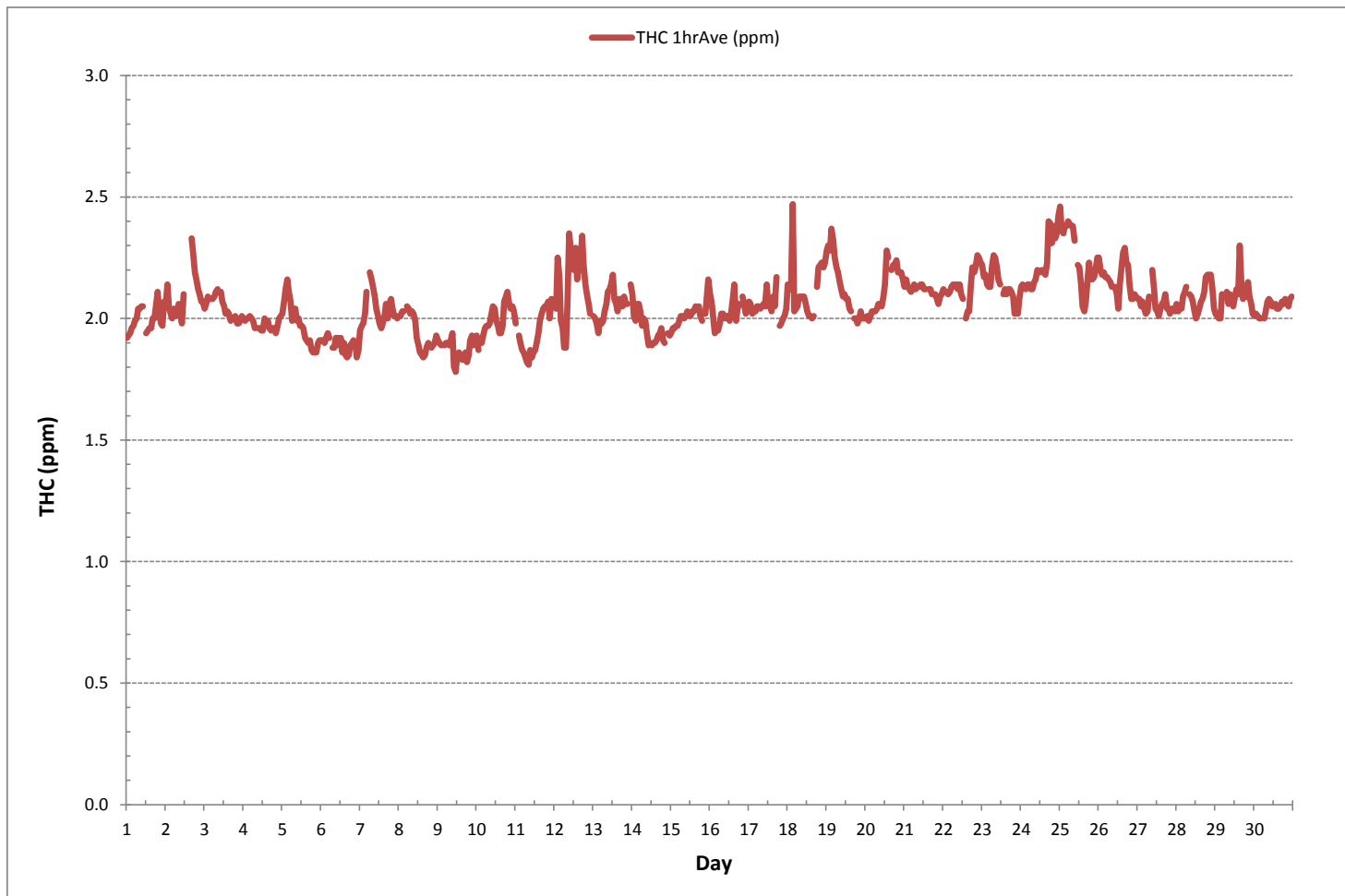
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	686			
MINIMUM 1-HR AVERAGE:	1.78 ppm	@ HOUR(S)	11	ON DAY(S) 9
MAXIMUM 1-HR AVERAGE:	2.47 ppm	@ HOUR(S)	3	ON DAY(S) 18
MAXIMUM 24-HR AVERAGE:	2.26 ppm			ON DAY(S) 25
				VAR-VARIOUS
IZS CALIBRATION TIME:	30 hrs	OPERATIONAL TIME:	720 hrs	
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	0.11	MONTHLY AVERAGE:	2.06 ppm	



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2016

TOTAL HYDROCARBONS Hourly Averages (THC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2016

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

HR START (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-HR	RDGS.		
HR END (MST)	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.			
DAY																														
1	1.86	1.86	1.88	1.89	1.92	1.94	1.95	1.98	2.08	2.23	2.14	S	2.32	2.27	2.51	2.54	2.44	2.69	2.48	3.26	2.60	2.08	2.07	2.05	1.86	3.26	2.22	24		
2	2.26	2.24	2.21	2.12	2.11	2.17	2.14	2.14	2.32	2.18	2.17	2.26	C	C	C	C	C	2.44	2.35	2.33	2.27	2.27	2.23	2.23	2.11	2.44	2.23	24		
3	2.20	2.25	2.26	2.26	2.23	2.25	2.26	2.27	2.29	S	2.29	2.26	2.23	2.20	2.20	2.23	2.17	2.17	2.18	2.20	2.17	2.17	2.18	2.21	2.17	2.29	2.22	24		
4	2.21	2.19	2.20	2.20	2.20	2.20	2.20	2.17	S	2.14	2.15	2.14	2.17	2.20	2.17	2.17	2.19	2.13	2.14	2.14	2.14	2.11	2.14	2.20	2.20	2.11	2.21	2.17	24	
5	2.17	2.25	2.28	2.32	2.29	2.23	2.14	S	2.20	2.14	2.16	2.13	2.11	2.13	2.08	2.05	2.04	2.05	2.01	2.01	1.99	1.98	2.80	2.20	1.98	2.80	2.16	24		
6	2.05	2.08	2.04	2.26	2.25	2.05	S	2.04	2.17	2.80	2.38	2.08	2.47	2.08	2.54	2.22	2.04	2.08	2.11	2.13	2.14	2.14	2.10	2.17	2.04	2.80	2.19	24		
7	2.22	2.24	2.25	2.32	2.41	S	2.47	2.47	2.41	2.36	2.32	2.29	2.26	2.26	2.25	2.28	2.35	2.32	2.38	2.36	2.30	2.26	2.27	2.26	2.22	2.47	2.32	24		
8	2.26	2.26	2.27	2.27	S	2.29	2.29	2.26	2.26	2.26	2.23	2.14	2.13	2.08	2.07	2.06	2.07	2.08	2.10	2.08	2.08	2.09	2.09	2.14	2.06	2.29	2.17	24		
9	2.09	2.08	2.08	S	2.08	2.10	2.11	2.11	2.12	2.17	2.11	2.04	2.24	2.23	2.20	2.23	2.38	2.33	2.20	2.29	2.44	2.41	2.35	2.41	2.04	2.44	2.21	24		
10	2.44	2.23	S	2.23	2.23	2.26	2.27	2.27	2.26	2.32	2.33	2.33	2.29	2.26	2.23	2.21	2.26	2.41	2.38	2.39	2.35	2.29	2.32	2.30	2.21	2.44	2.30	24		
11	2.25	S	2.17	2.14	2.11	2.08	2.07	2.04	2.02	2.11	2.04	2.07	2.07	2.11	2.14	2.19	2.20	2.23	2.22	2.20	2.23	2.17	2.26	2.23	2.02	2.26	2.15	24		
12	S	2.51	9.34	2.41	2.25	2.25	2.07	2.04	2.35	2.53	2.45	2.41	2.36	3.66	3.39	2.85	2.38	3.17	2.45	2.66	2.57	2.51	2.44	S	2.04	9.34	2.87	24		
13	2.48	2.32	2.11	2.08	2.11	2.08	2.11	2.14	2.18	2.22	2.22	2.26	2.29	2.26	2.16	2.12	2.22	2.20	2.13	2.17	2.14	2.20	S	2.22	2.08	2.48	2.19	24		
14	2.20	2.08	2.08	2.13	2.13	2.11	2.04	2.25	2.53	2.38	1.98	2.08	2.02	1.98	2.04	2.00	2.07	2.01	2.09	2.09	1.99	S	2.02	1.98	1.98	2.53	2.10	24		
15	2.00	2.01	2.01	2.01	2.01	2.04	2.05	2.05	2.04	2.05	2.07	2.05	2.04	2.07	2.09	2.11	2.07	2.08	2.04	2.01	S	2.51	2.95	2.56	2.00	2.95	2.13	24		
16	2.54	2.14	2.94	2.00	2.27	2.00	2.04	2.10	2.26	2.64	2.35	2.12	2.33	2.51	2.78	2.87	2.21	2.17	2.60	S	2.67	2.48	2.66	2.66	2.00	2.94	2.41	24		
17	2.23	2.23	2.20	2.21	2.23	2.26	2.30	2.41	2.44	2.83	2.53	3.64	2.73	2.81	2.76	3.19	3.16	3.52	S	2.51	2.33	2.35	2.35	2.38	2.20	3.64	2.59	24		
18	P	4.65	3.43	6.70	2.38	2.41	2.41	2.44	2.45	2.44	2.44	2.41	2.38	2.35	2.35	2.35	2.35	S	2.50	2.54	2.54	2.54	2.51	2.54	2.35	6.70	2.78	23		
19	2.60	2.59	2.60	2.66	2.61	2.54	2.50	2.47	2.41	2.36	2.35	2.33	2.31	2.31	2.26	2.25	S	2.20	2.22	2.17	2.21	2.23	2.18	2.18	2.17	2.66	2.37	24		
20	2.17	2.18	2.17	2.17	2.20	2.19	2.18	2.20	2.20	2.20	2.18	2.23	2.32	2.49	2.47	S	2.32	2.33	2.35	2.35	2.28	2.29	2.27	2.25	2.17	2.49	2.26	24		
21	2.20	2.23	2.21	2.17	2.14	2.15	2.17	2.15	2.15	2.16	2.17	2.17	2.18	2.14	S	2.14	2.14	2.13	2.13	2.14	2.14	2.14	2.14	2.20	2.13	2.23	2.16	24		
22	2.20	2.20	2.20	2.20	2.22	2.23	2.25	2.26	2.26	2.26	2.29	2.26	2.29	2.26	2.23	S	2.20	2.28	2.18	2.36	2.36	2.32	2.33	2.35	2.38	2.35	2.18	2.38	2.27	24
23	2.31	2.28	2.26	2.22	2.20	2.23	2.27	2.30	2.29	2.26	2.20	2.17	S	2.12	2.14	2.14	2.15	2.17	2.14	2.11	2.07	2.05	2.05	2.13	2.05	2.31	2.19	24		
24	2.17	2.18	2.17	2.23	2.17	2.18	2.17	2.17	2.20	2.22	2.25	S	2.23	2.23	2.22	2.20	2.28	2.44	2.45	2.32	2.41	2.32	2.35	2.41	2.17	2.45	2.26	24		
25	2.45	2.38	2.30	2.32	2.32	2.33	2.32	2.30	2.30	2.26	S	2.14	2.11	2.10	1.98	1.98	2.02	2.17	2.29	2.21	2.13	2.15	2.18	2.23	1.98	2.45	2.22	24		
26	2.55	2.20	2.17	2.20	2.17	2.18	2.17	2.51	2.15	S	2.17	2.13	2.04	2.23	2.20	2.26	2.27	2.22	2.17	2.11	2.04	2.04	2.01	1.99	1.99	2.55	2.18	24		
27	1.98	1.96	1.94	1.95	1.92	1.89	1.91	1.98	S	2.08	2.01	1.89	1.88	1.89	2.44	2.44	2.63	2.51	2.61	2.53	2.18	2.52	2.26	2.39	1.88	2.63	2.16	24		
28	2.29	2.35	2.54	2.36	2.57	2.41	2.47	S	2.38	2.63	2.45	2.39	1.95	2.13	2.17	2.35	2.04	2.08	2.55	2.42	2.48	2.48	2.60	2.35	1.95	2.63	2.37	24		
29	2.15	2.04	2.02	2.21	2.58	2.48	S	2.69	2.38	2.60	2.42	2.38	2.41	2.50	2.91	3.09	3.04	2.12	2.14	2.14	2.20	2.17	2.11	2.08	2.02	3.09	2.39	24		
30	2.07	2.06	2.05	2.05	2.04	S	2.04	2.08	2.11	2.13	2.14	2.10	2.11	2.11	2.08	2.08	2.11	2.11	2.10	2.11	2.11	2.09	2.13	2.11	2.04	2.14	2.09	24		
HOURLY MAX	2.60	4.65	9.34	6.70	2.61	2.54	2.50	2.69	2.53	2.83	2.53	3.64	2.73	3.66	3.39	3.19	3.16	3.52	2.61	3.26	2.67	2.54	2.95	2.66						
HOURLY AVG	2.24	2.29	2.50	2.35	2.22	2.20	2.19	2.22	2.26	2.32	2.24	2.25	2.22	2.28	2.32	2.32	2.28	2.31	2.27	2.29	2.26	2.26	2.29	2.26						

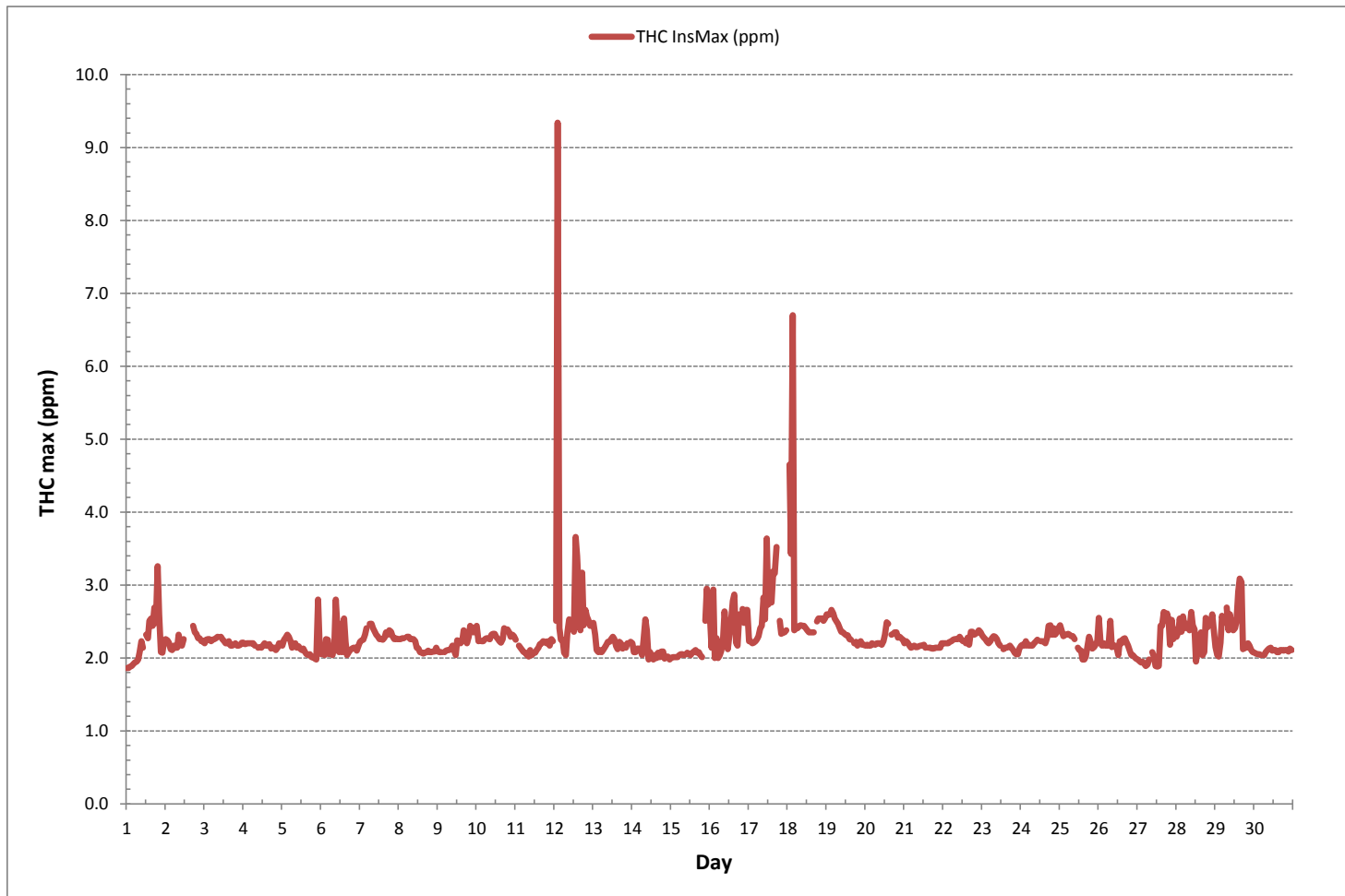
STATUS FLAG CODES

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:	684
MAXIMUM INSTANTANEOUS VALUE:	9.34 ppm @ HOUR(S) 2 ON DAY(S) 12
	VAR-VARIOUS
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	719 hrs
STANDARD DEVIATION:	0.40

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

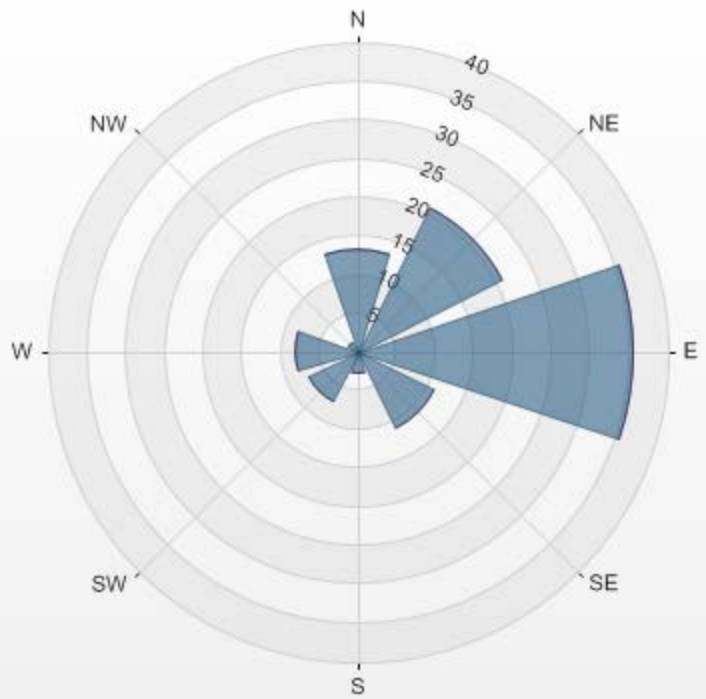


Wind: LICA ST. LINA Poll.: LICA ST. LINA-THC[ppm] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 89.58% Calm Avg: 0.00 [ppm]

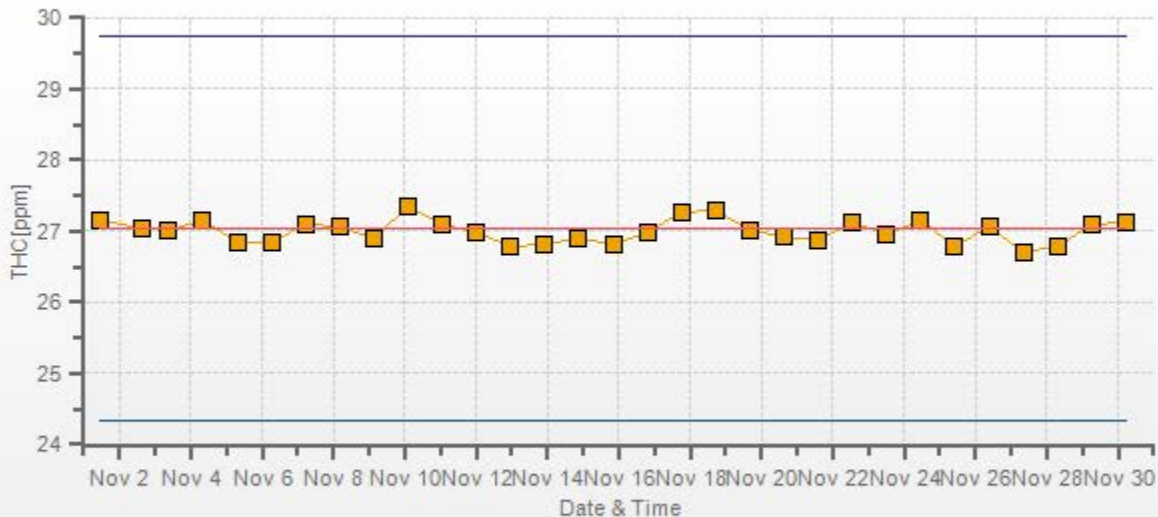
Direction	0.0-0.8	0.8-1.7	1.7-2.5	>2.5	Total
N	0	0	13.18	0	13.18
NE	0	0	20.78	0	20.78
E	0	0	35.5	0	35.5
SE	0	0	11.16	0	11.16
S	0	0	2.79	0	2.79
SW	0	0	7.13	0	7.13
W	0	0	8.06	0	8.06
NW	0	0	1.4	0	1.4
Summary	0	0	100	0	100

% Icon Classes (ppm) 0 0.0-0.8 0 0.8-1.7 100 1.7-2.5 0 >2.5

LICA ST. LINA Poll.: LICA ST. LINA-THC[ppm] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



THC[ppm] Calibration: LICA ST. LINA Monthly: 2016/11 Type: Span



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

OXIDES OF NITROGEN

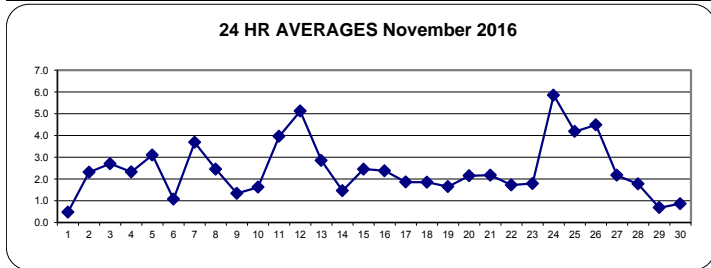


OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY 1	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.1	0.0	0.0	S	0.7	0.3	0.6	0.5	0.9	0.9	0.4	1.0	1.6	1.0	1.3	0.9	0.0	1.6	0.5	24
2	2.0	3.4	2.5	1.9	2.2	3.5	3.4	2.7	2.2	C	C	C	C	C	C	C	2.7	2.1	1.9	2.3	2.0	1.9	1.4	1.3	1.3	3.5	2.3	24
3	1.2	1.1	1.3	1.5	1.4	1.8	1.8	2.0	2.2	S	4.5	4.3	2.7	2.1	2.0	2.4	3.2	4.7	6.2	5.8	3.1	2.2	2.2	2.5	1.1	6.2	2.7	24
4	2.4	2.0	1.6	1.4	1.5	1.8	2.7	1.6	S	2.1	3.0	2.8	3.0	2.7	2.7	2.1	2.8	3.1	3.3	2.4	1.9	2.0	2.3	2.2	1.4	3.3	2.3	24
5	2.1	2.7	3.2	3.1	2.5	2.2	2.5	S	3.5	3.3	3.4	3.5	3.6	4.4	4.3	4.1	4.5	3.5	2.8	2.6	2.6	2.4	2.4	2.1	2.1	4.5	3.1	24
6	3.8	2.8	1.8	1.6	1.3	0.7	S	0.5	1.2	1.0	0.9	1.2	0.9	1.1	0.6	0.6	0.1	0.4	0.8	0.7	0.7	0.8	0.4	0.1	3.8	1.1	24	
7	0.9	1.1	1.7	4.0	6.8	S	10.0	8.0	4.9	4.2	4.4	4.5	4.3	3.8	2.6	2.7	3.9	4.1	3.7	2.6	2.0	1.7	1.5	1.4	0.9	10.0	3.7	24
8	1.4	1.7	1.6	1.7	S	2.2	2.3	2.2	2.9	4.1	3.0	2.6	2.6	1.9	2.2	2.5	3.0	2.7	2.4	2.2	2.6	2.7	3.0	3.0	1.4	4.1	2.5	24
9	2.2	1.7	1.4	S	1.9	2.3	2.5	2.7	4.6	6.4	2.3	0.6	0.8	0.0	0.1	0.1	0.3	0.2	0.2	0.1	0.0	0.1	0.2	0.2	0.0	6.4	1.3	24
10	0.3	0.0	S	0.3	0.9	1.1	1.0	1.5	1.5	3.8	1.7	2.2	2.4	2.7	1.3	1.3	1.4	2.7	2.7	2.7	1.6	1.7	1.4	1.1	0.0	3.8	1.6	24
11	0.8	S	0.8	0.9	0.7	0.7	1.1	1.2	1.2	2.7	2.2	2.5	4.2	5.5	6.6	7.2	7.5	6.8	6.4	7.6	4.8	6.5	6.4	0.7	7.6	4.0	24	
12	S	12.2	10.8	13.4	7.3	4.2	1.6	1.1	4.3	8.3	6.4	5.1	4.3	4.1	4.0	3.8	4.0	5.1	3.6	2.7	2.0	2.1	2.4	S	1.1	13.4	5.1	24
13	2.7	2.1	2.0	1.5	1.1	0.7	0.5	0.7	1.2	1.8	2.3	3.2	4.9	4.0	3.2	5.3	4.1	3.3	3.0	5.3	5.5	3.5	S	3.7	0.5	5.5	2.9	24
14	2.9	2.4	2.9	3.2	3.7	5.7	4.9	1.9	2.0	0.7	0.6	0.2	0.0	0.2	0.1	0.0	0.4	0.7	0.2	0.0	0.2	S	0.3	0.4	0.0	5.7	1.5	24
15	0.4	0.6	0.7	0.6	0.7	0.8	1.6	0.9	1.4	1.5	2.8	3.2	4.3	3.8	5.9	5.2	5.0	3.6	2.7	S	2.9	2.7	3.5	0.4	5.9	2.5	24	
16	3.8	3.2	2.5	2.4	2.1	1.9	2.1	2.9	2.2	2.3	3.1	2.8	2.7	2.6	2.5	2.0	2.5	2.2	2.0	S	2.0	1.7	1.6	1.6	1.6	3.8	2.4	24
17	1.4	1.4	1.2	1.6	2.8	3.1	2.9	1.8	1.0	0.5	0.5	0.6	1.0	1.0	2.0	2.1	6.0	6.5	S	2.3	1.4	0.6	0.7	0.4	0.4	6.5	1.9	24
18	0.8	0.8	0.7	0.8	0.9	0.8	1.0	0.8	0.9	1.5	2.5	1.4	0.9	0.8	1.0	0.8	1.4	S	2.9	3.9	4.6	4.8	4.6	4.0	0.7	4.8	1.9	24
19	4.3	4.2	3.3	3.0	2.6	2.0	1.9	1.7	1.7	1.6	1.6	1.3	1.1	1.3	1.1	0.7	S	0.5	0.6	0.6	0.5	1.0	0.7	0.6	0.5	4.3	1.6	24
20	1.2	0.7	0.4	0.5	1.1	1.0	0.8	0.9	1.0	1.9	1.6	2.1	2.5	5.2	4.6	S	2.9	3.5	3.2	3.4	3.0	2.7	2.7	2.6	0.4	5.2	2.2	24
21	2.9	3.1	2.8	2.7	2.4	2.6	2.4	2.3	2.2	2.4	3.0	3.1	2.4	2.3	S	2.5	2.2	1.6	1.8	1.4	1.0	0.9	1.0	1.1	0.9	3.1	2.2	24
22	1.2	1.3	1.3	1.1	1.0	1.0	1.1	1.2	1.0	1.2	1.2	1.3	0.7	S	0.9	1.3	1.5	3.1	3.6	2.9	2.8	3.9	3.1	1.9	0.7	3.9	1.7	24
23	1.8	1.7	1.8	1.8	1.4	1.6	1.8	2.0	1.9	2.1	2.2	2.4	S	2.4	2.5	2.4	2.3	1.8	1.6	1.3	1.2	1.0	0.9	1.3	0.9	2.5	1.8	24
24	1.8	1.9	1.3	1.1	1.4	2.9	4.3	6.0	7.2	7.2	8.7	S	8.7	8.4	9.9	6.8	8.6	10.2	8.6	6.8	7.0	6.0	5.1	4.8	1.1	10.2	5.9	24
25	4.7	4.2	4.3	4.7	5.3	5.5	5.3	5.0	5.3	4.9	S	3.9	4.3	3.3	2.7	2.8	4.2	4.0	3.9	2.9	3.1	3.2	4.0	4.8	2.7	5.5	4.2	24
26	4.5	3.4	3.3	9.7	7.8	4.8	4.3	5.4	5.8	S	4.9	5.0	4.5	5.4	6.2	6.3	5.4	4.3	3.6	2.1	1.4	1.7	2.1	1.5	1.4	9.7	4.5	24
27	1.7	1.8	1.4	2.1	1.0	0.5	0.6	2.1	S	7.3	5.1	2.7	2.2	1.9	2.0	2.9	2.7	3.3	2.0	1.2	1.6	1.4	1.3	1.1	0.5	7.3	2.2	24
28	1.3	1.1	0.8	0.8	1.0	1.1	1.3	S	2.0	1.7	1.6	1.3	1.3	1.7	2.4	2.4	3.2	3.0	3.3	2.8	2.1	2.1	1.5	0.9	0.8	3.3	1.8	24
29	0.7	0.6	0.5	0.6	0.4	0.3	S	0.6	0.7	0.5	1.0	0.7	0.6	0.6	0.7	0.7	0.9	0.5	1.2	1.0	0.9	0.8	0.9	0.3	0.3	1.2	0.7	24
30	0.3	0.1	0.2	0.5	0.3	S	0.7	0.7	1.0	1.1	1.1	1.1	1.0	1.0	1.2	1.4	1.3	1.3	1.2	0.9	0.8	0.9	0.9	0.9	0.1	1.4	0.9	24
HOURLY MAX	4.7	12.2	10.8	13.4	7.8	5.7	10.0	8.0	7.2	8.3	8.7	5.1	8.7	8.4	9.9	7.2	8.6	10.2	8.6	6.8	7.6	6.0	6.5	6.4				
HOURLY AVG	1.9	2.2	2.0	2.4	2.2	2.0	2.4	2.2	2.4	2.8	2.7	2.4	2.6	2.7	2.6	3.1	3.1	2.8	2.5	2.3	2.2	2.1	2.0					

STATUS FLAG CODES

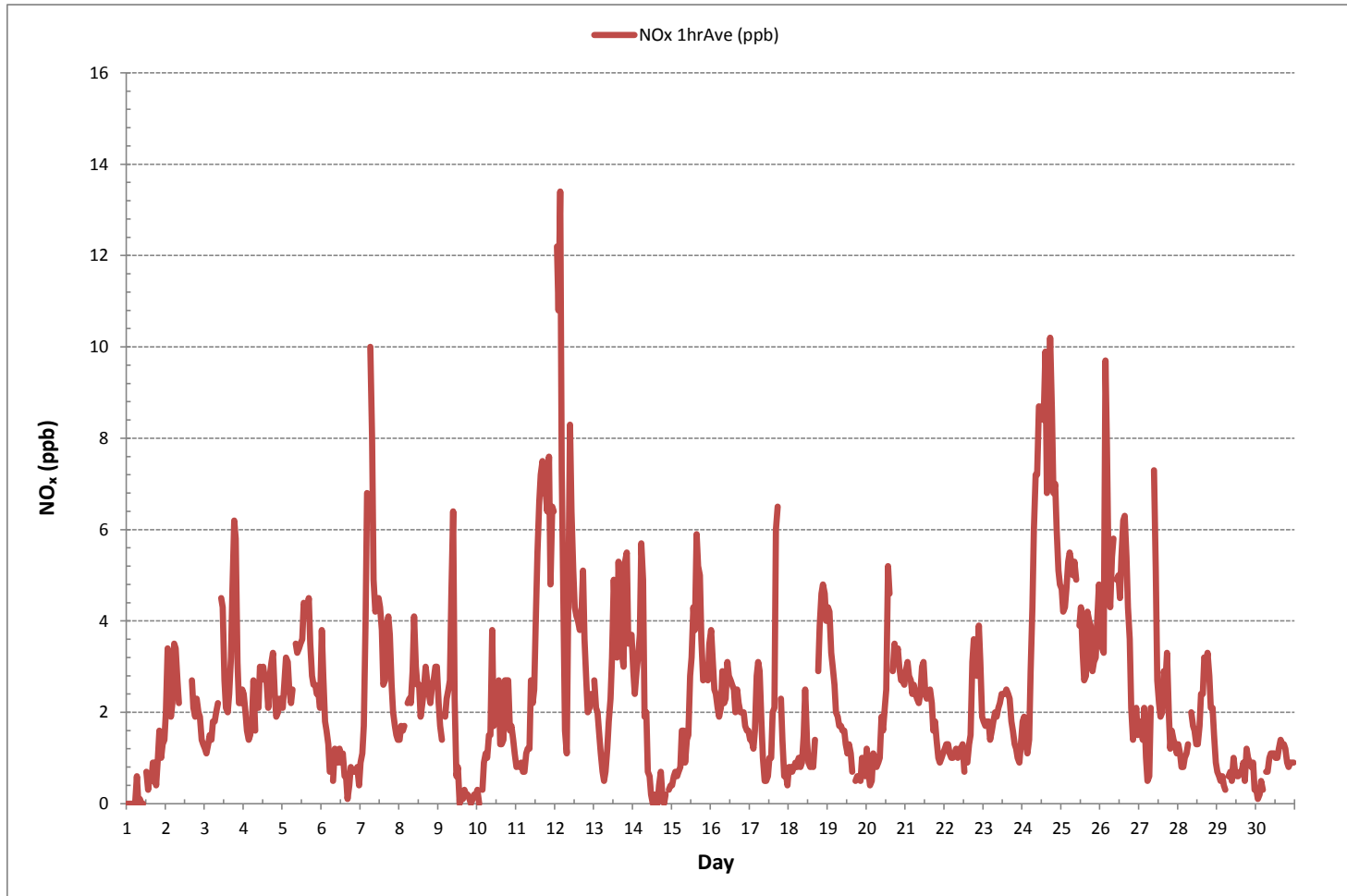
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	668				
MINIMUM 1-HR AVERAGE:	0.0	ppb	@ HOUR(S)	VAR	ON DAY(S)
MAXIMUM 1-HR AVERAGE:	13.4	ppb	@ HOUR(S)	3	ON DAY(S)
MAXIMUM 24-HR AVERAGE:	5.9	ppb			ON DAY(S)
					VAR-VARIOUS
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	720	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	1.9		MONTHLY AVERAGE:	2.4	ppb

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2016

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)

HR START (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-HR AVG.	RDGS.	
HR END (MST)	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	0.7	0.6	0.6	0.6	0.5	0.6	3.6	2.5	2.7	0.9	0.7	S	2.4	0.9	1.9	2.0	3.6	3.0	0.9	4.4	8.0	1.2	4.4	1.1	0.5	8.0	2.1	24	
2	3.9	3.9	4.0	2.0	2.4	4.5	4.2	3.3	2.3	C	C	C	C	C	C	C	2.6	2.8	2.4	3.6	1.8	4.8	1.4	1.1	1.1	4.8	3.0	24	
3	1.0	0.9	1.3	1.3	1.3	1.4	1.6	2.0	2.3	S	16.0	4.5	21.9	3.1	1.7	2.1	3.5	4.8	6.2	6.3	3.6	2.2	2.0	2.6	0.9	21.9	4.1	24	
4	2.2	1.8	1.4	1.0	1.3	1.3	3.5	1.8	S	1.8	4.7	2.8	3.2	4.3	5.8	3.4	4.5	3.6	3.6	2.5	1.8	1.7	2.2	2.1	1.0	5.8	2.7	24	
5	2.1	2.7	3.3	3.2	2.4	2.1	3.2	S	4.7	3.5	3.7	4.0	26.1	17.4	5.6	4.8	8.2	3.7	3.1	2.7	2.6	2.8	2.5	2.2	2.1	26.1	5.1	24	
6	4.5	3.9	2.1	1.9	1.9	1.0	S	0.6	1.5	1.9	0.9	1.5	1.3	4.8	1.5	3.4	0.4	0.6	1.7	0.7	0.9	0.7	0.7	0.4	0.4	4.8	1.7	24	
7	0.7	0.9	1.8	4.8	8.1	S	9.9	8.9	6.0	30.9	10.2	10.2	5.1	5.1	2.4	2.5	3.9	3.9	4.1	2.4	1.8	1.5	1.3	1.0	0.7	30.9	5.5	24	
8	0.9	1.1	1.2	1.2	S	1.9	2.6	2.1	6.7	8.1	2.6	2.2	3.4	1.6	2.4	2.2	5.3	3.5	2.0	3.3	2.9	2.8	2.8	4.2	0.9	8.1	2.9	24	
9	2.3	1.5	0.9	S	2.0	2.1	3.1	17.5	5.4	6.1	4.8	0.4	1.0	0.0	0.0	0.0	7.6	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	17.5	2.4	24	
10	0.0	0.0	S	0.2	0.5	0.5	0.7	1.5	1.2	44.0	1.3	2.1	1.9	4.0	1.0	0.8	1.2	2.6	2.4	2.3	1.4	1.1	0.9	0.6	0.0	44.0	3.1	24	
11	0.4	S	0.3	0.4	0.1	0.2	1.5	1.2	1.5	10.6	2.8	2.9	4.2	6.5	6.8	9.2	47.6	7.3	29.5	7.6	52.7	5.2	6.8	6.6	0.1	52.7	9.2	24	
12	S	14.2	11.8	15.0	10.4	6.2	2.8	1.5	6.8	8.7	7.0	4.8	4.3	4.3	4.3	4.5	4.3	5.8	3.9	2.3	2.0	1.8	2.2	S	1.5	15.0	5.9	24	
13	3.1	2.0	2.0	1.5	0.9	0.4	0.4	0.7	1.6	2.1	3.8	4.3	4.9	4.2	3.7	6.1	4.7	3.3	4.5	5.4	5.7	3.7	S	4.1	0.4	6.1	3.2	24	
14	2.9	2.4	3.2	3.4	4.1	6.1	6.1	13.9	45.3	1.3	0.6	0.0	0.0	0.0	0.0	0.0	0.7	19.8	0.0	0.0	0.0	S	0.0	0.0	0.0	45.3	4.8	24	
15	0.0	0.2	0.3	0.2	0.3	0.2	19.8	2.9	0.7	28.0	12.9	4.0	4.7	5.5	4.0	9.3	4.7	4.8	4.1	2.3	S	2.8	2.5	3.7	0.0	28.0	5.1	24	
16	3.4	2.9	3.2	2.8	1.6	1.5	3.0	4.7	2.3	2.6	3.5	2.1	13.2	4.2	5.0	2.2	4.5	2.3	2.6	S	1.7	1.3	1.0	0.9	0.9	13.2	3.2	24	
17	1.0	2.5	0.7	1.5	2.1	2.5	2.5	2.4	0.8	0.1	0.0	0.9	0.8	1.0	2.6	2.9	10.0	36.0	S	8.4	7.2	0.2	0.0	0.0	0.0	36.0	3.7	24	
18	P	0.3	0.2	0.2	0.6	0.4	1.1	0.6	0.5	1.6	3.0	1.4	0.6	0.7	0.8	0.6	1.3	S	0.5	3.1	4.1	4.5	4.9	4.4	3.9	0.2	4.9	1.8	23
19	4.2	4.1	3.4	3.0	2.5	1.9	1.9	1.6	1.6	1.6	1.6	1.3	1.1	1.1	1.4	0.8	S	0.5	0.7	0.5	0.8	0.9	0.6	0.6	0.5	4.2	1.6	24	
20	1.1	0.8	0.3	0.4	1.1	1.0	0.6	0.6	1.1	1.7	1.4	1.9	2.7	6.2	6.1	S	3.0	3.3	3.1	3.3	2.9	2.7	2.6	2.4	0.3	6.2	2.2	24	
21	3.1	3.2	3.0	2.7	2.4	2.7	2.6	2.4	2.3	2.6	3.7	3.7	2.8	2.6	S	3.0	2.4	1.9	2.6	2.7	1.2	1.1	1.3	1.3	1.1	3.7	2.5	24	
22	1.1	1.3	1.4	1.3	1.0	1.1	2.0	1.7	1.2	2.0	1.6	4.0	0.7	S	0.8	2.4	2.1	3.5	3.5	3.0	2.8	4.8	4.9	1.7	0.7	4.9	2.2	24	
23	1.9	1.9	1.8	1.6	1.3	1.7	1.5	1.9	1.6	1.9	2.2	2.4	S	2.3	2.4	2.4	2.4	1.7	1.4	1.4	1.2	0.9	0.9	1.6	0.9	2.4	1.8	24	
24	1.9	2.0	1.9	1.3	1.7	3.6	5.6	7.9	48.7	11.2	11.4	S	9.3	9.4	11.0	8.5	9.8	11.9	9.4	7.7	7.4	7.4	5.2	4.9	1.3	48.7	8.7	24	
25	4.7	4.2	4.3	4.9	5.5	5.7	5.4	5.0	5.2	5.0	S	4.0	4.4	3.9	3.4	3.1	5.0	4.4	4.5	3.2	3.7	4.3	4.3	5.2	3.1	5.7	4.5	24	
26	6.2	3.8	5.2	11.3	10.5	5.5	4.7	9.0	8.7	S	5.5	5.5	5.0	7.1	6.8	6.7	6.7	5.1	4.3	2.6	1.6	2.1	2.4	1.7	1.6	11.3	5.6	24	
27	1.9	1.8	1.7	2.3	1.4	0.4	0.7	2.9	S	7.9	6.1	3.0	2.1	2.6	2.9	5.1	2.6	5.0	2.9	0.9	4.1	3.6	1.8	1.1	0.4	7.9	2.8	24	
28	0.8	1.6	0.3	0.2	0.4	0.5	0.5	S	2.4	1.7	3.6	1.3	1.9	15.2	23.4	29.4	5.3	3.0	3.2	2.9	1.7	4.8	1.2	0.6	0.2	29.4	4.6	24	
29	0.3	0.2	0.1	0.2	0.1	0.1	S	0.9	1.7	0.9	1.5	0.4	0.2	0.4	1.3	1.3	2.4	0.2	1.5	0.5	0.6	0.4	0.5	0.0	0.0	2.4	0.7	24	
30	0.0	0.0	0.0	0.0	0.0	S	0.3	0.5	0.6	0.5	1.4	0.6	0.7	0.5	0.9	0.9	1.0	1.1	0.9	0.9	0.5	0.5	0.6	0.5	0.0	1.4	0.6	24	
HOURLY MAX	6.2	14.2	11.8	15.0	10.5	6.2	19.8	17.5	48.7	44.0	16.0	10.2	26.1	17.4	23.4	29.4	47.6	36.0	29.5	8.4	52.7	7.4	6.8	6.6					
HOURLY AVG	2.0	2.3	2.1	2.4	2.4	2.0	3.4	3.7	6.0	7.0	4.2	2.8	4.6	4.2	3.9	4.3	5.6	5.2	3.9	3.0	4.4	2.5	2.1	1.9					

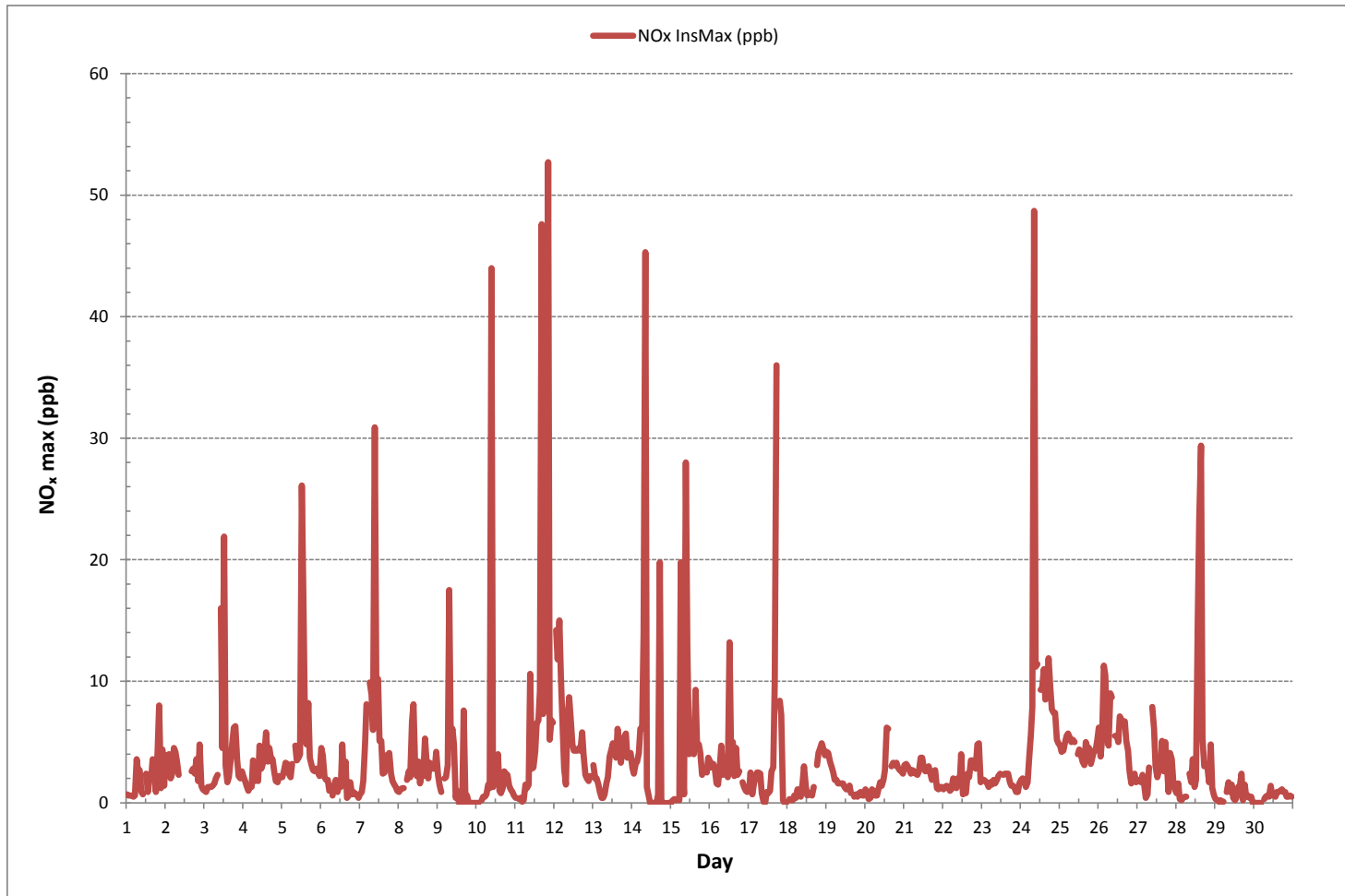
STATUS FLAG CODES

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:	651
MAXIMUM INSTANTANEOUS VALUE:	52.7 ppb @ HOUR(S) 20 ON DAY(S) 11
	VAR-VARIOUS
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	5.5
OPERATIONAL TIME:	719 hrs

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)

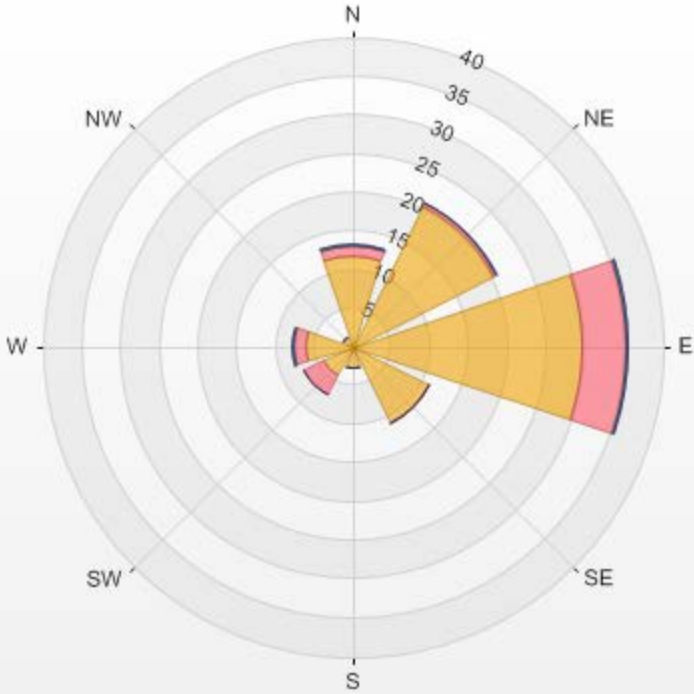


Wind: LICA ST. LINA Poll.: LICA ST. LINA-NOX[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 89.44% Calm Avg: 0.00 [ppb]

Direction	0.0-4.5	4.5-9.0	9.0-13.5	>13.5	Total
N	11.65	1.4	0.16	0	13.21
NE	20.34	0.31	0.16	0	20.81
E	29.66	5.59	0.47	0	35.72
SE	11.02	0.16	0	0	11.18
S	2.8	0	0	0	2.8
SW	4.19	2.8	0	0	6.99
W	6.06	1.55	0.31	0	7.92
NW	1.4	0	0	0	1.4
Summary	87.12	11.81	1.1	0	100

% Icon Classes (ppb)	87	0.0-4.5	12	4.5-9.0	1	9.0-13.5	0	>13.5
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LICA ST. LINA Poll.: LICA ST. LINA-NOX[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



NOX[ppb] Calibration: LICA ST. LINA Monthly: 2016/11 Type: Span



Span Meas Span Ref Span Low Span High

NITRIC OXIDES

NITRIC OXIDE Hourly Averages (NO ppb)

DAY	HR START (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-HR AVG.	RDGS.	
	HR END (MST)	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	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	S	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	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	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	0.0	24
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	S	2.3	1.9	1.0	0.8	0.6	0.5	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.3	24
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.2	0.7	0.6	0.6	0.5	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.1	24
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.3	0.4	0.7	1.0	0.9	1.3	1.1	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.3	24
6	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.1	0.0	0.0	0.0	0.0	0.3	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	0.3	0.0	24
7	0.0	0.0	0.0	0.0	0.0	S	0.1	0.5	0.6	1.5	1.8	1.8	1.4	1.0	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	1.8	0.4	24
8	0.0	0.1	0.0	0.0	S	0.3	0.2	0.1	0.4	1.1	0.9	0.7	0.9	0.3	0.4	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.3	24
9	0.0	0.0	0.0	S	0.0	0.0	0.0	0.1	0.2	0.7	0.3	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	0.7	0.1	24
10	0.1	0.0	S	0.1	0.0	0.1	0.0	0.2	0.2	1.6	0.5	0.8	0.8	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	1.6	0.2	24
11	0.0	S	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.8	0.6	0.7	1.5	1.3	1.0	1.1	1.0	0.1	0.3	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.4	24
12	S	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.5	0.5	0.4	0.3	0.2	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.5	0.1	24
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.8	0.8	1.9	1.1	0.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	1.9	0.3	24	
14	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.6	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.2	0.4	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.6	0.1	24	
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.4	0.3	0.8	0.6	0.9	0.1	0.7	0.0	0.0	0.0	S	0.1	0.0	0.0	0.0	0.0	0.9	0.2	24	
16	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.3	0.1	0.3	0.9	0.9	0.9	0.8	0.7	0.3	0.3	0.0	0.2	S	0.3	0.1	0.2	0.0	0.0	0.0	0.9	0.3	24	
17	0.2	0.1	0.0	0.2	0.3	0.2	0.2	0.3	0.2	0.1	0.2	0.2	0.2	0.1	0.4	0.3	0.9	1.1	S	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.3	24
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.5	0.2	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	0.5	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	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
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.2	0.9	0.5	S	0.1	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
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.1	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	0.3	0.0	24
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	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	0.0	24
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	S	0.5	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	24
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.9	3.7	S	4.2	3.4	3.7	1.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.9	24
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	S	0.7	1.4	0.9	0.5	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	1.4	0.2	24	
26	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.1	S	0.6	0.5	0.7	0.6	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.2	24
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.6	0.6	0.1	0.1	0.1	0.1	0.4	0.0	0.4	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	24
28	0.0	0.1	0.0	0.0	0.1	0.1	0.2	S	0.5	0.2	0.4	0.2	0.2	0.3	0.6	0.5	0.6	0.2	0.2	0.1	0.1	0.2	0.2	0.0	0.0	0.0	0.6	0.2	24	
29	0.0	0.0	0.0	0.0	0.0	S	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	0.1	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	0.0	24
HOURLY MAX	0.2	0.1	0.1	0.2	0.3	0.3	0.3	0.5	1.1	1.9	3.7	1.9	4.2	3.4	3.7	1.1	1.0	1.1	0.3	0.4	0.6	0.2	0.2	0.2						
HOURLY AVG	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	0.6	0.5	0.7	0.6	0.5	0.3	0.2	0.1	0.0	0.0	0.1	0.0	0.0	0.0						

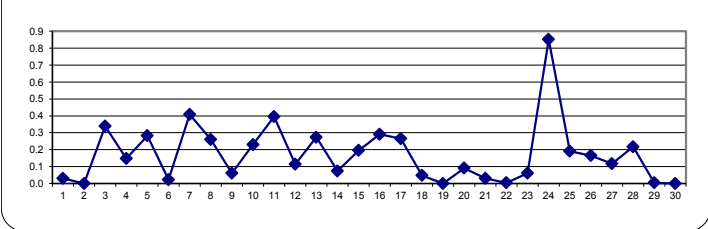
STATUS FLAG CODES

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

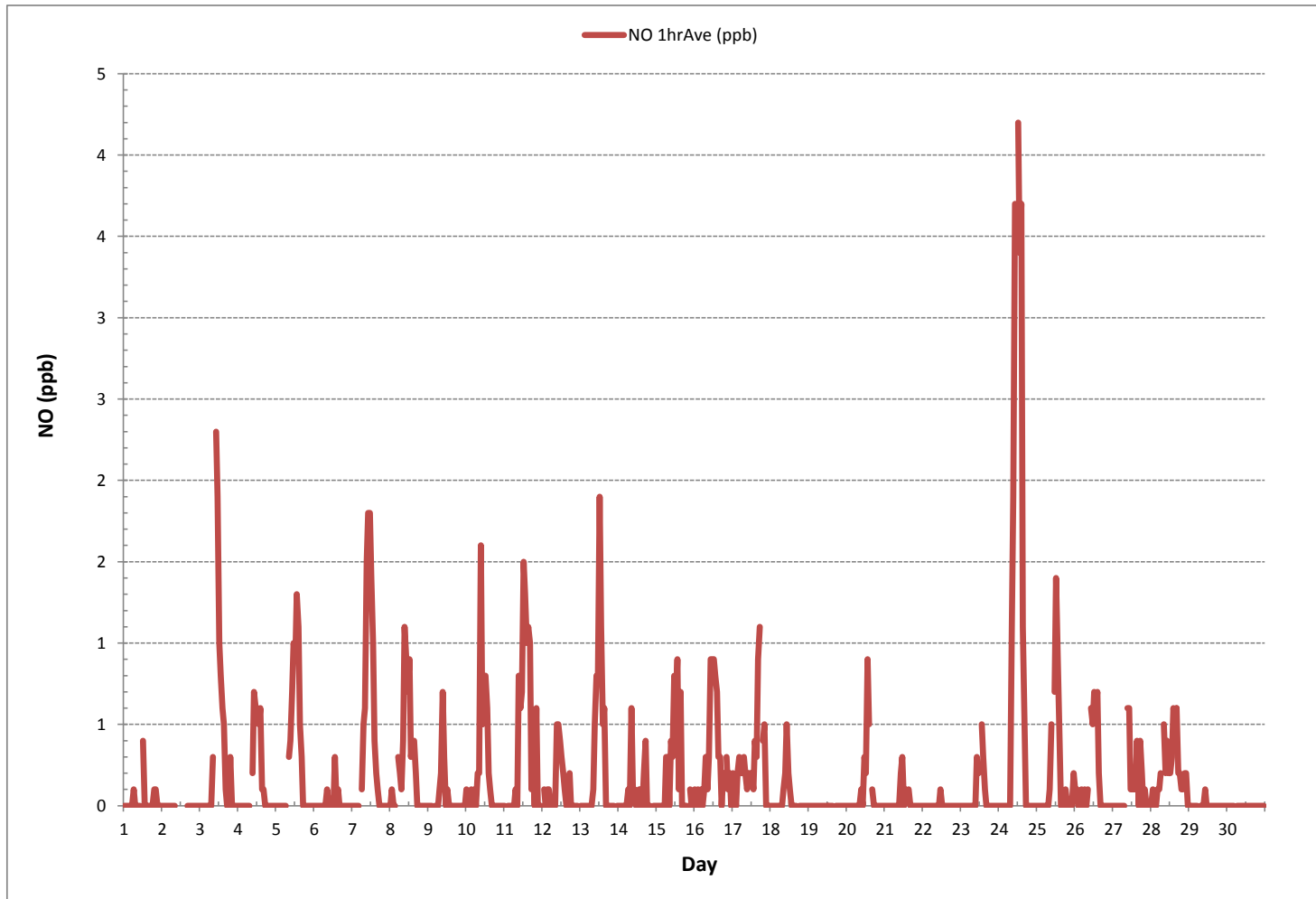
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	237					
MINIMUM 1-HR AVERAGE:	0.0	ppb	@ HOUR(S)	VAR	ON DAY(S)	
MAXIMUM 1-HR AVERAGE:	4.2	ppb	@ HOUR(S)	12	ON DAY(S)	
MAXIMUM 24-HR AVERAGE:	0.9	ppb			ON DAY(S)	
					VAR-VARIOUS	
IZS CALIBRATION TIME:	30	hrs		OPERATIONAL TIME:	720	hrs
MONTHLY CALIBRATION TIME:	7	hrs		AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	0.4			MONTHLY AVERAGE:	0.2	ppb

24 HR AVERAGES November 2016



NITRIC OXIDE Hourly Averages (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2016

NITRIC OXIDE Instantaneous Maximum (NO ppb)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY 1	0.4	0.4	0.4	0.4	0.4	0.4	1.6	0.8	1.0	0.5	0.3	S	1.8	0.6	1.1	1.1	1.9	1.3	0.4	2.8	3.9	0.4	1.1	0.4	0.3	3.9	1.0	24	
2	0.4	0.6	0.4	0.3	0.4	0.5	0.4	0.4	0.2	C	C	C	C	C	C	C	0.9	0.7	0.5	1.5	0.4	2.4	0.2	0.4	0.2	2.4	0.6	24	
3	0.3	0.4	0.2	0.4	0.3	0.3	0.1	0.2	1.4	S	13.7	2.6	10.3	2.2	1.0	0.9	0.6	0.5	0.4	1.1	0.4	0.2	0.3	0.3	0.1	13.7	1.7	24	
4	0.2	0.1	0.1	0.2	0.3	0.3	0.3	0.4	S	0.9	2.2	1.4	1.3	2.6	3.0	0.7	1.2	0.4	0.5	0.4	0.3	0.0	0.4	0.5	0.0	3.0	0.8	24	
5	0.4	0.3	0.5	0.5	0.4	0.5	0.7	S	1.6	1.2	1.8	2.0	18.9	12.1	1.9	1.8	3.3	0.4	0.2	0.3	0.5	0.3	0.2	0.4	0.2	18.9	2.2	24	
6	0.3	0.3	0.2	0.0	0.2	0.2	S	0.4	0.7	0.7	0.4	0.8	0.7	2.6	0.8	2.6	0.4	0.6	0.7	0.4	0.4	0.4	0.4	0.4	0.0	2.6	0.6	24	
7	0.4	0.2	0.4	0.5	0.5	S	0.7	2.2	1.3	20.6	6.5	6.4	2.3	2.7	1.1	0.8	0.6	0.7	0.3	0.4	0.5	0.5	0.4	0.4	0.2	20.6	2.2	24	
8	0.5	0.4	0.2	0.4	S	0.7	0.9	0.5	3.5	3.5	1.3	1.1	2.3	0.8	1.0	0.8	1.3	0.9	0.4	0.9	0.6	0.4	0.4	2.0	0.2	3.5	1.1	24	
9	0.4	0.5	0.5	S	0.4	0.8	1.2	8.5	1.0	1.3	1.2	0.7	0.5	0.5	0.6	0.5	5.3	0.7	0.7	0.4	0.1	0.1	0.2	0.3	0.1	8.5	1.1	24	
10	0.4	0.5	S	0.3	0.4	0.4	0.5	0.6	0.6	35.2	0.9	1.5	1.4	2.0	1.0	0.6	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.3	35.2	2.2	24	
11	0.5	S	0.7	0.5	0.4	0.6	1.0	0.8	1.3	5.6	1.7	2.3	2.3	3.0	1.9	3.5	31.9	1.3	22.2	1.7	42.6	0.5	0.4	0.4	0.4	42.6	5.5	24	
12	S	0.6	0.4	0.6	0.7	0.7	0.3	0.4	0.8	1.0	1.0	1.0	1.0	0.8	0.8	0.9	0.5	1.4	0.5	0.7	1.0	0.4	0.5	S	0.3	1.4	0.7	24	
13	0.9	0.5	0.6	0.7	0.4	0.5	0.6	0.6	1.3	1.3	2.6	1.6	2.7	2.0	1.3	1.5	0.6	0.5	0.5	0.5	0.4	0.4	S	0.6	0.4	2.7	1.0	24	
14	0.4	0.4	0.4	0.5	0.5	0.6	0.7	6.2	30.8	1.0	0.9	0.6	0.6	0.8	0.6	0.5	1.1	14.8	0.6	0.2	0.1	S	0.6	0.4	0.1	30.8	2.8	24	
15	0.3	0.4	0.4	0.3	0.4	0.4	14.4	2.2	1.2	17.7	7.3	2.5	2.1	2.3	0.9	3.0	0.5	0.6	0.4	0.4	S	0.7	0.4	0.4	0.3	17.7	2.6	24	
16	0.5	0.5	0.7	0.6	0.5	0.4	1.2	1.7	0.7	1.3	1.6	1.2	9.5	1.6	2.2	0.9	1.4	0.3	0.6	S	0.6	0.3	0.4	0.4	0.3	9.5	1.3	24	
17	0.5	0.9	0.5	0.7	0.8	0.6	0.5	1.3	0.8	0.5	0.6	1.0	0.5	0.6	1.5	0.9	4.2	19.3	S	2.3	4.9	0.4	0.3	0.2	0.2	19.3	1.9	24	
18	P	0.6	0.6	0.5	0.4	0.6	0.6	0.4	0.7	0.9	1.3	0.9	0.6	0.6	0.4	0.4	0.4	S	0.7	0.6	0.8	0.6	0.6	0.5	0.4	1.3	0.6	23	
19	0.5	0.4	0.7	0.8	0.5	0.3	0.4	0.7	0.4	0.6	0.6	0.5	0.5	0.4	0.5	0.4	S	0.7	0.4	0.4	0.2	0.4	0.3	0.5	0.2	0.8	0.5	24	
20	0.6	0.3	0.5	0.5	0.7	0.5	0.4	0.4	0.5	0.7	0.7	0.8	0.7	1.5	1.2	S	0.7	0.4	0.4	0.7	0.5	0.2	0.6	0.4	0.2	1.5	0.6	24	
21	0.4	0.4	0.4	0.5	0.5	0.5	0.2	0.4	0.4	0.7	1.2	1.0	0.9	0.9	S	1.0	0.6	0.2	1.2	1.3	0.2	0.2	0.2	0.2	0.2	1.3	0.6	24	
22	0.3	0.2	0.4	0.4	0.3	0.2	0.8	0.8	0.4	0.6	0.5	2.4	0.4	S	0.6	1.4	0.2	1.4	0.5	0.2	0.6	0.3	0.3	0.2	0.2	2.4	0.6	24	
23	0.3	0.2	0.4	0.3	0.1	0.4	0.2	0.2	0.3	0.4	0.9	0.8	S	0.9	0.7	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.3	0.1	0.4	0.1	0.9	0.4	24
24	0.5	0.5	0.4	0.3	0.2	0.5	1.7	1.0	38.9	5.5	5.7	S	5.1	4.1	4.6	2.5	1.7	0.7	0.6	0.6	0.4	0.6	0.3	0.2	0.2	38.9	3.3	24	
25	0.0	0.2	0.2	0.2	0.4	0.5	0.2	0.4	0.5	0.9	S	1.1	1.9	1.5	1.3	0.6	0.6	0.6	1.3	0.4	0.5	0.3	0.4	0.6	0.0	1.9	0.6	24	
26	0.9	0.7	0.3	0.4	0.5	0.4	0.4	0.3	0.5	S	1.2	1.0	1.1	1.3	1.2	0.7	0.6	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3	1.3	0.6	24	
27	0.3	0.3	0.2	0.3	0.5	0.3	0.1	0.2	S	1.4	1.4	0.7	0.7	0.6	1.1	2.0	0.6	1.9	2.1	0.3	1.7	1.6	0.8	0.5	0.1	2.1	0.9	24	
28	0.0	0.8	0.2	0.2	0.4	0.4	0.4	S	1.9	0.6	2.5	0.8	1.0	8.9	14.2	22.0	3.2	1.0	0.6	0.4	0.5	1.9	0.6	0.2	0.0	22.0	2.7	24	
29	0.3	0.4	0.4	0.3	0.2	0.2	S	0.4	1.0	0.6	0.7	0.5	0.4	0.5	0.9	0.9	0.7	0.4	0.4	0.4	0.3	0.1	0.6	0.1	0.1	1.0	0.5	24	
30	0.1	0.0	0.1	0.3	0.2	S	0.5	0.7	0.4	0.3	0.7	0.5	0.4	0.4	0.4	0.3	0.2	0.4	0.3	0.1	0.1	0.2	0.3	0.1	0.0	0.7	0.3	24	
HOURLY MAX	0.9	0.9	0.7	0.8	0.8	0.8	14.4	8.5	38.9	35.2	13.7	6.4	18.9	12.1	14.2	22.0	31.9	19.3	22.2	2.8	42.6	2.4	1.1	2.0					
HOURLY AVG	0.4	0.4	0.4	0.4	0.4	0.5	1.1	1.2	3.4	3.9	2.2	1.4	2.6	2.1	1.7	1.9	2.3	1.8	1.3	0.7	2.2	0.5	0.4	0.4					

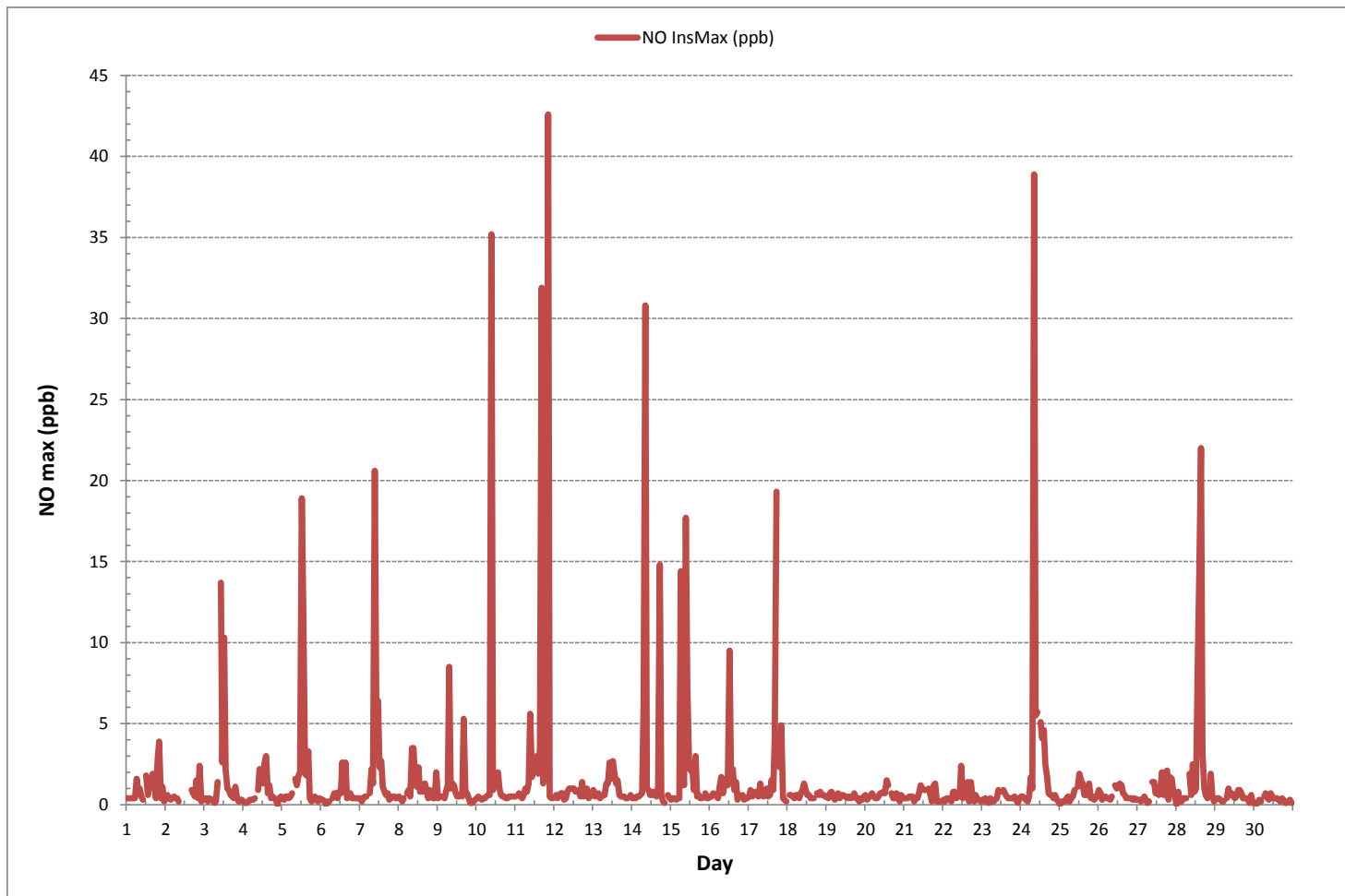
STATUS FLAG CODES

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

NUMBER OF NON-ZERO READINGS:	677
MAXIMUM INSTANTANEOUS VALUE:	42.6 ppb @ HOUR(S) 20 ON DAY(S) 11
	VAR-VARIOUS
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	7 hrs
OPERATIONAL TIME:	719 hrs
STANDARD DEVIATION:	3.8

NITRIC OXIDE Instantaneous Maximum (NO ppb)



Wind: LICA ST. LINA Poll.: LICA ST. LINA-NO[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 89.44% Calm Avg: 0.00 [ppb]

Direction	0.0-1.4	1.4-2.9	2.9-4.3	>4.3	Total
N	13.2	0	0	0	13.2
NE	20.5	0.31	0	0	20.81
E	34.63	1.09	0	0	35.72
SE	11.02	0	0.16	0	11.18
S	2.8	0	0	0	2.8
SW	6.52	0.16	0.31	0	6.99
W	7.76	0	0.16	0	7.92
NW	1.4	0	0	0	1.4
Summary	97.83	1.56	0.63	0	100

% Icon Classes (ppb)

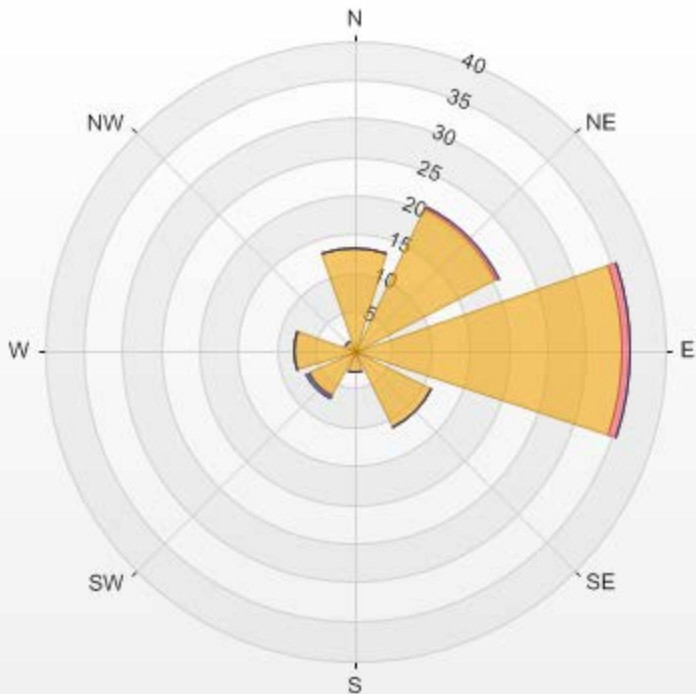
98 0.0-1.4

2 1.4-2.9

1 2.9-4.3

0 >4.3

LICA ST. LINA Poll.: LICA ST. LINA-NO[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



NITROGEN DIOXIDE



NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY 1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.0	S	0.3	0.3	0.6	0.5	0.9	0.9	0.4	0.9	1.5	1.0	1.3	0.9	0.0	1.5	0.4	24	
2	2.0	3.4	2.5	1.9	2.2	3.5	3.4	2.7	2.2	C	C	C	C	C	C	C	2.7	2.1	1.9	2.3	2.0	1.9	1.4	1.3	1.3	3.5	2.3	24	
3	1.2	1.1	1.3	1.5	1.4	1.8	1.8	2.0	1.9	S	2.2	2.4	1.7	1.3	1.4	1.9	3.2	4.7	6.2	5.5	3.1	2.2	2.2	2.5	1.1	6.2	2.4	24	
4	2.4	2.0	1.6	1.4	1.5	1.8	2.7	1.6	S	1.9	2.3	2.2	2.4	2.2	2.2	2.1	2.7	3.1	3.3	2.4	1.9	2.0	2.3	2.2	1.4	3.3	2.2	24	
5	2.1	2.7	3.2	3.1	2.5	2.2	2.5	S	3.2	2.9	2.8	2.5	2.7	3.0	3.2	3.6	4.2	3.5	2.8	2.6	2.6	2.4	2.4	2.1	2.1	4.2	2.8	24	
6	3.8	2.8	1.8	1.6	1.3	0.7	S	0.5	1.1	1.0	0.9	1.1	0.9	0.8	0.6	0.5	0.1	0.4	0.8	0.7	0.7	0.7	0.8	0.4	0.1	3.8	1.0	24	
7	0.9	1.1	1.7	4.0	6.8	S	9.9	7.5	4.2	2.8	2.6	2.7	2.9	2.8	2.2	2.5	3.8	4.1	3.7	2.6	2.0	1.7	1.5	1.4	0.9	9.9	3.3	24	
8	1.3	1.6	1.6	1.7	S	1.9	2.0	2.1	2.5	3.0	2.1	1.9	1.7	1.6	1.8	2.2	2.8	2.7	2.4	2.2	2.6	2.7	3.0	3.0	1.3	3.0	2.2	24	
9	2.2	1.7	1.4	S	1.9	2.3	2.5	2.6	4.4	5.7	2.0	0.6	0.7	0.0	0.1	0.1	0.3	0.2	0.2	0.1	0.0	0.1	0.2	0.2	0.0	5.7	1.3	24	
10	0.1	0.0	S	0.3	0.9	1.0	1.0	1.4	1.3	2.1	1.2	1.4	1.6	2.0	1.0	1.2	1.4	2.7	2.7	2.7	1.6	1.7	1.4	1.1	0.0	2.7	1.4	24	
11	0.8	S	0.8	0.9	0.7	0.7	1.1	1.1	1.2	1.9	1.7	1.8	2.7	4.2	5.6	6.2	6.5	6.7	6.5	6.4	7.0	4.8	6.5	6.4	0.7	7.0	3.6	24	
12	S	12.1	10.8	13.3	7.2	4.2	1.6	1.1	4.3	7.8	5.9	4.7	4.0	3.9	4.0	3.8	4.0	4.9	3.6	2.7	2.0	2.1	2.4	S	1.1	13.3	5.0	24	
13	2.7	2.1	2.0	1.5	1.1	0.7	0.5	0.7	1.1	1.4	1.6	2.5	3.0	2.9	2.7	4.8	4.1	3.3	3.0	5.3	5.5	3.5	S	3.7	0.5	5.5	2.6	24	
14	2.9	2.4	2.9	3.2	3.7	5.7	4.8	1.9	1.3	0.6	0.5	0.2	0.0	0.1	0.0	0.0	0.2	0.4	0.2	0.0	0.2	S	0.3	0.4	0.0	5.7	1.4	24	
15	0.4	0.6	0.7	0.6	0.7	0.8	1.3	1.3	0.9	1.1	1.1	2.0	2.6	3.4	3.6	5.2	5.0	3.6	2.7	S	2.9	2.7	3.5	0.4	5.2	2.3	24		
16	3.7	3.2	2.4	2.3	2.1	1.9	2.0	2.5	2.1	2.0	2.2	1.8	1.8	1.8	1.8	1.7	2.2	2.2	1.9	S	1.7	1.6	1.4	1.5	1.4	3.7	2.1	24	
17	1.3	1.3	1.2	1.4	2.5	2.8	2.7	1.6	0.8	0.4	0.3	0.4	0.8	0.9	1.5	1.8	5.1	5.5	S	1.9	1.0	0.6	0.7	0.4	0.3	5.5	1.6	24	
18	0.8	0.8	0.7	0.8	0.9	0.8	1.0	0.8	0.8	1.3	2.1	1.2	0.9	0.8	1.0	0.8	1.4	S	2.9	3.9	4.6	4.8	4.6	4.0	0.7	4.8	1.8	24	
19	4.3	4.2	3.3	3.0	2.6	2.0	1.9	1.7	1.7	1.6	1.6	1.3	1.1	1.3	1.1	0.7	S	0.5	0.6	0.6	0.5	1.0	0.7	0.6	0.5	4.3	1.6	24	
20	1.2	0.7	0.4	0.5	1.1	1.0	0.8	0.9	1.0	1.8	1.6	1.8	2.3	4.3	4.1	S	2.8	3.5	3.2	3.4	3.0	2.7	2.7	2.6	0.4	4.3	2.1	24	
21	2.9	3.1	2.8	2.7	2.4	2.6	2.4	2.3	2.2	2.4	2.8	2.9	2.4	2.2	S	2.4	2.2	1.6	1.8	1.4	1.0	0.9	1.0	1.1	0.9	3.1	2.2	24	
22	1.2	1.3	1.3	1.1	1.0	1.0	1.1	1.2	1.0	1.2	1.2	1.2	0.7	S	0.9	1.3	1.5	3.1	3.6	2.9	2.8	3.9	3.1	1.9	0.7	3.9	1.7	24	
23	1.8	1.7	1.8	1.8	1.4	1.6	1.8	2.0	1.9	2.0	2.0	2.2	S	2.0	2.2	2.3	2.3	1.8	1.6	1.3	1.2	1.0	0.9	1.3	0.9	2.3	1.7	24	
24	1.8	1.9	1.3	1.1	1.4	2.9	4.3	6.0	6.1	5.3	4.9	S	4.6	5.0	6.2	5.7	8.1	10.2	8.6	6.8	7.0	6.0	5.1	4.8	1.1	10.2	5.0	24	
25	4.7	4.2	4.3	4.7	5.3	5.5	5.3	5.0	5.1	4.4	S	3.1	2.8	2.4	2.2	2.7	4.2	4.0	3.8	2.9	3.0	3.2	4.0	4.7	2.2	5.5	4.0	24	
26	4.3	3.3	3.3	9.7	7.7	4.8	4.2	5.4	5.7	S	6.4	4.3	4.5	3.8	4.7	5.5	6.0	5.4	4.3	3.6	2.1	1.4	1.7	2.1	1.5	1.4	9.7	4.3	24
27	1.7	1.8	1.4	2.1	1.0	0.5	0.6	2.1	S	6.6	4.4	2.6	2.1	1.8	1.9	2.5	2.7	2.9	1.8	1.2	1.5	1.4	1.3	1.1	0.5	6.6	2.0	24	
28	1.3	1.1	0.8	0.8	0.9	1.0	1.1	S	1.5	1.5	1.2	1.1	1.1	1.3	1.9	1.8	2.6	2.8	3.1	2.8	2.0	1.9	1.2	0.9	0.8	3.1	1.6	24	
29	0.7	0.6	0.5	0.6	0.4	0.3	S	0.6	0.7	0.5	0.9	0.7	0.6	0.6	0.7	0.7	0.9	0.5	1.2	1.0	0.9	0.8	0.9	0.3	0.3	1.2	0.7	24	
30	0.3	0.1	0.2	0.5	0.3	S	0.7	0.7	1.0	1.1	1.1	1.1	1.0	1.0	1.2	1.4	1.3	1.3	1.2	0.9	0.8	0.9	0.9	0.9	0.1	1.4	0.9	24	
HOURLY MAX	4.7	12.1	10.8	13.3	7.7	5.7	9.9	7.5	6.1	7.8	5.9	4.7	4.6	5.0	6.2	6.2	8.1	10.2	8.6	6.8	7.0	6.0	6.5	6.4					
HOURLY AVG	1.9	2.2	2.0	2.3	2.2	2.0	2.3	2.1	2.2	2.4	2.1	1.9	1.9	2.1	2.2	2.4	2.9	3.1	2.8	2.5	2.2	2.1	2.0	2.0					

STATUS FLAG CODES

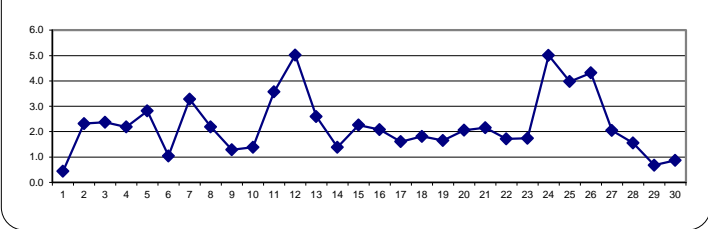
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

OBJECTIVE LIMIT: ALBERTA ENVIRONMENT: 1-HR 159 ppb

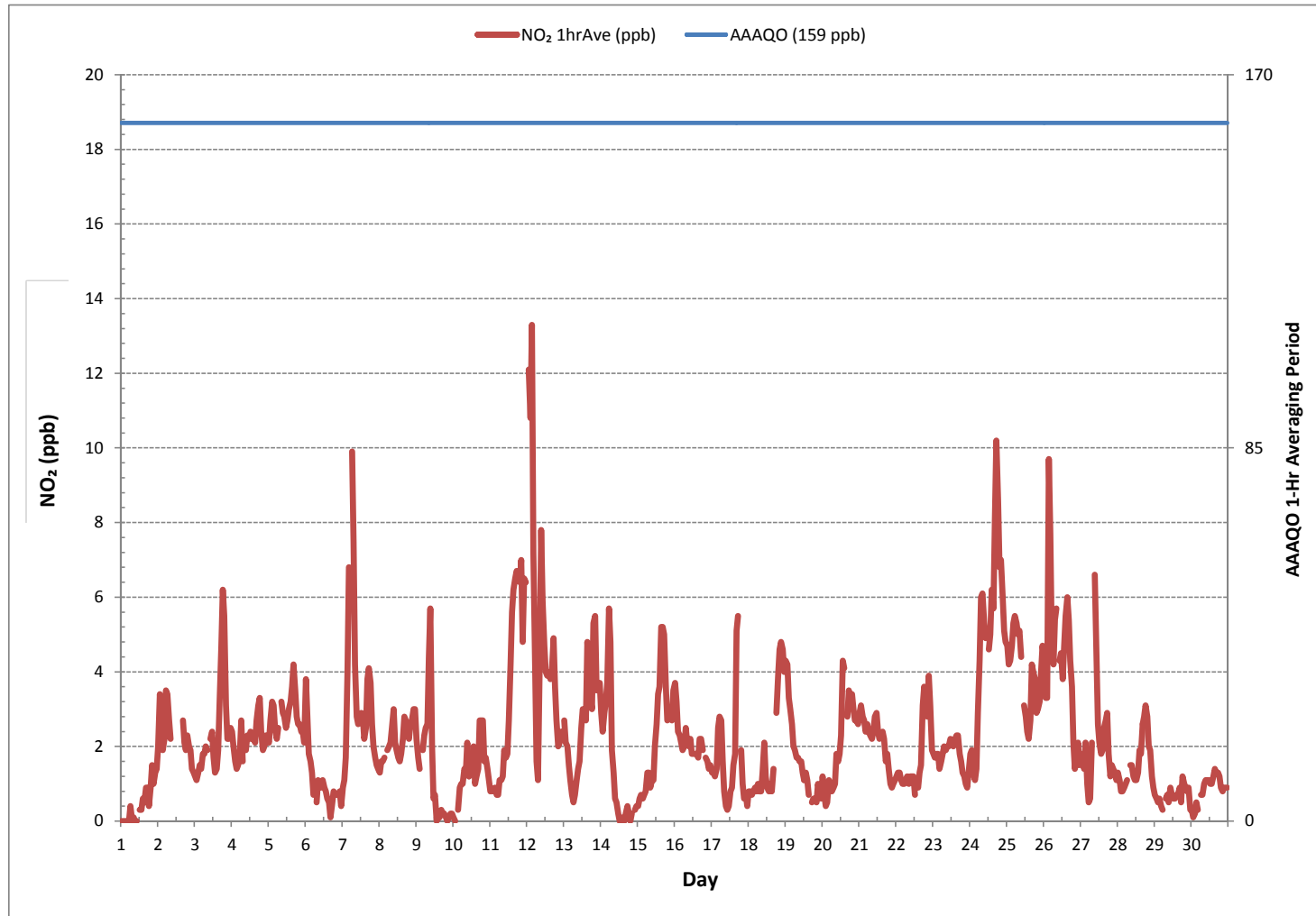
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	667					
MINIMUM 1-HR AVERAGE:	0.0	ppb	@ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 1-HR AVERAGE:	13.3	ppb	@ HOUR(S)	3	ON DAY(S)	12
MAXIMUM 24-HR AVERAGE:	5.0	ppb			ON DAY(S)	12, 24
					VAR-VARIOUS	
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	720	hrs	
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	100.0	%	
STANDARD DEVIATION:	1.8		MONTHLY AVERAGE:	2.2	ppb	

24 HR AVERAGES November 2016



NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2016

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)

HR START (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-HR AVG.	RDGS.	
HR END (MST)	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	1.0	0.8	0.7	0.7	0.6	0.9	2.0	1.9	2.1	0.9	0.6	S	1.0	0.6	0.9	0.8	1.7	1.7	0.7	1.9	4.3	1.4	3.4	1.2	0.6	4.3	1.4	24	
2	3.9	3.9	3.6	2.0	2.3	4.2	4.1	3.0	2.2	C	C	C	C	C	C	C	2.2	2.2	1.9	2.4	1.9	2.6	1.5	1.1	1.1	4.2	2.6	24	
3	1.1	1.1	1.3	1.3	1.3	1.3	1.8	1.8	1.6	S	4.7	2.2	11.4	1.5	1.5	2.4	3.9	5.1	6.6	6.3	3.8	2.1	2.0	2.7	1.1	11.4	3.0	24	
4	2.4	2.0	1.6	1.3	1.3	1.6	3.5	1.6	S	1.6	2.7	2.0	2.3	2.2	3.4	3.0	4.2	3.4	3.7	2.6	1.9	2.1	2.3	2.2	1.3	4.2	2.4	24	
5	2.1	2.9	3.2	3.2	2.5	2.2	2.9	S	3.5	2.8	2.9	2.7	7.2	8.6	4.1	3.6	5.5	4.1	3.6	3.0	2.7	2.9	3.1	2.4	2.1	8.6	3.6	24	
6	4.8	3.9	2.1	1.9	1.8	1.0	S	0.6	1.4	1.6	1.1	1.1	1.1	2.4	1.2	1.2	0.3	0.6	1.3	0.9	1.0	0.9	0.8	0.6	0.3	4.8	1.5	24	
7	1.1	1.3	1.9	4.7	8.1	S	9.6	8.7	5.2	11.3	4.1	4.1	3.1	2.8	2.0	2.6	3.9	4.1	4.0	2.7	1.9	1.5	1.4	1.1	1.1	11.3	4.0	24	
8	1.1	1.4	1.5	1.3	S	1.6	2.2	2.1	3.9	5.0	2.0	1.7	2.6	1.5	1.9	2.0	4.4	3.4	2.5	3.0	2.7	2.9	3.0	2.8	1.1	5.0	2.5	24	
9	2.7	1.6	1.4	S	2.1	1.9	2.2	9.5	5.2	5.8	4.1	0.5	1.1	0.0	0.2	0.0	4.6	0.0	0.3	0.0	0.0	0.0	0.2	0.0	0.0	9.5	1.9	24	
10	0.0	0.0	S	0.3	0.6	0.6	0.5	1.1	1.2	10.8	0.9	1.2	1.5	2.4	0.9	0.9	1.2	2.8	2.4	2.4	1.5	1.4	1.1	0.8	0.0	10.8	1.6	24	
11	0.9	S	0.3	0.6	0.5	0.6	1.0	0.9	0.8	5.6	1.4	1.7	2.5	4.3	6.0	6.1	16.1	6.5	11.2	6.4	13.2	5.3	7.0	6.7	0.3	16.1	4.6	24	
12	S	13.7	11.9	14.8	10.5	6.2	2.9	1.3	6.6	8.1	6.5	4.7	3.9	4.2	4.1	4.1	4.5	6.1	3.9	2.7	2.2	2.0	2.2	S	1.3	14.8	5.8	24	
13	2.6	2.2	1.9	1.3	1.1	0.6	0.6	0.7	1.2	1.5	2.0	3.2	3.3	3.0	3.0	5.2	4.8	3.5	4.7	5.7	5.9	4.0	S	3.8	0.6	5.9	2.9	24	
14	2.9	2.7	3.4	3.6	4.1	6.1	5.9	8.1	15.2	0.8	0.4	0.1	0.0	0.0	0.0	0.0	0.4	9.6	0.1	0.1	0.0	S	0.0	0.0	0.0	15.2	2.8	24	
15	0.0	0.3	0.5	0.2	0.2	0.2	9.6	1.2	0.4	11.3	7.8	2.4	3.1	3.8	3.5	6.7	4.7	4.7	4.1	2.3	S	2.5	2.7	3.8	0.0	11.3	3.3	24	
16	3.5	3.3	2.7	2.4	1.5	1.3	1.9	3.0	1.9	1.7	2.2	1.4	6.2	2.6	3.1	1.9	3.7	2.4	2.1	S	1.3	1.3	1.1	1.1	1.1	6.2	2.3	24	
17	0.8	1.8	0.6	1.1	2.2	2.6	2.3	2.0	0.4	0.1	0.0	0.4	0.7	0.9	2.0	2.9	7.2	19.8	S	6.7	2.7	0.2	0.1	0.4	0.0	19.8	2.5	24	
18	P	0.5	0.4	0.5	0.4	0.3	0.9	0.6	0.4	1.2	2.0	0.9	0.4	0.6	1.0	0.8	1.5	S	3.0	4.2	4.8	4.8	4.5	4.0	0.3	4.8	1.7	23	
19	4.3	4.5	3.7	2.9	2.8	2.3	2.0	1.8	1.8	1.7	1.6	1.4	1.2	1.2	1.2	0.9	S	0.6	0.6	0.6	0.9	0.9	0.6	0.7	0.6	4.5	1.7	24	
20	1.2	1.0	0.6	0.4	1.0	0.9	0.9	0.9	1.2	1.7	1.7	2.0	2.5	5.2	5.2	S	2.8	3.4	3.1	3.3	3.0	3.1	2.5	2.5	0.4	5.2	2.2	24	
21	2.8	3.0	2.7	2.4	2.3	2.5	2.6	2.6	2.4	2.1	2.9	3.2	2.5	2.4	S	2.4	2.3	2.1	2.1	1.8	1.5	1.0	1.5	1.3	1.0	3.2	2.3	24	
22	1.4	1.5	1.3	1.5	1.1	1.4	1.6	1.3	1.3	1.7	1.2	1.7	0.8	S	0.9	1.3	2.4	3.4	3.7	3.1	2.9	4.7	4.8	2.0	0.8	4.8	2.0	24	
23	1.9	2.0	1.8	1.8	1.5	1.7	1.8	2.1	2.1	1.9	1.7	2.0	S	2.0	2.2	2.2	2.5	1.7	1.6	1.5	1.3	1.3	1.2	1.9	1.2	2.5	1.8	24	
24	2.0	2.4	2.0	1.6	1.9	3.9	5.4	7.0	14.7	5.9	6.0	S	4.9	5.7	6.6	7.2	9.9	11.7	9.6	7.7	7.7	7.9	5.4	5.1	1.6	14.7	6.2	24	
25	4.9	4.6	4.7	5.1	5.4	5.7	5.7	5.2	5.3	4.9	S	3.3	3.1	2.8	2.5	3.4	4.7	4.3	4.3	3.4	3.4	4.4	4.6	5.1	2.5	5.7	4.4	24	
26	5.8	4.0	5.4	11.2	10.4	5.7	5.0	9.2	8.7	S	4.9	4.9	4.4	6.3	5.7	6.7	6.6	5.2	4.5	3.1	1.7	2.6	2.7	1.8	1.7	11.2	5.5	24	
27	2.0	2.0	2.2	2.6	2.1	0.6	1.1	3.0	S	7.2	5.1	2.8	2.1	2.5	2.3	3.6	2.5	3.5	2.1	1.1	2.4	2.1	1.2	0.8	0.6	7.2	2.5	24	
28	1.0	1.1	0.3	0.5	0.6	0.7	0.9	S	1.2	1.4	1.3	0.8	1.0	8.7	12.9	10.3	2.6	2.7	3.0	3.0	1.8	3.0	1.3	0.7	0.3	12.9	2.6	24	
29	0.7	0.4	0.5	0.4	0.3	0.2	S	0.6	1.0	0.6	0.8	0.4	0.4	0.4	0.6	0.5	2.1	0.4	1.7	0.8	0.6	0.6	0.6	0.2	0.2	2.1	0.6	24	
30	0.1	0.1	0.0	0.1	0.1	S	0.3	0.5	0.9	0.8	1.1	0.9	0.7	0.8	0.8	1.1	1.1	1.2	1.2	1.2	1.0	0.7	0.6	1.0	1.2	0.0	1.2	0.7	24
HOURLY MAX	5.8	13.7	11.9	14.8	10.5	6.2	9.6	9.5	15.2	11.3	7.8	4.9	11.4	8.7	12.9	10.3	16.1	19.8	11.2	7.7	13.2	7.9	7.0	6.7					
HOURLY AVG	2.1	2.4	2.2	2.5	2.4	2.1	2.9	2.9	3.4	3.7	2.6	2.0	2.7	2.8	2.8	3.0	3.9	4.1	3.2	2.9	2.7	2.4	2.2	2.0					

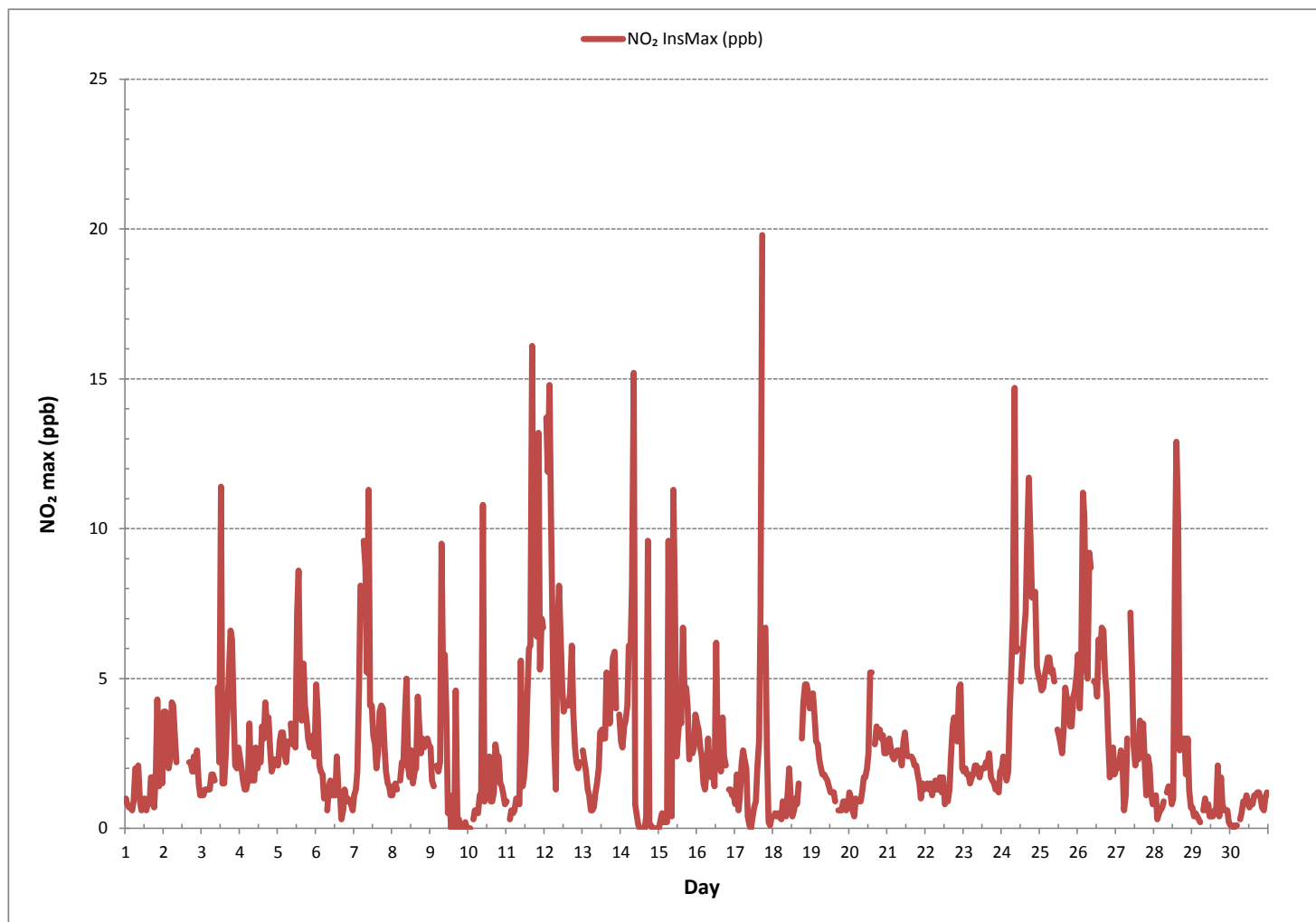
STATUS FLAG CODES

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:	663
MAXIMUM INSTANTANEOUS VALUE:	19.8 ppb @ HOUR(S) 17 ON DAY(S) 17
	VAR-VARIOUS
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	2.6
OPERATIONAL TIME:	719 hrs

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)

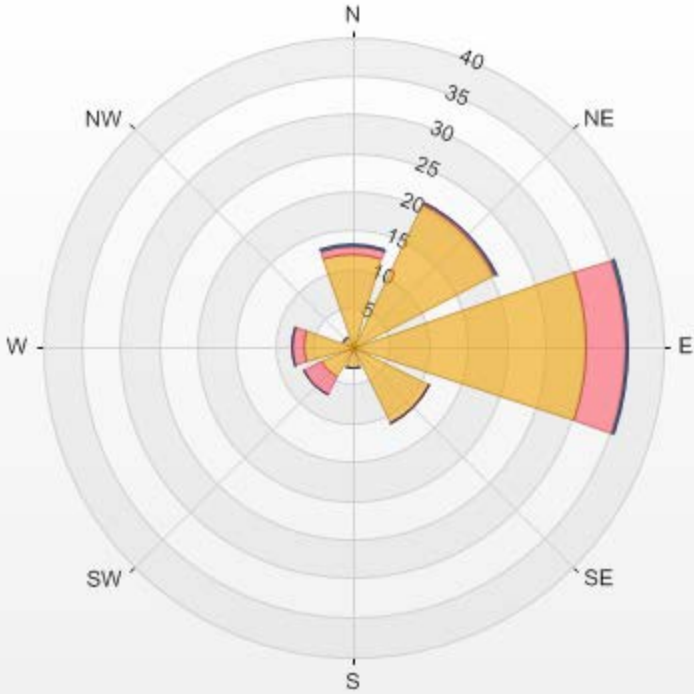


Wind: LICA ST. LINA Poll.: LICA ST. LINA-NO2[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 89.44% Calm Avg: 0.00 [ppb]

Direction	0.0-4.5	4.5-8.9	8.9-13.4	>13.4	Total
N	11.96	1.09	0.16	0	13.21
NE	20.5	0.16	0.16	0	20.82
E	30.28	4.97	0.47	0	35.72
SE	11.02	0.16	0	0	11.18
S	2.8	0	0	0	2.8
SW	4.5	2.48	0	0	6.98
W	6.21	1.55	0.16	0	7.92
NW	1.4	0	0	0	1.4
Summary	88.67	10.41	0.95	0	100

% Icon Classes (ppb)	89	10	1	0
	0.0-4.5	4.5-8.9	8.9-13.4	>13.4

LICA ST. LINA Poll.: LICA ST. LINA-NO2[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



NO2[ppb] Calibration: LICA ST. LINA Monthly: 2016/11 Type: Span



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

OZONE

OZONE Hourly Averages (O₃ ppb)

HR START (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-HR AVG.	RDGS.
HR END (MST)	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	20.4	22.0	23.0	24.2	23.5	22.8	21.8	22.0	22.1	20.1	19.2	S	20.2	20.6	20.5	19.3	18.5	17.7	21.2	21.5	20.0	20.1	20.1	20.0	17.7	24.2	20.9	24
2	17.6	15.4	16.7	17.6	18.7	17.6	17.2	17.1	16.6	C	C	C	C	C	14.7	13.8	13.5	14.0	15.3	14.9	15.0	15.2	15.5	14.9	13.5	18.7	15.9	24
3	13.5	12.7	11.7	11.1	10.4	10.2	9.5	8.6	7.9	S	10.6	16.5	23.8	27.6	30.4	28.9	27.8	27.6	23.5	22.4	27.0	28.7	30.0	29.7	7.9	30.4	19.6	24
4	28.1	26.6	24.1	24.4	23.6	24.1	23.7	27.4	S	26.4	26.6	29.2	30.2	30.7	31.5	31.1	30.7	28.6	27.0	27.9	25.9	24.8	24.5	23.6	23.6	31.5	27.0	24
5	22.9	22.2	21.4	20.6	21.6	21.4	21.5	S	19.2	18.8	18.2	17.3	19.0	19.7	20.3	20.1	19.8	20.3	21.8	24.0	23.8	24.9	24.5	22.5	17.3	24.9	21.1	24
6	21.0	23.5	27.1	26.2	26.2	30.5	S	32.1	27.7	28.7	26.0	26.7	26.9	26.1	25.5	25.1	24.9	23.2	20.6	20.9	18.3	18.2	18.7	19.0	18.2	32.1	24.5	24
7	14.5	13.8	13.4	10.8	7.0	S	3.9	6.4	8.4	10.2	11.4	12.8	16.6	20.6	23.8	21.8	16.7	19.0	18.5	20.2	21.2	20.1	18.6	18.7	3.9	23.8	15.1	24
8	18.4	18.1	17.3	17.4	S	15.7	15.6	15.9	15.4	15.0	16.3	18.6	21.0	23.1	23.3	23.8	23.1	20.3	20.0	21.1	20.3	19.6	18.8	17.9	15.0	23.8	19.0	24
9	19.0	20.3	19.8	S	18.3	17.7	17.3	17.5	16.6	17.0	25.5	28.3	31.0	35.6	36.0	37.1	37.6	36.6	35.3	34.5	33.8	33.2	32.9	32.1	16.6	37.6	27.5	24
10	32.0	31.9	S	29.1	26.0	23.7	21.5	20.5	21.2	19.0	19.5	20.6	25.2	29.8	32.7	32.0	28.6	25.0	24.3	24.2	26.3	26.2	25.4	25.4	19.0	32.7	25.7	24
11	26.9	S	25.1	24.1	23.8	22.7	21.3	20.3	19.3	17.4	16.0	14.6	13.6	12.8	11.9	10.5	10.2	10.1	10.6	9.5	18.3	11.0	14.4	9.5	26.9	16.3	24	
12	S	15.0	16.0	11.6	22.7	25.2	30.8	31.8	24.1	20.1	21.6	22.2	22.4	21.5	20.5	19.4	18.5	15.9	16.6	17.9	18.2	18.2	17.2	S	11.6	31.8	20.3	24
13	16.2	15.8	15.9	18.1	19.4	20.1	18.6	15.8	13.5	10.5	11.4	12.2	11.9	20.8	24.2	20.3	17.9	16.7	18.2	14.6	14.3	17.4	S	15.1	10.5	24.2	16.5	24
14	14.4	14.1	13.5	12.1	12.1	13.5	17.2	21.8	24.9	27.6	31.0	34.6	36.4	36.8	36.6	36.0	34.9	33.8	32.7	33.0	32.5	S	31.7	30.6	12.1	36.8	26.6	24
15	29.9	28.3	27.2	27.5	27.7	26.8	25.6	26.3	27.7	28.0	28.9	28.1	29.9	28.6	27.3	23.8	20.5	18.9	25.6	28.8	S	27.3	24.8	21.2	18.9	29.9	26.5	24
16	20.4	21.3	23.1	24.5	23.3	23.1	21.9	19.3	19.7	21.8	19.3	21.4	23.2	23.9	23.3	25.8	25.8	22.9	22.4	S	22.9	22.5	22.7	21.8	19.3	25.8	22.4	24
17	22.0	22.5	23.4	22.7	20.6	20.7	22.0	25.8	27.6	30.2	31.0	31.5	31.5	30.9	29.8	28.6	24.4	23.9	S	27.9	28.2	28.1	26.7	25.2	20.6	31.5	26.3	24
18	25.3	25.3	24.7	24.1	22.2	22.3	20.6	21.7	21.3	20.4	21.3	25.2	27.2	27.5	26.5	27.1	26.6	S	22.8	21.6	20.4	19.8	19.9	20.2	19.8	27.5	23.2	24
19	19.6	19.2	20.5	20.4	21.0	22.4	23.4	24.9	25.8	26.1	27.2	27.2	27.2	26.4	26.4	26.7	S	25.1	25.3	25.8	25.2	22.9	23.0	23.5	19.2	27.2	24.1	24
20	22.9	23.2	23.3	22.7	21.7	21.3	21.1	20.8	19.9	19.3	19.4	18.3	16.4	14.0	16.0	S	17.1	15.5	15.6	15.2	15.4	15.5	15.6	15.6	14.0	23.3	18.5	24
21	15.3	13.6	13.2	13.6	14.5	14.1	13.8	13.8	14.1	14.0	13.0	12.9	13.5	13.9	S	13.2	13.3	13.9	13.8	14.9	18.5	20.7	16.8	14.2	12.9	20.7	14.5	24
22	13.0	12.3	13.3	14.0	13.5	12.7	13.4	14.1	13.1	12.6	13.5	15.3	15.8	S	16.5	17.8	19.7	18.1	14.9	14.1	14.6	14.0	16.2	17.9	12.3	19.7	14.8	24
23	17.5	17.0	16.0	17.3	17.6	17.5	16.8	15.9	15.9	16.1	16.5	15.8	S	15.8	15.3	15.4	15.1	16.9	16.6	17.1	17.4	17.2	17.0	15.0	15.0	17.6	16.5	24
24	13.4	11.8	12.6	13.1	12.3	11.7	10.4	8.1	6.7	7.5	7.4	S	8.4	9.1	8.0	8.4	6.2	5.6	8.0	9.5	10.9	13.2	13.3	14.2	5.6	14.2	10.0	24
25	14.5	14.5	14.0	13.3	12.8	12.7	12.8	13.2	13.6	16.1	S	19.8	20.3	22.4	23.4	22.4	19.7	16.0	14.2	18.8	18.6	16.4	13.8	11.2	11.2	23.4	16.3	24
26	12.3	15.5	16.7	11.8	13.2	14.4	15.5	16.8	17.5	S	20.7	21.4	24.6	22.5	20.9	17.7	20.6	21.3	21.5	25.2	27.5	25.1	22.2	21.7	11.8	27.5	19.4	24
27	21.2	21.8	23.9	24.2	25.5	25.3	24.0	21.2	S	15.8	18.7	21.9	22.6	22.6	22.6	21.7	20.9	19.9	20.9	21.7	20.7	20.4	20.8	22.9	15.8	25.5	21.8	24
28	24.9	24.4	25.6	25.5	24.4	23.4	20.1	S	18.8	23.7	26.6	26.0	26.1	25.3	22.9	21.1	18.4	17.2	15.1	16.2	22.4	22.2	25.4	27.7	15.1	27.7	22.8	24
29	28.9	28.1	26.8	25.8	25.7	25.8	S	22.8	20.6	19.9	19.3	20.1	20.5	21.0	23.2	23.0	22.9	22.6	21.6	22.7	22.4	23.6	24.5	29.4	19.3	29.4	23.5	24
30	29.6	29.7	29.8	30.7	30.9	S	30.5	29.9	29.0	28.9	29.2	28.9	29.4	29.5	29.2	28.5	28.1	27.8	27.9	28.0	28.5	28.2	28.1	27.7	27.7	30.9	29.0	24
HOURLY MAX	32.0	31.9	29.8	30.7	30.9	30.5	30.8	32.1	29.0	30.2	31.0	34.6	36.4	36.8	36.6	37.1	37.6	36.6	35.3	34.5	33.8	33.2	32.9	32.1				
HOURLY AVG	20.5	20.0	20.0	19.9	20.0	20.0	19.0	19.7	18.9	19.7	20.2	21.8	22.7	23.5	23.6	22.8	21.5	20.5	20.4	21.2	21.4	21.4	21.4	21.1				

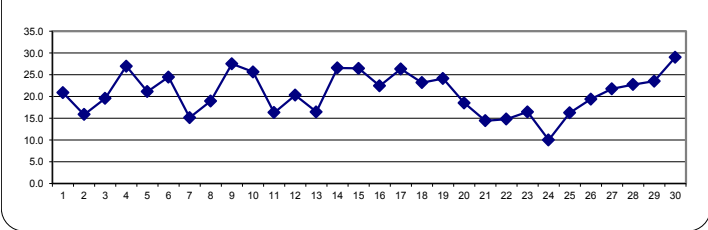
STATUS FLAG CODES

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 82 ppb

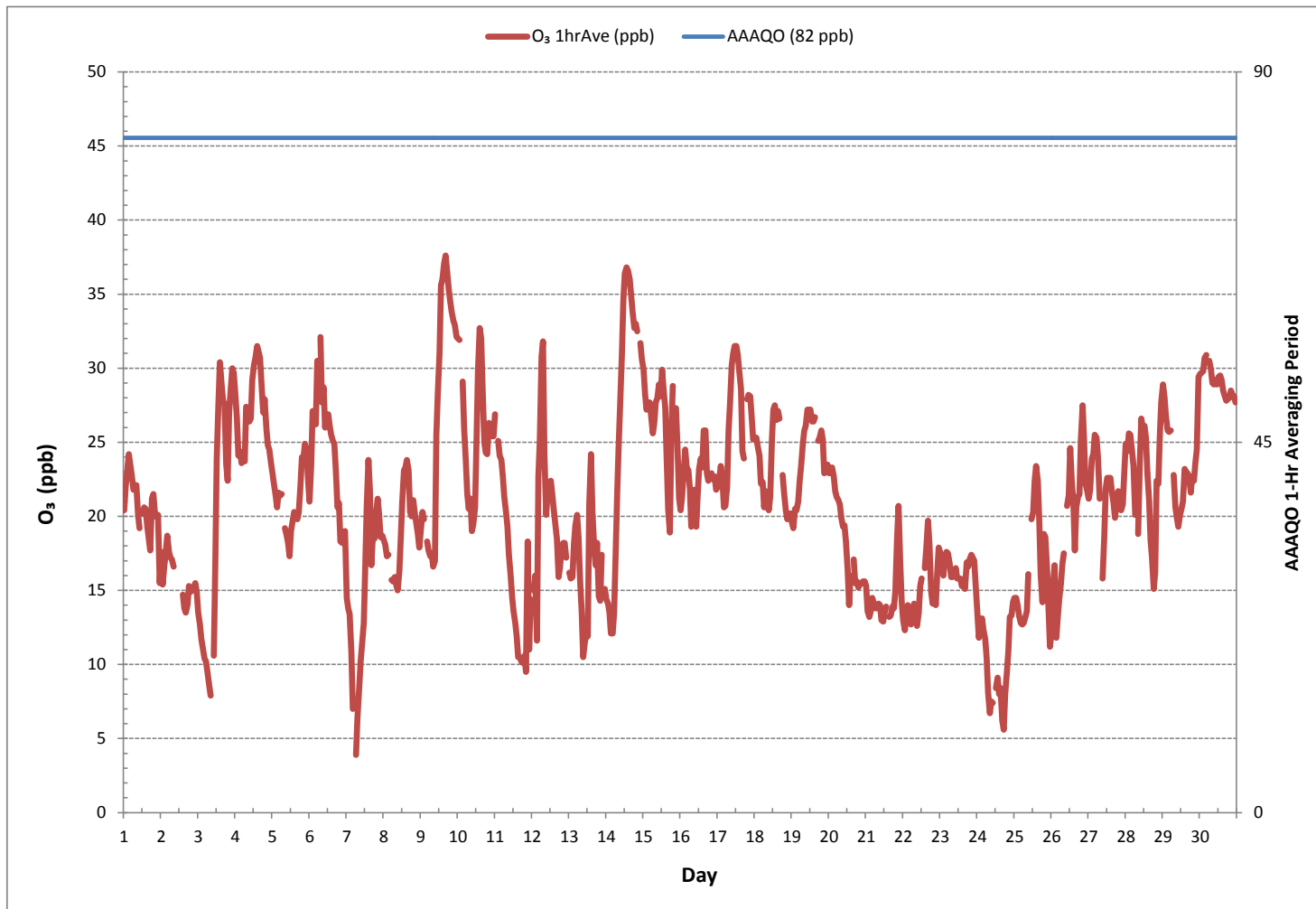
24 HR AVERAGES November 2016



MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	685				
MINIMUM 1-HR AVERAGE:	3.9 ppb	@ HOUR(S)	6	ON DAY(S)	7
MAXIMUM 1-HR AVERAGE:	37.6 ppb	@ HOUR(S)	16	ON DAY(S)	9
MAXIMUM 24-HR AVERAGE:	29.0 ppb			ON DAY(S)	30
				VAR-VARIOUS	
IZS CALIBRATION TIME:	30 hrs	OPERATIONAL TIME:	720 hrs		
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0 %		
STANDARD DEVIATION:	6.2	MONTHLY AVERAGE:	20.9 ppb		

OZONE Hourly Averages (O₃ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2016

OZONE Instantaneous Maximum (O₃ ppb)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY																													
1	22.9	24.0	24.2	25.6	24.7	24.0	23.2	23.0	23.2	21.8	20.6	S	21.1	21.8	21.7	20.5	19.6	18.8	22.6	22.6	21.3	21.0	21.3	21.0	18.8	25.6	22.2	24	
2	20.2	16.4	17.9	18.2	19.1	18.8	17.4	17.3	16.9	C	C	C	C	C	14.6	14.1	13.5	15.1	15.5	15.0	15.0	15.6	15.3	15.2	13.5	20.2	16.4	24	
3	14.1	13.4	11.8	11.2	10.2	9.8	9.6	8.5	7.4	S	12.0	20.6	25.1	28.8	31.1	29.9	27.8	28.0	25.6	24.3	28.1	29.3	31.2	31.1	7.4	31.2	20.4	24	
4	28.4	28.0	24.6	24.6	24.1	25.2	24.9	29.3	S	26.7	27.9	30.0	30.5	31.3	31.9	31.9	31.4	29.9	27.9	28.5	26.8	24.9	24.7	23.9	23.9	31.9	27.7	24	
5	23.1	22.5	21.9	21.0	21.7	21.4	21.7	S	19.4	19.0	18.2	17.7	19.9	20.4	20.3	20.2	20.1	21.4	22.5	25.1	24.7	26.1	25.2	23.1	17.7	26.1	21.6	24	
6	23.4	28.0	28.5	26.7	30.5	32.2	S	33.2	29.4	30.4	27.4	27.9	28.0	28.4	27.8	28.6	25.4	23.9	21.1	21.1	19.6	18.6	18.8	19.4	18.6	33.2	26.0	24	
7	15.5	13.7	13.6	12.1	7.9	S	4.2	6.6	8.7	10.8	11.4	14.3	19.0	22.6	24.3	22.6	20.4	20.6	19.4	20.5	21.0	20.7	18.8	18.7	4.2	24.3	16.0	24	
8	18.6	18.1	17.3	17.4	S	15.7	15.9	16.2	15.4	15.6	17.2	19.6	21.9	23.2	23.7	24.2	23.8	21.8	20.5	21.3	20.2	19.7	19.0	18.3	15.4	24.2	19.3	24	
9	19.4	20.5	20.0	S	18.6	17.8	17.4	17.8	17.0	20.7	27.2	29.2	34.3	36.2	37.1	37.6	38.0	36.9	36.5	35.0	34.3	33.9	33.1	32.6	17.0	38.0	28.3	24	
10	32.4	32.2	S	30.9	27.3	25.1	22.9	21.7	21.9	20.9	20.6	23.2	28.1	32.1	33.6	32.6	31.0	27.4	25.0	25.4	27.1	26.6	25.8	26.5	20.6	33.6	27.0	24	
11	27.6	S	25.8	24.6	23.9	23.4	22.1	20.8	20.0	18.6	16.5	15.2	14.1	13.2	12.4	11.0	11.0	10.7	10.2	11.8	12.9	19.9	15.1	15.9	10.2	27.6	17.2	24	
12	S	21.2	21.4	19.9	28.2	31.0	35.2	35.2	27.2	20.8	21.8	22.2	22.7	21.8	20.9	20.5	19.1	17.1	17.3	17.8	18.2	18.2	17.7	S	17.1	35.2	22.5	24	
13	16.4	16.2	16.6	18.8	20.1	20.4	19.5	17.5	15.2	10.6	12.9	14.1	15.6	24.2	25.8	21.4	20.4	17.7	19.4	14.6	16.6	18.3	S	15.2	10.6	25.8	17.7	24	
14	15.1	14.2	14.4	12.6	13.7	14.1	19.0	23.7	27.3	28.9	32.2	36.9	37.1	38.0	37.8	36.6	35.6	34.8	33.4	33.5	32.9	S	32.7	31.3	12.6	38.0	27.6	24	
15	31.3	29.1	28.6	28.5	28.2	27.4	26.2	27.7	28.2	28.9	30.1	29.7	32.6	29.5	29.2	25.6	22.1	20.9	29.3	29.8	S	29.2	27.7	23.8	20.9	32.6	28.0	24	
16	22.5	22.6	24.4	25.8	23.9	23.6	23.4	20.9	20.2	24.3	22.6	23.5	24.0	25.4	25.1	26.9	26.8	25.2	23.7	S	23.1	22.7	23.1	22.3	20.2	26.9	23.7	24	
17	23.0	23.5	23.8	23.5	21.8	21.5	24.6	28.1	29.1	31.2	31.4	31.9	32.2	31.9	30.9	30.3	28.2	27.0	S	29.3	29.0	29.4	27.3	26.4	21.5	32.2	27.6	24	
18	P	25.7	25.8	24.6	23.7	24.6	22.7	23.1	22.5	21.0	23.1	26.8	28.1	28.1	27.2	28.0	27.6	S	24.6	22.5	21.0	20.3	20.4	20.5	20.3	28.1	24.2	23	
19	20.4	19.9	21.0	20.9	22.1	23.2	25.2	25.8	26.9	27.2	27.4	27.6	28.2	26.9	27.2	27.6	S	25.5	25.6	26.1	26.0	23.4	23.1	23.8	19.9	28.2	24.8	24	
20	23.3	23.7	23.8	23.1	21.9	21.7	21.3	21.3	20.8	19.5	19.5	19.1	17.3	15.2	17.7	S	18.3	15.7	15.7	15.4	15.5	15.5	15.7	15.7	15.2	23.8	19.0	24	
21	16.0	14.0	13.3	14.0	14.8	14.2	14.1	13.8	14.2	14.1	13.3	13.1	13.7	14.0	S	13.6	13.3	14.0	14.1	15.6	21.4	21.7	18.7	14.6	13.1	21.7	14.9	24	
22	13.2	12.8	13.7	14.2	13.6	12.8	14.0	14.1	14.1	14.3	14.7	15.5	16.5	S	16.5	19.5	19.8	18.4	16.1	14.2	14.7	14.1	17.8	17.9	12.8	19.8	15.3	24	
23	17.9	17.1	16.4	17.8	17.8	17.7	17.3	16.1	16.0	16.2	16.8	16.3	S	15.8	16.4	15.3	16.5	16.9	16.9	17.0	17.3	17.1	17.1	16.2	15.3	17.9	16.8	24	
24	14.0	12.9	13.3	13.1	12.6	12.1	10.5	9.3	7.0	7.3	7.4	S	9.3	9.4	8.4	8.8	6.6	6.8	8.5	9.7	11.4	13.6	13.7	14.4	6.6	14.4	10.4	24	
25	14.4	14.4	14.2	13.4	12.9	17.8	13.2	13.4	14.6	18.3	S	20.1	21.0	23.5	24.0	23.5	20.7	18.7	15.8	20.3	20.5	19.1	14.9	12.5	12.5	24.0	17.4	24	
26	15.0	17.1	17.5	14.9	14.3	15.0	17.3	17.4	24.6	S	22.6	24.6	26.8	25.6	22.1	19.6	24.7	24.7	23.4	26.9	28.4	28.0	23.0	22.7	14.3	28.4	21.6	24	
27	21.6	22.6	25.3	25.6	26.6	25.8	25.1	22.2	S	17.4	21.0	23.1	23.4	23.4	23.1	22.9	21.7	20.7	22.2	22.5	21.9	21.4	22.5	25.2	17.4	26.6	22.9	24	
28	25.5	25.2	27.7	26.9	25.3	24.7	21.8	S	22.8	25.7	27.8	27.0	27.3	26.5	24.4	23.4	20.2	19.0	16.8	22.5	23.8	24.4	28.0	29.8	16.8	29.8	24.6	24	
29	29.8	29.4	28.4	26.9	26.5	26.9	S	24.7	22.4	21.3	20.3	21.4	21.9	23.5	24.8	24.4	24.8	24.0	23.9	24.2	24.7	26.4	30.1	30.9	20.3	30.9	25.3	24	
30	31.1	31.1	31.7	32.1	32.4	S	32.1	31.4	30.8	30.5	30.6	30.4	30.8	30.9	30.6	30.1	29.6	29.3	29.4	29.4	29.7	29.6	29.3	28.9	28.9	32.4	30.5	24	
HOURLY MAX	32.4	32.2	31.7	32.1	32.4	32.2	35.2	35.2	30.8	31.2	32.2	36.9	37.1	38.0	37.8	37.6	38.0	36.9	36.5	35.0	34.3	33.9	33.1	32.6					
HOURLY AVG	21.3	21.0	20.9	21.0	21.0	21.0	20.1	20.7	20.1	20.8	21.2	23.0	23.9	24.7	24.5	23.8	22.7	21.8	21.5	22.1	22.3	22.4	22.5	22.0					

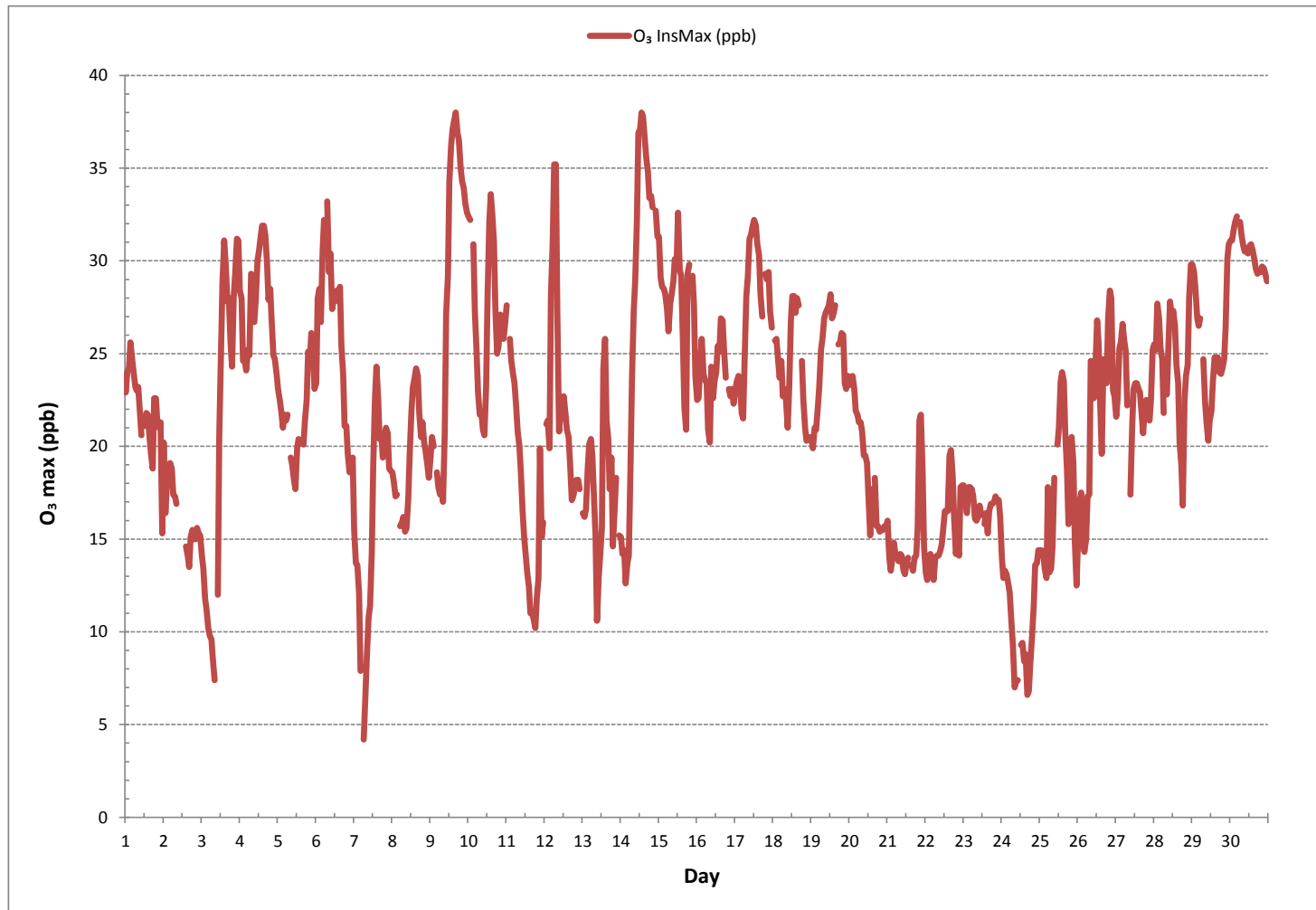
STATUS FLAG CODES

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:	684
MAXIMUM INSTANTANEOUS VALUE:	38.0 ppb @ HOUR(S) 16, 13 ON DAY(S) 9, 14
	VAR-VARIOUS
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	6.4
OPERATIONAL TIME:	719 hrs

OZONE Instantaneous Maximum (O₃ ppb)



Wind: LICA ST. LINA Poll.: LICA ST. LINA-O3[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 89.72% Calm Avg: 0.00 [ppb]

Direction	0.0-14.0	14.0-28.0	28.0-42.0	>42.0	Total
N	0.46	9.13	3.56	0	13.15
NE	0.62	15.33	4.8	0	20.75
E	6.35	25.39	3.87	0	35.61
SE	0.46	10.22	0.77	0	11.45
S	0.31	2.17	0.31	0	2.79
SW	2.94	3.72	0.31	0	6.97
W	0.93	6.81	0.15	0	7.89
NW	0	1.39	0	0	1.39
Summary	12.07	74.16	13.77	0	100

% Icon Classes (ppb)

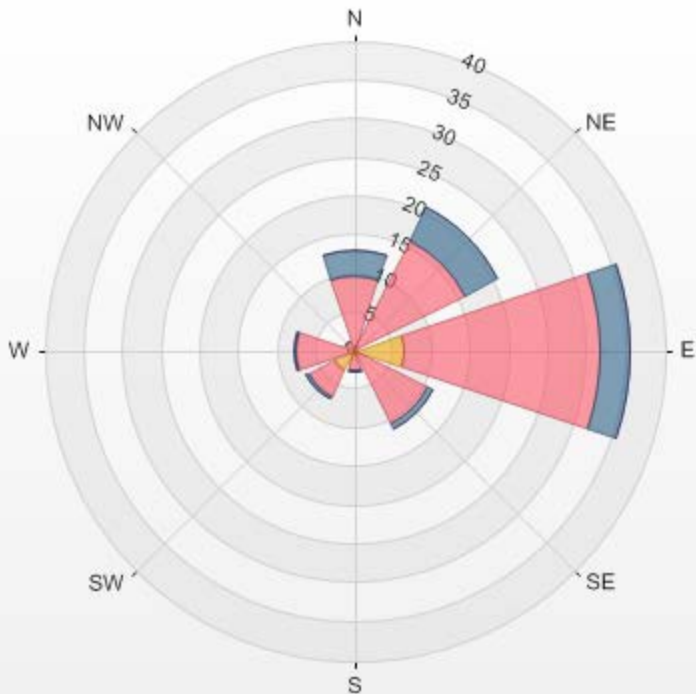
12 0.0-14.0

74 14.0-28.0

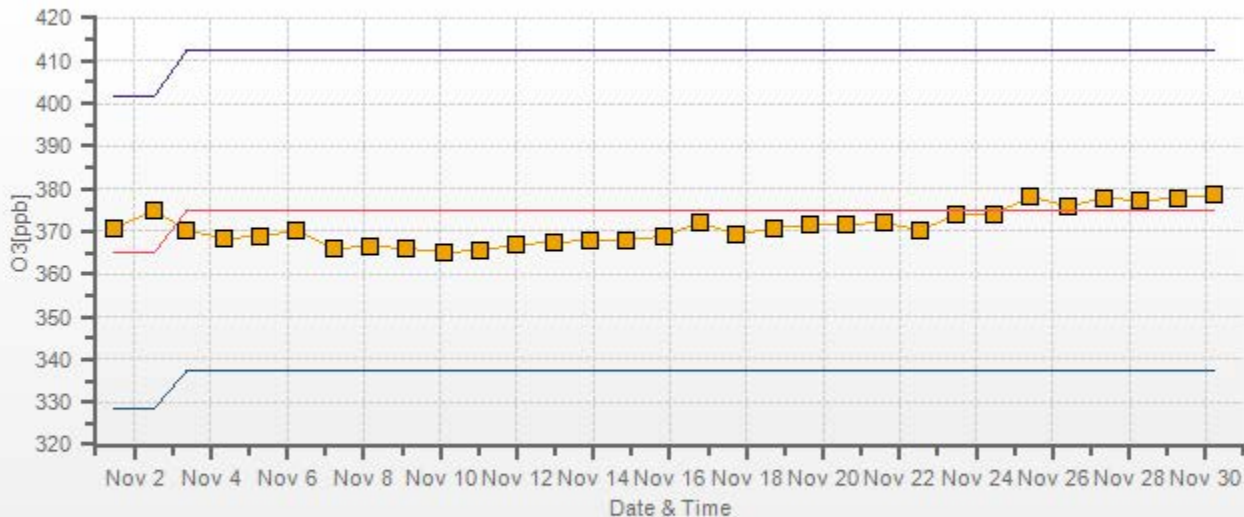
14 28.0-42.0

0 >42.0

LICA ST. LINA Poll.: LICA ST. LINA-O3[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



O3[ppb] Calibration: LICA ST. LINA Monthly: 2016/11 Type: Span



Span Meas Span Ref Span Low Span High

PARTICULATE MATTER 2.5

PARTICULATE MATTER < 2.5 MICRONS Hourly Averages (PM_{2.5} µg/m³)

HR START (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-HR AVG.	RDGS.
HR END (MST)	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	1.4	0.4	2.4	0.9	0.0	1.4	2.4	0.9	3.4	6.9	0.0	0.9	0.0	0.0	0.0	2.4	2.9	1.9	4.4	1.9	0.0	0.9	2.4	2.4	0.0	6.9	1.7	24
2	6.9	3.9	4.0	5.9	1.9	5.4	2.4	1.4	0.9	2.4	3.9	2.4	7.5	5.9	5.9	6.9	9.0	10.4	12.4	10.4	10.9	9.9	5.9	6.9	0.9	12.4	6.0	24
3	3.9	5.0	6.4	6.9	5.9	7.9	7.5	5.4	6.4	7.5	7.5	5.4	3.5	3.9	2.9	5.9	1.9	2.9	5.0	2.9	4.4	0.4	0.4	5.9	0.4	7.9	4.8	24
4	3.4	5.0	3.4	5.4	1.9	5.9	7.5	5.9	3.9	5.0	9.4	2.9	7.5	5.0	2.4	3.5	6.4	4.0	3.9	2.4	3.4	8.4	5.9	4.4	1.9	9.4	4.9	24
5	1.9	5.4	7.9	3.5	5.4	4.0	1.9	3.9	4.5	0.4	5.9	2.4	4.5	5.9	2.4	0.4	4.4	2.9	1.4	1.4	5.0	0.9	1.9	5.0	0.4	7.9	3.5	24
6	2.4	0.9	1.4	0.0	3.4	2.4	5.9	1.9	4.4	5.4	0.0	5.4	5.4	3.4	3.9	0.4	0.0	0.0	0.4	2.9	0.0	0.4	1.4	0.0	5.9	2.2	24	
7	0.0	0.0	X	1.9	2.9	7.9	9.9	7.5	5.0	0.4	5.4	6.4	7.9	7.9	3.4	4.5	2.4	7.5	7.9	4.0	6.9	5.4	2.9	3.4	0.0	9.9	4.8	23
8	0.0	0.9	0.0	0.0	2.4	0.0	0.4	0.0	3.4	0.4	3.4	0.0	0.0	0.0	2.9	0.4	X	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	3.4	0.6	23
9	0.0	0.0	0.9	0.0	0.0	2.4	0.4	0.0	0.0	0.4	3.9	0.0	0.0	0.0	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	3.9	0.5	24
10	0.0	X	0.4	0.0	1.9	0.0	1.4	2.9	3.9	0.0	0.0	1.9	0.0	C	0.0	0.0	0.0	1.9	X	1.4	1.4	0.0	1.4	2.9	0.0	3.9	1.0	22
11	0.0	0.0	2.9	0.0	0.0	1.4	2.4	3.5	0.0	0.9	0.4	3.4	0.0	2.9	3.4	1.4	1.9	0.9	5.0	2.4	4.4	2.9	6.9	3.4	0.0	6.9	2.1	24
12	4.4	6.9	6.4	7.9	0.4	1.4	4.4	1.4	2.4	5.0	2.4	4.0	0.9	2.9	3.9	1.9	5.9	0.9	3.4	3.4	1.4	0.9	1.9	3.5	0.4	7.9	3.2	24
13	1.4	6.9	3.5	5.0	2.4	5.4	3.9	4.5	3.4	4.0	5.0	7.5	13.4	9.9	1.9	2.9	2.4	6.4	4.4	6.4	6.9	1.9	6.4	5.4	1.4	13.4	5.1	24
14	7.5	0.0	2.4	1.9	5.0	6.4	2.4	0.4	1.4	0.0	0.0	0.0	X	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.9	0.0	4.4	0.0	7.5	1.5	23
15	0.9	0.0	3.9	0.9	2.4	2.4	1.4	0.9	0.4	1.9	0.0	1.4	1.9	1.9	2.4	0.4	3.9	1.9	1.9	0.4	0.0	1.4	2.9	0.4	0.0	3.9	1.5	24
16	1.9	0.0	4.4	4.4	5.4	0.4	3.9	4.4	6.4	4.0	5.0	3.9	4.0	3.9	8.4	2.9	3.4	4.4	4.4	2.9	5.9	1.9	3.4	3.4	0.0	8.4	3.9	24
17	0.4	0.0	0.0	4.5	4.0	1.4	2.9	1.9	0.0	1.4	1.9	3.9	0.9	2.4	0.0	0.0	3.4	0.0	0.0	X	0.4	0.0	0.0	0.0	0.0	4.5	1.3	23
18	0.0	0.0	0.0	5.0	4.5	0.0	2.4	0.0	0.0	0.9	5.4	4.5	1.4	2.9	1.4	3.5	7.9	9.0	4.5	6.4	7.5	4.5	5.0	5.4	0.0	9.0	3.4	24
19	7.5	5.4	7.5	4.0	8.4	6.9	9.0	2.9	0.0	7.9	5.4	5.9	8.4	6.4	9.0	5.0	7.9	0.0	2.4	1.9	4.5	3.4	0.4	6.4	0.0	9.0	5.3	24
20	3.4	5.9	0.0	2.9	0.0	1.4	0.9	1.9	5.0	3.9	7.9	11.4	15.5	9.5	4.5	9.9	5.4	6.9	9.9	6.9	9.4	11.9	9.9	8.4	0.0	15.5	6.4	24
21	6.4	9.0	7.5	8.4	10.9	9.5	8.4	5.4	8.4	6.9	9.0	6.4	2.4	2.9	5.9	3.9	6.4	8.4	5.9	10.4	7.5	3.9	9.0	8.4	2.4	10.9	7.1	24
22	4.9	9.0	5.0	7.9	9.0	5.4	5.9	3.4	2.4	2.9	2.9	5.9	2.9	C	0.0	4.4	0.0	7.5	13.4	5.4	4.9	3.4	7.5	4.0	0.0	13.4	5.1	24
23	7.9	6.4	5.9	4.4	0.0	2.4	1.4	2.4	4.0	3.4	1.9	2.9	2.9	2.4	3.9	6.9	2.9	3.4	2.9	1.4	6.9	2.9	7.9	2.9	0.0	7.9	3.8	24
24	3.4	7.9	3.9	7.5	8.4	9.0	17.4	21.0	14.9	16.9	12.9	9.9	9.0	10.4	9.9	12.4	14.5	7.9	14.9	6.4	18.4	2.4	14.9	3.9	2.4	21.0	10.8	24
25	6.9	1.9	6.9	12.4	6.9	5.0	5.4	10.9	1.9	14.0	10.4	10.4	X	4.9	0.0	0.0	5.4	2.4	1.9	9.0	9.4	15.4	9.4	17.4	0.0	17.4	7.3	23
26	17.9	6.4	7.9	12.9	23.4	6.9	X	20.9	2.9	22.4	12.9	16.4	5.0	14.9	5.0	3.4	9.9	4.9	0.4	5.4	0.0	0.9	9.0	6.4	0.0	23.4	9.4	23
27	X	7.5	7.9	0.0	5.0	0.0	6.9	6.4	12.9	1.4	4.9	7.9	3.4	11.9	14.5	2.9	9.9	11.9	9.0	15.4	18.4	9.4	7.9	5.4	0.0	18.4	7.9	23
28	4.4	3.9	3.9	3.9	6.4	0.0	4.4	8.4	8.4	10.4	7.5	7.5	0.4	1.9	11.9	0.9	5.4	10.9	12.4	7.5	9.9	7.9	3.9	3.9	0.0	12.4	6.1	24
29	5.9	13.4	15.4	0.0	5.9	2.9	4.4	0.0	X	1.4	8.4	3.9	2.9	0.4	4.4	0.0	5.9	X	X	19.9	20.4	22.9	25.9	5.9	0.0	25.9	8.1	21
30	2.9	0.0	X	5.4	5.9	5.9	2.9	2.4	1.9	1.9	2.9	0.0	0.9	11.9	3.9	X	15.4	8.4	5.9	4.4	1.4	6.9	0.0	5.9	0.0	15.4	4.4	22
HOURLY MAX	17.9	13.4	15.4	12.9	23.4	9.5	17.4	21.0	14.9	22.4	12.9	16.4	15.5	14.9	14.5	12.4	15.4	11.9	14.9	19.9	20.4	22.9	25.9	17.4				
HOURLY AVG	3.7	3.9	4.4	4.1	4.7	3.7	4.5	4.4	3.9	4.7	4.9	4.8	4.0	4.9	4.0	3.1	5.0	4.4	4.9	4.9	5.8	4.4	5.1	4.6				

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

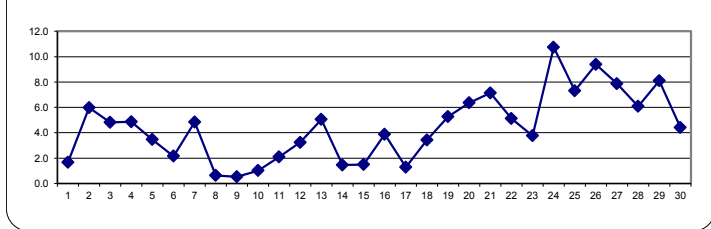
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	80	µg/m ³	24-HR	30	µg/m ³
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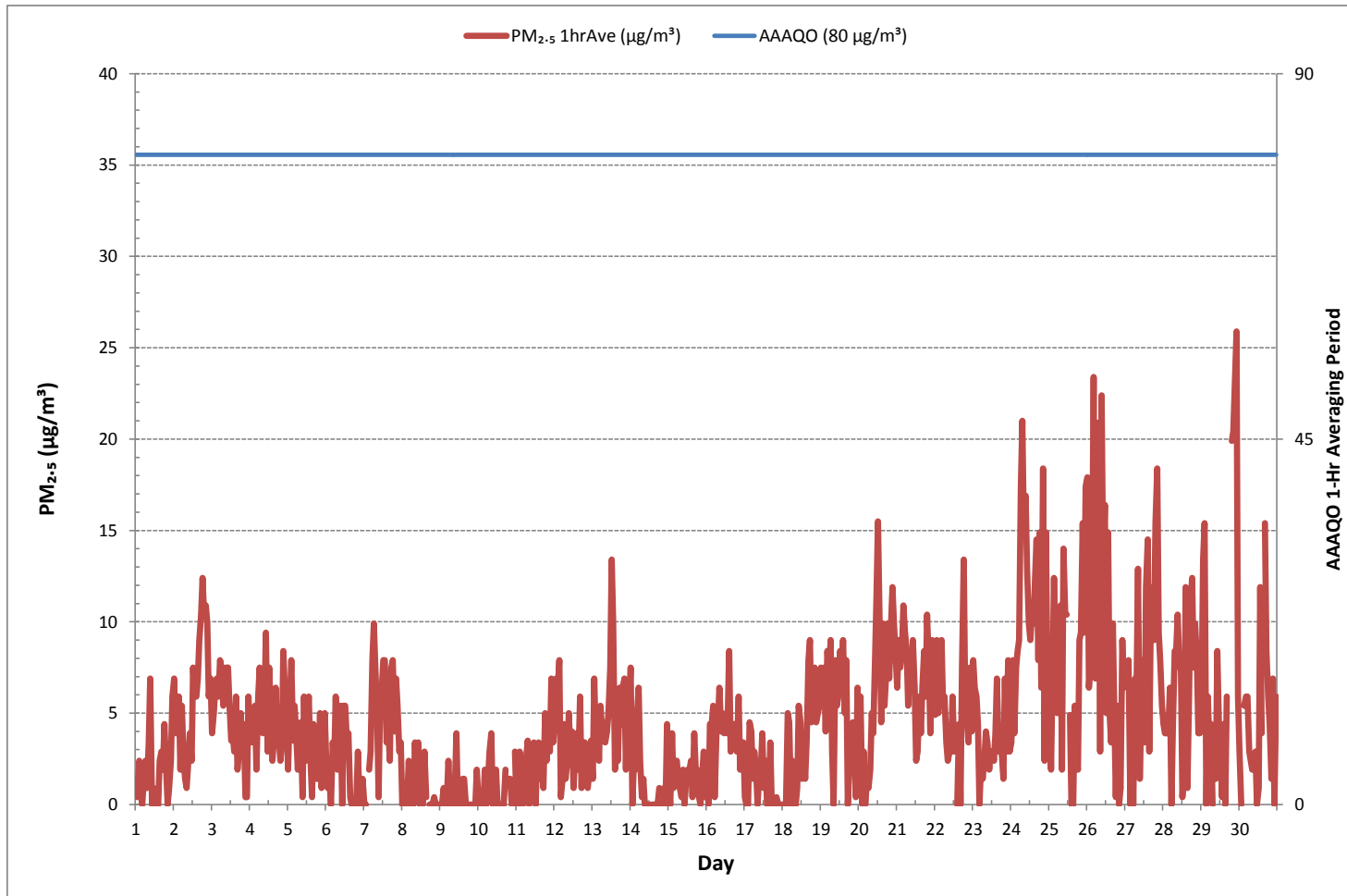
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF 24-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	593			
MINIMUM 1-HR AVERAGE:	0.0	µg/m ³	@ HOUR(S)	VAR
MAXIMUM 1-HR AVERAGE:	25.9	µg/m ³	@ HOUR(S)	22
MAXIMUM 24-HR AVERAGE:	10.8	µg/m ³		24
			ON DAY(S)	VAR
			ON DAY(S)	29
			ON DAY(S)	24
			VAR-VARIOUS	
MONTHLY CALIBRATION TIME:	2	hrs	OPERATIONAL TIME:	706
			AMD OPERATION UPTIME:	98.1
				%
STANDARD DEVIATION:	4.2		MONTHLY AVERAGE:	4.4
				µg/m ³

24 HR AVERAGES November 2016



PARTICULATE MATTER < 2.5 MICRONS Hourly Averages (PM_{2.5} µg/m³)

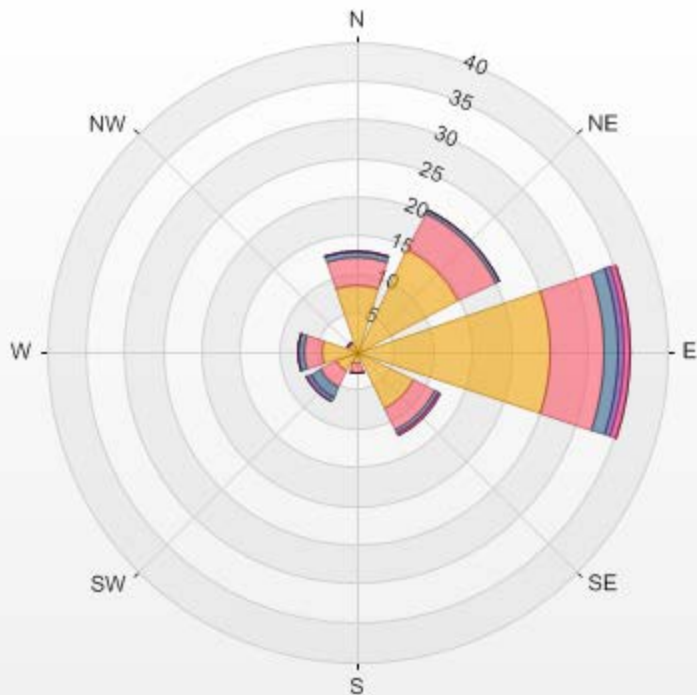


Wind: LICA ST. LINA Poll.: LICA ST. LINA-PM25[ug/m3(L)] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 92.22% Calm Avg: 0.00 [ug/m3(L)]

Direction	0.0-5.2	5.2-10.4	10.4-15.6	15.6-20.8	20.8-26.0	>26.0	Total
N	8.73	3.61	0.6	0	0.15	0	13.09
NE	14.76	5.27	0.6	0	0	0	20.63
E	25	6.93	1.96	0.75	0.6	0	35.24
SE	8.28	3.16	0.45	0	0.15	0	12.04
S	1.66	1.05	0	0	0	0	2.71
SW	2.86	2.41	1.36	0.6	0	0	7.23
W	4.52	2.41	0.75	0	0	0	7.68
NW	1.2	0.15	0	0	0	0	1.35
Summary	67.01	24.99	5.72	1.35	0.9	0	100

% Icon Classes (ug/m3(L)) 67 0.0-5.2 25 5.2-10.4 6 10.4-15.6 1 15.6-20.8 1 20.8-26.0 0 >26.0

LICA ST. LINA Poll.: LICA ST. LINA-PM25[ug/m3(L)] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



WIND SPEED



WIND SPEED Hourly Averages (WS kph)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY																													
1	20.9	18.7	10.0	8.4	8.9	11.6	6.5	14.3	11.1	10.4	8.9	14.1	18.2	19.7	20.0	19.9	21.2	21.4	20.5	23.5	14.2	16.5	20.7	22.2	6.5	23.5	7.2	24	
2	19.4	20.4	19.4	17.7	16.5	15.3	16.0	13.8	14.7	17.8	19.9	18.7	10.2	11.3	16.9	14.9	20.3	19.3	20.4	20.8	21.0	18.8	20.7	12.2	10.2	21.0	6.0	24	
3	11.4	19.9	20.1	21.7	21.0	19.1	19.4	11.4	20.4	19.1	12.8	9.0	10.7	11.0	13.9	15.2	17.9	21.9	23.2	18.2	16.2	14.7	15.4	22.2	9.0	23.2	9.7	24	
4	22.4	23.7	23.1	22.5	23.1	19.7	14.1	16.7	16.1	21.6	20.8	22.2	21.9	21.3	21.7	22.2	22.8	9.4	18.8	23.7	13.9	13.8	14.4	14.8	9.4	23.7	18.3	24	
5	14.9	16.3	18.5	23.3	22.7	23.3	20.6	22.3	22.3	19.5	20.9	21.2	20.8	15.7	20.4	20.3	23.3	23.5	23.9	24.4	23.1	20.5	16.4	20.4	14.9	24.4	19.4	24	
6	22.3	12.6	17.1	7.7	14.1	7.9	11.4	21.0	6.9	20.2	18.3	22.1	20.8	20.0	15.7	20.0	17.1	14.0	16.1	15.5	15.2	17.0	16.8	16.1	6.9	22.3	11.7	24	
7	17.6	20.3	11.5	5.4	26.2	31.7	82.9	63.4	99.4	100.7	71.9	21.0	20.1	16.5	9.7	12.1	22.0	21.9	19.1	20.6	13.1	12.5	14.6	14.2	5.4	100.7	15.7	24	
8	15.7	17.6	20.2	16.6	17.1	21.3	21.8	21.0	23.3	22.1	22.9	22.5	22.3	21.9	21.8	22.7	23.0	19.7	21.1	18.6	23.8	23.1	22.8	19.0	15.7	23.8	20.4	24	
9	22.0	20.2	20.0	19.9	22.4	22.9	20.6	19.3	17.3	15.6	10.9	13.5	16.4	17.0	14.9	16.5	16.4	18.8	16.1	15.6	18.4	17.3	15.8	16.1	10.9	22.9	15.8	24	
10	16.6	17.0	17.2	17.0	15.1	16.0	17.6	22.5	21.7	19.9	21.2	22.8	16.9	12.1	11.3	20.6	18.2	18.5	20.7	20.7	22.0	21.1	18.4	19.9	11.3	22.8	8.4	24	
11	20.2	21.1	22.2	24.9	26.6	24.0	24.6	23.6	22.2	19.1	14.9	11.0	12.7	14.8	15.9	18.0	20.6	19.4	18.2	20.6	19.2	17.9	19.2	19.8	11.0	26.6	17.1	24	
12	20.4	20.5	13.7	11.4	23.1	19.0	19.1	17.9	15.9	14.9	14.6	18.1	20.1	17.9	4.3	9.6	9.1	15.8	17.6	17.3	17.1	17.7	18.4	18.7	4.3	23.1	12.6	24	
13	18.0	16.6	17.1	16.0	17.2	18.2	19.9	18.3	20.1	22.3	20.3	20.0	15.3	15.3	16.4	21.6	20.7	19.6	20.7	16.4	22.5	18.4	19.2	12.5	12.5	22.5	10.8	24	
14	18.1	17.2	15.2	15.4	15.6	16.8	13.8	15.9	18.3	14.3	11.5	13.8	9.2	7.8	9.5	7.0	10.9	14.5	12.7	12.1	12.9	13.8	14.3	13.3	7.0	18.3	12.4	24	
15	13.6	14.4	13.7	14.1	15.2	14.5	15.1	13.4	13.5	13.4	16.5	16.9	16.2	19.9	22.1	16.9	14.9	24.3	25.8	24.2	23.8	23.1	21.2	20.0	13.4	25.8	17.5	24	
16	20.5	21.0	21.0	8.6	14.6	6.0	21.4	21.2	22.2	22.7	18.1	8.8	5.6	23.6	23.8	23.3	21.5	22.4	20.8	21.1	20.2	21.2	21.8	22.4	5.6	23.8	17.5	24	
17	22.4	18.4	12.1	15.5	11.2	9.8	11.7	17.8	18.1	20.2	19.9	18.2	17.6	18.6	17.6	20.4	21.1	22.6	23.7	22.7	21.6	20.7	21.0	20.1	9.8	23.7	17.4	24	
18	19.1	19.4	20.7	19.0	22.8	16.8	23.0	24.4	9.8	13.6	20.7	21.9	20.2	20.9	21.2	21.4	20.9	22.0	21.6	20.4	20.8	19.8	20.2	21.0	9.8	24.4	16.6	24	
19	21.5	21.8	19.5	14.4	21.2	21.2	21.7	21.8	21.8	23.2	24.0	22.3	21.6	20.8	22.3	19.0	17.8	18.4	17.0	16.4	17.9	17.4	15.3	13.8	13.8	24.0	17.2	24	
20	16.5	14.0	13.2	15.0	12.0	15.0	9.3	7.2	7.1	11.5	14.8	21.0	19.4	18.8	18.1	18.2	18.8	17.3	11.8	11.8	10.3	13.5	X	X	7.1	21.0	8.8	22	
21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
22	X	X	X	X	X	X	X	X	X	X	X	Y	Y	20.7	17.9	18.0	16.5	17.7	14.9	15.1	13.7	14.2	13.2	11.5	11.5	20.7	15.4	11	
23	12.4	11.9	14.1	13.1	14.6	15.7	14.2	15.6	16.0	17.2	15.7	14.5	14.6	16.1	15.6	16.8	14.9	13.3	14.0	15.4	18.0	19.6	20.9	23.5	11.9	23.5	15.4	24	
24	18.7	2.3	21.8	20.3	19.4	20.1	20.7	20.1	20.6	19.6	7.5	16.4	15.8	13.2	20.5	19.5	15.4	15.6	15.0	16.2	13.3	12.9	13.7	14.8	2.3	21.8	3.4	24	
25	14.6	14.0	14.4	15.6	16.7	16.4	15.2	16.6	16.8	18.4	19.7	20.2	18.5	13.4	21.1	12.7	7.6	8.5	11.3	11.3	13.7	12.4	12.1	17.0	7.6	21.1	5.4	24	
26	16.0	15.2	16.0	16.0	21.0	20.4	19.4	23.0	23.4	9.8	20.4	19.2	18.0	14.7	13.4	12.7	9.7	9.8	12.4	15.3	17.4	16.0	15.6	15.9	9.7	23.4	3.0	24	
27	15.5	16.9	14.8	11.6	14.1	19.8	20.9	20.6	19.1	20.6	19.9	20.3	23.0	3.8	16.8	18.1	21.6	22.4	20.7	21.1	25.2	24.1	22.8	20.2	3.8	25.2	3.2	24	
28	20.0	22.8	21.6	20.6	19.8	21.2	20.8	22.0	19.3	20.0	20.5	23.8	21.5	18.7	19.4	24.3	20.4	20.5	23.6	21.6	19.3	20.6	20.1	18.9	18.7	24.3	20.6	24	
29	17.8	14.7	14.0	19.2	18.7	19.6	19.1	20.0	20.1	18.4	17.3	10.7	8.2	13.5	20.3	23.1	8.9	22.0	12.3	14.4	12.3	11.5	18.9	16.2	8.2	23.1	10.4	24	
30	14.2	14.5	15.8	14.6	15.1	13.8	13.4	12.5	14.5	13.7	13.9	13.8	13.1	14.4	14.6	15.7	15.8	15.6	16.7	14.1	14.1	16.2	14.1	16.1	12.5	16.7	14.4	24	
HOURLY MAX	22.4	23.7	23.1	24.9	26.6	31.7	82.9	63.4	99.4	100.7	71.9	23.8	23.0	23.6	23.8	24.3	23.3	24.3	25.8	24.4	25.2	24.1	22.8	23.5					
HOURLY AVG	6.9	7.2	7.6	8.2	7.9	7.3	10.3	10.9	12.5	12.8	10.5	6.9	7.3	10.1	11.0	10.1	9.6	9.6	10.3	9.3	9.0	8.7	8.1	7.9					

STATUS FLAG CODES

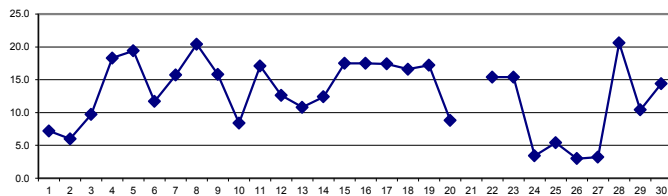
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	September 12, 2016
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

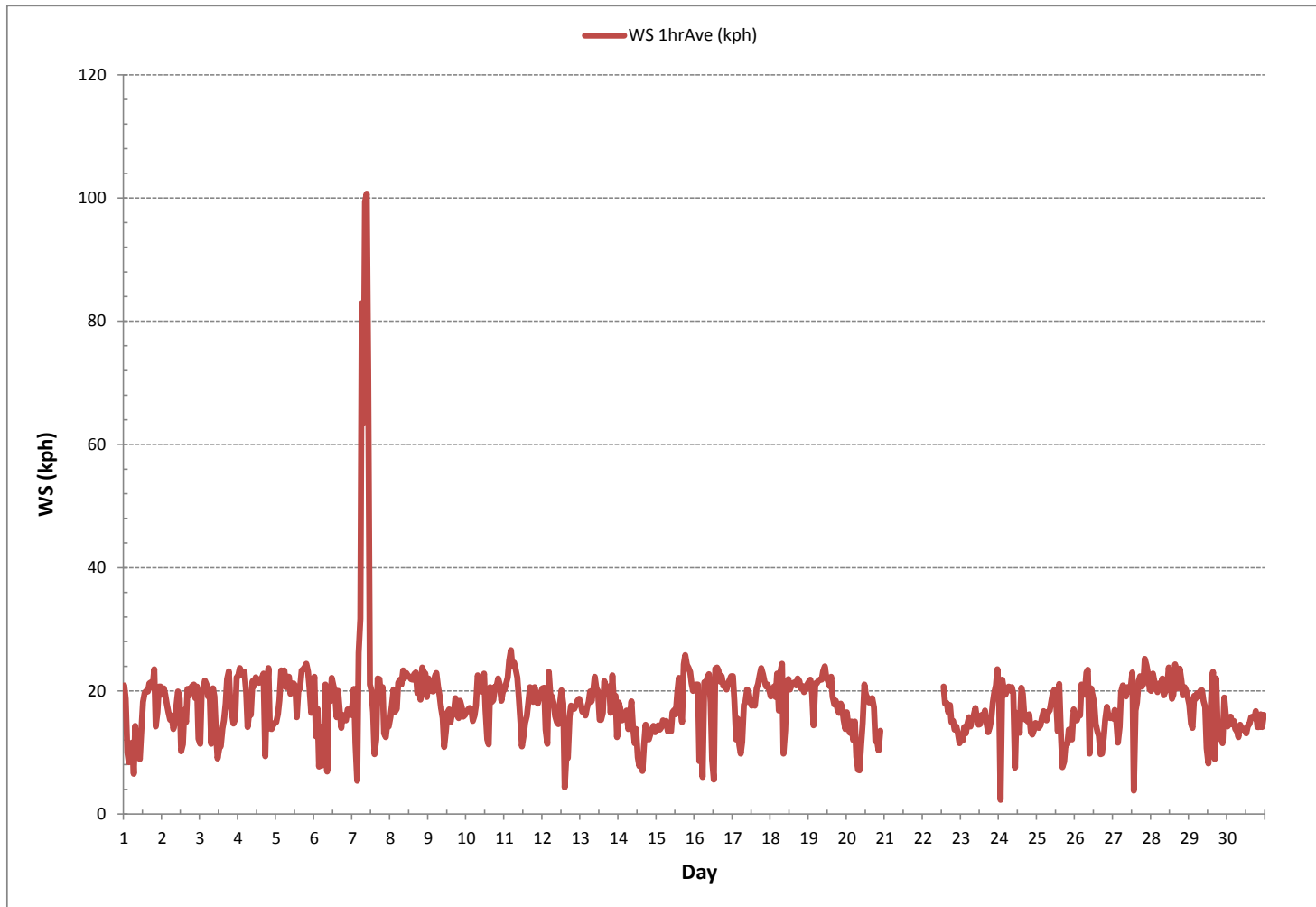
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	681
MINIMUM 1-HR AVERAGE:	2.3 kph @ HOUR(S) 1 ON DAY(S) 24
MAXIMUM 1-HR AVERAGE:	100.7 kph @ HOUR(S) 9 ON DAY(S) 7
MAXIMUM 24-HR AVERAGE:	20.6 kph ON DAY(S) 28
	VAR-VARIOUS
MONTHLY CALIBRATION TIME:	0 hrs
	OPERATIONAL TIME: 681 hrs
	AMD OPERATION UPTIME: 94.6 %
STANDARD DEVIATION:	7.1
	MONTHLY AVERAGE: 9.1 kph

24 HOUR AVERAGES FOR November 2016



WIND SPEED Hourly Averages (WS kph)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2016

WIND SPEED Instantaneous Maximum (WS kph)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY																													
1	28.6	28.0	31.7	30.2	29.9	31.2	27.9	31.0	28.0	28.7	30.1	29.6	29.7	29.3	28.4	28.0	28.5	28.4	28.2	28.8	28.6	28.6	28.2	28.2	27.9	31.7	29.1	24	
2	26.5	27.1	26.4	26.0	26.0	27.0	26.8	23.4	26.0	26.8	28.7	28.4	30.9	32.3	29.3	29.1	28.6	36.3	29.4	28.7	30.7	34.4	29.5	30.6	23.4	36.3	28.7	24	
3	42.4	36.5	27.6	32.2	34.1	39.8	37.2	35.4	29.8	29.1	22.2	24.3	25.5	22.7	23.8	25.9	22.6	28.7	27.0	26.3	21.5	22.1	22.8	28.7	21.5	42.4	28.7	24	
4	28.1	28.3	28.5	27.6	28.5	30.2	30.9	36.4	36.2	34.0	33.8	33.8	38.2	35.1	33.6	31.4	28.5	29.8	30.0	29.6	33.4	35.1	40.8	36.6	27.6	40.8	32.4	24	
5	37.5	39.8	38.8	30.5	30.5	30.6	35.5	35.7	35.7	28.0	30.0	31.5	27.9	26.7	27.7	28.7	27.9	30.0	28.9	28.9	29.7	29.8	24.5	29.6	24.5	39.8	31.0	24	
6	34.0	38.4	30.7	28.7	30.0	29.8	30.2	35.2	29.1	28.0	27.2	27.8	28.1	29.3	29.3	27.3	22.8	21.9	24.0	20.8	20.5	22.3	21.0	18.9	18.9	38.4	27.3	24	
7	22.3	25.6	21.3	178.6	178.6	178.5	178.6	178.6	178.6	178.6	94.3	27.9	31.6	28.5	30.2	29.8	31.5	30.6	35.0	36.8	37.9	35.5	37.4	36.5	21.3	178.6	76.8	24	
8	37.3	36.8	34.9	36.3	34.7	35.7	32.0	35.4	36.8	33.7	38.8	34.2	33.0	34.4	38.2	37.3	40.4	33.1	29.2	30.0	30.1	30.7	29.2	32.2	29.2	40.4	34.4	24	
9	28.1	24.4	27.0	27.1	28.3	28.7	25.7	25.4	24.3	23.3	26.8	28.4	35.1	39.0	35.3	27.7	27.8	33.7	27.2	29.3	29.6	28.0	26.9	27.6	23.3	39.0	28.5	24	
10	27.8	25.5	23.5	22.3	22.6	21.5	23.8	27.0	26.3	25.2	28.1	28.7	29.8	29.1	30.9	28.5	27.6	35.7	33.7	34.3	41.6	43.8	47.1	41.2	21.5	47.1	30.2	24	
11	48.4	53.5	49.7	53.0	56.5	44.0	43.3	43.1	40.3	29.1	24.8	21.7	24.6	22.4	22.8	23.9	25.4	24.3	22.3	24.5	21.7	24.3	24.3	26.5	21.7	56.5	33.1	24	
12	24.4	28.7	31.2	29.8	28.3	27.8	27.4	26.5	27.6	25.0	24.9	26.7	29.8	30.2	30.0	30.0	28.7	25.9	26.7	26.2	27.8	26.5	28.6	24.4	24.4	31.2	27.9	24	
13	26.6	26.3	23.4	25.0	25.6	25.9	24.1	27.4	29.0	27.8	27.1	27.2	29.4	25.0	24.3	27.9	28.3	28.9	30.5	29.1	28.3	30.6	34.0	32.0	23.4	34.0	27.7	24	
14	30.4	26.3	21.1	20.8	23.5	23.9	26.0	26.9	28.7	28.6	25.9	39.0	35.7	31.2	34.4	28.7	27.8	24.9	27.4	32.2	26.3	26.4	22.5	20.3	20.3	39.0	27.5	24	
15	22.1	21.3	19.7	23.0	22.3	20.6	21.0	20.6	20.4	21.0	27.8	28.7	25.6	28.3	27.9	27.6	27.3	27.1	29.3	26.7	27.5	28.2	26.1	27.2	19.7	29.3	24.9	24	
16	28.1	28.2	27.6	29.1	27.8	28.0	28.2	27.6	27.8	28.0	29.8	31.2	30.9	29.1	29.3	27.8	27.5	27.1	26.4	27.0	26.1	26.7	27.3	27.1	26.1	31.2	28.1	24	
17	26.9	27.5	29.5	31.1	34.1	36.4	29.2	34.9	27.8	31.3	28.0	32.5	31.5	30.0	29.7	28.0	27.7	27.5	27.5	26.0	25.8	23.6	24.2	23.3	23.3	36.4	28.9	24	
18	P	25.1	26.4	27.3	27.3	27.3	26.6	27.9	28.8	28.4	28.4	28.8	28.4	27.3	27.9	27.9	28.6	29.3	26.6	26.4	29.1	27.6	27.1	27.3	25.1	29.3	27.6	23	
19	27.6	31.1	34.7	43.3	44.2	30.6	39.3	34.5	40.8	48.9	48.1	36.9	41.6	49.4	51.6	50.5	51.4	46.3	46.1	48.9	44.8	42.0	43.7	42.4	27.6	51.6	42.4	24	
20	39.5	41.1	39.1	31.7	28.2	28.0	30.0	27.5	27.1	28.2	27.7	27.5	26.6	27.7	26.4	26.0	27.9	25.6	34.5	33.9	28.4	32.1	X	X	25.6	41.1	30.2	22	
21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
22	X	X	X	X	X	X	X	X	X	X	X	Y	Y	Y	28.8	27.5	27.9	30.8	27.7	29.5	26.1	28.4	28.2	28.0	26.1	30.8	28.3	10	
23	28.4	29.5	28.0	28.7	28.9	27.6	32.3	31.7	27.3	33.2	32.8	30.4	30.0	29.1	27.7	28.8	28.8	27.5	27.1	28.2	27.9	29.0	29.1	31.1	27.1	33.2	29.3	24	
24	36.3	32.9	27.8	29.6	29.1	30.1	31.5	35.6	32.2	31.7	30.9	36.8	29.7	30.4	30.4	29.7	27.7	28.4	28.4	28.8	25.6	25.7	29.7	28.4	25.6	36.8	30.3	24	
25	27.1	26.4	27.0	26.4	26.7	25.8	24.6	25.8	26.1	27.5	28.6	28.9	28.6	34.7	28.7	23.2	30.3	30.1	26.9	26.9	25.8	22.9	21.2	27.6	21.2	34.7	27.0	24	
26	23.4	22.7	20.3	22.5	26.5	25.8	25.6	32.3	33.9	31.6	26.0	26.6	28.6	26.6	25.9	24.4	24.4	24.9	25.7	26.2	26.4	25.8	24.9	25.1	20.3	33.9	26.1	24	
27	26.7	27.1	27.3	26.0	26.9	29.9	29.0	26.8	27.7	30.5	30.4	30.7	34.5	34.9	32.8	33.0	34.8	31.5	31.3	26.8	36.1	34.8	33.7	31.3	26.0	36.1	30.6	24	
28	31.3	34.1	32.2	30.4	29.8	32.8	32.6	36.4	29.5	33.2	35.2	36.1	34.6	32.0	33.0	34.3	30.6	31.4	36.1	37.4	29.1	33.2	28.0	37.6	28.0	37.6	33.0	24	
29	35.4	35.4	33.9	34.3	29.7	33.2	26.2	28.4	28.2	27.9	28.9	29.1	32.1	31.9	31.3	33.5	41.2	30.8	32.5	25.4	25.8	26.4	33.6	32.7	25.4	41.2	31.2	24	
30	25.9	27.1	26.3	26.0	25.3	25.7	26.5	26.7	26.8	25.3	26.6	26.1	26.1	25.8	26.7	26.2	27.2	26.9	26.4	26.6	26.1	26.4	25.7	26.4	25.3	27.2	26.3	24	
HOURLY MAX	48.4	53.5	49.7	178.6	178.6	178.5	178.6	178.6	178.6	178.6	94.3	39.0	41.6	49.4	51.6	50.5	51.4	46.3	46.1	48.9	44.8	43.8	47.1	42.4					
HOURLY AVG	30.4	30.5	29.1	34.9	35.1	34.9	34.7	35.9	35.0	34.7	31.9	30.0	30.6	30.4	30.2	29.4	29.7	29.7	29.4	29.3	28.9	29.4	29.2	29.8					

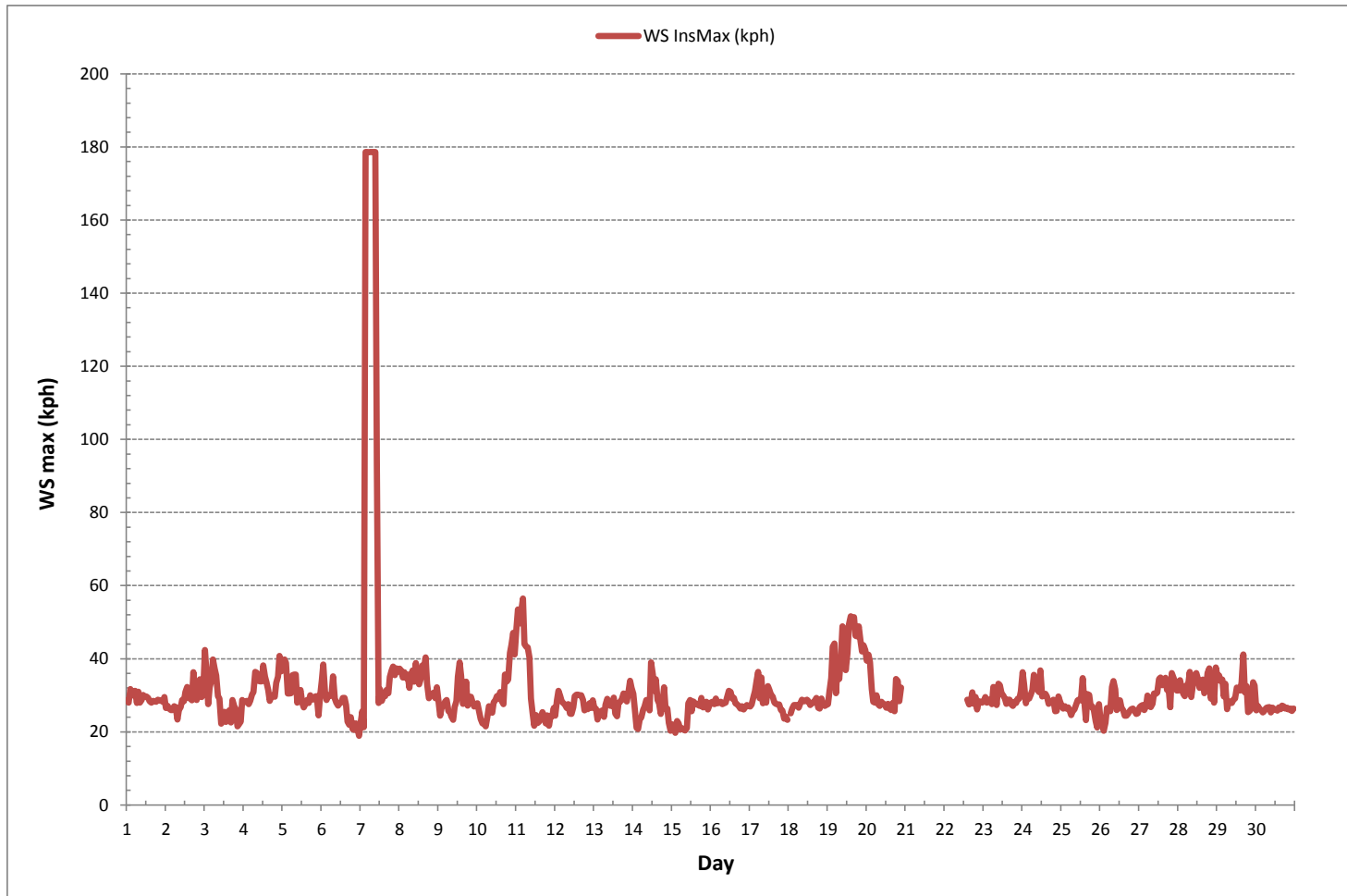
STATUS FLAG CODES

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

MAXIMUM INSTANTANEOUS VALUE:	178.6	kph	@ HOUR(S)	VAR	ON DAY(S)	7
				VAR-VARIOUS		
OPERATIONAL TIME:					679	hrs

WIND SPEED Instantaneous Maximum (WS kph)

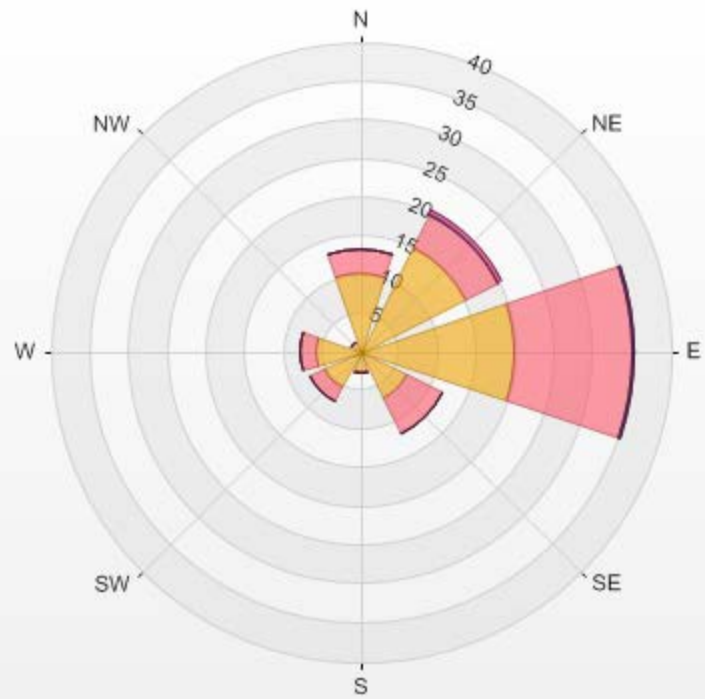


Wind: LICA ST. LINA Monitor: WSP [kph] Monthly: 11/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.58% Calm Avg: 0.00 [kph]

Direction	0.0-20.2	20.2-40.3	40.3-60.5	60.5-80.6	80.6-100.8	>100.8	Total
N	10.13	3.08	0	0	0	0	13.21
NE	15.12	4.7	0	0.15	0.44	0	20.41
E	19.82	15.27	0	0.15	0	0	35.24
SE	6.75	5.14	0	0	0	0	11.89
S	2.5	0.29	0	0	0	0	2.79
SW	5.29	2.06	0	0	0	0	7.35
W	5.87	1.91	0	0	0	0	7.78
NW	1.32	0	0	0	0	0	1.32
Summary	66.8	32.45	0	0.3	0.44	0	100

% Icon Classes (kph) 67 0.0-20.2 32 20.2-40.3 0 40.3-60.5 0 60.5-80.6 0 80.6-100.8 0 >100.8

LICA ST. LINA 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2016

WIND DIRECTION Hourly Averages (WD)

HR START (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	24-HR		
HR END (MST)	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	RDGS.		
DAY																												
1	WNW	WNW	WNW	N	NW	WNW	N	NE	NE	NE	NNE	NE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	W	W	W	NNE	24		
2	W	W	W	W	W	W	W	WSW	WSW	WSW	WSW	SW	SSE	SSE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	SE	S	24	
3	S	SW	SW	SW	SW	SW	SW	S	ESE	ESE	ESE	E	E	E	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	SE	24	
4	ESE	ESE	ESE	ESE	ESE	ESE	ESE	SE	SE	SE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	SSE	SSE	ESE	24
5	S	SSE	SE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	E	ESE	ESE	ESE	ESE	ESE	E	ESE	ESE	E	NE	ESE	24	
6	NE	NNW	WNW	NNE	NE	NNW	NNE	WNW	NNW	ENE	NE	ENE	ENE	E	ENE	E	E	E	E	E	E	E	E	E	E	ENE	24	
7	E	E	ESE	NNE	ENE	E	NNE	ENE	NNE	ENE	NE	ENE	ESE	ESE	ESE	S	SSW	SW	SW	SW	SW	S	S	SSE	S	ENE	24	
8	S	SE	ESE	SE	SE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	24
9	ESE	E	ESE	ESE	ESE	ESE	ESE	ESE	ESE	E	NE	ENE	ENE	NE	NE	NE	NE	NE	NE	ENE	ENE	NE	NE	NE	NE	E	24	
10	ENE	ENE	ENE	E	E	E	E	E	ESE	E	E	ESE	ESE	SE	SSW	SW	SW	SW	SW	SW	SW	SSW	SSW	SSW	SSW	SE	24	
11	S	S	SSE	SE	SE	SE	SE	SE	ESE	ESE	ESE	SE	E	E	E	E	E	E	E	E	E	E	E	E	ENE	E	ESE	24
12	E	ENE	ENE	NNE	NNE	NNE	NNE	N	N	N	N	NNW	N	NNE	NE	W	NW	E	ENE	ENE	ENE	ENE	ENE	ENE	ENE	NNE	24	
13	ENE	ENE	E	ENE	ENE	ENE	E	E	E	ESE	ESE	ESE	E	E	ESE	ESE	ESE	ESE	SW	SW	SW	SW	SW	SSW	SSW	ESE	24	
14	ESE	ESE	ESE	ESE	E	E	E	ENE	ENE	E	ENE	NE	NNE	NE	NE	NE	ENE	ENE	ENE	ENE	NE	ENE	ENE	E	E	ENE	24	
15	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	ESE	E	E	E	E	E	E	ENE	ENE	ENE	E	24	
16	ENE	ENE	ENE	NNE	NE	NNW	ENE	ENE	ENE	ENE	WNV	WNV	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	24
17	ENE	ENE	NE	NE	N	NNW	NE	NE	ENE	ENE	NE	NE	NE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	E	E	E	E	ENE	24	
18	ENE	ENE	ENE	ENE	W	NW	N	N	NNE	NNE	N	N	N	N	N	N	N	N	NNE	N	NNE	NNE	NNE	NNE	NNE	NNE	24	
19	NNE	NNE	NNE	ENE	NNE	NNE	NNE	NE	NE	NE	NE	NE	NE	NE	NE	ENE	ENE	ENE	ENE	ENE	E	ESE	ESE	ESE	ESE	NE	24	
20	ESE	ESE	ESE	SE	SE	SE	E	ESE	E	SE	NNE	N	N	N	NNE	NNE	NNE	NNE	NE	ESE	ESE	ESE	X	X	ENE	22		
21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	0
22	X	X	X	X	X	X	X	X	X	X	X	Y	Y	N	N	N	N	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	24	
23	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	N	N	N	N	N	N	NNE	24	
24	WNW	SE	E	E	E	E	E	E	E	ESE	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	SSW	24	
25	WSW	WSW	SW	SW	SW	WSW	SW	WSW	WSW	SW	SW	SW	SE	ESE	ESE	ESE	ENE	ENE	ENE	ENE	E	E	E	E	E	SSW	24	
26	E	E	ESE	ESE	ESE	ESE	E	E	ENE	ESE	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	W	W	W	W	W	W	SSW	24	
27	W	W	W	W	W	WSW	W	WNW	W	W	W	W	W	W	ENE	ENE	ENE	ENE	ENE	ENE	E	ENE	ENE	ENE	ENE	NNW	24	
28	ENE	ENE	ENE	ENE	ENE	ENE	ENE	E	ENE	ENE	ENE	E	E	E	E	E	E	E	E	ENE	ENE	ENE	ENE	ENE	ENE	ENE	24	
29	NE	NE	NE	NE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	NE	NE	ENE	ENE	ENE	WNW	W	ESE	SW	SW	E	N	N	NE	24		
30	NNW	N	NNW	N	N	NNW	N	N	N	N	N	N	NNE	N	N	N	N	N	N	N	N	N	N	NNW	N	24		

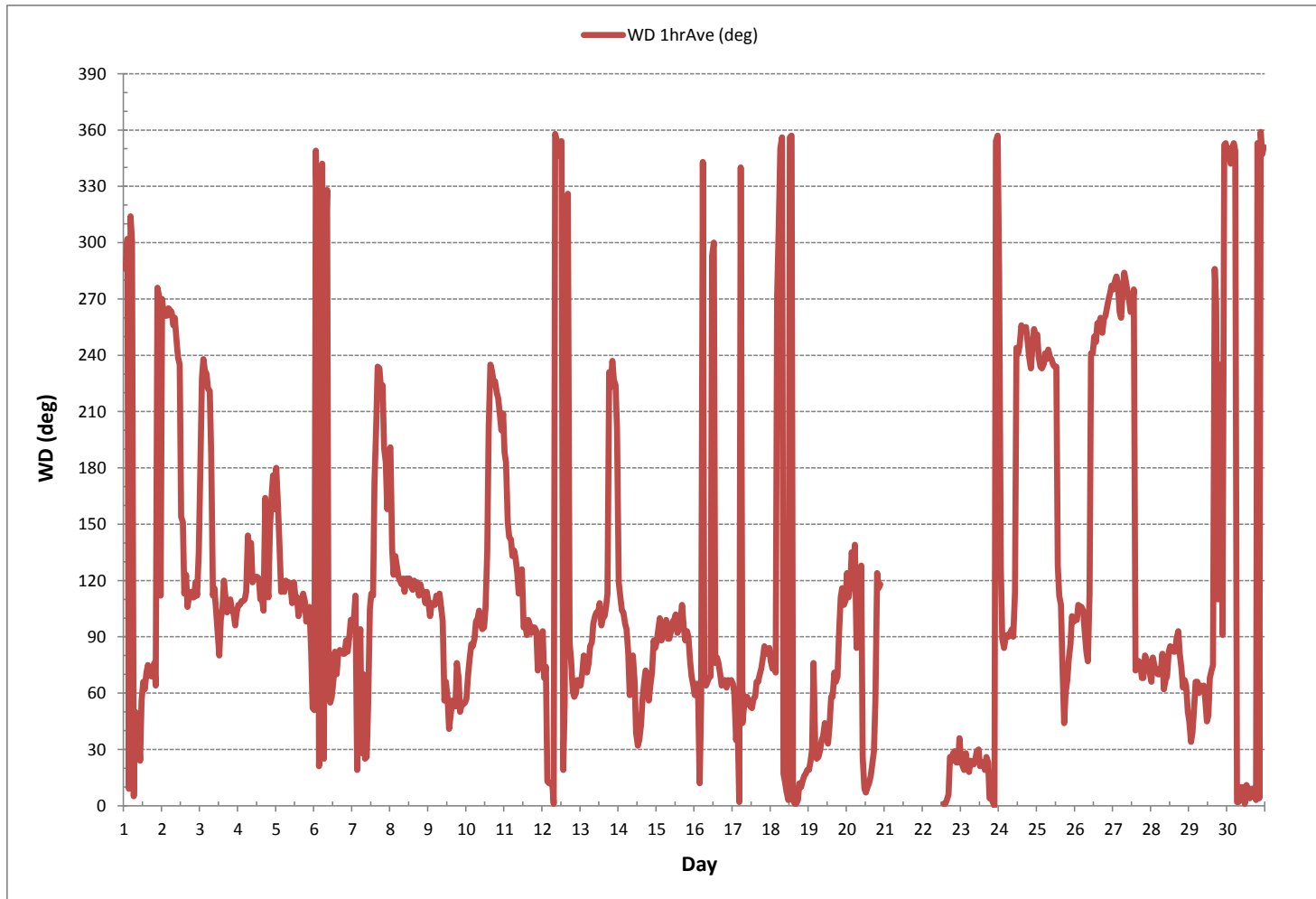
STATUS FLAG CODES

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:	September 12, 2016
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	0 hrs	OPERATIONAL TIME:	681 hrs
STANDARD DEVIATION:	88.71	AMD OPERATION UPTIME:	94.6 %
		MONTHLY AVERAGE:	76 (ENE)

WIND DIRECTION Hourly Averages (WD)



STANDARD DEVIATION WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
 St. Lina Continuous Monitoring Station - November 2016

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)

HR START (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.	
HR END (MST)	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	19	38	71	78	74	65	67	57	67	69	70	56	33	29	15	7	10	22	9	5	44	52	34	4	24	
2	6	5	5	7	8	9	9	12	11	8	16	37	69	65	45	54	28	34	18	17	17	37	22	64	24	
3	67	37	15	14	25	41	40	61	16	10	13	29	26	23	13	9	5	6	4	6	5	6	6	10	24	
4	5	11	15	5	12	39	56	51	55	26	30	24	22	28	21	23	15	57	43	19	56	63	60	60	24	
5	61	57	48	10	11	18	36	24	19	9	9	11	7	10	7	32	6	19	14	9	15	23	9	10	24	
6	20	41	47	70	58	71	62	24	70	15	10	13	8	14	46	5	5	8	5	6	4	4	3	3	24	
7	3	2	29	36	18	32	61	68	59	30	14	27	31	46	42	65	27	19	43	36	59	64	57	61	24	
8	54	51	38	49	47	33	27	31	13	15	17	12	15	17	26	25	19	39	33	45	11	21	17	35	24	
9	4	4	3	5	7	7	4	5	5	7	28	19	16	20	21	16	16	14	10	11	12	12	13	13	24	
10	12	8	6	4	6	4	3	9	3	3	4	9	49	65	55	11	10	12	21	32	28	40	50	43	24	
11	48	49	41	34	28	25	28	26	15	11	11	14	12	7	5	4	2	3	3	2	3	6	4	4	24	
12	4	32	32	60	3	6	7	8	11	11	11	9	17	37	45	49	38	39	6	10	11	10	8	9	24	
13	10	8	6	8	8	6	3	4	20	8	7	8	43	10	9	8	34	41	31	53	14	43	42	65	24	
14	40	7	6	4	6	6	11	13	10	13	25	29	48	54	47	44	27	12	20	22	18	14	8	8	24	
15	8	6	7	9	7	6	4	8	6	8	8	11	9	6	12	45	56	3	4	2	3	3	4	6	24	
16	27	28	29	73	55	74	26	23	13	8	45	76	73	11	3	3	26	17	5	7	6	5	6	9	24	
17	16	41	65	53	69	73	63	38	37	17	15	29	35	26	32	16	23	10	5	2	2	2	2	1	24	
18	4	4	4	38	7	25	2	5	54	61	30	17	7	6	12	9	19	13	13	9	16	13	10	11	24	
19	14	21	36	61	28	16	20	23	25	20	20	22	20	36	43	48	53	52	56	56	50	51	58	62	24	
20	51	61	63	55	65	55	56	76	54	65	53	16	32	12	11	12	13	15	31	15	31	15	X	X	22	
21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0
22	X	X	X	X	X	X	X	X	X	X	X	Y	Y	13	10	8	14	16	20	18	21	20	22	28	11	
23	23	24	18	23	17	16	19	16	16	16	22	22	22	16	15	14	18	20	16	15	12	8	6	16	24	
24	31	60	8	6	4	5	5	5	6	28	70	45	47	58	8	7	14	14	14	13	21	20	21	16	24	
25	14	17	16	14	11	9	12	9	10	9	15	18	35	45	12	13	42	39	28	23	16	18	9	5	24	
26	4	5	4	5	7	6	2	4	4	47	24	29	8	11	19	19	36	33	24	13	7	6	7	8	24	
27	8	9	14	24	20	7	8	17	8	7	7	6	25	82	49	43	32	12	20	17	6	8	5	7	24	
28	10	6	9	4	6	8	10	5	17	21	16	5	6	9	8	6	2	3	4	9	11	12	12	29	24	
29	37	54	53	28	32	11	11	9	18	30	36	63	69	57	22	5	38	1	57	51	49	57	5	11	24	
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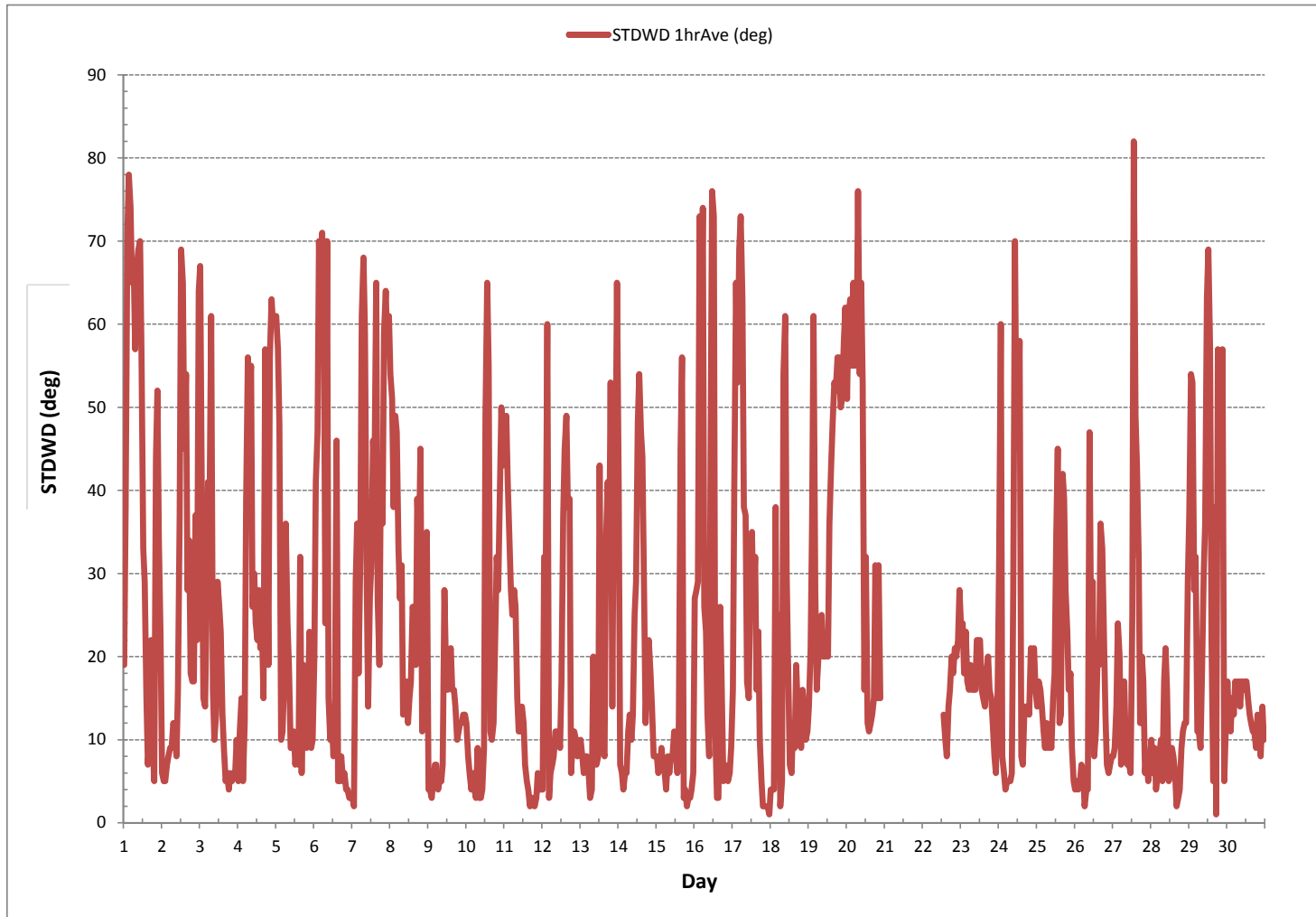
STATUS FLAG CODES

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: September 12, 2016

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 681 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



RELATIVE HUMIDITY



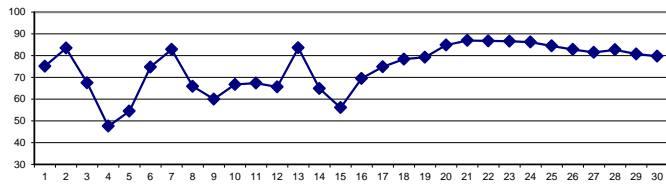
RELATIVE HUMIDITY Hourly Averages (RH %)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY 1	82	81	81	83	85	83	81	77	76	73	68	69	65	67	68	72	74	79	72	70	73	75	75	75	65	85	75	24	
2	76	78	79	79	79	81	82	84	84	83	83	82	81	82	83	84	85	86	87	88	89	89	90	90	76	90	84	24	
3	90	90	90	90	90	90	90	90	90	90	90	77	58	47	42	39	43	47	49	54	59	55	52	50	50	39	90	68	24
4	53	57	62	62	61	58	57	55	53	50	45	38	34	32	30	35	37	41	44	45	48	49	48	48	30	62	48	24	
5	51	52	53	57	57	59	58	60	64	64	62	62	57	51	44	48	51	53	51	48	49	50	52	55	44	64	55	24	
6	54	57	56	58	61	60	61	60	64	67	77	85	85	85	83	81	83	85	87	88	89	90	90	90	54	90	75	24	
7	90	90	90	90	90	90	89	89	90	90	89	87	79	68	66	68	76	75	80	82	82	81	81	78	66	90	83	24	
8	76	75	75	74	75	75	75	74	74	73	68	62	55	51	50	51	54	61	63	62	63	64	66	67	50	76	66	24	
9	66	65	67	67	67	67	67	66	66	62	52	51	50	51	52	51	49	51	57	61	61	63	65	66	49	67	60	24	
10	67	69	71	75	76	79	82	82	77	73	67	60	54	51	50	52	60	66	68	67	64	63	64	65	50	82	67	24	
11	61	62	63	65	67	70	72	74	75	74	70	69	63	61	61	64	67	70	70	69	71	64	71	66	61	75	67	24	
12	66	58	57	61	54	55	49	49	59	60	60	60	58	59	61	63	65	70	78	84	86	88	88	88	49	88	66	24	
13	88	88	89	88	88	88	89	90	90	87	84	89	86	69	63	67	77	84	84	84	85	82	84	84	63	90	84	24	
14	83	82	80	82	82	79	76	73	77	76	69	58	48	42	42	45	50	55	58	56	58	59	62	64	42	83	65	24	
15	64	66	67	67	65	65	65	64	58	52	46	44	43	45	48	52	57	59	52	48	56	51	54	58	43	67	56	24	
16	62	64	66	67	70	72	74	77	78	74	68	60	57	59	61	60	64	70	73	75	77	79	80	82	57	82	70	24	
17	81	82	82	81	80	79	77	76	77	76	75	72	68	64	59	63	68	71	73	75	77	78	81	82	59	82	75	24	
18	81	81	81	81	81	80	81	79	79	76	76	75	74	75	76	76	76	76	77	79	79	80	80	80	74	81	78	24	
19	80	81	81	81	80	79	78	77	76	76	76	74	73	77	78	78	79	81	83	83	83	83	83	83	73	83	79	24	
20	83	83	83	83	83	84	84	84	84	84	85	85	86	86	86	86	86	86	86	86	86	86	86	86	87	83	87	85	24
21	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	24
22	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	86	87	87	86	86	86	86	86	87	87	24
23	86	86	86	86	86	86	86	86	86	86	86	86	86	86	87	87	87	87	87	87	88	88	88	88	86	88	87	24	
24	88	88	89	88	88	87	87	86	86	85	85	85	85	85	85	86	86	86	86	86	86	86	86	86	85	89	86	24	
25	86	86	86	87	86	86	86	86	86	86	86	87	87	87	86	84	81	79	79	80	81	82	83	85	86	79	87	85	24
26	87	87	87	87	86	86	86	86	85	84	83	82	81	81	80	81	81	81	80	77	76	79	82	85	76	87	83	24	
27	85	83	81	79	79	79	81	83	84	83	80	79	77	78	79	81	82	82	83	84	84	84	84	83	77	85	82	24	
28	80	80	79	82	84	83	85	85	86	85	81	78	75	79	82	83	86	86	85	85	85	85	84	83	75	86	83	24	
29	83	82	81	80	80	80	81	82	83	82	80	78	76	75	74	76	81	85	85	85	84	83	83	81	74	85	81	24	
30	81	81	81	81	81	81	81	80	80	79	78	77	76	75	76	77	78	79	80	81	82	82	83	84	75	84	80	24	
HOURLY MAX	90	90	90	90	90	90	90	90	90	90	89	89	87	87	87	87	87	87	87	87	88	89	90	90	90				
HOURLY AVG	77	77	77	78	78	78	78	78	78	77	74	72	69	68	67	69	71	74	75	75	76	76	77	77					

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

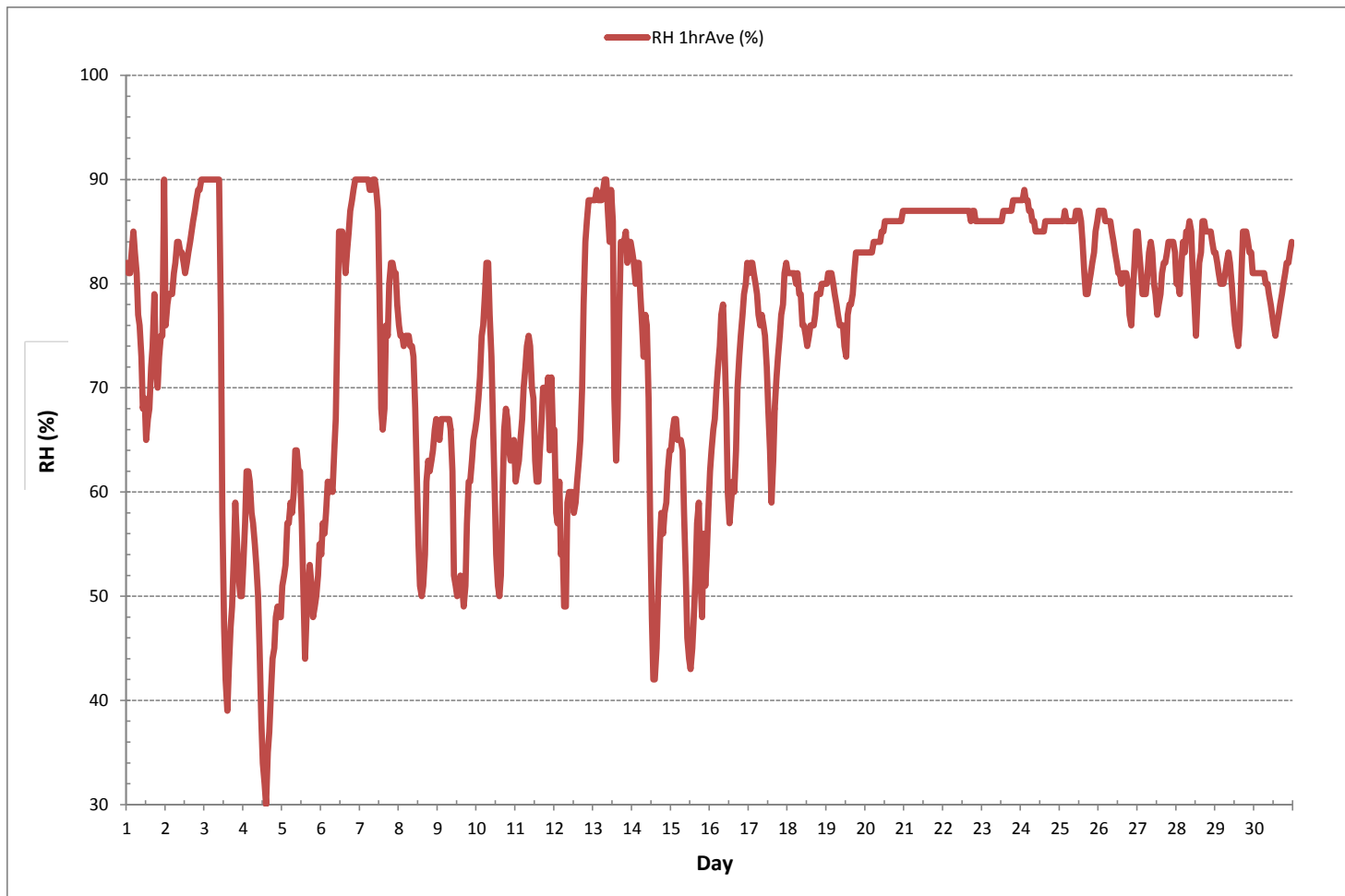
24 HR AVERAGES November 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	30	%	@ HOUR(S)	14	ON DAY(S)	4
MAXIMUM 1-HR AVERAGE:	90	%	@ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 24-HR AVERAGE:	87	%			ON DAY(S)	VAR
					VAR-VARIOUS	
OPERATIONAL TIME:						720 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	13					
MONTHLY AVERAGE:						75 %

RELATIVE HUMIDITY Hourly Averages (RH %)



BAROMETRIC PRESSURE

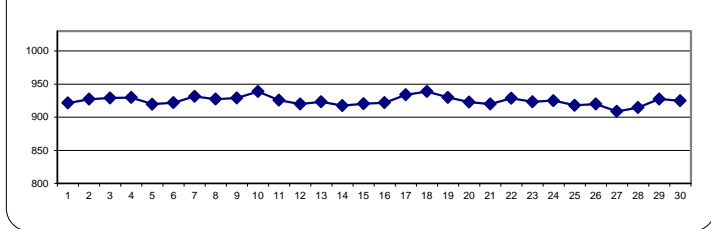
BAROMETRIC PRESSURE Hourly Averages (BP mbar)

HR START (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-HR AVG.	RDGS.	
HR END (MST)	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	916	917	917	917	918	918	918	919	920	920	921	922	922	923	923	923	924	924	925	925	926	926	926	926	916	926	922	24	
2	926	926	926	926	926	926	926	926	926	927	927	927	927	928	928	928	928	928	928	929	929	929	929	928	926	929	927	24	
3	928	928	928	927	926	926	926	926	926	927	928	929	931	931	932	932	932	931	931	931	931	931	932	932	925	932	929	24	
4	932	932	932	932	931	931	931	930	930	931	931	931	931	930	931	930	930	929	929	928	927	926	926	925	925	932	930	24	
5	924	924	923	922	922	921	921	920	920	920	920	920	919	919	919	919	919	918	918	918	917	917	917	918	917	924	920	24	
6	918	918	919	919	919	919	919	919	920	920	921	921	921	922	922	923	924	924	925	925	926	927	927	928	918	928	922	24	
7	928	928	929	929	930	930	930	930	931	932	933	933	933	934	934	935	934	934	934	933	932	932	931	931	928	935	932	24	
8	930	930	930	929	928	928	928	927	927	927	927	928	928	928	928	928	927	927	926	925	925	925	925	925	925	930	927	24	
9	925	925	925	925	924	924	925	925	926	927	928	929	930	930	931	932	932	933	933	934	935	936	937	924	937	929	24		
10	937	938	939	939	939	939	939	940	941	942	942	942	942	941	940	940	938	938	937	936	935	934	933	933	942	939	24		
11	931	930	929	928	926	925	924	923	923	924	924	924	925	925	926	926	926	926	926	926	926	925	926	926	923	931	926	24	
12	926	925	925	924	923	923	922	922	921	920	919	919	918	917	917	917	916	916	916	918	918	918	918	919	920	916	926	920	24
13	920	921	922	922	923	924	924	925	925	925	926	926	925	926	926	925	925	924	922	922	920	920	919	918	918	926	923	24	
14	917	916	916	915	916	915	915	916	916	916	917	917	917	918	918	918	918	919	919	920	921	921	921	922	915	922	918	24	
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17	928	928	929	929	930	931	931	932	933	934	934	934	935	935	936	936	936	937	937	937	937	938	938	938	928	938	934	24	
18	938	939	939	939	940	940	940	940	940	940	940	940	940	940	940	939	939	938	938	937	937	937	936	936	940	939	24		
19	936	935	935	934	934	933	933	933	932	932	931	930	930	929	928	928	927	927	927	926	925	925	925	925	925	936	930	24	
20	925	924	924	924	924	924	924	924	925	924	924	924	924	923	923	923	922	922	922	921	921	920	920	919	919	925	923	24	
21	919	919	918	918	918	918	918	918	918	918	918	919	919	919	919	920	921	921	922	923	923	924	924	925	918	925	920	24	
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23	927	926	926	925	925	924	924	924	923	923	923	922	922	922	922	922	922	922	922	922	922	923	923	924	922	927	923	24	
24	924	924	925	925	925	926	926	926	927	927	927	927	926	926	926	926	925	925	925	924	923	923	922	922	922	922	927	925	24
25	921	920	920	919	918	918	917	916	916	915	915	914	914	915	915	916	917	918	919	920	921	921	922	922	914	922	918	24	
26	923	923	923	924	924	924	924	923	923	922	922	922	921	920	919	918	917	917	917	916	915	914	913	913	913	924	920	24	
27	912	912	911	910	910	910	910	909	909	909	909	909	909	908	908	908	908	908	908	908	908	908	908	909	908	912	909	24	
28	909	909	910	909	910	911	911	912	912	913	914	915	915	915	916	916	917	918	918	919	919	920	921	922	909	922	915	24	
29	922	923	924	925	925	926	926	927	928	928	929	929	929	930	930	930	929	929	929	929	929	929	928	928	922	930	928	24	
30	928	928	927	927	926	926	925	925	925	925	925	925	924	924	924	924	924	924	924	924	924	924	924	924	924	928	925	24	
HOURLY MAX	938	939	939	939	939	940	940	940	940	941	942	942	942	942	941	940	940	938	938	938	937	938	938	938					
HOURLY AVG	924	924	925	924	924	924	924	924	924	925	925	925	925	925	925	925	925	925	925	925	925	925	925	925					

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

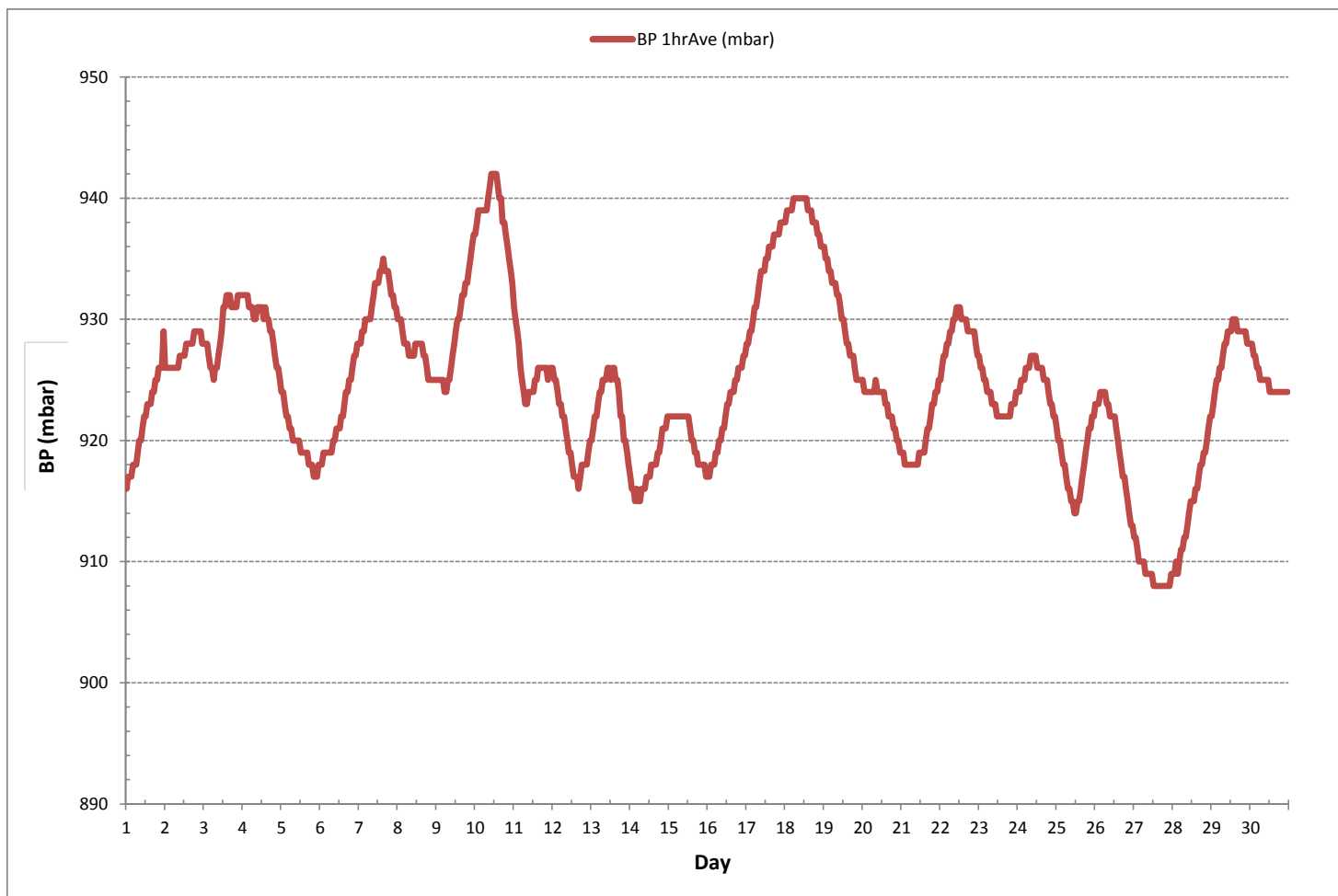
24 HR AVERAGES November 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	908 mbar	@ HOUR(S)	VAR	ON DAY(S)	27
MAXIMUM 1-HR AVERAGE:	942 mbar	@ HOUR(S)	VAR	ON DAY(S)	10
MAXIMUM 24-HR AVERAGE:	939 mbar			ON DAY(S)	10, 18
				VAR-VARIOUS	
		OPERATIONAL TIME:			720 hrs
		AMD OPERATION UPTIME:			100.0 %
STANDARD DEVIATION:	7	MONTHLY AVERAGE:			925 mbar

BAROMETRIC PRESSURE Hourly Averages (BP mbar)



AMBIENT TEMPERATURE

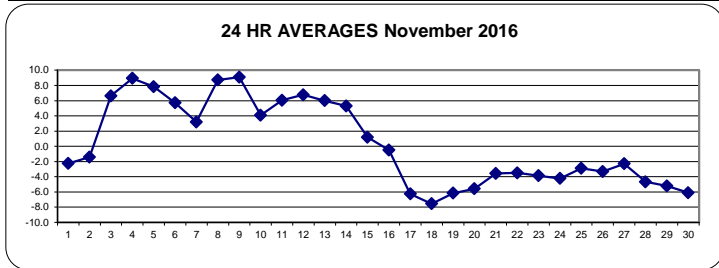


AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY 1	-0.7	-1.2	-1.5	-2.0	-2.3	-2.5	-2.7	-2.7	-2.6	-2.1	-1.5	-1.7	-0.6	-1.2	-1.3	-1.8	-2.0	-2.5	-2.7	-2.9	-3.3	-3.7	-4.1	-4.4	-4.4	-0.6	-2.3	24	
2	-4.5	-4.9	-5.1	-5.2	-5.0	-5.2	-4.9	-4.4	-3.8	-3.1	-2.0	-0.9	0.4	1.0	1.3	1.2	1.5	1.6	1.5	1.5	1.4	1.3	1.3	1.0	-5.2	1.6	-1.4	24	
3	1.1	1.4	1.5	1.4	1.6	1.6	1.3	1.0	1.2	2.5	5.7	9.8	12.8	14.1	14.7	13.8	11.8	10.8	10.3	8.7	8.2	8.1	8.0	7.9	1.0	14.7	6.6	24	
4	6.6	5.6	3.9	4.0	4.0	4.7	5.1	5.4	6.1	7.6	9.7	12.0	13.9	15.3	16.2	14.6	13.2	11.8	11.0	9.9	9.1	8.5	8.3	7.8	3.9	16.2	8.9	24	
5	7.1	6.8	6.3	5.2	5.1	4.4	4.8	4.5	4.2	4.6	5.5	6.2	8.0	9.8	12.3	11.2	10.5	10.3	10.7	11.1	10.7	10.3	9.5	8.9	4.2	12.3	7.8	24	
6	8.9	8.0	8.1	7.5	6.9	6.9	6.9	6.7	6.0	5.8	4.9	4.5	4.8	5.3	5.8	6.2	5.9	5.4	4.9	4.6	4.2	3.5	3.0	2.7	2.7	8.9	5.7	24	
7	0.3	-0.7	-1.0	-1.0	-1.0	-1.4	-1.4	-1.0	-0.9	0.7	2.9	4.9	6.9	9.3	10.1	8.8	6.6	6.3	5.4	5.0	5.1	4.6	4.1	4.1	-1.4	10.1	3.2	24	
8	3.9	3.8	3.4	3.4	3.1	3.1	3.4	4.0	4.3	5.3	7.8	11.1	14.2	15.9	16.6	16.3	14.7	12.7	11.4	11.3	10.9	10.4	9.7	8.9	3.1	16.6	8.7	24	
9	8.9	9.1	8.6	8.5	8.3	8.3	8.3	8.2	8.1	8.9	12.0	13.2	13.7	13.2	12.7	12.1	11.2	9.4	7.6	6.5	6.2	5.5	4.9	4.5	4.5	13.7	9.1	24	
10	4.0	3.5	2.8	1.5	0.6	-0.1	-1.1	-1.2	0.0	1.5	3.9	6.7	8.5	9.3	9.5	8.9	6.5	5.1	4.4	4.5	5.2	5.3	4.7	4.2	-1.2	9.5	4.1	24	
11	5.4	6.0	5.8	5.7	5.5	4.7	4.1	3.8	3.6	4.1	5.6	6.1	8.0	8.6	8.8	8.2	7.2	6.4	6.1	6.3	5.8	7.1	5.6	6.8	3.6	8.8	6.1	24	
12	6.7	8.3	8.5	7.5	8.4	8.2	8.5	8.1	6.8	6.8	7.2	7.6	7.9	8.0	7.4	7.0	6.6	5.8	5.1	4.7	4.5	4.4	4.4	4.3	4.3	8.5	6.8	24	
13	4.0	3.8	3.9	4.1	4.3	4.2	4.1	4.0	4.0	4.9	6.0	5.0	7.1	10.8	11.4	10.7	8.5	7.2	6.7	6.3	5.9	6.4	5.6	5.1	3.8	11.4	6.0	24	
14	5.0	4.8	5.1	4.6	4.6	5.0	4.9	5.3	5.2	6.0	7.9	8.9	9.3	9.2	8.5	7.4	5.8	4.4	3.8	3.9	3.2	2.4	1.3	0.7	0.7	9.3	5.3	24	
15	0.3	-0.4	-0.9	-1.0	-1.0	-1.3	-1.7	-1.7	-0.5	1.2	3.2	4.9	5.5	4.5	3.7	2.8	1.7	1.3	1.7	2.0	0.9	1.6	1.2	0.8	-1.7	5.5	1.2	24	
16	0.2	-0.1	-0.3	-0.3	-0.8	-1.1	-1.8	-2.4	-2.5	-1.8	0.4	3.1	3.7	2.8	2.1	1.6	0.1	-0.7	-1.4	-1.9	-2.1	-2.5	-2.8	-3.5	-3.5	3.7	-0.5	24	
17	-4.3	-4.9	-5.1	-4.5	-4.5	-4.4	-4.3	-4.3	-4.6	-4.9	-5.3	-5.6	-5.7	-5.5	-4.3	-5.4	-7.1	-8.1	-8.7	-9.2	-9.4	-9.5	-9.8	-10.3	-10.3	-4.3	-6.2	24	
18	-9.7	-9.5	-9.6	-10.0	-9.9	-9.9	-9.7	-9.2	-8.6	-7.4	-6.9	-6.6	-6.2	-6.1	-6.2	-6.0	-6.3	-6.3	-6.3	-6.2	-6.1	-6.1	-6.1	-10.0	-10.0	-6.0	-7.6	24	
19	-6.0	-6.0	-5.9	-5.9	-5.8	-5.6	-5.5	-5.6	-6.0	-6.1	-6.0	-5.3	-4.9	-4.9	-5.2	-5.6	-6.6	-7.0	-7.1	-7.2	-7.2	-7.6	-7.4	-7.3	-7.6	-4.9	-6.2	24	
20	-7.4	-7.4	-7.3	-7.3	-7.3	-7.3	-7.3	-7.0	-6.8	-6.6	-6.1	-5.2	-4.3	-3.6	-3.7	-4.1	-4.5	-4.5	-4.4	-4.4	-4.4	-4.4	-4.3	-4.2	-7.4	-3.6	-5.6	24	
21	-4.0	-3.7	-3.4	-3.3	-3.4	-3.6	-3.7	-3.9	-3.9	-3.8	-3.5	-3.4	-3.3	-3.4	-3.4	-3.4	-3.6	-3.7	-3.7	-3.8	-3.6	-3.2	-3.1	-4.0	-3.1	-3.1	-3.6	24	
22	-3.1	-3.1	-3.1	-3.2	-3.3	-3.4	-3.4	-3.4	-3.3	-3.0	-2.7	-2.6	-2.7	-2.8	-3.0	-3.3	-3.6	-4.0	-4.3	-4.4	-4.5	-4.4	-4.5	-4.7	-4.7	-2.6	-3.5	24	
23	-4.8	-4.7	-4.6	-4.8	-4.9	-4.7	-4.8	-4.8	-4.6	-4.4	-4.1	-3.8	-3.7	-3.8	-3.8	-3.6	-3.5	-3.2	-2.9	-2.6	-2.2	-2.0	-1.8	-4.9	-1.8	-3.9	24		
24	-1.8	-1.8	-1.8	-1.9	-2.5	-3.2	-3.6	-4.2	-5.1	-5.6	-5.7	-5.3	-5.1	-4.8	-4.7	-4.9	-5.4	-5.1	-5.2	-5.2	-4.6	-4.6	-4.6	-5.7	-4.6	-5.7	-1.8	-4.2	24
25	-4.6	-4.5	-4.4	-4.4	-4.6	-5.0	-5.0	-4.9	-4.9	-4.3	-3.0	-2.2	-0.6	0.8	1.2	0.9	0.4	-1.4	-2.4	-2.0	-2.4	-2.9	-3.6	-5.2	-5.2	1.2	-2.9	24	
26	-5.4	-5.4	-5.3	-4.9	-5.4	-6.3	-6.4	-5.7	-5.1	-4.9	-3.8	-2.3	-0.4	-0.3	-0.5	-1.1	-1.0	-1.0	-1.1	-1.4	-2.0	-2.8	-3.5	-3.7	-6.4	-0.3	-3.3	24	
27	-3.5	-3.1	-2.8	-2.5	-2.3	-2.3	-2.5	-2.8	-2.9	-2.3	-1.6	-1.6	-1.4	-1.4	-1.8	-2.1	-2.2	-2.3	-2.3	-2.4	-2.3	-2.3	-2.2	-2.3	-3.5	-1.4	-2.3	24	
28	-2.4	-2.4	-2.6	-3.9	-4.1	-3.7	-3.9	-4.7	-5.6	-5.0	-4.3	-3.5	-2.8	-3.7	-4.8	-5.3	-6.0	-6.5	-6.8	-6.5	-6.3	-6.1	-5.7	-5.5	-6.8	-2.4	-4.7	24	
29	-5.3	-5.2	-4.9	-4.7	-4.7	-4.7	-4.8	-4.8	-4.7	-4.4	-4.2	-4.1	-3.6	-3.5	-3.8	-4.6	-6.1	-7.1	-7.4	-7.1	-6.7	-6.4	-6.2	-5.8	-7.4	-3.5	-5.2	24	
30	-5.9	-5.9	-5.9	-6.0	-6.2	-6.3	-6.2	-6.3	-6.2	-6.1	-5.7	-5.5	-5.4	-5.3	-5.5	-5.7	-6.0	-6.2	-6.3	-6.5	-6.8	-6.8	-6.8	-6.9	-6.9	-5.3	-6.1	24	
HOURLY MAX	8.9	9.1	8.6	8.5	8.4	8.3	8.5	8.2	8.1	8.9	12.0	13.2	14.2	15.9	16.6	16.3	14.7	12.7	11.4	11.3	10.9	10.4	9.7	8.9					
HOURLY AVG	-0.4	-0.5	-0.6	-0.8	-0.9	-1.0	-1.1	-1.1	-1.1	-0.5	0.5	1.5	2.5	2.9	3.0	2.5	1.6	1.0	0.6	0.4	0.2	0.1	-0.2	-0.4					

STATUS FLAG CODES

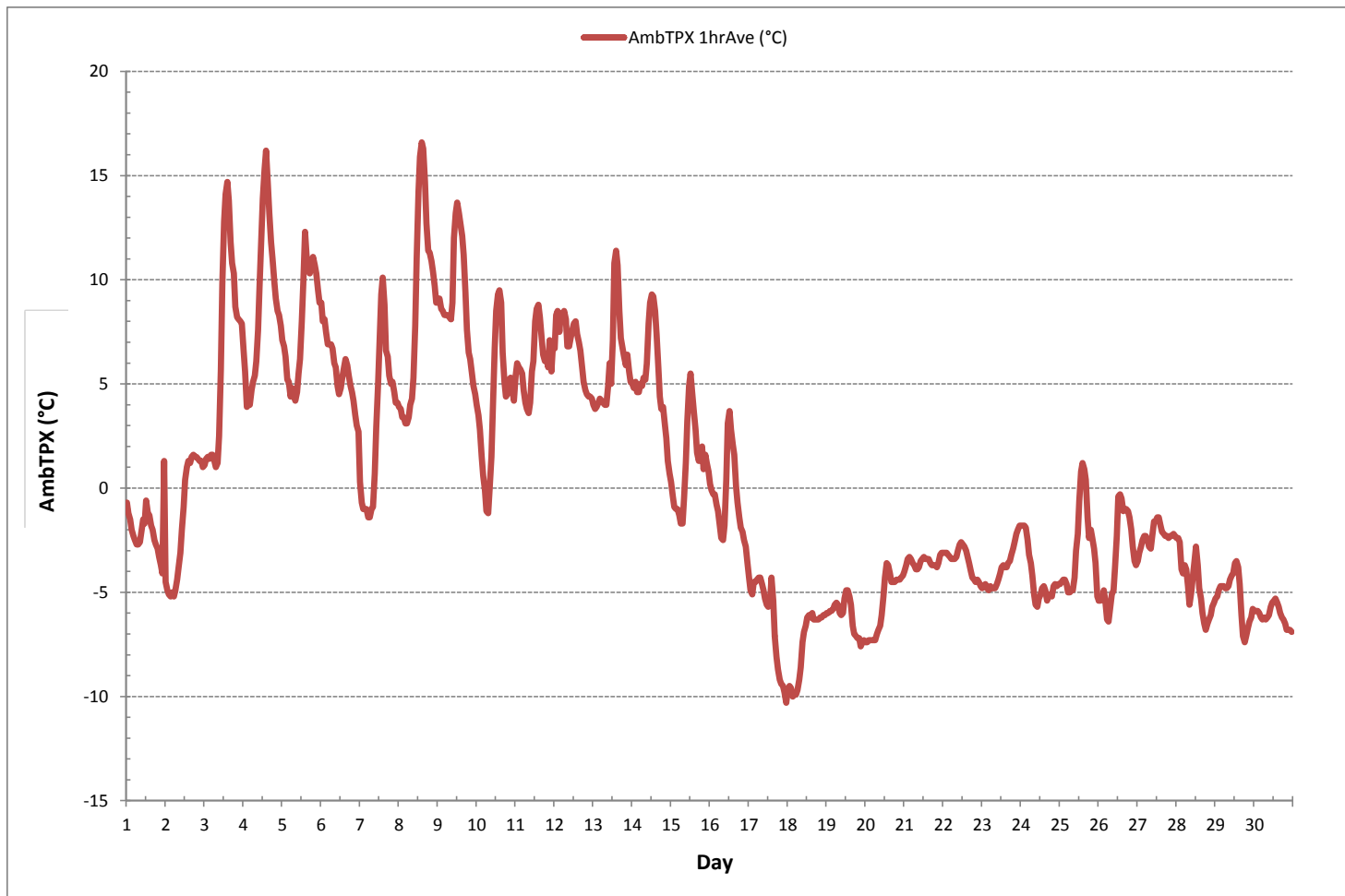
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-10.3 °C	@ HOUR(S)	23	ON DAY(S)	17
MAXIMUM 1-HR AVERAGE:	16.6 °C	@ HOUR(S)	14	ON DAY(S)	8
MAXIMUM 24-HR AVERAGE:	9.1 °C			ON DAY(S)	9
				VAR-VARIOUS	
OPERATIONAL TIME:				720	hrs
AMD OPERATION UPTIME:				100.0	%
STANDARD DEVIATION:	5.9			MONTHLY AVERAGE:	0.3 °C

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



PRECIPITATION



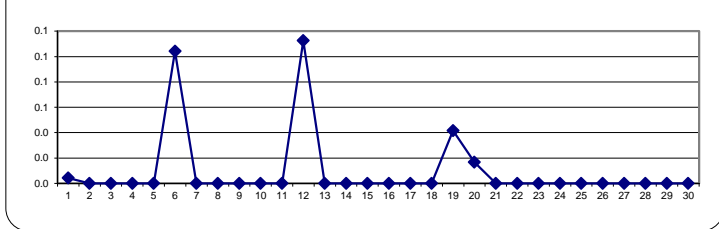
PRECIPITATION Hourly Averages (mm)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY 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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
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	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	0.0	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	0.5	1.3	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	1.3	0.1	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	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	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	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	0.0	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	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.1	0.3	0.1	0.0	0.0	0.0	1.2	0.1	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	0.0	0.0	0.0	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	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	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	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	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.2	0.0	24
20	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	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	0.0	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	0.0	C	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	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	0.1	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.5	1.3	0.7	0.0	0.0	0.0	0.0	0.0	1.2	1.1	0.3	0.2	0.2	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	0.0	0.0	0.0	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

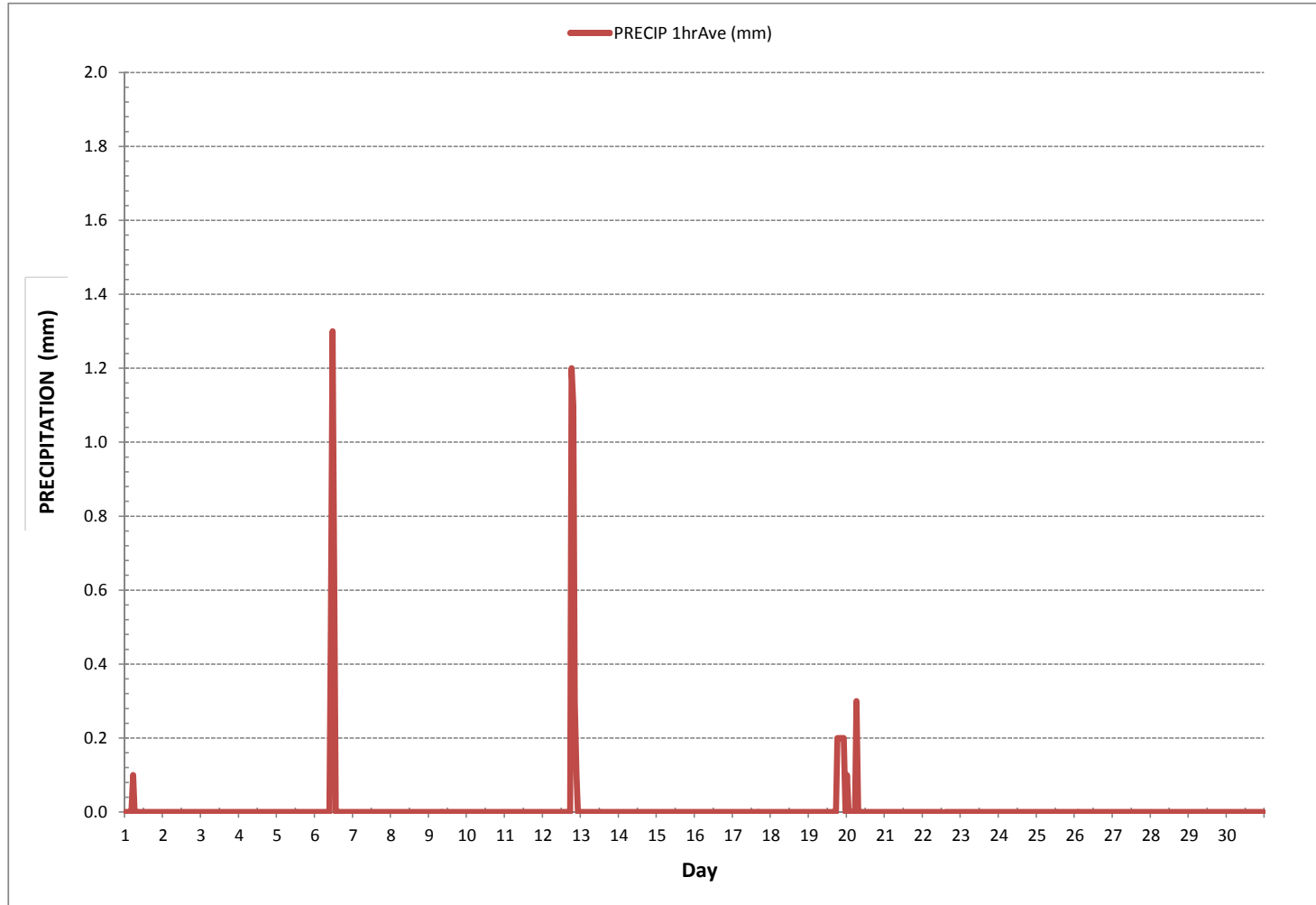
24 HR AVERAGES November 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	0.0	mm	@ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	1.3	mm	@ HOUR(S)	11	ON DAY(S)	6
MAXIMUM 24-HR AVERAGE:	0.1	mm			ON DAY(S)	6, 12
MONTHLY TOTAL	6.7	mm			VAR-VARIOUS	
OPERATIONAL TIME:						720 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	0.1					MONTHLY AVERAGE: 0.0 mm

PRECIPITATION Hourly Averages (mm)



APPENDIX II
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE



API 100E Sulphur Dioxide Analyzer Calibration

Date: <u>November 2, 2016</u>	Barometric Pressure: <u>27.37 inHg</u>
Company/Airshed: <u>LICA</u>	Station Temperature °C: <u>23</u>
Location/Station Name: <u>St Lina</u>	Weather Conditions: <u>Mainly cloudy with light snow</u>
Parameter: <u>Sulphur Dioxide</u>	Calibration Purpose: <u>routine monthly</u>
Start Time 24 hr. (mst): <u>9:33</u>	Performed By/Reviewer: <u>Chris Wesson</u> <u>Trina Whitsitt</u>
End Time 24 hr. (mst): <u>13:19</u>	Cal Gas Expiry Date: <u>December 2, 2023</u>
Calibration Method: <u>Gas Dilution</u>	Converter Model & s/n (if applicable): <u>n/a</u>

Analyzer: ID# or Serial Number: <u>468</u>	Range ppb: <u>1000</u>	Station SO2 Analyzer Range? <u>500</u> ppb
Last Calibration Date: <u>October 14, 2016</u>	As Found C.F.: <u>0.993</u>	
Previous C.F.: <u>1.000</u>	New C.F.: <u>1.000</u>	

Calibrator: Flow Meter ID's: <u>n/a</u>	Standard Calibration Points for Ranges	SO ₂ Scrubber Check (10 mins.)								
Make & Model: <u>Sabio 2010</u>	<table border="1" style="margin: auto;"> <tr><th>Point</th><th>ppb</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	ppb	High	780	Mid	380	Low	190	Start/End Time 24 hr.: _____
Point	ppb									
High	780									
Mid	380									
Low	190									
Serial #: <u>17100415</u>		Target Concentration (ppb): <u>380</u>								
Cal Gas Cylinder I.D. #: <u>LL119317</u>		Result (ppb): <u>3</u>								
Cal Gas Conc. (ppm): <u>49.9</u>		Zero Corrected Result (ppb): <u>3</u>								
		warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb								

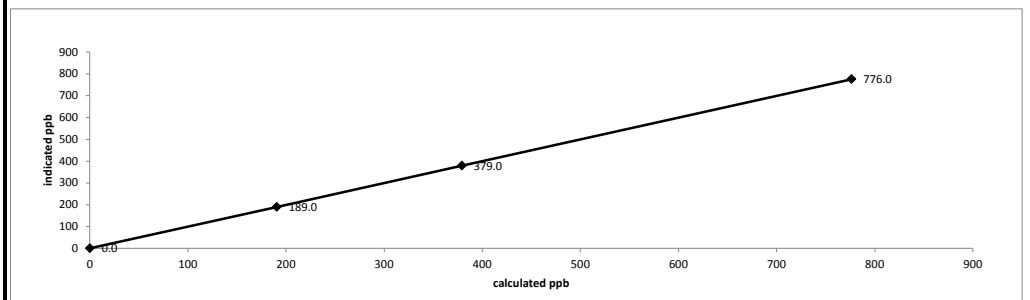
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	5001	0.00	5001	0.0	-0.5	N/A
as found high	4923	77.80	5001	776.3	781.0	0.993
adjusted zero	5001	0.00	5001	0.0	0.0	n/a
adjusted high	4923	77.80	5001	776.3	776.0	1.000
mid	4963	38.00	5001	379.2	379.0	1.000
low	4981	19.10	5000	190.6	189.0	1.009
calibrator zero	5002	0.00	5002	0.0	0.5	n/a
Average C.F. =						1.003

Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u>	LIMITS > or = 0.995
Slope = <u>1.000</u>	.95-1.05
b (Intercept as % of full scale) = <u>0.06%</u>	± 3% F.S.
% change in C.F. from last cal = <u>0.66%</u>	± 10%

API 100E Sulphur Dioxide Analyzer Calibration

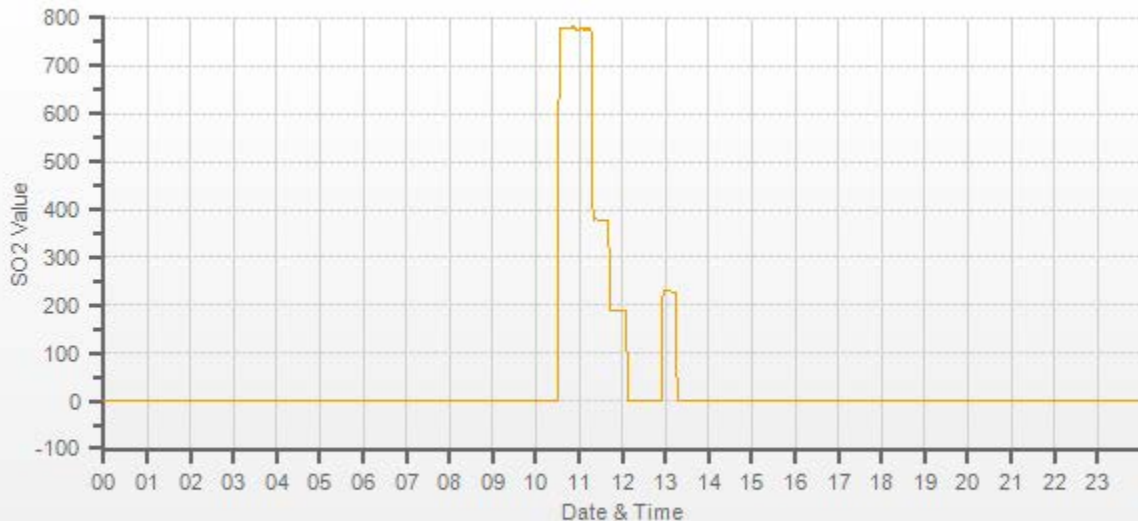


As found:	As left:
SLOPE: <u>1.002</u>	SLOPE: <u>0.994</u>
OFFSET: <u>115.3</u>	OFFSET: <u>113.9</u>
HVPS: <u>651</u>	HVPS: <u>651</u>
RCELL TEMP: <u>50.0</u>	RCELL TEMP: <u>50.0</u>
BOX TEMP: <u>29.7</u>	BOX TEMP: <u>31.1</u>
PMT TEMP: <u>7.8</u>	PMT TEMP: <u>7.8</u>
IZS TEMP: <u>40.0</u>	IZS TEMP: <u>40.0</u>
PRES: <u>23.9</u>	PRES: <u>23.9</u>
SAMP FL: <u>619</u>	SAMP FL: <u>617</u>
NORM PMT: <u>113.5</u>	NORM PMT: <u>113.9</u>
UV LAMP: <u>3238</u>	UV LAMP: <u>3241</u>
LAMP RATIO: <u>99.4</u>	LAMP RATIO: <u>99.4</u>
STR. LGT: <u>57.8</u>	STR. LGT: <u>56.6</u>
DRK PMT: <u>5.1</u>	DRK PMT: <u>5.7</u>
DRK LMP: <u>6.7</u>	DRK LMP: <u>6.5</u>
Expected Value: <u>233.5</u>	Expected Value: <u>233.5</u>

Comments:
The analyzer sample inlet filter was changed.

IZS oven temp increased (40>50°C) after calibration due to low EV.

SO2[ppb] Station: LICA ST. LINA Daily: 2016/11/02 Type: AVG 1 Min. [1 Min.]



— SO2[ppb]

HYDROGEN SULPHIDE



API 101E Hydrogen Sulphide Analyzer Calibration

Date: <u>November 2, 2016</u>	Barometric Pressure: <u>27.37 inHg</u>
Company/Airshed: <u>LICA</u>	Station Temperature °C: <u>23</u>
Location/Station Name: <u>St Lina</u>	Weather Conditions: <u>Mainly cloudy with light snow</u>
Parameter: <u>Hydrogen Sulphide</u>	Calibration Purpose: <u>routine monthly</u>
Start Time 24 hr. (mst): <u>9:33</u>	Performed By/Reviewer: <u>Chris Wesson</u> <u>Trina Whitsitt</u>
End Time 24 hr. (mst): <u>13:19</u>	Cal Gas Expiry Date: <u>December 1, 2018</u>
Calibration Method: <u>Gas Dilution</u>	Converter Model & s/n (if applicable): <u>Internal</u>

Analyzer: ID# or Serial Number: <u>509</u>	Range ppb: <u>100</u> Station SO2 Analyzer Range? <u>1000</u> ppb
Last Calibration Date: <u>October 14, 2016</u>	As Found C.F.: <u>0.993</u>
Previous C.F.: <u>1.000</u>	New C.F.: <u>1.001</u>

Calibrator: Flow Meter ID's: <u>n/a</u>	Standard Calibration Points for Ranges	SO ₂ Scrubber Check (10 mins.)								
Make & Model: <u>API 700</u>	<table border="1" style="font-size: small;"> <tr><th>Point</th><th>ppb</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	ppb	High	78	Mid	38	Low	19	Start/End Time 24 hr.: <u>10:24-10:40</u>
Point	ppb									
High	78									
Mid	38									
Low	19									
Serial #: <u>829</u>		Target Concentration (ppb): <u>780</u>								
Cal Gas Cylinder I.D. #: <u>BLM001927</u>		Result (ppb): <u>0.7</u>								
Cal Gas Conc. (ppm): <u>10.3</u>		Zero Corrected Result (ppb): <u>0</u>								

warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb

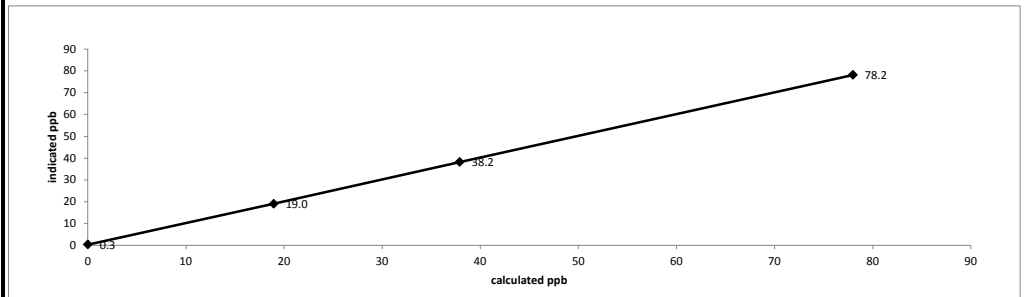
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	7501	0.00	7501	0.0	-0.4	N/A
as found high	7445	56.80	7502	78.0	78.1	0.993
adjusted zero	7501	0.00	7501	0.0	0.3	n/a
adjusted high	7445	56.80	7502	78.0	78.2	1.001
mid	7471	27.60	7499	37.9	38.2	1.000
low	7487	13.80	7501	18.9	19.0	1.013
calibrator zero	7502	0.00	7502	0.0	0.5	n/a
Average C.F. =						1.005

Linear Regression/Calibration Results:

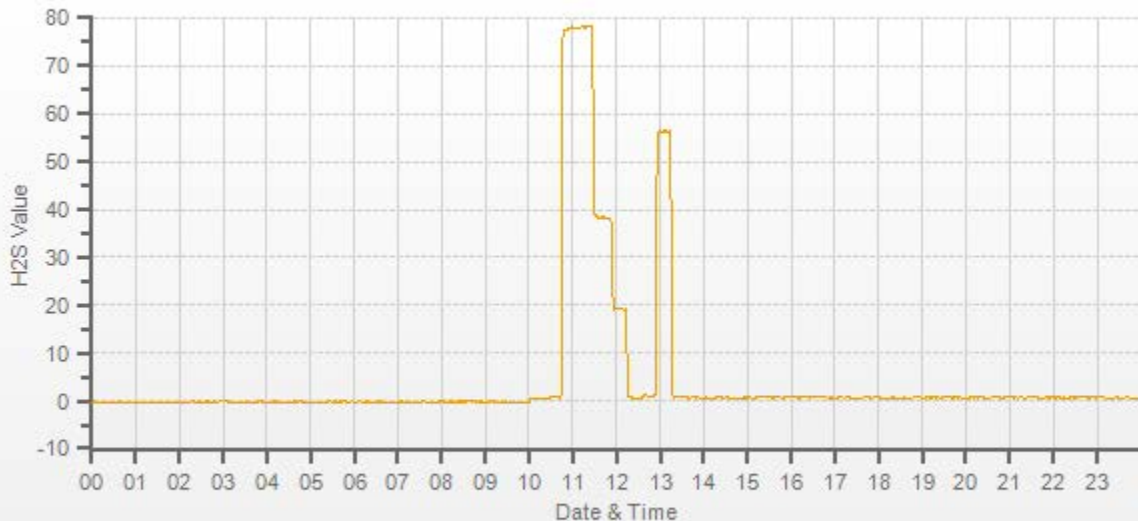
Correlation Coefficient = <u>1.000</u>	LIMITS > or = 0.995
Slope = <u>1.000</u>	.95-1.05
b (Intercept as % of full scale) = <u>-0.21%</u>	± 3% F.S.
% change in C.F. from last cal = <u>0.65%</u>	± 10%

API 101E Hydrogen Sulphide Analyzer Calibration



<p style="text-align: center; font-weight: bold; font-size: x-small;">As found:</p> <p>SLOPE: <u>0.939</u></p> <p>OFFSET: <u>53.0</u></p> <p>HVPS: <u>675</u></p> <p>RCELL TEMP: <u>50.0</u></p> <p>BOX TEMP: <u>31.1</u></p> <p>PMT TEMP: <u>7.9</u></p> <p>IZS TEMP: <u>48.0</u></p> <p>Converter Temp: <u>313.9</u></p> <p>PRES: <u>20.5</u></p> <p>SAMP FL: <u>557</u></p> <p>UV LAMP: <u>3651</u></p> <p>LAMP RATIO: <u>97.7</u></p> <p>STR. LGT: <u>24.9</u></p> <p>DRK PMT: <u>0.3</u></p> <p>DRK LMP: <u>0.4</u></p> <p>Expected Value: <u>56.9</u></p>	<p style="text-align: center; font-weight: bold; font-size: x-small;">As left:</p> <p>SLOPE: <u>0.934</u></p> <p>OFFSET: <u>51.2</u></p> <p>HVPS: <u>675</u></p> <p>RCELL TEMP: <u>50.0</u></p> <p>BOX TEMP: <u>32.1</u></p> <p>PMT TEMP: <u>8.0</u></p> <p>IZS TEMP: <u>48.0</u></p> <p>Converter Temp: <u>315.7</u></p> <p>PRES: <u>20.5</u></p> <p>SAMP FL: <u>556</u></p> <p>UV LAMP: <u>3650</u></p> <p>LAMP RATIO: <u>97.7</u></p> <p>STR. LGT: <u>23.9</u></p> <p>DRK PMT: <u>0.4</u></p> <p>DRK LMP: <u>0.5</u></p> <p>Expected Value: <u>56.3</u></p>
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Comments:
The analyzer sample inlet filter was changed.



— H2S[ppb]

TOTAL HYDROCARBON



Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	November 2, 2016	Barometric Pressure:	27.37 inHg
Company/Airshed:	LICA	Station Temperature °C:	24
Location/Station Name:	St Lina	Weather Conditions:	Light snow
Parameter:	Total Hydrocarbon	Calibration Purpose:	routine monthly
Start/End Time 24 hr. (mst):	12:57 / 16:00	Performed By/Reviewer:	Chris Wesson / Trina Whitsitt
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 25, 2023

Analyzer:	ID# or Serial Number:	51CLT-77021-384	Range ppm:	50
	Last Calibration Date:	October 21, 2016	As Found C.F.:	0.988
	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:	API 700		
	Serial #:	829		
	Cal Gas Cylinder I.D. #:	LL86139		
	CH ₄ /C ₃ H ₈ Cylinder Conc. (ppm):	599.0 211.0		
	CH ₄ as propane/total CH ₄ equivalents (ppm):	580.3 1179.3		

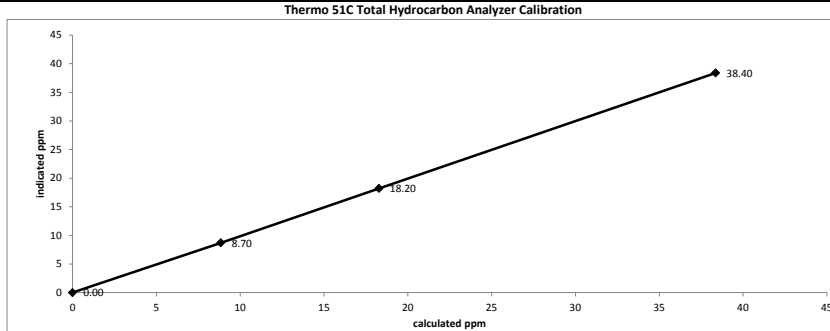
Point	Target ppm
High	38
Mid	18
Low	9

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	2001	0.00	2001	0.0	-0.02	n/a
as found high	1933	65.00	1998	38.36	38.80	0.988
adjusted zero	2001	0.00	2001	0.00	0.00	n/a
adjusted high	1933	65.00	1998	38.36	38.40	0.999
mid	1969	31.00	2000	18.28	18.20	1.004
low	1985	15.00	2000	8.84	8.70	1.017
calibrator zero	2001	0.00	2001	0.0	0.10	n/a
Average C.F. =						1.007

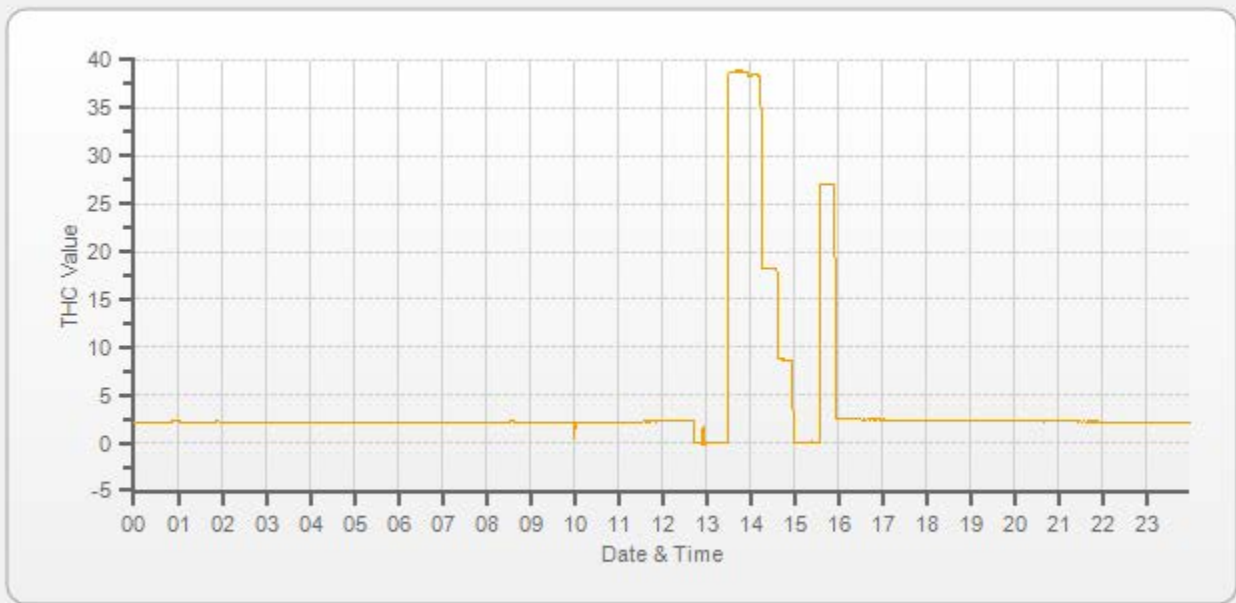
Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.998		.95-1.05
b (Intercept as % of full scale) =	0.16%		± 3% F.S.
% change in C.F. from last cal =	1.17%		± 10%



As found:	As left:
H2 cylinder (psi): 1700	H2 cylinder (psi): 1700
H2 cylinder reg set (psi): 22	H2 cylinder reg set (psi): 22
Span Cylinder (psi): 1800	Span Cylinder (psi): 1800
Span Cylinder Reg Set (psi): 22	Span Cylinder Reg Set (psi): 22
Zero Air Gen Pressure: 42	Zero Air Gen Pressure: 42
measurement alarms: None	measurement alarms: None
service alarms: None	service alarms: None
cnt: 1804	cnt: 1920
rng: 1	rng: 1
try: 1	try: 1
flm: 190.5	flm: 190.8
det: 125.5	det: 125.5
Flame: 190	Flame: 190
Filter: 125	Filter: 125
Base: 125	Base: 126
Sample psi: 6.9	Sample psi: 6.90
Internal Air Pressure: 20	Internal Air Pressure: 20
Internal Fuel Pressure: 12	Internal Fuel Pressure: 12
Measured Flow: 1071 cc/min	Measured Flow: n/a
Expected Value: 27.04	Expected Value: 27.04

Comments:
 The analyzer sample inlet filter was changed.
 The analyzer cooling fan filter(s) were cleaned.



— THC[ppm]

NITROGEN DIOXIDE



API 200E NO-NO2-NOx Analyzer Calibration

Date: November 2, 2016	Barometric Pressure: 27.37 inHg
Company/Airshed: LICA	Station Temperature °C: 23
Location/Station Name: St Lina	Weather Conditions: Mainly cloudy with light snow
Start/End Time 24 hr. (mst): 09:33 / 15:24	Calibration Purpose: routine monthly
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Chris Wesson Trina Whitsitt
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: December 2, 2023

Analyzer: ID# or Serial Number: 594 Last Calibration Date: October 14, 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>1.002</td> <td>0.999</td> </tr> <tr> <td>NO₂ =</td> <td>1.000</td> <td>1.006</td> <td>1.006</td> </tr> <tr> <td>NOx =</td> <td>1.000</td> <td>1.002</td> <td>0.999</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	1.002	0.999	NO ₂ =	1.000	1.006	1.006	NOx =	1.000	1.002	0.999
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	1.002	0.999														
NO ₂ =	1.000	1.006	1.006														
NOx =	1.000	1.002	0.999														

Calibrator: Flow Meter ID's: n/a Make & Model: Sabio 2010 Serial #: 17100415 Cal Gas Cylinder I.D. #: LL119317 NO/NOx Gas Conc. (ppm): 50.3 50.3	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	5001	0.0	5001	0	0	0.0	2.0	n/a	n/a
as found high	4923	77.8	5001	782.5	782.5	781.0	783.0	1.002	1.002
adjusted zero	5001	0.00	5001	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4923	77.80	5001	782.5	782.5	783.0	783.0	0.999	0.999
mid	4963	38.00	5001	382.2	382.2	382.0	382.0	1.001	1.001
low	4981	19.10	5000	192.1	192.1	191.0	192.0	1.006	1.001
calibrator zero	5002	0.00	5002	0	0	0.0	-1.0	n/a	n/a
Average C.F.=								1.002	1.000

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	4923	77.80	5001	0.0	786.0	785.0	-2.0	0.0	-2.0	
as found high NO2	4923	77.80	5001	500.0	288.0	782.0	493.0	498.0	495.0	1.006
adjusted high NO2	4923	77.80	5001	500.0	288.0	782.0	493.0	498.0	495.0	1.006
gpt mid	4923	77.80	5001	275.0	518.0	785.0	267.0	268.0	269.0	0.996
gpt low	4923	77.80	5001	95.0	697.0	782.0	85.0	89.0	87.0	1.023
Average NO ₂ C.F.=									1.008	

Linear Regression/Calibration Results:

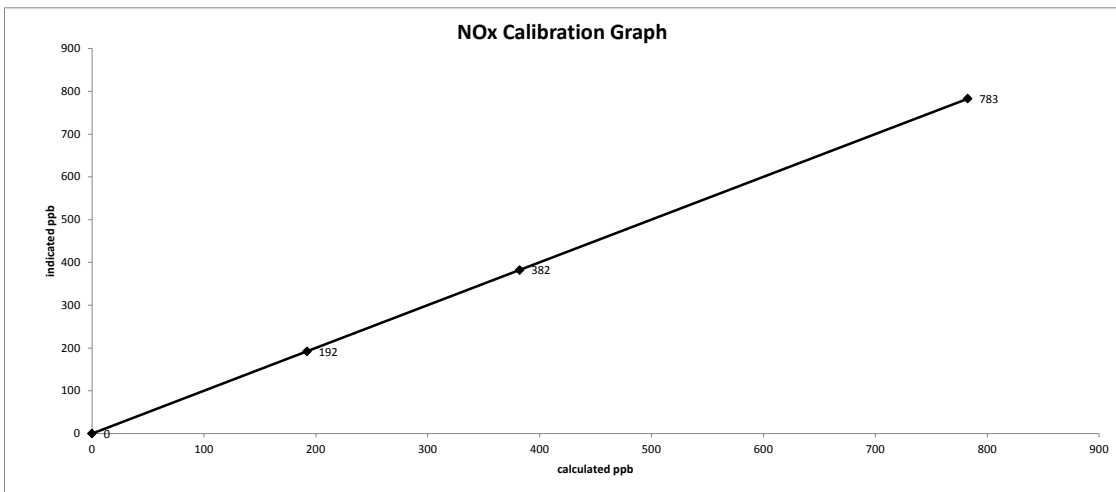
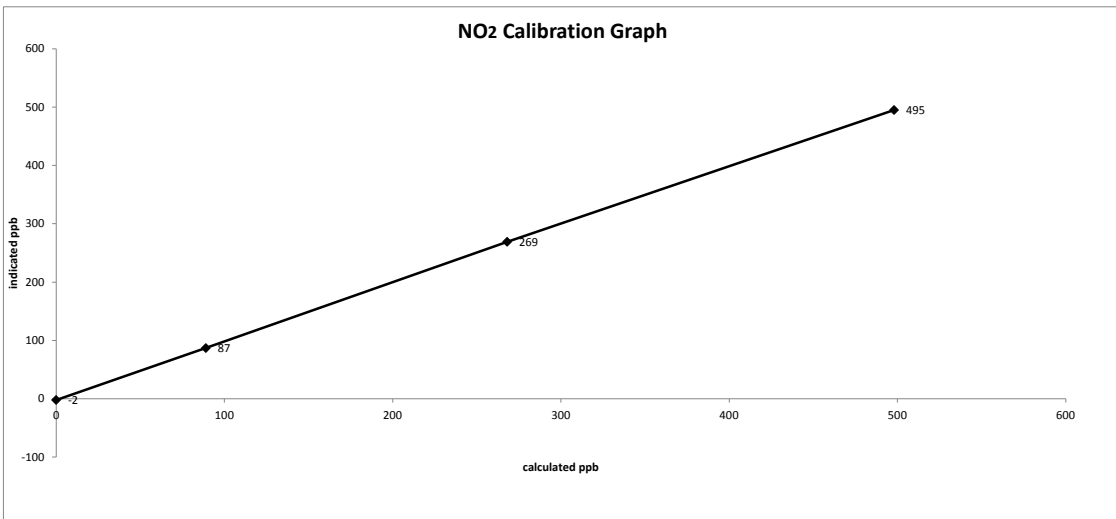
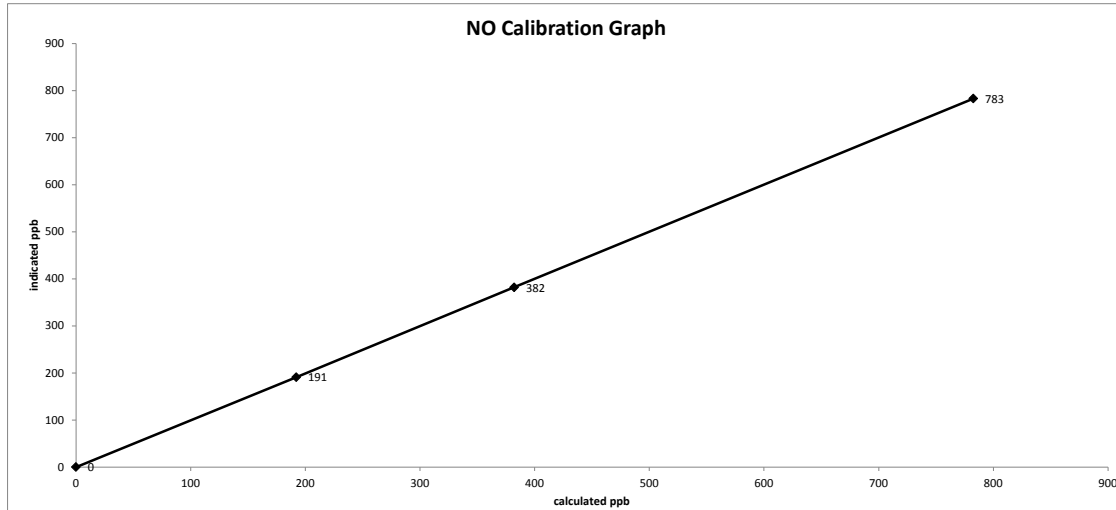
	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.999	0.999	1.001	.95-1.05
b (Intercept as % of full scale)=	-0.06%	-0.02%	-0.13%	± 3% F.S.
% change in C.F. from last cal=	-0.20%	-0.20%	-0.61%	± 10%
NO2 converter efficiency			0.99	0.96 to 1.04

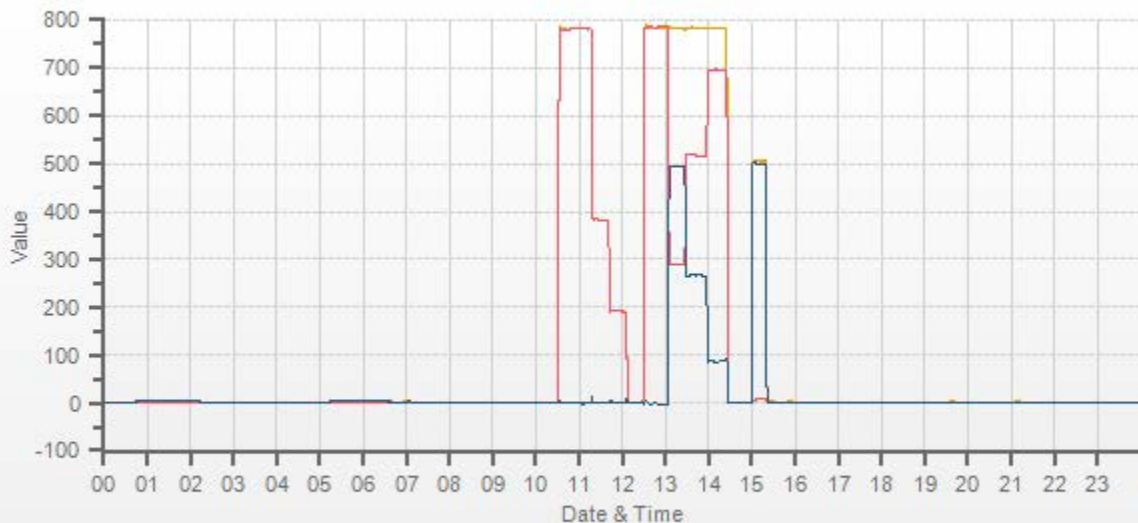
As found:	As left:
NOx SLOPE: 0.980	NOx SLOPE: 0.986
NOx OFFS: 0.8	NOx OFFS: 2.6
NO SLOPE: 0.992	NO SLOPE: 0.996
NO OFFS: 0.4	NO OFFS: 0.5
SAMP FLW: 481	SAMP FLW: 481
OZONE FL: 78	OZONE FL: 78
PMT: 16.7	PMT: 17.3
NORM PMT: -0.2	NORM PMT: 2.5
AZERO: 16.6	AZERO: 16.8
HVPS: 767	HVPS: 767
RCELL TEMP: 50.0	RCELL TEMP: 50.0
BOX TEMP: 30.7	BOX TEMP: 30.6
PMT TEMP: 6.6	PMT TEMP: 6.7
IZS TEMP: 45.0	IZS TEMP: 45.1
MOLY TEMP: 315.9	MOLY TEMP: 315.1
RCEL: 5.1	RCEL: 5.1
SAMP: 26.1	SAMP: 26.1
Expected Value NO: 6.80	Expected Value NO: 7.20
Expected Value NO2: 509.00	Expected Value NO2: 498.00
Expected Value NOx: 515.00	Expected Value NOx: 505.00

Comments:
 The analyzer sample inlet filter was changed. No high point NO2 adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.

Date: November 2, 2016
Company/Airshed: LICA
Location/Station Name: St Lina

Start/End Time 24 hr. (mst): 09:33 / 15:24
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Gas Phase Titration





— NOx[ppb] — NO[ppb] — NO2[ppb]

OZONE

Maxxam Thermo 49i Ozone Analyzer Calibration

A Bureau Veritas Group Company

Date:	November 2, 2016	Barometric Pressure:	27.37 inHg
Company/Airshed:	LICA	Station Temperature °C:	23
Location/Station Name:	St Lina	Weather Conditions:	Mainly cloudy with light snow
Start/End Time 24 hr. (mst):	9:32 - 13:19	Calibration Purpose:	routine monthly
Ozone Calibration Method:	Varying UV Lamp Power	Performed By/Reviewer:	Chris Wesson Trina Whitsitt
G.P.T. Date:	n/a-done by Varying UV Lamp Power	Cal Gas Expiry Date:	n/a

Analyzer:	ID# or Serial Number:	1002240371	Ozone Range ppb:	500
	Last Calibration Date:	October 21, 2016	As Found C.F.:	1.013
	Previous Cal High Point C.F.:	1.000	New C.F.:	1.000

Calibrator:	Flow Meter ID's:	n/a	<table border="1"> <thead> <tr> <th>Point</th> <th>AMD Required Range of Ozone Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>300-400 ppb</td> </tr> <tr> <td>Mid</td> <td>150-200 ppb</td> </tr> <tr> <td>Low</td> <td>50-75 ppb</td> </tr> </tbody> </table>	Point	AMD Required Range of Ozone Calibration Points	High	300-400 ppb	Mid	150-200 ppb	Low	50-75 ppb
Point	AMD Required Range of Ozone Calibration Points										
High	300-400 ppb										
Mid	150-200 ppb										
Low	50-75 ppb										
	Make & Model:	Sabio 2030									
	Serial #:	15001215A									
	Cal Gas Cylinder I.D. #:	n/a									

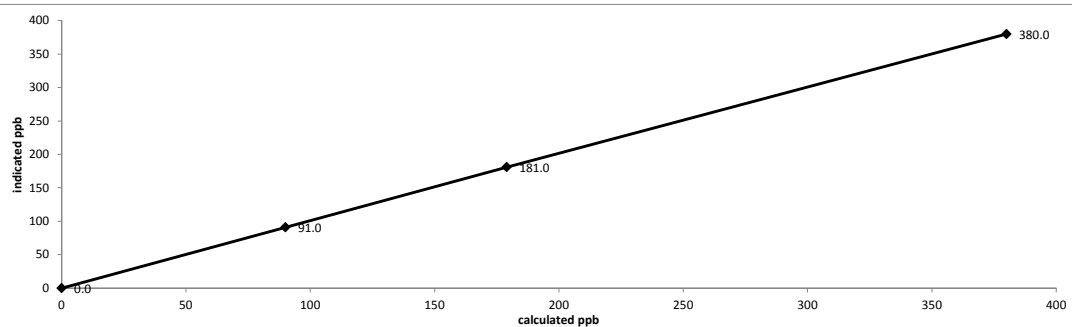
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

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	3000	3000	0.0	n/a	0.9	n/a
as found high	3000	3000	380.0	380.0	376.0	1.013
adjusted zero	3000	3000	0.0	0.0	0.0	n/a
adjusted high	3000	3000	380.0	380.0	380.0	1.000
mid	3000	3000	179.0	179.0	181.0	0.989
low	3000	3000	90.0	90.0	91.0	0.989
calibrator zero	3000	3000	0.0	n/a	0.0	n/a
Average C.F.=						0.993

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.000		.95-1.05
b (Intercept as % of full scale)=	-0.16%		± 3% F.S.
% change in C.F. from last cal=	-1.31%		± 10%

Thermo 49i Ozone Analyzer Calibration



As found:

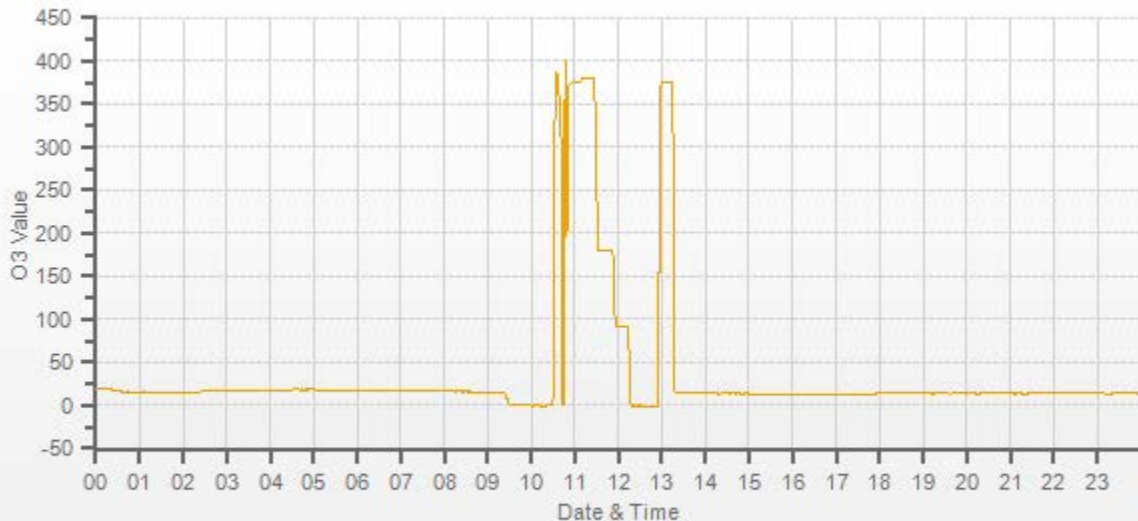
O3 Bkg:	-0.1
O3 Coef:	0.966
Photo Lamp	9.4
O3 Lamp	7.8
Bench:	27.2
Bench Lamp:	53.6
O3 Lamp:	67.8
Pressure:	675.5
Cell A lpm:	0.723
Cell B lpm:	0.719
O3 ppb:	1.1
Cell A ppb:	1.8
Cell B ppb:	0.1
Cell A int:	56656
Expected Value:	365.0

As left:

O3 Bkg:	0.9
O3 Coef:	0.975
Photo Lamp	9.4
O3 Lamp	5.7
Bench:	29.9
Bench Lamp:	53.6
O3 Lamp:	67.9
Pressure:	675.8
Cell A lpm:	0.724
Cell B lpm:	0.719
O3 ppb:	0.1
Cell A ppb:	-1.5
Cell B ppb:	1.7
Cell A int:	56594
Expected Value:	375.0

Comments: The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned.

Cell B Intensity (pre/post) = 71755 / 71674



— O3[ppb]

PARTICULATE MATTER



R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: November 10, 2016
 Company: LICA
 Station Name/Location: St. Lina
 Previous Audit Date: October 27, 2016
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whitsitt
 Start Time (mst): 13:42
 End Time (mst): 14:28
 Calibration Purpose: Bi-monthly #1
 Weather Conditions: Mix of sun and clouds

1400A Information and Status:

ID# or Serial Number: 1405A208301003 As Found Filter Loading %: 24.51
 Ko Factor: 13125 As Left Filter Loading %: 23.38
 Ambient Temperature °C: 9.52 As Found Noise: 0.003
 Ambient Pressure atm: 0.930 As Left Noise: 0.000
 Main Flow Reading lpm: 3.00 Pump Vacuum: 0.28
 Aux Flow Reading lpm: 13.67 Warnings: None

Reference Standards:

	Flow:	Pressure:	Temperature:
Make:	<u>Dwyer</u>	<u>BRUNTON</u>	<u>BRUNTON</u>
Model:	<u>475 Mark III</u>	<u>BIO</u>	<u>BIO</u>
Serial Number:	<u>#2</u>	<u>BPO 14</u>	<u>BPO 14</u>
Calibration Date:	<u>January 15, 2016</u>	<u>July 7, 2016</u>	<u>July 7, 2016</u>

As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	-0.05	0.00	-0.05
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	-0.90	0.00	-0.90
	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	-0.05	0.00	-0.05
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	-0.90	0.00	-0.90
	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>9.5</u>	1405F pressure atm: <u>0.930</u>
reference temperature °C: <u>9.3</u>	reference pressure: <u>0.928</u>
difference °C: <u>-0.2</u>	difference: <u>0.002</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>9.3</u>	1405F pressure atm: <u>0.928</u>
reference temperature °C: <u>9.3</u>	reference pressure: <u>0.928</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>2.99</u>	reference total/aux flow lpm: <u>16.79</u>
difference lpm: <u>-0.01</u>	difference lpm: <u>0.12</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>2.99</u>	reference total/aux flow lpm: <u>16.79</u>
difference lpm: <u>-0.01</u>	difference lpm: <u>0.12</u>

K_o Audit:

Last K_o audit date: August 16, 2016
 1405F K_o factor: 13125
 Measured K_o factor: 13230.7000
 % difference: 0.81

Comments:

The TEOM intake head and associated sharp cut components were cleaned.
 The bypass (auxillary) flow filter was changed.



R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: November 22, 2016
Company: LICA
Station Name/Location: St. Lina
Previous Audit Date: November 10, 2016
Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whitsitt
Start Time (mst): 13:35
End Time (mst): 14:47
Calibration Purpose: Bi-monthly #2
Weather Conditions: Light snow

1400A Information and Status:

ID# or Serial Number: <u>1405A208301003</u>	As Found Filter Loading %: <u>32.59</u>
Ko Factor: <u>13125</u>	As Left Filter Loading %: <u>20.63</u>
Ambient Temperature °C: <u>-3.17</u>	As Found Noise: <u>0.002</u>
Ambient Pressure atm: <u>0.921</u>	As Left Noise: <u>0.000</u>
Main Flow Reading lpm: <u>3.00</u>	Pump Vacuum: <u>0.29</u>
Aux Flow Reading lpm: <u>13.67</u>	Warnings: <u>None</u>

Reference Standards:

Make: <u>Dwyer</u>	Pressure: <u>BRUNTON</u>	Temperature: <u>BRUNTON</u>
Model: <u>475 Mark III</u>	<u>BIO</u>	<u>BIO</u>
Serial Number: <u>#2</u>	<u>BPO 14</u>	<u>BPO 14</u>
Calibration Date: <u>January 15, 2016</u>	<u>July 7, 2016</u>	<u>July 7, 2016</u>

As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	-0.01	-0.05	0.00	-0.05
	limit	0.15	X	0.15	X
Bypass Flow	actual	0.00	-0.88	0.00	-0.88
	limit	0.60	X	0.60	X

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

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	-0.01	-0.05	0.00	-0.05
	limit	0.15	X	0.15	X
Bypass Flow	actual	0.00	-0.88	0.00	-0.88
	limit	0.60	X	0.60	X

As found temperature and pressure:

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: <u>-3.2</u>	1405F pressure atm: <u>0.921</u>
reference temperature °C: <u>-2.9</u>	reference pressure: <u>0.923</u>
difference °C: <u>0.3</u>	difference : <u>-0.002</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>-2.9</u>	1405F pressure atm: <u>0.923</u>
reference temperature °C: <u>-2.9</u>	reference pressure: <u>0.923</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>2.98</u> difference lpm: <u>-0.02</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>17.00</u> difference lpm: <u>0.33</u>
--	--

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>2.99</u> difference lpm: <u>-0.01</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>16.84</u> difference lpm: <u>0.17</u>
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K_o Audit:

Last K_o audit date: August 16, 2016
 1405F K_o factor: 13125
 Measured K_o factor: 13230.7000
 % difference: 0.81

Comments:

The TEOM sample filter was changed. The TEOM intake head and associated sharp cut components were cleaned.
 The bypass (auxillary) flow filter was changed.

WIND SYSTEM



Sonic Wind Sensor Certificate of Calibration

Sensor Model No.: 50.5H	Sensor Serial No.: H12635
Sensor Output Swing 0V - 1.0V	Sensor Output Range: 0 - 50.0 MPS
Customer: <u>Maxxam Analytics</u>	Sales Order No.: <u>117998</u>
Tested per PO: <u>35-64914</u>	Calibration Date: <u>09/12/2016</u>
Calibrated by: <u>David Frith</u>	QC Inspection: <u>[Signature]</u>

Instrument Condition Within Tolerance:	As Found	<input type="checkbox"/>	As Left	<input checked="" type="checkbox"/>
Corrective Action:	No Adjustment	<input type="checkbox"/>	Adjust	<input checked="" type="checkbox"/>
	Preventative Maintenance	<input type="checkbox"/>	Repair	<input type="checkbox"/>

As Found Test Date: N/A As Left Test Date: 09/12/2016

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

METEOROLOGICAL SYSTEM CHECK



Meteorological System Checklist

Performed by: Alex Yakupov
Station: **St. Lina**
Start: 13:35 End: 13:54

PRECIPITATION SENSOR CHECK

	YES	NO
Is the sensor Level?	YES	
Is the heater operating properly?	YES	
Are the bucket drain holes clean?	YES	
Is the inner screen on the housing? (screen should be on between July and September)		NO
Is the upper screen on the housing? (screen should be on between July and September)		NO
Is the housing clean?	YES	
Is the area around the housing clean and free from obstacle?	YES	
Is the tipping sensor working properly? (test quantity 2.1 mm at 13:42)	YES	
	PASS	

Comments: Rain gauge was tested with water.

Response is timely and accurate. No issues.

Field Technician: Alexander Yakupov

November 22, 2016

CALIBRATORS

Company <u>Maxxam</u>		Operator: <u>Christopher Wesson</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>N/A</u>
Serial Number	<u>17100415</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
5000	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5001	80.7	0.783	0.783	0.810	-0.004	0.806	3%	3%
5001	39.4	0.382	0.382	0.395	-0.001	0.393	3%	3%
5000	19.8	0.192	0.192	0.198	0.000	0.198	3%	3%
Absolute Average Percent Difference							3%	3%

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)= 1.0347	0.90-1.10	m (Slope)= 1.0292
b (Intercept % of FS)= -0.0283	± 3% F.S.	b (Intercept % of FS)= 0.0098

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5001	Lamp C.	0.000	0.808	-0.004	0.804	NO ₂	% Diff. Limit
5001	1.316	0.476	0.332	0.472	0.804	0%	± 10%
5001	0.696	0.234	0.574	0.231	0.805	0%	± 10%
5001	0.392	0.089	0.719	0.086	0.805	1%	± 10%
Absolute Average Percent Difference						1%	± 10%

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

NO₂	LIMITS
Correlation= 1.0000	≥ 0.995
m (Slope)= 0.9994	0.90-1.10
b (Intercept % of FS)= -0.3382	± 3% F.S.

AENV Standards	NO_x Analyzer
Audit Calibrator	
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: Al Clark
 Operator Signature: *Al Clark*

Date: May 18, 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

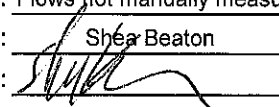
Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5000	0	0.000	0.793	0.001	0.794	NO ₂	% Diff. Limit
5000	0.5	0.533	0.260	0.537	0.797	1%	± 10%
5000	0.25	0.277	0.516	0.280	0.796	1%	± 10%
5000	0.095	0.115	0.678	0.114	0.792	-2%	± 10%
Absolute Average Percent Difference						0%	± 10%

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



Calibrator Performance Audit

OZONE

File No. 2015-108

Company: AMEC

Operator: Lee

Calibrator:
 Make/Model Sabio 2030
 Serial Number 15001215A
 Oven Temperature NA
 Last Verification Date New

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

Flow Measurements
 Pt. No. 1 350 Pt. No. 2 250 Pt. No. 3 125

Calibrator Flow (scm)	Calculated Concentration (ppm)	Indicated Concentration (ppm)	% Difference	
			vs Audit Gas	% Diff. Limit
Zero Air	0.000	0.001		
3353	0.338	0.344	1%	± 10%
3353	0.242	0.246	1%	± 10%
3353	0.123	0.124	0%	± 10%
Absolute Average Percent Difference			0.91%	± 10%

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

<u>O₃</u>		<u>LIMITS</u>
Correlation=	1.0000	≥ 0.995
m (Slope)=	1.0157	0.90-1.10
b (Intercept % of FS)=	0.0486	± 3% F.S.

AENV Standards		Ozone Analyzer	
Audit Calibrator		Make/Model	<u>Thermo 49i</u>
Make/Model	<u>Thermo 49iPS</u>	Serial/AMU Number	<u>1843</u>
Serial/AMU Number	<u>1808</u>	Last Calibration Date	<u>January 25, 2016</u>
Ozone Standard	<u>49iPS 1808</u>	Full Scale (ppm)	<u>0.5</u>

COMMENTS: - Total Output Flow verified with Bios D

Auditor: Shea Beaton Date: January 28, 2016
 Operator Signature: _____ Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2015-114CGA

Company: Maxxam Operator's Name: Chris Wesson
Cylinder #: LL119317 Concentration PPM: 49.9 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				
4945	0.00	0.000	0.01598	62.597	49.4
4937	78.87	0.789	0.01598	62.597	49.4
4956	39.38	0.392	0.00795	125.851	49.3
4940	19.50	0.193	0.00395	253.333	48.9
Average Cylinder Concentration:					49.2

Previous Stated Concentration PPM: 49.9

Percent variance from Stated: 1.4

Meets Manufacturer Tolerance. Use manufacturers stated concentration COMMENTS: SO2/NO blend 50.3ppm 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. 2015-109CGA

Company: Maxxam Operator's Name: Chris Wesson
 Cylinder #: BLM001927 Concentration PPM: 10.3 Tolerance(%) 2 Certified By: Air Liquide

Reference Calibrator and Gas:

Make/Model: R&R MFC 201
 Serial Number: AMU 1690
 Last Verification Date: February 2, 2016
 Gas Type: H2S Conc. 20.43
 Cylinder Number: CAL015584

Flow Measurement Device:

Make/Model: Bios DC-2
 Serial Number: Bios D
 Temp. °C: 24.5
 B.P. 702mmHg

Reference Analyzer:

Make/Model: Thermo 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 15.3 Span: 1.126 Range: 0.1
 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				
5025	0.0	0.000	0.000	0.000	0.000
5058	37.84	0.078	0.00748	133.668	10.4
5059	17.85	0.036	0.00353	283.417	10.3
5031	9.15	0.019	0.00182	549.836	10.2
Average Cylinder Concentration:					10.3

Previous Stated Concentration PPM: 10.3

Percent variance from Stated: 0.1

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: Shea Beaton
 Operator Signature: [Signature]

Date: February 2, 2016
 Location: McIntyre Center Edmonton



Calibration Gas Audit

CH4 / C3H8 Cylinder Gas

File No. 2015-091CGA

Company: Maxxam Operators name: Chris Wesson
Cylinder #: LL86139 Conc CH4 (PPM) 599/211 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 23
B.P. 599mmHg

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 (scm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	CH4	C3H8			CH4	C3H8
2583	0.00	0.00	0.00	0.02145	46.621	597	213
2635	56.52	12.80	12.59	0.02145	46.621	597	213
2592	19.72	4.54	4.49	0.00761	131.440	597	215
2584	9.69	2.25	2.24	0.00375	266.667	600	217
Average Cylinder Concentration:						598	215

	<u>CH4</u>	<u>C3H8</u>
Previous Stated Concentration PPM:	<u>599</u>	<u>211</u>
Percent variance from Stated:	<u>0.2</u>	<u>1.9</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. 2015-113CGA

Company: Maxxam **Operators name:** Chris Wesson
Cylinder #: LL119317 **Conc (PPM)** 50.3/50.3 **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
4945	0.0	0.000	0.000				
4937	78.87	0.801	0.803	0.01598	62.597	50.1	50.3
4956	39.38	0.399	0.399	0.00795	125.851	50.2	50.2
4940	19.50	0.198	0.198	0.00395	253.333	50.2	50.2
Average Cylinder Concentration:						50.2	50.2

	NO		NOx
Previous Stated Concentration PPM:	<u>50.3</u>		<u>50.3</u>
Percent variance from Stated:	<u>0.3</u>		<u>0.2</u>

Cylinder gas tolerances based on NO only
 Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS: SO2/NO Blend 49.9PPM 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 Continuous Monitoring Station
Name of the Representative of the Person Responsible (Last, First, Middle)	Position / Title of the Representative of the Person Responsible
Wunmi Adekanmbi	Project Manager, 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

28-12-2016

Report Issued Date (dd-mm-yyyy)

***APPENDIX IV
DATA VALIDATION CERTIFICATION FORM***



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2016-11-31-C</u>
Site: <u>St. Lina Continuous Monitoring Station</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	 <hr style="width: 80%; margin: 0 auto;"/>	Date <u>14-Dec-16</u>
Level 1 Primary Validation	 <hr style="width: 80%; margin: 0 auto;"/>	Date <u>19-Dec-16</u>
Level 2 Final Validation	 <hr style="width: 80%; margin: 0 auto;"/>	Date <u>28-Dec-16</u>
Level 3 Independent Data Review	 <hr style="width: 80%; margin: 0 auto;"/>	Date <u>03-Jan-17</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
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T2E 6P7

maxxam.ca
Toll Free 800-386-7247
Fax 403-219-3673

AMBIENT AIR MONITORING MONTHLY DATA REPORT
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
BONNYVILLE CONTINUOUS MONITORING STATION

JOB #: 2833-2016-11-35-C

November 2016

Prepared for:

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

Attention: MIKE BISAGA

DATE: **January 13, 2017**

Prepared by:

A handwritten signature in blue ink, appearing to read "Wunmi Adekanmbi".

Wunmi Adekanmbi, M.Sc., EPt.
Project Manager, Customer Service, Air Services

Reviewed by:

A handwritten signature in black ink, appearing to read "Cheri Sinclair".

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

SUMMARY

In November 2016, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the Bonnyville station, near Bonnyville, Alberta. The monitoring station provides continuous meteorological measurements and air quality data for non-compliance parameters, as requested by Lakeland Industry & Community Association.

All data collected this month was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above the 90% requirement.

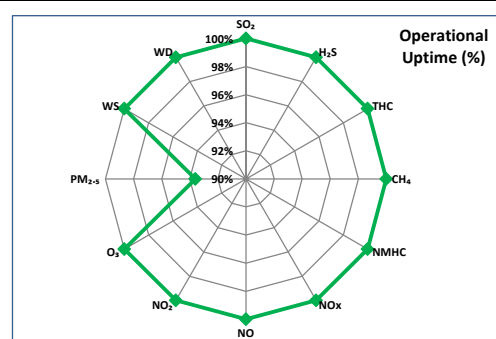
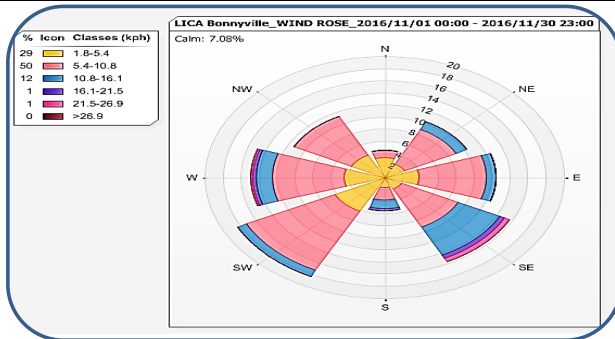
PM_{2.5}: A total of forty-six hours of downtime were recorded this month. Thirty-six hours were attributed to a malfunction of the TEOM software. Ten hours of data were recorded this month at concentrations less than -3 µg/m³, rendering the data invalid.

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 Analytics is issuing this completed report to Lakeland Industry & Community Association, Bonnyville Continuous Monitoring Station.

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.

Name	Unit	Monthly Records		1-Hour Records					24-Hour Records			
		Avg. Conc.	Uptime	Maximum			AAAQO Objective	Exceed. Hours	Maximum		AAAQO Objective	Exceed. Days
				Conc.	Date	Hour			Conc.	Date		
SO ₂	ppb	0.0	100.0%	2.9	November 16	10	172	0	0.2	November 16	48	0
H ₂ S	ppb	0.2	100.0%	2.0	November 8	4	10	0	0.7	November 8	3	0
THC	ppm	2.20	100.0%	3.55	November 5	21	-	-	2.82	November 5	-	-
CH ₄	ppm	2.19	100.0%	3.38	November 5	21	-	-	2.75	November 5	-	-
NMHC	ppm	0.01	100.0%	0.66	November 12	15	-	-	0.07	November 5	-	-
NO _x	ppb	9.8	100.0%	86.1	November 5	7	-	-	28.5	November 5	-	-
NO	ppb	3.2	100.0%	65.5	November 8	19	-	-	14.8	November 5	-	-
NO ₂	ppb	6.7	100.0%	27.7	November 15	18	159	0	15.6	November 16	-	-
O ₃	ppb	16.7	100.0%	40.1	November 4	12	82	0	27.7	November 30	-	-
PM _{2.5}	µg/m ³	6.1	93.6%	56.1	November 4	12	80	0	12.2	November 4	30	0
WS	kph	1.3	100.0%	26.8	November 10	22	-	-	12.9	November 23	-	-
WD	degree	179 (S)	100.0%	-	-	-	-	-	-	-	-	-



Monthly Update

- * All sampling, analysis, and QA/QC for this project was performed by Maxxam Analytics and complies with the Alberta Air Monitoring Directive.
- * All data collected this month were within the objectives outlined in the AMD 2016 and AAAQO 2016.
- * The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above 90%.

Operational Issues

- **PM_{2.5}:** A total of forty-six hours of downtime were recorded this month. Thirty-six hours were attributed to a malfunction of the TEOM software. Ten hours of data were recorded this month at concentrations less than -3 µg/m³, rendering the data invalid.
- **Non-Continuous Data:** Five NMHC canister events were recorded this month between November 2 and November 29. The date, time and initial 5-min average concentration measurements are as follows:
 - November 2 at hour 09:05 - 0.38 ppm
 - November 4 at hour 16:40 - 0.33 ppm
 - November 12 at hour 15:30 - 1.79 ppm
 - November 25 at hour 07:40 - 0.43 ppm
 - November 29 at hour 08:50 - 0.46 ppm

Monthly Continuous Data Summary

Lakeland Industry & Community Association Bonnyville Continuous Monitoring Station						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 (sector)	READING	DAY	
SO ₂ (ppb)	172	48	0	0	0.0	2.9	16	10	3.2	NW	0.2	16	100.0
H ₂ S (ppb)	10	3	0	0	0.2	2.0	8	4	5.1	ENE	0.7	8	100.0
THC (ppm)	-	-	-	-	2.20	3.55	5	21	1.8	N	2.82	5	100.0
CH ₄ (ppm)	-	-	-	-	2.19	3.38	5	21	1.8	N	2.75	5	100.0
NMHC (ppm)	-	-	-	-	0.01	0.66	12	15	2.0	NNE	0.07	5	100.0
NO ₂ (ppb)	159	-	0	-	6.7	27.7	15	18	0.4	NNW	15.6	16	100.0
NO (ppb)	-	-	-	-	3.2	65.5	8	19	1.3	NNE	14.8	5	100.0
NO _x (ppb)	-	-	-	-	9.8	86.1	5	7	3.1	N	28.5	5	100.0
O ₃ (ppb)	82	-	0	-	16.7	40.1	4	12	4.5	SSW	27.7	30	100.0
PM _{2.5} (µg/m ³)	80	30	0	0	6.1	56.1	4	12	4.5	SSW	12.2	4	93.6
VECTOR WS (kph)	-	-	-	-	1.3	26.8	10	22	-	SSE	12.9	23	100.0
VECTOR WD (sec)	-	-	-	-	179 (S)	-	-	-	-	-	-	-	100.0

NA-NOT AVAILABLE VAR-VARIOUS

Exceedance Summary Report

SO₂ 1-Hour Exceedances

Measured concentrations of sulphur dioxide were below the 1-hour AAAQO of 172 ppb.

SO₂ 24-Hour Exceedances

Measured concentrations of sulphur dioxide were below the 24-hour AAAQO of 48.0 ppb.

H₂S 1-Hour Exceedances

Measured concentrations of hydrogen sulphide were below the 1-hour AAAQO of 10 ppb.

H₂S 24-Hour Exceedances

Measured concentrations of hydrogen sulphide were below the 24-hour AAAQO of 3 ppb.

NO₂ 1-Hour Exceedances

Measured concentrations of nitrogen dioxide were below the 1-hour AAAQO of 159 ppb.

PM_{2.5} 1-Hour Exceedances

Measured concentrations of fine particulate matter were below the 1-hour AAAQO of 80 µg/m³.

PM_{2.5} 24-Hour Exceedances

Measured concentrations of fine particulate matter were below the 24-hour AAAQO of 30 µg/m³.

O₃ 1-Hour Exceedances

Measured concentrations of ozone were below the 1-hour AAAQO of 82 ppb.

In accordance with EPEA and the Substance Release Regulation.

In accordance with A Guide to Release Reporting and the Alberta Ambient Air Quality Objectives and Guidelines Summary.

Volatile Organics (VOCs) Data Summary

Sample Collection Date	Maximum Reading (ppb)	Volatile Organic Compound
November 2, 2016	3.6	Acetone
November 8, 2016	3.8	Ethanol
November 14, 2016	7.6	Acetone
November 20, 2016	1.8	Ethanol
November 26, 2016	2.4	Acetone

Note: NA

Polycyclic Aromatic Hydrocarbons (PAHs) Data Summary

Sample Collection Date	Maximum Reading ($\mu\text{g}/\text{puf}$)	Semi-Volatile Organic
November 2, 2016	0.17	Phenanthrene
November 8, 2016	0.87	Phenanthrene
November 14, 2016	0.2	Phenanthrene
November 20, 2016	0.21	Phenanthrene
November 26, 2016	0.34	Phenanthrene

Note: NA

Volatile Organics (VOCs) Data Summary - NMHC Canister System

Sample Collection Date	Maximum Reading (ppb)	Volatile Organic Compound
November 2, 2016	6.14	n-Butane
November 4, 2016	8.4	Ethanol
November 12, 2016	61.3	n-Butane
November 25, 2016	3.8	Acetone
November 29, 2016	2.01	n-Butane

Note: NA

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1.0 Discussion

This monthly report consists of continuous monitoring results for the following 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 non-continuous VOCs, PAHs and NMHC canister monitoring 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, at a minimum, for each monthly monitoring period.

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/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 November 17. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on December 18, at hour 00:00, was invalidated due to a brief power outage.

HYDROGEN SULPHIDE (H₂S)

The routine monthly calibration was performed on November 17. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on December 18, at hour 00:00, was invalidated due to a brief power outage.

TOTAL HYDROCARBONS (THC), METHANE (CH₄) and NON-METHANE HYDROCARBONS (NMHC)

The routine monthly calibration was performed on November 17. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on December 18, at hour 00:00, was invalidated due to a brief power outage. The carrier gas was replenished on November 24.

NITROGEN DIOXIDE (NO₂)

The routine monthly calibration was performed on November 17. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on December 18, at hour 00:00, was invalidated due to a brief power outage.

OZONE (O₃)

The routine monthly calibration was performed on November 17. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on December 18, at hour 00:00, was invalidated due to a brief power outage.

PARTICULATE MATTER < 2.5 MICRONS (PM_{2.5})

- Two routine TEOM audits were performed this month: one was completed on November 10 and the other audit was performed on November 24. Both the inlet filter and the FDMS filter were replaced during the audits.
- The TEOM software malfunctioned on November 21. The unit was restarted on November 23, and after stabilization, normal operations resumed. Thirty-six hours of data were discarded due to this event.
- Data was corrected in accordance with AMD (2016), Chapter 6, Table 2, Zero Adjustment Criteria. Data recorded between 0 and -3 µg/m³ was corrected to 0 µg/m³. Data recorded below -3 µg/m³ was invalidated. Ten hours of data were invalidated as the data was below -3 µg/m³ this month.

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

The wind data is reported as vector wind speed and vector wind direction. Wind direction is defined as the direction from which the wind is blowing from and is measured in degrees from true north.

There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on December 18, at hour 00:00, was invalidated due to a brief power outage.

VOC SAMPLES

The sampler was programmed to run for 24 hours every 6th day per the NAPS (North American Pollution Samples) were collected on November 2, 8, 14, 20 and 26. Analytical results are included in this report. VOC values are reported ppb.

PAH SAMPLES

The sampler was programmed to run for 24 hours every 6th day per the NAPS (North American Pollution Samples) were collected on November 2, 8, 14, 20 and 26. Analytical results are included in this report. PAH values are reported ug.

NMHC CANISTER SAMPLES

The canister sampler is programmed to draw in a whole air sample when the 5-minute average concentration of NMHC is above 0.30 ppm. A representative sample of ambient air is collected over a one-hour period when the canister event is triggered.

Five canister events were recorded this month between November 2 and November 29. The date, time and initial 5-min average concentration measurements are as follows:

- November 2 at hour 09:05 - 0.38 ppm
- November 4 at hour 16:40 - 0.33 ppm
- November 12 at hour 15:30 - 1.79 ppm
- November 25 at hour 07:40 - 0.43 ppm
- November 29 at hour 08:50 - 0.46 ppm

Analytical results are included in this report. The values for the NMHC canister samples are reported in ppb.

2.0 Project Personnel

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

3.0 Plant Monthly Required AMD Summary

All data collected this month was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems 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 monitoring program:

- Maxxam AIR SOP-00001 - Methane, Non-Methane Hydrocarbon Analyzer Monitoring
- Maxxam AIR SOP-00208: RM Young Wind Monitor Calibration
- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-00212: Ambient O₃ Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO₂/NO_x 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
- VOC - XONTECH 910A Gaseous Air Sampler
- PAH - TISCH PUF Plus

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

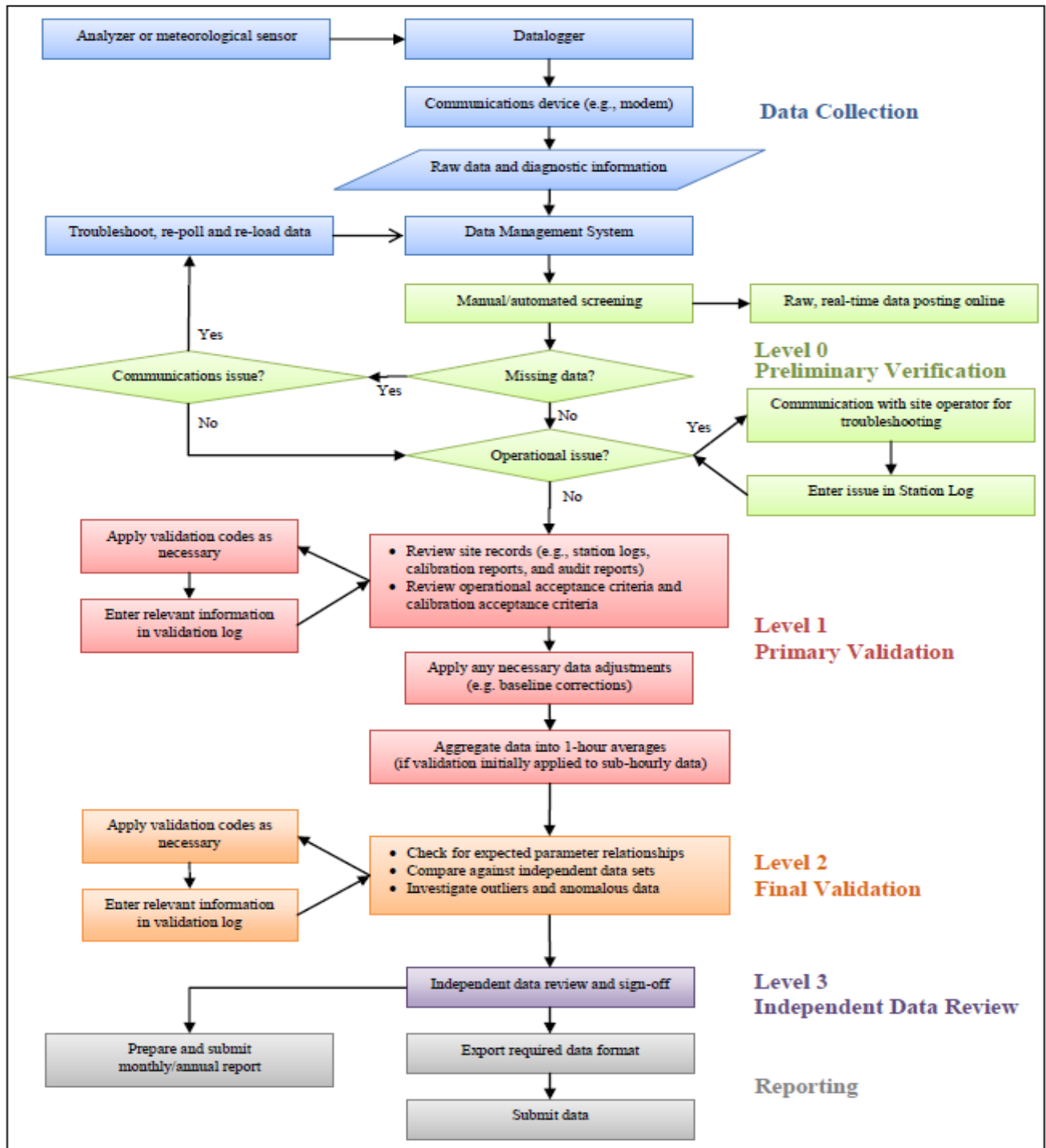
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

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 Hourly Averages (SO₂ ppb)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY 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	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	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
3	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
4	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	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.2	24
5	0.0	0.0	S	0.0	0.0	0.0	0.0	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.6	24
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	0.0	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	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	S	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	0.0	0.0	0.4	0.8	0.0	0.0	S	0.0	0.0	0.8	24	
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.1	0.7	0.1	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	1.1	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	0.0	0.0	0.0	S	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	0.1	0.3	0.5	0.4	0.1	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	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	0.1	0.3	0.2	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	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	S	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	0.1	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	0.0	0.0	0.0	0.0	0.1	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	S	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	24
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	2.9	0.5	1.8	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	2.9	24
17	0.0	0.0	0.1	0.3	0.3	0.2	0.1	0.2	0.2	0.4	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	0.4	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	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
19	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
20	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
21	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
22	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
23	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	24
24	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	24
25	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.1	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	0.3	24
26	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
27	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
28	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
29	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
30	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	S	0.0	0.0	0.0	24
HOURLY MAX	0.0	0.0	0.1	0.3	0.3	0.2	0.1	0.6	0.3	1.1	2.9	0.5	1.8	0.5	0.4	0.1	0.0	0.0	0.4	0.8	0.0	0.2	0.0	0.0	0.0	0.0	0.0	24
HOURLY AVG	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	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	24

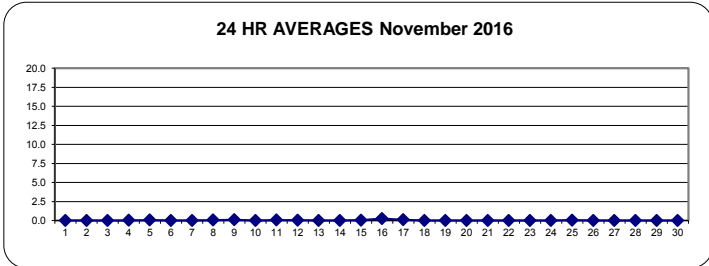
STATUS FLAG CODES

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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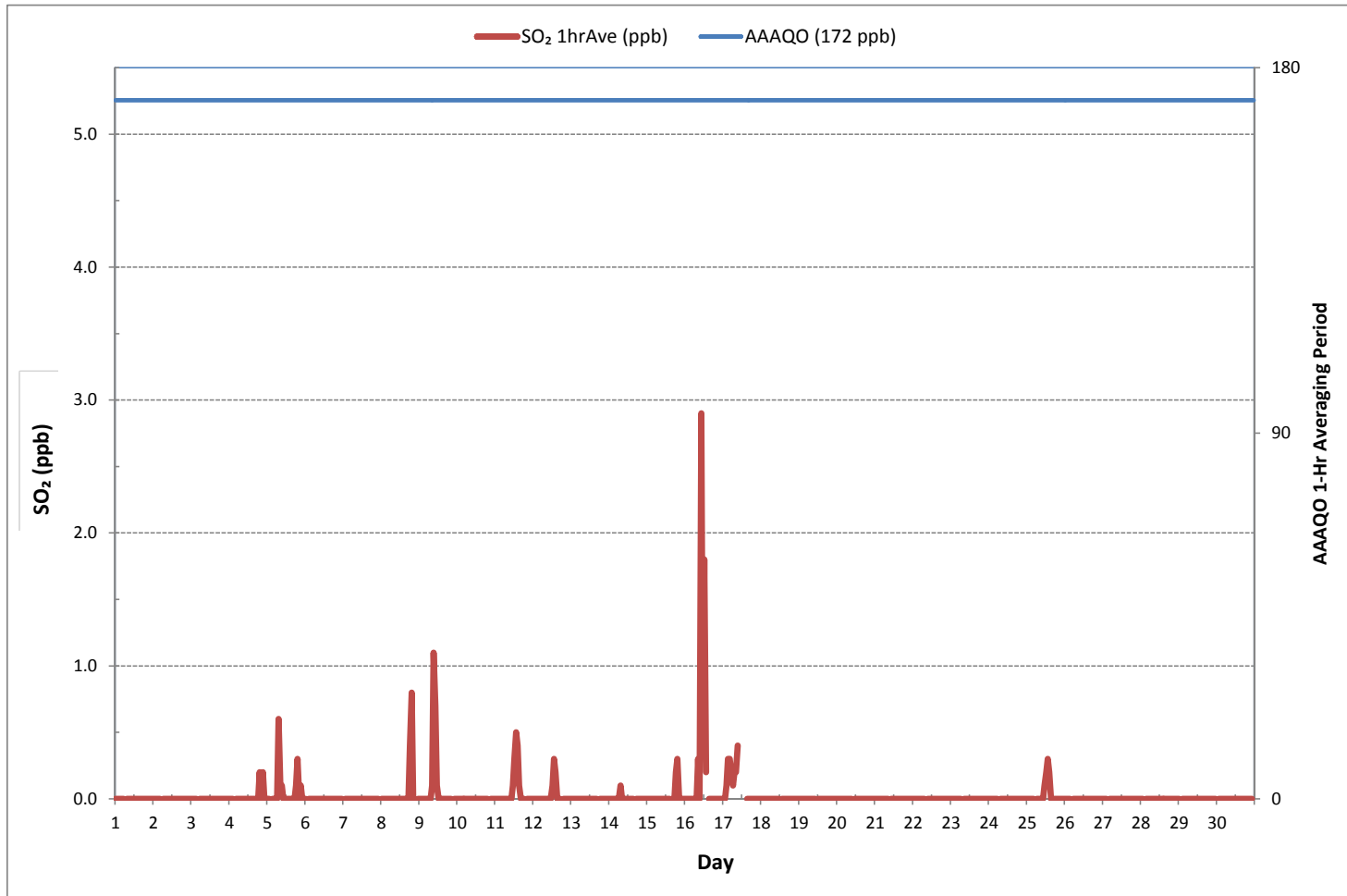
24 HR AVERAGES November 2016



MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0
NUMBER OF 24-HR EXCEEDANCES:	0
NUMBER OF NON-ZERO READINGS:	42
MINIMUM 1-HR AVERAGE:	0.0 ppb @ HOUR(S) VAR ON DAY(S) ALL
MAXIMUM 1-HR AVERAGE:	2.9 ppb @ HOUR(S) 10 ON DAY(S) 16
MAXIMUM 24-HR AVERAGE:	0.2 ppb VAR-VARIOUS ON DAY(S) 16
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	720 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	0.2
MONTHLY AVERAGE:	0.0 ppb

SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)

HR START (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-HR AVG.	RDGS.	
HR END (MST)	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	3.9	3.9	3.9	3.9	3.7	3.8	S	3.5	3.5	3.7	4.5	3.4	3.5	3.4	3.2	3.3	3.5	3.2	3.0	3.1	3.0	2.8	2.8	3.2	2.8	4.5	3.5	24	
2	3.5	3.8	3.8	3.3	2.9	S	2.7	2.7	3.0	3.2	3.1	3.1	3.3	3.3	3.3	3.0	3.1	3.1	3.1	3.0	2.9	3.1	2.8	2.9	2.7	3.8	3.1	24	
3	3.1	2.8	2.9	3.1	S	3.0	3.2	3.3	3.3	3.2	3.1	3.8	3.7	3.4	3.2	3.1	3.1	3.4	3.7	3.9	3.5	3.1	3.1	3.1	2.8	3.9	3.3	24	
4	3.2	3.6	3.6	S	2.8	2.9	2.9	3.1	3.5	3.8	3.3	3.7	3.8	3.6	3.6	3.5	3.5	3.9	4.4	4.7	4.3	4.6	4.4	4.1	2.8	4.7	3.7	24	
5	4.2	4.1	S	4.7	4.2	4.3	4.9	5.7	4.9	4.9	4.6	4.3	4.4	4.5	4.8	4.8	4.6	4.7	5.6	5.6	4.9	5.0	5.0	4.8	4.1	5.7	4.8	24	
6	4.5	S	4.3	4.4	4.5	4.5	4.3	4.1	4.1	4.3	4.1	3.9	3.9	3.9	3.9	3.9	3.7	3.6	3.7	3.7	3.3	3.3	3.2	3.3	3.2	4.5	3.9	24	
7	S	2.9	2.9	2.9	2.9	2.9	3.2	3.2	3.2	3.1	3.0	3.1	3.3	3.2	3.1	3.5	3.2	2.7	3.4	3.0	3.1	2.9	3.0	S	2.7	3.5	3.1	24	
8	3.1	3.2	3.3	3.2	3.3	3.4	3.5	4.3	3.9	3.9	3.9	3.9	3.8	3.6	4.0	4.2	4.0	4.5	4.9	5.9	4.5	4.5	S	3.8	3.1	5.9	3.9	24	
9	3.9	3.9	3.8	3.8	3.8	3.9	3.9	4.0	4.3	5.1	5.0	4.1	3.6	3.6	3.4	3.3	3.2	3.2	3.1	3.0	2.8	S	2.4	2.6	2.4	5.1	3.6	24	
10	2.6	2.4	2.5	2.2	2.2	2.1	2.2	2.1	2.3	2.1	2.2	2.0	2.2	2.3	2.3	2.7	2.6	2.5	2.5	S	2.9	3.0	2.8	2.0	3.0	2.4	2.4	24	
11	3.1	3.1	3.1	3.1	3.2	3.3	3.5	3.7	3.5	3.5	3.8	3.8	4.2	4.3	4.3	4.1	4.2	3.6	3.5	S	3.6	3.6	3.9	3.9	3.1	4.3	3.6	24	
12	3.5	3.6	3.9	3.8	3.8	3.8	4.0	4.6	4.5	4.4	4.5	4.5	5.0	5.4	5.2	4.9	4.5	4.7	S	4.2	4.7	4.3	4.3	4.2	3.5	5.4	4.4	24	
13	4.1	3.9	3.9	3.8	3.5	3.6	3.8	3.7	3.6	3.5	3.4	3.6	3.6	3.6	3.8	3.8	3.8	S	3.9	3.9	4.7	4.5	4.4	4.5	3.4	4.7	3.9	24	
14	4.5	4.6	4.5	4.5	4.6	4.4	4.7	4.9	4.7	4.7	4.4	4.4	4.4	4.3	4.2	4.2	S	4.0	3.9	3.9	3.9	3.8	3.8	3.7	3.7	4.9	4.3	24	
15	3.6	3.5	3.4	3.6	3.6	3.5	3.6	3.5	3.6	3.7	3.7	3.7	3.9	3.9	S	3.8	4.3	4.7	5.0	4.3	4.2	4.5	4.6	3.4	5.0	3.9	24		
16	4.5	4.2	4.4	4.5	4.1	4.1	4.1	3.9	7.0	4.3	10.9	6.6	11.3	4.7	S	4.0	4.3	4.3	3.9	3.9	3.7	3.5	3.4	3.4	11.3	4.9	24		
17	3.3	3.2	3.5	3.4	3.3	3.1	2.9	3.0	2.9	3.0	C	C	C	C	C	1.4	1.3	1.3	1.1	1.1	1.2	1.0	1.0	1.0	1.0	3.5	2.2	24	
18	P	1.0	0.8	1.0	0.9	0.8	0.9	1.0	1.5	1.5	1.7	1.3	S	1.1	1.0	1.1	1.3	1.2	1.2	1.0	1.0	1.2	1.1	1.1	0.8	1.7	1.1	23	
19	1.2	1.3	1.5	1.7	1.5	1.5	1.4	1.6	1.7	1.5	1.5	S	1.6	1.6	1.5	1.8	1.7	1.7	1.9	1.9	1.9	1.9	1.9	1.9	1.2	1.9	1.6	24	
20	1.8	2.0	2.1	2.1	2.1	1.9	2.0	2.1	2.0	2.0	S	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.3	2.4	2.4	2.4	2.4	1.8	2.4	2.2	24	
21	2.5	2.6	2.5	2.7	2.7	2.7	3.1	2.8	S	2.6	2.7	2.7	2.7	2.9	2.6	2.7	2.6	2.5	2.5	2.4	2.4	2.3	2.2	2.2	2.2	3.1	2.6	24	
22	2.1	2.1	2.2	1.9	1.9	1.8	1.9	2.0	S	2.0	1.8	1.7	1.9	2.0	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.2	2.2	1.9	2.1	1.7	2.2	2.0	24
23	2.1	2.1	2.0	2.1	2.1	2.1	2.2	S	2.1	2.3	2.4	2.3	2.4	2.5	2.4	2.4	2.5	2.4	2.3	2.4	2.3	2.4	2.3	2.4	2.0	2.5	2.3	24	
24	2.1	2.2	2.5	2.4	2.5	2.2	S	2.3	2.4	2.2	2.3	2.5	2.5	2.4	2.4	2.4	2.4	2.5	2.2	2.2	2.3	2.5	2.5	2.4	2.1	2.5	2.4	24	
25	2.5	2.7	2.5	2.8	2.8	S	2.7	3.2	3.1	3.0	3.4	3.1	3.6	3.4	3.3	3.1	2.8	2.8	2.7	2.6	2.6	2.5	2.3	2.2	2.2	3.6	2.9	24	
26	2.3	2.3	2.1	2.2	S	2.3	2.4	2.2	2.2	2.5	2.5	2.5	2.6	2.9	2.9	2.7	2.7	2.9	2.9	2.9	2.9	2.9	2.7	3.1	3.1	2.1	3.1	2.6	24
27	3.1	3.1	3.1	S	3.3	3.3	3.3	3.3	3.4	3.4	3.4	3.5	3.5	3.5	3.5	3.7	3.3	3.6	3.5	3.4	3.3	3.4	3.5	3.7	3.1	3.7	3.4	24	
28	3.4	3.5	S	3.3	3.4	3.2	3.3	3.1	3.1	3.3	3.0	2.9	3.1	3.1	2.8	2.8	2.9	2.7	2.7	2.3	2.6	2.4	2.4	2.1	2.1	3.5	2.9	24	
29	2.3	S	2.2	2.2	2.0	1.9	2.0	1.9	1.9	1.7	1.7	1.8	1.8	1.9	2.0	1.9	1.7	2.2	2.5	1.5	1.8	1.7	1.5	1.4	1.4	2.5	1.9	24	
30	S	1.8	1.7	1.7	1.7	1.8	2.0	2.1	2.0	2.1	1.8	2.0	2.0	2.2	2.0	2.2	2.2	2.5	2.6	2.6	2.2	2.1	1.9	S	1.7	2.6	2.1	24	
HOURLY MAX	4.5	4.6	4.5	4.7	4.6	4.5	4.9	5.7	7.0	5.1	10.9	6.6	11.3	5.4	5.2	4.9	4.6	4.7	5.6	5.9	4.9	5.0	5.0	4.8					
HOURLY AVG	3.1	3.0	3.0	3.0	3.0	2.9	3.0	3.1	3.2	3.2	3.4	3.2	3.5	3.2	3.1	3.1	3.0	3.0	3.1	3.1	3.0	3.0	2.9	3.0					

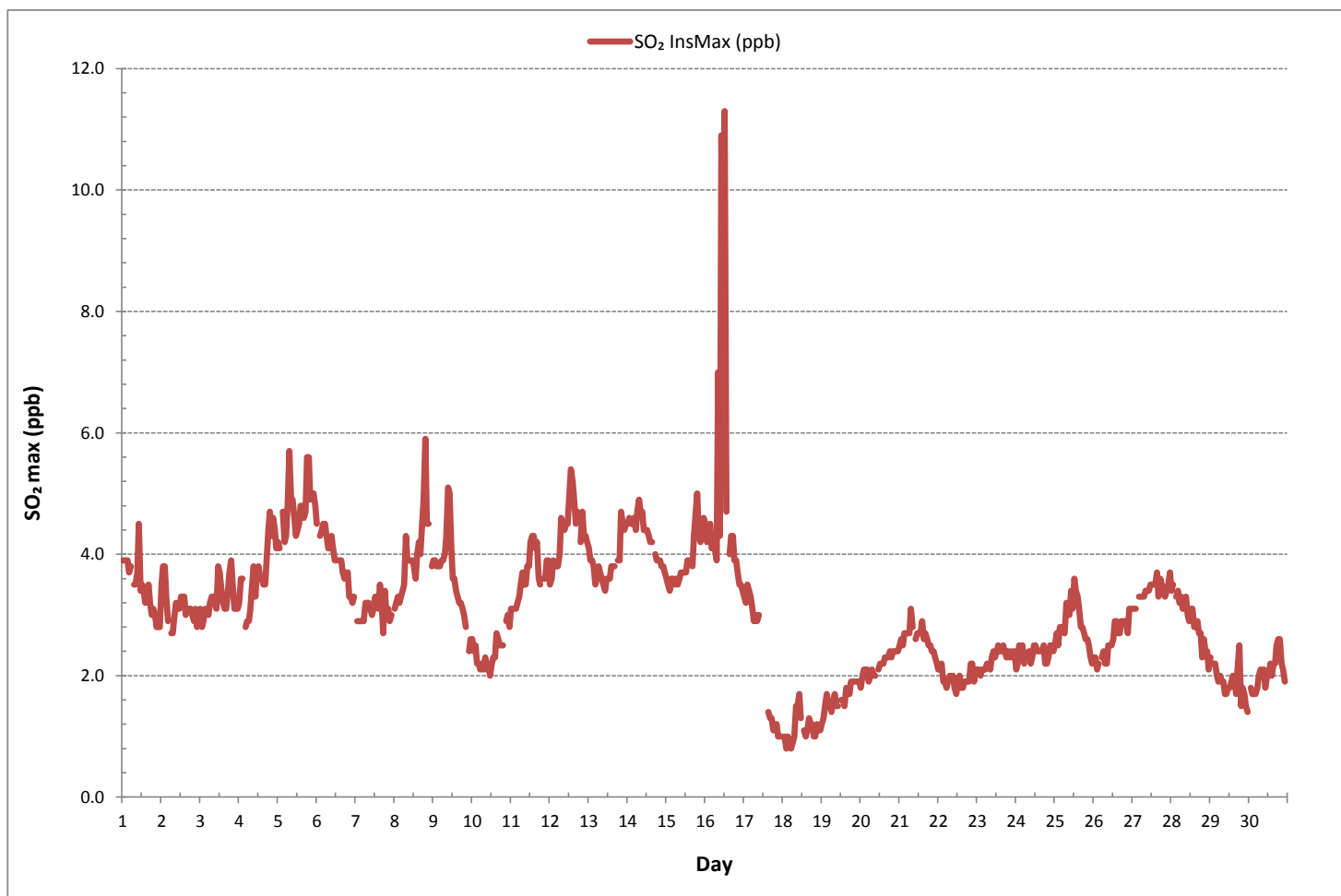
STATUS FLAG CODES

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:	683
MAXIMUM INSTANTANEOUS VALUE:	11.3 ppb @ HOUR(S) 12 ON DAY(S) 16
VAR-VARIOUS	
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	1.1
OPERATIONAL TIME:	719 hrs

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)

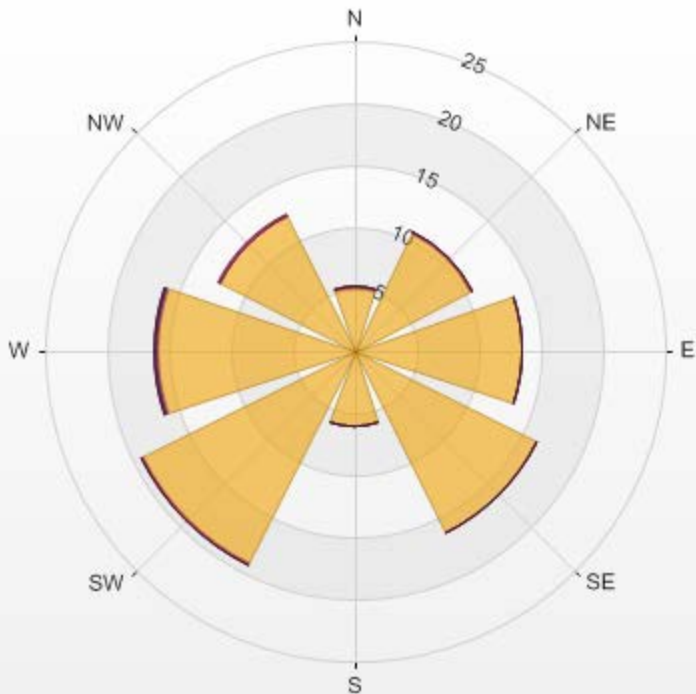


Wind: LICA Bonnyville Poll.: LICA Bonnyville-SO2[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.86% Calm Avg: 0.00 [ppb]

Direction	0.0-0.6	0.6-1.2	1.2-1.8	1.8-2.4	2.4-3.0	>3.0	Total
N	5.12	0.15	0	0	0	0	5.27
NE	10.54	0.15	0	0	0	0	10.69
E	13.62	0	0	0	0	0	13.62
SE	16.4	0	0	0	0	0	16.4
S	6.15	0	0	0	0	0	6.15
SW	19.18	0.15	0	0	0	0	19.33
W	15.96	0.15	0	0.15	0	0	16.26
NW	12.15	0	0	0	0.15	0	12.3
Summary	99.12	0.6	0	0.15	0.15	0	100

% Icon Classes (ppb)	99	 0.0-0.6	1	 0.6-1.2	0	 1.2-1.8	0	 1.8-2.4	0	 2.4-3.0	0	 >3.0
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LICA Bonnyville Poll.: LICA Bonnyville-SO₂[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



SO2[ppb] Calibration: LICA Bonnyville Monthly: 2016/11 Type: Span



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

HYDROGEN SULPHIDE



HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY 1	0.0	0.0	0.0	0.0	0.1	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	0.1	0.0	24
2	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.1	0.3	0.5	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	24
3	0.0	0.0	0.0	0.0	0.0	S	0.1	0.3	0.2	1.3	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.5	0.1	0.2	0.0	0.0	0.0	0.0	1.3	0.1	24
4	0.0	0.0	0.0	S	0.0	0.2	1.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.7	0.5	0.1	0.0	0.0	0.0	0.0	0.0	1.1	0.2	24	
5	0.0	0.0	S	0.0	0.1	0.3	0.4	1.2	1.0	1.4	0.9	0.4	0.0	0.0	0.0	0.0	0.3	0.4	0.6	1.4	0.9	1.0	0.9	0.7	0.0	1.4	0.5	24	
6	0.6	S	0.4	0.5	0.5	0.4	0.3	0.5	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.1	0.0	0.0	0.6	0.3	24	
7	S	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.4	0.0	0.0	0.6	0.4	0.1	0.3	1.5	1.2	0.7	0.4	0.2	0.3	0.2	S	0.0	1.5	0.3	24	
8	0.3	0.3	1.2	1.2	2.0	0.5	0.4	1.1	1.6	0.3	1.0	1.1	0.2	0.0	0.7	0.0	0.1	0.6	1.1	1.2	0.4	0.4	S	0.0	0.0	2.0	0.7	24	
9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.2	0.0	24	
10	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	0.4	0.7	0.1	0.8	0.7	0.3	S	0.1	0.0	0.1	0.0	0.8	0.1	24	
11	0.1	0.1	0.0	0.2	0.1	0.1	0.2	0.0	0.2	0.2	0.3	0.4	0.3	0.2	0.2	0.4	0.2	0.3	0.2	S	0.2	0.1	0.2	0.2	0.0	0.4	0.2	24	
12	0.0	0.1	1.4	0.9	0.5	1.6	0.9	1.3	1.1	0.4	0.2	0.6	0.3	0.4	1.4	0.6	0.8	0.5	S	0.4	0.1	0.1	0.1	0.2	0.0	1.6	0.6	24	
13	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	S	0.0	0.0	0.3	0.8	0.0	0.0	0.0	0.8	0.1	24	
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	24	
15	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	0.0	0.0	S	0.3	0.5	0.8	1.8	1.4	1.0	0.4	0.3	0.0	1.8	0.3	24
16	0.5	0.2	0.5	0.4	0.3	0.0	0.0	0.0	0.4	0.3	0.3	0.3	0.0	0.1	S	0.0	0.3	0.2	0.4	0.4	1.0	0.1	0.0	0.5	0.0	1.0	0.3	24	
17	0.4	0.2	0.5	0.4	0.4	0.3	0.4	0.6	0.7	0.5	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	0.0	0.7	0.2	24
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.7	0.4	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	0.7	0.1	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	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
20	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.1	0.4	0.4	0.0	0.0	0.1	0.3	0.2	0.1	0.2	0.1	0.0	0.1	0.0	0.4	0.1	24	
21	0.0	0.1	0.1	0.1	0.0	0.0	0.2	0.2	0.1	S	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	0.2	0.0	24	
22	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	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24
23	0.0	0.0	0.0	0.1	0.0	0.0	0.1	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	0.0	0.0	0.0	0.1	0.0	24
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	24
25	0.0	0.0	0.0	0.0	0.0	S	0.1	0.2	0.4	0.1	0.1	0.4	0.5	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	24	
26	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	0.0	24	
27	0.0	0.0	0.0	S	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	0.1	0.0	24
28	0.0	0.0	S	0.0	0.0	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	0.0	0.0	0.0	0.0	0.2	0.0	24
29	0.0	S	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.3	0.2	0.2	0.3	0.1	0.0	0.0	0.0	0.3	0.1	24	
30	S	0.3	0.3	0.6	0.0	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.0	S	0.0	0.6	0.1	24	
HOURLY MAX	0.6	0.3	1.4	1.2	2.0	1.6	1.0	1.3	1.6	1.4	1.0	1.1	0.6	0.4	1.4	0.7	1.5	1.2	1.1	1.8	1.4	1.0	0.9	0.7					
HOURLY AVG	0.1	0.0	0.2	0.2	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	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

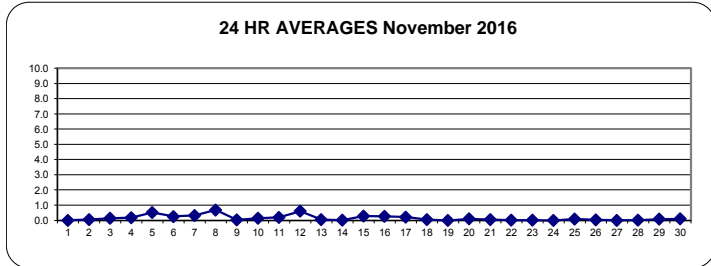
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	10	ppb	24-HR	3	ppb
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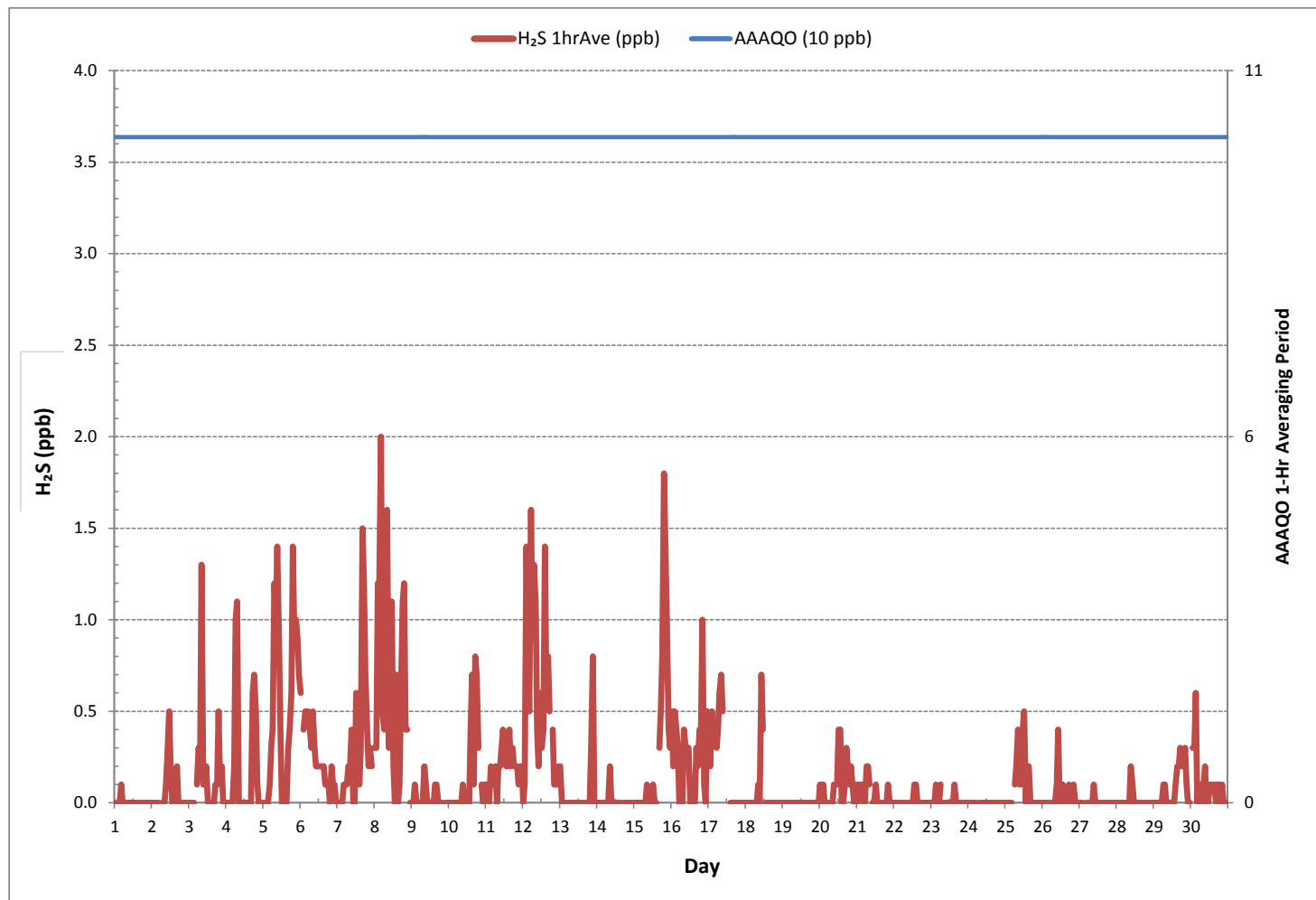
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0
NUMBER OF 24-HR EXCEEDANCES:	0
NUMBER OF NON-ZERO READINGS:	266
MINIMUM 1-HR AVERAGE:	0.0 ppb @ HOUR(S) VAR ON DAY(S) ALL
MAXIMUM 1-HR AVERAGE:	2.0 ppb @ HOUR(S) 4 ON DAY(S) 8
MAXIMUM 24-HR AVERAGE:	0.7 ppb VAR-VARIOUS ON DAY(S) 8
IZS CALIBRATION TIME:	31 hrs OPERATIONAL TIME: 720 hrs
MONTHLY CALIBRATION TIME:	4 hrs AMD OPERATION UPTIME: 100.0 %
STANDARD DEVIATION:	0.3 MONTHLY AVERAGE: 0.2 ppb

24 HR AVERAGES November 2016



HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)

HR START (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-HR AVG.	RDGS.
HR END (MST)	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	1.4	1.4	1.5	1.4	1.6	1.4	S	1.4	1.3	1.5	1.5	1.5	1.4	1.4	1.4	1.2	1.4	1.4	1.4	1.3	1.3	1.1	1.3	1.3	1.1	1.6	1.4	24
2	1.3	1.4	1.2	1.2	1.3	S	1.4	1.4	1.7	1.8	2.2	2.2	1.8	1.7	1.1	1.3	1.7	1.5	1.3	1.4	1.3	1.2	1.2	1.1	1.1	2.2	1.5	24
3	1.1	1.2	1.3	1.5	S	1.6	1.7	1.6	6.5	1.6	1.4	1.6	1.2	1.3	1.3	1.2	1.5	1.6	1.9	2.1	1.6	1.4	1.3	1.2	1.1	6.5	1.7	24
4	1.3	1.2	1.2	S	1.2	1.9	6.9	6.4	1.9	1.5	1.5	1.7	1.3	1.3	1.6	1.6	1.7	2.6	2.9	2.8	2.2	1.6	1.6	1.9	1.2	6.9	2.2	24
5	1.7	1.7	S	2.0	2.0	2.2	3.1	3.8	3.3	3.5	3.3	2.7	1.9	1.7	1.7	1.8	2.0	2.1	2.8	3.5	3.0	3.0	2.5	2.1	1.7	3.8	2.5	24
6	2.0	S	1.9	1.9	1.9	1.9	1.9	1.7	1.9	2.0	1.8	1.8	1.6	1.6	1.5	1.4	1.4	1.5	1.4	1.5	1.4	1.4	1.2	1.2	1.2	2.0	1.7	24
7	S	1.2	1.2	1.1	1.3	1.3	1.4	1.7	1.5	1.8	1.2	1.3	2.0	1.5	1.2	1.6	3.6	3.8	2.6	1.3	1.2	1.4	1.2	S	1.1	3.8	1.7	24
8	1.4	2.0	3.0	3.0	5.9	3.8	1.7	3.1	4.5	2.2	7.7	4.1	1.9	2.0	2.6	1.6	1.8	2.5	3.2	3.4	2.5	2.2	S	2.0	1.4	7.7	3.0	24
9	1.5	1.8	1.9	1.6	1.6	1.3	1.4	1.5	1.7	1.5	1.4	1.4	1.4	1.3	1.4	1.5	1.4	1.4	1.3	1.4	1.1	S	1.3	0.9	0.9	1.9	1.4	24
10	1.0	1.1	1.0	1.1	1.0	1.0	1.2	1.1	1.0	1.2	1.1	1.0	0.7	1.8	2.4	3.2	2.2	3.6	3.0	1.5	S	1.3	1.1	1.2	0.7	3.6	1.5	24
11	1.2	1.2	1.2	1.3	1.3	1.2	1.4	1.3	1.4	1.4	1.5	1.8	1.5	1.5	1.5	1.7	1.5	1.6	1.6	S	1.6	1.4	1.8	1.5	1.2	1.8	1.5	24
12	1.4	1.4	3.8	3.4	1.8	5.2	3.1	3.4	3.3	2.0	1.7	2.2	1.8	2.1	5.3	3.6	2.4	2.2	S	1.9	1.6	1.5	1.6	1.7	1.4	5.3	2.5	24
13	1.6	1.5	1.4	1.3	1.5	1.3	1.4	1.4	1.4	1.5	1.4	1.2	1.3	1.3	1.5	1.6	1.7	S	1.6	1.5	4.7	3.8	1.6	1.6	1.2	4.7	1.7	24
14	1.7	1.7	1.6	1.6	1.8	1.7	1.6	1.8	1.9	1.7	1.4	1.7	1.7	1.6	1.7	1.6	S	1.5	1.5	1.6	1.3	1.5	1.5	1.4	1.3	1.9	1.6	24
15	1.5	1.5	1.5	1.3	1.4	1.6	1.6	1.5	1.6	1.6	1.5	1.5	1.8	1.4	1.4	S	1.9	2.2	3.3	4.6	6.2	3.4	2.1	2.1	1.3	6.2	2.1	24
16	2.2	1.9	2.0	2.0	2.0	1.8	1.6	1.7	2.0	2.0	1.9	2.1	1.8	1.7	S	1.5	2.0	2.0	1.8	2.1	2.5	1.5	1.2	1.8	1.2	2.5	1.9	24
17	1.8	1.4	1.9	1.5	1.4	1.3	1.8	1.4	1.6	1.3	C	C	C	C	C	0.3	0.5	0.1	0.8	0.4	0.7	0.7	0.2	0.3	0.1	1.9	1.0	24
18	P	0.3	0.2	0.7	0.6	0.5	0.3	0.4	0.8	0.7	2.0	1.5	S	0.4	0.6	0.7	0.6	0.2	0.3	0.4	0.5	0.8	0.9	0.0	0.0	2.0	0.6	23
19	0.0	0.3	0.8	0.8	0.8	0.3	1.1	0.7	0.6	0.2	0.7	S	0.6	0.8	0.3	1.1	0.8	1.1	0.1	1.0	0.9	0.6	1.2	0.6	0.0	1.2	0.7	24
20	1.3	0.4	1.0	0.4	0.1	0.5	0.6	0.6	0.4	0.7	S	0.7	1.1	1.1	0.4	0.6	0.5	0.9	0.8	0.7	1.0	0.9	0.6	0.6	0.1	1.3	0.7	24
21	0.6	0.6	0.7	0.6	0.9	0.6	1.1	1.1	0.8	S	1.1	0.9	1.7	1.2	0.6	1.8	0.4	0.3	0.8	0.3	0.7	0.6	0.5	0.4	0.3	1.8	0.8	24
22	0.5	0.3	0.5	0.4	0.4	0.4	0.3	0.5	S	0.6	0.4	0.3	0.5	0.6	0.6	0.4	0.3	0.4	0.5	0.6	0.2	0.2	0.3	0.2	0.2	0.6	0.4	24
23	0.2	0.4	0.3	0.5	0.4	0.3	0.4	S	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.7	0.5	0.6	0.4	0.4	0.5	0.4	0.3	0.4	0.2	0.7	0.4	24
24	0.4	0.3	0.5	0.5	0.5	S	0.4	0.3	0.5	0.4	0.2	0.6	0.6	0.4	0.5	0.3	0.4	0.6	0.6	0.8	0.7	0.3	0.5	0.2	0.8	0.5	24	
25	0.6	0.6	0.5	0.5	0.5	S	0.8	1.2	1.2	0.9	1.0	1.1	1.7	1.1	1.4	1.0	0.8	0.9	1.0	0.6	0.5	0.7	0.5	0.5	0.5	1.7	0.9	24
26	0.5	0.7	0.4	0.4	S	0.3	0.6	0.5	0.6	1.3	1.5	0.8	0.9	1.1	0.8	0.6	0.8	0.9	0.5	0.4	0.9	0.7	0.8	0.8	0.3	1.5	0.7	24
27	0.8	0.6	0.7	S	0.8	0.7	0.6	0.9	0.8	0.9	0.8	0.8	0.8	0.4	0.8	0.8	0.7	0.9	0.8	0.4	0.9	0.8	0.8	0.7	0.4	0.9	0.7	24
28	0.8	0.8	S	0.9	0.8	0.8	0.9	0.9	0.8	0.9	0.9	0.5	0.4	0.5	0.5	0.5	0.6	0.6	0.7	0.6	0.5	0.5	0.5	0.6	0.4	0.9	0.7	24
29	0.5	S	0.4	0.4	0.4	0.3	0.7	0.6	0.4	0.3	0.6	0.4	0.3	0.4	0.5	0.8	0.6	0.9	1.2	0.6	0.7	0.4	0.4	0.3	0.3	1.2	0.5	24
30	S	1.0	1.0	1.6	0.4	0.4	0.4	0.1	0.7	0.8	0.4	0.3	0.6	0.5	0.5	0.6	0.2	0.6	0.5	0.5	0.6	0.4	0.6	S	0.1	1.6	0.6	24
HOURLY MAX	2.2	2.0	3.8	3.4	5.9	5.2	6.9	6.4	6.5	3.5	7.7	4.1	2.0	2.1	5.3	3.6	3.6	3.8	3.3	4.6	6.2	3.8	2.5	2.1				
HOURLY AVG	1.1	1.1	1.2	1.2	1.3	1.3	1.5	1.5	1.6	1.3	1.5	1.4	1.2	1.2	1.3	1.3	1.2	1.4	1.4	1.4	1.5	1.2	1.1	1.0				

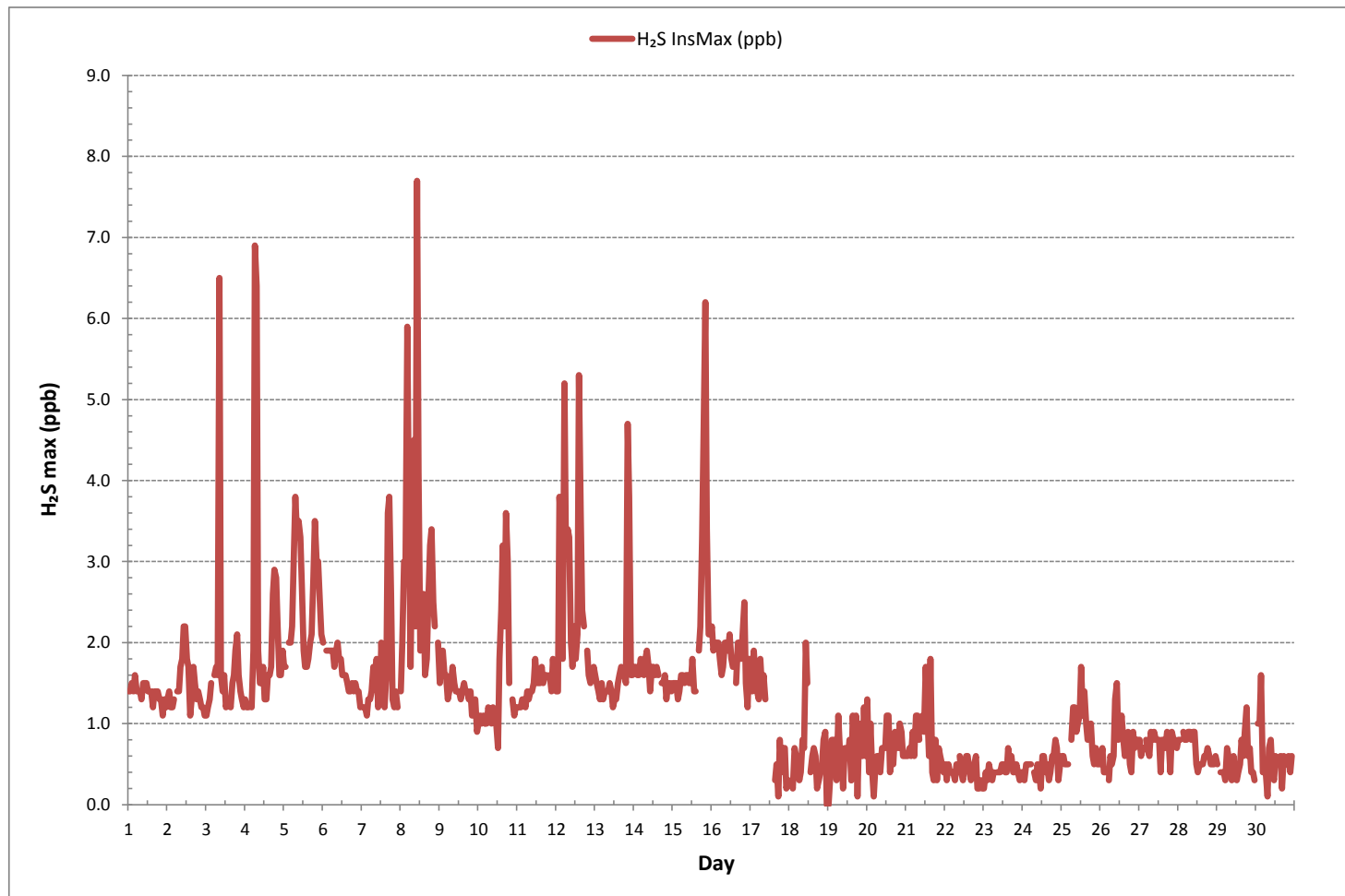
STATUS FLAG CODES

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:	681
MAXIMUM INSTANTANEOUS VALUE:	7.7 ppb @ HOUR(S) 10 ON DAY(S) 8
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	0.9
OPERATIONAL TIME:	719 hrs

HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)



Wind: LICA Bonnyville Poll.: LICA Bonnyville-H2S[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.86% Calm Avg: 0.00 [ppb]

Direction	0.0-0.7	0.7-1.5	1.5-2.2	>2.2	Total
N	4.25	1.02	0	0	5.27
NE	9.66	0.73	0.29	0	10.68
E	11.57	1.76	0.29	0	13.62
SE	15.96	0.44	0	0	16.4
S	6.15	0	0	0	6.15
SW	19.03	0.29	0	0	19.32
W	15.96	0.15	0.15	0	16.26
NW	12.01	0.29	0	0	12.3
Summary	94.59	4.68	0.73	0	100

% Icon Classes (ppb)

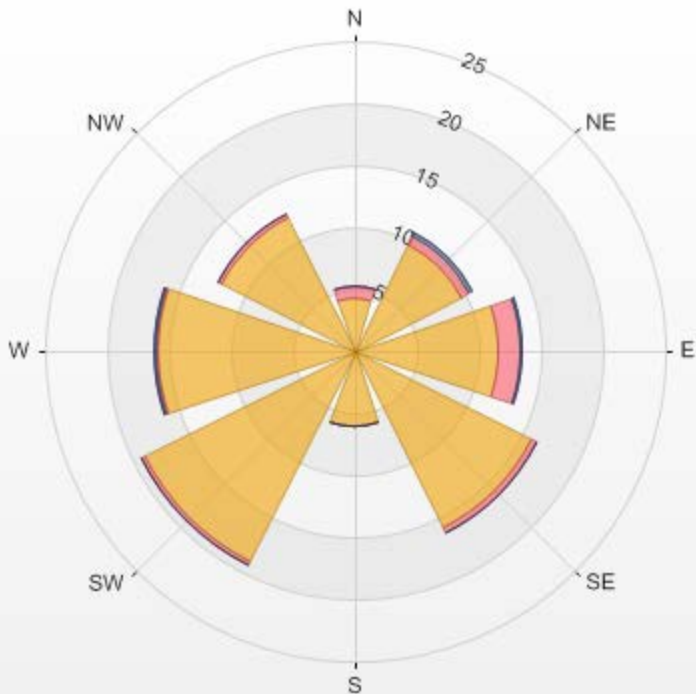
95 0.0-0.7

5 0.7-1.5

1 1.5-2.2

0 >2.2

LICA Bonnyville Poll.: LICA Bonnyville-H2S[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



H2S[ppb] Calibration: LICA Bonnyville Monthly: 2016/11 Type: Span



Span Meas Span Ref Span Low Span High

TOTAL HYDROCARBON

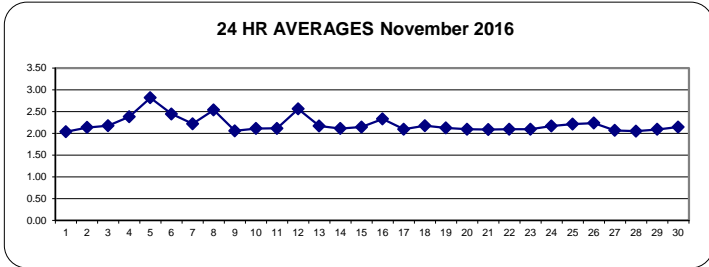


TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (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-HR AVG.	RDGS.	
HR END (MST)	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	2.07	2.09	2.06	2.04	2.06	2.04	S	2.04	2.05	2.02	2.02	2.02	2.02	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.02	2.05	2.19	2.06	2.01	2.19	2.04	24	
2	2.01	2.01	2.04	2.09	2.14	S	2.04	2.04	2.04	2.17	2.07	2.10	2.11	2.19	2.25	2.23	2.28	2.30	2.25	2.18	2.16	2.16	2.14	2.14	2.01	2.30	2.14	24	
3	2.11	2.11	2.15	2.24	S	2.26	2.32	2.33	2.43	2.24	2.28	2.20	2.13	2.09	2.05	2.04	2.07	2.18	2.23	2.33	2.16	2.06	2.04	2.03	2.03	2.43	2.18	24	
4	2.07	2.03	2.05	S	2.09	2.19	2.34	2.31	2.42	2.52	2.34	2.35	2.33	2.28	2.30	2.30	2.52	2.62	2.76	2.67	2.69	2.53	2.47	2.69	2.03	2.76	2.39	24	
5	2.58	2.83	S	2.82	2.78	3.23	2.97	3.49	3.02	2.91	2.68	2.49	2.34	2.26	2.24	2.22	2.56	2.56	2.74	3.26	3.25	3.55	3.10	3.00	2.22	3.55	2.82	24	
6	3.03	S	3.02	3.29	3.18	3.03	2.70	2.54	2.74	2.66	2.50	2.30	2.35	2.23	2.17	2.09	2.06	2.05	2.08	2.07	2.06	2.03	2.05	2.06	2.03	3.29	2.45	24	
7	S	2.05	2.04	2.04	2.06	2.13	2.18	2.26	2.20	2.14	2.13	2.13	2.23	2.17	2.26	2.52	2.56	2.35	2.38	2.24	2.27	2.17	2.36	S	2.04	2.56	2.22	24	
8	2.19	2.44	2.42	2.51	2.63	2.56	2.73	3.13	2.49	2.54	2.52	2.47	2.27	2.18	2.25	2.29	2.41	2.46	2.85	3.11	2.66	2.84	S	2.44	2.18	3.13	2.54	24	
9	2.31	2.34	2.21	2.12	2.11	2.10	2.15	2.09	2.08	2.03	2.00	1.99	1.98	1.97	1.97	1.97	1.97	1.98	1.99	1.98	1.99	2.00	S	2.00	1.99	1.97	2.34	2.06	24
10	2.01	2.02	2.02	2.03	2.01	2.00	2.03	2.06	2.05	2.05	2.05	2.03	2.01	2.03	2.08	2.13	2.18	2.44	2.34	2.26	S	2.24	2.29	2.24	2.00	2.44	2.11	24	
11	2.20	2.20	2.15	2.11	2.09	2.07	2.07	2.05	2.07	2.10	2.12	2.14	2.02	2.02	2.03	2.04	2.06	2.08	2.13	S	2.14	2.16	2.45	2.18	2.02	2.45	2.12	24	
12	2.13	2.19	2.35	2.24	2.63	2.34	3.06	2.81	3.12	2.58	2.37	2.39	2.65	2.49	2.72	3.16	2.49	2.61	S	2.96	2.68	2.41	2.32	2.22	2.13	3.16	2.56	24	
13	2.15	2.11	2.09	2.07	2.06	2.06	2.05	2.04	2.02	2.05	2.05	2.04	2.00	2.04	2.05	2.05	2.08	S	2.30	2.35	2.68	2.42	2.48	2.64	2.00	2.68	2.17	24	
14	2.58	2.32	2.51	2.38	2.38	2.35	2.28	2.10	2.08	2.06	2.01	1.97	1.96	1.96	1.95	1.95	S	1.95	1.96	1.96	1.97	1.97	1.97	1.97	1.95	2.58	2.11	24	
15	1.97	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.99	1.99	S	2.09	2.14	2.55	2.59	2.23	2.85	2.54	2.67	1.97	2.85	2.15	24	
16	2.75	2.64	2.98	3.04	2.74	2.31	2.28	2.22	2.22	2.27	2.32	2.25	2.11	2.05	S	2.11	2.26	2.17	2.12	2.17	2.12	2.14	2.15	2.22	2.05	3.04	2.33	24	
17	2.33	2.30	2.15	2.10	2.16	2.18	2.10	2.03	1.99	2.02	2.02	2.05	2.07	S	2.03	2.05	2.02	2.03	2.06	2.10	2.15	2.16	2.10	2.02	1.99	2.33	2.10	24	
18	2.01	2.03	2.11	2.39	2.55	2.43	2.15	2.12	2.15	C	C	C	C	2.14	2.11	2.13	2.11	2.08	2.15	2.13	2.22	2.19	2.18	2.16	2.01	2.55	2.18	24	
19	2.27	2.29	2.29	2.26	2.30	2.26	2.20	2.19	2.17	2.13	2.11	S	2.05	2.02	2.02	2.03	2.05	2.04	2.03	2.05	2.02	2.04	2.04	2.02	2.02	2.30	2.13	24	
20	2.02	2.02	2.03	2.03	2.03	2.03	2.04	2.05	2.08	2.31	S	2.12	2.09	2.09	2.10	2.10	2.08	2.14	2.16	2.11	2.15	2.15	2.11	2.12	2.02	2.31	2.09	24	
21	2.12	2.08	2.10	2.05	2.05	2.05	2.25	2.10	2.16	S	2.06	2.08	2.09	2.08	2.06	2.06	2.04	2.06	2.09	2.10	2.08	2.08	2.09	2.09	2.04	2.25	2.09	24	
22	2.12	2.15	2.12	2.17	2.16	2.12	2.12	2.09	S	2.08	2.08	2.05	2.05	2.03	2.05	2.06	2.06	2.05	2.05	2.11	2.03	2.06	2.18	2.26	2.03	2.26	2.10	24	
23	2.19	2.11	2.12	2.12	2.11	2.12	2.13	S	2.14	2.11	2.10	2.10	2.08	2.05	2.04	2.05	2.06	2.07	2.09	2.08	2.07	2.07	2.07	2.09	2.04	2.19	2.09	24	
24	2.10	2.11	2.14	2.19	2.20	2.18	S	2.07	2.07	2.08	2.08	2.08	2.11	2.11	2.15	2.16	2.17	2.23	2.27	2.37	2.29	2.30	2.25	2.22	2.07	2.37	2.17	24	
25	2.29	2.28	2.22	2.20	2.24	S	2.24	2.29	2.26	2.21	2.21	2.24	2.23	2.24	2.21	2.22	2.29	2.16	2.19	2.19	2.16	2.09	2.11	2.15	2.09	2.29	2.21	24	
26	2.14	2.11	2.11	2.11	S	2.14	2.11	2.08	2.21	2.58	2.29	2.33	2.37	2.46	2.51	2.51	2.31	2.18	2.19	2.15	2.12	2.12	2.16	2.16	2.08	2.58	2.24	24	
27	2.12	2.09	2.05	S	2.05	2.06	2.09	2.15	2.19	2.13	2.07	2.06	2.03	2.02	2.03	2.02	2.03	2.05	2.05	2.09	2.07	2.09	2.06	2.03	2.02	2.19	2.07	24	
28	2.02	2.02	S	2.06	2.06	2.09	2.11	2.06	2.05	2.04	2.04	2.05	2.06	2.09	2.08	2.03	2.02	2.03	2.06	2.07	2.07	2.03	2.06	2.05	2.02	2.11	2.05	24	
29	2.03	S	2.04	2.02	2.03	2.09	2.11	2.08	2.15	2.09	2.09	2.06	2.06	2.06	2.10	2.09	2.07	2.08	2.12	2.11	2.20	2.19	2.07	2.21	2.02	2.21	2.09	24	
30	S	2.18	2.24	2.35	2.27	2.09	2.08	2.06	2.05	2.07	2.09	2.09	2.13	2.15	2.17	2.21	2.18	2.17	2.15	2.14	2.14	2.13	2.10	S	2.05	2.35	2.15	24	
HOURLY MAX	3.03	2.83	3.02	3.29	3.18	3.23	3.06	3.49	3.12	2.91	2.68	2.49	2.65	2.49	2.72	3.16	2.56	2.62	2.85	3.26	3.25	3.55	3.10	3.00					
HOURLY AVG	2.21	2.18	2.21	2.25	2.26	2.23	2.25	2.24	2.23	2.22	2.17	2.15	2.13	2.12	2.14	2.17	2.18	2.18	2.22	2.27	2.24	2.25	2.21	2.22					

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



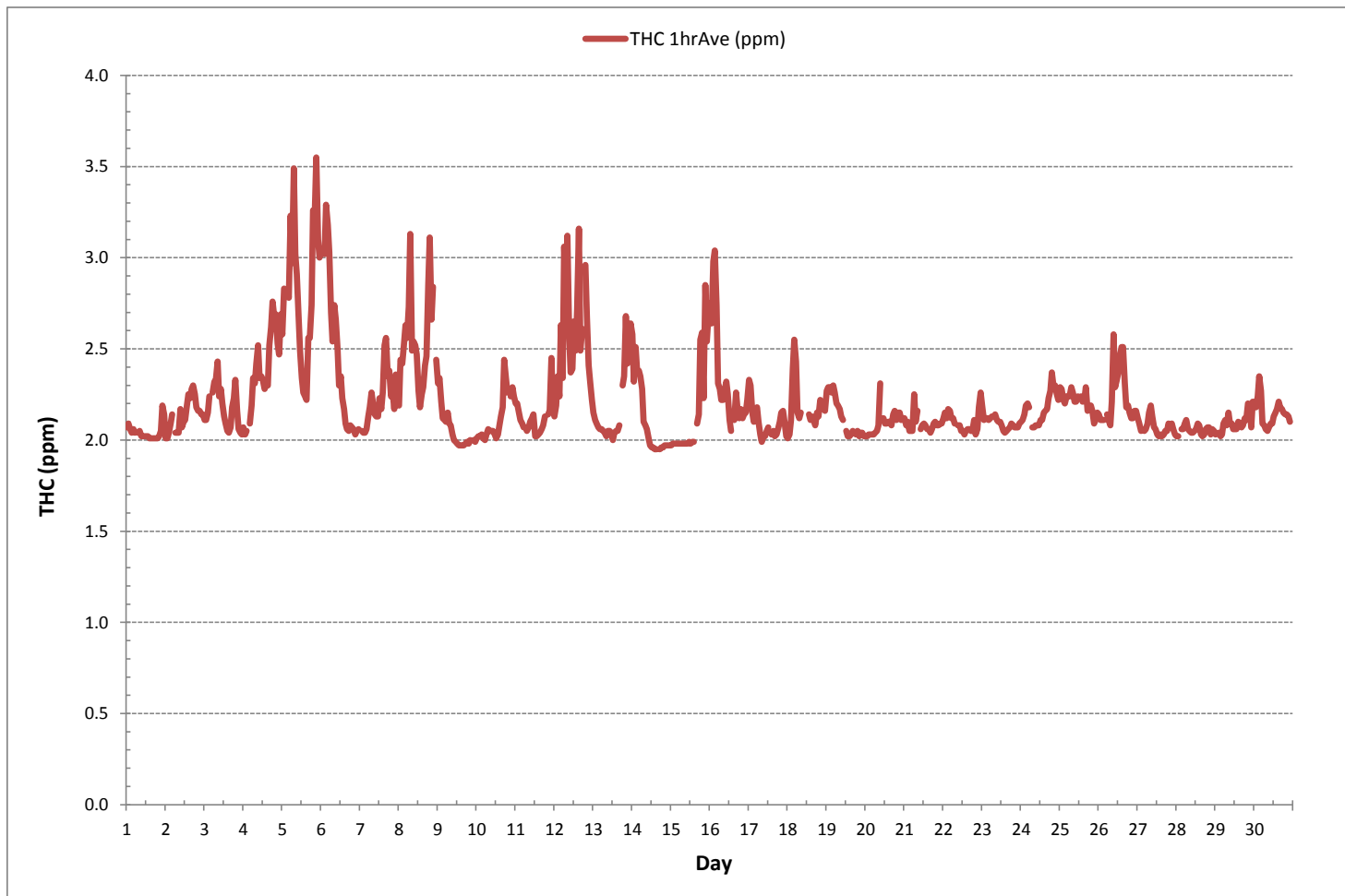
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	685				
MINIMUM 1-HR AVERAGE:	1.95 ppm	@ HOUR(S)	VAR	ON DAY(S)	14
MAXIMUM 1-HR AVERAGE:	3.55 ppm	@ HOUR(S)	21	ON DAY(S)	5
MAXIMUM 24-HR AVERAGE:	2.82 ppm			ON DAY(S)	5
				VAR-VARIOUS	
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:		720 hrs	
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:		100.0 %	
STANDARD DEVIATION:	0.25	MONTHLY AVERAGE:		2.20 ppm	



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

TOTAL HYDROCARBONS Hourly Averages (THC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

HR START (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-HR	RDGS.					
HR END (MST)	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.						
DAY																																	
1	2.11	2.24	2.14	2.13	2.12	2.10	S	2.13	2.08	2.07	2.06	2.10	2.05	2.06	2.03	2.48	2.02	2.02	2.03	2.03	2.05	2.14	2.38	2.13	2.02	2.48	2.12	24					
2	2.05	2.02	2.25	2.15	2.16	S	2.11	2.07	2.15	2.64	2.30	2.43	2.33	2.59	2.33	2.31	2.71	2.37	2.29	2.22	2.17	2.30	2.15	2.15	2.02	2.71	2.27	24					
3	2.13	2.23	2.19	2.44	S	2.50	2.62	2.66	2.89	2.39	2.55	2.41	2.20	2.15	2.06	2.05	2.52	2.53	2.63	2.77	2.19	2.12	2.07	2.08	2.05	2.89	2.36	24					
4	2.25	2.05	2.11	S	2.34	2.38	3.69	3.09	2.73	2.92	2.39	2.45	2.52	2.36	2.40	2.36	4.11	3.58	3.59	3.55	4.70	3.89	3.63	3.90	2.05	4.70	3.00	24					
5	3.53	4.04	S	3.43	4.58	4.93	3.43	4.02	4.40	3.41	3.84	2.94	2.49	2.30	2.29	2.27	3.35	3.34	3.27	3.92	8.97	5.83	3.86	3.27	2.27	8.97	3.81	24					
6	3.71	S	3.33	5.58	4.03	3.60	3.47	2.68	2.93	2.85	2.66	2.32	2.47	2.29	2.24	2.13	2.08	2.18	2.12	2.13	2.09	2.05	2.06	2.12	2.05	5.58	2.74	24					
7	S	2.08	2.06	2.05	2.09	2.26	2.38	2.44	2.33	2.23	2.15	2.16	2.57	2.20	2.69	2.97	3.26	2.55	2.82	2.28	3.11	2.23	3.11	S	2.05	3.26	2.46	24					
8	2.54	3.34	3.30	3.44	3.37	4.66	3.88	4.12	3.01	3.60	3.08	3.23	2.54	2.40	2.44	2.53	3.55	3.56	4.32	4.32	3.20	3.31	S	3.12	2.40	4.66	3.30	24					
9	2.57	2.58	2.35	2.14	2.12	2.15	3.29	2.11	2.10	2.10	2.01	2.01	2.10	2.17	2.07	1.98	2.02	1.99	2.00	2.00	2.01	S	2.02	2.00	1.98	3.29	2.17	24					
10	2.01	2.08	2.03	2.05	2.03	2.01	2.05	2.06	2.30	2.07	2.08	2.04	2.10	2.22	2.39	3.10	2.34	2.84	3.00	3.00	S	2.31	2.33	2.25	2.01	3.10	2.29	24					
11	2.24	2.29	2.27	2.27	2.10	2.10	2.08	2.06	2.08	2.27	2.14	2.92	2.04	2.03	2.15	2.05	2.12	2.10	2.68	S	2.24	2.28	3.11	2.40	2.03	3.11	2.26	24					
12	2.74	2.43	3.71	2.43	3.70	2.91	4.65	4.57	4.48	5.22	2.90	3.18	4.96	3.14	5.78	7.02	3.12	2.76	S	3.12	2.93	2.67	2.36	2.28	2.28	7.02	3.61	24					
13	2.17	2.14	2.10	2.09	2.09	2.08	2.07	2.05	2.05	2.08	2.06	2.13	2.13	2.08	2.14	2.12	2.44	S	3.82	2.83	4.43	2.94	3.23	3.84	2.05	4.43	2.48	24					
14	3.99	2.35	5.75	4.52	2.48	2.50	4.97	2.19	2.15	2.14	2.11	1.99	2.12	2.10	1.96	1.96	S	1.96	1.97	1.97	1.98	1.97	1.98	1.98	1.98	1.96	5.75	2.57	24				
15	1.98	1.99	1.99	1.99	1.98	1.99	1.99	1.99	2.00	1.99	1.99	2.07	2.00	1.99	2.11	S	2.24	2.24	2.94	3.01	2.60	3.13	2.71	3.01	1.98	3.13	2.26	24					
16	3.10	2.95	3.15	3.22	3.13	2.57	2.35	2.25	2.45	2.46	2.50	2.34	2.17	2.22	S	2.14	2.51	2.40	2.20	2.31	2.15	2.71	2.56	2.43	2.14	3.22	2.53	24					
17	2.46	2.95	2.25	2.15	2.26	2.25	2.25	2.10	2.04	2.10	2.09	2.08	2.75	S	2.06	2.43	2.04	2.41	2.08	2.14	2.28	2.18	2.29	2.03	2.03	2.25	2.25	24					
18	P	2.04	2.23	2.60	2.68	2.56	2.35	2.39	2.23	C	C	C	C	C	C	2.33	2.25	2.31	2.19	2.26	2.38	2.40	2.34	2.48	2.37	2.04	2.68	2.36	23				
19	2.50	2.59	2.45	2.40	2.58	2.37	2.37	2.50	2.38	2.26	2.23	S	2.15	2.08	2.08	2.10	2.12	2.12	2.08	2.15	2.04	2.10	2.05	2.04	2.04	2.59	2.25	24					
20	2.04	2.08	2.08	2.08	2.06	2.05	2.19	2.08	2.29	2.55	S	2.57	2.35	2.27	2.35	2.18	2.18	2.28	2.33	2.29	2.29	2.36	2.18	2.31	2.04	2.57	2.24	24					
21	2.28	2.19	2.29	2.13	2.14	2.23	2.66	2.20	2.36	S	2.16	2.19	2.15	2.47	2.23	2.13	2.42	2.16	2.18	2.20	2.17	2.17	2.16	2.33	2.13	2.66	2.24	24					
22	2.19	2.29	2.19	2.50	2.40	2.23	2.50	2.28	S	2.29	2.17	2.34	2.14	2.04	2.17	2.14	2.59	2.32	2.10	2.19	2.09	2.12	2.25	2.35	2.04	2.59	2.26	24					
23	2.31	2.20	2.15	2.19	2.14	2.23	2.15	S	2.18	2.17	2.19	2.21	2.20	2.14	2.07	2.10	2.11	2.09	2.16	2.25	2.19	2.17	2.14	2.17	2.07	2.31	2.17	24					
24	2.10	2.14	2.15	2.22	2.23	2.19	S	2.16	2.08	2.09	2.09	2.09	2.22	2.30	2.30	2.30	2.28	2.43	2.54	2.66	2.50	2.50	2.44	2.36	2.08	2.66	2.28	24					
25	2.34	3.19	2.50	2.42	2.44	S	2.38	3.07	3.06	2.47	2.30	2.34	2.28	2.36	2.45	2.28	2.43	2.31	2.22	2.27	2.20	2.10	2.15	2.16	2.10	3.19	2.42	24					
26	2.23	2.15	2.17	2.15	S	2.24	2.13	2.15	2.51	6.22	2.93	2.75	2.50	2.70	2.69	2.70	2.50	2.56	2.24	2.23	2.19	2.18	2.24	2.23	2.13	6.22	2.55	24					
27	2.20	2.14	2.12	S	2.09	2.13	2.27	3.11	2.51	2.27	2.15	2.27	2.12	2.12	2.15	2.21	2.11	2.15	2.13	2.52	2.25	2.15	2.09	2.06	2.06	3.11	2.23	24					
28	2.08	2.06	S	2.12	2.08	2.16	2.43	2.13	2.13	2.11	2.05	2.21	2.20	2.18	2.37	2.10	2.10	2.05	2.07	2.08	3.21	2.08	2.11	2.16	2.05	3.21	2.19	24					
29	3.42	S	2.10	2.07	2.09	2.17	2.17	2.10	2.72	2.31	2.18	2.20	2.14	2.09	2.84	2.11	2.09	2.11	2.23	2.20	2.41	2.42	2.13	2.89	2.07	3.42	2.31	24					
30	S	2.67	2.48	2.99	3.19	2.10	2.09	2.09	2.08	2.12	2.10	2.20	2.25	2.21	2.28	2.41	2.18	2.32	2.15	2.15	2.15	2.14	2.10	S	2.08	3.19	2.29	24					
HOURLY MAX	3.99	4.04	5.75	5.58	4.58	4.93	4.97	4.57	4.48	6.22	3.84	3.23	4.96	3.14	5.78	7.02	4.11	3.58	3.82	4.32	8.97	5.83	3.86	3.90									
HOURLY AVG	2.49	2.41	2.50	2.57	2.53	2.49	2.68	2.51	2.51	2.62	2.34	2.36	2.35	2.26	2.39	2.45	2.48	2.41	2.47	2.52	2.73	2.51	2.43	2.44									

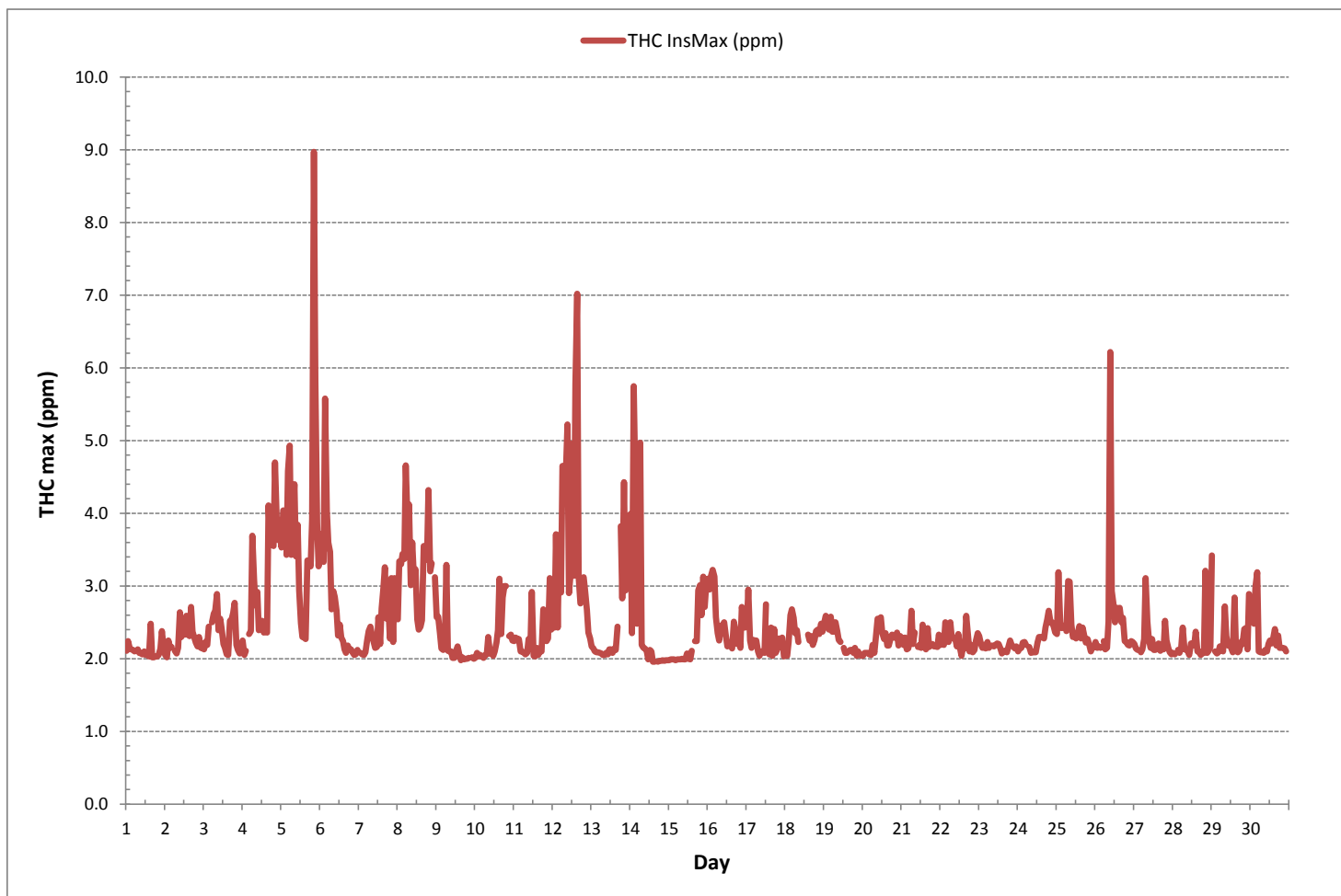
STATUS FLAG CODES

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:	683
MAXIMUM INSTANTANEOUS VALUE:	8.97 ppm @ HOUR(S) 20 ON DAY(S) 5
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	719 hrs
STANDARD DEVIATION:	0.68

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

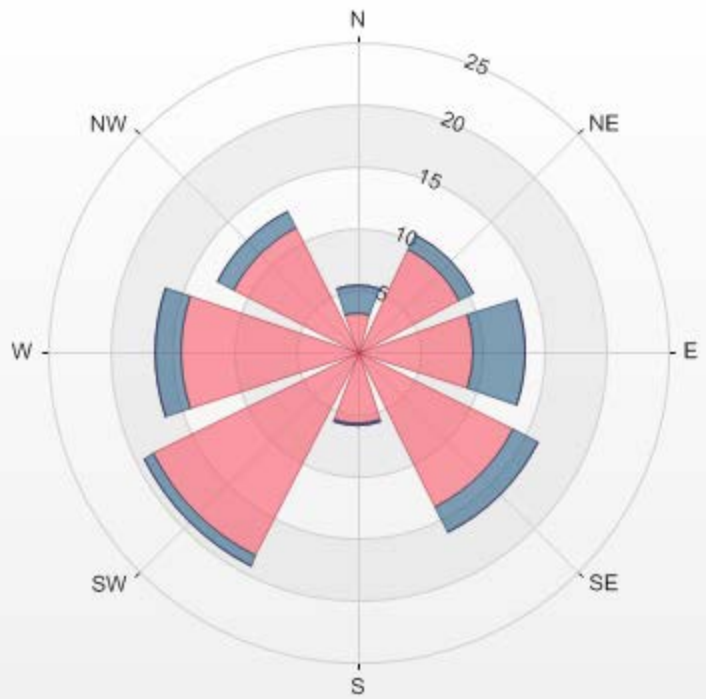


Wind: LICA Bonnyville Poll.: LICA Bonnyville-THC55[ppm] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.86% Calm Avg: 0.00 [ppm]

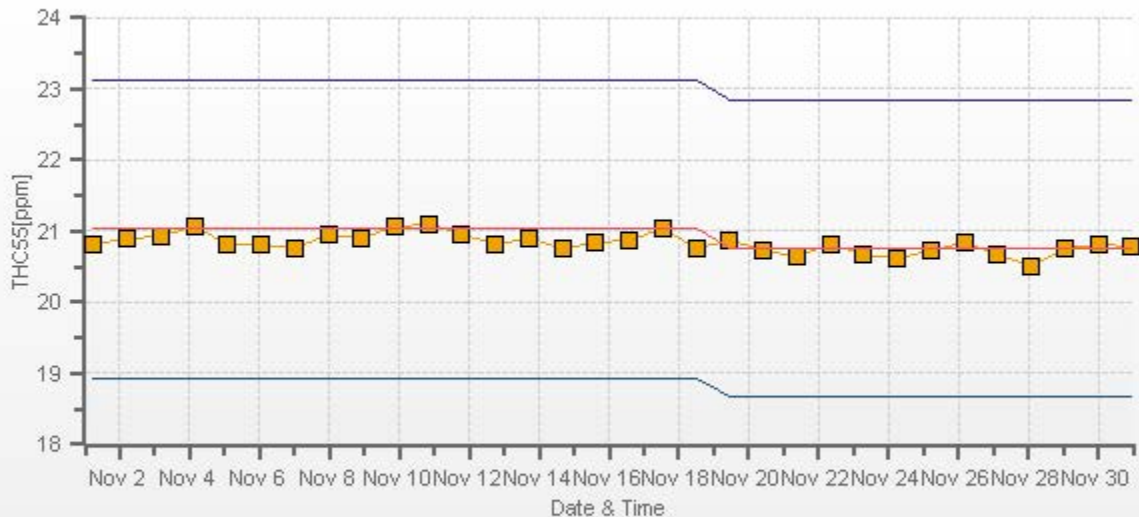
Direction	0.0-1.2	1.2-2.4	2.4-3.6	>3.6	Total
N	0	3.07	2.34	0	5.41
NE	0	9.22	1.32	0	10.54
E	0	9.37	4.1	0	13.47
SE	0	14.06	2.2	0	16.26
S	0	5.86	0.15	0	6.01
SW	0	18.45	0.88	0	19.33
W	0	14.35	2.05	0	16.4
NW	0	11.27	1.32	0	12.59
Summary	0	85.65	14.36	0	100

% Icon Classes (ppm)	0	0.0-1.2	86	1.2-2.4	14	2.4-3.6	0	>3.6
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LICA Bonnyville Poll.: LICA Bonnyville-THC55[ppm] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



THC55[ppm] Calibration: LICA Bonnyville Monthly: 2016/11 Type: Span



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

METHANE

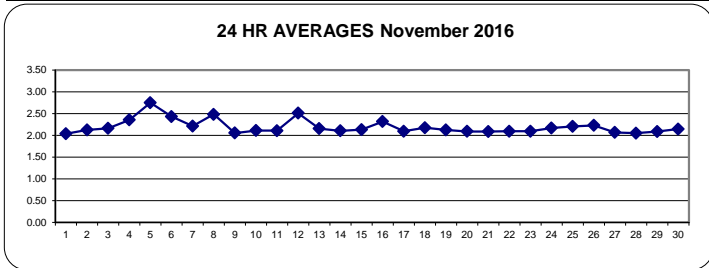


METHANE Hourly Averages (CH₄ ppm)

HR START (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-HR AVG.	RDGS.
HR END (MST)	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	2.07	2.09	2.06	2.04	2.06	2.04	S	2.04	2.05	2.02	2.02	2.02	2.02	2.02	2.01	2.01	2.01	2.01	2.01	2.01	2.02	2.05	2.19	2.06	2.01	2.19	2.04	24
2	2.01	2.01	2.04	2.09	2.14	S	2.04	2.04	2.04	2.06	2.07	2.09	2.10	2.18	2.25	2.22	2.27	2.30	2.25	2.18	2.16	2.16	2.14	2.14	2.01	2.30	2.13	24
3	2.11	2.11	2.15	2.24	S	2.26	2.32	2.32	2.32	2.23	2.28	2.20	2.13	2.08	2.05	2.04	2.06	2.14	2.19	2.27	2.16	2.06	2.04	2.03	2.03	2.32	2.16	24
4	2.07	2.03	2.05	S	2.09	2.19	2.32	2.30	2.40	2.51	2.34	2.35	2.32	2.28	2.30	2.30	2.46	2.48	2.61	2.53	2.63	2.52	2.46	2.65	2.03	2.65	2.36	24
5	2.56	2.78	S	2.79	2.76	3.14	2.92	3.29	2.96	2.86	2.63	2.49	2.34	2.26	2.24	2.22	2.42	2.51	2.61	3.06	3.14	3.38	3.02	2.93	2.22	3.38	2.75	24
6	2.98	S	2.97	3.20	3.15	3.01	2.69	2.53	2.73	2.65	2.50	2.30	2.35	2.23	2.17	2.09	2.06	2.05	2.08	2.07	2.06	2.03	2.05	2.06	2.03	3.20	2.44	24
7	S	2.05	2.04	2.04	2.06	2.13	2.18	2.24	2.19	2.14	2.13	2.13	2.23	2.17	2.26	2.50	2.48	2.33	2.37	2.24	2.26	2.17	2.35	S	2.04	2.50	2.21	24
8	2.19	2.43	2.41	2.50	2.60	2.55	2.68	2.96	2.48	2.51	2.50	2.44	2.26	2.18	2.25	2.27	2.40	2.42	2.59	2.83	2.62	2.69	S	2.42	2.18	2.96	2.49	24
9	2.31	2.34	2.21	2.12	2.11	2.10	2.14	2.09	2.08	2.03	2.00	1.99	1.97	1.97	1.97	1.97	1.97	1.98	1.99	1.98	2.00	S	2.00	1.99	1.97	2.34	2.06	24
10	2.01	2.02	2.02	2.03	2.01	2.00	2.03	2.06	2.05	2.05	2.05	2.03	2.01	2.03	2.07	2.12	2.18	2.44	2.34	2.26	S	2.24	2.29	2.24	2.00	2.44	2.11	24
11	2.20	2.19	2.15	2.11	2.09	2.07	2.07	2.05	2.07	2.10	2.12	2.13	2.02	2.02	2.03	2.04	2.06	2.08	2.12	S	2.13	2.14	2.35	2.16	2.02	2.35	2.11	24
12	2.13	2.19	2.33	2.23	2.58	2.32	3.00	2.78	3.07	2.56	2.37	2.38	2.61	2.47	2.68	2.50	2.45	2.57	S	2.94	2.67	2.40	2.32	2.22	2.13	3.07	2.51	24
13	2.15	2.11	2.09	2.07	2.06	2.06	2.05	2.04	2.02	2.05	2.05	2.04	2.00	2.03	2.05	2.04	2.07	S	2.26	2.33	2.60	2.39	2.44	2.59	2.00	2.60	2.16	24
14	2.55	2.32	2.48	2.37	2.37	2.35	2.27	2.09	2.08	2.06	2.01	1.97	1.95	1.95	1.95	1.95	S	1.95	1.96	1.96	1.97	1.97	1.97	1.97	1.95	2.55	2.11	24
15	1.97	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.99	1.98	1.99	1.99	S	2.09	2.14	2.41	2.42	2.22	2.85	2.54	2.64	1.97	2.85	2.13	24
16	2.72	2.62	2.95	3.02	2.73	2.31	2.28	2.22	2.21	2.25	2.32	2.25	2.11	2.04	S	2.11	2.23	2.16	2.12	2.16	2.12	2.09	2.13	2.22	2.04	3.02	2.32	24
17	2.33	2.30	2.15	2.10	2.16	2.18	2.10	2.03	1.99	2.02	2.02	2.05	2.07	S	2.03	2.03	2.02	2.02	2.06	2.10	2.15	2.16	2.10	2.02	1.99	2.33	2.10	24
18	2.01	2.03	2.11	2.39	2.55	2.43	2.15	2.12	2.15	C	C	C	C	2.14	2.11	2.13	2.11	2.08	2.15	2.13	2.22	2.19	2.18	2.16	2.01	2.55	2.18	24
19	2.27	2.29	2.29	2.26	2.30	2.26	2.20	2.19	2.17	2.13	2.11	S	2.05	2.02	2.02	2.03	2.05	2.04	2.03	2.05	2.02	2.04	2.04	2.02	2.02	2.30	2.13	24
20	2.02	2.02	2.03	2.03	2.03	2.03	2.04	2.05	2.08	2.31	S	2.12	2.09	2.09	2.09	2.10	2.08	2.14	2.16	2.11	2.15	2.15	2.11	2.12	2.02	2.31	2.09	24
21	2.12	2.08	2.10	2.04	2.05	2.05	2.25	2.10	2.15	S	2.06	2.08	2.09	2.08	2.06	2.06	2.04	2.06	2.09	2.10	2.08	2.08	2.09	2.09	2.04	2.25	2.09	24
22	2.12	2.15	2.12	2.17	2.16	2.12	2.09	2.09	S	2.08	2.08	2.05	2.05	2.03	2.05	2.06	2.06	2.05	2.05	2.11	2.03	2.06	2.18	2.26	2.03	2.26	2.10	24
23	2.19	2.11	2.12	2.12	2.11	2.12	2.13	S	2.14	2.11	2.10	2.10	2.08	2.05	2.04	2.05	2.06	2.07	2.09	2.08	2.07	2.07	2.07	2.09	2.04	2.19	2.09	24
24	2.10	2.11	2.14	2.19	2.20	2.18	S	2.07	2.07	2.08	2.08	2.08	2.11	2.11	2.15	2.16	2.16	2.23	2.27	2.37	2.29	2.30	2.25	2.22	2.07	2.37	2.17	24
25	2.29	2.28	2.22	2.20	2.24	S	2.23	2.24	2.25	2.21	2.21	2.24	2.23	2.24	2.20	2.22	2.29	2.16	2.19	2.19	2.16	2.09	2.11	2.15	2.09	2.29	2.21	24
26	2.14	2.11	2.11	2.11	S	2.14	2.11	2.08	2.20	2.52	2.28	2.32	2.37	2.45	2.49	2.50	2.30	2.17	2.19	2.15	2.12	2.12	2.16	2.16	2.08	2.52	2.23	24
27	2.12	2.09	2.05	S	2.05	2.06	2.09	2.15	2.19	2.13	2.07	2.06	2.03	2.02	2.03	2.02	2.03	2.05	2.05	2.09	2.07	2.09	2.06	2.03	2.02	2.19	2.07	24
28	2.02	2.02	S	2.06	2.06	2.09	2.11	2.06	2.05	2.04	2.04	2.05	2.05	2.09	2.08	2.03	2.02	2.03	2.06	2.07	2.07	2.03	2.06	2.05	2.02	2.11	2.05	24
29	2.03	S	2.04	2.02	2.03	2.09	2.11	2.08	2.09	2.09	2.05	2.05	2.06	2.06	2.08	2.09	2.07	2.08	2.12	2.11	2.19	2.19	2.07	2.21	2.02	2.21	2.09	24
30	S	2.18	2.24	2.35	2.27	2.09	2.08	2.06	2.05	2.07	2.09	2.09	2.13	2.15	2.17	2.20	2.18	2.16	2.15	2.14	2.14	2.13	2.10	S	2.05	2.35	2.15	24
HOURLY MAX	2.98	2.78	2.97	3.20	3.15	3.14	3.00	3.29	3.07	2.86	2.63	2.49	2.61	2.47	2.68	2.50	2.48	2.57	2.61	3.06	3.14	3.38	3.02	2.93				
HOURLY AVG	2.21	2.18	2.20	2.25	2.25	2.23	2.24	2.22	2.22	2.21	2.16	2.15	2.13	2.12	2.13	2.14	2.16	2.17	2.19	2.24	2.22	2.24	2.20	2.21				

STATUS FLAG CODES

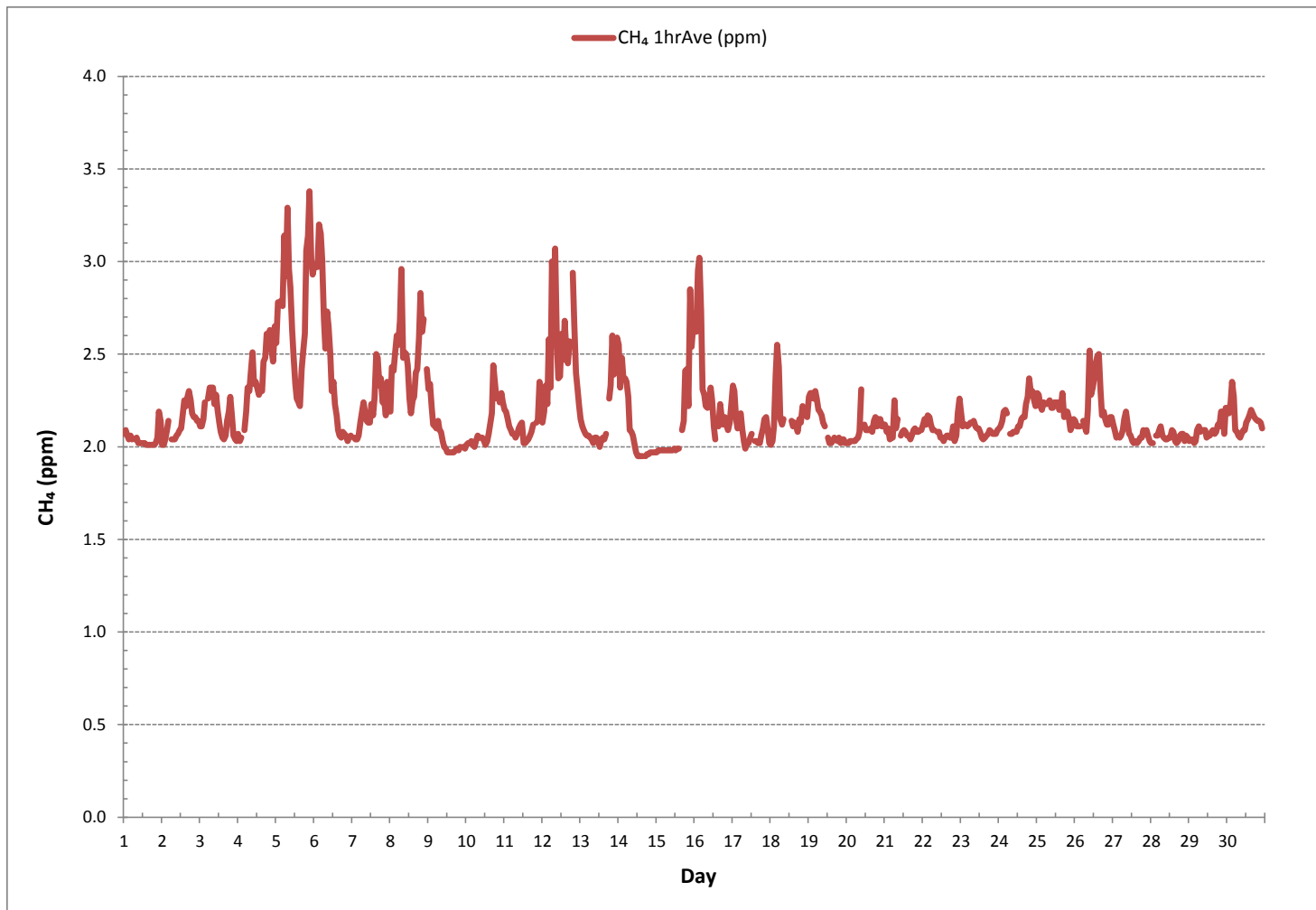
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	685				
MINIMUM 1-HR AVERAGE:	1.95	ppm	@ HOUR(S)	VAR	ON DAY(S) 14
MAXIMUM 1-HR AVERAGE:	3.38	ppm	@ HOUR(S)	21	ON DAY(S) 5
MAXIMUM 24-HR AVERAGE:	2.75	ppm			ON DAY(S) 5
					VAR-VARIOUS
IZS CALIBRATION TIME:	31	hrs		OPERATIONAL TIME:	720 hrs
MONTHLY CALIBRATION TIME:	4	hrs		AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	0.23			MONTHLY AVERAGE:	2.19 ppm

METHANE Hourly Averages (CH₄ ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

METHANE MAX Instantaneous Maximum (CH₄ ppm)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY 1	2.12	2.19	2.15	2.14	2.13	2.10	S	2.13	2.09	2.08	2.06	2.09	2.05	2.05	2.03	2.05	2.02	2.02	2.03	2.03	2.05	2.15	2.38	2.14	2.02	2.38	2.10	24
2	2.05	2.03	2.25	2.16	2.17	S	2.12	2.07	2.15	2.20	2.24	2.26	2.33	2.34	2.33	2.25	2.53	2.37	2.30	2.24	2.18	2.18	2.15	2.15	2.03	2.53	2.22	24
3	2.13	2.22	2.19	2.44	S	2.51	2.44	2.66	2.69	2.28	2.34	2.34	2.15	2.13	2.06	2.05	2.11	2.27	2.47	2.55	2.19	2.13	2.08	2.08	2.05	2.69	2.28	24
4	2.26	2.05	2.12	S	2.28	2.33	3.45	2.96	2.63	2.78	2.39	2.39	2.34	2.32	2.35	2.33	3.54	3.40	3.21	3.16	4.30	3.63	3.45	3.65	2.05	4.30	2.84	24
5	3.39	3.84	S	3.31	4.30	4.54	3.28	3.75	4.12	3.25	3.69	2.89	2.48	2.30	2.29	2.27	2.97	3.25	3.08	3.74	8.15	5.42	3.69	3.13	2.27	8.15	3.61	24
6	3.56	S	3.07	5.17	3.90	3.48	3.38	2.68	2.84	2.71	2.64	2.32	2.39	2.30	2.24	2.14	2.08	2.08	2.12	2.14	2.10	2.05	2.06	2.12	2.05	5.17	2.68	24
7	S	2.09	2.06	2.05	2.10	2.16	2.38	2.38	2.22	2.23	2.15	2.14	2.53	2.19	2.56	2.88	3.09	2.40	2.81	2.28	3.00	2.23	2.98	S	2.05	3.09	2.41	24
8	2.54	3.23	3.19	3.31	2.95	4.34	3.70	3.86	2.88	3.40	2.91	2.86	2.36	2.30	2.44	2.52	3.37	3.37	2.95	3.81	3.07	3.12	S	2.87	2.30	4.34	3.10	24
9	2.49	2.56	2.36	2.15	2.13	2.15	3.15	2.11	2.10	2.11	2.01	2.01	2.01	1.98	2.01	1.98	1.98	1.99	2.01	2.00	2.02	S	2.02	2.00	1.98	3.15	2.14	24
10	2.01	2.09	2.03	2.05	2.04	2.01	2.05	2.06	2.07	2.08	2.08	2.04	2.02	2.23	2.36	3.00	2.34	2.84	2.95	2.95	S	2.31	2.33	2.26	2.01	3.00	2.27	24
11	2.24	2.21	2.19	2.13	2.11	2.11	2.08	2.06	2.09	2.27	2.15	2.28	2.04	2.03	2.05	2.06	2.12	2.10	2.64	S	2.14	2.17	2.95	2.23	2.03	2.95	2.19	24
12	2.68	2.43	3.51	2.44	3.51	2.77	4.43	4.28	4.17	4.95	2.87	3.10	4.66	3.06	5.35	3.82	2.94	2.66	S	2.97	2.86	2.47	2.36	2.28	2.28	5.35	3.33	24
13	2.18	2.14	2.11	2.09	2.08	2.09	2.08	2.06	2.08	2.06	2.05	2.04	2.06	2.06	2.06	2.34	S	3.59	2.73	4.14	2.83	3.05	3.64	2.04	4.14	2.42	24	
14	3.77	2.35	5.37	4.22	2.46	2.50	4.65	2.10	2.09	2.08	2.04	1.99	1.96	1.95	1.95	S	1.96	1.97	1.98	1.98	1.98	1.98	1.98	1.98	1.95	5.37	2.49	24
15	1.99	1.99	1.99	2.00	1.99	1.99	1.99	1.99	2.00	1.99	1.99	2.00	2.00	2.00	2.12	S	2.24	2.24	2.71	2.72	2.60	3.08	2.72	2.89	1.99	3.08	2.23	24
16	3.03	2.83	3.03	3.08	2.96	2.57	2.35	2.25	2.44	2.49	2.34	2.18	2.08	S	2.15	2.30	2.26	2.17	2.19	2.15	2.19	2.34	2.29	2.08	3.08	2.43	24	
17	2.46	2.87	2.25	2.16	2.26	2.25	2.26	2.11	2.04	2.10	2.10	2.09	2.66	S	2.06	2.13	2.04	2.04	2.09	2.15	2.28	2.19	2.25	2.03	2.03	2.87	2.21	24
18	P	2.04	2.23	2.60	2.68	2.56	2.35	2.39	2.23	C	C	C	C	C	2.33	2.25	2.31	2.20	2.26	2.38	2.40	2.34	2.48	2.37	2.04	2.68	2.36	23
19	2.50	2.59	2.46	2.41	2.54	2.37	2.37	2.32	2.38	2.26	2.23	S	2.16	2.08	2.08	2.10	2.13	2.13	2.09	2.09	2.04	2.10	2.05	2.04	2.04	2.59	2.24	24
20	2.04	2.09	2.09	2.08	2.06	2.05	2.20	2.09	2.30	2.54	S	2.52	2.35	2.27	2.31	2.18	2.18	2.28	2.33	2.29	2.29	2.36	2.19	2.26	2.04	2.54	2.23	24
21	2.29	2.19	2.29	2.11	2.15	2.24	2.62	2.21	2.35	S	2.16	2.19	2.16	2.46	2.23	2.14	2.38	2.16	2.18	2.20	2.18	2.18	2.16	2.33	2.11	2.62	2.24	24
22	2.20	2.29	2.20	2.51	2.35	2.22	2.29	2.28	S	2.30	2.18	2.35	2.15	2.04	2.18	2.15	2.17	2.21	2.11	2.20	2.10	2.13	2.25	2.30	2.04	2.51	2.22	24
23	2.31	2.20	2.15	2.20	2.15	2.23	2.15	S	2.19	2.18	2.20	2.22	2.21	2.14	2.07	2.11	2.11	2.10	2.17	2.25	2.20	2.17	2.14	2.18	2.07	2.31	2.18	24
24	2.11	2.14	2.16	2.22	2.22	2.20	S	2.14	2.09	2.10	2.09	2.09	2.22	2.30	2.27	2.30	2.28	2.43	2.53	2.55	2.51	2.47	2.44	2.36	2.09	2.55	2.27	24
25	2.34	3.09	2.49	2.42	2.37	S	2.34	2.30	2.91	2.46	2.30	2.34	2.28	2.34	2.39	2.28	2.30	2.31	2.22	2.20	2.20	2.10	2.16	2.17	2.10	3.09	2.36	24
26	2.16	2.12	2.14	2.14	S	2.17	2.14	2.16	2.51	5.77	2.87	2.68	2.49	2.71	2.63	2.65	2.37	2.23	2.24	2.22	2.19	2.19	2.24	2.23	2.12	5.77	2.49	24
27	2.21	2.15	2.13	S	2.09	2.14	2.24	3.03	2.51	2.27	2.16	2.27	2.08	2.05	2.15	2.20	2.12	2.16	2.14	2.52	2.25	2.15	2.10	2.06	2.05	3.03	2.23	24
28	2.08	2.06	S	2.12	2.08	2.17	2.43	2.13	2.13	2.09	2.06	2.06	2.12	2.19	2.37	2.10	2.04	2.05	2.08	2.09	3.08	2.09	2.12	2.16	2.04	3.08	2.17	24
29	3.27	S	2.11	2.07	2.10	2.18	2.18	2.11	2.12	2.31	2.19	2.14	2.14	2.09	2.14	2.12	2.10	2.12	2.22	2.20	2.40	2.42	2.14	2.78	2.07	3.27	2.25	24
30	S	2.67	2.47	2.95	3.09	2.10	2.10	2.10	2.08	2.12	2.11	2.21	2.25	2.21	2.28	2.28	2.19	2.18	2.16	2.15	2.16	2.15	2.11	S	2.08	3.09	2.28	24
HOURLY MAX	3.77	3.84	5.37	5.17	4.30	4.54	4.65	4.28	4.17	5.77	3.69	3.10	4.66	3.06	5.35	3.82	3.54	3.40	3.59	3.81	8.15	5.42	3.69	3.65				
HOURLY AVG	2.46	2.38	2.46	2.53	2.47	2.45	2.61	2.44	2.42	2.55	2.31	2.30	2.30	2.22	2.33	2.29	2.37	2.34	2.41	2.45	2.66	2.45	2.39	2.39				

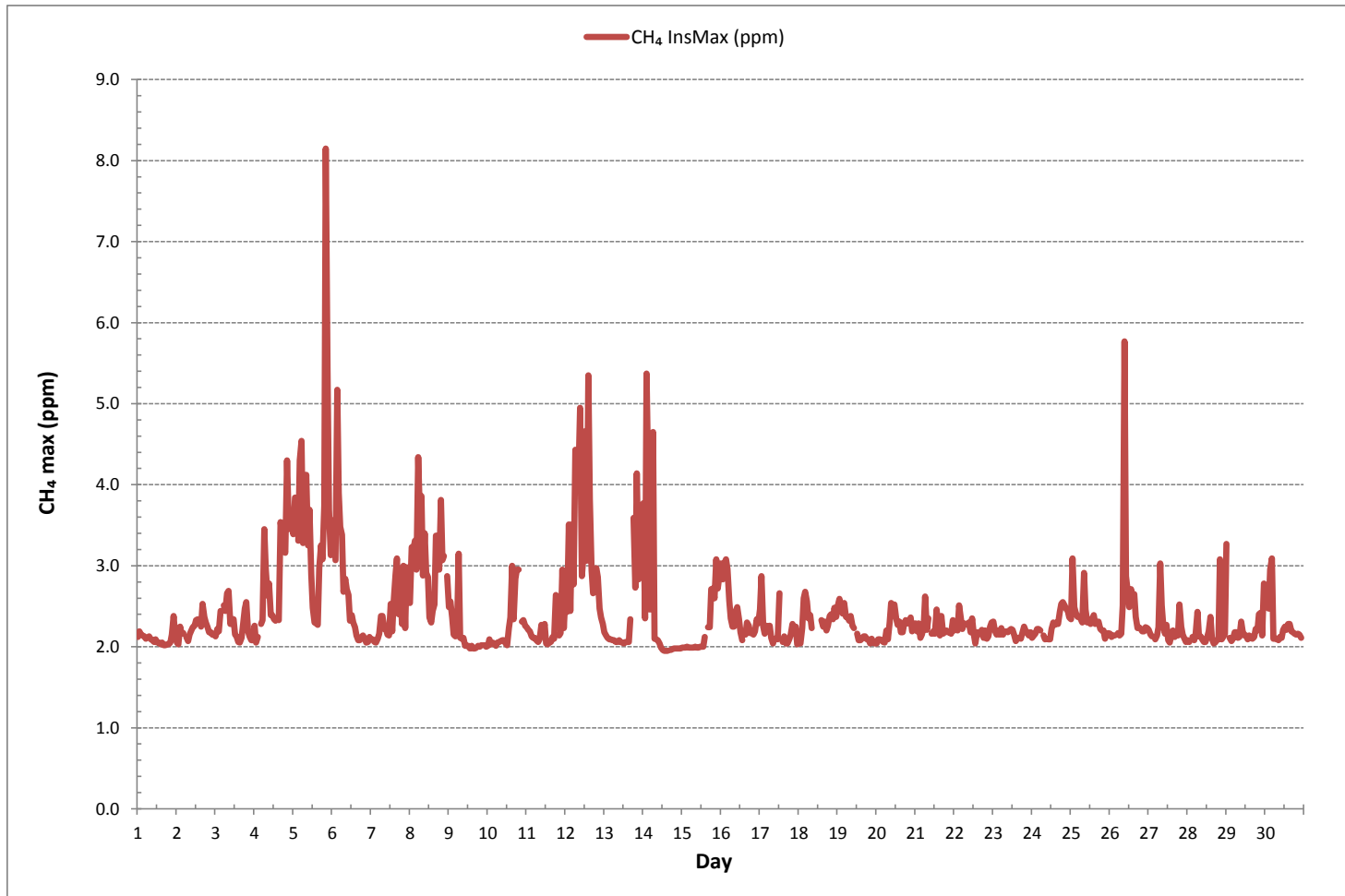
STATUS FLAG CODES

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:	683
MAXIMUM INSTANTANEOUS VALUE:	8.15 ppm @ HOUR(S) 20 ON DAY(S) 5
VAR-VARIOUS	
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	0.58
OPERATIONAL TIME:	719 hrs

METHANE MAX Instantaneous Maximum (CH₄ ppm)

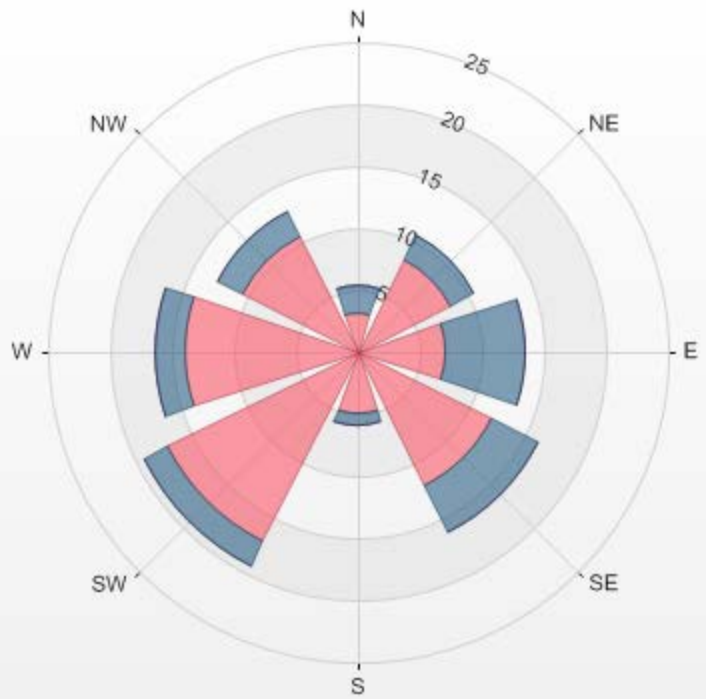


Wind: LICA Bonnyville Poll.: LICA Bonnyville-CH4[ppm] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr
 Calm: 0.00% Valid Data: 94.86% Calm Avg: 0.00 [ppm]

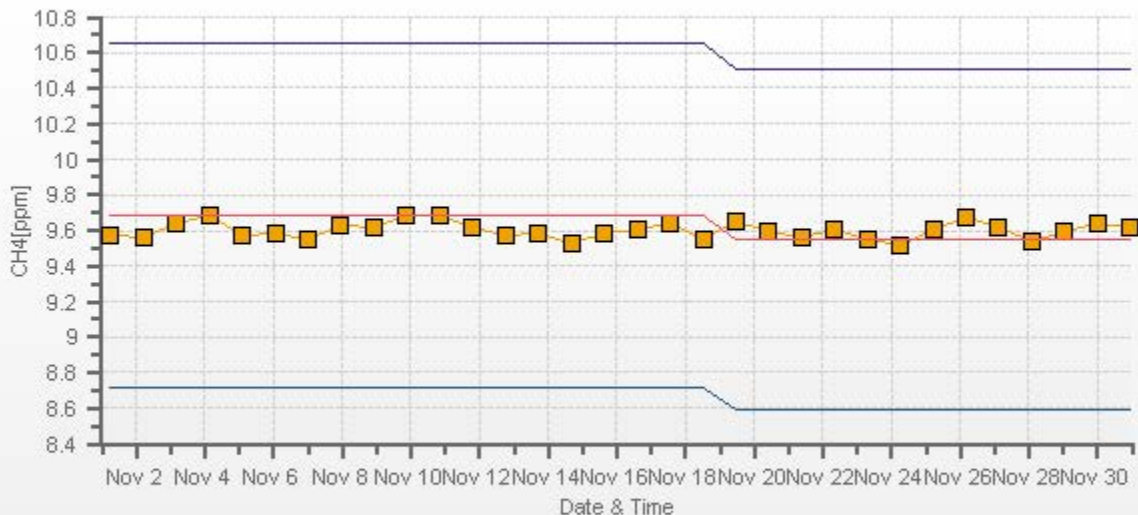
Direction	0.0-1.1	1.1-2.3	2.3-3.4	>3.4	Total
N	0	3.07	2.34	0	5.41
NE	0	8.35	2.2	0	10.55
E	0	7.17	6.3	0	13.47
SE	0	12.15	4.1	0	16.25
S	0	4.98	1.02	0	6
SW	0	17.13	2.2	0	19.33
W	0	13.91	2.49	0	16.4
NW	0	10.4	2.2	0	12.6
Summary	0	77.16	22.85	0	100

% Icon Classes (ppm)	0	0.0-1.1	77	1.1-2.3	23	2.3-3.4	0	>3.4
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LICA Bonnyville Poll.: LICA Bonnyville-CH4[ppm] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



CH4[ppm] Calibration: LICA Bonnyville Monthly: 2016/11 Type: Span



Span Meas Span Ref Span Low Span High

NON-METHANE HYDROCARBON



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

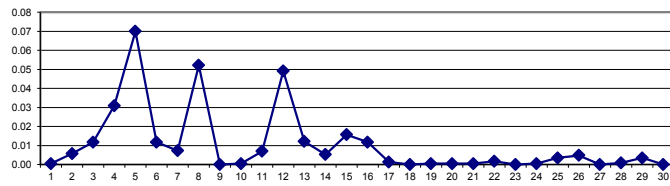
NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY 1	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	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24	
2	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.11	0.00	0.00	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	0.11	0.01	24
3	0.00	0.00	0.00	0.00	S	0.00	0.00	0.01	0.11	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.04	0.03	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.01	24
4	0.00	0.00	0.00	S	0.00	0.00	0.02	0.01	0.02	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.07	0.14	0.15	0.14	0.07	0.02	0.01	0.04	0.00	0.15	0.03	24	
5	0.02	0.05	S	0.03	0.02	0.10	0.05	0.20	0.07	0.05	0.05	0.01	0.00	0.00	0.00	0.14	0.05	0.13	0.20	0.11	0.18	0.08	0.07	0.00	0.20	0.07	24		
6	0.05	S	0.04	0.09	0.03	0.02	0.01	0.00	0.02	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	0.09	0.01	24	
7	S	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.08	0.02	0.01	0.00	0.00	0.00	0.01	S	0.00	0.08	0.01	24	
8	0.00	0.01	0.01	0.01	0.03	0.01	0.04	0.16	0.01	0.03	0.02	0.03	0.01	0.00	0.00	0.02	0.01	0.05	0.26	0.28	0.04	0.15	S	0.02	0.00	0.28	0.05	24	
9	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	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	24	
10	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	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.01	0.00	24	
11	0.00	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	0.00	0.00	0.00	0.00	0.01	S	0.01	0.02	0.10	0.01	0.00	0.10	0.01	24	
12	0.00	0.00	0.02	0.00	0.05	0.02	0.06	0.04	0.05	0.01	0.00	0.01	0.04	0.01	0.04	0.66	0.03	0.05	S	0.02	0.01	0.01	0.00	0.00	0.00	0.66	0.05	24	
13	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	0.00	0.01	S	0.04	0.02	0.08	0.03	0.04	0.05	0.00	0.08	0.01	24		
14	0.04	0.00	0.02	0.01	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.01	0.01	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	24	
15	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	S	0.00	0.00	0.14	0.17	0.01	0.01	0.00	0.03	0.00	0.17	0.02	24	
16	0.03	0.02	0.04	0.02	0.01	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.01	S	0.00	0.03	0.01	0.00	0.00	0.00	0.05	0.02	0.00	0.00	0.05	0.01	24	
17	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	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	24	
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	C	C	C	C	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	24	
19	0.00	0.00	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	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24	
20	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	24	
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	S	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	0.00	24	
22	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	24	
23	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
24	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	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24	
25	0.00	0.00	0.00	0.00	0.00	S	0.01	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	24	
26	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.06	0.01	0.00	0.00	0.00	0.02	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	24	
27	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
28	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	0.01	0.00	24	
29	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.06	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	0.06	0.00	24	
30	S	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	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	24	
HOURLY MAX	0.05	0.05	0.04	0.09	0.05	0.10	0.06	0.20	0.11	0.11	0.05	0.03	0.04	0.01	0.04	0.66	0.14	0.14	0.26	0.28	0.11	0.18	0.10	0.07					
HOURLY AVG	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.01	0.03	0.03	0.01	0.02	0.01	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

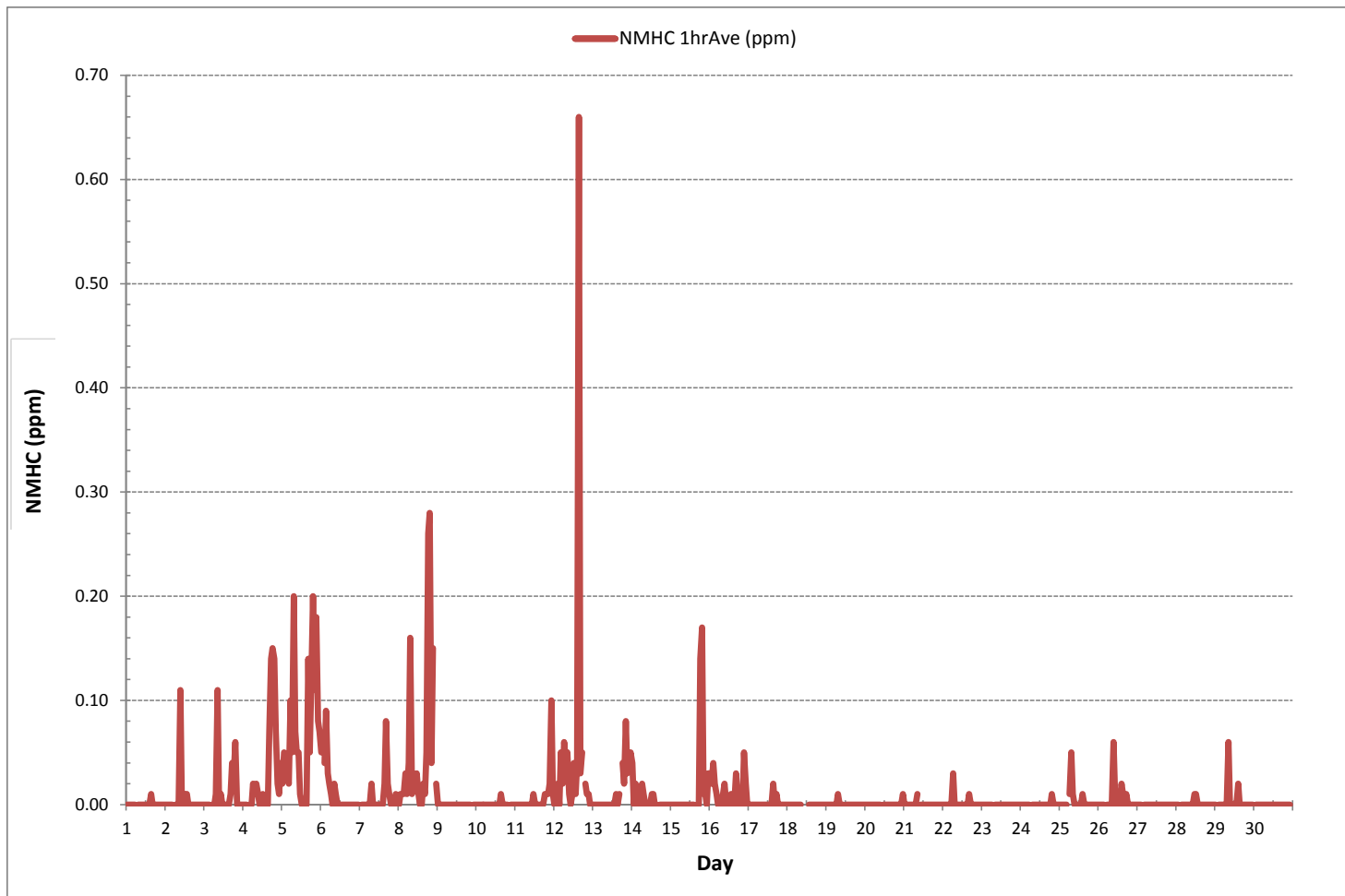
24 HR AVERAGES November 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	154				
MINIMUM 1-HR AVERAGE:	0.00 ppm	@ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	0.66 ppm	@ HOUR(S)	15	ON DAY(S)	12
MAXIMUM 24-HR AVERAGE:	0.07 ppm			ON DAY(S)	5
				VAR-VARIOUS	
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	720 hrs		
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	100.0 %		
STANDARD DEVIATION:	0.04	MONTHLY AVERAGE:	0.01 ppm		

NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)

HR START (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-HR AVG.	RDGS.
DAY																												
1	0.00	0.12	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.09	0.00	0.03	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.03	24
2	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.62	0.10	0.29	0.19	0.36	0.00	0.09	0.19	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.62	0.09	24
3	0.00	0.00	0.00	0.00	S	0.00	0.24	0.10	0.48	0.16	0.26	0.08	0.07	0.09	0.00	0.00	0.45	0.29	0.26	0.23	0.00	0.00	0.00	0.00	0.00	0.48	0.12	24
4	0.00	0.00	0.00	S	0.07	0.11	0.24	0.14	0.11	0.15	0.00	0.12	0.18	0.11	0.07	0.06	0.80	0.31	0.39	0.43	0.40	0.26	0.17	0.25	0.00	0.80	0.19	24
5	0.16	0.21	S	0.17	0.28	0.39	0.24	0.33	0.27	0.25	0.21	0.12	0.00	0.00	0.00	0.00	0.86	0.26	0.37	0.50	0.83	0.42	0.20	0.20	0.00	0.86	0.27	24
6	0.19	S	0.27	0.41	0.17	0.18	0.13	0.12	0.16	0.15	0.11	0.00	0.13	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.09	24
7	S	0.00	0.00	0.00	0.00	0.11	0.12	0.19	0.13	0.11	0.04	0.06	0.09	0.00	0.14	0.19	0.43	0.16	0.19	0.00	0.11	0.00	0.16	S	0.00	0.43	0.10	24
8	0.00	0.12	0.11	0.14	0.42	0.31	0.18	0.39	0.20	0.26	0.17	0.60	0.22	0.23	0.00	0.26	0.18	0.20	0.47	0.52	0.24	0.62	S	0.25	0.00	0.62	0.26	24
9	0.09	0.06	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.10	0.20	0.08	0.00	0.04	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.20	0.03	24
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.08	0.00	0.12	0.27	0.00	0.15	0.06	0.06	S	0.00	0.00	0.00	0.00	0.27	0.04	24
11	0.00	0.10	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.00	0.00	0.14	0.00	0.00	0.00	0.20	S	0.10	0.13	0.25	0.17	0.00	0.65	0.09	24
12	0.06	0.05	0.19	0.12	0.19	0.21	0.22	0.30	0.31	0.28	0.07	0.13	0.31	0.14	0.44	3.83	0.18	0.21	S	0.16	0.13	0.21	0.00	0.01	0.00	3.83	0.34	24
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.13	0.04	0.10	0.09	0.15	S	0.24	0.18	0.29	0.16	0.18	0.20	0.00	0.29	0.08	24
14	0.22	0.00	0.40	0.30	0.15	0.00	0.32	0.12	0.09	0.09	0.09	0.00	0.17	0.16	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.09	24
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	S	0.00	0.00	0.35	0.34	0.24	0.14	0.04	0.22	0.00	0.35	0.06	24
16	0.17	0.17	0.21	0.16	0.20	0.00	0.00	0.00	0.26	0.24	0.11	0.00	0.00	0.18	S	0.00	0.24	0.18	0.10	0.13	0.00	0.63	0.47	0.19	0.00	0.63	0.16	24
17	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	S	0.00	0.40	0.00	0.38	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.40	0.04	24
18	P	0.00	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	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	23
19	0.00	0.00	0.00	0.00	0.04	0.00	0.06	0.30	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.30	0.02	24
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.05	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.06	0.09	0.00	0.21	0.00	0.22	0.03	24
21	0.00	0.00	0.00	0.09	0.00	0.00	0.09	0.00	0.31	S	0.07	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.03	24
22	0.00	0.00	0.00	0.08	0.11	0.00	0.31	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.14	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.45	0.05	24
23	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	0.00	0.00	0.08	0.09	0.00	0.00	0.00	0.09	0.01	24
24	0.00	0.00	0.00	0.00	0.00	0.00	S	0.10	0.00	0.02	0.00	0.00	0.03	0.00	0.06	0.07	0.10	0.10	0.11	0.16	0.00	0.03	0.00	0.00	0.00	0.16	0.03	24
25	0.00	0.11	0.02	0.00	0.12	S	0.12	0.84	0.29	0.08	0.00	0.00	0.00	0.02	0.12	0.04	0.14	0.00	0.10	0.00	0.00	0.00	0.02	0.00	0.00	0.84	0.09	24
26	0.09	0.06	0.09	0.08	S	0.10	0.00	0.00	0.10	0.79	0.10	0.11	0.06	0.07	0.14	0.18	0.16	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79	0.11	24
27	0.00	0.00	0.00	S	0.00	0.00	0.04	0.08	0.00	0.00	0.00	0.00	0.11	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.01	24
28	0.00	0.00	S	0.00	0.00	0.06	0.00	0.00	0.00	0.03	0.00	0.16	0.16	0.00	0.00	0.08	0.07	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.16	0.03	24
29	0.15	S	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.06	0.00	0.16	0.00	0.00	0.70	0.00	0.00	0.00	0.07	0.00	0.09	0.00	0.11	0.00	0.00	0.70	0.09	24
30	S	0.03	0.00	0.06	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.17	0.00	0.00	0.00	0.00	0.11	S	0.00	0.17	0.02	24
HOURLY MAX	0.22	0.21	0.40	0.41	0.42	0.39	0.32	0.84	0.63	0.79	0.26	0.65	0.31	0.36	0.70	3.83	0.86	0.38	0.47	0.52	0.83	0.63	0.47	0.25				
HOURLY AVG	0.04	0.04	0.05	0.06	0.07	0.05	0.09	0.10	0.12	0.12	0.05	0.10	0.07	0.06	0.08	0.21	0.15	0.11	0.10	0.10	0.09	0.10	0.06	0.07				

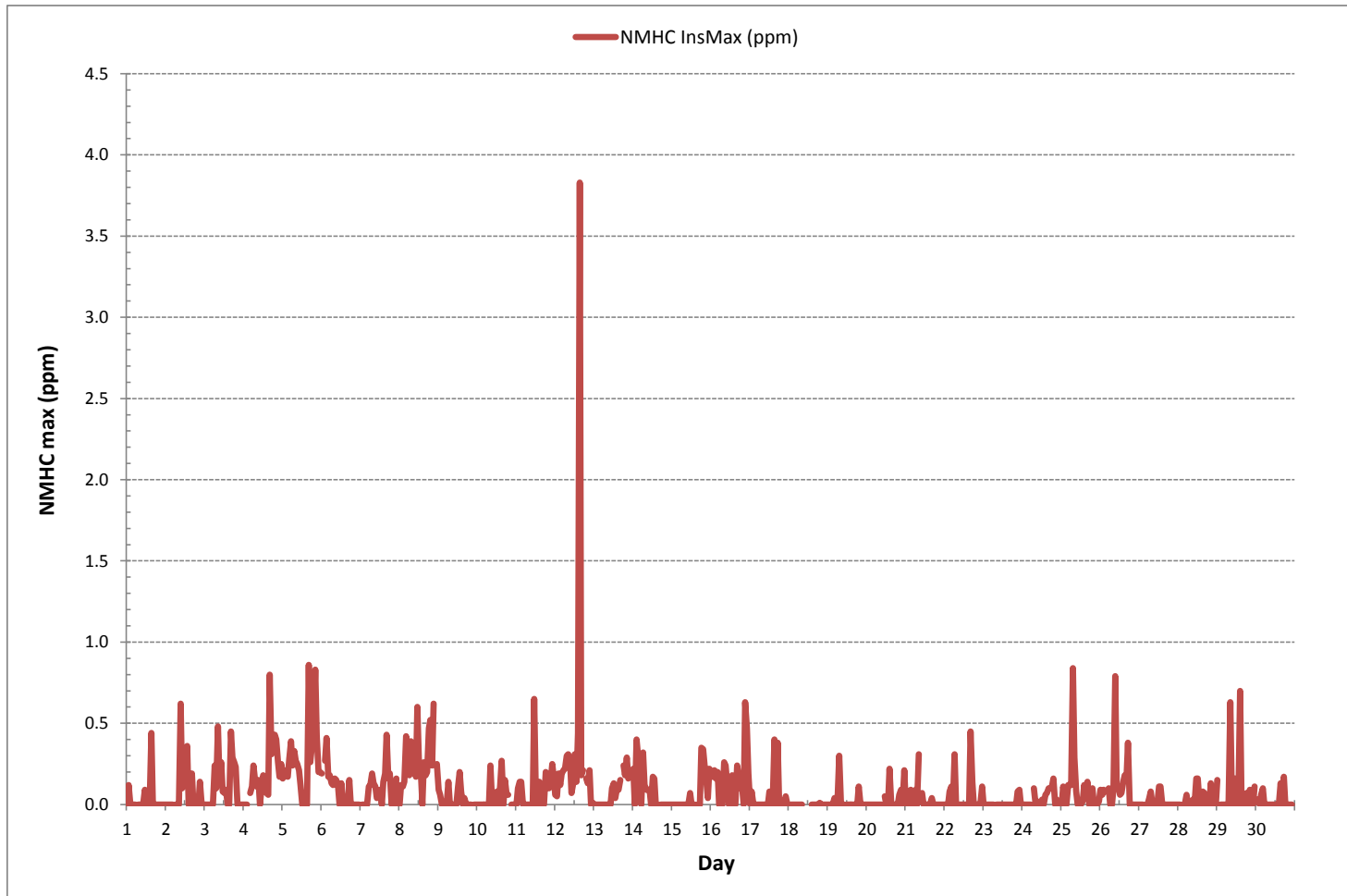
STATUS FLAG CODES

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:	292		
MAXIMUM INSTANTANEOUS VALUE:	3.83 ppm @ HOUR(S) 15 ON DAY(S) 12		
	VAR-VARIOUS		
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	719 hrs
MONTHLY CALIBRATION TIME:	5 hrs		
STANDARD DEVIATION:	0.20		

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)

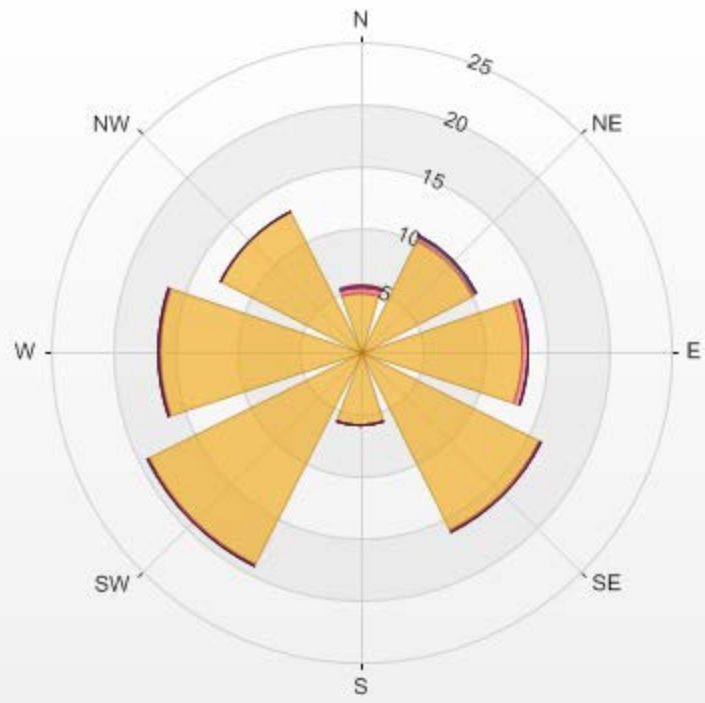


Wind: LICA Bonnyville Poll.: LICA Bonnyville-NMHC[ppm] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.86% Calm Avg: 0.00 [ppm]

Direction	0-0.134	0.134-0.268	0.268-0.402	0.402-0.536	0.536-0.67	>0.7	Total
N	4.69	0.59	0	0	0.15	0	5.43
NE	10.1	0.29	0.15	0	0	0	10.54
E	13.03	0.44	0	0	0	0	13.47
SE	16.11	0.15	0	0	0	0	16.26
S	6	0	0	0	0	0	6
SW	19.18	0.15	0	0	0	0	19.33
W	16.25	0.15	0	0	0	0	16.4
NW	12.59	0	0	0	0	0	12.59
Summary	97.95	1.77	0.15	0	0.15	0	100

%	Icon	Classes (ppm)
98		0-0.134
2		0.134-0.268
0		0.268-0.402
0		0.402-0.536
0		0.536-0.67
0		>0.7

LICA Bonnyville Poll.: LICA Bonnyville-NMHC[ppm] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



NMHC[ppm] Calibration: LICA Bonnyville Monthly: 2016/11 Type: Span



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

OXIDES OF NITROGEN



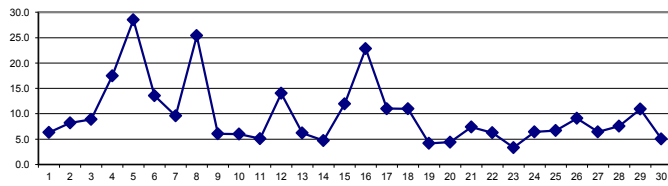
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY 1	4.6	5.5	4.5	3.9	5.9	9.6	S	10.3	7.4	6.7	9.2	6.2	5.5	5.9	6.9	6.9	6.2	5.4	5.4	4.0	3.8	5.7	10.1	5.2	3.8	10.3	6.3	24	
2	8.6	6.5	6.5	4.7	6.7	S	7.2	10.1	19.5	17.8	19.5	15.1	13.0	11.2	5.5	5.2	10.5	6.4	3.5	2.6	2.0	2.2	1.9	2.1	1.9	19.5	8.2	24	
3	2.1	2.0	2.1	3.2	S	5.7	10.9	12.8	20.5	7.7	7.4	6.9	5.6	5.0	5.1	3.9	9.4	13.2	33.2	30.8	9.0	3.8	3.0	1.7	1.7	33.2	8.9	24	
4	2.1	2.6	3.1	S	5.3	24.7	32.4	24.1	13.5	12.7	8.9	13.0	11.1	10.2	13.1	15.3	18.5	40.1	50.2	43.0	22.7	12.0	9.4	14.4	2.1	50.2	17.5	24	
5	10.0	14.3	S	20.3	25.3	33.6	26.9	86.1	53.7	41.1	28.2	15.3	9.8	10.4	11.5	10.3	28.9	26.3	39.9	41.8	29.3	38.8	24.6	29.7	9.8	86.1	28.5	24	
6	23.3	S	23.8	27.8	25.6	24.6	14.3	19.1	23.9	24.5	14.5	11.4	11.4	10.2	8.4	4.3	6.1	4.8	9.4	14.0	3.9	2.9	1.5	1.9	1.5	27.8	13.5	24	
7	S	1.8	1.2	1.4	2.2	4.4	9.9	25.9	18.0	13.5	7.6	8.1	10.0	7.9	7.9	19.5	27.4	15.7	9.6	4.7	5.2	4.2	5.1	S	1.2	27.4	9.6	24	
8	3.6	6.2	9.4	15.3	21.1	10.2	34.3	60.6	32.1	17.0	18.5	18.8	12.5	6.3	9.2	15.8	15.6	31.6	74.2	85.4	34.5	36.7	S	15.0	3.6	85.4	25.4	24	
9	9.9	6.4	5.2	3.2	7.3	5.2	8.2	6.9	10.4	7.6	6.9	6.0	5.9	3.6	5.2	5.2	8.1	6.3	6.2	4.8	4.1	S	3.8	2.8	2.8	10.4	6.1	24	
10	2.5	4.5	3.2	1.4	1.1	3.1	2.5	4.5	5.7	4.5	5.3	4.3	4.0	3.9	7.6	14.8	10.2	21.7	16.3	5.5	S	4.8	3.8	2.9	1.1	21.7	6.0	24	
11	2.2	2.1	1.8	1.4	1.2	1.1	1.3	1.4	2.3	6.8	3.2	8.7	3.0	3.8	6.7	7.2	8.3	7.1	9.0	S	10.1	10.2	12.6	5.7	1.1	12.6	5.1	24	
12	4.6	5.4	11.1	6.7	9.6	12.4	18.9	28.0	22.5	7.7	7.6	18.4	9.6	17.4	21.3	25.8	19.0	18.5	S	19.4	14.3	8.7	8.9	7.0	4.6	28.0	14.0	24	
13	5.5	4.4	3.7	3.2	3.5	2.4	3.9	2.5	2.7	3.8	4.6	2.8	3.1	3.6	4.4	6.0	9.0	S	9.7	11.5	19.1	14.2	10.6	8.3	2.4	19.1	6.2	24	
14	7.6	5.0	5.4	5.6	6.5	7.0	7.5	7.4	8.0	8.8	5.0	3.8	2.9	3.0	2.6	3.4	S	3.7	4.6	3.6	2.7	1.8	1.7	1.2	1.2	8.8	4.7	24	
15	0.9	1.1	0.8	0.8	0.7	0.9	1.6	2.0	3.3	1.5	2.3	2.2	2.0	2.5	4.8	S	14.5	27.5	54.1	55.8	11.1	25.1	28.5	30.5	0.7	55.8	11.9	24	
16	35.6	22.4	35.2	35.9	26.1	19.9	21.0	21.4	36.6	34.2	21.6	20.5	17.0	9.3	S	12.8	28.6	26.5	29.0	18.9	13.4	10.7	11.9	16.9	9.3	36.6	22.8	24	
17	17.2	14.3	10.4	9.3	11.2	12.3	10.3	6.7	7.5	7.7	C	C	C	C	C	C	C	C	11.0	13.4	12.6	15.3	16.2	8.4	3.4	3.4	17.2	11.0	24
18	2.3	4.9	7.5	14.7	17.1	16.8	18.2	18.2	27.7	17.7	14.2	9.5	S	7.8	6.0	11.0	10.5	10.2	9.0	7.2	7.9	4.7	4.6	4.5	2.3	27.7	11.0	24	
19	5.3	5.6	5.7	4.8	4.0	4.6	3.5	4.1	4.3	3.0	3.3	S	3.7	2.9	3.3	4.3	4.4	4.8	4.2	4.2	4.1	4.6	4.4	3.0	2.9	5.7	4.2	24	
20	3.5	3.2	3.1	3.1	4.4	6.5	4.7	4.6	5.4	5.2	S	6.2	5.4	5.3	4.7	4.2	3.9	4.3	5.1	3.8	3.5	4.3	3.4	3.4	3.1	6.5	4.4	24	
21	3.5	3.7	4.8	4.3	4.4	4.9	13.7	23.6	11.9	S	7.1	7.7	9.1	8.0	9.3	9.0	7.5	7.5	6.5	5.2	5.2	4.7	4.7	3.5	3.5	23.6	7.4	24	
22	4.1	5.3	5.3	4.9	5.8	5.6	10.1	17.7	S	15.9	9.6	5.2	5.1	6.3	4.2	9.9	7.4	4.6	2.6	3.5	2.3	2.8	3.6	2.5	2.3	17.7	6.3	24	
23	2.4	1.7	1.4	1.2	0.9	1.7	4.0	S	5.6	4.6	3.7	4.3	5.2	3.2	3.7	6.1	4.5	2.3	3.7	3.7	2.6	3.3	2.9	3.5	0.9	6.1	3.3	24	
24	2.9	2.0	2.2	2.3	3.0	2.6	S	6.2	5.4	4.5	6.5	6.9	8.0	9.1	8.6	15.0	9.7	9.3	9.4	10.3	7.4	6.8	5.2	4.1	2.0	15.0	6.4	24	
25	5.7	7.0	6.6	4.8	6.3	S	10.8	12.4	12.0	7.4	6.6	5.8	5.7	5.4	7.5	7.2	9.5	6.5	6.3	5.1	4.6	3.8	4.0	3.4	3.4	12.4	6.7	24	
26	3.9	3.0	2.2	3.1	S	6.1	5.2	5.8	8.9	17.2	17.5	11.7	15.9	15.3	17.4	14.5	11.1	8.0	8.5	6.6	7.7	5.8	7.4	6.6	2.2	17.5	9.1	24	
27	5.0	4.1	2.6	S	3.8	5.0	5.3	9.8	11.4	14.8	10.0	4.5	4.6	4.0	3.6	2.8	5.8	7.5	9.8	7.1	9.4	6.7	5.8	4.1	2.6	14.8	6.4	24	
28	4.0	4.1	S	6.2	12.2	10.7	14.7	9.7	11.7	11.9	6.6	5.6	7.6	7.1	8.8	8.8	5.2	6.3	7.7	5.7	5.7	4.4	5.0	4.3	4.0	14.7	7.6	24	
29	3.0	S	4.4	3.8	4.7	6.6	8.6	7.6	11.8	9.7	7.5	6.6	7.7	6.3	14.3	21.0	15.7	32.5	24.4	8.4	19.9	6.4	9.7	11.1	3.0	32.5	10.9	24	
30	S	9.3	8.3	9.6	6.1	1.9	2.8	1.6	15.0	11.4	1.9	2.4	6.3	2.8	3.2	11.3	2.4	3.0	2.2	2.8	3.2	1.7	1.3	S	1.3	15.0	5.0	24	
HOURLY MAX	35.6	22.4	35.2	35.9	26.1	33.6	34.3	86.1	53.7	41.1	28.2	20.5	17.0	17.4	21.3	25.8	28.9	40.1	74.2	85.4	34.5	38.8	28.5	30.5					
HOURLY AVG	6.6	5.7	6.5	7.4	8.3	8.9	11.2	15.6	14.4	12.0	9.5	8.5	7.5	6.8	7.7	10.1	11.4	12.8	16.1	14.9	9.8	8.9	7.2	7.2					

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

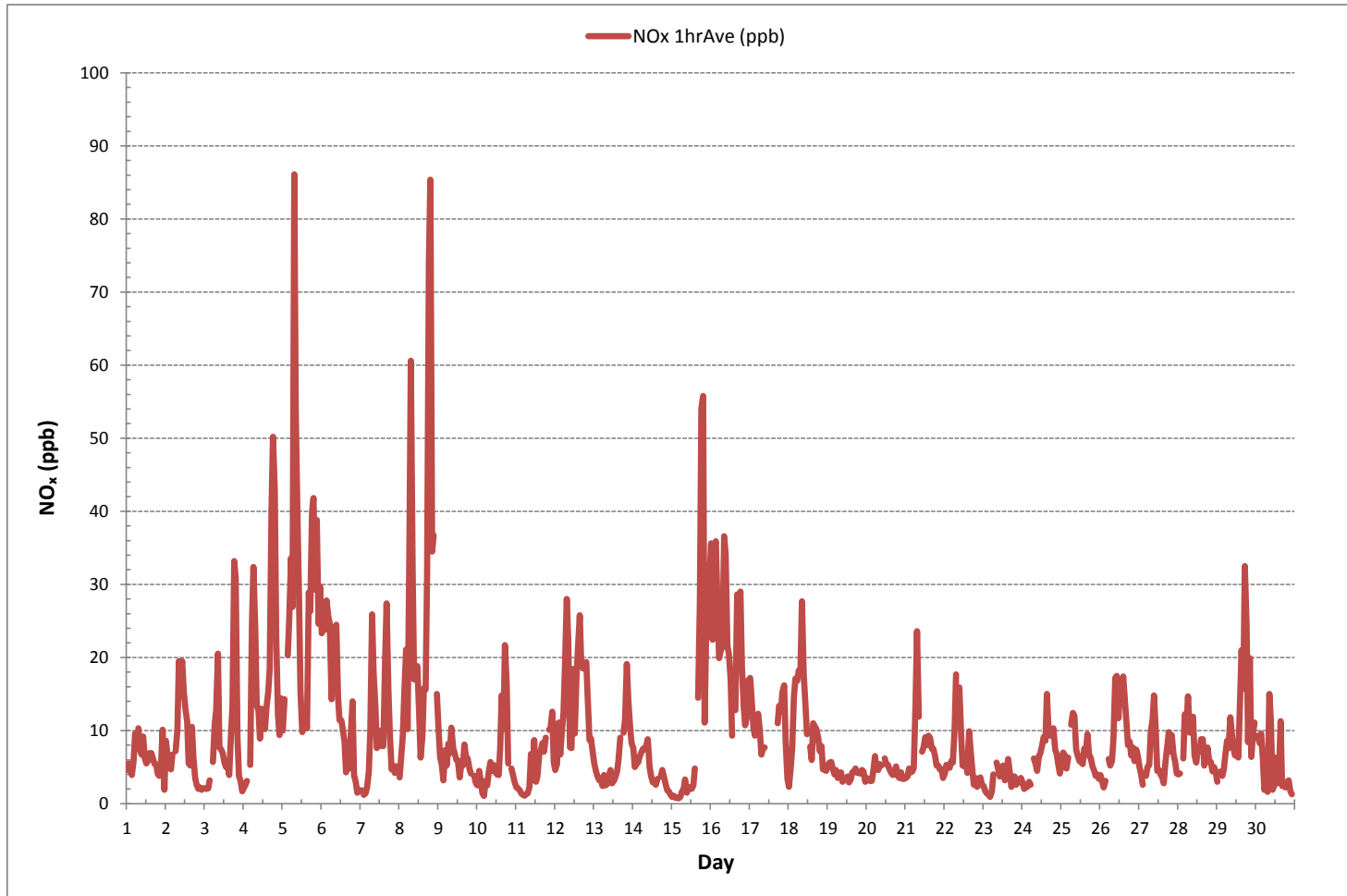
24 HR AVERAGES November 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	682			
MINIMUM 1-HR AVERAGE:	0.7 ppb	@ HOUR(S)	4	ON DAY(S) 15
MAXIMUM 1-HR AVERAGE:	86.1 ppb	@ HOUR(S)	7	ON DAY(S) 5
MAXIMUM 24-HR AVERAGE:	28.5 ppb			ON DAY(S) 5
				VAR-VARIOUS
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	720 hrs	
MONTHLY CALIBRATION TIME:	7 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	10.0	MONTHLY AVERAGE:	9.8 ppb	

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY																													
1	8.7	8.2	7.7	7.2	8.8	19.1	S	31.0	11.4	12.2	14.7	8.7	8.5	9.4	15.4	12.5	16.5	7.3	7.6	7.4	7.0	8.6	14.5	8.0	7.0	31.0	11.3	24	
2	10.8	8.2	9.2	7.7	52.6	S	12.0	18.0	56.8	56.9	51.3	44.0	47.4	47.1	23.1	21.2	59.7	31.8	33.7	4.8	3.8	14.1	3.3	3.7	3.3	59.7	27.0	24	
3	3.8	3.7	3.9	6.3	S	25.1	42.8	41.4	53.4	15.4	12.8	24.1	9.2	8.2	27.7	7.1	59.8	43.4	79.2	107.1	15.1	8.3	40.3	3.1	3.1	107.1	27.9	24	
4	3.4	4.0	7.8	S	18.2	34.6	67.2	56.2	24.1	45.5	33.7	37.9	32.3	29.6	48.1	62.7	77.8	77.1	81.9	114.7	45.3	19.3	14.9	22.8	3.4	114.7	41.7	24	
5	15.1	24.9	S	67.3	34.1	46.0	73.8	152.5	97.3	81.9	60.1	39.0	53.8	54.1	54.0	30.6	45.8	42.4	79.7	85.3	56.2	71.8	44.1	41.2	15.1	152.5	58.7	24	
6	29.8	S	34.8	34.9	32.6	34.6	73.6	24.1	52.5	60.6	34.6	46.8	40.7	52.6	15.3	7.4	34.2	30.8	32.3	52.2	25.1	7.8	2.9	5.0	2.9	73.6	33.3	24	
7	S	3.5	2.2	2.6	7.2	6.6	61.4	41.3	50.5	39.2	22.1	35.0	31.8	13.3	28.0	75.4	41.0	26.5	43.3	7.3	7.8	8.6	9.9	S	2.2	75.4	25.7	24	
8	6.6	13.8	12.5	61.9	45.7	18.3	44.0	93.3	86.4	47.2	49.7	28.2	56.8	21.2	26.5	59.5	47.6	92.4	109.5	146.0	75.1	48.5	S	26.9	6.6	146.0	52.9	24	
9	13.7	8.3	8.6	5.9	34.2	33.1	19.4	37.4	37.0	11.0	10.2	13.6	20.4	5.8	9.2	9.3	12.4	9.6	9.8	9.4	6.2	S	9.6	4.3	4.3	37.4	14.7	24	
10	4.3	28.0	6.0	3.5	3.1	41.4	10.0	37.2	36.2	22.6	10.3	24.2	22.7	17.0	41.5	78.1	43.5	60.5	46.1	16.3	S	6.6	5.5	4.2	3.1	78.1	24.7	24	
11	3.3	3.1	10.6	2.4	2.0	2.0	9.7	5.5	13.4	16.5	11.3	34.5	4.5	5.8	11.3	11.7	48.1	9.7	27.1	S	36.9	21.8	49.1	8.4	2.0	49.1	15.2	24	
12	9.6	15.6	18.4	12.5	16.1	20.7	24.4	86.7	68.4	11.5	20.6	30.8	32.1	78.3	59.7	38.5	30.2	52.3	S	22.8	18.2	11.1	12.2	9.8	9.6	86.7	30.5	24	
13	7.9	6.9	5.4	5.0	5.7	7.7	6.8	7.6	27.4	9.0	28.0	25.5	36.4	5.8	6.1	26.1	54.7	S	20.0	33.5	83.3	18.5	13.9	11.6	5.0	83.3	19.7	24	
14	11.2	6.9	8.2	8.6	11.7	9.7	26.2	9.9	10.6	14.5	9.3	6.1	4.8	5.2	4.6	5.7	S	7.0	6.6	6.4	4.1	3.8	3.0	3.6	3.0	26.2	8.2	24	
15	3.6	2.6	2.0	2.2	2.0	2.2	6.3	4.7	6.0	3.1	4.4	4.0	4.1	7.2	23.6	S	65.6	81.7	84.7	87.2	22.4	31.7	44.8	44.6	2.0	87.2	23.5	24	
16	47.0	35.8	40.4	39.3	32.1	32.0	30.7	31.1	49.9	54.0	28.9	53.3	95.6	32.7	S	53.1	61.5	85.4	40.7	30.7	18.1	17.4	16.2	24.8	16.2	95.6	41.3	24	
17	22.7	18.8	14.5	12.1	15.9	16.0	14.8	11.7	12.3	10.7	C	C	C	C	C	C	C	14.7	21.6	18.3	22.4	20.0	19.2	7.0	7.0	22.7	16.0	24	
18	P	7.2	11.1	21.9	21.0	19.2	27.8	33.6	40.4	34.9	49.3	35.2	S	20.1	56.7	50.9	30.6	12.8	11.4	10.4	45.8	22.4	17.3	6.3	6.3	56.7	26.7	23	
19	7.8	7.5	7.7	6.9	6.4	12.5	6.2	6.9	7.5	5.5	5.0	S	6.9	5.1	5.8	6.3	7.0	7.3	6.2	6.0	6.4	6.5	6.4	5.2	5.0	12.5	6.7	24	
20	5.1	5.6	5.0	5.3	10.1	10.1	9.0	6.6	8.5	8.4	S	20.2	40.2	8.1	41.6	14.2	29.1	14.4	9.4	8.9	5.9	11.5	5.1	5.7	5.0	41.6	12.5	24	
21	5.3	6.1	8.5	8.2	6.7	8.9	22.7	38.9	29.6	S	12.4	14.3	18.9	14.3	15.2	19.6	10.9	10.4	11.1	8.7	7.6	7.0	8.3	5.6	5.3	38.9	13.0	24	
22	6.6	7.0	8.4	7.2	9.3	10.8	14.2	23.6	S	81.1	19.9	10.3	8.2	43.3	28.0	43.2	24.9	31.3	5.1	6.2	24.7	18.1	28.8	4.4	4.4	81.1	20.2	24	
23	4.0	3.1	11.8	2.6	2.7	3.5	22.6	S	24.7	13.5	6.8	7.8	17.5	9.8	17.3	19.9	27.6	14.9	20.8	12.9	4.9	10.1	20.0	7.9	2.6	27.6	12.5	24	
24	4.9	3.1	4.3	3.3	5.5	5.3	S	11.1	8.6	7.8	22.6	39.6	22.5	30.2	35.8	47.8	33.7	30.0	14.6	29.0	27.1	9.2	7.0	6.1	3.1	47.8	17.8	24	
25	9.4	10.1	9.1	7.1	9.7	S	17.0	21.0	34.2	21.0	27.5	15.6	20.3	23.4	23.0	18.1	41.8	12.1	8.2	7.5	6.6	5.6	7.8	5.9	5.6	41.8	15.7	24	
26	5.8	5.0	3.5	5.4	S	7.9	46.2	31.5	15.7	28.2	24.9	41.5	26.6	26.5	21.1	17.2	22.0	11.1	10.8	11.2	9.8	9.5	11.1	11.8	3.5	46.2	17.6	24	
27	7.8	6.5	3.9	S	4.9	7.8	9.7	15.9	17.6	18.4	17.4	7.8	8.2	7.1	7.4	5.9	10.0	12.3	13.6	9.9	12.3	10.5	9.1	6.3	3.9	18.4	10.0	24	
28	7.0	6.7	S	10.6	19.1	18.9	21.8	16.3	15.7	17.0	9.0	8.3	11.1	21.4	17.5	12.3	16.0	11.7	14.2	7.8	8.0	6.8	7.1	7.6	6.7	21.8	12.7	24	
29	7.1	S	6.8	7.4	7.9	10.7	29.8	12.3	22.0	16.4	32.7	9.5	12.3	9.5	20.8	32.5	21.3	137.3	60.6	55.0	36.9	14.2	12.8	16.2	6.8	137.3	25.7	24	
30	S	12.9	10.2	14.1	24.1	65.0	66.3	8.1	52.9	54.8	9.7	8.8	23.3	7.3	22.6	52.2	3.9	9.4	14.3	23.2	12.9	2.8	2.3	S	2.3	66.3	22.8	24	
HOURLY MAX	47.0	35.8	40.4	67.3	52.6	65.0	73.8	152.5	97.3	81.9	60.1	53.3	95.6	78.3	59.7	78.1	77.8	137.3	109.5	146.0	83.3	71.8	49.1	44.6					
HOURLY AVG	10.1	9.8	10.1	13.6	16.1	18.9	29.2	31.6	33.5	28.2	22.8	24.1	25.6	21.4	25.2	30.0	34.9	34.1	31.9	32.6	22.6	15.6	15.4	11.4					

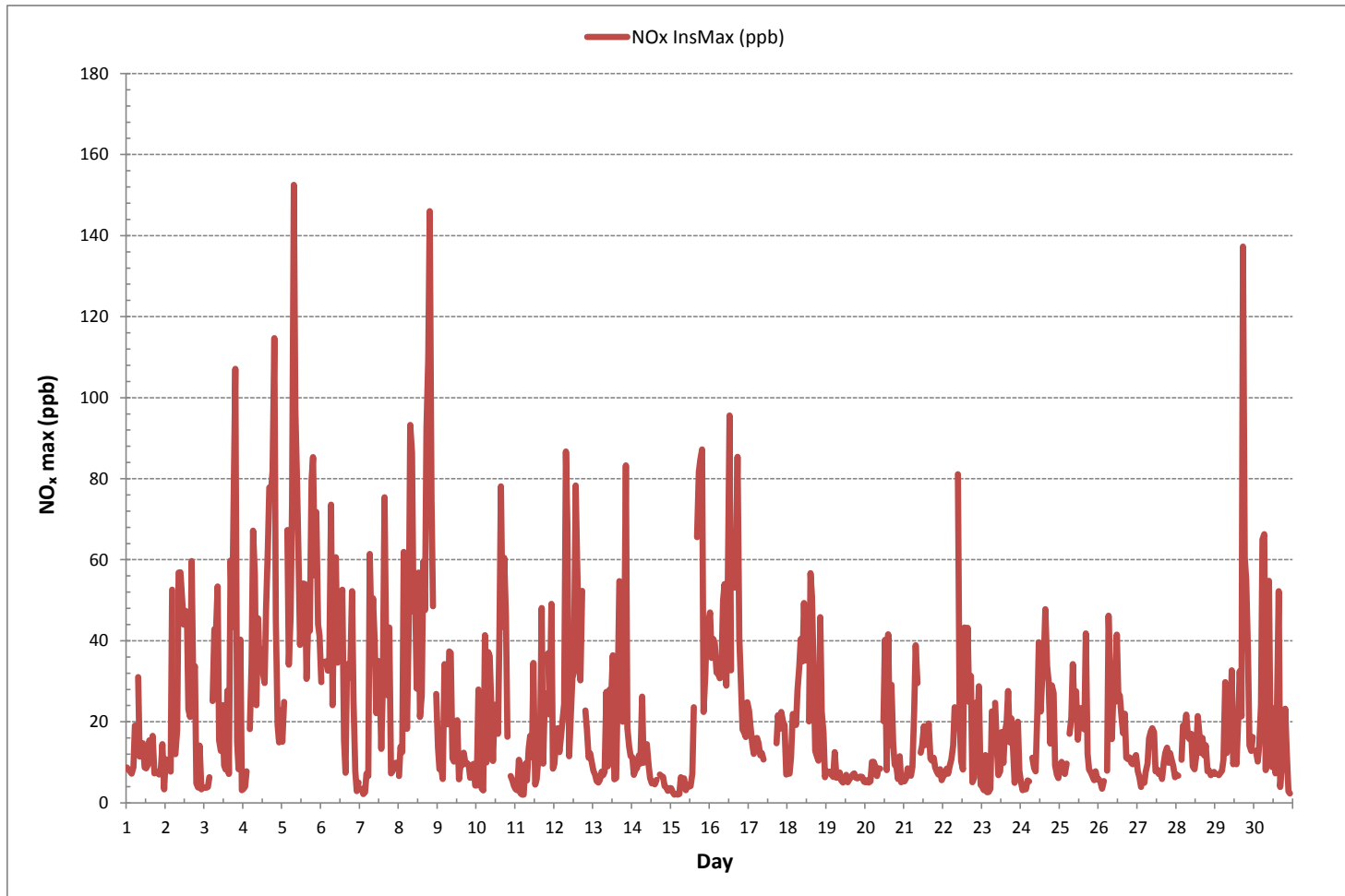
STATUS FLAG CODES

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

NUMBER OF NON-ZERO READINGS:	681
MAXIMUM INSTANTANEOUS VALUE:	152.5 ppb @ HOUR(S) 7 ON DAY(S) 5
VAR-VARIOUS	
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	22.0
OPERATIONAL TIME:	719 hrs

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)

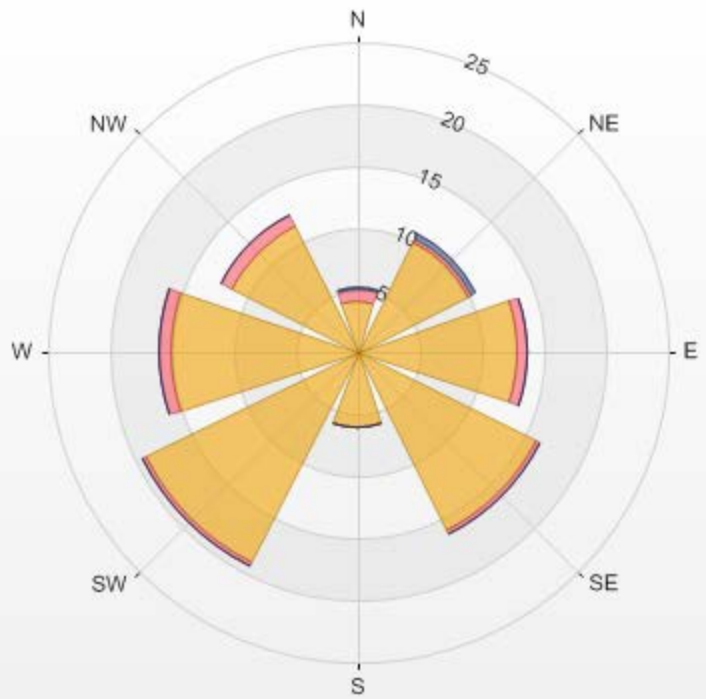


Wind: LICA Bonnyville Poll.: LICA Bonnyville-NOX[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.58% Calm Avg: 0.00 [ppb]

Direction	0.0-28.7	28.7-57.5	57.5-86.2	>86.2	Total
N	4.11	1.03	0.15	0	5.29
NE	9.99	0.29	0.44	0	10.72
E	12.92	0.73	0	0	13.65
SE	16.15	0.29	0	0	16.44
S	6.17	0	0	0	6.17
SW	19.09	0.29	0	0	19.38
W	15.12	0.88	0	0	16
NW	11.45	0.88	0	0	12.33
Summary	95	4.39	0.59	0	100

% Icon Classes (ppb) 95 0.0-28.7 4 28.7-57.5 1 57.5-86.2 0 >86.2

LICA Bonnyville Poll.: LICA Bonnyville-NOX[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



NOX[ppb] Calibration: LICA Bonnyville Monthly: 2016/11 Type: Span



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

NITRIC OXIDES



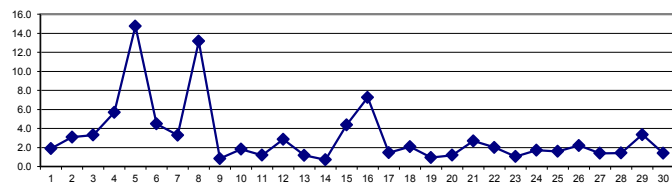
NITRIC OXIDE Hourly Averages (NO ppb)

Table with 24 columns (HR START, HR END, DAY, 23 hourly readings, DAILY MIN, DAILY MAX, 24-HR AVG, RDGS). Rows represent days 1 through 30, with data points for each hour and summary statistics.

STATUS FLAG CODES

Legend table for status flag codes: C - MONTHLY CALIBRATION, C1 - REPEAT CALIBRATION, Y - MAINTENANCE, S - DAILY ZERO/SPAN CHECK, S1 - REPEAT ZERO/SPAN CHECK, Q - QUALITY ASSURANCE, R - RECOVERY, X - MACHINE MALFUNCTION, G - OUT FOR REPAIR, P - POWER FAILURE.

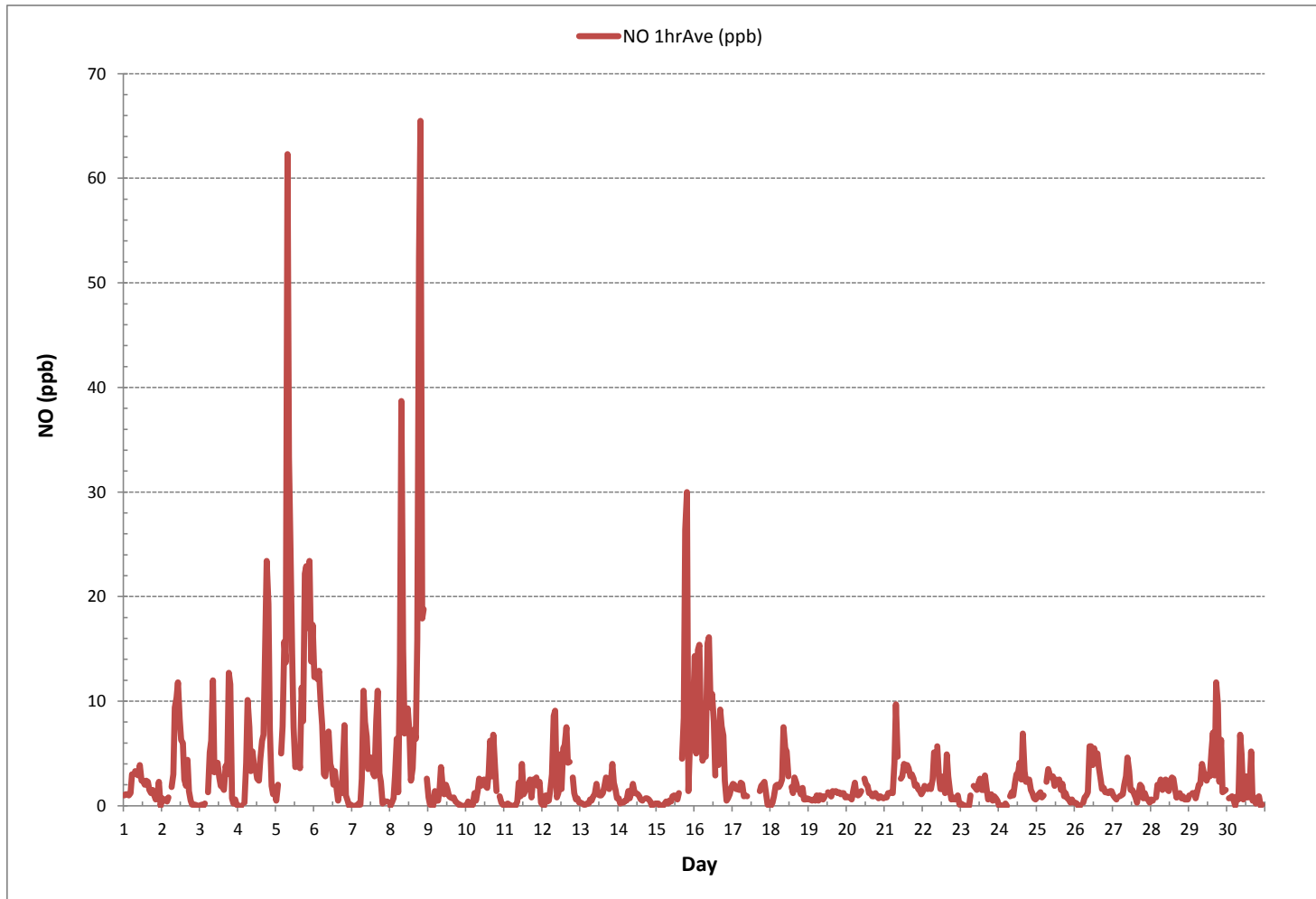
24 HR AVERAGES November 2016



MONTHLY SUMMARY

Summary table with 4 rows and 6 columns: NUMBER OF NON-ZERO READINGS: 640; MINIMUM 1-HR AVERAGE: 0.0 ppb; MAXIMUM 1-HR AVERAGE: 65.5 ppb; MAXIMUM 24-HR AVERAGE: 14.8 ppb; IZS CALIBRATION TIME: 31 hrs; MONTHLY CALIBRATION TIME: 7 hrs; STANDARD DEVIATION: 5.8; OPERATIONAL TIME: 720 hrs; AMD OPERATION UPTIME: 100.0%; MONTHLY AVERAGE: 3.2 ppb.

NITRIC OXIDE Hourly Averages (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

NITRIC OXIDE Instantaneous Maximum (NO ppb)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY 1	3.4	3.3	2.9	3.1	2.7	9.6	S	15.1	5.2	5.6	7.4	4.2	4.5	3.5	6.5	6.9	8.9	2.5	2.9	2.9	1.9	4.4	5.3	2.8	1.9	15.1	5.0	24	
2	2.8	1.8	2.1	2.0	7.2	S	4.7	7.6	39.5	42.0	43.1	31.8	30.1	33.5	13.4	15.5	43.7	22.5	24.1	1.8	1.8	8.2	0.9	1.2	0.9	43.7	16.6	24	
3	1.0	1.1	1.1	2.4	S	9.5	30.0	30.9	39.2	7.7	7.7	16.8	9.8	3.8	14.3	4.0	34.5	28.3	51.0	76.5	4.2	2.7	24.5	1.2	1.0	76.5	17.5	24	
4	0.9	1.0	0.9	S	2.2	8.6	39.1	27.1	10.4	31.2	19.5	14.5	10.9	9.2	31.3	35.5	43.4	50.9	51.4	72.2	26.8	7.2	4.2	5.2	0.9	72.2	21.9	24	
5	1.7	6.4	S	33.9	13.5	24.9	55.7	120.1	77.8	61.1	37.1	30.8	31.3	31.5	37.8	21.1	23.0	24.8	55.5	60.7	41.2	53.3	29.2	27.0	1.7	120.1	39.1	24	
6	16.7	S	20.4	16.9	15.5	14.8	58.4	6.2	30.2	33.8	24.2	29.9	29.4	39.7	5.9	2.9	21.4	24.0	19.0	38.4	10.3	3.5	1.0	2.3	1.0	58.4	20.2	24	
7	S	1.3	0.8	1.0	3.7	1.8	49.2	24.2	33.1	30.6	20.7	22.3	19.4	7.3	17.1	51.2	20.2	10.2	32.6	2.5	2.2	2.6	3.7	S	0.8	51.2	16.3	24	
8	1.4	2.5	2.4	32.1	23.8	4.0	21.7	72.7	61.5	35.0	29.1	16.1	49.7	10.1	17.1	24.5	36.3	67.0	88.6	126.6	55.0	28.6	S	8.0	1.4	126.6	35.4	24	
9	2.5	1.2	2.4	2.3	21.4	13.2	5.9	23.7	20.5	5.2	2.6	7.4	12.3	2.3	2.5	2.4	2.2	2.2	1.8	1.7	1.5	S	1.5	1.2	1.2	23.7	6.1	24	
10	0.9	11.3	1.5	1.2	1.7	24.4	4.1	25.6	21.6	11.0	7.0	18.4	17.3	15.1	23.2	47.0	16.5	29.6	29.2	5.0	S	2.0	1.3	1.6	0.9	47.0	13.8	24	
11	0.8	0.9	7.8	0.9	0.8	0.8	1.2	4.5	7.8	6.5	3.0	22.4	2.4	2.9	4.1	5.1	33.3	3.5	20.9	S	27.7	9.0	29.8	2.9	0.8	33.3	8.7	24	
12	2.5	2.2	4.2	3.3	3.5	6.7	7.2	63.3	41.5	2.9	10.3	26.5	13.3	47.6	39.8	16.1	11.2	35.3	S	5.0	2.9	2.4	2.3	1.8	1.8	63.3	15.3	24	
13	1.5	1.4	1.4	1.3	1.5	4.1	3.1	4.1	18.2	3.7	22.4	14.6	7.1	3.0	2.7	16.3	36.5	S	6.2	16.1	49.1	5.6	4.5	3.6	1.3	49.1	9.9	24	
14	2.7	1.4	1.7	1.6	2.9	2.9	12.2	2.1	2.6	5.0	2.3	2.5	2.3	2.2	1.8	1.8	S	2.8	2.2	1.7	1.4	1.0	1.1	1.6	1.0	12.2	2.6	24	
15	1.6	1.2	1.1	1.1	1.1	1.2	3.0	1.6	2.1	1.6	3.0	2.9	2.8	3.2	11.7	S	37.1	43.8	54.9	54.4	5.2	12.5	18.4	21.2	1.1	54.9	12.5	24	
16	22.7	15.5	20.1	18.5	11.9	11.5	8.8	12.1	25.6	29.4	14.1	35.9	77.8	11.4	S	40.1	27.6	53.4	14.2	9.1	2.4	2.4	4.1	5.7	2.4	77.8	20.6	24	
17	5.3	5.2	4.1	4.6	4.1	5.2	4.7	3.1	3.3	3.3	C	C	C	C	C	C	C	3.7	6.3	5.3	6.9	3.9	2.5	1.7	1.7	6.9	4.3	24	
18	P	2.1	3.3	4.3	4.1	3.8	5.5	8.8	15.2	17.8	28.3	19.1	S	6.5	41.1	33.7	24.0	4.0	3.4	3.7	22.9	9.6	5.8	1.9	1.9	41.1	12.2	23	
19	1.7	1.7	1.6	1.6	2.2	6.0	1.9	2.8	2.1	1.6	2.1	S	2.5	2.1	1.9	2.5	2.2	2.9	2.1	2.1	2.5	2.1	2.3	1.7	1.6	6.0	2.3	24	
20	1.6	1.9	1.6	1.7	4.2	4.1	2.8	2.4	2.7	3.1	S	14.5	21.8	3.2	8.6	7.5	10.5	6.9	4.3	3.6	2.5	5.1	1.9	1.8	1.6	21.8	5.1	24	
21	1.9	2.4	3.1	3.1	2.9	2.8	9.6	19.6	20.0	S	5.8	5.3	10.1	6.3	6.8	6.2	4.3	4.3	5.6	3.9	3.3	2.8	3.5	2.2	1.9	20.0	5.9	24	
22	2.7	3.3	3.4	3.0	3.8	3.7	4.7	10.1	S	69.4	8.0	3.5	3.1	25.2	13.0	31.8	9.9	15.9	3.6	2.5	20.6	15.5	20.7	1.4	1.4	69.4	12.1	24	
23	1.0	1.2	1.2	0.6	0.8	1.1	14.5	S	19.0	9.2	3.8	5.2	11.5	5.6	7.2	17.3	14.2	9.0	12.7	10.1	2.1	11.7	12.7	3.4	0.6	19.0	7.6	24	
24	1.3	0.4	0.8	0.5	2.3	2.1	S	3.3	3.8	4.0	15.8	31.0	5.5	15.6	13.9	33.3	20.5	13.3	5.2	10.1	8.4	2.4	1.9	1.9	0.4	33.3	8.6	24	
25	1.9	2.9	2.4	2.3	2.5	S	4.4	8.4	16.1	11.0	19.3	5.9	16.1	10.4	7.8	7.7	22.8	2.7	2.1	1.5	1.2	0.7	2.7	1.0	0.7	22.8	6.7	24	
26	0.8	0.8	0.3	0.4	S	0.7	23.7	23.7	2.8	10.3	8.2	23.4	9.9	8.9	6.2	4.5	11.1	2.9	2.2	2.6	2.1	1.8	2.1	3.7	0.3	23.7	6.7	24	
27	1.7	1.5	0.7	S	1.2	2.3	1.8	5.0	5.3	5.6	5.6	2.5	2.6	2.1	2.0	1.3	2.8	3.7	3.2	1.6	3.3	2.4	2.6	0.8	0.7	5.6	2.7	24	
28	1.7	1.3	S	2.3	3.7	2.9	4.2	2.8	3.3	4.0	2.5	2.3	3.4	11.7	4.7	2.3	11.0	3.9	4.6	1.6	2.1	2.1	1.5	1.8	1.3	11.7	3.6	24	
29	3.1	S	2.3	3.2	2.1	3.7	12.6	5.2	8.8	6.0	12.7	3.7	5.7	4.3	7.3	13.5	5.1	110.6	34.3	27.5	14.4	5.2	2.1	2.9	2.1	110.6	12.9	24	
30	S	1.4	1.5	2.1	15.7	14.7	14.9	6.2	26.9	23.4	4.7	6.1	14.3	2.1	8.7	29.8	1.0	7.4	3.6	21.3	5.6	0.7	0.5	S	0.5	29.8	9.7	24	
HOURLY MAX	22.7	15.5	20.4	33.9	23.8	24.9	58.4	120.1	77.8	69.4	43.1	35.9	77.8	47.6	41.1	51.2	43.7	110.6	88.6	126.6	55.0	53.3	29.8	27.0					
HOURLY AVG	3.3	2.8	3.5	5.4	5.8	6.8	14.6	18.7	19.5	16.6	13.2	15.0	15.2	11.4	12.8	17.2	19.1	20.4	18.9	19.7	11.4	7.3	6.7	4.1					

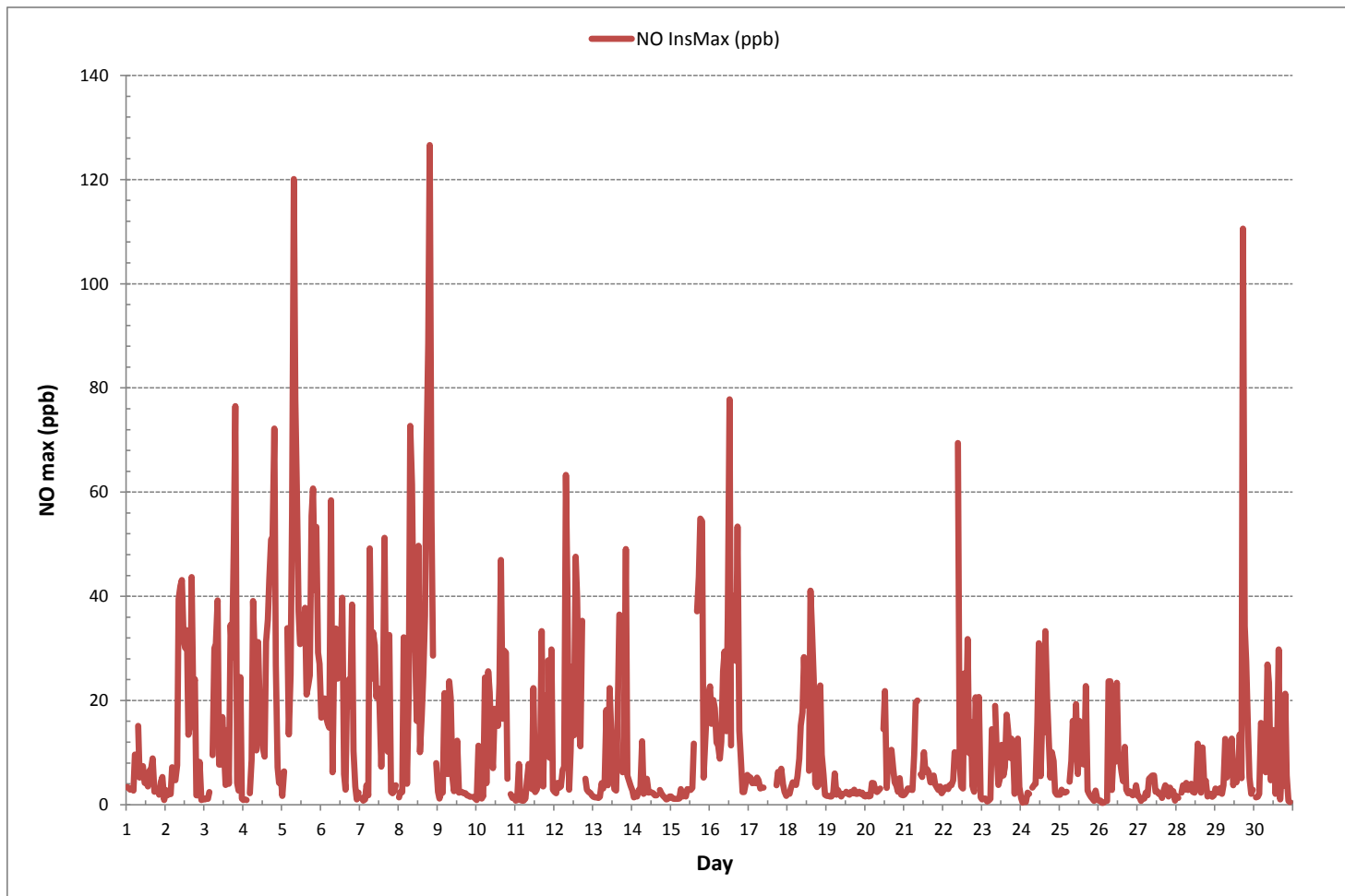
STATUS FLAG CODES

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:	681
MAXIMUM INSTANTANEOUS VALUE:	126.6 ppb @ HOUR(S) 19 ON DAY(S) 8
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	7 hrs
OPERATIONAL TIME:	719 hrs
STANDARD DEVIATION:	16.2

NITRIC OXIDE Instantaneous Maximum (NO ppb)

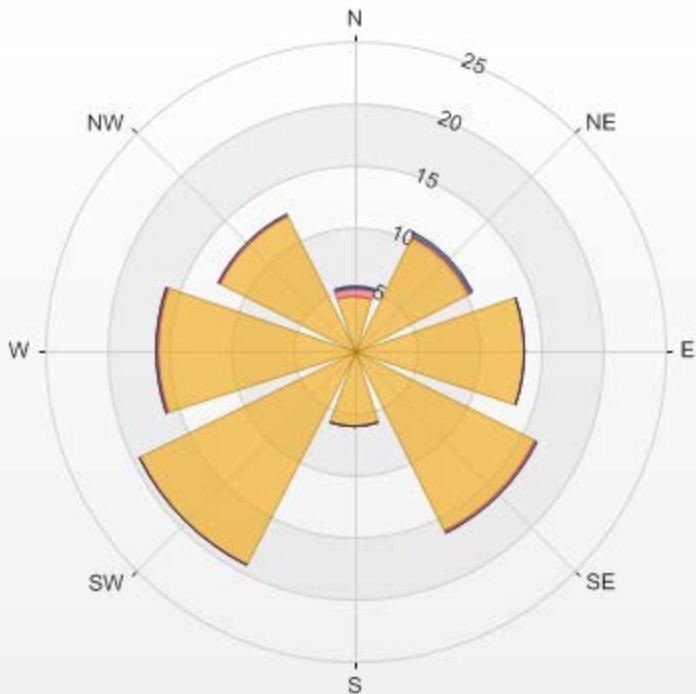


Wind: LICA Bonnyville Poll.: LICA Bonnyville-NO[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.58% Calm Avg: 0.00 [ppb]

Direction	0.0-21.9	21.9-43.7	43.7-65.6	>65.6	Total
N	4.41	0.73	0.15	0	5.29
NE	10.28	0.15	0.29	0	10.72
E	13.66	0	0	0	13.66
SE	16.3	0.15	0	0	16.45
S	6.17	0	0	0	6.17
SW	19.38	0	0	0	19.38
W	15.86	0.15	0	0	16.01
NW	12.19	0.15	0	0	12.34
Summary	98.25	1.33	0.44	0	100

% Icon Classes (ppb) 98 0.0-21.9 1 21.9-43.7 0 43.7-65.6 0 >65.6

LICA Bonnyville Poll.: LICA Bonnyville-NO[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



NITROGEN DIOXIDE



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY																													
1	3.6	4.5	3.3	2.8	4.7	6.6	S	7.0	4.3	3.8	5.2	3.8	3.1	4.0	4.5	4.6	4.7	4.2	3.9	3.0	3.2	4.6	7.8	4.3	2.8	7.8	4.4	24	
2	7.9	6.0	5.9	4.3	5.9	S	5.4	7.1	10.1	7.5	7.8	6.8	6.7	5.2	3.0	3.3	6.1	5.0	3.0	2.5	1.9	2.1	1.9	2.1	1.9	1.9	10.1	5.1	24
3	2.1	1.9	2.1	3.0	S	4.4	5.8	6.6	8.5	4.6	4.1	2.8	2.9	3.1	3.3	2.5	5.7	10.2	20.5	19.2	8.2	3.6	2.5	1.6	1.6	20.5	5.6	24	
4	2.1	2.6	3.1	S	5.0	20.7	22.3	16.5	10.3	7.5	5.0	9.5	8.5	7.7	8.6	9.1	11.7	24.5	26.8	23.7	15.5	10.2	8.4	12.6	2.1	26.8	11.8	24	
5	9.4	12.3	S	15.2	17.7	17.9	13.1	23.9	20.4	16.0	13.6	7.9	6.2	6.4	6.6	6.7	17.5	18.2	17.7	18.9	12.3	15.5	10.7	12.4	6.2	23.9	13.8	24	
6	10.9	S	11.8	14.9	15.8	16.9	11.3	16.3	18.8	17.4	10.5	8.0	9.4	6.9	6.8	3.8	4.4	3.6	6.0	6.3	2.9	2.5	1.5	1.8	1.5	18.8	9.1	24	
7	S	1.8	1.2	1.4	2.1	4.3	7.2	14.9	10.0	6.9	4.1	4.3	5.4	4.8	5.1	11.4	16.4	12.5	7.3	4.5	4.8	3.9	4.7	S	1.2	16.4	6.3	24	
8	3.6	5.9	8.7	12.4	14.7	8.8	20.7	21.9	17.1	10.1	10.4	9.5	5.6	3.8	5.6	8.5	9.2	15.7	21.8	19.9	16.6	17.9	S	12.4	3.6	21.9	12.2	24	
9	9.1	6.4	5.0	3.2	5.9	4.7	7.7	5.4	6.7	5.9	5.8	3.9	4.3	2.8	4.4	4.5	7.3	5.8	5.9	4.6	4.0	S	3.8	2.8	2.8	9.1	5.2	24	
10	2.5	4.1	3.0	1.4	1.0	1.9	1.9	3.1	3.1	2.6	2.9	1.8	2.1	2.2	4.5	8.6	7.4	14.9	12.6	4.1	S	4.0	3.5	2.8	1.0	14.9	4.2	24	
11	2.2	2.0	1.5	1.3	1.2	1.1	1.3	1.3	1.9	4.6	2.3	4.7	2.0	2.4	4.8	5.2	5.9	6.2	6.5	S	7.3	8.3	10.3	5.3	1.1	10.3	3.9	24	
12	4.4	5.3	10.1	6.3	9.1	10.6	15.9	19.5	13.3	6.9	6.4	13.5	7.9	11.9	15.4	18.3	14.9	14.3	S	16.7	13.1	8.1	8.3	6.7	4.4	19.5	11.2	24	
13	5.2	4.2	3.6	3.1	3.4	2.2	3.3	2.0	1.8	2.7	2.5	1.7	2.0	2.6	3.1	4.2	6.3	S	8.1	9.4	15.1	12.0	9.2	7.6	1.7	15.1	5.0	24	
14	7.0	4.9	5.1	5.3	6.0	6.4	6.1	6.7	6.7	6.8	3.8	2.7	1.9	2.1	2.0	2.9	S	3.0	3.9	3.0	2.3	1.8	1.6	1.0	1.0	7.0	4.0	24	
15	0.8	0.9	0.8	0.8	S	0.7	0.7	1.2	1.8	2.8	1.1	1.4	1.2	1.2	1.8	3.6	S	10.0	19.1	27.7	25.8	9.7	18.6	20.9	21.6	0.7	27.7	7.6	24
16	21.3	17.4	20.4	20.5	19.1	15.6	16.0	16.7	21.0	18.1	12.2	9.8	9.0	6.4	S	8.9	19.4	18.9	22.4	16.5	12.9	10.0	10.8	15.1	6.4	22.4	15.6	24	
17	15.1	12.3	8.8	7.7	9.7	10.0	8.3	5.9	6.5	6.8	C	C	C	C	C	C	C	9.6	11.5	10.6	13.0	15.1	8.3	3.4	3.4	15.1	9.6	24	
18	2.3	4.6	6.6	12.8	15.2	15.0	16.2	15.7	20.2	12.2	9.0	6.7	S	6.0	4.8	8.3	8.3	8.7	7.5	6.1	6.1	4.1	4.0	3.8	2.3	20.2	8.9	24	
19	4.7	5.0	5.2	4.2	3.5	3.6	2.9	3.1	3.4	2.4	2.4	S	2.4	1.8	2.4	2.9	3.1	3.4	3.0	3.0	3.0	3.4	3.2	2.2	1.8	5.2	3.2	24	
20	2.6	2.5	2.4	2.4	3.0	4.3	3.6	3.6	4.3	3.8	S	3.6	3.3	3.3	3.5	3.0	3.0	3.3	3.9	3.0	2.8	3.4	2.6	2.8	2.4	4.3	3.2	24	
21	2.7	2.9	3.7	3.0	3.1	3.7	9.4	13.9	7.2	S	4.5	4.9	5.1	4.6	5.4	5.4	4.7	4.5	3.9	3.4	3.2	3.1	3.3	2.4	2.4	13.9	4.7	24	
22	2.7	3.4	3.6	3.4	3.8	4.0	7.7	12.6	S	10.2	6.9	3.5	3.5	3.5	3.0	5.0	4.6	3.2	2.0	2.7	1.6	2.1	2.6	2.4	1.6	12.6	4.3	24	
23	2.2	1.6	1.4	1.2	0.9	1.7	3.0	S	3.7	2.9	2.2	2.2	2.5	1.8	2.2	3.2	2.7	1.7	2.7	2.6	2.2	2.5	2.2	3.0	0.9	3.7	2.3	24	
24	2.9	2.0	2.2	2.3	2.7	2.6	S	5.3	4.0	3.5	4.3	3.9	4.8	5.0	6.1	8.1	6.4	7.0	7.2	7.7	5.9	5.6	4.5	3.5	2.0	8.1	4.7	24	
25	4.9	6.0	5.3	4.0	5.4	S	8.5	8.9	8.9	4.7	3.8	4.0	3.2	3.1	5.1	5.6	7.5	5.7	5.0	4.4	4.1	3.5	3.4	3.1	3.1	8.9	5.1	24	
26	3.6	2.8	2.2	3.0	S	5.8	4.4	4.8	7.7	11.5	11.7	7.8	10.5	10.5	12.4	10.8	8.5	6.3	6.8	5.3	6.4	4.6	5.9	5.3	2.2	12.4	6.9	24	
27	4.0	3.2	1.9	S	3.0	4.0	4.3	7.8	8.6	10.2	6.7	2.9	3.0	2.9	2.8	2.4	4.6	5.5	8.1	6.4	8.2	6.1	5.2	3.8	1.9	10.2	5.0	24	
28	3.4	3.6	S	5.4	10.2	8.9	12.3	8.2	9.6	9.4	5.0	4.2	5.2	4.5	6.2	7.3	4.4	5.3	6.5	5.1	4.8	3.8	4.4	3.7	3.4	12.3	6.1	24	
29	2.0	S	3.2	2.6	4.0	5.3	6.6	5.5	7.7	6.4	4.9	4.2	4.7	3.5	8.9	14.0	12.8	20.7	14.7	6.1	13.6	5.1	8.3	9.6	2.0	20.7	7.6	24	
30	S	8.7	7.5	8.6	5.6	1.9	2.0	1.0	8.2	6.5	1.2	1.6	3.4	2.0	2.1	6.1	1.9	2.1	2.0	2.1	2.3	1.7	1.2	S	1.0	8.7	3.6	24	
HOURLY MAX	21.3	17.4	20.4	20.5	19.1	20.7	22.3	23.9	21.0	18.1	13.6	13.5	10.5	11.9	15.4	18.3	19.4	24.5	27.7	25.8	16.6	18.6	20.9	21.6					
HOURLY AVG	5.2	5.0	5.0	5.6	6.5	6.9	8.2	9.2	8.9	7.3	5.7	5.1	4.6	4.4	5.2	6.6	7.8	9.1	9.6	8.5	7.1	6.5	5.7	5.7					

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

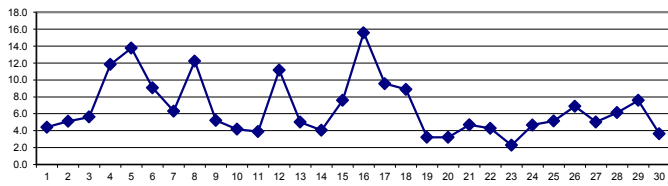
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	682					
MINIMUM 1-HR AVERAGE:	0.7	ppb	@ HOUR(S)	4 , 5	ON DAY(S)	15, 15
MAXIMUM 1-HR AVERAGE:	27.7	ppb	@ HOUR(S)	18	ON DAY(S)	15
MAXIMUM 24-HR AVERAGE:	15.6	ppb			ON DAY(S)	16
					VAR-VARIOUS	
IZS CALIBRATION TIME:	31	hrs	OPERATIONAL TIME:	720	hrs	
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	100.0	%	
STANDARD DEVIATION:	5.1		MONTHLY AVERAGE:	6.7	ppb	

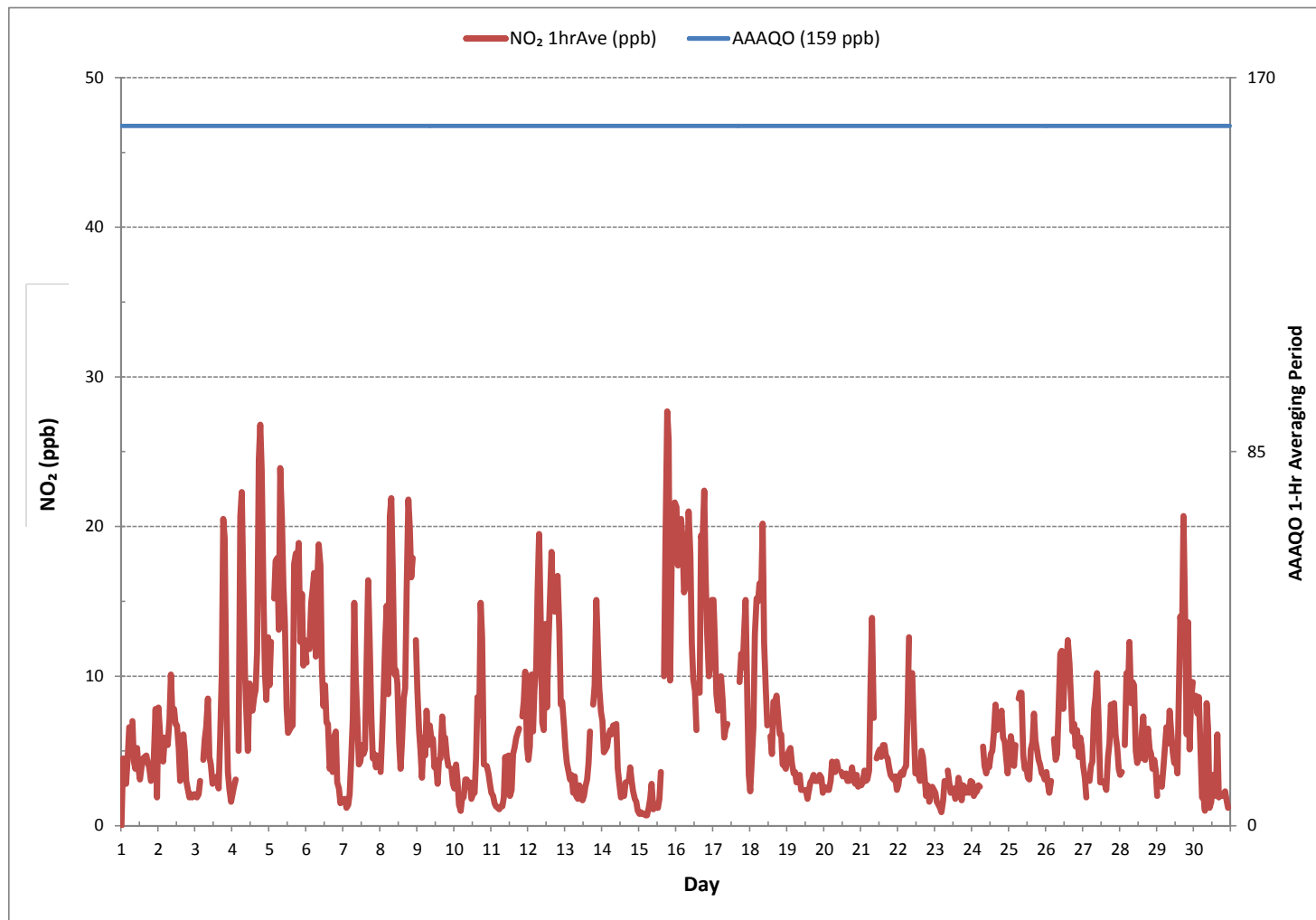
24 HR AVERAGES November 2016





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)

HR START (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-HR AVG.	RDGS.
HR END (MST)	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	5.9	6.8	6.5	5.1	7.2	10.0	S	18.4	7.4	7.1	8.0	5.2	4.9	6.8	9.7	7.5	8.9	5.7	5.5	5.4	6.0	6.3	11.8	6.6	4.9	18.4	7.5	24
2	9.6	7.3	7.9	6.4	45.8	S	8.4	10.9	39.4	16.6	20.5	12.6	30.2	17.7	11.2	10.3	25.0	19.5	11.5	4.4	3.5	6.8	3.3	3.4	3.3	45.8	14.4	24
3	3.6	3.5	3.9	4.8	S	16.1	18.4	18.8	16.8	8.8	6.7	11.7	5.3	5.2	14.1	4.3	28.5	24.1	29.6	40.1	11.8	7.8	17.8	2.8	2.8	40.1	13.2	24
4	3.5	3.9	7.5	S	17.2	26.9	33.6	30.7	14.5	20.3	20.4	25.6	21.6	21.2	23.2	35.1	36.6	35.2	35.4	43.4	26.4	13.4	13.7	18.2	3.5	43.4	22.9	24
5	14.1	19.1	S	35.9	21.7	22.2	19.4	38.0	31.5	24.0	29.2	20.4	24.9	25.3	18.4	10.7	25.5	22.8	26.9	26.3	32.8	24.7	15.4	14.7	10.7	38.0	23.6	24
6	13.5	S	14.7	18.3	18.4	21.3	18.6	19.1	23.7	31.4	16.8	24.0	12.6	20.9	11.3	5.4	21.4	11.1	13.7	20.4	16.4	4.9	3.0	3.8	3.0	31.4	15.9	24
7	S	3.0	2.3	2.4	4.4	6.4	20.0	17.7	19.1	12.2	7.2	15.5	12.5	6.6	13.1	32.2	22.0	17.1	15.6	6.6	6.7	6.5	7.5	S	2.3	32.2	11.7	24
8	6.2	11.9	11.0	36.4	26.0	15.5	24.6	27.6	30.0	22.5	26.3	15.3	22.7	12.7	16.1	39.9	18.3	30.6	28.9	24.9	27.1	21.8	S	19.5	6.2	39.9	22.4	24
9	11.8	8.0	8.0	5.2	16.7	21.6	14.4	17.0	19.5	8.3	8.4	6.8	9.9	4.5	7.5	7.8	11.2	8.6	8.9	8.6	5.4	S	8.4	4.0	4.0	21.6	10.0	24
10	4.1	16.9	5.7	3.2	2.3	19.8	6.3	15.2	18.4	12.9	5.2	7.6	9.5	9.0	20.4	35.7	30.2	46.9	21.0	12.8	S	5.6	5.4	3.7	2.3	46.9	13.8	24
11	3.4	2.9	3.6	2.4	2.2	2.1	9.0	2.9	9.3	11.3	9.0	17.6	3.4	3.7	8.2	8.1	18.4	7.8	10.1	S	16.7	13.5	23.2	6.8	2.1	23.2	8.5	24
12	8.2	14.1	15.2	11.9	13.5	15.9	18.6	31.7	29.3	10.3	13.8	20.8	31.3	28.5	23.6	19.7	23.6	S	18.5	16.1	10.0	10.4	8.6	8.2	31.7	18.0	24	
13	7.4	6.3	4.9	4.4	4.8	4.3	6.1	4.6	12.4	5.9	11.9	12.1	32.1	4.1	4.4	11.5	25.9	S	14.7	19.2	38.3	15.4	11.5	9.3	4.1	38.3	11.8	24
14	9.4	6.3	7.3	7.8	9.5	8.4	15.7	8.6	9.2	10.1	7.5	4.4	3.4	4.1	4.1	5.3	S	5.2	6.1	5.5	3.7	3.4	2.9	2.7	2.7	15.7	6.5	24
15	2.7	2.5	1.9	2.0	1.6	1.7	4.3	4.3	4.7	2.1	2.8	2.6	2.7	4.8	12.5	S	31.3	42.8	32.9	33.0	18.0	20.4	26.9	24.0	1.6	42.8	12.3	24
16	24.9	20.7	21.6	21.6	21.0	23.2	23.0	19.7	24.9	25.1	15.1	23.3	25.7	23.5	S	19.2	34.5	37.1	27.3	22.0	16.5	15.8	14.9	19.7	14.9	37.1	22.6	24
17	18.4	14.9	11.4	9.6	12.5	11.7	10.9	9.3	9.9	8.6	C	C	C	C	C	C	C	11.9	16.5	13.9	16.6	18.0	17.6	6.0	6.0	18.4	12.8	24
18	P	6.0	9.1	18.4	17.9	16.8	23.9	25.9	25.7	21.4	21.2	17.5	S	14.3	18.4	20.4	20.8	10.0	9.0	7.4	23.2	13.2	13.7	5.1	5.1	25.9	16.3	23
19	6.5	6.7	6.6	5.9	5.0	9.4	4.7	5.0	5.8	4.3	4.1	S	5.1	3.9	4.4	4.7	5.4	5.2	5.1	4.7	4.7	5.0	4.9	4.2	3.9	9.4	5.3	24
20	4.2	4.4	4.1	3.9	6.5	6.6	6.6	5.2	6.1	6.0	S	6.4	18.3	5.5	33.5	7.5	21.8	10.5	6.0	5.8	4.5	9.7	4.2	4.7	3.9	33.5	8.3	24
21	4.1	4.6	6.0	5.6	5.4	6.4	13.7	19.3	15.3	S	7.3	9.5	8.9	8.4	8.7	14.6	7.2	6.7	6.1	5.6	4.8	4.9	5.6	4.1	4.1	19.3	7.9	24
22	4.9	5.3	5.9	5.2	6.6	7.8	10.7	15.4	S	18.7	12.0	7.7	5.6	18.4	15.6	19.7	15.4	18.8	4.1	4.8	6.7	12.0	9.9	3.6	3.6	19.7	10.2	24
23	3.6	2.8	11.1	2.4	2.4	3.0	10.7	S	9.2	8.6	4.0	3.9	11.1	4.5	10.9	10.9	14.5	9.3	12.8	4.4	3.7	5.6	8.8	5.2	2.4	14.5	7.1	24
24	4.3	3.3	3.9	3.5	5.3	4.2	S	9.0	6.4	5.1	9.9	17.1	17.5	20.5	22.3	22.6	17.5	18.8	10.1	23.9	19.8	7.4	6.0	5.3	3.3	23.9	11.5	24
25	7.9	8.1	7.7	5.8	8.6	S	12.9	16.7	18.6	11.6	8.3	10.3	8.8	14.7	15.6	13.6	21.0	9.4	6.8	6.4	6.0	5.4	5.5	5.2	5.2	21.0	10.2	24
26	5.6	4.7	3.9	5.4	S	7.9	22.9	11.4	13.3	18.5	17.1	18.4	16.7	17.6	15.2	13.2	14.1	10.1	8.8	9.1	8.7	8.0	10.2	8.1	3.9	22.9	11.7	24
27	6.2	5.6	3.8	S	4.6	6.7	8.2	11.3	12.5	13.6	12.1	5.6	5.7	5.3	5.8	5.3	8.4	9.1	11.5	9.0	11.4	9.5	8.0	6.1	3.8	13.6	8.1	24
28	5.9	5.8	S	9.0	16.1	16.3	18.0	13.9	13.6	13.6	7.3	6.6	8.0	9.5	13.3	10.4	7.9	8.6	10.8	7.2	6.8	5.5	6.1	6.1	5.5	18.0	9.8	24
29	4.6	S	5.3	5.5	7.0	7.4	17.8	9.2	13.5	10.5	23.0	6.3	7.0	5.8	13.7	19.4	16.8	31.0	26.3	27.8	22.6	11.0	11.3	13.7	4.6	31.0	13.8	24
30	S	12.2	9.6	12.5	12.3	50.5	51.6	4.4	29.0	33.3	7.1	5.6	11.9	5.5	15.8	26.5	3.5	5.7	10.9	11.4	10.7	3.0	2.4	S	2.4	51.6	15.2	24
HOURLY MAX	24.9	20.7	21.6	36.4	45.8	50.5	51.6	38.0	39.4	33.3	29.2	25.6	32.1	31.3	33.5	39.9	36.6	46.9	35.4	43.4	38.3	24.7	26.9	24.0				
HOURLY AVG	7.6	7.8	7.5	9.3	11.5	13.2	16.2	15.2	16.9	13.9	12.2	12.2	13.1	11.6	14.1	15.9	19.0	17.4	14.9	14.9	13.6	10.2	10.0	8.0				

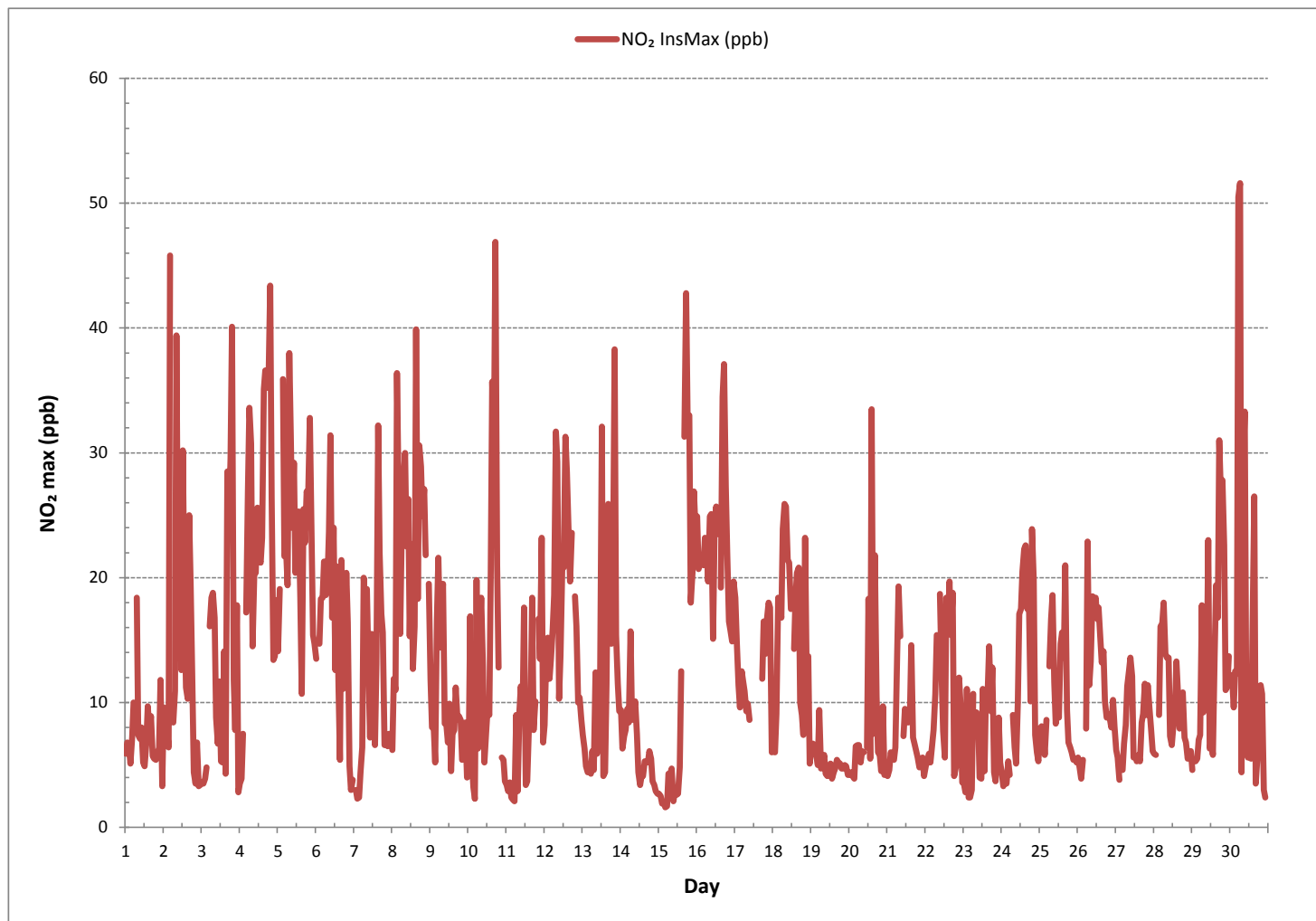
STATUS FLAG CODES

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:	681
MAXIMUM INSTANTANEOUS VALUE:	51.6 ppb @ HOUR(S) 6 ON DAY(S) 30
VAR-VARIOUS	
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	8.9
OPERATIONAL TIME:	719 hrs

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)

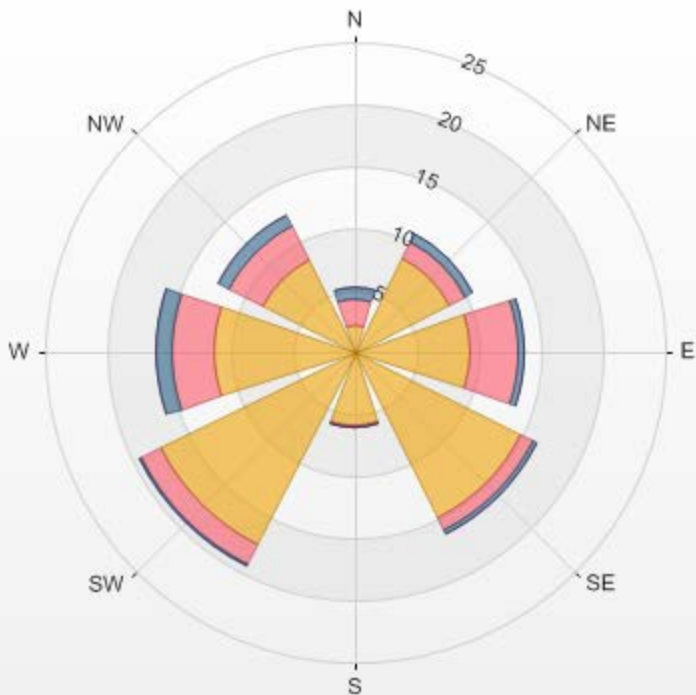


Wind: LICA Bonnyville Poll.: LICA Bonnyville-NO2[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 94.58% Calm Avg: 0.00 [ppb]

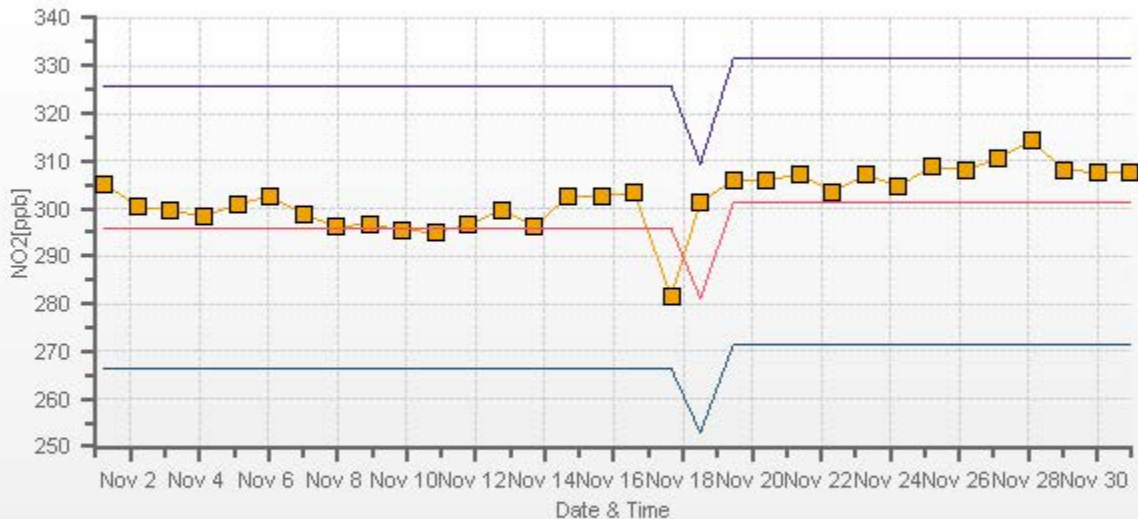
Direction	0.0-9.3	9.3-18.5	18.5-27.8	>27.8	Total
N	2.2	2.06	1.03	0	5.29
NE	8.52	1.47	0.73	0	10.72
E	9.4	3.82	0.44	0	13.66
SE	14.98	1.17	0.29	0	16.44
S	6.02	0.15	0	0	6.17
SW	17.47	1.76	0.15	0	19.38
W	11.31	3.52	1.17	0	16
NW	8.37	3.08	0.88	0	12.33
Summary	78.27	17.03	4.69	0	100

% Icon Classes (ppb) 78 0.0-9.3 17 9.3-18.5 5 18.5-27.8 0 >27.8

LICA Bonnyville Poll.: LICA Bonnyville-NO2[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



NO2[ppb] Calibration: LICA Bonnyville Monthly: 2016/11 Type: Span



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

OZONE

OZONE Hourly Averages (O₃ ppb)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY 1	16.7	15.8	18.5	20.9	19.6	16.9	S	16.6	16.2	19.1	18.8	19.4	18.4	21.1	21.8	19.4	17.2	16.2	16.1	18.8	18.3	15.9	12.3	16.9	12.3	21.8	17.9	24
2	16.4	18.0	18.0	18.6	17.6	S	16.9	14.4	13.3	12.9	13.1	13.4	15.3	16.2	16.3	14.3	11.7	12.4	15.2	16.7	18.2	18.1	19.2	19.1	11.7	19.2	15.9	24
3	18.2	17.7	14.8	11.3	S	9.9	7.5	5.9	4.7	6.1	6.3	12.2	15.3	20.7	25.1	24.9	20.2	16.4	9.0	9.0	17.5	21.1	23.7	25.7	4.7	25.7	14.9	24
4	25.7	24.2	24.9	S	24.6	10.0	4.8	14.9	20.0	20.5	24.0	35.3	40.1	35.4	29.7	21.8	19.6	6.8	3.6	6.9	9.3	15.6	16.9	11.8	3.6	40.1	19.4	24
5	14.5	12.6	S	7.5	2.8	0.8	1.1	1.0	2.3	4.1	6.8	12.6	15.2	16.7	15.1	17.6	6.3	5.3	3.3	2.0	1.6	1.2	1.1	0.5	0.5	17.6	6.6	24
6	0.4	S	0.5	0.4	0.4	1.2	5.5	5.2	3.7	4.5	9.9	12.8	12.5	14.2	14.0	16.0	14.6	14.7	11.9	12.6	14.9	14.1	14.8	12.6	0.4	16.0	9.2	24
7	S	14.0	15.4	15.1	13.7	11.6	8.5	3.3	6.4	9.1	12.2	13.5	14.0	18.1	18.9	10.4	5.3	7.9	14.5	20.6	19.8	20.9	18.6	S	3.3	20.9	13.3	24
8	18.4	15.5	12.7	8.1	5.9	11.2	1.8	1.1	6.5	9.9	9.8	9.8	15.8	20.2	15.5	13.9	10.2	4.0	1.1	1.2	1.9	1.7	S	8.9	1.1	20.2	8.9	24
9	11.3	10.8	14.3	15.6	14.8	14.7	13.1	14.0	14.1	18.6	20.4	21.8	26.8	35.6	33.0	33.1	29.5	30.3	30.1	29.9	29.2	S	28.4	28.3	10.8	35.6	22.5	24
10	28.2	23.2	24.7	21.9	23.1	22.5	21.2	17.7	17.5	18.6	19.4	21.8	25.1	28.3	28.1	24.8	22.7	15.0	14.0	23.7	S	24.5	23.3	23.1	14.0	28.3	22.3	24
11	23.9	23.3	23.9	24.1	23.6	23.4	22.7	22.3	20.7	17.1	18.6	15.3	17.1	15.6	12.4	10.4	8.4	7.1	7.1	S	10.4	11.8	8.2	10.8	7.1	24.1	16.4	24
12	13.5	14.3	10.7	11.3	7.4	9.0	3.0	5.6	3.9	21.1	23.7	15.7	20.7	15.8	10.6	4.1	4.1	2.3	S	2.6	7.5	12.8	11.8	12.3	2.3	23.7	10.6	24
13	11.1	11.7	12.0	13.2	12.9	11.6	11.6	12.5	13.6	12.1	14.1	16.6	27.6	23.7	20.4	18.7	15.4	S	17.6	13.5	7.2	8.5	11.3	12.9	7.2	27.6	14.3	24
14	13.7	14.7	13.1	11.3	10.2	9.7	10.0	12.0	14.8	16.6	23.5	29.6	33.6	34.6	35.4	33.2	S	31.5	29.3	29.3	30.4	30.5	30.4	29.2	9.7	35.4	22.9	24
15	28.0	27.9	26.2	25.4	25.5	25.7	25.1	24.8	24.4	27.4	27.8	28.2	30.1	30.5	27.8	S	15.2	12.0	3.0	1.5	12.4	4.9	4.7	1.9	1.5	30.5	20.0	24
16	1.9	1.5	1.3	1.6	2.9	6.0	6.6	6.0	4.1	7.2	12.0	14.7	17.7	24.2	S	19.6	9.9	9.0	7.0	10.1	14.3	15.9	12.6	12.1	1.3	24.2	9.5	24
17	8.0	10.4	13.1	14.1	11.7	10.3	15.8	24.2	24.3	22.5	22.3	23.0	25.7	S	28.6	26.5	23.5	22.1	18.6	19.2	16.8	13.7	18.8	21.5	8.0	28.6	18.9	24
18	22.6	18.9	17.8	9.3	10.1	12.1	15.9	17.1	11.9	C	C	C	C	25.1	25.0	21.7	22.1	21.1	21.7	22.8	21.8	24.4	23.9	24.2	9.3	25.1	19.5	24
19	22.9	22.2	21.5	22.7	23.3	23.1	23.9	23.3	23.8	25.9	26.0	S	27.1	27.5	26.1	24.7	24.2	23.6	24.5	23.1	22.3	22.7	23.1	23.6	21.5	27.5	24.0	24
20	22.8	22.7	22.4	22.3	21.5	20.0	20.4	20.1	18.9	18.8	S	18.0	17.5	16.6	16.9	19.3	18.8	16.6	16.1	17.2	16.7	16.5	17.3	16.9	16.1	22.8	18.9	24
21	16.3	15.4	13.7	13.9	13.7	12.3	7.1	5.0	9.6	S	12.5	12.2	12.1	12.0	11.3	10.7	10.8	10.7	11.8	12.5	13.0	14.6	16.3	18.1	5.0	18.1	12.4	24
22	16.4	14.7	13.6	12.5	12.8	14.9	11.0	6.1	S	9.9	13.1	17.2	17.8	18.2	18.7	17.9	18.6	20.7	20.2	18.7	20.8	19.1	17.7	18.3	6.1	20.8	16.0	24
23	18.2	18.3	18.4	19.0	19.5	18.4	17.4	S	16.5	17.4	17.9	17.6	17.6	17.9	18.2	16.6	16.7	16.6	16.2	16.8	17.6	17.3	17.1	15.1	15.1	19.5	17.5	24
24	14.2	14.3	13.6	13.2	12.1	10.6	S	12.6	12.3	12.1	11.3	11.7	10.8	12.4	12.1	13.0	14.4	13.6	12.5	13.7	15.3	16.0	17.6	18.7	10.6	18.7	13.4	24
25	16.0	14.6	15.0	16.0	14.5	S	12.5	11.2	12.3	16.9	18.1	19.8	20.9	21.2	19.6	19.3	14.4	17.2	14.5	13.2	15.3	20.6	17.1	13.3	11.2	21.2	16.2	24
26	13.7	15.3	16.7	16.5	S	16.7	19.1	17.8	13.4	11.1	12.8	15.1	14.4	16.3	13.0	10.3	12.3	19.6	18.4	21.0	23.1	21.6	18.9	18.2	10.3	23.1	16.3	24
27	20.3	23.0	25.1	S	24.7	22.3	21.4	17.6	16.2	15.3	20.2	23.6	23.2	22.9	22.3	22.4	20.2	18.8	15.7	16.3	14.4	15.8	17.9	19.3	14.4	25.1	20.0	24
28	19.7	19.4	S	19.0	12.6	14.2	13.5	19.0	19.2	19.9	22.1	23.7	24.1	24.5	23.0	22.2	21.9	19.0	16.5	19.0	21.5	22.6	20.2	23.0	12.6	24.5	20.0	24
29	27.3	S	25.9	24.1	21.6	19.5	16.9	15.4	11.5	12.9	15.7	18.6	19.1	18.3	13.3	8.9	10.1	4.0	7.4	13.7	7.7	12.6	10.6	9.4	4.0	27.3	15.0	24
30	S	12.3	11.9	12.0	17.4	29.1	30.3	31.6	29.0	32.0	35.0	35.0	33.4	33.9	33.2	30.2	32.9	31.7	30.0	27.9	26.7	26.3	27.4	S	11.9	35.0	27.7	24
HOURLY MAX	28.2	27.9	26.2	25.4	25.5	29.1	30.3	31.6	29.0	32.0	35.0	35.3	40.1	35.6	35.4	33.2	32.9	31.7	30.1	29.9	30.4	30.5	30.4	29.2				
HOURLY AVG	17.2	16.7	16.4	15.0	15.0	14.6	13.7	13.7	14.0	15.7	17.4	18.9	21.0	22.0	20.9	18.8	16.2	15.4	14.7	15.6	16.1	16.6	17.3	16.6				

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

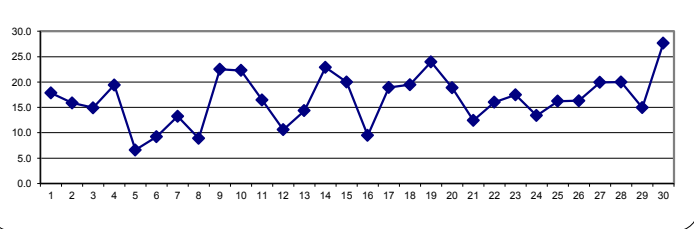
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 82 ppb

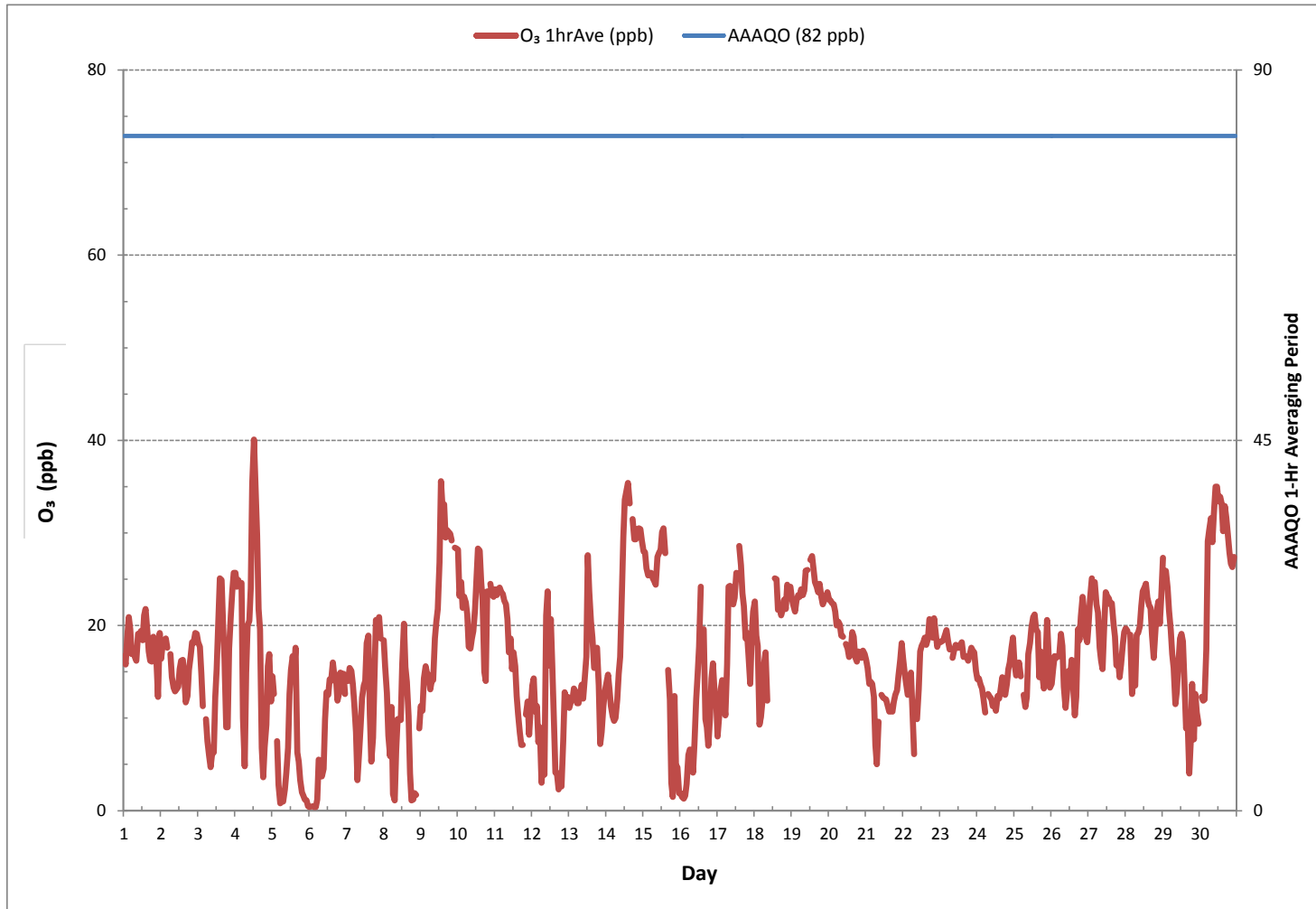
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	685			
MINIMUM 1-HR AVERAGE:	0.4 ppb	@ HOUR(S)	VAR	ON DAY(S) 6
MAXIMUM 1-HR AVERAGE:	40.1 ppb	@ HOUR(S)	12	ON DAY(S) 4
MAXIMUM 24-HR AVERAGE:	27.7 ppb			ON DAY(S) 30
				VAR-VARIOUS
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	720 hrs	
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	7.3	MONTHLY AVERAGE:	16.7 ppb	

24 HR AVERAGES November 2016



OZONE Hourly Averages (O₃ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

OZONE Instantaneous Maximum (O₃ ppb)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY																												
1	18.2	19.5	20.4	22.3	21.1	19.4	S	18.9	18.5	21.3	21.2	20.7	20.5	24.1	24.4	22.8	19.7	17.7	17.4	20.2	20.1	17.9	16.5	20.1	16.5	24.4	20.1	24
2	17.5	19.4	20.1	19.7	19.4	S	19.5	17.5	15.5	15.6	15.4	16.4	18.2	18.0	17.7	15.4	14.1	13.7	16.7	18.8	19.5	19.2	19.9	19.9	13.7	20.1	17.7	24
3	19.2	18.6	17.5	12.7	S	11.3	9.1	7.5	7.5	7.9	8.2	14.3	16.8	23.4	27.5	27.5	26.1	21.7	19.7	16.4	22.2	24.1	26.6	26.9	7.5	27.5	17.9	24
4	26.7	24.9	26.1	S	28.7	14.4	11.7	21.2	23.3	23.7	26.4	48.0	47.4	41.6	38.6	27.2	25.1	17.8	11.4	15.2	17.9	18.0	19.4	18.9	11.4	48.0	24.9	24
5	19.5	17.3	S	14.3	5.1	1.7	4.0	1.5	5.5	7.2	9.7	14.8	19.1	18.5	18.3	22.9	17.3	9.9	7.9	3.7	3.8	2.7	2.7	0.7	0.7	22.9	9.9	24
6	0.6	S	0.6	0.6	0.7	3.3	8.5	7.2	4.9	6.9	14.1	14.9	14.3	15.6	16.2	17.4	16.4	16.8	15.7	16.5	16.2	15.9	16.4	14.1	0.6	17.4	11.0	24
7	S	15.4	16.4	16.0	15.0	13.2	10.0	7.2	10.0	12.3	12.9	16.4	17.1	25.3	23.5	14.7	8.2	9.3	21.1	23.1	21.3	22.2	20.9	S	7.2	25.3	16.0	24
8	19.7	18.6	14.9	13.7	12.0	13.8	6.4	2.9	12.4	12.4	12.6	14.1	19.5	23.7	18.3	18.0	12.7	10.8	1.5	1.8	4.0	4.3	S	12.5	1.5	23.7	12.2	24
9	13.2	15.4	15.7	16.7	17.9	17.3	17.1	15.4	15.9	21.6	22.1	26.3	32.8	37.9	37.2	35.9	32.6	32.3	32.6	31.9	30.7	S	29.6	29.1	13.2	37.9	25.1	24
10	29.0	27.3	26.1	24.5	24.5	24.0	23.5	19.2	19.1	20.4	21.9	24.0	27.7	32.0	30.3	28.8	26.0	17.7	18.6	25.1	S	26.0	24.3	24.4	17.7	32.0	24.5	24
11	25.1	24.6	24.9	24.7	24.0	23.8	23.3	22.8	22.1	20.1	20.5	17.9	18.0	16.4	15.1	12.4	10.5	8.5	8.8	S	13.7	13.7	13.5	16.2	8.5	25.1	18.3	24
12	16.0	17.1	13.5	13.8	13.0	12.4	4.8	10.3	13.8	26.0	26.0	23.3	23.3	19.4	14.3	6.8	6.4	4.8	S	4.3	12.9	13.7	12.7	13.2	4.3	26.0	14.0	24
13	11.8	12.6	12.9	14.0	13.7	12.7	13.2	13.8	15.7	13.8	15.7	22.5	30.2	28.5	21.5	20.7	18.9	S	21.2	16.2	10.1	10.6	12.7	14.0	10.1	30.2	16.4	24
14	15.3	15.6	14.2	13.4	12.4	12.9	12.3	13.1	16.5	19.2	28.1	31.2	35.6	35.9	37.5	36.3	S	32.3	31.6	31.0	31.5	31.0	31.0	30.0	12.3	37.5	24.7	24
15	29.0	28.5	27.5	26.4	26.3	26.1	25.8	25.8	26.6	28.1	28.4	29.0	31.5	31.7	33.5	S	21.6	18.9	16.5	3.9	23.1	8.2	11.7	7.2	3.9	33.5	23.3	24
16	11.1	4.8	4.3	6.3	12.6	8.2	9.0	8.8	5.7	11.2	17.1	16.8	21.0	29.6	S	24.6	19.7	16.0	15.2	15.7	16.8	18.6	20.1	26.0	4.3	29.6	14.7	24
17	12.3	12.0	15.2	15.4	14.6	11.5	24.3	26.4	27.9	25.4	24.5	27.7	28.0	S	31.0	29.1	26.7	25.6	23.1	21.4	20.1	18.6	21.9	23.1	11.5	31.0	22.0	24
18	P	21.9	21.0	14.6	12.4	17.1	20.5	24.1	15.9	C	C	C	C	26.0	26.0	26.1	25.4	23.2	24.1	23.8	22.9	26.4	26.1	24.9	12.4	26.4	22.2	23
19	24.3	22.9	22.5	23.8	24.0	23.8	24.9	24.4	24.7	27.0	27.3	S	27.8	28.4	28.0	25.8	25.6	26.0	26.1	24.0	23.4	23.8	24.3	24.4	22.5	28.4	25.1	24
20	23.8	23.7	23.3	23.1	22.8	22.2	21.9	21.2	20.7	20.8	S	19.4	18.5	17.9	21.0	20.7	21.0	17.4	17.7	18.3	17.7	17.7	17.9	17.9	17.4	23.8	20.3	24
21	17.1	16.4	15.4	15.0	14.9	14.0	10.0	10.3	11.7	S	14.4	14.0	13.7	13.2	12.6	12.5	12.6	12.3	13.8	14.0	14.5	15.9	19.1	19.2	10.0	19.2	14.2	24
22	17.7	16.2	14.3	13.8	15.6	17.2	13.5	10.6	S	14.4	15.7	20.4	19.2	19.5	20.6	20.5	20.7	22.2	21.6	20.1	21.8	20.4	18.5	19.1	10.6	22.2	18.0	24
23	19.2	19.2	19.2	20.1	20.2	19.1	18.6	S	18.5	18.5	18.8	18.5	19.1	19.1	19.4	18.2	17.7	17.3	17.3	17.7	18.5	18.3	18.2	16.8	16.8	20.2	18.6	24
24	14.7	14.7	14.3	13.8	13.2	12.0	S	14.6	13.8	12.8	12.5	12.3	11.8	14.2	14.7	15.7	16.8	15.1	14.5	15.1	17.0	17.4	18.5	19.5	11.8	19.5	14.7	24
25	17.5	15.7	16.2	17.0	15.4	S	14.9	13.2	14.4	18.0	19.2	20.9	21.9	22.4	23.0	22.5	18.5	19.8	16.2	14.7	20.1	21.5	20.4	14.1	13.2	23.0	18.2	24
26	14.5	16.4	17.6	17.7	S	18.8	19.9	19.4	17.4	17.0	15.9	16.5	18.0	20.2	16.8	11.7	17.0	21.8	20.1	23.7	25.1	23.4	21.0	20.2	11.7	25.1	18.7	24
27	22.6	25.4	26.1	S	25.7	24.0	23.3	21.3	18.6	18.3	24.4	25.4	24.5	24.5	24.5	23.8	23.8	20.9	18.0	18.0	16.5	17.7	19.9	20.8	16.5	26.1	22.1	24
28	21.5	20.5	S	21.6	16.7	19.2	17.4	25.1	23.5	23.7	24.0	26.4	26.7	26.3	26.4	24.6	24.4	21.5	19.1	21.0	23.4	24.0	21.3	28.0	16.7	28.0	22.9	24
29	28.4	S	28.1	25.7	24.3	21.8	18.8	18.5	14.9	14.9	21.0	21.5	22.5	20.2	18.2	14.4	14.2	8.5	15.4	17.2	18.6	16.2	14.6	12.9	8.5	28.4	18.7	24
30	S	15.1	13.8	15.0	28.1	31.0	31.2	32.9	32.8	35.3	36.2	36.2	35.8	35.8	34.7	33.5	33.9	33.1	31.6	29.6	28.0	27.2	28.2	S	13.8	36.2	30.0	24
HOURLY MAX	29.0	28.5	28.1	26.4	28.7	31.0	31.2	32.9	32.8	35.3	36.2	48.0	47.4	41.6	38.6	36.3	33.9	33.1	32.6	31.9	31.5	31.0	31.0	30.0				
HOURLY AVG	18.7	18.6	17.9	17.0	17.7	16.7	16.3	16.4	16.8	18.4	19.8	21.8	23.5	24.5	23.8	21.7	19.8	18.4	18.4	18.0	19.0	18.4	19.6	19.1				

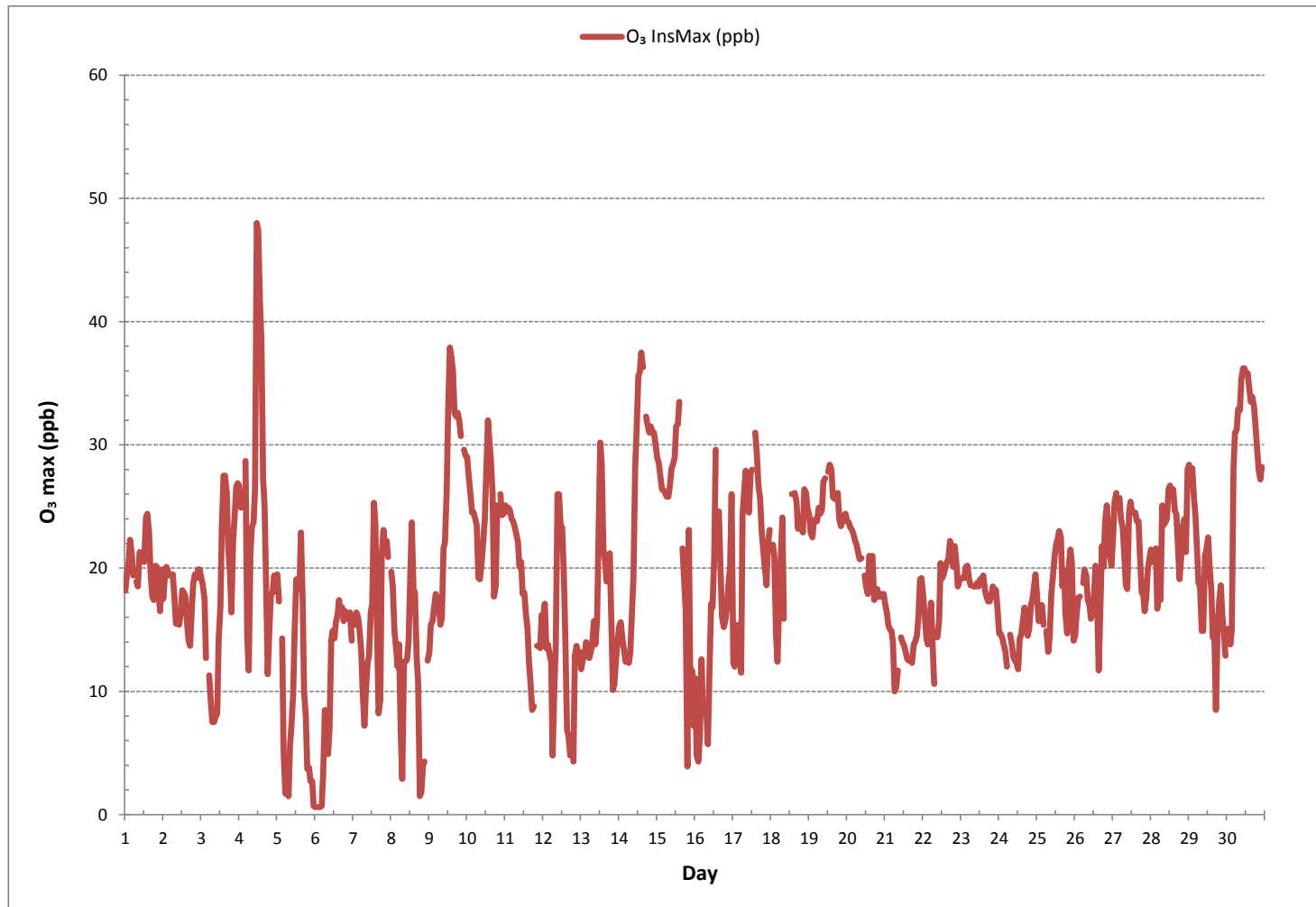
STATUS FLAG CODES

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:	684
MAXIMUM INSTANTANEOUS VALUE:	48.0 ppb @ HOUR(S) 11 ON DAY(S) 4
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	4 hrs
STANDARD DEVIATION:	7.1
OPERATIONAL TIME:	719 hrs

OZONE Instantaneous Maximum (O₃ ppb)



Wind: LICA Bonnyville Poll.: LICA Bonnyville-O3[ppb] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 95.00% Calm Avg: 0.00 [ppb]

Direction	0.0-13.4	13.4-26.8	26.8-40.2	>40.2	Total
N	2.92	2.49	0	0	5.41
NE	2.49	8.04	0	0	10.53
E	5.56	7.46	0.44	0	13.46
SE	2.19	12.13	2.05	0	16.37
S	1.61	3.8	0.58	0	5.99
SW	5.99	11.4	1.9	0	19.29
W	5.7	7.16	3.51	0	16.37
NW	5.85	6.58	0.15	0	12.58
Summary	32.31	59.06	8.63	0	100

% Icon Classes (ppb)

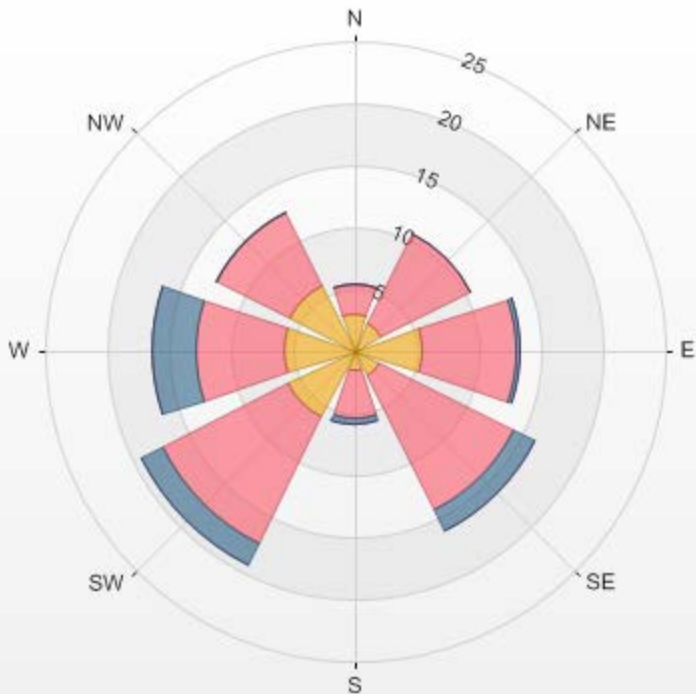
32 0.0-13.4

59 13.4-26.8

9 26.8-40.2

0 >40.2

LICA Bonnyville Poll.: LICA Bonnyville-O3[ppb] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



O3[ppb] Calibration: LICA Bonnyville Monthly: 2016/11 Type: Span



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

PARTICULATE MATTER 2.5



PARTICULATE MATTER < 2.5 MICRONS Hourly Averages (PM_{2.5} µg/m³)

HR START (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-HR	RDGS.	
HR END (MST)	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.		
DAY 1	2.7	0.7	0.0	0.2	1.1	2.7	0.0	2.2	0.1	0.1	3.2	1.6	6.2	5.1	0.7	0.0	4.7	3.2	0.7	0.0	1.1	0.2	3.1	0.7	0.0	6.2	1.7	24	
2	2.2	4.7	2.2	2.6	5.1	4.7	0.7	3.6	5.1	7.2	0.1	5.1	6.2	5.6	5.6	3.2	24.2	10.6	5.7	12.2	7.7	9.6	11.7	9.7	0.1	24.2	6.5	24	
3	10.6	9.7	12.1	15.7	15.2	7.7	10.1	9.2	13.2	0.0	7.2	6.2	6.2	0.0	4.1	0.7	5.6	28.6	21.7	24.1	4.7	4.1	1.1	2.2	0.0	28.6	9.2	24	
4	4.7	2.7	6.2	1.1	1.1	0.0	4.7	3.2	2.7	10.1	4.7	41.7	56.1	31.2	14.2	12.7	11.7	22.6	18.6	13.2	11.2	5.6	4.7	7.7	0.0	56.1	12.2	24	
5	6.2	1.1	5.6	3.2	9.2	7.2	6.2	6.6	4.7	10.6	6.7	4.1	0.0	7.7	6.2	9.2	19.6	7.2	15.2	15.7	7.7	17.1	9.2	9.2	0.0	19.6	8.1	24	
6	7.2	7.2	7.2	2.7	4.7	5.6	6.2	2.2	3.7	5.6	5.6	5.6	5.6	1.1	0.7	3.7	4.7	9.6	9.6	7.2	2.2	3.7	1.7	3.2	0.7	9.6	4.9	24	
7	3.7	4.1	2.2	2.2	2.2	4.7	13.7	11.2	12.1	13.2	5.6	9.2	7.2	7.2	4.7	8.2	16.7	7.7	5.6	3.7	3.7	0.0	0.0	5.1	0.0	16.7	6.4	24	
8	0.0	0.0	0.0	5.6	1.7	0.0	6.2	4.7	0.0	1.1	7.2	0.0	3.7	4.1	3.7	4.7	2.2	6.7	6.2	7.2	7.7	2.7	8.2	5.7	0.0	8.2	3.7	24	
9	3.7	5.1	3.7	3.7	6.2	4.7	4.7	2.2	1.6	0.7	0.0	0.7	3.7	2.7	5.6	0.0	8.2	7.2	2.2	2.7	3.2	3.2	0.0	0.7	0.0	8.2	3.2	24	
10	1.1	1.2	3.2	0.7	3.7	1.6	2.2	4.7	1.6	4.1	C	C	0.0	0.2	3.2	5.6	4.2	9.2	6.2	5.1	5.1	0.0	1.1	2.7	0.0	9.2	3.0	24	
11	3.7	2.2	0.0	4.1	0.7	0.0	2.2	0.0	2.7	0.0	0.0	6.2	2.7	2.2	3.2	6.7	5.1	7.7	13.7	9.2	10.6	25.7	38.7	24.2	0.0	38.7	7.1	24	
12	7.7	6.7	10.1	15.2	15.2	12.7	4.1	4.7	8.2	4.1	2.2	6.7	8.7	5.6	8.2	10.6	6.2	10.6	8.7	11.2	5.6	4.7	5.1	2.2	15.2	8.0	24		
13	3.2	6.2	5.1	7.7	5.1	3.2	0.7	4.1	4.1	3.2	8.2	2.2	5.2	6.2	7.7	5.6	4.7	7.2	0.7	6.7	5.7	10.6	9.6	7.2	0.7	10.6	5.4	24	
14	8.2	7.2	5.2	1.2	0.2	6.7	2.2	5.7	7.2	1.2	0.0	0.0	0.0	1.1	2.7	5.6	1.7	1.1	0.7	2.2	0.0	1.2	0.0	0.0	0.0	8.2	2.6	24	
15	1.7	4.1	0.2	0.0	5.1	2.7	0.0	0.1	0.0	4.1	1.6	X	X	X	7.2	10.6	X	5.6	25.7	49.7	2.7	7.7	5.1	10.1	0.0	49.7	7.2	20	
16	10.6	4.7	5.6	9.2	13.7	7.7	2.7	2.7	5.6	8.7	2.6	10.1	6.2	7.2	0.0	5.1	6.6	10.1	16.7	5.6	9.6	14.1	12.1	36.6	0.0	36.6	8.9	24	
17	9.6	6.6	5.6	10.1	6.6	10.6	5.6	4.1	0.1	7.7	7.2	6.2	1.2	0.0	0.0	4.7	5.6	13.1	5.1	6.2	7.7	11.6	5.1	0.0	0.0	13.1	5.8	24	
18	0.0	1.1	0.7	5.1	0.0	2.2	3.1	X	2.6	4.2	4.7	6.7	6.7	1.2	3.7	6.7	5.1	6.7	8.7	6.2	4.2	4.7	7.7	5.1	0.0	8.7	4.2	23	
19	3.2	8.2	6.2	10.1	7.7	8.7	4.2	2.7	5.2	7.2	14.2	8.7	8.2	8.7	4.2	5.2	7.2	7.7	5.7	7.2	7.2	4.2	5.6	7.2	2.7	14.2	6.9	24	
20	2.2	5.6	2.2	3.7	1.7	0.7	2.7	3.7	6.2	3.7	9.7	9.6	11.7	10.6	12.7	10.1	5.7	8.2	10.6	11.2	9.2	8.2	14.2	X	0.7	14.2	7.1	23	
21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
22	X	X	X	X	X	X	X	X	X	X	X	3.7	5.1	1.7	4.7	5.1	5.7	3.7	5.6	1.2	5.7	1.2	9.2	5.7	1.2	9.2	4.5	13	
23	7.2	3.7	4.7	1.7	5.1	1.7	1.7	2.7	2.2	3.2	2.2	1.2	0.7	3.7	6.2	5.2	3.2	5.6	4.1	3.7	5.1	0.0	0.7	10.1	0.0	10.1	3.6	24	
24	2.7	3.7	1.2	7.2	8.2	5.2	8.2	12.1	10.1	0.0	C	C	0.0	12.1	15.7	11.7	7.2	11.2	10.6	7.2	6.2	7.7	10.6	7.2	0.0	15.7	7.5	24	
25	4.7	6.2	10.6	13.2	12.7	7.2	7.7	10.6	5.6	3.7	8.7	0.0	2.7	1.7	4.7	3.2	6.7	2.7	15.2	11.2	2.7	3.7	7.7	8.2	0.0	15.2	6.7	24	
26	17.7	12.2	6.2	11.7	13.7	8.2	6.7	2.2	4.2	11.7	11.2	6.7	9.2	3.2	10.7	10.2	7.2	5.2	2.2	1.7	1.2	1.2	7.2	1.2	1.2	17.7	7.6	24	
27	3.2	3.7	0.7	11.7	8.7	9.2	6.7	2.7	4.2	0.0	5.2	7.2	8.2	15.2	1.7	5.2	10.2	6.2	14.2	8.7	15.2	12.7	5.7	4.7	0.0	15.2	7.1	24	
28	1.2	4.7	3.2	5.7	3.2	3.7	3.2	7.2	5.7	5.7	0.0	5.2	0.0	3.7	8.2	9.2	0.0	5.7	10.7	7.2	6.7	4.2	12.2	9.7	0.0	12.2	5.3	24	
29	11.7	8.2	7.7	3.2	0.0	X	X	17.2	8.7	13.7	0.0	11.7	0.0	7.7	2.7	7.2	4.2	5.2	8.7	4.2	8.7	5.7	7.2	2.7	0.0	17.2	6.7	22	
30	5.2	0.2	1.2	8.2	5.2	0.0	X	X	0.0	5.7	6.7	1.2	X	13.7	0.0	0.7	3.2	0.7	7.2	1.2	6.7	10.7	9.2	17.1	0.0	17.1	5.0	21	
HOURLY MAX	17.7	12.2	12.1	15.7	15.2	12.7	13.7	17.2	13.2	13.7	14.2	41.7	56.1	31.2	15.7	12.7	24.2	28.6	25.7	49.7	15.2	25.7	38.7	36.6					
HOURLY AVG	5.2	4.7	4.2	6.0	5.8	4.8	4.5	5.1	4.6	5.0	4.8	6.4	6.3	6.2	5.2	6.0	7.2	8.2	9.4	8.6	6.2	6.4	7.1	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

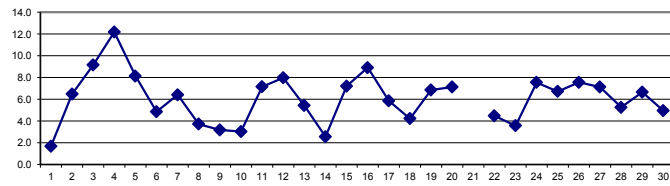
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	80	µg/m ³	24-HR	30	µg/m ³
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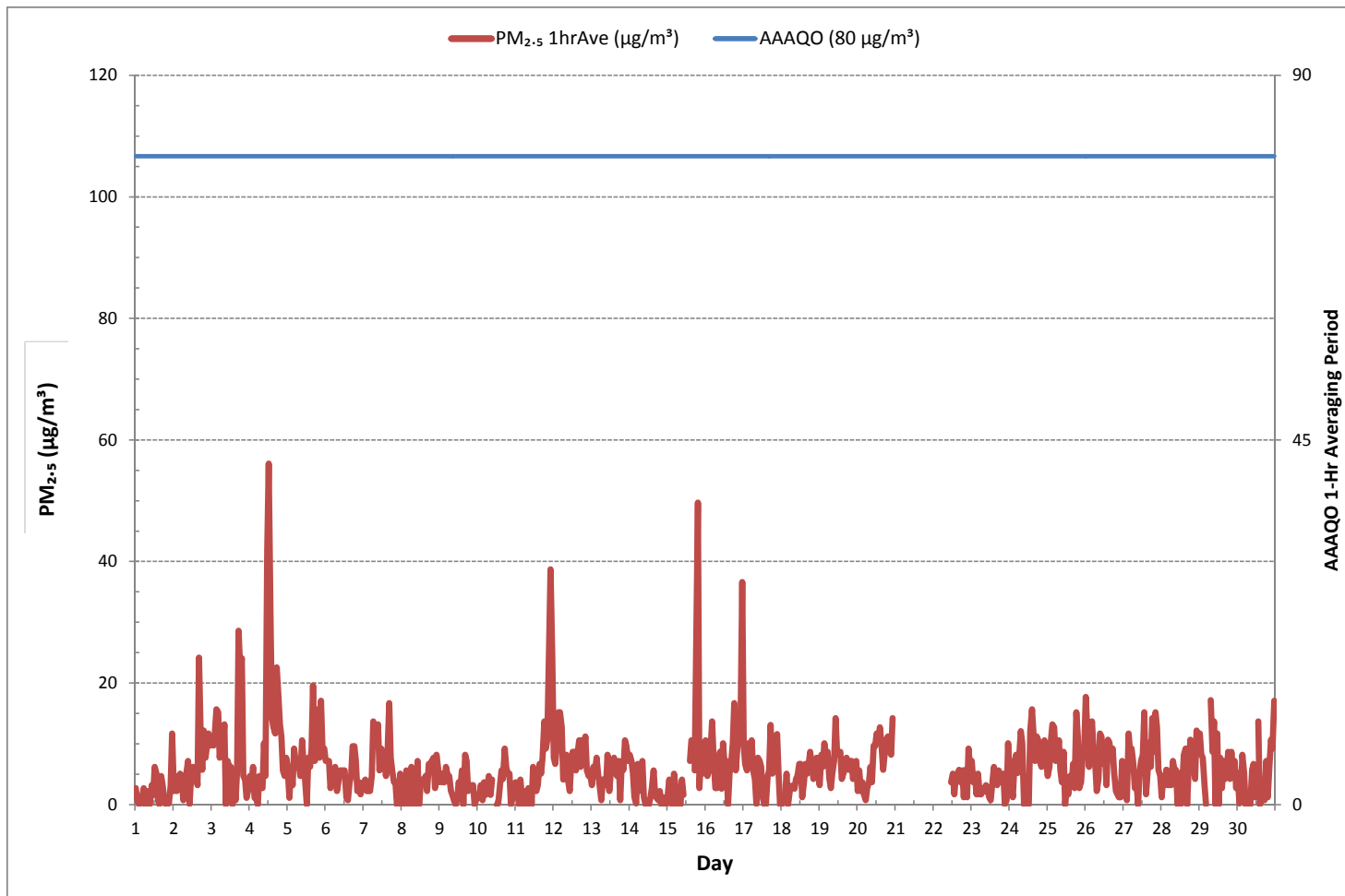
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF 24-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	615					
MINIMUM 1-HR AVERAGE:	0.0	µg/m ³	@ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 1-HR AVERAGE:	56.1	µg/m ³	@ HOUR(S)	12	ON DAY(S)	4
MAXIMUM 24-HR AVERAGE:	12.2	µg/m ³			ON DAY(S)	4
					VAR-VARIOUS	
MONTHLY CALIBRATION TIME:	4	hrs	OPERATIONAL TIME:	674	hrs	
STANDARD DEVIATION:	5.7		AMD OPERATION UPTIME:	93.6	%	
			MONTHLY AVERAGE:	6.1	µg/m ³	

24 HR AVERAGES November 2016



PARTICULATE MATTER < 2.5 MICRONS Hourly Averages (PM_{2.5} µg/m³)

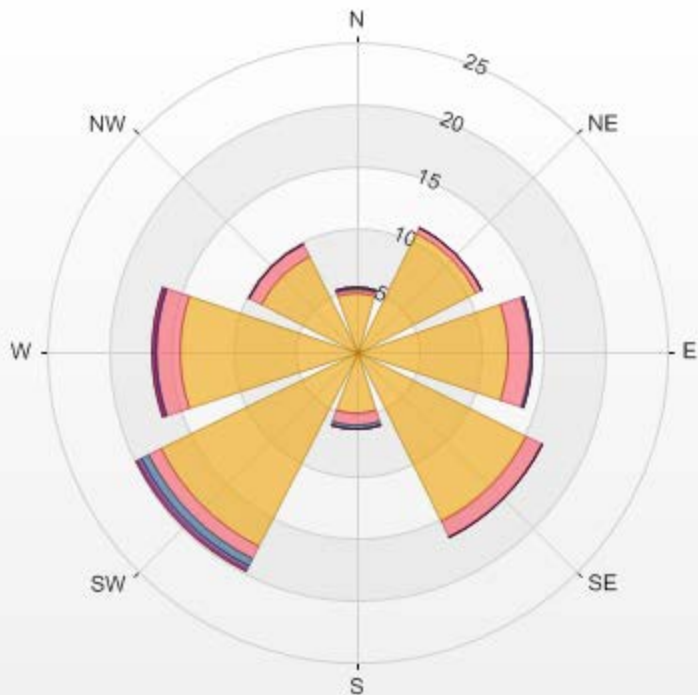


Wind: LICA Bonnyville Poll.: LICA Bonnyville-PM25[ug/m3(L)] Monthly: 11/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 85.28% Calm Avg: 0.00 [ug/m³]

Direction	0.0-11.2	11.2-22.5	22.5-33.7	33.7-45.0	45.0-56.2	>56.2	Total
N	4.72	0.33	0.16	0	0	0	5.21
NE	10.75	0.49	0	0	0	0	11.24
E	12.21	1.79	0.16	0	0	0	14.16
SE	15.31	1.47	0	0	0	0	16.78
S	5.05	0.98	0.33	0	0	0	6.36
SW	17.59	1.14	0.65	0.33	0.16	0	19.87
W	14.33	1.95	0	0.16	0.16	0	16.6
NW	8.63	1.14	0	0	0	0	9.77
Summary	88.59	9.29	1.3	0.49	0.32	0	100

% Icon Classes (ug/m3(L)) 89 0.0-11.2 9 11.2-22.5 1 22.5-33.7 0 33.7-45.0 0 45.0-56.2 0 >56.2

LICA Bonnyville Poll.: LICA Bonnyville-PM25[ug/m3(L)] 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



WIND SPEED



WIND SPEED Hourly Averages (WS kph)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY																												
1	7.2	5.6	6.2	7.2	6.8	5.9	6.8	7.8	9.9	7.5	6.7	6.8	7.1	8.0	8.1	7.9	8.4	8.0	7.8	7.7	7.2	4.9	5.3	7.4	4.9	9.9	6.4	24
2	7.4	4.8	4.7	6.8	7.4	6.2	7.4	8.3	8.3	6.7	6.2	4.7	5.9	8.1	6.1	9.8	4.2	6.5	11.4	11.7	12.5	10.7	12.2	11.9	4.2	12.5	4.6	24
3	8.7	7.1	8.4	8.8	9.8	9.9	7.8	7.2	3.6	0.8	3.5	11.1	11.0	8.7	7.3	11.7	9.0	9.0	1.9	6.5	8.2	7.2	7.9	7.3	0.8	11.7	4.8	24
4	8.3	8.6	6.3	7.7	2.9	5.2	2.3	6.3	8.6	7.3	5.2	4.4	4.5	3.2	5.5	6.2	5.1	2.2	1.2	3.0	5.0	4.2	4.7	4.1	1.2	8.6	3.3	24
5	5.8	4.8	3.7	3.4	3.1	0.6	0.3	3.1	3.5	3.7	1.3	3.8	6.3	5.4	7.1	6.6	0.8	2.7	1.2	3.1	0.7	1.8	2.6	2.1	0.3	7.1	0.5	24
6	1.3	3.0	1.6	3.3	1.9	1.6	3.0	2.7	1.4	1.6	3.6	2.0	4.2	4.5	2.9	4.3	3.1	2.9	2.6	4.9	6.1	4.8	6.6	5.5	1.3	6.6	2.9	24
7	5.7	5.1	5.8	5.2	6.6	7.5	5.2	2.2	7.0	8.6	8.3	2.1	2.2	3.7	7.9	7.1	4.7	7.3	8.5	12.1	10.6	9.2	6.4	7.4	2.1	12.1	4.5	24
8	10.1	3.6	4.3	1.6	5.1	4.2	2.0	1.9	6.5	3.7	4.1	2.2	8.2	9.9	2.1	5.8	6.1	0.4	1.7	1.3	3.8	1.5	1.3	4.8	0.4	10.1	2.3	24
9	5.2	6.5	5.7	7.9	8.9	6.8	4.7	6.2	8.1	10.1	10.2	8.2	14.2	24.2	16.3	15.2	11.4	10.2	8.4	6.9	6.2	5.6	5.5	6.6	4.7	24.2	7.9	24
10	7.0	5.4	6.3	5.8	6.3	4.1	7.3	7.7	6.2	6.3	6.8	2.3	0.6	2.5	5.0	6.0	8.8	7.3	5.4	13.1	12.9	19.3	26.8	23.7	0.6	26.8	5.6	24
11	19.8	19.7	17.8	23.1	22.8	20.3	20.6	17.9	10.8	5.7	15.7	6.6	9.0	10.3	6.1	5.5	4.9	4.8	5.1	7.3	5.5	4.0	2.8	5.4	2.8	23.1	9.1	24
12	4.1	0.9	4.0	1.3	0.3	4.6	0.9	3.2	1.1	7.2	6.9	4.1	2.7	4.1	1.5	2.0	0.5	4.0	5.7	4.7	4.8	7.6	5.9	6.5	0.3	7.6	0.5	24
13	6.0	5.6	6.7	6.8	5.4	3.8	5.6	5.2	5.7	4.8	6.2	8.1	13.7	11.7	7.5	5.9	3.4	4.6	6.4	5.4	3.4	6.1	6.5	7.3	3.4	13.7	4.1	24
14	4.9	6.3	3.6	4.4	6.8	7.3	4.9	8.3	8.6	7.5	8.6	13.7	18.5	16.0	16.1	14.3	10.8	12.3	9.7	10.4	11.8	9.5	9.7	9.7	3.6	18.5	8.4	24
15	9.3	10.7	11.8	10.4	11.0	10.5	9.4	8.9	9.1	10.8	9.9	9.7	11.4	8.0	4.0	0.9	2.5	0.1	0.4	0.2	1.7	4.5	4.0	2.1	0.1	11.8	6.1	24
16	1.5	1.4	2.3	2.7	2.6	4.4	6.1	5.8	4.5	4.0	3.2	5.2	1.4	3.4	3.5	1.7	3.0	3.8	3.2	3.4	4.3	4.7	3.0	3.3	1.4	6.1	3.2	24
17	4.4	5.2	5.4	6.7	4.8	6.0	8.0	8.9	6.9	3.5	2.2	4.4	8.0	9.8	9.4	8.4	8.7	8.6	7.0	7.0	3.5	2.3	4.1	4.0	2.2	9.8	5.4	24
18	4.5	3.3	5.2	2.6	3.1	2.4	2.0	2.0	4.0	3.2	2.8	3.7	0.5	0.9	0.1	2.8	3.3	6.3	6.7	5.8	5.7	8.6	6.6	7.7	0.1	8.6	1.8	24
19	7.2	7.4	6.5	8.2	10.8	10.8	10.0	9.5	9.7	11.9	11.0	13.9	13.1	12.6	13.7	12.9	12.9	11.2	10.9	12.4	11.5	11.4	11.1	10.6	6.5	13.9	10.6	24
20	8.4	9.1	8.6	7.7	8.9	7.0	6.7	7.3	6.1	8.6	6.8	7.2	5.6	6.0	8.7	9.6	9.2	10.2	9.0	10.3	10.4	11.0	11.1	10.3	5.6	11.1	7.7	24
21	8.4	6.9	6.4	8.1	8.4	5.3	3.6	3.8	4.8	3.5	3.8	4.7	7.7	7.6	7.2	7.5	8.4	8.6	8.7	7.8	8.1	7.9	8.4	7.8	3.5	8.7	4.8	24
22	5.8	5.2	5.2	4.4	7.1	5.6	3.4	2.6	3.1	1.1	2.1	1.5	1.6	1.9	4.0	6.6	6.2	9.5	12.3	12.3	14.0	16.0	12.3	12.1	1.1	16.0	2.4	24
23	13.7	14.6	13.0	14.7	14.5	15.9	14.5	15.5	13.9	13.6	14.1	14.4	14.2	13.3	12.6	13.4	13.0	15.4	13.9	10.5	8.5	7.7	8.2	8.2	7.7	15.9	12.9	24
24	8.1	7.5	6.8	7.0	4.3	2.8	4.7	6.3	7.6	7.2	5.4	4.4	2.4	5.2	2.7	5.8	7.7	10.2	8.5	8.8	9.1	9.7	10.7	10.2	2.4	10.7	4.2	24
25	6.5	6.0	6.2	8.5	6.5	7.3	8.1	7.0	6.1	11.5	10.7	11.9	11.0	9.6	2.5	8.1	5.1	11.3	13.7	11.7	12.3	10.8	9.0	8.7	2.5	13.7	2.0	24
26	7.8	8.3	8.1	10.3	7.9	9.1	7.2	3.5	1.1	1.2	1.9	2.2	2.0	5.5	5.8	7.8	9.7	8.5	8.8	5.9	6.3	6.5	6.4	6.7	1.1	10.3	1.0	24
27	7.3	7.9	9.9	10.2	11.1	6.5	5.1	3.6	4.3	3.7	6.5	7.3	6.9	4.3	1.8	0.4	5.1	5.7	3.8	1.6	2.2	3.0	3.5	5.4	0.4	11.1	3.8	24
28	7.1	6.6	8.5	5.5	5.1	7.2	5.9	8.0	6.1	7.6	7.4	8.0	8.2	6.5	5.0	5.7	6.5	5.0	6.2	8.0	9.3	9.1	8.9	10.2	5.0	10.2	6.9	24
29	9.3	8.8	6.7	8.2	7.6	8.3	8.5	8.9	8.1	7.4	7.7	9.5	10.6	10.0	7.6	4.4	5.2	2.9	1.1	2.3	0.9	3.1	3.4	0.4	0.4	10.6	6.0	24
30	0.9	0.4	2.0	2.6	4.0	9.1	10.8	12.4	8.3	13.1	12.0	11.9	11.5	9.6	9.4	10.1	12.5	12.3	12.1	12.3	11.4	8.9	9.9	8.3	0.4	13.1	8.7	24
HOURLY MAX	19.8	19.7	17.8	23.1	22.8	20.3	20.6	17.9	13.9	13.6	15.7	14.4	18.5	24.2	16.3	15.2	13.0	15.4	13.9	13.1	14.0	19.3	26.8	23.7				
HOURLY AVG	1.3	1.1	0.8	1.0	1.3	1.2	1.0	0.6	0.6	1.3	1.9	1.4	1.8	2.1	1.6	1.9	1.6	1.3	1.2	1.8	1.7	1.7	1.9	1.8				

STATUS FLAG CODES

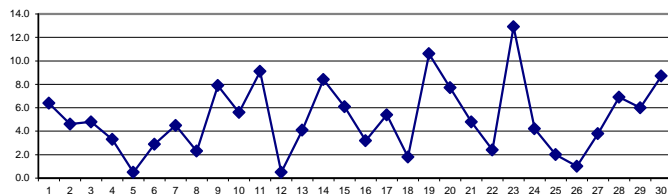
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	January 26, 2016
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

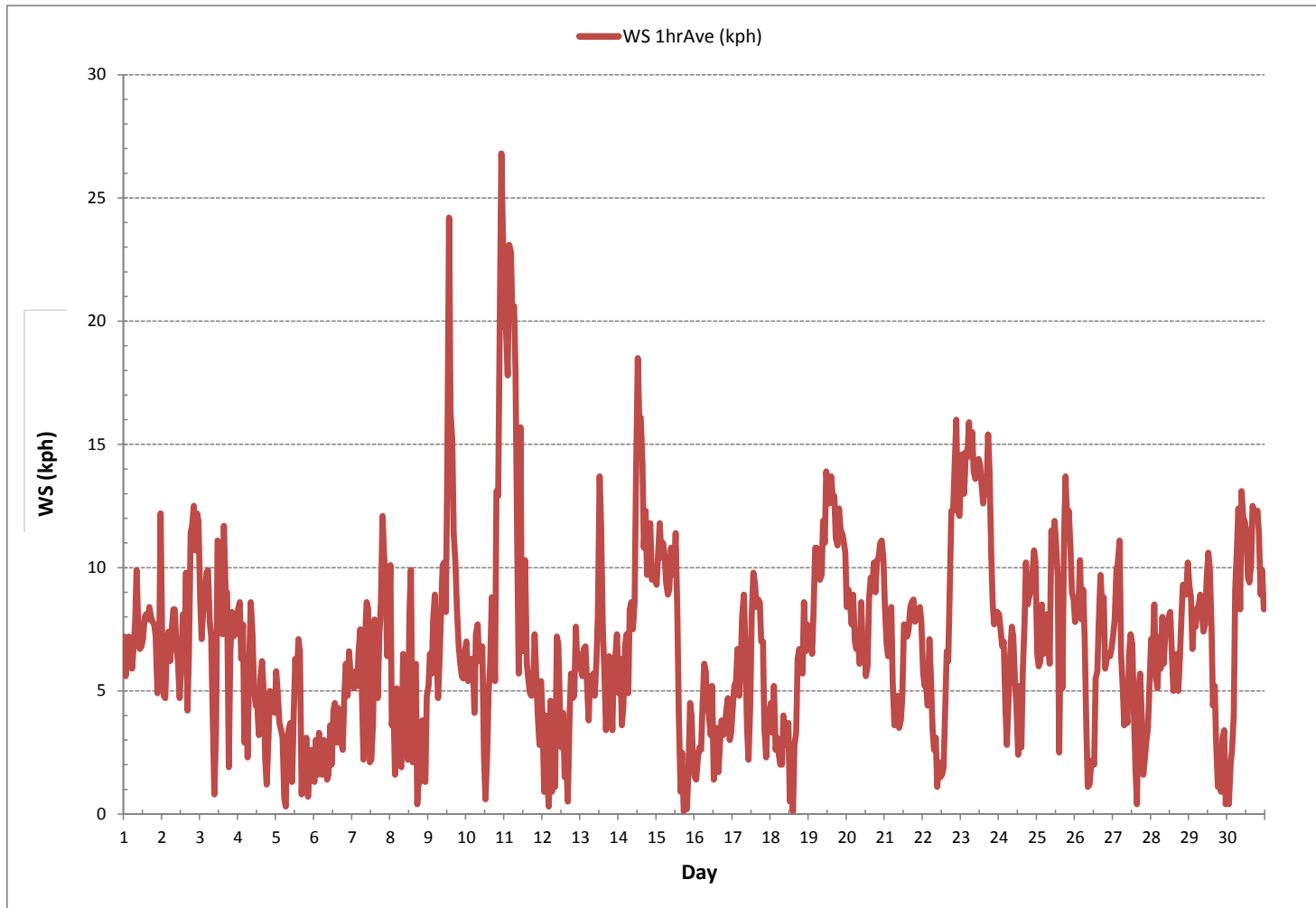
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	720
MINIMUM 1-HR AVERAGE:	0.1 kph @ HOUR(S) 17 , 14 ON DAY(S) 15 , 18
MAXIMUM 1-HR AVERAGE:	26.8 kph @ HOUR(S) 22 ON DAY(S) 10
MAXIMUM 24-HR AVERAGE:	12.9 kph ON DAY(S) 23
	VAR-VARIOUS
MONTHLY CALIBRATION TIME:	0 hrs
	OPERATIONAL TIME: 720 hrs
	AMD OPERATION UPTIME: 100.0 %
STANDARD DEVIATION:	3.9
	MONTHLY AVERAGE: 1.3 kph

24 HOUR AVERAGES November 2016



WIND SPEED Hourly Averages (WS kph)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

WIND SPEED Instantaneous Maximum (WS kph)

HR START (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-HR	RDGS.
HR END (MST)	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.	
DAY 1	13.9	12.0	14.1	14.0	13.3	14.6	13.9	17.0	22.3	16.7	15.0	17.0	16.7	17.6	19.0	17.9	16.9	17.4	17.3	20.0	17.0	13.2	11.2	16.8	11.2	22.3	16.0	24
2	14.6	10.3	10.9	14.2	17.1	15.9	16.4	18.3	17.0	20.2	14.8	11.4	14.0	15.0	15.8	18.8	12.3	13.3	21.8	23.7	21.7	20.4	20.3	22.5	10.3	23.7	16.7	24
3	19.2	13.9	16.2	19.9	21.4	21.0	13.8	17.0	10.7	7.4	10.4	22.2	23.6	19.7	19.7	17.9	15.3	15.4	6.3	12.9	18.0	16.9	13.9	14.4	6.3	23.6	16.1	24
4	13.2	14.7	14.0	13.2	9.6	12.8	9.4	13.0	16.0	15.0	15.3	11.0	12.3	8.5	17.1	14.6	11.8	9.3	7.6	7.0	11.8	10.2	13.5	7.9	7.0	17.1	12.0	24
5	14.6	9.9	13.9	11.1	8.3	4.9	4.0	6.8	8.1	10.1	7.8	9.1	16.3	10.4	13.2	11.8	8.4	9.4	6.5	10.6	6.7	11.3	8.7	8.1	4.0	16.3	9.6	24
6	7.0	9.2	9.2	8.2	7.0	7.4	10.3	8.4	8.5	6.7	9.6	7.9	9.9	11.0	9.9	12.5	7.3	8.1	6.2	10.1	11.3	8.7	9.2	10.1	6.2	12.5	8.9	24
7	8.4	9.0	10.3	8.1	9.4	11.6	11.1	7.4	12.2	13.1	15.2	7.6	7.6	23.1	21.7	14.7	10.5	12.3	18.9	22.2	20.3	19.7	13.5	13.2	7.4	23.1	13.4	24
8	21.9	13.2	8.2	7.4	12.6	10.0	6.4	8.6	13.9	14.5	11.1	7.8	17.8	22.2	7.7	12.0	12.5	10.5	5.7	4.1	10.1	6.2	7.0	11.2	4.1	22.2	10.9	24
9	9.1	18.4	10.0	12.8	15.4	12.2	9.4	11.0	14.4	25.9	24.4	24.9	45.1	52.5	48.4	37.4	26.8	27.9	22.9	17.0	21.7	11.8	14.2	14.9	9.1	52.5	22.0	24
10	17.5	13.9	13.8	9.8	10.7	7.2	12.0	12.3	10.7	11.5	14.8	8.3	5.0	11.3	10.3	13.4	15.9	14.4	14.3	25.0	28.8	39.1	44.4	43.1	5.0	44.4	17.0	24
11	42.7	42.2	32.3	41.2	41.8	41.7	35.6	32.1	23.3	20.6	25.3	16.6	19.3	20.6	15.7	9.8	7.9	9.5	9.1	10.7	9.2	9.4	6.8	9.8	6.8	42.7	22.2	24
12	7.5	4.3	9.7	6.2	3.8	10.5	7.3	6.9	7.4	20.2	14.2	9.9	8.8	7.9	6.9	6.7	8.1	10.6	13.9	12.3	13.3	16.8	14.9	15.1	3.8	20.2	10.1	24
13	12.1	13.3	14.1	17.6	13.1	10.0	13.4	10.7	10.8	9.9	12.3	16.0	23.7	25.9	16.1	15.2	6.6	7.5	12.3	13.6	9.9	13.1	12.4	13.9	6.6	25.9	13.5	24
14	11.2	12.4	9.8	12.7	14.1	17.9	12.1	18.5	18.8	17.6	22.8	35.7	42.4	38.6	46.7	41.7	30.9	32.1	24.3	28.4	29.6	24.2	21.0	21.2	9.8	46.7	24.4	24
15	17.8	23.1	25.4	21.6	22.7	21.0	19.2	18.1	18.4	21.8	18.4	18.8	22.8	17.5	11.8	5.6	7.9	3.9	3.7	5.6	13.4	7.9	7.5	5.9	3.7	25.4	15.0	24
16	4.1	5.6	4.9	5.9	6.1	8.0	12.6	10.0	11.0	9.4	8.1	10.5	8.0	8.8	8.5	5.2	6.9	7.5	8.1	7.0	9.6	9.5	10.3	6.5	4.1	12.6	8.0	24
17	8.7	10.6	12.5	14.9	13.3	13.3	21.0	19.2	16.1	9.3	8.1	17.2	17.8	20.9	22.3	20.1	20.8	17.9	12.5	13.5	7.5	6.8	8.1	9.1	6.8	22.3	14.2	24
18	P	7.1	12.2	6.7	6.5	7.1	7.5	6.9	11.0	10.2	8.8	8.5	6.0	8.2	5.8	8.9	11.0	12.9	14.0	12.7	10.8	15.7	15.1	16.2	5.8	16.2	10.0	23
19	14.5	15.4	13.8	19.0	25.0	21.9	22.8	20.3	21.7	23.1	26.8	29.2	30.1	28.0	32.6	32.9	28.8	27.5	27.5	28.6	27.0	24.1	25.0	23.5	13.8	32.9	24.5	24
20	18.5	22.2	20.5	16.2	18.2	15.9	15.7	15.4	13.2	16.8	15.2	16.8	13.3	13.4	18.3	19.9	22.2	23.4	20.7	23.4	21.3	23.0	25.5	19.6	13.2	25.5	18.7	24
21	22.3	17.1	15.7	16.8	19.7	12.6	8.4	10.7	11.2	9.7	10.8	12.7	16.7	17.1	16.5	17.8	19.1	20.2	21.9	17.3	19.0	19.3	22.3	17.6	8.4	22.3	16.4	24
22	13.7	10.7	11.8	11.1	16.8	17.4	6.7	6.4	6.2	4.8	5.8	7.6	8.6	9.1	12.5	13.8	13.9	23.1	23.7	26.2	27.2	29.0	26.6	24.9	4.8	29.0	14.9	24
23	30.9	28.4	26.9	33.1	33.9	33.5	31.2	31.7	31.3	30.4	30.8	31.9	33.9	29.2	26.8	30.4	28.8	30.7	32.2	23.6	18.7	18.0	15.8	14.8	14.8	33.9	28.2	24
24	14.2	13.3	12.2	11.3	8.8	7.7	12.2	15.2	15.5	18.4	12.3	10.2	10.4	13.1	9.3	13.7	17.6	20.5	17.7	18.9	20.4	20.5	22.8	24.7	7.7	24.7	15.0	24
25	17.2	13.5	15.4	17.7	19.6	16.5	16.5	16.6	17.3	27.4	23.4	23.6	22.8	19.0	15.2	14.8	9.1	33.4	44.0	33.0	27.4	29.5	21.2	16.1	9.1	44.0	21.3	24
26	16.7	16.4	13.7	15.1	13.3	15.8	14.3	8.6	7.6	6.9	7.0	8.3	9.8	12.0	14.6	21.2	20.4	20.9	20.4	17.7	18.5	14.4	15.7	14.3	6.9	21.2	14.3	24
27	16.0	20.9	25.5	24.8	25.9	17.7	14.1	9.0	8.8	9.0	17.2	22.3	15.7	10.9	10.7	5.2	13.7	14.8	9.5	4.6	6.5	9.4	9.8	13.6	4.6	25.9	14.0	24
28	14.9	15.1	19.6	10.2	15.0	15.5	13.4	21.3	15.2	16.9	16.9	17.7	16.6	15.9	14.1	14.8	13.3	12.6	15.1	21.2	19.8	20.0	20.5	23.1	10.2	23.1	16.6	24
29	20.4	19.0	14.7	17.9	16.0	16.5	17.9	18.2	17.5	15.8	16.7	18.1	23.5	20.3	17.5	12.9	12.4	8.9	5.3	6.8	4.2	8.0	9.1	5.4	4.2	23.5	14.3	24
30	6.6	5.0	7.2	7.5	13.8	18.5	20.9	23.8	16.8	22.9	22.2	22.3	23.7	22.4	19.5	23.2	24.4	21.8	23.5	23.4	20.5	17.6	18.0	17.0	5.0	24.4	18.4	24
HOURLY MAX	42.7	42.2	32.3	41.2	41.8	41.7	35.6	32.1	31.3	30.4	30.8	35.7	45.1	52.5	48.4	41.7	30.9	33.4	44.0	33.0	29.6	39.1	44.4	43.1				
HOURLY AVG	15.5	14.7	14.6	14.9	15.7	15.2	14.3	14.6	14.4	15.4	15.4	16.0	18.1	18.3	17.5	16.8	15.4	16.6	16.2	16.7	16.7	16.5	16.1	15.8				

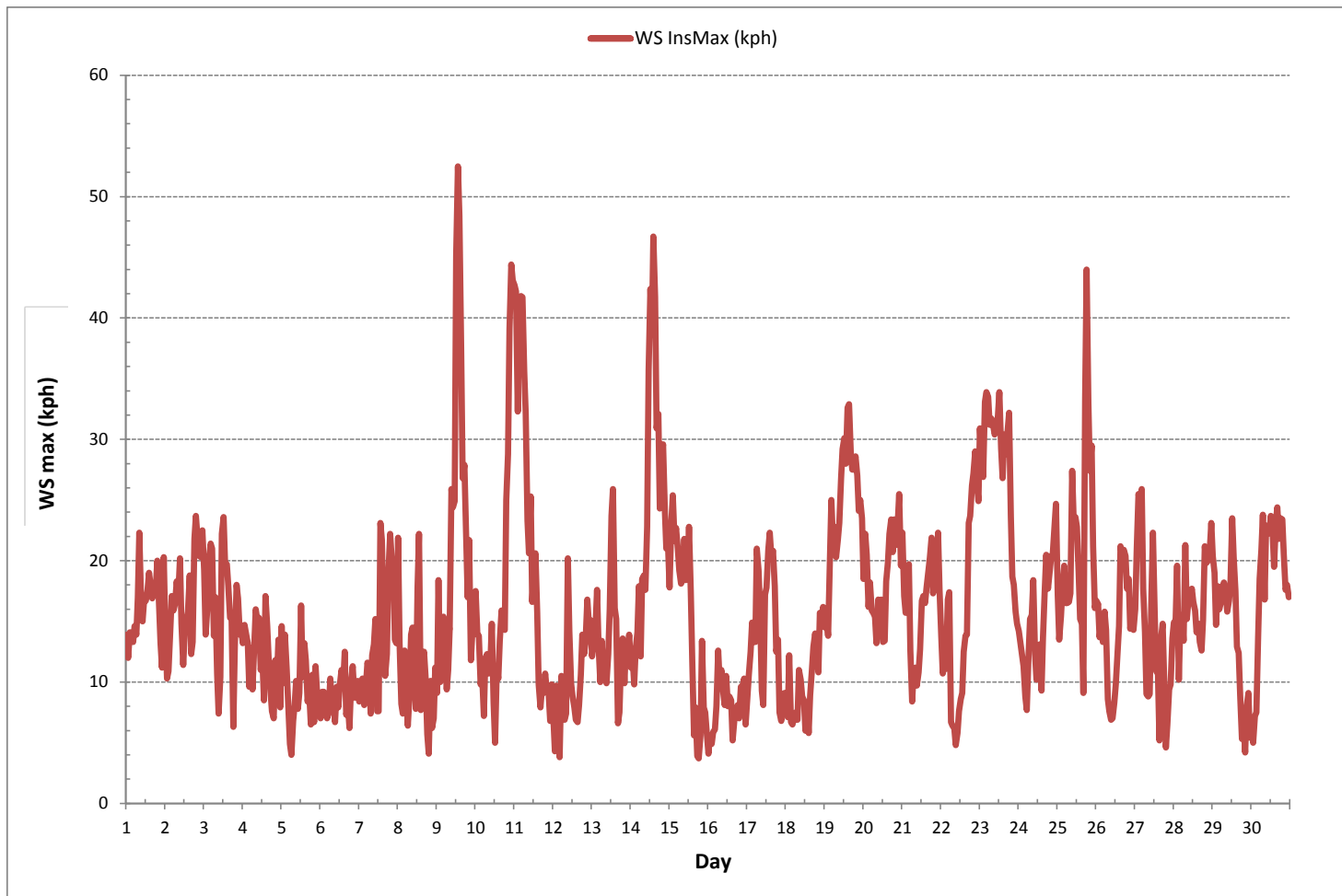
STATUS FLAG CODES

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

MAXIMUM INSTANTANEOUS VALUE:	52.5	kph	@ HOUR(S)	13	ON DAY(S)	9
					VAR-VARIOUS	
OPERATIONAL TIME:					719	hrs

WIND SPEED Instantaneous Maximum (WS kph)



Wind: LICA Bonnyville Monitor: WSP [kph] Monthly: 11/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.
 Calm: 0.00% Valid Data: 100.00% Calm Avg: 0.00 km/hr

Direction	0.0-5.4	5.4-10.8	10.8-16.1	16.1-21.5	21.5-26.9	>26.9	Total
N	3.89	1.25	0	0	0	0	5.14
NE	3.06	6.39	1.39	0	0	0	10.84
E	4.86	7.5	1.11	0	0	0	13.47
SE	2.78	6.94	5.28	0.56	0.56	0	16.12
S	2.36	2.08	1.39	0.42	0	0	6.25
SW	7.22	10.97	1.11	0	0	0	19.3
W	5.97	7.92	1.81	0.42	0.14	0	16.26
NW	5.56	7.08	0	0	0	0	12.64
Summary	35.7	50.13	12.09	1.4	0.7	0	100

% Icon Classes (kph)

50  5.4-10.8

12  10.8-16.1

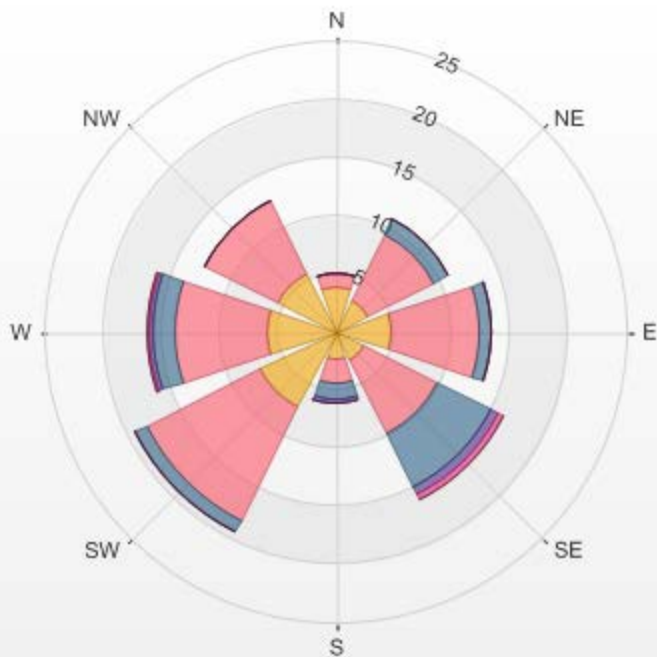
1  16.1-21.5

1  21.5-26.9

0  >26.9

36  0.0-5.4

LICA Bonnyville 01/11/2016 00:00 - 30/11/2016 23:00 Calm: 0.00%



WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

WIND DIRECTION Hourly Averages (WD)

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

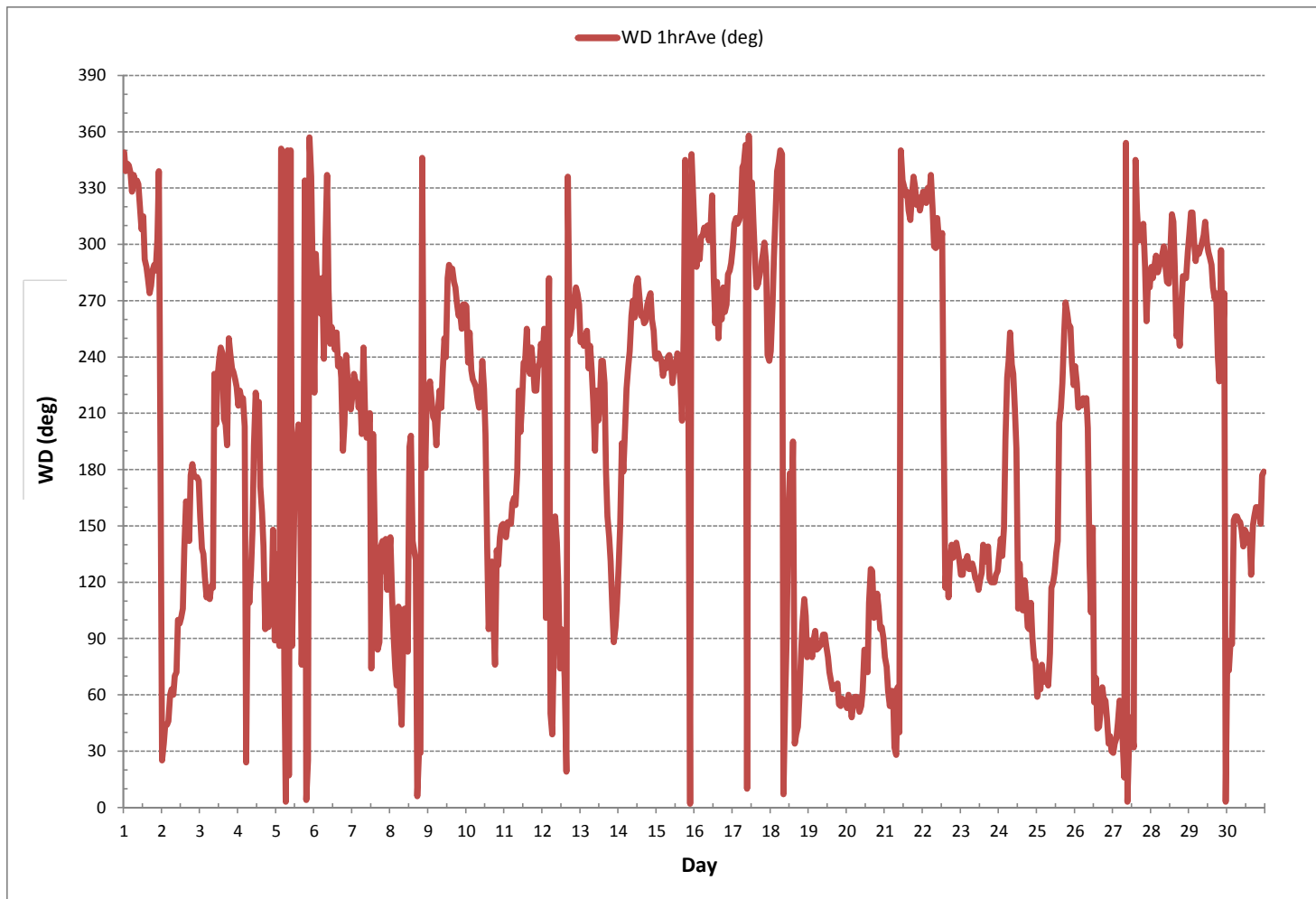
STATUS FLAG CODES

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:	720	hrs
STANDARD DEVIATION:	94		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	179	(S)

WIND DIRECTION Hourly Averages (WD)



STANDARD DEVIATION WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville Continuous Monitoring Station - November 2016

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)

HR START (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.	
HR END (MST)	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	11	13	13	12	12	13	13	13	17	17	19	17	17	20	16	16	16	15	15	14	12	12	19	24	
2	16	19	22	18	20	23	20	18	21	22	21	28	20	15	16	10	35	15	10	10	10	11	11	11	11	24
3	14	16	14	16	15	13	13	17	45	42	25	13	16	17	17	7	7	9	20	11	13	13	11	11	24	
4	8	10	10	10	24	10	42	17	14	11	17	26	33	34	45	26	36	40	40	37	22	22	47	24	24	
5	21	20	31	20	10	52	16	8	23	16	45	41	27	15	22	10	64	29	21	45	58	33	38	31	24	
6	23	18	29	13	22	26	25	15	10	19	17	16	16	20	30	27	23	16	23	9	10	11	7	5	24	
7	6	10	11	7	6	9	31	37	6	6	10	55	53	24	19	12	16	10	12	11	12	12	18	12	24	
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12	9	12	33	18	34	25	43	28	47	22	15	21	54	29	46	31	25	15	17	15	14	15	14	15	24	
13	12	14	15	17	16	17	14	15	12	20	11	10	10	14	14	12	21	12	12	37	42	19	14	15	24	
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15	13	15	14	13	13	13	14	13	14	13	14	14	13	14	15	25	20	17	10	22	38	15	11	9	24	
16	7	8	6	6	7	7	9	10	11	11	15	14	26	19	15	16	8	10	9	10	12	11	8	8	24	
17	9	10	10	11	12	12	14	14	17	25	23	18	14	14	16	16	15	13	10	10	9	7	10	11	24	
18	9	11	11	12	13	15	15	14	17	29	53	41	55	57	48	33	33	20	20	26	24	16	22	20	24	
19	17	18	22	23	16	18	19	18	17	15	17	18	19	20	20	20	19	21	20	18	17	17	16	17	24	
20	18	19	17	17	15	17	18	18	17	16	20	19	21	19	15	16	15	16	16	15	17	15	15	14	24	
21	19	19	18	16	19	19	18	15	19	28	18	19	15	18	15	14	14	15	15	14	14	14	14	15	24	
22	12	11	11	11	16	15	10	14	13	10	14	23	24	39	42	18	24	17	13	14	12	12	13	14	24	
23	14	12	16	14	15	14	15	15	16	15	15	16	16	16	14	15	16	13	14	15	15	16	14	13	24	
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26	12	10	9	8	6	11	12	18	18	56	48	32	28	23	22	20	18	20	20	32	23	19	23	17	24	
27	17	20	19	20	18	22	22	19	14	17	19	25	20	26	20	17	14	13	11	8	14	18	15	15	24	
28	14	14	13	12	13	12	12	14	12	15	16	16	17	17	15	16	16	15	13	16	14	14	14	14	24	
29	13	15	13	15	12	13	13	13	14	14	14	14	15	15	14	14	15	12	22	14	13	22	15	43	24	
30	69	40	54	42	50	14	13	12	12	12	14	15	15	16	16	15	10	12	11	14	11	16	15	20	24	

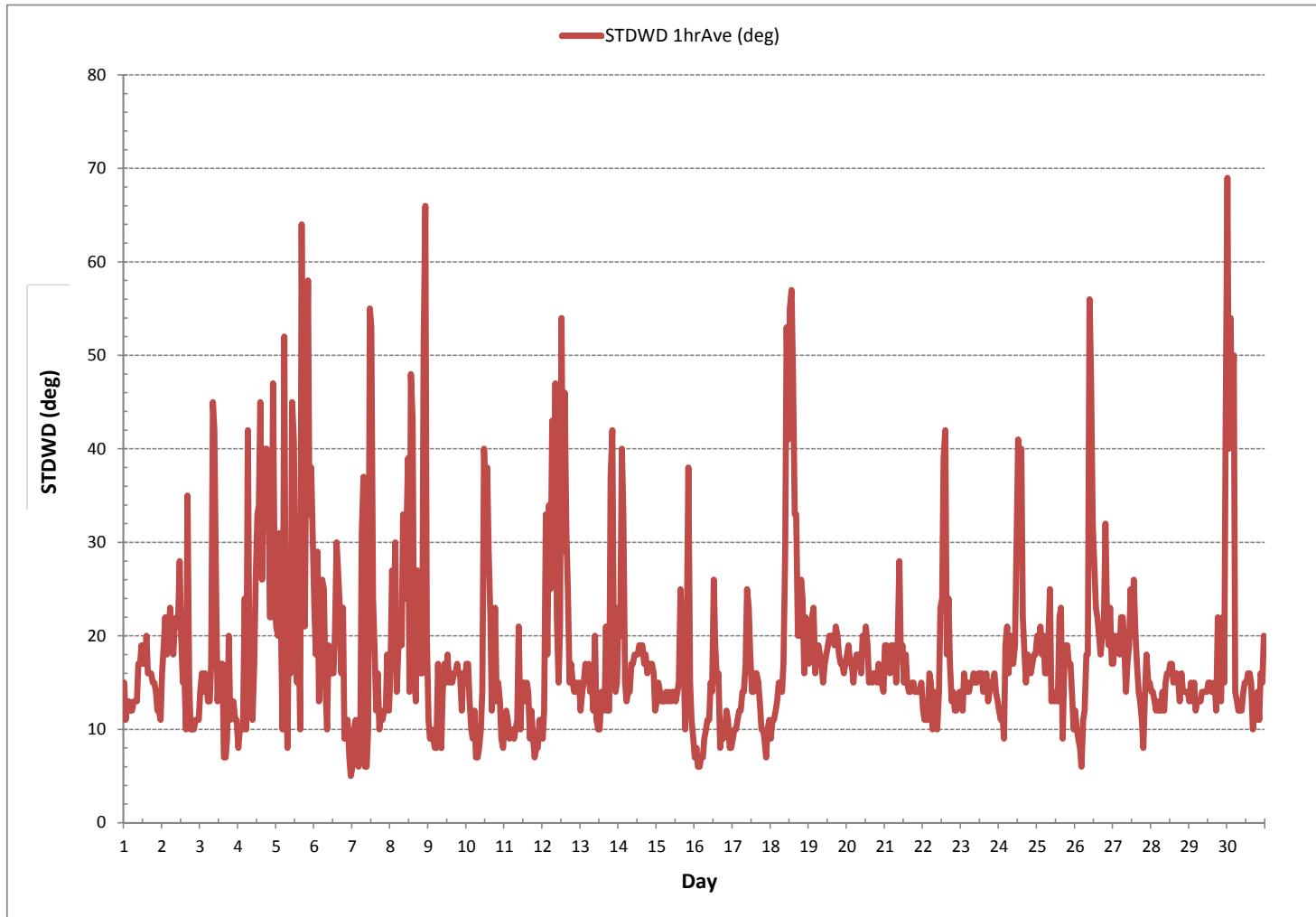
STATUS FLAG CODES

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

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 720 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



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: 2645
 Station ID: LICA 37 Installation Date/Time (mst): Oct 28, 2016 @ 11:46
 Sample ID: LICA/VOC/Bonnyville/Nov 2, 2016 Removal Date/Time (mst): Nov 04, 2016 @ 08:20

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>Nov 2, 2016</u>	<u>00:00</u>	<u>00:00 Nov 3, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.6</u>	<u>19</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: Oct 07, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: Sep 28, 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 : Oct 07, 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: [Signature] Date: Nov 04, 2016

Sample ID: 16110059-003

Customer ID: LICA
 Cust Samp ID: LICA/VOC/Bonnyville/Nov 2, 2016



Volatile Organics Data Results

Date: November 2, 2016
Canister ID: 2645

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	0.07
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	0.03
2,4-Dimethylpentane	0.01
2-Methylheptane	0.01
2-Methylhexane	< 0.01
2-Methylpentane	0.08
3-Methylheptane	< 0.02
3-Methylhexane	0.03
3-Methylpentane	0.05
Acetone	3.6
Acrolein	< 0.3
Benzene	0.09
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	0.02
Carbon disulfide	0.06
Carbon tetrachloride	0.13
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.02
Chloromethane	0.48
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	< 0.02
cis-2-Pentene	< 0.02
Cyclohexane	0.04
Cyclopentane	0.02
Dibromochloromethane	< 0.01
Ethanol	1.1
Ethyl acetate	< 0.4
Ethylbenzene	0.01
Freon-11	0.37

Volatile Organics Data Results

Date: November 2, 2016
Canister ID: 2645

PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.08
Freon-114	0.03
Freon-12	0.76
Hexachloro-1,3-butadiene	< 0.50
Isobutane	1.63
Isopentane	0.60
Isoprene	< 0.01
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	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.05
Methylcyclopentane	0.05
Methylene chloride	0.4
n-Butane	1.54
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.02
n-Hexane	0.07
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.3
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	0.07
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

Sample ID: 16110116-002

AIR FCD-01320/2

Customer ID: LICA

Cust Samp ID: LICA/VOC/Bonnyville/Nov 8, 2016



Maxxam

VOC Sample Collection Data Sheet

24-Nov-2016
CW

Client: LICA
Location: BONNYVILLE - AER
Station ID: LICA 37
Field Sample ID: LICA/VOC/BONNYVILLE/NOV 8, 2016

Sampler S/N: 6200
Canister ID: H3210
Canister Installation Date/Time: NOV 07, 2016 @ 08:40
Canister Removal Date/Time: NOV 10, 2016 / 09:44

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
<u>NOV 08, 2016</u>	<u>00:00</u>	<u>24:00</u>	<u>24.0</u>

Flow Settings		
Meter Reading (sccm)	Pot Set Pt.	Pump Pressure Setting (psig)
<u>10.0</u>	<u>4.94</u>	<u>26</u>

Canister Information	
Initial Canister Vacuum (inHg)	Final Canister Pressure (psig)
<u>-27</u>	<u>+19.7</u>

Canister valve open prior to sampling?: YES / NO
Timer set to 0.00 minutes prior to sampling? YES / NO
Canister valve closed prior to disconnection?: YES / NO

Comments: n/a

Technician Signature: Installed by: [Signature]

Collected by: Alex Yakupov Date: Nov 10, 2016

Volatile Organics Data Results

Date: November 8, 2016
Canister ID: H3290

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	0.06
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	0.06
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.17
1-Hexene	< 0.02
1-Pentene	0.03
2,2,4-Trimethylpentane	0.06
2,2-Dimethylbutane	0.03
2,3,4-Trimethylpentane	0.02
2,3-Dimethylbutane	0.06
2,3-Dimethylpentane	0.09
2,4-Dimethylpentane	0.03
2-Methylheptane	0.03
2-Methylhexane	0.09
2-Methylpentane	0.18
3-Methylheptane	0.02
3-Methylhexane	0.08
3-Methylpentane	0.09
Acetone	1.8
Acrolein	< 0.3
Benzene	0.20
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	0.01
Carbon disulfide	0.01
Carbon tetrachloride	0.13
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.04
Chloromethane	0.52
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.02
cis-2-Pentene	< 0.02
Cyclohexane	0.07
Cyclopentane	0.03
Dibromochloromethane	< 0.01
Ethanol	3.8
Ethyl acetate	< 0.4
Ethylbenzene	0.05
Freon-11	0.37

Volatile Organics Data Results

Date: November 8, 2016
Canister ID: H3290

PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.07
Freon-114	0.03
Freon-12	0.76
Hexachloro-1,3-butadiene	< 0.50
Isobutane	1.63
Isopentane	0.85
Isoprene	0.02
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	0.16
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	0.12
Methylcyclopentane	0.10
Methylene chloride	< 0.3
n-Butane	2.41
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.07
n-Hexane	0.14
n-Nonane	0.02
n-Octane	0.03
n-Pentane	0.5
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	0.02
o-Xylene	0.06
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	0.31
Tetrahydrofuran	< 0.4
Toluene	0.27
trans-1,2-Dichloroethylene	0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.03
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: 2864
 Station ID: LICA 37 Installation Date/Time (mst): Nov 10, 2016 @ 09:50
 Sample ID: LICA/VOC/Bonnyville/Nov 14, 2016 Removal Date/Time (mst): Nov 17, 2016 @ 18:55

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>Nov 14, 2016</u>	<u>00:00</u>	<u>00:00 Nov 15, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.0</u>	<u>+18.1</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: Oct 07, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: Sep 28, 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 - Oct 07, 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Nov 17, 2016

Sample ID: 16110222-001
Customer ID: LICA
Cust Samp ID: LICA/VOC/Bonnyville/Nov 14, 2016



Volatile Organics Data Results

Date: November 14, 2016
 Canister ID: 2664

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,1,2-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	0.19
1-Hexene	0.02
1-Pentene	0.03
2,2,4-Trimethylpentane	0.03
2,2-Dimethylbutane	0.02
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	0.03
2,4-Dimethylpentane	0.01
2-Methylheptane	0.02
2-Methylhexane	< 0.01
2-Methylpentane	0.07
3-Methylheptane	< 0.02
3-Methylhexane	0.05
3-Methylpentane	0.05
Acetone	7.6
Acrolein	< 0.3
Benzene	0.13
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	3.11
Carbon tetrachloride	0.12
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.03
Chloromethane	0.55
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.04
cis-2-Pentene	< 0.02
Cyclohexane	0.03
Cyclopentane	0.02
Dibromochloromethane	< 0.01
Ethanol	1.4
Ethyl acetate	< 0.4
Ethylbenzene	0.02
Freon-11	0.34

Volatile Organics Data Results

Date: November 14, 2016
Canister ID: 2664

PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.07
Freon-114	0.02
Freon-12	0.70
Hexachloro-1,3-butadiene	< 0.50
Isobutane	1.23
Isopentane	0.86
Isoprene	< 0.01
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	0.05
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	1.2
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.05
Methylcyclopentane	0.05
Methylene chloride	< 0.3
n-Butane	1.36
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.05
n-Hexane	0.08
n-Nonane	0.02
n-Octane	< 0.02
n-Pentane	0.3
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	0.08
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: 1516
 Station ID: LICA 37 Installation Date/Time (mst): Nov 17, 2016 @ 13:55
 Sample ID: LICA/VOC/Bonnyville/Nov 20, 2016 Removal Date/Time (mst): Nov 21, 2016 @ 13:15

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>Nov 20, 2016</u>	<u>00:00</u>	<u>00:00</u> <u>Nov 21, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.0</u>	<u>+18.1</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: Oct 07, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: Sep 28, 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 - Oct 07, 2016

Deployment Technician Signature: Alex Yakupov
 Collection Technician Signature: Alex Yakupov Date: Nov 21, 2016

Sample ID: 16110222-003

Customer ID: LICA
 Cust Samp ID: LICA/VOC/Bonnyville/Nov 20, 2016



Volatile Organics Data Results

Date: November 20, 2016
Canister ID: 1516

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	0.07
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	0.02
3-Methylpentane	0.03
Acetone	1.4
Acrolein	< 0.3
Benzene	0.08
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	0.13
Carbon tetrachloride	0.12
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.03
Chloromethane	0.52
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.03
cis-2-Pentene	< 0.02
Cyclohexane	0.03
Cyclopentane	0.02
Dibromochloromethane	< 0.01
Ethanol	1.8
Ethyl acetate	< 0.4
Ethylbenzene	0.02
Freon-11	0.35

Volatile Organics Data Results

Date: November 20, 2016
Canister ID: 1516

PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.08
Freon-114	0.02
Freon-12	0.73
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.53
Isopentane	0.27
Isoprene	< 0.01
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	0.04
Methylcyclopentane	0.04
Methylene chloride	< 0.3
n-Butane	0.89
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.02
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	0.04
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.07
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: 6200
 Location: Bonnyville - AER Canister ID: A.Y. #13-01 2411
 Station ID: LICA 37 Installation Date/Time (mst): Nov 21, 2016 @ 13:15
 Sample ID: LICA/VOC/Bonnyville/Nov 26, 2016 Removal Date/Time (mst): Nov 28, 2016 @ 13:42

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>Nov 26, 2016</u>	<u>00:00</u>	<u>00:00</u> <u>Nov 27, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.0</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: Oct 07, 2016 (due every 3 months)
 Last date of sample line & fitting replacement: Sep 28, 2016 (due every 6 months)

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

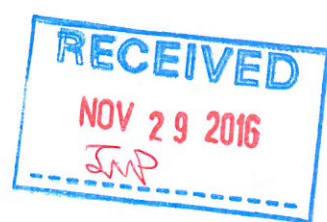
Comments: Date of last audit - Oct 07, 2016
No pressure gauge on the canister. The data is taken from the pressure gauge on the sampler.

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Nov 28, 2016

Sample ID: 16110258-001

Customer ID: LICA
 Cust Samp ID: LICA/VOC/Bonnyville/Nov 26, 2016



Volatile Organics Data Results

Date: November 26 , 2016
Canister ID: 2411

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	0.05
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.02
1,2-Dichloropropane	0.01
1,3,5-Trimethylbenzene	0.04
1,3-Butadiene	0.03
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	0.02
2,2,4-Trimethylpentane	0.02
2,2-Dimethylbutane	0.02
2,3,4-Trimethylpentane	0.01
2,3-Dimethylbutane	0.03
2,3-Dimethylpentane	0.06
2,4-Dimethylpentane	0.01
2-Methylheptane	0.02
2-Methylhexane	0.10
2-Methylpentane	0.09
3-Methylheptane	< 0.02
3-Methylhexane	0.05
3-Methylpentane	0.06
Acetone	2.4
Acrolein	< 0.3
Benzene	0.16
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	0.15
Carbon tetrachloride	0.12
Chlorobenzene	< 0.02
Chloroethane	0.07
Chloroform	0.03
Chloromethane	0.78
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.07
cis-2-Pentene	< 0.02
Cyclohexane	0.07
Cyclopentane	0.03
Dibromochloromethane	< 0.01
Ethanol	1.3
Ethyl acetate	< 0.4
Ethylbenzene	0.03
Freon-11	0.35

Volatile Organics Data Results

Date: November 26 , 2016
Canister ID: 2411

PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.06
Freon-114	0.02
Freon-12	0.71
Hexachloro-1,3-butadiene	< 0.50
Isobutane	1.12
Isopentane	0.39
Isoprene	0.01
Isopropyl alcohol	< 0.4
Isopropylbenzene	0.02
m,p-Xylene	0.09
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	0.17
Methylcyclopentane	0.07
Methylene chloride	< 0.3
n-Butane	1.90
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.04
n-Hexane	0.12
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.4
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	0.02
o-Xylene	0.03
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	0.07
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.12
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: 16110059-004

Customer ID: LICA

Cust Samp ID: LICA/PUF/Bonnyville/Nov 2, 2016

PUF PLUS Sample Collection Data Sheet

Client:	LICA	Puf+ S/N:	TE-08	
Location:	Bonnyville - AER	Motor S/N:	1139/ 100-1015	
Station ID:	LICA 37	Installation Date/Time:	Oct 28, 2016 / 11:55	
Field Sample ID:	LICA/PUF/Bonnyville/Nov 2, 2016		Removal Date/Time:	Nov 04, 2016 / 08:50

Sample Data Collection Information

Sample Date:	Nov 2, 2016	Average Pressure (mmHg)	703
Start Time (mst):	00:00	Average Flow (Q _{std})	229
End Time (mst):	00:00 Nov 3, 2016	Average Temperature (°C)	-0.8
Elapsed Time (Hours):	24.0	Volume (Vstd m ³)	370.19

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:	Oct 07, 2016	
Other observations?		



Deployed By: Alex Yakupov

Collected By: *[Signature]* Date Nov 04, 2016

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: November 2, 2016
PUF S/N: TE08

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.02
2-Methylnaphthalene	0.06
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.02
Acenaphthylene	0.04
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	0.04
Fluorene	0.06
Indeno(1,2,3-cd)pyrene	0.04
Naphthalene	0.03
Perylene	< 0.01
Phenanthrene	0.17
Pyrene	0.06
Retene	0.02

Sample ID: 16110116-003

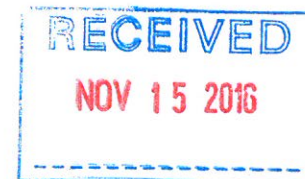
AIR FCD-01321/2

Customer ID: LICA

Cust Samp ID: LICA/PUF/Bonnyville/Nov 8, 2016

Maxxam

Hi-Vol PUF+ Sample Collection Data Sheet



Client: LICA
Location: BONNYVILLE - AER
Station ID: LICA 37
Field Sample ID: LICA/PUF/Bonnyville/Nov 08, 2016

Puf+ S/N: TE-11
Motor S/N: 1139 / 1022-1015
Installation Date/Time: Nov 04, 2016 @ 08:50
Removal Date/Time: Nov 10, 2016 / 09:37

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
<u>Nov 08, 2016</u>	<u>00:00</u>	<u>24:00</u>	<u>24</u>

PUF and QFF Information			
Date Received	Date Shipped	Puf Expiration Date	QFF Prep Date

Set Flow Rate (slpm): 230

Date of Last Calibration: Oct 07, 2016

Sampling Data			
Average Pressure (mmHg)	Average Flow (Qstd slpm)	Average Temperature (°C)	Volume (Vstd m ³)
<u>701</u>	<u>229</u>	<u>6.9°</u>	<u>330.19</u>

Time set correctly prior to sampling? YES / NO
Timer set correctly prior to sampling? YES / NO
Sampling data saved to memory card after sampling? YES / NO

Comments: n/a

Technician Signature: Installed by: [Signature]

Collected by: Alex Yakupov

Date: Nov 10, 2016

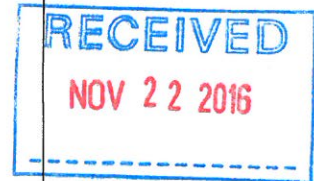
Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: November 8, 2016
PUF S/N: TE11

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.15
2-Methylnaphthalene	0.24
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.10
Acenaphthylene	0.59
Acridine	< 0.01
Anthracene	0.12
Benzo(a)anthracene	0.04
Benzo(a)pyrene	0.01
Benzo(b,j,k)fluoranthene	0.06
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	0.04
Benzo(ghi)perylene	< 0.01
Chrysene	0.04
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.22
Fluorene	0.27
Indeno(1,2,3-cd)pyrene	0.04
Naphthalene	0.17
Perylene	< 0.01
Phenanthrene	0.87
Pyrene	0.21
Retene	0.10

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>Nov 10, 2016/ 09:37</u>
Field Sample ID:	<u>LICA/PUF/Bonnyville/Nov 14, 2016</u>	Removal Date/Time:	<u>Nov 17, 2016 / 14:12</u>
Sample Data Collection Information			
Sample Date:	<u>Nov 14, 2016</u>	Average Pressure (mmHg)	<u>694</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q _{std})	<u>229</u>
End Time (mst):	<u>00:00 Nov 15, 2016</u>	Average Temperature (°C)	<u>5.4</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		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>Oct 07, 2016</u>		
Other observations?	_____		

Deployed By:	<u>Alex Yakupov</u>		
Collected By:	<u>Alex Yakupov</u>	Date:	<u>Nov 17, 2016</u>



Sample ID: 16110222-002
Customer ID: LICA
Cust Samp ID: LICA/PUF/Bonnyville/Nov 14, 2016

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: November 14, 2016
PUF S/N: TE04

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	< 0.01
2-Methylnaphthalene	0.04
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	< 0.01
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	0.03
Perylene	< 0.01
Phenanthrene	0.20
Pyrene	0.05
Retene	0.05

TISCH PUF PLUS Sample Collection Data Sheet			
Client:	<u>LICA</u>	Puf+ S/N:	<u>TE-02</u>
Location:	<u>Bonnyville - AER</u>	Motor S/N:	<u>1139 / 100-1015</u>
Station ID:	<u>LICA 37</u>	Installation Date/Time:	<u>Nov 17, 2016 / 14:12</u>
Field Sample ID:	<u>LICA/PUF/Bonnyville/Nov 20, 2016</u>	Removal Date/Time:	<u>Nov 21, 2016 / 13:32</u>
Sample Data Collection Information			
Sample Date:	<u>Nov 20, 2016</u>	Average Pressure (mmHg)	<u>699</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q _{std})	<u>229</u>
End Time (mst):	<u>00:00 Nov 21, 2016</u>	Average Temperature (°C)	<u>-4.9</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (V _{std} 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)	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>Oct 07, 2016</u>		
Other observations?	<u>n/a</u>		
<div style="border: 1px solid blue; padding: 5px; display: inline-block;"> <p style="margin: 0; color: blue; font-weight: bold; font-size: 1.2em;">RECEIVED</p> <p style="margin: 0; color: red; font-weight: bold;">NOV 22 2016</p> </div>			
<p>Sample ID: 16110222-004</p> <p>Customer ID: LICA</p> <p>Cust Samp ID: LICA/PUF/Bonnyville/Nov 20, 2016</p>			
Deployed By:	<u>Alex Yakupov</u>		
Collected By:	<u>Alex Yakupov</u>	<u>Date: Nov 21, 2016</u>	

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: November 20, 2016
PUF S/N: TE02

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.07
2-Methylnaphthalene	0.14
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.03
Acenaphthylene	0.05
Acridine	< 0.01
Anthracene	0.02
Benzo(a)anthracene	0.02
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	0.06
Indeno(1,2,3-cd)pyrene	0.03
Naphthalene	0.14
Perylene	< 0.01
Phenanthrene	0.21
Pyrene	0.03
Retene	0.06



TISCH PUF PLUS Sample Collection Data Sheet			
Client:	<u>LICA</u>	Puf+ S/N:	<u>P13-01</u>
Location:	<u>Bonnyville - AER</u>	Motor S/N:	<u>1139 / 100 - 1015</u>
Station ID:	<u>LICA 37</u>	Installation Date/Time:	<u>Nov 21, 2016 / 13:32</u>
Field Sample ID:	<u>LICA/PUF/Bonnyville/Nov 26, 2016</u>	Removal Date/Time:	<u>Nov 28, 2016 / 13:52</u>
Sample Data Collection Information			
Sample Date:	<u>Nov 26, 2016</u>	Average Pressure (mmHg)	<u>699</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q _{std})	<u>2.29</u>
End Time (mst):	<u>00:00 Nov 27, 2016</u>	Average Temperature (°C)	<u>-2.5</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (V _{std} m ³)	<u>330.16</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>Oct 07, 2016</u>		
Other observations?			
Deployed By:	<u>Alex Yarepov</u>		
Collected By:	<u>Alex Yarepov</u>	Date:	<u>Nov 28, 2016</u>

Sample ID: 16110258-002
Customer ID: LICA
Cust Samp ID: LICA/PUF/Bonnyville/Nov 26, 2016

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: November 26, 2016
PUF S/N: P1301

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.12
2-Methylnaphthalene	0.18
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.08
Acenaphthylene	0.12
Acridine	< 0.01
Anthracene	0.02
Benzo(a)anthracene	0.04
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	0.07
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	0.10
Fluorene	0.15
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.15
Perylene	< 0.01
Phenanthrene	0.34
Pyrene	0.11
Retene	0.11

NMHC CANISTER RESULTS

Sample ID: 16110059-005

Customer ID: LICA
 Cust Samp ID: LICA/NMHC-
 VOC/Bonnyville/Nov 2, 2016

Maxxam

VOC Sample Collection Data Sheet

Client: LICA Sampler S/N: n/a
 Location: Bonnyville - AER Canister ID: 1689
 Station ID: LICA 37 Canister Installation Date/Time: October 24, 2016 / 17:03
 Field Sample ID: LICA/NMHC-VOC/Bonnyville/Nov 02, 2016 Canister Removal Date/Time: Nov 03, 2016 / 19:15

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
<u>Nov 02, 2016</u>	<u>09:05</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 Vacuum (inHg)
<u>-27.7</u>	<u>-3</u>



Canister valve open prior to sampling?: YES / NO
 Canister valve closed prior to disconnection?: YES / NO

Comments: NMHC canister

Technician Signature: Install Alex Yakupov Date: Nov 03, 2016
Remove: Chris Wesson

Volatile Organics Data Results (NMHC Canister System)

Date: November 2, 2016
Canister ID: 1689

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	< 0.06
1,2,3-Trimethylbenzene	< 0.08
1,2,4-Trichlorobenzene	< 1.2
1,2,4-Trimethylbenzene	< 0.05
1,2-Dibromoethane	< 0.03
1,2-Dichlorobenzene	< 0.05
1,2-Dichloroethane	0.02
1,2-Dichloropropane	< 0.02
1,3,5-Trimethylbenzene	< 0.03
1,3-Butadiene	0.08
1,3-Dichlorobenzene	< 0.5
1,4-Dichlorobenzene	< 0.6
1,4-Dioxane	< 0.6
1-Butene	0.34
1-Hexene	< 0.03
1-Pentene	0.03
2,2,4-Trimethylpentane	0.02
2,2-Dimethylbutane	0.02
2,3,4-Trimethylpentane	0.02
2,3-Dimethylbutane	0.03
2,3-Dimethylpentane	0.04
2,4-Dimethylpentane	< 0.02
2-Methylheptane	< 0.02
2-Methylhexane	0.05
2-Methylpentane	0.14
3-Methylheptane	< 0.03
3-Methylhexane	0.04
3-Methylpentane	0.08
Acetone	1.6
Acrolein	< 0.5
Benzene	0.16
Benzyl chloride	< 0.6
Bromodichloromethane	< 0.03
Bromoform	< 0.03
Bromomethane	< 0.02
Carbon disulfide	0.05
Carbon tetrachloride	0.13
Chlorobenzene	< 0.03
Chloroethane	< 0.03
Chloroform	< 0.03
Chloromethane	0.49
cis-1,2-Dichloroethene	< 0.02
cis-1,3-Dichloropropene	< 0.06
cis-2-Butene	0.09
cis-2-Pentene	< 0.03
Cyclohexane	< 0.03
Cyclopentane	0.03
Dibromochloromethane	< 0.02
Ethanol	2.0
Ethyl acetate	< 0.6
Ethylbenzene	0.03
Freon-11	0.36

Volatile Organics Data Results (NMHC Canister System)

Date: November 2, 2016
Canister ID: 1689

PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.06
Freon-114	< 0.03
Freon-12	0.75
Hexachloro-1,3-butadiene	< 0.78
Isobutane	2.89
Isopentane	1.26
Isoprene	0.02
Isopropyl alcohol	< 0.6
Isopropylbenzene	< 0.02
m,p-Xylene	0.07
m-Diethylbenzene	< 0.06
m-Ethyltoluene	< 0.12
Methyl butyl ketone	< 0.78
Methyl ethyl ketone	< 0.5
Methyl isobutyl ketone	< 0.6
Methyl methacrylate	< 0.11
Methyl tert butyl ether	< 0.05
Methylcyclohexane	0.03
Methylcyclopentane	0.07
Methylene chloride	< 0.5
n-Butane	6.14
n-Decane	< 0.09
n-Dodecane	< 0.6
n-Heptane	0.03
n-Hexane	0.10
n-Nonane	< 0.02
n-Octane	< 0.03
n-Pentane	0.5
n-Propylbenzene	< 0.08
n-Undecane	< 0.8
Naphthalene	< 0.8
o-Ethyltoluene	< 0.02
o-Xylene	0.03
p-Diethylbenzene	< 0.06
p-Ethyltoluene	< 0.11
Styrene	< 0.06
Tetrachloroethylene	< 0.06
Tetrahydrofuran	< 0.6
Toluene	0.13
trans-1,2-Dichloroethylene	< 0.02
trans-1,3-Dichloropropylene	< 0.06
trans-2-Butene	0.06
trans-2-Pentene	0.05
Trichloroethylene	0.08
Vinyl acetate	< 0.6
Vinyl chloride	< 0.03

Sample ID: 16110116-001

AIR FCD-01320/2

Customer ID: LICA

Cust Samp ID: LICA/NMHC-
VOC/Bonnyville/Nov 4, 2016

Maxxam



VOC Sample Collection Data Sheet

Client: LICA Sampler S/N: n/a
 Location: Bonnyville - AER Canister ID: 55608
 Station ID: LICA 37 Canister Installation Date/Time: Nov 03, 2016 / 19:24
 Field Sample ID: LICA/NMHC-voc/Bonnyville/NOV 04, 2016 Canister Removal Date/Time: _____

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
<u>Nov 04, 2016</u>	<u>16:45</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 Vacuum (inHg)
<u>-2.8</u>	<u>-4.5</u>

Canister valve open prior to sampling?: YES / NO

Canister valve closed prior to disconnection?: YES / NO

Comments: NMHC canister

Technician Signature: Install: [Signature] Date: Nov 10, 2016

Collected by Alex Yakupov

Volatile Organics Data Results (NMHC Canister System)

Date: November 4, 2016
Canister ID: 55608

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	< 0.06
1,2,3-Trimethylbenzene	< 0.07
1,2,4-Trichlorobenzene	< 1.2
1,2,4-Trimethylbenzene	0.16
1,2-Dibromoethane	< 0.03
1,2-Dichlorobenzene	< 0.04
1,2-Dichloroethane	0.03
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	0.06
1,3-Butadiene	< 0.03
1,3-Dichlorobenzene	< 0.4
1,4-Dichlorobenzene	< 0.6
1,4-Dioxane	< 0.6
1-Butene	0.53
1-Hexene	< 0.03
1-Pentene	0.05
2,2,4-Trimethylpentane	0.20
2,2-Dimethylbutane	0.04
2,3,4-Trimethylpentane	0.08
2,3-Dimethylbutane	0.09
2,3-Dimethylpentane	0.22
2,4-Dimethylpentane	0.07
2-Methylheptane	0.04
2-Methylhexane	0.15
2-Methylpentane	0.30
3-Methylheptane	0.04
3-Methylhexane	0.13
3-Methylpentane	0.17
Acetone	3.0
Acrolein	< 0.4
Benzene	0.36
Benzyl chloride	< 0.6
Bromodichloromethane	< 0.03
Bromoform	< 0.03
Bromomethane	< 0.01
Carbon disulfide	0.06
Carbon tetrachloride	0.12
Chlorobenzene	< 0.03
Chloroethane	< 0.03
Chloroform	0.05
Chloromethane	0.54
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.06
cis-2-Butene	0.09
cis-2-Pentene	0.04
Cyclohexane	0.07
Cyclopentane	0.05
Dibromochloromethane	< 0.01
Ethanol	8.4
Ethyl acetate	< 0.6
Ethylbenzene	0.11
Freon-11	0.36

Volatile Organics Data Results (NMHC Canister System)

Date: November 4, 2016
Canister ID: 55608

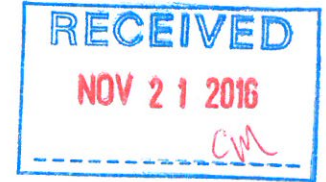
PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.06
Freon-114	0.03
Freon-12	0.78
Hexachloro-1,3-butadiene	< 0.72
Isobutane	2.65
Isopentane	1.49
Isoprene	0.04
Isopropyl alcohol	< 0.6
Isopropylbenzene	0.01
m,p-Xylene	0.38
m-Diethylbenzene	< 0.06
m-Ethyltoluene	< 0.12
Methyl butyl ketone	< 0.72
Methyl ethyl ketone	< 0.4
Methyl isobutyl ketone	< 0.6
Methyl methacrylate	< 0.10
Methyl tert butyl ether	< 0.04
Methylcyclohexane	0.14
Methylcyclopentane	0.18
Methylene chloride	< 0.4
n-Butane	4.38
n-Decane	< 0.09
n-Dodecane	< 0.6
n-Heptane	0.13
n-Hexane	0.23
n-Nonane	0.04
n-Octane	0.05
n-Pentane	0.8
n-Propylbenzene	< 0.07
n-Undecane	< 0.7
Naphthalene	< 0.7
o-Ethyltoluene	0.05
o-Xylene	0.15
p-Diethylbenzene	< 0.06
p-Ethyltoluene	< 0.10
Styrene	< 0.06
Tetrachloroethylene	0.79
Tetrahydrofuran	< 0.6
Toluene	0.63
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.06
trans-2-Butene	0.11
trans-2-Pentene	0.06
Trichloroethylene	< 0.06
Vinyl acetate	< 0.6
Vinyl chloride	< 0.03

Sample ID: 16110212-001

AIR FCD-01320/2

Customer ID: LICA
Cust Samp ID: LICA/NMHC-
VOC/Bonnyville/Nov 12,
2016

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VOC Sample Collection Data Sheet

Client: LICA Sampler S/N: n/a
Location: Bonnyville - AER Canister ID: 1532
Station ID: LICA 37 Canister Installation Date/Time: Nov 10, 2016 / 10:10
Field Sample ID: LICA/NMHC VOC/Bonnyville/Nov 12, 2016 Canister Removal Date/Time: Nov 17, 2016 / 12:57

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
<u>Nov 12, 2016</u>	<u>15:35</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 (in Hg)	Final Canister Vacuum (in Hg)
<u>-27.0</u>	<u>-5.0</u>

Canister valve open prior to sampling?: YES / NO

Canister valve closed prior to disconnection?: YES / NO

Comments:

NMHC sampling canister

Technician Signature: Alex Yakupov Date: Nov 17, 2016

Volatile Organics Data Results (NMHC Canister System)

Date: November 12, 2016
Canister ID: 1532

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.03
1,1,1,2-Tetrachloroethane	< 0.03
1,1,2-Trichloroethane	< 0.03
1,1-Dichloroethane	< 0.03
1,1-Dichloroethylene	< 0.06
1,2,3-Trimethylbenzene	< 0.07
1,2,4-Trichlorobenzene	< 1.2
1,2,4-Trimethylbenzene	< 0.04
1,2-Dibromoethane	< 0.03
1,2-Dichlorobenzene	< 0.04
1,2-Dichloroethane	0.03
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.03
1,3-Butadiene	0.06
1,3-Dichlorobenzene	< 0.4
1,4-Dichlorobenzene	< 0.6
1,4-Dioxane	< 0.6
1-Butene	0.56
1-Hexene	0.10
1-Pentene	0.35
2,2,4-Trimethylpentane	0.23
2,2-Dimethylbutane	0.05
2,3,4-Trimethylpentane	0.06
2,3-Dimethylbutane	0.31
2,3-Dimethylpentane	0.29
2,4-Dimethylpentane	0.13
2-Methylheptane	0.04
2-Methylhexane	0.20
2-Methylpentane	0.87
3-Methylheptane	< 0.03
3-Methylhexane	0.17
3-Methylpentane	0.47
Acetone	< 0.6
Acrolein	< 0.4
Benzene	0.38
Benzyl chloride	< 0.6
Bromodichloromethane	< 0.03
Bromoform	< 0.03
Bromomethane	< 0.01
Carbon disulfide	0.25
Carbon tetrachloride	0.12
Chlorobenzene	< 0.03
Chloroethane	< 0.03
Chloroform	0.04
Chloromethane	0.52
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.06
cis-2-Butene	0.57
cis-2-Pentene	0.32
Cyclohexane	0.15
Cyclopentane	0.17
Dibromochloromethane	< 0.01
Ethanol	9.6
Ethyl acetate	< 0.6
Ethylbenzene	0.05
Freon-11	0.32

Volatile Organics Data Results (NMHC Canister System)

Date: November 12, 2016
Canister ID: 1532

PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.06
Freon-114	< 0.03
Freon-12	0.70
Hexachloro-1,3-butadiene	< 0.74
Isobutane	29.7
Isopentane	9.06
Isoprene	0.04
Isopropyl alcohol	< 0.6
Isopropylbenzene	< 0.01
m,p-Xylene	0.18
m-Diethylbenzene	< 0.06
m-Ethyltoluene	< 0.12
Methyl butyl ketone	< 0.74
Methyl ethyl ketone	0.5
Methyl isobutyl ketone	< 0.6
Methyl methacrylate	< 0.10
Methyl tert butyl ether	< 0.04
Methylcyclohexane	0.18
Methylcyclopentane	0.40
Methylene chloride	< 0.4
n-Butane	61.3
n-Decane	< 0.09
n-Dodecane	< 0.6
n-Heptane	0.14
n-Hexane	0.46
n-Nonane	< 0.01
n-Octane	0.04
n-Pentane	2.9
n-Propylbenzene	< 0.07
n-Undecane	< 0.7
Naphthalene	< 0.7
o-Ethyltoluene	< 0.01
o-Xylene	0.06
p-Diethylbenzene	< 0.06
p-Ethyltoluene	< 0.10
Styrene	< 0.06
Tetrachloroethylene	0.34
Tetrahydrofuran	< 0.6
Toluene	0.44
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.06
trans-2-Butene	0.47
trans-2-Pentene	0.60
Trichloroethylene	< 0.06
Vinyl acetate	< 0.6
Vinyl chloride	< 0.03

Maxxam

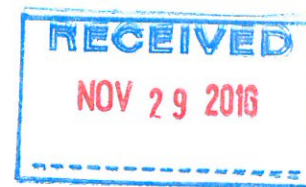
VOC Sample Collection Data Sheet

Client: LICA Sampler S/N: n/a
 Location: Bonnyville - AER Canister ID: 17130
 Station ID: LICA 37 Canister Installation Date/Time: NOV 17, 2016 / 12:57
 Field Sample ID: LICA/NMHC VOC/Bonnyville Canister Removal Date/Time: NOV 28, 2016 / 13:13
NOV 25, 2016

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
<u>NOV 25, 2016</u>	<u>07:45</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 (in Hg)	Final Canister Vacuum (in Hg)
<u>-27.0</u>	<u>-3.5</u>



Canister valve open prior to sampling?: YES / NO

Canister valve closed prior to disconnection?: YES / NO

Sample ID: 16110258-005

Customer ID: LICA
 Cust Samp ID: LICA/NMHC-VOC/Bonnyville/Nov 25, 2016

Comments:

NMHC sampling canister

Technician Signature: Alex Yakupov Date: NOV 28, 2016

Volatile Organics Data Results (NMHC Canister System)

Date: November 25, 2016
Canister ID: 17130

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	0.08
1,1,2,2-Tetrachloroethane	0.05
1,1,2-Trichloroethane	0.05
1,1-Dichloroethane	0.06
1,1-Dichloroethylene	0.06
1,2,3-Trimethylbenzene	< 0.07
1,2,4-Trichlorobenzene	< 1.1
1,2,4-Trimethylbenzene	0.09
1,2-Dibromoethane	0.04
1,2-Dichlorobenzene	< 0.04
1,2-Dichloroethane	0.10
1,2-Dichloropropane	0.05
1,3,5-Trimethylbenzene	0.08
1,3-Butadiene	0.09
1,3-Dichlorobenzene	< 0.4
1,4-Dichlorobenzene	< 0.6
1,4-Dioxane	< 0.6
1-Butene	0.69
1-Hexene	0.05
1-Pentene	0.07
2,2,4-Trimethylpentane	0.07
2,2-Dimethylbutane	0.06
2,3,4-Trimethylpentane	0.07
2,3-Dimethylbutane	0.08
2,3-Dimethylpentane	0.10
2,4-Dimethylpentane	0.06
2-Methylheptane	0.06
2-Methylhexane	0.11
2-Methylpentane	0.21
3-Methylheptane	0.05
3-Methylhexane	0.11
3-Methylpentane	0.16
Acetone	3.8
Acrolein	< 0.4
Benzene	2.29
Benzyl chloride	< 0.6
Bromodichloromethane	0.07
Bromoform	0.05
Bromomethane	0.07
Carbon disulfide	0.38
Carbon tetrachloride	0.19
Chlorobenzene	0.05
Chloroethane	0.06
Chloroform	0.10
Chloromethane	0.49
cis-1,2-Dichloroethene	0.05
cis-1,3-Dichloropropene	< 0.06
cis-2-Butene	0.19
cis-2-Pentene	0.06
Cyclohexane	0.14
Cyclopentane	0.09
Dibromochloromethane	0.06
Ethanol	1.5
Ethyl acetate	< 0.6
Ethylbenzene	0.11
Freon-11	0.42

Volatile Organics Data Results (NMHC Canister System)

Date: November 25, 2016
Canister ID: 17130

PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.11
Freon-114	0.09
Freon-12	0.73
Hexachloro-1,3-butadiene	< 0.72
Isobutane	1.43
Isopentane	1.28
Isoprene	0.06
Isopropyl alcohol	< 0.6
Isopropylbenzene	0.05
m,p-Xylene	0.28
m-Diethylbenzene	< 0.06
m-Ethyltoluene	< 0.11
Methyl butyl ketone	< 0.72
Methyl ethyl ketone	< 0.4
Methyl isobutyl ketone	< 0.6
Methyl methacrylate	< 0.10
Methyl tert butyl ether	< 0.04
Methylcyclohexane	0.15
Methylcyclopentane	0.16
Methylene chloride	< 0.4
n-Butane	2.61
n-Decane	< 0.09
n-Dodecane	< 0.6
n-Heptane	0.14
n-Hexane	0.27
n-Nonane	0.04
n-Octane	0.07
n-Pentane	0.7
n-Propylbenzene	< 0.07
n-Undecane	< 0.7
Naphthalene	< 0.7
o-Ethyltoluene	0.04
o-Xylene	0.12
p-Diethylbenzene	< 0.06
p-Ethyltoluene	< 0.10
Styrene	< 0.06
Tetrachloroethylene	0.07
Tetrahydrofuran	< 0.6
Toluene	0.22
trans-1,2-Dichloroethylene	0.05
trans-1,3-Dichloropropylene	< 0.06
trans-2-Butene	0.09
trans-2-Pentene	0.08
Trichloroethylene	0.07
Vinyl acetate	< 0.6
Vinyl chloride	0.05



Sample ID: 16120042-005

Maxxam

Customer ID: LICA
 Cust Samp ID: LICA/NMHC
 VOC/Bonnyville/ Nov 29,
 2016

VOC Sample Collection Data Sheet

Client: LICA
 Location: Bonnyville - AER
 Station ID: LICA 37
 Field Sample ID: LICA/NMHC VOC/Bonnyville/
Nov 29, 2016

Sampler S/N: n/a
 Canister ID: 14720
 Canister Installation Date/Time: Nov 28, 2016 / 13:15
 Canister Removal Date/Time: Dec 01, 2016 / 10:30

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
<u>Nov 29, 2016</u>	<u>08:50</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 (in Hg)	Final Canister Vacuum (in Hg)
<u>-27.0</u>	<u>-5.2</u>

Canister valve open prior to sampling?: YES / NO

Canister valve closed prior to disconnection?: YES / NO

Comments:
NMHC sampling canister

Technician Signature: Alex Yakupov Date: Dec 01, 2016

Volatile Organics Data Results (NMHC Canister System)

Date: November 25 , 2016
Canister ID: 14720

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	< 0.06
1,2,3-Trimethylbenzene	< 0.07
1,2,4-Trichlorobenzene	< 1.2
1,2,4-Trimethylbenzene	< 0.04
1,2-Dibromoethane	< 0.03
1,2-Dichlorobenzene	< 0.04
1,2-Dichloroethane	0.02
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.03
1,3-Butadiene	0.04
1,3-Dichlorobenzene	< 0.4
1,4-Dichlorobenzene	< 0.6
1,4-Dioxane	< 0.6
1-Butene	0.17
1-Hexene	< 0.03
1-Pentene	0.02
2,2,4-Trimethylpentane	0.02
2,2-Dimethylbutane	0.02
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.03
2,3-Dimethylpentane	0.03
2,4-Dimethylpentane	< 0.01
2-Methylheptane	< 0.01
2-Methylhexane	0.03
2-Methylpentane	0.09
3-Methylheptane	< 0.03
3-Methylhexane	0.04
3-Methylpentane	0.06
Acetone	1.0
Acrolein	< 0.4
Benzene	0.16
Benzyl chloride	< 0.6
Bromodichloromethane	< 0.03
Bromoform	< 0.03
Bromomethane	< 0.01
Carbon disulfide	0.02
Carbon tetrachloride	0.13
Chlorobenzene	< 0.03
Chloroethane	< 0.03
Chloroform	< 0.03
Chloromethane	0.46
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.06
cis-2-Butene	0.06
cis-2-Pentene	< 0.03
Cyclohexane	< 0.03
Cyclopentane	0.03
Dibromochloromethane	< 0.01
Ethanol	0.7
Ethyl acetate	< 0.6
Ethylbenzene	0.02
Freon-11	0.37


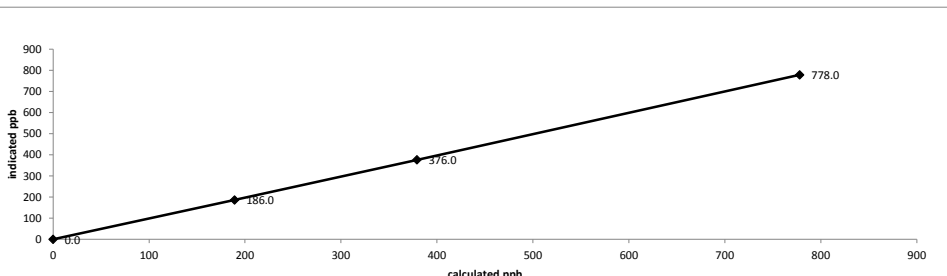
Volatile Organics Data Results (NMHC Canister System)

Date: November 25 , 2016
Canister ID: 14720

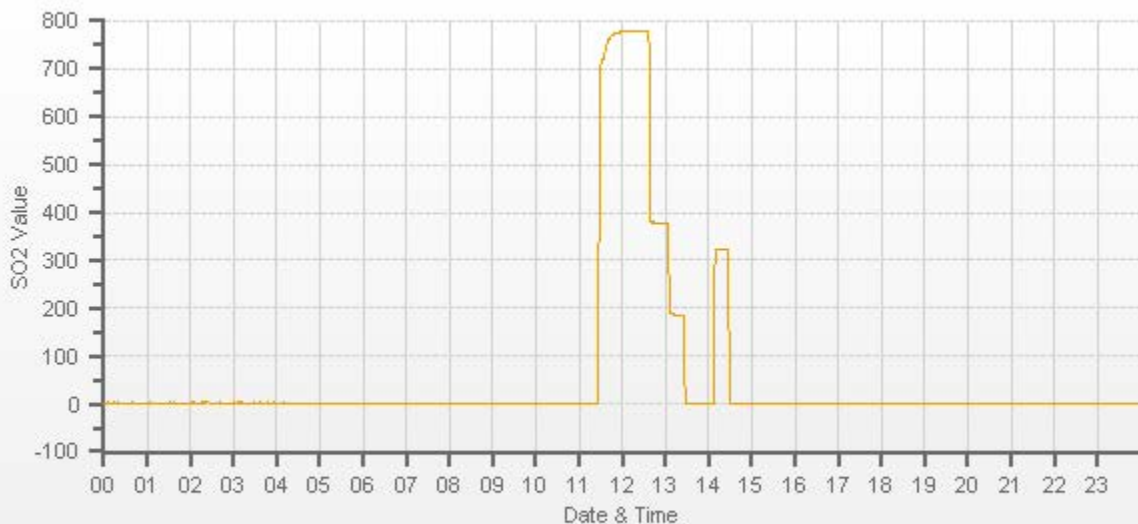
PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.05
Freon-114	< 0.03
Freon-12	0.73
Hexachloro-1,3-butadiene	< 0.74
Isobutane	0.92
Isopentane	0.59
Isoprene	< 0.01
Isopropyl alcohol	< 0.6
Isopropylbenzene	< 0.01
m,p-Xylene	0.06
m-Diethylbenzene	< 0.06
m-Ethyltoluene	< 0.12
Methyl butyl ketone	< 0.74
Methyl ethyl ketone	< 0.4
Methyl isobutyl ketone	< 0.6
Methyl methacrylate	< 0.10
Methyl tert butyl ether	< 0.04
Methylcyclohexane	0.05
Methylcyclopentane	0.06
Methylene chloride	< 0.4
n-Butane	2.01
n-Decane	< 0.09
n-Dodecane	< 0.6
n-Heptane	0.04
n-Hexane	0.11
n-Nonane	< 0.01
n-Octane	< 0.03
n-Pentane	0.6
n-Propylbenzene	< 0.07
n-Undecane	< 0.7
Naphthalene	< 0.7
o-Ethyltoluene	< 0.01
o-Xylene	0.02
p-Diethylbenzene	< 0.06
p-Ethyltoluene	< 0.10
Styrene	< 0.06
Tetrachloroethylene	< 0.06
Tetrahydrofuran	< 0.6
Toluene	0.10
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.06
trans-2-Butene	< 0.01
trans-2-Pentene	< 0.03
Trichloroethylene	< 0.06
Vinyl acetate	< 0.6
Vinyl chloride	< 0.03

APPENDIX III
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE

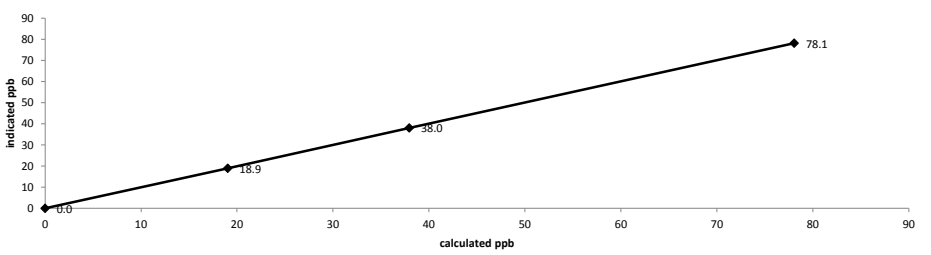
 API 100E Sulphur Dioxide Analyzer Calibration																																																																							
Date: November 17, 2016 Company/Airshed: LICA Location/Station Name: Bonnyville - AER Parameter: Sulphur Dioxide Start Time 24 hr. (mst): 11:12 End Time 24 hr. (mst): 14:32 Calibration Method: Gas Dilution	Barometric Pressure: 0.940 atm Station Temperature °C: 22 Weather Conditions: Light snow Calibration Purpose: routine monthly Performed By/Reviewer: Alex Yakupov / Trina Whitsitt <input checked="" type="checkbox"/> Skip Cal Gas Expiry Date: July 18, 2019 Converter Model & s/n (if applicable): n/a																																																																						
Analyzer: ID# or Serial Number: 467 Range ppb: 1000 Station SO2 Analyzer Range? Last Calibration Date: October 6, 2016 As Found C.F.: 0.999 500 ppb Previous C.F.: 1.000 New C.F.: 1.000																																																																							
Calibrator: Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. # : LL104222 Cal Gas Conc. (ppm): 50.6	Standard Calibration Points for Ranges <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><th>Point</th><th>ppb</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> SO₂ Scrubber Check (10 mins.) Start/End Time 24 hr.: Target Concentration (ppb): 380 Result (ppb): 3 Zero Corrected Result (ppb): 3 **warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**	Point	ppb	High	780	Mid	380	Low	190																																																														
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<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">Calibrator Flow Rates (cc/min)</th> <th>Calculated Concentration:</th> <th>Indicated Concentration:</th> <th>Correction Factors (C.F.):</th> </tr> <tr> <th>Point</th> <th>Diluent</th> <th>Cal Gas</th> <th>Total</th> <th>(ppb)</th> <th>(ppb)</th> <th></th> </tr> </thead> <tbody> <tr> <td>as found zero</td> <td>5000</td> <td>0.00</td> <td>5000</td> <td>0.0</td> <td>1.5</td> <td>n/a</td> </tr> <tr> <td>as found high</td> <td>4924</td> <td>76.90</td> <td>5001</td> <td>778.1</td> <td>780.0</td> <td>0.999</td> </tr> <tr> <td>adjusted zero</td> <td>5000</td> <td>0.00</td> <td>5000</td> <td>0.0</td> <td>0.0</td> <td>n/a</td> </tr> <tr> <td>adjusted high</td> <td>4924</td> <td>76.90</td> <td>5001</td> <td>778.1</td> <td>778.0</td> <td>1.000</td> </tr> <tr> <td>mid</td> <td>4966</td> <td>37.50</td> <td>5004</td> <td>379.2</td> <td>376.0</td> <td>1.009</td> </tr> <tr> <td>low</td> <td>4981</td> <td>18.70</td> <td>5000</td> <td>189.3</td> <td>186.0</td> <td>1.018</td> </tr> <tr> <td>calibrator zero</td> <td>5000</td> <td>0.00</td> <td>5000</td> <td>0.0</td> <td>0.0</td> <td>n/a</td> </tr> <tr> <td colspan="6" style="text-align: right;">Average C.F.=</td> <td>1.009</td> </tr> </tbody> </table>		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	1.5	n/a	as found high	4924	76.90	5001	778.1	780.0	0.999	adjusted zero	5000	0.00	5000	0.0	0.0	n/a	adjusted high	4924	76.90	5001	778.1	778.0	1.000	mid	4966	37.50	5004	379.2	376.0	1.009	low	4981	18.70	5000	189.3	186.0	1.018	calibrator zero	5000	0.00	5000	0.0	0.0	n/a	Average C.F.=						1.009
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API 100E Sulphur Dioxide Analyzer Calibration																																																																							
																																																																							
As found: SLOPE: <u>0.986</u> OFFSET: <u>121.5</u> HVPS: <u>524</u> RCELL TEMP: <u>50.0</u> BOX TEMP: <u>32.1</u> PMT TEMP: <u>8.1</u> IZS TEMP: <u>45.0</u> PRES: <u>25.6</u> SAMP FL: <u>571</u> NORM PMT: <u>123.6</u> UV LAMP: <u>2753.8</u> LAMP RATIO: <u>99.1</u> STR. LGT: <u>59.9</u> DRK PMT: <u>15.5</u> DRK LMP: <u>2.6</u> Expected Value: <u>320.0</u>	As left: SLOPE: <u>0.981</u> OFFSET: <u>124.0</u> HVPS: <u>524</u> RCELL TEMP: <u>50.0</u> BOX TEMP: <u>32.3</u> PMT TEMP: <u>8.1</u> IZS TEMP: <u>45.0</u> PRES: <u>25.6</u> SAMP FL: <u>571</u> NORM PMT: <u>123.8</u> UV LAMP: <u>2756.3</u> LAMP RATIO: <u>99.2</u> STR. LGT: <u>60.8</u> DRK PMT: <u>15.4</u> DRK LMP: <u>2.6</u> Expected Value: <u>322.0</u>																																																																						
Comments: The analyzer sample inlet filter was changed.																																																																							

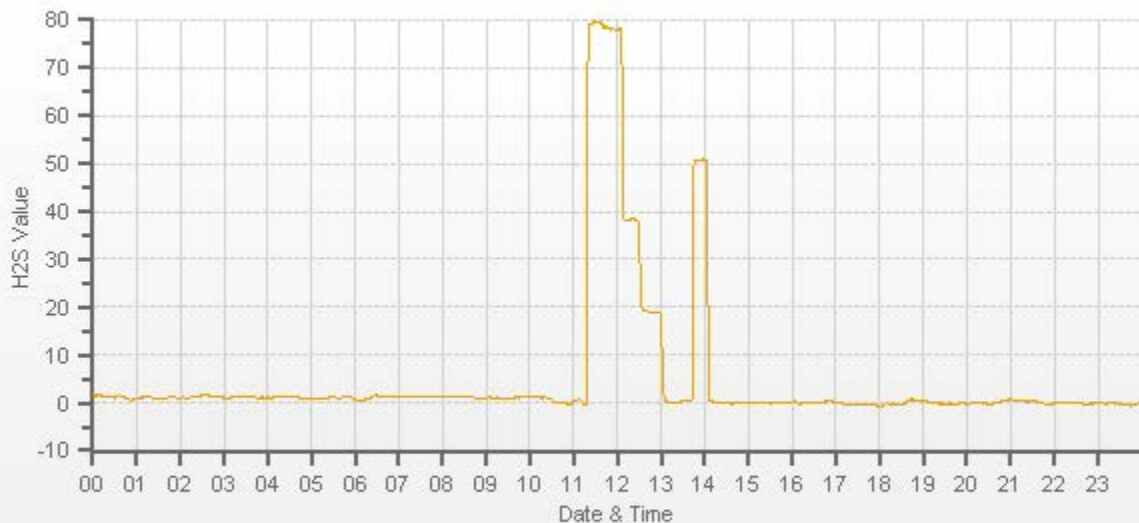
SO2[ppb] Station: LICA Bonnyville Daily: 2016/11/17 Type: AVG 1 Min. [1 Min.]



— SO2[ppb]


HYDROGEN SULPHIDE

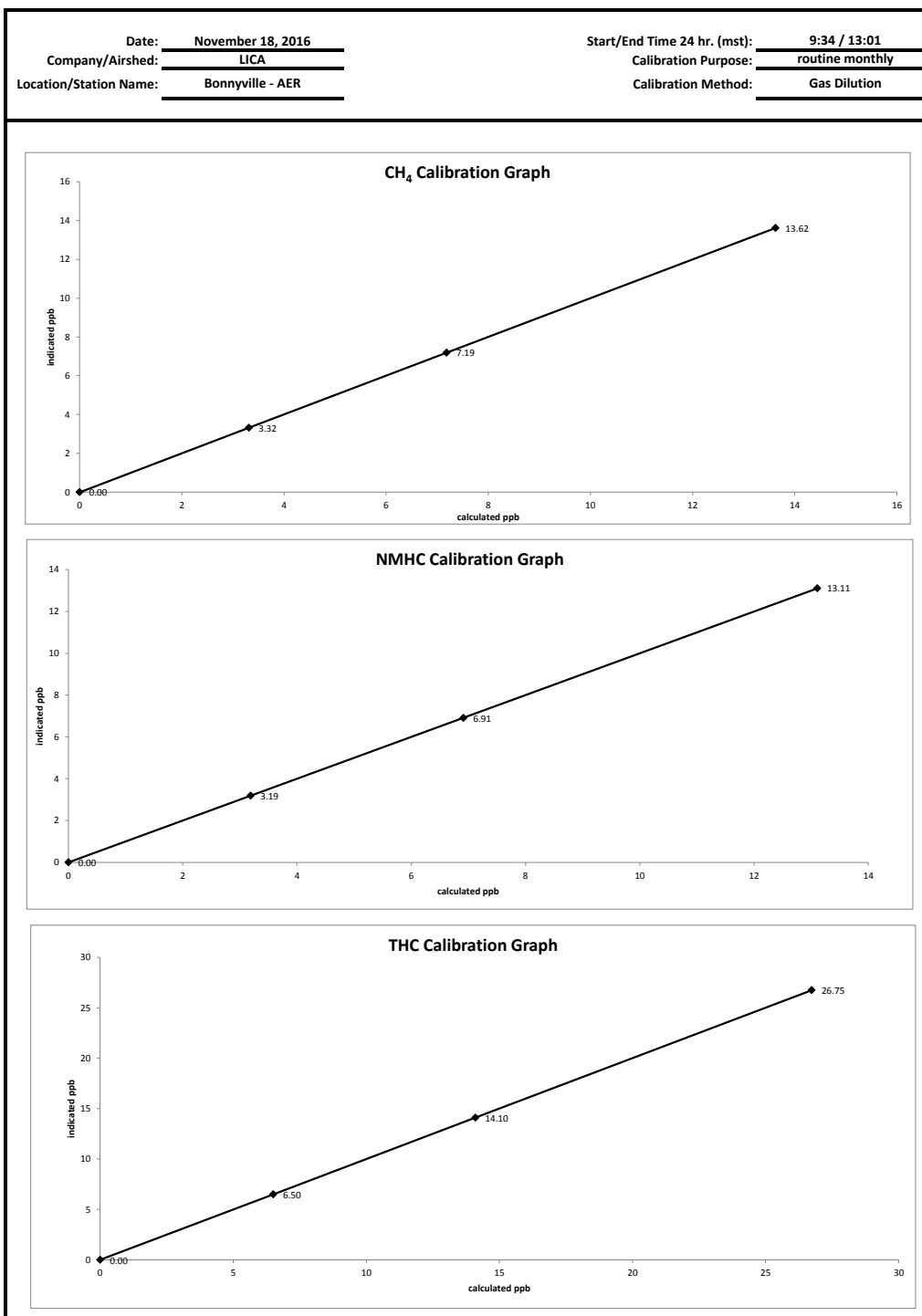
API 101E Hydrogen Sulphide Analyzer Calibration																																																																								
Date: November 17, 2016 Company/Airshed: LICA Location/Station Name: Bonnyville - AER Parameter: Hydrogen Sulphide Start Time 24 hr. (mst): 11:12 End Time 24 hr. (mst): 14:08 Calibration Method: Gas Dilution	Barometric Pressure: 0.940 atm Station Temperature °C: 22 Weather Conditions: Light snow Calibration Purpose: routine monthly Performed By/Reviewer: Alex Yakupov / Trina Whitsitt Cal Gas Expiry Date: June 14, 2019 Converter Model & s/n (if applicable): n/a																																																																							
Analyzer: ID# or Serial Number: 510 Range ppb: 100 Station SO2 Analyzer Range? Last Calibration Date: October 6, 2016 As Found C.F.: 0.997 500 ppb Previous C.F.: 1.000 New C.F.: 1.000																																																																								
Calibrator: Flow Meter ID's: n/a Make & Model: SABIO 2010 D Serial #: 11900613 Cal Gas Cylinder I.D. # : EY0000654 Cal Gas Conc. (ppm): 10.2	Standard Calibration Points for Ranges <table border="1" style="margin-top: 10px;"> <tr><th>Point</th><th>ppb</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	ppb	High	78	Mid	38	Low	19	SO₂ Scrubber Check (10 mins.) Start/End Time 24 hr.: 10:57/11:12 Target Concentration (ppb): 380 Result (ppb): 0.6 Zero Corrected Result (ppb): 1 **warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**																																																														
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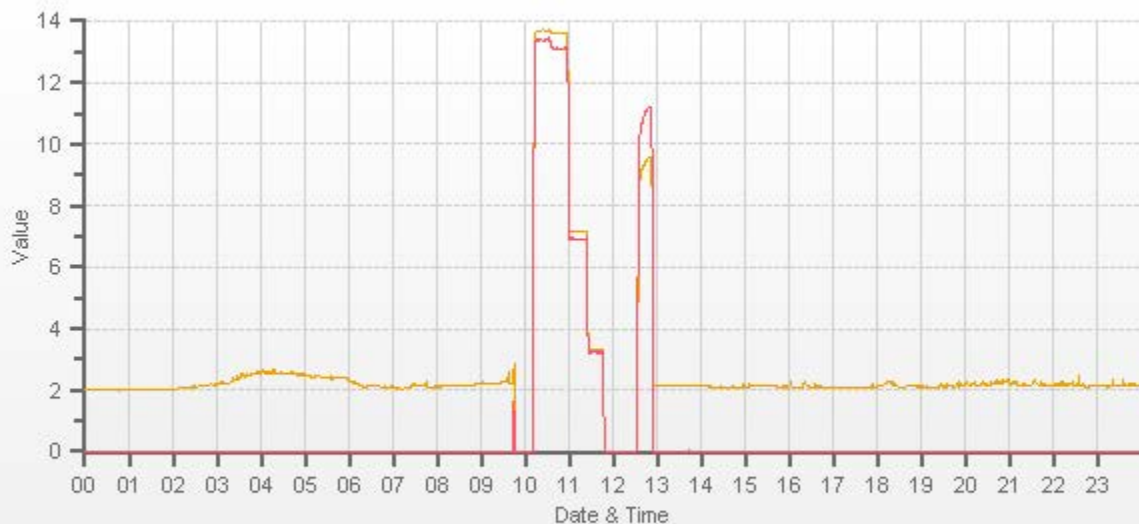


— H2S[ppb]

TOTAL HYDROCARBON

 Thermo 55i Methane/Non-Methane Analyzer Calibration																																																																																																																												
Date: November 18, 2016 Company/Airshed: LICA Location/Station Name: Bonnyville - AER Parameter: CH ₄ / NMHC / THC Start/End Time 24 hr. (mst): 9:34 / 13:01 Calibration Method: Gas Dilution	Barometric Pressure: 0.949 atm Station Temperature °C: 20 Weather Conditions: Mix of sun and clouds Calibration Purpose: routine monthly Performed By/Reviewer: Alex Yakupov / Trina Whitsitt Cal Gas Expiry Date: November 25, 2023																																																																																																																											
Analyzer: ID# or Serial Number: 1236656107 Measured Flow: 1.171 Last Calibration Date: October 5, 2016 Range ppm: 20 CH ₄ /20 NMHC/40 THC																																																																																																																												
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Calibrator: Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. #: LL165372 CH₄ Cylinder Conc. = 606.0 212.0 =C ₂ H ₆ Cylinder Conc. CH₄ as C₂H₆ = 583.0 1189.0 =total CH ₄ equivalent																																																																																																																												
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	CH ₄ RT: 12.4																																																																																																																											
Calibration History:	CH ₄ PK IDX: 22																																																																																																																											
	CH ₄ PK HT: 19063																																																																																																																											
Calibration History:	NM Span Conc: 13.11																																																																																																																											
	NM SP Ratio: 0.000152																																																																																																																											
Comments: The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned. <div style="text-align: center;"> No zero adjustment was required/made. As found zero values were copied to adjusted zero values for linearity calculation purposes. </div>																																																																																																																												



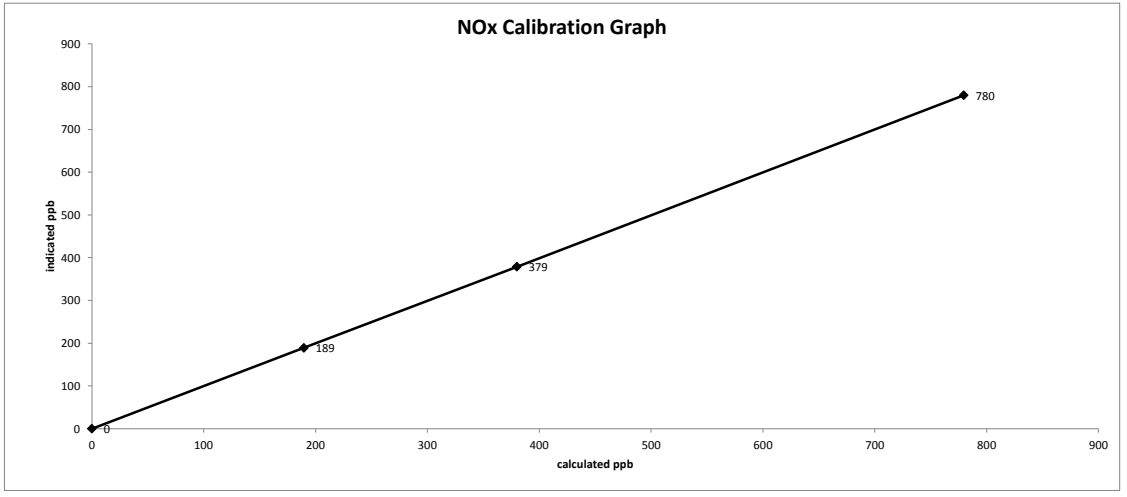
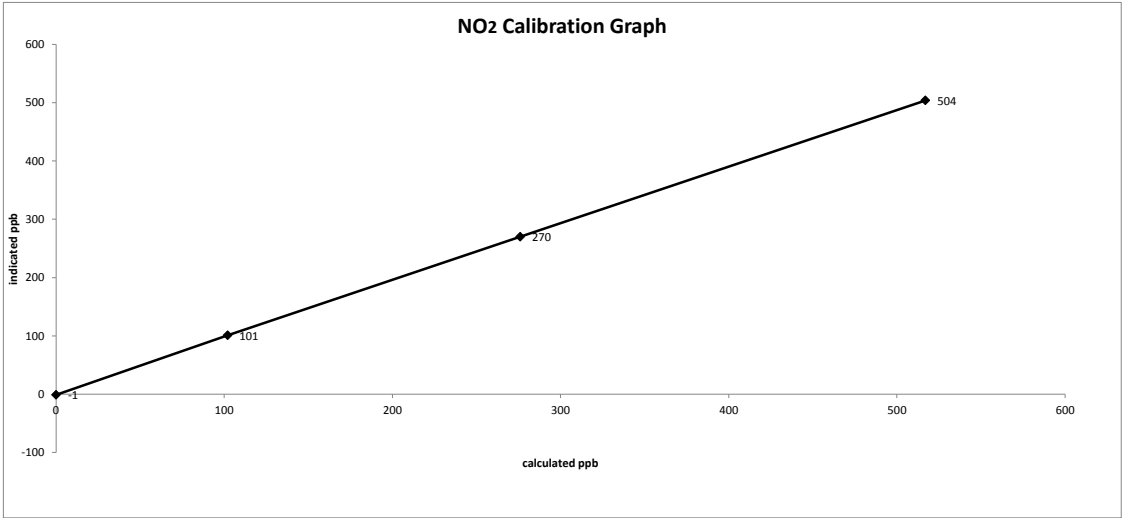
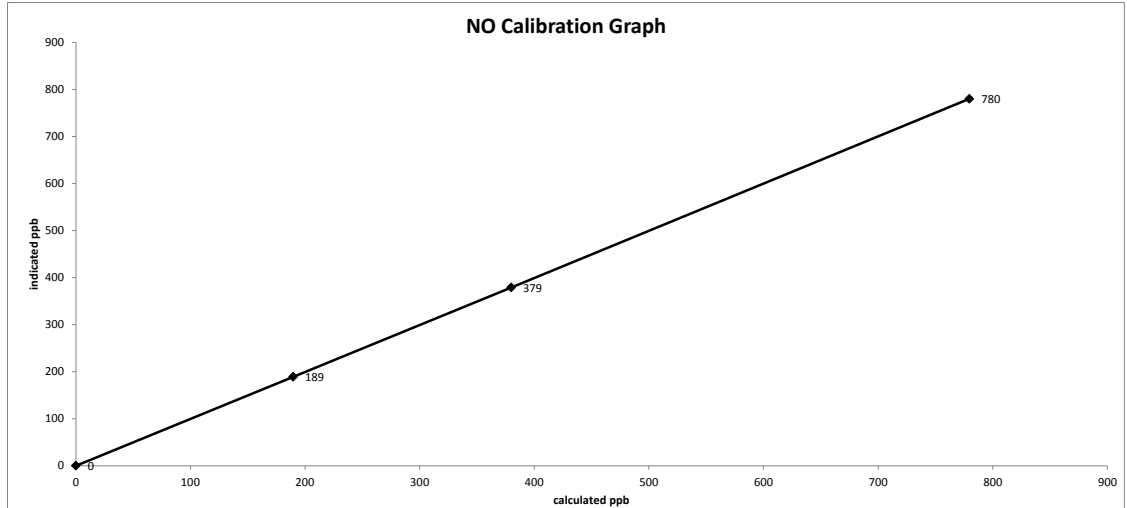


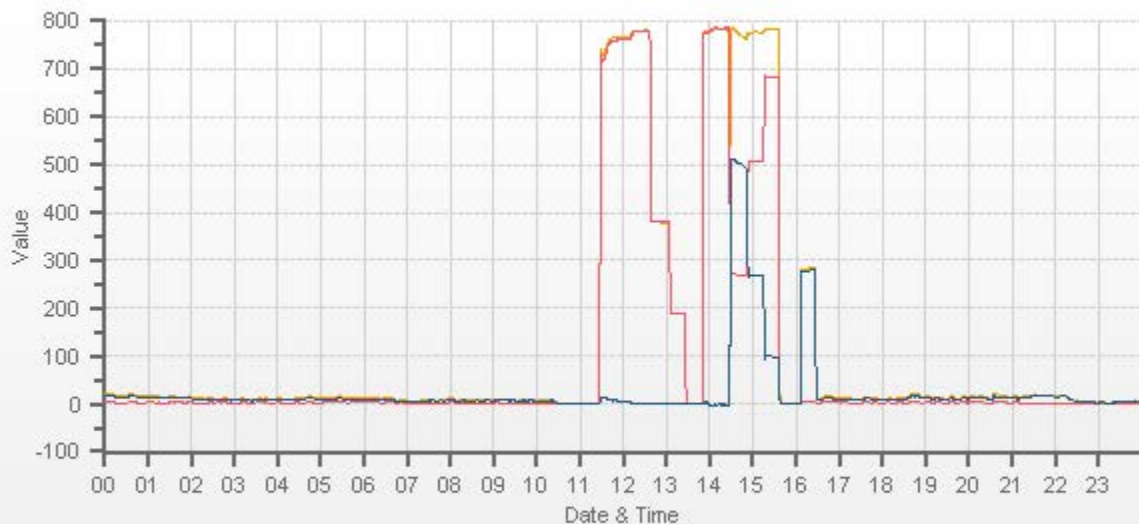
CH4[ppm] NMHC[ppm]

NITROGEN DIOXIDE

API 200E NO-NO2-NOx Analyzer Calibration																																																																																																					
Date: November 23, 2016 Company/Airshed: LICA Location/Station Name: Bonnyville - AER Start/End Time 24 hr. (mst): 11:12 / 16:31 G.P.T. to be used for Ozone? No Calibration Method: Gas Dilution & Gas Phase Titration	Barometric Pressure: 0.940 atm Station Temperature °C: 22 Weather Conditions: Light snow Calibration Purpose: routine monthly Performed By/Reviewer: Alex Yakupov Trina Whitsitt Cal Gas Expiry Date: July 18, 2019																																																																																																				
Analyzer: ID# or Serial Number: 593 Last Calibration Date: October 6, 2016 Range ppb: 1000	Correction Factors: <table border="1" style="width: 100%; text-align: center;"> <tr> <td></td> <td>Previous C.F.:</td> <td>As Found C.F.:</td> <td>New C.F.:</td> </tr> <tr> <td>NO =</td> <td>1.000</td> <td>1.022</td> <td>1.000</td> </tr> <tr> <td>NO₂ =</td> <td>0.998</td> <td>1.026</td> <td>1.026</td> </tr> <tr> <td>NOx =</td> <td>1.000</td> <td>1.018</td> <td>1.000</td> </tr> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	1.022	1.000	NO ₂ =	0.998	1.026	1.026	NOx =	1.000	1.018	1.000																																																																																				
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Calibrator: Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. # : LL104222 NO/NOx Gas Conc. (ppm): 50.7 50.7	Standard Calibration Points for a Range of: 1000 ppb <table border="1" style="width: 100%; text-align: center;"> <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																																																																												
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Date:	November 23, 2016	Start/End Time 24 hr. (mst):	11:12 / 16:31
Company/Airshed:	LICA	Calibration Purpose:	routine monthly
Location/Station Name:	Bonnyville - AER	Calibration Method:	Gas Dilution & Gas Phase Titration

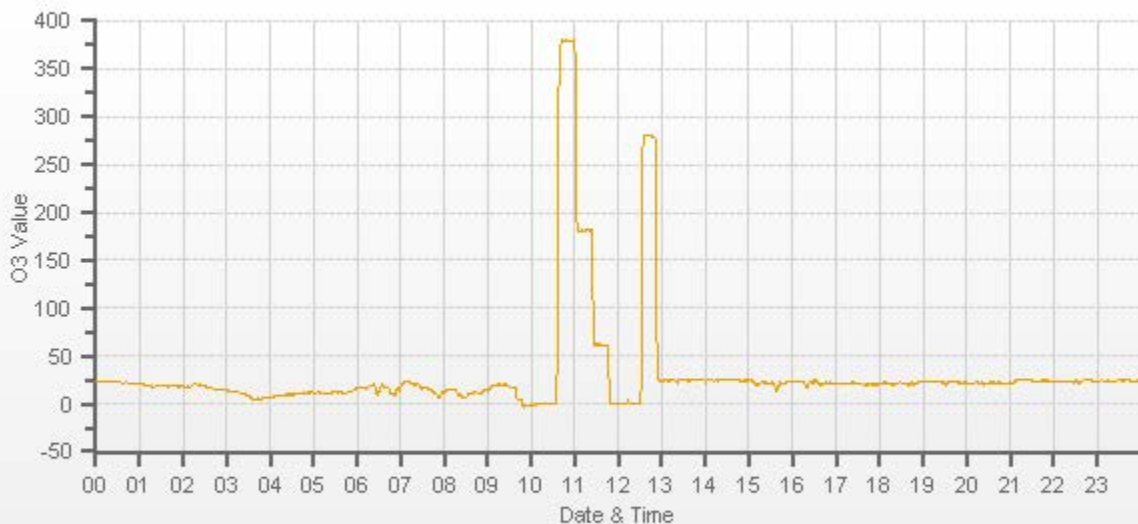




— NOX[ppb] — NO[ppb] — NO2[ppb]

OZONE

Thermo 49i Ozone Analyzer Calibration																																																																					
Date: November 18, 2016 Company/Airshed: LICA Location/Station Name: Bonnyville - AER Start/End Time 24 hr. (mst): 9:34 / 12:56 Ozone Calibration Method: Varying UV Lamp Power G.P.T. Date: n/a-done by Varying UV Lamp Power	Barometric Pressure: 0.949 atm Station Temperature °C: 20 Weather Conditions: Mix of sun and clouds Calibration Purpose: routine monthly Performed By/Reviewer: Alex Yakupov / Trina Whitsitt Cal Gas Expiry Date: n/a																																																																				
Analyzer: ID# or Serial Number: 1002240372 Ozone Range ppb: 500 Last Calibration Date: October 5, 2016 As Found C.F.: 1.000 Previous Cal High Point C.F.: 1.000 New C.F.: 1.000																																																																					
Calibrator: Flow Meter ID's: n/a Make & Model: SABIO 2010 D Serial #: 11900613 Cal Gas Cylinder I.D. #: n/a																																																																					
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<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Point</th> <th colspan="2">Calibrator Flow Rate (cc/min)</th> <th>Calculated Concentration:</th> <th>Corrected Calculated Concentration:</th> <th>Indicated Concentration:</th> <th rowspan="2">Correction Factors:</th> </tr> <tr> <th>Total Flow @ Point Start</th> <th>Total Flow @ Point Finish</th> <th>(ppb)</th> <th>(ppb)</th> <th>(ppb)</th> </tr> </thead> <tbody> <tr> <td>as found zero</td> <td>5000</td> <td>5000</td> <td>0.0</td> <td>n/a</td> <td>0.0</td> <td>n/a</td> </tr> <tr> <td>as found high</td> <td>5000</td> <td>5000</td> <td>380.0</td> <td>380.0</td> <td>380.0</td> <td>1.000</td> </tr> <tr> <td>adjusted zero</td> <td>5000</td> <td>5000</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>n/a</td> </tr> <tr> <td>adjusted high</td> <td>5000</td> <td>5000</td> <td>380.0</td> <td>380.0</td> <td>380.0</td> <td>1.000</td> </tr> <tr> <td>mid</td> <td>5000</td> <td>5000</td> <td>180.0</td> <td>180.0</td> <td>181.0</td> <td>0.994</td> </tr> <tr> <td>low</td> <td>5000</td> <td>5000</td> <td>60.0</td> <td>60.0</td> <td>61.0</td> <td>0.984</td> </tr> <tr> <td>calibrator zero</td> <td>5000</td> <td>5000</td> <td>0.0</td> <td>n/a</td> <td>0.0</td> <td>n/a</td> </tr> <tr> <td colspan="6" style="text-align: right;">Average C.F.=</td> <td>0.993</td> </tr> </tbody> </table>		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	380.0	1.000	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	181.0	0.994	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.=						0.993
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Comments: The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned.																																																																					
No High Point adjustment was made. No ZERO adjustment made.																																																																					



— O3[ppb]

PARTICULATE MATTER



R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: November 10, 2016
 Company: LICA
 Station Name/Location: Bonnyville - AER
 Previous Audit Date: October 26, 2016
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whatsitt
 Start Time (mst): 10:46
 End Time (mst): 11:58
 Calibration Purpose: Bi-monthly #1
 Weather Conditions: Mix of sun and clouds

1400A Information and Status:

ID# or Serial Number: 1405A207691003 As Found Filter Loading %: 29.61
 Ko Factor: 15635 As Left Filter Loading %: 17.72
 Ambient Temperature °C: 5.4 As Found Noise: 0.002
 Ambient Pressure atm: 0.947 As Left Noise: 0.000
 Main Flow Reading lpm: 3.00 Pump Vacuum: 0.37
 Aux Flow Reading lpm: 13.67 Warnings: None

Reference Standards:

	Flow:	Pressure:	Temperature:
Make:	<u>Dwyer</u>	<u>BRUNTON</u>	<u>BRUNTON</u>
Model:	<u>475 Mark III</u>	<u>BIO</u>	<u>BIO</u>
Serial Number:	<u>#2</u>	<u>BPO 14</u>	<u>BPO 14</u>
Calibration Date:	<u>January 15, 2016</u>	<u>July 7, 2016</u>	<u>July 7, 2016</u>

As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.09	0.00	0.09
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	-0.40	0.00	-0.40
	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	0.09	0.00	0.09
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	-0.40	0.00	-0.40
	limit	0.60	0.60	0.60	0.60

As found temperature and pressure:

tolerance +/- 2.0°C	1405F temperature °C: <u>5.4</u>	tolerance +/- 0.01 atm	1405F pressure atm: <u>0.947</u>
reference temperature °C: <u>4.6</u>	reference pressure: <u>0.949</u>	reference temperature °C: <u>4.6</u>	reference pressure: <u>0.949</u>
difference °C: <u>-0.8</u>	difference : <u>-0.002</u>	difference : <u>-0.002</u>	

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

tolerance +/- 2.0°C	1405F temperature °C: <u>4.6</u>	tolerance +/- 0.01 atm	1405F pressure atm: <u>0.949</u>
reference temperature °C: <u>4.6</u>	reference pressure: <u>0.949</u>	reference temperature °C: <u>4.6</u>	reference pressure: <u>0.949</u>
difference °C: <u>0.0</u>	difference : <u>0.000</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>2.96</u>	reference total/aux flow lpm: <u>16.89</u>
difference lpm: <u>-0.04</u>	difference lpm: <u>0.22</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>2.96</u>	reference total/aux flow lpm: <u>16.89</u>
difference lpm: <u>-0.04</u>	difference lpm: <u>0.22</u>

K_o Audit:

Last K_o audit date: August 4, 2016
 1405F K_o factor: 15635
 Measured K_o factor: 15819.0000
 % difference: 1.18

Comments:

The TEOM sample filter was changed. The TEOM intake head and associated sharp cut components were cleaned.
 The bypass (auxiliary) flow filter was changed.



R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: November 24, 2016
 Company: LICA
 Station Name/Location: Bonnyville - AER
 Previous Audit Date: November 10, 2016
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whitsitt
 Start Time (mst): 10:22
 End Time (mst): 11:48
 Calibration Purpose: Bi-monthly #2
 Weather Conditions: A few clouds

1400A Information and Status:

ID# or Serial Number:	<u>1405A207691003</u>	As Found Filter Loading %:	<u>27.16</u>
Ko Factor:	<u>15635</u>	As Left Filter Loading %:	<u>18.81</u>
Ambient Temperature °C:	<u>-1.73</u>	As Found Noise:	<u>0.003</u>
Ambient Pressure atm:	<u>0.935</u>	As Left Noise:	<u>0.000</u>
Main Flow Reading lpm:	<u>3.00</u>	Pump Vacuum:	<u>0.35</u>
Aux Flow Reading lpm:	<u>13.67</u>	Warnings:	<u>None</u>

Reference Standards:

	Flow:	Pressure:	Temperature:
Make:	<u>Dwyer</u>	<u>BRUNTON</u>	<u>BRUNTON</u>
Model:	<u>475 Mark III</u>	<u>BIO</u>	<u>BIO</u>
Serial Number:	<u>#2</u>	<u>BPO 14</u>	<u>BPO 14</u>
Calibration Date:	<u>January 15, 2016</u>	<u>July 7, 2016</u>	<u>July 7, 2016</u>

As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.09	0.00	0.09
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	-0.40	0.00	-0.40
	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	0.09	0.00	0.09
	limit	0.15	0.15	0.15	0.15
Bypass Flow	actual	0.00	-0.40	0.00	-0.40
	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>-1.7</u>	1405F pressure atm: <u>0.935</u>
reference temperature °C: <u>-1.9</u>	reference pressure: <u>0.936</u>
difference °C: <u>-0.2</u>	difference: <u>-0.001</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>-1.9</u>	1405F pressure atm: <u>0.935</u>
reference temperature °C: <u>-1.9</u>	reference pressure: <u>0.935</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>2.95</u>	reference total/aux flow lpm: <u>16.83</u>
difference lpm: <u>-0.05</u>	difference lpm: <u>0.16</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>2.95</u>	reference total/aux flow lpm: <u>16.83</u>
difference lpm: <u>-0.05</u>	difference lpm: <u>0.16</u>

K_o Audit:

Last K_o audit date: November 24, 2016
 1405F K_o factor: 15635
 Measured K_o factor: 15790.8000
 % difference: 1.00

Comments:

The TEOM sample filter was changed. The TEOM intake head and associated sharp cut components were cleaned.
 The bypass (auxillary) flow filter was changed.

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

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

NO	LIMITS	NOx
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	NOx	% 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 *y=mx+b (where x=calculated concentration, y=indicated concentration)*

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 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>March 28, 2016</u>
	Full Scale (ppm) <u>1</u>

COMMENTS: NO Cyl has 49.9ppb SO₂ - Flows Not Manually Measured

Auditor: Shea Beaton Date: March 31, 2016

Operator Signature: [Signature] Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2016-335CGA

Company: Maxxam **Operator's Name:** Russell Kirchner
Cylinder #: LL104222 **Concentration PPM:** 50.6 **Tolerance(%)** 1 **Certified By:** Praxair
Expiry Date: July 2019

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model: <u>R&R MFC 201</u>	Make/Model: <u>Bios DC2</u>
Serial Number: <u>AMU 1690</u>	Serial Number: <u>AMY 1659</u>
Last Verification Date: <u>October 19, 2016</u>	Temp. °C: <u>24.5 C</u>
Gas Type: <u>SO2</u> Conc. <u>98.07</u>	B.P. <u>706 mmhg</u>
Cylinder Number: <u>CA:016625</u>	
Expiry Date: <u>January 2019</u>	

Reference Analyzer:
Make/Model: Teco 43C **Serial/AMU Number:** 1623
Instrument Settings: **Zero:** 9.2 **Span:** 1.024 **Range:** 1.0
Last Calibration: **Date:** Oct 19/16 **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	0.0000	0.0000	0.0000
4935	82.0	0.830	0.01662	60.183	50.0
4968	40.8	0.412	0.00821	121.765	50.2
4955	20.2	0.203	0.00408	245.297	49.8
Average Cylinder Concentration:					50.0

Previous Stated Concentration PPM: 50.6

Percent variance from Stated: 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: October 19, 2016
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: [Signature]

Date: January 19, 2016
 Location: McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2016-336CGA

Company: Maxxam **Operators name:** Russell Kirchner

Cylinder #: LL104222 Conc (PPM) 50.7/50.9 Tolerance (%) 1 Certified By: Praxair

Expiry Date: July 2019

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>October 19, 2019</u>			Temp. °C	<u>24.5 C</u>
Gas Type	<u>NO</u>	Conc.	<u>48.79</u>	B.P.	<u>706 mmhg</u>
Cylinder Number	<u>CAL018188</u>				
Expiry Date	<u>March 2019</u>				

Reference Analyzer:

Make/Model Teco 42i Serial/AMU Number: 1868

Instrument Settings Zero: 4.4 Span: 1.080 Range: 1.0

Last Calibration: Date: Oct 18/16 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
5000	0.0	0.000	0.000				
4935	82.0	0.838	0.837	0.017	60.183	50.4	50.4
4968	40.8	0.417	0.417	0.008	121.765	50.8	50.8
4955	20.2	0.207	0.207	0.004	245.297	50.8	50.8
Average Cylinder Concentration:						50.7	50.6

	<u>NO</u>		<u>NOx</u>
Previous Stated Concentration PPM:	<u>50.7</u>	<u>50.9</u>	
Percent variance from Stated:	<u>0</u>	<u>1</u>	

Cylinder gas tolerances based on NO only

Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:**

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration Contains 50.6 ppm SO2.

> 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Al Clark Date: October 19, 2016

Operator Signature: *Al Clark* Location: McIntyre Center Edmonton

APPENDIX IV
ANALYTICAL RESULTS

VOCS SAMPLES

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/Nov 2, 2016	2645	Ambient Air	02-Nov-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110059-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16
16110059-003	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	16-Nov-16
16110059-003	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	16-Nov-16
16110059-003	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-003	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	16-Nov-16
16110059-003	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	1,3-Butadiene	I	0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	16-Nov-16
16110059-003	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-003	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-003	1-Butene	I	0.07	ppbv	0.02	AC-058	16-Nov-16
16110059-003	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	1-Pentene	I	0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	2,2,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	16-Nov-16
16110059-003	2,2-Dimethylbutane	I	0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	2,3-Dimethylbutane	I	0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	2,3-Dimethylpentane	I	0.03	ppbv	0.02	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/Nov 2, 2016	2645	Ambient Air	02-Nov-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110059-003	2,4-Dimethylpentane	I	0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	2-Methylheptane	I	0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	2-Methylpentane	I	0.08	ppbv	0.01	AC-058	16-Nov-16
16110059-003	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	3-Methylhexane	I	0.03	ppbv	0.02	AC-058	16-Nov-16
16110059-003	3-Methylpentane	I	0.05	ppbv	0.01	AC-058	16-Nov-16
16110059-003	Acetone		3.6	ppbv	0.4	AC-058	16-Nov-16
16110059-003	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	16-Nov-16
16110059-003	Benzene	I	0.09	ppbv	0.01	AC-058	16-Nov-16
16110059-003	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	Bromomethane	I	0.02	ppbv	0.01	AC-058	16-Nov-16
16110059-003	Carbon disulfide	I	0.06	ppbv	0.01	AC-058	16-Nov-16
16110059-003	Carbon tetrachloride	I	0.13	ppbv	0.01	AC-058	16-Nov-16
16110059-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	Chloroform	I	0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	Chloromethane		0.48	ppbv	0.02	AC-058	16-Nov-16
16110059-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16
16110059-003	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	Cyclohexane	I	0.04	ppbv	0.02	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/Nov 2, 2016	2645	Ambient Air	02-Nov-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110059-003	Cyclopentane	I	0.02	ppbv	0.01	AC-058	16-Nov-16
16110059-003	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	Ethanol		1.1	ppbv	0.3	AC-058	16-Nov-16
16110059-003	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-003	Ethylbenzene	I	0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	Freon-11		0.37	ppbv	0.02	AC-058	16-Nov-16
16110059-003	Freon-113	I	0.08	ppbv	0.01	AC-058	16-Nov-16
16110059-003	Freon-114	I	0.03	ppbv	0.02	AC-058	16-Nov-16
16110059-003	Freon-12		0.76	ppbv	0.02	AC-058	16-Nov-16
16110059-003	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	16-Nov-16
16110059-003	Isobutane		1.63	ppbv	0.02	AC-058	16-Nov-16
16110059-003	Isopentane		0.60	ppbv	0.03	AC-058	16-Nov-16
16110059-003	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-003	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	m,p-Xylene	I	0.04	ppbv	0.03	AC-058	16-Nov-16
16110059-003	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16
16110059-003	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	16-Nov-16
16110059-003	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	16-Nov-16
16110059-003	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	16-Nov-16
16110059-003	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-003	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	16-Nov-16
16110059-003	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-003	Methylcyclohexane	I	0.05	ppbv	0.01	AC-058	16-Nov-16
16110059-003	Methylcyclopentane	I	0.05	ppbv	0.02	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/Nov 2, 2016	2645	Ambient Air	02-Nov-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110059-003	Methylene chloride		0.4	ppbv	0.3	AC-058	16-Nov-16
16110059-003	n-Butane		1.54	ppbv	0.03	AC-058	16-Nov-16
16110059-003	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	16-Nov-16
16110059-003	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-003	n-Heptane	I	0.02	ppbv	0.01	AC-058	16-Nov-16
16110059-003	n-Hexane	I	0.07	ppbv	0.01	AC-058	16-Nov-16
16110059-003	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	n-Pentane	I	0.3	ppbv	0.1	AC-058	16-Nov-16
16110059-003	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	16-Nov-16
16110059-003	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	16-Nov-16
16110059-003	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	16-Nov-16
16110059-003	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	o-Xylene	I	0.02	ppbv	0.01	AC-058	16-Nov-16
16110059-003	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16
16110059-003	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	16-Nov-16
16110059-003	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16
16110059-003	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16
16110059-003	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	16-Nov-16
16110059-003	Toluene	I	0.07	ppbv	0.01	AC-058	16-Nov-16
16110059-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	16-Nov-16
16110059-003	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16
16110059-003	trans-2-Butene	I	0.02	ppbv	0.01	AC-058	16-Nov-16
16110059-003	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-003	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

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 Vegreville, Alberta
 Canada T9C 1T4
 (780) 632-8211

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/Nov 2, 2016	2645	Ambient Air	02-Nov-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110059-003	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	16-Nov-16
16110059-003	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/Nov 8, 2016	H3290	Ambient Air	08-Nov-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110116-002	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16
16110116-002	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	18-Nov-16
16110116-002	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	18-Nov-16
16110116-002	1,2,4-Trimethylbenzene	I	0.06	ppbv	0.03	AC-058	18-Nov-16
16110116-002	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	18-Nov-16
16110116-002	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	18-Nov-16
16110116-002	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-002	1,3,5-Trimethylbenzene	I	0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	1,3-Butadiene	I	0.06	ppbv	0.02	AC-058	18-Nov-16
16110116-002	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	18-Nov-16
16110116-002	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-002	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-002	1-Butene	I	0.17	ppbv	0.02	AC-058	18-Nov-16
16110116-002	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	1-Pentene	I	0.03	ppbv	0.01	AC-058	18-Nov-16
16110116-002	2,2,4-Trimethylpentane	I	0.06	ppbv	0.01	AC-058	18-Nov-16
16110116-002	2,2-Dimethylbutane	I	0.03	ppbv	0.01	AC-058	18-Nov-16
16110116-002	2,3,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	18-Nov-16
16110116-002	2,3-Dimethylbutane	I	0.06	ppbv	0.02	AC-058	18-Nov-16
16110116-002	2,3-Dimethylpentane	I	0.09	ppbv	0.02	AC-058	18-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/Nov 8, 2016	H3290	Ambient Air	08-Nov-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110116-002	2,4-Dimethylpentane	I	0.03	ppbv	0.01	AC-058	18-Nov-16
16110116-002	2-Methylheptane	I	0.03	ppbv	0.01	AC-058	18-Nov-16
16110116-002	2-Methylhexane	I	0.09	ppbv	0.01	AC-058	18-Nov-16
16110116-002	2-Methylpentane	I	0.18	ppbv	0.01	AC-058	18-Nov-16
16110116-002	3-Methylheptane	I	0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	3-Methylhexane	I	0.08	ppbv	0.02	AC-058	18-Nov-16
16110116-002	3-Methylpentane	I	0.09	ppbv	0.01	AC-058	18-Nov-16
16110116-002	Acetone		1.8	ppbv	0.4	AC-058	18-Nov-16
16110116-002	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	18-Nov-16
16110116-002	Benzene	I	0.20	ppbv	0.01	AC-058	18-Nov-16
16110116-002	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-002	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	Bromomethane	I	0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-002	Carbon disulfide	I	0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-002	Carbon tetrachloride	I	0.13	ppbv	0.01	AC-058	18-Nov-16
16110116-002	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	Chloroform	I	0.04	ppbv	0.02	AC-058	18-Nov-16
16110116-002	Chloromethane		0.52	ppbv	0.02	AC-058	18-Nov-16
16110116-002	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-002	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16
16110116-002	cis-2-Butene	I	0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	Cyclohexane	I	0.07	ppbv	0.02	AC-058	18-Nov-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/Nov 8, 2016	H3290	Ambient Air	08-Nov-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110116-002	Cyclopentane	I	0.03	ppbv	0.01	AC-058	18-Nov-16
16110116-002	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-002	Ethanol		3.8	ppbv	0.3	AC-058	18-Nov-16
16110116-002	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-002	Ethylbenzene	I	0.05	ppbv	0.01	AC-058	18-Nov-16
16110116-002	Freon-11		0.37	ppbv	0.02	AC-058	18-Nov-16
16110116-002	Freon-113	I	0.07	ppbv	0.01	AC-058	18-Nov-16
16110116-002	Freon-114	I	0.03	ppbv	0.02	AC-058	18-Nov-16
16110116-002	Freon-12		0.76	ppbv	0.02	AC-058	18-Nov-16
16110116-002	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	18-Nov-16
16110116-002	Isobutane		1.63	ppbv	0.02	AC-058	18-Nov-16
16110116-002	Isopentane		0.85	ppbv	0.03	AC-058	18-Nov-16
16110116-002	Isoprene	I	0.02	ppbv	0.01	AC-058	18-Nov-16
16110116-002	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-002	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-002	m,p-Xylene	I	0.16	ppbv	0.03	AC-058	18-Nov-16
16110116-002	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16
16110116-002	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	18-Nov-16
16110116-002	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	18-Nov-16
16110116-002	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	18-Nov-16
16110116-002	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-002	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	18-Nov-16
16110116-002	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	18-Nov-16
16110116-002	Methylcyclohexane	I	0.12	ppbv	0.01	AC-058	18-Nov-16
16110116-002	Methylcyclopentane	I	0.10	ppbv	0.02	AC-058	18-Nov-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/Nov 8, 2016	H3290	Ambient Air	08-Nov-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110116-002	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	18-Nov-16
16110116-002	n-Butane		2.41	ppbv	0.03	AC-058	18-Nov-16
16110116-002	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	18-Nov-16
16110116-002	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-002	n-Heptane	I	0.07	ppbv	0.01	AC-058	18-Nov-16
16110116-002	n-Hexane	I	0.14	ppbv	0.01	AC-058	18-Nov-16
16110116-002	n-Octane	I	0.03	ppbv	0.02	AC-058	18-Nov-16
16110116-002	n-Pentane		0.5	ppbv	0.1	AC-058	18-Nov-16
16110116-002	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	18-Nov-16
16110116-002	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	18-Nov-16
16110116-002	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	18-Nov-16
16110116-002	n-Nonane	I	0.02	ppbv	0.01	AC-058	18-Nov-16
16110116-002	o-Ethyltoluene	I	0.02	ppbv	0.01	AC-058	18-Nov-16
16110116-002	o-Xylene	I	0.06	ppbv	0.01	AC-058	18-Nov-16
16110116-002	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16
16110116-002	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	18-Nov-16
16110116-002	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16
16110116-002	Tetrachloroethylene		0.31	ppbv	0.04	AC-058	18-Nov-16
16110116-002	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-002	Toluene	I	0.27	ppbv	0.01	AC-058	18-Nov-16
16110116-002	trans-1,2-Dichloroethylene	I	0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-002	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16
16110116-002	trans-2-Butene	I	0.03	ppbv	0.01	AC-058	18-Nov-16
16110116-002	trans-2-Pentene	I	0.02	ppbv	0.02	AC-058	18-Nov-16
16110116-002	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16

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

Date: December-20-16

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/Nov 8, 2016	H3290	Ambient Air	08-Nov-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110116-002	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	18-Nov-16
16110116-002	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	18-Nov-16

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Nov 14, 2016	2664	Ambient Air	14-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110222-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	25-Nov-16
16110222-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	25-Nov-16
16110222-001	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110222-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110222-001	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110222-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110222-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-001	1-Butene	I	0.19	ppbv	0.02	AC-058	25-Nov-16
16110222-001	1-Hexene	I	0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	1-Pentene	I	0.03	ppbv	0.01	AC-058	25-Nov-16
16110222-001	2,2,4-Trimethylpentane	I	0.03	ppbv	0.01	AC-058	25-Nov-16
16110222-001	2,2-Dimethylbutane	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110222-001	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-001	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	2,3-Dimethylpentane	I	0.03	ppbv	0.02	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Nov 14, 2016	2664	Ambient Air	14-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110222-001	2,4-Dimethylpentane	I	0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-001	2-Methylheptane	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110222-001	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-001	2-Methylpentane	I	0.07	ppbv	0.01	AC-058	25-Nov-16
16110222-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	3-Methylhexane	I	0.05	ppbv	0.02	AC-058	25-Nov-16
16110222-001	3-Methylpentane	I	0.05	ppbv	0.01	AC-058	25-Nov-16
16110222-001	Acetone		7.6	ppbv	0.4	AC-058	25-Nov-16
16110222-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110222-001	Benzene	I	0.13	ppbv	0.01	AC-058	25-Nov-16
16110222-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-001	Carbon disulfide		3.11	ppbv	0.01	AC-058	25-Nov-16
16110222-001	Carbon tetrachloride	I	0.12	ppbv	0.01	AC-058	25-Nov-16
16110222-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	Chloroform	I	0.03	ppbv	0.02	AC-058	25-Nov-16
16110222-001	Chloromethane		0.55	ppbv	0.02	AC-058	25-Nov-16
16110222-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-001	cis-2-Butene	I	0.04	ppbv	0.02	AC-058	25-Nov-16
16110222-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	Cyclohexane	I	0.03	ppbv	0.02	AC-058	25-Nov-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Nov 14, 2016	2664	Ambient Air	14-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110222-001	Cyclopentane	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110222-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-001	Ethanol		1.4	ppbv	0.3	AC-058	25-Nov-16
16110222-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-001	Ethylbenzene	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110222-001	Freon-11		0.34	ppbv	0.02	AC-058	25-Nov-16
16110222-001	Freon-113	I	0.07	ppbv	0.01	AC-058	25-Nov-16
16110222-001	Freon-114	I	0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	Freon-12		0.70	ppbv	0.02	AC-058	25-Nov-16
16110222-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	25-Nov-16
16110222-001	Isobutane		1.23	ppbv	0.02	AC-058	25-Nov-16
16110222-001	Isopentane		0.86	ppbv	0.03	AC-058	25-Nov-16
16110222-001	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-001	m,p-Xylene	I	0.05	ppbv	0.03	AC-058	25-Nov-16
16110222-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	25-Nov-16
16110222-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	25-Nov-16
16110222-001	Methyl ethyl ketone		1.2	ppbv	0.3	AC-058	25-Nov-16
16110222-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	25-Nov-16
16110222-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110222-001	Methylcyclohexane	I	0.05	ppbv	0.01	AC-058	25-Nov-16
16110222-001	Methylcyclopentane	I	0.05	ppbv	0.02	AC-058	25-Nov-16

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.ICA/VOC/Bonnyville/Nov 14, 2016	2664	Ambient Air	14-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110222-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110222-001	n-Butane		1.36	ppbv	0.03	AC-058	25-Nov-16
16110222-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	25-Nov-16
16110222-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-001	n-Heptane	I	0.05	ppbv	0.01	AC-058	25-Nov-16
16110222-001	n-Hexane	I	0.08	ppbv	0.01	AC-058	25-Nov-16
16110222-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	n-Pentane	I	0.3	ppbv	0.1	AC-058	25-Nov-16
16110222-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	25-Nov-16
16110222-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	25-Nov-16
16110222-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	25-Nov-16
16110222-001	n-Nonane	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110222-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-001	o-Xylene	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110222-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	25-Nov-16
16110222-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-001	Toluene	I	0.08	ppbv	0.01	AC-058	25-Nov-16
16110222-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-001	trans-2-Butene	I	0.06	ppbv	0.01	AC-058	25-Nov-16
16110222-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Nov 14, 2016	2664	Ambient Air	14-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110222-001	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	25-Nov-16
16110222-001	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Nov 20, 2016	1516	Ambient Air	20-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110222-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-003	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	25-Nov-16
16110222-003	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	25-Nov-16
16110222-003	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110222-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110222-003	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110222-003	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110222-003	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-003	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-003	1-Butene	I	0.07	ppbv	0.02	AC-058	25-Nov-16
16110222-003	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	1-Pentene	I	0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	2,2,4-Trimethylpentane	I	0.03	ppbv	0.01	AC-058	25-Nov-16
16110222-003	2,2-Dimethylbutane	I	0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	2,3-Dimethylpentane	I	0.04	ppbv	0.02	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Nov 20, 2016	1516	Ambient Air	20-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110222-003	2,4-Dimethylpentane	I	0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	2-Methylheptane	I	0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	2-Methylhexane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	2-Methylpentane	I	0.06	ppbv	0.01	AC-058	25-Nov-16
16110222-003	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	3-Methylhexane	I	0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	3-Methylpentane	I	0.03	ppbv	0.01	AC-058	25-Nov-16
16110222-003	Acetone		1.4	ppbv	0.4	AC-058	25-Nov-16
16110222-003	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110222-003	Benzene	I	0.08	ppbv	0.01	AC-058	25-Nov-16
16110222-003	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	Carbon disulfide	I	0.13	ppbv	0.01	AC-058	25-Nov-16
16110222-003	Carbon tetrachloride	I	0.12	ppbv	0.01	AC-058	25-Nov-16
16110222-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	Chloroform	I	0.03	ppbv	0.02	AC-058	25-Nov-16
16110222-003	Chloromethane		0.52	ppbv	0.02	AC-058	25-Nov-16
16110222-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-003	cis-2-Butene	I	0.03	ppbv	0.02	AC-058	25-Nov-16
16110222-003	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	Cyclohexane	I	0.03	ppbv	0.02	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Nov 20, 2016	1516	Ambient Air	20-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110222-003	Cyclopentane	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110222-003	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	Ethanol		1.8	ppbv	0.3	AC-058	25-Nov-16
16110222-003	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-003	Ethylbenzene	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110222-003	Freon-11		0.35	ppbv	0.02	AC-058	25-Nov-16
16110222-003	Freon-113	I	0.08	ppbv	0.01	AC-058	25-Nov-16
16110222-003	Freon-114	I	0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	Freon-12		0.73	ppbv	0.02	AC-058	25-Nov-16
16110222-003	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	25-Nov-16
16110222-003	Isobutane		0.53	ppbv	0.02	AC-058	25-Nov-16
16110222-003	Isopentane	I	0.27	ppbv	0.03	AC-058	25-Nov-16
16110222-003	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-003	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	m,p-Xylene	I	0.08	ppbv	0.03	AC-058	25-Nov-16
16110222-003	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-003	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	25-Nov-16
16110222-003	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	25-Nov-16
16110222-003	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110222-003	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-003	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	25-Nov-16
16110222-003	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110222-003	Methylcyclohexane	I	0.04	ppbv	0.01	AC-058	25-Nov-16
16110222-003	Methylcyclopentane	I	0.04	ppbv	0.02	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Nov 20, 2016	1516	Ambient Air	20-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110222-003	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	25-Nov-16
16110222-003	n-Butane		0.89	ppbv	0.03	AC-058	25-Nov-16
16110222-003	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	25-Nov-16
16110222-003	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-003	n-Heptane	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110222-003	n-Hexane	I	0.05	ppbv	0.01	AC-058	25-Nov-16
16110222-003	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	n-Pentane	I	0.2	ppbv	0.1	AC-058	25-Nov-16
16110222-003	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	25-Nov-16
16110222-003	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	25-Nov-16
16110222-003	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	25-Nov-16
16110222-003	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	o-Ethyltoluene	I	0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	o-Xylene	I	0.04	ppbv	0.01	AC-058	25-Nov-16
16110222-003	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-003	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	25-Nov-16
16110222-003	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-003	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-003	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110222-003	Toluene	I	0.07	ppbv	0.01	AC-058	25-Nov-16
16110222-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110222-003	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110222-003	trans-2-Butene	I	0.02	ppbv	0.01	AC-058	25-Nov-16
16110222-003	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	25-Nov-16
16110222-003	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Nov 20, 2016	1516	Ambient Air	20-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110222-003	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	25-Nov-16
16110222-003	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Nov 26, 2016	2411	Ambient Air	26-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110258-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	08-Dec-16
16110258-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	08-Dec-16
16110258-001	1,2,4-Trimethylbenzene	I	0.05	ppbv	0.03	AC-058	08-Dec-16
16110258-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16110258-001	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16110258-001	1,2-Dichloropropane	I	0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-001	1,3,5-Trimethylbenzene	I	0.04	ppbv	0.02	AC-058	08-Dec-16
16110258-001	1,3-Butadiene	I	0.03	ppbv	0.02	AC-058	08-Dec-16
16110258-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16110258-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-001	1-Butene	I	0.16	ppbv	0.02	AC-058	08-Dec-16
16110258-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-001	1-Pentene	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16110258-001	2,2,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16110258-001	2,2-Dimethylbutane	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16110258-001	2,3,4-Trimethylpentane	I	0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-001	2,3-Dimethylbutane	I	0.03	ppbv	0.02	AC-058	08-Dec-16
16110258-001	2,3-Dimethylpentane	I	0.06	ppbv	0.02	AC-058	08-Dec-16

Report certified by: Graham Knox, Team Lead

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

Date: January-03-17

Inquiries: (780) 632 8455

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Nov 26, 2016	2411	Ambient Air	26-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110258-001	2,4-Dimethylpentane	I	0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-001	2-Methylheptane	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16110258-001	2-Methylhexane	I	0.10	ppbv	0.01	AC-058	08-Dec-16
16110258-001	2-Methylpentane	I	0.09	ppbv	0.01	AC-058	08-Dec-16
16110258-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-001	3-Methylhexane	I	0.05	ppbv	0.02	AC-058	08-Dec-16
16110258-001	3-Methylpentane	I	0.06	ppbv	0.01	AC-058	08-Dec-16
16110258-001	Acetone		2.4	ppbv	0.4	AC-058	08-Dec-16
16110258-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16110258-001	Benzene	I	0.16	ppbv	0.01	AC-058	08-Dec-16
16110258-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-001	Carbon disulfide	I	0.15	ppbv	0.01	AC-058	08-Dec-16
16110258-001	Carbon tetrachloride	I	0.12	ppbv	0.01	AC-058	08-Dec-16
16110258-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-001	Chloroethane	I	0.07	ppbv	0.02	AC-058	08-Dec-16
16110258-001	Chloroform	I	0.03	ppbv	0.02	AC-058	08-Dec-16
16110258-001	Chloromethane		0.78	ppbv	0.02	AC-058	08-Dec-16
16110258-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-001	cis-2-Butene	I	0.07	ppbv	0.02	AC-058	08-Dec-16
16110258-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-001	Cyclohexane	I	0.07	ppbv	0.02	AC-058	08-Dec-16

Report certified by: Graham Knox, Team Lead

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

Date: January-03-17

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Nov 26, 2016	2411	Ambient Air	26-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110258-001	Cyclopentane	I	0.03	ppbv	0.01	AC-058	08-Dec-16
16110258-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-001	Ethanol		1.3	ppbv	0.3	AC-058	08-Dec-16
16110258-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-001	Ethylbenzene	I	0.03	ppbv	0.01	AC-058	08-Dec-16
16110258-001	Freon-11		0.35	ppbv	0.02	AC-058	08-Dec-16
16110258-001	Freon-113	I	0.06	ppbv	0.01	AC-058	08-Dec-16
16110258-001	Freon-114	I	0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-001	Freon-12		0.71	ppbv	0.02	AC-058	08-Dec-16
16110258-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	08-Dec-16
16110258-001	Isobutane		1.12	ppbv	0.02	AC-058	08-Dec-16
16110258-001	Isopentane		0.39	ppbv	0.03	AC-058	08-Dec-16
16110258-001	Isoprene	I	0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-001	Isopropylbenzene	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16110258-001	m,p-Xylene	I	0.09	ppbv	0.03	AC-058	08-Dec-16
16110258-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	08-Dec-16
16110258-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	08-Dec-16
16110258-001	Methyl ethyl ketone		0.4	ppbv	0.3	AC-058	08-Dec-16
16110258-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	08-Dec-16
16110258-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16110258-001	Methylcyclohexane	I	0.17	ppbv	0.01	AC-058	08-Dec-16
16110258-001	Methylcyclopentane	I	0.07	ppbv	0.02	AC-058	08-Dec-16

Report certified by: Graham Knox, Team Lead

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

Date: January-03-17

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Nov 26, 2016	2411	Ambient Air	26-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110258-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16110258-001	n-Butane		1.90	ppbv	0.03	AC-058	08-Dec-16
16110258-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	08-Dec-16
16110258-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-001	n-Heptane	I	0.04	ppbv	0.01	AC-058	08-Dec-16
16110258-001	n-Hexane	I	0.12	ppbv	0.01	AC-058	08-Dec-16
16110258-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-001	n-Pentane		0.4	ppbv	0.1	AC-058	08-Dec-16
16110258-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	08-Dec-16
16110258-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	08-Dec-16
16110258-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	08-Dec-16
16110258-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-001	o-Ethyltoluene	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16110258-001	o-Xylene	I	0.03	ppbv	0.01	AC-058	08-Dec-16
16110258-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	08-Dec-16
16110258-001	Styrene	I	0.07	ppbv	0.04	AC-058	08-Dec-16
16110258-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-001	Toluene	I	0.12	ppbv	0.01	AC-058	08-Dec-16
16110258-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16110258-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-001	trans-2-Butene	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16110258-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16110258-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16

Report certified by: Graham Knox, Team Lead

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

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Nov 26, 2016	2411	Ambient Air	26-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110258-001	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	08-Dec-16
16110258-001	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	08-Dec-16

Report certified by: Graham Knox, Team Lead

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

Date: January-03-17

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PAHS SAMPLES

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/Bonnyville/Nov 2, 2016	TE08	Air Filter	02-Nov-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110059-004	1-Methylnaphthalene		0.02	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	2-Methylnaphthalene		0.06	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Acenaphthene		0.02	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Acenaphthylene		0.04	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Anthracene		0.02	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Benzo(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Benzo(a)pyrene		0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Benzo(e)pyrene		0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Chrysene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Fluoranthene		0.04	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Fluorene		0.06	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Indeno(1,2,3-cd)pyrene		0.04	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Naphthalene		0.03	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Phenanthrene		0.17	ug/puf	0.01	NA-017	27-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/Bonnyville/Nov 2, 2016	TE08	Air Filter	02-Nov-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110059-004	Pyrene		0.06 ug/puf	0.01	NA-017	27-Nov-16
16110059-004	Retene		0.02 ug/puf	0.01	NA-017	27-Nov-16

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/Bonnyville/Nov 8, 2016	TE11	Air Filter	08-Nov-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110116-003	1-Methylnaphthalene		0.15	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	2-Methylnaphthalene		0.24	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Acenaphthene		0.10	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Acenaphthylene		0.59	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Anthracene		0.12	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Benzo(a)anthracene		0.04	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Benzo(a)pyrene		0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Benzo(b,j,k)fluoranthene		0.06	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Benzo(e)pyrene		0.04	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Chrysene		0.04	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Fluoranthene		0.22	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Fluorene		0.27	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Indeno(1,2,3-cd)pyrene		0.04	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Naphthalene		0.17	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Phenanthrene		0.87	ug/puf	0.01	NA-017	27-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/Bonnyville/Nov 8, 2016	TE11	Air Filter	08-Nov-16 0:00
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110116-003	Pyrene		0.21 ug/puf	0.01	NA-017	27-Nov-16
16110116-003	Retene		0.10 ug/puf	0.01	NA-017	27-Nov-16

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

Date: December-20-16

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RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE Calgary AB T2E 6P8 INVOICE: Charmaine Code	CLIENT SAMPLE ID ICA/PUF/Bonnyville/Nov 14, 2016	CANISTER ID TE-04	Matrix Air Filter	Priority Normal
	DESCRIPTION: Bonnyville - AER		DATE SAMPLED: 14-Nov-16 0:00	DATE RECEIVED: 22-Nov-16
	REPORT CREATED: 20-Dec-16		REPORT NUMBER: 16110222	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110222-002	1-Methylnaphthalene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	2-Methylnaphthalene		0.04 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	3-Methylcholanthrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Acenaphthene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Acenaphthylene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Acridine	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Anthracene		0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Benzo(a)anthracene		0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Benzo(a)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Benzo(c)phenanthrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Benzo(e)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Benzo(ghi)perylene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Chrysene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/PUF/Bonnyville/Nov 14, 2016	TE-04	Air Filter	14-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110222-002	Dibenzo(ah)anthracene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Fluoranthene		0.05 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Fluorene		0.06 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Naphthalene		0.03 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Perylene	K, T, U	< 0.01 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Phenanthrene		0.20 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Pyrene		0.05 ug/puf	0.01	NA-017	27-Nov-16
16110222-002	Retene		0.05 ug/puf	0.01	NA-017	27-Nov-16

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/PUF/Bonnyville/Nov 20, 2016	TE-02	Air Filter	20-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110222-004	1-Methylnaphthalene		0.07	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	2-Methylnaphthalene		0.14	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Acenaphthene		0.03	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Acenaphthylene		0.05	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Anthracene		0.02	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Benzo(a)anthracene		0.02	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Benzo(a)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Benzo(e)pyrene		0.01	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Chrysene	K, T, U	< 0.01	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Fluoranthene		0.04	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Fluorene		0.06	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Indeno(1,2,3-cd)pyrene		0.03	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Naphthalene		0.14	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Phenanthrene		0.21	ug/puf	0.01	NA-017	28-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

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 Vegreville, Alberta
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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/PUF/Bonnyville/Nov 20, 2016	TE-02	Air Filter	20-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110222	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110222-004	Pyrene		0.03 ug/puf	0.01	NA-017	28-Nov-16
16110222-004	Retene		0.06 ug/puf	0.01	NA-017	28-Nov-16

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

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/Bonnyville/Nov 26, 2016	P13-01	Air Filter	26-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110258-002	1-Methylnaphthalene		0.12 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	2-Methylnaphthalene		0.18 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	3-Methylcholanthrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Acenaphthene		0.08 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Acenaphthylene		0.12 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Acridine	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Anthracene		0.02 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Benzo(a)anthracene		0.04 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Benzo(a)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Benzo(b,j,k)fluoranthene		0.07 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Benzo(c)phenanthrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Benzo(e)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Benzo(ghi)perylene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Chrysene		0.02 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Dibenzo(ah)anthracene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Fluoranthene		0.10 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Fluorene		0.15 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Naphthalene		0.15 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Perylene	K, T, U	< 0.01 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Phenanthrene		0.34 ug/puf	0.01	NA-017	11-Dec-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: January-03-17

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 Vegreville, Alberta
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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/Bonnyville/Nov 26, 2016	P13-01	Air Filter	26-Nov-16 0:00
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110258-002	Pyrene		0.11 ug/puf	0.01	NA-017	11-Dec-16
16110258-002	Retene		0.11 ug/puf	0.01	NA-017	11-Dec-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: January-03-17

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

NMHC CANISTER SAMPLES

RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE Calgary AB T2E 6P8 INVOICE: Charmaine Code	CLIENT SAMPLE ID /NMHC-VOC/Bonnyville/Nov 2, 2	CANISTER ID 1689	Matrix Ambient Air	Priority Normal
	DESCRIPTION: Bonnyville- AER		DATE SAMPLED: 02-Nov-16 9:05	DATE RECEIVED: 08-Nov-16
	REPORT CREATED: 20-Dec-16		REPORT NUMBER: 16110059	VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110059-005	1,1,1-Trichloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	16-Nov-16
16110059-005	1,1,2,2-Tetrachloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	16-Nov-16
16110059-005	1,1,2-Trichloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	16-Nov-16
16110059-005	1,1-Dichloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	16-Nov-16
16110059-005	1,1-Dichloroethylene	K, T, U	< 0.06 ppbv	0.06	AC-058	16-Nov-16
16110059-005	1,2,3-Trimethylbenzene	K, T, U	< 0.08 ppbv	0.08	AC-058	16-Nov-16
16110059-005	1,2,4-Trichlorobenzene	K, T, U	< 1.2 ppbv	1.2	AC-058	16-Nov-16
16110059-005	1,2,4-Trimethylbenzene	K, T, U	< 0.05 ppbv	0.05	AC-058	16-Nov-16
16110059-005	1,2-Dibromoethane	K, T, U	< 0.03 ppbv	0.03	AC-058	16-Nov-16
16110059-005	1,2-Dichlorobenzene	K, T, U	< 0.05 ppbv	0.05	AC-058	16-Nov-16
16110059-005	1,2-Dichloroethane	I	0.02 ppbv	0.02	AC-058	16-Nov-16
16110059-005	1,2-Dichloropropane	K, T, U	< 0.02 ppbv	0.02	AC-058	16-Nov-16
16110059-005	1,3,5-Trimethylbenzene	K, T, U	< 0.03 ppbv	0.03	AC-058	16-Nov-16
16110059-005	1,3-Butadiene	I	0.08 ppbv	0.03	AC-058	16-Nov-16
16110059-005	1,3-Dichlorobenzene	K, T, U	< 0.5 ppbv	0.5	AC-058	16-Nov-16
16110059-005	1,4-Dichlorobenzene	K, T, U	< 0.6 ppbv	0.6	AC-058	16-Nov-16
16110059-005	1,4-Dioxane	K, T, U	< 0.6 ppbv	0.6	AC-058	16-Nov-16
16110059-005	1-Butene	I	0.34 ppbv	0.03	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\\NMHC-VOC/Bonnyville/Nov 2, 2016	1689	Ambient Air	02-Nov-16 9:05
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110059-005	1-Hexene	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-005	1-Pentene	I	0.03	ppbv	0.02	AC-058	16-Nov-16
16110059-005	2,2,4-Trimethylpentane	I	0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-005	2,2-Dimethylbutane	I	0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-005	2,3,4-Trimethylpentane	I	0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-005	2,3-Dimethylbutane	I	0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-005	2,3-Dimethylpentane	I	0.04	ppbv	0.03	AC-058	16-Nov-16
16110059-005	2,4-Dimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-005	2-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-005	2-Methylhexane	I	0.05	ppbv	0.02	AC-058	16-Nov-16
16110059-005	2-Methylpentane	I	0.14	ppbv	0.02	AC-058	16-Nov-16
16110059-005	3-Methylheptane	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-005	3-Methylhexane	I	0.04	ppbv	0.03	AC-058	16-Nov-16
16110059-005	3-Methylpentane	I	0.08	ppbv	0.02	AC-058	16-Nov-16
16110059-005	Acetone		1.6	ppbv	0.6	AC-058	16-Nov-16
16110059-005	Acrolein	K, T, U	< 0.5	ppbv	0.5	AC-058	16-Nov-16
16110059-005	Benzene	I	0.16	ppbv	0.02	AC-058	16-Nov-16
16110059-005	Benzyl chloride	K, T, U	< 0.6	ppbv	0.6	AC-058	16-Nov-16
16110059-005	Bromodichloromethane	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-005	Bromoform	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-005	Bromomethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-005	Carbon disulfide	I	0.05	ppbv	0.02	AC-058	16-Nov-16
16110059-005	Carbon tetrachloride	I	0.13	ppbv	0.02	AC-058	16-Nov-16
16110059-005	Chlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-005	Chloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\\NMHC-VOC/Bonnyville/Nov 2, 2016	1689	Ambient Air	02-Nov-16 9:05
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110059-005	Chloroform	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-005	Chloromethane		0.49	ppbv	0.03	AC-058	16-Nov-16
16110059-005	cis-1,2-Dichloroethene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-005	cis-1,3-Dichloropropene	K, T, U	< 0.06	ppbv	0.06	AC-058	16-Nov-16
16110059-005	cis-2-Butene	I	0.09	ppbv	0.03	AC-058	16-Nov-16
16110059-005	cis-2-Pentene	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-005	Cyclohexane	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-005	Cyclopentane	I	0.03	ppbv	0.02	AC-058	16-Nov-16
16110059-005	Dibromochloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-005	Ethanol		2.0	ppbv	0.5	AC-058	16-Nov-16
16110059-005	Ethyl acetate	K, T, U	< 0.6	ppbv	0.6	AC-058	16-Nov-16
16110059-005	Ethylbenzene	I	0.03	ppbv	0.02	AC-058	16-Nov-16
16110059-005	Freon-11	I	0.36	ppbv	0.03	AC-058	16-Nov-16
16110059-005	Freon-113	I	0.06	ppbv	0.02	AC-058	16-Nov-16
16110059-005	Freon-114	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-005	Freon-12		0.75	ppbv	0.03	AC-058	16-Nov-16
16110059-005	Hexachloro-1,3-butadiene	K, T, U	< 0.78	ppbv	0.78	AC-058	16-Nov-16
16110059-005	Isobutane		2.89	ppbv	0.03	AC-058	16-Nov-16
16110059-005	Isopentane		1.26	ppbv	0.05	AC-058	16-Nov-16
16110059-005	Isoprene	I	0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-005	Isopropyl alcohol	K, T, U	< 0.6	ppbv	0.6	AC-058	16-Nov-16
16110059-005	Isopropylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-005	m,p-Xylene	I	0.07	ppbv	0.05	AC-058	16-Nov-16
16110059-005	m-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	16-Nov-16
16110059-005	m-Ethyltoluene	K, T, U	< 0.12	ppbv	0.12	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\\NMHC-VOC/Bonnyville/Nov 2, 2016	1689	Ambient Air	02-Nov-16 9:05
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110059-005	Methyl butyl ketone	K, T, U	< 0.78	ppbv	0.78	AC-058	16-Nov-16
16110059-005	Methyl ethyl ketone	K, T, U	< 0.5	ppbv	0.5	AC-058	16-Nov-16
16110059-005	Methyl isobutyl ketone	K, T, U	< 0.6	ppbv	0.6	AC-058	16-Nov-16
16110059-005	Methyl methacrylate	K, T, U	< 0.11	ppbv	0.11	AC-058	16-Nov-16
16110059-005	Methyl tert butyl ether	K, T, U	< 0.05	ppbv	0.05	AC-058	16-Nov-16
16110059-005	Methylcyclohexane	I	0.03	ppbv	0.02	AC-058	16-Nov-16
16110059-005	Methylcyclopentane	I	0.07	ppbv	0.03	AC-058	16-Nov-16
16110059-005	Methylene chloride	K, T, U	< 0.5	ppbv	0.5	AC-058	16-Nov-16
16110059-005	n-Butane		6.14	ppbv	0.05	AC-058	16-Nov-16
16110059-005	n-Decane	K, T, U	< 0.09	ppbv	0.09	AC-058	16-Nov-16
16110059-005	n-Dodecane	K, T, U	< 0.6	ppbv	0.6	AC-058	16-Nov-16
16110059-005	n-Heptane	I	0.03	ppbv	0.02	AC-058	16-Nov-16
16110059-005	n-Hexane	I	0.10	ppbv	0.02	AC-058	16-Nov-16
16110059-005	n-Octane	K, T, U	< 0.03	ppbv	0.03	AC-058	16-Nov-16
16110059-005	n-Pentane		0.5	ppbv	0.2	AC-058	16-Nov-16
16110059-005	n-Propylbenzene	K, T, U	< 0.08	ppbv	0.08	AC-058	16-Nov-16
16110059-005	n-Undecane	K, T, U	< 0.8	ppbv	0.8	AC-058	16-Nov-16
16110059-005	Naphthalene	K, T, U	< 0.8	ppbv	0.8	AC-058	16-Nov-16
16110059-005	n-Nonane	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-005	o-Ethyltoluene	K, T, U	< 0.02	ppbv	0.02	AC-058	16-Nov-16
16110059-005	o-Xylene	I	0.03	ppbv	0.02	AC-058	16-Nov-16
16110059-005	p-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	16-Nov-16
16110059-005	p-Ethyltoluene	K, T, U	< 0.11	ppbv	0.11	AC-058	16-Nov-16
16110059-005	Styrene	K, T, U	< 0.06	ppbv	0.06	AC-058	16-Nov-16
16110059-005	Tetrachloroethylene	K, T, U	< 0.06	ppbv	0.06	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\\NMHC-VOC/Bonnyville/Nov 2, 2016	1689	Ambient Air	02-Nov-16 9:05
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110059	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110059-005	Tetrahydrofuran	K, T, U	< 0.6 ppbv	0.6	AC-058	16-Nov-16
16110059-005	Toluene	I	0.13 ppbv	0.02	AC-058	16-Nov-16
16110059-005	trans-1,2-Dichloroethylene	K, T, U	< 0.02 ppbv	0.02	AC-058	16-Nov-16
16110059-005	trans-1,3-Dichloropropylene	K, T, U	< 0.06 ppbv	0.06	AC-058	16-Nov-16
16110059-005	trans-2-Butene	I	0.06 ppbv	0.02	AC-058	16-Nov-16
16110059-005	trans-2-Pentene	I	0.05 ppbv	0.03	AC-058	16-Nov-16
16110059-005	Trichloroethylene	I	0.08 ppbv	0.06	AC-058	16-Nov-16
16110059-005	Vinyl acetate	K, T, U	< 0.6 ppbv	0.6	AC-058	16-Nov-16
16110059-005	Vinyl chloride	K, T, U	< 0.03 ppbv	0.03	AC-058	16-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE Calgary AB T2E 6P8 INVOICE: Charmaine Code	CLIENT SAMPLE ID /NMHC-VOC/Bonnyville/Nov 4, 2	CANISTER ID S5608	Matrix Ambient Air	Priority Normal
	DESCRIPTION: Bonnyville- AER			
	DATE SAMPLED: 04-Nov-16 16:45	DATE RECEIVED: 15-Nov-16		
	REPORT CREATED: 20-Dec-16	REPORT NUMBER: 16110116		
		VERSION: Version 01		

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110116-001	1,1,1-Trichloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	18-Nov-16
16110116-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	18-Nov-16
16110116-001	1,1,2-Trichloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	18-Nov-16
16110116-001	1,1-Dichloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	18-Nov-16
16110116-001	1,1-Dichloroethylene	K, T, U	< 0.06 ppbv	0.06	AC-058	18-Nov-16
16110116-001	1,2,3-Trimethylbenzene	K, T, U	< 0.07 ppbv	0.07	AC-058	18-Nov-16
16110116-001	1,2,4-Trichlorobenzene	K, T, U	< 1.2 ppbv	1.2	AC-058	18-Nov-16
16110116-001	1,2,4-Trimethylbenzene	I	0.16 ppbv	0.04	AC-058	18-Nov-16
16110116-001	1,2-Dibromoethane	K, T, U	< 0.03 ppbv	0.03	AC-058	18-Nov-16
16110116-001	1,2-Dichlorobenzene	K, T, U	< 0.04 ppbv	0.04	AC-058	18-Nov-16
16110116-001	1,2-Dichloroethane	I	0.03 ppbv	0.01	AC-058	18-Nov-16
16110116-001	1,2-Dichloropropane	K, T, U	< 0.01 ppbv	0.01	AC-058	18-Nov-16
16110116-001	1,3,5-Trimethylbenzene	I	0.06 ppbv	0.03	AC-058	18-Nov-16
16110116-001	1,3-Butadiene	K, T, U	< 0.03 ppbv	0.03	AC-058	18-Nov-16
16110116-001	1,3-Dichlorobenzene	K, T, U	< 0.4 ppbv	0.4	AC-058	18-Nov-16
16110116-001	1,4-Dichlorobenzene	K, T, U	< 0.6 ppbv	0.6	AC-058	18-Nov-16
16110116-001	1,4-Dioxane	K, T, U	< 0.6 ppbv	0.6	AC-058	18-Nov-16
16110116-001	1-Butene		0.53 ppbv	0.03	AC-058	18-Nov-16

Report certified by: Colleen McGerrigle, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\\NMHC-VOC/Bonnyville/Nov 4, 2	S5608	Ambient Air	04-Nov-16 16:45
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110116-001	1-Hexene	K, T, U	< 0.03	ppbv	0.03	AC-058	18-Nov-16
16110116-001	1-Pentene	I	0.05	ppbv	0.01	AC-058	18-Nov-16
16110116-001	2,2,4-Trimethylpentane	I	0.20	ppbv	0.01	AC-058	18-Nov-16
16110116-001	2,2-Dimethylbutane	I	0.04	ppbv	0.01	AC-058	18-Nov-16
16110116-001	2,3,4-Trimethylpentane	I	0.08	ppbv	0.01	AC-058	18-Nov-16
16110116-001	2,3-Dimethylbutane	I	0.09	ppbv	0.03	AC-058	18-Nov-16
16110116-001	2,3-Dimethylpentane	I	0.22	ppbv	0.03	AC-058	18-Nov-16
16110116-001	2,4-Dimethylpentane	I	0.07	ppbv	0.01	AC-058	18-Nov-16
16110116-001	2-Methylheptane	I	0.04	ppbv	0.01	AC-058	18-Nov-16
16110116-001	2-Methylhexane	I	0.15	ppbv	0.01	AC-058	18-Nov-16
16110116-001	2-Methylpentane	I	0.30	ppbv	0.01	AC-058	18-Nov-16
16110116-001	3-Methylheptane	I	0.04	ppbv	0.03	AC-058	18-Nov-16
16110116-001	3-Methylhexane	I	0.13	ppbv	0.03	AC-058	18-Nov-16
16110116-001	3-Methylpentane	I	0.17	ppbv	0.01	AC-058	18-Nov-16
16110116-001	Acetone		3.0	ppbv	0.6	AC-058	18-Nov-16
16110116-001	Acrolein	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-001	Benzene	I	0.36	ppbv	0.01	AC-058	18-Nov-16
16110116-001	Benzyl chloride	K, T, U	< 0.6	ppbv	0.6	AC-058	18-Nov-16
16110116-001	Bromodichloromethane	K, T, U	< 0.03	ppbv	0.03	AC-058	18-Nov-16
16110116-001	Bromoform	K, T, U	< 0.03	ppbv	0.03	AC-058	18-Nov-16
16110116-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-001	Carbon disulfide	I	0.06	ppbv	0.01	AC-058	18-Nov-16
16110116-001	Carbon tetrachloride	I	0.12	ppbv	0.01	AC-058	18-Nov-16
16110116-001	Chlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	18-Nov-16
16110116-001	Chloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	18-Nov-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\\NMHC-VOC/Bonnyville/Nov 4, 2016	S5608	Ambient Air	04-Nov-16 16:45
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110116-001	Chloroform	I	0.05	ppbv	0.03	AC-058	18-Nov-16
16110116-001	Chloromethane		0.54	ppbv	0.03	AC-058	18-Nov-16
16110116-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-001	cis-1,3-Dichloropropene	K, T, U	< 0.06	ppbv	0.06	AC-058	18-Nov-16
16110116-001	cis-2-Butene	I	0.09	ppbv	0.03	AC-058	18-Nov-16
16110116-001	cis-2-Pentene	I	0.04	ppbv	0.03	AC-058	18-Nov-16
16110116-001	Cyclohexane	I	0.07	ppbv	0.03	AC-058	18-Nov-16
16110116-001	Cyclopentane	I	0.05	ppbv	0.01	AC-058	18-Nov-16
16110116-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-001	Ethanol		8.4	ppbv	0.4	AC-058	18-Nov-16
16110116-001	Ethyl acetate	K, T, U	< 0.6	ppbv	0.6	AC-058	18-Nov-16
16110116-001	Ethylbenzene	I	0.11	ppbv	0.01	AC-058	18-Nov-16
16110116-001	Freon-11	I	0.36	ppbv	0.03	AC-058	18-Nov-16
16110116-001	Freon-113	I	0.06	ppbv	0.01	AC-058	18-Nov-16
16110116-001	Freon-114	I	0.03	ppbv	0.03	AC-058	18-Nov-16
16110116-001	Freon-12		0.78	ppbv	0.03	AC-058	18-Nov-16
16110116-001	Hexachloro-1,3-butadiene	K, T, U	< 0.72	ppbv	0.72	AC-058	18-Nov-16
16110116-001	Isobutane		2.65	ppbv	0.03	AC-058	18-Nov-16
16110116-001	Isopentane		1.49	ppbv	0.04	AC-058	18-Nov-16
16110116-001	Isoprene	I	0.04	ppbv	0.01	AC-058	18-Nov-16
16110116-001	Isopropyl alcohol	K, T, U	< 0.6	ppbv	0.6	AC-058	18-Nov-16
16110116-001	Isopropylbenzene	I	0.01	ppbv	0.01	AC-058	18-Nov-16
16110116-001	m,p-Xylene	I	0.38	ppbv	0.04	AC-058	18-Nov-16
16110116-001	m-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	18-Nov-16
16110116-001	m-Ethyltoluene	K, T, U	< 0.12	ppbv	0.12	AC-058	18-Nov-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\\NMHC-VOC/Bonnyville/Nov 4, 2016	S5608	Ambient Air	04-Nov-16 16:45
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110116-001	Methyl butyl ketone	K, T, U	< 0.72	ppbv	0.72	AC-058	18-Nov-16
16110116-001	Methyl ethyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-001	Methyl isobutyl ketone	K, T, U	< 0.6	ppbv	0.6	AC-058	18-Nov-16
16110116-001	Methyl methacrylate	K, T, U	< 0.10	ppbv	0.10	AC-058	18-Nov-16
16110116-001	Methyl tert butyl ether	K, T, U	< 0.04	ppbv	0.04	AC-058	18-Nov-16
16110116-001	Methylcyclohexane	I	0.14	ppbv	0.01	AC-058	18-Nov-16
16110116-001	Methylcyclopentane	I	0.18	ppbv	0.03	AC-058	18-Nov-16
16110116-001	Methylene chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	18-Nov-16
16110116-001	n-Butane		4.38	ppbv	0.04	AC-058	18-Nov-16
16110116-001	n-Decane	K, T, U	< 0.09	ppbv	0.09	AC-058	18-Nov-16
16110116-001	n-Dodecane	K, T, U	< 0.6	ppbv	0.6	AC-058	18-Nov-16
16110116-001	n-Heptane	I	0.13	ppbv	0.01	AC-058	18-Nov-16
16110116-001	n-Hexane	I	0.23	ppbv	0.01	AC-058	18-Nov-16
16110116-001	n-Octane	I	0.05	ppbv	0.03	AC-058	18-Nov-16
16110116-001	n-Pentane		0.8	ppbv	0.1	AC-058	18-Nov-16
16110116-001	n-Propylbenzene	K, T, U	< 0.07	ppbv	0.07	AC-058	18-Nov-16
16110116-001	n-Undecane	K, T, U	< 0.7	ppbv	0.7	AC-058	18-Nov-16
16110116-001	Naphthalene	K, T, U	< 0.7	ppbv	0.7	AC-058	18-Nov-16
16110116-001	n-Nonane	I	0.04	ppbv	0.01	AC-058	18-Nov-16
16110116-001	o-Ethyltoluene	I	0.05	ppbv	0.01	AC-058	18-Nov-16
16110116-001	o-Xylene	I	0.15	ppbv	0.01	AC-058	18-Nov-16
16110116-001	p-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	18-Nov-16
16110116-001	p-Ethyltoluene	K, T, U	< 0.10	ppbv	0.10	AC-058	18-Nov-16
16110116-001	Styrene	K, T, U	< 0.06	ppbv	0.06	AC-058	18-Nov-16
16110116-001	Tetrachloroethylene		0.79	ppbv	0.06	AC-058	18-Nov-16

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CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\\NMHC-VOC/Bonnyville/Nov 4, 2016	S5608	Ambient Air	04-Nov-16 16:45
DESCRIPTION:	Bonnyville- AER		
REPORT NUMBER:	16110116	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110116-001	Tetrahydrofuran	K, T, U	< 0.6 ppbv	0.6	AC-058	18-Nov-16
16110116-001	Toluene		0.63 ppbv	0.01	AC-058	18-Nov-16
16110116-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01 ppbv	0.01	AC-058	18-Nov-16
16110116-001	trans-1,3-Dichloropropylene	K, T, U	< 0.06 ppbv	0.06	AC-058	18-Nov-16
16110116-001	trans-2-Butene	I	0.11 ppbv	0.01	AC-058	18-Nov-16
16110116-001	trans-2-Pentene	I	0.06 ppbv	0.03	AC-058	18-Nov-16
16110116-001	Trichloroethylene	K, T, U	< 0.06 ppbv	0.06	AC-058	18-Nov-16
16110116-001	Vinyl acetate	K, T, U	< 0.6 ppbv	0.6	AC-058	18-Nov-16
16110116-001	Vinyl chloride	K, T, U	< 0.03 ppbv	0.03	AC-058	18-Nov-16

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE Calgary AB T2E 6P8 INVOICE: Charmaine Code	CLIENT SAMPLE ID /NMHC-VOC/Bonnyville/Nov 12, :	CANISTER ID 1532	Matrix Ambient Air	Priority Normal
	DESCRIPTION: Bonnyville - AER		DATE SAMPLED: 12-Nov-16 15:35	DATE RECEIVED: 21-Nov-16
	REPORT CREATED: 20-Dec-16	REPORT NUMBER: 16110212		VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110212-001	1,1,1-Trichloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	25-Nov-16
16110212-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	25-Nov-16
16110212-001	1,1,2-Trichloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	25-Nov-16
16110212-001	1,1-Dichloroethane	K, T, U	< 0.03 ppbv	0.03	AC-058	25-Nov-16
16110212-001	1,1-Dichloroethylene	K, T, U	< 0.06 ppbv	0.06	AC-058	25-Nov-16
16110212-001	1,2,3-Trimethylbenzene	K, T, U	< 0.07 ppbv	0.07	AC-058	25-Nov-16
16110212-001	1,2,4-Trichlorobenzene	K, T, U	< 1.2 ppbv	1.2	AC-058	25-Nov-16
16110212-001	1,2,4-Trimethylbenzene	K, T, U	< 0.04 ppbv	0.04	AC-058	25-Nov-16
16110212-001	1,2-Dibromoethane	K, T, U	< 0.03 ppbv	0.03	AC-058	25-Nov-16
16110212-001	1,2-Dichlorobenzene	K, T, U	< 0.04 ppbv	0.04	AC-058	25-Nov-16
16110212-001	1,2-Dichloroethane	I	0.03 ppbv	0.01	AC-058	25-Nov-16
16110212-001	1,2-Dichloropropane	K, T, U	< 0.01 ppbv	0.01	AC-058	25-Nov-16
16110212-001	1,3,5-Trimethylbenzene	K, T, U	< 0.03 ppbv	0.03	AC-058	25-Nov-16
16110212-001	1,3-Butadiene	I	0.06 ppbv	0.03	AC-058	25-Nov-16
16110212-001	1,3-Dichlorobenzene	K, T, U	< 0.4 ppbv	0.4	AC-058	25-Nov-16
16110212-001	1,4-Dichlorobenzene	K, T, U	< 0.6 ppbv	0.6	AC-058	25-Nov-16
16110212-001	1,4-Dioxane	K, T, U	< 0.6 ppbv	0.6	AC-058	25-Nov-16
16110212-001	1-Butene		0.56 ppbv	0.03	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC-VOC/Bonnyville/Nov 12, 2	1532	Ambient Air	12-Nov-16 15:35
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110212	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110212-001	1-Hexene	I	0.10	ppbv	0.03	AC-058	25-Nov-16
16110212-001	1-Pentene	I	0.35	ppbv	0.01	AC-058	25-Nov-16
16110212-001	2,2,4-Trimethylpentane	I	0.23	ppbv	0.01	AC-058	25-Nov-16
16110212-001	2,2-Dimethylbutane	I	0.05	ppbv	0.01	AC-058	25-Nov-16
16110212-001	2,3,4-Trimethylpentane	I	0.06	ppbv	0.01	AC-058	25-Nov-16
16110212-001	2,3-Dimethylbutane	I	0.31	ppbv	0.03	AC-058	25-Nov-16
16110212-001	2,3-Dimethylpentane	I	0.29	ppbv	0.03	AC-058	25-Nov-16
16110212-001	2,4-Dimethylpentane	I	0.13	ppbv	0.01	AC-058	25-Nov-16
16110212-001	2-Methylheptane	I	0.04	ppbv	0.01	AC-058	25-Nov-16
16110212-001	2-Methylhexane	I	0.20	ppbv	0.01	AC-058	25-Nov-16
16110212-001	2-Methylpentane		0.87	ppbv	0.01	AC-058	25-Nov-16
16110212-001	3-Methylheptane	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110212-001	3-Methylhexane	I	0.17	ppbv	0.03	AC-058	25-Nov-16
16110212-001	3-Methylpentane		0.47	ppbv	0.01	AC-058	25-Nov-16
16110212-001	Acetone	K, T, U	< 0.6	ppbv	0.6	AC-058	25-Nov-16
16110212-001	Acrolein	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110212-001	Benzene	I	0.38	ppbv	0.01	AC-058	25-Nov-16
16110212-001	Benzyl chloride	K, T, U	< 0.6	ppbv	0.6	AC-058	25-Nov-16
16110212-001	Bromodichloromethane	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110212-001	Bromoform	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110212-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-001	Carbon disulfide	I	0.25	ppbv	0.01	AC-058	25-Nov-16
16110212-001	Carbon tetrachloride	I	0.12	ppbv	0.01	AC-058	25-Nov-16
16110212-001	Chlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110212-001	Chloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16

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DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110212	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110212-001	Chloroform	I	0.04	ppbv	0.03	AC-058	25-Nov-16
16110212-001	Chloromethane		0.52	ppbv	0.03	AC-058	25-Nov-16
16110212-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-001	cis-1,3-Dichloropropene	K, T, U	< 0.06	ppbv	0.06	AC-058	25-Nov-16
16110212-001	cis-2-Butene		0.57	ppbv	0.03	AC-058	25-Nov-16
16110212-001	cis-2-Pentene	I	0.32	ppbv	0.03	AC-058	25-Nov-16
16110212-001	Cyclohexane	I	0.15	ppbv	0.03	AC-058	25-Nov-16
16110212-001	Cyclopentane	I	0.17	ppbv	0.01	AC-058	25-Nov-16
16110212-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-001	Ethanol		9.6	ppbv	0.4	AC-058	25-Nov-16
16110212-001	Ethyl acetate	K, T, U	< 0.6	ppbv	0.6	AC-058	25-Nov-16
16110212-001	Ethylbenzene	I	0.05	ppbv	0.01	AC-058	25-Nov-16
16110212-001	Freon-11	I	0.32	ppbv	0.03	AC-058	25-Nov-16
16110212-001	Freon-113	I	0.06	ppbv	0.01	AC-058	25-Nov-16
16110212-001	Freon-114	K, T, U	< 0.03	ppbv	0.03	AC-058	25-Nov-16
16110212-001	Freon-12		0.70	ppbv	0.03	AC-058	25-Nov-16
16110212-001	Hexachloro-1,3-butadiene	K, T, U	< 0.74	ppbv	0.74	AC-058	25-Nov-16
16110212-001	Isobutane		29.7	ppbv	0.03	AC-058	25-Nov-16
16110212-001	Isopentane		9.06	ppbv	0.04	AC-058	25-Nov-16
16110212-001	Isoprene	I	0.04	ppbv	0.01	AC-058	25-Nov-16
16110212-001	Isopropyl alcohol	K, T, U	< 0.6	ppbv	0.6	AC-058	25-Nov-16
16110212-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-001	m,p-Xylene	I	0.18	ppbv	0.04	AC-058	25-Nov-16
16110212-001	m-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	25-Nov-16
16110212-001	m-Ethyltoluene	K, T, U	< 0.12	ppbv	0.12	AC-058	25-Nov-16

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			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110212-001	Methyl butyl ketone	K, T, U	< 0.74	ppbv	0.74	AC-058	25-Nov-16
16110212-001	Methyl ethyl ketone		0.5	ppbv	0.4	AC-058	25-Nov-16
16110212-001	Methyl isobutyl ketone	K, T, U	< 0.6	ppbv	0.6	AC-058	25-Nov-16
16110212-001	Methyl methacrylate	K, T, U	< 0.10	ppbv	0.10	AC-058	25-Nov-16
16110212-001	Methyl tert butyl ether	K, T, U	< 0.04	ppbv	0.04	AC-058	25-Nov-16
16110212-001	Methylcyclohexane	I	0.18	ppbv	0.01	AC-058	25-Nov-16
16110212-001	Methylcyclopentane	I	0.40	ppbv	0.03	AC-058	25-Nov-16
16110212-001	Methylene chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	25-Nov-16
16110212-001	n-Butane		61.3	ppbv	0.13	AC-058	25-Nov-16
16110212-001	n-Decane	K, T, U	< 0.09	ppbv	0.09	AC-058	25-Nov-16
16110212-001	n-Dodecane	K, T, U	< 0.6	ppbv	0.6	AC-058	25-Nov-16
16110212-001	n-Heptane	I	0.14	ppbv	0.01	AC-058	25-Nov-16
16110212-001	n-Hexane		0.46	ppbv	0.01	AC-058	25-Nov-16
16110212-001	n-Octane	I	0.04	ppbv	0.03	AC-058	25-Nov-16
16110212-001	n-Pentane		2.9	ppbv	0.1	AC-058	25-Nov-16
16110212-001	n-Propylbenzene	K, T, U	< 0.07	ppbv	0.07	AC-058	25-Nov-16
16110212-001	n-Undecane	K, T, U	< 0.7	ppbv	0.7	AC-058	25-Nov-16
16110212-001	Naphthalene	K, T, U	< 0.7	ppbv	0.7	AC-058	25-Nov-16
16110212-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	25-Nov-16
16110212-001	o-Xylene	I	0.06	ppbv	0.01	AC-058	25-Nov-16
16110212-001	p-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	25-Nov-16
16110212-001	p-Ethyltoluene	K, T, U	< 0.10	ppbv	0.10	AC-058	25-Nov-16
16110212-001	Styrene	K, T, U	< 0.06	ppbv	0.06	AC-058	25-Nov-16
16110212-001	Tetrachloroethylene	I	0.34	ppbv	0.06	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC-VOC/Bonnyville/Nov 12, 2	1532	Ambient Air	12-Nov-16 15:35
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110212	REPORT CREATED:	20-Dec-16
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110212-001	Tetrahydrofuran	K, T, U	< 0.6 ppbv	0.6	AC-058	25-Nov-16
16110212-001	Toluene	I	0.44 ppbv	0.01	AC-058	25-Nov-16
16110212-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01 ppbv	0.01	AC-058	25-Nov-16
16110212-001	trans-1,3-Dichloropropylene	K, T, U	< 0.06 ppbv	0.06	AC-058	25-Nov-16
16110212-001	trans-2-Butene		0.47 ppbv	0.01	AC-058	25-Nov-16
16110212-001	trans-2-Pentene		0.60 ppbv	0.03	AC-058	25-Nov-16
16110212-001	Trichloroethylene	K, T, U	< 0.06 ppbv	0.06	AC-058	25-Nov-16
16110212-001	Vinyl acetate	K, T, U	< 0.6 ppbv	0.6	AC-058	25-Nov-16
16110212-001	Vinyl chloride	K, T, U	< 0.03 ppbv	0.03	AC-058	25-Nov-16

Report certified by: Rebecca Holgate, Account Coordinator

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

Date: December-20-16

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE Calgary AB T2E 6P8	CLIENT SAMPLE ID /NMHC-VOC/Bonnyville/Nov 25,	CANISTER ID 17130	Matrix Ambient Air	Priority Normal
	DESCRIPTION: Bonnyville - AER			
INVOICE: Arianna Cook PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5	DATE SAMPLED: 25-Nov-16	7:45	DATE RECEIVED: 29-Nov-16	
	REPORT CREATED: 03-Jan-17		REPORT NUMBER: 16110258	
			VERSION: Version 01	

Lab ID	Parameter	Qualifier	Result	Units	RD L	Method	Analysis Date
16110258-005	1,1,1-Trichloroethane	I	0.08	ppbv	0.03	AC-058	08-Dec-16
16110258-005	1,1,2,2-Tetrachloroethane	I	0.05	ppbv	0.03	AC-058	08-Dec-16
16110258-005	1,1,2-Trichloroethane	I	0.05	ppbv	0.03	AC-058	08-Dec-16
16110258-005	1,1-Dichloroethane	I	0.06	ppbv	0.03	AC-058	08-Dec-16
16110258-005	1,1-Dichloroethylene	I	0.06	ppbv	0.06	AC-058	08-Dec-16
16110258-005	1,2,3-Trimethylbenzene	K, T, U	< 0.07	ppbv	0.07	AC-058	08-Dec-16
16110258-005	1,2,4-Trichlorobenzene	K, T, U	< 1.1	ppbv	1.1	AC-058	08-Dec-16
16110258-005	1,2,4-Trimethylbenzene	I	0.09	ppbv	0.04	AC-058	08-Dec-16
16110258-005	1,2-Dibromoethane	I	0.04	ppbv	0.03	AC-058	08-Dec-16
16110258-005	1,2-Dichlorobenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-005	1,2-Dichloroethane	I	0.10	ppbv	0.01	AC-058	08-Dec-16
16110258-005	1,2-Dichloropropane	I	0.05	ppbv	0.01	AC-058	08-Dec-16
16110258-005	1,3,5-Trimethylbenzene	I	0.08	ppbv	0.03	AC-058	08-Dec-16
16110258-005	1,3-Butadiene	I	0.09	ppbv	0.03	AC-058	08-Dec-16
16110258-005	1,3-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-005	1,4-Dichlorobenzene	K, T, U	< 0.6	ppbv	0.6	AC-058	08-Dec-16
16110258-005	1,4-Dioxane	K, T, U	< 0.6	ppbv	0.6	AC-058	08-Dec-16
16110258-005	1-Butene		0.69	ppbv	0.03	AC-058	08-Dec-16

Report certified by: Graham Knox, Team Lead

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

Date: January-03-17

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC-VOC/Bonnyville/Nov 25, 2	17130	Ambient Air	25-Nov-16 7:45
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110258-005	1-Hexene	I	0.05	ppbv	0.03	AC-058	08-Dec-16
16110258-005	1-Pentene	I	0.07	ppbv	0.01	AC-058	08-Dec-16
16110258-005	2,2,4-Trimethylpentane	I	0.07	ppbv	0.01	AC-058	08-Dec-16
16110258-005	2,2-Dimethylbutane	I	0.06	ppbv	0.01	AC-058	08-Dec-16
16110258-005	2,3,4-Trimethylpentane	I	0.07	ppbv	0.01	AC-058	08-Dec-16
16110258-005	2,3-Dimethylbutane	I	0.08	ppbv	0.03	AC-058	08-Dec-16
16110258-005	2,3-Dimethylpentane	I	0.10	ppbv	0.03	AC-058	08-Dec-16
16110258-005	2,4-Dimethylpentane	I	0.06	ppbv	0.01	AC-058	08-Dec-16
16110258-005	2-Methylheptane	I	0.06	ppbv	0.01	AC-058	08-Dec-16
16110258-005	2-Methylhexane	I	0.11	ppbv	0.01	AC-058	08-Dec-16
16110258-005	2-Methylpentane	I	0.21	ppbv	0.01	AC-058	08-Dec-16
16110258-005	3-Methylheptane	I	0.05	ppbv	0.03	AC-058	08-Dec-16
16110258-005	3-Methylhexane	I	0.11	ppbv	0.03	AC-058	08-Dec-16
16110258-005	3-Methylpentane	I	0.16	ppbv	0.01	AC-058	08-Dec-16
16110258-005	Acetone		3.8	ppbv	0.6	AC-058	08-Dec-16
16110258-005	Acrolein	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-005	Benzene		2.29	ppbv	0.01	AC-058	08-Dec-16
16110258-005	Benzyl chloride	K, T, U	< 0.6	ppbv	0.6	AC-058	08-Dec-16
16110258-005	Bromodichloromethane		0.07	ppbv	0.03	AC-058	08-Dec-16
16110258-005	Bromoform	I	0.05	ppbv	0.03	AC-058	08-Dec-16
16110258-005	Bromomethane	I	0.07	ppbv	0.01	AC-058	08-Dec-16
16110258-005	Carbon disulfide	I	0.38	ppbv	0.01	AC-058	08-Dec-16
16110258-005	Carbon tetrachloride	I	0.19	ppbv	0.01	AC-058	08-Dec-16
16110258-005	Chlorobenzene	I	0.05	ppbv	0.03	AC-058	08-Dec-16
16110258-005	Chloroethane	I	0.06	ppbv	0.03	AC-058	08-Dec-16

Report certified by: Graham Knox, Team Lead

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

Date: January-03-17

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC-VOC/Bonnyville/Nov 25, 2	17130	Ambient Air	25-Nov-16 7:45
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110258-005	Chloroform	I	0.10	ppbv	0.03	AC-058	08-Dec-16
16110258-005	Chloromethane		0.49	ppbv	0.03	AC-058	08-Dec-16
16110258-005	cis-1,2-Dichloroethene	I	0.05	ppbv	0.01	AC-058	08-Dec-16
16110258-005	cis-1,3-Dichloropropene	K, T, U	< 0.06	ppbv	0.06	AC-058	08-Dec-16
16110258-005	cis-2-Butene	I	0.19	ppbv	0.03	AC-058	08-Dec-16
16110258-005	cis-2-Pentene	I	0.06	ppbv	0.03	AC-058	08-Dec-16
16110258-005	Cyclohexane	I	0.14	ppbv	0.03	AC-058	08-Dec-16
16110258-005	Cyclopentane	I	0.09	ppbv	0.01	AC-058	08-Dec-16
16110258-005	Dibromochloromethane	I	0.06	ppbv	0.01	AC-058	08-Dec-16
16110258-005	Ethanol		1.5	ppbv	0.4	AC-058	08-Dec-16
16110258-005	Ethyl acetate	K, T, U	< 0.6	ppbv	0.6	AC-058	08-Dec-16
16110258-005	Ethylbenzene	I	0.11	ppbv	0.01	AC-058	08-Dec-16
16110258-005	Freon-11	I	0.42	ppbv	0.03	AC-058	08-Dec-16
16110258-005	Freon-113	I	0.11	ppbv	0.01	AC-058	08-Dec-16
16110258-005	Freon-114	I	0.09	ppbv	0.03	AC-058	08-Dec-16
16110258-005	Freon-12		0.73	ppbv	0.03	AC-058	08-Dec-16
16110258-005	Hexachloro-1,3-butadiene	K, T, U	< 0.72	ppbv	0.72	AC-058	08-Dec-16
16110258-005	Isobutane		1.43	ppbv	0.03	AC-058	08-Dec-16
16110258-005	Isopentane		1.28	ppbv	0.04	AC-058	08-Dec-16
16110258-005	Isoprene	I	0.06	ppbv	0.01	AC-058	08-Dec-16
16110258-005	Isopropyl alcohol	K, T, U	< 0.6	ppbv	0.6	AC-058	08-Dec-16
16110258-005	Isopropylbenzene	I	0.05	ppbv	0.01	AC-058	08-Dec-16
16110258-005	m,p-Xylene	I	0.28	ppbv	0.04	AC-058	08-Dec-16
16110258-005	m-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	08-Dec-16
16110258-005	m-Ethyltoluene	K, T, U	< 0.11	ppbv	0.11	AC-058	08-Dec-16

Report certified by: Graham Knox, Team Lead

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

Date: January-03-17

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC-VOC/Bonnyville/Nov 25, 2	17130	Ambient Air	25-Nov-16 7:45
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16110258-005	Methyl butyl ketone	K, T, U	< 0.72	ppbv	0.72	AC-058	08-Dec-16
16110258-005	Methyl ethyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-005	Methyl isobutyl ketone	K, T, U	< 0.6	ppbv	0.6	AC-058	08-Dec-16
16110258-005	Methyl methacrylate	K, T, U	< 0.10	ppbv	0.10	AC-058	08-Dec-16
16110258-005	Methyl tert butyl ether	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16110258-005	Methylcyclohexane	I	0.15	ppbv	0.01	AC-058	08-Dec-16
16110258-005	Methylcyclopentane	I	0.16	ppbv	0.03	AC-058	08-Dec-16
16110258-005	Methylene chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16110258-005	n-Butane		2.61	ppbv	0.04	AC-058	08-Dec-16
16110258-005	n-Decane	K, T, U	< 0.09	ppbv	0.09	AC-058	08-Dec-16
16110258-005	n-Dodecane	K, T, U	< 0.6	ppbv	0.6	AC-058	08-Dec-16
16110258-005	n-Heptane	I	0.14	ppbv	0.01	AC-058	08-Dec-16
16110258-005	n-Hexane	I	0.27	ppbv	0.01	AC-058	08-Dec-16
16110258-005	n-Octane	I	0.07	ppbv	0.03	AC-058	08-Dec-16
16110258-005	n-Pentane		0.7	ppbv	0.1	AC-058	08-Dec-16
16110258-005	n-Propylbenzene	K, T, U	< 0.07	ppbv	0.07	AC-058	08-Dec-16
16110258-005	n-Undecane	K, T, U	< 0.7	ppbv	0.7	AC-058	08-Dec-16
16110258-005	Naphthalene	K, T, U	< 0.7	ppbv	0.7	AC-058	08-Dec-16
16110258-005	n-Nonane	I	0.04	ppbv	0.01	AC-058	08-Dec-16
16110258-005	o-Ethyltoluene	I	0.04	ppbv	0.01	AC-058	08-Dec-16
16110258-005	o-Xylene	I	0.12	ppbv	0.01	AC-058	08-Dec-16
16110258-005	p-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	08-Dec-16
16110258-005	p-Ethyltoluene	K, T, U	< 0.10	ppbv	0.10	AC-058	08-Dec-16
16110258-005	Styrene	K, T, U	< 0.06	ppbv	0.06	AC-058	08-Dec-16
16110258-005	Tetrachloroethylene	I	0.07	ppbv	0.06	AC-058	08-Dec-16

Report certified by: Graham Knox, Team Lead

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

Date: January-03-17

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC-VOC/Bonnyville/Nov 25, 2	17130	Ambient Air	25-Nov-16 7:45
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16110258	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16110258-005	Tetrahydrofuran	K, T, U	< 0.6 ppbv	0.6	AC-058	08-Dec-16
16110258-005	Toluene	I	0.22 ppbv	0.01	AC-058	08-Dec-16
16110258-005	trans-1,2-Dichloroethylene	I	0.05 ppbv	0.01	AC-058	08-Dec-16
16110258-005	trans-1,3-Dichloropropylene	K, T, U	< 0.06 ppbv	0.06	AC-058	08-Dec-16
16110258-005	trans-2-Butene	I	0.09 ppbv	0.01	AC-058	08-Dec-16
16110258-005	trans-2-Pentene	I	0.08 ppbv	0.03	AC-058	08-Dec-16
16110258-005	Trichloroethylene	I	0.07 ppbv	0.06	AC-058	08-Dec-16
16110258-005	Vinyl acetate	K, T, U	< 0.6 ppbv	0.6	AC-058	08-Dec-16
16110258-005	Vinyl chloride	I	0.05 ppbv	0.03	AC-058	08-Dec-16

Report certified by: Graham Knox, Team Lead

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

Date: January-03-17

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

RESULTS: Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE Calgary AB T2E 6P8	CLIENT SAMPLE ID /NMHC VOC/Bonnyville/ Nov 29,	CANISTER ID 14720	Matrix Ambient Air	Priority Normal
	DESCRIPTION: Bonnyville - AER			
INVOICE: Arianna Cook PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5	DATE SAMPLED: 29-Nov-16	8:50	DATE RECEIVED: 07-Dec-16	
	REPORT CREATED: 03-Jan-17		REPORT NUMBER: 16120042	
			VERSION: Version 01	

Lab ID	Parameter	Qualifier	Result	Units	RD L	Method	Analysis Date
16120042-005	1,1,1-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	1,1,2,2-Tetrachloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	1,1,2-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	1,1-Dichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	1,1-Dichloroethylene	K, T, U	< 0.06	ppbv	0.06	AC-058	08-Dec-16
16120042-005	1,2,3-Trimethylbenzene	K, T, U	< 0.07	ppbv	0.07	AC-058	08-Dec-16
16120042-005	1,2,4-Trichlorobenzene	K, T, U	< 1.2	ppbv	1.2	AC-058	08-Dec-16
16120042-005	1,2,4-Trimethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-005	1,2-Dibromoethane	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	1,2-Dichlorobenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-005	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16120042-005	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-005	1,3,5-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	1,3-Butadiene	I	0.04	ppbv	0.03	AC-058	08-Dec-16
16120042-005	1,3-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-005	1,4-Dichlorobenzene	K, T, U	< 0.6	ppbv	0.6	AC-058	08-Dec-16
16120042-005	1,4-Dioxane	K, T, U	< 0.6	ppbv	0.6	AC-058	08-Dec-16
16120042-005	1-Butene	I	0.17	ppbv	0.03	AC-058	08-Dec-16

Report certified by: Graham Knox, Team Lead

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

Date: January-03-17

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC VOC/Bonnyville/ Nov 29, :	14720	Ambient Air	29-Nov-16 8:50
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16120042	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120042-005	1-Hexene	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	1-Pentene	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16120042-005	2,2,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16120042-005	2,2-Dimethylbutane	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16120042-005	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-005	2,3-Dimethylbutane	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	2,3-Dimethylpentane	I	0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-005	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-005	2-Methylhexane	I	0.03	ppbv	0.01	AC-058	08-Dec-16
16120042-005	2-Methylpentane	I	0.09	ppbv	0.01	AC-058	08-Dec-16
16120042-005	3-Methylheptane	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	3-Methylhexane	I	0.04	ppbv	0.03	AC-058	08-Dec-16
16120042-005	3-Methylpentane	I	0.06	ppbv	0.01	AC-058	08-Dec-16
16120042-005	Acetone		1.0	ppbv	0.6	AC-058	08-Dec-16
16120042-005	Acrolein	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-005	Benzene	I	0.16	ppbv	0.01	AC-058	08-Dec-16
16120042-005	Benzyl chloride	K, T, U	< 0.6	ppbv	0.6	AC-058	08-Dec-16
16120042-005	Bromodichloromethane	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	Bromoform	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-005	Carbon disulfide	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16120042-005	Carbon tetrachloride	I	0.13	ppbv	0.01	AC-058	08-Dec-16
16120042-005	Chlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	Chloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16

Report certified by: Graham Knox, Team Lead

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

Date: January-03-17

Inquiries: (780) 632 8455

E-mail: EAS.Results@innotechalberta.ca

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC VOC/Bonnyville/ Nov 29, :	14720	Ambient Air	29-Nov-16 8:50
DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16120042	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120042-005	Chloroform	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	Chloromethane		0.46	ppbv	0.03	AC-058	08-Dec-16
16120042-005	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-005	cis-1,3-Dichloropropene	K, T, U	< 0.06	ppbv	0.06	AC-058	08-Dec-16
16120042-005	cis-2-Butene	I	0.06	ppbv	0.03	AC-058	08-Dec-16
16120042-005	cis-2-Pentene	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	Cyclohexane	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	Cyclopentane	I	0.03	ppbv	0.01	AC-058	08-Dec-16
16120042-005	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-005	Ethanol		0.7	ppbv	0.4	AC-058	08-Dec-16
16120042-005	Ethyl acetate	K, T, U	< 0.6	ppbv	0.6	AC-058	08-Dec-16
16120042-005	Ethylbenzene	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16120042-005	Freon-11	I	0.37	ppbv	0.03	AC-058	08-Dec-16
16120042-005	Freon-113	I	0.05	ppbv	0.01	AC-058	08-Dec-16
16120042-005	Freon-114	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	Freon-12		0.73	ppbv	0.03	AC-058	08-Dec-16
16120042-005	Hexachloro-1,3-butadiene	K, T, U	< 0.74	ppbv	0.74	AC-058	08-Dec-16
16120042-005	Isobutane		0.92	ppbv	0.03	AC-058	08-Dec-16
16120042-005	Isopentane		0.59	ppbv	0.04	AC-058	08-Dec-16
16120042-005	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-005	Isopropyl alcohol	K, T, U	< 0.6	ppbv	0.6	AC-058	08-Dec-16
16120042-005	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-005	m,p-Xylene	I	0.06	ppbv	0.04	AC-058	08-Dec-16
16120042-005	m-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	08-Dec-16
16120042-005	m-Ethyltoluene	K, T, U	< 0.12	ppbv	0.12	AC-058	08-Dec-16

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DESCRIPTION:	Bonnyville - AER		
REPORT NUMBER:	16120042	REPORT CREATED:	03-Jan-17
			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120042-005	Methyl butyl ketone	K, T, U	< 0.74	ppbv	0.74	AC-058	08-Dec-16
16120042-005	Methyl ethyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-005	Methyl isobutyl ketone	K, T, U	< 0.6	ppbv	0.6	AC-058	08-Dec-16
16120042-005	Methyl methacrylate	K, T, U	< 0.10	ppbv	0.10	AC-058	08-Dec-16
16120042-005	Methyl tert butyl ether	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-005	Methylcyclohexane	I	0.05	ppbv	0.01	AC-058	08-Dec-16
16120042-005	Methylcyclopentane	I	0.06	ppbv	0.03	AC-058	08-Dec-16
16120042-005	Methylene chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-005	n-Butane		2.01	ppbv	0.04	AC-058	08-Dec-16
16120042-005	n-Decane	K, T, U	< 0.09	ppbv	0.09	AC-058	08-Dec-16
16120042-005	n-Dodecane	K, T, U	< 0.6	ppbv	0.6	AC-058	08-Dec-16
16120042-005	n-Heptane	I	0.04	ppbv	0.01	AC-058	08-Dec-16
16120042-005	n-Hexane	I	0.11	ppbv	0.01	AC-058	08-Dec-16
16120042-005	n-Octane	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-005	n-Pentane		0.6	ppbv	0.1	AC-058	08-Dec-16
16120042-005	n-Propylbenzene	K, T, U	< 0.07	ppbv	0.07	AC-058	08-Dec-16
16120042-005	n-Undecane	K, T, U	< 0.7	ppbv	0.7	AC-058	08-Dec-16
16120042-005	Naphthalene	K, T, U	< 0.7	ppbv	0.7	AC-058	08-Dec-16
16120042-005	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-005	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-005	o-Xylene	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16120042-005	p-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	08-Dec-16
16120042-005	p-Ethyltoluene	K, T, U	< 0.10	ppbv	0.10	AC-058	08-Dec-16
16120042-005	Styrene	K, T, U	< 0.06	ppbv	0.06	AC-058	08-Dec-16
16120042-005	Tetrachloroethylene	K, T, U	< 0.06	ppbv	0.06	AC-058	08-Dec-16

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			VERSION: Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120042-005	Tetrahydrofuran	K, T, U	< 0.6 ppbv	0.6	AC-058	08-Dec-16
16120042-005	Toluene	I	0.10 ppbv	0.01	AC-058	08-Dec-16
16120042-005	trans-1,2-Dichloroethylene	K, T, U	< 0.01 ppbv	0.01	AC-058	08-Dec-16
16120042-005	trans-1,3-Dichloropropylene	K, T, U	< 0.06 ppbv	0.06	AC-058	08-Dec-16
16120042-005	trans-2-Butene	K, T, U	< 0.01 ppbv	0.01	AC-058	08-Dec-16
16120042-005	trans-2-Pentene	K, T, U	< 0.03 ppbv	0.03	AC-058	08-Dec-16
16120042-005	Trichloroethylene	K, T, U	< 0.06 ppbv	0.06	AC-058	08-Dec-16
16120042-005	Vinyl acetate	K, T, U	< 0.6 ppbv	0.6	AC-058	08-Dec-16
16120042-005	Vinyl chloride	K, T, U	< 0.03 ppbv	0.03	AC-058	08-Dec-16

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

Date: January-03-17

Inquiries: (780) 632 8455

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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	Bonnyville Continuous Monitoring Station
Name of the Representative of the Person Responsible (Last, First, Middle)	Position / Title of the Representative of the Person Responsible
Wunmi Adekanmbi	Project Manager, 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

11-01-2017





Report Issued Date (dd-mm-yyyy)

APPENDIX VI
DATA VALIDATION CERTIFICATION FORM



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2016-11-35-C</u>
Site: <u>Bonnyville Continuous Monitoring Station</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u></u>	Date <u>20-Dec-16</u>
Level 1 Primary Validation	<u></u>	Date <u>29-Dec-16</u>
Level 2 Final Validation	<u></u>	Date <u>11-Jan-17</u>
Level 3 Independent Data Review	<u></u>	Date <u>13-Jan-17</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.