

Alberta Environment and Parks (AEP)
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January 3, 2019

Subject: Monthly Report Submission for the LICA Cold Lake South station

Lakeland Industry & Community Association (LICA) is pleased to submit the ambient air monitoring monthly report for the LICA Cold Lake South AQM Station in the month of November 2018.

The air monitoring program consists of continuous air monitoring, passive sampling, intermittent sampling, including both VOC and PAH sampling program, and Partisol sampling program. All the air monitoring activities were conducted by contractors.

Sampling Program	Monitoring Activities Conducted By	Sample Analysis Conducted By	Data/Report Review and Prepared By	Electronic Submission Conducted By
Continuous ambient air	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics
Passive	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics
Intermittent	Maxxam Analytics	InnoTech Alberta Inc	InnoTech Alberta Inc	Not Applicable
Partisol	Maxxam Analytics	InnoTech Alberta Inc	InnoTech Alberta Inc	Not Applicable

This monthly report only contains the continuous ambient air data. The passive results, intermittent results and partisol results are reported in the quarterly integrated sampling report.

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

All data collected in November 2018 was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

As the LICA Environmental Program Manager and Data & Reporting Specialist, we have reviewed and verified this report and that the information is complete, accurate and representative of the monitoring results, reporting timeframe and the specified analysis, summarization and reporting requirements. We also verify all air data that are required by the AMD to be electronically submitted to AEP and Alberta’s Ambient Air Quality Data Warehouse have been submitted by the time of this report submission, with the exception of electronic submission for the results of intermittent samples and Partisol samples. We are currently working with the airdata warehouse to set up codes for some VOC/PAH species that are missing in the parameter list. The results for these data will be submitted once all needed codes are available.

Should you have any questions, please don’t hesitate to contact us.



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Respectfully,

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

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

JOB #: 2833-2018-11-1-C

November 2018

Prepared for:

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
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Attention: MIKE BISAGA

DATE: **December 27, 2018**

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SUMMARY

In November 2018, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the Cold Lake Continuous Monitoring Station, near Cold Lake, 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.

All data collected this month were within the Alberta Ambient Air Quality Objectives and Guidelines (November, 2018).

Wind System: WS data recorded at hours 00:00 and 01:00 on November 5 were considered anomalous and were therefore discarded, along with the corresponding WD and STDWD data. Two hours of downtime were incurred as a result.

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 South 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.

Monthly Continuous Data Summary

Lakeland Industry & Community Association						MAXIMUM VALUES							OPERATIONAL TIME (%)
Cold Lake South Continuous Monitoring Station						1-HOUR					24-HOUR		
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
	1-hr	24-hr	1-hr	24-hr									
SO ₂ (ppb)	172	48	0	0	0	2	6	13	5.7	W	1	6	100.0
TRS (ppb)	-	-	-	-	0	1	8	17	1.4	SSE	0	1	100.0
THC (ppm)	-	-	-	-	2.10	3.00	30	8	0.6	ESE	2.75	30	100.0
CH ₄ (ppm)	-	-	-	-	2.10	3.00	30	8	0.6	ESE	2.75	30	100.0
NMHC (ppm)	-	-	-	-	0.00	0.04	2	15	7.0	E	0.00	1	100.0
NO ₂ (ppb)	159	-	0	-	4	17	13	20	2.1	ESE	9	13	100.0
NO (ppb)	-	-	-	-	1	26	30	8	0.6	ESE	5	30	100.0
NO _x (ppb)	-	-	-	-	5	37	30	8	0.6	ESE	14	30	100.0
O ₃ (ppb)	82	-	0	-	20.6	39.3	11	2	13.4	NNW	33.8	11	100.0
PM _{2.5} (µg/m ³)	80	29	0	0	7	30	19	10	4.4	SSW	17	19	100.0
RELATIVE HUMIDITY (%)	-	-	-	-	82	100	20	9	5.4	ESE	95	20	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	-6.9	8.5	14	13	7.9	W	0.0	14	100.0
VECTOR WS (kph)	-	-	-	-	0.9	29.5	5	2	-	NE	12.7	5	99.7
VECTOR WD (sec)	-	-	-	-	73 (ENE)	-	-	-	-	-	-	-	99.7

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 29 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 results for the following parameters: Sulphur Dioxide (SO₂), Total Reduced Sulphur (TRS), 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}), Relative Humidity (RH), Ambient Temperature (AmbTPX), Wind Speed (WS), Wind Direction (WD) and Standard Deviation Wind Direction (STDWD).

The sample inlet filter for all continuous air analyzers are replaced 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 (December, 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. The minimum and maximum statistics are highlighted in the data table and are for reference only. The highlighted cells are based on the software's interpretation of the exact position of the minimum or maximum value. The visual presentation of these statistics may not be the obvious choice in a data range due to rounding, truncating or analyzer specifications.

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)

- Operational time for the monitoring period was 100%.
- The routine monthly calibration was performed on November 19.

TOTAL REDUCED SULPHUR (TRS)

- Operational time for the monitoring period was 100%.
- The routine monthly calibration was performed on November 19.

TOTAL HYDROCARBONS (THC), METHANE (CH₄) and NON-METHANE HYDROCARBONS (NMHC)

- Operational time for the monitoring period was 100%.
- The routine monthly calibration was performed on November 21.

OXIDES OF NITROGEN (NO_x), NITRIC OXIDE (NO) and NITROGEN DIOXIDE (NO₂)

- Operational time for the monitoring period was 100%.
- The routine monthly calibration was performed on November 19.

OZONE (O₃)

- Operational time for the monitoring period was 100%.
- The routine monthly calibration was performed on November 21.

PARTICULATE MATTER < 2.5 MICRONS (PM_{2.5})

- Operational time for the monitoring period was 100%.
- The routine monthly check was performed on November 15.

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

- Operational time for the monitoring period was 99.7%, equivalent to 2 hours of downtime.
- On November 5, at hours 00:00 and 01:00, sporadic anomalous WS minute data spikes were observed. As data quality could not be assured due to the unstable and abrupt wind speed shifts the equipment recorded, the hourly averages were discarded, along with the corresponding WD and STDWD data. Two hours of downtime were incurred as a result.
- 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.

RELATIVE HUMIDITY (RH)

- Operational time for the monitoring period was 100%.

AMBIENT TEMPERATURE (AmbTPX)

- Operational time for the monitoring period was 100%.

2.0 Project Personnel

Mike Bisaga and Lily Lin were the contacts 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.

All data collected this month were within the Alberta Ambient Air Quality Objectives and Guidelines (November, 2018).

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-00014: Measurement of Particulate Concentration Using the THERMO SHARP
- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-00212: Ambient O₃ Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO₂/NO_x Monitoring
- MET One Instruments: Operation Manual Document No. 50.5-9800

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
- Methane, Non-Methane Hydrocarbon - Thermo 55i FID Analyzer
- Oxides of Nitrogen - Thermo 42i Chemiluminescent Analyzer
- Ozone - Thermo 49i Photometric Analyzer
- Particulate Matter (PM_{2.5}) - Thermo SHARP 5030 Unit
- Wind System - Met One Unit
- Relative Humidity - Met One Unit
- Ambient Temperature - Met One Unit
- Datalogger - Envista Ultimate

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

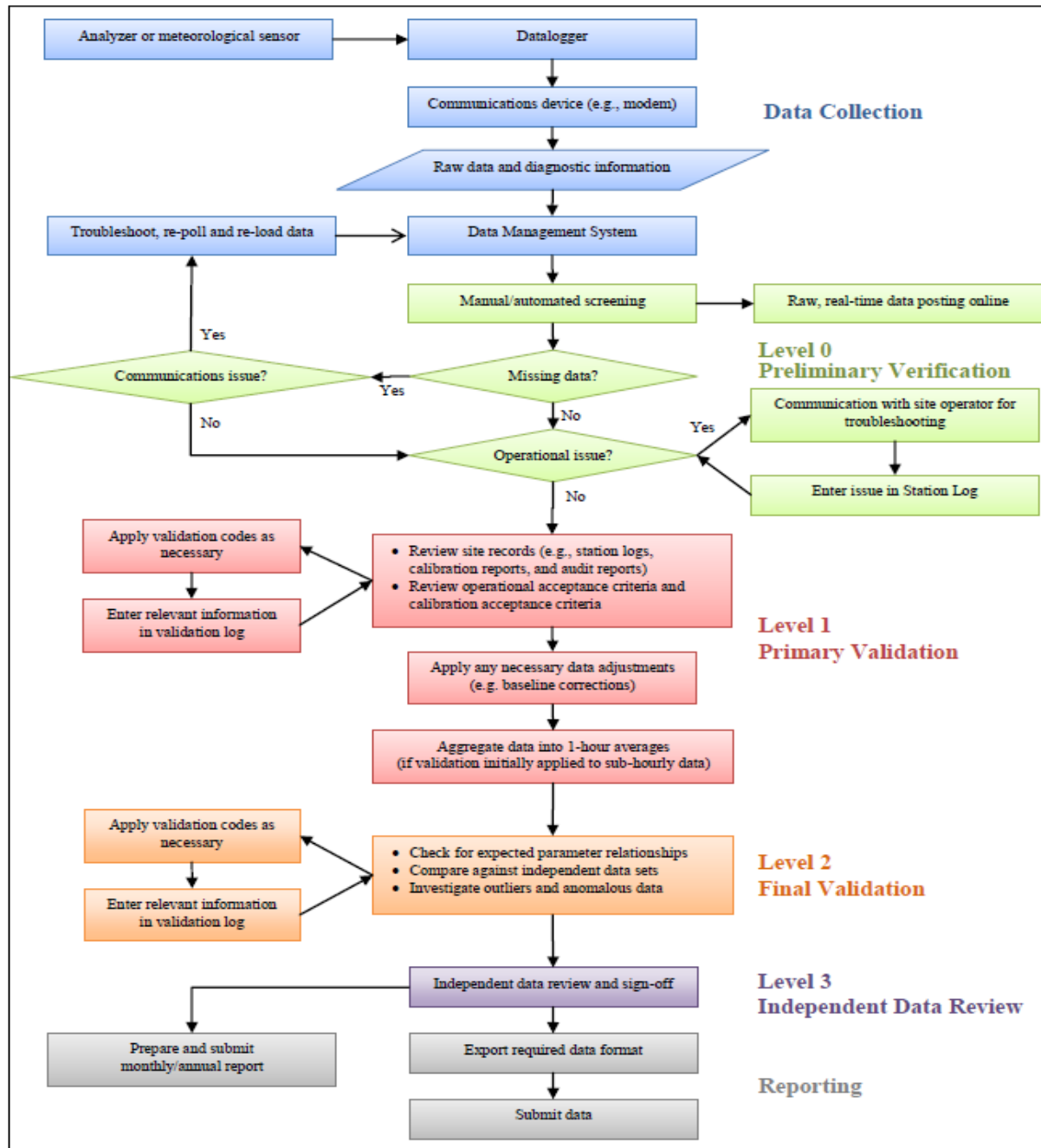
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

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 (December 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	1	1	1	1	1	0	0	0	1	S	0	0	0	0	1	0	24	
2	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	24	
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	24	
4	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	24	
5	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	
6	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	S	2	1	1	1	0	0	0	0	0	2	1	24	
7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	1	0	24	
8	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	24	
9	0	0	0	0	0	0	1	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	1	24	
10	0	1	1	1	1	1	1	1	1	1	0	S	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	24	
11	0	0	0	0	0	0	0	0	0	0	1	S	1	1	0	1	1	1	1	1	1	1	0	0	0	1	1	24	
12	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	
13	0	0	0	0	0	0	0	0	S	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
14	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	24	
15	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	
16	0	0	0	0	0	S	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	24	
17	0	0	0	0	S	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	24	
18	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	24	
19	0	0	S	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	24	
20	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	24	
21	S	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	24	
22	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	24	
23	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	S	0	0	0	1	0	24	
24	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	1	0	24	
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	S	0	0	0	0	0	1	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	24	
27	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	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	24	
29	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	24	
30	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	1	0	24	
HOURLY MAX	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	2	1	1	1	1	1	1	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					

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

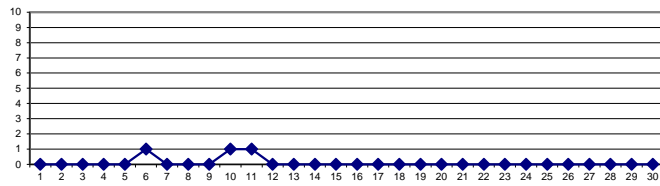
OBJECTIVE LIMIT:

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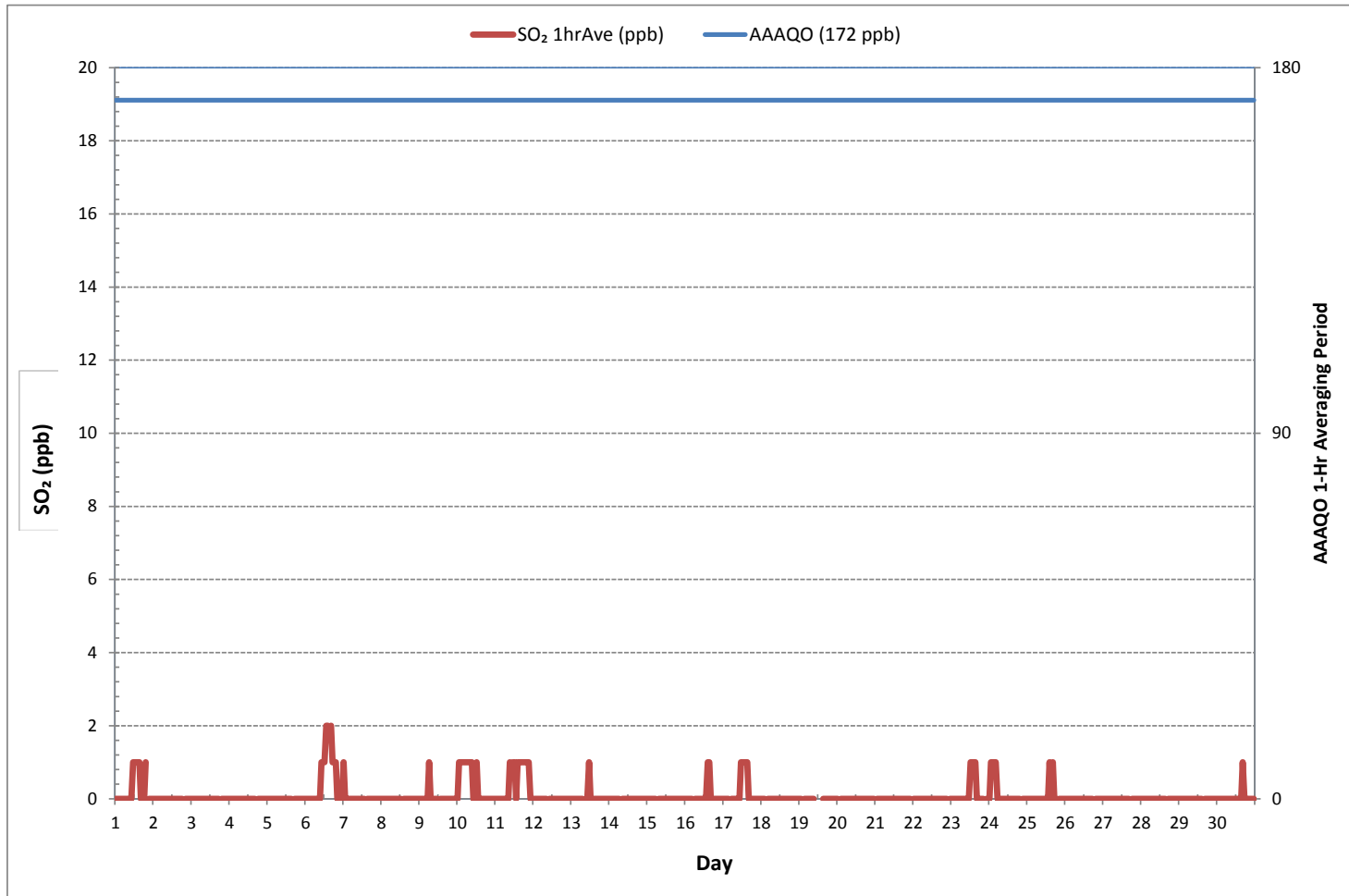
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF 24-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	57					
MINIMUM 1-HR AVERAGE:	0	ppb	@ HOUR	0	ON DAY	1
MAXIMUM 1-HR AVERAGE:	2	ppb	@ HOUR	13	ON DAY	6
MAXIMUM 24-HR AVERAGE:	1	ppb			ON DAY	6
IZS CALIBRATION TIME:	31	hrs	OPERATIONAL TIME:	720	hrs	
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:	100.0	%	
STANDARD DEVIATION:	0		MONTHLY AVERAGE:	0	ppb	

24 HR AVERAGES November 2018



SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)



Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-SO2[ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

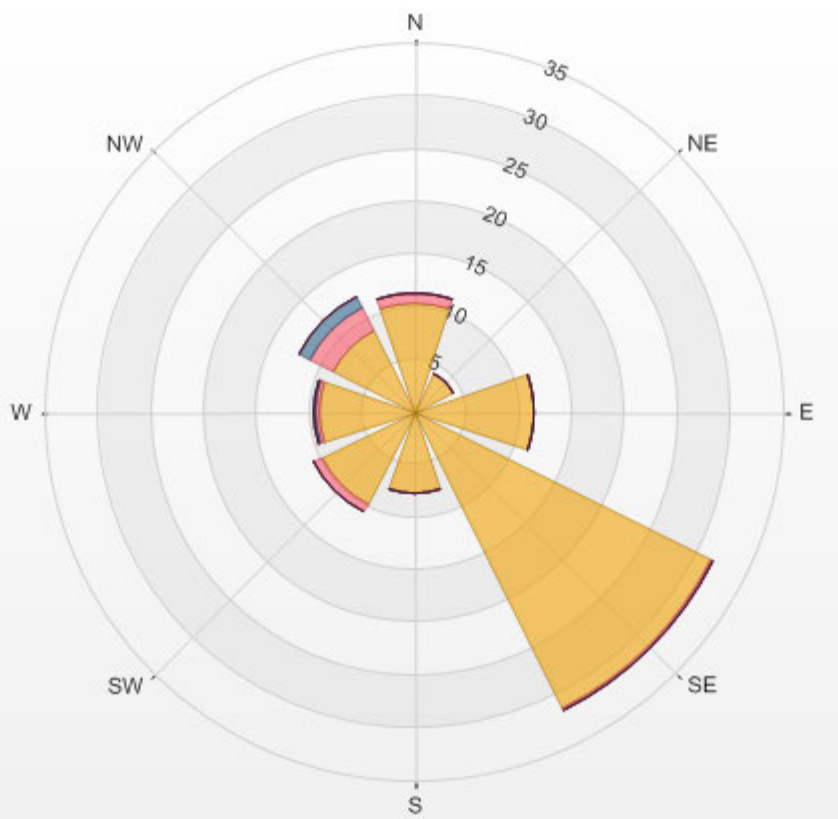
Calm: 1.32%

Calm Avg: 0.10 [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	10.4	0.9	0.0	0.0	0.0	0.0	11.3
NE	4.1	0.0	0.0	0.0	0.0	0.0	4.1
E	11.3	0.0	0.0	0.0	0.0	0.0	11.3
SE	31.5	0.2	0.0	0.0	0.0	0.0	31.7
S	7.8	0.0	0.0	0.0	0.0	0.0	7.8
SW	9.8	0.9	0.0	0.0	0.0	0.0	10.7
W	9.1	0.3	0.3	0.0	0.0	0.0	9.7
NW	8.7	2.5	1.0	0.0	0.0	0.0	12.2
Summary	92.7	4.7	1.3	0.0	0.0	0.0	98.7

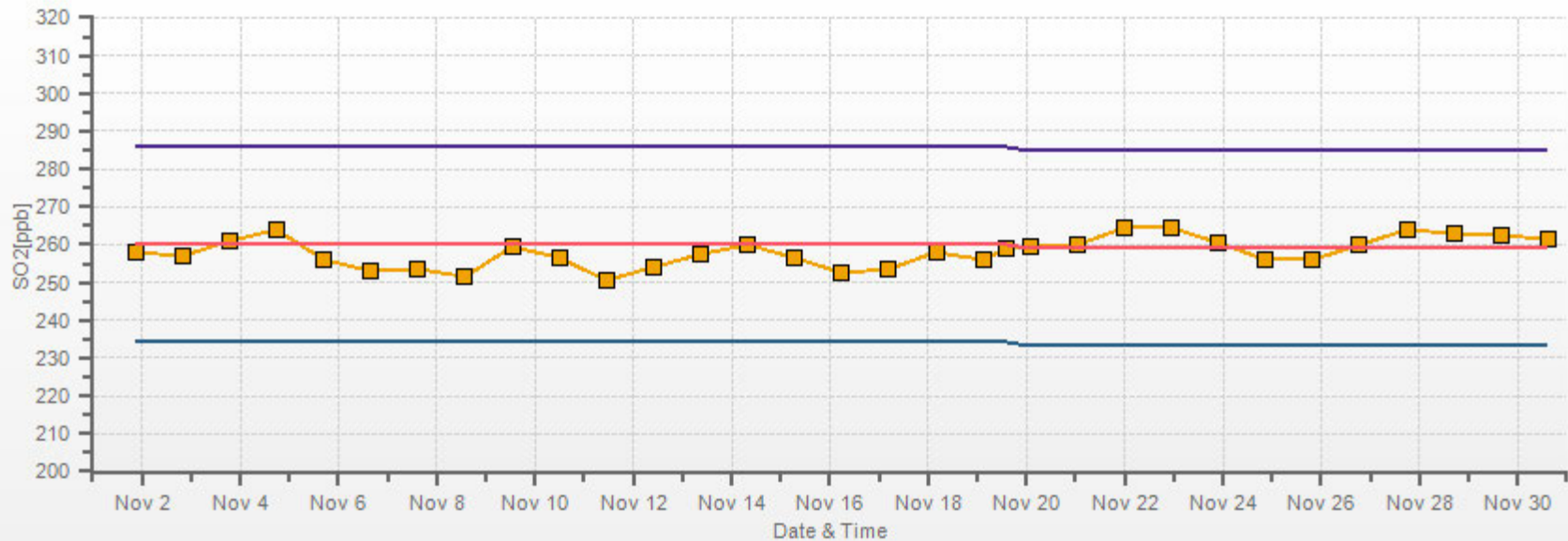
% Icon	Classes (ppb)	93	5	1	0	0	0
	0.0-0.6						
	0.6-1.2						
	1.2-1.8						
	1.8-2.4						
	2.4-3.0						
	>3.0						

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-SO2[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 1.32% Calm Poll Avg: 0.10[ppb]



SO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 18/11 Type: Span

Span Meas Span Ref Span Low Span High



TOTAL REDUCED SULPHUR

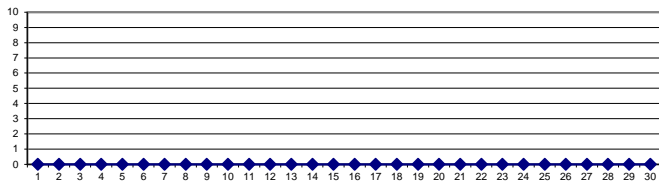
TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)

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.
DAY 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	24
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	24
3	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	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	24
5	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
6	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	24
7	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
8	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	1	0	0	0	0	0	0	1	0	24
9	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
10	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	24
11	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
12	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	24
13	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	24
14	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
15	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	24
16	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
17	0	1	0	0	S	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24
18	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	24
19	0	0	S	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	24
20	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	24
21	S	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	24
22	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	24
23	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	24
24	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
25	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	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	24
27	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	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	24
29	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
30	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	24
HOURLY MAX	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	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				

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

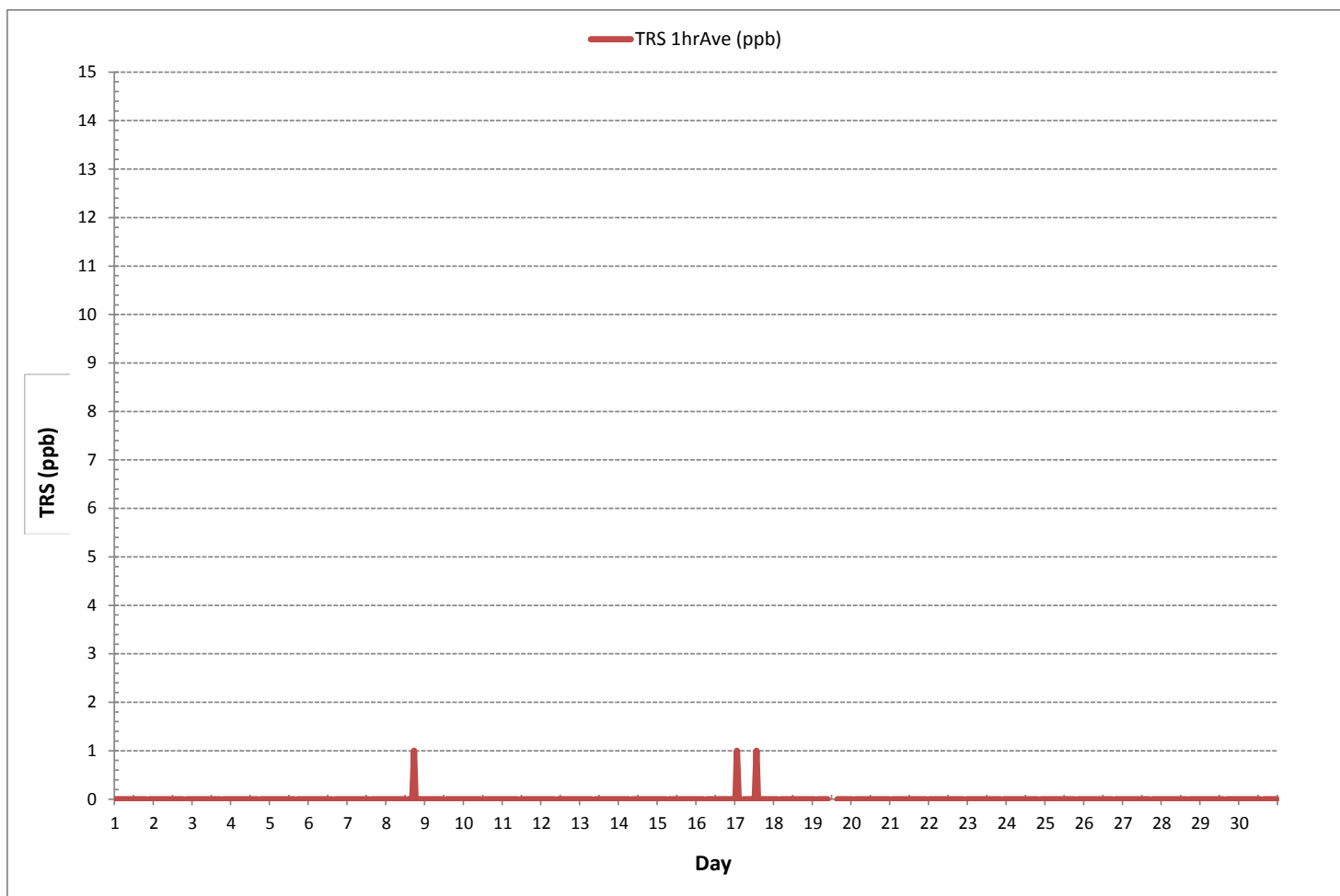
24 HR AVERAGES November 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	3				
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	0	ON DAY 1	
MAXIMUM 1-HR AVERAGE:	1	ppb @ HOUR	17	ON DAY 8	
MAXIMUM 24-HR AVERAGE:	0	ppb		ON DAY 1	
IZS CALIBRATION TIME:	31	hrs	OPERATIONAL TIME:	720	hrs
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	0		MONTHLY AVERAGE:	0	ppb

TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)



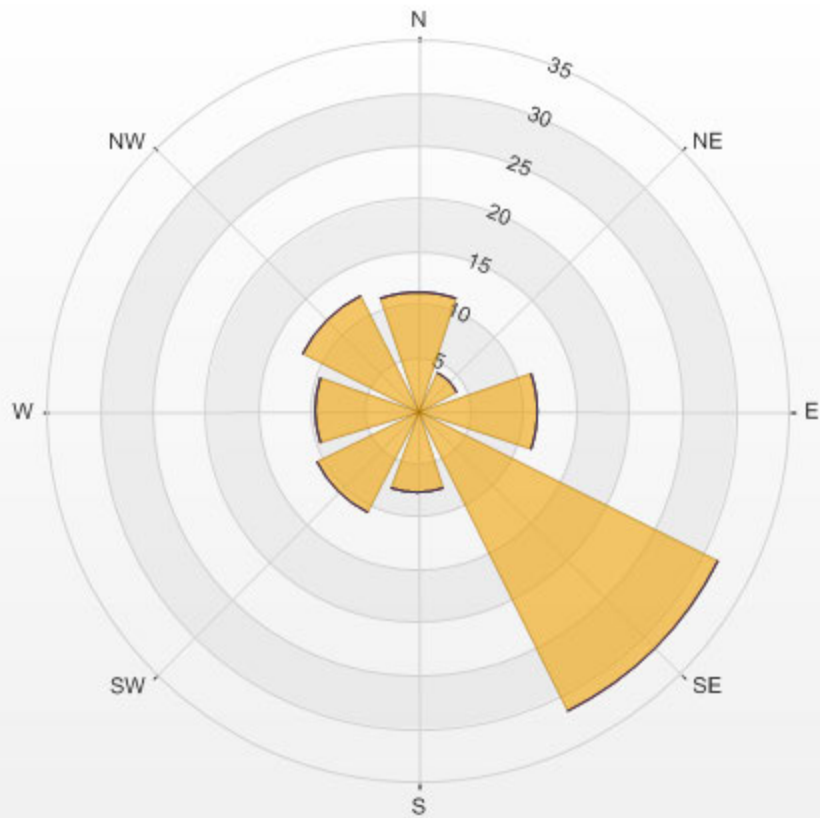
Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-TRS[ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 1.32% Calm Avg: 0.20 [ppb]

Direction	0.0-0.7	0.7-1.3	1.3-2.0	>2.0	Total
N	11.3	0.0	0.0	0.0	11.3
NE	4.1	0.0	0.0	0.0	4.1
E	11.3	0.0	0.0	0.0	11.3
SE	31.7	0.0	0.0	0.0	31.7
S	7.8	0.0	0.0	0.0	7.8
SW	10.7	0.0	0.0	0.0	10.7
W	9.7	0.0	0.0	0.0	9.7
NW	12.2	0.0	0.0	0.0	12.2
Summary	98.7	0.0	0.0	0.0	98.7

%	Icon	Classes (ppb)	99	0	0	0
		0.0-0.7				
		0.7-1.3				
		1.3-2.0				
		>2.0				

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-TRS[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 1.32% Calm Poll Avg: 0.20[ppb]



TRS[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 18/11 Type: Span

Span Meas Span Ref Span Low Span High



TOTAL HYDROCARBON



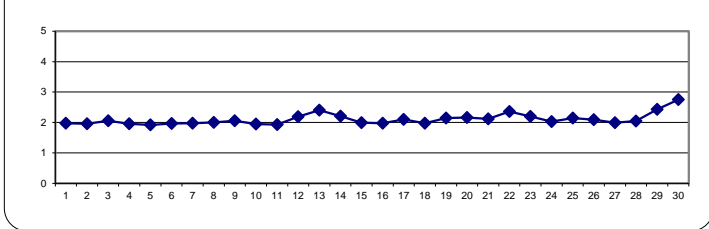
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

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	2.22	2.31	2.09	1.95	1.95	1.94	1.95	1.95	1.94	1.94	1.94	1.94	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.96	S	1.95	1.95	1.95	1.94	2.31	1.98	24
2	1.95	1.97	1.95	1.95	1.96	1.98	1.96	1.97	1.96	1.96	1.96	1.95	1.94	1.94	1.94	2.00	1.96	1.96	1.94	S	1.95	1.96	2.00	2.02	1.94	2.02	1.96	24
3	2.00	1.98	2.01	2.01	2.02	2.02	2.04	2.07	2.07	2.03	2.03	2.04	2.05	2.07	2.06	2.08	2.07	2.08	S	2.16	2.13	2.11	2.09	2.11	1.98	2.16	2.06	24
4	2.10	2.04	2.04	2.04	2.02	2.00	1.99	1.98	1.95	1.94	1.93	1.93	1.93	1.93	1.93	1.94	1.93	S	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.96	24
5	1.91	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.93	1.93	1.93	1.92	1.93	1.93	S	1.93	1.92	1.92	1.93	1.93	1.93	1.93	1.91	1.93	1.92	24
6	1.93	1.93	1.93	1.94	1.93	1.94	1.95	1.95	1.94	1.95	1.96	1.96	1.96	1.96	1.96	S	1.98	1.99	2.05	2.05	2.02	2.01	2.03	1.99	1.93	2.05	1.97	24
7	2.00	2.01	2.01	1.96	1.97	2.04	2.08	2.09	2.10	2.03	1.95	1.93	1.93	1.94	S	1.94	1.95	1.97	1.94	1.94	1.95	1.94	1.94	1.96	1.93	2.10	1.98	24
8	1.97	1.95	1.95	1.95	1.95	1.95	1.95	1.98	1.96	1.96	1.96	1.93	1.94	S	1.95	1.95	1.97	1.99	2.09	2.12	2.12	2.09	2.11	2.26	1.93	2.26	2.00	24
9	2.22	2.23	2.14	2.05	2.06	2.05	2.03	2.03	2.01	2.00	2.01	2.00	S	2.01	2.03	2.03	2.04	2.04	2.04	2.04	2.07	2.11	2.10	2.12	2.00	2.23	2.06	24
10	2.14	2.07	1.99	1.95	1.95	1.95	1.96	1.96	1.93	1.94	1.93	S	1.92	1.92	1.95	1.95	1.95	1.94	1.92	1.91	1.91	1.91	1.91	1.92	1.91	2.14	1.95	24
11	1.92	1.92	1.92	1.92	1.92	1.91	1.91	1.92	1.92	1.93	S	1.93	1.93	1.93	1.94	1.94	1.95	1.95	1.94	1.95	1.94	1.96	1.97	1.98	1.91	1.98	1.93	24
12	2.01	2.03	2.06	2.09	2.11	2.11	2.20	2.18	2.17	S	2.14	2.15	2.15	2.17	2.19	2.26	2.28	2.30	2.32	2.28	2.29	2.28	2.30	2.29	2.01	2.32	2.19	24
13	2.31	2.32	2.32	2.40	2.47	2.54	2.50	2.44	S	2.32	2.36	2.38	2.37	2.37	2.38	2.38	2.33	2.41	2.43	2.42	2.44	2.52	2.49	2.44	2.31	2.54	2.41	24
14	2.39	2.39	2.43	2.48	2.56	2.61	2.59	S	2.48	2.33	2.19	2.09	2.07	2.00	1.94	1.92	1.93	1.96	1.96	2.00	2.06	2.07	2.11	2.22	1.92	2.61	2.21	24
15	2.24	2.21	2.20	2.14	2.06	1.98	S	1.95	1.95	1.95	1.99	1.94	1.94	1.94	1.94	1.95	1.95	1.95	1.95	1.94	1.93	1.94	1.94	1.93	1.93	2.24	1.99	24
16	1.93	1.93	1.93	1.93	1.94	S	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.95	1.95	1.99	1.99	2.02	2.04	2.03	2.09	2.13	2.11	2.07	1.93	2.13	1.98	24
17	2.01	2.04	2.06	2.03	S	2.13	2.11	2.16	2.28	2.13	2.05	2.05	2.06	2.06	2.07	2.08	2.08	2.08	2.08	2.12	2.16	2.24	2.14	2.06	2.01	2.28	2.10	24
18	2.05	2.02	1.99	S	1.98	1.97	1.95	1.96	1.97	1.99	1.99	1.99	1.98	1.99	1.98	1.98	1.97	1.97	1.96	1.95	1.96	1.96	1.97	1.96	1.95	2.05	1.98	24
19	1.96	2.00	S	2.01	2.03	2.01	2.03	2.09	2.10	2.12	2.17	2.16	2.15	2.16	2.24	2.17	2.18	2.21	2.23	2.25	2.30	2.28	2.26	2.26	1.96	2.30	2.15	24
20	2.29	S	2.23	2.33	2.42	2.44	2.43	2.26	2.13	2.18	2.18	2.13	2.09	2.06	2.05	2.06	2.06	2.04	2.02	2.02	2.03	2.05	2.06	2.07	2.02	2.44	2.16	24
21	S	2.11	2.13	2.14	2.11	2.09	2.09	2.07	2.07	C	C	C	C	C	2.17	2.14	2.14	2.13	2.16	2.14	2.13	2.15	2.12	S	2.07	2.17	2.12	24
22	2.13	2.13	2.16	2.18	2.22	2.27	2.31	2.32	2.34	2.38	2.41	2.44	2.45	2.46	2.49	2.50	2.49	2.45	2.45	2.47	2.47	2.44	S	2.42	2.13	2.50	2.36	24
23	2.40	2.40	2.46	2.54	2.54	2.53	2.45	2.36	2.31	2.35	2.08	2.04	2.04	2.03	2.02	2.02	2.02	2.02	2.01	2.01	2.00	S	2.00	2.01	2.00	2.54	2.20	24
24	2.00	2.01	2.01	2.00	2.01	2.01	2.01	2.03	2.03	2.01	2.01	2.00	2.00	2.00	2.02	2.00	2.07	2.05	2.04	2.05	S	2.11	2.14	2.12	2.00	2.14	2.03	24
25	2.14	2.20	2.20	2.18	2.17	2.18	2.17	2.17	2.16	2.14	2.13	2.14	2.15	2.16	2.15	2.13	2.12	2.13	2.16	S	2.13	2.14	2.14	2.14	2.12	2.20	2.15	24
26	2.15	2.18	2.20	2.18	2.19	2.19	2.19	2.18	2.17	2.15	2.10	2.07	2.05	2.04	2.01	2.00	2.02	S	2.01	2.02	2.00	2.00	2.00	2.00	2.00	2.20	2.09	24
27	2.00	2.01	2.01	2.00	1.99	1.99	1.99	1.99	2.00	2.00	2.00	2.00	1.99	1.99	1.99	2.00	2.00	S	2.00	1.99	1.98	1.97	1.97	1.98	1.97	2.01	1.99	24
28	1.97	1.97	1.98	1.98	1.98	1.98	1.98	1.97	1.97	1.99	2.00	2.01	2.04	2.08	2.10	2.08	S	2.12	2.07	2.06	2.11	2.19	2.20	2.21	1.97	2.21	2.05	24
29	2.22	2.19	2.20	2.24	2.24	2.31	2.30	2.35	2.39	2.38	2.35	2.44	2.47	2.48	2.52	S	2.53	2.54	2.59	2.59	2.59	2.61	2.69	2.70	2.19	2.70	2.43	24
30	2.71	2.74	2.80	2.81	2.87	2.89	2.92	2.94	3.00	3.00	2.87	2.84	2.77	2.77	S	2.62	2.57	2.58	2.63	2.63	2.65	2.65	2.52	2.48	2.48	3.00	2.75	24
HOURLY MAX	2.71	2.74	2.80	2.81	2.87	2.89	2.92	2.94	3.00	3.00	2.87	2.84	2.77	2.77	2.52	2.62	2.57	2.58	2.63	2.63	2.65	2.65	2.69	2.70				
HOURLY AVG	2.11	2.11	2.11	2.11	2.12	2.14	2.13	2.11	2.11	2.11	2.09	2.08	2.08	2.08	2.06	2.07	2.09	2.10	2.10	2.10	2.12	2.12	2.11	2.12				

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 2018



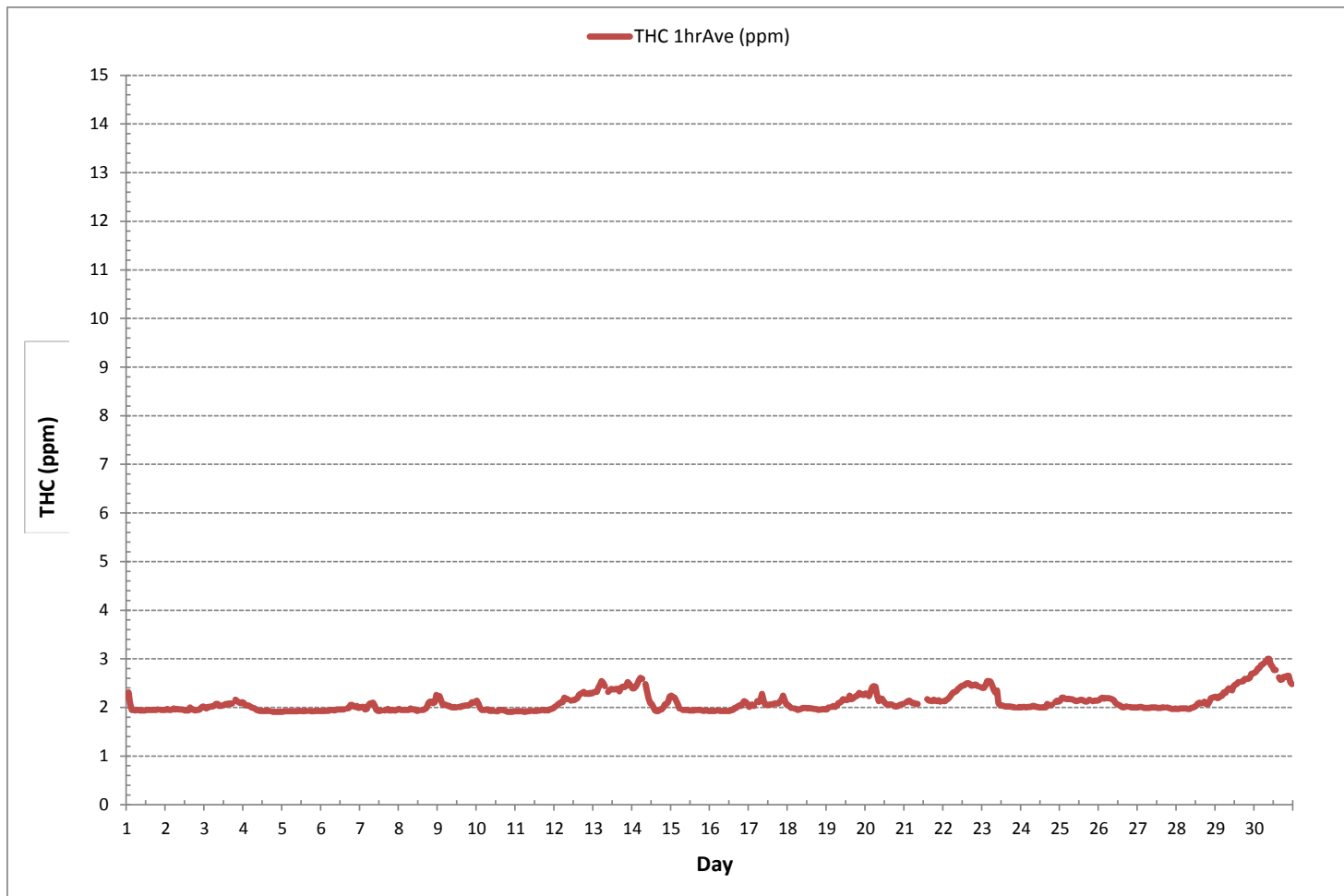
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	684		
MINIMUM 1-HR AVERAGE:	1.91 ppm	@ HOUR	18 ON DAY 4
MAXIMUM 1-HR AVERAGE:	3.00 ppm	@ HOUR	8 ON DAY 30
MAXIMUM 24-HR AVERAGE:	2.75 ppm		ON DAY 30
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	720 hrs
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	0.20	MONTHLY AVERAGE:	2.10 ppm



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

TOTAL HYDROCARBONS Hourly Averages (THC ppm)



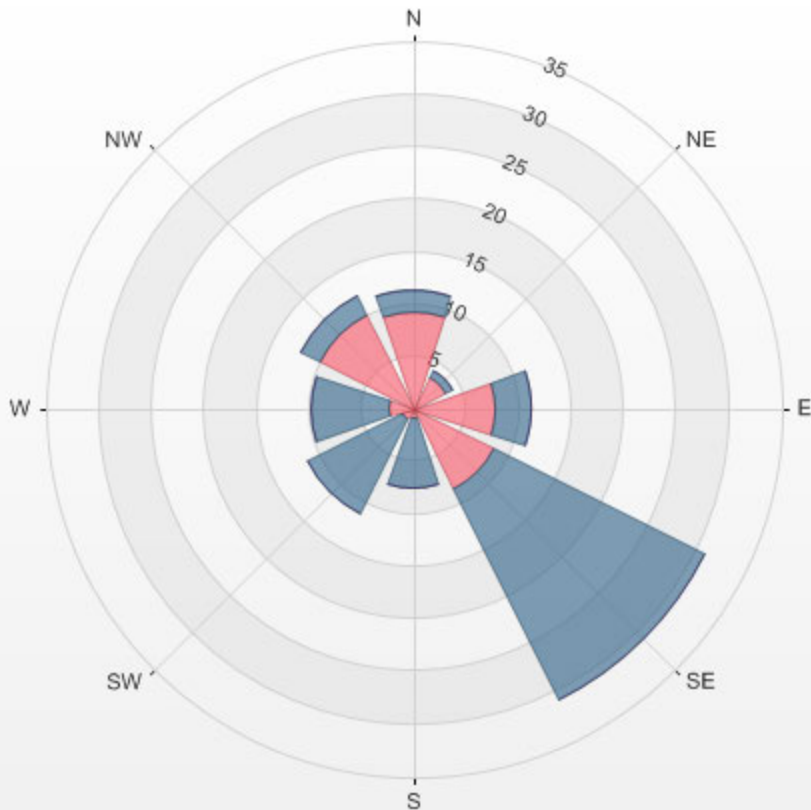
Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-THC[ppm]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 1.32% Calm Avg: 2.51 [ppm]

Direction	0.0-1.0	1.0-2.0	2.0-3.0	>3.0	Total
N	0.0	9.2	2.1	0.0	11.3
NE	0.0	3.4	0.7	0.0	4.1
E	0.0	7.8	3.5	0.0	11.3
SE	0.0	8.7	22.4	0.0	31.1
S	0.0	0.9	6.7	0.0	7.6
SW	0.0	1.2	10.1	0.0	11.3
W	0.0	2.4	7.5	0.0	9.8
NW	0.0	10.0	2.2	0.0	12.2
Summary	0.0	43.4	55.3	0.0	98.7

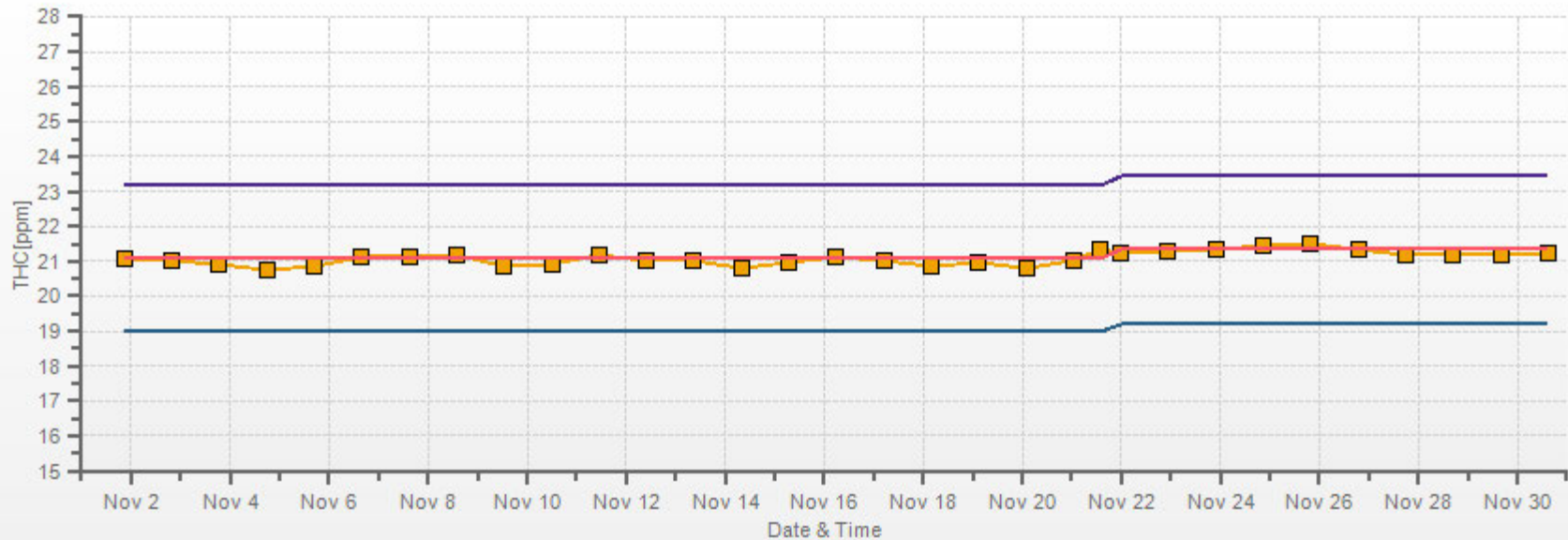
% Icon Classes (ppm) 0 0.0-1.0 43 1.0-2.0 55 2.0-3.0 0 >3.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-THC[ppm] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 1.32% Calm Poll Avg: 2.51[ppm]



THC[ppm] Calibration: LICA COLD LAKE SOUTH Monthly: 18/11 Type: Span

Span Meas Span Ref Span Low Span High



METHANE

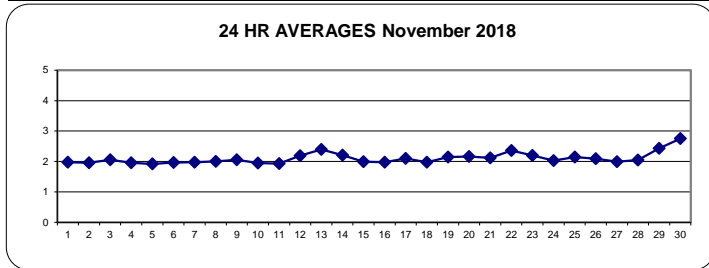


METHANE Hourly Averages (CH₄ ppm)

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	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	2.22	2.31	2.09	1.95	1.95	1.94	1.95	1.95	1.94	1.94	1.94	1.94	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.96	S	1.95	1.95	1.95	1.94	2.31	1.98	24
2	1.95	1.97	1.95	1.95	1.96	1.98	1.96	1.97	1.96	1.96	1.96	1.95	1.94	1.94	1.94	1.96	1.96	1.96	1.94	S	1.95	1.96	2.00	2.02	1.94	2.02	1.96	24
3	2.00	1.98	2.01	2.01	2.02	2.02	2.04	2.07	2.07	2.03	2.03	2.04	2.05	2.07	2.06	2.08	2.07	2.08	S	2.16	2.13	2.11	2.09	2.11	1.98	2.16	2.06	24
4	2.10	2.04	2.04	2.04	2.02	2.00	1.99	1.98	1.95	1.94	1.93	1.93	1.93	1.93	1.93	1.94	1.93	S	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.96	24
5	1.91	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.93	1.93	1.93	1.93	1.92	1.93	1.93	S	1.93	1.92	1.92	1.93	1.93	1.93	1.93	1.91	1.93	1.92	24
6	1.93	1.93	1.93	1.94	1.93	1.94	1.95	1.95	1.94	1.95	1.96	1.96	1.96	1.96	1.96	S	1.98	1.99	2.05	2.05	2.02	2.01	2.03	1.99	1.93	2.05	1.97	24
7	2.00	2.01	2.01	1.96	1.97	2.04	2.08	2.09	2.10	2.03	1.95	1.93	1.93	1.94	S	1.94	1.95	1.97	1.94	1.94	1.95	1.94	1.94	1.96	1.93	2.10	1.98	24
8	1.97	1.95	1.95	1.95	1.95	1.95	1.95	1.98	1.96	1.96	1.96	1.93	1.94	S	1.95	1.95	1.97	1.99	2.09	2.12	2.12	2.09	2.11	2.26	1.93	2.26	2.00	24
9	2.22	2.23	2.14	2.05	2.06	2.05	2.03	2.03	2.01	2.00	2.01	2.00	S	2.01	2.01	2.03	2.03	2.04	2.04	2.04	2.07	2.11	2.10	2.12	2.00	2.23	2.06	24
10	2.14	2.07	1.99	1.95	1.95	1.95	1.96	1.96	1.93	1.94	1.93	S	1.92	1.92	1.95	1.95	1.95	1.94	1.92	1.91	1.91	1.91	1.91	1.92	1.91	2.14	1.95	24
11	1.92	1.92	1.92	1.92	1.92	1.91	1.91	1.92	1.92	1.93	S	1.93	1.93	1.93	1.94	1.94	1.95	1.95	1.94	1.95	1.94	1.96	1.97	1.98	1.91	1.98	1.93	24
12	2.01	2.03	2.06	2.09	2.11	2.11	2.20	2.18	2.17	S	2.14	2.15	2.15	2.17	2.19	2.26	2.28	2.30	2.31	2.28	2.29	2.28	2.30	2.29	2.01	2.31	2.19	24
13	2.31	2.32	2.32	2.40	2.47	2.52	2.50	2.44	S	2.32	2.36	2.38	2.37	2.37	2.38	2.38	2.33	2.40	2.43	2.42	2.44	2.52	2.49	2.44	2.31	2.52	2.40	24
14	2.39	2.39	2.43	2.48	2.56	2.61	2.59	S	2.47	2.33	2.19	2.09	2.07	2.00	1.94	1.92	1.93	1.96	1.96	2.00	2.06	2.07	2.11	2.22	1.92	2.61	2.21	24
15	2.24	2.21	2.20	2.14	2.06	1.98	S	1.95	1.95	1.95	1.94	1.94	1.94	1.94	1.94	1.95	1.95	1.95	1.95	1.94	1.93	1.94	1.94	1.93	1.93	2.24	1.99	24
16	1.93	1.93	1.93	1.93	1.94	S	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.95	1.95	1.99	1.99	2.02	2.04	2.03	2.09	2.13	2.11	2.07	1.93	2.13	1.98	24
17	2.01	2.04	2.06	2.03	S	2.13	2.11	2.16	2.28	2.13	2.05	2.05	2.05	2.06	2.07	2.08	2.08	2.08	2.12	2.16	2.24	2.14	2.06	2.01	2.28	2.10	24	
18	2.05	2.02	1.99	S	1.98	1.97	1.95	1.96	1.97	1.99	1.99	1.99	1.98	1.98	1.98	1.97	1.97	1.96	1.95	1.96	1.96	1.97	1.96	1.95	2.05	1.98	24	
19	1.96	2.00	S	2.01	2.03	2.01	2.03	2.09	2.10	2.12	2.17	2.16	2.15	2.16	2.24	2.17	2.18	2.21	2.23	2.25	2.30	2.28	2.26	2.26	1.96	2.30	2.15	24
20	2.29	S	2.23	2.33	2.42	2.44	2.43	2.26	2.13	2.18	2.18	2.13	2.09	2.06	2.05	2.06	2.06	2.04	2.02	2.02	2.03	2.05	2.06	2.07	2.02	2.44	2.16	24
21	S	2.11	2.13	2.14	2.11	2.09	2.08	2.07	2.07	C	C	C	C	C	2.15	2.14	2.14	2.13	2.16	2.14	2.13	2.15	2.12	S	2.07	2.16	2.12	24
22	2.13	2.13	2.16	2.18	2.22	2.27	2.31	2.32	2.34	2.38	2.41	2.44	2.45	2.46	2.49	2.50	2.49	2.45	2.45	2.47	2.47	2.44	S	2.42	2.13	2.50	2.36	24
23	2.40	2.40	2.46	2.54	2.54	2.53	2.45	2.36	2.31	2.35	2.08	2.04	2.04	2.03	2.02	2.02	2.02	2.02	2.01	2.01	2.00	S	2.00	2.01	2.00	2.54	2.20	24
24	2.00	2.01	2.01	2.00	2.01	2.01	2.01	2.03	2.03	2.01	2.01	2.00	2.00	2.00	2.00	2.00	2.05	2.05	2.04	2.05	S	2.11	2.14	2.12	2.00	2.14	2.03	24
25	2.14	2.20	2.20	2.18	2.17	2.18	2.17	2.17	2.16	2.14	2.13	2.14	2.15	2.16	2.15	2.13	2.12	2.13	2.16	S	2.13	2.14	2.14	2.14	2.12	2.20	2.15	24
26	2.15	2.18	2.20	2.18	2.19	2.19	2.19	2.18	2.17	2.15	2.10	2.07	2.05	2.04	2.01	2.00	2.01	2.02	S	2.01	2.00	2.00	2.00	2.00	2.00	2.20	2.09	24
27	2.00	2.01	2.01	2.00	1.99	1.99	1.99	1.99	2.00	2.00	2.00	2.00	1.99	1.99	1.99	2.00	2.00	2.00	S	2.00	1.99	1.98	1.97	1.97	1.98	2.01	1.99	24
28	1.97	1.97	1.98	1.98	1.98	1.98	1.98	1.97	1.97	1.99	2.00	2.01	2.04	2.08	2.10	2.08	S	2.12	2.07	2.06	2.11	2.19	2.20	2.21	1.97	2.21	2.05	24
29	2.22	2.19	2.20	2.24	2.24	2.31	2.30	2.35	2.39	2.38	2.35	2.44	2.47	2.48	2.52	S	2.53	2.54	2.59	2.59	2.59	2.61	2.69	2.70	2.19	2.70	2.43	24
30	2.71	2.74	2.80	2.81	2.87	2.87	2.90	2.94	3.00	3.00	2.87	2.84	2.77	2.77	S	2.62	2.57	2.58	2.63	2.63	2.65	2.65	2.52	2.48	2.48	3.00	2.75	24
HOURLY MAX	2.71	2.74	2.80	2.81	2.87	2.87	2.90	2.94	3.00	3.00	2.87	2.84	2.77	2.77	2.52	2.62	2.57	2.58	2.63	2.63	2.65	2.65	2.69	2.70				
HOURLY AVG	2.11	2.11	2.11	2.11	2.12	2.13	2.13	2.11	2.11	2.11	2.09	2.08	2.08	2.08	2.06	2.07	2.09	2.10	2.10	2.10	2.12	2.12	2.11	2.12				

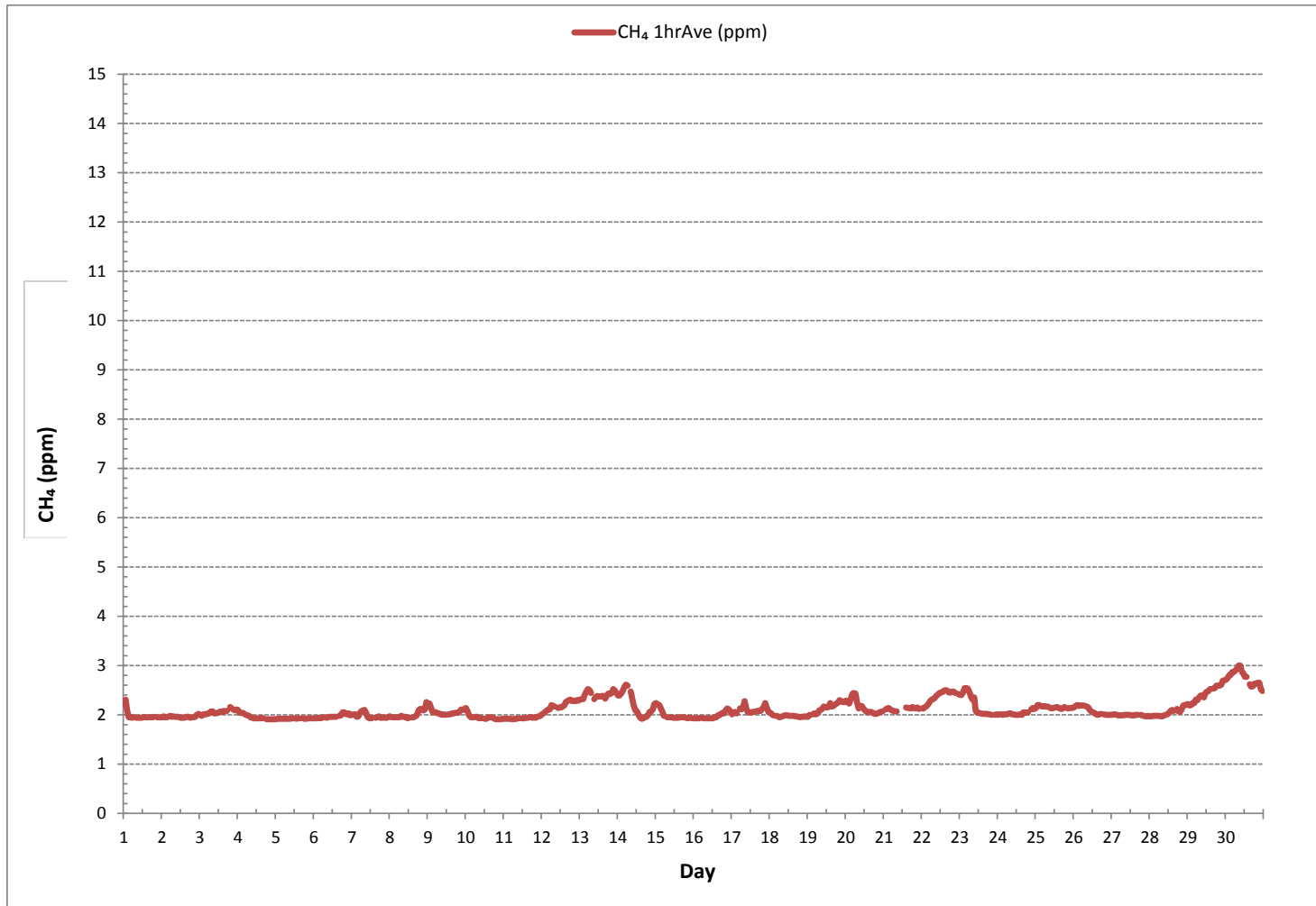
STATUS FLAG CODES

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			
MINIMUM 1-HR AVERAGE:	1.91 ppm	@ HOUR	18	ON DAY 4
MAXIMUM 1-HR AVERAGE:	3.00 ppm	@ HOUR	8	ON DAY 30
MAXIMUM 24-HR AVERAGE:	2.75 ppm			ON DAY 30
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	720 hrs	
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	0.20	MONTHLY AVERAGE:	2.10 ppm	



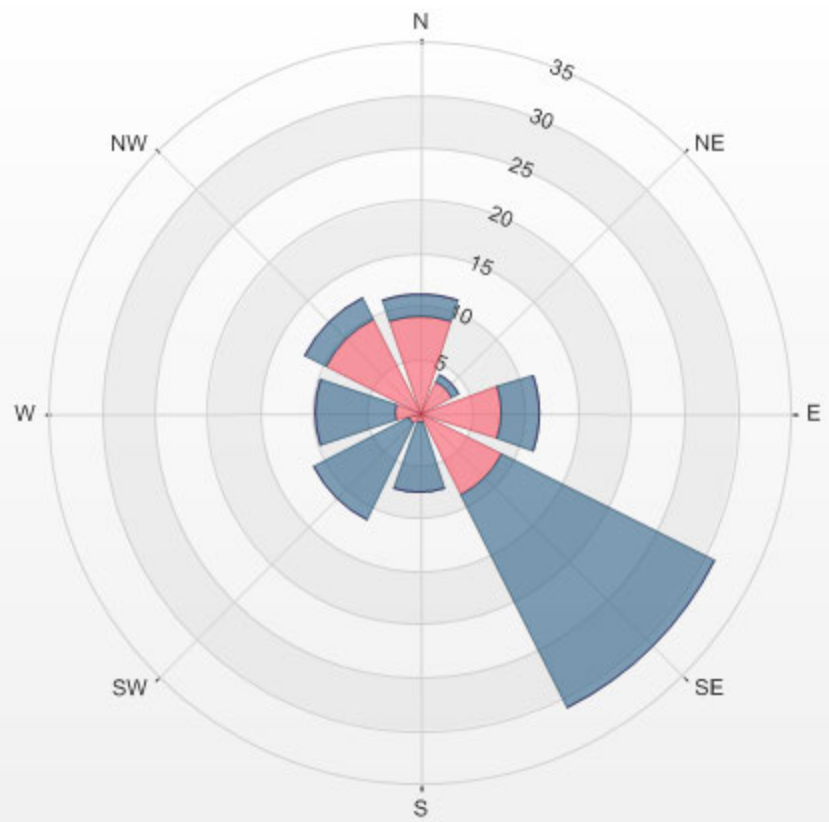
Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-CH4[ppm]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 1.32% Calm Avg: 2.51 [ppm]

Direction	0.0-1.0	1.0-2.0	2.0-3.0	>3.0	Total
N	0.0	9.2	2.1	0.0	11.3
NE	0.0	3.4	0.7	0.0	4.1
E	0.0	7.8	3.5	0.0	11.3
SE	0.0	8.7	22.4	0.0	31.1
S	0.0	0.9	6.7	0.0	7.6
SW	0.0	1.2	10.1	0.0	11.3
W	0.0	2.4	7.5	0.0	9.8
NW	0.0	10.0	2.2	0.0	12.2
Summary	0.0	43.4	55.3	0.0	98.7

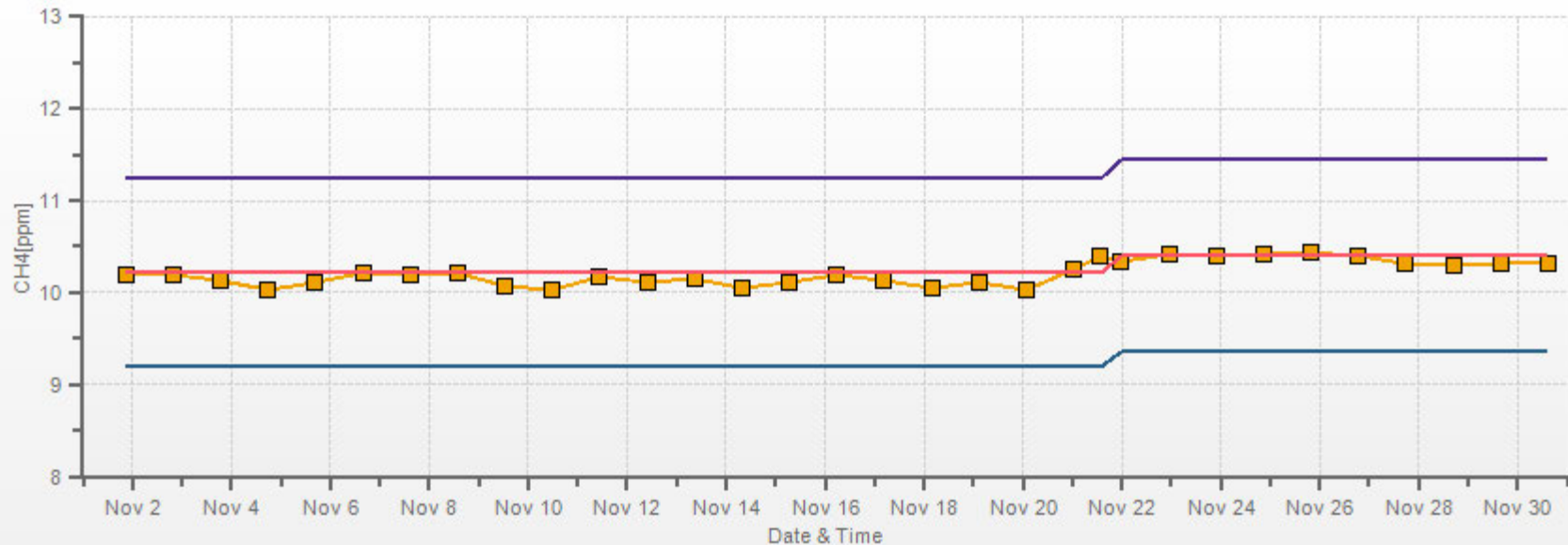
% Icon	Classes (ppm)	0	0.0-1.0	43	1.0-2.0	55	2.0-3.0	0	>3.0
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LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-CH4[ppm] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 1.32% Calm Poll Avg: 2.51[ppm]



CH4[ppm] Calibration: LICA COLD LAKE SOUTH Monthly: 18/11 Type: Span

Span Meas Span Ref Span Low Span High



NON-METHANE HYDROCARBON



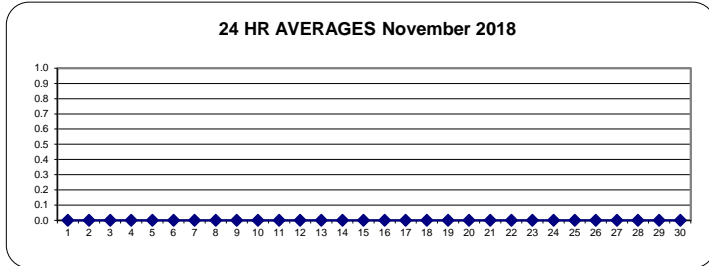
NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

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	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
2	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	0.04	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	0.04	0.00	24	
3	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
4	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
5	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
6	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
7	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	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	
8	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	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	
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	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	
10	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	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	
11	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
12	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
13	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	S	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
15	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
16	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
17	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
18	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	0.00	0.00	0.00	0.00	0.00	0.00	24
19	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
20	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
21	S	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	C	C	C	C	C	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	24
22	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	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	S	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	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	0.00	0.00	0.00	0.00	0.00	0.00	24
25	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
26	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	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	24
27	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	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	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
29	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	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
30	0.00	0.00	0.00	0.00	0.00	0.02	0.02	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	24
HOURLY MAX	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.02	0.04	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
HOURLY AVG	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24

STATUS FLAG CODES

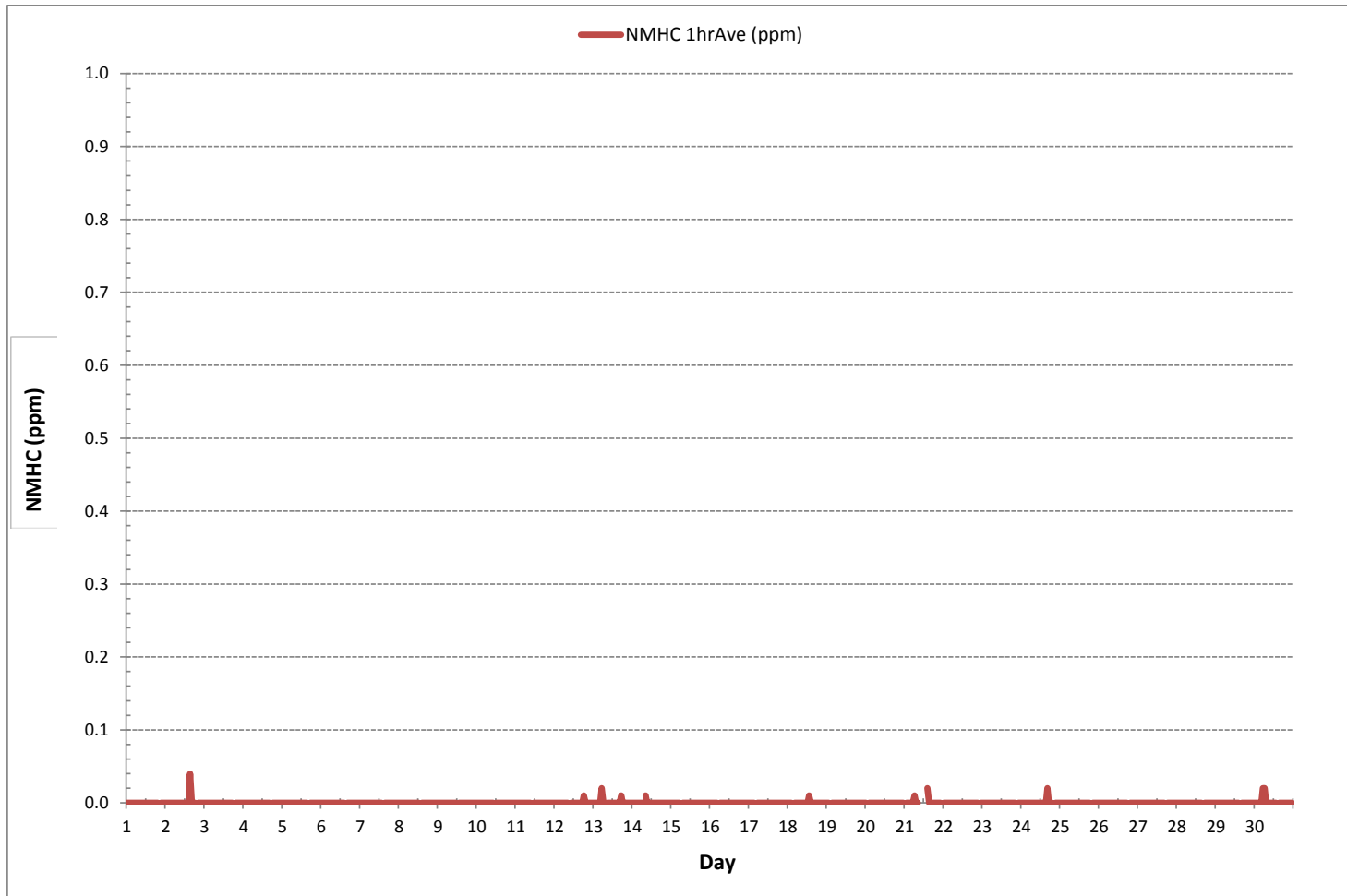
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

24 HR AVERAGES November 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	11
MINIMUM 1-HR AVERAGE:	0.00 ppm @ HOUR 0 ON DAY 1
MAXIMUM 1-HR AVERAGE:	0.04 ppm @ HOUR 15 ON DAY 2
MAXIMUM 24-HR AVERAGE:	0.00 ppm ON DAY 1
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	720 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	0.00
MONTHLY AVERAGE:	0.00 ppm



Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-NMHC[ppm]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 1.32%

Calm Avg: 0.00 [ppm]

Direction	0-0.08	0.08-0.16	0.16-0.24	0.24-0.32	0.32-0.4	>0.4	Total
N	11.3	0.0	0.0	0.0	0.0	0.0	11.3
NE	4.1	0.0	0.0	0.0	0.0	0.0	4.1
E	11.3	0.0	0.0	0.0	0.0	0.0	11.3
SE	31.1	0.0	0.0	0.0	0.0	0.0	31.1
S	7.6	0.0	0.0	0.0	0.0	0.0	7.6
SW	11.3	0.0	0.0	0.0	0.0	0.0	11.3
W	9.8	0.0	0.0	0.0	0.0	0.0	9.8
NW	12.2	0.0	0.0	0.0	0.0	0.0	12.2
Summary	98.7	0.0	0.0	0.0	0.0	0.0	98.7

% Icon Classes (ppm)

99 0-0.08

0 0.08-0.16

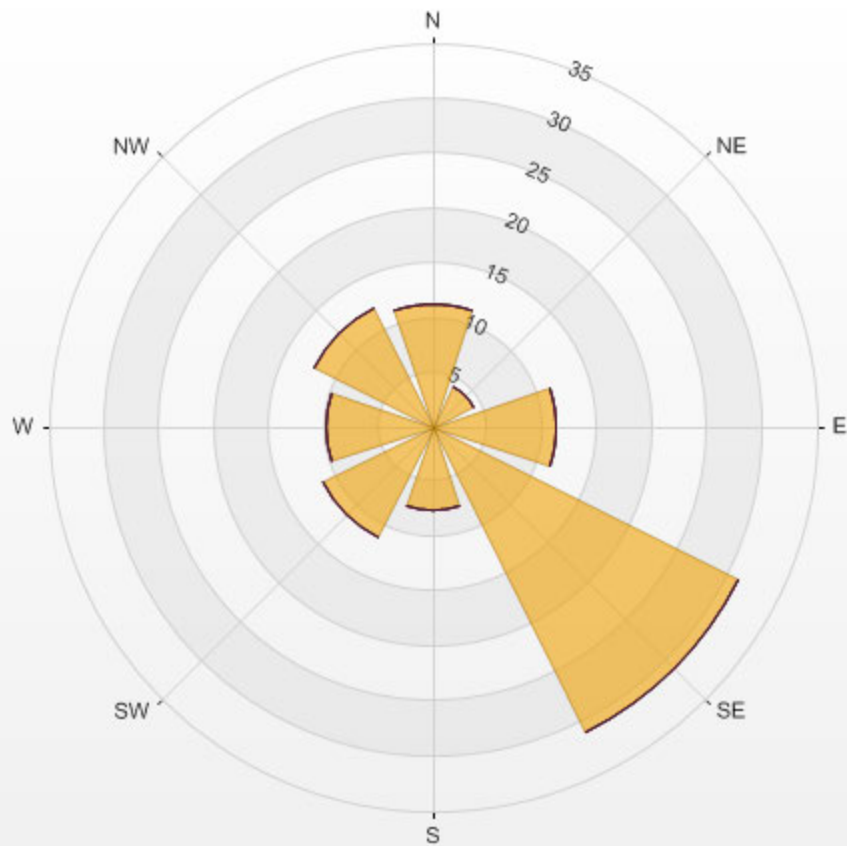
0 0.16-0.24

0 0.24-0.32

0 0.32-0.4

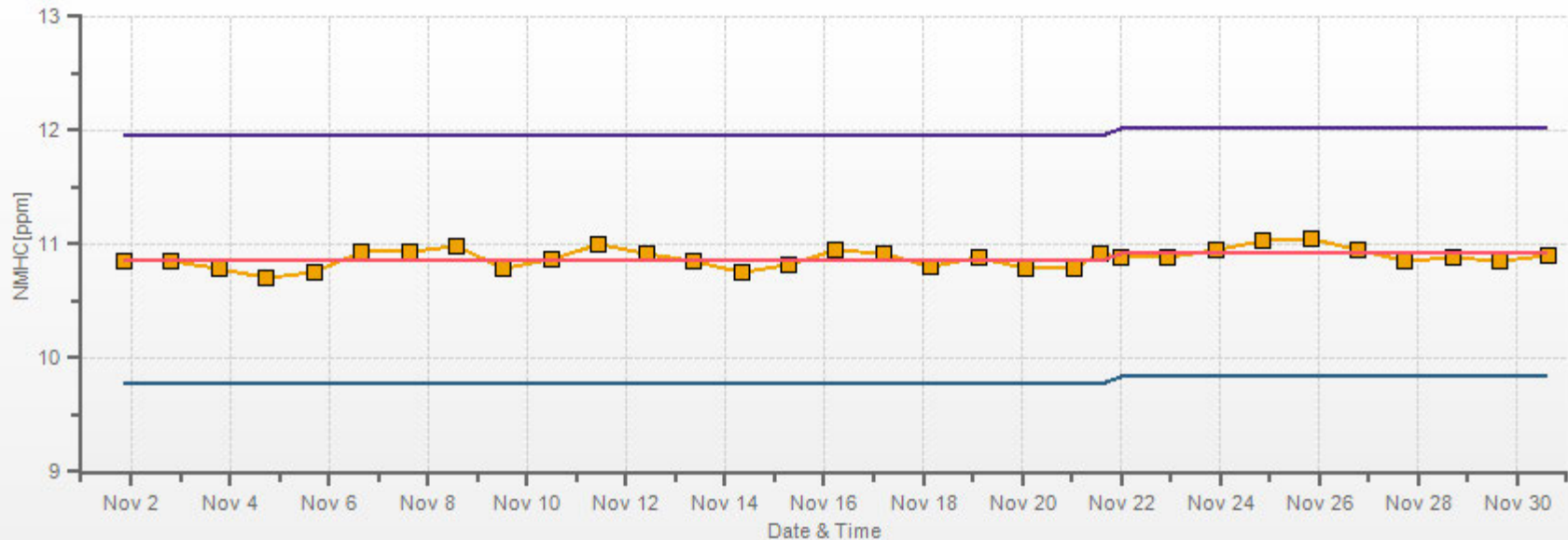
0 >0.4

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NMHC[ppm] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 1.32% Calm Poll Avg: 0.00[ppm]



NMHC[ppm] Calibration: LICA COLD LAKE SOUTH Monthly: 18/11 Type: Span

Span Meas Span Ref Span Low Span High



OXIDES OF NITROGEN



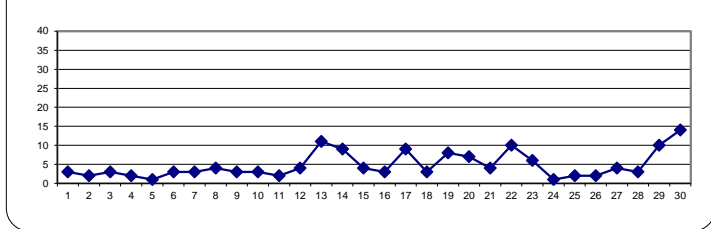
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

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	5	4	4	2	1	1	2	2	1	2	3	2	3	3	3	4	4	3	4	3	S	3	2	1	1	1	5	3	24
DAY 2	1	2	1	2	2	2	4	4	3	4	2	2	1	2	2	2	3	2	1	S	1	1	1	1	1	1	4	2	24
DAY 3	1	1	1	1	1	1	1	1	2	2	2	3	3	4	3	4	3	4	S	7	7	4	4	4	4	1	7	3	24
DAY 4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	S	1	1	0	0	0	0	0	0	3	2	24
DAY 5	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	S	2	1	1	0	1	0	0	0	0	2	1	24
DAY 6	1	1	1	1	1	1	1	1	1	1	1	3	4	6	8	6	S	6	4	4	5	7	6	4	3	1	8	3	24
DAY 7	3	2	3	3	2	5	6	8	9	5	1	1	0	0	S	1	1	1	2	1	1	2	1	1	1	0	9	3	24
DAY 8	2	1	1	1	0	1	2	6	5	2	1	1	1	S	1	2	9	10	11	8	6	4	4	3	0	11	4	24	
DAY 9	2	3	3	2	2	2	3	2	2	2	2	2	S	3	3	3	3	3	3	3	4	6	5	6	2	6	3	24	
DAY 10	7	7	4	3	3	3	5	5	2	3	2	S	2	1	2	4	3	2	1	1	1	1	0	0	1	0	7	3	24
DAY 11	1	1	1	1	1	1	1	1	1	1	3	S	3	2	2	3	3	4	4	3	2	3	2	2	1	4	2	24	
DAY 12	5	3	3	4	3	3	3	2	3	S	3	4	3	3	4	5	5	6	7	6	5	6	7	7	2	7	4	24	
DAY 13	6	7	6	8	10	16	16	10	S	24	8	6	6	7	7	11	16	16	8	20	26	10	8	6	6	6	26	11	24
DAY 14	6	6	5	6	11	12	9	S	17	14	15	11	7	5	4	4	4	6	7	7	8	9	14	26	4	26	9	24	
DAY 15	28	19	10	6	3	3	S	2	2	2	2	3	2	2	2	3	3	3	2	2	2	1	1	1	1	1	28	4	24
DAY 16	1	0	0	0	1	S	0	1	1	1	1	0	0	2	5	6	9	8	6	6	6	6	4	4	0	9	3	24	
DAY 17	3	4	4	4	S	17	10	9	8	8	8	8	8	12	21	10	11	12	11	11	10	11	7	6	3	21	9	24	
DAY 18	6	5	3	S	3	2	2	3	3	3	3	4	4	4	3	4	4	3	3	2	2	1	2	2	1	6	3	24	
DAY 19	1	1	S	1	1	1	2	2	3	3	C	C	C	C	C	C	10	10	12	12	28	21	14	10	1	28	8	24	
DAY 20	10	S	10	11	13	18	20	19	13	7	5	4	4	3	3	4	3	3	3	3	2	2	3	2	2	20	7	24	
DAY 21	S	3	3	2	3	3	3	3	3	3	3	4	3	4	5	6	5	4	4	4	5	4	5	S	2	6	4	24	
DAY 22	5	4	3	3	4	5	7	6	8	9	10	14	11	10	12	13	16	13	17	17	18	10	S	8	3	18	10	24	
DAY 23	9	8	12	15	14	14	13	11	8	8	6	4	4	3	4	3	3	2	1	1	2	S	2	1	1	15	6	24	
DAY 24	1	1	1	1	2	1	1	2	3	1	1	0	0	1	1	2	1	1	1	1	S	2	2	2	0	3	1	24	
DAY 25	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	4	3	3	3	S	3	3	3	3	2	4	2	24	
DAY 26	2	3	2	2	3	3	2	2	2	2	2	2	2	2	3	3	3	3	2	S	2	2	2	2	2	3	2	24	
DAY 27	2	2	3	2	3	4	4	6	4	3	3	3	4	4	5	6	5	S	4	4	3	3	3	3	2	6	4	24	
DAY 28	2	2	2	2	2	2	4	3	3	2	2	2	2	2	3	4	S	6	7	6	6	5	6	7	2	7	3	24	
DAY 29	7	7	6	6	6	11	8	15	13	8	7	8	8	8	9	S	11	13	11	11	10	10	12	12	6	15	10	24	
DAY 30	11	9	7	11	14	13	18	22	37	23	11	11	10	11	S	11	13	13	13	11	12	13	11	10	7	37	14	24	
HOURLY MAX	28	19	12	15	14	18	20	22	37	24	15	14	11	12	21	13	16	16	17	20	28	21	14	26					
HOURLY AVG	5	4	4	4	4	5	5	5	6	5	4	4	4	4	4	5	6	6	5	6	6	5	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

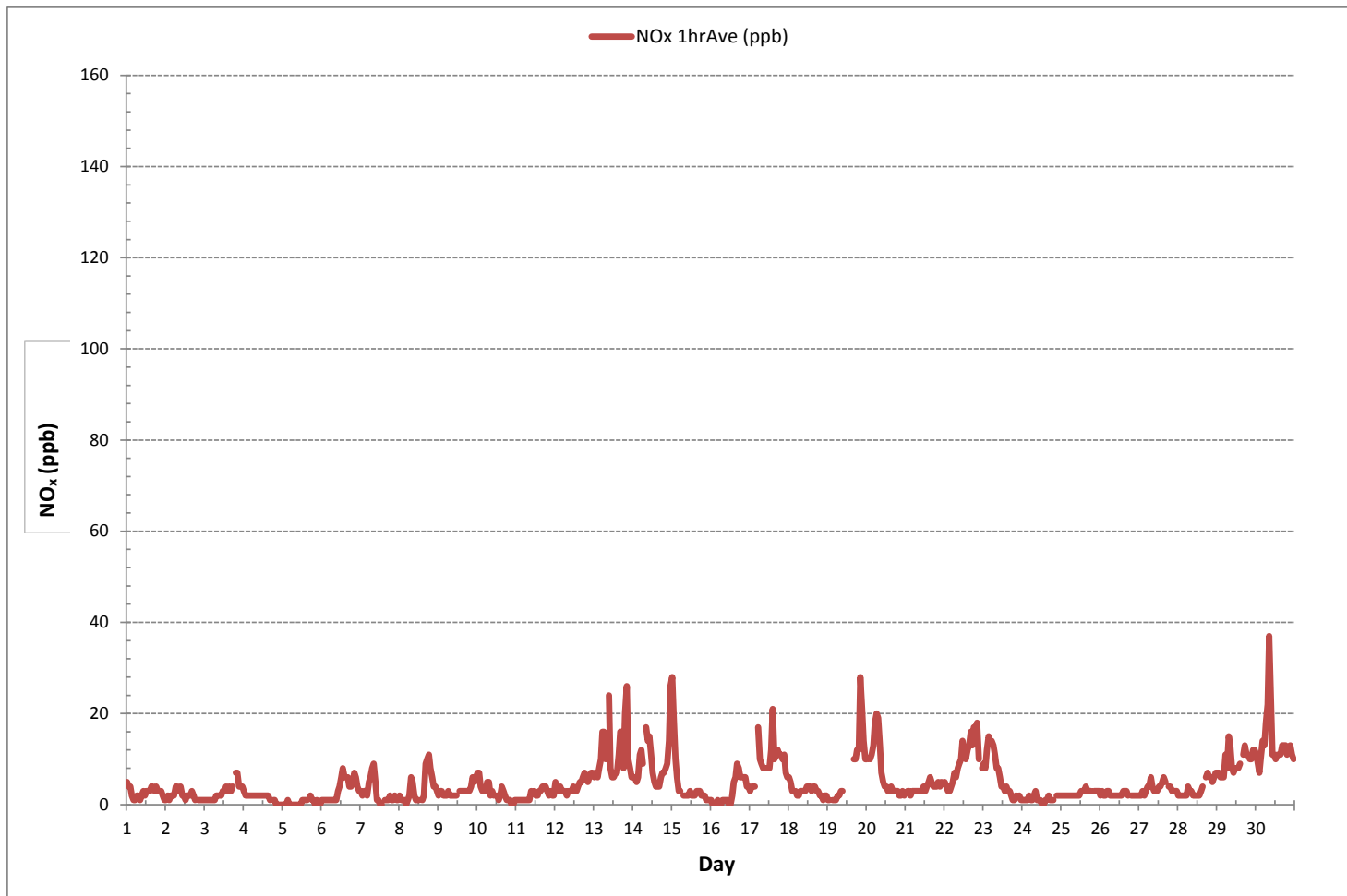
24 HR AVERAGES November 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	652		
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	20 ON DAY 4
MAXIMUM 1-HR AVERAGE:	37 ppb	@ HOUR	8 ON DAY 30
MAXIMUM 24-HR AVERAGE:	14 ppb		ON DAY 30
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	720 hrs
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	5	MONTHLY AVERAGE:	5 ppb

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)



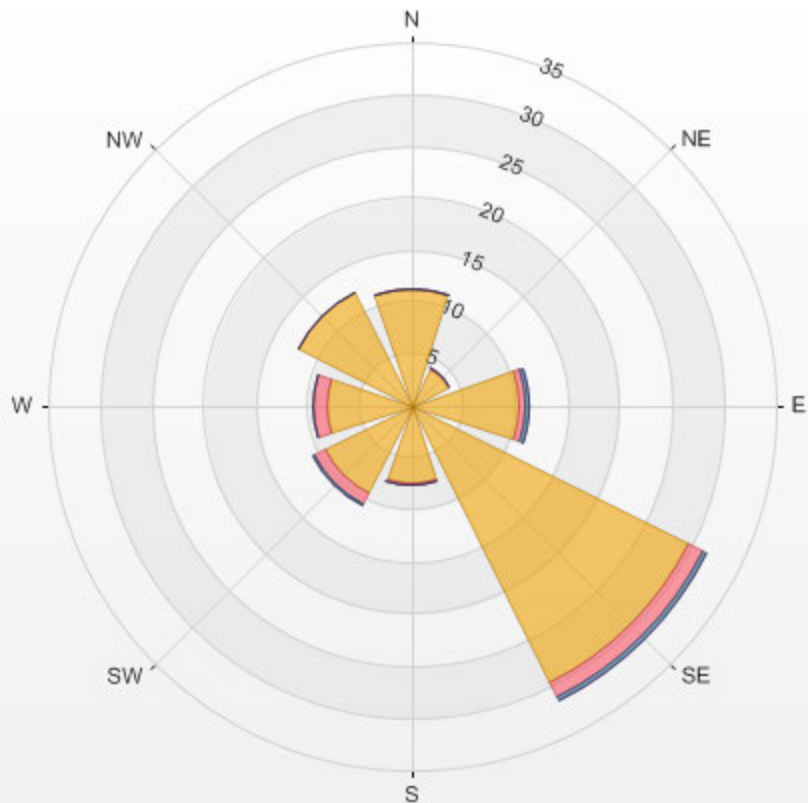
Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-NOX[ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 1.32% Calm Avg: 12.00 [ppb]

Direction	0.0-12.7	12.7-25.3	25.3-38.0	>38.0	Total
N	11.2	0.2	0.0	0.0	11.3
NE	4.0	0.2	0.0	0.0	4.1
E	10.4	0.6	0.3	0.0	11.3
SE	29.8	1.6	0.3	0.0	31.7
S	7.5	0.3	0.0	0.0	7.8
SW	9.4	1.2	0.2	0.0	10.7
W	8.2	1.3	0.0	0.0	9.5
NW	12.2	0.0	0.0	0.0	12.2
Summary	92.7	5.3	0.7	0.0	98.7

% Icon Classes (ppb) 93 0.0-12.7 5 12.7-25.3 1 25.3-38.0 0 >38.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NOX[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 1.32% Calm Poll Avg: 12.00[ppb]



NOX[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 18/11 Type: Span

Span Meas Span Ref Span Low Span High



NITRIC OXIDE



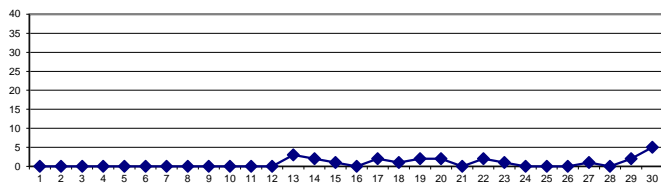
NITRIC OXIDE Hourly Averages (NO ppb)

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 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	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	1	0	24
DAY 2	0	0	0	0	0	1	1	1	1	1	0	0	1	0	1	0	1	0	0	S	0	0	0	0	0	0	1	0	24
DAY 3	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	S	1	1	0	1	0	0	0	1	0	24
DAY 4	0	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	0	S	0	0	0	0	0	0	0	0	1	0	24
DAY 5	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	24
DAY 6	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	S	0	0	0	0	0	0	0	0	0	0	2	0	24
DAY 7	0	0	0	0	0	0	1	1	1	1	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	1	0	24
DAY 8	0	0	0	0	0	0	1	1	1	1	0	0	0	S	0	0	1	1	1	1	1	0	0	0	0	0	1	0	24
DAY 9	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
DAY 10	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	1	0	24
DAY 11	0	0	0	0	0	0	0	0	0	0	0	S	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
DAY 12	0	0	0	0	0	0	0	0	0	0	S	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	1	0	24
DAY 13	0	0	0	0	0	5	5	2	S	11	4	3	3	3	2	2	2	2	3	0	3	8	0	0	0	0	11	3	24
DAY 14	0	0	0	0	1	2	1	S	6	4	6	3	2	1	1	0	0	0	0	0	0	1	3	10	0	0	10	2	24
DAY 15	13	8	2	0	0	0	S	0	0	0	1	1	0	1	0	1	1	0	1	1	1	0	0	0	0	0	13	1	24
DAY 16	0	0	0	0	0	S	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	24
DAY 17	0	0	0	0	S	1	0	1	2	3	4	4	6	11	2	1	0	0	0	0	0	1	0	0	0	0	11	2	24
DAY 18	0	0	0	S	0	0	0	0	1	1	1	1	1	1	1	1	0	1	0	1	0	0	0	0	0	0	1	1	24
DAY 19	0	0	S	0	0	0	0	0	0	0	C	C	C	C	C	C	1	0	1	2	14	10	5	3	0	0	14	2	24
DAY 20	3	S	1	0	1	4	7	6	3	2	2	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	7	2	24
DAY 21	S	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	S	0	0	1	0	24
DAY 22	0	0	0	0	0	0	0	0	1	3	4	7	5	4	4	3	3	1	3	4	7	1	S	0	0	0	7	2	24
DAY 23	0	1	2	6	3	1	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	S	0	0	0	0	6	1	24
DAY 24	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	1	0	24
DAY 25	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	S	0	0	0	0	0	1	0	24
DAY 26	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
DAY 27	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	S	0	1	0	0	0	0	0	0	1	1	24
DAY 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	1	0	0	0	0	0	0	0	0	1	0	24
DAY 29	0	0	0	0	0	2	1	5	4	3	3	3	4	3	3	S	1	2	1	1	1	1	1	2	2	0	5	2	24
DAY 30	3	1	1	4	7	5	8	13	26	13	3	4	4	4	S	1	1	0	1	1	1	1	2	2	2	0	26	5	24
HOURLY MAX	13	8	2	6	7	5	8	13	26	13	6	7	5	6	11	3	3	3	3	4	14	10	5	10					
HOURLY AVG	1	0	0	0	0	1	1	1	2	2	1	1	1	1	1	1	1	0	0	1	1	1	0	1					

STATUS FLAG CODES

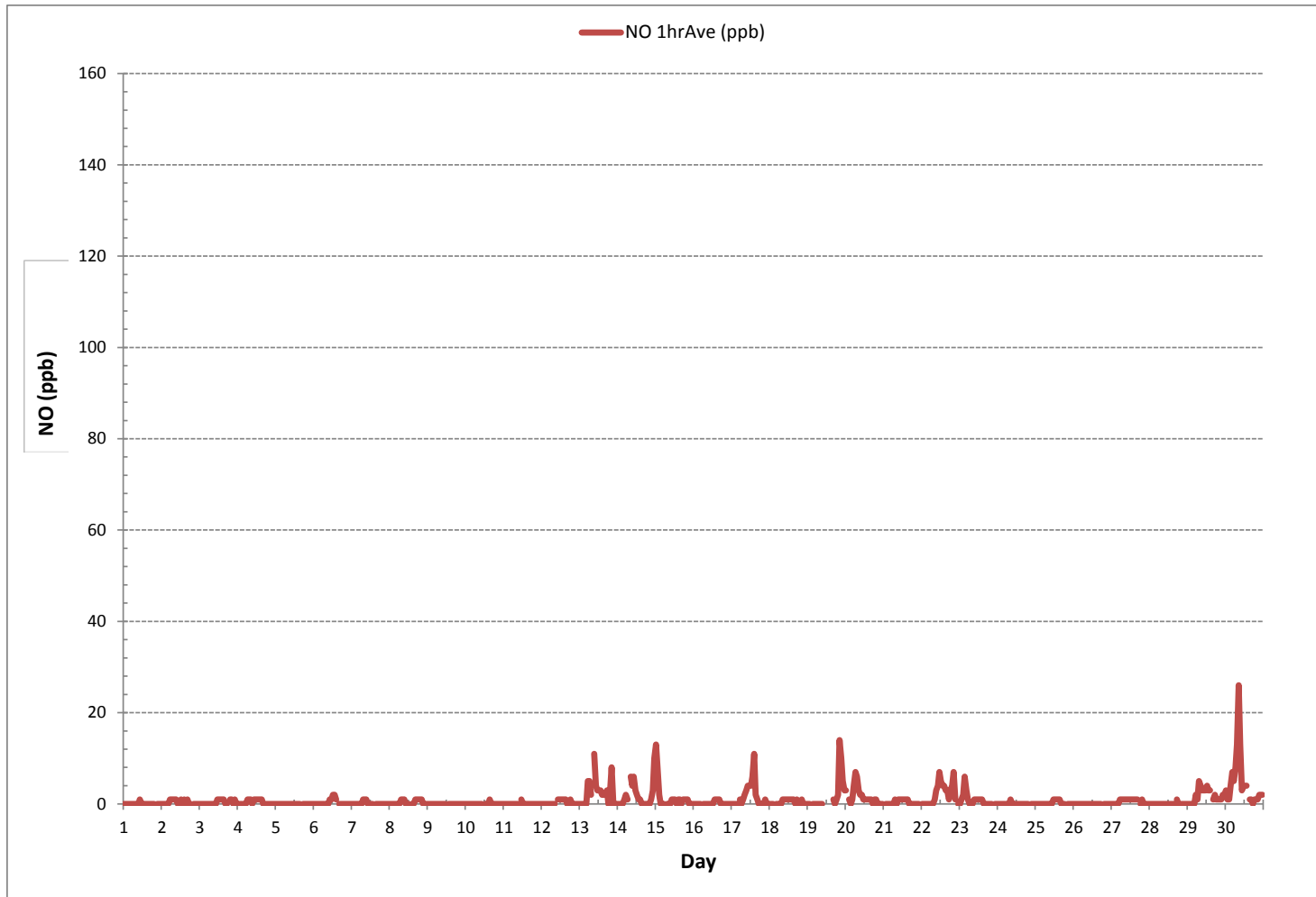
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

24 HR AVERAGES November 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	233			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	0	ON DAY 1
MAXIMUM 1-HR AVERAGE:	26 ppb	@ HOUR	8	ON DAY 30
MAXIMUM 24-HR AVERAGE:	5 ppb			ON DAY 30
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	720 hrs	
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	2	MONTHLY AVERAGE:	1	ppb



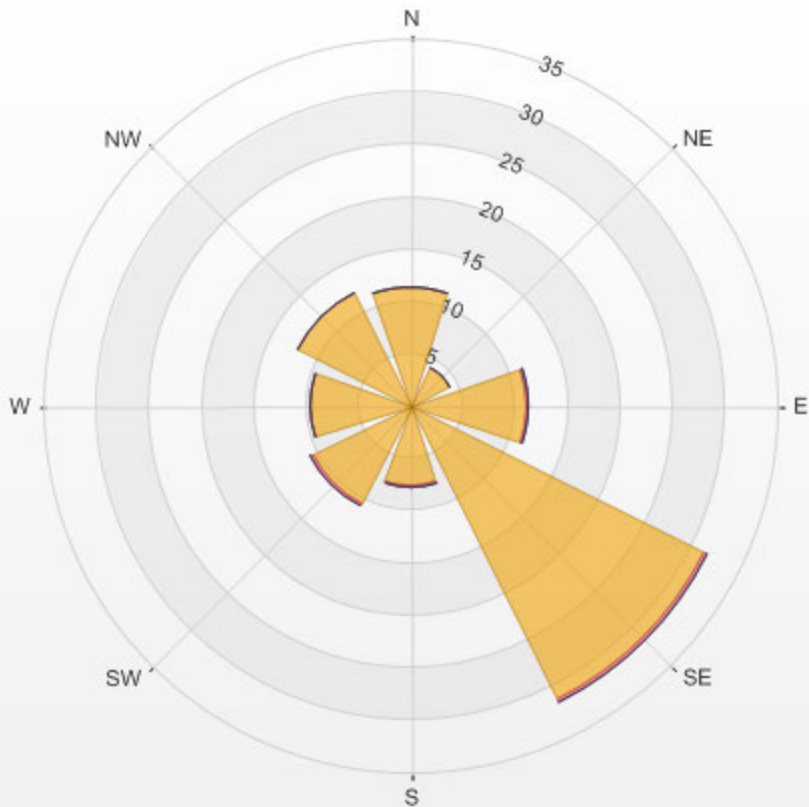
Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-NO[ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 1.32% Calm Avg: 3.79 [ppb]

Direction	0.0-9.0	9.0-18.0	18.0-27.0	>27.0	Total
N	11.3	0.0	0.0	0.0	11.3
NE	4.1	0.0	0.0	0.0	4.1
E	11.0	0.2	0.2	0.0	11.3
SE	31.3	0.4	0.0	0.0	31.7
S	7.6	0.2	0.0	0.0	7.8
SW	10.4	0.3	0.0	0.0	10.7
W	9.5	0.0	0.0	0.0	9.5
NW	12.2	0.0	0.0	0.0	12.2
Summary	97.5	1.0	0.2	0.0	98.7

% Icon Classes (ppb) 98 0.0-9.0 1 9.0-18.0 0 18.0-27.0 0 >27.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 1.32% Calm Poll Avg: 3.79[ppb]



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	4	4	4	2	1	1	2	2	1	2	2	2	2	3	3	3	3	3	4	3	S	2	2	1	1	4	2	24	
2	1	2	1	2	2	2	3	3	2	3	1	1	1	1	1	1	2	1	1	S	1	1	1	1	1	1	3	1	24
3	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	S	6	6	4	4	4	1	6	2	24
4	3	2	2	2	2	2	2	2	1	2	1	1	1	2	1	1	1	S	1	0	0	0	0	0	0	0	3	1	24
5	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	S	2	1	0	0	1	0	0	0	2	0	24	
6	1	1	1	1	1	1	1	1	1	1	1	2	3	4	5	5	S	6	4	4	5	7	6	4	3	1	7	3	24
7	2	2	3	3	2	4	6	7	8	4	1	1	0	0	S	1	1	1	2	1	1	2	1	1	0	8	2	24	
8	1	1	1	1	0	1	2	5	4	2	1	0	1	S	1	1	8	9	10	7	5	4	4	2	0	10	3	24	
9	2	2	2	2	2	2	3	2	2	2	2	2	S	2	2	3	3	3	3	3	4	5	6	2	6	2	6	3	24
10	7	7	4	3	3	3	5	5	2	2	1	S	1	1	2	3	3	2	1	1	1	0	0	1	0	7	3	24	
11	1	1	1	1	1	1	1	1	1	1	S	2	2	2	2	3	4	4	4	3	2	2	2	2	1	4	2	24	
12	5	3	3	4	2	3	3	2	2	S	2	3	2	3	3	5	5	6	6	6	5	6	7	7	2	7	4	24	
13	6	6	5	8	10	11	11	8	S	13	5	4	4	4	5	8	14	13	8	16	17	10	8	6	4	17	9	24	
14	5	6	5	6	10	10	8	S	11	10	9	7	5	4	4	4	6	6	6	7	8	12	15	4	15	7	24		
15	15	11	8	5	3	2	S	2	1	1	2	2	2	1	1	2	2	2	1	2	1	1	1	0	0	15	3	24	
16	0	0	0	0	1	S	0	1	1	1	0	0	0	1	3	5	8	7	6	6	5	5	4	4	0	8	3	24	
17	3	4	4	4	S	16	9	8	6	5	5	4	5	6	10	8	10	12	10	10	10	10	6	6	3	16	7	24	
18	6	5	3	S	3	2	2	3	2	2	2	3	3	3	3	4	4	3	2	2	2	1	2	2	1	6	3	24	
19	1	1	S	1	1	1	2	2	2	2	C	C	C	C	C	C	10	9	11	10	14	11	9	7	1	14	6	24	
20	7	S	9	11	12	14	13	12	10	5	3	2	2	2	2	3	3	2	2	2	2	2	2	2	2	14	5	24	
21	S	3	3	2	3	3	3	2	3	2	2	2	2	3	4	5	5	4	4	4	4	4	5	S	2	5	3	24	
22	4	4	3	3	4	5	6	6	7	5	5	7	6	6	8	10	14	11	13	13	11	9	S	8	3	14	7	24	
23	8	8	10	9	11	14	13	11	8	7	5	3	3	3	3	3	2	1	1	2	S	2	1	1	14	6	24		
24	1	1	1	1	2	1	1	2	3	1	1	0	0	1	1	1	1	1	1	1	S	2	2	2	0	3	1	24	
25	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	4	3	3	3	S	3	3	3	3	2	4	2	24	
26	2	2	2	2	3	3	2	2	2	2	2	2	1	2	2	2	2	2	S	2	2	2	2	2	1	3	2	24	
27	2	2	2	2	3	4	4	4	4	3	2	3	3	3	4	5	4	S	3	3	3	3	3	2	2	5	3	24	
28	2	2	2	2	2	2	3	2	2	2	1	2	2	2	2	3	S	5	7	5	6	5	6	7	1	7	3	24	
29	7	7	6	6	6	9	7	11	9	5	5	4	5	5	7	S	11	11	10	10	9	9	10	9	4	11	8	24	
30	8	8	6	7	7	7	10	10	11	10	7	7	6	7	S	10	12	12	12	10	11	11	9	9	6	12	9	24	
HOURLY MAX	15	11	10	11	12	16	13	12	11	13	9	7	6	7	10	10	14	13	13	16	17	11	12	15					
HOURLY AVG	4	3	3	3	3	4	4	4	4	3	3	3	2	3	3	4	5	5	5	5	5	4	4	4					

STATUS FLAG CODES

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

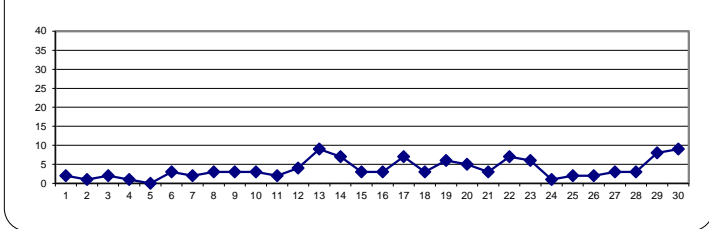
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	644			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	19	ON DAY
MAXIMUM 1-HR AVERAGE:	17 ppb	@ HOUR	20	ON DAY
MAXIMUM 24-HR AVERAGE:	9 ppb			ON DAY
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	720 hrs	
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	3	MONTHLY AVERAGE:	4 ppb	

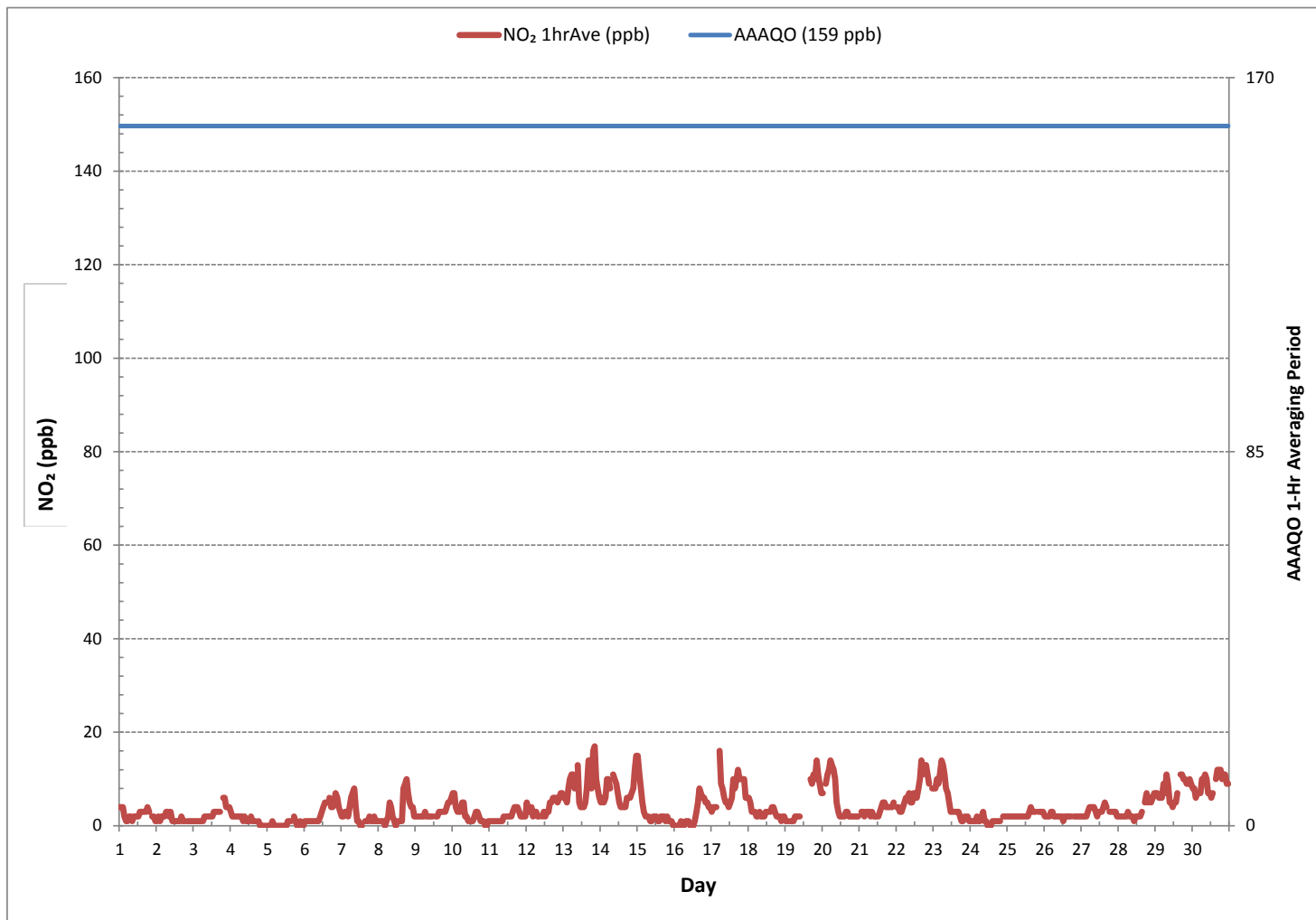
24 HR AVERAGES November 2018





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)



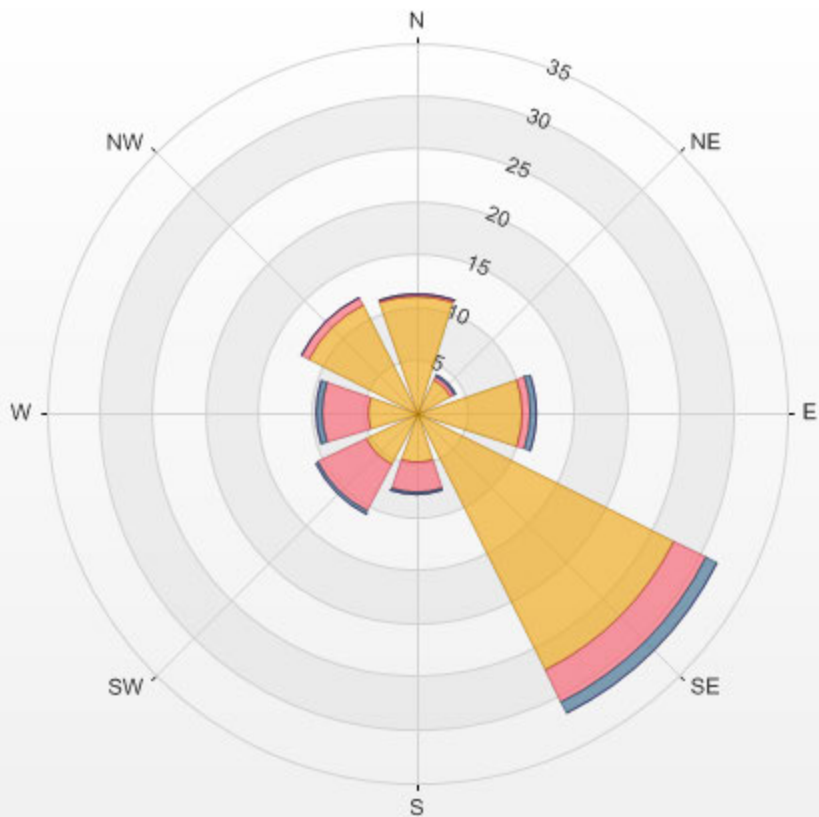
Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-NO2[ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 1.32% Calm Avg: 8.21 [ppb]

Direction	0.0-6.0	6.0-12.0	12.0-18.0	>18.0	Total
N	11.0	0.3	0.0	0.0	11.3
NE	3.5	0.4	0.2	0.0	4.1
E	10.0	0.9	0.4	0.0	11.3
SE	27.2	3.5	1.0	0.0	31.7
S	4.7	2.8	0.3	0.0	7.8
SW	5.4	5.0	0.3	0.0	10.7
W	4.7	4.3	0.6	0.0	9.6
NW	11.5	0.7	0.0	0.0	12.2
Summary	78.0	17.9	2.8	0.0	98.7

% Icon Classes (ppb) 78 0.0-6.0 18 6.0-12.0 3 12.0-18.0 0 >18.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO2[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 1.32% Calm Poll Avg: 8.21[ppb]



NO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 18/11 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	11.5	16.0	17.5	12.6	15.1	10.5	9.3	14.4	21.1	21.0	23.9	26.0	25.3	26.3	26.9	26.2	25.7	26.2	24.5	24.8	S	28.5	28.4	29.1	9.3	29.1	21.3	24
2	28.4	28.0	27.5	25.9	22.7	16.8	14.9	14.2	14.3	13.0	16.2	19.9	24.1	25.3	24.5	22.3	22.6	23.4	23.7	S	23.0	22.5	21.6	20.6	13.0	28.4	21.5	24
3	20.0	22.2	21.8	22.3	21.5	20.9	19.7	18.5	17.5	16.7	15.6	14.5	13.6	13.7	13.5	13.1	12.3	11.0	S	8.4	8.4	9.7	10.3	11.1	8.4	22.3	15.5	24
4	12.5	14.3	14.6	14.9	15.4	15.2	15.0	14.3	15.3	15.2	14.6	14.3	13.4	12.4	12.6	10.1	14.1	S	19.2	21.4	22.9	24.1	25.4	26.9	10.1	26.9	16.4	24
5	29.8	30.4	31.4	31.7	32.2	32.7	32.5	32.3	31.6	31.4	31.4	30.9	30.1	30.3	31.7	32.4	S	32.6	33.7	33.5	33.0	32.1	31.9	32.1	29.8	33.7	31.8	24
6	31.6	31.3	31.0	30.3	30.7	30.5	30.0	29.6	30.2	30.4	29.0	27.9	27.3	25.5	25.2	S	22.3	22.7	22.4	21.4	18.7	20.6	23.0	26.1	18.7	31.6	26.9	24
7	26.3	26.6	27.0	27.5	26.6	23.2	20.7	19.5	18.9	24.2	29.3	31.0	33.2	33.2	S	34.6	34.3	33.6	32.0	32.5	32.0	33.2	33.9	32.5	18.9	34.6	29.0	24
8	32.6	35.5	32.6	30.6	32.2	32.4	31.1	27.3	30.0	32.0	33.0	33.6	33.5	S	34.0	32.8	23.6	19.2	15.8	18.1	18.9	22.8	24.1	27.0	15.8	35.5	28.4	24
9	27.9	28.0	28.3	29.5	29.1	29.7	28.4	29.5	30.2	30.6	30.8	31.1	S	30.8	30.5	29.5	28.1	27.3	26.4	25.6	22.4	20.7	19.5	17.1	17.1	31.1	27.4	24
10	14.7	13.7	19.4	24.5	24.3	25.5	23.8	24.5	30.6	29.0	28.7	S	31.4	32.4	30.8	28.6	28.6	31.1	33.5	37.6	37.1	37.6	37.8	37.0	13.7	37.8	28.8	24
11	37.1	36.8	39.3	38.8	38.0	37.7	36.8	36.2	35.3	34.0	S	35.3	35.0	34.7	34.1	33.2	31.5	30.5	31.0	31.5	33.1	28.9	26.0	21.9	21.9	39.3	33.8	24
12	18.1	22.9	22.8	25.8	26.7	27.0	27.0	26.7	S	27.2	27.4	27.4	27.1	26.7	24.7	23.0	20.8	18.5	17.4	17.1	16.4	13.5	13.6	13.5	27.4	22.8	24	
13	12.3	9.3	7.6	4.1	2.7	1.1	3.8	7.3	S	9.3	15.1	16.4	16.8	17.1	16.5	14.1	7.5	7.6	15.2	5.4	3.4	8.3	10.4	12.6	1.1	17.1	9.7	24
14	11.9	10.8	9.0	6.8	3.0	2.3	3.7	S	6.9	14.8	19.3	27.0	32.7	36.3	35.8	35.2	34.4	25.9	19.8	14.2	14.7	11.6	6.6	1.0	1.0	36.3	16.7	24
15	0.6	0.7	1.8	8.2	13.8	17.4	S	21.1	21.1	22.0	23.7	25.8	26.4	26.3	25.5	24.6	24.5	25.5	26.2	26.8	27.8	28.7	30.0	31.5	0.6	31.5	20.9	24
16	32.1	32.3	32.5	32.9	33.0	S	32.1	32.4	32.5	33.3	33.6	34.9	34.9	34.7	31.4	27.9	25.0	24.0	24.5	22.5	25.3	25.0	25.3	24.5	22.5	34.9	29.9	24
17	24.4	21.8	18.2	17.0	S	6.2	9.6	9.8	11.2	15.8	19.2	20.0	20.5	20.1	18.8	18.5	15.7	12.5	12.7	13.1	12.3	11.7	15.7	16.9	6.2	24.4	15.7	24
18	16.5	17.9	20.2	S	22.0	23.2	24.3	23.4	22.3	21.4	21.1	21.1	21.6	22.2	22.8	22.1	22.0	22.8	23.6	24.1	24.3	25.3	24.9	24.3	16.5	25.3	22.3	24
19	25.0	24.9	S	24.5	23.9	23.2	22.1	22.5	21.5	21.3	20.7	20.0	19.3	18.5	16.5	14.9	12.4	10.4	5.5	4.5	0.9	0.8	0.6	0.7	0.6	25.0	15.4	24
20	0.5	S	3.0	4.7	1.9	0.8	0.4	1.6	7.6	8.5	9.2	11.4	13.5	14.6	15.2	15.9	16.9	17.3	17.7	18.0	17.7	17.2	15.8	15.6	0.4	18.0	10.7	24
21	S	17.1	18.1	17.9	17.2	16.8	16.7	16.9	17.1	C	C	C	C	C	C	14.8	14.8	15.3	15.1	14.4	13.8	14.6	14.1	S	13.8	18.1	15.9	24
22	13.4	13.3	14.4	13.9	13.3	11.5	9.7	9.1	7.9	8.7	9.6	9.5	10.1	10.8	10.2	8.7	3.6	6.9	3.1	2.7	1.0	3.4	S	9.2	1.0	14.4	8.9	24
23	10.6	8.5	3.3	0.7	2.1	7.0	9.9	12.0	12.9	9.9	13.7	18.9	18.9	20.0	21.2	21.8	21.8	24.2	25.5	25.2	24.8	S	26.3	25.9	0.7	26.3	15.9	24
24	25.7	25.0	25.2	26.1	24.8	25.8	25.7	25.1	26.8	28.5	28.8	31.1	33.1	32.8	30.7	29.2	28.3	27.4	26.6	25.3	S	24.9	24.6	24.3	24.3	33.1	27.2	24
25	23.5	23.6	23.6	23.8	23.7	23.2	22.8	22.8	22.7	22.6	22.4	21.9	21.5	21.1	21.2	20.6	20.9	20.6	20.4	S	20.0	19.4	19.0	19.7	19.0	23.8	21.8	24
26	20.6	21.5	21.6	20.1	19.6	21.3	22.7	24.1	24.5	25.0	25.2	26.2	26.4	25.6	25.8	25.8	25.0	24.2	S	24.4	24.6	24.6	24.6	24.5	19.6	26.4	23.8	24
27	24.6	24.1	23.8	23.9	23.2	22.3	20.8	21.1	21.5	22.3	22.8	22.4	22.3	23.0	22.5	22.2	23.8	S	25.1	25.4	26.3	26.0	25.8	26.4	20.8	26.4	23.5	24
28	27.6	28.0	28.2	28.2	27.8	28.0	26.9	27.8	27.5	27.5	26.9	26.4	25.9	25.0	24.2	23.2	S	21.4	19.8	20.4	17.6	14.1	12.2	11.5	11.5	28.2	23.7	24
29	10.7	10.7	10.7	11.1	9.3	4.9	4.8	3.9	4.0	8.1	9.2	10.2	9.6	9.4	9.0	S	6.7	2.9	3.0	1.9	1.9	1.9	1.0	0.5	0.5	11.1	6.3	24
30	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.5	0.8	3.8	8.1	9.9	11.8	11.7	S	11.3	9.8	7.4	4.9	3.9	2.9	2.2	5.2	5.6	0.4	11.8	4.5	24
HOURLY MAX	37.1	36.8	39.3	38.8	38.0	37.7	36.8	36.2	35.3	34.0	33.6	35.3	35.0	36.3	35.8	35.2	34.4	33.6	33.7	37.6	37.1	37.6	37.8	37.0				
HOURLY AVG	19.7	20.5	19.8	20.0	19.9	18.5	18.8	19.6	20.4	20.7	21.7	23.0	23.6	23.6	23.6	22.8	20.7	20.5	20.3	19.4	18.8	19.2	19.9	19.6				

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

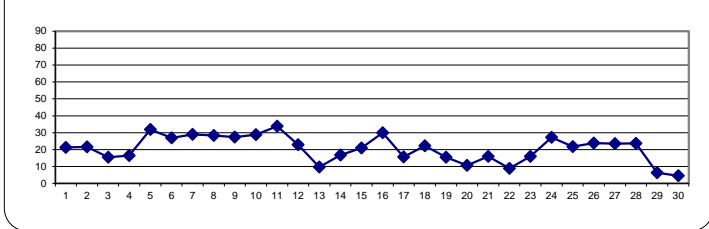
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 82 ppb

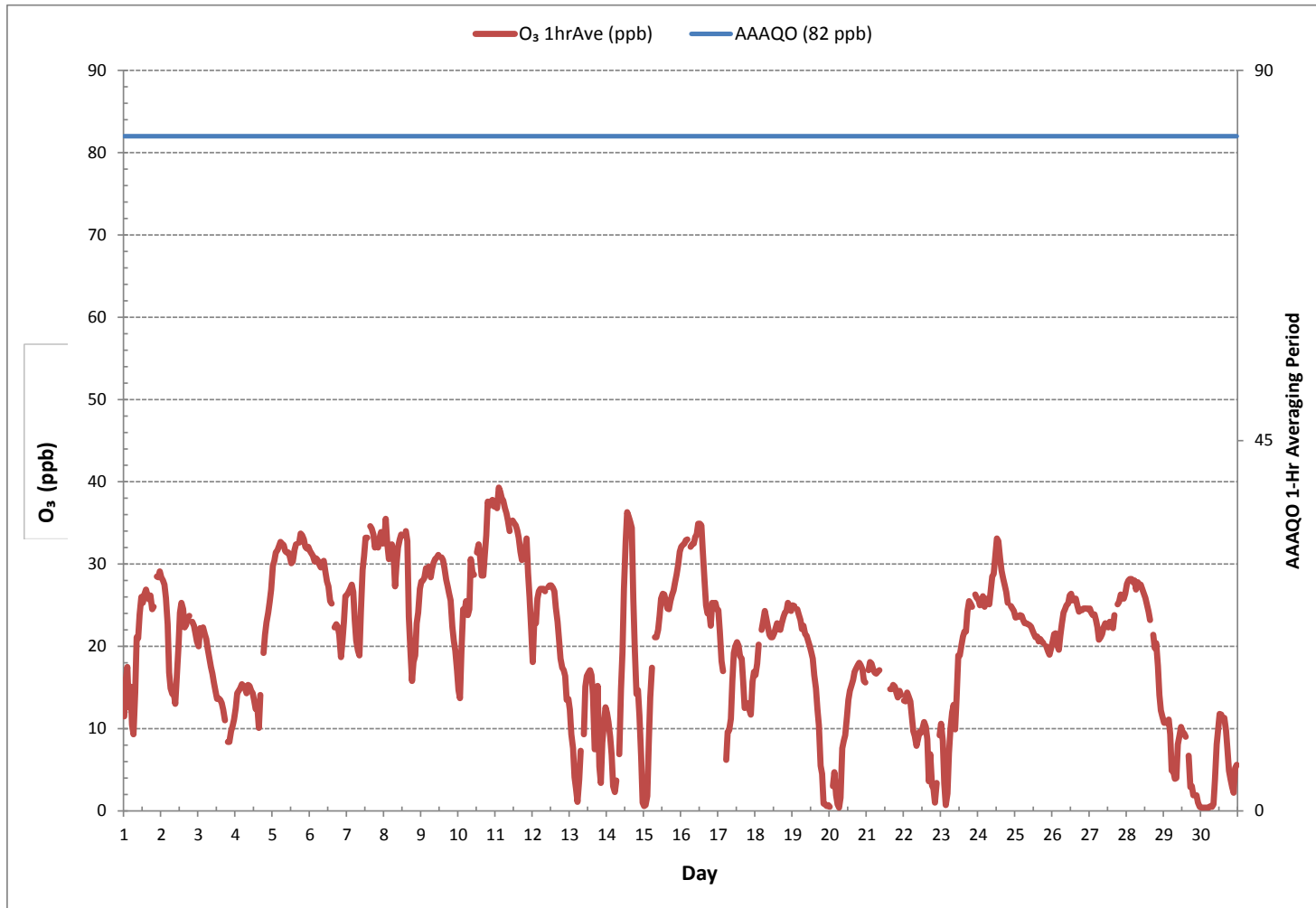
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	683				
MINIMUM 1-HR AVERAGE:	0.4	ppb	@ HOUR	6	ON DAY 20
MAXIMUM 1-HR AVERAGE:	39.3	ppb	@ HOUR	2	ON DAY 11
MAXIMUM 24-HR AVERAGE:	33.8	ppb			ON DAY 11
IZS CALIBRATION TIME:	31	hrs	OPERATIONAL TIME:	720	hrs
MONTHLY CALIBRATION TIME:	6	hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	9.3		MONTHLY AVERAGE:	20.6	ppb

24 HR AVERAGES November 2018



OZONE Hourly Averages (O₃ ppb)



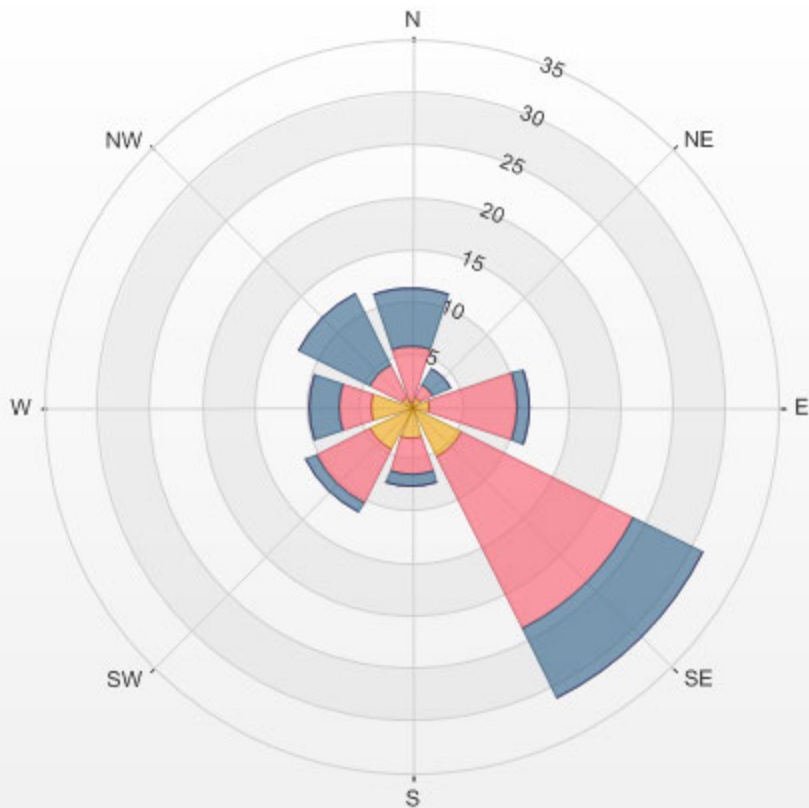
Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-O3[ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 1.32% Calm Avg: 4.04 [ppb]

Direction	0.0-13.1	13.1-26.3	26.3-39.4	>39.4	Total
N	0.4	5.3	5.6	0.0	11.3
NE	1.0	1.3	1.8	0.0	4.1
E	1.8	8.4	1.0	0.0	11.2
SE	5.3	18.4	7.5	0.0	31.1
S	3.1	3.4	1.2	0.0	7.6
SW	4.6	5.7	1.0	0.0	11.3
W	4.0	3.1	2.8	0.0	9.8
NW	1.0	3.4	7.8	0.0	12.2
Summary	21.1	48.9	28.6	0.0	98.7

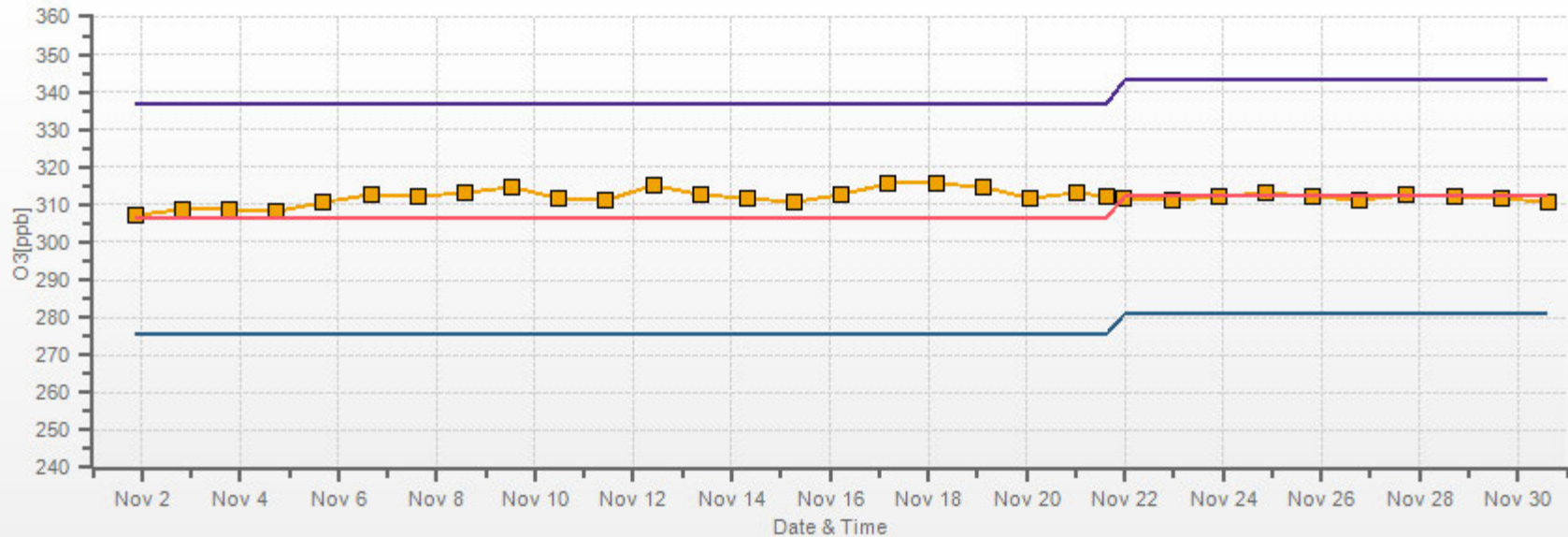
% Icon Classes (ppb) 21 0.0-13.1 49 13.1-26.3 29 26.3-39.4 0 >39.4

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-O3[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 1.32% Calm Poll Avg: 4.04[ppb]



O3[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 18/11 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	4	4	3	3	4	1	0	0	1	1	3	5	6	5	4	3	3	4	4	4	5	4	3	1	0	6	3	24	
2	2	2	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0	1	0	0	0	0	0	2	1	24	
3	1	1	2	2	2	2	3	4	5	6	6	7	8	7	7	6	5	6	8	8	8	8	7	8	1	8	5	24	
4	9	12	12	12	10	9	6	5	3	3	3	3	3	2	1	0	0	1	0	0	0	0	0	0	0	12	4	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	24	
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	1	0	1	0	24	
7	2	2	1	2	2	2	2	3	3	3	2	2	1	1	1	1	3	4	3	2	2	2	2	2	1	4	2	24	
8	2	1	2	2	2	2	2	3	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	3	1	24	
9	1	1	1	2	2	3	3	5	6	6	6	6	6	6	5	6	6	7	8	8	8	9	10	1	1	10	5	24	
10	12	12	10	9	9	8	8	8	6	6	7	9	8	9	11	11	11	8	5	3	2	3	3	2	2	12	8	24	
11	3	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0	3	1	24	
12	1	1	1	1	1	1	2	2	3	4	5	5	5	6	7	8	9	9	9	8	8	9	10	8	1	10	5	24	
13	8	8	8	9	9	9	12	12	12	13	11	9	9	8	8	8	9	11	13	15	14	12	12	14	8	15	10	24	
14	14	15	13	13	13	12	9	6	6	5	4	3	4	3	3	2	3	3	4	4	5	6	8	13	2	15	7	24	
15	12	11	9	13	20	22	15	11	7	5	3	C	2	2	2	3	2	3	2	2	2	2	1	1	1	22	7	24	
16	2	2	2	3	2	2	2	2	2	2	2	1	1	2	3	4	6	6	4	4	4	4	5	6	1	6	3	24	
17	11	14	13	11	10	15	9	8	9	11	13	15	15	15	15	21	20	19	19	21	17	15	14	13	8	21	14	24	
18	12	10	8	9	9	8	7	7	6	7	6	7	7	7	6	7	7	6	5	5	4	5	5	4	5	4	12	7	24
19	6	6	7	7	9	8	9	14	15	23	30	29	29	28	26	23	22	20	18	17	20	16	14	13	6	30	17	24	
20	17	25	19	15	16	18	21	17	11	13	18	14	10	8	8	9	11	12	11	10	10	11	14	16	8	25	14	24	
21	15	11	9	10	10	11	11	11	10	9	9	8	8	8	9	9	8	8	9	10	10	10	10	7	7	7	15	10	24
22	8	9	8	9	10	10	12	12	10	11	10	10	11	12	12	11	11	10	10	10	10	10	10	8	8	8	12	10	24
23	7	9	11	10	9	6	5	5	7	7	4	4	4	3	3	2	1	1	1	1	1	1	1	1	1	11	4	24	
24	1	2	2	1	2	1	1	1	0	0	0	0	0	0	0	0	2	1	2	3	3	1	1	2	0	0	3	1	24
25	2	2	3	3	3	4	4	4	5	6	9	9	9	10	12	13	13	16	18	19	20	19	17	12	2	20	10	10	24
26	12	12	11	9	11	10	8	6	6	6	6	5	4	5	4	4	5	4	3	2	2	2	3	3	2	12	6	24	
27	4	5	5	5	6	7	13	11	9	8	8	8	8	8	8	8	7	6	6	7	7	8	8	7	4	13	7	24	
28	7	7	6	6	5	4	4	4	4	5	6	6	7	8	9	10	11	11	9	9	15	22	21	19	4	22	9	24	
29	17	17	18	15	14	14	14	15	13	12	12	12	11	11	10	11	14	15	14	14	13	12	12	10	18	18	14	24	
30	12	12	11	11	12	12	13	13	14	14	13	12	10	11	11	17	27	26	18	16	14	16	11	10	10	27	14	24	
HOURLY MAX	17	25	19	15	20	22	21	17	15	23	30	29	29	28	26	23	27	26	19	21	20	22	21	19					
HOURLY AVG	7	7	7	6	7	7	7	6	6	6	7	7	6	6	6	7	7	7	7	7	7	7	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

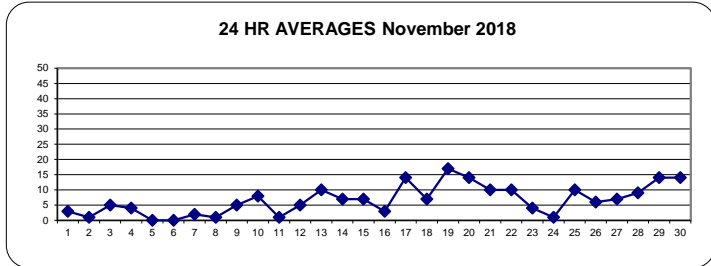
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	80	µg/m ³	24-HR	29	µg/m ³
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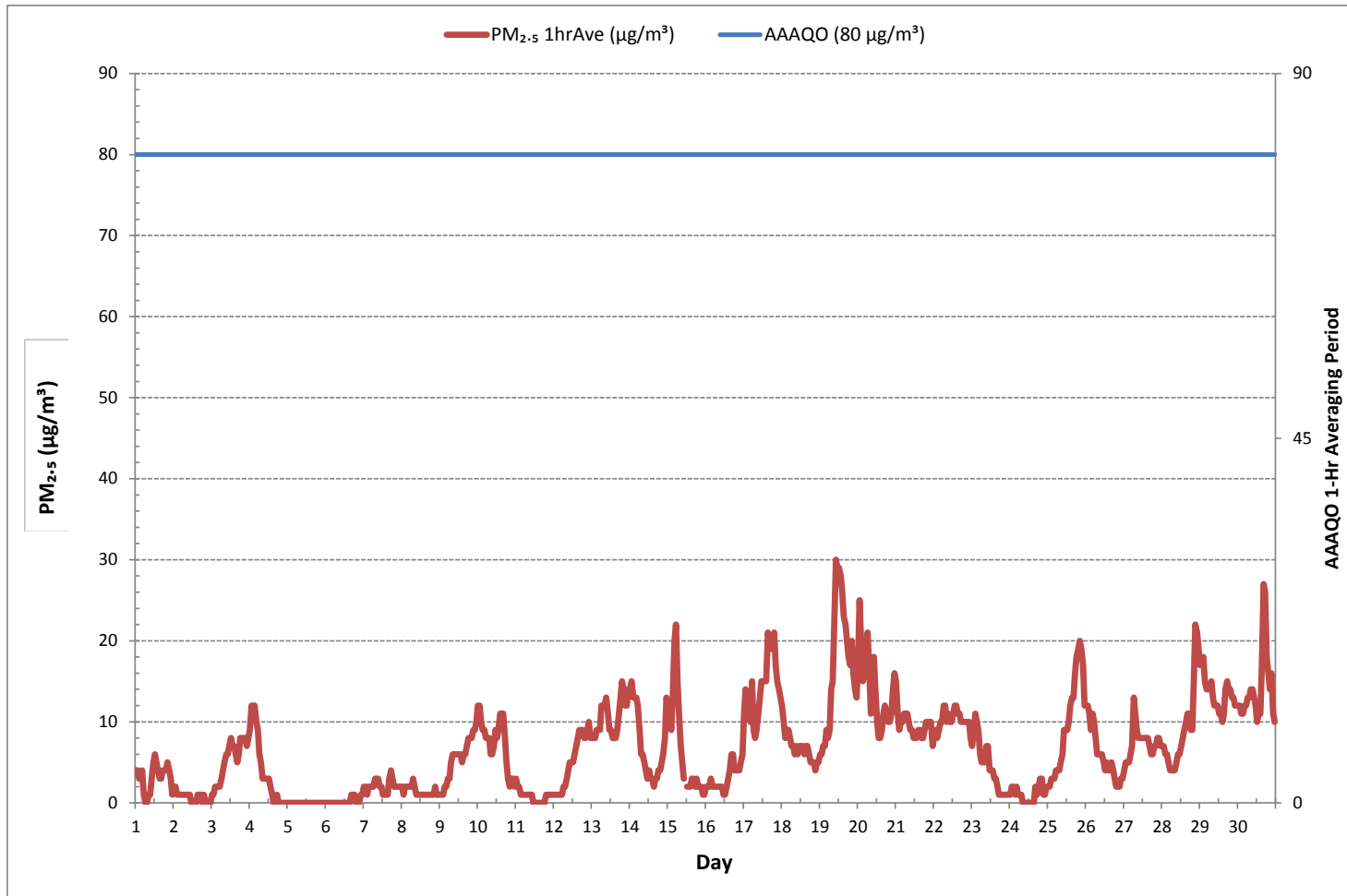
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	641				
MINIMUM 1-HR AVERAGE:	0 µg/m ³ @ HOUR	6	ON DAY	1	
MAXIMUM 1-HR AVERAGE:	30 µg/m ³ @ HOUR	10	ON DAY	19	
MAXIMUM 24-HR AVERAGE:	17 µg/m ³		ON DAY	19	
MONTHLY CALIBRATION TIME:	1	hrs	OPERATIONAL TIME:	720	hrs
STANDARD DEVIATION:	6		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	7	µg/m ³

24 HR AVERAGES November 2018



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



Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-PM2.5[ug/m3]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

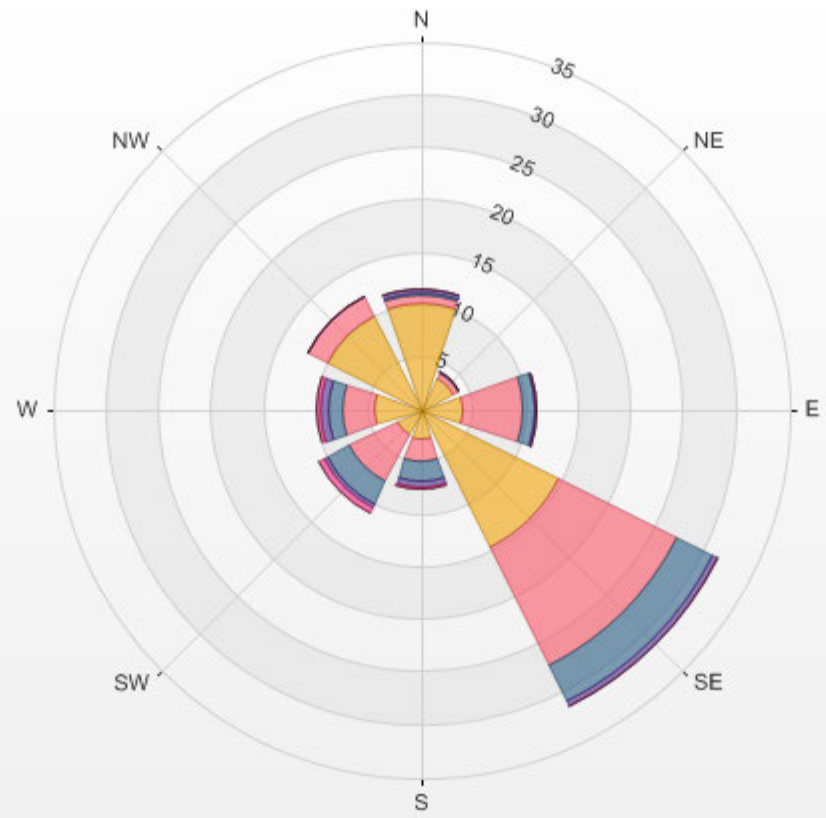
Calm: 1.26%

Calm Avg: 10.88 [ug/m3]

Direction	0.0-6.2	6.2-12.4	12.4-18.6	18.6-24.8	24.8-31.0	>31.0	Total
N	10.2	0.7	0.3	0.3	0.0	0.0	11.4
NE	3.4	0.6	0.1	0.0	0.0	0.0	4.1
E	3.9	5.9	1.1	0.1	0.0	0.0	11.0
SE	14.6	12.6	3.8	0.7	0.0	0.0	31.7
S	2.8	2.2	1.8	0.6	0.3	0.0	7.7
SW	2.7	5.0	2.4	0.4	0.6	0.0	11.0
W	4.5	3.1	1.4	0.7	0.3	0.0	9.9
NW	9.9	2.1	0.0	0.0	0.0	0.0	12.0
Summary	51.9	32.1	10.9	2.8	1.1	0.0	98.8

% Icon Classes (ug/m3(L)) 52 0.0-6.2 32 6.2-12.4 11 12.4-18.6 3 18.6-24.8 1 24.8-31.0 0 >31.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-PM2.5_2[ug/m3(L)] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 1.26% Calm Poll Avg: 10.88[ug/m3(L)]



WIND SPEED



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

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 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	2.2	3.9	8.2	8.6	12.0	9.6	10.5	9.7	12.5	8.7	11.6	10.7	8.7	7.8	7.2	6.2	3.5	3.0	2.5	3.3	3.4	5.7	5.6	6.1	2.2	12.5	5.5	24
2	4.9	4.8	5.7	5.6	7.5	6.7	8.0	7.7	8.3	7.6	8.1	8.1	8.8	7.5	6.6	7.0	5.9	5.6	5.3	5.2	5.0	6.0	5.8	6.1	4.8	8.8	6.4	24
3	4.4	3.2	3.4	5.7	4.3	4.7	5.2	4.3	5.3	5.1	5.1	4.6	4.5	5.4	5.4	3.3	1.8	2.0	1.7	2.0	3.2	4.9	4.5	4.0	1.7	5.7	3.4	24
4	6.5	9.6	6.7	7.3	9.3	9.8	9.4	10.2	8.7	8.6	7.8	9.6	10.8	8.6	9.3	8.8	15.9	15.4	17.4	16.1	17.2	17.3	15.4	15.4	6.5	17.4	8.3	24
5	X	X	29.5	19.2	14.7	18.2	15.8	15.4	15.5	14.3	13.1	12.6	12.9	12.3	12.1	13.1	10.2	8.2	12.3	11.4	10.7	10.3	10.6	11.7	8.2	29.5	12.7	22
6	10.7	10.8	10.4	10.1	11.8	7.5	6.0	6.7	7.8	7.6	5.2	5.2	5.6	5.7	6.0	5.5	5.6	5.2	5.0	4.2	4.1	3.5	4.9	7.0	3.5	11.8	6.3	24
7	5.4	4.2	3.1	4.0	4.1	4.9	5.3	4.7	3.3	4.5	5.7	6.2	8.2	6.6	7.5	9.0	8.7	10.8	8.5	5.6	4.6	5.2	3.9	4.4	3.1	10.8	4.9	24
8	4.4	8.8	6.6	5.9	9.0	4.5	5.7	4.1	6.8	6.1	7.5	8.5	5.3	1.0	1.8	3.8	1.6	1.4	1.8	2.6	2.4	2.8	4.0	5.6	1.0	9.0	1.6	24
9	7.4	5.9	5.2	6.3	6.3	5.5	5.4	5.2	4.4	6.2	7.9	6.0	4.6	3.9	3.4	2.9	2.4	1.8	1.4	1.1	3.2	4.0	5.3	5.0	1.1	7.9	3.1	24
10	5.2	5.9	10.1	16.7	14.3	12.1	10.8	10.4	12.5	7.3	10.0	9.7	8.3	9.3	5.5	4.8	5.1	6.2	11.5	17.3	16.7	16.6	12.8	10.1	4.8	17.3	9.8	24
11	10.3	9.6	13.4	12.9	12.6	12.1	11.7	9.1	10.7	13.1	10.5	12.8	12.0	11.1	9.9	7.2	6.2	4.1	3.8	4.1	4.2	1.9	1.7	1.4	1.4	13.4	7.7	24
12	1.1	0.8	1.4	1.7	3.3	5.0	3.6	5.0	4.0	6.4	4.5	3.4	1.9	3.8	4.3	3.4	2.6	2.5	1.3	1.4	1.5	1.0	0.3	1.0	0.3	6.4	1.8	24
13	0.5	0.6	0.2	0.2	0.5	1.3	3.2	2.1	3.2	2.4	3.8	5.1	5.1	5.7	5.8	3.6	0.6	2.9	3.7	1.2	2.1	0.5	0.7	0.7	0.2	5.8	2.2	24
14	0.8	0.6	1.1	0.7	0.2	1.0	2.8	4.3	3.0	4.5	4.0	5.0	7.9	7.9	7.1	8.3	7.0	1.6	2.6	2.4	1.1	2.5	0.2	0.4	0.2	8.3	3.1	24
15	1.0	2.2	0.9	1.8	3.9	5.8	5.1	7.5	7.9	7.1	7.7	7.6	6.7	8.8	8.9	8.7	8.1	9.9	10.7	9.8	11.8	13.1	14.3	13.5	0.9	14.3	6.7	24
16	12.4	11.5	12.2	11.7	9.4	9.7	12.7	13.3	11.6	12.2	10.3	10.1	2.5	5.3	8.6	6.9	5.6	5.0	3.9	3.0	6.5	6.2	7.3	7.5	2.5	13.3	4.5	24
17	5.6	3.7	4.9	1.5	0.7	2.1	1.0	1.1	1.8	3.8	6.8	7.8	5.6	6.8	7.9	4.2	4.0	3.0	1.0	1.5	3.0	3.5	4.2	6.3	0.7	7.9	2.9	24
18	8.0	7.9	7.5	9.1	9.0	11.5	10.1	7.0	6.8	7.7	9.6	7.6	8.2	8.1	7.3	5.6	6.2	5.2	6.4	6.2	5.6	5.9	4.5	3.8	3.8	11.5	7.0	24
19	8.5	6.6	6.9	6.5	8.1	7.1	4.9	4.1	3.4	5.1	4.4	3.8	3.0	4.9	7.0	4.8	4.2	2.8	2.1	1.6	0.9	0.9	0.3	0.5	0.3	8.5	2.8	24
20	0.8	1.1	2.3	1.8	1.6	0.6	0.9	2.6	4.1	5.4	7.4	7.1	8.6	7.9	7.3	9.5	7.1	6.4	6.1	3.4	4.9	4.1	2.5	7.5	0.6	9.5	3.5	24
21	11.0	11.6	7.7	5.8	5.5	6.2	6.1	6.5	6.4	6.5	5.5	6.2	5.8	3.8	4.3	5.9	6.6	8.9	7.6	5.8	4.5	4.8	3.4	4.1	3.4	11.6	4.9	24
22	2.3	2.6	2.4	4.9	2.7	4.9	5.2	5.9	6.2	4.2	4.3	6.4	5.7	6.8	9.1	5.2	6.2	11.8	5.7	1.2	1.8	3.4	3.9	3.5	1.2	11.8	4.4	24
23	2.9	2.4	1.3	0.6	3.1	3.9	4.4	3.5	4.3	4.5	9.1	8.5	6.5	8.7	6.4	6.0	7.6	8.3	7.7	6.5	6.7	8.1	6.2	8.5	0.6	9.1	4.6	24
24	6.9	6.5	8.3	7.8	7.1	5.2	4.2	2.3	4.0	4.6	5.1	5.9	3.9	4.9	6.2	3.9	4.4	5.2	6.8	5.6	6.3	8.0	7.4	9.5	2.3	9.5	2.2	24
25	8.9	8.2	6.8	8.0	6.8	5.8	5.9	6.6	7.3	7.0	7.1	6.7	6.4	6.2	6.1	6.0	8.4	9.2	7.3	7.3	8.1	7.5	8.0	8.3	5.8	9.2	7.2	24
26	8.3	9.8	9.7	5.2	4.8	8.0	7.9	10.3	8.9	10.5	10.0	10.8	12.1	10.8	11.2	12.3	13.9	9.8	10.3	11.0	11.8	9.7	10.9	8.7	4.8	13.9	9.8	24
27	8.9	6.7	8.3	7.6	8.8	8.0	9.1	9.4	8.5	8.1	8.6	7.4	7.7	8.0	6.8	6.9	7.7	7.9	8.6	8.2	7.5	7.2	7.3	5.8	5.8	9.4	7.8	24
28	5.9	6.7	8.1	6.3	4.5	6.2	4.5	6.6	7.7	7.8	7.3	7.2	6.9	8.0	7.0	5.3	4.7	2.9	2.9	2.8	1.2	1.5	2.3	2.4	1.2	8.1	5.2	24
29	3.7	2.5	3.9	3.4	2.0	1.2	3.1	3.5	3.6	4.5	3.3	5.2	4.5	3.4	3.5	1.6	0.5	1.0	1.0	0.8	0.6	0.4	0.4	0.6	0.4	5.2	2.2	24
30	0.8	1.0	0.7	0.3	0.3	0.6	1.3	0.2	0.6	1.2	2.2	2.9	2.5	1.9	2.6	1.9	1.5	0.5	0.8	0.7	0.6	1.2	2.6	2.6	0.2	2.9	0.5	24
HOURLY MAX	12.4	11.6	29.5	19.2	14.7	18.2	15.8	15.4	15.5	14.3	13.1	12.8	12.9	12.3	12.1	13.1	15.9	15.4	17.4	17.3	17.2	17.3	15.4	15.4				

STATUS FLAG CODES

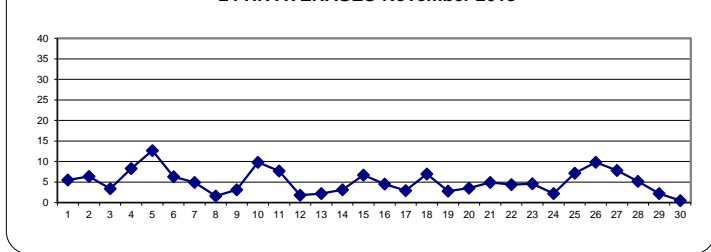
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

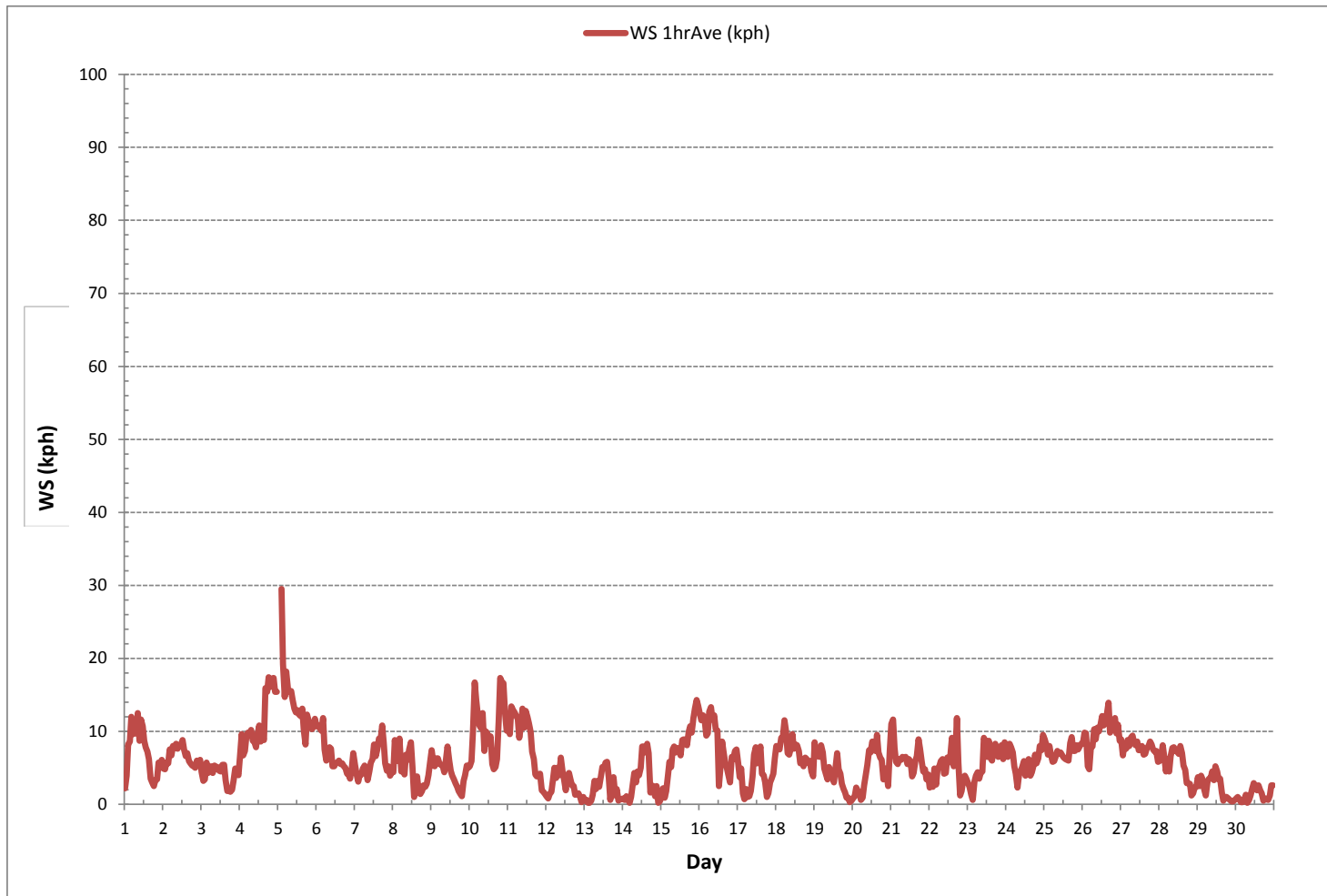
LAST CALIBRATION:	November 9, 2017
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	718
MINIMUM 1-HR AVERAGE:	0.2 kph @ HOUR 2 ON DAY 13
MAXIMUM 1-HR AVERAGE:	29.5 kph @ HOUR 2 ON DAY 5
MAXIMUM 24-HR AVERAGE:	12.7 kph ON DAY 5
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	718 hrs
AMD OPERATION UPTIME:	99.7 %
STANDARD DEVIATION:	3.7
MONTHLY AVERAGE:	0.9 kph

24 HR AVERAGES November 2018





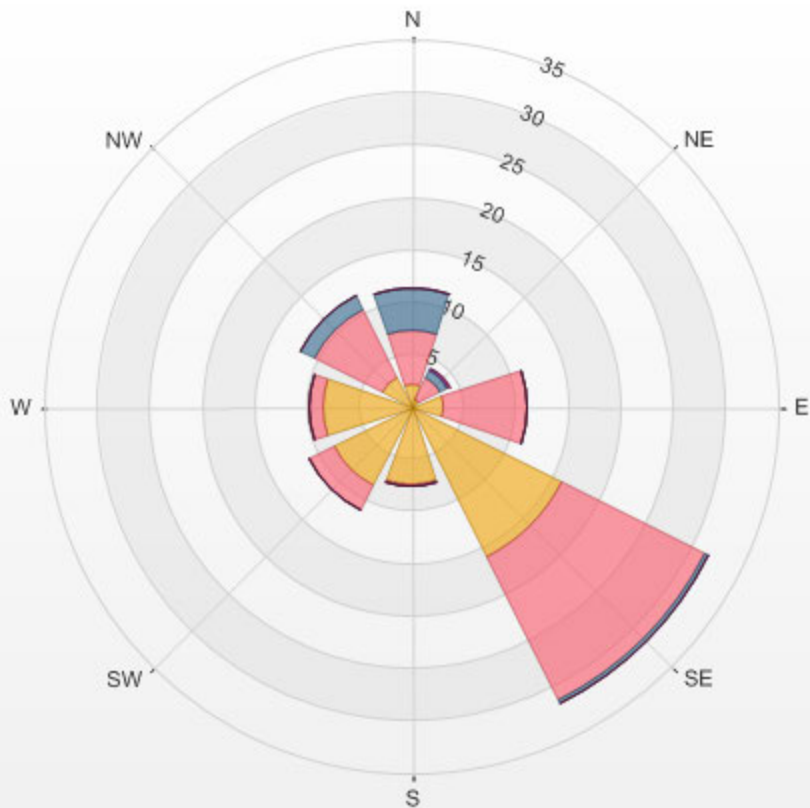
Wind: LICA COLD LAKE SOUTH
 Monitor: WSP [kph]
 Monthly: 18/11
 Type: WindRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 1.25%

Direction	0.4-5.9	5.9-11.8	11.8-17.8	17.8-23.7	23.7-29.6	>29.6	Total
N	2.2	5.2	3.9	0.1	0.0	0.0	11.4
NE	0.8	2.2	0.8	0.1	0.1	0.0	4.2
E	3.1	7.9	0.0	0.0	0.0	0.0	11.0
SE	16.0	15.2	0.4	0.0	0.0	0.0	31.6
S	7.5	0.1	0.0	0.0	0.0	0.0	7.7
SW	8.4	2.7	0.0	0.0	0.0	0.0	11.0
W	8.5	1.4	0.0	0.0	0.0	0.0	9.9
NW	3.1	7.2	1.7	0.0	0.0	0.0	12.0
Summary	49.6	41.9	6.8	0.3	0.1	0.0	98.8

% Icon Classes (kph)	50	0.4-5.9	42	5.9-11.8	7	11.8-17.8	0	17.8-23.7	0	23.7-29.6	0	>29.6
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LICA COLD LAKE SOUTH 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 1.25% Calm Wind Avg Speed: 0.24(kph)



WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

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	NW	WNW	NW	NNW	NNW	NW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNE	N	N	N	ENE	E	ESE	SE	NNW	24		
2	SE	ESE	ESE	E	E	ESE	E	E	E	E	ESE	ESE	ESE	SE	ESE	E	E	ESE	SE	SE	SE	SE	SE	SE	ESE	24	
3	SSE	S	SSW	SSW	S	SSW	SSW	S	S	SSW	SSW	S	SSW	SW	SW	SSW	SW	SSE	SSE	ESE	SE	SE	ESE	ESE	S	24	
4	SE	SE	ESE	ESE	E	E	E	E	E	E	ENE	ENE	ENE	ENE	NE	NNE	NNE	N	N	N	N	N	N	N	NE	24	
5	X	X	NE	NNE	N	NNW	NNW	N	N	NNW	NNW	NNW	NNW	NNW	N	NNW	NNW	NNW	N	N	NNW	NNW	NNW	NNW	N	22	
6	NNW	NNW	NNW	NNW	NW	N	NNW	NW	NW	NW	WNW	WNW	W	WNW	WNW	NW	WNW	NW	WNW	WNW	W	W	WNW	NW	NW	24	
7	WNW	WNW	WNW	W	WSW	W	WSW	WSW	W	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	NW	NNW	NNW	N	NNE	NNE	WNW	24
8	NNW	NW	NNW	N	NNW	N	SE	E	ESE	ESE	ESE	SE	SE	SW	SSE	SE	SSE	SSE	SSE	SE	SSE	SE	SE	SE	ESE	24	
9	SE	SE	SE	SE	SE	SE	SE	SSE	S	SSE	SE	SSE	SSE	S	S	SSE	S	SSW	SW	NW	WNW	W	WNW	W	SSE	24	
10	W	WNW	NNW	NNW	NNW	NW	NW	NNW	NW	NW	NW	WNW	WNW	W	WNW	WSW	WSW	WNW	NW	NNW	NW	NNW	NNW	NNW	NNW	NW	24
11	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NW	NNW	N	NNW	NW	NW	NW	WNW	WNW	WNW	W	W	WSW	SSW	S	SW	NW	24	
12	ESE	SE	SE	ESE	SE	SE	SE	SE	SE	SE	SE	SE	SSW	W	WSW	SW	SW	S	SSW	S	SSE	E	SSE	ESE	SSE	24	
13	NE	S	WNW	ENE	E	ESE	SE	SSE	ESE	ESE	SSE	SE	SE	SE	E	E	SE	SE	E	ESE	S	SSW	SSW	SE	SE	24	
14	SSW	SE	S	WSW	NNE	WSW	WSW	WSW	WSW	WSW	W	WSW	W	WSW	WSW	W	WNW	SW	WSW	W	W	NE	SSW	WSW	WSW	24	
15	SE	W	WSW	WNW	N	N	N	N	NNE	NNE	NE	NE	NE	NE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	NE	NE	NE	24	
16	NE	NE	NNE	NNE	NNE	N	NNW	NNW	NNW	NNW	NNW	NNW	NNW	SW	SW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	SW	SW	NNW	24	
17	WSW	WSW	WSW	SSE	ENE	SE	SSE	SW	SW	WSW	SW	SW	WSW	SW	SW	WSW	WSW	S	SSE	SSW	SE	SE	SE	SW	24		
18	SE	SE	SE	SE	SE	SE	SE	ESE	ESE	E	E	E	E	E	E	E	E	ESE	ESE	SE	SE	SE	ESE	SE	ESE	24	
19	SE	SE	SE	SE	SE	SE	SE	SSE	S	SW	SSW	SSW	SSW	SW	WSW	W	W	WSW	WSW	SW	ESE	ESE	S	WSW	S	24	
20	W	W	WSW	W	WSW	ENE	SE	ESE	E	ESE	E	E	ESE	ESE	ESE	ESE	ESE	ESE	SE	ESE	SE	S	SW	ESE	24		
21	WSW	SW	SSW	S	SSE	SSE	SSE	SSE	SE	SE	SE	SE	SSE	SE	ESE	SE	SE	SE	SE	SE	ESE	SE	ESE	SE	SSE	24	
22	ESE	SE	S	SW	WSW	WSW	SW	SW	SW	WSW	SW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	SSW	WSW	WSW	WSW	WSW	WSW	WSW	24	
23	WSW	W	W	N	WSW	W	W	WNW	WNW	NNW	NNE	NNE	N	NNW	N	N	N	NNW	NNW	NNW	N	NE	NNE	NNW	NNW	24	
24	NNW	NNW	NNW	NNW	NNW	N	NNW	NNE	SE	SE	SE	SE	SSE	SSE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	ESE	24	
25	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	24
26	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	ESE	SE	ESE	24	
27	SE	ESE	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	ESE	E	E	ESE	24	
28	ESE	SE	SE	SE	ESE	SE	ESE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	ESE	ESE	SE	SSW	SSE	SSE	SE	24	
29	SSE	S	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SSE	S	SSE	SW	SSW	WSW	NNW	W	SW	SE	24	
30	S	SE	W	E	WNW	SW	ESE	SSW	ESE	S	S	SSE	SW	NW	W	SSW	SSE	SSW	S	WSW	S	ENE	ENE	ENE	S	24	

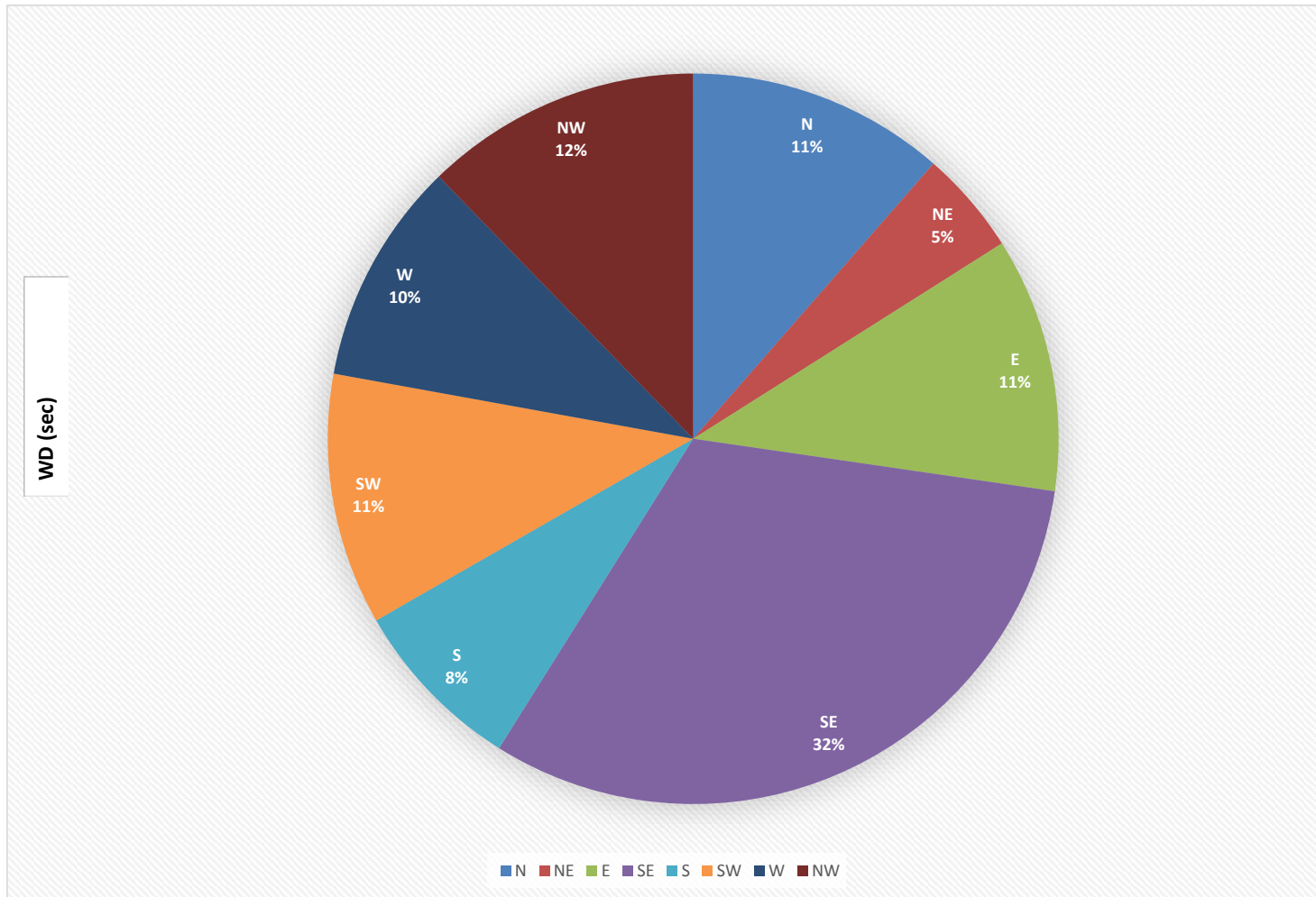
STATUS FLAG CODES

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

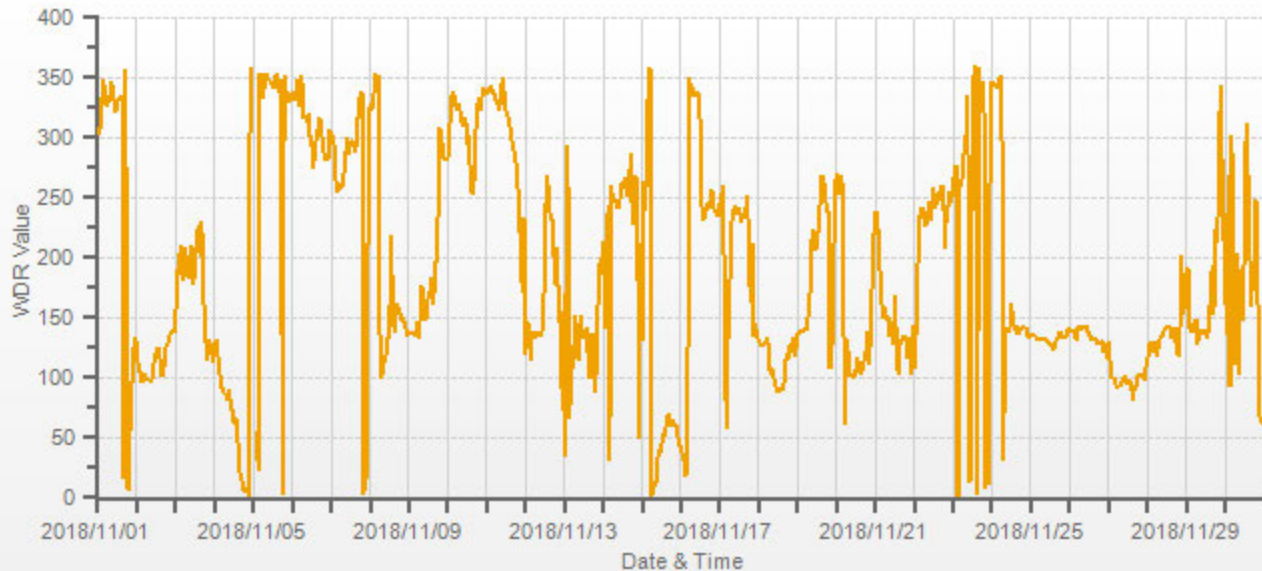
LAST CALIBRATION:	November 9, 2017
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	718	hrs
STANDARD DEVIATION:	94		AMD OPERATION UPTIME:	99.7	%
			MONTHLY AVERAGE:	73 (ENE)	

WIND DIRECTION Hourly Averages (WD)



— WDR[degwdr]



STANDARD DEVIATION WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

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	7	9	12	6	7	8	9	9	15	8	9	12	14	16	22	17	29	29	22	21	24	13	8	24	
2	13	10	11	11	8	8	7	7	6	7	12	11	12	13	12	7	10	11	9	9	7	6	5	5	24	
3	19	21	31	16	20	21	14	20	20	24	18	24	22	14	11	27	19	23	41	30	12	7	14	16	24	
4	6	6	12	11	6	6	6	7	10	9	14	9	7	7	10	28	6	9	5	5	6	7	7	9	24	
5	X	X	10	17	21	11	10	8	8	11	9	13	14	14	11	6	8	14	9	7	8	8	6	6	22	
6	12	12	9	16	11	11	13	9	11	10	30	29	23	20	19	14	10	11	8	8	7	9	13	7	24	
7	10	16	19	10	11	8	7	7	15	15	16	17	21	17	14	14	18	7	9	7	17	18	28	13	24	
8	27	11	15	26	7	49	12	19	12	12	14	10	25	67	57	14	31	26	26	19	19	13	12	5	24	
9	4	5	5	4	7	9	11	13	20	14	11	12	21	30	26	23	19	26	24	16	7	12	7	7	24	
10	6	8	12	8	8	8	7	10	6	11	9	10	16	11	18	8	6	14	14	10	8	8	9	11	24	
11	6	13	8	9	8	9	7	9	8	12	12	11	9	10	13	15	12	17	18	18	25	25	28	46	24	
12	48	57	32	34	17	9	18	9	10	8	16	25	51	28	15	12	15	17	39	43	34	40	72	46	24	
13	65	65	75	74	51	31	15	41	19	31	23	14	14	14	10	25	68	27	18	43	25	66	58	68	24	
14	58	64	50	57	75	63	22	13	25	23	12	13	10	11	9	7	15	46	26	14	41	24	72	57	24	
15	49	26	54	48	14	14	10	7	6	10	16	14	15	8	10	8	8	6	7	8	6	7	5	8	24	
16	8	11	7	14	14	16	5	6	8	7	10	9	52	19	9	6	7	9	15	14	9	9	6	7	24	
17	16	17	16	35	56	17	35	42	45	11	5	6	12	10	6	9	10	9	56	53	32	19	19	8	24	
18	5	6	9	8	8	4	7	10	10	6	6	12	10	9	8	10	12	11	12	9	12	11	11	12	24	
19	5	6	6	6	5	6	8	26	32	12	18	20	25	16	12	11	10	12	18	38	59	53	65	60	24	
20	50	44	16	29	29	52	41	14	13	11	7	8	12	12	13	8	10	10	14	29	13	30	42	34	24	
21	21	12	28	18	22	21	26	18	19	16	11	11	17	29	12	12	8	7	8	11	16	8	17	15	24	
22	27	19	45	8	27	14	12	11	7	10	15	10	9	8	11	9	12	3	13	53	31	12	15	13	24	
23	14	18	36	55	12	13	6	18	10	25	7	9	23	12	12	17	16	11	9	14	7	13	18	8	24	
24	10	9	9	8	10	19	15	45	13	14	13	13	32	18	8	11	8	9	8	7	6	6	5	5	24	
25	5	7	6	5	7	8	8	6	6	6	7	12	11	10	11	11	5	4	7	6	5	7	6	8	24	
26	6	6	5	14	12	7	7	5	9	5	7	6	6	8	7	6	5	8	8	6	6	8	7	11	24	
27	7	12	8	7	6	8	6	7	8	10	7	12	7	8	9	10	7	7	7	9	8	8	6	10	24	
28	11	8	8	10	11	9	10	9	7	5	8	7	8	6	6	7	10	21	12	14	53	35	24	32	24	
29	32	37	22	32	27	49	15	30	19	20	23	13	8	14	26	36	67	35	54	46	56	69	70	62	24	
30	51	34	48	70	70	60	44	72	66	59	39	23	26	17	31	26	29	54	38	53	55	40	15	13	24	

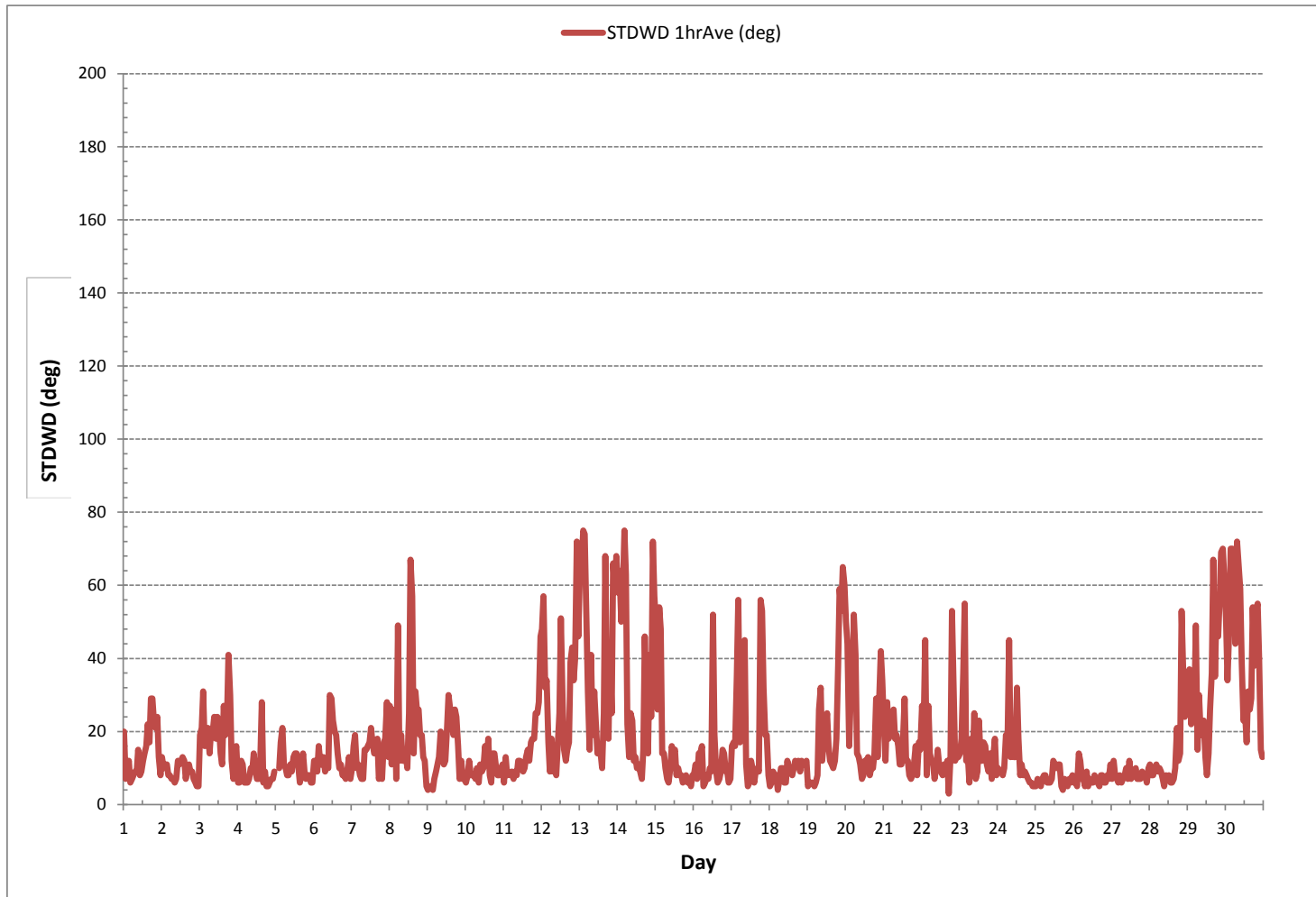
STATUS FLAG CODES

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: November 9, 2017

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 718 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWWD deg)



RELATIVE HUMIDITY

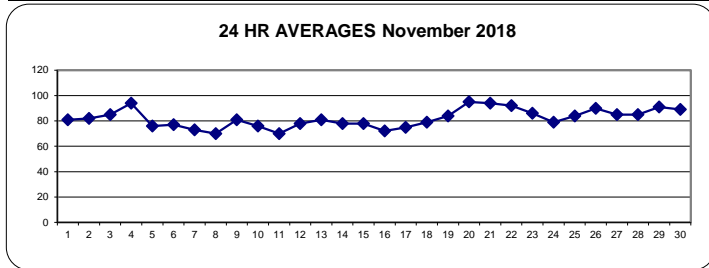


RELATIVE HUMIDITY Hourly Averages (RH %)

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	97	98	98	96	91	90	90	88	79	82	79	75	75	72	69	70	71	72	73	74	74	74	74	73	69	98	81	24
2	73	73	74	76	78	85	86	87	87	91	85	79	77	78	79	85	83	81	80	83	87	89	91	91	73	91	82	24
3	90	85	84	82	82	82	83	83	82	80	81	90	90	87	84	83	82	85	85	88	89	90	90	89	80	90	85	24
4	90	94	96	97	98	98	94	93	90	89	90	92	92	95	97	99	99	99	98	96	93	92	92	91	89	99	94	24
5	87	86	86	85	82	80	80	79	78	76	72	69	67	65	67	71	73	76	75	75	76	76	75	65	87	76	24	
6	76	76	76	76	76	77	78	78	77	75	73	72	71	70	70	71	77	80	83	84	85	84	82	77	70	85	77	24
7	78	78	78	77	81	83	83	82	81	75	70	68	63	64	66	65	67	68	69	70	71	69	67	70	63	83	73	24
8	68	64	72	81	76	74	74	66	63	60	56	57	53	52	57	67	77	81	80	80	79	79	78	52	81	70	24	
9	77	77	77	76	76	75	76	74	72	76	81	82	81	83	84	85	85	84	86	87	88	88	88	87	72	88	81	24
10	88	89	86	80	81	82	82	81	78	78	78	73	68	65	67	70	74	77	78	69	68	68	69	71	65	89	76	24
11	74	74	68	69	72	69	70	72	70	69	69	67	65	64	64	65	67	68	68	70	70	75	79	82	64	82	70	24
12	82	82	82	82	82	82	81	81	81	80	78	74	71	70	70	71	72	75	77	79	80	81	82	82	70	82	78	24
13	83	85	86	87	87	90	90	89	87	84	75	73	71	67	66	68	77	81	80	82	84	84	84	84	66	90	81	24
14	84	83	84	86	86	87	89	89	88	74	61	53	51	49	52	58	65	76	88	90	91	92	92	92	49	92	78	24
15	91	91	90	91	90	87	85	83	80	79	74	69	66	66	68	70	69	69	71	73	74	76	77	78	66	91	78	24
16	76	76	76	73	74	75	75	73	73	73	73	74	64	58	60	63	69	73	75	77	77	77	77	77	58	77	72	24
17	77	78	79	78	78	78	77	76	76	75	72	68	67	67	69	72	74	74	75	76	77	76	76	67	79	75	24	
18	80	81	80	81	81	81	81	82	82	82	81	79	77	76	77	78	78	77	76	77	78	78	79	76	82	79	24	
19	79	80	81	81	82	84	85	85	84	84	85	84	82	80	80	81	82	84	89	91	92	91	91	90	79	92	84	24
20	90	91	93	95	96	96	97	98	99	100	100	98	97	96	95	94	94	93	93	93	93	93	94	95	90	100	95	24
21	95	95	95	94	94	94	93	93	93	92	93	93	93	93	92	92	93	94	94	94	95	96	97	92	97	94	24	
22	97	97	96	96	96	96	97	96	95	94	94	89	83	84	83	88	90	94	94	94	92	91	92	92	83	97	92	24
23	91	89	88	87	88	91	92	92	92	93	90	89	88	85	84	83	84	83	82	81	81	82	79	80	79	93	86	24
24	80	81	80	81	81	81	81	81	81	80	79	78	76	76	76	75	75	75	76	78	79	82	85	84	75	85	79	24
25	83	82	82	82	82	82	82	83	83	82	81	80	79	79	80	81	81	84	90	93	94	94	93	93	79	94	84	24
26	93	93	93	93	93	94	94	94	93	93	93	93	91	88	88	89	88	87	86	86	86	86	86	88	86	94	90	24
27	87	87	87	87	87	88	88	87	86	85	84	83	83	83	82	81	81	82	82	83	84	85	85	81	88	85	24	
28	85	85	84	84	87	87	88	86	84	84	83	83	81	80	80	80	81	82	83	85	89	94	95	96	80	96	85	24
29	96	95	95	95	93	92	91	91	91	92	92	91	88	86	87	88	89	90	90	90	90	91	92	86	96	91	24	
30	93	92	92	92	91	91	92	92	92	92	90	87	82	80	80	83	88	88	87	89	89	89	87	86	80	93	89	24
HOURLY MAX	97	98	98	97	98	98	97	98	99	100	100	98	97	96	97	99	99	99	98	96	94	95	96	97				
HOURLY AVG	85	85	85	85	85	85	85	85	83	82	81	79	77	75	76	77	79	81	82	83	83	84	84	84				

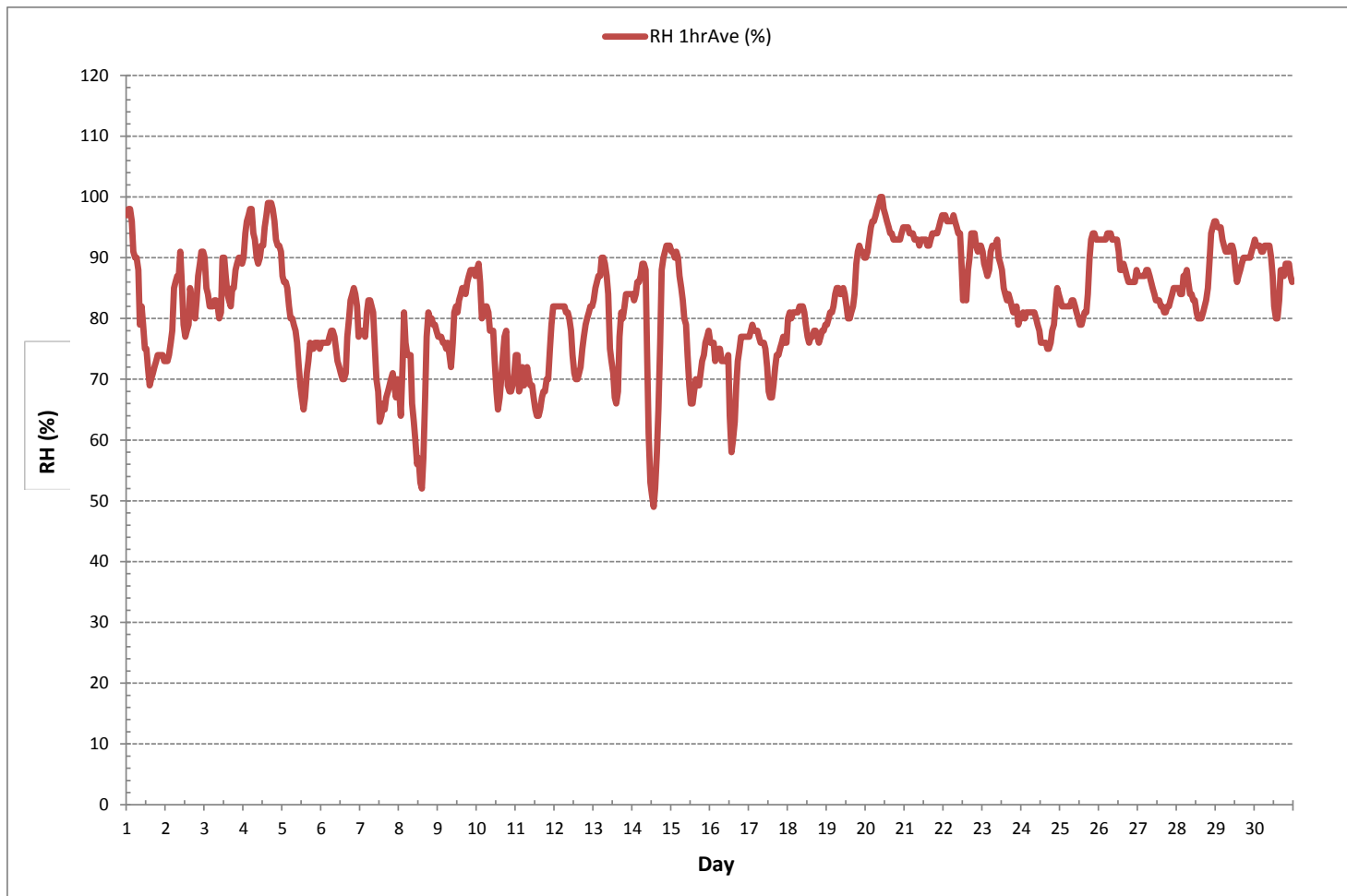
STATUS FLAG CODES

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:	49	%	@ HOUR	13	ON DAY	14
MAXIMUM 1-HR AVERAGE:	100	%	@ HOUR	9	ON DAY	20
MAXIMUM 24-HR AVERAGE:	95	%			ON DAY	20
OPERATIONAL TIME:						720 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	9		MONTHLY AVERAGE:			82 %



AMBIENT TEMPERATURE



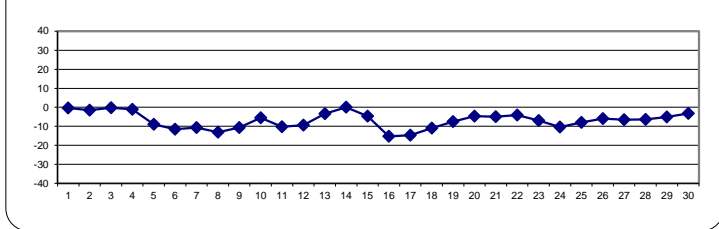
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

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	2.8	2.9	2.6	2.3	1.8	0.8	0.5	0.2	0.0	-0.4	-0.8	-0.9	-0.9	-1.1	-1.1	-1.3	-1.7	-2.0	-2.2	-2.3	-2.4	-2.5	-2.5	-2.4	-2.5	2.9	-0.4	24
2	-2.3	-2.0	-1.9	-1.8	-1.8	-1.7	-1.6	-1.5	-1.3	-1.2	-0.8	-0.4	-0.4	-0.5	-0.4	-0.8	-1.0	-1.2	-1.5	-1.8	-2.2	-2.5	-2.8	-2.8	-2.8	-0.4	-1.5	24
3	-2.5	-2.4	-2.3	-2.3	-2.3	-2.2	-2.1	-2.2	-1.7	-0.8	-0.1	-0.1	0.5	1.0	1.7	2.2	2.2	1.7	1.5	1.0	1.0	0.9	1.0	1.0	-2.5	2.2	-0.2	24
4	0.9	0.8	0.8	0.6	0.4	0.2	0.3	0.3	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.2	-1.4	-2.4	-3.4	-4.1	-4.8	-5.6	-6.2	-6.6	-6.6	0.9	-1.1	24
5	-7.1	-7.5	-7.8	-8.4	-9.1	-9.5	-9.8	-9.5	-9.2	-9.0	-8.6	-8.0	-7.2	-7.1	-7.5	-8.3	-9.2	-9.9	-10.4	-10.4	-10.6	-10.7	-10.9	-11.1	-11.1	-7.1	-9.0	24
6	-11.1	-11.3	-11.4	-11.5	-11.8	-11.8	-11.9	-11.9	-11.8	-11.4	-11.3	-11.2	-10.8	-10.7	-10.6	-10.8	-11.0	-11.2	-11.8	-12.8	-12.4	-11.7	-11.4	-12.8	-12.8	-10.6	-11.5	24
7	-11.3	-11.3	-11.2	-11.1	-11.1	-11.1	-11.0	-10.8	-10.4	-10.1	-10.0	-9.8	-9.7	-9.6	-9.6	-10.1	-10.5	-10.8	-11.1	-11.2	-11.2	-11.0	-10.7	-10.8	-11.3	-9.6	-10.6	24
8	-10.9	-11.0	-11.3	-11.8	-12.3	-12.4	-12.6	-12.8	-12.4	-12.0	-11.5	-10.9	-10.8	-10.2	-9.6	-11.0	-12.5	-15.0	-16.2	-16.9	-17.5	-17.4	-17.7	-17.5	-17.7	-9.6	-13.1	24
9	-17.2	-17.0	-16.7	-15.8	-15.3	-13.9	-13.5	-12.2	-11.1	-10.5	-10.2	-9.5	-8.5	-8.3	-8.0	-7.8	-7.5	-7.3	-7.1	-7.2	-7.3	-7.8	-7.7	-7.4	-17.2	-7.1	-10.6	24
10	-7.3	-7.0	-6.7	-7.2	-7.3	-7.3	-7.2	-7.2	-7.2	-6.6	-5.9	-5.0	-3.8	-3.0	-2.7	-3.0	-3.5	-3.6	-3.7	-4.1	-5.1	-5.7	-6.0	-6.3	-7.3	-2.7	-5.5	24
11	-6.7	-7.2	-8.0	-8.7	-9.1	-9.6	-10.0	-10.1	-10.1	-10.2	-10.4	-10.2	-10.1	-10.0	-10.0	-10.1	-10.4	-10.6	-10.7	-11.0	-11.4	-12.5	-13.6	-15.4	-15.4	-6.7	-10.3	24
12	-15.7	-15.8	-16.0	-15.0	-14.5	-13.6	-13.0	-12.8	-12.3	-11.4	-9.9	-8.3	-6.8	-6.2	-5.7	-5.4	-5.4	-5.3	-5.4	-5.7	-5.8	-5.6	-5.6	-5.1	-16.0	-5.1	-9.4	24
13	-4.8	-5.5	-5.6	-5.2	-5.2	-6.1	-5.9	-5.6	-5.0	-4.2	-1.9	-1.4	-0.7	0.4	0.7	0.2	-2.1	-3.3	-3.1	-3.9	-4.2	-3.6	-3.4	-3.3	-6.1	0.7	-3.4	24
14	-3.0	-2.8	-2.8	-3.2	-2.6	-2.8	-3.3	-2.9	-3.1	0.9	4.1	6.8	7.9	8.5	8.1	6.4	4.5	1.7	-1.4	-2.8	-3.7	-4.4	-5.0	-5.0	-5.0	8.5	0.0	24
15	-5.5	-5.7	-4.4	-2.7	-1.6	-1.3	-1.6	-2.0	-2.5	-2.9	-3.3	-3.6	-3.8	-3.9	-4.2	-4.7	-5.1	-5.5	-5.8	-6.2	-6.8	-7.8	-9.0	-10.3	-10.3	-1.3	-4.6	24
16	-11.3	-12.1	-12.5	-13.1	-13.4	-13.9	-14.8	-15.7	-16.1	-16.4	-16.0	-15.4	-13.5	-12.7	-13.5	-14.5	-16.0	-17.1	-17.8	-19.1	-18.4	-18.1	-18.4	-19.1	-11.3	-15.3	24	
17	-18.4	-19.0	-20.2	-21.2	-21.3	-21.2	-21.5	-21.7	-20.5	-16.2	-14.0	-12.1	-10.5	-10.2	-10.1	-10.2	-10.6	-10.7	-10.2	-10.3	-10.2	-10.0	-9.8	-9.6	-21.7	-9.6	-14.6	24
18	-9.6	-9.8	-10.6	-11.0	-11.5	-11.8	-12.1	-12.0	-11.7	-11.4	-11.1	-10.9	-10.7	-10.5	-10.4	-10.4	-10.5	-10.5	-10.6	-10.9	-11.3	-11.4	-11.4	-12.1	-9.6	-11.0	-9.4	24
19	-11.9	-12.1	-12.0	-12.0	-11.9	-11.9	-11.0	-10.0	-9.3	-8.5	-7.9	-7.0	-5.9	-4.6	-2.9	-2.0	-1.9	-2.1	-3.6	-4.5	-5.2	-6.3	-7.2	-8.2	-12.1	-1.9	-7.5	24
20	-7.7	-5.7	-4.1	-3.4	-2.9	-2.6	-2.5	-2.0	-1.0	-1.0	-1.8	-3.4	-4.2	-4.9	-5.3	-6.0	-6.6	-7.0	-7.4	-7.4	-7.2	-6.8	-6.1	-5.5	-7.7	-1.0	-4.7	24
21	-5.0	-4.9	-5.5	-5.8	-5.9	-6.1	-6.3	-6.6	-6.9	-7.0	-6.4	-5.6	-5.0	-4.2	-3.6	-3.5	-3.8	-4.2	-4.3	-4.2	-4.0	-3.5	-3.1	-2.8	-7.0	-2.8	-4.9	24
22	-2.9	-3.0	-3.0	-3.1	-3.2	-3.4	-3.9	-4.9	-5.9	-5.7	-4.7	-3.9	-2.5	-1.9	-1.2	-1.4	-2.5	-3.2	-4.7	-5.7	-6.4	-7.1	-7.1	-7.5	-7.5	-1.2	-4.1	24
23	-8.5	-9.3	-10.5	-11.5	-10.3	-6.7	-5.6	-4.8	-4.2	-3.7	-4.3	-5.0	-5.3	-5.7	-5.9	-6.1	-6.4	-6.9	-7.0	-6.9	-7.0	-7.4	-8.2	-8.9	-11.5	-3.7	-6.9	24
24	-9.4	-9.5	-9.8	-10.3	-10.7	-10.9	-11.0	-11.1	-11.3	-11.3	-11.1	-10.8	-10.4	-10.3	-10.4	-10.2	-10.0	-9.9	-10.0	-10.0	-10.1	-10.4	-10.5	-10.4	-11.3	-9.4	-10.4	24
25	-10.3	-10.2	-9.9	-9.7	-9.4	-9.2	-9.2	-9.2	-9.1	-8.7	-8.2	-7.5	-6.9	-6.5	-6.4	-6.2	-6.3	-6.3	-6.5	-6.7	-6.8	-6.8	-6.6	-6.4	-10.3	-6.2	-7.9	24
26	-6.3	-6.4	-6.8	-6.6	-6.3	-5.9	-5.8	-6.2	-6.6	-6.5	-6.2	-5.7	-5.6	-5.3	-5.3	-5.4	-5.5	-5.7	-6.0	-6.1	-6.1	-6.0	-5.9	-5.8	-6.8	-5.3	-6.0	24
27	-5.7	-5.6	-5.6	-5.9	-6.2	-6.1	-6.1	-6.5	-6.6	-6.7	-6.5	-6.2	-6.3	-6.3	-6.2	-6.2	-6.3	-6.5	-6.6	-7.0	-7.4	-7.6	-7.8	-8.0	-8.0	-5.6	-6.5	24
28	-8.1	-8.1	-8.1	-8.1	-8.1	-8.3	-8.3	-8.3	-8.1	-7.8	-7.1	-6.7	-6.0	-5.3	-4.8	-4.7	-4.8	-4.8	-5.1	-5.4	-5.1	-4.4	-4.2	-4.3	-8.3	-4.2	-6.4	24
29	-4.7	-4.9	-5.1	-5.4	-6.1	-7.7	-8.1	-7.9	-8.3	-6.5	-5.5	-4.9	-4.6	-3.9	-3.7	-3.6	-3.8	-4.1	-4.1	-4.0	-3.8	-3.6	-3.9	-4.6	-8.3	-3.6	-5.1	24
30	-5.2	-5.2	-6.2	-6.5	-5.6	-5.2	-5.0	-5.2	-4.6	-3.7	-3.2	-2.4	-1.4	-1.3	-1.1	-0.9	-1.1	-1.0	-1.2	-1.7	-1.9	-1.9	-2.2	-6.5	-0.9	-3.2	24	
HOURLY MAX	2.8	2.9	2.6	2.3	1.8	0.8	0.5	0.3	0.6	0.9	4.1	6.8	7.9	8.5	8.1	6.4	4.5	1.7	1.5	1.0	1.0	0.9	1.0	1.0				
HOURLY AVG	-7.6	-7.6	-7.8	-7.8	-7.8	-7.8	-7.8	-7.8	-7.6	-7.0	-6.5	-6.0	-5.5	-5.1	-5.0	-5.2	-5.7	-6.2	-6.6	-6.9	-7.2	-7.3	-7.5	-7.6				

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

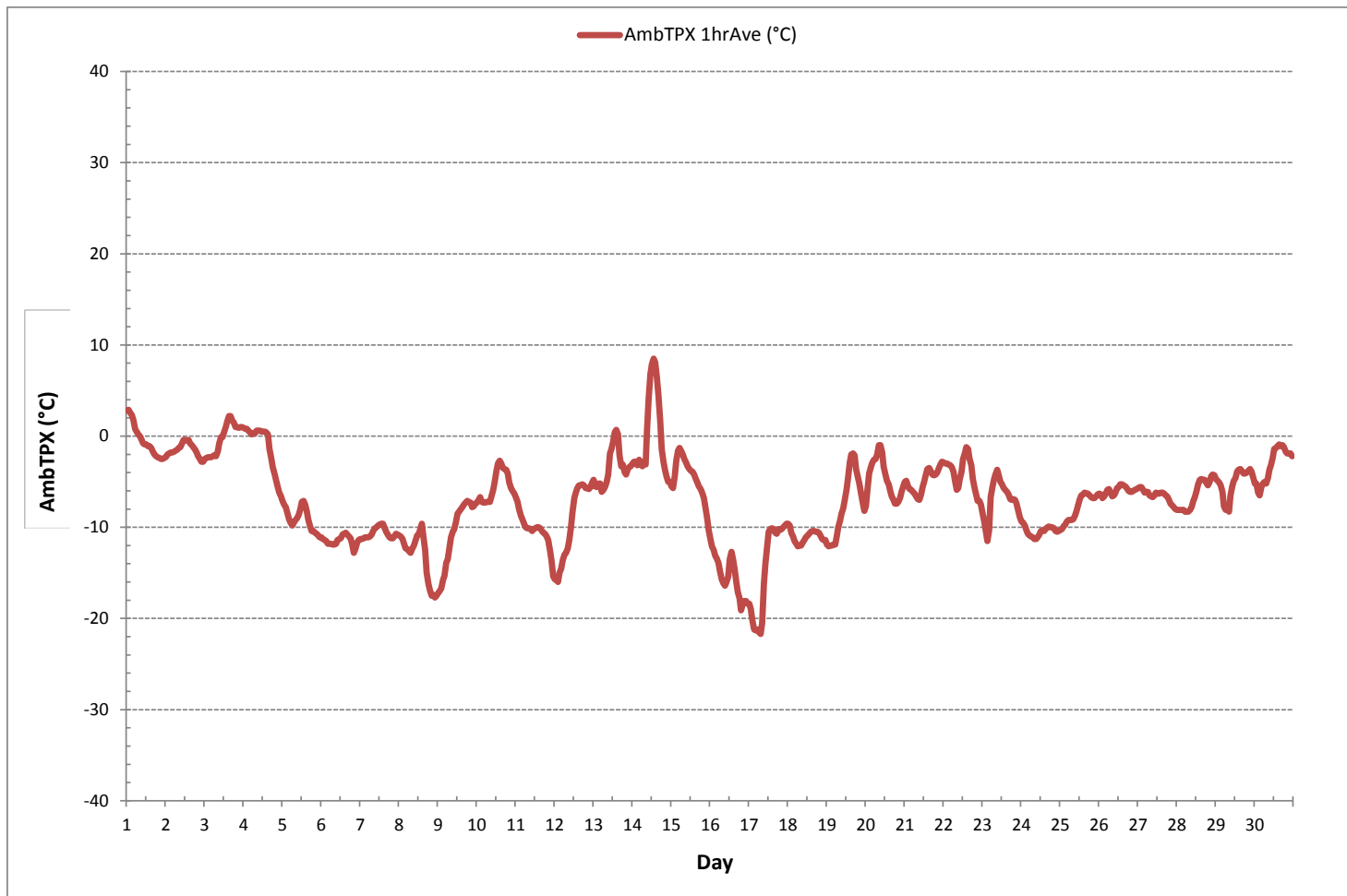
24 HR AVERAGES November 2018



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-21.7 °C	@ HOUR	7	ON DAY	17
MAXIMUM 1-HR AVERAGE:	8.5 °C	@ HOUR	13	ON DAY	14
MAXIMUM 24-HR AVERAGE:	0.0 °C			ON DAY	14
OPERATIONAL TIME:					720 hrs
AMD OPERATION UPTIME:					100.0 %
STANDARD DEVIATION:	4.7	MONTHLY AVERAGE:			-6.9 °C

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



APPENDIX II
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE



Thermo 43i Sulphur Dioxide Analyzer Calibration

Date:	Nov 19, 2018	Barometer/B.P./units:	F.S. 05544 expires January 15, 2019	951	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	21	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	Light snow		
Parameter:	Sulphur Dioxide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	9:48	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	14:18	Cal Gas Expiry Date:	October 24, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		
Analyzer:					
Serial Number/Owner:	806528242 LICA	Range ppb:	500		
Last Calibration Date:	Oct 17, 2018	As Found C.F.:	1.014		
Previous C.F.:	0.999	New C.F.:	1.000		

Calibration Standards: Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: API id# 690 expires March 15, 2019 Cal Gas Cylinder I.D. #: LL 104225 Cal Gas Conc. (ppm): 49.2	Standard Calibration Points for Ranges <table border="1"> <tr><td>Point</td><td>ppb</td></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
Point	ppb								
High	380								
Mid	180								
Low	90								

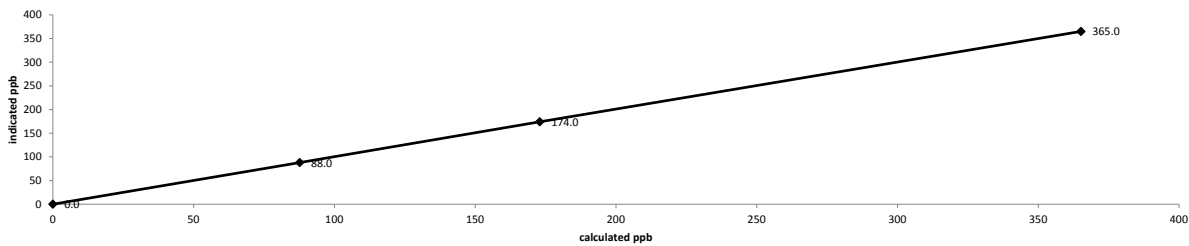
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	4895	0.00	4895	0.0	0	n/a
as found high	4940	36.94	4977	365.2	360	1.014
adjusted zero	4895	0.00	4895	0.0	0	n/a
adjusted high	4940	36.94	4977	365.2	365	1.000
mid	4927	17.38	4944	173.0	174	0.994
low	4941	8.82	4950	87.7	88	0.996
calibrator zero	4895	0.00	4895	0.0	0	n/a
Average C.F. =						0.997

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.001		0.95-1.05
b (Intercept as % of full scale) =	-0.08%		± 3% F.S.
% change in C.F. from last cal =	-1.54%		± 10%

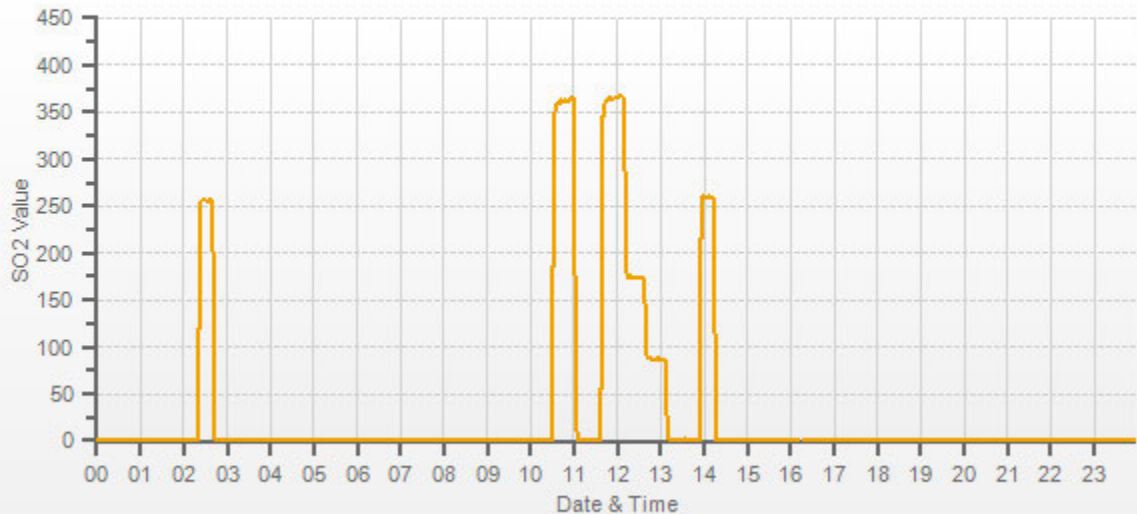
Thermo 43i Sulphur Dioxide Analyzer Calibration



As found:		As left:	
Bkg:	9.1	Bkg:	9.2
Coef:	0.981	Coef:	0.984
Pmt:	-623.8	Pmt:	-623.8
Flash:	767	Flash:	766
Internal:	29.1	Internal:	29.3
Chamber:	45.0	Chamber:	45.2
Perm Oven Gas:	45.00	Perm Oven Gas:	45.00
Perm Oven Heater:	44.25	Perm Oven Heater:	44.25
Pressure:	681.9	Pressure:	679.8
Sample Flow:	0.477	Sample Flow:	0.476
Lamp Intensity:	96	Lamp Intensity:	97
Converter:	n/a	Converter:	n/a
Converter Set:	n/a	Converter Set:	n/a
Averaging Time:	120	Averaging Time:	120
Expected Value:	260.0	Expected Value:	259.0

Comments: The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned. The manifold blower was found to be working normally.

SO2[ppb]



TOTAL REDUCED SULPHUR



Thermo 450i Total Reduced Sulphur Analyzer Calibration

Date:	Nov 19, 2018	Barometer/B.P./units:	F.S. 05544 expires January 15, 2019	951	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	21	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	Light snow		
Parameter:	Total Reduced Sulphur	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	9:49	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	14:17	Cal Gas Expiry Date:	October 20, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	CDNOVA / Model CDN 101 / #501		
Analyzer:					
Serial Number/Owner:	812728560 LICA	Range ppb:	100		
Last Calibration Date:	Oct 16, 2018	As Found C.F.:	0.961		
Previous C.F.:	1.000	New C.F.:	1.000		

Calibration Standards: Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: Sabio id# 11900613 expires August 22, 2019 Cal Gas Cylinder I.D. #: EY 0001003 Cal Gas Conc. (ppm): 9.55	Standard Calibration Points for Ranges <table border="1"> <tr><td>Point</td><td>ppb</td></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 minutes): Start/End Time 24 hr.: 09:50 / 10:05 SO2 Analyzer Range: 500 Target Concentration (ppb): 380 As Found Zero: 0.0 Analyzer Response (ppb): 0.0 Zero Corrected Result (ppb): 0.0
Point	ppb									
High	78									
Mid	38									
Low	19									

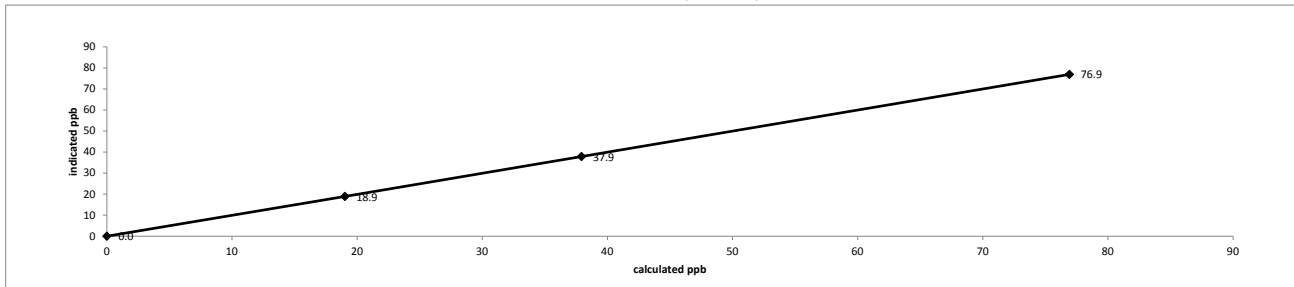
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	7499	0.00	7499	0.0	0	n/a
as found high	7494	60.85	7555	76.9	80	0.961
adjusted zero	7499	0.00	7499	0.0	0	n/a
adjusted high	7494	60.85	7555	76.9	76.9	1.000
mid	7420	29.59	7450	37.9	37.9	1.001
low	7420	14.81	7435	19.0	18.9	1.007
calibrator zero	7499	0.00	7499	0.0	0	n/a
Average C.F. =						1.003

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.000		0.95-1.05
b (Intercept as % of full scale) =	0.05%		± 3% F.S.
% change in C.F. from last cal =	3.85%		± 10%

Thermo 450i Total Reduced Sulphur Analyzer Calibration

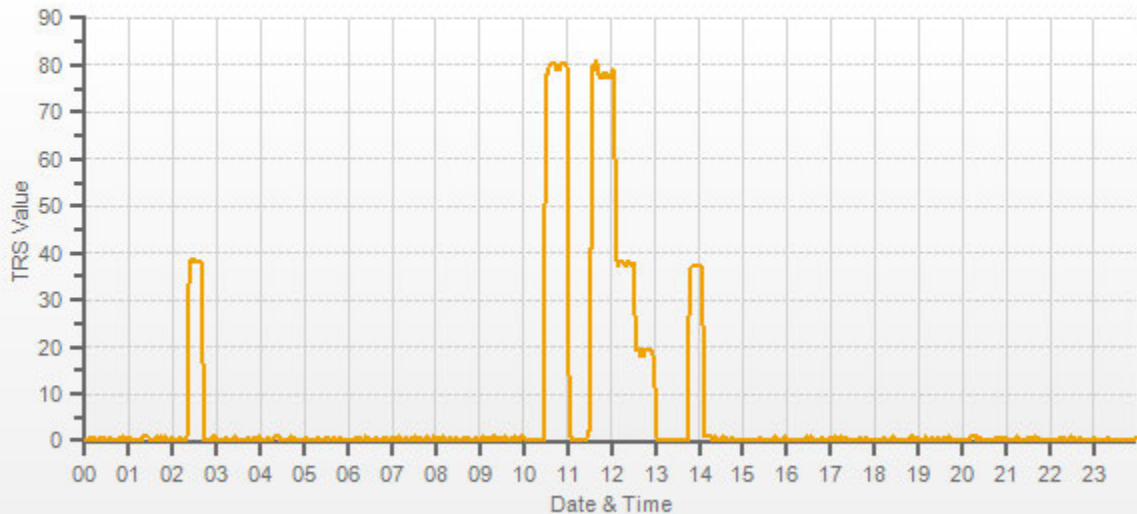


As found:		As left:	
Bkg:	15.4	Bkg:	15.1
Coef:	0.928	Coef:	0.902
Pmt:	-650.8	Pmt:	-650.8
Flash:	743	Flash:	743
Internal:	32.1	Internal:	32.2
Chamber:	45.2	Chamber:	45.0
Converter Temp:	825	Converter Temp:	825
Converter Set:	825	Converter Set:	825
Perm Oven Gas:	45.00	Perm Oven Gas:	45.00
Perm Oven Htr:	44.38	Perm Oven Htr:	44.37
Pressure:	633.1	Pressure:	633.0
Sample Flow:	0.490	Sample Flow:	0.490
Lamp Intensity:	92	Lamp Intensity:	92
Averaging Time:	120	Averaging Time:	120
Expected Value:	38.8	Expected Value:	36.9

Comments: The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned. The manifold blower was found to be working normally.

TRS[ppb] Station: LICA COLD LAKE SOUTH Daily: 18/11/19 Type: AVG 1 Min. [1 Min.]

— TRS[ppb]



TOTAL HYDROCARBON



Thermo 55i Methane/Non-Methane Analyzer Calibration

Date:	November 21, 2018	Barometer/B.P./units:	F.S. 05544 expires January 15, 2019	943	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	A few clouds		
Parameter:	CH4 / NMHC / THC	Calibration Purpose:	routine monthly		
Start/End Time 24 hr. (mst):	9:44 / 13:44	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	October 18, 2025		

Analyzer:		Correction Factors:			
Serial Number/Owner:	1180320044 LICA	Previous C.F.:	As Found C.F.:	New C.F.:	
Measured Flow:	0.944	CH ₄ =	1.000	1.024	1.000
Last Calibration Date:	October 17, 2018	NMHC =	1.000	1.017	1.000
Range ppm:	20 CH4/20 NMHC/40 THC	THC =	1.000	1.023	1.000

Calibration Standards:		Standard Calibration Points for Analyzer Range of 20/20/40 ppm			
Low Flow Meter ID/Expiry Date:	Defender Low 152019 expires December 13, 2018	Point	CH4	NMHC	THC
High Flow Meter ID/Expiry Date:	Defender High 148944 expires December 13, 2018	High	13.00	13.00	26.00
Calibrator ID/Expiry Date:	API id# 690 expires March 15, 2019	Mid	7.00	7.00	14.00
Cal Gas Cylinder I.D. #:	LL 119471	Low	3.00	3.00	6.00
CH4 Cylinder Conc. =	599.0 207.0 =C ₂ H ₆ Cylinder Conc.				
CH ₄ expressed as C ₂ H ₆ =	569.3 1168.3 =total CH ₄ equivalent				

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

Point	Calibrator Flow Rates (cc/min)			Calculated CH ₄ (ppm)	Calculated NMHC (ppm)	Calculated THC (ppm)	Indicated CH ₄ (ppm)	Indicated NMHC (ppm)	Indicated THC (ppm)	Correction Factors:		
	Diluent	Cal Gas	Total Flow							CH ₄	NMHC	THC
as found zero	2500	0.00	2500	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
as found high	2468	56.03	2524	13.30	12.64	25.93	12.99	12.42	25.36	1.024	1.017	1.023
adjusted zero	2500	0.00	2500	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
adjusted high	2468	56.03	2524	13.30	12.64	25.93	13.30	12.64	25.93	1.000	1.000	1.000
mid	2469	31.00	2500	7.43	7.06	14.49	7.49	7.07	14.57	0.992	0.998	0.994
low	2486	14.00	2500	3.35	3.19	6.54	3.43	3.25	6.68	0.978	0.981	0.979
calibrator zero	2500	0.00	2500	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
										Average C.F. =		
										0.990 0.993 0.991		

Linear Regression/Calibration Results:

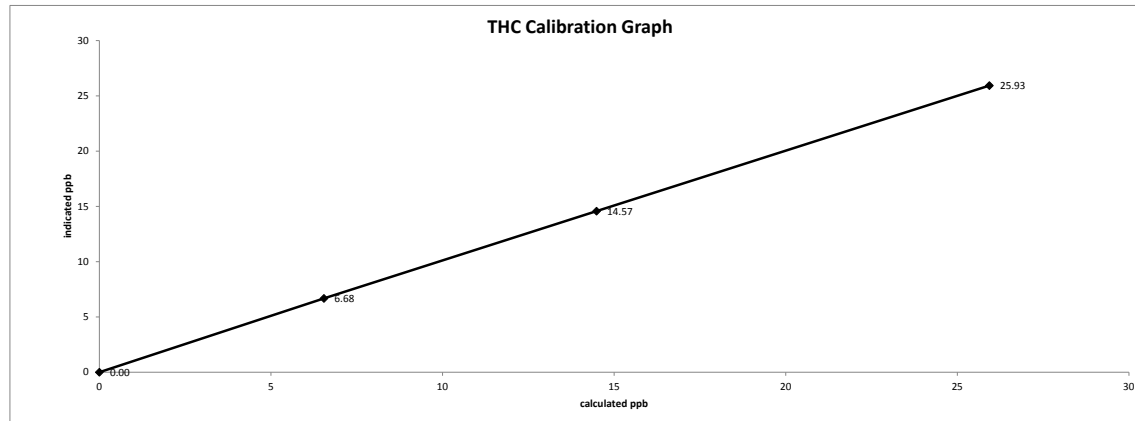
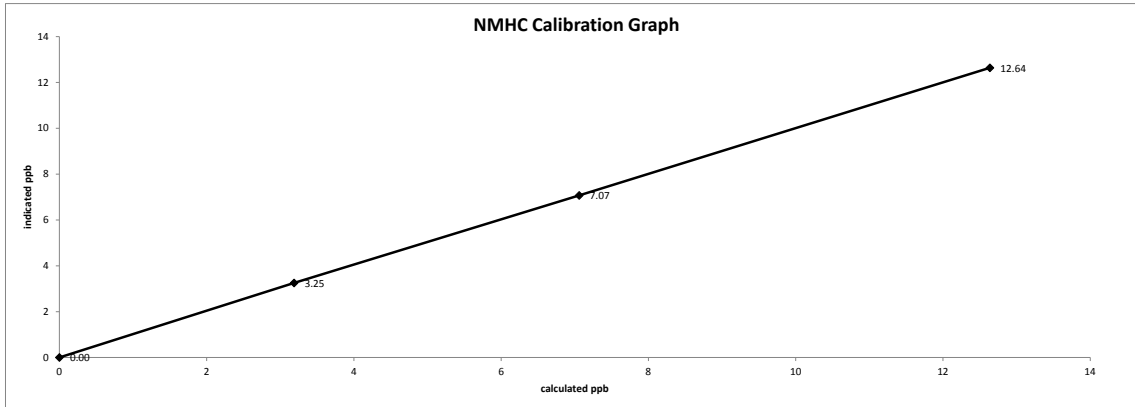
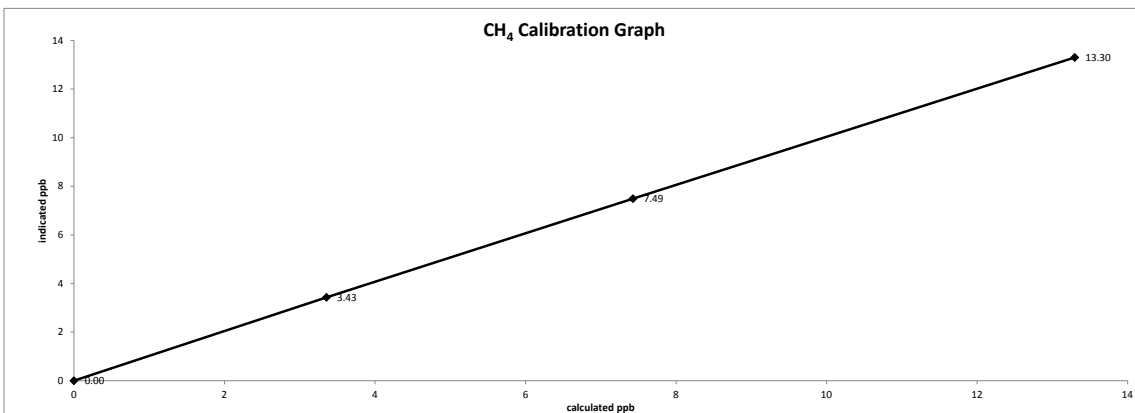
Correlation Coefficient =	CH ₄	NMHC	THC	LIMITS > or = 0.995 0.95-1.05 ± 3% F.S. ± 10%
	1.000	1.000	1.000	
	Slope = 0.999	0.999	0.999	
	b (Intercept as % of full scale) = 0.20%	0.13%	0.18%	
% change in C.F. from last cal = -2.36%	-1.74%	-2.26%		

As Left Instrument Diagnostics:			
Interface Board Voltages:	Bias Supply: 297.2	Calibration History cnt'd:	NM Peak Area: 87354
Temperatures:	Detector Oven: 175.1	Crucial Settings:	Methane Start: n/a
	Filter: 175.0		Methane End: n/a
Cylinder Pressures/reg.:	Column Oven: 75.0		Backflush: n/a
	Internal: 34.8		NMHV Start: n/a
	Carrier: 1300 50	Run History>1:	NMHC End: n/a
	Fuel: 1600 50	Date: Nov 21, 2018	
Internal Pressures:	Span Gas: 700 10	Time: 09:59	CH ₄ PK HT: 2740
	Zero Air Generator: 42	CH ₄ PK RT: 13.0	CH ₄ Baseline: 2696
FID Status:	Carrier: 29.4	CH ₄ LOD: 40	CH ₄ SD: 13
	Fuel: 44.2	CH ₄ CONC: 2.07	NM PK HT: 0
	Air: 30.2	NM Peak Area: 0	NM CONC: 0.00
	Status: LIT	NM Base Start: 2679	NM Base End: 2686
Flame and Power Stats:	Counts: 31004	NM LOD: 16	NM Start IDX: 12
	Flame: 346.8	NM End IDX: 57	NM Max Slope: 1.2e+00
	Det Base: 175.0	NM Min Slope: -1.0e+00	NM PT Count: 0
	Det Power On: Sep 08, 2018	Previous CH ₄ : 10.21	Previous NMHC: 10.86
Calibration History:	Flameouts: 1	Previous THC: 21.07	New CH ₄ : 10.40
	Det Oven at Start: 170.5	New NMHC: 10.92	New THC: 21.32
	Col Oven at Start: 74.6		
	Time: Oct 17, 2018 / 11:19		
	Type: SPAN		
	Status: GOOD		
	Check/Adjust: ADJUST		
	CH ₄ Span Conc: 13.26		

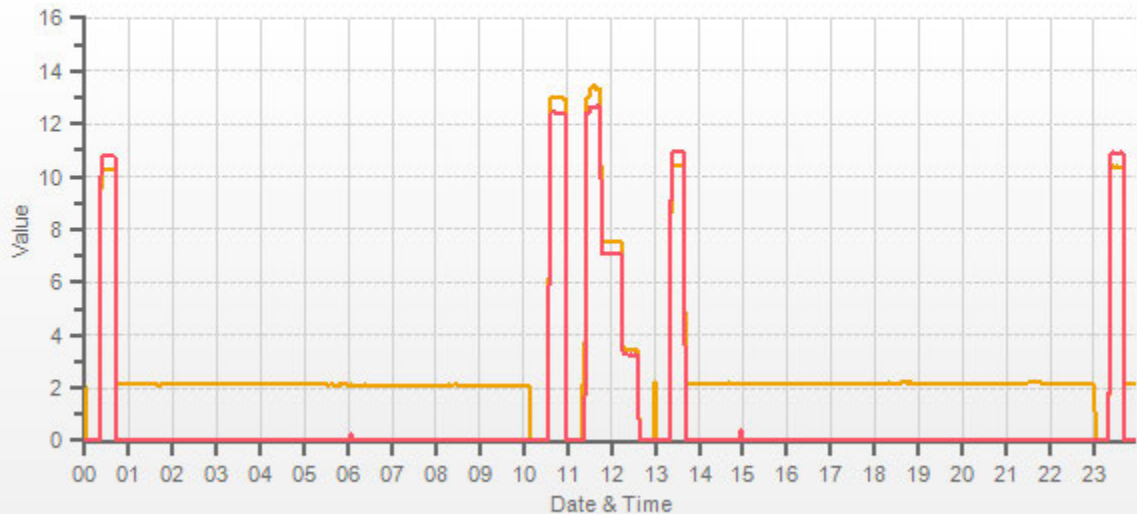
Comments:
 The analyzer sample inlet filter was changed.
 No zero adjustment was required/made. As found zero values were copied to adjusted zero values for linearity calculation purposes.
 The analyzer cooling fan filter(s) were cleaned.
 The manifold blower was found to be working normally.

Date: November 21, 2018
Company/Airshed: LICA
Location/Station Name: Cold Lake South

Start/End Time 24 hr. (mst): 9:44 / 13:44
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution



CH4[ppm] NMHC[ppm]



NITROGEN DIOXIDE



Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: Nov 19, 2018 Company/Airshed: LICA Location/Station Name: Cold Lake South Start/End Time 24 hr. (mst): 09:49 / 16:11 G.P.T. to be used for Ozone? No Calibration Method: Gas Dilution & Gas Phase Titration	Barometer/B.P./units: F.S. 05544 expires January 15, 2019 951 millibars Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019 21 °C Weather Conditions: Light snow Calibration Purpose: routine monthly Performed By/Reviewer: Alex Yakupov Rob Fisher Cal Gas Expiry Date: October 24, 2020
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Analyzer: Serial Number/Owner: 1505664393 LICA Last Calibration Date: October 17, 2018 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>1.000</td> <td>0.988</td> <td>1.001</td> </tr> <tr> <td>NO₂ =</td> <td>1.000</td> <td>1.000</td> <td>1.000</td> </tr> <tr> <td>NO_x =</td> <td>0.999</td> <td>0.987</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	0.988	1.001	NO ₂ =	1.000	1.000	1.000	NO _x =	0.999	0.987	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	0.988	1.001														
NO ₂ =	1.000	1.000	1.000														
NO _x =	0.999	0.987	1.000														

Calibration Standards:

Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018
 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018
 Calibrator ID/Expiry Date: API id# 690 expires March 15, 2019
 Cal Gas Cylinder I.D. #: LL 104225
 Cal Gas Conc. (ppm): 51.5 51.6

Standard Calibration Points for a Range of: 500 ppb			
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 NO _x	Indicated NO	Indicated NO _x	NO C.F.	NO _x C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	4895	0.0	4895	0	0	0.0	0.0	n/a	n/a
as found high	4940	36.9	4977	382.2	383.0	387.0	388.0	0.988	0.987
adjusted zero	4895	0.00	4895	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4940	36.94	4977	382.2	383.0	382.0	383.0	1.001	1.000
mid	4927	17.38	4944	181.0	181.4	181.0	181.0	1.000	1.002
low	4941	8.82	4950	91.8	91.9	92.0	92.0	0.997	0.999
calibrator zero	4895	0.00	4895	0	0	0.0	0.0	n/a	n/a
								Average C.F. =	0.999 1.000

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NO _x	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)
NO _x reference	4940	36.94	4977	0.0	383.0	383.0	0.0	0.0	0.0	
as found high NO ₂	4940	36.94	4977	250.0	139.0	383.0	244.0	244.0	244.0	1.000
adjusted high NO ₂	4940	36.94	4977	250.0	139.0	380.0	244.0	244.0	244.0	1.000
gpt mid	4940	36.94	4977	147.0	241.0	383.0	142.0	142.0	142.0	1.000
gpt low	4940	36.94	4977	50.0	334.0	383.0	49.0	49.0	49.0	1.000
										Average NO ₂ C.F. = 1.000

Linear Regression/Calibration Results:

	NO	NO _x	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.001	1.000	1.000	0.95-1.05
b (Intercept as % of full scale) =	0.03%	-0.01%	0.00%	± 3% F.S.
% change in C.F. from last cal =	1.23%	1.19%	0.00%	± 10%
NO ₂ converter efficiency			1.00	0.96 to 1.04

	As found:	As left:
NO Bkg:	4.3	4.3
NO _x Bkg:	4.6	4.6
NO Coef:	1.076	1.061
NO ₂ Coef:	0.996	0.996
NO _x Coef:	0.999	0.997
PMT:	-854.7	-854.7
Internal:	26.8	26.8
Chamber:	50.5	50.2
Cooler:	-3.0	-3.0
NO ₂ Converter:	324.5	324.5
NO ₂ Converter Set:	325.0	325.0
Perm Oven Gas:	35.00	35.00
Perm Oven Heater:	34.24	34.24
Pressure:	181.7	181.1
Flow:	0.730	0.732
Ozonator Flow:	OK	OK
Expected Value NO:	3	2
Expected Value NO ₂ :	277	275
Expected Value NO _x :	280	277

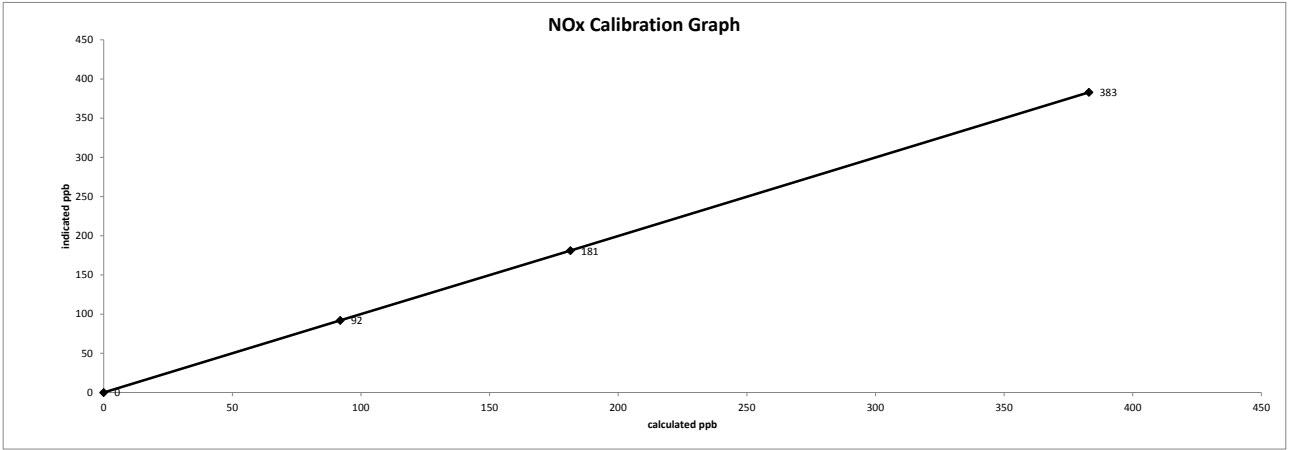
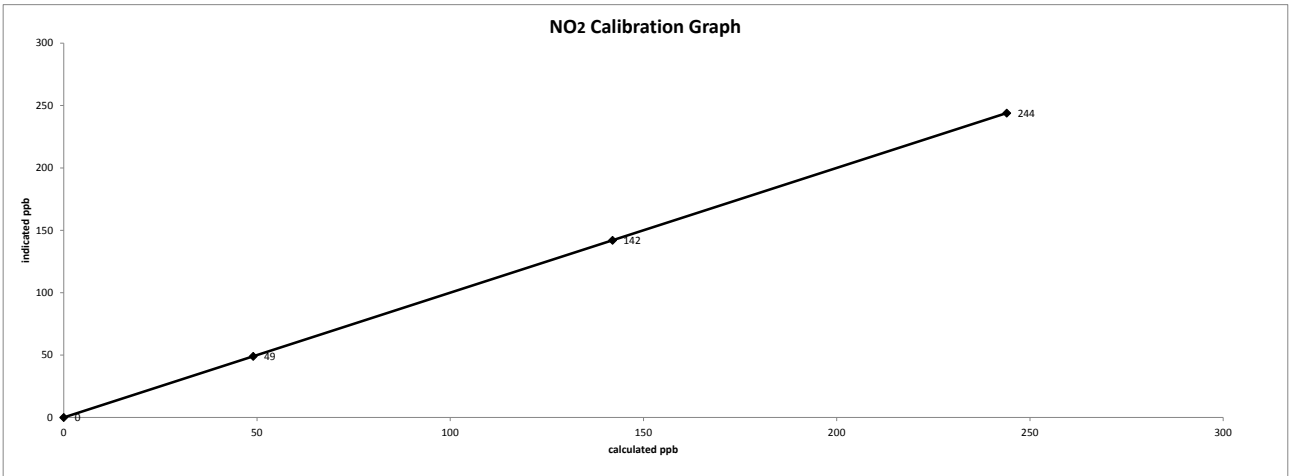
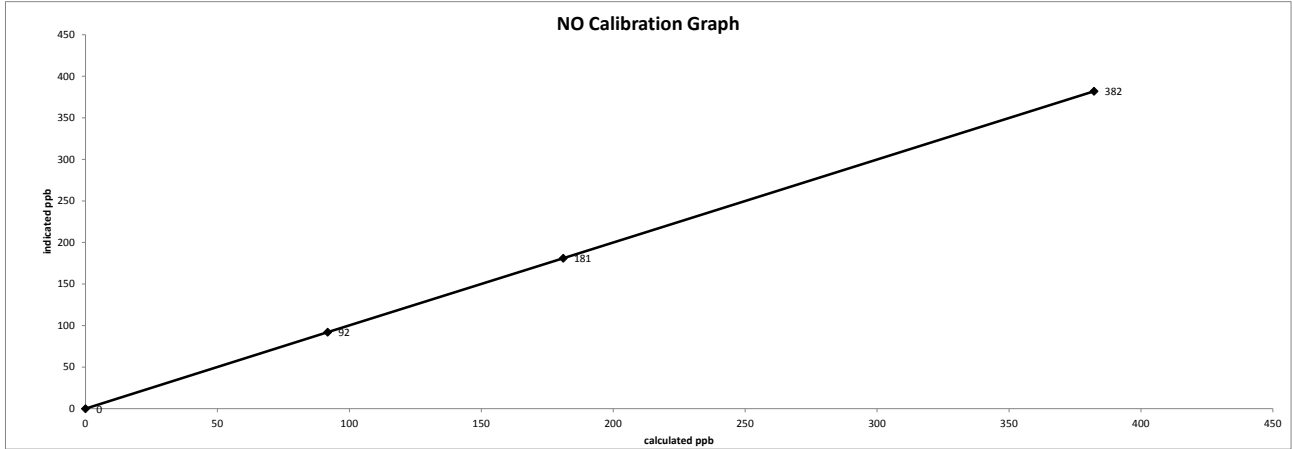
Comments:

The analyzer sample inlet filter was changed. The converter cooling fan filter was cleaned.
 The manifold blower was found to be working normally. No high point NO₂ adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.
 The analyzer cooling fan filter(s) were cleaned.

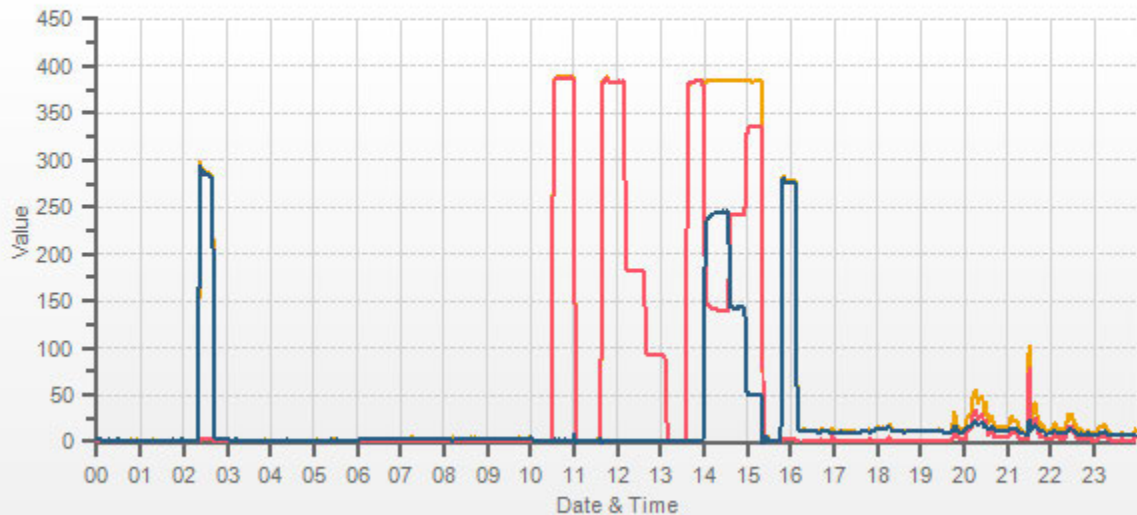
Date: Nov 19, 2018
Company/Airshed: LICA
Location/Station Name: Cold Lake South

Start/End Time 24 hr. (mst): 09:49 / 16:11
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Gas Phase Titration

Thermo 42i NO-NO2-NOx Analyzer Calibration



NOX[ppb] NO[ppb] NO2[ppb]



OZONE



Thermo 49i Ozone Analyzer Calibration

Date: November 21, 2018 Company/Airshed: LICA Location/Station Name: Cold Lake South Start/End Time 24 hr. (mst): 9:44 / 14:47 Ozone Calibration Method: Varying UV Lamp Power G.P.T. Date: n/a-done by Varying UV Lamp Power Analyzer: Serial Number/Owner: 700419951 LICA Last Calibration Date: October 16, 2018 Previous Cal High Point C.F.: 1.000	Barometer/B.P./units: F.S. 05544 expires January 15, 2019 943 millibars Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019 22 °C Weather Conditions: A few clouds Calibration Purpose: routine monthly Performed By/Reviewer: Alex Yakupov Rob Fisher Cal Gas Expiry Date: n/a-done by Varying UV Lamp Power Ozone Range ppb: 500 As Found C.F.: 0.992 New C.F.: 1.000
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Calibration Standards:

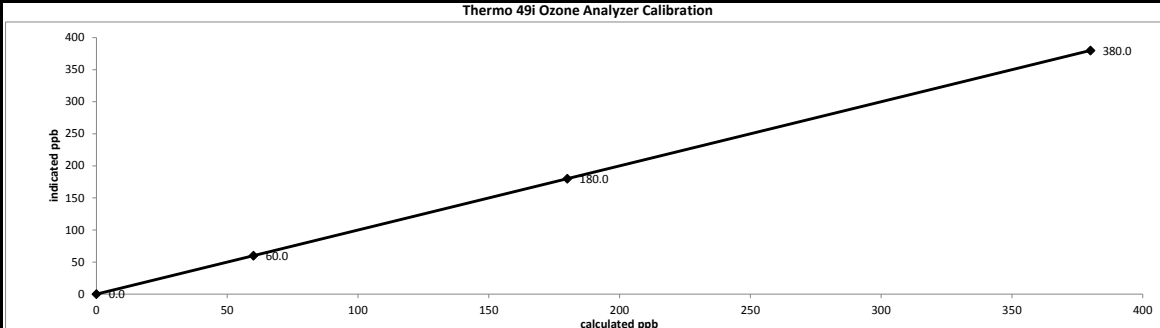
Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: Sabio id# 11900613 expires August 22, 2019 Cal Gas Cylinder I.D. #: n/a	<table border="1" style="width: 100%; border-collapse: collapse;"> <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								

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	0.8	n/a
as found high	5000	5000	380.0	380.0	384.0	0.992
adjusted zero	5000	5000	0.0	0.0	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	180.0	180.0	180.0	1.000
low	5000	5000	60.0	60.0	60.0	1.000
calibrator zero	5000	5000	0.0	n/a	0.0	n/a
Average C.F.=						1.000

Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u> Slope = <u>1.000</u> b (Intercept as % of full scale)= <u>0.00%</u> % change in C.F. from last cal= <u>0.84%</u>	LIMITS > or = 0.995 0.95-1.05 ± 3% F.S. ± 10%
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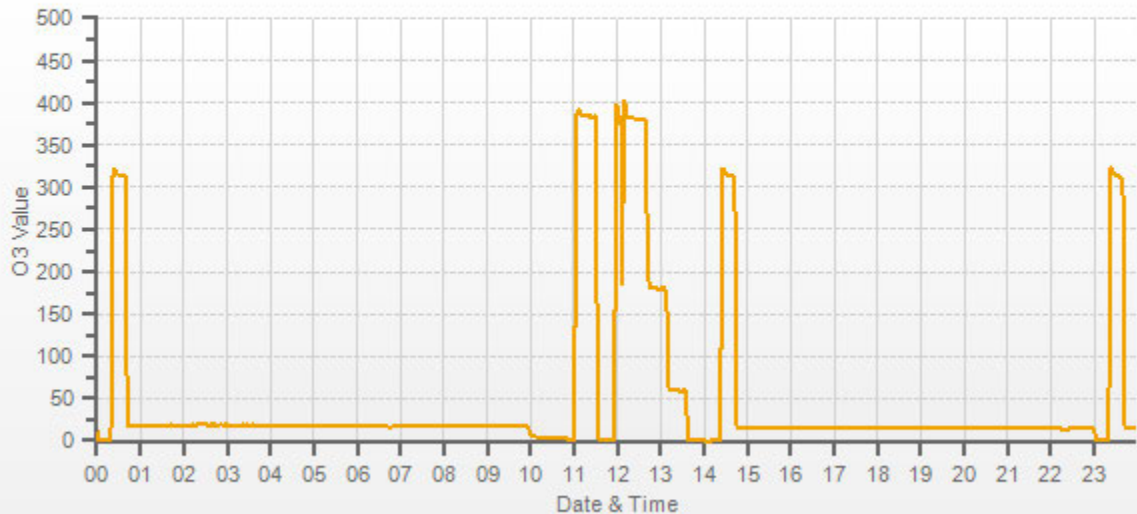


As found:	As left:
O3 Bkg: 0.0	O3 Bkg: 0.0
O3 Coef: 1.051	O3 Coef: 1.041
Photo Lamp: 9.6	Photo Lamp: 9.6
O3 Lamp: 8.0	O3 Lamp: 8.0
Bench: 30.0	Bench: 29.9
Bench Lamp: 53.5	Bench Lamp: 53.5
O3 Lamp: 67.5	O3 Lamp: 67.5
Pressure: 700.5	Pressure: 698.6
Cell A lpm: 0.707	Cell A lpm: 0.706
Cell B lpm: 0.749	Cell B lpm: 0.749
O3 ppb: 1.1	O3 ppb: 0.7
Cell A ppb: 14.5	Cell A ppb: -1.4
Cell B ppb: -12.3	Cell B ppb: 2.7
Cell A int (Hz): 77966	Cell A int (Hz): 77980
Cell B int (Hz): 79679	Cell B int (Hz): 76697
Expected Value: 306.0	Expected Value: 312.0

Comments:
 The analyzer sample inlet filter was changed.
 The analyzer cooling fan filter(s) were cleaned.
 The manifold blower was found to be working normally.

Due to operator error, the calibrator was reset at 12:14 and the adjusted high point was restarted.

O3[ppb]



PARTICULATE MATTER



Thermo 5030 SHARP Monitor Monthly Check

Date: November 15, 2018
 Company: LICA
 Station Name/Location: Cold Lake South
 Previous Audit Date: October 16, 2018
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Rob Fisher
 Start Time (mst): 11:10
 End Time (mst): 11:45
 Calibration Purpose: routine monthly
 Weather Conditions: A few clouds

SHARP Information and Status:

Serial Number: CM-2209 Status: 0.00
 Approx Tape remaining: 50% Error Code: 0.00

Reference Standards:

Air Flow

	Manometer	Orifice	Pressure:	Temperature:
Make:	Dwyer 475	Airmetrics	F. Scientific	F. Scientific
Model:	Mark III	Chinook High	FB 61291	11-661-7A
Serial Number:	Maxxam ID#3	Maxxam ID#2	5544	170286131
Calibration Expiration Date:	January 9, 2019	April 24, 2019	January 15, 2019	April 19, 2019

As found temperature and pressure:

Tolerance +/- 4°C	Tolerance +/- 13.33 hPa
SHARP T1 °C: <u>-3.0</u>	SHARP P3 (hPa): <u>953.000</u>
Reference °C: <u>-3.4</u>	Reference (hPa): <u>952.000</u>
Difference °C: <u>-0.4</u>	Difference (hPa): <u>1.000</u>

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

Tolerance +/- 4°C	Tolerance +/- 13.33 hPa
SHARP T1 °C: <u>-3.0</u>	SHARP P3 (hPa): <u>953.000</u>
Reference °C: <u>-3.4</u>	Reference (hPa): <u>952.000</u>
Difference °C: <u>-0.4</u>	Difference: <u>1.000</u>

As found flows:

Targets: 1000 l/hr / <90%	Flow Tolerance 16.67 lpm +/- 0.67 lpm
SHARP AirFlow l/hr <u>1000.00</u>	SHARP Airflow (l/min) <u>16.67</u>
Pump Voltage (%) <u>50.80</u>	Reference AirFlow (l/min) <u>16.65</u>
	Difference (l/min) <u>-0.02</u>

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

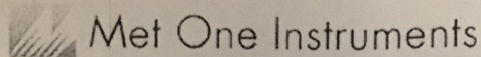
Targets: 1000 l/hr / <90%	Flow Tolerance 16.67 lpm +/- 0.67 lpm
SHARP AirFlow l/hr <u>1000.00</u>	SHARP Airflow (l/min) <u>16.67</u>
Pump Voltage (%) <u>50.80</u>	Reference AirFlow (l/min) <u>16.65</u>
	Difference (l/min) <u>-0.02</u>

Inlet Assembly:

	Yes/No?	If No, give reason
PM10 Inlet Cleaned	yes	
PM2.5 Cyclone Cleaned	yes	

Comments:

WIND SYSTEM



Sonic Wind Sensor Certificate of Calibration

Sensor Model No.: 50.5H Sensor Serial No.: F1644
 Sensor Output Swing: 0V - 1.0V Sensor Output Range: 0 - 50.0 MPS
 Customer: Maxxam Analytics Sales Order No.: 125713
 Tested per PO: PO0000003392 Calibration Date: 11/09/2017
 Calibrated by: David Frith *DF* QC Inspection: *Dyson Paulsen*

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

As Found Test Date: N/A As Left Test Date: 11/09/2017

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	1/26/2017	1/26/2022	Accuracy < 0.15 mph or 1% WS	

Environmental Data: Temperature 65 to 80 Deg F Vibration none
 Humidity 20 to 70% Radiation none

Firmware Version: 3194-01 R2.62

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

CALIBRATORS

Company: Maxxam Operator: Chris W

Calibrator:				Flow Measurement Device:			
Make/Model	<u>API 700</u>			Make/Model	<u>Mesa Defender 530</u>		
Serial Number	<u>690</u>			Serial Number	<u>L-153351 H-152571</u>		
Last Verification Date	<u>March 2016</u>			Temperature (°C)	<u>23.5 C</u>		
NO Cylinder S/N	<u>LL108015</u>			Barometric Pressure	<u>695 mmHg</u>		
NO [PPM]	<u>52.2</u>	NOx [PPM]	<u>52.3</u>				
Expiry Date	<u>Oct 2020</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%	
4959	75.0	0.789	0.791	0.793	0.000	0.793	1%	0%
4971	36.5	0.383	0.384	0.384	0.000	0.384	0%	0%
4967	18.2	0.191	0.192	0.191	0.000	0.191	0%	-1%
Absolute Average Percent Difference							0%	0%

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)=	1.0054	0.90-1.10		m (Slope)=	1.0031
b (Intercept % of FS)=	-0.0583	± 3% F.S.		b (Intercept % of FS)=	-0.0795

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4959	0.000	0.000	0.790	-0.001	0.789	NO ₂	% Diff. Limit
4959	0.500	0.497	0.293	0.493	0.786	-1%	± 10%
4959	0.275	0.273	0.517	0.269	0.787	-1%	± 10%
4959	0.100	0.102	0.688	0.099	0.787	-2%	± 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)=	0.9946	0.90-1.10
b (Intercept % of FS)=	-0.1817	± 3% F.S.

AENV Standards		NO_x Analyzer	
Audit Calibrator		Make/Model	<u>Teco 42i</u>
Make/Model	<u>Teco 146i</u>	Serial/AMU Number	<u>AMU 1868</u>
Serial/AMU Number	<u>AMU 1809</u>	Last Calibration Date	<u>March 14, 2018</u>
SRM Gas Cylinder No.	<u>APEX1170572</u>	Full Scale (ppm)	<u>1.0</u>
Cylinder Conc. (ppm)	<u>49.99</u>	Cylinder Gas Expiry Date	<u>November 2020</u>

COMMENTS: Cylinder contains 47.9 ppm SO₂.

Auditor: Al Clark
Operator Signature: *Chris W*

Date: March 15, 2018
Location: McIntyre Center Edmonton

Company Maxxam Operator: Mike

Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio</u>	Make/Model	<u>Bios Definer 220</u>
Serial Number	<u>11900613</u>	Serial Number	<u>H=128686; L=129069</u>
Last Verification Date	<u>March 16, 2018</u>	Temperature (°C)	<u>22.9 C</u>
NO Cylinder S/N	<u>LL104183</u>	Barometric Pressure	<u>698 mmHg</u>
NO [PPM]	<u>50.8</u>	NOx [PPM]	<u>50.9</u>
Expiry Date	<u>October 24, 2020</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5059</u>	Pt. #2	<u>5073</u>
		Pt. #3	<u>5073</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>38.2</u>
		Pt. #3	<u>19.1</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5124	0.0	0.0000	0.0000	0.0000	-0.0001	0.0000	Limit ± 10%	
5059	77.5	0.7782	0.7797	0.7763	0.0005	0.7767	0%	0%
5073	38.2	0.3825	0.3833	0.3794	0.0000	0.3795	-1%	-1%
5073	19.1	0.1913	0.1916	0.1904	0.0000	0.1904	0%	-1%
Absolute Average Percent Difference							1%	1%

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

<u>NO</u>		<u>LIMITS</u>		<u>NOx</u>	
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000
m (Slope)=	0.9975	0.90-1.10		m (Slope)=	0.9960
b (Intercept % of FS)=	-0.0616	± 3% F.S.		b (Intercept % of FS)=	-0.0661

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5059	0.0	0.0000	0.7741	0.0000	0.7741	NO ₂	% Diff. Limit
5059	500.0	0.4918	0.2823	0.4916	0.7739	0%	± 10%
5059	275.0	0.2774	0.4967	0.2780	0.7747	0%	± 10%
5059	100.0	0.1031	0.6710	0.1032	0.7743	0%	± 10%
Absolute Average Percent Difference						0%	± 10%

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

<u>NO₂</u>		<u>LIMITS</u>	
Correlation=	1.0000	≥ 0.995	
m (Slope)=	0.9998	0.90-1.10	
b (Intercept % of FS)=	0.0173	± 3% F.S.	

<u>AENV Standards</u>		<u>NO_x Analyzer</u>	
<u>Audit Calibrator</u>			
Make/Model	<u>Thermo 146i</u>	Make/Model	<u>Thermo 42i</u>
Serial/AMU Number	<u>1809</u>	Serial/AMU Number	<u>1868</u>
SRM Gas Cylinder No.	<u>APEX1170572</u>	Last Calibration Date	<u>August 16, 2018</u>
Cylinder Conc. (ppm)	<u>49.99</u>	Full Scale (ppm)	<u>1.0</u>
		Cylinder Gas Expiry Date	<u>November 15, 2020</u>

COMMENTS: _____

Auditor: Shea Beaton
Operator Signature: _____

Date: August 22, 2018
Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-482CGA

Company: Maxxam **Operator's Name:** Mike
Cylinder #: LL104225 **Concentration PPM:** 49.2 **Tolerance(%)** 2 **Certified By:** Praxair
Expiry Date: October 2020

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model: <u>R&R MFC 201</u>	Make/Model: <u>Mesa Definer 220</u>
Serial Number: <u>AMU 1690</u>	Serial Number: <u>H-133034 / L-132702</u>
Last Verification Date: <u>December 13, 2017</u>	Temp. °C: <u>23.4 C</u>
Gas Type: <u>SO2</u> Conc. <u>98.07</u>	B.P. <u>707 mmHg</u>
Cylinder Number: <u>CAL016625</u>	
Expiry Date: <u>January 2019</u>	

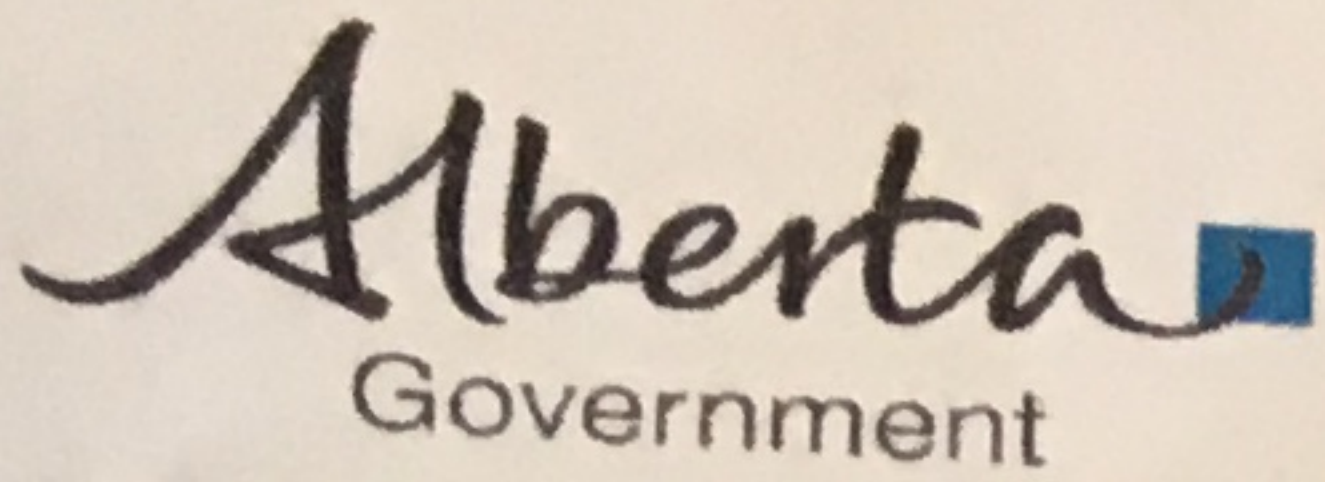
Reference Analyzer:
 Make/Model: Teco 43C Serial/AMU Number: 1623
 Instrument Settings: Zero: 10.0 Span: 1.006 Range: 1.0
 Last Calibration: Date: Dec12/17 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.000			
4989	79.5	0.764	0.01594	62.755	47.9
4995	39.6	0.380	0.00793	126.136	47.9
4992	19.6	0.188	0.00393	254.694	47.9
Average Cylinder Concentration:					47.9

Previous Stated Concentration PPM: 49.2
 Percent variance from Stated: 3

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: December 13, 2017
 Operator Signature: *Al Clark* Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-493CGA

Company: Maxxam Operator's Name: Mike
 Cylinder #: EY0001003 Concentration PPM: 9.55 Tolerance(%): 2 Certified By: Praxair
 Expiry Date: October 2020

Reference Calibrator and Gas:
 Make/Model: Sabio 2010
 Serial Number: AMU 2092
 Last Verification Date: January 17, 2018
 Gas Type: H2S Conc. 20.43
 Cylinder Number: CAL015272
 Expiry Date: January 2019

Flow Measurement Device:
 Make/Model: Mesa Defender 530
 Serial Number: H-153961 / L-153874
 Temp. °C: 23.0 C
 B.P.: 697 mmHg

Reference Analyzer:
 Make/Model: Teco 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 12.9 Span: 0.955 Range: 0.1
 Last Calibration: Date: Jan 17/18 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	0.0000	0.0000	0.0000
5051	39.6	0.0753	0.00784	127.551	9.60
5028	20.2	0.0387	0.00402	248.911	9.63
5033	10.5	0.0198	0.00209	479.333	9.49
Average Cylinder Concentration:					9.58

Previous Stated Concentration PPM: 9.55

Percent variance from Stated: 0

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

Auditor: Al Clark

Date: January 18, 2018

Operator Signature: [Signature]

Location: McIntyre Center Edmonton



Calibration Gas Audit

CH₄ / C₃H₈ Cylinder Gas

File No. 2017-481CGA

Company: <u>Maxxam</u>	Operators name: <u>Mike</u>
Cylinder #: <u>LL119471</u> Conc <u>CH₄</u> (PPM) <u>599/207</u> Tolerance (%) <u>2</u>	Certified By: <u>Praxair</u>
Expiry Date: <u>October 2025</u>	

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model <u>R&R MFC 201</u>	Make/Model <u>Mesa Definer 220</u>
Serial Number <u>AMU 1690</u>	Serial Number <u>H-133034 / L-132702</u>
Last Verification Date <u>December 13, 2017</u>	Temp. °C <u>23.1 C</u>
Gas Type <u>CH₄</u> Conc. <u>990.4</u>	B.P. <u>707 mmHg</u>
Cylinder Number <u>5604875</u> Expiry Date <u>July 2021</u>	
Gas Type <u>C₃H₈</u> Conc. <u>246.5</u>	
Cylinder Number <u>XF003845B</u> Expiry Date <u>July 2022</u>	

Reference Analyzer:

Make/Model <u>Teco 55i</u>	Serial/AMU Number: <u>2108</u>
Instrument Settings Zero: <u>N/A</u>	Span: <u>N/A</u> Range: <u>20.0</u>
Last Calibration: Date: <u>Dec 12/17</u>	C.F. <u>1.000</u> Done By: <u>Al Clark</u>

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
		CH ₄	C ₃ H ₈			CH ₄	C ₃ H ₈
3500	0.0	0.00	0.00	0.02	45.00	603	209
3618	80.4	13.41	12.75	0.02	45.00	603	209
3547	39.8	6.73	6.47	0.01	89.12	600	210
3560	19.8	3.34	3.21	0.01	179.80	601	210
Average Cylinder Concentration:						601	209

<u>CH₄</u>	<u>C₃H₈</u>
Previous Stated Concentration PPM: <u>599</u>	<u>207</u>
Percent variance from Stated: <u>0</u>	<u>1</u>

Cylinder gas tolerances based on CH₄ only

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: December 13, 2017
 Operator Signature: *Al Clark* Location: McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2017-483CGA

Company: Maxxam **Operators name:** Mike

Cylinder #: LL104225 Conc (PPM) 51.5/51.6 Tolerance (%) 2 Certified By: Praxair

Expiry Date: October 2020

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Teco 146i</u>			Make/Model	<u>Mesa Definer 220</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>H-133034 / L-132702</u>
Last Verification Date	<u>December 13, 2017</u>			Temp. °C	<u>23.4 C</u>
Gas Type	<u>NO</u>	Conc.	<u>50.03</u>	B.P.	<u>707 mmHg</u>
Cylinder Number	<u>APEX 1223938</u>				
Expiry Date	<u>June 2020</u>				

Reference Analyzer:

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

Instrument Settings Zero: 4.7 Span: 1.004 Range: 1.0

Last Calibration: Date: Dec12/17 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				
4989	79.5	0.813	0.812	0.016	62.755	51.0	51.0
4995	39.6	0.407	0.406	0.008	126.136	51.3	51.2
4992	19.6	0.202	0.201	0.004	254.694	51.4	51.2
Average Cylinder Concentration:						51.3	51.1

<u>NO</u>	<u>NOx</u>
Previous Stated Concentration PPM: <u>51.5</u>	<u>51.6</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

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

Auditor: Al Clark Date: December 13, 2017

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

***APPENDIX III
MAXIMUM INSTANTANEOUS DATA***



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

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	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	S	0	0	0	0	1	1	24
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	24
3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	S	0	0	0	0	0	0	1	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	24
5	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
6	0	0	0	0	0	0	0	1	0	1	1	2	2	2	S	2	2	2	1	1	1	1	0	1	1	0	2	1	24
7	1	1	1	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	1	0	0	0	0	0	0	1	0	24
8	0	0	0	0	0	0	0	1	1	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
9	0	0	0	0	0	1	1	1	0	0	1	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
10	0	1	1	1	1	2	2	1	1	0	S	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	24
11	0	1	0	0	0	1	0	0	1	2	S	1	1	1	1	1	1	1	1	2	1	1	1	1	0	2	1	24	
12	0	0	0	0	0	0	0	0	0	S	1	1	1	1	1	1	0	1	1	1	1	0	1	0	0	1	0	24	
13	0	0	0	0	0	0	0	0	S	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	24
14	0	0	0	0	0	0	0	S	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
15	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	24
16	0	0	0	0	0	S	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	0	24
17	1	1	0	0	S	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	24
18	0	1	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
19	0	0	S	0	0	0	0	0	0	C	C	C	C	C	C	1	1	1	0	0	1	1	0	0	0	1	0	24	
20	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	S	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	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	S	0	0	0	0	24
23	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	S	0	1	0	1	0	24
24	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	1	0	24
25	0	1	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	S	0	0	0	0	1	0	1	0	24
26	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	1	0	24
27	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
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	1	0	1	0	24
29	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	1	0	24
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	1	1	1	0	0	0	0	0	0	0	0	0	0	24
HOURLY MAX	1	1	1	1	1	1	2	2	1	2	1	2	2	2	2	2	1	2	2	2	1	1	1	1	1				
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				

STATUS FLAG CODES

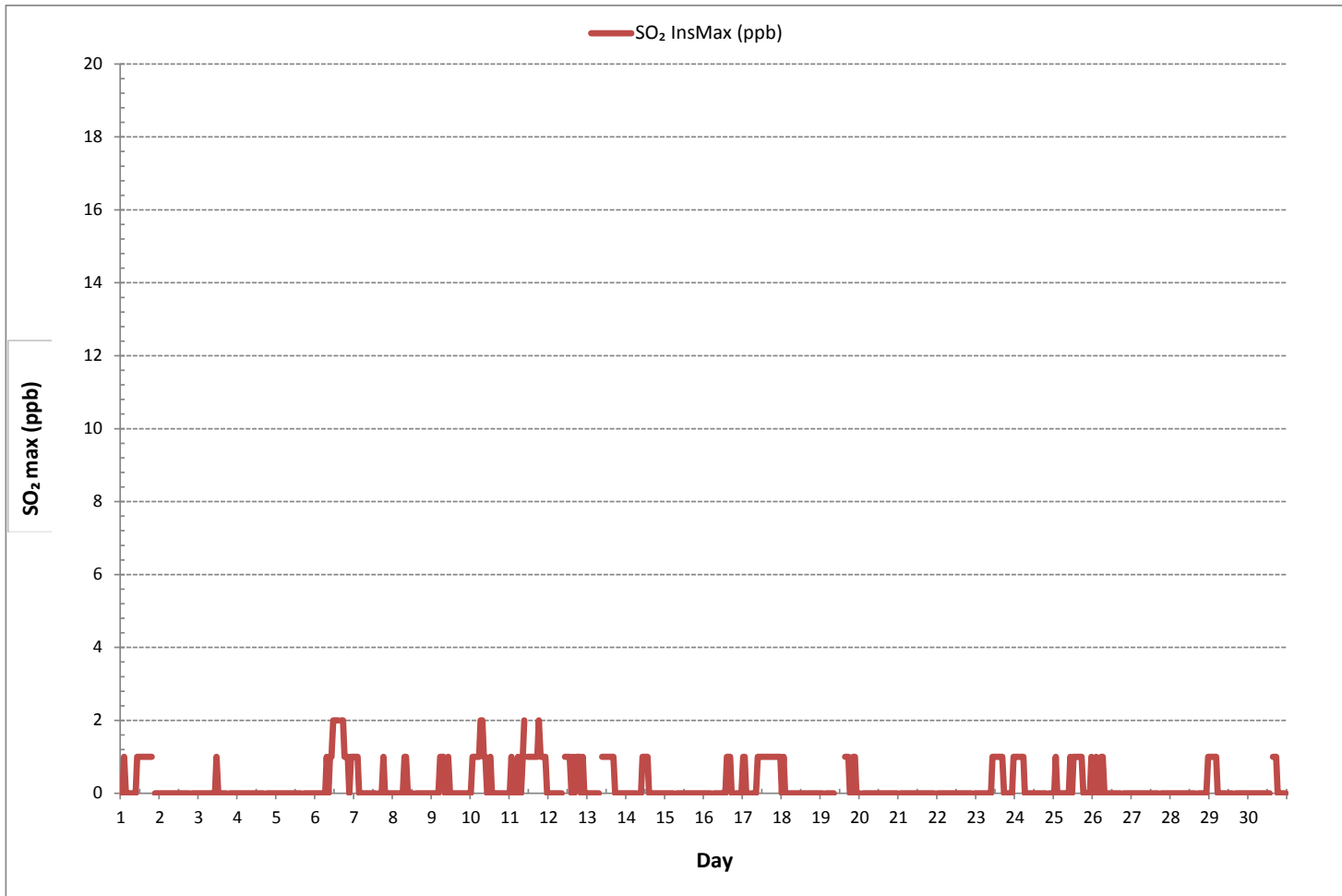
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	144
MAXIMUM INSTANTANEOUS VALUE:	2 ppb @ HOUR 11 ON DAY 6
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	6 hrs
STANDARD DEVIATION:	0
OPERATIONAL TIME:	720 hrs



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018
SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

TOTAL REDUCED SULPHUR Instantaneous Maximum (TRS 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	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	24	
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	24	
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	24	
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	24	
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	24	
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	24	
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	24	
8	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	2	1	1	1	1	1	1	1	1	24	
9	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
10	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
11	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
12	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
13	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
14	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
15	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
16	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
17	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
18	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
19	1	1	S	1	1	1	1	1	C	C	C	C	C	C	1	1	1	1	1	1	1	1	1	1	1	1	24	
20	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
21	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	24	
22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	24	
23	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	24	
24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	24	
25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	24	
26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	24	
27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	24	
28	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	24	
29	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	24	
30	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	24	
HOURLY MAX	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1		
HOURLY AVG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		

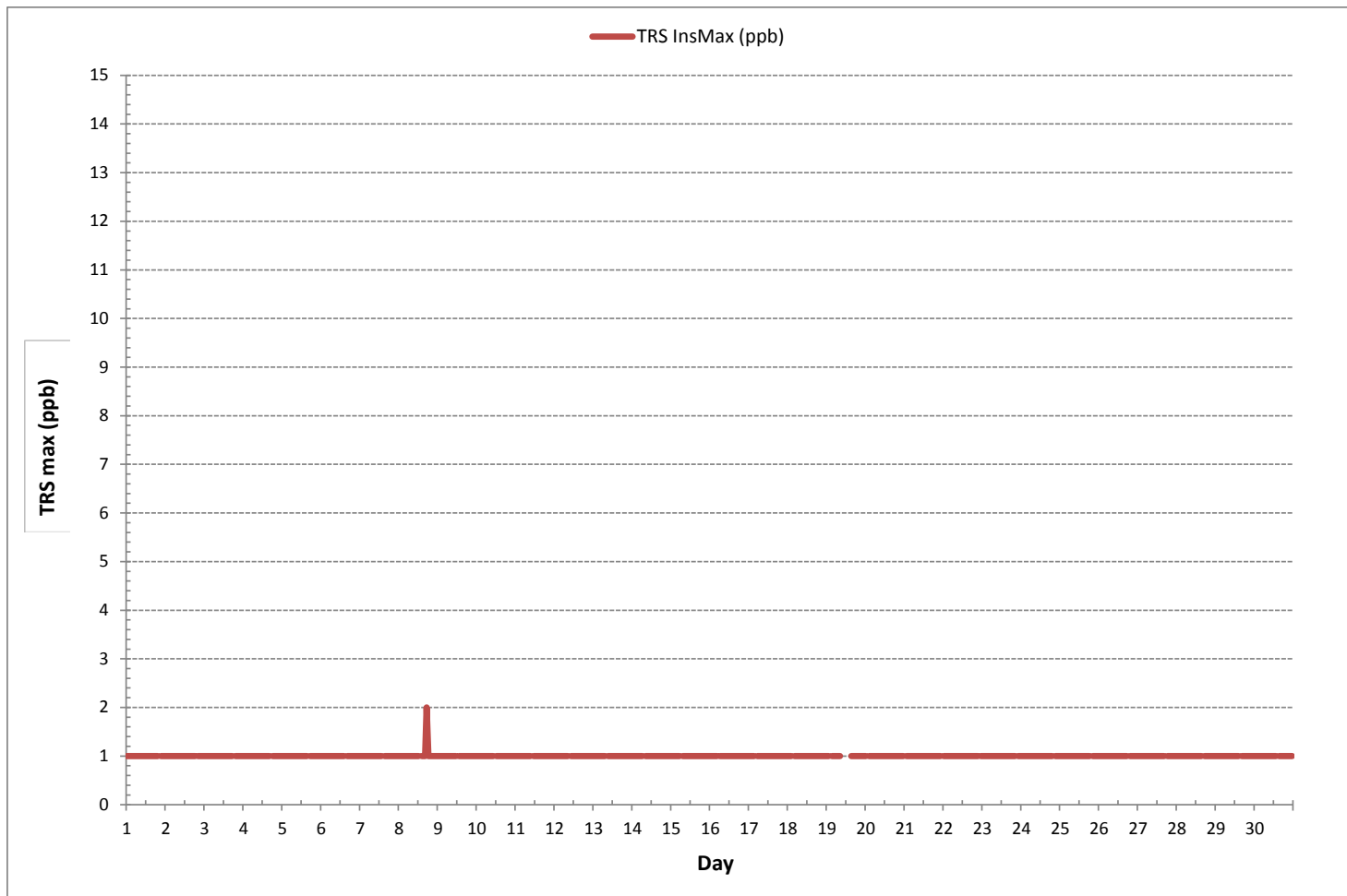
STATUS FLAG CODES

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:	2 ppb @ HOUR 17 ON DAY 8
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	6 hrs
STANDARD DEVIATION:	0
OPERATIONAL TIME:	720 hrs

TOTAL REDUCED SULPHUR Instantaneous Maximum (TRS ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

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	2.33	2.41	2.38	2.00	1.99	1.96	1.96	1.96	1.95	1.95	1.95	1.95	1.97	1.96	1.99	1.97	1.96	2.00	1.96	1.97	S	1.98	1.97	1.97	1.95	1.95	2.41	2.02	24
2	1.99	2.01	2.00	2.00	2.00	2.01	1.98	2.01	1.99	1.99	1.99	1.98	1.96	1.96	1.98	2.32	2.00	2.00	1.96	S	1.97	2.02	2.05	2.07	1.96	1.96	2.32	2.01	24
3	2.05	2.01	2.03	2.03	2.04	2.03	2.06	2.10	2.10	2.08	2.06	2.06	2.07	2.08	2.07	2.11	2.11	2.11	S	2.30	2.28	2.24	2.18	2.16	2.01	2.30	2.10	24	
4	2.12	2.08	2.06	2.06	2.05	2.01	2.00	1.99	1.97	1.95	1.94	1.94	1.94	1.94	1.94	1.96	1.94	S	1.93	1.92	1.92	1.92	1.92	1.92	1.92	1.92	2.12	1.97	24
5	1.92	1.93	1.92	1.93	1.93	1.94	1.93	1.94	1.93	1.94	1.94	1.96	1.94	1.94	1.95	1.94	S	1.94	1.93	1.93	1.94	1.94	1.95	1.95	1.92	1.96	1.94	24	
6	1.94	1.95	1.94	1.95	1.94	1.96	1.96	1.97	1.95	1.97	1.98	1.98	1.98	1.99	1.98	S	2.00	2.00	2.17	2.22	2.05	2.05	2.10	2.04	1.94	2.22	2.00	24	
7	2.09	2.14	2.03	1.99	2.03	2.06	2.10	2.10	2.12	2.10	2.00	1.94	1.95	1.95	S	1.97	1.96	1.98	1.95	1.96	1.96	1.97	1.95	1.99	1.94	2.14	2.01	24	
8	2.00	1.97	1.98	1.97	1.97	1.99	1.99	2.03	1.99	1.99	1.99	1.94	1.95	S	1.96	1.98	2.01	2.07	2.17	2.16	2.16	2.13	2.27	2.36	1.94	2.36	2.04	24	
9	2.29	2.35	2.29	2.08	2.20	2.06	2.05	2.04	2.04	2.02	2.03	2.02	S	2.03	2.02	2.04	2.04	2.06	2.05	2.06	2.14	2.14	2.11	2.17	2.02	2.35	2.10	24	
10	2.16	2.11	2.03	1.97	1.96	1.97	1.97	1.97	1.96	1.99	1.94	S	1.94	1.93	1.96	1.97	1.97	1.98	1.93	1.92	1.92	1.92	1.92	1.93	1.92	2.16	1.97	24	
11	1.94	1.95	1.95	1.94	1.93	1.92	1.92	1.95	1.93	1.95	S	1.95	1.97	1.94	1.96	1.95	1.97	1.96	1.97	1.96	1.96	1.99	1.99	2.02	1.92	2.02	1.96	24	
12	2.10	2.07	2.10	2.19	2.15	2.25	2.26	2.26	2.24	S	2.21	2.17	2.17	2.18	2.44	2.34	2.30	2.33	3.20	2.31	2.31	2.32	2.37	2.32	2.07	3.20	2.29	24	
13	2.35	2.35	2.37	2.48	2.55	3.02	2.61	2.62	S	2.40	2.52	2.43	2.43	2.44	2.48	2.45	2.38	2.71	2.54	2.54	2.59	2.58	2.55	2.51	2.35	3.02	2.52	24	
14	2.44	2.42	2.46	2.54	2.60	2.64	2.65	S	2.97	2.57	2.27	2.41	2.16	2.10	2.03	1.95	1.97	2.05	1.98	2.04	2.19	2.10	2.23	2.26	1.95	2.97	2.31	24	
15	2.42	2.29	2.27	2.23	2.23	2.01	S	1.97	1.98	1.98	1.97	1.96	1.95	1.96	1.95	1.96	1.96	1.96	1.97	1.95	1.96	1.95	1.96	1.94	1.94	2.42	2.03	24	
16	1.94	1.94	1.95	1.95	1.96	S	1.95	1.96	1.94	1.96	1.95	1.96	1.95	1.97	2.00	2.06	2.05	2.05	2.07	2.06	2.12	2.15	2.20	2.10	1.94	2.20	2.01	24	
17	2.04	2.09	2.09	2.06	S	2.17	2.15	2.38	2.39	2.27	2.07	2.12	2.08	2.07	2.09	2.10	2.25	2.10	2.11	2.14	2.19	2.41	2.25	2.13	2.04	2.41	2.16	24	
18	2.06	2.05	2.01	S	2.01	1.99	1.97	1.98	2.02	2.02	2.01	2.01	2.01	2.42	2.00	1.99	2.01	2.01	1.99	1.98	1.97	1.98	1.99	1.99	1.97	2.42	2.02	24	
19	1.98	2.03	S	2.07	2.06	2.06	2.09	2.10	2.13	2.18	2.19	2.20	2.19	2.20	2.40	2.23	2.21	2.24	2.27	2.32	2.45	2.38	2.31	2.33	1.98	2.45	2.20	24	
20	2.33	S	2.28	2.46	2.45	2.46	2.49	2.41	2.28	2.21	2.21	2.18	2.12	2.09	2.07	2.09	2.10	2.08	2.04	2.07	2.08	2.11	2.09	2.04	2.49	2.20	24		
21	S	2.15	2.15	2.17	2.16	2.11	2.55	2.08	2.10	C	C	C	C	C	2.51	2.17	2.15	2.15	2.18	2.17	2.14	2.23	2.16	S	2.08	2.55	2.20	24	
22	2.21	2.15	2.18	2.22	2.23	2.30	2.32	2.34	2.36	2.40	2.44	2.46	2.48	2.49	2.52	2.53	2.55	2.50	2.56	2.63	2.61	2.47	S	2.47	2.15	2.63	2.41	24	
23	2.43	2.49	2.57	2.63	2.61	2.56	2.50	2.42	2.45	2.50	2.11	2.06	2.05	2.05	2.04	2.03	2.03	2.02	2.02	2.03	S	2.02	2.02	2.02	2.02	2.63	2.25	24	
24	2.01	2.02	2.02	2.02	2.02	2.03	2.03	2.08	2.07	2.03	2.02	2.02	2.02	2.01	2.03	2.04	3.11	2.09	2.08	2.06	S	2.15	2.17	2.13	2.01	3.11	2.10	24	
25	2.16	2.25	2.24	2.20	2.20	2.19	2.18	2.18	2.17	2.15	2.15	2.15	2.16	2.17	2.19	2.15	2.13	2.15	2.19	S	2.14	2.17	2.17	2.18	2.13	2.25	2.17	24	
26	2.18	2.23	2.24	2.21	2.23	2.28	2.20	2.21	2.18	2.18	2.15	2.09	2.08	2.07	2.03	2.01	2.02	2.04	S	2.01	2.01	2.00	2.00	2.03	2.00	2.28	2.12	24	
27	2.01	2.04	2.06	2.04	2.01	2.00	2.00	2.00	2.02	2.03	2.02	2.02	2.00	2.01	2.01	2.01	2.01	S	2.03	2.02	2.03	2.01	2.03	2.02	2.00	2.06	2.02	24	
28	2.00	1.99	1.99	1.99	1.99	2.00	2.01	1.99	1.99	2.02	2.03	2.05	2.07	2.12	2.12	S	2.16	2.13	2.11	2.18	2.20	2.22	2.24	1.99	2.24	2.07	24		
29	2.24	2.20	2.23	2.30	2.33	2.36	2.33	2.40	2.58	2.52	2.40	2.48	2.57	2.53	2.59	S	2.55	2.57	2.66	2.63	2.63	2.70	2.71	2.74	2.20	2.74	2.49	24	
30	2.74	2.78	2.85	2.89	2.89	3.88	3.36	3.03	3.09	3.11	2.90	2.86	2.82	2.80	S	2.70	2.59	2.65	2.67	2.69	2.69	2.69	2.65	2.49	2.49	3.88	2.86	24	
HOURLY MAX	2.74	2.78	2.85	2.89	2.89	3.88	3.36	3.03	3.09	3.11	2.90	2.86	2.82	2.80	2.59	2.70	3.11	2.71	3.20	2.69	2.69	2.70	2.71	2.74					
HOURLY AVG	2.15	2.15	2.16	2.16	2.16	2.21	2.19	2.15	2.17	2.16	2.12	2.12	2.11	2.12	2.12	2.11	2.15	2.14	2.17	2.15	2.16	2.17	2.16	2.16					

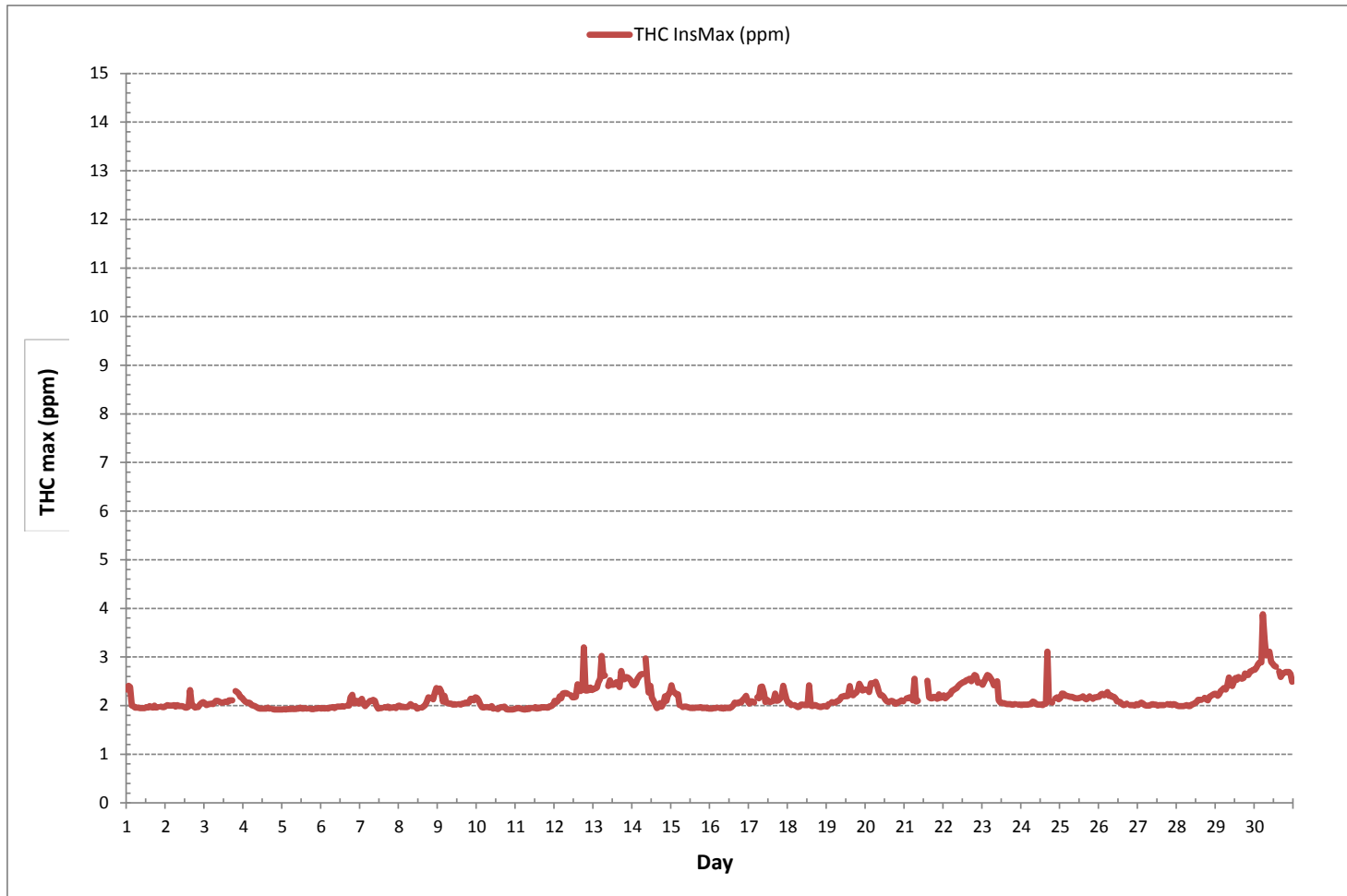
STATUS FLAG CODES

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:	3.88 ppm @ HOUR 5 ON DAY 30
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	720 hrs
STANDARD DEVIATION:	0.24

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

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	2.33	2.41	2.38	2.00	1.99	1.96	1.96	1.96	1.95	1.95	1.95	1.95	1.97	1.96	1.99	1.97	1.96	2.00	1.96	1.97	S	1.98	1.97	1.97	1.95	2.41	2.02	24	
2	1.99	2.01	2.00	2.00	2.00	2.01	1.98	2.01	1.99	1.99	1.99	1.98	1.96	1.96	1.98	1.99	2.00	2.00	1.96	S	1.97	2.02	2.05	2.07	1.96	2.07	1.99	24	
3	2.05	2.01	2.03	2.03	2.04	2.03	2.06	2.10	2.10	2.08	2.06	2.06	2.07	2.08	2.07	2.11	2.11	2.11	S	1.93	2.30	2.28	2.24	2.18	2.16	2.01	2.30	2.10	24
4	2.12	2.08	2.06	2.06	2.05	2.01	2.00	1.99	1.97	1.95	1.94	1.94	1.94	1.94	1.94	1.96	1.94	S	1.93	1.92	1.92	1.92	1.92	1.92	1.92	2.12	1.97	24	
5	1.92	1.93	1.92	1.93	1.93	1.94	1.93	1.94	1.93	1.94	1.94	1.96	1.94	1.94	1.95	1.94	S	1.94	1.93	1.93	1.93	1.94	1.94	1.95	1.95	1.92	1.96	1.94	24
6	1.94	1.95	1.94	1.95	1.94	1.96	1.96	1.97	1.95	1.97	1.98	1.98	1.98	1.99	1.98	S	2.00	2.00	2.00	2.17	2.22	2.05	2.05	2.10	2.04	1.94	2.22	2.00	24
7	2.09	2.14	2.03	1.99	2.03	2.06	2.10	2.10	2.12	2.10	2.00	1.94	1.95	1.95	S	1.97	1.96	1.98	1.95	1.96	1.96	1.97	1.95	1.99	1.94	2.14	2.01	24	
8	2.00	1.97	1.98	1.97	1.97	1.97	1.99	2.03	1.99	1.99	1.99	1.94	1.95	S	1.96	1.98	2.01	2.07	2.17	2.16	2.16	2.13	2.27	2.36	1.94	2.36	2.04	24	
9	2.29	2.35	2.29	2.08	2.20	2.06	2.05	2.04	2.04	2.02	2.03	2.02	S	2.03	2.02	2.04	2.04	2.06	2.05	2.06	2.14	2.14	2.11	2.17	2.02	2.35	2.10	24	
10	2.16	2.11	2.03	1.97	1.96	1.97	1.97	1.97	1.96	1.99	1.94	S	1.94	1.93	1.96	1.97	1.97	1.98	1.93	1.92	1.92	1.92	1.92	1.93	1.92	2.16	1.97	24	
11	1.94	1.95	1.95	1.94	1.93	1.92	1.92	1.95	1.93	1.95	S	1.95	1.97	1.94	1.96	1.95	1.97	1.96	1.97	1.96	1.96	1.99	1.99	2.02	1.92	2.02	1.96	24	
12	2.10	2.07	2.10	2.19	2.15	2.25	2.26	2.26	2.24	S	2.21	2.17	2.17	2.18	2.44	2.34	2.30	2.33	2.34	2.31	2.31	2.32	2.37	2.32	2.07	2.44	2.25	24	
13	2.35	2.35	2.37	2.48	2.55	2.57	2.61	2.62	S	2.40	2.52	2.43	2.43	2.44	2.48	2.45	2.38	2.53	2.54	2.54	2.59	2.58	2.55	2.51	2.35	2.62	2.49	24	
14	2.44	2.42	2.46	2.54	2.60	2.64	2.65	S	2.68	2.57	2.27	2.41	2.16	2.10	2.03	1.95	1.97	2.05	1.98	2.04	2.19	2.10	2.23	2.26	1.95	2.68	2.29	24	
15	2.42	2.29	2.27	2.23	2.23	2.01	S	1.97	1.98	1.98	1.97	1.96	1.95	1.96	1.95	1.96	1.96	1.96	1.97	1.95	1.96	1.95	1.96	1.94	1.94	2.42	2.03	24	
16	1.94	1.94	1.95	1.95	1.96	S	1.95	1.96	1.94	1.96	1.95	1.96	1.95	1.97	2.00	2.06	2.05	2.05	2.07	2.06	2.12	2.15	2.20	2.10	1.94	2.20	2.01	24	
17	2.04	2.09	2.09	2.06	S	2.17	2.15	2.38	2.39	2.27	2.07	2.12	2.08	2.07	2.09	2.10	2.25	2.10	2.11	2.14	2.19	2.41	2.25	2.13	2.04	2.41	2.16	24	
18	2.06	2.05	2.01	S	2.01	1.99	1.97	1.98	2.02	2.02	2.01	2.01	2.01	1.99	2.00	1.99	2.01	2.01	1.99	1.98	1.97	1.98	1.99	1.99	1.97	2.06	2.00	24	
19	1.98	2.03	S	2.07	2.06	2.06	2.09	2.10	2.13	2.18	2.19	2.20	2.19	2.20	2.40	2.23	2.21	2.24	2.27	2.32	2.45	2.38	2.31	2.33	1.98	2.45	2.20	24	
20	2.33	S	2.28	2.46	2.45	2.46	2.49	2.41	2.28	2.21	2.21	2.18	2.12	2.09	2.07	2.09	2.10	2.08	2.04	2.04	2.07	2.08	2.11	2.09	2.04	2.49	2.20	24	
21	S	2.15	2.15	2.17	2.16	2.11	2.10	2.08	2.10	C	C	C	C	C	2.19	2.17	2.15	2.15	2.18	2.17	2.14	2.23	2.16	S	2.08	2.23	2.15	24	
22	2.21	2.15	2.18	2.22	2.23	2.30	2.32	2.34	2.36	2.40	2.44	2.46	2.48	2.49	2.52	2.53	2.55	2.50	2.56	2.63	2.61	2.47	S	2.47	2.15	2.63	2.41	24	
23	2.43	2.49	2.57	2.63	2.61	2.56	2.50	2.42	2.45	2.50	2.11	2.06	2.05	2.05	2.04	2.03	2.03	2.03	2.02	2.02	2.03	S	2.02	2.02	2.02	2.63	2.25	24	
24	2.01	2.02	2.02	2.02	2.02	2.03	2.03	2.08	2.07	2.03	2.02	2.02	2.02	2.01	2.03	2.04	2.10	2.09	2.08	2.06	S	2.15	2.17	2.13	2.01	2.17	2.05	24	
25	2.16	2.25	2.24	2.20	2.20	2.19	2.18	2.18	2.17	2.15	2.15	2.15	2.16	2.17	2.19	2.15	2.13	2.15	2.19	S	2.14	2.17	2.17	2.18	2.13	2.25	2.17	24	
26	2.18	2.23	2.24	2.21	2.23	2.28	2.20	2.21	2.18	2.18	2.15	2.09	2.08	2.07	2.03	2.01	2.02	2.04	S	2.01	2.01	2.01	2.00	2.03	2.00	2.28	2.12	24	
27	2.01	2.04	2.06	2.04	2.01	2.00	2.00	2.00	2.02	2.03	2.02	2.02	2.00	2.01	2.01	2.01	2.01	S	2.03	2.02	2.03	2.01	2.03	2.02	2.00	2.06	2.02	24	
28	2.00	1.99	1.99	1.99	1.99	2.00	2.01	1.99	1.99	2.02	2.03	2.05	2.07	2.12	2.12	2.12	S	2.16	2.13	2.11	2.18	2.20	2.22	2.24	1.99	2.24	2.07	24	
29	2.24	2.20	2.23	2.30	2.33	2.36	2.33	2.40	2.58	2.52	2.40	2.48	2.57	2.53	2.59	S	2.55	2.57	2.66	2.63	2.63	2.70	2.71	2.74	2.20	2.74	2.49	24	
30	2.74	2.78	2.85	2.89	2.89	2.90	2.98	3.03	3.09	3.11	2.90	2.86	2.82	2.80	S	2.70	2.59	2.65	2.67	2.69	2.69	2.69	2.65	2.49	2.49	3.11	2.80	24	
HOURLY MAX	2.74	2.78	2.85	2.89	2.89	2.90	2.98	3.03	3.09	3.11	2.90	2.86	2.82	2.80	2.59	2.70	2.59	2.65	2.67	2.69	2.69	2.70	2.71	2.74					
HOURLY AVG	2.15	2.15	2.16	2.16	2.16	2.16	2.16	2.15	2.16	2.16	2.12	2.12	2.11	2.11	2.11	2.10	2.12	2.14	2.14	2.15	2.16	2.17	2.16	2.16					

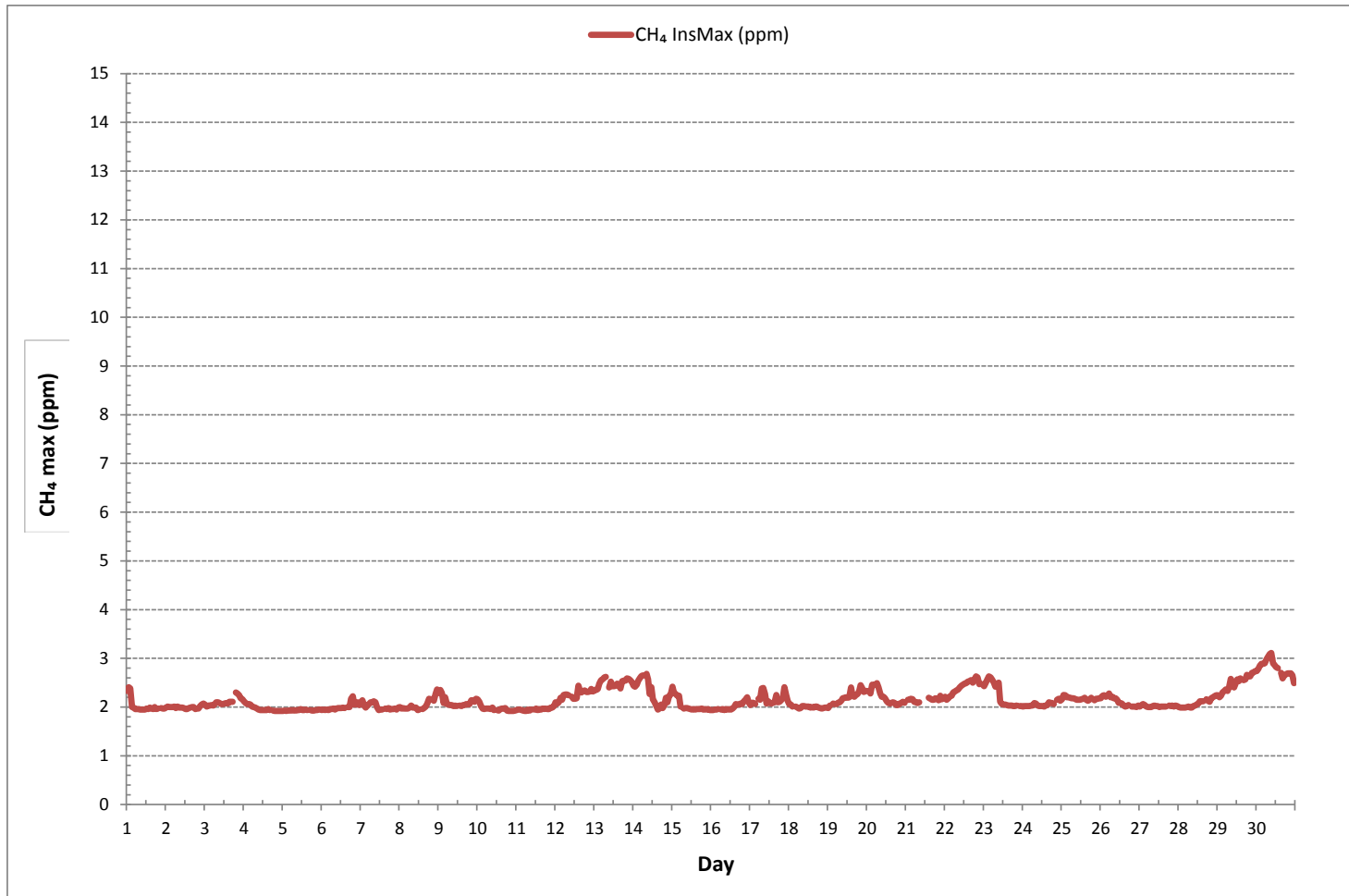
STATUS FLAG CODES

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:	3.11 ppm @ HOUR 9 ON DAY 30
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	0.22
OPERATIONAL TIME:	720 hrs

METHANE MAX Instantaneous Maximum (CH₄ ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

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.	
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	0.00	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	0.00	24	
2	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	0.34	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.01	24
3	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	0.00	0.00	0.00	0.00	24
4	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	0.00	0.00	0.00	0.00	0.00	24
5	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	0.00	0.00	0.00	0.00	0.00	0.00	24
6	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
7	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
8	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	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	24
10	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
11	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	0.00	0.00	0.00	0.00	0.00	24
12	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	0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.88	0.04	24
13	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.04	24
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.51	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	0.51	0.02	24
15	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	0.00	0.00	24
16	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	0.00	0.00	0.00	24
17	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	0.00	0.00	0.00	0.00	24
18	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	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.02	24
19	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	0.00	0.00	24
20	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	0.00	0.00	0.00	24
21	S	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.00	C	C	C	C	C	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.45	0.05	24
22	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	0.00	S	0.00	0.00	0.00	24
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	24
24	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	1.01	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	1.01	0.04	24
25	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	0.00	0.00	0.00	24
26	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	0.00	0.00	0.00	0.00	24
27	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	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
28	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	0.00	0.00	0.00	0.00	0.00	0.00	24
29	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
30	0.00	0.00	0.00	0.00	0.00	0.99	0.39	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	0.99	0.06	24
HOURLY MAX	0.00	0.00	0.00	0.00	0.00	0.99	0.45	0.00	0.51	0.00	0.00	0.00	0.00	0.43	0.37	0.34	1.01	0.34	0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
HOURLY AVG	0.00	0.00	0.00	0.00	0.00	0.05	0.03	0.00	0.02	0.00	0.00	0.00	0.00	0.02	0.01	0.01	0.04	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24

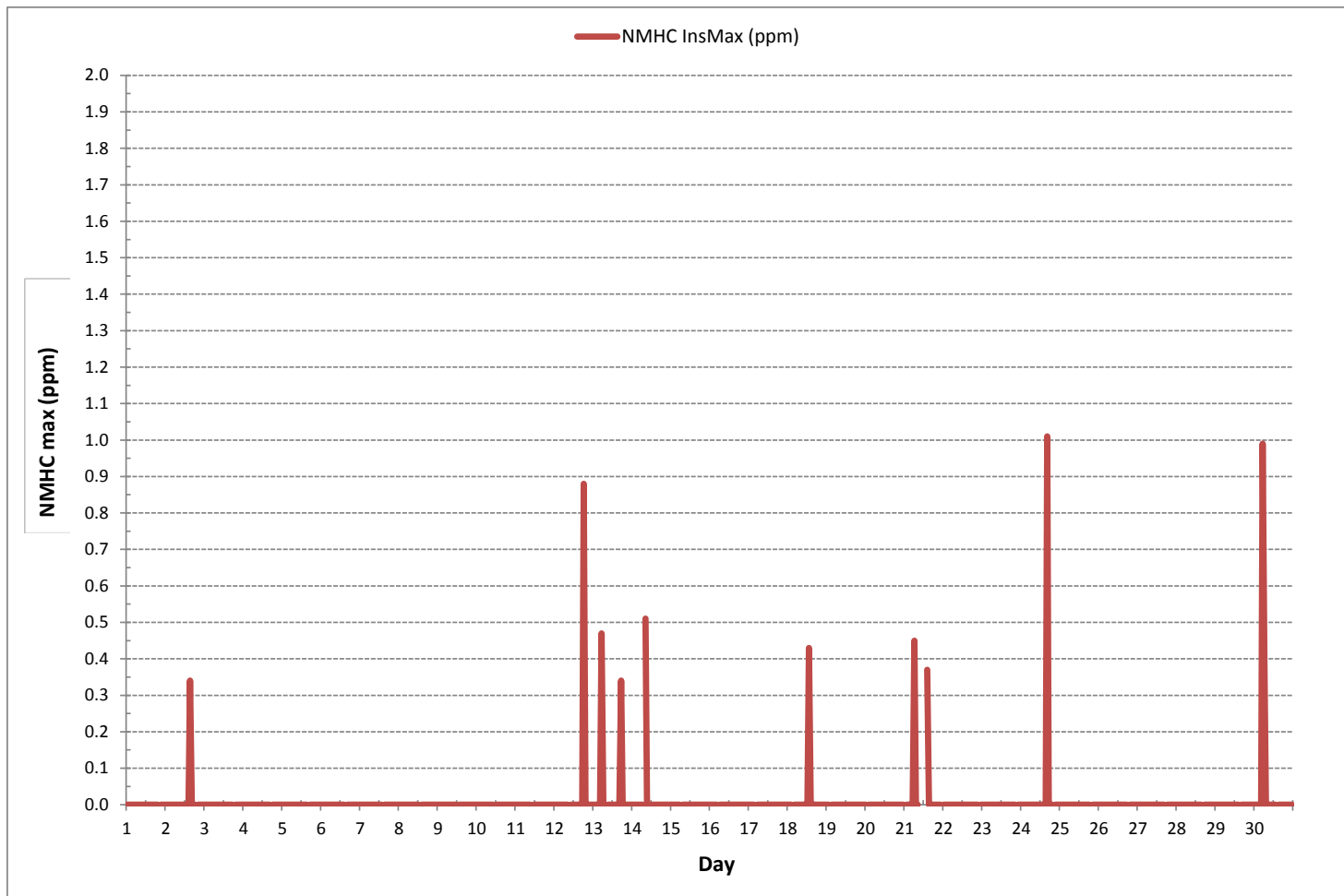
STATUS FLAG CODES

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

NUMBER OF NON-ZERO READINGS:	11
MAXIMUM INSTANTANEOUS VALUE:	1.01 ppm @ HOUR 16 ON DAY 24
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	0.08
OPERATIONAL TIME:	720 hrs

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

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	8	6	6	2	1	2	3	6	2	3	17	2	7	4	6	5	4	5	9	5	S	6	3	2	1	17	5	24	
2	2	4	3	4	3	5	11	5	5	9	4	3	7	6	6	3	4	3	2	S	3	1	2	1	1	11	4	24	
3	2	1	2	1	1	1	1	2	3	2	4	6	4	16	7	7	6	6	S	15	13	6	7	6	1	16	5	24	
4	4	3	3	3	4	4	4	3	7	4	6	6	4	4	5	4	2	S	2	1	1	1	1	1	1	7	3	24	
5	1	1	1	1	1	0	1	1	1	1	1	1	2	2	2	2	S	3	2	1	1	1	1	1	1	0	3	1	24
6	1	2	2	2	1	2	2	2	2	2	6	6	12	13	8	S	7	6	6	9	11	11	8	4	1	13	5	24	
7	3	4	5	6	5	7	9	11	12	12	3	2	2	1	S	3	2	2	3	2	3	4	4	3	1	12	5	24	
8	3	2	1	2	1	3	7	14	11	5	2	6	2	S	8	5	24	21	19	17	11	13	6	5	1	24	8	24	
9	3	4	5	3	3	4	5	4	3	3	5	3	S	4	4	4	5	4	5	5	5	9	7	8	3	9	5	24	
10	10	7	6	4	3	4	6	6	4	3	3	S	3	2	3	7	5	5	2	1	2	1	1	1	1	10	4	24	
11	1	3	2	1	1	2	1	1	2	4	S	3	2	3	3	5	6	6	6	5	4	10	4	10	1	10	4	24	
12	10	10	7	7	6	4	6	4	7	S	6	9	4	5	7	8	7	8	27	8	7	13	12	10	4	27	8	24	
13	10	11	10	14	15	27	27	16	S	59	12	8	7	9	10	21	24	32	12	29	40	12	11	8	7	59	19	24	
14	10	12	7	9	16	22	16	S	37	17	27	19	11	6	7	7	7	13	20	13	19	22	33	36	6	37	17	24	
15	38	34	17	8	5	4	S	5	5	3	6	12	10	5	5	6	5	7	5	6	5	2	2	2	2	38	9	24	
16	2	2	1	1	2	S	1	2	2	2	3	2	1	3	8	13	17	10	10	10	8	7	7	6	1	17	5	24	
17	8	6	7	10	S	25	18	18	16	10	11	10	11	26	54	16	20	16	14	15	12	22	9	9	6	54	16	24	
18	7	6	5	S	5	4	3	4	5	5	12	8	7	7	7	9	12	14	6	7	4	5	5	3	14	7	24		
19	4	2	S	2	2	2	4	6	4	C	C	C	C	C	C	C	C	16	19	33	56	107	31	20	2	107	21	24	
20	18	S	13	14	15	24	25	29	22	11	7	6	5	7	5	7	6	8	6	10	5	4	5	4	4	29	11	24	
21	S	4	4	4	4	6	6	8	6	10	6	6	5	8	8	14	7	19	5	6	7	6	9	S	4	19	7	24	
22	10	7	5	4	6	8	9	10	11	11	14	24	15	13	15	18	23	20	30	28	43	14	S	12	4	43	15	24	
23	12	25	17	21	17	17	16	15	11	12	9	11	5	5	12	5	5	4	2	3	3	S	4	2	2	25	10	24	
24	3	2	2	2	4	3	3	6	70	3	3	2	1	6	2	2	9	3	2	5	S	3	4	3	1	70	6	24	
25	3	3	3	3	4	4	3	3	8	3	3	5	8	8	6	11	5	4	4	S	4	4	4	4	3	11	5	24	
26	3	3	3	4	5	8	3	4	3	8	4	10	3	4	6	9	13	3	S	5	7	3	3	4	3	13	5	24	
27	3	4	4	3	4	11	7	12	6	6	4	5	6	6	9	10	8	S	5	11	8	5	5	4	3	12	6	24	
28	4	6	3	3	5	5	8	5	10	9	4	6	6	3	4	12	S	41	11	9	9	6	7	8	3	41	8	24	
29	9	8	7	7	13	40	13	37	20	14	9	10	14	10	11	S	14	29	17	14	13	15	18	15	7	40	16	24	
30	16	13	9	16	20	19	35	42	65	49	12	12	15	12	S	14	25	15	29	17	17	17	15	16	9	65	22	24	
HOURLY MAX	38	34	17	21	20	40	35	42	70	59	27	24	15	26	54	21	25	41	30	33	56	107	33	36					
HOURLY AVG	7	7	6	6	6	9	9	10	12	10	7	7	6	7	8	8	10	11	10	10	12	11	8	7					

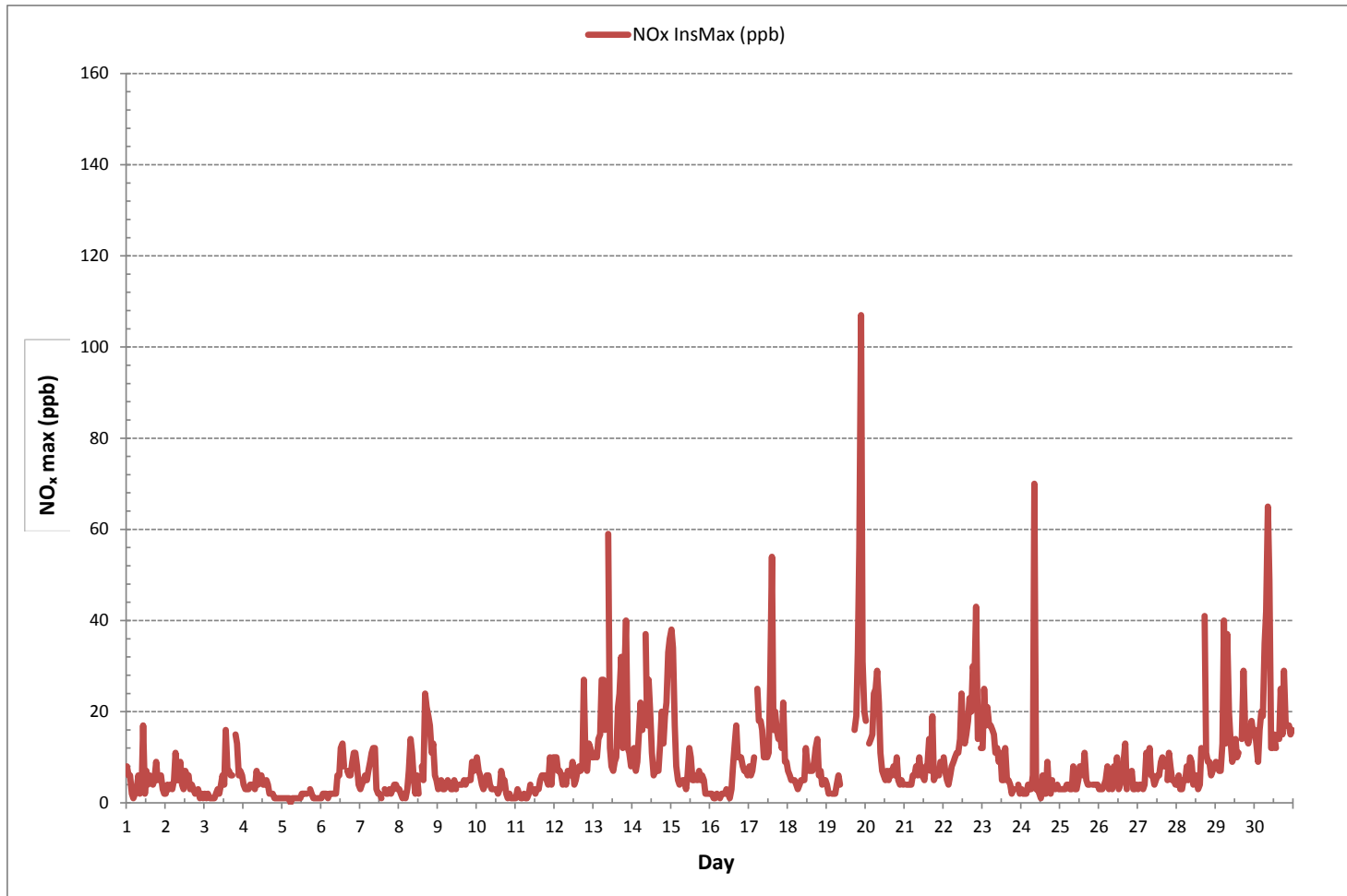
STATUS FLAG CODES

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:	680
MAXIMUM INSTANTANEOUS VALUE:	107 ppb @ HOUR 21 ON DAY 19
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	9
OPERATIONAL TIME:	720 hrs

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

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	1	0	0	0	0	0	0	6	0	1	13	0	2	1	1	1	1	1	2	1	S	1	1	1	0	13	2	24	
2	0	2	1	1	1	2	5	6	4	6	2	1	6	3	5	1	2	0	1	S	0	0	0	0	0	6	2	24	
3	0	0	0	0	0	0	0	0	1	1	2	2	1	4	3	3	1	2	S	4	2	1	5	1	0	5	1	24	
4	1	0	1	1	1	1	2	2	10	1	15	4	2	2	2	2	1	S	1	0	0	0	0	0	0	15	2	24	
5	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	S	0	0	0	0	0	0	0	1	0	24	
6	0	1	0	0	0	0	1	0	0	0	2	2	5	6	2	S	1	0	0	1	2	2	2	0	0	6	1	24	
7	0	1	2	2	2	2	1	2	2	3	2	1	1	0	S	1	0	0	0	0	0	1	2	2	1	0	3	1	24
8	1	0	0	0	0	0	2	4	3	2	1	4	1	S	2	1	14	6	3	6	12	4	1	1	0	14	3	24	
9	0	1	1	0	0	0	1	0	0	1	2	1	S	1	1	1	2	1	1	0	0	2	1	1	0	2	1	24	
10	2	0	0	0	0	0	0	0	0	1	1	S	1	1	1	3	1	1	0	0	0	0	0	0	0	3	1	24	
11	0	0	0	0	0	1	0	0	0	1	S	1	1	1	1	1	1	1	1	1	1	1	2	1	3	0	3	1	24
12	2	1	1	2	1	1	1	1	1	S	4	4	1	2	2	1	1	0	18	1	0	2	3	3	0	18	2	24	
13	1	3	1	2	2	14	12	7	S	30	8	4	3	4	4	6	7	12	2	8	19	2	1	0	0	30	7	24	
14	2	6	1	4	4	7	6	S	20	6	13	7	3	1	2	1	2	0	6	4	4	11	15	18	0	20	6	24	
15	21	19	6	1	1	1	S	1	4	2	3	9	3	1	3	3	2	3	3	2	2	1	1	1	1	21	4	24	
16	1	1	0	0	1	S	0	0	1	0	2	0	1	1	3	7	5	1	3	1	2	2	1	1	0	7	2	24	
17	2	1	1	1	S	5	3	6	5	4	4	4	6	18	29	7	4	2	2	1	1	11	1	1	1	29	5	24	
18	1	1	1	S	1	1	1	1	2	1	2	3	4	3	3	2	1	7	2	2	3	1	2	1	1	7	2	24	
19	1	0	S	0	0	0	1	4	3	C	C	C	C	C	C	C	C	4	4	15	36	83	17	10	0	83	12	24	
20	9	S	2	1	2	9	11	18	8	5	3	3	4	2	2	2	3	5	2	5	1	1	2	1	1	18	4	24	
21	S	0	0	1	1	3	2	15	1	5	3	2	2	3	2	5	1	8	1	1	2	1	2	S	0	15	3	24	
22	3	2	1	1	1	1	1	1	3	5	6	11	8	5	6	7	7	11	13	12	24	4	S	3	1	24	6	24	
23	2	9	5	13	8	2	1	1	2	3	3	6	2	1	2	1	1	1	0	1	1	S	1	0	0	13	3	24	
24	1	0	1	1	1	0	1	1	25	1	1	1	0	4	1	1	2	0	0	3	S	1	1	1	0	25	2	24	
25	0	0	1	1	1	1	0	1	3	1	1	6	5	6	2	3	1	1	1	S	1	1	1	0	0	6	2	24	
26	1	0	0	0	1	2	1	1	1	4	1	4	1	1	2	3	2	1	S	3	4	1	1	1	0	4	2	24	
27	0	1	1	1	1	2	6	4	1	3	2	2	7	2	3	4	2	S	1	4	2	1	1	1	0	7	2	24	
28	1	1	1	2	1	2	2	1	2	6	3	1	1	1	1	5	S	19	3	3	1	1	1	1	1	19	3	24	
29	0	1	1	1	5	15	4	22	13	20	3	6	10	4	3	S	2	16	5	3	3	4	6	6	0	22	7	24	
30	6	3	1	8	12	10	21	27	59	36	5	5	7	4	S	3	11	2	19	5	5	4	4	6	1	59	11	24	
HOURLY MAX	21	19	6	13	12	15	21	27	59	36	15	11	10	18	29	7	14	19	19	15	36	83	17	18					
HOURLY AVG	2	2	1	2	2	3	3	5	6	5	4	3	3	3	3	3	3	4	3	3	5	5	3	2					

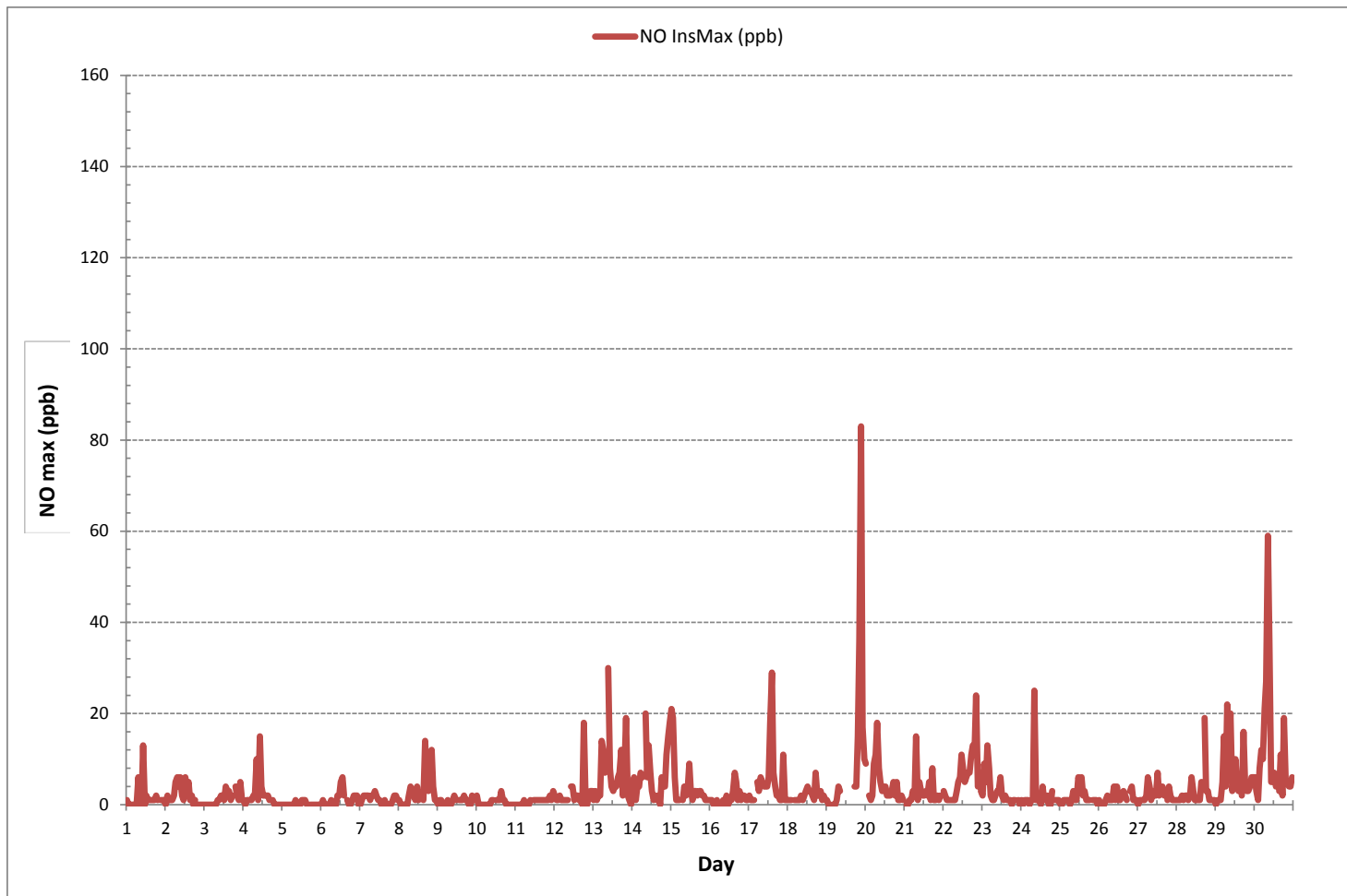
STATUS FLAG CODES

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:	550
MAXIMUM INSTANTANEOUS VALUE:	83 ppb @ HOUR 21 ON DAY 19
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	720 hrs
STANDARD DEVIATION:	6

NITRIC OXIDE Instantaneous Maximum (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

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	7	6	6	2	1	2	2	3	2	2	6	2	5	3	4	4	4	4	7	4	S	5	2	2	1	7	4	24		
2	2	3	2	3	3	4	6	4	3	4	2	2	3	3	3	2	3	2	2	S	3	1	1	1	1	1	6	3	24	
3	1	1	1	1	1	1	1	2	2	2	2	4	3	12	4	4	4	5	S	12	11	5	5	5	5	1	12	4	24	
4	3	2	3	3	3	3	3	2	3	4	4	3	2	2	3	2	1	S	2	1	1	1	1	0	1	0	4	2	24	
5	0	0	0	1	1	0	1	1	1	1	0	0	2	1	2	2	S	3	2	1	1	1	1	1	1	0	3	1	24	
6	1	1	1	2	2	2	2	2	2	1	4	4	8	7	6	S	6	6	5	8	9	9	6	4	1	9	4	24		
7	3	3	4	4	3	7	8	9	10	9	2	1	1	1	S	3	2	2	3	2	3	2	3	2	3	2	1	10	4	24
8	2	1	1	2	1	3	6	12	8	3	2	2	2	S	6	4	13	15	16	11	9	9	5	4	1	16	6	24		
9	3	3	4	2	3	4	5	4	3	2	5	2	S	3	3	3	4	4	4	5	7	7	8	2	8	4	24			
10	8	7	6	4	3	4	6	6	4	3	2	S	2	1	2	7	5	5	2	1	2	1	1	1	1	8	3	24		
11	1	3	2	1	1	2	1	1	1	3	S	3	2	2	3	4	5	5	5	5	4	8	4	7	1	8	3	24		
12	9	8	6	6	5	4	5	3	6	S	3	5	3	3	5	6	6	7	11	7	6	10	11	9	3	11	6	24		
13	9	9	9	13	13	14	15	11	S	43	7	6	4	5	6	15	18	21	11	22	22	12	10	8	4	43	13	24		
14	8	8	6	8	12	15	12	S	22	11	13	12	7	5	5	7	6	13	14	10	15	13	18	19	5	22	11	24		
15	18	18	12	7	4	4	S	4	4	2	4	8	7	4	3	4	4	4	3	4	3	2	2	1	1	18	5	24		
16	1	1	1	1	1	S	1	2	2	2	2	2	1	2	7	8	13	9	8	8	7	6	6	5	1	13	4	24		
17	6	5	6	9	S	22	15	13	10	6	7	6	7	15	35	12	17	15	12	13	11	15	9	8	5	35	12	24		
18	7	6	4	S	4	3	3	4	4	4	4	9	5	5	4	6	8	6	12	4	4	3	3	5	3	12	5	24		
19	3	2	S	2	2	2	3	3	4	C	C	C	C	C	C	C	C	14	15	18	22	25	14	10	2	25	9	24		
20	9	S	11	13	13	16	15	15	16	6	5	3	4	6	3	5	4	4	4	6	4	3	4	3	3	16	7	24		
21	S	4	4	3	3	4	4	5	4	5	3	4	4	6	6	9	6	11	4	5	6	6	7	S	3	11	5	24		
22	7	6	4	4	5	7	8	9	9	7	8	14	8	8	10	14	17	14	17	19	11	S	10	4	19	10	24			
23	10	17	13	12	15	16	16	14	9	9	7	6	4	4	10	4	4	3	2	2	3	S	3	2	2	17	8	24		
24	2	2	2	2	3	3	2	5	46	2	2	1	1	2	2	2	7	2	2	3	S	2	3	2	1	46	4	24		
25	3	3	3	2	3	3	3	2	4	2	2	3	3	4	4	8	4	4	3	S	4	4	3	3	2	8	3	24		
26	3	3	3	3	4	6	3	3	2	4	3	6	2	3	5	6	12	3	S	3	3	3	2	3	2	12	4	24		
27	2	3	4	3	4	9	6	8	5	6	3	4	5	5	7	7	5	S	5	7	6	4	4	4	2	9	5	24		
28	3	5	2	3	3	4	7	4	9	4	2	5	5	2	3	7	S	23	10	8	8	5	7	8	2	23	6	24		
29	8	7	7	6	9	25	9	19	11	10	5	6	6	6	8	S	12	13	12	11	11	11	12	11	5	25	10	24		
30	10	10	8	9	9	10	14	15	17	13	8	7	7	8	S	12	15	14	13	13	13	13	12	11	7	17	11	24		
HOURLY MAX	18	18	13	13	15	25	16	19	46	43	13	14	8	15	35	15	18	23	17	22	22	25	18	19						
HOURLY AVG	5	5	5	5	5	7	6	6	8	6	4	5	4	5	6	6	8	8	7	8	8	7	6	5						

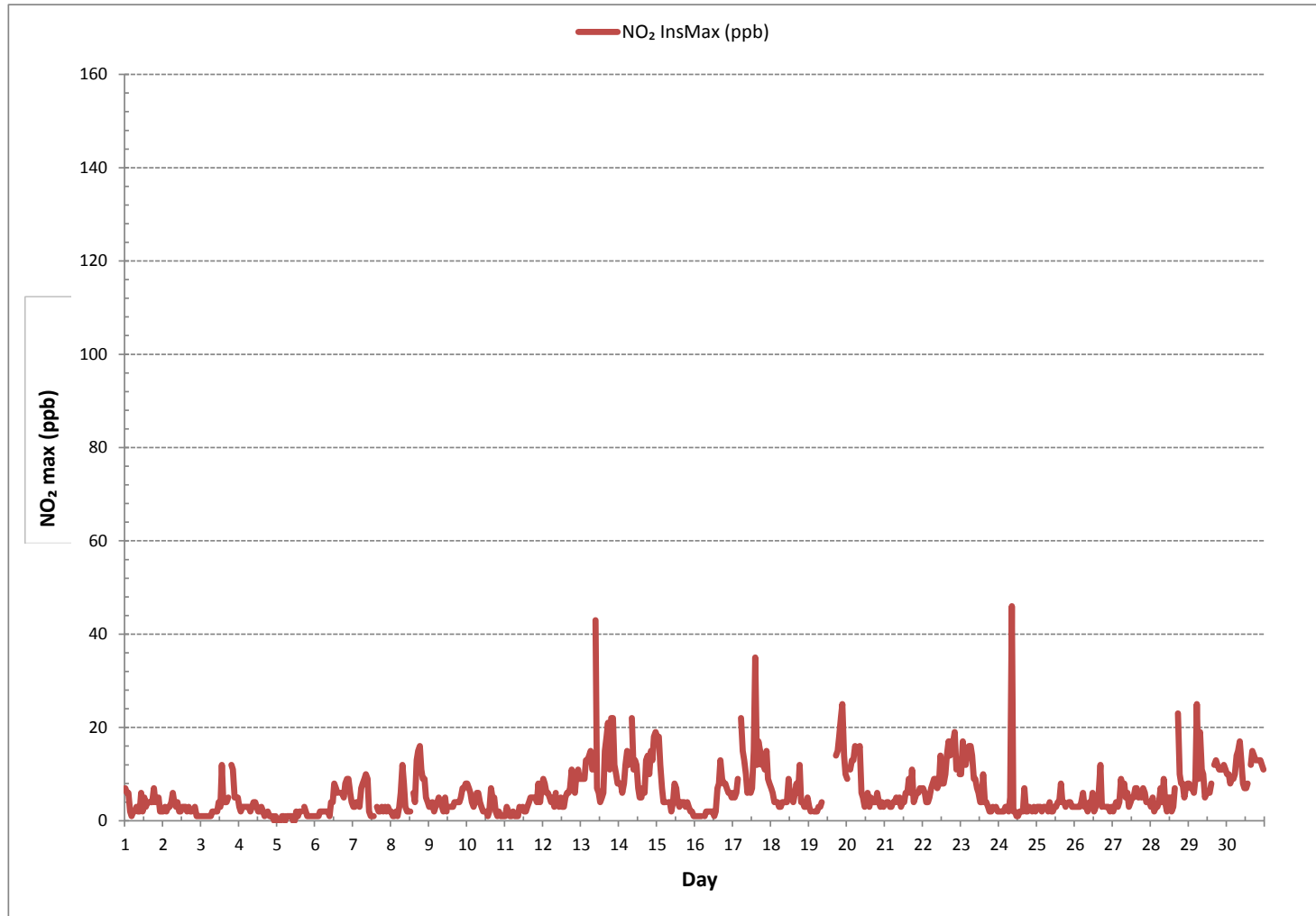
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	674
MAXIMUM INSTANTANEOUS VALUE:	46 ppb @ HOUR 8 ON DAY 24
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	5
OPERATIONAL TIME:	720 hrs

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

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 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	16.9	17.3	19.2	16.3	17.9	13.6	11.2	19.4	22.6	21.8	26.0	26.7	26.2	27.4	28.5	27.3	27.0	28.0	26.1	27.2	S	29.4	29.4	29.7	11.2	29.7	23.3	24	
2	29.4	28.9	27.9	26.7	25.6	18.7	15.8	15.1	15.1	14.2	18.1	22.2	25.5	26.3	25.8	23.3	23.5	24.4	24.5	S	23.4	23.1	22.1	21.1	14.2	29.4	22.6	24	
3	21.1	22.8	22.2	22.5	22.1	21.6	20.3	19.3	17.8	17.4	16.1	15.3	14.0	14.1	14.2	13.7	12.9	12.7	S	10.5	10.5	10.4	10.7	12.2	10.4	22.8	16.3	24	
4	12.8	15.0	15.0	15.3	15.9	16.3	16.0	15.2	15.8	15.9	15.1	15.0	14.0	13.4	13.3	11.3	16.7	S	20.3	22.2	23.5	25.1	26.0	28.1	11.3	28.1	17.3	24	
5	30.3	30.9	31.8	32.2	32.5	32.8	32.7	32.6	31.9	31.8	31.6	31.3	30.8	31.6	32.9	33.0	S	33.8	33.9	33.7	33.5	32.4	32.2	32.2	30.3	33.9	32.3	24	
6	32.0	31.6	31.4	30.7	31.1	30.9	30.5	30.3	31.0	30.9	30.0	28.7	28.1	26.1	25.8	S	23.6	23.6	23.5	22.5	19.8	22.6	25.6	28.2	19.8	32.0	27.8	24	
7	27.4	27.6	27.6	28.7	28.1	25.3	22.3	20.0	21.3	26.8	30.2	32.8	33.5	33.5	S	35.4	34.9	34.3	32.7	32.9	33.4	34.1	34.7	34.3	20.0	35.4	30.1	24	
8	35.1	36.2	34.6	31.7	32.7	33.0	32.5	29.1	31.5	32.5	33.5	34.0	34.1	S	34.4	33.9	30.2	24.8	21.8	21.8	23.1	25.9	26.5	28.1	21.8	36.2	30.5	24	
9	28.1	28.6	29.0	29.7	29.4	30.1	29.8	30.1	30.4	31.0	31.0	31.2	S	30.9	30.7	30.1	28.7	27.5	27.5	26.5	23.7	21.5	20.1	18.4	18.4	31.2	28.0	24	
10	15.3	14.6	22.8	25.7	25.9	25.7	25.1	26.2	31.6	29.7	29.5	S	32.3	32.6	32.2	30.5	29.0	34.1	36.1	38.5	38.0	38.3	38.4	37.6	14.6	38.5	30.0	24	
11	37.7	38.2	39.9	39.4	38.6	38.3	37.4	36.7	36.1	34.6	S	35.7	35.3	34.9	34.6	34.1	32.8	31.0	32.0	32.5	34.2	32.2	29.9	26.1	26.1	39.9	34.9	24	
12	23.9	26.8	27.6	27.5	27.2	27.6	27.7	27.6	27.1	S	27.8	27.8	27.7	27.4	27.2	25.8	24.1	22.5	19.7	18.8	18.3	18.0	16.5	14.8	14.8	27.8	24.3	24	
13	14.1	10.7	8.7	5.9	4.7	2.4	11.0	11.8	S	13.6	15.7	16.6	17.3	17.5	16.8	16.3	13.0	16.4	17.5	15.2	13.4	13.4	14.1	14.4	2.4	17.5	13.1	24	
14	14.0	12.2	11.1	8.0	4.6	4.3	5.3	S	9.8	22.8	20.9	29.9	35.1	37.3	36.7	36.2	35.3	33.2	25.5	18.6	21.2	16.1	13.5	1.4	1.4	37.3	19.7	24	
15	0.7	1.8	3.8	13.7	17.3	20.2	S	22.5	21.7	23.0	24.9	26.8	27.0	26.6	26.3	25.2	25.7	25.9	27.0	27.8	28.5	29.2	30.7	32.4	0.7	32.4	22.1	24	
16	32.4	32.6	32.8	33.6	33.5	S	32.3	32.7	32.9	33.4	33.8	35.6	35.7	35.7	35.1	29.2	27.5	25.3	25.5	24.5	26.0	25.4	26.2	25.2	24.5	35.7	30.7	24	
17	25.5	22.7	20.1	19.1	S	10.2	12.8	12.7	15.9	19.0	19.5	20.3	21.1	20.7	20.3	19.2	17.5	13.5	13.7	14.1	13.1	13.9	16.5	17.6	10.2	25.5	17.3	24	
18	17.0	20.0	20.6	S	23.2	23.9	24.8	24.1	23.2	22.2	21.4	21.8	22.3	23.5	23.5	23.3	23.6	23.3	24.3	24.7	25.1	25.5	25.2	25.0	17.0	25.5	23.1	24	
19	25.6	25.1	S	24.7	24.1	23.5	22.9	23.0	22.2	21.7	21.0	20.4	19.9	18.9	17.3	15.8	12.8	12.1	8.6	8.6	3.3	1.5	1.0	1.1	1.0	25.6	16.3	24	
20	1.0	S	5.7	6.7	2.6	1.5	0.7	4.4	11.2	10.1	10.2	12.6	14.6	14.8	15.9	16.9	17.5	17.9	18.1	18.4	18.2	17.7	16.5	15.6	0.7	18.4	11.7	24	
21	S	17.9	18.1	17.9	17.4	16.8	16.9	17.1	17.3	C	C	C	C	C	C	C	15.3	15.1	15.6	15.4	14.7	14.2	14.8	14.6	S	14.2	18.1	16.2	24
22	14.6	13.8	14.9	14.1	13.7	13.1	10.0	9.7	8.1	9.0	11.0	10.1	10.3	11.0	11.0	9.6	5.6	8.4	6.6	4.2	1.8	6.7	S	11.9	1.8	14.9	10.0	24	
23	12.6	11.3	7.0	1.2	4.9	8.8	10.8	12.7	13.3	12.2	18.2	19.5	19.0	20.6	22.1	22.6	22.3	25.6	25.6	25.3	25.1	S	26.7	26.3	1.2	26.7	17.1	24	
24	25.9	25.2	25.9	26.2	25.7	26.5	26.1	26.3	28.1	28.8	29.4	33.0	33.7	33.7	31.7	29.8	29.1	28.1	27.0	25.9	S	25.0	24.9	24.7	24.7	33.7	27.9	24	
25	23.8	23.8	23.8	24.0	23.9	23.6	23.0	23.0	22.8	22.9	22.8	22.3	22.1	21.7	21.5	21.1	21.1	20.8	20.6	S	20.3	19.6	19.0	20.3	19.0	24.0	22.1	24	
26	21.1	21.8	21.9	20.7	20.2	22.4	23.1	24.6	25.1	25.4	25.9	26.4	26.7	26.3	26.3	26.3	25.4	24.5	S	24.7	24.9	24.9	24.9	24.7	20.2	26.7	24.3	24	
27	24.6	24.4	24.4	24.3	23.6	23.3	21.8	22.4	22.0	22.8	23.3	22.9	23.0	23.6	23.6	23.8	24.8	S	25.9	26.2	26.8	26.4	26.3	27.1	21.8	27.1	24.2	24	
28	28.0	28.2	28.4	28.3	28.2	28.5	27.9	28.3	28.5	27.9	27.0	26.6	26.3	25.4	25.5	23.8	S	22.4	21.5	21.3	20.0	15.1	13.1	11.8	11.8	28.5	24.4	24	
29	10.8	10.9	11.1	11.5	10.7	7.3	5.8	6.4	6.2	8.7	10.0	10.7	10.0	9.7	9.5	S	7.7	5.5	3.9	2.7	2.5	2.5	1.4	0.7	0.7	11.5	7.2	24	
30	0.4	0.5	0.4	0.4	0.4	0.4	1.0	0.5	1.1	6.8	8.9	10.7	12.7	12.0	S	12.2	11.4	8.7	7.5	5.0	4.7	3.8	5.9	6.3	0.4	12.7	5.3	24	
HOURLY MAX	37.7	38.2	39.9	39.4	38.6	38.3	37.4	36.7	36.1	34.6	33.8	35.7	35.7	37.3	36.7	36.2	35.3	34.3	36.1	38.5	38.0	38.3	38.4	37.6					
HOURLY AVG	20.8	21.4	21.0	20.9	20.9	19.7	19.9	20.8	21.4	22.0	22.6	23.8	24.2	24.2	24.5	23.8	22.1	22.3	21.9	21.0	20.4	20.5	21.1	20.6					

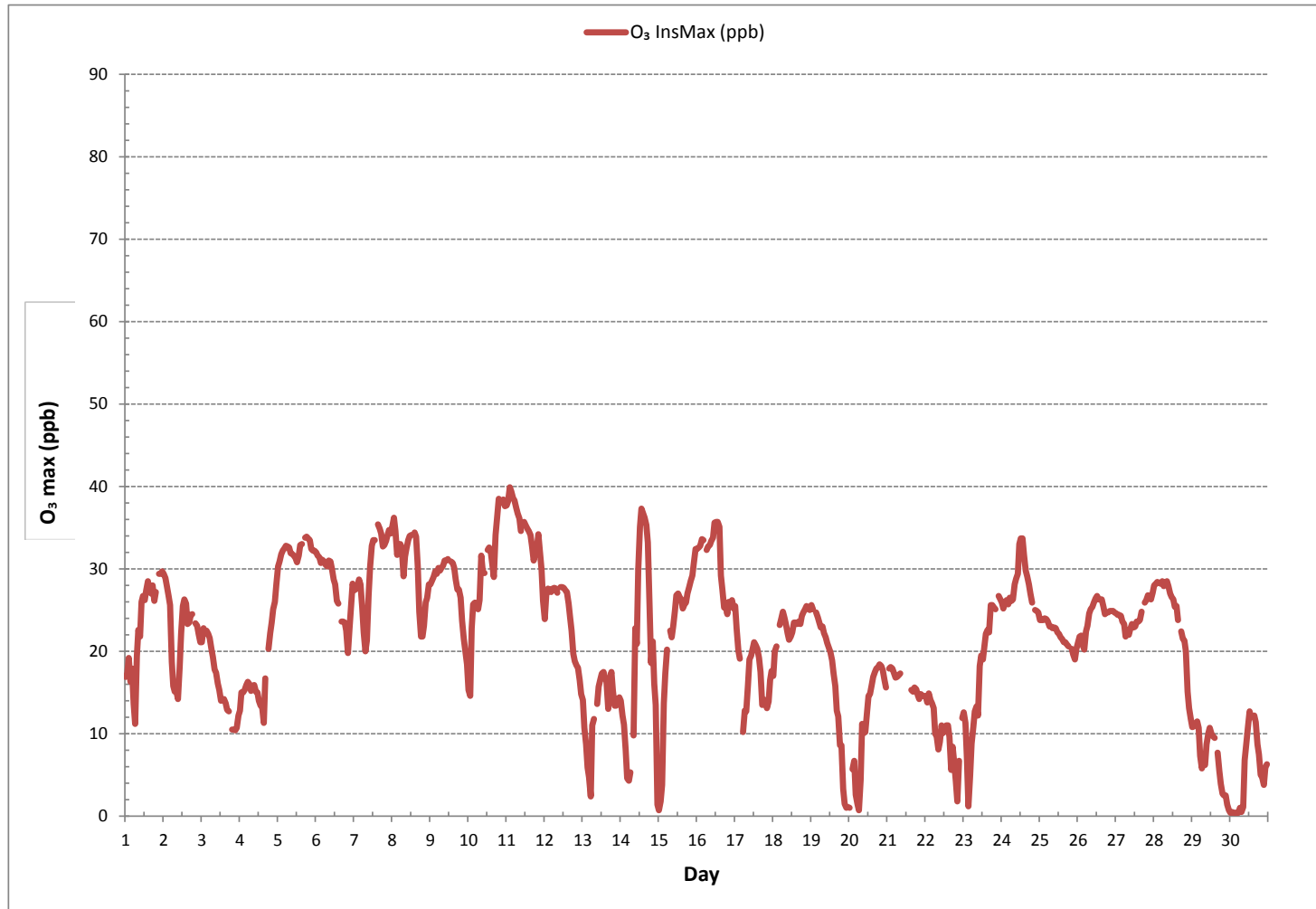
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	683
MAXIMUM INSTANTANEOUS VALUE:	39.9 ppb @ HOUR 2 ON DAY 11
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	6 hrs
STANDARD DEVIATION:	9.0
OPERATIONAL TIME:	720 hrs

OZONE Instantaneous Maximum (O₃ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2018

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 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	6.4	12.3	20.8	26.4	31.5	31.8	29.3	32.3	38.1	26.4	32.0	26.6	27.9	24.2	23.5	19.2	9.8	9.6	8.1	8.9	12.3	15.4	18.1	14.4	6.4	38.1	21.1	24
2	19.1	15.7	19.1	18.9	23.7	21.8	27.4	23.2	22.5	30.8	35.9	24.9	23.5	21.4	21.5	22.4	18.4	18.4	15.2	14.7	14.0	15.0	12.3	15.8	12.3	35.9	20.6	24
3	14.7	14.9	17.1	24.2	21.3	25.7	22.7	20.3	25.7	24.5	18.1	21.1	17.6	17.6	17.9	13.0	7.5	7.9	8.4	6.0	7.3	13.3	11.5	15.7	6.0	25.7	16.4	24
4	17.6	22.3	19.6	22.0	30.3	32.8	30.3	31.5	28.6	28.8	26.9	27.9	29.3	24.9	27.6	35.3	45.9	49.8	56.9	47.9	47.9	46.7	46.2	55.2	17.6	56.9	34.7	24
5	X	X	64.0	46.4	44.9	54.7	40.3	45.7	48.5	41.1	38.6	34.0	32.0	34.2	35.0	34.7	30.4	28.3	36.9	31.0	28.4	26.9	28.6	26.9	26.9	64.0	37.8	22
6	29.3	30.2	24.2	30.4	26.9	26.4	22.3	16.7	17.9	16.2	14.8	24.0	22.0	21.6	21.9	18.1	14.2	12.1	12.7	11.8	13.7	12.5	14.3	17.6	11.8	30.4	19.7	24
7	14.4	12.3	10.5	10.5	21.0	11.8	22.4	13.0	9.1	11.8	16.9	23.5	24.2	20.8	29.3	26.9	33.2	27.1	26.4	20.1	22.7	24.2	19.6	11.9	9.1	33.2	19.3	24
8	21.8	24.5	17.9	23.0	29.2	25.7	18.9	20.1	23.0	22.7	27.0	23.6	15.4	14.2	12.0	9.3	9.8	10.1	12.1	10.6	8.8	15.0	11.5	15.9	8.8	29.2	17.6	24
9	18.4	16.9	13.5	17.9	16.2	17.8	16.3	19.6	20.3	25.4	27.4	24.2	17.4	14.7	12.7	10.9	8.8	8.1	4.7	3.0	7.4	11.8	16.2	11.8	3.0	27.4	15.1	24
10	13.2	13.2	43.0	55.7	41.1	33.5	29.6	29.6	32.0	21.0	23.2	22.5	26.9	22.7	19.1	11.3	13.5	17.9	38.1	46.4	40.3	47.9	36.7	32.5	11.3	55.7	29.6	24
11	28.3	32.0	37.7	38.9	33.5	36.9	29.3	28.3	30.6	41.0	34.7	38.6	30.1	27.6	26.4	21.1	21.3	12.5	19.7	11.8	14.7	6.2	10.3	11.0	6.2	41.0	25.9	24
12	12.7	10.6	10.9	9.8	18.2	11.5	11.5	15.2	10.4	14.8	10.6	10.6	13.0	9.3	10.3	9.1	6.9	7.6	4.9	6.5	6.7	4.9	3.8	4.9	3.8	18.2	9.8	24
13	4.2	4.5	3.5	3.2	2.5	4.2	9.6	8.6	12.5	8.4	12.0	13.6	14.2	15.7	15.9	11.5	10.9	11.3	12.5	4.6	9.1	4.0	5.2	8.1	2.5	15.9	8.7	24
14	7.4	7.4	5.9	6.4	5.7	10.4	11.0	13.0	9.7	16.2	11.5	14.0	22.0	32.5	22.5	23.0	31.5	7.6	6.5	5.3	5.8	6.9	4.5	3.3	3.3	32.5	12.1	24
15	4.2	5.2	7.7	8.3	12.7	20.3	13.5	26.9	26.2	28.6	22.7	25.4	26.2	22.0	26.9	23.0	22.0	25.5	35.2	24.7	29.3	33.2	36.2	37.1	4.2	37.1	22.6	24
16	37.1	40.1	34.2	42.3	34.2	28.9	30.3	35.2	32.8	29.3	28.8	28.9	17.1	19.3	19.3	20.8	15.9	15.7	18.1	18.6	20.3	21.0	21.5	23.0	15.7	42.3	26.4	24
17	21.9	11.6	12.0	12.0	9.1	4.7	3.7	13.2	9.8	11.1	16.7	21.0	15.3	15.7	22.5	9.3	11.5	8.6	5.2	10.2	8.6	10.1	11.5	15.3	3.7	22.5	12.1	24
18	20.5	26.7	22.1	23.0	24.7	28.4	31.3	30.8	21.3	22.0	31.0	26.7	30.1	28.8	25.2	25.4	19.6	19.6	24.5	19.8	17.6	18.6	16.2	12.0	12.0	31.3	23.6	24
19	19.8	17.1	18.4	16.2	19.6	19.6	12.3	20.2	20.1	15.2	15.7	12.7	10.8	14.5	17.9	17.6	9.9	7.1	6.9	8.6	7.4	6.3	2.9	2.8	2.8	20.2	13.3	24
20	4.2	4.5	7.1	6.2	5.4	3.6	4.0	7.1	13.0	16.7	26.4	28.6	30.6	30.8	31.0	34.3	31.5	23.7	25.9	25.4	17.4	17.1	19.1	27.4	3.6	34.3	18.4	24
21	21.4	21.6	23.3	18.4	21.5	17.6	21.8	20.6	22.3	20.1	14.5	22.5	22.7	18.5	21.3	15.9	18.9	25.2	18.7	17.4	15.2	13.0	11.8	12.7	11.8	25.2	19.0	24
22	11.3	8.4	18.1	17.6	15.9	20.4	18.4	17.0	17.9	19.3	15.4	20.4	26.9	18.9	25.4	20.1	14.7	22.5	15.4	10.3	14.4	15.9	17.0	15.7	8.4	26.9	17.4	24
23	14.5	12.0	5.2	3.3	7.6	10.1	10.6	9.8	10.1	20.1	26.9	25.8	24.5	22.3	23.8	25.7	25.7	28.6	23.5	21.5	26.3	24.5	24.2	23.7	3.3	28.6	18.8	24
24	24.5	21.5	24.2	26.4	23.2	19.7	16.8	14.7	11.5	11.3	12.5	17.4	13.7	17.6	15.5	10.1	10.8	17.4	17.9	19.8	15.0	20.6	19.1	21.3	10.1	26.4	17.6	24
25	23.2	22.5	18.1	20.1	16.4	18.1	17.9	17.2	18.1	18.1	20.1	18.1	18.4	16.7	17.9	21.5	19.7	22.3	18.4	21.8	18.6	22.5	20.2	24.5	16.4	24.5	19.6	24
26	20.1	22.4	24.0	17.1	13.5	23.7	22.3	25.3	24.7	28.3	27.5	27.0	28.1	28.6	30.8	36.4	35.7	26.4	27.0	26.9	34.0	31.1	33.0	27.1	13.5	36.4	26.7	24
27	31.1	18.6	26.4	22.3	23.7	22.4	23.7	32.4	24.7	26.3	24.0	22.3	21.5	35.1	21.8	19.3	23.8	23.5	28.3	25.7	24.5	22.5	21.0	17.9	17.9	35.1	24.3	24
28	19.1	18.4	21.5	17.9	13.3	17.5	16.7	19.8	22.3	18.6	17.4	16.9	17.9	18.6	15.4	14.2	12.3	8.6	8.6	8.2	10.2	7.2	6.7	11.0	6.7	22.3	14.9	24
29	13.0	11.0	10.7	12.0	8.4	6.9	9.6	12.8	12.3	12.5	11.8	14.0	12.5	10.8	12.0	7.9	6.4	4.2	7.4	4.8	4.2	5.7	6.2	3.1	3.1	14.0	9.2	24
30	3.5	3.2	3.0	4.2	4.2	4.5	6.5	2.8	4.2	7.4	8.4	8.4	8.4	6.0	7.6	6.9	4.1	3.3	3.1	4.2	4.2	4.9	6.4	7.1	2.8	8.4	5.3	24
HOURLY MAX	37.1	40.1	64.0	55.7	44.9	54.7	40.3	45.7	48.5	41.1	38.6	38.6	32.0	35.1	35.0	36.4	45.9	49.8	56.9	47.9	47.9	47.9	46.2	55.2				

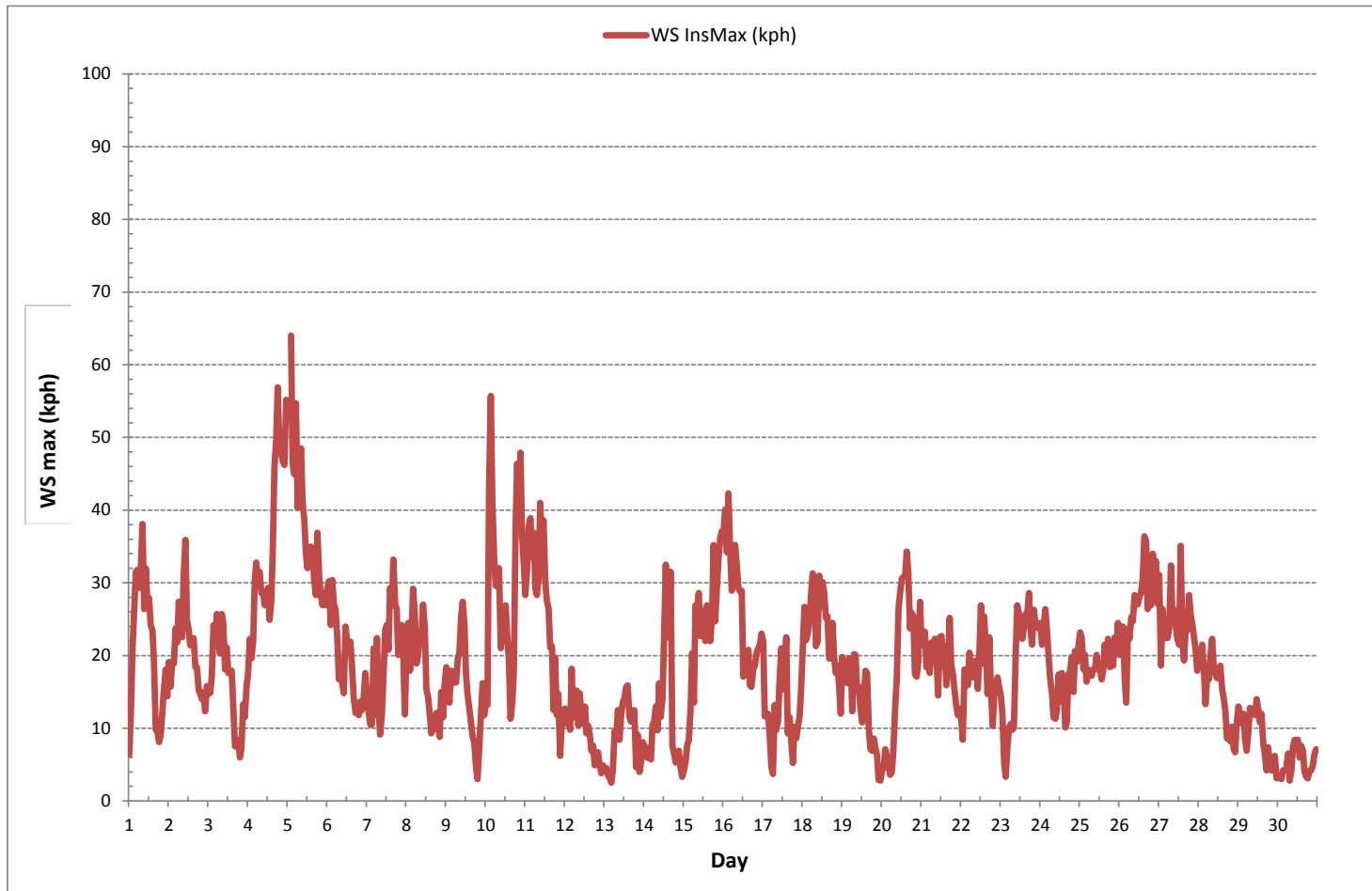
STATUS FLAG CODES

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

MAXIMUM INSTANTANEOUS VALUE:	64.0	kph	@ HOUR	2	ON DAY	5	
OPERATIONAL TIME:						718	hrs

WIND SPEED Instantaneous Maximum (WS kph)



***APPENDIX IV
REPORT CERTIFICATION FORM***

Report Certification Form

Alberta Airshed (if applicable)	EPA Approval or Code of Practice Registration # (if applicable)
NO	N/A
Company Name (if applicable)	Industrial Operation Name (if applicable)
Lakeland Industry & Community Association	Cold Lake South Continuous Monitoring Station
Name of the Representative of the Person Responsible	Position / Title of the Representative of the Person Responsible
Mike Bisaga	
Is an External Party Certifying the Report? If 'Yes', fill in the fields below for the external person.	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Name of External Person Certifying the Report	Position / Title of External Person Certifying the Report
Wunmi Adekanmbi	Project Team Lead, Customer Service - Air Services
Company Name for the External Person Certifying the Report	Identification of Qualifications / Professional Designations of the External Person Certifying the Report
Maxxam Analytics, A Bureau Veritas Group Company	M.Sc., EPT, PMP

Maxxam Analytics is the designated contractor conducting monitoring and reporting activities. I certify that the submitted data has been (a) reviewed and validated as per the AMD Chapter 6: Ambient Data Quality. I certify that the submitted report (b) accurately reflects the monitoring results and reporting timeframe and (c) meets the specified analysis, summarization and reporting requirements as per the AMD Chapter 9: Reporting.



Signature of the External Person Certifying the Report

27-Dec-2018

Report Issued Date (dd-mon-yyyy)

APPENDIX V
DATA VALIDATION CERTIFICATION FORM



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2018-11-1-C</u>
Site: <u>Cold Lake South Continuous Monitoring Station</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u>Maram Ghalab</u>	Date <u>18-Dec-2018</u>
Level 1 Primary Validation	<u>Maram Ghalab</u>	Date <u>18-Dec-2018</u>
Level 2 Final Validation	<u>Maram Ghalab</u>	Date <u>24-Dec-2018</u>
Level 3 Independent Data Review	<u>msalmba</u>	Date <u>27-Dec-2018</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.

Alberta Environment and Parks (AEP)
Air.Reporting@gov.ab.ca

January 3, 2019

Subject: Monthly Report Submission for the LICA Maskwa station

Lakeland Industry & Community Association (LICA) is pleased to submit the ambient air monitoring monthly report for the LICA Maskwa AQM Station in the month of November 2018.

The air monitoring program consists of continuous air monitoring results for 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).

Sampling Program	Monitoring Activities Conducted By	Sample Analysis Conducted By	Data/Report Review and Prepared By	Electronic Submission Conducted By
Continuous ambient air	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics

All data collected in November was compliant with the requirements outlined in the Air Monitoring Directive 2016 (AMD 2016).

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

Precipitation: A configuration error occurred during the datalogger upgrade on May 31 and was corrected on November 1 during hour 16 and hour 17. Data collected during this time frame, at rates greater than or equal to 0.3 millimeter /minute, might be compromised and should therefore be used with caution.

Should you have any questions, please don't hesitate to contact us.

Respectfully,



Michael Bisaga
 Technical Program Manager
 Lakeland Industry & Community Association
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Lakeland Industry & Community Association
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A handwritten signature in blue ink, appearing to read "Lily Lin", is written over a light blue rectangular background.

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

JOB #: 2833-2018-11-30-C

November 2018

Prepared for:

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
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Attention: MIKE BISAGA

DATE: **December 28, 2018**

Prepared by:



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SUMMARY

In November 2018, 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

All data collected this month were within the Alberta Ambient Air Quality Objectives and Guidelines (November, 2018).

H₂S: One hour of downtime was recorded on November 17, at hour 9:00, due to an additional zero-span check performed to assess a biased low drift in span response.

THC: The fuel gas (H₂) was depleted on November 13 and the gas cylinder was replaced on the same day. Eleven hours of downtime were incurred due to this event.

Precipitation: A configuration error occurred during the datalogger upgrade on May 30, and was corrected on November 1, at hour 16:00. Consequently, data collected during this time frame, at rates greater than or equal to 0.3 mm/min, might be compromised and should therefore be used with caution. Two hours of downtime were recorded on November 1, at hours 16:00 – 17:00, due to this correction event.

The summary of results is presented on the following pages.

Any deviations or modifications made to the sampling or analytical methods are outlined in Section 1.0, Discussion. On this basis, Maxxam 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.

Monthly Continuous Data Summary

Lakeland Industry & Community Association Maskwa Continuous Monitoring Station						MAXIMUM VALUES							OPERATIONAL TIME (%)
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	1-HOUR					24-HOUR		
	1-hr	24-hr	1-hr	24-hr		READING	DAY	HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
SO ₂ (ppb)	172	48	0	0	1	6	9	21	4.3	NW	2	10	100.0
H ₂ S (ppb)	10	3	0	0	0	2	4	1	5.2	ESE	0	1	99.9
THC (ppm)	-	-	-	-	2.20	3.15	30	4	3.3	SSW	2.70	30	98.5
NO ₂ (ppb)	159	-	0	-	5	23	14	6	6.5	SSW	11	29	100.0
NO (ppb)	-	-	-	-	2	26	23	12	6.1	NNE	6	13	100.0
NO _x (ppb)	-	-	-	-	7	41	23	12	6.1	NNE	16	13	100.0
RELATIVE HUMIDITY (%)	-	-	-	-	91	100	1	0	2.3	NW	100	20	100.0
BAROMETRIC PRESSURE (millibar)	-	-	-	-	936	955	11	16	2.5	NNW	951	11	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	-7.2	7.4	14	14	4.6	W	1.7	14	100.0
PRECIPITATION (mm)	-	-	-	-	0.5	0.3	1	0	2.3	NW	0.5	1	99.7
VECTOR WS (kph)	-	-	-	-	0.7	14.1	15	22	-	NNE	7.9	4	100.0
VECTOR WD (sec)	-	-	-	-	85 (E)	-	-	-	-	-	-	-	100.0

* Precipitation: data represents the total (sum) for the indicated time frame.

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).

The sample inlet filter for all continuous air analyzers are replaced 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 (December, 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. The minimum and maximum statistics are highlighted in the data table and are for reference only. The highlighted cells are based on the software's interpretation of the exact position of the minimum or maximum value. The visual presentation of these statistics may not be the obvious choice in a data range due to rounding, truncating or analyzer specifications.

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)

- Operational time, for the monitoring period was 100%.
- The routine monthly calibration was performed on November 27.

HYDROGEN SULPHIDE (H₂S)

- Operational time for the monitoring period was 99.9%, equivalent to 1 hour of downtime.
- The analyzer spanned close to the lower acceptance limit on November 17. An additional zero-span check performed the same day, at hour 09:00 was within limits, but exhibited a similar response. The results of subsequent automated daily zero-span checks exhibited no drift, hence, no further action was required. One hour of downtime was incurred due to the additional quality check.
- The routine monthly calibration was performed on November 27.

TOTAL HYDROCARBONS (THC)

- Operational time for the monitoring period was 98.5%, equivalent to 11 hours of downtime.
- The analyzer flamed out on November 13, at hour 10:00, as the fuel gas (H₂) was depleted. The gas cylinder was replaced at hour 20:00 on the same day. Eleven hours of downtime were recorded, due to this event.
- The automated daily zero-span check, scheduled for hour 14:00 on November 27, was interrupted by routine monthly calibration activities. Impacted minute concentrations, recorded at 14:00 - 14:01, were excluded and the hourly average was recalculated. The corresponding maximum instantaneous data was invalidated.

OXIDES OF NITROGEN (NO_x), NITRIC OXIDE (NO) and NITROGEN DIOXIDE (NO₂)

- Operational time, for the monitoring period was 100%.
- The routine monthly calibration was performed on November 27.

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

- Operational time for the monitoring period was 100%.
- Wind data is reported as vector 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.

RELATIVE HUMIDITY (RH)

- Operational time for the monitoring period was 100%.

BAROMETRIC PRESSURE (BP)

- Operational time for the monitoring period was 100%.

PRECIPITATION (PRECIP)

- Operational time for the monitoring period was 99.7%, equivalent to 2 hours of downtime.
- A configuration error occurred during the datalogger upgrade on May 30, and was corrected on November 1, at hour 16:00. Consequently, data collected during this time frame, at rates greater than or equal to 0.3 mm/min, might be compromised and should therefore be used with caution. Two hours of downtime were recorded on November 1, at hours 16:00 – 17:00, due to this correction event.

AMBIENT TEMPERATURE (AmbTPX)

- Operational time for the monitoring period was 100%.

2.0 Project Personnel

Mike Bisaga and Lily Lin were the contacts 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.

All data collected this month were within the Alberta Ambient Air Quality Objectives and Guidelines (November, 2018).

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-00013: RM Young Wind Monitor Calibration
- 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 - Thermo 43I - TLE UV Fluorescent Analyzer
- Hydrogen Sulphide - Thermo 450i UV Fluorescent Analyzer
- Total Hydrocarbons - Thermo 51C FID Analyzer
- Oxides of Nitrogen - Thermo 42i Chemiluminescent Analyzer
- Wind System - RM Young Unit
- Relative Humidity - Rotronic Hygroclip Unit
- Barometric Pressure - Met One Unit
- Ambient Temperature - Rotronic Hygroclip Unit
- Precipitation - Met One Unit
- Datalogger - Envidas Ultimate

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

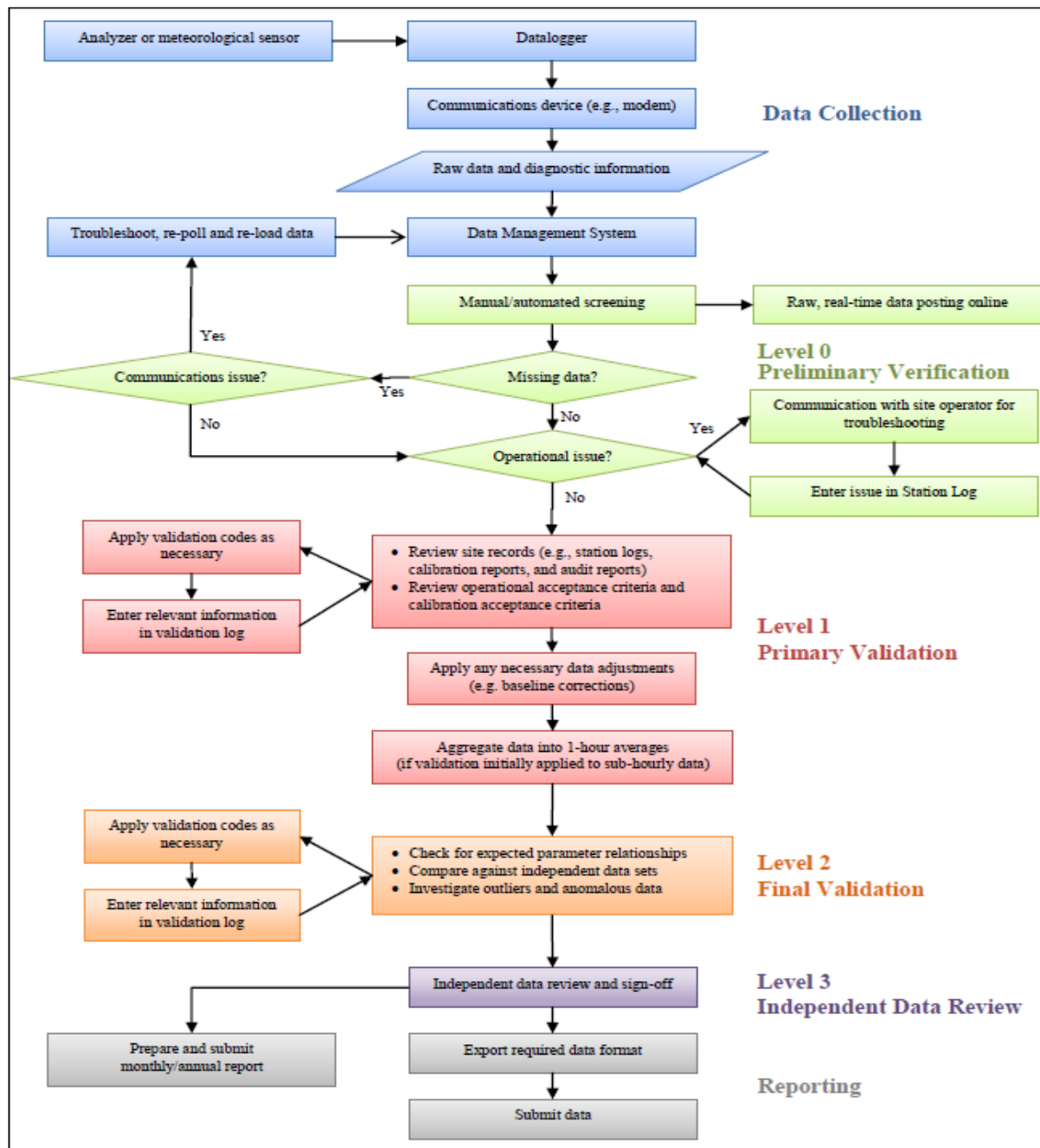
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

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 (December 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	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	S	0	0	0	0	0	0	0	0	0	1	0	24
2	0	0	1	0	2	1	1	1	2	1	0	0	1	0	0	0	S	0	0	0	0	0	0	1	1	0	2	1	24
3	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	24
4	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	1	0	24
5	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
6	0	0	0	0	0	0	1	1	1	1	1	1	S	2	1	1	1	0	1	3	3	0	0	0	0	0	3	1	24
7	1	0	1	1	1	1	4	4	2	2	1	S	2	1	2	0	1	1	0	0	0	0	0	0	0	0	4	1	24
8	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	24
9	0	0	0	0	0	0	0	1	0	S	0	0	0	0	0	0	0	0	0	0	0	2	6	2	1	0	6	1	24
10	1	1	1	1	1	1	1	0	S	3	3	3	5	3	0	2	4	5	0	0	0	0	0	0	0	0	5	2	24
11	0	0	0	0	0	0	0	S	1	1	1	1	0	1	1	1	1	1	2	1	1	1	0	0	0	2	1	24	
12	0	0	0	0	0	0	0	S	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24
13	0	0	0	0	0	S	0	0	0	0	1	1	2	4	2	2	1	1	1	0	0	0	0	0	0	0	4	1	24
14	2	2	1	1	S	2	2	1	3	1	1	1	0	0	0	0	0	2	1	3	2	1	0	0	0	3	1	24	
15	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	1	0	24
16	0	0	S	0	0	0	0	0	0	0	0	0	1	2	1	0	1	0	0	0	1	1	1	1	0	2	0	24	
17	1	S	3	1	1	3	3	2	3	3	2	1	1	1	1	1	0	1	1	1	0	0	0	0	0	3	1	24	
18	S	0	0	0	0	0	0	2	1	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	24
19	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24
20	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	3	0	0	0	0	0	S	0	0	0	3	1	24
21	0	0	1	1	1	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	S	0	0	0	0	1	0	24
22	0	1	1	0	0	1	1	0	0	1	1	0	0	0	0	1	0	0	0	0	S	1	2	3	1	0	3	1	24
23	0	0	0	0	1	5	5	1	0	0	1	1	1	0	0	0	0	S	0	0	0	0	1	0	1	0	5	1	24
24	1	1	1	1	1	1	1	1	2	3	2	1	1	0	0	0	1	S	0	1	0	2	2	1	0	3	1	24	
25	0	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	S	0	0	1	0	0	0	1	1	0	1	0	24
26	1	1	0	1	1	2	1	1	1	0	0	0	0	0	0	S	0	0	1	0	0	1	0	1	0	1	0	24	
27	0	0	1	2	3	2	3	2	1	1	C	C	C	C	C	1	1	1	1	1	0	0	1	1	0	3	1	24	
28	0	0	0	0	0	0	0	0	0	0	1	1	1	S	1	1	1	0	0	0	0	0	0	0	0	1	0	24	
29	0	1	1	1	0	0	0	0	1	2	1	1	S	0	0	0	0	0	0	1	1	1	0	0	0	2	0	24	
30	0	0	0	0	0	0	0	0	0	0	0	S	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	24
HOURLY MAX	2	2	3	2	3	5	5	4	3	3	3	3	5	4	2	2	4	5	2	3	3	6	3	1					
HOURLY AVG	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0					

STATUS FLAG CODES

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

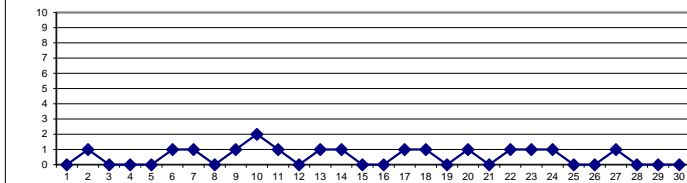
OBJECTIVE LIMIT:

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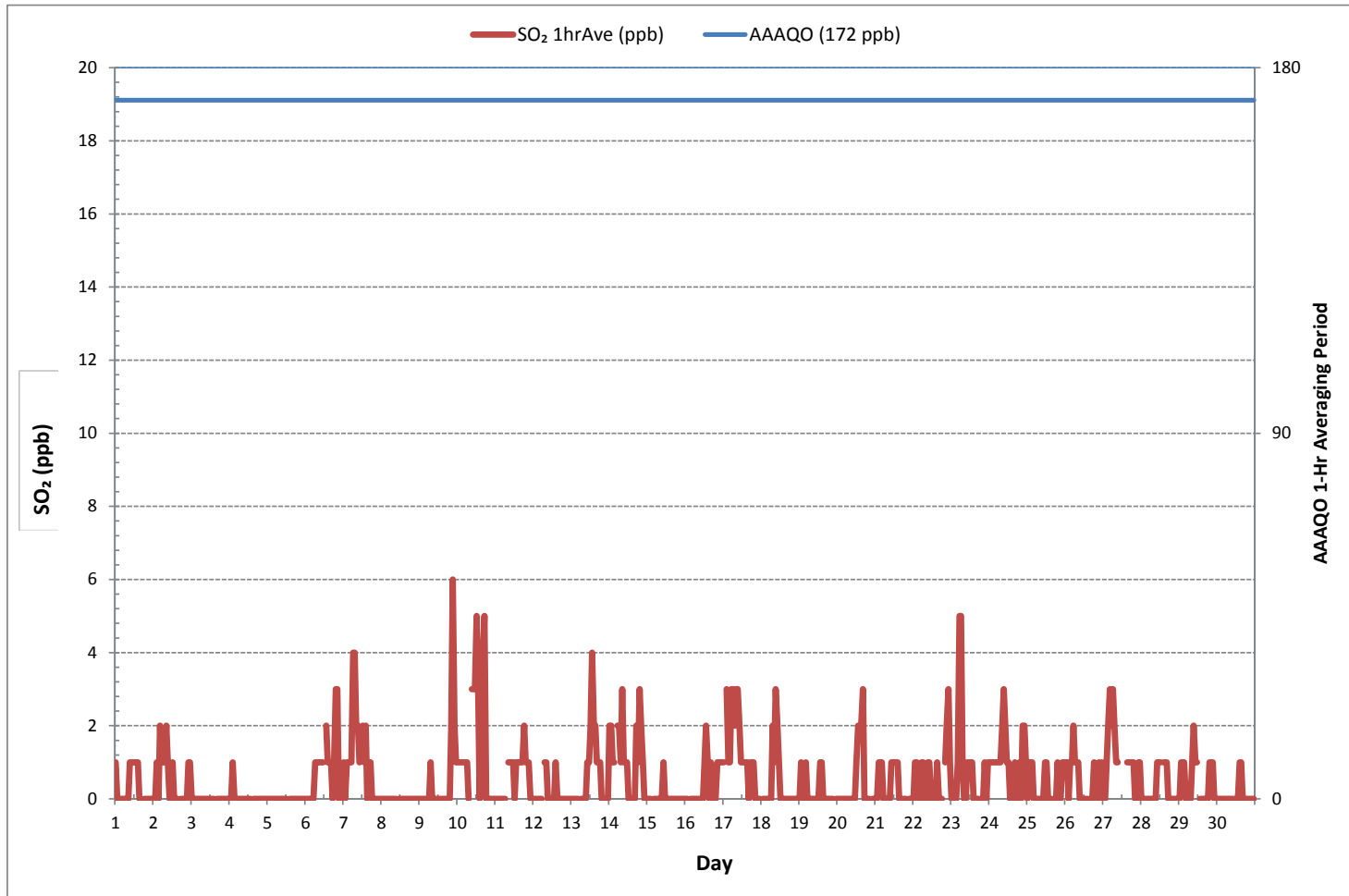
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0
NUMBER OF 24-HR EXCEEDANCES:	0
NUMBER OF NON-ZERO READINGS:	247
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR 1 ON DAY 1
MAXIMUM 1-HR AVERAGE:	6 ppb @ HOUR 21 ON DAY 9
MAXIMUM 24-HR AVERAGE:	2 ppb ON DAY 10
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	720 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	1
MONTHLY AVERAGE:	1 ppb

24 HR AVERAGES November 2018



SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)



Wind: LICA MASKWA
 Poll.: LICA MASKWA-SO₂ [ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 14.45%

Calm Avg: 0.45 [ppb]

Direction	0.0-1.4	1.4-2.8	2.8-4.2	4.2-5.6	5.6-7.0	>7.0	Total
N	18.4	0.2	0.0	0.0	0.0	0.0	18.5
NE	7.6	0.0	0.0	0.0	0.0	0.0	7.6
E	3.1	2.3	0.0	0.0	0.0	0.0	5.4
SE	18.8	0.9	0.2	0.0	0.0	0.0	19.9
S	13.4	0.6	0.0	0.0	0.0	0.0	14.0
SW	9.6	1.2	0.4	0.0	0.0	0.0	11.3
W	2.0	0.7	0.2	0.2	0.0	0.0	3.1
NW	2.5	1.9	0.9	0.4	0.2	0.0	5.9
Summary	75.5	7.8	1.6	0.6	0.2	0.0	85.6

% Icon Classes (ppb)

75 0.0-1.4

8 1.4-2.8

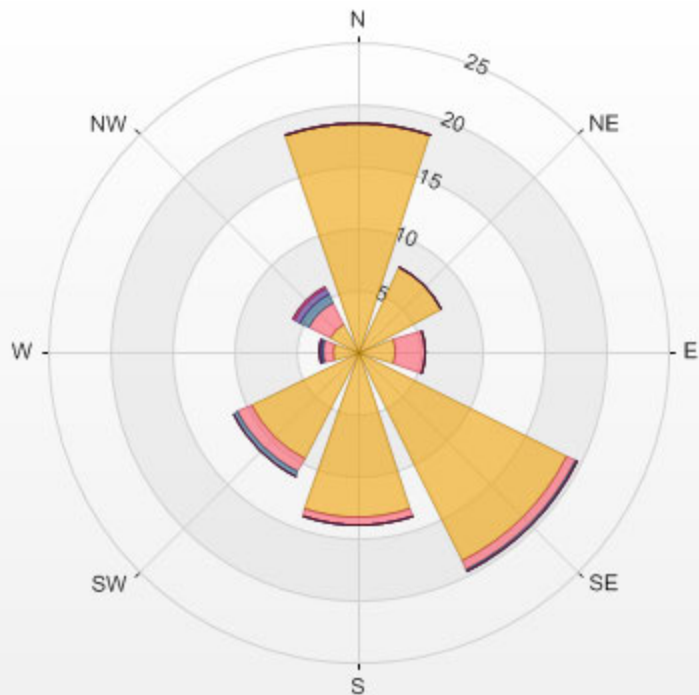
2 2.8-4.2

1 4.2-5.6

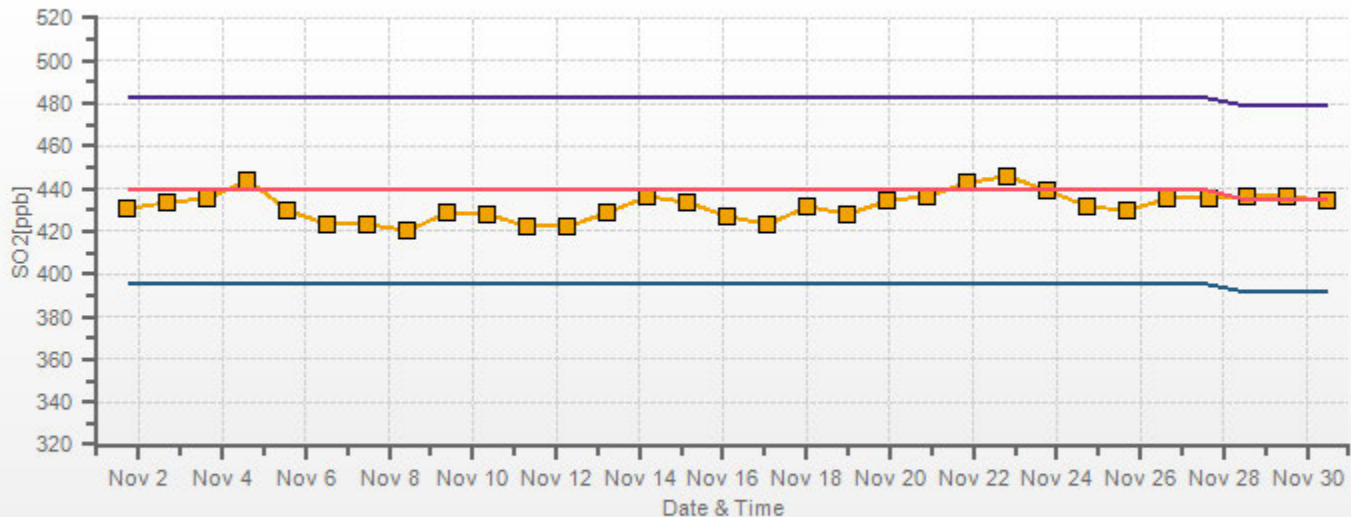
0 5.6-7.0

0 >7.0

LICA MASKWA Poll.: LICA MASKWA-SO₂[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 14.45% Calm Poll Avg: 0.45[ppb]



SO2[ppb] Calibration: LICA MASKWA Monthly: 18/11 Type: Span



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 MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY 1	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	24
2	0	0	1	1	1	1	1	1	0	0	0	1	1	0	0	0	S	0	0	0	0	0	0	0	0	1	0	24
3	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	
4	0	2	1	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	2	0	24	
5	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	
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	24	
7	0	0	0	0	0	0	0	0	0	0	0	S	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
8	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	24	
9	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	
10	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	24	
11	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	
12	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	24	
13	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	S	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	S	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	S	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	S	0	0	0	0	0	0	0	S1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	
18	S	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	1	0	24	
19	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	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	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	24	
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	1	0	0	1	0	24	
23	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	
24	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	24	
25	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	
26	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	
27	0	0	1	1	1	1	1	1	1	1	C	C	C	C	C	C	0	0	0	0	0	0	0	0	1	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	24	
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	24	
30	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	
HOURLY MAX	0	2	1	1	1	1	1	1	1	1	0	1	1	0	0	0	1	0	0	0	0	1	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		

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

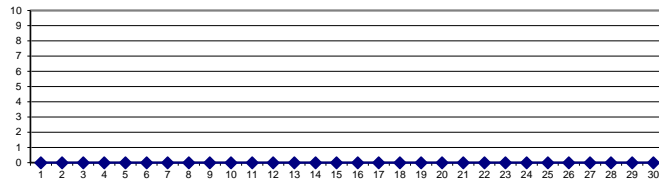
OBJECTIVE LIMIT:

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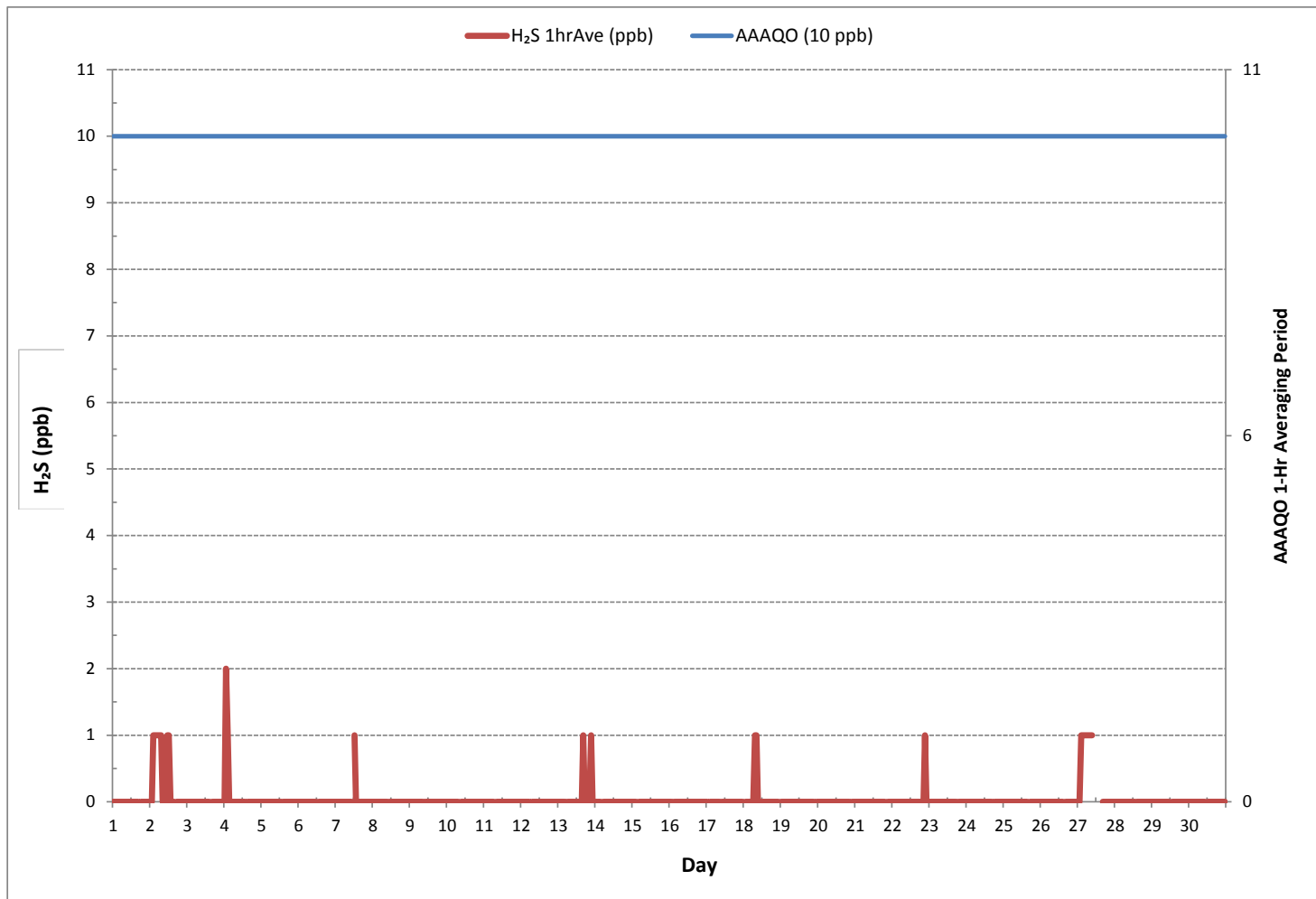
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	24		
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0 ON DAY	1
MAXIMUM 1-HR AVERAGE:	2 ppb @ HOUR	1 ON DAY	4
MAXIMUM 24-HR AVERAGE:	0 ppb	ON DAY	1
IZS CALIBRATION TIME:	30 hrs	OPERATIONAL TIME:	719 hrs
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	99.9 %
STANDARD DEVIATION:	0	MONTHLY AVERAGE:	0 ppb

24 HR AVERAGES November 2018



HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)



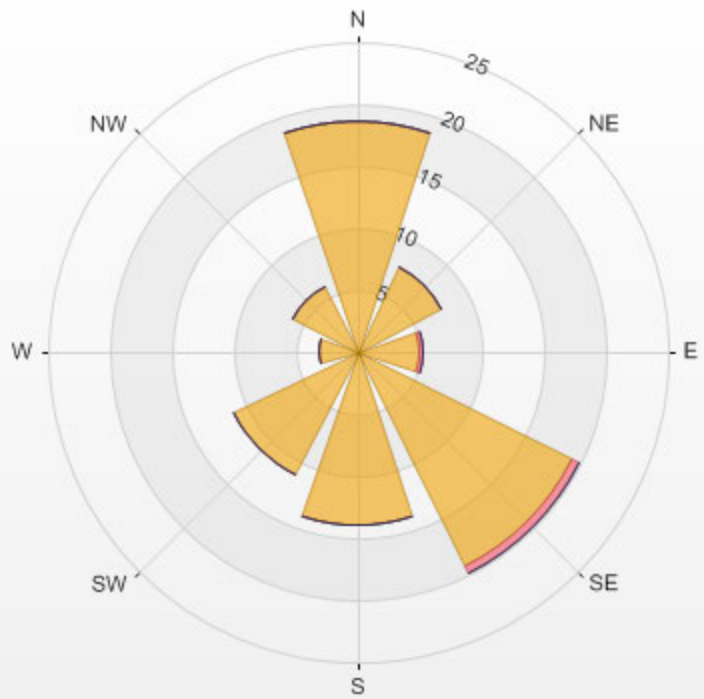
Wind: LICA MASKWA
 Poll.: LICA MASKWA-H₂S [ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 14.49% Calm Avg: 0.15 [ppb]

Direction	0.0-1.0	1.0-2.0	2.0-3.0	>3.0	Total
N	18.6	0.0	0.0	0.0	18.6
NE	7.6	0.0	0.0	0.0	7.6
E	5.0	0.3	0.0	0.0	5.3
SE	19.3	0.6	0.0	0.0	19.9
S	14.1	0.0	0.0	0.0	14.1
SW	11.1	0.0	0.0	0.0	11.1
W	3.1	0.0	0.0	0.0	3.1
NW	5.9	0.0	0.0	0.0	5.9
Summary	84.6	0.9	0.0	0.0	85.5

% Icon Classes (ppb)	85	0.0-1.0	1	1.0-2.0	0	2.0-3.0	0	>3.0
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LICA MASKWA Poll.: LICA MASKWA-H2S[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 14.49% Calm Poll Avg: 0.15[ppb]



H2S[ppb] Calibration: LICA MASKWA Monthly: 18/11 Type: Span



TOTAL HYDROCARBON



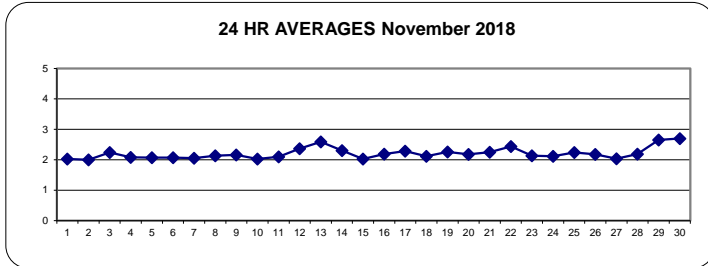
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

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	2.05	1.98	2.00	2.01	2.02	2.04	2.04	2.03	2.05	2.06	2.06	2.04	2.05	2.06	2.04	2.03	2.03	S	2.07	2.02	2.02	2.01	1.99	1.99	1.98	2.07	2.03	24	
2	1.97	1.96	1.97	1.97	1.97	1.94	1.93	1.94	1.97	1.95	1.94	1.95	1.95	1.97	1.99	2.01	S	2.04	2.05	2.07	2.07	2.07	2.11	2.13	1.93	2.13	2.00	24	
3	2.16	2.18	2.24	2.26	2.23	2.23	2.25	2.26	2.25	2.26	2.26	2.25	2.26	2.26	2.24	S	2.22	2.24	2.24	2.24	2.26	2.29	2.27	2.22	2.16	2.29	2.24	24	
4	2.17	2.16	2.12	2.09	2.08	2.06	2.05	2.04	2.05	2.05	2.06	2.05	2.04	2.14	S	2.06	2.06	2.07	2.08	2.09	2.09	2.09	2.10	2.10	2.04	2.17	2.08	24	
5	2.11	2.13	2.12	2.11	2.11	2.11	2.11	2.10	2.09	2.07	2.07	2.05	2.05	S	2.02	2.06	2.07	2.03	2.05	2.04	2.03	2.03	2.04	2.04	2.02	2.13	2.07	24	
6	2.03	2.04	2.05	2.07	2.06	2.06	2.06	2.07	2.08	2.09	2.09	2.08	S	2.07	2.08	2.09	2.09	2.07	2.05	2.09	2.08	2.07	2.07	2.06	2.03	2.09	2.07	24	
7	2.07	2.08	2.08	2.08	2.07	2.07	2.07	2.11	2.14	2.08	2.07	S	2.04	2.05	2.04	2.03	2.04	2.03	2.00	2.00	2.00	2.00	1.99	2.01	1.99	2.14	2.05	24	
8	2.01	2.02	2.03	2.03	2.04	2.06	2.06	2.08	2.08	2.07	S	2.07	2.07	2.08	2.09	2.11	2.15	2.18	2.20	2.25	2.33	2.32	2.30	2.30	2.01	2.33	2.13	24	
9	2.31	2.31	2.31	2.29	2.26	2.24	2.23	2.24	2.21	S	2.15	2.11	2.08	2.07	2.06	2.05	2.05	2.07	2.09	2.11	2.14	2.13	2.07	2.07	2.05	2.31	2.16	24	
10	2.08	2.08	2.08	2.11	2.10	2.13	2.12	2.05	S	2.04	2.04	2.03	2.03	2.00	1.98	1.98	2.04	2.01	1.95	1.95	1.96	1.97	1.98	1.99	1.95	2.13	2.03	24	
11	1.99	2.00	2.01	2.02	2.02	2.04	S	2.07	2.12	2.12	2.13	2.12	2.13	2.14	2.14	2.15	2.16	2.17	2.13	2.12	2.13	2.16	2.19	1.99	2.19	2.10	24		
12	2.19	2.24	2.28	2.27	2.26	2.25	S	2.24	2.25	2.24	2.26	2.28	2.32	2.38	2.39	2.41	2.45	2.51	2.53	2.52	2.52	2.51	2.55	2.57	2.19	2.57	2.37	24	
13	2.55	2.51	2.48	2.47	2.49	S	2.52	2.52	2.51	2.54	X	X	X	X	X	X	X	X	X	X	X	X	2.83	2.82	2.86	2.47	2.86	2.59	13
14	2.82	2.71	2.60	2.42	S	3.08	3.01	2.90	2.69	2.42	2.24	2.06	1.96	1.94	1.93	1.92	1.97	2.01	1.97	2.04	2.05	2.07	2.05	2.07	1.92	3.08	2.30	24	
15	2.07	2.09	2.11	S	2.09	2.08	2.07	2.07	2.08	2.08	2.05	2.04	2.01	2.00	2.00	2.00	2.00	1.97	1.97	1.97	1.98	2.00	2.01	2.03	1.97	2.11	2.03	24	
16	2.04	2.05	S	2.05	2.09	2.11	2.13	2.14	2.14	2.16	2.14	2.13	2.12	2.12	2.11	2.18	2.20	2.21	2.23	2.29	2.36	2.46	2.45	2.36	2.04	2.46	2.19	24	
17	2.27	S	2.22	2.20	2.23	2.26	2.23	2.23	2.28	2.28	2.26	2.25	2.32	2.32	2.38	2.50	2.50	2.50	2.47	2.46	2.17	2.08	2.09	2.12	2.08	2.50	2.29	24	
18	S	2.21	2.18	2.13	2.10	2.09	2.07	2.09	2.09	2.12	2.15	2.17	2.10	2.11	2.11	2.11	2.10	2.11	2.11	2.11	2.11	2.10	2.11	S	2.07	2.21	2.12	24	
19	2.12	2.16	2.16	2.16	2.20	2.23	2.23	2.26	2.31	2.31	2.31	2.32	2.30	2.29	2.28	2.31	2.34	2.31	2.27	2.24	2.23	2.29	S	2.35	2.12	2.35	2.26	24	
20	2.44	2.21	2.15	2.21	2.15	2.10	2.13	2.13	2.11	2.13	2.15	2.21	2.27	2.19	2.22	2.22	2.21	2.16	2.14	2.15	2.16	S	2.16	2.22	2.10	2.44	2.18	24	
21	2.23	2.25	2.29	2.30	2.28	2.28	2.29	2.26	2.25	2.24	2.26	2.24	2.23	2.27	2.25	2.24	2.24	2.24	2.25	2.23	S	2.20	2.20	2.20	2.20	2.30	2.25	24	
22	2.22	2.22	2.24	2.24	2.25	2.30	2.39	2.47	2.53	2.59	2.61	2.67	2.78	2.74	2.68	2.73	2.61	2.47	2.36	S	2.38	2.29	2.24	2.18	2.18	2.78	2.44	24	
23	2.22	2.29	2.23	2.20	2.17	2.14	2.08	2.08	2.12	2.19	2.16	2.14	2.12	2.08	2.07	2.08	2.09	2.08	S	2.06	2.07	2.08	2.08	2.08	2.06	2.29	2.13	24	
24	2.09	2.09	2.10	2.10	2.10	2.11	2.11	2.12	2.10	2.11	2.10	2.11	2.08	2.10	2.10	2.08	2.09	S	2.08	2.13	2.18	2.19	2.21	2.20	2.08	2.21	2.12	24	
25	2.20	2.22	2.24	2.28	2.29	2.24	2.22	2.23	2.24	2.25	2.24	2.24	2.24	2.23	2.23	2.22	S	2.21	2.22	2.24	2.24	2.25	2.26	2.27	2.20	2.29	2.24	24	
26	2.28	2.27	2.28	2.34	2.30	2.29	2.31	2.31	2.31	2.33	2.28	2.24	2.18	2.18	2.10	S	2.05	2.05	2.03	2.02	2.04	2.00	2.00	2.00	2.00	2.34	2.18	24	
27	1.99	1.99	2.01	2.02	2.04	2.06	2.06	2.06	2.04	2.03	2.05	2.04	2.02	2.04	2.05	C	C	C	C	2.09	2.04	2.04	2.05	2.05	1.99	2.09	2.04	24	
28	2.05	2.05	2.04	2.05	2.06	2.07	2.06	2.08	2.07	2.10	2.12	2.15	2.18	S	2.22	2.25	2.22	2.25	2.31	2.32	2.37	2.42	2.44	2.44	2.04	2.44	2.19	24	
29	2.47	2.51	2.53	2.50	2.49	2.51	2.49	2.48	2.49	2.57	2.66	2.68	S	2.71	2.71	2.72	2.73	2.77	2.83	2.80	2.87	2.94	2.91	2.69	2.47	2.94	2.65	24	
30	2.47	2.77	2.95	2.95	3.15	3.01	3.03	3.01	2.81	2.54	2.49	S	2.65	2.68	2.68	2.60	2.74	2.76	2.66	2.64	2.47	2.28	2.31	2.35	2.28	3.15	2.70	24	
HOURLY MAX	2.82	2.77	2.95	2.95	3.15	3.08	3.03	3.01	2.81	2.59	2.66	2.68	2.78	2.74	2.71	2.73	2.74	2.77	2.83	2.80	2.87	2.94	2.91	2.86					
HOURLY AVG	2.20	2.20	2.21	2.20	2.20	2.21	2.22	2.23	2.22	2.21	2.19	2.18	2.17	2.19	2.19	2.20	2.21	2.21	2.20	2.19	2.19	2.21	2.21	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

24 HR AVERAGES November 2018

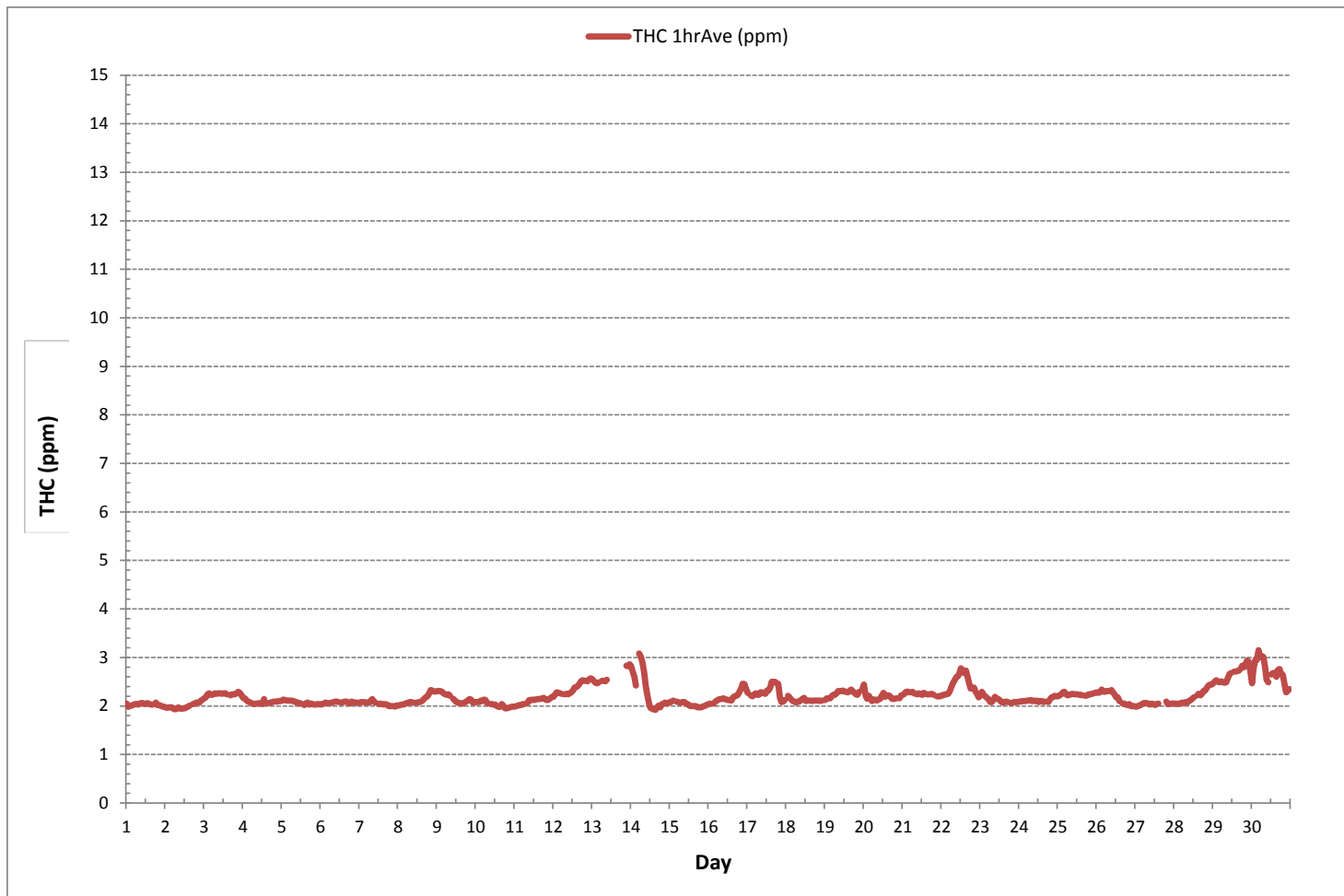


MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	675		
MINIMUM 1-HR AVERAGE:	1.92 ppm	@ HOUR	15 ON DAY
MAXIMUM 1-HR AVERAGE:	3.15 ppm	@ HOUR	4 ON DAY
MAXIMUM 24-HR AVERAGE:	2.70 ppm		ON DAY
IZS CALIBRATION TIME:	30 hrs	OPERATIONAL TIME:	709 hrs
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	98.5 %
STANDARD DEVIATION:	0.21	MONTHLY AVERAGE:	2.20 ppm



TOTAL HYDROCARBONS Hourly Averages (THC ppm)



Wind: LICA MASKWA
 Poll.: LICA MASKWA-THC [ppm]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

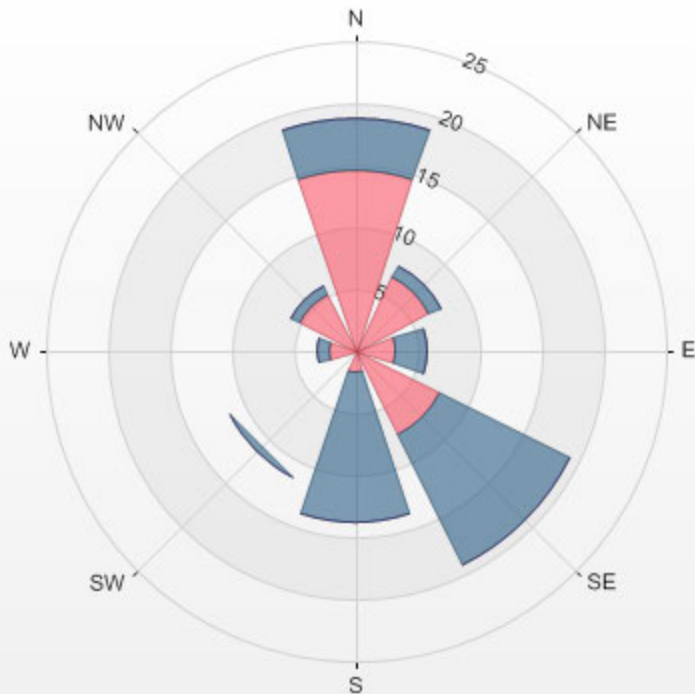
Calm: 13.93%

Calm Avg: 2.36 [ppm]

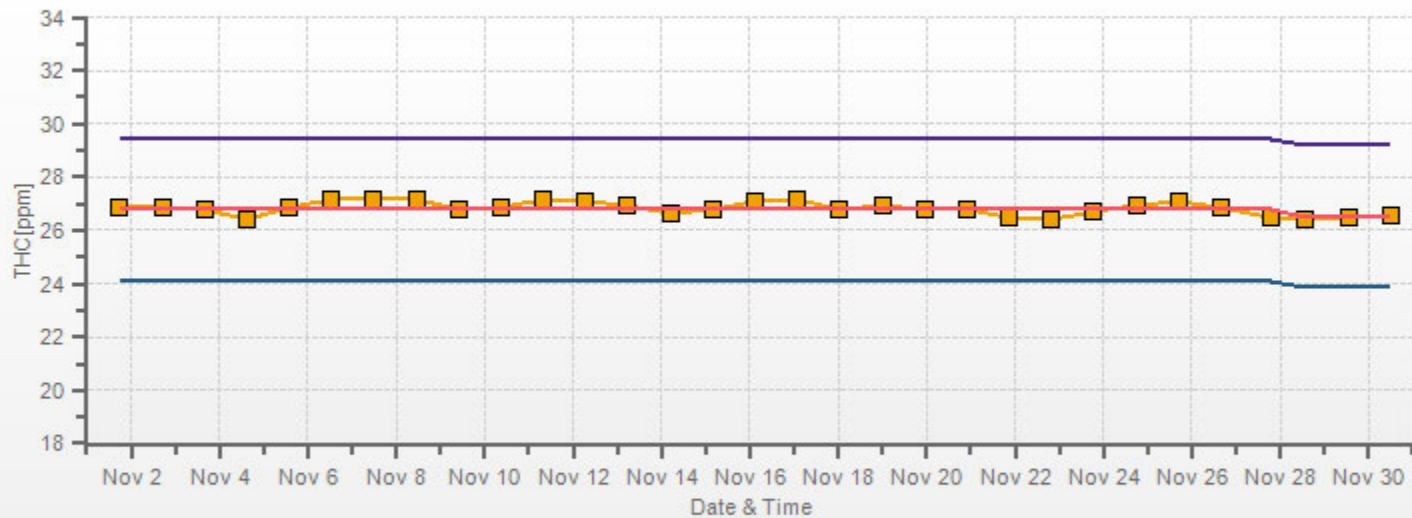
Direction	0.0-1.1	1.1-2.1	2.1-3.2	>3.2	Total
N	0.0	14.5	4.3	0.0	18.8
NE	0.0	6.7	1.0	0.0	7.7
E	0.0	3.3	2.5	0.0	5.8
SE	0.0	7.6	11.9	0.0	19.4
S	0.0	1.8	12.2	0.0	13.9
SW	0.0	0.2	11.3	0.0	11.4
W	0.0	2.2	0.9	0.0	3.1
NW	0.0	5.0	0.9	0.0	5.9
Summary	0.0	41.2	44.9	0.0	86.1

% Icon	Classes (ppm)	0	0.0-1.1	41	1.1-2.1	45	2.1-3.2	0	>3.2
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LICA MASKWA Poll.: LICA MASKWA-THC[ppm] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 13.93% Calm Poll Avg: 2.36[ppm]



THC[ppm] Calibration: LICA MASKWA Monthly: 18/11 Type: Span



OXIDES OF NITROGEN

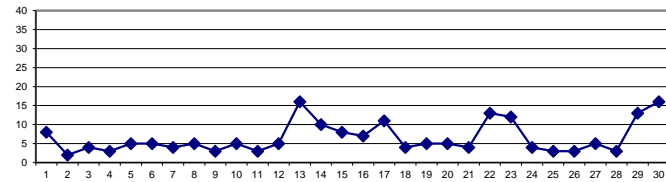
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

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	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
1	5	4	4	5	5	6	13	14	12	12	14	16	13	18	12	5	5	S	3	3	2	2	4	2	2	18	8	24
2	1	0	3	1	6	3	3	3	9	5	0	1	2	0	0	0	S	2	1	1	1	1	3	3	0	9	2	24
3	1	1	1	1	2	2	4	3	4	3	4	4	5	5	5	S	7	6	5	3	4	4	4	3	1	7	4	24
4	3	4	7	2	2	2	1	1	1	1	3	4	5	12	S	4	4	4	3	2	2	2	3	2	1	12	3	24
5	2	2	3	3	4	4	4	3	6	6	7	10	7	S	5	5	6	5	6	4	5	5	4	6	2	10	5	24
6	5	4	4	5	5	5	6	4	4	4	7	6	S	6	7	6	7	5	4	5	6	1	3	4	1	7	5	24
7	3	1	4	5	3	4	8	9	5	5	3	S	5	5	6	1	4	3	4	3	4	1	0	1	0	9	4	24
8	4	5	4	3	5	4	4	8	0	19	S	22	3	1	1	1	4	4	4	2	3	2	1	1	0	22	5	24
9	1	1	1	1	0	1	1	1	2	S	2	2	2	3	3	4	4	4	4	4	4	9	15	5	4	0	15	3
10	4	8	6	5	5	6	5	2	S	7	6	6	12	6	1	5	7	11	1	3	3	3	4	3	1	12	5	24
11	3	4	3	5	3	2	3	S	5	5	5	5	5	4	6	5	5	5	2	2	1	1	1	2	1	6	3	24
12	3	3	3	2	2	3	S	5	5	4	3	3	4	6	6	7	8	9	8	8	8	7	9	9	2	9	5	24
13	9	8	11	8	8	S	9	23	16	29	13	7	10	11	10	12	12	18	36	22	30	28	19	15	7	36	16	24
14	14	15	14	10	S	27	25	23	22	15	9	5	2	2	3	2	6	10	4	10	7	7	4	2	2	27	10	24
15	3	2	10	S	7	6	5	12	18	35	26	28	9	4	5	2	2	2	2	4	3	2	2	2	2	35	8	24
16	3	3	S	4	4	4	3	8	12	16	15	9	3	8	16	4	7	4	5	7	9	11	11	8	3	16	7	24
17	6	S	10	6	7	12	12	14	15	13	12	12	13	12	15	19	19	20	19	16	7	3	3	2	2	20	11	24
18	S	6	5	3	3	2	1	7	6	8	6	5	3	3	7	10	4	3	3	2	0	0	S	0	0	10	4	24
19	2	3	0	0	3	2	1	2	3	4	4	5	6	8	10	11	14	9	6	6	5	4	S	5	0	14	5	24
20	17	8	4	7	4	3	3	2	3	4	3	8	9	7	9	9	1	1	1	1	S	2	2	1	17	5	24	
21	2	4	5	5	4	4	4	3	5	4	5	5	6	5	4	4	4	4	S	4	4	3	2	2	2	6	4	24
22	4	6	5	4	4	6	7	10	13	14	15	16	18	18	18	25	17	15	11	S	11	22	24	17	4	25	13	24
23	4	5	5	6	10	11	10	7	12	20	30	33	41	17	11	11	5	S	S	6	6	5	5	5	4	41	12	24
24	7	6	6	3	2	1	1	3	6	10	8	5	3	2	1	1	2	S	2	3	2	5	4	3	1	10	4	24
25	3	4	4	3	2	1	1	2	2	2	2	2	3	3	2	2	2	S	3	3	4	3	3	4	4	4	3	24
26	4	4	3	4	4	4	4	3	3	2	2	2	2	2	S	2	2	2	3	1	2	4	1	5	1	5	3	24
27	2	2	7	7	10	10	10	10	7	6	C	C	C	C	C	C	C	C	4	3	6	1	2	3	3	1	10	5
28	1	1	1	1	1	1	1	1	1	2	3	5	5	S	5	5	5	4	4	5	5	6	7	7	1	7	3	24
29	8	9	10	9	8	8	8	8	9	12	13	13	S	15	15	15	17	15	17	18	18	20	17	15	8	20	13	24
30	9	16	20	20	26	30	28	21	26	17	13	S	15	14	18	13	13	12	11	11	10	7	7	7	7	30	16	24
HOURLY MAX	17	16	20	20	26	30	28	23	26	35	30	33	41	18	18	25	19	20	36	22	30	28	24	17				
HOURLY AVG	5	5	6	5	5	6	6	7	8	10	8	9	8	7	7	7	7	7	6	6	6	6	5	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

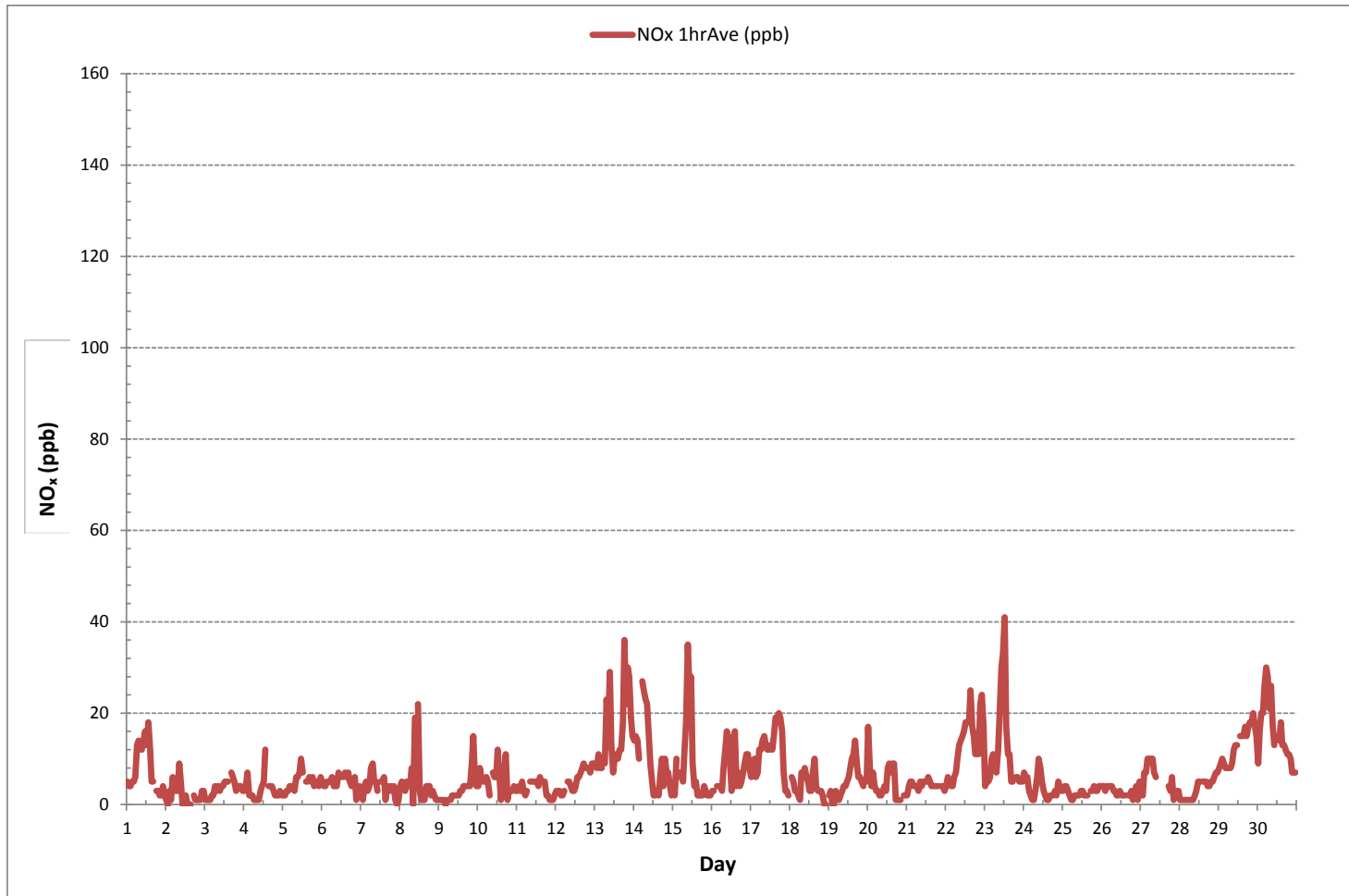
24 HR AVERAGES November 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	671			
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	1	ON DAY 2
MAXIMUM 1-HR AVERAGE:	41	ppb @ HOUR	12	ON DAY 23
MAXIMUM 24-HR AVERAGE:	16	ppb		ON DAY 13
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	720
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	6		MONTHLY AVERAGE:	7
				ppb




OXIDES OF NITROGEN Hourly Averages (NO_x ppb)



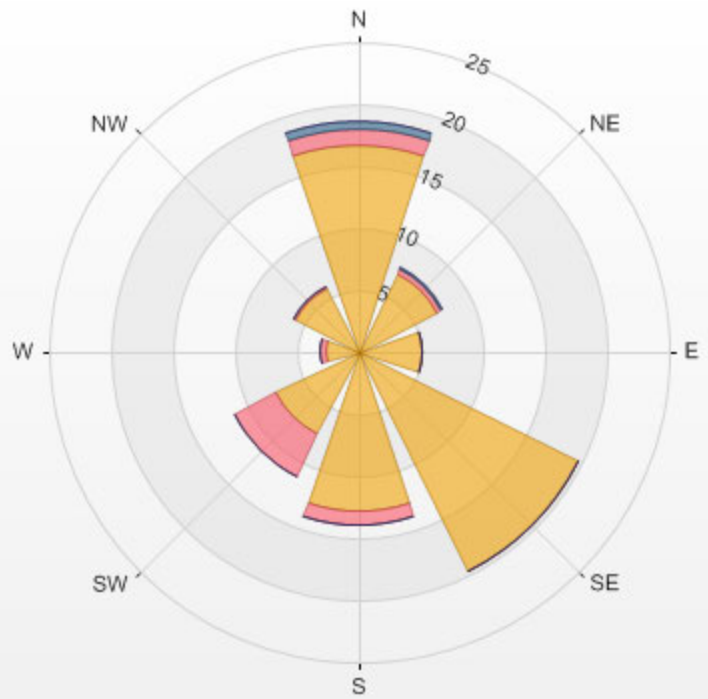
Wind: LICA MASKWA
 Poll.: LICA MASKWA-NO_x [ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 14.49% Calm Avg: 9.56 [ppb]

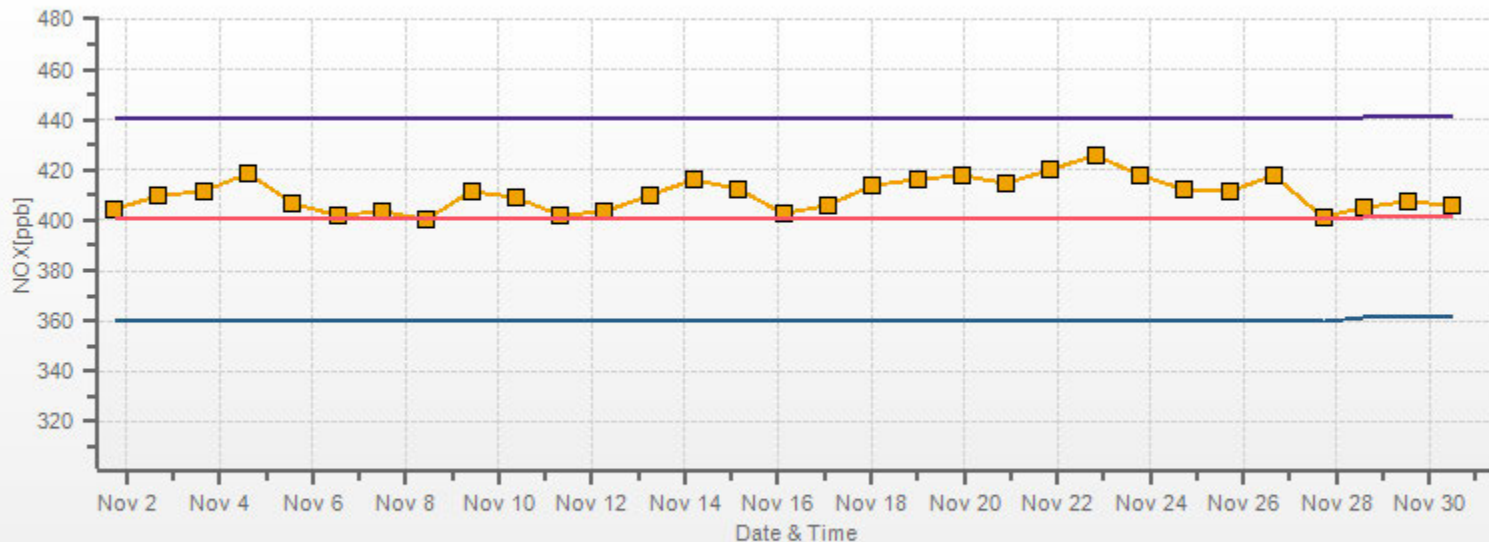
Direction	0.0-14.0	14.0-28.0	28.0-42.0	>42.0	Total
N	16.7	1.3	0.6	0.0	18.6
NE	7.0	0.4	0.2	0.0	7.6
E	5.1	0.0	0.0	0.0	5.1
SE	19.9	0.0	0.0	0.0	19.9
S	12.9	1.2	0.0	0.0	14.1
SW	7.5	3.8	0.0	0.0	11.3
W	2.6	0.4	0.0	0.0	3.1
NW	5.7	0.2	0.0	0.0	5.9
Summary	77.5	7.3	0.7	0.0	85.5

% Icon	Classes (ppb)	77		0.0-14.0	7		14.0-28.0	1		28.0-42.0	0		>42.0
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LICA MASKWA Poll.: LICA MASKWA-NOX[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 14.49% Calm Poll Avg: 9.56[ppb]



NOX[ppb] Calibration: LICA MASKWA Monthly: 18/11 Type: Span



NITRIC OXIDE

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 MIN.	DAILY MAX.	24-HR AVG.	RDGS.	
DAY 1	1	1	2	2	2	3	7	7	6	5	7	7	6	8	5	1	1	S	0	0	0	0	0	0	0	0	8	3	24
DAY 2	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	2	0	24
DAY 3	0	0	0	0	0	0	1	0	1	0	1	1	1	2	1	S	1	0	0	0	0	0	0	0	0	0	2	0	24
DAY 4	0	0	1	0	0	0	0	0	0	0	1	2	3	9	S	2	2	2	1	1	1	1	2	1	0	0	9	1	24
DAY 5	1	1	1	1	2	2	2	1	3	3	4	6	4	S	2	2	2	1	2	1	2	2	1	2	1	0	6	2	24
DAY 6	2	1	1	2	2	1	1	0	1	1	2	2	S	2	2	1	2	1	1	1	0	1	0	1	1	0	2	1	24
DAY 7	0	0	0	0	0	0	1	1	1	1	1	S	1	1	1	0	1	1	1	0	1	0	0	0	0	0	1	1	24
DAY 8	1	2	2	1	2	1	1	4	0	9	S	11	1	0	0	0	1	0	0	0	0	0	0	0	0	0	11	2	24
DAY 9	0	0	0	0	0	0	0	0	0	S	0	0	0	0	1	0	0	0	0	0	0	1	5	1	0	0	5	0	24
DAY 10	0	2	1	1	1	1	1	0	S	2	2	3	5	2	0	1	1	2	0	1	1	1	1	1	0	0	5	1	24
DAY 11	1	1	1	1	1	0	1	S	1	1	2	2	2	1	1	1	0	1	0	0	0	0	0	0	0	0	2	1	24
DAY 12	0	0	0	0	0	0	S	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	24
DAY 13	0	0	2	0	0	S	3	13	8	20	7	2	3	3	3	2	1	5	16	7	16	14	5	3	0	0	20	6	24
DAY 14	1	0	0	0	S	5	2	2	3	4	3	2	1	0	1	0	1	0	0	1	0	0	1	0	0	0	5	1	24
DAY 15	0	0	3	S	2	2	2	5	10	21	15	17	4	2	3	1	1	1	1	2	2	1	1	1	0	0	21	4	24
DAY 16	1	2	S	2	2	2	2	4	4	8	7	4	1	3	6	0	0	0	0	1	0	0	0	0	0	0	8	2	24
DAY 17	0	S	0	0	0	0	0	1	3	4	5	5	6	5	5	5	2	1	0	0	1	1	1	0	0	0	6	2	24
DAY 18	S	0	0	0	0	0	0	0	1	1	2	2	1	1	4	4	2	1	1	1	1	0	0	S	0	0	4	1	24
DAY 19	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2	2	0	0	0	0	0	0	S	0	0	2	1	24
DAY 20	9	1	0	0	0	0	0	0	0	0	1	1	1	3	3	2	3	3	0	0	0	0	S	0	0	0	9	1	24
DAY 21	0	0	0	0	0	0	0	0	0	0	1	2	2	1	1	0	0	0	0	0	0	S	0	0	0	0	2	0	24
DAY 22	0	0	0	0	0	0	0	2	4	6	8	8	10	10	8	13	5	4	2	S	1	5	4	2	0	0	13	4	24
DAY 23	0	0	0	0	0	2	3	2	6	12	18	20	26	10	8	5	4	1	1	S	2	2	1	1	0	0	26	5	24
DAY 24	2	1	2	1	0	0	0	0	0	2	2	1	0	0	0	0	0	S	0	0	0	0	0	0	0	0	2	1	24
DAY 25	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	S	0	0	0	0	0	0	0	0	0	1	0	24
DAY 26	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
DAY 27	0	0	1	1	2	1	2	2	1	1	C	C	C	C	C	C	C	C	0	0	1	0	0	0	0	0	2	1	24
DAY 28	0	0	0	0	0	0	0	0	0	0	0	1	1	S	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24
DAY 29	0	0	0	0	0	0	0	1	1	4	5	6	S	6	5	4	4	2	2	2	2	5	4	2	0	0	6	2	24
DAY 30	0	2	5	4	10	14	15	8	13	8	3	S	5	4	5	1	0	0	0	0	0	0	0	0	0	0	15	4	24
HOURLY MAX	9	2	5	4	10	14	15	13	13	21	18	20	26	10	8	13	5	5	16	7	16	14	5	3					
HOURLY AVG	1	0	1	1	1	1	2	2	2	4	4	4	3	3	2	2	1	1	1	1	1	1	1	0					

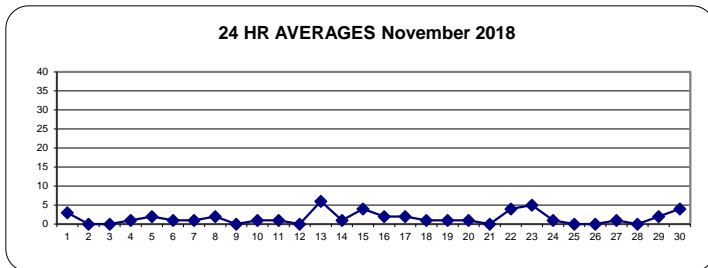
STATUS FLAG CODES

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

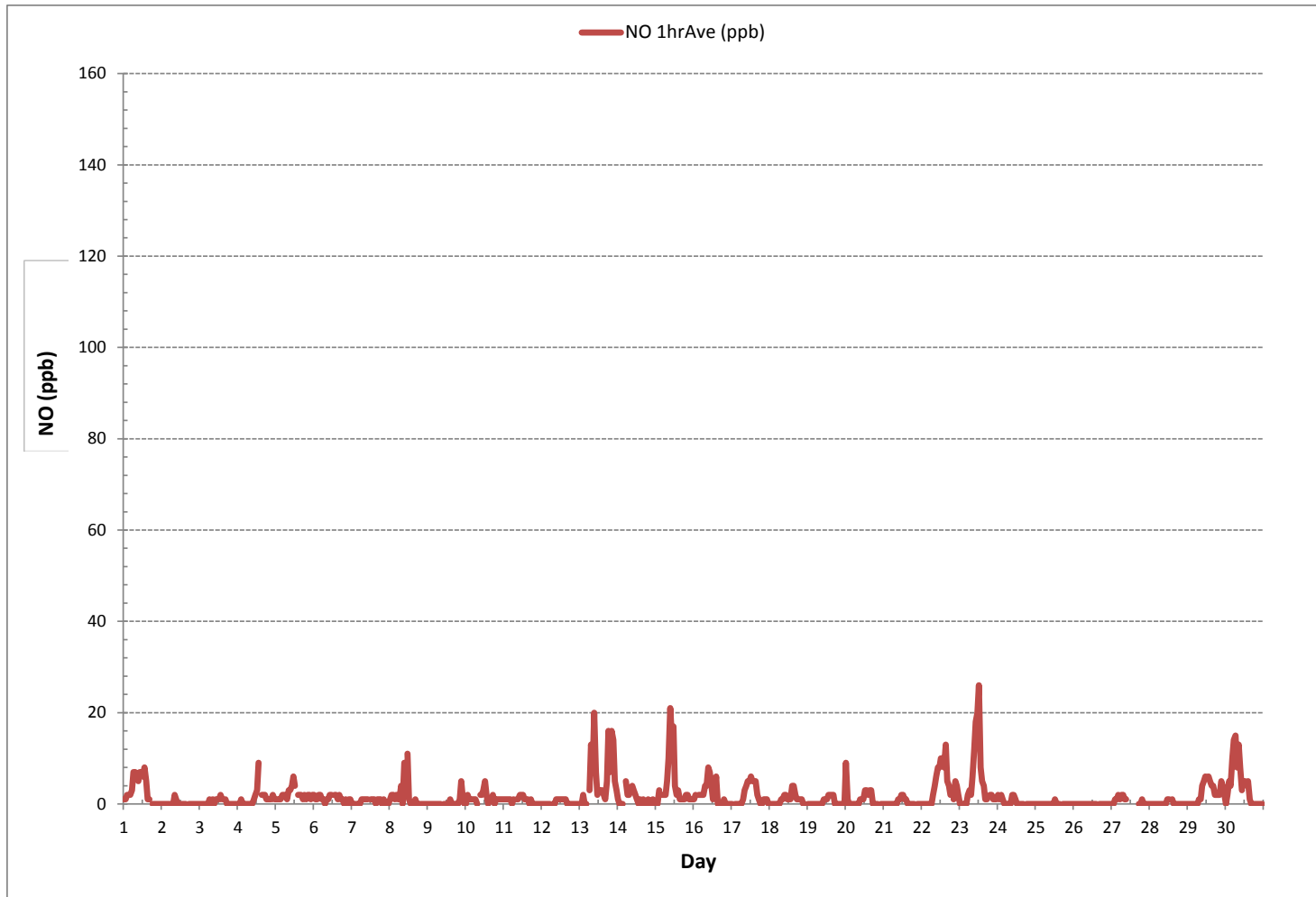
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	356			
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	18	ON DAY 1
MAXIMUM 1-HR AVERAGE:	26	ppb @ HOUR	12	ON DAY 23
MAXIMUM 24-HR AVERAGE:	6	ppb		ON DAY 13
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	720 hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	3		MONTHLY AVERAGE:	2 ppb

24 HR AVERAGES November 2018



NITRIC OXIDE Hourly Averages (NO ppb)



Wind: LICA MASKWA
 Poll.: LICA MASKWA-NO [ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 14.49%

Calm Avg: 2.31 [ppb]

Direction	0.0-9.0	9.0-18.0	18.0-27.0	>27.0	Total
N	17.7	0.3	0.6	0.0	18.6
NE	7.0	0.6	0.0	0.0	7.6
E	5.1	0.0	0.0	0.0	5.1
SE	19.9	0.0	0.0	0.0	19.9
S	14.1	0.0	0.0	0.0	14.1
SW	10.8	0.4	0.0	0.0	11.3
W	3.1	0.0	0.0	0.0	3.1
NW	5.9	0.0	0.0	0.0	5.9
Summary	83.6	1.3	0.6	0.0	85.5

% Icon Classes (ppb)

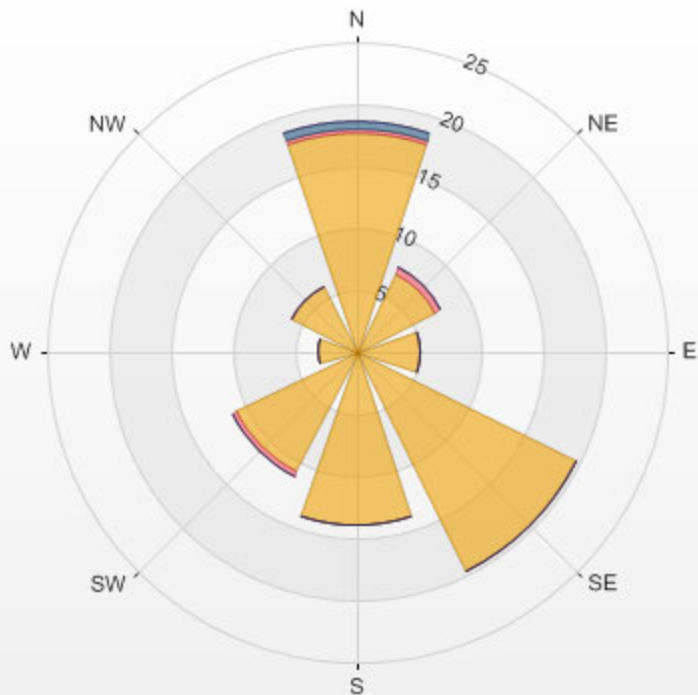
84 0.0-9.0

1 9.0-18.0

1 18.0-27.0

0 >27.0

LICA MASKWA Poll.: LICA MASKWA-NO[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 14.49% Calm Poll Avg: 2.31[ppb]



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	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
1	4	3	3	3	3	3	6	7	6	7	8	9	8	9	7	4	4	S	3	3	2	2	3	2	2	9	5	24
2	1	0	3	1	6	3	3	2	7	4	0	1	2	0	0	0	S	2	1	1	1	1	3	3	0	7	2	24
3	1	1	1	1	2	2	3	3	3	3	3	3	4	4	4	4	S	6	6	5	3	4	4	3	1	6	3	24
4	3	4	6	2	2	2	1	1	1	1	2	2	2	3	S	2	2	2	1	1	1	1	1	1	1	6	2	24
5	1	1	2	2	2	2	2	2	3	3	3	4	3	S	3	3	4	4	4	3	3	3	3	4	1	4	3	24
6	4	3	2	4	4	4	5	4	4	3	5	4	S	4	5	5	5	4	4	3	5	4	1	2	3	1	5	24
7	2	1	4	5	3	4	7	7	4	3	2	S	4	4	4	1	3	3	3	3	3	3	1	0	1	0	7	24
8	2	3	2	2	3	3	3	5	0	10	S	12	2	1	1	0	4	4	4	2	3	2	1	1	0	12	3	24
9	1	1	1	1	0	1	1	1	2	S	2	2	2	2	3	3	4	4	4	4	7	10	4	4	0	10	3	24
10	4	6	4	4	4	5	4	2	S	5	4	4	7	3	1	4	7	9	1	2	2	3	3	2	1	9	4	24
11	2	2	2	4	2	2	S	4	3	4	3	3	3	5	4	4	4	2	2	1	1	1	2	1	1	5	3	24
12	3	3	3	2	2	3	S	5	4	3	2	2	3	4	5	6	7	8	8	8	8	7	9	9	2	9	5	24
13	8	8	9	8	7	S	6	10	8	9	6	5	7	7	8	10	11	13	20	15	14	14	13	12	5	20	10	24
14	13	15	14	10	S	22	23	21	19	12	6	4	1	1	2	1	4	9	4	9	7	6	4	2	1	23	9	24
15	2	2	7	S	5	4	4	7	8	14	11	11	5	2	2	1	1	1	1	2	2	1	1	1	1	14	4	24
16	1	1	S	3	2	2	2	4	8	7	8	5	2	5	10	3	6	4	5	7	9	11	11	8	1	11	5	24
17	6	S	10	6	7	11	12	12	12	9	7	6	7	7	10	15	18	19	18	16	6	2	2	1	1	19	10	24
18	S	6	5	3	3	2	1	6	5	6	4	4	2	2	4	6	2	1	1	1	0	0	S	0	0	6	3	24
19	2	3	0	0	3	2	1	2	2	3	4	4	5	5	7	9	11	9	6	6	5	4	S	5	0	11	4	24
20	8	7	4	7	4	3	3	2	2	2	4	3	5	6	4	6	7	1	1	1	S	2	2	1	1	8	4	24
21	2	4	5	5	4	4	4	3	4	3	4	3	4	4	4	4	4	4	4	S	4	4	3	2	2	5	4	24
22	4	6	5	4	4	6	7	9	10	8	8	8	9	9	10	12	12	10	9	S	10	18	19	15	4	19	9	24
23	4	5	5	6	9	9	7	5	6	8	12	13	15	8	6	7	4	3	S	4	4	3	4	4	3	15	7	24
24	5	5	5	2	2	1	1	3	6	8	6	4	2	1	1	1	2	S	2	3	2	5	4	3	1	8	3	24
25	3	4	4	3	2	1	1	2	2	2	2	2	2	2	2	2	S	3	3	4	3	3	4	4	1	4	3	24
26	4	4	3	4	4	4	4	3	3	2	2	3	2	2	S	2	2	3	1	2	4	1	5	1	1	5	3	24
27	2	2	7	7	9	8	8	8	6	5	C	C	C	C	C	C	C	4	3	5	1	2	3	3	1	9	5	24
28	1	1	1	1	1	1	1	1	1	1	2	3	4	4	S	5	5	5	4	4	5	5	6	7	1	7	3	24
29	8	9	10	9	8	8	7	8	8	8	7	7	S	9	10	11	13	14	15	16	14	13	13	7	7	16	11	24
30	9	14	15	15	16	16	13	12	13	9	10	S	9	10	13	11	13	12	11	11	9	7	7	6	6	16	11	24
HOURLY MAX	13	15	15	15	16	22	23	21	19	14	12	13	15	10	13	15	18	19	20	16	16	18	19	15				
HOURLY AVG	4	4	5	4	4	5	5	5	6	6	5	5	4	4	5	5	6	6	5	5	5	5	5	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

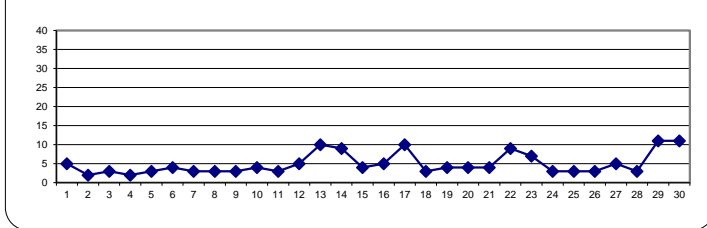
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

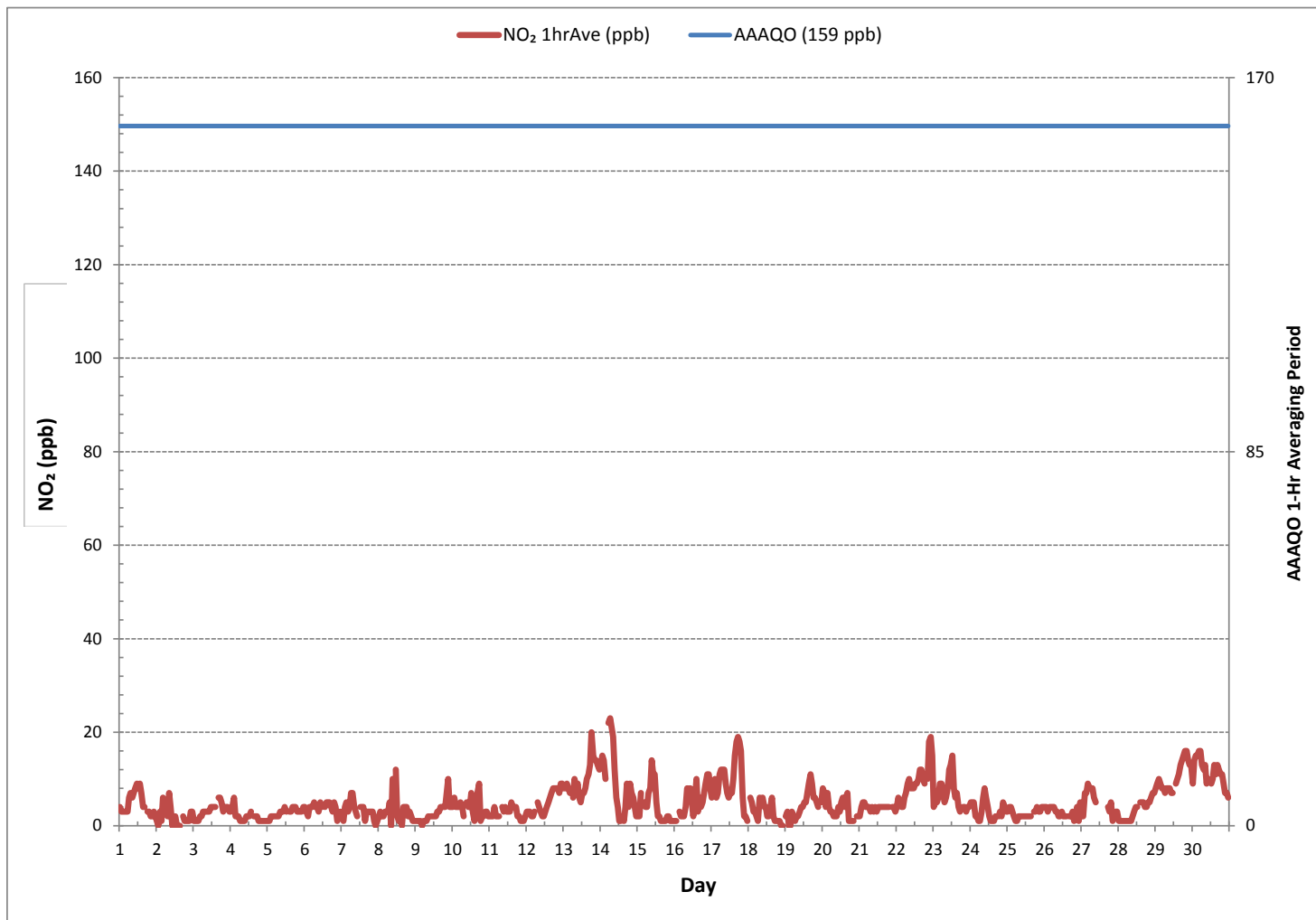
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	670				
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	1	ON DAY	2
MAXIMUM 1-HR AVERAGE:	23	ppb @ HOUR	6	ON DAY	14
MAXIMUM 24-HR AVERAGE:	11	ppb		ON DAY	29
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	720	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	4		MONTHLY AVERAGE:	5	ppb

24 HR AVERAGES November 2018



NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)



Wind: LICA MASKWA
 Poll.: LICA MASKWA-NO₂ [ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 14.49%

Calm Avg: 7.25 [ppb]

Direction	0.0-8.0	8.0-16.0	16.0-24.0	>24.0	Total
N	17.4	1.2	0.0	0.0	18.6
NE	7.0	0.6	0.0	0.0	7.6
E	4.7	0.4	0.0	0.0	5.1
SE	19.8	0.2	0.0	0.0	19.9
S	12.2	1.6	0.3	0.0	14.1
SW	4.4	6.0	0.9	0.0	11.3
W	2.2	0.6	0.3	0.0	3.1
NW	5.4	0.4	0.0	0.0	5.9
Summary	73.1	11.0	1.5	0.0	85.5

% Icon Classes (ppb)

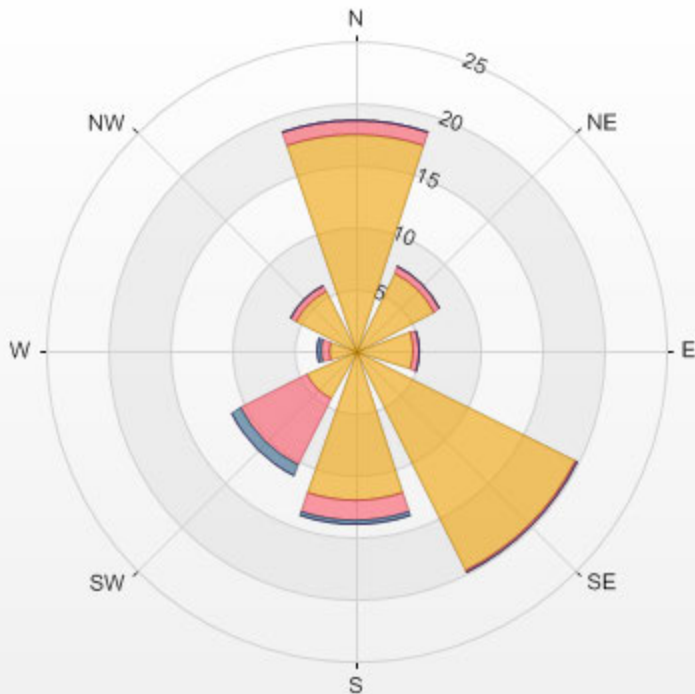
73 0.0-8.0

11 8.0-16.0

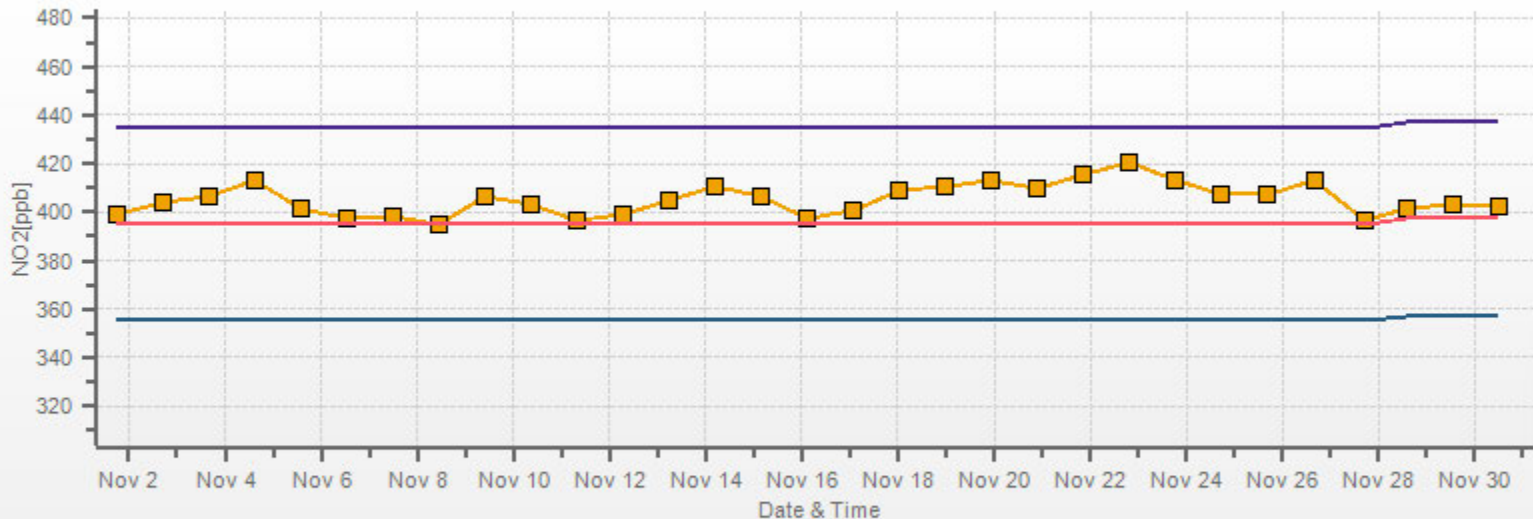
1 16.0-24.0

0 >24.0

LICA MASKWA Poll.: LICA MASKWA-NO2[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 14.49% Calm Poll Avg: 7.25[ppb]



NO2[ppb] Calibration: LICA MASKWA Monthly: 18/11 Type: Span



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 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	2.3	3.4	5.2	6.6	5.3	5.9	6.7	6.9	6.2	6.7	5.9	4.4	4.0	4.9	3.6	4.1	4.1	2.3	2.9	0.9	3.0	2.0	0.8	2.4	0.8	6.9	3.7	24
2	5.2	4.6	4.2	5.3	4.3	4.4	6.6	5.9	5.4	6.4	6.1	5.6	5.6	5.4	4.3	3.9	4.3	4.8	3.8	4.9	4.6	4.0	4.5	4.4	3.8	6.6	4.8	24
3	5.2	7.0	8.1	6.1	6.7	6.8	7.0	7.4	8.0	6.9	6.5	6.9	7.1	7.4	7.0	5.3	2.4	1.6	1.0	1.1	1.9	2.5	2.5	3.0	1.0	8.1	4.8	24
4	4.2	5.2	4.8	5.3	6.3	8.0	8.3	8.6	8.2	7.7	7.2	9.1	8.9	9.3	12.6	13.1	12.4	10.8	12.2	11.5	12.8	10.5	11.4	10.7	4.2	13.1	7.9	24
5	11.8	10.2	7.9	8.5	7.3	8.1	8.7	9.6	8.9	8.9	8.3	6.6	8.4	6.5	6.9	6.8	5.4	7.0	5.4	5.3	6.5	5.2	4.7	4.2	4.2	11.8	7.3	24
6	4.8	4.4	5.7	8.1	4.7	4.4	3.4	3.0	3.6	4.1	3.5	3.9	3.0	2.9	3.8	3.6	3.4	3.2	2.3	2.9	3.6	2.9	3.8	3.0	2.3	8.1	3.6	24
7	3.0	2.4	2.1	2.1	2.8	2.4	3.9	4.2	3.7	5.0	4.9	3.6	4.1	3.5	3.6	3.4	3.9	4.5	3.1	2.5	3.4	3.0	2.0	1.0	1.0	5.0	2.6	24
8	4.8	6.7	5.6	6.7	6.6	4.1	5.0	4.4	2.9	1.9	5.7	4.2	1.5	2.8	3.1	2.6	3.2	2.3	3.1	4.9	4.1	5.6	6.3	6.2	1.5	6.7	1.1	24
9	6.9	6.2	6.6	5.9	6.1	5.5	6.0	5.9	6.5	7.1	6.2	7.6	6.4	6.0	6.6	5.8	4.3	3.0	1.1	1.0	1.4	4.3	3.2	3.5	1.0	7.6	4.1	24
10	3.8	5.2	7.6	7.6	6.5	6.6	5.9	5.9	4.5	4.6	5.5	5.6	5.6	4.7	4.3	3.1	4.9	5.0	7.7	7.7	7.2	5.2	6.2	5.5	3.1	7.7	5.4	24
11	5.9	6.7	6.9	3.9	4.5	6.2	6.9	5.9	5.9	8.1	7.5	6.4	5.5	5.0	4.3	3.4	2.5	2.2	2.9	2.5	1.0	2.2	1.9	2.6	1.0	8.1	3.8	24
12	2.4	2.1	3.3	1.9	0.8	1.1	1.5	1.6	1.4	3.8	4.5	4.8	5.7	5.8	5.2	4.7	3.5	2.6	3.2	2.0	2.4	1.0	0.9	1.7	0.8	5.8	2.7	24
13	0.8	1.8	0.5	0.8	0.8	1.7	0.5	0.7	1.0	0.9	2.5	3.7	4.3	3.9	4.4	2.5	1.7	0.3	0.6	0.4	0.5	0.6	1.6	3.3	0.3	4.4	1.2	24
14	3.8	4.0	2.7	2.7	4.5	7.5	6.5	7.2	5.5	2.6	4.0	7.9	8.6	6.4	4.6	3.7	4.6	2.5	1.3	2.3	2.0	0.5	1.2	0.0	0.0	8.6	3.2	24
15	1.1	0.7	1.7	3.4	4.2	4.7	5.7	5.9	7.3	5.3	5.8	6.2	4.4	5.4	5.4	6.9	8.2	9.9	9.4	9.5	11.0	12.8	14.1	13.3	0.7	14.1	6.6	24
16	13.6	11.1	10.2	9.5	10.1	7.3	5.3	5.6	3.7	4.5	4.7	3.3	2.5	3.1	2.5	6.0	4.3	4.6	4.6	5.2	5.2	4.4	5.2	4.9	2.5	13.6	2.0	24
17	6.1	5.0	6.0	5.6	3.7	3.1	3.2	4.3	4.7	2.7	4.2	4.7	4.1	5.6	6.7	4.1	2.8	2.8	0.5	0.9	3.0	3.9	4.5	2.9	0.5	6.7	2.6	24
18	2.7	3.9	4.1	5.6	6.1	4.6	5.7	5.1	5.3	4.9	6.6	5.8	6.8	5.4	7.0	5.9	8.6	7.9	5.7	5.0	2.2	0.5	2.1	3.5	0.5	8.6	3.7	24
19	3.6	4.4	3.3	2.6	4.2	4.5	5.0	6.0	4.8	5.1	6.1	4.6	5.6	5.0	3.9	2.7	2.1	2.4	1.9	1.8	1.0	1.2	0.3	1.0	0.3	6.1	3.1	24
20	0.4	1.1	0.7	1.2	1.4	0.6	0.7	1.9	2.1	2.4	4.4	4.9	5.6	5.6	6.0	6.2	6.4	4.9	6.3	4.8	6.1	4.2	3.9	4.3	0.4	6.4	3.2	24
21	3.5	3.1	3.3	2.8	3.0	3.3	2.9	3.6	3.5	2.8	2.5	3.2	3.0	3.0	2.5	3.0	2.1	2.6	3.2	2.9	2.7	2.2	1.4	1.0	1.0	3.6	2.8	24
22	1.3	1.7	1.3	1.0	0.2	1.1	1.1	0.7	2.3	2.1	0.7	4.4	1.5	3.0	4.7	3.5	3.2	2.3	1.8	0.9	1.7	3.3	2.0	2.6	0.2	4.7	1.8	24
23	3.9	3.1	1.3	1.2	1.9	3.1	3.7	3.3	4.2	7.2	7.9	7.3	6.1	3.9	4.8	4.3	3.4	2.7	4.2	5.8	6.4	7.7	6.5	2.5	1.2	7.9	3.4	24
24	5.5	3.2	3.1	3.5	2.9	3.0	2.2	1.5	2.4	1.6	0.1	0.8	3.1	3.9	4.8	2.8	2.3	2.7	3.7	3.7	4.3	4.8	3.3	3.1	0.1	5.5	1.6	24
25	3.1	2.4	2.3	2.1	2.6	2.6	2.4	2.4	2.0	2.5	2.5	3.3	2.3	3.3	3.8	3.4	3.7	5.1	3.9	4.2	4.1	4.9	5.4	5.1	2.0	5.4	3.3	24
26	4.1	3.7	5.2	4.6	4.4	4.3	4.1	5.1	5.1	5.3	5.3	5.8	5.1	5.4	5.6	6.1	5.3	4.5	5.8	5.9	6.5	7.0	5.7	7.2	3.7	7.2	5.2	24
27	6.3	6.4	5.0	4.6	5.1	5.3	5.2	5.4	5.5	6.3	5.9	6.3	4.8	5.5	4.9	4.8	4.8	4.9	6.0	6.1	6.5	4.9	4.3	4.8	4.3	6.5	5.3	24
28	4.9	4.3	2.8	3.5	2.2	3.5	4.3	4.0	3.9	3.5	3.2	3.5	4.2	3.5	2.6	2.6	2.0	1.8	1.8	1.8	4.4	3.9	2.3	2.6	1.8	4.9	2.9	24
29	2.7	2.1	1.2	1.6	1.5	1.6	0.9	0.4	0.2	0.2	0.5	1.9	2.3	3.1	3.0	2.3	1.4	2.8	5.9	4.9	3.4	2.2	1.6	4.0	0.2	5.9	2.1	24
30	3.7	3.7	2.8	3.7	3.3	1.4	1.0	0.7	0.3	2.1	4.7	4.0	4.7	2.8	1.8	2.4	2.0	1.4	1.7	1.1	3.4	1.6	0.4	0.7	0.3	4.7	2.1	24
HOURLY MAX	13.6	11.1	10.2	9.5	10.1	8.1	8.7	9.6	8.9	8.9	8.3	9.1	8.9	9.3	12.6	13.1	12.4	10.8	12.2	11.5	12.8	12.8	14.1	13.3				

STATUS FLAG CODES

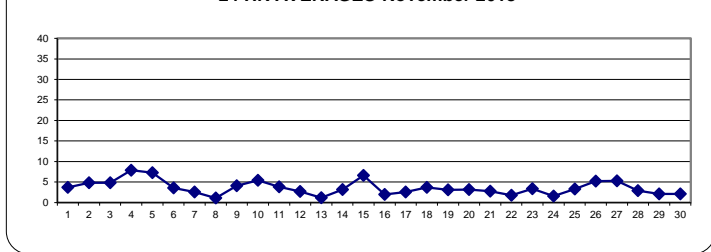
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	September 17, 2018
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

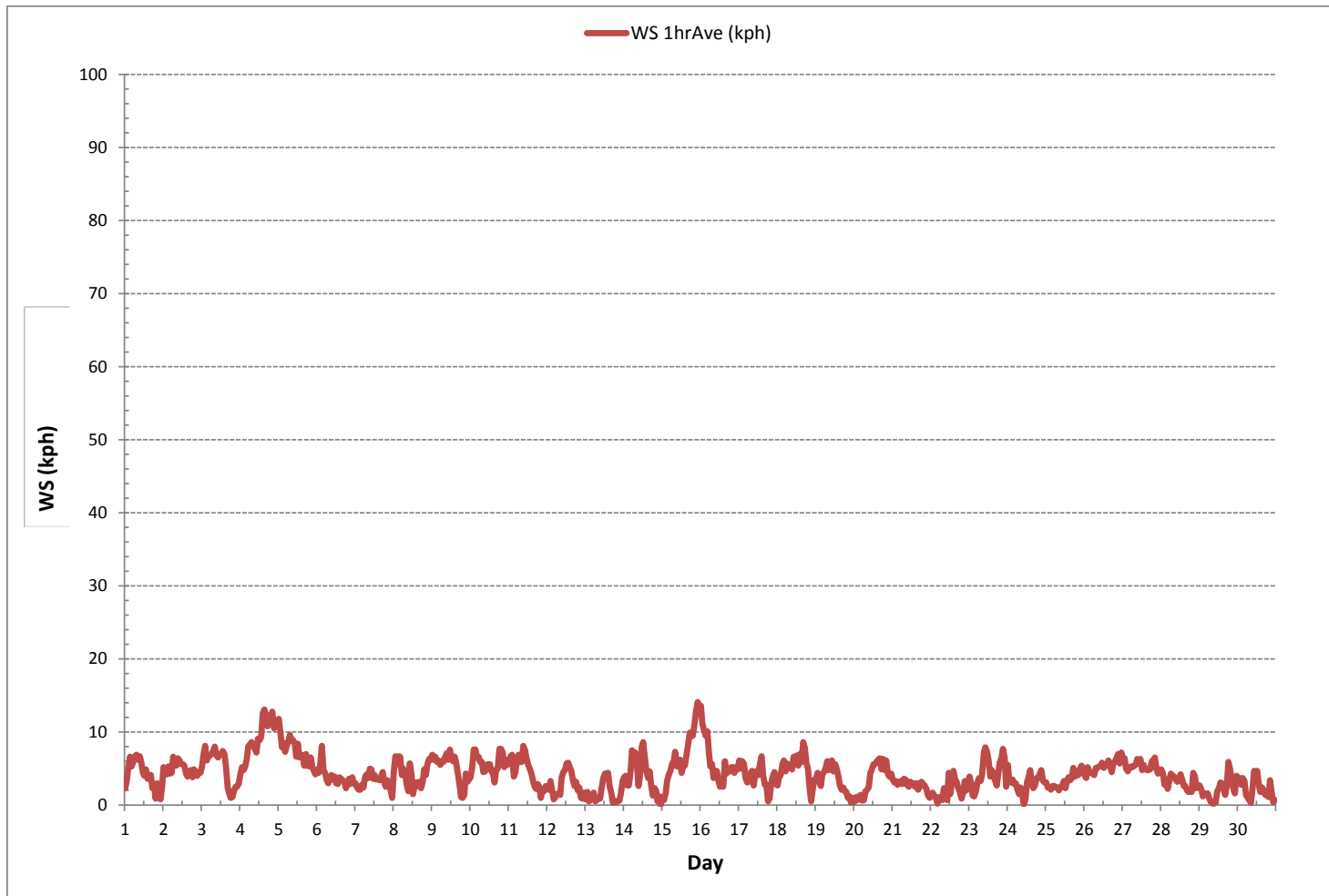
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	719
MINIMUM 1-HR AVERAGE:	0.0 kph @ HOUR 23 ON DAY 14
MAXIMUM 1-HR AVERAGE:	14.1 kph @ HOUR 22 ON DAY 15
MAXIMUM 24-HR AVERAGE:	7.9 kph ON DAY 4
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	720 hrs
AMT OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	2.4
MONTHLY AVERAGE:	0.7 kph

24 HR AVERAGES November 2018



WIND SPEED Hourly Averages (WS kph)



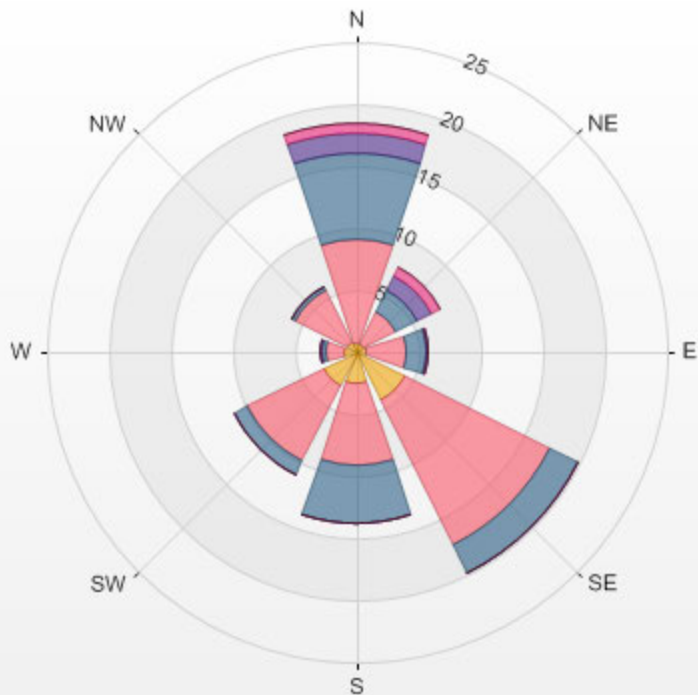
Wind: LICA MASKWA
 Monitor: WSP [kph]
 Monthly: 18/11
 Type: WindRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 14.31%

Direction	1.8-2.8	2.8-5.7	5.7-8.5	8.5-11.4	11.4-14.2	>14.2	Total
N	0.7	8.5	6.9	1.5	0.8	0.0	18.5
NE	0.7	2.9	1.9	1.3	0.8	0.0	7.6
E	0.8	3.2	1.7	0.1	0.0	0.0	5.8
SE	4.3	13.1	2.6	0.0	0.0	0.0	20.0
S	2.6	6.5	4.7	0.0	0.0	0.0	13.9
SW	3.1	6.8	1.3	0.0	0.0	0.0	11.1
W	1.1	1.4	0.3	0.1	0.0	0.0	2.9
NW	0.8	4.7	0.3	0.0	0.0	0.0	5.8
Summary	14.2	47.1	19.7	3.1	1.7	0.0	85.7

% Icon	Classes (kph)	14	 1.8-2.8	47	 2.8-5.7	20	 5.7-8.5	3	 8.5-11.4	2	 11.4-14.2	0	 >14.2
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LICA MASKWA 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 14.31% Calm Wind Avg Speed: 1.05(kph)



WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2018

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

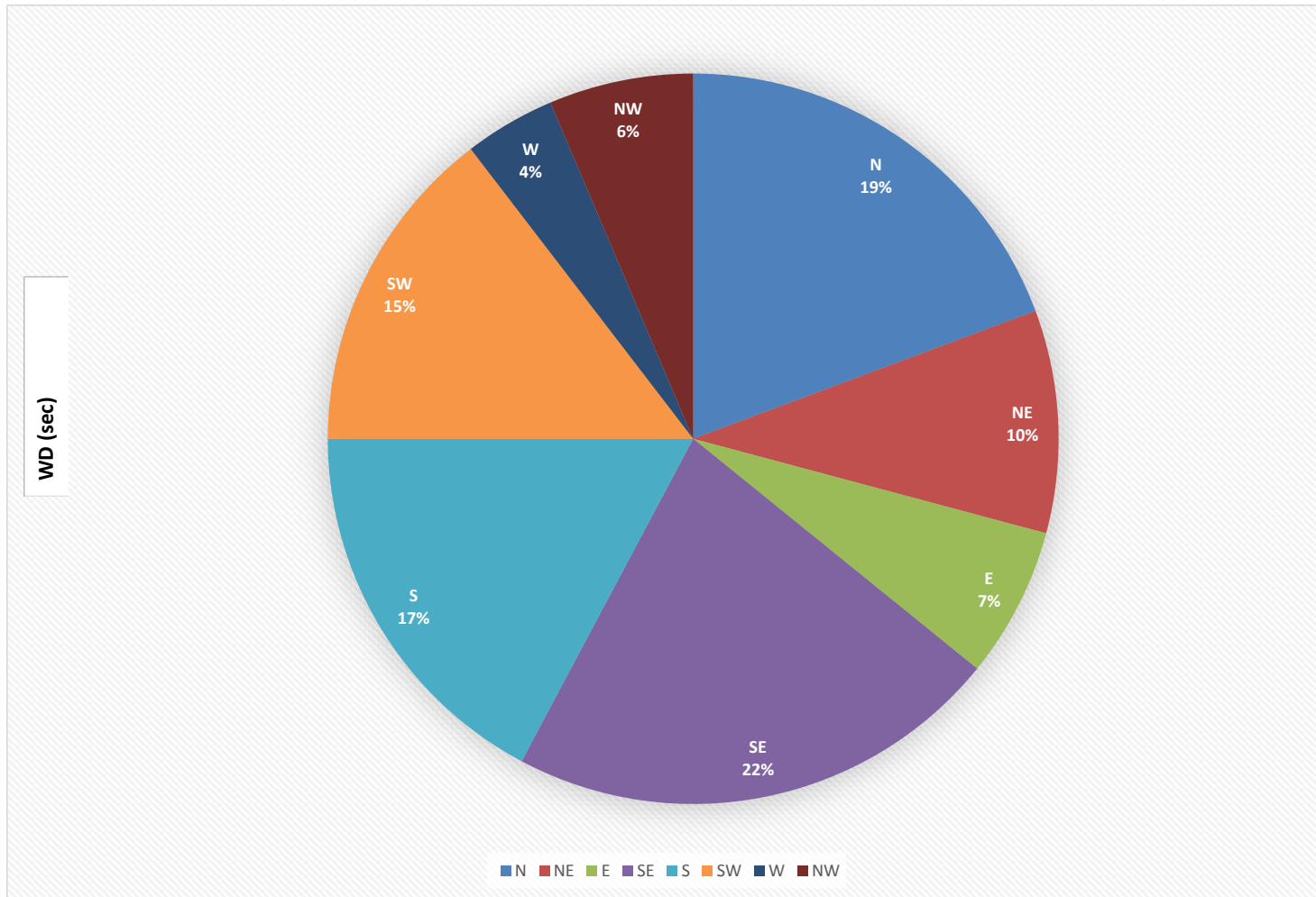
STATUS FLAG CODES

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

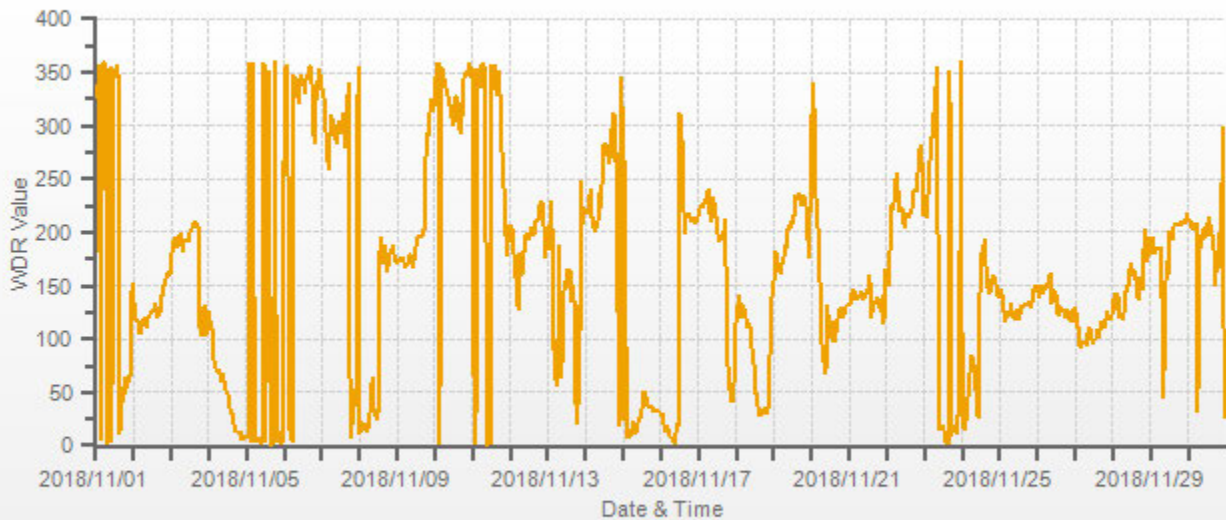
LAST CALIBRATION:	September 17, 2018
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	720	hrs
STANDARD DEVIATION:	101		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	85	(E)

WIND DIRECTION Hourly Averages (WD)



WDR[degwdr] Station: LICA MASKWA Monthly: 18/11 Type: AVG 1 Hr. [1 Hr.]



STANDARD DEVIATION WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2018

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	23	20	11	9	12	9	7	13	15	14	18	21	31	22	27	27	12	13	14	16	13	18	42	29	24
2	14	12	13	15	16	10	9	12	12	12	13	11	12	11	17	14	13	10	15	9	11	13	12	13	24
3	14	10	7	11	13	11	12	11	11	11	10	11	7	7	8	8	16	31	28	20	24	23	19	12	24
4	10	11	14	10	14	13	10	10	11	12	13	11	11	9	6	6	7	6	8	8	6	9	7	7	24
5	8	7	10	9	10	8	6	5	7	10	11	15	18	16	15	11	8	11	14	10	12	9	9	14	24
6	13	15	13	6	10	13	17	21	19	15	29	29	24	28	22	18	20	16	27	17	17	18	17	19	24
7	20	23	29	19	18	20	17	14	14	16	19	27	21	21	20	26	21	24	13	14	10	14	26	31	24
8	13	6	8	8	9	8	9	15	14	25	10	14	48	35	40	25	13	13	13	10	11	7	8	8	24
9	8	9	10	10	11	11	11	12	10	11	12	13	12	12	10	10	9	13	26	17	17	11	12	11	24
10	19	9	10	11	13	14	14	17	17	13	14	18	17	19	19	22	12	18	13	11	16	15	11	14	24
11	22	10	9	15	18	17	14	14	14	14	13	16	19	22	24	26	25	24	19	19	36	14	15	13	24
12	13	12	10	24	48	31	35	33	28	16	15	15	12	10	8	9	15	14	13	24	13	20	44	30	24
13	39	28	48	43	43	22	59	55	47	53	25	19	24	28	27	32	27	71	29	54	64	64	44	13	24
14	12	11	14	15	11	5	5	6	9	22	15	14	9	10	13	15	8	20	23	14	15	46	28	75	24
15	19	62	31	9	8	9	10	6	8	9	8	11	14	17	17	14	8	7	8	7	6	5	5	5	24
16	5	8	7	8	8	9	8	8	16	17	17	28	25	26	28	11	9	7	7	6	7	8	8	6	24
17	7	8	6	8	11	13	16	10	9	15	10	12	11	10	8	13	20	12	55	54	22	16	13	29	24
18	16	14	17	13	8	13	11	13	11	15	12	14	17	13	8	5	5	9	10	11	14	37	28	11	24
19	14	14	21	17	15	14	15	14	18	9	10	13	13	15	18	18	16	10	12	15	26	22	57	27	24
20	65	30	26	20	13	54	25	19	17	25	11	18	13	11	13	10	11	12	10	13	9	12	14	11	24
21	15	12	19	15	15	14	15	12	13	17	22	18	16	18	19	15	17	16	14	17	17	17	23	39	24
22	27	20	37	22	37	21	20	35	15	15	17	8	18	12	7	12	17	27	20	33	33	16	24	19	24
23	6	6	20	30	16	11	17	22	16	8	7	6	10	15	18	16	13	13	10	6	6	8	12	16	24
24	7	21	18	16	18	13	18	29	19	33	78	56	25	22	11	26	19	21	18	11	15	13	18	16	24
25	20	16	22	20	17	16	16	18	24	17	17	18	23	20	20	20	12	11	12	12	14	14	13	12	24
26	14	15	18	18	16	16	15	13	14	13	16	12	15	13	14	9	13	15	13	11	11	9	13	11	24
27	11	11	17	17	15	11	15	13	14	10	10	12	12	13	13	18	13	14	10	10	13	11	15	14	24
28	12	12	17	16	17	13	11	16	14	12	17	23	24	22	21	23	18	21	16	28	13	12	21	19	24
29	19	17	29	25	21	24	36	43	39	44	40	27	21	18	22	14	23	20	6	13	8	13	19	6	24
30	11	7	17	10	9	29	24	50	64	24	11	15	13	18	18	17	14	28	25	23	16	26	47	19	24

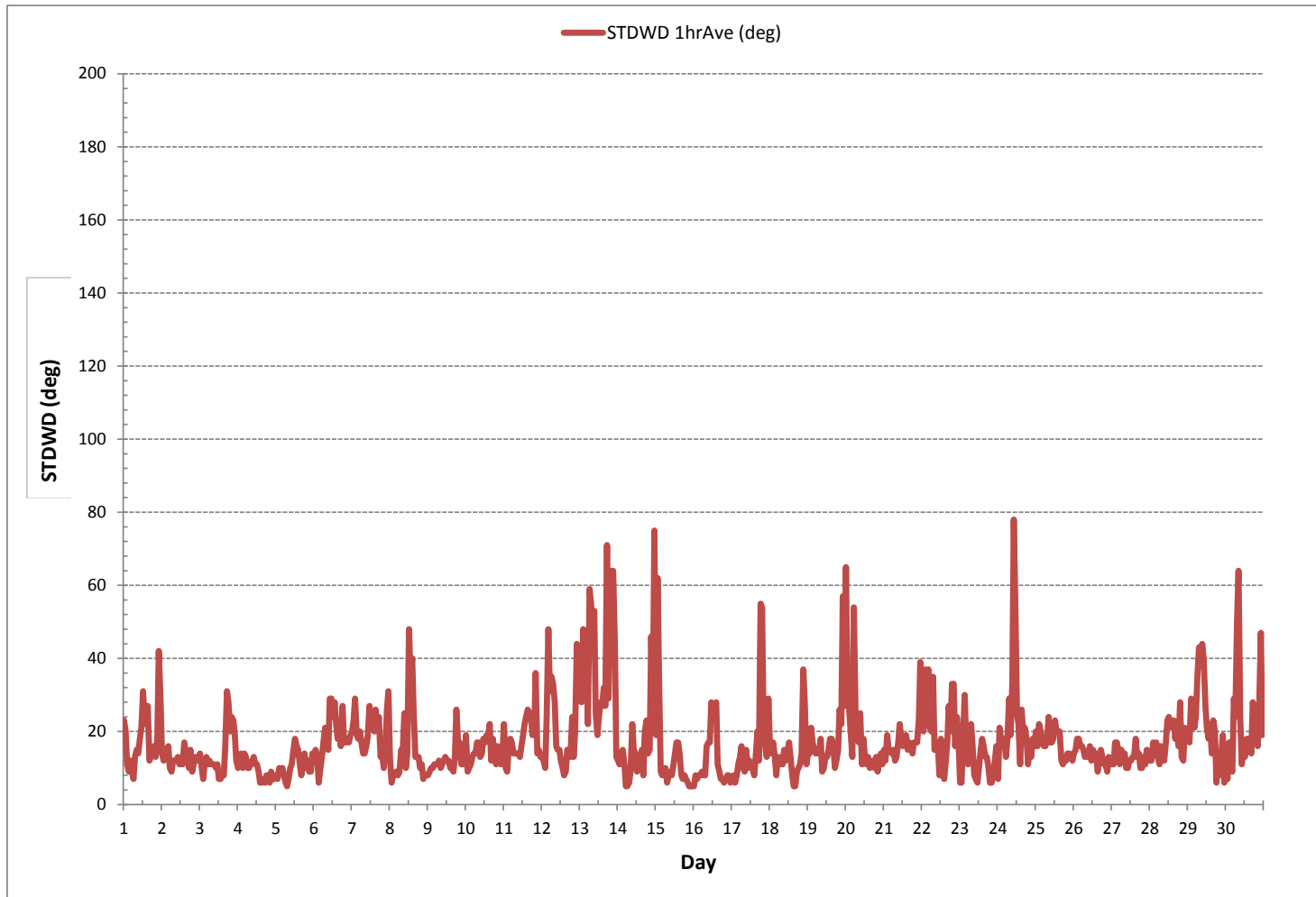
STATUS FLAG CODES

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 17, 2018

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	100	100	100	100	100	100	97	92	92	87	86	86	84	82	83	79	82	87	91	94	95	95	94	92	79	100	92	24				
2	87	86	85	84	86	89	93	93	93	95	94	89	86	90	90	94	94	93	92	93	95	96	97	98	84	98	91	24				
3	98	96	94	95	94	94	94	94	94	93	94	99	99	98	96	96	97	98	100	100	99	99	99	100	93	100	97	24				
4	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	98	97	96	94	94	92	89	89	100	98	24				
5	89	90	90	88	88	89	89	88	87	83	81	77	74	79	79	80	85	86	86	87	87	88	87	86	74	90	85	24				
6	86	86	86	85	86	87	87	87	85	83	83	80	79	78	79	80	85	89	90	89	87	85	84	78	90	85	24					
7	83	83	84	87	89	87	80	79	79	77	73	74	73	76	78	81	80	79	80	82	84	86	81	81	73	89	81	24				
8	81	84	86	84	81	84	84	85	85	78	77	77	76	71	66	67	74	89	90	83	84	85	85	85	66	90	81	24				
9	84	83	84	85	85	86	86	85	84	88	87	86	87	89	89	91	92	93	94	94	92	95	94	95	83	95	89	24				
10	94	93	90	92	92	92	91	90	90	89	87	82	78	74	74	79	82	89	82	80	80	81	82	82	74	94	85	24				
11	82	84	78	81	84	82	80	80	78	78	75	72	71	72	73	74	77	77	79	81	82	89	92	90	71	92	80	24				
12	89	90	90	89	89	91	91	90	89	88	85	82	81	81	83	85	86	88	89	89	90	91	91	81	91	87	24					
13	92	94	92	92	95	96	98	97	97	94	83	79	74	69	69	78	88	93	94	94	95	94	93	88	69	98	89	24				
14	87	88	89	83	82	83	83	81	82	75	62	59	59	59	59	67	77	82	93	98	99	100	100	59	100	81	24					
15	100	100	99	98	96	93	93	90	86	84	81	80	78	77	76	74	75	78	81	81	83	86	84	82	74	100	86	24				
16	81	82	82	81	80	80	83	84	86	82	75	69	62	60	57	66	75	79	84	88	89	88	90	89	57	90	79	24				
17	89	89	89	89	89	89	90	90	90	90	87	82	77	75	74	77	80	82	83	84	83	84	84	86	74	90	85	24				
18	84	86	88	88	90	91	90	91	92	91	90	90	91	90	90	90	91	90	90	90	90	91	90	89	84	92	90	24				
19	89	92	92	92	94	95	93	94	94	96	97	96	96	94	94	95	97	98	100	100	100	99	99	99	89	100	96	24				
20	100	100	100	100	100	100	99	100	100	100	100	100	100	100	100	100	100	100	100	100	99	99	100	100	99	100	100	24				
21	100	100	100	100	100	100	99	99	99	98	98	98	99	99	100	100	100	100	100	100	100	100	100	100	98	100	100	24				
22	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	24				
23	100	99	98	99	99	100	100	100	100	100	98	97	96	96	95	95	95	95	95	94	93	93	92	92	92	100	97	24				
24	91	91	92	92	92	93	92	92	93	92	89	89	90	90	89	89	91	90	91	90	91	92	92	92	89	93	91	24				
25	92	91	92	92	92	92	93	92	93	92	91	91	91	93	95	95	96	97	98	100	100	100	100	100	91	100	95	24				
26	100	100	100	100	99	100	100	100	99	99	99	99	99	99	99	99	99	99	99	99	98	98	98	97	97	100	99	24				
27	97	97	98	98	98	98	99	99	99	98	97	97	97	97	97	97	97	97	97	97	97	98	98	97	97	99	98	24				
28	95	95	94	94	94	94	94	94	94	93	92	93	95	96	97	98	97	96	99	100	100	100	100	100	92	100	96	24				
29	100	100	100	100	100	100	100	99	99	99	99	99	99	99	99	99	100	100	100	100	99	99	100	99	99	100	99	24				
30	100	100	100	100	100	100	100	100	100	99	100	98	97	98	100	100	100	100	100	100	100	100	100	100	97	100	100	24				
HOURLY MAX	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100							
HOURLY AVG	92	93	92	92	92	93	93	92	92	91	89	87	86	86	86	87	90	91	92	93	93	94	93	93	93							

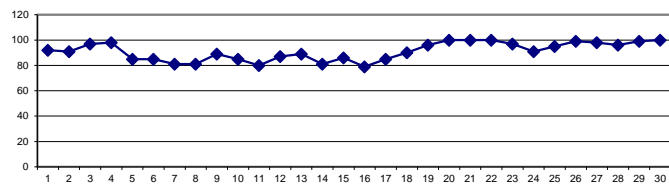
STATUS FLAG CODES

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

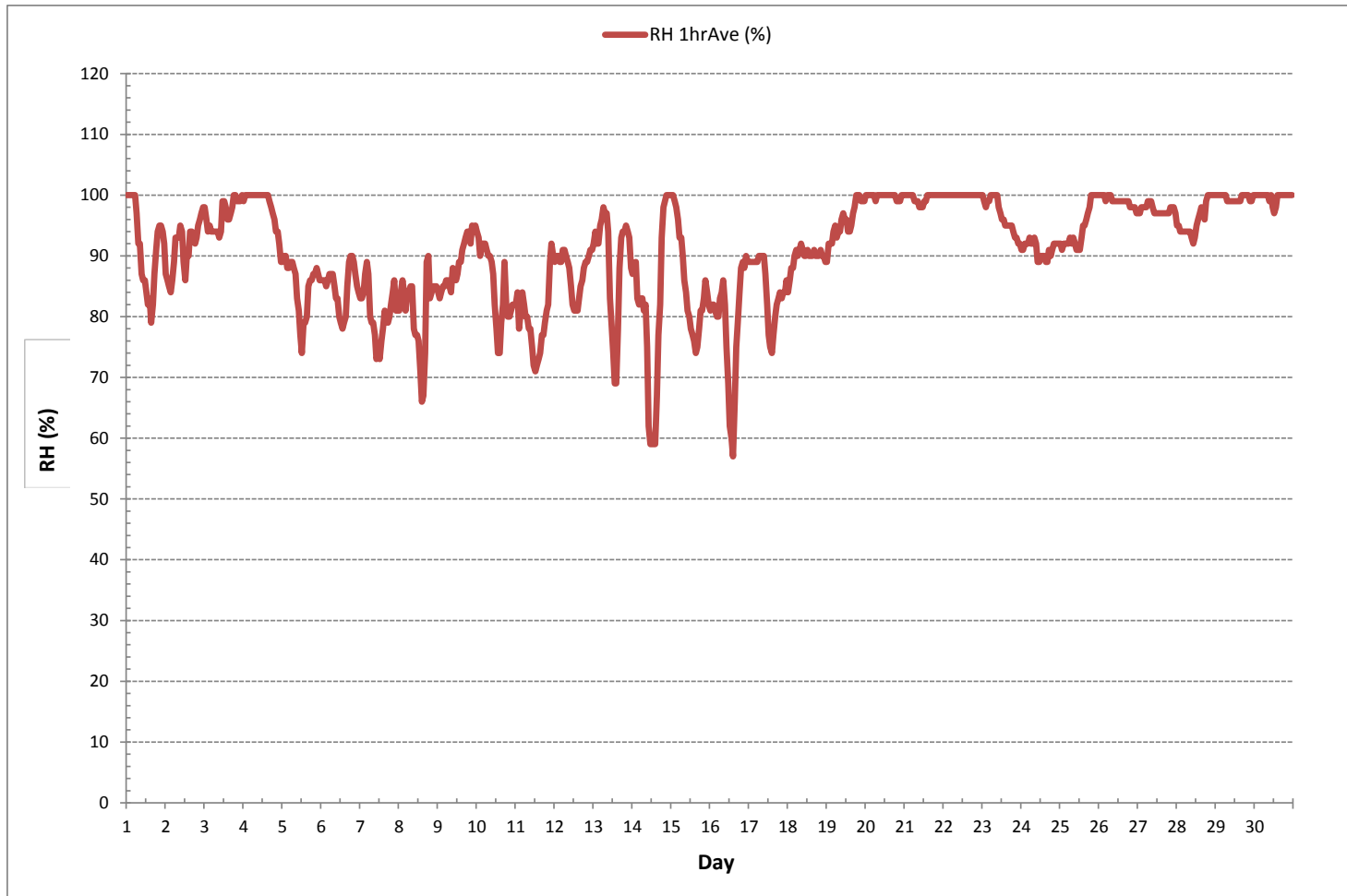
MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	57	%	@ HOUR	14	ON DAY	16
MAXIMUM 1-HR AVERAGE:	100	%	@ HOUR	0	ON DAY	1
MAXIMUM 24-HR AVERAGE:	100	%			ON DAY	20
OPERATIONAL TIME:						720 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	9					MONTHLY AVERAGE: 91 %

24 HR AVERAGES November 2018



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	930	930	931	932	933	934	935	936	937	938	938	939	939	940	940	940	940	939	939	939	938	937	937	937	930	940	937	24	
2	937	936	935	935	934	933	933	932	932	932	932	933	933	934	934	935	935	936	937	937	937	937	938	938	932	938	935	24	
3	937	937	937	937	936	936	936	935	935	935	934	934	933	933	932	932	932	931	930	929	928	927	926	926	926	937	933	24	
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5	929	931	932	933	933	934	935	935	936	937	937	938	938	939	939	940	940	941	941	942	942	943	943	943	929	943	938	24	
6	944	944	945	945	945	946	946	946	947	947	947	947	947	947	947	947	947	947	947	947	947	948	948	948	944	948	946	24	
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8	946	946	947	947	948	948	948	949	950	950	951	951	951	951	952	952	951	951	951	951	950	950	949	948	946	952	950	24	
9	947	946	944	943	941	940	938	937	936	934	933	932	932	931	930	930	929	929	929	929	929	929	930	931	929	947	935	24	
10	932	933	935	936	936	937	938	938	939	939	940	940	940	941	941	941	941	941	941	942	943	944	944	945	932	945	939	24	
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12	952	951	951	950	949	948	948	947	946	946	945	945	945	944	944	944	944	943	943	943	942	942	943	942	942	942	952	946	24
13	942	941	941	941	940	940	939	939	939	938	938	938	937	937	936	935	934	933	933	933	932	932	932	932	932	932	942	937	24
14	932	931	931	931	930	930	930	930	930	931	931	931	930	930	930	931	931	931	930	931	932	932	933	934	930	934	931	24	
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16	944	945	946	948	949	950	951	952	953	953	954	954	954	954	954	954	953	953	952	952	951	951	950	944	954	951	24		
17	949	948	947	946	945	944	943	942	942	942	941	941	941	940	939	939	939	938	938	937	937	936	936	936	936	949	941	24	
18	935	934	934	933	933	933	932	932	932	933	934	935	935	937	938	939	940	940	940	941	941	941	941	941	932	941	936	24	
19	941	941	941	941	940	939	938	937	936	936	935	935	934	933	933	933	933	933	932	932	932	932	932	933	932	941	936	24	
20	933	933	933	933	933	934	933	933	934	934	934	934	933	934	934	934	934	933	933	933	933	932	932	932	932	934	933	24	
21	932	932	931	931	930	930	929	929	929	929	928	928	927	927	926	926	925	924	924	923	922	922	921	921	921	921	932	927	24
22	921	920	920	920	919	919	919	919	919	919	920	920	920	920	920	920	920	920	920	920	920	920	921	921	919	921	920	24	
23	921	922	922	922	923	923	924	925	925	926	927	927	927	927	928	928	928	929	929	929	929	930	931	931	921	931	926	24	
24	932	932	933	933	934	934	935	936	936	937	937	938	938	938	938	938	939	939	939	939	939	939	940	932	940	937	24		
25	940	940	940	940	940	940	941	941	941	941	942	942	942	942	942	942	942	942	942	942	942	942	942	941	940	942	941	24	
26	941	941	940	940	940	940	939	939	939	938	938	937	937	936	935	935	934	934	933	932	931	930	930	928	928	941	936	24	
27	928	928	927	927	926	926	926	925	925	925	924	924	923	923	923	923	923	922	922	922	922	922	922	922	922	922	928	924	24
28	922	922	922	922	922	922	922	922	922	922	922	922	922	922	922	922	922	922	922	922	922	923	923	923	922	923	922	24	
29	923	923	923	922	922	922	922	922	923	923	923	923	923	923	923	923	923	923	923	923	923	924	924	924	922	924	923	24	
30	925	925	925	925	926	926	926	926	927	927	928	928	929	929	929	930	931	931	931	932	932	933	933	933	925	933	929	24	
HOURLY MAX	952	951	951	950	949	950	951	952	953	953	954	954	954	954	954	955	955	955	954	954	954	954	953	952					
HOURLY AVG	936	936	936	936	935	935	935	935	935	936	936	936	936	936	936	936	936	936	936	936	936	936	936	936					

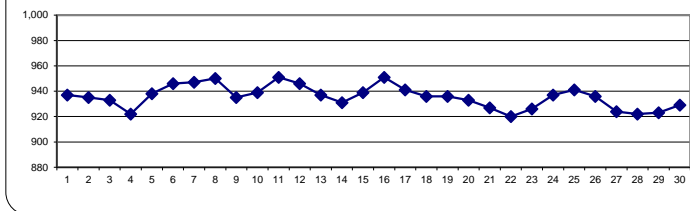
STATUS FLAG CODES

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

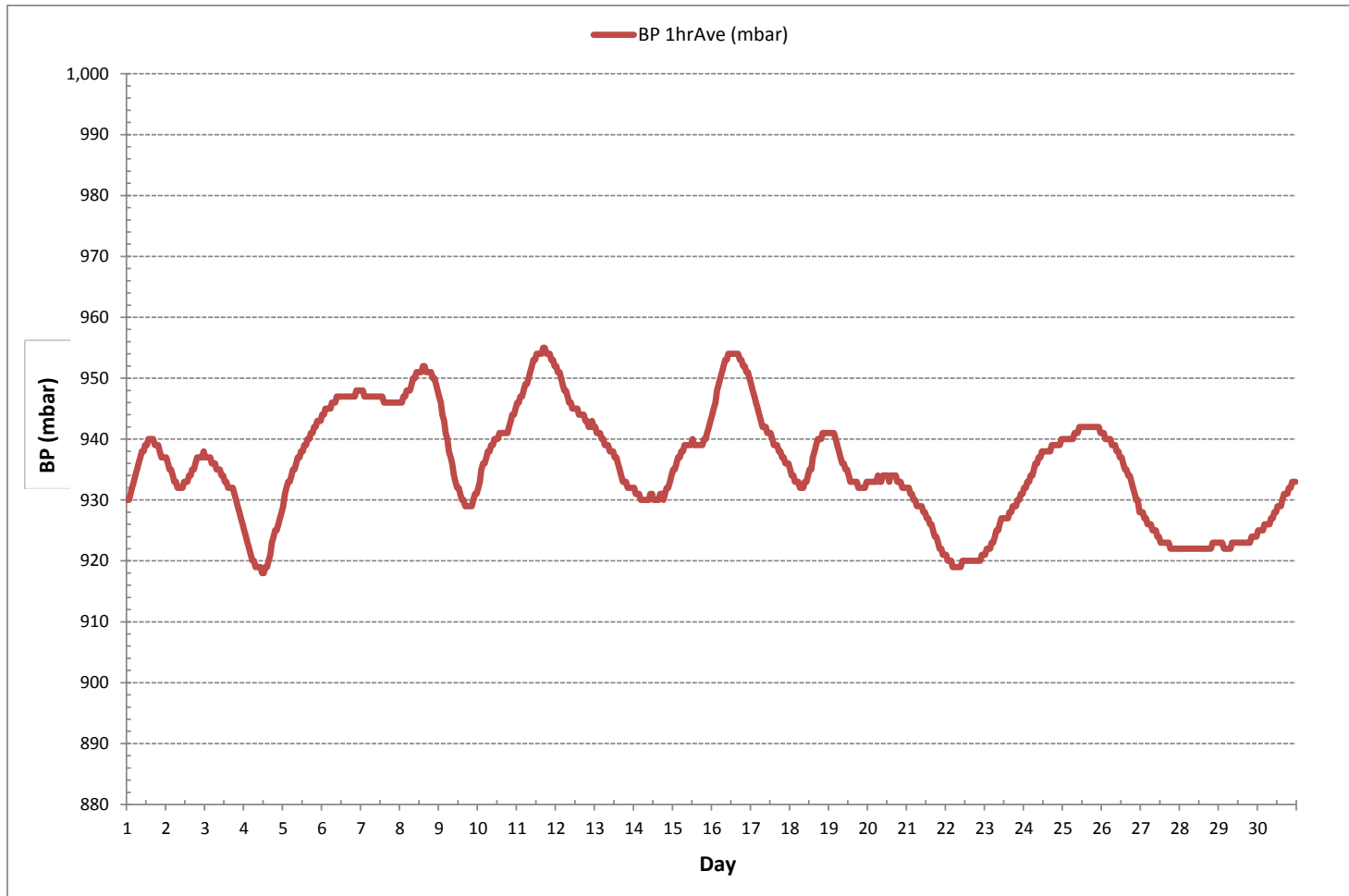
MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	918	mbar	@ HOUR	11	ON DAY	4
MAXIMUM 1-HR AVERAGE:	955	mbar	@ HOUR	16	ON DAY	11
MAXIMUM 24-HR AVERAGE:	951	mbar			ON DAY	11
OPERATIONAL TIME:						720 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	9				MONTHLY AVERAGE:	936 mbar

24 HR AVERAGES November 2018



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	2.3	1.6	1.3	1.0	0.3	-0.1	-0.5	-0.9	-1.3	-1.9	-2.2	-2.4	-2.6	-2.7	-2.9	-2.7	-3.4	-4.3	-5.4	-6.4	-6.3	-6.1	-4.9	-4.0	-6.4	2.3	-2.3	24	
2	-3.7	-3.5	-3.2	-2.8	-2.6	-2.2	-2.0	-1.8	-1.5	-1.4	-1.2	-0.9	-0.7	-1.0	-1.0	-1.4	-1.6	-1.8	-2.3	-2.6	-3.0	-3.2	-3.0	-3.7	-0.7	-2.1	24		
3	-3.1	-3.2	-3.4	-3.4	-3.3	-3.2	-3.1	-3.2	-2.8	-2.3	-1.7	-1.3	-0.9	-0.3	0.3	0.5	0.6	0.6	0.1	0.0	0.2	0.0	0.1	0.2	-3.4	0.6	-1.4	24	
4	0.3	0.2	0.1	0.2	0.1	-0.1	-0.3	-0.3	-0.2	-0.1	-0.1	-0.2	0.0	0.1	-0.5	-1.6	-2.8	-3.7	-4.6	-5.4	-6.1	-6.8	-7.4	-7.7	-7.7	0.3	-2.0	24	
5	-8.2	-8.5	-9.0	-9.7	-10.2	-10.6	-10.7	-10.5	-10.3	-10.0	-9.6	-8.7	-8.2	-8.9	-9.5	-10.2	-11.0	-11.2	-11.2	-11.3	-11.4	-11.5	-11.5	-11.6	-11.6	-8.2	-10.2	24	
6	-11.8	-12.1	-12.5	-12.7	-12.8	-13.0	-13.3	-13.3	-13.2	-12.9	-12.7	-12.3	-11.8	-11.4	-11.4	-11.4	-11.7	-11.8	-12.0	-12.1	-12.0	-12.0	-12.0	-11.8	-12.2	-11.4	-12.3	24	
7	-11.9	-11.8	-11.7	-11.6	-11.6	-11.3	-11.0	-11.1	-11.0	-11.0	-11.0	-10.8	-10.6	-10.5	-10.6	-11.0	-11.5	-11.9	-12.1	-12.2	-12.1	-12.2	-12.0	-11.8	-12.2	-10.5	-11.4	24	
8	-12.1	-12.4	-12.8	-13.3	-14.1	-15.1	-15.1	-15.8	-16.1	-13.6	-12.9	-12.5	-12.1	-11.6	-11.3	-11.5	-13.4	-16.5	-17.6	-15.7	-16.1	-16.3	-16.2	-16.2	-17.6	-11.3	-14.2	24	
9	-16.5	-16.3	-16.3	-16.0	-15.6	-15.0	-14.3	-13.3	-12.5	-11.8	-10.9	-10.0	-9.5	-9.3	-8.8	-8.6	-8.5	-8.4	-8.1	-8.2	-8.2	-8.1	-7.8	-7.9	-16.5	-7.8	-11.3	24	
10	-7.6	-7.4	-7.8	-8.0	-8.0	-8.0	-8.0	-8.1	-7.8	-7.1	-6.4	-5.6	-4.6	-3.4	-3.3	-3.6	-3.9	-4.3	-4.6	-5.5	-6.3	-6.6	-7.0	-7.2	-8.1	-3.3	-6.3	24	
11	-7.7	-8.5	-9.3	-9.7	-10.2	-10.8	-10.8	-11.0	-11.0	-11.4	-11.3	-11.0	-10.8	-10.8	-10.9	-11.0	-11.3	-11.6	-11.8	-12.0	-12.7	-13.8	-15.1	-15.3	-15.3	-7.7	-11.2	24	
12	-14.7	-15.0	-14.9	-14.3	-14.1	-13.6	-13.1	-12.4	-11.7	-10.8	-10.0	-8.9	-8.3	-7.8	-7.4	-7.1	-6.8	-6.7	-6.4	-6.3	-6.2	-6.0	-5.4	-5.4	-15.0	-5.4	-9.8	24	
13	-5.3	-5.6	-4.8	-4.5	-5.1	-5.9	-6.3	-6.2	-6.2	-4.8	-1.4	-0.1	0.9	2.3	1.9	0.1	-2.0	-3.1	-3.7	-3.8	-4.0	-3.5	-2.9	-1.7	-6.3	2.3	-3.2	24	
14	-1.2	-0.9	-0.8	0.7	0.9	0.0	0.1	0.5	1.5	3.3	6.1	7.1	7.2	7.2	7.4	5.4	3.4	2.2	0.1	-0.8	-1.4	-2.4	-2.5	-3.3	-3.3	7.4	1.7	24	
15	-3.5	-3.6	-2.9	-2.3	-2.4	-2.8	-3.0	-3.6	-4.3	-4.6	-4.7	-4.8	-4.9	-4.8	-5.3	-5.8	-6.4	-7.0	-7.6	-8.2	-8.8	-10.0	-11.1	-11.9	-11.9	-2.3	-5.6	24	
16	-12.9	-13.9	-14.4	-14.8	-15.2	-15.8	-16.8	-17.8	-18.5	-17.9	-16.7	-15.4	-13.6	-12.6	-11.7	-13.5	-15.1	-16.1	-16.9	-17.7	-18.0	-18.4	-19.2	-19.2	-19.2	-11.7	-15.9	24	
17	-19.5	-19.5	-19.1	-19.0	-19.4	-19.2	-18.0	-18.1	-18.2	-15.7	-13.2	-11.3	-10.1	-9.2	-9.6	-10.4	-10.7	-10.5	-10.1	-10.0	-9.9	-10.0	-10.3	-10.2	-19.5	-9.2	-13.8	24	
18	-9.9	-10.0	-10.1	-10.5	-10.9	-11.1	-11.4	-11.3	-10.8	-10.3	-10.1	-9.8	-10.1	-10.5	-10.5	-10.3	-10.8	-11.7	-12.2	-12.5	-12.4	-12.0	-11.8	-11.8	-12.5	-9.8	-10.9	24	
19	-11.8	-12.0	-12.1	-11.8	-11.6	-11.3	-11.0	-10.8	-10.3	-9.6	-8.9	-7.9	-6.7	-5.4	-4.1	-3.4	-2.9	-3.0	-3.9	-4.1	-3.7	-4.8	-5.7	-5.4	-12.1	-2.9	-7.6	24	
20	-3.9	-2.5	-1.8	-1.7	-1.3	-1.4	-1.0	-1.3	-1.0	-1.0	-0.7	-1.2	-2.8	-3.5	-4.1	-4.5	-5.0	-5.5	-6.2	-6.6	-6.6	-6.4	-6.0	-5.7	-6.6	-0.7	-3.4	24	
21	-5.5	-5.3	-5.0	-5.1	-5.6	-6.0	-6.2	-6.6	-6.9	-6.8	-6.5	-6.0	-5.5	-5.3	-5.0	-4.9	-4.7	-4.8	-5.0	-5.1	-4.9	-4.5	-4.1	-6.9	-4.1	-5.4	24		
22	-3.9	-3.8	-3.8	-3.8	-3.8	-4.0	-4.4	-5.2	-5.8	-5.2	-3.9	-3.7	-3.3	-1.7	-1.2	-1.6	-2.2	-2.8	-3.7	-4.4	-4.6	-3.8	-4.2	-4.9	-5.8	-1.2	-3.7	24	
23	-4.7	-6.1	-7.2	-6.9	-5.1	-4.3	-3.8	-3.6	-3.8	-4.8	-5.8	-6.5	-6.5	-6.6	-7.0	-7.5	-7.9	-7.8	-7.8	-7.8	-8.5	-9.3	-10.2	-10.3	-10.3	-3.6	-6.7	24	
24	-10.6	-10.9	-11.1	-11.4	-11.8	-12.0	-12.1	-12.0	-12.1	-12.0	-11.3	-10.9	-10.8	-10.8	-10.7	-10.7	-10.9	-11.0	-10.6	-10.5	-10.5	-10.4	-10.4	-12.1	-10.4	-11.1	-10.4	-11.1	24
25	-10.5	-10.2	-10.1	-9.9	-9.8	-9.7	-9.5	-9.2	-9.2	-8.9	-8.5	-8.0	-7.5	-7.4	-7.2	-7.2	-7.1	-7.2	-7.0	-6.9	-7.0	-7.1	-7.0	-7.0	-10.5	-6.9	-8.3	24	
26	-6.8	-6.8	-6.9	-7.0	-7.1	-6.8	-6.5	-6.4	-6.7	-6.8	-6.9	-6.6	-6.1	-6.0	-6.1	-6.2	-5.9	-6.1	-6.2	-6.3	-6.5	-6.7	-6.4	-6.5	-6.4	-7.1	-5.9	-6.5	24
27	-6.1	-6.2	-6.0	-5.8	-5.8	-5.8	-5.7	-5.8	-6.0	-6.1	-6.1	-6.0	-5.9	-6.0	-6.0	-6.2	-6.3	-6.3	-6.6	-6.7	-7.0	-7.2	-7.4	-7.5	-7.5	-5.7	-6.3	24	
28	-7.8	-8.2	-8.2	-8.4	-8.3	-8.4	-8.5	-8.3	-8.3	-8.1	-7.6	-6.8	-6.3	-5.8	-5.6	-5.5	-5.5	-5.4	-5.2	-5.3	-5.4	-5.4	-5.2	-5.4	-8.5	-5.2	-6.8	24	
29	-5.4	-5.3	-5.2	-5.4	-6.0	-6.3	-6.4	-6.7	-6.9	-6.0	-5.2	-3.9	-3.7	-3.9	-3.7	-3.9	-3.9	-4.0	-4.0	-3.6	-3.6	-4.5	-4.7	-3.4	-6.9	-3.4	-4.8	24	
30	-2.6	-2.9	-4.1	-4.2	-3.8	-3.5	-3.4	-3.2	-3.1	-2.4	-2.4	-1.8	-1.5	-1.6	-1.3	-1.4	-1.8	-1.9	-2.0	-1.9	-2.5	-2.8	-2.7	-2.7	-4.2	-1.3	-2.6	24	
HOURLY MAX	2.3	1.6	1.3	1.0	0.9	0.0	0.1	0.5	1.5	3.3	6.1	7.1	7.2	7.2	7.4	5.4	3.4	2.2	0.1	0.0	0.2	0.0	0.1	0.2					
HOURLY AVG	-7.6	-7.7	-7.8	-7.7	-7.8	-7.9	-7.9	-7.9	-7.9	-7.4	-6.8	-6.3	-5.9	-5.6	-5.6	-5.9	-6.4	-6.8	-7.2	-7.4	-7.5	-7.7	-7.8	-7.8					

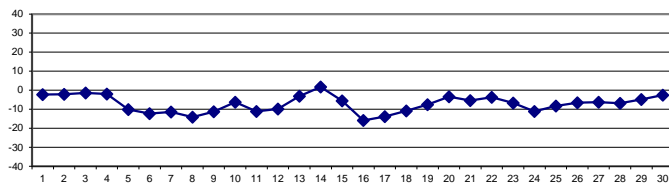
STATUS FLAG CODES

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

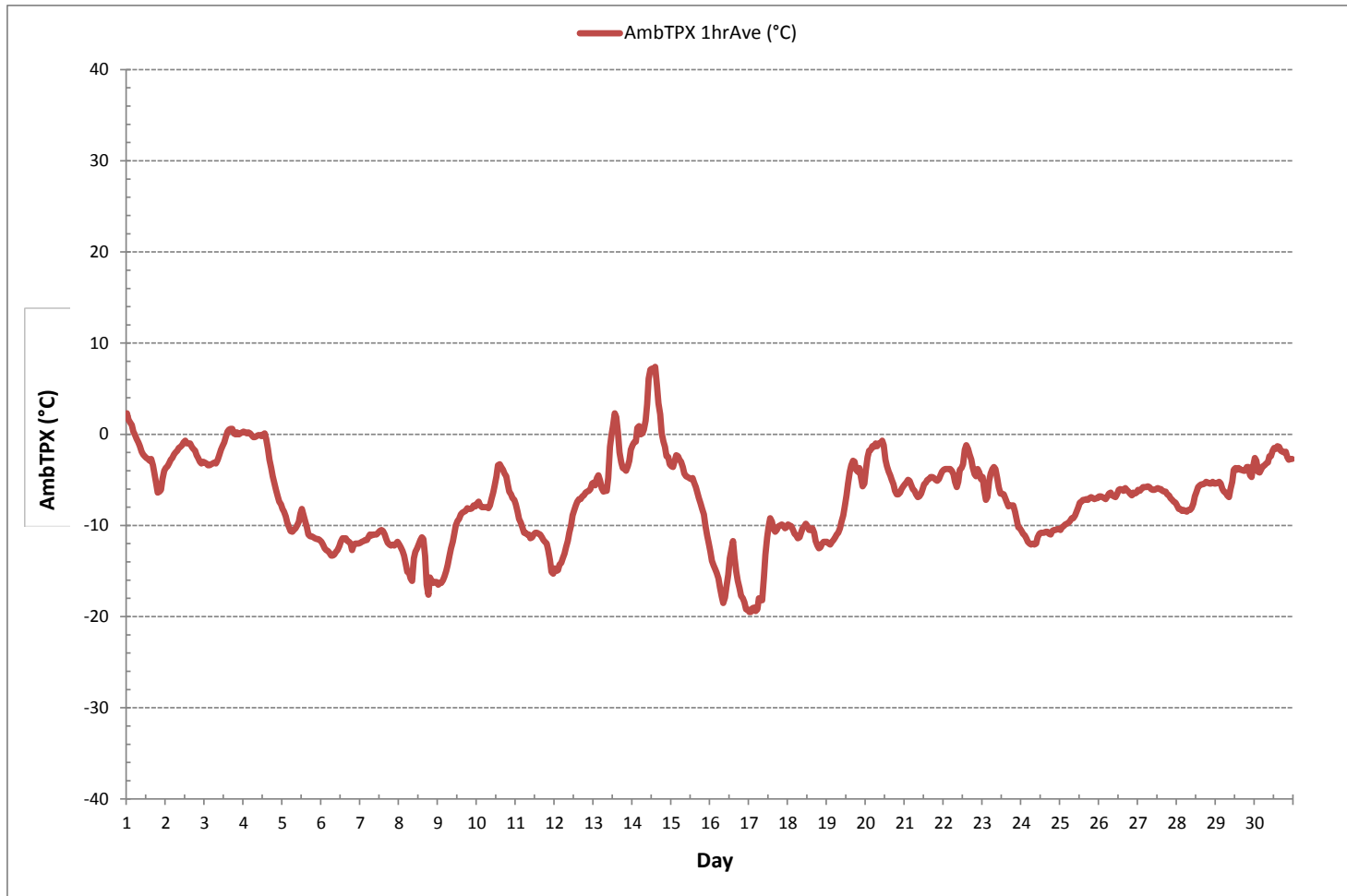
MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-19.5 °C	@ HOUR	0	ON DAY	17
MAXIMUM 1-HR AVERAGE:	7.4 °C	@ HOUR	14	ON DAY	14
MAXIMUM 24-HR AVERAGE:	1.7 °C			ON DAY	14
OPERATIONAL TIME:				720	hrs
AMD OPERATION UPTIME:				100.0	%
STANDARD DEVIATION:	4.8	MONTHLY AVERAGE:		-7.2	°C

24 HR AVERAGES November 2018



AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



PRECIPITATION



PRECIPITATION Hourly Totals (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.	SUM		
DAY 1	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Y	Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	22
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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				

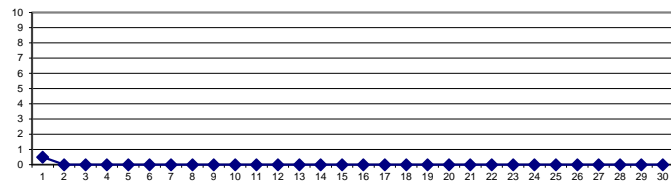
STATUS FLAG CODES

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

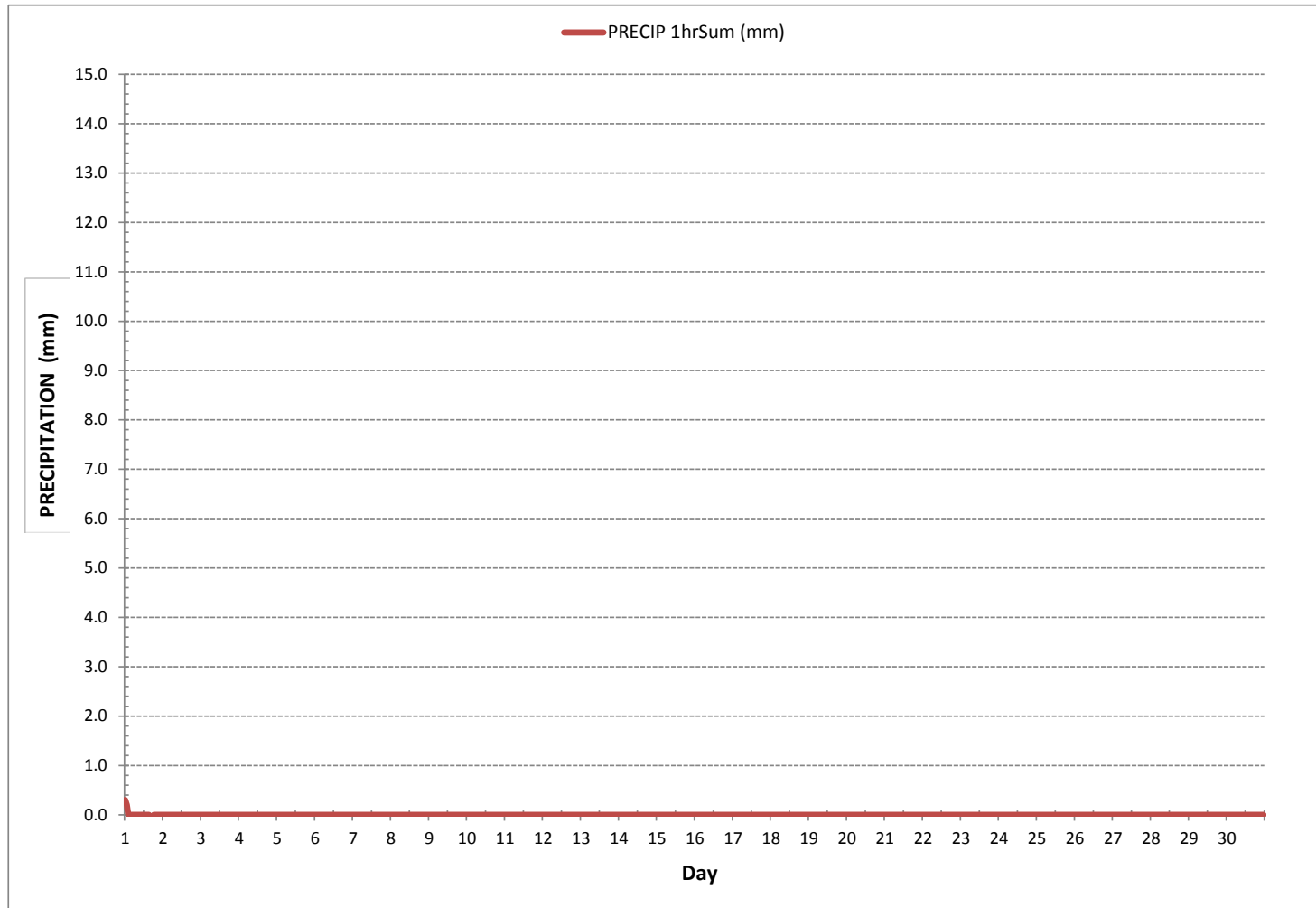
MONTHLY SUMMARY

MINIMUM 1-HR TOTAL:	0.0	mm	@ HOUR	2	ON DAY	1
MAXIMUM 1-HR TOTAL:	0.3	mm	@ HOUR	0	ON DAY	1
MAXIMUM 24-HR TOTAL:	0.5	mm			ON DAY	1
MONTHLY TOTAL	0.5	mm				
OPERATIONAL TIME:						718 hrs
AMD OPERATION UPTIME:						99.7 %
STANDARD DEVIATION:	0.0		MONTHLY TOTAL:			0.5 mm

24 HR Total November 2018



PRECIPITATION Hourly Totals (mm)



APPENDIX II
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE



Thermo 43I-TLE Sulphur Dioxide Analyzer Calibration

Date:	November 27, 2018	Barometer/B.P./units:	F.S. 05544 expires January 15, 2019	925	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	Maskwa	Weather Conditions:	A few clouds		
Parameter:	Sulphur Dioxide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	10:22	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	15:13	Cal Gas Expiry Date:	October 24, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		
Analyzer:					
Serial Number/Owner:	1180930031 LICA	Range ppb:	1000		
Last Calibration Date:	October 12, 2018	As Found C.F.:	0.980		
Previous C.F.:	1.000	New C.F.:	1.000		

Calibration Standards: Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: API id# 690 expires March 15, 2019 Cal Gas Cylinder I.D. #: LL 104225 Cal Gas Conc. (ppm): 49.2	Standard Calibration Points for Ranges <table border="1"> <tr><td>Point</td><td>ppb</td></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
Point	ppb								
High	780								
Mid	380								
Low	190								

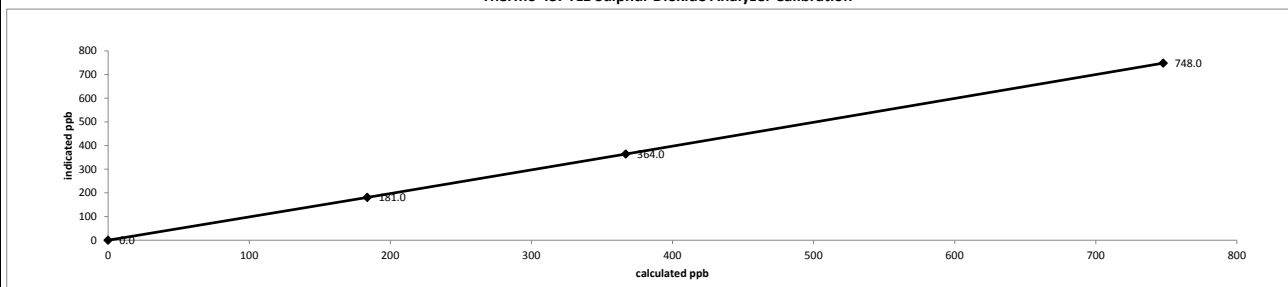
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	5007	0.00	5007	0.0	0	n/a
as found high	4910	75.78	4986	747.8	763	0.980
adjusted zero	5007	0.00	5007	0.0	0	n/a
adjusted high	4910	75.78	4986	747.8	748	1.000
mid	4915	36.93	4952	366.9	364	1.008
low	4932	18.48	4950	183.7	181	1.015
calibrator zero	5007	0.00	5007	0.0	0	n/a
Average C.F. =						1.008

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.999		0.95-1.05
b (Intercept as % of full scale) =	0.17%		± 3% F.S.
% change in C.F. from last cal =	2.00%		± 10%

Thermo 43I-TLE Sulphur Dioxide Analyzer Calibration



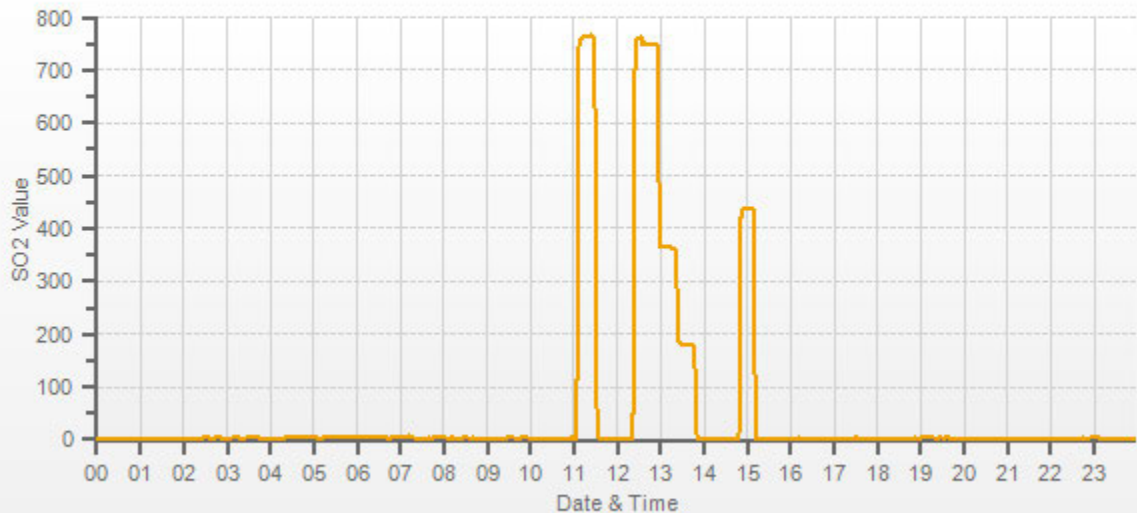
As found:		As left:	
Bkg:	2.16	Bkg:	2.13
Coef:	0.977	Coef:	0.960
Pmt:	-701.2	Pmt:	-700.4
Flash:	987	Flash:	986
Internal:	30.2	Internal:	30.0
Chamber:	45.3	Chamber:	44.9
Perm Oven Gas:	35.00	Perm Oven Gas:	35.00
Perm Oven Heater:	34.26	Perm Oven Heater:	34.26
Pressure:	663.7	Pressure:	662.8
Sample Flow:	0.454	Sample Flow:	0.454
Lamp Intensity:	91	Lamp Intensity:	91
Converter:	n/a	Converter:	n/a
Converter Set:	n/a	Converter Set:	n/a
Averaging Time:	120	Averaging Time:	120
Expected Value:	439.0	Expected Value:	435.0

Comments:

The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned. The manifold blower was found to be working normally.

SO2[ppb] Station: LICA MASKWA Daily: 18/11/27 Type: AVG 1 Min. [1 Min.]

— SO2[ppb]



HYDROGEN SULPHIDE



Thermo 450i Hydrogen Sulphide Analyzer Calibration

Date:	November 27, 2018	Barometer/B.P./units:	F.S. 05544 expires January 15, 2019	925	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	Maskwa	Weather Conditions:	A few clouds		
Parameter:	Hydrogen Sulphide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	10:22	Performed By/Reviewer:	Alex Yakupov	Cheri Sinclair	
End Time 24 hr. (mst):	15:39	Cal Gas Expiry Date:	October 20, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		
Analyzer:					
Serial Number/Owner:	CM 17360005 LICA	Range ppb:	100		
Last Calibration Date:	October 12, 2018	As Found C.F.:	0.974		
Previous C.F.:	1.000	New C.F.:	1.000		

Calibration Standards: Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: Sabio id# 11900613 expires August 22, 2019 Cal Gas Cylinder I.D. #: EY 0001003 Cal Gas Conc. (ppm): 9.55	Standard Calibration Points for Ranges <table border="1"> <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 minutes): Start/End Time 24 hr.: 10:31 / 10:47 SO2 Analyzer Range: 1000 Target Concentration (ppb): 780 As Found Zero: 1.0 Analyzer Response (ppb): 1.0 Zero Corrected Result (ppb): 0.0
Point	ppb									
High	78									
Mid	38									
Low	19									

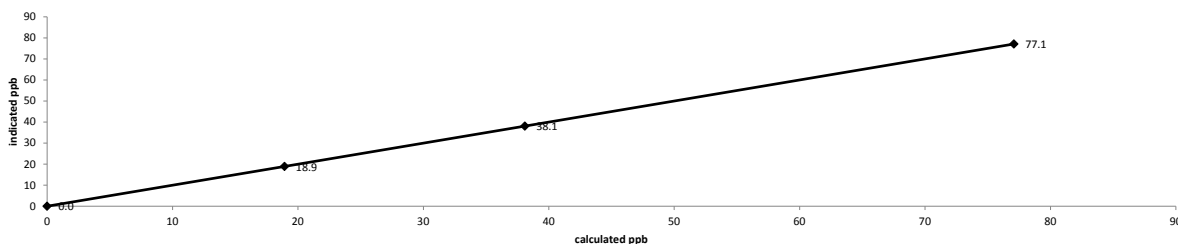
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	7499	0.00	7499	0.0	1	n/a
as found high	7378	61.30	7439	78.7	81.8	0.974
adjusted zero	7499	0.00	7499	0.0	0	n/a
adjusted high	7496	61.00	7557	77.1	77.1	1.000
mid	7440	29.80	7470	38.1	38.1	1.000
low	7554	15.00	7569	18.9	18.9	1.001
calibrator zero	7400	0.00	7400	0.0	0	n/a
Average C.F. =						1.000

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.000		0.95-1.05
b (Intercept as % of full scale) =	0.01%		± 3% F.S.
% change in C.F. from last cal =	2.60%		± 10%

Thermo 450i Hydrogen Sulphide Analyzer Calibration



As found:		As left:	
Bkg:	18.5	Bkg:	19.3
Coef:	0.871	Coef:	0.857
Pmt:	-602.4	Pmt:	-602.7
Flash:	811	Flash:	810
Internal:	34.0	Internal:	34.0
Chamber:	45.0	Chamber:	45.0
Converter Temp:	323.1	Converter Temp:	328.6
Converter Set:	325.0	Converter Set:	325.0
Perm Oven Gas:	35.00	Perm Oven Gas:	35.00
Perm Oven Htr:	34.32	Perm Oven Htr:	34.32
Pressure:	560.9	Pressure:	561.2
Sample Flow:	0.940	Sample Flow:	0.940
Lamp Intensity:	91	Lamp Intensity:	91
Averaging Time:	120	Averaging Time:	120
Expected Value:	53.6	Expected Value:	50.1

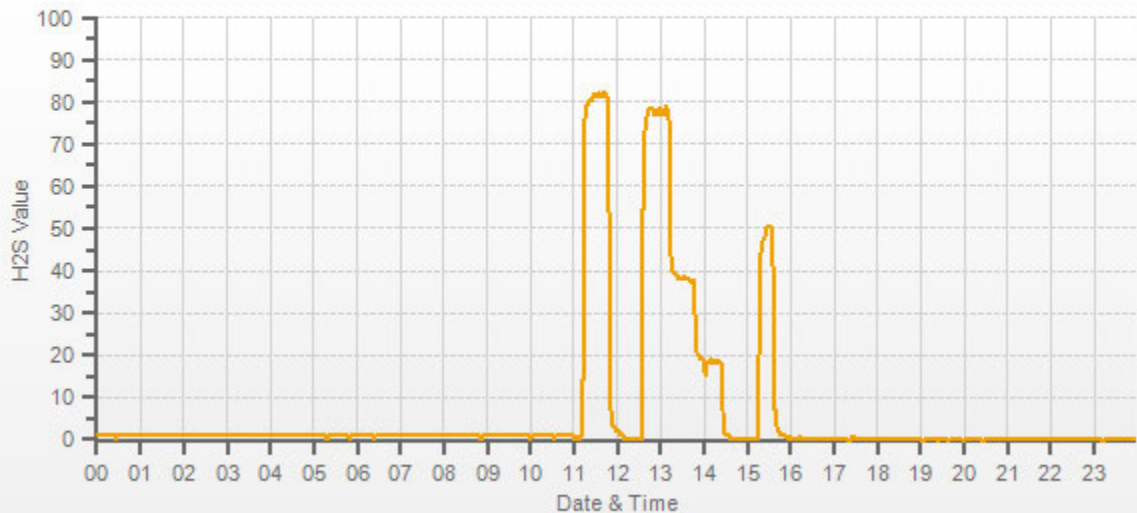
Comments:

The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned. The manifold blower was found to be working normally.

The scheduled daily ZS check interfered with the calibration at 14:01. The low point was repeated beginning at 14:04.

H2S[ppb] Station: LICA MASKWA Daily: 18/11/27 Type: AVG 1 Min. [1 Min.]

H2S[ppb]



TOTAL HYDROCARBON



Thermo 51C Total Hydrocarbon Analyzer Calibration

Date: November 27, 2018	Barometer/B.P./units: F.S. 05544 expires January 15, 2019
Company/Airshed: LICA	925 millibars
Location/Station Name: Maskwa	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019
Parameter: Total Hydrocarbon	22 °C
Start/End Time 24 hr. (mst): 15:05 / 19:00	Weather Conditions: A few clouds
Calibration Method: Gas Dilution	Calibration Purpose: routine monthly
Analyzer:	Performed By/Reviewer: Alex Yakupov / Rob Fisher
Serial Number/Owner: 436609738 / LICA	Cal Gas Expiry Date: October 18, 2025
Last Calibration Date: October 12, 2018	Range ppm: 50
Previous Cal High Point C.F.: 1.000	As Found C.F.: 1.001
	New C.F.: 1.000

Calibration Standards:

Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018
High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018

Calibrator ID/Expiry Date: API id# 690 expires March 15, 2019
Cal Gas Cylinder I.D. #: LL 119471

CH₄/C₂H₆ Cylinder Conc. (ppm):	599.0	207.0
CH₄ as propane/total CH₄ equivalents (ppm):	569.3	1168.3

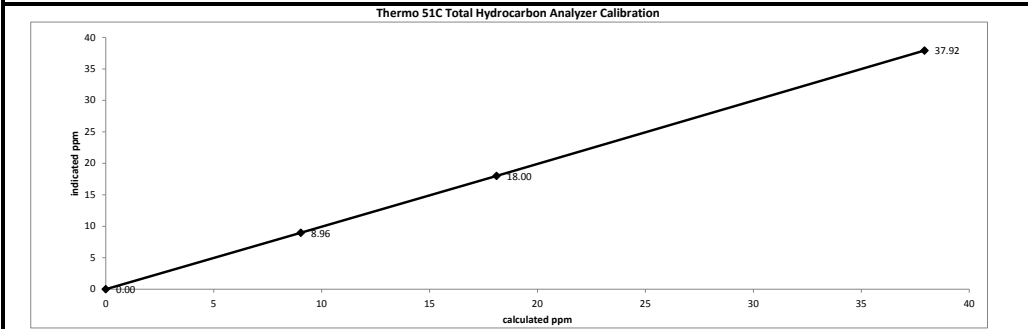
Standard Calibration Points for a Range of: 50 ppm	
Point	Target ppm
High	38
Mid	18
Low	9

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

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration: (ppm)	Indicated Concentration: (ppm)	Correction Factors:
	Diluent	Cal Gas	Total			
as found zero	2499	0.00	2499	0.0	0.02	n/a
as found high	2420	81.19	2501	37.92	37.92	1.001
adjusted zero	2499	0.00	2499	0.00	0.00	n/a
adjusted high	2420	81.19	2501	37.92	37.92	1.000
mid	2434	38.30	2472	18.10	18.00	1.006
low	2477	19.30	2496	9.03	8.96	1.008
calibrator zero	2499	0.00	2499	0.0	0.00	n/a
Average C.F.=						1.005

Linear Regression/Calibration Results:

Correlation Coefficient = 1.000 Slope = 1.000 b (Intercept as % of full scale) = 0.10% % change in C.F. from last cal = -0.07%	LIMITS > or = 0.995 0.95-1.05 ± 3% F.S. ± 10%
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As found: measurement alarms: None service alarms: None cnt: 2521 rng: 1 try: 2 flm: 212.4 det: 125.5 Flame: 212 Filter: 125 Base: 125 Sample psi: 07.51 Internal Air Pressure: 20 Internal Fuel Pressure: 13	As left: measurement alarms: None service alarms: None cnt: 2564 rng: 1 try: 2 flm: 212.4 det: 125.5 Flame: 212 Filter: 125 Base: 125 Sample psi: 07.51 Internal Air Pressure: 20 Internal Fuel Pressure: 13
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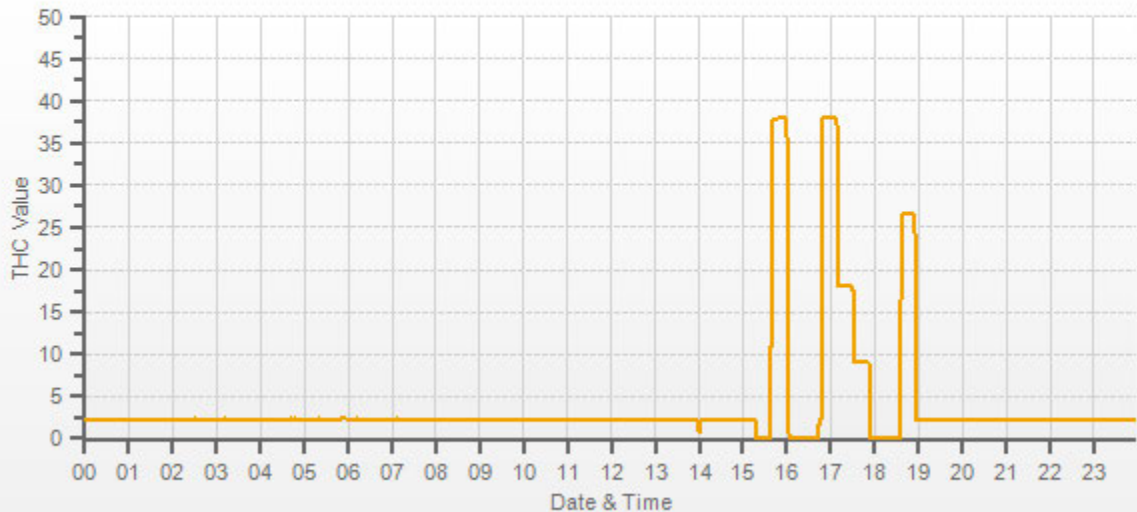
Cylinder/Regulator Pressures: H2 Cylinder (psi): 1500 H2 cylinder reg set (psi): 30 Zero Air Gen Pressure: 42 Span Cylinder (psi): 1500 Span Cylinder reg set (psi): 24 Measured Flow: 0.884 Expected Value: 26.77	H2 Cylinder (psi): 1500 H2 cylinder reg set (psi): 30 Zero Air Gen Pressure: 42 Span Cylinder (psi): 1500 Span Cylinder reg set (psi): 24 Measured Flow: n/a Expected Value: 26.51
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Comments:
 The analyzer sample inlet filter was changed.

No high point adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.
 The manifold blower was found to be working normally.

The analyzer cooling fan filter(s) were cleaned.

— THC[ppm]



NITROGEN DIOXIDE



Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: <u>November 27, 2018</u> Company/Airshed: <u>LICA</u> Location/Station Name: <u>Maskwa</u> Start/End Time 24 hr. (mst): <u>10:22 / 17:12</u> G.P.T. to be used for Ozone?: <u>No</u> Calibration Method: <u>Gas Dilution & Gas Phase Titration</u>	Barometer/B.P./units: <u>F.S. 05544 expires January 15, 2019</u> <u>925</u> millibars Thermometer/Station Temp: <u>F.S. 170286131 expires April 19, 2019</u> <u>22</u> °C Weather Conditions: <u>A few clouds</u> Calibration Purpose: <u>routine monthly</u> Performed By/Reviewer: <u>Alex Yakupov</u> <u>Rob Fisher</u> Cal Gas Expiry Date: <u>October 24, 2020</u>
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Analyzer: Serial Number/Owner: <u>1180930028</u> <u>LICA</u> Last Calibration Date: <u>October 12, 2018</u> Range ppb: <u>1000</u>	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>0.945</td> <td>1.000</td> </tr> <tr> <td>NO₂ =</td> <td>1.000</td> <td>1.000</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>1.000</td> <td>0.947</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	0.945	1.000	NO ₂ =	1.000	1.000	1.000	NOx =	1.000	0.947	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	0.945	1.000														
NO ₂ =	1.000	1.000	1.000														
NOx =	1.000	0.947	1.000														

Calibration Standards: Low Flow Meter ID/Expiry Date: <u>Defender Low 152019 expires December 13, 2018</u> High Flow Meter ID/Expiry Date: <u>Defender High 148944 expires December 13, 2018</u> Calibrator ID/Expiry Date: <u>API id# 690 expires March 15, 2019</u> Cal Gas Cylinder I.D. #: <u>LL 104225</u> Cal Gas Conc. (ppm): <u>51.5</u> <u>51.6</u>	Standard Calibration Points for a Range of: <u>1000 ppb</u> <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	5007	0.0	5007	0	0	0.0	0.0	n/a	n/a
as found high	4910	75.8	4986	782.7	784.2	828.0	828.0	0.945	0.947
adjusted zero	5007	0.00	5007	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4910	75.78	4986	782.7	784.2	783.0	784.0	1.000	1.000
mid	4915	36.93	4952	384.1	384.8	381.0	382.0	1.008	1.007
low	4932	18.48	4950	192.3	192.6	192.0	193.0	1.001	0.998
calibrator zero	5007	0.00	5007	0	0	0.0	0.0	n/a	n/a
Average C.F.=								1.003	1.002

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	4910	75.78	4986	0.0	780.0	781.0	1.0	0.0	1.0	
as found high NO2	4910	75.78	4986	500.0	286.0	781.0	495.0	494.0	494.0	1.000
adjusted high NO2	4910	75.78	4986	500.0	286.0	781.0	495.0	494.0	494.0	1.000
gpt mid	4910	75.78	4986	275.0	512.0	781.0	269.0	268.0	268.0	1.000
gpt low	4910	75.78	4986	100.0	682.0	782.0	99.0	98.0	98.0	1.000
Average NO ₂ C.F.=										1.000

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.000	1.001	1.002	0.95-1.05
b (Intercept as % of full scale)=	-0.08%	-0.04%	0.06%	± 3% F.S.
% change in C.F. from last cal=	5.47%	5.28%	0.00%	± 10%
NO2 converter efficiency			1.00	0.96 to 1.04

As found:		As left:	
NO Bkg:	2.7	NO Bkg:	2.6
NOx Bkg:	2.8	NOx Bkg:	2.7
NO Coef:	1.027	NO Coef:	0.976
NO2 Coef:	1.000	NO2 Coef:	1.000
NOx Coef:	0.999	NOx Coef:	1.000
PMT:	-866.5	PMT:	-866.5
Internal:	29.2	Internal:	29.3
Chamber:	49.9	Chamber:	50.6
Cooler:	-3.0	Cooler:	-2.8
NO2 Converter:	323.4	NO2 Converter:	324.5
NO2 Converter Set:	325.0	NO2 Converter Set:	325.0
Perm Oven Gas:	45.00	Perm Oven Gas:	45.00
Perm Oven Heater:	44.17	Perm Oven Heater:	44.18
Pressure:	253.1	Pressure:	254.3
Flow:	0.547	Flow:	0.547
Ozonator Flow:	OK	Ozonator Flow:	OK
Expected Value NO:	6	Expected Value NO:	5
Expected Value NO2:	395	Expected Value NO2:	397
Expected Value NOx:	400	Expected Value NOx:	401

Comments:

The analyzer sample inlet filter was changed.

The manifold blower was found to be working normally.

The converter cooling fan filter was cleaned.

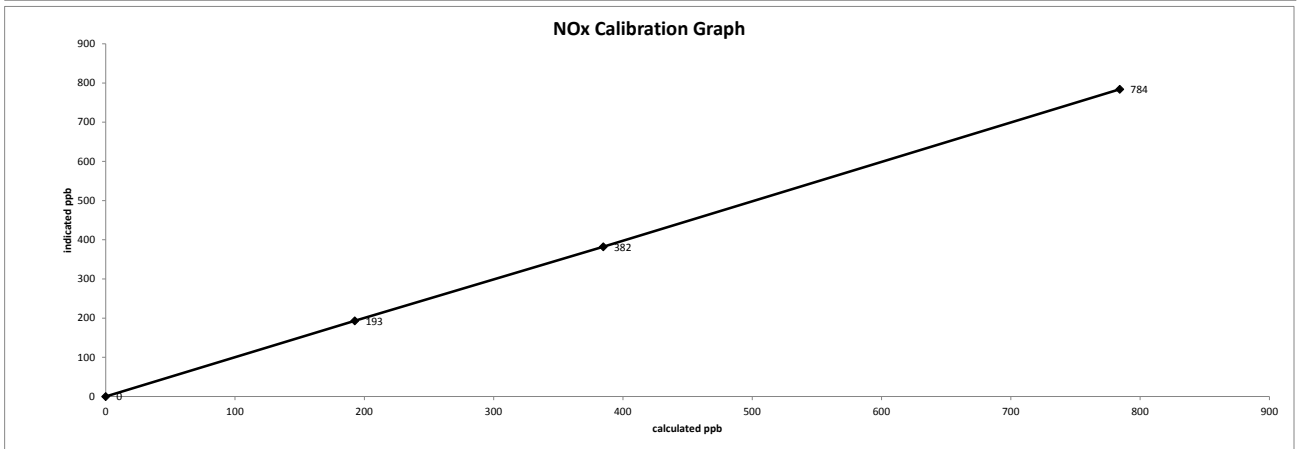
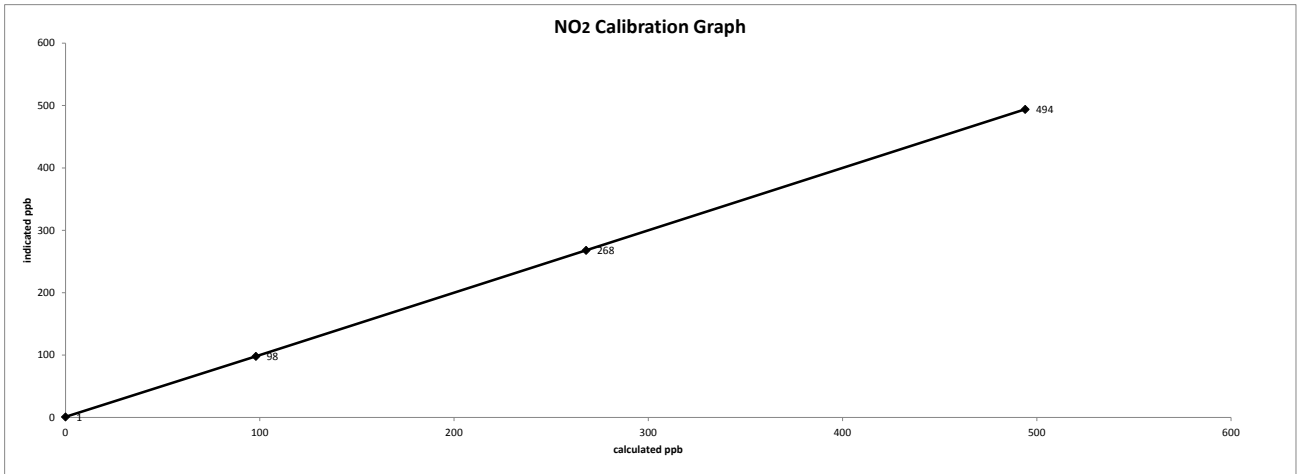
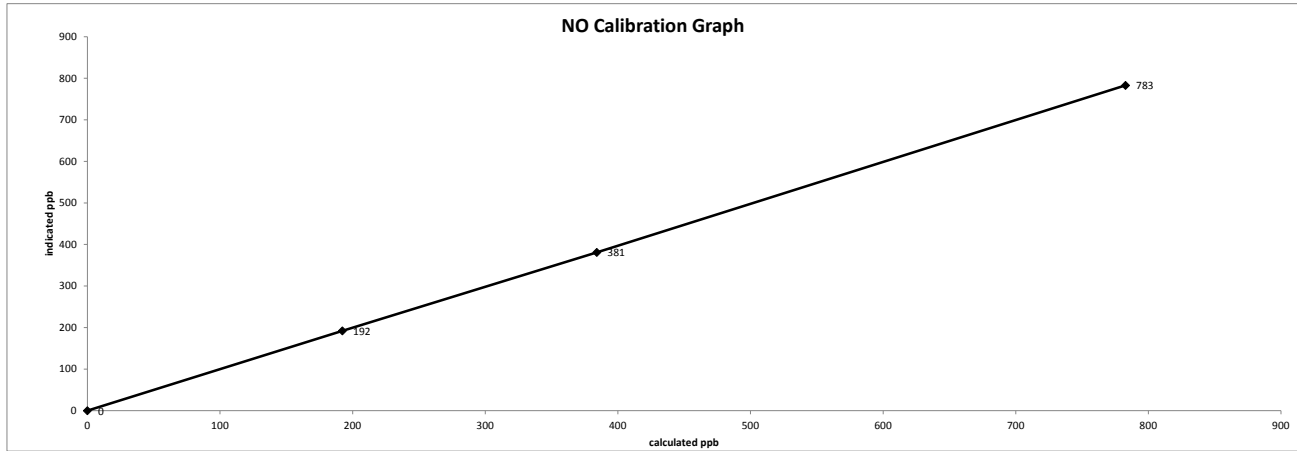
No high point NO2 adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.

The analyzer cooling fan filter(s) were cleaned.

Date: November 27, 2018
Company/Airshed: LICA
Location/Station Name: Maskwa

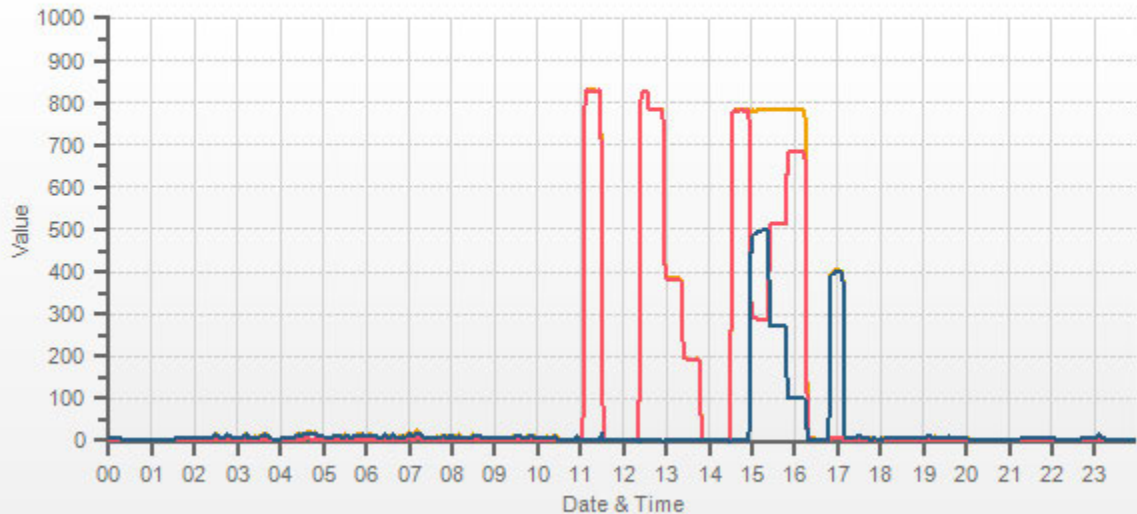
Start/End Time 24 hr. (mst): 10:22 / 17:12
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Gas Phase Titration

Thermo 42i NO-NO2-NOx Analyzer Calibration



Station: LICA MASKWA Daily: 18/11/27 Type: AVG 1 Min. [1 Min.]

— NOX[ppb] — NO[ppb] — NO2[ppb]



WIND SYSTEM



Meteorological Sensor Audit/Calibration

Location Information

Company:	LICA	Performed By:	Alex Yakupov
Audit Location:	Maskwa	Reviewed By:	Rob Fisher
Audit Date:	September 17, 2018	Start/End Time (mst):	9:36 / 12:48
Calibration Purpose:	installation	Weather Conditions:	Cloudy/Overcast

Wind Sensor Information

Sensor ID Data:		Sensor Outputs:	
Sensor Make:	RM Young	Velocity Voltage Output Range:	0-1 V
Sensor Model:	05305VK	Velocity Unit Output Range:	0-200 km/h
Serial #:	161465	Direction Voltage Output Range:	0-1 V
Previous Cal/Audit Date:	May 17, 2018	Direction Unit Output Range:	0-360 degrees

Wind Calibrator Information

Calibrator I.D. and Expiry Date: Model 18860-90/18802 SN: CA 4744; expiration May 18, 2019

Wind Speed Audit Data ****+/- 2% of the average correction factor is the limit****

RPM	Wind Speed Generated kph	Clockwise Wind Speed kph	Counter Clockwise Wind Speed kph	Correction Factor
0	0	0.1	0.1	-
1000	18.4	18.5	18.5	0.995
2000	36.9	36.9	36.9	1.000
3000	55.3	55.4	55.4	0.998
4000	73.7	73.8	73.8	0.999
5000	92.2	92.3	92.3	0.999
6000	110.6	110.8	110.8	0.998
7000	129.0	129.3	129.3	0.998
8000	147.4	147.7	147.7	0.998
9000	165.9	166.1	166.1	0.999
10000	184.3	184.9	184.9	0.997
The audit meets AMD requirements.			Average Correction Factor=	0.998

Wind Direction Audit Data ****+/- 3° of the absolute average degrees difference for all points is the limit****

Generated Wind Direction 0-360 (Up)	Generated Wind Direction 360-0 (Down)	Indicated Wind Direction 0-360 (Up)	Indicated Wind Direction 360-0 (Down)	Degrees Difference 0-360 (Up)	Degrees Difference 360-0 (Down)	Average Absolute Degrees Difference
0	355	0	355	0.3	0.1	0.2
30	330	30	329	-0.4	0.7	0.5
60	300	62	300	-1.9	-0.3	1.1
90	270	91	270	-1.3	-0.3	0.8
120	240	121	241	-1.0	-0.8	0.9
150	210	152	212	-1.7	-1.7	1.7
180	180	181	182	-1.1	-2.0	1.6
210	150	211	152	-1.1	-1.8	1.5
240	120	241	122	-0.5	-1.8	1.2
270	90	270	91	-0.1	-0.8	0.5
300	60	300	61	0.4	-0.6	0.5
330	30	330	31	-0.1	-0.7	0.4
355	0	354	0	0.6	0.3	0.5
The audit meets AMD requirements.			Average Absolute Degrees Difference=		0.9	

Comments:

CALIBRATORS

Company: <u>Maxxam</u>		Operator: <u>Chris W</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>API 700</u>	Make/Model	<u>Mesa Defender 530</u>
Serial Number	<u>690</u>	Serial Number	<u>L-153351 H-152571</u>
Last Verification Date	<u>March 2016</u>	Temperature (°C)	<u>23.5 C</u>
NO Cylinder S/N	<u>LL108015</u>	Barometric Pressure	<u>695 mmHg</u>
NO [PPM]	<u>52.2</u>	NOx [PPM]	<u>52.3</u>
Expiry Date	<u>Oct 2020</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%	
4959	75.0	0.789	0.791	0.793	0.000	0.793	1%	0%
4971	36.5	0.383	0.384	0.384	0.000	0.384	0%	0%
4967	18.2	0.191	0.192	0.191	0.000	0.191	0%	-1%
Absolute Average Percent Difference							0%	0%

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)= 1.0054	0.90-1.10	m (Slope)= 1.0031
b (Intercept % of FS)= -0.0583	± 3% F.S.	b (Intercept % of FS)= -0.0795

Flow	O ₂ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4959	0.000	0.000	0.790	-0.001	0.789	NO ₂	% Diff. Limit
4959	0.500	0.497	0.293	0.493	0.786	-1%	± 10%
4959	0.275	0.273	0.517	0.269	0.787	-1%	± 10%
4959	0.100	0.102	0.688	0.099	0.787	-2%	± 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)= 0.9946	0.90-1.10
b (Intercept % of FS)= -0.1817	± 3% F.S.

AENV Standards Audit Calibrator	NO_x Analyzer
Make/Model <u>Teco 146i</u>	Make/Model <u>Teco 42i</u>
Serial/AMU Number <u>AMU 1809</u>	Serial/AMU Number <u>AMU 1868</u>
SRM Gas Cylinder No. <u>APEX1170572</u>	Last Calibration Date <u>March 14, 2018</u>
Cylinder Conc. (ppm) <u>49.99</u>	Full Scale (ppm) <u>1.0</u>
	Cylinder Gas Expiry Date <u>November 2020</u>

COMMENTS: Cylinder contains 47.9 ppm SO₂.

Auditor: Al Clark
Operator Signature:

Date: March 15, 2018
Location: McIntyre Center Edmonton

Company Maxxam Operator: Mike

Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio</u>	Make/Model	<u>Bios Definer 220</u>
Serial Number	<u>11900613</u>	Serial Number	<u>H=128686; L=129069</u>
Last Verification Date	<u>March 16, 2018</u>	Temperature (°C)	<u>22.9 C</u>
NO Cylinder S/N	<u>LL104183</u>	Barometric Pressure	<u>698 mmHg</u>
NO [PPM]	<u>50.8</u>	NOx [PPM]	<u>50.9</u>
Expiry Date	<u>October 24, 2020</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5059</u>	Pt. #2	<u>5073</u>
		Pt. #3	<u>5073</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>38.2</u>
		Pt. #3	<u>19.1</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5124	0.0	0.0000	0.0000	0.0000	-0.0001	0.0000	Limit ± 10%	
5059	77.5	0.7782	0.7797	0.7763	0.0005	0.7767	0%	0%
5073	38.2	0.3825	0.3833	0.3794	0.0000	0.3795	-1%	-1%
5073	19.1	0.1913	0.1916	0.1904	0.0000	0.1904	0%	-1%
Absolute Average Percent Difference							1%	1%

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

<u>NO</u>		<u>LIMITS</u>		<u>NOx</u>	
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000
m (Slope)=	0.9975	0.90-1.10		m (Slope)=	0.9960
b (Intercept % of FS)=	-0.0616	± 3% F.S.		b (Intercept % of FS)=	-0.0661

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5059	0.0	0.0000	0.7741	0.0000	0.7741	NO ₂	% Diff. Limit
5059	500.0	0.4918	0.2823	0.4916	0.7739	0%	± 10%
5059	275.0	0.2774	0.4967	0.2780	0.7747	0%	± 10%
5059	100.0	0.1031	0.6710	0.1032	0.7743	0%	± 10%
Absolute Average Percent Difference						0%	± 10%

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

<u>NO₂</u>		<u>LIMITS</u>	
Correlation=	1.0000	≥ 0.995	
m (Slope)=	0.9998	0.90-1.10	
b (Intercept % of FS)=	0.0173	± 3% F.S.	

<u>AENV Standards</u>		<u>NO_x Analyzer</u>	
Audit Calibrator		Make/Model	<u>Thermo 42i</u>
Make/Model	<u>Thermo 146i</u>	Serial/AMU Number	<u>1868</u>
Serial/AMU Number	<u>1809</u>	Last Calibration Date	<u>August 16, 2018</u>
SRM Gas Cylinder No.	<u>APEX1170572</u>	Full Scale (ppm)	<u>1.0</u>
Cylinder Conc. (ppm)	<u>49.99</u>	Cylinder Gas Expiry Date	<u>November 15, 2020</u>

COMMENTS: _____

Auditor: Shea Beaton
Operator Signature: _____

Date: August 22, 2018
Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-482CGA

Company: Maxxam **Operator's Name:** Mike
Cylinder #: LL104225 **Concentration PPM:** 49.2 **Tolerance(%)** 2 **Certified By:** Praxair
Expiry Date: October 2020

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model: <u>R&R MFC 201</u>	Make/Model: <u>Mesa Definer 220</u>
Serial Number: <u>AMU 1690</u>	Serial Number: <u>H-133034 / L-132702</u>
Last Verification Date: <u>December 13, 2017</u>	Temp. °C: <u>23.4 C</u>
Gas Type: <u>SO2</u> Conc. <u>98.07</u>	B.P. <u>707 mmHg</u>
Cylinder Number: <u>CAL016625</u>	
Expiry Date: <u>January 2019</u>	

Reference Analyzer:
 Make/Model: Teco 43C Serial/AMU Number: 1623
 Instrument Settings: Zero: 10.0 Span: 1.006 Range: 1.0
 Last Calibration: Date: Dec12/17 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	0.000	0.000	0.000
4989	79.5	0.764	0.01594	62.755	47.9
4995	39.6	0.380	0.00793	126.136	47.9
4992	19.6	0.188	0.00393	254.694	47.9
Average Cylinder Concentration:					47.9

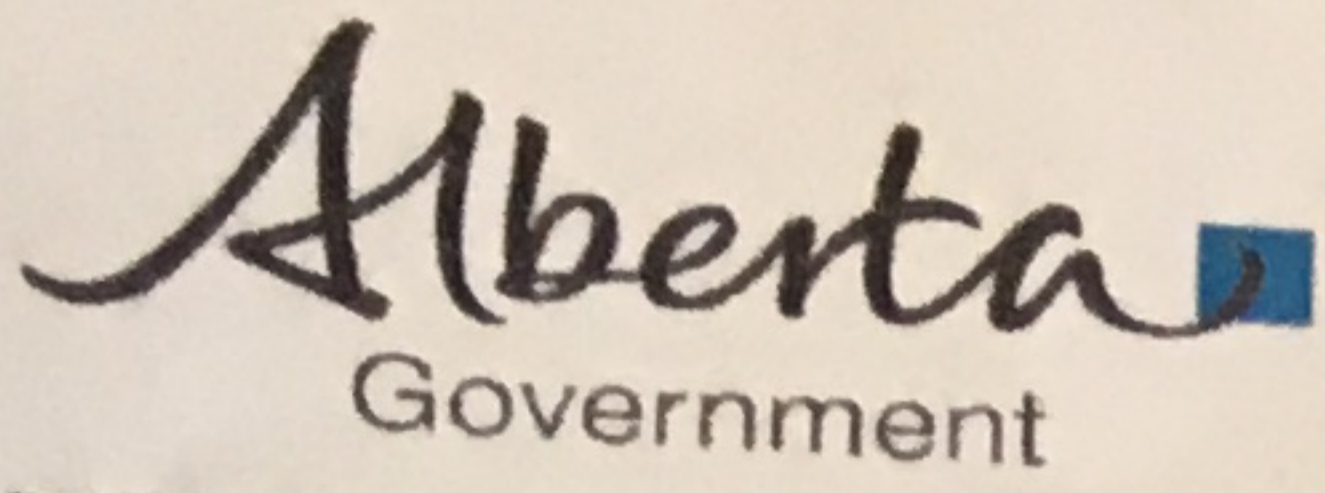
Previous Stated Concentration PPM: 49.2

Percent variance from Stated: 3

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

Auditor: Al Clark
 Operator Signature: *Al Clark*

Date: December 13, 2017
 Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-493CGA

Company: Maxxam Operator's Name: Mike
 Cylinder #: EY0001003 Concentration PPM: 9.55 Tolerance(%): 2 Certified By: Praxair
 Expiry Date: October 2020

Reference Calibrator and Gas:
 Make/Model: Sabio 2010
 Serial Number: AMU 2092
 Last Verification Date: January 17, 2018
 Gas Type: H2S Conc. 20.43
 Cylinder Number: CAL015272
 Expiry Date: January 2019

Flow Measurement Device:
 Make/Model: Mesa Defender 530
 Serial Number: H-153961 / L-153874
 Temp. °C: 23.0 C
 B.P.: 697 mmHg

Reference Analyzer:
 Make/Model: Teco 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 12.9 Span: 0.955 Range: 0.1
 Last Calibration: Date: Jan 17/18 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	0.0000	0.0000	0.0000
5051	39.6	0.0753	0.00784	127.551	9.60
5028	20.2	0.0387	0.00402	248.911	9.63
5033	10.5	0.0198	0.00209	479.333	9.49
Average Cylinder Concentration:					9.58

Previous Stated Concentration PPM: 9.55

Percent variance from Stated: 0

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

Auditor: Al Clark

Date: January 18, 2018

Operator Signature: *Al Clark*

Location: McIntyre Center Edmonton



Calibration Gas Audit

CH4 / C3H8 Cylinder Gas

File No. 2017-481CGA

Company: Maxxam **Operators name:** Mike
Cylinder #: LL119471 **Conc CH4 (PPM)** 599/207 **Tolerance (%)** 2 **Certified By:** Praxair
Expiry Date: October 2025

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>R&R MFC 201</u>			Make/Model	<u>Mesa Definer 220</u>
Serial Number	<u>AMU 1690</u>			Serial Number	<u>H-133034 / L-132702</u>
Last Verification Date	<u>December 13, 2017</u>			Temp. °C	<u>23.1 C</u>
Gas Type	<u>CH4</u>	Conc.	<u>990.4</u>	B.P.	<u>707 mmHg</u>
Cylinder Number	<u>5604875</u>	Expiry Date	<u>July 2021</u>		
Gas Type	<u>C3H8</u>	Conc.	<u>246.5</u>		
Cylinder Number	<u>XF003845B</u>	Expiry Date	<u>July 2022</u>		

Reference Analyzer:
Make/Model Teco 55i **Serial/AMU Number:** 2108
Instrument Settings **Zero:** N/A **Span:** N/A **Range:** 20.0
Last Calibration: **Date:** Dec 12/17 **C.F.** 1.000 **Done By:** Al Clark

Calibrator Flows (scem)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	CH4	C3H8			CH4	C3H8
3500	0.0	0.00	0.00	0.02	45.00	603	209
3618	80.4	13.41	12.75	0.02	45.00	603	209
3547	39.8	6.73	6.47	0.01	89.12	600	210
3560	19.8	3.34	3.21	0.01	179.80	601	210
Average Cylinder Concentration:						601	209

	<u>CH4</u>	<u>C3H8</u>
Previous Stated Concentration PPM:	<u>599</u>	<u>207</u>
Percent variance from Stated:	<u>0</u>	<u>1</u>

Cylinder gas tolerances based on CH4 only

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:** December 13, 2017
Operator Signature: *Al Clark* **Location:** McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2017-483CGA

Company: Maxxam **Operators name:** Mike

Cylinder #: LL104225 Conc (PPM) 51.5/51.6 Tolerance (%) 2 Certified By: Praxair

Expiry Date: October 2020

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Teco 146i</u>			Make/Model	<u>Mesa Definer 220</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>H-133034 / L-132702</u>
Last Verification Date	<u>December 13, 2017</u>			Temp. °C	<u>23.4 C</u>
Gas Type	<u>NO</u>	Conc.	<u>50.03</u>	B.P.	<u>707 mmHg</u>
Cylinder Number	<u>APEX 1223938</u>				
Expiry Date	<u>June 2020</u>				

Reference Analyzer:

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

Instrument Settings Zero: 4.7 Span: 1.004 Range: 1.0

Last Calibration: Date: Dec12/17 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				
4989	79.5	0.813	0.812	0.016	62.755	51.0	51.0
4995	39.6	0.407	0.406	0.008	126.136	51.3	51.2
4992	19.6	0.202	0.201	0.004	254.694	51.4	51.2
Average Cylinder Concentration:						51.3	51.1

<u>NO</u>	<u>NOx</u>
Previous Stated Concentration PPM: <u>51.5</u>	<u>51.6</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

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

Auditor: Al Clark Date: December 13, 2017

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

APPENDIX ~~@@~~
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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	6	2	0	0	0	0	0	0	0	1	1	1	4	2	3	0	0	S	1	0	0	0	0	0	0	0	6	1	24
2	0	0	2	1	3	2	2	1	4	3	0	1	3	0	0	0	S	2	0	0	0	1	1	1	1	0	4	1	24
3	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
4	0	1	3	1	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	3	0	24
5	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
6	0	0	0	0	0	0	1	1	1	1	1	1	S	3	2	1	1	0	4	5	10	1	0	8	0	10	2	24	
7	4	0	7	2	1	5	10	8	7	5	1	S	5	4	4	2	6	4	0	0	0	0	0	2	0	10	3	24	
8	0	0	0	0	0	0	0	1	0	1	S	0	1	1	0	0	0	0	0	0	0	1	0	0	0	1	0	24	
9	0	0	0	0	0	0	0	1	0	S	0	0	0	0	0	0	0	0	0	0	16	18	6	4	0	18	2	24	
10	2	2	1	1	1	1	1	4	S	12	11	14	15	11	1	9	10	14	1	1	0	0	0	0	0	15	5	24	
11	0	0	0	0	0	0	0	S	1	2	1	1	1	1	3	1	5	3	3	1	1	1	1	0	0	5	1	24	
12	0	0	0	0	0	0	S	2	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	2	1	24	
13	0	0	0	0	0	S	0	0	1	1	1	2	3	19	3	4	1	1	1	1	1	1	0	1	0	19	2	24	
14	4	3	2	1	S	4	3	2	4	2	3	2	0	0	0	0	0	4	1	6	4	3	0	0	0	6	2	24	
15	0	0	0	S	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
16	0	0	S	0	0	0	0	0	0	0	0	1	3	7	3	0	2	0	1	1	2	2	1	2	0	7	1	24	
17	2	S	7	1	2	6	6	3	4	3	2	2	1	1	1	1	1	1	1	1	1	0	0	1	0	7	2	24	
18	S	0	0	1	1	0	0	5	3	5	5	5	0	0	0	0	0	0	0	0	0	0	0	S	0	5	1	24	
19	1	3	0	0	1	1	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	S	0	0	3	1	24	
20	1	0	1	1	0	0	0	0	0	0	0	0	4	5	5	5	5	1	0	0	0	S	0	0	0	5	1	24	
21	0	0	2	2	1	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	S	0	0	0	0	2	1	24	
22	0	1	1	0	0	1	1	0	1	1	1	1	1	0	0	1	0	0	1	S	4	3	9	2	0	9	1	24	
23	0	0	1	1	7	11	16	6	1	1	1	1	1	1	0	0	0	0	S	0	1	1	1	1	0	16	2	24	
24	2	2	2	1	1	1	1	3	3	4	3	2	2	1	1	0	1	S	0	2	2	2	2	1	0	4	2	24	
25	1	1	1	1	0	0	0	1	0	1	1	1	1	1	1	0	S	0	1	1	1	1	1	1	0	1	1	24	
26	1	1	1	1	2	2	1	1	1	0	0	0	0	0	0	S	0	0	3	1	1	2	0	3	0	3	1	24	
27	1	1	3	4	5	5	4	7	4	3	C	C	C	C	C	C	2	2	2	3	0	1	2	3	0	7	3	24	
28	0	0	0	0	0	0	0	0	0	1	1	2	2	S	1	1	1	1	0	1	0	0	0	0	0	2	1	24	
29	1	1	1	1	1	1	0	1	2	2	1	1	S	1	1	0	0	0	1	1	1	1	0	0	0	2	1	24	
30	0	1	0	1	0	1	0	0	0	0	0	S	1	1	2	1	0	0	0	1	1	0	0	0	0	0	2	1	24
HOURLY MAX	6	3	7	4	7	11	16	8	7	12	11	14	15	19	5	9	10	14	4	6	16	18	9	8					
HOURLY AVG	1	1	1	1	1	1	2	2	1	2	1	1	2	2	1	1	1	1	1	1	1	2	1	1					

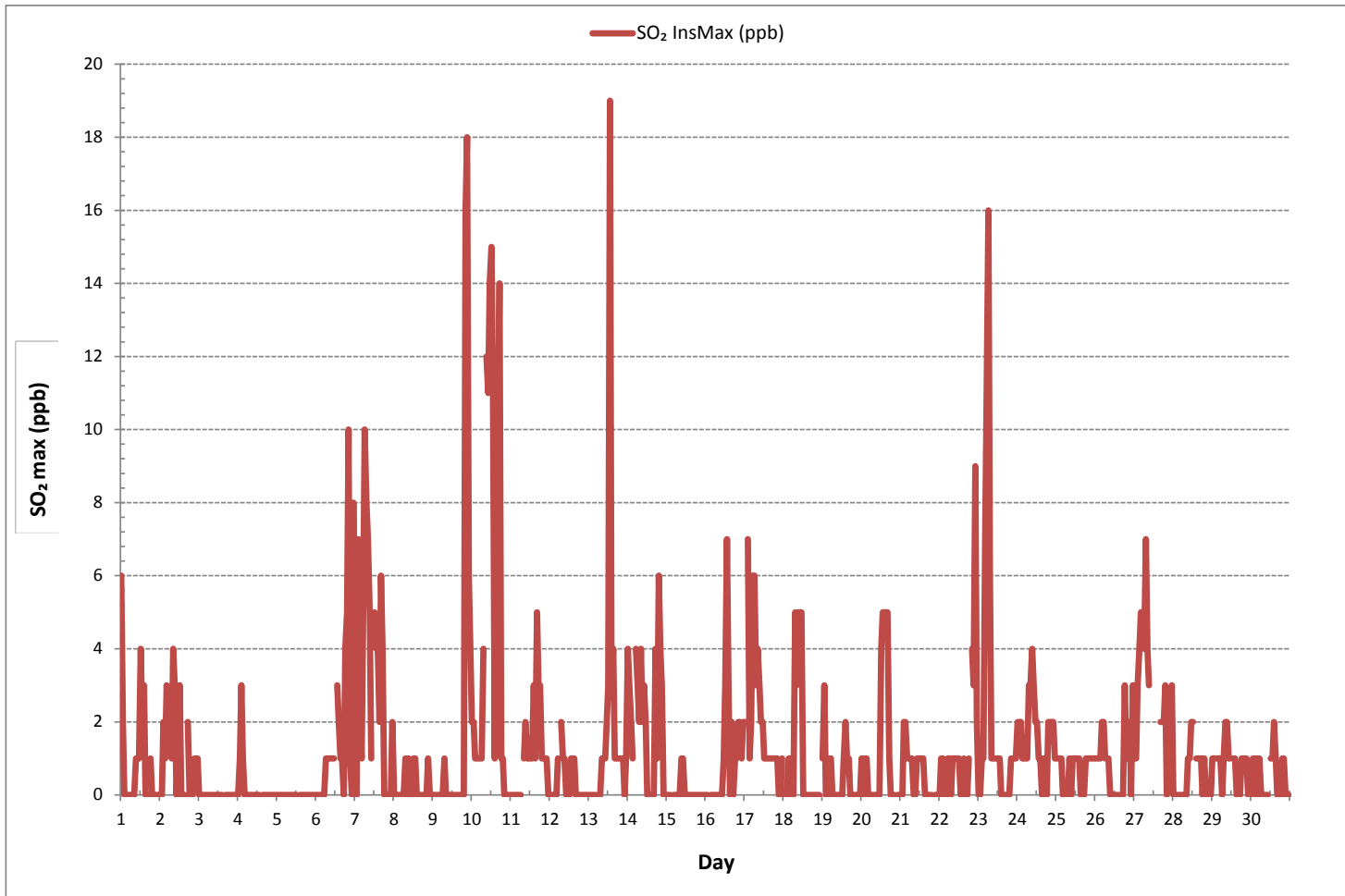
STATUS FLAG CODES

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:	343
MAXIMUM INSTANTANEOUS VALUE:	19 ppb @ HOUR 13 ON DAY 13
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	6 hrs
STANDARD DEVIATION:	2
OPERATIONAL TIME:	720 hrs

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ 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	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	24	
2	1	2	2	3	3	2	2	2	1	2	2	2	2	1	1	2	S	2	1	1	1	1	1	1	1	1	3	2	24
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	24
4	1	3	2	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	3	1	24
5	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
6	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	24
7	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
8	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
9	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
10	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	1	24
11	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
12	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
13	1	1	1	1	1	S	1	1	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	1	1	1	2	1	24
14	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	24
15	1	1	1	S	1	1	1	1	1	2	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	24
16	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
17	1	S	1	1	1	1	1	1	1	S1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
18	S	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	2	1	24
19	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	2	1	24
20	1	1	1	1	1	1	2	2	1	1	1	2	1	1	1	1	1	1	1	1	1	1	S	1	1	1	2	1	24
21	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	S	1	1	1	1	2	1	24
22	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	2	2	1	1	S	2	2	2	2	2	1	2	1	24
23	1	1	1	1	1	2	2	1	1	1	2	2	2	1	2	1	1	1	S	1	1	1	1	1	1	1	2	1	24
24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	S	1	1	1	1	1	1	2	1	2	1	24	
25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	2	1	1	1	2	1	2	1	24	
26	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	S	2	1	1	1	1	1	2	2	1	2	1	24	
27	1	1	1	2	2	1	2	2	1	1	C	C	C	C	C	C	1	1	0	0	0	0	0	0	0	0	2	1	24
28	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	1	0	1	0	24
29	0	0	1	1	1	0	0	1	0	0	1	1	S	1	0	0	0	0	0	1	0	0	0	1	1	0	1	1	24
30	0	1	0	1	1	1	0	1	1	1	0	S	0	0	0	0	1	1	0	0	1	1	0	0	0	0	1	1	24
HOURLY MAX	2	3	2	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	24
HOURLY AVG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24

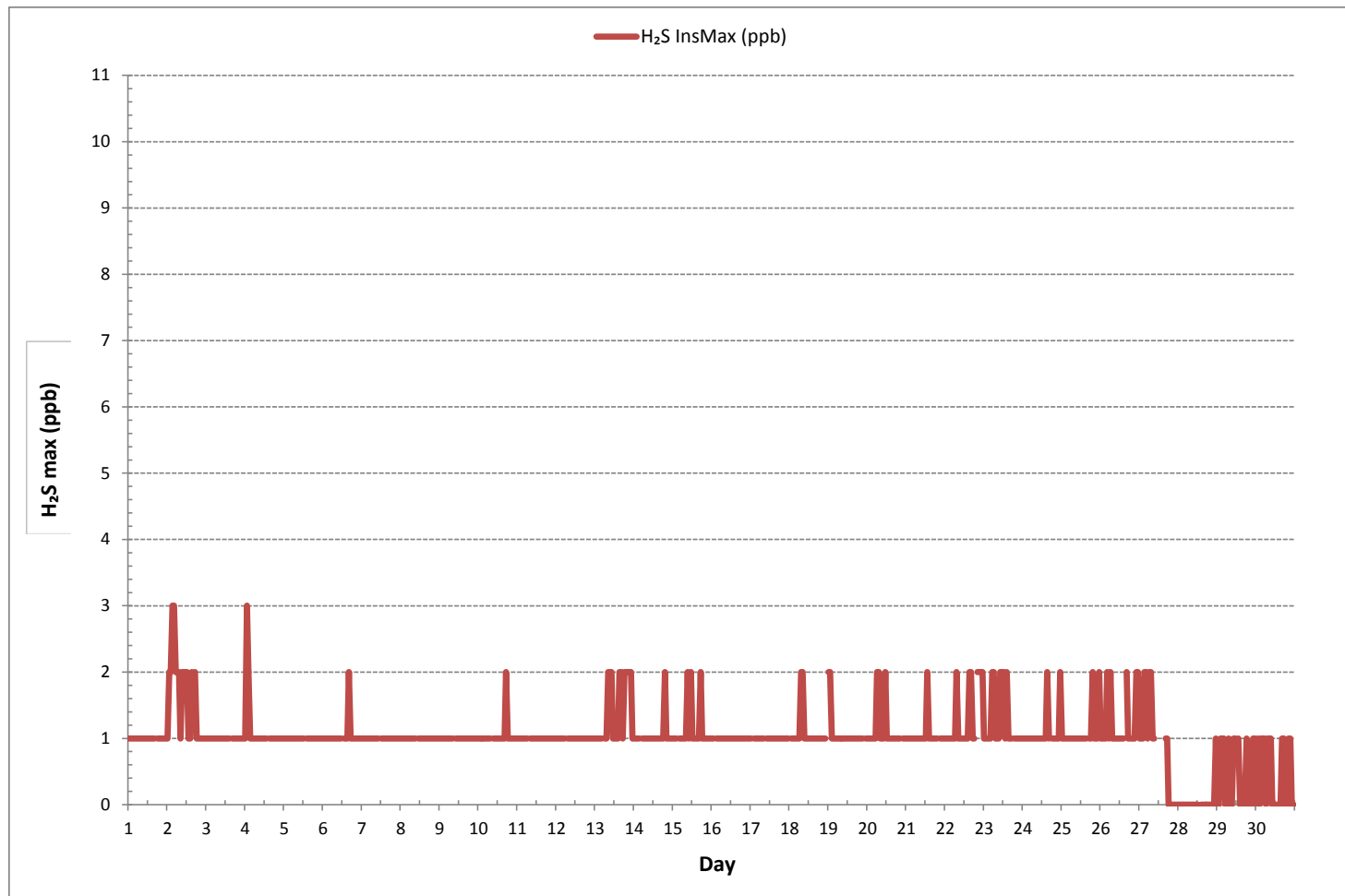
STATUS FLAG CODES

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

NUMBER OF NON-ZERO READINGS:	630
MAXIMUM INSTANTANEOUS VALUE:	3 ppb @ HOUR 3 ON DAY 2
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	6 hrs
STANDARD DEVIATION:	0
OPERATIONAL TIME:	719 hrs

HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2018

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	2.33	2.22	2.25	2.32	2.28	2.46	2.32	2.32	2.44	2.37	2.39	2.38	2.39	2.44	2.39	2.39	2.43	S	2.51	2.39	2.38	2.37	2.34	2.34	2.22	2.51	2.37	24	
2	2.32	2.29	2.32	2.30	2.31	2.26	2.25	2.23	2.28	2.26	2.23	2.22	2.23	2.23	2.25	2.27	S	2.29	2.30	2.31	2.30	2.31	2.35	2.37	2.22	2.37	2.28	24	
3	2.39	2.43	2.47	2.48	2.46	2.44	2.46	2.47	2.47	2.47	2.47	2.45	2.46	2.46	2.45	S	2.41	2.42	2.42	2.40	2.43	2.44	2.42	2.37	2.37	2.48	2.44	24	
4	2.30	2.28	2.24	2.19	2.17	2.15	2.13	2.10	2.11	2.10	2.10	2.09	2.08	3.22	S	2.09	2.12	2.13	2.18	2.19	2.21	2.23	2.25	2.27	2.08	3.22	2.21	24	
5	2.30	2.32	2.32	2.33	2.34	2.36	2.39	2.40	2.38	2.38	2.39	2.39	2.41	S	2.39	2.52	2.50	2.41	2.44	2.43	2.43	2.44	2.45	2.45	2.30	2.52	2.40	24	
6	2.44	2.46	2.47	2.49	2.49	2.49	2.50	2.51	2.52	2.54	2.55	2.84	S	2.55	2.55	2.55	2.55	2.56	2.51	2.59	2.56	2.54	2.54	2.56	2.44	2.84	2.54	24	
7	2.54	2.54	2.55	2.53	2.53	2.55	2.58	2.62	2.72	2.59	2.54	S	2.55	2.54	2.52	2.52	2.54	2.53	2.49	2.50	2.49	2.49	2.49	2.51	2.49	2.72	2.54	24	
8	2.51	2.53	2.54	2.56	2.56	2.57	2.58	2.62	2.60	2.60	S	2.59	2.58	2.58	2.57	2.57	2.62	2.63	2.65	2.72	2.75	2.72	2.70	2.67	2.51	2.75	2.61	24	
9	2.68	2.65	2.65	2.62	2.58	2.54	2.52	2.51	2.49	S	2.41	2.38	2.35	2.34	2.34	2.32	2.33	2.35	2.39	2.40	2.46	2.46	2.37	2.37	2.32	2.68	2.46	24	
10	2.37	2.38	2.39	2.41	2.42	2.45	2.46	2.40	S	2.38	2.38	2.42	2.42	2.39	2.35	2.42	2.56	2.70	2.35	2.36	2.39	2.40	2.43	2.43	2.35	2.70	2.42	24	
11	2.44	2.46	2.49	2.50	2.51	2.54	2.55	S	2.59	2.63	2.63	2.63	2.62	2.63	2.63	2.63	2.65	2.65	2.72	2.63	2.60	2.63	2.65	2.67	2.44	2.72	2.59	24	
12	2.69	2.75	2.78	2.77	2.79	2.74	S	2.71	2.70	2.69	2.69	2.70	2.76	2.78	2.78	2.80	2.85	2.87	2.88	2.87	2.86	2.84	2.89	2.89	2.69	2.89	2.79	24	
13	2.85	2.84	2.77	2.74	2.77	S	2.78	2.78	2.79	2.87	X	X	X	X	X	X	X	X	X	X	X	3.13	3.08	3.08	2.74	3.13	2.87	13	
14	3.07	2.95	2.87	2.74	S	3.41	3.33	3.18	3.11	2.79	2.68	2.63	2.20	2.16	2.16	2.26	2.32	2.23	2.34	2.32	2.32	2.32	2.33	2.16	3.41	2.60	24		
15	2.34	2.35	2.38	S	2.36	2.37	2.37	2.38	2.40	2.62	2.40	2.42	2.38	2.38	2.40	2.41	2.42	2.40	2.41	2.42	2.45	2.48	2.50	2.53	2.34	2.62	2.42	24	
16	2.56	2.58	S	2.59	2.63	2.66	2.66	2.68	2.68	2.69	2.68	2.67	2.66	2.67	2.65	2.74	2.74	2.75	2.79	2.86	2.93	3.03	3.01	2.98	2.56	3.03	2.73	24	
17	2.82	S	2.79	2.72	2.75	2.75	2.72	2.71	2.75	2.74	2.74	2.70	2.75	2.76	2.85	2.89	2.88	2.88	2.82	2.84	2.72	2.39	2.39	2.52	2.39	2.89	2.73	24	
18	S	2.53	2.48	2.44	2.40	2.39	2.38	2.42	2.42	2.48	2.53	2.59	2.45	2.45	2.47	2.47	2.45	2.47	2.47	2.47	2.47	2.47	2.49	S	2.38	2.59	2.46	24	
19	2.49	2.53	2.52	2.52	2.58	2.57	2.56	2.59	2.64	2.63	2.62	2.62	2.60	2.58	2.62	2.59	2.61	2.59	2.54	2.51	2.51	2.51	2.58	S	2.73	2.49	2.73	2.58	24
20	2.81	2.56	2.50	2.54	2.44	2.37	2.37	2.45	2.34	2.37	2.41	2.49	2.60	2.51	2.65	2.50	2.51	2.42	2.38	2.39	2.40	S	2.41	2.44	2.34	2.81	2.47	24	
21	2.45	2.46	2.50	2.51	2.49	2.46	2.46	2.44	2.41	2.39	2.40	2.39	2.36	2.39	2.37	2.34	2.33	2.32	2.32	2.30	S	2.26	2.26	2.26	2.26	2.51	2.39	24	
22	2.28	2.27	2.30	2.29	2.29	2.37	2.46	2.55	2.60	2.66	2.65	2.77	2.82	2.83	2.80	2.80	2.71	2.61	2.58	S	2.52	2.47	2.40	2.32	2.27	2.83	2.54	24	
23	2.46	2.42	2.35	2.42	2.28	2.30	2.23	2.20	2.26	2.35	2.34	2.28	2.28	2.26	2.24	2.25	2.27	2.28	S	2.27	2.28	2.30	2.30	2.20	2.20	2.46	2.30	24	
24	2.32	2.33	2.35	2.35	2.36	2.37	2.38	2.41	2.40	2.41	2.40	2.55	2.41	2.44	2.43	2.43	2.44	S	2.43	2.50	2.53	2.55	2.57	2.56	2.32	2.57	2.43	24	
25	2.57	2.58	2.62	2.66	2.67	2.63	2.60	2.61	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	S	2.60	2.60	2.62	2.62	2.63	2.63	2.64	2.57	2.67	2.62	24	
26	2.64	2.62	2.64	2.69	2.66	2.62	2.63	2.63	2.63	2.64	2.61	2.56	2.55	2.57	2.41	S	2.32	2.33	2.34	2.27	2.27	2.25	2.22	2.24	2.22	2.69	2.49	24	
27	2.20	2.20	2.28	2.28	2.28	2.33	2.29	2.29	2.24	2.23	2.25	2.24	2.20	2.19	X	C	C	C	C	C	C	2.13	2.13	2.16	2.16	2.13	2.33	2.23	24
28	2.12	2.11	2.11	2.11	2.11	2.12	2.11	2.13	2.11	2.13	2.15	2.19	2.21	S	2.26	2.27	2.24	2.30	2.34	2.37	2.41	2.46	2.48	2.48	2.11	2.48	2.23	24	
29	2.53	2.55	2.57	2.56	2.56	2.54	2.54	2.52	2.56	2.61	2.73	2.74	S	2.76	2.79	2.77	2.78	2.83	2.90	2.88	2.96	3.01	2.99	2.94	2.52	3.01	2.72	24	
30	2.64	2.98	3.06	3.12	3.28	3.21	3.16	3.13	3.07	2.85	2.68	S	2.86	2.82	2.82	2.76	2.92	2.93	2.83	2.80	2.74	2.46	2.48	2.55	2.46	3.28	2.88	24	
HOURLY MAX	3.07	2.98	3.06	3.12	3.28	3.41	3.33	3.18	3.11	2.87	2.74	2.84	2.86	3.22	2.85	2.89	2.92	2.93	2.90	2.88	2.96	3.13	3.08	3.08					
HOURLY AVG	2.50	2.49	2.50	2.51	2.49	2.52	2.51	2.52	2.53	2.52	2.49	2.50	2.47	2.54	2.51	2.50	2.52	2.52	2.51	2.50	2.50	2.51	2.50	2.52					

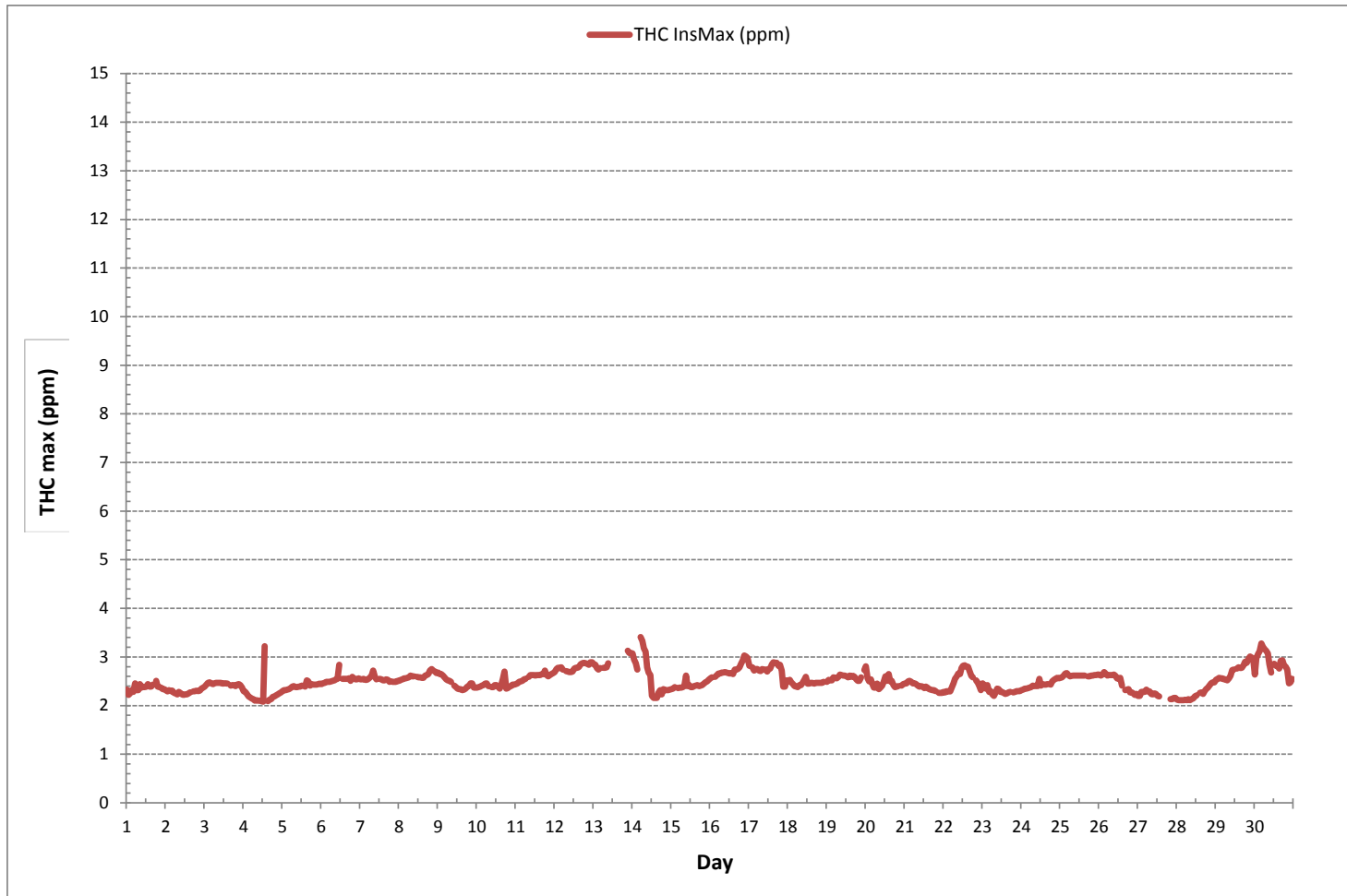
STATUS FLAG CODES

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:	3.41	ppm	@ HOUR	5	ON DAY	14
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	708	hrs	
MONTHLY CALIBRATION TIME:	5	hrs				
STANDARD DEVIATION:	0.22					

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)





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	18	10	10	9	8	16	31	49	24	40	27	37	36	45	36	11	13	S	4	3	2	12	14	11	2	49	20	24	
2	1	1	11	4	11	7	8	6	13	13	1	4	11	1	1	1	S	9	2	2	1	4	5	6	1	13	5	24	
3	1	1	2	2	2	12	10	7	8	4	9	7	13	17	6	S	9	7	7	5	6	6	6	4	1	17	7	24	
4	3	8	14	3	3	3	3	3	3	3	12	10	17	28	S	9	7	8	5	5	6	5	6	6	3	28	7	24	
5	6	7	7	7	8	9	7	9	18	15	21	27	25	S	10	10	12	8	11	8	10	12	9	12	6	27	12	24	
6	12	10	8	10	15	14	16	10	11	9	32	12	S	13	24	12	17	16	12	11	21	7	8	21	7	32	14	24	
7	12	12	15	9	8	13	21	20	15	19	17	S	17	15	26	5	14	10	8	7	14	5	4	6	4	26	13	24	
8	13	14	13	10	12	15	9	45	3	69	S	52	22	14	9	8	24	7	8	4	4	5	3	2	2	69	16	24	
9	2	2	3	2	2	3	7	7	7	S	7	6	5	6	9	10	8	7	6	6	38	39	14	11	2	39	9	24	
10	9	12	11	10	11	12	11	10	S	28	25	30	31	23	4	18	21	27	4	7	7	12	15	8	4	31	15	24	
11	11	8	7	15	10	7	11	S	12	9	8	10	9	11	15	10	12	13	7	4	5	2	5	4	2	15	9	24	
12	4	5	4	4	5	6	S	10	6	12	5	6	8	8	10	12	20	18	10	11	10	9	20	13	4	20	9	24	
13	12	11	35	10	15	S	31	59	130	101	60	14	21	15	15	16	20	73	80	57	136	66	40	54	10	136	47	24	
14	35	18	17	16	S	33	31	33	31	21	17	17	11	9	18	12	26	18	11	25	13	11	20	3	3	35	19	24	
15	9	7	24	S	16	13	15	22	37	70	58	95	44	15	39	10	9	5	4	14	10	6	7	7	4	95	23	24	
16	6	8	S	9	8	8	10	29	34	51	39	36	10	20	95	8	16	6	7	33	16	13	13	12	6	95	21	24	
17	9	S	18	8	12	20	19	28	23	18	15	15	18	16	20	24	25	23	23	20	20	13	11	7	7	28	18	24	
18	S	9	7	6	6	4	3	16	14	16	18	22	13	10	25	27	12	11	10	12	12	2	2	S	2	27	12	24	
19	4	9	2	2	6	6	3	7	6	7	8	11	10	14	16	31	53	14	9	9	14	9	S	8	2	53	11	24	
20	66	18	8	11	6	9	6	5	5	12	6	5	21	22	22	19	22	4	4	2	2	S	3	3	2	66	12	24	
21	4	5	7	7	5	5	5	8	9	8	7	7	7	8	7	6	5	5	5	S	S	6	5	5	4	9	6	24	
22	5	8	7	8	6	9	10	22	23	17	20	18	23	23	23	88	34	63	35	S	25	40	36	31	5	88	25	24	
23	8	8	11	11	19	25	27	20	25	38	59	63	64	40	31	33	15	12	S	13	11	9	13	12	8	64	25	24	
24	15	14	16	9	8	2	2	8	8	18	13	8	4	8	3	2	3	S	3	5	5	6	6	4	2	18	8	24	
25	4	5	5	5	3	3	2	3	3	3	3	4	8	4	3	3	S	4	4	5	4	5	6	6	2	8	4	24	
26	6	5	5	6	5	5	5	6	5	4	6	4	5	3	3	S	3	3	14	3	5	7	2	13	2	14	5	24	
27	7	6	17	17	19	17	18	23	15	12	C	C	C	C	C	C	C	C	7	12	3	5	8	14	3	23	13	24	
28	2	2	2	2	2	2	2	2	2	3	6	7	7	S	8	8	8	5	5	6	6	7	8	8	2	8	5	24	
29	10	11	11	11	9	12	9	14	13	14	19	20	S	22	31	36	29	19	66	57	20	24	22	21	9	66	22	24	
30	12	21	22	24	29	69	39	23	75	28	18	S	27	16	39	16	14	14	13	12	12	8	8	8	8	8	75	24	24
HOURLY MAX	66	21	35	24	29	69	39	59	130	101	60	95	64	45	95	88	53	73	80	57	136	66	40	54					
HOURLY AVG	11	9	11	9	9	12	13	17	20	23	19	20	18	16	20	16	17	15	13	13	15	12	11	11					

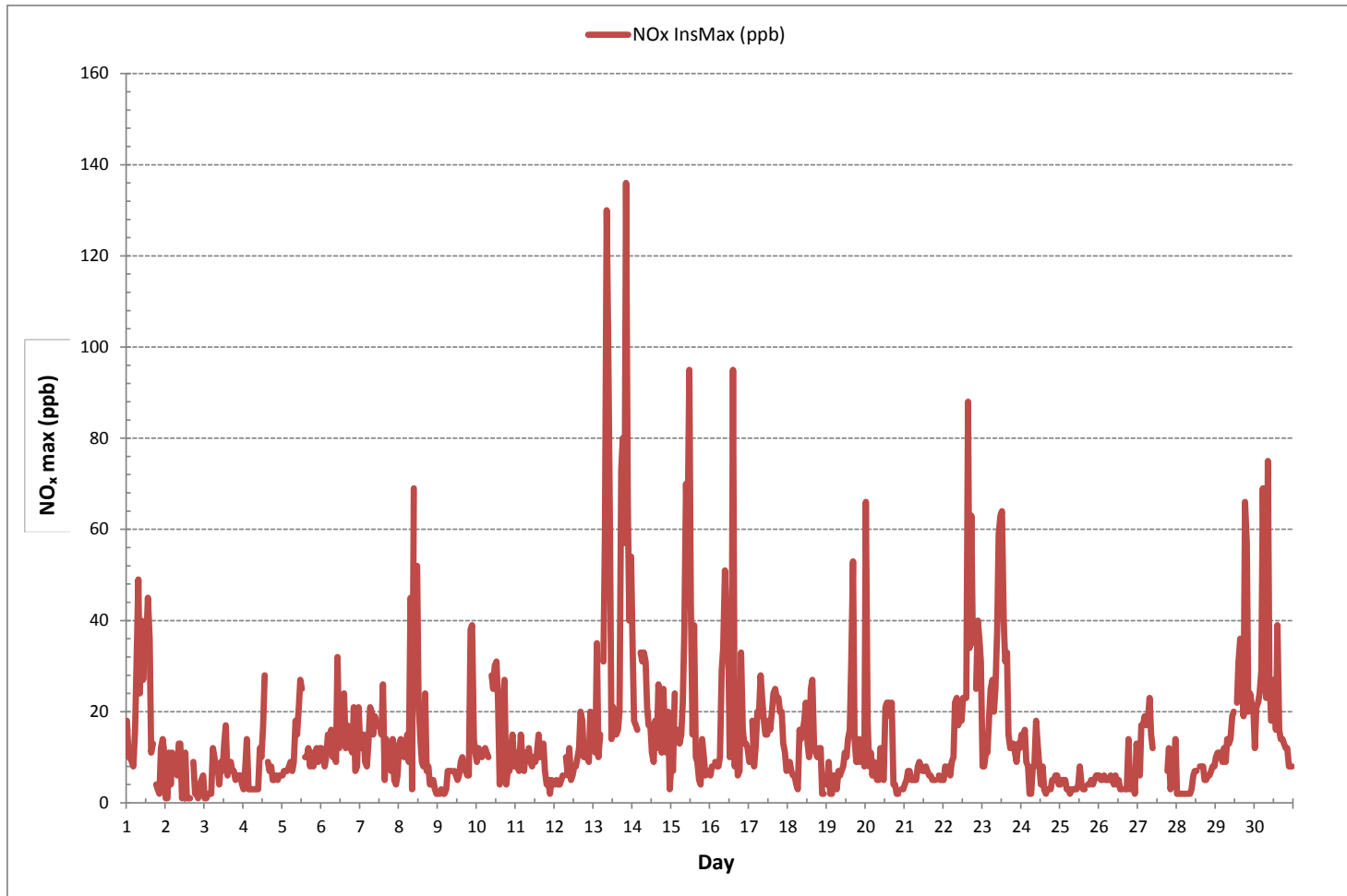
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	682
MAXIMUM INSTANTANEOUS VALUE:	136 ppb @ HOUR 20 ON DAY 13
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	15
OPERATIONAL TIME:	720 hrs

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)





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	5	5	6	4	4	8	24	32	17	20	15	20	18	26	20	5	5	S	0	0	0	2	4	2	0	32	10	24	
2	0	0	1	0	1	1	2	1	4	5	0	1	2	0	0	0	S	1	0	0	0	0	0	0	0	0	5	1	24
3	0	0	0	0	0	5	4	3	3	0	3	2	7	10	1	S	1	0	0	0	0	0	1	0	0	0	10	2	24
4	0	1	4	0	0	0	1	1	1	1	7	7	12	22	S	5	5	4	3	4	4	2	3	3	0	22	4	24	
5	3	3	2	3	3	4	3	4	11	9	12	16	15	S	4	4	4	4	4	3	4	5	3	4	2	16	6	24	
6	5	4	3	4	5	5	5	3	3	3	13	5	S	4	11	5	7	7	3	2	6	2	2	6	2	13	5	24	
7	2	4	4	0	0	3	5	5	3	6	8	S	6	7	12	1	5	3	2	1	5	1	1	1	0	12	4	24	
8	5	8	6	4	4	5	3	25	1	38	S	27	8	7	3	2	8	0	0	0	0	0	0	0	0	38	7	24	
9	0	0	0	0	0	0	7	7	2	S	3	1	1	1	4	4	1	0	0	0	0	17	17	4	2	0	17	3	24
10	2	4	4	3	3	4	3	2	S	12	10	15	16	10	1	3	4	8	1	2	3	3	4	2	1	16	5	24	
11	3	3	3	4	4	2	4	S	3	3	3	4	3	4	5	2	2	3	1	0	0	0	0	0	0	5	2	24	
12	0	0	0	0	0	0	S	2	1	3	1	2	3	2	2	3	7	3	0	0	0	0	3	0	0	7	1	24	
13	0	0	16	0	4	S	19	43	78	69	44	4	9	5	4	4	4	49	48	31	110	43	20	33	0	110	28	24	
14	15	1	0	1	S	8	6	10	7	6	6	7	6	4	7	4	8	1	0	3	1	0	12	0	0	15	5	24	
15	2	1	10	S	7	6	6	9	23	46	35	69	24	6	4	2	2	6	5	3	3	3	3	1	69	13	24		
16	3	4	S	3	4	4	5	13	15	29	22	24	4	8	58	2	9	0	0	17	4	0	0	0	0	58	10	24	
17	0	S	1	0	3	4	2	11	8	5	6	7	8	7	6	7	6	2	1	1	3	3	3	1	0	11	4	24	
18	S	0	0	0	0	0	0	3	2	4	6	9	5	4	14	12	6	5	6	5	5	0	0	S	0	14	4	24	
19	0	0	0	0	0	0	0	1	1	2	2	4	3	7	6	13	27	1	0	0	4	1	S	0	0	27	3	24	
20	51	5	0	0	0	3	0	0	1	6	1	1	9	11	10	7	9	0	1	0	0	S	0	0	0	51	5	24	
21	0	0	0	0	0	0	0	0	1	3	2	2	2	2	1	1	0	0	0	0	S	0	0	0	0	3	1	24	
22	0	0	0	2	0	0	1	11	12	8	10	9	12	13	12	73	19	44	18	S	6	13	10	5	0	73	12	24	
23	1	0	0	1	4	8	9	12	15	26	39	49	43	22	15	16	6	5	S	5	5	4	5	4	0	49	13	24	
24	7	5	6	3	3	0	0	1	0	8	3	2	1	3	1	0	0	S	0	0	0	0	0	0	0	8	2	24	
25	0	0	0	0	0	0	0	0	0	0	0	1	3	1	0	0	S	0	0	0	0	0	0	0	0	3	0	24	
26	0	0	0	0	0	0	1	2	2	0	2	1	1	0	0	S	0	0	2	0	0	1	0	2	0	2	1	24	
27	0	1	2	3	4	4	5	7	3	3	C	C	C	C	C	C	C	C	1	2	0	0	1	2	0	7	2	24	
28	0	0	0	0	0	0	0	0	0	0	2	1	1	S	1	1	1	0	0	0	0	0	0	0	0	2	0	24	
29	0	1	0	0	0	3	0	4	4	5	11	11	S	11	17	19	13	5	44	35	4	9	7	5	0	44	9	24	
30	0	4	6	7	12	49	24	10	59	17	8	S	14	6	18	3	2	0	0	0	0	0	0	0	0	0	59	10	24
HOURLY MAX	51	8	16	7	12	49	24	43	78	69	44	69	43	26	58	73	27	49	48	35	110	43	20	33					
HOURLY AVG	4	2	3	1	2	4	5	8	10	12	10	11	9	8	9	7	6	5	5	4	6	4	3	3					

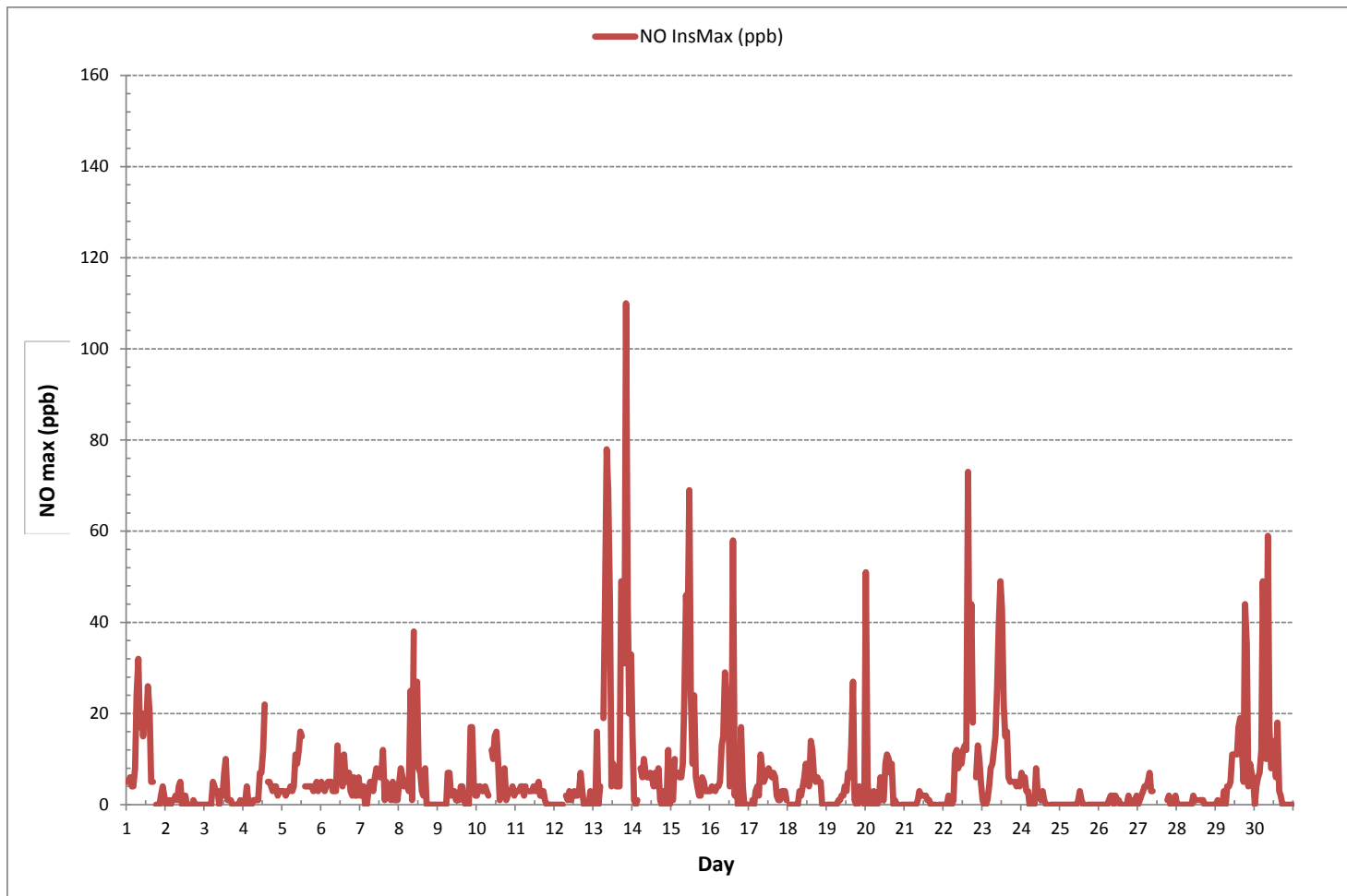
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	474
MAXIMUM INSTANTANEOUS VALUE:	110 ppb @ HOUR 20 ON DAY 13
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	720 hrs
STANDARD DEVIATION:	11

NITRIC OXIDE Instantaneous Maximum (NO 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	13	6	5	5	4	7	14	19	12	20	14	19	19	20	16	7	8	S	4	3	3	10	10	10	3	20	11	24	
2	1	1	10	4	10	6	6	5	10	8	1	3	8	1	1	1	S	8	2	2	1	4	5	6	1	10	4	24	
3	1	1	2	2	3	8	7	5	5	4	6	5	7	8	5	S	8	7	5	6	6	6	4	1	8	5	24		
4	3	7	10	3	3	2	2	2	2	2	5	4	5	7	S	5	4	4	3	3	3	3	3	4	2	10	4	24	
5	3	5	4	4	5	6	4	5	8	7	9	11	11	S	6	6	8	6	7	7	6	8	6	7	3	11	6	24	
6	8	7	5	7	11	9	11	8	8	6	19	8	S	9	13	8	10	10	8	10	15	5	6	15	5	19	9	24	
7	9	8	12	8	8	11	16	16	12	13	10	S	11	9	14	4	11	8	6	5	9	4	3	5	3	16	9	24	
8	10	7	7	6	8	10	7	21	2	33	S	26	14	8	7	6	18	7	8	4	4	4	3	2	2	33	10	24	
9	2	2	3	2	2	3	3	3	5	S	4	5	4	4	6	7	6	7	6	6	20	22	10	9	2	22	6	24	
10	6	8	7	7	8	8	8	7	S	16	14	15	16	13	3	15	17	19	3	5	5	9	12	6	3	19	10	24	
11	7	6	6	10	6	5	7	S	9	6	6	7	7	7	10	9	10	9	6	4	5	2	5	4	2	10	7	24	
12	4	5	4	4	4	6	S	9	6	9	4	4	5	6	8	9	13	15	10	11	10	9	17	12	4	17	8	24	
13	11	11	19	10	12	S	13	18	52	32	16	10	13	11	12	13	17	27	32	26	31	24	20	21	10	52	20	24	
14	20	17	17	15	S	26	26	24	24	17	12	11	7	5	12	8	19	17	10	24	12	10	13	3	3	26	15	24	
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18	S	9	7	6	6	4	3	12	12	11	12	13	8	6	12	17	7	6	5	6	7	2	2	S	2	17	8	24	
19	4	9	2	2	6	6	3	5	5	5	6	7	8	9	12	18	26	13	9	9	10	8	S	8	2	26	8	24	
20	19	13	8	11	6	5	5	5	4	6	5	4	11	12	12	12	13	4	3	2	2	S	3	3	2	19	7	24	
21	4	5	7	7	5	5	5	5	7	6	6	5	6	6	5	6	5	5	5	S	S	6	5	5	4	7	6	24	
22	5	8	7	6	6	9	10	15	13	10	11	10	11	11	12	19	15	21	17	S	20	28	28	27	5	28	14	24	
23	8	8	10	11	15	18	18	11	13	14	22	22	25	18	16	18	9	7	S	9	7	6	8	9	6	25	13	24	
24	8	9	10	7	6	2	2	8	8	11	10	7	4	5	3	2	3	S	3	6	5	6	6	4	2	11	6	24	
25	4	5	5	5	3	3	2	3	3	3	3	3	4	3	3	3	S	4	4	5	4	5	6	6	2	6	4	24	
26	6	5	5	6	5	5	5	4	5	4	4	4	4	3	3	S	3	3	12	3	5	7	2	11	2	12	5	24	
27	7	6	15	14	16	14	14	16	12	10	C	C	C	C	C	C	C	C	6	10	3	5	8	12	3	16	11	24	
28	2	2	2	2	2	2	2	2	2	3	4	6	5	S	7	7	7	5	5	6	6	7	8	8	2	8	4	24	
29	9	10	11	11	9	9	9	10	10	10	9	9	S	12	13	18	16	15	22	22	17	16	15	17	9	22	13	24	
30	11	17	17	17	17	20	16	14	17	13	12	S	13	12	22	13	14	14	13	12	12	8	8	8	8	8	22	14	24
HOURLY MAX	20	17	19	17	17	26	26	24	52	33	23	31	25	20	37	19	26	27	32	26	31	28	28	27	8	22	14	24	
HOURLY AVG	7	7	9	7	7	8	9	10	11	12	10	10	10	9	11	10	11	10	9	9	9	9	8	9	9	9	9	9	24

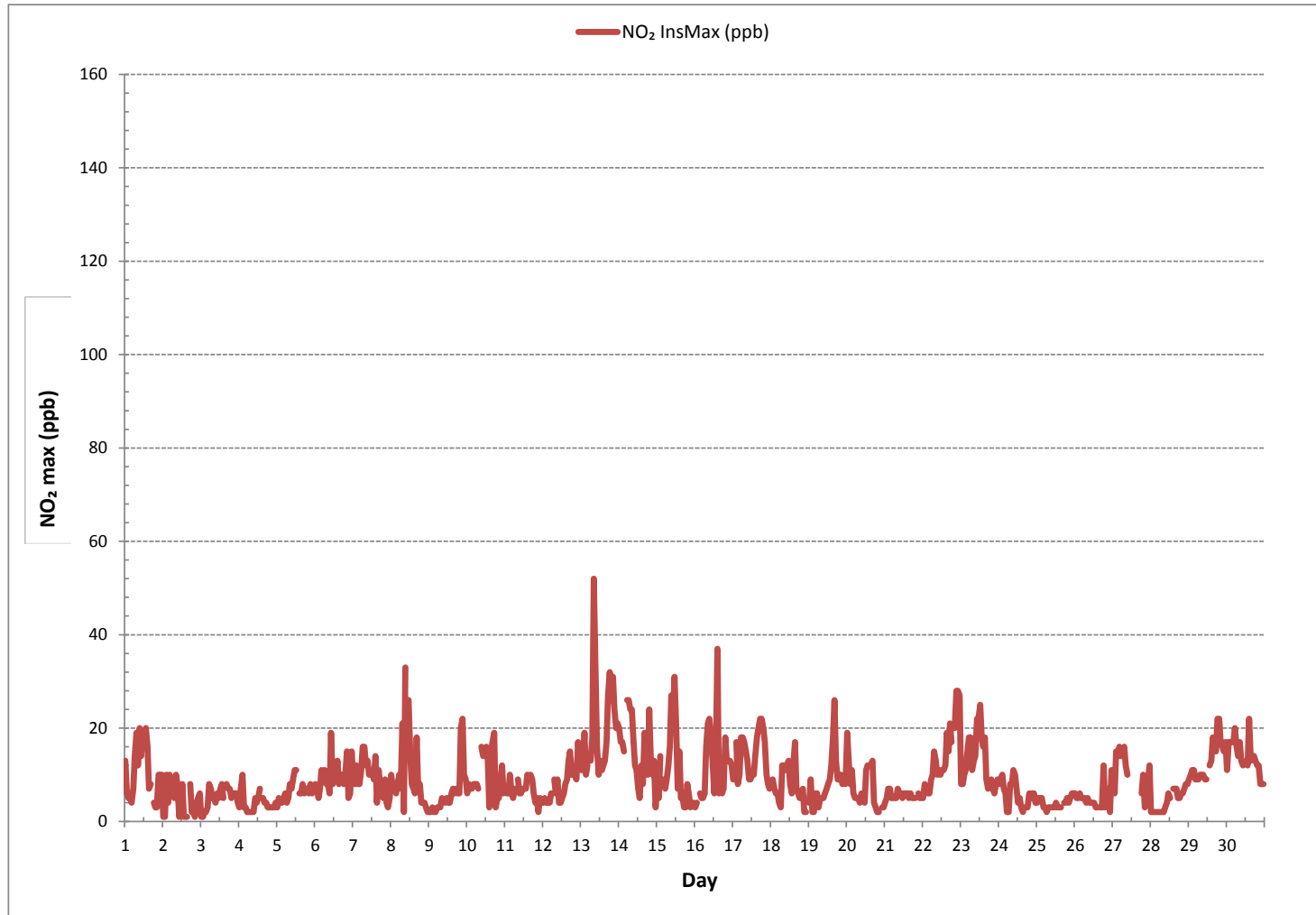
STATUS FLAG CODES

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

NUMBER OF NON-ZERO READINGS:	682
MAXIMUM INSTANTANEOUS VALUE:	52 ppb @ HOUR 8 ON DAY 13
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	6
OPERATIONAL TIME:	720 hrs

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)





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 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	7.5	7.1	8.6	12.6	10.4	10.0	9.8	12.9	10.6	13.5	10.3	6.8	7.1	6.8	6.7	8.3	5.2	3.0	3.2	2.6	4.7	4.1	3.2	5.0	2.6	13.5	7.5	24
2	8.1	7.4	7.1	8.7	6.4	7.3	11.2	9.1	9.0	10.3	10.8	8.9	9.1	8.9	6.5	6.5	8.0	6.3	5.9	7.1	6.7	7.3	6.7	7.6	5.9	11.2	7.9	24
3	7.6	8.7	8.6	8.8	9.9	9.6	9.1	10.5	10.1	9.4	9.9	9.8	11.3	10.0	8.6	7.2	3.5	3.8	2.3	1.6	3.6	3.3	3.3	5.1	1.6	11.3	7.3	24
4	7.5	9.2	10.9	7.7	10.1	12.4	12.0	12.9	13.4	13.1	11.0	11.9	12.8	12.0	14.7	15.9	16.5	13.6	17.3	16.3	16.7	16.7	15.5	16.6	7.5	17.3	13.2	24
5	16.3	15.5	13.4	14.3	12.3	13.8	13.7	14.4	12.2	13.4	12.7	15.0	13.6	12.3	10.9	9.4	7.2	11.4	9.3	8.9	9.3	7.2	7.1	6.6	6.6	16.3	11.7	24
6	7.8	8.8	10.1	10.0	7.6	7.4	6.2	5.2	7.2	7.5	5.9	6.8	6.8	5.6	6.6	6.4	7.1	8.1	4.9	5.7	7.6	5.9	7.4	6.9	4.9	10.1	7.1	24
7	6.8	5.6	4.0	4.4	5.2	8.0	8.8	10.3	7.2	8.9	7.9	8.0	8.5	7.4	5.6	9.0	8.6	11.2	4.0	2.9	3.3	4.8	5.3	3.5	2.9	11.2	6.6	24
8	7.6	7.5	6.6	8.7	8.3	4.6	5.7	6.2	4.6	4.1	7.0	6.1	4.4	5.9	5.8	6.2	5.9	2.3	4.4	6.9	6.0	7.7	9.0	9.5	2.3	9.5	6.3	24
9	11.0	9.4	11.2	9.7	8.4	8.1	9.5	9.8	10.1	11.8	9.1	11.8	9.2	7.9	7.2	7.4	5.7	3.9	3.4	2.5	8.1	8.0	7.5	5.1	2.5	11.8	8.2	24
10	6.8	8.6	14.4	11.9	11.0	13.4	12.5	15.5	7.5	9.3	10.1	10.3	9.6	10.0	8.8	9.0	7.8	10.9	17.0	14.5	13.7	12.4	11.3	10.1	6.8	17.0	11.1	24
11	11.2	11.2	10.7	8.1	9.0	12.0	11.8	11.6	11.3	12.9	11.8	10.6	9.1	9.6	8.3	6.9	6.2	4.6	5.6	5.6	3.1	2.3	2.5	3.2	2.3	12.9	8.3	24
12	4.0	3.5	5.2	4.6	2.5	2.6	4.7	3.6	4.1	6.0	5.3	6.8	6.7	8.1	5.4	5.9	5.4	4.1	4.3	3.3	3.6	2.5	2.0	2.8	2.0	8.1	4.5	24
13	1.8	3.1	2.4	2.0	1.8	2.9	1.9	2.1	2.7	2.5	5.7	6.7	5.8	6.1	6.1	4.8	2.4	2.8	1.7	1.4	2.2	3.6	4.7	5.8	1.4	6.7	3.4	24
14	6.6	4.6	4.7	6.0	5.0	8.4	8.4	10.5	9.0	5.2	7.5	13.8	15.9	10.9	8.3	8.5	7.5	7.1	2.7	4.6	4.0	2.7	2.9	0.9	0.9	15.9	6.9	24
15	2.3	4.0	3.7	4.9	7.2	7.5	7.1	7.0	11.5	6.7	6.4	6.6	5.6	6.8	7.7	9.3	9.9	11.6	12.8	11.5	11.8	16.7	15.5	15.4	2.3	16.7	8.7	24
16	15.0	14.1	12.2	13.8	12.4	10.4	7.5	8.2	5.6	6.1	6.7	6.1	5.3	5.0	4.9	6.9	5.9	6.8	4.8	5.5	5.9	4.8	5.9	7.2	4.8	15.0	7.8	24
17	8.5	8.2	10.8	10.3	7.5	7.3	7.5	7.0	5.7	5.0	5.4	5.9	4.8	5.6	6.9	4.5	5.0	4.2	2.0	3.3	5.1	5.4	5.4	5.5	2.0	10.8	6.1	24
18	4.7	6.5	6.8	8.1	10.0	8.2	10.1	8.7	8.2	8.1	11.5	9.2	8.5	7.8	8.4	6.7	9.4	9.9	7.0	6.5	3.4	1.4	3.6	5.4	1.4	11.5	7.4	24
19	5.8	6.2	5.5	5.0	7.4	7.2	7.4	10.2	8.7	7.2	7.9	6.5	7.2	8.5	7.5	4.9	3.6	4.0	3.3	3.2	2.6	2.4	1.3	2.8	1.3	10.2	5.7	24
20	3.0	2.4	2.0	2.6	2.2	1.4	1.4	2.8	3.4	3.8	7.4	9.0	10.7	10.1	8.9	10.0	10.7	8.3	9.8	8.3	9.1	8.7	6.4	7.1	1.4	10.7	6.2	24
21	5.9	6.3	6.1	5.1	5.0	5.3	4.7	4.5	5.7	6.1	4.1	5.7	4.8	4.8	4.2	4.6	4.9	4.8	6.4	5.4	4.8	4.1	3.7	3.4	3.4	6.4	5.0	24
22	2.6	3.2	2.8	3.7	2.6	4.1	4.2	3.7	4.4	3.8	3.3	4.5	4.7	4.5	5.2	4.4	4.2	4.1	3.2	2.4	4.3	6.6	3.6	4.1	2.4	6.6	3.9	24
23	4.0	3.5	2.5	2.9	4.2	4.7	7.5	6.7	7.5	9.8	9.5	8.9	8.1	6.7	6.7	6.1	6.8	3.9	5.5	8.6	9.5	9.0	9.4	4.6	2.5	9.8	6.5	24
24	6.7	5.3	6.1	5.5	4.3	4.4	3.7	3.2	4.2	3.2	2.9	3.6	5.3	6.4	5.9	5.3	3.9	5.4	6.5	5.9	7.2	7.2	5.3	5.9	2.9	7.2	5.1	24
25	6.0	4.3	4.6	4.1	4.6	5.3	4.1	4.1	4.2	4.6	4.0	5.2	5.2	5.4	6.4	6.2	7.2	8.2	6.4	6.1	7.2	8.6	9.8	8.2	4.0	9.8	5.8	24
26	7.0	6.1	10.4	7.9	6.7	8.3	7.0	8.8	8.5	8.7	7.9	8.8	8.1	9.6	9.9	10.9	9.1	8.7	9.1	10.4	12.1	12.2	11.9	11.5	6.1	12.2	9.1	24
27	11.5	12.9	13.3	7.9	9.3	9.5	9.6	10.3	11.0	10.9	8.7	9.3	9.5	9.0	9.7	10.7	8.4	9.3	10.2	12.9	11.0	8.4	7.9	8.0	7.9	13.3	10.0	24
28	7.3	8.0	5.9	4.9	5.2	6.0	8.3	7.2	6.0	7.1	5.9	5.8	5.9	6.5	4.9	4.7	3.1	4.4	3.6	3.3	6.2	5.8	3.8	4.5	3.1	8.3	5.6	24
29	4.3	3.8	2.5	2.9	2.3	2.6	2.2	1.6	1.1	1.2	1.6	5.3	3.3	4.7	5.1	4.2	2.6	4.1	6.7	6.6	4.2	3.1	3.2	4.5	1.1	6.7	3.5	24
30	4.3	4.5	4.2	5.7	6.6	3.4	2.2	2.4	2.5	4.7	6.3	6.6	6.3	5.6	3.1	3.7	2.5	2.7	3.2	2.3	4.5	3.6	1.4	1.4	1.4	6.6	3.9	24
HOURLY MAX	16.3	15.5	14.4	14.3	12.4	13.8	13.7	15.5	13.4	13.5	12.7	15.0	15.9	12.3	14.7	15.9	16.5	13.6	17.3	16.3	16.7	16.7	15.5	16.6				

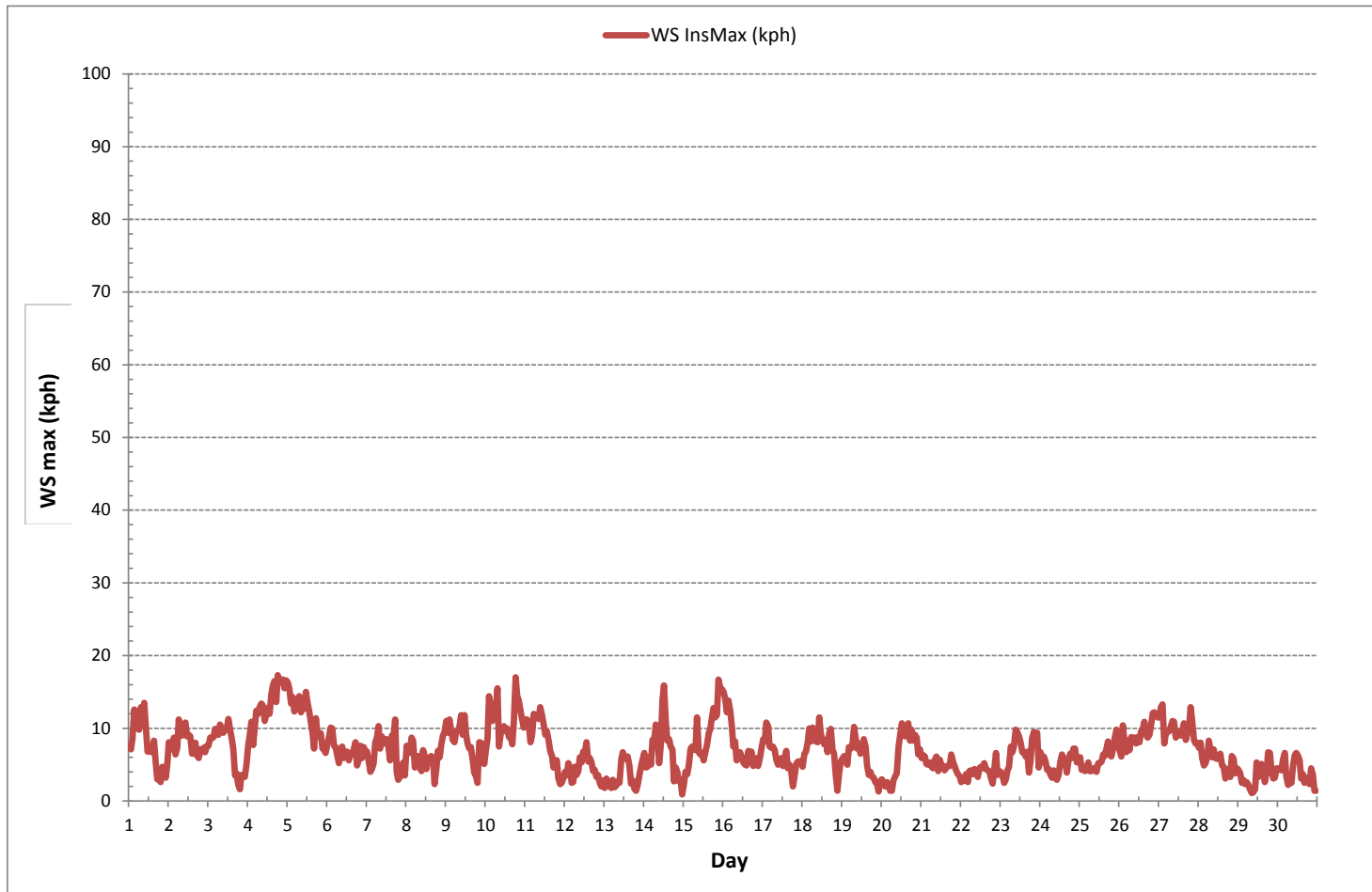
STATUS FLAG CODES

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

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	17.3	kph	@ HOUR	18	ON DAY	4	
OPERATIONAL TIME:						720	hrs

WIND SPEED Instantaneous Maximum (WS kph)



***APPENDIX IV
REPORT CERTIFICATION FORM***

Report Certification Form

Alberta Airshed (if applicable)	EPA Approval or Code of Practice Registration # (if applicable)
YES	NA
Company Name (if applicable)	Industrial Operation Name (if applicable)
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION	Maskwa Continuous Monitoring Station
Name of the Representative of the Person Responsible	Position / Title of the Representative of the Person Responsible
Mike Bisaga	Environment Monitoring Program Manager
Is an External Party Certifying the Report?	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Name of External Person Certifying the Report	Position / Title of External Person Certifying the Report
Wunmi Adeganmbi	Project Team Lead, Customer Service - Air Services
Company Name for External Person Certifying the Report	Identification of Qualifications / Professional Designations of the External Person Certifying the Report
Maxxam Analytics, A Bureau Veritas Group Company	M.Sc., EPT., PMP

Maxxam Analytics is the designated contractor conducting monitoring and reporting activities. I certify that the submitted data has been (a) reviewed and validated as per the AMD Chapter 6: Ambient Data Quality. I certify that the submitted report (b) accurately reflects the monitoring results and reporting timeframe and (c) meets the specified analysis, summarization and reporting requirements as per the AMD Chapter 9: Reporting.

Signature of the External Person Certifying the Report

28 - Dec - 2018

Report Issued Date (dd-mon-yyyy)

APPENDIX V
DATA VALIDATION CERTIFICATION FORM



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2018-11-30-C</u>
Site: <u>Maskwa Continuous Monitoring Station</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u><i>bimadeniji</i></u>	Date <u>18- Dec - 2018</u>
Level 1 Primary Validation	<u><i>bimadeniji</i></u>	Date <u>18 - Dec - 2018</u>
Level 2 Final Validation	<u><i>bimadeniji</i></u>	Date <u>21 - Dec - 2018</u>
Level 3 Independent Data Review	<u><i>msadmbg</i></u>	Date <u>28- Dec - 2018</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.

Alberta Environment and Parks (AEP)
Air.Reporting@gov.ab.ca

January 3, 2019

Subject: Monthly Report Submission for the LICA St. Lina station

Lakeland Industry & Community Association (LICA) is pleased to submit the ambient air monitoring monthly report for the LICA St. Lina AQM Station in the month of November 2018.

The air monitoring program consists of continuous air monitoring results for 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).

Sampling Program	Monitoring Activities Conducted By	Sample Analysis Conducted By	Data/Report Review and Prepared By	Electronic Submission Conducted By
Continuous ambient air	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics

All data collected in November 2018 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 met the 90% requirement.

Precipitation: A configuration error occurred during the datalogger upgrade on May 30 and was corrected on November 1 during hour 13 and hour 14. Data collected during this time frame, at rates greater than or equal to 0.3 millimeter /minute, might be compromised and should therefore be used with caution.

As the LICA Environmental Program Manager and Data & Reporting Specialist, we have reviewed and verified this report and that the information is complete, accurate and representative of the monitoring results, reporting timeframe and the specified analysis, summarization and reporting requirements. We also verify all air data that are required by the AMD to be electronically submitted to AEP and Alberta's Ambient Air Quality Data Warehouse have been submitted by the time of this report submission.

Should you have any questions, please don't hesitate to contact us.

Respectfully,



Lakeland Industry & Community Association
5107 50 St
Bonnyville, AB T9N 2J7

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

Michael Bisaga
Technical Program Manager
Lakeland Industry & Community Association
780-266-7068
monitoring@lica.ca

A handwritten signature in blue ink that reads "Lily Lin".

Lily Lin
Data & Reporting Specialist
587-225-2248
monitoring@lica.ca

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

JOB #: 2833-2018-11-31-C

November 2018

Prepared for:

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
5107 50 ST.
BONNYVILLE, ALBERTA
T9N 2J7

Attention: MIKE BISAGA

DATE: **December 21, 2018**

Prepared by:

Bim Adeniji

Bim Adeniji, M.Sc.
Project Manager Assistant, Customer Service, Air Services

Reviewed by:

Wunmi Adekanmbi

Wunmi Adekanmbi, M.Sc., EPT, PMP
Project Team Lead, Customer Service, Air Services

SUMMARY

In November 2018, 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 the 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.

All data collected this month were within the Alberta Ambient Air Quality Objectives and Guidelines (November, 2018).

All Parameters: Sixteen hours of downtime were incurred between November 12, hour 17:00 and November 13, hour 8:00, as the data polling service was interrupted by a Windows operating system update.

H₂S: Two hours of downtime were recorded on November 9, at hours 08:00 - 9:00, due to an additional zero-span check performed to assess a biased low drift in span response.

WS/WD/STDWD: Anomalous WS spikes were recorded on November 4, at hours 06:00 – 12:00, and November 12, at hours 0:00 – 12:00. Impacted WS data, along with the corresponding WD and STDWD data, were therefore invalidated. Eighteen hours of downtime were recorded due to these events.

Precipitation: A configuration error occurred during the datalogger upgrade on May 30, and was corrected on November 1, at hour 13:00. Consequently, data collected during this time frame, at rates greater than or equal to 0.3 mm/min, might be compromised and should therefore be used with caution. Two hours of downtime were recorded on November 1, at hours 13:00 – 14:00, due to this correction event.

The summary of results is presented on the following pages.

Any deviations or modifications made to the sampling or analytical methods are outlined in Section 1.0, Discussion. On this basis, Maxxam 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.

Monthly Continuous Data Summary

Lakeland Industry & Community Association						MAXIMUM VALUES							OPERATIONAL TIME (%)
St. Lina Continuous Monitoring Station						1-HOUR					24-HOUR		
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
	1-hr	24-hr	1-hr	24-hr									
SO ₂ (ppb)	172	48	0	0	0	3	13	12	8.3	SSW	1	13	97.8
H ₂ S (ppb)	10	3	0	0	0	0	1	0	6.9	N	0	1	97.5
THC (ppm)	-	-	-	-	2.09	2.92	10	13	13.2	WNW	2.26	21	97.8
CH ₄ (ppm)	-	-	-	-	2.09	2.90	10	13	13.2	WNW	2.26	21	97.8
NMHC (ppm)	-	-	-	-	0.00	0.02	10	13	13.2	WNW	0.00	1	97.8
NO ₂ (ppb)	159	-	0	-	3	19	29	19	7.2	WSW	12	29	97.8
NO (ppb)	-	-	-	-	0	9	29	12	6.6	SW	2	29	97.8
NO _x (ppb)	-	-	-	-	3	20	29	12	6.6	SW	14	29	97.8
O ₃ (ppb)	82	-	0	-	22.4	39.5	10	23	19.1	NNW	34.6	11	97.8
PM _{2.5} (µg/m ³)	80	29	0	0	8	33	15	10	2.7	NNE	18	28	97.8
RELATIVE HUMIDITY (%)	-	-	-	-	89	100	1	4	16.2	NNW	99	20	97.8
BAROMETRIC PRESSURE (millibar)	-	-	-	-	925	944	11	12	9.2	NNW	941	11	97.8
AMBIENT TEMPERATURE (°C)	-	-	-	-	-6.3	7.8	14	12	15.6	WNW	4.1	14	97.8
PRECIPITATION (mm)	-	-	-	-	18.5	1.5	4	14	3.5	ENE	9.6	4	97.5
VECTOR WS (kph)	-	-	-	-	1.1	22.3	9	4	-	S	14.9	5	95.3
VECTOR WD (sec)	-	-	-	-	210 (SSW)	-	-	-	-	-	-	-	95.3

* Precipitation: data represents the total (sum) for the indicated time frame.

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 29 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 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}), Relative Humidity (RH), Barometric Pressure (BP), Precipitation, Ambient Temperature (AmbTPX), Wind Speed (WS), Wind Direction (WD) and Standard Deviation Wind Direction (STDWD).

The sample inlet filter for all continuous air analyzers are replaced 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 \(December, 2016\)](#). 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. The minimum and maximum statistics are highlighted in the data table and are for reference only. The highlighted cells are based on the software's interpretation of the exact position of the minimum or maximum value. The visual presentation of these statistics may not be the obvious choice in a data range due to rounding, truncating or analyzer specifications.

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)

- Operational time for the monitoring period was 97.8%, equivalent to 16 hours of downtime.
- On November 12, the polling service was interrupted by a Windows operating system update. Data polling was restored on November 13, following a reboot of the Envidas Ultimate computer. Data was not collected between November 12, hour 17:00 and November 13, hour 8:00 due to the update. Sixteen hours of downtime were incurred as a result.
- The routine monthly calibration was performed on November 16.

HYDROGEN SULPHIDE (H₂S)

- Operational time for the monitoring period was 97.5%, equivalent to 18 hours of downtime.
- Two hours of downtime were recorded on November 9, at hours 08:00 - 9:00, due to an additional zero-span check performed to assess a biased low drift in span response.
- On November 12, the polling service was interrupted by a Windows operating system update. Data polling was restored on November 13, following a reboot of the Envidas Ultimate computer. Data was not collected between November 12, hour 17:00 and November 13, hour 8:00 due to the update. Sixteen hours of downtime were incurred as a result.
- The routine monthly calibration was performed on November 13.

TOTAL HYDROCARBONS (THC), METHANE (CH₄) and NON-METHANE HYDROCARBONS (NMHC)

- Operational time for the monitoring period was 97.8%, equivalent to 16 hours of downtime.
- On November 12, the polling service was interrupted by a Windows operating system update. Data polling was restored on November 13, following a reboot of the Envidas Ultimate computer. Data was not collected between November 12, hour 17:00 and November 13, hour 8:00 due to the update. Sixteen hours of downtime were incurred as a result.
- The carrier gas (N₂) cylinder was replaced on November 13.
- The routine monthly calibration was performed on November 16.
- The analyzer exhibited poor sample injections between November 5 and November 14, as demonstrated by sporadic minute data recorded at concentrations lower than 1.80 ppm. CH₄ minute concentrations < 1.80 ppm, along with the corresponding THC and NMHC values, were excluded and the corresponding hourly averages were re-calculated. The following hourly averages were re-calculated:
November 5, hour 07:00
November 6, hour 03:00
November 8, hour 10:00
November 14, hour 23:00
- Due to drifts in daily zero readings, the as-found zero value obtained during the monthly calibration was applied to baseline data correction for the month.
- Elevated hourly concentrations were recorded on November 10, at hour 13:00 and minute data review identified corresponding spikes at 13:32 - 13:43. These concentrations were therefore deemed valid.

OXIDES OF NITROGEN (NO_x), NITRIC OXIDE (NO) and NITROGEN DIOXIDE (NO₂)

- Operational time for the monitoring period was 97.8%, equivalent to 16 hours of downtime.
- On November 12, the polling service was interrupted by a Windows operating system update. Data polling was restored on November 13, following a reboot of the Envidas Ultimate computer. Data was not collected between November 12, hour 17:00 and November 13, hour 8:00 due to the update. Sixteen hours of downtime were incurred as a result.
- The routine monthly calibration was performed on November 16.

OZONE (O₃)

- Operational time for the monitoring period was 97.8%, equivalent to 16 hours of downtime.
- On November 12, the polling service was interrupted by a Windows operating system update. Data polling was restored on November 13, following a reboot of the Envidas Ultimate computer. Data was not collected between November 12, hour 17:00 and November 13, hour 8:00 due to the update. Sixteen hours of downtime were incurred as a result.
- The routine monthly calibration was performed on November 13.

PARTICULATE MATTER < 2.5 MICRONS (PM_{2.5})

- Operational time for the monitoring period was 97.8%, equivalent to 16 hours of downtime.
- On November 12, the polling service was interrupted by a Windows operating system update. Data polling was restored on November 13, following a reboot of the Envidas Ultimate computer. Data was not collected between November 12, hour 17:00 and November 13, hour 8:00 due to the update. Sixteen hours of downtime were incurred as a result.
- The routine quarterly audit/calibration was performed on November 23.

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

- Operational time for the monitoring period was 95.3%, equivalent to 34 hours of downtime.
- Anomalous WS spikes were recorded on November 4, at hours 06:00 – 12:00, and November 12, at hours 0:00 – 12:00. Impacted WS data were therefore invalidated, along with the corresponding WD and STDWD data. Seven minutes of data impacted at 05:53-05:59 on November 4 were invalidated and the hourly average was re-calculated. Eighteen hours of downtime were recorded due to these events.
- On November 12, the polling service was interrupted by a Windows operating system update. Data polling was restored on November 13, following a reboot of the Envidas Ultimate computer. Data was not collected between November 12, hour 17:00 and November 13, hour 8:00 due to the update. Sixteen hours of downtime were incurred as a result.
- On November 1, there was a brief interference on the wind channels while a configuration error on the precipitation channel was being addressed. One instance of maximum instantaneous data was invalidated at hour 14:00 as a result.
- 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 and is measured in degrees from true north.

RELATIVE HUMIDITY (RH)

- Operational time for the monitoring period was 97.8%, equivalent to 16 hours of downtime.
- On November 12, the polling service was interrupted by a Windows operating system update. Data polling was restored on November 13, following a reboot of the Envidas Ultimate computer. Data was not collected between November 12, hour 17:00 and November 13, hour 8:00 due to the update. Sixteen hours of downtime were incurred as a result.

BAROMETRIC PRESSURE (BP)

- Operational time for the monitoring period was 97.8%, equivalent to 16 hours of downtime.
- On November 12, the polling service was interrupted by Windows operating system to perform a software update. Data polling was restored on November 13, following a reboot of the Ultimate PC. Sixteen hours of downtime were incurred between November 12, hour 17:00 and November 13, hour 8:00 due to the update.

PRECIPITATION (PRECIP)

- Operational time for the monitoring period was 97.5%, equivalent to 18 hours of downtime.
- A configuration error occurred during the datalogger upgrade on May 30, and was corrected on November 1, at hour 13:00. Consequently, data collected during this time frame, at rates greater than or equal to 0.3 mm/min, might be compromised and should therefore be used with caution. Two hours of downtime were recorded on November 1, at hours 13:00 – 14:00, due to this correction event.
- On November 12, the polling service was interrupted by a Windows operating system update. Data polling was restored on November 13, following a reboot of the Envidas Ultimate computer. Data was not collected between November 12, hour 17:00 and November 13, hour 8:00 due to the update. Sixteen hours of downtime were incurred as a result.

AMBIENT TEMPERATURE (AmbTPX)

- Operational time for the monitoring period was 97.8%, equivalent to 16 hours of downtime.
- On November 12, the polling service was interrupted by Windows operating system to perform a software update. Data polling was restored on November 13, following a reboot of the Ultimate PC. Sixteen hours of downtime were incurred between November 12, hour 17:00 and November 13, hour 8:00 due to the update.

2.0 Project Personnel

Mike Bisaga and Lily Lin were the contacts 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.

All data collected this month were within the Alberta Ambient Air Quality Objectives and Guidelines (November, 2018).

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-00014: Measurement of Particulate Concentration Using the THERMO SHARP
- 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-00242: Precipitation Collector Installation/Maintenance
- MET One Instruments: Operation Manual Document No. 50.5-9800

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

- Sulphur Dioxide - Thermo 43i-TLE UV Fluorescent Analyzer
- Hydrogen Sulphide - Thermo 450i UV Fluorescent Analyzer
- Methane, Non-Methane Hydrocarbon - Thermo 55i FID Analyzer
- Oxides of Nitrogen - Thermo 42i Chemiluminescent Analyzer
- Ozone - Thermo 49i Photometric Analyzer
- Particulate Matter (PM_{2.5}) - Thermo SHARP 5030i Unit
- Wind System - Met One Unit
- Relative Humidity - Campbell Scientific Unit
- Barometric Pressure - Met One Unit
- Ambient Temperature - Campbell Scientific Unit
- Precipitation - Met One Unit
- Datalogger - Envista Ultimate

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

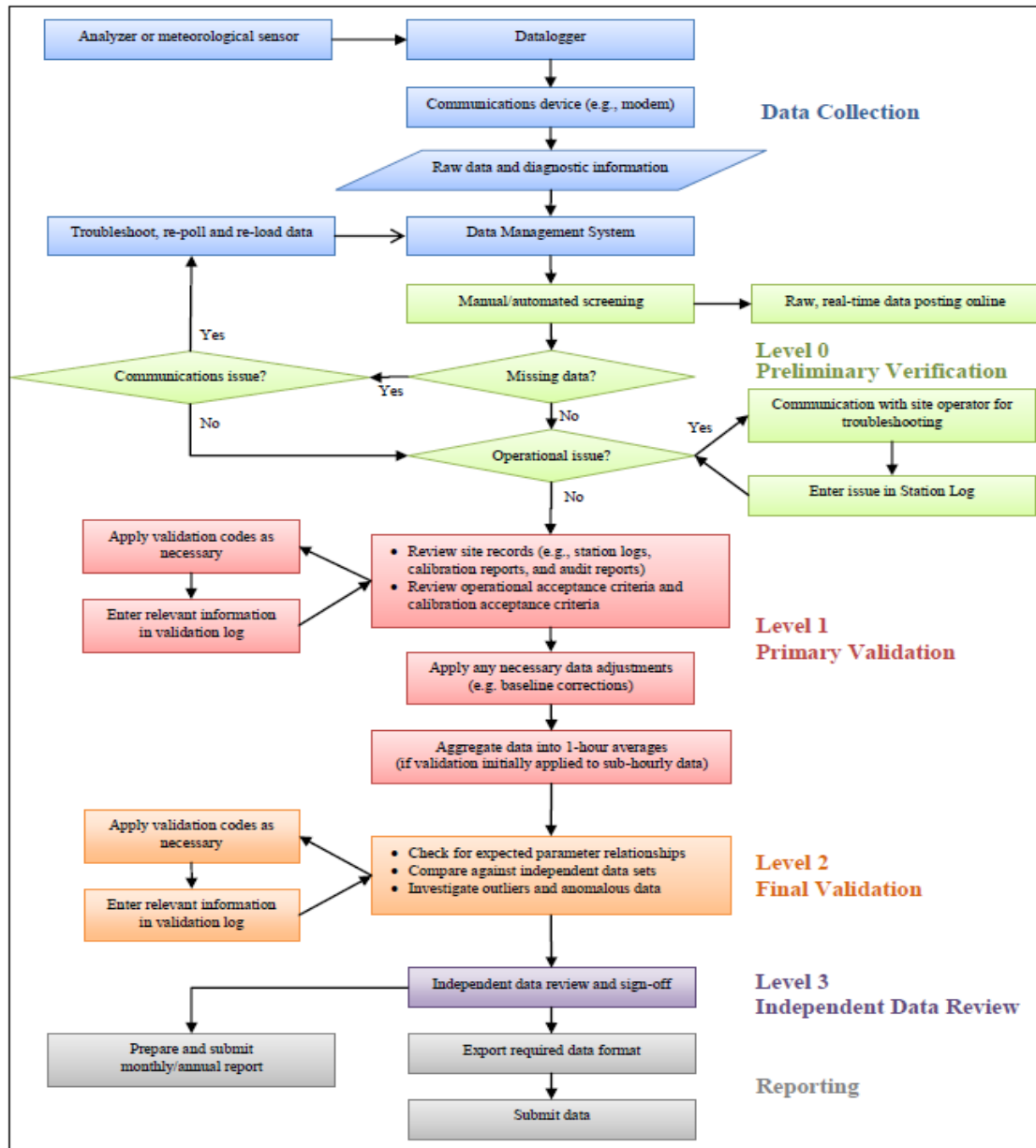
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

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 (December 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	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	24
2	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
3	S	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	S	0	1	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	S	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	S	0	0	0	0	0	24
6	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	1	0	24
7	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
8	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	24
9	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	S	0	0	0	0	0	0	0	0	1	0	24
10	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	1	0	24
11	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
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	X	X	X	X	X	X	X	X	0	0	0	17
13	X	X	X	X	X	X	X	X	X	1	1	2	3	S	2	2	1	1	0	1	0	0	0	1	0	3	1	15	
14	1	1	1	1	1	1	1	1	2	2	1	0	S	0	0	0	0	0	0	0	0	0	0	0	0	2	1	24	
15	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	24
16	0	0	0	0	0	0	0	0	0	0	0	0	S	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	24
17	0	1	2	1	0	0	0	0	0	0	S	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	2	0	24
18	0	0	0	0	0	1	1	1	1	S	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
19	0	0	0	0	0	0	0	0	S	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24
20	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	24
21	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
22	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	24
23	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
24	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	24
25	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	24
26	S	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	1	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	S	0	0	0	0	0	24
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	S	0	0	0	1	0	24
29	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	S	1	1	1	1	0	2	1	24
30	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	1	0	24
HOURLY MAX	1	1	2	1	1	1	1	1	2	2	1	2	3	1	2	2	1	1	1	2	0	1	1	1	1				
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				

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

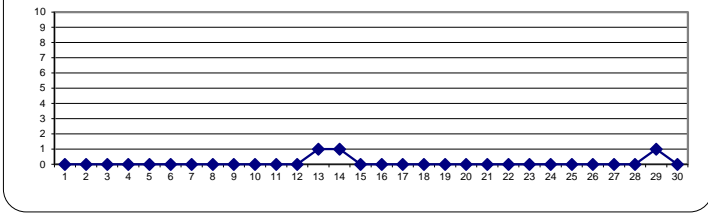
OBJECTIVE LIMIT:

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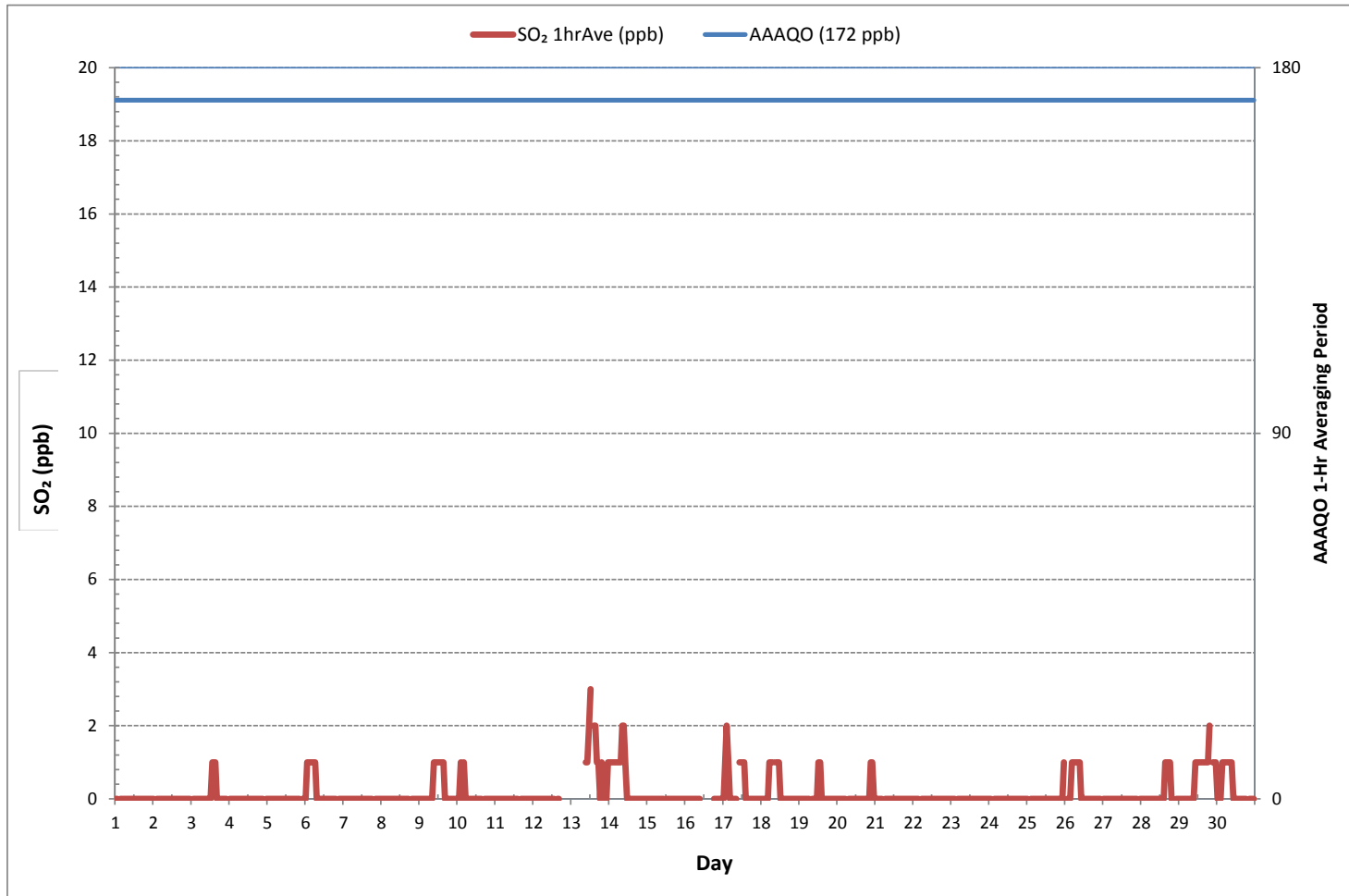
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	87		
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0 ON DAY	1
MAXIMUM 1-HR AVERAGE:	3 ppb @ HOUR	12 ON DAY	13
MAXIMUM 24-HR AVERAGE:	1 ppb	ON DAY	13
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	704 hrs
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	97.8 %
STANDARD DEVIATION:	0	MONTHLY AVERAGE:	0 ppb

24 HR AVERAGES November 2018



SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)



Wind: LICA ST. LINA
 Poll.: LICA ST. LINA-SO2[ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 0.00%

Calm Avg: 0.00 [ppb]

Direction	0.0-0.8	0.8-1.6	1.6-2.4	2.4-3.2	3.2-4.0	>4.0	Total
N	12.5	0.5	0.0	0.0	0.0	0.0	13.0
NE	7.1	0.0	0.0	0.0	0.0	0.0	7.1
E	7.7	0.3	0.0	0.0	0.0	0.0	8.0
SE	18.4	0.6	0.0	0.0	0.0	0.0	19.0
S	13.9	0.8	0.0	0.0	0.0	0.0	14.7
SW	12.4	2.6	0.6	0.2	0.0	0.0	15.7
W	7.9	0.3	0.5	0.0	0.0	0.0	8.6
NW	13.7	0.2	0.0	0.0	0.0	0.0	13.9
Summary	93.5	5.2	1.1	0.2	0.0	0.0	100.0

% Icon Classes (ppb)

94 0.0-0.8

5 0.8-1.6

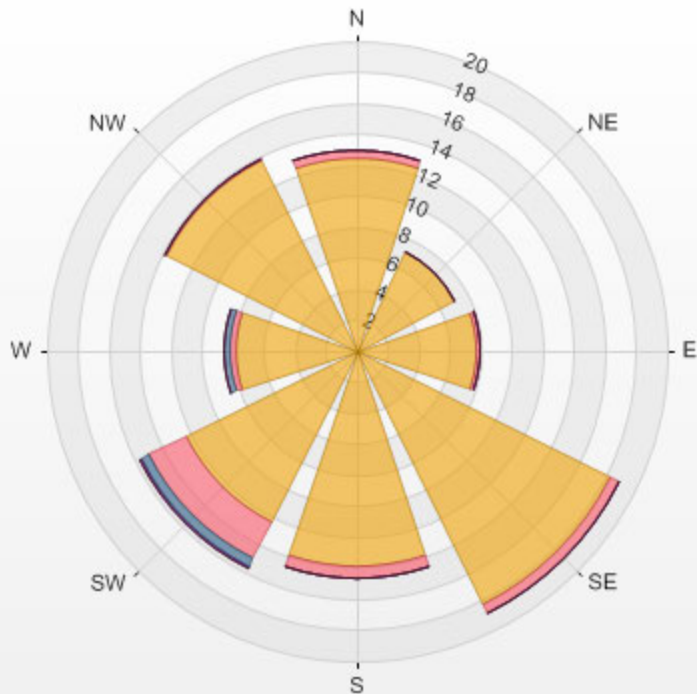
1 1.6-2.4

0 2.4-3.2

0 3.2-4.0

0 >4.0

LICA ST. LINA Poll.: LICA ST. LINA-SO₂[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 0.00%



SO2[ppb] Calibration: LICA ST. LINA Monthly: 18/11 Type: Span



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	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
2	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	24
3	S	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	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	S	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	S	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	S	0	0	0	0	0	24
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	S	0	0	0	0	0	0	0	0	24
9	0	0	0	0	0	0	0	0	S1	S1	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	22
10	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
11	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
12	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	X	X	X	X	X	X	X	X	0	0	17
13	X	X	X	X	X	X	X	X	X	0	0	0	0	S	C	C	C	C	C	0	0	0	0	0	0	0	0	15
14	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
15	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	S	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	S	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	S	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	S	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	S	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	S	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	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
23	0	0	0	S	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	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
25	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	24
26	S	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	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	S	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	S	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	S	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	S	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	
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	

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

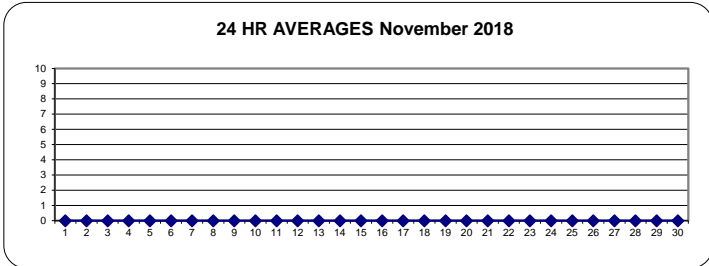
OBJECTIVE LIMIT:

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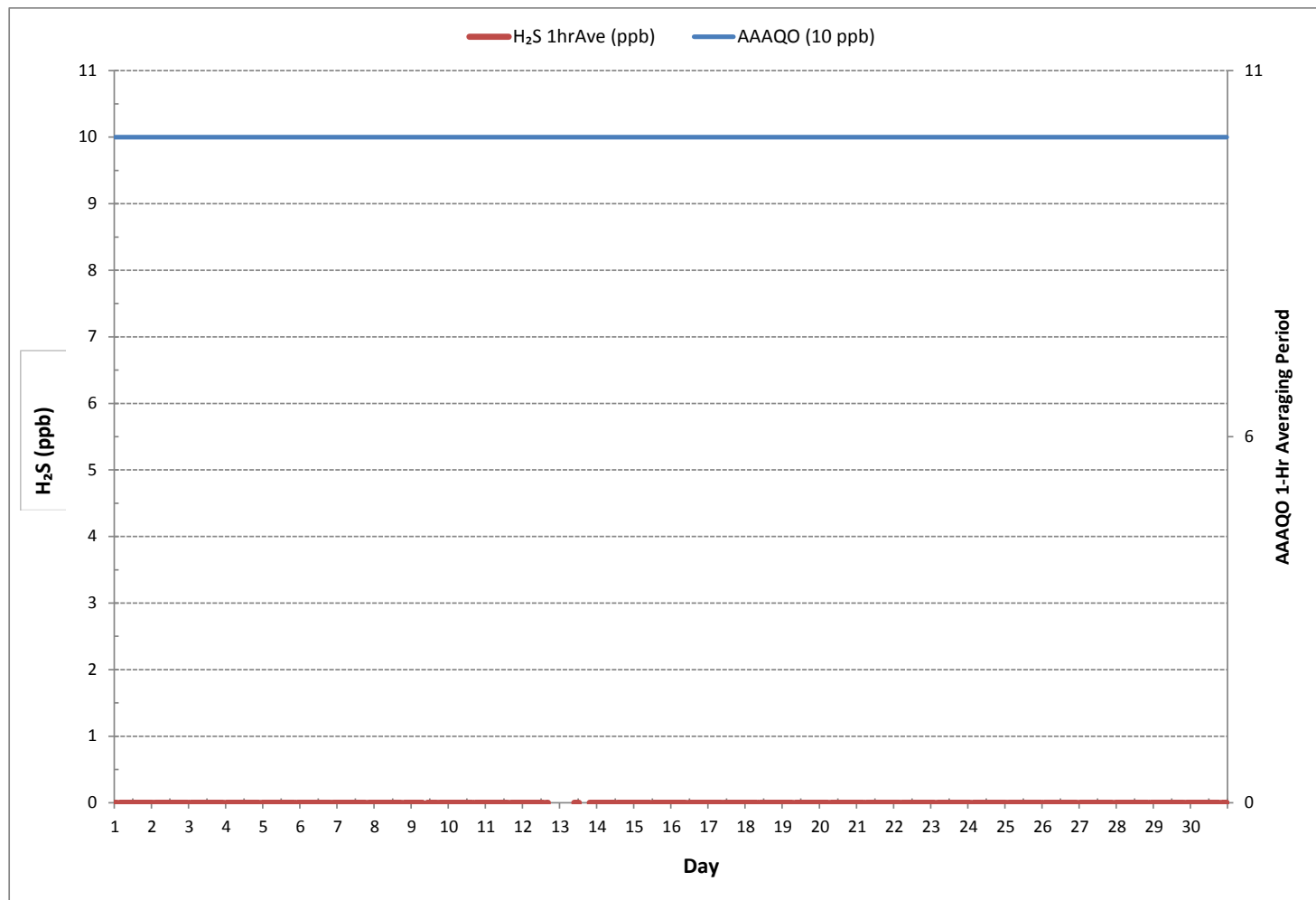
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	0				
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0	ON DAY	1	
MAXIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0	ON DAY	1	
MAXIMUM 24-HR AVERAGE:	0 ppb		ON DAY	1	
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	702	hrs
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:	97.5	%
STANDARD DEVIATION:	0		MONTHLY AVERAGE:	0	ppb

24 HR AVERAGES November 2018



HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)



Wind: LICA ST. LINA
 Poll.: LICA ST. LINA-H2S[ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 0.00% Calm Avg: 0.00 [ppb]

Direction	0.0-0.7	0.7-1.3	1.3-2.0	>2.0	Total
N	13.1	0.0	0.0	0.0	13.1
NE	7.1	0.0	0.0	0.0	7.1
E	8.0	0.0	0.0	0.0	8.0
SE	19.0	0.0	0.0	0.0	19.0
S	14.2	0.0	0.0	0.0	14.2
SW	15.8	0.0	0.0	0.0	15.8
W	8.7	0.0	0.0	0.0	8.7
NW	14.1	0.0	0.0	0.0	14.1
Summary	100.0	0.0	0.0	0.0	100.0

% Icon Classes (ppb)

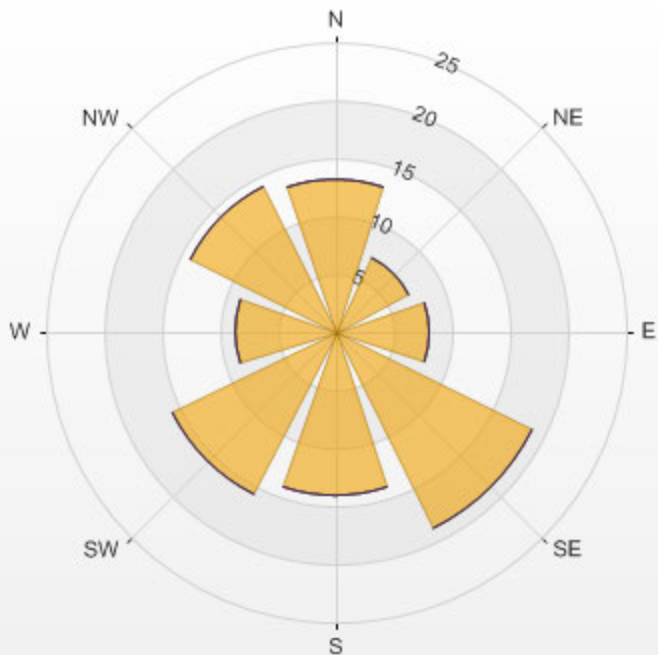
100 0.0-0.7

0 0.7-1.3

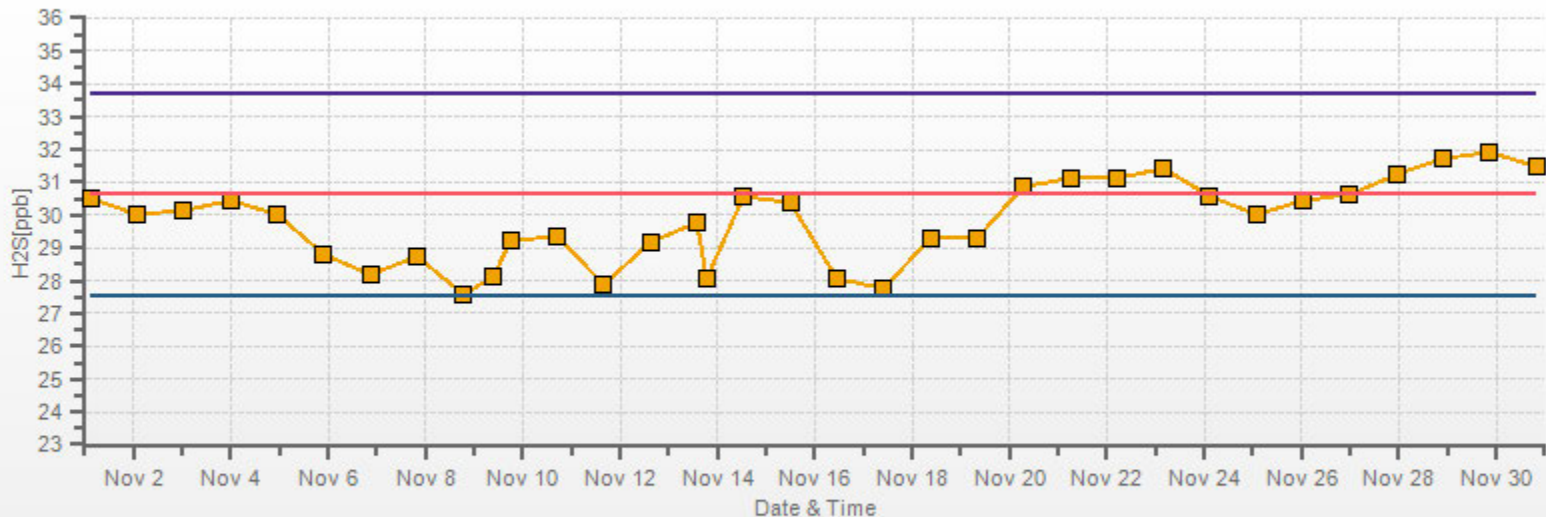
0 1.3-2.0

0 >2.0

LICA ST. LINA Poll.: LICA ST. LINA-H2S[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 0.00%



H2S[ppb] Calibration: LICA ST. LINA Monthly: 18/11 Type: Span



TOTAL HYDROCARBON



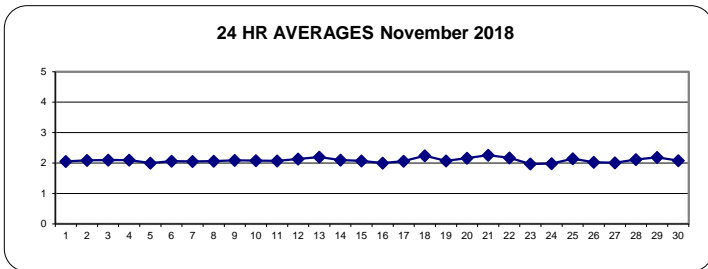
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

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	2.13	2.13	S	2.02	2.05	2.04	2.01	2.01	2.01	2.01	2.01	2.01	2.03	2.01	2.03	2.05	2.12	2.06	2.06	2.11	2.07	2.15	2.07	2.08	2.01	2.15	2.05	24	
2	2.15	S	2.12	2.14	2.10	2.13	2.15	2.15	2.15	2.12	2.10	2.06	2.03	2.03	2.03	2.03	2.04	2.10	2.08	2.09	2.08	2.07	2.09	2.03	2.03	2.15	2.09	24	
3	S	2.05	2.05	2.05	2.04	2.04	2.04	2.04	2.05	2.05	2.07	2.07	2.09	2.11	2.13	2.14	2.14	2.16	2.18	2.20	2.16	2.16	2.15	S	2.04	2.20	2.10	24	
4	2.21	2.18	2.15	2.19	2.22	2.22	2.22	2.16	2.12	2.09	2.08	2.05	2.05	2.04	2.07	2.08	2.06	2.03	2.02	2.01	2.01	2.00	S	2.00	2.00	2.22	2.10	24	
5	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.01	2.01	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	S	2.00	2.00	2.01	2.00	24	
6	2.01	2.02	2.02	2.03	2.03	2.04	2.04	2.03	2.04	2.07	2.09	2.05	2.04	2.04	2.04	2.04	2.08	2.10	2.23	2.09	S	2.05	2.02	2.12	2.01	2.23	2.06	24	
7	2.18	2.10	2.03	2.02	2.04	2.02	2.06	2.06	2.08	2.08	2.04	2.04	2.01	2.02	2.03	2.04	2.04	2.09	2.16	S	2.03	2.03	2.04	2.04	2.01	2.18	2.05	24	
8	2.10	2.08	2.04	2.07	2.09	2.07	2.07	2.03	2.02	2.04	2.07	2.04	2.04	2.02	2.02	2.02	2.02	2.02	2.09	S	2.09	2.07	2.08	2.09	2.07	2.02	2.10	2.06	24
9	2.06	2.07	2.08	2.08	2.09	2.08	2.08	2.08	2.08	2.08	2.07	2.07	2.08	2.08	2.08	2.08	2.09	S	2.13	2.11	2.10	2.09	2.08	2.10	2.06	2.13	2.09	24	
10	2.08	2.07	2.06	2.06	2.04	2.02	2.02	2.04	2.05	2.05	2.05	2.04	2.04	2.92	2.06	2.08	S	2.01	2.02	2.01	2.02	2.02	2.01	2.01	2.01	2.92	2.08	24	
11	2.02	2.01	2.03	2.05	2.11	2.03	2.03	2.02	2.02	2.03	2.02	2.03	2.04	2.04	2.06	S	2.28	2.26	2.04	2.03	2.23	2.08	2.07	2.10	2.01	2.28	2.07	24	
12	2.10	2.08	2.08	2.06	2.07	2.09	2.08	2.10	2.17	2.20	2.20	2.19	2.17	2.15	S	2.15	2.16	X	X	X	X	X	X	X	2.06	2.20	2.13	17	
13	X	X	X	X	X	X	X	X	X	2.20	2.22	2.24	2.23	S	2.16	2.15	2.16	2.17	2.18	2.20	2.24	2.24	2.25	2.22	2.15	2.25	2.20	15	
14	2.14	2.27	2.15	2.21	2.21	2.18	2.20	2.21	2.17	2.15	2.09	2.04	S	2.00	1.99	2.00	2.00	1.99	2.01	2.03	2.02	2.06	2.02	2.05	1.99	2.27	2.10	24	
15	2.02	2.08	2.03	2.06	2.03	2.05	2.08	2.07	2.08	2.08	S	2.15	2.12	2.10	2.09	2.10	2.06	2.04	2.03	2.03	2.04	2.07	2.07	2.02	2.02	2.15	2.07	24	
16	2.08	2.03	2.02	2.02	2.01	2.01	2.01	2.02	2.02	2.03	S	2.03	C	C	C	C	1.95	1.95	1.97	1.97	1.98	1.99	1.99	1.98	1.95	2.08	2.00	24	
17	1.98	1.97	1.98	1.99	1.99	2.00	2.00	2.01	2.02	S	2.05	2.07	2.06	2.05	2.06	2.07	2.08	2.07	2.11	2.08	2.21	2.16	2.16	2.19	1.97	2.21	2.06	24	
18	2.25	2.11	2.04	2.05	2.19	2.63	2.65	2.54	S	2.67	2.80	2.71	2.11	2.10	2.10	2.13	2.08	2.07	2.11	2.10	2.10	2.04	2.00	2.02	2.00	2.80	2.24	24	
19	2.07	2.06	2.08	2.12	2.09	2.13	2.18	S	2.16	2.15	2.16	2.15	2.14	2.12	2.08	2.04	2.01	2.02	2.01	1.97	1.96	1.95	1.95	1.95	1.95	2.18	2.07	24	
20	1.95	1.96	1.98	1.99	1.97	1.97	S	2.09	2.04	2.04	2.01	2.18	2.29	2.18	2.25	2.27	2.30	2.32	2.53	2.41	2.30	2.27	2.25	2.18	1.95	2.53	2.16	24	
21	2.14	2.10	2.13	2.20	2.25	S	2.28	2.29	2.31	2.32	2.32	2.29	2.23	2.21	2.24	2.35	2.36	2.33	2.30	2.26	2.23	2.24	2.32	2.32	2.10	2.36	2.26	24	
22	2.32	2.28	2.26	2.29	S	2.32	2.34	2.34	2.25	2.17	2.16	2.24	2.22	2.18	2.14	2.09	2.04	2.04	2.03	2.03	1.99	1.98	2.06	2.09	1.98	2.34	2.17	24	
23	2.11	2.03	2.08	S	1.98	1.98	1.96	1.99	1.97	1.97	1.97	1.98	1.96	1.95	1.94	1.93	1.93	1.94	1.94	1.96	1.94	1.94	1.94	1.93	2.11	1.97	24		
24	1.96	1.96	S	1.96	1.99	1.98	2.00	1.98	1.98	2.00	1.97	1.96	1.96	1.97	1.95	1.94	1.95	1.98	2.03	2.01	2.01	2.00	2.02	2.03	1.94	2.03	1.98	24	
25	2.06	S	2.08	2.11	2.11	2.12	2.11	2.13	2.21	2.25	2.24	2.25	2.25	2.18	2.14	2.13	2.10	2.11	2.10	2.16	2.12	2.07	2.07	2.05	2.05	2.25	2.14	24	
26	S	2.07	2.08	2.08	2.06	2.06	2.04	2.03	2.02	2.05	2.07	2.11	2.08	2.07	2.06	2.03	2.01	1.99	1.98	1.97	1.97	1.97	S	1.97	2.11	2.03	24		
27	1.97	1.97	1.99	2.00	1.99	1.99	2.02	2.04	2.00	2.02	2.00	1.98	1.99	1.99	1.99	2.00	2.06	2.05	2.02	2.01	2.02	2.03	S	2.02	1.97	2.06	2.01	24	
28	2.03	2.07	2.06	2.11	2.15	2.15	2.17	2.19	2.17	2.17	2.12	2.07	2.03	2.03	2.05	2.09	2.12	2.13	2.14	2.16	2.14	S	2.17	2.18	2.03	2.19	2.12	24	
29	2.20	2.18	2.20	2.21	2.21	2.23	2.27	2.31	2.31	2.31	2.28	2.26	2.20	2.17	2.16	2.13	2.12	2.11	2.13	2.12	S	2.10	2.11	2.08	2.08	2.31	2.19	24	
30	2.02	2.17	2.09	2.09	2.11	2.09	2.14	2.15	2.16	2.14	2.12	2.02	2.01	2.05	2.03	2.04	2.00	1.98	1.97	S	1.97	2.16	2.23	2.17	1.97	2.23	2.08	24	
HOURLY MAX	2.32	2.28	2.26	2.29	2.25	2.63	2.65	2.54	2.31	2.67	2.80	2.71	2.29	2.92	2.25	2.35	2.36	2.33	2.53	2.41	2.30	2.27	2.32	2.32					
HOURLY AVG	2.09	2.08	2.07	2.08	2.08	2.10	2.12	2.11	2.10	2.12	2.12	2.11	2.09	2.10	2.07	2.08	2.08	2.07	2.09	2.08	2.08	2.07	2.08	2.08					

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 2018



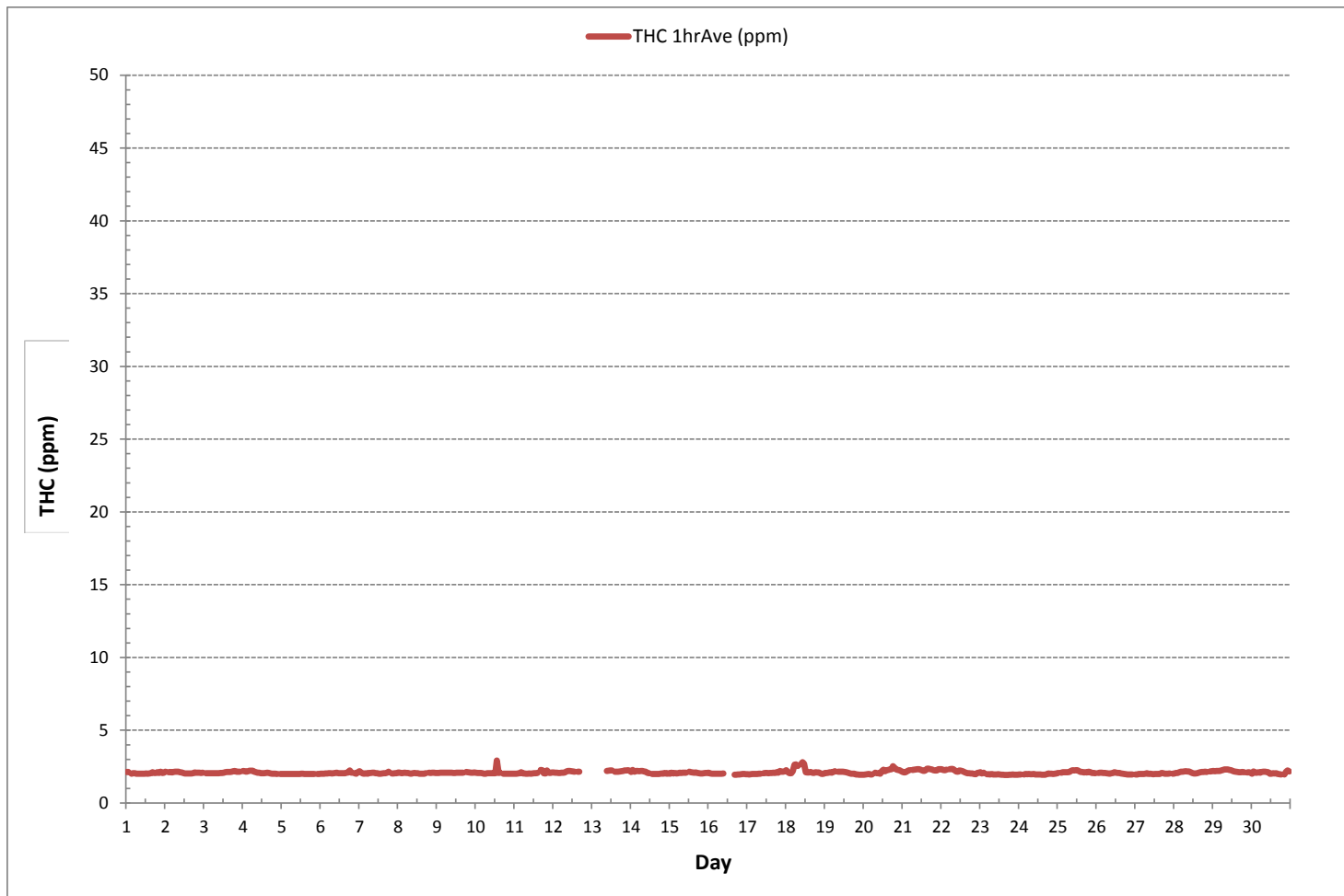
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	668			
MINIMUM 1-HR AVERAGE:	1.93 ppm	@ HOUR	15	ON DAY 23
MAXIMUM 1-HR AVERAGE:	2.92 ppm	@ HOUR	13	ON DAY 10
MAXIMUM 24-HR AVERAGE:	2.26 ppm			ON DAY 21
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	704 hrs	
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	97.8 %	
STANDARD DEVIATION:	0.11	MONTHLY AVERAGE:	2.09 ppm	



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2018

TOTAL HYDROCARBONS Hourly Averages (THC ppm)



% Icon Classes (ppm)

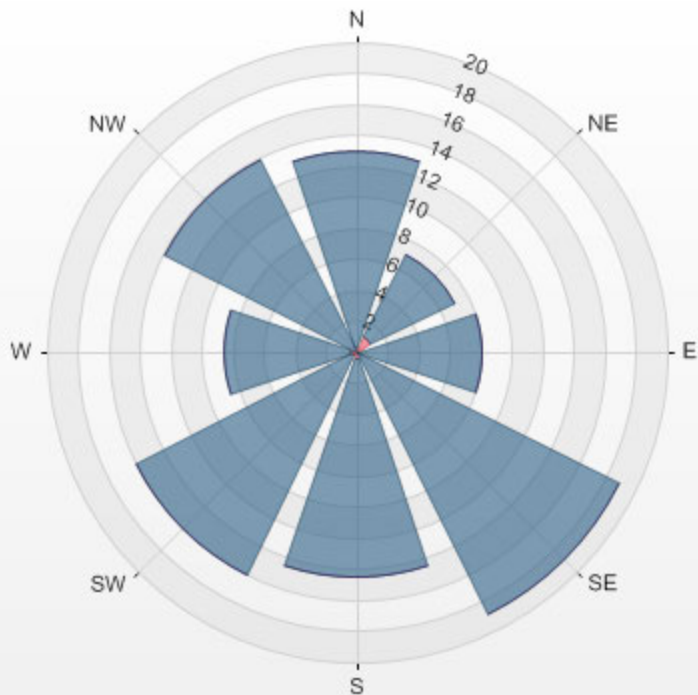
0 0.0-1.0

3 1.0-2.0

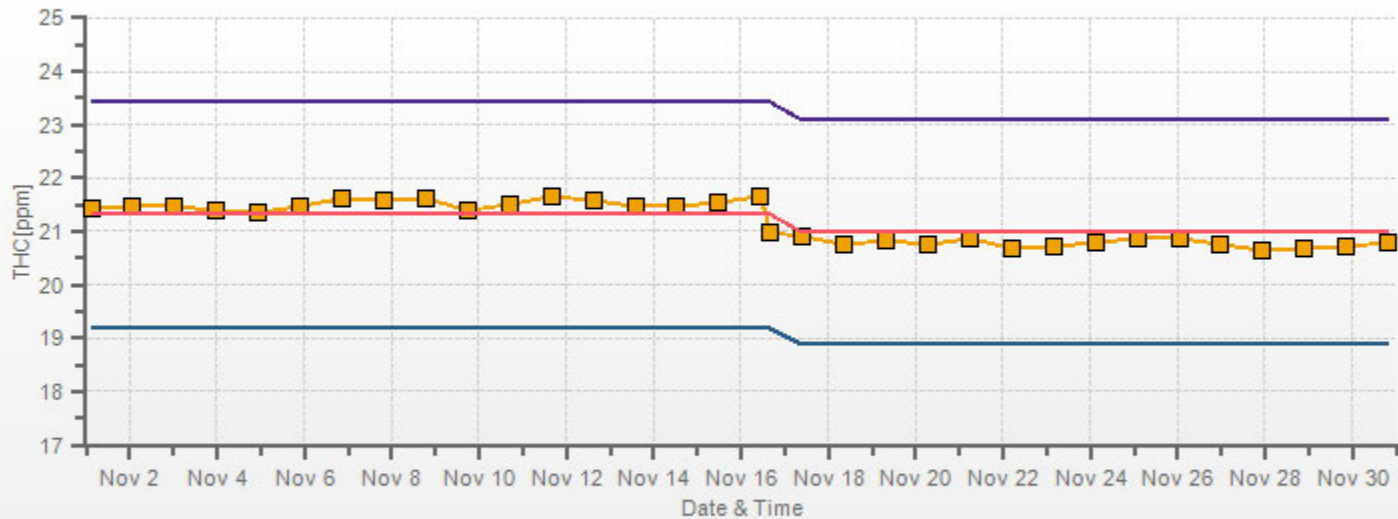
97 2.0-2.9

0 >2.9

LICA ST. LINA Poll.: LICA ST. LINA-THC[ppm] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 0.00%



THC[ppm] Calibration: LICA ST. LINA Monthly: 18/11 Type: Span



METHANE



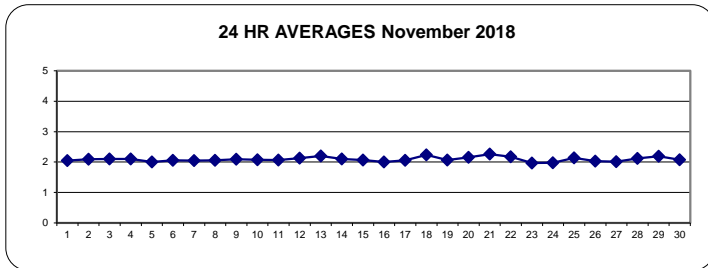
METHANE Hourly Averages (CH₄ ppm)

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	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	2.13	2.13	S	2.02	2.05	2.04	2.01	2.01	2.01	2.01	2.01	2.01	2.03	2.01	2.03	2.05	2.12	2.06	2.06	2.11	2.07	2.15	2.07	2.08	2.01	2.15	2.05	24
2	2.15	S	2.12	2.14	2.10	2.13	2.15	2.15	2.15	2.12	2.10	2.06	2.03	2.03	2.03	2.03	2.04	2.10	2.08	2.09	2.08	2.07	2.09	2.03	2.03	2.15	2.09	24
3	S	2.05	2.05	2.05	2.04	2.04	2.04	2.04	2.05	2.05	2.07	2.07	2.09	2.11	2.13	2.14	2.14	2.16	2.18	2.20	2.16	2.16	2.15	S	2.04	2.20	2.10	24
4	2.21	2.18	2.15	2.19	2.22	2.22	2.22	2.16	2.12	2.09	2.08	2.05	2.05	2.04	2.07	2.08	2.06	2.03	2.02	2.01	2.01	2.00	S	2.00	2.00	2.22	2.10	24
5	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.01	2.01	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	S	2.00	2.00	2.01	2.00	24
6	2.01	2.02	2.02	2.03	2.03	2.04	2.04	2.03	2.04	2.07	2.09	2.05	2.04	2.04	2.04	2.04	2.08	2.10	2.23	2.09	S	2.05	2.02	2.12	2.01	2.23	2.06	24
7	2.18	2.10	2.03	2.02	2.04	2.02	2.06	2.06	2.08	2.08	2.04	2.04	2.01	2.02	2.03	2.04	2.04	2.09	2.16	S	2.03	2.03	2.04	2.04	2.01	2.18	2.05	24
8	2.10	2.08	2.04	2.07	2.09	2.07	2.07	2.03	2.02	2.04	2.07	2.04	2.04	2.02	2.02	2.02	2.02	2.02	S	2.09	2.07	2.08	2.09	2.07	2.02	2.10	2.06	24
9	2.06	2.07	2.08	2.08	2.09	2.08	2.08	2.08	2.08	2.08	2.07	2.07	2.08	2.08	2.08	2.08	2.09	S	2.13	2.11	2.10	2.09	2.08	2.10	2.06	2.13	2.09	24
10	2.08	2.07	2.06	2.06	2.04	2.02	2.02	2.04	2.05	2.05	2.05	2.04	2.04	2.90	2.06	2.08	S	2.01	2.02	2.01	2.02	2.02	2.01	2.01	2.01	2.90	2.08	24
11	2.02	2.01	2.03	2.05	2.11	2.03	2.03	2.02	2.02	2.03	2.02	2.03	2.04	2.04	2.06	S	2.28	2.26	2.04	2.03	2.23	2.08	2.07	2.10	2.01	2.28	2.07	24
12	2.10	2.08	2.08	2.06	2.07	2.09	2.08	2.10	2.17	2.20	2.20	2.19	2.17	2.15	S	2.15	2.16	X	X	X	X	X	X	X	2.06	2.20	2.13	17
13	X	X	X	X	X	X	X	X	X	2.20	2.22	2.24	2.23	S	2.16	2.15	2.16	2.17	2.18	2.20	2.24	2.24	2.25	2.22	2.15	2.25	2.20	15
14	2.14	2.27	2.15	2.21	2.21	2.18	2.20	2.21	2.17	2.15	2.09	2.04	S	2.00	1.99	2.00	2.00	1.99	2.01	2.03	2.02	2.06	2.02	2.05	1.99	2.27	2.10	24
15	2.02	2.08	2.03	2.06	2.03	2.05	2.08	2.07	2.08	2.08	S	2.15	2.12	2.10	2.09	2.10	2.06	2.04	2.03	2.03	2.04	2.07	2.07	2.02	2.02	2.15	2.07	24
16	2.08	2.03	2.02	2.02	2.01	2.01	2.01	2.01	2.02	2.03	S	2.03	C	C	C	C	1.95	1.95	1.97	1.97	1.98	1.99	1.99	1.98	1.95	2.08	2.00	24
17	1.98	1.97	1.98	1.99	1.99	2.00	2.00	2.01	2.02	S	2.05	2.07	2.06	2.05	2.06	2.07	2.08	2.07	2.11	2.08	2.21	2.16	2.16	2.19	1.97	2.21	2.06	24
18	2.25	2.11	2.04	2.05	2.19	2.62	2.65	2.54	S	2.67	2.80	2.71	2.11	2.10	2.10	2.13	2.08	2.07	2.11	2.10	2.10	2.04	2.00	2.02	2.00	2.80	2.24	24
19	2.07	2.06	2.08	2.12	2.09	2.13	2.18	S	2.16	2.15	2.16	2.15	2.14	2.12	2.08	2.04	2.01	2.02	2.01	1.97	1.96	1.95	1.95	1.95	1.95	2.18	2.07	24
20	1.95	1.96	1.98	1.99	1.97	1.97	S	2.09	2.04	2.04	2.01	2.18	2.29	2.18	2.25	2.27	2.30	2.32	2.53	2.41	2.30	2.27	2.25	2.18	1.95	2.53	2.16	24
21	2.14	2.10	2.13	2.20	2.25	S	2.28	2.29	2.31	2.32	2.32	2.29	2.23	2.21	2.24	2.35	2.36	2.33	2.30	2.26	2.23	2.24	2.32	2.32	2.10	2.36	2.26	24
22	2.32	2.28	2.26	2.29	S	2.32	2.33	2.34	2.25	2.17	2.16	2.24	2.22	2.18	2.14	2.09	2.04	2.04	2.03	2.03	1.99	1.98	2.06	2.09	1.98	2.34	2.17	24
23	2.11	2.03	2.08	S	1.98	1.98	1.96	1.99	1.97	1.97	1.97	1.98	1.96	1.95	1.94	1.93	1.93	1.94	1.94	1.96	1.94	1.94	1.94	1.93	2.11	1.97	24	
24	1.96	1.96	S	1.96	1.99	1.98	2.00	1.98	1.98	2.00	1.97	1.96	1.96	1.97	1.95	1.94	1.95	1.98	2.03	2.01	2.01	2.00	2.02	2.03	1.94	2.03	1.98	24
25	2.06	S	2.08	2.11	2.11	2.12	2.11	2.13	2.21	2.25	2.24	2.25	2.25	2.18	2.14	2.13	2.10	2.11	2.10	2.16	2.12	2.07	2.07	2.05	2.05	2.25	2.14	24
26	S	2.07	2.08	2.08	2.06	2.06	2.04	2.03	2.02	2.05	2.07	2.11	2.08	2.07	2.06	2.03	2.01	1.99	1.98	1.97	1.97	1.97	S	1.97	2.11	2.03	24	
27	1.97	1.97	1.99	2.00	1.99	1.99	2.02	2.04	2.00	2.02	2.00	1.98	1.99	1.99	1.99	2.00	2.06	2.05	2.02	2.01	2.02	2.03	S	2.02	1.97	2.06	2.01	24
28	2.03	2.07	2.06	2.11	2.15	2.15	2.17	2.19	2.17	2.17	2.12	2.07	2.03	2.03	2.05	2.09	2.12	2.13	2.14	2.16	2.14	S	2.17	2.18	2.03	2.19	2.12	24
29	2.20	2.18	2.20	2.21	2.21	2.23	2.27	2.31	2.31	2.31	2.28	2.26	2.20	2.17	2.16	2.13	2.12	2.11	2.13	2.12	S	2.10	2.11	2.08	2.08	2.31	2.19	24
30	2.02	2.17	2.09	2.09	2.11	2.09	2.14	2.15	2.16	2.14	2.12	2.02	2.01	2.05	2.03	2.04	2.00	1.98	1.97	S	1.97	2.16	2.23	2.17	1.97	2.23	2.08	24
HOURLY MAX	2.32	2.28	2.26	2.29	2.25	2.62	2.65	2.54	2.31	2.67	2.80	2.71	2.29	2.90	2.25	2.35	2.36	2.33	2.53	2.41	2.30	2.27	2.32	2.32				
HOURLY AVG	2.09	2.08	2.07	2.08	2.08	2.10	2.12	2.11	2.10	2.12	2.12	2.11	2.09	2.10	2.07	2.08	2.08	2.07	2.09	2.08	2.08	2.07	2.08	2.08				

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

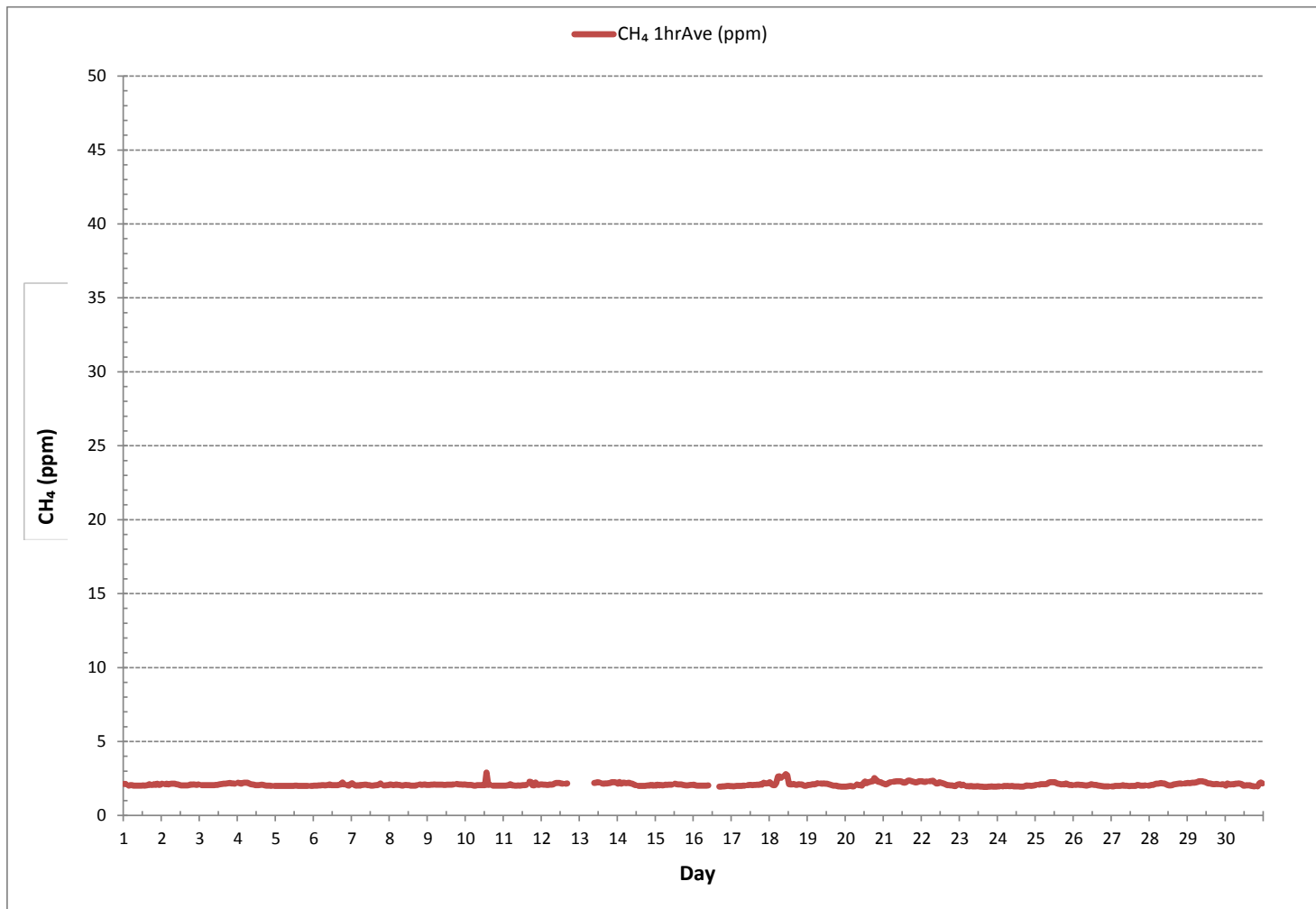
24 HR AVERAGES November 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	668			
MINIMUM 1-HR AVERAGE:	1.93 ppm	@ HOUR	15	ON DAY 23
MAXIMUM 1-HR AVERAGE:	2.90 ppm	@ HOUR	13	ON DAY 10
MAXIMUM 24-HR AVERAGE:	2.26 ppm			ON DAY 21
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	704	hrs
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	97.8	%
STANDARD DEVIATION:	0.11	MONTHLY AVERAGE:	2.09	ppm

METHANE Hourly Averages (CH₄ ppm)



% Icon Classes (ppm)

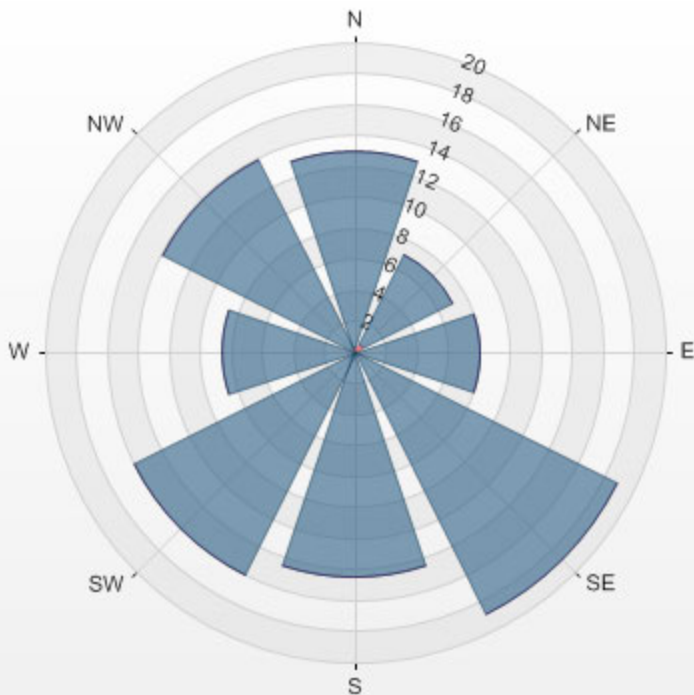
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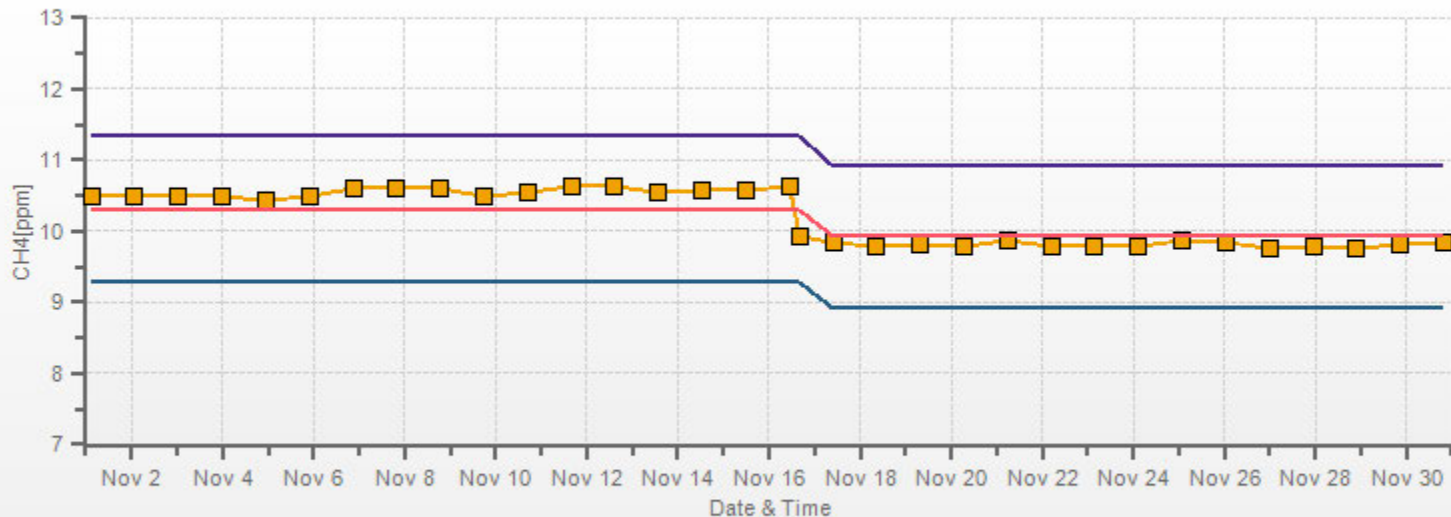
99 1.9-2.9

0 >2.9

LICA ST. LINA Poll.: LICA ST. LINA-CH4[ppm] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 0.00%



CH4[ppm] Calibration: LICA ST. LINA Monthly: 18/11 Type: Span



NON-METHANE HYDROCARBON

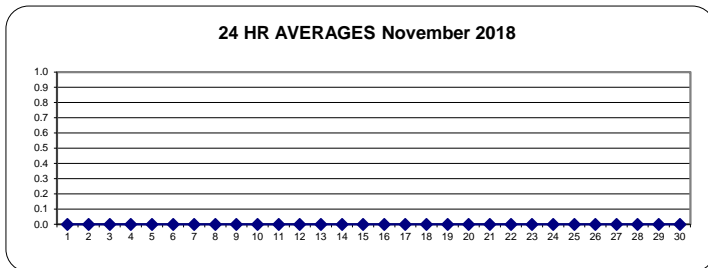


NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

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	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	0.00	24
2	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	0.00	0.00	24
3	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
4	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	0.00	24
5	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
6	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	0.00	24
7	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	0.00	0.00	24
8	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	0.00	0.00	0.00	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	S	0.00	0.00	0.00	0.00	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	0.02	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	24
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	24
12	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	X	X	X	X	X	X	X	0.00	0.00	0.00	17
13	X	X	X	X	X	X	X	X	X	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	15
14	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	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	24
16	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	C	C	C	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
17	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	0.00	0.00	0.00	0.00	0.00	24
18	0.00	0.00	0.00	0.00	0.00	0.01	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	0.01	0.00	24
19	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
20	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	0.00	0.00	24
21	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	0.00	0.00	24
22	0.00	0.00	0.00	0.00	S	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24
23	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
24	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	0.00	24
25	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	0.00	0.00	24
26	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
27	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	0.00	24
28	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
29	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	0.00	24
30	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	0.00	0.00	24
HOURLY MAX	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	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
HOURLY AVG	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	0.00				

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



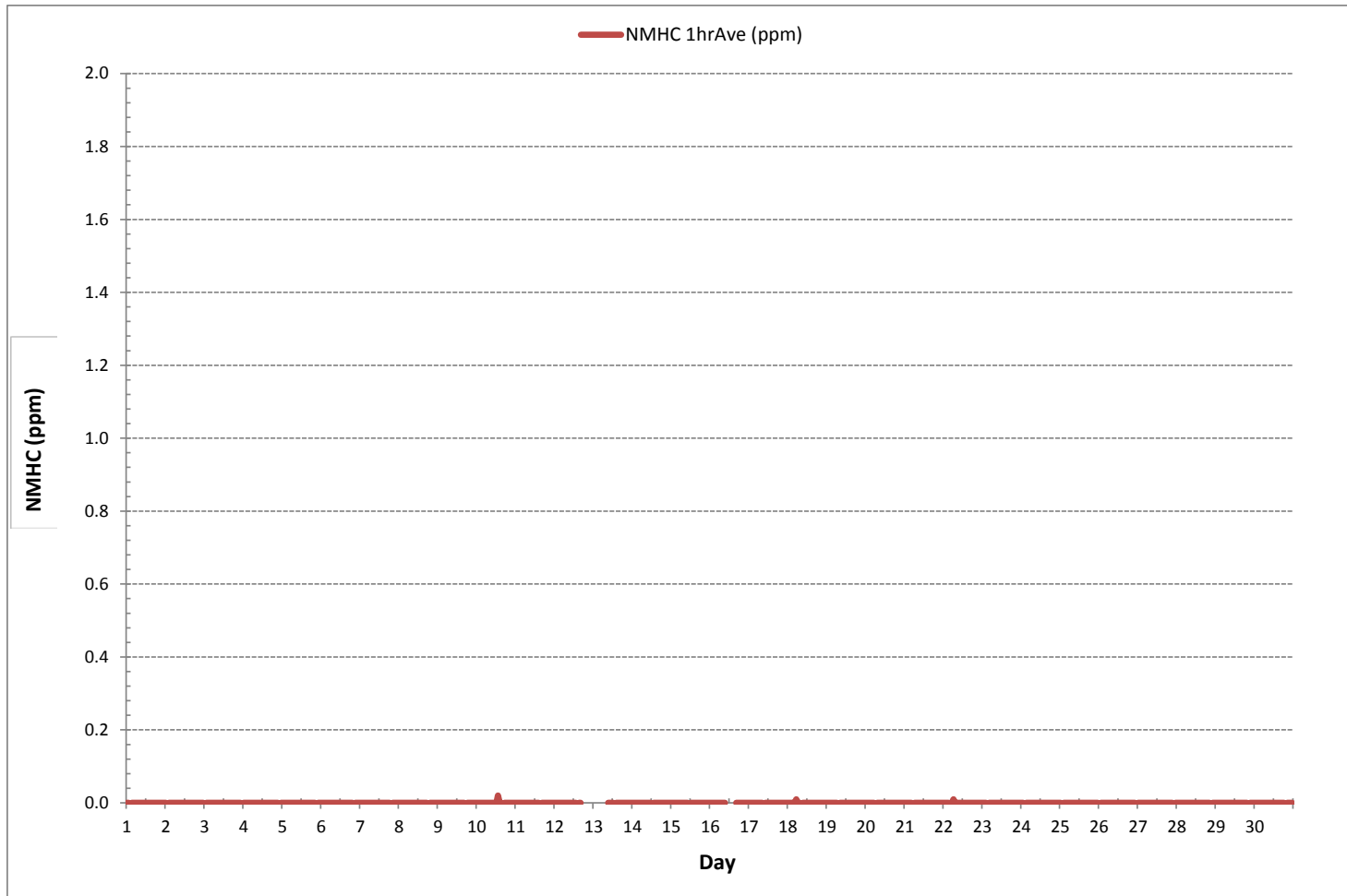
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	3
MINIMUM 1-HR AVERAGE:	0.00 ppm @ HOUR 0 ON DAY 1
MAXIMUM 1-HR AVERAGE:	0.02 ppm @ HOUR 13 ON DAY 10
MAXIMUM 24-HR AVERAGE:	0.00 ppm ON DAY 1
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	4 hrs
OPERATIONAL TIME:	704 hrs
AMD OPERATION UPTIME:	97.8 %
STANDARD DEVIATION:	0.00
MONTHLY AVERAGE:	0.00 ppm



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2018

NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)



Wind: LICA ST. LINA
 Poll.: LICA ST. LINA-NMHC[ppm]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

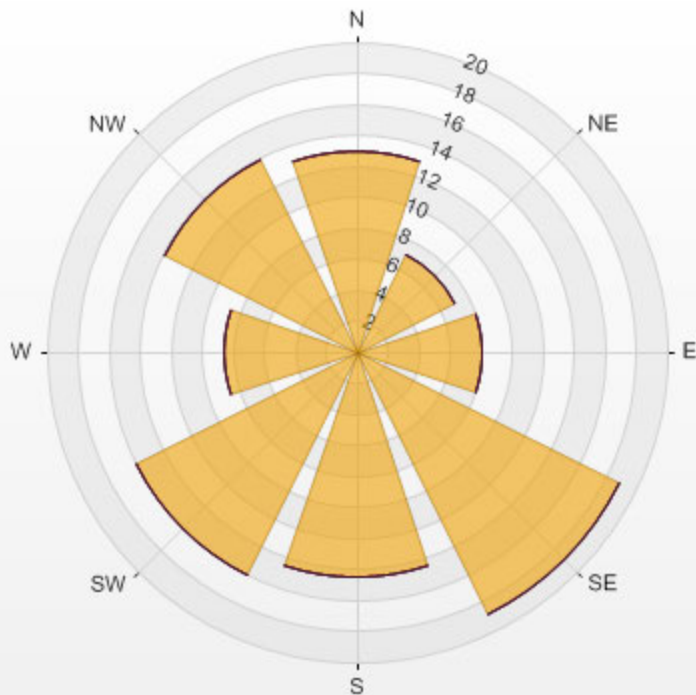
Calm: 0.00%

Calm Avg: 0.00 [ppm]

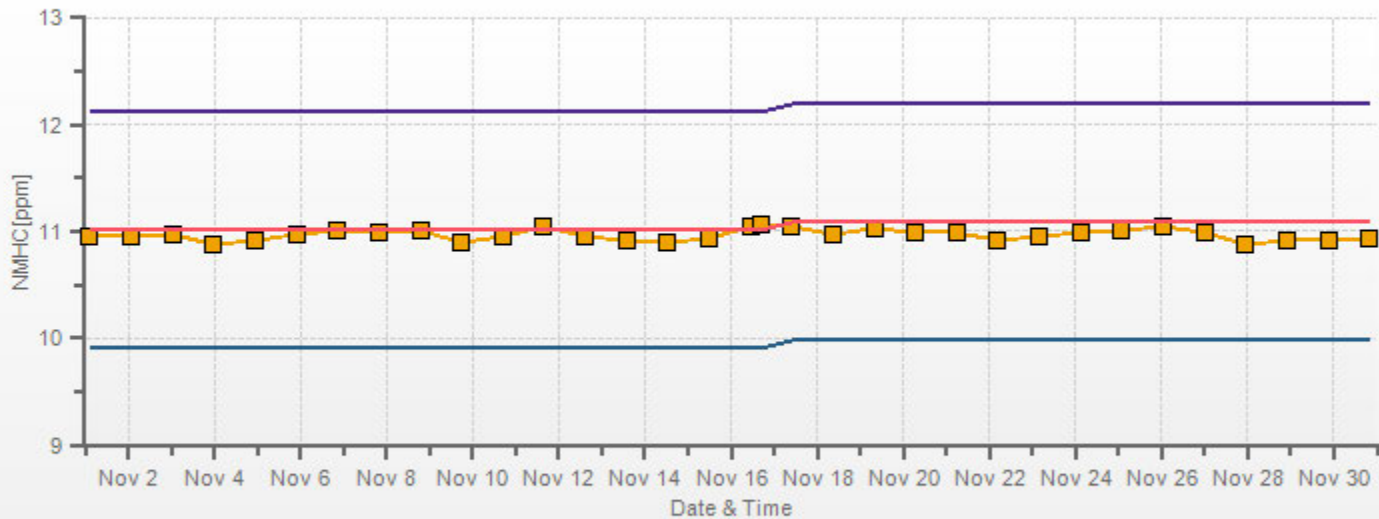
Direction	0-0.08	0.08-0.16	0.16-0.24	0.24-0.32	0.32-0.4	>0.4	Total
N	12.9	0.0	0.0	0.0	0.0	0.0	12.9
NE	7.1	0.0	0.0	0.0	0.0	0.0	7.1
E	8.0	0.0	0.0	0.0	0.0	0.0	8.0
SE	18.9	0.0	0.0	0.0	0.0	0.0	18.9
S	14.6	0.0	0.0	0.0	0.0	0.0	14.6
SW	16.0	0.0	0.0	0.0	0.0	0.0	16.0
W	8.6	0.0	0.0	0.0	0.0	0.0	8.6
NW	13.9	0.0	0.0	0.0	0.0	0.0	13.9
Summary	100.0	0.0	0.0	0.0	0.0	0.0	100.0

% Icon Classes (ppm) 100 0-0.08 0 0.08-0.16 0 0.16-0.24 0 0.24-0.32 0 0.32-0.4 0 >0.4

LICA ST. LINA Poll.: LICA ST. LINA-NMHC[ppm] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 0.00%



NMHC[ppm] Calibration: LICA ST. LINA Monthly: 18/11 Type: Span



OXIDES OF NITROGEN



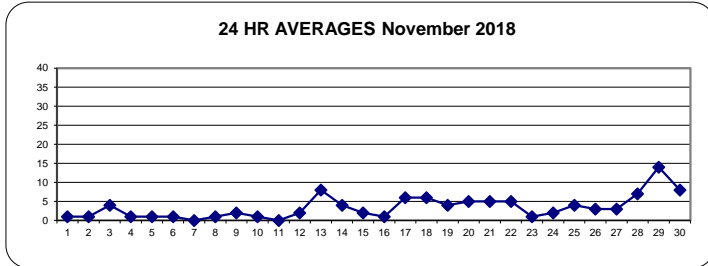
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

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	3	3	S	2	2	3	1	2	2	1	2	1	1	1	1	2	1	1	1	0	1	1	1	1	0	3	1	24	
2	1	S	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	24	
3	S	1	1	1	1	1	1	1	1	2	3	3	5	5	6	7	7	7	7	6	4	4	4	S	1	7	4	24	
4	4	3	3	2	2	2	2	2	1	1	1	1	1	1	2	2	0	0	0	0	0	0	S	1	0	4	1	24	
5	0	1	1	1	0	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	S	2	2	0	2	1	24	
6	2	2	2	2	2	1	1	1	1	1	1	1	0	0	1	1	0	1	1	0	1	S	1	0	0	2	1	24	
7	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	1	0	1	S	1	1	0	1	0	1	0	24	
8	1	2	1	1	2	1	1	0	0	0	0	1	1	1	0	0	0	0	S	2	1	1	1	0	0	2	1	24	
9	0	0	1	1	1	1	1	1	1	2	3	3	3	3	4	4	S	5	4	4	3	2	2	0	5	2	24		
10	2	1	1	1	1	0	0	0	0	0	1	0	0	0	0	1	0	S	2	1	0	0	0	0	0	2	1	24	
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	2	1	0	0	2	1	1	0	2	0	24		
12	1	1	1	0	0	1	1	2	2	2	3	3	3	4	S	6	7	X	X	X	X	X	X	X	0	7	2	17	
13	X	X	X	X	X	X	X	X	X	8	8	11	14	S	8	7	7	10	7	6	7	8	8	8	6	14	8	15	
14	9	6	7	8	8	8	10	9	9	9	5	2	S	1	1	1	1	0	0	0	0	1	1	0	10	4	24		
15	1	1	1	1	1	2	2	3	2	3	4	S	5	3	4	5	5	2	1	0	1	1	2	1	0	5	2	24	
16	1	0	0	0	0	0	0	0	0	0	S	1	C	C	C	C	C	C	C	C	2	2	2	2	0	2	1	24	
17	3	4	5	5	4	3	3	3	4	S	9	9	9	8	7	7	7	6	7	5	6	6	5	4	3	9	6	24	
18	5	4	5	5	9	17	15	11	S	11	11	10	4	4	4	3	3	3	3	2	1	1	1	1	1	17	6	24	
19	1	2	2	2	2	2	3	S	4	4	5	6	6	7	7	6	5	5	5	4	3	3	3	3	1	7	4	24	
20	3	3	3	3	3	3	S	3	4	5	6	7	9	7	7	6	6	6	6	6	5	5	5	5	3	9	5	24	
21	5	5	5	5	5	S	5	5	5	5	5	5	5	5	5	6	7	7	6	6	6	5	5	5	5	7	5	24	
22	5	5	5	5	S	6	6	6	6	6	5	6	6	6	6	6	5	4	4	4	5	3	3	4	5	6	5	24	
23	6	4	3	S	2	2	1	3	2	1	1	1	0	1	0	0	0	0	0	0	1	1	1	1	0	6	1	24	
24	2	2	S	2	2	3	2	2	2	2	2	2	2	2	2	1	1	1	2	1	1	1	1	2	1	3	2	24	
25	2	S	2	2	2	2	2	3	3	4	4	5	5	5	5	5	5	5	5	5	4	4	4	4	2	5	4	24	
26	S	4	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	3	2	2	2	S	2	4	3	24	
27	2	2	2	2	2	2	2	2	2	3	3	3	3	3	2	3	3	3	3	3	3	4	4	S	4	2	4	3	24
28	4	4	4	4	4	4	4	4	4	5	4	4	4	5	7	9	13	14	12	10	10	S	9	9	4	14	7	24	
29	9	9	9	9	9	10	10	11	11	12	14	17	20	19	16	17	19	18	18	19	S	17	16	12	9	20	14	24	
30	7	14	10	12	13	9	10	13	14	13	11	8	8	8	7	7	6	5	4	S	4	5	5	4	4	14	8	24	
HOURLY MAX	9	14	10	12	13	17	15	13	14	13	14	17	20	19	16	17	19	18	18	19	10	17	16	12					
HOURLY AVG	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3					

STATUS FLAG CODES

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

24 HR AVERAGES November 2018

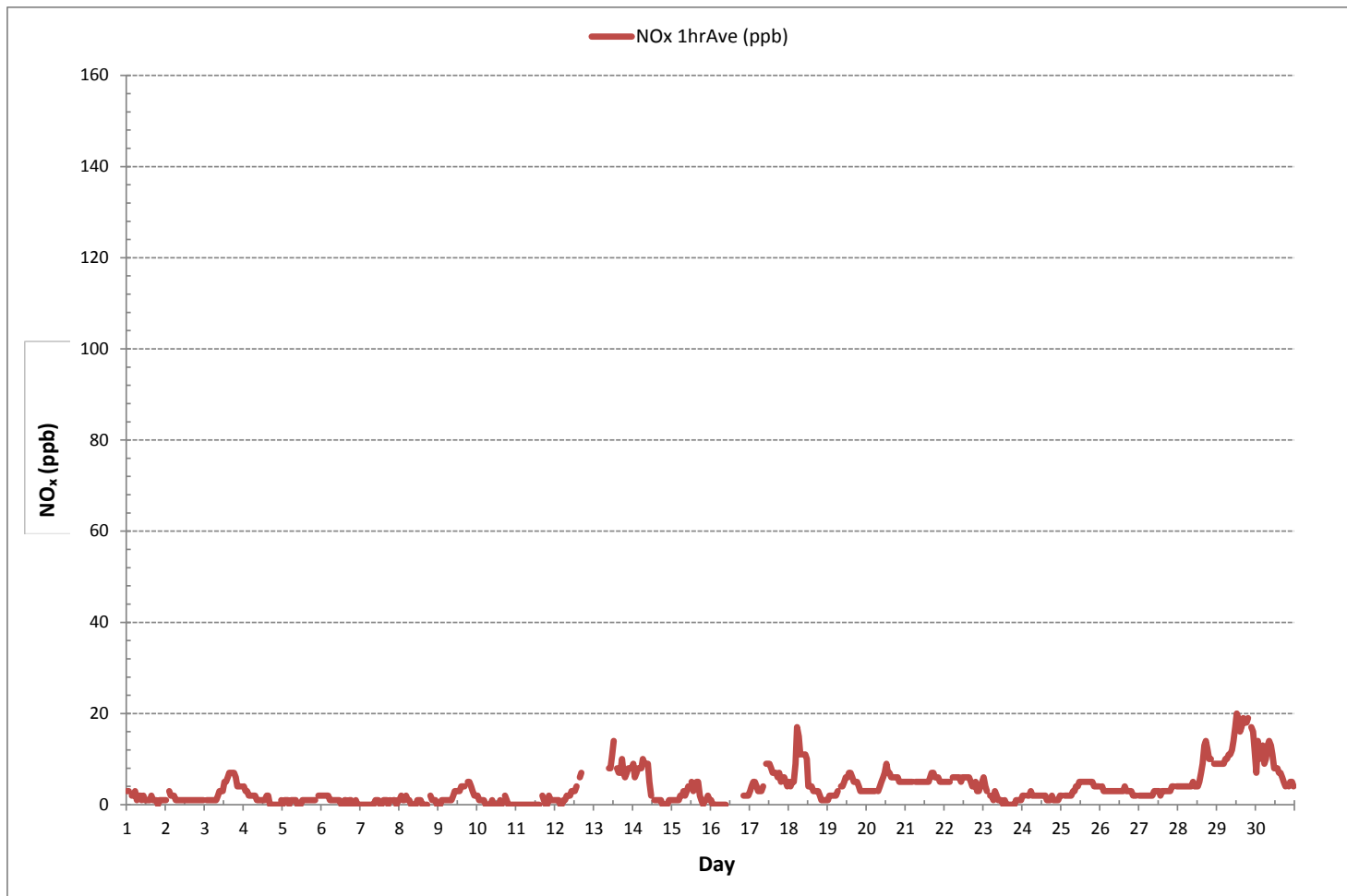


MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	568			
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	19	ON DAY
MAXIMUM 1-HR AVERAGE:	20	ppb @ HOUR	12	ON DAY
MAXIMUM 24-HR AVERAGE:	14	ppb		ON DAY
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	704
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:	97.8
STANDARD DEVIATION:	4		MONTHLY AVERAGE:	3
				ppb



OXIDES OF NITROGEN Hourly Averages (NO_x ppb)



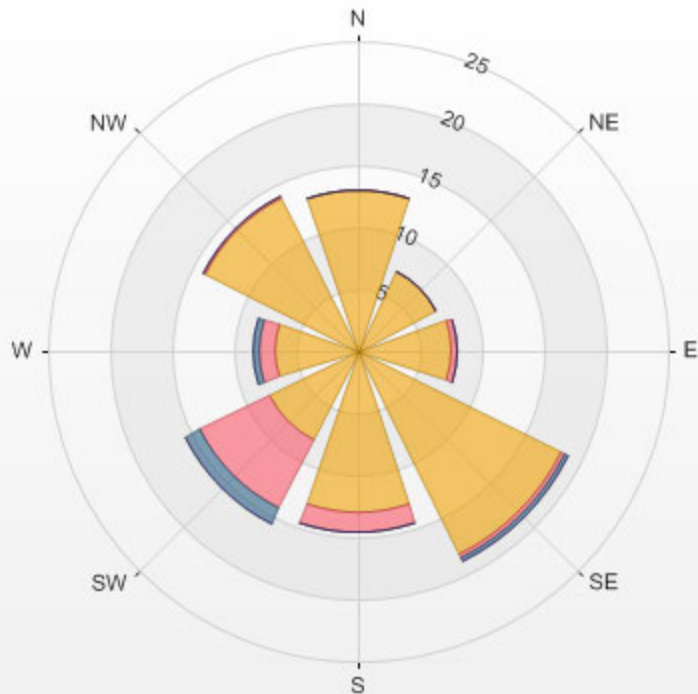
Wind: LICA ST. LINA
 Poll.: LICA ST. LINA-NOX[ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 0.00% Calm Avg: 0.00 [ppb]

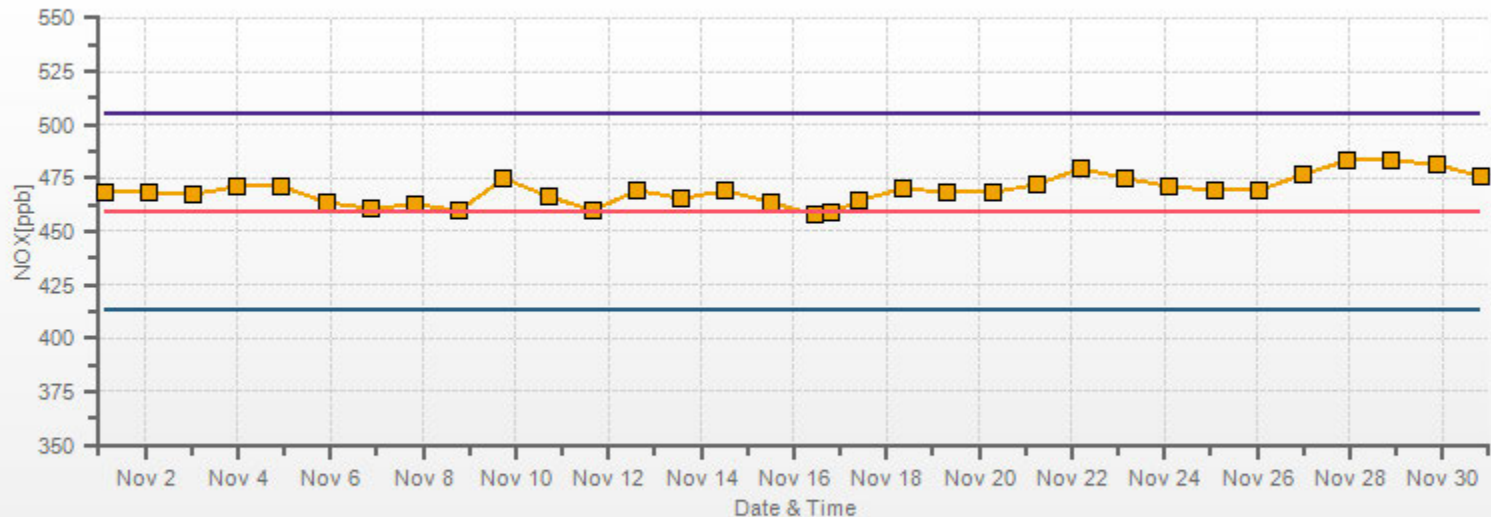
Direction	0.0-7.0	7.0-14.0	14.0-21.0	>21.0	Total
N	13.0	0.0	0.0	0.0	13.0
NE	7.1	0.0	0.0	0.0	7.1
E	7.6	0.5	0.0	0.0	8.1
SE	18.4	0.3	0.3	0.0	19.0
S	13.0	1.7	0.0	0.0	14.7
SW	8.1	6.2	1.4	0.0	15.6
W	6.7	1.4	0.5	0.0	8.5
NW	13.8	0.2	0.0	0.0	13.9
Summary	87.6	10.2	2.2	0.0	100.0

% Icon Classes (ppb) 88 0.0-7.0 10 7.0-14.0 2 14.0-21.0 0 >21.0

LICA ST. LINA Poll.: LICA ST. LINA-NOX[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 0.00%



NOX[ppb] Calibration: LICA ST. LINA Monthly: 18/11 Type: Span



NITRIC OXIDE



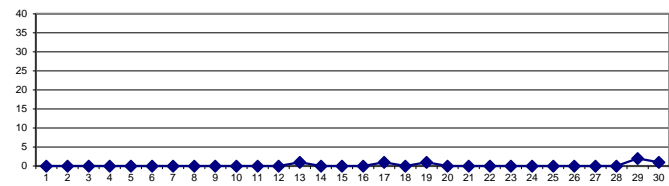
NITRIC OXIDE Hourly Averages (NO ppb)

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 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	0	S	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	24
2	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
3	S	0	0	0	0	0	0	0	0	0	1	1	2	2	2	1	0	0	0	0	0	0	0	0	S	0	2	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	S	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	S	0	0	0	0	0	24
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	S	0	0	0	0	0	1	0	24
7	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	S	0	0	0	0	0	0	1	0	24
8	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	24
9	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	S	0	0	0	0	0	0	0	0	1	0	24
10	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	24
11	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
12	0	0	0	0	0	0	0	0	0	0	1	1	1	1	S	1	1	X	X	X	X	X	X	X	X	0	1	0	17
13	X	X	X	X	X	X	X	X	X	2	2	4	4	S	2	1	0	1	0	0	0	0	0	0	0	0	4	1	15
14	0	0	0	0	0	0	1	0	1	2	1	0	S	0	0	0	0	0	0	0	0	0	0	0	0	2	0	24	
15	0	0	0	0	0	0	0	0	0	0	1	S	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
16	0	0	0	0	0	0	0	0	0	0	S	0	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	24	
17	0	0	0	0	0	0	0	0	0	1	S	4	5	5	4	3	2	1	0	0	0	0	0	0	0	5	1	24	
18	0	0	0	0	0	0	0	0	0	S	2	3	3	1	1	1	0	0	0	0	0	0	0	0	0	3	0	24	
19	0	0	0	0	0	0	0	0	S	0	1	1	2	2	2	2	1	0	0	0	0	0	0	0	0	2	1	24	
20	0	0	0	0	0	0	S	0	0	1	2	2	3	2	1	1	0	0	0	0	0	0	0	0	0	3	0	24	
21	0	0	0	0	0	S	0	0	0	1	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0	2	0	24	
22	0	0	0	0	S	0	0	0	1	1	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0	2	0	24	
23	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	24	
24	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	
25	0	S	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	24	
26	S	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	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	24	
28	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2	1	1	1	1	1	1	0	S	0	0	0	24	
29	0	0	0	0	0	0	0	1	2	4	6	7	9	7	4	2	1	0	1	0	S	0	0	0	0	9	2	24	
30	0	0	0	0	0	0	0	1	2	3	2	1	2	2	1	1	0	0	0	S	0	0	0	0	0	3	1	24	
HOURLY MAX	0	0	0	0	0	0	1	1	2	4	6	7	9	7	4	2	1	1	1	1	1	0	0	0	0				
HOURLY AVG	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	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

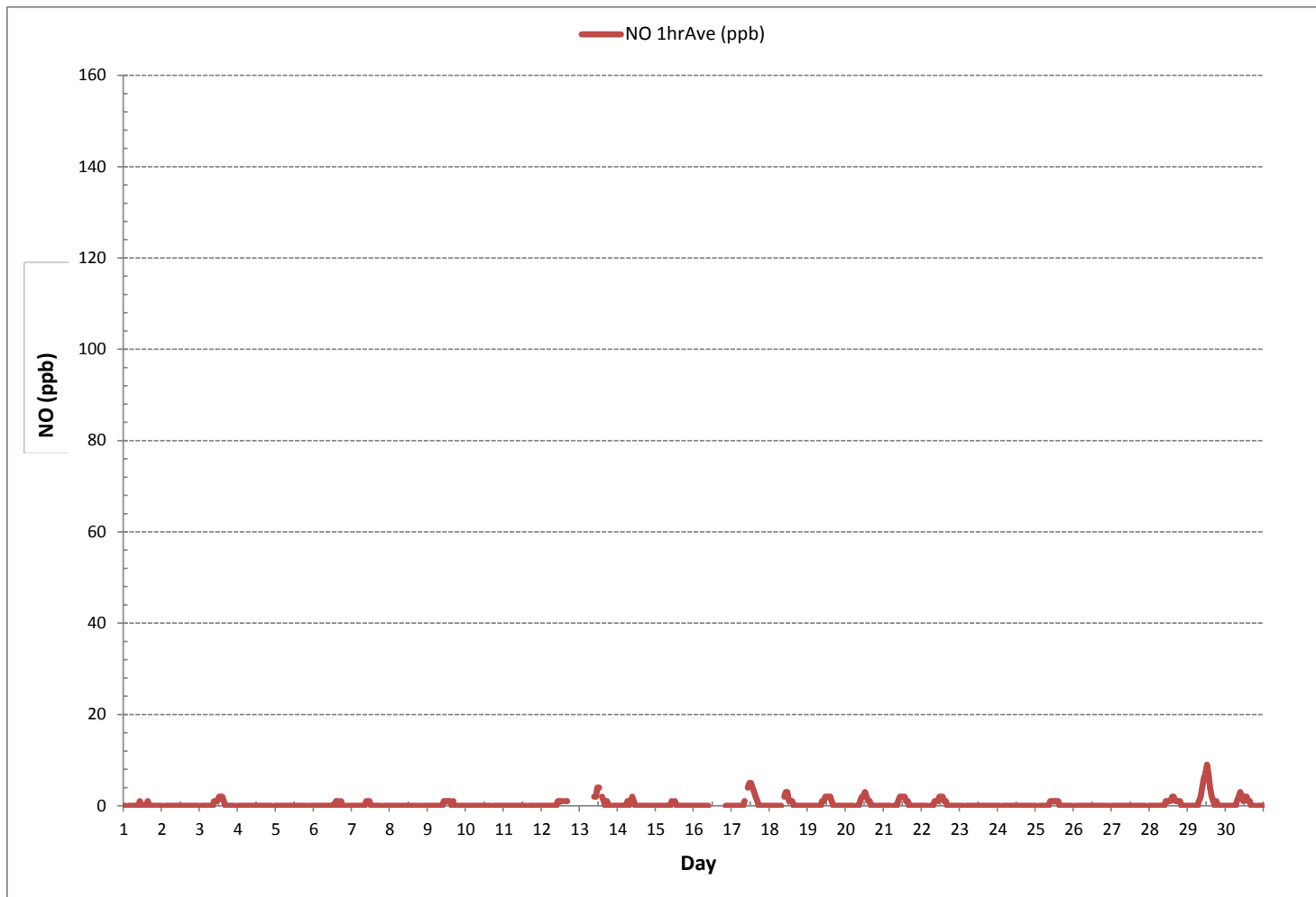
24 HR AVERAGES November 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	0	119		
MINIMUM 1-HR AVERAGE:	0	ppb	@ HOUR	0 ON DAY 1
MAXIMUM 1-HR AVERAGE:	9	ppb	@ HOUR	12 ON DAY 29
MAXIMUM 24-HR AVERAGE:	2	ppb		ON DAY 29
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	704 hrs
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:	97.8 %
STANDARD DEVIATION:	1		MONTHLY AVERAGE:	0 ppb

NITRIC OXIDE Hourly Averages (NO ppb)



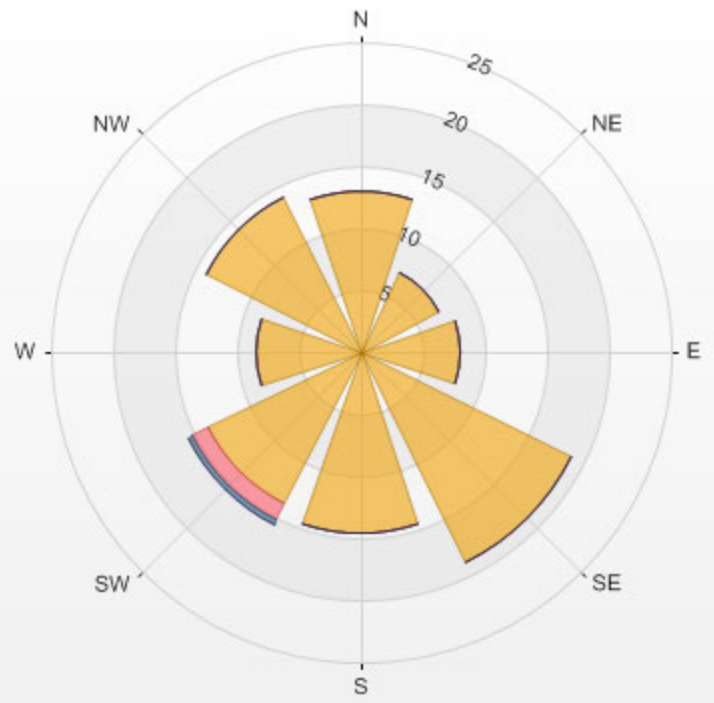
Wind: LICA ST. LINA
Poll.: LICA ST. LINA-NO[ppb]
Monthly: 18/11
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 0.00% Calm Avg: 0.00 [ppb]

Direction	0.0-3.3	3.3-6.7	6.7-10.0	>10.0	Total
N	13.0	0.0	0.0	0.0	13.0
NE	7.1	0.0	0.0	0.0	7.1
E	8.1	0.0	0.0	0.0	8.1
SE	19.0	0.0	0.0	0.0	19.0
S	14.7	0.0	0.0	0.0	14.7
SW	13.8	1.4	0.5	0.0	15.6
W	8.5	0.0	0.0	0.0	8.5
NW	13.9	0.0	0.0	0.0	13.9
Summary	98.1	1.4	0.5	0.0	100.0

% Icon Classes (ppb) 98 0.0-3.3 1 3.3-6.7 0 6.7-10.0 0 >10.0

LICA ST. LINA Poll.: LICA ST. LINA-NO[ppb] 2018/11/01 00:00 - 2018/11/30 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	3	3	S	2	2	2	1	1	2	1	1	1	0	0	1	1	1	1	1	0	1	1	1	1	0	3	1	24	
2	1	S	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	24
3	S	1	1	1	1	1	1	1	2	2	2	2	3	3	4	5	6	7	7	6	4	4	4	S	1	7	3	24	
4	4	3	3	2	2	2	2	2	1	1	1	1	1	1	2	1	0	0	0	0	0	0	S	1	0	4	1	24	
5	0	1	1	1	0	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	S	2	2	0	2	1	24	
6	2	2	2	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	S	1	0	0	0	2	1	24	
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	S	1	1	0	1	0	1	0	24	
8	1	2	1	1	2	1	1	0	0	0	0	1	1	0	0	0	0	0	S	2	1	1	1	0	0	2	1	24	
9	0	0	1	1	1	1	1	1	1	2	2	2	2	3	3	3	4	S	5	5	4	3	2	2	0	5	2	24	
10	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	S	2	1	0	0	0	0	0	0	2	0	24	
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	2	1	0	0	2	1	1	0	1	0	2	0	24
12	1	1	1	0	0	1	1	2	2	2	2	2	2	3	S	5	7	X	X	X	X	X	X	X	0	7	2	17	
13	X	X	X	X	X	X	X	X	X	6	5	7	9	S	6	6	7	9	7	6	7	8	8	8	5	9	7	15	
14	9	6	7	8	8	8	9	9	8	8	4	1	S	1	1	1	1	0	0	0	0	0	1	1	0	9	4	24	
15	1	1	1	1	1	2	2	2	2	3	3	S	4	3	4	5	5	2	1	0	1	1	2	1	0	5	2	24	
16	1	0	0	0	0	0	0	0	0	0	S	0	C	C	C	C	C	C	C	C	2	2	2	2	0	2	1	24	
17	3	4	5	5	4	3	3	3	S	5	4	4	4	4	6	6	6	6	7	5	6	6	5	4	3	7	5	24	
18	5	4	5	5	9	17	15	11	S	9	8	7	3	3	3	3	3	3	2	1	1	1	1	1	1	17	5	24	
19	1	2	2	2	2	2	3	S	4	3	4	3	4	5	5	5	5	5	5	4	3	3	3	3	1	5	3	24	
20	3	3	3	3	3	3	S	3	4	4	4	5	6	5	6	6	6	6	6	6	5	5	5	5	3	6	4	24	
21	5	5	5	5	5	S	5	5	5	4	4	4	3	3	4	5	6	7	6	6	6	5	5	3	7	5	24		
22	5	5	5	5	S	6	6	6	6	5	5	4	4	4	5	5	5	5	4	4	5	3	3	4	5	3	6	5	24
23	6	4	2	S	2	2	1	3	1	1	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	6	1	24	
24	2	2	S	2	2	2	3	2	2	2	2	2	2	2	2	1	1	1	2	1	1	1	1	2	1	3	2	24	
25	2	S	2	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	5	4	4	4	4	2	5	4	24	
26	S	4	3	3	3	3	3	3	2	3	2	2	2	3	3	3	3	3	3	3	2	2	2	S	2	4	3	24	
27	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	4	4	S	4	2	4	3	24
28	4	4	4	4	4	4	4	4	4	4	4	3	3	4	5	7	12	13	12	10	10	S	9	9	3	13	6	24	
29	9	9	9	9	9	9	9	10	10	8	8	10	12	12	12	14	18	18	17	S	19	S	17	16	12	8	19	12	24
30	7	14	10	12	13	9	10	12	12	10	9	6	6	7	6	6	5	4	S	4	5	5	4	4	4	14	8	24	
HOURLY MAX	9	14	10	12	13	17	15	12	12	10	9	10	12	12	12	14	18	18	17	19	10	17	16	12					
HOURLY AVG	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	3	3	3	3	3					

STATUS FLAG CODES

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

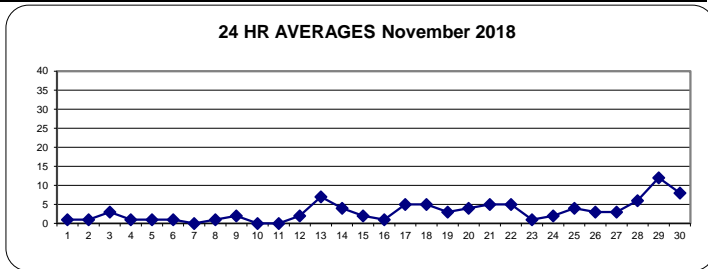
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	545			
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	12	ON DAY
MAXIMUM 1-HR AVERAGE:	19	ppb @ HOUR	19	ON DAY
MAXIMUM 24-HR AVERAGE:	12	ppb		ON DAY
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	704
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:	97.8
STANDARD DEVIATION:	3		MONTHLY AVERAGE:	3
				ppb

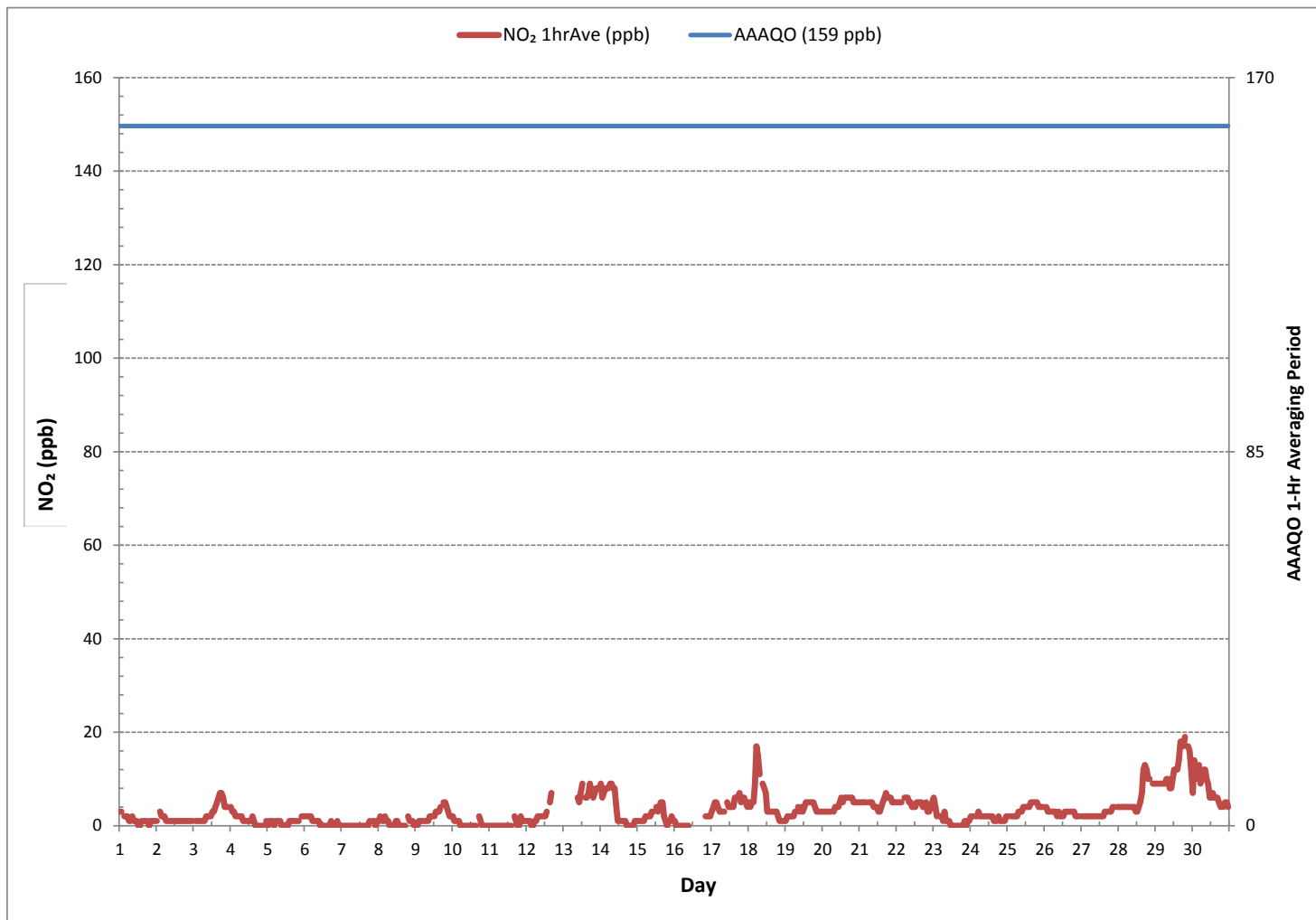
24 HR AVERAGES November 2018





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2018

NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)



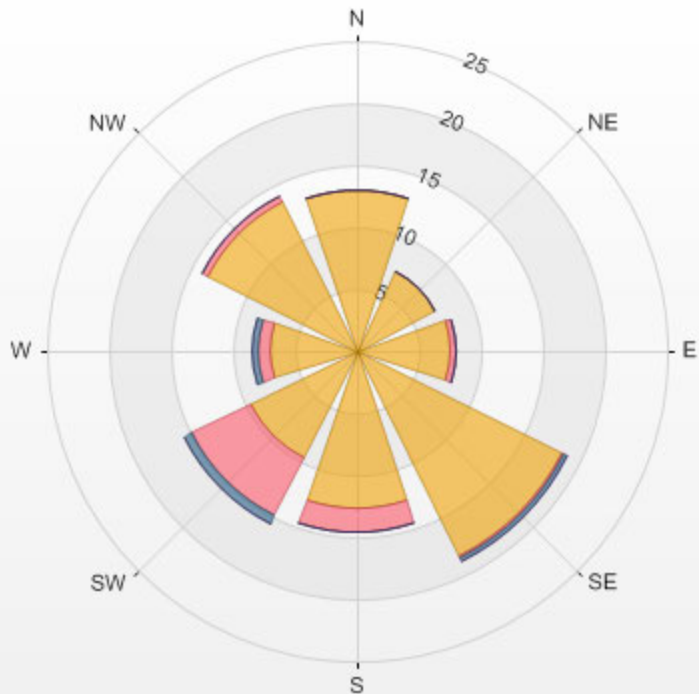
Wind: LICA ST. LINA
Poll.: LICA ST. LINA-NO2[ppb]
Monthly: 18/11
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 0.00% Calm Avg: 0.00 [ppb]

Direction	0.0-6.7	6.7-13.3	13.3-20.0	>20.0	Total
N	13.0	0.0	0.0	0.0	13.0
NE	7.1	0.0	0.0	0.0	7.1
E	7.6	0.5	0.0	0.0	8.1
SE	18.6	0.2	0.3	0.0	19.0
S	12.7	2.0	0.0	0.0	14.7
SW	9.6	5.3	0.8	0.0	15.6
W	7.0	1.1	0.5	0.0	8.5
NW	13.5	0.5	0.0	0.0	13.9
Summary	89.0	9.4	1.5	0.0	100.0

% Icon Classes (ppb) 89 0.0-6.7 9 6.7-13.3 2 13.3-20.0 0 >20.0

LICA ST. LINA Poll.: LICA ST. LINA-NO₂[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 0.00%



NO2[ppb] Calibration: LICA ST. LINA Monthly: 18/11 Type: Span



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	20.3	21.1	S	23.4	10.6	12.9	20.4	22.5	23.9	24.6	25.6	27.7	27.6	27.5	27.3	28.6	27.1	26.5	27.4	22.4	21.6	21.1	21.3	10.6	28.6	23.4	24	
2	19.8	S	20.1	20.1	20.6	20.4	20.6	18.7	17.9	17.4	17.0	16.4	20.0	21.9	23.4	23.7	23.1	22.4	20.8	21.3	21.9	22.6	23.2	21.6	16.4	23.7	20.7	24
3	S	22.8	21.9	20.7	19.9	19.0	18.0	16.8	15.5	14.7	13.6	13.0	13.1	12.9	11.9	10.7	9.0	8.2	9.5	10.1	13.3	13.7	12.1	S	8.2	22.8	14.6	24
4	11.3	12.8	12.8	13.2	13.2	13.6	13.8	13.8	13.8	14.1	13.8	14.6	15.2	15.0	11.8	10.4	11.6	17.2	19.9	21.5	22.8	24.1	S	27.9	10.4	27.9	15.6	24
5	27.9	28.6	29.3	29.3	29.7	30.4	30.7	30.4	30.2	30.6	31.0	30.1	29.0	28.4	28.9	30.1	30.1	31.0	31.9	32.1	32.1	S	31.9	31.7	27.9	32.1	30.2	24
6	31.0	30.0	28.9	27.6	27.7	28.7	29.6	29.6	29.6	29.6	29.8	30.3	30.9	31.0	31.3	30.9	30.4	29.4	28.6	29.7	S	30.7	30.7	30.4	27.6	31.3	29.8	24
7	30.2	30.1	29.7	29.2	28.9	28.9	29.4	32.0	31.7	31.2	33.6	34.2	33.7	32.6	31.9	31.5	32.1	33.8	32.9	S	31.8	31.8	31.3	30.4	28.9	34.2	31.4	24
8	29.2	27.1	31.0	29.8	26.5	28.3	30.6	32.5	33.7	33.4	34.0	32.7	32.7	33.7	33.9	33.7	33.8	33.1	S	32.0	31.9	31.0	31.1	31.3	26.5	34.0	31.6	24
9	31.2	31.0	30.1	29.6	29.5	29.2	29.4	29.2	28.8	28.1	28.1	28.2	27.8	27.0	25.8	24.7	23.5	S	21.4	19.7	20.8	22.3	21.4	21.0	19.7	31.2	26.4	24
10	22.0	23.4	24.7	24.9	29.1	34.0	35.8	31.5	29.9	28.8	28.7	28.9	30.5	33.0	33.9	35.5	S	34.6	33.8	36.7	35.8	35.2	36.9	39.5	22.0	39.5	31.6	24
11	38.2	37.3	36.9	36.9	36.4	35.9	35.3	35.6	35.3	35.2	34.9	34.6	34.4	34.3	34.0	S	33.7	33.6	34.3	33.9	31.5	32.1	31.5	30.2	30.2	38.2	34.6	24
12	30.7	31.6	31.1	31.8	32.1	30.0	28.6	27.5	26.3	25.7	25.5	25.0	24.5	23.9	S	21.7	20.8	X	X	X	X	X	X	X	20.8	32.1	27.3	17
13	X	X	X	X	X	X	X	X	X	20.6	22.3	27.0	27.0	S	C	C	C	C	20.0	20.6	19.4	18.0	17.3	16.0	16.0	27.0	20.8	15
14	19.9	24.9	19.6	13.9	13.7	17.2	15.5	15.7	20.4	23.5	30.8	35.5	S	38.7	38.6	38.1	37.3	37.1	37.0	36.2	35.4	34.6	33.6	32.3	13.7	38.7	28.2	24
15	31.0	29.7	28.3	26.3	22.9	18.5	17.2	15.5	15.4	14.8	14.7	S	14.8	17.1	17.6	16.7	16.9	21.5	23.7	24.6	24.6	24.6	24.2	24.2	14.7	31.0	21.1	24
16	24.8	28.9	29.7	31.0	32.3	32.6	32.7	31.8	31.4	31.5	S	32.0	34.2	36.2	33.4	33.0	32.8	31.7	27.6	26.2	24.5	24.5	23.6	22.4	22.4	36.2	29.9	24
17	21.6	20.4	18.6	18.7	19.6	20.2	20.1	19.9	19.5	S	19.2	19.4	20.2	20.6	20.6	19.5	18.3	17.9	17.3	19.8	16.7	15.2	16.8	19.3	15.2	21.6	19.1	24
18	17.4	18.1	18.6	18.1	12.9	6.6	7.9	10.9	S	12.3	13.0	14.2	18.2	18.4	18.6	18.4	18.6	18.1	18.0	19.1	20.8	21.5	21.1	20.8	6.6	21.5	16.6	24
19	19.4	18.8	20.1	20.7	20.2	18.9	17.6	S	17.2	16.8	16.9	17.0	16.4	16.5	18.5	19.8	20.3	18.7	18.4	20.1	21.1	21.8	22.0	21.9	16.4	22.0	19.1	24
20	21.6	22.5	21.1	20.4	23.3	23.2	S	18.6	18.6	17.3	17.8	18.0	17.6	19.3	18.4	18.1	17.4	17.6	17.1	16.6	16.5	16.1	15.3	15.5	15.3	23.3	18.6	24
21	15.6	14.9	13.9	13.1	13.0	S	13.1	12.5	12.0	12.4	13.0	13.4	14.2	14.5	14.0	12.9	11.7	11.2	11.6	11.5	11.8	12.0	11.8	11.6	11.2	15.6	12.9	24
22	12.0	11.7	11.1	10.5	S	9.1	8.6	7.9	13.7	18.7	18.4	16.1	17.2	18.4	21.5	22.7	27.3	27.1	27.9	27.6	31.0	31.1	22.8	20.8	7.9	31.1	18.8	24
23	19.8	26.0	28.4	S	29.2	29.3	27.0	25.7	22.8	19.9	16.7	16.7	20.4	23.6	24.2	25.3	24.9	25.3	25.2	24.6	23.8	26.1	26.1	25.6	16.7	29.3	24.2	24
24	24.7	24.4	S	25.3	25.4	24.8	24.8	24.8	25.3	25.5	24.9	25.0	25.4	25.7	26.0	26.8	27.2	26.4	26.3	26.8	26.7	26.5	26.0	25.2	24.4	27.2	25.6	24
25	24.3	S	22.8	21.9	21.0	20.8	20.4	19.4	18.3	17.9	17.8	17.5	17.5	17.7	17.3	17.2	17.1	16.8	17.5	16.9	18.7	19.7	18.5	18.4	16.8	24.3	18.9	24
26	S	19.5	19.4	19.5	19.7	20.2	21.9	22.7	23.6	24.1	24.9	25.1	26.0	26.2	25.0	24.1	23.5	24.1	23.6	24.4	25.8	26.1	26.0	S	19.4	26.2	23.4	24
27	25.7	25.2	24.5	24.6	24.0	22.8	22.3	22.1	21.6	20.7	21.0	21.0	21.0	21.3	20.9	20.0	19.6	19.4	19.2	19.3	18.8	18.7	S	19.9	18.7	25.7	21.5	24
28	19.8	19.6	19.7	19.7	19.4	19.2	19.1	19.0	19.1	18.5	17.8	16.3	14.0	12.0	10.8	8.5	4.3	2.5	2.8	4.1	3.5	S	3.4	3.6	2.5	19.8	12.9	24
29	3.7	5.0	5.1	5.6	5.6	4.9	4.7	4.1	5.1	7.9	10.0	10.8	13.0	13.9	14.0	12.3	9.9	8.6	7.0	7.2	S	9.7	10.3	14.0	3.7	14.0	8.4	24
30	19.9	9.2	14.9	12.6	11.4	15.6	11.7	8.7	8.4	10.7	12.4	18.1	17.7	15.8	17.6	17.1	18.3	20.1	20.7	S	20.5	18.3	18.4	20.0	8.4	20.7	15.6	24
HOURLY MAX	38.2	37.3	36.9	36.9	36.4	35.9	35.8	35.6	35.3	35.2	34.9	35.5	34.4	38.7	38.6	38.1	37.3	37.1	37.0	36.7	35.8	35.2	36.9	39.5				
HOURLY AVG	22.7	22.8	22.7	22.1	22.1	22.0	21.7	21.4	21.8	21.6	21.6	22.7	22.6	23.0	23.3	22.5	22.2	22.8	22.2	22.6	23.1	23.3	22.5	22.8				

STATUS FLAG CODES

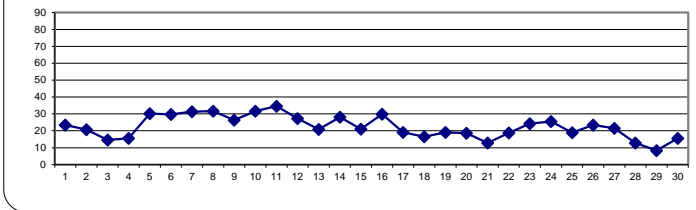
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

OBJECTIVE LIMIT: ALBERTA ENVIRONMENT: 1-HR 82 ppb

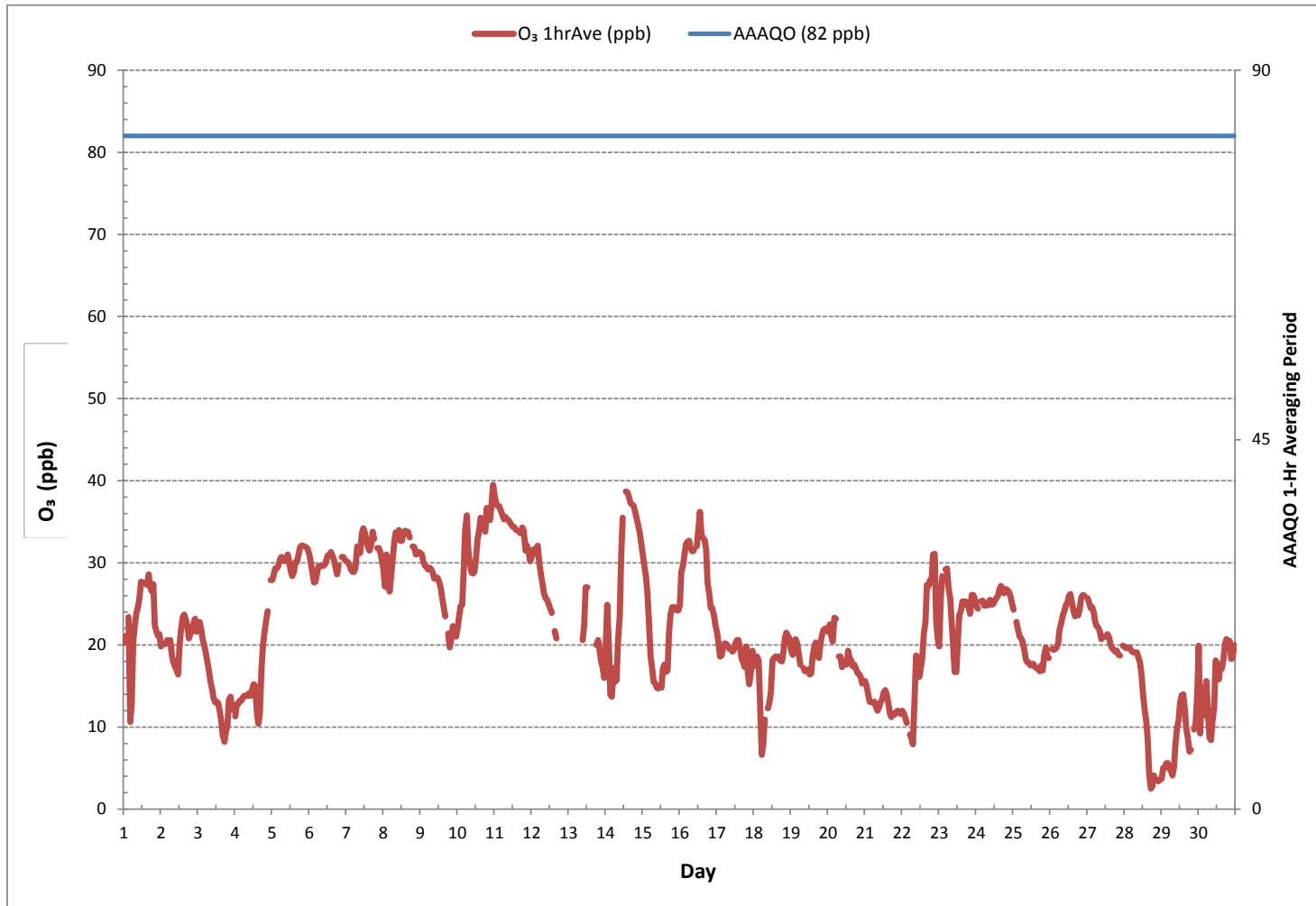
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	668				
MINIMUM 1-HR AVERAGE:	2.5 ppb	@ HOUR	17	ON DAY	28
MAXIMUM 1-HR AVERAGE:	39.5 ppb	@ HOUR	23	ON DAY	10
MAXIMUM 24-HR AVERAGE:	34.6 ppb			ON DAY	11
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	704 hrs		
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	97.8 %		
STANDARD DEVIATION:	7.7	MONTHLY AVERAGE:	22.4 ppb		

24 HR AVERAGES November 2018

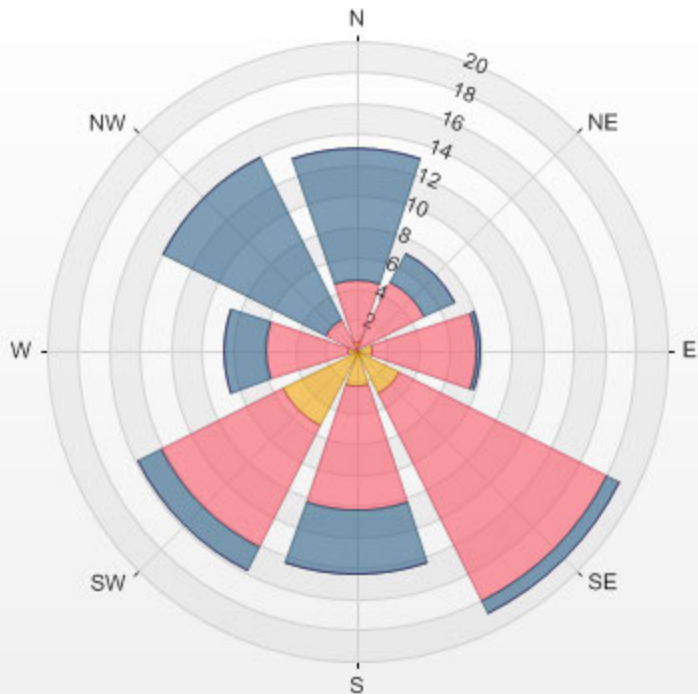


OZONE Hourly Averages (O₃ ppb)

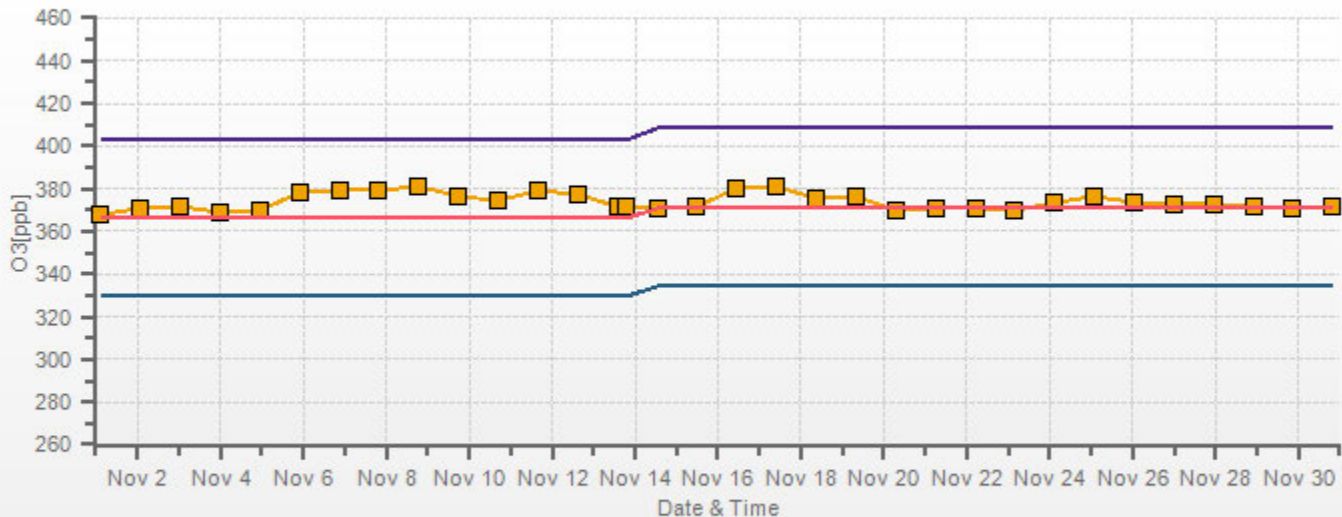


% Icon Classes (ppb)	13	0.0-13.2	55	13.2-26.4	32	26.4-39.6	0	>39.6
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LICA ST. LINA Poll.: LICA ST. LINA-O3[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 0.00%



O3[ppb] Calibration: LICA ST. LINA Monthly: 18/11 Type: Span



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.	
DAY 1	8	7	3	3	7	8	4	4	6	5	3	3	3	3	4	4	4	4	4	5	4	4	4	4	3	8	4	24	
2	5	6	8	8	8	7	5	4	3	2	2	2	3	2	2	2	1	1	2	2	2	2	2	4	1	8	3	24	
3	3	2	3	3	3	4	5	6	8	11	11	11	11	11	11	11	12	11	11	10	11	12	12	10	2	12	9	24	
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6	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	2	2	2	0	2	1	24	
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8	8	12	7	7	4	3	3	3	3	4	3	3	3	3	3	3	3	4	4	4	4	5	5	5	3	12	5	24	
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12	3	4	4	4	5	6	6	7	8	10	11	13	19	22	20	21	19	X	X	X	X	X	X	X	3	22	11	17	
13	X	X	X	X	X	X	X	X	X	11	13	27	24	12	9	8	8	8	10	14	12	13	16	12	8	27	13	15	
14	7	5	8	11	11	9	11	10	9	10	10	7	5	4	4	4	3	3	3	4	4	6	7	3	11	7	24		
15	7	8	10	11	13	17	18	24	23	30	33	30	28	22	13	8	6	5	3	5	4	3	3	3	33	14	24		
16	2	2	2	2	3	4	7	6	7	5	5	3	3	20	4	3	3	4	6	6	7	7	8	8	2	20	5	24	
17	9	7	5	6	5	5	4	5	6	12	19	21	19	17	16	15	14	11	16	21	11	9	10	11	4	21	11	24	
18	11	12	12	14	18	15	14	15	15	16	16	17	13	12	11	12	12	11	11	11	10	9	8	11	8	18	13	24	
19	15	19	21	18	18	19	21	22	24	27	24	20	18	16	15	13	10	9	7	5	4	3	3	3	3	27	15	24	
20	3	3	3	4	5	5	4	5	5	11	14	10	12	14	13	12	11	10	8	8	11	11	12	13	3	14	9	24	
21	13	16	17	15	17	18	17	18	17	15	13	12	11	10	9	11	11	11	11	13	10	10	11	11	9	18	13	24	
22	10	9	9	9	10	10	10	10	11	11	11	12	11	11	10	9	8	9	8	9	8	7	10	11	7	12	10	24	
23	12	8	7	9	7	25	18	19	13	16	15	10	6	7	4	C	C	C	2	2	2	1	2	1	1	25	9	24	
24	2	2	2	2	2	3	4	3	3	3	4	3	3	3	3	2	2	2	3	4	4	5	5	2	5	3	24		
25	6	6	8	10	13	12	12	11	11	14	23	28	26	23	11	7	7	7	7	9	8	8	9	6	6	28	12	24	
26	7	5	6	5	6	8	8	8	8	6	5	6	7	7	7	8	8	4	4	4	4	4	4	4	4	8	6	24	
27	4	4	5	5	6	7	9	10	9	9	12	13	12	9	9	10	10	13	14	15	15	17	16	14	4	17	10	24	
28	14	16	16	19	21	22	21	23	25	25	24	19	14	13	15	21	23	20	15	14	13	13	11	11	11	25	18	24	
29	12	12	13	13	12	11	11	11	10	11	11	10	8	7	6	6	6	7	7	7	7	7	8	8	9	6	13	9	24
30	8	7	8	12	14	13	15	16	16	19	23	19	19	20	16	15	10	10	10	12	11	12	12	11	7	23	14	24	
HOURLY MAX	15	19	21	19	21	25	21	24	25	30	33	30	28	23	20	21	23	20	18	21	16	17	16	14					
HOURLY AVG	7	7	7	8	8	9	9	9	9	11	11	11	10	10	8	8	8	7	7	8	7	7	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

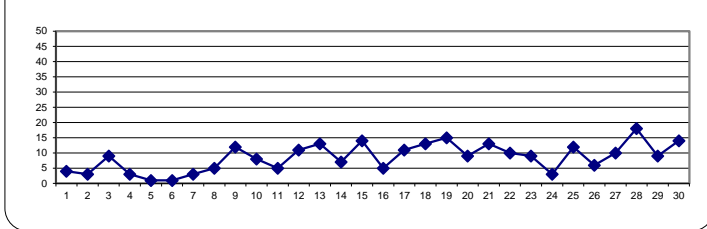
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	80	µg/m ³	24-HR	29	µg/m ³
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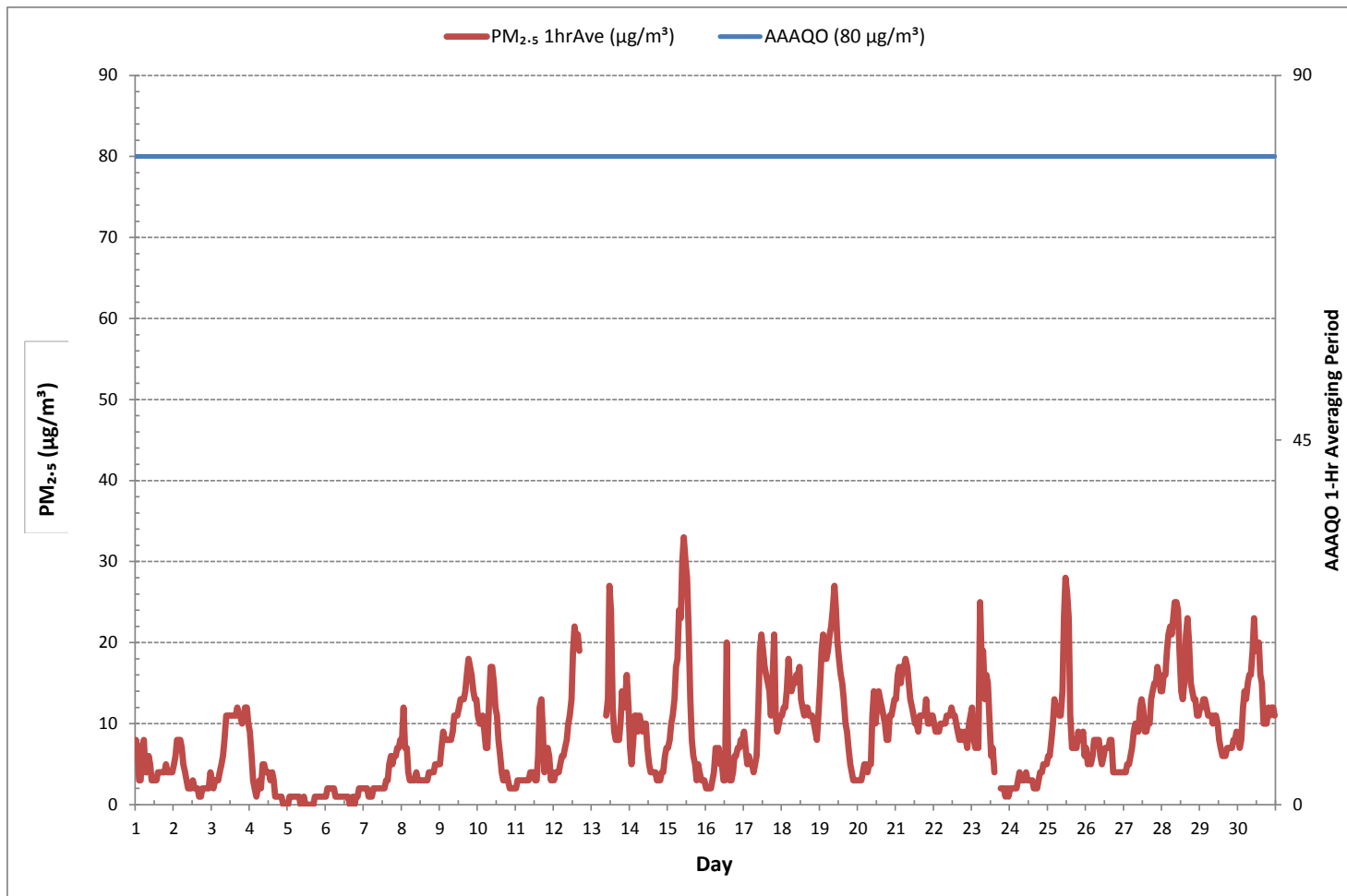
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	686				
MINIMUM 1-HR AVERAGE:	0 µg/m ³ @ HOUR	21	ON DAY	4	
MAXIMUM 1-HR AVERAGE:	33 µg/m ³ @ HOUR	10	ON DAY	15	
MAXIMUM 24-HR AVERAGE:	18 µg/m ³		ON DAY	28	
MONTHLY CALIBRATION TIME:	3	hrs	OPERATIONAL TIME:	704	hrs
STANDARD DEVIATION:	6		AMD OPERATION UPTIME:	97.8	%
			MONTHLY AVERAGE:	8	µg/m ³

24 HR AVERAGES November 2018



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



Wind: LICA ST. LINA
 Poll.: LICA ST. LINA-PM25[ug/m3]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

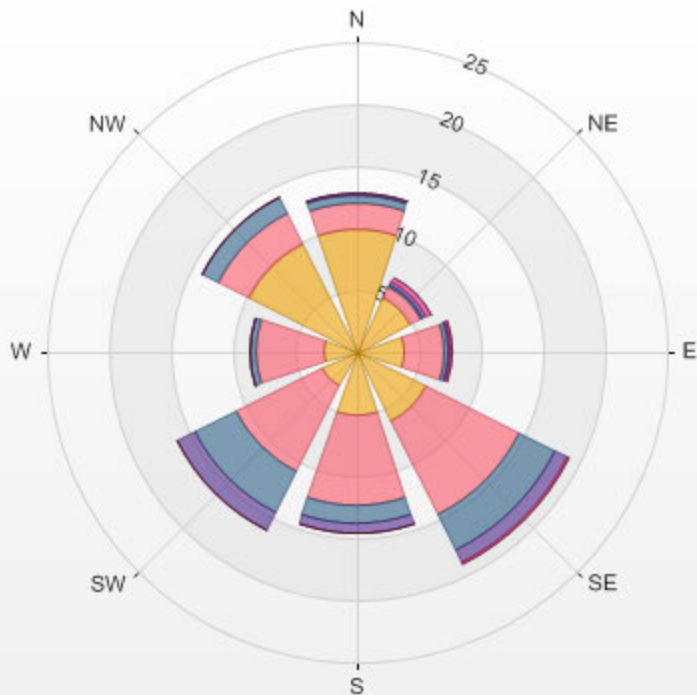
Calm: 0.00%

Calm Avg: 0.00 [ug/m3]

Direction	0.0-6.8	6.8-13.6	13.6-20.4	20.4-27.2	27.2-34.0	>34.0	Total
N	10.0	2.1	0.6	0.3	0.0	0.0	12.9
NE	4.8	1.0	0.2	0.3	0.4	0.0	6.8
E	3.8	3.2	0.4	0.2	0.2	0.0	7.8
SE	6.3	8.4	3.2	1.2	0.2	0.0	19.2
S	5.1	7.3	1.5	0.7	0.0	0.0	14.7
SW	3.1	7.8	3.7	1.6	0.0	0.0	16.1
W	2.6	5.4	0.6	0.0	0.0	0.0	8.7
NW	9.7	2.8	1.5	0.0	0.0	0.0	13.9
Summary	45.5	38.0	11.6	4.2	0.7	0.0	100.0

% Icon Classes (ug/m3(L)) 45 0.0-6.8 38 6.8-13.6 12 13.6-20.4 4 20.4-27.2 1 27.2-34.0 0 >34.0

LICA ST. LINA Poll.: LICA ST. LINA-PM25[ug/m3(L)] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 0.00%



WIND SPEED



WIND SPEED Hourly Averages (WS kph)

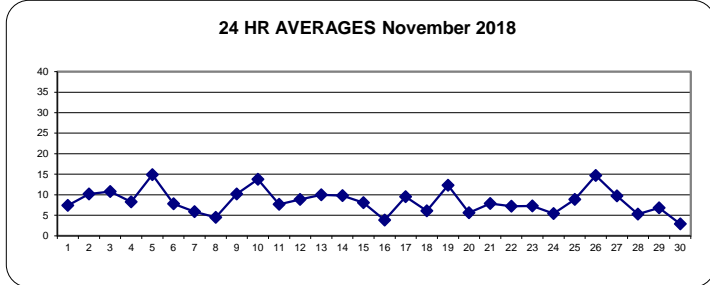
HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
DAY 1	6.9	10.5	12.6	13.8	16.2	16.0	19.9	14.6	16.6	14.0	12.0	9.4	8.5	8.2	6.5	5.0	4.1	2.7	2.9	5.0	9.5	9.7	7.9	9.2	2.7	19.9	7.4	24	
2	11.2	11.1	12.9	13.2	12.0	13.7	13.2	13.0	13.3	12.9	14.8	14.1	14.2	12.9	11.2	11.6	9.3	8.2	5.5	6.7	9.7	11.2	12.1	11.0	5.5	14.8	10.2	24	
3	12.3	13.2	11.7	11.2	14.4	13.5	12.9	13.3	15.4	15.8	15.8	13.1	14.5	13.5	10.8	5.9	2.9	7.2	8.6	8.9	10.5	11.1	10.6	10.3	2.9	15.8	10.8	24	
4	12.6	13.4	14.3	16.3	7.8	1.4	X	X	X	X	X	X	X	17.5	3.5	10.7	17.9	21.1	17.1	18.4	16.1	17.9	20.9	22.2	1.4	22.2	8.3	18	
5	20.8	21.4	21.8	20.6	20.8	19.8	17.9	17.2	15.3	14.6	13.6	13.6	12.9	13.4	13.9	16.2	13.4	13.9	12.0	10.7	10.7	10.4	10.6	10.2	10.2	21.8	14.9	24	
6	10.0	8.6	7.2	8.5	7.0	6.7	8.2	6.8	5.6	8.0	9.8	5.8	7.0	8.7	8.2	7.7	7.8	8.9	7.7	9.5	9.4	12.6	10.9	7.2	5.6	12.6	7.8	24	
7	5.3	5.6	6.1	6.9	7.0	6.0	5.7	5.2	5.5	5.7	9.1	8.2	5.5	5.2	6.3	6.2	5.2	6.8	5.4	4.4	5.5	5.0	9.6	9.0	4.4	9.6	5.9	24	
8	6.8	5.8	4.5	4.5	8.5	8.5	7.8	7.4	5.4	6.4	4.8	6.8	6.2	6.4	7.1	8.2	8.1	8.9	12.0	12.9	12.3	16.7	18.3	19.8	4.5	19.8	4.5	24	
9	18.7	19.2	20.5	21.4	22.3	20.2	19.5	17.4	16.2	16.4	17.7	18.0	14.4	13.7	10.5	10.4	9.4	7.9	10.9	15.9	17.1	14.7	11.9	11.3	7.9	22.3	10.2	24	
10	15.3	17.6	18.2	15.3	17.4	15.3	15.5	13.0	14.0	10.5	10.9	12.5	10.5	13.2	11.2	9.2	10.9	12.8	13.5	18.9	16.0	16.7	16.5	19.1	9.2	19.1	13.8	24	
11	17.6	15.5	13.7	11.2	12.0	11.8	11.1	14.2	10.5	9.5	12.9	13.3	9.2	8.7	10.6	8.9	6.5	5.4	4.1	4.2	7.9	8.3	10.4	8.2	4.1	17.6	7.7	24	
12	X	X	X	X	X	X	X	X	X	X	X	X	9.6	9.7	12.6	11.5	9.1	9.7	X	X	X	X	X	X	X	9.1	12.6	8.9	8
13	X	X	X	X	X	X	X	X	X	8.8	9.0	10.1	8.3	9.6	10.6	7.0	9.8	11.3	10.9	10.4	10.1	13.2	12.6	12.0	7.0	13.2	10.0	15	
14	14.2	11.4	6.3	8.9	11.5	12.3	9.9	10.0	11.2	12.8	13.3	13.6	15.6	14.5	12.3	10.7	9.7	11.9	10.8	13.2	12.4	9.9	10.9	5.9	5.9	15.6	9.8	24	
15	6.7	8.2	6.9	6.7	7.2	7.2	3.9	4.3	3.6	6.1	2.7	1.0	8.4	9.6	11.7	11.6	14.6	14.7	18.1	19.2	18.5	15.6	16.5	16.7	1.0	19.2	8.1	24	
16	14.8	15.0	13.9	15.2	15.6	13.3	13.5	12.4	9.9	7.5	7.7	8.7	6.5	2.9	8.5	8.2	7.7	8.8	9.4	10.7	12.2	14.4	13.4	11.6	2.9	15.6	3.8	24	
17	11.7	14.7	16.0	14.3	14.7	17.1	19.4	18.4	15.5	13.5	13.3	12.4	11.3	7.5	4.4	5.3	8.0	5.3	3.6	4.8	4.4	4.2	4.7	6.5	3.6	19.4	9.5	24	
18	6.0	5.3	8.1	8.4	8.9	9.4	9.9	10.7	8.0	9.0	8.5	8.5	12.2	11.4	10.4	9.5	7.4	4.9	5.5	5.9	6.4	8.2	6.0	6.0	4.9	12.2	6.1	24	
19	6.7	9.0	11.6	13.4	12.8	12.5	13.8	16.4	15.2	15.2	16.8	19.1	19.4	18.1	17.5	16.9	15.9	14.5	16.0	15.8	12.9	14.3	13.2	11.1	6.7	19.4	12.3	24	
20	10.1	10.4	9.1	6.6	6.4	3.3	4.8	10.5	8.3	6.1	6.6	8.1	9.7	8.7	8.9	8.3	9.2	10.2	11.2	10.6	9.5	9.9	10.5	9.5	3.3	11.2	5.6	24	
21	12.3	10.1	8.9	9.6	7.9	8.6	8.5	8.6	8.8	8.5	10.0	10.3	8.0	6.4	8.0	6.9	7.8	10.0	9.2	6.6	8.6	6.4	5.3	6.0	5.3	12.3	7.9	24	
22	5.6	0.9	1.4	6.4	8.3	12.6	8.1	10.3	10.6	9.7	8.4	7.6	9.1	9.6	9.3	9.4	10.5	5.7	7.4	7.8	10.2	9.6	9.0	8.4	0.9	12.6	7.2	24	
23	8.3	8.7	8.0	6.4	8.2	8.3	9.5	9.2	11.2	12.1	11.1	10.1	10.1	9.1	8.7	9.8	10.1	12.5	10.1	7.1	6.5	8.6	8.5	7.3	6.4	12.5	7.3	24	
24	6.5	4.9	4.6	5.8	5.5	2.7	2.8	4.1	4.2	5.1	5.8	7.6	8.6	9.3	8.6	9.8	8.8	9.0	10.5	11.0	10.0	9.6	9.3	9.5	2.7	11.0	5.4	24	
25	10.1	9.3	7.8	7.2	6.2	6.9	6.4	5.2	6.5	6.1	7.9	7.5	8.6	10.4	10.1	10.5	11.5	10.8	11.1	10.7	11.3	11.5	10.7	11.1	5.2	11.5	8.9	24	
26	10.6	11.4	11.7	10.9	10.1	11.8	12.2	14.0	14.3	15.6	15.1	14.8	15.6	15.7	17.0	15.5	16.3	17.9	18.9	18.9	18.7	16.8	18.8	16.0	10.1	18.9	14.7	24	
27	14.2	13.8	11.5	12.0	9.9	10.4	10.0	12.1	9.9	6.1	9.1	9.6	10.2	11.4	11.0	7.4	5.1	9.2	8.6	10.1	9.3	8.4	9.0	8.0	5.1	14.2	9.7	24	
28	8.6	7.3	7.6	6.4	6.8	7.0	6.5	5.4	5.6	5.6	5.6	6.5	7.1	7.8	6.9	7.8	6.9	6.3	7.1	6.8	4.9	4.7	5.8	5.6	4.7	8.6	5.3	24	
29	6.1	7.0	6.9	8.4	9.1	8.8	8.9	8.5	9.8	8.1	8.4	7.7	6.6	7.3	7.2	7.5	6.8	6.5	7.2	7.2	6.3	6.0	5.1	5.3	5.1	9.8	6.8	24	
30	5.6	5.7	4.5	5.9	6.1	7.5	7.9	7.3	5.3	5.0	4.9	5.1	4.4	4.0	1.2	1.9	2.1	2.0	2.4	2.3	4.1	3.7	4.4	4.9	1.2	7.9	2.9	24	
HOURLY MAX	20.8	21.4	21.8	21.4	22.3	20.2	19.9	18.4	16.6	16.4	17.7	19.1	19.4	18.1	17.5	16.9	17.9	21.1	18.9	19.2	18.7	17.9	20.9	22.2					

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

LAST CALIBRATION:	May 25, 2017
DECLINATION:	MAGNETIC DECLINATION 19 DEGREE EAST

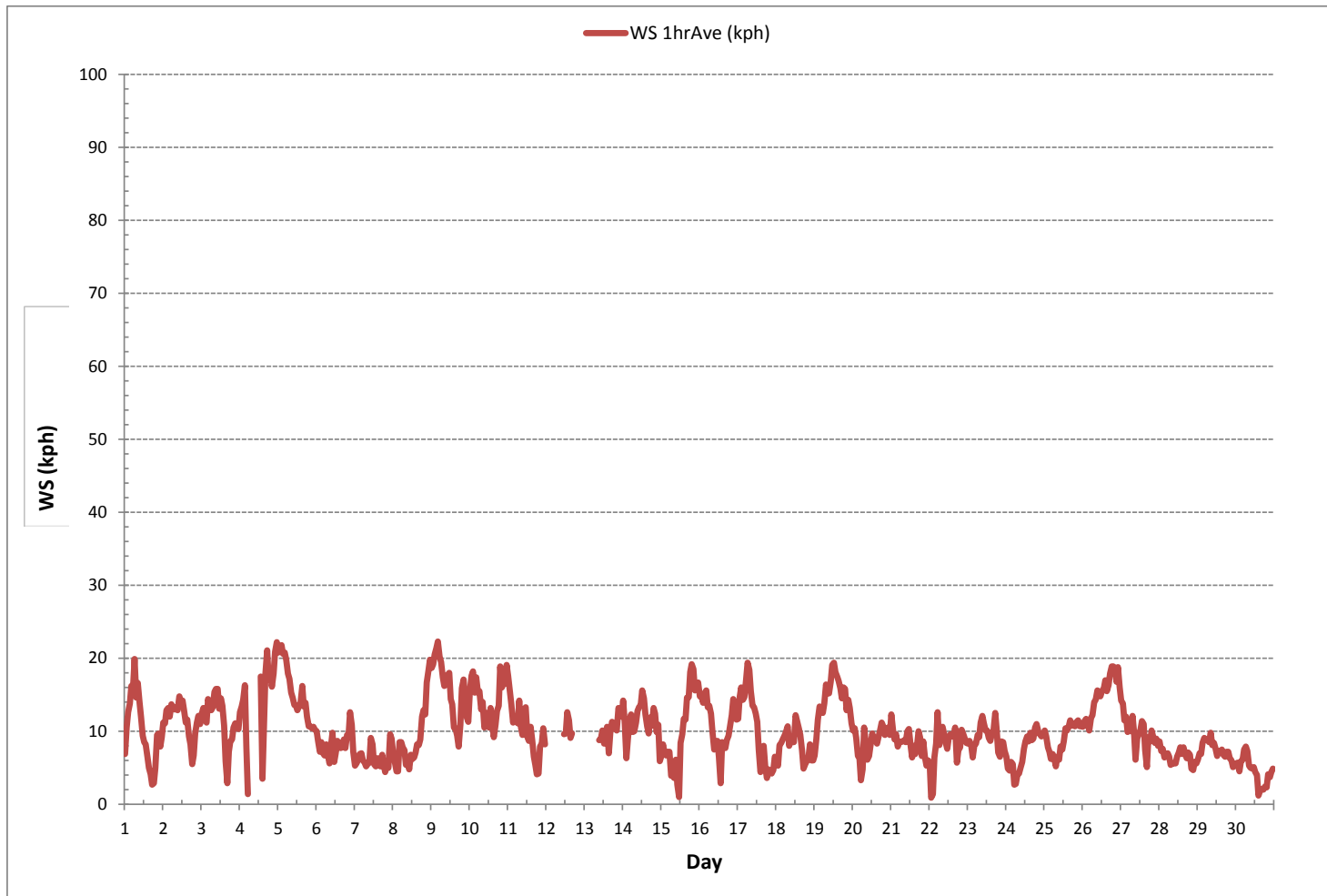
24 HR AVERAGES November 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	686
MINIMUM 1-HR AVERAGE:	0.9 kph @ HOUR 1 ON DAY 22
MAXIMUM 1-HR AVERAGE:	22.3 kph @ HOUR 4 ON DAY 9
MAXIMUM 24-HR AVERAGE:	14.9 kph ON DAY 5
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	686 hrs
AMT OPERATION UPTIME:	95.3 %
STANDARD DEVIATION:	4.2
MONTHLY AVERAGE:	1.1 kph

WIND SPEED Hourly Averages (WS kph)



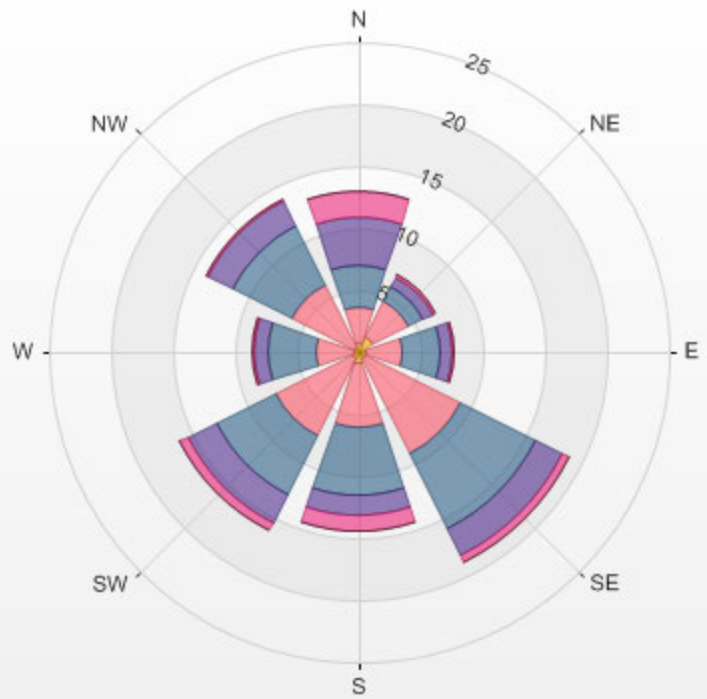
Wind: LICA ST. LINA
 Monitor: WSP [kph]
 Monthly: 18/11
 Type: WindRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 0.00%

Direction	0.4-4.5	4.5-9.0	9.0-13.4	13.4-17.9	17.9-22.4	>22.4	Total
N	0.7	2.9	3.4	3.9	2.0	0.0	13.0
NE	1.3	3.2	1.3	0.9	0.3	0.0	7.0
E	0.6	2.9	3.1	1.0	0.2	0.0	7.7
SE	0.6	8.6	6.7	2.5	0.7	0.0	19.1
S	1.0	5.1	5.5	1.6	1.3	0.0	14.6
SW	0.6	7.0	5.3	2.6	0.7	0.0	16.2
W	0.4	3.1	3.8	1.2	0.2	0.0	8.6
NW	0.4	5.5	5.4	2.3	0.2	0.0	13.9
Summary	5.7	38.4	34.4	16.0	5.6	0.0	100.0

% Icon	Classes (kph)	6		0.4-4.5	38		4.5-9.0	34		9.0-13.4	16		13.4-17.9	6		17.9-22.4	0		>22.4
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LICA ST. LINA 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 0.00%



WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2018

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	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NW	NNW	NNW	NNW	NNW	NE	NE	E	ESE	ESE	ESE	ESE	N	24	
2	E	ESE	ESE	ESE	ESE	ESE	E	ESE	E	E	E	ESE	ESE	ESE	ESE	ESE	SE	SE	SSE	SSE	S	S	S	S	ESE	24	
3	SSW	SSW	SSW	S	SSW	S	SSW	S	SSW	SSW	SSW	SSW	SW	SW	SW	SSW	S	S	S	S	S	SSE	SSE	SE	SSW	24	
4	ESE	SE	ESE	E	E	WNW	X	X	X	X	X	X	X	SSE	ENE	N	N	N	N	N	N	N	N	N	N	NNE	18
5	NNW	NNW	NNW	NNW	NNW	NNW	NNW	N	N	N	N	NNW	NNW	NNW	NNW	NNW	NW	NNW	N	N	N	N	NNE	NNE	N	24	
6	NNE	N	N	N	N	N	NNW	NNW	NNW	NW	NW	NW	NNW	NW	NW	NW	NW	NW	NW	NW	NW	NNW	NNW	NW	NNW	24	
7	NW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	NW	NW	NW	NNW	WNW	NW	NW	NW	NW	NW	NW	W	W	WSW	W	WNW	24	
8	N	NE	NNE	NNE	NE	NE	NE	NE	NE	ENE	ESE	ESE	SE	SE	SE	SSE	S	SSE	SSE	S	S	S	S	S	SE	24	
9	S	S	S	S	S	S	S	SSW	S	S	SSW	SSW	SSW	SW	SW	SW	SW	WSW	NW	NNW	NNW	NNW	NNW	NW	SSW	24	
10	NNW	NNW	N	N	N	NNW	NNW	NW	NW	NW	NW	NW	NW	WNW	WNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	24
11	NNW	NNW	NNW	NNW	NW	NNW	NNW	N	N	NNW	NNW	NNW	NNW	NNW	NW	NW	NW	NNW	NE	ESE	S	S	SSW	WNW	NNW	24	
12	X	X	X	X	X	X	X	X	X	X	X	SE	SW	SW	SW	SW	SW	X	X	X	X	X	X	X	SW	8	
13	X	X	X	X	X	X	X	X	X	X	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	15
14	NW	NW	WSW	SSW	SW	WSW	SSW	WSW	WSW	W	W	WNW	WNW	WNW	NW	WNW	WNW	W	WNW	NW	NW	NW	NW	WNW	WNW	24	
15	WNW	NW	NNW	NNW	N	NNE	NNE	N	NE	ENE	NNE	NNE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	NE	NE	NE	24	
16	NE	NE	NE	NNE	NNE	NNE	NNE	NNE	NNE	NE	NNE	N	NW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	SW	SW	SW	NNW	24	
17	SW	SW	SW	SW	SW	SW	SW	WSW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	NNW	NNE	S	S	SSE	S	SW	24	
18	SSE	SE	SE	ESE	ESE	SE	SE	SSE	SE	E	E	ENE	NE	NE	NE	NE	NE	ENE	ENE	E	E	E	ESE	SE	E	24	
19	S	S	S	S	S	S	S	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	24	
20	WSW	WSW	WSW	SW	W	W	SE	E	ESE	ESE	SE	ESE	ESE	ESE	ESE	SE	SE	SE	SE	SE	SE	SSE	SSE	SE	SSE	24	
21	SSE	S	SSE	SSE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	ESE	ESE	E	E	E	SE	24	
22	E	E	SSW	SW	SW	WSW	SW	SW	W	WNW	W	WSW	W	WSW	W	WSW	W	W	W	W	W	WNW	WNW	SW	WSW	24	
23	WSW	WNW	NW	W	WNW	NNW	NNW	NW	NNW	N	N	NNE	N	N	N	NNE	NNE	NNE	NNE	NE	NE	NNE	NE	NNE	N	24	
24	NE	NE	ENE	ENE	NE	NE	ENE	ESE	ESE	SE	SE	SE	SE	SSE	S	S	SSE	SSE	S	S	S	SSE	SSE	SE	SE	24	
25	SSE	S	SSE	SSE	SE	SSE	SSE	SE	SE	SE	SE	SE	SSE	SSE	SSE	SE	SSE	SSE	SSE	SSE	SSE	SSE	SSE	SSE	SSE	24	
26	SSE	SSE	SSE	SSE	SSE	SSE	SSE	SSE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	24	
27	SE	ESE	ESE	ESE	ESE	ESE	E	ESE	E	ESE	E	ESE	ESE	SE	SE	SE	E	ESE	SE	SE	SE	SE	SE	SE	ESE	24	
28	SE	SE	SE	SSE	SE	SE	SE	SE	SSE	SSE	S	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	S	S	SSE	S	24	
29	SSE	S	SSW	SSW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	WSW	WSW	WSW	WSW	W	W	W	W	SW	24	
30	NNW	SSW	SSW	S	S	S	SSW	SW	SW	SW	SW	WSW	WSW	W	WSW	SSW	S	S	SSE	ESE	SE	ESE	E	ESE	SSW	24	

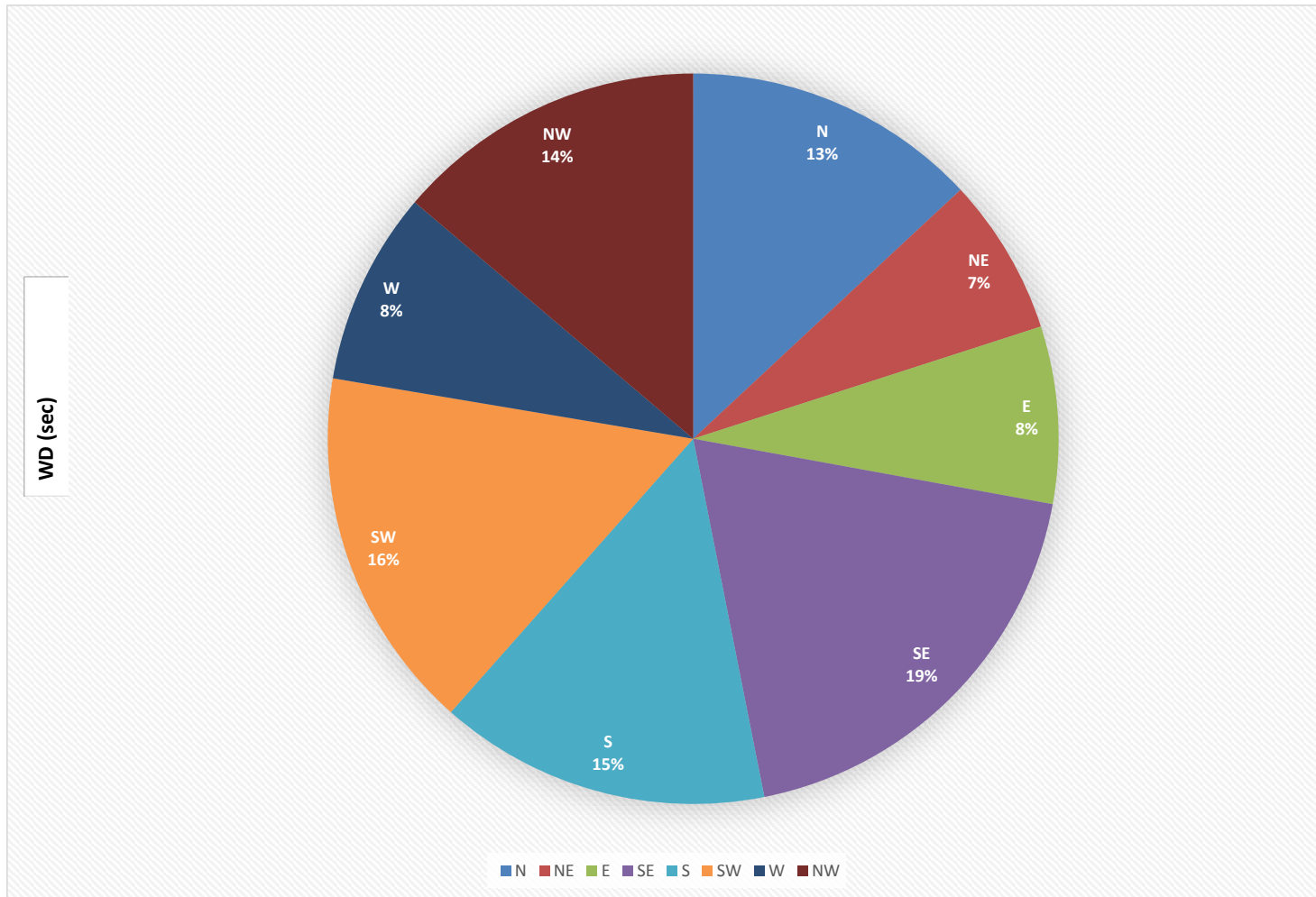
STATUS FLAG CODES

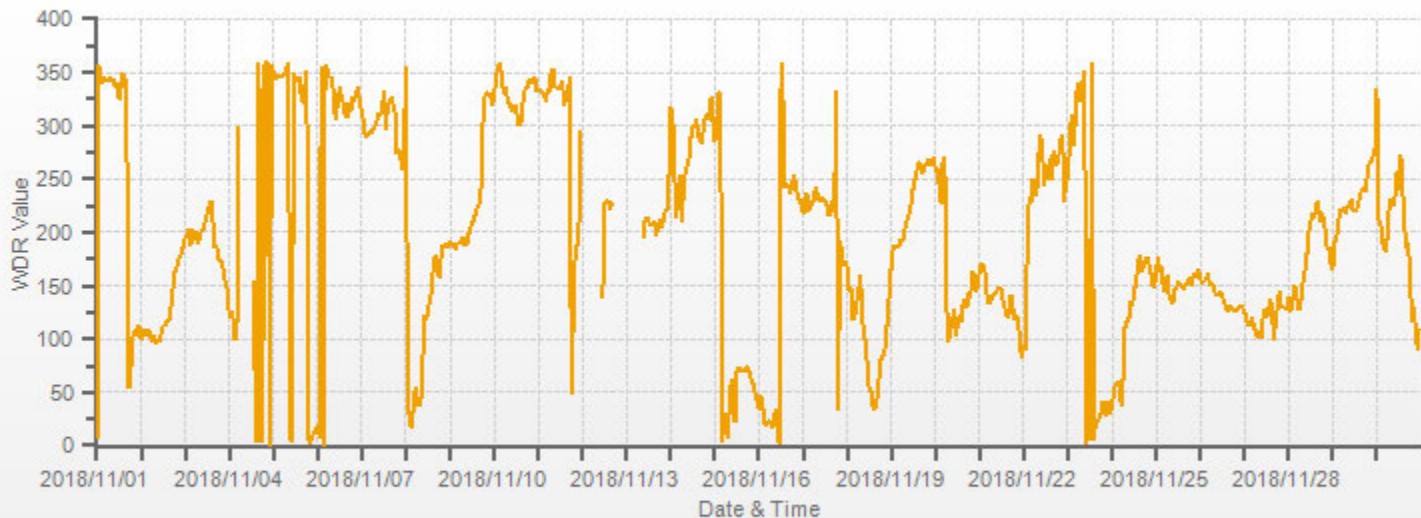
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	May 25, 2017
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	686	hrs
STANDARD DEVIATION:	98		AMD OPERATION UPTIME:	95.3	%
			MONTHLY AVERAGE:	210	(SSW)

WIND DIRECTION Hourly Averages (WD)





STANDARD DEVIATION WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2018

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	13	9	6	19	6	6	7	10	9	8	13	14	16	15	23	22	33	23	26	9	7	5	6	4	24
2	4	4	4	4	4	4	5	8	4	5	5	6	6	7	6	8	6	10	8	6	5	5	5	7	24
3	7	7	5	8	8	6	8	5	5	5	6	5	5	8	12	11	30	7	5	8	5	7	5	7	24
4	6	6	12	6	39	59	X	X	X	X	X	X	X	14	63	12	8	8	8	6	9	7	6	4	18
5	5	5	5	5	4	4	4	5	7	6	8	7	9	11	12	7	4	9	12	11	10	12	10	8	24
6	7	18	14	12	12	17	12	12	16	16	10	17	14	14	10	12	10	5	5	13	5	7	7	11	24
7	7	10	8	7	6	6	10	10	12	14	12	11	13	24	13	9	8	5	10	22	7	13	7	13	24
8	33	8	16	15	7	9	7	7	16	21	21	14	23	20	12	13	12	9	5	7	5	3	5	3	24
9	4	4	3	4	5	6	6	5	5	5	4	7	5	7	6	5	6	10	13	5	4	4	8	7	24
10	6	7	5	5	13	5	5	6	5	6	9	7	8	9	7	7	11	5	5	6	9	9	8	4	24
11	4	5	5	5	6	5	5	12	13	8	4	8	16	18	7	10	6	19	23	27	6	9	8	51	24
12	X	X	X	X	X	X	X	X	X	X	X	X	51	8	5	5	5	5	X	X	X	X	X	X	8
13	X	X	X	X	X	X	X	X	X	7	10	8	13	7	5	9	7	4	6	6	11	4	6	18	15
14	14	12	44	5	13	9	15	23	7	6	8	9	9	8	12	8	3	7	3	5	5	5	5	12	24
15	12	11	6	11	18	8	27	24	19	15	33	61	7	8	9	6	8	6	5	5	4	5	5	8	24
16	4	5	8	6	7	4	5	5	8	7	16	14	11	41	10	9	7	9	3	6	10	5	2	5	24
17	5	4	4	5	4	3	6	3	3	4	4	4	4	5	7	11	8	11	36	15	25	16	14	13	24
18	15	10	9	6	10	7	9	6	12	10	7	13	7	8	7	7	7	15	9	8	8	14	8	15	24
19	17	7	7	6	7	7	6	3	7	4	5	5	6	5	4	3	4	4	3	3	2	1	4	7	24
20	4	4	20	19	10	45	47	8	5	10	14	8	13	8	8	9	8	9	10	9	9	8	7	12	24
21	7	6	5	6	11	6	5	5	9	6	5	5	8	7	6	8	8	5	8	10	6	10	18	9	24
22	11	72	57	11	8	4	11	7	21	15	16	28	16	8	9	11	9	25	9	16	13	13	9	13	24
23	10	12	6	9	13	12	12	7	9	7	7	13	17	12	16	9	8	6	7	11	12	7	10	10	24
24	15	13	12	9	20	31	35	26	19	17	12	12	12	11	16	11	8	8	11	11	6	8	6	6	24
25	7	8	5	10	14	10	11	17	9	10	16	16	11	10	10	9	9	8	8	7	6	10	11	7	24
26	8	8	8	12	8	7	8	8	8	5	7	7	8	6	5	6	6	4	6	5	6	5	5	7	24
27	7	8	7	6	6	6	7	6	8	9	11	8	6	9	12	20	11	10	22	9	8	9	12	9	24
28	7	13	11	13	10	13	8	10	9	9	10	9	7	9	15	8	8	11	13	6	9	14	15	18	24
29	35	8	7	11	8	5	7	7	7	12	5	6	8	6	5	6	9	13	7	5	15	9	12	11	24
30	21	19	20	16	8	10	7	10	7	8	8	15	8	23	62	38	24	22	20	30	11	12	12	18	24

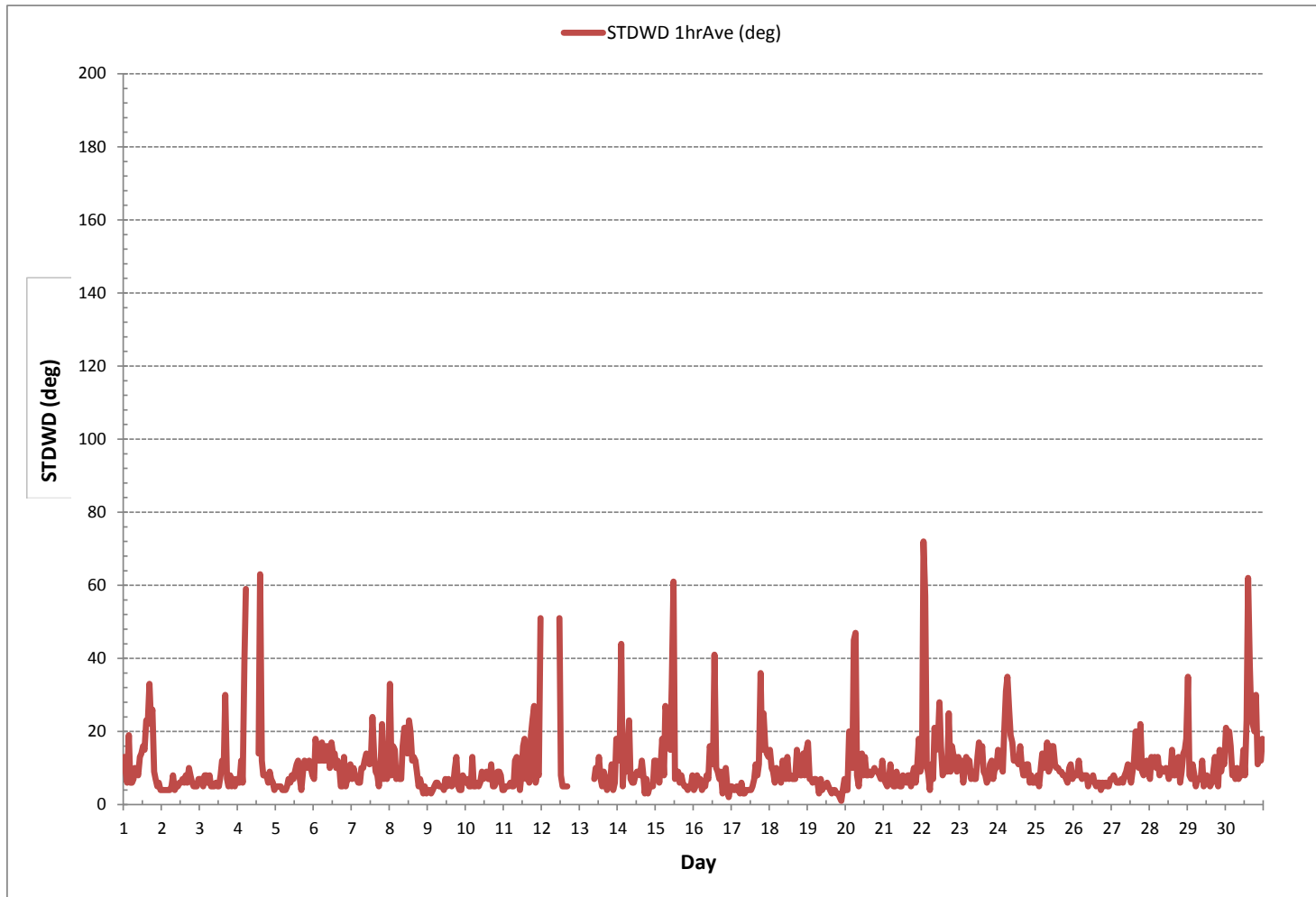
STATUS FLAG CODES

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: May 25, 2017

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 686 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWWD 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	99	99	99	99	100	98	92	89	87	88	86	80	79	77	76	76	77	80	82	83	88	90	90	90	76	100	88	24					
2	92	91	90	91	91	91	91	92	93	93	95	94	91	93	94	94	94	95	96	96	96	95	94	96	90	96	93	24					
3	95	94	94	95	95	95	95	95	94	94	94	93	89	85	86	87	89	91	91	92	92	93	95	97	85	97	93	24					
4	98	100	100	100	100	100	100	100	100	100	100	100	99	99	100	100	97	94	93	91	90	90	88	87	87	100	97	24					
5	87	87	85	84	85	86	86	86	85	82	78	77	75	75	76	78	82	83	84	85	85	85	85	85	75	87	83	24					
6	85	85	86	86	86	87	86	86	85	83	82	79	79	79	80	79	81	81	83	81	80	80	81	83	79	87	83	24					
7	82	82	85	87	88	88	86	81	86	82	76	77	79	80	78	80	78	75	74	77	82	86	88	89	74	89	82	24					
8	89	90	89	89	89	87	83	81	77	77	73	74	74	72	72	71	72	74	79	81	83	82	79	79	71	90	80	24					
9	80	80	82	83	83	83	83	84	89	89	89	88	90	90	91	92	93	93	95	94	92	92	94	95	80	95	88	24					
10	94	91	89	90	87	86	86	86	86	87	85	80	73	66	68	68	69	81	83	81	77	72	77	77	66	94	81	24					
11	79	79	80	80	82	82	82	79	81	80	77	72	73	72	72	78	83	86	88	92	92	91	90	72	92	81	24						
12	90	90	90	90	90	90	90	90	90	90	89	88	85	83	83	83	85	X	X	X	X	X	X	X	83	90	88	17					
13	X	X	X	X	X	X	X	X	X	86	80	71	67	62	62	66	71	74	76	76	78	78	79	76	62	86	73	15					
14	53	46	61	75	76	68	71	69	61	57	49	50	49	50	52	57	62	65	67	71	75	79	82	86	46	86	64	24					
15	89	91	95	97	98	96	96	96	95	94	94	92	94	96	90	85	83	81	83	85	88	89	88	81	98	91	24						
16	87	83	81	81	78	82	80	82	82	73	69	68	64	62	61	64	71	77	84	86	87	88	89	88	61	89	78	24					
17	88	88	88	87	87	88	88	88	87	85	85	84	80	72	65	69	75	78	79	80	83	85	83	83	65	88	82	24					
18	85	89	89	90	91	90	91	91	92	91	89	88	88	88	87	86	86	87	88	88	86	87	89	92	85	92	89	24					
19	95	94	94	93	92	93	93	94	95	95	95	94	93	87	84	84	87	91	92	94	95	95	95	96	84	96	92	24					
20	98	97	98	100	99	98	100	100	99	98	98	98	98	99	99	99	100	100	100	100	100	100	99	99	97	100	99	24					
21	99	99	99	99	99	97	97	97	97	97	97	97	97	97	98	98	98	98	97	97	97	97	97	97	97	99	98	24					
22	97	96	96	96	96	95	95	94	96	96	96	96	96	96	91	90	84	88	86	86	81	81	96	95	81	97	93	24					
23	94	88	87	94	93	93	92	91	94	92	96	96	93	92	93	94	95	94	93	93	92	90	90	90	87	96	92	24					
24	91	92	92	92	94	95	95	96	96	95	94	93	92	92	92	92	92	92	92	93	93	92	92	91	91	96	93	24					
25	92	92	93	93	93	93	93	93	93	93	95	95	95	95	96	98	100	99	98	98	98	98	97	97	92	100	95	24					
26	96	96	96	95	95	95	95	95	95	95	95	96	96	96	96	96	96	96	96	96	96	96	97	97	95	97	96	24					
27	97	97	97	97	97	97	98	98	97	97	97	97	97	97	97	97	96	97	97	97	97	96	97	96	96	96	98	97	24				
28	96	96	96	96	96	96	96	96	96	97	97	97	98	98	98	98	98	98	97	97	96	96	95	96	95	98	97	24					
29	95	96	96	96	96	96	95	95	95	96	97	98	99	99	100	100	100	100	100	100	100	100	99	100	95	100	98	24					
30	99	97	99	99	99	99	98	98	98	98	99	100	100	100	100	100	100	100	100	100	100	100	100	100	97	100	99	24					
HOURLY MAX	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	24					
HOURLY AVG	90	90	91	92	92	91	91	90	90	89	88	87	86	85	85	85	86	88	89	89	89	90	91	91									

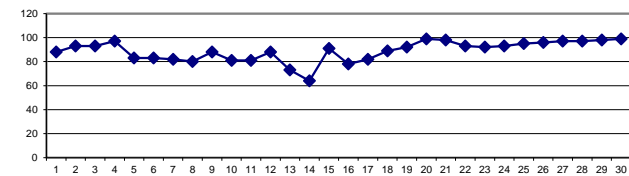
STATUS FLAG CODES

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

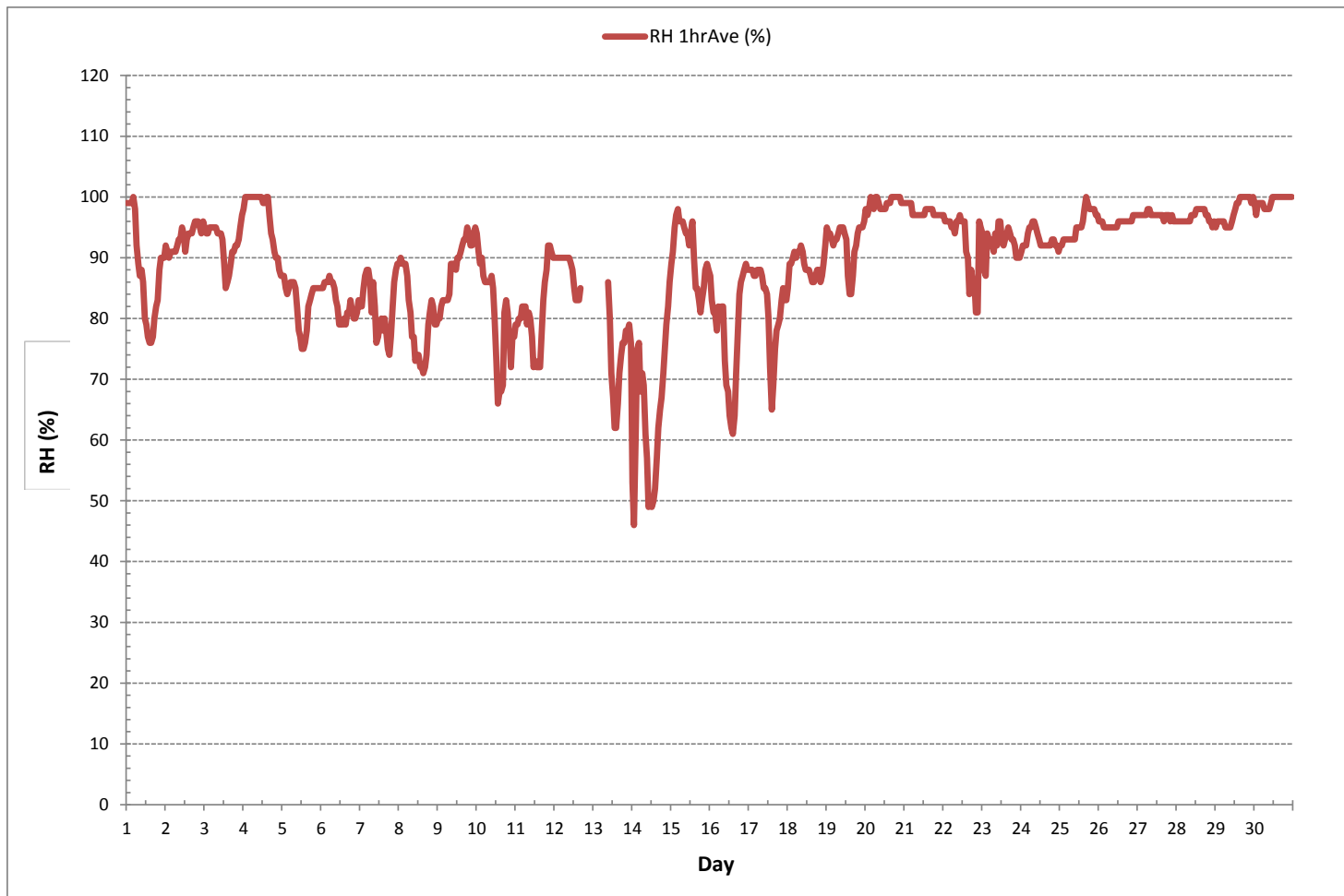
MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	46	%	@ HOUR	1	ON DAY	14
MAXIMUM 1-HR AVERAGE:	100	%	@ HOUR	4	ON DAY	1
MAXIMUM 24-HR AVERAGE:	99	%			ON DAY	20
OPERATIONAL TIME:						704 hrs
AMD OPERATION UPTIME:						97.8 %
STANDARD DEVIATION:	10					MONTHLY AVERAGE: 89 %

24 HR AVERAGES November 2018



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	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	921	922	923	924	925	926	927	928	928	929	929	930	931	931	931	930	930	929	929	928	927	926	921	931	928	24			
2	926	925	924	923	923	922	922	921	921	922	922	922	922	923	924	924	925	926	926	927	927	927	927	927	927	921	927	924	24
3	927	927	927	927	927	926	926	925	925	925	925	925	924	924	924	923	923	921	920	920	918	917	916	916	927	924	24		
4	914	913	913	911	910	909	909	909	909	908	908	908	908	909	910	911	912	913	914	916	917	917	918	919	908	919	912	24	
5	920	921	922	923	923	924	925	925	926	927	927	928	929	929	929	930	930	930	931	931	932	932	933	933	920	933	928	24	
6	933	934	934	934	934	935	935	935	936	936	936	937	937	937	937	937	937	937	937	937	937	937	938	938	933	938	936	24	
7	938	937	937	937	937	937	937	937	937	937	937	937	937	937	936	936	936	936	936	935	935	935	935	935	935	935	938	936	24
8	935	936	936	936	936	937	937	938	939	939	940	940	941	941	940	941	940	940	939	939	939	938	937	935	935	941	938	24	
9	935	933	932	930	929	927	926	925	924	923	922	921	921	920	920	919	919	920	921	921	922	923	919	935	924	24			
10	923	924	926	927	928	928	929	929	930	930	931	931	932	932	932	932	932	932	933	933	934	934	935	936	923	936	931	24	
11	936	937	937	937	938	938	939	940	941	942	943	943	944	944	944	944	944	943	942	942	941	941	936	944	941	24			
12	940	940	939	938	937	936	936	935	935	935	935	935	935	935	934	934	934	X	X	X	X	X	X	X	934	940	936	17	
13	X	X	X	X	X	X	X	X	X	928	929	928	928	927	926	926	926	925	925	924	924	924	924	924	924	929	926	15	
14	924	925	924	923	923	923	923	923	923	923	923	924	923	923	923	923	923	923	923	924	924	925	925	926	923	926	923	24	
15	926	927	927	928	928	928	929	929	930	930	930	930	930	929	929	929	928	928	928	928	929	930	930	931	926	931	929	24	
16	932	934	935	937	938	939	940	941	942	942	943	943	944	944	944	944	943	942	942	941	941	940	939	939	932	944	940	24	
17	938	937	936	935	934	933	932	931	931	931	931	931	930	930	930	929	929	928	927	927	926	926	925	925	925	938	930	24	
18	924	923	923	922	922	921	921	920	921	921	921	922	923	924	925	926	927	928	929	929	930	930	930	930	920	930	925	24	
19	930	930	930	929	929	928	928	927	926	926	925	925	925	925	925	925	925	925	924	925	924	924	925	924	924	930	926	24	
20	924	924	924	924	923	924	923	923	923	923	924	924	923	923	923	923	923	923	923	923	923	922	922	922	922	924	923	24	
21	922	921	921	920	920	919	919	918	918	918	918	917	917	916	915	915	914	913	912	912	911	911	911	911	911	911	922	916	24
22	910	910	910	910	910	909	909	909	910	911	911	912	912	913	912	912	912	912	912	912	912	913	913	912	909	913	911	24	
23	913	913	914	914	914	915	915	916	916	917	917	918	917	918	918	918	918	918	919	919	920	920	920	921	913	921	917	24	
24	921	922	923	923	923	924	925	925	925	926	926	927	927	927	927	928	928	928	928	928	928	928	928	928	921	928	926	24	
25	929	929	929	929	929	930	930	930	930	931	931	931	932	932	932	932	932	932	932	931	931	931	931	931	929	932	931	24	
26	930	930	929	929	928	928	928	927	927	926	926	925	924	924	923	923	922	921	920	919	919	918	917	917	930	925	24		
27	917	917	916	915	915	915	915	914	914	914	914	913	912	912	912	912	912	912	912	911	911	911	911	911	911	917	913	24	
28	912	912	911	912	911	911	911	911	911	912	912	912	912	912	912	912	912	912	912	912	912	912	912	912	911	912	912	24	
29	912	912	912	912	912	912	912	912	912	913	913	913	913	914	914	914	915	915	915	915	915	915	915	915	912	915	913	24	
30	915	915	916	916	916	916	916	917	917	918	918	919	919	920	920	921	921	922	922	923	923	923	924	915	924	919	24		
HOURLY MAX	940	940	939	938	938	939	940	941	942	942	943	943	944	944	944	944	944	944	943	943	942	942	941	941					
HOURLY AVG	925	925	925	925	925	925	925	925	925	925	926	926	926	926	926	926	926	926	925	925	925	925	925	925					

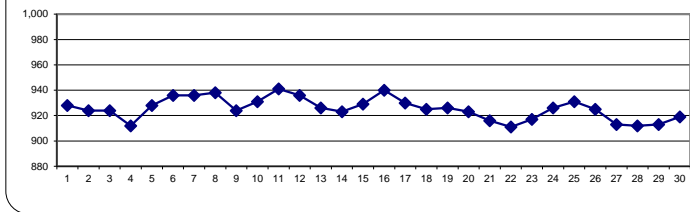
STATUS FLAG CODES

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

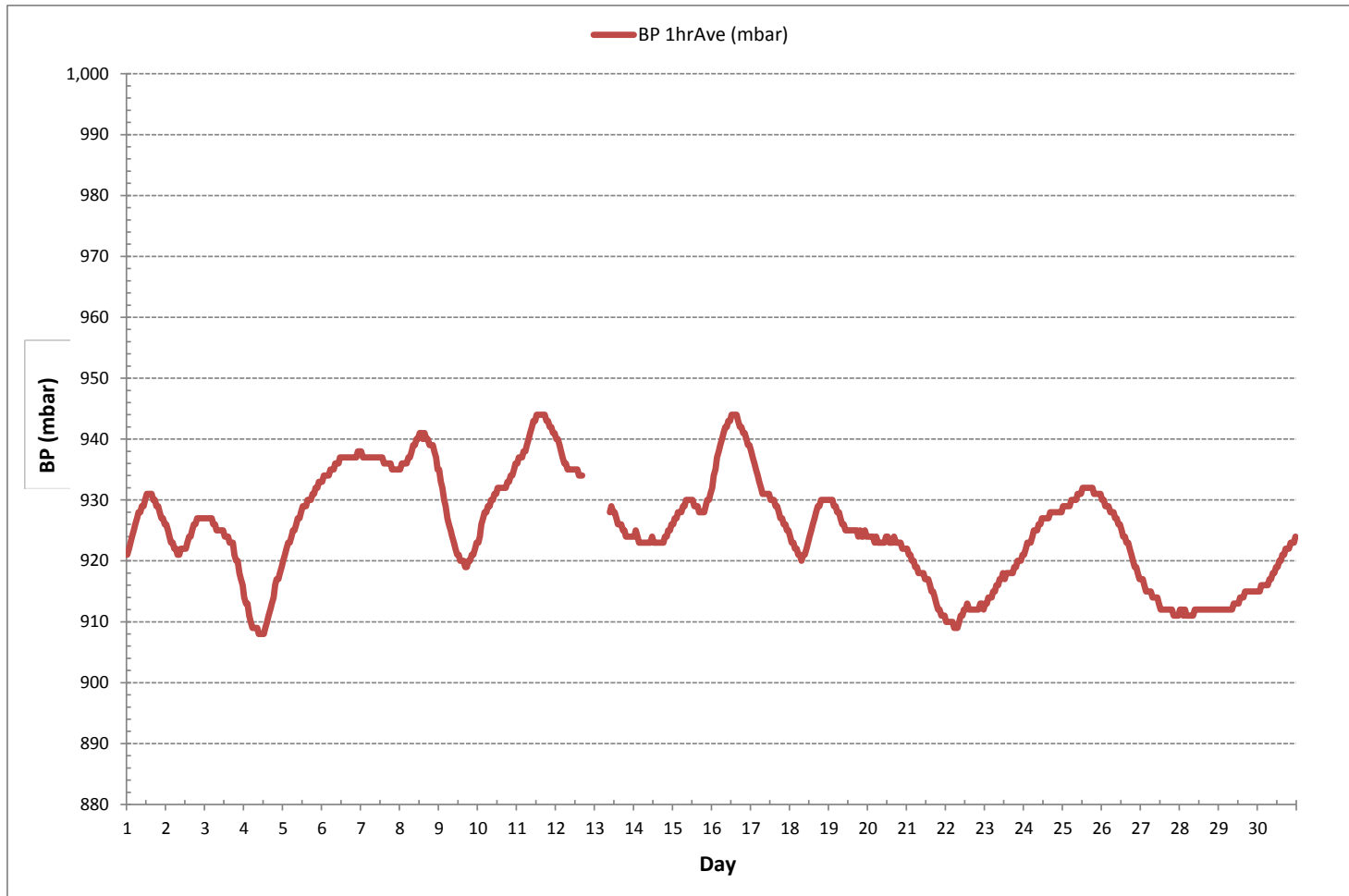
MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	908	mbar	@ HOUR	9	ON DAY	4
MAXIMUM 1-HR AVERAGE:	944	mbar	@ HOUR	12	ON DAY	11
MAXIMUM 24-HR AVERAGE:	941	mbar			ON DAY	11
OPERATIONAL TIME:						704 hrs
AMD OPERATION UPTIME:						97.8 %
STANDARD DEVIATION:	9					MONTHLY AVERAGE: 925 mbar

24 HR AVERAGES November 2018



BAROMETRIC PRESSURE Hourly Averages (BP mbar)



AMBIENT TEMPERATURE



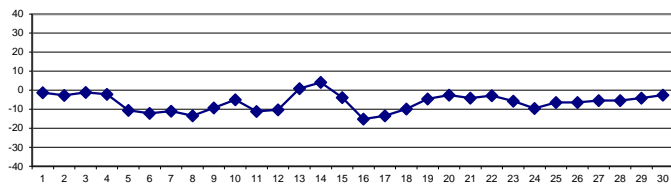
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

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	2.0	1.6	0.5	0.6	0.2	-0.3	-0.8	-1.5	-1.9	-2.2	-2.2	-1.8	-1.3	-1.0	-0.7	-0.9	-1.3	-1.7	-2.2	-2.6	-3.3	-3.8	-3.9	-3.8	-3.9	2.0	-1.3	24
2	-4.2	-4.2	-3.9	-3.6	-3.3	-2.9	-2.7	-2.4	-2.2	-1.8	-1.6	-1.4	-1.3	-1.4	-1.7	-1.8	-2.1	-2.4	-2.6	-2.9	-3.0	-3.2	-3.7	-4.3	-4.3	-1.3	-2.7	24
3	-4.1	-4.2	-4.1	-4.0	-3.7	-3.7	-3.7	-3.6	-3.0	-2.4	-1.5	-0.5	0.3	1.2	1.2	1.2	1.0	0.8	1.0	0.9	0.7	0.7	0.5	0.0	-4.2	1.2	-1.2	24
4	-0.2	-0.3	-0.2	-0.2	-0.3	-0.3	-0.4	-0.6	-0.7	-0.8	-0.7	-0.6	-0.4	-0.3	-0.2	-0.3	-1.7	-3.7	-4.8	-5.4	-5.9	-6.4	-7.1	-7.7	-7.7	-0.2	-2.1	24
5	-8.3	-9.2	-9.9	-10.4	-11.1	-11.3	-11.3	-11.2	-10.8	-10.5	-9.7	-9.4	-8.8	-9.1	-9.5	-10.3	-11.3	-11.1	-11.1	-11.2	-11.4	-11.6	-11.8	-12.0	-12.0	-8.3	-10.5	24
6	-12.1	-12.2	-12.4	-12.5	-12.7	-12.8	-13.0	-13.1	-12.9	-12.7	-12.5	-12.1	-11.6	-11.5	-11.5	-11.5	-11.6	-12.0	-12.3	-11.7	-11.8	-11.7	-11.8	-11.8	-13.1	-11.5	-12.2	24
7	-11.8	-11.8	-11.7	-11.6	-11.5	-11.5	-11.5	-11.4	-11.4	-11.1	-10.9	-10.8	-10.7	-10.3	-10.1	-10.2	-10.3	-10.5	-10.7	-10.9	-10.7	-10.5	-10.7	-10.6	-11.8	-10.1	-11.0	24
8	-10.7	-11.6	-11.7	-11.8	-12.4	-13.0	-13.7	-14.0	-14.2	-14.1	-13.6	-13.0	-12.8	-12.7	-12.6	-12.9	-13.3	-14.9	-15.6	-16.1	-15.8	-15.4	-15.7	-16.1	-16.1	-10.7	-13.5	24
9	-15.6	-15.5	-15.2	-15.0	-14.3	-13.5	-12.8	-11.8	-11.2	-10.2	-9.4	-8.5	-7.9	-7.3	-7.0	-6.7	-6.3	-5.9	-4.9	-4.5	-4.9	-5.0	-5.2	-5.2	-15.6	-4.5	-9.3	24
10	-4.8	-5.0	-5.3	-5.7	-6.3	-6.5	-6.5	-6.6	-6.5	-6.0	-5.3	-4.3	-3.6	-2.7	-2.9	-3.0	-3.2	-4.2	-4.6	-4.7	-4.9	-4.9	-5.5	-7.2	-7.2	-2.7	-5.0	24
11	-7.5	-7.7	-8.4	-9.2	-9.5	-9.5	-9.7	-9.9	-10.1	-10.0	-9.9	-10.1	-10.1	-10.3	-10.7	-11.0	-12.3	-12.9	-13.4	-13.8	-15.3	-15.7	-15.8	-16.1	-16.1	-7.5	-11.2	24
12	-15.9	-15.2	-14.7	-14.3	-13.6	-12.8	-12.7	-12.0	-11.3	-10.2	-9.0	-8.1	-7.0	-5.7	-4.8	-4.3	-4.2	X	X	X	X	X	X	X	-15.9	-4.2	-10.3	17
13	X	X	X	X	X	X	X	X	X	-3.2	-1.5	1.0	2.4	3.5	3.6	2.5	1.3	0.9	0.4	0.5	0.2	0.6	0.6	1.3	-3.2	3.6	0.9	15
14	6.0	7.5	4.4	1.8	1.3	2.5	1.9	2.1	3.4	4.6	6.5	7.3	7.8	7.6	7.3	6.1	4.8	4.2	3.8	2.8	2.2	1.5	1.0	0.2	0.2	7.8	4.1	24
15	-0.4	-0.7	-1.3	-1.7	-2.1	-2.2	-2.2	-2.3	-2.1	-2.3	-2.0	-1.8	-2.4	-3.4	-4.0	-4.2	-4.6	-5.2	-5.9	-6.6	-7.2	-7.8	-8.5	-9.3	-9.3	-0.4	-3.8	24
16	-10.5	-11.3	-12.2	-13.1	-14.1	-14.9	-15.5	-15.7	-16.0	-15.7	-15.0	-14.7	-13.9	-13.2	-12.7	-13.3	-14.8	-15.9	-17.2	-18.1	-18.9	-19.4	-19.8	-19.6	-19.8	-10.5	-15.2	24
17	-19.7	-19.8	-18.9	-19.1	-19.1	-18.5	-18.0	-17.6	-17.7	-16.0	-13.8	-11.9	-10.1	-8.7	-7.3	-8.1	-9.4	-9.8	-10.1	-9.9	-10.4	-10.5	-10.1	-9.6	-19.8	-7.3	-13.5	24
18	-9.5	-9.3	-9.0	-8.9	-9.3	-9.1	-9.1	-8.7	-8.6	-8.4	-8.2	-9.5	-10.1	-10.5	-10.6	-10.6	-10.7	-10.7	-10.7	-10.9	-11.0	-11.3	-11.4	-11.4	-11.4	-8.2	-9.8	24
19	-11.0	-10.5	-10.2	-10.0	-9.8	-9.4	-9.1	-8.9	-8.2	-7.5	-6.2	-4.5	-2.9	-0.9	0.5	1.0	0.9	-0.2	-0.3	-0.4	-0.3	-0.4	-0.3	-0.4	-11.0	1.0	-4.5	24
20	-0.9	-0.8	-1.6	-2.6	-1.5	-1.7	-4.3	-5.3	-4.4	-4.3	-3.3	-2.9	-2.5	-2.1	-2.3	-2.4	-2.4	-2.5	-2.3	-2.3	-2.5	-2.6	-2.8	-5.3	-0.8	-2.6	24	
21	-3.0	-3.1	-3.1	-3.0	-3.6	-4.8	-5.4	-5.6	-5.3	-4.7	-4.0	-3.7	-3.2	-2.8	-3.1	-3.7	-4.3	-4.4	-4.6	-4.7	-4.6	-4.6	-4.8	-5.5	-5.6	-2.8	-4.1	24
22	-5.5	-6.0	-5.8	-5.7	-6.4	-6.8	-7.2	-8.0	-5.4	-3.2	-2.6	-2.7	-1.8	-0.5	0.4	0.6	1.1	0.3	0.0	-0.1	0.6	0.6	-2.5	-2.9	-8.0	1.1	-2.9	24
23	-3.0	-2.3	-2.9	-4.3	-4.5	-4.5	-3.9	-4.2	-4.3	-4.1	-4.4	-5.0	-5.7	-6.3	-6.9	-7.6	-7.7	-7.8	-7.7	-7.6	-7.6	-7.9	-8.1	-8.1	-8.1	-2.3	-5.7	24
24	-8.3	-8.6	-8.8	-9.0	-9.3	-9.6	-9.9	-10.2	-10.5	-10.4	-10.3	-10.2	-9.9	-9.4	-9.5	-9.5	-9.2	-9.2	-9.3	-9.3	-9.3	-9.0	-8.8	-8.6	-10.5	-8.3	-9.5	24
25	-8.3	-7.9	-7.7	-7.6	-7.4	-7.2	-7.0	-7.0	-7.3	-6.9	-6.5	-5.8	-5.4	-5.4	-5.1	-5.4	-5.8	-5.7	-5.4	-5.4	-5.3	-5.2	-5.6	-6.4	-8.3	-5.1	-6.4	24
26	-6.5	-6.7	-6.9	-7.5	-7.7	-7.4	-7.2	-7.2	-7.0	-7.0	-6.6	-5.9	-5.7	-5.9	-5.9	-6.2	-6.3	-6.2	-5.9	-5.4	-5.2	-5.2	-5.3	-7.7	-5.2	-6.4	24	
27	-5.3	-5.3	-5.3	-5.2	-5.1	-5.2	-5.1	-5.0	-5.1	-5.6	-5.2	-5.2	-5.2	-5.2	-5.5	-6.0	-5.7	-5.8	-5.8	-5.8	-5.8	-5.8	-5.9	-6.0	-6.0	-5.0	-5.4	24
28	-6.0	-6.0	-6.3	-6.4	-6.4	-6.5	-6.5	-6.4	-6.1	-5.6	-5.0	-4.2	-3.2	-3.0	-3.3	-3.6	-3.9	-4.4	-5.2	-5.7	-6.3	-6.8	-7.1	-6.8	-7.1	-3.0	-5.4	24
29	-7.2	-5.9	-6.1	-6.2	-6.2	-6.6	-7.3	-7.6	-7.6	-6.5	-5.0	-4.0	-2.9	-2.2	-1.8	-1.8	-1.8	-2.0	-2.2	-2.1	-2.1	-2.2	-2.5	-2.3	-7.6	-1.8	-4.2	24
30	-2.4	-5.3	-3.5	-3.3	-3.1	-2.9	-4.1	-4.7	-4.4	-4.0	-3.1	-1.6	-1.0	-1.2	-1.1	-1.2	-1.4	-1.5	-1.4	-1.6	-1.8	-1.8	-2.0	-2.0	-5.3	-1.0	-2.5	24
HOURLY MAX	6.0	7.5	4.4	1.8	1.3	2.5	1.9	2.1	3.4	4.6	6.5	7.3	7.8	7.6	7.3	6.1	4.8	4.2	3.8	2.8	2.2	1.5	1.0	1.3				
HOURLY AVG	-6.7	-6.8	-7.0	-7.2	-7.3	-7.3	-7.5	-7.6	-7.3	-6.8	-6.1	-5.5	-5.0	-4.7	-4.6	-4.8	-5.2	-5.6	-5.9	-6.1	-6.3	-6.4	-6.7	-6.9				

STATUS FLAG CODES

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

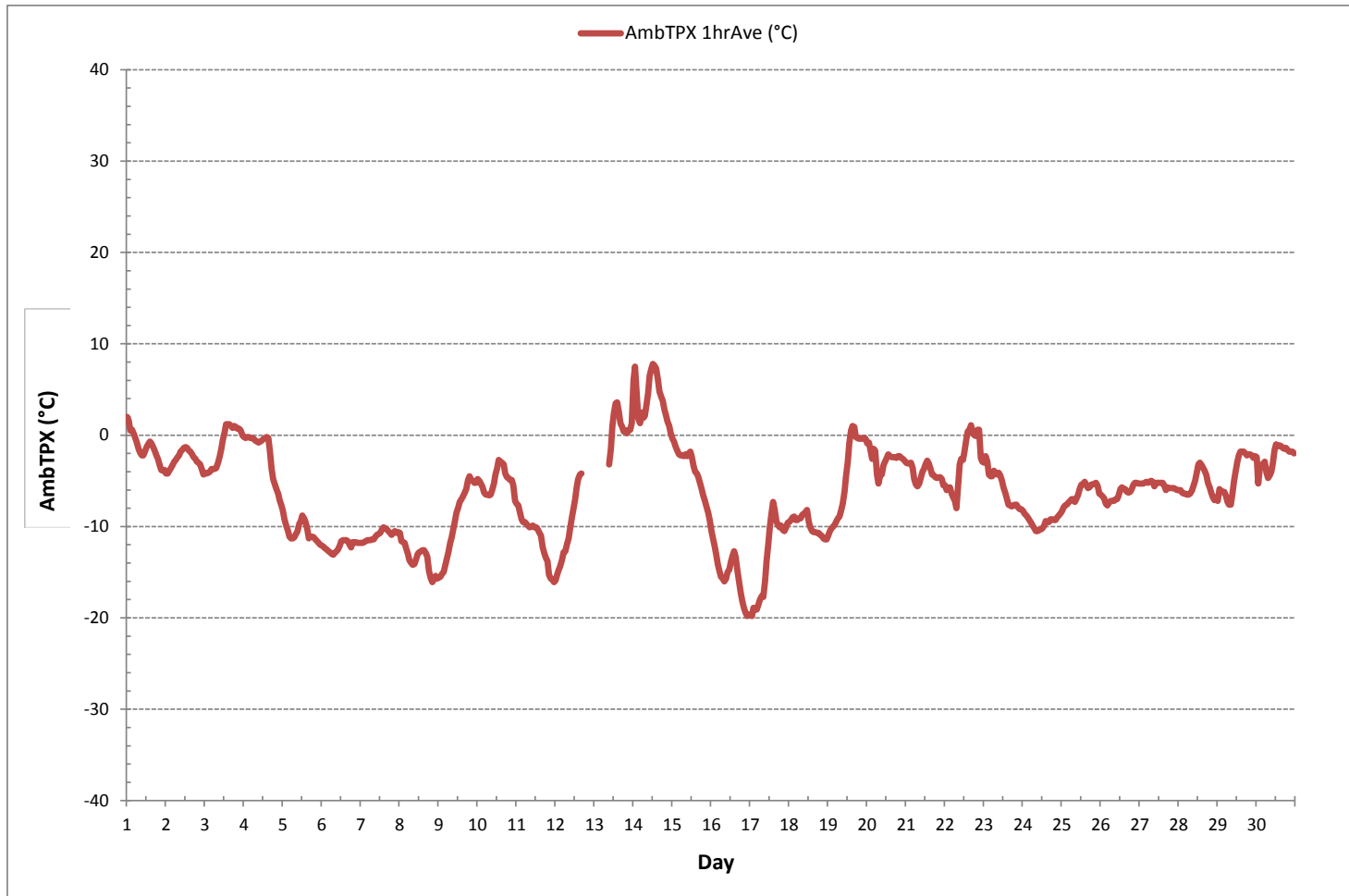
24 HR AVERAGES November 2018



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-19.8 °C	@ HOUR	22	ON DAY	16
MAXIMUM 1-HR AVERAGE:	7.8 °C	@ HOUR	12	ON DAY	14
MAXIMUM 24-HR AVERAGE:	4.1 °C			ON DAY	14
OPERATIONAL TIME:					704 hrs
AMD OPERATION UPTIME:					97.8 %
STANDARD DEVIATION:	5.0	MONTHLY AVERAGE:			-6.3 °C

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



PRECIPITATION

PRECIPITATION Hourly Totals (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.	SUM		
DAY 1	0.2	0.3	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Y	Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.3	22
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.5	0.1	0.2	0.4	0.1	0.0	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.5	2.2	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	0.1	0.5	0.8	1.2	0.5	0.8	1.5	1.4	0.8	0.3	0.5	0.2	0.4	0.4	0.1	0.1	0.0	0.0	1.5	9.6	24
5	0.3	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.7	24
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.2	0.2	0.5	0.0	0.7	0.4	0.3	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	2.5	24
10	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	0.0	0.1	0.1	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	X	X	X	X	X	X	X	X	0.0	0.0	0.0	17
13	X	X	X	X	X	X	X	X	X	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15
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	0.3	0.2	0.2	0.0	0.0	0.0	0.3	0.7	24
16	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	0.1	0.2	0.1	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.8	24
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	24
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	0.0	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	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	0.1	0.1	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	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	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	0.3	0.3	0.5	0.3	0.2	0.1	0.0	0.0	0.2	0.5	0.8	1.2	0.7	0.8	1.5	1.4	0.8	0.3	0.5	0.2	0.4	0.4	0.2	0.1	0.0				
HOURLY AVG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	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				

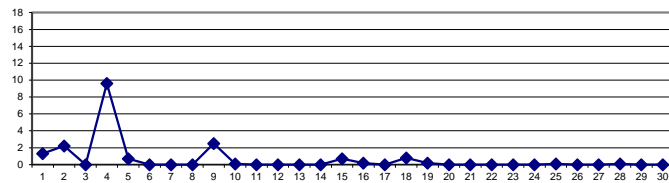
STATUS FLAG CODES

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

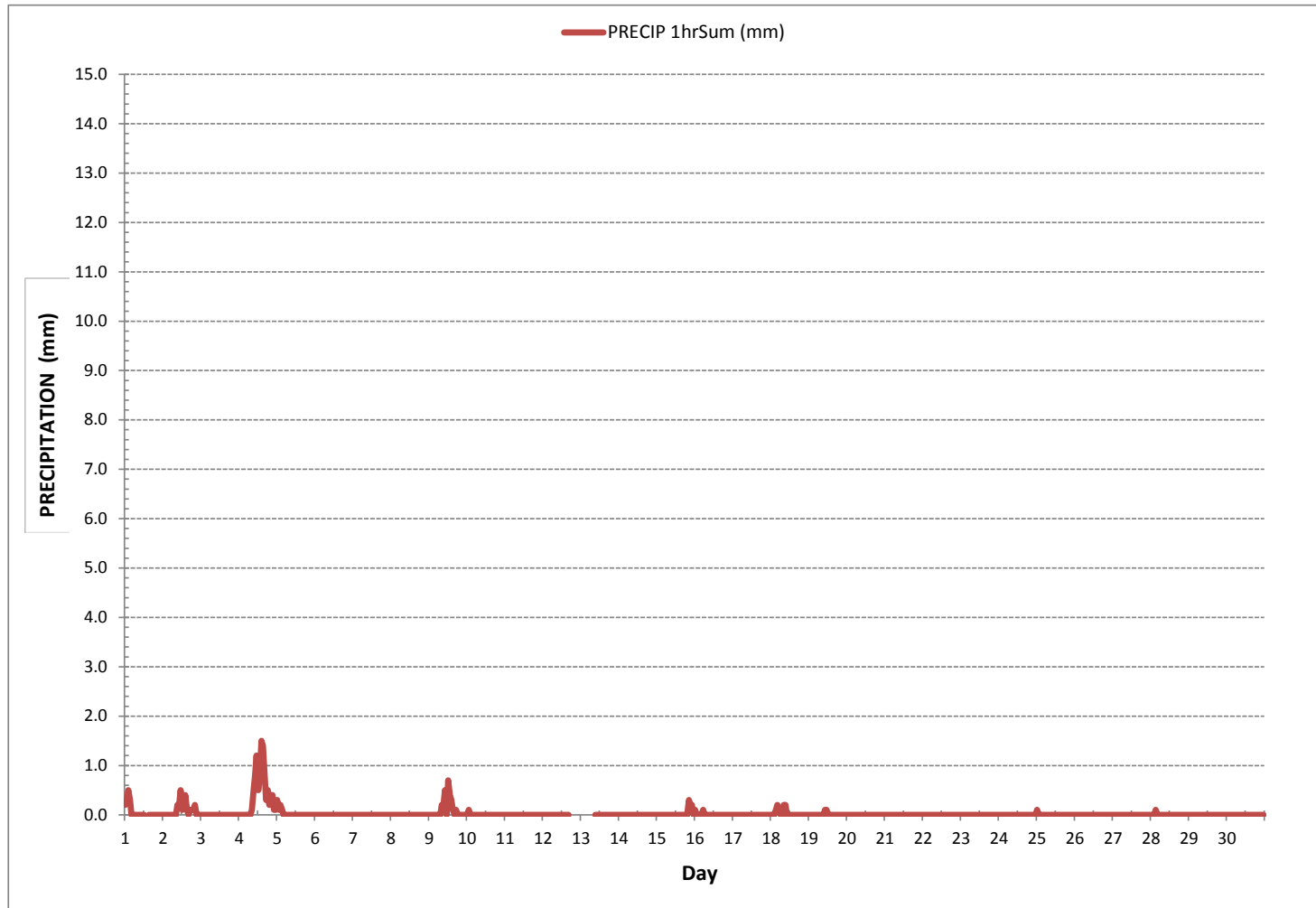
MONTHLY SUMMARY

MINIMUM 1-HR TOTAL:	0.0 mm	@ HOUR	4	ON DAY	1
MAXIMUM 1-HR TOTAL:	1.5 mm	@ HOUR	14	ON DAY	4
MAXIMUM 24-HR TOTAL:	9.6 mm			ON DAY	4
MONTHLY TOTAL	18.5 mm				
OPERATIONAL TIME:					702 hrs
AMD OPERATION UPTIME:					97.5 %
STANDARD DEVIATION:	0.1	MONTHLY TOTAL:			18.5 mm

24 HR Total November 2018



PRECIPITATION Hourly Totals (mm)



APPENDIX II
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE



Thermo 43I-TLE Sulphur Dioxide Analyzer Calibration

Date:	Nov 16, 2018	Barometer/B.P./units:	F.S. 05544 expires January 15, 2019	943	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	St. Lina	Weather Conditions:	Mainly sunny		
Parameter:	Sulphur Dioxide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	12:21	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	17:49	Cal Gas Expiry Date:	October 24, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		
Analyzer:					
Serial Number/Owner:	1180930030 LICA	Range ppb:	1000		
Last Calibration Date:	Oct 10, 2018	As Found C.F.:	1.017		
Previous C.F.:	1.001	New C.F.:	1.000		

Calibration Standards: Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: API id# 690 expires March 15, 2019 Cal Gas Cylinder I.D. #: LL 104225 Cal Gas Conc. (ppm): 49.2	Standard Calibration Points for Ranges <table border="1"> <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
Point	ppb								
High	780								
Mid	380								
Low	190								

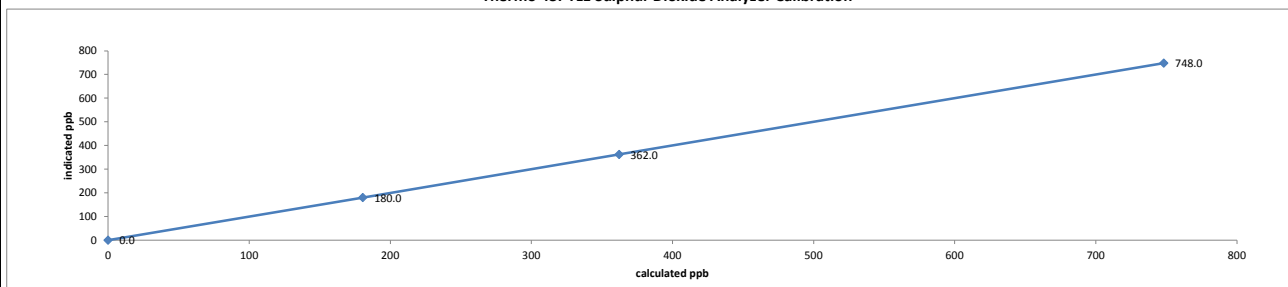
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	5015	0.00	5015	0.0	0	n/a
as found high	4894	75.58	4970	748.2	736	1.017
adjusted zero	5015	0.00	5015	0.0	0	n/a
adjusted high	4894	75.58	4970	748.2	748	1.000
mid	4976	36.90	5013	362.2	362	1.000
low	4996	18.40	5014	180.6	180	1.003
calibrator zero	5015	0.00	5015	0.0	0	n/a
Average C.F. =						1.001

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.000		0.95-1.05
b (Intercept as % of full scale) =	0.02%		± 3% F.S.
% change in C.F. from last cal =	-1.56%		± 10%

Thermo 43I-TLE Sulphur Dioxide Analyzer Calibration

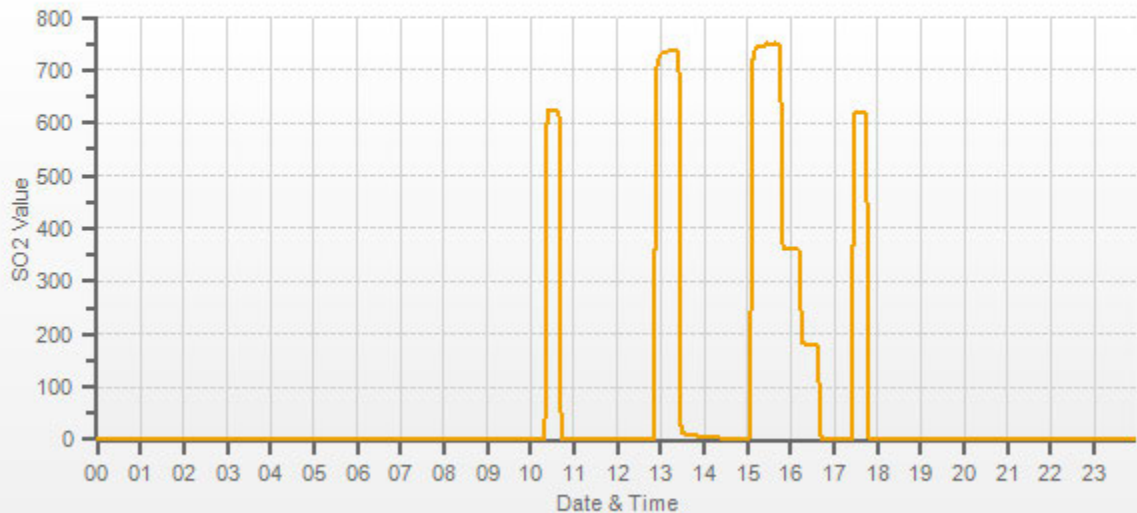


As found:		As left:	
Bkg:	3.76	Bkg:	3.77
Coef:	1.042	Coef:	1.042
Pmt:	-696.7	Pmt:	-696.3
Flash:	999	Flash:	999
Internal:	30.5	Internal:	30.2
Chamber:	45.0	Chamber:	45.0
Perm Oven Gas:	45.00	Perm Oven Gas:	44.99
Perm Oven Heater:	44.14	Perm Oven Heater:	44.14
Pressure:	681.2	Pressure:	680.9
Sample Flow:	0.445	Sample Flow:	0.446
Lamp Intensity:	91	Lamp Intensity:	91
Converter:	n/a	Converter:	n/a
Converter Set:	n/a	Converter Set:	n/a
Averaging Time:	120	Averaging Time:	120
Expected Value:	635.0	Expected Value:	619.0

Comments:
 The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned. The manifold blower was found to be working normally.
 No zero adjustment was required/made. The "as found" zero value was copied to the adjusted zero value field for linearity calculation purposes.

SO2[ppb] Station: LICA ST. LINA Daily: 18/11/16 Type: AVG 1 Min. [1 Min.]

— SO2[ppb]



HYDROGEN SULPHIDE



Thermo 450i Hydrogen Sulphide Analyzer Calibration

Date:	November 13, 2018	Barometer/B.P./units:	F.S. 05544 expires January 15, 2019	927	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	23	°C
Location/Station Name:	St. Lina	Weather Conditions:	Mainly sunny		
Parameter:	Hydrogen Sulphide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	13:48	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	18:32	Cal Gas Expiry Date:	October 20, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		
Analyzer:					
Serial Number/Owner:	CM 18010058 LICA	Range ppb:	100		
Last Calibration Date:	October 28, 2018	As Found C.F.:	1.007		
Previous C.F.:	1.000	New C.F.:	1.000		

Calibration Standards: Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: API id# 690 expires March 15, 2019 Cal Gas Cylinder I.D. #: EY 0001003 Cal Gas Conc. (ppm): 9.55	Standard Calibration Points for Ranges <table border="1"> <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 minutes): Start/End Time 24 hr.: 14:02 / 14:18 SO2 Analyzer Range: 1000 Target Concentration (ppb): 780 As Found Zero: 0.4 Analyzer Response: (ppb): 0.5 Zero Corrected Result (ppb): 0.1
Point	ppb									
High	78									
Mid	38									
Low	19									

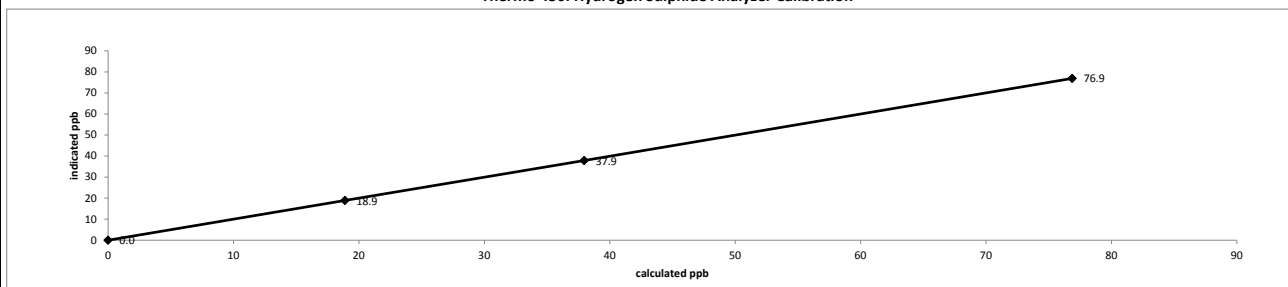
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	7565	0.00	7565	0.0	0.4	n/a
as found high	7500	60.85	7561	76.9	76.7	1.007
adjusted zero	7565	0.00	7565	0.0	0	n/a
adjusted high	7505	60.90	7566	76.9	76.9	1.000
mid	7442	29.70	7472	38.0	37.9	1.002
low	7470	14.80	7485	18.9	18.9	0.999
calibrator zero	7565	0.00	7565	0.0	0	n/a
Average C.F. =						1.000

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.000		0.95-1.05
b (Intercept as % of full scale) =	0.01%		± 3% F.S.
% change in C.F. from last cal =	-0.73%		± 10%

Thermo 450i Hydrogen Sulphide Analyzer Calibration



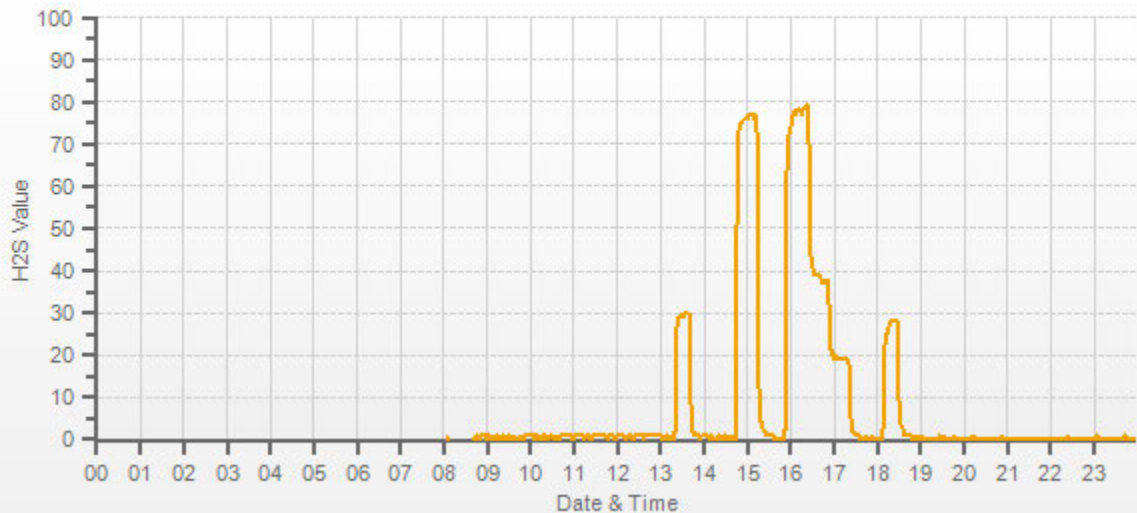
As found:		As left:	
Bkg:	30.0	Bkg:	31.2
Coef:	0.867	Coef:	0.884
Pmt:	-634.2	Pmt:	-634.2
Flash:	905	Flash:	904
Internal:	34.4	Internal:	33.2
Chamber:	45.2	Chamber:	45.0
Converter Temp:	323.1	Converter Temp:	326.5
Converter Set:	325.0	Converter Set:	325.0
Perm Oven Gas:	45.01	Perm Oven Gas:	45.00
Perm Oven Htr:	44.11	Perm Oven Htr:	44.08
Pressure:	583.3	Pressure:	581.5
Sample Flow:	0.824	Sample Flow:	0.823
Lamp Intensity:	91	Lamp Intensity:	92
Averaging Time:	120	Averaging Time:	120
Expected Value:	30.6	Expected Value:	30.6

Comments:

The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned. The manifold blower was found to be working normally.

The EV will be adjusted after a first scheduled ZS check within 24 hours.

H2S[ppb]



TOTAL HYDROCARBON



Thermo 55i Methane/Non-Methane Analyzer Calibration

Date: Nov 16, 2018	Barometer/B.P./units: F.S. 05544 expires January 15, 2019	943	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name: St. Lina	Weather Conditions: Mainly sunny		
Parameter: CH4 / NMHC / THC	Calibration Purpose: routine monthly		
Start/End Time 24 hr. (mst): 12:21 / 16:13	Performed By/Reviewer: Alex Yakupov		Rob Fisher
Calibration Method: Gas Dilution	Cal Gas Expiry Date: October 18, 2025		

Analyzer:		Correction Factors:		
Serial Number/Owner: 1180930025	LICA	Previous C.F.:	As Found C.F.:	New C.F.:
Measured Flow: 1243		CH ₄ = 1.000	0.961	1.000
Last Calibration Date: October 11, 2018		NMHC = 1.000	1.008	1.000
Range ppm: 20 CH4/20 NMHC/40 THC		THC = 1.000	0.983	1.000

Calibration Standards:		Standard Calibration Points for Analyzer Range of 20/20/40 ppm			
Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018		Point	CH4	NMHC	THC
High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018		High	13.00	13.00	26.00
Calibrator ID/Expiry Date: Sabio id# 11900613 expires August 22, 2019		Mid	7.00	7.00	14.00
Cal Gas Cylinder I.D. #: LL 119471		Low	3.00	3.00	6.00
CH4 Cylinder Conc.: 599.0	207.0 =C ₃ H ₈ Cylinder Conc.				
CH₄ expressed as C₃H₈: 569.3	1168.3 =total CH4 equivalent				

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

Calibrator Flow Rates (cc/min)				Correction Factors:								
Point	Diluent	Cal Gas	Total Flow	Calculated CH ₄ (ppm)	Calculated NMHC (ppm)	Calculated THC (ppm)	Indicated CH ₄ (ppm)	Indicated NMHC (ppm)	Indicated THC (ppm)	CH ₄	NMHC	THC
as found zero	2508	0.00	2508	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
as found high	2452	55.43	2507	13.24	12.59	25.83	13.78	12.49	26.27	0.961	1.008	0.983
adjusted zero	2508	0.00	2508	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
adjusted high	2452	55.43	2507	13.24	12.59	25.83	13.24	12.59	25.83	1.000	1.000	1.000
mid	2441	29.90	2471	7.25	6.89	14.14	7.16	6.85	14.01	1.012	1.006	1.009
low	2475	12.90	2488	3.11	2.95	6.06	3.10	3.00	6.10	1.002	0.984	0.993
calibrator zero	2508	0.00	2508	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
Average C.F. =										1.005	0.996	1.001

Linear Regression/Calibration Results:				
	CH₄	NMHC	THC	LIMITS > or = 0.995 0.95-1.05 ± 3% F.S. ± 10%
Correlation Coefficient =	1.000	1.000	1.000	
Slope =	0.999	0.998	0.998	
b (Intercept as % of full scale) =	-0.08%	0.07%	-0.01%	
% change in C.F. from last cal =	3.89%	-0.77%	1.67%	

As Left Instrument Diagnostics:

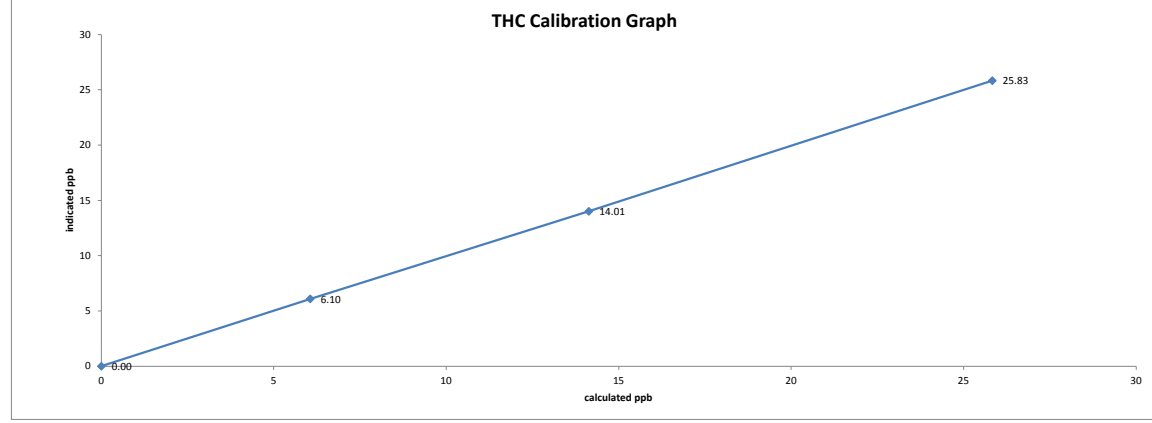
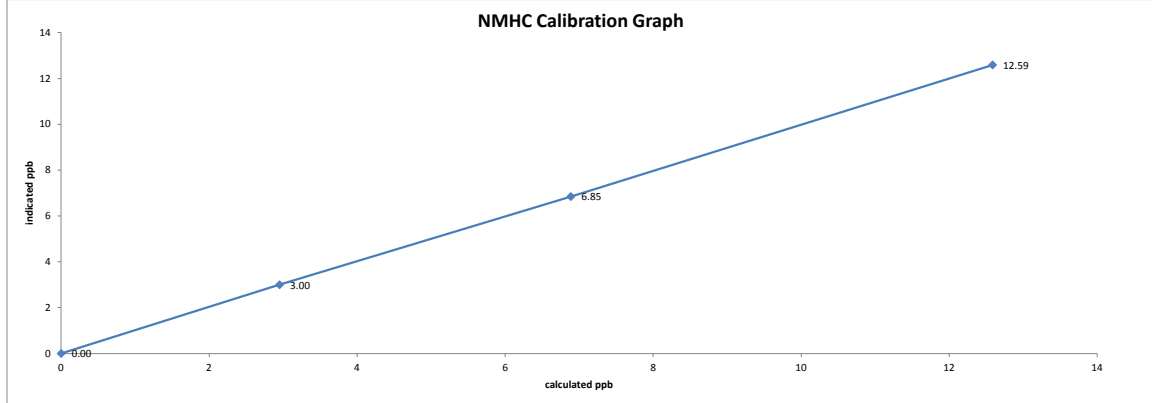
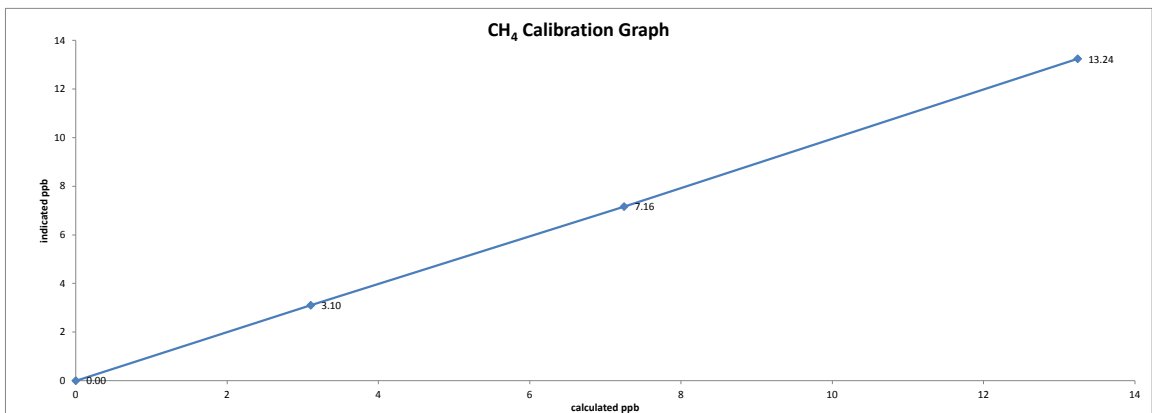
Interface Board Voltages:	Bias Supply: -296.5	Calibration History cnt'd:	NM Peak Area: n/a
Temperatures:	Detector Oven: 175.0	Crucial Settings:	Methane Start: n/a
	Filter: 175.1		Methane End: n/a
	Column Oven: 75.1		Backflush: n/a
	Internal: 28.7		NMHV Start: n/a
Cylinder Pressures/reg.:	Carrier: 2500	Run History>1:	NMHC End: n/a
	Fuel: 2000		Date: Nov 16, 2018
	Span Gas: 2000		Time: 12:36
	Zero Air Generator: 42		CH ₄ PK HT: 0
Internal Pressures:	Carrier: 32.0	CH ₄ RT: 13.0	CH ₄ Baseline: 3759
	Fuel: 48.1	CH ₄ LOD: 44	CH ₄ SD: 14
	Air: 36.2	CH ₄ CONC: 0.00	NM PK HT: 0
FID Status:	Status: LIT	NM Peak Area: 0	NM CONC: 0.00
	Counts: 41113	NM Base Start: 3719	NM Base End: 3762
	Flame: 405.0	NM LOD: 49	NM Start IDX: 4
	Det Base: 175.0	NM End IDX: 54	NM Max Slope: 2.4e+00
Flame and Power Stats:	Last Power On: Oct 17, 2018	NM Min Slope: -4.7e-01	NM PT Count: 0
	Flameouts: 1	Previous CH ₄ : 10.3	Previous NMHC: 11.01
	Det Oven at Start: 114.5	Previous THC: 21.31	New CH ₄ : 9.92
	Col Oven at Start: 60.7	New NMHC: 11.08	New THC: 20.99
Calibration History:	Time: Jan 01, 1970	Expected Values:	
	Type: n/a		
	Status: n/a		
	Check/Adjust: n/a		
	CH ₄ Span Conc: n/a		
	CH ₄ SP Ratio: n/a		
	CH ₄ RT: n/a		
	CH ₄ PK IDX: n/a		
CH ₄ PK HT: n/a			
NM Span Conc: n/a			
NM SP Ratio: n/a			

Comments:
 The analyzer sample inlet filter was changed.

 A new hydrogen cylinder was installed. No zero adjustment was required/made. As found zero values were copied to adjusted zero values for linearity calculation purposes.
 A new span gas cylinder was installed.
 The analyzer cooling fan filter(s) were cleaned.
 The manifold blower was found to be working normally.

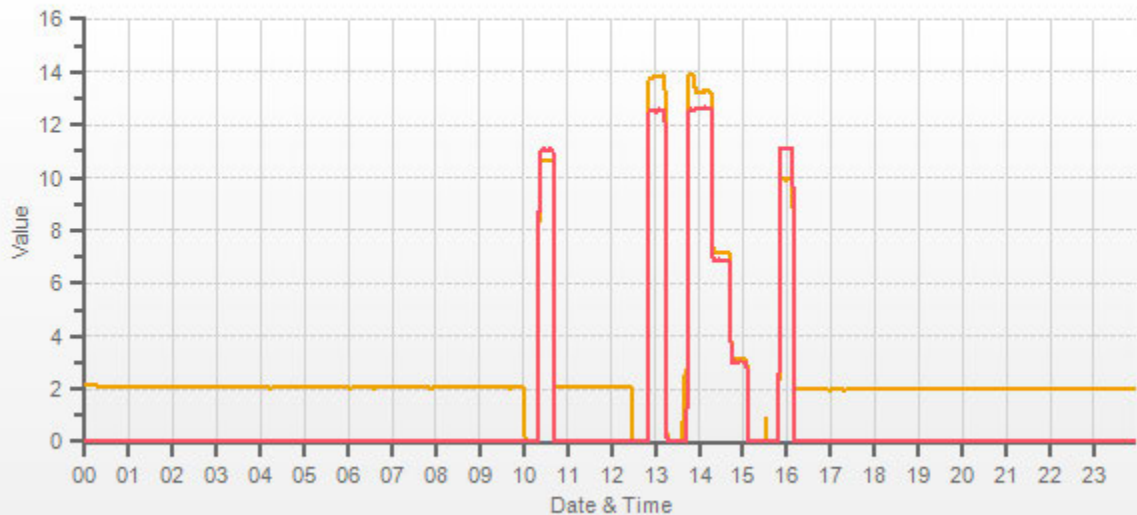
Date: Nov 16, 2018
Company/Airshed: LICA
Location/Station Name: St. Lina

Start/End Time 24 hr. (mst): 12:21 / 16:13
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution



Station: LICA ST. LINA Daily: 18/11/16 Type: AVG 1 Min. [1 Min.]

CH4[ppm] NMHC[ppm]



NITROGEN DIOXIDE



Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: Nov 16, 2018	Barometer/B.P./units: F.S. 05544 expires January 15, 2019	943	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name: St. Lina	Weather Conditions: Mainly sunny		
Start/End Time 24 hr. (mst): 12:21 / 19:36	Calibration Purpose: routine monthly		
G.P.T. to be used for Ozone?: No	Performed By/Reviewer: Alex Yakupov	not yet reviewed	
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: October 24, 2020		

Analyzer: Serial Number/Owner: 1180930029 LICA Last Calibration Date: Oct 10, 2018 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>1.008</td> <td>1.000</td> </tr> <tr> <td>NO₂ =</td> <td>1.000</td> <td>1.000</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>1.000</td> <td>1.009</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	1.008	1.000	NO ₂ =	1.000	1.000	1.000	NOx =	1.000	1.009	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	1.008	1.000														
NO ₂ =	1.000	1.000	1.000														
NOx =	1.000	1.009	1.000														

Calibration Standards: Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: API id# 690 expires March 15, 2019 Cal Gas Cylinder I.D. #: LL 104225 Cal Gas Conc. (ppm): 51.5 51.6	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">Standard Calibration Points for a Range of: 1000 ppb</th> </tr> <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>	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
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

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	5015	0.0	5015	0	0	0.0	0.0	n/a	n/a
as found high	4894	75.6	4970	783.2	784.7	777.0	778.0	1.008	1.009
adjusted zero	5015	0.00	5015	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4894	75.58	4970	783.2	784.7	783.0	785.0	1.000	1.000
mid	4976	36.90	5013	379.1	379.8	380.0	381.0	0.998	0.997
low	4996	18.40	5014	189.0	189.4	191.0	192.0	0.989	0.986
calibrator zero	5015	0.00	5015	0	0	0.0	0.0	n/a	n/a
Average C.F.=								0.996	0.994

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	4894	75.58	4970	0.0	787.0	788.0	1.0	0.0	1.0	
as found high NO2	4894	75.58	4970	500.0	286.0	788.0	502.0	501.0	501.0	1.000
adjusted high NO2	4894	75.58	4970	500.0	286.0	788.0	502.0	501.0	501.0	1.000
gpt mid	4894	75.58	4970	275.0	513.0	788.0	275.0	274.0	274.0	1.000
gpt low	4894	75.58	4970	100.0	686.0	788.0	102.0	101.0	101.0	1.000
Average NO ₂ C.F.=										1.000

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.001	1.001	1.002	0.95-1.05
b (Intercept as % of full scale)=	0.10%	0.12%	0.06%	± 3% F.S.
% change in C.F. from last cal=	-0.79%	-0.86%	0.00%	± 10%
NO2 converter efficiency			1.00	0.96 to 1.04

As found:		As left:	
NO Bkg:	5.3	NO Bkg:	5.2
NOx Bkg:	5.3	NOx Bkg:	5.3
NO Coef:	1.148	NO Coef:	1.147
NO2 Coef:	0.995	NO2 Coef:	0.995
NOx Coef:	1.000	NOx Coef:	1.001
PMT:	-824.0	PMT:	-824.0
Internal:	28.3	Internal:	27.6
Chamber:	50.1	Chamber:	50.2
Cooler:	-3.1	Cooler:	-3.2
NO2 Converter:	325.0	NO2 Converter:	323.4
NO2 Converter Set:	325.0	NO2 Converter Set:	325.0
Perm Oven Gas:	45.01	Perm Oven Gas:	45.01
Perm Oven Heater:	44.16	Perm Oven Heater:	44.16
Pressure:	260.5	Pressure:	259.0
Flow:	0.542	Flow:	0.540
Ozonator Flow:	OK	Ozonator Flow:	OK
Expected Value NO:	5	Expected Value NO:	4
Expected Value NO2:	455	Expected Value NO2:	455
Expected Value NOx:	459	Expected Value NOx:	459

Comments:

The analyzer sample inlet filter was changed.

The manifold blower was found to be working normally.

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

The converter cooling fan filter was cleaned.

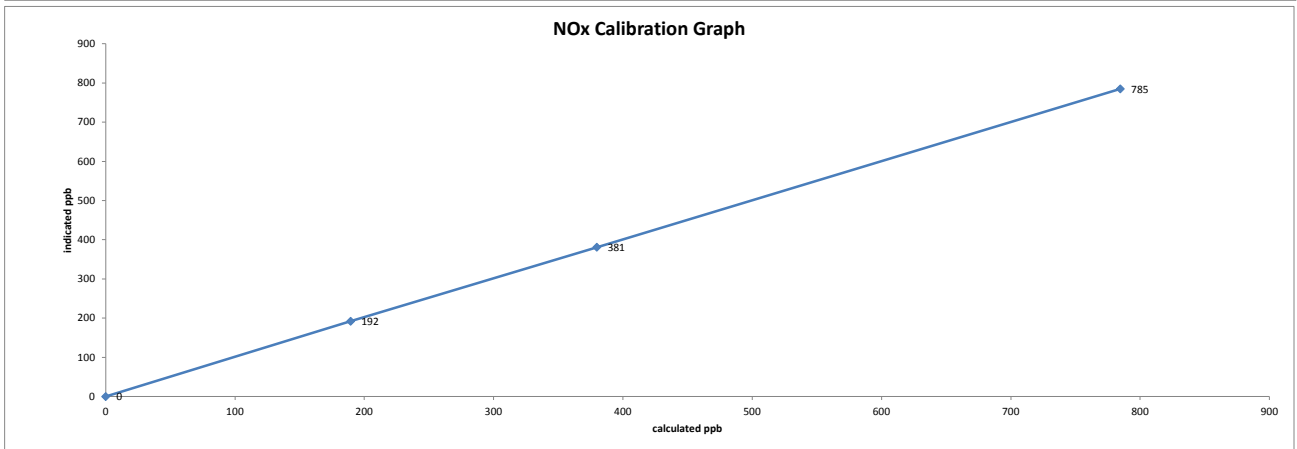
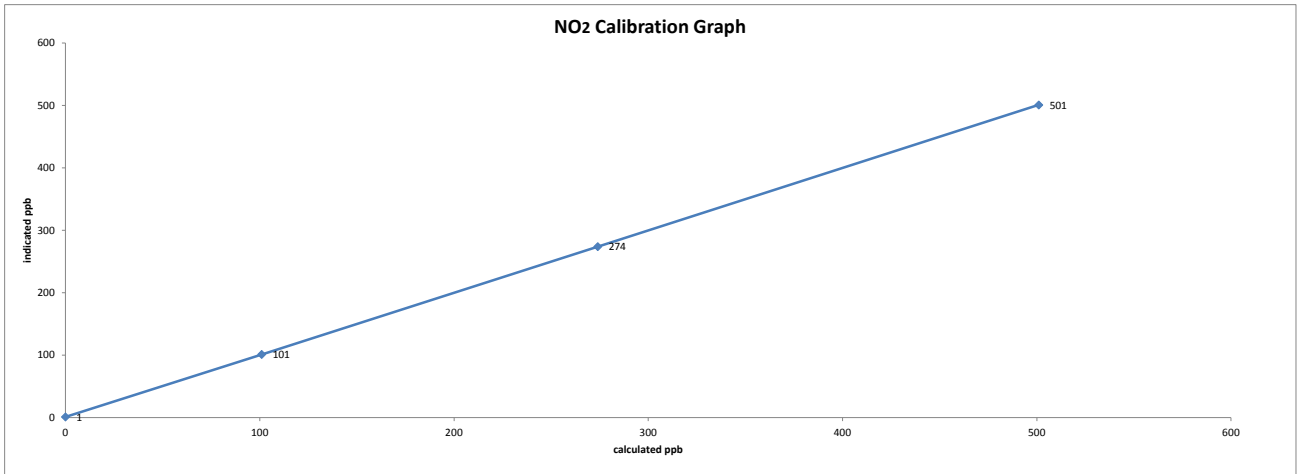
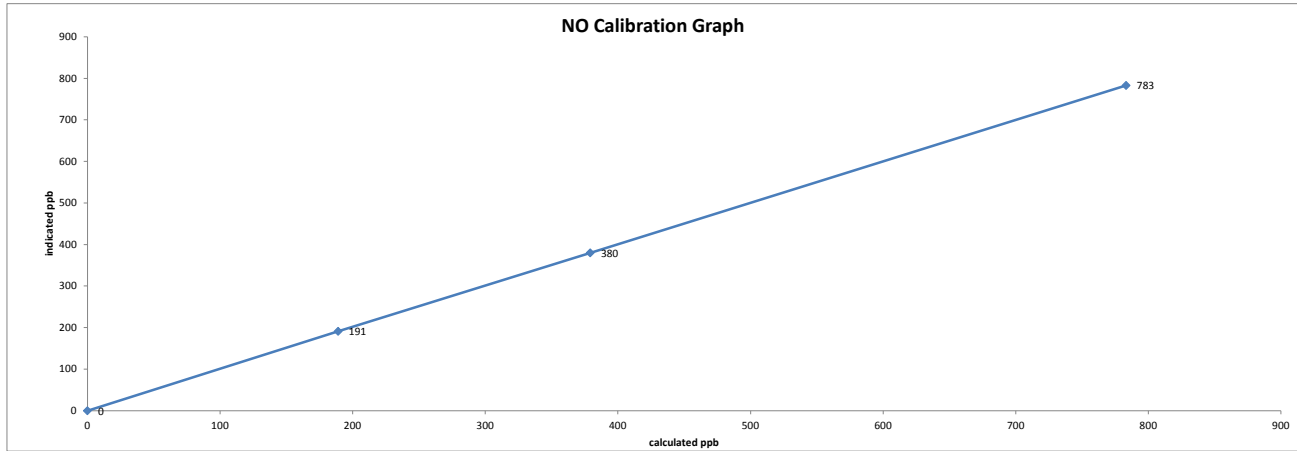
No high point NO2 adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.

The analyzer cooling fan filter(s) were cleaned.

Date: Nov 16, 2018
Company/Airshed: LICA
Location/Station Name: St. Lina

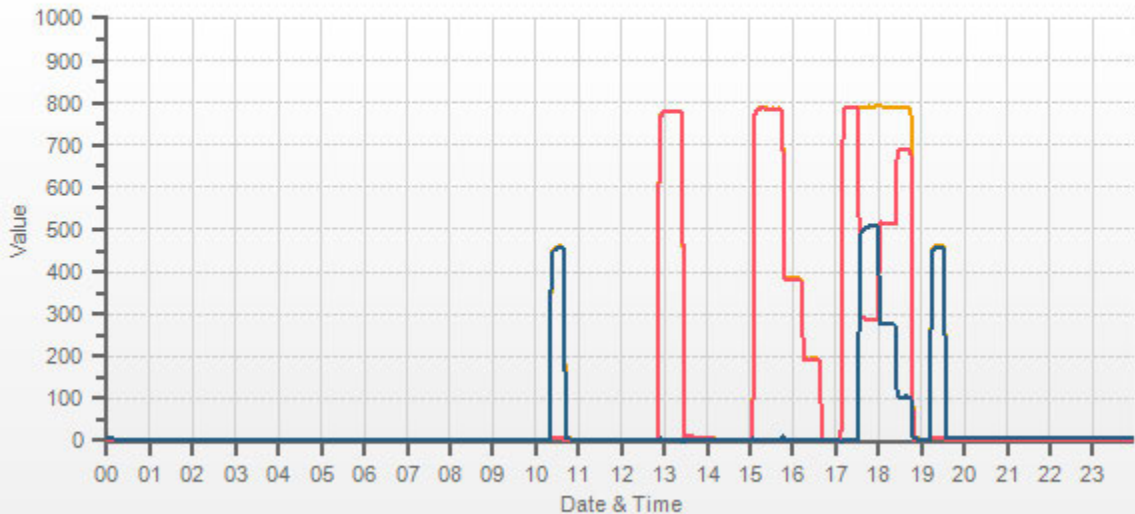
Start/End Time 24 hr. (mst): 12:21 / 19:36
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Gas Phase Titration

Thermo 42i NO-NO2-NOx Analyzer Calibration



Station: LICA ST. LINA Daily: 18/11/16 Type: AVG 1 Min. [1 Min.]

NOX[ppb] NO[ppb] NO2[ppb]



OZONE



Thermo 49i Ozone Analyzer Calibration

Date: November 13, 2018 Company/Airshed: LICA Location/Station Name: St. Lina Start/End Time 24 hr. (mst): 13:48 / 18:13 Ozone Calibration Method: Varying UV Lamp Power G.P.T. Date: n/a-done by Varying UV Lamp Power Analyzer: Serial Number/Owner: 1002240371 LICA Last Calibration Date: October 11, 2018 Previous Cal High Point C.F.: 1.000	Barometer/B.P./units: F.S. 05544 expires January 15, 2019 927 millibars Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019 23 °C Weather Conditions: Mainly sunny Calibration Purpose: routine monthly Performed By/Reviewer: Alex Yakupov Rob Fisher Cal Gas Expiry Date: n/a-done by Varying UV Lamp Power Ozone Range ppb: 500 As Found C.F.: 0.992 New C.F.: 1.000
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Calibration Standards:									
Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: Sabio id# 11900613 expires August 22, 2019 Cal Gas Cylinder I.D. #: n/a	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Point</th> <th>AMD Required Range of Ozone Calibration Points</th> </tr> <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> </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								

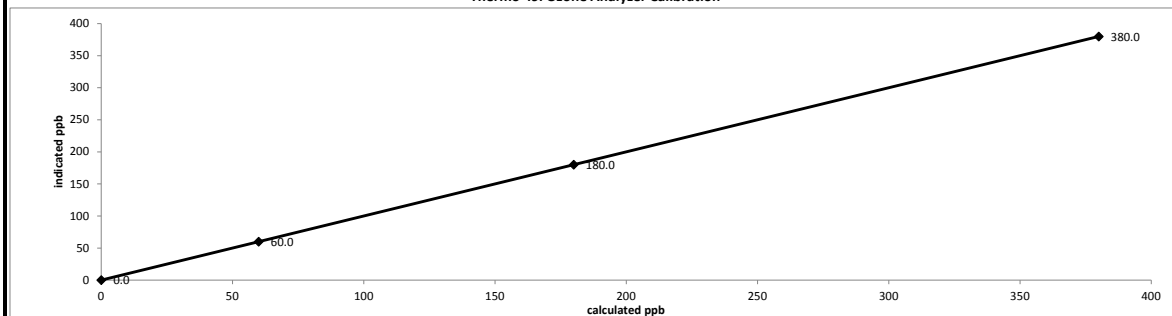
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5000	5000	0.0	n/a	-1.0	n/a
as found high	5000	5000	380.0	380.0	382.0	0.992
adjusted zero	5000	5000	0.0	0.0	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	180.0	180.0	180.0	1.000
low	5000	5000	60.0	60.0	60.0	1.000
calibrator zero	5000	5000	0.0	n/a	0.0	n/a
Average C.F.=						1.000

Linear Regression/Calibration Results:

Correlation Coefficient = 1.000 Slope = 1.000 b (Intercept as % of full scale)= 0.00% % change in C.F. from last cal= 0.78%	LIMITS > or = 0.995 0.95-1.05 ± 3% F.S. ± 10%
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Thermo 49i Ozone Analyzer Calibration



As found:

O3 Bkg:	-0.5
O3 Coef:	1.010
Photo Lamp:	10.7
O3 Lamp:	8.2
Bench:	28.9
Bench Lamp:	53.6
O3 Lamp:	67.8
Pressure:	677.6
Cell A lpm:	0.730
Cell B lpm:	0.774
O3 ppb:	-2.2
Cell A ppb:	0.0
Cell B ppb:	-4.4
Cell A int (Hz):	73189
Cell B int (Hz):	92320
Expected Value:	366.0

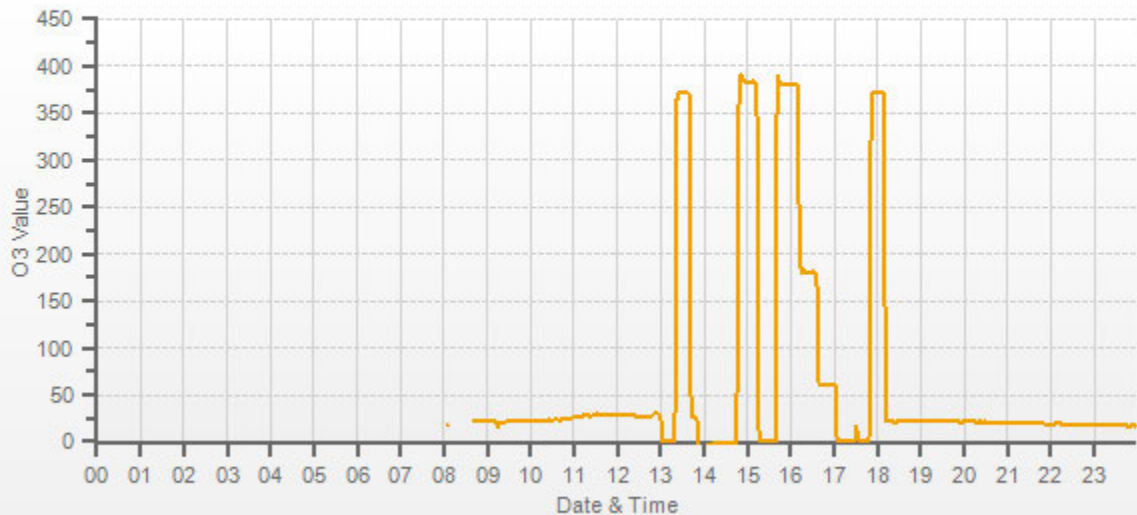
As left:

O3 Bkg:	-0.7
O3 Coef:	1.005
Photo Lamp:	10.7
O3 Lamp:	8.2
Bench:	28.7
Bench Lamp:	53.6
O3 Lamp:	67.8
Pressure:	677.0
Cell A lpm:	0.730
Cell B lpm:	0.774
O3 ppb:	0.4
Cell A ppb:	-1.6
Cell B ppb:	2.3
Cell A int (Hz):	73211
Cell B int (Hz):	93341
Expected Value:	371.0

Comments:

The analyzer sample inlet filter was changed.
 The analyzer cooling fan filter(s) were cleaned.
 The manifold blower was found to be working normally.

O3[ppb]



PARTICULATE MATTER



Thermo 5030i SHARP Monitor Calibration

Date:	November 23, 2018	Performed By/Reviewer:	Alex Yakupov
Company:	LICA	Start Time (mst):	15:19
Station Name/Location:	St. Lina	End Time (mst):	18:05
Previous Audit Date:	October 11, 2018	Calibration Purpose:	Quarterly
Parameter:	PM 2.5	Weather Conditions:	A few clouds

SHARP 5030i Information and Status:		
Serial Number:	CM 17091001	Filter Tape Counter: 132

Reference Standards: Air Flow						
	Manometer	Orifice	Pressure:		Temp / RH:	
Make:	Dwyer 475	Airmetrics	F. Scientific		F. Scientific	Foil Set:
Model:	Mark III	Chinook High	FB 61291		11-661-7A	4804
Serial Number:	Maxxam ID#3	Maxxam ID#2	5544		170286131	
Expiry Date:	January 9, 2019	April 24, 2019	January 15, 2019		April 19, 2019	

Ambient Temperature (°C)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	-7.08	-8.2	1.1	-7.70	-7.7	0.0
#2	-7.10	-8.2	1.1	-7.72	-7.7	0.0
#3	-7.14	-8.3	1.2	-7.76	-7.7	-0.1
Average	-7.1	-8.2	1.1	-7.7	-7.7	0.0

Temp Limit: ± 2°C

Ambient Relative Humidity (%RH)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Offset (ZERO)	Reference	SHARP	Offset (ZERO)
#1	90.10	90.2	-0.1	92.08	92.1	0.0
#2	90.16	90.1	0.1	92.16	92.1	0.1
#3	90.19	90.1	0.1	92.13	92.1	0.0
Average	90.2	90.1	0.0	92.1	92.1	0.0

RH Limit: ± 2 %RH

Flow Temperature (°C)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	23.12	23.5	-0.4	23.12	23.5	-0.4
#2	23.44	23.6	-0.2	23.44	23.6	-0.2
#3	23.51	23.6	-0.1	23.51	23.6	-0.1
Average	23.4	23.6	-0.2	23.4	23.6	-0.2

Temp Limit: ± 2°C

Barometric Pressure (mmHg)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	688.4	689.2	-0.8	688.4	689.2	-0.8

BP Limit: ± 2 mmHg

Nephelometer Relative Humidity (%RH)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	27.66	28.4	-0.7	27.66	28.4	-0.7

RH Limit: ± 2 %RH

Nephelometer Temperature (%RH)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	24.21	24.4	-0.2	24.21	24.4	-0.2

Temp Limit: ± 2°C

Nephelometer Source Level						
As Found:			As Left: (same as found if acceptable)			
	Variable	Value		Variable	Value	
	IRE D	65		IRE D	65	
	SRC LEVEL	47		SRC LEVEL	47	

IRE D Limit (as found): 60-70 mA
Adjusted IRE D Limit (as left): 65 mA

Detector Calibration (Auto)						
As Found:			As Left:			
Detector Auto Calibration Completed:			Variable	Value		
YES			HIGH VOLT	1360		
			BETA REF TH	280		
			ALPHA TH	710		
			DIFF HV	0		

Mass Coefficient (Auto)						
Zero			Span			
	Variable	Value		Variable	Value	
	MASS COEF	7131.1		MASS COEF	7031.5	
	FOIL VALUE	0		FOIL VALUE	1045	
	Beta Avg	9310		Beta Avg	8024	
	difference	n/a		difference	-1.4	

Foil Set: CM1597

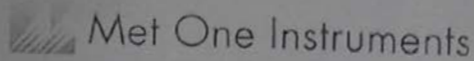
Flow Calibration (L/min)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	16.64	16.66	-0.02	16.64	16.66	-0.02
#2	16.64	16.67	-0.03	16.64	16.67	-0.03
#3	16.65	16.67	-0.02	16.65	16.67	-0.02
Average	16.64	16.67	-0.02	16.64	16.67	-0.02

Flow Limit: 16.67 ± 0.33 L/min

Leak Check (L/min)						
Without Leak Check Adapter			With leak Check Adapter			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	16.65	16.66	-0.01	16.60	16.63	-0.03
			LEAK RATE: -0.02			

Leak Limit: 0.08 L/min

WIND SYSTEM



Sonic Wind Sensor Certificate of Calibration

Sensor Model No.: 50.5H
 Sensor Output Swing: 0V - 1.0V
 Customer: MAXXAM Analytics
 Tested per PO: 35-67600
 Calibrated by: David Frith *DF*

Sensor Serial No.: H12635
 Sensor Output Range: 0 - 50.0 MPS
 Sales Order No.: 122618
 Calibration Date: 05/25/2017

QC Inspection *Chris Paul*

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

As Found Test Date: N/A As Left Test Date: 05/25/2017

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	1/26/2017	1/26/2022	Accuracy < 0.15 mph or 1% WS	

Environmental Data: Temperature 65 to 80 Deg F Vibration none
 Humidity 20 to 70% Radiation none

Firmware Version: 3194-01 R2.62

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

CALIBRATORS

Company: Maxxam **Operator:** Chris W

Calibrator:		Flow Measurement Device:	
Make/Model	<u>API 700</u>	Make/Model	<u>Mesa Defender 530</u>
Serial Number	<u>690</u>	Serial Number	<u>L-153351 H-152571</u>
Last Verification Date	<u>March 2016</u>	Temperature (°C)	<u>23.5 C</u>
NO Cylinder S/N	<u>LL108015</u>	Barometric Pressure	<u>695 mmHg</u>
NO [PPM]	<u>52.2</u>	NOx [PPM]	<u>52.3</u>
Expiry Date	<u>Oct 2020</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%	
4959	75.0	0.789	0.791	0.793	0.000	0.793	1%	0%
4971	36.5	0.383	0.384	0.384	0.000	0.384	0%	0%
4967	18.2	0.191	0.192	0.191	0.000	0.191	0%	-1%
Absolute Average Percent Difference							0%	0%

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)= 1.0054	0.90-1.10	m (Slope)= 1.0031
b (Intercept % of FS)= -0.0583	± 3% F.S.	b (Intercept % of FS)= -0.0795

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4959	0.000	0.000	0.790	-0.001	0.789	NO ₂	% Diff. Limit
4959	0.500	0.497	0.293	0.493	0.786	-1%	± 10%
4959	0.275	0.273	0.517	0.269	0.787	-1%	± 10%
4959	0.100	0.102	0.688	0.099	0.787	-2%	± 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)= 0.9946	0.90-1.10
b (Intercept % of FS)= -0.1817	± 3% F.S.

AENV Standards	NO_x Analyzer
Audit Calibrator	Make/Model <u>Teco 42i</u>
Make/Model <u>Teco 146i</u>	Serial/AMU Number <u>AMU 1868</u>
Serial/AMU Number <u>AMU 1809</u>	Last Calibration Date <u>March 14, 2018</u>
SRM Gas Cylinder No. <u>APEX1170572</u>	Full Scale (ppm) <u>1.0</u>
Cylinder Conc. (ppm) <u>49.99</u>	Cylinder Gas Expiry Date <u>November 2020</u>

COMMENTS: Cylinder contains 47.9 ppm SO₂.

Auditor: Al Clark
Operator Signature: *Al Clark*

Date: March 15, 2018
Location: McIntyre Center Edmonton

Company <u>Maxxam</u>		Operator: <u>Mike</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio</u>	Make/Model	<u>Bios Definer 220</u>
Serial Number	<u>11900613</u>	Serial Number	<u>H=128686; L=129069</u>
Last Verification Date	<u>March 16, 2018</u>	Temperature (°C)	<u>22.9 C</u>
NO Cylinder S/N	<u>LL104183</u>	Barometric Pressure	<u>698 mmHg</u>
NO [PPM]	<u>50.8</u>	NOx [PPM]	<u>50.9</u>
Expiry Date	<u>October 24, 2020</u>		
Dilution Flow (sccm)			
Pt. #1	<u>5059</u>	Pt. #2	<u>5073</u>
		Pt. #3	<u>5073</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>38.2</u>
		Pt. #3	<u>19.1</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5124	0.0	0.0000	0.0000	0.0000	-0.0001	0.0000	Limit ± 10%	
5059	77.5	0.7782	0.7797	0.7763	0.0005	0.7767	0%	0%
5073	38.2	0.3825	0.3833	0.3794	0.0000	0.3795	-1%	-1%
5073	19.1	0.1913	0.1916	0.1904	0.0000	0.1904	0%	-1%
Absolute Average Percent Difference							1%	1%

LINEAR REGRESSION ANALYSIS			<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>		
<u>NO</u>		<u>LIMITS</u>	<u>NOx</u>		
Correlation=	1.0000	≥ 0.990	Correlation=	1.0000	
m (Slope)=	0.9975	0.90-1.10	m (Slope)=	0.9960	
b (Intercept % of FS)=	-0.0616	± 3% F.S.	b (Intercept % of FS)=	-0.0661	

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5059	0.0	0.0000	0.7741	0.0000	0.7741	NO ₂	% Diff. Limit
5059	500.0	0.4918	0.2823	0.4916	0.7739	0%	± 10%
5059	275.0	0.2774	0.4967	0.2780	0.7747	0%	± 10%
5059	100.0	0.1031	0.6710	0.1032	0.7743	0%	± 10%
Absolute Average Percent Difference						0%	± 10%

LINEAR REGRESSION ANALYSIS			<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>		
<u>NO₂</u>		<u>LIMITS</u>			
Correlation=	1.0000	≥ 0.995			
m (Slope)=	0.9998	0.90-1.10			
b (Intercept % of FS)=	0.0173	± 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>
SRM Gas Cylinder No.	<u>APEX1170572</u>	Last Calibration Date	<u>August 16, 2018</u>
Cylinder Conc. (ppm)	<u>49.99</u>	Full Scale (ppm)	<u>1.0</u>
		Cylinder Gas Expiry Date	<u>November 15, 2020</u>

COMMENTS:

Auditor: Shea Beaton
Operator Signature: [Signature]

Date: August 22, 2018
Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-482CGA

Company: Maxxam **Operator's Name:** Mike
Cylinder #: LL104225 **Concentration PPM:** 49.2 **Tolerance(%)** 2 **Certified By:** Praxair
Expiry Date: October 2020

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model: <u>R&R MFC 201</u>	Make/Model: <u>Mesa Definer 220</u>
Serial Number: <u>AMU 1690</u>	Serial Number: <u>H-133034 / L-132702</u>
Last Verification Date: <u>December 13, 2017</u>	Temp. °C: <u>23.4 C</u>
Gas Type: <u>SO2</u> Conc. <u>98.07</u>	B.P. <u>707 mmHg</u>
Cylinder Number: <u>CAL016625</u>	
Expiry Date: <u>January 2019</u>	

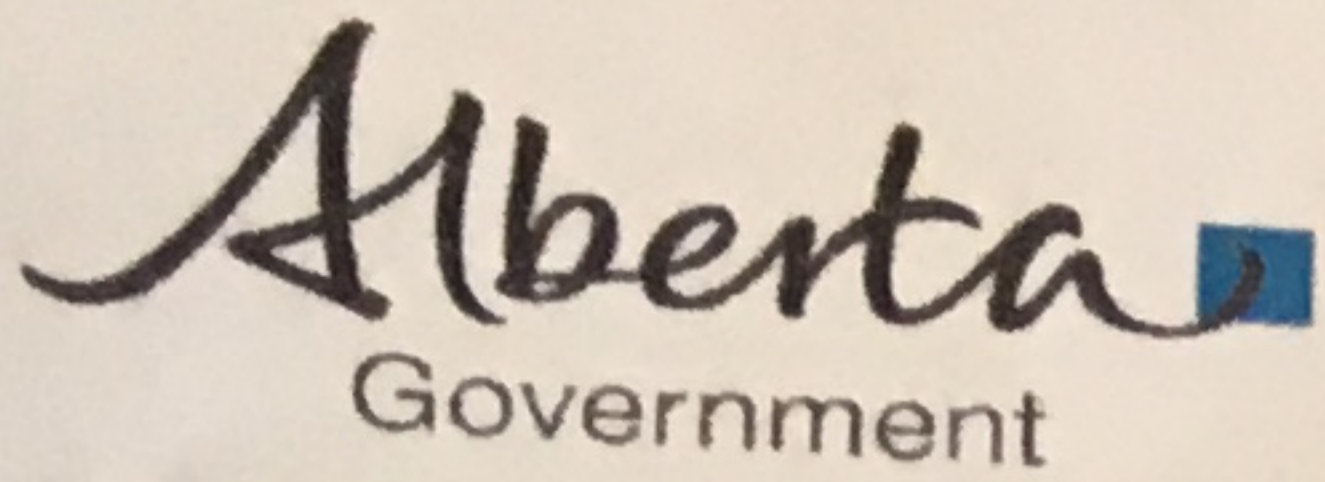
Reference Analyzer:
 Make/Model: Teco 43C Serial/AMU Number: 1623
 Instrument Settings: Zero: 10.0 Span: 1.006 Range: 1.0
 Last Calibration: Date: Dec12/17 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.000	0.000	0.000	0.000
4989	79.5	0.764	0.01594	62.755	47.9
4995	39.6	0.380	0.00793	126.136	47.9
4992	19.6	0.188	0.00393	254.694	47.9
Average Cylinder Concentration:					47.9

Previous Stated Concentration PPM: 49.2
 Percent variance from Stated: 3

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: December 13, 2017
 Operator Signature: *Al Clark* Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-493CGA

Company: Maxxam Operator's Name: Mike
 Cylinder #: EY0001003 Concentration PPM: 9.55 Tolerance(%): 2 Certified By: Praxair
 Expiry Date: October 2020

Reference Calibrator and Gas:
 Make/Model: Sabio 2010
 Serial Number: AMU 2092
 Last Verification Date: January 17, 2018
 Gas Type: H2S Conc. 20.43
 Cylinder Number: CAL015272
 Expiry Date: January 2019

Flow Measurement Device:
 Make/Model: Mesa Defender 530
 Serial Number: H-153961 / L-153874
 Temp. °C: 23.0 C
 B.P.: 697 mmHg

Reference Analyzer:
 Make/Model: Teco 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 12.9 Span: 0.955 Range: 0.1
 Last Calibration: Date: Jan 17/18 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	0.00784	248.911	9.60
5051	39.6	0.0753	0.00784	127.551	9.60
5028	20.2	0.0387	0.00402	248.911	9.63
5033	10.5	0.0198	0.00209	479.333	9.49
Average Cylinder Concentration:					9.58

Previous Stated Concentration PPM: 9.55

Percent variance from Stated: 0

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

Auditor: Al Clark

Date: January 18, 2018

Operator Signature: *[Signature]*

Location: McIntyre Center Edmonton



Calibration Gas Audit

CH4 / C3H8 Cylinder Gas

File No. 2017-481CGA

Company: Maxxam **Operators name:** Mike

Cylinder #: LL119471 Conc CH4 (PPM) 599/207 Tolerance (%) 2 Certified By: Praxair

Expiry Date: October 2025

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model <u>R&R MFC 201</u>	Make/Model <u>Mesa Definer 220</u>
Serial Number <u>AMU 1690</u>	Serial Number <u>H-133034 / L-132702</u>
Last Verification Date <u>December 13, 2017</u>	Temp. °C <u>23.1 C</u>
Gas Type <u>CH4</u> Conc. <u>990.4</u>	B.P. <u>707 mmHg</u>
Cylinder Number <u>5604875</u> Expiry Date <u>July 2021</u>	
Gas Type <u>C3H8</u> Conc. <u>246.5</u>	
Cylinder Number <u>XF003845B</u> Expiry Date <u>July 2022</u>	

Reference Analyzer:

Make/Model Teco 55i Serial/AMU Number: 2108

Instrument Settings Zero: N/A Span: N/A Range: 20.0

Last Calibration: Date: Dec 12/17 C.F. 1.000 Done By: Al Clark

Calibrator Flows (scem)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	CH4	C3H8			CH4	C3H8
3500	0.0	0.00	0.00	0.02	45.00	603	209
3618	80.4	13.41	12.75	0.02	45.00	603	209
3547	39.8	6.73	6.47	0.01	89.12	600	210
3560	19.8	3.34	3.21	0.01	179.80	601	210
Average Cylinder Concentration:						601	209

	CH4	C3H8
Previous Stated Concentration PPM:	<u>599</u>	<u>207</u>
Percent variance from Stated:	<u>0</u>	<u>1</u>

Cylinder gas tolerances based on CH4 only

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: December 13, 2017

Operator Signature: Location: McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2017-483CGA

Company: Maxxam **Operators name:** Mike
Cylinder #: LL104225 **Conc (PPM)** 51.5/51.6 **Tolerance (%)** 2 **Certified By:** Praxair
Expiry Date: October 2020

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model <u>Teco 146i</u>	Make/Model <u>Mesa Definer 220</u>
Serial Number <u>AMU 1809</u>	Serial Number <u>H-133034 / L-132702</u>
Last Verification Date <u>December 13, 2017</u>	Temp. °C <u>23.4 C</u>
Gas Type <u>NO</u> Conc. <u>50.03</u>	B.P. <u>707 mmHg</u>
Cylinder Number <u>APEX 1223938</u>	
Expiry Date <u>June 2020</u>	

Reference Analyzer:
 Make/Model Teco 42i Serial/AMU Number: 1868
 Instrument Settings Zero: 4.7 Span: 1.004 Range: 1.0
 Last Calibration: Date: Dec12/17 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				
4989	79.5	0.813	0.812	0.016	62.755	51.0	51.0
4995	39.6	0.407	0.406	0.008	126.136	51.3	51.2
4992	19.6	0.202	0.201	0.004	254.694	51.4	51.2
Average Cylinder Concentration:						51.3	51.1

<u>NO</u>	<u>NOx</u>
Previous Stated Concentration PPM: <u>51.5</u>	<u>51.6</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
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Al Clark Date: December 13, 2017
 Operator Signature: *Al Clark* Location: McIntyre Center Edmonton

***APPENDIX III
MAXIMUM INSTANTANEOUS DATA***



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2018

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	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		
2	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	24		
3	S	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	S	0	0	1	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	S	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	S	0	0	0	0	0	24	
6	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	1	0	24	
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	24	
8	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	
9	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	S	0	0	0	0	0	0	0	1	0	24	
10	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	S	0	0	0	0	0	0	0	0	0	1	0	24	
11	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	
12	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	X	X	X	X	X	X	X	X	X	X	0	0	0	16	
13	X	X	X	X	X	X	X	X	X	1	1	2	4	S	2	2	1	1	1	1	0	0	1	1	0	0	4	1	15	
14	2	1	1	1	1	1	1	1	2	2	1	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	24	
15	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	24	
16	0	0	0	0	0	0	0	0	0	0	0	S	0	C	C	C	C	C	0	0	0	0	1	1	0	1	0	24		
17	0	1	2	2	0	0	0	0	0	S	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	1	24	
18	0	0	0	0	1	1	1	1	S	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
19	0	0	0	0	0	0	0	S	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
20	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	24	
21	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	
22	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	24	
23	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	
24	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	24	
25	0	S	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	0	1	1	0	1	0	1	24	
26	S	0	0	1	1	1	1	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	2	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	S	0	0	0	0	24	
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	S	0	0	0	0	1	0	24	
29	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	1	1	2	1	2	1	2	S	1	1	1	0	2	1	24
30	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	1	0	24
HOURLY MAX	2	1	2	2	1	1	1	2	2	2	1	2	4	2	2	2	1	2	1	2	1	2	0	1	1	1				
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				

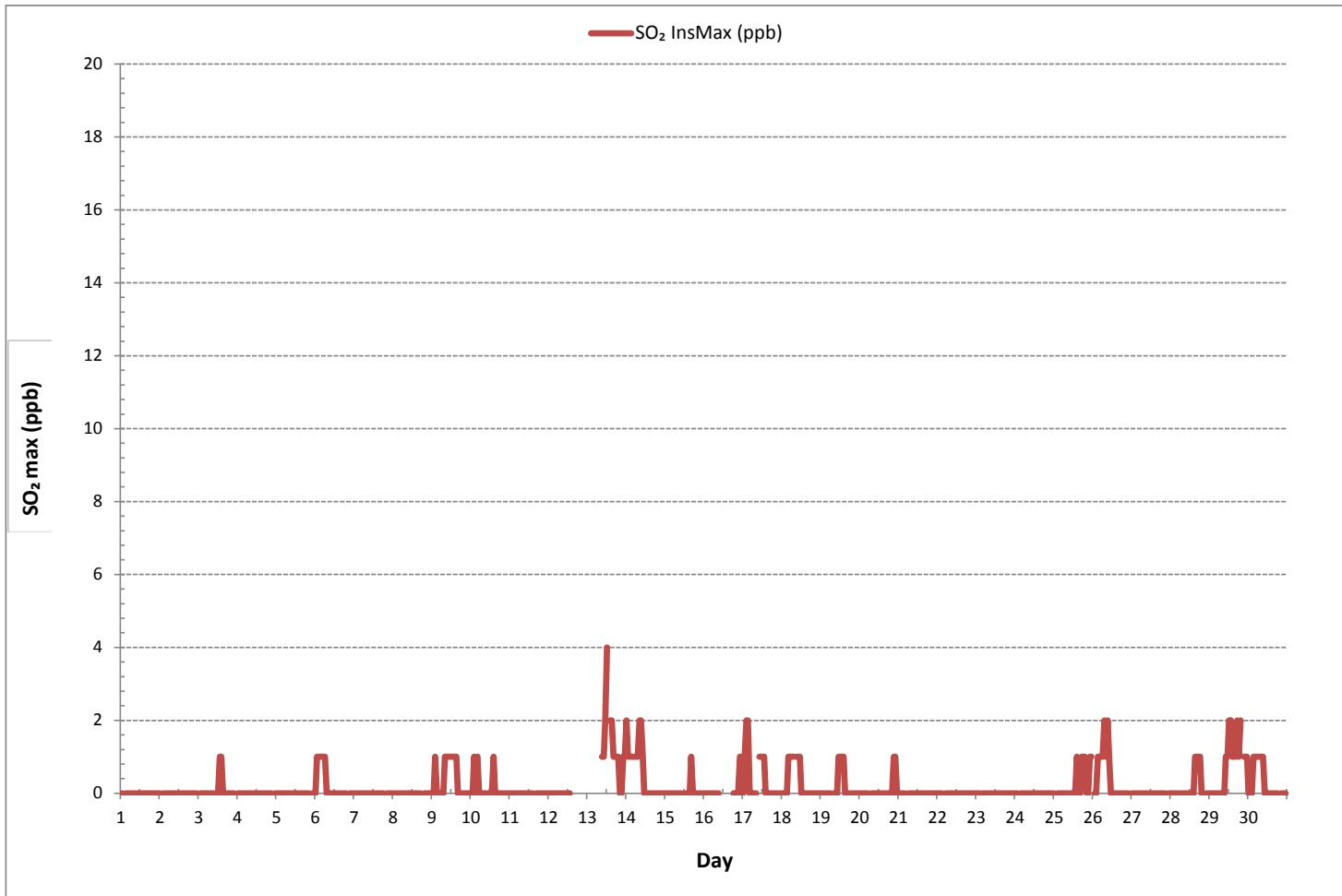
STATUS FLAG CODES

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:	104
MAXIMUM INSTANTANEOUS VALUE:	4 ppb @ HOUR 12 ON DAY 13
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	6 hrs
STANDARD DEVIATION:	0
OPERATIONAL TIME:	703 hrs

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ 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	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
2	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
3	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	S	1	2	24	
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	24	
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	0	S	1	1	0	1	24	
6	0	0	1	0	0	1	1	1	0	1	1	1	1	0	0	0	1	0	1	0	1	S	0	0	0	0	24	
7	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	S	0	0	0	0	0	24	
8	0	1	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	1	S	0	0	0	0	0	1	0	24	
9	0	0	0	0	0	0	0	0	S1	S1	0	0	0	0	0	1	1	S	1	1	1	1	1	1	0	22		
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	24	
11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	0	0	24	
12	1	1	0	0	1	1	1	1	1	0	1	1	1	1	S	1	X	X	X	X	X	X	X	X	X	0	16	
13	X	X	X	X	X	X	X	X	X	1	1	1	1	S	C	C	C	C	1	1	1	1	1	1	1	1	15	
14	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
15	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
16	1	1	1	1	1	0	1	0	0	0	S	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	24	
17	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	24	
18	0	0	1	1	0	1	1	1	S	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	24	
19	0	1	0	0	1	0	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	24	
20	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	1	2	24	
21	1	1	1	1	1	S	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1	1	1	1	1	2	24	
22	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
23	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
24	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24	
25	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	2	1	2	1	1	1	1	24	
26	S	1	1	1	1	2	2	1	1	1	1	1	2	1	1	1	2	1	1	2	1	2	2	S	1	2	24	
27	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	2	1	1	2	1	2	2	S	2	1	2	24	
28	1	1	1	1	2	2	2	1	1	2	1	2	2	2	2	2	2	2	2	2	2	2	S	2	2	2	24	
29	2	2	2	1	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	S	2	2	2	1	24	
30	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	S	2	2	2	2	2	24	
HOURLY MAX	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
HOURLY AVG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		

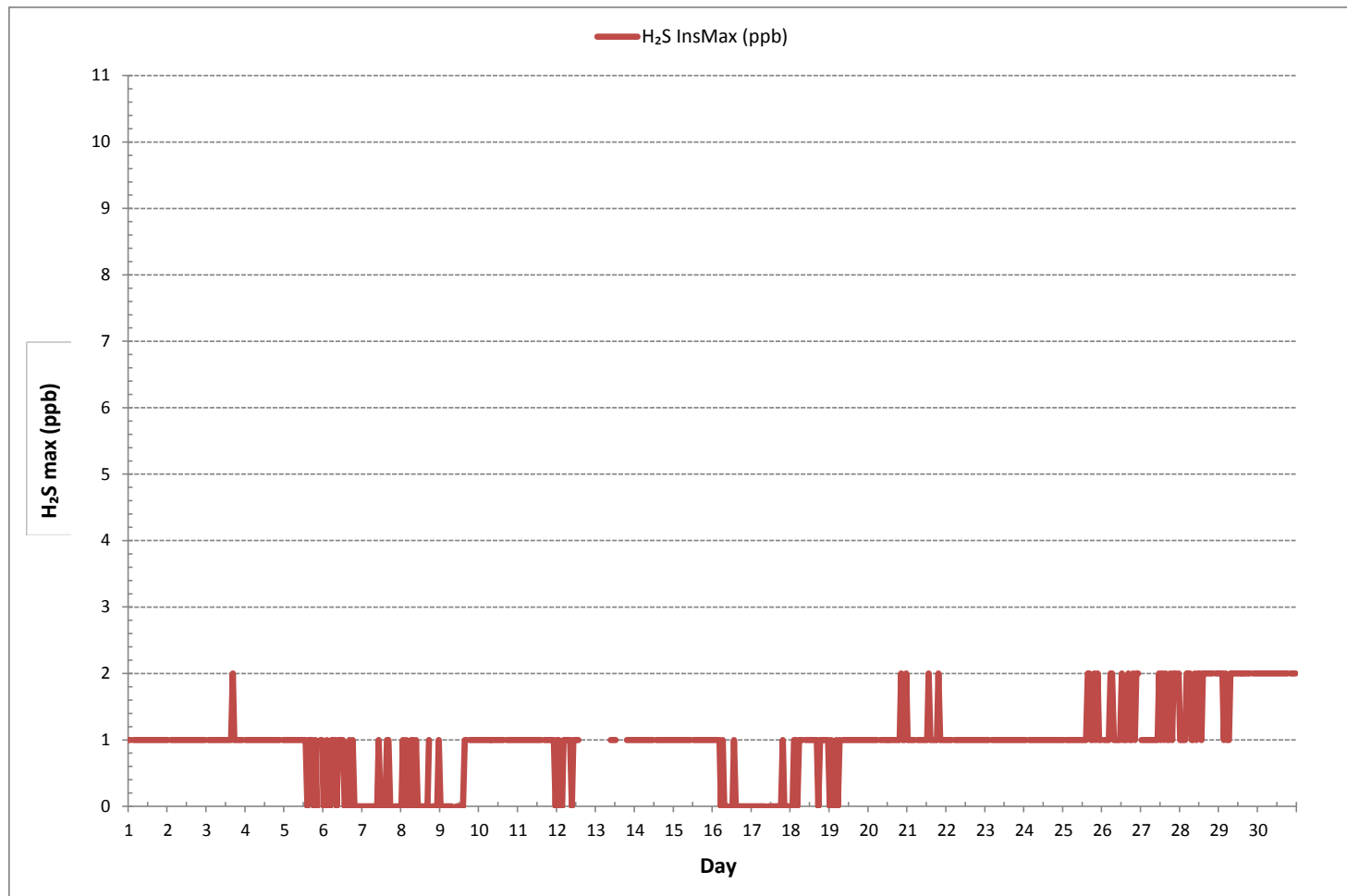
STATUS FLAG CODES

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:	549
MAXIMUM INSTANTANEOUS VALUE:	2 ppb @ HOUR 16 ON DAY 3
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	1
OPERATIONAL TIME:	701 hrs

HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2018

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	2.18	2.27	S	2.11	2.07	2.06	2.03	2.02	2.04	2.03	2.13	2.19	2.26	2.15	2.36	2.39	2.86	2.31	3.41	2.54	2.44	2.52	2.52	2.32	2.02	3.41	2.31	24	
2	2.47	S	2.29	2.41	2.20	2.47	2.31	2.36	2.30	2.28	2.26	2.31	2.13	2.13	2.10	2.06	2.04	2.06	2.14	2.13	2.10	2.10	2.08	2.10	2.04	2.47	2.21	24	
3	S	2.10	2.06	2.06	2.05	2.05	2.05	2.04	2.06	2.06	2.08	2.09	2.11	2.13	2.14	2.16	2.15	2.17	2.21	2.24	2.21	2.18	2.19	S	2.04	2.24	2.12	24	
4	2.25	2.20	2.22	2.64	2.46	2.38	2.33	2.35	2.34	2.20	2.11	2.07	2.11	2.06	2.08	2.10	2.09	2.04	2.03	2.02	2.01	2.01	S	2.00	2.00	2.64	2.18	24	
5	2.01	2.01	2.01	2.01	2.01	2.00	2.01	2.01	2.01	2.01	2.01	2.02	2.03	2.03	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	S	2.01	2.01	2.00	2.03	2.01	24
6	2.03	2.03	2.05	2.04	2.04	2.15	2.18	2.11	2.48	2.77	2.83	2.34	2.30	2.10	2.13	2.14	2.55	2.55	2.66	2.51	S	2.31	2.11	2.49	2.03	2.83	2.30	24	
7	3.31	2.46	2.33	2.10	2.37	2.21	2.36	2.56	2.49	2.38	2.12	2.14	2.08	2.06	2.10	2.09	2.17	2.36	2.73	S	2.04	2.04	2.05	2.12	2.04	3.31	2.29	24	
8	2.41	2.12	2.05	2.17	2.19	2.14	2.09	2.07	2.07	2.14	2.69	2.27	2.19	2.12	2.05	2.03	2.04	2.08	S	2.14	2.08	2.09	2.14	2.08	2.03	2.69	2.15	24	
9	2.08	2.08	2.09	2.09	2.10	2.09	2.09	2.09	2.08	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.10	S	2.16	2.13	2.14	2.13	2.15	2.24	2.08	2.24	2.11	24	
10	2.13	2.08	2.07	2.07	2.06	2.06	2.11	2.09	2.09	2.10	2.10	2.05	2.08	25.70	2.39	2.38	S	2.07	2.06	2.02	2.08	2.07	2.03	2.05	2.02	25.70	3.13	24	
11	2.15	2.04	2.16	2.78	2.56	2.13	2.33	2.21	2.05	2.41	2.09	2.14	2.20	2.19	2.15	S	3.68	5.67	2.26	2.09	2.45	2.11	2.09	2.12	2.04	5.67	2.44	24	
12	2.11	2.09	2.10	2.07	2.08	2.12	2.11	2.13	2.20	2.21	2.21	2.20	2.19	2.16	S	2.17	X	X	X	X	X	X	X	X	2.07	2.21	2.14	16	
13	X	X	X	X	X	X	X	X	X	2.22	2.25	2.27	2.25	S	2.18	2.16	2.30	2.19	2.19	2.23	2.26	2.27	2.29	2.25	2.16	2.30	2.24	15	
14	2.33	3.81	2.43	2.22	2.23	2.23	2.23	2.26	2.18	2.18	2.17	2.09	S	2.01	2.04	2.21	2.13	2.00	2.07	2.15	2.16	2.29	2.15	2.56	2.00	3.81	2.27	24	
15	2.33	2.53	2.11	2.42	2.05	2.06	3.07	2.39	2.37	2.15	2.17	S	2.27	2.31	2.20	2.11	2.35	2.16	2.10	2.04	2.04	2.06	2.10	2.10	2.04	3.07	2.24	24	
16	2.10	2.08	2.04	2.03	2.02	2.02	2.02	2.02	2.03	2.04	S	2.03	C	C	C	C	C	1.98	1.97	1.98	2.00	2.00	1.99	1.97	1.97	2.10	2.02	24	
17	1.99	1.98	1.99	2.00	2.00	2.01	2.01	2.02	2.05	S	2.07	2.08	2.08	2.06	2.07	2.12	2.09	2.08	2.67	2.16	2.31	2.20	2.29	2.27	1.98	2.67	2.11	24	
18	2.44	2.16	2.06	2.07	2.40	3.07	2.78	2.59	S	2.99	3.00	3.18	2.26	2.11	2.11	2.16	2.14	2.14	2.34	2.34	2.34	2.34	2.02	2.06	2.02	3.18	2.40	24	
19	2.09	2.08	2.10	2.14	2.13	2.15	2.21	S	2.24	2.16	2.17	2.16	2.15	2.14	2.11	2.06	2.03	2.03	2.02	1.99	1.97	1.95	1.96	1.96	1.95	2.24	2.09	24	
20	1.97	1.97	2.00	2.01	1.99	2.00	S	2.50	2.25	2.34	2.06	2.37	2.54	2.22	2.41	2.32	2.33	2.41	2.61	2.44	2.35	2.30	2.28	2.21	1.97	2.61	2.26	24	
21	2.17	2.12	2.17	2.26	2.29	S	2.30	2.30	2.32	2.51	2.34	2.30	2.27	2.22	2.32	2.51	2.38	2.36	2.31	2.46	2.28	2.38	3.02	3.26	2.12	3.26	2.38	24	
22	2.68	3.60	2.46	2.31	S	2.34	2.56	2.36	2.34	2.36	2.30	2.35	2.35	2.24	2.24	2.13	2.11	2.06	2.06	2.08	2.07	2.04	2.12	2.11	2.04	3.60	2.32	24	
23	2.13	2.13	2.34	S	2.20	2.17	2.12	2.11	2.02	1.99	2.00	2.02	1.98	1.98	1.96	1.95	1.94	1.94	1.94	1.97	1.97	1.96	1.96	1.95	1.94	2.34	2.03	24	
24	1.97	2.01	S	2.02	2.53	2.09	2.27	2.33	2.25	2.42	1.98	1.98	1.98	1.99	1.98	1.95	1.99	2.03	2.05	2.02	2.28	2.02	2.04	2.05	1.95	2.53	2.10	24	
25	2.09	S	2.14	2.14	2.14	2.14	2.14	2.19	2.24	2.27	2.26	2.29	2.28	2.24	2.16	2.16	2.12	2.12	2.13	2.19	2.14	2.12	2.09	2.06	2.06	2.29	2.17	24	
26	S	2.09	2.09	2.09	2.07	2.06	2.05	2.04	2.04	2.08	2.09	2.13	2.10	2.10	2.07	2.05	2.02	2.00	1.99	1.98	1.98	1.98	1.99	S	1.98	2.13	2.05	24	
27	1.98	2.03	2.20	2.26	2.00	2.10	2.20	2.20	2.18	2.50	2.29	2.00	2.00	2.01	2.06	2.14	2.42	2.69	2.29	2.02	2.03	2.03	S	2.04	1.98	2.69	2.16	24	
28	2.06	2.12	2.07	2.13	2.17	2.17	2.18	2.21	2.20	2.19	2.17	2.10	2.05	2.04	2.07	2.11	2.13	2.14	2.16	2.17	2.16	S	2.20	2.23	2.04	2.23	2.14	24	
29	2.29	2.22	2.22	2.23	2.37	2.27	2.29	2.34	2.32	2.35	2.30	2.30	2.24	2.20	2.20	2.15	2.13	2.13	2.14	2.13	S	2.12	2.13	2.13	2.12	2.37	2.23	24	
30	2.22	2.28	2.21	2.13	2.15	2.17	2.18	2.18	2.18	2.15	2.14	2.09	2.06	2.09	2.13	2.59	2.02	1.99	2.05	S	1.98	3.42	2.64	2.47	1.98	3.42	2.24	24	
HOURLY MAX	3.31	3.81	2.46	2.78	2.56	3.07	3.07	2.59	2.49	2.99	3.00	3.18	2.54	25.70	2.41	2.59	3.68	5.67	3.41	2.54	2.45	3.42	3.02	3.26					
HOURLY AVG	2.22	2.25	2.15	2.18	2.18	2.18	2.24	2.22	2.19	2.26	2.22	2.19	2.17	2.96	2.14	2.16	2.23	2.28	2.24	2.15	2.14	2.19	2.17	2.19					

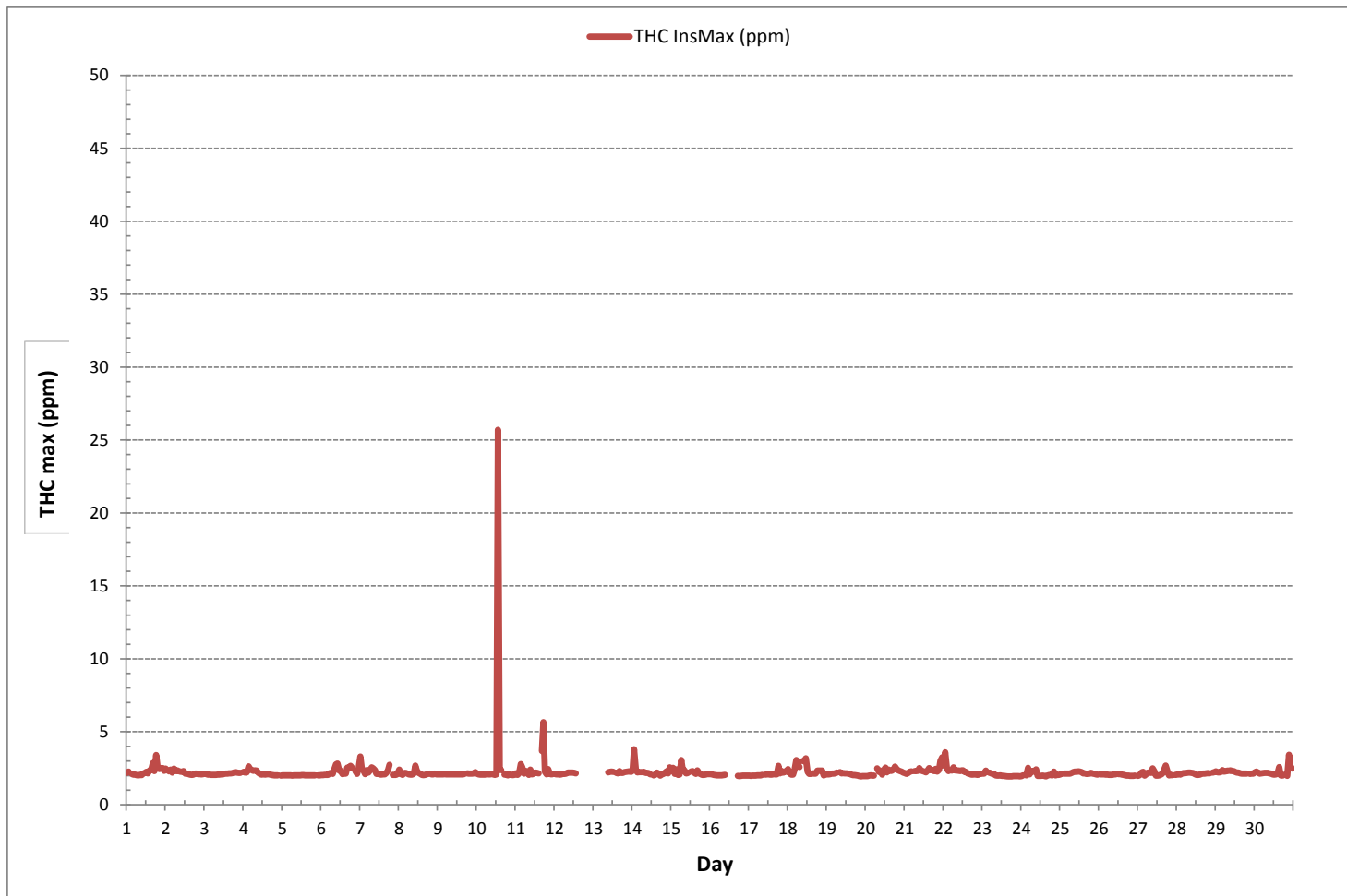
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	666				
MAXIMUM INSTANTANEOUS VALUE:	25.70	ppm	@ HOUR	13	ON DAY 10
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	703	hrs
MONTHLY CALIBRATION TIME:	5	hrs			
STANDARD DEVIATION:	0.95				

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2018

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 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	2.18	2.27	S	2.11	2.07	2.06	2.03	2.02	2.04	2.03	2.13	2.19	2.26	2.15	2.36	2.39	2.86	2.31	3.41	2.54	2.44	2.52	2.52	2.32	2.02	3.41	2.31	24	
2	2.45	S	2.29	2.41	2.20	2.47	2.31	2.36	2.30	2.28	2.26	2.31	2.13	2.13	2.10	2.06	2.04	2.06	2.14	2.13	2.10	2.10	2.08	2.10	2.04	2.47	2.21	24	
3	S	2.10	2.06	2.06	2.05	2.05	2.05	2.04	2.06	2.06	2.08	2.09	2.11	2.13	2.14	2.16	2.15	2.17	2.21	2.24	2.21	2.18	2.19	S	2.04	2.24	2.12	24	
4	2.25	2.20	2.22	2.64	2.46	2.38	2.33	2.35	2.34	2.20	2.11	2.07	2.11	2.06	2.08	2.10	2.09	2.04	2.03	2.02	2.01	2.01	S	2.00	2.00	2.64	2.18	24	
5	2.01	2.01	2.01	2.01	2.01	2.01	2.00	2.01	2.01	2.01	2.01	2.02	2.03	2.03	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	S	2.01	2.01	2.00	2.03	2.01	24
6	2.03	2.03	2.05	2.03	2.04	2.15	2.18	2.11	2.48	2.77	2.83	2.34	2.30	2.10	2.13	2.14	2.55	2.55	2.66	2.51	S	2.31	2.11	2.49	2.03	2.83	2.30	24	
7	3.31	2.46	2.33	2.10	2.37	2.21	2.36	2.56	2.49	2.38	2.12	2.14	2.08	2.06	2.10	2.09	2.17	2.36	2.73	S	2.04	2.04	2.05	2.12	2.04	3.31	2.29	24	
8	2.41	2.12	2.05	2.17	2.19	2.14	2.09	2.07	2.07	2.14	2.69	2.27	2.19	2.12	2.03	2.03	2.04	2.08	S	2.14	2.08	2.09	2.14	2.08	2.03	2.69	2.15	24	
9	2.08	2.08	2.09	2.09	2.10	2.09	2.09	2.09	2.08	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.10	S	2.16	2.13	2.14	2.13	2.15	2.24	2.08	2.24	2.11	24	
10	2.13	2.08	2.07	2.07	2.06	2.06	2.11	2.09	2.09	2.10	2.10	2.05	2.08	24.70	2.39	2.38	S	2.07	2.06	2.02	2.08	2.07	2.03	2.05	2.02	24.70	3.08	24	
11	2.15	2.04	2.16	2.78	2.56	2.13	2.33	2.21	2.05	2.41	2.09	2.14	2.20	2.19	2.15	S	3.68	5.67	2.26	2.09	2.45	2.11	2.09	2.12	2.04	5.67	2.44	24	
12	2.11	2.09	2.10	2.07	2.08	2.12	2.11	2.13	2.20	2.21	2.21	2.20	2.19	2.16	S	2.17	X	X	X	X	X	X	X	X	2.07	2.21	2.14	16	
13	X	X	X	X	X	X	X	X	X		2.22	2.25	2.26	2.25	S	2.18	2.16	2.17	2.19	2.19	2.23	2.25	2.27	2.28	2.25	2.16	2.28	2.23	15
14	2.33	3.81	2.21	2.22	2.23	2.22	2.23	2.26	2.18	2.18	2.17	2.09	S	2.01	2.04	2.21	2.13	2.00	2.07	2.15	2.16	2.29	2.15	2.56	2.00	3.81	2.26	24	
15	2.33	2.53	2.11	2.42	2.05	2.06	3.07	2.39	2.37	2.15	2.17	S	2.22	2.31	2.20	2.11	2.35	2.16	2.10	2.04	2.04	2.06	2.10	2.10	2.04	3.07	2.24	24	
16	2.10	2.08	2.04	2.03	2.02	2.02	2.02	2.03	2.04	S	2.03	C	C	C	C	C	1.98	1.97	1.98	1.97	2.00	2.00	2.00	1.99	1.97	2.10	2.02	24	
17	1.99	1.98	1.99	2.00	2.00	2.01	2.01	2.02	2.06	S	2.07	2.08	2.08	2.06	2.07	2.08	2.09	2.08	2.67	2.16	2.31	2.20	2.29	2.27	1.98	2.67	2.11	24	
18	2.44	2.16	2.06	2.07	2.40	2.79	2.78	2.59	S	2.99	3.00	3.18	2.26	2.11	2.11	2.16	2.14	2.14	2.34	2.34	2.34	2.34	2.01	2.06	2.01	3.18	2.38	24	
19	2.09	2.08	2.10	2.14	2.13	2.15	2.21	S	2.18	2.16	2.17	2.16	2.15	2.14	2.11	2.06	2.03	2.03	2.02	1.99	1.97	1.95	1.96	1.96	1.95	2.21	2.08	24	
20	1.97	1.97	2.00	2.01	1.99	2.00	S	2.50	2.25	2.34	2.06	2.37	2.54	2.21	2.41	2.32	2.33	2.41	2.61	2.44	2.35	2.30	2.28	2.21	1.97	2.61	2.26	24	
21	2.17	2.12	2.17	2.26	2.29	S	2.30	2.30	2.32	2.51	2.34	2.30	2.27	2.22	2.32	2.51	2.38	2.36	2.31	2.46	2.28	2.38	3.02	3.26	2.12	3.26	2.38	24	
22	2.68	3.60	2.46	2.30	S	2.34	2.35	2.36	2.34	2.36	2.30	2.35	2.35	2.24	2.24	2.13	2.11	2.06	2.06	2.08	2.07	2.04	2.12	2.11	2.04	3.60	2.31	24	
23	2.13	2.13	2.34	S	2.20	2.17	2.12	2.11	2.02	1.99	2.00	2.02	1.98	1.98	1.96	1.95	1.94	1.94	1.94	1.97	1.97	1.96	1.96	1.95	1.94	2.34	2.03	24	
24	1.97	2.01	S	2.02	2.53	2.09	2.27	2.33	2.25	2.42	1.98	1.98	1.98	1.99	1.98	1.95	1.99	2.02	2.05	2.02	2.28	2.02	2.04	2.05	1.95	2.53	2.10	24	
25	2.09	S	2.14	2.14	2.14	2.14	2.14	2.19	2.24	2.27	2.26	2.29	2.28	2.24	2.16	2.16	2.12	2.12	2.13	2.19	2.14	2.12	2.09	2.06	2.06	2.29	2.17	24	
26	S	2.09	2.09	2.09	2.07	2.06	2.05	2.04	2.04	2.08	2.09	2.13	2.10	2.10	2.07	2.05	2.02	2.00	1.99	1.98	1.98	1.98	1.99	S	1.98	2.13	2.05	24	
27	1.98	2.03	2.20	2.26	2.00	2.04	2.20	2.20	2.18	2.50	2.29	2.00	2.00	2.01	2.06	2.14	2.42	2.70	2.29	2.02	2.03	2.03	S	2.04	1.98	2.70	2.16	24	
28	2.06	2.12	2.07	2.13	2.17	2.17	2.18	2.21	2.20	2.19	2.17	2.10	2.05	2.04	2.07	2.11	2.13	2.14	2.15	2.17	2.16	S	2.20	2.23	2.04	2.23	2.14	24	
29	2.29	2.20	2.22	2.23	2.38	2.27	2.29	2.34	2.32	2.35	2.30	2.29	2.24	2.20	2.20	2.15	2.13	2.13	2.14	2.13	S	2.12	2.13	2.13	2.12	2.38	2.22	24	
30	2.22	2.28	2.21	2.13	2.15	2.17	2.18	2.18	2.18	2.15	2.14	2.09	2.06	2.09	2.13	2.59	2.02	1.99	2.05	S	1.98	3.42	2.64	2.47	1.98	3.42	2.24	24	
HOURLY MAX	3.31	3.81	2.46	2.78	2.56	2.79	3.07	2.59	2.49	2.99	3.00	3.18	2.54	24.70	2.41	2.59	3.68	5.67	3.41	2.54	2.45	3.42	3.02	3.26					
HOURLY AVG	2.22	2.25	2.14	2.18	2.18	2.16	2.23	2.22	2.19	2.26	2.22	2.19	2.16	2.92	2.14	2.16	2.23	2.28	2.24	2.15	2.14	2.19	2.17	2.19					

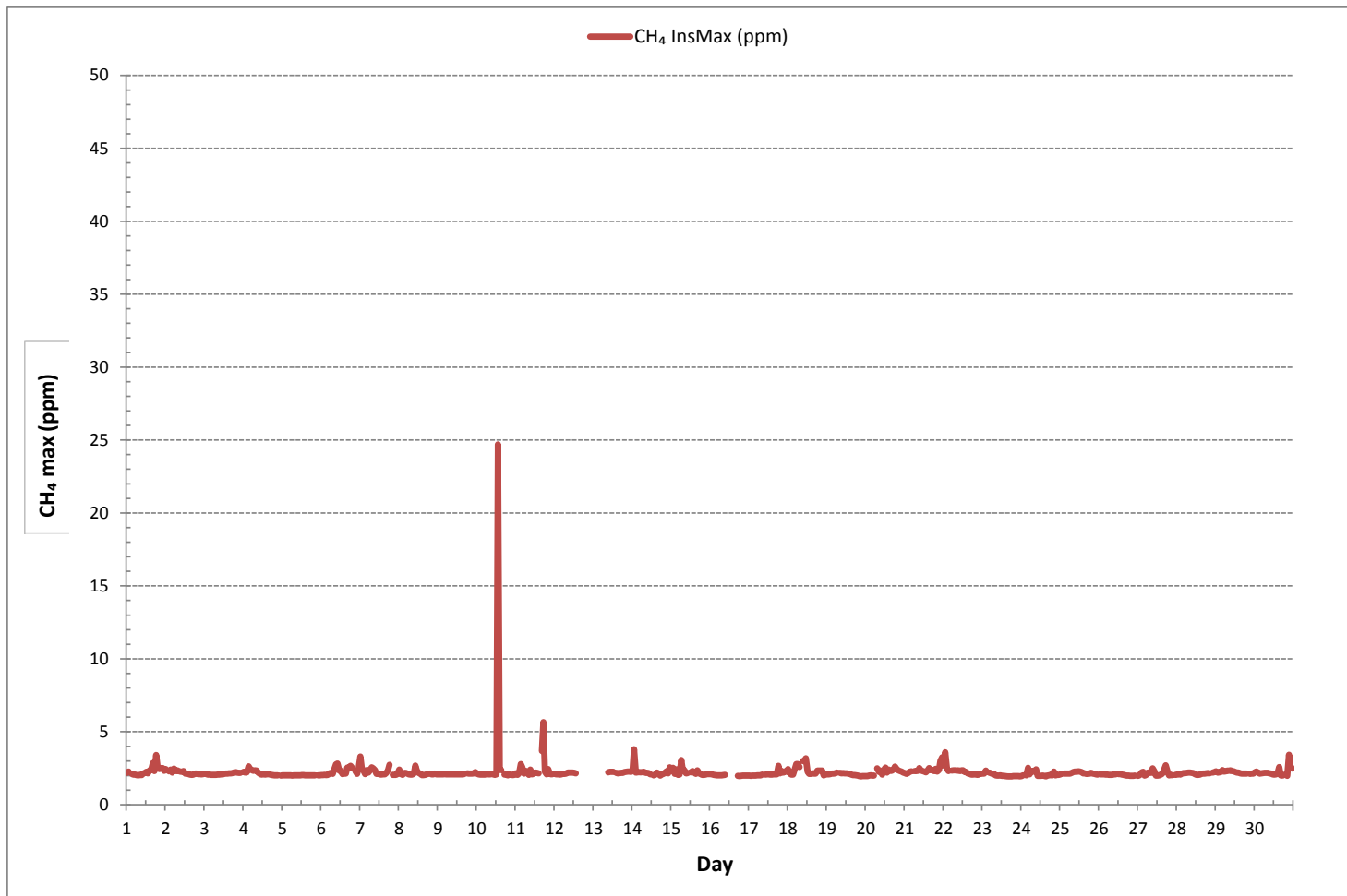
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	666
MAXIMUM INSTANTANEOUS VALUE:	24.70 ppm @ HOUR 13 ON DAY 10
IZS CALIBRATION TIME:	32 1.94
MONTHLY CALIBRATION TIME:	5 24.70
STANDARD DEVIATION:	0.91 3.08
OPERATIONAL TIME:	703 hrs

METHANE MAX Instantaneous Maximum (CH₄ ppm)





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.		
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	0.00	0.00	S	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	24	
2	0.00	S	0.00	0.02	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	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	24	
3	S	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	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.01	0.00	24		
4	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.01	0.00	24	
5	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	0.00	0.00	0.00	0.00	S	0.00	0.00	0.01	0.00	24		
6	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	0.00	0.00	0.00	0.00	0.00	0.00	0.06	S	0.00	0.00	0.00	0.00	0.06	0.00	24	
7	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	0.00	0.00	24	
8	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	0.04	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	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	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
10	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	0.00	0.00	0.00	0.01	0.00	1.00	0.01	0.00	S	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	1.00	0.05	24		
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.04	0.01	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	0.04	0.00	24	
12	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	0.01	0.00	S	0.01	X	X	X	X	X	X	X	X	0.00	0.01	0.00	16	
13	X	X	X	X	X	X	X	X	X	0.00	0.00	0.01	0.00	0.01	0.00	S	0.02	0.00	0.14	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.14	0.01	15
14	0.00	0.00	0.21	0.02	0.00	0.02	0.01	0.07	0.00	0.00	0.00	0.00	S	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	0.21	0.01	24	
15	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.05	0.00	0.00	0.01	S	0.10	0.03	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.10	0.01	24		
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	S	0.00	C	C	C	C	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	24	
17	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.05	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	
18	0.00	0.00	0.02	0.00	0.00	0.29	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	0.01	0.00	0.29	0.01	24	
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.08	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	0.08	0.00	24	
20	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	0.04	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	24		
21	0.00	0.00	0.00	0.00	0.01	S	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	24		
22	0.00	0.00	0.00	0.02	S	0.00	0.24	0.02	0.00	0.07	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.24	0.02	24		
23	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.03	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	0.03	0.00	24		
24	0.00	0.01	S	0.00	0.00	0.02	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	24		
25	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	0.00	0.00	0.00	24	
26	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	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	S	0.00	0.01	0.00	24		
27	0.00	0.01	0.00	0.00	0.00	0.11	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	S	0.01	0.00	0.11	0.01	24		
28	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	0.01	0.00	0.00	0.02	0.00	0.00	S	0.00	0.00	0.00	0.02	0.00	24		
29	0.00	0.04	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	S	0.00	0.00	0.01	0.00	0.04	0.00	24		
30	0.00	0.00	0.00	0.00	0.01	0.04	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	0.01	0.00	0.00	0.00	0.04	0.00	24	
HOURLY MAX	0.01	0.04	0.21	0.02	0.01	0.29	0.24	0.07	0.08	0.07	0.01	0.04	0.10	1.00	0.04	0.05	0.14	0.02	0.02	0.06	0.02	0.01	0.01	0.01						
HOURLY AVG	0.00	0.00	0.01	0.00	0.00	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.04	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00						

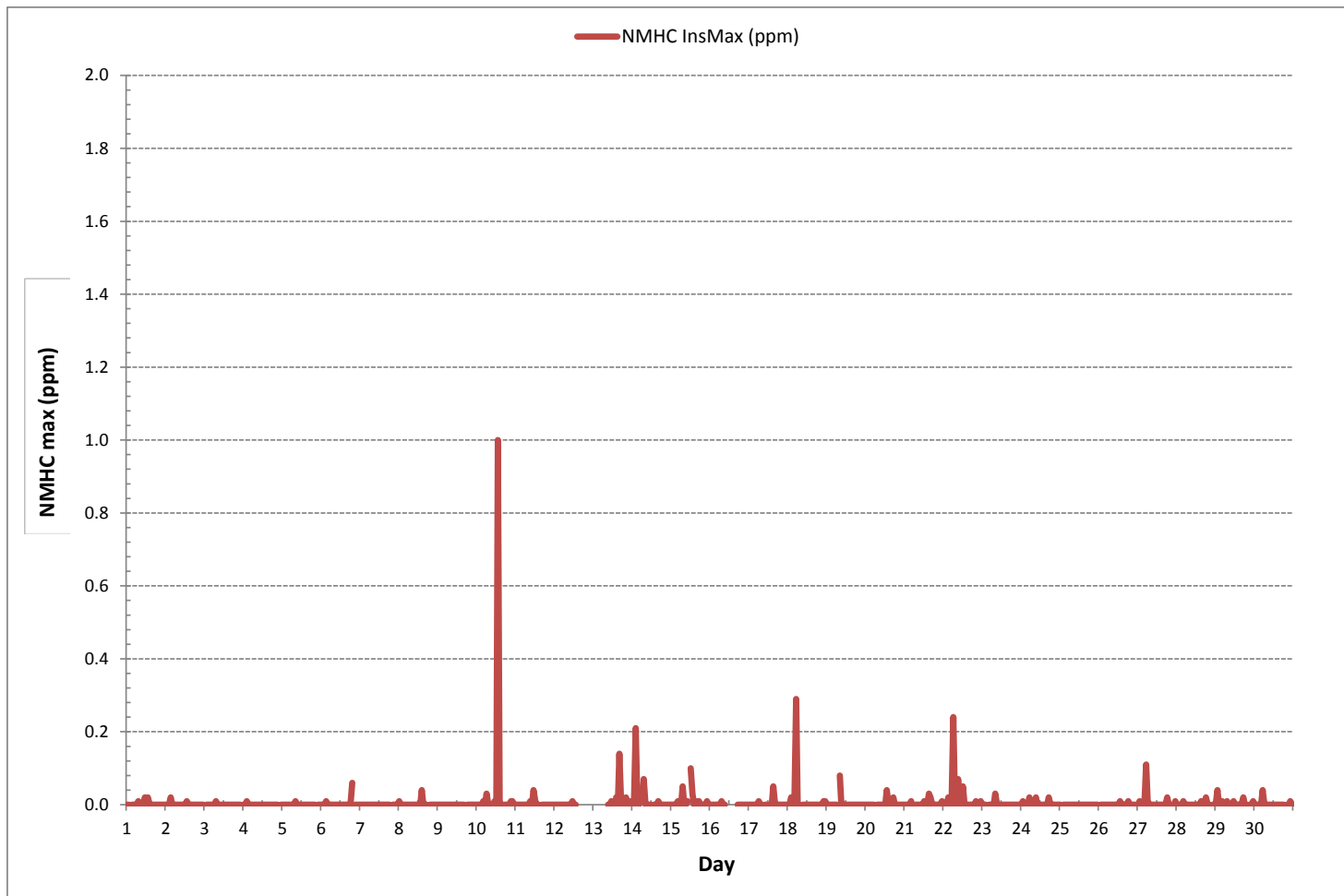
STATUS FLAG CODES

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:	89
MAXIMUM INSTANTANEOUS VALUE:	1.00 ppm @ HOUR 13 ON DAY 10
IZS CALIBRATION TIME:	32 0.00
MONTHLY CALIBRATION TIME:	5 1.00
STANDARD DEVIATION:	0.04
OPERATIONAL TIME:	703 hrs

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)





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	4	7	S	3	4	4	6	3	9	7	20	12	5	1	5	14	11	1	1	1	2	2	2	1	1	20	5	24	
2	2	S	4	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	1	1	2	1	4	2	24	
3	S	3	2	2	2	2	4	3	3	13	8	4	14	7	8	9	8	8	8	7	6	5	5	S	2	14	6	24	
4	6	4	4	4	3	3	3	3	2	2	2	2	2	2	3	3	2	1	1	1	1	1	1	S	2	1	6	2	24
5	1	1	1	1	1	1	2	2	2	1	1	2	5	2	4	4	4	2	2	2	2	S	3	2	1	5	2	24	
6	2	3	3	3	3	3	3	3	2	9	3	4	1	8	14	30	13	33	10	4	S	9	1	1	1	33	7	24	
7	1	1	1	1	1	1	4	3	2	25	32	23	8	4	10	14	10	2	18	S	2	6	2	2	1	32	7	24	
8	4	4	3	5	5	3	2	2	1	2	1	2	3	2	1	1	1	1	S	3	2	2	2	2	1	5	2	24	
9	1	1	2	3	2	2	2	3	3	4	9	14	7	9	8	5	14	S	10	6	6	5	4	3	1	14	5	24	
10	3	3	3	2	2	1	1	2	5	7	3	3	3	2	1	S	15	4	1	1	1	1	1	2	1	15	3	24	
11	1	1	1	1	1	1	3	1	0	1	5	9	5	3	1	S	5	10	3	1	4	2	1	3	0	10	3	24	
12	2	2	2	1	2	3	5	6	4	6	6	7	8	S	13	X	X	X	X	X	X	X	X	X	1	13	5	16	
13	X	X	X	X	X	X	X	X	X	41	15	14	17	S	16	14	9	45	11	9	9	20	13	12	9	45	18	15	
14	13	8	10	10	10	10	42	15	28	12	9	4	S	5	3	6	7	8	3	2	2	2	2	3	2	42	9	24	
15	2	2	2	2	2	3	3	12	3	5	9	S	8	5	6	6	6	4	2	1	2	2	3	3	1	12	4	24	
16	3	2	1	1	0	0	1	1	1	1	S	2	C	C	C	C	C	C	C	C	C	5	6	9	8	0	9	3	24
17	5	6	7	7	6	6	6	6	15	S	20	12	13	13	12	21	22	9	13	10	9	9	7	7	5	22	11	24	
18	8	8	8	8	16	21	20	13	S	14	14	14	8	7	6	6	5	5	6	5	4	3	3	3	3	21	9	24	
19	4	4	4	4	4	4	5	S	7	10	10	28	9	9	10	15	11	8	7	11	5	14	4	4	4	28	8	24	
20	4	4	4	4	4	4	S	5	6	7	7	10	10	9	8	8	8	8	7	8	7	7	6	7	6	4	10	7	24
21	6	6	6	6	6	S	7	6	6	6	6	6	6	6	6	8	8	8	7	8	7	7	7	6	6	8	7	24	
22	6	6	6	9	S	7	7	14	9	8	7	9	9	8	13	7	7	6	6	7	5	4	8	7	4	14	8	24	
23	7	6	4	S	4	4	3	10	7	2	3	2	2	4	3	2	1	1	1	2	2	2	2	2	1	10	3	24	
24	2	2	S	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	3	2	24	
25	3	S	3	3	3	3	3	4	4	5	5	6	6	6	6	6	5	6	5	6	5	4	5	5	3	6	5	24	
26	S	5	4	4	3	3	3	3	3	4	3	3	3	4	4	4	4	3	4	3	3	3	3	S	3	5	3	24	
27	3	3	2	2	2	3	2	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	S	5	2	5	3	24
28	4	4	4	4	5	5	5	5	5	5	5	7	6	6	8	16	16	18	24	22	13	S	11	10	4	24	9	24	
29	11	10	9	9	9	14	10	24	19	14	19	29	67	48	27	19	35	22	34	23	S	19	18	17	9	67	22	24	
30	11	16	15	14	15	12	15	29	45	41	13	12	27	25	9	13	11	8	5	S	5	5	5	5	5	5	5	24	
HOURLY MAX	13	16	15	14	16	21	42	29	45	41	32	29	67	48	27	30	35	45	34	23	13	20	18	17					
HOURLY AVG	4	5	4	4	4	5	6	7	7	9	8	9	9	8	7	9	8	9	7	6	4	5	5	5					

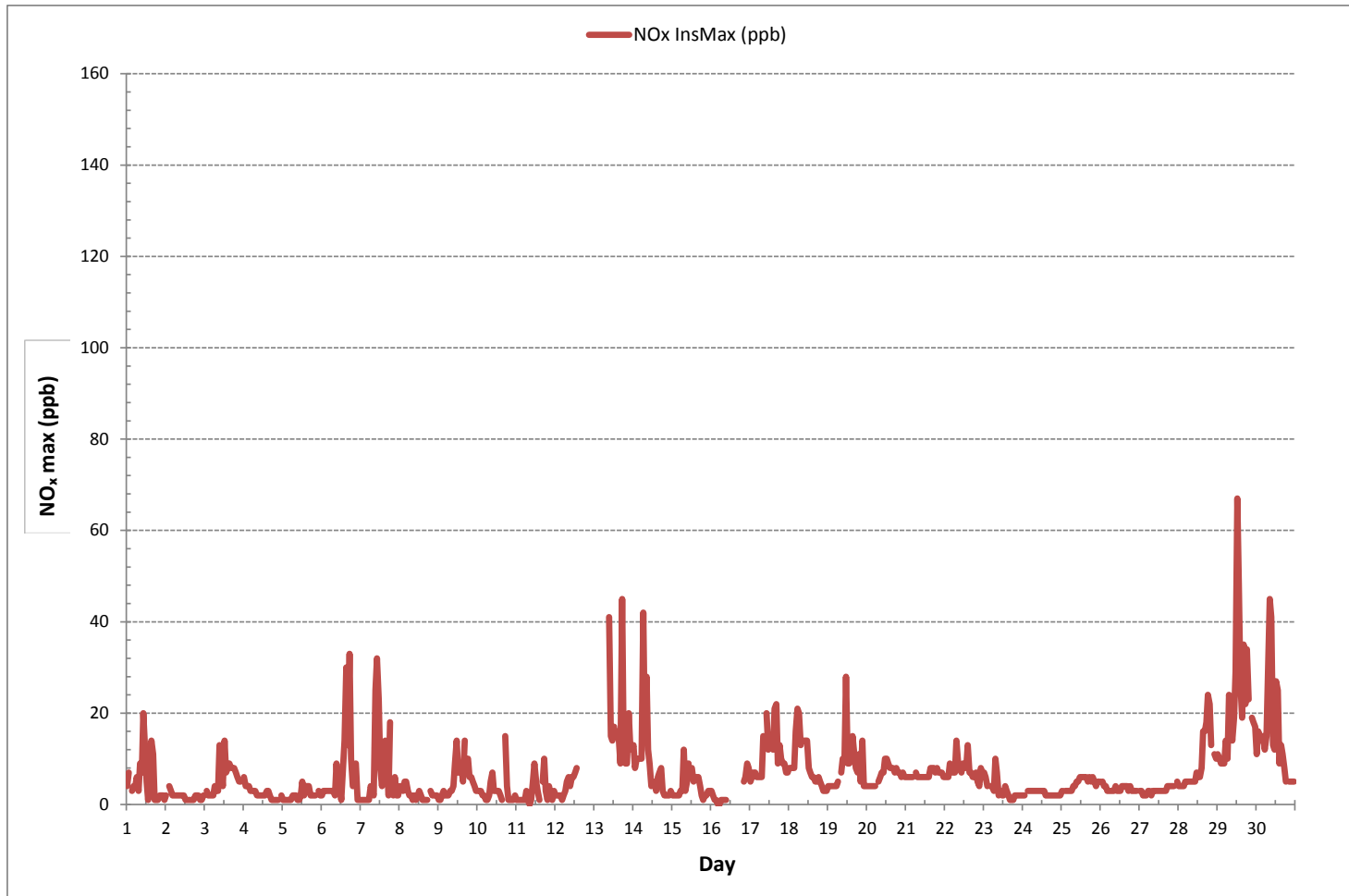
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	660
MAXIMUM INSTANTANEOUS VALUE:	67 ppb @ HOUR 12 ON DAY 29
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	7
OPERATIONAL TIME:	703 hrs

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)





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	S	0	0	0	3	1	4	4	15	7	3	0	3	6	5	0	0	0	0	0	0	0	0	15	2	24		
2	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	24		
3	S	0	0	0	0	0	1	0	1	7	3	1	6	3	2	2	1	0	0	0	0	0	0	0	S	0	7	1	24	
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	S	0	0	1	0	24	
5	0	0	0	0	0	0	0	1	0	0	0	1	2	1	1	2	1	0	0	0	0	0	S	0	0	0	2	0	24	
6	0	0	0	0	0	0	1	1	0	5	1	1	0	5	12	21	8	18	9	2	S	7	0	0	0	0	21	4	24	
7	0	0	0	0	0	0	2	1	1	18	27	12	3	1	6	9	3	0	7	S	0	2	0	0	0	0	27	4	24	
8	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	S	0	0	0	0	0	0	1	0	24	
9	0	0	0	0	0	0	0	0	0	0	4	9	3	3	3	1	9	S	2	1	0	0	0	0	0	0	9	2	24	
10	0	0	0	0	0	0	0	1	5	6	1	2	1	2	1	0	S	9	1	0	0	0	0	0	1	0	9	1	24	
11	0	0	0	0	0	0	1	0	0	1	2	2	3	1	0	S	2	4	0	0	0	0	0	0	0	0	4	1	24	
12	0	0	0	0	0	0	0	0	1	0	1	1	2	3	S	7	X	X	X	X	X	X	X	X	X	0	7	1	16	
13	X	X	X	X	X	X	X	X	X	23	7	5	5	S	5	4	0	25	1	1	0	8	0	0	0	0	25	6	15	
14	0	0	0	0	0	0	29	3	15	2	2	1	S	3	2	2	3	5	0	0	0	0	0	1	0	29	3	24		
15	0	0	0	0	0	0	0	4	0	1	3	S	1	1	0	0	0	0	0	0	0	0	0	0	0	0	4	0	24	
16	0	0	0	0	0	0	0	0	0	0	S	0	C	C	C	C	C	C	C	C	C	0	1	2	3	0	3	0	24	
17	0	0	0	0	0	0	2	0	5	S	8	5	7	5	5	11	10	0	0	0	0	0	1	0	0	0	11	2	24	
18	0	0	0	0	0	0	0	0	S	3	4	4	2	1	1	1	0	0	0	0	0	0	0	0	0	0	4	1	24	
19	0	0	0	0	0	0	0	S	1	5	2	27	4	2	4	5	3	2	0	4	0	9	0	0	0	0	27	3	24	
20	0	0	0	0	0	0	S	0	1	2	2	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0	3	1	24	
21	0	0	0	0	0	0	S	0	0	1	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	2	1	24	
22	0	0	0	2	S	0	0	7	4	2	2	3	4	2	5	1	2	0	0	0	0	0	0	1	1	0	7	2	24	
23	0	0	0	S	0	0	0	2	2	0	1	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	2	0	24	
24	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
25	0	S	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	24	
26	S	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	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	24
28	0	0	0	0	0	0	0	0	0	0	1	2	2	1	2	6	6	4	12	13	2	S	0	0	0	0	13	2	24	
29	1	0	0	0	0	3	0	11	7	5	9	17	52	30	11	3	13	2	19	3	S	0	0	1	0	52	8	24		
30	0	0	0	0	0	0	6	19	26	24	3	4	14	12	1	3	1	1	0	S	0	0	0	0	0	0	26	5	24	
HOURLY MAX	1	0	0	2	0	3	29	19	26	24	27	27	52	30	12	21	13	25	19	13	2	9	2	3						
HOURLY AVG	0	0	0	0	0	0	2	2	3	4	3	4	4	3	2	3	2	3	2	1	0	1	0	0						

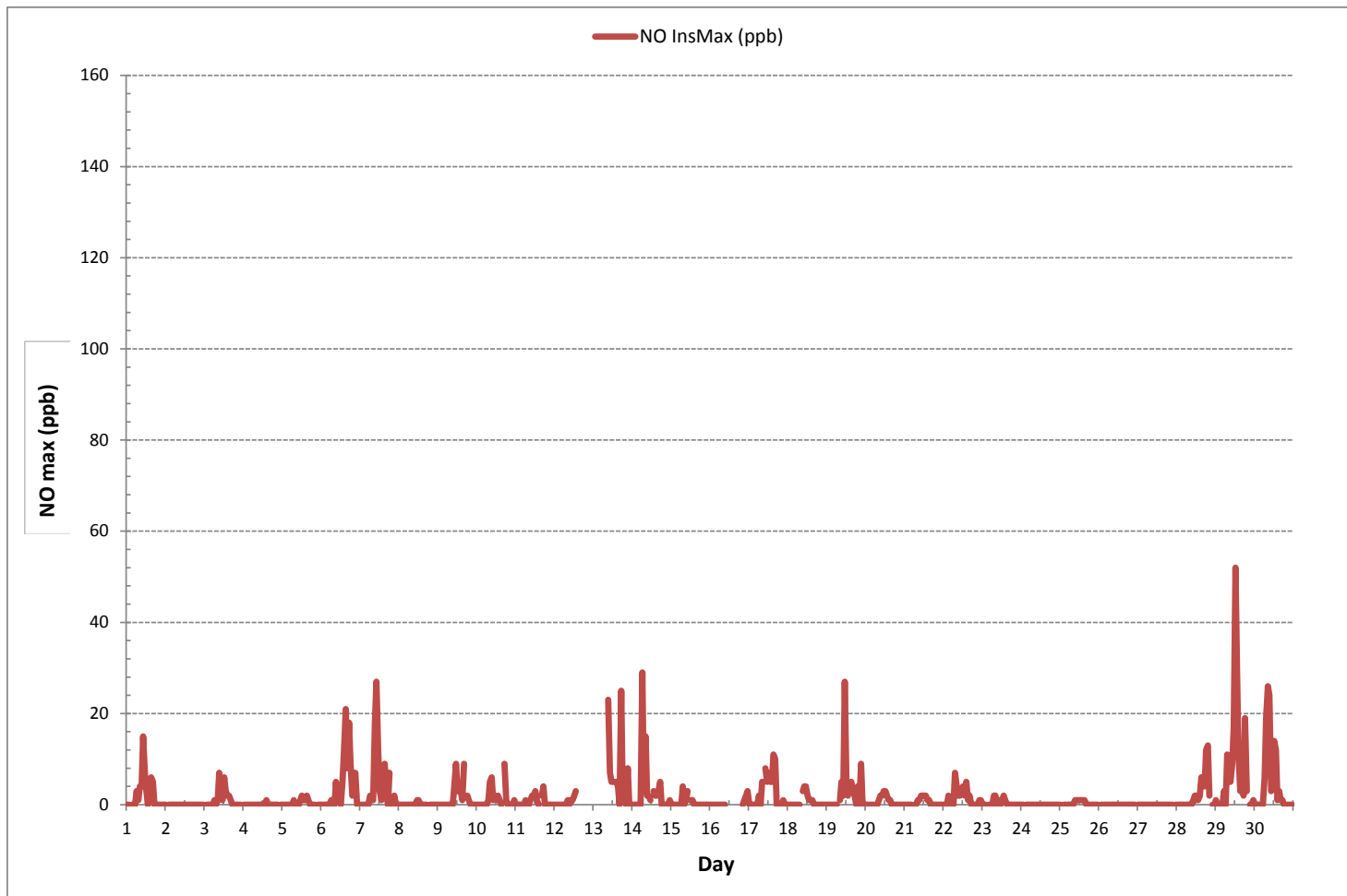
STATUS FLAG CODES

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:	230
MAXIMUM INSTANTANEOUS VALUE:	52 ppb @ HOUR 12 ON DAY 29
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	4
OPERATIONAL TIME:	703 hrs

NITRIC OXIDE Instantaneous Maximum (NO 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	5	7	S	3	4	4	3	3	5	3	6	6	2	1	2	9	6	1	1	1	2	2	2	2	1	9	3	24	
2	2	S	4	3	2	2	2	2	2	2	1	1	1	1	1	1	2	1	2	2	2	1	1	2	1	4	2	24	
3	S	3	2	2	2	2	3	3	3	6	4	3	9	5	6	7	7	8	8	7	6	5	5	S	2	9	5	24	
4	6	4	4	4	3	3	3	3	2	2	2	2	2	2	3	3	2	1	1	1	1	1	1	S	2	1	6	2	24
5	1	2	2	1	1	1	2	2	2	1	1	2	3	2	2	3	3	2	2	2	2	2	S	4	3	1	4	2	24
6	3	3	3	3	3	3	3	2	2	4	2	3	1	2	4	9	6	16	3	2	S	4	1	1	1	16	4	24	
7	1	1	1	1	1	1	2	2	1	7	6	12	5	3	5	7	7	2	11	S	3	5	2	2	1	12	4	24	
8	4	4	3	5	5	3	3	2	1	2	1	2	2	1	1	1	1	1	S	3	2	2	2	2	1	5	2	24	
9	2	2	2	3	2	2	2	3	3	3	6	6	5	6	5	5	8	S	7	6	6	4	4	4	2	8	4	24	
10	3	3	3	2	2	2	1	2	2	2	2	2	2	2	2	2	S	6	3	1	1	1	1	1	1	6	2	24	
11	1	1	1	1	1	1	2	1	1	1	3	7	3	2	1	S	5	6	3	1	4	2	2	3	1	7	2	24	
12	2	2	2	2	2	3	3	5	5	4	4	5	5	5	S	8	X	X	X	X	X	X	X	X	2	8	4	16	
13	X	X	X	X	X	X	X	X	X	19	10	10	13	S	11	10	9	20	10	9	9	14	13	12	9	20	12	15	
14	13	8	10	10	10	10	13	12	14	10	7	4	S	4	2	4	4	4	3	2	2	2	2	2	2	2	14	7	24
15	2	2	2	2	2	3	3	8	3	4	6	S	6	4	5	6	6	4	2	1	2	3	3	3	1	8	4	24	
16	3	2	1	1	0	0	1	1	1	1	S	2	C	C	C	C	C	C	C	C	C	5	5	7	6	0	7	2	24
17	5	7	7	7	7	6	6	6	11	S	12	7	7	8	8	12	13	9	13	10	9	9	8	8	5	13	8	24	
18	8	8	8	8	16	21	20	14	S	12	11	10	7	6	5	6	5	5	6	5	4	3	3	3	3	21	8	24	
19	4	4	4	4	4	4	5	S	7	6	8	12	7	7	8	10	9	7	7	7	5	8	4	4	4	12	6	24	
20	4	4	4	4	4	4	S	5	6	6	6	7	7	6	7	7	8	7	8	7	7	7	7	7	6	4	8	6	24
21	6	6	6	6	6	S	7	6	6	6	5	5	5	5	5	7	8	8	8	8	7	7	7	6	5	8	6	24	
22	6	6	6	8	S	7	7	8	7	6	6	6	6	6	8	7	6	6	6	7	5	4	7	7	4	8	6	24	
23	7	6	4	S	4	4	3	9	7	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	1	9	3	24	
24	2	3	S	3	3	3	3	3	3	3	3	3	2	3	2	2	2	2	2	2	2	2	2	2	2	3	2	24	
25	3	S	3	3	3	3	3	4	4	4	5	5	5	5	5	5	5	6	6	6	5	4	5	5	3	6	4	24	
26	S	5	4	4	3	3	3	4	3	4	3	3	3	3	4	4	4	4	4	3	3	3	3	S	3	5	3	24	
27	3	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	S	5	2	5	3	24
28	4	4	5	5	5	5	5	5	5	5	5	5	4	5	6	10	14	15	14	13	11	S	11	10	4	15	7	24	
29	10	10	10	9	9	11	10	14	13	10	9	12	20	20	16	17	22	21	20	20	S	19	18	17	9	22	15	24	
30	11	16	15	14	15	12	12	16	19	17	10	8	14	13	7	10	9	7	5	S	5	6	5	5	5	5	19	11	24
HOURLY MAX	13	16	15	14	16	21	20	16	19	19	12	12	20	20	16	17	22	21	20	20	11	19	18	17					
HOURLY AVG	4	5	4	4	4	5	5	5	5	5	5	5	5	5	5	6	6	6	6	5	4	5	5	5					

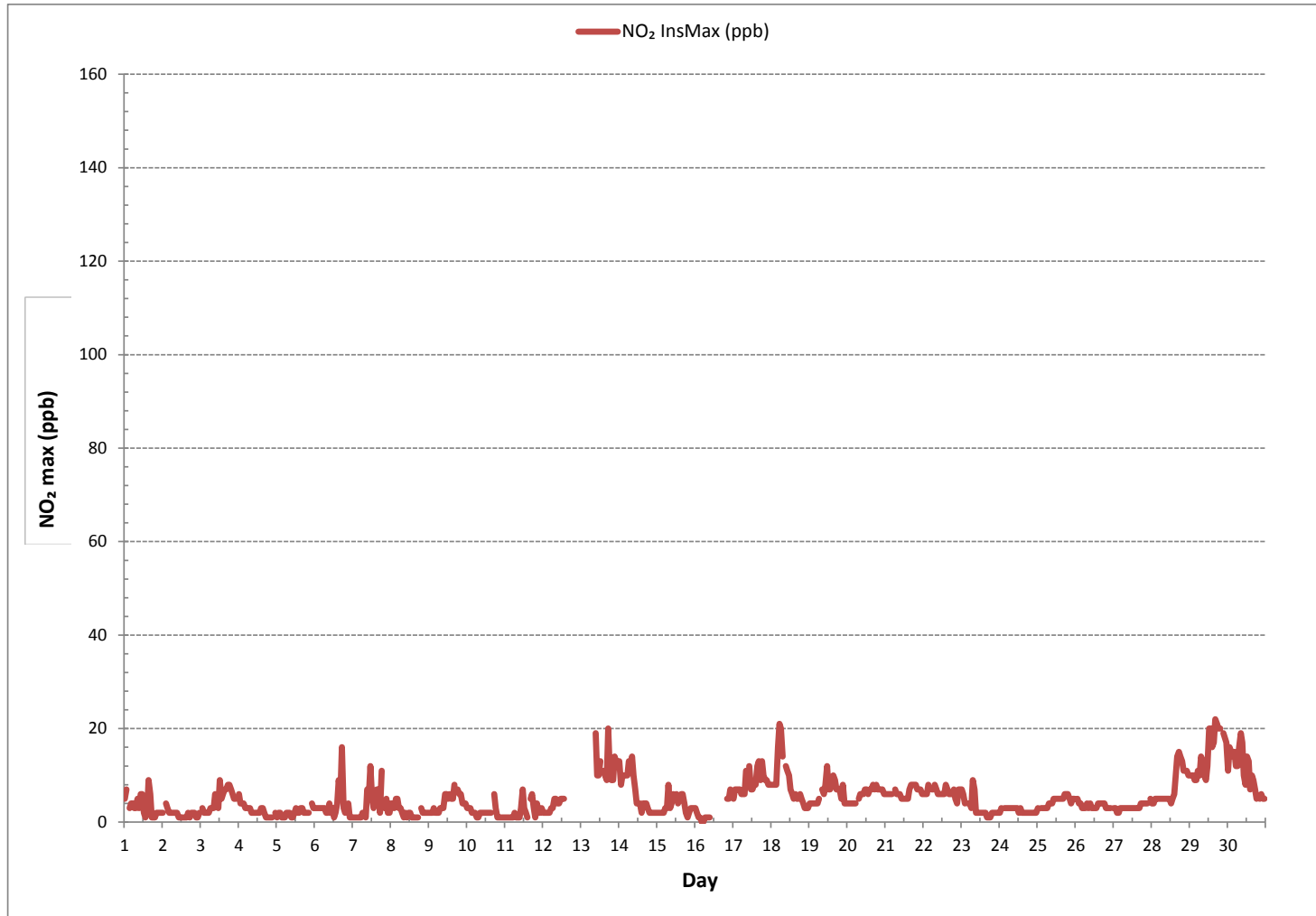
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	661
MAXIMUM INSTANTANEOUS VALUE:	22 ppb @ HOUR 16 ON DAY 29
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	4
OPERATIONAL TIME:	703 hrs

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2018

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 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	22.8	27.5	S	26.4	18.9	17.9	23.2	24.4	26.8	26.1	27.7	29.3	29.3	29.1	29.6	29.9	31.3	29.9	29.5	29.0	24.1	22.7	22.2	22.4	17.9	31.3	26.1	24
2	21.7	S	21.2	21.3	21.6	21.5	21.7	20.4	18.9	18.4	18.2	18.8	21.9	24.1	24.3	24.8	24.7	23.6	22.3	22.5	23.2	23.9	24.3	22.9	18.2	24.8	22.0	24
3	S	23.7	23.2	21.9	20.8	20.1	19.1	18.0	16.9	15.7	15.1	13.8	13.9	14.0	12.9	12.2	10.4	9.4	10.5	11.6	14.6	14.6	13.7	S	9.4	23.7	15.7	24
4	12.9	14.1	13.9	14.2	14.9	14.9	14.9	15.1	15.3	15.1	14.8	15.9	16.1	16.0	14.7	12.5	15.3	19.4	21.5	22.8	24.1	25.2	S	28.9	12.5	28.9	17.1	24
5	28.8	29.5	29.9	30.1	30.5	31.2	31.4	31.1	30.8	31.4	31.7	31.0	29.9	29.4	30.0	31.0	30.9	32.5	32.6	32.9	32.9	S	32.7	32.4	28.8	32.9	31.1	24
6	32.1	31.0	29.9	28.7	28.8	30.1	30.6	30.5	30.4	32.6	32.3	31.3	31.5	32.6	32.6	32.2	31.5	30.6	30.3	31.2	S	31.5	31.8	31.2	28.7	32.6	31.1	24
7	30.9	30.9	30.5	30.2	29.7	29.6	31.8	33.7	32.5	33.1	35.3	35.5	34.8	34.0	33.0	32.8	33.5	34.7	34.5	S	32.7	32.8	32.3	31.2	29.6	35.5	32.6	24
8	31.1	29.2	33.0	31.9	28.9	29.5	31.7	34.5	35.0	34.6	35.0	34.2	34.1	34.5	34.8	34.5	34.7	34.4	S	32.9	32.9	32.1	32.0	32.2	28.9	35.0	32.9	24
9	32.0	31.7	31.1	30.4	30.2	30.0	30.3	30.1	29.7	29.0	29.1	29.2	28.7	28.4	27.0	25.8	24.7	S	22.8	20.8	22.7	23.6	22.3	21.9	20.8	32.0	27.5	24
10	23.6	24.4	26.2	26.7	33.1	36.9	38.3	32.7	31.5	29.7	29.5	30.0	32.2	34.8	35.1	37.3	S	36.2	36.2	38.4	37.0	36.2	41.0	40.9	23.6	41.0	33.4	24
11	39.4	38.3	37.8	37.6	37.3	36.8	36.2	36.8	36.3	36.0	35.8	35.4	35.3	35.3	34.8	S	34.8	34.8	35.9	34.8	34.3	33.1	32.8	31.5	31.5	39.4	35.7	24
12	31.9	32.8	32.4	32.8	32.9	32.2	29.6	28.8	27.4	26.7	26.5	25.8	25.3	24.8	S	23.1	X	X	X	X	X	X	X	X	23.1	32.9	28.9	16
13	X	X	X	X	X	X	X	X	X	22.1	25.3	29.5	30.0	S	C	C	C	C	C	21.9	20.7	19.7	18.6	17.6	17.6	30.0	22.8	15
14	27.3	27.5	26.5	14.9	15.1	20.1	19.8	19.5	22.2	28.7	34.6	37.8	S	39.8	39.7	39.4	38.7	38.1	38.2	37.5	36.6	35.7	35.0	33.9	14.9	39.8	30.7	24
15	32.9	31.2	30.0	28.3	25.7	21.2	18.9	17.4	17.2	16.3	16.1	S	17.4	18.4	19.4	18.3	19.8	24.4	24.9	26.3	25.7	25.9	25.2	25.7	16.1	32.9	22.9	24
16	27.0	30.4	31.1	32.3	33.8	33.5	33.6	33.2	33.4	33.1	S	33.6	36.3	40.8	35.4	34.2	33.8	33.8	30.5	27.4	26.0	25.8	25.1	23.6	23.6	40.8	31.6	24
17	23.2	22.0	19.9	20.1	21.9	21.2	21.1	21.0	20.7	S	20.3	20.5	21.5	21.7	21.6	21.2	19.8	18.8	19.5	21.6	21.6	17.1	18.1	23.1	17.1	23.2	20.8	24
18	21.2	20.1	20.1	19.2	18.1	10.2	11.7	11.8	S	13.6	14.1	17.5	20.1	19.8	19.7	19.7	19.6	19.3	19.4	21.0	22.5	22.6	22.3	22.1	10.2	22.6	18.5	24
19	21.0	20.5	21.7	21.7	21.5	20.3	19.2	S	18.2	17.9	18.0	18.1	17.8	18.0	20.2	21.0	21.5	20.9	19.9	21.7	22.5	23.2	23.4	23.6	17.8	23.6	20.5	24
20	23.2	23.6	23.4	24.0	25.9	27.6	S	20.2	20.3	18.2	19.6	19.9	19.7	20.7	20.4	19.9	18.5	18.6	18.3	18.0	18.0	17.2	16.7	16.5	16.5	27.6	20.4	24
21	16.6	16.0	15.2	14.2	14.2	S	14.1	13.6	12.9	13.5	14.2	14.5	15.6	15.4	15.2	14.1	13.0	12.3	12.5	12.6	12.8	12.9	12.8	12.6	12.3	16.6	13.9	24
22	12.9	12.8	12.2	11.7	S	10.4	9.7	9.9	20.8	21.7	22.4	24.8	23.6	20.7	25.0	24.7	29.8	30.1	30.4	31.4	34.8	35.0	28.1	23.2	9.7	35.0	22.0	24
23	23.0	29.2	29.8	S	30.9	30.9	29.7	27.8	26.5	22.2	19.0	19.5	23.9	25.1	25.7	26.4	26.1	26.5	26.4	25.9	27.0	27.1	27.2	26.8	19.0	30.9	26.2	24
24	26.1	26.3	S	27.0	27.2	26.0	25.9	25.9	26.6	26.8	26.2	26.2	26.4	26.7	27.2	28.0	28.3	27.7	27.6	27.8	27.6	27.6	27.2	26.6	25.9	28.3	26.9	24
25	25.5	S	24.1	23.2	22.3	21.8	21.5	20.9	19.7	19.0	18.9	18.7	18.5	18.9	18.5	18.7	18.3	18.0	18.9	19.2	20.1	20.8	20.3	19.8	18.0	25.5	20.2	24
26	S	20.7	20.8	20.9	20.9	21.8	23.5	23.8	25.2	25.6	26.2	26.2	27.7	27.7	26.2	25.2	24.6	25.1	24.8	26.1	27.1	27.1	27.3	S	20.7	27.7	24.8	24
27	26.8	26.2	25.6	25.6	25.3	24.1	23.5	23.1	23.1	21.8	22.2	22.1	22.1	22.4	22.2	21.4	20.8	20.5	20.3	20.5	19.8	20.3	S	20.8	19.8	26.8	22.6	24
28	20.8	20.6	20.9	20.6	20.6	20.3	20.1	20.0	20.3	19.5	19.3	18.1	16.0	13.9	12.6	11.0	7.1	3.7	4.7	5.1	4.9	S	4.5	4.6	3.7	20.9	14.3	24
29	5.2	5.9	6.1	6.9	6.7	6.0	5.8	5.1	7.4	10.6	11.6	13.7	15.1	15.8	15.7	14.8	11.6	10.7	8.2	8.8	S	13.8	12.6	17.1	5.1	17.1	10.2	24
30	24.0	21.4	19.8	15.2	13.4	19.7	15.7	10.4	10.9	12.3	14.9	21.3	20.4	18.3	20.2	18.9	20.6	22.2	22.0	S	22.2	20.8	20.0	22.0	10.4	24.0	18.5	24
HOURLY MAX	39.4	38.3	37.8	37.6	37.3	36.9	38.3	36.8	36.3	36.0	35.8	37.8	36.3	40.8	39.7	39.4	38.7	38.1	38.2	38.4	37.0	36.2	41.0	40.9				
HOURLY AVG	24.6	24.7	24.3	23.5	24.0	23.8	23.3	22.8	23.5	23.1	23.2	24.6	24.3	24.9	24.8	24.0	23.8	24.3	23.8	24.1	24.8	24.8	24.1	24.3				

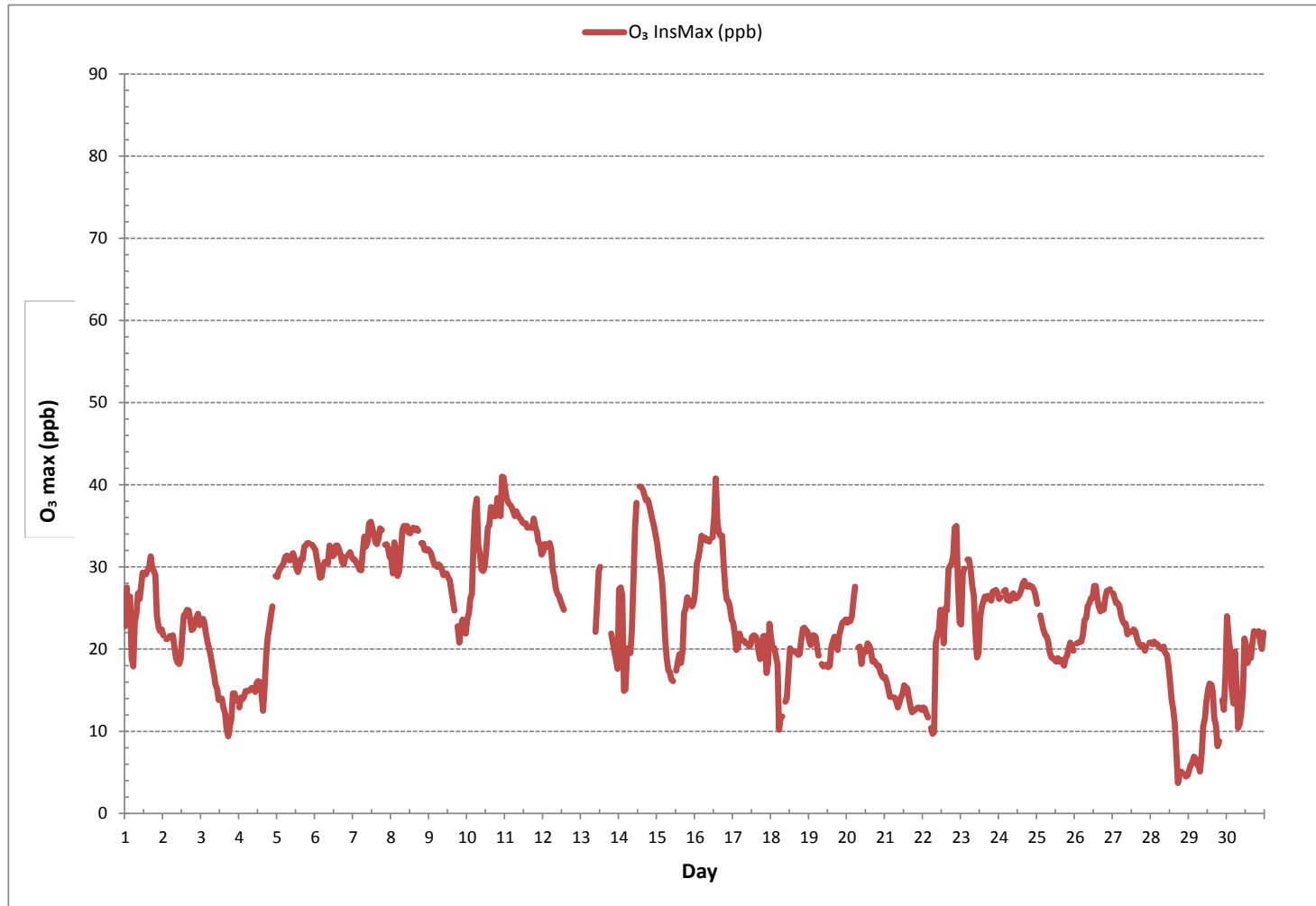
STATUS FLAG CODES

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:	666
MAXIMUM INSTANTANEOUS VALUE:	41.0 ppb @ HOUR 22 ON DAY 10
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	7.6
OPERATIONAL TIME:	703 hrs

OZONE Instantaneous Maximum (O₃ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2018

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 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	16.5	33.8	26.5	35.1	39.3	40.5	48.2	37.9	54.1	35.3	29.6	27.0	21.9	19.5	X	13.6	11.9	7.7	6.6	13.0	19.3	16.5	15.4	17.8	6.6	54.1	25.2	24
2	20.2	26.1	23.0	37.3	21.5	37.0	37.0	28.5	34.9	30.0	40.3	28.9	28.9	29.8	22.4	26.1	22.8	18.0	11.9	14.0	25.7	27.0	29.4	24.4	11.9	40.3	26.9	24
3	33.1	27.6	25.2	26.7	28.3	27.8	25.7	31.6	32.2	33.1	30.9	28.9	24.3	23.2	21.0	12.5	7.0	13.2	16.0	15.6	23.7	24.3	22.4	21.9	7.0	33.1	24.0	24
4	24.3	28.3	29.8	41.9	48.0	X	X	X	X	X	X	X	X	X	23.7	32.2	47.6	48.9	51.3	45.8	41.2	52.2	52.4	57.2	23.7	63.3	43.0	16
5	51.3	50.0	50.8	50.2	48.2	47.7	41.9	42.5	38.6	35.7	41.2	35.3	30.7	33.6	32.9	35.3	26.3	34.0	34.7	27.0	26.7	26.5	27.0	24.6	24.6	51.3	37.2	24
6	26.1	23.7	22.4	25.2	24.6	21.7	25.2	18.9	20.2	18.7	20.4	16.9	13.8	21.3	19.5	15.6	18.2	18.9	16.3	26.5	22.6	29.4	24.3	22.8	13.8	29.4	21.4	24
7	12.3	13.0	13.4	14.5	13.8	11.9	14.7	11.9	12.3	18.2	20.6	17.8	11.2	15.4	13.8	14.5	11.2	15.4	14.3	12.5	11.2	9.0	14.3	21.3	9.0	21.3	14.1	24
8	16.3	14.3	10.8	15.6	18.2	20.0	18.5	15.4	15.6	16.9	14.0	13.9	19.3	15.2	15.6	23.0	17.1	18.7	29.0	27.2	28.7	41.4	39.3	46.5	10.8	46.5	21.3	24
9	38.4	46.7	43.6	45.4	58.1	57.9	45.2	37.5	36.2	35.7	34.7	33.8	28.3	26.7	20.2	16.2	14.1	11.9	24.8	33.6	37.5	31.4	25.2	26.3	11.9	58.1	33.7	24
10	39.2	55.7	53.5	41.9	49.3	32.5	44.9	28.7	36.4	26.7	27.5	26.5	28.1	32.7	23.5	21.5	31.4	32.7	39.7	48.9	39.0	55.6	52.3	45.1	21.5	55.7	38.1	24
11	38.8	43.6	30.7	26.7	23.9	23.4	26.3	43.2	26.7	19.7	29.2	27.8	26.6	26.1	21.5	18.0	16.5	11.4	6.0	6.9	11.7	20.4	21.1	23.3	6.0	43.6	23.7	24
12	X	X	X	X	X	X	X	X	X	X	X	31.1	18.7	20.6	21.0	16.9	X	X	X	X	X	X	X	X	16.9	31.1	21.7	5
13	X	X	X	X	X	X	X	X	X	19.7	14.6	20.4	19.7	18.9	19.3	13.8	15.2	21.3	16.5	17.3	16.7	20.6	19.2	21.9	13.8	21.9	18.3	15
14	27.6	23.7	16.5	14.7	17.6	18.2	15.8	22.4	18.2	22.4	24.1	26.7	40.1	31.6	30.0	24.3	19.7	19.1	20.0	26.7	25.2	18.4	21.9	12.3	12.3	40.1	22.4	24
15	15.6	16.7	16.2	18.2	20.6	15.2	16.0	14.5	14.9	14.0	13.2	12.1	17.3	25.0	22.3	29.0	38.1	40.6	49.5	42.8	45.4	33.6	35.8	37.1	12.1	49.5	25.2	24
16	32.9	35.1	29.4	35.1	38.8	34.0	33.1	30.5	28.5	18.7	26.3	22.6	20.6	14.5	16.5	15.4	12.5	13.0	13.8	20.0	22.0	20.2	18.2	19.4	12.5	38.8	23.8	24
17	21.7	21.9	25.6	25.2	21.5	25.5	27.9	25.0	19.8	20.0	20.2	18.9	16.5	12.6	14.1	11.7	11.0	13.2	24.6	9.5	33.1	13.6	13.6	16.0	9.5	33.1	19.3	24
18	17.4	17.4	16.3	16.7	17.8	21.1	19.7	27.4	17.1	24.1	24.6	17.6	25.9	22.6	21.3	19.3	16.5	15.4	18.7	16.7	18.2	20.4	12.1	13.8	12.1	27.4	19.1	24
19	17.4	23.5	28.7	31.8	30.7	29.6	31.2	32.5	33.8	26.7	26.7	29.2	27.8	31.1	24.8	38.6	28.7	21.0	27.8	27.0	18.6	18.9	17.8	18.9	17.4	38.6	26.8	24
20	13.0	15.4	13.8	12.3	8.8	12.5	16.5	23.5	15.4	13.2	16.3	18.7	20.8	17.8	17.6	19.7	19.1	21.7	25.4	21.7	27.6	24.1	25.4	29.2	8.8	29.2	18.7	24
21	31.1	27.2	25.4	24.8	16.7	18.2	17.8	17.8	18.9	18.0	22.6	21.3	21.3	13.2	19.1	17.6	20.4	23.7	24.8	17.4	24.1	19.5	13.8	13.6	13.2	31.1	20.3	24
22	16.0	10.5	8.8	15.8	14.5	17.6	14.1	17.4	22.2	20.7	23.5	14.0	14.8	13.8	15.2	14.3	16.9	11.6	10.8	14.7	18.4	18.5	12.1	12.5	8.8	23.5	15.4	24
23	11.4	17.6	16.7	15.2	17.3	20.4	26.7	21.1	33.3	31.2	30.1	27.2	27.4	25.0	26.3	23.7	28.5	26.3	24.1	20.6	20.0	21.7	21.1	17.6	11.4	33.3	22.9	24
24	16.9	13.4	13.8	16.5	18.5	16.9	17.1	16.0	14.1	16.3	13.4	15.4	19.1	18.7	21.7	25.2	23.0	21.5	29.6	28.7	25.5	24.2	20.2	20.7	13.4	29.6	19.4	24
25	24.8	25.2	18.7	21.7	17.8	18.2	18.2	14.1	12.3	13.2	16.7	19.1	17.6	20.6	20.4	21.7	26.5	23.5	28.4	25.0	27.9	29.8	28.5	26.3	12.3	29.8	21.5	24
26	24.6	24.1	26.7	23.9	25.9	29.0	26.7	29.8	28.7	32.3	33.8	32.9	35.1	32.5	36.4	33.6	40.1	38.6	42.5	37.5	40.8	34.9	40.6	32.3	23.9	42.5	32.6	24
27	28.5	29.8	22.8	23.2	20.7	22.2	26.8	30.7	27.2	15.2	25.4	22.8	25.4	25.5	25.9	19.1	14.7	23.7	21.3	26.3	23.0	20.4	17.1	18.0	14.7	30.7	23.2	24
28	19.1	16.7	17.8	14.9	13.6	14.3	14.7	13.6	13.8	12.5	13.0	15.2	16.2	15.8	16.0	15.4	18.9	13.8	15.4	15.2	11.4	10.1	10.3	10.3	10.1	19.1	14.5	24
29	13.2	14.5	13.8	18.7	16.9	16.0	16.9	11.9	12.6	14.3	13.2	13.4	11.4	13.0	11.2	12.1	9.9	8.6	9.7	9.1	9.5	21.5	13.0	14.0	8.6	21.5	13.3	24
30	12.5	11.6	9.5	9.2	11.4	14.3	15.6	13.2	9.7	10.3	8.6	12.7	9.5	11.6	6.8	9.2	6.6	7.5	6.2	11.9	11.9	12.5	13.0	14.0	6.2	15.6	10.8	24
HOURLY MAX	51.3	55.7	53.5	50.2	58.1	57.9	48.2	43.2	54.1	35.7	41.2	35.3	40.1	33.6	36.4	38.6	47.6	48.9	51.3	48.9	45.4	55.6	52.4	57.2				

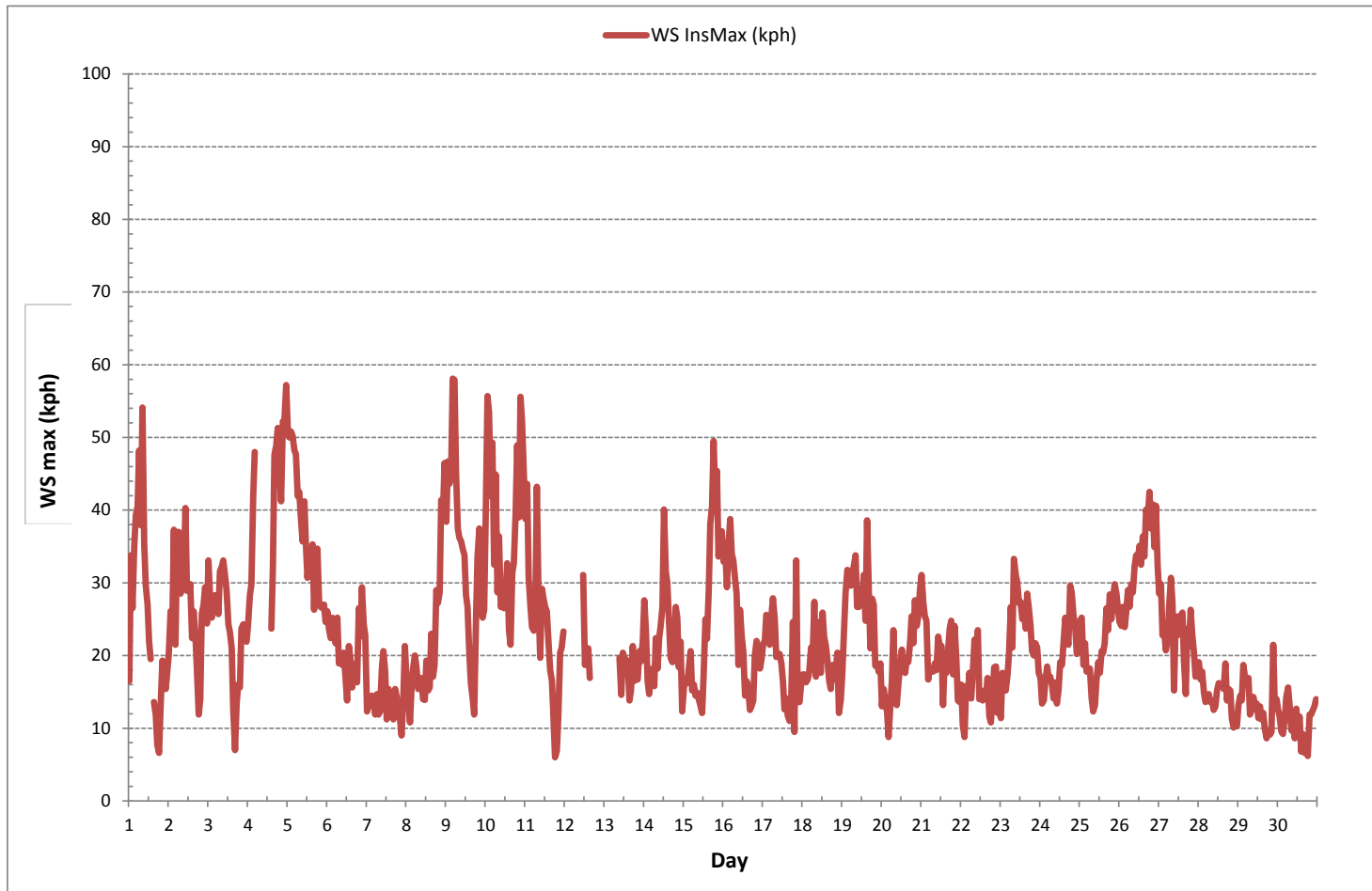
STATUS FLAG CODES

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

MAXIMUM INSTANTANEOUS VALUE:	58.1	kph	@ HOUR	4	ON DAY	9	
OPERATIONAL TIME:						682	hrs

WIND SPEED Instantaneous Maximum (WS kph)



***APPENDIX IV
REPORT CERTIFICATION FORM***

Report Certification Form

Alberta Airshed (if applicable)	EPA Approval or Code of Practice Registration # (if applicable)
YES	NA
Company Name (if applicable)	Industrial Operation Name (if applicable)
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION	ST. LINA CONTINUOUS MONITORING STATION
Name of the Representative of the Person Responsible	Position / Title of the Representative of the Person Responsible
Mike Bisaga	Environment Monitoring Program Manager
Is an External Party Certifying the Report?	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Name of External Person Certifying the Report	Position / Title of External Person Certifying the Report
Wunmi Adeganmbi	Project Team Lead, Customer Service - Air Services
Company Name for External Person Certifying the Report	Identification of Qualifications / Professional Designations of the External Person Certifying the Report
Maxxam Analytics, A Bureau Veritas Group Company	M.Sc., EPt., PMP

Maxxam Analytics is the designated contractor conducting monitoring and reporting activities. I certify that the submitted data has been (a) reviewed and validated as per the AMD Chapter 6: Ambient Data Quality. I certify that the submitted report (b) accurately reflects the monitoring results and reporting timeframe and (c) meets the specified analysis, summarization and reporting requirements as per the AMD Chapter 9: Reporting.



Signature of the External Person Certifying the Report

21 - Dec - 2018

Report Issued Date (dd-mon-yyyy)

***APPENDIX V
DATA VALIDATION CERTIFICATION FORM***



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2018-11-31-C</u>
Site: <u>St. Lina Continuous Monitoring Station</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u><i>bimadeniji</i></u>	Date <u>06 - Dec - 2018</u>
Level 1 Primary Validation	<u><i>bimadeniji</i></u>	Date <u>06 - Dec - 2018</u>
Level 2 Final Validation	<u><i>bimadeniji</i></u>	Date <u>12 - Dec - 2018</u>
Level 3 Independent Data Review	<u><i>ms-lmbg</i></u>	Date <u>21- Dec - 2018</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.

Alberta Environment and Parks (AEP)
Air.Reporting@gov.ab.ca

January 15, 2019

Subject: Monthly Report Submission for the LICA Bonnyville East station

Lakeland Industry & Community Association (LICA) is pleased to submit the ambient air monitoring monthly report for the LICA Bonnyville East AQM Station in the month of November 2018.

The air monitoring program consists of continuous air monitoring, intermittent sampling and NMHC canister sampling. The continuous air monitoring includes the monitoring of ambient 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 intermittent sampling includes both VOC and PAH sampling program.

Sampling Program	Monitoring Activities Conducted By	Sample Analysis Conducted By	Data/Report Review and Prepared By	Electronic Submission Conducted By
Continuous ambient air	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics
Intermittent	Maxxam Analytics	InnoTech Alberta Inc	InnoTech Alberta Inc	Not Applicable
NMHC Canister	Maxxam Analytics	InnoTech Alberta Inc	InnoTech Alberta Inc	Not Applicable

This monthly report only contains the continuous ambient air data. The intermittent results and NMHC canister results are reported in the quarterly integrated sampling report.

The air monitoring station was mobilized to the site on October 3. All the analyzers and the meteorological sensors were installed and calibrated between October 23 and 26. Data collected during the month of October is not reported to AEP as it was considered a period of equipment start-up and stabilization. The calibration records for the month of October are included in this report.

All data collected in November 2018 was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016), except H₂S.

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems met the 90% requirement, except H₂S (86.5%).

Non-Conformance:

- There were two 1-Hr contraventions for H₂S recorded this month: concentration of 14 ppb, on November 3 at hour 19; and concentration of 14 ppb, on November 8 at hour 19. AEP reference numbers: 246263 and 346472, respectively.
- The operational time for H₂S, was below the 90% requirement this month. AEP reference number: 347618.

H₂S: Operational time for the monitoring period was 86.8%, equivalent to 95 hours of downtime.

- The API 101E H₂S analyzer, s/n: 510, was installed following an installation calibration on October 26.
- Analyzer malfunction and subsequent corrective actions resulted in 39 hours of downtime between November 5 and November 8.
- A repeat calibration was performed on November 14 to address a biased high drift in span response. Five hours of downtime were incurred.
- The LICA -supplied LICA's API 101E analyzer, s/n: 510, was removed for maintenance on November 22 and the other LICA-supplied Thermo 450i, s/n: CM 17360002, was installed. Twenty-nine hours of downtime were recorded between November 22 and November 23 due to this analyzer replacement event and the additional quality checks performed around it.
- Twenty-one hours of downtime were recorded between November 28 and November 29 due to an analyzer maintenance event and the additional quality checks performed around it.

SO₂: The Thermo 43i-TLE SO₂ analyzer, s/n: 1180320043, was installed following an installation calibration on October 23.

THC/CH₄/NMHC: The Thermo 55i HC analyzer, s/n: 1236656107, was installed following an installation calibration on October 24.

NO₂/NO/NO_x: The Thermo 42i NO₂ analyzer, s/n: 1180930027, was installed following an installation calibration on October 23.

O₃: The Thermo 49i O₃ analyzer, s/n: 1002240372, was installed following an installation calibration on October 24.

PM_{2.5}: The Thermo 5030i Sharp PM_{2.5} analyzer, s/n: CM17071016, was installed following an installation calibration on October 26.

WS/WD/STDWD: The RM Young 05305VK wind system, s/n: 56778, was installed following an installation calibration on October 24.

As the LICA Environmental Program Manager and Data & Reporting Specialist, we have reviewed and verified this report and that the information is complete, accurate and representative of the monitoring results, reporting timeframe and the specified analysis, summarization and reporting requirements. Due to issues on the Alberta's Ambient Air Quality Data Warehouse, data submission cannot be performed at the time when the monthly report is completed. We are working with the airdata warehouse for the troubleshooting as well as setting up codes for some VOC/PAH species that are missing in the parameter list. The results for these data will be submitted once issues are resolved and all needed codes are available.



Lakeland Industry & Community Association
5107 50 St
Bonnyville, AB T9N 2J7

Should you have any questions, please don't hesitate to contact us.

Respectfully,

A handwritten signature in blue ink that reads "Michael Bisaga". The signature is written in a cursive style with a large, sweeping initial "M".

Michael Bisaga
Technical Program Manager
Lakeland Industry & Community Association
780-266-7068
monitoring@lica.ca

A handwritten signature in blue ink that reads "Lily Lin". The signature is written in a cursive style with a large, sweeping initial "L".

Lily Lin
Data & Reporting Specialist
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monitoring@lica.ca



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

JOB #: 2833-2018-11-39-C

November 2018

Prepared for:

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
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BONNYVILLE, ALBERTA
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Attention: MIKE BISAGA

DATE: **December 21, 2018**

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SUMMARY

In November 2018, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the Bonnyville East 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 and Community Association.

The air quality monitoring trailer and equipment were mobilized to site on October 3 as requested by LICA. The analyzers were installed and calibrated between October 23 and 26. AMD data completeness criteria (Chapter 6, DQ 4-C) is not applicable to data collected during the month of October, as it was considered a period of equipment start-up and stabilization. Data captured during this period is not reported.

All data collected this month, with the exception of H₂S, was compliant with the requirements outlined in the AMD, 2016.

Non-Conformance:

- There were two 1-Hr contraventions for H₂S recorded this month: concentration of 14 ppb, on November 3 at hour 19:00; and 14 ppb, on November 8 at hour 19:00. This was reported under AEP reference numbers: 246263 and 346472 respectively.
- The operational time for H₂S, was below the 90% requirement this month. This was reported under AEP reference number: 347618.

All Parameters:

- Fifteen hours of downtime were incurred between November 5 and November 6, as the data polling service was interrupted by a Windows operating system update.

All Gas Parameters:

- The automated daily zero-span check, scheduled for hour 06:00 on November 20, failed to execute successfully. A valid zero-span check was manually completed at hour 08:00 on the same day. One hour of downtime was incurred due to the failed execution.

Canister System: A canister event was recorded on November 20 at 05:50, at an initial concentration of 0.3 ppm. The sample was processed for analysis by InnoTech and the results will be provided in the Q3 integrated report.

H₂S: Equipment uptime did not meet the AMD's 90% requirement in the month of November. Operational time for the monitoring period was 86.8%, equivalent to 95 hours of downtime.

- Analyzer malfunction and subsequent corrective actions resulted in 39 hours of downtime between November 5 and November 8.
- A repeat calibration was performed on November 14 to address a biased high drift in span response. Five hours of downtime were incurred.
- LICA's API 101E analyzer (s/n: 510) was removed for maintenance on November 22 and a replacement (LICA's Thermo 450i, s/n: CM 17360002, was installed. Twenty-nine hours of downtime were recorded between November 22 and November 23 due to this analyzer replacement event and the additional quality checks performed around it.
- Twenty-one hours of downtime were recorded between November 28 and November 29 due to an analyzer maintenance event and the additional quality checks performed around it.

THC/CH₄/NMHC: The channels were placed in "maintenance" mode for the installation and testing of the canister system on November 2. One hour of downtime was incurred at hour 11:00 as a result.

NOX/NO/NO₂: The analyzer exhibited sporadic span drifts outside the upper acceptance limit across the month. Additional zero-span checks, a repeat calibration and an As-Found response check were corrective actions performed during the month to address this issue. Seventeen hours of downtime were incurred due to these additional quality checks.

O₃: A repeat calibration was performed on November 22 to correct a biased low drift in span response. Six hours of downtime were incurred due to the additional quality check.

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 East 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.

Monthly Continuous Data Summary

Lakeland Industry & Community Association						MAXIMUM VALUES							OPERATIONAL TIME (%)
Bonnyville East Continuous Monitoring Station						1-HOUR				24-HOUR			
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
	1-hr	24-hr	1-hr	24-hr									
SO ₂ (ppb)	172	48	0	0	0	3	12	6	10.4	SSE	1	6	97.8
H ₂ S (ppb)	10	3	2	0	1	14	3	19	9.0	SSE	1	1	86.8
THC (ppm)	-	-	-	-	2.15	4.07	13	9	6.2	E	2.79	30	97.6
CH ₄ (ppm)	-	-	-	-	2.14	3.97	13	9	6.2	E	2.70	13	97.6
NMHC (ppm)	-	-	-	-	0.01	0.18	29	14	2.2	ENE	0.09	29	97.6
NO ₂ (ppb)	159	-	0	-	4	19	30	20	2.3	NE	12	30	95.4
NO (ppb)	-	-	-	-	1	16	29	10	1.9	E	3	13	95.4
NO _x (ppb)	-	-	-	-	4	26	13	10	9.2	ENE	15	30	95.4
O ₃ (ppb)	82	-	0	-	21.1	38.2	11	3	19.8	N	34.8	11	96.9
PM _{2.5} (µg/m ³)	80	29	0	0	6	30	30	16	0.7	E	18	30	97.9
VECTOR WS (kph)	-	-	-	-	1.9	28.7	4	22	-	N	20.9	5	97.9
VECTOR WD (sec)	-	-	-	-	95 (E)	-	-	-	-	-	-	-	97.9

* Precipitation: data represents the total (sum) for the indicated time frame.

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

DATE	TIME (MST)	READING (ppb)	WS (kph)	WD (deg)	ESRD Reference #
November 3	19:00	14 ppb	9.0	155	246263
November 8	19:00	14 ppb	7.7	165	346472

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 29 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 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 sample inlet filter for all continuous air analyzers are replaced 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 (December, 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. The minimum and maximum statistics are highlighted in the data table and are for reference only. The highlighted cells are based on the software's interpretation of the exact position of the minimum or maximum value. The visual presentation of these statistics may not be the obvious choice in a data range due to rounding, truncating or analyzer specifications.

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)

- Operational time for the monitoring period was 97.8%, equivalent to 16 hours of downtime.
- The air quality monitoring trailer was mobilized to site on October 3, while the installation calibration was performed on the analyzer (Thermo 43I-TLE, s/n: 1180320043) on October 23. AMD data completeness criteria (Chapter 6, DQ 4-C) is not applicable to data collected during the month of October. Data captured during this period is not reported.
- Fifteen hours of downtime were incurred on November 5, as the polling service was interrupted by a Windows operating system update. Data polling was restored on November 6, following a reboot of the Envidas Ultimate computer. Data was not collected between November 5, hour 18:46 and November 6, hour 08:33 due to the update. The routine monthly calibration began at hour 8:34.
- The routine monthly calibration was performed on November 6.
- The automated daily zero-span check, scheduled for hour 06:00 on November 20, failed to execute successfully. A valid zero-span check was manually completed at hour 08:00 on the same day. One hour of downtime was incurred due to the failed execution.

HYDROGEN SULPHIDE (H₂S)

- Operational time for the monitoring period was 86.8%, equivalent to 95 hours of downtime. Equipment uptime did not meet the AMD's 90% requirement in the month of November. This was reported under AEP reference number: 347618.
- There were two 1-Hr contraventions recorded for H₂S this month: concentration of 14 ppb, on November 3 at hour 19:00; and 14 ppb, on November 8 at hour 19:00. These were reported under AEP reference numbers: 246263 and 346472 respectively.
- The air quality monitoring trailer was mobilized to site on October 3, while the installation calibration was performed on the analyzer (API 101E, s/n: 510) on October 26. AMD data completeness criteria (Chapter 6, DQ 4-C) is not applicable to data collected during the month of October. Data captured during this period is not reported.
- Data collection was disrupted at hour 18:00 on November 4. A technician was dispatched on November 5 and found the analyzer unresponsive upon arrival at the station. Troubleshooting revealed that one of the analyzer's power supplies (5V/15V) had failed. The faulty part was replaced using a part from LICA API 100E analyzer (s/n: #508). The permeation tube was also replaced. The analyzer was left offline to stabilize overnight and a post-repair calibration was successfully completed on November 6. Thirty-eight hours of downtime were incurred due to these events.
- The newly-installed perm tube was allowed time to stabilize and the expected span value was updated on November 8, following a repeat zero-span check at hour 08:00. One hour of downtime was incurred due to the additional quality check.
- After the expected span value was updated on November 8, span response continued to exhibit a biased high drift (outside the upper acceptance limit on November 10), indicating that the zero-span system did not properly stabilize after the perm tube was replaced. This prompted a site visit on November 14, where a repeat calibration was successfully completed and the expected span value was updated. Five hours of downtime were incurred due to the additional quality check.
- The automated daily zero-span check, scheduled for hour 06:00 on November 20, failed to execute successfully. A valid zero-span check was manually completed at hour 08:00 on the same day. One hour of downtime was incurred due to the failed execution.

HYDROGEN SULPHIDE (H₂S) CONT D

- The analyzer spanned outside the upper acceptance limit on November 22. An additional zero-span check performed on the same day at hour 07:00 was within limits but exhibited a similar response. A technician was immediately dispatched to site to replace the analyzer. Following a successful shutdown calibration, LICA's Thermo API 101E analyzer (s/n: 510) was removed and a replacement (LICA's Thermo 450i, s/n: CM 17360002) was installed. The analyzer was left offline to stabilize overnight and a successful installation calibration was completed on November 23. Twenty-nine hours of downtime were accrued as a result of these corrective actions.
- The analyzer spanned close to the upper limit on November 27. Two additional zero-span checks were performed on November 28 at hours 07:00 and 09:00. The results of both checks exceeded the upper acceptance limit. A technician was immediately dispatched to site to perform corrective actions. A successful shutdown calibration was performed prior to maintenance. Troubleshooting revealed a blocked orifice, which was subsequently cleaned. The permeation tube was also replaced. The analyzer was left offline to stabilize overnight and a successful post-repair calibration was performed on November 29. Twenty-one hours of downtime were incurred due to this event.

TOTAL HYDROCARBONS (THC), METHANE (CH₄) and NON-METHANE HYDROCARBONS (NMHC)

- Operational time for the monitoring period was 97.6%, equivalent to 17 hours of downtime.
- The air quality monitoring trailer was mobilized to site on October 3, while the installation calibration was performed on the analyzer (Thermo 55i, s/n: 1236656107) on October 24. AMD data completeness criteria (Chapter 6, DQ 4-C) is not applicable to data collected during the month of October. Data captured during this period is not reported.
- The channels were placed in "maintenance" mode for the installation and testing of the canister system on November 2. One hour of downtime was incurred at hour 11:00 as a result.
- On November 5, the polling service was interrupted by a Windows operating system update. Data polling was restored on November 6, following a reboot of the Envidas Ultimate computer. Data was not collected between November 5, hour 18:46 and November 6, hour 08:33 due to the update. Fifteen hours of downtime were incurred as a result.
- The routine monthly calibration was performed on November 6.
- The automated daily zero-span check, scheduled for hour 06:00 on November 20, failed to execute successfully. A valid zero-span check was manually completed at hour 08:00 on the same day. One hour of downtime was incurred due to the failed execution.
- 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.
- A canister event was recorded on November 20 at 05:50, at an initial concentration of 0.3 ppm. The sample was processed for analysis by InnoTech and the results will be provided in the Q3 integrated report.

OXIDES OF NITROGEN (NO_x), NITRIC OXIDE (NO) and NITROGEN DIOXIDE (NO₂)

- Operational time for the monitoring period was 95.4%, equivalent to 33 hours of downtime.
- The air quality monitoring trailer was mobilized to site on October 3, while the installation calibration was performed on the analyzer (Thermo 42i, s/n: 1180930027) on October 23. AMD data completeness criteria (Chapter 6, DQ 4-C) is not applicable to data collected during the month of October. Data captured during this period is not reported.
- Fifteen hours of downtime were incurred on November 5, as the polling service was interrupted by a Windows operating system update. Data polling was restored on November 6, following a reboot of the Envidas Ultimate computer. Data was not collected between November 5, hour 18:46 and November 6, hour 08:33 due to the update. The routine monthly calibration began at 8:35.
- The routine monthly calibration was performed on November 6.
- The scheduled zero-span check on November 8 exceeded the upper acceptance limit. An additional zero-span check was triggered at hour 23:00 and was within acceptance limits. No further action was necessary, however, one hour of downtime was incurred due to the additional quality check.
- The scheduled zero-span check on November 13 exceeded the upper acceptance limit. An additional zero-span check was triggered at hour 14:00 and also exceeded the upper acceptance limit. This prompted a site visit on November 14 where a repeat calibration was successfully performed. The expected span value was subsequently updated. Nine hours of downtime were incurred due to the additional quality checks.
- The automated daily zero-span check, scheduled for hour 06:00 on November 20, failed to execute successfully. A valid zero-span check was manually completed at hour 08:00 on the same day. One hour of downtime was incurred due to the failed execution.
- The scheduled zero-span check on November 27 exceeded the upper acceptance limit. Two additional zero-span checks were triggered on November 28 at hours 07:00 and 09:00, yielding similar results. This prompted an immediate site visit where an As-Found response check was performed to assess analyzer performance. The results met AMD requirements. No further action was deemed necessary at this point. Seven hours of downtime were incurred due to the additional quality checks.

OZONE (O₃)

- Operational time for the monitoring period was 96.9%, equivalent to 22 hours of downtime.
- The air quality monitoring trailer was mobilized to site on October 3, while the installation calibration was performed on the analyzer (Thermo 49i, s/n: 1002240372) on October 24. AMD data completeness criteria (Chapter 6, DQ 4-C) is not applicable to data collected during the month of October. Data captured during this period is not reported.
- On November 5, the polling service was interrupted by a Windows operating system update. Data polling was restored on November 6, following a reboot of the Envidas Ultimate computer. Data was not collected between November 5, hour 18:46 and November 6, hour 08:33 due to the update. Fifteen hours of downtime were incurred as a result.
- The routine monthly calibration was performed on November 6.
- The automated daily zero-span check, scheduled for hour 06:00 on November 20, failed to execute successfully. A valid zero-span check was manually completed at hour 08:00 on the same day. One hour of downtime was incurred due to the failed execution.
- A repeat calibration was performed on November 22 to correct a slight biased low drift in span response. The zero-span system pump was also rebuilt during this site visit. Six hours of downtime were incurred due to this event.

PARTICULATE MATTER < 2.5 MICRONS (PM_{2.5})

- Operational time for the monitoring period was 97.9 %, equivalent to 15 hours of downtime.
- The air quality monitoring trailer was mobilized to site on October 3, while the installation calibration was performed on the analyzer (Thermo 5030i, s/n: CM17071016) on October 26. AMD data completeness criteria (Chapter 6, DQ 4-C) is not applicable to data collected during the month of October. Data captured during this period is not reported.
- On November 5, the polling service was interrupted by a Windows operating system update. Data polling was restored on November 6, following a reboot of the Envidas Ultimate computer. Data was not collected between November 5, hour 18:46 and November 6, hour 08:33 due to the update. Fifteen hours of downtime were incurred as a result.
- The routine monthly check was performed on November 6.

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

- Operational time for the monitoring period was 97.9 %, equivalent to 15 hours of downtime.
- The air quality monitoring trailer was mobilized to site on October 3, while the installation calibration was performed on the wind system (RM Young, s/n: 56778) on October 24. AMD data completeness criteria (Chapter 6, DQ 4-C) is not applicable to data collected during the month of October. Data captured during this period is not reported.
- On November 5, the polling service was interrupted by a Windows operating system update. Data polling was restored on November 6, following a reboot of the Envidas Ultimate computer. Data was not collected between November 5, hour 18:46 and November 6, hour 08:33 due to the update. Fifteen hours of downtime were incurred as a result.
- 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 and is measured in degrees from true north.

2.0 Project Personnel

Mike Bisaga and Lily Lin were the contacts for Lakeland Industry & Community Association and the Maxxam field technicians were Alexander Yakupov and Christopher Wesson.

3.0 Plant Monthly Required AMD Summary

All data collected this month, with the exception of H₂S, was compliant with the requirements outlined in the AMD, 2016.

Non-Conformance:

- There were two 1-Hr contraventions for H₂S recorded this month: concentration of 14 ppb, on November 3 at hour 19:00; and 14 ppb, on November 8 at hour 19:00. This was reported under AEP reference numbers: 246263 and 346472 respectively.
- The operational time for H₂S, was below the 90% requirement this month. This was reported under AEP reference number: 347618.

4.0 Calculations and Results

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

As per LICA's request, data flagging for SO₂ and NO_x/NO/NO₂ was changed to "invalid" (X), for hour 08:00 on November 6, from what Maxxam had originally presented, which was "calibration" (C). This change in flagging had no apparent impact on the quality and defensibility of results.

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-00013: RM Young Wind Monitor Calibration
- Maxxam AIR SOP-00014: Measurement of Particulate Concentration Using the THERMO SHARP
- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-00212: Ambient O₃ Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO₂/NO_x Monitoring

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

- Sulphur Dioxide - Thermo 43I-TLE UV Fluorescent Analyzer
- Hydrogen Sulphide - API 101E & Thermo 450i UV Fluorescent Analyzer
- Methane, Non-Methane Hydrocarbon - Thermo 55i FID Analyzer
- Oxides of Nitrogen - Thermo 42i Chemiluminescent Analyzer
- Ozone - Thermo 49i Photometric Analyzer
- Particulate Matter (PM_{2.5}) - Thermo SHARP 5030i Unit
- Wind System - RM Young Unit
- Datalogger - Envista Ultimate

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

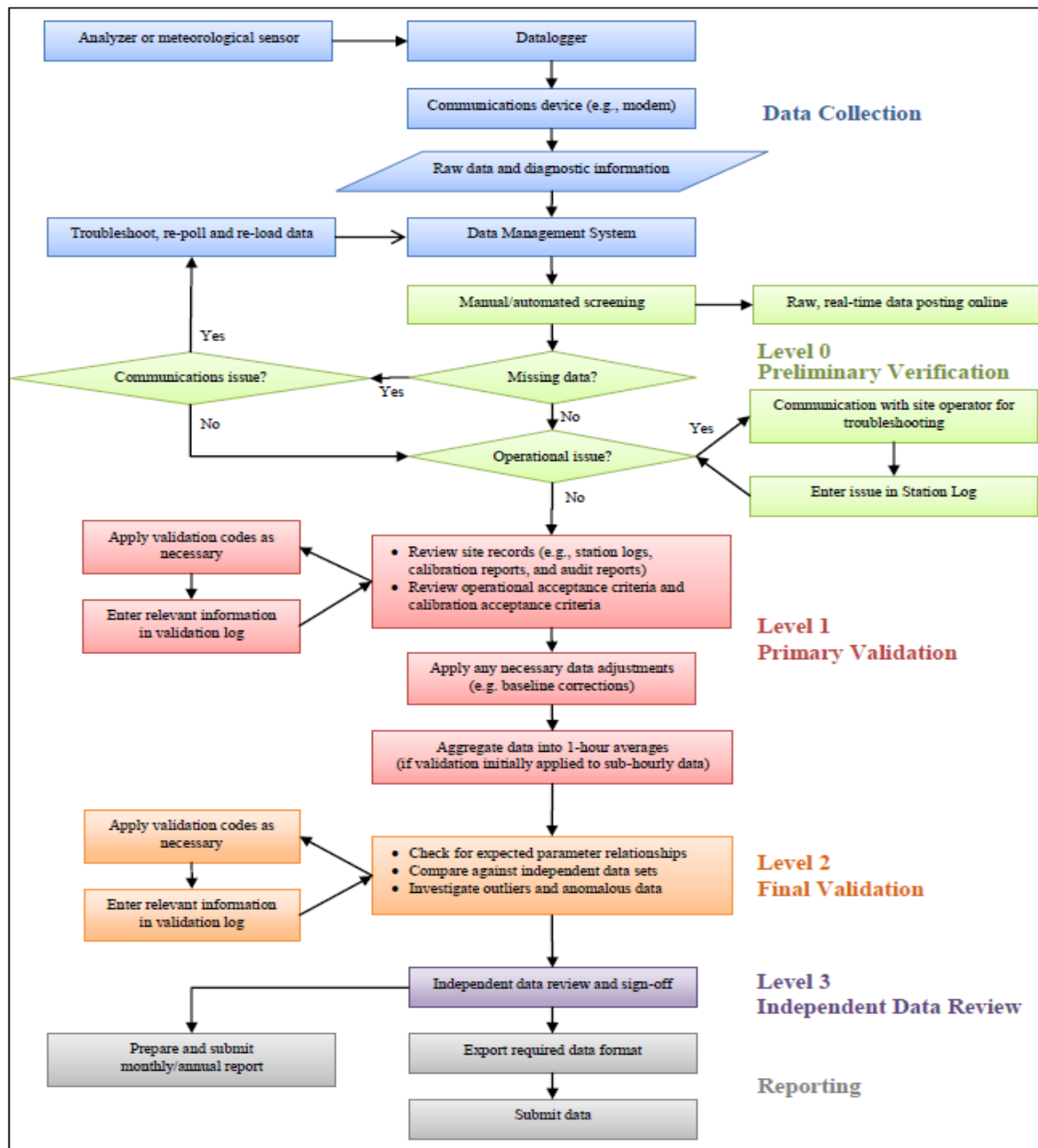
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

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 (December 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	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		
2	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	24		
3	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	S	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	S	0	0	0	24		
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	X	X	X	X	0	0	18		
6	X	X	X	X	X	X	X	X	X	C	C	C	C	2	1	1	1	0	0	S	0	0	0	0	0	0	2	15		
7	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	24		
8	0	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	1	0	24	
9	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	S	1	0	0	0	0	0	0	1	0	24	
10	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	1	0	24	
11	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	S	1	1	0	0	0	0	0	0	0	0	2	0	24	
12	0	0	0	0	1	1	3	3	3	2	1	1	0	0	S	1	1	0	0	0	0	0	0	1	1	0	3	1	24	
13	0	0	1	1	1	0	0	0	0	0	0	0	0	S	1	1	2	1	1	1	1	1	1	1	1	0	2	1	24	
14	1	1	1	1	1	1	1	1	1	1	1	2	1	S	0	0	0	0	0	0	0	0	0	0	0	0	2	0	24	
15	0	0	0	0	0	0	0	0	0	0	1	1	S	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
16	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	24	
17	1	1	1	1	1	1	0	0	0	S	2	2	1	1	1	1	1	1	1	1	1	1	1	1	0	0	2	1	24	
18	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	24
19	0	0	0	0	0	1	1	S	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	24	
20	0	0	0	0	0	0	X	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	23	
21	1	1	1	1	1	S	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
22	0	0	1	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
23	0	0	0	S	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	1	0	24	
24	1	1	S	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	2	1	24	
25	0	S	2	2	2	2	1	1	1	1	3	2	2	1	2	1	1	0	0	0	0	0	1	1	0	0	3	1	24	
26	S	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	1	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	S	0	0	0	0	24	
28	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	1	S	2	1	0	2	0	24	
29	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	S	1	1	1	0	2	1	24	
30	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	S	0	0	0	0	0	0	1	1	24	
HOURLY MAX	1	2	2	2	2	2	3	3	3	2	3	2	2	2	2	1	2	1	1	1	1	1	2	1						
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						

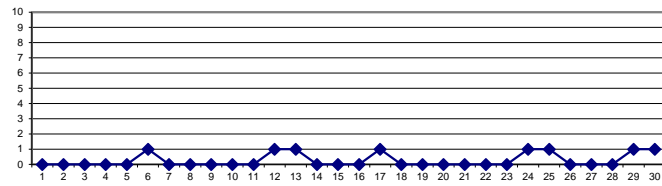
STATUS FLAG CODES

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 2018



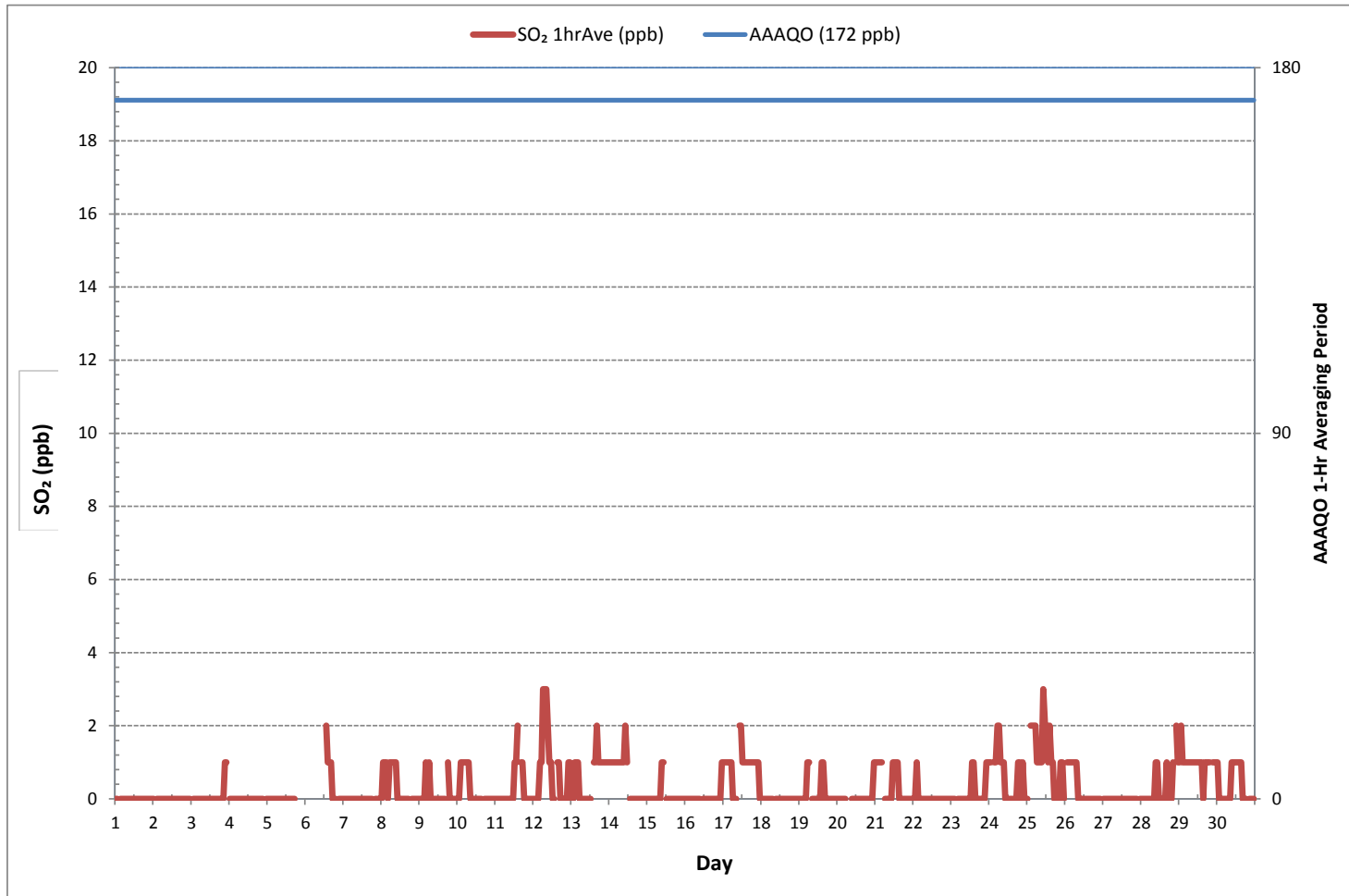
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	178		
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0 ON DAY	1
MAXIMUM 1-HR AVERAGE:	3 ppb @ HOUR	6 ON DAY	12
MAXIMUM 24-HR AVERAGE:	1 ppb	ON DAY	6
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	704 hrs
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	97.8 %
STANDARD DEVIATION:	1	MONTHLY AVERAGE:	0 ppb



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)









Wind: LICA Bonnyville East
 Poll.: LICA Bonnyville East-SO2[ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

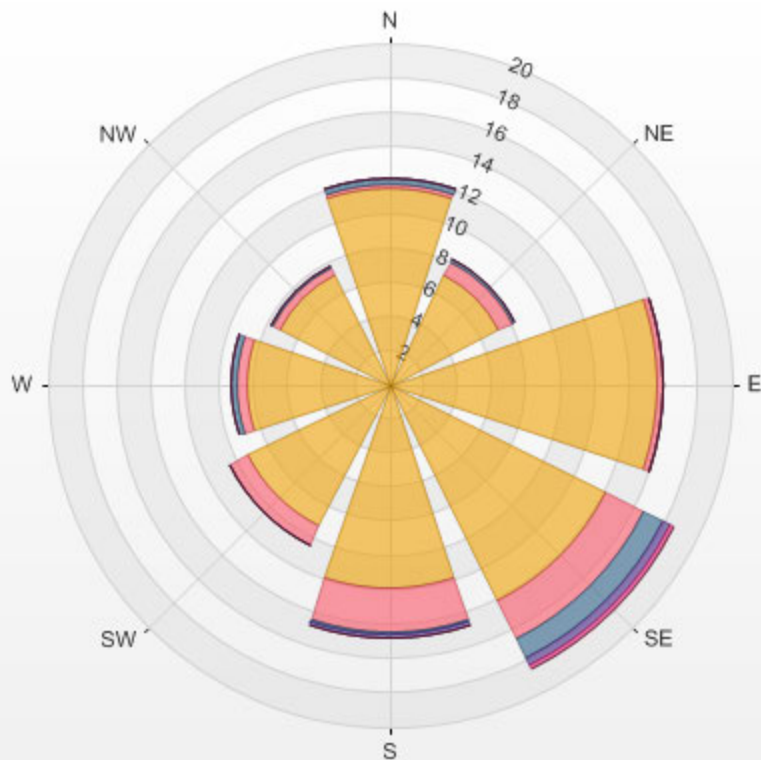
Calm: 2.84%

Calm Avg: 0.48 [ppb]

Direction	0.0-0.8	0.8-1.6	1.6-2.4	2.4-3.2	3.2-4.0	>4.0	Total
N	11.5	0.3	0.3	0.0	0.0	0.0	12.1
NE	7.2	0.9	0.2	0.0	0.0	0.0	8.2
E	15.7	0.3	0.0	0.0	0.0	0.0	16.0
SE	14.2	2.4	1.4	0.5	0.2	0.0	18.5
S	12.0	2.5	0.2	0.2	0.0	0.0	14.8
SW	9.3	1.2	0.0	0.0	0.0	0.0	10.5
W	8.4	0.6	0.3	0.0	0.0	0.0	9.3
NW	7.2	0.5	0.2	0.0	0.0	0.0	7.8
Summary	85.4	8.7	2.4	0.6	0.2	0.0	97.2

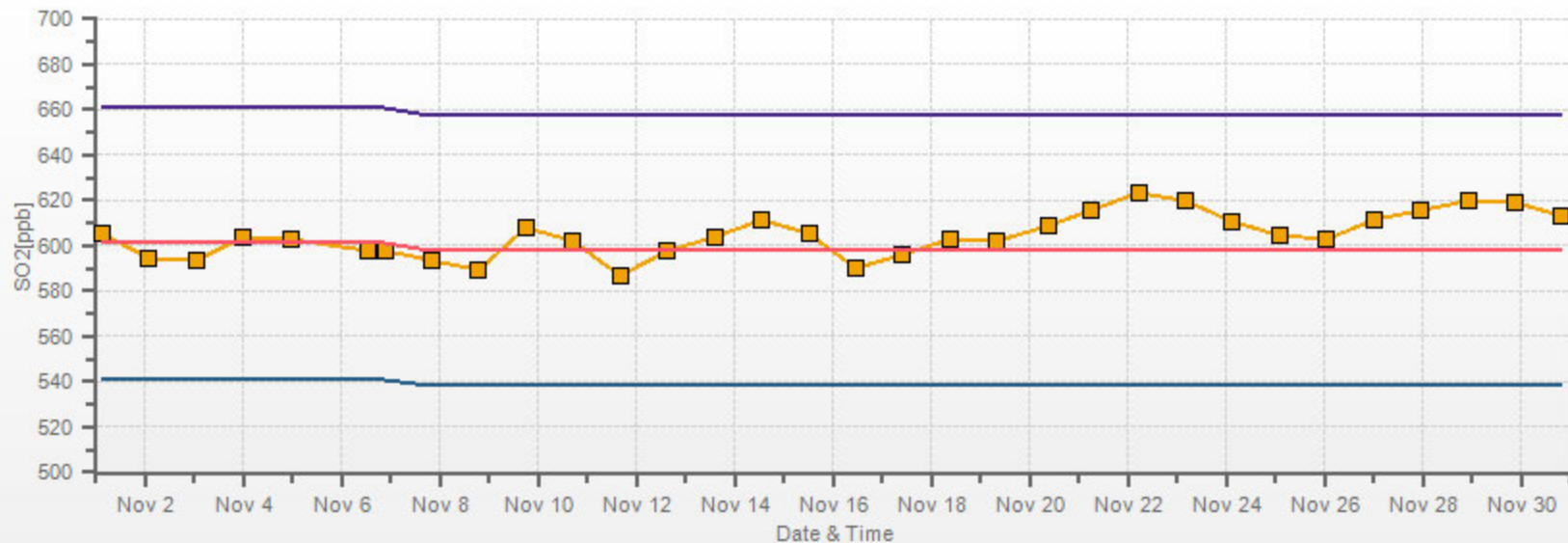
% Icon	Classes (ppb)	85		0.0-0.8	9		0.8-1.6	2		1.6-2.4	1		2.4-3.2	0		3.2-4.0	0		>4.0
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LICA Bonnyville East Poll.: LICA Bonnyville East-SO2[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 2.84% Calm Poll Avg: 0.48[ppb]



SO2[ppb] Calibration: LICA Bonnyville East Monthly: 18/11 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	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	2	0	2	1	24		
2	1	S	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	5	1	0	0	0	5	1	24		
3	S	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	9	1	14	0	2	2	S	0	0	14	1	24		
4	1	2	2	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	X	X	X	X	X	X	0	2	1	18		
5	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		
6	X	X	X	X	X	X	X	X	C	C	C	C	0	0	0	1	0	1	0	0	S	1	0	0	0	0	1	0	16	
7	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	
8	1	1	0	0	0	0	0	0	S1	0	0	0	0	0	0	0	0	0	S	14	8	1	0	0	0	0	14	1	23	
9	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	24
10	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	24
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	2	0	0	2	0	24
12	2	1	1	0	0	1	1	1	1	1	0	0	0	0	S	0	0	0	0	0	0	0	0	0	1	0	0	2	1	24
13	3	6	0	0	1	0	3	1	0	1	1	0	0	S	0	1	1	3	1	1	1	3	1	2	0	0	6	1	24	
14	3	2	2	1	1	1	1	1	1	0	0	0	C1	C1	C1	C1	C1	0	0	1	1	0	0	0	0	0	0	3	1	19
15	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	24
16	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	S	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	1	0	24	
18	1	1	1	1	2	1	1	1	1	S	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	2	1	24
19	0	1	0	0	1	2	0	S	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	24
20	1	2	0	1	0	1	X	0	S	1	1	1	1	0	0	0	0	0	0	0	0	0	1	2	0	0	0	2	1	23
21	1	3	3	3	3	S	1	0	0	0	1	2	1	1	3	1	0	0	1	0	0	0	0	0	0	0	0	3	1	24
22	0	1	0	0	S	1	0	S1	S1	0	0	C1	C1	C1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	0	1	0	9	
23	Y	Y	Y	Y	Y	Y	Y	Y	Y	C1	C1	C1	C1	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
24	0	0	S	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	24
25	0	S	3	2	1	2	1	0	0	1	1	1	1	0	1	2	0	2	2	0	1	1	1	2	0	0	3	1	24	
26	S	1	1	2	1	1	1	2	1	0	2	1	2	0	0	0	0	0	0	0	0	0	0	S	0	0	2	1	24	
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	24
28	0	0	0	0	0	0	0	S1	0	S1	0	0	0	0	0	0	0	C1	C1	C1	Y	Y	Y	Y	Y	0	0	0	0	14
29	Y	Y	Y	Y	Y	Y	C1	C1	C1	C1	1	0	0	0	0	1	0	0	2	S	2	0	0	0	0	0	0	2	1	13
30	0	1	0	1	1	1	0	2	1	1	1	0	0	1	0	0	0	0	0	S	0	0	0	0	0	0	0	2	0	24
HOURLY MAX	3	6	3	3	3	2	3	2	1	1	2	2	2	1	3	2	1	9	2	14	8	3	2	2						
HOURLY AVG	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	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

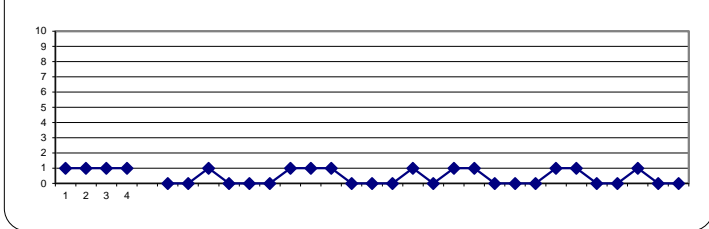
OBJECTIVE LIMIT:

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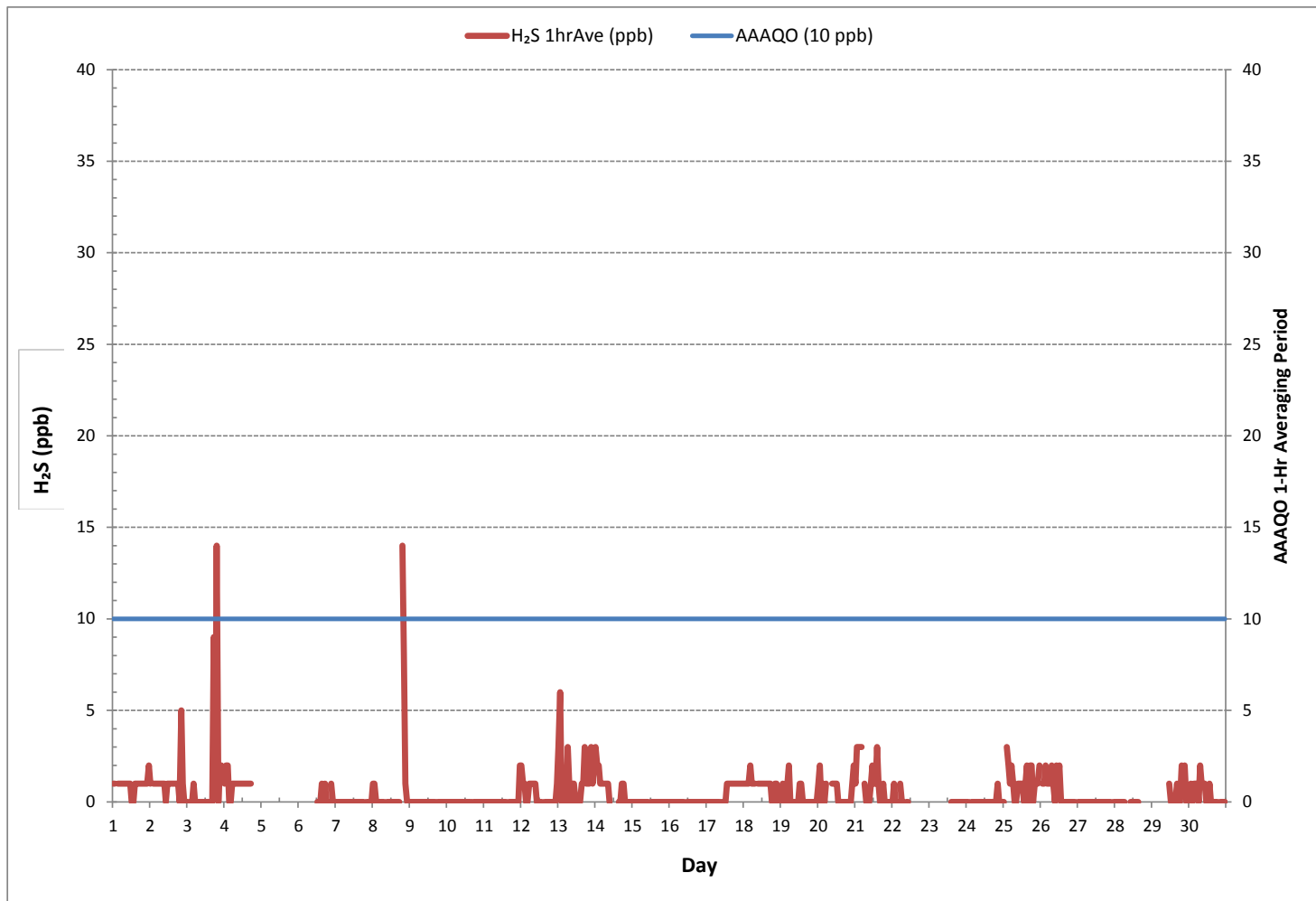
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	2		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	209		
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	12 ON DAY	1
MAXIMUM 1-HR AVERAGE:	14 ppb @ HOUR	19 ON DAY	3
MAXIMUM 24-HR AVERAGE:	1 ppb	ON DAY	1
IZS CALIBRATION TIME:	27 hrs	OPERATIONAL TIME:	625 hrs
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	86.8 %
STANDARD DEVIATION:	1	MONTHLY AVERAGE:	1 ppb

24 HR AVERAGES November 2018



HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)



Wind: LICA Bonnyville East
 Poll.: LICA Bonnyville East-H2S[ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 3.03% Calm Avg: 0.63 [ppb]

Direction	0.0-5.0	5.0-10.0	10.0-15.0	>15.0	Total
N	9.4	0.0	0.0	0.0	9.4
NE	8.9	0.0	0.0	0.0	8.9
E	17.9	0.0	0.0	0.0	17.9
SE	19.0	0.3	0.2	0.0	19.5
S	15.0	0.2	0.2	0.0	15.3
SW	10.3	0.0	0.0	0.0	10.3
W	7.4	0.0	0.0	0.0	7.4
NW	8.3	0.0	0.0	0.0	8.3
Summary	96.1	0.5	0.3	0.0	97.0

% Icon Classes (ppb)

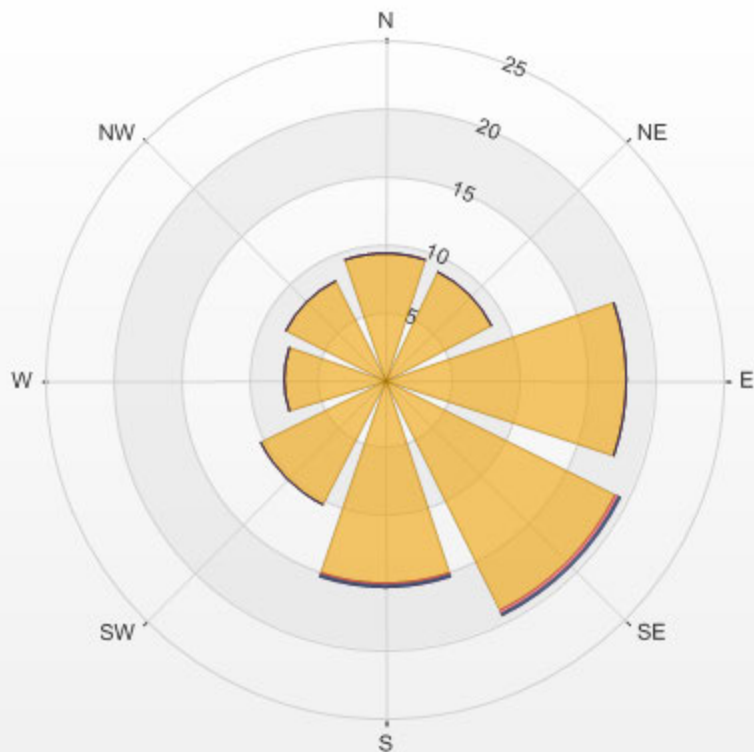
96 0.0-5.0

1 5.0-10.0

0 10.0-15.0

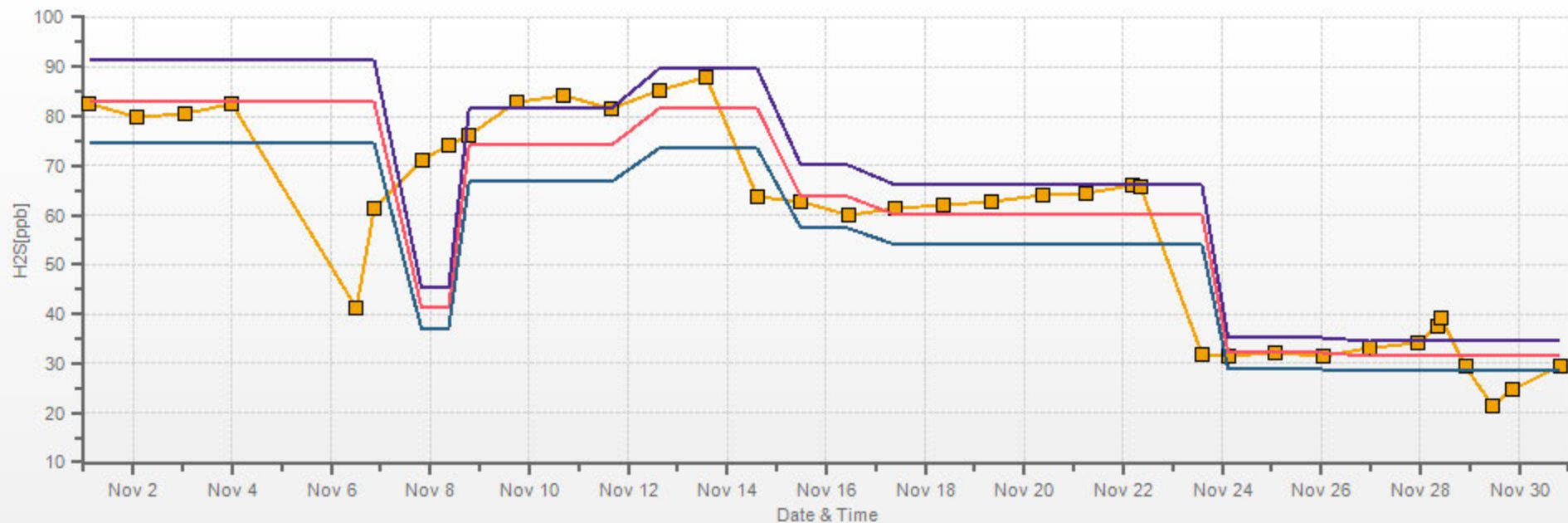
0 >15.0

LICA Bonnyville East Poll.: LICA Bonnyville East-H2S[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 3.03% Calm Poll Avg: 0.63[ppb]



H2S[ppb] Calibration: LICA Bonnyville East Monthly: 18/11 Type: Span

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



TOTAL HYDROCARBON

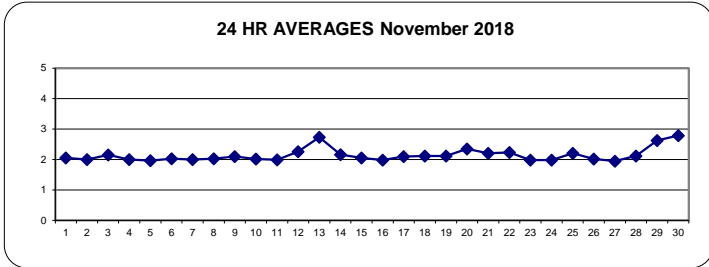


TOTAL HYDROCARBONS Hourly Averages (THC ppm)

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	2.30	2.26	S	2.02	2.03	2.01	2.00	2.01	1.98	1.98	1.98	1.98	1.95	1.95	1.95	1.96	1.97	1.98	2.16	2.12	2.11	2.13	2.10	2.14	1.95	2.30	2.05	24		
2	2.17	S	2.03	2.00	1.99	1.99	1.99	2.00	1.99	2.00	2.01	Y	1.95	1.95	1.95	1.97	1.99	2.02	1.99	2.04	2.00	1.99	1.99	2.00	1.95	2.17	2.00	23		
3	S	2.05	2.06	2.09	2.11	2.11	2.13	2.14	2.13	2.14	2.16	2.16	2.14	2.15	2.07	2.08	2.16	2.20	2.18	2.29	2.27	2.23	2.16	S	2.05	2.29	2.15	24		
4	2.12	2.07	2.08	2.11	2.12	2.06	2.03	2.02	2.00	1.99	1.98	1.98	1.96	1.97	1.97	1.97	1.97	1.95	1.95	1.95	1.95	1.94	S	1.95	1.94	2.12	2.00	24		
5	1.96	1.95	1.95	1.95	1.95	1.96	1.96	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.96	1.95	1.96	1.97	1.98	X	X	X	X	X	X	1.95	1.98	1.96	18	
6	X	X	X	X	X	X	X	X	X	X	X	1.98	1.97	C	C	C	C	C	2.01	2.01	2.03	2.04	S	2.08	2.08	2.08	1.97	2.08	2.03	15
7	2.05	2.02	2.03	2.03	1.99	1.99	1.99	2.00	2.00	1.99	1.97	1.97	1.97	1.97	1.97	1.98	1.99	2.00	2.01	S	2.02	2.00	2.09	2.08	1.97	2.09	2.00	24		
8	2.10	2.11	2.02	2.04	2.00	1.99	1.97	1.98	1.98	1.97	1.99	1.98	1.98	1.98	1.99	2.00	2.01	2.03	S	2.11	2.14	2.16	2.13	2.08	1.97	2.16	2.03	24		
9	2.07	2.08	2.07	2.07	2.08	2.08	2.07	2.06	2.05	2.05	2.05	2.06	2.07	2.08	2.10	2.11	2.12	S	2.14	2.14	2.15	2.16	2.12	2.23	2.05	2.23	2.10	24		
10	2.15	2.08	2.07	2.03	2.01	2.00	2.01	2.01	2.02	1.99	2.00	1.99	2.00	2.00	2.00	S	2.03	2.03	1.99	1.98	1.98	1.98	1.98	1.98	1.98	2.15	2.02	24		
11	1.98	1.98	1.98	1.98	1.98	1.99	1.98	1.98	1.98	1.97	1.97	1.98	1.99	1.99	S	2.00	2.00	1.99	2.00	2.03	2.03	2.01	1.98	2.00	1.97	2.03	1.99	24		
12	2.06	2.13	2.26	2.35	2.41	2.44	2.30	2.29	2.28	2.33	2.31	2.27	2.26	2.33	S	2.32	2.25	2.21	2.22	2.20	2.19	2.16	2.16	2.17	2.06	2.44	2.26	24		
13	2.30	2.38	2.16	2.13	2.17	2.41	2.32	2.62	2.76	4.07	3.66	3.27	3.13	S	2.87	2.77	2.48	2.59	2.70	2.90	2.84	2.78	2.79	2.78	2.13	4.07	2.73	24		
14	2.75	2.74	2.65	2.24	2.13	2.21	2.25	2.26	2.14	2.08	2.08	2.06	S	1.94	1.93	1.93	1.95	2.00	1.99	2.00	2.06	2.08	2.11	2.04	1.93	2.75	2.16	24		
15	2.07	2.10	2.27	2.35	2.31	2.24	2.20	2.15	2.06	2.01	1.99	S	1.99	1.98	1.97	1.96	1.96	1.95	1.95	1.93	1.92	1.92	1.91	1.90	1.90	2.35	2.05	24		
16	1.90	1.90	1.91	1.92	1.93	1.94	1.95	1.96	1.97	1.98	S	1.97	1.95	1.94	1.95	1.97	1.99	2.04	2.09	2.03	2.07	2.06	2.02	2.04	1.90	2.09	1.98	24		
17	2.05	2.06	2.06	2.03	2.02	2.04	2.06	2.07	2.06	S	2.05	2.06	2.06	2.06	2.09	2.09	2.10	2.13	2.25	2.21	2.21	2.22	2.22	2.19	2.02	2.25	2.10	24		
18	2.23	2.41	2.36	2.34	2.39	2.29	2.22	2.22	S	2.06	2.06	2.06	2.02	2.00	1.99	1.97	1.98	1.97	1.98	1.97	2.02	2.02	2.04	2.03	1.97	2.41	2.12	24		
19	2.03	2.05	2.14	2.17	2.15	2.20	2.18	S	2.17	2.15	2.15	2.18	2.22	2.23	2.13	2.11	2.10	2.11	2.10	2.10	2.06	2.03	2.04	2.01	2.01	2.23	2.12	24		
20	2.08	2.05	3.80	3.59	2.53	4.02	X	2.39	S	2.00	2.03	2.09	2.11	2.07	2.13	2.11	2.08	2.08	2.08	2.09	2.06	2.09	2.13	2.17	2.00	4.02	2.35	23		
21	2.20	2.20	2.19	2.19	2.20	S	2.24	2.23	2.27	2.20	2.21	2.21	2.22	2.22	2.24	2.25	2.23	2.23	2.24	2.20	2.18	2.24	2.19	2.17	2.17	2.27	2.21	24		
22	2.27	2.25	2.25	2.26	S	2.28	2.32	2.39	2.44	2.37	2.34	2.32	2.27	2.21	2.15	2.10	2.08	2.11	2.12	2.10	2.16	2.07	2.14	2.19	2.07	2.44	2.23	24		
23	2.11	2.05	2.02	S	2.03	1.98	2.00	2.03	2.10	2.08	2.00	2.01	2.01	1.98	1.96	1.94	1.92	1.91	1.92	1.92	1.92	1.92	1.91	1.93	1.91	2.11	1.98	24		
24	1.92	1.91	S	1.92	1.92	1.92	1.92	1.92	1.93	1.95	1.95	1.95	1.96	1.96	1.96	1.96	2.01	2.06	2.05	2.05	2.06	2.09	2.10	2.17	1.91	2.17	1.98	24		
25	2.16	S	2.20	2.24	2.25	2.27	2.28	2.29	2.29	2.23	2.22	2.23	2.23	2.24	2.23	2.23	2.20	2.20	2.19	2.20	2.15	2.09	2.13	2.14	2.09	2.29	2.21	24		
26	S	2.14	2.13	2.05	2.03	2.05	2.09	2.08	2.10	2.07	2.04	2.01	2.02	2.00	1.98	1.98	1.99	1.96	1.97	1.94	1.94	1.95	1.96	S	1.94	2.14	2.02	24		
27	1.96	1.97	1.98	1.99	1.99	1.98	1.93	1.92	1.93	1.94	1.94	1.95	1.93	1.93	1.93	1.94	1.94	1.94	1.95	1.94	1.94	1.96	S	1.96	1.92	1.99	1.95	24		
28	1.95	1.94	1.98	1.99	2.04	2.06	2.09	2.12	2.12	2.15	2.17	2.12	2.12	2.11	2.10	2.13	2.19	2.19	2.19	2.21	2.23	S	2.29	2.32	1.94	2.32	2.12	24		
29	2.33	2.37	2.38	2.40	2.42	2.47	2.43	2.43	2.46	2.62	3.46	2.98	2.72	2.97	3.32	2.99	2.83	2.62	2.67	2.60	S	2.47	2.30	2.27	2.27	3.46	2.63	24		
30	2.46	2.31	2.37	2.59	2.67	2.82	3.09	3.00	2.93	2.92	2.94	2.92	2.82	2.92	2.67	2.55	2.70	2.73	2.94	S	3.18	2.96	2.91	2.80	2.31	3.18	2.79	24		
HOURLY MAX	2.75	2.74	3.80	3.59	2.67	4.02	3.09	3.00	2.93	4.07	3.66	3.27	3.13	2.97	3.32	2.99	2.83	2.73	2.94	2.90	3.18	2.96	2.91	2.80						
HOURLY AVG	2.14	2.13	2.20	2.18	2.14	2.21	2.14	2.16	2.15	2.18	2.19	2.18	2.14	2.11	2.13	2.12	2.11	2.11	2.15	2.12	2.14	2.14	2.15	2.14						

STATUS FLAG CODES

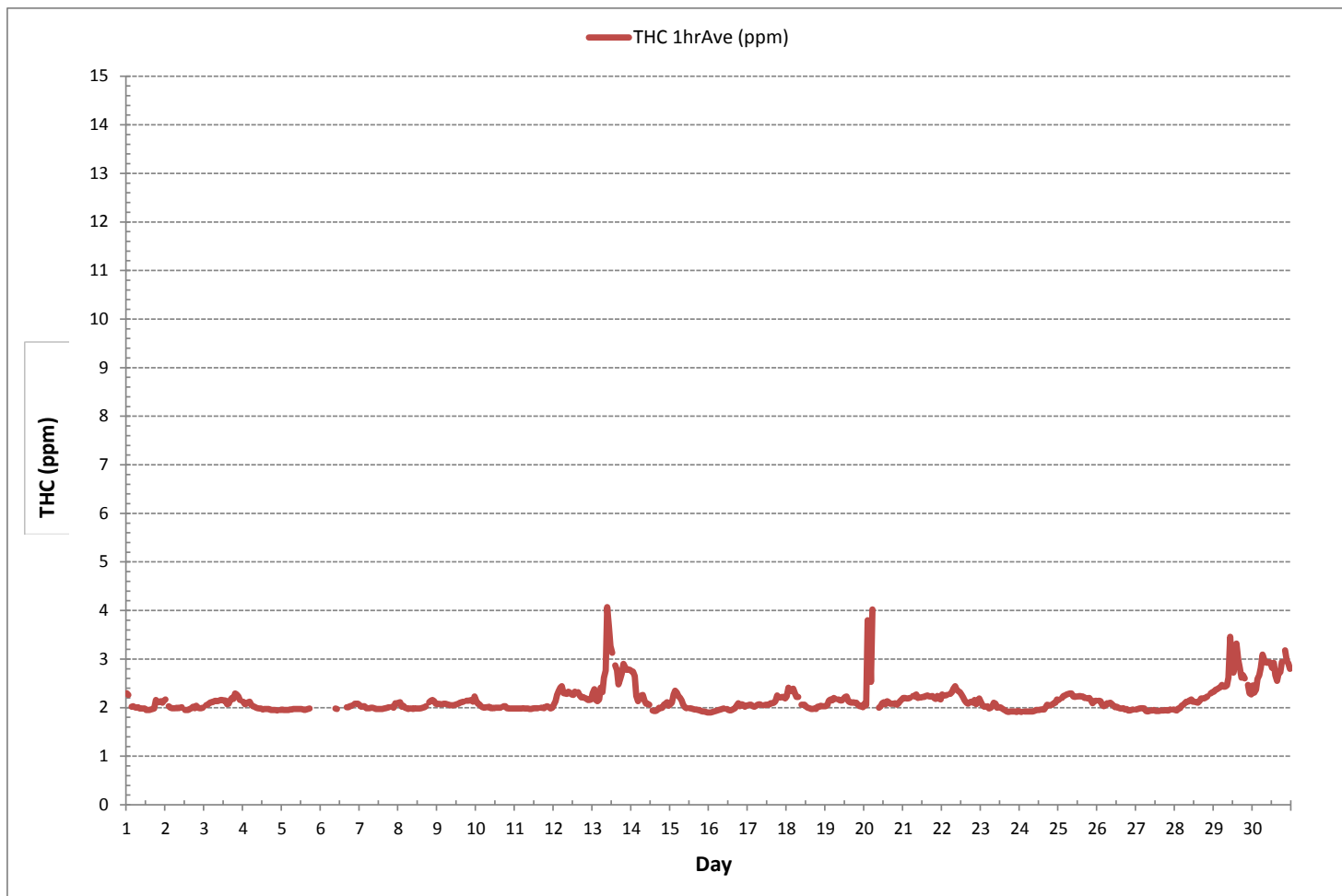
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	667			
MINIMUM 1-HR AVERAGE:	1.90 ppm	@ HOUR	23	ON DAY 15
MAXIMUM 1-HR AVERAGE:	4.07 ppm	@ HOUR	9	ON DAY 13
MAXIMUM 24-HR AVERAGE:	2.79 ppm			ON DAY 30
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	703 hrs	
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	97.6 %	
STANDARD DEVIATION:	0.28	MONTHLY AVERAGE:	2.15 ppm	

TOTAL HYDROCARBONS Hourly Averages (THC ppm)



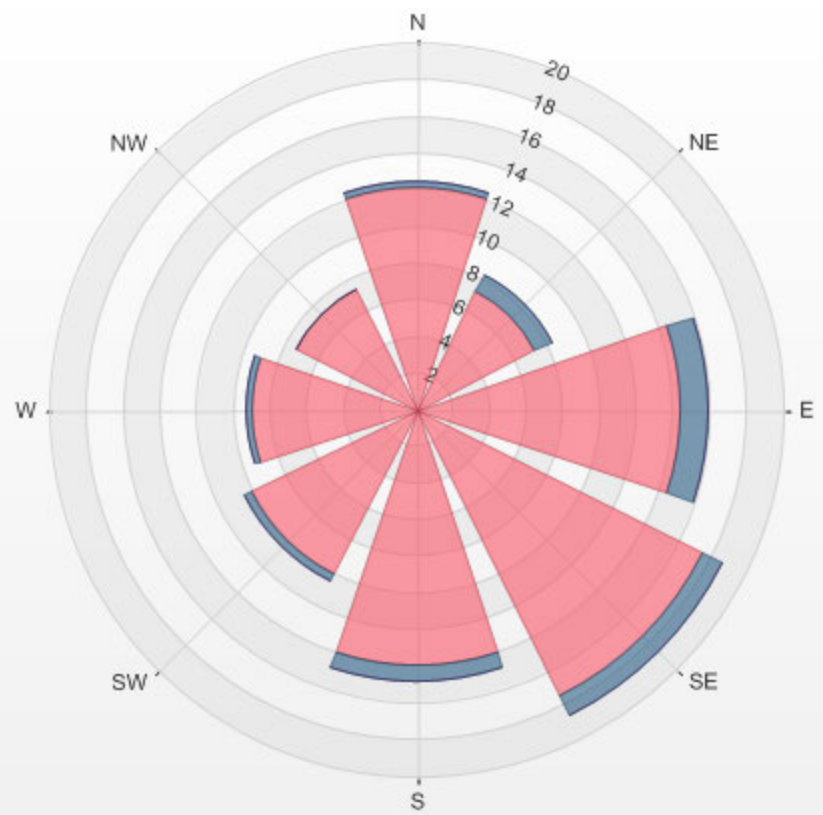
Wind: LICA Bonnyville East
 Poll.: LICA Bonnyville East-THC[ppm]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 2.85% Calm Avg: 2.38 [ppm]

Direction	0.0-1.4	1.4-2.7	2.7-4.1	>4.1	Total
N	0.0	12.1	0.3	0.0	12.4
NE	0.0	7.2	1.1	0.0	8.3
E	0.0	14.4	1.5	0.0	15.9
SE	0.0	17.4	1.2	0.0	18.6
S	0.0	13.9	0.9	0.0	14.8
SW	0.0	10.0	0.5	0.0	10.5
W	0.0	9.0	0.3	0.0	9.3
NW	0.0	7.4	0.0	0.0	7.4
Summary	0.0	91.5	5.7	0.0	97.2

% Icon Classes (ppm) 0 0.0-1.4 91 1.4-2.7 6 2.7-4.1 0 >4.1

LICA Bonnyville East Poll.: LICA Bonnyville East-THC[ppm] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 2.85% Calm Poll Avg: 2.38[ppm]



THC[ppm] Calibration: LICA Bonnyville East Monthly: 18/11 Type: Span

Span Meas Span Ref Span Low Span High



METHANE



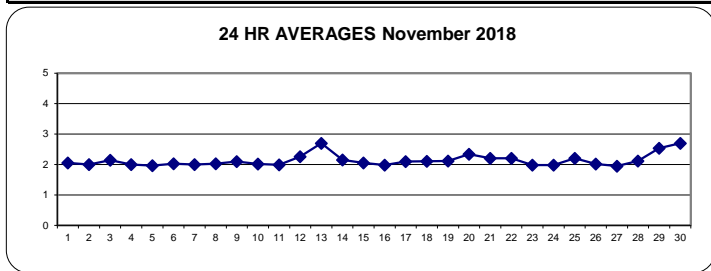
METHANE Hourly Averages (CH₄ ppm)

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	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	2.30	2.26	S	2.02	2.03	2.01	2.00	2.01	1.98	1.98	1.98	1.98	1.95	1.95	1.95	1.96	1.97	1.98	2.16	2.12	2.11	2.13	2.10	2.14	1.95	2.30	2.05	24	
2	2.17	S	2.03	2.00	1.99	1.99	1.99	2.00	1.99	2.00	2.01	Y	1.95	1.95	1.95	1.97	1.99	2.02	1.99	2.04	2.00	1.99	1.99	2.00	1.95	2.17	2.00	23	
3	S	2.05	2.06	2.09	2.11	2.11	2.13	2.14	2.13	2.14	2.16	2.16	2.14	2.15	2.07	2.08	2.15	2.20	2.18	2.29	2.27	2.23	2.15	S	2.05	2.29	2.14	24	
4	2.12	2.07	2.08	2.11	2.12	2.06	2.03	2.02	2.00	1.99	1.98	1.98	1.96	1.97	1.97	1.97	1.97	1.95	1.95	1.95	1.95	1.94	S	1.95	1.94	2.12	2.00	24	
5	1.96	1.95	1.95	1.95	1.95	1.96	1.96	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.96	1.95	1.96	1.97	1.98	X	X	X	X	X	X	1.95	1.98	1.96	18
6	X	X	X	X	X	X	X	X	X	X	1.98	1.97	C	C	C	C	C	2.01	2.01	2.03	2.04	S	2.08	2.08	2.08	1.97	2.08	2.03	15
7	2.05	2.02	2.03	2.03	1.99	1.99	1.99	2.00	2.00	1.99	1.97	1.97	1.97	1.97	1.97	1.98	1.99	2.00	2.01	S	2.02	2.00	2.09	2.08	1.97	2.09	2.00	24	
8	2.10	2.11	2.02	2.04	2.00	1.99	1.97	1.98	1.98	1.97	1.99	1.98	1.98	1.98	1.99	2.00	2.01	2.03	S	2.11	2.14	2.16	2.13	2.08	1.97	2.16	2.03	24	
9	2.07	2.08	2.07	2.07	2.08	2.07	2.07	2.06	2.05	2.05	2.05	2.06	2.07	2.08	2.10	2.11	2.12	S	2.14	2.14	2.15	2.16	2.12	2.23	2.05	2.23	2.10	24	
10	2.15	2.08	2.07	2.03	2.01	2.00	2.01	2.01	2.02	1.99	2.00	1.99	2.00	2.00	2.00	2.00	S	2.03	2.03	1.99	1.98	1.98	1.98	1.98	1.98	2.15	2.02	24	
11	1.98	1.98	1.98	1.98	1.98	1.99	1.98	1.98	1.98	1.97	1.97	1.98	1.99	1.99	1.99	S	2.00	2.00	1.99	2.02	2.03	2.01	1.98	2.00	1.97	2.03	1.99	24	
12	2.06	2.13	2.26	2.35	2.41	2.44	2.30	2.29	2.28	2.33	2.31	2.27	2.26	2.33	S	2.32	2.25	2.21	2.22	2.20	2.19	2.16	2.16	2.16	2.06	2.44	2.26	24	
13	2.30	2.37	2.16	2.13	2.17	2.40	2.31	2.61	2.74	3.97	3.58	3.23	3.09	S	2.85	2.74	2.45	2.56	2.66	2.83	2.78	2.72	2.73	2.72	2.13	3.97	2.70	24	
14	2.71	2.70	2.61	2.23	2.13	2.20	2.23	2.23	2.14	2.08	2.07	2.06	S	1.94	1.93	1.93	1.95	2.00	1.99	2.00	2.06	2.08	2.11	2.04	1.93	2.71	2.15	24	
15	2.07	2.10	2.27	2.35	2.31	2.24	2.20	2.15	2.06	2.01	1.99	S	1.99	1.98	1.97	1.96	1.96	1.95	1.95	1.93	1.92	1.91	1.90	1.90	1.90	2.35	2.05	24	
16	1.90	1.90	1.91	1.92	1.93	1.94	1.95	1.96	1.97	1.98	S	1.97	1.95	1.94	1.95	1.97	1.99	2.04	2.09	2.03	2.07	2.06	2.02	2.04	1.90	2.09	1.98	24	
17	2.05	2.06	2.06	2.03	2.02	2.04	2.06	2.07	2.06	S	2.05	2.06	2.06	2.06	2.09	2.09	2.10	2.12	2.24	2.19	2.18	2.19	2.18	2.16	2.02	2.24	2.10	24	
18	2.20	2.39	2.35	2.34	2.38	2.29	2.22	2.22	S	2.06	2.06	2.06	2.02	2.00	1.99	1.97	1.97	1.98	1.97	2.02	2.02	2.04	2.03	2.03	1.97	2.39	2.11	24	
19	2.03	2.05	2.14	2.17	2.15	2.20	2.18	S	2.17	2.15	2.15	2.18	2.22	2.22	2.13	2.11	2.10	2.11	2.10	2.10	2.06	2.03	2.03	2.01	2.01	2.22	2.12	24	
20	2.08	2.05	3.70	3.51	2.52	3.92	X	2.39	S	2.00	2.03	2.09	2.11	2.07	2.13	2.11	2.08	2.08	2.09	2.06	2.09	2.13	2.17	2.00	3.92	2.34	23		
21	2.20	2.20	2.19	2.19	2.20	S	2.24	2.23	2.27	2.20	2.21	2.21	2.21	2.21	2.23	2.24	2.23	2.23	2.24	2.23	2.24	2.19	2.17	2.17	2.17	2.27	2.21	24	
22	2.27	2.24	2.24	2.25	S	2.28	2.32	2.38	2.42	2.32	2.26	2.25	2.21	2.17	2.13	2.09	2.08	2.11	2.11	2.10	2.16	2.07	2.14	2.18	2.07	2.42	2.21	24	
23	2.11	2.04	2.02	S	2.03	1.98	2.00	2.03	2.10	2.08	2.00	2.01	2.01	1.98	1.96	1.94	1.92	1.91	1.92	1.92	1.92	1.91	1.93	1.91	2.11	1.98	24		
24	1.92	1.91	S	1.92	1.92	1.92	1.92	1.92	1.93	1.95	1.95	1.95	1.96	1.96	1.96	1.96	2.01	2.06	2.05	2.05	2.06	2.09	2.10	2.17	1.91	2.17	1.98	24	
25	2.16	S	2.20	2.24	2.25	2.27	2.28	2.29	2.29	2.23	2.22	2.23	2.23	2.24	2.23	2.23	2.20	2.20	2.19	2.20	2.15	2.09	2.13	2.14	2.09	2.29	2.21	24	
26	S	2.14	2.13	2.05	2.03	2.05	2.09	2.08	2.10	2.06	2.04	2.01	2.02	2.00	1.98	1.98	1.99	1.96	1.97	1.94	1.94	1.95	1.96	S	1.94	2.14	2.02	24	
27	1.96	1.97	1.98	1.99	1.99	1.98	1.93	1.92	1.93	1.94	1.94	1.95	1.93	1.93	1.93	1.94	1.94	1.94	1.95	1.94	1.94	1.96	S	1.96	1.92	1.99	1.95	24	
28	1.95	1.94	1.98	1.99	2.04	2.06	2.09	2.12	2.12	2.15	2.17	2.12	2.12	2.11	2.10	2.12	2.18	2.19	2.19	2.20	2.22	S	2.27	2.29	1.94	2.29	2.12	24	
29	2.30	2.30	2.33	2.34	2.35	2.40	2.36	2.37	2.39	2.52	3.30	2.84	2.60	2.81	3.14	2.83	2.71	2.53	2.58	2.52	S	2.42	2.26	2.25	2.25	3.30	2.54	24	
30	2.41	2.28	2.34	2.53	2.60	2.73	2.95	2.87	2.82	2.80	2.81	2.80	2.72	2.79	2.58	2.49	2.61	2.63	2.83	S	3.05	2.86	2.82	2.72	2.28	3.05	2.70	24	
HOURLY MAX	2.71	2.70	3.70	3.51	2.60	3.92	2.95	2.87	2.82	3.97	3.58	3.23	3.09	2.81	3.14	2.83	2.71	2.63	2.83	2.83	3.05	2.86	2.82	2.72					
HOURLY AVG	2.13	2.12	2.19	2.17	2.13	2.20	2.13	2.15	2.14	2.17	2.18	2.16	2.13	2.10	2.12	2.11	2.10	2.10	2.14	2.12	2.13	2.13	2.14	2.13					

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

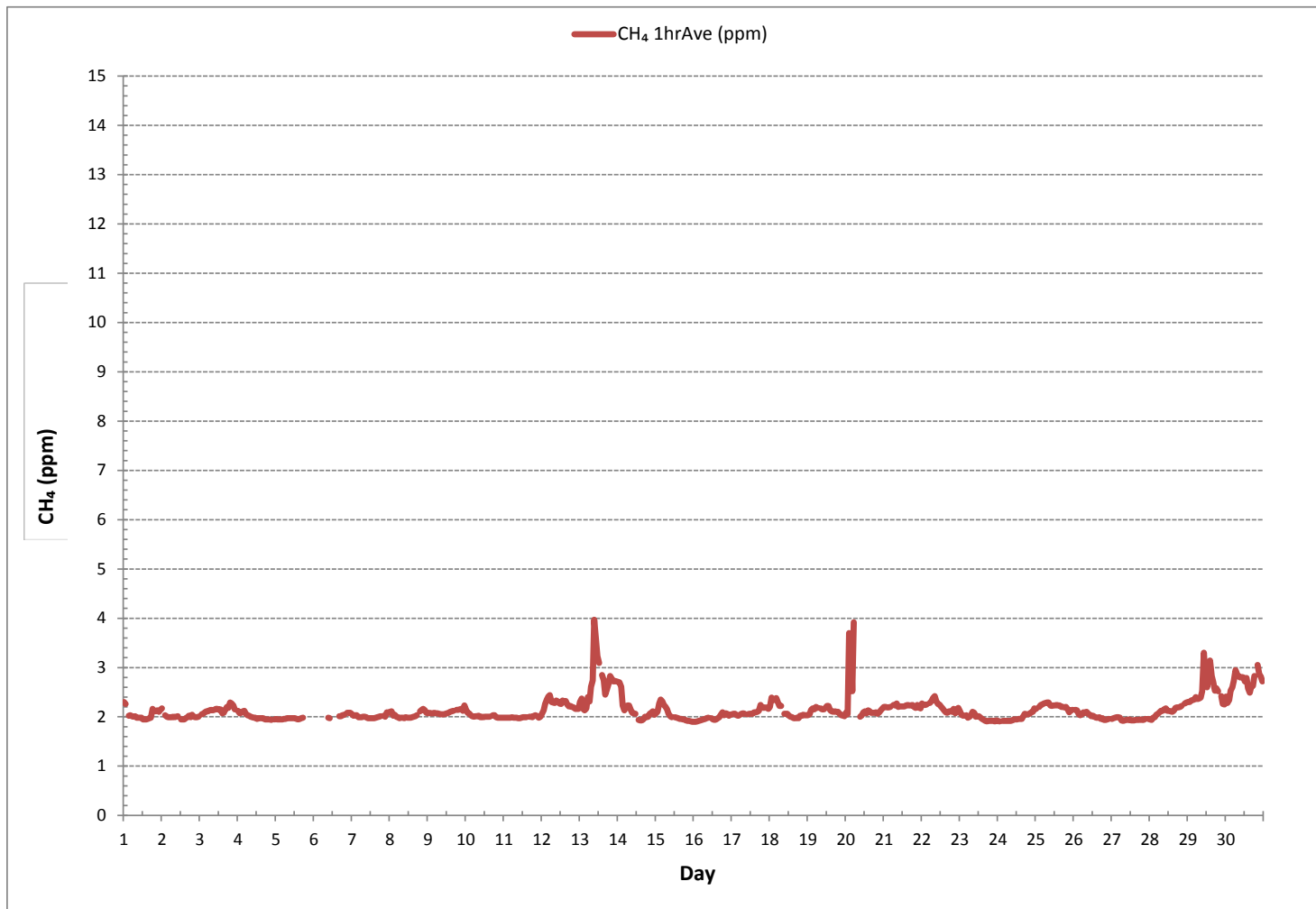
24 HR AVERAGES November 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	667			
MINIMUM 1-HR AVERAGE:	1.90 ppm	@ HOUR	23	ON DAY
MAXIMUM 1-HR AVERAGE:	3.97 ppm	@ HOUR	9	ON DAY
MAXIMUM 24-HR AVERAGE:	2.70 ppm			ON DAY
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	703	hrs
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	97.6	%
STANDARD DEVIATION:	0.26	MONTHLY AVERAGE:	2.14	ppm

METHANE Hourly Averages (CH₄ ppm)



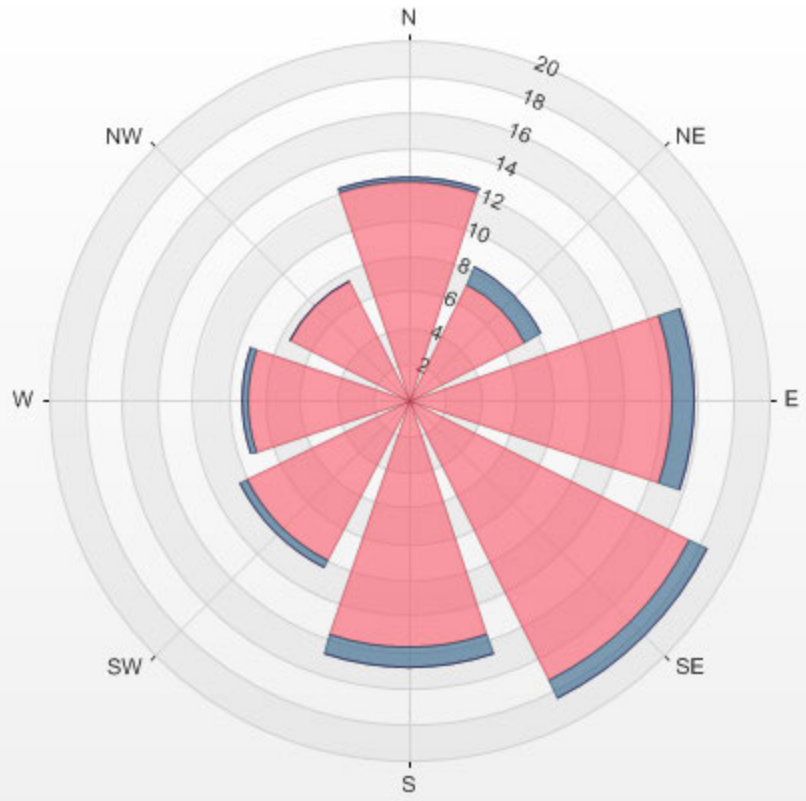
Wind: LICA Bonnyville East
 Poll.: LICA Bonnyville East-CH4[ppm]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 2.85% Calm Avg: 2.34 [ppm]

Direction	0.0-1.3	1.3-2.7	2.7-4.0	>4.0	Total
N	0.0	12.1	0.3	0.0	12.4
NE	0.0	7.2	1.1	0.0	8.3
E	0.0	14.7	1.2	0.0	15.9
SE	0.0	17.4	1.2	0.0	18.6
S	0.0	13.8	1.1	0.0	14.8
SW	0.0	10.0	0.5	0.0	10.5
W	0.0	9.0	0.3	0.0	9.3
NW	0.0	7.4	0.0	0.0	7.4
Summary	0.0	91.6	5.6	0.0	97.2

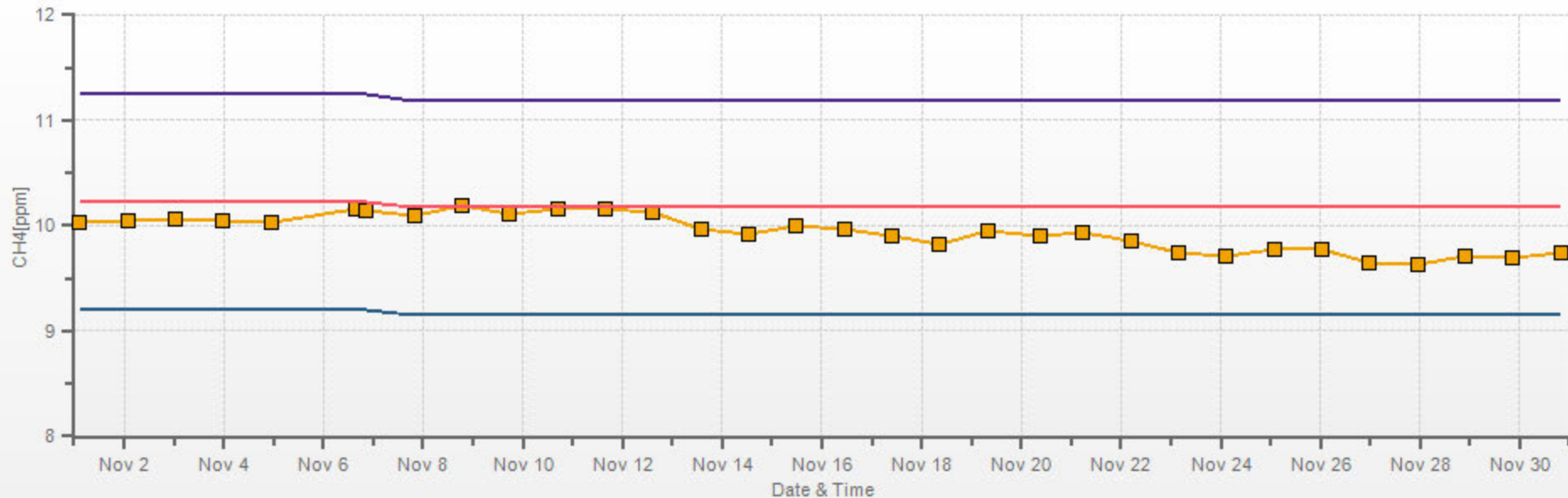
% Icon Classes (ppm) 0 0.0-1.3 92 1.3-2.7 6 2.7-4.0 0 >4.0

LICA Bonnyville East Poll.: LICA Bonnyville East-CH4[ppm] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 2.85% Calm Poll Avg: 2.34[ppm]



CH4[ppm] Calibration: LICA Bonnyville East Monthly: 18/11 Type: Span

Span Meas Span Ref Span Low Span High



NON-METHANE HYDROCARBON



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

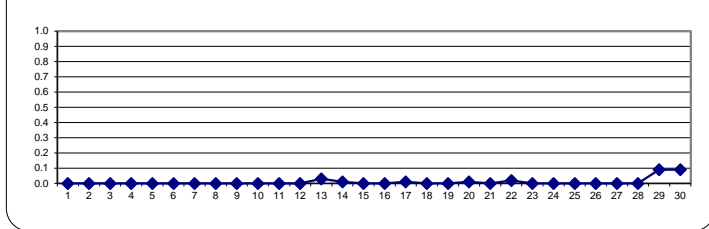
NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

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	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	0.00	24
2	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Y	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	23
3	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
4	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	0.00	24
5	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	X	X	X	X	X	0.00	0.00	0.00	18
6	X	X	X	X	X	X	X	X	X	0.00	0.00	C	C	C	C	C	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15
7	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	0.00	0.00	24
8	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	0.00	0.00	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	S	0.00	0.00	0.00	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	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	0.00	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	24
12	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	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01	24
13	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.10	0.09	0.05	0.04	S	0.02	0.03	0.03	0.03	0.04	0.07	0.06	0.06	0.06	0.05	0.00	0.10	0.03	24
14	0.04	0.04	0.04	0.01	0.00	0.01	0.02	0.03	0.00	0.00	0.01	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	0.04	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	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	24
16	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	0.00	0.00	0.00	0.00	24
17	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	0.01	0.01	0.02	0.03	0.02	0.03	0.03	0.02	0.00	0.03	0.01	24
18	0.02	0.02	0.01	0.01	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	0.00	0.00	0.02	0.00	24
19	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	0.00	24
20	0.00	0.00	0.10	0.08	0.01	0.11	X	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	0.11	0.01	23
21	0.00	0.00	0.00	0.01	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	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	0.01	0.01	S	0.01	0.01	0.01	0.02	0.06	0.08	0.07	0.06	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.02	24
23	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
24	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	0.00	24
25	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	0.00	0.00	24
26	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
27	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	0.01	0.00	0.00	S	0.00	0.00	0.01	0.00	24
28	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	0.01	0.01	S	0.03	0.02	0.00	0.03	0.00	24
29	0.03	0.07	0.06	0.06	0.07	0.07	0.07	0.06	0.07	0.10	0.16	0.14	0.12	0.16	0.18	0.16	0.12	0.09	0.09	0.08	S	0.06	0.04	0.03	0.03	0.18	0.09	24
30	0.05	0.03	0.03	0.06	0.07	0.09	0.14	0.12	0.11	0.12	0.13	0.12	0.10	0.12	0.09	0.06	0.08	0.09	0.11	S	0.13	0.11	0.09	0.08	0.03	0.14	0.09	24
HOURLY MAX	0.05	0.07	0.10	0.08	0.07	0.11	0.14	0.12	0.11	0.12	0.16	0.14	0.12	0.16	0.18	0.16	0.12	0.09	0.11	0.08	0.13	0.11	0.09	0.08				
HOURLY AVG	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	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

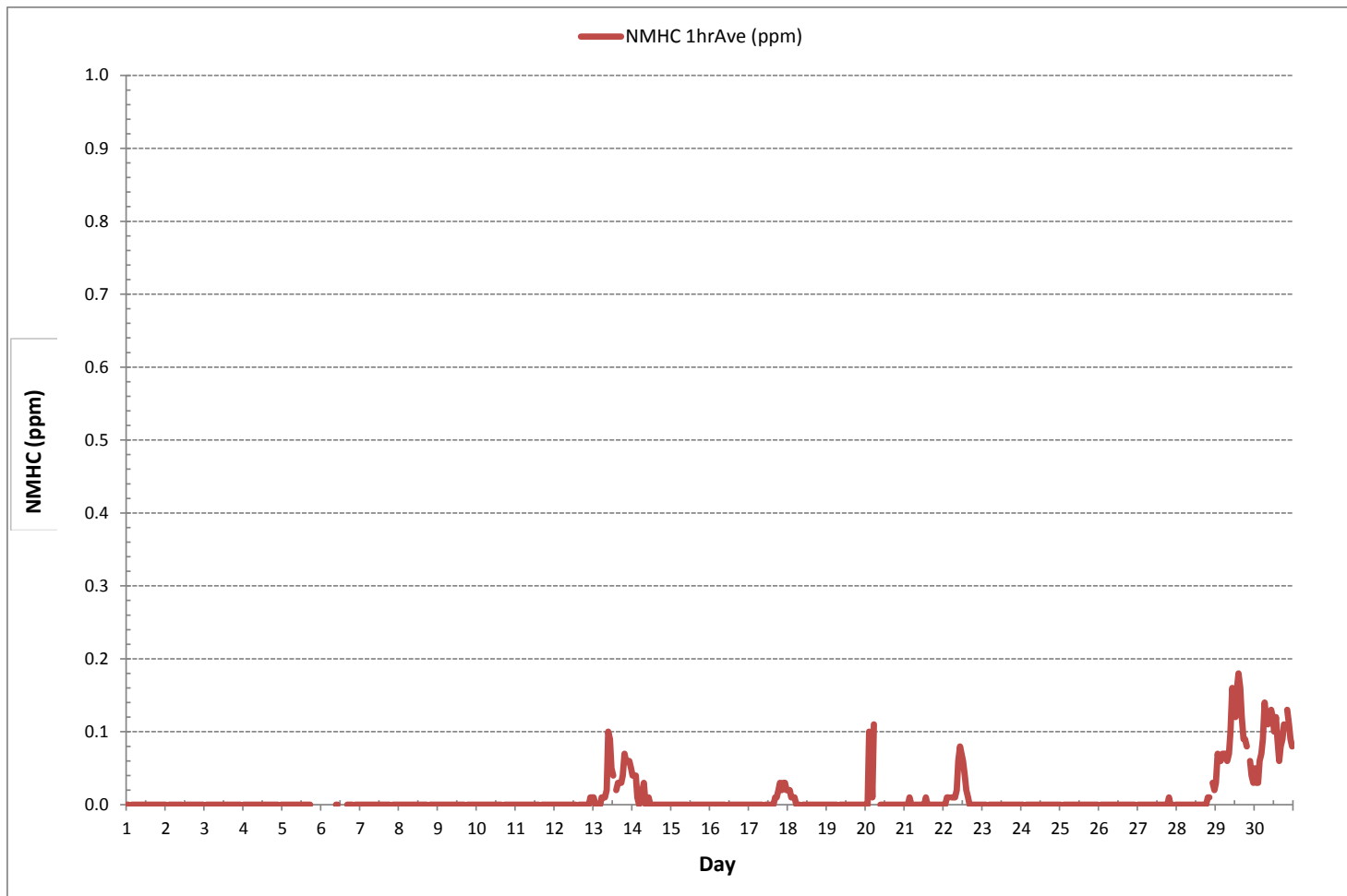
24 HR AVERAGES November 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	112
MINIMUM 1-HR AVERAGE:	0.00 ppm @ HOUR 0 ON DAY 1
MAXIMUM 1-HR AVERAGE:	0.18 ppm @ HOUR 14 ON DAY 29
MAXIMUM 24-HR AVERAGE:	0.09 ppm ON DAY 29
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	703 hrs
AMD OPERATION UPTIME:	97.6 %
STANDARD DEVIATION:	0.03
MONTHLY AVERAGE:	0.01 ppm

NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)



Wind: LICA Bonnyville East
 Poll.: LICA Bonnyville East-NMHC[ppm]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 2.85%

Calm Avg: 0.04 [ppm]

Direction	0.0-0.4	0.4-0.8	0.8-1.2	1.2-1.6	1.6-2.0	>2.0	Total
N	12.4	0.0	0.0	0.0	0.0	0.0	12.4
NE	8.3	0.0	0.0	0.0	0.0	0.0	8.3
E	15.9	0.0	0.0	0.0	0.0	0.0	15.9
SE	18.6	0.0	0.0	0.0	0.0	0.0	18.6
S	14.8	0.0	0.0	0.0	0.0	0.0	14.8
SW	10.5	0.0	0.0	0.0	0.0	0.0	10.5
W	9.3	0.0	0.0	0.0	0.0	0.0	9.3
NW	7.4	0.0	0.0	0.0	0.0	0.0	7.4
Summary	97.2	0.0	0.0	0.0	0.0	0.0	97.2

% Icon Classes (ppm)

97 0.0-0.4

0 0.4-0.8

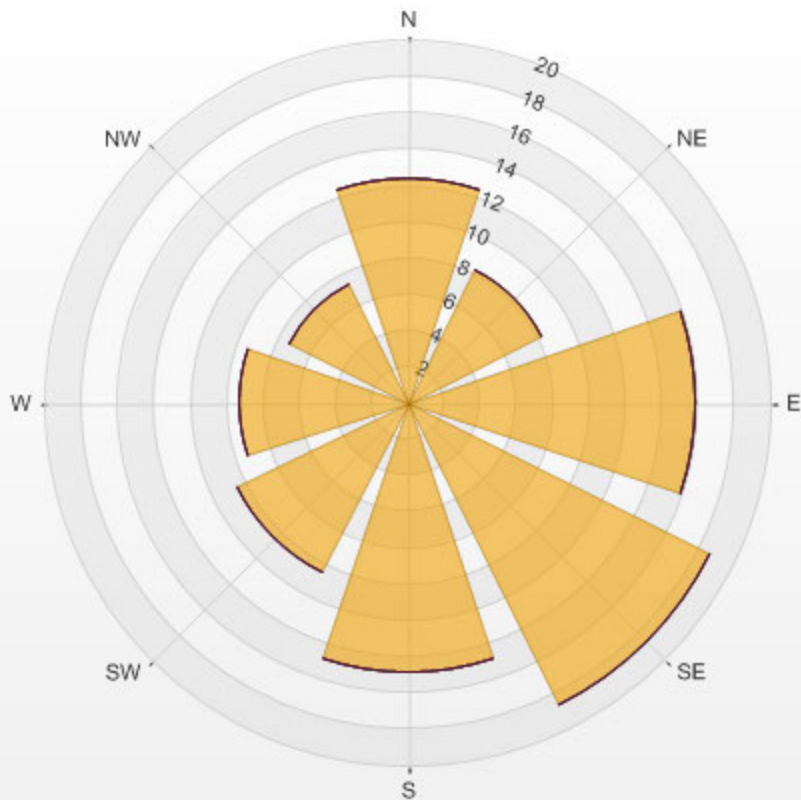
0 0.8-1.2

0 1.2-1.6

0 1.6-2.0

0 >2.0

LICA Bonnyville East Poll.: LICA Bonnyville East-NMHC[ppm] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 2.85% Calm Poll Avg: 0.04[ppm]



NMHC[ppm] Calibration: LICA Bonnyville East Monthly: 18/11 Type: Span

Span Meas Span Ref Span Low Span High



OXIDES OF NITROGEN



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

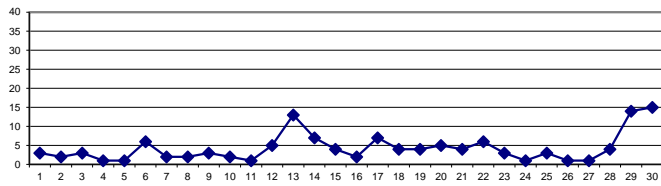
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

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	8	9	S	5	3	3	3	3	2	2	1	2	1	1	0	1	2	3	5	6	5	5	3	4	0	9	3	24	
2	4	S	3	2	1	1	1	1	1	7	1	1	0	0	1	1	2	2	1	2	1	1	1	0	0	7	2	24	
3	S	3	2	2	2	2	2	2	3	3	4	4	4	4	4	4	4	4	4	5	5	5	4	S	2	5	3	24	
4	5	3	2	2	2	2	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	S	2	0	5	1	24	
5	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	2	2	X	X	X	X	X	X	0	2	1	18	
6	X	X	X	X	X	X	X	X	X	C	C	C	C	C	C	C	5	6	5	3	S	11	5	4	3	11	6	15	24
7	3	3	3	3	2	3	3	4	4	2	1	0	0	0	0	1	2	3	2	S	3	1	2	3	0	4	2	24	
8	2	3	2	3	2	2	3	3	2	1	0	0	0	0	1	1	1	1	S	3	3	2	1	S1	0	3	2	23	
9	4	1	0	0	1	0	1	1	1	2	2	2	2	2	3	3	3	S	6	5	9	9	6	10	0	10	3	24	
10	7	3	3	2	2	2	2	2	3	2	2	1	2	1	1	1	S	7	5	1	0	0	0	0	0	7	2	24	
11	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	S	4	3	2	2	2	1	0	0	0	4	1	24	
12	1	2	4	5	6	6	5	5	5	6	5	4	4	5	S	8	6	6	6	5	6	6	6	6	1	8	5	24	
13	6	8	6	6	6	8	9	12	14	25	26	19	20	S	S1	16	12	13	11	14	14	13	15	13	6	26	13	23	
14	13	12	11	8	6	6	7	8	7	6	C1	C1	C1	C1	C1	C1	C1	C1	8	4	3	3	3	2	2	13	7	16	
15	2	3	6	9	9	8	10	8	6	4	5	S	5	2	1	7	1	1	0	0	0	0	0	0	0	10	4	24	
16	0	0	0	0	1	1	1	1	3	4	S	4	3	3	4	3	2	3	2	2	3	2	2	2	0	4	2	24	
17	2	2	4	4	4	4	4	4	4	S	9	8	8	8	8	8	9	10	11	11	11	10	10	9	2	11	7	24	
18	11	12	9	9	9	7	6	5	S	4	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0	12	4	24	
19	0	1	2	2	1	3	2	S	4	3	4	4	5	6	6	7	6	6	6	5	4	3	3	2	0	7	4	24	
20	3	2	9	13	5	19	X	8	S	8	3	4	3	3	2	1	1	1	1	1	1	2	4	5	1	19	5	23	
21	4	4	4	4	4	S	5	4	4	4	4	4	5	5	5	5	5	5	5	5	4	4	4	4	4	5	4	24	
22	5	5	5	4	S	6	5	6	8	8	7	8	7	6	6	5	5	5	5	5	5	3	3	4	3	8	6	24	
23	3	3	3	S	4	3	8	9	9	8	3	2	2	4	3	1	0	0	1	2	2	1	1	1	0	9	3	24	
24	1	1	S	2	2	3	3	2	0	1	1	0	0	0	0	0	1	2	2	1	2	2	2	2	0	3	1	24	
25	1	S	5	4	4	4	3	3	3	3	3	4	4	4	4	4	4	3	3	4	3	2	3	2	1	5	3	24	
26	S	4	3	3	2	2	2	2	1	1	1	1	1	1	1	2	1	1	1	1	0	0	1	S	0	4	1	24	
27	3	2	1	1	2	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	2	0	3	1	24
28	1	1	1	1	2	2	2	S1	7	S1	7	3	2	2	3	4	C1	C1	C1	S1	S1	S	12	11	1	12	4	17	
29	11	11	10	9	9	15	9	9	11	11	23	15	12	16	21	20	17	16	16	15	S	16	14	13	9	23	14	24	
30	14	11	11	12	12	14	15	14	21	21	15	15	14	15	13	13	13	14	17	S	20	16	15	13	11	21	15	24	
HOURLY MAX	14	12	11	13	12	19	15	14	21	25	26	19	20	16	21	20	17	16	17	15	20	16	15	13					
HOURLY AVG	4	4	4	4	4	5	4	4	5	5	5	4	4	3	4	4	4	4	5	4	4	4	4	4					

STATUS FLAG CODES

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

24 HR AVERAGES November 2018



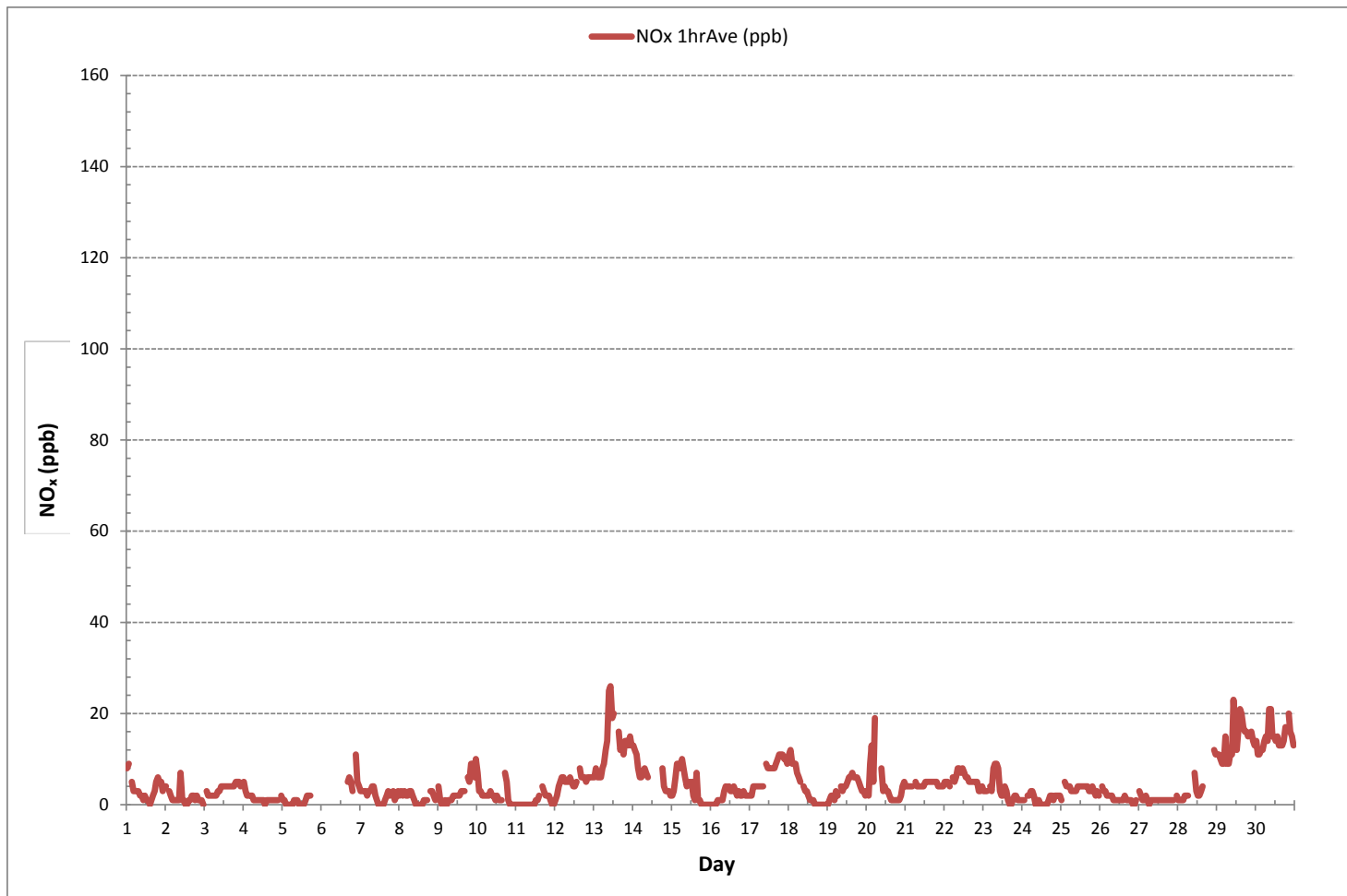
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	576				
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	14	ON DAY	1
MAXIMUM 1-HR AVERAGE:	26	ppb @ HOUR	10	ON DAY	13
MAXIMUM 24-HR AVERAGE:	15	ppb		ON DAY	30
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	687	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	95.4	%
STANDARD DEVIATION:	4		MONTHLY AVERAGE:	4	ppb



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)



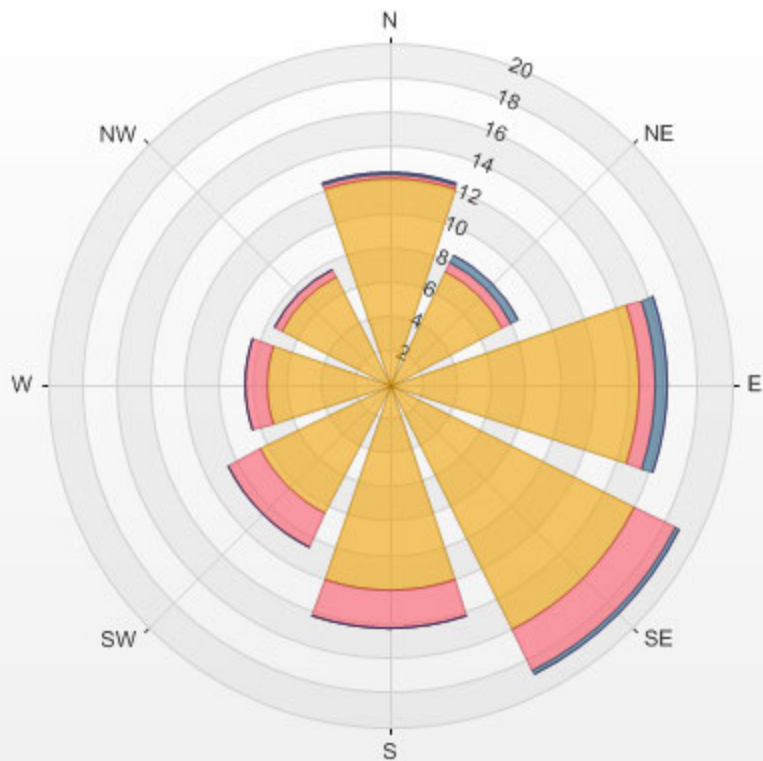
Wind: LICA Bonnyville East
 Poll.: LICA Bonnyville East-NOX[ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 2.92% Calm Avg: 8.61 [ppb]

Direction	0.0-9.0	9.0-18.0	18.0-27.0	>27.0	Total
N	12.2	0.2	0.2	0.0	12.5
NE	7.4	0.6	0.5	0.0	8.5
E	14.6	0.9	0.8	0.0	16.3
SE	16.0	2.8	0.2	0.0	18.9
S	12.0	2.3	0.0	0.0	14.3
SW	8.5	2.2	0.0	0.0	10.6
W	7.2	1.2	0.0	0.0	8.5
NW	7.1	0.5	0.0	0.0	7.5
Summary	84.9	10.6	1.5	0.0	97.1

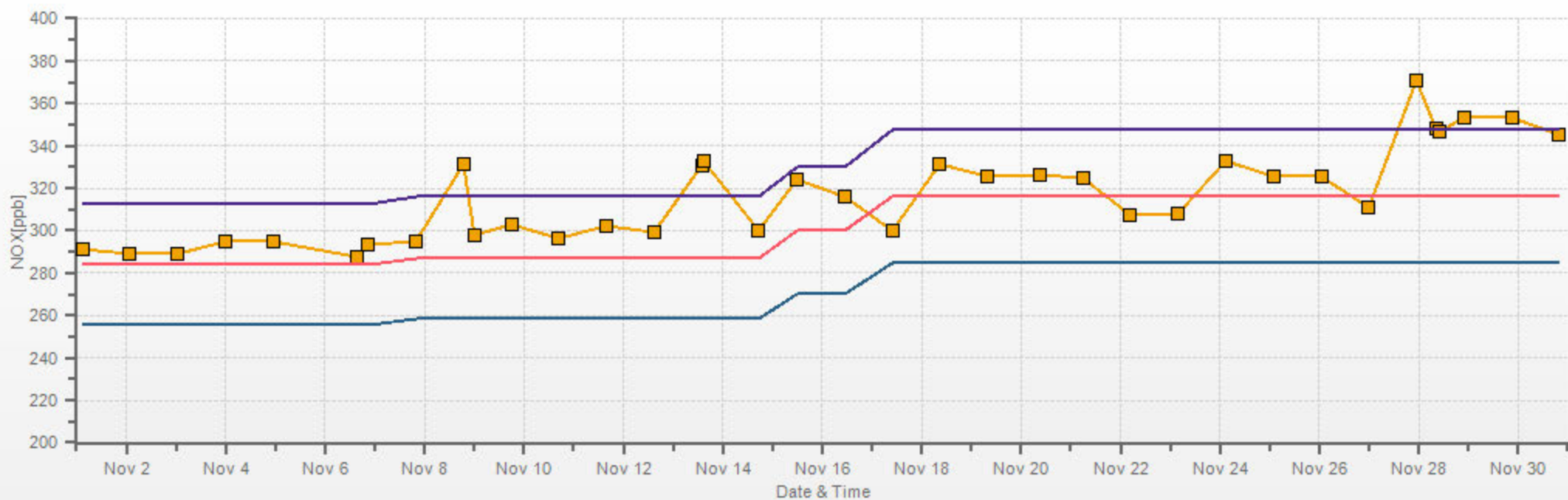
% Icon	Classes (ppb)	85	11	2	0
	0.0-9.0				
	9.0-18.0				
	18.0-27.0				
	>27.0				

LICA Bonnyville East Poll.: LICA Bonnyville East-NOX[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 2.92% Calm Poll Avg: 8.61[ppb]



NOX[ppb] Calibration: LICA Bonnyville East Monthly: 18/11 Type: Span

Span Meas Span Ref Span Low Span High



NITRIC OXIDE



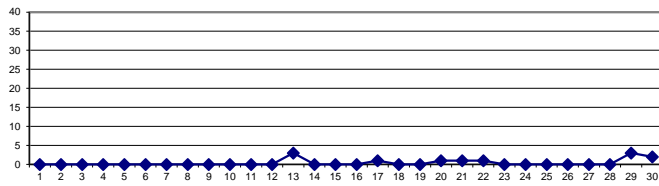
NITRIC OXIDE Hourly Averages (NO ppb)

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 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	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		
2	0	S	0	0	0	0	0	0	0	6	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	6	0	24	
3	S	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	S	0	1	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	S	0	0	0	0	24	
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	X	X	X	X	X	X	0	1	0	18	
6	X	X	X	X	X	X	X	X	X	C	C	C	C	C	C	C	0	0	0	0	S	0	0	0	0	0	0	0	15	
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	24	
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	S1	0	0	0	23	
9	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	S	0	0	0	0	0	0	0	1	0	24	
10	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	S	0	0	0	0	0	0	0	0	1	0	24	
11	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	S	0	0	0	0	0	0	0	0	0	0	1	0	24	
12	0	0	0	0	0	0	0	0	1	2	2	2	1	2	S	1	0	0	0	0	0	0	0	0	0	0	2	0	24	
13	0	0	0	0	0	0	0	0	3	14	15	10	11	S	S1	4	1	0	0	0	0	0	0	1	0	0	15	3	23	
14	0	0	0	0	0	0	0	0	1	2	C1	C1	C1	C1	C1	C1	C1	C1	0	0	0	0	0	0	0	0	2	0	16	
15	0	0	0	0	0	0	0	0	1	1	2	S	1	0	0	5	0	0	0	0	0	0	0	0	0	0	5	0	24	
16	0	0	0	0	0	0	0	0	0	1	S	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	24	
17	0	0	0	0	0	0	0	0	0	1	S	4	4	4	3	3	2	1	0	0	0	0	0	0	0	0	4	1	24	
18	0	0	0	0	0	0	0	0	0	S	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
19	0	0	0	0	0	0	0	0	S	0	1	1	2	2	2	2	1	1	0	0	0	0	0	0	0	0	2	0	24	
20	0	0	0	1	0	6	X	0	S	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	6	1	23		
21	0	0	0	0	0	S	0	0	0	1	2	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	2	1	24	
22	0	0	0	0	S	0	0	0	2	3	3	3	2	2	1	1	0	0	0	0	0	0	0	0	0	0	3	1	24	
23	0	0	0	S	0	0	0	0	1	2	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	2	0	24	
24	0	0	0	S	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
25	0	S	0	0	0	0	0	0	0	1	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	2	0	24	
26	S	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	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	S	0	0	0	0	24	
28	0	0	0	0	0	0	0	S1	0	S1	1	1	1	1	1	0	C1	C1	C1	S1	S1	S	0	0	0	0	1	0	17	
29	0	0	0	0	0	3	0	0	3	6	16	10	7	9	12	9	2	0	0	0	S	0	0	0	0	0	16	3	24	
30	0	0	0	0	0	0	0	0	6	9	6	7	6	6	4	2	0	0	0	0	S	1	0	0	0	0	0	9	2	24
HOURLY MAX	0	0	0	1	0	6	0	0	6	14	16	10	11	9	12	9	2	0	0	0	0	1	0	1	1					
HOURLY AVG	0	0	0	0	0	0	0	0	1	2	2	2	2	1	1	1	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 2018



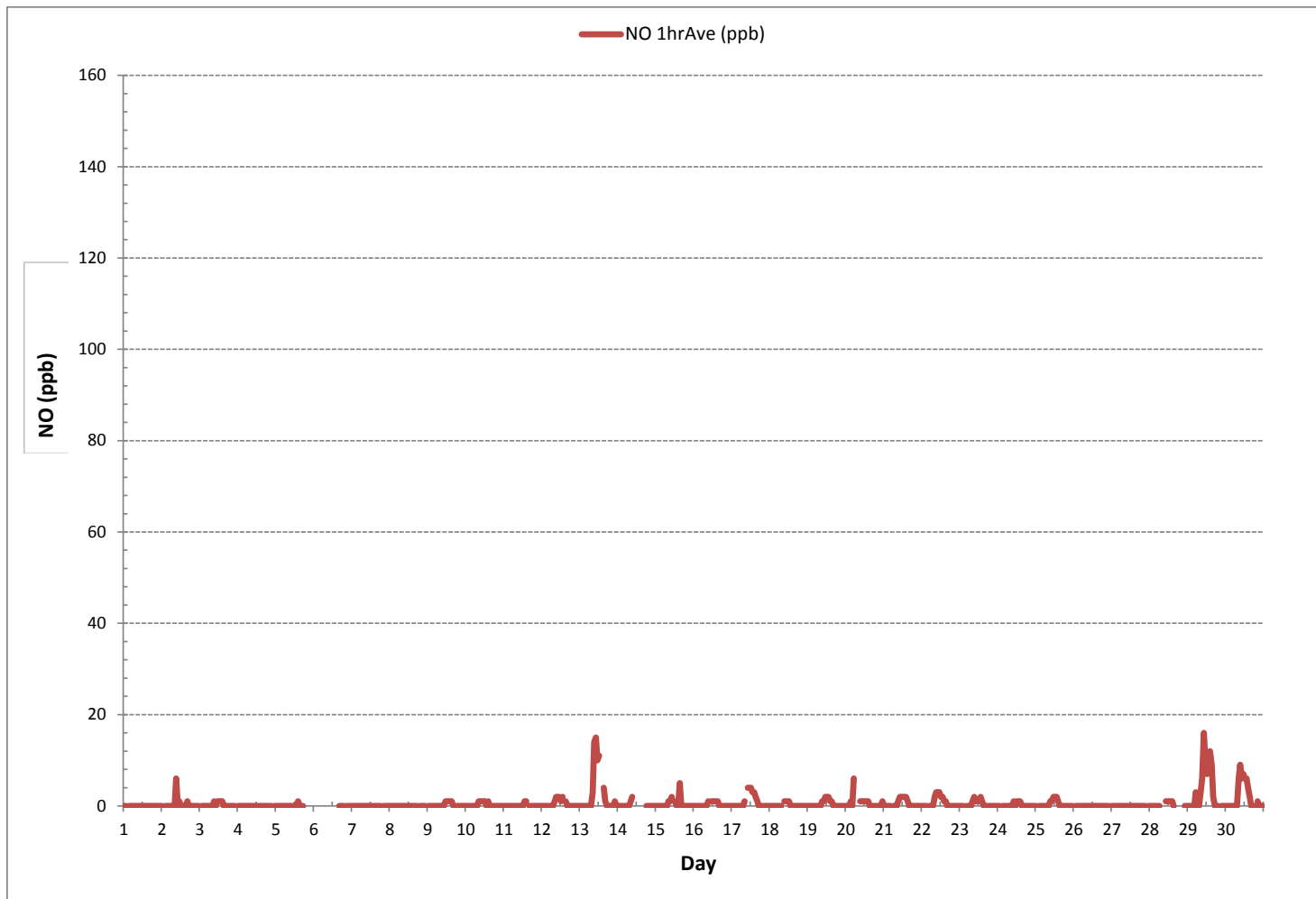
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	134			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	0	ON DAY 1
MAXIMUM 1-HR AVERAGE:	16 ppb	@ HOUR	10	ON DAY 29
MAXIMUM 24-HR AVERAGE:	3 ppb			ON DAY 13
IZS CALIBRATION TIME:	30 hrs	OPERATIONAL TIME:	687 hrs	
MONTHLY CALIBRATION TIME:	7 hrs	AMD OPERATION UPTIME:	95.4 %	
STANDARD DEVIATION:	2	MONTHLY AVERAGE:	1 ppb	



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

NITRIC OXIDE Hourly Averages (NO ppb)



Wind: LICA Bonnyville East
 Poll.: LICA Bonnyville East-NO[ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 2.92% Calm Avg: 1.02 [ppb]

Direction	0.0-5.7	5.7-11.3	11.3-17.0	>17.0	Total
N	12.3	0.2	0.0	0.0	12.5
NE	8.0	0.3	0.2	0.0	8.5
E	15.4	0.5	0.5	0.0	16.3
SE	18.5	0.5	0.0	0.0	18.9
S	13.7	0.6	0.0	0.0	14.3
SW	10.6	0.0	0.0	0.0	10.6
W	8.5	0.0	0.0	0.0	8.5
NW	7.5	0.0	0.0	0.0	7.5
Summary	94.5	2.0	0.6	0.0	97.1

% Icon Classes (ppb)

94

0.0-5.7

2

5.7-11.3

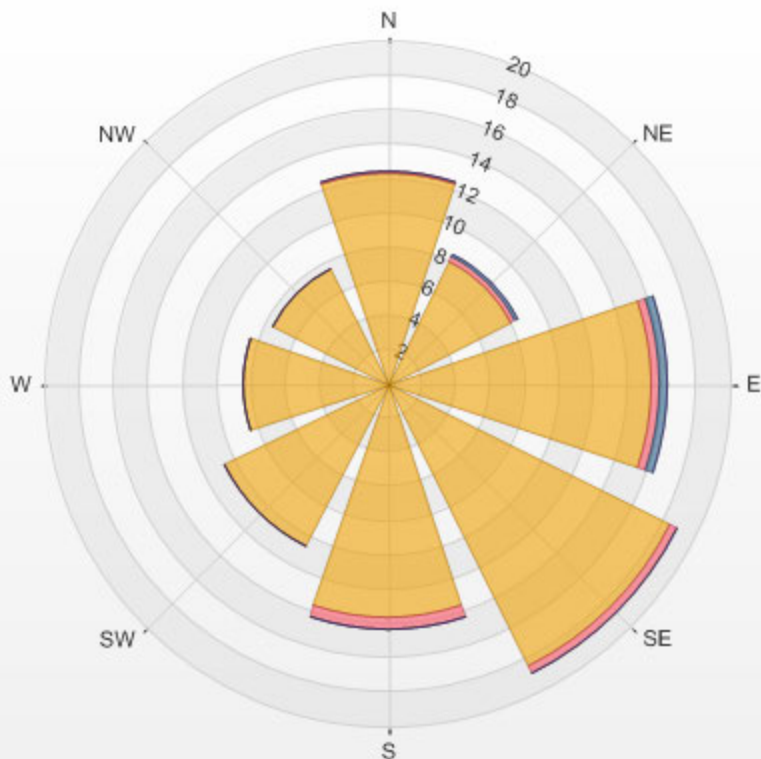
1

11.3-17.0

0

>17.0

LICA Bonnyville East Poll.: LICA Bonnyville East-NO[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 2.92% Calm Poll Avg: 1.02[ppb]



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	7	8	S	4	2	3	3	3	1	2	1	1	0	0	0	2	3	5	6	5	5	3	4	0	8	3	24	
2	4	S	3	2	1	1	1	1	1	2	1	1	0	0	0	1	1	2	1	2	1	1	1	0	4	1	24	
3	S	3	2	2	2	2	2	2	2	3	3	3	3	3	3	3	4	4	4	5	5	5	4	S	2	5	3	24
4	5	3	2	2	2	2	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	S	2	0	5	1	24
5	1	1	0	0	0	0	0	1	1	0	0	0	0	0	1	1	2	2	X	X	X	X	X	X	0	2	1	18
6	X	X	X	X	X	X	X	X	X	C	C	C	C	C	C	C	5	6	5	3	S	11	5	4	3	11	6	15
7	3	3	3	3	2	3	3	4	4	2	1	0	0	0	0	1	2	3	2	S	3	1	2	3	0	4	2	24
8	2	3	2	3	2	2	3	3	2	1	0	0	0	0	1	1	1	S	3	3	2	1	S1	0	3	2	23	
9	4	1	0	0	1	0	1	1	1	1	1	1	1	2	2	2	3	S	6	5	9	9	6	10	0	10	3	24
10	7	3	3	2	2	2	2	2	3	1	1	0	1	0	1	1	S	7	5	1	0	0	0	0	0	7	2	24
11	0	0	0	0	0	0	0	0	0	0	0	1	1	2	S	4	3	2	2	2	2	1	0	0	0	4	1	24
12	1	2	4	5	6	6	5	5	4	4	3	2	2	3	S	7	6	6	6	5	6	6	6	1	7	5	24	
13	6	8	6	6	6	8	9	12	10	11	11	9	9	S	S1	12	11	13	11	13	14	12	15	13	6	15	10	23
14	13	12	11	8	6	6	7	7	6	5	C1	C1	C1	C1	C1	C1	C1	C1	7	4	3	3	3	2	2	13	6	16
15	2	3	6	9	9	8	10	8	5	3	3	S	4	1	1	2	1	0	0	0	0	0	0	0	0	10	3	24
16	0	0	0	0	1	1	1	1	3	3	S	3	2	2	3	2	2	3	2	2	3	2	2	2	0	3	2	24
17	2	2	4	4	4	4	4	4	3	S	5	4	4	4	5	7	9	10	10	10	11	10	9	9	2	11	6	24
18	11	12	9	9	9	7	6	5	S	3	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	12	3	24
19	0	1	2	2	1	3	2	S	4	3	3	3	4	4	5	6	6	6	6	5	4	3	3	2	0	6	3	24
20	2	2	9	12	5	13	X	8	S	7	2	2	2	2	1	1	1	1	1	1	1	2	3	5	1	13	4	23
21	4	4	4	4	4	S	5	4	4	3	2	2	3	3	3	4	5	5	5	4	4	4	4	2	5	4	24	
22	5	5	5	4	S	6	5	5	6	5	4	5	5	4	5	5	5	5	5	5	5	3	3	4	3	6	5	24
23	3	3	3	S	4	3	8	9	9	6	2	1	3	2	1	0	0	1	2	2	1	1	1	0	0	9	3	24
24	1	1	S	2	2	3	3	2	0	1	0	0	0	0	0	1	2	2	1	2	2	2	2	2	0	3	1	24
25	1	S	5	4	4	4	3	3	3	2	2	2	2	3	3	3	4	3	3	4	3	2	3	2	1	5	3	24
26	S	4	3	3	2	2	2	2	1	1	1	1	1	1	1	2	1	1	1	1	0	0	1	S	0	4	1	24
27	3	2	1	1	2	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	2	0	3	1	24
28	1	1	1	1	2	2	2	S1	7	S1	6	2	1	1	2	3	C1	C1	C1	S1	S1	S	12	11	1	12	3	17
29	11	11	10	9	9	12	9	9	7	5	7	5	6	7	9	11	15	16	16	15	S	16	14	13	5	16	10	24
30	14	11	11	12	12	13	14	13	14	13	8	7	8	10	11	13	14	16	S	19	16	15	13	7	19	12	24	
HOURLY MAX	14	12	11	12	12	13	14	13	14	13	11	9	9	8	10	12	15	16	16	15	19	16	15	13				
HOURLY AVG	4	4	4	4	4	4	4	4	4	3	3	2	2	2	2	3	4	4	5	4	4	4	4	4				

STATUS FLAG CODES

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

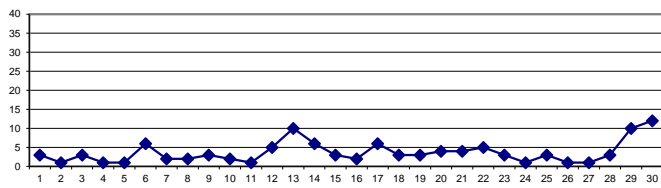
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	567			
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	12	ON DAY
MAXIMUM 1-HR AVERAGE:	19	ppb @ HOUR	20	ON DAY
MAXIMUM 24-HR AVERAGE:	12	ppb		ON DAY
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	687
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	95.4
STANDARD DEVIATION:	4		MONTHLY AVERAGE:	4
				ppb

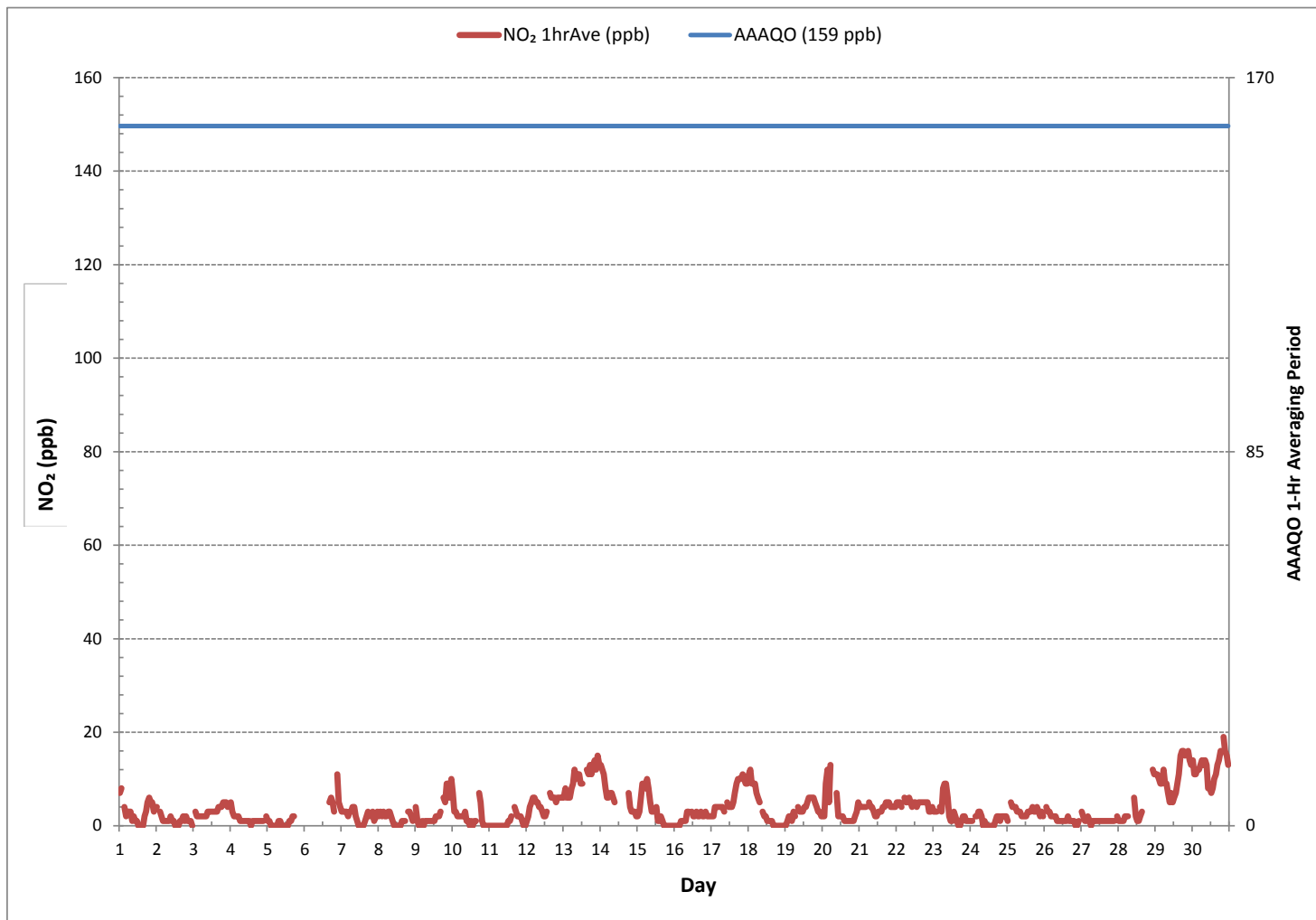
24 HR AVERAGES November 2018





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)



% Icon Classes (ppb)

82

0.0-6.7

12

6.7-13.3

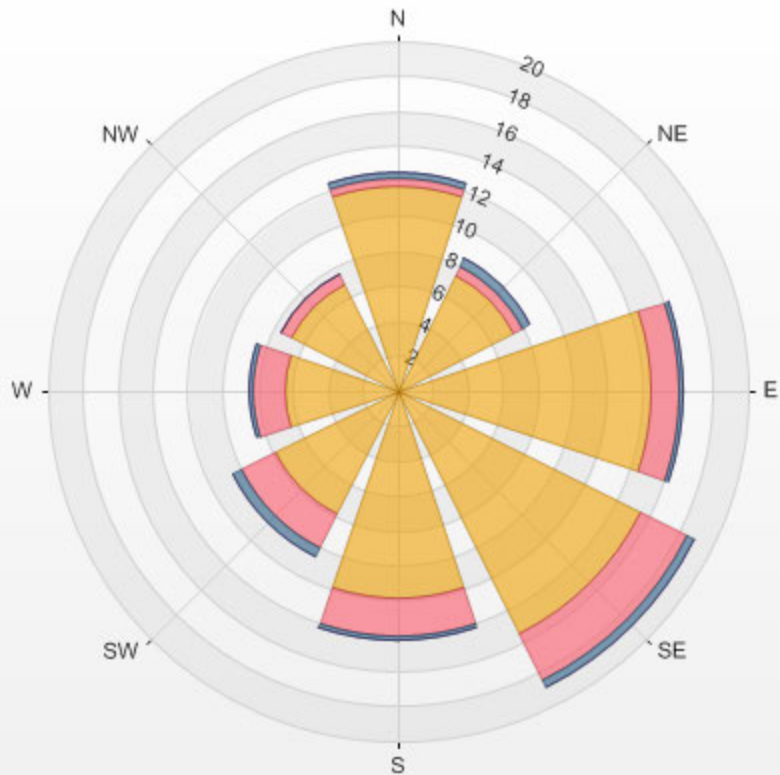
3

13.3-20.0

0

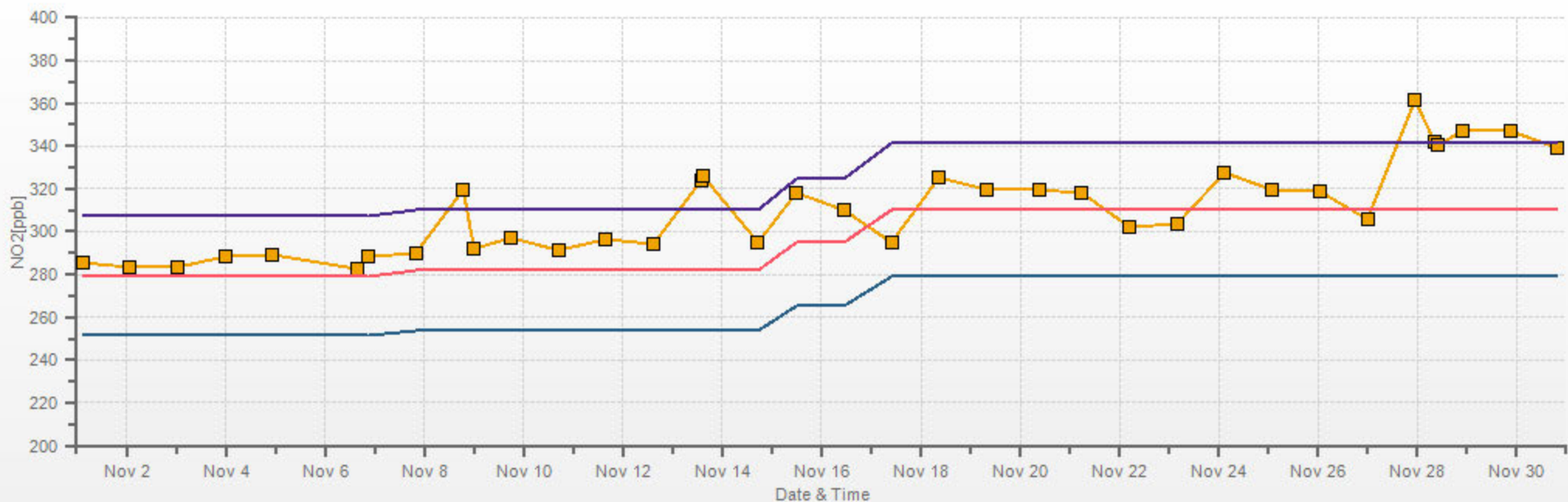
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LICA Bonnyville East Poll.: LICA Bonnyville East-NO2[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 2.92% Calm Poll Avg: 7.59[ppb]



NO2[ppb] Calibration: LICA Bonnyville East Monthly: 18/11 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	10.4	14.8	S	18.0	11.8	12.6	16.2	18.0	23.0	23.7	25.7	27.4	29.3	29.6	30.6	29.2	25.2	23.5	21.9	21.1	20.6	19.6	22.4	21.2	10.4	30.6	21.6	24
2	22.0	S	25.3	25.0	24.8	23.6	21.4	17.7	15.7	14.0	15.2	21.3	24.0	26.5	26.5	25.5	24.3	22.8	21.2	19.3	19.3	21.6	22.4	22.8	14.0	26.5	21.8	24
3	S	22.1	21.6	20.6	19.8	19.2	17.7	16.5	16.0	14.9	13.8	13.2	14.0	14.0	15.1	14.2	11.4	9.5	11.1	10.3	9.7	9.3	11.0	S	9.3	22.1	14.8	24
4	13.6	14.4	14.1	14.4	14.2	15.2	15.6	15.4	15.4	15.0	14.7	14.7	14.7	13.7	11.9	9.8	9.5	14.2	16.5	19.1	21.2	23.4	S	26.3	9.5	26.3	15.5	24
5	28.0	28.7	30.5	30.5	30.7	30.3	31.2	30.7	30.3	30.3	30.5	30.5	30.0	29.3	28.9	30.1	30.2	30.2	X	X	X	X	X	X	28.0	31.2	30.1	18
6	X	X	X	X	X	X	X	X	X	X	27.1	27.3	27.4	26.7	26.4	C	C	C	C	22.8	S	18.0	22.1	22.1	18.0	27.4	24.4	15
7	24.2	25.4	26.1	26.8	28.0	26.9	25.6	24.3	25.1	29.0	32.4	33.5	33.8	33.2	33.4	32.9	32.3	30.9	29.9	S	31.5	32.5	30.7	29.8	24.2	33.8	29.5	24
8	28.6	29.0	30.1	28.8	30.6	27.3	28.7	28.8	30.0	31.2	32.2	33.5	33.7	33.6	32.9	31.7	30.5	32.2	S	29.5	26.9	27.2	31.5	32.6	26.9	33.7	30.5	24
9	32.5	31.4	30.8	30.3	29.4	29.8	29.7	29.8	30.0	30.3	30.4	30.9	30.9	30.1	29.2	28.1	26.7	S	24.7	23.8	18.1	15.8	16.5	12.4	12.4	32.5	27.0	24
10	15.5	18.8	19.7	23.4	26.3	29.8	28.6	28.0	25.7	30.5	30.2	29.4	28.8	30.1	31.0	31.3	S	28.7	28.4	34.0	35.5	35.9	36.7	36.4	15.5	36.7	28.8	24
11	36.5	37.6	37.2	38.2	38.1	37.0	36.1	35.9	36.5	36.6	36.6	35.8	35.1	34.8	33.8	S	32.9	32.8	32.9	31.2	30.7	31.3	31.8	31.5	30.7	38.2	34.8	24
12	29.0	27.3	25.5	26.2	24.3	24.2	24.7	24.7	25.5	25.8	26.6	27.1	26.9	25.1	S	22.4	21.9	21.2	20.2	19.4	18.7	18.9	18.5	18.5	18.5	29.0	23.6	24
13	15.7	13.0	19.0	20.6	18.2	10.0	10.4	7.4	10.0	7.4	9.9	12.7	12.9	S	15.2	15.2	17.1	10.9	14.8	10.2	7.9	9.8	6.9	8.2	6.9	20.6	12.3	24
14	7.9	8.9	9.6	18.7	22.3	20.8	17.1	17.5	20.9	26.3	26.3	28.7	S	36.7	36.2	36.3	33.6	30.3	27.9	29.9	27.7	27.6	26.7	26.8	7.9	36.7	24.6	24
15	24.9	21.2	15.7	10.8	9.2	10.3	8.3	10.0	14.6	17.2	18.4	S	22.1	23.8	26.1	25.2	24.8	25.0	25.3	26.3	26.9	28.2	30.4	8.3	30.4	20.5	24	
16	31.8	32.0	31.9	30.8	30.2	30.9	29.7	29.8	28.4	27.4	S	31.4	32.4	32.1	31.0	30.8	30.0	29.7	30.7	30.3	27.4	26.3	25.8	24.7	24.7	32.4	29.8	24
17	23.9	24.0	22.3	21.2	21.2	21.2	20.6	19.8	20.0	S	20.6	21.3	21.5	21.7	20.8	19.7	16.7	15.0	12.9	13.0	12.7	12.5	13.0	12.5	12.5	24.0	18.6	24
18	10.6	10.0	11.6	12.0	11.9	13.8	15.7	16.7	S	18.1	18.8	19.1	19.8	20.9	21.6	22.4	22.7	22.8	23.5	23.3	23.8	23.4	24.0	23.8	10.0	24.0	18.7	24
19	23.3	22.4	20.4	20.9	22.7	20.8	21.2	S	21.2	20.9	20.2	18.8	17.8	17.7	17.6	17.5	17.3	16.5	16.3	15.7	18.1	19.6	19.0	19.1	15.7	23.3	19.3	24
20	18.3	17.1	5.8	4.0	10.5	2.6	X	13.6	S	20.2	19.9	20.3	20.6	20.7	12.1	12.3	12.7	13.1	13.7	14.2	14.5	13.5	13.0	13.1	2.6	20.7	13.9	23
21	14.4	15.0	15.1	15.2	14.8	S	14.7	15.2	15.0	16.1	16.2	15.7	15.3	15.2	14.6	13.9	13.2	12.7	12.8	12.8	12.8	11.6	11.6	11.5	11.5	16.2	14.1	24
22	11.3	12.3	12.0	10.8	S	10.4	9.5	7.7	7.3	11.3	14.1	C1	C1	C1	C1	C1	C1	24.8	23.7	24.8	22.0	27.2	27.0	23.5	7.3	27.2	16.5	18
23	24.6	26.1	25.3	S	24.4	25.6	19.4	17.2	14.9	14.3	13.8	14.5	16.0	16.5	17.8	20.4	24.4	25.6	24.9	23.7	23.8	24.4	24.8	23.9	13.8	26.1	21.1	24
24	25.3	25.3	S	26.1	25.5	23.4	23.3	24.9	26.6	26.1	26.4	26.8	26.6	27.0	27.0	26.8	25.3	24.2	24.0	24.3	24.0	23.8	24.2	23.8	23.3	27.0	25.3	24
25	23.6	S	21.9	20.8	20.2	19.4	19.2	19.2	18.8	19.6	19.3	19.3	18.9	18.8	18.4	17.8	17.6	17.7	17.9	17.3	18.6	20.0	18.7	18.9	17.3	23.6	19.2	24
26	S	18.9	18.7	19.2	20.3	22.1	23.1	23.5	23.6	24.6	25.9	26.9	26.7	26.2	25.9	25.4	25.0	24.7	25.2	25.2	24.8	25.0	25.2	S	18.7	26.9	23.9	24
27	25.3	25.0	24.0	23.8	23.1	22.9	23.4	22.9	22.2	21.9	22.5	22.2	22.0	22.2	22.0	21.8	22.0	23.4	23.6	24.3	24.7	24.5	S	25.4	21.8	25.4	23.3	24
28	25.0	24.9	24.1	23.9	22.9	22.4	22.5	22.4	22.3	21.9	22.3	22.6	22.2	21.2	20.3	18.6	15.2	15.5	14.4	11.7	10.4	S	7.5	6.4	6.4	25.0	19.2	24
29	5.0	3.5	4.0	4.1	3.6	1.5	3.1	2.9	3.5	6.1	5.8	8.0	9.5	8.2	5.9	3.6	3.2	4.4	3.6	5.3	S	6.7	8.9	9.5	1.5	9.5	5.2	24
30	7.2	8.9	8.4	5.8	5.3	4.6	2.8	3.6	4.4	6.5	10.0	10.7	12.3	12.0	12.6	12.1	9.1	7.6	4.5	S	3.0	4.5	4.8	4.9	2.8	12.6	7.2	24
HOURLY MAX	36.5	37.6	37.2	38.2	38.1	37.0	36.1	35.9	36.5	36.6	36.6	35.8	35.1	36.7	36.2	36.3	33.6	32.8	32.9	34.0	35.5	35.9	36.7	36.4				
HOURLY AVG	20.7	20.7	20.4	20.4	20.9	20.0	20.0	19.4	20.3	21.2	21.6	23.0	23.0	23.8	22.9	22.0	21.3	21.1	20.2	20.8	20.6	20.7	20.5	20.7				

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

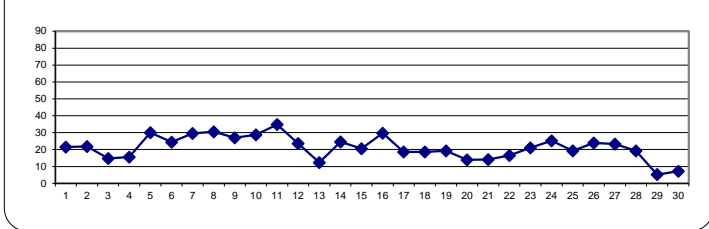
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 82 ppb

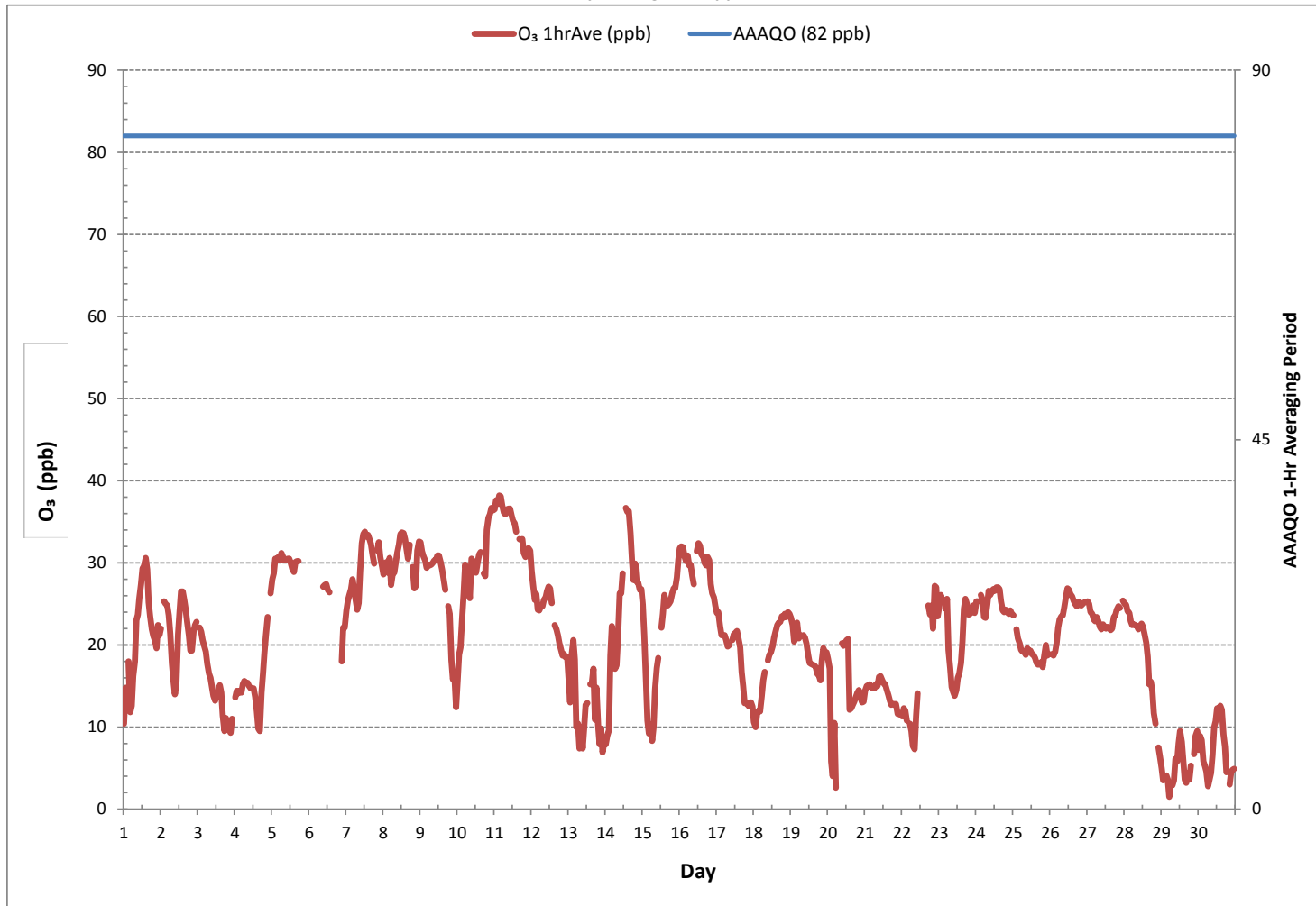
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	662				
MINIMUM 1-HR AVERAGE:	1.5	ppb	@ HOUR	5	ON DAY 29
MAXIMUM 1-HR AVERAGE:	38.2	ppb	@ HOUR	3	ON DAY 11
MAXIMUM 24-HR AVERAGE:	34.8	ppb			ON DAY 11
IZS CALIBRATION TIME:	31	hrs	OPERATIONAL TIME:	698	hrs
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:	96.9	%
STANDARD DEVIATION:	8.0		MONTHLY AVERAGE:	21.1	ppb

24 HR AVERAGES November 2018



OZONE Hourly Averages (O₃ ppb)



Wind: LICA Bonnyville East
 Poll.: LICA Bonnyville East-O3[ppb]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 2.87% Calm Avg: 14.56 [ppb]

Direction	0.0-12.8	12.8-25.5	25.5-38.3	>38.3	Total
N	1.2	2.6	8.8	0.0	12.5
NE	1.1	4.1	3.0	0.0	8.2
E	2.9	11.6	1.7	0.0	16.2
SE	3.6	12.7	2.4	0.0	18.7
S	2.9	7.6	4.5	0.0	15.0
SW	2.4	5.9	2.1	0.0	10.4
W	1.5	4.2	2.9	0.0	8.6
NW	0.0	3.0	4.5	0.0	7.6
Summary	15.6	51.7	29.9	0.0	97.1

% Icon Classes (ppb)

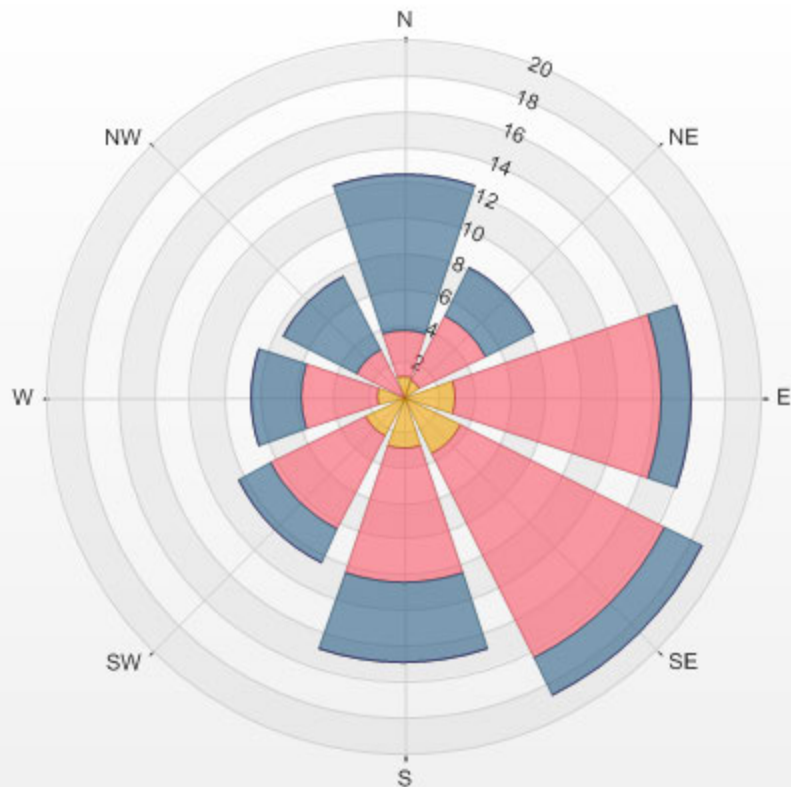
16 0.0-12.8

52 12.8-25.5

30 25.5-38.3

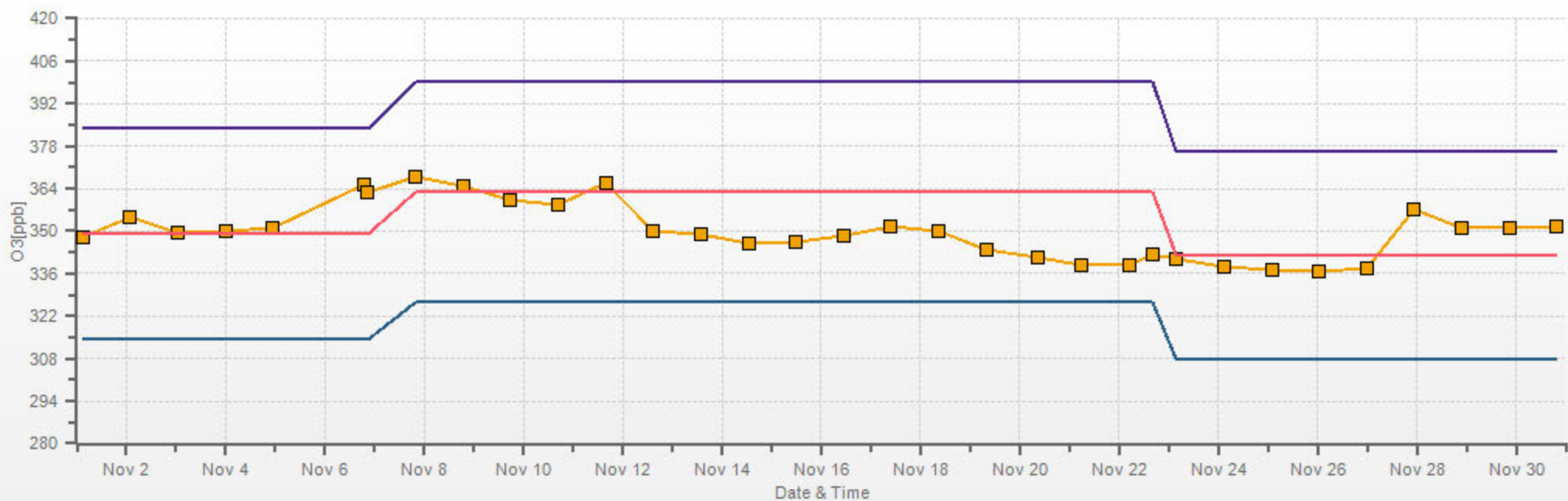
0 >38.3

LICA Bonnyville East Poll.: LICA Bonnyville East-O3[ppb] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 2.87% Calm Poll Avg: 14.56[ppb]



O3[ppb] Calibration: LICA Bonnyville East Monthly: 18/11 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	1	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	1	3	1	24	
2	2	2	2	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	2	1	24	
3	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	3	4	3	5	8	6	5	5	7	1	8	3	24	
4	7	7	7	9	7	5	4	3	3	3	3	3	4	3	2	1	1	1	1	1	0	0	0	0	0	0	9	3	24
5	0	1	1	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	X	X	X	X	X	X	0	2	1	18	
6	X	X	X	X	X	X	X	X	X	1	1	2	2	3	2	C	C	2	2	1	2	2	2	2	2	1	3	2	15
7	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	2	3	3	2	3	3	3	3	3	3	1	3	2	24
8	3	3	2	2	2	2	2	2	2	2	1	1	1	1	1	1	3	1	2	2	2	2	2	2	2	1	3	2	24
9	2	3	3	3	3	3	4	4	4	4	5	7	7	7	6	6	7	7	7	8	10	10	10	10	2	10	6	24	
10	9	8	8	8	9	6	7	7	8	7	11	15	15	15	13	11	11	8	8	4	3	3	3	3	3	3	15	8	24
11	3	3	3	2	2	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1	3	2	24
12	2	2	2	3	3	4	4	5	5	5	6	9	8	7	7	7	6	7	8	10	10	10	9	9	2	10	6	24	
13	8	9	9	8	9	9	9	9	9	9	10	11	10	9	9	7	6	6	7	7	8	8	8	9	6	11	8	24	
14	9	8	7	4	4	4	4	5	5	6	7	6	6	4	4	4	4	4	6	5	5	6	6	6	4	9	5	24	
15	7	7	8	10	14	17	18	19	18	15	8	6	5	4	3	3	4	4	4	3	3	4	3	4	3	3	19	8	24
16	3	4	3	3	3	4	5	4	5	5	4	4	4	5	5	4	4	3	4	4	4	5	6	7	3	7	4	24	
17	8	7	6	6	6	6	6	6	6	7	7	8	9	9	8	9	9	9	9	9	9	9	9	9	6	9	8	24	
18	9	10	11	11	12	14	12	11	10	9	8	8	7	7	7	6	6	7	7	8	7	9	12	13	6	14	9	24	
19	15	16	15	15	12	14	12	14	18	19	18	20	19	16	11	9	9	8	8	7	5	3	3	2	2	20	12	24	
20	1	1	4	5	6	11	8	6	5	6	7	7	8	8	18	15	17	20	22	22	22	14	9	1	22	11	24		
21	9	9	7	7	8	8	9	9	8	7	8	8	8	7	6	6	6	6	6	6	6	8	9	9	6	9	8	24	
22	8	7	7	8	9	7	7	7	7	7	8	7	9	9	8	7	6	6	6	6	6	6	6	6	6	9	7	24	
23	6	6	7	7	6	6	7	7	8	8	11	11	9	9	8	5	2	2	2	2	2	2	2	3	2	11	6	24	
24	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	4	2	4	2	24	
25	5	6	7	6	6	6	8	9	11	12	14	13	11	10	12	12	14	15	19	20	14	9	9	8	5	20	11	24	
26	7	6	5	5	5	5	4	4	6	5	4	5	4	3	4	3	3	4	3	3	3	3	3	3	3	7	4	24	
27	4	3	3	3	4	4	5	6	9	11	9	9	9	10	9	8	8	6	5	5	5	6	6	6	3	11	7	24	
28	7	8	8	8	8	8	9	9	9	11	13	16	15	14	16	17	17	17	16	21	17	12	10	11	7	21	12	24	
29	14	13	12	11	13	14	13	13	12	12	18	15	13	14	14	14	11	9	9	8	9	8	9	8	18	18	12	24	
30	10	10	10	11	12	12	12	11	12	14	22	21	18	19	25	29	30	27	22	22	25	25	24	19	10	30	18	24	
HOURLY MAX	15	16	15	15	14	17	18	19	18	19	22	21	19	19	25	29	30	27	22	22	25	25	24	19					
HOURLY AVG	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7	6	7	7	7	7	6	6	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

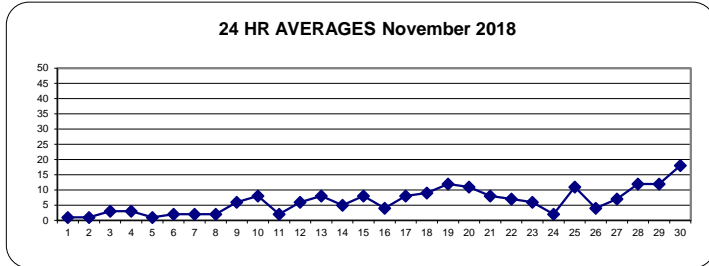
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	80	µg/m ³	24-HR	29	µg/m ³
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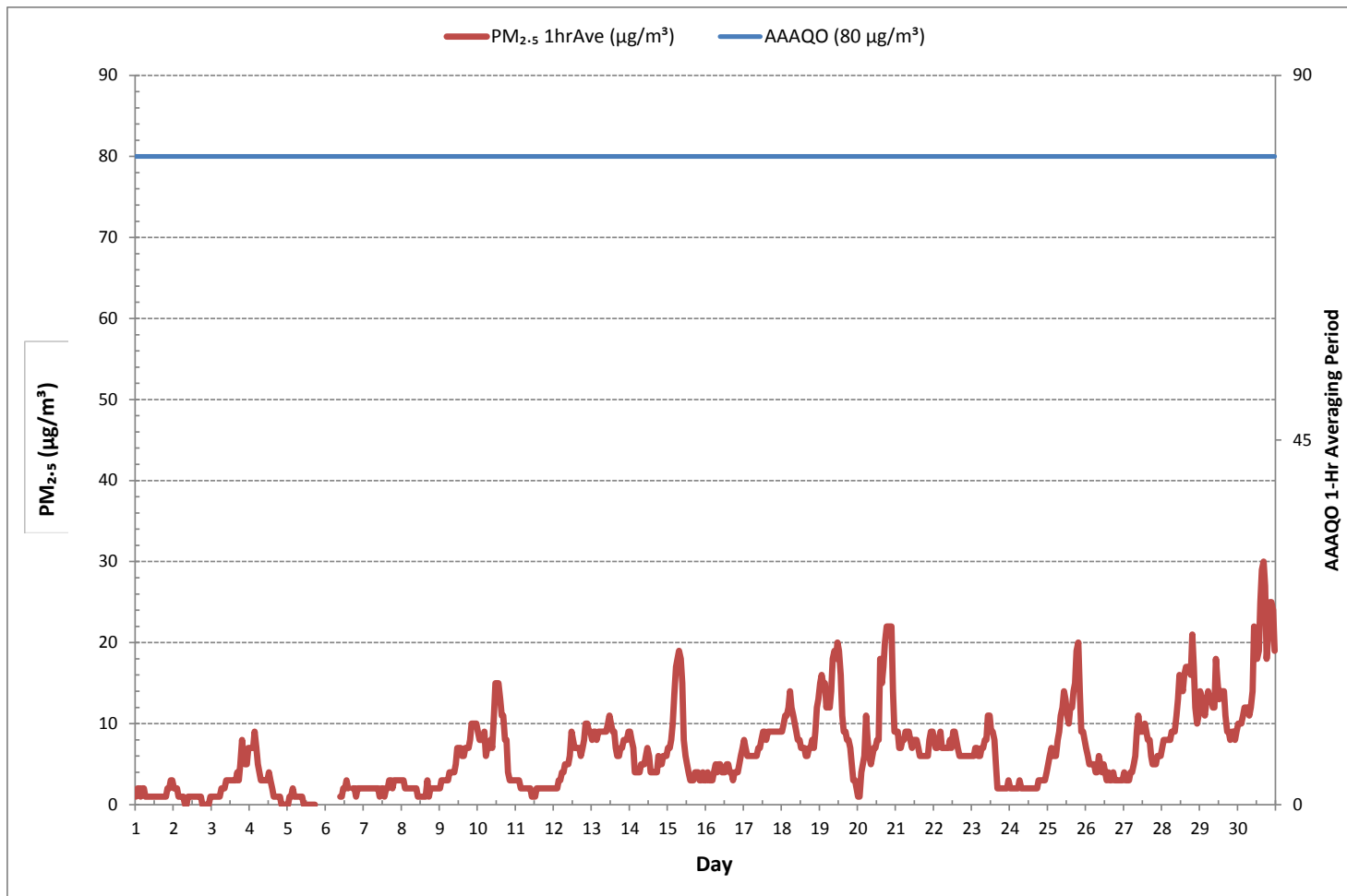
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	683				
MINIMUM 1-HR AVERAGE:	0 µg/m ³ @ HOUR	7	ON DAY	2	
MAXIMUM 1-HR AVERAGE:	30 µg/m ³ @ HOUR	16	ON DAY	30	
MAXIMUM 24-HR AVERAGE:	18 µg/m ³		ON DAY	30	
MONTHLY CALIBRATION TIME:	2	hrs	OPERATIONAL TIME:	705	hrs
STANDARD DEVIATION:	5		AMD OPERATION UPTIME:	97.9	%
			MONTHLY AVERAGE:	6	µg/m ³

24 HR AVERAGES November 2018



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



Wind: LICA Bonnyville East
 Poll.: LICA Bonnyville East-PM25[ug/m3]
 Monthly: 18/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

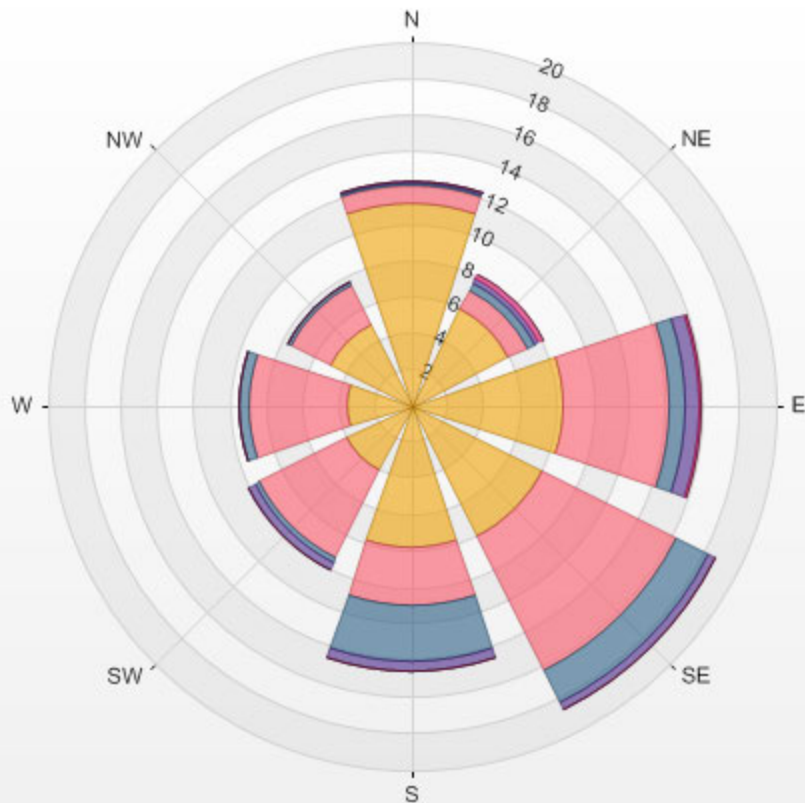
Calm: 2.99%

Calm Avg: 11.10 [ug/m3]

Direction	0.0-6.2	6.2-12.4	12.4-18.6	18.6-24.8	24.8-31.0	>31.0	Total
N	11.1	1.0	0.1	0.1	0.0	0.0	12.4
NE	6.0	1.1	0.4	0.3	0.3	0.0	8.1
E	8.4	5.8	0.9	0.7	0.1	0.0	15.9
SE	8.0	8.3	2.0	0.4	0.0	0.0	18.6
S	7.8	3.1	3.1	0.6	0.0	0.0	14.7
SW	4.0	5.4	0.3	0.4	0.0	0.0	10.1
W	3.6	5.4	0.6	0.0	0.0	0.0	9.5
NW	5.0	2.4	0.3	0.0	0.0	0.0	7.7
Summary	53.8	32.6	7.7	2.6	0.4	0.0	97.0

% Icon	Classes (ug/m3(L))	54	33	8	3	0	0
	0.0-6.2						
	6.2-12.4						
	12.4-18.6						
	18.6-24.8						
	24.8-31.0						
	>31.0						

LICA Bonnyville East Poll.: LICA Bonnyville East-PM25[ug/m3(L)] 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 2.99% Calm Poll Avg: 11.10[ug/m3(L)]



WIND SPEED



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

WIND SPEED Hourly Averages (WS kph)

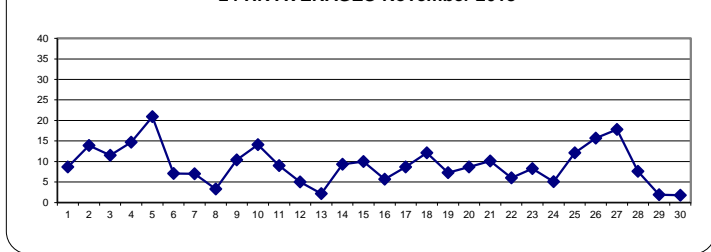
HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	5.7	12.1	13.4	15.5	17.6	14.0	15.3	17.2	19.0	18.8	17.8	15.8	11.5	11.8	10.9	8.9	8.4	9.3	9.6	10.9	13.3	11.3	10.7	10.9	5.7	19.0	8.7	24
2	12.4	18.2	19.1	17.5	19.3	17.9	19.9	17.9	18.5	18.9	17.4	19.9	17.1	17.0	14.8	13.6	13.4	11.6	12.1	8.6	6.4	9.6	11.3	11.4	6.4	19.9	13.9	24
3	13.9	15.5	17.3	15.6	15.5	15.1	11.7	11.9	13.6	15.4	16.3	11.0	10.4	12.1	13.1	8.0	3.6	3.2	7.8	9.0	7.6	7.8	13.2	17.5	3.2	17.5	11.5	24
4	16.5	15.7	14.0	16.0	19.1	24.2	22.4	22.5	23.0	22.0	20.8	22.1	23.5	18.8	12.8	9.5	21.8	26.3	23.3	22.8	24.7	25.7	28.7	23.9	9.5	28.7	14.7	24
5	24.6	26.6	28.6	27.2	25.8	22.4	21.2	18.4	16.3	17.3	21.1	20.1	19.4	19.1	21.9	18.4	15.2	13.2	X	X	X	X	X	X	13.2	28.6	20.9	18
6	X	X	X	X	X	X	X	X	X	7.8	7.6	6.7	9.3	9.3	10.1	7.7	5.0	4.6	4.7	4.5	7.3	9.6	8.7	9.3	4.5	10.1	7.1	15
7	6.9	6.6	7.8	7.4	9.6	10.2	10.0	10.6	11.2	11.7	12.9	12.2	12.2	14.9	13.2	10.1	11.5	9.0	6.0	6.5	4.7	7.2	6.3	6.9	4.7	14.9	7.0	24
8	4.8	2.0	5.3	8.7	10.8	12.6	11.8	7.2	7.5	10.1	9.6	9.5	5.0	3.3	5.8	5.0	0.3	10.6	11.0	7.7	7.7	7.8	16.1	16.1	0.3	16.1	3.3	24
9	20.7	22.4	22.8	19.4	18.5	18.4	15.7	16.4	17.0	17.7	17.3	15.3	12.8	10.3	8.6	5.8	5.9	1.7	0.3	0.5	7.1	11.1	11.9	9.2	0.3	22.8	10.4	24
10	12.9	14.6	15.9	21.1	21.1	14.4	18.3	11.6	7.8	11.5	13.7	15.9	10.8	12.8	10.0	10.6	11.8	13.2	15.3	19.8	23.2	20.1	20.8	17.4	7.8	23.2	14.1	24
11	16.1	16.1	14.3	19.8	15.0	15.2	11.5	14.6	16.5	15.4	17.8	16.9	13.5	15.3	12.4	9.1	3.5	6.5	2.3	5.4	6.9	7.4	8.2	6.6	2.3	19.8	9.0	24
12	4.1	4.0	5.4	6.9	8.3	10.7	10.4	10.4	7.6	10.5	6.7	1.6	1.7	5.6	6.2	7.2	4.9	5.7	5.1	6.5	9.6	10.2	4.9	2.0	1.6	10.7	5.0	24
13	1.4	2.4	8.1	8.0	0.4	4.4	4.8	5.3	3.6	6.2	9.2	3.5	5.2	5.8	4.9	3.7	2.9	6.2	8.6	3.2	2.4	3.3	2.1	3.1	0.4	9.2	2.2	24
14	1.9	5.0	4.3	7.2	9.9	11.0	11.2	8.8	13.8	12.8	12.5	10.1	11.9	15.8	12.9	14.9	12.6	7.6	5.7	7.5	9.5	9.8	10.7	9.9	1.9	15.8	9.3	24
15	9.6	7.8	5.5	4.6	6.4	4.9	1.8	5.7	7.0	9.7	11.8	9.9	12.2	14.4	16.8	17.7	17.8	22.3	20.7	22.6	20.5	20.0	23.2	27.8	1.8	27.8	10.0	24
16	26.9	23.4	20.1	19.7	17.5	17.8	17.4	18.6	16.1	8.5	11.1	5.2	3.3	3.6	3.6	4.6	8.6	8.1	7.3	9.2	7.9	9.5	11.8	10.3	3.3	26.9	5.7	24
17	12.4	10.1	10.1	13.3	14.2	14.3	10.1	11.8	13.3	12.8	10.6	11.8	8.2	6.9	5.6	8.7	6.2	5.5	6.2	8.5	6.6	3.5	1.6	3.8	1.6	14.3	8.7	24
18	6.3	8.4	10.0	11.9	12.5	14.4	13.2	12.2	17.1	20.7	19.5	19.9	20.3	19.7	16.7	14.6	13.3	12.9	14.2	11.3	9.7	6.9	8.7	8.4	6.3	20.7	12.1	24
19	9.1	7.6	10.7	11.5	12.1	12.5	12.4	15.1	14.2	4.2	3.5	7.0	9.0	5.2	9.8	12.8	9.2	8.3	11.1	11.5	12.2	9.9	9.4	9.5	3.5	15.1	7.3	24
20	3.5	1.2	6.2	2.7	1.7	4.3	7.1	9.5	10.5	8.4	9.9	8.9	10.2	12.3	18.3	20.7	21.3	18.8	16.2	13.6	12.9	9.7	9.2	15.2	1.2	21.3	8.7	24
21	16.4	12.4	13.4	12.7	13.9	13.1	10.9	9.5	9.6	9.0	10.1	14.7	13.0	10.4	11.6	9.0	8.3	9.5	10.5	12.1	8.5	13.3	10.2	7.9	7.9	16.4	10.1	24
22	6.4	8.6	5.5	3.7	5.3	1.1	4.5	5.4	5.3	8.8	11.9	13.0	15.7	11.7	6.7	4.6	7.5	4.2	4.5	8.3	4.2	6.2	8.9	9.0	1.1	15.7	6.0	24
23	10.4	13.6	13.6	14.8	13.5	11.1	8.6	9.9	10.9	9.7	15.1	13.6	12.3	13.6	11.0	13.0	16.7	13.2	12.5	8.2	8.6	11.0	12.0	12.7	8.2	16.7	8.3	24
24	11.3	9.3	8.0	8.0	7.2	6.8	4.8	4.7	3.0	7.6	6.1	3.0	5.3	8.8	8.7	8.4	7.4	14.1	13.8	11.1	12.4	11.8	10.8	12.4	3.0	14.1	5.1	24
25	12.0	10.2	14.6	14.0	13.3	12.9	9.3	9.0	9.6	9.5	12.6	11.2	11.0	9.5	13.3	10.3	15.3	15.3	13.2	10.9	11.3	14.2	16.1	14.3	9.0	16.1	12.1	24
26	13.4	13.0	12.3	12.8	13.0	13.5	13.5	13.5	13.7	15.7	15.0	15.7	17.9	20.7	20.6	19.7	17.3	20.2	16.5	18.2	21.6	17.2	17.2	16.8	12.3	21.6	15.7	24
27	14.9	16.2	14.2	15.1	14.9	13.4	19.1	21.0	19.1	19.7	20.1	19.5	18.3	21.0	20.2	17.4	17.8	19.0	20.4	18.1	17.6	17.9	17.1	18.5	13.4	21.0	17.8	24
28	17.2	14.7	12.2	10.0	10.1	9.5	9.8	9.8	9.9	11.1	10.4	10.7	13.3	10.1	7.4	6.8	8.3	6.3	6.4	4.6	6.1	7.0	5.8	4.9	4.6	17.2	7.6	24
29	5.2	2.7	2.6	1.1	2.1	3.5	3.3	2.6	5.3	3.6	1.9	2.9	2.3	3.6	2.2	0.6	4.9	3.3	1.3	1.3	0.9	2.9	5.7	5.7	0.6	5.7	1.9	24
30	5.9	4.1	3.3	3.2	2.8	4.3	2.0	4.4	2.7	2.5	5.7	4.7	2.4	3.3	0.7	0.5	0.7	3.4	4.7	3.0	2.3	3.9	5.6	7.1	0.5	7.1	1.8	24
HOURLY MAX	26.9	26.6	28.6	27.2	25.8	24.2	22.4	22.5	23.0	22.0	21.1	22.1	23.5	21.0	21.9	20.7	21.8	26.3	23.3	22.8	24.7	25.7	28.7	27.8				

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:	October 24, 2018
DECLINATION :	MAGNETIC DECLINATION 13 DEGREE EAST

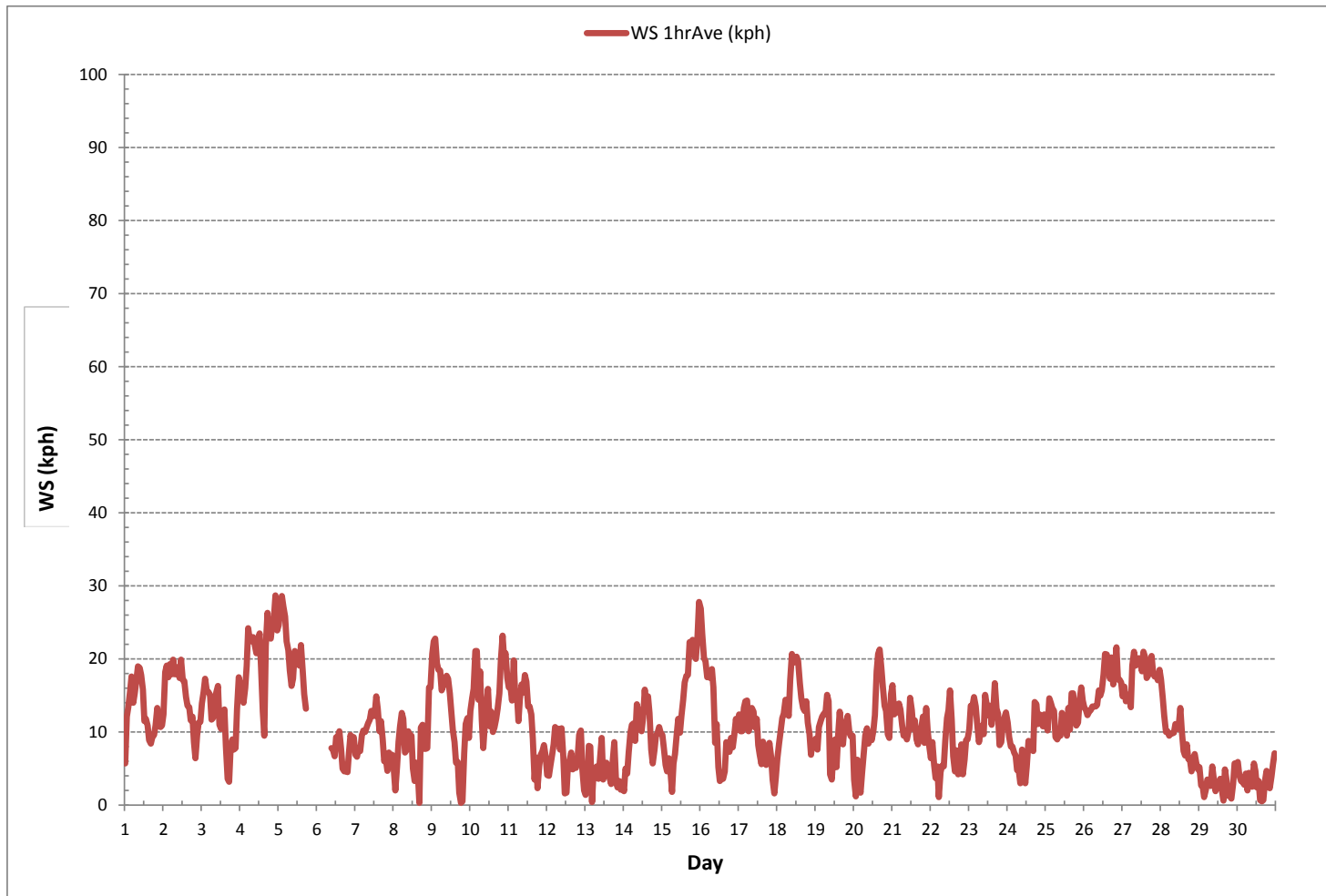
24 HR AVERAGES November 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	705	1.9	
MINIMUM 1-HR AVERAGE:	0.3 kph @ HOUR	16 ON DAY	8
MAXIMUM 1-HR AVERAGE:	28.7 kph @ HOUR	22 ON DAY	4
MAXIMUM 24-HR AVERAGE:	20.9 kph	ON DAY	5
MONTHLY CALIBRATION TIME:	0 hrs	OPERATIONAL TIME:	705 hrs
STANDARD DEVIATION:	5.8	AMD OPERATION UPTIME:	97.9 %
		MONTHLY AVERAGE:	1.9 kph

WIND SPEED Hourly Averages (WS kph)



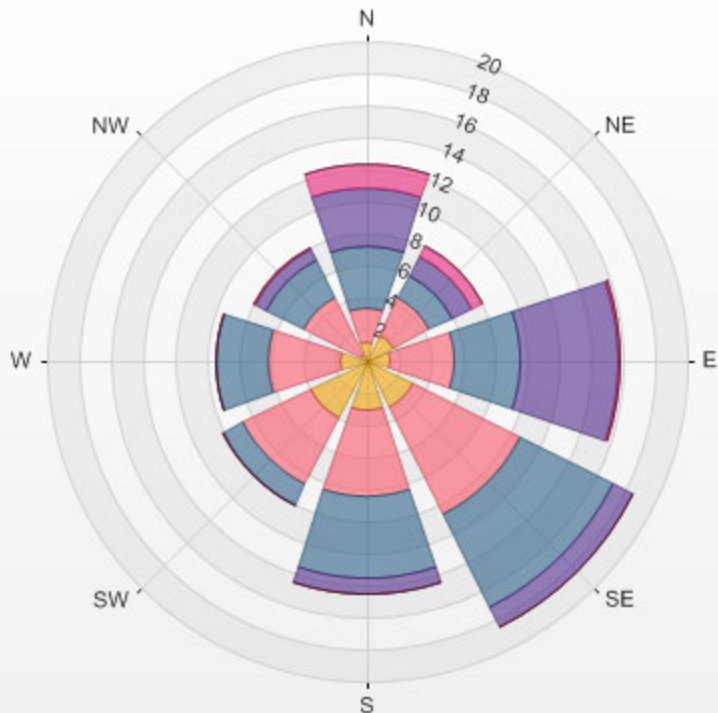
Wind: LICA Bonnyville East
 Monitor: WSV [kph]
 Monthly: 18/11
 Type: WindRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 2.98%

Direction	1.8-5.8	5.8-11.5	11.5-17.3	17.3-23.0	23.0-28.8	>28.8	Total
N	1.1	2.1	4.0	3.6	1.6	0.0	12.3
NE	1.8	2.6	1.6	1.4	0.7	0.0	8.1
E	1.6	4.0	4.1	6.1	0.1	0.0	15.9
SE	3.3	7.5	6.5	1.3	0.0	0.0	18.6
S	3.1	5.4	5.1	1.0	0.0	0.0	14.6
SW	4.0	4.7	1.4	0.0	0.0	0.0	10.1
W	1.7	4.5	3.3	0.0	0.0	0.0	9.5
NW	0.4	4.0	2.7	0.7	0.1	0.0	8.0
Summary	17.0	34.8	28.7	14.1	2.6	0.0	97.0

% Icon Classes (kph) 17 1.8-5.8 35 5.8-11.5 29 11.5-17.3 14 17.3-23.0 3 23.0-28.8 0 >28.8

LICA Bonnyville East 2018/11/01 00:00 - 2018/11/30 23:00 Calm: 2.98% Calm Wind Avg Speed: 1.06(kph)



WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

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	NNW	NNW	NNW	NNW	NNW	NNW	NW	NNW	NNW	NNW	NNW	N	N	NE	ESE	E	E	ESE	ESE	ESE	ESE	ESE	N	24	
2	E	E	E	E	E	E	E	E	E	E	E	ESE	ESE	ESE	ESE	E	E	E	E	ESE	SSE	S	SSE	S	ESE	24	
3	S	S	S	S	S	S	S	S	S	S	S	S	SSW	S	SW	SSW	S	SSE	SSE	SSE	SSE	SSE	SSE	SSE	S	24	
4	SE	SE	SE	E	E	E	E	E	E	E	E	ENE	ENE	ENE	ENE	NE	NNE	N	N	N	N	N	N	N	NE	24	
5	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	N	X	X	X	X	X	X	NNW	18	
6	X	X	X	X	X	X	X	X	X	NNW	N	NNW	NW	NW	NW	NW	NW	NNW	NNE	NNW	WNW	NW	NW	NW	SW	15	
7	NW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	NW	WNW	WNW	WNW	WNW	WNW	WNW	NW	NW	NW	NW	N	NE	ENE	ESE	ESE	NW	24	
8	SSE	ENE	NNE	NNE	N	NNE	NE	NNE	NNE	E	ESE	ESE	SE	E	NE	NE	W	S	S	SSE	SE	S	S	S	ESE	24	
9	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	W	N	WNW	WNW	WNW	WNW	S	24	
10	NW	NW	NNW	N	NNW	NNW	NNW	NNW	NW	NW	WNW	NW	WNW	W	W	WNW	WNW	NW	NNW	NNW	NNW	NNW	NNW	NNW	NW	24	
11	N	N	N	N	N	N	N	N	N	N	N	NNW	NNW	N	N	NNE	NNW	N	NNW	SSW	SSW	SSW	SSW	S	N	24	
12	SSE	SSE	SSE	SE	SE	SSE	SSE	SE	SSE	SSE	SSW	SW	SE	SW	SW	SSW	SSW	SW	SW	SW	SW	WSW	WSW	SSW	S	24	
13	S	S	SW	WSW	SW	E	SSE	SE	ESE	E	ENE	ENE	ENE	E	SE	SSE	ESE	S	WSW	ESE	SSE	N	SSW	SE	24		
14	W	SW	SSW	SW	SW	WSW	WSW	WSW	WSW	WSW	WSW	W	W	WNW	W	W	W	WNW	W	WSW	WSW	WSW	WSW	W	WSW	24	
15	W	WNW	WNW	W	WSW	W	NW	NNW	NNE	NNE	NE	NNE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	NE	NE	NE	NE	NE	24	
16	NE	NNE	NNE	NNE	NNE	N	N	N	N	N	N	ESE	SSW	SW	SW	SW	SW	SW	SW	SW	WSW	WSW	WSW	WSW	N	24	
17	SW	WSW	SW	WSW	WSW	WSW	SW	WSW	WSW	W	W	W	WSW	SW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	SW	SSE	SSE	WSW	24	
18	SE	ESE	ESE	SE	ESE	ESE	SE	ESE	E	E	ENE	ENE	ENE	ENE	NE	ENE	ENE	E	E	E	ESE	ESE	ESE	E	24		
19	SE	SSE	S	S	SSE	SSE	SSE	S	S	SSW	S	SW	SW	WSW	W	WSW	WSW	WSW	WSW	WSW	WSW	W	W	W	SW	24	
20	WSW	WNW	ENE	S	E	E	E	ESE	ESE	SSE	SSE	SSE	SSE	SE	E	E	E	E	E	ENE	E	E	SE	SSE	ESE	24	
21	SSE	SSE	SSE	SSE	SSE	SE	SE	SE	SE	ESE	SE	SSE	SSE	SSE	SE	ESE	ESE	SE	ESE	ESE	ENE	ENE	ENE	E	SE	24	
22	E	SE	SW	WSW	W	SW	SW	W	WSW	WSW	WSW	W	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	SW	WSW	WSW	24	
23	WSW	W	W	W	W	W	W	NW	NW	NW	NNW	NW	NNW	NNE	NNE	N	N	N	NNE	NNE	NE	NE	NE	NNE	NNW	24	
24	NNE	NNE	N	NE	NE	NNE	NNE	ENE	NE	ENE	ESE	SE	ESE	E	ENE	ENE	SE	SSE	SSE	SSE	SSE	SE	SE	SE	E	24	
25	SE	SE	SSE	SSE	SSE	SE	SE	SE	SE	SE	SSE	SSE	SE	SSE	SE	SSE	SSE	SSE	SSE	SE	SE	SSE	SSE	SSE	SSE	24	
26	SSE	SSE	SE	SSE	SSE	SSE	SSE	SSE	SE	SE	SSE	SE	SE	SE	SE	SE	SE	SE	ESE	SE	ESE	SE	ESE	ESE	SE	24	
27	ESE	E	E	E	E	E	ENE	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	ENE	E	E	24	
28	E	E	E	E	E	E	ESE	SE	SE	SSE	S	S	SSE	S	SSE	SSE	SSE	SSE	S	SSW	S	SSE	SSE	SE	24		
29	SSE	SE	SE	ENE	SSE	SW	S	SSE	SE	SE	E	SE	E	NNE	ENE	E	SSW	SW	SW	SSW	SSW	S	SSW	SW	SSE	24	
30	SW	SSW	SSW	SSE	SSW	ESE	SSE	SSE	NNW	ESE	SSE	SSE	S	SSE	WSW	ENE	E	E	E	ESE	NE	ENE	NE	ENE	SE	24	

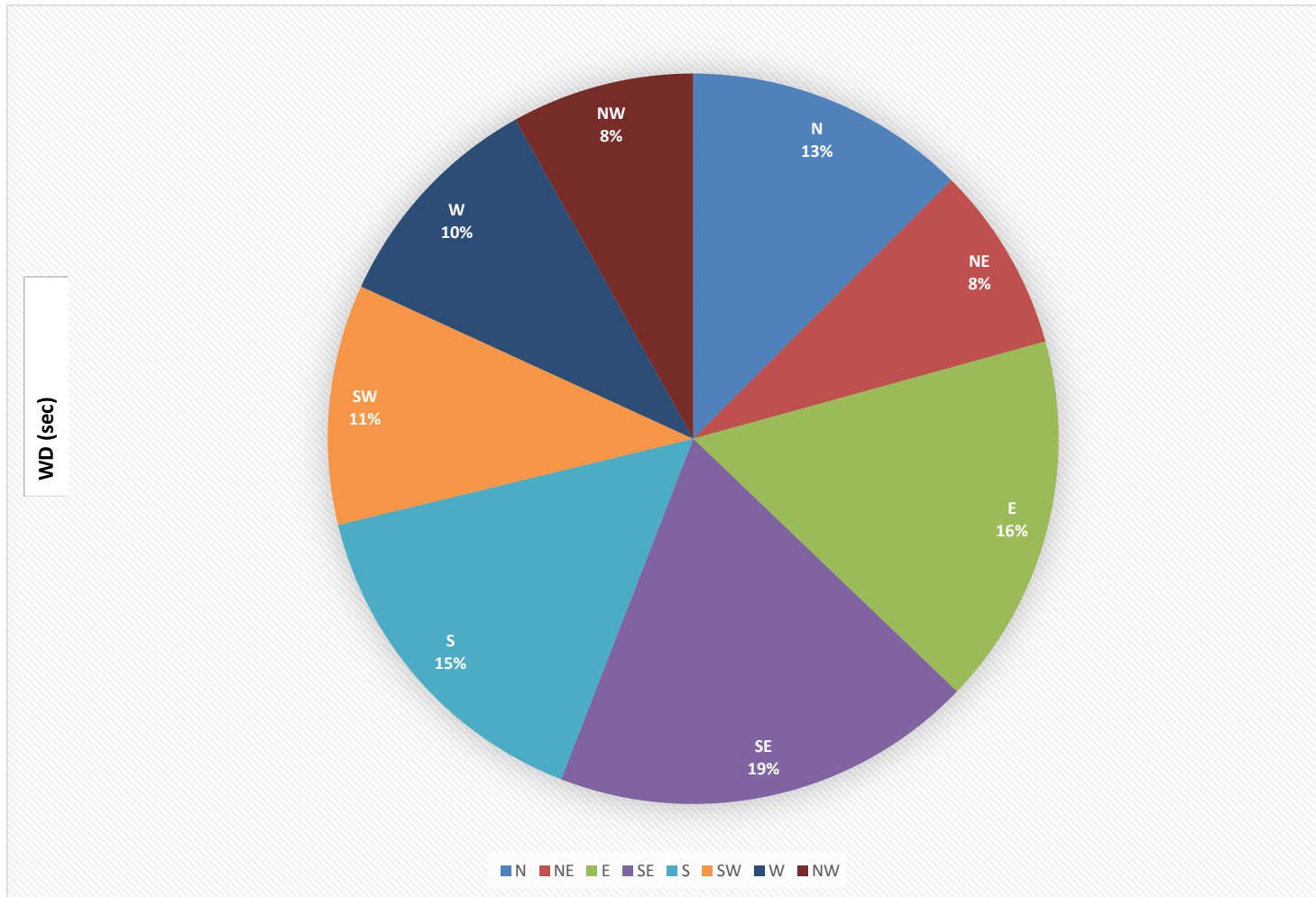
STATUS FLAG CODES

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:	October 24, 2018
DECLINATION:	MAGNETIC DECLINATION 13 DEGREE EAST

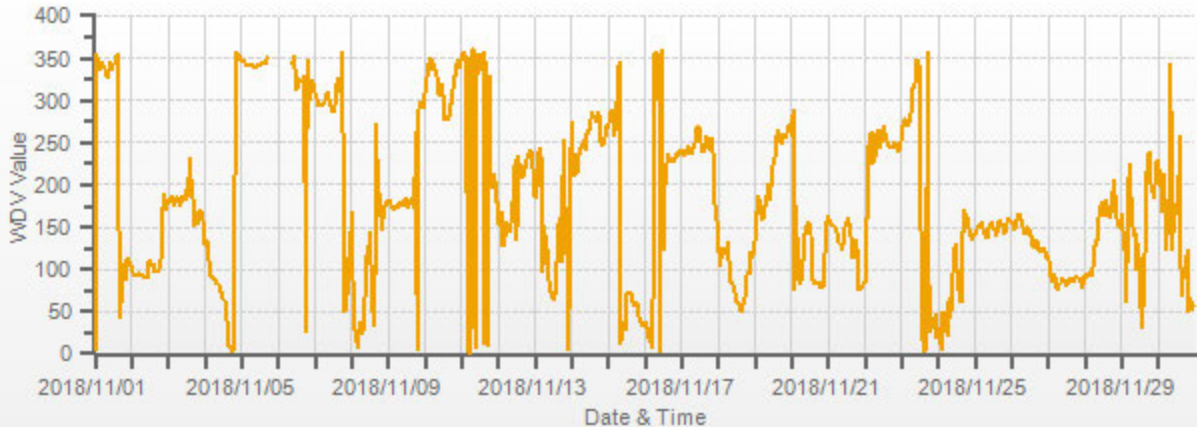
MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	705	hrs
STANDARD DEVIATION:	97		AMD OPERATION UPTIME:	97.9	%
			MONTHLY AVERAGE:	95	(E)

WIND DIRECTION Hourly Averages (WD)



WDV[degstdwd] Station: LICA Bonnyville East Monthly: 18/11 Type: AVG 1 Hr. [1 Hr.]

— WDV[degstdwd]



STANDARD DEVIATION WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

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	13	3	9	6	6	9	12	9	6	6	5	7	15	14	16	20	10	7	9	9	13	10	8	7	24
2	3	4	3	2	4	4	3	3	5	5	6	6	9	8	11	6	4	3	5	14	10	9	4	7	24
3	7	5	4	8	7	6	6	7	8	6	6	12	7	5	9	21	30	32	7	7	5	11	5	9	24
4	5	5	9	5	3	3	6	5	5	6	3	7	4	4	5	13	6	6	6	6	3	4	4	4	24
5	3	3	4	3	3	5	3	3	5	4	4	5	5	9	5	3	2	7	X	X	X	X	X	X	18
6	X	X	X	X	X	X	X	X	X	22	18	23	10	12	7	6	6	10	13	18	7	13	7	6	15
7	8	9	7	7	5	4	4	5	4	5	8	15	10	10	9	6	11	21	21	7	11	7	16	14	24
8	9	55	10	8	6	9	5	4	6	21	12	16	15	23	10	10	76	4	9	18	9	13	4	4	24
9	4	4	6	8	4	9	5	6	6	6	7	7	5	4	6	7	6	22	46	47	10	3	7	8	24
10	5	7	6	5	7	3	7	5	5	10	4	17	3	7	3	5	3	8	5	3	9	6	5	24	
11	9	3	7	6	5	6	4	6	5	12	5	12	12	7	8	21	14	55	11	8	7	8	15	24	
12	15	18	16	19	13	8	6	6	9	9	17	46	50	15	8	5	8	7	11	6	3	3	22	31	24
13	47	34	5	9	76	22	15	21	18	9	8	28	18	12	19	41	46	19	25	17	36	24	53	38	24
14	44	44	38	10	7	13	6	12	12	6	7	6	9	7	5	4	5	46	25	11	6	8	10	6	24
15	5	12	23	19	5	11	31	10	6	7	7	8	17	5	4	4	5	3	4	4	5	4	3	3	24
16	4	4	6	5	5	8	5	4	5	6	5	20	22	12	17	12	6	8	6	10	7	6	6	8	24
17	9	8	4	6	5	4	4	3	4	4	8	5	4	17	7	8	8	14	6	6	6	35	44	27	24
18	8	7	6	5	4	3	5	14	5	3	4	6	3	4	4	4	5	5	7	6	7	7	12	5	24
19	7	12	9	6	7	5	6	9	8	13	26	22	6	23	9	5	3	6	11	5	6	7	3	3	24
20	36	59	14	43	47	10	9	10	12	21	13	8	10	15	4	5	3	3	3	2	5	7	36	3	24
21	5	5	3	4	4	3	9	6	4	8	11	6	7	8	5	15	9	15	11	9	13	4	6	7	24
22	17	17	44	22	16	47	11	20	11	7	7	9	4	3	11	29	6	9	21	9	28	7	4	3	24
23	8	5	2	3	3	3	6	8	6	7	12	6	16	6	12	10	8	6	7	6	7	6	14	5	24
24	14	17	13	19	17	16	12	18	33	17	24	29	20	6	7	8	37	7	4	5	6	4	5	4	24
25	4	7	4	4	5	7	8	6	6	8	7	8	9	10	7	6	5	6	4	5	4	8	9	6	24
26	7	7	7	6	6	9	7	6	7	5	5	9	7	8	6	3	7	5	7	6	4	6	8	6	24
27	5	7	6	6	3	9	7	3	2	5	3	2	4	5	2	4	5	3	4	3	2	2	6	3	24
28	6	3	8	6	4	6	18	6	5	9	9	6	6	10	13	9	8	14	16	19	8	13	16	24	
29	6	22	15	67	56	41	17	16	12	18	24	30	50	9	19	72	8	19	49	44	42	31	11	10	24
30	15	9	13	19	43	18	54	20	51	47	9	7	21	24	56	64	63	17	11	14	20	13	6	7	24

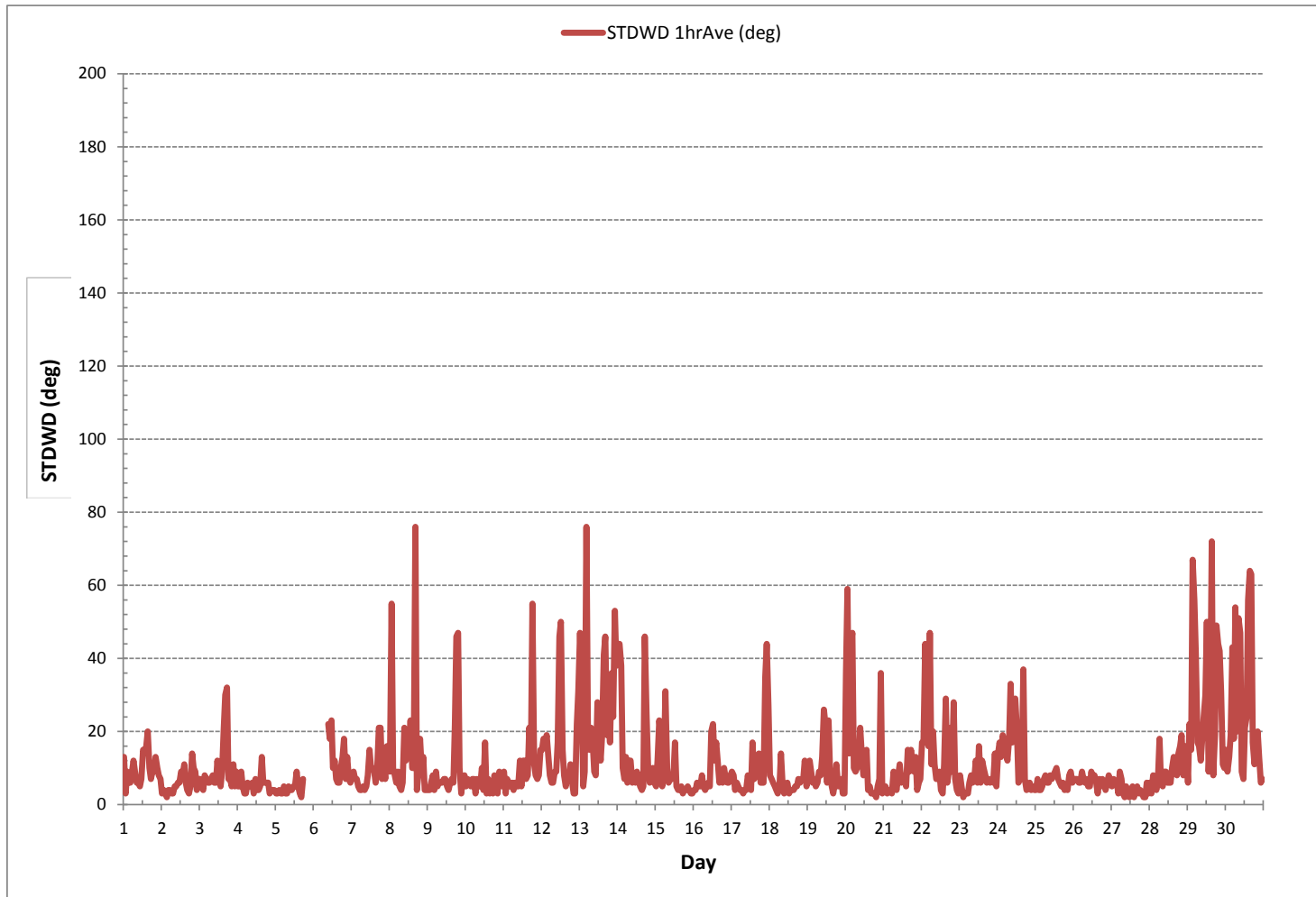
STATUS FLAG CODES

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: October 24, 2018

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 705 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



APPENDIX II
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE



Thermo 431-TLE Sulphur Dioxide Analyzer Calibration

Date:	October 23, 2018	Barometer/B.P./units:	F.S. 05544 expires January 15, 2019	949	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	Bonnyville East	Weather Conditions:	Mainly sunny		
Parameter:	Sulphur Dioxide	Calibration Purpose:	installation		
Start Time 24 hr. (mst):	10:06	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	15:02	Cal Gas Expiry Date:	October 24, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		
Analyzer:					
Serial Number/Owner:	1180320043 LICA	Range ppb:	1000		
Last Calibration Date:	n/a	As Found C.F.:	n/a		
Previous C.F.:	n/a	New C.F.:	1.000		

Calibration Standards:		Standard Calibration Points for Ranges								
Low Flow Meter ID/Expiry Date:	Defender Low 152019 expires December 13, 2018	<table border="1"> <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
Point	ppb									
High	780									
Mid	380									
Low	190									
High Flow Meter ID/Expiry Date:	Defender High 148944 expires December 13, 2018									
Calibrator ID/Expiry Date:	API id# 690 expires March 15, 2019									
Cal Gas Cylinder I.D. #:	LL 104225									
Cal Gas Conc. (ppm):	49.2									

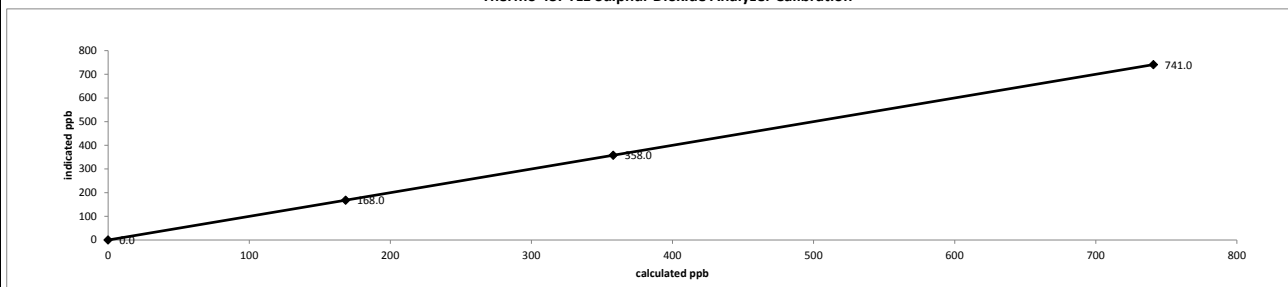
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Diluent	Cal Gas	Total	Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
adjusted zero	5032	0.00	5032	0.0	0	n/a
adjusted high	4947	75.64	5023	740.9	741	1.000
mid	4990	36.58	5027	358.0	358	1.000
low	5023	17.25	5040	168.4	168	1.002
calibrator zero	5032		5032	0.0	0	n/a
Average C.F. =						1.001

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS
Slope =	1.000	> or = 0.995
b (Intercept as % of full scale) =	0.02%	0.95-1.05
% change in C.F. from last cal =	n/a	± 3% F.S.
		n/a

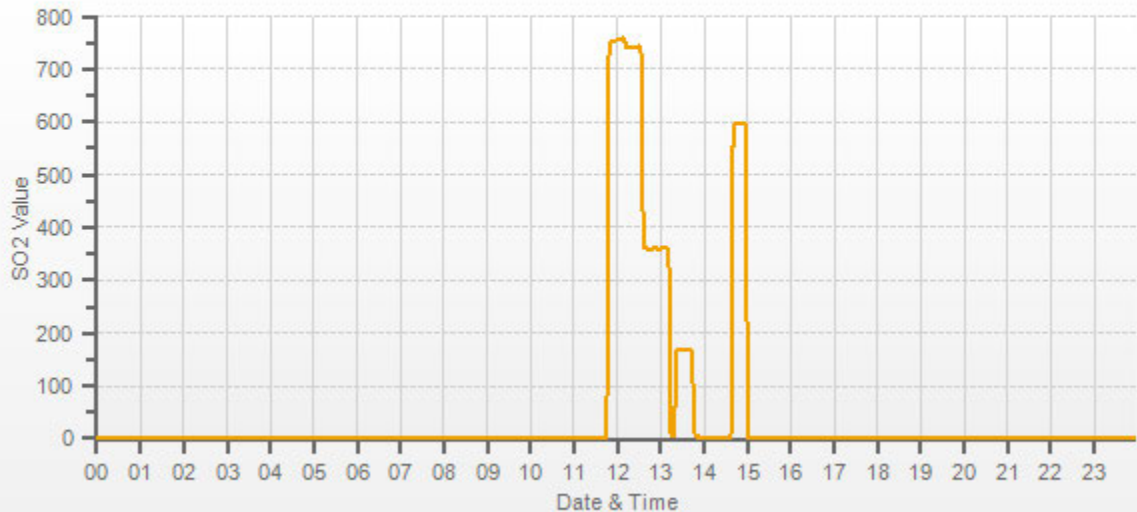
Thermo 431-TLE Sulphur Dioxide Analyzer Calibration



As found:	As left:
Bkg: n/a	Bkg: 3.96
Coef: n/a	Coef: 0.975
Pmt: n/a	Pmt: -677.8
Flash: n/a	Flash: 1050
Internal: n/a	Internal: 31.8
Chamber: n/a	Chamber: 44.8
Perm Oven Gas: n/a	Perm Oven Gas: 45.00
Perm Oven Heater: n/a	Perm Oven Heater: 44.23
Pressure: n/a	Pressure: 679.5
Sample Flow: n/a	Sample Flow: 0.457
Lamp Intensity: n/a	Lamp Intensity: 90
Converter: n/a	Converter: n/a
Converter Set: n/a	Converter Set: n/a
Averaging Time: n/a	Averaging Time: 120
Expected Value: n/a	Expected Value: 601.0

Comments:
 The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned. The manifold blower was found to be working normally.
 The analyzer perm tube was changed , the new expected value will be updated once the perm tube temperature has stabilized.

SO2[ppb]





Thermo 431-TLE Sulphur Dioxide Analyzer Calibration

Date: November 6, 2018	Barometer/B.P./units: Brunton 05490 expires December 11, 2018	961	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 160459244 expires June 19, 2020	22	°C
Location/Station Name: Bonnyville East	Weather Conditions: Light snow		
Parameter: Sulphur Dioxide	Calibration Purpose: routine monthly		
Start Time 24 hr. (mst): 8:34	Performed By/Reviewer: Chris Wesson	Rob Fisher	
End Time 24 hr. (mst): 12:59	Cal Gas Expiry Date: October 24, 2020		
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a		
Analyzer:	Serial Number/Owner: 1180320043 LICA	Range ppb: 1000	
	Last Calibration Date: October 23, 2018	As Found C.F.: 1.030	
	Previous C.F.: 1.000	New C.F.: 1.000	

Calibration Standards:	Standard Calibration Points for Ranges								
Low Flow Meter ID/Expiry Date: N/A	<table border="1"> <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
Point	ppb								
High	780								
Mid	380								
Low	190								
High Flow Meter ID/Expiry Date: N/A									
Calibrator ID/Expiry Date: Sabio id# 17200415 expires August 21, 2019									
Cal Gas Cylinder I.D. #: LL104225									
Cal Gas Conc. (ppm): 49.2									

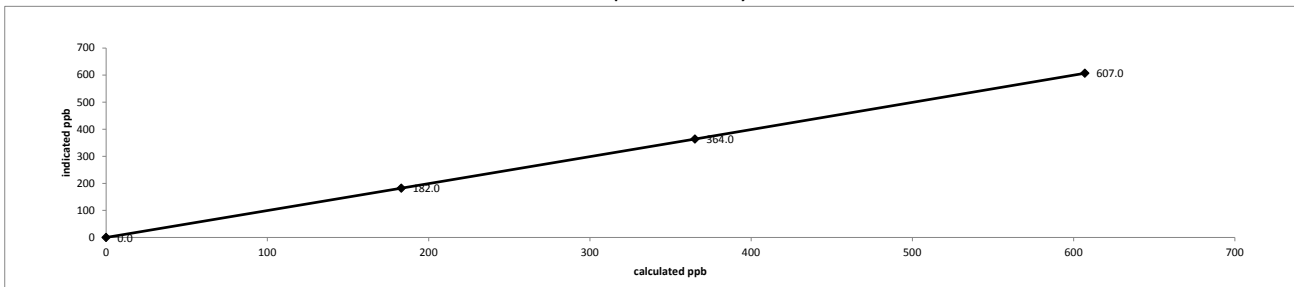
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Diluent	Cal Gas	Total	Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
as found zero	4998	0.00	4998	0.0	0.2	n/a
as found high	4940	61.70	5002	606.9	589.5	1.030
adjusted zero	4998	0.00	4998	0.0	0	n/a
adjusted high	4939	61.70	5001	607.0	607	1.000
mid	4961	37.10	4998	365.2	364	1.003
low	4981	18.60	5000	183.0	182	1.006
calibrator zero	4998	0.00	4998	0.0	0.3	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%	0.95-1.05
% change in C.F. from last cal = -2.98%	± 3% F.S.
	± 10%

Thermo 431-TLE Sulphur Dioxide Analyzer Calibration



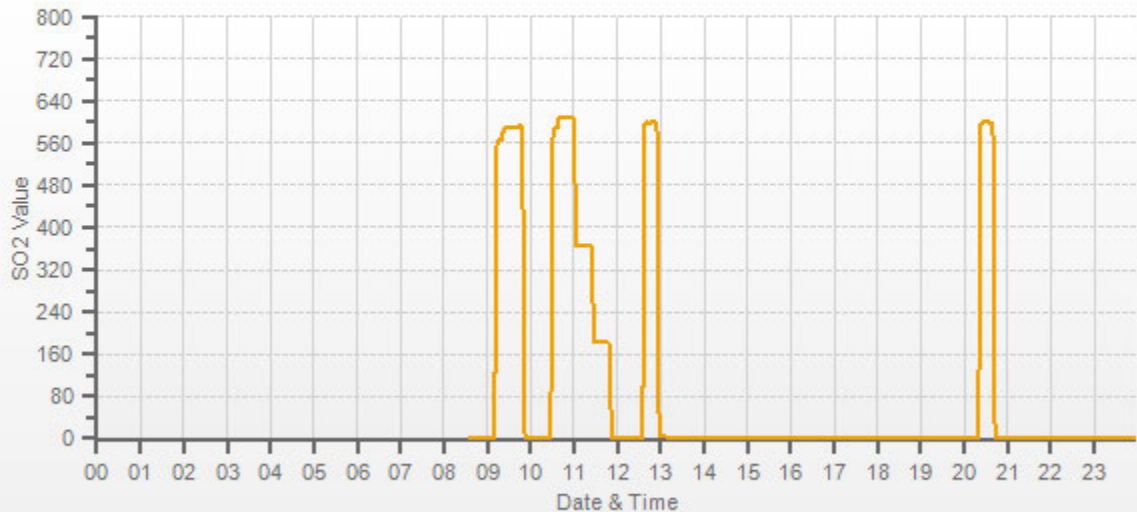
As found:	As left:
Bkg: 3.91	Bkg: 4.44
Coef: 0.975	Coef: 1.004
Pmt: -676.7	Pmt: -677.5
Flash: 1052	Flash: 1052
Internal: 33.2	Internal: 32.9
Chamber: 45.0	Chamber: 44.8
Perm Oven Gas: 45.00	Perm Oven Gas: 44.99
Perm Oven Heater: 44.25	Perm Oven Heater: 44.24
Pressure: 687.7	Pressure: 688.3
Sample Flow: 0.462	Sample Flow: 0.462
Lamp Intensity: 88	Lamp Intensity: 89
Averaging Time: 120	Averaging Time: 120
Expected Value: 601.0	Expected Value: 598.0

Comments:
 The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned. The manifold blower was found to be working normally.

The calibrator was adjusted at 09:20 as the output was too low for the As-Found High. The As Found High was restarted.

SO2[ppb] Station: LICA Bonnyville East Daily: 18/11/06 Type: AVG 1 Min. [1 Min.]

— SO2[ppb]



HYDROGEN SULPHIDE



API 101E Hydrogen Sulphide Analyzer Calibration

Date:	October 26, 2018	Barometer/B.P./units:	F.S. 05544 expires January 15, 2019	939	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	Bonnyville East	Weather Conditions:	Mainly sunny		
Parameter:	Hydrogen Sulphide	Calibration Purpose:	installation		
Start Time 24 hr. (mst):	9:36	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	14:45	Cal Gas Expiry Date:	October 20, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		
Analyzer:		Range ppb:	100		
Serial Number/Owner:	510 LICA	As Found C.F.:	n/a		
Last Calibration Date:	n/a	New C.F.:	1.000		
Previous C.F.:	n/a				

Calibration Standards:	Standard Calibration Points for Ranges	SO2 Scrubber Check (10 minutes):								
Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018	<table border="1"> <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.: 09:48 / 10:06
Point	ppb									
High	78									
Mid	38									
Low	19									
High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018		SO2 Analyzer Range: 1000								
Calibrator ID/Expiry Date: Sabio id# 11900613 expires August 22, 2019		Target Concentration (ppb): 780								
Cal Gas Cylinder I.D. # : EY 0001003		As Found Zero: 0.0								
Cal Gas Conc. (ppm): 9.6		Analyzer Response: (ppb): 0.0								
		Zero Corrected Result (ppb): 0.0								

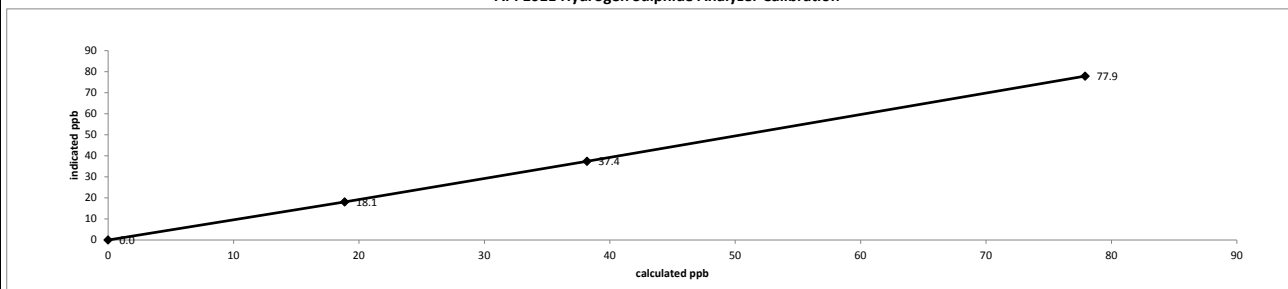
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Diluent	Cal Gas	Total	Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
adjusted zero	7565	0.00	7565	0.0	0	n/a
adjusted high	7489	61.60	7551	77.9	77.9	1.000
mid	7527	30.22	7557	38.2	37.4	1.021
low	7534	14.91	7549	18.9	18.1	1.042
calibrator zero	7565	0.00	7565	0.0	0	n/a
Average C.F. =						1.021

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.998		0.95-1.05
b (Intercept as % of full scale) =	0.47%		± 3% F.S.
% change in C.F. from last cal =	n/a		n/a

API 101E Hydrogen Sulphide Analyzer Calibration



As found:	As left:
Slope:	1.118
Offset:	27.7
Hvps:	530
Rcell Temp:	50
Box Temp:	34.3
Pmt Temp:	8.4
Izs Temp:	40.0
Converter Temp:	314.7
Pres:	19.8
Samp Fl:	514
Uv Lamp:	2687.0
Lamp Ratio:	101.2
Str Lgt:	15.5
Drk Pmt:	59.9
Expected Value:	to be adjusted

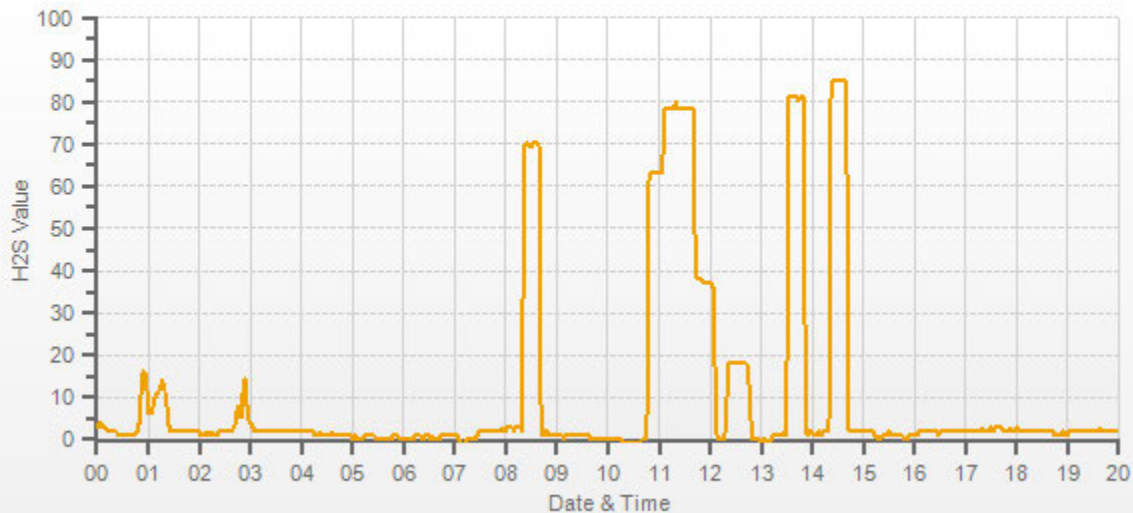
Comments:

The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned. The manifold blower was found to be working normally.

The analyzer perm tube was changed, the new expected value will be updated once the perm tube temperature has stabilized.

A new station is installed. The Thermo-Scientific 450i new analyzer was sent back to CD Nova for Warranty repair. The API 101E #510 is installed as a temporary substitute.

H2S[ppb]





API 101E Hydrogen Sulphide Analyzer Calibration

Date:	November 6, 2018	Barometer/B.P./units:	Brunton 05490 expires December 11, 2018	961	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 160459244 expires June 19, 2020	22	°C
Location/Station Name:	Bonnyville East	Weather Conditions:	Light snow		
Parameter:	Hydrogen Sulphide	Calibration Purpose:	post repair		
Start Time 24 hr. (mst):	8:34	Performed By/Reviewer:	Chris Wesson	Rob Fisher	
End Time 24 hr. (mst):	12:10	Cal Gas Expiry Date:	May 16, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	Internal		
Analyzer:					
Serial Number/Owner:	510 LICA	Range ppb:	100		
Last Calibration Date:	October 26, 2018	As Found C.F.:	n/a		
Previous C.F.:	1.000	New C.F.:	1.001		

Calibration Standards: Low Flow Meter ID/Expiry Date: N/A High Flow Meter ID/Expiry Date: N/A Calibrator ID/Expiry Date: Sabio id# 30860808 expires August 21, 2019 Cal Gas Cylinder I.D. #: LL119420 Cal Gas Conc. (ppm): 10.2	Standard Calibration Points for Ranges <table border="1" style="margin: auto;"> <tr><td>Point</td><td>ppb</td></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 minutes): Start/End Time 24 hr.: 08:43 / 08:58 SO2 Analyzer Range: 1000 Target Concentration (ppb): 780 As Found Zero: 0.5 Analyzer Response (ppb): 0.3 Zero Corrected Result (ppb): -0.2
Point	ppb									
High	78									
Mid	38									
Low	19									

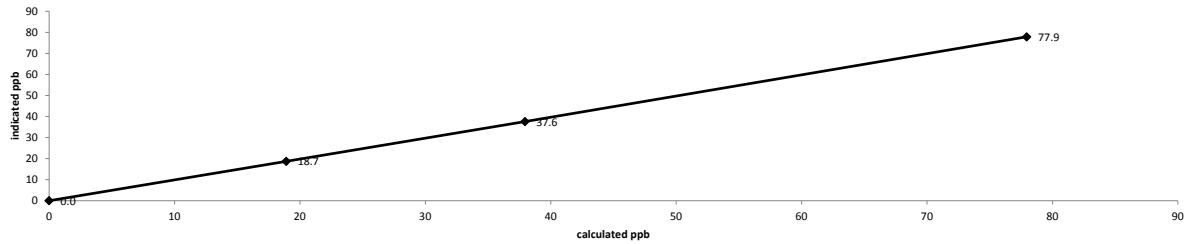
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Total	Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas					
adjusted zero	7499	0.00		7499	0.0	0	n/a
adjusted high	7441	57.30		7498	77.9	77.9	1.001
mid	7473	27.90		7501	37.9	37.6	1.009
low	7486	13.90		7500	18.9	18.7	1.011
calibrator zero	7499	0.00		7499	0.0	-0.3	n/a
Average C.F. =							1.007

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.000		0.95-1.05
b (Intercept as % of full scale) =	0.14%		± 3% F.S.
% change in C.F. from last cal =	n/a		n/a

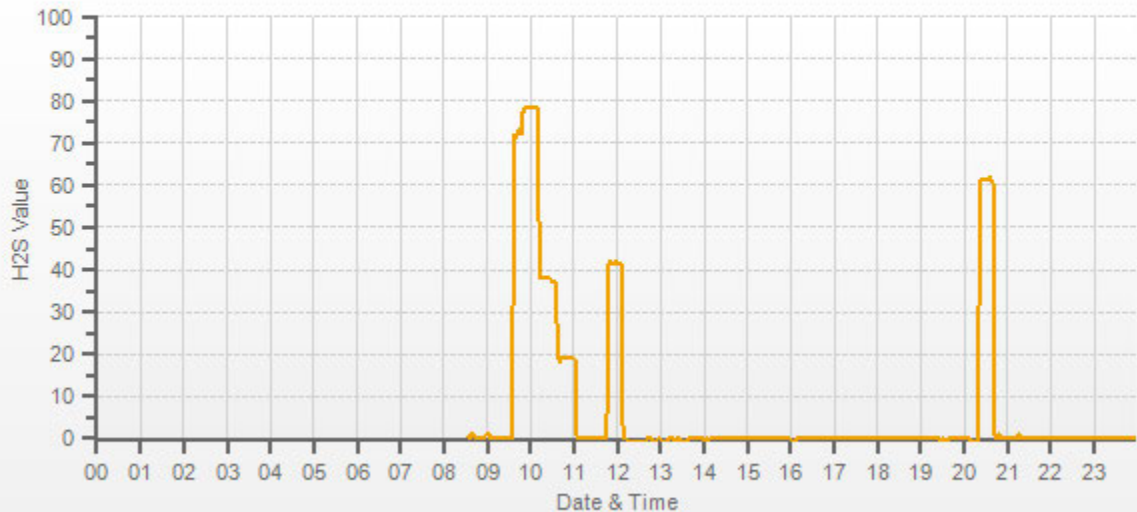
API 101E Hydrogen Sulphide Analyzer Calibration



As found: Slope: 1.118 Offset: 27.7 Hvps: 531 Rcell Temp: 50.0 Box Temp: 36.4 Pmt Temp: 8.4 Izs Temp: 45.0 Converter Temp: 314.6 Pres: 20.3 Samp Fl: 523 Uv Lamp: 2654.3 Lamp Ratio: 99.9 Str Lgt: 15.5 Drk Pmt: 106.8 Drk Lmp: -2.0 Expected Value: n/a	As left: Slope: 1.213 Offset: 28.9 Hvps: 531 Rcell Temp: 50.0 Box Temp: 38.0 Pmt Temp: 8.4 Izs Temp: 45.0 Converter Temp: 315.3 Pres: 20.3 Samp Fl: 522 Uv Lamp: 2651.4 Lamp Ratio: 99.8 Str Lgt: 17.5 Drk Pmt: 106.3 Drk Lmp: -1.6 Expected Value: 41.1
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Comments:
 The analyzer sample inlet filter was changed.
 The manifold blower was found to be working normally.
 The analyzer perm tube was changed, the new expected value will be updated once the perm tube temperature has stabilized.
 A post repair calibration was performed to address failed power supply on November 5, 2018. The power supply was replaced and the analyzer was stabilized overnight.

H2S[ppb]





API 101E Hydrogen Sulphide Analyzer Calibration

Date: <u>November 14, 2018</u>	Barometer/B.P./units: <u>F.S. 05544 expires January 15, 2019</u> <u>938</u> <u>millibars</u>	Thermometer/Station Temp: <u>F.S. 170286131 expires April 19, 2019</u> <u>22</u> <u>°C</u>
Company/Airshed: <u>LICA</u>	Weather Conditions: <u>A few clouds</u>	
Location/Station Name: <u>Bonnyville - East</u>	Calibration Purpose: <u>repeat</u>	
Parameter: <u>Hydrogen Sulphide</u>	Performed By/Reviewer: <u>Alex Yakupov</u> <u>Rob Fisher</u>	
Start Time 24 hr. (mst): <u>10:16</u>	Cal Gas Expiry Date: <u>October 20, 2020</u>	
End Time 24 hr. (mst): <u>14:32</u>	Converter Model & s/n (if applicable): <u>n/a</u>	
Calibration Method: <u>Gas Dilution</u>	Analyzer: Serial Number/Owner: <u>510</u> <u>LICA</u>	
Analyzer: Last Calibration Date: <u>November 6, 2018</u>	Range ppb: <u>100</u>	
Previous C.F.: <u>1.001</u>	As Found C.F.: <u>0.959</u>	
	New C.F.: <u>0.999</u>	

Calibration Standards: Low Flow Meter ID/Expiry Date: <u>Defender Low 152019 expires December 13, 2018</u> High Flow Meter ID/Expiry Date: <u>Defender High 148944 expires December 13, 2018</u> Calibrator ID/Expiry Date: <u>Sabio id# 11900613 expires August 22, 2019</u> Cal Gas Cylinder I.D. #: <u>EY 0001003</u> Cal Gas Conc. (ppm): <u>9.55</u>	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
Point	ppb								
High	78								
Mid	38								
Low	19								

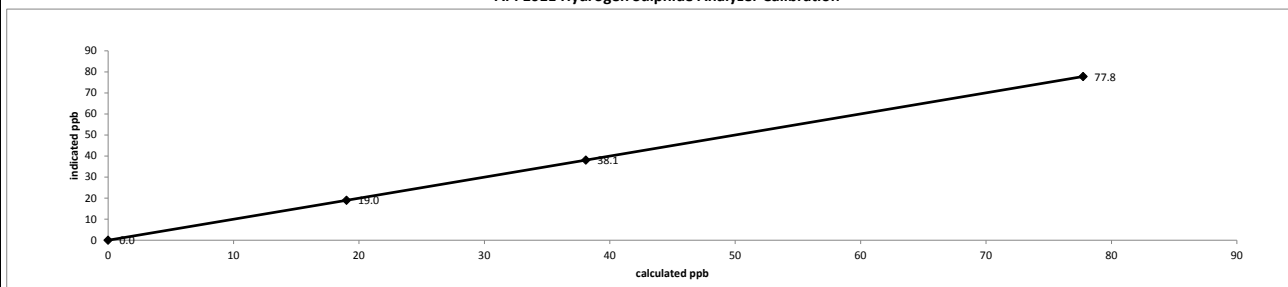
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	7523	0.00	7523	0.0	0.6	n/a
as found high	7442	61.08	7503	77.7	81.7	0.959
adjusted zero	7523	0.00	7523	0.0	0	n/a
adjusted high	7442	61.08	7503	77.7	77.8	0.999
mid	7440	29.80	7470	38.1	38.1	1.000
low	7470	14.90	7485	19.0	19	1.001
calibrator zero	7523	0.00	7523	0.0	0	n/a
Average C.F. =						1.000

Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u>	LIMITS
Slope = <u>0.999</u>	> or = 0.995
b (Intercept as % of full scale) = <u>0.01%</u>	0.95-1.05
% change in C.F. from last cal = <u>4.23%</u>	± 3% F.S.
	± 10%

API 101E Hydrogen Sulphide Analyzer Calibration



As found: Slope: <u>1.213</u> Offset: <u>28.9</u> Hvps: <u>531</u> Rcell Temp: <u>50.0</u> Box Temp: <u>36.3</u> Pmt Temp: <u>8.4</u> Izs Temp: <u>50.0</u> Converter Temp: <u>314.6</u> Pres: <u>19.8</u> Samp Fl: <u>513</u> Uv Lamp: <u>2651.5</u> Lamp Ratio: <u>99.8</u> Str Lgt: <u>17.5</u> Drk Pmt: <u>73.9</u> Expected Value: <u>81.5</u>	As left: Slope: <u>1.163</u> Offset: <u>29.7</u> Hvps: <u>531</u> Rcell Temp: <u>50.0</u> Box Temp: <u>35.5</u> Pmt Temp: <u>8.4</u> Izs Temp: <u>45.0</u> Converter Temp: <u>315.2</u> Pres: <u>19.8</u> Samp Fl: <u>513</u> Uv Lamp: <u>2661.9</u> Lamp Ratio: <u>100.2</u> Str Lgt: <u>17.2</u> Drk Pmt: <u>73.3</u> Expected Value: <u>81.5</u>
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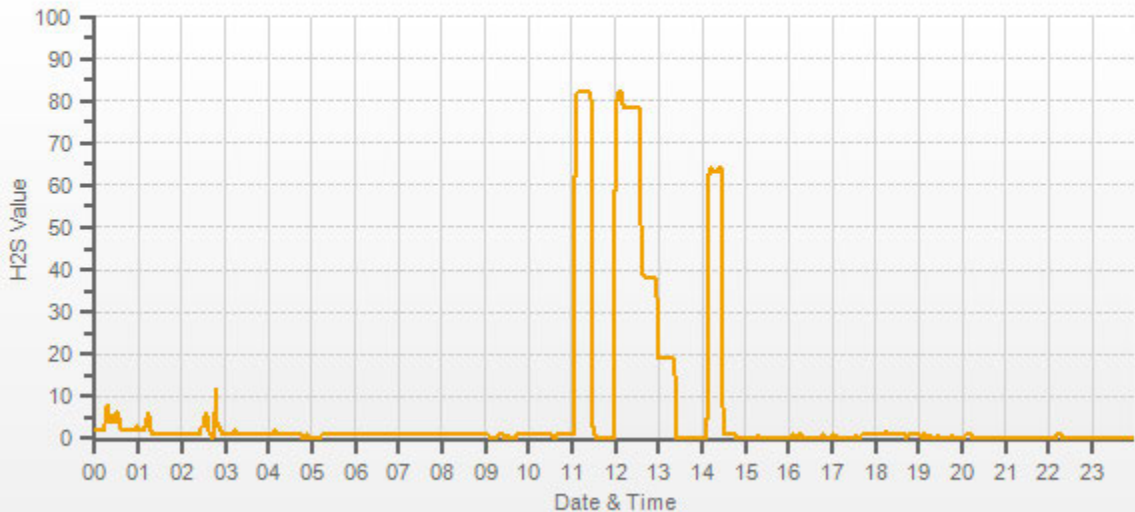
Comments:

The SO2 scrubber check was not performed, see comments below.
The manifold blower was found to be working normally.

A repeat calibration was completed because of the SPAN value drifted over 7%. SO2 scrubber was tested during a monthly calibration. IZS TEMP was reduced to 45 degrees. The EV will be updated in 48 hours.

H2S[ppb] Station: LICA Bonnyville East Daily: 18/11/14 Type: AVG 1 Min. [1 Min.]

H2S[ppb]





API 101E Hydrogen Sulphide Analyzer Calibration

Date: November 22, 2018	Barometer/B.P./units: F.S. 05544 expires January 15, 2019	930	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	24	°C
Location/Station Name: Bonnyville-East	Weather Conditions:	A few clouds	
Parameter: Hydrogen Sulphide	Calibration Purpose:	shut down	
Start Time 24 hr. (mst): 11:30	Performed By/Reviewer:	Alex Yakupov	Rob Fisher
End Time 24 hr. (mst): 13:32	Cal Gas Expiry Date:	October 20, 2020	
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable):	n/a	
Analyzer:	Serial Number/Owner: 510 LICA	Range ppb:	100
Last Calibration Date: November 14, 2018	As Found C.F.:	1.001	
Previous C.F.: 0.999	New C.F.:	n/a	

Calibration Standards:	Standard Calibration Points for Ranges								
Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018	<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
Point	ppb								
High	78								
Mid	38								
Low	19								
High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018									
Calibrator ID/Expiry Date: API id# 690 expires March 15, 2019									
Cal Gas Cylinder I.D. #: EY 0001003									
Cal Gas Conc. (ppm): 9.55									

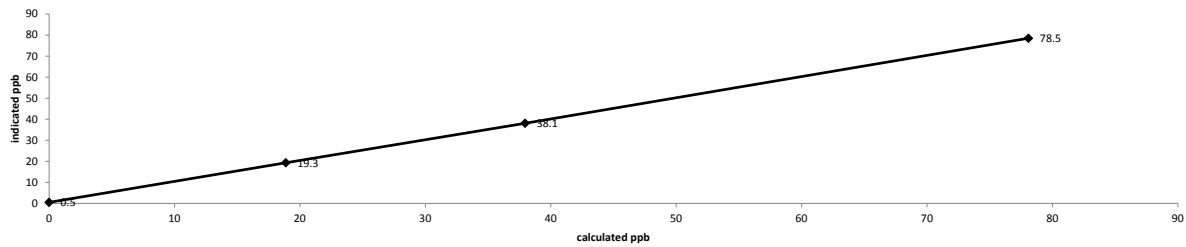
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	Concentration (ppb):		
as found zero	7500	0.00	7500	0.0	0.5	n/a
as found high	7404	61.04	7465	78.1	78.5	1.001
mid	7442	29.70	7472	38.0	38.1	1.010
low	7473	14.80	7488	18.9	19.3	1.004
Average C.F. =						1.005

Linear Regression/Calibration Results:

Correlation Coefficient = 1.000	LIMITS
Slope = 1.001	> or = 0.995
b (Intercept as % of full scale) = -0.41%	0.90-1.10
% change in C.F. from last cal = -0.21%	± 3% F.S.
	± 10%

API 101E Hydrogen Sulphide Analyzer Calibration



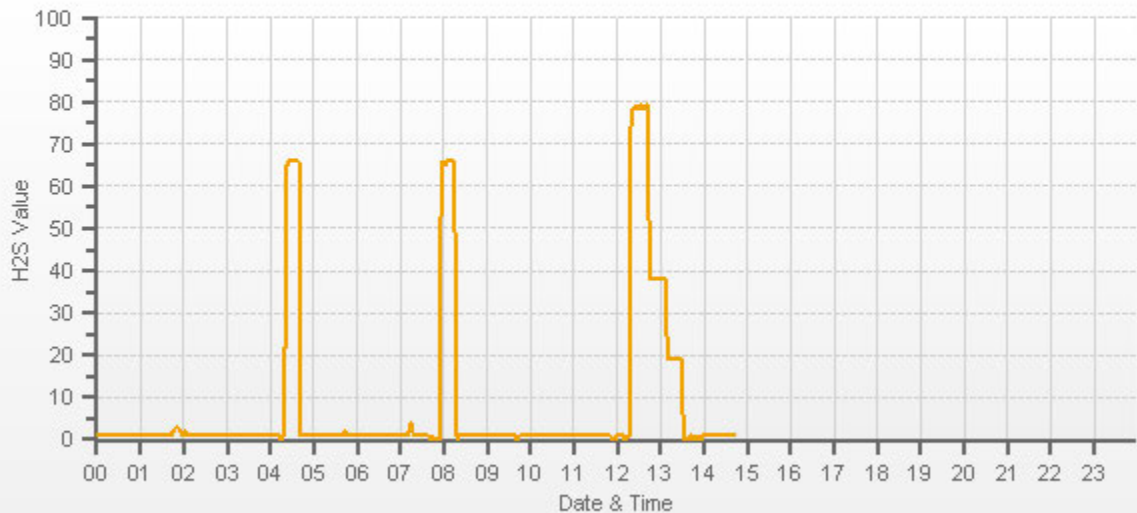
As found:	As left:
Slope: 1.163	Slope: n/a
Offset: 29.7	Offset: n/a
Hvps: 531	Hvps: n/a
Rcell Temp: 50.0	Rcell Temp: n/a
Box Temp: 37.6	Box Temp: n/a
Pmt Temp: 8.4	Pmt Temp: n/a
Izs Temp: 45.0	Izs Temp: n/a
Converter Temp: 315.1	Converter Temp: n/a
Pres: 19.5	Pres: n/a
Samp Fl: 506	Samp Fl: n/a
Uv Lamp: 2645.2	Uv Lamp: n/a
Lamp Ratio: 99.6	Lamp Ratio: n/a
Str Lgt: 17.2	Str Lgt: n/a
Drk Pmt: 69.3	Drk Pmt: n/a
Expected Value: 60.0	Expected Value: n/a

Comments:

The SO2 scrubber check was not performed, see comments below.
The manifold blower was found to be working normally.

A Shutdown calibration was completed to install a new 450i analyzer. The SO2 scrubber check was completed during a monthly calibration.

H2S[ppb]





Thermo 450i Hydrogen Sulphide Analyzer Calibration

Date: November 23, 2018	Barometer/B.P./units: F.S. 05544 expires January 15, 2019	935	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	24	°C
Location/Station Name: Bonnyville - East	Weather Conditions:	Light snow	
Parameter: Hydrogen Sulphide	Calibration Purpose:	installation	
Start Time 24 hr. (mst): 9:37	Performed By/Reviewer:	Alex Yakupov	Rob Fisher
End Time 24 hr. (mst): 14:10	Cal Gas Expiry Date:	October 20, 2020	
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable):	n/a	
Analyzer:			
Serial Number/Owner: CM 17360002 LICA	Range ppb:	100	
Last Calibration Date: n/a	As Found C.F.:	n/a	
Previous C.F.: n/a	New C.F.:	1.000	

Calibration Standards:	Standard Calibration Points for Ranges	SO2 Scrubber Check (10 minutes):								
Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018	<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.: 09:44 / 10:02
Point		ppb								
High		78								
Mid		38								
Low	19									
High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018	SO2 Analyzer Range: 1000									
Calibrator ID/Expiry Date: API id# 690 expires March 15, 2019	Target Concentration (ppb): 780									
Cal Gas Cylinder I.D. #: EY 0001003	As Found Zero: 0.0	Analyzer Response: (ppb): 0.0								
Cal Gas Conc. (ppm): 9.55		Zero Corrected Result (ppb): 0.0								

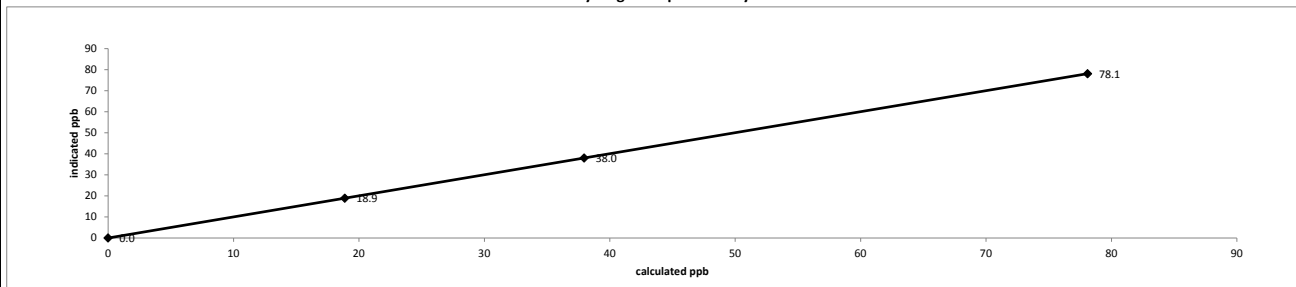
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	Concentration (ppb):		
adjusted zero	7457	0.00	7457	0.0	0	n/a
adjusted high	7386	60.90	7447	78.1	78.1	1.000
mid	7442	29.70	7472	38.0	38	0.999
low	7473	14.80	7488	18.9	18.9	0.999
calibrator zero	7457	0.00	7457	0.0	0	n/a
Average C.F. =						0.999

Linear Regression/Calibration Results:

Correlation Coefficient =	<u>1.000</u>	LIMITS
Slope =	<u>1.000</u>	> or = 0.995
b (Intercept as % of full scale) =	<u>-0.02%</u>	0.95-1.05
% change in C.F. from last cal =	<u>n/a</u>	± 3% F.S.
		n/a

Thermo 450i Hydrogen Sulphide Analyzer Calibration



As found:	As left:
Bkg: <u>n/a</u>	Bkg: <u>16.0</u>
Coef: <u>n/a</u>	Coef: <u>1.152</u>
Pmt: <u>n/a</u>	Pmt: <u>-638.6</u>
Flash: <u>n/a</u>	Flash: <u>779</u>
Internal: <u>n/a</u>	Internal: <u>39.1</u>
Chamber: <u>n/a</u>	Chamber: <u>45.2</u>
Converter Temp: <u>n/a</u>	Converter Temp: <u>327.3</u>
Converter Set: <u>n/a</u>	Converter Set: <u>325.0</u>
Perm Oven Gas: <u>n/a</u>	Perm Oven Gas: <u>45.00</u>
Perm Oven Htr: <u>n/a</u>	Perm Oven Htr: <u>43.98</u>
Pressure: <u>n/a</u>	Pressure: <u>559.8</u>
Sample Flow: <u>n/a</u>	Sample Flow: <u>0.930</u>
Lamp Intensity: <u>n/a</u>	Lamp Intensity: <u>91</u>
Averaging Time: <u>n/a</u>	Averaging Time: <u>120</u>
Expected Value: <u>n/a</u>	Expected Value: <u>to be adjusted</u>

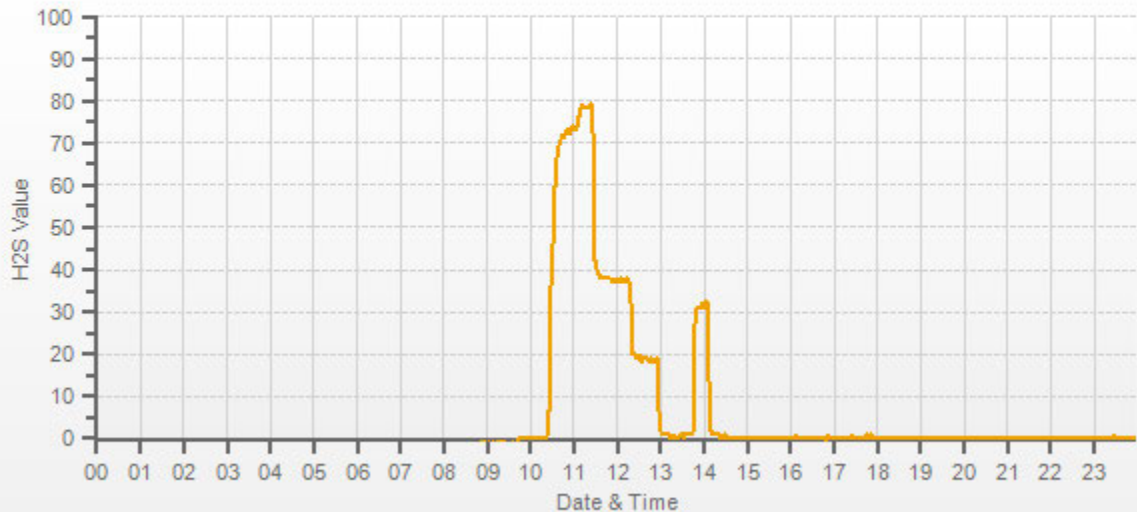
Comments:

The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned. The manifold blower was found to be working normally.

The analyzer perm tube was changed , the new expected value will be updated once the perm tube temperature has stabilized.

An installation calibration was performed to install a new analyzer that was repaired under warranty.

H2S[ppb]





Thermo 450i Hydrogen Sulphide Analyzer Calibration

Date:	November 28, 2018	Barometer/B.P./units:	Brunton 05490 expires December 11, 2018	27.61	inHg
Company/Airshed:	LICA	Thermometer/Station Temp:	Station Thermometer	24	°C
Location/Station Name:	Bonnyville East	Weather Conditions:	Fog		
Parameter:	Hydrogen Sulphide	Calibration Purpose:	shut down		
Start Time 24 hr. (mst):	16:26	Performed By/Reviewer:	Chris Wesson	Rob Fisher	
End Time 24 hr. (mst):	18:16	Cal Gas Expiry Date:	November 7, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	Internal		
Analyzer:					
Serial Number/Owner:	CM1760002 LICA	Range ppb:	100		
Last Calibration Date:	November 23, 2018	As Found C.F.:	1.087		
Previous C.F.:	1.000	New C.F.:	n/a		

Calibration Standards:		Standard Calibration Points for Ranges
Low Flow Meter ID/Expiry Date:	N/A	Point
High Flow Meter ID/Expiry Date:	N/A	High
Calibrator ID/Expiry Date:	Sabio id# 17100415 expires August 21, 2019	Mid
Cal Gas Cylinder I.D. #:	LL119432	Low
Cal Gas Conc. (ppm):	10.3	

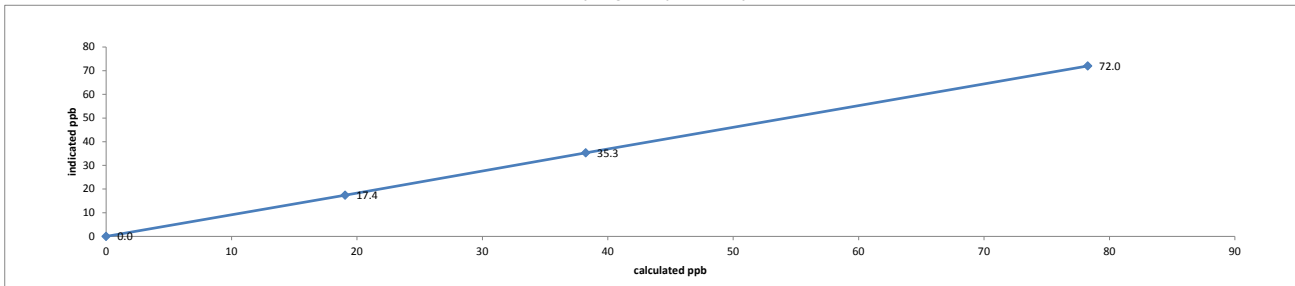
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	Concentration (ppb):		
as found zero	7499	0.00	7499	0.0	0	n/a
as found high	7442	57.10	7499	78.3	72	1.087
mid	7471	27.90	7499	38.2	35.3	1.083
low	7485	13.90	7499	19.1	17.4	1.095
Average C.F. =						1.089

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.086		0.90-1.10
b (Intercept as % of full scale) =	0.03%		± 3% F.S.
% change in C.F. from last cal =	-8.72%		± 10%

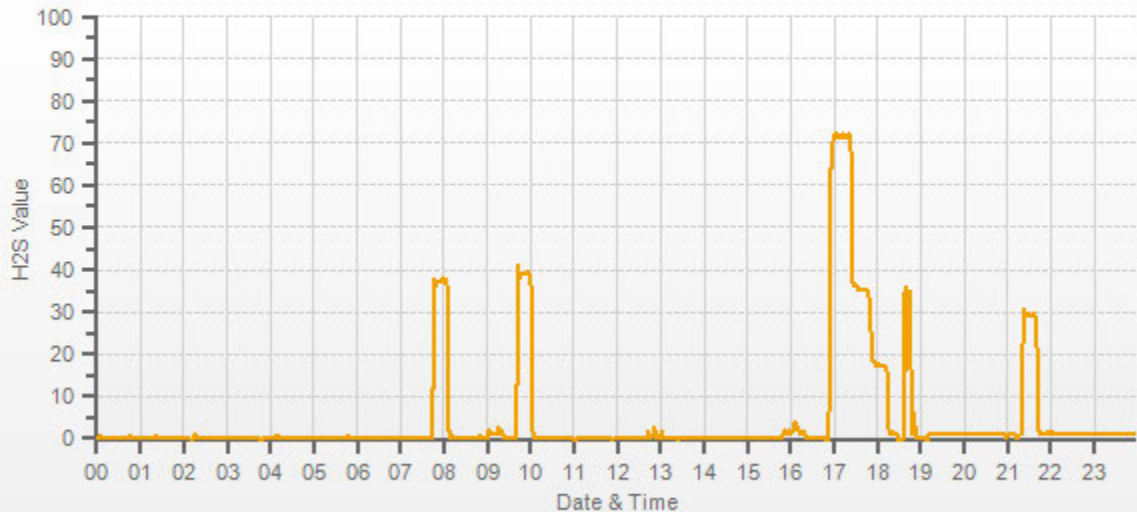
Thermo 450i Hydrogen Sulphide Analyzer Calibration



As found:		As left:	
Bkg:	18.9	Bkg:	
Coef:	1.152	Coef:	
Pmt:	-639.7	Pmt:	
Flash:	777	Flash:	
Internal:	37.6	Internal:	
Chamber:	45.4	Chamber:	
Converter Temp:	323.6	Converter Temp:	
Converter Set:	325.0	Converter Set:	
Perm Oven Gas:	45.00	Perm Oven Gas:	
Perm Oven Htr:	43.96	Perm Oven Htr:	
Pressure:	434.7	Pressure:	
Sample Flow:	0.770	Sample Flow:	
Lamp Intensity:	91	Lamp Intensity:	
Averaging Time:	120	Averaging Time:	
Expected Value:		Expected Value:	

Comments:

H2S[ppb]





Thermo 450i Hydrogen Sulphide Analyzer Calibration

Date: November 29, 2018	Barometer/B.P./units: Brunton 05490 expires December 11, 2018	27.62	inHg
Company/Airshed: LICA	Thermometer/Station Temp: Station Thermometer	22	°C
Location/Station Name: Bonnyville East	Weather Conditions:	Fog	
Parameter: Hydrogen Sulphide	Calibration Purpose:	post repair	
Start Time 24 hr. (mst): 7:40	Performed By/Reviewer:	Chris Wesson	Rob Fisher
End Time 24 hr. (mst): 11:01	Cal Gas Expiry Date:	November 7, 2020	
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable):	Internal	
Analyzer:			
Serial Number/Owner: CM1760002 LICA	Range ppb:	100	
Last Calibration Date: n/a	As Found C.F.:	n/a	
Previous C.F.: n/a	New C.F.:	1.000	

Calibration Standards:	Standard Calibration Points for Ranges								
Low Flow Meter ID/Expiry Date: N/A	<table border="1"> <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								
High Flow Meter ID/Expiry Date: N/A									
Calibrator ID/Expiry Date: Sabio id# 17100415 expires August 21, 2019									
Cal Gas Cylinder I.D. #: LL119432									
Cal Gas Conc. (ppm): 10.3									

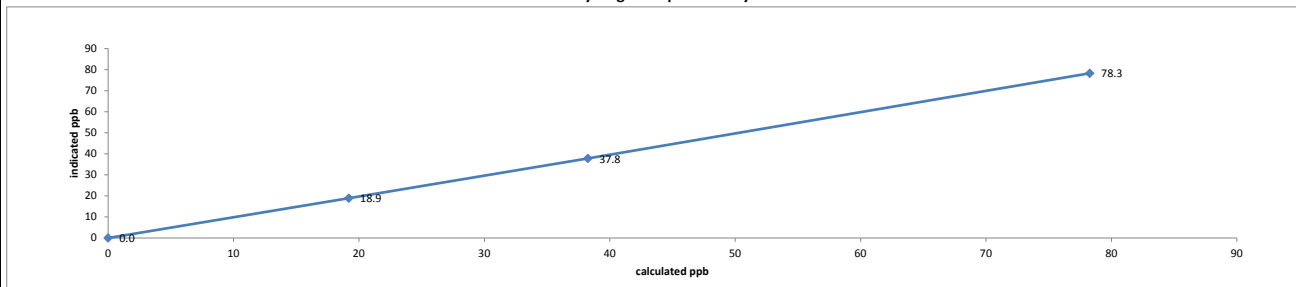
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Diluent	Cal Gas	Total	Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
adjusted zero	7499	0.00	7499	0.0	0	n/a
adjusted high	7442	57.10	7499	78.3	78.3	1.000
mid	7470	27.90	7498	38.3	37.8	1.012
low	7486	14.00	7500	19.2	18.9	1.015
calibrator zero	7499	0.00	7499	0.0	0.5	n/a
Average C.F. =						1.009

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.999	0.95-1.05	
b (Intercept as % of full scale) =	0.21%	± 3% F.S.	
% change in C.F. from last cal =	n/a	n/a	

Thermo 450i Hydrogen Sulphide Analyzer Calibration



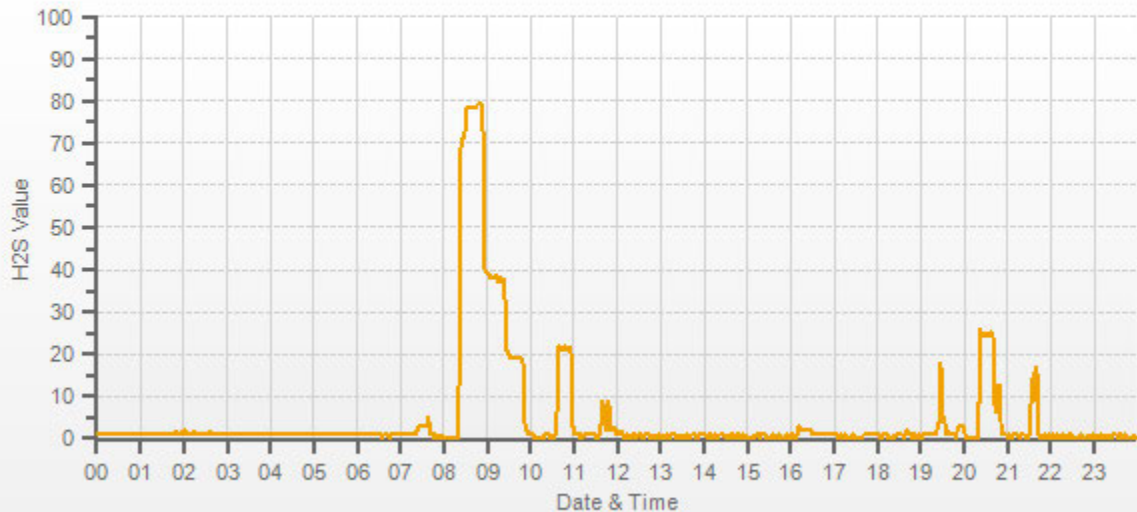
As found:		As left:	
Bkg:	18.9	Bkg:	17.4
Coef:	1.152	Coef:	1.209
Pmt:	-638.6	Pmt:	-638.6
Flash:	776	Flash:	778
Internal:	34.6	Internal:	37.0
Chamber:	45.1	Chamber:	45.1
Converter Temp:	327.5	Converter Temp:	324.7
Converter Set:	325.0	Converter Set:	325.0
Perm Oven Gas:	46.76	Perm Oven Gas:	45.00
Perm Oven Htr:	45.99	Perm Oven Htr:	43.93
Pressure:	552.3	Pressure:	551.1
Sample Flow:	0.936	Sample Flow:	0.937
Lamp Intensity:	91	Lamp Intensity:	91
Averaging Time:	120	Averaging Time:	120
Expected Value:	n/a	Expected Value:	n/a

Comments: The SO2 scrubber check was not performed, see comments below. The manifold blower was found to be working normally.

The analyzer perm tube was changed , the new expected value will be updated once the perm tube temperature has stabilized.

Scrubber already completed this month for this analyzer.

H2S[ppb]



TOTAL HYDROCARBON



Thermo 55i Methane/Non-Methane Analyzer Calibration

Date:	October 24, 2018	Barometer/B.P./units:	F.S. 05544 expires January 15, 2019	944	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	23	°C
Location/Station Name:	Bonnyville East	Weather Conditions:	Mainly sunny		
Parameter:	CH4 / NMHC / THC	Calibration Purpose:	installation		
Start/End Time 24 hr. (mst):	9:37 / 18:43	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	October 18, 2025		

Analyzer:		Correction Factors:		
Serial Number/Owner:	1236656107 LICA	Previous C.F.:	As Found C.F.:	New C.F.:
Measured Flow:	1.079	CH ₄ =	n/a	1.000
Last Calibration Date:	n/a	NMHC =	n/a	1.000
Range ppm:	20 CH4/20 NMHC/40 THC	THC =	n/a	1.000

Low Flow Meter ID/Expiry Date:	Defender Low 152019 expires December 13, 2018	Standard Calibration Points for Analyzer Range of 20/20/40 ppm			
High Flow Meter ID/Expiry Date:	Defender High 148944 expires December 13, 2018	Point	CH4	NMHC	THC
Calibrator ID/Expiry Date:	API Id# 690 expires March 15, 2019	High	13.00	13.00	26.00
Cal Gas Cylinder I.D. #:	LL 119471	Mid	7.00	7.00	14.00
CH4 Cylinder Conc. =	599.0 207.0 =C ₂ H ₆ Cylinder Conc.	Low	3.00	3.00	6.00
CH ₄ expressed as C ₂ H ₆ =	569.3 1168.3 =total CH4 equivalent				

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

Point	Calibrator Flow Rates (cc/min)			Calculated CH ₄ (ppm)	Calculated NMHC (ppm)	Calculated THC (ppm)	Indicated CH ₄ (ppm)	Indicated NMHC (ppm)	Indicated THC (ppm)	Correction Factors:		
	Diluent	Cal Gas	Total Flow							CH ₄	NMHC	THC
adjusted zero	2906	0.00	2906	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
adjusted high	2999	67.97	3067	13.27	12.62	25.89	13.27	12.62	25.89	1.000	1.000	1.000
mid	3003	37.62	3041	7.41	7.04	14.45	7.49	7.10	14.59	0.989	0.992	0.991
low	3004	15.79	3020	3.13	2.98	6.11	3.18	3.00	6.18	0.985	0.992	0.988
calibrator zero	2906	0.00	2906	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
Average C.F. =										0.992	0.995	0.993

Linear Regression/Calibration Results:

	CH ₄	NMHC	THC	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.999	1.001	1.000	0.95-1.05
b (Intercept as % of full scale) =	0.17%	0.09%	0.13%	± 3% F.S.
% change in C.F. from last cal =	n/a	n/a	n/a	n/a

As Left Instrument Diagnostics:

Interface Board Voltages:	Bias Supply: -292.7	Calibration History cnt'd:	NM Peak Area: n/a
Temperatures:	Detector Oven: 175.0	Crucial Settings:	Methane Start: n/a
	Filter: 175.1		Methane End: n/a
	Column Oven: 75.1		Backflush: n/a
	Internal: 32.6		NMHV Start: n/a
Cylinder Pressures/reg.:	Carrier: 2500 50	Run History>1:	NMHC End: n/a
	Fuel: 1900 50	Date:	Oct 24, 2018
	Span Gas: 2000 22	Time:	10:03
	Zero Air Generator: 47	CH ₄ PK HT:	0
Internal Pressures:	Carrier: 31.0	CH ₄ RT:	8.0
	Fuel: 40.3	CH ₄ Baseline:	2291
	Air: 31.5	CH ₄ LOD:	56
FID Status:	Status: LIT	CH ₄ SD:	17
	Counts: 27079	CH ₄ CONC:	0.00
	Flame: 361.0	NM PK HT:	0
	Det Base: 175.0	NM Peak Area:	0
Flame and Power Stats:	Last Power On: Oct 18, 2018	NM CONC:	0.00
	Flameouts: 1	NM Base Start:	2241
	Det Oven at Start: 23.1	NM Base End:	2239
	Col Oven at Start: 22.3	NM LOD:	8
Calibration History:	Time: n/a	NM Start IDX:	55
	Type: n/a	NM End IDX:	88
	Status: n/a	NM Max Slope:	6.1e-01
	Check/Adjust: n/a	NM Min Slope:	-7.7e-01
	CH ₄ Span Conc: n/a	NM PT Count:	0
	CH ₄ SP Ratio: n/a	Previous CH ₄ :	n/a
	CH ₄ RT: n/a	Previous NMHC:	n/a
	CH ₄ PK IDX: n/a	Previous THC:	n/a
	CH ₄ PK HT: n/a	New CH ₄ :	10.23
	NM Span Conc: n/a	New NMHC:	11.18
	NM SP Ratio: n/a	New THC:	21.41

Comments:

The analyzer sample inlet filter was changed. A new nitrogen cylinder was installed.

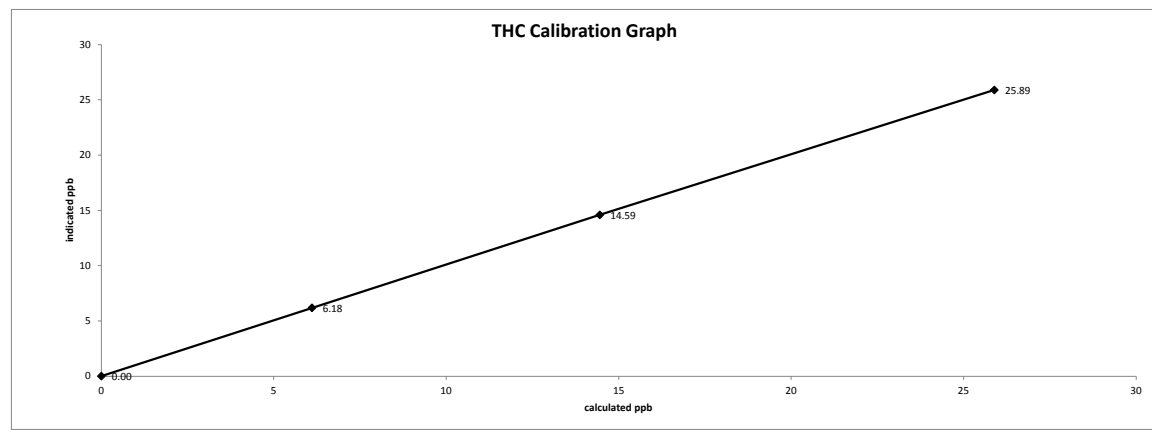
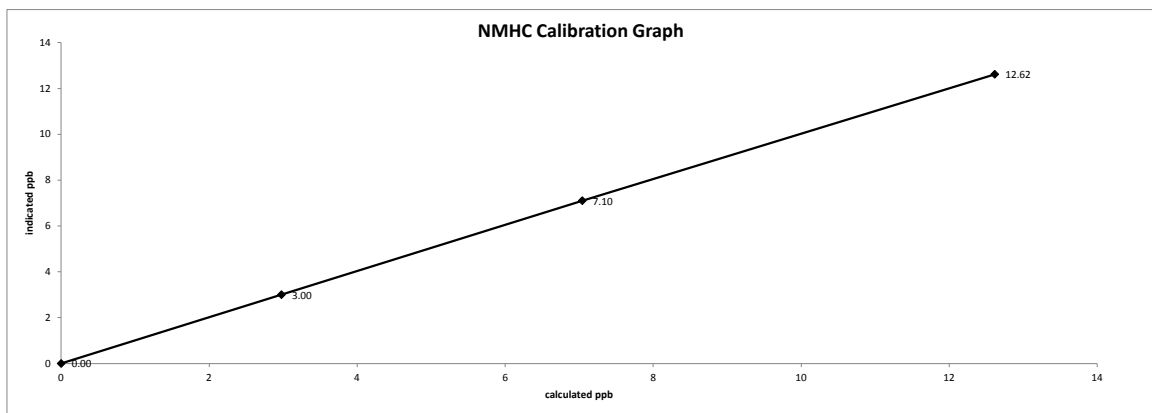
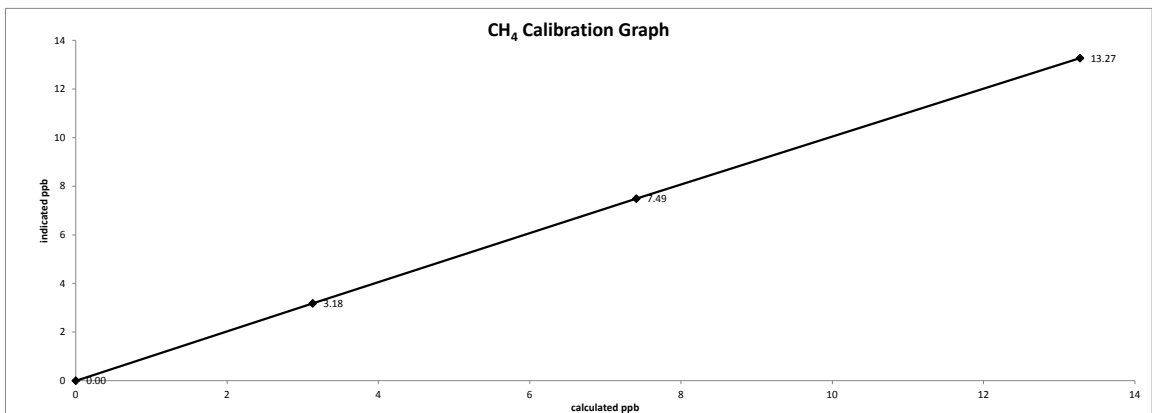
A new hydrogen cylinder was installed. No zero adjustment was required/made. As found zero values were copied to adjusted zero values for linearity calculation purposes.

A new span gas cylinder was installed. The analyzer cooling fan filter(s) were cleaned. The oxygen purifiers were replaced.

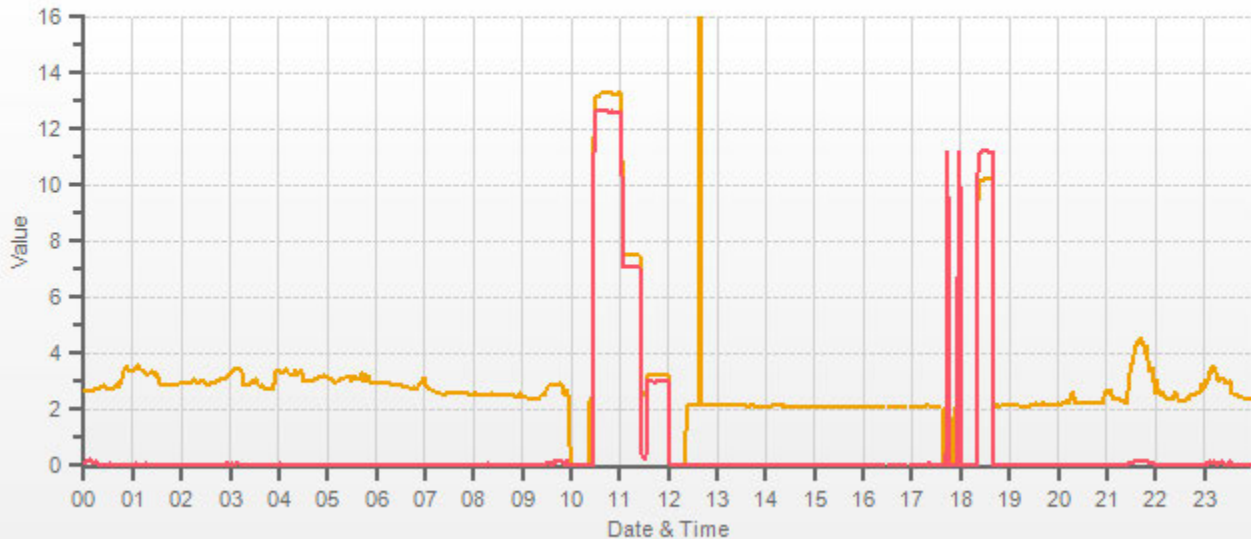
The manifold blower was found to be working normally.

Date: October 24, 2018
Company/Airshed: LICA
Location/Station Name: Bonnyville East

Start/End Time 24 hr. (mst): 9:37 / 18:43
Calibration Purpose: installation
Calibration Method: Gas Dilution



CH4[ppm] NMHC[ppm]





Thermo 55i Methane/Non-Methane Analyzer Calibration

Date:	November 6, 2018	Barometer/B.P./units:	Brunton 05490 expires December 11, 2018	961	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 160459244 expires June 19, 2020	23	°C
Location/Station Name:	Bonnyville East	Weather Conditions:	Light snow		
Parameter:	CH4 / NMHC / THC	Calibration Purpose:	routine monthly		
Start/End Time 24 hr. (mst):	11:30 / 15:51	Performed By/Reviewer:	Chris Wesson	Rob Fisher	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	October 18, 2025		

Analyzer:	Serial Number/Owner: 123656107 LICA	Correction Factors:	
Measured Flow: 1.1 L/min	Previous C.F.:	As Found C.F.:	New C.F.:
Last Calibration Date: October 24, 2018	CH ₄ = 1.000	1.007	1.000
Range ppm: 20 CH4/20 NMHC/40 THC	NMHC = 1.000	0.999	0.999
	THC = 1.000	1.003	0.999

Calibration Standards:

Low Flow Meter ID/Expiry Date: N/A
 High Flow Meter ID/Expiry Date: N/A
 Calibrator ID/Expiry Date: Sabio id# 30860808 expires August 21, 2019
 Cal Gas Cylinder I.D. #: LL119471
 CH4 Cylinder Conc.: 599.0 | 207.0 = C₂H₆ Cylinder Conc.
 CH₄ expressed as C₂H₆: 569.3 | 1168.3 = total CH₄ equivalent

Point	CH4	NMHC	THC
High	13.00	13.00	26.00
Mid	7.00	7.00	14.00
Low	3.00	3.00	6.00

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

Point	Calibrator Flow Rates (cc/min)			Calculated CH ₄ (ppm)	Calculated NMHC (ppm)	Calculated THC (ppm)	Indicated CH ₄ (ppm)	Indicated NMHC (ppm)	Indicated THC (ppm)	Correction Factors:		
	Diluent	Cal Gas	Total Flow							CH ₄	NMHC	THC
as found zero	2499	0.00	2499	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
as found high	2438	60.90	2499	14.60	13.87	28.47	14.49	13.88	28.38	1.007	0.999	1.003
adjusted zero	2499	0.00	2499	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
adjusted high	2438	60.90	2499	14.60	13.87	28.47	14.60	13.89	28.49	1.000	0.999	0.999
mid	2469	30.30	2499	7.26	6.90	14.16	7.29	6.80	14.09	0.996	1.015	1.005
low	2484	15.40	2499	3.69	3.51	7.20	3.74	3.39	7.13	0.987	1.035	1.010
calibrator zero	2499	0.00	2499	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
Average C.F. =										0.994	1.016	1.005

Linear Regression/Calibration Results:

	CH ₄	NMHC	THC	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.999	1.003	1.001	0.95-1.05
b (Intercept as % of full scale) =	0.12%	-0.36%	-0.12%	± 3% F.S.
% change in C.F. from last cal =	-0.74%	0.05%	-0.32%	± 10%

As Left Instrument Diagnostics:

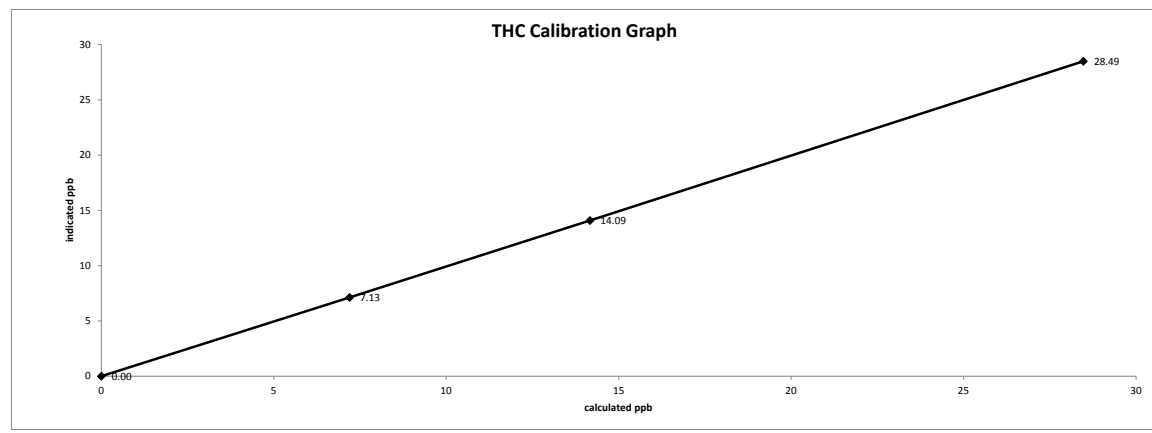
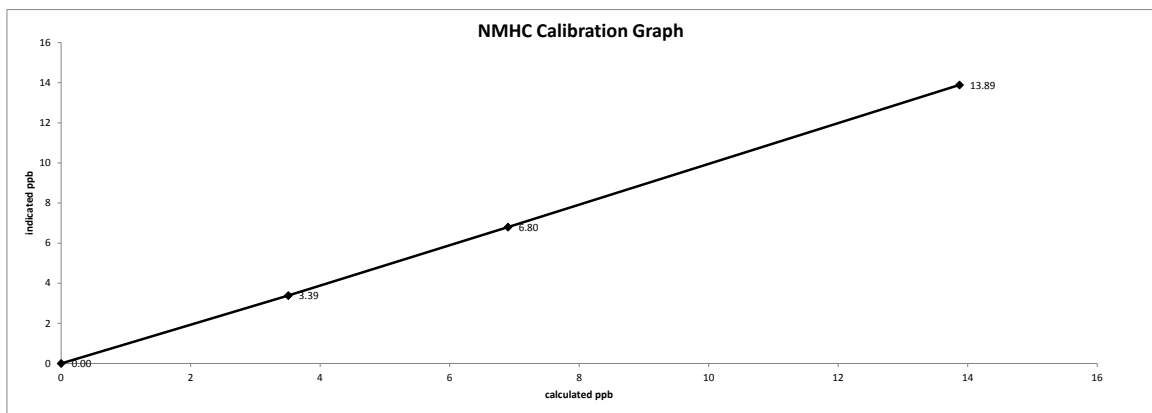
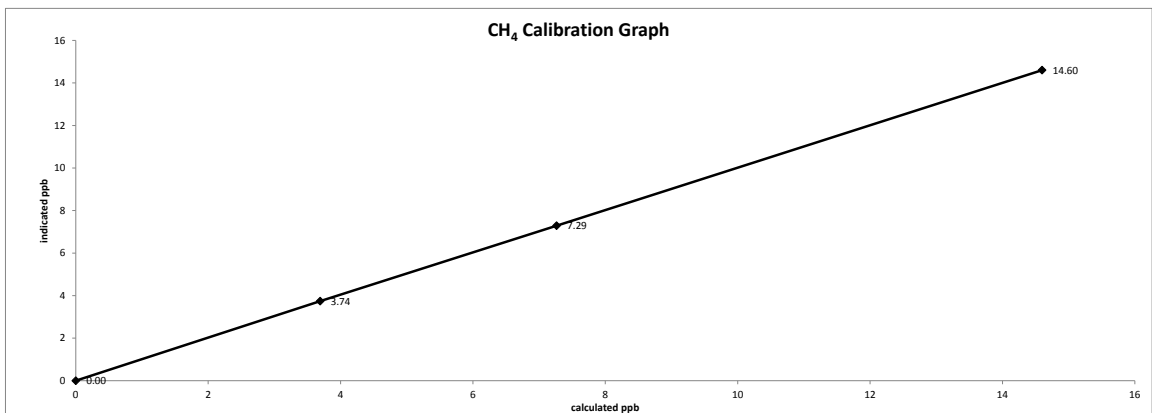
Interface Board Voltages:	Bias Supply: 292.9	Calibration History cnt'd:	NM Peak Area: 91026
Temperatures:	Detector Oven: 175.0	Crucial Settings:	Methane Start: n/a
	Filter: 175.0		Methane End: n/a
	Column Oven: 74.9		Backflush: n/a
	Internal: 32.9		NMHV Start: n/a
Cylinder Pressures/reg.:	Carrier: 2100 50	Run History>1:	NMHC End: n/a
	Fuel: 1400 50		Date: 06Nov2018
	Span Gas: 1850 22		Time: 14:56
	Zero Air Generator: 48		CH ₄ PK HT: 0
Internal Pressures:	Carrier: 31.0		CH ₄ RT: 8.0
	Fuel: 40.3		CH ₄ Baseline: 2498
	Air: 31.5		CH ₄ LOD: 48
FID Status:	Status: LIT		CH ₄ SD: 16
	Counts: 28437		CH ₄ CONC: 0.00
	Flame: 363.4		NM PK HT: 0
	Det Base: 175.0		NM Peak Area: 0
Flame and Power Stats:	Last Power On: 18Oct2018@11:03		NM CONC: 0.00
	Flameouts: 1		NM Base Start: 2514
	Det Oven at Start: 23.1		NM Base End: 2446
	Col Oven at Start: 22.3		NM LOD: 7
Calibration History:	Time: 06Nov2018@13:30		NM Start IDX: 2
	Type: Span		NM End IDX: 35
	Status: Good		NM Max Slope: 0.0e+00
	Check/Adjust: Adjust		NM Min Slope: -1.4e+00
	CH ₄ Span Conc: 14.60		NM PT Count: 0
	CH ₄ SP Ratio: 0.000778	Expected Values:	Previous CH ₄ : 10.23
	CH ₄ RT: 13.8		Previous NMHC: 11.18
	CH ₄ PK IDX: 29		Previous THC: 21.41
	CH ₄ PK HT: 18756		New CH ₄ : 10.17
	NM Span Conc: 13.87		New NMHC: 11.31
	NM SP Ratio: 0.000152		New THC: 21.48

Comments:
 The analyzer sample inlet filter was changed.

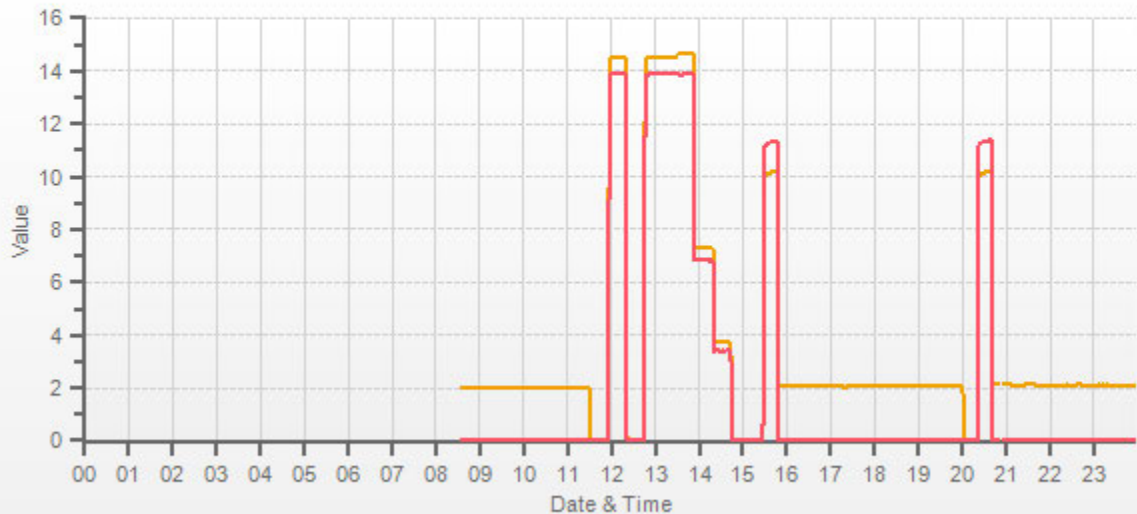
The analyzer cooling fan filter(s) were cleaned.
 The manifold blower was found to be working normally.

Date: November 6, 2018
Company/Airshed: LICA
Location/Station Name: Bonnyville East

Start/End Time 24 hr. (mst): 11:30 / 15:51
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution



CH4[ppm] NMHC[ppm]



NITROGEN DIOXIDE



Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: October 23, 2018 Company/Airshed: LICA Location/Station Name: Bonnyville East Start/End Time 24 hr. (mst): 10:06 / 17:35 G.P.T. to be used for Ozone? No Calibration Method: Gas Dilution & Gas Phase Titration	Barometer/B.P./units: F.S. 05544 expires January 15, 2019 949 millibars Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019 22 °C Weather Conditions: Mainly sunny Calibration Purpose: Installation Performed By/Reviewer: Alex Yakupov Rob Fisher Cal Gas Expiry Date: October 24, 2020
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Analyzer: Serial Number/Owner: 1180930027 LICA Last Calibration Date: n/a 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>n/a</td> <td>n/a</td> <td>0.999</td> </tr> <tr> <td>NO₂ =</td> <td>n/a</td> <td>n/a</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>n/a</td> <td>n/a</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	n/a	n/a	0.999	NO ₂ =	n/a	n/a	1.000	NOx =	n/a	n/a	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	n/a	n/a	0.999														
NO ₂ =	n/a	n/a	1.000														
NOx =	n/a	n/a	1.000														

Calibration Standards: Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: Sabio id# 11900613 expires August 22, 2019 Cal Gas Cylinder I.D. #: LL 104225 Cal Gas Conc. (ppm): 51.5 51.6	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">Standard Calibration Points for a Range of: 1000 ppb</th> </tr> <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>	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
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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
adjusted zero	5032	0.0	5032	0	0	0.0	0.0	n/a	n/a
adjusted high	4947	75.6	5023	775.5	777.0	776.0	777.0	0.999	1.000
mid	4990	36.58	5027	374.8	375.5	377.0	378.0	0.994	0.993
low	5023	17.25	5040	176.3	176.6	178.0	178.0	0.990	0.992
calibrator zero	5032	0.00	5032	0.0	0.0	0.0	0.0	n/a	n/a
Average C.F.=								0.995	0.995

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	4947	75.64	5023	0.0	775.0	776.0	1.0	0.0	1.0	
adjusted high NO2	4947	75.64	5023	510.0	270.0	776.0	506.0	505.0	505.0	1.000
gpt mid	4947	75.64	5023	275.0	506.0	776.0	270.0	269.0	269.0	1.000
gpt low	4947	75.64	5023	100.0	676.0	776.0	100.0	99.0	99.0	1.000
Average NO₂ C.F.=										1.000

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.000	1.000	1.001	0.95-1.05
b (Intercept as % of full scale)=	0.11%	0.11%	0.06%	± 3% F.S.
% change in C.F. from last cal=	n/a	n/a	n/a	n/a
NO2 converter efficiency			1.00	0.96 to 1.04

As found:	As left:
NO Bkg: n/a	NO Bkg: 9.4
NOx Bkg: n/a	NOx Bkg: 9.6
NO Coef: n/a	NO Coef: 1.166
NO2 Coef: n/a	NO2 Coef: 0.995
NOx Coef: n/a	NOx Coef: 0.999
PMT: n/a	PMT: -906.1
Internal: n/a	Internal: 29.5
Chamber: n/a	Chamber: 49.9
Cooler: n/a	Cooler: -3.1
NO2 Converter: n/a	NO2 Converter: 326.3
NO2 Converter Set: n/a	NO2 Converter Set: 325.0
Perm Oven Gas: n/a	Perm Oven Gas: 45.02
Perm Oven Heater: n/a	Perm Oven Heater: 44.24
Pressure: n/a	Pressure: 255.0
Flow: n/a	Flow: 0.550
Ozonator Flow: n/a	Ozonator Flow: OK
Expected Value NO: n/a	Expected Value NO: 5
Expected Value NO2: n/a	Expected Value NO2: 279
Expected Value NOx: n/a	Expected Value NOx: 284

Comments: The converter cooling fan filter was cleaned.

The analyzer sample inlet filter was changed.

The manifold blower was found to be working normally.

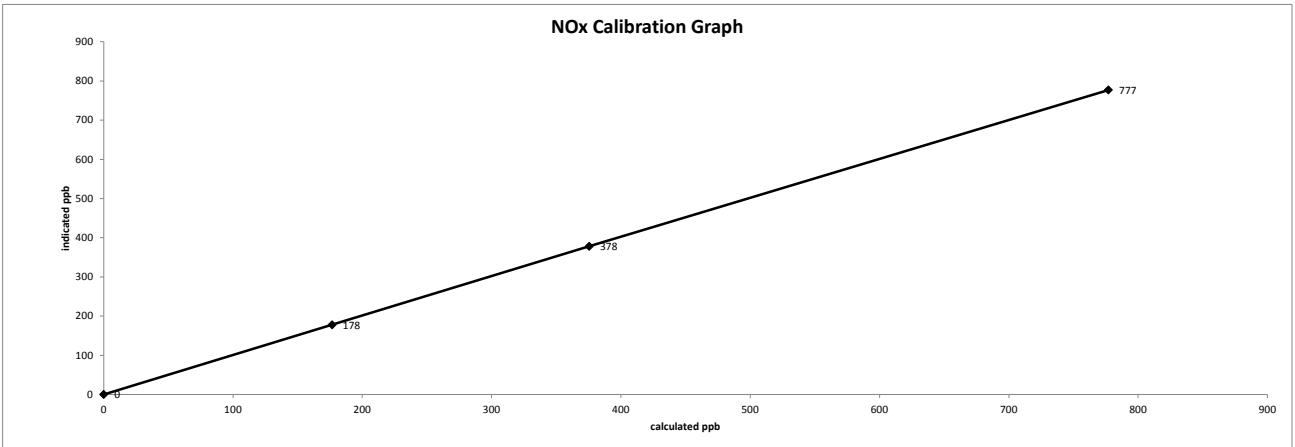
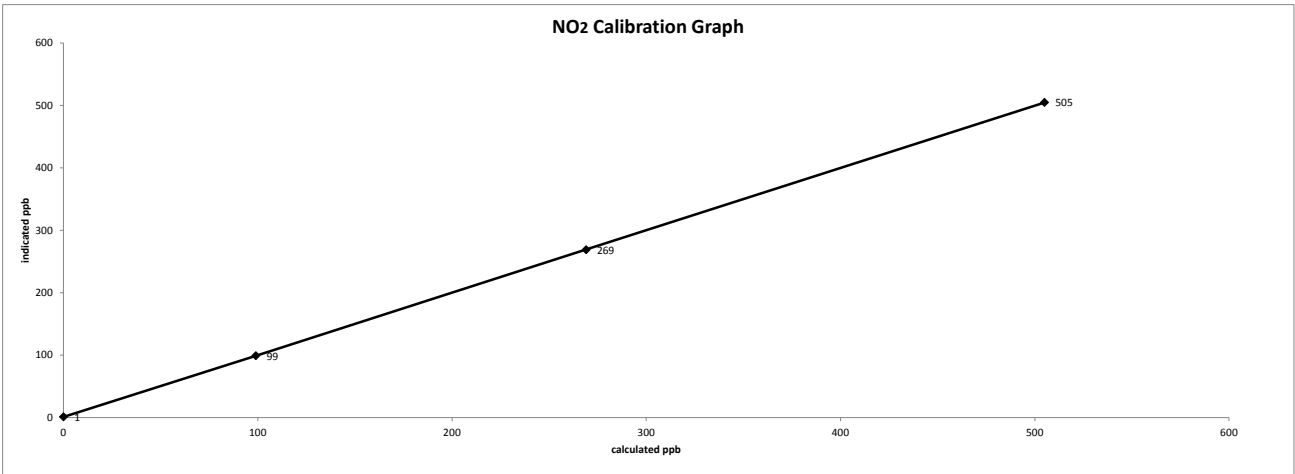
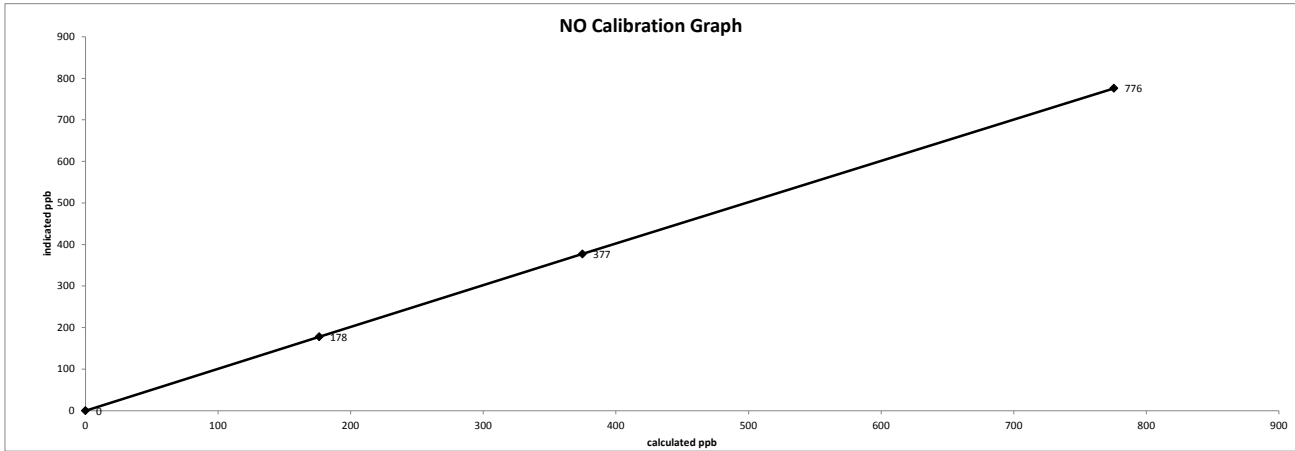
The analyzer perm tube was changed , new expected value to be updated once the perm tube temperature has stabilized.

The analyzer cooling fan filter(s) were cleaned.

Date: October 23, 2018
Company/Airshed: LICA
Location/Station Name: Bonnyville East

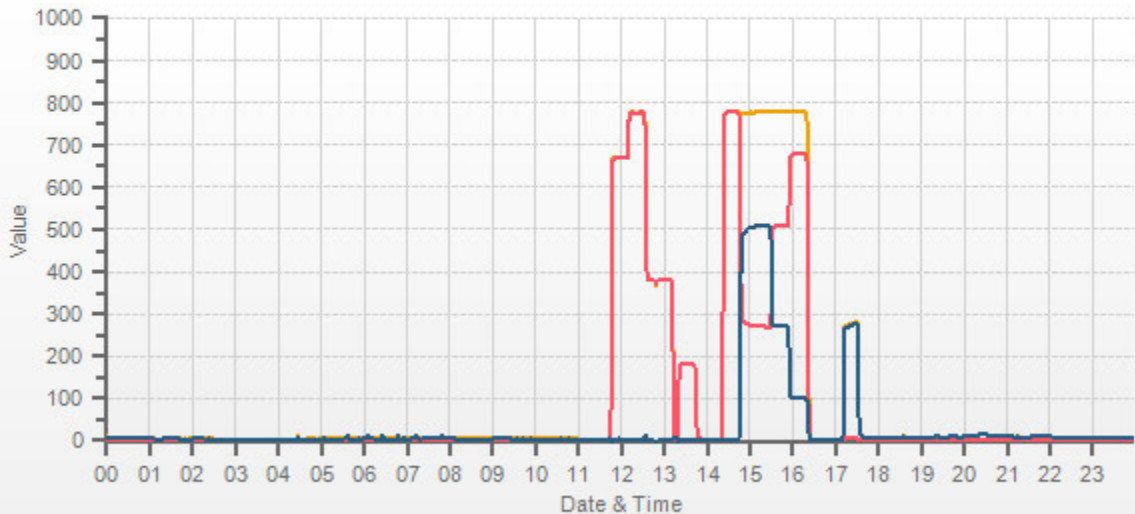
Start/End Time 24 hr. (mst): 10:06 / 17:35
Calibration Purpose: installation
Calibration Method: Gas Dilution & Gas Phase Titration

Thermo 42i NO-NO2-NOx Analyzer Calibration



Station: LICA Bonnyville East Daily: 18/10/23 Type: AVG 1 Min. [1 Min.]

— NOX[ppb] — NO[ppb] — NO2[ppb]





Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: November 6, 2018 Company/Airshed: LICA Location/Station Name: Bonnyville East Start/End Time 24 hr. (mst): 08:35 / 15:21 G.P.T. to be used for Ozone?: Yes with 1000 ppb NOx full scale Calibration Method: Gas Dilution & Gas Phase Titration	Barometer/B.P./units: Brunton 05490 expires December 11, 2018 961 millibars Thermometer/Station Temp: F.S. 160459244 expires June 19, 2020 22 °C Weather Conditions: Light snow Calibration Purpose: routine monthly Performed By/Reviewer: Chris Wesson Rob Fisher Cal Gas Expiry Date: October 24, 2020
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Analyzer: Serial Number/Owner: 1180930027 LICA Last Calibration Date: October 23, 2018 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>1.002</td> <td>1.001</td> </tr> <tr> <td>NO₂ =</td> <td>1.000</td> <td>0.995</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>1.000</td> <td>1.003</td> <td>0.999</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	0.999	1.002	1.001	NO ₂ =	1.000	0.995	1.000	NOx =	1.000	1.003	0.999
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	0.999	1.002	1.001														
NO ₂ =	1.000	0.995	1.000														
NOx =	1.000	1.003	0.999														

Calibration Standards: Low Flow Meter ID/Expiry Date: N/A High Flow Meter ID/Expiry Date: N/A Calibrator ID/Expiry Date: Sabio id# 17200415 expires August 21, 2019 Cal Gas Cylinder I.D. #: LL104225 Cal Gas Conc. (ppm): 51.5 51.6	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">Standard Calibration Points for a Range of: 1000 ppb</th> </tr> <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>610</td> <td>375</td> <td><-high ozone</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>190</td> <td><-mid ozone</td> </tr> <tr> <td>Low</td> <td>190</td> <td>70</td> <td><-low ozone</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>	Standard Calibration Points for a Range of: 1000 ppb				Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	610	375	<-high ozone	Mid	380	190	<-mid ozone	Low	190	70	<-low ozone	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Standard Calibration Points for a Range of: 1000 ppb																													
Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																										
High	610	375	<-high ozone																										
Mid	380	190	<-mid ozone																										
Low	190	70	<-low ozone																										
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	4998	0.0	4998	0	0	-0.3	-0.4	n/a	n/a
as found high	4940	61.7	5002	635.3	636.5	634.0	634.0	1.002	1.003
adjusted zero	4998	0.00	4998	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4939	61.70	5001	635.4	636.6	635.0	637.0	1.001	0.999
mid	4961	37.10	4998	382.3	383.0	382.0	384.0	1.001	0.997
low	4981	18.60	5000	191.6	192.0	192.0	193.0	0.998	0.995
calibrator zero	4998	0.00	4998	0	0	0.1	0.1	n/a	n/a
Average C.F.=								1.000	0.997

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO ₂	NO drop	NO ₂ gain	NO ₂ C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4939	61.70	5001	0.0	637.0	640.0	3.0	0.0	3.0	
as found high NO2	4939	61.70	5001	370.0	246.0	642.0	396.0	391.0	393.0	0.995
adjusted high NO2	4939	61.70	5001	370.0	247.0	639.0	393.0	390.0	390.0	1.000
gpt mid	4939	61.70	5001	180.0	446.0	640.0	194.0	191.0	191.0	1.000
gpt low	4939	61.70	5001	85.0	549.0	640.0	91.0	88.0	88.0	1.000
Average NO ₂ C.F.=										1.000

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.001	1.000	1.006	0.95-1.05
b (Intercept as % of full scale)=	0.02%	0.05%	0.17%	± 3% F.S.
% change in C.F. from last cal=	-0.25%	-0.33%	0.51%	± 10%
NO2 converter efficiency			1.00	0.96 to 1.04

As found: NO Bkg: 9.4 NOx Bkg: 9.6 NO Coef: 1.166 NO2 Coef: 0.995 NOx Coef: 0.999 PMT: -906.5 Internal: 30.1 Chamber: 50.3 Cooler: -3.0 NO2 Converter: 324.2 NO2 Converter Set: 325.0 Perm Oven Gas: 45.02 Perm Oven Heater: 44.26 Pressure: 257.4 Flow: 0.558 Ozonator Flow: OK Expected Value NO: 5 Expected Value NO2: 279 Expected Value NOx: 284	As left: NO Bkg: 9.3 NOx Bkg: 9.3 NO Coef: 1.171 NO2 Coef: 1.002 NOx Coef: 1.002 PMT: -906.1 Internal: 29.9 Chamber: 50.1 Cooler: -2.8 NO2 Converter: 325.3 NO2 Converter Set: 325.0 Perm Oven Gas: 45.00 Perm Oven Heater: 44.23 Pressure: 258.3 Flow: 0.562 Ozonator Flow: OK Expected Value NO: 6 Expected Value NO2: 282 Expected Value NOx: 287
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Comments:

The analyzer sample inlet filter was changed.

The manifold blower was found to be working normally.

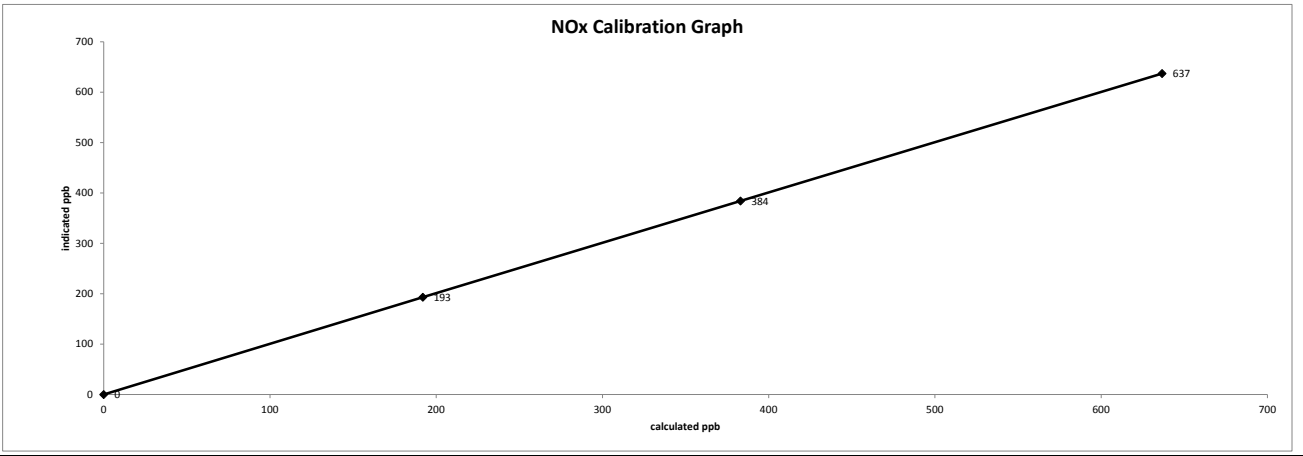
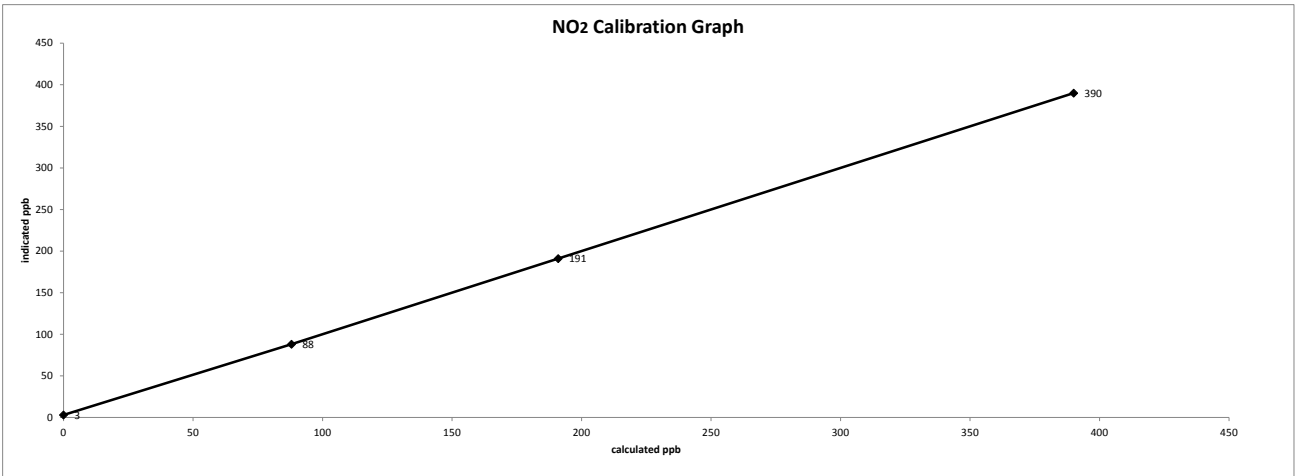
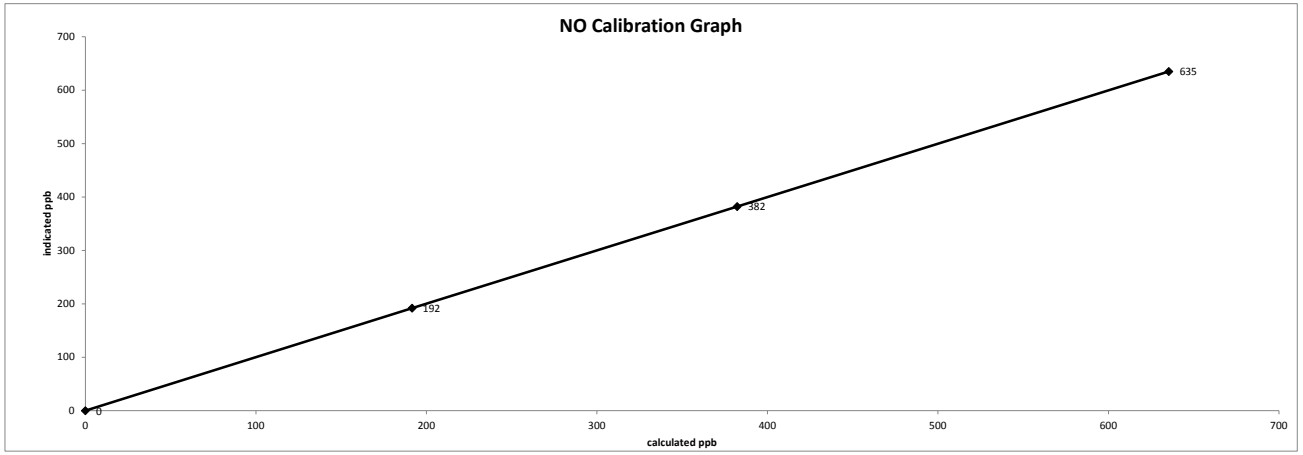
The analyzer cooling fan filter(s) were cleaned.

The calibrator was adjusted at 09:20 as the output was too low for the SO2 As-Found High. The As Found High was restarted.

Date: November 6, 2018
Company/Airshed: LICA
Location/Station Name: Bonnyville East

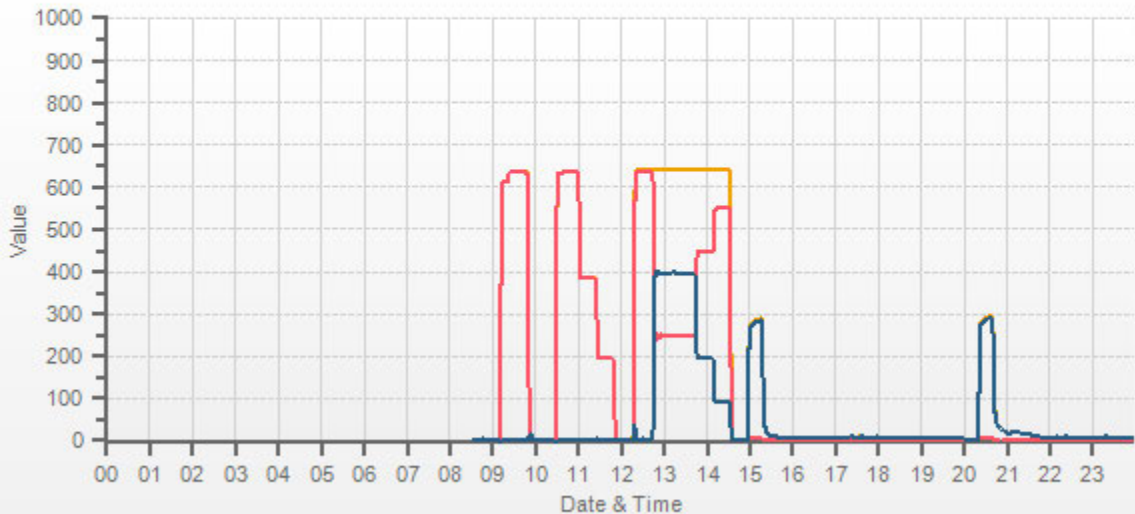
Start/End Time 24 hr. (mst): 08:35 / 15:21
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Gas Phase Titration

Thermo 42i NO-NO2-NOx Analyzer Calibration



Station: LICA Bonnyville East Daily: 18/11/06 Type: AVG 1 Min. [1 Min.]

— NOX[ppb] — NO[ppb] — NO2[ppb]





Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: November 14, 2018	Barometer/B.P./units: F.S. 05544 expires January 15, 2019	938	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name: Bonnyville East	Weather Conditions: A few clouds		
Start/End Time 24 hr. (mst): 10:16 / 17:15	Calibration Purpose: repeat		
G.P.T. to be used for Ozone?: No	Performed By/Reviewer: Alex Yakupov	Rob Fisher	
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: October 24, 2020		

Analyzer: Serial Number/Owner: 1180930027 LICA Last Calibration Date: November 6, 2018 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>1.001</td> <td>0.978</td> <td>0.999</td> </tr> <tr> <td>NO₂ =</td> <td>1.000</td> <td>1.012</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>0.999</td> <td>0.976</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.001	0.978	0.999	NO ₂ =	1.000	1.012	1.000	NOx =	0.999	0.976	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.001	0.978	0.999														
NO ₂ =	1.000	1.012	1.000														
NOx =	0.999	0.976	1.000														

Calibration Standards: Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: API id# 690 expires March 15, 2019 Cal Gas Cylinder I.D. #: LL 104225 Cal Gas Conc. (ppm): 51.5 51.6	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	5016	0.0	5016	0	0	0.1	0.3	n/a	n/a
as found high	4923	76.1	4999	783.6	785.1	801.0	805.0	0.978	0.976
adjusted zero	5016	0.00	5016	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4934	75.83	5010	779.5	781.0	780.0	781.0	0.999	1.000
mid	4976	36.67	5013	376.7	377.5	379.0	380.0	0.994	0.993
low	4996	18.29	5014	187.9	188.2	189.0	189.0	0.994	0.996
calibrator zero	5016	0.00	5016	0	0	0.0	0.0	n/a	n/a
Average C.F.=								0.996	0.996

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO ₂	NO drop	NO ₂ gain	NO ₂ C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4934	75.83	5010	0.0	781.0	782.0	1.0	0.0	1.0	
as found high NO2	4934	75.83	5010	510.0	272.0	777.0	504.0	509.0	503.0	1.012
adjusted high NO2	4934	75.83	5010	510.0	272.0	782.0	510.0	509.0	509.0	1.000
gpt mid	4934	75.83	5010	275.0	510.0	782.0	272.0	271.0	271.0	1.000
gpt low	4934	75.83	5010	100.0	682.0	782.0	100.0	99.0	99.0	1.000
Average NO ₂ C.F.=										1.000

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.000	1.000	1.001	0.95-1.05
b (Intercept as % of full scale)=	0.08%	0.08%	0.06%	± 3% F.S.
% change in C.F. from last cal=	2.26%	2.34%	-1.19%	± 10%
NO ₂ converter efficiency			1.00	0.96 to 1.04

As found:		As left:	
NO Bkg:	9.3	NO Bkg:	9.3
NOx Bkg:	9.3	NOx Bkg:	9.4
NO Coef:	1.171	NO Coef:	1.141
NO ₂ Coef:	1.002	NO ₂ Coef:	0.994
NOx Coef:	1.002	NOx Coef:	0.999
PMT:	-906.1	PMT:	-906.1
Internal:	30.2	Internal:	29.7
Chamber:	49.9	Chamber:	50.0
Cooler:	-3.0	Cooler:	-2.9
NO ₂ Converter:	325.0	NO ₂ Converter:	323.9
NO ₂ Converter Set:	325.0	NO ₂ Converter Set:	325.0
Perm Oven Gas:	45.01	Perm Oven Gas:	45.00
Perm Oven Heater:	44.24	Perm Oven Heater:	44.23
Pressure:	253.2	Pressure:	252.9
Flow:	0.554	Flow:	0.554
Ozonator Flow:	OK	Ozonator Flow:	OK
Expected Value NO:	6	Expected Value NO:	5
Expected Value NO ₂ :	282	Expected Value NO ₂ :	295
Expected Value NOx:	287	Expected Value NOx:	300

Comments:

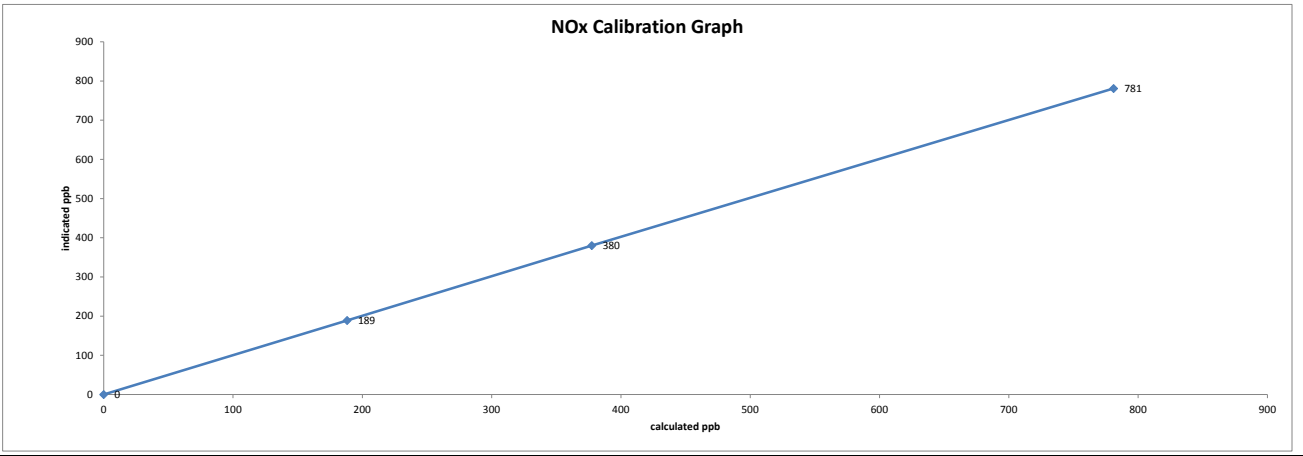
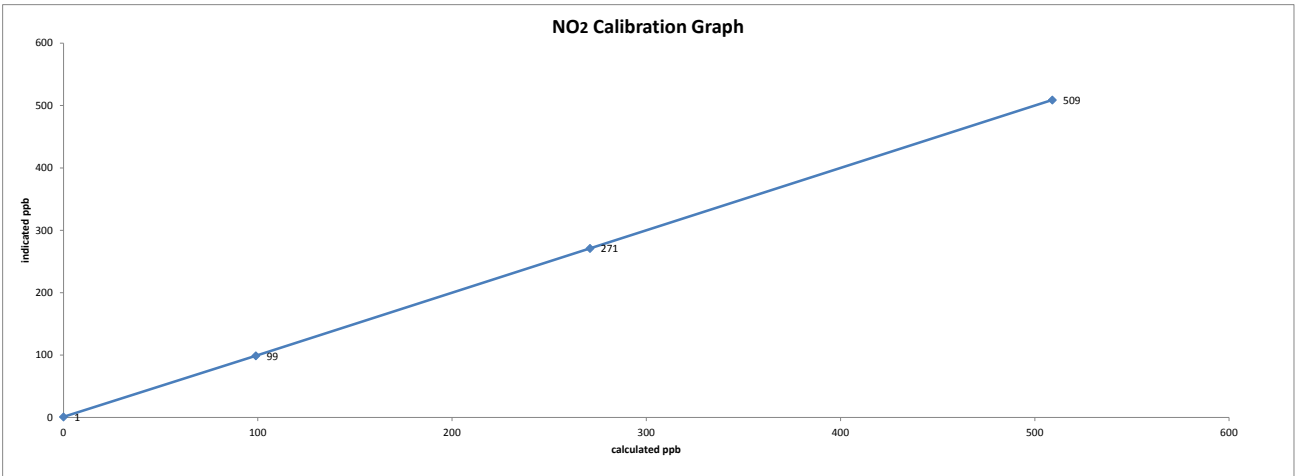
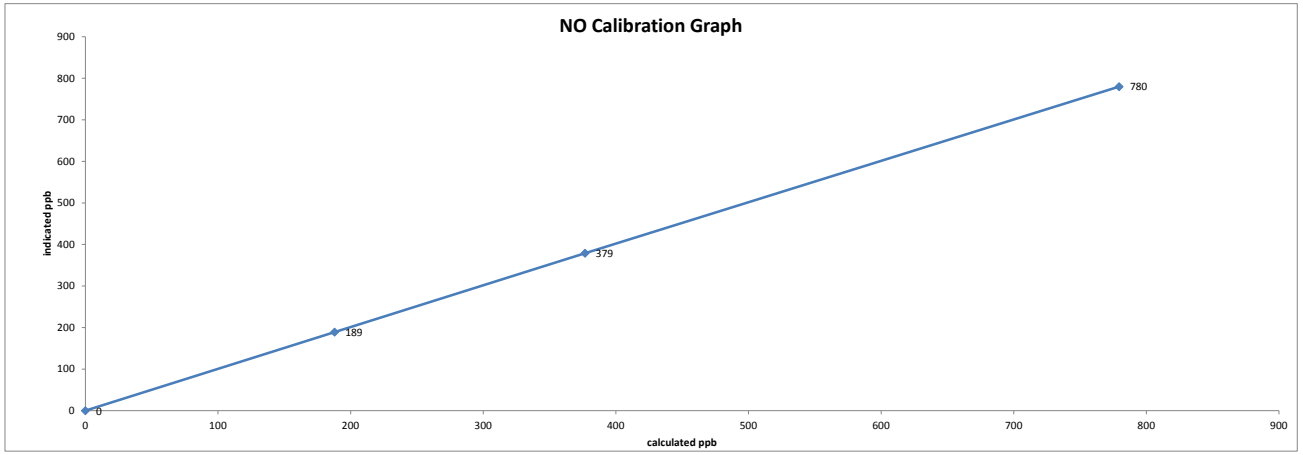
The manifold blower was found to be working normally.

A repeat calibration was completed due to an EV drift of 15%.

Date: November 14, 2018
Company/Airshed: LICA
Location/Station Name: Bonnyville East

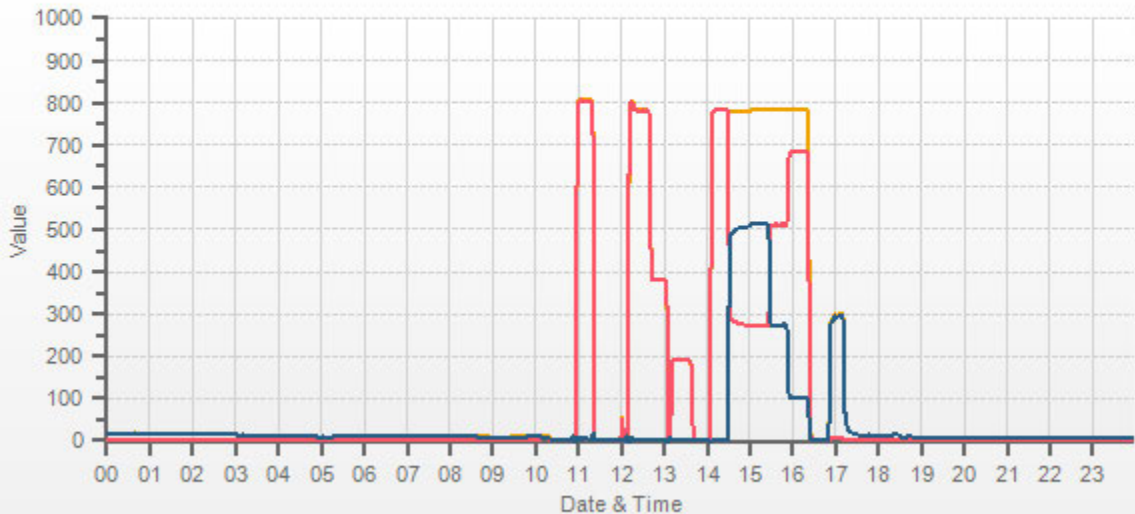
Start/End Time 24 hr. (mst): 10:16 / 17:15
Calibration Purpose: repeat
Calibration Method: Gas Dilution & Gas Phase Titration

Thermo 42i NO-NO2-NOx Analyzer Calibration



Station: LICA Bonnyville East Daily: 18/11/14 Type: AVG 1 Min. [1 Min.]

— NOX[ppb] — NO[ppb] — NO2[ppb]





Thermo 42i NO-NO2-NOx Analyzer Calibration

Date:	November 28, 2018	Barometer/B.P./units:	Brunton 05490 expires December 11, 2018		inHg
Company/Airshed:	LICA	Thermometer/Station Temp:	Station Thermometer	24	°C
Location/Station Name:	Bonnyville East	Weather Conditions:	Fog		
Start/End Time 24 hr. (mst):	16:26 / 18:00	Calibration Purpose:	as found		
G.P.T. to be used for Ozone?	No	Performed By/Reviewer:	Chris Wesson		
Calibration Method:	Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date:	October 24, 2020		

Analyzer: Serial Number/Owner: 1180930027 LICA Last Calibration Date: November 14, 2018 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>0.991</td> <td>n/a</td> </tr> <tr> <td>NO₂ =</td> <td>1.000</td> <td>0.996</td> <td>n/a</td> </tr> <tr> <td>NO_x =</td> <td>1.000</td> <td>0.995</td> <td>n/a</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	0.999	0.991	n/a	NO ₂ =	1.000	0.996	n/a	NO _x =	1.000	0.995	n/a
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	0.999	0.991	n/a														
NO ₂ =	1.000	0.996	n/a														
NO _x =	1.000	0.995	n/a														

Calibration Standards: Low Flow Meter ID/Expiry Date: N/A High Flow Meter ID/Expiry Date: N/A Calibrator ID/Expiry Date: Sabio id# 30860808 expires August 21, 2019 Cal Gas Cylinder I.D. #: LL108015 Cal Gas Conc. (ppm): 52.2 52.3	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 NO _x	Indicated NO	Indicated NO _x	NO C.F.	NO _x C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	5002	0.0	5002	0	0	0.0	0.4	n/a	n/a
as found high	4925	74.7	5000	779.9	781.4	787.0	786.0	0.991	0.995
Average C.F.=								n/a	n/a

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NO _x	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)
NO _x reference	4925	74.70	5000	0.0	787.0	786.0	-1.0	0.0	-1.0	
as found high NO ₂	4925	74.70	5000	500.0	301.0	788.0	487.0	486.0	488.0	0.996
Average NO ₂ C.F.=										n/a

Linear Regression/Calibration Results:

	NO	NO _x	NO ₂	LIMITS
Correlation Coefficient =	n/a	n/a	n/a	n/a
Slope =	n/a	n/a	n/a	n/a
b (Intercept as % of full scale) =	n/a	n/a	n/a	n/a
% change in C.F. from last cal =	n/a	n/a	n/a	n/a
NO ₂ converter efficiency			0.99	0.96 to 1.04

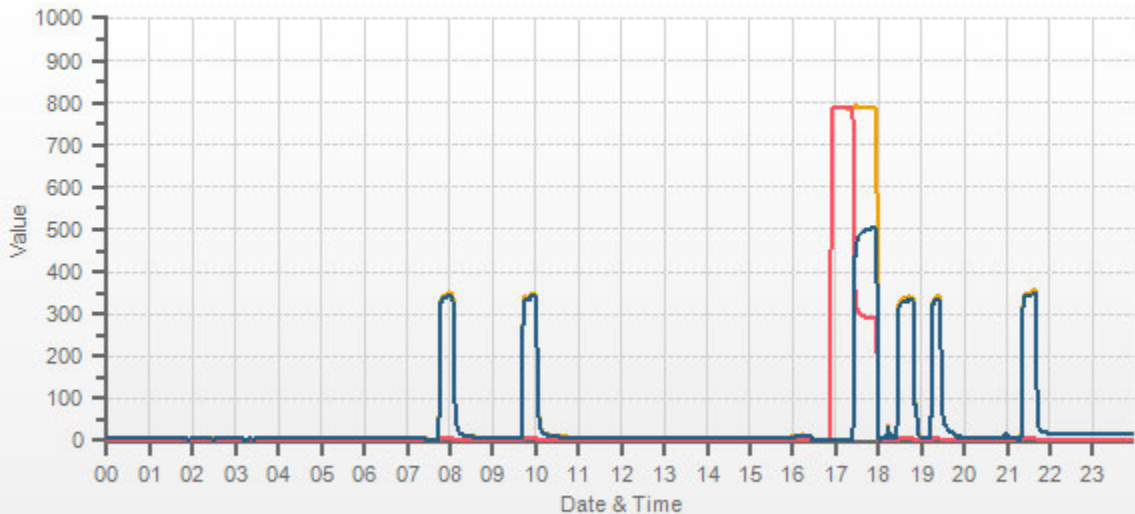
As found:	As left:
NO Bkg: 9.3	NO Bkg: n/a
NO _x Bkg: 9.4	NO _x Bkg: n/a
NO Coef: 1.141	NO Coef: n/a
NO ₂ Coef: 0.994	NO ₂ Coef: n/a
NO _x Coef: 0.999	NO _x Coef: n/a
PMT: -906.1	PMT: n/a
Internal: 32.6	Internal: n/a
Chamber: 50.0	Chamber: n/a
Cooler: -3.0	Cooler: n/a
NO ₂ Converter: 326.3	NO ₂ Converter: n/a
NO ₂ Converter Set: 325.0	NO ₂ Converter Set: n/a
Perm Oven Gas: 45.04	Perm Oven Gas: n/a
Perm Oven Heater: 44.30	Perm Oven Heater: n/a
Pressure: 250.8	Pressure: n/a
Flow: 0.551	Flow: n/a
Ozonator Flow: OK	Ozonator Flow: n/a

Comments:

As-found due to span drift.

Station: LICA Bonnyville East Daily: 18/11/28 Type: AVG 1 Min. [1 Min.]

— NOX[ppb] — NO[ppb] — NO2[ppb]



OZONE



Thermo 49i Ozone Analyzer Calibration

Date: October 24, 2018 Company/Airshed: LICA Location/Station Name: Bonnyville East Start/End Time 24 hr. (mst): 9:42 / 16:14 Ozone Calibration Method: Varying UV Lamp Power G.P.T. Date: n/a-done by Varying UV Lamp Power Analyzer: Serial Number/Owner: 1002240372 LICA Last Calibration Date: n/a Previous Cal High Point C.F.: n/a	Barometer/B.P./units: F.S. 05544 expires January 15, 2019 944 millibars Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019 23 °C Weather Conditions: Mainly sunny Calibration Purpose: installation Performed By/Reviewer: Alex Yakupov Rob Fisher Cal Gas Expiry Date: n/a-done by Varying UV Lamp Power Ozone Range ppb: 500 As Found C.F.: n/a New C.F.: 1.000
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Calibration Standards:									
Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: Sabio id# 11900613 expires August 22, 2019 Cal Gas Cylinder I.D. # : n/a	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Point</th> <th>AMD Required Range of Ozone Calibration Points</th> </tr> <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> </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								

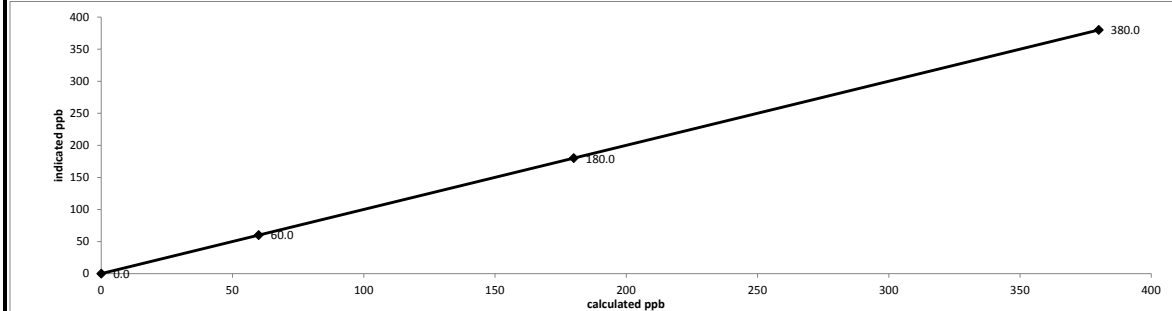
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

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)	
adjusted zero	5000	5000	0.0	n/a	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	180.0	180.0	180.0	1.000
low	5000	5000	60.0	60.0	60.0	1.000
calibrator zero	5000	5000	0.0	0.0	0.0	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) = 0.00%	0.95-1.05
% change in C.F. from last cal = n/a	± 3% F.S.
	n/a

Thermo 49i Ozone Analyzer Calibration



As found:

O3 Bkg:	n/a
O3 Coef:	n/a
Photo Lamp:	n/a
O3 Lamp:	n/a
Bench:	n/a
Bench Lamp:	n/a
O3 Lamp:	n/a
Pressure:	n/a
Cell A lpm:	n/a
Cell B lpm:	n/a
O3 ppb:	n/a
Cell A ppb:	n/a
Cell B ppb:	n/a
Cell A int (Hz):	n/a
Cell B int (Hz):	n/a
Expected Value:	n/a

As left:

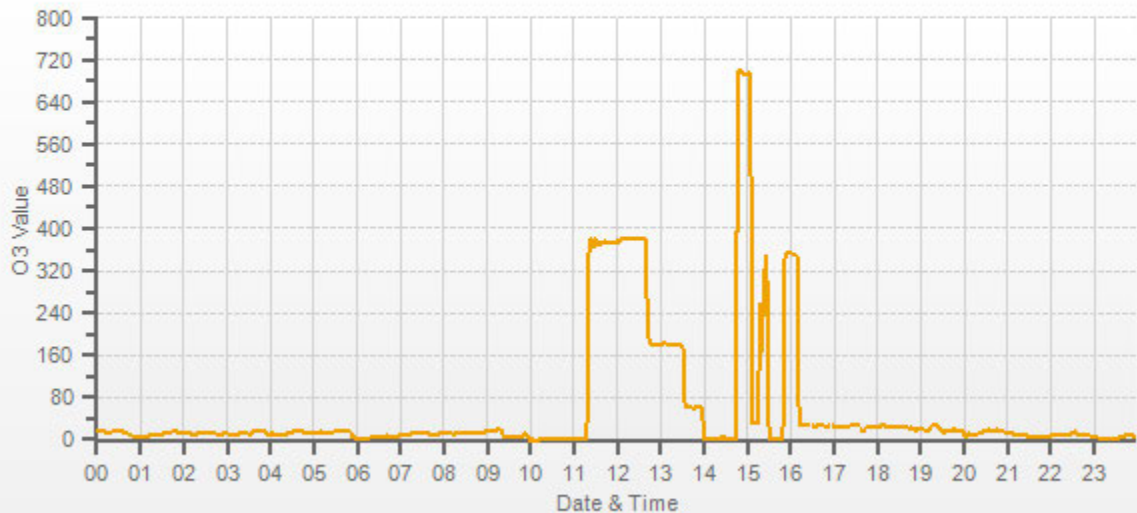
O3 Bkg:	-0.1
O3 Coef:	1.037
Photo Lamp:	14.2
O3 Lamp:	5.8
Bench:	30.1
Bench Lamp:	54.0
O3 Lamp:	68.0
Pressure:	693.8
Cell A lpm:	0.758
Cell B lpm:	0.763
O3 ppb:	0.2
Cell A ppb:	1.0
Cell B ppb:	-1.7
Cell A int (Hz):	80370
Cell B int (Hz):	86598
Expected Value:	349.0

Comments:

The analyzer sample inlet filter was changed.
 The analyzer cooling fan filter(s) were cleaned.
 The manifold blower was found to be working normally.

O3[ppb] Station: LICA Bonnyville East Daily: 18/10/24 Type: AVG 1 Min. [1 Min.]

O3[ppb]





Thermo 49i Ozone Analyzer Calibration

Date: November 6, 2018 Company/Airshed: LICA Location/Station Name: Bonnyville East Start/End Time 24 hr. (mst): 14:37 / 18:51 Ozone Calibration Method: Direct G.P.T. G.P.T. Date: November 6, 2018 Analyser: Serial Number/Owner: 1002240372 LICA Last Calibration Date: October 24, 2018 Previous Cal High Point C.F.: 1.000	Barometer/B.P./units: Brunton 05490 expires December 11, 2018 961 millibars Thermometer/Station Temp: F.S. 160459244 expires June 19, 2020 23 °C Weather Conditions: Light snow Calibration Purpose: routine monthly Performed By/Reviewer: Chris Wesson Rob Fisher Cal Gas Expiry Date: October 24, 2020 Ozone Range ppb: 500 As Found C.F.: 0.999 New C.F.: 1.000
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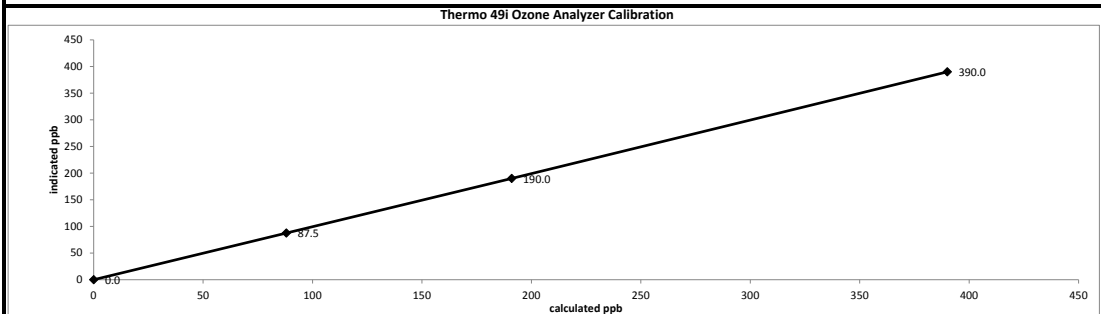
Calibration Standards: Low Flow Meter ID/Expiry Date: N/A High Flow Meter ID/Expiry Date: N/A Calibrator ID/Expiry Date: Sabio id# 17200415 expires August 21, 2019 Cal Gas Cylinder I.D. #: LL104225	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Point</th> <th>AMD Required Range of Ozone Calibration Points</th> </tr> <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>50-100 ppb</td> </tr> </table>	Point	AMD Required Range of Ozone Calibration Points	High	300-400 ppb	Mid	150-200 ppb	Low	50-100 ppb
Point	AMD Required Range of Ozone Calibration Points								
High	300-400 ppb								
Mid	150-200 ppb								
Low	50-100 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	4998	4998	0.0	n/a	-0.3	n/a
as found high	4998	4998	390.0	390.0	390.0	0.999
adjusted zero	4998	4998	0.0	0.0	0.0	n/a
adjusted high	4998	4998	390.0	390.0	390.0	1.000
mid	4998	4998	191.0	191.0	190.0	1.005
low	4998	4998	88.0	88.0	87.5	1.006
calibrator zero	4998	4998	0.0	n/a	0.1	n/a
					Average C.F.=	1.004

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.000		0.95-1.05
b (Intercept as % of full scale) =	0.08%		± 3% F.S.
% change in C.F. from last cal =	0.08%		± 10%

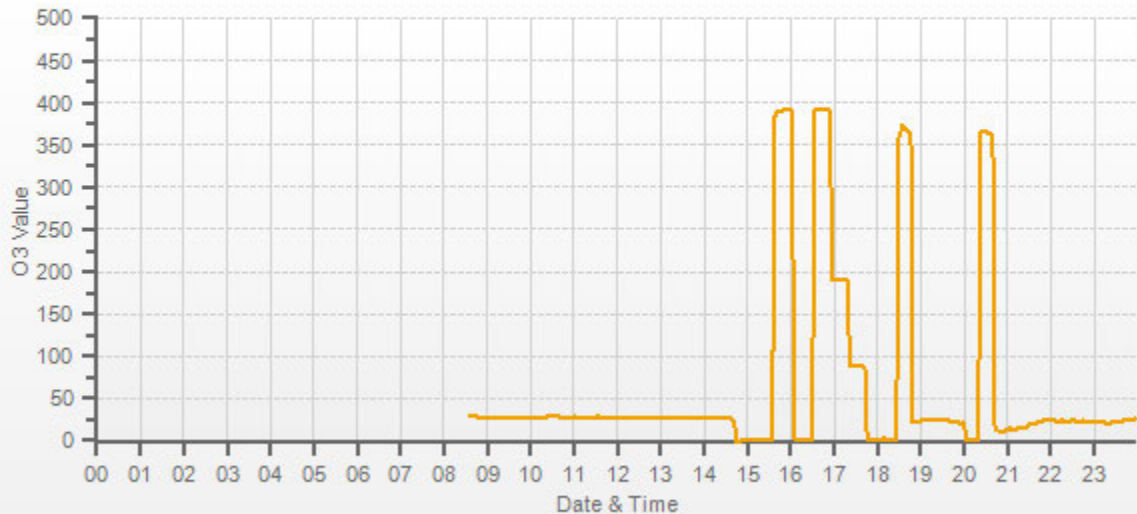


As found: O3 Bkg: -0.1 O3 Coef: 1.037 Photo Lamp: 14.2 O3 Lamp: 9.3 Bench: 30.8 Bench Lamp: 54.0 O3 Lamp: 68.0 Pressure: 706.9 Cell A lpm: 0.766 Cell B lpm: 0.770 O3 ppb: 0.2 Cell A ppb: -0.7 Cell B ppb: 1.0 Cell A int (Hz): 79523 Cell B int (Hz): 83611 Expected Value: 349.0	As left: O3 Bkg: -0.2 O3 Coef: 1.035 Photo Lamp: 14.2 O3 Lamp: 9.3 Bench: 31.2 Bench Lamp: 54.0 O3 Lamp: 68.0 Pressure: 707.2 Cell A lpm: 0.767 Cell B lpm: 0.770 O3 ppb: -0.4 Cell A ppb: -0.2 Cell B ppb: -0.7 Cell A int (Hz): 79522 Cell B int (Hz): 83611 Expected Value: 349.0
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Comments:
 The analyzer sample inlet filter was changed.
 The analyzer cooling fan filter(s) were cleaned.
 The manifold blower was found to be working normally.

O3[ppb] Station: LICA Bonnyville East Daily: 18/11/06 Type: AVG 1 Min. [1 Min.]

O3[ppb]





Thermo 49i Ozone Analyzer Calibration

Date: November 22, 2018 Company/Airshed: LICA Location/Station Name: Bonnyville - East Start/End Time 24 hr. (mst): 11:29 / 16:16 Ozone Calibration Method: Varying UV Lamp Power G.P.T. Date: n/a-done by Varying UV Lamp Power Analyzer: Serial Number/Owner: 1002240372 LICA Last Calibration Date: November 6, 2018 Previous Cal High Point C.F.: 1.000	Barometer/B.P./units: F.S. 05544 expires January 15, 2019 930 millibars Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019 24 °C Weather Conditions: A few clouds Calibration Purpose: repeat Performed By/Reviewer: Alex Yakupov Rob Fisher Cal Gas Expiry Date: n/a-done by Varying UV Lamp Power Ozone Range ppb: 500 As Found C.F.: 1.000 New C.F.: 1.000
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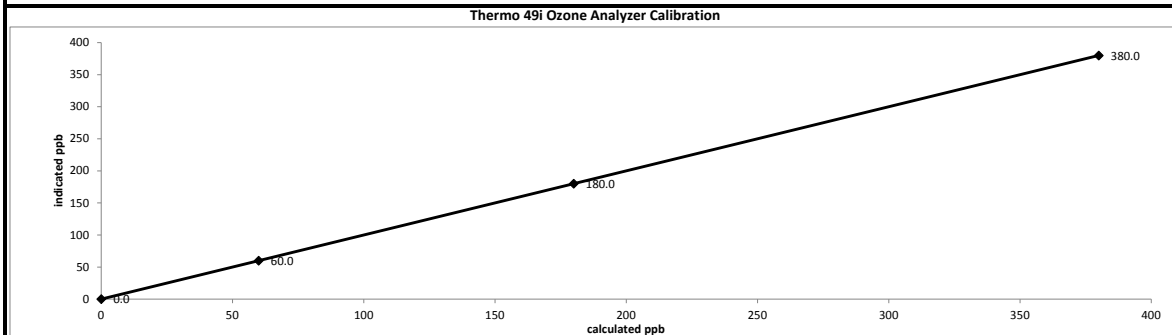
Calibration Standards: Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: Sabio id# 11900613 expires August 22, 2019 Cal Gas Cylinder I.D. #: n/a	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Point</th> <th>AMD Required Range of Ozone Calibration Points</th> </tr> <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> </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								

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

Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5000	5000	0.0	n/a	0.0	n/a
as found high	5000	5000	380.0	380.0	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	180.0	1.000
low	5000	5000	60.0	60.0	60.0	1.000
calibrator zero	5000	5000	0.0	n/a	0.0	n/a
Average C.F.=						1.000

Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u>	LIMITS
Slope = <u>1.000</u>	> or = 0.995
b (Intercept as % of full scale) = <u>0.00%</u>	0.95-1.05
% change in C.F. from last cal = <u>0.00%</u>	± 3% F.S.
	± 10%



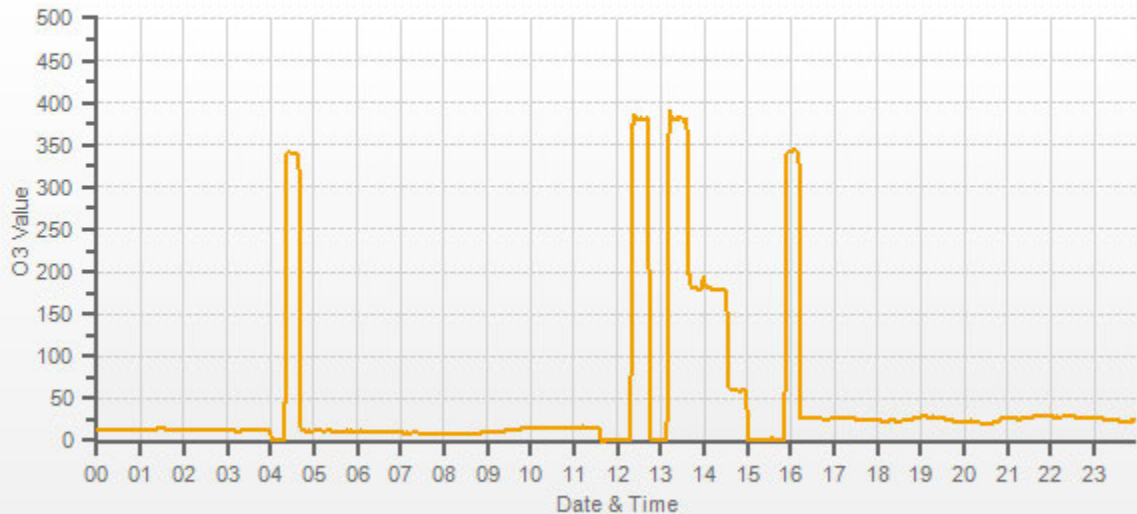
As found: O3 Bkg: <u>-0.2</u> O3 Coef: <u>1.035</u> Photo Lamp: <u>14.2</u> O3 Lamp: <u>9.3</u> Bench: <u>32.5</u> Bench Lamp: <u>54.1</u> O3 Lamp: <u>68.1</u> Pressure: <u>685.5</u> Cell A lpm: <u>0.750</u> Cell B lpm: <u>0.755</u> O3 ppb: <u>-0.1</u> Cell A ppb: <u>2.1</u> Cell B ppb: <u>-2.0</u> Cell A int (Hz): <u>78670</u> Cell B int (Hz): <u>81640</u> Expected Value: <u>363.0</u>	As left: O3 Bkg: <u>-0.2</u> O3 Coef: <u>1.035</u> Photo Lamp: <u>14.2</u> O3 Lamp: <u>9.3</u> Bench: <u>31.6</u> Bench Lamp: <u>54.1</u> O3 Lamp: <u>68.1</u> Pressure: <u>685.8</u> Cell A lpm: <u>0.751</u> Cell B lpm: <u>0.755</u> O3 ppb: <u>0.0</u> Cell A ppb: <u>2.1</u> Cell B ppb: <u>-2.0</u> Cell A int (Hz): <u>70886</u> Cell B int (Hz): <u>81685</u> Expected Value: <u>342.0</u>
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Comments: No zero adjustment was required/made. As found zero values were copied to adjusted zero values for linearity calculation purposes.
 No high point adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.

The manifold blower was found to be working normally.

A Repeat calibration was completed to correct a SPAN value drift of -7%. Also, the ZS system pump was rebuilt.

O3[ppb]



PARTICULATE MATTER

Thermo 5030i SHARP Monitor Quarterly Audit/Calibration

Date: October 26, 2018	Performed By/Reviewer: Alex Yakupov Rob Fisher
Company: LICA	Start Time (mst): 10:12
Station Name/Location: Bonnyville East	End Time (mst): 14:41
Previous Audit Date: n/a	Calibration Purpose: installation
Parameter: PM 2.5	Weather Conditions: Mainly sunny

SHARP 5030i Information and Status:	
Serial Number: CM 17071016	Filter Tape Counter: 19

Reference Standards:			
Air Flow			
Manometer	Orifice	Pressure:	Temp / RH:
Make: Dwyer	Chinook	Fisher Scientific	Fisher Scientific
Model: 475 Mk.III	CHN0901	FB61291	11-661-7A, 11745843
Serial Number: #3	#2	130168457 / 05544	170286131
Expiry Date: January 9, 2019	April 24, 2019	January 15, 2019	April 19, 2019

Ambient Temperature (°C)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	n/a	n/a	n/a	8.89	8.9	0.0
#2	n/a	n/a	n/a	8.92	8.9	0.0
#3	n/a	n/a	n/a	8.86	8.8	0.1
Average	n/a	n/a	n/a	8.9	8.9	0.0
<i>Temp Limit: ± 2°C</i>						

Ambient Relative Humidity (%RH)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Offset (ZERO)	Reference	SHARP	Offset (ZERO)
#1	n/a	n/a	n/a	55.62	55.6	0.0
#2	n/a	n/a	n/a	55.14	55.1	0.0
#3	n/a	n/a	n/a	55.22	55.3	-0.1
Average	n/a	n/a	n/a	55.3	55.3	0.0
<i>RH Limit: ± 2 %RH</i>						

Flow Temperature (°C)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	n/a	n/a	n/a	25.31	25.3	0.0
#2	n/a	n/a	n/a	25.34	25.3	0.0
#3	n/a	n/a	n/a	25.35	25.4	0.0
Average	n/a	n/a	n/a	25.3	25.3	0.0
<i>Temp Limit: ± 2°C</i>						

Barometric Pressure (mmHg)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	n/a	n/a	n/a	704.3	704.3	0.0
<i>BP Limit: ± 2 mmHg</i>						

Nephelometer Relative Humidity (%RH)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	n/a	n/a	n/a	19.41	19.4	0.0
<i>RH Limit: ± 2 %RH</i>						

Nephelometer Temperature (%RH)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	n/a	n/a	n/a	24.80	24.9	-0.1
<i>Temp Limit: ± 2°C</i>						

Nephelometer Source Level						
As Found:			As Left: (same as found if acceptable)			
	Variable	Value		Variable	Value	
	IRE D	67		IRE D	67	
	SRC LEVEL	48		SRC LEVEL	48	
<i>IRE D Limit (as found): 60-70 mA Adjusted IRE D Limit (as left): 65 mA</i>						

Detector Calibration (Auto)						
As Found:			As Left:			
Detector Auto Calibration Completed: YES			Variable	Value		
			HIGH VOLT	1380		
			BETA REF TH	340		
			ALPHA TH	840		
			DIFF HV	2		

Mass Coefficient (Auto)						
Zero			Span			
	Variable	Value		Variable	Value	
	MASS COEF	6993.4		MASS COEF	7009.8	
	FOIL VALUE	0		FOIL VALUE	1328	
	Beta Avg	10573		Beta Avg	8201	
	difference	N/A		difference	-1.6	
Foil Set: 9258						

Flow Calibration (L/min)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	n/a	n/a	n/a	16.65	16.63	0.02
#2	n/a	n/a	n/a	16.71	16.68	0.03
#3	n/a	n/a	n/a	16.65	16.67	-0.02
Average	n/a	n/a	n/a	16.67	16.66	0.01
<i>Flow Limit: 16.67 ± 0.33 L/min</i>						

Leak Check (L/min)						
Without Leak Check Adapter			With leak Check Adapter			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	16.67	16.67	0.00	16.65	16.65	0.00
<i>Leak Limit: 0.08 L/min</i>						
LEAK RATE: 0.00						



Thermo 5030i SHARP Monitor Monthly Check

Date: November 6, 2018
Company: LICA
Station Name/Location: Bonnyville East
Previous Audit Date: October 26, 2018
Parameter: PM 2.5

Performed By/Reviewer: Chris Wesson | Rob Fisher
Start Time (mst): 15:20
End Time (mst): 16:26
Calibration Purpose: routine monthly
Weather Conditions: Light snow

SHARP 5030i Information and Status:

Serial Number: CM17071016 **Filter Tape Counter:** 57

Reference Standards:

Air Flow

	Manometer	Orifice	Pressure:	Temp / RH:
Make:	Dwyer	Airmetrics	Brunton	Fisher Scientific
Model:	475 Mk.III	MNF1868	ADC PRO	11-661-7A, 11745843
Serial Number:	#2	#1	05490	160459244
Calibration Expiration Date:	January 29, 2019	February 14, 2019	December 11, 2018	June 19, 2020

Ambient Temperature (°C)

	Reference	SHARP	Difference	Range	Action
#1	-11.80	-13.0	1.2	< ± 2°C	OK
				2-3 °C	Recalibrate
				> 3°C	Fail

Ambient Relative Humidity (%RH)

	Reference	SHARP	Difference	Range	Action
#1	80.10	79.2	0.9	< ± 2 %RH	OK
				2-5 %RH	Recalibrate
				> 5 %RH	Fail

Barometric Pressure (mmHg)

	Reference	SHARP	Difference	Range	Action
#1	720.6	718.0	2.6	< ± 10 mmHg	OK
				10-12 mmHg	Recalibrate
				> 12 mmHg	Fail

Flow Audit (L/min)

	Reference	SHARP	% Difference	Range	Action
#1	16.51	16.67	1.01010101	< ± 4%	OK
#2	16.48	16.67		4-5%	Recalibrate
#3	16.51	16.66		>5%	Fail
Average	16.50	16.67			

Leak Check (L/min)

	Without Leak Check Adapter			With leak Check Adapter			
	Reference	SHARP	Difference	Reference	SHARP	Difference	
#1	16.50	16.67	-0.17	16.48	16.67	-0.19	Leak Limit: 0.80 L/min
						LEAK RATE:	-0.02

WIND SYSTEM



Meteorological Sensor Audit/Calibration

Location Information

Company:	LICA	Performed By:	Alex Yakupov
Audit Location:	Bonnyville East	Reviewed By:	Rob Fisher
Audit Date:	October 24, 2018	Start/End Time (mst):	12:56 / 14:01
Calibration Purpose:	installation	Weather Conditions:	Mainly sunny

Wind Sensor Information

Sensor ID Data:		Sensor Outputs:	
Sensor Make:	RM Young	Velocity Voltage Output Range:	0-1 V
Sensor Model:	05305VK	Velocity Unit Output Range:	0-200 km/h
Serial #:	56778	Direction Voltage Output Range:	0-1 V
Previous Cal/Audit Date:	n/a or unknown	Direction Unit Output Range:	0-360 degrees

Wind Calibrator Information

Calibrator I.D. and Expiry Date: Model 18860-90/18802 SN: CA 4744, calibrated on May 18, 2018

Wind Speed Audit Data ****+/- 2% of the average correction factor is the limit****

RPM	Wind Speed Generated kph	Clockwise Wind Speed kph	Counter Clockwise Wind Speed kph	Correction Factor
0	0	0.0	0.0	-
1000	18.4	18.4	18.4	1.000
2000	36.9	36.8	36.8	1.003
3000	55.3	55.4	55.4	0.998
4000	73.7	73.8	73.8	0.999
5000	92.2	92.2	92.2	1.000
6000	110.6	110.6	110.6	1.000
7000	129.0	129.0	129.0	1.000
8000	147.4	147.4	147.4	1.000
9000	165.9	165.8	166.0	1.000
10000	184.3	184.0	184.4	1.001
The audit meets AMD requirements.			Average Correction Factor=	1.000

Wind Direction Audit Data ****+/- 3° of the absolute average degrees difference for all points is the limit****

Generated Wind Direction 0-360 (Up)	Generated Wind Direction 360-0 (Down)	Indicated Wind Direction 0-360 (Up)	Indicated Wind Direction 360-0 (Down)	Degrees Difference 0-360 (Up)	Degrees Difference 360-0 (Down)	Average Absolute Degrees Difference
0	355	0	355	0.0	0.0	0.0
30	330	30	331	0.0	-0.6	0.3
60	300	60	301	0.0	-0.8	0.4
90	270	90	271	0.0	-1.0	0.5
120	240	121	241	-0.6	-0.8	0.7
150	210	151	211	-0.8	-1.3	1.1
180	180	181	182	-0.9	-1.8	1.4
210	150	211	152	-1.0	-2.3	1.7
240	120	240	121	-0.3	-1.4	0.9
270	90	270	92	0.0	-2.0	1.0
300	60	300	62	0.1	-1.6	0.9
330	30	330	31	-0.1	-1.0	0.6
355	0	355	0	0.0	0.3	0.2
The audit meets AMD requirements.			Average Absolute Degrees Difference=		0.7	

Comments:

CALIBRATORS

Company <u>Maxxam</u>		Operator: <u>Mike</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio</u>	Make/Model	<u>Bios Definer 220</u>
Serial Number	<u>17200415</u>	Serial Number	<u>H=128686; L=129069</u>
Last Verification Date	<u>May 16, 2017</u>	Temperature (°C)	<u>22.2 C</u>
NO Cylinder S/N	<u>LL104183</u>	Barometric Pressure	<u>706.1mmHg</u>
NO [PPM]	<u>50.8</u>	NOx [PPM]	<u>50.9</u>
Expiry Date	<u>October 24, 2020</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5057</u>	Pt. #2	<u>5055</u>
		Pt. #3	<u>5070</u>
Gas Flow (sccm)			
Pt. #1	<u>77.4</u>	Pt. #2	<u>37.9</u>
		Pt. #3	<u>19.1</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5102	0.0	0.0000	0.0000	0.0001	-0.0002	-0.0001	Limit ± 10%	
5057	77.4	0.7775	0.7779	0.7973	0.0012	0.7985	3%	3%
5055	37.9	0.3809	0.3816	0.3896	0.0000	0.3896	2%	2%
5070	19.1	0.1914	0.1918	0.1962	0.0000	0.1962	2%	2%
Absolute Average Percent Difference							2%	2%

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)= 1.0253	0.90-1.10	m (Slope)= 1.0266
b (Intercept % of FS)= -0.0176	± 3% F.S.	b (Intercept % of FS)= -0.0763

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5057	0.0	0.0000	0.7868	0.0006	0.7874	NO ₂	% Diff. Limit
5057	500.0	0.5003	0.2865	0.5016	0.7875	0%	± 10%
5057	275.0	0.2802	0.5066	0.2797	0.7862	0%	± 10%
5057	100.0	0.1053	0.6815	0.1046	0.7863	-1%	± 10%
Absolute Average Percent Difference						0%	± 10%

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

NO₂	LIMITS	
Correlation= 1.0000	≥ 0.995	
m (Slope)= 1.0020	0.90-1.10	
b (Intercept % of FS)= -0.0259	± 3% F.S.	

AENV Standards	NO_x Analyzer
Audit Calibrator	
Make/Model	<u>Thermo 146i</u>
Serial/AMU Number	<u>1809</u>
SRM Gas Cylinder No.	<u>APEX1170572</u>
Cylinder Conc. (ppm)	<u>49.99</u>
	Make/Model
	<u>Thermo 42i</u>
	Serial/AMU Number
	<u>1868</u>
	Last Calibration Date
	<u>August 16, 2018</u>
	Full Scale (ppm)
	<u>1.0</u>
	Cylinder Gas Expiry Date
	<u>November 15, 2020</u>

COMMENTS:

Auditor: Shea Beaton
Operator Signature: 

Date: August 21, 2018
Location: McIntyre Center Edmonton

Company <u>Maxxam</u>		Operator: <u>Mike</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio</u>	Make/Model	<u>Bios Definer 220</u>
Serial Number	<u>3860808</u>	Serial Number	<u>H=128686; L=129069</u>
Last Verification Date	<u>26-Jan-17</u>	Temperature (°C)	<u>22.2 C</u>
NO Cylinder S/N	<u>LL104183</u>	Barometric Pressure	<u>706.1mmHg</u>
NO [PPM]	<u>50.8</u>	NOx [PPM]	<u>50.9</u>
Expiry Date	<u>October 24, 2020</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5065</u>	Pt. #2	<u>5085</u>
		Pt. #3	<u>5079</u>
Gas Flow (sccm)			
Pt. #1	<u>78.3</u>	Pt. #2	<u>38.1</u>
		Pt. #3	<u>19.2</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5095	0.0	0.0000	0.0000	0.0000	0.0001	0.0001	Limit ± 10%	
5065	78.3	0.7853	0.7869	0.7957	0.0005	0.7962	1%	1%
5085	38.1	0.3806	0.3814	0.3850	0.0001	0.3851	1%	1%
5079	19.2	0.1920	0.1924	0.1936	-0.0001	0.1935	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)=	1.0136	0.90-1.10		m (Slope)= 1.0121
b (Intercept % of FS)=	-0.0509	± 3% F.S.		b (Intercept % of FS)= -0.0577

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5065	0.0	0.0000	0.7937	-0.0005	0.7932	NO ₂	% Diff. Limit
5065	500.0	0.4556	0.3381	0.4549	0.7925	0%	± 10%
5065	275.0	0.2406	0.5531	0.2392	0.7923	0%	± 10%
5065	95.0	0.0799	0.7138	0.0771	0.7910	-3%	± 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)=	1.0014	0.90-1.10
b (Intercept % of FS)=	-0.1619	± 3% F.S.

AENV Standards	NO_x Analyzer
Audit Calibrator	
Make/Model	<u>Thermo 146i</u>
Serial/AMU Number	<u>1809</u>
SRM Gas Cylinder No.	<u>APEX1170572</u>
Cylinder Conc. (ppm)	<u>49.99</u>
	Make/Model <u>Thermo 42i</u>
	Serial/AMU Number <u>1868</u>
	Last Calibration Date <u>August 16, 2018</u>
	Full Scale (ppm) <u>1.0</u>
	Cylinder Gas Expiry Date <u>November 15, 2020</u>

COMMENTS: _____

Auditor: Shea Beaton Date: August 21, 2018

Operator Signature: [Signature] Location: McIntyre Center Edmonton

Company Maxxam Operator: Mike

Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio</u>	Make/Model	<u>Bios Definer 220</u>
Serial Number	<u>11900613</u>	Serial Number	<u>H=128686; L=129069</u>
Last Verification Date	<u>March 16, 2018</u>	Temperature (°C)	<u>22.9 C</u>
NO Cylinder S/N	<u>LL104183</u>	Barometric Pressure	<u>698 mmHg</u>
NO [PPM]	<u>50.8</u>	NOx [PPM]	<u>50.9</u>
Expiry Date	<u>October 24, 2020</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5059</u>	Pt. #2	<u>5073</u>
		Pt. #3	<u>5073</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>38.2</u>
		Pt. #3	<u>19.1</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5124	0.0	0.0000	0.0000	0.0000	-0.0001	0.0000	Limit ± 10%	
5059	77.5	0.7782	0.7797	0.7763	0.0005	0.7767	0%	0%
5073	38.2	0.3825	0.3833	0.3794	0.0000	0.3795	-1%	-1%
5073	19.1	0.1913	0.1916	0.1904	0.0000	0.1904	0%	-1%
Absolute Average Percent Difference							1%	1%

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

<u>NO</u>		<u>LIMITS</u>		<u>NOx</u>	
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000
m (Slope)=	0.9975	0.90-1.10		m (Slope)=	0.9960
b (Intercept % of FS)=	-0.0616	± 3% F.S.		b (Intercept % of FS)=	-0.0661

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5059	0.0	0.0000	0.7741	0.0000	0.7741	NO ₂	% Diff. Limit
5059	500.0	0.4918	0.2823	0.4916	0.7739	0%	± 10%
5059	275.0	0.2774	0.4967	0.2780	0.7747	0%	± 10%
5059	100.0	0.1031	0.6710	0.1032	0.7743	0%	± 10%
Absolute Average Percent Difference						0%	± 10%

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

<u>NO₂</u>		<u>LIMITS</u>	
Correlation=	1.0000	≥ 0.995	
m (Slope)=	0.9998	0.90-1.10	
b (Intercept % of FS)=	0.0173	± 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>
SRM Gas Cylinder No.	<u>APEX1170572</u>	Last Calibration Date	<u>August 16, 2018</u>
Cylinder Conc. (ppm)	<u>49.99</u>	Full Scale (ppm)	<u>1.0</u>
		Cylinder Gas Expiry Date	<u>November 15, 2020</u>

COMMENTS:

Auditor: Shea Beaton
Operator Signature: [Signature]

Date: August 22, 2018
Location: McIntyre Center Edmonton

Company: <u>Maxxam</u>		Operator: <u>Chris W</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>API 700</u>	Make/Model	<u>Mesa Defender 530</u>
Serial Number	<u>690</u>	Serial Number	<u>L-153351 H-152571</u>
Last Verification Date	<u>March 2016</u>	Temperature (°C)	<u>23.5 C</u>
NO Cylinder S/N	<u>LL108015</u>	Barometric Pressure	<u>695 mmHg</u>
NO [PPM]	<u>52.2</u>	NOx [PPM]	<u>52.3</u>
Expiry Date	<u>Oct 2020</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%	
4959	75.0	0.789	0.791	0.793	0.000	0.793	1%	0%
4971	36.5	0.383	0.384	0.384	0.000	0.384	0%	0%
4967	18.2	0.191	0.192	0.191	0.000	0.191	0%	-1%
Absolute Average Percent Difference							0%	0%

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)=	1.0054	0.90-1.10		m (Slope)=	1.0031
b (Intercept % of FS)=	-0.0583	± 3% F.S.		b (Intercept % of FS)=	-0.0795

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4959	0.000	0.000	0.790	-0.001	0.789	NO ₂	% Diff. Limit
4959	0.500	0.497	0.293	0.493	0.786	-1%	± 10%
4959	0.275	0.273	0.517	0.269	0.787	-1%	± 10%
4959	0.100	0.102	0.688	0.099	0.787	-2%	± 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)=	0.9946	0.90-1.10
b (Intercept % of FS)=	-0.1817	± 3% F.S.

<p align="center">AENV Standards Audit Calibrator</p> <p>Make/Model <u>Teco 146i</u></p> <p>Serial/AMU Number <u>AMU 1809</u></p> <p>SRM Gas Cylinder No. <u>APEX1170572</u></p> <p>Cylinder Conc. (ppm) <u>49.99</u></p>	<p align="center">NO_x Analyzer</p> <p>Make/Model <u>Teco 42i</u></p> <p>Serial/AMU Number <u>AMU 1868</u></p> <p>Last Calibration Date <u>March 14, 2018</u></p> <p>Full Scale (ppm) <u>1.0</u></p> <p>Cylinder Gas Expiry Date <u>November 2020</u></p>
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COMMENTS: Cylinder contains 47.9 ppm SO₂.

Auditor: Al Clark

Operator Signature: *Chris W*

Date: March 15, 2018

Location: McIntyre Center Edmonton

Company <u>Maxxam</u>		Operator: <u>Mike</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio</u>	Make/Model	<u>Bios Definer 220</u>
Serial Number	<u>17100415</u>	Serial Number	<u>H=128686; L=129069</u>
Last Verification Date	<u>May 16, 2017</u>	Temperature (°C)	<u>22.2 C</u>
NO Cylinder S/N	<u>LL104183</u>	Barometric Pressure	<u>706.1mmHg</u>
NO [PPM]	<u>50.8</u>	NOx [PPM]	<u>50.9</u>
Expiry Date	<u>October 24, 2020</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5120</u>	Pt. #2	<u>5121</u>
		Pt. #3	<u>5128</u>
Gas Flow (sccm)			
Pt. #1	<u>77.4</u>	Pt. #2	<u>37.8</u>
		Pt. #3	<u>19</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5136	0.0	0.0000	0.0000	0.0001	-0.0002	0.0001	Limit ± 10%	
5120	77.4	0.7680	0.7695	0.7793	0.0003	0.7796	1%	1%
5121	37.8	0.3750	0.3757	0.3802	0.0000	0.3802	1%	1%
5128	19.0	0.1882	0.1885	0.1908	0.0005	0.1909	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)=	1.0146	0.90-1.10		m (Slope)=	1.0130		
b (Intercept % of FS)=	-0.0074	± 3% F.S.		b (Intercept % of FS)=	-0.0059		

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5120	0.0	0.0000	0.7794	0.0005	0.7799	NO ₂	% Diff. Limit
5120	500.0	0.4827	0.2967	0.4854	0.7806	0%	± 10%
5120	275.0	0.2672	0.5122	0.2676	0.7798	0%	± 10%
5120	90.0	0.0896	0.6898	0.0890	0.7787	-1%	± 10%
Absolute Average Percent Difference						0%	± 10%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
NO₂		LIMITS					
Correlation=	1.0000	≥ 0.995					
m (Slope)=	1.0053	0.90-1.10					
b (Intercept % of FS)=	-0.0370	± 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>
SRM Gas Cylinder No.	<u>APEX1170572</u>	Last Calibration Date	<u>August 16, 2018</u>
Cylinder Conc. (ppm)	<u>49.99</u>	Full Scale (ppm)	<u>1.0</u>
		Cylinder Gas Expiry Date	<u>November 15, 2020</u>

COMMENTS: _____

Auditor: Shea Beaton Date: August 21, 2018

Operator Signature: Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-482CGA

Company: Maxxam **Operator's Name:** Mike
Cylinder #: LL104225 **Concentration PPM:** 49.2 **Tolerance(%)** 2 **Certified By:** Praxair
Expiry Date: October 2020

Reference Calibrator and Gas:

Make/Model: R&R MFC 201
Serial Number: AMU 1690
Last Verification Date: December 13, 2017
Gas Type: SO2 **Conc.** 98.07
Cylinder Number: CAL016625
Expiry Date: January 2019

Flow Measurement Device:

Make/Model: Mesa Definer 220
Serial Number: H-133034 / L-132702
Temp. °C: 23.4 C
B.P. 707 mmHg

Reference Analyzer:

Make/Model: Teco 43C **Serial/AMU Number:** 1623
Instrument Settings: **Zero:** 10.0 **Span:** 1.006 **Range:** 1.0
Last Calibration: **Date:** Dec12/17 **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	0.000	0.000	0.000
4989	79.5	0.764	0.01594	62.755	47.9
4995	39.6	0.380	0.00793	126.136	47.9
4992	19.6	0.188	0.00393	254.694	47.9
Average Cylinder Concentration:					47.9

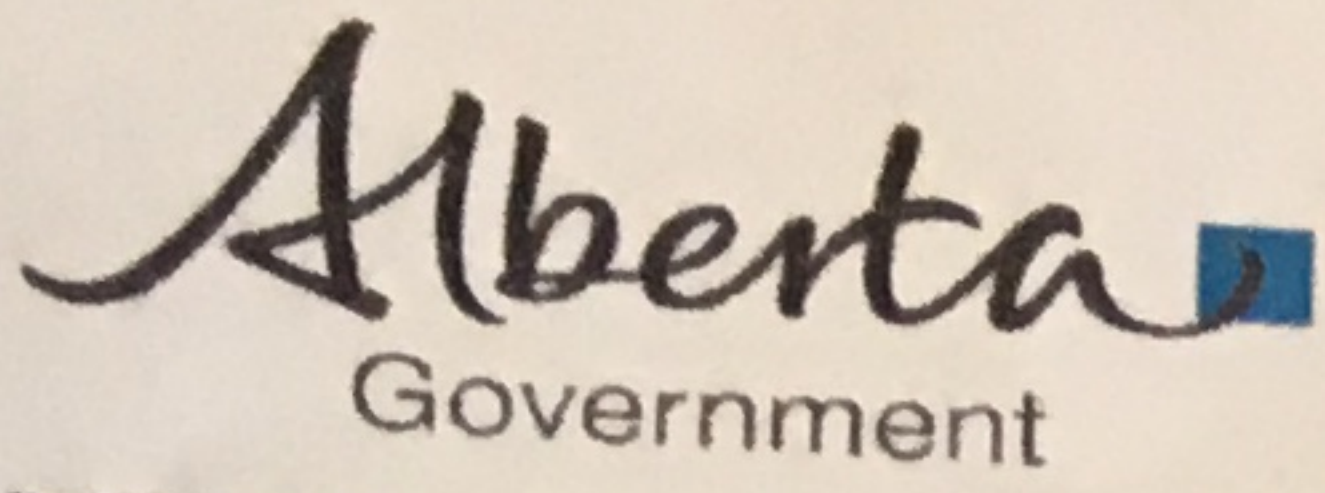
Previous Stated Concentration PPM: 49.2

Percent variance from Stated: 3

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

Auditor: Al Clark
Operator Signature: *Al Clark*

Date: December 13, 2017
Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-493CGA

Company: Maxxam Operator's Name: Mike
 Cylinder #: EY0001003 Concentration PPM: 9.55 Tolerance(%): 2 Certified By: Praxair
 Expiry Date: October 2020

Reference Calibrator and Gas:
 Make/Model: Sabio 2010
 Serial Number: AMU 2092
 Last Verification Date: January 17, 2018
 Gas Type: H2S Conc. 20.43
 Cylinder Number: CAL015272
 Expiry Date: January 2019

Flow Measurement Device:
 Make/Model: Mesa Defender 530
 Serial Number: H-153961 / L-153874
 Temp. °C: 23.0 C
 B.P.: 697 mmHg

Reference Analyzer:
 Make/Model: Teco 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 12.9 Span: 0.955 Range: 0.1
 Last Calibration: Date: Jan 17/18 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	0.0000	0.0000	0.0000
5051	39.6	0.0753	0.00784	127.551	9.60
5028	20.2	0.0387	0.00402	248.911	9.63
5033	10.5	0.0198	0.00209	479.333	9.49
Average Cylinder Concentration:					9.58

Previous Stated Concentration PPM: 9.55

Percent variance from Stated: 0

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

Auditor: Al Clark

Date: January 18, 2018

Operator Signature: *Al Clark*

Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-137CGA

Company: Maxxam **Operator's Name:** Raja Abid Ashraf
Cylinder #: LL119432 **Concentration PPM:** 10.3 **Tolerance(%)** 2 **Certified By:** Praxair
Expiry Date: May 16, 2020

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model: <u>R&R MFC 201</u>	Make/Model: <u>Mesa Definer 220</u>
Serial Number: <u>AMU 1690</u>	Serial Number: <u>H-133034 L-132702</u>
Last Verification Date: <u>July 27, 2017</u>	Temp. °C: <u>22.0 C</u>
Gas Type: <u>H2S</u> Conc. <u>20.43</u>	B.P. <u>700 mmhg</u>
Cylinder Number: <u>CAL015272</u>	
Expiry Date: <u>Janaury 2019</u>	

Reference Analyzer:
 Make/Model: Teco 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 21.9 Span: 1.069 Range: 0.1
 Last Calibration: Date: July 27, 2017 C.F. 1.000 Done By: AI Clark

Calibrator Flows (scem)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	0.0000	0.0000	0.0
5117	38.9	0.0595	0.00760	131.542	7.8
5103	18.4		0.00361	277.337	0.0
5097	9.4		0.00184	542.234	0.0
Average Cylinder Concentration:					2.6

Previous Stated Concentration PPM: 10.3

Percent variance from Stated: 75

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

Auditor: AI Clark
 Operator Signature: *AI Clark*

Date: July 27, 2017
 Location: McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2017-483CGA

Company: Maxxam **Operators name:** Mike

Cylinder #: LL104225 Conc (PPM) 51.5/51.6 Tolerance (%) 2 Certified By: Praxair

Expiry Date: October 2020

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Teco 146i</u>			Make/Model	<u>Mesa Definer 220</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>H-133034 / L-132702</u>
Last Verification Date	<u>December 13, 2017</u>			Temp. °C	<u>23.4 C</u>
Gas Type	<u>NO</u>	Conc.	<u>50.03</u>	B.P.	<u>707 mmHg</u>
Cylinder Number	<u>APEX 1223938</u>				
Expiry Date	<u>June 2020</u>				

Reference Analyzer:

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

Instrument Settings Zero: 4.7 Span: 1.004 Range: 1.0

Last Calibration: Date: Dec12/17 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				
4989	79.5	0.813	0.812	0.016	62.755	51.0	51.0
4995	39.6	0.407	0.406	0.008	126.136	51.3	51.2
4992	19.6	0.202	0.201	0.004	254.694	51.4	51.2
Average Cylinder Concentration:						51.3	51.1

<u>NO</u>	<u>NOx</u>
Previous Stated Concentration PPM: <u>51.5</u>	<u>51.6</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

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

Auditor: Al Clark Date: December 13, 2017

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



Calibration Gas Audit

NO Cylinder Gas

File No. 2017-487CGA

Company: Maxxam **Operators name:** Mike
Cylinder #: LL108015 **Conc (PPM)** 52.2/52.3 **Tolerance (%)** 2 **Certified By:** Praxair
Expiry Date: October 2020

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Teco 146i</u>			Make/Model	<u>Mesa Definer 220</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>H-133034 / L-132702</u>
Last Verification Date	<u>December 13, 2017</u>			Temp. °C	<u>23.4 C</u>
Gas Type	<u>NO</u>	Conc.	<u>50.03</u>	B.P.	<u>707 mmHg</u>
Cylinder Number	<u>APEX 1223938</u>				
Expiry Date	<u>June 2020</u>				

Reference Analyzer:

Make/Model Teco 42i Serial/AMU Number: 1868
Instrument Settings Zero: 4.7 Span: 1.004 Range: 1.0
Last Calibration: Date: Dec12/17 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				
4989	79.5	0.833	0.831	0.016	62.755	52.3	52.1
4995	39.6	0.417	0.417	0.008	126.136	52.6	52.6
4992	19.6	0.209	0.209	0.004	254.694	53.2	53.2
Average Cylinder Concentration:						52.7	52.7

<u>NO</u>	<u>NOx</u>
Previous Stated Concentration PPM: <u>52.2</u>	<u>52.3</u>
Percent variance from Stated: <u>1</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
> 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Al Clark Date: December 13, 2017
Operator Signature: *Al Clark* Location: McIntyre Center Edmonton

APPENDIX III
MAXIMUM INSTANTANEOUS DATA



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

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	0	0	S	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1	1	1	0	0	0	1	0	24		
2	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	24	
3	S	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	1	1	1	S	0	1	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	S	0	0	0	0	24	
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	X	X	X	X	X	X	X	0	1	0	18	
6	X	X	X	X	X	X	X	X	X	C	C	C	C	2	1	1	1	0	1	0	S	0	0	0	0	0	2	1	15	
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	24	
8	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	1	0	24	
9	0	0	0	0	1	0	2	1	0	0	0	0	0	0	0	0	0	S	1	0	0	0	0	0	0	0	2	0	24	
10	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	1	0	24	
11	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	S	2	1	0	1	1	1	0	0	0	0	2	0	24	
12	0	0	0	0	1	2	3	4	3	3	2	1	1	0	S	1	1	0	0	0	0	0	1	1	1	0	4	1	24	
13	1	0	1	1	1	0	0	0	0	0	0	1	1	S	2	2	2	2	1	1	1	1	1	1	1	0	2	1	24	
14	1	1	1	1	1	1	1	1	1	2	2	1	S	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	24	
15	0	0	0	0	0	0	0	0	1	1	1	S	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
16	0	0	0	1	1	0	0	0	1	0	S	1	1	1	1	0	0	0	0	0	0	0	1	1	0	1	0	1	0	24
17	1	1	2	2	1	1	1	0	1	S	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	0	2	1	24	
18	1	1	1	1	1	0	0	1	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
19	0	0	0	0	1	1	1	S	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	24	
20	0	0	0	0	0	0	X	0	S	S	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	23	24	
21	1	1	1	1	1	S	1	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	24	
22	0	1	2	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	24	
23	0	0	0	S	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1	0	1	0	24	
24	1	1	S	1	1	2	2	2	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0	0	2	1	24		
25	0	S	3	3	2	2	3	1	1	2	3	3	3	2	3	3	2	1	1	0	0	1	1	0	0	3	2	24		
26	S	1	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	2	1	24		
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	24	
28	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	1	1	0	0	0	1	S	3	2	0	3	1	24		
29	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	2	1	24	
30	1	1	0	0	0	0	0	0	0	3	3	1	1	1	1	1	1	1	0	S	0	0	0	0	0	0	3	1	24	
HOURLY MAX	2	2	3	3	2	2	3	4	3	3	3	3	3	2	3	3	2	2	1	1	1	1	3	2						
HOURLY AVG	0	0	1	1	1	0	1	1	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0						

STATUS FLAG CODES

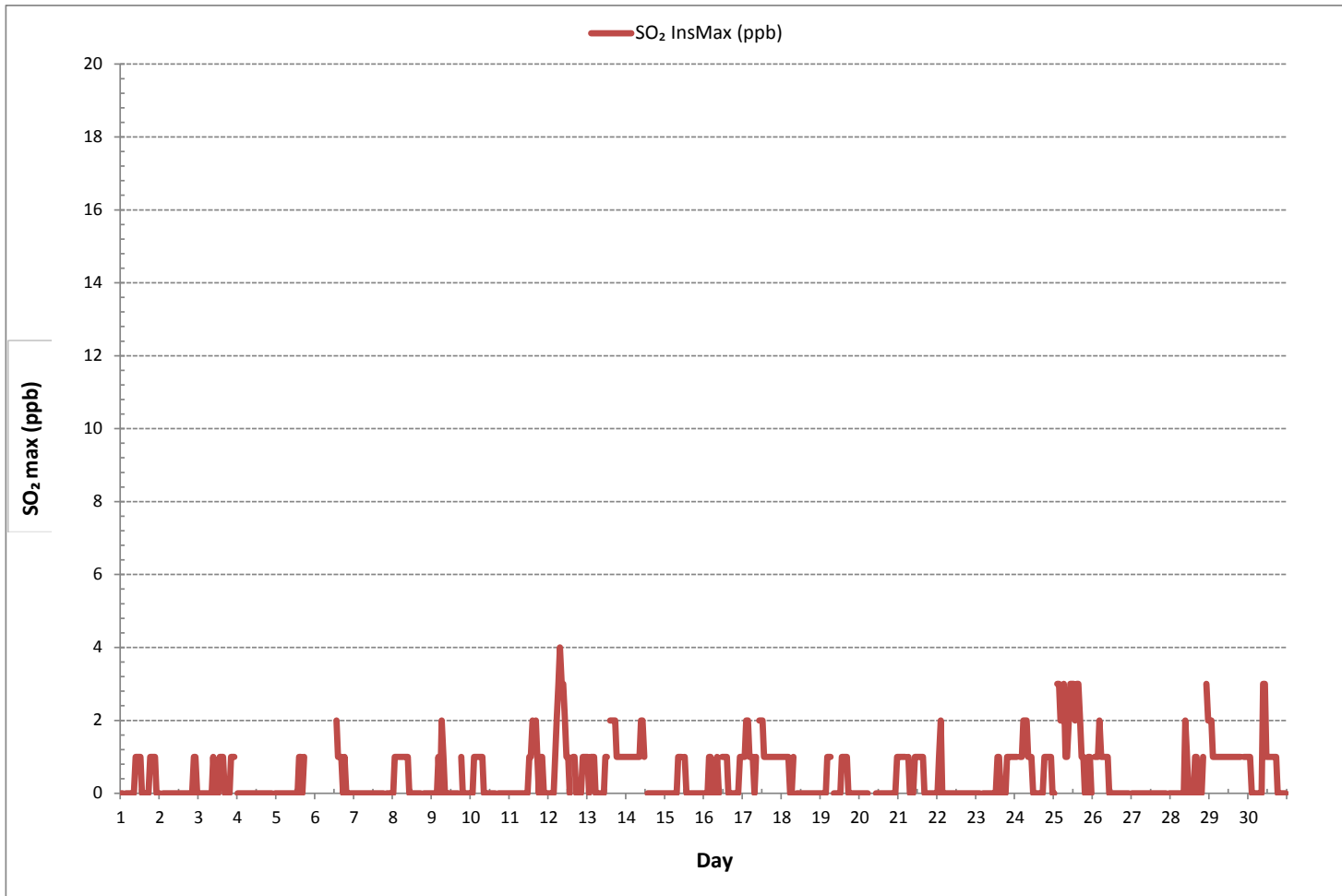
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	247
MAXIMUM INSTANTANEOUS VALUE:	4 ppb @ HOUR 7 ON DAY 12
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	4 hrs
STANDARD DEVIATION:	1
OPERATIONAL TIME:	704 hrs



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018
SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

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	2	2	S	2	2	2	2	2	2	1	2	2	1	1	1	1	2	2	1	1	1	10	13	1	13	2	24		
2	1	S	1	2	2	2	2	2	2	2	1	2	2	2	1	2	2	2	2	3	15	2	2	2	1	15	2	24	
3	S	1	1	1	2	2	2	1	2	2	2	2	2	2	2	3	64	9	28	2	20	20	S	1	64	8	24		
4	5	7	9	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	X	X	X	X	X	X	2	9	3	18	
5	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
6	X	X	X	X	X	X	X	X	C	C	C	C	C	0	0	0	0	0	0	0	0	S	1	0	0	1	0	16	
7	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	S	1	0	1	1	0	1	0	24
8	2	3	1	0	0	1	0	1	S1	1	0	1	1	0	0	0	1	1	S	43	27	17	1	1	0	43	5	23	
9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	24
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	2	1	1	1	1	1	1	1	2	1	24
11	1	0	1	1	1	1	1	0	0	0	0	1	1	0	0	S	0	0	0	0	1	0	0	21	0	21	1	24	
12	12	13	4	1	1	4	3	4	3	3	1	1	1	S	1	1	1	1	1	1	1	1	1	3	1	13	3	24	
13	16	24	1	1	4	1	19	17	1	1	1	1	1	S	1	18	4	25	7	1	2	6	18	16	1	25	8	24	
14	8	6	14	2	2	1	1	2	1	1	C1	C1	C1	C1	C1	1	1	1	2	1	1	0	1	1	0	14	2	19	
15	0	0	0	0	0	1	0	1	0	0	0	S	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	24	
16	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	24
17	0	0	0	0	0	0	0	0	1	S	0	0	0	1	1	1	1	1	1	1	1	1	2	1	0	2	1	24	
18	2	1	0	1	2	1	2	1	S	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2	1	24
19	0	3	0	0	2	3	0	S	1	0	0	0	1	1	0	0	1	1	0	1	0	0	0	0	0	0	3	1	24
20	9	5	2	6	1	2	X	0	S	S	3	3	3	2	0	0	0	0	0	0	0	0	5	4	0	9	2	23	
21	3	5	4	6	4	S	4	1	1	1	3	6	4	4	5	5	1	1	3	1	1	1	1	1	1	6	3	24	
22	1	3	2	1	S	2	1	S1	S1	1	1	C1	C1	C1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1	3	2	9	
23	Y	Y	Y	Y	Y	Y	Y	Y	Y	C1	C1	C1	C1	C1	C1	1	1	1	1	1	1	1	0	1	1	0	1	1	9
24	1	1	S	1	1	1	1	1	1	1	1	1	1	1	0	1	3	1	2	4	5	2	1	2	0	5	1	24	
25	3	S	4	4	5	4	4	2	1	3	4	4	3	2	4	4	4	5	3	3	4	4	4	4	1	5	4	24	
26	S	4	5	5	4	5	5	4	4	3	4	3	4	3	1	1	2	1	1	1	1	1	1	S	1	5	3	24	
27	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	S	1	0	1	1	24
28	1	1	1	1	1	1	1	S1	S1	S1	S1	1	3	2	1	3	C1	C1	C1	Y	Y	Y	Y	Y	1	3	1	12	
29	Y	Y	Y	Y	Y	Y	Y	C1	C1	C1	C1	C1	2	1	1	1	3	1	2	19	S	18	1	1	1	19	5	12	
30	1	8	1	5	4	5	4	10	2	5	5	1	1	4	1	1	2	1	1	1	S	1	1	1	1	1	10	3	24
HOURLY MAX	16	24	14	6	5	5	19	17	4	5	5	6	4	4	5	18	4	64	9	43	27	20	20	21					
HOURLY AVG	3	4	2	2	2	2	2	2	1	1	1	2	1	1	1	2	1	4	2	5	3	3	3	3					

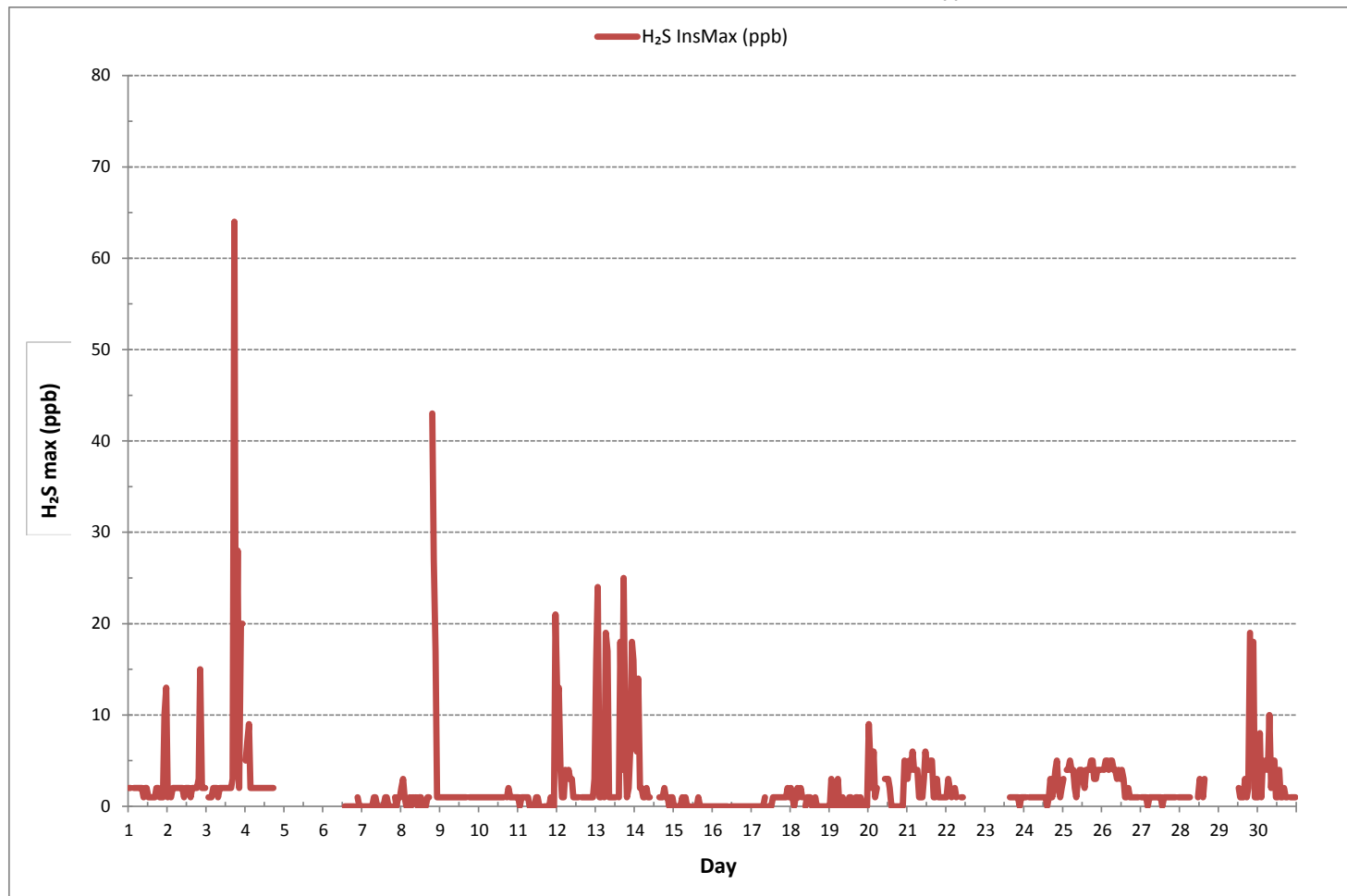
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	449
MAXIMUM INSTANTANEOUS VALUE:	64 ppb @ HOUR 17 ON DAY 3
IZS CALIBRATION TIME:	28 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	5
OPERATIONAL TIME:	621 hrs

HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

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	2.44	2.47	S	2.06	2.05	2.03	2.02	2.03	1.99	1.99	2.00	1.99	2.00	1.98	1.96	1.98	1.99	2.03	2.33	2.27	2.25	2.25	2.17	2.20	1.96	2.47	2.11	24
2	2.20	S	2.10	2.06	2.05	2.03	2.02	2.03	2.02	2.04	Y	Y	1.97	1.99	1.98	2.02	2.01	2.08	2.03	2.12	2.05	2.00	2.03	2.02	1.97	2.20	2.04	22
3	S	2.07	2.10	2.12	2.16	2.16	2.16	2.19	2.15	2.18	2.18	2.22	2.16	2.19	2.15	2.16	2.28	2.33	2.38	2.38	2.33	2.26	2.24	S	2.07	2.38	2.20	24
4	2.22	2.09	2.10	2.17	2.22	2.09	2.06	2.05	2.02	2.01	2.00	2.00	1.97	1.98	1.99	1.98	2.01	1.97	1.99	1.96	1.99	1.96	S	1.99	1.96	2.22	2.03	24
5	1.97	1.98	1.97	1.99	1.97	1.99	1.97	2.00	2.00	2.00	2.00	1.98	1.98	1.98	1.97	1.98	1.99	2.01	X	X	X	X	X	X	1.97	2.01	1.98	18
6	X	X	X	X	X	X	X	X	X	1.99	2.00	C	C	C	C	C	2.02	2.05	2.09	2.12	S	2.11	2.09	2.09	1.99	2.12	2.06	15
7	2.07	2.04	2.05	2.04	2.01	2.00	2.00	2.01	2.01	2.01	1.99	1.98	1.98	1.98	1.98	1.99	2.01	2.09	2.04	S	2.05	2.03	2.16	2.13	1.98	2.16	2.03	24
8	2.20	2.21	2.05	2.09	2.03	2.02	1.98	2.00	1.99	2.01	2.01	1.99	1.99	2.00	2.00	2.04	2.04	2.07	S	2.17	2.18	2.20	2.18	2.11	1.98	2.21	2.07	24
9	2.09	2.10	2.08	2.07	2.08	2.09	2.08	2.07	2.06	2.06	2.06	2.07	2.08	2.10	2.12	2.12	2.14	S	2.16	2.15	2.17	2.18	2.16	2.26	2.06	2.26	2.11	24
10	2.23	2.10	2.10	2.05	2.04	2.02	2.02	2.03	2.04	2.01	2.02	2.02	2.01	2.01	2.01	2.03	S	2.04	2.05	2.01	2.00	2.00	1.99	1.99	1.99	2.23	2.03	24
11	2.00	1.99	2.00	2.00	2.00	2.01	1.99	1.99	1.99	1.98	1.99	1.99	2.00	2.00	2.01	S	2.06	2.02	2.00	2.05	2.07	2.04	2.05	2.06	1.98	2.07	2.01	24
12	2.11	2.19	2.37	2.39	2.48	2.54	2.32	2.31	2.30	2.35	2.33	2.29	2.29	2.38	S	2.48	2.26	2.23	2.24	2.24	2.24	2.20	2.24	2.23	2.11	2.54	2.30	24
13	2.41	2.51	2.23	2.22	2.28	2.63	2.44	2.96	2.98	4.39	3.53	3.32	S	3.04	3.03	2.60	2.79	2.78	3.07	2.98	2.92	2.91	3.30	2.22	4.79	2.96	24	
14	2.86	3.13	2.81	2.68	2.19	2.44	2.42	2.39	2.28	2.17	2.16	2.10	S	1.98	1.94	1.94	2.02	2.06	2.01	2.02	2.12	2.21	2.25	1.94	3.13	2.27	24	
15	2.25	2.20	2.34	2.39	2.35	2.26	2.24	2.23	2.15	2.04	2.00	S	2.02	2.01	1.99	1.97	1.98	1.97	1.99	1.94	1.96	1.93	1.92	1.91	1.91	2.39	2.09	24
16	1.95	1.96	1.93	1.96	1.95	1.99	1.96	1.98	1.99	2.01	S	2.01	1.98	1.95	1.99	1.98	2.02	2.10	2.17	2.06	2.13	2.13	2.09	2.10	1.93	2.17	2.02	24
17	2.06	2.15	2.10	2.04	2.05	2.07	2.09	2.14	2.09	S	2.10	2.13	2.09	2.11	2.13	2.14	2.20	2.34	2.39	2.31	2.27	2.31	2.30	2.30	2.04	2.39	2.17	24
18	2.41	2.59	2.53	2.44	2.50	2.41	2.25	2.29	S	2.12	2.11	2.07	2.08	2.03	2.03	1.99	2.03	2.00	2.11	2.08	2.09	2.06	2.05	1.99	2.59	2.19	24	
19	2.07	2.07	2.19	2.19	2.19	2.21	2.20	S	2.19	2.16	2.17	2.21	2.23	2.28	2.20	2.16	2.17	2.15	2.16	2.17	2.14	2.11	2.10	2.08	2.07	2.28	2.17	24
20	2.18	2.46	4.60	4.46	3.10	7.04	X	2.66	S	S	2.07	2.12	2.15	2.22	2.22	2.19	2.12	2.14	2.14	2.17	2.10	2.18	2.22	2.19	2.07	7.04	2.70	23
21	2.22	2.27	2.22	2.26	2.23	S	2.28	2.25	2.30	2.27	2.23	2.25	2.25	2.32	2.33	2.31	2.34	2.48	2.30	2.27	2.25	2.30	2.27	2.29	2.22	2.48	2.28	24
22	2.34	2.33	2.34	2.34	S	2.36	2.41	2.51	2.55	2.46	2.42	2.39	2.34	2.33	2.23	2.25	2.17	2.23	2.20	2.30	2.14	2.25	2.28	2.14	2.55	2.32	24	
23	2.17	2.16	2.10	S	2.08	2.05	2.06	2.08	2.17	2.12	2.05	2.03	2.04	2.03	2.00	1.95	1.98	1.96	1.93	1.96	1.94	1.95	1.92	1.96	1.92	2.17	2.03	24
24	1.92	1.94	S	1.93	1.94	1.92	1.96	1.93	1.95	1.94	1.99	1.97	1.99	1.98	1.97	1.99	2.05	2.12	2.07	2.09	2.07	2.15	2.17	2.20	1.92	2.20	2.01	24
25	2.20	S	2.25	2.25	2.31	2.28	2.34	2.30	2.35	2.26	2.24	2.28	2.25	2.31	2.26	2.29	2.22	2.26	2.21	2.24	2.18	2.12	2.19	2.16	2.12	2.35	2.25	24
26	S	2.19	2.20	2.08	2.08	2.12	2.13	2.16	2.12	2.11	2.10	2.08	2.04	2.05	2.01	2.03	2.01	1.98	2.00	1.96	1.97	1.96	1.99	S	1.96	2.20	2.06	24
27	1.99	2.06	2.06	2.04	2.01	2.01	1.94	1.94	1.94	1.97	1.96	1.99	1.96	1.95	1.95	1.98	1.98	2.02	2.03	2.01	1.98	2.03	S	2.00	1.94	2.06	1.99	24
28	1.98	1.96	2.04	2.03	2.08	2.09	2.16	2.16	2.16	2.20	2.20	2.14	2.18	2.14	2.17	2.23	2.24	2.25	2.25	2.28	2.32	S	2.37	2.41	1.96	2.41	2.18	24
29	2.41	2.46	2.46	2.46	2.57	2.57	2.51	2.54	2.55	3.08	3.75	3.20	2.85	3.71	3.71	3.05	3.04	2.80	2.78	2.86	S	2.70	2.42	2.37	2.37	3.75	2.82	24
30	2.66	2.44	2.59	2.79	2.94	3.06	3.34	3.27	3.03	3.07	3.02	3.00	2.90	3.11	2.82	2.66	2.77	2.80	3.37	S	3.28	3.15	3.17	2.89	2.44	3.37	2.96	24
HOURLY MAX	2.86	3.13	4.60	4.46	3.10	7.04	3.34	3.27	3.03	4.79	4.39	3.53	3.32	3.71	3.71	3.05	3.04	2.80	3.37	3.07	3.28	3.15	3.17	3.30				
HOURLY AVG	2.21	2.23	2.29	2.27	2.21	2.37	2.19	2.23	2.20	2.26	2.27	2.22	2.18	2.18	2.18	2.18	2.16	2.19	2.22	2.20	2.20	2.20	2.22	2.22				

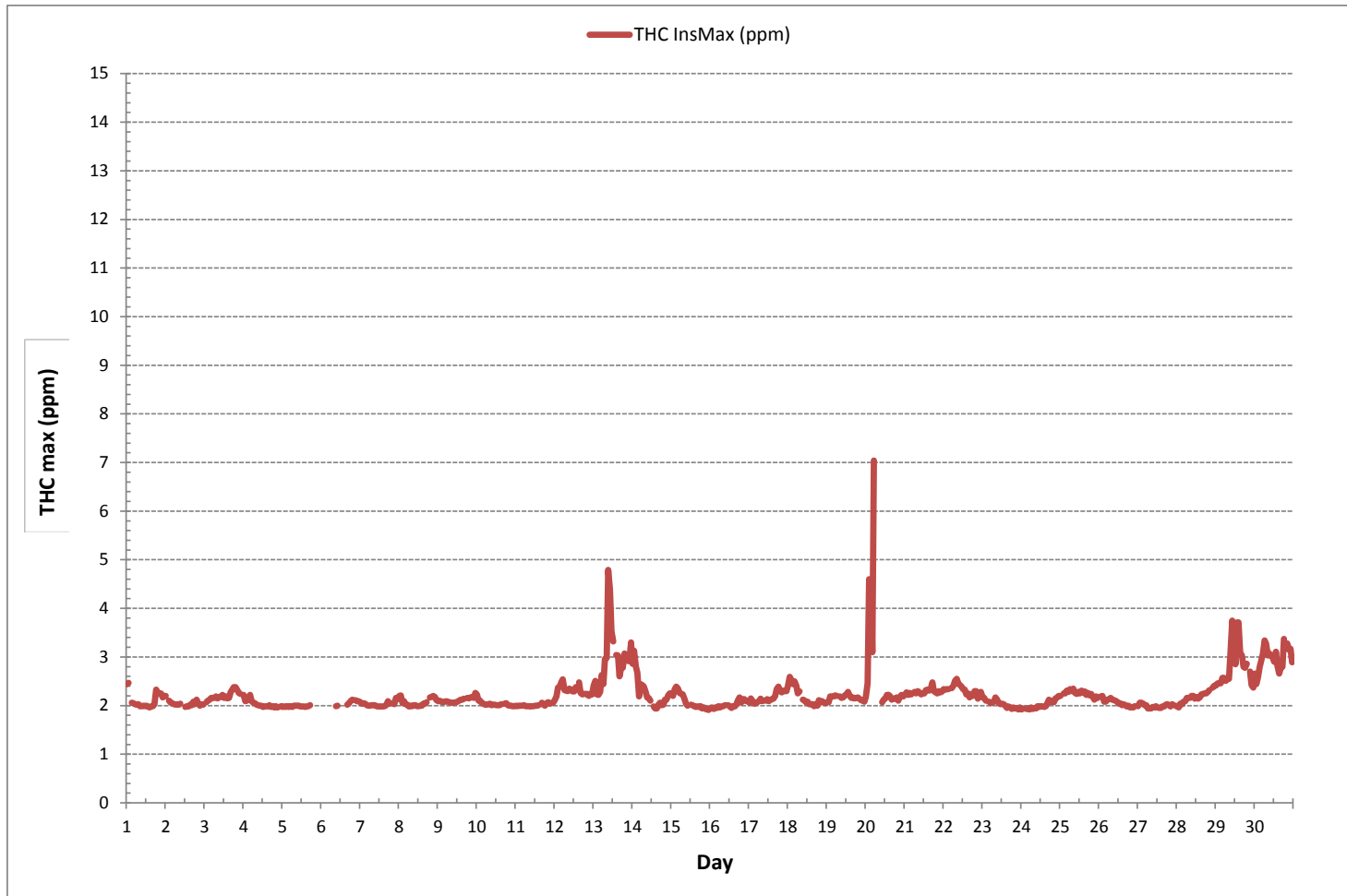
STATUS FLAG CODES

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:	665
MAXIMUM INSTANTANEOUS VALUE:	7.04 ppm @ HOUR 5 ON DAY 20
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	702 hrs
STANDARD DEVIATION:	0.39

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

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	2.44	2.43	S	2.06	2.05	2.03	2.02	2.03	1.99	1.99	2.00	1.99	2.00	1.98	1.96	1.98	1.99	2.03	2.33	2.27	2.25	2.25	2.17	2.20	1.96	2.44	2.11	24
2	2.20	S	2.10	2.06	2.05	2.03	2.02	2.03	2.02	2.04	Y	Y	1.97	1.99	1.98	2.02	2.01	2.08	2.03	2.12	2.05	2.00	2.03	2.02	1.97	2.20	2.04	22
3	S	2.07	2.10	2.12	2.16	2.16	2.16	2.19	2.15	2.18	2.18	2.19	2.16	2.19	2.15	2.14	2.18	2.33	2.30	2.35	2.32	2.26	2.22	S	2.07	2.35	2.19	24
4	2.16	2.09	2.10	2.17	2.22	2.09	2.06	2.05	2.02	2.01	2.00	2.00	1.97	1.98	1.99	1.98	2.01	1.97	1.99	1.96	1.99	1.96	S	1.99	1.96	2.22	2.03	24
5	1.97	1.98	1.97	1.99	1.97	1.99	1.97	2.00	2.00	2.00	2.00	1.98	1.98	1.98	1.97	1.98	1.99	2.01	X	X	X	X	X	X	1.97	2.01	1.98	18
6	X	X	X	X	X	X	X	X	X	1.99	2.00	C	C	C	C	C	2.02	2.05	2.04	2.12	S	2.11	2.09	2.09	1.99	2.12	2.06	15
7	2.07	2.04	2.05	2.04	2.01	2.00	2.00	2.01	2.01	2.01	1.99	1.98	1.98	1.98	1.98	1.99	2.01	2.09	2.04	S	2.05	2.03	2.16	2.13	1.98	2.16	2.03	24
8	2.20	2.21	2.05	2.09	2.03	2.02	1.98	2.00	1.99	2.01	2.01	1.99	1.99	2.00	2.00	2.04	2.04	2.07	S	2.17	2.18	2.20	2.18	2.11	1.98	2.21	2.07	24
9	2.09	2.10	2.08	2.07	2.08	2.08	2.08	2.07	2.06	2.06	2.06	2.07	2.08	2.10	2.12	2.12	2.14	S	2.16	2.15	2.17	2.18	2.16	2.26	2.06	2.26	2.11	24
10	2.23	2.10	2.10	2.05	2.04	2.02	2.02	2.03	2.04	2.01	2.02	2.02	2.01	2.01	2.01	2.03	S	2.04	2.05	2.01	2.00	2.00	1.99	1.99	1.99	2.23	2.03	24
11	2.00	1.99	2.00	2.00	2.00	2.01	1.99	1.99	1.99	1.98	1.99	1.99	2.00	2.00	2.01	S	2.06	2.02	2.00	2.05	2.07	2.04	2.05	2.06	1.98	2.07	2.01	24
12	2.11	2.19	2.37	2.39	2.48	2.54	2.32	2.31	2.30	2.35	2.33	2.29	2.29	2.38	S	2.41	2.26	2.23	2.24	2.22	2.21	2.19	2.19	2.23	2.11	2.54	2.30	24
13	2.41	2.44	2.18	2.22	2.28	2.63	2.39	2.96	2.91	4.65	4.24	3.44	3.25	S	2.93	2.89	2.54	2.77	2.70	2.97	2.89	2.81	2.83	3.30	2.18	4.65	2.90	24
14	2.74	3.00	2.72	2.62	2.15	2.38	2.36	2.31	2.21	2.14	2.10	2.10	S	1.98	1.94	1.94	2.02	2.06	2.01	2.02	2.12	2.12	2.21	2.25	1.94	3.00	2.24	24
15	2.25	2.20	2.34	2.39	2.35	2.26	2.24	2.23	2.15	2.04	2.00	S	2.02	2.01	1.99	1.97	1.98	1.97	1.99	1.94	1.96	1.93	1.92	1.91	1.91	2.39	2.09	24
16	1.95	1.96	1.93	1.96	1.95	1.99	1.96	1.98	1.99	2.01	S	2.01	1.98	1.95	1.99	1.98	2.02	2.10	2.17	2.06	2.13	2.13	2.09	2.10	1.93	2.17	2.02	24
17	2.07	2.12	2.10	2.04	2.05	2.07	2.09	2.14	2.09	S	2.08	2.08	2.09	2.07	2.13	2.13	2.13	2.25	2.32	2.22	2.20	2.22	2.20	2.21	2.04	2.32	2.13	24
18	2.33	2.53	2.52	2.41	2.42	2.36	2.23	2.29	S	2.12	2.11	2.07	2.08	2.03	2.03	2.03	1.99	2.03	2.00	2.11	2.08	2.09	2.06	2.05	1.99	2.53	2.17	24
19	2.07	2.07	2.19	2.19	2.19	2.21	2.20	S	2.19	2.16	2.17	2.21	2.23	2.24	2.20	2.12	2.11	2.14	2.16	2.17	2.14	2.07	2.09	2.08	2.07	2.24	2.16	24
20	2.18	2.46	4.46	4.31	3.02	6.71	X	2.66	S	S	2.07	2.12	2.15	2.22	2.22	2.19	2.12	2.14	2.14	2.17	2.10	2.18	2.22	2.19	2.07	6.71	2.67	23
21	2.22	2.21	2.22	2.21	2.21	S	2.24	2.25	2.30	2.27	2.23	2.23	2.25	2.25	2.26	2.27	2.34	2.48	2.27	2.23	2.25	2.30	2.25	2.29	2.21	2.48	2.26	24
22	2.34	2.30	2.27	2.26	S	2.31	2.36	2.46	2.48	2.40	2.32	2.28	2.25	2.22	2.18	2.15	2.17	2.16	2.16	2.24	2.25	2.14	2.21	2.23	2.14	2.48	2.27	24
23	2.17	2.11	2.03	S	2.08	2.05	2.06	2.08	2.17	2.12	2.05	2.03	2.04	2.03	2.00	1.95	1.98	1.96	1.93	1.96	1.94	1.95	1.92	1.96	1.92	2.17	2.02	24
24	1.92	1.94	S	1.93	1.94	1.92	1.96	1.93	1.95	1.94	1.99	1.97	1.99	1.98	1.97	1.99	2.05	2.12	2.07	2.09	2.07	2.15	2.17	2.20	1.92	2.20	2.01	24
25	2.20	S	2.25	2.25	2.31	2.28	2.34	2.30	2.35	2.26	2.24	2.23	2.25	2.31	2.26	2.29	2.22	2.26	2.21	2.22	2.18	2.12	2.19	2.16	2.12	2.35	2.25	24
26	S	2.16	2.20	2.08	2.08	2.12	2.13	2.16	2.12	2.11	2.06	2.03	2.04	2.05	2.01	2.03	2.01	1.98	2.00	1.96	1.97	1.96	1.99	S	1.96	2.20	2.06	24
27	1.99	2.05	2.06	2.04	2.01	2.01	1.94	1.94	1.94	1.97	1.96	1.99	1.96	1.95	1.95	1.98	1.98	1.98	1.99	1.98	1.98	2.03	S	2.00	1.94	2.06	1.99	24
28	1.98	1.96	2.04	2.03	2.08	2.09	2.16	2.16	2.16	2.20	2.20	2.14	2.18	2.13	2.15	2.18	2.23	2.20	2.23	2.25	2.25	S	2.29	2.34	1.96	2.34	2.16	24
29	2.33	2.34	2.35	2.37	2.45	2.43	2.39	2.46	2.45	2.95	3.57	3.15	2.71	3.47	3.47	2.88	2.87	2.67	2.67	2.77	S	2.63	2.35	2.30	2.30	3.57	2.70	24
30	2.56	2.35	2.51	2.71	2.81	2.93	3.17	3.10	2.88	2.92	2.85	2.85	2.76	2.96	2.71	2.54	2.65	2.68	3.24	S	3.14	2.99	3.00	2.79	2.35	3.24	2.83	24
HOURLY MAX	2.74	3.00	4.46	4.31	3.02	6.71	3.17	3.10	2.91	4.65	4.24	3.44	3.25	3.47	3.47	2.89	2.87	2.77	3.24	2.97	3.14	2.99	3.00	3.30				
HOURLY AVG	2.19	2.20	2.27	2.25	2.20	2.35	2.17	2.22	2.18	2.25	2.24	2.20	2.17	2.16	2.16	2.15	2.14	2.17	2.19	2.18	2.18	2.18	2.19	2.20				

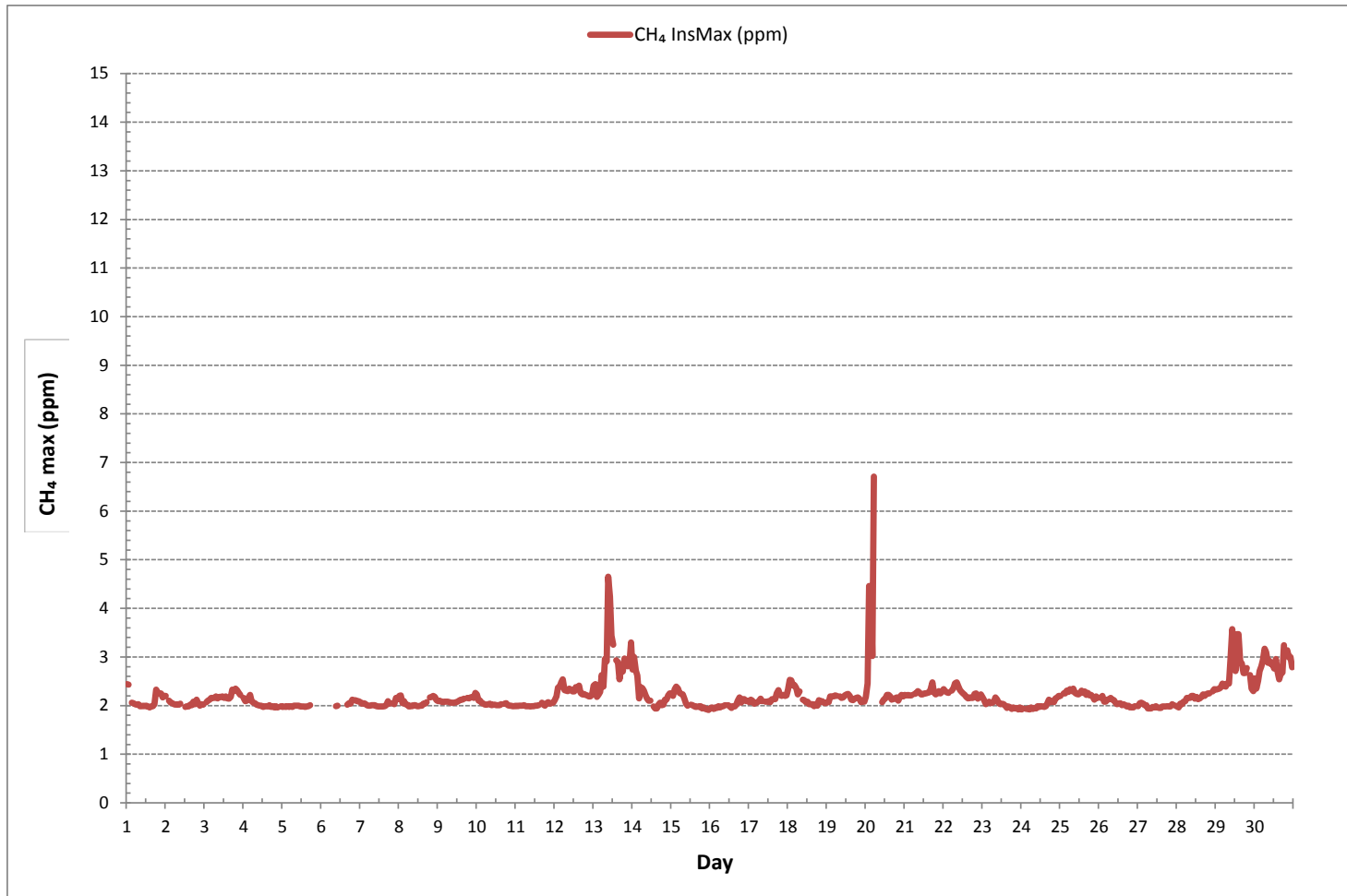
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	665
MAXIMUM INSTANTANEOUS VALUE:	6.71 ppm @ HOUR 5 ON DAY 20
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	0.36
OPERATIONAL TIME:	702 hrs

METHANE MAX Instantaneous Maximum (CH₄ ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
 Bonnyville East Continuous Monitoring Station - November 2018

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.	
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	0.00	0.06	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	0.06	0.00	24	
2	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Y	Y	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	22
3	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.09	0.10	0.04	0.08	0.08	0.06	0.00	0.08	S	0.00	0.10	0.03	24	
4	0.06	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.06	0.00	24
5	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	X	X	X	X	X	X	0.00	0.00	0.00	18	
6	X	X	X	X	X	X	X	X	X	0.00	0.00	C	C	C	C	C	0.00	0.00	0.06	0.00	S	0.00	0.00	0.00	0.00	0.06	0.01	15	
7	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	0.00	24	
8	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	0.00	0.00	0.00	24	
9	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	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24	
10	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	S	0.00	0.00	0.00	0.00	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	0.00	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	24	
12	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	0.07	0.00	0.00	0.00	0.00	0.03	0.06	0.06	0.07	0.08	0.00	0.08	0.02	24	
13	0.07	0.09	0.06	0.00	0.06	0.08	0.07	0.10	0.09	0.19	0.15	0.11	0.11	S	0.11	0.20	0.10	0.09	0.11	0.13	0.14	0.15	0.12	0.13	0.00	0.20	0.11	24	
14	0.14	0.14	0.11	0.10	0.06	0.09	0.11	0.09	0.09	0.05	0.10	0.04	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	0.14	0.05	24	
15	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
16	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	0.00	0.00	0.00	0.00	24	
17	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.05	0.06	0.03	0.05	0.06	0.07	0.08	0.09	0.10	0.10	0.08	0.11	0.13	0.09	0.00	0.13	0.05	24	
18	0.10	0.09	0.10	0.07	0.10	0.05	0.04	0.00	S	0.03	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	0.10	0.03	24	
19	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	0.06	0.00	0.06	0.07	0.04	0.00	0.00	0.00	0.07	0.07	0.00	0.00	0.07	0.02	24	
20	0.00	0.00	0.15	0.16	0.09	0.33	X	0.05	S	S	0.00	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	0.33	0.04	23	
21	0.00	0.08	0.00	0.08	0.02	S	0.06	0.00	0.00	0.00	0.00	0.05	0.04	0.07	0.10	0.07	0.06	0.00	0.06	0.08	0.00	0.00	0.06	0.00	0.00	0.10	0.04	24	
22	0.04	0.06	0.08	0.09	S	0.10	0.06	0.08	0.12	0.12	0.12	0.13	0.11	0.12	0.09	0.10	0.07	0.08	0.06	0.07	0.07	0.01	0.06	0.06	0.01	0.13	0.08	24	
23	0.00	0.06	0.08	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	0.08	0.01	24	
24	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	0.00	24	
25	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	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.04	0.00	24	
26	S	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.06	0.07	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	0.07	0.01	24	
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.01	0.04	0.07	0.07	0.06	0.06	S	0.00	0.00	0.07	0.02	24		
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.04	0.08	0.06	0.06	0.06	0.07	0.09	0.09	S	0.10	0.11	0.00	0.11	0.03	24	
29	0.12	0.14	0.13	0.11	0.13	0.15	0.14	0.11	0.13	0.14	0.21	0.19	0.16	0.24	0.27	0.21	0.19	0.14	0.14	0.15	S	0.11	0.09	0.09	0.09	0.27	0.15	24	
30	0.12	0.11	0.10	0.12	0.13	0.18	0.19	0.18	0.17	0.20	0.21	0.19	0.16	0.15	0.18	0.15	0.12	0.14	0.15	0.16	S	0.19	0.15	0.17	0.14	0.10	0.20	0.15	24
HOURLY MAX	0.14	0.14	0.15	0.16	0.13	0.33	0.19	0.18	0.17	0.20	0.21	0.19	0.16	0.24	0.27	0.21	0.19	0.15	0.16	0.15	0.19	0.15	0.17	0.14					
HOURLY AVG	0.02	0.03	0.03	0.03	0.02	0.04	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.03				

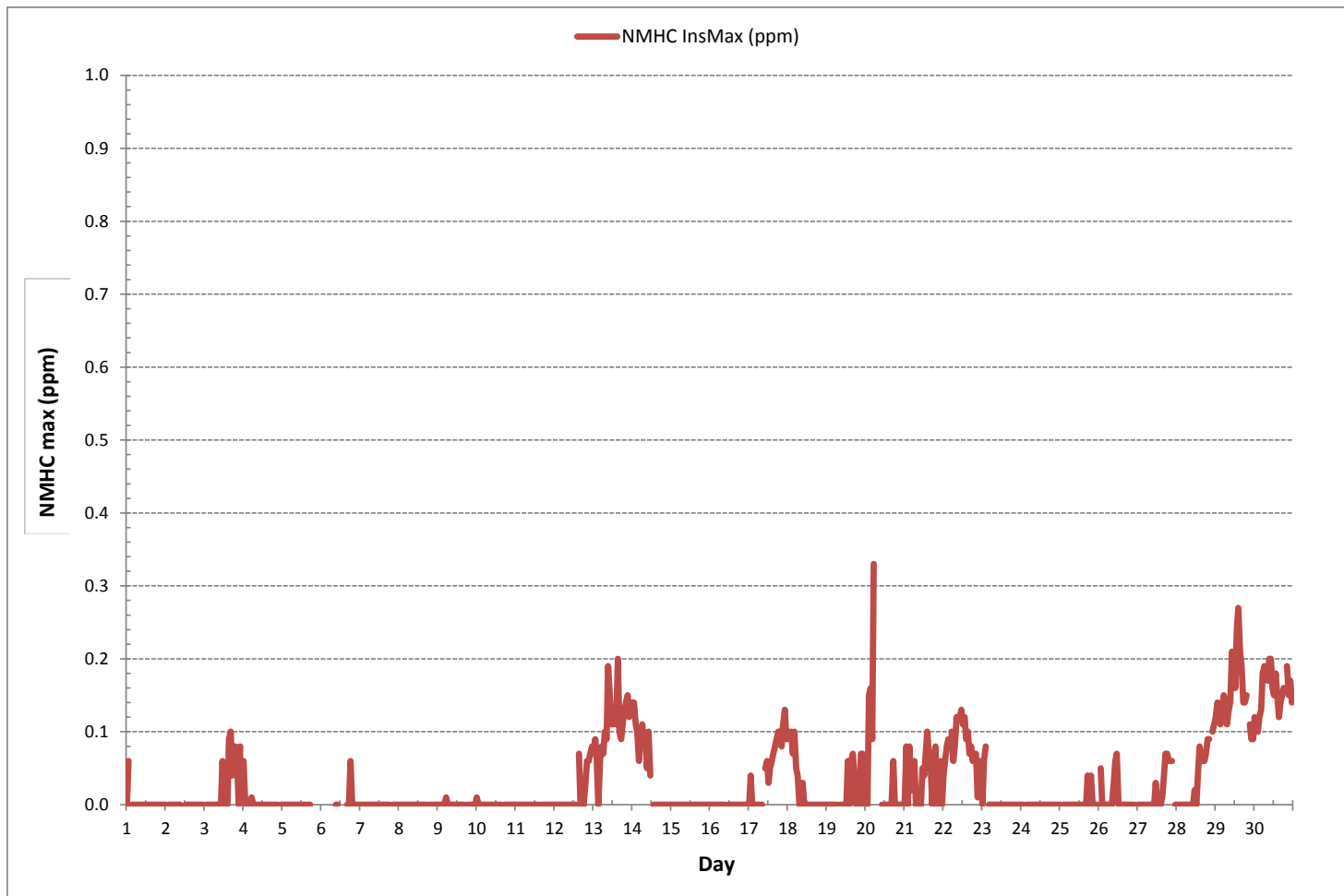
STATUS FLAG CODES

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:	198
MAXIMUM INSTANTANEOUS VALUE:	0.33 ppm @ HOUR 5 ON DAY 20
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	0.05
OPERATIONAL TIME:	702 hrs

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

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	11	15	S	9	4	4	5	5	3	3	2	2	2	1	1	1	7	11	8	8	7	7	4	6	1	15	6	24	
2	5	S	8	3	2	2	2	9	11	60	24	11	6	4	10	6	38	3	2	5	2	9	2	1	1	60	10	24	
3	S	7	3	3	3	3	3	3	4	4	5	5	5	5	5	5	5	6	7	6	6	6	5	S	3	7	5	24	
4	12	4	4	4	4	3	2	2	2	3	2	4	2	2	3	2	3	2	3	3	2	2	2	S	6	2	12	3	24
5	2	2	1	1	1	1	2	2	2	2	1	1	1	2	3	3	4	5	X	X	X	X	X	X	X	1	5	2	18
6	X	X	X	X	X	X	X	X	X	C	C	C	C	C	C	C	7	8	9	7	S	18	8	8	7	18	9	15	
7	6	5	5	5	4	6	6	6	7	5	3	2	2	3	3	3	4	5	4	S	7	3	4	5	2	7	4	24	
8	5	6	4	5	4	8	5	5	4	12	2	13	1	1	4	3	5	3	S	6	5	5	7	S1	1	13	5	23	
9	S1	3	3	3	7	3	3	3	3	8	5	6	4	8	5	5	5	S	10	7	15	12	9	12	3	15	6	23	
10	11	6	5	4	3	4	4	4	5	5	3	4	4	4	4	S	10	10	4	2	2	2	2	2	2	11	5	24	
11	2	1	2	1	1	2	2	1	1	2	1	2	3	3	4	S	6	5	4	4	3	2	2	2	1	6	2	24	
12	3	4	7	7	9	8	7	8	8	14	7	8	10	8	S	13	8	8	8	7	8	9	9	9	3	14	8	24	
13	8	11	8	9	9	13	17	17	18	35	35	24	29	S	S1	23	16	19	16	19	20	17	24	18	8	35	18	23	
14	17	16	14	13	8	9	10	11	10	10	C1	C1	C1	C1	C1	C1	C1	C1	13	7	5	4	5	5	4	17	10	16	
15	5	8	12	12	12	10	12	10	9	8	7	S	33	8	2	45	4	2	2	1	2	1	2	1	1	45	9	24	
16	0	1	1	2	3	3	3	3	5	7	S	9	6	6	6	5	4	5	5	4	5	3	4	0	9	4	24		
17	4	5	6	6	6	6	6	6	6	6	S	12	11	10	10	11	11	12	13	13	13	13	12	12	4	13	9	24	
18	15	15	14	12	12	10	10	8	S	10	7	5	4	3	3	3	3	5	4	3	5	5	3	3	3	15	7	24	
19	4	3	5	5	5	6	5	S	9	6	8	8	8	9	10	9	9	9	8	8	6	7	5	3	10	7	24		
20	7	5	17	18	14	42	X	15	S	S	8	10	10	6	5	4	4	4	4	4	4	5	11	10	4	42	10	23	
21	10	6	6	6	6	S	10	6	6	8	6	7	12	12	8	9	8	8	8	7	7	7	7	7	6	12	8	24	
22	7	8	9	7	S	11	7	11	12	12	10	11	10	9	11	9	7	7	9	8	8	7	6	7	6	12	9	24	
23	5	6	5	S	8	7	13	13	13	13	9	5	5	7	7	4	3	2	3	4	4	3	3	3	2	13	6	24	
24	3	3	S	6	4	6	5	17	3	6	3	2	2	2	3	2	4	5	4	4	4	5	4	4	2	17	4	24	
25	4	S	9	6	6	6	6	5	5	5	8	6	7	8	7	7	6	6	5	6	5	5	5	5	4	9	6	24	
26	S	9	5	5	5	4	4	4	4	4	4	3	3	3	3	3	5	3	3	3	2	2	2	2	S	2	9	4	24
27	7	4	4	4	4	4	2	2	3	3	3	3	3	3	4	3	3	3	3	3	3	3	10	S	6	2	10	4	24
28	4	3	4	6	4	5	5	S1	S1	S1	S1	7	6	6	7	8	C1	C1	C1	S1	S1	S	16	14	3	16	7	15	
29	14	14	13	12	13	23	16	14	27	20	73	21	16	27	41	24	23	20	21	20	S	22	18	17	12	73	22	24	
30	17	15	15	16	18	19	20	18	36	35	20	20	24	19	17	16	16	17	25	S	24	21	22	16	15	36	20	24	
HOURLY MAX	17	16	17	18	18	42	20	18	36	60	73	24	33	27	41	45	38	20	25	20	24	22	24	18	15	36	20	24	
HOURLY AVG	7	7	7	7	6	8	7	8	8	12	10	8	8	7	7	9	8	7	8	7	7	8	7	7	7	7	7	7	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

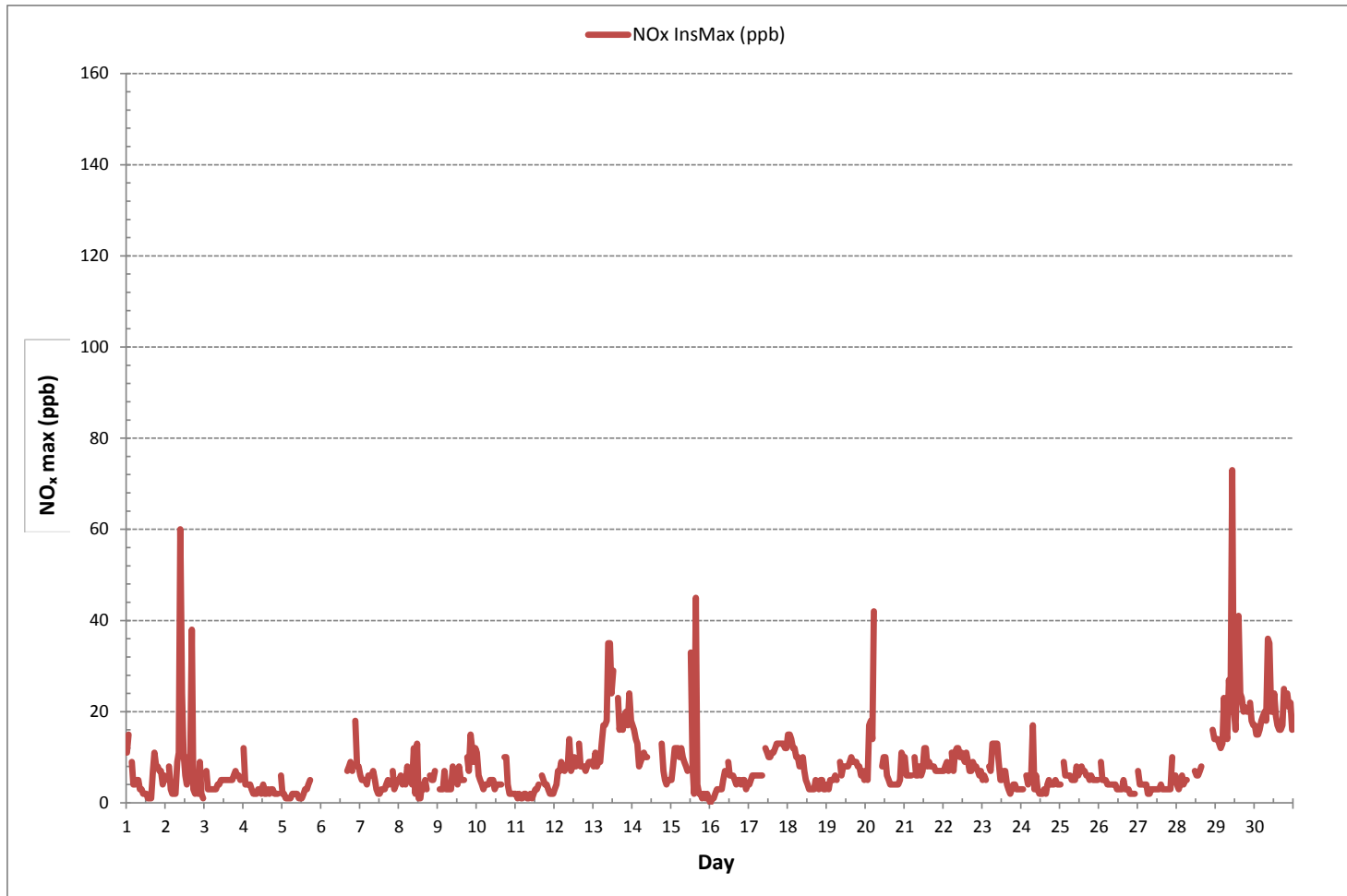
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	645
MAXIMUM INSTANTANEOUS VALUE:	73 ppb @ HOUR 10 ON DAY 29
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	7
OPERATIONAL TIME:	684 hrs



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

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	S	0	0	1	0	0	1	0	0	1	1	0	0	0	1	8	0	0	1	0	0	0	0	8	1	24
2	0	S	0	0	0	0	0	1	8	56	20	10	4	2	6	4	24	1	0	1	0	4	0	0	0	56	6	24
3	S	0	1	0	0	0	0	0	1	1	1	1	1	2	2	1	1	1	0	1	0	0	0	S	0	2	1	24
4	0	0	0	0	0	0	0	0	0	3	1	0	1	0	0	0	0	0	0	0	0	0	S	0	0	3	0	24
5	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	X	X	X	X	X	X	0	1	0	18
6	X	X	X	X	X	X	X	X	C	C	C	C	C	C	C	C	1	0	6	0	S	0	0	0	0	6	1	15
7	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	S	0	0	0	0	0	1	0	24
8	0	0	0	0	0	1	0	0	1	4	1	8	0	0	1	0	0	0	S	0	0	0	2	S1	0	8	1	23
9	S1	0	0	0	3	1	0	0	0	3	1	2	1	2	1	1	0	S	0	0	0	0	0	0	0	3	1	23
10	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	S	0	0	0	0	0	0	0	0	1	0	24
11	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	S	0	0	0	0	0	0	0	0	0	1	0	24
12	0	0	0	0	0	0	0	0	1	7	2	3	5	2	S	2	1	0	0	0	0	0	0	0	0	7	1	24
13	0	0	0	0	0	3	3	1	6	20	21	13	17	S	S1	6	1	1	1	0	2	1	2	2	0	21	5	23
14	0	0	0	0	0	0	0	0	1	2	C1	C1	C1	C1	C1	C1	C1	0	0	0	0	0	0	0	0	2	0	16
15	0	0	0	0	0	0	0	0	1	1	2	S	4	4	0	37	1	0	0	0	0	0	0	0	0	37	2	24
16	0	0	0	0	0	0	0	0	1	2	S	2	2	2	2	1	0	0	0	0	0	0	0	0	0	2	1	24
17	0	0	0	0	0	0	0	0	1	S	4	5	4	3	3	2	1	0	0	0	0	1	1	0	0	5	1	24
18	0	1	0	0	0	0	0	0	0	S	1	1	1	1	0	0	0	2	1	0	1	1	0	0	0	2	1	24
19	0	0	0	0	0	0	0	S	1	1	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	2	1	24
20	0	0	1	1	0	25	X	0	S	S	3	4	5	2	1	1	0	0	0	0	0	4	2	0	25	2	23	
21	2	0	0	0	0	S	0	0	1	3	2	3	6	6	2	2	1	1	1	0	0	0	0	0	0	6	1	24
22	0	0	0	0	0	S	0	0	1	3	4	3	4	3	2	2	1	0	0	0	0	0	0	0	0	4	1	24
23	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	2	0	24
24	0	0	S	0	0	0	0	7	0	2	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	7	1	24
25	0	S	0	0	0	0	0	0	0	1	3	2	2	3	2	1	0	0	0	0	0	0	0	0	0	3	1	24
26	S	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	2	0	0	0	0	0	0	S	0	2	0	24
27	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	3	S	0	3	0	24	
28	0	0	2	1	0	0	0	S1	S1	S1	S1	2	1	1	1	1	C1	C1	C1	S1	S1	S	1	1	0	2	1	15
29	0	0	0	0	0	7	3	3	15	12	61	13	7	15	24	11	8	1	1	1	S	1	0	0	0	61	8	24
30	0	0	1	1	1	1	2	1	17	17	8	9	11	8	5	3	1	0	2	S	2	1	1	0	0	17	4	24
HOURLY MAX	2	1	2	1	3	25	3	7	17	56	61	13	17	15	24	37	24	8	6	1	2	4	4	2				
HOURLY AVG	0	0	0	0	0	1	0	1	2	6	5	3	3	2	2	3	2	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

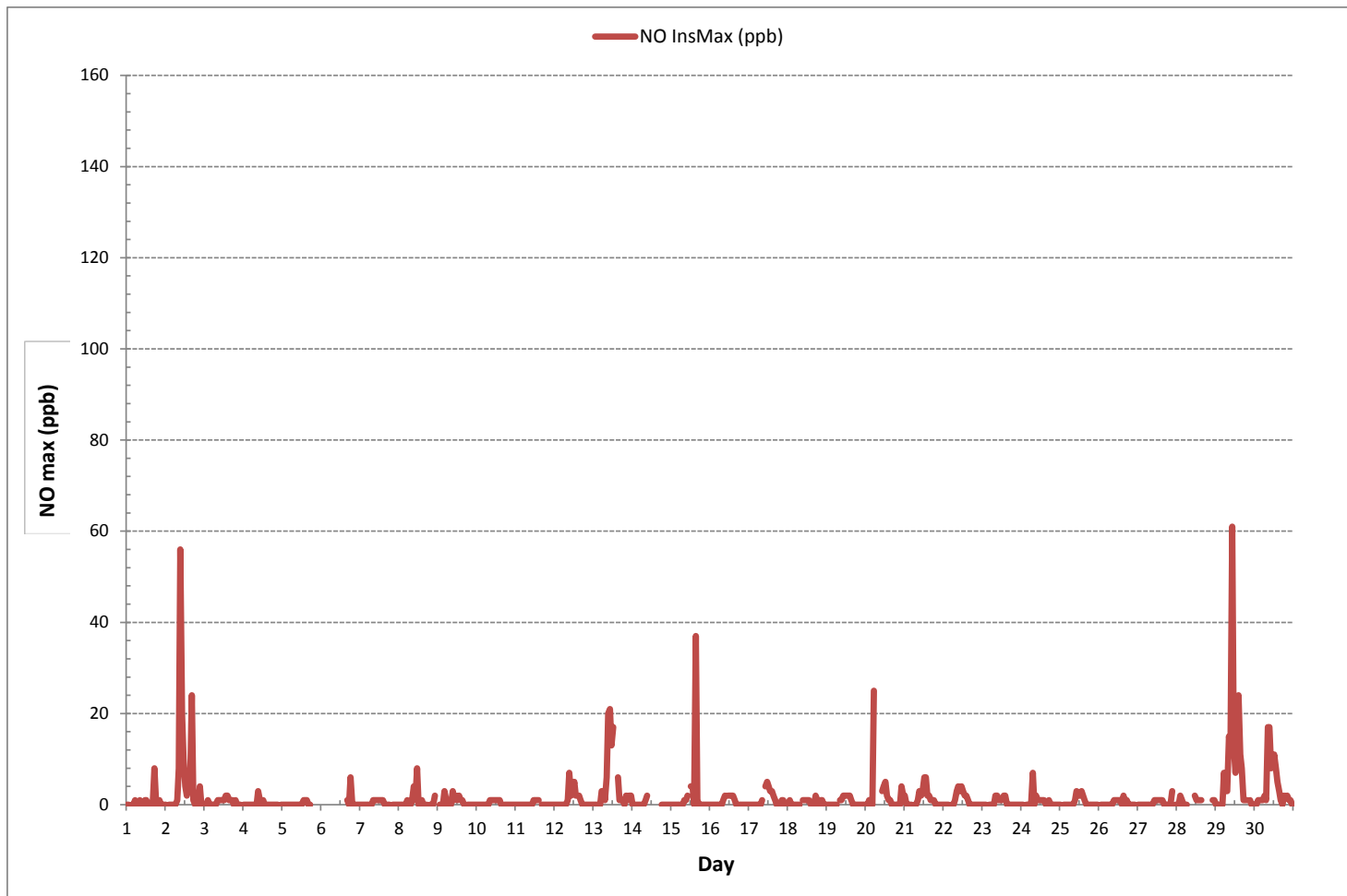
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	254
MAXIMUM INSTANTANEOUS VALUE:	61 ppb @ HOUR 10 ON DAY 29
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	7 hrs
OPERATIONAL TIME:	684 hrs
STANDARD DEVIATION:	5



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

NITRIC OXIDE Instantaneous Maximum (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
 Bonnyville East Continuous Monitoring Station - November 2018

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	11	15	S	9	3	4	5	4	2	3	2	2	1	1	1	2	6	6	8	8	7	7	5	6	1	15	5	24	
2	5	S	8	3	2	2	2	7	8	19	5	5	2	2	4	2	14	3	2	4	2	4	2	1	1	1	19	5	24
3	S	7	3	3	3	3	3	3	3	4	4	4	4	4	4	5	5	6	7	6	6	5	S	3	7	4	24		
4	12	4	4	4	4	3	2	2	2	2	2	2	3	2	2	3	2	3	3	2	2	2	S	6	2	12	3	24	
5	2	2	2	2	1	1	2	2	2	2	1	1	1	1	2	3	4	5	X	X	X	X	X	X	1	5	2	18	
6	X	X	X	X	X	X	X	X	X	C	C	C	C	C	C	C	7	9	8	7	S	19	8	8	7	19	9	15	
7	6	5	5	5	4	6	6	6	6	4	3	2	2	2	2	3	4	5	4	S	7	3	4	6	2	7	4	24	
8	5	6	4	5	4	7	5	6	4	8	2	6	1	1	3	3	5	4	S	6	5	5	5	S1	1	8	4	23	
9	S1	3	3	3	5	3	3	3	3	6	4	4	3	6	4	5	5	S	10	7	15	12	9	12	3	15	6	23	
10	11	7	5	4	3	4	4	4	5	4	4	2	3	3	3	4	S	10	10	4	3	2	2	2	2	11	4	24	
11	2	1	2	1	1	2	2	2	1	1	1	1	2	2	3	S	6	5	4	4	3	3	2	2	1	6	2	24	
12	3	4	7	7	9	8	7	8	6	8	5	6	6	6	S	12	8	8	8	7	8	8	8	9	3	12	7	24	
13	8	11	8	9	9	13	14	17	13	15	14	11	12	S	S1	17	15	18	15	19	20	17	22	18	8	22	14	23	
14	17	16	14	13	8	9	10	10	10	8	C1	C1	C1	C1	C1	C1	C1	C1	13	7	5	5	5	5	5	5	17	10	16
15	5	8	12	12	12	10	12	10	9	6	5	S	29	5	2	23	3	2	2	1	2	2	2	2	1	29	8	24	
16	1	1	1	2	4	3	3	3	5	6	S	7	4	4	4	4	5	5	3	5	5	4	4	1	7	4	24		
17	4	5	6	6	6	6	6	6	6	S	9	6	6	7	8	10	12	13	13	13	13	13	12	12	4	13	9	24	
18	15	15	14	12	12	10	10	8	S	9	6	4	4	3	3	4	3	3	3	3	4	4	3	3	3	15	7	24	
19	4	4	6	6	5	6	5	S	9	5	6	6	6	7	8	9	9	9	9	8	8	6	6	5	4	9	7	24	
20	6	5	16	17	14	17	X	15	S	S	6	6	6	4	3	4	4	4	4	5	4	5	8	8	3	17	8	23	
21	8	6	6	6	S	10	6	6	5	4	5	6	6	7	8	8	8	8	7	7	7	7	7	4	10	7	24		
22	7	8	9	7	S	11	7	10	9	8	7	7	7	7	9	8	8	8	9	8	8	6	7	6	11	8	24		
23	5	6	5	S	8	7	13	13	12	11	7	4	4	5	6	3	3	2	3	4	4	3	3	4	2	13	6	24	
24	3	3	S	6	4	6	5	10	3	4	2	2	2	2	2	4	4	4	4	4	5	4	4	2	10	4	24		
25	4	S	9	6	6	6	6	5	6	5	5	4	5	6	6	6	6	5	6	5	5	5	5	5	4	9	6	24	
26	S	9	5	5	5	5	4	4	3	3	3	3	3	3	3	4	3	3	3	2	2	2	2	S	2	9	4	24	
27	7	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	8	S	6	3	8	4	24
28	4	4	3	5	5	5	S1	S1	S1	S1	5	5	5	6	7	C1	C1	C1	S1	S1	S	15	14	3	15	6	15		
29	14	14	13	12	13	16	13	12	12	9	17	9	9	12	17	15	19	19	20	19	S	22	18	16	9	22	15	24	
30	17	15	15	16	17	18	18	17	21	19	12	11	12	12	13	15	16	17	23	S	24	21	21	16	11	24	17	24	
HOURLY MAX	17	16	16	17	17	18	18	17	21	19	17	11	29	12	17	23	19	19	19	23	19	24	22	18					
HOURLY AVG	7	7	7	7	6	7	7	7	7	7	5	5	5	4	5	7	7	7	8	7	7	7	7	7					

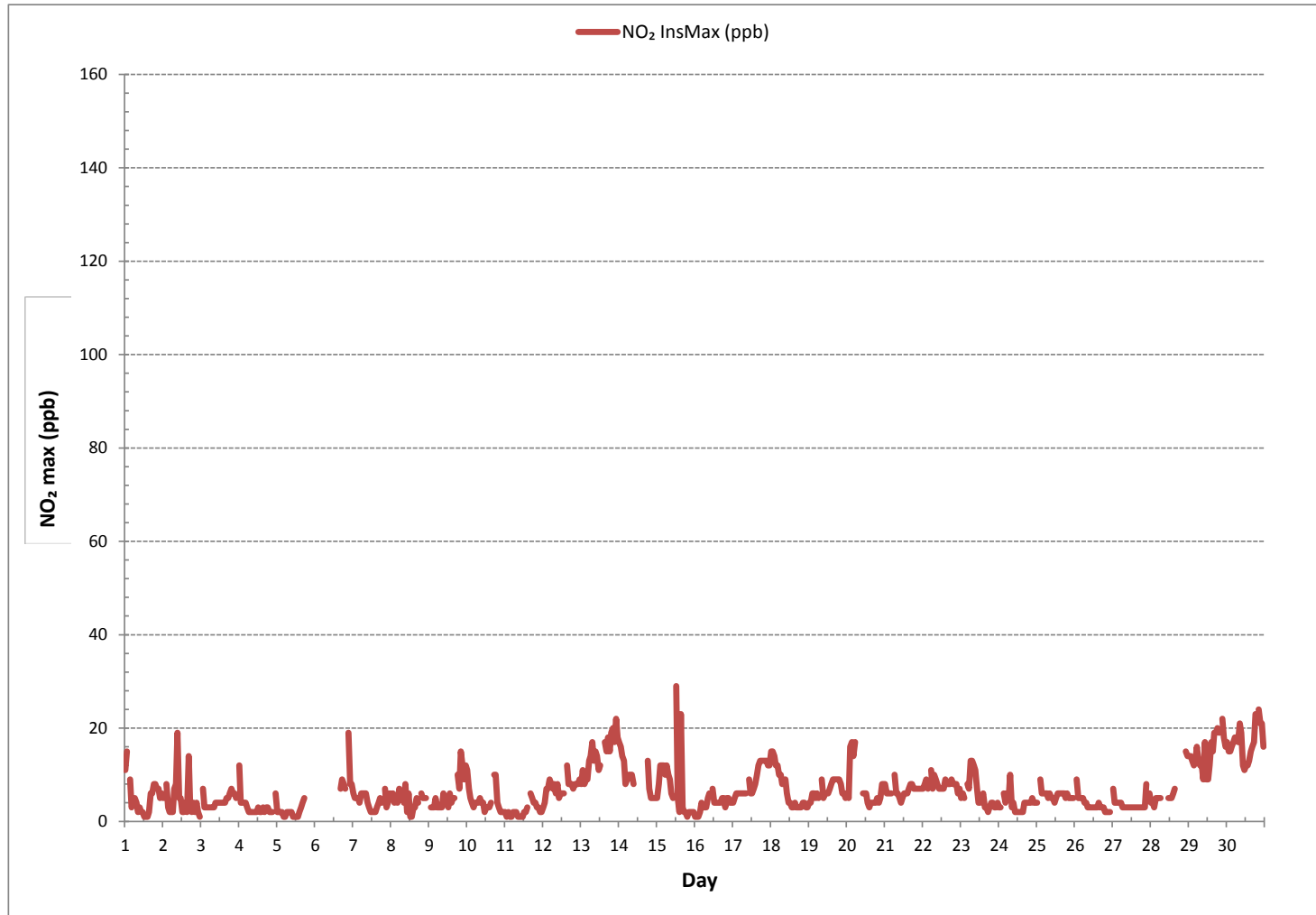
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	646
MAXIMUM INSTANTANEOUS VALUE:	29 ppb @ HOUR 12 ON DAY 15
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	5
OPERATIONAL TIME:	684 hrs

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
 Bonnyville East Continuous Monitoring Station - November 2018

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 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	13.1	26.4	S	21.6	14.3	14.5	23.2	24.0	24.2	25.5	27.0	28.8	30.8	30.8	31.4	30.3	27.9	27.6	27.9	23.2	22.7	22.6	23.6	22.3	13.1	31.4	24.5	24	
2	22.7	S	26.1	25.9	25.5	24.4	23.0	19.6	16.7	15.6	19.9	22.9	26.0	27.2	27.1	26.9	25.8	24.3	23.2	21.4	21.6	23.6	23.4	24.4	15.6	27.2	23.3	24	
3	S	22.9	22.2	21.6	20.4	19.9	19.0	17.0	16.5	16.0	14.7	13.9	14.7	14.9	16.1	16.0	12.9	12.1	12.0	11.1	10.2	10.0	12.9	S	10.0	22.9	15.8	24	
4	14.3	14.9	14.8	15.2	14.9	15.9	16.3	15.9	15.7	15.6	15.2	15.7	15.3	14.5	12.7	11.0	11.7	16.5	17.5	20.9	22.5	24.8	S	28.2	11.0	28.2	16.5	24	
5	28.7	29.8	31.5	31.2	31.2	30.9	31.7	31.3	30.8	30.8	30.9	30.9	30.4	30.1	29.5	30.7	30.8	32.2	X	X	X	X	X	X	X	28.7	32.2	30.7	18
6	X	X	X	X	X	X	X	X	X	X	27.7	28.0	27.8	27.2	26.9	C	C	C	C	C	24.2	S	24.4	23.8	25.2	23.8	28.0	26.1	15
7	25.6	26.9	27.2	27.8	28.8	28.2	26.9	25.0	26.6	31.4	34.1	34.2	34.5	33.8	34.4	33.9	33.6	32.5	31.2	S	32.7	33.3	33.5	30.8	25.0	34.5	30.7	24	
8	30.6	32.5	31.0	31.0	32.0	29.5	29.4	30.3	30.8	32.5	33.5	34.2	34.2	34.2	33.6	32.7	33.1	33.2	S	32.2	29.9	30.3	32.8	33.5	29.4	34.2	32.0	24	
9	33.2	32.3	31.4	31.0	30.6	30.3	30.4	30.3	30.7	31.0	31.0	31.4	31.4	30.9	30.1	29.2	27.7	S	25.6	24.5	23.6	17.7	17.5	15.7	15.7	33.2	28.2	24	
10	17.8	19.9	22.4	25.5	30.7	31.1	30.4	29.7	28.1	32.7	31.5	30.3	29.5	31.0	32.3	32.4	S	30.2	31.7	35.5	36.9	37.0	37.6	37.4	17.8	37.6	30.5	24	
11	38.1	38.6	38.0	39.4	39.0	38.2	37.2	36.7	37.3	37.5	37.6	36.7	35.9	35.5	34.9	S	33.8	33.9	34.0	34.9	31.7	32.3	33.1	33.5	31.7	39.4	36.0	24	
12	31.8	29.6	27.8	28.0	26.0	25.6	25.5	26.0	26.1	26.8	27.4	27.7	27.8	27.1	S	23.2	22.5	22.0	21.3	20.5	19.6	19.8	19.5	20.1	19.5	31.8	24.9	24	
13	18.1	17.6	21.6	21.9	20.4	13.0	13.5	10.8	11.7	9.9	12.6	13.6	14.1	S	17.4	20.7	20.4	12.8	16.7	12.8	11.4	13.3	13.3	11.1	9.9	21.9	15.2	24	
14	10.6	11.3	13.3	22.6	22.9	23.5	18.5	18.3	26.8	28.1	27.1	31.6	S	37.4	37.2	37.6	35.1	33.4	30.8	32.3	30.2	29.0	28.3	27.8	10.6	37.6	26.7	24	
15	26.9	23.6	19.7	11.7	10.1	11.0	9.8	11.2	16.5	18.4	19.9	S	23.5	26.0	26.7	26.6	25.8	25.7	26.2	27.4	27.6	27.5	29.4	31.4	9.8	31.4	21.8	24	
16	32.3	32.4	32.5	31.6	31.3	32.1	30.8	30.5	29.8	28.7	S	35.2	34.2	33.4	31.7	31.8	30.4	30.6	31.3	30.9	29.3	26.9	26.3	25.9	25.9	35.2	30.9	24	
17	24.4	24.4	23.5	21.6	21.7	21.8	21.3	20.3	20.7	S	21.2	21.8	21.8	22.2	21.7	20.8	18.4	15.8	14.3	13.5	13.2	13.2	13.7	13.3	13.2	24.4	19.3	24	
18	12.3	11.3	12.3	12.6	13.0	18.3	16.7	17.6	S	19.0	19.1	19.5	20.6	21.6	22.2	23.2	23.1	23.5	24.2	23.8	24.6	24.4	24.7	24.4	11.3	24.7	19.6	24	
19	24.2	23.0	22.0	22.9	23.5	21.4	21.7	S	21.8	21.3	21.3	19.6	18.3	18.2	18.2	18.5	18.1	17.2	17.1	16.4	20.3	20.2	19.8	19.6	16.4	24.2	20.2	24	
20	19.8	20.2	10.1	11.6	13.8	5.4	X	20.8	S	S	21.0	21.1	21.6	21.9	12.7	12.7	13.3	13.8	14.4	15.0	15.2	15.4	14.0	14.4	5.4	21.9	15.6	23	
21	15.1	15.4	15.6	15.7	15.4	S	15.3	15.7	15.7	16.7	16.7	16.3	16.1	15.8	15.6	14.5	14.0	13.6	13.7	13.4	13.8	12.6	12.5	12.5	12.5	16.7	14.9	24	
22	12.6	13.8	13.0	11.5	S	11.0	10.8	9.8	9.2	13.9	14.5	C1	C1	C1	C1	C1	C1	26.1	27.5	27.9	26.9	29.3	28.9	26.0	9.2	29.3	18.4	18	
23	26.3	27.3	26.8	S	25.8	26.7	23.0	19.1	16.2	15.4	15.2	15.2	17.8	17.4	19.4	23.1	25.7	26.4	25.8	24.5	24.9	25.6	25.8	25.5	15.2	27.3	22.6	24	
24	26.4	26.5	S	27.0	27.0	24.9	24.5	26.1	27.3	27.2	27.2	27.4	27.2	27.6	27.6	27.4	27.6	25.0	24.6	24.8	24.6	24.5	24.7	24.4	24.4	27.6	26.1	24	
25	24.4	S	22.7	21.8	21.1	20.0	19.9	19.8	19.9	20.2	19.8	20.0	19.5	19.6	19.4	18.5	18.3	18.4	18.5	18.5	20.5	21.4	19.4	19.7	18.3	24.4	20.1	24	
26	S	19.8	19.5	19.8	21.3	23.5	24.1	24.4	24.3	26.0	26.8	27.5	27.5	26.7	26.5	25.9	25.7	25.4	25.7	25.9	25.2	25.5	25.7	S	19.5	27.5	24.7	24	
27	25.8	25.9	24.7	24.5	24.2	23.9	23.9	23.4	23.2	22.8	22.9	22.7	22.6	22.7	22.7	22.3	23.1	24.0	24.1	25.1	25.1	25.1	S	26.0	22.3	26.0	23.9	24	
28	27.4	25.4	24.9	24.5	23.8	23.1	23.5	23.0	23.0	22.9	23.0	23.3	22.7	21.9	20.8	19.9	16.2	46.5	15.5	13.1	11.5	S	9.3	7.3	7.3	46.5	21.4	24	
29	5.8	4.0	4.7	6.6	4.5	3.7	4.5	4.2	5.6	7.2	7.6	9.7	10.2	9.7	6.7	5.9	4.4	6.2	7.3	9.9	S	9.8	10.0	10.6	3.7	10.6	6.9	24	
30	9.6	11.0	10.8	8.7	7.9	8.3	5.2	5.8	6.7	10.2	10.7	12.0	13.3	13.0	13.3	12.9	10.5	8.6	7.5	S	6.2	5.3	6.8	6.9	5.2	13.3	9.2	24	
HOURLY MAX	38.1	38.6	38.0	39.4	39.0	38.2	37.2	36.7	37.3	37.5	37.6	36.7	35.9	37.4	37.2	37.6	35.1	46.5	34.0	35.5	36.9	37.0	37.6	37.4					
HOURLY AVG	22.1	22.5	21.9	22.0	22.2	21.4	21.4	21.0	21.6	22.5	22.7	24.0	23.9	24.7	23.8	23.3	22.6	23.5	21.8	22.4	22.3	22.3	21.9	22.1					

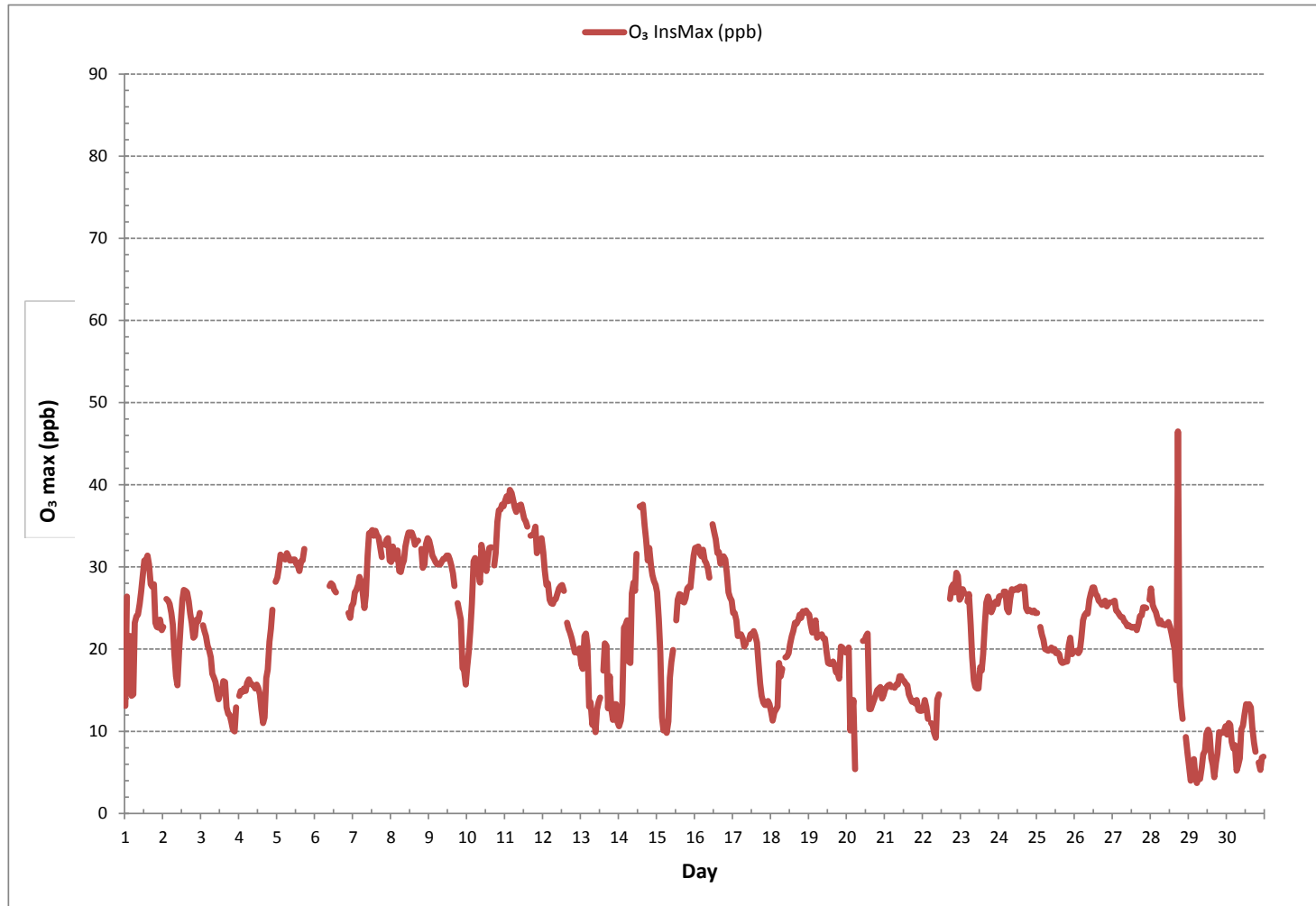
STATUS FLAG CODES

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:	661
MAXIMUM INSTANTANEOUS VALUE:	46.5 ppb @ HOUR 17 ON DAY 28
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	698 hrs
STANDARD DEVIATION:	7.9

OZONE Instantaneous Maximum (O₃ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - November 2018

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 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	9.6	18.8	18.5	22.2	28.0	25.5	27.7	31.8	30.6	27.0	24.8	21.3	20.5	20.3	18.6	16.3	10.9	13.3	13.5	14.2	16.8	16.6	14.1	13.8	9.6	31.8	19.8	24
2	14.9	23.7	22.0	21.5	23.6	23.7	23.6	21.0	21.7	22.7	24.4	27.2	25.4	21.1	19.5	16.3	15.5	14.3	15.3	11.8	8.3	15.8	16.1	20.8	8.3	27.2	19.6	24
3	22.7	23.0	23.4	21.3	21.6	21.7	16.9	15.9	19.4	24.4	23.5	17.5	15.2	17.7	22.5	16.1	7.3	8.9	10.9	12.0	12.0	13.7	25.9	24.9	7.3	25.9	18.3	24
4	22.6	23.2	21.0	21.3	26.5	29.4	29.8	28.4	28.2	28.0	26.0	30.2	30.9	27.8	20.1	17.0	38.2	41.6	37.0	34.8	35.8	36.3	41.7	36.6	17.0	41.7	29.7	24
5	35.7	39.6	42.1	40.5	41.2	34.8	34.3	25.2	23.5	27.5	28.6	27.8	26.1	28.1	27.5	28.0	20.4	21.9	X	X	X	X	X	X	20.4	42.1	30.7	18
6	X	X	X	X	X	X	X	X	X	15.6	14.6	11.4	14.6	13.7	14.8	10.2	6.7	7.1	6.8	6.9	9.5	18.5	12.7	14.7	6.7	18.5	11.9	15
7	10.3	10.6	10.7	11.5	15.8	14.5	14.1	14.2	15.1	18.3	18.4	19.9	18.3	22.7	20.5	13.9	18.9	17.9	12.2	10.0	8.0	11.2	8.7	10.8	8.0	22.7	14.4	24
8	6.7	7.6	7.4	15.3	16.2	16.8	18.6	11.6	10.4	16.5	14.4	15.3	10.4	7.5	7.9	7.2	6.6	13.4	14.6	10.7	10.1	15.8	24.2	25.9	6.6	25.9	13.0	24
9	30.5	32.6	35.6	36.4	29.1	29.6	23.5	23.8	28.5	23.8	25.2	19.9	17.2	13.2	12.6	8.4	8.2	5.5	2.5	2.7	11.9	17.0	19.3	13.0	2.5	36.4	19.6	24
10	18.4	21.3	26.9	32.3	32.7	24.6	29.5	22.6	11.7	16.7	22.3	25.2	17.7	17.7	14.2	13.1	17.2	17.9	22.9	27.2	39.7	31.2	30.5	25.0	11.7	39.7	23.3	24
11	26.5	23.5	22.9	28.4	24.6	27.2	19.1	23.0	24.0	23.3	25.3	21.9	19.1	18.9	17.9	17.5	7.8	10.5	8.3	10.0	8.3	8.5	9.6	10.5	7.8	28.4	18.2	24
12	6.8	6.3	10.0	10.9	13.5	17.6	15.2	14.3	11.1	13.0	10.8	7.0	4.8	11.6	10.5	11.1	8.6	9.3	8.8	11.3	12.1	13.8	7.5	5.3	4.8	17.6	10.5	24
13	7.4	6.9	11.7	10.5	8.9	6.0	7.1	8.7	7.1	9.4	11.3	7.6	9.2	9.8	8.5	10.2	9.4	7.5	13.6	6.9	6.2	5.7	6.9	6.8	5.7	13.6	8.5	24
14	8.4	12.1	9.6	11.7	14.9	18.6	15.6	14.8	18.5	19.6	16.9	13.0	18.1	24.7	19.7	20.6	16.9	16.7	8.6	9.0	11.8	12.4	11.4	10.9	8.4	24.7	14.8	24
15	11.0	11.0	7.3	8.7	8.9	7.4	4.2	9.3	11.6	14.4	16.1	14.5	17.6	18.1	22.8	22.3	21.5	28.7	26.2	28.9	27.6	28.8	33.5	38.1	4.2	38.1	18.3	24
16	38.0	35.4	32.9	29.0	23.7	26.2	23.7	27.4	25.9	13.7	15.3	10.7	6.1	6.3	6.0	8.3	13.5	11.1	9.7	13.2	12.8	16.3	18.2	14.9	6.0	38.0	18.3	24
17	20.6	15.3	15.8	21.0	21.5	22.4	15.0	14.8	19.4	20.7	16.0	17.3	10.7	10.8	10.0	13.7	9.2	9.6	9.9	11.7	10.1	6.5	5.6	6.4	5.6	22.4	13.9	24
18	7.9	11.0	13.8	15.1	16.2	17.8	17.0	16.1	20.2	23.6	21.8	25.4	24.9	23.0	22.2	19.9	16.9	17.6	16.7	15.8	12.4	10.7	11.8	10.4	7.9	25.4	17.0	24
19	11.8	10.3	15.4	16.1	19.2	16.5	17.8	23.3	23.9	8.8	11.2	21.0	15.8	9.9	16.5	16.2	16.0	12.0	12.8	13.8	15.5	13.3	11.0	10.9	8.8	23.9	14.9	24
20	7.8	5.4	10.6	5.1	4.4	5.6	9.9	14.4	14.5	11.6	14.0	12.8	13.9	17.6	21.8	25.0	26.0	22.3	19.3	15.8	15.5	11.7	16.4	21.4	4.4	26.0	14.3	24
21	23.6	16.5	17.2	18.0	19.2	18.1	16.8	12.7	12.4	12.2	16.6	19.2	18.5	19.2	16.7	13.7	13.0	13.2	17.6	16.5	13.4	18.6	15.2	10.6	10.6	23.6	16.2	24
22	9.3	14.4	15.9	9.4	9.2	4.4	6.6	9.1	8.7	13.1	17.8	17.8	20.4	15.6	9.8	8.1	8.6	8.5	10.3	7.9	7.7	11.1	10.3	4.4	20.4	11.0	24	
23	12.3	17.0	17.3	16.7	15.8	14.2	13.3	15.9	15.3	14.0	23.1	18.7	17.3	20.3	16.4	21.1	23.8	24.4	19.8	15.3	15.2	19.9	17.1	17.1	12.3	24.4	17.6	24
24	17.5	17.5	13.1	14.0	14.6	13.8	13.4	8.4	9.3	13.7	12.4	8.9	12.4	12.2	10.3	10.7	14.6	19.4	18.1	17.3	17.6	15.0	15.2	18.1	8.4	19.4	14.1	24
25	17.3	16.6	19.8	17.8	17.9	18.0	13.6	11.3	13.3	13.3	16.9	15.1	17.0	12.5	19.1	17.3	20.5	20.8	18.6	14.8	18.9	23.7	22.7	22.5	11.3	23.7	17.5	24
26	20.6	18.3	21.1	20.2	18.1	20.6	20.3	19.3	19.6	24.3	23.4	24.7	24.3	29.2	28.2	25.9	23.9	27.0	25.5	26.3	28.2	27.4	25.5	23.8	18.1	29.2	23.6	24
27	20.3	21.9	19.4	18.4	19.9	18.9	24.1	24.3	21.8	22.4	23.0	23.1	24.1	25.4	25.0	21.7	21.2	22.4	24.0	23.4	20.1	21.2	21.0	22.0	18.4	25.4	22.0	24
28	20.3	17.5	14.5	11.8	13.0	11.4	13.4	13.1	13.2	16.0	14.3	13.8	16.9	14.9	10.0	11.6	12.1	10.2	11.6	7.6	9.3	10.8	9.4	7.8	7.6	20.3	12.7	24
29	7.7	6.5	5.5	7.1	7.2	7.1	6.1	5.1	6.7	6.0	4.1	5.5	7.1	5.3	4.5	5.2	6.7	6.2	6.5	3.5	4.1	6.2	7.5	8.2	3.5	8.2	6.1	24
30	8.4	5.9	4.9	7.3	7.4	7.4	8.5	8.6	8.6	7.8	8.8	6.5	5.7	7.4	4.2	3.4	4.0	5.8	6.1	6.0	5.4	7.3	8.4	9.3	3.4	9.3	6.8	24
HOURLY MAX	38.0	39.6	42.1	40.5	41.2	34.8	34.3	31.8	30.6	28.0	28.6	30.2	30.9	29.2	28.2	28.0	38.2	41.6	37.0	34.8	39.7	36.3	41.7	38.1				

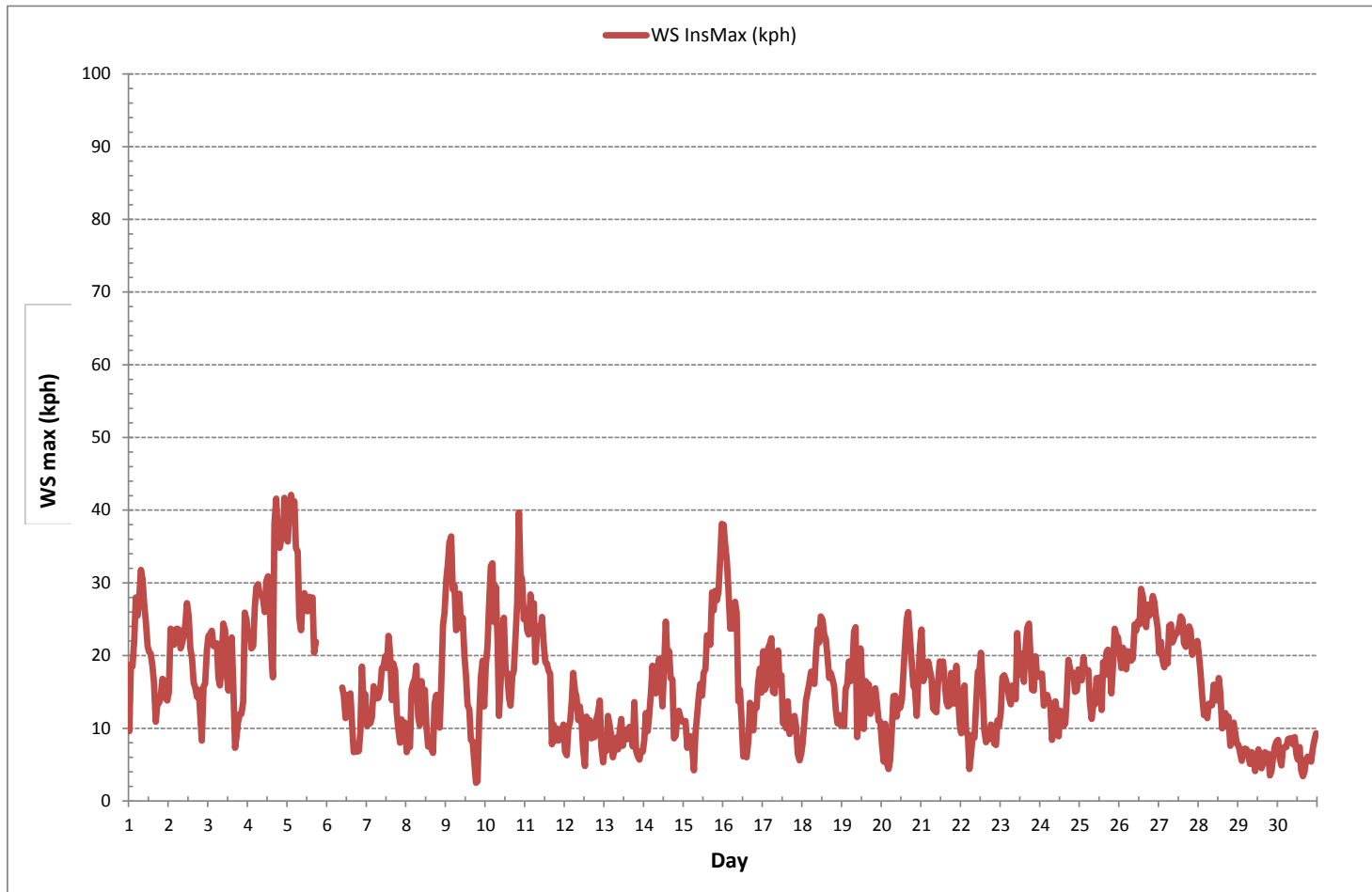
STATUS FLAG CODES

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

MAXIMUM INSTANTANEOUS VALUE:	42.1	kph	@ HOUR	2	ON DAY	5	
OPERATIONAL TIME:						705	hrs

WIND SPEED Instantaneous Maximum (WS kph)



***APPENDIX IV
REPORT CERTIFICATION FORM***

Report Certification Form

Alberta Airshed (if applicable)	EPA Approval or Code of Practice Registration # (if applicable)
YES	N/A
Company Name (if applicable)	Industrial Operation Name (if applicable)
Lakeland Industry & Community Association	Bonnyville East Continuous Monitoring Station
Name of the Representative of the Person Responsible	Position / Title of the Representative of the Person Responsible
Mike Bisaga	Environment Monitoring Program Manager
Is an External Party Certifying the Report? If 'Yes', fill in the fields below for the external person.	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Name of External Person Certifying the Report	Position / Title of External Person Certifying the Report
Wunmi Adekanmbi	Project Team Lead, Customer Service - Air Services
Company Name for the External Person Certifying the Report	Identification of Qualifications / Professional Designations of the External Person Certifying the Report
Maxxam Analytics, A Bureau Veritas Group Company	M.Sc., EPT., PMP

Maxxam Analytics is the designated contractor conducting monitoring and reporting activities. I certify that the submitted data has been (a) reviewed and validated as per the AMD Chapter 6: Ambient Data Quality. I certify that the submitted report (b) accurately reflects the monitoring results and reporting timeframe and (c) meets the specified analysis, summarization and reporting requirements as per the AMD Chapter 9: Reporting.



Signature of the External Person Certifying the Report

21 - Dec - 2018

Report Issued Date (dd-mon-yyyy)

APPENDIX V
DATA VALIDATION CERTIFICATION FORM



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2018-11-39-C</u>
Site: <u>Bonnyville East Continuous Monitoring Station</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u>Maram Ghaleb</u>	Date <u>06 - Dec - 2018</u>
Level 1 Primary Validation	<u>Maram Ghaleb</u>	Date <u>06 - Dec - 2018</u>
Level 2 Final Validation	<u>Maram Ghaleb</u>	Date <u>17 - Dec - 2018</u>
Level 3 Independent Data Review	<u>MSB</u>	Date <u>21 - Dec - 2018</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.