



Alberta Environment and Parks (AEP)
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January 8, 2018

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 2017.

The air monitoring program consists of continuous air monitoring, passive sampling, intermittent sampling, including both VOC and PAH sampling program, and VOC canister 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
VOC Canister	Maxxam Analytics	InnoTech Alberta Inc	InnoTech Alberta Inc	Not Applicable

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

All data collected in November 2017 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 certify that 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 certify 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 passive samples, intermittent samples and VOC canister samples. The results for both intermittent samples and VOC canister samples is scheduled to be submitted by the end of January 2018.

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 #: 2833-2017-11-1-C

November 2017

Prepared for:

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

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BONNYVILLE, ALBERTA

T9N 2J7

Attention: MIKE BISAGA

DATE: **December 21, 2017**

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SUMMARY

In November 2017, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the Cold Lake South Continuous Monitoring Station, near Bonnyville, Alberta. The monitoring station provides continuous meteorological measurements and air quality data for non-compliance parameters, as requested by the Lakeland Industry & Community Association.

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

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

Gas Parameters: Following the monthly calibration on November 9, calibrator cross-checks were performed on the channels. Downtime ranging from one to three hours were recorded across the channels as a result. Two more hours of downtime were recorded for NO_x/NO/NO₂ due to an additional zero-span check performed on November 24 to assess a biased high span response.

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						1-HOUR					24-HOUR		
Station 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	30	4	7.7	WSW	1	10	99.3
TRS (ppb)	-	-	-	-	0	1	29	3	0.4	ENE	0	1	99.7
THC (ppm)	-	-	-	-	2.16	2.75	19	3	2.2	ENE	2.46	18	99.9
NO ₂ (ppb)	159	-	0	-	4	29	28	18	0.5	SE	13	28	99.4
NO (ppb)	-	-	-	-	1	27	28	28	1.1	SW	6	28	99.4
NO _x (ppb)	-	-	-	-	5	44	28	10	1.1	SW	19	28	99.4
O ₃ (ppb)	82	-	0	-	24.4	39.7	2	11	11.1	ENE	34.1	2	99.6
PM _{2.5} (µg/m ³)	80	30	0	0	6	26	12	1	0.3	SW	18	11	100.0
RELATIVE HUMIDITY (%)	-	-	-	-	77	94	1	7	6.1	NNW	90	13	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	-9.2	2.9	23	20	10.1	W	-1.6	30	100.0
VECTOR WS (kph)	-	-	-	-	0.9	20.4	27	16	-	WNW	12.1	20	100.0
VECTOR WD (sec)	-	-	-	-	293 (WNW)	-	-	-	-	-	-	-	100.0

Exceedance Summary Report

SO₂ 1-Hour Exceedances

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

SO₂ 24-Hour Exceedances

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

NO₂ 1-Hour Exceedances

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

PM_{2.5} 1-Hour Exceedances

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

PM_{2.5} 24-Hour Exceedances

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

O₃ 1-Hour Exceedances

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

In accordance with EPEA and the Substance Release Regulation.

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

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1.0 Discussion

This monthly report consists of continuous monitoring results for the following parameters: Sulphur Dioxide (SO₂), Total Reduced Sulphur (TRS), Total Hydrocarbon (THC), Oxides of Nitrogen (NO_x), Nitric Oxides (NO), Nitrogen Dioxide (NO₂), Ozone (O₃), Particulate Matter 2.5 (PM_{2.5}), Relative Humidity (RH), Ambient Temperature (AmbTPX), Wind Speed (WS), Wind Direction (WD) and Standard Deviation Wind Direction (STDWD).

The 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 99.3 %, equivalent to five hours of downtime.
- The routine monthly calibration was performed on November 9. The analyzer was left in "maintenance" mode for a calibrator cross check. Five hours of downtime were incurred as a result.

TOTAL REDUCED SULPHUR (TRS)

- Operational time, for the monitoring period, was 99.7%, equivalent to two hours of downtime.
- The routine monthly calibration was performed on November 9. The analyzer was left in "maintenance" mode for a calibrator cross check. Two hours of downtime were incurred as a result.

TOTAL HYDROCARBONS (THC)

- Operational time, for the monitoring period, was 99.9%, equivalent to one hour of downtime.
- The routine monthly calibration was performed on November 9. The analyzer was left in "maintenance" mode for a calibrator cross check. One hour of downtime was incurred as a result. The fuel gas cylinder was replaced during this site visit.
- One instance of maximum instantaneous data was invalidated on November 21 at hour 10:00, due to an anomalous spike. Review of the minute data, bracketing the spike, did not support the validity of the elevated measurement.

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

- Operational time, for the monitoring period, was 99.4%, equivalent to four hours of downtime.
- The routine monthly calibration was performed on November 9. The analyzer was left in "maintenance" mode for a calibrator cross check. Two hours of downtime were incurred as a result.
- The analyzer spanned towards the upper acceptance limit on November 23. A repeat zero-span check performed on November 24 at 07:00-08:00 confirmed there was no trending drift. Two hours of downtime were recorded due to the additional zero-span check.

OZONE (O₃)

- Operational time, for the monitoring period, was 99.6%, equivalent to three hours of downtime.
- The routine monthly calibration was performed on November 9. The analyzer was left in "maintenance" mode for a calibrator cross check. Three hours of downtime were incurred as a result.

PARTICULATE MATTER < 2.5 MICRONS (PM_{2.5})

- Operational time, for the monitoring period, was 100%.
- The routine monthly audit was performed on November 20.
- Data was corrected in accordance with AMD (2016), Chapter 6, Table 2, Zero Adjustment Criteria. Data recorded between 0 and $-3 \mu\text{g}/\text{m}^3$ was corrected to $0 \mu\text{g}/\text{m}^3$. Data recorded below $-3 \mu\text{g}/\text{m}^3$ was invalidated. No hourly data was invalidated as all measurements were above $-3 \mu\text{g}/\text{m}^3$ this month.

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 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 was the contact for Lakeland Industry & Community Association and the Maxxam field technicians were Limin Li and Alexander Yakupov.

3.0 Plant Monthly Required AMD Summary

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

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

4.0 Calculations and Results

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

5.0 Methods and Procedures

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

- Maxxam AIR SOP-00208: RM Young Wind Monitor Calibration
- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-00212: Ambient O₃ Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO₂/NO_x Monitoring
- Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring
- Maxxam AIR SOP-00010: Thermo Model 5030 SHARP Monitor

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

- Sulphur Dioxide - Thermo 43i UV Fluorescent Analyzer
- Total Reduced Sulphur - Thermo 450i UV Fluorescent Analyzer
- Total Hydrocarbons - Thermo 51C FID Analyzer
- Oxides of Nitrogen - Thermo 42i Chemiluminescent Analyzer
- Ozone - Thermo 49i Photometric Analyzer
- Particulate Matter (PM_{2.5}) - Thermo 5030 SHARP Unit
- Wind System - RM Young Unit
- Relative Humidity - Met One Unit
- Ambient Temperature - Met One Unit
- Datalogger - ESC 8832

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

Level 0 Preliminary Verification

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

Level 1 Primary Validation

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

Level 2 Final Validation

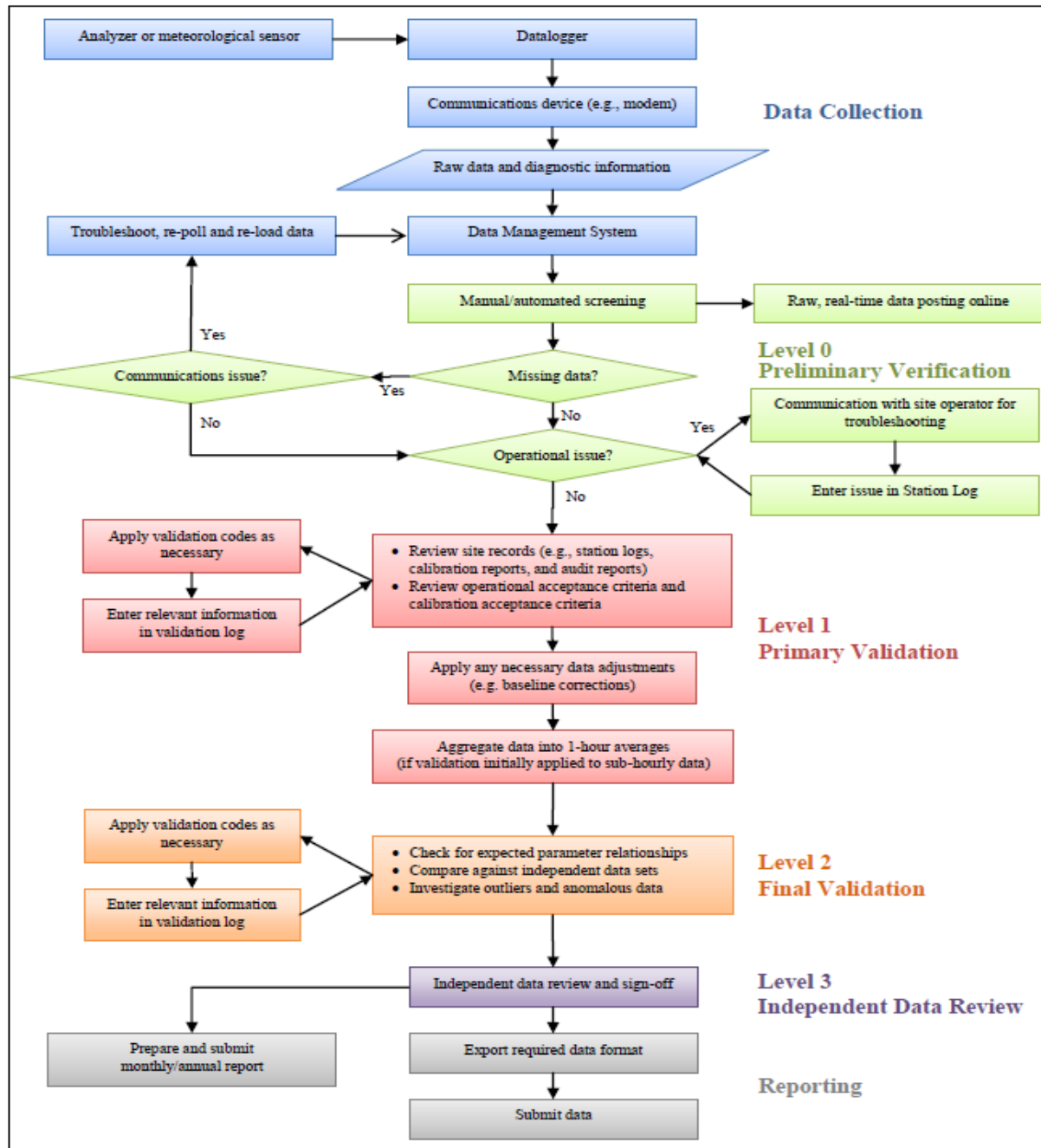
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

Level 3 Independent Data Review

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

Post-Final Validation

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



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

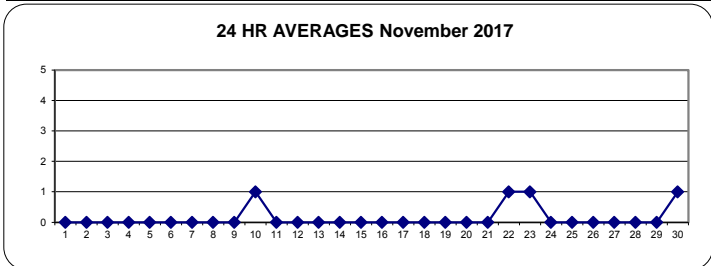
STATUS FLAG CODES

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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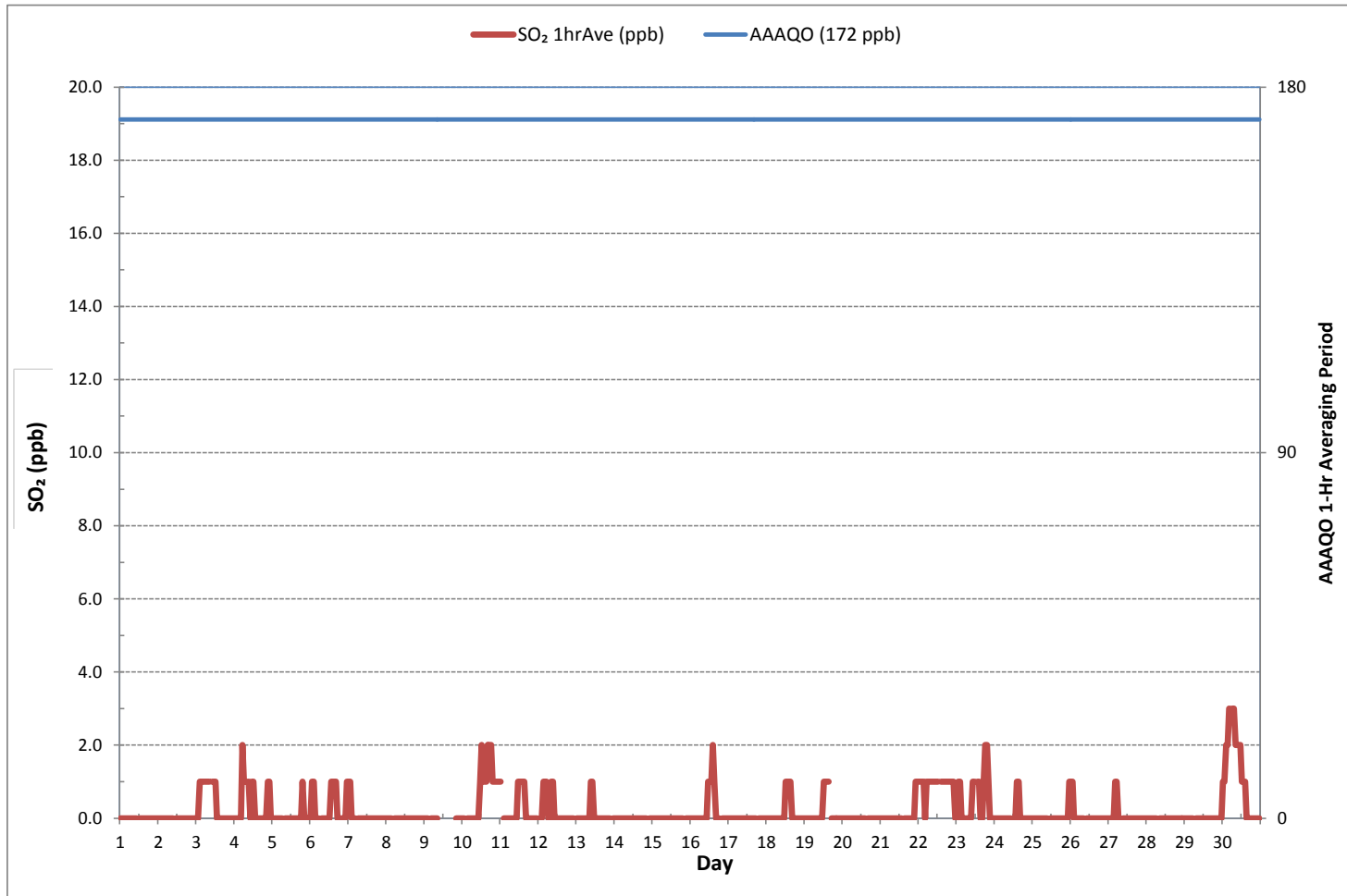
24 HR AVERAGES November 2017



MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0
NUMBER OF 24-HR EXCEEDANCES:	0
NUMBER OF NON-ZERO READINGS:	121
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR 0 ON DAY 1
MAXIMUM 1-HR AVERAGE:	3 ppb @ HOUR 4 ON DAY 30
MAXIMUM 24-HR AVERAGE:	1 ppb ON DAY 10
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	715 hrs
AMD OPERATION UPTIME:	99.3 %
STANDARD DEVIATION:	0
MONTHLY AVERAGE:	0 ppb

SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2017

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

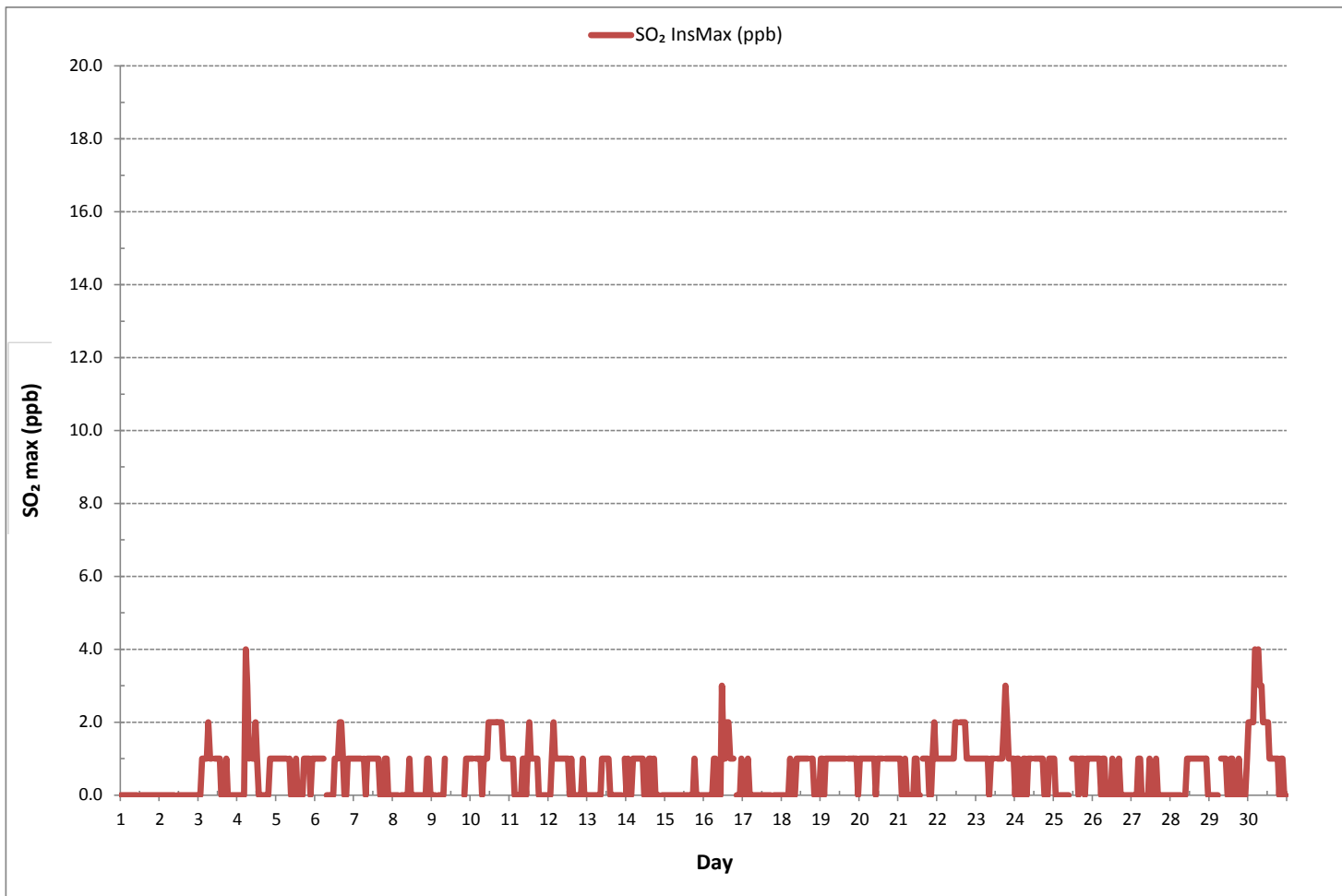
STATUS FLAG CODES

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:	347
MAXIMUM INSTANTANEOUS VALUE:	4 ppb @ HOUR 5 ON DAY 4
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	1
OPERATIONAL TIME:	715 hrs

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)



Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-SO₂[ppb]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

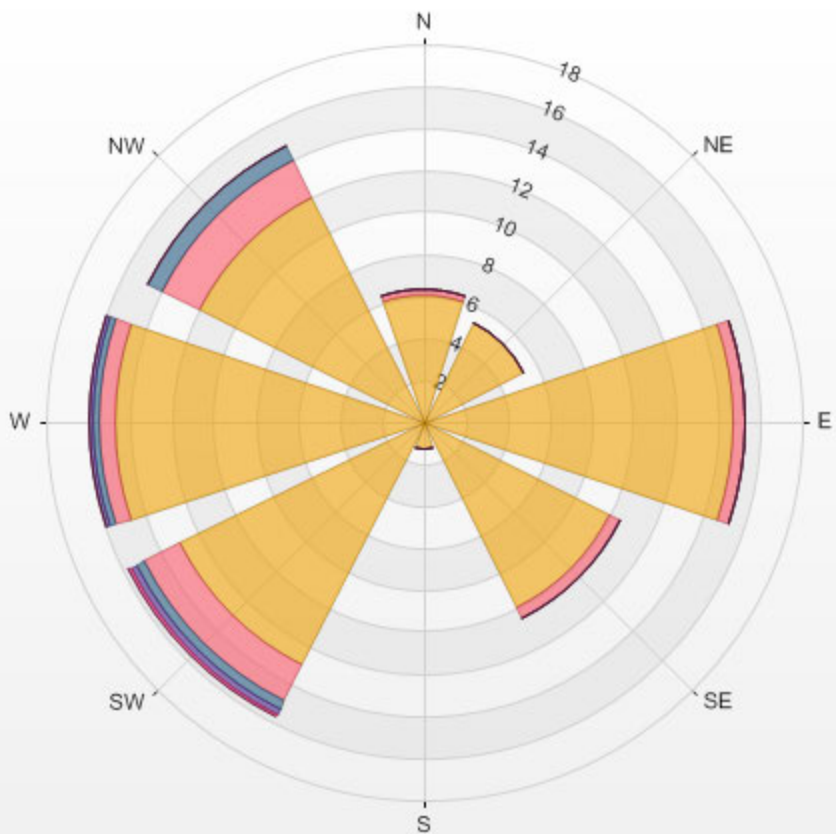
Calm: 14.87%

Calm Avg: 0.11 [ppb]

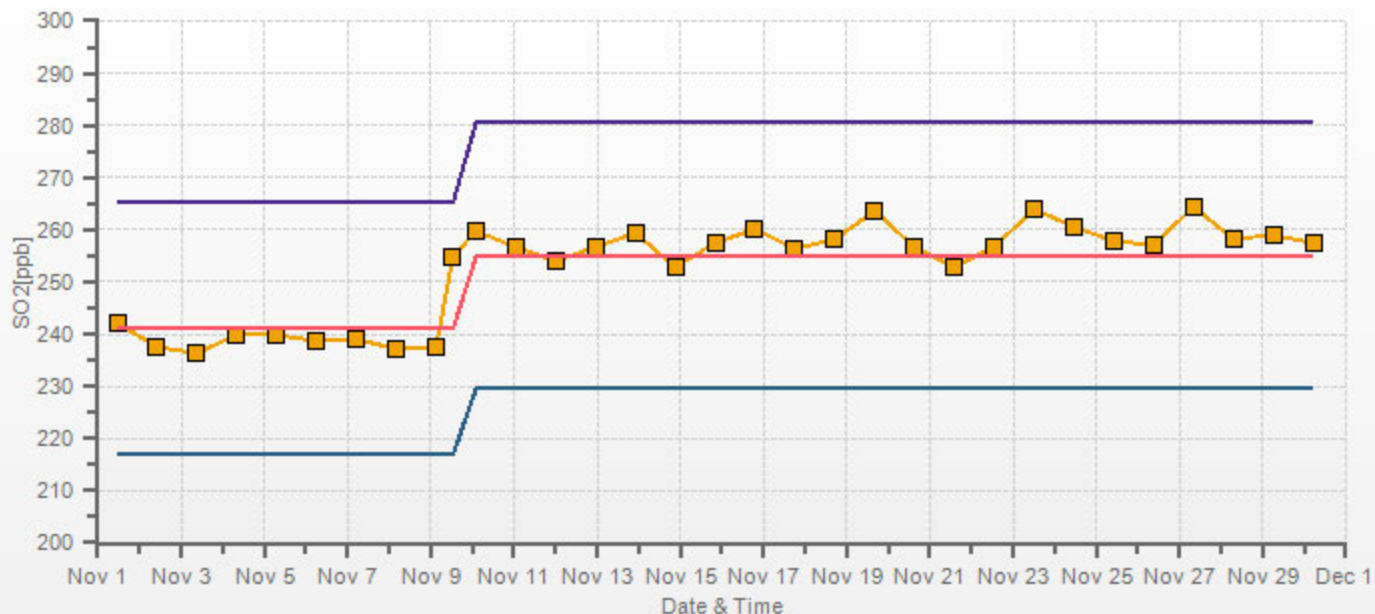
Direction	0.0-0.8	0.8-1.6	1.6-2.4	2.4-3.2	3.2-4.0	>4.0	Total
N	6.0	0.3	0.0	0.0	0.0	0.0	6.3
NE	5.3	0.0	0.0	0.0	0.0	0.0	5.3
E	14.7	0.6	0.0	0.0	0.0	0.0	15.3
SE	9.9	0.6	0.0	0.0	0.0	0.0	10.5
S	1.3	0.0	0.0	0.0	0.0	0.0	1.3
SW	13.0	1.9	0.4	0.3	0.2	0.0	15.8
W	14.7	0.7	0.3	0.2	0.0	0.0	15.9
NW	11.9	2.1	0.7	0.0	0.0	0.0	14.7
Summary	76.9	6.2	1.5	0.4	0.2	0.0	85.1

% Icon Classes (ppb) 77 0.0-0.8 6 0.8-1.6 1 1.6-2.4 0 2.4-3.2 0 3.2-4.0 0 >4.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-SO2[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 14.87% Calm Poll Avg: 0.11[ppb]



SO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/11 Type: Span



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

TOTAL REDUCED SULPHUR

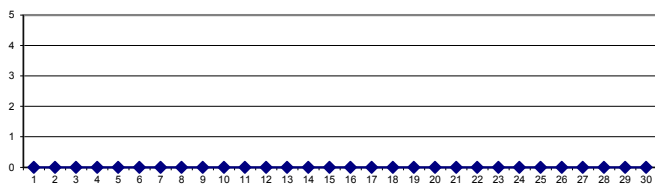
TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)

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	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
2	0	0	0	0	0	0	0	0	0	0	0	S	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	S	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	S	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	S	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	S	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	S	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	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
9	0	0	0	S	0	0	0	0	0	C	C	C	C	C	C	Y	Y	0	0	0	0	0	0	0	0	0	0	22
10	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
11	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
12	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
13	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
14	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
15	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
16	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
17	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
18	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
19	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
20	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
21	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
22	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
23	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
24	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
25	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
26	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
27	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
28	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
29	0	0	0	1	0	0	S	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
30	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
HOURLY MAX	0	0	0	1	0	0	0	0	1	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				

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

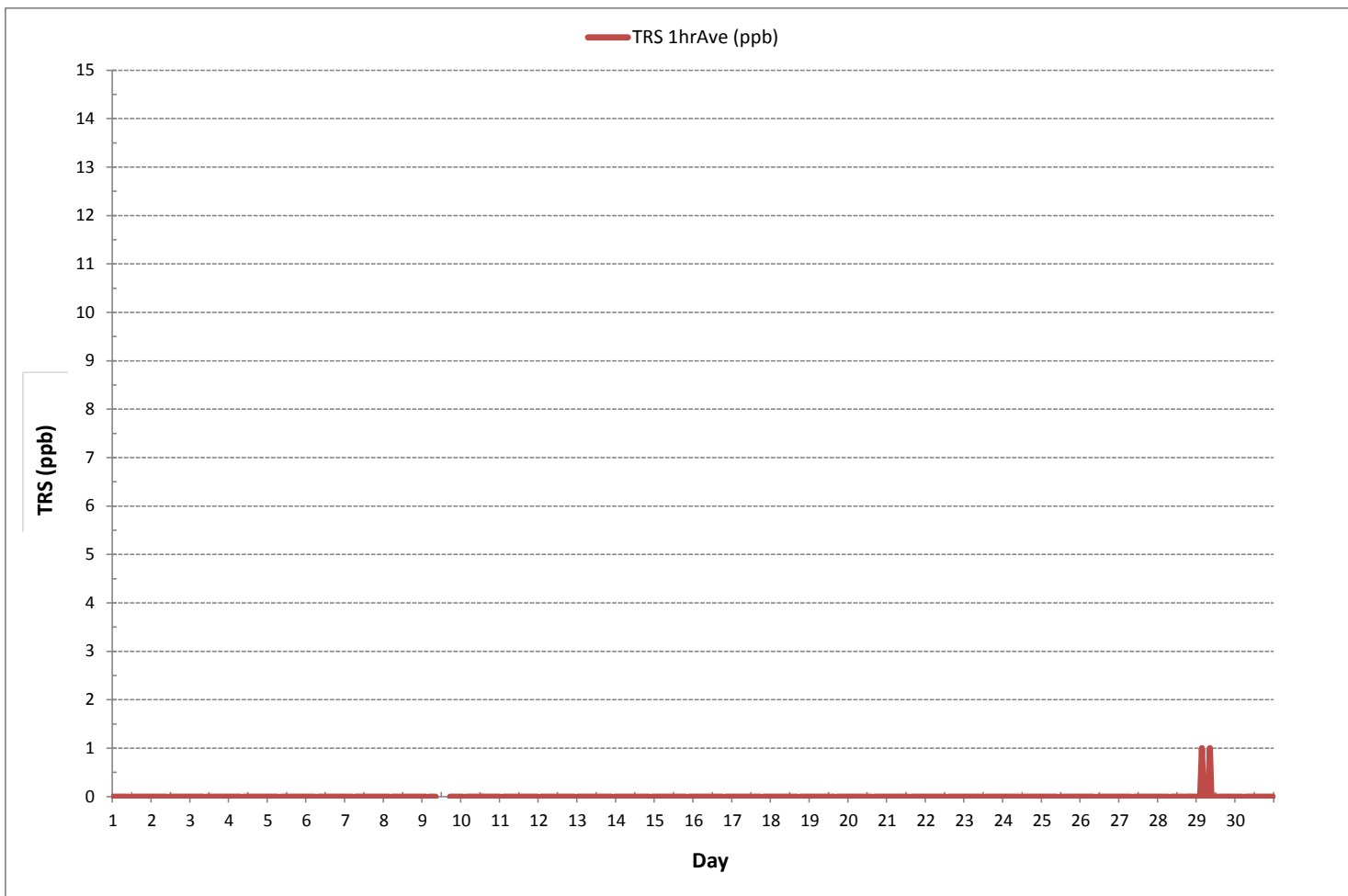
24 HR AVERAGES November 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	2
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR 0 ON DAY 1
MAXIMUM 1-HR AVERAGE:	1 ppb @ HOUR 3 ON DAY 29
MAXIMUM 24-HR AVERAGE:	0 ppb ON DAY 1
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	718 hrs
AMD OPERATION UPTIME:	99.7 %
STANDARD DEVIATION:	0
MONTHLY AVERAGE:	0 ppb

TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2017

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

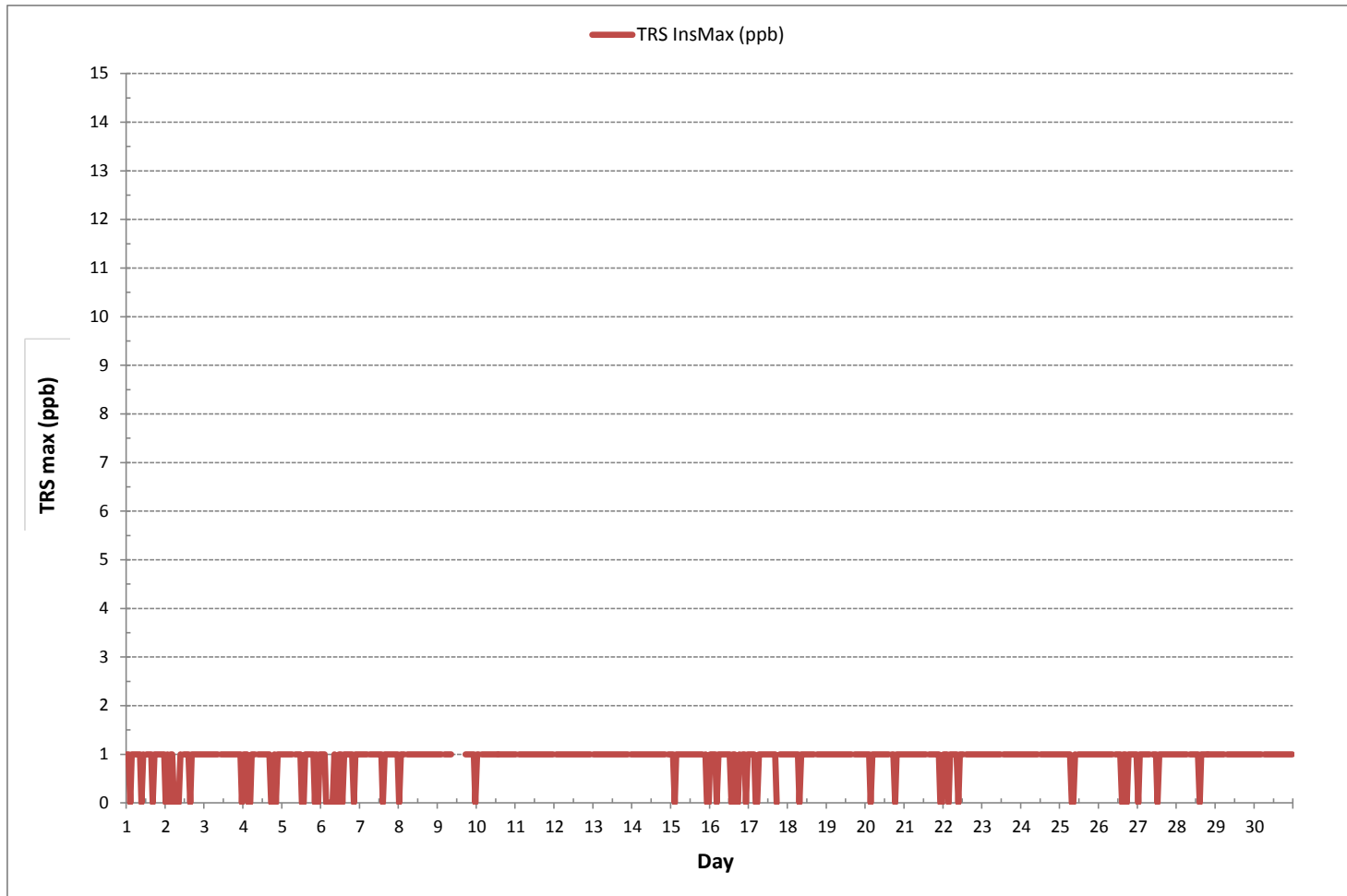
STATUS FLAG CODES

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:	625
MAXIMUM INSTANTANEOUS VALUE:	1 ppb @ HOUR 0 ON DAY 1
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	6 hrs
STANDARD DEVIATION:	0
OPERATIONAL TIME:	718 hrs

TOTAL REDUCED SULPHUR Instantaneous Maximum (TRS ppb)



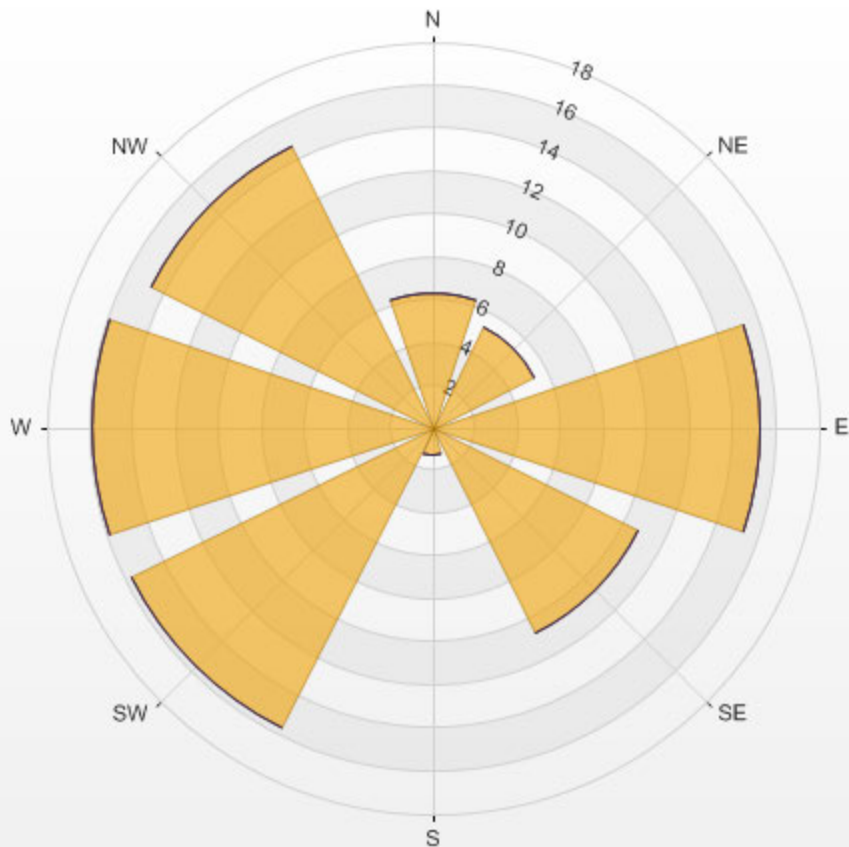
Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-TRS[ppb]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 14.83% Calm Avg: 0.21 [ppb]

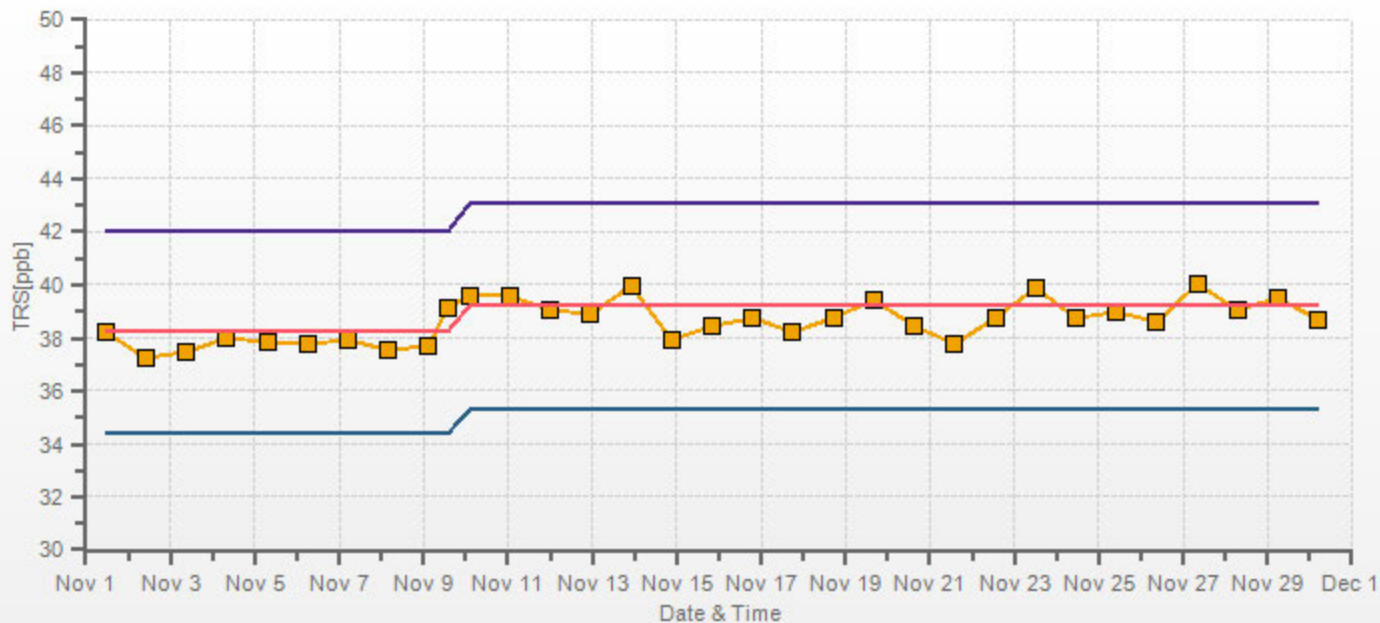
Direction	0.0-0.7	0.7-1.3	1.3-2.0	>2.0	Total
N	6.3	0.0	0.0	0.0	6.3
NE	5.3	0.0	0.0	0.0	5.3
E	15.3	0.0	0.0	0.0	15.3
SE	10.7	0.0	0.0	0.0	10.7
S	1.3	0.0	0.0	0.0	1.3
SW	15.7	0.0	0.0	0.0	15.7
W	15.9	0.0	0.0	0.0	15.9
NW	14.7	0.0	0.0	0.0	14.7
Summary	85.2	0.0	0.0	0.0	85.2

% Icon Classes (ppb) 85 0.0-0.7 0 0.7-1.3 0 1.3-2.0 0 >2.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-TRS[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 14.83% Calm Poll Avg: 0.21[ppb]



TRS[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/11 Type: Span



Span Meas Span Ref Span Low Span High

TOTAL HYDROCARBON



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2017

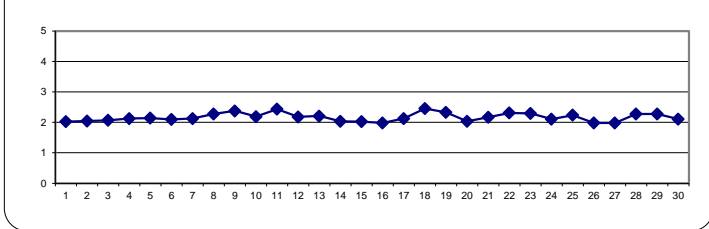
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

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	2.01	2.05	2.04	2.04	2.03	2.05	2.07	2.06	2.03	2.00	2.02	S	2.00	2.02	2.02	2.03	2.01	2.03	2.03	2.04	2.04	2.03	2.01	2.04	2.00	2.07	2.03	24
2	2.05	2.05	2.04	2.04	2.05	2.04	2.06	2.07	2.06	2.05	S	2.02	2.04	2.03	2.04	2.05	2.04	2.06	2.05	2.05	2.07	2.07	2.07	2.06	2.02	2.07	2.05	24
3	2.07	2.08	2.09	2.10	2.09	2.06	2.08	2.09	2.10	S	2.06	2.05	2.21	2.04	2.01	2.01	2.02	2.04	2.03	2.02	2.04	2.10	2.08	2.05	2.01	2.21	2.07	24
4	2.07	2.03	2.03	2.03	2.01	2.07	2.09	2.13	S	2.08	2.08	2.06	2.05	2.19	2.31	2.17	2.22	2.21	2.16	2.17	2.16	2.18	2.19	2.23	2.01	2.31	2.13	24
5	2.26	2.26	2.26	2.23	2.26	2.25	2.22	S	2.20	2.20	2.23	2.16	2.05	2.03	2.02	2.03	2.06	2.06	2.07	2.08	2.06	2.05	2.05	2.02	2.26	2.14	24	
6	2.06	2.06	2.06	2.06	2.06	2.06	S	2.12	2.16	2.16	2.18	2.12	2.11	2.11	2.09	2.07	2.09	2.10	2.08	2.07	2.10	2.15	2.11	2.10	2.06	2.18	2.10	24
7	2.13	2.18	2.25	2.34	2.26	S	2.13	2.17	2.11	2.09	2.10	2.07	2.08	2.09	2.09	2.08	2.09	2.08	2.11	2.19	2.15	2.04	2.05	2.04	2.04	2.34	2.13	24
8	2.06	2.19	2.27	2.27	S	2.20	2.21	2.19	2.32	2.48	2.43	2.25	2.23	2.36	2.26	2.13	2.11	2.18	2.31	2.28	2.35	2.39	2.41	2.46	2.06	2.48	2.28	24
9	2.43	2.37	2.39	S	2.57	2.68	2.48	2.54	2.59	2.46	2.48	2.49	2.40	C	C	C	C	C	Y	2.16	2.15	2.07	2.07	2.07	2.68	2.38	23	
10	2.08	2.08	S	2.09	2.10	2.08	2.07	2.11	2.25	2.33	2.34	2.29	2.22	2.21	2.20	2.21	2.21	2.20	2.22	2.25	2.23	2.22	2.21	2.21	2.07	2.34	2.19	24
11	2.21	S	2.37	2.41	2.46	2.50	2.51	2.45	2.50	2.58	2.49	2.32	2.43	2.51	2.42	2.38	2.35	2.39	2.41	2.41	2.44	2.49	2.51	2.53	2.21	2.58	2.44	24
12	S	2.61	2.40	2.08	2.08	2.11	2.20	2.18	2.15	2.16	2.15	2.14	2.13	2.11	2.13	2.17	2.20	2.20	2.17	2.14	2.16	2.16	2.13	S	2.08	2.61	2.18	24
13	2.12	2.14	2.18	2.19	2.24	2.32	2.30	2.33	2.36	2.35	2.29	2.22	2.23	2.26	2.19	2.21	2.17	2.14	2.14	2.15	2.14	2.15	S	2.11	2.11	2.36	2.21	24
14	2.12	2.08	2.07	2.06	2.07	2.06	2.05	2.04	2.08	2.06	2.01	1.96	2.01	1.98	2.03	2.01	2.02	2.09	2.02	2.04	2.03	S	2.05	2.07	1.96	2.12	2.04	24
15	2.10	2.06	2.10	2.05	2.09	2.07	2.07	2.11	2.04	2.08	2.05	2.04	2.06	1.99	2.02	2.05	2.00	2.01	1.96	1.98	S	1.93	1.95	1.93	1.93	2.11	2.03	24
16	1.90	1.94	1.91	1.91	1.95	1.90	1.93	1.97	1.93	1.99	2.01	1.97	1.95	1.98	1.97	2.02	2.06	2.07	2.09	S	2.03	2.04	2.07	2.02	1.90	2.09	1.98	24
17	2.04	2.16	2.20	2.11	2.11	2.17	2.12	2.13	2.15	2.06	2.05	2.05	2.10	2.05	2.04	2.08	2.12	2.15	S	2.17	2.27	2.32	2.18	2.20	2.04	2.32	2.13	24
18	2.17	2.24	2.29	2.32	2.40	2.35	2.40	2.41	2.40	2.41	2.50	2.61	2.59	2.60	2.57	2.45	2.45	S	2.49	2.53	2.57	2.61	2.62	2.67	2.17	2.67	2.46	24
19	2.71	2.67	2.73	2.75	2.64	2.59	2.44	2.31	2.30	2.26	2.24	2.25	2.26	2.31	2.30	2.23	S	2.13	2.11	2.09	2.10	2.05	2.06	2.06	2.05	2.75	2.33	24
20	2.06	2.07	2.20	2.02	1.98	1.97	1.97	1.97	1.95	1.97	1.99	2.00	1.99	2.03	2.07	S	2.03	2.02	2.05	2.06	2.08	2.10	2.15	2.14	1.95	2.20	2.04	24
21	2.12	2.18	2.21	2.20	2.17	2.15	2.18	2.32	2.39	2.23	2.19	2.13	2.08	2.06	S	2.18	2.16	2.18	2.28	2.11	2.10	2.12	2.10	2.12	2.06	2.39	2.17	24
22	2.17	2.19	2.20	2.21	2.23	2.31	2.40	2.47	2.49	2.31	2.27	2.22	2.22	S	2.26	2.31	2.30	2.30	2.30	2.37	2.44	2.46	2.43	2.33	2.17	2.49	2.31	24
23	2.29	2.38	2.52	2.48	2.46	2.33	2.32	2.37	2.36	2.31	2.51	2.69	S	2.64	2.56	2.53	2.41	1.95	1.93	1.94	1.93	1.97	2.00	1.99	1.93	2.69	2.30	24
24	2.04	2.04	2.08	2.10	2.04	2.03	2.06	2.10	2.18	2.28	2.32	S	1.89	1.94	1.97	1.97	2.02	2.09	2.19	2.36	2.36	2.34	1.99	2.13	1.89	2.36	2.11	24
25	2.18	2.07	2.02	2.09	2.13	2.14	2.14	2.13	2.16	2.21	S	2.47	2.43	2.56	2.69	2.68	2.63	2.40	2.13	2.04	2.06	2.07	2.06	2.09	2.02	2.69	2.24	24
26	2.14	2.17	2.16	2.12	2.06	2.05	2.06	2.04	2.02	S	2.00	1.99	1.97	1.95	1.92	1.92	1.92	1.90	1.89	1.87	1.88	1.87	1.84	1.84	1.84	2.17	1.98	24
27	1.89	1.86	1.87	1.93	1.93	1.98	2.10	2.09	S	2.05	2.07	1.99	1.96	1.97	1.95	1.96	1.98	1.99	1.99	1.98	1.99	2.00	2.02	2.03	1.86	2.10	1.98	24
28	2.03	2.13	2.17	2.23	2.24	2.27	2.26	S	2.30	2.30	2.39	2.40	2.24	2.19	2.17	2.21	2.21	2.24	2.32	2.38	2.43	2.40	2.47	2.37	2.03	2.47	2.28	24
29	2.33	2.44	2.48	2.50	2.56	2.66	S	2.57	2.58	2.64	2.65	2.16	2.04	1.99	2.00	2.06	2.09	2.10	2.19	2.15	2.07	2.07	2.12	2.08	1.99	2.66	2.28	24
30	2.12	2.15	2.12	2.08	2.08	S	2.10	2.15	2.13	2.10	2.10	2.08	2.03	2.04	2.04	2.07	2.13	2.14	2.10	2.11	2.07	2.14	2.22	2.24	2.03	2.24	2.11	24
HOURLY MAX	2.71	2.67	2.73	2.75	2.64	2.68	2.51	2.57	2.59	2.64	2.65	2.69	2.59	2.64	2.69	2.68	2.63	2.40	2.49	2.53	2.57	2.61	2.62	2.67				
HOURLY AVG	2.14	2.17	2.20	2.17	2.18	2.19	2.18	2.20	2.22	2.22	2.22	2.19	2.14	2.15	2.16	2.15	2.15	2.12	2.14	2.14	2.16	2.16	2.15	2.15				

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

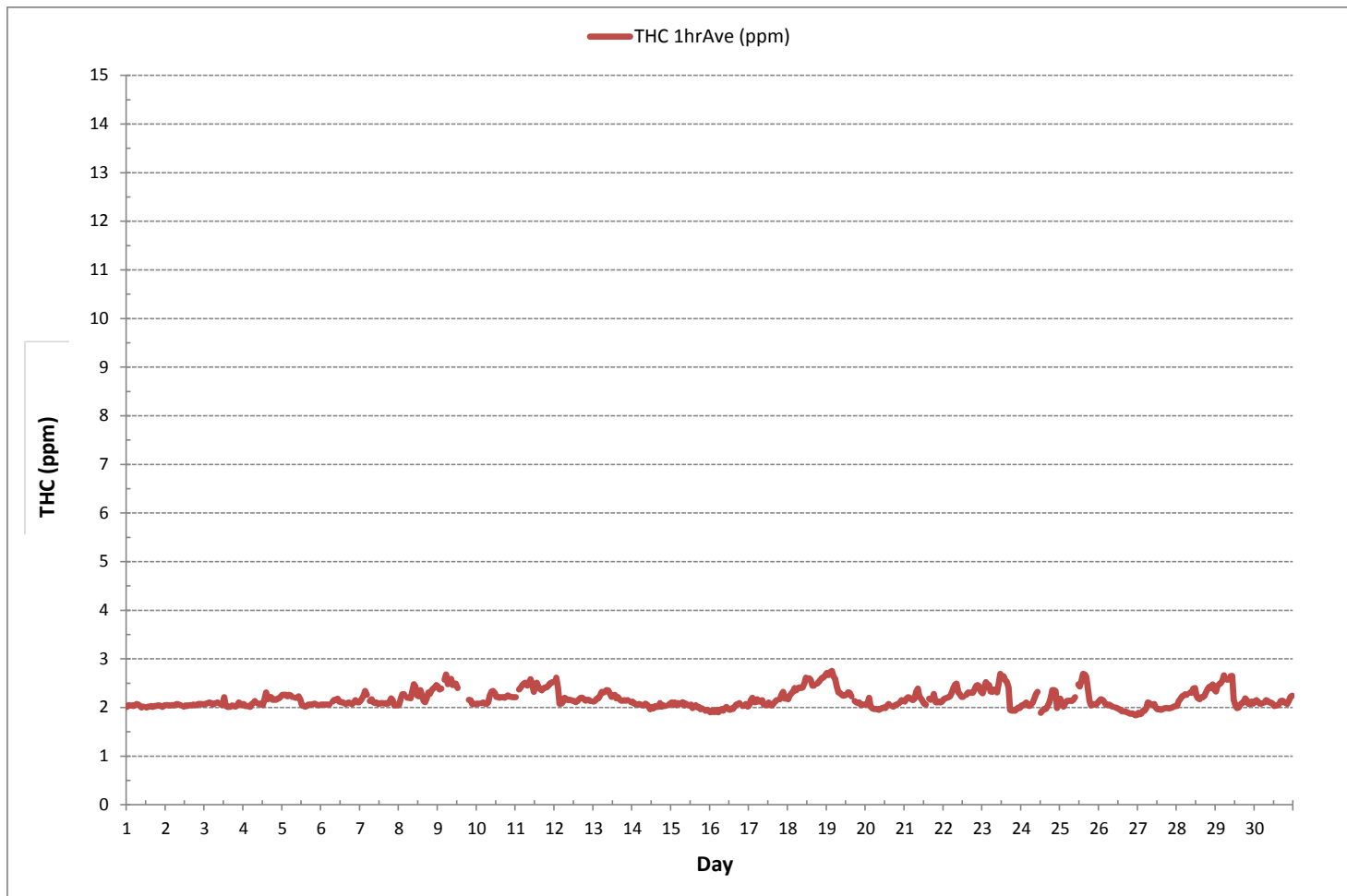
24 HR AVERAGES November 2017



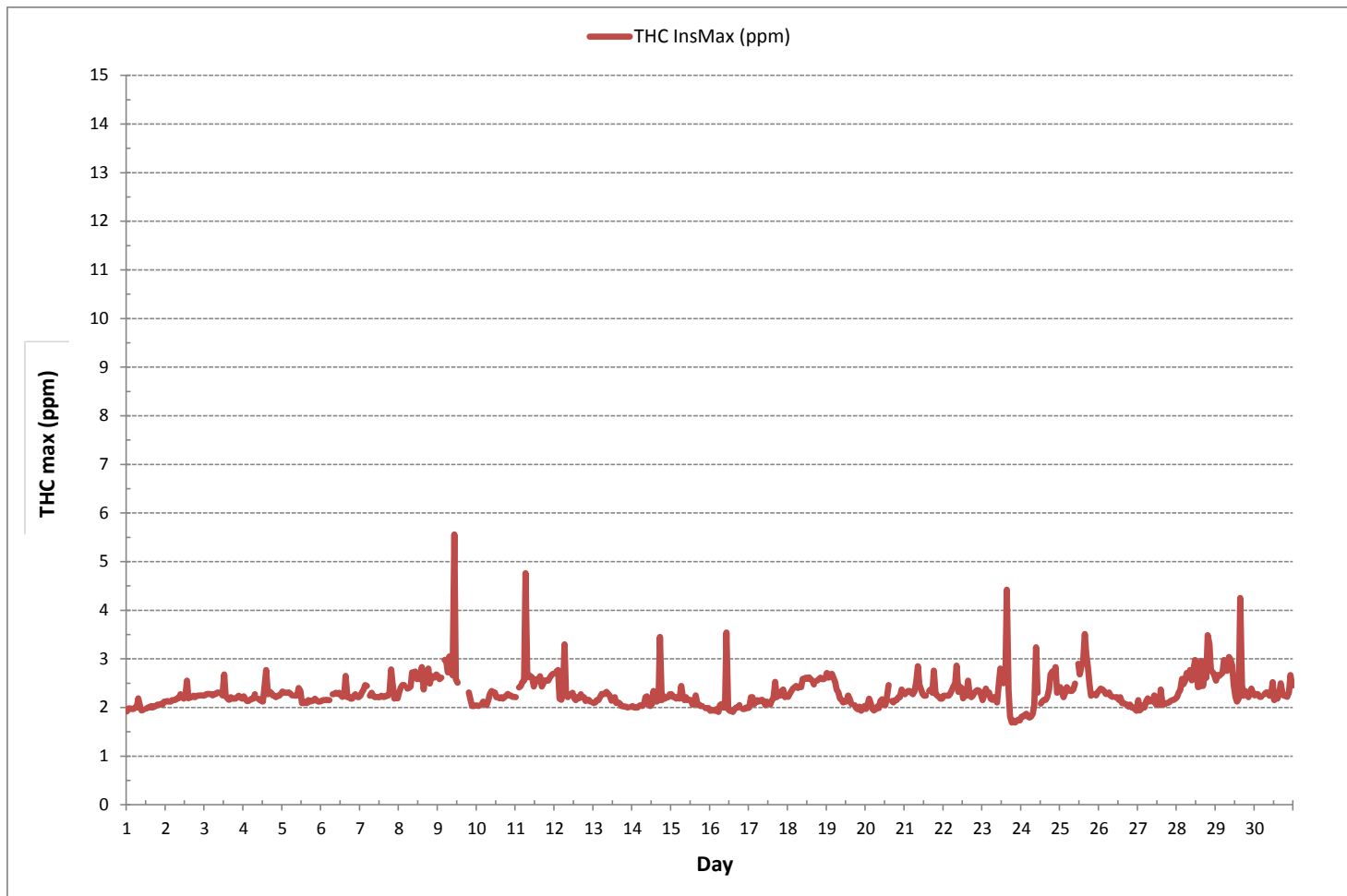
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	683		
MINIMUM 1-HR AVERAGE:	1.84 ppm	@ HOUR	22 ON DAY 26
MAXIMUM 1-HR AVERAGE:	2.75 ppm	@ HOUR	3 ON DAY 19
MAXIMUM 24-HR AVERAGE:	2.46 ppm		ON DAY 18
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	719 hrs
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	99.9 %
STANDARD DEVIATION:	0.18	MONTHLY AVERAGE:	2.17 ppm

TOTAL HYDROCARBONS Hourly Averages (THC ppm)

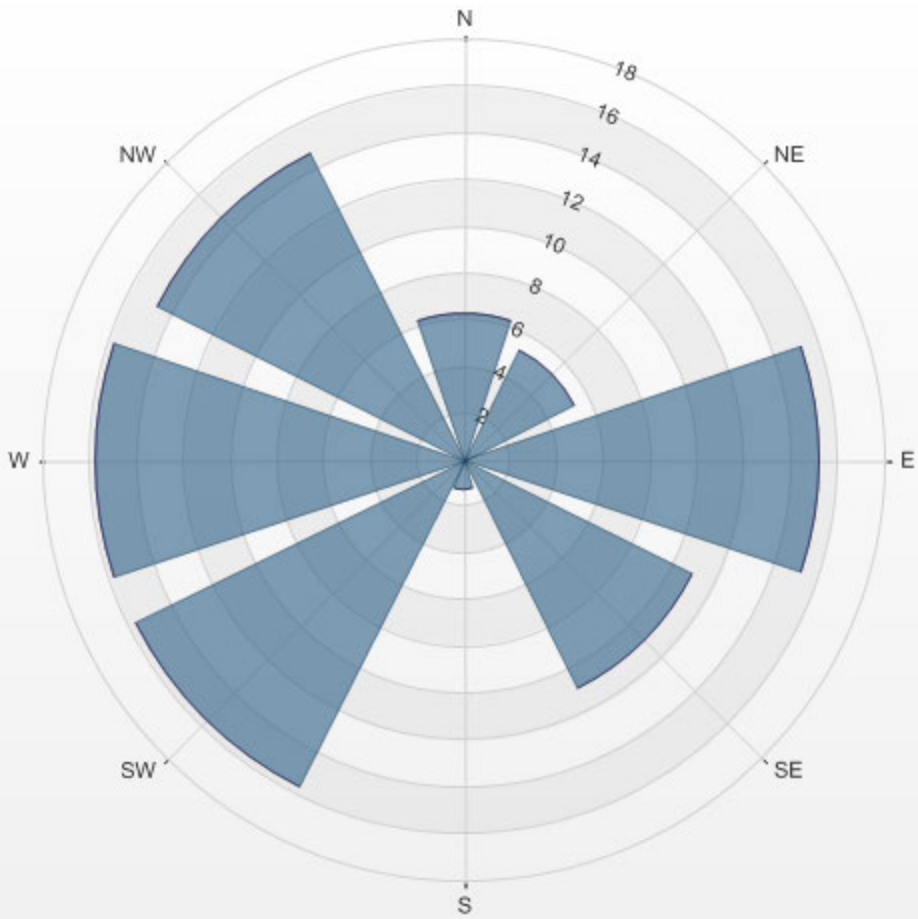


TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

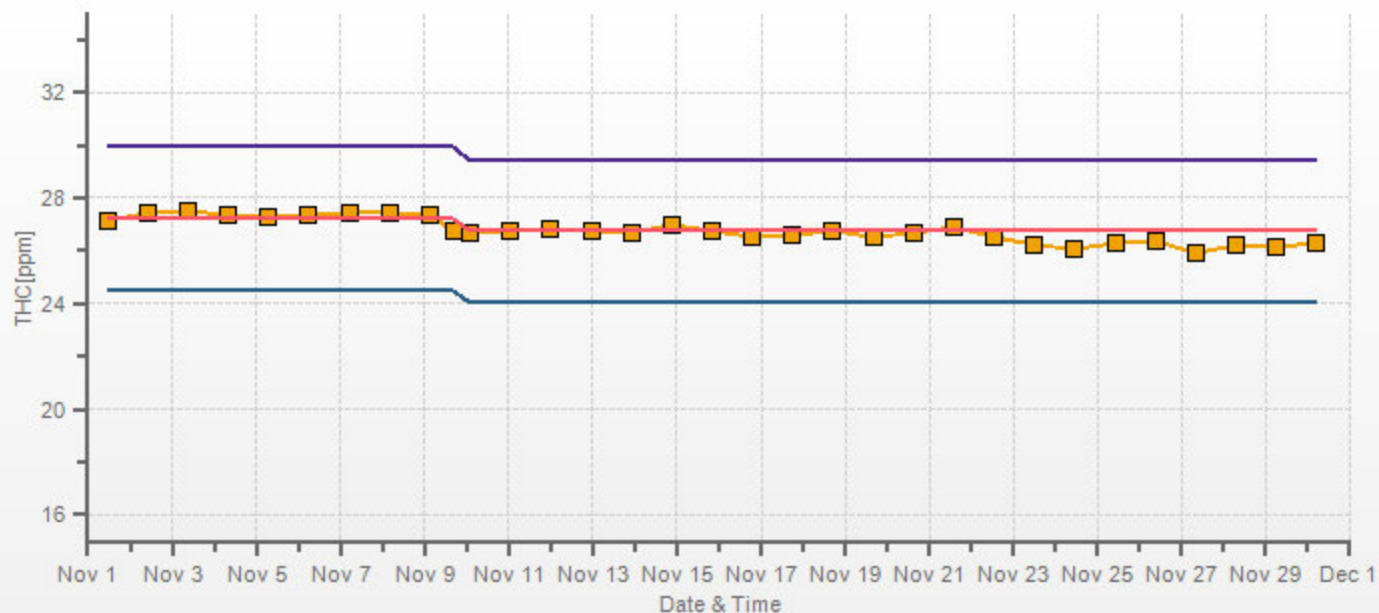


% Icon	Classes (ppm)	0	0.0-0.9	0	0.9-1.8	85	1.8-2.8	0	>2.8
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LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-THC[ppm] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 14.79% Calm Poll Avg: 2.31[ppm]



THC[ppm] Calibration: LICA COLD LAKE SOUTH Monthly: 17/11 Type: Span



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

OXIDES OF NITROGEN



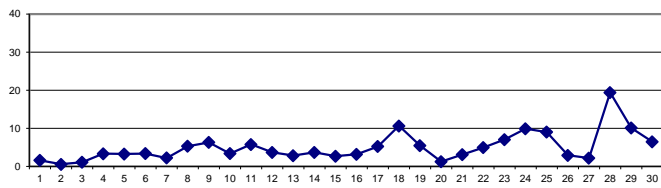
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.				
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.					
DAY																																
1	3	3	3	3	4	5	2	1	2	1	1	S	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	5	2	24	
2	0	0	0	0	0	0	1	1	2	1	S	1	1	2	1	0	0	2	0	0	0	0	0	0	0	0	0	0	2	1	24	
3	0	0	1	2	1	1	1	1	2	S	3	2	2	2	1	0	1	1	2	1	0	0	0	0	0	0	0	0	3	1	24	
4	0	0	0	0	0	6	5	4	S	2	2	4	3	3	7	3	4	3	3	4	4	6	6	7	0	0	0	7	7	3	24	
5	6	7	8	7	7	7	6	S	7	5	5	3	0	0	0	0	0	0	1	2	1	0	1	1	0	0	0	8	8	3	24	
6	0	2	2	1	0	0	S	14	14	11	4	1	1	2	2	2	3	2	2	2	3	3	4	0	0	0	0	0	14	3	24	
7	5	6	7	8	6	S	2	4	2	1	1	1	0	1	0	1	0	1	1	2	1	0	0	0	0	0	0	8	8	2	24	
8	0	1	0	1	S	3	6	9	19	11	9	6	4	9	5	2	2	2	4	5	5	6	7	5	0	0	0	19	5	5	24	
9	4	4	4	S	22	25	8	8	6	C	C	C	C	C	C	C	Y	Y	C	1	0	0	0	0	0	0	0	25	6	22	22	
10	0	0	S	1	1	1	2	2	4	5	6	5	5	4	4	4	4	5	5	5	3	3	4	4	0	0	0	6	3	24	24	
11	3	S	5	3	3	3	6	4	5	5	4	3	5	6	6	6	7	7	7	8	10	9	10	3	10	6	0	10	6	24	24	
12	S	12	9	4	3	6	11	9	3	3	2	2	1	2	2	2	2	2	1	1	1	1	1	S	1	12	4	0	12	4	24	24
13	1	1	1	1	1	2	2	3	4	5	4	4	4	5	5	4	3	3	3	2	2	2	S	2	1	5	3	0	5	3	24	24
14	2	1	1	1	1	1	1	1	1	12	7	1	1	0	1	4	7	9	5	6	8	S	8	5	0	12	4	0	12	4	24	24
15	6	3	4	3	2	2	3	4	4	4	2	2	3	3	2	3	3	2	1	S	1	1	1	1	1	1	1	0	6	3	24	24
16	1	1	2	3	3	4	4	6	3	3	5	4	2	3	5	5	7	4	3	S	1	1	1	1	1	1	1	0	7	3	24	24
17	1	3	6	6	4	5	11	5	6	4	4	3	4	3	2	4	5	7	S	9	8	8	6	6	1	11	5	0	11	5	24	24
18	4	4	6	4	10	8	10	10	14	18	9	11	11	12	12	9	9	S	12	12	19	14	12	14	4	19	11	0	19	11	24	24
19	21	8	8	11	8	7	5	4	4	3	3	3	3	5	4	4	S	4	4	5	4	3	2	2	2	2	2	0	21	5	24	24
20	3	3	5	2	2	1	1	0	0	0	0	0	0	1	S	1	1	1	1	2	1	1	1	2	0	5	1	0	5	1	24	24
21	2	2	3	3	2	2	3	6	8	6	4	2	2	1	S	4	3	2	2	3	3	3	2	1	8	3	2	0	8	3	24	24
22	2	3	2	3	2	3	4	5	6	6	5	5	4	S	6	6	6	7	8	8	7	7	5	4	2	8	5	0	8	5	24	24
23	4	5	5	4	3	3	4	3	7	4	6	8	S	11	15	19	25	5	7	7	4	4	4	4	3	25	7	0	25	7	24	24
24	4	4	5	5	3	3	4	S1	S1	6	4	S	3	3	4	5	6	18	20	25	35	34	3	13	3	35	10	0	35	10	22	22
25	11	3	2	7	6	5	4	8	9	12	S	15	15	16	19	21	22	15	4	2	2	2	3	4	2	22	9	0	22	9	24	24
26	5	6	5	4	2	2	2	2	2	S	3	3	3	2	2	3	3	3	2	3	3	2	2	2	2	6	3	0	6	3	24	24
27	2	3	2	2	4	4	4	4	S	4	4	2	2	2	1	1	1	1	1	1	1	1	1	1	1	4	2	0	4	2	24	24
28	2	4	4	6	5	6	12	S	24	28	44	21	7	8	11	17	13	25	38	43	40	36	34	18	2	44	19	0	44	19	24	24
29	14	14	15	17	14	13	S	18	21	18	19	8	4	2	2	6	11	6	6	6	4	4	5	5	2	21	10	0	21	10	24	24
30	6	6	4	5	5	S	7	6	7	6	6	7	6	5	6	6	19	6	4	4	4	6	7	10	4	19	6	0	19	6	24	24
HOURLY MAX	21	14	15	17	22	25	12	18	24	28	44	21	15	16	19	21	25	25	38	43	40	36	34	18								
HOURLY AVG	4	4	4	4	4	5	5	5	7	7	6	5	4	4	5	5	6	5	5	6	6	5	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

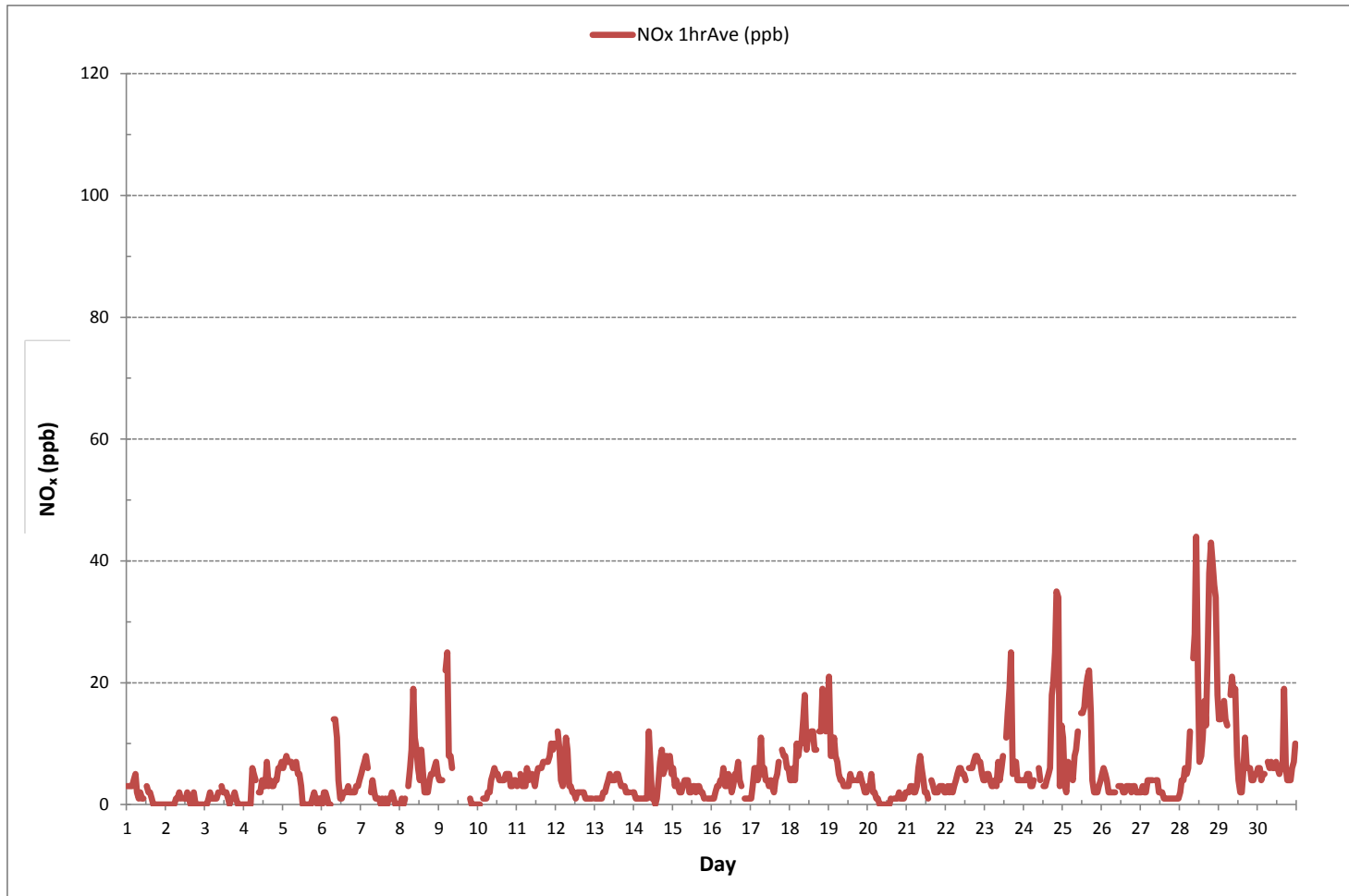
24 HR AVERAGES November 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	611			
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	16	ON DAY 1
MAXIMUM 1-HR AVERAGE:	44	ppb @ HOUR	10	ON DAY 28
MAXIMUM 24-HR AVERAGE:	19	ppb		ON DAY 28
I2S CALIBRATION TIME:	31	hrs	OPERATIONAL TIME:	716 hrs
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:	99.4 %
STANDARD DEVIATION:	6		MONTHLY AVERAGE:	5 ppb

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2017

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	9	6	6	5	9	10	3	9	12	3	3	S	10	5	11	4	1	1	1	2	1	1	1	1	1	1	12	5	24
2	1	1	1	1	1	1	2	3	4	3	S	6	3	9	5	2	2	6	1	2	3	1	1	1	1	1	9	3	24
3	1	2	3	3	3	2	4	3	3	S	9	4	6	5	7	4	4	3	8	6	1	2	5	1	1	1	9	4	24
4	3	3	2	2	4	12	9	8	S	4	4	6	5	9	10	6	9	5	6	6	7	8	9	11	2	12	6	24	
5	8	10	12	9	10	10	10	S	9	8	9	7	2	2	2	2	3	7	3	4	4	4	2	2	2	2	12	6	24
6	2	4	5	4	3	2	S	40	20	18	7	4	5	3	4	5	5	4	4	3	4	5	5	7	2	40	7	24	
7	7	8	11	12	10	S	4	6	5	2	2	2	2	5	2	4	2	2	4	5	4	2	1	1	1	12	4	24	
8	5	4	2	3	S	6	11	15	42	35	11	11	12	12	9	6	5	6	6	8	15	10	11	9	2	42	11	24	
9	8	8	7	S	38	38	22	19	12	C	C	C	C	C	C	C	Y	Y	C	6	5	2	2	2	2	38	13	22	
10	2	3	S	3	3	3	27	6	7	8	8	7	6	6	6	6	6	7	8	7	7	6	7	6	2	27	7	24	
11	7	S	7	8	8	8	18	7	7	8	7	5	7	7	8	9	12	10	18	15	15	17	18	18	5	18	11	24	
12	S	17	14	8	7	12	22	19	6	6	4	4	3	4	12	3	6	7	3	2	4	3	2	S	2	22	8	24	
13	2	3	3	5	4	3	4	6	6	7	6	7	10	10	13	8	7	8	6	6	4	4	S	5	2	13	6	24	
14	3	3	2	2	2	2	2	3	3	53	33	8	2	2	6	61	41	16	11	11	13	S	24	9	2	61	14	24	
15	10	6	11	6	6	5	7	14	10	7	7	5	5	7	6	6	5	4	4	S	4	3	3	3	3	14	6	24	
16	5	4	5	9	5	8	10	16	9	7	7	9	4	14	9	7	15	7	5	S	3	3	3	2	2	16	7	24	
17	3	8	9	11	6	7	103	8	9	6	7	6	6	5	5	6	8	11	S	10	11	13	8	8	3	103	12	24	
18	6	26	27	12	16	14	17	13	22	28	12	12	17	16	15	12	15	S	17	16	38	25	20	25	6	38	18	24	
19	27	14	11	16	15	9	8	7	9	6	4	6	5	13	7	6	S	10	6	9	6	5	7	3	3	27	9	24	
20	4	5	7	4	3	2	2	1	2	1	1	2	2	1	1	S	2	2	2	3	2	2	3	4	1	7	3	24	
21	3	5	5	5	4	3	5	9	9	17	8	4	3	S	12	17	5	4	3	4	5	4	4	3	17	6	24		
22	4	5	4	5	4	4	6	8	10	8	7	13	6	S	8	9	8	12	16	11	9	8	7	10	4	16	8	24	
23	7	13	6	6	5	4	7	6	18	5	7	10	S	24	25	46	40	6	8	9	6	6	6	7	4	46	12	24	
24	7	6	6	8	5	4	5	S1	S1	19	18	S	4	6	17	10	15	28	36	36	42	49	7	30	4	49	17	22	
25	17	6	3	13	10	10	7	12	21	17	S	20	21	20	21	34	34	33	11	3	3	4	6	7	3	34	14	24	
26	9	9	8	7	4	4	4	4	4	S	4	6	5	4	4	10	5	3	16	8	3	3	6	3	16	6	24		
27	4	6	6	4	7	6	7	5	S	6	5	3	3	2	2	1	1	1	1	1	1	2	2	3	1	7	4	24	
28	4	5	5	12	10	17	21	S	39	42	62	42	9	12	31	36	26	39	51	65	113	68	48	35	4	113	34	24	
29	21	24	19	32	18	18	S	19	25	21	22	13	5	2	2	22	26	7	9	9	6	8	7	13	2	32	15	24	
30	10	8	5	5	7	S	11	8	9	7	9	10	10	7	13	8	86	12	6	5	5	13	14	29	5	86	13	24	
HOURLY MAX	27	26	27	32	38	38	103	40	42	53	62	42	21	24	31	61	86	39	51	65	113	68	48	35					
HOURLY AVG	7	8	7	8	8	8	13	10	12	13	10	9	6	8	9	12	15	9	9	10	12	10	8	9					

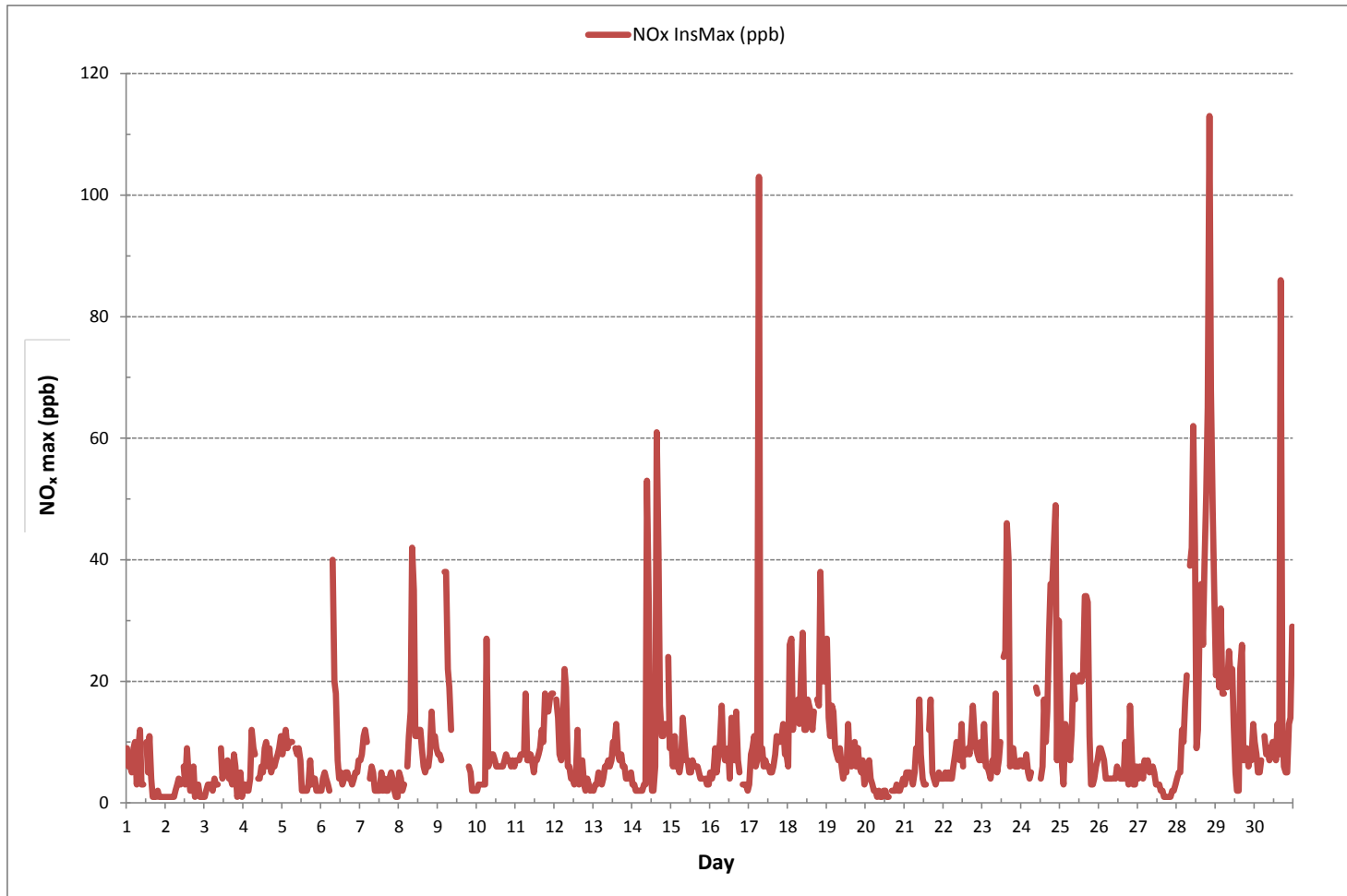
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	677
MAXIMUM INSTANTANEOUS VALUE:	113 ppb @ HOUR 20 ON DAY 28
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	11
OPERATIONAL TIME:	716 hrs

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)



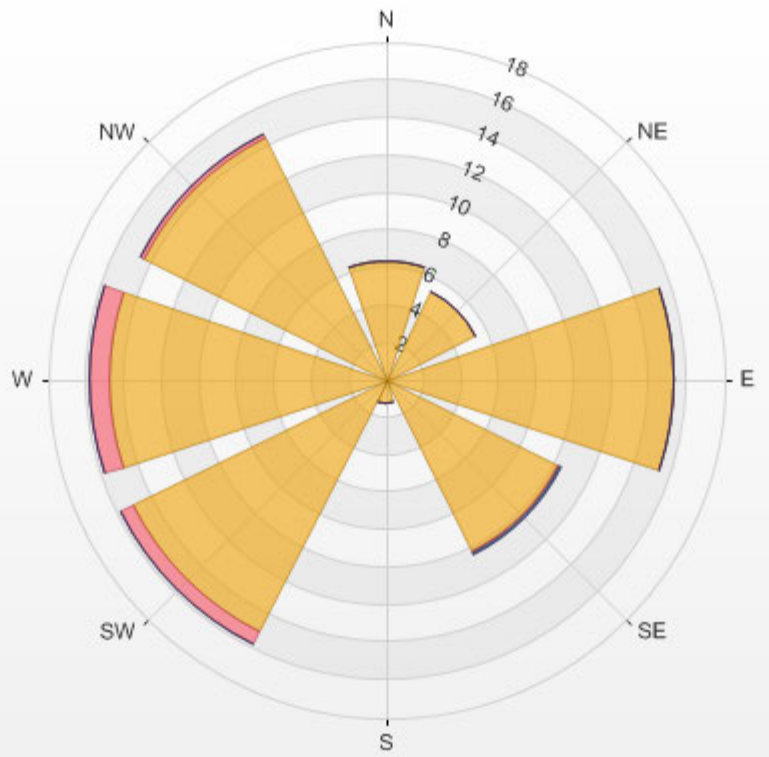
Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-NO_x[ppb]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 14.92% Calm Avg: 10.98 [ppb]

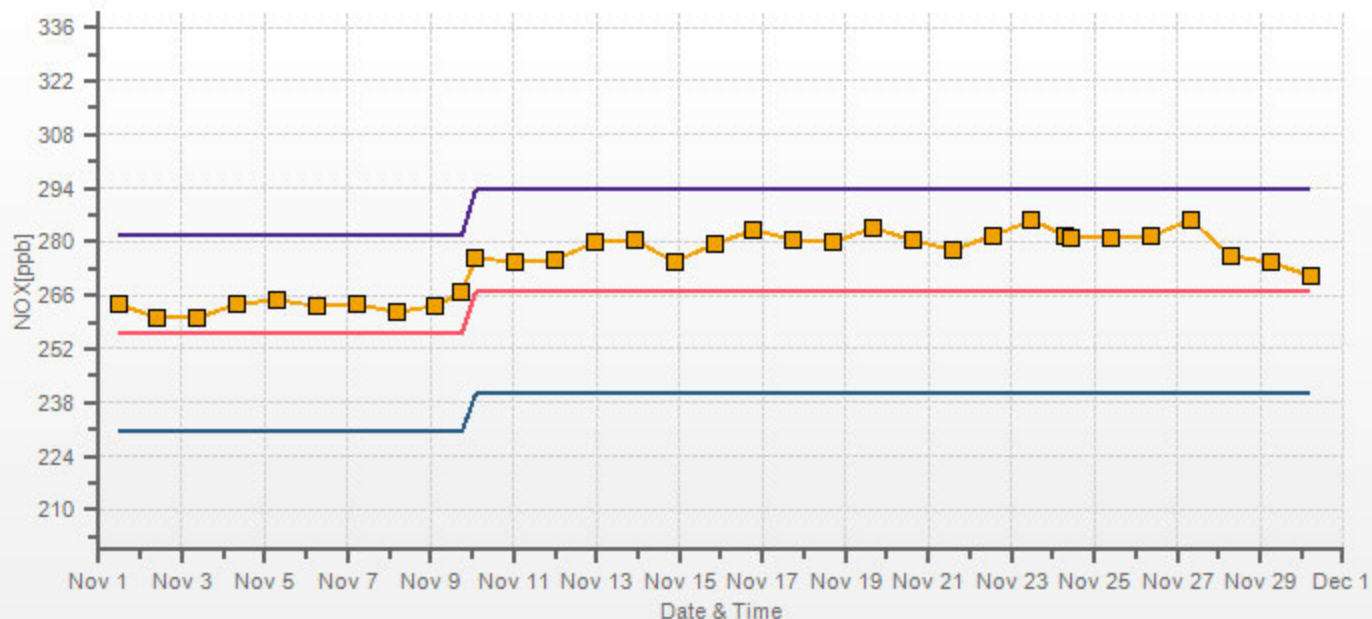
Direction	0.0-15.0	15.0-30.0	30.0-45.0	>45.0	Total
N	6.4	0.0	0.0	0.0	6.4
NE	5.3	0.0	0.0	0.0	5.3
E	15.4	0.0	0.0	0.0	15.4
SE	10.2	0.2	0.2	0.0	10.5
S	1.3	0.0	0.0	0.0	1.3
SW	15.1	0.7	0.0	0.0	15.8
W	14.8	1.0	0.0	0.0	15.8
NW	14.5	0.2	0.0	0.0	14.6
Summary	82.9	2.1	0.2	0.0	85.1

% Icon	Classes (ppb)	83	0.0-15.0	2	15.0-30.0	0	30.0-45.0	0	>45.0
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LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NOX[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 14.92% Calm Poll Avg: 10.98[ppb]



NOX[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/11 Type: Span



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

NITRIC OXIDES

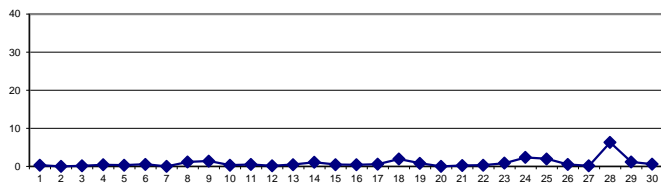
NITRIC OXIDE Hourly Averages (NO ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.	
DAY 1	1	0	0	0	1	0	0	1	0	0	S	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
DAY 2	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
DAY 3	0	0	0	0	0	0	0	0	0	0	S	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
DAY 4	0	0	0	0	0	0	0	0	S	1	1	2	1	1	2	1	0	0	0	0	0	0	0	0	0	2	0	24	
DAY 5	0	0	0	0	0	0	0	S	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	24	
DAY 6	0	0	0	0	0	0	S	2	3	4	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	4	1	24	
DAY 7	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	
DAY 8	0	0	0	0	S	0	0	1	8	4	4	2	2	3	1	0	0	0	0	0	0	1	0	0	0	8	1	24	
DAY 9	0	0	0	S	7	8	1	1	1	C	C	C	C	C	C	C	Y	Y	C	0	0	0	0	0	0	0	8	1	22
DAY 10	0	0	S	0	0	0	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	24	
DAY 11	0	S	0	0	0	0	1	0	1	1	1	0	1	1	1	1	0	0	0	0	0	1	0	2	0	2	0	24	
DAY 12	S	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	1	0	24	
DAY 13	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	1	0	S	0	0	1	0	24	
DAY 14	0	0	0	0	0	0	0	0	0	11	5	0	0	0	0	1	3	1	0	1	1	S	1	0	0	11	1	24	
DAY 15	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	0	1	0	S	0	0	0	1	0	24	
DAY 16	0	0	0	1	0	1	1	1	0	0	1	1	0	1	1	1	0	0	0	S	0	0	0	0	0	1	0	24	
DAY 17	0	0	0	0	0	0	4	0	1	1	1	1	2	1	1	1	0	0	S	0	0	0	0	0	0	4	1	24	
DAY 18	0	0	1	0	0	0	0	0	3	8	4	5	5	4	3	1	0	0	S	0	1	5	1	1	2	8	2	24	
DAY 19	5	0	0	1	1	1	0	1	1	1	1	1	1	2	1	0	S	0	1	0	0	0	0	0	0	5	1	24	
DAY 20	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 21	0	0	0	0	0	0	0	0	1	1	1	0	0	S	1	0	0	0	0	0	0	0	0	0	0	1	0	24	
DAY 22	0	0	0	0	0	0	0	0	0	1	1	1	1	S	1	0	0	0	0	0	0	0	0	1	0	1	0	24	
DAY 23	0	1	0	0	0	0	0	0	1	2	2	S	2	3	3	4	0	0	0	0	0	0	0	0	0	4	1	24	
DAY 24	0	0	0	0	0	0	0	S1	S1	1	1	S	1	1	1	1	1	1	3	6	14	16	0	2	0	16	2	22	
DAY 25	0	0	0	0	0	0	0	1	2	5	S	7	6	6	6	5	4	1	0	0	0	0	1	1	0	7	2	24	
DAY 26	1	1	1	0	0	0	0	0	0	S	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	1	0	24	
DAY 27	0	0	0	0	0	0	0	0	0	S	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
DAY 28	0	0	0	0	0	0	2	S	9	14	27	10	2	2	3	4	1	3	9	15	15	13	12	3	0	27	6	24	
DAY 29	1	1	1	3	1	1	S	1	3	3	6	2	1	0	0	1	1	0	0	0	0	0	0	0	0	6	1	24	
DAY 30	0	0	0	0	0	S	0	0	0	1	1	2	2	1	1	0	4	0	0	0	0	0	0	1	0	4	1	24	
HOURLY MAX	5	1	1	3	7	8	4	2	9	14	27	10	6	6	6	5	4	3	9	15	15	16	12	3					
HOURLY AVG	0	0	0	0	0	0	0	0	1	2	2	2	1	1	1	1	1	0	0	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

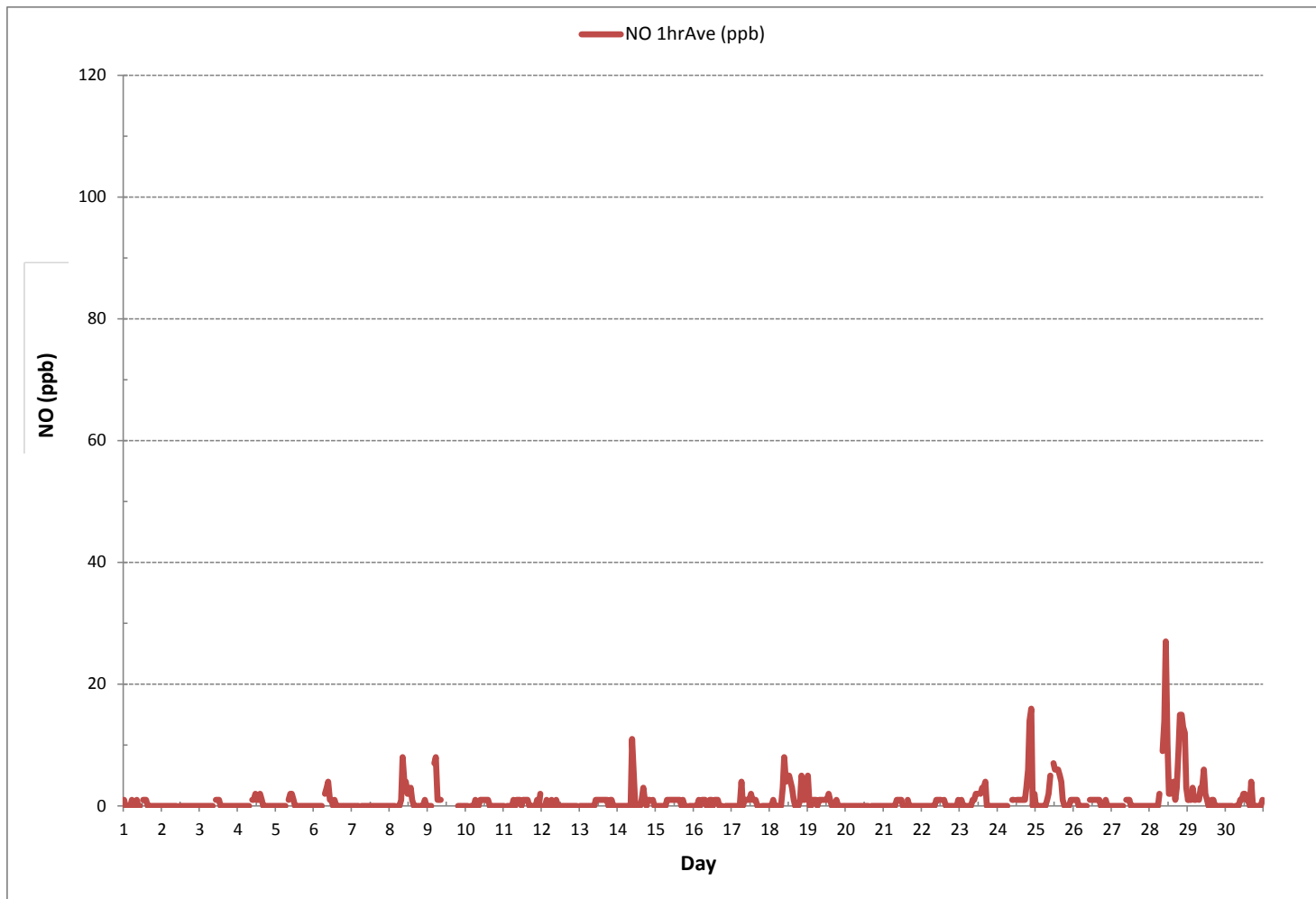
24 HR AVERAGES November 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	231			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	1	ON DAY 1
MAXIMUM 1-HR AVERAGE:	27 ppb	@ HOUR	28	ON DAY 28
MAXIMUM 24-HR AVERAGE:	6 ppb			ON DAY 28
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	716 hrs	
MONTHLY CALIBRATION TIME:	8 hrs	AMD OPERATION UPTIME:	99.4 %	
STANDARD DEVIATION:	2	MONTHLY AVERAGE:	1 ppb	

NITRIC OXIDE Hourly Averages (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2017

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	10	2	2	1	2	3	0	1	3	1	1	S	9	2	5	1	0	1	0	1	0	0	0	0	0	10	2	24	
2	0	0	0	0	0	0	0	1	1	1	S	2	2	3	1	0	0	2	0	0	0	0	0	0	0	3	1	24	
3	0	0	1	1	0	0	0	0	1	S	4	2	3	2	2	5	1	0	2	2	0	0	1	0	0	5	1	24	
4	2	0	1	0	1	0	0	1	S	1	1	2	2	3	3	2	4	1	1	1	1	1	2	1	2	0	4	1	24
5	0	1	3	2	1	1	1	S	2	3	3	2	1	1	1	0	1	3	0	0	0	0	0	0	0	3	1	24	
6	0	0	1	1	1	0	S	18	6	6	2	1	2	1	1	1	2	1	0	0	1	1	1	1	0	18	2	24	
7	1	1	1	3	2	S	1	1	1	1	1	1	1	2	0	5	0	0	0	1	0	0	0	0	0	5	1	24	
8	1	0	0	1	S	2	2	3	24	19	4	4	4	4	3	2	1	1	1	1	5	1	4	1	0	24	4	24	
9	0	0	1	S	18	18	5	2	6	C	C	C	C	C	C	C	Y	Y	C	1	1	0	0	0	0	18	4	22	
10	0	0	S	0	0	0	27	2	1	1	2	2	1	1	1	1	0	0	0	0	1	1	1	0	0	27	2	24	
11	1	S	1	2	1	2	13	1	1	2	2	1	2	2	2	2	1	1	3	3	4	3	4	8	1	13	3	24	
12	S	3	2	2	3	2	5	3	1	4	1	1	1	1	2	1	2	3	1	0	1	0	0	S	0	5	2	24	
13	0	0	0	1	1	0	1	1	1	1	1	1	2	3	5	2	2	4	2	2	2	2	S	2	0	5	2	24	
14	1	1	1	0	0	1	1	1	1	114	23	8	1	0	2	25	43	5	2	3	3	S	9	2	0	114	11	24	
15	1	1	2	1	1	1	2	4	3	3	3	3	2	4	6	1	1	5	1	1	S	1	1	1	1	6	2	24	
16	2	1	1	3	2	3	3	5	4	1	2	2	1	6	3	1	2	1	1	S	1	1	1	0	0	6	2	24	
17	0	1	1	1	1	1	78	1	2	1	2	2	3	2	2	1	1	2	S	1	2	2	1	1	0	78	5	24	
18	0	14	14	2	3	2	2	1	8	14	6	6	7	6	6	3	2	S	2	3	20	6	5	9	0	20	6	24	
19	9	2	1	5	3	1	2	2	3	2	1	1	1	12	8	2	S	3	2	2	1	1	9	0	0	12	3	24	
20	1	1	1	0	0	0	0	0	0	0	1	1	0	0	S	0	1	0	0	0	0	0	0	1	0	1	0	24	
21	1	1	1	1	1	1	3	2	1	2	1	2	1	1	S	9	6	1	1	1	1	1	1	0	0	9	2	24	
22	0	1	1	0	2	1	0	1	2	2	2	7	1	S	2	2	1	1	4	1	2	1	1	11	0	11	2	24	
23	2	12	1	1	1	0	3	1	3	1	2	5	S	13	7	17	11	1	1	1	1	1	1	1	0	17	4	24	
24	1	1	1	1	1	1	1	S1	S1	4	16	S	2	2	13	7	8	6	12	14	22	26	1	12	1	26	7	22	
25	2	1	1	1	1	1	2	4	9	8	S	9	10	8	7	17	17	12	1	1	0	2	2	3	0	17	5	24	
26	8	7	3	2	1	1	1	1	1	S	1	3	2	2	1	2	7	1	1	2	3	1	1	2	1	8	2	24	
27	1	2	2	1	1	1	1	1	S	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	0	2	1	24	
28	1	1	1	2	1	5	7	S	22	26	40	24	3	5	24	35	6	9	20	35	93	40	22	13	1	93	19	24	
29	4	5	4	16	2	3	S	2	5	6	9	4	1	1	8	7	1	2	2	1	4	1	1	1	1	16	4	24	
30	2	1	1	1	1	S	2	1	1	1	2	3	3	2	5	1	31	1	1	1	1	2	2	11	1	31	3	24	
HOURLY MAX	10	14	14	16	18	18	78	18	24	114	40	24	10	13	24	35	43	12	20	35	93	40	22	13					
HOURLY AVG	2	2	2	2	2	2	6	2	4	8	5	4	3	3	4	5	6	2	2	3	6	3	2	3					

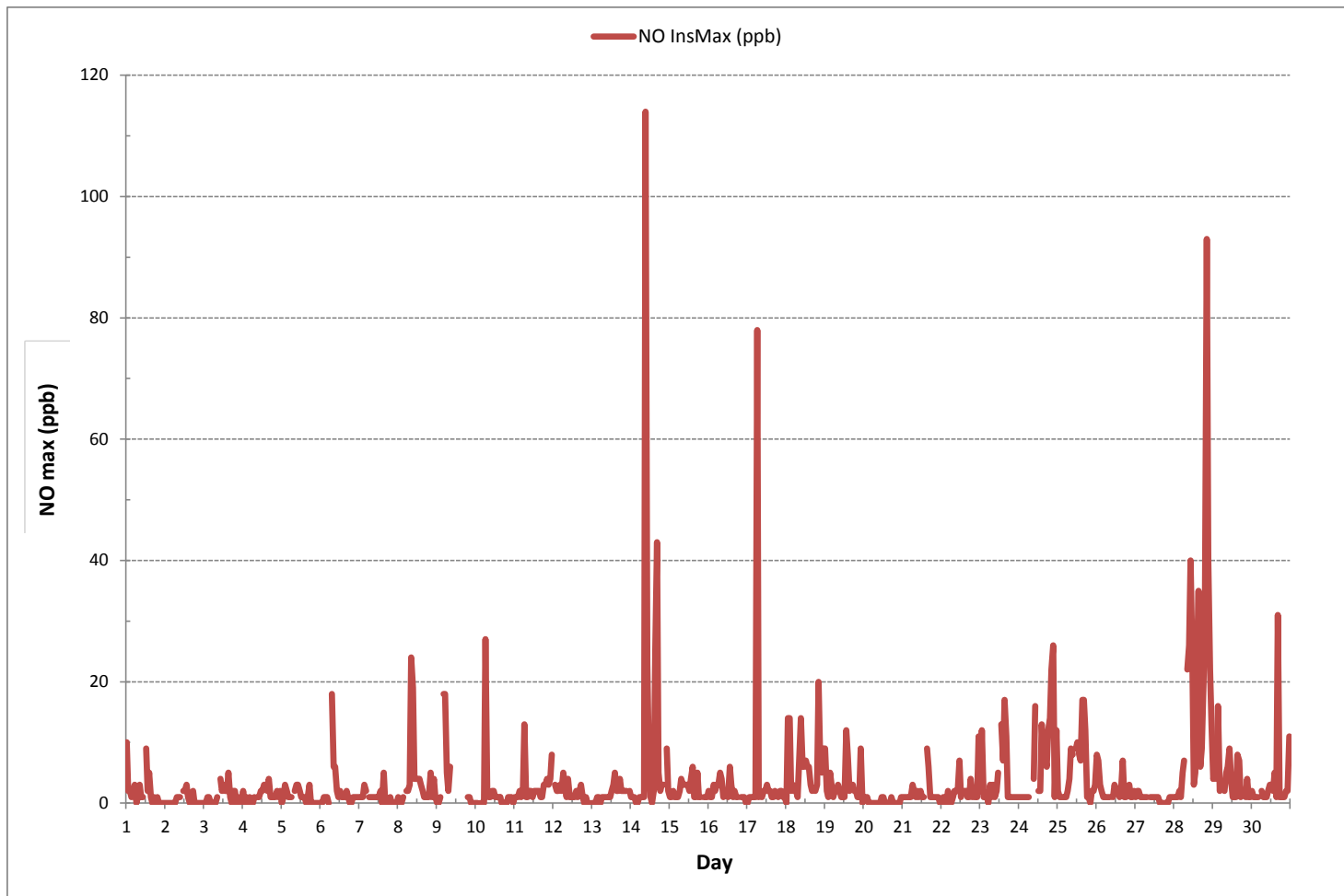
STATUS FLAG CODES

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

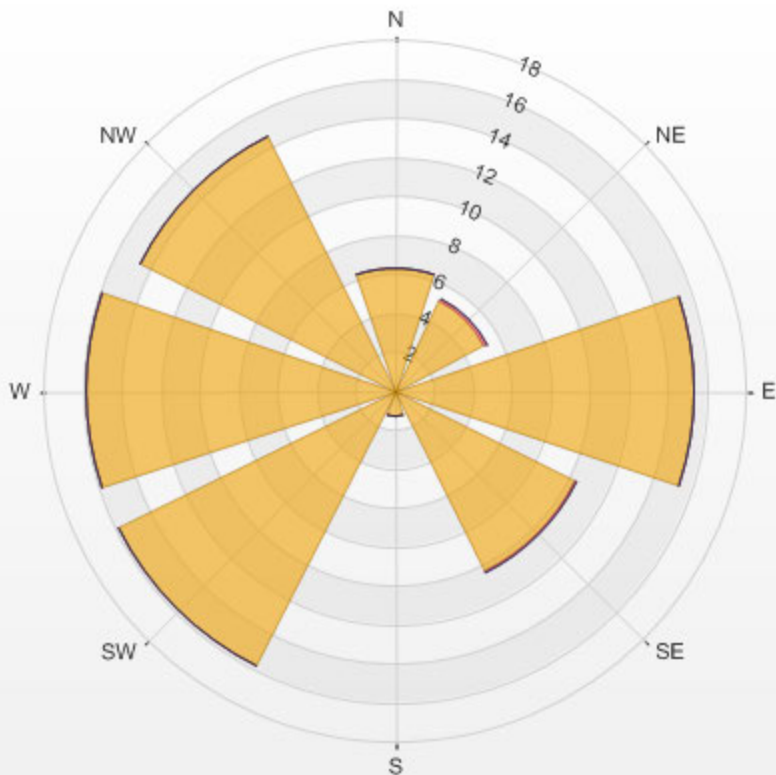
NUMBER OF NON-ZERO READINGS:	561
MAXIMUM INSTANTANEOUS VALUE:	114 ppb @ HOUR 9 ON DAY 14
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	716 hrs
STANDARD DEVIATION:	8

NITRIC OXIDE Instantaneous Maximum (NO ppb)



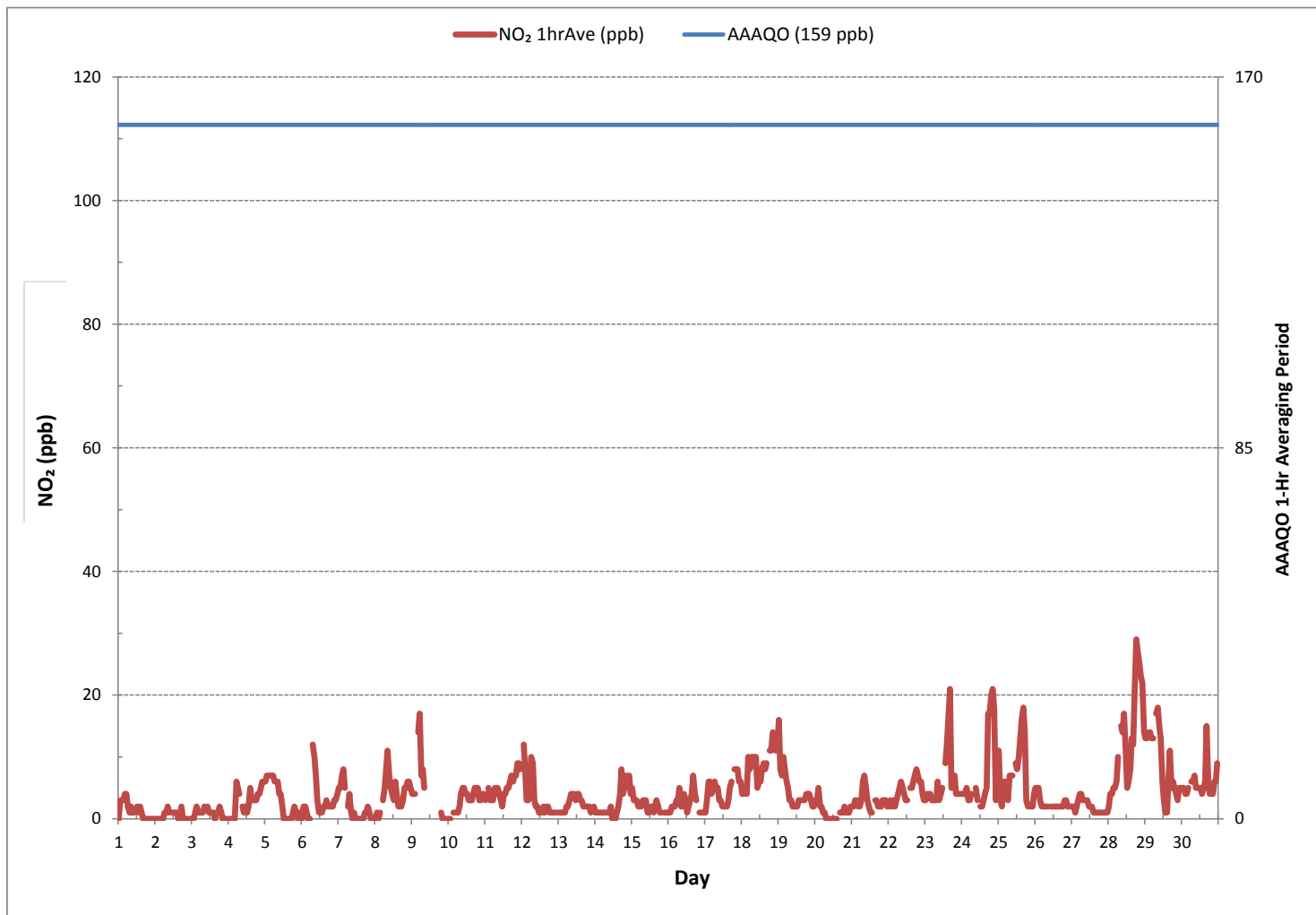
% Icon	Classes (ppb)	85	0.0-9.3	0	9.3-18.7	0	18.7-28.0	0	>28.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 14.92% Calm Poll Avg: 2.49[ppb]



NITROGEN DIOXIDE

NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2017

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	4	4	5	8	8	3	8	10	2	2	S	6	3	7	4	1	1	1	1	1	1	1	1	1	1	10	4	24
2	1	0	0	0	1	1	2	2	3	2	S	4	2	5	4	2	2	4	1	2	2	1	0	1	0	5	2	24	
3	1	2	2	3	2	2	4	2	3	S	6	3	4	3	5	3	3	2	6	5	1	1	4	1	1	6	3	24	
4	2	2	2	1	3	12	9	7	S	3	3	4	3	6	7	5	6	5	5	6	8	9	9	1	12	5	24		
5	8	9	10	8	9	9	9	S	8	6	6	5	1	1	2	1	2	4	3	4	4	4	2	2	2	1	10	5	24
6	2	4	4	3	2	2	S	24	14	12	5	3	4	3	3	5	5	4	4	3	3	5	5	6	2	24	5	24	
7	6	7	10	11	9	S	4	6	4	2	2	2	1	4	1	3	2	2	4	5	4	1	1	1	1	11	4	24	
8	4	4	2	3	S	5	10	12	18	17	7	7	8	9	7	4	5	5	5	8	10	9	9	8	2	18	8	24	
9	8	8	6	S	20	20	17	17	9	C	C	C	C	C	C	C	Y	Y	C	5	4	2	2	2	2	20	9	22	
10	2	2	S	3	3	3	13	5	6	7	6	6	5	5	5	5	6	7	8	7	6	5	7	6	2	13	6	24	
11	5	S	7	6	7	7	9	6	6	6	5	4	6	6	7	8	11	9	15	12	12	14	14	14	4	15	9	24	
12	S	15	13	6	5	10	19	17	5	4	3	3	2	3	10	3	4	4	3	2	3	2	2	S	2	19	6	24	
13	2	2	3	4	3	3	4	5	5	6	5	6	8	7	9	6	5	5	5	4	4	3	S	3	2	9	5	24	
14	3	2	2	1	2	2	2	2	2	23	24	2	2	1	5	36	18	12	9	8	11	S	16	8	1	36	8	24	
15	9	6	9	5	6	4	5	11	7	5	4	3	3	5	3	5	5	4	3	3	S	3	2	2	2	11	5	24	
16	3	3	4	7	4	6	8	12	6	6	6	6	4	8	6	5	14	6	5	S	3	3	2	2	2	14	6	24	
17	2	7	8	10	6	7	42	7	7	4	5	4	3	3	4	5	7	10	S	10	10	12	8	8	2	42	8	24	
18	6	11	15	11	15	13	15	12	15	15	7	7	10	10	11	10	13	S	9	15	13	21	20	15	16	6	21	13	24
19	18	13	11	14	13	8	7	5	6	4	3	5	4	8	6	5	S	9	6	6	6	6	4	5	3	3	18	7	24
20	4	4	7	4	3	2	2	1	1	1	1	1	1	1	1	S	2	1	2	3	2	2	2	3	1	7	2	24	
21	3	4	4	4	3	3	4	8	9	14	7	3	2	2	S	5	10	4	3	3	4	4	4	3	2	14	5	24	
22	3	4	4	5	3	4	6	8	8	6	6	6	4	S	7	8	8	11	12	11	8	8	6	5	3	12	7	24	
23	6	6	6	5	4	3	5	5	15	4	5	6	S	17	19	29	30	6	8	8	6	5	5	6	3	30	9	24	
24	6	6	6	7	4	3	5	S1	S1	14	7	S	3	4	8	7	11	23	24	24	22	25	6	18	3	25	11	22	
25	15	5	2	12	10	9	6	9	12	9	S	11	11	12	14	20	25	21	11	2	2	3	4	5	2	25	10	24	
26	7	7	6	5	3	3	3	3	3	S	3	3	4	3	3	3	6	4	3	14	5	2	2	4	2	14	4	24	
27	3	5	4	3	6	6	6	4	S	5	4	2	2	2	1	1	1	1	1	1	1	1	2	2	1	6	3	24	
28	4	4	4	11	9	12	17	S	21	18	23	19	6	8	14	21	20	30	32	32	44	28	26	22	4	44	18	24	
29	17	19	16	18	16	17	S	19	20	17	15	9	4	1	2	16	19	7	7	7	6	4	7	12	1	20	12	24	
30	8	7	5	5	6	S	10	7	8	6	7	8	7	5	8	7	61	11	5	5	5	11	13	20	5	61	10	24	
HOURLY MAX	18	19	16	18	20	20	42	24	21	23	24	19	11	17	19	36	61	30	32	32	44	28	26	22					
HOURLY AVG	6	6	6	6	6	7	9	8	9	8	7	5	4	5	6	8	11	8	7	7	7	7	6	7					

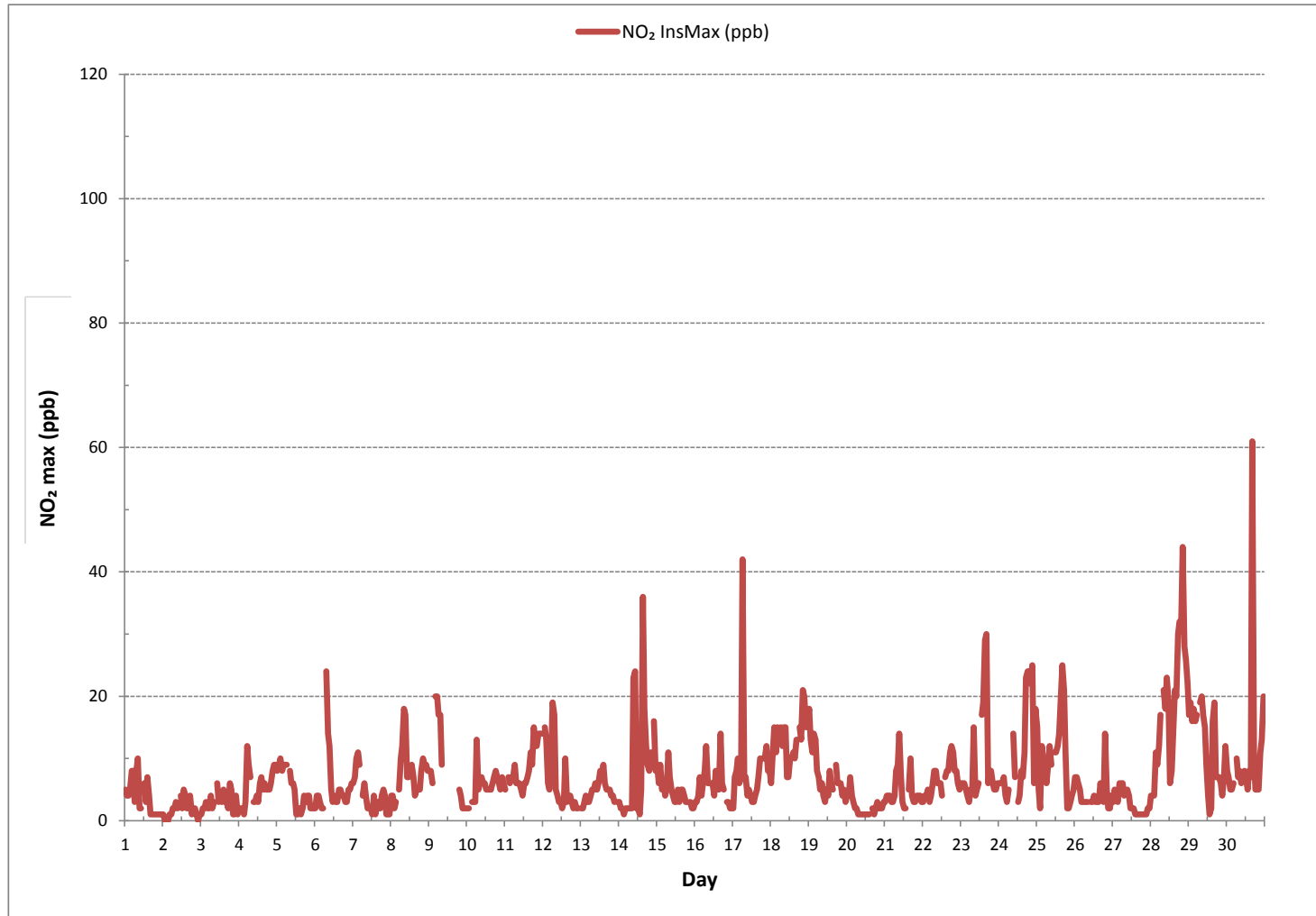
STATUS FLAG CODES

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

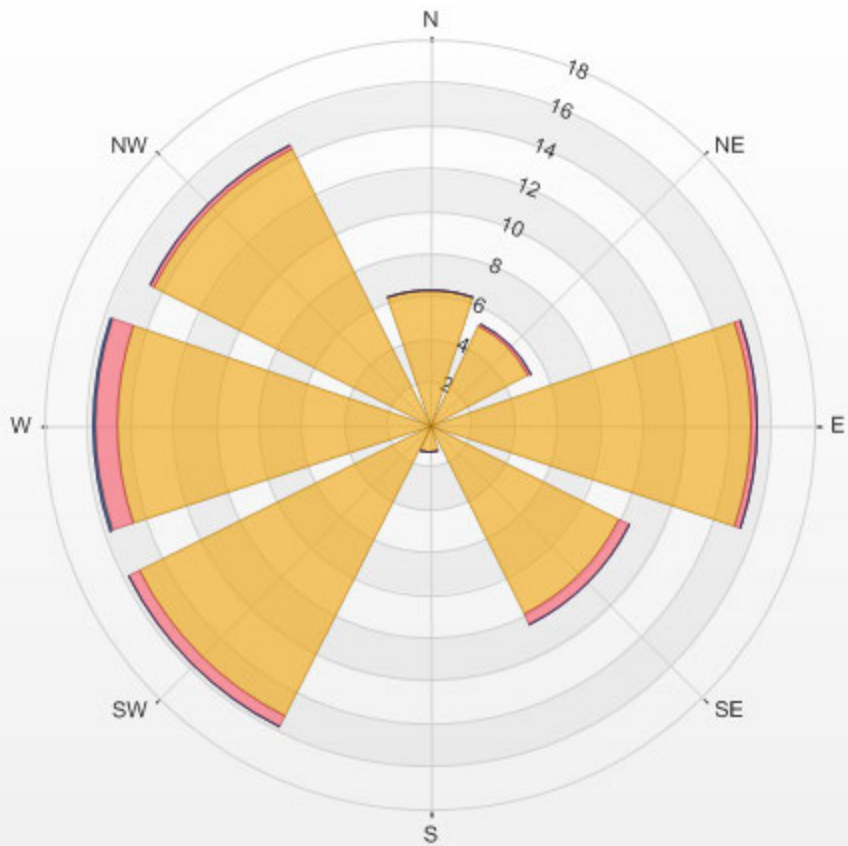
NUMBER OF NON-ZERO READINGS:	673
MAXIMUM INSTANTANEOUS VALUE:	61 ppb @ HOUR 16 ON DAY 30
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	6
OPERATIONAL TIME:	716 hrs

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)

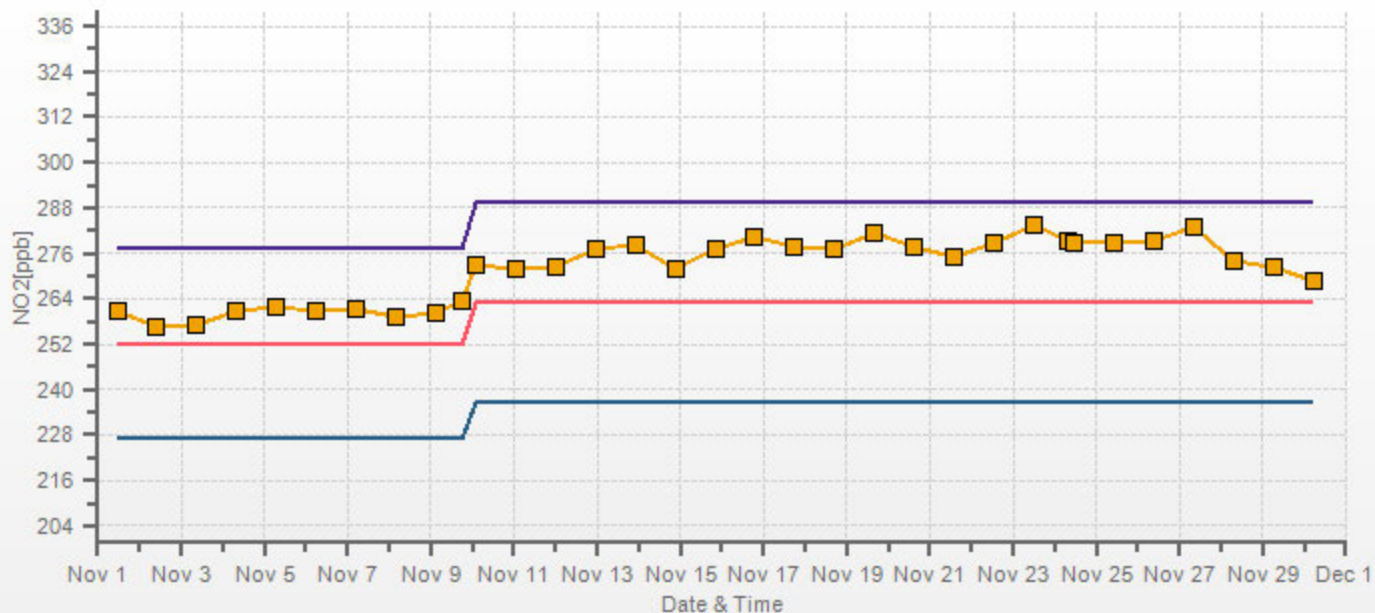


% Icon	Classes (ppb)	82	3	0	0
	0.0-10.0				
			10.0-20.0	20.0-30.0	>30.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO2[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 14.92% Calm Poll Avg: 8.49[ppb]



NO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/11 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	22.4	20.9	21.0	21.0	20.6	22.2	19.4	21.4	24.0	26.4	28.0	S	28.5	27.6	26.3	25.1	21.7	22.2	24.7	26.6	27.5	26.4	26.7	27.2	19.4	28.5	24.3	24	
2	28.1	29.0	30.6	31.1	31.0	31.3	31.2	32.1	32.6	36.0	S	39.7	39.6	38.7	38.0	37.9	37.4	36.0	37.9	33.2	32.7	33.4	33.3	32.9	28.1	39.7	34.1	24	
3	32.8	30.9	30.0	29.2	31.6	32.5	32.5	32.1	31.0	S	31.2	31.8	31.5	32.0	32.7	33.2	32.3	32.6	33.4	33.9	34.5	34.3	33.6	33.2	29.2	34.5	32.3	24	
4	33.6	33.6	33.1	32.2	31.7	23.2	23.7	23.7	S	30.1	31.1	30.7	31.0	29.6	27.1	28.4	26.8	26.3	26.5	25.5	24.2	21.4	19.9	18.7	18.7	33.6	27.5	24	
5	17.5	15.5	14.5	14.5	13.5	13.4	13.6	S	14.9	17.1	17.9	22.8	29.6	31.5	31.8	31.5	30.8	32.3	33.6	33.0	33.3	35.2	34.1	33.8	13.4	35.2	24.6	24	
6	34.5	33.3	32.6	33.0	34.6	35.6	S	16.8	15.1	21.6	31.3	32.4	33.5	32.9	33.9	34.0	31.7	32.3	32.6	33.0	32.5	30.8	29.6	27.9	15.1	35.6	30.7	24	
7	25.6	23.6	20.9	19.0	21.5	S	25.8	23.7	26.1	27.9	28.3	31.1	32.9	33.8	34.9	34.0	33.8	32.7	31.2	29.4	31.6	33.6	33.5	33.1	19.0	34.9	29.0	24	
8	31.3	27.5	23.0	19.1	S	15.2	12.1	11.0	8.9	19.9	23.6	28.0	29.8	25.8	28.2	30.4	30.2	28.4	26.0	23.2	24.1	20.4	19.6	14.5	8.9	31.3	22.6	24	
9	12.8	14.0	15.1	S	2.7	1.2	15.5	18.6	21.0	25.3	26.7	28.7	C	C	C	C	Y	Y	Y	Y	36.2	36.0	35.7	34.4	33.9	1.2	36.2	22.4	21
10	33.8	33.2	S	32.6	32.4	31.7	30.3	28.7	26.8	25.1	24.6	24.6	25.9	26.2	25.9	25.4	25.1	24.4	23.1	22.6	23.4	23.0	22.6	21.1	21.1	33.8	26.6	24	
11	20.4	S	15.9	13.3	10.6	8.8	8.2	13.4	18.1	20.1	22.5	26.6	26.2	25.4	24.8	24.7	20.9	16.6	12.1	9.5	8.5	5.4	4.3	4.5	4.3	26.6	15.7	24	
12	S	3.3	12.3	25.8	26.9	25.5	19.6	19.3	24.8	24.5	25.8	25.3	27.0	28.5	28.5	26.9	26.1	26.3	28.8	31.3	31.7	32.5	33.5	S	3.3	33.5	25.2	24	
13	34.9	33.9	32.6	31.4	31.8	30.8	29.4	28.2	27.0	25.8	26.1	28.2	27.5	26.2	28.1	27.6	29.4	29.2	29.1	28.5	27.8	27.2	S	26.5	25.8	34.9	29.0	24	
14	24.8	23.6	25.4	27.9	28.4	28.3	28.2	27.4	27.5	27.5	29.6	31.0	31.0	31.0	31.0	30.3	28.6	24.1	26.9	26.0	23.3	S	23.4	27.0	23.3	31.0	27.5	24	
15	25.2	27.6	26.8	27.4	27.8	28.4	28.0	28.0	27.8	28.0	28.8	29.0	28.5	29.5	31.0	31.4	31.8	31.5	32.1	32.1	S	31.6	31.6	31.2	25.2	32.1	29.4	24	
16	30.8	30.7	30.3	29.4	29.2	28.3	27.9	26.3	28.3	27.8	26.8	25.6	27.5	26.9	25.4	24.7	21.1	23.6	25.3	S	25.3	24.5	24.0	23.8	21.1	30.8	26.7	24	
17	23.5	19.8	17.3	19.8	21.5	20.2	20.7	22.6	22.0	24.4	25.0	26.0	25.8	26.7	26.8	25.5	23.8	22.1	S	19.0	17.4	17.0	20.6	20.0	17.0	26.8	22.1	24	
18	23.0	20.8	17.1	15.5	12.4	15.8	10.1	9.1	8.2	10.1	17.6	17.2	17.1	15.9	14.0	15.2	14.5	S	11.3	10.8	6.3	3.3	3.0	3.0	3.0	23.0	12.7	24	
19	1.1	10.3	10.8	7.7	11.3	13.6	16.2	17.6	17.9	19.5	20.9	21.5	21.0	19.9	21.3	23.8	S	26.0	25.7	25.3	25.7	26.4	26.2	26.0	1.1	26.4	18.9	24	
20	24.9	24.3	20.6	20.9	22.9	25.3	27.2	28.8	28.4	29.6	29.7	29.7	29.2	28.9	29.2	S	28.5	28.7	29.3	29.4	31.6	31.5	30.7	29.2	20.6	31.6	27.8	24	
21	28.6	27.2	26.2	26.0	27.1	27.0	25.5	21.9	20.1	22.7	25.6	27.5	28.3	30.1	S	29.1	29.3	28.8	28.4	29.0	27.7	27.1	27.4	27.5	20.1	30.1	26.9	24	
22	27.4	27.0	27.0	26.2	26.5	26.2	25.2	24.1	23.8	24.4	25.7	27.3	28.0	S	27.0	26.2	25.6	23.9	22.3	21.4	21.6	21.2	24.1	26.1	21.2	28.0	25.1	24	
23	26.2	24.6	23.9	24.2	24.0	24.9	23.9	23.2	19.6	23.2	22.5	21.1	S	18.5	18.4	16.2	14.6	39.3	34.7	31.3	33.2	32.3	31.2	29.6	14.6	39.3	25.2	24	
24	27.8	28.2	26.8	25.4	27.3	24.4	21.7	20.7	17.0	22.4	28.2	S	27.2	26.7	26.0	24.9	21.6	8.9	5.2	1.3	0.6	4.5	25.4	15.2	0.6	28.2	19.9	24	
25	11.3	22.2	23.8	16.6	12.3	10.0	7.8	6.4	5.5	10.9	S	14.7	16.5	16.3	13.8	9.5	8.5	9.7	24.1	27.8	28.3	25.8	26.8	26.9	5.5	28.3	16.3	24	
26	24.2	23.4	24.1	27.3	29.4	29.6	28.5	29.4	29.5	S	19.9	28.6	28.5	28.6	28.9	28.9	27.4	27.0	26.9	27.4	26.9	26.1	26.6	26.8	26.5	23.4	29.6	27.4	24
27	26.0	25.1	25.2	24.1	21.3	19.6	20.1	20.9	S	19.9	19.3	20.5	21.7	22.2	22.1	28.7	27.6	27.6	27.7	27.6	27.4	26.3	25.4	24.7	19.3	28.7	24.2	24	
28	22.7	19.1	15.9	14.6	12.1	10.3	7.5	S	3.3	6.1	7.7	18.2	27.3	27.8	23.8	18.0	19.5	8.0	1.2	1.7	2.2	0.7	0.8	3.7	0.7	27.8	11.8	24	
29	4.4	4.9	3.2	2.6	2.5	3.5	S	7.3	8.6	15.5	19.0	26.7	29.7	31.3	30.8	26.0	20.3	24.9	25.1	26.4	28.8	30.0	26.9	20.4	2.5	31.3	18.2	24	
30	26.4	25.6	28.6	28.3	27.5	S	27.0	27.4	27.7	30.6	31.6	31.6	31.9	32.4	31.9	30.8	23.5	29.5	31.5	31.2	30.9	26.6	22.2	16.1	16.1	32.4	28.3	24	
HOURLY MAX	34.9	33.9	33.1	33.0	34.6	35.6	32.5	32.1	32.6	36.0	31.6	39.7	39.6	38.7	38.0	37.9	37.4	39.3	37.9	36.2	36.0	35.7	34.4	33.9					
HOURLY AVG	24.3	23.6	22.6	23.0	22.5	21.7	21.7	21.8	20.9	22.9	25.1	26.6	27.9	27.5	27.4	26.7	25.4	25.8	25.6	25.3	25.0	24.6	24.9	23.6					

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

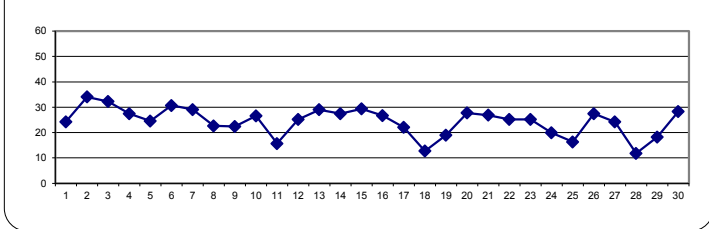
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 82 ppb

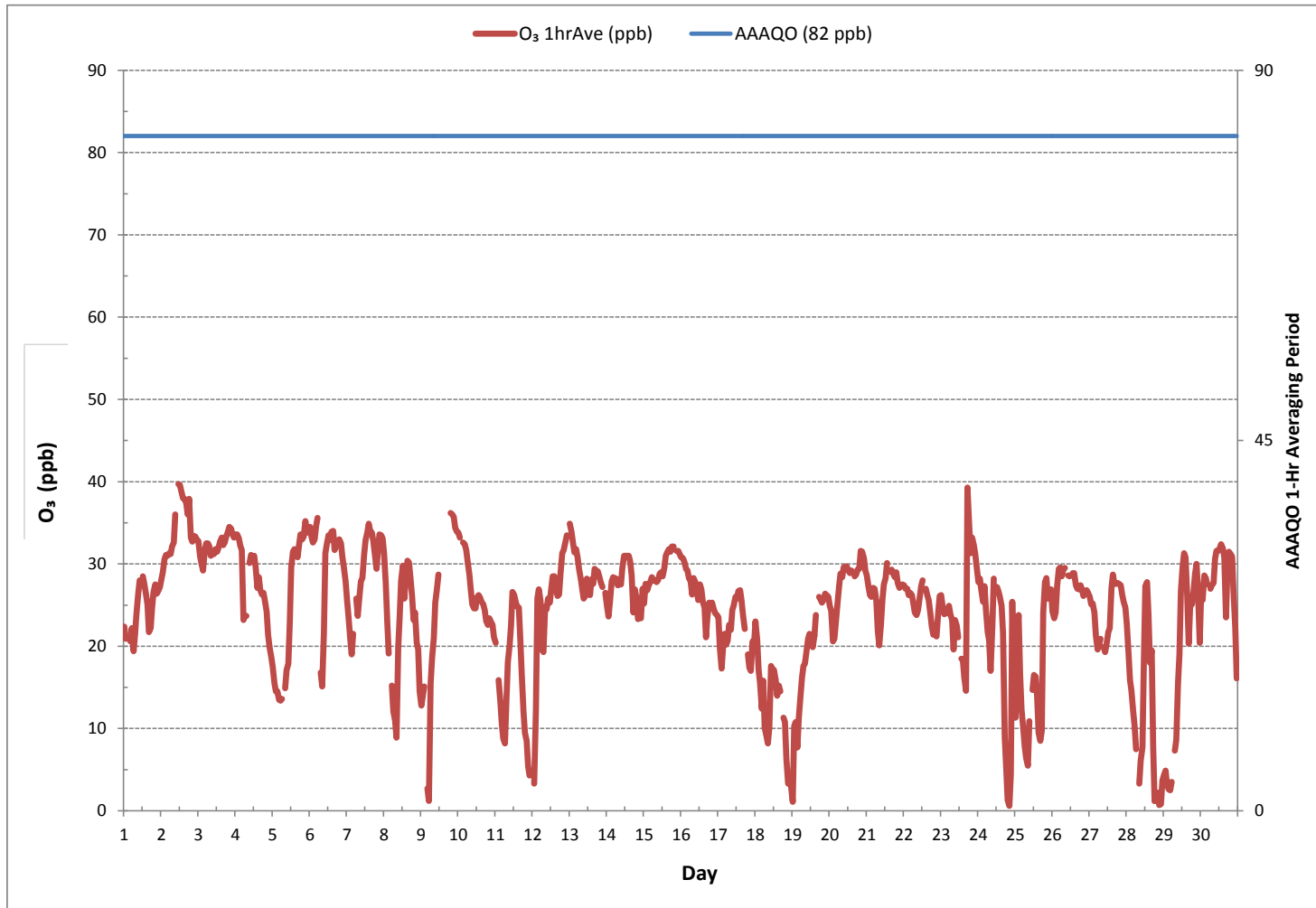
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	682				
MINIMUM 1-HR AVERAGE:	0.6	ppb	@ HOUR	20	ON DAY 24
MAXIMUM 1-HR AVERAGE:	39.7	ppb	@ HOUR	11	ON DAY 2
MAXIMUM 24-HR AVERAGE:	34.1	ppb			ON DAY 2
I2S CALIBRATION TIME:	31	hrs	OPERATIONAL TIME:	717	hrs
MONTHLY CALIBRATION TIME:	4	hrs	AMD OPERATION UPTIME:	99.6	%
STANDARD DEVIATION:	7.8		MONTHLY AVERAGE:	24.4	ppb

24 HR AVERAGES November 2017



OZONE Hourly Averages (O₃ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2017

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	23.7	22.1	21.7	23.0	22.0	24.4	21.4	22.6	26.7	27.6	29.1	S	29.9	29.1	28.0	26.2	25.8	24.1	25.9	27.1	28.5	26.9	27.1	28.2	21.4	29.9	25.7	24
2	28.6	29.7	31.2	31.2	31.3	31.6	32.0	32.7	34.1	39.3	S	40.2	40.2	39.7	39.0	38.7	38.1	38.1	38.4	38.2	35.1	33.9	33.8	33.3	28.6	40.2	35.1	24
3	33.3	31.9	30.4	29.8	32.3	32.7	32.7	32.6	31.3	S	31.7	32.6	32.3	33.3	34.5	33.8	33.3	34.1	35.3	35.7	35.6	34.8	34.5	34.4	29.8	35.7	33.2	24
4	34.1	34.4	34.1	33.0	33.0	30.1	24.7	25.0	S	30.8	31.7	31.6	31.5	31.6	28.0	29.1	28.2	27.9	28.0	26.4	25.9	23.5	20.3	19.8	19.8	34.4	28.8	24
5	18.2	16.5	15.3	15.3	13.7	14.0	14.1	S	15.8	17.5	18.6	29.9	30.3	32.0	32.2	32.4	31.0	34.7	34.7	34.2	34.8	35.7	35.1	34.7	13.7	35.7	25.7	24
6	34.8	34.1	33.0	33.9	36.1	36.2	S	21.1	18.2	31.0	32.3	33.8	34.7	33.6	34.8	35.0	33.6	33.3	33.2	33.2	33.2	31.6	30.4	28.9	18.2	36.2	32.2	24
7	27.1	25.0	22.3	19.5	26.1	S	26.2	25.3	27.4	28.2	30.2	32.0	33.6	34.8	35.4	34.7	34.4	33.5	32.3	30.8	33.3	34.1	33.8	33.5	19.5	35.4	30.2	24
8	32.9	30.4	27.0	21.8	S	17.1	15.0	14.6	14.1	22.3	24.3	32.6	32.9	28.5	29.5	31.2	31.5	29.7	26.7	26.1	25.9	23.3	21.2	16.9	14.1	32.9	25.0	24
9	14.9	15.5	17.7	S	7.6	6.3	21.5	21.2	21.7	26.1	27.7	28.8	C	C	C	C	Y	Y	Y	Y	35.4	35.3	33.9	33.2	6.3	35.4	23.1	20
10	32.9	32.4	S	32.0	31.6	31.4	30.1	29.8	26.7	24.6	24.1	24.5	25.5	25.6	25.5	25.0	24.4	23.8	23.2	22.7	23.2	23.0	22.4	20.8	20.8	32.9	26.3	24
11	20.3	S	16.1	14.1	12.1	9.1	9.3	16.9	18.2	19.8	24.7	26.4	25.8	24.9	24.3	24.1	23.0	20.1	14.4	14.2	10.0	6.0	4.4	7.3	4.4	26.4	16.8	24
12	S	3.3	23.2	25.8	26.5	25.6	21.5	24.5	24.7	24.3	25.5	25.3	26.8	28.0	28.3	27.0	25.8	26.2	29.8	31.0	31.4	32.3	33.9	S	3.3	33.9	25.9	24
13	34.2	33.5	32.6	31.0	31.3	30.8	29.1	28.6	27.1	26.1	25.9	28.8	28.8	28.9	28.6	27.7	29.2	29.1	29.1	28.0	27.9	26.8	S	26.5	25.9	34.2	29.1	24
14	25.1	23.2	26.1	27.6	27.7	27.7	27.6	26.8	27.4	28.0	30.3	30.4	30.4	30.4	30.4	29.9	29.7	27.9	27.3	26.4	25.2	S	24.6	26.8	23.2	30.4	27.7	24
15	26.4	28.2	27.6	27.6	27.9	28.2	27.6	28.5	28.5	28.2	28.3	28.5	28.3	30.1	30.5	31.2	31.9	31.3	31.7	31.7	S	31.2	31.0	30.5	26.4	31.9	29.3	24
16	30.4	30.1	30.3	28.9	28.9	28.5	28.6	27.4	28.0	28.0	26.5	26.2	26.7	26.5	25.9	25.0	23.5	24.3	25.2	S	24.9	23.8	23.2	23.3	23.2	30.4	26.7	24
17	23.2	22.0	17.9	21.1	21.5	19.9	22.3	22.4	22.9	24.0	25.3	25.9	25.3	26.5	26.1	25.8	24.4	22.0	S	19.3	17.5	20.5	21.2	21.2	17.5	26.5	22.5	24
18	22.7	21.8	18.8	16.2	18.2	19.3	15.0	10.6	9.0	15.6	18.2	17.2	16.8	16.1	14.5	15.3	14.4	S	12.1	11.2	10.1	4.5	5.8	5.1	4.5	22.7	14.3	24
19	5.5	11.5	11.8	7.9	12.6	14.1	16.5	17.1	17.7	19.8	20.3	20.8	20.6	19.6	21.5	24.7	S	25.8	25.3	25.3	25.6	25.9	25.8	25.5	5.5	25.9	19.2	24
20	24.8	24.0	22.3	21.1	24.3	25.2	27.4	28.2	28.6	28.9	29.1	29.1	28.5	28.3	28.5	S	28.2	28.2	29.1	29.1	31.0	30.8	30.4	29.4	21.1	31.0	27.6	24
21	27.9	27.3	25.8	25.6	26.5	26.5	25.9	23.6	20.2	23.3	26.1	27.3	28.0	30.2	S	29.5	29.2	28.8	27.8	28.4	27.6	26.6	27.3	27.1	20.2	30.2	26.8	24
22	27.0	26.5	26.5	25.9	26.1	25.8	25.0	24.0	24.1	24.3	25.9	27.3	27.6	S	26.8	26.1	25.3	24.7	22.9	21.7	21.4	20.9	24.9	25.9	20.9	27.6	25.1	24
23	25.9	24.5	23.3	23.8	23.6	24.3	24.0	23.0	21.8	23.6	22.6	20.9	S	19.2	19.8	19.6	37.1	39.1	37.1	31.9	32.9	31.7	31.6	29.2	19.2	39.1	26.5	24
24	27.9	27.9	27.9	25.8	26.7	26.2	21.4	21.1	19.5	29.7	29.5	S	26.8	26.4	25.9	25.1	23.8	15.3	9.0	2.4	0.0	19.3	25.8	25.0	0.0	29.7	22.1	24
25	18.3	23.6	23.6	22.3	14.7	11.9	9.0	8.9	6.7	14.1	S	15.9	16.9	17.2	13.7	12.1	19.8	18.9	26.4	27.4	27.9	27.7	28.3	27.7	6.7	28.3	18.8	24
26	24.0	23.3	24.8	27.9	29.2	29.7	28.0	28.9	29.1	S	28.3	28.0	28.0	28.5	28.6	27.4	27.0	26.7	27.1	26.7	26.2	26.2	26.2	26.1	23.3	29.7	27.2	24
27	25.5	25.0	24.8	24.3	22.7	19.6	20.8	20.8	S	19.6	19.0	20.1	21.7	22.4	28.0	28.0	27.4	27.0	27.0	26.8	26.9	26.1	25.1	24.3	19.0	28.0	24.0	24
28	23.6	19.3	16.5	16.7	13.4	11.2	9.3	S	4.4	6.6	11.8	25.0	26.9	28.3	26.0	23.2	21.8	20.8	1.1	3.8	8.2	0.2	2.0	8.2	0.2	28.3	14.3	24
29	6.6	6.3	4.9	4.9	3.1	3.0	S	7.9	12.2	16.3	22.0	27.9	30.6	30.7	30.1	29.9	25.0	26.2	25.0	26.1	29.8	29.9	29.1	26.2	3.0	30.7	19.7	24
30	27.1	27.4	27.9	27.3	S	26.5	27.0	28.0	30.5	31.6	32.2	32.0	32.0	31.9	31.6	31.2	28.5	32.0	31.2	30.8	30.8	28.9	27.1	18.7	18.7	32.2	29.0	24
HOURLY MAX	34.8	34.4	34.1	33.9	36.1	36.2	32.7	32.7	34.1	39.3	32.3	40.2	40.2	39.7	39.0	38.7	38.1	39.1	38.4	38.2	35.6	35.7	35.1	34.7				
HOURLY AVG	25.1	24.2	23.6	23.7	23.4	22.5	22.6	22.9	21.9	24.2	25.7	27.5	28.1	27.9	27.7	27.5	27.7	27.6	26.3	25.6	25.7	25.6	25.5	24.7				

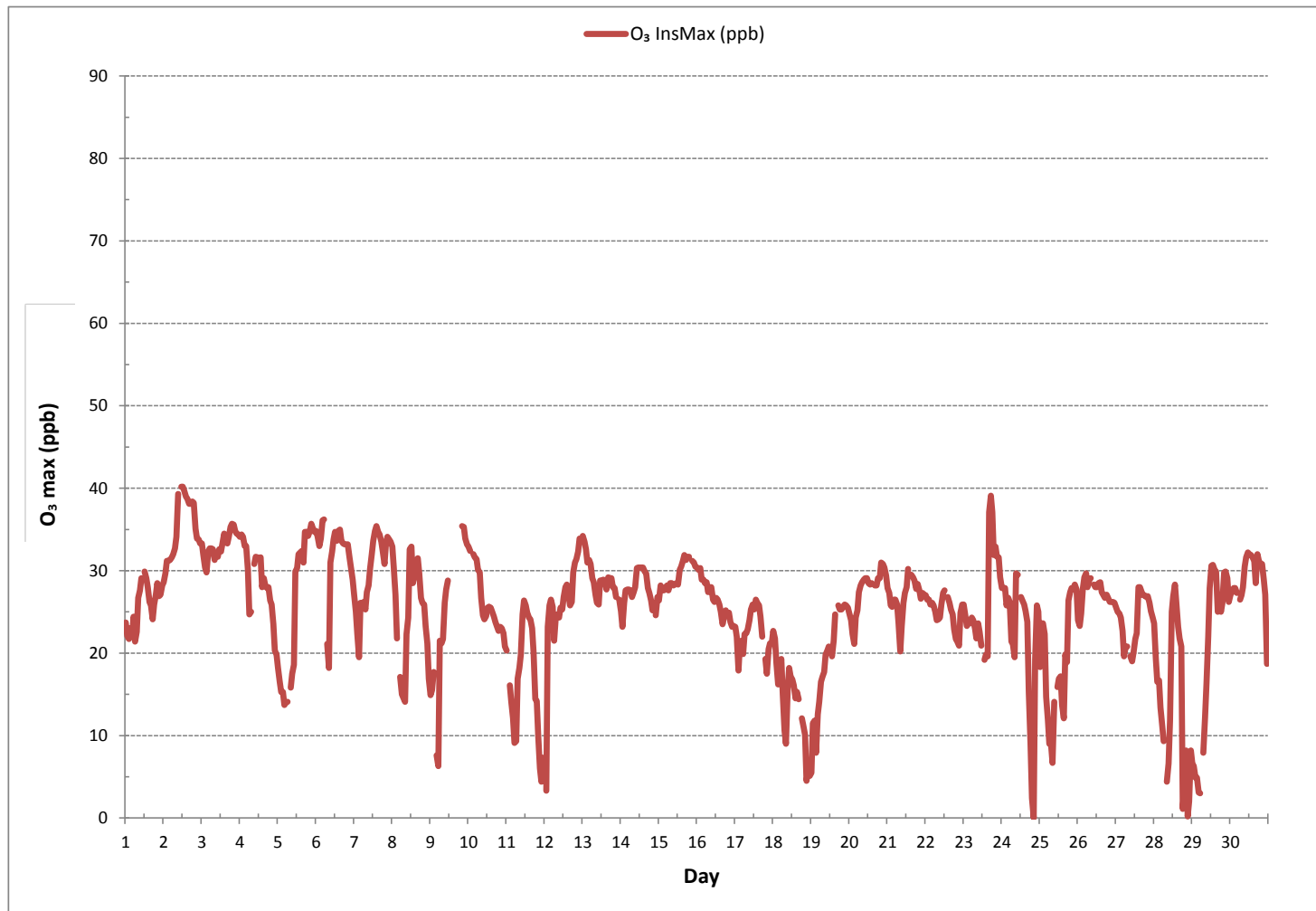
STATUS FLAG CODES

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:	40.2 ppb @ HOUR 11 ON DAY 2
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	4 hrs
STANDARD DEVIATION:	7.2
OPERATIONAL TIME:	716 hrs

OZONE Instantaneous Maximum (O₃ ppb)



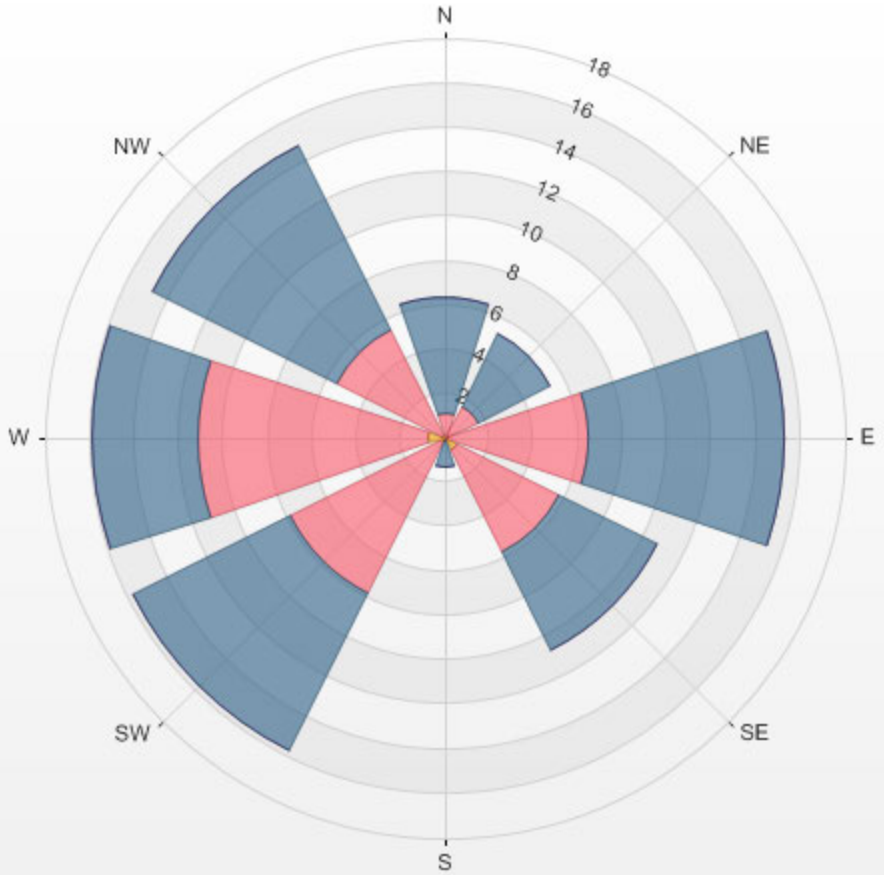
Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-O₃[ppb]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 14.83% Calm Avg: 13.96 [ppb]

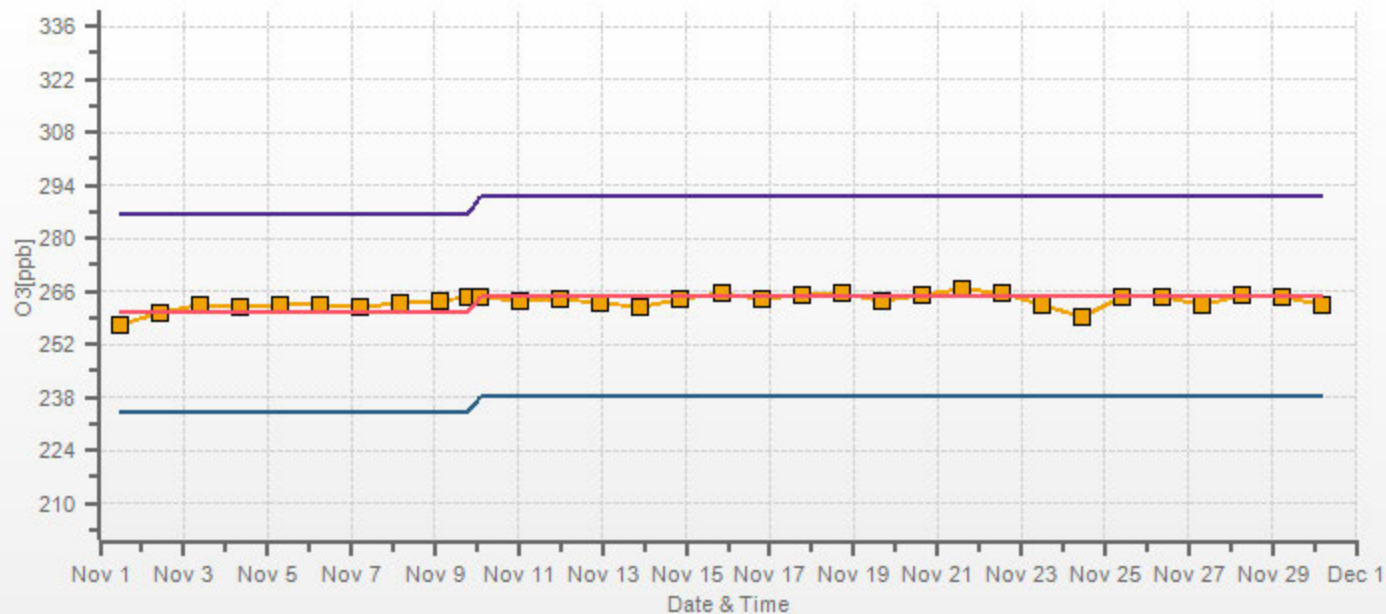
Direction	0.0-13.3	13.3-26.5	26.5-39.8	>39.8	Total
N	0.0	1.2	5.1	0.0	6.3
NE	0.2	1.5	3.7	0.0	5.3
E	0.2	6.3	8.8	0.0	15.3
SE	0.6	5.1	5.0	0.0	10.7
S	0.0	0.2	1.2	0.0	1.3
SW	0.2	7.6	7.9	0.0	15.7
W	0.7	10.4	4.7	0.0	15.9
NW	0.2	5.3	9.3	0.0	14.7
Summary	1.9	37.6	45.7	0.0	85.2

% Icon Classes (ppb) 2 0.0-13.3 38 13.3-26.5 46 26.5-39.8 0 >39.8

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-O3[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 14.83% Calm Poll Avg: 13.96[ppb]



O3[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/11 Type: Span



Span Meas Span Ref Span Low Span High

PARTICULATE MATTER 2.5



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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59						
DAY 1	4	4	3	4	4	3	2	2	2	2	1	1	1	1	1	1	1	1	0	0	0	1	1	1	0	4	2	24		
2	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		
3	1	1	2	3	2	2	2	2	2	2	2	1	1	1	2	1	1	1	1	1	1	1	1	2	2	1	3	2	24	
4	2	3	3	3	3	3	3	4	4	3	3	2	2	3	3	3	4	6	8	10	12	18	22	22	2	22	6	24		
5	22	21	18	14	13	12	11	10	8	7	7	5	2	1	1	1	2	1	1	1	1	1	1	1	1	22	7	24		
6	1	1	1	1	1	1	2	2	2	2	5	3	4	5	5	5	4	5	5	4	4	7	5	5	1	7	3	24		
7	6	8	8	7	6	5	5	4	4	3	3	3	3	2	2	2	1	1	1	1	1	2	1	1	1	8	3	24		
8	1	1	1	1	1	2	2	2	2	2	2	2	2	3	2	3	3	3	4	4	4	6	9	10	1	10	3	24		
9	11	12	12	12	11	11	10	10	8	6	7	8	6	4	3	3	4	5	4	3	3	3	3	4	3	4	3	12	7	24
10	5	6	6	6	6	6	6	7	8	9	10	11	13	12	13	12	13	12	12	11	10	9	9	9	5	13	9	24		
11	10	11	11	11	10	12	17	21	19	17	16	17	19	21	24	25	24	21	20	19	21	18	20	10	25	18	24			
12	25	26	17	10	10	10	10	9	9	10	11	12	11	10	11	13	15	15	13	14	14	12	11	11	9	26	13	24		
13	12	13	14	14	15	20	22	21	23	21	15	10	13	16	10	10	8	7	6	6	8	10	8	8	6	23	13	24		
14	8	8	6	5	4	4	3	3	3	3	2	2	2	2	2	2	2	3	5	2	2	3	8	7	2	8	4	24		
15	4	4	2	2	2	2	2	2	2	3	3	3	2	2	2	2	2	2	1	2	2	2	2	3	1	4	2	24		
16	3	3	3	3	3	4	4	4	4	4	5	5	5	5	4	5	5	6	7	7	7	6	5	8	3	8	5	24		
17	11	12	18	13	9	9	8	8	11	12	12	9	9	7	7	6	6	8	9	9	8	7	7	6	6	18	9	24		
18	5	5	5	5	5	5	4	4	5	5	8	10	14	18	20	17	16	15	14	14	16	13	12	12	4	20	10	24		
19	14	15	15	16	16	14	11	9	9	9	10	9	9	12	12	10	8	8	8	8	8	8	8	9	8	16	11	24		
20	10	10	11	4	3	3	3	3	3	2	2	C	C	C	1	1	1	1	1	1	2	2	2	1	11	3	24			
21	1	1	2	2	2	2	2	2	3	2	3	3	3	3	2	2	5	3	3	3	3	3	4	1	5	3	24			
22	4	4	5	5	5	7	7	7	6	5	6	6	9	11	12	11	10	10	11	9	10	8	5	4	4	12	7	24		
23	4	5	6	7	6	6	8	8	9	8	8	8	10	11	10	9	7	0	1	1	0	0	0	0	11	6	24			
24	0	0	0	0	0	1	2	3	3	3	3	3	4	4	5	6	7	8	8	9	11	11	5	9	0	11	4	24		
25	9	8	7	7	7	7	6	7	7	9	9	9	7	7	7	7	14	5	4	3	2	3	3	3	2	14	7	24		
26	3	3	3	2	2	1	2	2	2	2	3	5	3	2	2	3	4	4	5	6	7	7	7	8	1	8	4	24		
27	10	10	10	10	11	11	12	9	8	6	6	6	6	5	2	2	2	3	4	5	6	7	8	9	2	12	7	24		
28	10	10	10	9	7	7	6	6	6	9	11	4	2	1	2	3	3	3	4	10	8	6	5	3	1	11	6	24		
29	3	3	3	3	3	5	7	12	11	5	3	2	1	1	1	1	1	1	1	1	0	0	0	0	12	3	24			
30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2	1	2	2	3	1	3	1	24		
HOURLY MAX	25	26	18	16	16	20	22	21	23	21	16	17	19	21	24	25	25	24	21	20	19	21	22	22						
HOURLY AVG	7	7	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	6	6	6	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

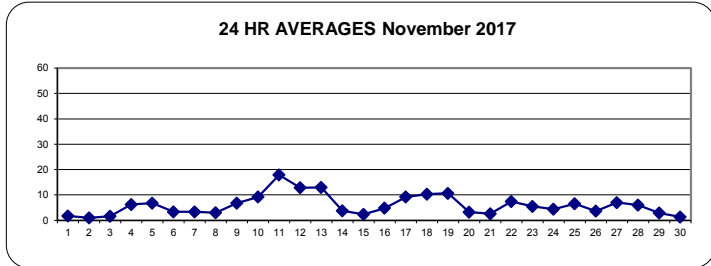
OBJECTIVE LIMIT:

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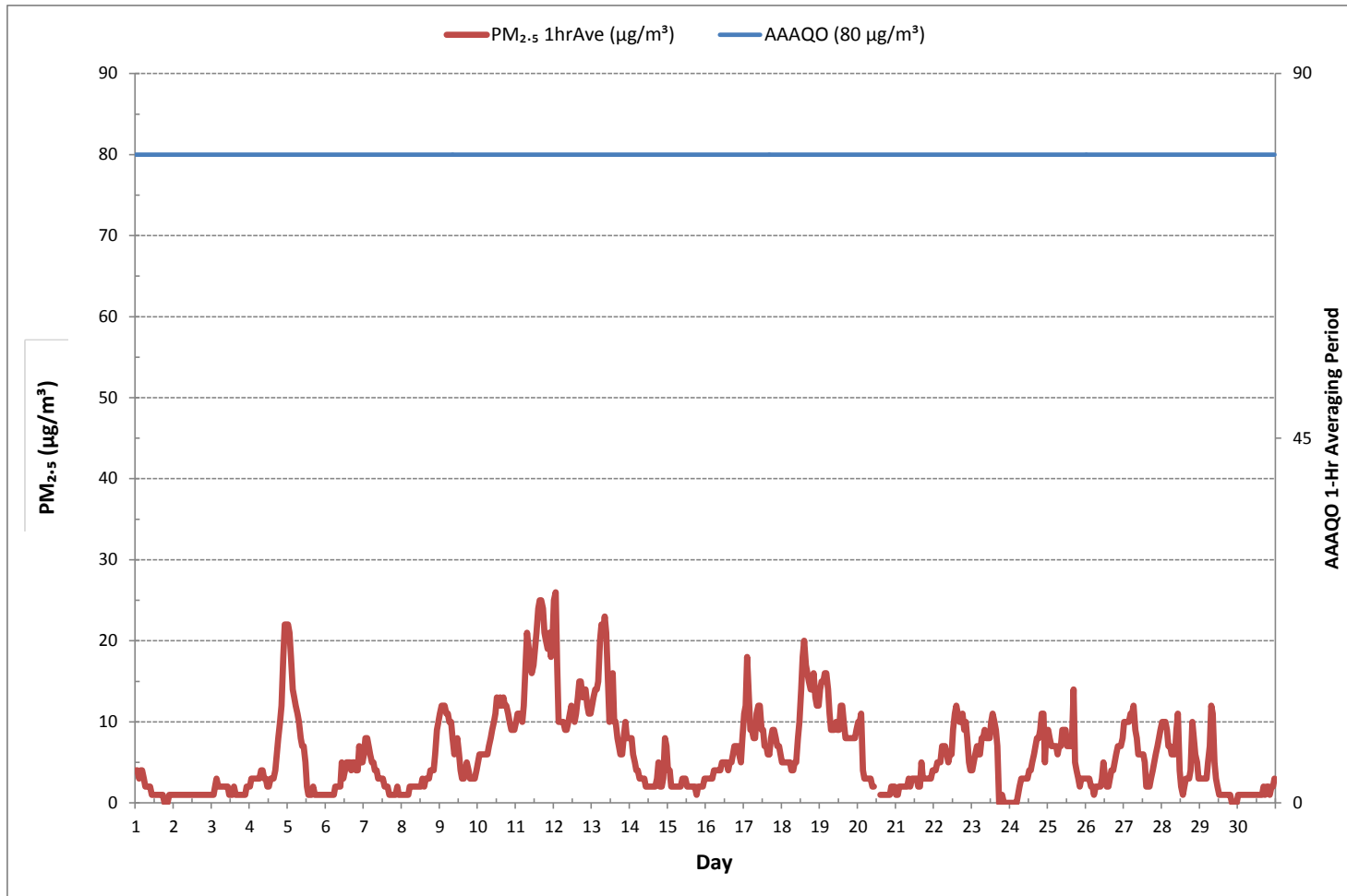
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	700				
MINIMUM 1-HR AVERAGE:	0 µg/m ³ @ HOUR	18	ON DAY	1	
MAXIMUM 1-HR AVERAGE:	26 µg/m ³ @ HOUR	1	ON DAY	12	
MAXIMUM 24-HR AVERAGE:	18 µg/m ³		ON DAY	11	
MONTHLY CALIBRATION TIME:	3	hrs	OPERATIONAL TIME:	720	hrs
STANDARD DEVIATION:	5		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	6	µg/m ³

24 HR AVERAGES November 2017



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



Wind: LICA COLD LAKE SOUTH
 Poll.: LICA COLD LAKE SOUTH-PM2.5_2[ug/m³(L)]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

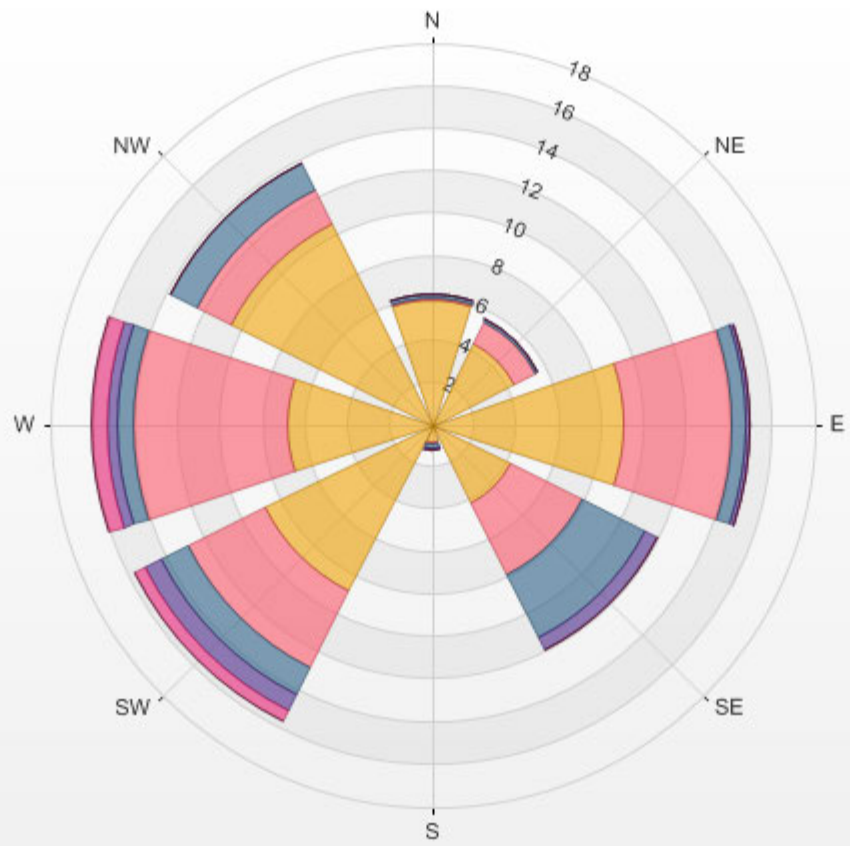
Calm: 14.66%

Calm Avg: 7.71 [ug/m³(L)]

Direction	0.0-5.4	5.4-10.8	10.8-16.2	16.2-21.6	21.6-27.0	>27.0	Total
N	5.9	0.1	0.1	0.0	0.0	0.0	6.2
NE	4.3	1.1	0.1	0.0	0.0	0.0	5.6
E	9.1	5.0	0.7	0.1	0.0	0.0	15.0
SE	4.2	3.8	3.2	0.7	0.0	0.0	11.9
S	0.8	0.1	0.1	0.1	0.0	0.0	1.3
SW	8.8	4.1	1.4	0.8	0.6	0.0	15.7
W	6.8	7.3	0.7	0.6	0.7	0.0	16.1
NW	10.6	1.8	1.4	0.0	0.0	0.0	13.8
Summary	50.6	23.3	7.8	2.4	1.3	0.0	85.4

% Icon	Classes (ug/m3(L))	51	23	8	2	1	0
	0.0-5.4						
	5.4-10.8						
	10.8-16.2						
	16.2-21.6						
	21.6-27.0						
	>27.0						

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-PM2.5_2[ug/m3(L)] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 14.66% Calm Poll Avg: 7.71[ug/m3(L)]



WIND SPEED



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2017

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	3.0	2.6	3.3	2.6	1.6	2.0	3.4	6.1	7.9	9.4	10.6	9.6	7.3	5.2	1.7	4.9	11.2	10.4	10.8	10.1	7.7	7.9	7.2	6.6	1.6	11.2	5.2	24
2	8.8	9.1	9.7	8.7	9.0	8.8	8.8	8.1	8.0	7.9	12.5	11.1	10.4	8.4	5.7	7.1	7.3	1.7	1.3	3.4	3.2	8.3	8.5	6.3	1.3	12.5	6.4	24
3	5.5	5.9	6.8	6.5	8.8	9.3	6.8	4.5	3.4	3.4	2.9	1.3	1.9	1.9	3.0	3.1	1.6	2.5	2.9	1.8	1.6	1.0	1.0	1.9	1.0	9.3	2.1	24
4	2.4	1.4	1.0	0.7	0.9	6.0	7.5	5.4	6.2	7.0	5.3	4.6	6.6	7.6	8.0	7.3	5.9	4.9	5.0	5.3	5.2	6.3	5.8	5.5	0.7	8.0	4.0	24
5	6.2	6.4	4.9	4.8	4.8	4.8	5.3	6.2	6.4	7.8	8.5	7.1	11.1	10.3	9.2	8.6	6.4	9.1	11.5	7.3	8.4	10.0	8.9	9.5	4.8	11.5	6.7	24
6	8.8	6.6	5.0	3.7	3.5	3.9	1.6	0.1	0.4	1.8	5.5	8.2	9.7	8.8	9.3	9.8	8.4	7.5	10.1	9.3	8.9	8.0	7.0	6.8	0.1	10.1	5.5	24
7	6.3	6.5	5.7	4.3	4.1	5.6	5.6	5.5	6.4	10.0	12.9	13.9	13.9	11.5	11.3	7.3	6.1	4.5	2.6	2.9	6.6	8.1	6.2	5.4	2.6	13.9	6.2	24
8	2.0	1.0	1.8	3.5	2.9	1.5	2.5	1.5	0.7	2.5	4.1	5.3	7.8	6.6	7.7	8.2	7.1	5.9	3.5	5.0	5.1	3.6	4.8	0.4	0.4	8.2	3.9	24
9	0.3	0.1	0.1	0.2	1.3	0.6	1.0	2.9	4.8	8.8	11.2	10.6	12.5	9.9	13.6	14.7	9.2	9.5	9.4	11.3	6.8	7.1	10.3	7.9	0.1	14.7	6.7	24
10	6.4	5.5	3.9	2.4	3.1	2.0	1.8	2.3	4.8	5.1	5.2	5.6	8.9	9.6	9.2	8.3	6.5	5.0	3.7	4.4	4.1	2.7	2.2	1.1	1.1	9.6	2.7	24
11	1.3	2.3	0.8	1.4	0.7	0.5	1.2	4.2	3.3	3.1	5.2	7.0	9.3	8.9	8.3	6.3	3.3	2.4	1.6	0.6	0.7	0.1	0.4	0.4	0.1	9.3	2.4	24
12	0.6	0.3	3.5	5.9	6.4	4.7	2.7	3.8	6.7	7.9	8.1	8.2	8.5	6.8	6.6	7.4	6.4	6.0	8.2	8.8	8.8	10.1	7.0	7.7	0.3	10.1	5.9	24
13	6.4	6.0	2.3	1.8	4.9	4.7	3.9	4.1	3.1	2.7	3.7	5.3	4.1	5.4	9.2	8.0	10.5	11.8	8.3	10.6	11.8	13.5	13.4	15.6	1.8	15.6	4.3	24
14	14.3	14.4	12.5	13.6	13.7	13.8	13.3	11.2	12.0	12.9	11.1	9.6	8.5	8.8	9.4	7.5	6.0	4.0	7.5	4.8	2.6	2.1	2.8	3.7	2.1	14.4	8.5	24
15	3.9	5.7	4.9	4.2	5.5	6.1	6.6	6.3	8.0	8.4	10.1	10.2	10.4	11.6	11.1	9.9	8.5	11.1	9.6	7.7	8.4	7.8	9.6	8.9	3.9	11.6	8.1	24
16	8.3	7.0	5.6	4.7	5.7	4.7	4.0	3.1	3.4	1.7	4.1	7.1	10.0	9.2	9.1	7.0	3.8	5.2	7.2	7.8	5.9	4.9	5.7	7.7	1.7	10.0	2.5	24
17	4.5	2.9	6.7	7.2	5.7	5.1	6.8	8.0	8.0	7.2	7.0	9.1	7.5	7.2	7.4	6.2	5.6	5.8	5.3	4.5	4.6	4.3	4.0	4.6	2.9	9.1	5.8	24
18	5.6	2.3	1.2	1.2	1.2	0.8	0.1	0.3	0.4	1.3	2.0	3.2	1.3	3.4	4.0	6.5	3.8	1.9	1.8	2.0	0.6	0.1	0.6	0.1	0.1	6.5	0.8	24
19	0.7	1.7	1.4	2.2	4.8	6.1	7.7	7.7	8.0	8.4	7.5	9.0	9.3	7.7	9.9	7.6	6.7	7.0	6.8	5.7	5.1	6.1	4.0	1.0	0.7	9.9	5.6	24
20	3.2	5.7	7.1	18.1	15.9	16.9	17.8	17.3	15.4	17.4	18.5	18.0	15.7	14.0	13.1	15.2	8.3	6.0	11.5	9.6	8.9	7.5	7.5	6.2	3.2	18.5	12.1	24
21	7.1	6.4	7.1	5.6	5.7	4.1	6.0	6.5	4.9	4.4	5.6	5.9	4.1	6.0	8.1	5.9	3.4	2.5	3.1	3.3	2.9	3.9	3.9	3.5	2.5	8.1	3.8	24
22	4.4	2.3	2.7	0.3	2.3	3.2	5.9	6.2	6.3	6.9	6.3	6.9	7.5	7.4	8.7	4.9	1.2	2.0	3.2	3.4	5.5	6.2	5.5	5.6	0.3	8.7	2.7	24
23	7.0	6.2	6.6	7.3	7.4	11.2	7.8	4.4	1.1	4.2	8.1	9.5	6.0	4.7	4.8	3.3	5.8	10.5	11.2	10.2	10.1	8.8	5.8	6.6	1.1	11.2	3.7	24
24	6.1	7.6	7.4	5.6	5.8	6.2	4.5	3.6	2.0	4.0	5.9	7.9	8.0	7.4	7.2	4.4	2.6	0.2	0.7	0.5	0.7	3.0	6.8	2.5	0.2	8.0	1.2	24
25	1.1	6.8	5.7	1.0	0.4	0.6	0.5	0.9	1.6	2.0	3.5	3.2	4.3	6.5	5.6	1.7	2.9	2.0	7.5	9.9	6.7	8.4	10.3	7.9	0.4	10.3	0.9	24
26	5.8	5.2	6.6	7.5	10.9	9.9	9.9	10.5	10.1	11.1	10.7	11.2	11.6	10.7	14.2	12.9	10.9	11.9	9.8	10.3	8.0	9.9	8.8	7.5	5.2	14.2	9.8	24
27	7.3	6.0	0.8	5.4	4.3	7.6	10.9	11.2	11.6	14.3	14.2	14.3	14.1	15.2	19.4	17.1	20.4	17.6	19.3	19.5	11.9	8.1	9.0	7.1	0.8	20.4	10.3	24
28	4.4	3.9	2.7	1.2	0.4	0.4	0.3	0.4	0.3	0.2	1.1	1.6	3.6	3.6	4.0	2.9	1.4	0.8	0.5	1.1	0.2	0.1	1.2	0.6	0.1	4.4	1.0	24
29	0.9	0.6	0.7	0.4	1.0	3.0	2.5	5.2	5.5	8.0	8.7	12.7	12.4	11.6	8.2	2.7	4.7	4.9	5.5	5.5	5.9	5.3	0.7	1.9	0.4	12.7	4.5	24
30	5.0	6.5	7.7	9.2	7.7	6.8	7.2	6.6	6.8	9.5	10.6	11.0	10.3	8.6	8.6	5.8	3.1	5.1	7.0	7.3	5.6	2.3	0.9	0.4	0.4	11.0	6.6	24
HOURLY MAX	14.3	14.4	12.5	18.1	15.9	16.9	17.8	17.3	15.4	17.4	18.5	18.0	15.7	15.2	19.4	17.1	20.4	17.6	19.3	19.5	11.9	13.5	13.4	15.6				
HOURLY AVG	0.3	0.2	0.5	1.1	0.8	1.1	1.5	1.5	1.2	1.4	1.4	1.9	1.8	1.8	1.7	1.2	1.1	0.6	0.7	0.8	0.8	0.2	0.1	0.4				

STATUS FLAG CODES

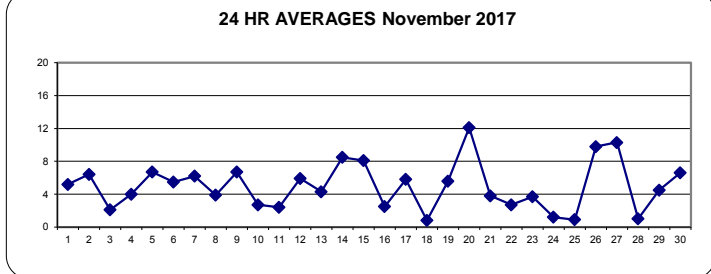
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	October 23, 2017
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

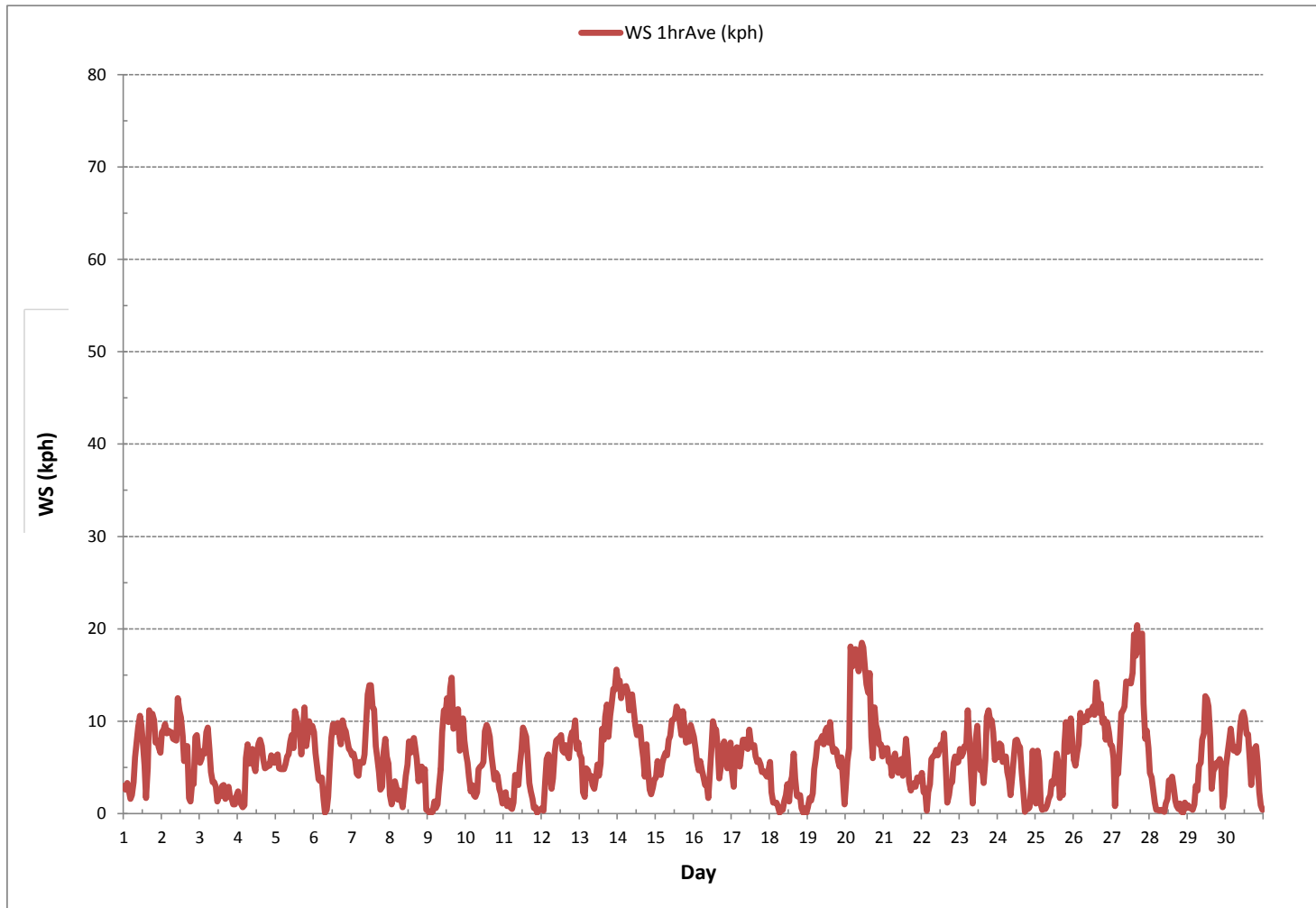
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	720
MINIMUM 1-HR AVERAGE	0.1 kph @ HOUR 7 ON DAY 6
MAXIMUM 1-HR AVERAGE:	20.4 kph @ HOUR 16 ON DAY 27
MAXIMUM 24-HR AVERAGE:	12.1 kph ON DAY 20
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	720 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	3.8
MONTHLY AVERAGE:	0.9 kph

24 HR AVERAGES November 2017



WIND SPEED Hourly Averages (WS kph)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2017

WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	8.0	6.4	5.7	6.1	3.8	5.4	7.4	9.4	12.2	15.2	15.0	14.7	12.8	13.3	9.8	9.4	16.4	17.9	18.7	17.9	15.1	11.1	10.2	10.1	3.8	18.7	11.3	24
2	14.6	12.9	13.6	11.4	13.4	13.0	13.5	13.8	11.1	14.3	18.1	17.3	16.1	15.6	11.3	11.2	11.3	6.5	6.6	9.5	13.7	11.8	13.0	9.6	6.5	18.1	12.6	24
3	12.2	10.9	11.5	11.1	13.6	12.4	10.6	8.4	6.0	6.2	5.7	7.9	6.6	6.0	7.9	9.0	5.0	4.4	7.2	6.0	3.9	3.9	3.7	4.7	3.7	13.6	7.7	24
4	5.2	4.6	3.2	3.5	4.0	9.1	11.9	8.3	11.0	11.4	11.6	9.4	10.1	11.5	11.8	12.5	10.6	7.9	8.5	9.8	8.2	9.2	8.6	8.8	3.2	12.5	8.8	24
5	8.7	8.5	7.9	7.5	7.1	7.0	7.3	10.1	9.3	10.8	13.8	19.2	20.2	17.0	16.2	17.7	10.1	16.6	20.2	13.2	18.9	15.7	13.0	16.7	7.0	20.2	13.0	24
6	14.1	10.3	9.7	6.5	8.8	9.4	4.1	1.2	1.7	4.7	12.1	13.4	16.3	14.8	15.5	17.6	13.3	13.5	17.6	16.1	13.8	13.9	10.3	10.0	1.2	17.6	11.2	24
7	9.4	10.4	8.6	6.5	7.1	7.9	7.8	8.1	11.2	15.1	22.2	23.3	20.9	18.7	18.1	10.6	10.3	7.1	4.4	6.3	9.9	11.8	9.0	8.3	4.4	23.3	11.4	24
8	6.8	3.9	3.8	4.9	4.0	3.0	4.4	3.3	2.6	5.0	7.8	8.5	12.8	10.6	13.2	13.3	11.6	9.8	6.5	6.2	7.5	5.9	7.0	3.7	2.6	13.3	6.9	24
9	1.6	1.3	1.2	2.4	3.7	4.1	3.4	6.3	10.5	16.4	15.6	17.6	18.9	15.6	19.7	21.2	16.1	14.9	14.0	15.4	12.1	11.7	15.0	15.0	1.2	21.2	11.4	24
10	12.4	9.2	6.8	6.6	4.3	5.3	4.1	4.9	8.3	8.6	9.5	12.7	13.8	13.7	13.9	14.9	12.0	10.3	5.3	7.0	6.1	5.5	5.5	5.1	4.1	14.9	8.6	24
11	4.2	5.0	3.6	2.8	2.5	3.2	3.6	6.7	8.6	7.3	8.5	15.7	14.1	13.8	14.6	10.6	5.0	5.3	4.0	2.4	3.5	1.6	2.0	5.1	1.6	15.7	6.4	24
12	4.6	2.8	7.4	8.4	9.0	7.3	3.8	8.2	12.1	12.5	14.5	17.0	17.1	11.0	13.0	13.8	11.2	9.4	13.5	14.0	13.8	15.7	12.6	14.2	2.8	17.1	11.1	24
13	12.9	9.7	10.9	4.4	8.8	8.7	5.9	7.1	6.3	5.4	7.4	9.7	8.8	14.9	15.5	15.8	17.4	19.6	16.2	20.7	21.6	19.1	23.0	22.3	4.4	23.0	13.0	24
14	23.7	22.1	17.4	21.4	22.0	23.2	20.1	20.0	18.5	18.0	17.8	13.5	13.8	15.1	14.0	13.0	9.7	7.3	11.1	7.9	6.0	6.1	5.4	7.3	5.4	23.7	14.8	24
15	6.8	9.9	9.3	7.0	10.0	9.8	11.3	10.7	12.8	13.4	14.6	15.3	15.6	17.8	18.2	14.5	11.4	17.2	14.1	13.9	13.8	17.9	15.8	14.7	6.8	18.2	13.2	24
16	14.1	13.8	10.6	8.2	9.9	8.7	7.7	7.0	7.3	5.3	7.1	14.9	13.7	14.3	14.2	13.2	8.8	9.4	14.3	15.3	11.0	7.6	9.1	11.6	5.3	15.3	10.7	24
17	9.5	8.0	10.0	9.8	8.9	10.0	10.2	12.8	12.8	11.6	11.5	14.2	11.9	11.6	12.6	11.7	8.6	7.6	8.4	6.5	6.7	6.1	8.0	9.1	6.1	14.2	9.9	24
18	9.1	6.3	4.5	6.8	4.1	3.3	2.7	2.9	3.4	3.4	4.9	6.1	4.2	6.8	7.2	11.0	9.3	8.5	3.9	4.2	2.3	1.3	3.4	1.9	1.3	11.0	5.1	24
19	4.6	3.5	4.8	6.8	9.0	11.2	13.8	14.2	15.3	13.5	12.2	14.6	13.2	11.6	15.9	14.6	12.3	11.6	11.0	9.2	8.3	14.6	9.4	4.5	3.5	15.9	10.8	24
20	7.1	8.3	14.0	26.2	26.0	27.5	27.9	28.0	26.7	26.5	26.5	28.7	24.2	22.7	20.0	25.4	17.9	12.4	16.9	17.7	14.6	10.7	12.5	9.5	7.1	28.7	19.9	24
21	10.5	10.0	11.1	8.9	9.2	7.1	9.2	10.6	9.4	8.8	12.3	12.0	8.1	10.9	13.3	12.1	7.9	6.5	8.8	6.2	6.0	7.9	7.4	5.8	5.8	13.3	9.2	24
22	7.1	4.7	6.0	6.1	5.2	5.6	11.6	12.6	10.6	12.3	11.8	11.7	12.6	11.9	12.2	9.9	3.6	6.3	6.0	8.5	11.8	10.4	9.7	8.6	3.6	12.6	9.0	24
23	12.0	10.3	12.1	13.0	13.3	15.9	11.5	12.4	4.3	11.0	12.9	13.9	11.7	8.3	7.9	6.0	13.0	15.2	15.4	16.0	13.3	13.2	8.1	10.2	4.3	16.0	11.7	24
24	8.9	10.8	11.3	10.9	10.2	11.2	7.8	6.6	5.4	9.3	10.5	13.0	13.5	12.1	12.7	9.9	5.9	5.0	3.6	2.4	2.0	7.8	9.5	4.7	2.0	13.5	8.5	24
25	4.2	11.7	11.7	4.0	2.9	3.4	3.1	2.9	3.4	3.9	5.6	6.3	7.1	10.6	8.8	5.0	8.3	6.4	12.0	16.4	10.5	13.2	16.4	13.9	2.9	16.4	8.0	24
26	9.5	9.7	9.8	17.1	17.8	17.1	16.4	16.4	15.1	16.6	19.5	20.0	18.6	17.5	21.3	19.4	19.7	20.5	18.0	20.2	15.1	16.5	14.5	10.9	9.5	21.3	16.6	24
27	12.8	12.9	12.8	8.8	12.0	13.8	16.3	15.4	18.1	19.9	21.1	21.0	25.5	25.1	30.0	29.0	31.5	26.9	29.2	33.2	20.1	14.3	14.4	12.9	8.8	33.2	19.9	24
28	6.8	5.7	4.6	4.7	2.6	1.9	1.7	2.6	2.6	2.2	3.9	5.3	6.5	6.5	5.5	5.6	6.2	3.3	3.7	3.3	3.3	4.3	5.6	4.0	1.7	6.8	4.3	24
29	6.8	5.9	3.6	3.3	4.3	6.8	6.9	8.2	10.3	12.0	13.4	17.7	19.0	19.4	14.9	8.6	7.3	7.8	10.3	7.9	9.2	7.4	2.7	6.2	2.7	19.4	9.2	24
30	9.4	12.0	11.0	14.9	11.4	10.0	11.2	11.0	9.8	16.0	16.2	15.7	15.6	13.3	11.7	10.1	5.4	8.3	10.5	10.5	9.2	4.7	3.5	2.0	2.0	16.2	10.6	24
HOURLY MAX	23.7	22.1	17.4	26.2	26.0	27.5	27.9	28.0	26.7	26.5	26.5	28.7	25.5	25.1	30.0	29.0	31.5	26.9	29.2	33.2	21.6	19.1	23.0	22.3				
HOURLY AVG	9.3	8.7	8.6	8.7	9.0	9.4	9.2	9.7	9.9	11.2	12.8	14.3	14.1	13.7	14.0	13.2	11.2	10.8	11.3	11.5	10.4	10.0	9.6	9.0				

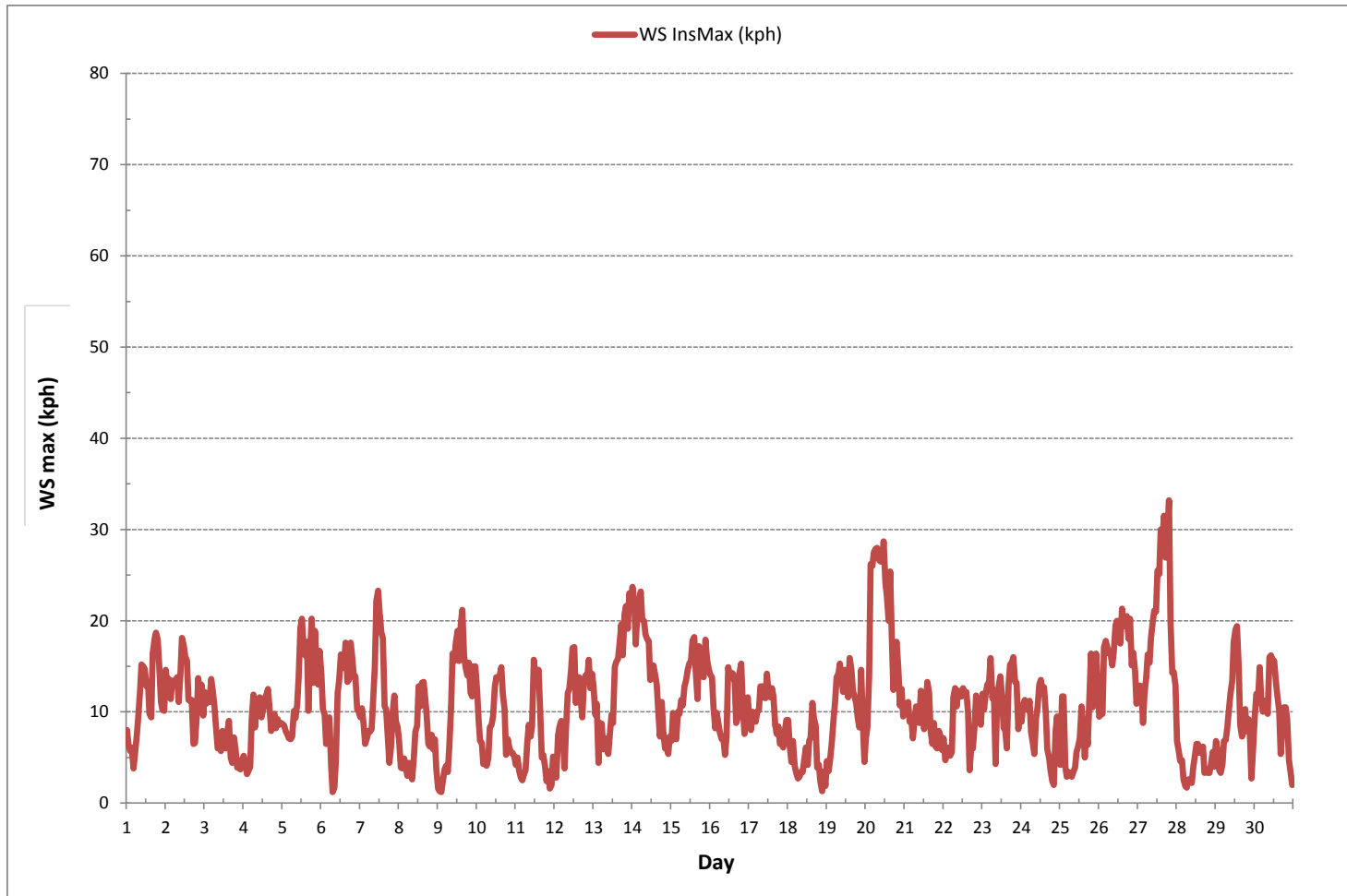
STATUS FLAG CODES

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

MAXIMUM INSTANTANEOUS VALUE:	33.2	kph	@ HOUR	19	ON DAY	27	
OPERATIONAL TIME:						720	hrs

WIND SPEED Instantaneous Maximum (WS kph)



Wind: LICA COLD LAKE SOUTH
 Monitor: WSP [kph]
 Monthly: 17/11
 Type: WindRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 14.58%

Direction	1.8-4.1	4.1-8.2	8.2-12.3	12.3-16.4	16.4-20.5	>20.5	Total
N	0.6	2.9	2.6	0.0	0.0	0.0	6.1
NE	0.4	1.5	2.1	1.5	0.0	0.0	5.6
E	2.6	6.8	5.0	0.4	0.0	0.0	14.9
SE	4.3	4.7	2.4	0.4	0.0	0.0	11.8
S	1.3	0.0	0.0	0.0	0.0	0.0	1.3
SW	2.6	9.9	3.1	0.0	0.0	0.0	15.6
W	2.9	10.1	1.9	0.8	0.1	0.0	16.0
NW	2.2	5.7	3.3	1.4	1.7	0.0	14.3
Summary	17.0	41.7	20.4	4.6	1.8	0.0	85.4

% Icon Classes (kph)

17



1.8-4.1

42



4.1-8.2

20



8.2-12.3

5



12.3-16.4

2



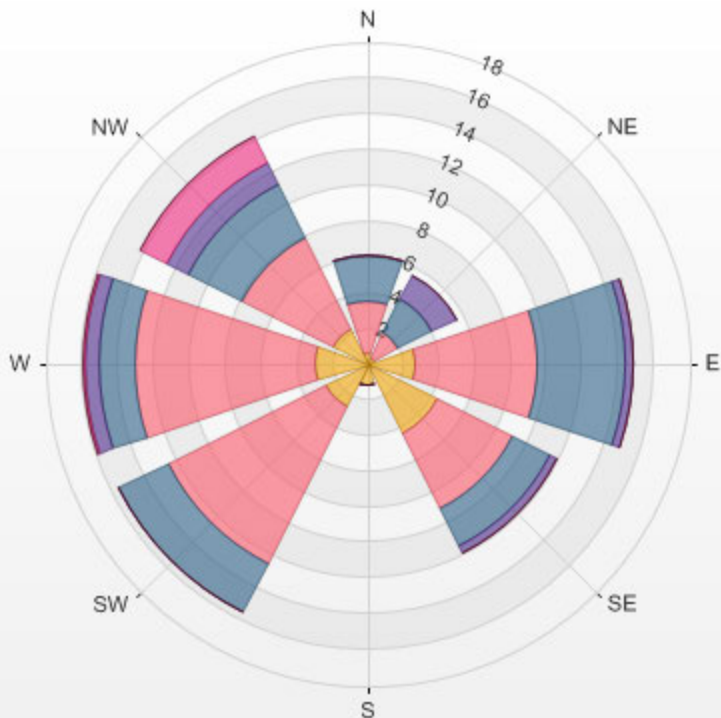
16.4-20.5

0



>20.5

LICA COLD LAKE SOUTH 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 14.58% Calm Wind Avg Speed: 0.87(kph)



WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2017

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

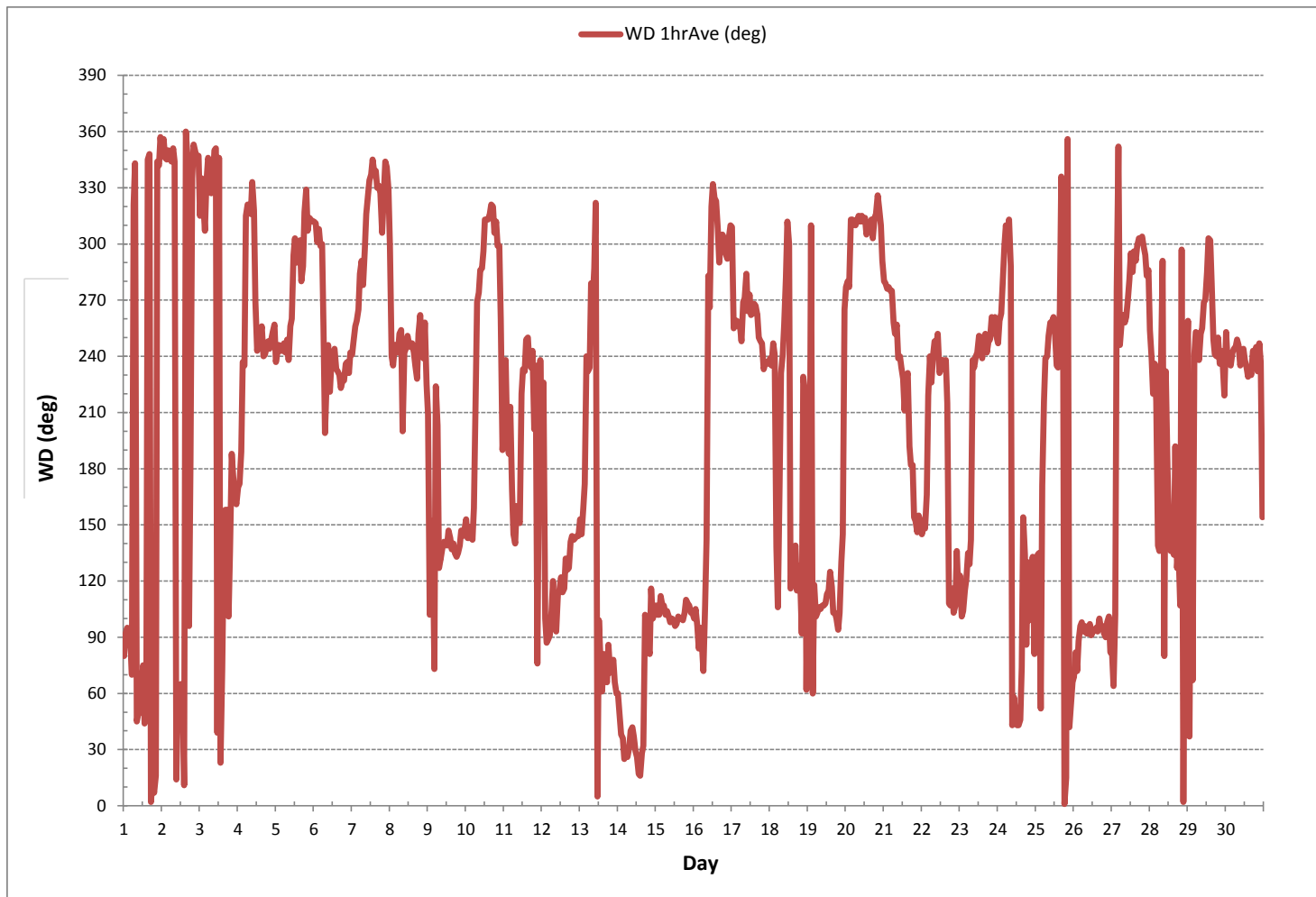
STATUS FLAG CODES

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

LAST CALIBRATION:	October 23, 2017
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	720	hrs
STANDARD DEVIATION:	92		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	293 (WNW)	

WIND DIRECTION Hourly Averages (WD)



STANDARD DEVIATION WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2017

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		
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	RDGS.	
DAY																										
1	19	16	17	23	23	31	17	14	18	18	18	18	20	23	26	36	15	16	17	16	20	14	14	17	24	
2	15	17	14	14	15	15	14	15	14	19	17	18	19	21	21	19	16	35	47	36	60	17	18	18	24	
3	16	16	17	16	13	11	13	16	16	15	27	61	43	45	35	36	34	19	28	40	27	51	51	40	24	
4	30	48	26	41	48	16	11	11	15	18	25	31	18	18	18	18	15	15	16	16	14	14	16	15	24	
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9	20	39	25	47	36	38	47	19	18	16	13	16	14	22	16	15	15	15	18	15	17	23	16	24	24	
10	26	18	18	22	11	24	27	18	18	21	22	19	16	16	16	15	13	14	13	11	15	22	16	40	24	
11	22	17	28	18	28	24	35	14	32	28	25	25	18	18	18	17	14	18	16	25	64	53	30	46	24	
12	54	51	16	19	18	14	11	15	19	17	23	24	21	24	24	19	22	20	17	18	16	15	24	17	24	
13	29	23	39	26	18	18	18	21	23	27	22	19	22	23	18	20	19	17	20	19	20	21	17	17	24	
14	18	17	19	19	19	19	20	20	20	18	19	18	21	18	16	19	19	25	15	17	26	41	16	20	24	
15	19	19	19	20	22	23	22	22	20	21	21	21	21	19	20	22	20	21	21	24	23	22	22	22	24	
16	19	23	24	24	24	23	20	21	18	33	18	20	14	15	16	15	19	14	16	18	19	17	16	16	24	
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19	55	25	34	43	20	21	22	23	22	22	23	23	23	25	22	24	22	22	21	19	21	23	24	47	24	
20	22	19	19	15	16	16	16	16	15	15	15	16	17	17	16	16	16	17	14	16	14	13	13	17	24	
21	18	18	19	19	19	18	17	17	21	25	22	21	29	34	22	18	34	37	37	35	30	23	27	26	24	
22	20	29	35	61	24	20	17	17	19	18	20	19	19	18	17	20	39	37	28	27	25	21	18	22	24	
23	23	22	24	24	23	16	19	41	38	21	19	21	24	23	17	17	13	17	18	17	18	16	16	14	24	
24	12	15	16	20	17	16	17	18	23	21	22	22	18	19	16	24	18	70	39	56	28	19	15	16	24	
25	22	13	19	26	52	34	24	65	39	32	18	24	18	15	14	43	22	35	18	16	16	19	17	17	24	
26	17	19	19	19	19	19	18	19	19	18	19	20	20	22	19	19	20	19	22	21	20	22	21	21	24	
27	20	23	26	19	26	33	20	18	17	17	20	21	20	22	20	22	19	19	19	18	18	20	20	20	24	
28	14	13	17	51	32	43	32	27	60	40	41	44	29	24	13	32	34	65	33	35	46	50	59	60	24	
29	50	40	42	50	48	17	13	13	13	17	19	18	20	19	18	25	11	12	15	13	14	17	60	26	24	
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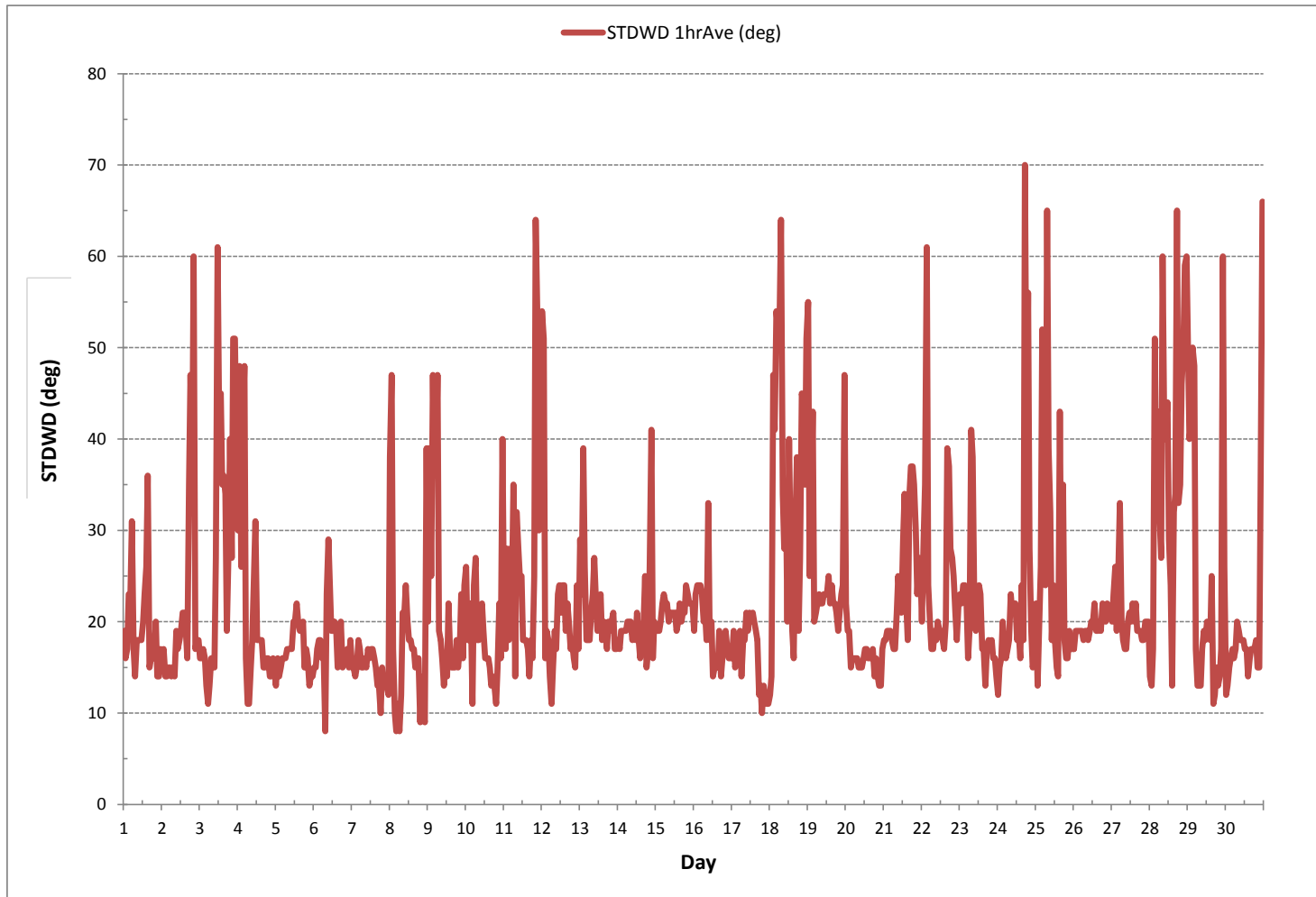
STATUS FLAG CODES

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

LAST CALIBRATION: October 23, 2017

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 720 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



RELATIVE HUMIDITY



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2017

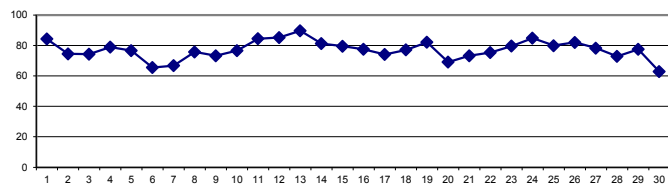
RELATIVE HUMIDITY Hourly Averages (RH %)

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	91	92	91	92	92	92	93	94	86	78	72	68	66	73	83	79	80	83	82	85	84	88	89	90	66	94	84	24	
2	88	85	86	85	85	86	85	84	83	76	61	58	58	59	63	66	69	71	78	74	76	69	72	73	58	88	75	24	
3	72	77	79	80	81	81	81	84	83	80	74	66	68	69	64	66	68	73	71	72	73	74	74	76	64	84	74	24	
4	78	78	78	80	80	80	83	85	83	81	77	71	68	71	72	74	78	81	83	84	83	82	82	82	68	85	79	24	
5	82	81	82	82	83	83	84	84	84	83	83	80	72	64	64	71	82	77	73	70	72	69	68	69	64	84	77	24	
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7	72	73	75	76	78	78	79	81	78	70	64	57	54	56	53	55	55	58	61	63	65	66	68	69	53	81	67	24	
8	72	77	81	81	79	78	78	78	75	73	70	65	62	67	66	66	73	79	82	83	84	83	84	82	62	84	76	24	
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16	80	81	80	81	81	81	81	81	81	81	80	78	75	72	70	70	75	78	75	76	76	78	77	74	70	81	78	24	
17	74	77	79	79	80	80	79	77	77	74	69	66	64	62	63	67	71	75	77	78	78	78	78	77	62	80	74	24	
18	78	77	77	76	78	78	78	77	76	75	74	75	70	69	74	74	76	78	78	79	83	85	83	83	69	85	77	24	
19	84	85	85	85	84	82	84	85	85	84	83	81	79	76	74	76	80	82	82	83	83	83	83	84	74	85	82	24	
20	86	86	85	73	69	68	68	67	68	64	64	62	62	62	63	63	66	67	67	68	68	70	71	72	62	86	69	24	
21	73	73	74	74	74	75	75	76	77	75	74	73	72	72	71	71	73	73	73	73	73	71	71	71	71	77	73	24	
22	72	72	73	74	74	74	74	75	75	75	73	72	73	77	80	78	76	76	78	79	78	80	77	76	72	80	75	24	
23	76	80	82	84	83	83	84	85	86	81	75	73	75	75	73	74	82	76	80	81	78	80	82	85	73	86	80	24	
24	88	87	88	89	89	90	89	90	90	84	78	77	78	79	76	77	81	87	88	89	88	87	85	85	76	90	85	24	
25	86	87	87	88	88	87	86	86	84	81	78	72	67	65	66	72	80	85	83	78	77	79	79	78	65	88	80	24	
26	79	81	81	80	80	81	83	82	83	82	82	81	80	77	77	80	82	82	83	85	86	87	88	88	77	88	82	24	
27	88	88	89	89	91	90	88	83	86	88	86	79	76	74	67	66	67	67	67	67	68	70	72	74	66	91	78	24	
28	78	83	83	83	81	80	80	79	78	74	72	64	54	50	53	57	60	69	75	77	78	79	81	83	50	83	73	24	
29	84	85	85	85	87	87	87	84	80	74	67	66	65	65	65	72	78	80	81	79	77	74	76	78	65	87	78	24	
30	67	66	57	56	58	57	57	58	58	55	53	54	54	54	54	60	68	70	69	70	71	76	82	85	53	85	63	24	
HOURLY MAX	91	92	91	92	92	92	93	94	92	92	92	92	91	90	89	89	88	89	88	89	88	88	89	90					
HOURLY AVG	80	80	81	81	81	81	81	82	81	78	75	72	70	70	70	71	75	76	77	77	78	78	78	79					

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

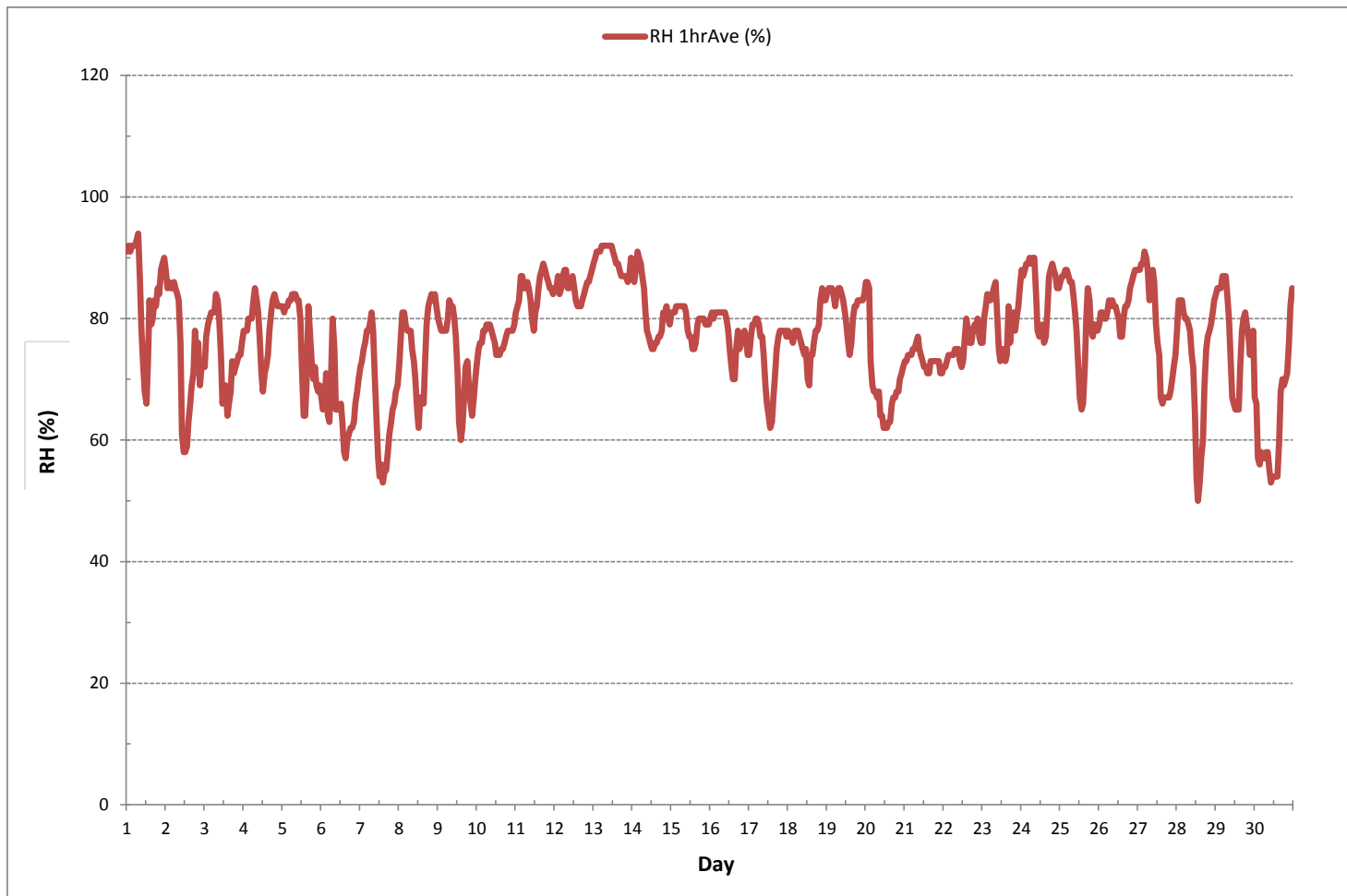
24 HR AVERAGES November 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	50	%	@ HOUR	13	ON DAY	28
MAXIMUM 1-HR AVERAGE:	94	%	@ HOUR	7	ON DAY	1
MAXIMUM 24-HR AVERAGE:	90	%			ON DAY	13
OPERATIONAL TIME:						720 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	8					
MONTHLY AVERAGE:						77 %

RELATIVE HUMIDITY Hourly Averages (RH %)



AMBIENT TEMPERATURE



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - November 2017

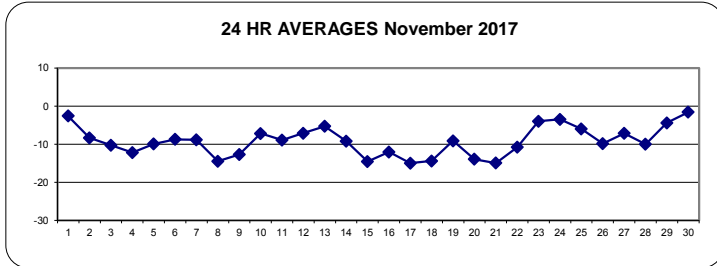
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

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	-2.2	-2.2	-2.2	-2.1	-2.2	-2.1	-2.1	-1.2	-1.1	-1.1	-0.9	-0.5	-0.6	-1.3	-1.2	-2.1	-3.1	-3.9	-4.9	-5.0	-5.6	-5.9	-6.1	-6.1	-0.5	-2.6	24	
2	-6.5	-6.8	-7.2	-7.6	-7.8	-8.2	-8.5	-9.3	-9.5	-9.1	-8.0	-7.5	-7.4	-7.5	-7.5	-7.8	-8.4	-8.5	-8.8	-8.8	-9.1	-9.7	-10.0	-10.1	-10.1	-10.1	-6.5	-8.3	24
3	-10.2	-10.4	-10.7	-11.4	-12.0	-12.3	-12.2	-11.9	-11.5	-10.2	-9.0	-8.2	-8.3	-9.0	-9.1	-9.4	-9.4	-9.7	-9.7	-10.0	-10.2	-10.2	-10.3	-10.5	-12.3	-8.2	-10.2	24	
4	-10.7	-10.8	-10.8	-10.9	-10.9	-11.2	-12.8	-14.0	-13.8	-12.3	-11.7	-10.7	-9.9	-10.0	-9.9	-10.4	-11.6	-12.8	-13.6	-14.3	-14.7	-14.8	-14.8	-15.1	-15.1	-9.9	-12.2	24	
5	-15.5	-15.6	-14.9	-14.5	-13.9	-13.3	-12.7	-12.1	-11.3	-10.2	-9.0	-7.7	-6.7	-5.5	-5.6	-6.0	-6.6	-6.9	-7.2	-7.5	-7.9	-9.2	-9.3	-9.3	-15.6	-5.5	-9.9	24	
6	-9.4	-9.5	-9.6	-9.6	-9.7	-10.4	-12.0	-14.8	-14.1	-10.7	-8.5	-7.2	-6.0	-5.2	-4.8	-5.4	-6.1	-6.5	-7.0	-7.7	-8.1	-8.6	-9.1	-9.2	-14.8	-4.8	-8.7	24	
7	-9.5	-10.0	-10.1	-9.5	-9.0	-8.6	-9.2	-9.5	-8.9	-7.5	-6.9	-6.9	-6.8	-7.8	-8.3	-8.5	-8.7	-8.9	-9.1	-9.2	-9.4	-9.8	-10.2	-10.8	-10.8	-6.8	-8.9	24	
8	-11.9	-13.7	-16.0	-17.7	-18.7	-19.6	-20.0	-20.2	-18.7	-15.0	-13.0	-11.0	-9.9	-10.6	-10.1	-9.4	-10.8	-12.0	-13.1	-14.5	-14.1	-15.0	-15.5	-17.0	-20.2	-9.4	-14.5	24	
9	-18.2	-18.9	-19.5	-19.7	-19.9	-19.7	-18.3	-17.2	-16.1	-13.7	-12.9	-10.7	-8.4	-6.6	-6.5	-7.2	-8.8	-9.7	-9.6	-8.8	-8.5	-8.1	-8.9	-9.1	-19.9	-6.5	-12.7	24	
10	-9.2	-9.3	-9.3	-9.1	-9.2	-9.1	-9.0	-8.9	-8.7	-8.2	-7.6	-6.8	-6.1	-5.7	-5.6	-5.4	-5.3	-5.5	-5.6	-5.7	-5.7	-5.7	-5.7	-5.9	-9.3	-5.3	-7.2	24	
11	-6.1	-6.3	-6.8	-9.5	-11.7	-12.7	-12.3	-11.1	-9.1	-8.3	-7.3	-5.8	-5.7	-5.6	-5.7	-6.1	-7.2	-8.1	-9.6	-10.7	-11.4	-12.0	-12.6	-13.0	-13.0	-5.6	-8.9	24	
12	-11.7	-10.9	-9.1	-7.3	-7.6	-8.3	-9.3	-10.0	-8.2	-7.4	-7.0	-6.7	-6.4	-6.0	-5.8	-5.7	-5.5	-5.3	-5.2	-5.3	-5.4	-5.4	-5.5	-5.7	-11.7	-5.2	-7.1	24	
13	-5.8	-5.9	-5.8	-5.8	-6.0	-6.7	-6.8	-6.6	-6.5	-6.1	-5.7	-5.1	-4.6	-4.5	-4.4	-4.7	-4.8	-4.7	-4.4	-4.3	-4.3	-4.2	-4.4	-4.8	-6.8	-4.2	-5.3	24	
14	-4.9	-5.4	-6.2	-7.1	-7.6	-8.0	-8.2	-8.4	-8.4	-8.3	-8.4	-8.5	-8.5	-8.5	-8.7	-8.6	-8.7	-9.4	-10.8	-11.9	-12.6	-14.3	-14.6	-14.8	-14.8	-4.9	-9.2	24	
15	-15.5	-15.7	-16.3	-17.0	-16.8	-16.2	-15.8	-15.0	-14.6	-14.6	-14.6	-14.6	-14.6	-13.8	-13.4	-13.0	-12.7	-13.2	-13.5	-13.8	-13.9	-14.1	-13.9	-14.1	-13.9	-17.0	-12.6	-14.6	24
16	-13.6	-13.3	-13.1	-13.1	-13.2	-13.0	-12.9	-12.8	-12.8	-12.3	-11.9	-11.1	-10.7	-10.2	-10.1	-10.4	-11.8	-12.5	-11.1	-11.1	-11.8	-12.6	-12.3	-11.8	-13.6	-10.1	-12.1	24	
17	-11.8	-11.8	-12.6	-13.7	-14.9	-14.8	-16.3	-16.7	-17.0	-15.6	-14.3	-13.3	-12.2	-11.9	-11.9	-12.8	-13.9	-15.4	-16.4	-17.5	-18.9	-19.2	-18.6	-18.9	-19.2	-11.8	-15.0	24	
18	-18.2	-19.2	-20.6	-21.4	-19.3	-18.3	-18.8	-19.2	-20.0	-18.8	-15.4	-13.2	-10.5	-9.3	-8.9	-8.5	-8.7	-8.6	-8.7	-8.7	-10.3	-12.6	-14.4	-14.3	-21.4	-8.5	-14.4	24	
19	-12.3	-10.9	-10.2	-10.0	-9.5	-9.7	-9.8	-9.8	-9.8	-9.6	-9.0	-8.6	-8.0	-7.6	-7.3	-7.4	-8.0	-8.5	-8.6	-8.9	-9.0	-8.8	-8.9	-8.6	-12.3	-7.3	-9.1	24	
20	-8.4	-8.3	-7.9	-8.9	-10.9	-12.7	-13.8	-15.1	-15.3	-15.8	-15.6	-15.3	-15.4	-15.5	-15.3	-15.4	-15.8	-16.0	-15.8	-15.7	-15.6	-15.5	-15.4	-15.3	-16.0	-7.9	-13.9	24	
21	-15.3	-15.3	-15.2	-15.1	-15.1	-14.9	-14.9	-14.8	-14.8	-14.5	-14.2	-14.0	-13.7	-13.5	-14.0	-14.4	-15.2	-15.6	-15.7	-15.8	-15.6	-15.6	-15.6	-15.6	-15.6	-15.9	-13.5	-15.0	24
22	-15.6	-15.2	-14.9	-14.6	-14.4	-13.9	-13.6	-13.0	-12.4	-11.8	-11.0	-10.3	-9.7	-9.4	-9.2	-8.6	-8.1	-7.8	-7.6	-7.2	-7.1	-7.4	-7.7	-7.6	-15.6	-7.1	-10.8	24	
23	-7.7	-7.7	-7.8	-7.9	-8.0	-8.0	-8.2	-8.1	-8.4	-7.3	-6.6	-6.3	-5.7	-4.2	-2.5	-1.9	-2.7	2.3	2.2	2.1	2.9	2.2	1.6	0.7	-8.4	2.9	-4.0	24	
24	-0.6	-0.1	0.9	1.2	1.6	1.4	0.8	0.3	0.2	-0.1	-2.0	-2.5	-3.8	-4.2	-4.1	-4.2	-5.4	-7.4	-9.1	-10.1	-10.6	-10.0	-7.5	-8.4	-10.6	1.6	-3.5	24	
25	-9.7	-8.3	-7.4	-8.3	-9.6	-10.3	-11.3	-11.9	-12.4	-9.0	-5.7	-2.6	-0.5	0.3	0.4	-0.7	-2.5	-4.2	-3.2	-3.5	-4.7	-5.0	-6.1	-7.3	-12.4	0.4	-6.0	24	
26	-8.3	-9.4	-9.8	-9.9	-11.1	-12.0	-12.2	-12.3	-12.0	-11.8	-11.4	-10.9	-9.7	-9.4	-9.3	-9.0	-8.6	-7.9	-7.6	-7.6	-7.9	-8.0	-8.1	-12.3	-7.6	-9.9	24		
27	-8.2	-7.8	-7.4	-7.1	-7.1	-7.5	-6.7	-6.3	-6.3	-5.9	-5.4	-5.1	-5.6	-5.6	-6.0	-6.5	-6.8	-6.9	-7.3	-7.9	-8.5	-9.1	-9.8	-10.5	-10.5	-5.1	-7.1	24	
28	-11.7	-13.1	-14.7	-15.2	-16.6	-17.3	-17.6	-17.9	-18.0	-14.6	-9.9	-5.0	-2.5	-1.2	-1.5	-2.9	-3.9	-6.1	-7.5	-8.0	-8.3	-8.4	-8.6	-9.4	-18.0	-1.2	-10.0	24	
29	-10.3	-10.4	-9.7	-10.0	-11.1	-11.3	-11.5	-7.6	-5.6	-3.0	-1.4	0.6	1.7	1.9	1.7	0.1	-1.5	-2.3	-2.6	-3.0	-3.1	-2.5	-2.4	-2.6	-11.5	1.9	-4.4	24	
30	-0.9	-1.8	-0.8	-0.8	-1.5	-1.5	-1.8	-2.0	-1.7	-0.1	1.0	1.5	2.1	2.3	2.1	0.5	-1.7	-2.8	-2.7	-3.1	-3.5	-4.9	-7.0	-8.6	-8.6	2.3	-1.6	24	
HOURLY MAX	-0.6	-0.1	0.9	1.2	1.6	1.4	0.8	0.3	0.2	-0.1	1.0	1.5	2.1	2.3	2.1	0.5	-1.5	2.3	2.2	2.1	2.9	2.2	1.6	0.7					
HOURLY AVG	-10.0	-10.1	-10.2	-10.5	-10.8	-11.0	-11.3	-11.3	-10.9	-9.8	-8.8	-7.8	-7.2	-6.8	-6.8	-7.0	-7.7	-8.1	-8.4	-8.8	-9.1	-9.5	-9.7	-10.1					

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

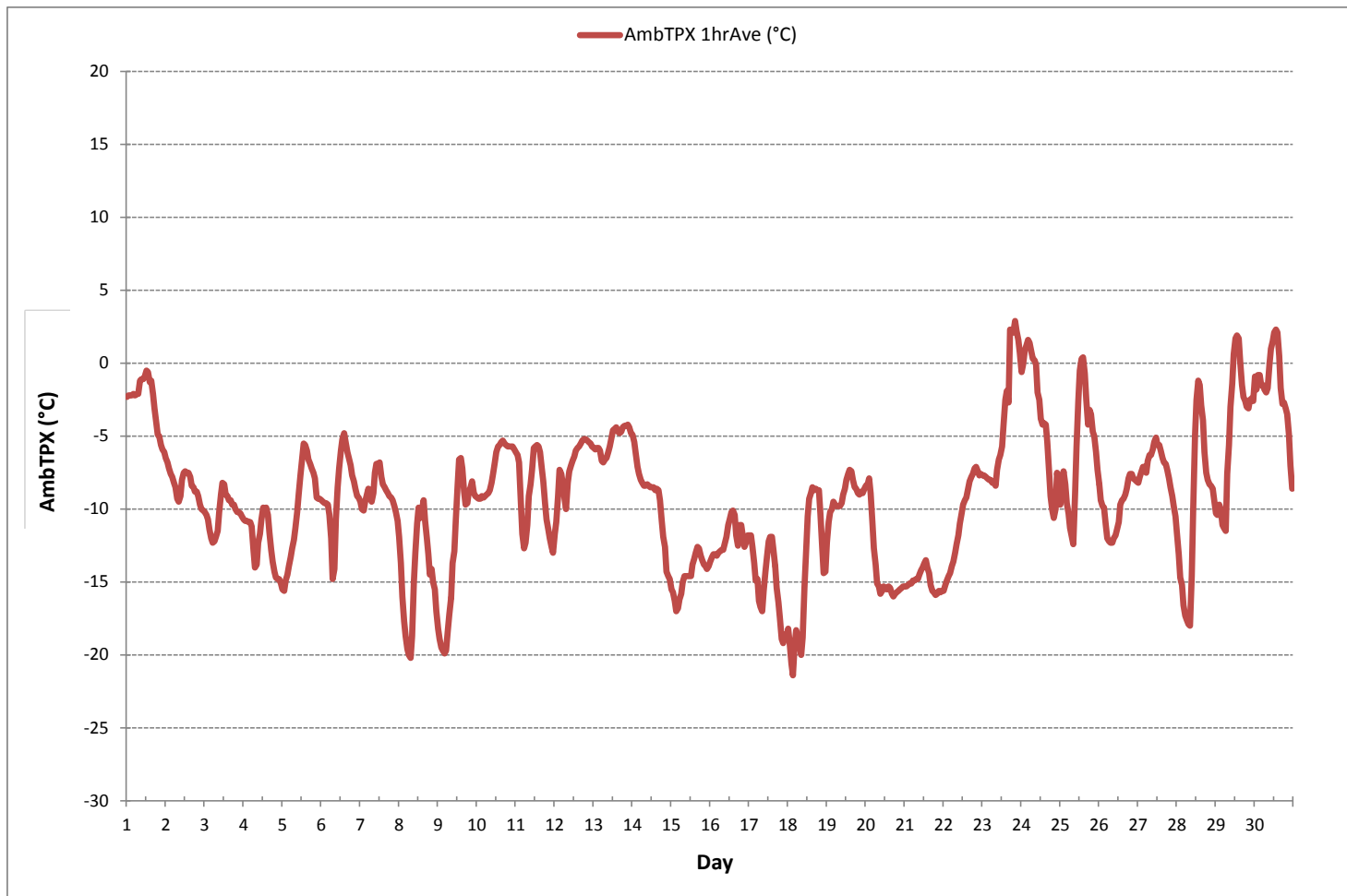
24 HR AVERAGES November 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-21.4 °C	@ HOUR	3	ON DAY	18
MAXIMUM 1-HR AVERAGE:	2.9 °C	@ HOUR	20	ON DAY	23
MAXIMUM 24-HR AVERAGE:	-1.6 °C			ON DAY	30
OPERATIONAL TIME:					720 hrs
AMD OPERATION UPTIME:					100.0 %
STANDARD DEVIATION:	4.7				
MONTHLY AVERAGE:	-9.2 °C				

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



APPENDIX II
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE



Thermo 43i Sulphur Dioxide Analyzer Calibration

Date: <u>November 9, 2017</u>	Barometer/B.P./units: <u>Brunton 05490 expires December 5, 2017</u>	<u>28.29</u>	<u>inHg</u>
Company/Airshed: <u>LICA</u>	Thermometer/Station Temp: <u>F.S. 160348895 expires April 8, 2018</u>	<u>22.6</u>	<u>°C</u>
Location/Station Name: <u>Cold Lake South</u>	Weather Conditions: <u>Mainly sunny</u>		
Parameter: <u>Sulphur Dioxide</u>	Calibration Purpose: <u>routine monthly</u>		
Start Time 24 hr. (mst): <u>9:31</u>	Performed By/Reviewer: <u>Limin Li</u>	<u>Tom Bourque</u>	
End Time 24 hr. (mst): <u>13:30</u>	Cal Gas Expiry Date: <u>December 8, 2019</u>		
Calibration Method: <u>Gas Dilution</u>	Converter Model & s/n (if applicable): <u>n/a</u>		

Analyzer: ID# or Serial Number: <u>80652842</u>	Range ppb: <u>500</u>
Last Calibration Date: <u>October 10, 2017</u>	As Found C.F.: <u>1.068</u>
Previous C.F.: <u>1.001</u>	New C.F.: <u>0.999</u>

Calibration Standards: Low Flow Meter ID/Expiry Date: <u>DC-2 Low 1662 expires February 2, 2018</u> High Flow Meter ID/Expiry Date: <u>DC-2 High 2272 expires February 2, 2018</u> Calibrator ID/Expiry Date: <u>Sabio id# 17200415 expires May 16, 2018</u> Cal Gas Cylinder I.D. #: <u>EY0000769</u> Cal Gas Conc. (ppm): <u>50.5</u>	Standard Calibration Points for Ranges <table border="1" style="margin: auto;"> <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								

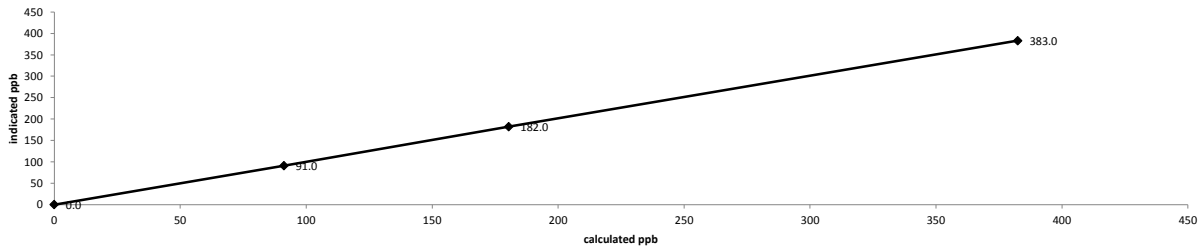
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	5862	0.00	5862	0.0	0.0	n/a
as found high	5814	44.37	5858	382.5	358.0	1.068
adjusted zero	5862	0.00	5862	0.0	0.0	n/a
adjusted high	5814	44.37	5858	382.5	383.0	0.999
mid	5884	21.10	5905	180.4	182.0	0.991
low	5901	10.68	5912	91.2	91.0	1.003
calibrator zero	5897	0.00	5897	0.0	0.0	n/a
Average C.F. =						0.998

Linear Regression/Calibration Results:

Correlation Coefficient =	<u>1.000</u>	LIMITS	<u>> or = 0.995</u>
Slope =	<u>0.998</u>	LIMITS	<u>0.95-1.05</u>
b (Intercept as % of full scale) =	<u>-0.03%</u>	LIMITS	<u>± 3% F.S.</u>
% change in C.F. from last cal =	<u>-6.74%</u>	LIMITS	<u>± 10%</u>

Thermo 43i Sulphur Dioxide Analyzer Calibration



As found: Bkg: <u>7.9</u> Coef: <u>0.917</u> Pmt: <u>-623.8 V</u> Flash: <u>769 V</u> Internal: <u>30.6 °C</u> Chamber: <u>45.0 °C</u> Perm Oven Gas: <u>35.00 °C</u> Perm Oven Heater: <u>34.24 °C</u> Pressure: <u>683.1 mmHg</u> Sample Flow: <u>0.477 L/min</u> Lamp Intensity: <u>97%</u> Averaging Time: <u>120 Sec</u> Expected Value: <u>241.0</u>	As left: Bkg: <u>8.4</u> Coef: <u>0.977</u> Pmt: <u>-623.8 V</u> Flash: <u>769 V</u> Internal: <u>30.6 °C</u> Chamber: <u>45.0 °C</u> Perm Oven Gas: <u>35.00 °C</u> Perm Oven Heater: <u>34.24 °C</u> Pressure: <u>683.1 mmHg</u> Sample Flow: <u>0.477 L/min</u> Lamp Intensity: <u>97%</u> Averaging Time: <u>120 Sec</u> Expected Value: <u>254.8</u>
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Comments:

The analyzer sample inlet filter was changed.

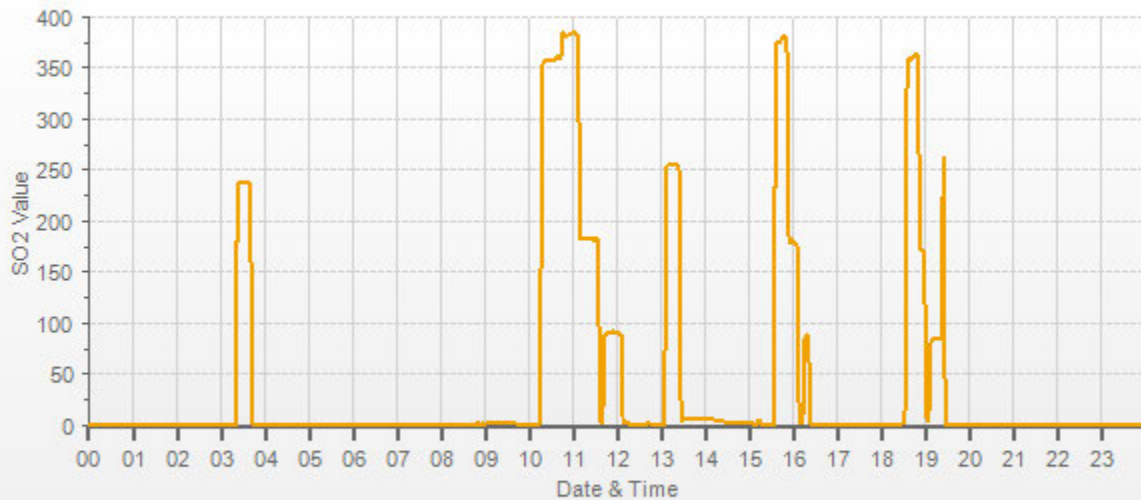
The analyzer cooling fan filter(s) were cleaned.

The manifold blower was found to be working normally.

No zero adjustment was required/made.

Flow measurement after mid-point.

SO2[ppb] Station: LICA COLD LAKE SOUTH Daily: 17/11/09 Type: AVG 1 Min. [1 Min.]



— SO2[ppb]

TOTAL REDUCED SULPHUR



Thermo 450i Total Reduced Sulphur Analyzer Calibration

Date: November 9, 2017	Barometer/B.P./units: Brunton 05490 expires December 5, 2017	28.29	inHg
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 160348895 expires April 8, 2018	22.6	°C
Location/Station Name: Cold Lake South	Weather Conditions: Mainly sunny		
Parameter: Total Reduced Sulphur	Calibration Purpose: routine monthly		
Start Time 24 hr. (mst): 9:31	Performed By/Reviewer: Limin Li	Tom Bourque	
End Time 24 hr. (mst): 14:20	Cal Gas Expiry Date: August 23, 2020		
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): CDNova Model CDN-101 / #501		

Analyzer:	ID# or Serial Number: 812728560	Range ppb: 100	
	Last Calibration Date: October 10, 2017	As Found C.F.: 1.027	
	Previous C.F.: 1.000	New C.F.: 1.000	

Calibration Standards:	Standard Calibration Points for Ranges								
Low Flow Meter ID/Expiry Date: DC-2 Low 1662 expires February 2, 2018	<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								
High Flow Meter ID/Expiry Date: DC-2 High 2272 expires February 2, 2018									
Calibrator ID/Expiry Date: Enviroics id# 1991 expires March 16, 2018									
Cal Gas Cylinder I.D. # : LL119500									
Cal Gas Conc. (ppm): 9.8									

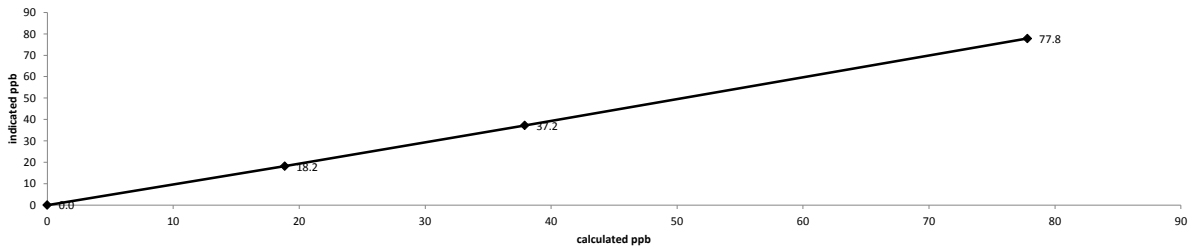
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	7544	0.00	7544	0.0	0.0	n/a
as found high	7472	59.81	7532	77.8	75.8	1.027
adjusted zero	7544	0.00	7544	0.0	0.0	n/a
adjusted high	7472	59.81	7532	77.8	77.8	1.000
mid	7549	29.31	7578	37.9	37.2	1.019
low	7546	14.55	7561	18.9	18.2	1.036
calibrator zero	7913	0.00	7913	0.0	0.0	n/a
Average C.F. =						1.018

Linear Regression/Calibration Results:

Correlation Coefficient =	<u>1.000</u>	> or = 0.995
Slope =	<u>0.998</u>	0.95-1.05
b (Intercept as % of full scale) =	<u>0.41%</u>	± 3% F.S.
% change in C.F. from last cal =	<u>-2.66%</u>	± 10%

Thermo 450i Total Reduced Sulphur Analyzer Calibration

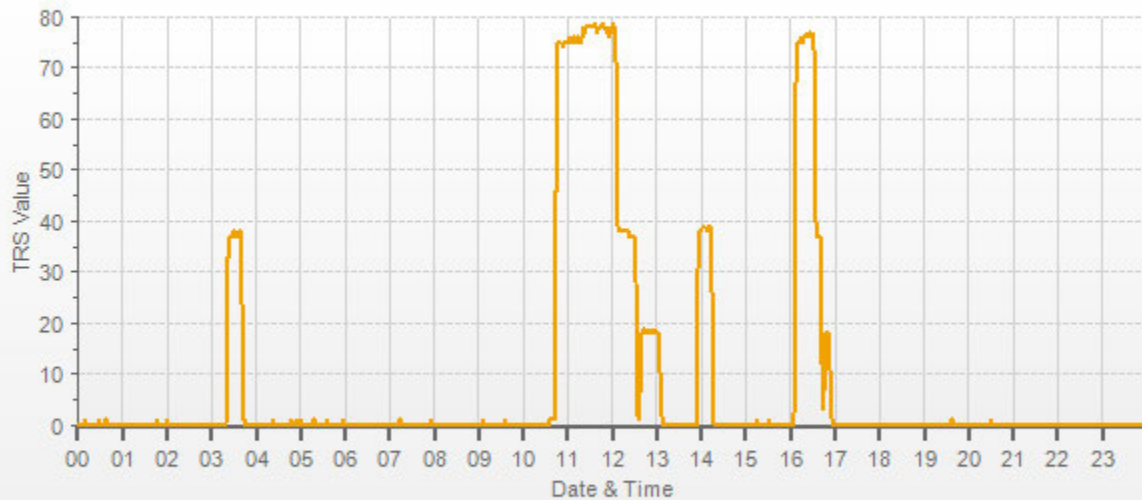


As found:	As left:
Bkg: 14.2	Bkg: 14.5
Coef: 0.900	Coef: 0.924
Pmt: -650.5 V	Pmt: -650.5 V
Flash: 739 V	Flash: 739 V
Internal: 33.7 °C	Internal: 33.7 °C
Chamber: 45.0 °C	Chamber: 45.0 °C
Converter Temp: 825 °C	Converter Temp: 825 °C
Converter Set: 825 °C	Converter Set: 825 °C
Perm Oven Gas: 45.00 °C	Perm Oven Gas: 45.00 °C
Perm Oven Htr: 44.37 °C	Perm Oven Htr: 44.37 °C
Pressure: 634.3 mmHg	Pressure: 634.3 mmHg
Sample Flow: 0.490 L/min	Sample Flow: 0.490 L/min
Lamp Intensity: 91 %	Lamp Intensity: 91 %
Averaging Time: 120	Averaging Time: 120
Expected Value: 38.2	Expected Value: 39.2

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.
 Flow measurement after mid-point.

TRS[ppb] Station: LICA COLD LAKE SOUTH Daily: 17/11/09 Type: AVG 1 Min. [1 Min.]



— TRS[ppb]

TOTAL HYDROCARBON



Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	November 9, 2017	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	28.29	inHg
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22.6	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	Mainly sunny		
Parameter:	Total Hydrocarbon	Calibration Purpose:	routine monthly		
Start/End Time 24 hr. (mst):	13:30 / 17:10	Performed By/Reviewer:	Limin Li	Tom Bourque	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	December 24, 2022		

Analyzer:	Range ppm:
ID# or Serial Number:	50
Last Calibration Date:	As Found C.F.:
October 30, 2017	0.977
Previous Cal High Point C.F.:	New C.F.:
1.000	1.000

Calibration Standards:	
Low Flow Meter ID/Expiry Date:	DC-2 Low 1662 expires February 2, 2018
High Flow Meter ID/Expiry Date:	DC-2 High 2272 expires February 2, 2018
Calibrator ID/Expiry Date:	Environics id# 1991 expires March 16, 2018
Cal Gas Cylinder I.D. #:	LL165367
CH ₄ /C ₃ H ₈ Cylinder Conc. (ppm):	590.0 207.0
CH ₄ as propane/total CH ₄ equivalents (ppm):	569.3 1159.3
Standard Calibration Points for a Range of: 50 ppm	
Point	Target ppm
High	38
Mid	18
Low	9

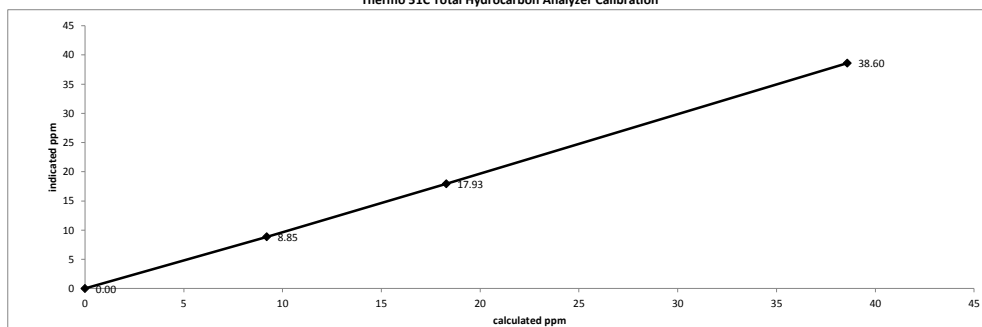
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppm)	Indicated Concentration (ppm)	Correction Factors
	Diluent	Cal Gas	Total			
as found zero	2478	0.00	2478	0.0	0.00	n/a
as found high	2390	82.28	2472	38.59	39.50	0.977
adjusted zero	2478	0.00	2478	0.00	0.00	n/a
adjusted high	2390	82.28	2472	38.59	38.60	1.000
mid	2441	39.12	2480	18.29	17.93	1.020
low	2448	19.59	2468	9.20	8.85	1.040
calibrator zero	2478	0.00	2478	0.0	0.00	n/a
Average C.F.=						1.020

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000		LIMITS
Slope =	0.997		> or = 0.995
b (Intercept as % of full scale) =	0.44%		0.95-1.05
% change in C.F. from last cal =	2.32%		± 3% F.S.
			± 10%

Thermo 51C Total Hydrocarbon Analyzer Calibration



Comments:
The analyzer sample inlet filter was changed.

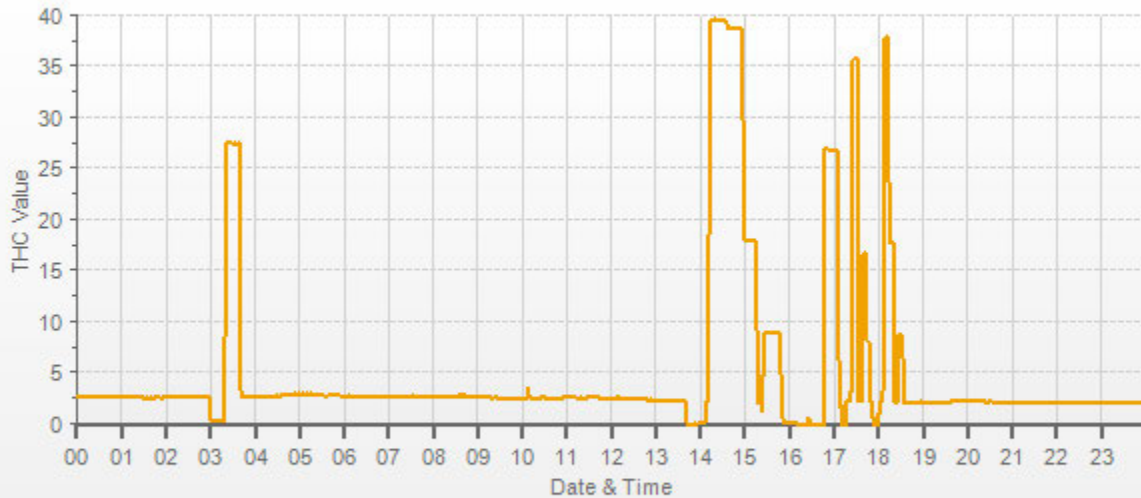
A new hydrogen cylinder was installed.

The analyzer cooling fan filter(s) were cleaned.

The manifold blower was found to be working normally.

Flow measurement after mid-point.

THC[ppm] Station: LICA COLD LAKE SOUTH Daily: 17/11/09 Type: AVG 1 Min. [1 Min.]



— THC[ppm]

NITROGEN DIOXIDE



Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: November 9, 2017	Barometer/B.P./units: Brunton 05490 expires December 5, 2017	28.29	inHg
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 160348895 expires April 8, 2018	22.6	°C
Location/Station Name: Cold Lake South	Weather Conditions: Mainly sunny		
Start/End Time 24 hr. (mst): 09:31 / 15:00	Calibration Purpose: routine monthly		
G.P.T. to be used for Ozone? Yes with 500 ppb NOx full scale	Performed By/Reviewer: Limin Li	Tom Bourque	
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: December 8, 2019		

Analyzer:	Correction Factors:
ID# or Serial Number: 1505664393	Previous C.F.:
Last Calibration Date: October 10, 2017	As Found C.F.:
Range ppb: 500	New C.F.:
	NO = 1.000 1.038 1.000
	NO ₂ = 1.000 1.000 1.000
	NOx = 1.000 1.040 0.999

Calibration Standards: Low Flow Meter ID/Expiry Date: DC-2 Low 1662 expires February 2, 2018 High Flow Meter ID/Expiry Date: DC-2 High 2272 expires February 2, 2018 Calibrator ID/Expiry Date: Sabio id# 17200415 expires May 16, 2018 Cal Gas Cylinder I.D. #: EY0000769 Cal Gas Conc. (ppm): 51.1 51.2	Standard Calibration Points for a Range of: 500 ppb <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>380</td> <td>330</td> <td><-high ozone</td> </tr> <tr> <td>Mid</td> <td>180</td> <td>245</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>90</td> <td>175</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>133</td> <td><-mid ozone</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>53</td> <td><-low ozone</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	380	330	<-high ozone	Mid	180	245	n/a	Low	90	175	n/a	Extra Point #1	n/a	133	<-mid ozone	Extra Point #2	n/a	53	<-low ozone
Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																						
High	380	330	<-high ozone																						
Mid	180	245	n/a																						
Low	90	175	n/a																						
Extra Point #1	n/a	133	<-mid ozone																						
Extra Point #2	n/a	53	<-low ozone																						

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	5862	0.0	5862	0	0	0.0	0.0	n/a	n/a
as found high	5814	44.4	5858	387.0	387.8	373.0	373.0	1.038	1.040
adjusted zero	5862	0.00	5862	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	5814	44.37	5858	387.0	387.8	387.0	388.0	1.000	0.999
mid	5884	21.10	5905	182.6	183.0	183.0	184.0	0.998	0.994
low	5901	10.68	5912	92.3	92.5	93.0	93.0	0.993	0.995
calibrator zero	5897	0.00	5897	0	0	0.0	0.0	n/a	n/a
Average C.F. =								0.997	0.996

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO ₂	NO drop	NO ₂ gain	NO ₂ C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	5852	44.25	5896	0.0	383.0	384.0	1.0	0.0	1.0	
as found high NO2	5852	44.25	5896	245.0	140.0	384.0	244.0	243.0	243.0	1.000
adjusted high NO2	5852	44.25	5896	245.0	140.0	384.0	244.0	243.0	243.0	1.000
gpt mid	5852	44.25	5896	133.0	250.0	384.0	134.0	133.0	133.0	1.000
gpt low	5852	44.25	5896	53.0	333.0	384.0	51.0	50.0	50.0	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 =	1.001	1.000	1.003	0.95-1.05
b (Intercept as % of full scale) =	0.07%	0.08%	0.12%	± 3% F.S.
% change in C.F. from last cal =	-3.77%	-3.97%	0.00%	± 10%
NO ₂ converter efficiency			0.99	0.96 to 1.04

As found:	As left:
NO Bkg: 3.8	NO Bkg: 3.9
NOx Bkg: 4.0	NOx Bkg: 4.1
NO Coef: 0.959	NO Coef: 0.999
NO ₂ Coef: 0.990	NO ₂ Coef: 0.990
NOx Coef: 0.997	NOx Coef: 1.000
PMT: -854.3	PMT: -854.3
Internal: 28.9 °C	Internal: 28.8 °C
Chamber: 50.4 °C	Chamber: 50.4 °C
Cooler: -3.0 °C	Cooler: -3.0 °C
NO ₂ Converter: 323.4 °C	NO ₂ Converter: 323.4 °C
NO ₂ Converter Set: 325.0 °C	NO ₂ Converter Set: 325.0 °C
Perm Oven Gas: 35.00 °C	Perm Oven Gas: 35.00 °C
Perm Oven Heater: 34.27 °C	Perm Oven Heater: 34.27 °C
Pressure: 177.2 mmHg	Pressure: 177.2 mmHg
Flow: 0.770 LPM	Flow: 0.770 LPM
Ozonator Flow: OK	Ozonator Flow: OK
Expected Value NO: 3	Expected Value NO: 3
Expected Value NO ₂ : 252	Expected Value NO ₂ : 263
Expected Value NOx: 256	Expected Value NOx: 267

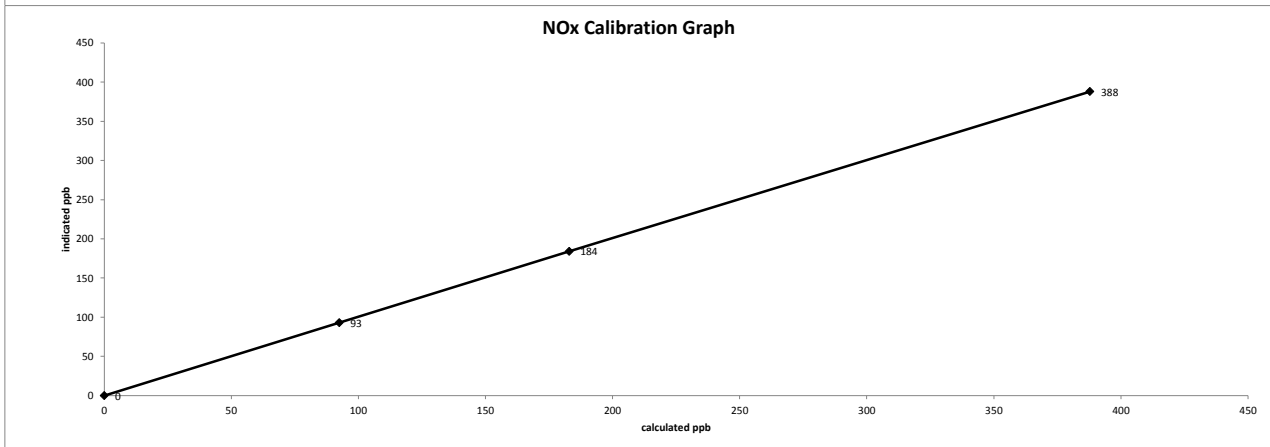
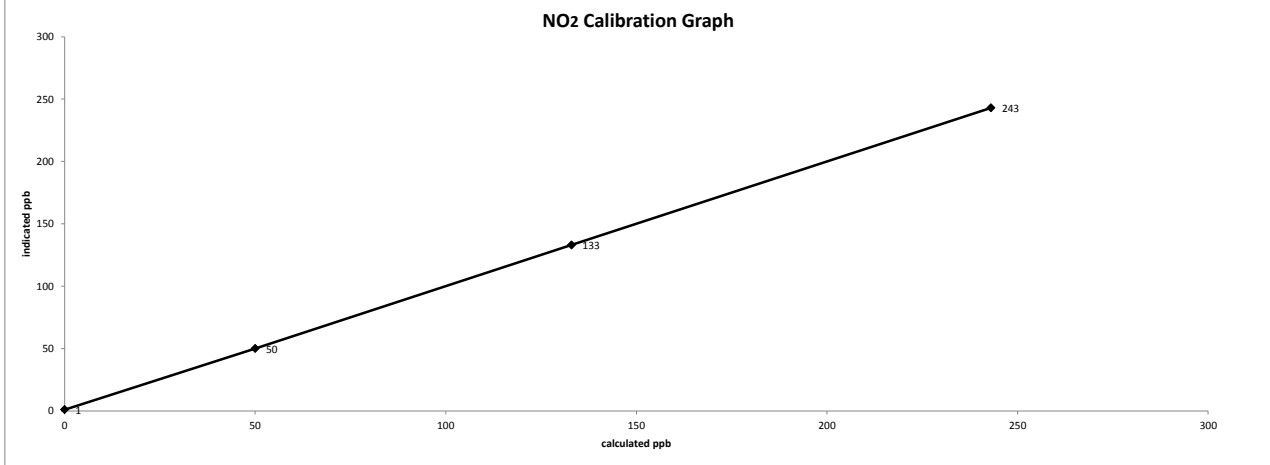
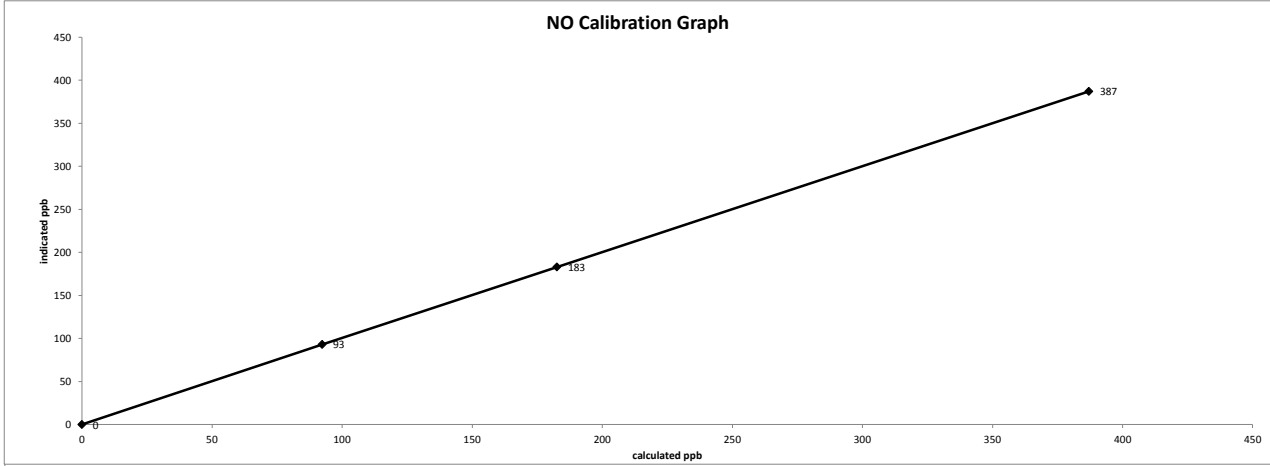
Comments:
 The analyzer sample inlet filter was changed.
 The manifold blower was found to be working normally.
 No zero adjustment was required/made.
 The analyzer cooling fan filter(s) were cleaned.

Extra point for O3 high (less than 15 m): NOx:384, NO:55, NO₂:329
 No high point NO₂ adjustment was required/made.
 Flow measurement after mid-point.

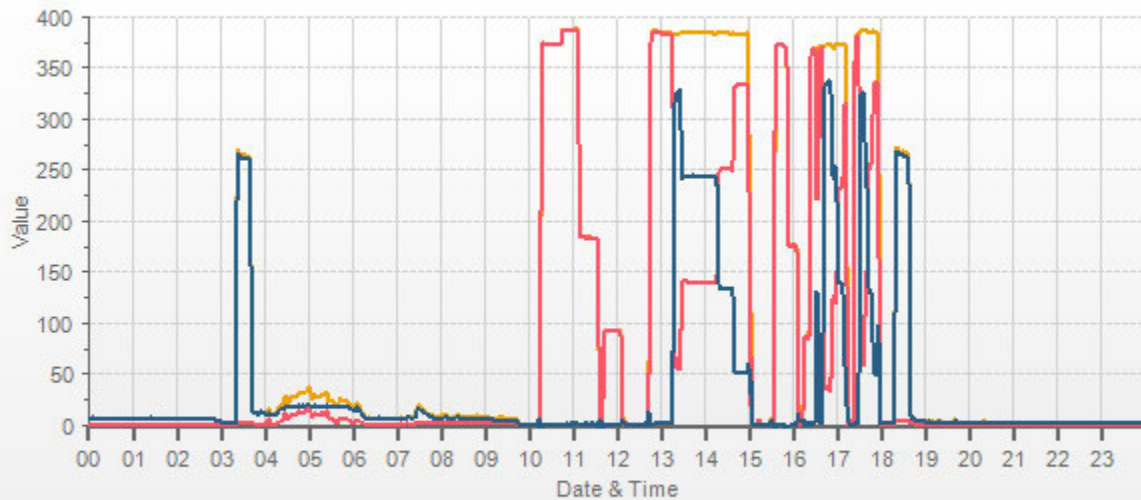
Date: November 9, 2017
Company/Airshed: LICA
Location/Station Name: Cold Lake South

Start/End Time 24 hr. (mst): 09:31 / 15:00
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Gas Phase Titration

Thermo 42i NO-NO2-NOx Analyzer Calibration



Station: LICA COLD LAKE SOUTH Daily: 17/11/09 Type: AVG 1 Min. [1 Min.]



— NOX[ppb] — NO[ppb] — NO2[ppb]

OZONE



Thermo 49i Ozone Analyzer Calibration

Date: November 9, 2017	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	28.29	inHg
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	22.6	°C
Location/Station Name: Cold Lake South	Weather Conditions: Mainly sunny		
Start/End Time 24 hr. (mst): 12:03 / 15:43	Calibration Purpose: routine monthly		
Ozone Calibration Method: Varying UV Lamp Power	Performed By/Reviewer: Limin Li / Tom Bourque		
G.P.T. Date: n/a-done by Varying UV Lamp Power	Cal Gas Expiry Date: n/a-done by Varying UV Lamp Power		

Analyzer:	Ozone Range ppb: 500
ID# or Serial Number: 700419951	As Found C.F.: 1.017
Last Calibration Date: October 11, 2017	New C.F.: 1.000
Previous Cal High Point C.F.: 1.000	

Calibration Standards:										
Low Flow Meter ID/Expiry Date: DC-2 Low 1662 expires February 2, 2018		<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									
High Flow Meter ID/Expiry Date: DC-2 High 2272 expires February 2, 2018										
Calibrator ID/Expiry Date: Sabio id# 11900613 expires March 16, 2018										
Cal Gas Cylinder I.D. #: n/a										

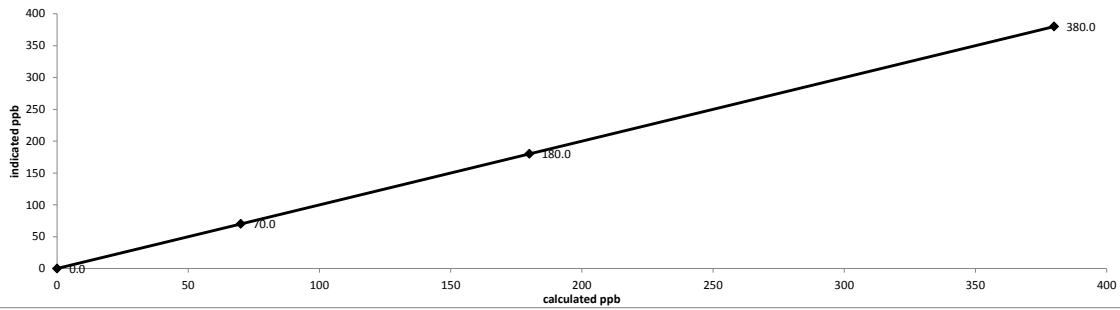
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5200	5200	0.0	n/a	1.2	n/a
as found high	5200	5200	380.0	380.0	375.0	1.017
adjusted zero	5200	5200	0.0	0.0	0.0	n/a
adjusted high	5200	5200	380.0	380.0	380.0	1.000
mid	5200	5200	180.0	180.0	180.0	1.000
low	5200	5200	70.0	70.0	70.0	1.000
calibrator zero	5200	5200	0.0	n/a	-0.8	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 = -1.66%	± 3% F.S.
	± 10%

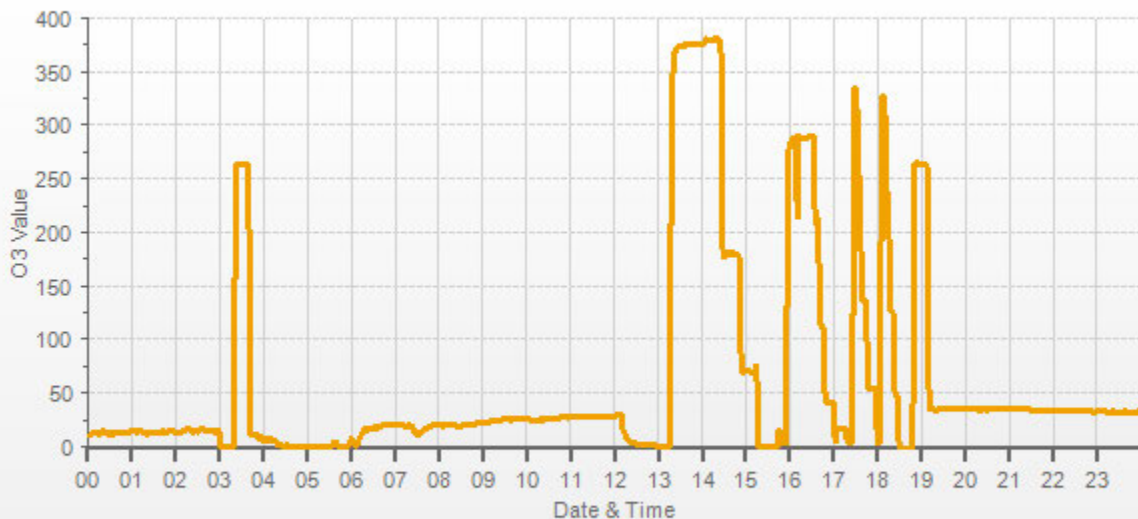
Thermo 49i Ozone Analyzer Calibration



As found:	As left:
O3 Bkg: 0.2	O3 Bkg: 1.1
O3 Coef: 0.993	O3 Coef: 1.004
Photo Lamp: 9.6 V	Photo Lamp: 9.6 V
O3 Lamp: 9.0 V	O3 Lamp: 9.0 V
Bench: 30.2 °C	Bench: 30.2 °C
Bench Lamp: 53.5 °C	Bench Lamp: 53.5 °C
O3 Lamp: 67.4 °C	O3 Lamp: 67.4 °C
Pressure: 709.5 mmHg	Pressure: 709.5 mmHg
Cell A lpm: 0.718	Cell A lpm: 0.718
Cell B lpm: 0.757	Cell B lpm: 0.757
O3 ppb: 25.9	O3 ppb: 25.9
Cell A ppb: 21.8	Cell A ppb: 21.8
Cell B ppb: 29.3	Cell B ppb: 29.3
Cell A int: 85485.0	Cell A int: 85485.0
Cell B int: 86080.0	Cell B int: 86080.0
Expected Value: 260.0	Expected Value: 264.2

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 5030 SHARP Monitor Audit

Date: November 20, 2017
 Company: LICA
 Station Name/Location: Cold Lake South
 Previous Audit Date: October 11, 2017
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Tom Bourque
 Start Time (mst): 11:07
 End Time (mst): 14:11
 Calibration Purpose: quarterly
 Weather Conditions: Light snow

SHARP Information and Status:

Serial Number: CM-2209 Status Code: 0
 Approx. % Tape Reaming: 90% Error Code: 0

Reference Standards/I.D./Cert. Date:

High Flow: Airmetrics/Chinook High Maxxam ID #2 expires March 24, 2018
 Digital Manometer: Dwyer 475 Mark III id# 2 expires January 6, 2018
 Temperature: F.S. 170286131 expires April 19, 2019
 Pressure: F.S. 05544 expires December 5, 2018

As Found Temperatures, Pressure, Humidity:

	T1 (°C)	T2 (°C)	T3 (°C)	T4 (°C)	P3 (hPa)	RH (%)
SHARP:	-12	22	23	23	946	7
Reference:	-13.7	23.3	23.3	23.3	943.0	6.3
Difference:	1.7	1.3	0.3	0.3	3.0	-0.7

Temp Limit: ± 4 °C
 Pressure Limit: ± 13.33 hPa
 RH Limit: $\pm 2\%$

As Left Temperature and Pressure (same as above if as found adequate):

	T1 (°C)	T2 (°C)	T3 (°C)	T4 (°C)	P3 (hPa)	RH (%)
SHARP:	-13	23	23	23	943	7
Reference:	-13.0	23.0	23.0	23.0	943.0	7.0
Difference:	0.0	0.0	0.0	0.0	0.0	0.0%

Temp Limit: ± 4 °C
 Pressure Limit: ± 13.33 hPa
 RH Limit: $\pm 2\%$

Mass Foil Calibration:

	Mass Foil:	ZERO:	Span Sensitivity
Mass Foil ID:	<u>9015</u>	QLF: <u>5</u>	OLD: <u>7011</u>
Spanfoil Value (µg):	<u>1294</u>	CONFID: <u>9</u>	NEW: <u>7023</u>

Nephelometer Zero:

	As Found	As Left
Analog	<u>156.00</u>	<u>156.00</u>
NEPH	<u>-0.10</u>	<u>-0.40</u>
C14	<u>55.40</u>	<u>55.00</u>
Conc	<u>0.00</u>	<u>-0.10</u>

Flow rate:

	As Found	As Left
SHARP AirFlow l/hr	<u>1000</u>	<u>1000</u>
Reference AirFlow (l/min)	<u>16.68</u>	<u>16.68</u>
Reference AirFlow (l/hr)	<u>1001</u>	<u>1001</u>
% Difference:	<u>-0.1%</u>	<u>-0.1%</u>

$$\%D = 100 \times \frac{Q_m - Q_i}{Q_i}$$

Tolerance +/- 5%

Inlet Assembly:

	Yes/No?	If no, explain:
PM10 Inlet Cleaned	<u>yes</u>	
PM2.5 Cyclone Cleaned	<u>yes</u>	

Pump Assembly:

	Yes/No?	If no, explain:
Pump Inspected / Cleaned	<u>yes</u>	
Pump Vanes Replaced	<u>no</u>	<u>Not Required</u>

Comments:

Leak Check: Reference without adapter = 16.68 lpm ; Reference with adapter = 16.80 lpm ; Difference = 0.12 lpm (0.12 lpm < 0.8 lpm)

WIND SYSTEM



Meteorological Sensor Audit/Calibration

Location Information

Company:	LICA	Performed By:	Alex Yakupov
Audit Location:	Cold Lake South	Reviewed By:	Tom Bourque
Audit Date:	October 23, 2017	Start/End Time (mst):	11:36 / 15:19
Calibration Purpose:	installation	Weather Conditions:	Mainly sunny

Wind Sensor Information

Sensor ID Data:		Sensor Outputs:	
Sensor Make:	RM Young	Velocity Voltage Output Range:	0-1V
Sensor Model:	05305VK	Velocity Unit Output Range:	0-200 km/h
Serial #:	92411	Direction Voltage Output Range:	0-1V
Previous Cal/Audit Date:	n/a or unknown	Direction Unit Output Range:	0-360 degrees

Wind Calibrator Information

Calibrator I.D. and Expiry Date: (SIA) RM Young 18802 sn/id# CA4309 expires February 24, 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	18.5	0.997
2000	36.9	36.9	36.9	1.000
3000	55.3	55.4	55.4	0.999
4000	73.7	73.8	73.8	0.998
5000	92.2	92.3	92.3	0.999
6000	110.6	110.7	110.7	0.999
7000	129.0	129.1	129.1	0.999
8000	147.4	147.5	147.5	0.999
9000	165.9	165.9	166.0	1.000
10000	184.3	184.3	184.4	1.000
The audit meets AMD requirements.			Average Correction Factor=	0.999

Wind Direction Audit Data ****+/- 5° 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	0.2	-0.1	0.2
30	330	31	330	-1.2	0.5	0.9
60	300	61	300	-1.3	0.0	0.6
90	270	92	270	-1.5	-0.2	0.8
120	240	122	241	-1.5	-0.5	1.0
150	210	152	211	-1.6	-0.8	1.2
180	180	181	181	-1.3	-1.4	1.4
210	150	211	151	-1.3	-0.8	1.1
240	120	241	121	-0.6	-0.9	0.8
270	90	271	91	-0.8	-1.0	0.9
300	60	301	61	-0.5	-1.1	0.8
330	30	330	30	-0.1	-0.3	0.2
355	0	355	0	-0.2	0.3	0.2
The audit meets AMD requirements.			Average Absolute Degrees Difference=		0.8	

Comments:

The RM Young Wind System was installed to replace a Sonic Wind System Met One for by-annual calibration at a factory.

CALIBRATORS

Company <u>Maxxam</u>		Operator: <u>Micheal Espiritu</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>Mesa Defender 530</u>
Serial Number	<u>17200415</u>	Serial Number	<u>L-152019 H-148944</u>
Last Verification Date	<u>May 2016</u>	Temperature (°C)	<u>25.0 C</u>
NO Cylinder S/N	<u>EY0000597</u>	Barometric Pressure	<u>697 mmhg</u>
NO [PPM]	<u>49.0</u>	NOx [PPM]	<u>49.0</u>
Expiry Date	<u>December 2019</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
5028	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
4930	78.7	0.783	0.783	0.809	-0.012	0.797	3%	2%
4936	38.6	0.383	0.383	0.396	-0.006	0.390	3%	2%
4935	19.4	0.193	0.193	0.199	-0.003	0.196	3%	2%
Absolute Average Percent Difference							3%	2%

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)=	1.0334		0.90-1.10	m (Slope)=	1.0181
b (Intercept % of FS)=	-0.0105	±	3% F.S.	b (Intercept % of FS)=	-0.0148

Flow	O ₂ Conc (LC)	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4930	0.000	0.000	0.806	-0.013	0.795	NO ₂	% Diff. Limit
4930	1.425	0.523	0.283	0.511	0.794	0%	± 10%
4930	0.825	0.278	0.528	0.266	0.795	0%	± 10%
4930	0.386	0.095	0.711	0.085	0.796	3%	± 10%
Absolute Average Percent Difference						1%	± 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)=	0.9998		0.90-1.10		
b (Intercept % of FS)=	-1.1702	±	3% F.S.		

AENV Standards		NO_x Analyzer	
Audit Calibrator			
Make/Model	<u>Teco 146i</u>	Make/Model	<u>Teco 42i</u>
Serial/AMU Number	<u>AMU 1809</u>	Serial/AMU Number	<u>AMU 1868</u>
SRM Gas Cylinder No.	<u>CAL018101</u>	Last Calibration Date	<u>May 16, 2017</u>
Cylinder Conc. (ppm)	<u>48.79</u>	Full Scale (ppm)	<u>1.0</u>
		Cylinder Gas Expiry Date	<u>March 2019</u>

COMMENTS: Contains 50.4 ppm SO₂.

Auditor: Al Clark
Operator Signature:

Date: May 16, 2017
Location: McIntyre Center Edmonton

Company Maxxam Operator: Mike

Calibrator:			Flow Measurement Device:		
Make/Model	<u>EnviroNics 2000</u>		Make/Model	<u>Bios Defender 530</u>	
Serial Number	<u>1991</u>		Serial Number	<u>HI148944 Lo 152019</u>	
Last Verification Date	<u>March 31, 2016</u>		Temperature (°C)	<u>24.5</u>	
NO Cylinder S/N	<u>EY0000597</u>		Barometric Pressure	<u>699</u>	
NO [PPM]	<u>49.0</u>	NOx [PPM] <u>49.0</u>			
Expiry Date	<u>December 8, 2019</u>				

Dilution Flow (sccm)					
Pt. #1	<u>4902</u>	Pt. #2	<u>4935</u>	Pt. #3	<u>4957</u>
Gas Flow (sccm)					
Pt. #1	<u>79.3</u>	Pt. #2	<u>38.7</u>	Pt. #3	<u>19.4</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
4976	0.0	0.0000	0.0000	0.0001	0.0000	0.0001	Limit ± 10%	
4981	79.3	0.7801	0.7801	0.7898	0.0000	0.7898	1%	1%
4972	38.7	0.3814	0.3814	0.3841	0.0002	0.3843	1%	1%
4976	19.4	0.1910	0.1910	0.1913	0.0003	0.1916	0%	0%
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)= 1.0130	0.90-1.10	m (Slope)= 1.0129
b (Intercept % of FS)= -0.1190	± 3% F.S.	b (Intercept % of FS)= -0.1029

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4981	0.000	0.0000	0.7925	-0.0001	0.7924	NO ₂	% Diff. Limit
4981	0.400	0.5347	0.2578	0.5279	0.7857	-1%	± 10%
4981	0.200	0.2490	0.5435	0.2478	0.7913	0%	± 10%
4981	0.090	0.1090	0.6835	0.1095	0.7927	1%	± 10%
Absolute Average Percent Difference						0%	± 10%

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

NO ₂	LIMITS
Correlation= 1.0000	≥ 0.995
m (Slope)= 0.9864	0.90-1.10
b (Intercept % of FS)= 0.1136	± 3% F.S.

AENV Standards	NO _x Analyzer
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>March 15, 2017</u>
SRM Gas Cylinder No. <u>CAL018140</u>	Full Scale (ppm) <u>1.0</u>
Cylinder Conc. (ppm) <u>48.79</u>	Cylinder Gas Expiry Date <u>March 28, 2019</u>

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton Date: March 16, 2017

Operator Signature: [Signature] Location: McIntyre Center Edmonton

Company <u>Maxxam</u>		Operator: <u>Mike</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010D</u>	Make/Model	<u>Bios Defender 530</u>
Serial Number	<u>11900613</u>	Serial Number	<u>HI148944 Lo 152019</u>
Last Verification Date	<u>March 31, 2016</u>	Temperature (°C)	<u>23.9</u>
NO Cylinder S/N	<u>EY0000769</u>	Barometric Pressure	<u>698mmHg</u>
NO [PPM]	<u>51.1</u>	NOx [PPM]	<u>51.2</u>
Expiry Date	<u>December 8, 2019</u>		

Dilution Flow (sccm)		
Pt. #1 <u>4879</u>	Pt. #2 <u>4932</u>	Pt. #3 <u>4950</u>
Gas Flow (sccm)		
Pt. #1 <u>74.5</u>	Pt. #2 <u>36.4</u>	Pt. #3 <u>18.2</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
4965	0.0	0.0000	0.0000	0.0001	0.0000	0.0001	Limit ± 10%	
4954	74.5	0.7685	0.7700	0.7915	0.0008	0.7923	3%	3%
4968	36.4	0.3744	0.3751	0.3832	0.0006	0.3838	2%	2%
4968	18.2	0.1872	0.1876	0.1916	0.0002	0.1918	2%	2%
Absolute Average Percent Difference							3%	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)=	1.0301	0.90-1.10		m (Slope)=	1.0291
b (Intercept % of FS)=	-0.0919	± 3% F.S.		b (Intercept % of FS)=	-0.0881

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4954	0.000	0.0000	0.7949	0.0005	0.7954	NO ₂	% Diff. Limit
4954	0.510	0.5104	0.2845	0.5072	0.7917	-1%	± 10%
4954	0.250	0.2516	0.5433	0.2514	0.7944	0%	± 10%
4954	0.100	0.1085	0.6864	0.1087	0.7951	0%	± 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)=	0.9926	0.90-1.10
b (Intercept % of FS)=	0.0925	± 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>CAL018140</u>
Cylinder Conc. (ppm)	<u>48.79</u>
	Make/Model
	<u>Thermo 42i</u>
	Serial/AMU Number
	<u>1868</u>
	Last Calibration Date
	<u>March 15, 2017</u>
	Full Scale (ppm)
	<u>1.0</u>
	Cylinder Gas Expiry Date
	<u>March 28, 2019</u>

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton
Operator Signature: [Signature]

Date: March 16, 2017
Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-213CGA

Company: Maxxam **Operator's Name:** C. Wesson

Cylinder #: LL119500 Concentration PPM: 9.8 Tolerance(%): 2 Certified By: Praxair

Expiry Date: August 2020

<p>Reference Calibrator and Gas:</p> <p>Make/Model: <u>R&R MFC 201</u></p> <p>Serial Number: <u>AMU 1690</u></p> <p>Last Verification Date: <u>September 22, 2017</u></p> <p>Gas Type: <u>H2S</u> Conc. <u>20.43</u></p> <p>Cylinder Number: <u>CAL015272</u></p> <p>Expiry Date: <u>January 2019</u></p>	<p>Flow Measurement Device:</p> <p>Make/Model: <u>Mesa Definer 220</u></p> <p>Serial Number: <u>H-133034 L-132702</u></p> <p>Temp. °C: <u>23.5 C</u></p> <p>B.P. <u>705 mmhg</u></p>
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Reference Analyzer:

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

Instrument Settings: Zero: 22.4 Span: 1.091 Range: 0.1

Last Calibration: Date: Sep 22/17 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	0.0000	0.0000	0.0000	0.0000
5114	39.5	0.0734	0.00772	129.468	9.5
5096	18.5	0.0345	0.00363	275.459	9.5
5089	9.5	0.0178	0.00187	535.684	9.5
Average Cylinder Concentration:					9.5

Previous Stated Concentration PPM: 9.8

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: September 22, 2017

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



Calibration Gas Audit

CH₄ / C₃H₈ Cylinder Gas

File No. 2015-029CGA

Company: Maxxam **Operators name:** Limin Li
Cylinder #: LL165367 **Conc CH₄ (PPM)** 590/207 **Tolerance (%)** 2 **Certified By:** Praxair

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>R&R MFC 201</u>			Make/Model	<u>Bios DC2</u>
Serial Number	<u>AMU 1691</u>			Serial Number	<u>AMU 1650</u>
Last Verification Date	<u>May 21, 2015</u>			Temp. °C	<u>24.0 C</u>
Gas Type	<u>CH₄</u>	Conc.	<u>999.2</u>	B.P.	<u>703 mmhg</u>
Cylinder Number	<u>D751932</u>				
Gas Type	<u>C₃H₈</u>	Conc.	<u>246.5</u>		
Cylinder Number	<u>XF0037998</u>				

Reference Analyzer:

Make/Model Teco 55C Serial/AMU Number: 1643
Instrument Settings Zero: N/A Span: N/A Range: 20
Last Calibration: Date: May 21/15 C.F. 1.000 Done By: Al Clark

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
Dilution	Gas						
<u>2600</u>	<u>0.0</u>	<u>0.00</u>	<u>0.00</u>	0.02005	49.883	602	206
<u>2569</u>	<u>51.5</u>	<u>12.06</u>	<u>11.37</u>	<u>0.02005</u>	<u>49.883</u>	<u>602</u>	<u>206</u>
<u>3549</u>	<u>22.3</u>	<u>3.77</u>	<u>3.57</u>	<u>0.00628</u>	<u>159.148</u>	<u>600</u>	<u>207</u>
<u>3523</u>	<u>10.4</u>	<u>1.77</u>	<u>1.70</u>	<u>0.00295</u>	<u>338.750</u>	<u>600</u>	<u>209</u>
Average Cylinder Concentration:						600	207

<u>CH₄</u>	<u>C₃H₈</u>
Previous Stated Concentration PPM: <u>590</u>	<u>207</u>
Percent variance from Stated: <u>1.8</u>	<u>0.2</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: May 21, 2015
Operator Signature: _____ Location: McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2016-437CGA

Company: Maxxam **Operators name:** Chris

Cylinder #: EY0000769 Conc (PPM) 51.1 Tolerance (%) 0.7 Certified By: Praxair

Expiry Date: December 8, 2019

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model <u>Thermo 146i</u>	Make/Model <u>Bios Definer 220</u>
Serial Number <u>AMU 1809</u>	Serial Number <u>AMU 1941</u>
Last Verification Date <u>January 26, 2017</u>	Temp.°C <u>24.4</u>
Gas Type <u>NO</u> Conc. <u>48.79</u>	B.P. <u>704.7</u>
Cylinder Number <u>CAL018140</u>	
Expiry Date <u>March 25, 2019</u>	

Reference Analyzer:

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

Instrument Settings Zero: 4.5 Span: 1.110 Range: 1.0

Last Calibration: Date: 25-Jan-17 C.F. 1.000 Done By: SB

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
4911	0.0	0.000	0.000				
4918	77.4	0.822	0.822	0.016	63.540	52.2	52.2
4918	38.5	0.408	0.408	0.008	127.740	52.2	52.1
4915	19.2	0.202	0.202	0.004	255.990	51.7	51.7
Average Cylinder Concentration:						52.0	52.0

	<u>NO</u>		<u>NOx</u>
Previous Stated Concentration PPM:	<u>51.1</u>		<u>51.2</u>
Percent variance from Stated:	<u>1.8</u>		<u>1.6</u>

Cylinder gas tolerances based on NO only

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

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration 50.5 PPM SO2

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

Auditor: Shea Beaton Date: January 26, 2017

Operator Signature: _____ Location: McIntyre Center Edmonton

***APPENDIX III
REPORT CERTIFICATION FORM***

Report Certification Form

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

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

Maram Ghaleb

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

December 13, 2017

Report Issued Date (dd-mm-yyyy)

APPENDIX IV
DATA VALIDATION CERTIFICATION FORM



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2017-11-1-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>December 13 , 2017</u>
Level 1 Primary Validation	<u>Maram Ghalab</u>	Date <u>December 13 , 2017</u>
Level 2 Final Validation	<u>Maram Ghalab</u>	Date <u>December 21 , 2017</u>
Level 3 Independent Data Review	<u>Chris Lumb</u>	Date <u>December 21 , 2017</u>
Post-Final Validation	<u>NA</u>	Date <u>NA</u>

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



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

February 14, 2018

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 2017.

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 2017 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 systems.

H₂S: On November 2, The Maxxam-Supplied analyzer (API 101E, s/n: 722) was replaced with the LICA-Owned analyzer (API 101E, s/n: 510) in order to address the zero/span system instability exhibited in the October monitoring period.

THC: On November 22, the LICA-Owned analyzer (Thermo 51C, s/n: 436609739) was removed and the other LICA-Owned analyzer (Thermo 51C, s/n: 436609738) was installed for maintenance purpose. The Thermo 51C, s/n: 436609739, was recorded to be sensitive to shifts in barometric pressure.

NO₂/NO/NO_x: The LICA-Owned analyzer (API 200E, s/n: 592) malfunctioned on November 21. The analyzer was removed and the Maxxam-supplied analyzer (API 200A, s/n: 2051) was installed on November 23.

As the LICA Environmental Program Manager and Data & Reporting Specialist, we certify that 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 certify 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.



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

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

Respectfully,

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

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

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

Lily Lin
Data & Reporting Specialist
587-225-2248
rebbaca@gmail.com



MAXXAM ANALYTICS
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T2E 6P7

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Toll Free 800-386-7247
Fax 403-219-3673

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

JOB #: 2833-2017-11-30-C

November 2017

Prepared for:

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

5107 50 ST.
BONNYVILLE, ALBERTA
T9N 2J7

Attention: MIKE BISAGA

DATE: **December 27, 2017**

Prepared by:

Maram Ghaleb, B.Sc.
Project Manager, Customer Service, Air Services

Reviewed by:

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

SUMMARY

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

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

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

H₂S: On November 2, Maxxam's analyzer (API 101E, s/n: 722) was replaced with LICA's analyzer (API 101E, s/n: 510) in order to address the zero/span system instability exhibited in the October monitoring period.

THC:

- Twenty hours of data were invalidated on November 16 (00:00-17:00) due to low gas pressure. A new fuel gas cylinder was installed and a zero-span check performed at 18:00-19:00.
- On November 22, the resident analyzer (LICA's Thermo 51C, s/n: 436609739), which was sensitive to shifts in barometric pressure, was removed and a replacement analyzer (LICA's Thermo 51C, s/n: 436609738) was installed. Seven hours of downtime were incurred.

NO₂/NO/NO_x:

- One hour of downtime was recorded on November 20 due to an additional zero-span check performed to assess a drift in span response.
- LICA's analyzer (API 200E, s/n: 592) malfunctioned on November 21 resulting in 61 hours of downtime. A replacement analyzer supplied by Maxxam (API 200A, s/n: 2051) was installed on November 23. Data was invalidated from November 21 at hour 03:00 to November 23 at hour 09:00.

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	14	7	3	5.7	WNW	5	20	100.0
H ₂ S (ppb)	10	3	0	0	0	3	25	18	6.7	N	1	16	100.0
THC (ppm)	-	-	-	-	2.26	2.99	19	0	2.1	NNE	2.59	18	96.3
NO ₂ (ppb)	159	-	0	-	3	18	18	3	3.2	SW	10	18	91.4
NO (ppb)	-	-	-	-	0	12	27	27	12.9	NW	2	27	91.4
NO _x (ppb)	-	-	-	-	4	27	27	20	12.9	NW	10	18	91.4
RELATIVE HUMIDITY (%)	-	-	-	-	76	90	24	0	4.9	W	85	13	100.0
BAROMETRIC PRESSURE (millibar)	-	-	-	-	936	954	2	21	7.5	NNE	951	3	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	-9.5	3.9	30	13	4.0	WSW	-1.7	30	100.0
PRECIPITATION (mm)	-	-	-	-	0.0	1.6	14	1	13.8	NNE	0.3	14	100.0
VECTOR WS (kph)	-	-	-	-	0.5	15.3	27	13	-	WNW	8.8	15	100.0
VECTOR WD (sec)	-	-	-	-	320 (NW)	-	-	-	-	-	-	-	100.0

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 2.
- One instance of maximum instantaneous data was discarded due to brief power outage on November 22 at hour 10:00.

HYDROGEN SULPHIDE (H₂S)

- Operational time, for the monitoring period, was 100%.
- A shut-down and subsequent installation calibrations were performed on November 2 to replace Maxxam's analyzer (API 101E, s/n: 722) with LICA's analyzer (API 101E, s/n: 510) in order to address the zero/span system instability exhibited in the October monitoring period. The output voltage was also calibrated during this site visit.
- One instance of maximum instantaneous data was discarded due to brief power outage on November 22 at hour 10:00.

TOTAL HYDROCARBONS (THC)

- Operational time for the monitoring period, was 96.3% equivalent to 27 hours of downtime.
- The routine monthly calibration was performed on November 2.
- Data collected on November 16 from hour 00:00 to 17:00 were invalidated due to low gas pressure. A new fuel gas cylinder was installed on the same day, followed by a zero-span check at 18:00-19:00. Twenty hours of downtime were incurred.
- On November 22, the resident analyzer (LICA's Thermo 51C, s/n: 436609739) was removed and a replacement analyzer (LICA's Thermo 51C, s/n: 436609738) was installed. The resident analyzer was removed for maintenance as it appeared to be sensitive to shifts in Barometric Pressure. Seven hours of downtime were incurred due to the additional quality calibrations.
- One instance of maximum instantaneous data was discarded due to brief power outage on November 22 at hour 10:00.

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

- Operational time for the monitoring period was 91.4%, equivalent to 62 hours of downtime.
- The routine monthly calibration was performed on November 2.
- A zero-span check was manually triggered on November 20 at 08:00 to assess the results of the scheduled zero-span check on the previous day as it had approached the upper acceptance limit. The result was within AMD requirements and closer to the mean. One hour of downtime was incurred due to the additional quality check.
- LICA's analyzer (API 200E, s/n: 592) malfunctioned on November 21, prompting a site visit on November 22. Shut-down calibration/onsite maintenance was not possible due to the state of the analyzer. The cause of the malfunction could not be identified at the time. A replacement analyzer supplied by Maxxam (API 200A, s/n: 2051) was mobilized to the station on November 22 and was installed on November 23. Data was invalidated back to the point of malfunction, determined to be November 21 at hour 03:00. Sixty-one hours of downtime were incurred as a result.
- The expected span value was readjusted on November 24, following the post-calibration adjustment.

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

- Operational time, for the monitoring period, was 100%.
- One instance of maximum instantaneous data was discarded due to brief power outage on November 22 at hour 10:00.
- One instance of maximum instantaneous data was invalidated on November 8 at hour 07:00, due to an anomalous spike. Review of the minute data, bracketing the spike, did not support the validity of the elevated measurement.
- 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%.

BAROMETRIC PRESSURE (BP)

- Operational time, for the monitoring period, was 100%.

PRECIPITATION (PRECIP)

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

3.0 Plant Monthly Required AMD Summary

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

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

4.0 Calculations and Results

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

5.0 Methods and Procedures

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

- Met One Instruments: Operation Manual Document No. 50.5-9800
- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO₂/NO_x Monitoring
- Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring
- Maxxam AIR SOP-00242: Precipitation Collector Installation/Maintenance

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

- Sulphur Dioxide - API 100E UV Fluorescent Analyzer
- Hydrogen Sulphide - API 101E UV Fluorescent Analyzer
- Total Hydrocarbons - Thermo 51C FID Analyzer
- Oxides of Nitrogen - API 200E and 200A Chemiluminescent Analyzers
- Wind System - Met One Unit
- Relative Humidity - Met One Unit
- Barometric Pressure - Met One Unit
- Ambient Temperature - Met One Unit
- Precipitation - Met One Unit
- Datalogger - ESC 8832

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

Level 0 Preliminary Verification

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

Level 1 Primary Validation

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

Level 2 Final Validation

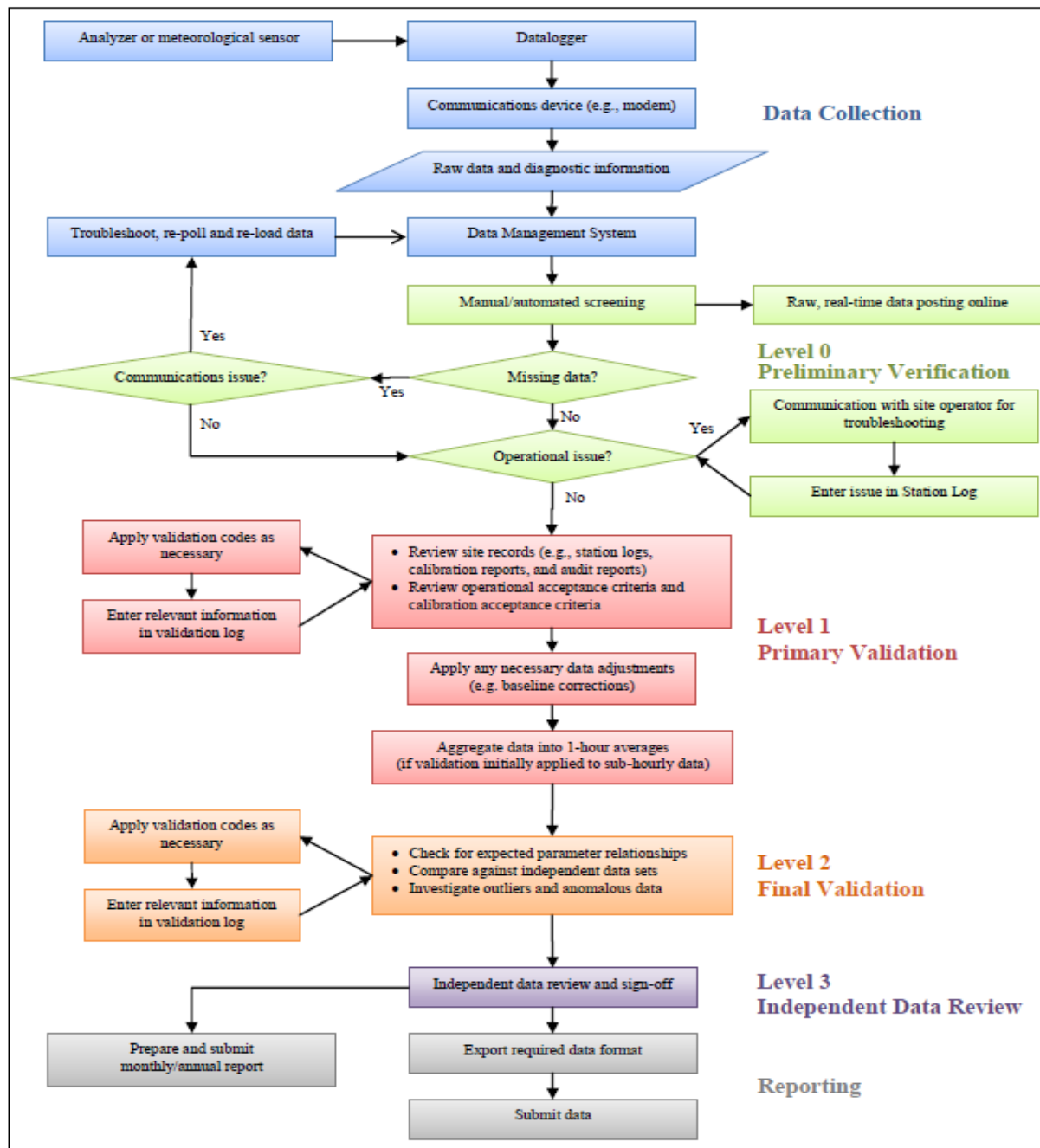
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

Level 3 Independent Data Review

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

Post-Final Validation

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



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

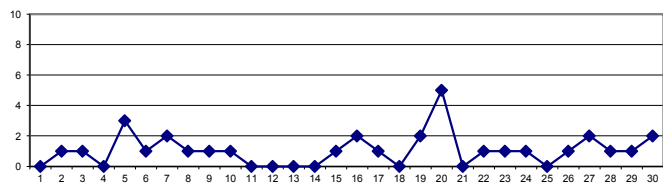
STATUS FLAG CODES

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

OBJECTIVE LIMIT:

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

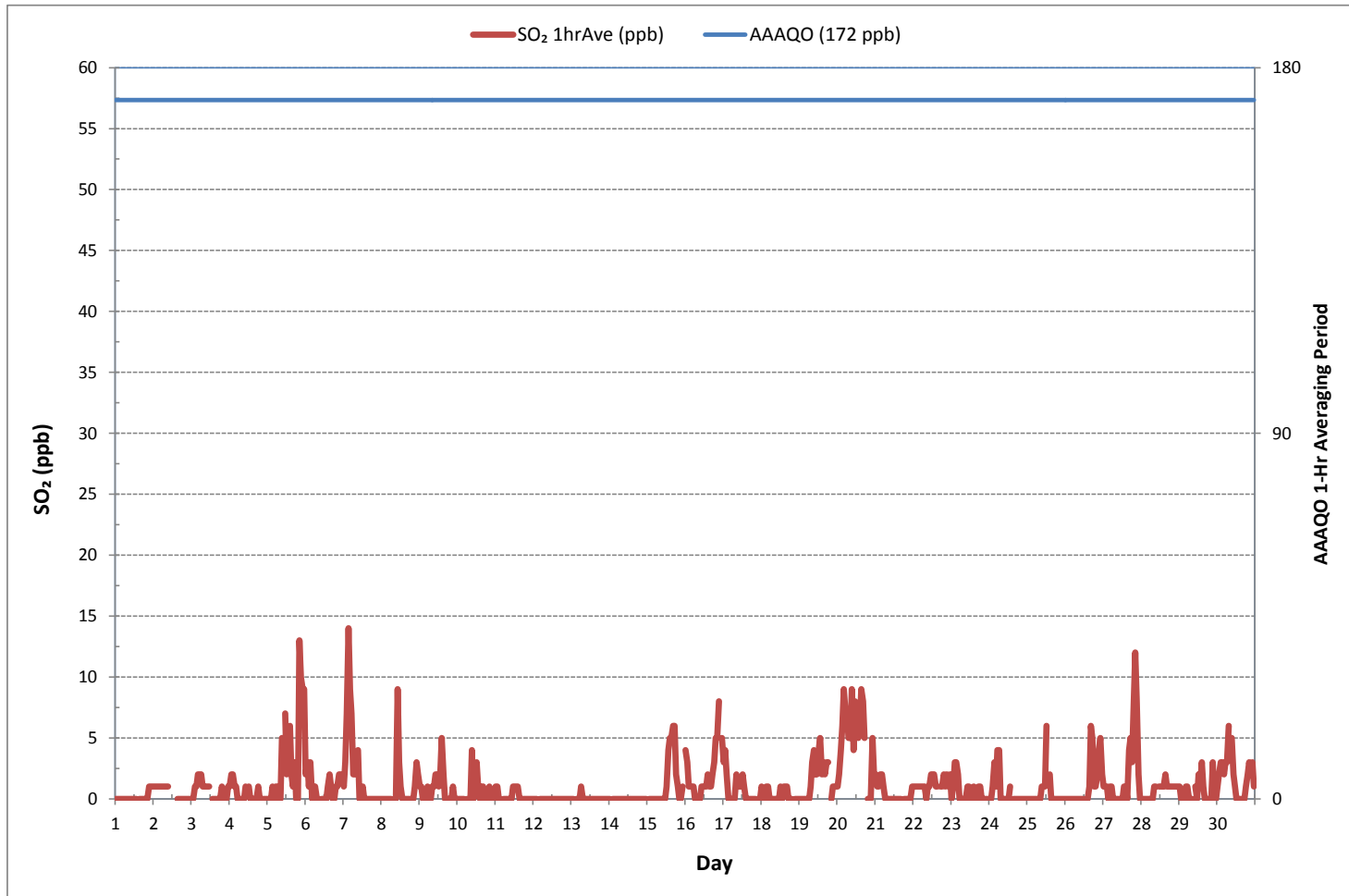
24 HR AVERAGES November 2017



MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0
NUMBER OF 24-HR EXCEEDANCES:	0
NUMBER OF NON-ZERO READINGS:	296
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR 0 ON DAY 1
MAXIMUM 1-HR AVERAGE:	14 ppb @ HOUR 3 ON DAY 7
MAXIMUM 24-HR AVERAGE:	5 ppb ON DAY 20
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	720 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	2
MONTHLY AVERAGE:	1 ppb

SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2017

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)

DAY	HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
	HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59				
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3	1	1	2	2	4	4	4	2	2	2	2	2	2	S	1	2	1	1	2	2	2	2	2	2	2	1	4	2	24
4	5	5	4	3	2	2	2	2	2	2	2	4	S	3	3	2	2	2	3	4	3	2	2	2	2	2	5	3	24
5	3	2	2	3	3	4	3	3	3	3	19	S	16	7	8	15	11	5	20	2	3	25	17	18	17	2	25	9	24
6	8	9	3	14	2	2	2	2	2	S	1	1	1	2	2	2	3	2	2	2	2	3	4	4	4	1	14	3	24
7	2	6	18	26	15	16	4	4	S	11	1	1	6	4	1	1	1	1	1	1	1	1	1	1	1	1	26	5	24
8	1	1	1	2	2	1	1	S	1	2	27	14	3	1	1	2	2	2	2	2	2	2	4	5	4	1	27	4	24
9	4	5	4	2	2	4	S	2	4	3	5	5	4	5	9	7	3	2	3	3	3	3	4	3	3	2	9	4	24
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12	2	2	2	S	3	2	2	2	2	2	2	4	5	4	2	2	2	2	2	2	3	4	3	3	4	2	5	3	24
13	4	3	S	3	3	4	4	4	3	3	3	3	4	4	3	3	3	3	3	3	3	3	3	3	4	3	4	3	24
14	3	S	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	24
15	S	2	2	2	2	2	2	2	2	2	2	2	4	7	12	14	14	11	14	9	8	3	7	6	S	2	14	6	24
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20	6	8	31	22	21	22	16	14	13	16	18	18	16	16	15	18	22	14	S	3	3	3	13	8	3	31	15	24	
21	8	4	4	11	8	7	3	2	2	2	2	2	2	2	2	2	S	3	3	3	3	3	3	4	2	11	4	24	
22	4	4	4	4	4	4	4	4	4	5	P	6	5	6	6	5	S	5	6	7	6	5	10	8	11	4	11	6	23
23	5	12	13	16	16	5	5	5	5	5	7	7	7	6	8	S	6	6	6	6	6	6	5	6	5	5	16	7	24
24	5	6	6	12	11	17	15	5	4	4	5	4	5	4	S	4	4	4	4	4	4	4	4	4	4	4	17	6	24
25	4	4	4	4	4	4	4	4	4	5	5	5	6	16	S	11	4	6	3	3	3	4	4	3	4	3	16	5	24
26	4	3	3	3	3	3	3	3	3	3	4	4	S	5	6	8	14	13	10	5	11	13	14	13	3	14	7	24	
27	6	6	6	6	6	7	6	5	6	6	S	5	5	8	7	5	17	16	12	19	22	21	10	5	5	22	9	24	
28	4	4	4	4	4	4	5	4	5	5	S	5	5	5	8	6	5	5	5	5	5	5	5	5	5	4	8	5	24
29	5	5	5	5	5	6	5	5	5	S	14	4	10	6	10	7	4	4	6	5	5	9	4	5	4	14	6	24	
30	5	6	8	10	7	8	8	12	S	14	7	5	4	4	4	4	4	4	6	7	7	9	9	12	5	4	14	7	24
HOURLY MAX		12	12	31	26	21	22	16	14	13	22	27	18	16	19	15	18	22	20	13	19	25	21	18	17				
HOURLY AVG		5	5	6	6	5	5	4	4	4	6	6	6	6	5	6	5	6	6	5	4	6	6	5	5				

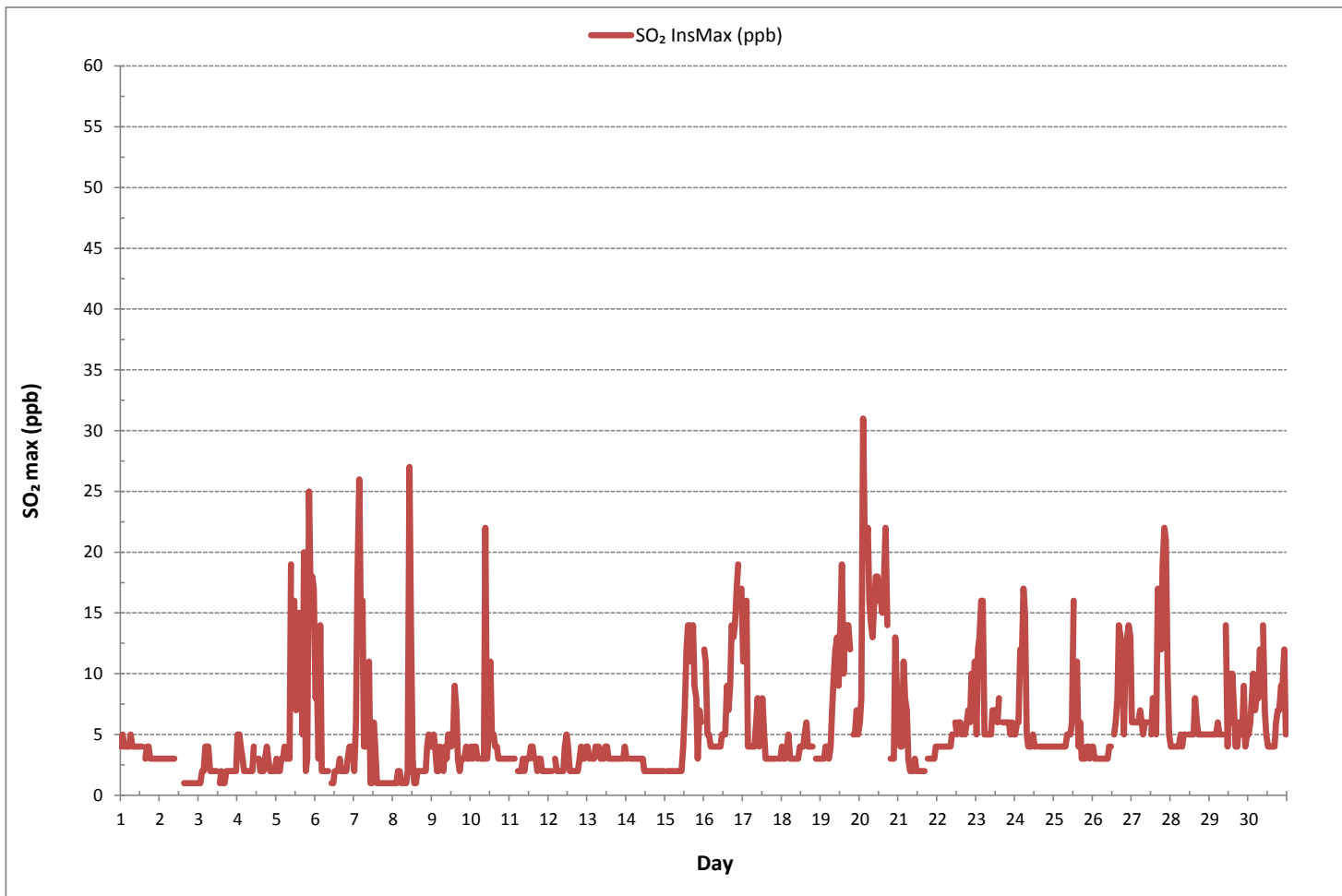
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	684
MAXIMUM INSTANTANEOUS VALUE:	31 ppb @ HOUR 2 ON DAY 20
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	5
OPERATIONAL TIME:	719 hrs

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)









Wind: LICA MASKWA
 Poll.: LICA MASKWA-SO₂[ppb]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

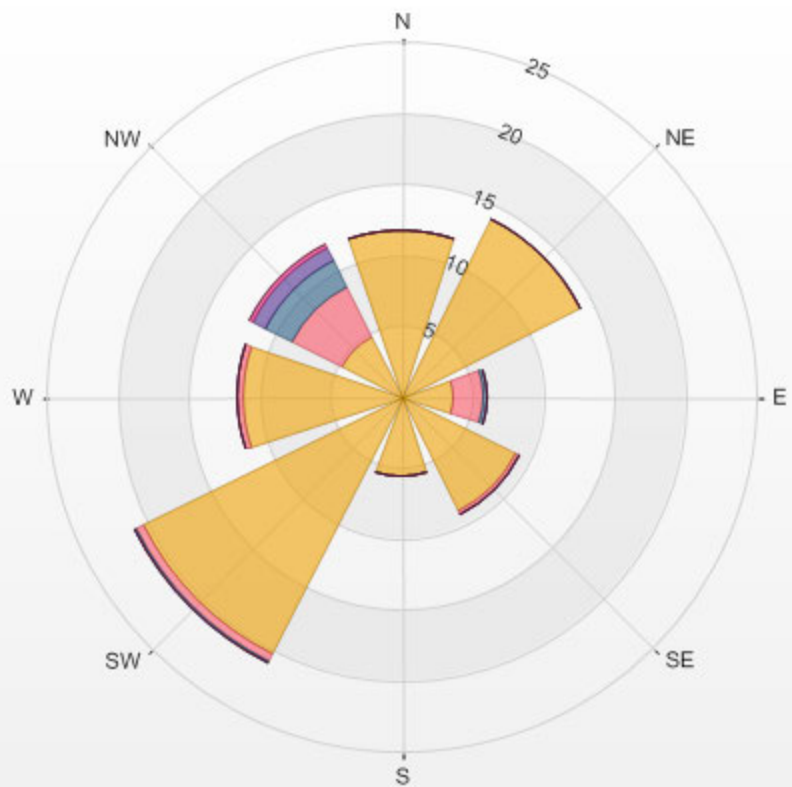
Calm: 8.63%

Calm Avg: 0.26 [ppb]

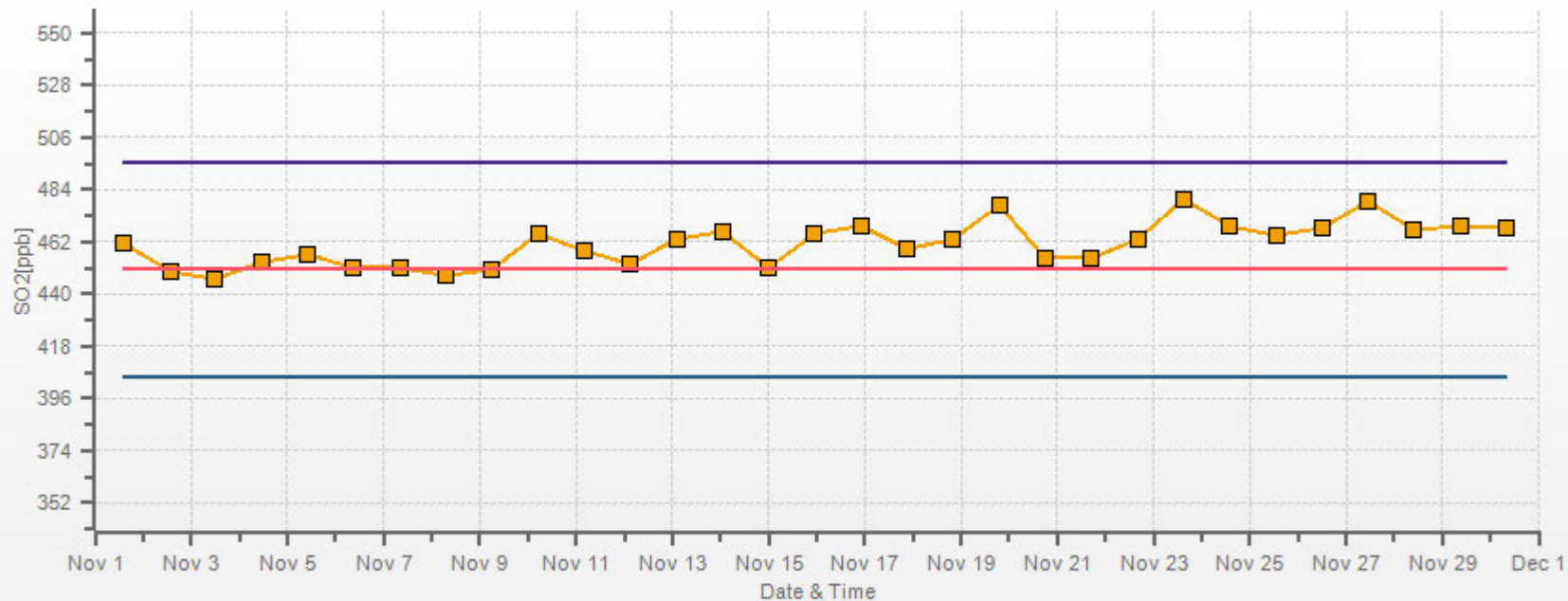
Direction	0.0-3.0	3.0-6.0	6.0-9.0	9.0-12.0	12.0-15.0	>15.0	Total
N	11.7	0.0	0.0	0.0	0.0	0.0	11.7
NE	14.0	0.0	0.0	0.0	0.0	0.0	14.0
E	3.7	2.2	0.2	0.0	0.0	0.0	6.0
SE	9.1	0.3	0.0	0.0	0.0	0.0	9.4
S	5.7	0.0	0.0	0.0	0.0	0.0	5.7
SW	20.3	0.6	0.2	0.0	0.0	0.0	21.1
W	11.3	0.3	0.0	0.0	0.0	0.0	11.6
NW	4.7	4.0	2.2	0.9	0.3	0.0	12.0
Summary	80.4	7.3	2.5	0.9	0.3	0.0	91.4

% Icon	Classes (ppb)	80	 0.0-3.0	7	 3.0-6.0	2	 6.0-9.0	1	 9.0-12.0	0	 12.0-15.0	0	 >15.0
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LICA MASKWA Poll.: LICA MASKWA-SO2[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 8.63% Calm Poll Avg: 0.26[ppb]



SO2[ppb] Calibration: LICA MASKWA Monthly: 17/11 Type: Span



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

HYDROGEN SULPHIDE



HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	24
2	0	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	24
3	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
4	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
5	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
6	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
7	0	1	1	1	1	1	0	1	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
8	0	0	0	0	0	0	1	S	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24
9	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
10	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
11	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
12	0	1	1	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
13	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	24
14	0	S	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
15	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	S	0	1	0	24
16	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	0	1	1	24
17	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	1	0	24
18	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	S	0	0	0	0	1	0	24
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	S	0	0	0	0	0	1	0	24
20	0	1	1	1	1	1	1	1	1	1	0	0	1	0	0	1	0	0	S	0	0	0	0	0	0	1	0	24
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	24
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	24
23	0	0	0	1	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	1	0	24
24	0	0	0	0	0	0	0	0	0	1	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	1	0	24
25	0	0	0	0	0	0	1	0	0	0	0	0	0	0	S	0	0	0	0	3	1	1	0	0	0	3	0	24
26	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
27	0	0	0	0	0	0	0	0	1	0	0	S	0	0	0	0	1	1	1	1	1	1	1	0	0	1	0	24
28	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	24
29	1	2	2	2	2	2	0	1	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	24
30	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
HOURLY MAX	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	3	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				

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

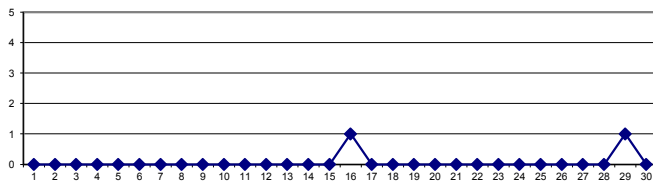
OBJECTIVE LIMIT:

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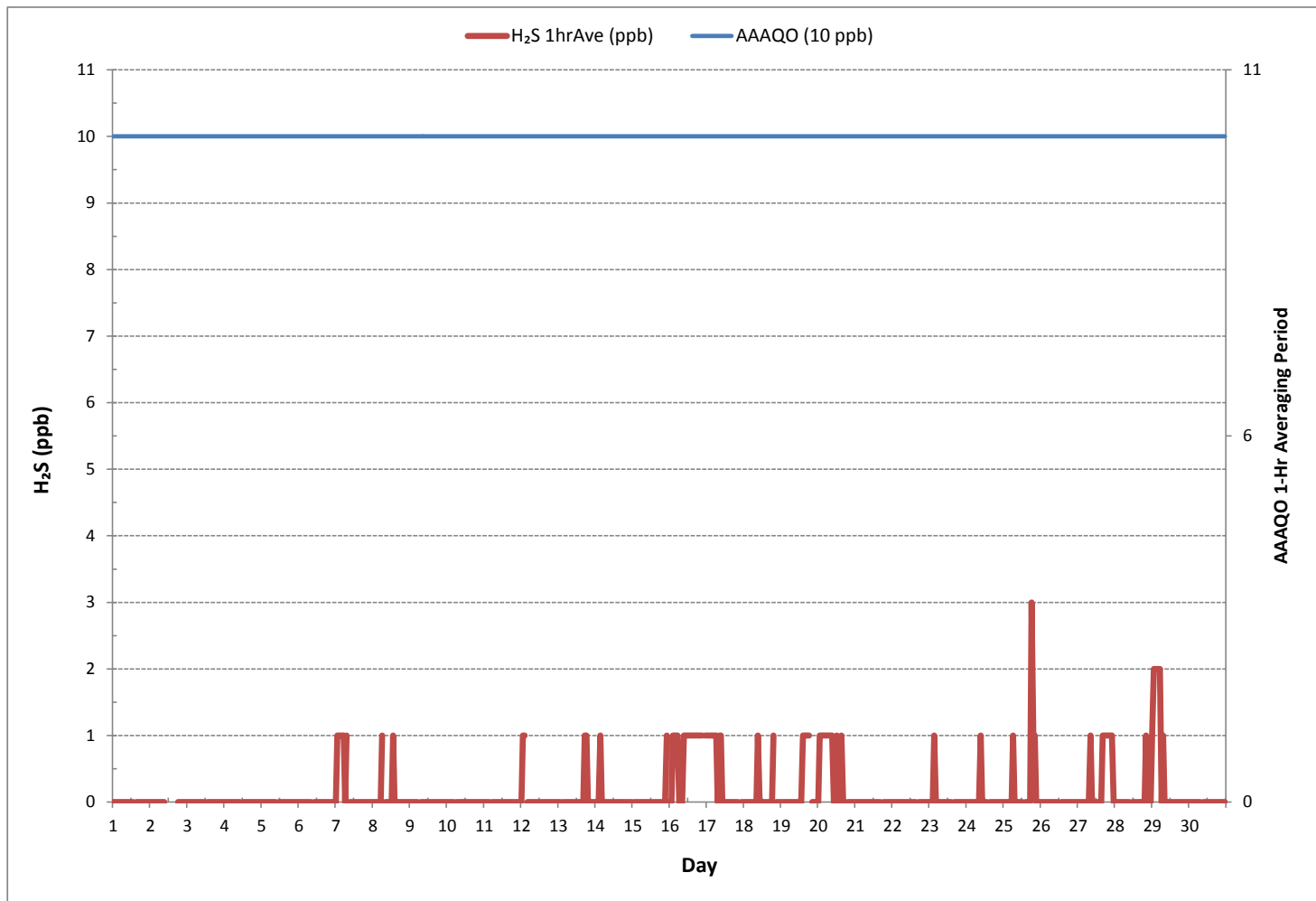
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	81				
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0	ON DAY	1	
MAXIMUM 1-HR AVERAGE:	3 ppb @ HOUR	18	ON DAY	25	
MAXIMUM 24-HR AVERAGE:	1 ppb		ON DAY	16	
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	720	hrs
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	0		MONTHLY AVERAGE:	0	ppb

24 HR AVERAGES November 2017



HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2017

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

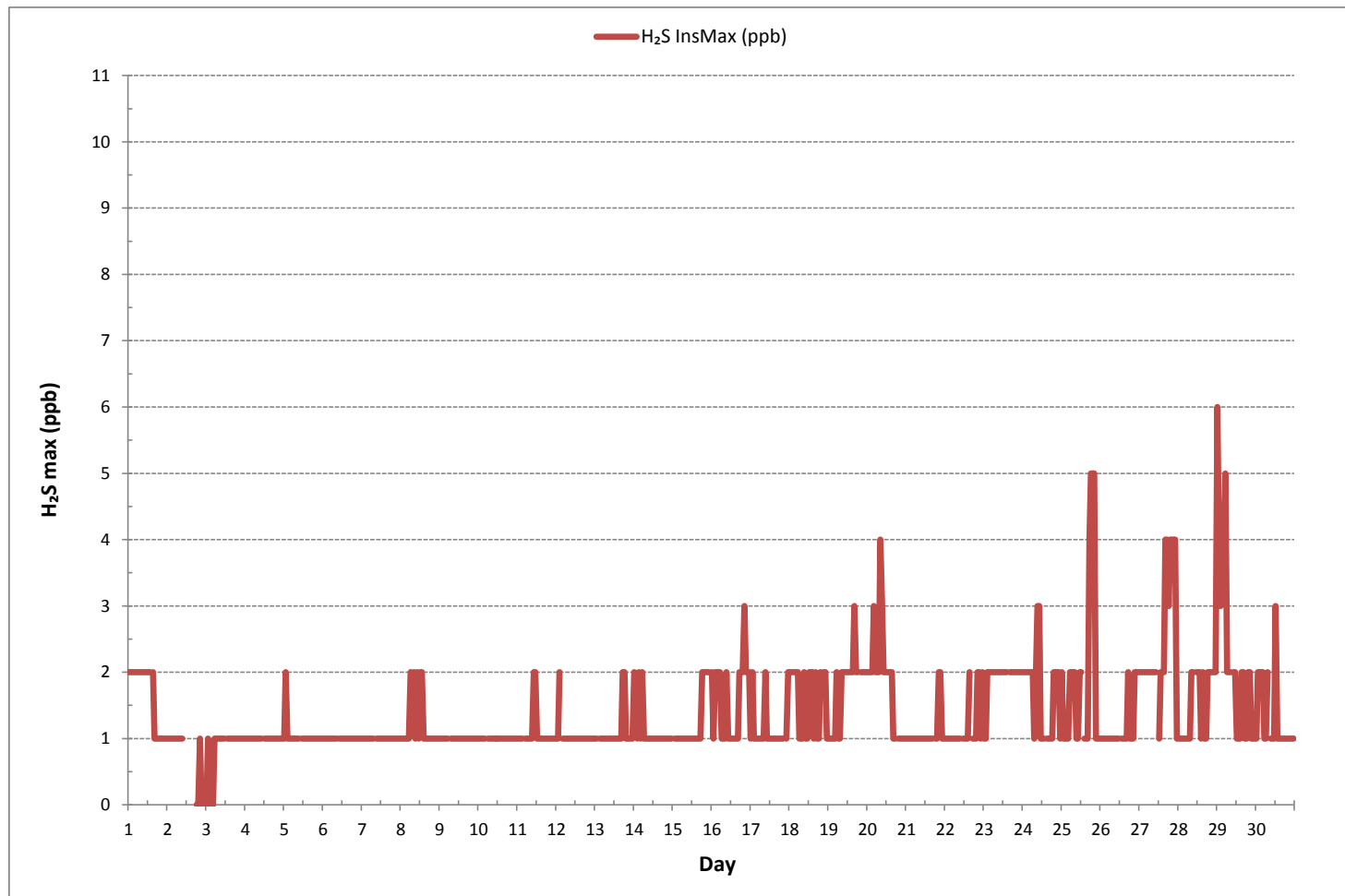
STATUS FLAG CODES

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:	672
MAXIMUM INSTANTANEOUS VALUE:	6 ppb @ HOUR 0 ON DAY 29
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	1
OPERATIONAL TIME:	719 hrs

HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)



Wind: LICA MASKWA
 Poll.: LICA MASKWA-H₂S[ppb]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 8.66% Calm Avg: 0.29 [ppb]

Direction	0.0-1.3	1.3-2.7	2.7-4.0	>4.0	Total
N	11.5	0.2	0.0	0.0	11.6
NE	13.8	0.0	0.0	0.0	13.8
E	6.0	0.0	0.0	0.0	6.0
SE	9.4	0.0	0.0	0.0	9.4
S	5.7	0.0	0.0	0.0	5.7
SW	20.6	0.6	0.0	0.0	21.2
W	11.6	0.0	0.0	0.0	11.6
NW	12.0	0.0	0.0	0.0	12.0
Summary	90.6	0.7	0.0	0.0	91.3

% Icon Classes (ppb)

91 0.0-1.3

1

1.3-2.7

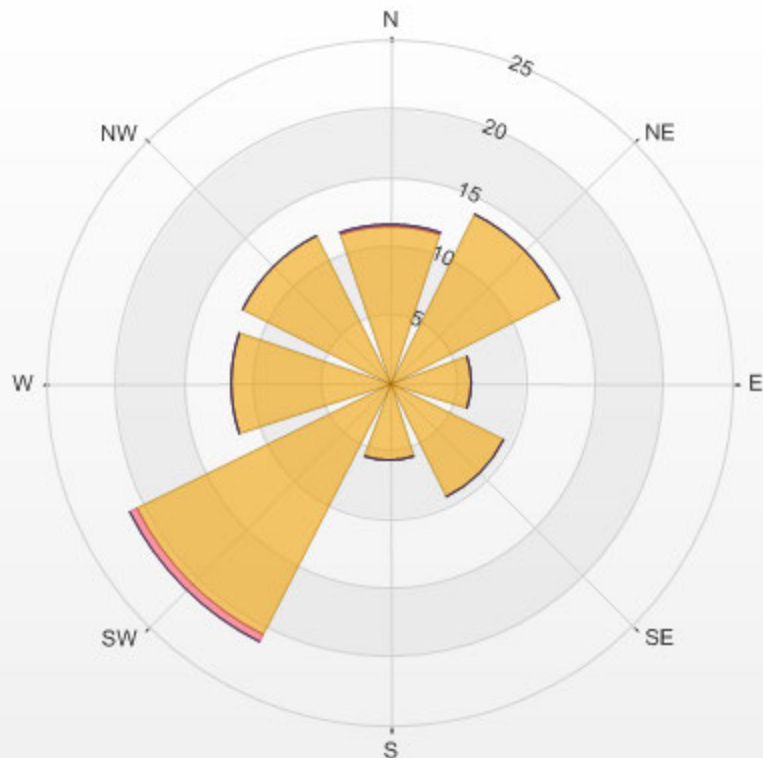
0

2.7-4.0

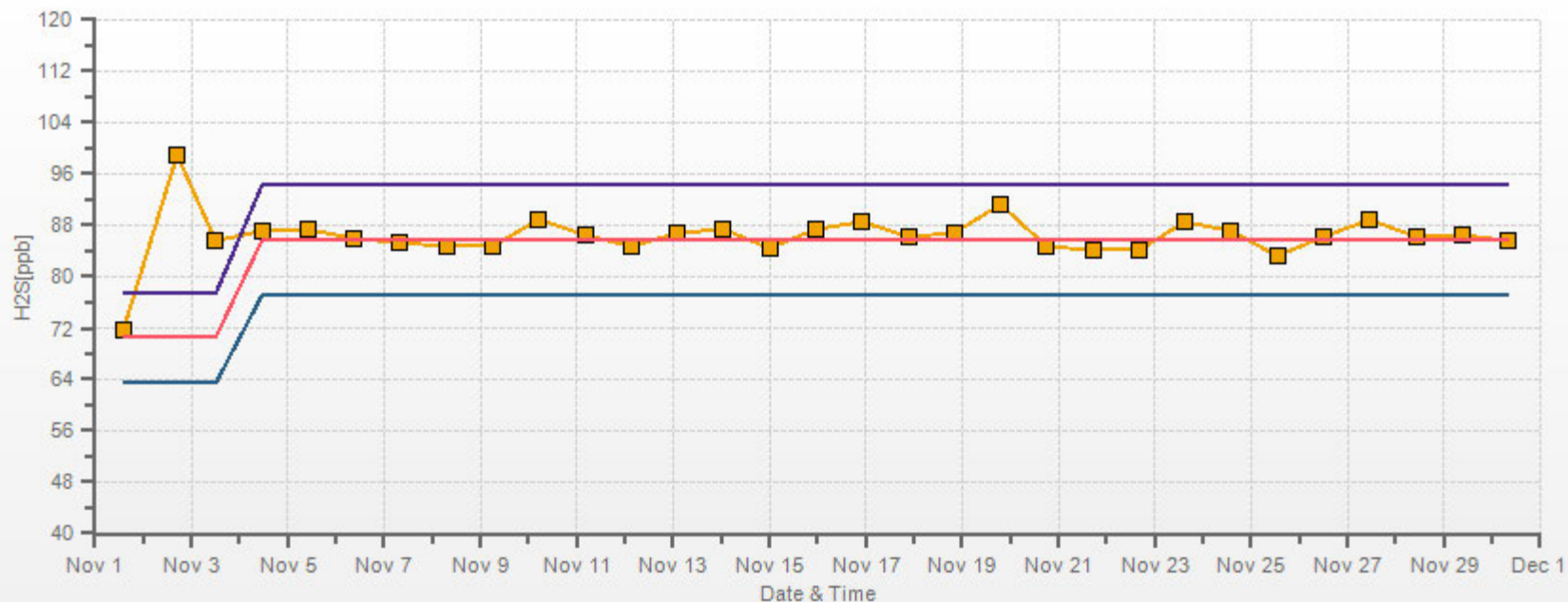
0

>4.0

LICA MASKWA Poll.: LICA MASKWA-H2S[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 8.66% Calm Poll Avg: 0.29[ppb]



H2S[ppb] Calibration: LICA MASKWA Monthly: 17/11 Type: Span



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

TOTAL HYDROCARBON



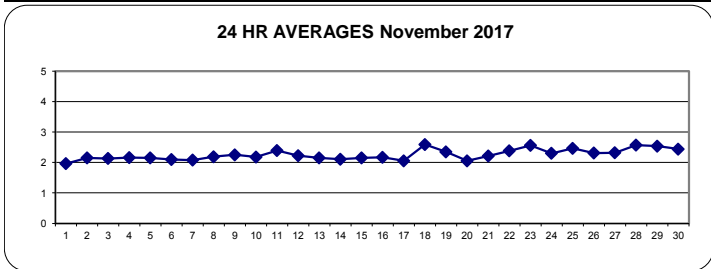
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	1.92	1.93	1.94	1.94	1.92	1.95	1.95	1.96	1.94	1.93	1.94	1.93	1.93	1.98	S	1.93	1.94	1.98	1.99	2.01	2.04	2.05	2.06	2.07	1.92	2.07	1.97	24
2	2.08	2.10	2.11	2.13	2.16	2.17	2.19	2.22	2.23	2.22	2.17	2.11	2.10	2.09	2.15	2.22	C	C	C	C	C	2.14	2.17	2.17	2.08	2.23	2.15	24
3	2.17	2.18	2.18	2.17	2.17	2.16	2.14	2.16	2.15	2.20	2.29	2.42	S	2.05	2.05	2.05	2.05	2.06	2.05	2.05	2.06	2.07	2.07	2.06	2.05	2.42	2.13	24
4	2.08	2.09	2.08	2.08	2.10	2.14	2.17	2.18	2.19	2.12	2.11	S	2.06	2.07	2.08	2.08	2.12	2.14	2.24	2.29	2.28	2.33	2.33	2.40	2.06	2.40	2.16	24
5	2.37	2.33	2.30	2.34	2.30	2.31	2.29	2.27	2.27	2.18	S	2.05	2.06	2.06	2.04	2.03	2.02	2.04	2.01	2.02	2.07	2.05	2.07	2.01	2.01	2.37	2.15	24
6	2.05	2.06	2.06	2.07	2.06	2.09	2.16	2.17	2.20	S	2.12	2.24	2.06	2.05	2.04	2.04	2.05	2.06	2.07	2.09	2.11	2.11	2.14	2.19	2.04	2.24	2.10	24
7	2.23	2.19	2.15	2.11	2.10	2.08	2.07	2.08	S	2.05	2.05	2.06	2.07	2.08	2.06	2.05	2.05	2.06	2.04	2.03	2.04	2.04	2.04	2.05	2.03	2.23	2.08	24
8	2.04	2.08	2.10	2.16	2.35	2.40	2.27	S	2.25	2.16	2.10	2.09	2.03	2.04	2.05	2.18	2.21	2.16	2.20	2.25	2.26	2.29	2.35	2.37	2.03	2.40	2.19	24
9	2.42	2.44	2.39	2.27	2.30	2.41	S	2.37	2.46	2.32	2.30	2.39	2.34	2.32	2.18	2.10	2.11	2.13	2.11	2.08	2.07	2.11	2.12	2.13	2.07	2.46	2.26	24
10	2.15	2.14	2.14	2.16	2.18	S	2.16	2.25	2.29	2.29	2.22	2.21	2.20	2.18	2.17	2.16	2.18	2.18	2.17	2.17	2.17	2.18	2.15	2.11	2.11	2.29	2.18	24
11	2.08	2.07	2.09	2.14	S	2.58	2.42	2.44	2.42	2.33	2.35	2.47	2.41	2.41	2.30	2.34	2.47	2.41	2.45	2.50	2.55	2.58	2.59	2.59	2.07	2.59	2.39	24
12	2.62	2.47	2.34	S	2.19	2.19	2.15	2.15	2.16	2.18	2.18	2.17	2.18	2.15	2.15	2.14	2.17	2.22	2.22	2.23	2.22	2.21	2.19	2.19	2.14	2.62	2.22	24
13	2.17	2.17	S	2.19	2.23	2.23	2.24	2.24	2.22	2.21	2.20	2.18	2.16	2.14	2.13	2.13	2.09	2.09	2.10	2.12	2.11	2.09	2.07	2.07	2.07	2.24	2.16	24
14	2.07	S	2.05	2.06	2.08	2.10	2.10	2.12	2.12	2.12	2.11	2.12	2.13	2.14	2.13	2.10	2.13	2.17	2.16	2.13	2.11	2.10	2.11	2.09	2.05	2.17	2.11	24
15	S	2.09	2.13	2.16	2.18	2.19	2.20	2.21	2.20	2.19	2.20	2.18	2.17	2.19	2.16	2.15	2.12	2.11	2.10	2.12	2.13	2.14	2.11	S	2.09	2.21	2.16	24
16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	S1	S1	2.20	2.18	S	2.13	2.13	2.20	2.17	4
17	2.11	2.09	2.06	2.03	2.05	2.05	2.02	2.02	2.05	2.02	2.00	2.01	2.02	1.99	1.97	1.99	2.01	2.05	2.10	2.11	2.13	S	2.13	2.18	1.97	2.18	24	
18	2.28	2.40	2.61	2.70	2.64	2.62	2.70	2.79	2.54	2.46	2.39	2.35	2.41	2.47	2.52	2.63	2.65	2.70	2.69	2.76	S	2.80	2.76	2.28	2.80	2.59	24	
19	2.99	2.72	2.67	2.58	2.53	2.45	2.41	2.44	2.37	2.32	2.28	2.27	2.29	2.31	2.30	2.25	2.20	2.19	2.21	S	2.09	2.10	2.10	2.07	2.07	2.99	2.35	24
20	2.05	2.12	2.06	2.00	1.99	2.03	1.96	2.00	2.08	2.03	2.00	2.00	2.03	2.06	2.02	2.05	2.07	2.05	S	2.07	2.09	2.12	2.16	2.19	1.96	2.19	2.05	24
21	2.23	2.25	2.24	2.25	2.26	2.24	2.25	2.23	2.23	2.28	2.28	2.33	2.19	2.14	2.17	2.17	2.14	S	2.19	2.22	2.19	2.16	2.15	2.15	2.14	2.33	2.21	24
22	2.14	2.13	2.12	2.13	2.17	2.20	2.27	2.29	2.33	2.51	2.56	C1	C1	C1	C1	C1	C1	C1	2.55	2.51	2.59	2.67	2.69	2.67	2.12	2.69	2.38	17
23	2.56	2.58	2.65	2.79	2.76	2.74	2.69	2.64	2.63	2.61	2.67	2.76	2.96	2.91	2.72	S	2.59	2.54	2.33	2.23	2.18	2.15	2.15	2.16	2.15	2.96	2.57	24
24	2.16	2.17	2.17	2.22	2.21	2.24	2.24	2.22	2.22	2.23	2.25	2.28	2.30	2.31	S	2.31	2.32	2.33	2.39	2.47	2.46	2.45	2.48	2.49	2.16	2.49	2.30	24
25	2.49	2.57	2.49	2.47	2.47	2.51	2.67	2.62	2.65	2.67	2.63	2.52	2.38	S	2.30	2.32	2.33	2.34	2.33	2.34	2.37	2.39	2.42	2.45	2.30	2.67	2.47	24
26	2.47	2.43	2.41	2.39	2.38	2.36	2.34	2.32	2.33	2.32	2.31	2.30	S	2.28	2.27	2.27	2.30	2.29	2.25	2.23	2.25	2.25	2.25	2.21	2.21	2.47	2.31	24
27	2.19	2.19	2.20	2.21	2.22	2.23	2.29	2.29	2.31	2.33	2.33	S	2.30	2.32	2.31	2.31	2.39	2.45	2.41	2.40	2.40	2.47	2.43	2.37	2.19	2.47	2.32	24
28	2.37	2.39	2.39	2.48	2.56	2.52	2.49	2.47	2.45	2.42	S	2.42	2.52	2.71	2.81	2.77	2.64	2.59	2.64	2.69	2.71	2.72	2.74	2.76	2.37	2.81	2.58	24
29	2.87	2.90	2.92	2.90	2.90	2.82	2.58	2.80	2.44	S	2.32	2.30	2.36	2.32	2.36	2.31	2.31	2.32	2.35	2.51	2.50	2.52	2.42	2.37	2.30	2.92	2.54	24
30	2.41	2.46	2.49	2.51	2.46	2.50	2.58	2.64	S	2.65	2.57	2.52	2.38	2.32	2.24	2.25	2.26	2.27	2.35	2.48	2.51	2.48	2.44	2.41	2.24	2.65	2.44	24
HOURLY MAX	2.99	2.90	2.92	2.90	2.90	2.82	2.70	2.80	2.65	2.67	2.67	2.76	2.96	2.91	2.81	2.77	2.65	2.70	2.69	2.76	2.71	2.80	2.76	2.76				
HOURLY AVG	2.28	2.28	2.27	2.27	2.28	2.30	2.29	2.31	2.29	2.27	2.26	2.26	2.23	2.23	2.22	2.20	2.22	2.23	2.25	2.26	2.25	2.27	2.27	2.27				

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 2017



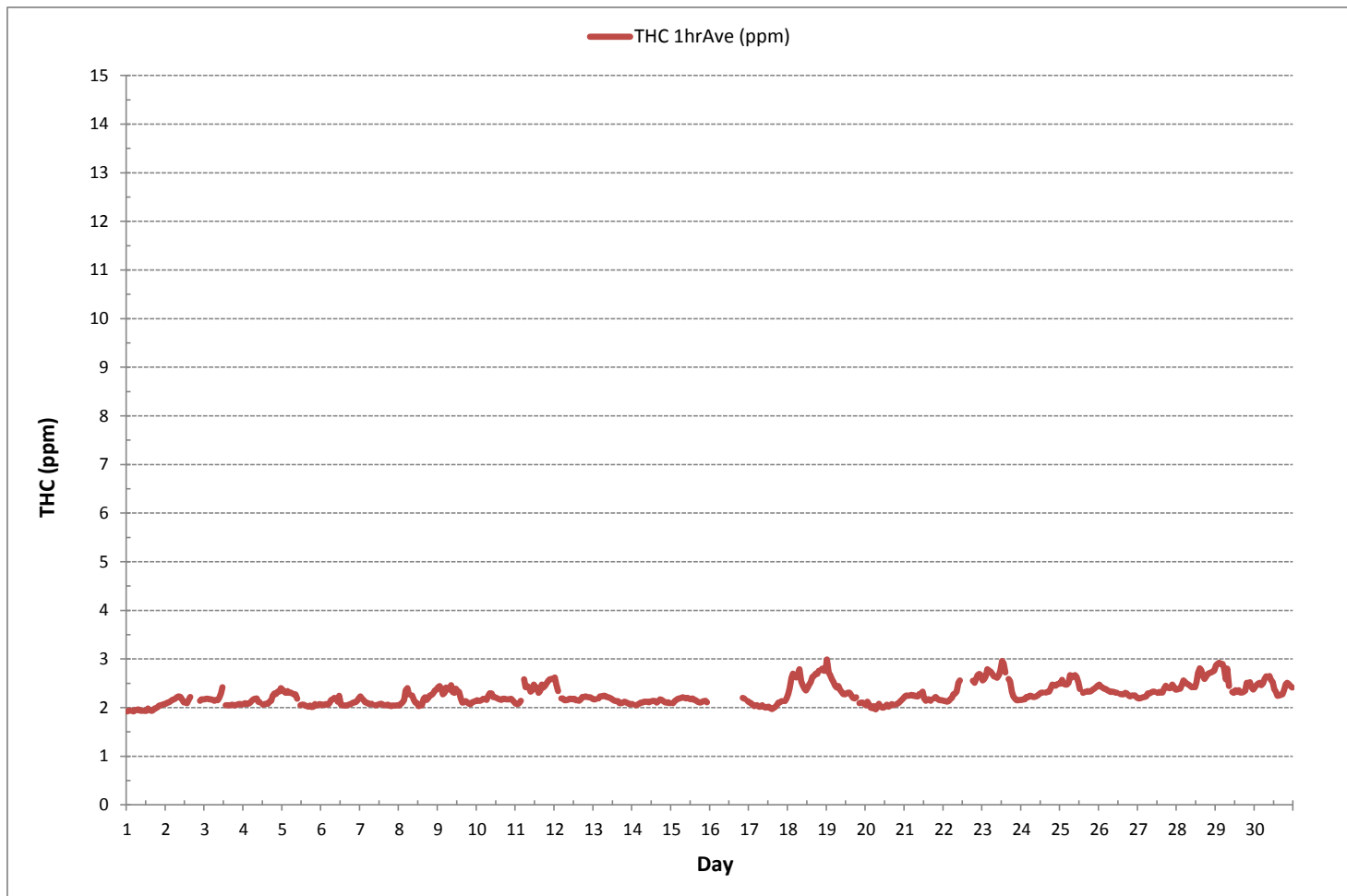
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	659			
MINIMUM 1-HR AVERAGE:	1.92 ppm	@ HOUR	0 ON DAY	1
MAXIMUM 1-HR AVERAGE:	2.99 ppm	@ HOUR	0 ON DAY	19
MAXIMUM 24-HR AVERAGE:	2.59 ppm		ON DAY	18
IZS CALIBRATION TIME:	29 hrs	OPERATIONAL TIME:	693 hrs	
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	96.3 %	
STANDARD DEVIATION:	0.21	MONTHLY AVERAGE:	2.26 ppm	



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2017

TOTAL HYDROCARBONS Hourly Averages (THC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2017

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	1.69	1.71	1.72	1.80	1.75	1.81	1.81	1.84	1.84	1.84	1.87	1.88	1.90	2.08	S	1.91	1.93	1.97	1.99	2.02	2.05	2.05	2.06	2.09	1.69	2.09	1.90	24	
2	2.09	2.11	2.12	2.15	2.18	2.18	2.23	2.24	2.27	2.27	2.23	2.15	2.14	2.12	2.21	2.27	C	C	C	C	C	2.21	2.24	2.21	2.09	2.27	2.19	24	
3	2.23	2.26	2.24	2.24	2.24	2.24	2.23	2.24	2.24	2.66	2.67	2.95	S	2.12	2.12	2.11	2.11	2.12	2.11	2.08	2.08	2.09	2.06	2.06	2.06	2.06	2.95	2.24	24
4	2.06	2.06	2.06	2.05	2.06	2.08	2.11	2.11	2.18	2.05	2.00	S	1.99	2.09	2.00	1.97	2.00	2.06	2.15	2.18	2.17	2.23	2.23	2.30	1.97	2.30	2.10	24	
5	2.27	2.21	2.18	2.21	2.18	2.20	2.15	2.15	2.14	2.12	S	1.96	2.12	2.03	1.99	2.00	1.97	2.03	1.96	1.96	2.05	2.03	2.02	2.06	1.96	2.27	2.09	24	
6	2.03	2.03	2.05	2.08	2.08	2.11	2.32	2.26	2.36	S	2.20	2.33	2.15	2.10	2.08	2.08	2.09	2.09	2.11	2.12	2.14	2.14	2.18	2.24	2.03	2.36	2.15	24	
7	2.27	2.24	2.21	2.15	2.14	2.12	2.12	2.11	S	2.12	2.11	2.12	2.15	2.15	2.15	2.12	2.15	2.15	2.15	2.14	2.17	2.17	2.17	2.20	2.11	2.27	2.16	24	
8	2.20	2.24	2.27	2.50	2.64	2.87	2.54	S	2.49	2.36	2.33	2.27	2.21	2.23	2.21	2.45	2.43	2.32	2.36	2.40	2.40	2.45	2.48	2.52	2.20	2.87	2.40	24	
9	2.57	2.58	2.52	2.42	2.49	2.55	S	2.48	2.53	2.44	2.33	2.40	2.36	2.32	2.21	2.09	2.03	2.03	2.03	1.96	1.93	1.96	1.94	1.93	1.93	2.58	2.27	24	
10	1.94	1.90	1.88	1.90	1.88	S	1.93	2.03	2.06	2.09	2.00	2.00	2.00	1.99	2.00	2.03	2.05	2.03	2.03	2.03	2.10	2.10	2.03	1.88	2.10	2.00	24		
11	2.00	2.00	2.05	2.11	S	2.83	2.42	2.73	2.70	2.32	2.40	2.49	2.45	2.45	2.33	2.39	2.62	2.46	2.51	2.58	2.62	2.70	2.76	2.71	2.00	2.83	2.46	24	
12	2.83	2.64	2.52	S	2.29	2.27	2.21	2.20	2.20	2.21	2.21	2.18	2.18	2.15	2.12	2.11	2.14	2.15	2.15	2.15	2.14	2.11	2.11	2.08	2.08	2.83	2.23	24	
13	2.05	2.03	S	2.06	2.09	2.08	2.09	2.08	2.06	2.06	2.03	2.00	1.99	1.97	1.96	1.94	1.91	1.90	1.90	1.91	1.91	1.87	1.86	1.87	1.86	2.09	1.98	24	
14	1.86	S	1.87	1.90	1.96	1.97	2.00	2.03	2.03	2.06	2.06	2.06	2.10	2.12	2.15	2.17	2.15	2.20	2.27	2.24	2.24	2.26	2.27	2.27	1.86	2.07	2.11	24	
15	S	2.23	2.24	2.26	2.26	2.24	2.24	2.24	2.21	2.18	2.18	2.15	2.12	2.30	2.17	2.05	2.03	1.96	1.93	1.96	1.91	1.93	1.88	S	1.88	2.30	2.12	24	
16	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	S1	S1	1.93	1.88	S	1.84	1.84	1.93	1.88	4
17	1.84	1.81	1.81	1.78	1.84	1.84	1.81	1.81	1.86	1.84	1.84	1.90	1.91	1.88	1.87	1.90	1.93	2.00	2.03	2.06	2.10	S	2.11	2.15	1.78	2.15	1.91	24	
18	2.27	2.46	2.61	2.65	2.58	2.62	3.30	3.30	2.49	2.45	2.33	2.27	2.36	2.40	2.50	2.55	2.58	2.60	2.58	2.77	S	2.73	2.60	2.60	2.27	3.30	2.59	24	
19	3.10	2.64	2.45	2.37	2.30	2.21	2.12	2.14	2.08	2.00	1.96	1.90	1.91	1.90	1.80	1.83	1.77	1.72	1.72	S	1.66	1.69	1.72	1.71	1.66	3.10	2.03	24	
20	1.74	1.90	1.93	1.80	1.81	2.18	1.81	1.96	2.11	2.02	1.93	1.98	2.09	2.39	2.06	2.14	2.18	2.15	S	2.18	2.21	2.26	2.30	2.33	1.74	2.39	2.06	24	
21	2.36	2.40	2.39	2.40	2.43	2.40	2.41	2.39	2.40	2.46	2.45	2.52	2.43	2.33	2.38	2.38	2.33	S	2.38	2.41	2.36	2.32	2.30	2.30	2.30	2.52	2.39	24	
22	2.27	2.24	2.23	2.24	2.27	2.32	2.36	2.36	2.42	2.87	P	C1	C1	C1	C1	C1	C1	C1	2.66	2.57	2.62	2.69	2.63	2.63	2.23	2.87	2.46	16	
23	2.48	2.54	2.63	2.79	2.70	2.63	2.57	2.51	2.48	2.47	2.51	2.63	2.81	2.70	2.60	S	2.38	2.32	2.20	2.01	2.01	1.93	2.29	1.95	1.93	2.81	2.44	24	
24	1.95	1.96	1.98	2.10	2.02	2.10	2.08	2.04	2.04	2.05	2.07	2.11	2.13	2.15	S	2.14	2.20	2.17	2.39	2.32	2.35	2.31	2.41	2.81	1.95	2.81	2.17	24	
25	2.39	2.52	2.48	2.38	2.33	2.46	2.60	2.55	2.57	2.52	2.54	2.44	2.29	S	2.20	2.18	2.20	2.20	2.20	2.20	2.23	2.26	2.27	2.32	2.18	2.60	2.36	24	
26	2.33	2.30	2.26	2.24	2.23	2.21	2.20	2.17	2.17	2.17	2.15	2.14	S	2.11	2.11	2.11	2.14	2.14	2.08	2.05	2.08	2.07	2.06	2.03	2.03	2.33	2.15	24	
27	1.96	1.96	1.97	1.98	1.99	1.99	2.05	2.04	2.05	2.07	S	2.03	2.12	2.21	2.17	2.32	2.59	2.43	2.32	2.43	2.49	2.46	2.15	1.96	2.59	2.17	24		
28	2.15	2.21	2.26	2.33	2.39	2.33	2.33	2.32	2.26	2.24	S	2.29	2.35	2.63	2.64	2.63	2.54	2.42	2.49	2.51	2.55	2.57	2.62	2.62	2.15	2.64	2.42	24	
29	2.93	2.78	2.80	2.75	2.88	2.78	2.57	2.74	2.65	S	2.27	2.15	2.26	2.26	2.32	2.17	2.15	2.17	2.24	2.38	2.38	2.41	2.30	2.20	2.15	2.93	2.46	24	
30	2.27	2.32	2.33	2.39	2.30	2.38	2.43	2.51	S	2.51	2.43	2.41	2.23	2.20	2.08	2.09	2.09	2.12	2.26	2.35	2.38	2.36	2.32	2.26	2.08	2.51	2.31	24	
HOURLY MAX	3.10	2.78	2.80	2.79	2.88	2.87	3.30	3.30	2.70	2.87	2.67	2.95	2.81	2.70	2.64	2.63	2.62	2.60	2.66	2.77	2.62	2.73	2.76	2.81					
HOURLY AVG	2.22	2.22	2.22	2.22	2.23	2.29	2.25	2.27	2.26	2.24	2.20	2.22	2.18	2.20	2.18	2.15	2.16	2.16	2.20	2.22	2.18	2.22	2.23	2.22					

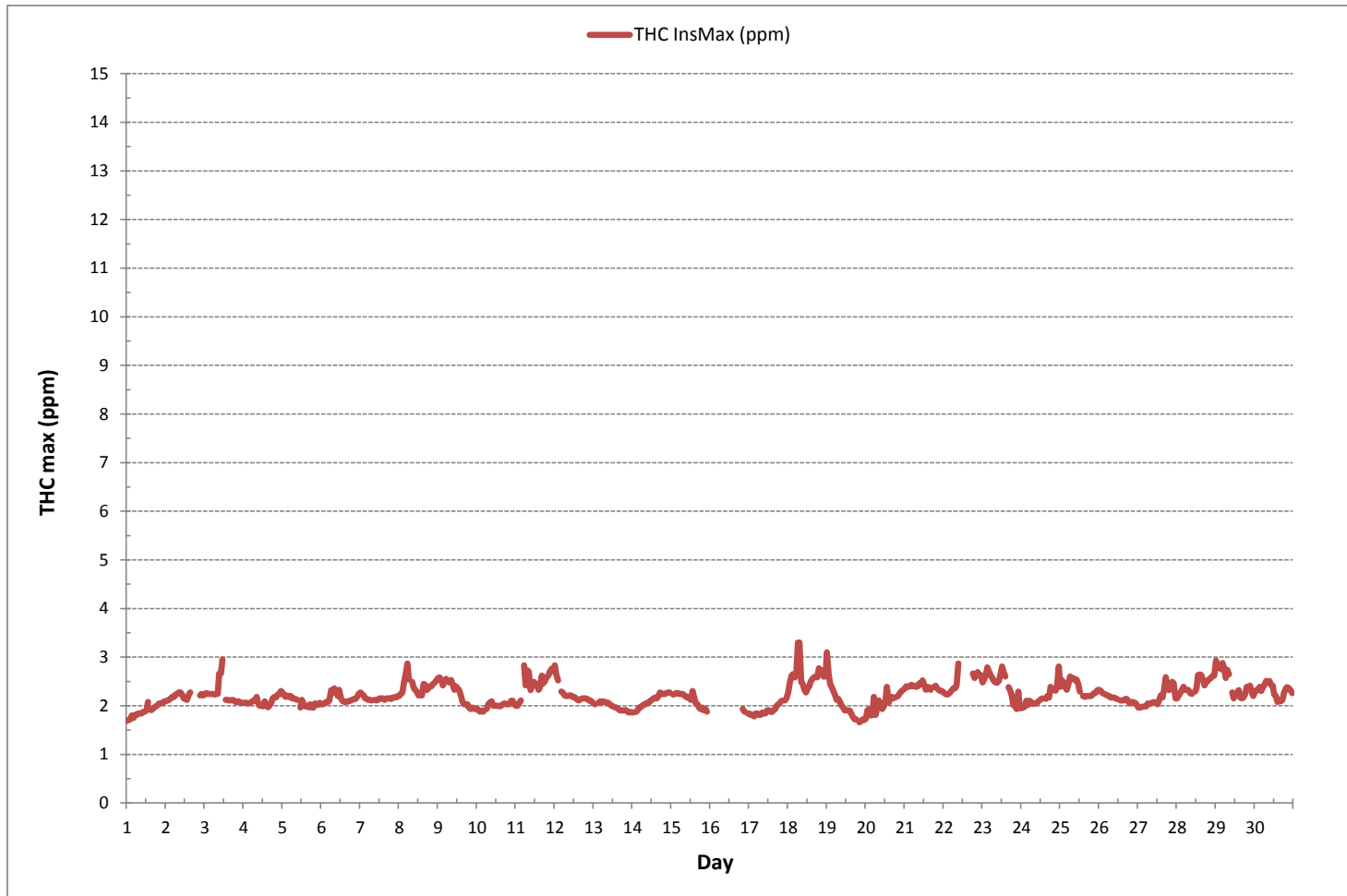
STATUS FLAG CODES

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:	658
MAXIMUM INSTANTANEOUS VALUE:	3.30 ppm @ HOUR 6 ON DAY 18
IZS CALIBRATION TIME:	29 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	692 hrs
STANDARD DEVIATION:	0.25

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)



Wind: LICA MASKWA
 Poll.: LICA MASKWA-THC[ppm]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 8.66% Calm Avg: 2.42 [ppm]

Direction	0.0-1.0	1.0-2.0	2.0-3.0	>3.0	Total
N	0.0	1.4	9.4	0.0	10.8
NE	0.0	1.4	13.5	0.0	14.9
E	0.0	0.0	5.9	0.0	5.9
SE	0.0	0.0	9.1	0.0	9.1
S	0.0	0.0	5.9	0.0	5.9
SW	0.0	0.0	21.1	0.0	21.1
W	0.0	0.6	11.4	0.0	12.0
NW	0.0	0.6	10.9	0.0	11.6
Summary	0.0	4.0	87.4	0.0	91.4

% Icon Classes (ppm)

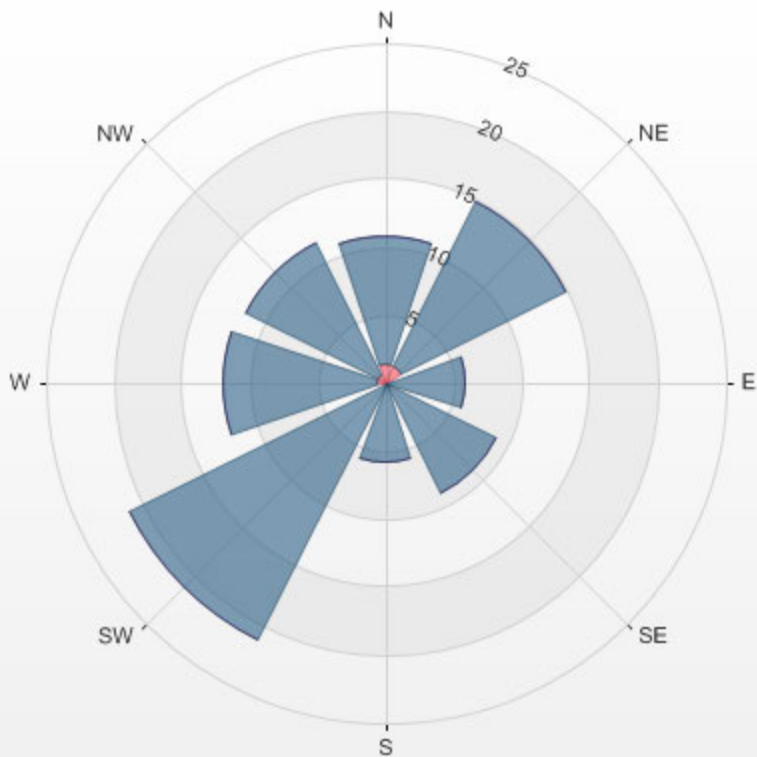
0 0.0-1.0

4 1.0-2.0

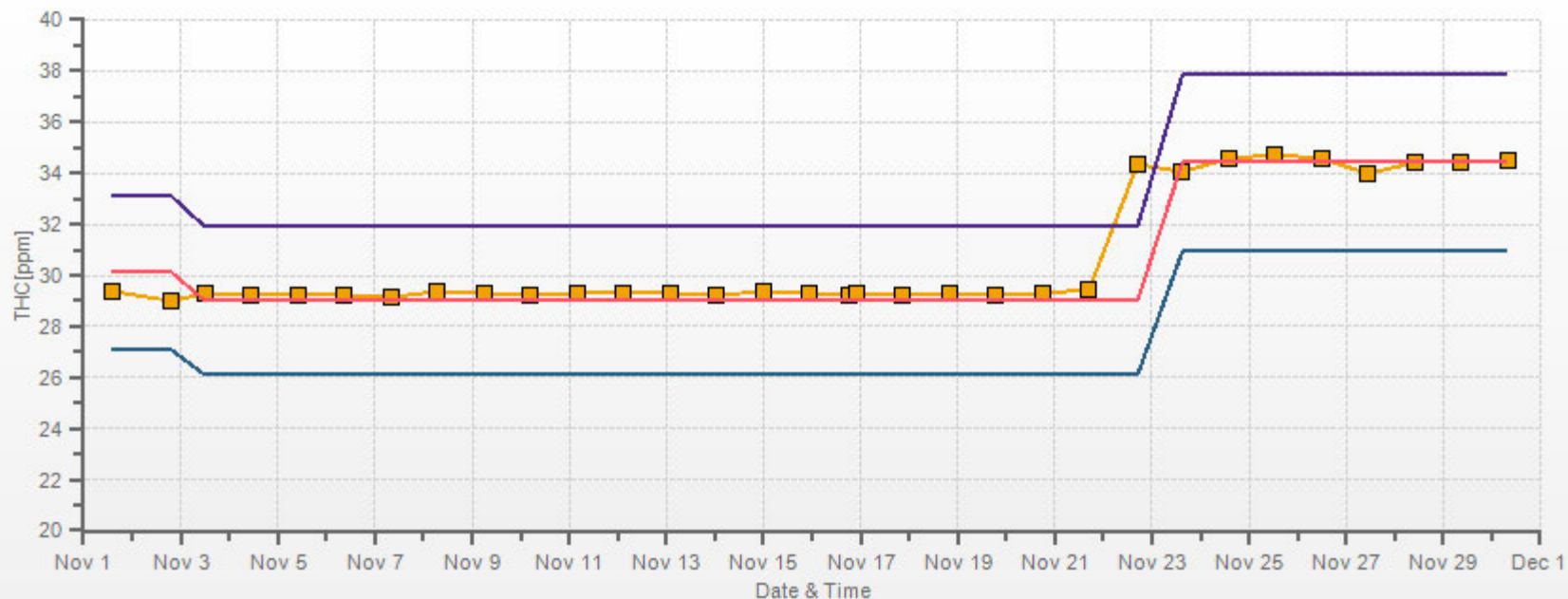
87 2.0-3.0

0 >3.0

LICA MASKWA Poll.: LICA MASKWA-THC[ppm] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 8.66% Calm Poll Avg: 2.42[ppm]



THC[ppm] Calibration: LICA MASKWA Monthly: 17/11 Type: Span



Span Meas Span Ref Span Low Span High

OXIDES OF NITROGEN



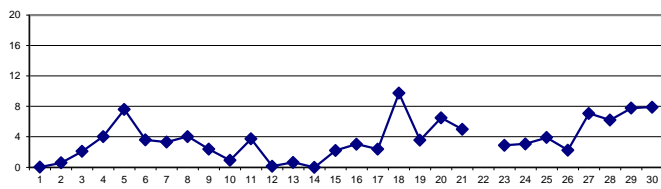
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
DAY 1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	1	0	24
2	0	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	1	2	2	1	1	1	2	0	0	2	1	24
3	2	3	3	3	3	3	3	3	1	1	1	1	S	0	1	1	1	1	2	5	4	2	2	2	0	0	5	2	24
4	4	8	8	3	4	3	3	2	2	2	6	S	3	2	2	1	2	2	6	6	5	6	6	7	1	8	4	24	
5	7	7	6	8	7	10	9	9	8	9	S	8	5	6	8	5	5	7	1	1	16	12	10	11	1	16	8	24	
6	2	5	4	6	2	5	7	6	2	S	2	3	1	1	2	4	3	2	2	3	3	5	6	7	1	7	4	24	
7	6	12	13	15	11	7	2	4	S	4	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	15	3	24	
8	0	0	0	1	2	2	4	S	10	6	9	5	3	0	0	4	8	4	4	3	4	6	9	9	0	10	4	24	
9	8	9	7	3	2	7	S	7	5	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	9	2	24	
10	0	0	0	1	0	S	1	1	2	7	1	1	3	0	0	1	1	0	0	0	0	0	1	1	0	7	1	24	
11	1	2	1	1	S	3	2	2	2	2	2	2	3	3	3	4	6	7	7	8	8	7	6	4	1	8	4	24	
12	2	1	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	
13	0	0	S	0	0	2	4	4	1	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	4	1	24	
14	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	
15	S	0	0	0	0	0	0	0	0	0	0	0	2	4	6	7	9	7	5	2	1	1	5	S	0	9	2	24	
16	6	3	2	1	1	1	0	0	0	0	1	2	1	1	2	3	3	4	6	8	8	10	S	7	0	10	3	24	
17	6	6	2	1	1	2	1	2	9	4	2	3	2	0	1	1	1	1	1	1	1	S	2	3	0	9	2	24	
18	7	8	14	18	16	12	10	11	15	7	4	4	6	7	10	11	11	11	9	9	S	9	8	7	4	18	10	24	
19	6	6	5	4	3	2	1	2	3	4	3	3	4	4	4	5	4	6	5	S	1	2	3	2	1	6	4	24	
20	2	7	5	7	11	8	9	8	S1	12	5	9	7	4	7	10	10	6	S	0	1	1	8	6	0	12	7	23	
21	5	6	5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	5	6	5	3
22	X	X	X	X	X	X	X	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-
23	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C1	C1	C1	C1	C1	C1	10	8	4	1	0	0	0	0	0	10	3	8	
24	0	2	5	9	1	9	9	1	1	1	1	2	2	2	S	3	3	3	4	3	3	3	2	2	0	9	3	24	
25	1	1	1	1	1	1	6	9	12	7	7	9	13	S	6	2	2	1	1	1	1	2	2	3	1	13	4	24	
26	4	3	1	1	0	0	0	0	0	0	0	1	S	1	1	2	8	7	2	1	4	6	7	3	0	8	2	24	
27	1	1	1	2	2	3	4	3	3	3	0	S	3	7	6	3	13	14	10	20	27	19	10	5	1	27	7	24	
28	1	1	1	4	5	5	7	5	6	8	S	9	9	9	10	11	8	6	6	6	6	6	6	8	1	11	6	24	
29	8	6	6	8	10	11	9	17	9	S	7	3	10	7	11	10	10	4	4	7	6	9	4	3	3	17	8	24	
30	5	7	9	10	7	9	12	16	S	19	13	10	5	5	4	5	3	2	7	7	8	7	7	5	2	19	8	24	
HOURLY MAX	8	12	14	18	16	12	12	17	15	19	13	10	13	9	11	11	13	14	10	20	27	19	10	11					
HOURLY AVG	3	4	4	4	3	4	4	4	4	4	3	3	4	3	4	4	4	4	3	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

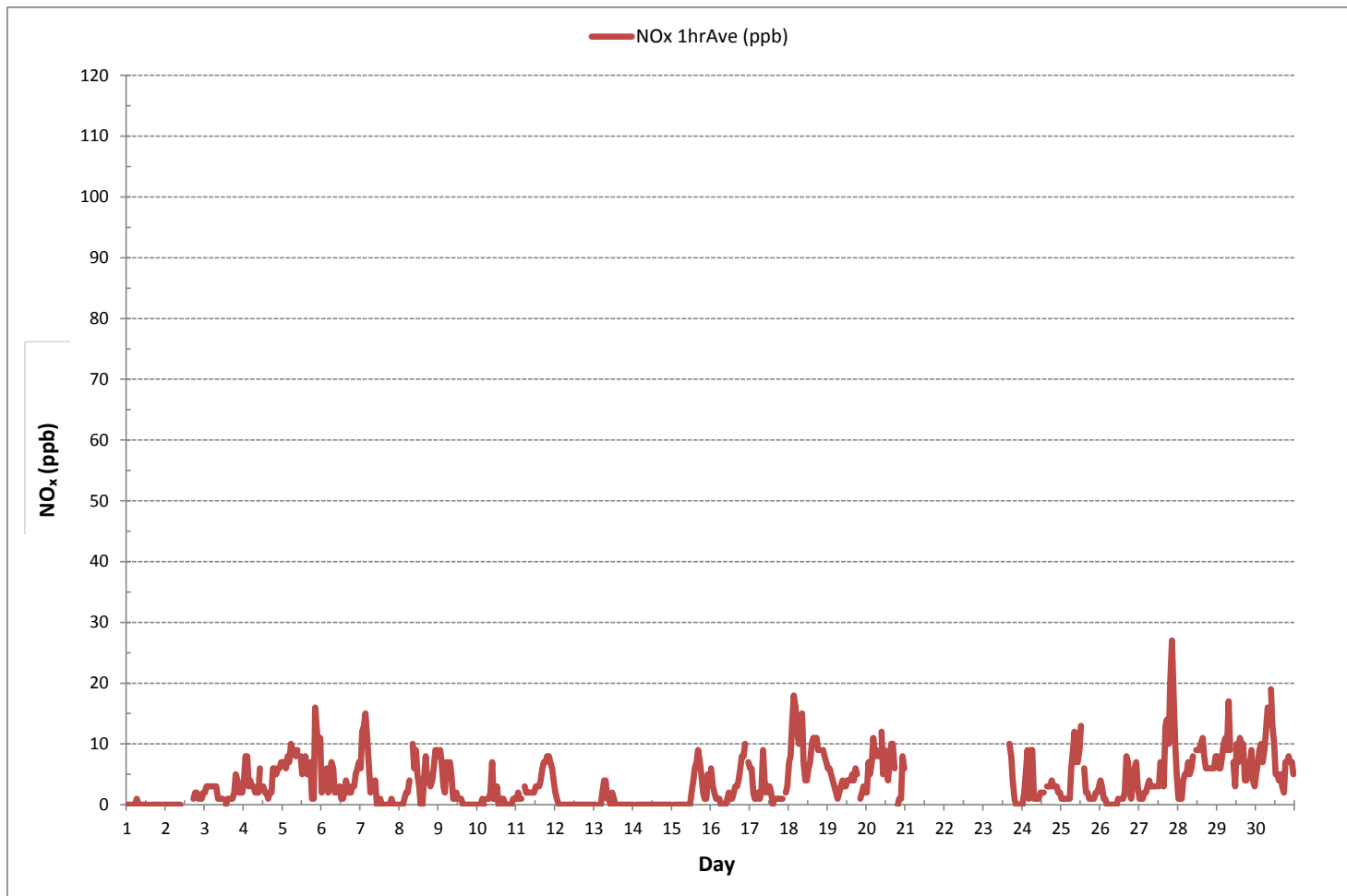
24 HR AVERAGES November 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	465			
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0	ON DAY	1
MAXIMUM 1-HR AVERAGE:	27 ppb @ HOUR	20	ON DAY	27
MAXIMUM 24-HR AVERAGE:	10 ppb		ON DAY	18
IZS CALIBRATION TIME:	27 hrs	OPERATIONAL TIME:	658 hrs	
MONTHLY CALIBRATION TIME:	7 hrs	AMD OPERATION UPTIME:	91.4 %	
STANDARD DEVIATION:	4	MONTHLY AVERAGE:	4 ppb	

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)





OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
DAY 1	0	0	0	0	0	1	2	1	0	0	0	1	0	0	S	0	0	0	0	0	0	0	0	0	0	0	2	0	24
2	0	0	0	0	0	0	2	2	0	1	C	C	C	C	C	C	C	C	C	3	3	2	2	3	3	0	3	1	24
3	4	5	5	5	6	6	6	5	4	4	S		3	3	4	4	4	6	9	8	5	5	5	3	9	5	24		
4	11	12	12	7	7	6	10	5	6	5	16	S		8	7	44	4	4	5	9	7	10	9	11	4	44	10	24	
5	10	10	9	12	10	13	12	13	12	25	S		20	10	12	20	15	15	25	3	4	30	22	21	20	3	30	15	24
6	11	13	8	18	8	9	14	58	6	S		6	7	5	5	6	8	7	5	6	6	7	9	10	11	5	58	11	24
7	10	17	25	31	19	22	7	64	S		14	3	3	10	7	3	3	4	3	3	5	4	3	4	3	3	64	12	24
8	3	3	3	6	6	5	9	S	18	18	18	13	8	3	7	15	75	9	11	8	8	13	15	14	3	75	13	24	
9	13	16	16	9	8	13	S	14	13	7	6	7	6	6	7	5	4	5	4	4	4	6	6	4	4	16	8	24	
10	6	4	5	5	5	S	7	5	7	31	5	7	15	6	6	6	5	5	4	5	5	5	6	6	4	31	7	24	
11	6	6	6	6	S	8	8	7	8	7	7	8	9	9	9	12	12	14	19	14	14	13	12	11	6	19	10	24	
12	9	8	6	S	5	4	5	4	4	4	6	8	7	5	5	4	4	4	4	5	6	5	5	6	4	9	5	24	
13	5	4	S	4	5	10	10	11	6	6	5	7	6	4	4	4	4	4	4	4	4	4	4	4	4	4	11	5	24
14	4	S	4	4	4	4	4	5	4	4	5	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	5	4	24
15	S	3	3	3	3	3	3	3	3	5	3	5	9	12	14	14	15	16	11	10	5	10	10	S	3	16	7	24	
16	12	11	6	8	4	4	3	4	4	4	4	6	5	5	10	8	11	18	17	20	20	23	S	21	3	23	10	24	
17	15	13	15	4	6	6	6	7	16	14	7	11	11	9	4	8	6	4	5	4	4	S	7	8	4	16	8	24	
18	11	14	21	22	21	19	18	17	27	18	9	10	11	12	17	15	16	16	14	15	S	14	13	12	9	27	16	24	
19	11	12	10	9	8	7	6	8	10	13	11	9	11	13	11	12	14	14	12	S	6	6	8	6	6	6	14	10	24
20	5	15	25	29	26	27	53	S1	S1	21	24	22	24	26	24	29	27	20	S	4	4	4	20	13	4	53	21	22	
21	12	9	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	9	12	10	3
22	X	X	X	X	X	X	X	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-
23	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C1	C1	C1	C1	C1	C1	30	12	7	3	2	2	2	1	1	30	7	8	
24	1	12	14	20	13	26	18	4	2	1	2	3	2	3	S	3	3	4	4	4	4	4	3	3	2	1	26	7	24
25	2	2	2	2	2	2	38	16	20	9	9	14	23	S	14	3	6	2	3	2	4	3	3	5	2	38	8	24	
26	5	3	2	1	0	0	0	0	0	0	0	1	S	2	3	5	13	13	6	2	9	12	13	10	0	13	4	24	
27	0	0	2	3	4	4	6	4	4	3	14	S	31	10	24	4	27	26	16	30	35	34	14	6	0	35	13	24	
28	3	2	0	6	6	5	14	5	10	10	S	11	11	12	40	13	9	7	6	6	6	6	11	0	40	9	24		
29	11	6	7	11	12	17	16	27	30	S	28	6	13	40	16	38	61	6	6	8	7	12	4	4	4	61	17	24	
30	5	7	10	12	8	10	34	17	S	44	34	25	7	9	28	71	5	2	32	9	9	9	12	6	2	71	18	24	
HOURLY MAX	15	17	25	31	26	27	53	64	30	44	34	25	31	40	44	71	75	26	32	30	35	34	21	21					
HOURLY AVG	7	8	8	9	8	9	12	12	9	11	9	9	10	9	13	12	14	9	8	7	8	9	8	8					

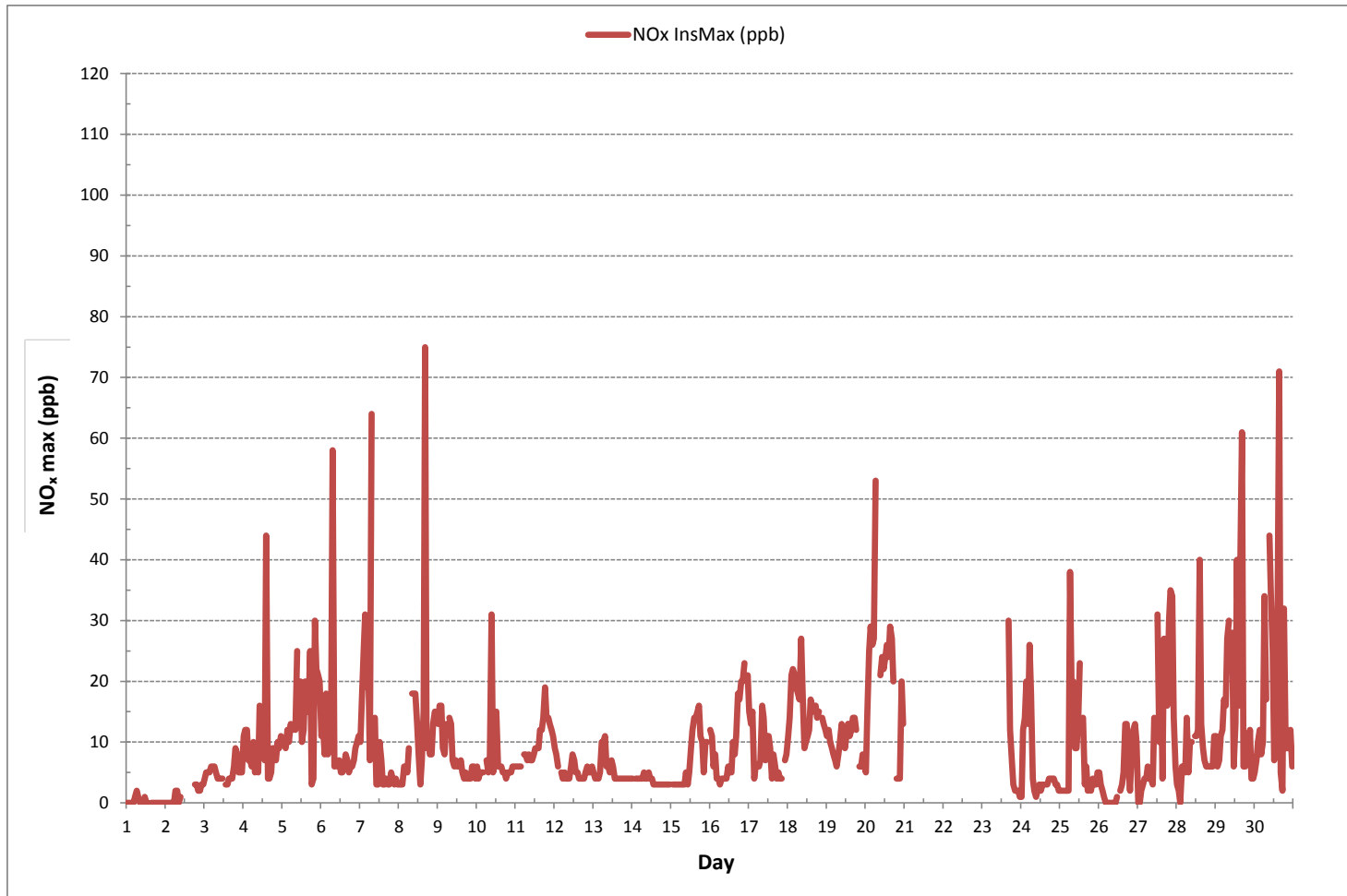
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	586
MAXIMUM INSTANTANEOUS VALUE:	75 ppb @ HOUR 16 ON DAY 8
IZS CALIBRATION TIME:	27 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	9
OPERATIONAL TIME:	657 hrs

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)



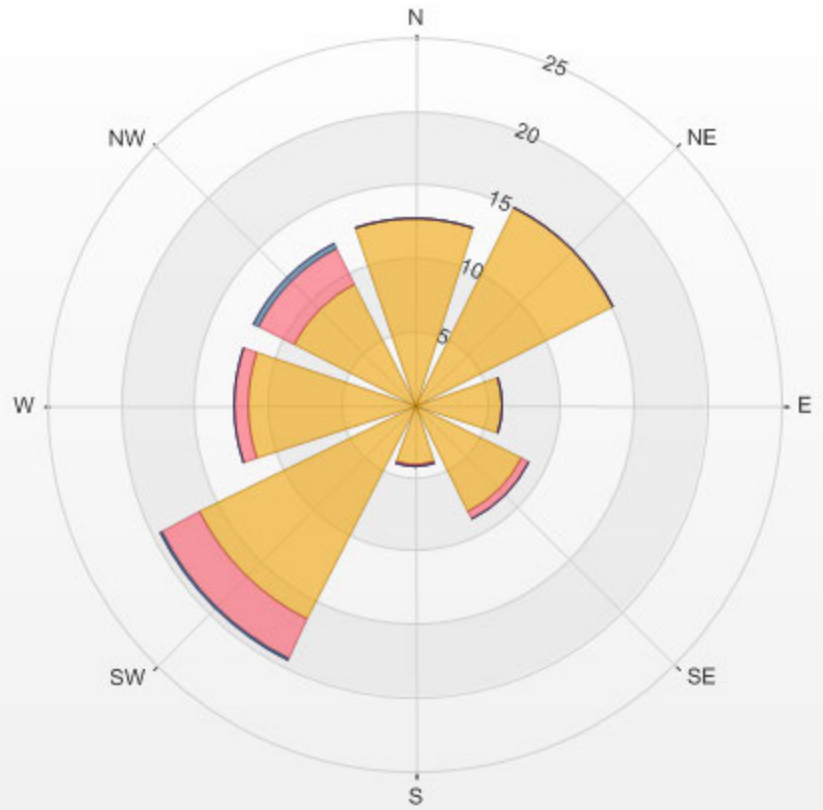
Wind: LICA MASKWA
 Poll.: LICA MASKWA-NOX[ppb]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 9.16% Calm Avg: 4.43 [ppb]

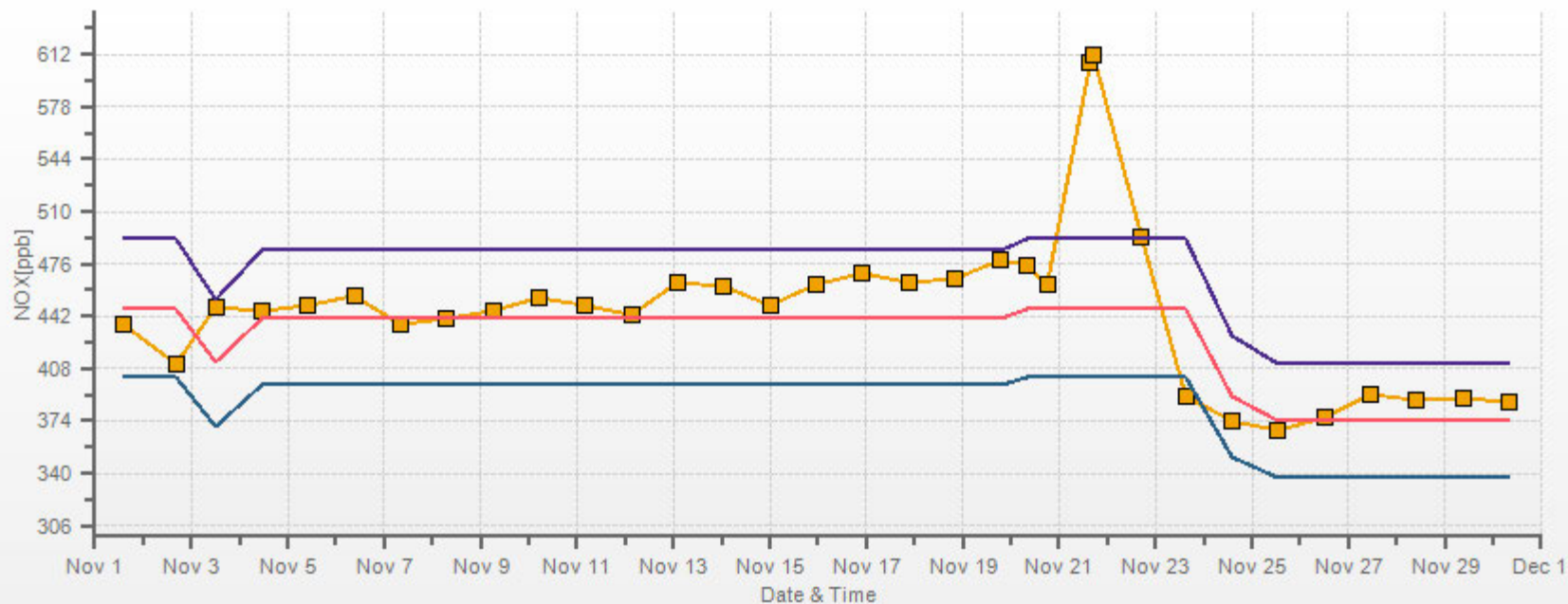
Direction	0.0-9.3	9.3-18.7	18.7-28.0	>28.0	Total
N	12.7	0.0	0.0	0.0	12.7
NE	15.1	0.0	0.0	0.0	15.1
E	6.0	0.0	0.0	0.0	6.0
SE	8.2	0.5	0.0	0.0	8.7
S	4.0	0.2	0.0	0.0	4.2
SW	16.4	2.9	0.2	0.0	19.5
W	11.4	1.0	0.0	0.0	12.4
NW	9.2	2.7	0.5	0.0	12.4
Summary	83.0	7.2	0.6	0.0	90.8

% Icon Classes (ppb) 83 0.0-9.3 7 9.3-18.7 1 18.7-28.0 0 >28.0

LICA MASKWA Poll.: LICA MASKWA-NOX[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 9.16% Calm Poll Avg: 4.43[ppb]



NOX[ppb] Calibration: LICA MASKWA Monthly: 17/11 Type: Span



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

NITRIC OXIDES

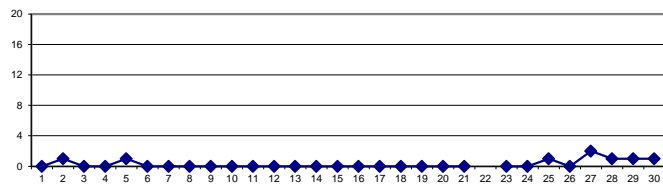
NITRIC OXIDE Hourly Averages (NO ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.	
DAY 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	24
DAY 2	0	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	1	2	2	1	1	1	1	1	0	2	1	24
DAY 3	1	1	1	1	1	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
DAY 4	0	0	0	0	0	0	0	0	0	0	1	S	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	0	24
DAY 5	1	1	1	1	2	2	2	2	2	2	3	S	1	2	1	2	1	1	1	1	1	1	1	1	0	0	3	1	24
DAY 6	1	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
DAY 7	0	0	1	0	0	0	0	1	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
DAY 8	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
DAY 9	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
DAY 10	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
DAY 11	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
DAY 12	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
DAY 13	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
DAY 14	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
DAY 15	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
DAY 16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	1	0	S	0	0	1	0	24
DAY 17	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	1	0	24
DAY 18	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	0	1	0	24
DAY 19	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
DAY 20	0	0	0	1	2	0	2	1	S1	1	0	2	0	0	1	0	0	0	0	0	S	0	0	0	0	0	2	0	23
DAY 21	0	0	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0	1	0	3
DAY 22	X	X	X	X	X	X	X	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-
DAY 23	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C1	C1	C1	C1	C1	C1	0	0	0	0	0	0	0	0	0	0	0	0	8
DAY 24	0	0	0	1	0	2	1	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	2	0	24
DAY 25	0	0	0	0	0	0	3	2	4	2	2	4	6	S	2	0	0	0	0	0	0	0	0	0	0	0	6	1	24
DAY 26	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	1	1	0	0	1	1	1	0	0	0	1	0	24
DAY 27	0	0	0	0	0	0	1	1	1	1	1	S	1	2	1	1	4	5	3	9	12	8	2	0	0	0	12	2	24
DAY 28	0	0	0	0	0	0	1	1	1	1	2	S	3	3	3	3	1	0	0	0	0	0	1	0	0	0	3	1	24
DAY 29	0	1	0	1	1	1	1	2	2	S	2	1	3	2	3	2	3	0	0	0	0	0	0	0	0	0	3	1	24
DAY 30	0	0	0	0	0	1	1	1	1	S	4	3	3	1	2	1	1	0	0	1	0	0	0	0	0	0	4	1	24
HOURLY MAX	1	1	1	1	2	2	3	2	4	4	3	4	6	3	3	2	4	5	3	9	12	8	2	1					
HOURLY AVG	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	1	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

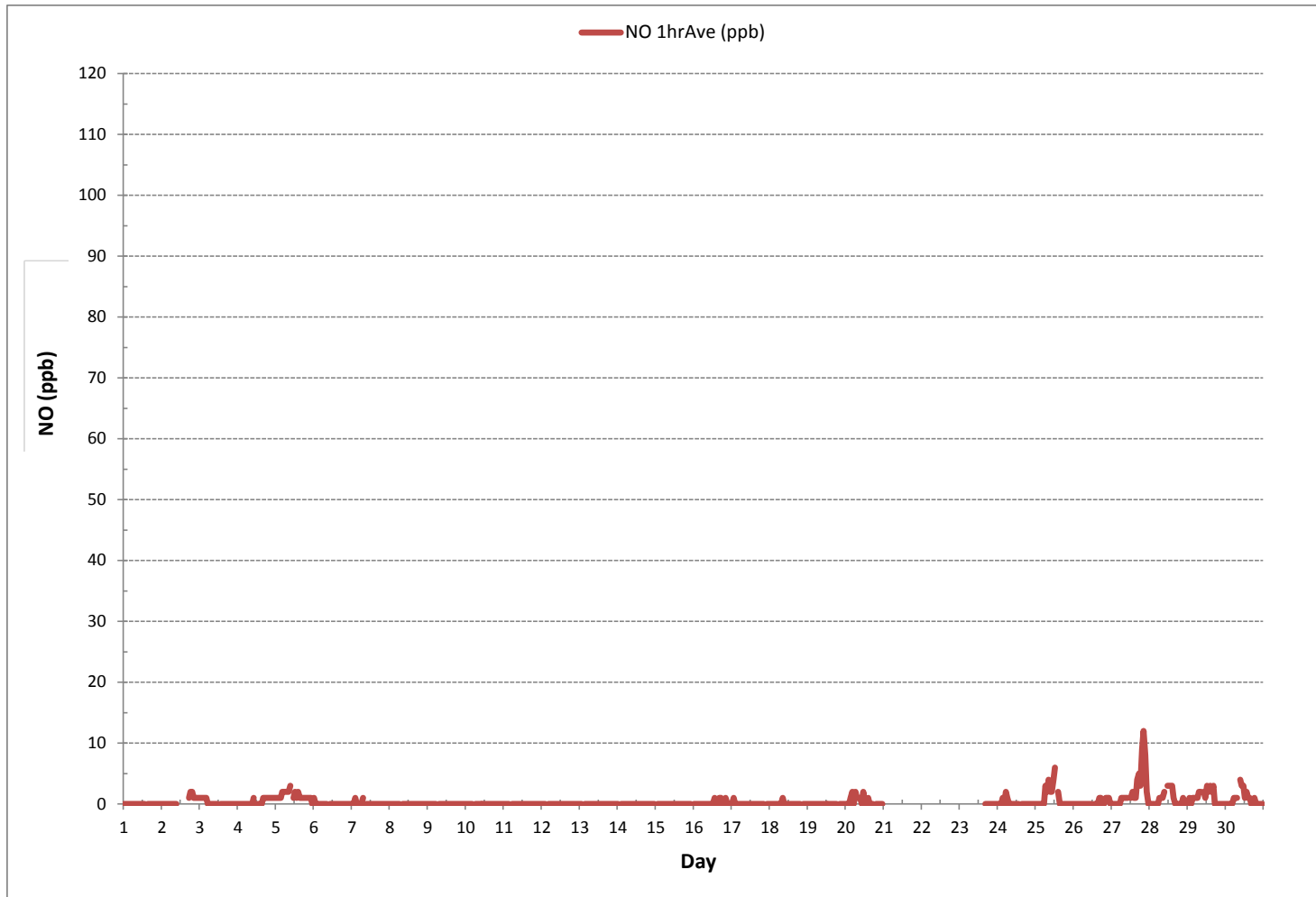
24 HR AVERAGES November 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	127			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	0	ON DAY 1
MAXIMUM 1-HR AVERAGE:	12 ppb	@ HOUR	27	ON DAY 27
MAXIMUM 24-HR AVERAGE:	2 ppb			ON DAY 27
IZS CALIBRATION TIME:	27 hrs	OPERATIONAL TIME:	658 hrs	
MONTHLY CALIBRATION TIME:	7 hrs	AMD OPERATION UPTIME:	91.4 %	
STANDARD DEVIATION:	1	MONTHLY AVERAGE:	0 ppb	

NITRIC OXIDE Hourly Averages (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2017

NITRIC OXIDE Instantaneous Maximum (NO ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.						
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.							
DAY 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
2	0	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	2	2	2	2	2	2	2	2	0	2	1	24				
3	2	2	2	2	2	2	2	2	2	2	2	2	S	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	24	
4	2	2	2	2	2	2	3	2	2	2	5	S	2	3	36	2	2	2	2	2	2	2	2	2	2	2	2	36	4	24				
5	2	2	2	3	2	2	3	2	2	10	S	6	3	3	5	3	2	7	2	2	7	4	6	3	2	10	4	24						
6	3	2	2	3	2	2	3	29	2	S	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	29	3	24					
7	2	2	7	7	4	5	3	41	S	5	2	2	5	3	2	2	2	2	2	2	2	2	2	2	2	2	41	5	24					
8	2	2	2	2	2	2	2	S	3	5	6	4	2	2	4	4	45	2	2	2	2	2	2	2	2	45	4	24						
9	2	3	2	2	2	2	S	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	24					
10	2	2	2	2	2	S	2	2	2	10	2	2	4	2	2	2	2	2	2	2	2	2	2	2	2	10	2	24						
11	2	2	2	2	S	2	2	2	2	2	2	2	3	2	2	3	3	3	5	2	2	2	2	2	2	5	2	24						
12	2	2	2	S	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	24					
13	2	2	S	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	24					
14	2	S	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	24		
15	S	2	2	2	2	2	2	2	2	3	2	2	3	4	4	3	2	3	3	2	2	2	2	S	2	4	2	24						
16	2	2	2	2	2	2	2	2	2	2	3	2	3	3	3	2	4	5	4	5	6	5	S	7	2	7	3	24						
17	4	4	6	2	2	2	3	3	3	5	3	4	4	3	2	4	2	2	2	2	2	S	2	2	2	6	3	24						
18	2	2	2	2	2	2	3	3	10	5	2	3	2	2	3	2	2	2	2	2	S	2	2	2	2	10	3	24						
19	2	2	2	2	2	2	2	2	3	4	3	3	3	4	3	3	3	3	3	S	2	2	2	2	2	4	3	24						
20	2	3	9	13	10	11	25	S1	S1	7	9	9	8	11	10	11	8	7	S	2	2	2	4	3	2	25	8	22						
21	3	3	6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	3	6	4	3					
22	X	X	X	X	X	X	X	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-					
23	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C1	C1	C1	C1	C1	C1	5	1	0	0	0	0	0	0	0	5	1	8						
24	0	0	0	3	3	8	4	1	0	0	1	1	0	S	0	0	0	0	0	0	1	0	0	0	0	8	1	24						
25	0	0	0	0	0	0	24	4	8	3	3	5	11	S	5	0	1	0	0	0	0	0	0	0	0	24	3	24						
26	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	1	3	3	1	0	1	2	2	1	0	3	1	24						
27	0	0	0	0	0	0	1	1	1	1	8	S	4	3	10	1	12	11	6	14	18	16	5	0	0	18	5	24						
28	0	0	0	0	0	0	4	0	4	3	S	3	4	4	21	3	0	0	0	0	0	0	0	0	0	21	2	24						
29	0	0	0	0	0	3	5	21	S	11	3	4	31	4	26	42	1	0	0	0	0	0	0	0	0	42	7	24						
30	0	0	0	0	0	0	15	1	S	22	10	15	2	4	15	35	1	0	13	0	0	0	0	0	0	0	35	6	24					
HOURLY MAX	4	4	9	13	10	11	25	41	21	22	11	15	11	31	36	35	45	11	13	14	18	16	6	7										
HOURLY AVG	1	2	2	2	2	2	4	4	3	4	3	3	3	4	6	5	6	3	2	2	2	2	2	2										

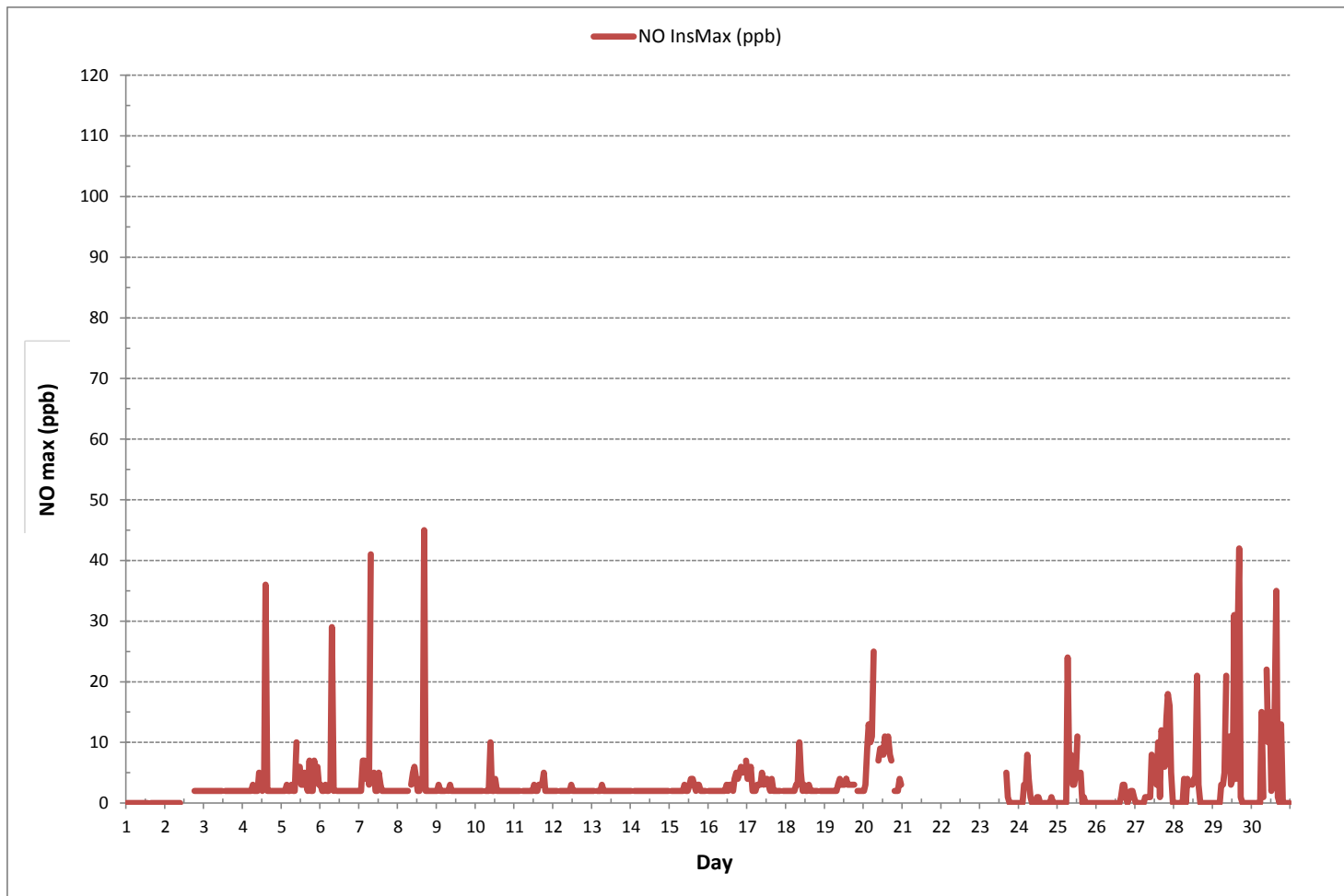
STATUS FLAG CODES

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:	494
MAXIMUM INSTANTANEOUS VALUE:	45 ppb @ HOUR 16 ON DAY 8
IZS CALIBRATION TIME:	27 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	657 hrs
STANDARD DEVIATION:	5

NITRIC OXIDE Instantaneous Maximum (NO ppb)



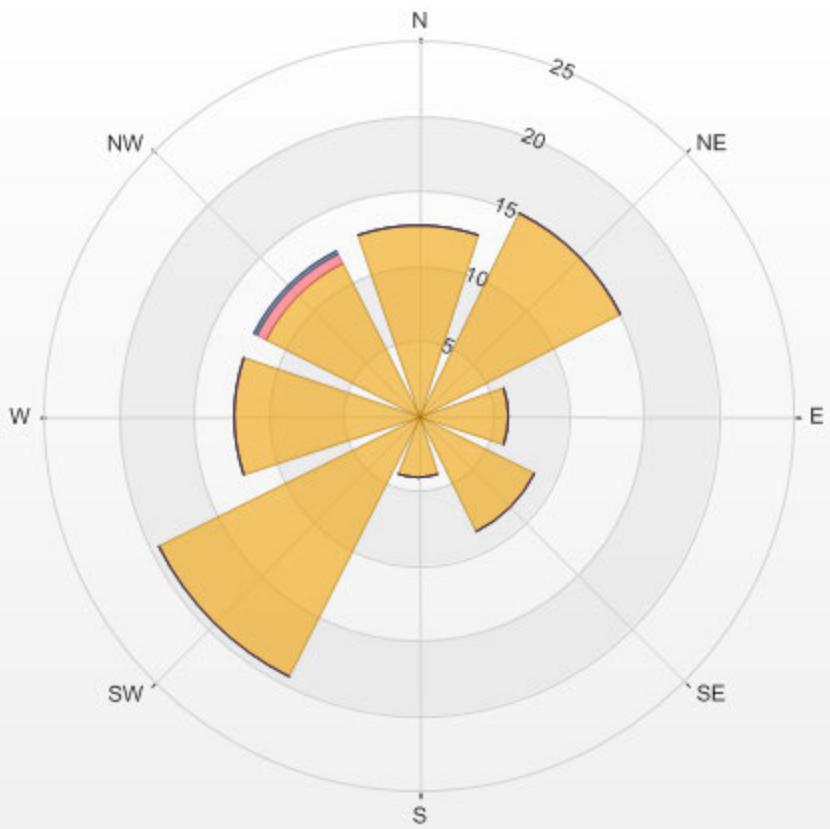
Wind: LICA MASKWA
 Poll.: LICA MASKWA-NO[ppb]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 9.16% Calm Avg: 0.20 [ppb]

Direction	0.0-4.3	4.3-8.7	8.7-13.0	>13.0	Total
N	12.7	0.0	0.0	0.0	12.7
NE	15.1	0.0	0.0	0.0	15.1
E	6.0	0.0	0.0	0.0	6.0
SE	8.7	0.0	0.0	0.0	8.7
S	4.2	0.0	0.0	0.0	4.2
SW	19.5	0.0	0.0	0.0	19.5
W	12.4	0.0	0.0	0.0	12.4
NW	11.4	0.6	0.3	0.0	12.4
Summary	89.9	0.6	0.3	0.0	90.8

% Icon Classes (ppb) 90 0.0-4.3 1 4.3-8.7 0 8.7-13.0 0 >13.0

LICA MASKWA Poll.: LICA MASKWA-NO[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 9.16% Calm Poll Avg: 0.20[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	0	0	0	0	0	0	1	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	1	0	24
2	0	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	24
3	1	2	2	2	2	3	3	2	1	1	1	1	S	0	1	1	1	1	1	2	5	4	2	2	2	0	5	2	24
4	4	8	7	3	3	3	3	2	2	2	5	S	3	1	2	1	1	1	5	5	4	5	5	6	1	8	4	24	
5	6	6	4	7	6	8	8	8	6	6	S	7	3	5	7	4	4	6	0	0	15	11	9	11	0	15	6	24	
6	1	4	3	5	2	4	7	6	2	S	2	3	1	1	2	4	3	2	2	3	3	5	6	7	1	7	3	24	
7	6	12	12	15	11	7	2	4	S	4	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	15	3	24	
8	0	0	0	1	2	2	4	S	10	6	9	5	3	0	0	4	8	4	4	3	4	6	9	9	0	10	4	24	
9	8	9	7	3	2	7	S	7	5	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	9	2	24	
10	0	0	0	1	0	S	1	1	2	7	1	1	3	0	0	1	1	0	0	0	0	0	1	1	0	7	1	24	
11	1	2	1	1	S	3	2	2	2	2	2	2	3	3	3	4	6	7	7	8	8	7	5	4	1	8	4	24	
12	2	1	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	
13	0	0	S	0	0	2	4	4	1	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	4	1	24	
14	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	
15	S	0	0	0	0	0	0	0	0	0	0	0	2	4	6	7	9	7	5	2	1	1	4	S	0	9	2	24	
16	6	3	2	1	1	0	0	0	0	0	0	1	1	1	2	2	2	3	5	8	7	10	S	7	0	10	3	24	
17	6	5	2	1	1	1	1	1	8	4	2	3	3	2	0	1	1	1	1	1	1	S	2	3	0	8	2	24	
18	7	8	14	18	16	12	10	11	14	7	4	4	6	7	10	11	11	10	9	9	S	9	8	7	4	18	10	24	
19	6	6	5	4	3	2	1	2	3	4	3	3	4	4	4	5	4	6	5	S	1	1	2	2	1	6	3	24	
20	2	7	5	6	9	8	7	7	S1	11	5	7	7	4	6	10	10	6	S	0	1	1	8	6	0	11	6	23	
21	5	5	4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	4	5	5	3
22	X	X	X	X	X	X	X	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	-
23	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C1	C1	C1	C1	C1	C1	9	8	4	1	0	0	0	0	0	9	3	8	
24	0	2	5	8	1	7	8	1	1	1	1	2	2	2	S	3	2	2	3	3	3	3	2	1	0	8	3	24	
25	1	0	1	1	1	1	4	7	8	5	5	5	7	S	4	1	2	1	1	1	1	2	2	3	0	8	3	24	
26	4	2	1	1	0	0	0	0	0	0	0	1	S	1	1	2	7	6	2	1	3	5	6	2	0	7	2	24	
27	1	1	1	1	2	2	3	3	2	2	2	S	2	5	5	2	8	8	7	11	14	11	8	4	1	14	5	24	
28	1	1	1	3	5	4	5	5	5	5	6	S	6	5	6	7	9	7	6	6	6	5	5	7	1	9	5	24	
29	8	5	5	8	10	10	8	15	7	S	5	2	7	4	8	8	7	3	4	7	5	9	4	3	2	15	7	24	
30	5	7	9	10	7	9	11	15	S	15	10	7	3	3	3	4	2	2	6	7	7	7	7	5	2	15	7	24	
HOURLY MAX	8	12	14	18	16	12	11	15	14	15	10	7	7	7	10	11	11	10	9	11	15	11	9	11					
HOURLY AVG	3	4	3	4	3	4	4	4	3	3	2	3	3	2	3	3	4	3	3	3	3	4	4	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

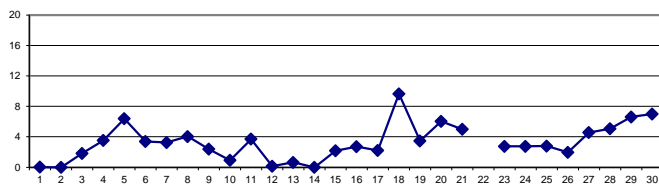
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

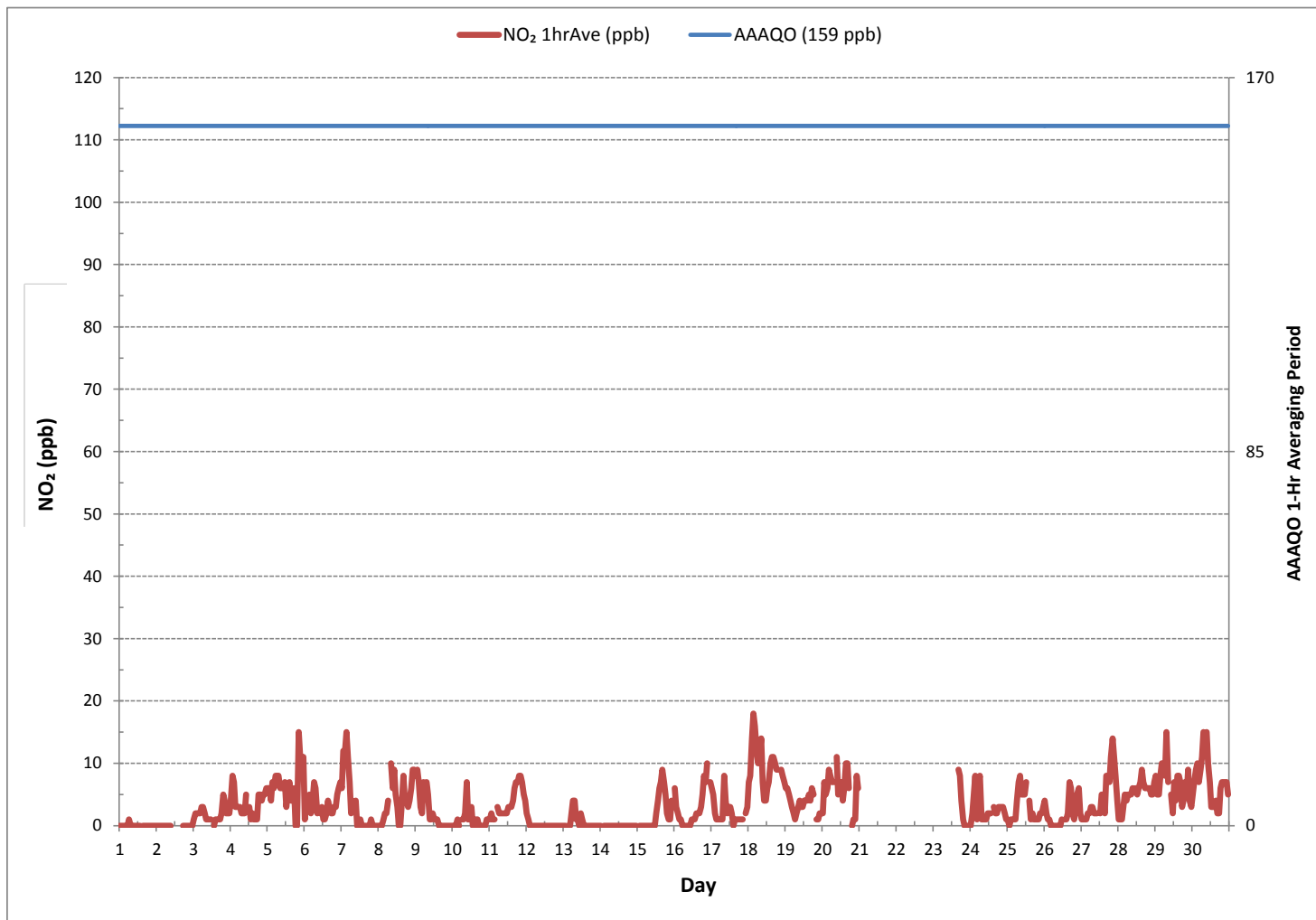
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	453			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	0	ON DAY
MAXIMUM 1-HR AVERAGE:	18 ppb	@ HOUR	3	ON DAY
MAXIMUM 24-HR AVERAGE:	10 ppb			ON DAY
IZS CALIBRATION TIME:	27 hrs	OPERATIONAL TIME:	658 hrs	
MONTHLY CALIBRATION TIME:	7 hrs	AMD OPERATION UPTIME:	91.4 %	
STANDARD DEVIATION:	3	MONTHLY AVERAGE:	3 ppb	

24 HR AVERAGES November 2017



NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2017

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	0	0	0	0	0	1	2	1	0	0	0	0	1	0	S	0	0	0	0	0	0	0	0	0	0	0	2	0	24
2	0	0	0	0	0	0	2	2	0	1	C	C	C	C	C	C	C	C	C	1	0	0	0	1	1	0	2	1	24
3	2	3	3	3	3	4	4	3	2	2	2	2	S	1	1	1	1	2	4	6	6	3	2	3	1	6	3	24	
4	8	9	9	4	5	4	6	3	3	2	10	S	6	5	11	2	2	3	7	7	5	7	7	8	2	11	6	24	
5	8	7	7	9	8	11	10	11	9	15	S	14	6	9	15	12	12	17	0	2	24	17	17	16	0	24	11	24	
6	8	10	6	14	5	6	12	38	4	S	4	5	3	2	3	5	5	3	4	4	5	7	8	9	2	38	7	24	
7	8	15	19	23	15	17	5	32	S	10	1	1	5	4	1	1	2	1	1	2	1	1	1	1	1	1	32	7	24
8	0	1	1	4	4	3	7	S	13	12	13	9	5	1	3	11	41	6	7	6	6	10	12	12	0	41	8	24	
9	11	13	12	6	6	11	S	11	9	5	4	4	4	3	4	3	2	2	2	2	2	4	4	2	2	13	5	24	
10	4	2	3	3	2	S	4	3	4	20	3	4	10	3	4	4	3	3	2	2	3	3	3	4	2	20	4	24	
11	4	4	3	4	S	6	5	5	6	5	5	5	6	6	6	9	10	11	14	11	11	11	10	8	3	14	7	24	
12	7	6	4	S	3	2	2	2	2	2	4	5	5	3	3	2	2	2	2	2	3	3	3	3	2	7	3	24	
13	3	2	S	2	3	7	7	8	4	3	2	5	4	2	2	2	2	1	1	1	1	2	1	2	1	8	3	24	
14	1	S	1	1	2	1	2	2	2	2	2	1	1	1	1	1	1	1	1	0	0	1	1	1	0	2	1	24	
15	S	1	0	1	1	1	1	1	1	2	1	2	6	7	10	11	11	12	8	7	3	8	7	S	0	12	5	24	
16	9	8	4	5	2	2	1	2	1	1	2	3	3	3	6	5	8	13	12	14	14	17	S	13	1	17	6	24	
17	11	9	9	2	4	3	3	4	13	9	5	6	6	5	2	4	4	2	3	2	2	S	4	5	2	13	5	24	
18	9	12	19	19	18	16	15	14	17	14	6	6	8	10	14	13	14	13	12	12	S	12	11	10	6	19	13	24	
19	9	9	8	7	5	4	4	5	7	9	7	7	8	9	8	9	10	11	9	S	3	3	5	4	3	11	7	24	
20	3	12	16	16	17	16	28	S1	S1	15	15	13	15	15	14	18	21	13	S	1	2	2	16	9	1	28	13	22	
21	8	7	7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	7	8	7	3	
22	X	X	X	X	X	X	X	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	
23	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C1	C1	C1	C1	C1	C1	25	11	8	3	3	1	1	1	1	25	7	8	
24	1	11	14	17	11	18	14	3	1	1	3	2	3	S	3	3	3	4	5	4	4	3	3	3	1	18	6	24	
25	1	1	2	2	2	3	15	12	13	6	6	8	13	S	10	3	5	2	3	1	4	4	3	5	1	15	5	24	
26	5	3	2	1	1	0	0	0	0	0	0	1	S	2	2	4	10	10	5	1	8	10	11	9	0	11	4	24	
27	1	1	2	3	4	4	5	4	3	3	8	S	26	8	15	4	15	14	10	17	18	18	13	6	1	26	9	24	
28	3	2	1	6	6	5	11	5	7	7	S	8	7	8	23	11	9	7	7	7	7	6	7	11	1	23	7	24	
29	11	6	7	11	11	14	13	22	16	S	17	5	10	10	13	17	32	5	6	8	7	11	4	4	4	32	11	24	
30	5	7	11	13	8	11	20	17	S	26	24	13	5	5	14	37	4	3	22	9	9	9	12	5	3	37	13	24	
HOURLY MAX	11	15	19	23	18	18	28	38	17	26	24	14	26	15	23	37	41	17	22	17	24	18	17	16					
HOURLY AVG	5	6	6	7	6	7	8	8	6	7	6	5	7	5	8	7	9	6	6	5	6	6	6	6					

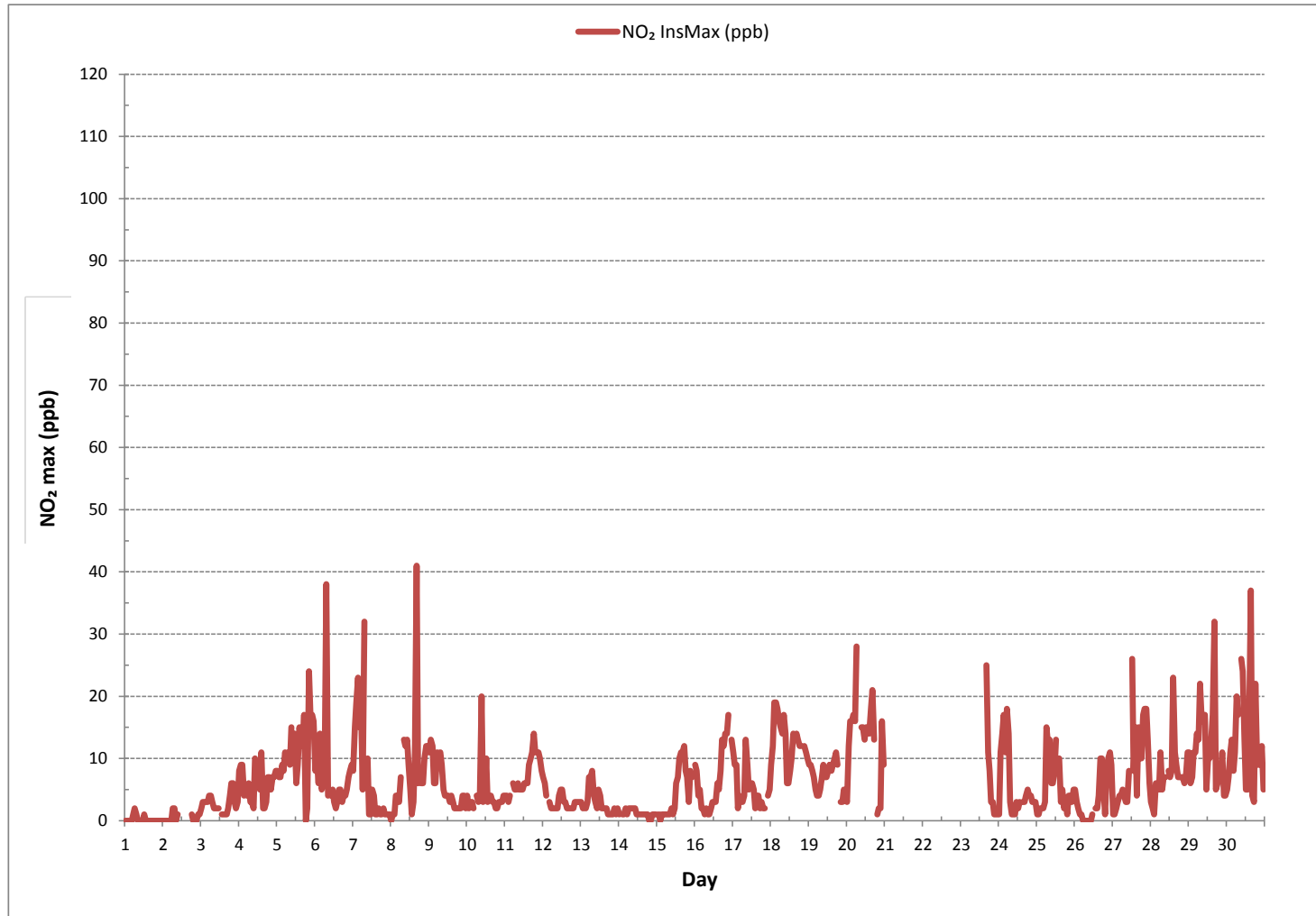
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	582
MAXIMUM INSTANTANEOUS VALUE:	41 ppb @ HOUR 16 ON DAY 8
	VAR-VARIOUS
IZS CALIBRATION TIME:	27 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	6
OPERATIONAL TIME:	657 hrs

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)



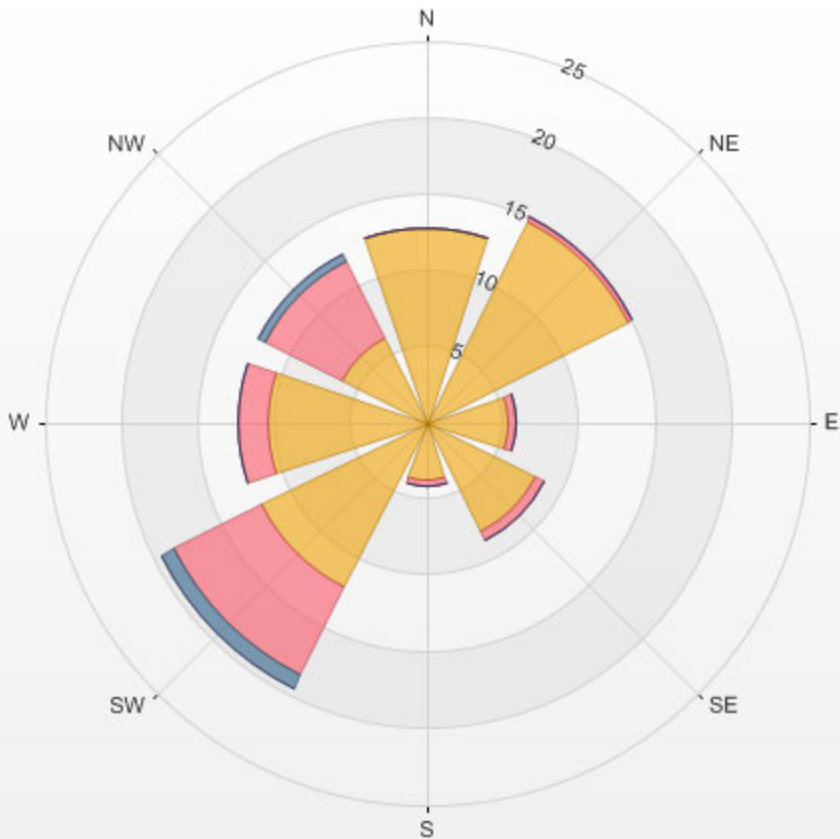
Wind: LICA MASKWA
 Poll.: LICA MASKWA-NO₂[ppb]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 9.16% Calm Avg: 4.23 [ppb]

Direction	0.0-6.3	6.3-12.7	12.7-19.0	>19.0	Total
N	12.7	0.0	0.0	0.0	12.7
NE	14.8	0.3	0.0	0.0	15.1
E	5.3	0.6	0.0	0.0	6.0
SE	8.0	0.6	0.0	0.0	8.7
S	3.9	0.3	0.0	0.0	4.2
SW	12.1	6.4	1.0	0.0	19.5
W	10.5	1.9	0.0	0.0	12.4
NW	6.3	5.6	0.5	0.0	12.4
Summary	73.5	15.9	1.4	0.0	90.8

% Icon	Classes (ppb)	73	0.0-6.3	16	6.3-12.7	1	12.7-19.0	0	>19.0
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LICA MASKWA Poll.: LICA MASKWA-NO2[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 9.16% Calm Poll Avg: 4.23[ppb]



NO2[ppb] Calibration: LICA MASKWA Monthly: 17/11 Type: Span



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

WIND SPEED



WIND SPEED Hourly Averages (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	7.5	6.1	5.9	4.9	6.3	3.2	2.8	5.4	8.6	9.9	8.8	9.4	7.8	7.0	6.5	7.9	7.6	8.9	8.5	9.2	6.9	4.8	5.5	5.6	2.8	9.9	6.8	24	
2	6.9	6.5	5.4	4.5	4.7	5.1	6.7	6.4	6.0	9.4	10.4	8.0	6.8	5.6	7.3	5.2	4.3	6.4	4.3	5.3	7.5	7.5	7.2	6.5	4.3	10.4	6.3	24	
3	6.7	8.1	7.3	6.2	6.9	7.0	6.3	6.6	6.3	6.4	7.0	5.5	4.6	4.2	3.3	2.8	0.7	1.4	2.9	1.5	1.8	0.4	2.4	0.9	0.4	8.1	3.8	24	
4	1.5	1.8	1.3	2.8	4.3	2.5	3.0	2.0	5.2	4.2	3.9	3.8	4.3	4.7	4.6	4.4	3.2	3.4	3.8	3.2	4.3	4.1	3.7	4.9	1.3	5.2	1.8	24	
5	4.8	4.0	4.7	4.9	4.5	5.0	4.7	5.0	4.2	5.5	6.6	6.5	8.1	9.3	6.8	6.7	6.2	7.6	4.9	5.7	7.0	7.0	6.6	5.7	4.0	9.3	4.5	24	
6	5.3	3.6	3.2	3.6	3.8	2.3	2.0	2.6	3.7	5.0	7.1	8.0	9.0	8.6	9.5	7.7	9.5	8.1	7.9	11.2	7.2	6.4	5.3	4.3	2.0	11.2	5.3	24	
7	2.4	4.8	5.8	5.7	5.7	5.3	5.4	5.5	6.0	8.5	7.9	8.2	7.4	6.3	5.4	3.8	3.1	3.6	4.1	7.6	6.1	4.9	4.6	2.4	8.5	4.8	24		
8	1.6	1.1	1.2	1.3	1.2	1.6	1.9	2.0	2.1	3.7	4.3	6.1	4.4	4.8	4.7	4.4	3.8	4.0	4.9	6.8	7.4	5.6	4.2	3.5	1.1	7.4	2.9	24	
9	4.8	3.2	3.8	3.4	2.0	2.1	0.2	1.2	1.5	5.1	6.6	8.2	8.0	6.9	8.3	9.3	9.5	8.8	6.7	6.3	6.6	5.8	8.1	7.8	0.2	9.5	5.0	24	
10	5.0	4.2	3.7	1.7	2.5	2.0	2.4	2.7	3.3	4.1	5.0	6.2	5.3	6.0	5.5	5.3	4.0	3.4	3.8	3.5	3.3	4.2	2.4	1.3	1.3	6.2	1.8	24	
11	1.6	0.3	1.6	1.8	2.7	2.6	1.6	1.9	2.7	4.5	7.5	8.0	7.1	6.2	6.5	5.8	3.5	5.2	4.9	2.8	1.5	1.0	0.3	1.1	0.3	8.0	3.1	24	
12	2.4	3.6	3.9	4.8	4.4	3.3	5.6	7.6	5.9	6.4	6.1	8.2	6.7	6.8	6.4	6.5	6.3	6.8	5.7	5.6	7.0	6.9	6.9	7.3	2.4	8.2	4.6	24	
13	5.6	5.6	5.8	3.2	2.7	1.9	2.0	2.2	3.4	4.0	6.7	6.8	7.5	7.9	11.1	7.7	8.0	10.6	9.2	11.0	12.9	13.0	12.9	14.0	1.9	14.0	5.1	24	
14	14.7	13.8	13.7	12.9	10.9	11.3	11.2	10.7	10.2	12.4	11.1	8.7	9.2	7.0	8.0	6.0	4.4	4.8	5.0	4.5	5.2	3.6	2.6	3.9	2.6	14.7	8.2	24	
15	7.1	6.3	6.5	6.6	6.8	8.2	7.0	8.1	9.0	11.3	10.1	10.7	9.8	10.0	11.0	9.4	8.4	10.3	10.7	11.1	10.6	9.5	9.2	7.9	6.3	11.3	8.8	24	
16	5.8	5.2	5.7	4.9	2.9	0.9	1.1	3.9	2.3	2.6	4.0	5.3	5.1	4.3	4.2	3.9	4.1	4.1	6.5	7.5	6.2	5.8	5.5	6.5	0.9	7.5	2.3	24	
17	5.6	5.3	5.7	3.1	4.2	4.1	4.6	7.0	5.5	5.9	7.3	7.9	6.0	5.8	6.3	5.9	4.4	3.9	4.3	2.9	3.4	3.6	4.0	4.3	2.9	7.9	4.5	24	
18	5.4	6.2	5.9	3.2	1.9	1.7	0.1	1.5	0.8	3.3	4.8	3.3	4.4	2.2	2.9	2.1	0.8	0.6	0.9	0.8	1.4	1.3	0.3	0.8	0.1	6.2	1.8	24	
19	2.1	2.7	2.5	4.7	6.8	6.1	5.5	7.0	6.9	8.1	9.1	10.1	9.6	7.9	7.5	6.9	7.1	6.9	5.7	4.9	6.4	3.9	1.4	2.6	1.4	10.1	5.2	24	
20	3.3	5.5	8.2	10.4	10.7	9.8	10.7	8.6	10.2	9.4	9.0	10.4	9.2	9.3	8.6	9.2	6.4	7.7	6.7	5.1	4.2	3.6	3.7	3.5	3.3	10.7	7.4	24	
21	4.6	3.9	3.4	3.3	2.7	2.4	2.5	2.4	1.7	3.2	4.9	4.8	6.7	9.3	7.2	6.4	5.9	5.9	7.8	5.8	4.0	2.8	4.0	3.7	1.7	9.3	3.6	24	
22	3.8	3.8	3.2	2.5	3.6	6.2	3.0	3.3	3.5	4.3	4.0	5.2	5.6	7.7	5.6	3.5	3.7	2.0	1.8	3.1	3.8	3.8	3.3	5.4	1.8	7.7	3.0	24	
23	6.1	5.5	6.5	6.3	7.6	6.5	5.6	2.2	1.5	4.4	6.0	6.1	9.5	5.1	5.8	4.2	5.2	5.2	5.9	4.3	8.6	8.3	6.8	4.7	1.5	9.5	2.9	24	
24	4.9	5.2	6.1	6.0	5.9	6.8	4.9	3.9	1.7	4.0	3.8	6.7	6.4	6.6	5.6	2.3	2.3	1.3	1.8	1.9	1.2	1.1	1.5	2.4	1.1	6.8	2.1	24	
25	2.4	1.5	1.4	1.7	0.5	0.8	0.7	2.4	4.0	4.0	3.4	4.2	7.0	6.8	5.8	5.4	3.8	7.3	6.7	6.9	9.2	9.5	8.5	5.6	0.5	9.5	2.7	24	
26	5.6	6.4	7.6	7.5	7.3	7.1	7.0	8.2	7.3	8.4	7.7	8.6	9.4	11.1	10.7	10.6	10.1	9.7	8.3	8.5	8.6	7.9	7.2	5.2	5.2	11.1	7.8	24	
27	6.3	7.1	2.6	4.2	4.6	3.8	5.0	6.2	4.8	6.0	11.1	10.4	13.7	15.3	14.2	15.3	14.1	12.7	13.5	13.0	12.9	10.3	9.5	4.9	2.6	15.3	7.9	24	
28	3.2	3.4	3.4	6.5	6.0	3.7	3.4	7.0	6.6	7.0	8.5	8.1	5.0	4.3	4.0	3.1	5.8	4.5	4.1	2.3	2.3	0.3	1.2	1.4	0.3	8.5	4.1	24	
29	2.2	0.5	1.4	2.3	2.7	2.9	3.3	3.9	7.6	8.7	11.1	10.3	10.2	9.8	7.3	4.8	3.1	3.4	5.6	4.7	3.6	5.5	6.3	7.5	0.5	11.1	4.5	24	
30	6.1	6.5	4.8	8.4	8.6	7.1	6.3	6.5	6.7	6.7	6.8	5.7	5.1	4.0	4.3	3.9	3.7	4.8	7.5	7.6	6.5	5.6	6.3	6.6	3.7	8.6	5.9	24	
HOURLY MAX	14.7	13.8	13.7	12.9	10.9	11.3	11.2	10.7	10.2	12.4	11.1	10.7	13.7	15.3	14.2	15.3	14.1	12.7	13.5	13.0	12.9	13.0	12.9	14.0					
HOURLY AVG	0.3	0.6	0.6	0.7	0.8	0.5	0.7	0.7	0.8	0.9	1.3	1.0	1.1	1.2	1.0	0.7	0.5	0.1	0.4	0.1	0.3	0.4	0.1	0.5					

STATUS FLAG CODES

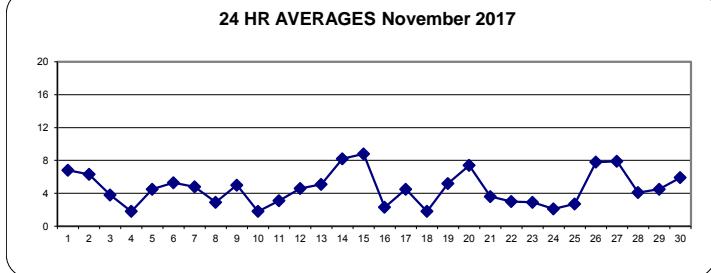
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

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

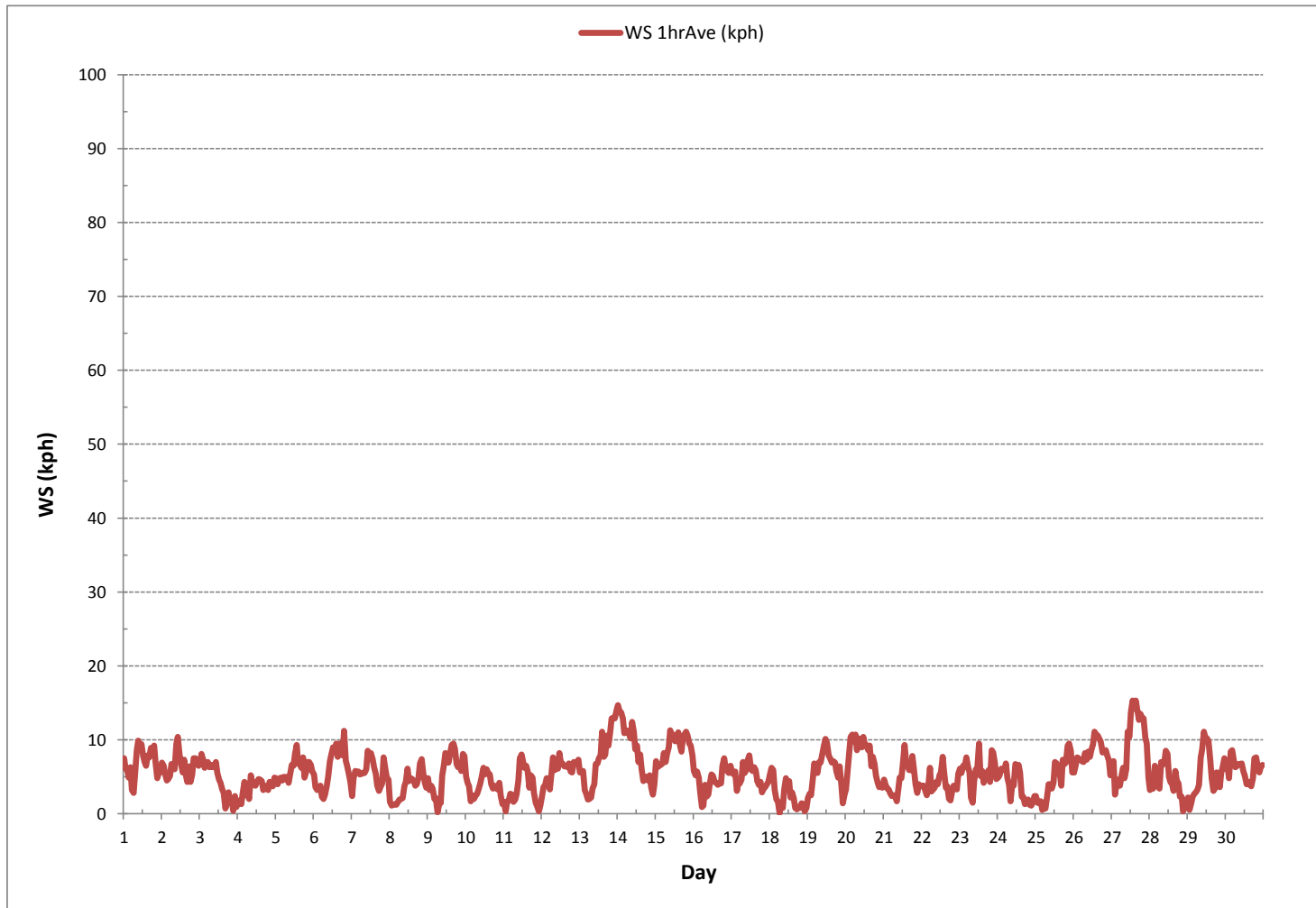
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	720
MINIMUM 1-HR AVERAGE	0.1 kph @ HOUR 6 ON DAY 18
MAXIMUM 1-HR AVERAGE:	15.3 kph @ HOUR 13 ON DAY 27
MAXIMUM 24-HR AVERAGE:	8.8 kph ON DAY 15
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	720 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	2.8
MONTHLY AVERAGE:	0.5 kph

24 HR AVERAGES November 2017



WIND SPEED Hourly Averages (WS kph)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2017

WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	17.5	14.0	11.8	10.2	14.2	10.7	10.7	14.2	23.6	21.0	18.4	22.3	18.8	19.0	21.0	23.8	20.6	24.1	25.7	28.9	19.2	17.7	15.1	15.5	10.2	28.9	18.3	24
2	19.5	17.3	17.8	12.9	13.5	14.0	15.7	14.4	15.4	20.4	23.4	17.7	16.4	14.4	16.9	13.8	14.6	14.9	14.0	13.5	19.0	22.8	19.9	18.2	12.9	23.4	16.7	24
3	18.6	18.6	17.9	16.4	16.2	14.6	14.4	14.6	15.4	15.1	17.1	15.9	12.7	14.0	12.5	11.8	20.8	10.0	11.8	10.0	10.3	16.4	20.4	18.8	10.0	20.8	15.2	24
4	16.2	18.4	12.1	13.7	13.3	14.0	15.7	12.4	14.4	12.5	17.7	15.3	15.7	17.6	16.6	19.9	13.3	12.4	13.8	11.7	13.5	13.8	37.5	10.7	10.7	37.5	15.5	24
5	10.3	12.0	10.5	11.1	11.6	11.0	11.8	12.0	13.3	29.1	23.8	27.9	31.7	37.9	23.2	23.6	19.9	24.1	23.0	24.7	27.3	29.6	23.4	18.6	10.3	37.9	20.5	24
6	17.5	14.3	13.5	19.5	15.7	15.5	16.5	11.8	10.3	16.0	18.4	20.8	29.1	26.8	29.2	26.2	26.9	29.6	28.0	30.7	22.5	19.9	21.4	14.6	10.3	30.7	20.6	24
7	12.7	17.3	17.1	19.8	18.6	23.8	21.0	16.4	18.6	24.4	30.3	37.7	32.0	29.3	21.4	19.2	12.9	11.8	16.8	14.4	19.7	15.1	14.0	12.4	11.8	37.7	19.9	24
8	17.3	14.9	20.4	58.1	57.0	36.4	26.3	X	47.2	32.4	15.7	21.0	15.9	18.5	15.9	18.8	13.3	11.1	10.3	13.8	15.3	15.5	11.4	11.6	10.3	58.1	22.5	23
9	11.0	10.9	12.7	15.7	43.0	21.3	58.8	17.5	19.7	18.9	22.1	25.8	21.9	21.4	26.5	32.6	27.8	28.0	22.8	19.2	19.7	18.6	22.5	39.5	10.9	58.8	24.1	24
10	17.1	12.9	14.4	9.4	10.9	10.5	11.9	20.6	14.0	21.0	17.0	19.7	22.4	22.8	20.1	18.6	14.9	12.2	14.4	11.8	11.8	12.2	12.4	18.8	9.4	22.8	15.5	24
11	11.3	9.6	10.2	4.2	6.3	10.5	11.1	9.4	11.6	12.9	24.3	24.5	16.8	16.6	16.6	15.1	11.1	12.5	12.5	10.5	4.6	9.2	8.9	14.9	4.2	24.5	12.3	24
12	17.6	13.3	12.2	9.6	13.3	17.1	21.9	25.8	25.2	21.6	30.4	25.8	24.1	27.7	20.2	20.1	19.2	20.8	17.7	16.8	22.3	22.6	20.3	24.9	9.6	30.4	20.4	24
13	19.9	18.4	17.5	11.3	13.7	11.2	11.8	12.2	14.4	13.5	17.3	15.9	19.7	17.5	26.3	22.5	32.4	32.6	40.3	34.2	39.9	38.2	36.6	34.6	11.2	40.3	23.0	24
14	35.2	30.9	31.5	29.8	27.1	33.3	34.4	25.8	27.4	26.9	26.9	19.7	20.1	17.5	18.6	17.7	14.6	14.7	17.3	14.9	25.0	16.4	17.1	18.2	14.6	35.2	23.4	24
15	19.5	19.9	19.7	22.8	23.4	24.5	28.7	25.2	28.8	36.1	31.8	32.4	29.6	33.6	38.2	32.4	28.0	36.1	33.3	40.7	31.6	34.0	33.1	27.4	19.5	40.7	29.6	24
16	19.3	20.9	18.8	16.4	15.7	12.2	12.7	12.8	17.1	13.1	14.0	18.2	17.3	14.9	15.3	14.6	15.7	17.9	23.6	24.8	25.6	25.0	21.7	26.9	12.2	26.9	18.1	24
17	21.5	23.4	20.1	14.4	19.5	14.5	24.7	26.9	23.0	21.7	25.7	28.7	21.0	21.4	21.4	22.3	18.7	17.5	15.5	15.7	11.8	13.3	13.1	11.8	11.8	28.7	19.5	24
18	10.9	12.9	15.1	10.5	26.1	29.9	21.9	21.4	40.1	50.7	14.4	10.7	11.3	12.4	11.7	11.6	14.6	13.5	9.2	10.0	9.8	23.9	9.8	73.4	9.2	73.4	19.8	24
19	12.0	74.5	12.3	18.6	23.9	18.4	16.2	26.9	26.5	26.6	32.0	28.2	38.5	28.4	26.3	26.0	23.7	25.4	24.1	18.1	23.2	18.4	11.6	12.5	11.6	74.5	24.7	24
20	16.4	26.0	41.2	51.1	38.6	43.5	39.0	33.1	40.5	32.0	30.5	37.5	35.5	34.2	31.5	31.4	25.6	31.1	26.9	24.5	17.6	17.3	14.0	14.4	14.0	51.1	30.6	24
21	18.0	17.5	19.7	15.7	12.9	22.6	11.4	12.9	21.2	12.4	17.6	17.5	16.8	23.6	23.6	16.2	15.5	18.4	19.5	15.1	12.9	11.1	11.6	13.3	11.1	23.6	16.5	24
22	11.8	12.0	11.3	13.1	12.9	17.1	13.4	14.0	13.8	16.2	P	13.1	14.2	16.4	17.3	12.2	13.7	18.8	12.4	12.0	16.4	19.5	14.2	24.3	11.3	24.3	14.8	23
23	19.8	22.3	25.1	25.8	23.9	26.5	17.0	12.8	6.9	12.4	19.0	20.1	26.0	21.9	17.6	17.8	20.6	24.3	27.1	15.9	31.9	28.0	21.6	18.8	6.9	31.9	21.0	24
24	15.7	19.4	19.3	20.0	21.8	27.8	19.4	16.2	10.5	15.5	14.0	19.7	17.9	13.2	10.9	14.8	12.2	16.8	5.4	11.6	18.4	9.4	18.6	10.3	5.4	27.8	15.8	24
25	16.8	11.1	10.0	34.0	10.5	12.0	18.4	16.8	13.1	14.4	14.0	17.7	24.0	24.0	26.4	21.4	16.6	23.8	22.1	18.1	24.3	23.7	20.6	20.8	10.0	34.0	18.9	24
26	21.2	19.0	20.6	22.8	21.4	22.5	24.1	26.5	22.4	25.6	28.2	29.8	36.1	35.9	38.3	40.6	40.7	36.4	32.9	30.0	30.7	31.3	27.7	22.1	19.0	40.7	28.6	24
27	20.3	20.6	15.1	14.6	17.5	21.4	19.9	27.6	19.7	32.0	41.2	39.2	43.2	59.7	62.2	49.5	52.8	46.4	49.9	48.5	50.7	33.9	31.5	24.5	14.6	62.2	35.1	24
28	16.4	12.2	14.9	13.8	16.8	14.9	9.9	15.5	14.9	14.9	18.4	20.3	17.9	15.5	13.8	11.3	16.6	13.5	14.0	10.2	9.8	10.9	10.3	10.0	9.8	20.3	14.0	24
29	10.9	9.8	8.9	11.1	10.7	11.4	14.4	10.9	28.2	32.4	37.4	38.5	38.7	30.2	27.8	14.7	10.7	12.2	12.9	16.6	14.0	15.5	18.6	18.6	8.9	38.7	19.0	24
30	16.2	15.4	16.4	19.7	21.0	18.4	18.4	18.6	16.2	23.6	23.7	18.4	18.1	18.1	16.4	17.5	13.7	13.5	16.4	17.3	15.1	15.6	19.0	16.2	13.5	23.7	17.6	24
HOURLY MAX	35.2	74.5	41.2	58.1	57.0	43.5	58.8	33.1	47.2	50.7	41.2	39.2	43.2	59.7	62.2	49.5	52.8	46.4	49.9	48.5	50.7	38.2	37.5	73.4				
HOURLY AVG	16.9	18.7	16.9	18.9	19.7	19.4	19.7	18.1	20.4	22.2	22.9	23.3	23.4	23.5	22.8	21.3	20.1	20.8	20.5	19.5	20.5	20.0	19.3	20.6				

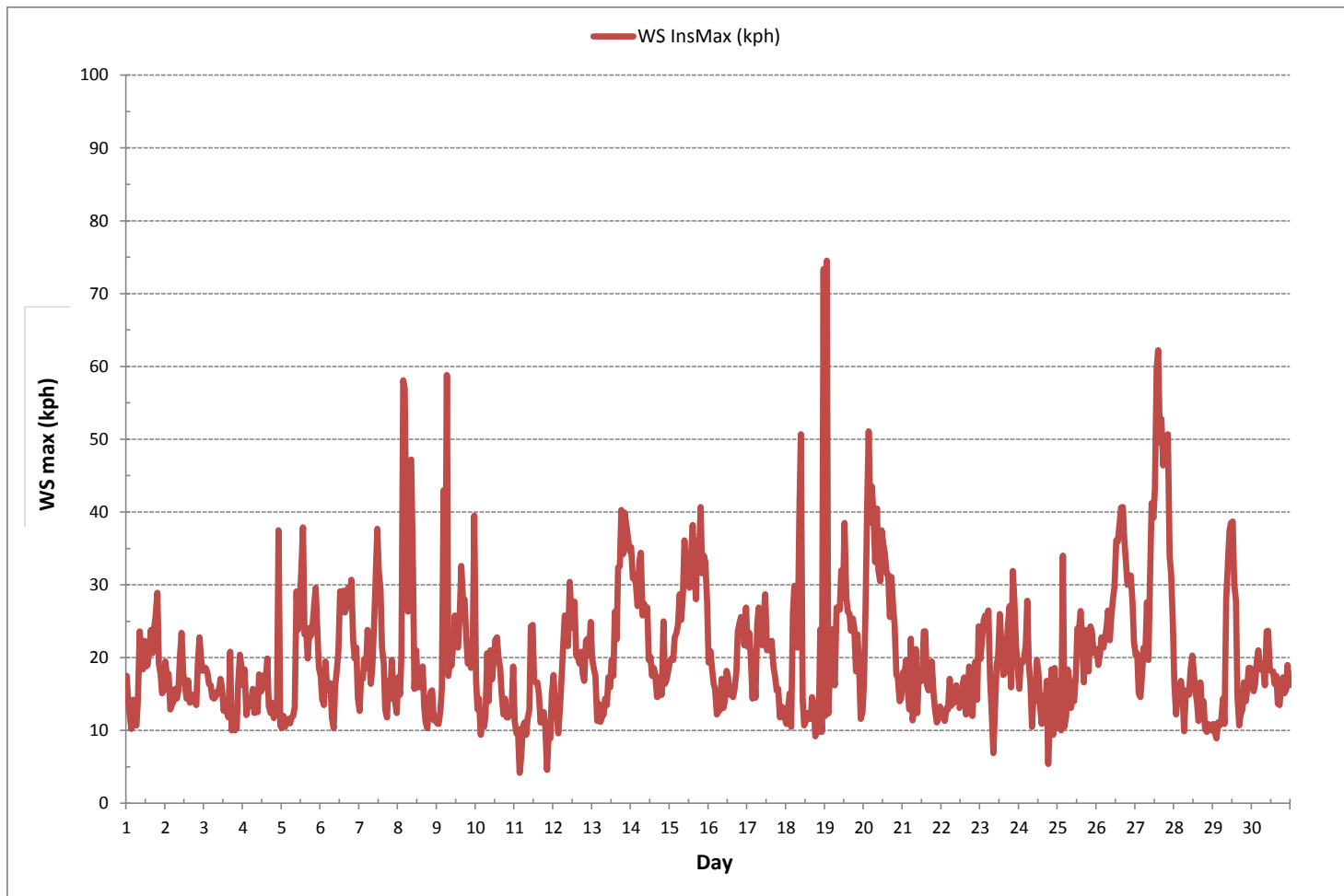
STATUS FLAG CODES

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

MAXIMUM INSTANTANEOUS VALUE:	74.5	kph	@ HOUR	1	ON DAY	19	
OPERATIONAL TIME:						718	hrs

WIND SPEED Instantaneous Maximum (WS kph)



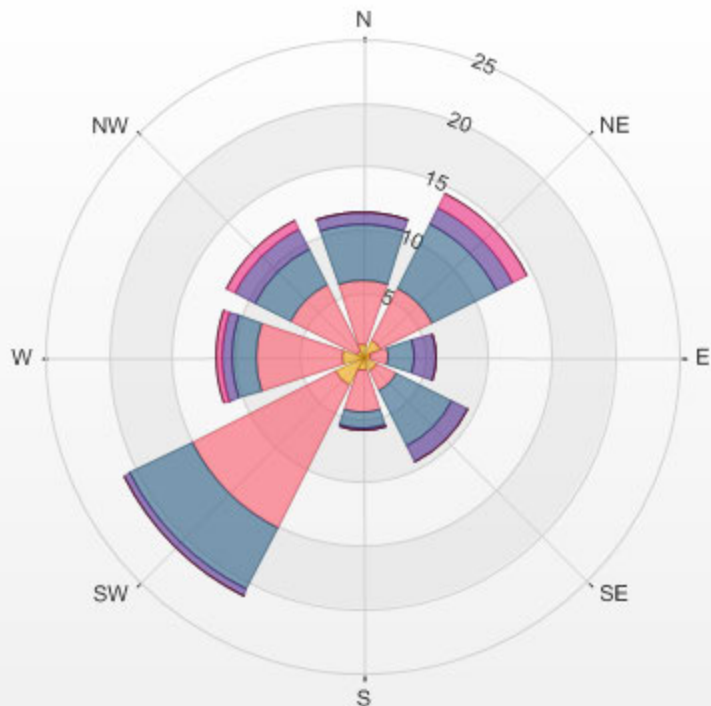
Wind: LICA MASKWA
 Monitor: WSP [kph]
 Monthly: 17/11
 Type: WindRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 8.47%

Direction	1.8-3.1	3.1-6.2	6.2-9.2	9.2-12.3	12.3-15.4	>15.4	Total
N	1.0	5.1	4.3	1.0	0.0	0.0	11.4
NE	1.5	4.6	5.7	1.4	1.3	0.0	14.4
E	0.7	1.4	2.1	1.7	0.0	0.0	5.8
SE	1.3	1.8	4.9	1.4	0.0	0.0	9.3
S	1.1	3.3	1.3	0.1	0.0	0.0	5.8
SW	2.5	12.6	5.4	0.6	0.0	0.0	21.1
W	1.7	6.8	1.8	0.8	0.4	0.0	11.5
NW	0.6	5.8	3.2	1.7	0.8	0.0	12.1
Summary	10.3	41.5	28.6	8.6	2.5	0.0	91.5

% Icon	Classes (kph)	10	 1.8-3.1	42	 3.1-6.2	29	 6.2-9.2	9	 9.2-12.3	3	 12.3-15.4	0	 >15.4
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LICA MASKWA 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 8.47% Calm Wind Avg Speed: 1.15(kph)



WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2017

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

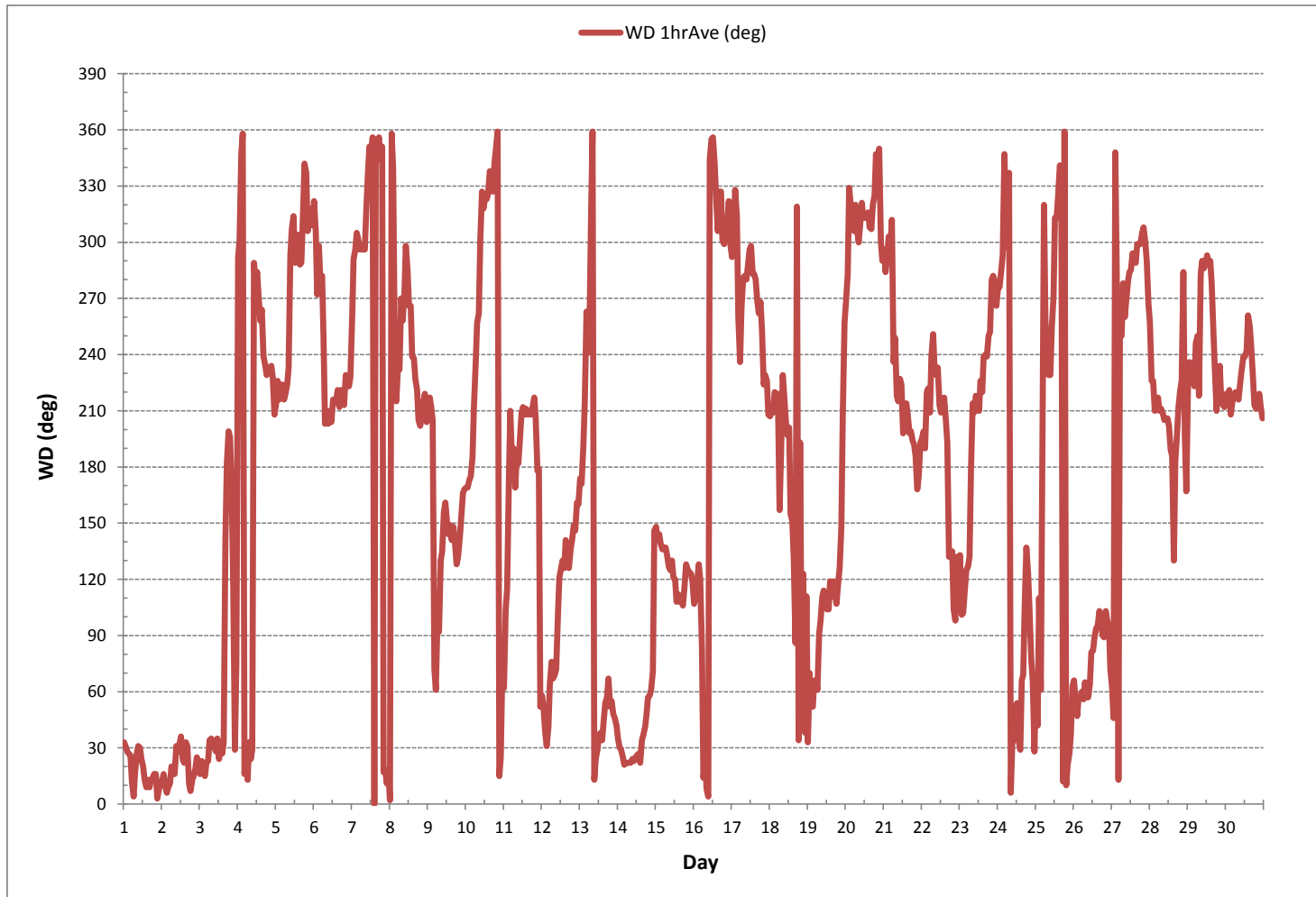
STATUS FLAG CODES

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

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

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	720	hrs
STANDARD DEVIATION:	104		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	320 (NW)	

WIND DIRECTION Hourly Averages (WD)



STANDARD DEVIATION WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - November 2017

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		
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	RDGS.	
DAY																										
1	14	11	11	13	12	18	22	18	15	15	16	18	19	21	23	22	22	19	21	20	18	26	22	21	24	
2	21	22	19	19	17	17	14	15	21	15	16	19	24	24	19	20	19	20	26	22	18	19	17	18	24	
3	20	16	21	21	16	15	16	17	21	16	18	28	25	21	27	23	40	28	21	51	35	61	23	36	24	
4	31	52	33	30	15	19	16	22	15	32	40	44	41	34	32	36	33	23	25	28	23	25	19	11	24	
5	12	19	13	17	16	15	18	17	21	31	32	42	32	26	32	29	27	32	38	36	31	34	33	31	24	
6	35	37	32	37	31	33	25	12	15	18	20	20	24	23	24	27	22	28	27	21	29	31	27	28	24	
7	30	25	25	31	29	32	27	29	28	36	35	34	36	32	30	30	40	30	34	33	20	19	22	20	24	
8	36	48	25	30	26	26	29	30	31	28	35	32	39	39	33	36	25	19	12	11	13	15	17	12	24	
9	13	25	17	29	46	28	56	54	53	33	31	29	30	31	28	25	24	25	29	30	28	30	24	28	24	
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11	48	53	16	16	12	19	27	37	38	26	22	22	22	21	20	18	14	15	24	30	46	60	28	24	24	
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14	17	14	13	14	19	15	16	16	15	14	17	17	17	19	17	17	16	16	18	21	24	29	29	32	24	
15	24	24	27	25	28	28	32	29	29	29	31	29	29	29	26	28	29	26	27	28	30	30	31	30	24	
16	30	33	30	25	35	40	46	18	27	28	33	31	32	35	36	34	40	38	34	27	30	34	38	32	24	
17	31	36	35	37	29	30	36	27	33	30	30	29	32	33	30	27	25	28	24	26	20	20	15	14	24	
18	12	11	16	24	30	46	38	29	47	42	24	32	20	34	34	45	64	44	54	43	28	40	67	50	24	
19	31	24	24	24	24	24	21	29	27	31	32	28	29	29	32	29	30	29	30	27	28	38	44	35	24	
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21	29	32	36	36	45	38	28	37	53	31	29	29	26	20	28	23	21	20	20	24	26	35	24	29	24	
22	22	23	32	38	28	21	42	36	32	33	36	22	22	19	27	34	29	49	50	36	37	42	35	29	24	
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29	37	66	48	21	28	29	28	17	23	26	24	28	30	30	26	27	24	24	14	26	31	21	19	20	24	
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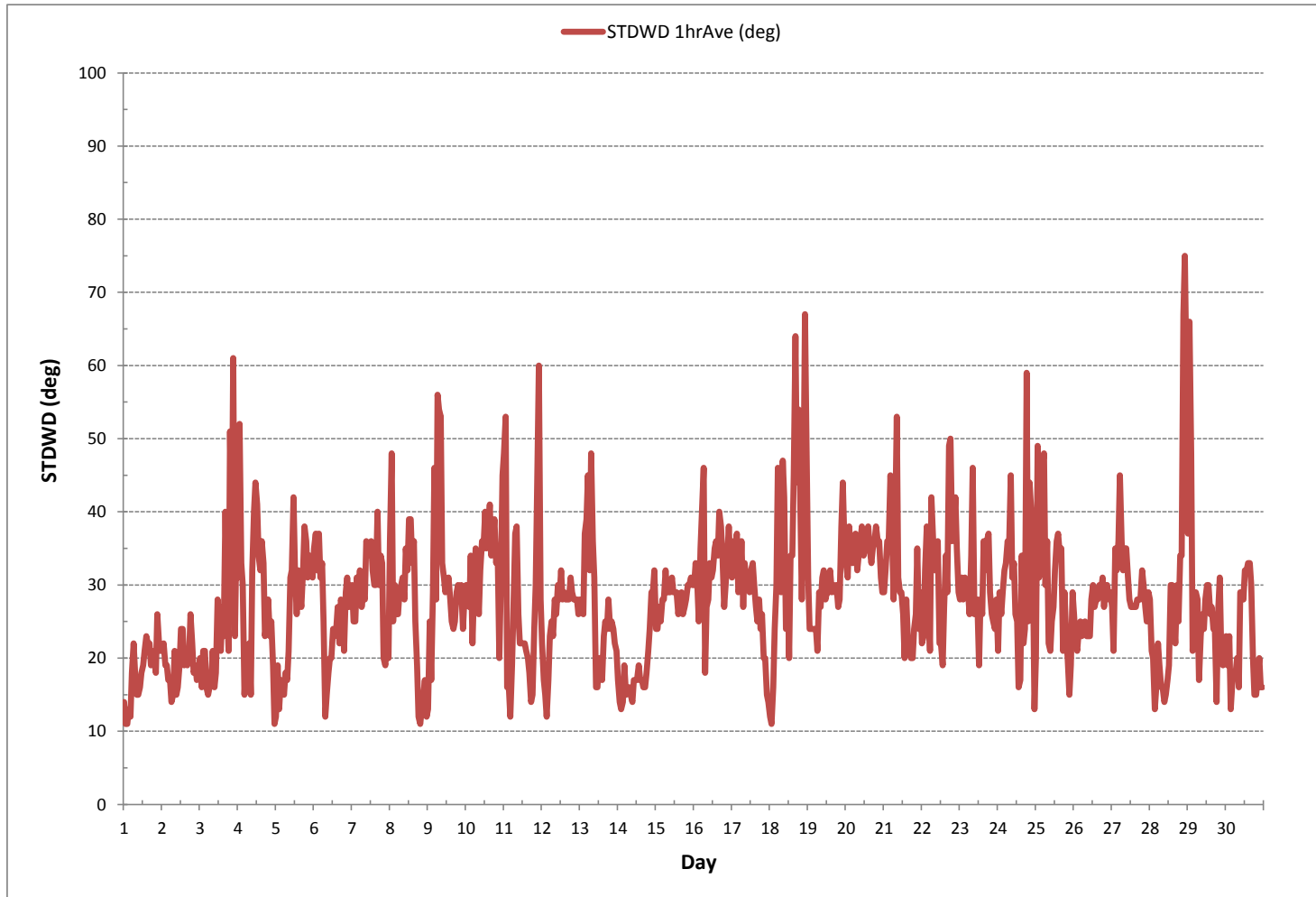
STATUS FLAG CODES

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

LAST CALIBRATION: March 30, 2016

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 720 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



RELATIVE HUMIDITY

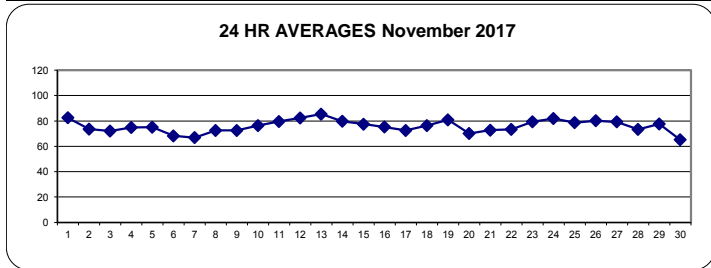


RELATIVE HUMIDITY Hourly Averages (RH %)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY 1	87	87	88	88	88	88	88	87	84	81	77	76	75	76	76	79	81	80	81	81	82	83	83	83	75	88	82	24	
2	82	81	80	82	82	81	80	80	78	72	68	66	62	64	67	68	72	73	74	73	71	70	70	70	62	82	74	24	
3	74	73	71	70	71	72	72	72	72	70	69	67	65	68	69	71	73	75	72	75	76	77	76	77	65	77	72	24	
4	79	77	77	78	79	79	79	78	79	77	71	60	57	59	63	69	75	80	81	81	80	80	80	79	57	81	75	24	
5	79	79	79	79	79	79	80	80	80	80	78	75	67	67	70	73	74	74	74	74	71	69	70	71	67	80	75	24	
6	67	71	74	67	69	74	77	78	77	67	65	64	65	62	59	61	63	65	67	66	68	69	71	72	59	78	68	24	
7	75	77	76	76	76	77	78	78	76	69	60	55	52	53	54	56	59	62	64	67	67	64	65	68	52	78	67	24	
8	72	78	79	77	76	75	74	74	75	76	70	59	54	55	60	64	71	76	80	80	80	80	79	78	54	80	73	24	
9	79	78	78	77	75	76	76	75	77	79	78	73	67	65	61	64	67	71	73	72	70	69	69	71	61	79	73	24	
10	74	76	76	77	77	78	78	79	79	78	74	74	73	73	73	74	76	77	77	77	78	79	78	79	73	79	76	24	
11	79	80	83	83	81	81	80	81	82	81	77	73	70	68	69	76	83	85	84	84	84	82	81	68	85	80	24		
12	81	82	83	83	83	84	83	83	83	83	83	81	79	78	79	80	81	83	83	83	84	85	85	86	78	86	82	24	
13	87	87	87	87	86	86	86	86	86	86	85	85	84	84	85	85	85	85	85	85	85	84	83	85	85	83	87	85	24
14	85	84	84	83	83	83	82	82	81	79	79	77	75	74	73	74	78	80	78	80	79	80	80	80	73	85	80	24	
15	78	79	79	79	78	78	78	78	79	79	77	72	72	74	76	77	80	80	79	78	77	77	77	79	72	80	78	24	
16	79	79	78	78	79	80	80	79	78	76	74	72	70	67	67	71	74	75	75	75	76	75	74	74	67	80	75	24	
17	75	75	75	74	75	77	76	74	74	70	66	64	62	60	63	70	74	77	77	78	77	77	76	76	60	78	73	24	
18	75	75	75	75	74	74	73	73	73	75	76	74	73	76	77	79	80	81	81	81	80	79	80	73	81	76	24		
19	80	82	82	82	82	82	83	83	82	81	82	81	79	79	77	78	80	81	82	83	81	80	80	80	77	83	81	24	
20	82	82	77	74	71	71	70	71	69	68	65	64	64	64	67	69	68	69	70	70	70	72	72	72	64	82	70	24	
21	73	73	74	74	74	74	75	75	74	73	72	70	72	72	72	73	73	73	72	72	73	72	72	72	70	75	73	24	
22	72	72	72	73	73	74	74	74	73	72	66	63	63	68	72	75	76	76	77	77	77	80	83	80	63	83	73	24	
23	79	78	82	83	83	82	83	82	82	78	72	69	73	75	72	76	78	79	80	80	81	84	87	88	69	88	79	24	
24	90	90	89	88	87	84	83	80	80	78	76	75	74	74	76	82	85	86	85	83	83	82	82	74	90	82	24		
25	82	82	84	84	84	84	83	82	85	86	84	77	68	66	65	74	79	79	76	76	77	78	78	77	65	86	79	24	
26	77	78	78	78	79	80	79	79	79	79	81	79	77	77	78	80	81	83	84	85	85	86	86	77	86	80	24		
27	86	86	85	86	85	85	85	84	84	84	83	83	79	77	75	72	73	73	72	72	71	72	73	77	71	86	79	24	
28	80	80	81	80	81	80	80	82	83	82	76	67	58	52	54	62	62	63	67	72	75	78	81	83	52	83	73	24	
29	83	82	82	84	83	83	82	81	80	73	69	68	72	68	69	77	81	83	82	82	80	76	72	69	68	84	78	24	
30	70	69	70	67	63	62	63	63	66	63	59	55	54	53	53	62	67	68	68	69	71	74	76	77	53	77	65	24	
HOURLY MAX	90	90	89	88	88	88	88	87	86	86	85	85	84	84	85	85	85	85	86	85	85	85	85	87	88				
HOURLY AVG	79	79	79	79	79	79	79	78	78	77	74	71	69	68	69	72	75	76	77	77	77	77	77	78					

STATUS FLAG CODES

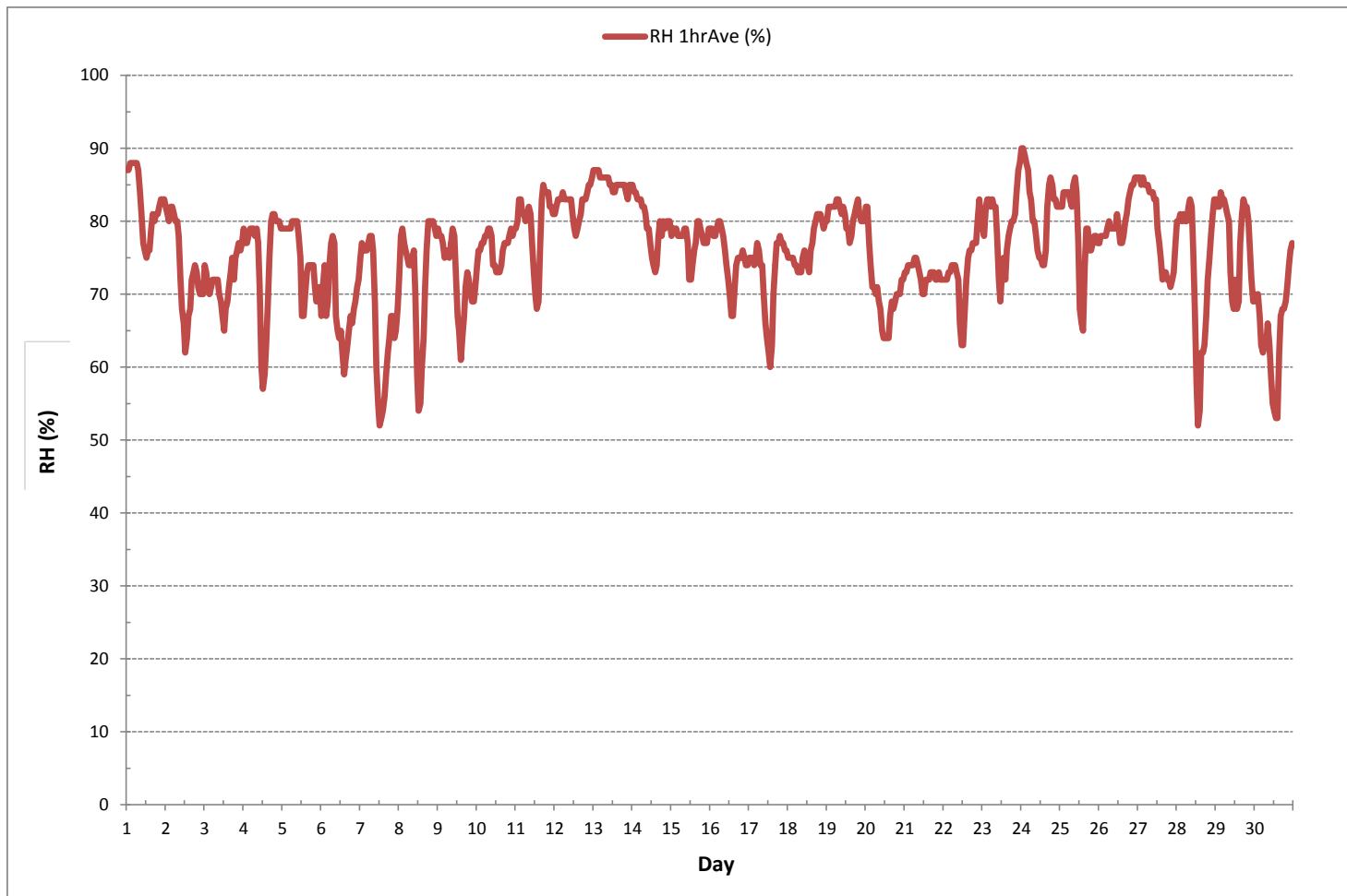
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	52	%	@ HOUR	12	ON DAY	7
MAXIMUM 1-HR AVERAGE:	90	%	@ HOUR	0	ON DAY	24
MAXIMUM 24-HR AVERAGE:	85	%			ON DAY	13
OPERATIONAL TIME:						720 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	7					
MONTHLY AVERAGE:						76 %

RELATIVE HUMIDITY Hourly Averages (RH %)



BAROMETRIC PRESSURE



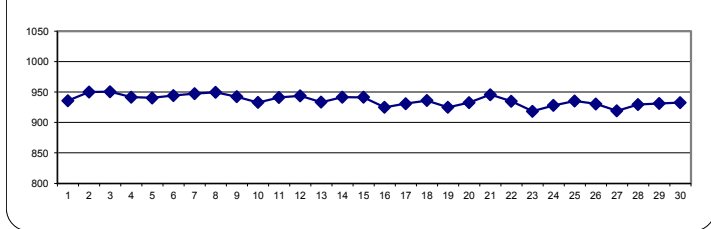
BAROMETRIC PRESSURE Hourly Averages (BP mbar)

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	928	928	929	930	930	931	932	933	933	934	935	936	936	937	937	938	939	940	941	941	942	943	943	944	928	944	936	24	
2	944	945	945	946	946	947	948	948	949	950	950	951	951	951	951	952	952	952	953	953	953	954	954	944	944	950	24		
3	954	954	953	953	953	953	953	953	953	953	952	952	951	950	950	949	949	948	948	947	947	947	946	945	945	954	951	24	
4	945	944	944	943	943	943	943	943	942	942	942	942	942	941	941	941	940	940	940	940	940	940	940	940	940	940	945	942	24
5	940	939	939	939	939	939	939	939	939	940	940	940	940	940	941	941	942	942	942	942	942	943	943	944	939	944	940	24	
6	944	944	945	945	945	945	946	946	946	946	946	946	946	945	944	944	943	943	942	942	942	942	942	942	942	942	946	944	24
7	943	943	944	945	945	945	946	947	947	948	949	949	949	949	949	949	949	949	949	949	949	949	949	949	949	950	950	948	24
8	950	950	950	950	950	950	950	950	950	950	950	950	949	949	949	949	949	949	949	949	949	949	949	949	949	949	950	950	24
9	949	948	948	948	947	947	947	946	946	946	945	945	944	943	942	940	939	938	937	936	935	934	934	933	933	949	942	24	
10	932	931	931	931	930	930	930	930	930	931	931	932	932	933	933	934	934	935	936	936	936	937	937	937	938	930	938	933	24
11	938	938	939	939	939	939	939	940	940	941	941	941	942	942	942	942	943	943	944	944	945	945	946	938	946	941	24		
12	946	946	947	947	947	947	947	946	947	946	946	946	946	945	944	944	943	942	942	941	940	939	938	937	937	947	944	24	
13	937	936	936	935	935	935	934	935	935	934	934	934	933	933	933	933	932	932	932	931	931	931	931	931	931	937	934	24	
14	931	932	933	934	935	936	937	938	939	940	941	942	943	944	944	945	946	947	947	948	948	949	949	949	931	949	942	24	
15	949	948	948	948	948	947	947	946	946	945	944	943	942	941	940	939	938	936	936	935	934	934	933	932	930	930	949	941	24
16	929	928	928	927	926	925	925	924	924	924	924	923	923	923	923	924	924	924	925	925	925	925	925	926	923	929	925	24	
17	926	926	926	927	927	927	927	928	928	929	930	930	931	931	932	933	933	934	935	935	936	937	937	938	926	938	931	24	
18	938	938	938	938	938	938	938	938	938	937	937	936	936	935	935	934	934	934	934	934	934	934	934	934	934	934	938	936	24
19	934	934	934	934	933	932	931	931	930	929	928	926	924	922	921	920	919	918	917	917	916	916	917	916	916	916	934	925	24
20	917	918	919	921	922	923	925	927	928	930	931	932	934	935	936	938	939	941	942	943	944	945	946	947	917	947	933	24	
21	948	949	949	949	949	949	950	950	949	949	949	947	947	946	945	944	943	942	941	940	939	938	937	937	937	950	946	24	
22	937	936	936	935	935	935	936	936	936	937	937	937	937	936	936	936	935	934	934	933	932	932	931	930	930	937	935	24	
23	928	928	926	924	922	921	919	918	918	918	917	917	916	916	915	915	915	915	915	916	916	916	917	918	915	928	919	24	
24	918	919	921	922	923	924	925	926	927	927	928	929	930	931	931	932	932	933	933	934	933	933	933	933	918	934	928	24	
25	933	932	932	932	932	931	931	931	932	932	933	934	935	936	937	938	938	940	940	941	941	941	942	931	942	936	24		
26	942	941	941	941	940	939	938	937	937	936	935	933	931	929	927	926	925	923	922	921	920	917	916	915	915	942	931	24	
27	914	913	914	915	913	914	915	915	916	916	916	917	917	918	920	921	922	924	925	926	927	928	929	930	913	930	919	24	
28	931	931	931	932	932	932	932	932	932	932	932	931	931	930	930	928	928	927	927	926	926	925	925	925	925	925	932	930	24
29	925	925	926	926	926	927	927	928	929	931	932	933	934	934	935	935	935	936	936	936	935	935	935	934	925	936	931	24	
30	934	934	933	933	933	932	932	932	932	932	933	933	933	933	933	933	933	932	932	932	932	932	932	932	932	932	934	933	24
HOURLY MAX	954	954	953	953	953	953	953	953	953	953	952	952	951	951	951	952	952	952	953	953	953	954	954	954					
HOURLY AVG	936	936	936	936	936	936	936	936	937	937	937	937	937	937	937	936	936	937	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

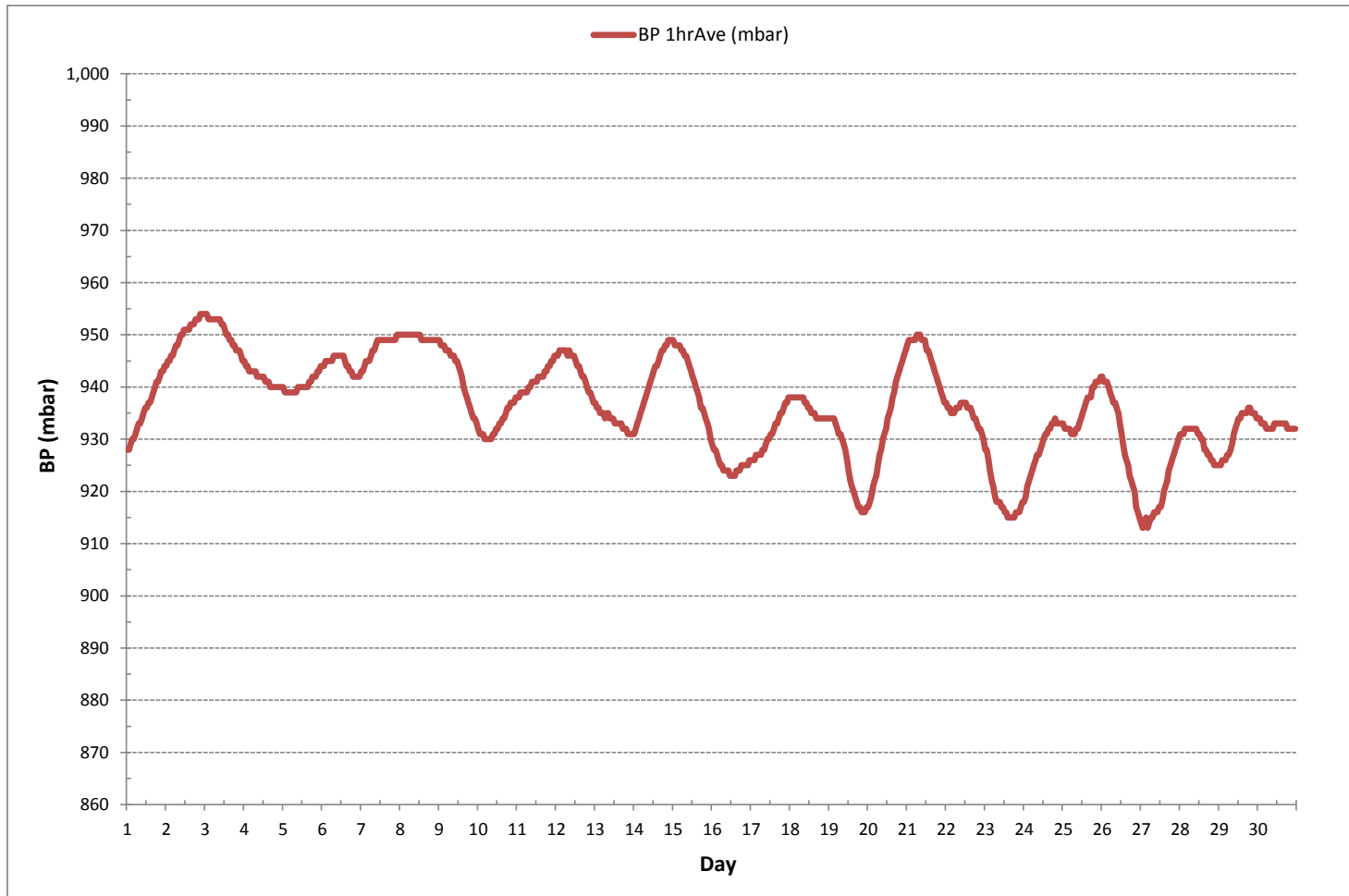
24 HR AVERAGES November 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	913	mbar	@ HOUR	1	ON DAY	27
MAXIMUM 1-HR AVERAGE:	954	mbar	@ HOUR	21	ON DAY	2
MAXIMUM 24-HR AVERAGE:	951	mbar			ON DAY	3
OPERATIONAL TIME:						720 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	9					
MONTHLY AVERAGE:						936 mbar

BAROMETRIC PRESSURE Hourly Averages (BP mbar)



AMBIENT TEMPERATURE



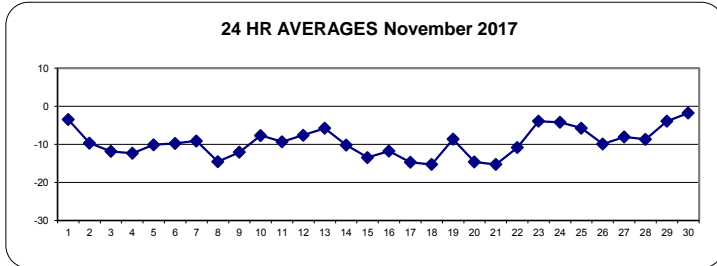
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY 1	-2.3	-2.6	-2.7	-2.8	-2.9	-3.1	-3.1	-3.0	-2.7	-2.0	-0.7	-0.6	-0.8	-0.8	-1.3	-2.6	-4.2	-5.3	-6.0	-6.4	-6.6	-6.8	-7.0	-7.3	-7.3	-0.6	-3.5	24	
2	-7.7	-8.2	-8.6	-9.8	-10.9	-11.0	-11.1	-11.6	-11.5	-9.8	-8.7	-8.0	-7.4	-7.9	-8.4	-9.0	-9.3	-9.7	-10.1	-10.3	-10.6	-10.9	-11.1	-11.3	-11.6	-7.4	-9.7	24	
3	-11.7	-12.3	-12.8	-13.3	-13.6	-13.8	-14.0	-14.2	-14.0	-13.2	-12.0	-10.5	-9.9	-10.3	-10.3	-10.5	-10.6	-10.8	-10.9	-11.2	-11.3	-11.1	-10.9	-11.3	-14.2	-9.9	-11.9	24	
4	-11.8	-11.3	-11.6	-12.4	-14.0	-16.9	-17.7	-17.1	-14.4	-13.0	-10.5	-7.6	-6.5	-6.5	-6.9	-8.7	-11.0	-12.8	-13.2	-13.7	-14.1	-14.5	-15.0	-15.7	-17.7	-6.5	-12.4	24	
5	-15.5	-15.5	-14.9	-14.6	-14.0	-13.9	-13.4	-12.7	-11.5	-9.1	-7.6	-7.0	-5.2	-5.4	-6.0	-6.4	-7.0	-7.5	-8.1	-8.3	-9.4	-9.6	-9.8	-10.0	-15.5	-5.2	-10.1	24	
6	-10.1	-10.2	-10.5	-10.6	-11.8	-14.1	-15.8	-16.9	-15.9	-10.6	-8.0	-6.5	-5.8	-5.0	-5.1	-6.2	-7.1	-7.5	-8.1	-8.8	-9.3	-9.6	-10.2	-10.3	-16.9	-5.0	-9.8	24	
7	-10.7	-10.0	-8.6	-8.2	-8.3	-8.8	-9.4	-9.4	-9.0	-7.3	-6.6	-6.6	-7.0	-8.1	-8.3	-8.7	-9.2	-9.6	-9.7	-10.0	-10.5	-11.1	-11.4	-12.0	-12.0	-6.6	-9.1	24	
8	-13.9	-15.8	-17.1	-18.7	-20.1	-20.9	-21.1	-20.6	-19.1	-15.5	-11.7	-9.2	-7.8	-8.2	-9.2	-9.6	-11.4	-12.5	-13.8	-13.7	-13.7	-14.3	-15.0	-16.0	-21.1	-7.8	-14.5	24	
9	-16.1	-16.0	-16.4	-16.7	-18.8	-18.8	-17.6	-19.1	-17.8	-11.6	-9.8	-9.1	-7.5	-6.5	-5.6	-7.2	-8.9	-10.2	-10.5	-10.1	-9.4	-8.8	-8.7	-9.1	-19.1	-5.6	-12.1	24	
10	-9.3	-9.4	-9.5	-9.6	-9.5	-9.5	-9.5	-9.7	-9.5	-8.4	-7.0	-6.4	-6.0	-5.8	-5.5	-5.8	-6.2	-6.3	-6.4	-6.6	-6.7	-6.9	-7.2	-7.4	-9.7	-5.5	-7.7	24	
11	-7.6	-7.6	-9.7	-12.4	-14.0	-13.7	-14.4	-12.3	-9.7	-8.3	-7.1	-5.8	-4.8	-3.9	-4.1	-5.9	-7.9	-8.6	-9.7	-11.0	-11.9	-13.0	-13.1	-14.4	-3.9	-9.4	24		
12	-12.8	-11.3	-10.5	-10.4	-9.8	-9.3	-8.6	-8.3	-8.1	-7.8	-6.9	-6.3	-5.9	-5.7	-5.9	-6.3	-6.5	-6.3	-6.1	-5.9	-5.8	-5.9	-6.0	-6.1	-12.8	-5.7	-7.6	24	
13	-6.2	-6.3	-6.4	-6.4	-6.4	-6.7	-6.8	-6.7	-6.6	-6.3	-6.1	-5.5	-5.1	-5.1	-5.2	-5.1	-5.1	-5.1	-4.8	-4.9	-5.1	-5.2	-5.7	-6.2	-6.8	-4.8	-5.8	24	
14	-6.9	-7.8	-8.1	-8.5	-8.9	-9.2	-9.4	-9.5	-9.5	-9.4	-9.3	-8.8	-8.7	-8.5	-8.8	-9.3	-10.9	-12.5	-13.3	-14.0	-12.5	-12.8	-14.1	-14.6	-14.6	-6.9	-10.2	24	
15	-13.9	-14.7	-15.1	-16.0	-15.8	-16.4	-16.6	-15.5	-14.1	-13.1	-12.3	-11.4	-12.0	-12.3	-12.4	-12.3	-11.9	-11.6	-11.7	-12.2	-12.9	-13.3	-13.1	-12.9	-16.6	-11.4	-13.5	24	
16	-12.7	-12.3	-12.2	-12.3	-12.3	-12.2	-12.4	-13.0	-12.8	-12.3	-11.4	-10.8	-10.3	-9.6	-9.6	-10.6	-11.2	-11.4	-11.5	-11.7	-12.8	-12.6	-12.5	-12.5	-13.0	-9.6	-11.8	24	
17	-12.5	-12.6	-13.1	-13.5	-13.7	-14.3	-15.2	-16.1	-16.7	-14.7	-13.2	-12.2	-11.3	-10.3	-11.4	-13.4	-14.9	-16.4	-16.7	-17.6	-18.2	-18.5	-18.4	-18.6	-18.6	-10.3	-14.7	24	
18	-18.5	-19.3	-19.4	-20.3	-20.7	-20.3	-21.0	-21.5	-21.4	-18.3	-14.1	-12.1	-11.1	-9.9	-9.8	-9.8	-10.0	-10.1	-10.5	-11.9	-13.9	-14.8	-15.4	-13.1	-21.5	-9.8	-15.3	24	
19	-11.8	-10.7	-10.0	-9.4	-9.4	-9.5	-9.5	-8.7	-8.5	-8.3	-8.2	-7.6	-7.4	-7.1	-7.0	-7.8	-8.1	-8.1	-8.1	-8.5	-8.3	-8.5	-8.6	-8.6	-11.8	-7.0	-8.7	24	
20	-8.6	-8.2	-8.5	-11.0	-12.8	-13.8	-15.4	-16.3	-16.3	-16.2	-15.7	-15.3	-15.3	-15.4	-15.5	-16.3	-16.5	-16.4	-16.4	-16.4	-16.3	-16.1	-16.0	-15.9	-16.5	-8.2	-14.6	24	
21	-15.9	-15.8	-15.6	-15.5	-15.4	-15.4	-15.3	-15.2	-15.0	-14.5	-13.9	-13.3	-13.3	-13.8	-14.5	-15.1	-16.0	-16.1	-16.1	-16.3	-16.4	-16.4	-16.3	-16.0	-16.4	-13.3	-15.3	24	
22	-15.7	-15.5	-15.2	-15.0	-15.0	-14.6	-13.8	-13.4	-13.0	-12.0	-10.0	-8.8	-7.8	-8.7	-8.7	-8.5	-8.7	-8.4	-8.0	-7.8	-7.9	-7.7	-8.0	-7.5	-15.7	-7.5	-10.8	24	
23	-7.3	-7.3	-7.1	-7.4	-8.0	-8.6	-8.6	-8.2	-8.2	-7.3	-5.7	-4.4	-5.6	-4.8	-1.7	-0.7	-0.3	0.1	1.1	1.8	1.9	1.4	0.8	0.0	-8.6	1.9	-3.9	24	
24	-0.6	0.3	1.0	1.3	0.9	0.2	0.0	-0.3	-0.4	-0.8	-1.3	-2.2	-3.9	-4.0	-3.9	-4.2	-6.2	-8.2	-9.9	-10.9	-11.2	-11.8	-12.0	-12.4	-12.4	1.3	-4.2	24	
25	-12.2	-10.9	-9.8	-8.9	-9.5	-10.4	-11.1	-11.5	-9.9	-5.5	-3.2	0.3	3.0	3.5	3.1	-0.1	-2.1	-2.6	-3.7	-5.3	-6.1	-7.1	-8.0	-9.1	-12.2	3.5	-5.7	24	
26	-10.4	-11.2	-11.7	-12.3	-12.6	-12.7	-13.2	-13.3	-13.0	-11.9	-9.8	-8.4	-7.7	-7.8	-8.2	-8.3	-8.3	-8.1	-7.8	-7.5	-7.3	-7.3	-7.2	-13.3	-7.2	-9.9	24		
27	-7.2	-7.8	-8.0	-7.6	-7.7	-8.1	-7.2	-7.0	-7.2	-6.8	-6.5	-6.6	-6.3	-6.9	-7.7	-8.0	-8.2	-8.3	-8.4	-9.0	-9.7	-10.4	-10.9	-12.2	-12.2	-6.3	-8.1	24	
28	-13.7	-14.6	-15.0	-14.1	-13.9	-13.9	-14.9	-12.4	-10.9	-9.0	-6.9	-4.8	-2.5	-0.8	-1.8	-4.1	-4.4	-4.6	-5.5	-6.5	-7.1	-8.0	-8.9	-9.7	-15.0	-0.8	-8.7	24	
29	-9.7	-10.0	-9.4	-10.3	-9.9	-9.0	-7.6	-7.3	-4.3	-0.6	0.7	1.2	0.4	1.2	0.9	-1.2	-2.4	-2.8	-2.8	-3.4	-3.3	-2.1	-1.4	-0.9	-10.3	1.2	-3.9	24	
30	-1.5	-2.0	-2.9	-2.8	-2.4	-2.4	-2.7	-3.1	-3.8	-2.7	0.7	1.5	2.9	3.9	3.5	0.2	-1.5	-2.1	-2.5	-3.1	-3.6	-4.4	-4.6	-4.9	-4.9	3.9	-1.7	24	
HOURLY MAX	-0.6	0.3	1.0	1.3	0.9	0.2	0.0	-0.3	-0.4	-0.6	0.7	1.5	3.0	3.9	3.5	0.2	-0.3	0.1	1.1	1.8	1.9	1.4	0.8	0.0					
HOURLY AVG	-10.5	-10.6	-10.6	-11.0	-11.4	-11.7	-11.9	-11.8	-11.2	-9.6	-8.2	-7.2	-6.6	-6.3	-6.5	-7.4	-8.2	-8.7	-8.9	-9.3	-9.6	-9.9	-10.2	-10.4					

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

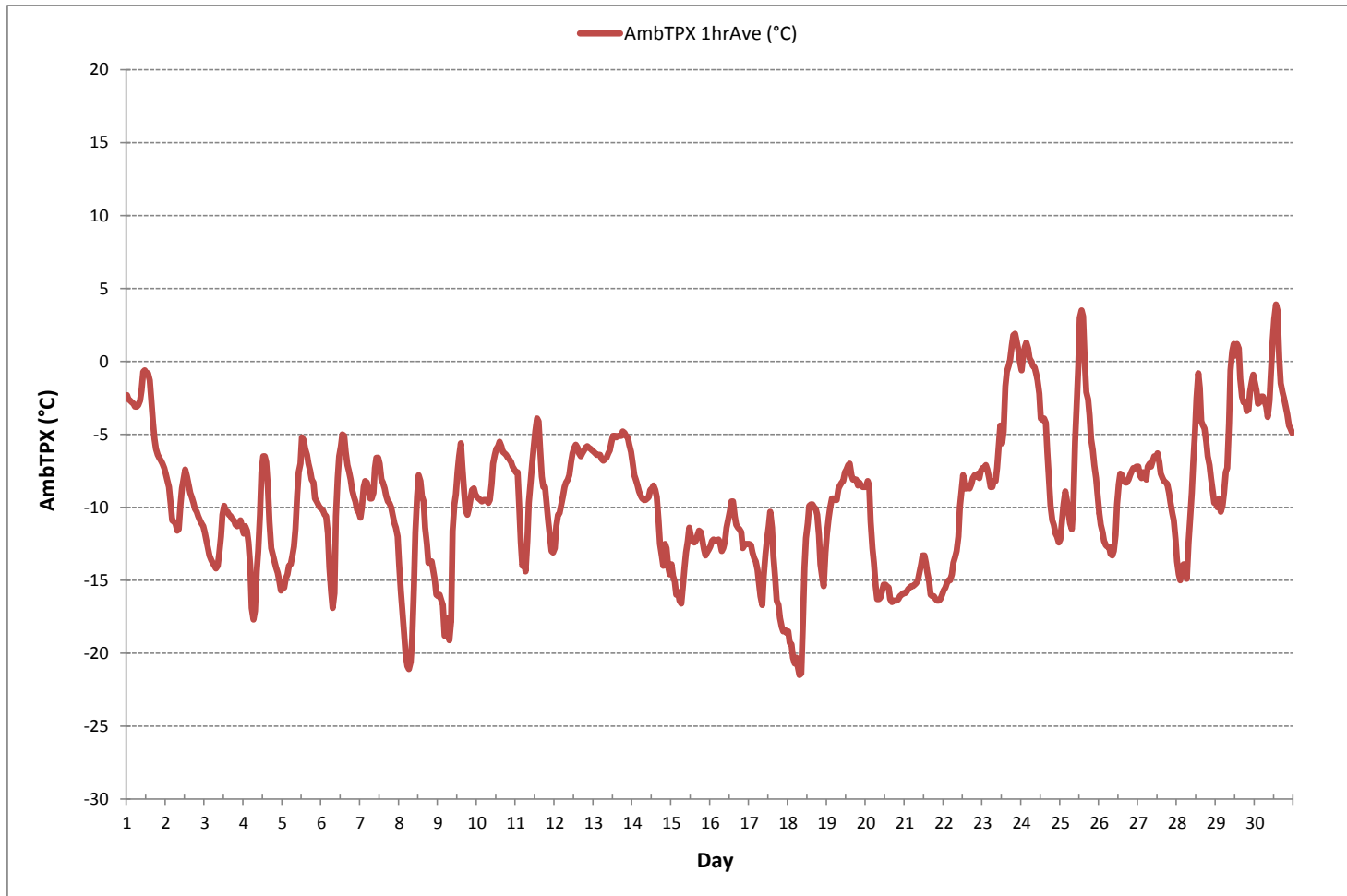
24 HR AVERAGES November 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-21.5 °C	@ HOUR	7	ON DAY	18
MAXIMUM 1-HR AVERAGE:	3.9 °C	@ HOUR	13	ON DAY	30
MAXIMUM 24-HR AVERAGE:	-1.7 °C			ON DAY	30
OPERATIONAL TIME:				720	hrs
AMD OPERATION UPTIME:				100.0	%
STANDARD DEVIATION:	4.7	MONTHLY AVERAGE:		-9.5	°C

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



PRECIPITATION



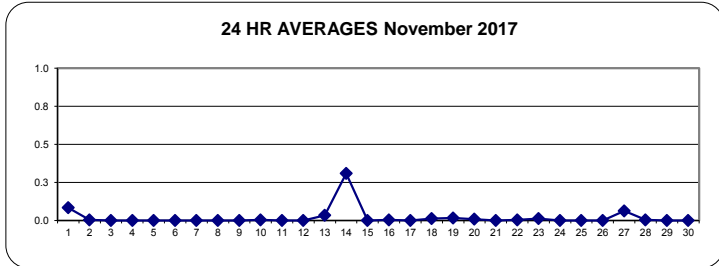
PRECIPITATION Hourly Averages (mm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	0.1	0.0	0.3	0.3	0.3	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.3	0.1	24
2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	24
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
10	0.1	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	0.0	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	24
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.0	0.5	0.0	24
14	1.0	1.6	1.4	0.9	1.2	0.8	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.3	24
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	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	0.0	24
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	24
19	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	0.1	0.0	0.1	0.0	24
20	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	0.0	0.2	0.0	24
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	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	0.3	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	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	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	24
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.2	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.1	24
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	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	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	24
HOURLY MAX	1.0	1.6	1.4	0.9	1.2	0.8	0.4	0.1	0.3	0.3	0.2	0.2	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.3	0.3	0.1	0.5	0.3				
HOURLY AVG	0.0	0.1	0.1	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				

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

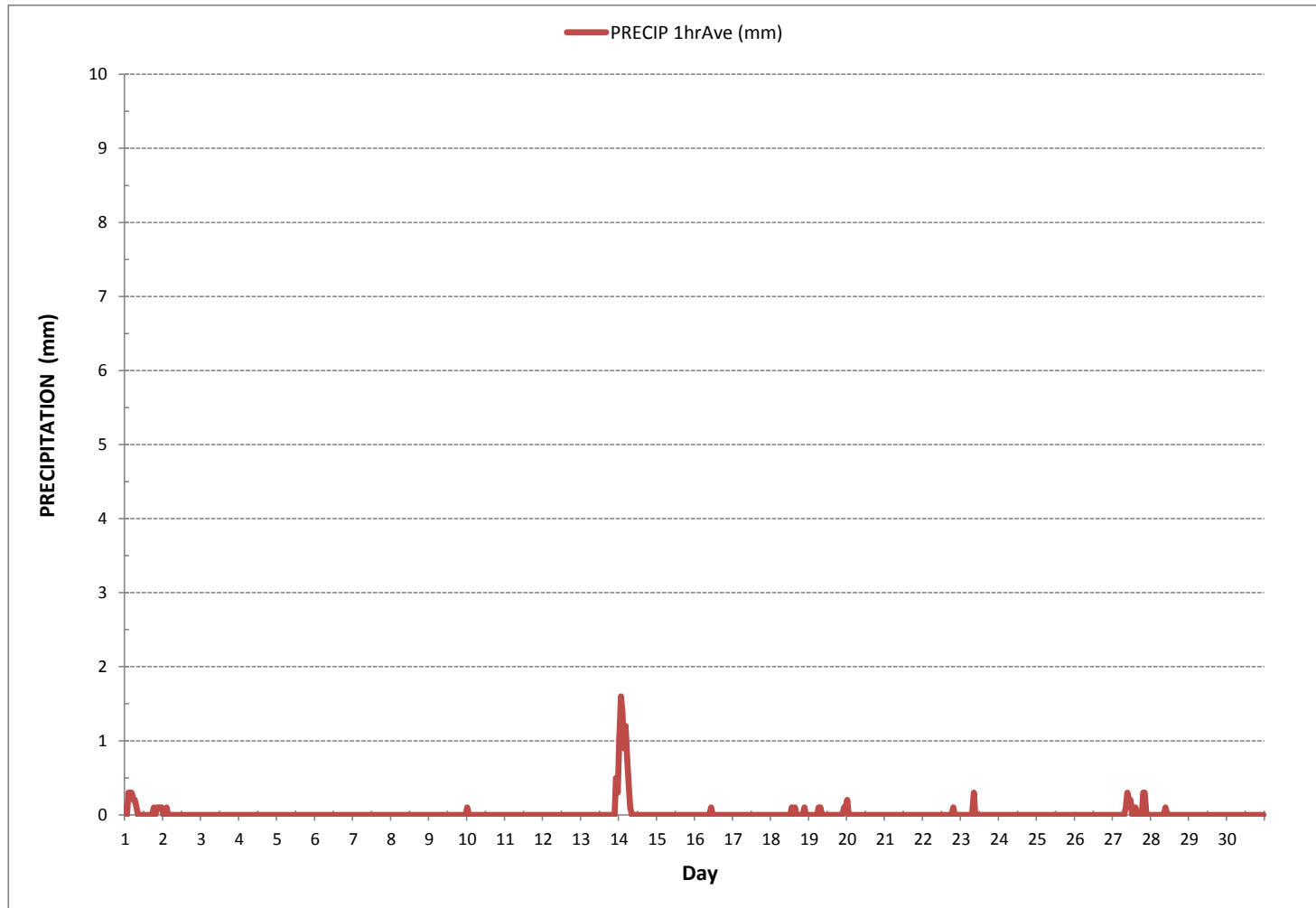
24 HR AVERAGES November 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	0.0 mm	@ HOUR	1	ON DAY	1
MAXIMUM 1-HR AVERAGE:	1.6 mm	@ HOUR	1	ON DAY	14
MAXIMUM 24-HR AVERAGE:	0.3 mm			ON DAY	14
MONTHLY TOTAL	13.4 mm				
OPERATIONAL TIME:					720 hrs
AMD OPERATION UPTIME:					100.0 %
STANDARD DEVIATION:	0.1	MONTHLY AVERAGE:			0.0 mm

PRECIPITATION Hourly Averages (mm)



APPENDIX II
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE



API 100E Sulphur Dioxide Analyzer Calibration

Date: <u>November 2, 2017</u>	Barometer/B.P./units: <u>F.S. 05544 expires December 5, 2018</u>	<u>950</u>	millibars
Company/Airshed: <u>LICA</u>	Thermometer/Station Temp: <u>F.S. 170286131 expires April 19, 2019</u>	<u>22</u>	°C
Location/Station Name: <u>Maskwa</u>	Weather Conditions: <u>Mainly sunny</u>		
Parameter: <u>Sulphur Dioxide</u>	Calibration Purpose: <u>routine monthly</u>		
Start Time 24 hr. (mst): <u>10:22</u>	Performed By/Reviewer: <u>Alex Yakupov</u>	<u>Tom Bourque</u>	
End Time 24 hr. (mst): <u>14:46</u>	Cal Gas Expiry Date: <u>July 18, 2019</u>		
Calibration Method: <u>Gas Dilution</u>	Converter Model & s/n (if applicable): <u>n/a</u>		

Analyzer:	Range ppb: <u>1000</u>
ID# or Serial Number: <u>508</u>	As Found C.F.: <u>1.007</u>
Last Calibration Date: <u>October 3, 2017</u>	New C.F.: <u>1.000</u>
Previous C.F.: <u>1.000</u>	

Calibration Standards:	Standard Calibration Points for Ranges								
Low Flow Meter ID/Expiry Date: <u>Defender Low 152020 expires November 21, 2017</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>780</td></tr> <tr><td>Mid</td><td>380</td></tr> <tr><td>Low</td><td>190</td></tr> </table>	Point	ppb	High	780	Mid	380	Low	190
Point		ppb							
High		780							
Mid		380							
Low	190								
High Flow Meter ID/Expiry Date: <u>Defender High 148943 expires November 21, 2017</u>									
Calibrator ID/Expiry Date: <u>API id# 627 expires January 27, 2018</u>									
Cal Gas Cylinder I.D. #: <u>LL 104222</u>									
Cal Gas Conc. (ppm): <u>50.6</u>									

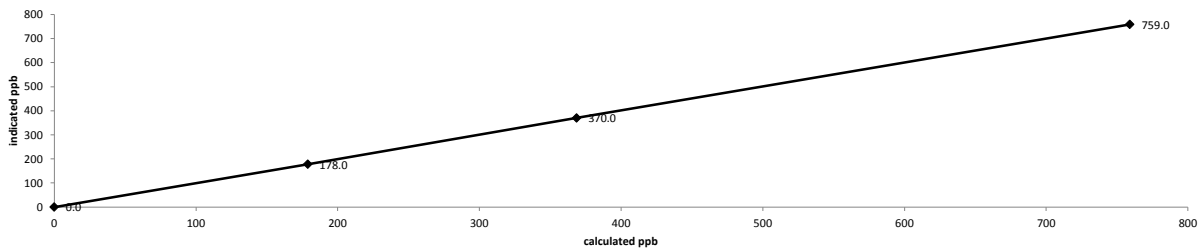
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	5146	0.00	5146	0.0	1.0	n/a
as found high	5201	79.21	5280	759.1	755.0	1.007
adjusted zero	5146	0.00	5146	0.0	0.0	n/a
adjusted high	5201	79.21	5280	759.1	759.0	1.000
mid	5237	38.43	5275	368.6	370.0	0.996
low	5259	18.67	5278	179.0	178.0	1.006
calibrator zero	5146	0.00	5146	0.0	0.0	n/a
Average C.F. =						1.001

Linear Regression/Calibration Results:

	LIMITS
Correlation Coefficient = <u>1.000</u>	> or = 0.995
Slope = <u>0.999</u>	0.95-1.05
b (Intercept as % of full scale) = <u>0.01%</u>	± 3% F.S.
% change in C.F. from last cal = <u>-0.68%</u>	± 10%

API 100E Sulphur Dioxide Analyzer Calibration

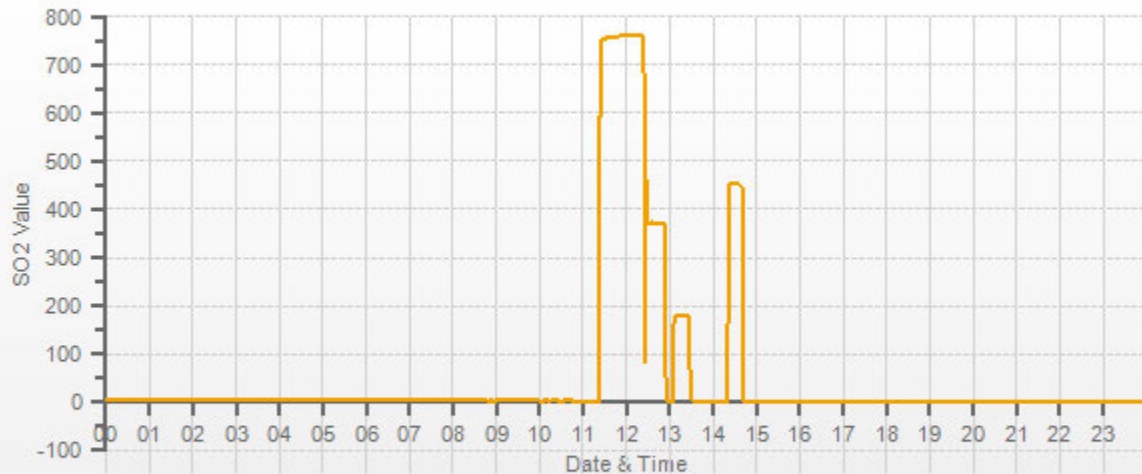


	As found:		As left:
Slope:	<u>0.911</u>	Slope:	<u>0.914</u>
Offset:	<u>156.3</u>	Offset:	<u>157.9</u>
Hvps:	<u>483</u>	Hvps:	<u>483</u>
Rcell Temp:	<u>50.0</u>	Rcell Temp:	<u>50.0</u>
Box Temp:	<u>30.9</u>	Box Temp:	<u>30.8</u>
Pmt Temp:	<u>7.6</u>	Pmt Temp:	<u>7.6</u>
Izs Temp:	<u>50.0</u>	Izs Temp:	<u>50.0</u>
Pres:	<u>25.0</u>	Pres:	<u>25.0</u>
Samp Fl:	<u>588</u>	Samp Fl:	<u>588</u>
Norm Pmt:	<u>155.2</u>	Norm Pmt:	<u>156.5</u>
Uv Lamp:	<u>2457.1</u>	Uv Lamp:	<u>2458.8</u>
Lamp Ratio:	<u>89.7</u>	Lamp Ratio:	<u>89.8</u>
Str Lgt:	<u>71.2</u>	Str Lgt:	<u>72.2</u>
Drk Pmt:	<u>-0.6</u>	Drk Pmt:	<u>10.6</u>
Expected Value:	<u>450.0</u>	Expected Value:	<u>450.0</u>

Comments:

The analyzer sample inlet filter was changed.
 The manifold blower was found to be working normally.
 No EV adjustment was made. The EV did not change after the calibration.
 Flow measurements after mid-point.

SO2[ppb] Station: LICA MASKWA Daily: 17/11/02 Type: AVG 1 Min. [1 Min.]



— SO2[ppb]

HYDROGEN SULPHIDE



API 101E Hydrogen Sulphide Analyzer Calibration

Date:	November 2, 2017	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	950	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	Maskwa	Weather Conditions:	Mainly sunny		
Parameter:	Hydrogen Sulphide	Calibration Purpose:	shut down		
Start Time 24 hr. (mst):	10:22	Performed By/Reviewer:	Alex Yakupov	Tom Bourque	
End Time 24 hr. (mst):	12:48	Cal Gas Expiry Date:	June 14, 2019		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		

Analyzer: ID# or Serial Number: 722 Last Calibration Date: October 27, 2017 Previous C.F.: 1.001	Range ppb: 100 As Found C.F.: 1.002 New C.F.: n/a
--	---

Calibration Standards: Low Flow Meter ID/Expiry Date: Defender Low 152020 expires November 21, 2017 High Flow Meter ID/Expiry Date: Defender High 148943 expires November 21, 2017 Calibrator ID/Expiry Date: Sabio id# 11900613 expires March 16, 2018 Cal Gas Cylinder I.D. #: EY 0000654 Cal Gas Conc. (ppm): 10.2	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">Standard Calibration Points for Ranges</th> <th style="text-align: right;">10:55 / 11:05</th> </tr> <tr> <th style="text-align: center;">Point</th> <th style="text-align: center;">ppb</th> <th></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">High</td> <td style="text-align: center;">78</td> <td style="text-align: right;">1000</td> </tr> <tr> <td style="text-align: center;">Mid</td> <td style="text-align: center;">38</td> <td style="text-align: right;">780</td> </tr> <tr> <td style="text-align: center;">Low</td> <td style="text-align: center;">19</td> <td style="text-align: right;">0.0</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">0.0</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">0.0</td> </tr> </tbody> </table>	Standard Calibration Points for Ranges		10:55 / 11:05	Point	ppb		High	78	1000	Mid	38	780	Low	19	0.0			0.0			0.0
Standard Calibration Points for Ranges		10:55 / 11:05																				
Point	ppb																					
High	78	1000																				
Mid	38	780																				
Low	19	0.0																				
		0.0																				
		0.0																				

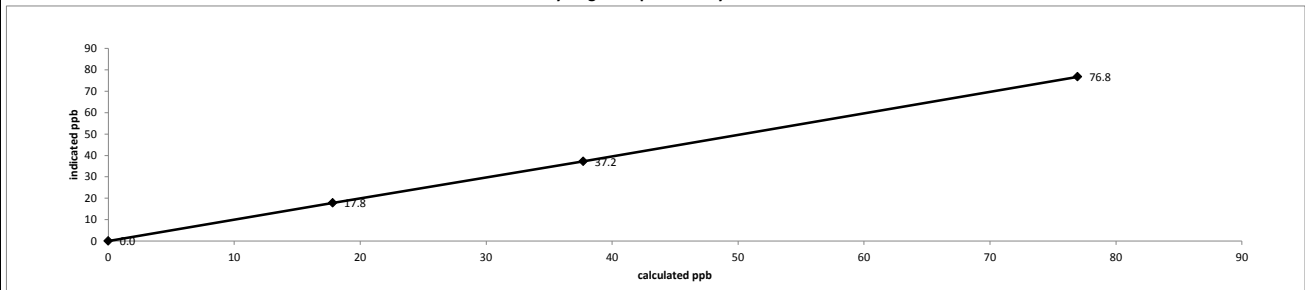
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	0.0	0.0	n/a
as found zero	7893	0.00	7893	77.0	76.8	1.002
as found high	7826	59.49	7885	37.7	37.2	1.014
mid	7869	29.20	7898	17.8	17.8	1.001
low	7888	13.80	7902			
Average C.F.=						1.006

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.003		0.90-1.10
b (Intercept as % of full scale)=	0.08%		± 3% F.S.
% change in C.F. from last cal=	-0.10%		± 10%

API 101E Hydrogen Sulphide Analyzer Calibration



As found: Slope: 0.839 Offset: 104.3 Hvps: 583 Rcell Temp: 50.0 Box Temp: 30.8 Pmt Temp: 8.2 Izs Temp: 32.0 Converter Temp: 314.7 Pres: 23.6 Samp Fl: 622 Uv Lamp: 3238.9 Lamp Ratio: 99.1 Str Lgt: 43.7 Drk Pmt: 23.8 Expected Value: 70.4	As left: Slope: n/a Offset: n/a Hvps: n/a Rcell Temp: n/a Box Temp: n/a Pmt Temp: n/a Izs Temp: n/a Converter Temp: n/a Pres: n/a Samp Fl: n/a Uv Lamp: n/a Lamp Ratio: n/a Str Lgt: n/a Drk Pmt: n/a Expected Value: n/a
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Comments:

The manifold blower was found to be working normally.

Removal of Maxxam owned analyzer to re-install LICA's repaired analyzer.

Flow measurements after mid-point



API 101E Hydrogen Sulphide Analyzer Calibration

Date: November 2, 2017	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	952	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name: Maskwa	Weather Conditions: Mainly sunny		
Parameter: Hydrogen Sulphide	Calibration Purpose: installation		
Start Time 24 hr. (mst): 12:49	Performed By/Reviewer: Alex Yakupov		Tom Bourque
End Time 24 hr. (mst): 17:34	Cal Gas Expiry Date: June 14, 2019		
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a		

Analyzer:	ID# or Serial Number: 510	Range ppb: 100
	Last Calibration Date: n/a	As Found C.F.: n/a
	Previous C.F.: n/a	New C.F.: 1.000

Calibration Standards:	Standard Calibration Points for Ranges																					
Low Flow Meter ID/Expiry Date: Defender Low 152020 expires November 21, 2017	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Point</td> <td style="width: 30%;">ppb</td> <td style="width: 40%;"></td> </tr> <tr> <td>High</td> <td style="text-align: center;">78</td> <td style="text-align: right;">14:20 / 14:30</td> </tr> <tr> <td>Mid</td> <td style="text-align: center;">38</td> <td style="text-align: right;">1000</td> </tr> <tr> <td>Low</td> <td style="text-align: center;">19</td> <td style="text-align: right;">780</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">0.0</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">0.0</td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">0.0</td> </tr> </table>	Point	ppb		High	78	14:20 / 14:30	Mid	38	1000	Low	19	780			0.0			0.0			0.0
Point	ppb																					
High	78	14:20 / 14:30																				
Mid	38	1000																				
Low	19	780																				
		0.0																				
		0.0																				
		0.0																				
High Flow Meter ID/Expiry Date: Defender High 148943 expires November 21, 2017																						
Calibrator ID/Expiry Date: Sabio id# 11900613 expires March 16, 2018																						
Cal Gas Cylinder I.D. #: EY 0000654																						
Cal Gas Conc. (ppm): 10.2																						

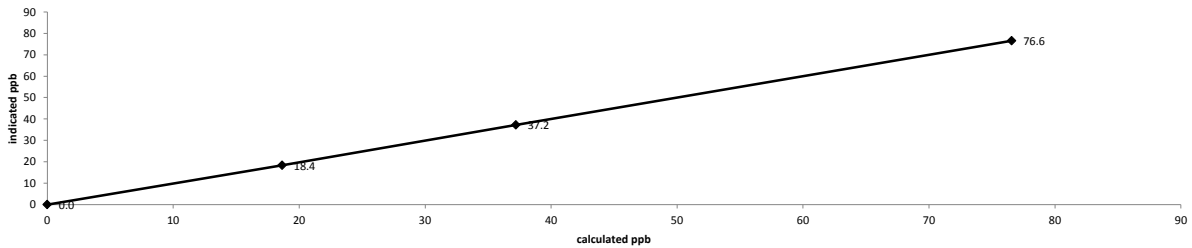
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
adjusted zero	7881	0.00	7881	0.0	0.0	n/a
adjusted high	7825	59.18	7884	76.6	76.6	1.000
mid	7890	28.89	7919	37.2	37.2	1.000
low	7900	14.47	7914	18.6	18.4	1.014
calibrator zero	7881	0.00	7881	0.0	0.0	n/a
Average C.F.=						1.004

Linear Regression/Calibration Results:

	LIMITS
Correlation Coefficient = 1.000	> or = 0.995
Slope = 0.998	0.95-1.05
b (Intercept as % of full scale)= 0.11%	± 3% F.S.
% change in C.F. from last cal= n/a	n/a

API 101E Hydrogen Sulphide Analyzer Calibration



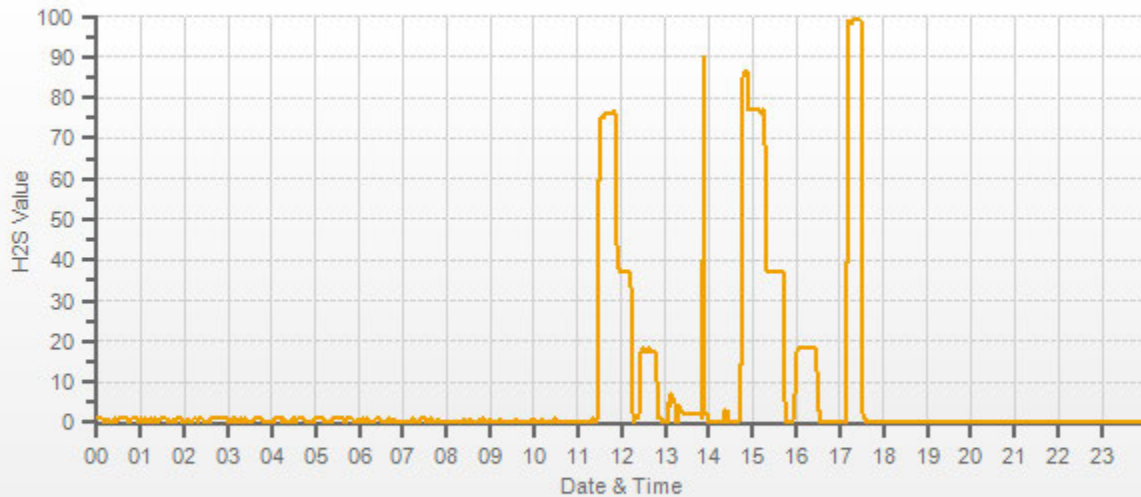
As found:	As left:
Slope: n/a	Slope: 0.943
Offset: n/a	Offset: 32.5
Hvps: n/a	Hvps: 530
Rcell Temp: n/a	Rcell Temp: 50.0
Box Temp: n/a	Box Temp: 34.4
Pmt Temp: n/a	Pmt Temp: 8.4
Izs Temp: n/a	Izs Temp: 32.0
Converter Temp: n/a	Converter Temp: 314.5
Pres: n/a	Pres: 20.8
Samp Fl: n/a	Samp Fl: 544
Uv Lamp: n/a	Uv Lamp: 2938.7
Lamp Ratio: n/a	Lamp Ratio: 87.6
Str Lgt: n/a	Str Lgt: 15.8
Drk Pmt: n/a	Drk Pmt: 65.5
Expected Value: n/a	Expected Value: 85.7

Comments:

The analyzer sample inlet filter was changed.
 The manifold blower was found to be working normally.
 Zero adjusted starts at 13:55. Output voltage was calibrated. SO2 scrubber was renewed. ZS Temp was changed from 45 to 32 degrees. This is a re-installation of a LICA owned analyzer that was repaired.

Flow measurements after mid-point

H2S[ppb] Station: LICA MASKWA Daily: 17/11/02 Type: AVG 1 Min. [1 Min.]



— H2S[ppb]

TOTAL HYDROCARBON



Thermo 51C Total Hydrocarbon Analyzer Calibration

Date: <u>November 2, 2017</u>	Barometer/B.P./units: <u>F.S. 05544 expires December 5, 2018</u>	<u>952</u>	millibars
Company/Airshed: <u>LICA</u>	Thermometer/Station Temp: <u>F.S. 170286131 expires April 19, 2019</u>	<u>22</u>	°C
Location/Station Name: <u>Maskwa</u>	Weather Conditions: <u>Mainly sunny</u>		
Parameter: <u>Total Hydrocarbon</u>	Calibration Purpose: <u>routine monthly</u>		
Start/End Time 24 hr. (mst): <u>16:20 / 20:19</u>	Performed By/Reviewer: <u>Alex Yakupov</u>	<u>Tom Bourque</u>	
Calibration Method: <u>Gas Dilution</u>	Cal Gas Expiry Date: <u>November 25, 2023</u>		

Analyzer:	Range ppm: <u>50</u>
ID# or Serial Number: <u>436609739</u>	As Found C.F.: <u>0.997</u>
Last Calibration Date: <u>October 26, 2017</u>	New C.F.: <u>1.000</u>
Previous Cal High Point C.F.: <u>0.999</u>	

Calibration Standards:	
Low Flow Meter ID/Expiry Date: <u>Defender Low 152020 expires November 21, 2017</u>	Standard Calibration Points for a Range of: <u>50 ppm</u>
High Flow Meter ID/Expiry Date: <u>Defender High 148943 expires November 21, 2017</u>	
Calibrator ID/Expiry Date: <u>API id# 627 expires January 27, 2018</u>	
Cal Gas Cylinder I.D. #: <u>LL 165372</u>	
CH ₄ /C ₃ H ₈ Cylinder Conc. (ppm): <u>606.0</u> <u>212.0</u>	
CH ₄ as propane/total CH ₄ equivalents (ppm): <u>583.0</u> <u>1189.0</u>	

Point	Target ppm
High	<u>38</u>
Mid	<u>18</u>
Low	<u>9</u>

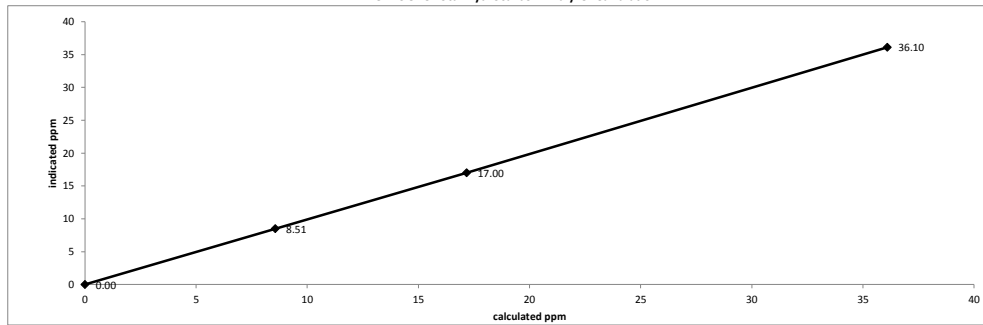
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration: (ppm)	Indicated Concentration: (ppm)	Correction Factors:
	Diluent	Cal Gas	Total			
as found zero	2063	0.00	2063	0.0	0.19	n/a
as found high	2003	62.72	2066	36.10	36.40	0.997
adjusted zero	2063	0.00	2063	0.00	0.00	n/a
adjusted high	2003	62.72	2066	36.10	36.10	1.000
mid	2031	29.77	2061	17.17	17.00	1.010
low	2051	14.88	2066	8.56	8.51	1.006
calibrator zero	2063	0.00	2063	0.0	0.00	n/a
Average C.F.=						1.005

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>0.12%</u>	0.95-1.05
% change in C.F. from last cal = <u>0.22%</u>	± 3% F.S.
	± 10%

Thermo 51C Total Hydrocarbon Analyzer Calibration

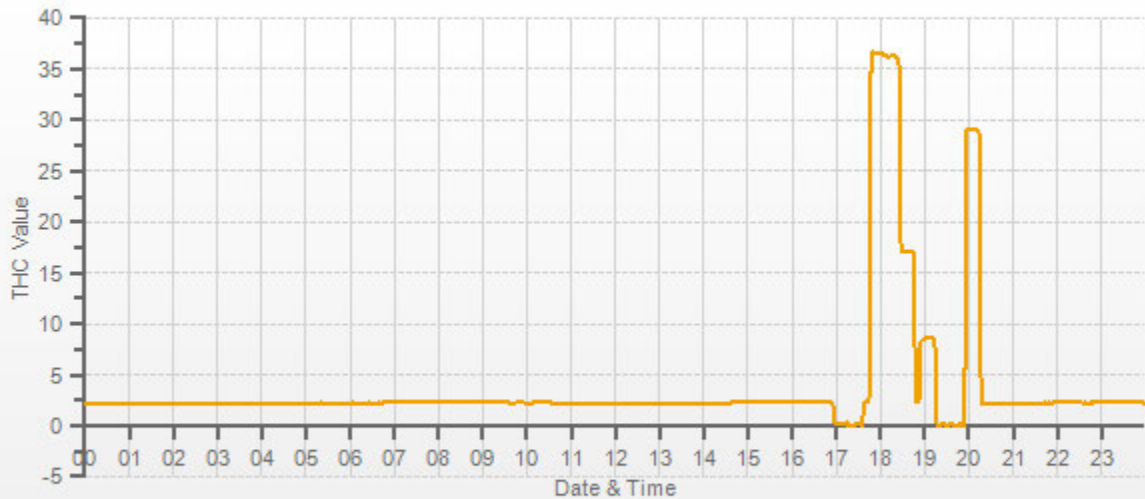


<p style="text-align: center;">As found:</p> H2 cylinder (psi): <u>500</u> H2 cylinder reg set (psi): <u>25</u> Span Cylinder (psi): <u>2000</u> Span Cylinder Reg Set (psi): <u>22 (see comments)</u> Zero Air Gen Pressure: <u>38</u> measurement alarms: <u>None</u> service alarms: <u>None</u> cnt: <u>3495</u> rng: <u>1</u> try: <u>0</u> flm: <u>218.2</u> det: <u>125.5</u> Flame: <u>218</u> Filter: <u>125</u> Base: <u>125</u> Sample psi: <u>06.82</u> Internal Air Pressure: <u>21</u> Internal Fuel Pressure: <u>12</u> Measured Flow: <u>1.021</u> Expected Value: <u>30.10</u>	<p style="text-align: center;">As left:</p> H2 cylinder (psi): <u>500</u> H2 cylinder reg set (psi): <u>25</u> Span Cylinder (psi): <u>2000</u> Span Cylinder Reg Set (psi): <u>22 (see comments)</u> Zero Air Gen Pressure: <u>38</u> measurement alarms: <u>None</u> service alarms: <u>None</u> cnt: <u>3507</u> rng: <u>1</u> try: <u>0</u> flm: <u>218.2</u> det: <u>125.5</u> Flame: <u>218</u> Filter: <u>125</u> Base: <u>125</u> Sample psi: <u>06.81</u> Internal Air Pressure: <u>21</u> Internal Fuel Pressure: <u>12</u> Measured Flow: <u>n/a</u> Expected Value: <u>29.00</u>
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Comments:
The analyzer sample inlet filter was changed.
The manifold blower was found to be working normally.

Flow measurements after mid-point

THC[ppm] Station: LICA MASKWA Daily: 17/11/02 Type: AVG 1 Min. [1 Min.]



— THC[ppm]



Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	November 22, 2017	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	937	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	Maskwa	Weather Conditions:	Mix of sun and clouds		
Parameter:	Total Hydrocarbon	Calibration Purpose:	shut down		
Start/End Time 24 hr. (mst):	10:50 / 13:05	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 24, 2022		

Analyzer:	
ID# or Serial Number:	436609739
Range ppm:	50
Last Calibration Date:	November 2, 2017
As Found C.F.:	1.090
Previous Cal High Point C.F.:	1.000
New C.F.:	n/a

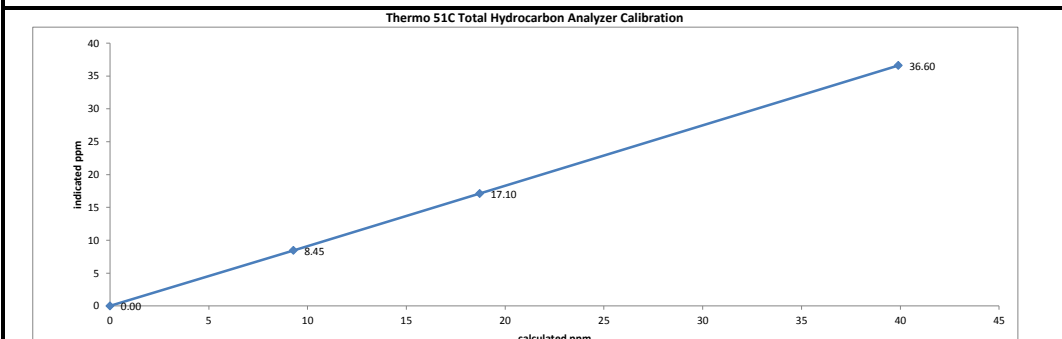
Calibration Standards:	
Low Flow Meter ID/Expiry Date:	Definer Low 129069 expires February 5, 2018
High Flow Meter ID/Expiry Date:	Definer High 128686 expires February 5, 2018
Calibrator ID/Expiry Date:	Sabio id# 11900613 expires March 16, 2018
Cal Gas Cylinder I.D. #:	LL 165367
CH ₄ /C ₂ H ₆ Cylinder Conc. (ppm):	590.0 207.0
CH ₄ as propane/total CH ₄ equivalents (ppm):	569.3 1159.3
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

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	Diluent	Cal Gas	Total	(ppm)	(ppm)	
as found zero	2360	0.00	2360	0.0	0.00	n/a
as found high	2272	80.98	2353	39.90	36.60	1.090
mid	2337	38.34	2375	18.71	17.10	1.094
low	2368	19.11	2387	9.28	8.45	1.098
Average C.F.=						1.094

Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u>	LIMITS
Slope = <u>1.090</u>	> or = 0.995
b (Intercept as % of full scale) = <u>0.09%</u>	0.90-1.10
% change in C.F. from last cal = <u>-9.01%</u>	± 3% F.S.
	± 10%



<p style="text-align: center;">As found:</p> <p>H2 cylinder (psi): 1800</p> <p>H2 cylinder reg set (psi): 22</p> <p>Span Cylinder (psi): 2000</p> <p>Span Cylinder Reg Set (psi): 22</p> <p>Zero Air Gen Pressure: 38</p> <p>measurement alarms: None</p> <p>service alarms: None</p> <p>cnt: 3514</p> <p>rng: 1</p> <p>try: 1</p> <p>flm: 216.9</p> <p>det: 125.9</p> <p>Flame: 216</p> <p>Filter: 125</p> <p>Base: 125</p> <p>Sample psi: 06.83</p> <p>Internal Air Pressure: 21</p> <p>Internal Fuel Pressure: 12</p> <p>Measured Flow: 1.018</p> <p>Expected Value: 29.00</p>	<p style="text-align: center;">As left:</p> <p>H2 cylinder (psi): n/a</p> <p>H2 cylinder reg set (psi): n/a</p> <p>Span Cylinder (psi): n/a</p> <p>Span Cylinder Reg Set (psi): n/a</p> <p>Zero Air Gen Pressure: n/a</p> <p>measurement alarms: n/a</p> <p>service alarms: n/a</p> <p>cnt: n/a</p> <p>rng: n/a</p> <p>try: n/a</p> <p>flm: n/a</p> <p>det: n/a</p> <p>Flame: n/a</p> <p>Filter: n/a</p> <p>Base: n/a</p> <p>Sample psi: n/a</p> <p>Internal Air Pressure: n/a</p> <p>Internal Fuel Pressure: n/a</p> <p>Measured Flow: n/a</p> <p>Expected Value: n/a</p>
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Comments:

The manifold blower was found to be working normally.

The analyzer was affected by fluctuations in barometric pressure. A shutdown calibration was performed prior to removing the analyzer for inspection.

Flow measurements after mid-point



Thermo 51C Total Hydrocarbon Analyzer Calibration

Date: <u>November 22, 2017</u>	Barometer/B.P./units: <u>F.S. 05544 expires December 5, 2018</u>	<u>937</u>	<u>millibars</u>
Company/Airshed: <u>LICA</u>	Thermometer/Station Temp: <u>F.S. 170286131 expires April 19, 2019</u>	<u>22</u>	<u>°C</u>
Location/Station Name: <u>Maskwa</u>	Weather Conditions: <u>Mix of sun and clouds</u>		
Parameter: <u>Total Hydrocarbon</u>	Calibration Purpose: <u>installation</u>		
Start/End Time 24 hr. (mst): <u>14:15 / 17:35</u>	Performed By/Reviewer: <u>Alex Yakupov</u>	<u>Rob Fisher</u>	
Calibration Method: <u>Gas Dilution</u>	Cal Gas Expiry Date: <u>November 24, 2022</u>		

Analyzer ID# or Serial Number: <u>436609738</u>	Range ppm: <u>50</u>
Last Calibration Date: <u>n/a</u>	As Found C.F.: <u>n/a</u>
Previous Cal High Point C.F.: <u>n/a</u>	New C.F.: <u>1.000</u>

Calibration Standards:

Low Flow Meter ID/Expiry Date: <u>Definer Low 129069 expires February 5, 2018</u>	Standard Calibration Points for a Range of: <u>50 ppm</u>
High Flow Meter ID/Expiry Date: <u>Definer High 128686 expires February 5, 2018</u>	
Calibrator ID/Expiry Date: <u>Sabio id# 11900613 expires March 16, 2018</u>	
Cal Gas Cylinder I.D. #: <u>LL 165367</u>	
CH ₄ /C ₃ H ₈ Cylinder Conc. (ppm): <u>590.0</u> <u>207.0</u>	
CH ₄ as propane/total CH ₄ equivalents (ppm): <u>569.3</u> <u>1159.3</u>	

Point	Target ppm
High	38
Mid	18
Low	9

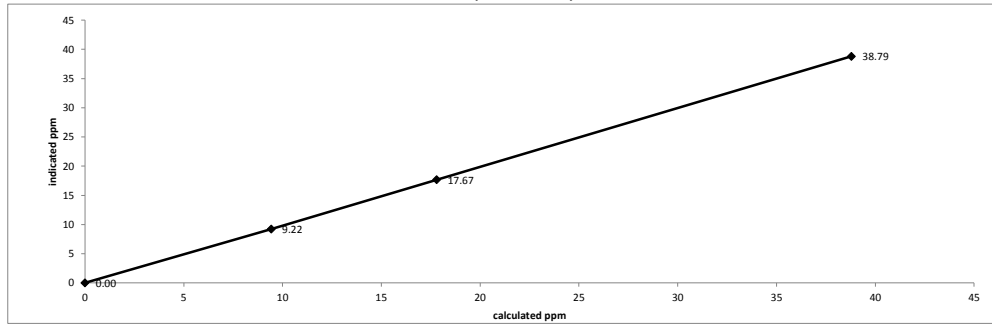
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	Diluent	Cal Gas	Total	(ppm)	(ppm)	
adjusted zero	2362	0.00	2362	0.0	0.00	n/a
adjusted high	2279	78.91	2358	38.79	38.79	1.000
mid	2325	36.25	2361	17.80	17.67	1.007
low	2343	19.21	2362	9.43	9.22	1.023
calibrator zero	2362	0.00	2362	0.00	0.00	n/a
Average C.F.=						1.010

Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u>	LIMITS
Slope = <u>0.998</u>	> or = 0.995
b (Intercept as % of full scale) = <u>0.22%</u>	0.95-1.05
% change in C.F. from last cal = <u>n/a</u>	± 3% F.S.
	n/a

Thermo 51C Total Hydrocarbon Analyzer Calibration

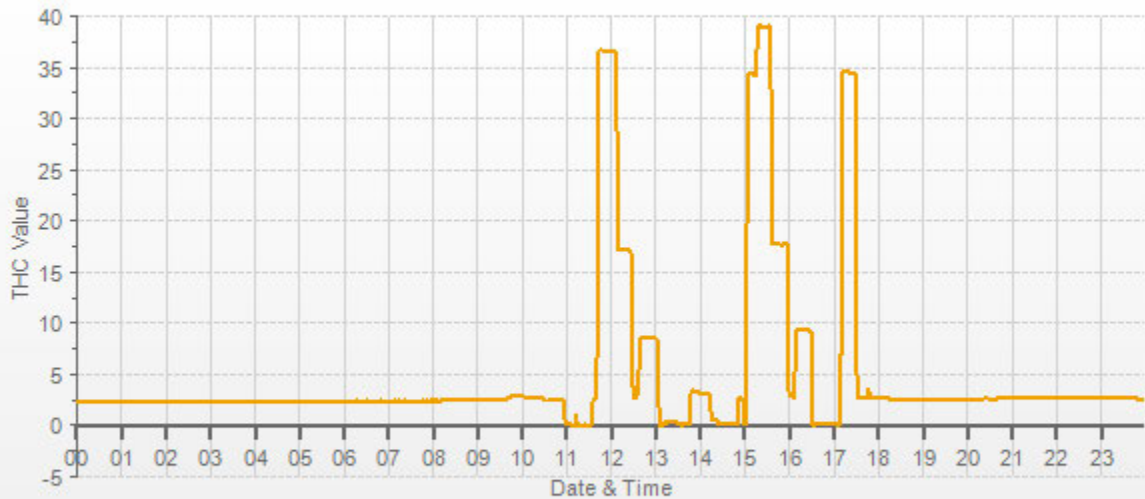


As found:	As left:
H2 cylinder (psi): <u>n/a</u>	H2 cylinder (psi): <u>1800</u>
H2 cylinder reg set (psi): <u>n/a</u>	H2 cylinder reg set (psi): <u>22</u>
Span Cylinder (psi): <u>n/a</u>	Span Cylinder (psi): <u>2000</u>
Span Cylinder Reg Set (psi): <u>n/a</u>	Span Cylinder Reg Set (psi): <u>22</u>
Zero Air Gen Pressure: <u>n/a</u>	Zero Air Gen Pressure: <u>38</u>
measurement alarms: <u>n/a</u>	measurement alarms: <u>None</u>
service alarms: <u>n/a</u>	service alarms: <u>None</u>
cnt: <u>n/a</u>	cnt: <u>1466</u>
rng: <u>n/a</u>	rng: <u>1</u>
try: <u>n/a</u>	try: <u>2</u>
flm: <u>n/a</u>	flm: <u>195.3</u>
det: <u>n/a</u>	det: <u>125.8</u>
Flame: <u>n/a</u>	Flame: <u>195</u>
Filter: <u>n/a</u>	Filter: <u>125</u>
Base: <u>n/a</u>	Base: <u>125</u>
Sample psi: <u>n/a</u>	Sample psi: <u>07.53</u>
Internal Air Pressure: <u>n/a</u>	Internal Air Pressure: <u>22</u>
Internal Fuel Pressure: <u>n/a</u>	Internal Fuel Pressure: <u>12</u>
Measured Flow: <u>n/a</u>	Measured Flow: <u>0.9287</u>
Expected Value: <u>n/a</u>	Expected Value: <u>34.40</u>

Comments:
 The analyzer sample inlet filter was changed.
 The manifold blower was found to be working normally.

Analyzer 436609739 was removed and Analyzer 436609738 was installed. An installation calibration was completed for Analyzer 436609738 and Analyzer 436609739 was sent for inspection.
 Flow measurements after mid-point

THC[ppm] Station: LICA MASKWA Daily: 17/11/22 Type: AVG 1 Min. [1 Min.]



— THC[ppm]

NITROGEN DIOXIDE



API 200E NO-NO2-NOx Analyzer Calibration

Date: November 2, 2017	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	950	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name: Maskwa	Weather Conditions: Mainly sunny		
Start/End Time 24 hr. (mst): 10:22 / 17:04	Calibration Purpose: routine monthly		
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Alex Yakupov		Tom Bourque
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: July 18, 2019		

Analyzer:	Correction Factors:												
ID# or Serial Number: 592	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Previous C.F.:</td> <td style="width: 33%;">As Found C.F.:</td> <td style="width: 33%;">New C.F.:</td> </tr> <tr> <td>NO = 1.000</td> <td>1.013</td> <td>1.001</td> </tr> <tr> <td>NO₂ = 1.002</td> <td>0.996</td> <td>0.996</td> </tr> <tr> <td>NO_x = 1.000</td> <td>1.007</td> <td>1.001</td> </tr> </table>	Previous C.F.:	As Found C.F.:	New C.F.:	NO = 1.000	1.013	1.001	NO ₂ = 1.002	0.996	0.996	NO _x = 1.000	1.007	1.001
Previous C.F.:	As Found C.F.:	New C.F.:											
NO = 1.000	1.013	1.001											
NO ₂ = 1.002	0.996	0.996											
NO _x = 1.000	1.007	1.001											
Last Calibration Date: October 26, 2017													
Range ppb: 1000													

Calibration Standards:	Standard Calibration Points for a Range of: 1000 ppb																								
Low Flow Meter ID/Expiry Date: Defender Low 152020 expires November 21, 2017	<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																						
High Flow Meter ID/Expiry Date: Defender High 148943 expires November 21, 2017																									
Calibrator ID/Expiry Date: API id# 627 expires January 27, 2018																									
Cal Gas Cylinder I.D. #: LL 104222																									
Cal Gas Conc. (ppm): 50.7 50.7																									

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	5146	0.0	5146	0	0	0.0	0.0	n/a	n/a
as found high	5201	79.2	5280	760.6	760.6	751.0	755.0	1.013	1.007
adjusted zero	5146	0.00	5146	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	5201	79.21	5280	760.6	760.6	760.0	760.0	1.001	1.001
mid	5237	38.43	5275	369.4	369.4	372.0	372.0	0.993	0.993
low	5259	18.67	5278	179.3	179.3	178.0	178.0	1.008	1.008
calibrator zero	5146	0.00	5146	0	0	0.0	0.0	n/a	n/a
Average C.F. =								1.000	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	5201	79.21	5280	0.0	750.0	748.0	-2.0	0.0	-2.0	
as found high NO ₂	5201	79.21	5280	510.0	245.0	752.0	505.0	505.0	507.0	0.996
adjusted high NO ₂	5201	79.21	5280	510.0	245.0	752.0	505.0	505.0	507.0	0.996
gpt mid	5201	79.21	5280	275.0	475.0	746.0	270.0	275.0	272.0	1.011
gpt low	5201	79.21	5280	100.0	646.0	745.0	98.0	104.0	100.0	1.040
Average NO₂ C.F. =										1.016

Linear Regression/Calibration Results:

	NO	NO _x	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.000	1.000	0.991	0.95-1.05
b (Intercept as % of full scale) =	0.01%	0.01%	-0.37%	± 3% F.S.
% change in C.F. from last cal =	-1.28%	-0.74%	0.59%	± 10%
NO ₂ converter efficiency			0.97	0.96 to 1.04

	As found:	As left:
NO _x SLOPE:	0.871	0.873
NO _x OFFS:	2.3	-5.4
NO SLOPE:	0.869	0.876
NO OFFS:	-1.0	-5.3
SAMP FLW:	424	424
OZONE FL:	73	73
PMT:	26.4	46.0
NORM PMT:	6.2	-12.0
AZERO:	23.4	56.8
HVPS:	666	666
RCCELL TEMP:	50.0	50.0
BOX TEMP:	31.6	31.8
PMT TEMP:	7.5	7.5
IZS TEMP:	45.0	45.0
MOLY TEMP:	313.8	315.0
RCCEL:	4.8	4.8
SAMP:	27.5	27.5
Expected Value NO:	7	5
Expected Value NO ₂ :	439	441
Expected Value NO _x :	447	447

Comments:

The analyzer sample inlet filter was changed.

The manifold blower was found to be working normally.

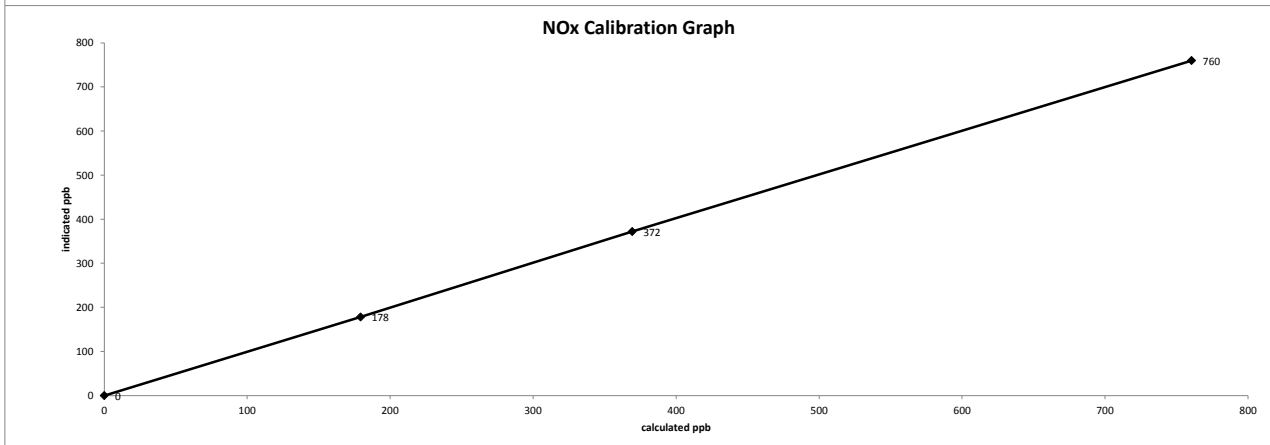
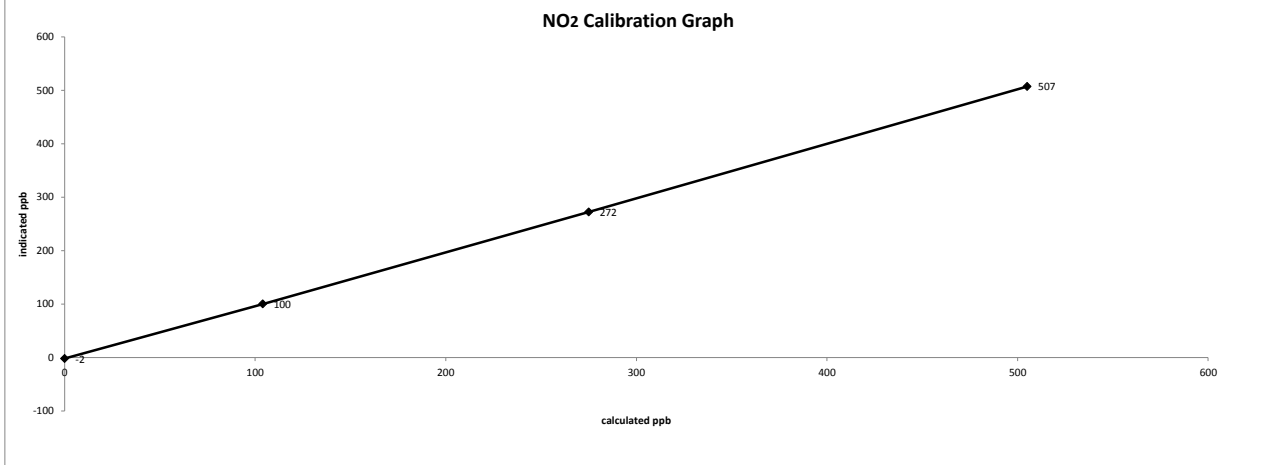
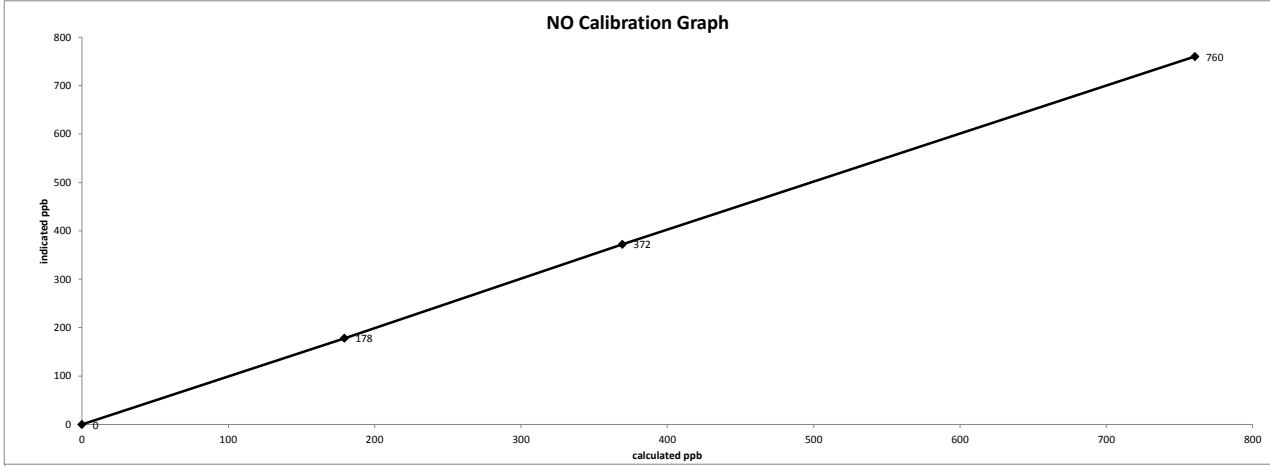
No high point NO₂ adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.

Flow measurements after mid-point.

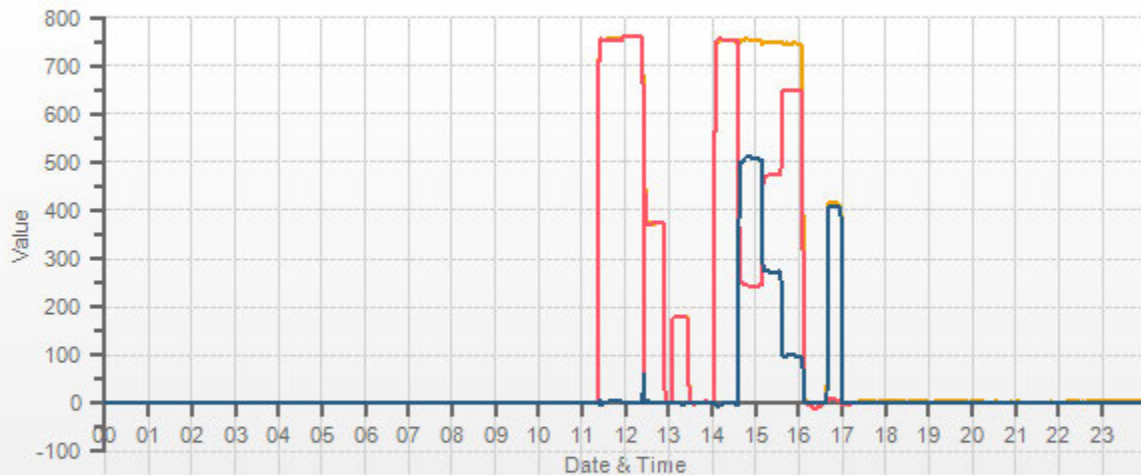
Date: November 2, 2017
Company/Airshed: LICA
Location/Station Name: Maskwa

Start/End Time 24 hr. (mst): 10:22 / 17:04
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Gas Phase Titration

API 200E NO-NO2-NOx Analyzer Calibration



Station: LICA MASKWA Daily: 17/11/02 Type: AVG 1 Min. [1 Min.]



— NOX[ppb] — NO[ppb] — NO2[ppb]



API 200A NO-NO2-NOx Analyzer Calibration

Date: November 23, 2017	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	916	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name: Maskwa	Weather Conditions: Mix of sun and clouds		
Start/End Time 24 hr. (mst): 10:20 / 15:43	Calibration Purpose: installation		
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: July 18, 2019		

Analyzer:		Correction Factors:		
ID# or Serial Number: 2051	NO =	Previous C.F.:	As Found C.F.:	New C.F.:
Last Calibration Date: n/a	NO ₂ =	n/a	n/a	0.999
Range ppb: 1000	NOx =	n/a	n/a	0.999

Calibration Standards:		Standard Calibration Points for a Range of: 1000 ppb			
Low Flow Meter ID/Expiry Date: Definer Low 129069 expires February 5, 2018		Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?
High Flow Meter ID/Expiry Date: Definer High 128686 expires February 5, 2018		High	780	500	n/a
Calibrator ID/Expiry Date: API id# 627 expires January 27, 2018		Mid	380	275	n/a
Cal Gas Cylinder I.D. #: LL 104222		Low	190	100	n/a
Cal Gas Conc. (ppm): 50.7 50.7		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	4940	0.0	4940	0	0	0.0	0.0	n/a	n/a
adjusted high	4865	77.8	4943	797.6	797.6	798.0	798.0	0.999	0.999
mid	4900	36.74	4937	377.3	377.3	372.0	372.0	1.014	1.014
low	4917	18.85	4936	193.6	193.6	186.0	186.0	1.041	1.041
calibrator zero	4940	0.00	4940	0.0	0.0	0.0	0.0	n/a	n/a
								Average C.F.=	1.018

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	4865	77.76	4943	0.0	796.0	796.0	0.0	0.0	0.0	
adjusted high NO2	4865	77.76	4943	500.0	276.0	796.0	520.0	520.0	520.0	1.000
gpt mid	4865	77.76	4943	270.0	509.0	797.0	287.0	287.0	287.0	1.000
gpt low	4865	77.76	4943	90.0	701.0	797.0	95.0	95.0	95.0	1.000
									Average NO ₂ C.F.=	1.000

Linear Regression/Calibration Results:			
	NO	NOx	NO ₂
Correlation Coefficient =	1.000	1.000	1.000
Slope =	0.997	0.997	1.000
b (Intercept as % of full scale)=	-0.42%	-0.42%	0.00%
% change in C.F. from last cal=	n/a	n/a	n/a
NO ₂ converter efficiency			1.00
	LIMITS		
	> or = 0.995		
	0.95-1.05		
	± 3% F.S.		
	n/a		
	0.96 to 1.04		

As found:		As left:	
NOx SLOPE:	n/a	NOx SLOPE:	1.034
NOx OFFS:	n/a	NOx OFFS:	0.2
NO SLOPE:	n/a	NO SLOPE:	1.036
NO OFFS:	n/a	NO OFFS:	-1.8
SAMP FLW:	n/a	SAMP FLW:	487
OZONE FL:	n/a	OZONE FL:	79
NORM PMT:	n/a	NORM PMT:	1.5
AZERO:	n/a	AZERO:	50.6
HVPS:	n/a	HVPS:	707
DCPS:	n/a	DCPS:	2571
RCELL:	n/a	RCELL:	50.5
BOX TEMP:	n/a	BOX TEMP:	28.6
IZS TEMP:	n/a	IZS TEMP:	43.3
MOLY TEMP:	n/a	MOLY TEMP:	315.5
RCEL:	n/a	RCEL:	7.0
SAMP:	n/a	SAMP:	28.9
Expected Value NO:	n/a	Expected Value NO:	6
Expected Value NO ₂ :	n/a	Expected Value NO ₂ :	384
Expected Value NOx:	n/a	Expected Value NOx:	390

Comments:

The analyzer sample inlet filter was changed.

The manifold blower was found to be working normally.

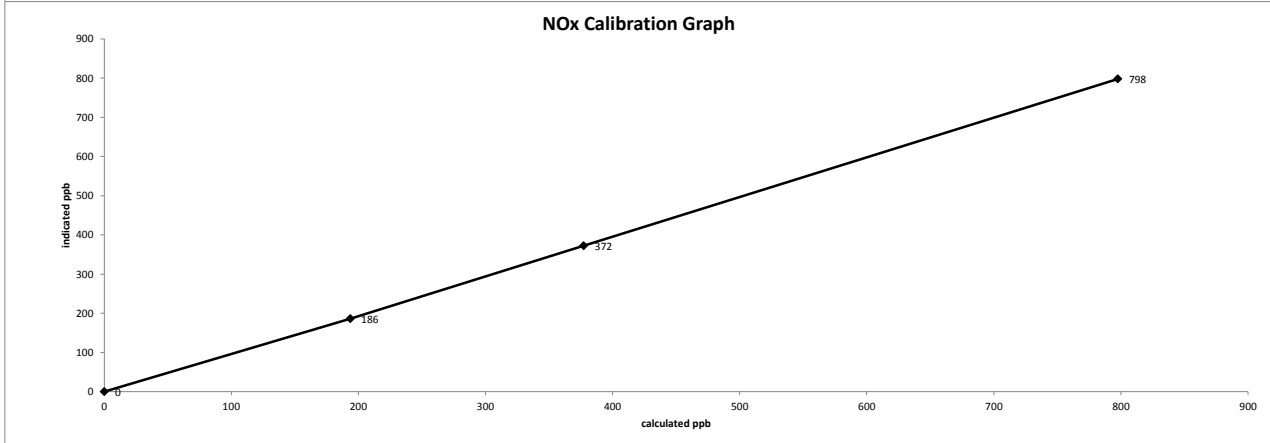
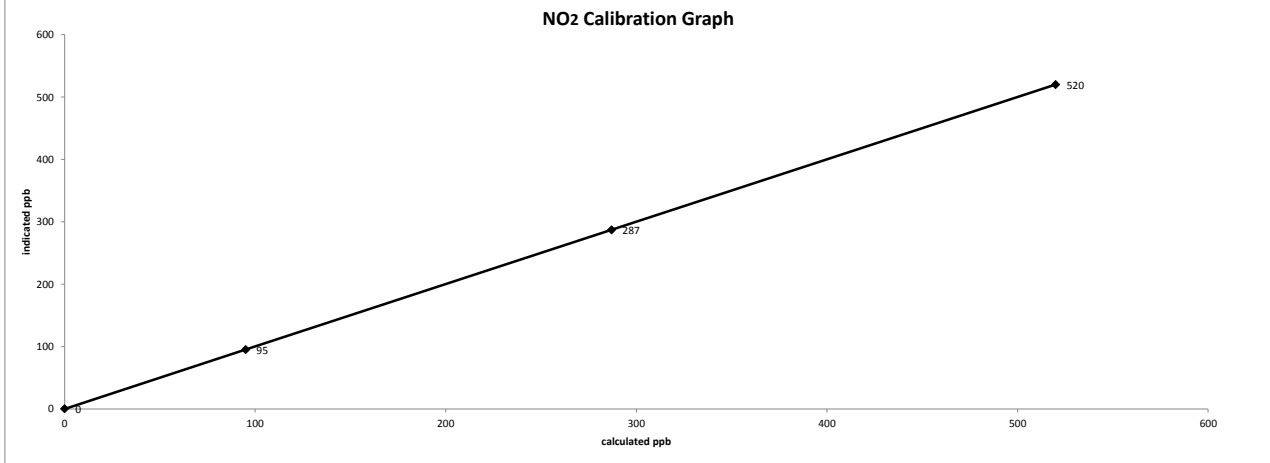
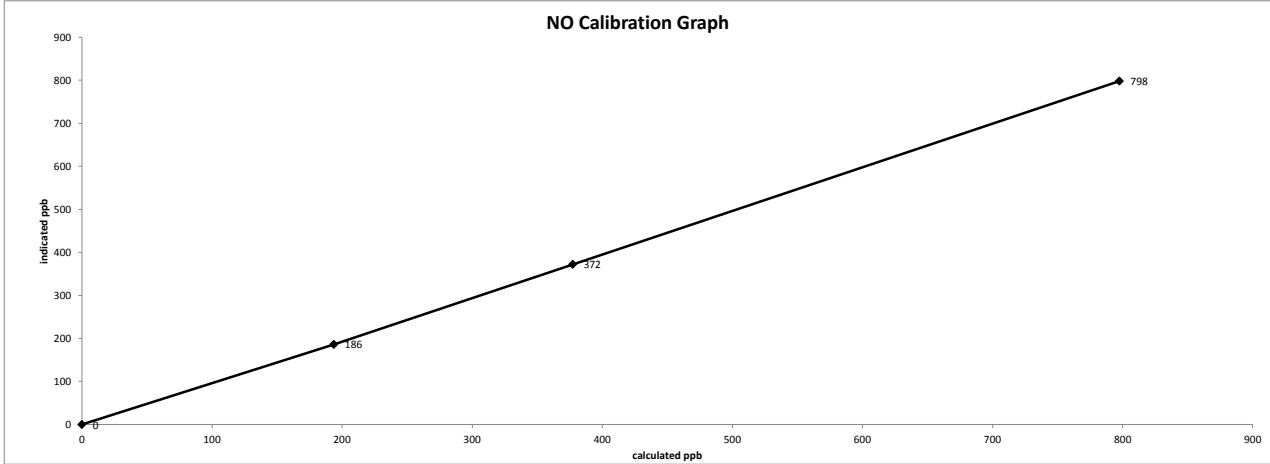
The analyzer #592 indicated AZERO warning and a PMT TEMP warning. Also, a valve malfunctioned where the analyzer sampled from the SPAN chamber. A shutdown calibration was not performed for analyzer 592 due to it's current state. Analyzer #592 was removed and Analyzer #2051 was installed.

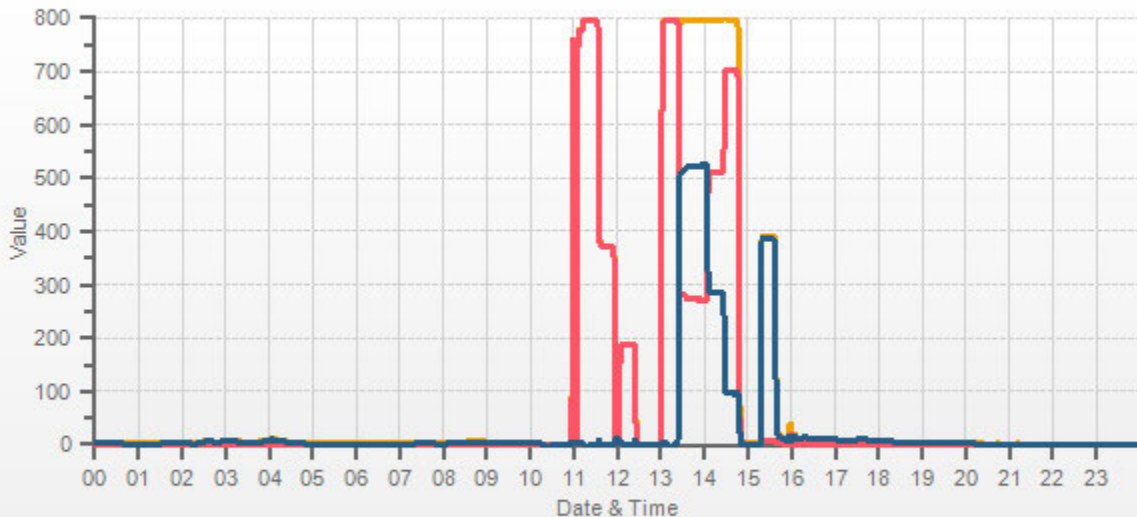
Flow measurements after mid-point.

Date: November 23, 2017
Company/Airshed: LICA
Location/Station Name: Maskwa

Start/End Time 24 hr. (mst): 10:20 / 15:43
Calibration Purpose: installation
Calibration Method: Gas Dilution & Gas Phase Titration

API 200A NO-NO2-NOx Analyzer Calibration





— NOX[ppb] — NO[ppb] — NO2[ppb]

WIND SYSTEM

CALIBRATORS

Company Maxxam/SIA **Operator:** Chris

Calibrator:		Flow Measurement Device:	
Make/Model	<u>API 700</u>	Make/Model	<u>Definer 530</u>
Serial Number	<u>627</u>	Serial Number	<u>H-148944, L-152019</u>
Last Verification Date	<u>February 3, 2016</u>	Temperature (°C)	<u>23.5</u>
NO Cylinder S/N	<u>EY0000597</u>	Barometric Pressure	<u>707.1 mmHg</u>
NO [PPM]	<u>49.0</u>	NOx [PPM]	<u>49.0</u>
Expiry Date	<u>December 8, 2019</u>		

Dilution Flow (sccm)		
Pt. #1	<u>4892</u>	Pt. #3 <u>4951</u>
Pt. #2	<u>4975</u>	
Gas Flow (sccm)		
Pt. #1	<u>79.7</u>	Pt. #3 <u>19.4</u>
Pt. #2	<u>38.8</u>	

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
	0.0	0.0000	0.0000	0.0000	-0.0004	-0.0004	Limit ± 10%	
4972	79.7	0.7855	0.7855	0.7883	0.0004	0.7887	0.4%	0.5%
4936	38.8	0.3822	0.3822	0.3816	0.0005	0.3822	-0.2%	0.1%
4970	19.4	0.1913	0.1913	0.1902	0.0006	0.1913	-0.6%	0.2%
Absolute Average Percent Difference							0.1%	0.3%

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

NO	LIMITS	NOx
Correlation= 1.0000	≥ 0.990	Correlation= 1.0000
m (Slope)= 1.0041	0.90-1.10	m (Slope)= 1.0046
b (Intercept % of FS)= -0.1118	± 3% F.S.	b (Intercept % of FS)= -0.0871

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4972	0	0.0000	0.7867	0.0014	0.7881	NO ₂	% Diff, Limit
4972	500	0.5127	0.2740	0.5104	0.7849	-0.7%	± 10%
4972	275	0.2863	0.5004	0.2860	0.7865	-0.6%	± 10%
4972	90	0.0940	0.6927	0.0954	0.7880	0.0%	± 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)= 0.9924	0.90-1.10
b (Intercept % of FS)= 0.1755	± 3% F.S.

AENV Standards	NO_x Analyzer
Audit Calibrator	Make/Model <u>Thermo 42i</u>
Make/Model <u>Thermo 146i</u>	Serial/AMU Number <u>AMU 1868</u>
Serial/AMU Number <u>AMU1809</u>	Last Calibration Date <u>January 25, 2017</u>
SRM Gas Cylinder No. <u>CAL018140</u>	Full Scale (ppm) <u>1.0</u>
Cylinder Conc. (ppm) <u>48.79</u>	Cylinder Gas Expiry Date <u>March 25, 2019</u>

COMMENTS:

Auditor: Shea Beaton
Operator Signature: 

Date: January 27, 2017
Location: McIntyre Center Edmonton

Company <u>Maxxam</u>		Operator: <u>Mike</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010D</u>	Make/Model	<u>Bios Defender 530</u>
Serial Number	<u>11900613</u>	Serial Number	<u>HI148944 Lo 152019</u>
Last Verification Date	<u>March 31, 2016</u>	Temperature (°C)	<u>23.9</u>
NO Cylinder S/N	<u>EY0000769</u>	Barometric Pressure	<u>698mmHg</u>
NO [PPM]	<u>51.1</u>	NOx [PPM]	<u>51.2</u>
Expiry Date	<u>December 8, 2019</u>		

Dilution Flow (sccm)		
Pt. #1 <u>4879</u>	Pt. #2 <u>4932</u>	Pt. #3 <u>4950</u>
Gas Flow (sccm)		
Pt. #1 <u>74.5</u>	Pt. #2 <u>36.4</u>	Pt. #3 <u>18.2</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
4965	0.0	0.0000	0.0000	0.0001	0.0000	0.0001	Limit ± 10%	
4954	74.5	0.7685	0.7700	0.7915	0.0008	0.7923	3%	3%
4968	36.4	0.3744	0.3751	0.3832	0.0006	0.3838	2%	2%
4968	18.2	0.1872	0.1876	0.1916	0.0002	0.1918	2%	2%
Absolute Average Percent Difference							3%	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)= 1.0301	0.90-1.10	m (Slope)= 1.0291
b (Intercept % of FS)= -0.0919	± 3% F.S.	b (Intercept % of FS)= -0.0881

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4954	0.000	0.0000	0.7949	0.0005	0.7954	NO ₂	% Diff. Limit
4954	0.510	0.5104	0.2845	0.5072	0.7917	-1%	± 10%
4954	0.250	0.2516	0.5433	0.2514	0.7944	0%	± 10%
4954	0.100	0.1085	0.6864	0.1087	0.7951	0%	± 10%
Absolute Average Percent Difference						0%	± 10%

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

NO ₂	LIMITS
Correlation= 1.0000	≥ 0.995
m (Slope)= 0.9926	0.90-1.10
b (Intercept % of FS)= 0.0925	± 3% F.S.

AENV Standards		NO_x Analyzer	
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>March 15, 2017</u>
SRM Gas Cylinder No.	<u>CAL018140</u>	Full Scale (ppm)	<u>1.0</u>
Cylinder Conc. (ppm)	<u>48.79</u>	Cylinder Gas Expiry Date	<u>March 28, 2019</u>

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton
Operator Signature: [Signature]

Date: March 16, 2017
Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2016-335CGA

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

Cylinder #: LL104222 Concentration PPM: 50.6 Tolerance(%) 1 Certified By: Praxair

Expiry Date: July 2019

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

Reference Analyzer:

Make/Model: Teco 43C Serial/AMU Number: 1623

Instrument Settings: Zero: 9.2 Span: 1.024 Range: 1.0

Last Calibration: Date: Oct 19/16 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.000	0.000	0.000	0.000
4935	82.0	0.830	0.01662	60.183	50.0
4968	40.8	0.412	0.00821	121.765	50.2
4955	20.2	0.203	0.00408	245.297	49.8
Average Cylinder Concentration:					50.0

Previous Stated Concentration PPM: 50.6

Percent variance from Stated: 1

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

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration _____

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

Auditor: Al Clark

Operator Signature: *Al Clark*

Date: October 19, 2016

Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2016-334CGA

Company: Maxxam Operator's Name: Russell Kirchner
 Cylinder #: EY0000654 Concentration PPM: 10.2 Tolerance(%) 2 Certified By: Praxair
 Expiry Date: June 2019

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

Reference Analyzer:
 Make/Model: Teco 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 16.6 Span: 1.231 Range: 0.1
 Last Calibration: Date: Oct 19/16 C.F. 1.000 Done By: Al Clark

Calibrator Flows (scm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	0.0000	0.0000	0.0000
5050	38.0	0.0764	0.00752	132.895	10.2
5050	17.8	0.0355	0.00352	283.708	10.1
5023	9.1	0.0182	0.00181	551.978	10.0
Average Cylinder Concentration:					10.1

Previous Stated Concentration PPM: 10.2

Percent variance from Stated: 1

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

Auditor: Al Clark
 Operator Signature: *Al Clark*

Date: October 19, 2016
 Location: McIntyre Center Edmonton



Calibration Gas Audit

CH4 / C3H8 Cylinder Gas

File No. 2015-092CGA

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

Reference Calibrator and Gas:

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

Flow Measurement Device:

Make/Model Bios DC-2
Serial Number Bios D
Temp. °C 24.5
B.P. 698mmHg

Reference Analyzer:

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

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

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

Cylinder gas tolerances based on CH4 only

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

Auditor: Shea Beaton
Operator Signature: _____

Date: January 19, 2016
Location: McIntyre Center Edmonton



Calibration Gas Audit

CH₄ / C₃H₈ Cylinder Gas

File No. 2015-029CGA

Company: Maxxam **Operators name:** Limin Li
Cylinder #: LL165367 **Conc CH₄ (PPM)** 590/207 **Tolerance (%)** 2 **Certified By:** Praxair

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>R&R MFC 201</u>			Make/Model	<u>Bios DC2</u>
Serial Number	<u>AMU 1691</u>			Serial Number	<u>AMU 1650</u>
Last Verification Date	<u>May 21, 2015</u>			Temp. °C	<u>24.0 C</u>
Gas Type	<u>CH₄</u>	Conc.	<u>999.2</u>	B.P.	<u>703 mmhg</u>
Cylinder Number	<u>D751932</u>				
Gas Type	<u>C₃H₈</u>	Conc.	<u>246.5</u>		
Cylinder Number	<u>XF0037998</u>				

Reference Analyzer:
 Make/Model Teco 55C Serial/AMU Number: 1643
 Instrument Settings Zero: N/A Span: N/A Range: 20
 Last Calibration: Date: May 21/15 C.F. 1.000 Done By: Al Clark

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
Dilution	Gas						
<u>2600</u>	<u>0.0</u>	<u>0.00</u>	<u>0.00</u>	0.02005	49.883	602	206
<u>2569</u>	<u>51.5</u>	<u>12.06</u>	<u>11.37</u>	<u>0.02005</u>	<u>49.883</u>	<u>602</u>	<u>206</u>
<u>3549</u>	<u>22.3</u>	<u>3.77</u>	<u>3.57</u>	<u>0.00628</u>	<u>159.148</u>	<u>600</u>	<u>207</u>
<u>3523</u>	<u>10.4</u>	<u>1.77</u>	<u>1.70</u>	<u>0.00295</u>	<u>338.750</u>	<u>600</u>	<u>209</u>
Average Cylinder Concentration:						600	207

	<u>CH₄</u>		<u>C₃H₈</u>
Previous Stated Concentration PPM:	<u>590</u>		<u>207</u>
Percent variance from Stated:	<u>1.8</u>		<u>0.2</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: May 21, 2015
 Operator Signature: _____ Location: McIntyre Center Edmonton

DocNumber: 000096245

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

MAXXAM ANALYTICS INC *NA*
 9372 49TH ST
 EDMONTON AB T6B 2L7

Praxair Order Number: 26637434
 Customer PO Number: 35-36415
 Customer Reference Number:

Fill Date: 7/5/2016
 Part Number: NI NO50MS2E-AQ
 Lot Number: 109618704
 Cylinder Style and Outlet: AQ CGA 660
 Cylinder Pressure and Volume: 2000 psig 82 cu. ft.

Certified Concentration:

Expiration Date:	07/18/2019	NIST Traceable
Cylinder Number:	LL104222	Expanded Uncertainty:
50.7 ppm	NITRIC OXIDE	± 0.7 %
50.6 ppm	SULFUR DIOXIDE	± 1.0 %
Balance	NITROGEN	

NOx ppm = 50.9 ppm

NOX for Reference Only

Certification Information: Certification Date : 7/18/2016 Term : 36 Months Expiration Date : 07/18/2019

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.
 Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1 . Component: NITRIC OXIDE

Requested Concentration: 50 ppm
 Certified Concentration: 50.7 ppm
 Instrument Used: Thermo Electron 42i-LS S/N 1030645077
 Analytical Method: Chemiluminescence
 Last Multipoint Calibration: 06/23/2016

Reference Standard Type: GMIS
 Ref. Std. Cylinder #: CC222724
 Ref. Std. Conc: 50.96 ppm
 Ref. Std. traceable to SRM #: vs. 1653b
 SRM Sample #: 45-V-42
 SRM Cylinder #: CAL017897

First Analysis Data:				Date: 07/11/2016	
Z:	0	R:	51	C:	50.6
				Conc:	50.6
R:	51	Z:	0	C:	50.8
				Conc:	50.8
Z:	0	C:	50.8	R:	51
				Conc:	50.9
UOM:	ppm		Mean Test Assay:	50.7 ppm	

Second Analysis Data:				Date: 07/18/2016	
Z:	0	R:	51	C:	50.7
				Conc:	50.7
R:	51	Z:	0	C:	50.8
				Conc:	50.8
Z:	0	C:	50.8	R:	51
				Conc:	50.7
UOM:	ppm		Mean Test Assay:	50.7 ppm	

2 . Component: SULFUR DIOXIDE

Requested Concentration: 50 ppm
 Certified Concentration: 50.6 ppm
 Instrument Used: Ametek 921CE S/N AW-921-S321
 Analytical Method: Ultraviolet Absorption
 Last Multipoint Calibration: 06/27/2016

Reference Standard Type: NTRM
 Ref. Std. Cylinder #: CC
 Ref. Std. Conc: 48.58 ppm
 Ref. Std. traceable to SRM #: n/a
 SRM Sample #: 12070103
 SRM Cylinder #: N/A

First Analysis Data:				Date: 07/11/2016	
Z:	0	R:	482.8	C:	503.8
				Conc:	50.7
R:	482.6	Z:	0	C:	503.9
				Conc:	50.7
Z:	0	C:	503.9	R:	482.6
				Conc:	50.7
UOM:	ppm		Mean Test Assay:	50.7 ppm	

Second Analysis Data:				Date: 07/18/2016	
Z:	0	R:	482.1	C:	500.6
				Conc:	50.4
R:	482.7	Z:	0	C:	501.3
				Conc:	50.5
Z:	0	C:	501.3	R:	482.7
				Conc:	50.4
UOM:	ppm		Mean Test Assay:	50.4 ppm	

Analyzed by:

Matthew Angerer

Certified by:

Henry Koung

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specified analyses performed, we make no warranty or representation as to the suitability of the use of the information for any purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Praxair Distribution, Inc. arising out of the use of the information contained herein exceed the fee established for providing such information.

***APPENDIX III
REPORT CERTIFICATION FORM***

Report Certification Form

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

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

Maram Ghaleb

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

December 27, 2017

Report Issued Date (dd-mm-yyyy)

APPENDIX IV
DATA VALIDATION CERTIFICATION FORM



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2017-11-30-C</u>
Site: <u>Maskwa Continuous Monitoring Station</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u>Maram Ghaleb</u>	Date <u>December 13, 2017</u>
Level 1 Primary Validation	<u>Maram Ghaleb</u>	Date <u>December 13, 2017</u>
Level 2 Final Validation	<u>Maram Ghaleb</u>	Date <u>December 26, 2017</u>
Level 3 Independent Data Review	<u>CSA-Lmhq</u>	Date <u>December 27, 2017</u>
Post-Final Validation	<u>NA</u>	Date <u>NA</u>

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



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

February 14, 2018

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 2017.

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 2017 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 systems, with the exception of THC (87.5%).

Non-Conformance: The THC analyzer and zero air generator were replaced for maintenance, resulting in 90 hours of downtime. Equipment uptime (87.5%) did not meet the AMD's 90% requirement this month. AEP reference number: 333177.

THC: The baseline-corrected concentrations exhibited a low trend beginning on November 23. On November 24, a shut-down calibration was performed to remove the LICA-owned Thermo 51C analyzer (s/n: 51 CLT-77021-384) for maintenance. The Maxxam-owned Thermo 51i analyzer (s/n: 925436893) was attempted to be installed on November 25. However, it was deemed invalid due to instability/noise suspected to be caused by instability in zero air pressure. On November 26, the LICA-owned zero air generator was removed for maintenance and a Maxxam-supplied zero air generator was installed. 73 hours of downtime were recorded due to this event.

NO_x/NO/NO₂: A technician was onsite on November 30 to troubleshoot the electrical/wiring issues. The connection between the NO channel on the data logger was compromised from November 26 at 14:00 to November 30 at 08:00. Missing NO data were derived using the following equation: NO = NO_x – NO₂. The NO value obtained from the daily zero span cycle was derived using the same formula. There were no elevated zero values on the NO_x or NO₂ channel during this time. This data treatment did not follow Maxxam's routine data validation process, it was based on the provision of the AMD chapter 6, section 4.3.6. A zero-span check was performed following the maintenance as an additional quality check.



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

As the LICA Environmental Program Manager and Data & Reporting Specialist, we certify that 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 certify 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 me.

Respectfully,

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

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

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

Lily Lin
Data & Reporting Specialist
587-225-2248
rebbacaa@gmail.com



MAXXAM ANALYTICS
#1 2080 39 Ave. NE, Calgary, AB
T2E 6P7

maxxam.ca
Toll Free 800-386-7247
Fax 403-219-3673

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

JOB #: 2833-2017-11-31-C

November 2017

Prepared for:

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

Attention: MIKE BISAGA

DATE: **December 29, 2017**

Prepared by: *Maram Ghaleb*

Maram Ghaleb, B.Sc.
Project Manager, Customer Service, Air Services

Reviewed by: *Wunmi Adekanmbi*

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

SUMMARY

In November 2017, 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, with the exception of THC, was compliant with the requirements outlined in the AMD, 2016.

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

Non-Conformance: The THC analyzer and zero air generator were replaced for maintenance, resulting in 90 hours of downtime. Equipment uptime (87.5%) did not meet the AMD's 90% requirement this month. This event was reported to AEP under reference number: 333177.

All Parameters: A power failure and subsequent analyzer recovery, three hours of data were discarded on November 12, at hours 10:00-12:00 across all channels.

All Parameters (except THC & Precipitation): Between November 7 and November 8, the datalogger was reset multiple times in order to address an issue with the calibration program. Two hours of data were discarded on November 7, at hours 21:00-22:00 as a result.

H₂S: A repeat zero-span check was performed on November 20 at 08:00, as the analyzer spanned towards the upper acceptance limit on November 19. One hour of downtime was recorded as a result.

THC:

- THC zero-span program was impacted by brief datalogger power supply interruptions. Maintenance was performed to address the zero/span program issue between November 7 and November 8, which resulted in eight hours of data to be invalidated.
- A shut-down/post-repair calibration on November 7 resulted in four hours of downtime.
- A site visit on November 10 where the span gas cylinder was replaced resulted in two hours of downtime.
- 73 hours of downtime were recorded due to an analyzer swap event. Thermo 51C (s/n: 51 CLT-77021-384) was removed and a Thermo 51i (s/n: 925436893) analyzer installed.

NO_x/NO/NO₂: A technician was onsite on November 30 to troubleshoot the electrical/wiring issues. The connection between the NO channel on the data logger was compromised from November 26 at 14:00 to November 30 at 08:00. Missing NO data were derived using the following equation: $NO = NO_x - NO_2$. A zero-span check was performed following the maintenance as an additional quality check. Three hours of downtime were recorded due to this event.

O₃: The routine monthly calibration was attempted on November 7 but failed at the low point due to issues from the calibration gear. Four 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, 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	6	30	3	12.7	SW	3	30	99.3
H ₂ S (ppb)	10	3	0	0	0	1	18	11	8.8	SSW	0	1	99.2
THC (ppm)	-	-	-	-	2.23	3.22	19	6	11.9	ENE	2.66	19	87.5
NO ₂ (ppb)	159	-	0	-	3	17	19	0	7.7	ENE	8	19	98.9
NO (ppb)	-	-	-	-	0	6	18	18	10	SSW	1	18	98.9
NO _x (ppb)	-	-	-	-	3	17	19	0	7.7	ENE	9	19	98.9
O ₃ (ppb)	82	-	0	-	26.9	41.3	23	15	21.6	SW	31.0	6	98.8
PM _{2.5} (µg/m ³)	80	30	0	0	9	57	18	11	8.8	SSW	28	11	99.3
RELATIVE HUMIDITY (%)	-	-	-	-	74	88	1	0	9.0	NNE	84	1	99.4
BAROMETRIC PRESSURE (millibar)	-	-	-	-	922	939	2	20	9.6	NNE	936	2	99.4
AMBIENT TEMPERATURE (°C)	-	-	-	-	-9.9	5.3	24	12	13.2	WNW	-0.8	24	99.4
PRECIPITATION (mm)	-	-	-	-	0.0	2.5	14	1	14.5	NNE	0.4	14	99.7
VECTOR WS (kph)	-	-	-	-	1.7	28.4	27	10	-	W	16.3	15	99.4
VECTOR WD (sec)	-	-	-	-	261 (W)	-	-	-	-	-	-	-	99.4

Exceedance Summary Report

SO₂ 1-Hour Exceedances

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

SO₂ 24-Hour Exceedances

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

H₂S 1-Hour Exceedances

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

H₂S 24-Hour Exceedances

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

NO₂ 1-Hour Exceedances

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

PM_{2.5} 1-Hour Exceedances

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

PM_{2.5} 24-Hour Exceedances

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

O₃ 1-Hour Exceedances

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

In accordance with EPEA and the Substance Release Regulation.

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

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1.0 Discussion

This monthly report consists of continuous monitoring 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), 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 99.3%, equivalent to 5 hours of downtime.
- The routine monthly calibration was performed on November 7.
- Between November 7 and November 8, the datalogger was reset multiple times in order to address an issue with the calibration program. Two hours of data were discarded on November 7, at hours 21:00-22:00 as a result. Additionally, three instances of data were discarded on the maximum instantaneous channel on November 7 at 19:00-20:00 and November 8 at 00:00 for the same reason.
- The O₃ and SO₂ span programs are designed to run concurrently. One instance of quality check was recorded on the SO₂ channel on November 8 at hour 16:00 due to activities on the O₃ channel.
- Due to a power failure and subsequent analyzer recovery, three hours of data were discarded on November 12, at hours 10:00-12:00.
- Two additional instances of maximum instantaneous data were discarded on November 24 at 17:00-18:00 due to a brief power outage.

HYDROGEN SULPHIDE (H₂S)

- Operational time, for the monitoring period was 99.2%, equivalent to 6 hours of downtime.
- The routine monthly calibration was performed on November 7.
- Between November 7 and November 8, the datalogger was reset multiple times in order to address an issue with the calibration program. Two hours of data were discarded on November 7, at hours 21:00-22:00 as a result. Additionally, three instances of data were discarded on the maximum instantaneous channel on November 7 at 19:00-20:00 and November 8 at 00:00 for the same reason.
- Due to a power failure and subsequent analyzer recovery, three hours of data were discarded on November 12, at hours 10:00-12:00.
- A repeat zero-span check was performed on November 20 at 08:00, as the analyzer spanned towards the upper acceptance limit on November 19. The results were closer to the mean, no further action was required. One hour of downtime was recorded due to the additional zero-span check.
- Two additional instances of maximum instantaneous data were discarded on November 24 at 17:00-18:00 due to a brief power outage.

TOTAL HYDROCARBONS (THC)

- Operational time, for the monitoring period was 87.5%, equivalent to 90 hours of downtime.
- Between November 7 and November 8, maintenance was performed on the datalogger in order to address issues with the daily zero/span program. It was discovered that the configuration for the zero/span program for the THC channel was being impacted by brief power supply interruptions. Eight hours of data were invalidated due to this maintenance: November 7 at hours 19:00, 21:00-23:00 and November 8 at hours 00:00-01:00, 06:00 and 08:00.
- Following a successful shut-down calibration on November 7, the analyzer was checked and fittings were tightened. A successful post-repair calibration was then completed. Four hours of downtime were incurred due to this maintenance event.
- The analyzer spanned low on November 9 at 06:00 as the span gas was running out, confirmed by a repeat zero-span check at 21:00. This prompted a site visit on November 10 where the span gas cylinder was replaced. Two hours of downtime were recorded due to the additional quality checks.
- Due to a power failure and subsequent analyzer recovery, three hours of data were discarded on November 12, at hours 10:00-12:00.
- The baseline-corrected concentrations exhibited a low trend beginning on November 23. On November 24, a shut-down calibration was performed to remove the LICA-owned Thermo 51C (s/n: 51 CLT-77021-384) for maintenance. The replacement, a Maxxam-owned Thermo 51i (s/n: 925436893) analyzer, was attempted to be installed on November 25. However, it was deemed invalid due to instability/noise suspected to be caused by instability in zero air pressure. On November 26, the LICA-owned zero air generator was removed for maintenance and a Maxxam-supplied zero air generator was installed. A successful installation calibration was then completed. Data was invalidated back to the point where concentrations started declining, determined to be on November 23 at hour 17:00. 73 hours of downtime were recorded due to this event.
- The expected span value was adjusted on November 27 following the analyzer replacement.
- Maximum instantaneous concentrations below 1.5 ppm were recorded on November 23 at 14:00-15:00. This is due to the fact that maximum instantaneous data does not undergo baseline corrections.
- Equipment uptime (87.5%) did not meet the AMD's 90% requirement this month. This event was reported to AEP under reference number: 333177

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

- Operational time, for the monitoring period was 98.9%, equivalent to 8 hours of downtime.
- The routine monthly calibration was performed on November 7.
- Between November 7 and November 8, the datalogger was reset multiple times in order to address an issue with the calibration program. Two hours of data were discarded on November 7, at hours 21:00-22:00 as a result. Additionally, four instances of data were discarded on the maximum instantaneous channel on November 7 at 19:00-20:00 and November 8 at 00:00 and 06:00 for the same reason.
- Due to a power failure and subsequent analyzer recovery, three hours of data were discarded on November 12, at hours 10:00-12:00.
- From November 26 hour 14:00 to November 30 hour 08:00, the connection between the NO channel on the data logger was compromised. This impacted the communication from the analyzer to the data logger, resulting in missing data and anomalous zero-span results. There were no problems with the analyzer as demonstrated by the successful monthly calibration.

Missing NO data were derived using the following equation: $NO = NO_x - NO_2$. This step was necessary in order to provide the raw data that would normally be obtained by the NO channel. The NO value obtained from the daily zero span cycle was derived using the same formula; however there were no elevated zero values on the NO_x or NO₂ channel during this time. This data treatment did not follow Maxxam's routine data validation process, it was based on the provision of the AMD chapter 6, section 4.3.6.

Following this data treatment, Maxxam's standard data corrections were applied. Maximum instantaneous data is not subjected to the same data treatment and was therefore flagged invalid during this period. NO₂ and NO_x maximum instantaneous channels were not impacted by this electrical issue.

- A technician was onsite on November 30 to troubleshoot the electrical/wiring issues. A successful zero-span check was completed following the maintenance, confirming that functionality was restored. Three hours of downtime were recorded due to this event.
- Two additional instances of maximum instantaneous data were discarded on November 24 at 17:00-18:00 due to a brief power outage.

OZONE (O₃)

- Operational time, for the monitoring period was 98.8%, equivalent to 9 hours of downtime.
- The O₃ and SO₂ span programs are designed to run concurrently. An additional quality check was recorded on the O₃ channel on November 7 at hour 13:00 due to activities on the SO₂ channel.
- The routine monthly calibration was attempted on November 7 but failed at the low point. It was suspected that this failure resulted from the calibration equipment and not the analyzer. The analyzer was restored to the as-found state and returned to "sampling" mode. On November 8, a successful routine monthly calibration was completed using alternate calibration equipment. Four hours of downtime were incurred due to the calibration attempt on November 7.
- Between November 7 and November 8, the datalogger was reset multiple times in order to address an issue with the calibration program. Two hours of data were discarded on November 7, at hours 21:00-22:00 as a result. Additionally, two instances of data were discarded on the maximum instantaneous channel on November 7 at 19:00-20:00 and November 8 at 00:00 for the same reason.
- Due to a power failure and subsequent analyzer recovery, three hours of data were discarded on November 12, at hours 10:00-12:00.
- Two additional instances of maximum instantaneous data were discarded on November 24 at 17:00-18:00 due to a brief power outage.

PARTICULATE MATTER < 2.5 MICRONS (PM_{2.5})

- Operational time, for the monitoring period was 99.3%, equivalent to 5 hours of downtime.
- The datalogger was reset multiple times in order to address an issue with the calibration program; two hours of data were discarded on November 7, at hours 21:00-22:00 as a result.
- Due to a power failure and subsequent analyzer recovery, three hours of data were discarded on November 12, at hours 10:00-12:00.
- The routine monthly audit was performed on November 28.
- Data was corrected in accordance with AMD (2016), Chapter 6, Table 2, Zero Adjustment Criteria. Data recorded between 0 and $-3 \mu\text{g}/\text{m}^3$ were corrected to $0 \mu\text{g}/\text{m}^3$. No hourly data were invalidated as all measurements were above $-3 \mu\text{g}/\text{m}^3$ this month.

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

- Operational time, for the monitoring period was 99.4%, equivalent to 4 hours of downtime.
- The datalogger was reset multiple times in order to address an issue with the calibration programs; two hours of data were discarded on November 7, at hours 21:00-22:00 as a result. Additionally, three instances of data were discarded on the maximum instantaneous channel on November 7 at 19:00-20:00 and November 8 at 00:00 for the same reason.
- Due to a power failure, two hours of data were discarded on November 12, at hours 10:00-11:00.
- Two additional instances of maximum instantaneous data were discarded on November 24 at 17:00-18:00 due to a brief power outage.
- 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 99.4%, equivalent to 4 hours of downtime.
- The datalogger was reset multiple times in order to address an issue with the calibration programs; two hours of data were discarded on November 7, at hours 21:00-22:00 as a result.
- Due to a power failure, two hours of data were discarded on November 12, at hours 10:00-11:00.

BAROMETRIC PRESSURE (BP)

- Operational time, for the monitoring period was 99.4%, equivalent to 4 hours of downtime.
- The datalogger was reset multiple times in order to address an issue with the calibration program; two hours of data were discarded on November 7, at hours 21:00-22:00 as a result.
- Due to a power failure, two hours of data were discarded on November 12, at hours 10:00-11:00.

PRECIPITATION (PRECIP)

- Operational time, for the monitoring period was 99.7%, equivalent to 2 hours of downtime.
- Due to a power failure, two hours of data were discarded on November 12, at hours 10:00-11:00.

AMBIENT TEMPERATURE (AmbTPX)

- Operational time, for the monitoring period was 99.4%, equivalent to 4 hours of downtime.
- The datalogger was reset multiple times in order to address an issue with the calibration programs; two hours of data were discarded on November 7, at hours 21:00-22:00 as a result.
- Due to a power failure, two hours of data were discarded on November 12, at hours 10:00-11:00.

2.0 Project Personnel

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

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, with the exception of THC, were above the 90% requirement.

Non-Conformance: The THC analyzer and zero air generator were replaced for maintenance, resulting in 90 hours of downtime. Equipment uptime (87.5%) did not meet the AMD's 90% requirement this month. This event was reported to AEP under reference number: 333177.

4.0 Calculations and Results

All calculations and reporting of results follow the methods described in the AMD, 2016, except for Nitric Oxide (NO).

5.0 Methods and Procedures

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

- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-00212: Ambient O₃ Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO₂/NO_x Monitoring
- Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring
- Maxxam AIR SOP-00010: Thermo Model 5030i SHARP Monitor
- 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 - API 100E UV Fluorescent Analyzer
- Hydrogen Sulphide - API 101E UV Fluorescent Analyzer
- Total Hydrocarbons - Thermo 51C FID Analyzer
- Total Hydrocarbons - Thermo 51i FID Analyzer
- Oxides of Nitrogen - API 200E Chemiluminescent Analyzer
- Ozone - Thermo 49i Photometric Analyzer
- Particulate Matter (PM_{2.5}) - Thermo 5030i SHARP Unit
- Wind System - Met One Unit
- Relative Humidity - Met One Unit
- Barometric Pressure - Met One Unit
- Ambient Temperature - Met One Unit
- Precipitation - Met One Unit
- Datalogger - ESC 8832

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

Level 0 Preliminary Verification

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

Level 1 Primary Validation

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

Level 2 Final Validation

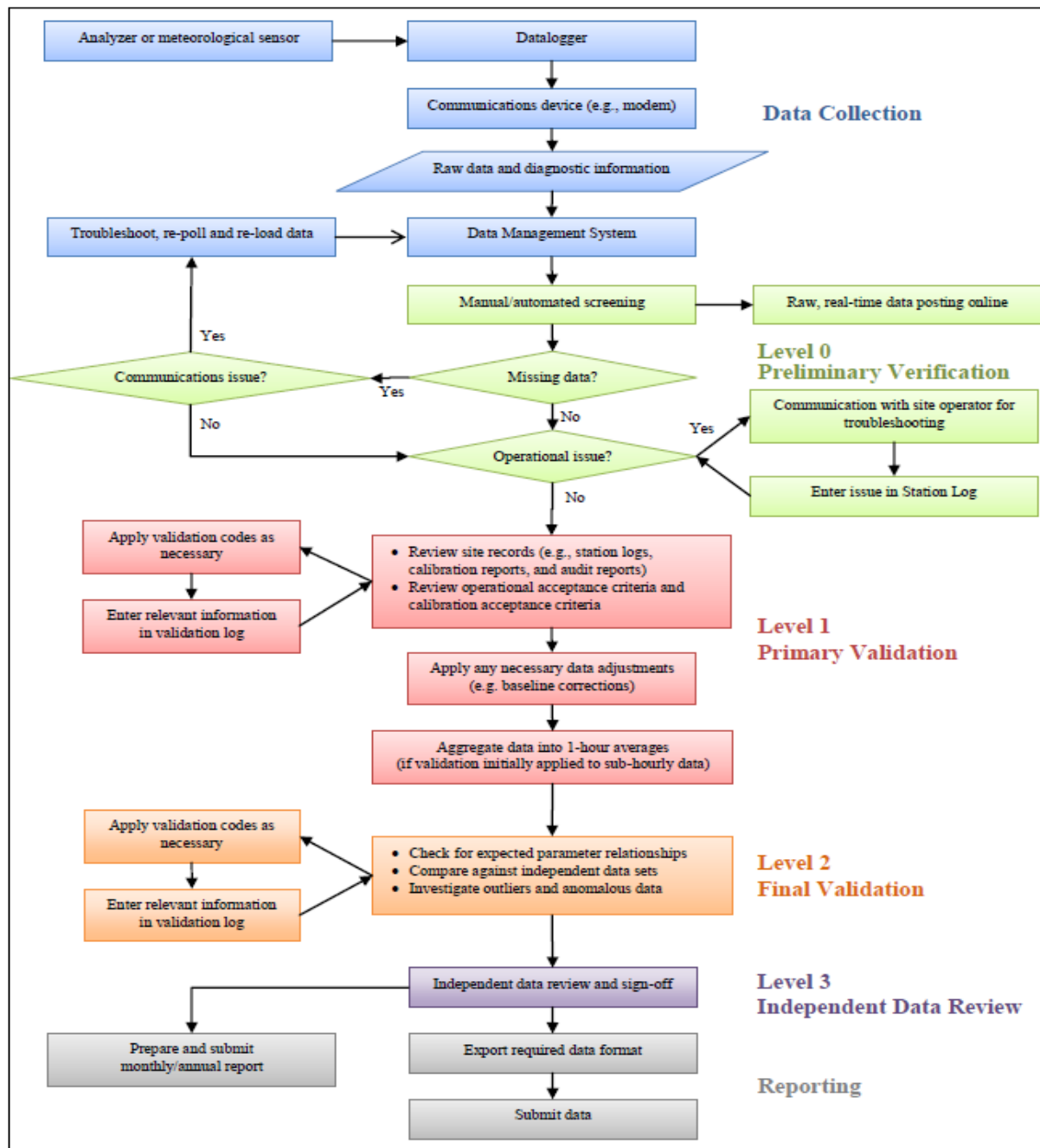
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

Level 3 Independent Data Review

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

Post-Final Validation

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



Source: Air Monitoring Directive (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	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	24
DAY 2	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 3	0	0	0	0	0	0	1	1	1	1	1	1	S	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
DAY 4	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	1	3	2	1	1	2	2	2	0	0	3	1	24
DAY 5	2	2	1	1	1	1	1	1	0	0	S	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	24
DAY 6	0	0	0	0	0	0	0	0	0	S	0	1	3	1	1	1	0	1	1	1	1	1	1	1	0	0	3	1	24
DAY 7	1	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	X	X	0	0	0	1	0	22
DAY 8	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	Q	0	0	0	0	0	0	0	0	0	0	0	24
DAY 9	0	0	0	0	0	1	1	S	0	1	5	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	5	0	24
DAY 10	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
DAY 11	0	0	0	0	0	S	0	0	0	0	0	1	1	1	1	1	1	0	1	0	1	0	0	0	0	0	1	0	24
DAY 12	0	0	1	1	S	1	1	1	0	0	P	P	R	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	21
DAY 13	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	24
DAY 14	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
DAY 15	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
DAY 16	S	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	S	0	0	1	0	24
DAY 17	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	S	0	0	0	1	0	24
DAY 18	0	0	1	0	0	0	0	0	0	0	0	1	2	1	2	1	1	1	1	1	1	S	0	0	0	0	2	1	24
DAY 19	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	S	1	1	1	0	0	1	1	24
DAY 20	1	1	1	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
DAY 21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	2	2	2	3	2	0	0	3	0	24
DAY 22	1	1	1	1	1	1	1	1	1	1	1	3	4	3	2	3	5	S	4	2	2	3	3	1	1	1	5	2	24
DAY 23	1	1	2	2	2	1	1	1	1	1	1	1	2	2	2	S	4	2	1	1	1	0	0	1	0	0	4	1	24
DAY 24	1	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	1	0	0	0	1	0	24
DAY 25	1	1	1	1	1	1	1	1	1	1	1	1	0	0	S	0	0	0	0	0	0	0	0	0	0	0	1	1	24
DAY 26	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	1	1	1	1	1	1	1	0	0	1	0	24
DAY 27	1	1	1	1	1	1	1	0	0	0	1	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
DAY 28	0	0	0	0	1	2	1	1	1	1	1	0	S	1	1	1	1	1	1	1	1	1	1	3	0	0	3	1	24
DAY 29	4	2	2	1	1	1	1	1	1	0	S	0	0	0	0	0	0	0	0	0	0	2	3	3	0	0	4	1	24
DAY 30	3	4	4	6	6	5	5	4	5	S	2	1	1	0	0	0	0	0	0	2	4	3	2	2	0	6	3	24	
HOURLY MAX	4	4	4	6	6	5	5	4	5	1	5	3	4	3	2	3	5	4	4	2	4	3	3	3					
HOURLY AVG	1	0	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1					

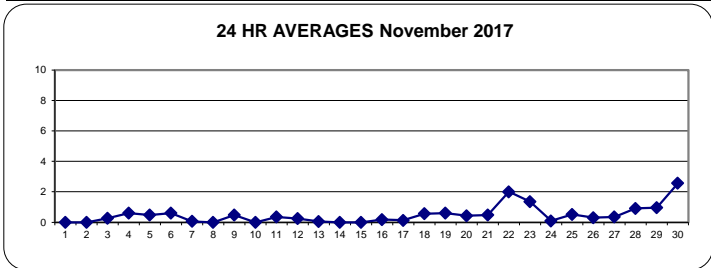
STATUS FLAG CODES

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

OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	172	ppb	24-HR	48	ppb
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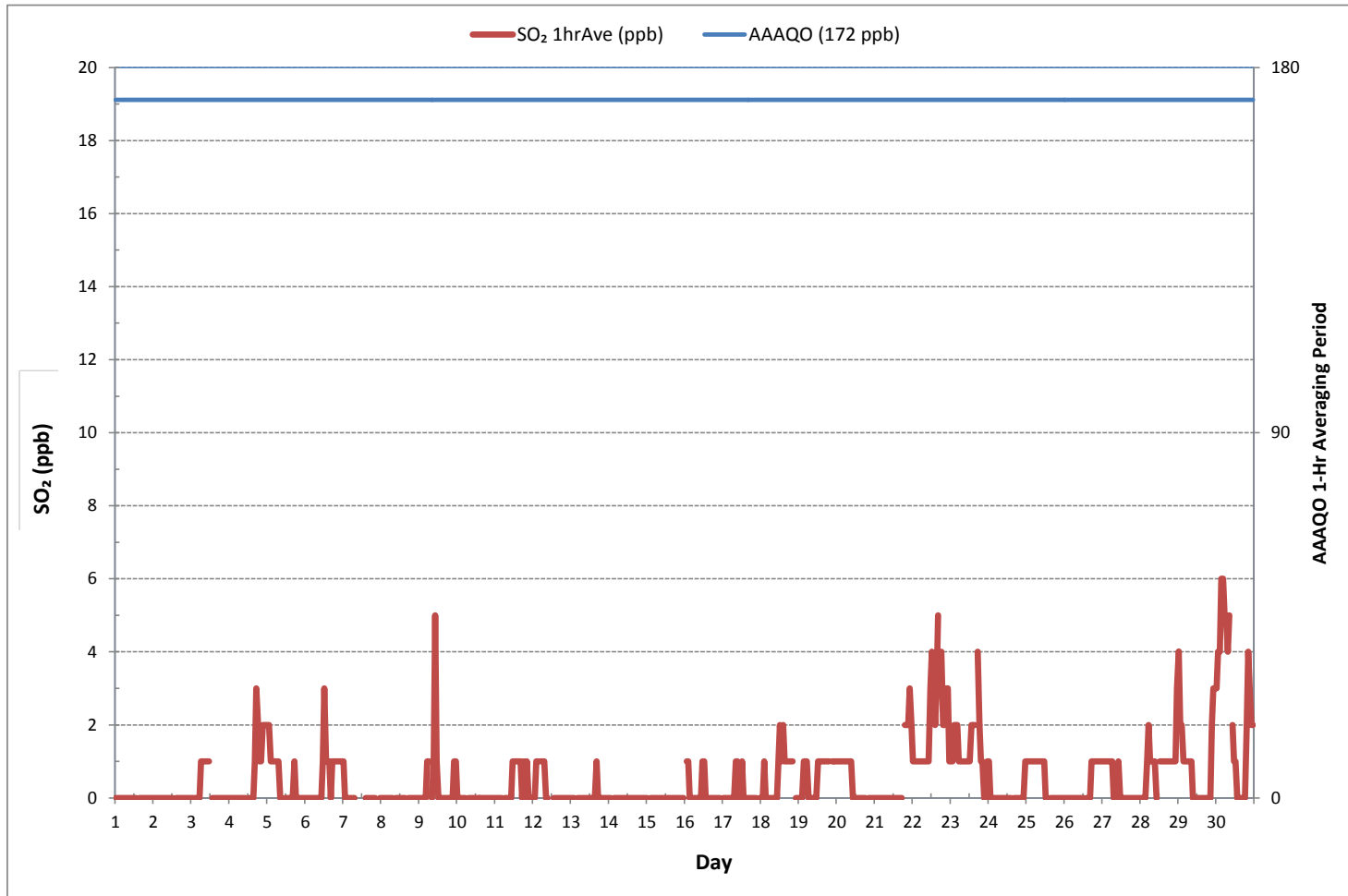
24 HR AVERAGES November 2017



MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	224		
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0 ON DAY	1
MAXIMUM 1-HR AVERAGE:	6 ppb @ HOUR	3 ON DAY	30
MAXIMUM 24-HR AVERAGE:	3 ppb	ON DAY	30
IZS CALIBRATION TIME:	30 hrs	OPERATIONAL TIME:	715 hrs
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	99.3 %
STANDARD DEVIATION:	1	MONTHLY AVERAGE:	0 ppb

SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2017

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																													
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HOURLY MAX	9	7	9	11	11	9	9	8	9	6	10	6	7	8	8	8	8	9	9	8	8	7	7	11					
HOURLY AVG	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4					

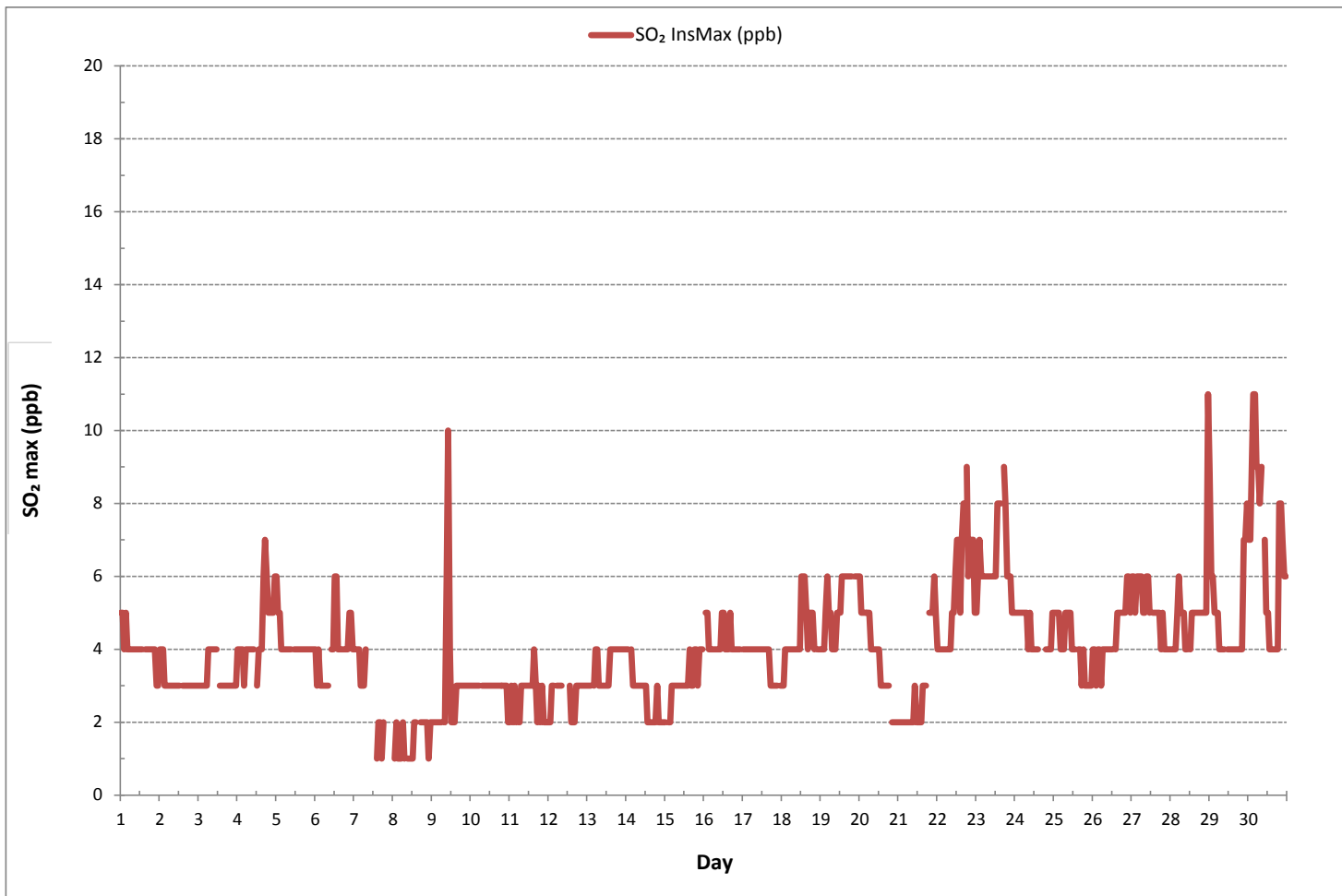
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	671
MAXIMUM INSTANTANEOUS VALUE:	11 ppb @ HOUR 23 ON DAY 28
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	1
OPERATIONAL TIME:	709 hrs

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)



Wind: LICA ST. LINA
 Poll.: LICA ST. LINA-SO2[ppb]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 0.30%

Calm Avg: 0.40 [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	10.6	0.0	0.0	0.0	0.0	0.0	10.6
NE	8.9	0.0	0.0	0.0	0.0	0.0	8.9
E	9.5	0.8	0.0	0.0	0.0	0.0	10.3
SE	7.3	0.6	0.2	0.3	0.0	0.0	8.4
S	8.6	1.2	0.2	0.2	0.0	0.0	10.1
SW	13.6	2.7	1.0	0.6	0.3	0.0	18.2
W	15.2	1.5	0.5	0.2	0.0	0.0	17.3
NW	16.0	0.0	0.0	0.0	0.0	0.0	16.0
Summary	89.7	6.7	1.8	1.2	0.3	0.0	100.0

% Icon Classes (ppb)

90 0.0-1.4

7 1.4-2.8

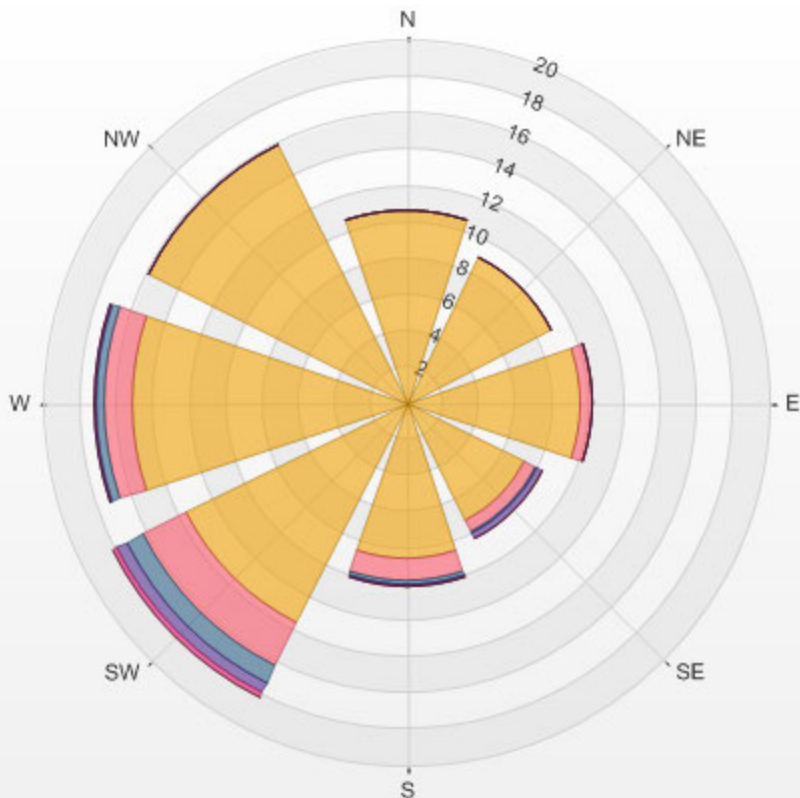
2 2.8-4.2

1 4.2-5.6

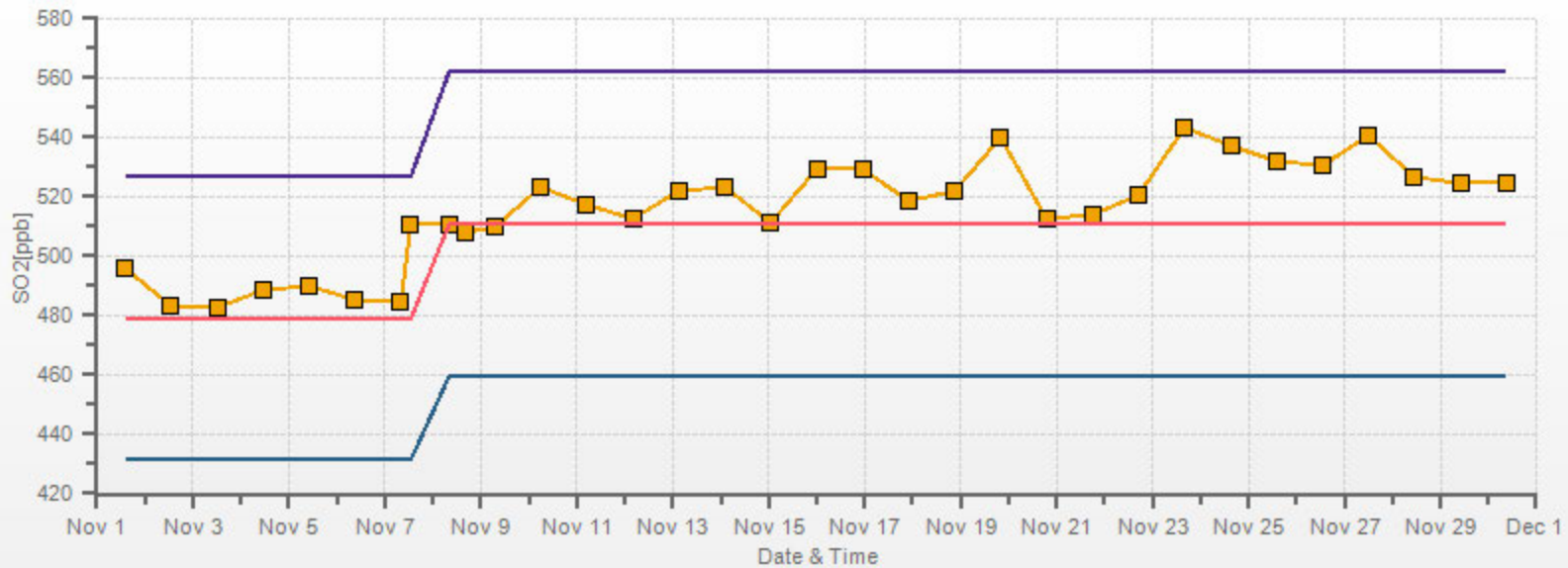
0 5.6-7.0

0 >7.0

LICA ST. LINA Poll.: LICA ST. LINA-SO2[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 0.30% Calm Poll Avg: 0.40[ppb]



SO2[ppb] Calibration: LICA ST. LINA Monthly: 17/11 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 MIN.	DAILY MAX.	24-HR AVG.	RDGS.	
DAY 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	24
DAY 2	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 3	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
DAY 4	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
DAY 5	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
DAY 6	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
DAY 7	0	0	0	0	0	0	0	0	S	0	0	0	C	C	C	C	C	C	0	0	0	X	X	0	0	0	0	0	22
DAY 8	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
DAY 9	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
DAY 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	0	0	24
DAY 11	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
DAY 12	0	0	0	0	S	0	0	0	0	0	P	P	R	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21
DAY 13	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
DAY 14	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
DAY 15	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
DAY 16	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	0	24
DAY 17	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
DAY 18	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	S	0	0	0	1	0	24
DAY 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	0	0	24
DAY 20	0	0	0	0	0	0	0	0	S1	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	23
DAY 21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	24
DAY 22	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
DAY 23	0	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	1	0	24
DAY 24	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 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	24
DAY 26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	1	1	1	0	1	0	24
DAY 27	1	1	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	24
DAY 28	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
DAY 29	1	1	1	1	1	1	1	1	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
DAY 30	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
HOURLY MAX	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	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
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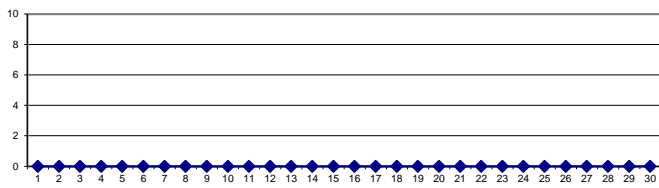
OBJECTIVE LIMIT:

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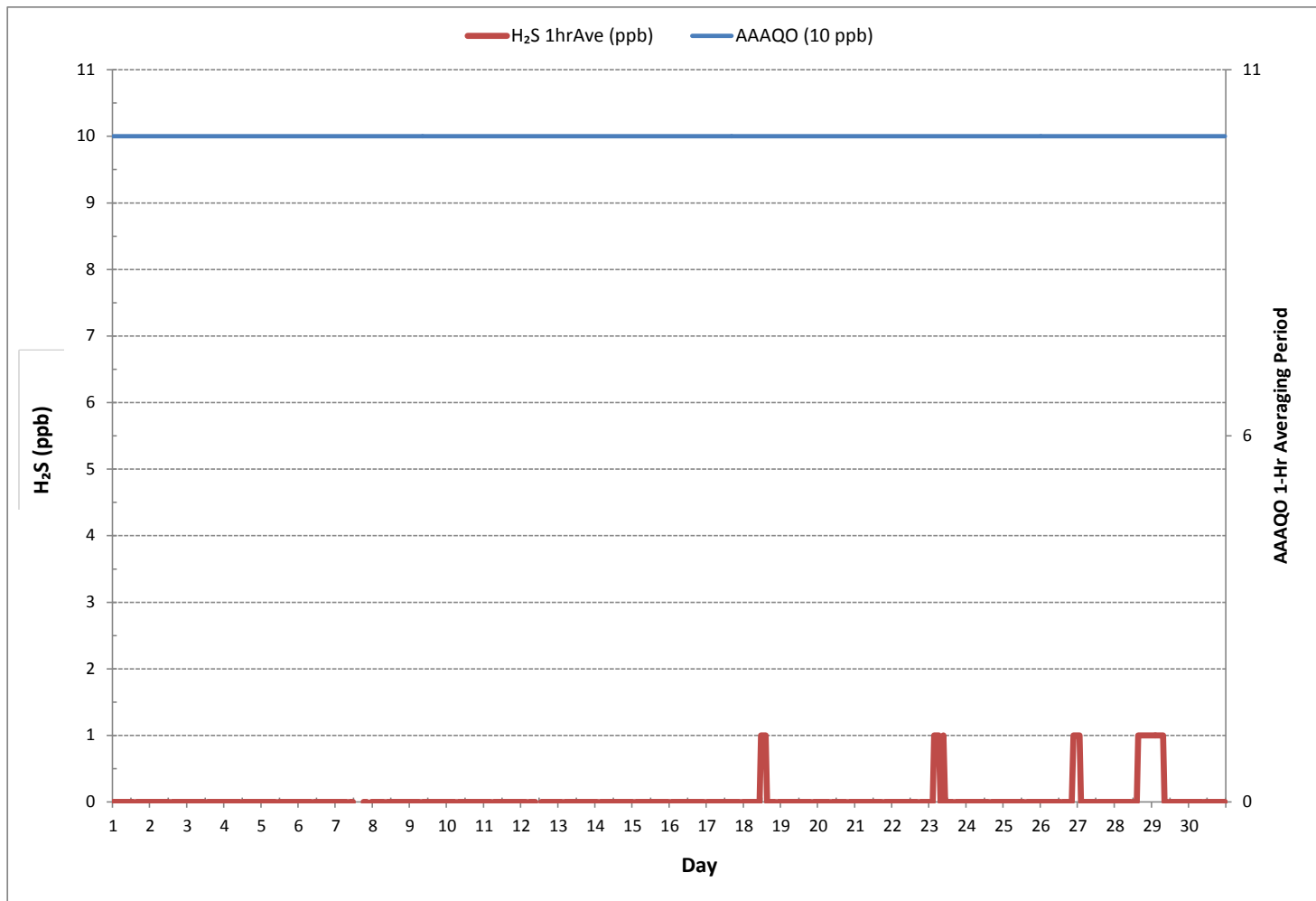
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	31		
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR ON DAY 1		
MAXIMUM 1-HR AVERAGE:	1 ppb @ HOUR ON DAY 18		
MAXIMUM 24-HR AVERAGE:	0 ppb ON DAY 1		
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	714 hrs
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	99.2 %
STANDARD DEVIATION:	0	MONTHLY AVERAGE:	0 ppb

24 HR AVERAGES November 2017



HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)





HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.			
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59							
DAY 1	1	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			
2	1	1	1	1	1	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24		
3	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	1	0	1	0	0	1	0	1	0	24			
4	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	1	24		
5	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		
6	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		
7	1	1	1	1	1	1	1	1	S	0	1	C	C	C	C	C	C	C	1	X	X	X	X	0	0	1	1	20			
8	X	0	1	1	0	0	0	1	S	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	0	1	1	23	
9	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		
10	1	1	1	1	2	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	24	
11	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	1	24	
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23	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	2	S	2	2	2	2	2	2	2	2	2	3	2	24	
24	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	S	2	P	P	2	1	2	2	2	1	2	2	2	2	24	
25	2	2	2	2	2	2	2	2	2	2	2	2	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
26	2	1	1	1	1	1	1	1	1	1	1	1	2	S	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	24	
27	2	2	2	2	2	2	2	2	2	2	2	2	S	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	24
28	2	2	1	1	2	2	2	2	2	2	2	2	S	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	24	
29	2	2	2	2	2	2	2	2	2	2	2	S	1	1	1	1	1	1	2	1	1	1	1	1	2	1	2	1	1	24	
30	2	2	2	2	2	2	2	2	2	S	2	2	2	1	1	2	2	1	2	2	2	2	2	2	1	2	2	2	1	24	
HOURLY MAX	2	2	2	2	2	2	2	2	2	2	2	3	2	3	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	1	24	

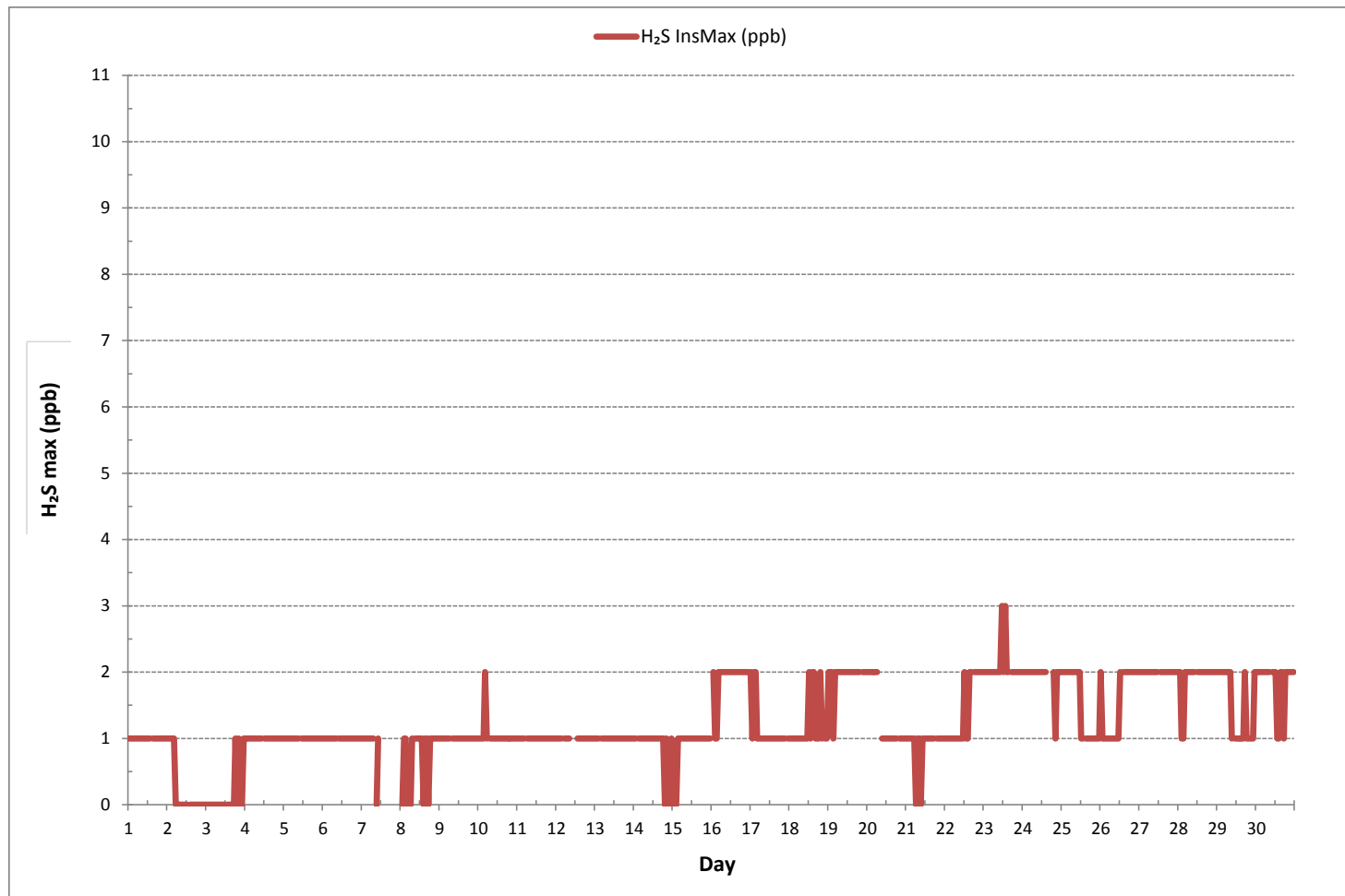
STATUS FLAG CODES

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:	616
MAXIMUM INSTANTANEOUS VALUE:	3 ppb @ HOUR 11 ON DAY 23
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	1
OPERATIONAL TIME:	707 hrs

HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)



Wind: LICA ST. LINA
Poll.: LICA ST. LINA-H2S[ppb]
Monthly: 17/11
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 0.30%

Calm Avg: 0.40 [ppb]

Direction	0.0-0.7	0.7-1.3	1.3-2.0	>2.0	Total
N	10.5	0.0	0.0	0.0	10.5
NE	9.0	0.0	0.0	0.0	9.0
E	10.3	0.0	0.0	0.0	10.3
SE	8.4	0.0	0.0	0.0	8.4
S	10.0	0.2	0.0	0.0	10.2
SW	18.1	0.5	0.0	0.0	18.5
W	16.4	0.9	0.0	0.0	17.3
NW	15.6	0.0	0.0	0.0	15.6
Summary	98.2	1.5	0.0	0.0	100.0

% Icon Classes (ppb)

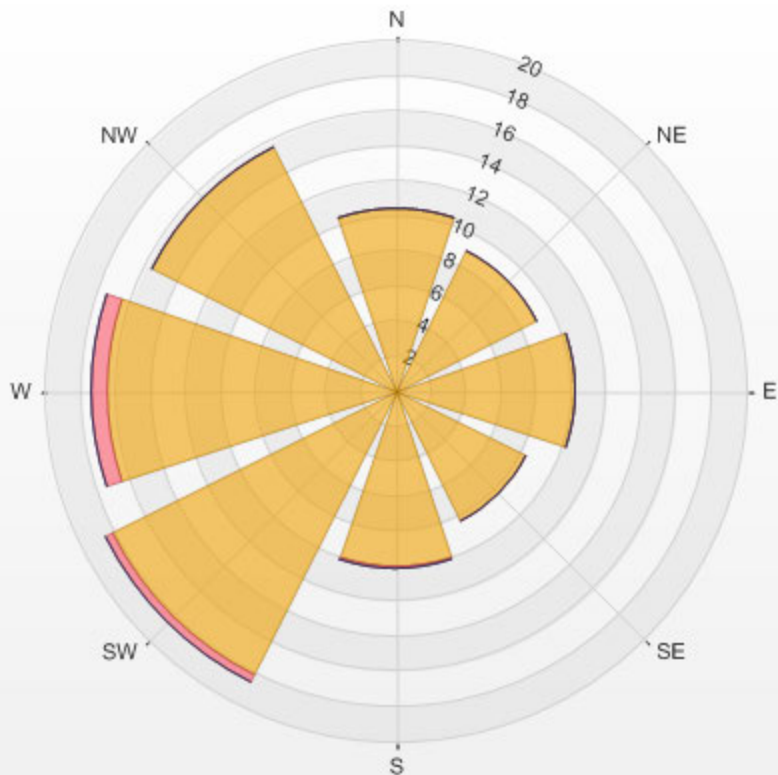
98 0.0-0.7

2 0.7-1.3

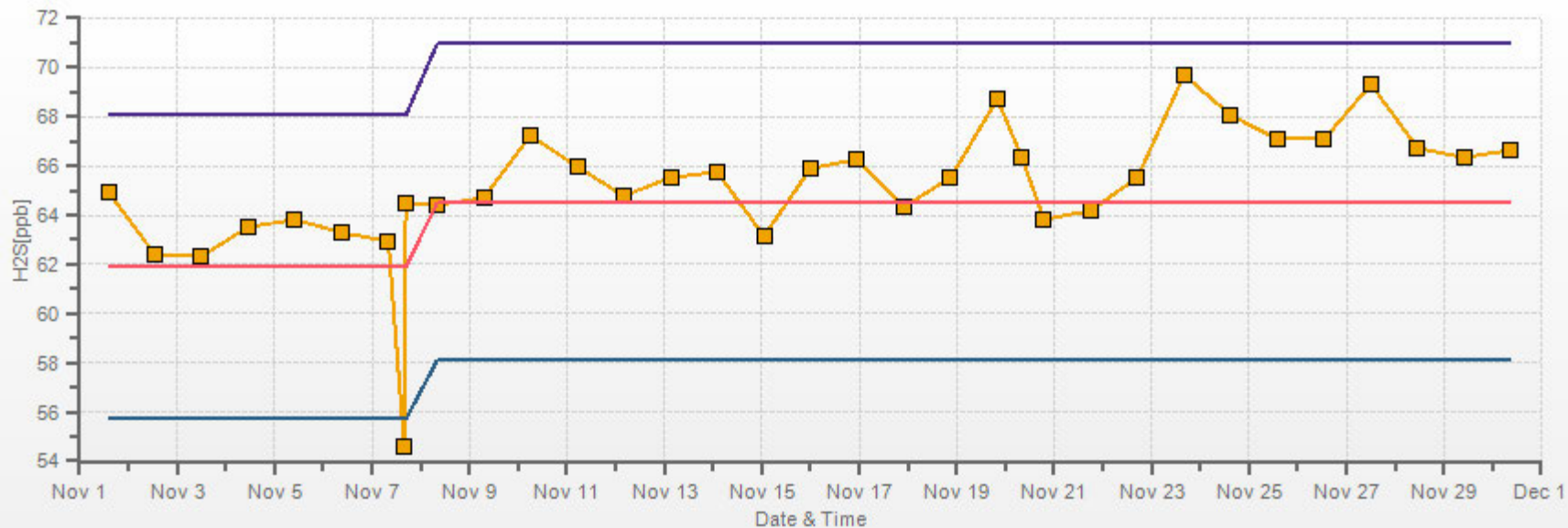
0 1.3-2.0

0 >2.0

LICA ST. LINA Poll.: LICA ST. LINA-H2S[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 0.30% Calm Poll Avg: 0.40[ppb]



H2S[ppb] Calibration: LICA ST. LINA Monthly: 17/11 Type: Span



Span Meas Span Ref Span Low Span High

TOTAL HYDROCARBON



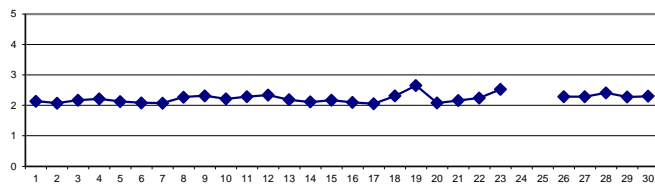
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

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	2.24	2.28	2.24	2.18	2.20	2.20	2.20	2.22	2.23	2.24	2.26	2.14	1.99	2.00	S	2.01	2.02	2.03	2.05	2.07	2.08	2.09	2.08	2.09	1.99	2.28	2.14	24
2	2.09	2.08	2.09	2.10	2.08	2.08	2.08	2.08	2.07	2.06	2.05	2.05	2.05	S	2.03	2.06	2.07	2.07	2.08	2.09	2.10	2.07	2.10	2.13	2.03	2.13	2.08	24
3	2.15	2.13	2.18	2.16	2.20	2.33	2.23	2.21	2.21	2.18	2.19	2.20	S	2.18	2.10	2.10	2.10	2.11	2.10	2.08	2.11	2.14	2.35	2.08	2.35	2.17	24	
4	2.53	2.54	2.36	2.25	2.23	2.23	2.18	2.12	2.17	2.23	2.19	S	2.10	2.10	2.10	2.12	2.13	2.15	2.16	2.19	2.21	2.23	2.23	2.20	2.10	2.54	2.22	24
5	2.20	2.21	2.22	2.17	2.19	2.22	2.21	2.22	2.22	2.22	S	2.14	2.08	2.06	2.04	2.04	2.04	2.05	2.04	2.05	2.06	2.06	2.07	2.08	2.04	2.22	2.13	24
6	2.06	2.07	2.08	2.07	2.06	2.07	2.10	2.11	2.12	S	2.13	2.15	2.11	2.08	2.06	2.07	2.09	2.09	2.05	2.05	2.04	2.07	2.09	2.10	2.04	2.15	2.08	24
7	2.09	2.08	2.06	2.04	2.05	2.05	2.03	2.05	S	C	C	C	Y	Y	Y	Y	C	C	C	X	2.24	X	X	X	2.03	2.24	2.08	16
8	X	X	2.19	2.18	2.19	2.18	X	2.20	X	2.24	2.24	2.28	S	2.10	2.15	2.23	2.32	2.41	2.42	2.40	2.35	2.36	2.37	2.36	2.10	2.42	2.27	20
9	2.34	2.32	2.30	2.29	2.28	2.28	2.34	S	2.60	2.69	2.48	2.38	2.34	2.33	2.29	2.37	2.35	2.30	2.19	2.11	2.11	S1	2.13	2.11	2.11	2.69	2.32	23
10	2.11	2.10	2.11	2.13	2.14	2.19	S	2.22	2.24	S1	2.23	2.25	2.26	2.27	2.25	2.25	2.26	2.26	2.24	2.25	2.24	2.23	2.22	2.21	2.10	2.27	2.21	23
11	2.20	2.17	2.16	2.16	2.16	S	2.11	2.11	2.16	2.20	2.27	2.33	2.36	2.38	2.39	2.46	2.44	2.41	2.44	2.42	2.45	2.41	2.27	2.20	2.11	2.46	2.29	24
12	2.20	2.35	2.39	2.26	S	2.40	2.34	2.29	2.15	2.14	P	P	R	2.58	2.51	2.50	2.47	2.45	2.38	2.33	2.31	2.28	2.28	2.27	2.14	2.58	2.34	21
13	2.25	2.24	2.23	2.29	2.28	2.28	2.30	2.29	S	2.22	2.20	2.29	2.24	2.23	2.21	2.17	2.14	2.11	2.10	2.03	2.03	2.04	2.06	2.06	2.03	2.30	2.19	24
14	2.06	2.13	S	2.05	2.06	2.08	2.08	2.08	2.09	2.10	2.11	2.16	2.12	2.12	2.13	2.13	2.15	2.19	2.17	2.16	2.11	2.12	2.10	2.12	2.05	2.19	2.11	24
15	2.13	S	2.12	2.18	2.27	2.31	2.26	2.23	2.22	2.22	2.19	2.18	2.17	2.15	2.16	2.15	2.14	2.13	2.13	2.15	2.14	2.12	2.11	2.13	2.11	2.31	2.17	24
16	S	2.08	2.08	2.07	2.03	2.09	2.09	2.12	2.15	2.12	2.09	2.05	2.07	2.07	2.10	2.11	2.12	2.14	2.14	2.14	2.13	2.11	2.10	S	2.03	2.15	2.10	24
17	2.05	2.02	2.00	2.02	2.02	2.03	2.03	2.04	2.04	2.03	2.05	2.03	2.05	2.06	2.06	2.06	2.07	2.07	2.06	2.08	2.10	2.13	S	2.17	2.00	2.17	2.06	24
18	2.17	2.18	2.20	2.28	2.23	2.25	2.28	2.28	2.29	2.34	2.42	2.49	2.52	2.46	2.35	2.32	2.34	2.30	2.30	2.28	2.27	S	2.24	2.35	2.17	2.52	2.31	24
19	2.81	2.62	2.80	2.66	2.72	3.04	3.22	2.93	2.76	2.74	2.69	2.56	2.51	2.48	2.49	2.50	2.47	2.51	2.55	2.53	S	2.48	2.50	2.50	2.47	3.22	2.66	24
20	2.47	2.23	2.10	2.06	2.06	2.04	2.01	1.97	2.03	2.02	2.04	2.05	2.05	2.08	2.08	2.08	2.03	1.95	2.00	S	2.05	2.09	2.12	2.16	1.95	2.47	2.08	24
21	2.19	2.22	2.19	2.21	2.23	2.23	2.25	2.24	2.24	2.26	2.25	2.20	2.19	2.17	2.18	2.14	2.11	2.10	S	2.06	2.05	2.04	2.04	2.02	2.02	2.26	2.17	24
22	2.07	2.11	2.15	2.12	2.14	2.18	2.30	2.31	2.27	2.20	2.20	2.21	2.21	2.21	2.21	2.21	2.21	S	2.25	2.20	2.32	2.53	2.58	2.45	2.07	2.58	2.24	24
23	2.54	2.59	2.57	2.68	2.59	2.66	2.74	2.78	2.77	2.81	2.75	2.49	2.30	2.19	2.20	1.96	S	X	X	X	X	X	X	X	1.96	2.81	2.53	17
24	X	X	X	X	X	X	X	X	X	X	X	X	X	X	C1	C1	C1	G	G	G	G	G	G	G	-	-	-	-
25	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	-	-	-	-
26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	C1	C1	C1	2.27	2.28	2.32	2.28	2.29	2.26	2.26	2.32	2.28	6
27	2.25	2.28	2.28	2.29	2.29	2.29	2.33	2.35	2.36	2.29	2.25	2.23	S	2.28	2.27	2.26	2.28	2.29	2.31	2.29	2.28	2.31	2.30	2.30	2.23	2.36	2.29	24
28	2.30	2.32	2.35	2.35	2.38	2.42	2.46	2.42	2.40	2.43	2.44	S	2.40	2.35	2.36	2.51	2.55	2.52	2.47	2.45	2.43	2.41	2.40	2.42	2.30	2.55	2.41	24
29	2.43	2.42	2.41	2.40	2.40	2.36	2.33	2.29	2.27	2.28	S	2.21	2.20	2.17	2.18	2.18	2.21	2.22	2.21	2.23	2.23	2.25	2.28	2.32	2.17	2.43	2.28	24
30	2.31	2.34	2.33	2.37	2.35	2.33	2.33	2.34	2.36	S	2.31	2.29	2.27	2.18	2.17	2.20	2.22	2.24	2.25	2.32	2.35	2.34	2.37	2.38	2.17	2.38	2.30	24
HOURLY MAX	2.81	2.62	2.80	2.68	2.72	3.04	3.22	2.93	2.77	2.81	2.75	2.56	2.52	2.58	2.51	2.51	2.55	2.52	2.55	2.53	2.45	2.53	2.58	2.50				
HOURLY AVG	2.25	2.24	2.24	2.22	2.22	2.26	2.27	2.25	2.27	2.27	2.26	2.23	2.21	2.21	2.20	2.21	2.21	2.21	2.21	2.21	2.20	2.22	2.22	2.23				

STATUS FLAG CODES

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

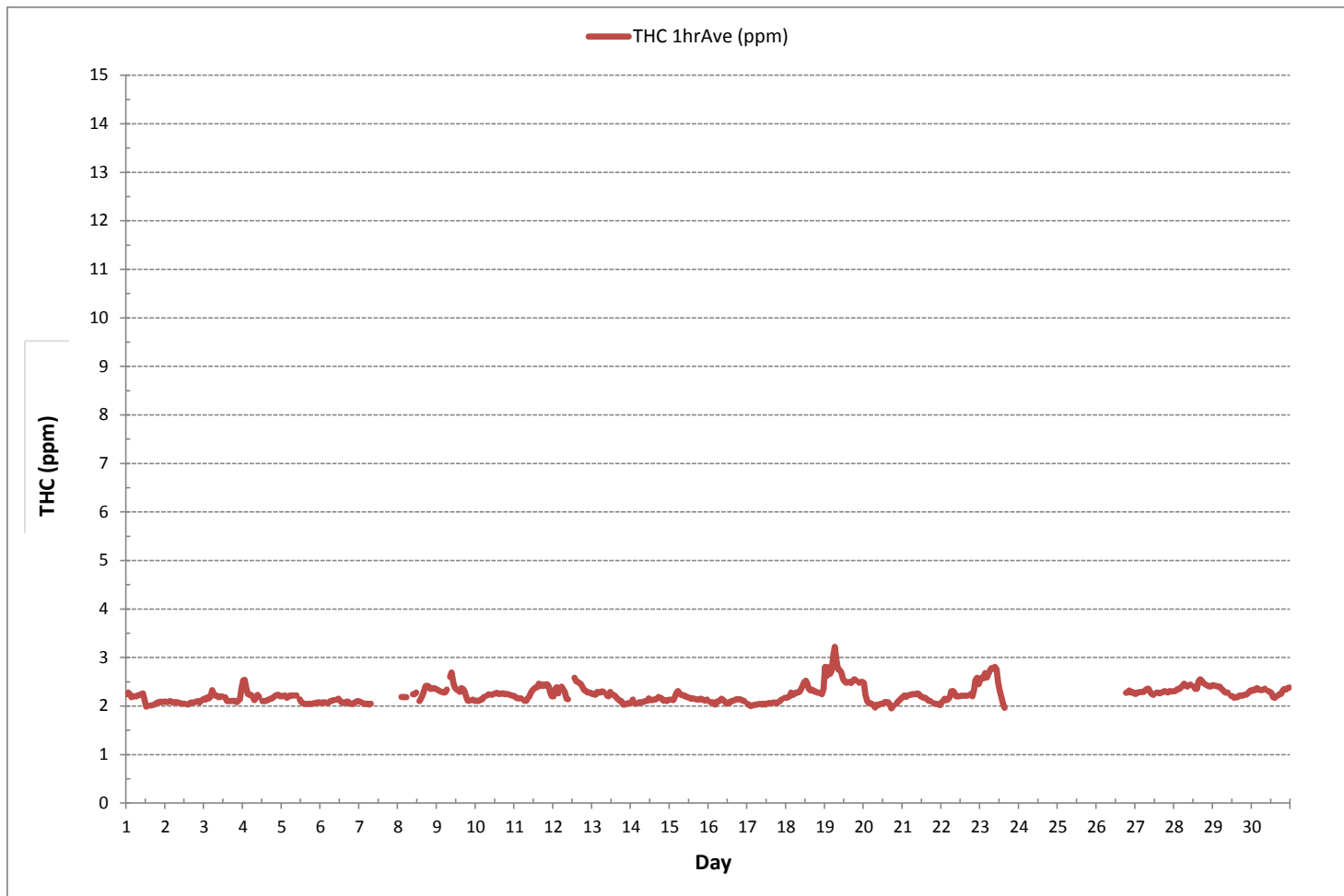
24 HR AVERAGES November 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	596			
MINIMUM 1-HR AVERAGE:	1.95 ppm	@ HOUR	17	ON DAY 20
MAXIMUM 1-HR AVERAGE:	3.22 ppm	@ HOUR	6	ON DAY 19
MAXIMUM 24-HR AVERAGE:	2.66 ppm			ON DAY 19
IZS CALIBRATION TIME:	28 hrs	OPERATIONAL TIME:	630 hrs	
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	87.5 %	
STANDARD DEVIATION:	0.17	MONTHLY AVERAGE:	2.23 ppm	

TOTAL HYDROCARBONS Hourly Averages (THC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2017

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	1.95	1.97	1.90	1.84	1.84	1.86	1.85	1.87	1.88	1.88	1.90	1.89	1.63	1.64	S	1.69	1.69	1.72	1.75	1.78	1.79	1.81	1.81	1.84	1.63	1.97	1.82	24
2	1.86	1.85	1.88	1.89	1.88	1.89	1.91	1.92	1.94	1.92	1.94	1.92	1.94	S	1.92	1.95	1.96	1.95	1.98	1.98	1.98	1.98	1.98	2.02	1.85	2.02	1.93	24
3	2.04	2.04	2.07	2.05	2.13	2.23	2.17	2.11	2.08	2.07	2.05	2.08	S	2.07	1.98	1.95	1.95	1.94	2.01	1.94	1.91	1.92	2.04	2.26	1.91	2.26	2.05	24
4	2.38	2.41	2.23	2.10	2.04	2.01	1.95	1.94	2.01	2.01	1.95	S	1.84	1.84	1.85	1.86	1.86	1.89	1.89	1.92	1.95	1.98	1.96	1.95	1.84	2.41	1.99	24
5	1.94	1.98	1.96	1.89	1.94	1.95	1.92	1.95	1.94	1.94	S	1.88	1.85	1.80	1.79	1.81	1.81	1.81	1.81	1.82	1.83	1.83	1.85	1.86	1.79	1.98	1.88	24
6	1.87	1.86	1.87	1.88	1.86	1.89	1.91	1.94	1.95	S	1.96	1.99	1.96	1.92	1.91	1.92	1.94	2.07	1.94	1.89	1.91	1.95	1.98	2.01	1.86	2.07	1.93	24
7	1.98	1.95	1.94	1.92	1.92	1.94	1.92	1.95	S	C	C	C	Y	Y	Y	Y	C	C	C	X	X	X	X	X	1.92	1.98	1.94	15
8	X	X	2.08	2.07	2.08	X	X	2.11	X	2.14	2.18	2.19	S	2.01	2.13	2.16	2.31	2.36	2.35	2.35	2.32	2.32	2.33	2.35	2.01	2.36	2.21	19
9	2.33	2.31	2.32	2.31	2.31	2.33	2.41	S	2.76	2.76	2.56	2.37	2.32	2.32	2.25	2.32	2.28	2.23	2.14	2.01	S1	S1	1.97	1.95	1.95	2.76	2.31	22
10	1.92	1.89	1.89	1.91	1.89	1.95	S	1.97	1.95	S1	1.98	2.01	2.02	2.04	2.04	2.04	2.07	2.07	2.05	2.07	2.08	2.08	2.08	2.07	1.89	2.08	2.00	23
11	2.08	2.07	2.05	2.07	2.08	S	2.04	2.05	2.11	2.19	2.27	2.32	2.35	2.37	2.41	2.47	2.47	2.42	2.47	2.44	2.50	2.60	2.90	2.26	2.04	2.90	2.30	24
12	2.26	2.52	2.54	2.38	S	2.52	2.42	2.36	2.29	P	P	P	R	2.66	2.54	2.53	2.50	2.45	2.42	2.35	2.29	2.26	2.26	2.26	2.26	2.66	2.41	20
13	2.23	2.20	2.17	2.23	2.23	2.25	2.23	2.25	S	2.16	2.14	2.25	2.17	2.16	2.14	2.10	2.02	2.02	1.98	1.95	1.91	1.92	1.92	1.94	1.91	2.25	2.11	24
14	1.97	1.98	S	1.92	1.98	1.98	2.01	2.04	2.04	2.07	2.11	2.14	2.11	2.16	2.16	2.17	2.20	2.23	2.23	2.25	2.20	2.22	2.20	2.25	1.92	2.25	2.11	24
15	2.26	S	2.22	2.26	2.34	2.32	2.29	2.22	2.17	2.17	2.14	2.11	2.07	2.01	2.04	1.98	1.95	1.92	1.90	1.91	1.88	1.83	1.81	1.81	1.81	2.34	2.07	24
16	S	1.75	1.76	1.75	1.72	1.76	1.78	1.82	1.83	1.85	1.76	1.75	1.78	1.76	1.78	1.78	1.83	1.82	1.81	1.82	1.78	1.78	S	1.72	1.85	1.78	24	
17	1.75	1.72	1.75	1.75	1.76	1.78	1.79	1.79	1.81	1.82	1.87	1.83	1.89	1.90	1.92	1.92	1.94	1.95	1.92	1.95	1.99	2.04	S	2.07	1.72	2.07	1.87	24
18	2.07	2.07	2.11	2.17	2.13	2.16	2.16	2.17	2.17	2.22	2.32	2.36	2.41	2.41	2.25	2.20	2.20	2.31	2.17	2.17	2.14	S	2.08	2.26	2.07	2.41	2.20	24
19	2.75	2.55	2.56	2.41	2.53	2.94	3.02	2.66	2.44	2.35	2.35	2.14	2.08	2.01	1.99	2.01	1.92	1.95	1.98	1.95	S	1.94	1.99	2.01	1.92	3.02	2.28	24
20	2.01	1.88	1.69	1.67	1.72	1.70	1.72	1.70	1.79	1.78	1.85	1.88	1.90	1.94	1.98	1.98	2.47	1.92	1.99	S	2.02	2.07	2.10	2.14	1.67	2.47	1.91	24
21	2.16	2.19	2.14	2.17	2.17	2.16	2.19	2.22	2.17	2.22	2.20	2.11	2.11	2.10	2.07	2.02	2.01	1.98	S	1.94	1.92	1.91	1.89	1.88	1.88	2.22	2.08	24
22	1.92	1.97	2.00	1.97	1.97	2.04	2.14	2.14	2.10	2.05	2.01	2.02	2.01	2.02	2.00	2.02	1.99	S	2.01	1.92	2.07	2.26	2.26	2.08	1.92	2.26	2.04	24
23	2.16	2.23	2.17	2.31	2.13	2.17	2.20	2.22	2.19	2.20	2.17	1.88	1.69	1.51	1.38	1.21	S	X	X	X	X	X	X	X	1.21	2.31	1.99	17
24	X	X	X	X	X	X	X	X	X	X	X	X	X	X	C1	C1	C1	G	G	G	G	G	G	G	-	-	-	-
25	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	-	-	-	-
26	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	C1	C1	C1	2.37	2.40	2.42	2.39	2.36	2.34	2.34	2.42	2.38	6
27	2.30	2.35	2.36	2.36	2.35	2.36	2.37	2.40	2.39	2.37	2.28	2.26	S	2.32	2.30	2.29	2.30	2.33	2.35	2.35	2.33	2.33	2.33	2.35	2.26	2.40	2.34	24
28	2.33	2.33	2.39	2.37	2.40	2.42	2.48	2.46	2.40	2.44	2.45	S	2.40	2.38	2.44	2.52	2.60	2.62	2.48	2.48	2.45	2.44	2.42	2.45	2.33	2.62	2.44	24
29	2.45	2.45	2.43	2.44	2.45	2.41	2.35	2.30	2.30	2.32	S	2.28	2.24	2.21	2.24	2.23	2.26	2.28	2.25	2.30	2.29	2.29	2.36	2.36	2.21	2.45	2.33	24
30	2.37	2.41	2.42	2.45	2.44	2.43	2.41	2.42	2.44	S	2.41	2.36	2.46	2.24	2.24	2.28	2.28	2.30	2.30	2.36	2.37	2.40	2.40	2.44	2.24	2.46	2.38	24
HOURLY MAX	2.75	2.55	2.56	2.45	2.53	2.94	3.02	2.66	2.76	2.76	2.56	2.37	2.46	2.66	2.54	2.53	2.60	2.62	2.48	2.48	2.50	2.60	2.90	2.45				
HOURLY AVG	2.13	2.12	2.11	2.09	2.09	2.14	2.15	2.11	2.13	2.13	2.12	2.09	2.06	2.07	2.07	2.05	2.11	2.11	2.10	2.09	2.10	2.11	2.12	2.13				

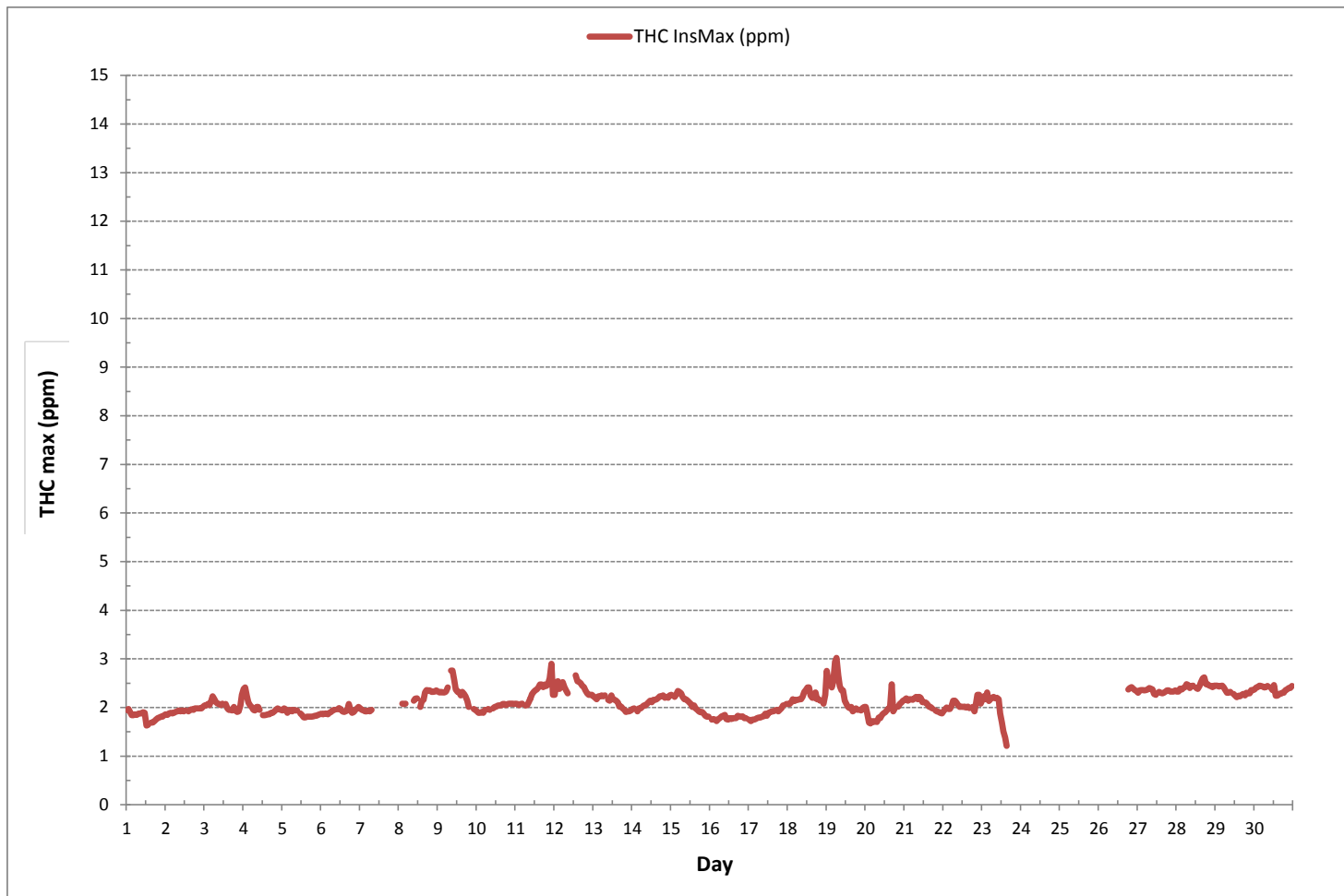
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	592				
MAXIMUM INSTANTANEOUS VALUE:	3.02	ppm	@ HOUR	6	ON DAY 19
IZS CALIBRATION TIME:	28	hrs	OPERATIONAL TIME:	626	hrs
MONTHLY CALIBRATION TIME:	6	hrs			
STANDARD DEVIATION:	0.24				

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)



Wind: LICA ST. LINA
Poll.: LICA ST. LINA-THC[ppm]
Monthly: 17/11
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 0.34%

Calm Avg: 2.37 [ppm]

Direction	0.0-1.1	1.1-2.2	2.2-3.2	>3.2	Total
N	0.0	8.1	2.5	0.0	10.6
NE	0.0	3.4	5.9	0.0	9.3
E	0.0	2.7	6.3	0.0	9.0
SE	0.0	1.9	7.3	0.0	9.1
S	0.0	2.7	7.3	0.0	10.0
SW	0.0	5.4	14.7	0.0	20.1
W	0.0	3.6	12.2	0.0	15.7
NW	0.0	10.6	5.2	0.0	15.9
Summary	0.0	38.4	61.3	0.0	100.0

% Icon Classes (ppm)

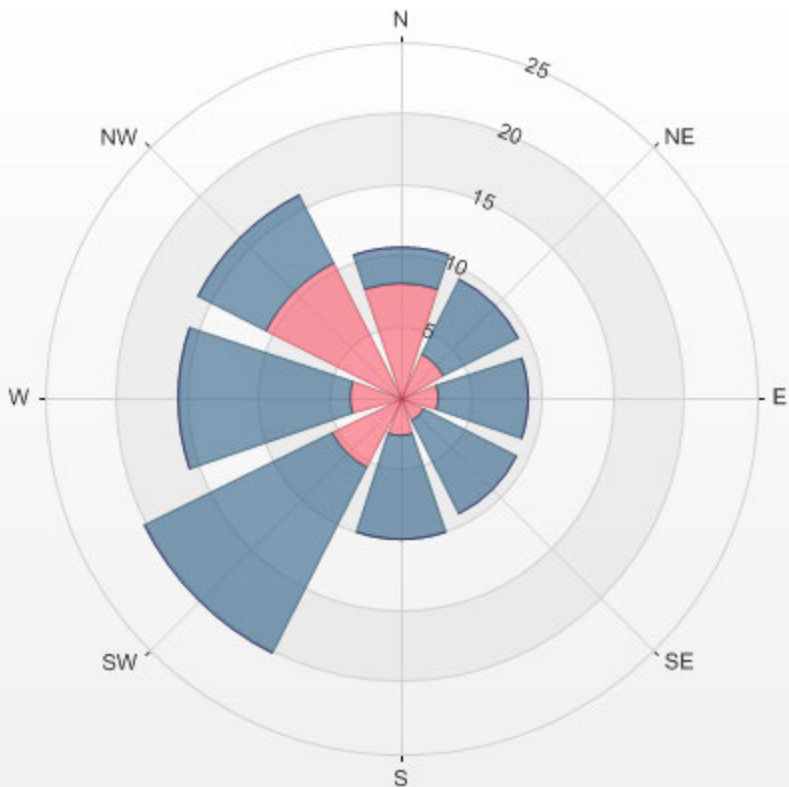
0 0.0-1.1

38 1.1-2.2

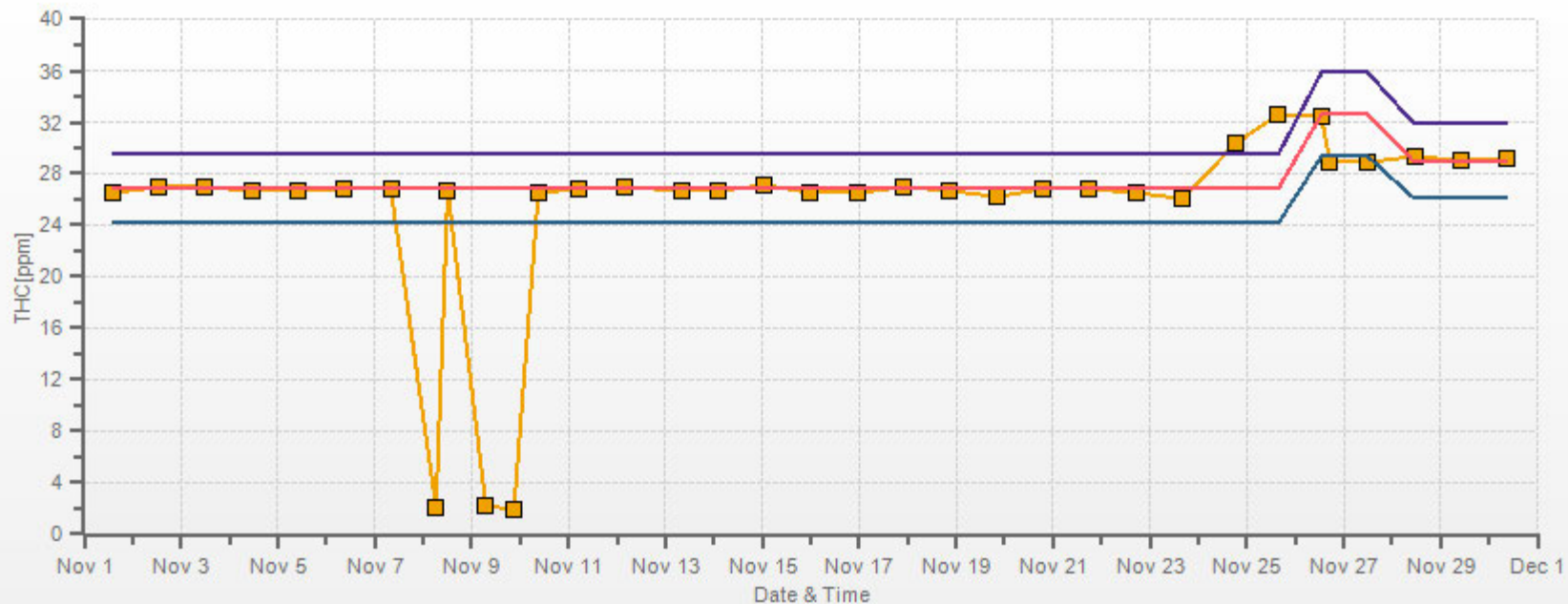
61 2.2-3.2

0 >3.2

LICA ST. LINA Poll.: LICA ST. LINA-THC[ppm] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 0.34% Calm Poll Avg: 2.37[ppm]



THC[ppm] Calibration: LICA ST. LINA Monthly: 17/11 Type: Span



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

OXIDES OF NITROGEN



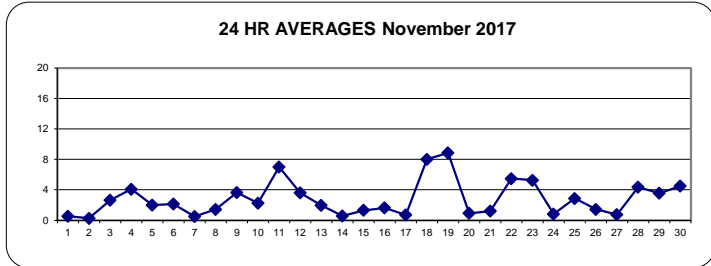
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.				
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.					
DAY																																
1	3	4	3	1	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	1	0	0	0	4	1	24			
2	1	1	1	1	1	1	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24			
3	1	1	2	2	3	5	4	4	4	3	4	3	S	4	2	1	2	1	2	1	1	1	2	8	1	8	3	24				
4	11	10	6	4	3	4	2	1	1	2	1	S	1	2	1	1	2	5	4	5	6	7	7	8	1	11	4	24				
5	8	7	6	4	4	4	3	3	3	2	S	2	0	0	0	0	0	0	0	0	0	0	0	0	0	8	2	24				
6	0	0	0	0	0	0	0	0	1	S	2	5	6	2	1	1	2	3	4	3	3	4	6	6	0	6	2	24				
7	4	2	1	0	0	0	0	0	C	C	C	C	C	C	C	C	0	0	0	0	0	X	X	0	0	4	1	22				
8	0	0	0	0	0	0	0	0	S	1	1	1	1	1	0	0	1	2	4	4	4	4	4	5	0	5	1	24				
9	4	4	4	3	4	4	5	S	7	8	8	5	4	4	3	4	3	3	2	1	1	1	1	1	1	8	4	24				
10	1	1	1	1	1	1	S	2	2	3	3	3	3	3	4	3	4	3	3	2	2	2	2	2	1	4	2	24				
11	2	2	2	2	2	S	2	2	3	4	5	7	9	10	13	14	12	11	12	11	13	11	7	5	2	14	7	24				
12	4	7	10	6	S	8	6	5	3	2	P	P	R	2	2	2	2	2	2	2	2	1	2	2	1	10	4	21				
13	1	2	2	S	2	2	2	2	2	2	1	3	3	3	3	4	4	2	1	1	1	1	0	1	0	4	2	24				
14	1	2	S	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	1	0	0	1	0	2	1	24				
15	1	S	1	1	2	2	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	2	1	2	1	24				
16	S	2	1	1	2	3	2	3	4	2	1	1	1	1	1	1	2	2	2	1	1	1	1	S	1	4	2	24				
17	1	0	0	1	0	0	0	0	1	0	1	1	1	0	0	1	1	0	1	0	1	3	S	3	0	3	1	24				
18	2	2	4	8	8	8	8	8	7	9	9	11	13	11	10	9	8	7	8	9	9	S	8	8	2	13	8	24				
19	17	13	15	11	13	17	17	12	8	7	6	5	5	6	6	6	6	6	6	5	S	6	6	5	5	17	9	24				
20	5	4	3	2	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	S	1	1	0	0	0	5	1	24				
21	1	1	0	0	0	0	0	1	1	2	2	2	1	1	1	2	1	1	S	3	2	2	2	2	2	3	1	24				
22	1	1	1	1	1	1	1	1	2	2	4	7	8	8	6	10	14	S	11	9	9	11	10	7	1	14	5	24				
23	7	6	5	5	5	5	6	6	6	5	6	8	7	8	5	5	S	10	7	5	2	1	1	1	1	10	5	24				
24	1	1	0	0	0	0	0	1	1	1	1	1	0	0	0	S	1	1	2	2	1	1	2	3	0	3	1	24				
25	4	6	5	4	4	4	4	4	6	7	5	4	2	1	S	2	1	1	0	0	0	0	1	1	0	7	3	24				
26	2	3	2	3	3	2	2	2	1	1	1	1	0	S	1	1	1	1	1	1	1	1	1	1	0	3	1	24				
27	1	1	2	1	1	1	1	1	1	1	1	1	S	1	1	1	1	0	0	0	0	0	0	0	0	2	1	24				
28	0	0	0	1	2	5	5	5	4	5	5	S	4	4	4	7	8	6	5	5	6	5	9	0	9	4	24					
29	12	13	10	8	7	4	2	1	1	1	S	1	1	0	0	1	1	0	1	1	1	3	6	8	0	13	4	24				
30	5	5	6	7	7	6	6	6	7	S	Y	S1	S1	1	1	1	1	1	1	2	4	6	6	6	6	1	7	5	21			
HOURLY MAX	17	13	15	11	13	17	17	12	8	9	9	11	13	11	13	14	14	11	12	11	13	11	10	9								
HOURLY AVG	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2	3	3	3	3	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

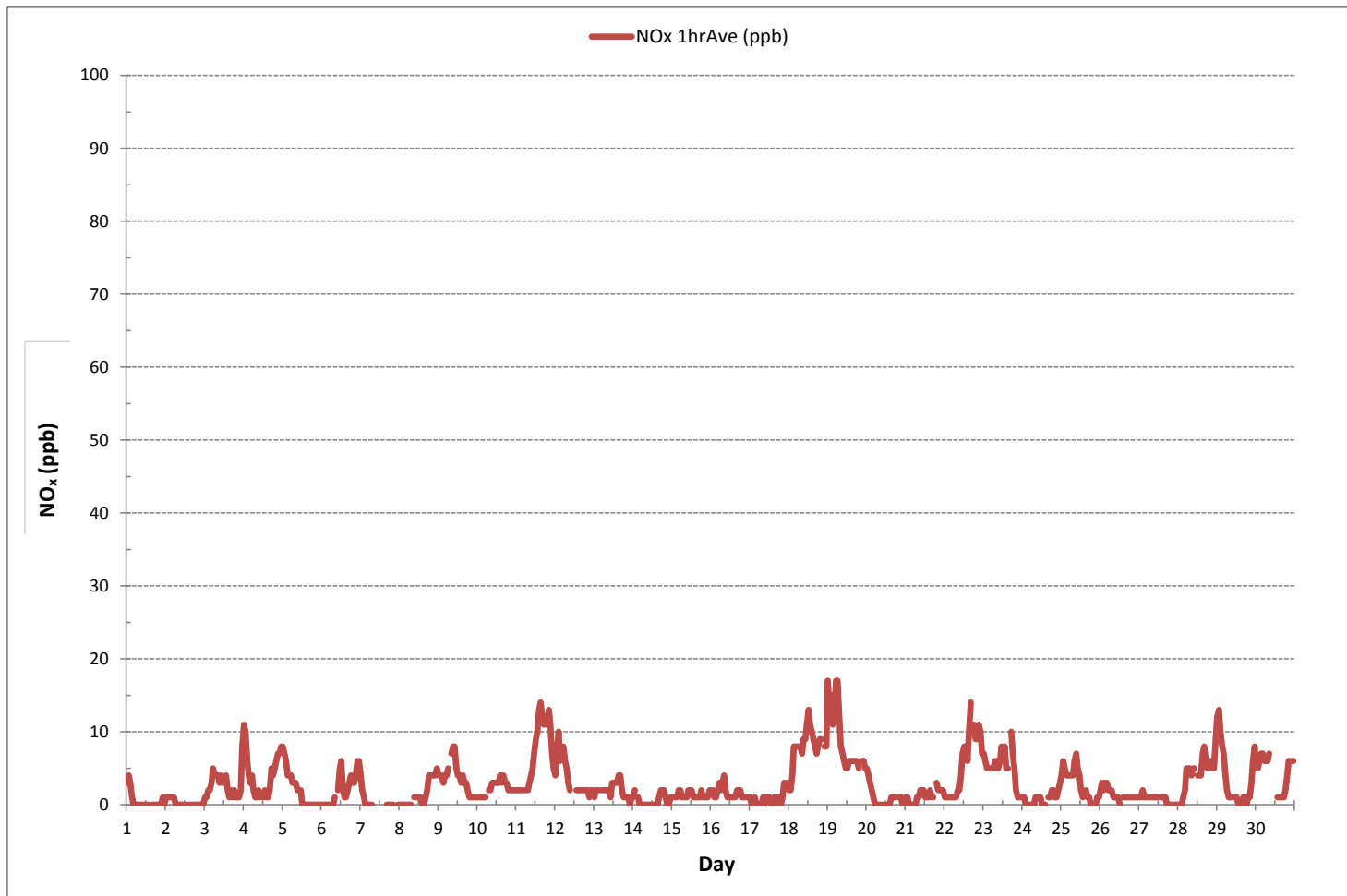
24 HR AVERAGES November 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	527			
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	4	ON DAY 1
MAXIMUM 1-HR AVERAGE:	17	ppb @ HOUR	0	ON DAY 19
MAXIMUM 24-HR AVERAGE:	9	ppb		ON DAY 19
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	712 hrs
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:	98.9 %
STANDARD DEVIATION:	3		MONTHLY AVERAGE:	3 ppb

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2017

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	6	7	4	4	2	1	2	1	1	1	1	1	1	0	S	1	1	1	1	1	1	1	2	1	0	7	2	24	
2	2	3	2	2	2	2	1	1	2	1	1	1	1	S	1	2	1	2	2	1	1	1	1	2	1	3	2	24	
3	2	2	3	3	5	7	5	5	5	4	6	5	S	5	4	2	3	3	4	3	2	2	6	11	2	11	4	24	
4	13	13	8	6	5	5	5	3	4	4	5	S	37	35	5	28	30	7	6	19	8	9	9	11	3	37	12	24	
5	11	10	9	6	7	7	6	5	7	5	S	4	3	1	2	2	1	2	2	2	1	2	2	1	1	11	4	24	
6	1	1	1	1	1	1	1	2	5	S	6	7	9	5	3	3	14	22	6	24	5	7	9	10	1	24	6	24	
7	5	5	2	2	1	1	2	2	C	C	C	C	C	C	C	C	2	3	1	X	X	X	X	0	0	5	2	20	
8	X	0	1	0	0	0	X	1	S	3	29	16	4	2	1	6	2	4	5	4	5	5	8	8	0	29	5	22	
9	6	5	6	5	5	5	7	S	10	10	12	6	5	5	4	5	4	4	3	2	2	2	2	2	2	12	5	24	
10	2	1	1	1	1	2	S	3	3	4	4	4	5	5	7	4	6	4	4	3	3	4	3	2	1	7	3	24	
11	2	2	2	2	3	S	3	3	4	19	26	27	33	13	14	16	13	38	14	12	16	15	11	6	2	38	13	24	
12	6	10	12	8	S	10	8	6	5	P	P	P	R	4	3	3	3	4	3	3	3	3	3	3	3	12	5	20	
13	3	3	3	S	3	3	3	4	3	3	3	6	4	5	6	6	6	4	2	2	2	2	1	2	1	6	3	24	
14	2	3	S	2	1	1	1	1	1	1	1	1	1	1	1	1	2	3	2	2	2	1	1	1	1	3	1	24	
15	1	S	1	2	3	2	2	2	2	2	2	2	3	2	1	1	2	2	2	2	2	2	2	2	1	3	2	24	
16	S	2	2	2	3	3	3	4	39	3	2	2	1	2	3	4	3	5	26	2	2	3	2	S	1	39	5	24	
17	2	1	1	2	1	1	1	2	3	2	2	1	2	2	2	2	2	3	2	1	34	7	S	4	1	34	3	24	
18	3	4	7	11	10	9	9	28	9	12	13	18	26	13	36	11	10	10	21	23	12	S	11	11	3	36	14	24	
19	23	21	17	13	15	21	20	16	11	8	8	7	7	8	8	8	8	7	8	7	8	S	8	8	6	6	23	11	24
20	6	6	4	4	3	1	1	1	1	1	1	1	1	1	1	1	2	15	2	S	3	1	1	1	1	15	3	24	
21	1	1	1	1	1	1	1	3	6	43	24	8	2	3	4	3	2	1	S	4	3	3	3	3	1	43	5	24	
22	2	2	2	2	2	2	2	3	33	23	33	89	76	40	10	54	62	S	13	11	12	13	13	10	2	89	22	24	
23	8	8	7	7	6	7	7	10	32	18	21	59	13	22	16	6	S	15	10	7	5	3	2	2	2	59	13	24	
24	2	2	1	1	1	1	1	32	2	2	2	1	1	2	S	2	P	P	3	2	2	3	4	1	32	3	22		
25	5	7	7	5	5	4	4	6	8	8	7	5	3	2	S	3	2	1	1	1	1	1	2	2	1	8	4	24	
26	3	4	3	4	4	3	2	3	2	1	1	1	1	1	S	2	2	1	2	1	2	1	1	1	1	4	2	24	
27	2	2	2	2	2	2	2	2	2	2	1	1	S	2	2	1	1	1	1	1	1	1	1	1	1	2	2	24	
28	1	1	1	1	3	6	6	6	5	8	6	S	5	4	6	7	9	8	6	6	6	6	6	15	1	15	6	24	
29	15	15	12	9	9	6	4	2	1	16	S	2	2	1	1	1	17	2	1	1	2	7	8	16	1	17	7	24	
30	6	6	7	8	8	7	7	8	9	S	Y	S1	S1	2	3	2	3	2	4	7	7	7	7	8	2	9	6	24	
HOURLY MAX	23	21	17	13	15	21	20	28	39	43	33	89	76	40	36	54	62	38	26	24	34	15	13	16					
HOURLY AVG	5	5	4	4	4	4	4	5	9	8	9	11	10	7	5	7	7	6	5	6	5	4	5	5					

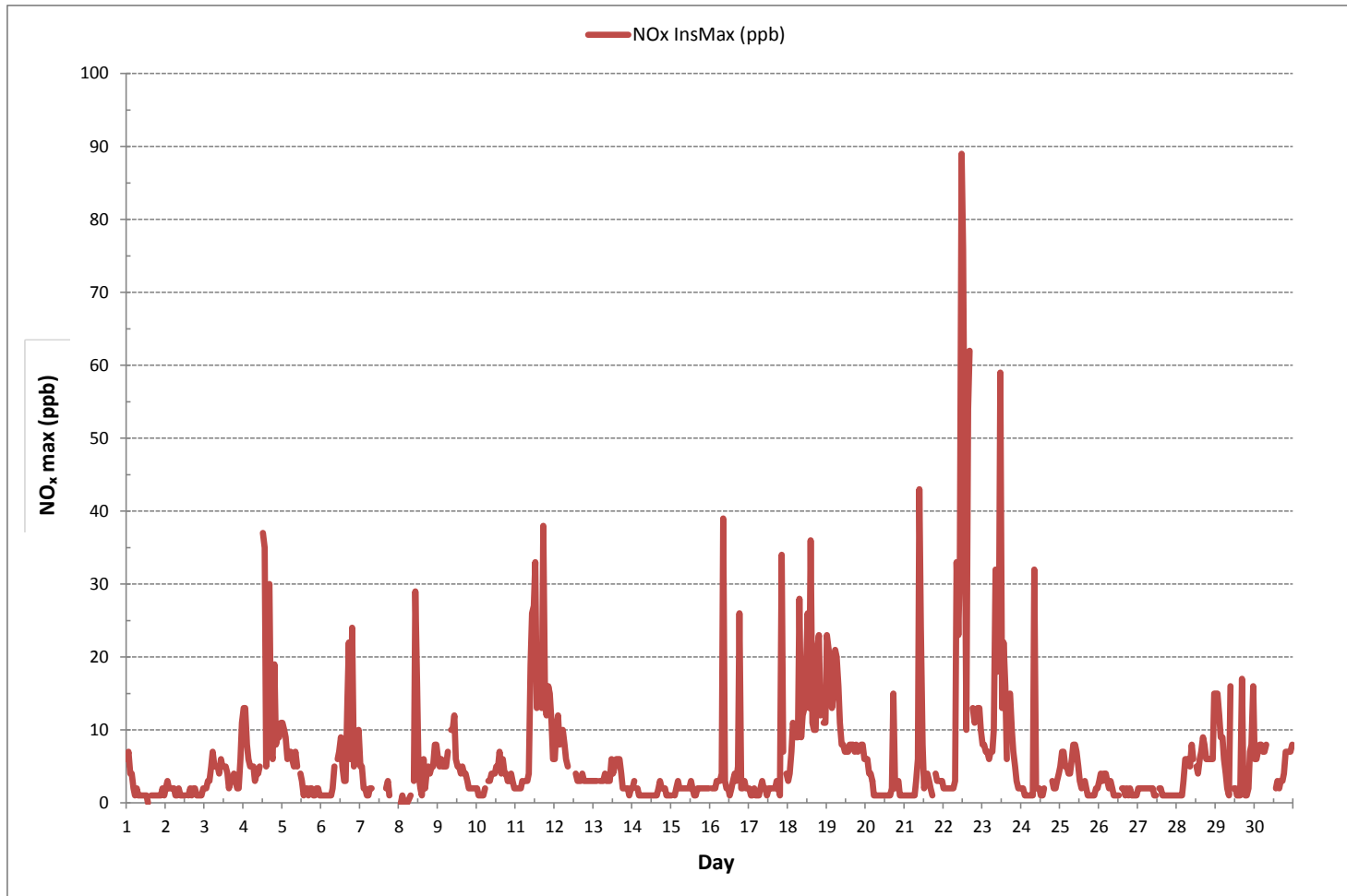
STATUS FLAG CODES

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:	89 ppb @ HOUR 11 ON DAY 22
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	9
OPERATIONAL TIME:	705 hrs

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)



Wind: LICA ST. LINA
 Poll.: LICA ST. LINA-NOX[ppb]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 0.30%

Calm Avg: 7.54 [ppb]

Direction	0.0-15.3	15.3-30.7	30.7-46.0	>46.0	Total
N	10.5	0.0	0.0	0.0	10.5
NE	9.0	0.0	0.0	0.0	9.0
E	9.9	0.5	0.0	0.0	10.4
SE	8.4	0.0	0.0	0.0	8.4
S	10.2	0.0	0.0	0.0	10.2
SW	18.3	0.0	0.0	0.0	18.3
W	17.1	0.0	0.0	0.0	17.1
NW	15.9	0.0	0.0	0.0	15.9
Summary	99.3	0.5	0.0	0.0	100.0

% Icon Classes (ppb)

99

0.0-15.3

0

15.3-30.7

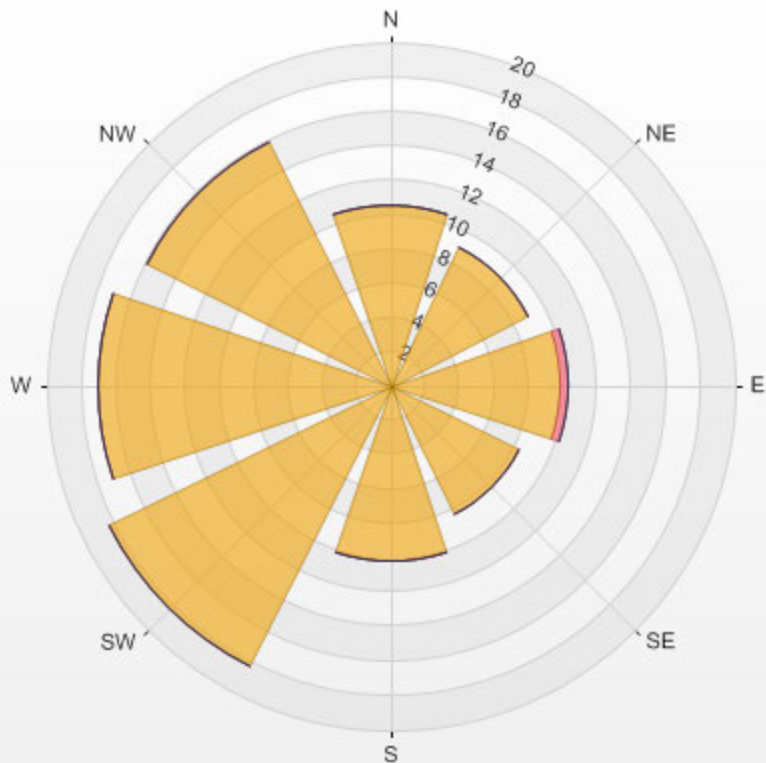
0

30.7-46.0

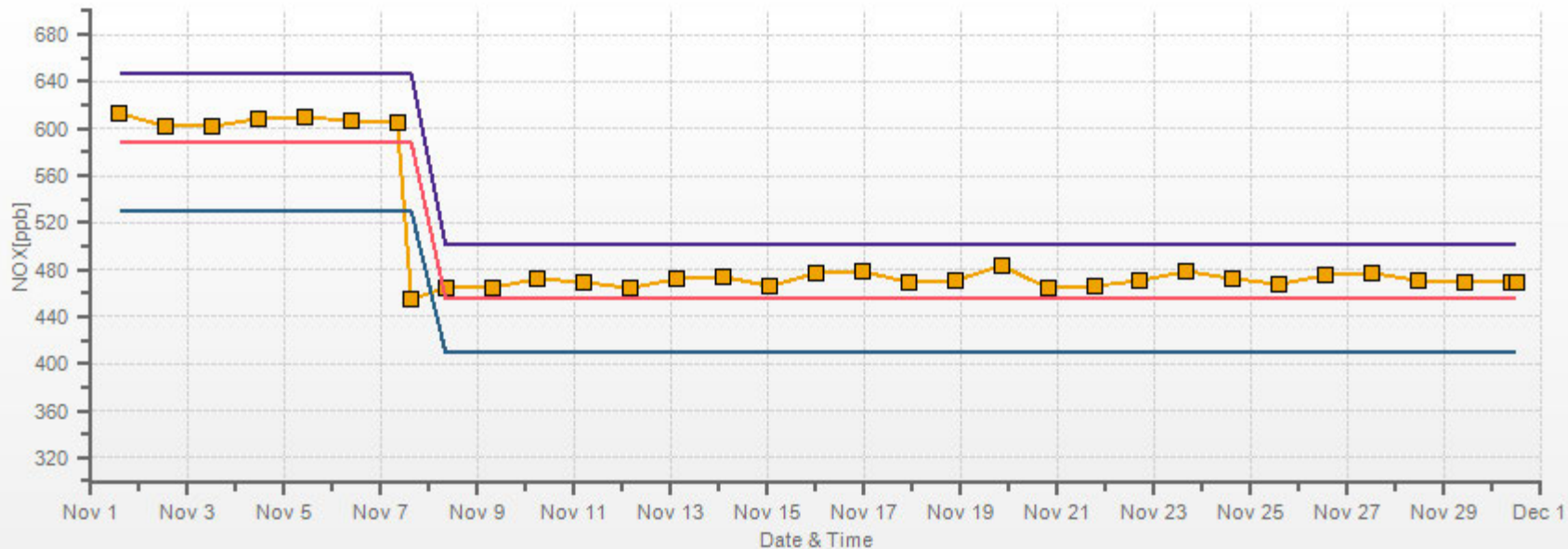
0

>46.0

LICA ST. LINA Poll.: LICA ST. LINA-NOX[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 0.30% Calm Poll Avg: 7.54[ppb]



NOX[ppb] Calibration: LICA ST. LINA Monthly: 17/11 Type: Span



Span Meas Span Ref Span Low Span High

NITRIC OXIDES

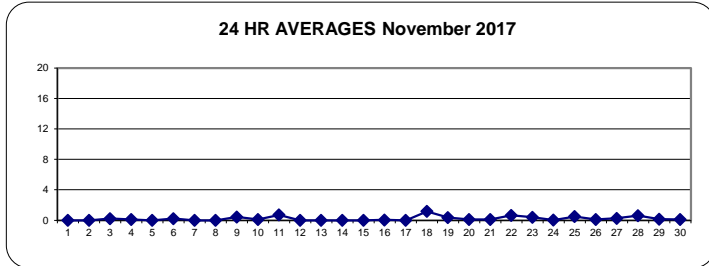
NITRIC OXIDE Hourly Averages (NO ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY 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	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	24	
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	24	
3	0	0	0	0	0	0	0	0	0	0	1	1	1	S	2	0	0	0	0	0	0	0	0	0	0	0	2	24	
4	0	0	0	0	0	0	0	0	0	0	0	0	S	1	1	0	0	0	0	0	0	0	0	0	0	0	1	24	
5	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	
6	0	0	0	0	0	0	0	0	0	0	0	S	1	2	2	0	0	0	0	0	0	0	0	0	0	0	2	24	
7	0	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	0	0	0	0	0	X	X	0	0	0	22	
8	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	0	S	1	2	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	3	24	
10	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	24	
11	0	0	0	0	0	S	0	0	0	0	0	1	2	3	3	3	2	1	1	0	0	0	0	0	0	3	1	24	
12	0	0	0	0	0	S	0	0	0	0	0	P	P	R	0	0	0	0	0	0	0	0	0	0	0	0	0	21	
13	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	
14	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	
15	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	
16	S	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	1	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	S	0	0	24	
18	0	0	0	0	0	0	0	0	0	1	3	4	5	6	4	3	1	0	0	0	0	0	0	S	0	0	6	1	24
19	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	1	1	0	0	0	0	0	S	0	0	0	2	24	
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	S	1	0	0	0	0	1	0	24	
21	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	S	0	0	0	0	0	1	0	24
22	0	0	0	0	0	0	0	0	0	0	1	3	3	3	1	2	2	S	0	0	0	0	0	0	0	0	3	1	24
23	0	0	0	0	0	0	0	0	1	1	2	2	1	1	1	0	S	0	0	0	0	0	0	0	0	0	2	0	24
24	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	1	0	24
25	0	0	0	0	1	0	1	0	1	2	2	2	1	0	S	1	0	0	0	0	0	0	0	0	0	0	2	0	24
26	0	0	0	0	0	0	0	0	0	0	0	0	0	S	1	1	0	0	0	0	0	0	0	0	0	0	1	0	24
27	0	1	0	0	0	0	0	0	0	0	1	0	0	S	1	1	0	0	0	0	0	0	0	0	1	0	1	0	24
28	0	0	0	0	0	0	0	0	1	1	2	S	2	1	1	1	1	1	0	0	1	0	1	1	1	0	2	1	24
29	0	0	0	0	0	0	0	0	0	1	S	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
30	0	0	0	0	0	0	1	1	S	Y	S1	S1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	21
HOURLY MAX	0	1	0	0	1	0	1	1	1	3	4	5	6	4	3	2	2	1	0	0	1	0	1	1	1				
HOURLY AVG	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	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

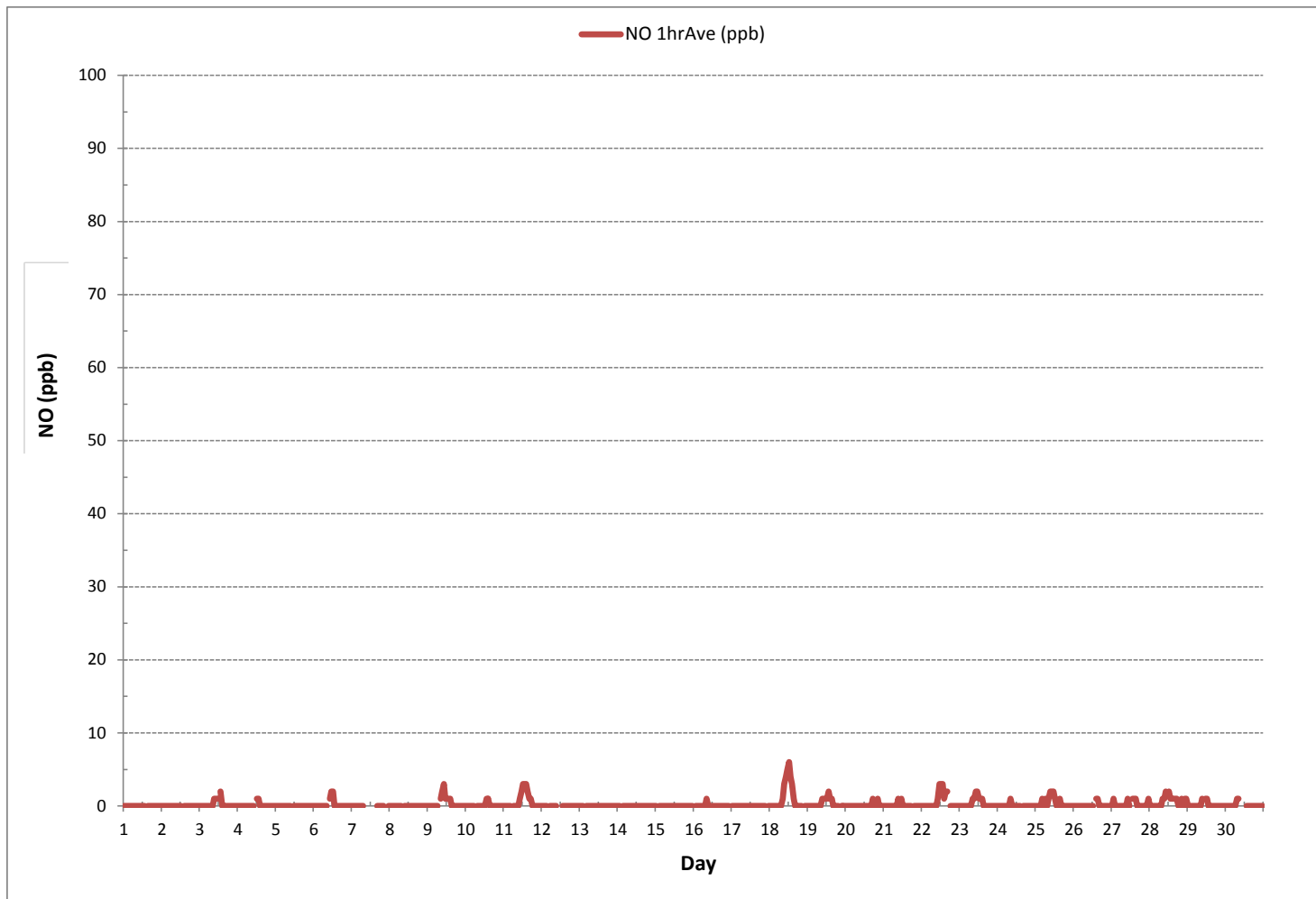
24 HR AVERAGES November 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	94				
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	0	ON DAY 1	
MAXIMUM 1-HR AVERAGE:	6	ppb @ HOUR	18	ON DAY 18	
MAXIMUM 24-HR AVERAGE:	1	ppb		ON DAY 18	
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	712	hrs
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:	98.9	%
STANDARD DEVIATION:	1		MONTHLY AVERAGE:	0	ppb

NITRIC OXIDE Hourly Averages (NO 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	3	3	3	3	3	3	3	3	3	3	3	3	2	2	S	2	2	2	2	2	2	2	2	2	2	2	3	3	24
2	3	2	2	2	2	2	2	2	2	2	2	2	3	S	3	3	2	3	3	2	2	2	3	2	2	2	3	2	24
3	2	2	2	2	2	2	2	2	3	3	4	4	S	4	4	3	2	2	3	2	2	2	2	2	2	2	4	3	24
4	2	2	2	2	2	2	2	2	3	4	4	S	32	25	8	17	19	3	2	8	2	2	2	2	2	2	32	6	24
5	2	2	2	2	2	2	2	3	4	3	S	4	2	2	3	3	2	3	3	2	2	3	3	2	2	2	4	3	24
6	2	2	2	2	2	2	2	3	4	S	5	5	6	5	4	3	5	20	3	12	3	2	2	2	2	2	20	4	24
7	2	2	2	2	2	2	3	3	C	C	C	C	C	C	C	C	2	2	1	X	X	X	X	0	0	3	2	20	
8	X	0	0	0	0	0	X	1	S	1	16	20	3	1	1	6	1	2	2	1	1	1	2	2	0	20	3	22	
9	1	1	1	1	1	1	1	S	3	4	5	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	5	2	24
10	1	1	1	0	1	1	S	1	1	1	1	1	2	3	4	1	2	1	1	0	1	1	1	1	0	4	1	24	
11	0	1	1	1	1	S	1	1	1	1	9	14	14	22	5	5	4	2	22	1	1	1	1	1	0	22	5	24	
12	1	1	1	1	S	1	1	1	1	P	P	P	R	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
13	1	1	1	S	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	2	1	24
14	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
15	1	S	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	24
16	S	1	1	1	1	1	1	1	28	1	1	1	1	1	2	2	2	2	22	1	1	1	1	S	1	28	3	24	
17	1	1	1	1	1	1	1	1	2	2	1	2	2	1	1	2	1	2	1	1	1	20	4	S	1	20	2	24	
18	1	1	1	1	1	1	1	16	2	5	7	9	18	6	24	3	2	1	16	3	2	S	2	1	1	24	5	24	
19	2	1	1	1	1	2	2	1	2	2	2	3	3	3	3	2	1	1	1	1	S	1	1	1	1	3	2	24	
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	9	2	S	2	1	1	1	1	1	9	1	24	
21	1	1	1	1	1	1	1	1	4	22	11	4	2	2	2	1	1	1	S	1	1	1	1	1	1	22	3	24	
22	1	1	1	1	1	1	1	1	14	16	18	63	55	22	3	44	38	S	1	1	1	1	1	1	1	63	12	24	
23	1	1	1	1	1	1	1	3	20	14	10	38	4	9	3	2	S	2	1	1	1	1	1	1	1	38	5	24	
24	1	1	1	1	0	1	0	1	30	1	1	1	1	1	1	S	1	P	P	1	1	1	1	1	0	30	2	22	
25	1	1	1	1	1	1	1	1	2	2	3	2	2	1	S	1	1	1	1	1	1	1	1	1	1	3	1	24	
26	1	1	1	1	1	1	1	1	1	1	1	1	1	S	X	X	X	X	X	X	X	X	X	X	1	1	1	14	
27	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	-	-	-	-
28	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	-	-	-	-
29	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	-	-	-	-
30	X	X	X	X	X	X	X	X	X	X	Y	S1	S1	1	2	1	1	1	2	1	1	1	1	1	1	1	2	1	11
HOURLY MAX	3	3	3	3	3	3	3	16	30	22	18	63	55	25	24	44	38	22	22	12	20	4	3	2					
HOURLY AVG	1	1	1	1	1	1	1	2	6	4	5	8	7	4	3	4	4	4	3	2	2	1	1	1					

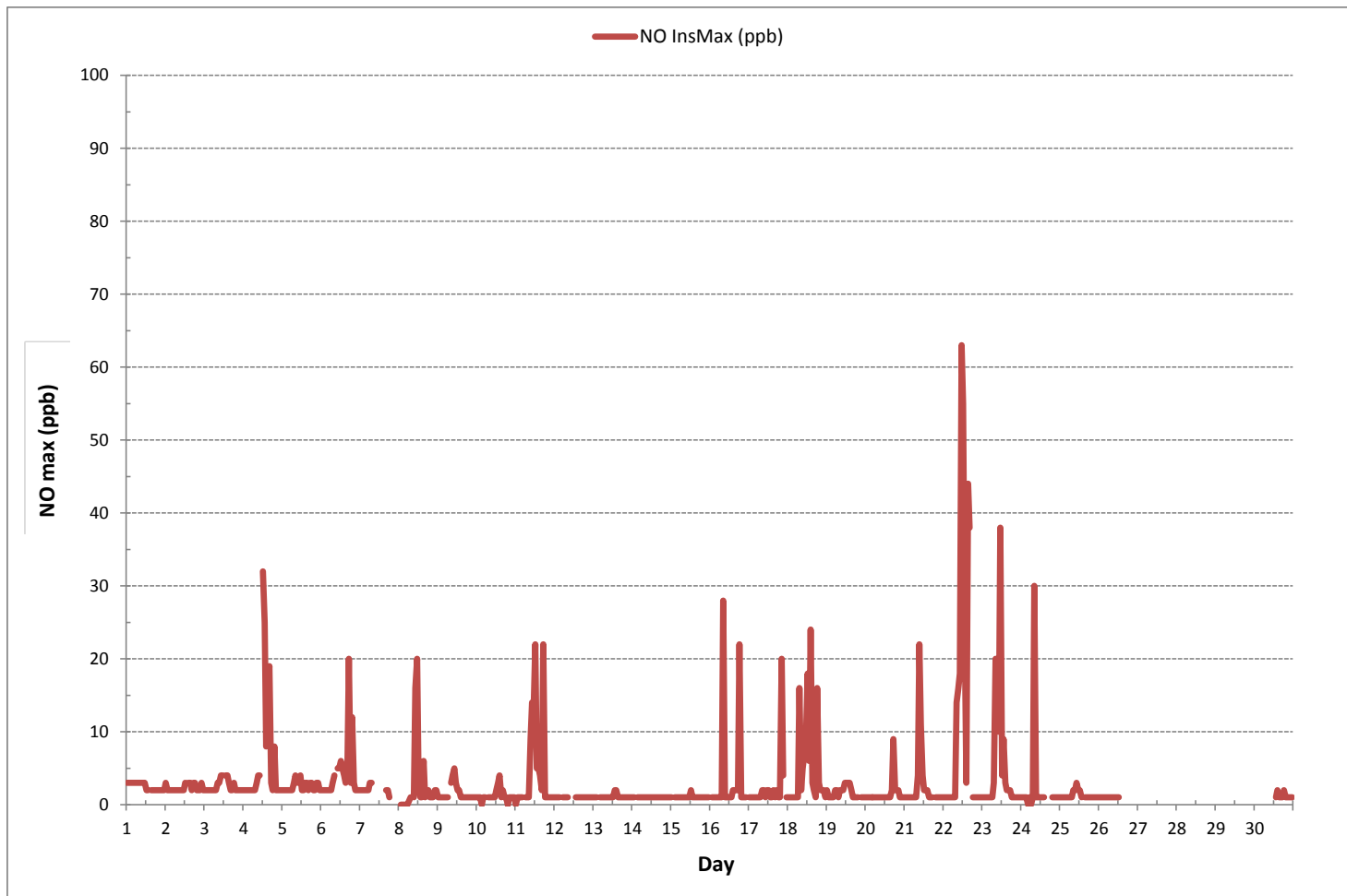
STATUS FLAG CODES

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:	668
MAXIMUM INSTANTANEOUS VALUE:	63 ppb @ HOUR 11 ON DAY 22
IZS CALIBRATION TIME:	26 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	613 hrs
STANDARD DEVIATION:	6

NITRIC OXIDE Instantaneous Maximum (NO ppb)



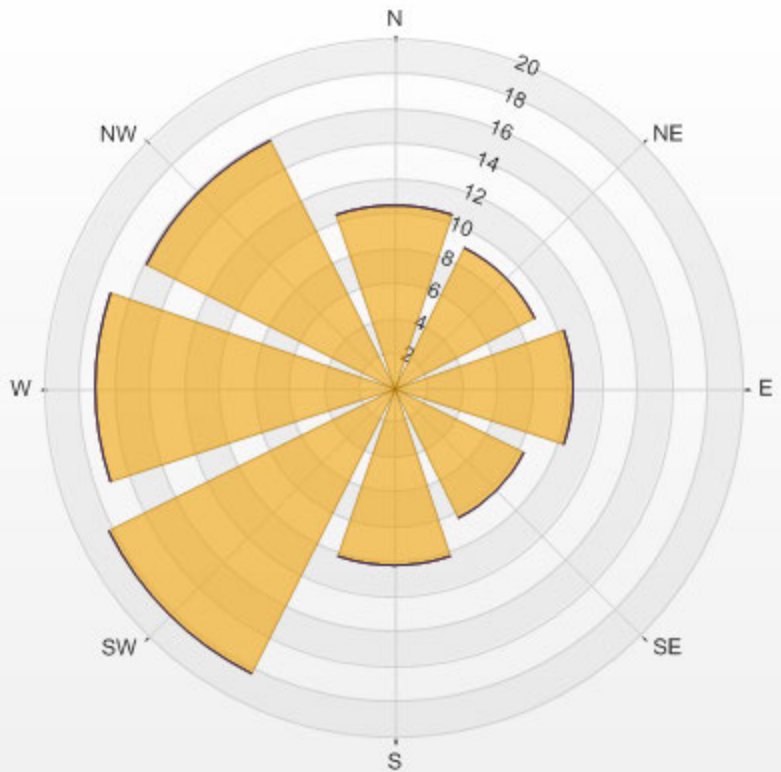
Wind: LICA ST. LINA
 Poll.: LICA ST. LINA-NO[ppb]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 0.30% Calm Avg: 0.00 [ppb]

Direction	0.0-15.3	15.3-30.7	30.7-46.0	>46.0	Total
N	10.5	0.0	0.0	0.0	10.5
NE	9.0	0.0	0.0	0.0	9.0
E	10.3	0.0	0.0	0.0	10.3
SE	8.4	0.0	0.0	0.0	8.4
S	10.2	0.0	0.0	0.0	10.2
SW	18.3	0.0	0.0	0.0	18.3
W	17.1	0.0	0.0	0.0	17.1
NW	15.9	0.0	0.0	0.0	15.9
Summary	100.0	0.0	0.0	0.0	100.0

% Icon Classes (ppb) 100 0.0-15.3 0 15.3-30.7 0 30.7-46.0 0 >46.0

LICA ST. LINA Poll.: LICA ST. LINA-NO[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 0.30% Calm Poll Avg: 0.00[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	3	4	3	1	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	1	0	0	4	1	24
2	1	1	1	1	1	1	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	1	0	24
3	1	1	2	2	3	5	4	4	4	3	3	2	S	2	1	1	2	1	2	1	1	1	2	8	1	8	2	24
4	11	10	6	4	3	4	2	1	1	1	1	S	1	1	0	1	2	5	4	5	6	7	7	8	0	11	4	24
5	8	7	6	4	4	4	3	3	3	2	S	1	0	0	0	0	0	0	0	0	0	0	0	0	0	8	2	24
6	0	0	0	0	0	0	0	0	1	S	2	3	4	2	1	1	2	3	4	3	3	4	6	6	0	6	2	24
7	4	2	1	0	0	0	0	0	C	C	C	C	C	C	C	C	0	0	0	0	0	X	X	0	0	4	1	22
8	0	0	0	0	0	0	0	0	S	1	1	1	1	1	0	0	1	2	4	4	4	4	4	5	0	5	1	24
9	4	4	4	3	4	4	5	S	6	6	5	3	3	3	3	3	3	3	2	1	1	1	1	1	1	6	3	24
10	1	1	1	1	1	1	S	2	2	2	2	3	3	3	3	3	3	3	3	2	2	2	2	2	1	3	2	24
11	2	2	2	2	2	S	2	2	3	3	4	5	6	7	9	12	11	10	12	11	13	11	7	5	2	13	6	24
12	4	7	10	6	S	8	6	5	3	2	P	P	R	2	2	2	2	2	2	2	2	1	2	2	1	10	4	21
13	1	2	2	S	2	2	2	2	2	2	1	3	3	3	3	4	4	2	1	1	1	1	0	1	0	4	2	24
14	1	2	S	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	2	1	0	0	1	0	2	1	24
15	1	S	1	1	2	2	1	1	1	1	2	1	1	1	1	1	1	1	2	1	1	1	1	2	1	2	1	24
16	S	2	1	1	2	3	2	3	3	2	1	1	1	1	1	1	1	2	2	1	1	1	1	S	1	3	2	24
17	1	0	0	1	0	0	0	0	1	0	1	1	1	0	0	1	1	0	1	0	1	3	S	3	0	3	1	24
18	2	2	4	8	8	8	8	8	7	6	5	6	7	7	7	8	8	7	8	9	9	S	8	8	2	9	7	24
19	17	13	15	11	13	16	17	12	7	6	5	4	4	4	5	6	6	6	6	5	S	6	6	5	4	17	8	24
20	5	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	1	0	S	1	0	0	0	0	0	5	1	24
21	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	S	3	2	2	2	2	0	3	1	24
22	1	1	1	1	1	1	1	1	2	2	3	4	5	5	5	8	13	S	10	9	9	11	10	7	1	13	5	24
23	6	6	5	5	5	5	5	6	5	4	5	6	6	7	5	4	S	9	7	5	2	1	1	1	1	9	5	24
24	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	S	1	1	2	1	1	1	2	3	0	3	1	24
25	4	5	5	4	4	3	3	4	5	5	3	2	1	1	S	1	1	0	0	0	0	0	1	1	0	5	2	24
26	1	3	2	3	3	2	2	2	1	1	1	1	0	S	1	0	1	1	1	1	1	1	0	0	0	3	1	24
27	0	1	1	1	1	1	0	1	1	1	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	1	0	24
28	0	0	0	0	1	4	5	5	4	4	3	S	2	2	3	6	7	6	4	5	5	4	4	8	0	8	4	24
29	12	13	10	7	6	4	2	1	1	1	S	0	0	0	0	0	0	0	0	0	1	3	6	7	0	13	3	24
30	5	5	6	7	6	5	6	6	7	S	Y	S1	S1	1	1	1	1	1	2	4	6	6	6	6	1	7	4	21
HOURLY MAX	17	13	15	11	13	16	17	12	7	6	5	6	7	7	9	12	13	10	12	11	13	11	10	8				
HOURLY AVG	3	3	3	3	3	3	3	2	3	2	2	2	2	2	2	2	3	2	3	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

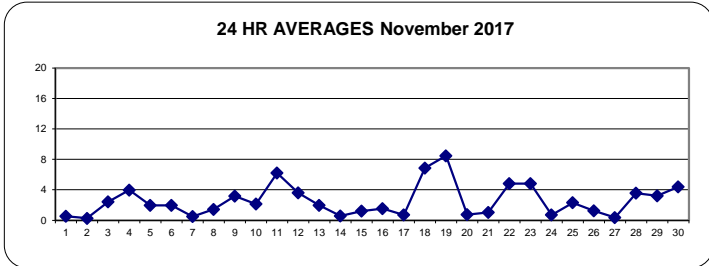
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	502			
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	4	ON DAY
MAXIMUM 1-HR AVERAGE:	17	ppb @ HOUR	0	ON DAY
MAXIMUM 24-HR AVERAGE:	8	ppb		ON DAY
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	712
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:	98.9
STANDARD DEVIATION:	3		MONTHLY AVERAGE:	3
				ppb

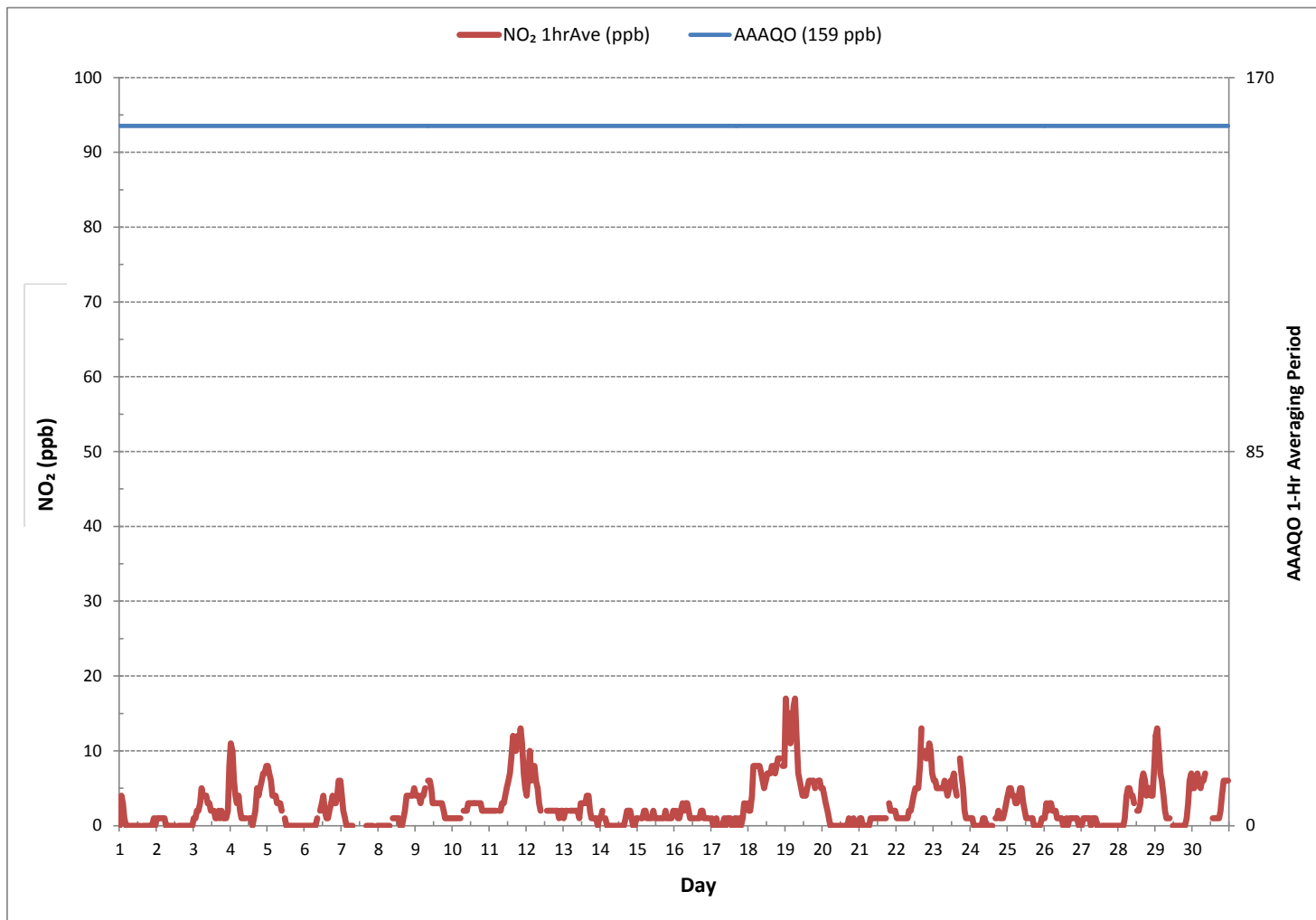
24 HR AVERAGES November 2017





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2017

NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2017

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	6	6	4	4	1	1	1	1	1	1	1	1	1	0	S	1	1	1	1	1	1	1	2	1	0	6	2	24
2	2	3	3	2	2	2	1	1	2	1	1	1	0	S	1	1	1	2	2	1	1	1	1	2	0	3	1	24
3	2	2	3	3	5	7	5	5	5	3	4	3	S	3	2	2	2	3	3	3	2	2	6	11	2	11	4	24
4	13	12	8	6	5	5	4	3	3	3	2	S	8	15	3	13	13	7	6	14	8	9	9	10	2	15	8	24
5	10	9	9	7	7	7	5	5	5	4	S	3	2	1	1	1	1	2	1	1	1	1	1	1	1	10	4	24
6	1	1	1	1	1	1	1	2	4	S	4	4	5	3	2	3	11	7	6	14	4	7	9	10	1	14	4	24
7	5	5	2	1	1	1	1	1	C	C	C	C	C	C	C	C	1	1	0	X	X	X	X	0	0	5	2	20
8	X	0	0	0	0	0	X	0	S	1	13	1	2	0	0	4	1	3	4	4	4	4	5	6	0	13	2	22
9	5	5	6	4	4	5	6	S	7	7	7	4	3	3	3	4	4	4	3	2	1	1	1	2	1	7	4	24
10	1	1	1	1	1	2	S	2	2	2	3	2	3	3	3	4	3	4	3	3	2	3	2	2	1	4	2	24
11	2	2	2	2	2	S	2	2	3	11	12	12	14	8	10	12	12	16	13	12	15	14	11	5	2	16	8	24
12	5	10	12	8	S	9	8	6	4	P	P	P	R	3	3	3	3	3	3	3	3	2	2	2	2	12	5	20
13	2	3	3	S	3	3	3	4	2	2	2	3	3	4	5	6	5	4	2	2	1	2	1	2	1	6	3	24
14	2	3	S	1	1	1	1	1	1	1	1	0	0	0	1	0	2	2	2	2	1	1	0	1	0	3	1	24
15	1	S	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	2	1	24
16	S	2	2	1	2	3	3	3	17	2	1	1	1	1	2	2	2	2	7	2	2	2	1	S	1	17	3	24
17	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	15	4	S	3	1	15	2	24
18	3	3	6	10	9	9	8	16	8	8	6	9	13	8	15	9	9	9	9	21	11	S	10	11	3	21	10	24
19	22	20	16	13	15	19	19	15	10	7	6	5	5	5	6	7	7	7	7	7	S	7	7	6	5	22	10	24
20	6	5	4	3	2	1	1	1	1	0	0	0	0	1	0	1	1	5	1	S	1	1	0	0	0	6	2	24
21	1	1	0	0	0	0	1	2	2	21	16	4	1	1	2	2	1	1	S	3	3	3	2	0	21	3	24	
22	2	2	2	2	2	2	2	19	9	27	32	25	18	7	18	25	S	12	11	11	13	13	9	2	32	12	24	
23	8	8	7	7	6	6	7	8	26	6	13	22	9	14	14	6	S	13	9	6	4	2	2	2	2	26	9	24
24	2	2	1	1	1	1	1	6	1	1	1	0	0	1	S	1	P	P	2	2	1	3	4	0	6	2	22	
25	5	6	6	4	4	4	4	6	6	6	5	3	2	1	S	2	2	1	1	1	1	0	2	1	0	6	3	24
26	2	3	3	4	4	2	2	2	2	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	4	2	24
27	1	2	2	2	2	1	1	1	1	1	1	1	S	1	1	0	1	1	1	0	1	0	1	1	0	2	1	24
28	0	0	1	1	3	6	5	5	4	5	4	S	3	3	5	7	8	7	5	5	6	5	14	0	14	5	24	
29	14	14	12	9	9	5	3	2	1	3	S	1	1	0	0	0	13	1	1	1	1	7	7	15	0	15	5	24
30	6	6	7	8	8	6	7	7	8	S	Y	S1	S1	1	1	1	2	2	3	7	7	7	7	8	1	8	5	24
HOURLY MAX	22	20	16	13	15	19	19	16	26	21	27	32	25	18	15	18	25	16	13	21	15	14	13	15				
HOURLY AVG	5	5	4	4	4	4	4	4	5	4	5	5	4	4	3	4	5	4	4	5	4	4	4	5				

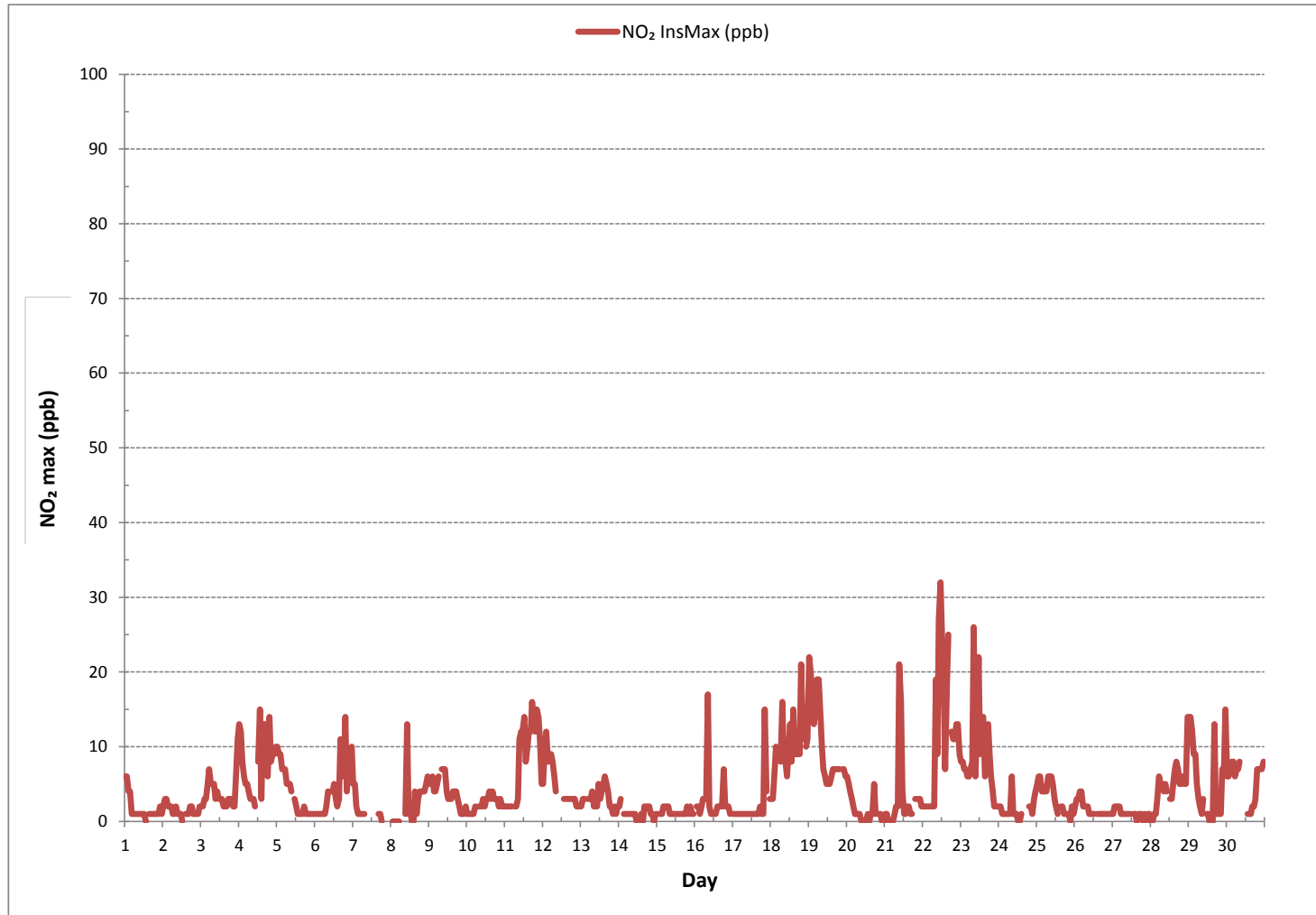
STATUS FLAG CODES

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

MONTHLY SUMMARY

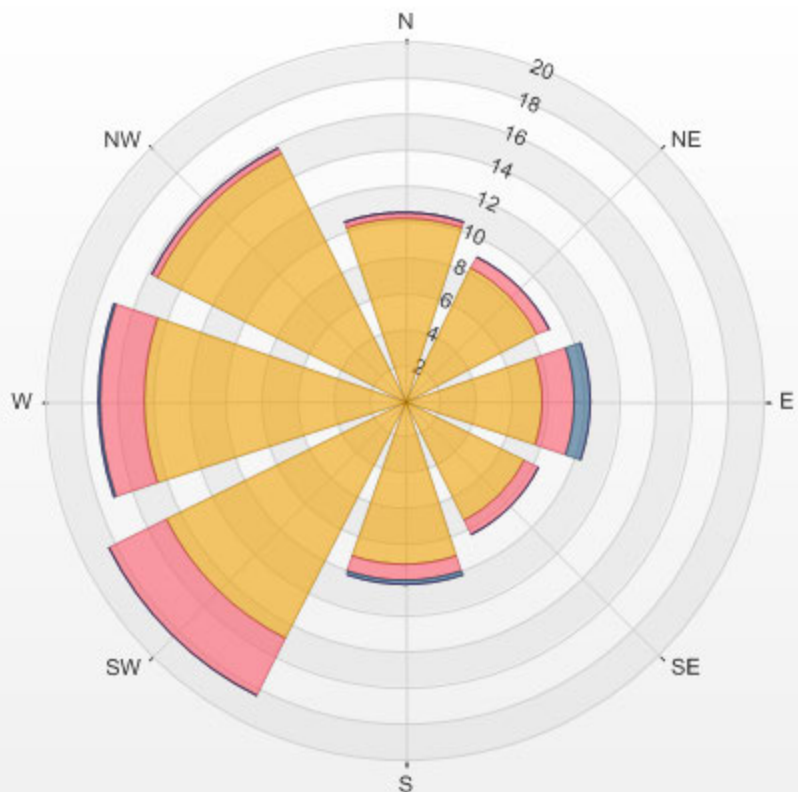
NUMBER OF NON-ZERO READINGS:	628
MAXIMUM INSTANTANEOUS VALUE:	32 ppb @ HOUR 11 ON DAY 22
	VAR-VARIOUS
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	5
OPERATIONAL TIME:	705 hrs

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)

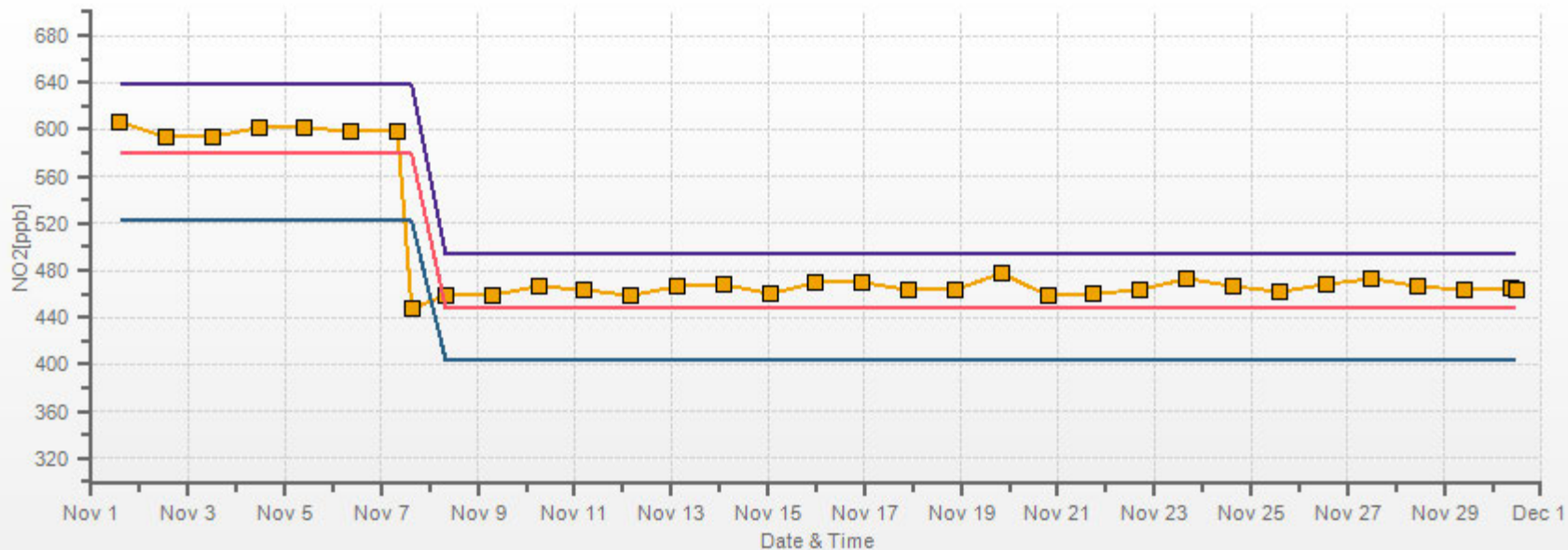


% Icon Classes (ppb) 88 0.0-6.0 11 6.0-12.0 1 12.0-18.0 0 >18.0

LICA ST. LINA Poll.: LICA ST. LINA-NO2[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 0.30% Calm Poll Avg: 7.54[ppb]



NO2[ppb] Calibration: LICA ST. LINA Monthly: 17/11 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	17.4	13.9	17.0	16.9	17.6	20.3	18.7	21.8	19.7	20.5	22.0	21.9	23.0	25.1	S	27.0	21.9	23.9	24.5	25.9	26.6	26.5	26.6	26.4	13.9	27.0	22.0	24
2	24.5	22.8	21.9	21.5	22.5	22.5	23.2	23.1	23.9	29.3	29.8	30.9	33.6	S	33.7	33.0	32.4	32.6	33.0	32.9	32.9	32.9	33.3	32.6	21.5	33.7	28.6	24
3	30.9	28.4	25.3	25.4	24.2	22.0	26.2	27.1	28.0	29.5	29.4	30.2	S	30.8	32.3	32.4	32.3	32.4	31.7	31.7	31.4	29.8	27.4	20.4	20.4	32.4	28.7	24
4	16.5	18.8	23.5	27.2	28.1	27.9	30.0	33.0	30.7	23.5	26.6	S	32.5	32.6	31.7	30.7	28.9	25.0	24.2	22.1	20.3	19.1	17.7	16.1	16.1	33.0	25.5	24
5	16.4	15.8	16.2	18.1	16.9	15.2	16.4	16.7	17.0	18.8	S	22.9	29.1	32.2	32.8	32.9	36.5	36.7	36.3	35.6	36.1	35.8	35.8	35.3	15.2	36.7	26.3	24
6	34.5	32.9	33.1	33.0	32.4	32.3	31.6	31.0	29.4	S	27.5	27.3	29.6	32.8	34.0	33.6	32.0	31.8	30.4	31.5	31.3	29.2	26.2	25.8	25.8	34.5	31.0	24
7	26.2	27.2	29.7	30.5	30.6	30.4	30.3	30.3	S	29.2	29.8	29.5	25.9	Q	33.0	Y	Y	Y	Y	32.6	32.8	X	X	34.3	25.9	34.3	30.1	18
8	33.5	33.4	33.4	33.8	33.5	32.7	32.0	31.4	S	32.0	31.6	32.1	C	C	C	C	C	30.9	27.0	25.8	25.6	24.4	23.6	22.6	22.6	33.8	30.0	24
9	23.3	23.9	24.4	25.5	24.8	24.9	24.6	S	23.3	24.2	26.6	29.8	31.0	32.1	32.9	31.4	31.9	32.6	34.3	35.2	35.5	34.9	34.2	33.4	23.3	35.5	29.3	24
10	33.0	32.8	32.2	31.7	31.3	30.5	S	29.6	27.7	26.4	25.1	23.9	22.7	22.6	22.6	22.4	21.7	21.5	21.5	21.6	21.7	21.5	22.9	24.1	21.5	33.0	25.7	24
11	22.5	24.2	26.1	26.5	25.9	S	27.2	27.5	26.1	25.1	24.7	24.1	23.9	23.5	22.0	20.0	19.1	19.3	18.1	18.4	15.5	18.4	25.4	24.7	15.5	27.5	23.0	24
12	23.5	18.5	16.7	20.2	S	17.4	18.7	20.7	24.6	24.2	P	P	R	25.0	26.3	28.7	30.1	31.1	32.7	33.8	33.6	34.5	34.1	33.9	16.7	34.5	26.4	21
13	33.0	32.4	31.8	S	31.6	31.4	31.1	30.8	30.9	31.0	30.5	27.9	28.4	27.6	26.9	25.4	25.3	27.2	28.3	29.1	29.8	28.9	28.0	26.7	25.3	33.0	29.3	24
14	26.2	23.9	S	25.8	27.5	27.8	27.8	27.3	27.3	27.1	27.5	28.0	28.8	29.1	29.3	29.8	29.1	28.3	28.8	28.6	30.3	30.9	30.8	30.4	23.9	30.9	28.3	24
15	30.2	S	30.3	29.6	28.7	28.9	29.8	30.1	30.6	31.4	32.0	32.0	31.8	31.2	31.0	31.4	31.1	31.0	30.3	30.3	30.4	30.1	29.5	29.2	28.7	32.0	30.5	24
16	S	28.6	29.1	29.6	29.0	27.1	27.5	26.9	25.9	27.2	28.4	28.7	29.1	29.0	29.1	28.4	26.4	24.6	24.1	23.6	21.4	20.8	22.1	S	20.8	29.6	26.7	24
17	24.2	27.3	28.2	27.7	26.8	26.4	26.4	25.8	26.2	27.5	27.9	28.3	28.6	29.0	29.4	29.5	29.3	29.1	28.5	27.9	26.6	24.7	S	24.0	24.0	29.5	27.4	24
18	24.3	24.4	23.0	18.7	17.8	17.2	16.4	15.6	15.8	15.8	15.3	14.0	13.9	15.7	18.8	20.4	20.9	22.7	22.9	21.8	21.8	S	22.2	18.7	13.9	24.4	19.0	24
19	7.3	11.7	8.2	10.6	8.4	5.3	4.1	9.1	12.5	14.2	16.9	20.7	22.5	24.5	24.4	24.1	23.4	23.1	22.6	22.7	S	21.5	21.5	22.1	4.1	24.5	16.6	24
20	20.6	16.8	18.9	20.1	24.0	25.2	27.8	27.5	27.8	28.6	28.4	28.8	30.1	30.4	30.6	31.1	30.9	31.3	31.2	S	30.4	30.4	30.3	29.9	16.8	31.3	27.4	24
21	29.5	29.7	29.5	29.5	29.3	29.0	28.9	28.6	27.9	28.1	30.2	31.4	32.4	32.1	32.3	32.2	32.1	32.1	S	29.5	29.1	28.9	28.5	29.7	27.9	32.4	30.0	24
22	30.5	30.8	31.1	31.4	30.4	29.8	29.6	29.5	28.9	28.6	27.7	24.8	23.7	22.9	22.8	20.8	16.8	S	17.9	19.2	19.0	16.9	18.6	21.5	16.8	31.4	24.9	24
23	21.3	21.3	21.8	21.1	22.0	21.4	20.2	19.5	19.8	20.0	20.3	22.4	27.3	31.9	40.4	41.3	S	31.6	31.6	31.4	33.3	33.6	32.7	31.8	19.5	41.3	26.9	24
24	31.3	30.8	31.9	33.1	32.6	31.9	32.0	31.3	30.5	31.5	32.7	34.6	35.2	36.4	35.4	S	27.0	26.3	24.6	24.7	27.0	27.4	27.0	25.7	24.6	36.4	30.5	24
25	25.7	24.9	24.6	25.6	24.3	23.7	22.9	22.1	21.2	22.1	25.2	29.6	34.4	36.6	S	34.1	29.4	29.5	29.2	28.6	27.5	26.4	25.1	26.9	21.2	36.6	26.9	24
26	26.2	22.6	25.9	25.0	24.2	25.1	25.6	25.3	27.7	28.4	27.9	27.4	27.4	S	26.8	26.5	26.4	26.5	26.6	26.5	26.1	26.1	25.9	25.6	22.6	28.4	26.2	24
27	25.0	24.1	23.5	23.2	22.8	22.1	21.5	20.2	19.7	23.8	29.3	29.5	S	25.8	26.3	26.8	25.9	26.1	26.3	26.4	27.4	28.7	28.2	28.0	19.7	29.5	25.2	24
28	28.7	29.8	29.3	28.8	26.8	23.7	22.4	23.3	25.5	27.3	28.6	S	32.1	32.2	30.5	27.7	23.9	24.5	24.9	24.3	23.9	24.4	24.0	22.1	22.1	32.2	26.5	24
29	19.5	18.0	21.0	22.7	23.7	26.3	29.3	30.3	30.7	30.5	S	32.6	33.6	34.0	33.8	34.5	33.5	33.9	34.8	34.5	34.0	31.3	27.0	24.6	18.0	34.8	29.3	24
30	27.6	27.9	27.5	26.3	27.3	28.2	27.1	27.5	25.8	S	31.4	32.9	34.5	36.9	36.7	36.1	34.8	34.4	33.8	30.2	27.3	26.6	25.5	23.2	23.2	36.9	30.0	24
HOURLY MAX	34.5	33.4	33.4	33.8	33.5	32.7	32.0	33.0	30.9	32.0	32.7	34.6	35.2	36.9	40.4	41.3	36.5	36.7	36.3	35.6	36.1	35.8	35.8	35.3				
HOURLY AVG	25.3	24.7	25.3	25.5	25.7	25.1	25.1	25.6	25.2	25.9	27.2	27.6	28.7	29.3	29.8	29.3	27.9	28.6	27.9	27.8	27.9	27.3	26.9	26.5				

STATUS FLAG CODES

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

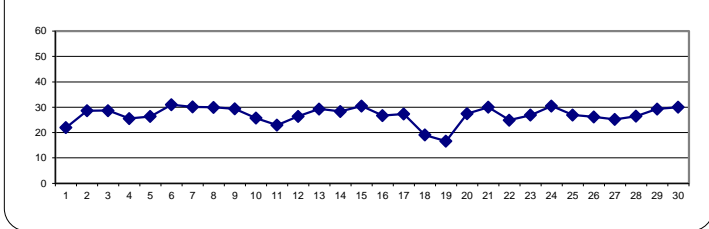
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 82 ppb

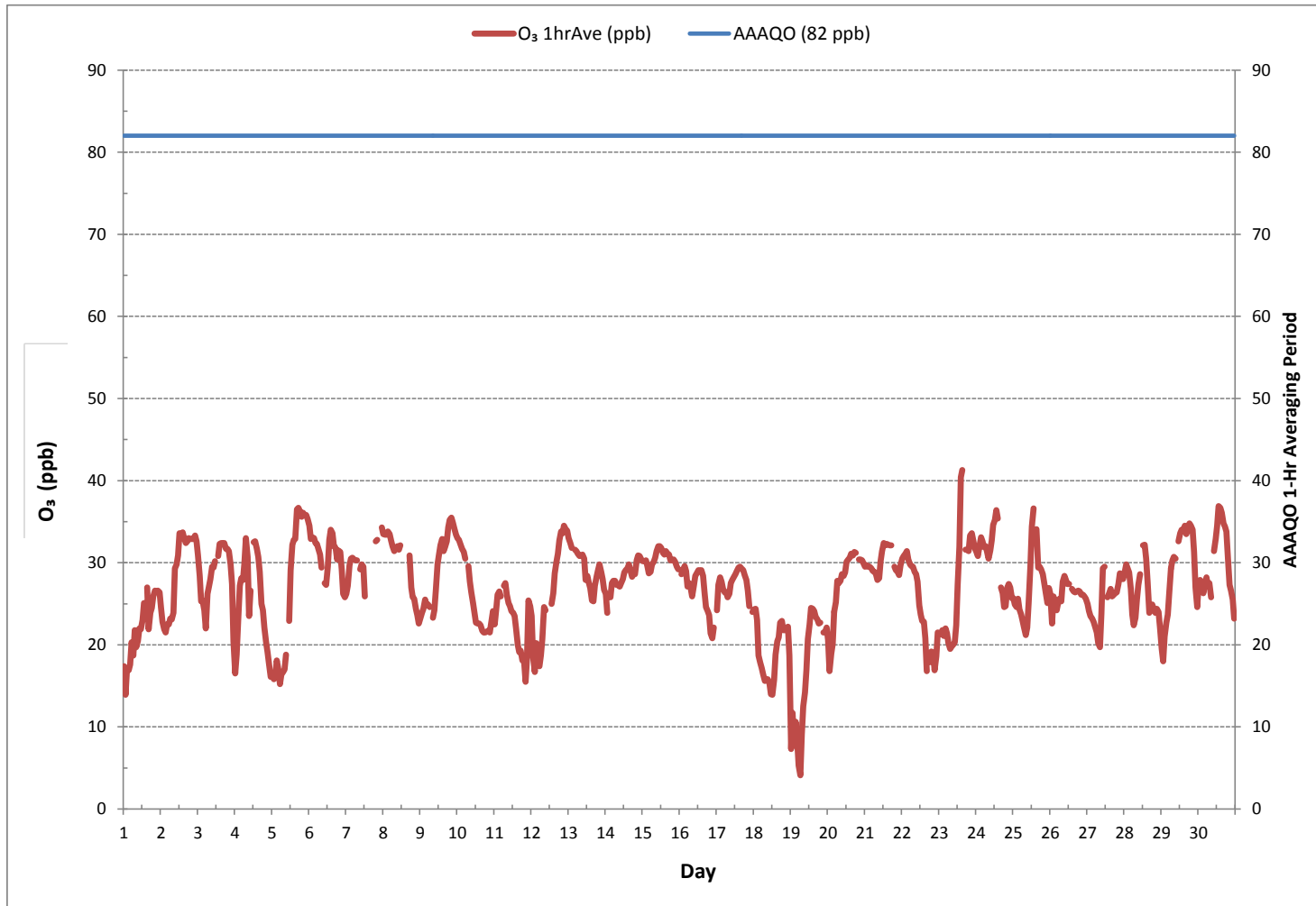
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	674			
MINIMUM 1-HR AVERAGE:	4.1 ppb	@ HOUR	6 ON DAY	19
MAXIMUM 1-HR AVERAGE:	41.3 ppb	@ HOUR	15 ON DAY	23
MAXIMUM 24-HR AVERAGE:	31.0 ppb		ON DAY	6
I2S CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	711 hrs	
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	98.8 %	
STANDARD DEVIATION:	5.4	MONTHLY AVERAGE:	26.9 ppb	

24 HR AVERAGES November 2017



OZONE Hourly Averages (O₃ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2017

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	18.5	15.2	18.5	18.2	19.4	21.4	19.2	25.1	24.2	21.5	22.9	22.5	24.2	26.5	S	28.0	27.4	25.3	25.6	26.9	27.0	27.0	26.9	27.2	15.2	28.0	23.4	24	
2	25.5	23.8	22.4	22.1	23.1	23.0	24.2	23.9	27.3	30.1	30.9	33.0	34.7	S	35.1	34.0	33.2	33.5	33.6	33.4	33.5	33.5	33.8	33.4	22.1	35.1	29.6	24	
3	31.9	30.8	26.5	26.1	25.5	23.8	27.8	27.8	29.2	30.6	30.5	31.7	S	32.2	33.0	33.0	33.0	33.6	38.6	33.4	32.7	30.5	29.8	23.9	23.8	38.6	30.3	24	
4	18.2	23.5	25.6	28.9	29.4	29.7	31.5	34.3	34.6	26.4	30.0	S	34.0	33.6	33.0	31.7	30.6	26.6	25.1	24.0	21.3	20.2	19.1	16.9	16.9	34.6	27.3	24	
5	17.0	17.1	17.5	18.8	18.4	15.8	17.0	17.1	17.9	19.9	S	23.9	32.2	33.9	33.9	34.8	37.3	37.2	36.8	36.2	36.6	36.3	36.2	36.0	15.8	37.3	27.3	24	
6	35.1	34.3	33.5	33.4	33.1	32.9	32.4	31.5	31.1	S	28.1	28.1	31.7	34.1	34.6	34.7	33.1	32.9	31.3	32.1	31.9	30.8	27.7	26.4	26.4	35.1	31.9	24	
7	26.6	28.8	30.6	30.9	30.9	30.6	30.6	30.6	S	30.4	30.3	30.4	30.4	Q	Y	Y	Y	Y	Y	X	X	X	X	34.8	26.6	34.8	30.5	15	
8	X	33.9	34.0	34.0	33.9	33.2	32.5	32.3	S	33.5	33.6	33.9	C	C	C	C	C	33.2	29.1	26.8	26.5	26.2	24.8	24.0	24.0	34.0	30.9	23	
9	24.4	25.4	25.8	26.5	26.0	26.5	26.1	S	26.9	25.6	29.8	31.3	31.9	34.8	35.1	33.1	33.1	34.4	35.4	36.5	36.5	35.8	35.4	34.5	24.4	36.5	30.9	24	
10	34.0	33.6	33.4	32.7	32.6	31.7	S	30.9	29.4	27.7	26.5	25.1	23.7	23.8	23.6	23.5	23.1	22.4	22.4	22.5	22.6	22.9	26.5	28.1	22.4	34.0	27.1	24	
11	24.2	26.6	27.3	27.5	27.2	S	29.2	29.2	27.3	26.2	26.4	25.1	24.8	24.6	23.5	21.5	20.5	20.6	20.0	19.5	17.9	25.5	41.8	25.6	17.9	41.8	25.3	24	
12	25.2	22.6	20.9	21.5	S	18.6	20.1	22.9	26.1	P	P	P	R	26.9	29.1	30.0	31.7	32.5	33.8	35.1	35.0	35.6	35.1	34.8	18.6	35.6	28.3	20	
13	34.0	33.5	32.7	S	32.4	32.5	32.1	31.8	31.8	31.9	31.7	29.9	29.6	28.9	28.3	27.3	26.8	29.3	29.3	30.4	30.8	30.1	29.2	28.2	26.8	34.0	30.5	24	
14	27.3	25.4	S	27.6	28.5	28.8	28.6	28.5	28.2	28.0	28.5	28.9	29.7	29.9	30.3	30.6	30.8	29.6	29.6	29.8	31.5	31.7	31.5	31.5	25.4	31.7	29.3	24	
15	31.3	S	31.1	30.5	29.8	29.7	30.8	31.2	31.3	32.6	33.0	32.9	32.9	32.5	32.1	32.1	32.1	31.8	31.3	31.0	31.3	31.0	30.5	30.3	29.7	33.0	31.4	24	
16	S	29.6	30.8	30.9	30.4	28.6	28.6	28.4	27.2	28.8	29.3	29.5	30.1	29.8	30.1	29.7	28.6	25.9	25.1	24.6	23.4	21.7	23.7	S	21.7	30.9	27.9	24	
17	26.8	28.6	29.3	28.9	27.8	27.2	27.2	26.6	27.7	28.5	28.6	29.2	29.6	29.7	30.4	30.5	30.3	30.1	29.3	28.9	28.0	26.6	S	25.5	25.5	30.5	28.5	24	
18	25.4	25.4	25.0	21.8	18.8	18.4	17.5	16.5	16.9	16.9	17.0	15.7	15.5	18.6	21.0	21.5	22.1	24.0	24.2	23.0	23.9	S	25.0	21.1	15.5	25.4	20.7	24	
19	15.9	14.0	11.4	12.0	9.9	8.3	6.7	11.7	14.1	15.7	20.4	22.1	24.7	25.5	25.2	25.1	24.3	23.8	23.4	23.5	S	22.5	22.6	22.9	6.7	25.5	18.5	24	
20	22.6	18.8	21.0	22.3	25.6	27.2	30.6	30.1	28.9	29.6	29.3	29.6	31.3	31.2	31.7	32.1	32.2	32.2	32.2	S	31.3	31.3	31.0	31.0	18.8	32.2	28.8	24	
21	30.3	30.8	30.3	30.3	30.0	29.8	29.7	29.7	29.1	29.6	31.9	33.4	33.2	33.1	33.5	33.2	32.9	33.0	S	30.4	30.1	29.7	29.3	30.9	29.1	33.5	31.1	24	
22	31.3	31.7	32.1	32.9	31.7	30.9	30.6	30.5	30.0	29.7	29.1	27.4	26.2	24.9	24.6	23.2	18.8	S	19.0	20.9	20.9	18.1	20.9	22.9	18.1	32.9	26.4	24	
23	22.8	22.2	22.9	22.3	23.0	22.8	21.3	20.5	21.0	20.9	22.9	26.2	29.1	36.5	42.7	42.7	S	33.4	32.6	32.5	34.8	34.6	34.3	32.6	20.5	42.7	28.5	24	
24	32.5	31.9	33.2	34.3	34.0	32.7	33.0	32.9	31.8	32.6	34.7	35.7	36.5	37.5	36.3	S	28.2	P	P	26.6	28.6	29.3	28.4	27.3	26.6	37.5	32.3	22	
25	26.9	26.9	26.4	26.9	25.2	24.7	23.9	23.0	22.6	24.1	28.8	32.7	36.3	37.7	S	36.6	32.2	30.4	30.1	29.6	29.2	27.4	27.4	28.1	22.6	37.7	28.6	24	
26	27.4	25.2	28.5	28.0	26.1	26.3	26.4	26.1	29.8	29.5	28.6	28.2	28.1	S	27.8	27.2	27.2	27.4	27.9	27.7	27.0	27.0	27.2	26.6	25.2	29.8	27.4	24	
27	26.2	25.7	24.4	24.2	23.7	23.0	22.6	21.7	21.0	29.3	30.5	31.5	S	26.9	28.1	28.0	26.9	27.0	27.1	27.3	28.6	29.7	29.3	28.9	21.0	31.5	26.6	24	
28	30.4	30.6	30.5	29.8	29.2	26.0	23.4	25.0	27.1	28.6	30.3	S	33.0	33.2	32.3	29.7	26.2	26.0	25.7	25.5	25.0	25.6	25.1	25.4	23.4	33.2	28.0	24	
29	21.1	20.0	23.1	24.2	27.6	28.8	30.6	31.4	31.7	31.7	S	33.9	34.7	35.0	34.8	35.4	34.7	35.1	35.8	35.8	35.3	35.0	28.9	26.8	20.0	35.8	30.9	24	
30	28.5	29.1	29.1	27.6	29.6	29.6	28.0	28.5	27.4	S	33.5	33.6	34.7	37.1	37.7	37.6	37.3	37.0	35.3	34.9	33.9	28.2	27.7	26.6	25.4	25.4	37.7	31.4	24
HOURLY MAX	35.1	34.3	34.0	34.3	34.0	33.2	33.0	34.3	34.6	33.5	34.7	35.7	37.1	37.7	42.7	42.7	37.3	37.2	38.6	36.5	36.6	36.3	41.8	36.0					
HOURLY AVG	26.5	26.4	26.8	26.7	27.0	26.3	26.3	26.9	26.8	27.4	28.8	29.1	30.2	30.7	31.1	30.6	29.4	29.9	29.2	28.9	28.9	28.7	28.9	28.0					

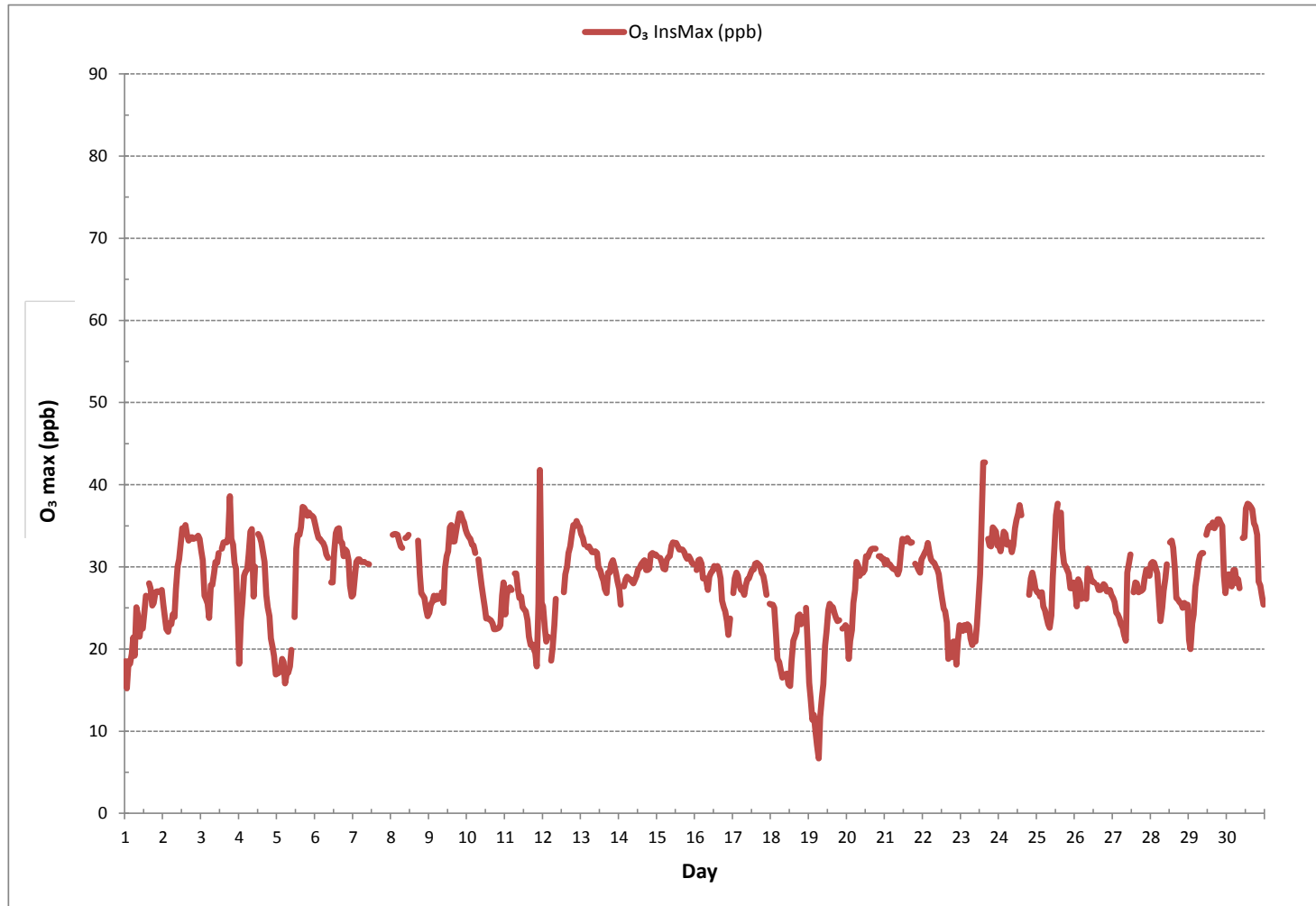
STATUS FLAG CODES

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

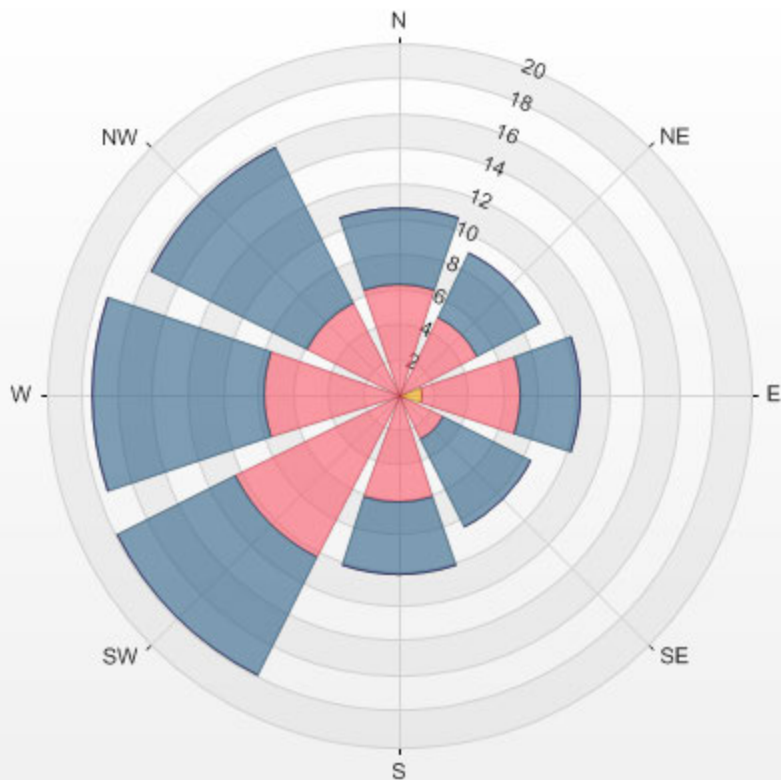
NUMBER OF NON-ZERO READINGS:	667
MAXIMUM INSTANTANEOUS VALUE:	42.7 ppb @ HOUR 14 ON DAY 23
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	5.2
OPERATIONAL TIME:	704 hrs

OZONE Instantaneous Maximum (O₃ ppb)

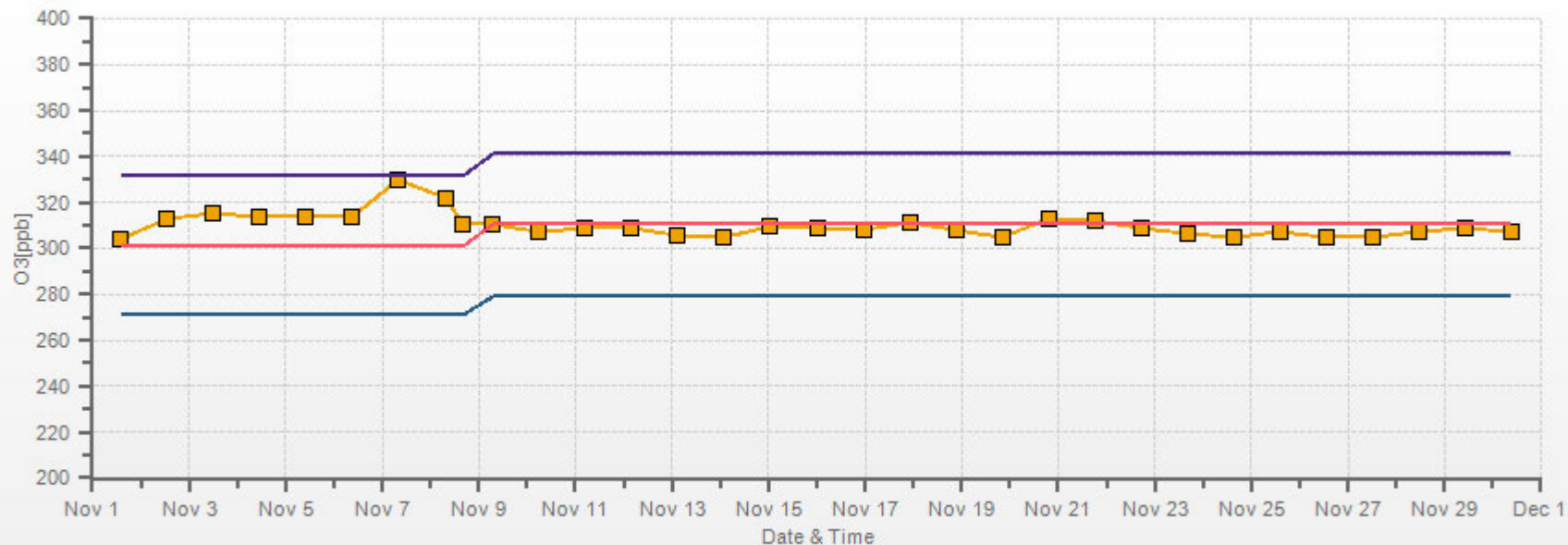


% Icon Classes (ppb) 1 0.0-13.8 50 13.8-27.6 49 27.6-41.4 0 >41.4

LICA ST. LINA Poll.: LICA ST. LINA-O3[ppb] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 0.30% Calm Poll Avg: 23.43[ppb]



O3[ppb] Calibration: LICA ST. LINA Monthly: 17/11 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	6	5	5	3	4	20	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	3	1	1	0	20	3	24
2	1	1	2	1	1	0	1	0	1	0	0	0	0	0	1	0	7	1	1	1	1	1	1	1	0	7	1	24
3	1	1	1	1	1	3	3	3	2	3	3	4	3	3	2	3	4	6	21	3	5	3	2	4	1	21	4	24
4	5	6	5	5	12	5	3	7	4	11	20	29	40	42	28	31	38	53	34	12	17	21	20	18	3	53	19	24
5	16	17	17	13	14	16	15	16	17	17	17	17	13	9	8	7	4	3	3	3	3	4	5	3	3	17	11	24
6	3	6	6	5	5	4	5	4	6	10	17	28	36	18	12	12	14	21	15	11	12	18	16	17	3	36	13	24
7	10	9	8	8	9	9	8	6	5	5	5	5	5	3	3	3	3	4	4	3	3	X	X	1	1	10	22	
8	1	1	2	1	1	2	2	1	14	14	26	50	13	13	12	11	14	18	36	34	22	19	19	23	1	50	15	24
9	24	21	23	32	35	25	24	19	24	21	18	19	17	16	13	13	12	10	8	7	8	9	9	9	7	35	17	24
10	8	8	7	7	8	10	10	10	13	17	21	24	23	23	22	22	23	22	23	23	23	22	23	22	7	24	17	24
11	21	19	18	19	21	22	21	21	23	25	28	33	36	36	35	32	32	32	33	32	34	30	41	20	18	41	28	24
12	21	26	14	12	14	13	13	13	12	14	P	P	R	23	20	18	21	20	20	19	19	16	17	18	12	26	17	21
13	20	22	24	24	24	23	4	5	5	5	7	8	8	8	7	7	7	7	7	6	6	7	8	7	4	24	11	24
14	5	5	4	4	3	2	6	5	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	6	3	24
15	2	2	2	2	3	3	2	2	3	3	3	3	2	2	2	2	2	2	3	3	3	4	5	5	2	5	3	24
16	5	5	4	3	3	3	3	5	7	6	7	7	8	9	13	11	10	9	9	9	10	13	15	17	3	17	8	24
17	10	4	5	6	4	4	3	4	4	3	5	8	7	6	6	6	6	5	5	4	4	5	6	6	3	10	5	24
18	8	8	12	22	27	27	26	27	28	34	52	57	50	42	31	26	24	23	19	16	14	15	14	16	8	57	26	24
19	21	17	20	18	19	21	20	18	19	18	18	15	14	14	14	14	14	15	16	16	17	17	17	17	14	21	17	24
20	15	9	4	4	6	7	4	3	3	2	1	1	1	1	1	1	3	1	1	1	1	2	2	1	1	15	3	24
21	2	6	2	2	3	3	3	3	3	3	4	4	3	4	4	3	2	2	2	3	5	5	5	2	6	3	3	24
22	5	5	5	4	4	5	5	6	6	6	9	17	11	10	9	15	13	20	25	20	20	27	24	13	4	27	12	24
23	13	13	13	12	11	10	10	10	10	10	12	13	12	8	2	1	1	2	2	2	1	1	1	1	1	13	7	24
24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	6	6	6	6	6	10	8	1	1	10	3	24
25	9	10	11	10	9	9	9	9	10	10	9	7	3	2	2	4	6	6	6	6	6	7	7	5	2	11	7	24
26	5	7	7	6	6	6	5	5	3	3	3	4	4	4	5	5	5	7	7	6	6	7	8	9	3	9	6	24
27	11	11	14	14	12	9	8	9	9	6	4	4	3	5	5	6	6	6	7	7	6	5	5	5	3	14	7	24
28	5	3	3	3	3	5	8	9	7	4	4	3	2	C	C	C	4	4	3	3	4	4	5	7	2	9	4	24
29	9	11	13	16	15	13	8	3	2	2	2	2	1	1	1	1	2	2	2	3	4	4	5	1	16	5	5	24
30	5	5	5	5	5	5	5	4	4	5	4	4	3	2	3	3	3	5	5	8	9	8	9	9	2	9	5	24
HOURLY MAX	24	26	24	32	35	27	26	27	28	34	52	57	50	42	35	32	38	53	36	34	34	30	41	23				
HOURLY AVG	9	9	9	9	9	10	8	8	8	9	10	13	11	11	9	9	9	11	11	9	9	10	10	9				

STATUS FLAG CODES

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

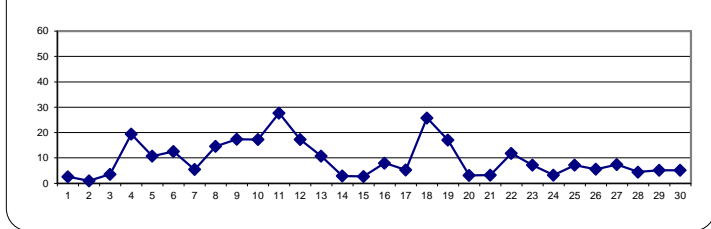
OBJECTIVE LIMIT:

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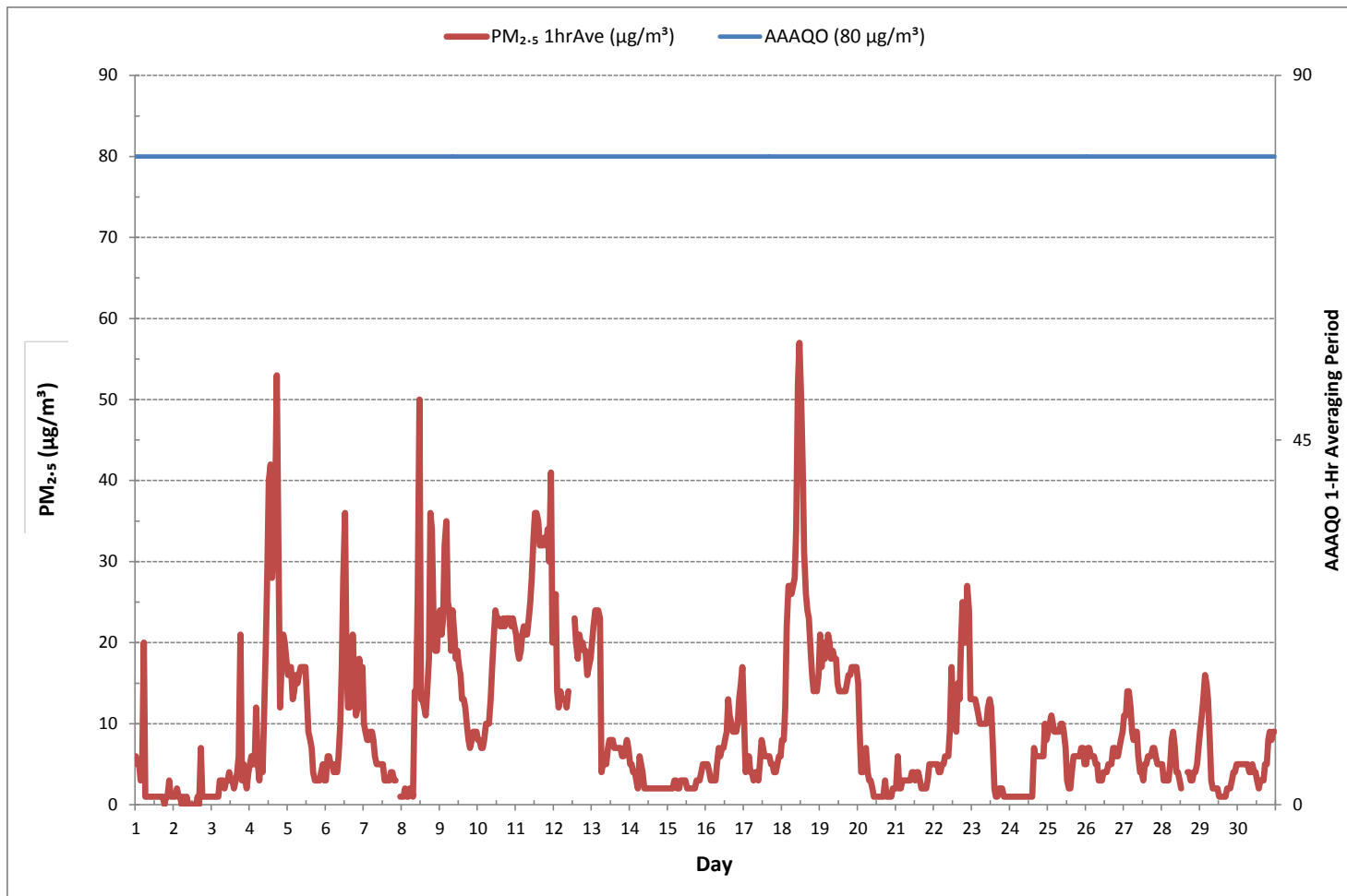
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	702				
MINIMUM 1-HR AVERAGE:	0 µg/m ³ @ HOUR	18	ON DAY	1	
MAXIMUM 1-HR AVERAGE:	57 µg/m ³ @ HOUR	11	ON DAY	18	
MAXIMUM 24-HR AVERAGE:	28 µg/m ³		ON DAY	11	
MONTHLY CALIBRATION TIME:	3	hrs	OPERATIONAL TIME:	715	hrs
STANDARD DEVIATION:	9		AMD OPERATION UPTIME:	99.3	%
			MONTHLY AVERAGE:	9	µg/m ³

24 HR AVERAGES November 2017



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



Wind: LICA ST. LINA
 Poll.: LICA ST. LINA-PM25[ug/m3(L)]
 Monthly: 17/11
 Type: PollutionRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

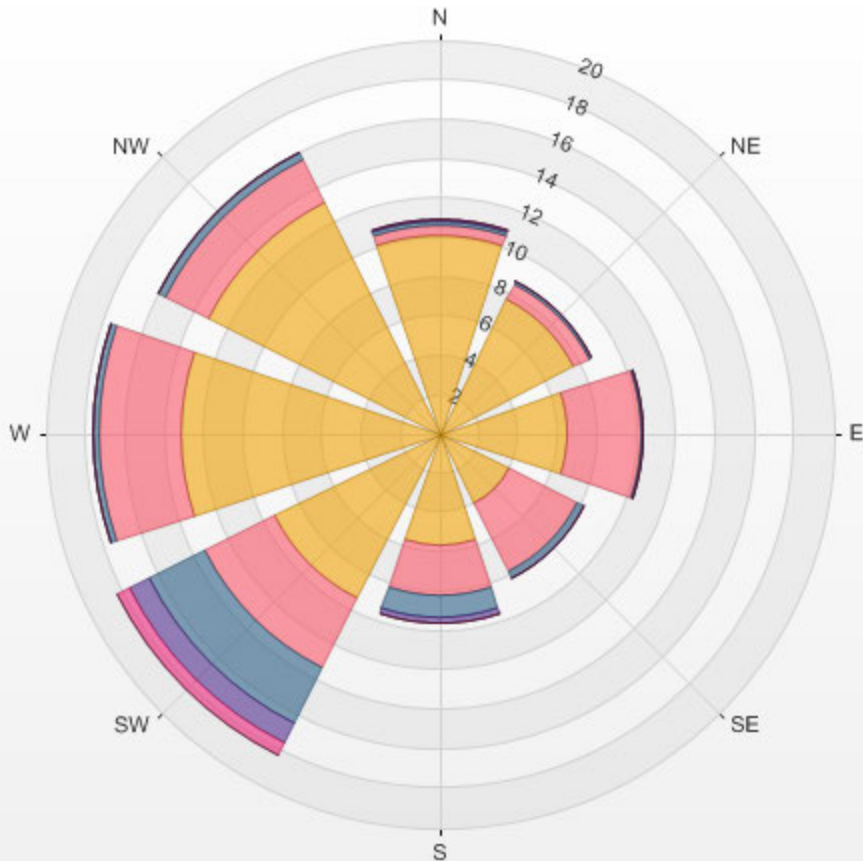
Calm: 0.28%

Calm Avg: 28.48 [ug/m3(L)]

Direction	0.0-11.6	11.6-23.2	23.2-34.8	34.8-46.4	46.4-58.0	>58.0	Total
N	10.1	0.6	0.1	0.1	0.0	0.0	10.9
NE	7.7	0.9	0.1	0.0	0.0	0.0	8.7
E	6.5	3.7	0.1	0.0	0.0	0.0	10.4
SE	4.0	3.8	0.4	0.0	0.0	0.0	8.2
S	5.7	2.6	1.1	0.3	0.0	0.0	9.6
SW	9.4	4.0	3.1	1.1	0.7	0.0	18.3
W	13.2	4.1	0.3	0.0	0.0	0.0	17.6
NW	13.2	2.4	0.4	0.0	0.0	0.0	16.0
Summary	69.6	22.0	5.8	1.6	0.7	0.0	100.0

% Icon Classes (ug/m3(L)) 70 0.0-11.6 22 11.6-23.2 6 23.2-34.8 2 34.8-46.4 1 46.4-58.0 0 >58.0

LICA ST. LINA Poll.: LICA ST. LINA-PM25[ug/m3(L)] 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 0.28% Calm Poll Avg: 28.48[ug/m3(L)]



WIND SPEED



WIND SPEED Hourly Averages (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	9.0	7.5	7.0	9.8	10.2	9.9	9.6	11.7	9.8	11.6	10.2	11.4	10.7	11.5	9.8	8.4	12.0	12.7	12.5	12.5	11.5	10.7	10.2	9.2	7.0	12.7	10.1	24
2	10.1	10.7	9.9	8.4	9.1	9.8	9.1	6.6	7.1	10.9	9.9	9.0	9.4	10.2	8.2	7.9	7.5	7.9	10.1	8.9	9.6	7.5	8.6	7.0	6.6	10.9	8.6	24
3	6.8	7.9	6.8	7.3	8.8	9.8	9.7	8.1	8.2	8.7	8.2	5.2	8.2	7.8	9.4	6.2	4.9	3.7	5.8	6.1	6.8	7.0	6.9	6.2	3.7	9.8	6.9	24
4	6.4	4.6	3.5	3.0	3.7	3.7	3.6	2.6	2.3	4.4	7.2	7.5	7.8	6.9	10.5	10.0	9.3	13.2	12.8	13.0	10.3	11.9	9.6	11.0	2.3	13.2	4.9	24
5	10.0	7.6	7.8	7.8	6.0	6.3	8.4	11.2	11.3	9.9	7.8	8.9	12.0	11.8	11.6	11.3	12.9	7.7	7.7	9.0	10.4	6.7	6.9	5.4	5.4	12.9	8.0	24
6	2.3	5.3	5.7	5.1	5.0	5.1	6.3	6.5	4.7	6.4	8.5	11.8	17.8	22.1	19.0	16.2	12.4	13.8	16.3	15.4	17.8	13.8	12.1	9.8	2.3	22.1	10.2	24
7	8.4	9.2	11.9	11.8	11.4	8.8	10.7	10.7	12.7	9.8	7.6	11.9	11.6	12.4	10.1	8.5	8.5	6.8	5.7	5.1	5.9	X	X	6.0	5.1	12.7	8.9	22
8	4.2	6.1	6.9	7.4	5.4	6.4	5.8	5.6	5.4	4.8	5.0	4.9	7.8	12.8	13.5	11.7	9.7	7.6	9.2	10.5	8.5	5.8	6.5	7.2	4.2	13.5	6.0	24
9	6.5	6.5	6.8	7.4	9.2	12.5	12.7	10.3	7.9	9.6	11.6	13.0	14.7	15.1	14.8	13.9	14.6	15.7	14.7	15.2	16.5	12.4	12.0	11.1	6.5	16.5	11.3	24
10	7.1	6.0	3.4	2.8	4.8	6.1	7.3	7.5	8.6	9.6	12.3	13.5	13.6	11.3	9.8	8.4	4.9	4.2	5.2	4.4	3.3	3.5	2.8	2.9	2.8	13.6	5.2	24
11	5.9	7.0	7.2	8.8	7.2	10.7	12.8	12.3	12.5	10.7	12.3	12.1	9.0	9.5	7.7	8.5	5.4	6.0	4.0	3.5	0.1	3.0	6.2	7.9	0.1	12.8	6.4	24
12	8.6	10.1	12.0	12.4	13.4	12.3	14.6	14.3	16.4	14.0	P	P	12.6	12.6	10.6	13.5	13.7	13.0	13.9	14.7	11.7	12.2	11.3	12.2	8.6	16.4	10.0	22
13	8.7	5.5	4.8	5.6	3.1	1.0	2.1	3.7	3.6	4.7	7.2	7.0	6.5	7.9	7.9	11.7	12.3	15.9	18.1	20.0	17.4	16.6	17.9	13.6	1.0	20.0	7.2	24
14	10.1	14.5	14.7	14.7	15.4	14.4	13.5	12.6	11.1	9.7	8.9	7.9	7.3	5.8	5.6	4.5	2.9	5.6	7.1	8.0	8.6	13.3	10.6	11.3	2.9	15.4	7.8	24
15	11.7	12.1	10.7	10.1	12.7	13.3	15.4	13.9	16.0	15.5	17.3	20.4	22.3	18.6	17.5	19.9	18.4	23.7	19.4	15.9	16.8	18.3	19.2	13.9	10.1	23.7	16.3	24
16	11.0	9.6	6.2	6.3	6.2	4.1	6.0	4.4	5.0	7.2	9.6	11.5	10.1	9.0	8.6	8.2	10.0	9.2	6.2	5.3	7.8	6.8	8.5	6.6	4.1	11.5	4.9	24
17	7.9	10.9	9.3	9.9	7.7	7.5	10.3	10.6	12.1	8.8	13.6	11.2	9.1	8.7	8.9	6.6	8.0	11.2	10.0	8.8	7.1	6.5	7.1	6.5	6.5	13.6	8.2	24
18	9.4	7.7	9.4	8.6	7.3	8.5	6.7	6.7	6.6	7.6	8.0	8.8	10.0	10.8	9.7	8.0	6.7	11.2	11.8	9.6	10.7	7.6	4.0	5.2	4.0	11.8	6.7	24
19	7.7	8.8	7.4	9.2	10.8	10.7	11.9	14.7	13.2	12.3	17.9	14.1	15.0	15.1	16.1	14.4	12.5	10.2	6.6	10.1	9.1	5.1	5.2	7.8	5.1	17.9	9.6	24
20	15.6	20.3	21.2	20.0	17.9	20.2	19.3	21.7	18.5	20.2	18.5	20.5	21.3	16.9	15.0	14.3	15.1	14.6	12.6	12.4	12.5	9.2	7.3	4.9	4.9	21.7	16.1	24
21	7.3	5.6	4.5	4.9	3.6	2.4	7.9	5.0	3.4	4.3	8.9	7.6	11.3	11.9	9.9	8.3	9.5	9.8	11.8	12.9	8.1	7.9	5.9	6.9	2.4	12.9	5.9	24
22	6.1	2.5	2.7	4.9	3.4	6.5	7.0	11.3	10.3	8.0	8.7	2.9	7.2	9.3	8.0	6.9	6.7	6.8	7.7	9.4	7.8	10.5	14.4	2.5	14.4	4.8	24	
23	12.7	11.8	15.0	16.3	14.2	11.1	5.7	6.6	7.9	9.0	15.7	14.0	17.0	14.6	18.4	21.6	18.0	16.9	19.3	19.7	17.3	16.3	12.8	10.5	5.7	21.6	7.9	24
24	12.4	12.9	13.4	14.3	12.8	9.6	7.9	9.0	9.5	11.2	11.9	14.3	13.2	13.1	11.1	8.2	5.8	2.2	5.3	8.0	8.1	10.9	11.9	13.2	2.2	14.3	5.8	24
25	24.5	14.0	15.0	13.4	12.0	13.4	12.8	11.2	11.2	10.7	8.4	11.9	10.2	10.7	11.0	13.8	8.6	8.7	9.1	9.4	9.1	9.2	9.2	10.6	8.4	24.5	2.9	24
26	11.0	11.9	14.9	17.0	17.7	17.8	17.3	21.5	21.9	22.8	23.1	20.8	20.5	18.8	16.6	16.2	14.0	14.6	11.8	12.7	13.8	16.4	11.4	8.0	8.0	23.1	16.2	24
27	9.5	6.1	9.6	5.8	16.3	17.0	13.0	14.2	16.1	19.5	28.4	26.1	20.7	22.5	22.3	28.4	23.7	20.8	19.9	19.3	17.2	15.0	8.9	9.7	5.8	28.4	15.4	24
28	10.7	10.1	9.6	11.7	10.7	9.0	10.3	10.9	9.9	8.9	9.6	11.5	12.1	11.7	9.9	11.3	12.9	14.0	10.8	9.9	9.9	8.0	9.5	11.4	8.0	14.0	9.5	24
29	12.9	10.9	10.7	10.5	10.2	9.5	11.4	12.5	13.2	13.3	13.9	15.3	15.2	13.0	11.9	12.2	14.1	14.3	11.2	9.5	9.8	12.7	13.5	15.4	9.5	15.4	11.7	24
30	14.5	13.3	14.9	12.7	11.2	12.1	8.8	8.5	9.7	11.2	15.0	15.5	12.0	13.3	11.8	10.3	12.5	10.7	9.7	12.5	9.3	9.2	10.1	10.3	8.5	15.5	11.2	24
HOURLY MAX	24.5	20.3	21.2	20.0	17.9	20.2	19.3	21.7	21.9	22.8	28.4	26.1	22.3	22.5	22.3	28.4	23.7	23.7	19.9	20.0	17.8	18.3	19.2	15.4				
HOURLY AVG	0.7	0.9	1.3	1.3	1.6	1.6	1.9	2.2	2.2	2.5	3.6	3.6	2.8	2.6	2.5	2.0	1.7	1.8	1.9	1.9	1.1	1.1	0.8	1.2				

STATUS FLAG CODES

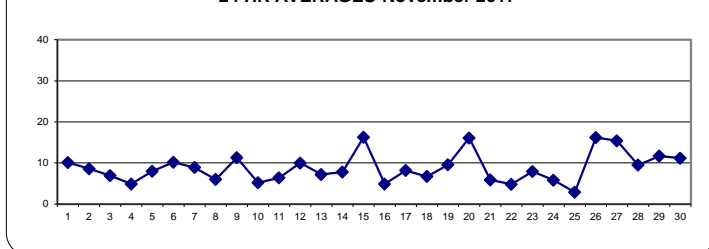
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

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

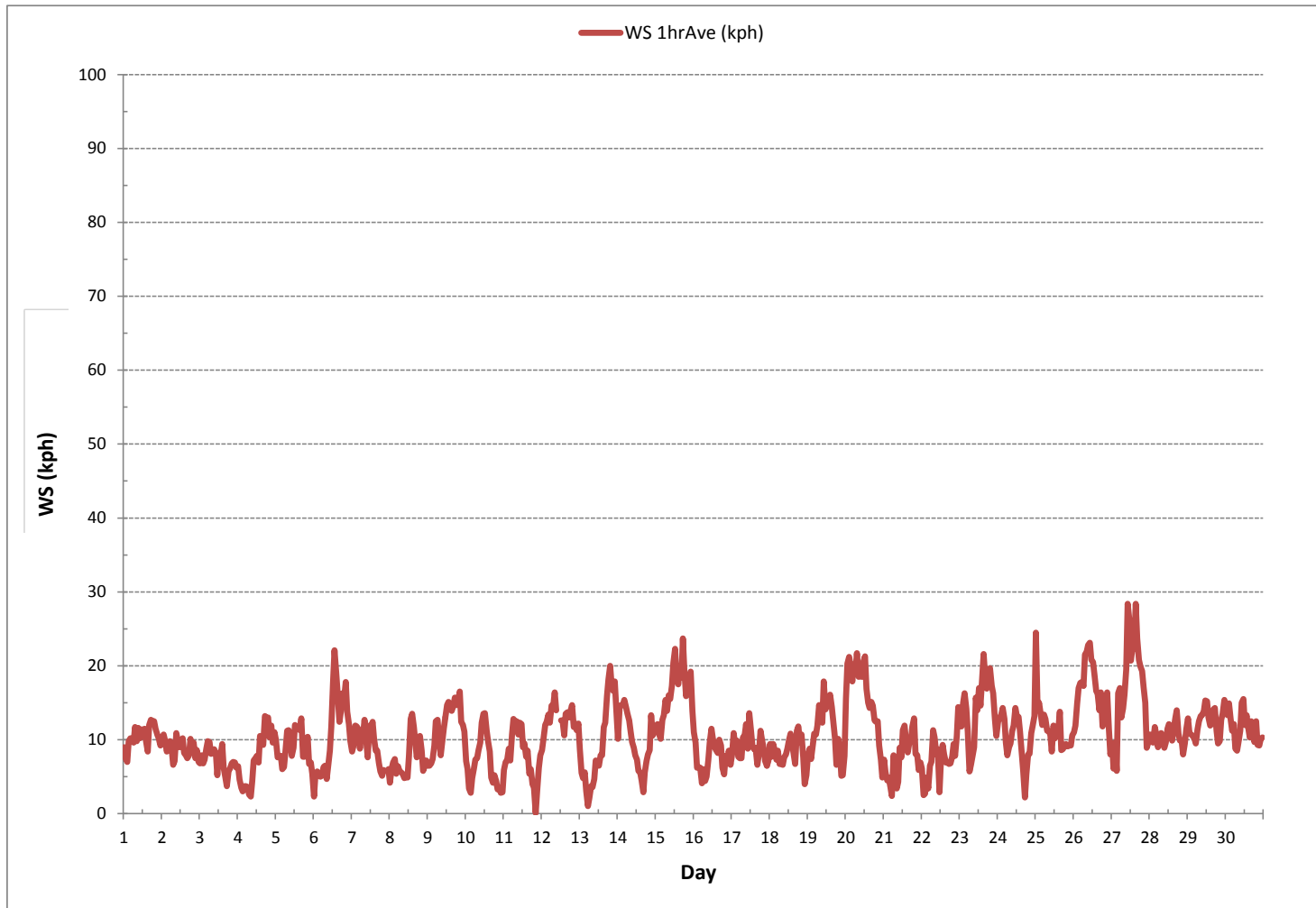
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	716
MINIMUM 1-HR AVERAGE:	0.1 kph @ HOUR 20 ON DAY 11
MAXIMUM 1-HR AVERAGE:	28.4 kph @ HOUR 10 ON DAY 27
MAXIMUM 24-HR AVERAGE:	16.3 kph ON DAY 15
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	716 hrs
AMD OPERATION UPTIME:	99.4 %
STANDARD DEVIATION:	4.4
MONTHLY AVERAGE:	1.7 kph

24 HR AVERAGES November 2017



WIND SPEED Hourly Averages (WS kph)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2017

WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	20.3	17.0	17.4	22.5	22.4	25.9	24.6	24.2	23.1	29.4	27.9	28.6	26.4	28.1	29.2	25.4	36.2	33.3	32.9	31.6	32.5	26.7	28.3	23.0	17.0	36.2	26.5	24
2	23.2	28.7	26.8	24.1	27.4	24.7	21.9	23.0	22.6	26.8	25.5	28.3	27.2	28.9	24.1	24.0	24.9	26.1	25.6	25.2	21.7	16.9	20.7	17.8	16.9	28.9	24.4	24
3	15.0	17.4	15.8	15.4	16.5	17.3	21.0	16.0	18.0	17.4	17.4	14.5	23.9	23.3	24.3	20.4	18.4	14.0	17.6	14.5	11.2	11.0	13.2	13.8	11.0	24.3	17.0	24
4	15.2	15.8	28.1	11.5	12.3	11.4	6.2	5.3	32.6	16.7	19.5	15.6	18.2	17.2	20.1	16.2	14.4	20.5	20.3	22.3	19.9	18.4	18.2	21.5	5.3	32.6	17.4	24
5	16.9	13.8	12.2	19.5	14.9	12.9	14.2	18.8	21.2	19.2	16.2	14.3	33.3	27.0	29.4	34.1	34.0	20.4	20.1	31.3	26.1	20.4	18.8	18.9	12.2	34.1	21.2	24
6	16.3	14.9	14.9	16.9	15.8	13.8	14.5	9.4	8.1	13.4	24.1	22.4	32.3	40.1	35.1	34.0	24.1	27.4	30.9	27.4	36.4	24.8	21.9	21.9	8.1	40.1	22.5	24
7	17.3	21.3	26.8	25.0	23.0	20.8	23.2	22.5	24.5	24.1	20.0	30.9	33.6	32.3	30.7	25.0	23.3	18.2	15.4	X	X	X	X	19.5	15.4	33.6	23.9	20
8	X	12.3	16.7	16.8	13.8	19.7	13.1	14.5	13.9	15.1	14.8	12.8	13.4	25.7	26.6	20.2	17.3	11.3	14.1	14.5	15.4	13.0	17.4	16.0	11.3	26.6	16.0	23
9	16.5	18.9	15.6	19.1	19.8	28.5	27.2	25.5	21.7	27.9	27.0	30.3	37.3	35.8	36.2	29.2	31.4	30.7	34.4	41.0	49.1	34.0	29.2	26.8	15.6	49.1	28.9	24
10	22.4	18.9	13.9	13.7	13.2	15.2	16.5	17.3	22.6	25.2	29.8	30.3	30.7	27.4	20.9	18.9	18.7	11.2	12.1	11.4	10.4	12.8	13.8	14.3	10.4	30.7	18.4	24
11	15.2	11.0	13.2	24.4	15.4	27.4	29.4	25.7	21.7	20.4	20.7	18.0	14.6	13.7	12.8	12.7	9.1	8.4	10.8	12.6	11.2	15.2	13.9	14.0	8.4	29.4	16.3	24
12	18.0	22.2	25.0	25.7	27.7	25.1	40.4	42.4	43.9	P	P	P	R	27.9	24.3	31.1	30.9	30.5	31.2	35.1	29.2	32.0	28.1	29.9	18.0	43.9	30.0	20
13	27.0	19.6	17.8	13.9	12.5	10.3	12.3	16.2	15.5	16.3	20.9	18.1	16.3	23.8	23.7	33.4	41.0	48.4	55.7	64.9	55.4	49.7	45.6	45.9	10.3	64.9	29.3	24
14	26.4	34.3	37.8	37.3	41.7	37.7	34.8	28.0	38.8	28.1	26.5	24.1	21.7	20.4	21.5	15.6	14.0	15.4	19.1	25.9	29.2	34.2	29.2	30.6	14.0	41.7	28.0	24
15	27.9	26.3	22.4	22.8	28.3	27.2	38.6	31.1	34.2	35.1	40.6	44.5	49.7	47.6	38.7	48.2	56.5	51.0	43.1	37.2	38.6	37.9	42.3	32.2	22.4	56.5	37.6	24
16	27.7	21.7	22.2	14.5	13.4	20.1	51.0	16.2	12.9	21.7	22.8	28.3	30.3	22.1	23.0	20.4	24.5	27.6	15.7	14.7	20.8	17.7	21.3	18.1	12.9	51.0	22.0	24
17	21.2	28.7	22.4	23.7	19.5	19.1	20.8	25.2	27.6	29.1	25.8	33.7	24.3	22.3	21.7	19.7	14.2	17.7	23.9	22.5	13.1	17.3	9.8	16.4	9.8	33.7	21.7	24
18	13.1	17.7	19.5	15.3	11.4	12.5	11.0	9.2	16.8	16.4	15.6	16.3	16.2	19.7	20.8	20.2	12.5	15.4	21.5	22.0	21.3	16.9	15.0	14.6	9.2	22.0	16.3	24
19	17.4	19.2	16.3	22.2	24.6	27.0	27.9	39.7	32.7	29.6	44.9	32.5	37.9	32.6	31.6	32.5	28.9	26.9	18.7	25.0	19.7	14.1	15.4	23.2	14.1	44.9	26.7	24
20	35.5	53.9	52.1	45.8	45.1	47.7	49.7	49.0	43.1	48.5	42.7	44.7	50.7	40.5	36.8	37.2	35.2	32.8	27.0	27.6	33.5	23.0	21.7	20.4	20.4	53.9	39.3	24
21	17.8	14.0	14.9	14.7	39.5	58.9	17.8	18.2	13.6	28.3	19.5	24.3	26.3	26.7	21.5	22.1	24.9	28.7	29.7	30.3	29.4	22.8	18.2	19.6	13.6	58.9	24.2	24
22	17.1	15.4	29.9	29.6	37.0	13.4	12.7	18.2	15.4	16.2	14.3	11.9	19.6	19.3	21.7	18.9	19.7	22.1	15.8	18.3	20.0	17.4	21.7	28.1	11.9	37.0	19.7	24
23	29.4	24.4	35.1	31.2	30.7	25.7	14.7	19.1	23.0	17.0	31.4	25.2	33.8	32.6	35.6	39.1	35.8	41.1	47.2	42.8	45.9	40.6	34.1	18.1	14.7	47.2	31.4	24
24	21.6	29.5	31.7	29.5	22.9	21.8	15.4	15.0	17.4	19.8	27.1	36.5	31.5	30.8	26.2	21.4	11.1	P	P	15.2	13.7	25.1	25.7	28.3	11.1	36.5	23.5	22
25	27.3	28.1	36.0	23.7	18.5	17.4	17.0	25.2	26.1	17.2	22.9	24.6	24.0	25.8	30.2	39.0	26.6	24.8	25.7	29.0	24.0	22.9	21.6	27.0	17.0	39.0	25.2	24
26	26.8	28.5	38.6	54.1	42.8	46.5	53.9	58.0	60.5	59.8	70.7	56.1	62.4	51.5	46.4	42.7	31.2	41.4	34.6	33.4	37.7	39.7	30.5	16.9	16.9	70.7	44.4	24
27	18.7	21.9	27.2	22.6	50.0	47.3	34.9	26.5	41.4	46.9	68.6	60.1	55.1	48.4	57.6	64.8	71.6	53.4	43.3	45.6	45.6	35.1	22.6	20.2	18.7	71.6	42.9	24
28	22.2	20.2	18.7	17.1	17.6	16.2	16.0	21.0	19.9	21.1	22.4	30.8	27.7	30.5	27.3	27.5	29.6	26.6	19.6	17.2	15.9	12.4	12.6	19.4	12.4	30.8	21.2	24
29	22.7	21.1	18.5	16.1	20.9	14.2	19.0	24.9	23.8	26.4	29.9	43.1	38.4	38.5	26.6	31.9	28.1	24.8	23.5	16.5	17.4	30.6	25.5	29.5	14.2	43.1	25.5	24
30	31.3	28.6	34.8	23.3	24.6	28.4	20.7	14.3	14.8	18.7	30.4	27.1	25.2	30.4	19.2	18.5	20.3	17.4	17.2	22.2	15.6	16.1	20.9	19.6	14.3	34.8	22.5	24
HOURLY MAX	35.5	53.9	52.1	54.1	50.0	58.9	53.9	58.0	60.5	59.8	70.7	60.1	62.4	51.5	57.6	64.8	71.6	53.4	55.7	64.9	55.4	49.7	45.6	45.9				
HOURLY AVG	21.6	22.2	24.1	23.1	24.1	24.5	24.0	23.3	25.0	25.2	28.3	28.5	30.4	29.7	28.1	28.1	26.9	26.5	25.7	26.8	26.2	24.1	22.7	22.2				

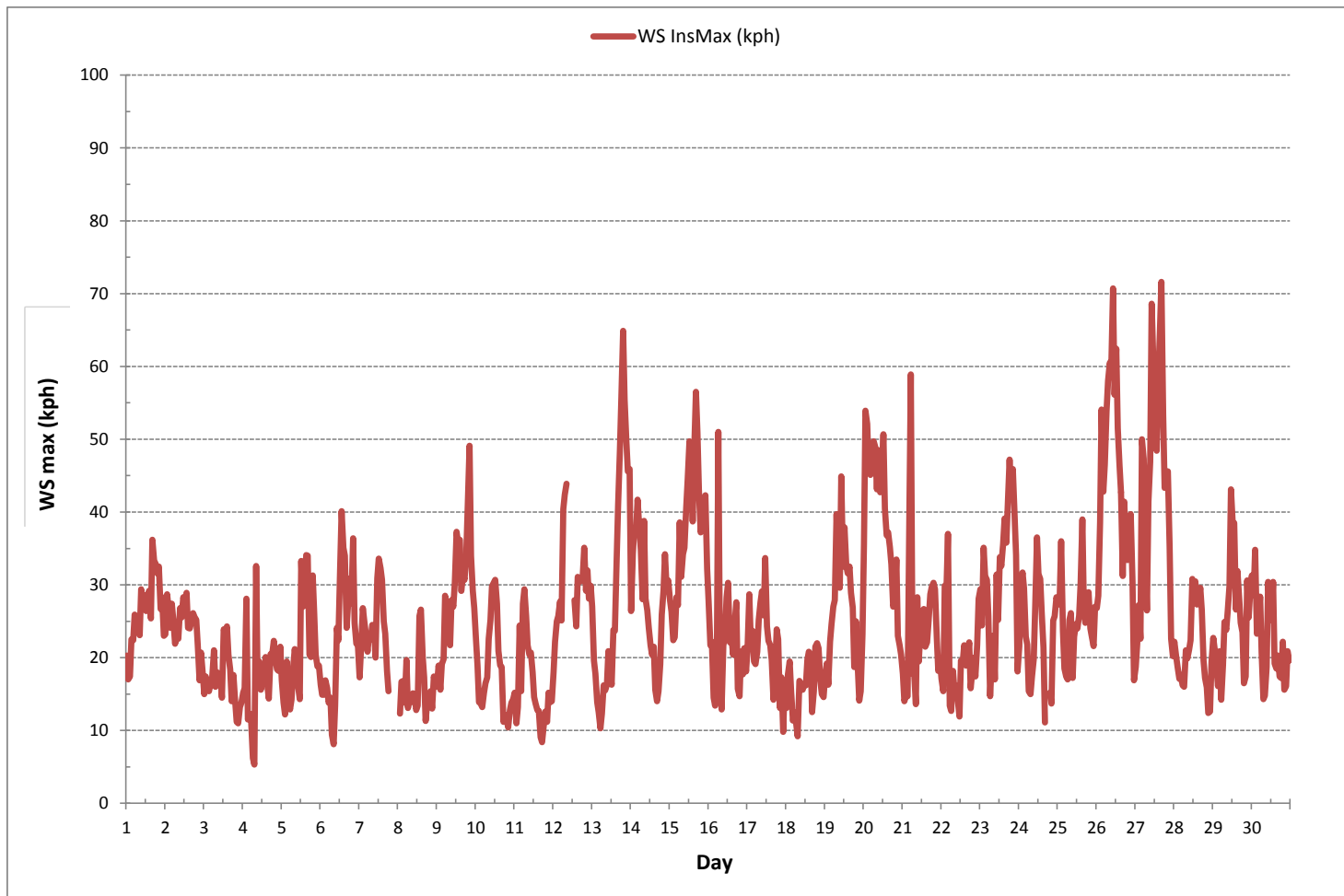
STATUS FLAG CODES

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

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	71.6	kph	@ HOUR	16	ON DAY	27
OPERATIONAL TIME:						709 hrs

WIND SPEED Instantaneous Maximum (WS kph)



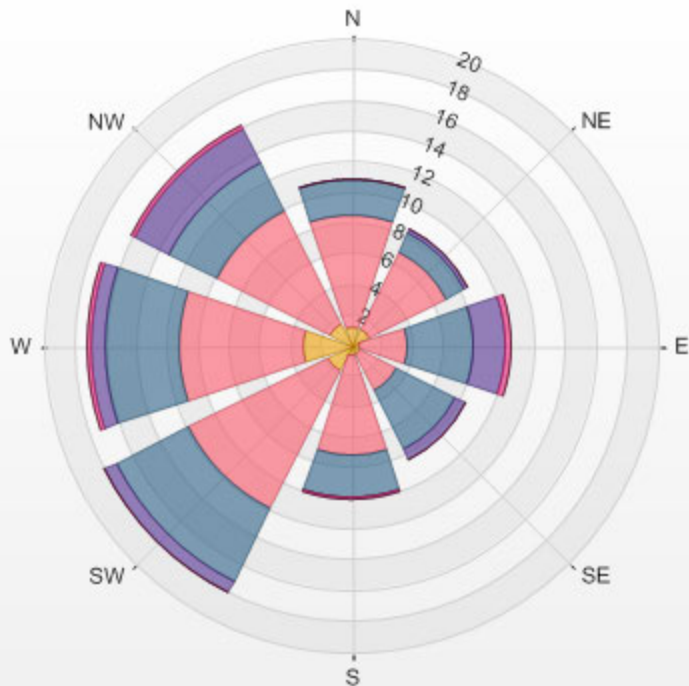
Wind: LICA ST. LINA
 Monitor: WSP [kph]
 Monthly: 17/11
 Type: WindRose
 Direction: Blowing From (Wind Frequency)
 Based On 1 Hr.

Calm: 0.28%

Direction	1.8-5.7	5.7-11.4	11.4-17.1	17.1-22.8	22.8-28.5	>28.5	Total
N	1.3	7.3	2.4	0.0	0.0	0.0	10.9
NE	1.3	5.6	1.4	0.3	0.0	0.0	8.5
E	0.6	3.1	4.3	2.1	0.4	0.0	10.5
SE	0.7	2.5	4.3	0.8	0.0	0.0	8.4
S	0.7	6.4	2.8	0.0	0.1	0.0	10.1
SW	1.8	10.1	5.3	0.8	0.0	0.0	18.0
W	3.2	8.1	4.8	1.0	0.3	0.0	17.3
NW	1.7	8.1	3.6	2.4	0.3	0.0	16.1
Summary	11.2	51.1	28.9	7.4	1.1	0.0	100.0

% Icon Classes (kph) 11 1.8-5.7 51 5.7-11.4 29 11.4-17.1 7 17.1-22.8 1 22.8-28.5 0 >28.5

LICA ST. LINA 2017/11/01 00:00 - 2017/11/30 23:00 Calm: 0.28% Calm Wind Avg Speed: 0.58(kph)



WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2017

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

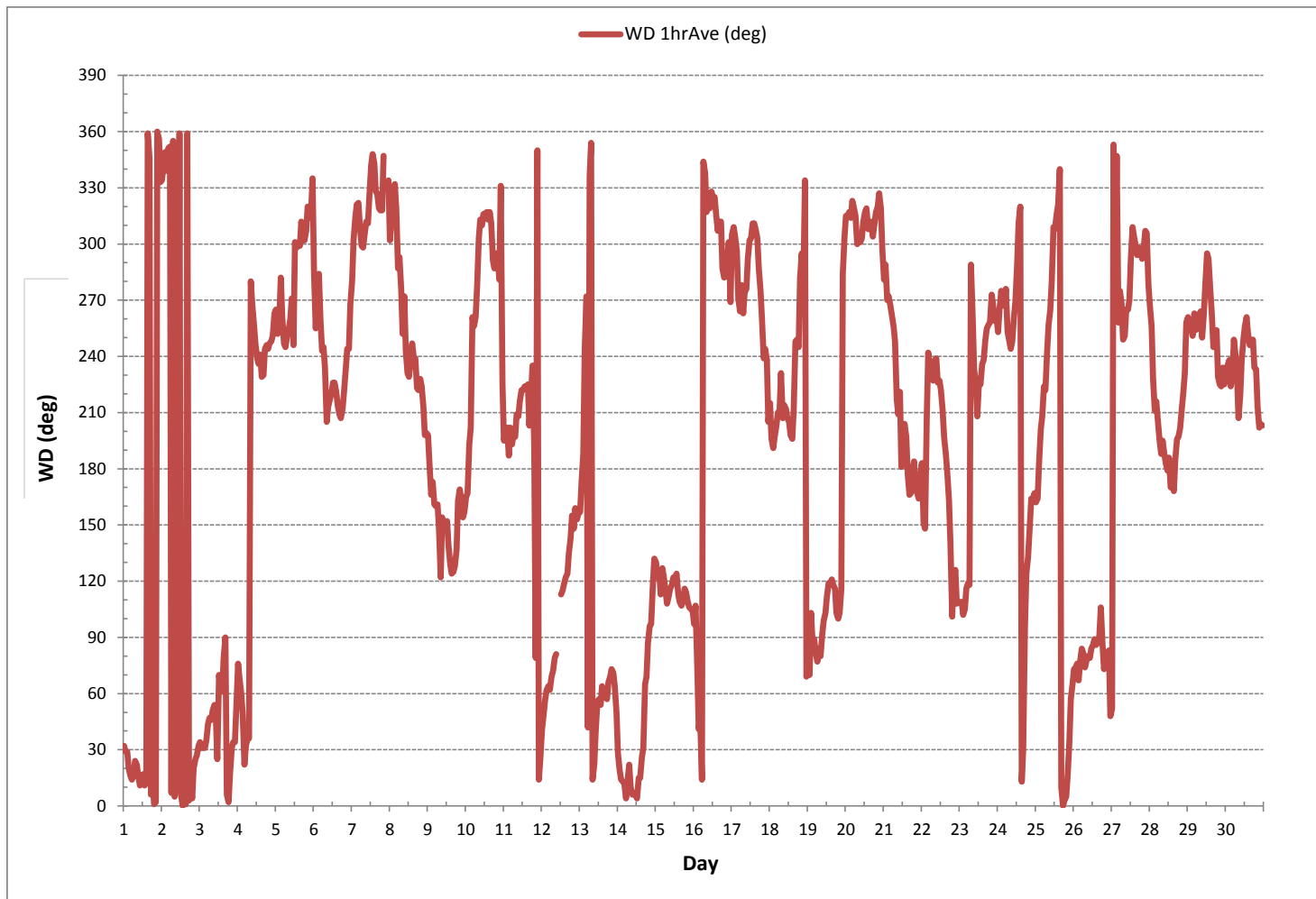
STATUS FLAG CODES

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:	716	hrs
STANDARD DEVIATION:	101		AMD OPERATION UPTIME:	99.4	%
			MONTHLY AVERAGE:	261	(W)

WIND DIRECTION Hourly Averages (WD)



STANDARD DEVIATION WIND DIRECTION



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - November 2017

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	12	13	12	12	12	12	12	11	12	13	14	12	13	13	15	14	15	14	13	20	15	15	15	14	24	
2	12	14	15	15	15	15	12	17	14	15	17	21	16	17	16	18	16	14	13	15	12	12	11	10	24	
3	11	11	11	10	9	9	10	10	10	11	12	15	16	15	14	17	18	17	8	6	7	7	9	8	24	
4	6	10	11	13	7	7	5	4	17	15	12	13	13	16	10	8	5	5	4	4	6	4	5	8	24	
5	9	5	5	13	11	5	7	7	9	11	14	9	19	15	16	17	14	14	15	16	13	14	13	17	24	
6	22	10	12	16	9	8	6	5	8	11	10	9	9	9	9	10	9	9	9	9	7	7	6	8	24	
7	11	12	13	12	11	12	12	12	13	14	16	15	18	16	16	14	13	13	12	13	16	X	X	14	22	
8	14	8	8	7	10	10	11	9	8	14	14	10	10	11	9	8	7	5	4	4	5	8	9	9	24	
9	10	10	11	13	12	12	12	13	14	17	16	16	15	16	14	14	13	14	15	14	15	16	14	14	24	
10	13	12	15	16	10	7	6	11	14	14	14	15	13	14	14	17	15	14	15	14	15	14	10	14	13	24
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12	10	10	10	11	11	10	11	11	12	12	P	P	14	14	14	15	13	15	14	14	17	15	15	15	22	
13	17	17	16	19	21	49	51	27	26	17	16	17	18	18	17	16	15	15	15	15	15	16	14	15	24	
14	14	13	14	13	13	16	13	12	14	15	15	17	17	20	20	16	21	15	15	14	14	13	13	13	15	24
15	14	15	12	13	14	15	14	13	13	14	14	15	15	14	14	13	13	12	14	14	12	12	12	13	24	
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19	8	8	10	10	10	11	11	11	12	11	11	12	13	13	14	13	12	13	13	11	12	23	40	15	24	
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21	14	14	17	14	16	20	8	28	19	34	14	18	23	14	14	14	14	13	13	13	14	13	15	14	24	
22	15	23	18	14	21	9	10	7	7	9	7	37	10	12	14	16	14	16	14	11	12	14	13	11	24	
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24	7	11	13	11	10	11	8	6	7	7	10	14	17	15	14	18	8	18	11	9	8	10	8	8	24	
25	9	9	10	9	6	3	4	6	7	6	11	13	13	15	13	15	15	16	17	15	11	13	14	12	24	
26	11	12	12	11	11	12	12	11	11	11	11	11	11	11	11	11	11	13	14	13	14	13	12	11	12	24
27	12	24	16	21	15	14	12	8	8	11	12	14	16	15	15	14	15	15	15	15	14	13	12	10	24	
28	6	6	9	5	5	4	6	7	8	9	11	13	12	12	15	12	11	10	9	7	9	7	6	7	24	
29	4	4	5	4	6	3	5	8	9	7	12	14	15	16	16	12	7	8	8	12	10	10	9	7	24	
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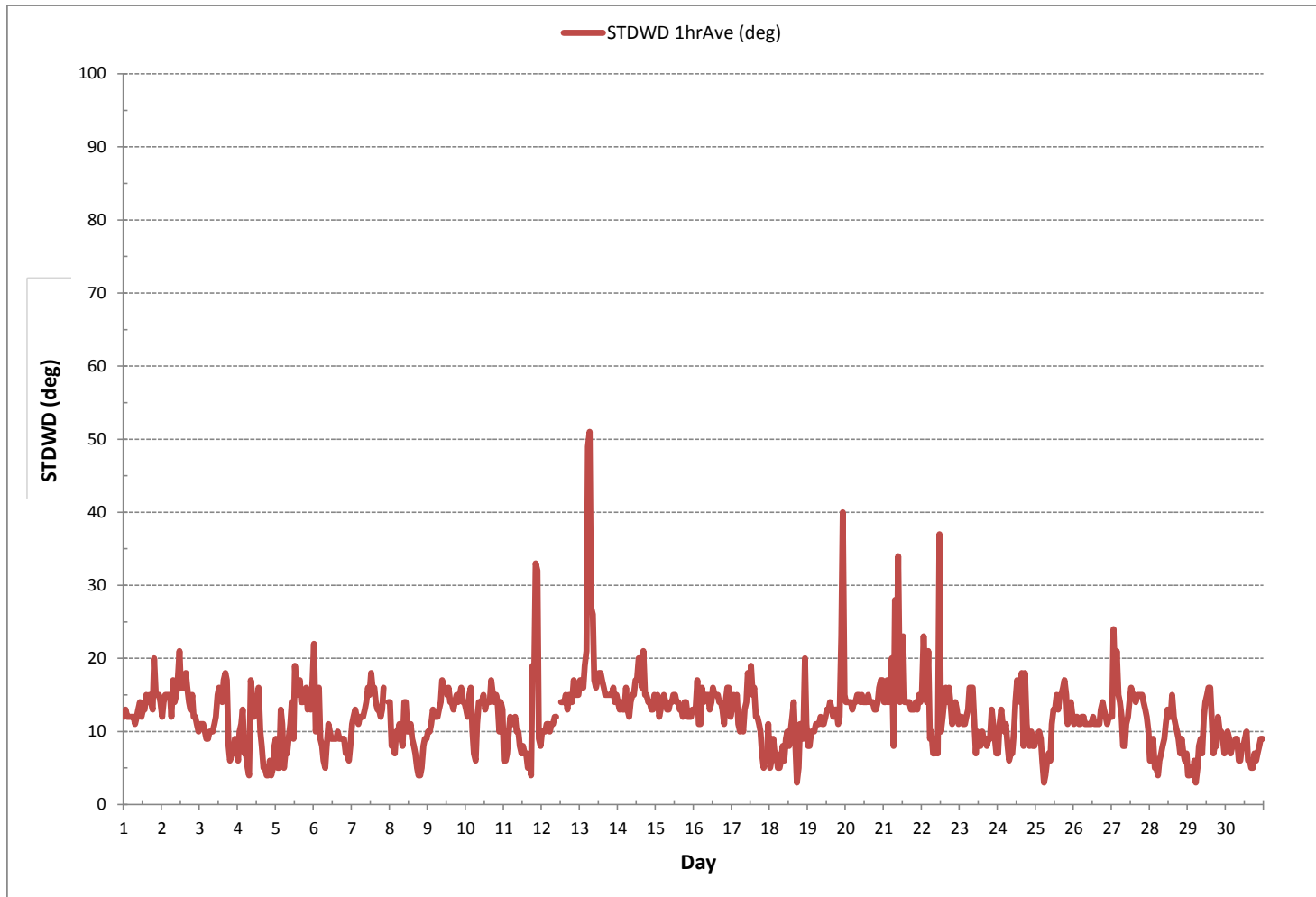
STATUS FLAG CODES

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

LAST CALIBRATION: May 25, 2017

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 716 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



RELATIVE HUMIDITY



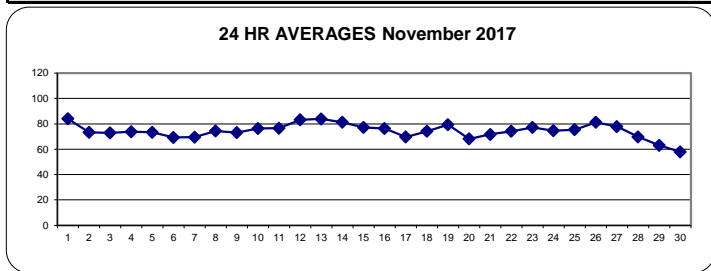
RELATIVE HUMIDITY Hourly Averages (RH %)

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	88	88	88	88	88	88	88	87	87	85	84	82	81	78	78	80	82	83	83	82	82	82	82	82	78	88	84	24	
2	82	81	81	81	81	81	81	81	77	66	59	59	64	62	67	70	74	76	74	74	72	72	72	73	59	82	73	24	
3	76	78	79	79	79	78	77	76	73	66	59	57	58	58	64	70	73	76	77	78	79	80	79	79	57	80	73	24	
4	79	78	79	79	80	81	80	80	73	62	61	63	62	63	67	68	73	77	79	78	77	77	76	77	61	81	74	24	
5	77	76	77	78	77	77	78	78	78	77	78	75	70	66	67	73	62	62	64	75	73	72	74	77	62	78	73	24	
6	79	78	76	76	78	82	82	81	77	69	60	60	58	55	55	58	64	68	68	67	66	67	68	69	55	82	69	24	
7	69	70	71	73	74	76	78	78	74	68	69	68	66	59	58	61	65	66	67	71	75	X	X	73	58	78	70	22	
8	75	78	79	79	78	79	78	77	75	71	67	64	62	64	66	68	71	78	81	81	80	79	78	77	62	81	74	24	
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10	75	76	76	77	77	78	80	80	79	77	75	75	74	73	72	73	74	75	76	76	76	77	80	81	72	81	76	24	
11	83	82	81	81	80	80	80	80	79	74	70	67	62	62	63	67	75	80	80	82	83	83	83	81	62	83	77	24	
12	81	82	81	81	82	83	83	84	83	83	P	P	83	83	84	84	84	84	84	85	84	84	84	84	84	81	85	83	22
13	84	83	83	83	83	83	83	83	83	83	83	84	84	84	84	84	85	85	85	85	85	85	85	85	83	85	84	24	
14	85	84	84	83	82	82	82	81	81	81	81	81	81	81	81	80	80	81	80	80	80	80	80	79	79	85	81	24	
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16	78	78	77	77	77	77	77	77	77	77	76	75	72	73	73	74	76	78	78	78	78	78	78	76	72	78	76	24	
17	76	74	75	74	76	76	75	75	74	70	65	61	54	53	54	59	66	70	72	73	76	75	75	74	53	76	70	24	
18	74	74	75	75	76	76	75	76	75	74	72	73	75	73	69	70	69	69	71	73	74	77	82	84	69	84	74	24	
19	82	82	80	80	79	81	82	83	84	82	82	81	79	74	74	76	77	78	78	78	78	78	78	80	74	84	79	24	
20	82	80	72	71	71	70	70	68	67	64	63	63	62	61	62	64	65	66	67	68	69	69	70	70	61	82	68	24	
21	71	72	72	73	73	74	74	74	74	72	71	71	69	69	70	71	70	70	70	71	72	73	73	72	69	74	72	24	
22	72	73	73	75	77	76	76	76	75	73	73	73	66	67	68	71	73	73	73	75	76	81	83	83	66	83	74	24	
23	83	82	81	81	80	80	81	81	80	73	76	75	75	73	67	69	76	79	78	78	73	75	77	79	67	83	77	24	
24	79	78	75	74	76	75	75	77	77	73	63	55	54	54	57	69	82	85	86	86	85	84	86	86	54	86	75	24	
25	84	82	82	82	82	81	82	82	77	68	59	59	58	58	62	73	80	80	80	79	79	80	81	79	58	84	75	24	
26	79	81	81	80	81	82	82	81	80	79	79	80	79	80	80	81	84	83	82	83	84	84	84	84	79	84	81	24	
27	83	83	84	83	84	84	84	85	85	86	82	76	70	70	69	68	71	70	69	71	75	76	78	81	68	86	78	24	
28	83	81	82	83	82	81	80	78	74	67	62	56	48	46	51	59	64	68	70	71	71	72	73	72	46	83	70	24	
29	69	69	66	66	68	68	67	65	66	63	58	55	54	54	57	60	66	67	66	66	66	66	62	57	54	69	63	24	
30	55	54	52	54	53	53	54	55	59	57	52	50	47	46	49	54	63	66	68	69	69	70	71	71	46	71	58	24	
HOURLY MAX	88	88	88	88	88	88	88	87	87	86	84	84	84	84	84	84	85	85	86	86	85	85	86	86					
HOURLY AVG	78	78	77	77	78	78	78	78	77	73	70	68	67	66	67	70	73	75	75	76	76	77	77	77					

STATUS FLAG CODES

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

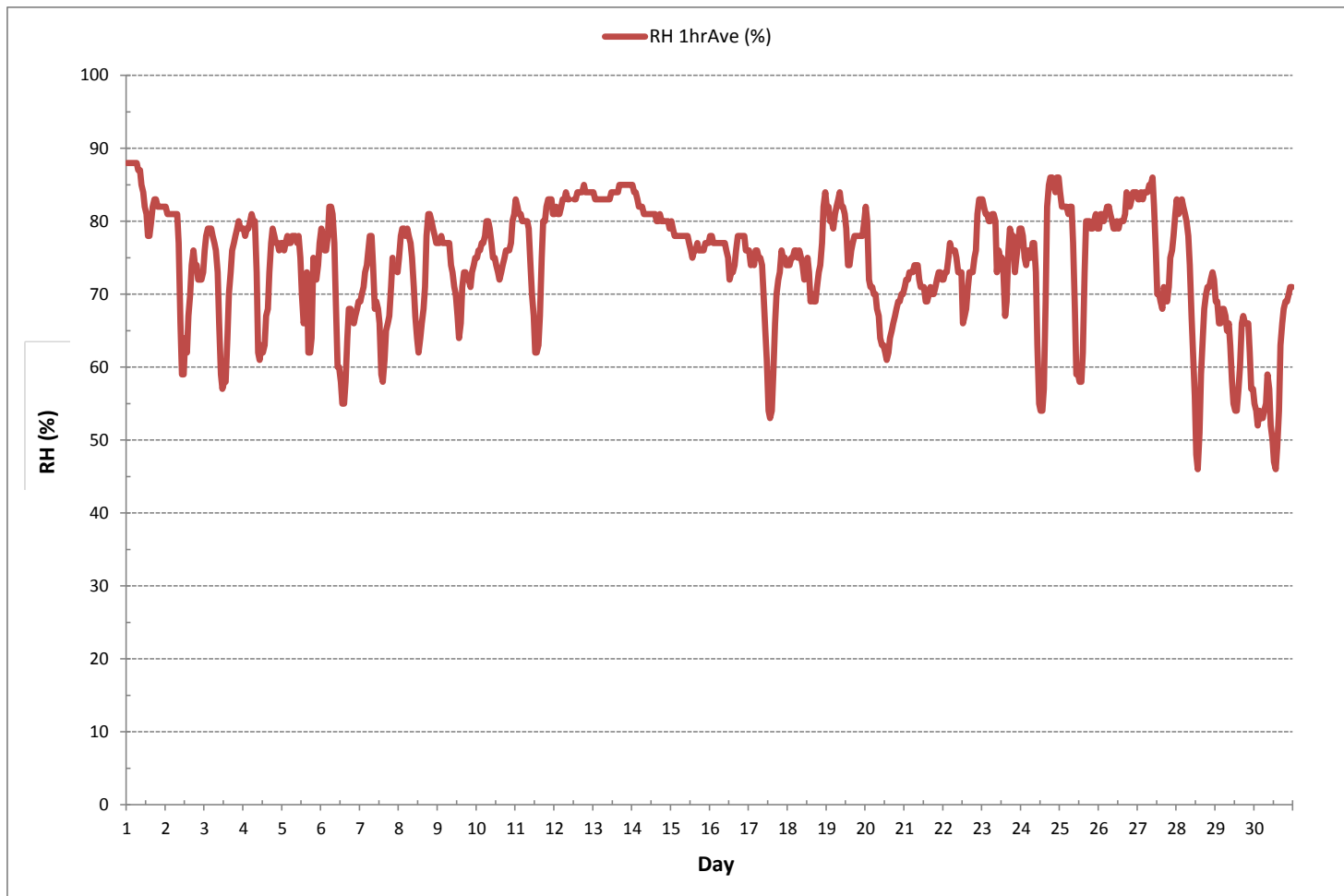
24 HR AVERAGES November 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	46	%	@ HOUR	13	ON DAY	28
MAXIMUM 1-HR AVERAGE:	88	%	@ HOUR	0	ON DAY	1
MAXIMUM 24-HR AVERAGE:	84	%			ON DAY	1
OPERATIONAL TIME:						716 hrs
AMD OPERATION UPTIME:						99.4 %
STANDARD DEVIATION:	8					
MONTHLY AVERAGE:						74 %

RELATIVE HUMIDITY Hourly Averages (RH %)



BAROMETRIC PRESSURE



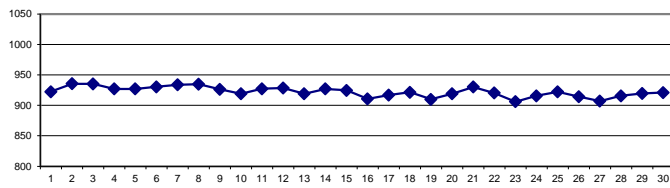
BAROMETRIC PRESSURE Hourly Averages (BP mbar)

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	914	915	916	917	917	918	919	919	920	921	922	923	923	924	924	925	926	926	927	928	928	929	930	930	914	930	923	24	
2	930	931	931	932	932	933	933	934	935	935	937	937	937	937	937	937	938	938	938	938	938	939	939	939	930	939	936	24	
3	939	938	939	938	938	937	937	937	937	937	937	938	937	936	935	935	934	933	933	932	932	931	930	930	930	930	939	935	24
4	929	929	929	928	928	928	927	927	927	928	928	928	928	928	927	927	926	926	926	926	926	926	926	926	926	926	929	927	24
5	926	925	925	925	925	925	925	926	926	927	927	928	928	928	927	928	928	928	928	929	929	930	930	930	925	930	927	24	
6	930	930	931	931	931	931	931	931	931	931	932	932	932	932	931	931	930	930	929	929	929	929	929	929	929	929	932	931	24
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8	935	935	935	935	934	935	935	934	934	935	935	935	936	936	936	935	935	935	934	934	934	934	934	933	933	933	936	935	24
9	933	933	932	932	931	931	930	930	929	929	929	928	928	927	925	924	923	922	921	920	919	918	918	918	918	918	933	926	24
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11	923	924	924	924	924	925	924	925	925	926	927	928	928	929	929	930	930	930	931	931	931	931	931	931	923	931	927	24	
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13	922	921	921	921	921	920	921	921	921	920	920	920	920	919	919	918	918	917	916	916	917	916	916	917	916	922	919	24	
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23	913	912	910	908	907	905	904	905	905	904	905	905	905	905	905	905	905	905	905	905	906	906	906	907	904	913	906	24	
24	907	908	909	910	911	912	913	913	914	915	916	917	918	919	919	919	920	920	920	920	920	920	920	919	907	920	916	24	
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27	899	900	902	901	901	902	902	903	904	904	904	905	906	907	908	910	911	912	913	914	915	916	917	917	899	917	907	24	
28	917	918	918	918	919	918	918	918	918	918	918	917	917	916	915	914	914	913	913	913	913	912	912	912	912	912	919	916	24
29	913	913	913	914	914	915	916	917	918	919	921	922	922	923	924	924	924	924	924	924	924	924	923	923	913	924	920	24	
30	922	922	922	921	921	921	921	921	921	921	921	922	922	922	922	921	921	921	920	920	920	920	920	920	920	920	922	921	24
HOURLY MAX	939	938	939	938	938	937	937	937	937	937	937	938	937	937	937	937	938	938	938	938	938	939	939	939	939				
HOURLY AVG	922	922	922	922	922	922	922	922	922	923	923	923	923	923	923	923	923	923	922	922	922	922	922	922	920	922	921	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

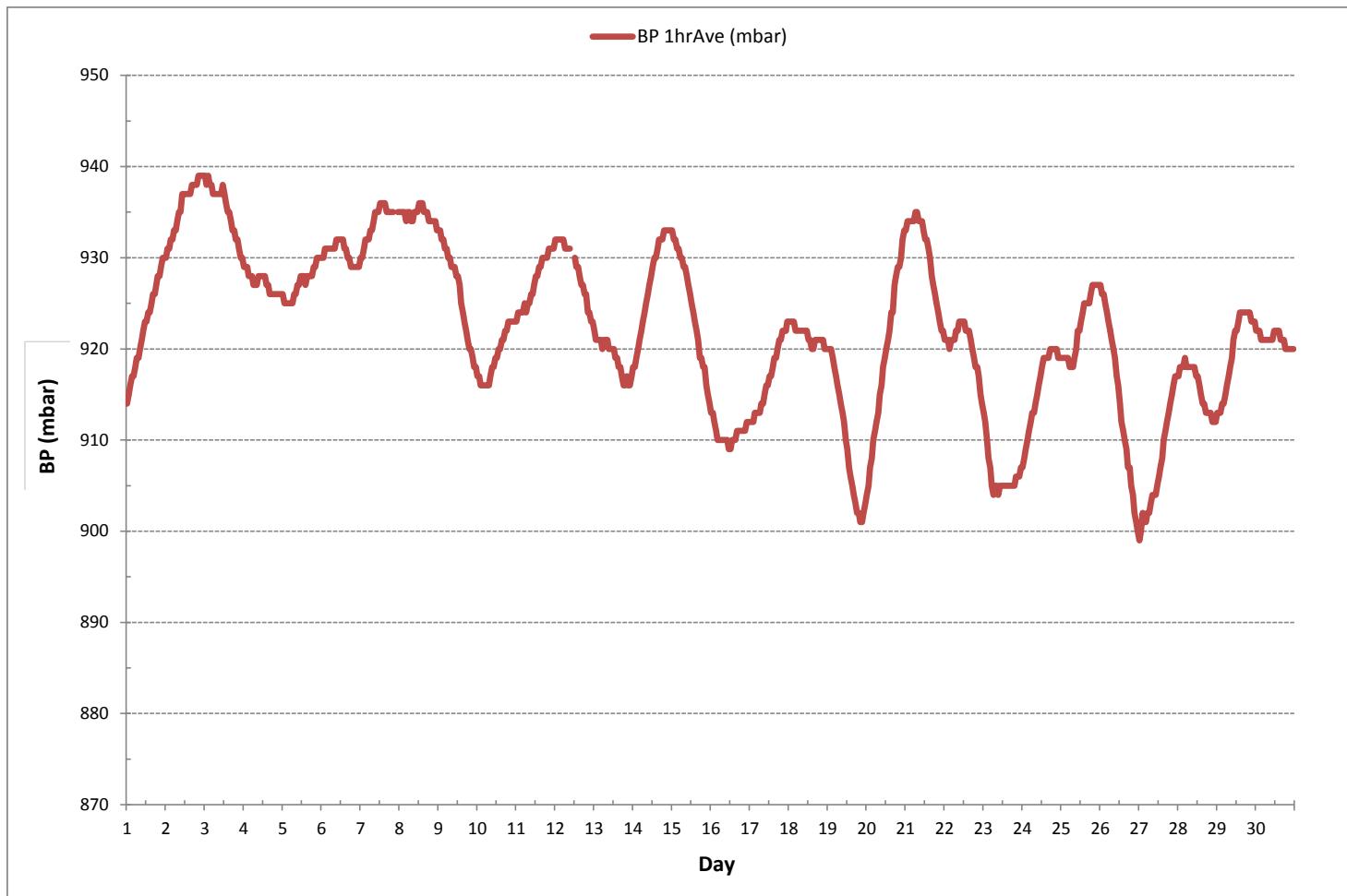
24 HR AVERAGES November 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	899	mbar	@ HOUR	0	ON DAY	27
MAXIMUM 1-HR AVERAGE:	939	mbar	@ HOUR	20	ON DAY	2
MAXIMUM 24-HR AVERAGE:	936	mbar			ON DAY	2
OPERATIONAL TIME:						716 hrs
AMD OPERATION UPTIME:						99.4 %
STANDARD DEVIATION:	9				MONTHLY AVERAGE:	922 mbar

BAROMETRIC PRESSURE Hourly Averages (BP mbar)



AMBIENT TEMPERATURE



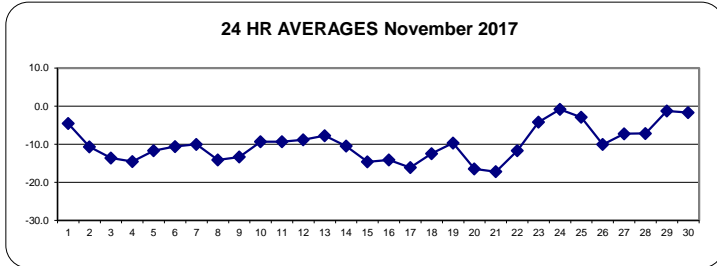
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY 1	-3.3	-3.3	-3.4	-3.5	-3.9	-4.1	-4.1	-4.1	-3.6	-3.1	-2.7	-2.2	-2.1	-2.0	-2.4	-3.1	-4.0	-5.3	-6.2	-7.1	-8.0	-8.4	-8.8	-10.0	-10.0	-2.0	-4.5	24	
2	-10.3	-10.2	-10.1	-10.8	-11.1	-11.5	-12.0	-12.5	-11.3	-8.6	-7.4	-7.5	-9.1	-9.0	-9.5	-10.2	-10.9	-11.4	-11.7	-11.9	-12.0	-12.3	-12.5	-13.0	-13.0	-7.4	-10.7	24	
3	-13.2	-13.3	-13.6	-14.3	-15.6	-16.6	-17.3	-17.7	-15.6	-12.5	-10.6	-9.8	-8.5	-8.5	-10.2	-12.2	-12.7	-13.8	-14.2	-14.6	-15.3	-15.8	-16.0	-15.8	-17.7	-8.5	-13.7	24	
4	-15.2	-14.7	-14.7	-15.0	-15.9	-16.6	-17.0	-16.9	-13.9	-11.9	-11.7	-10.8	-10.0	-10.1	-11.1	-11.8	-14.0	-15.2	-16.1	-17.0	-17.6	-17.9	-18.1	-17.2	-18.1	-10.0	-14.6	24	
5	-16.5	-17.2	-17.3	-15.5	-15.5	-16.1	-15.3	-14.7	-13.7	-12.0	-10.2	-8.1	-6.9	-6.8	-7.3	-7.8	-8.8	-9.3	-9.3	-9.5	-10.2	-10.6	-10.7	-10.9	-17.3	-6.8	-11.7	24	
6	-11.3	-11.5	-11.4	-11.4	-12.1	-13.5	-14.2	-15.0	-14.0	-11.6	-7.5	-6.8	-6.6	-6.3	-6.3	-7.1	-8.8	-10.5	-11.1	-11.2	-11.5	-11.7	-11.4	-15.0	-6.3	-10.6	24		
7	-10.7	-10.4	-9.8	-10.0	-10.1	-10.4	-10.9	-10.9	-9.8	-8.8	-8.4	-8.3	-8.4	-8.7	-8.8	-9.4	-10.2	-10.6	-10.8	-11.0	-11.4	X	X	-12.9	-12.9	-8.3	-10.0	22	
8	-13.6	-14.7	-15.6	-16.0	-16.6	-16.4	-16.4	-16.7	-16.6	-14.2	-12.0	-10.3	-9.7	-9.4	-10.0	-10.4	-11.2	-13.2	-14.3	-15.2	-15.7	-16.3	-17.0	-17.7	-17.7	-9.4	-14.1	24	
9	-17.6	-17.6	-17.0	-16.6	-17.1	-17.4	-16.9	-16.3	-16.1	-15.0	-12.5	-11.0	-10.4	-9.3	-10.1	-12.3	-12.4	-11.9	-11.1	-10.4	-10.4	-10.5	-10.6	-17.6	-10.6	-9.3	-13.4	24	
10	-10.6	-10.5	-10.4	-10.2	-10.1	-10.4	-11.2	-11.2	-10.1	-8.9	-8.0	-7.9	-7.8	-7.4	-7.6	-7.9	-8.2	-8.5	-8.6	-8.7	-8.8	-9.2	-10.4	-11.1	-11.2	-7.4	-9.3	24	
11	-12.0	-13.4	-13.4	-13.6	-13.7	-12.8	-12.2	-11.8	-11.4	-10.0	-8.5	-7.0	-5.0	-4.1	-3.8	-5.0	-7.0	-7.9	-7.8	-8.4	-8.9	-8.9	-8.7	-8.2	-13.7	-3.8	-9.3	24	
12	-8.5	-9.4	-9.4	-9.4	-9.8	-10.2	-10.5	-10.7	-10.2	-9.7	P	P	-8.1	-7.8	-7.5	-7.7	-7.8	-7.8	-8.0	-8.1	-8.1	-8.3	-8.7	-8.8	-10.7	-7.5	-8.8	22	
13	-8.7	-8.8	-8.9	-9.1	-9.1	-9.2	-9.1	-9.1	-8.9	-8.3	-7.7	-7.3	-7.1	-7.1	-7.1	-7.3	-7.1	-6.9	-6.8	-6.7	-6.6	-6.5	-6.5	-6.6	-9.2	-6.5	-7.8	24	
14	-7.1	-7.6	-8.2	-9.0	-9.9	-10.5	-10.8	-11.3	-11.3	-11.0	-10.4	-9.3	-9.3	-9.3	-9.3	-10.5	-11.7	-11.6	-11.7	-11.8	-12.0	-12.3	-12.9	-13.0	-13.0	-7.1	-10.5	24	
15	-12.9	-12.9	-14.7	-15.5	-14.9	-14.9	-15.0	-14.4	-13.6	-12.7	-12.8	-13.9	-14.7	-14.6	-14.7	-15.0	-15.3	-15.7	-15.9	-16.0	-16.0	-16.0	-15.4	-15.1	-16.0	-12.7	-14.6	24	
16	-14.8	-14.4	-14.7	-15.6	-15.6	-15.6	-15.5	-15.4	-15.2	-15.1	-13.4	-12.8	-11.9	-12.1	-12.0	-12.4	-13.9	-14.0	-14.1	-14.3	-13.9	-14.2	-14.2	-15.0	-15.6	-11.9	-14.2	24	
17	-15.6	-15.8	-16.1	-16.7	-17.4	-18.0	-18.1	-18.7	-17.6	-15.2	-13.3	-13.3	-11.3	-11.0	-11.5	-13.3	-15.6	-16.5	-17.1	-18.0	-19.1	-19.3	-20.0	-19.6	-20.0	-11.0	-16.2	24	
18	-20.2	-19.8	-19.0	-18.9	-19.0	-18.9	-18.3	-17.9	-17.8	-17.0	-13.7	-11.9	-10.8	-9.7	-8.1	-7.6	-6.5	-5.9	-5.3	-4.9	-5.6	-6.7	-8.7	-20.2	-20.0	-4.9	-12.5	24	
19	-9.8	-8.6	-9.1	-8.7	-9.0	-9.8	-10.3	-10.1	-10.2	-10.2	-9.8	-8.5	-7.7	-7.4	-8.6	-9.7	-10.5	-10.7	-10.9	-10.9	-10.8	-10.7	-10.3	-9.9	-10.9	-7.4	-9.7	24	
20	-9.0	-8.5	-10.4	-12.0	-14.2	-15.0	-15.9	-17.0	-18.5	-18.8	-18.7	-18.8	-18.4	-18.3	-18.4	-18.5	-16.8	-18.6	-18.6	-18.6	-18.7	-18.5	-18.3	-18.2	-18.8	-8.5	-16.5	24	
21	-18.3	-18.1	-17.9	-17.8	-17.6	-17.6	-17.5	-17.3	-16.7	-16.3	-16.0	-16.5	-16.7	-17.1	-17.4	-17.5	-17.2	-17.5	-17.7	-17.5	-17.0	-16.5	-15.9	-18.3	-15.9	-18.3	-15.9	-17.2	24
22	-15.5	-15.1	-14.7	-14.8	-15.3	-15.0	-14.7	-14.2	-13.7	-12.7	-11.9	-10.2	-9.1	-9.2	-9.1	-9.6	-9.5	-9.1	-8.7	-9.2	-9.6	-10.0	-9.8	-10.0	-15.5	-8.7	-11.7	24	
23	-9.8	-9.4	-9.4	-9.8	-10.2	-10.7	-11.2	-11.2	-11.2	-9.1	-8.0	-4.7	-2.0	1.1	3.2	3.2	1.8	1.1	1.2	1.2	1.9	1.2	0.2	-0.5	-11.2	3.2	-4.2	24	
24	-0.9	-0.9	-0.6	-0.3	-0.7	-0.7	-0.9	-1.3	-1.5	-0.2	2.4	4.7	5.3	4.2	3.2	0.3	-2.5	-3.2	-4.1	-4.6	-4.2	-4.5	-4.6	-4.7	-4.7	5.3	-0.8	24	
25	-4.1	-4.0	-4.0	-3.9	-4.5	-5.1	-5.7	-5.9	-4.7	-2.2	0.8	2.1	3.8	4.1	2.9	0.1	-2.4	-3.5	-3.9	-4.6	-5.1	-5.4	-6.6	-8.0	-8.0	4.1	-2.9	24	
26	-8.2	-8.6	-8.9	-9.8	-10.6	-11.1	-11.6	-12.0	-12.5	-12.7	-12.3	-11.4	-10.5	-10.3	-10.3	-9.9	-9.8	-8.2	-8.2	-9.2	-9.2	-9.0	-8.7	-8.7	-12.7	-8.2	-10.1	24	
27	-8.9	-9.0	-8.8	-8.6	-8.4	-7.9	-7.5	-7.3	-6.5	-4.9	-3.2	-2.9	-2.5	-4.5	-5.2	-6.7	-8.2	-8.9	-9.1	-8.9	-8.6	-8.4	-9.3	-9.9	-9.9	-2.5	-7.3	24	
28	-9.9	-9.7	-9.9	-10.5	-10.5	-10.2	-10.9	-10.7	-10.2	-8.6	-6.5	-4.4	-2.6	-1.7	-3.6	-5.5	-6.3	-6.3	-6.2	-6.0	-5.8	-5.6	-6.0	-5.0	-10.9	-1.7	-7.2	24	
29	-4.2	-4.3	-3.9	-4.0	-4.4	-4.5	-3.8	-2.5	-2.2	-1.4	0.7	2.7	3.7	3.8	2.8	1.3	-0.7	-1.4	-1.6	-2.0	-2.1	-1.1	-0.2	-0.9	-4.5	3.8	-1.3	24	
30	-1.5	-1.8	-1.4	-2.2	-1.9	-1.4	-2.0	-2.3	-3.3	-2.5	-0.1	1.4	2.9	3.7	2.4	0.3	-2.3	-3.0	-3.8	-3.7	-3.7	-4.3	-5.0	-5.7	-5.7	3.7	-1.7	24	
HOURLY MAX	-0.9	-0.9	-0.6	-0.3	-0.7	-0.7	-0.9	-1.3	-1.5	-0.2	2.4	4.7	5.3	4.2	3.2	3.2	1.8	1.1	1.2	1.2	1.9	1.2	0.2	-0.5					
HOURLY AVG	-10.7	-10.8	-10.9	-11.1	-11.5	-11.7	-11.9	-11.9	-11.4	-10.2	-8.7	-7.7	-7.0	-6.8	-7.2	-8.1	-9.0	-9.5	-9.7	-10.0	-10.1	-10.2	-10.5	-10.8					

STATUS FLAG CODES

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

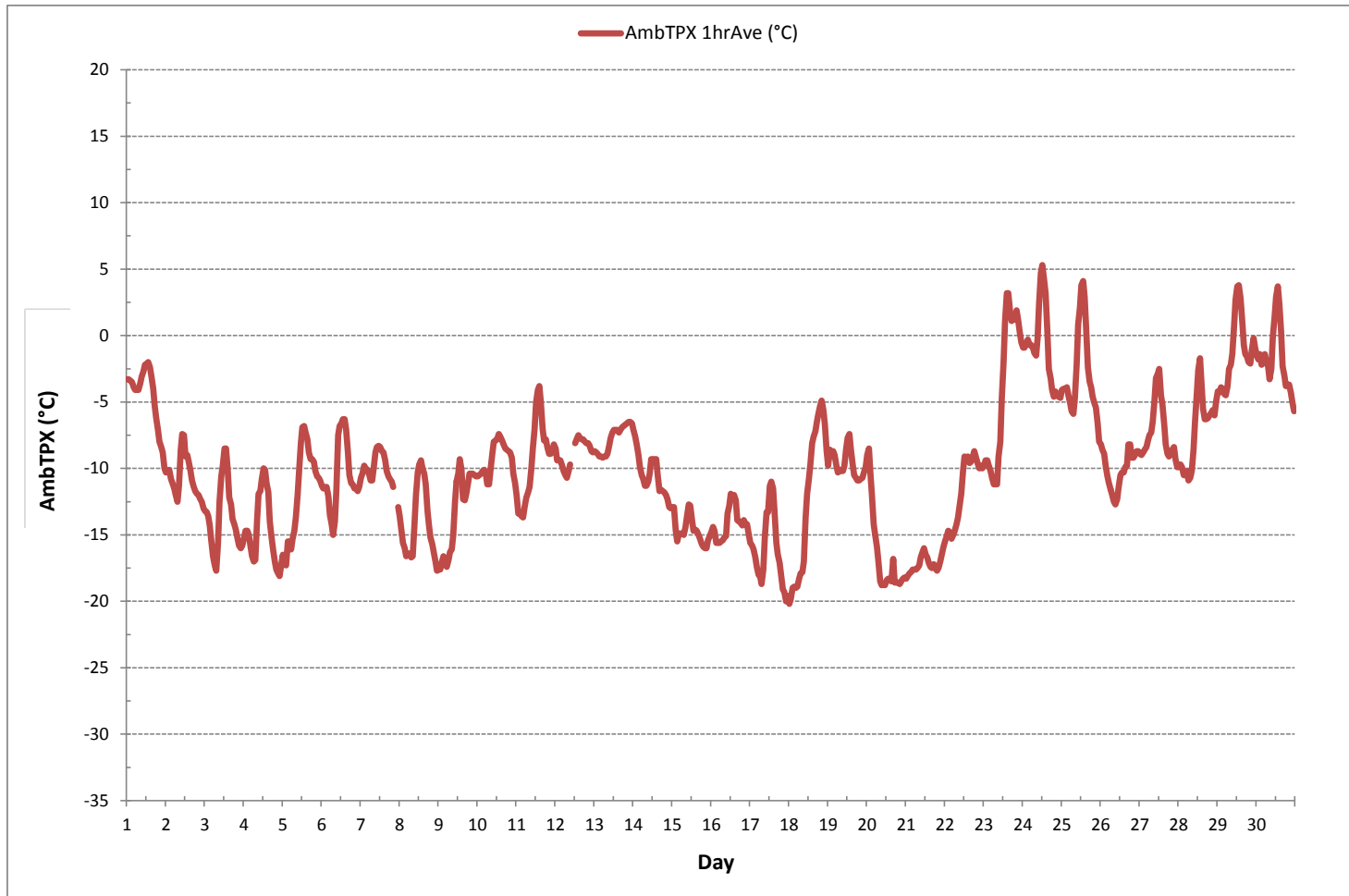
24 HR AVERAGES November 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-20.2 °C	@ HOUR	0	ON DAY	18
MAXIMUM 1-HR AVERAGE:	5.3 °C	@ HOUR	12	ON DAY	24
MAXIMUM 24-HR AVERAGE:	-0.8 °C			ON DAY	24
OPERATIONAL TIME:					716 hrs
AMD OPERATION UPTIME:					99.4 %
STANDARD DEVIATION:	5.2				
MONTHLY AVERAGE:	-9.9 °C				

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



PRECIPITATION



PRECIPITATION Hourly Averages (mm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	0.2	0.1	0.6	0.2	0.1	0.2	0.4	0.2	0.4	0.2	0.3	0.5	0.7	0.1	0.2	0.0	0.1	0.3	0.3	0.3	0.2	0.3	0.2	0.0	0.0	0.7	0.3	24
2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24
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	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	24
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	24
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	P	P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22
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	0.1	0.0	0.1	0.0	24
14	1.9	2.5	2.0	1.2	1.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.4	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	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	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	24
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	24
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	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	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	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	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	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	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	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	24
27	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	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	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	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	24
HOURLY MAX	1.9	2.5	2.0	1.2	1.3	0.5	0.4	0.3	0.4	0.2	0.3	0.5	0.8	0.1	0.3	0.6	0.1	0.3	0.3	0.3	0.2	0.3	0.2	0.2				
HOURLY AVG	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

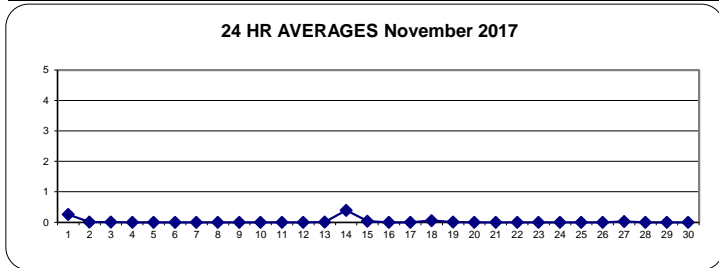
STATUS FLAG CODES

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

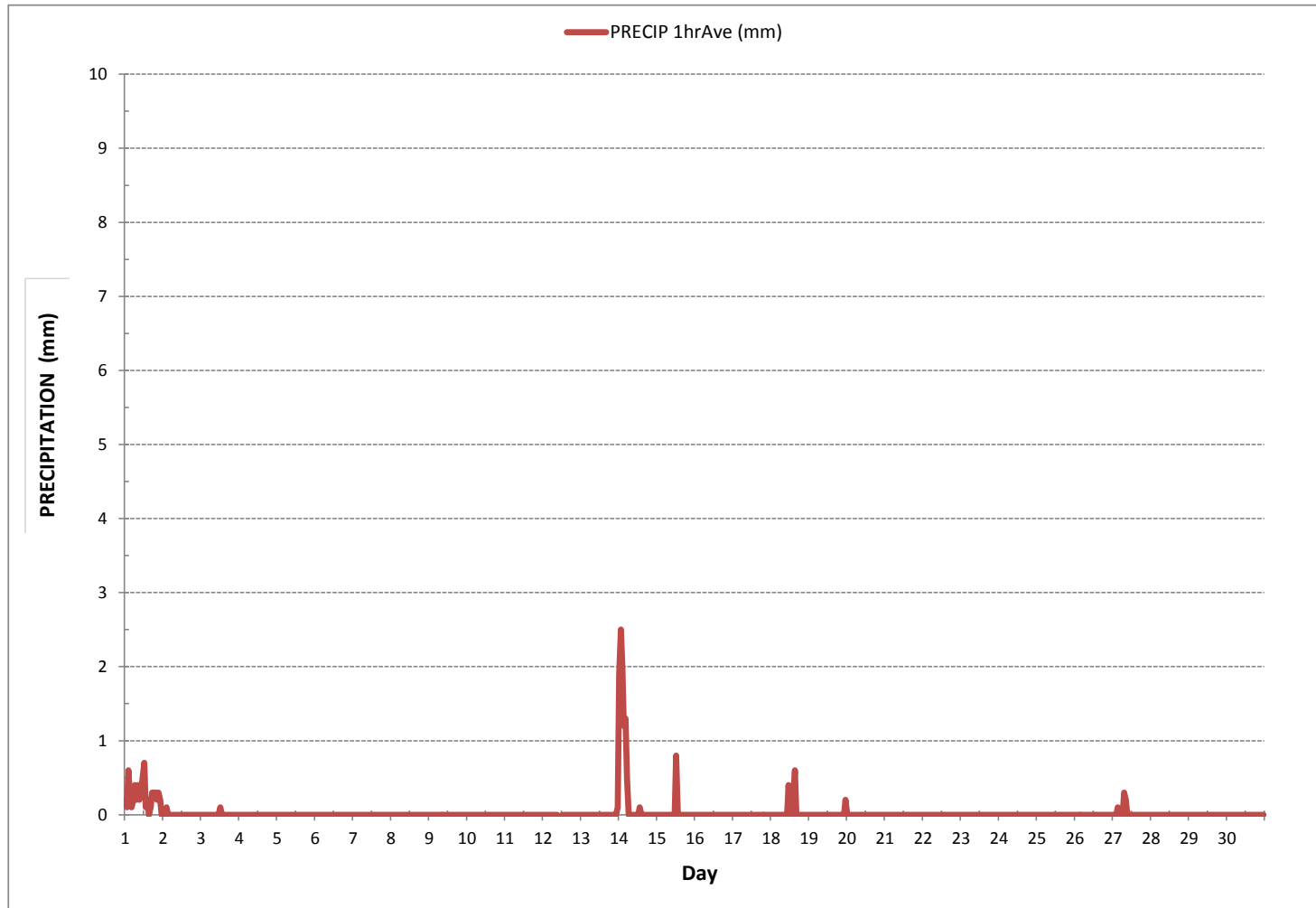
MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	0.0 mm	@ HOUR	15	ON DAY	1
MAXIMUM 1-HR AVERAGE:	2.5 mm	@ HOUR	1	ON DAY	14
MAXIMUM 24-HR AVERAGE:	0.4 mm			ON DAY	14
MONTHLY TOTAL	18.8 mm				
OPERATIONAL TIME:					718 hrs
AMD OPERATION UPTIME:					99.7 %
STANDARD DEVIATION:	0.2	MONTHLY AVERAGE:			0.0 mm

24 HR AVERAGES November 2017



PRECIPITATION Hourly Averages (mm)



APPENDIX II
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE

API 100E Sulphur Dioxide Analyzer Calibration

Date:	November 7, 2017	Barometer/B.P./units:	Brunton 05490 expires December 5, 2017	27.8	inHg
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 160348895 expires April 8, 2018	24	°C
Location/Station Name:	St. Lina	Weather Conditions:	Mainly cloudy with snow		
Parameter:	Sulphur Dioxide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	9:28	Performed By/Reviewer:	Limin Li	Tom Bourque	
End Time 24 hr. (mst):	13:40	Cal Gas Expiry Date:	December 8, 2019		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		

Analyzer:	ID# or Serial Number:	468	Range ppb:	1000
	Last Calibration Date:	October 4, 2017	As Found C.F.:	1.058
	Previous C.F.:	1.000	New C.F.:	1.000

Calibration Standards:	Standard Calibration Points for Ranges								
Low Flow Meter ID/Expiry Date: DC-2 Low 1662 expires February 2, 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: DC-2 High 2272 expires February 2, 2018									
Calibrator ID/Expiry Date: Sabio id# 17200415 expires May 16, 2018									
Cal Gas Cylinder I.D. # : EY0000769									
Cal Gas Conc. (ppm): 50.5									

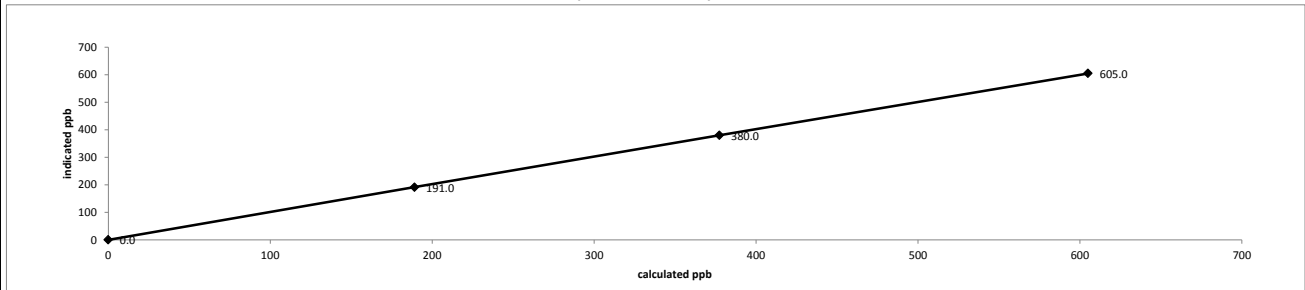
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppb)	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	4903	0.00	4903	0.0	1.0	n/a
as found high	4843	58.73	4902	605.0	573.0	1.058
adjusted zero	4903	0.00	4903	0.0	0.0	n/a
adjusted high	4843	58.73	4902	605.0	605.0	1.000
mid	4886	36.79	4923	377.4	380.0	0.993
low	4900	18.42	4918	189.1	191.0	0.990
calibrator zero	4903	0.00	4903	0.0	1.0	n/a
Average C.F. =						0.994

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) =	-0.11%		± 3% F.S.
% change in C.F. from last cal =	-5.77%		± 10%

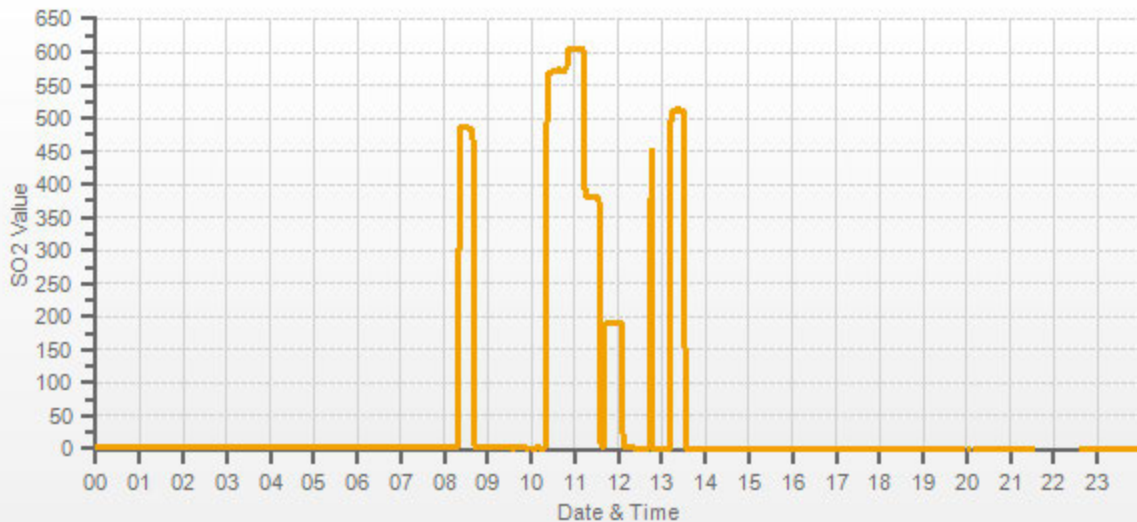
API 100E Sulphur Dioxide Analyzer Calibration



As found:		As left:	
Slope:	0.930	Slope:	0.987
Offset:	137.4	Offset:	138.1
Hvps:	651 V	Hvps:	651 V
Rcell Temp:	50.0 °C	Rcell Temp:	50.0 °C
Box Temp:	33.2 °C	Box Temp:	33.4 °C
Pmt Temp:	7.9 °C	Pmt Temp:	7.9 °C
Izs Temp:	45.0 °C	Izs Temp:	45.0 °C
Pres:	24.1 IN-HG-A	Pres:	24.2 IN-HG-A
Samp Fl:	605 CC/M	Samp Fl:	606 CC/M
Norm Pmt:	138.8 MV	Norm Pmt:	138.4 MV
Uv Lamp:	2946.7 MV	Uv Lamp:	2943 MV
Lamp Ratio:	93.7 %	Lamp Ratio:	93.5 %
Str Lgt:	63.9 PPB	Str Lgt:	68.2 PPB
Drk Pmt:	6.0 MV	Drk Pmt:	5.7 MV
Drk Lmp:	6.3 MV	Drk Lmp:	6.6 MV
Expected Value:	479.0	Expected Value:	510.7

Comments:
The analyzer sample inlet filter was changed.
The manifold blower was found to be working normally.

Flow measurements after mid-point



— SO2[ppb]

HYDROGEN SULPHIDE



API 101E Hydrogen Sulphide Analyzer Calibration

Date:	November 7, 2017	Barometer/B.P./units:	Brunton 05490 expires December 5, 2017	27.81	inHg
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 160348895 expires April 8, 2018	24	°C
Location/Station Name:	St. Lina	Weather Conditions:	Mainly cloudy with snow		
Parameter:	Hydrogen Sulphide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	11:45	Performed By/Reviewer:	Limin Li	Tom Bourque	
End Time 24 hr. (mst):	17:25	Cal Gas Expiry Date:	August 23, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	Internal		

Analyzer:	Range ppb:
ID# or Serial Number:	100
Last Calibration Date:	As Found C.F.:
Previous C.F.:	New C.F.:
509	1.026
October 26, 2017	1.000
0.998	

Calibration Standards:	Standard Calibration Points for Ranges	
Low Flow Meter ID/Expiry Date:	DC-2 Low 1662 expires February 2, 2018	12:22 / 12:32
High Flow Meter ID/Expiry Date:	DC-2 High 2272 expires February 2, 2018	1000
Calibrator ID/Expiry Date:	Envionics id# 1991 expires March 16, 2018	780
Cal Gas Cylinder I.D. #:	LL119500	0.0
Cal Gas Conc. (ppm):	9.8	0.0
		0.0

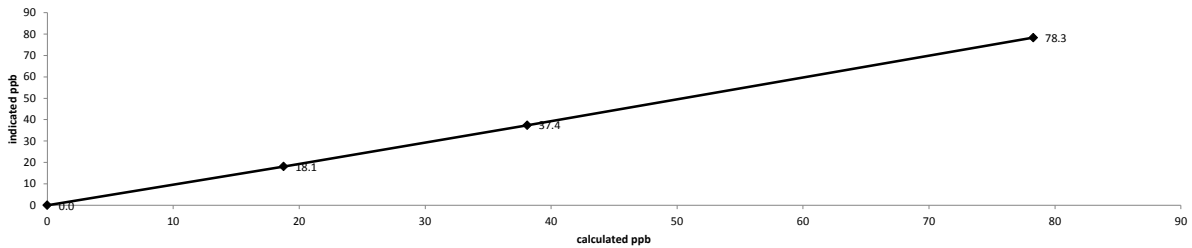
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	7459	0.00	7459	0.0	0.0	n/a
as found high	7413	59.70	7473	78.3	76.3	1.026
adjusted high	7413	59.70	7473	78.3	78.3	1.000
mid	7357	28.72	7386	38.1	37.4	1.019
low	7473	14.34	7487	18.8	18.1	1.037
calibrator zero	7459	0.00	7459	0.0	-0.2	n/a
Average C.F.=						1.019

Linear Regression/Calibration Results:

LIMITS	
Correlation Coefficient =	1.000 > or = 0.995
Slope =	0.998 0.95-1.05
b (Intercept as % of full scale)=	0.42% ± 3% F.S.
% change in C.F. from last cal=	-2.81% ± 10%

API 101E Hydrogen Sulphide Analyzer Calibration

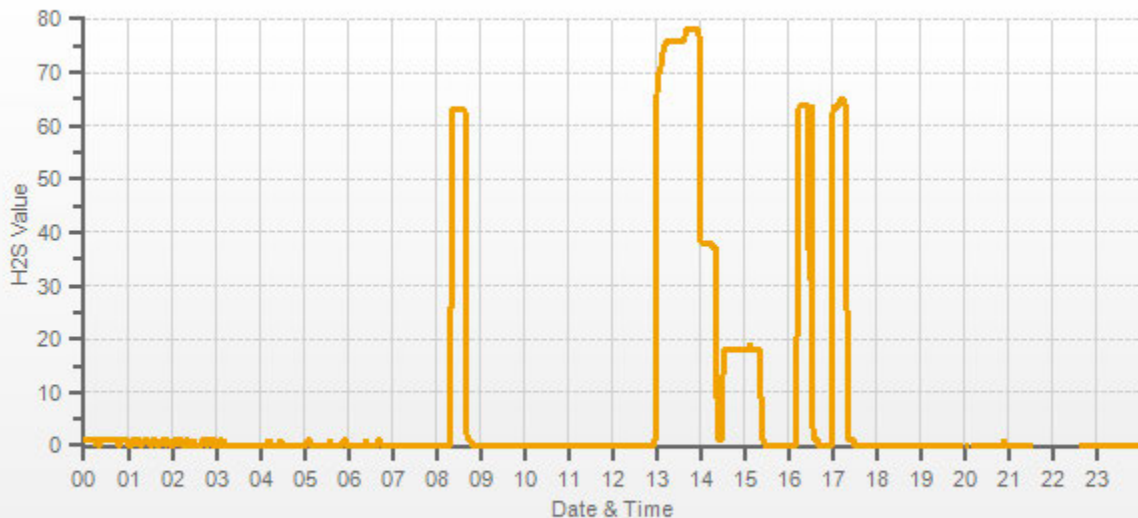


<p style="text-align: center;">As found:</p> Slope: 0.931 Offset: 66.8 MV Hvps: 671 V Rcell Temp: 50.0 °C Box Temp: 34.0 °C Pmt Temp: 8.0 °C Izs Temp: 48.0 °C Converter Temp: 314.3 °C Pres: 20.6 IN-HG-A Samp Fl: 526 CC/M Uv Lamp: 3357 MV Lamp Ratio: 100.1 % Str Lgt: 31.1 PPB Drk Pmt: 0.6 MV Drk Lmp: 0.3 MV Expected Value: 61.9	<p style="text-align: center;">As left:</p> Slope: 0.957 Offset: 66.8 Hvps: 671V Rcell Temp: 50.0 °C Box Temp: 34.0 °C Pmt Temp: 8.0 °C Izs Temp: 48.0 °C Converter Temp: 314.3 °C Pres: 20.6 IN-HG-A Samp Fl: 526 CC/M Uv Lamp: 3357 MV Lamp Ratio: 100.1 % Str Lgt: 32 PPB Drk Pmt: 0.8 MV Drk Lmp: 0.2 MV Expected Value: 64.5
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Comments:

The analyzer sample inlet filter was changed.
The manifold blower was found to be working normally.
No zero adjustment was required/made.

Flow measurements after mid-point
IZS repeated at 16:39 as the first was too low



— H2S[ppb]

TOTAL HYDROCARBON



Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	November 7, 2017	Barometer/B.P./units:	Brunton 05490 expires December 5, 2017	27.8	inHg
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 160348895 expires April 8, 2018	24	°C
Location/Station Name:	St. Lina	Weather Conditions:	Mainly cloudy with snow		
Parameter:	Total Hydrocarbon	Calibration Purpose:	shut down		
Start/End Time 24 hr. (mst):	9:28 / 11:45	Performed By/Reviewer:	Limin Li	Tom Bourque	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 24, 2022		

Analyzer:	ID# or Serial Number:	51CLT-77021-384	Range ppm:	50
	Last Calibration Date:	October 26, 2017	As Found C.F.:	0.986
	Previous Cal High Point C.F.:	1.001	New C.F.:	n/a

Calibration Standards:	Low Flow Meter ID/Expiry Date:	DC-2 Low 1662 expires February 2, 2018	High Flow Meter ID/Expiry Date:	DC-2 High 2272 expires February 2, 2018
	Calibrator ID/Expiry Date:	Environics id# 1991 expires March 16, 2018	Cal Gas Cylinder I.D. #:	LL165367
	CH ₄ /C ₃ H ₈ Cylinder Conc. (ppm):	590.0	207.0	
	CH ₄ as propane/total CH ₄ equivalents (ppm):	569.3	1159.3	

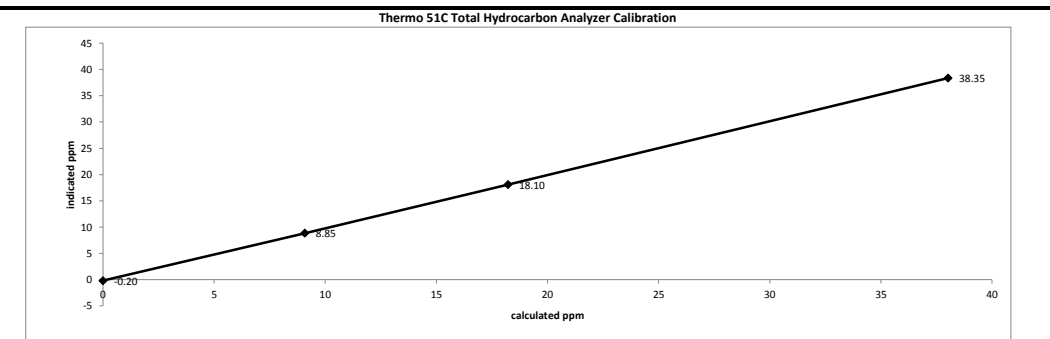
Standard Calibration Points for a Range of:		50 ppm
Point	Target ppm	
High	38	
Mid	18	
Low	9	

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

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	Diluent	Cal Gas	Total	(ppm)	(ppm)	
as found zero	2008	0.00	2008	0.0	-0.20	n/a
as found high	2006	68.02	2074	38.02	38.35	0.986
mid	2017	32.21	2049	18.22	18.10	0.996
low	2011	15.88	2027	9.08	8.85	1.004
Average C.F. =						0.995

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS
Slope =	0.985	> or = 0.995
b (Intercept as % of full scale) =	0.59%	0.90-1.10
% change in C.F. from last cal =	1.47%	± 3% F.S.
		± 10%




<p>As found:</p> <p>H2 cylinder (psi): 1400</p> <p>H2 cylinder reg set (psi): 22</p> <p>Span Cylinder (psi): 400</p> <p>Span Cylinder Reg Set (psi): 20</p> <p>Zero Air Gen Pressure: 38</p> <p>measurement alarms: None</p> <p>service alarms: None</p> <p>cnt: 3645</p> <p>rng: 1</p> <p>try: 1</p> <p>flm: 198.7 °C</p> <p>det: 125.9 °C</p> <p>Flame: 198 °C</p> <p>Filter: 125 °C</p> <p>Base: 125 °C</p> <p>Sample psi: 6.92 PSI</p> <p>Internal Air Pressure: 20 psi</p> <p>Internal Fuel Pressure: 11 psi</p> <p>Measured Flow: 1.052 LPM</p> <p>Expected Value: 26.86</p>	<p>As left:</p> <p>H2 cylinder (psi): n/a</p> <p>H2 cylinder reg set (psi): n/a</p> <p>Span Cylinder (psi): n/a</p> <p>Span Cylinder Reg Set (psi): n/a</p> <p>Zero Air Gen Pressure: n/a</p> <p>measurement alarms: n/a</p> <p>service alarms: n/a</p> <p>cnt: n/a</p> <p>rng: n/a</p> <p>try: n/a</p> <p>flm: n/a</p> <p>det: n/a</p> <p>Flame: n/a</p> <p>Filter: n/a</p> <p>Base: n/a</p> <p>Sample psi: n/a</p> <p>Internal Air Pressure: n/a</p> <p>Internal Fuel Pressure: n/a</p> <p>Measured Flow: n/a</p> <p>Expected Value: n/a</p>
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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.

Baseline shift was observed in analyzer, this shutdown is a QC check to verify analyzer performance. Analyzer inspected, tubing inspected and appears okay.

Flow measurements after mid-point

		<h2 style="margin: 0;">Thermo 51C Total Hydrocarbon THC Analyzer Calibration</h2>			
Date: November 7, 2017		Barometer/B.P./units: Brunton 05490 expires December 5, 2017		27.8	inHg
Company/Airshed: LICA		Thermometer/Station Temp: F.S. 160348895 expires April 8, 2018		24	°C
Location/Station Name: St. Lina		Weather Conditions: Mainly cloudy with snow			
Parameter: Total Hydrocarbon		Calibration Purpose: post repair			
Start/End Time 24 hr. (mst): 16:40 / 20:00		Performed By/Reviewer: Limin Li		Tom Bourque	
Calibration Method: Gas Dilution		Cal Gas Expiry Date: November 24, 2022			

Analyzer:	
ID# or Serial Number: 51CLT-77021-384	Range ppm: 50
Last Calibration Date: n/a	As Found C.F.: n/a
Previous Cal High Point C.F.: n/a	New C.F.: 1.000

Calibration Standards:									
Low Flow Meter ID/Expiry Date: DC-2 Low 1662 expires February 2, 2018	Standard Calibration Points for a Range of: 50 ppm								
High Flow Meter ID/Expiry Date: DC-2 High 2272 expires February 2, 2018	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">Point</th> <th style="width: 50%;">Target ppm</th> </tr> <tr> <td>High</td> <td style="text-align: center;">38</td> </tr> <tr> <td>Mid</td> <td style="text-align: center;">18</td> </tr> <tr> <td>Low</td> <td style="text-align: center;">9</td> </tr> </table>	Point	Target ppm	High	38	Mid	18	Low	9
Point	Target ppm								
High	38								
Mid	18								
Low	9								
Calibrator ID/Expiry Date: EnviroNics id# 1991 expires March 16, 2018									
Cal Gas Cylinder I.D. #: LL165367									
CH₄/C₂H₆ Cylinder Conc. (ppm): 590.0 207.0									
CH₄ as propane/total CH₄ equivalents (ppm): 569.3 1159.3									

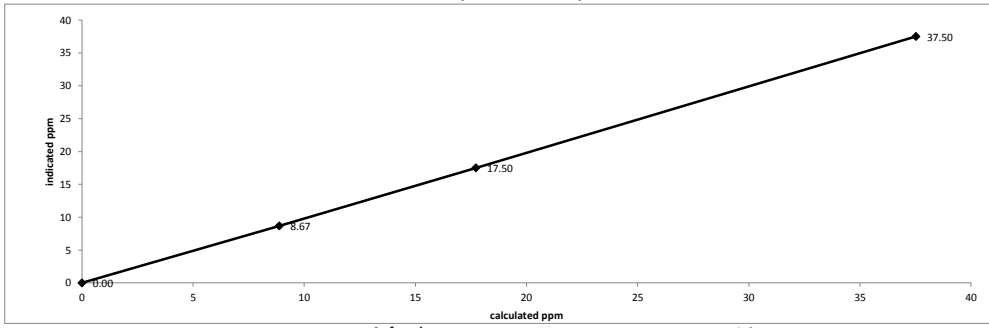
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	Diluent	Cal Gas	Total	(ppm)	(ppm)	
adjusted zero	2416	0.00	2416	0.0	0.00	n/a
adjusted high	2436	81.46	2517	37.52	37.50	1.000
mid	2451	38.06	2489	17.73	17.50	1.013
low	2459	18.98	2478	8.88	8.67	1.024
calibrator zero	2416	0.00	2416	0.00	0.00	n/a
Average C.F.=						1.013

Linear Regression/Calibration Results:

Correlation Coefficient = 1.000 Slope = 0.999 b (Intercept as % of full scale)= 0.26% % change in C.F. from last cal= n/a	LIMITS > or = 0.995 0.95-1.05 ± 3% F.S. n/a
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Thermo 51C Total Hydrocarbon THC Analyzer Calibration

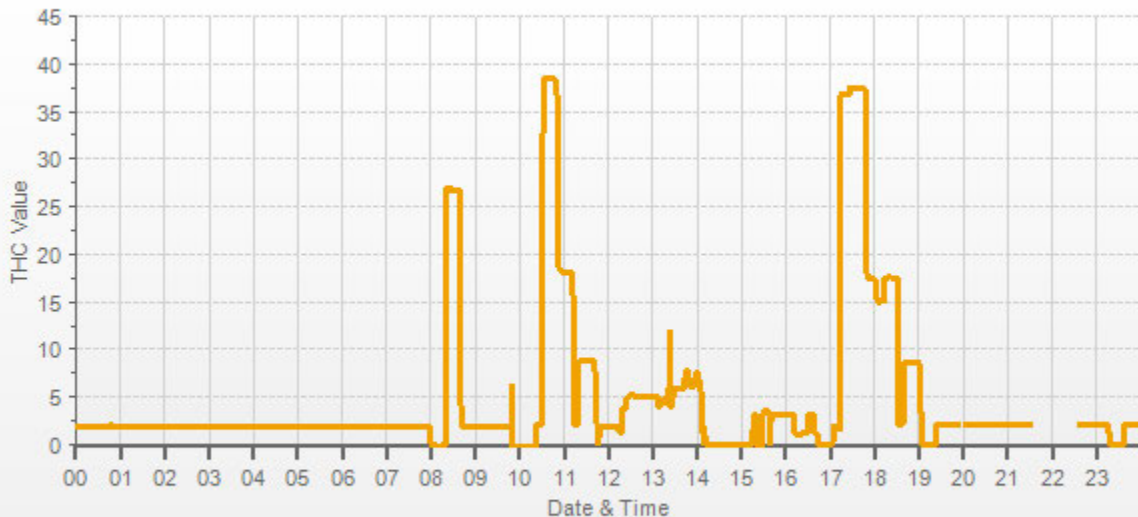


As found:	As left:
H2 cylinder (psi): n/a	H2 cylinder (psi): 1400
H2 cylinder reg set (psi): n/a	H2 cylinder reg set (psi): 25
Span Cylinder (psi): n/a	Span Cylinder (psi): 400
Span Cylinder Reg Set (psi): n/a	Span Cylinder Reg Set (psi): 20
Zero Air Gen Pressure: n/a	Zero Air Gen Pressure: 38
measurement alarms: n/a	measurement alarms: None
service alarms: n/a	service alarms: None
cnt: n/a	cnt: 3249
rng: n/a	rng: 1
try: n/a	try: 1
flm: n/a	flm: 208.2 °C
det: n/a	det: 125.2 °C
Flame: n/a	Flame: 208 °C
Filter: n/a	Filter: 125 °C
Base: n/a	Base: 125 °C
Sample psi: n/a	Sample psi: 6.9 PSI
Internal Air Pressure: n/a	Internal Air Pressure: 20 PSI
Internal Fuel Pressure: n/a	Internal Fuel Pressure: 13 PSI
Measured Flow: n/a	Measured Flow: 1.052 LPM
Expected Value: n/a	Expected Value: 26.86

Comments:

Post repair conducted following the shutdown calibration which was a QC check.

Flow measurements after mid-point



— THC[ppm]



Thermo 51C Total HydrocarbonTHC Analyzer Calibration

Date:	November 24, 2017	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	919	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	St. Lina	Weather Conditions:	Mix of sun and clouds		
Parameter:	Total Hydrocarbon	Calibration Purpose:	shut down		
Start/End Time 24 hr. (mst):	14:05 / 16:49	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 24, 2022		

Analyzer:			
ID# or Serial Number:	51CLT-77021-384	Range ppm:	50
Last Calibration Date:	November 7, 2017	As Found C.F.:	1.080
Previous Cal High Point C.F.:	1.000	New C.F.:	n/a

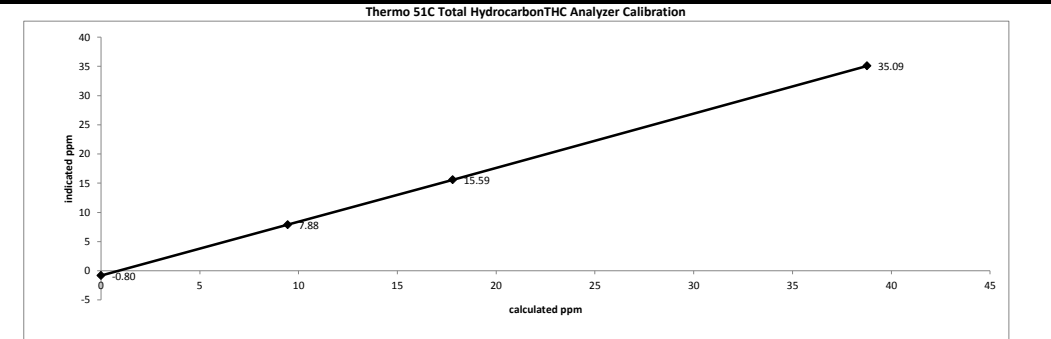
Calibration Standards:			
Low Flow Meter ID/Expiry Date:	Definer Low 129069 expires February 5, 2018	Standard Calibration Points for a Range of: 50 ppm	
High Flow Meter ID/Expiry Date:	Definer High 128686 expires February 5, 2018		
Calibrator ID/Expiry Date:	Sabio id# 11900613 expires March 16, 2018		
Cal Gas Cylinder I.D. #:	LL 165367		
CH ₄ /C ₂ H ₆ Cylinder Conc. (ppm):	590.0 207.0	Point	Target ppm
CH ₄ as propane/total CH ₄ equivalents (ppm):	569.3 1159.3	High	38
		Mid	18
		Low	9

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

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	Diluent	Cal Gas	Total	(ppm)	(ppm)	
as found zero	2367	0.00	2367	0.0	-0.80	n/a
as found high	2289	79.19	2368	38.77	35.09	1.080
mid	2334	36.40	2370	17.80	15.59	1.086
low	2354	19.34	2373	9.45	7.88	1.088
Average C.F. =						1.085

Linear Regression/Calibration Results:

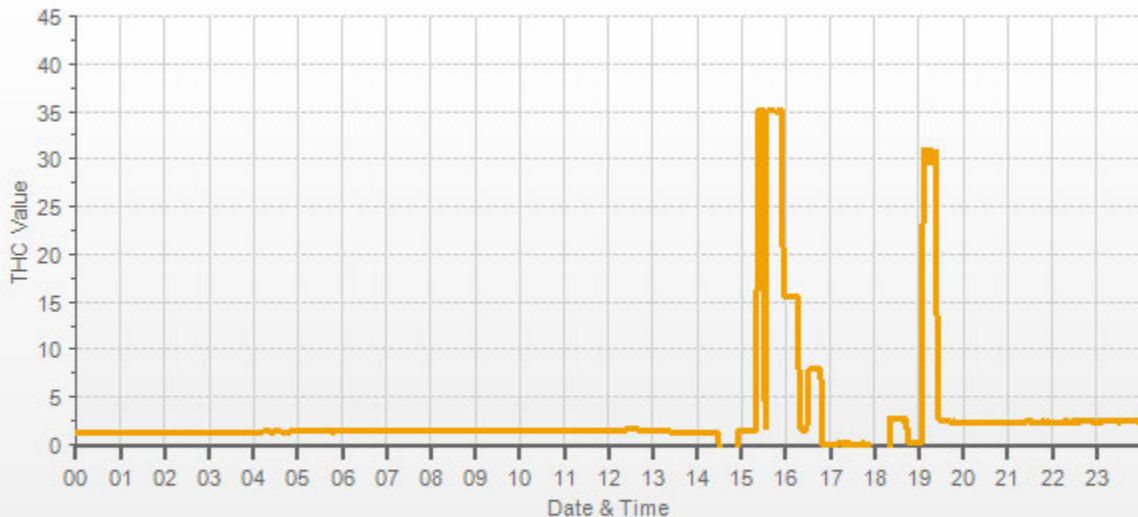
Correlation Coefficient =	1.000	LIMITS
Slope =	1.080	> or = 0.995
b (Intercept as % of full scale) =	1.83%	0.90-1.10
% change in C.F. from last cal =	-8.02%	± 3% F.S.
		± 10%



<p>As found:</p> <p>H2 cylinder (psi): 1500</p> <p>H2 cylinder reg set (psi): 22</p> <p>Span Cylinder (psi): 400</p> <p>Span Cylinder Reg Set (psi): 22</p> <p>Zero Air Gen Pressure: 42</p> <p>measurement alarms: None</p> <p>service alarms: None</p> <p>cnt: 2777</p> <p>rng: 1</p> <p>try: 1</p> <p>flm: 204.1</p> <p>det: 125.7</p> <p>Flame: 204</p> <p>Filter: 125</p> <p>Base: 125</p> <p>Sample psi: 06.90</p> <p>Internal Air Pressure: 20</p> <p>Internal Fuel Pressure: 13</p> <p>Measured Flow: 1.046</p> <p>Expected Value: 26.86</p>	<p>As left:</p> <p>H2 cylinder (psi): n/a</p> <p>H2 cylinder reg set (psi): n/a</p> <p>Span Cylinder (psi): n/a</p> <p>Span Cylinder Reg Set (psi): n/a</p> <p>Zero Air Gen Pressure: n/a</p> <p>measurement alarms: n/a</p> <p>service alarms: n/a</p> <p>cnt: n/a</p> <p>rng: n/a</p> <p>try: n/a</p> <p>flm: n/a</p> <p>det: n/a</p> <p>Flame: n/a</p> <p>Filter: n/a</p> <p>Base: n/a</p> <p>Sample psi: n/a</p> <p>Internal Air Pressure: n/a</p> <p>Internal Fuel Pressure: n/a</p> <p>Measured Flow: n/a</p> <p>Expected Value: n/a</p>
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Comments:
 No zero adjustment was required/made.
 No high point adjustment was required/made.
 The manifold blower was found to be working normally.

Shutdown calibration was completed to remove the analyzer for repair.
 Flow measurements after mid-point



— THC[ppm]



Thermo 51i Total Hydrocarbon THC Analyzer Calibration

Date: November 26, 2017	Barometer/B.P./units: Brunton 05535 expires December 5, 2017	917	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 160459244 expires May 18, 2018	21	°C
Location/Station Name: St Lina	Weather Conditions: Cloudy/Overcast		
Parameter: Total Hydrocarbon	Calibration Purpose: installation		
Start/End Time 24 hr. (mst): 15:08 / 17:53	Performed By/Reviewer: Chris Wesson / Rob Fisher		
Calibration Method: Gas Dilution	Cal Gas Expiry Date: November 25, 2023		

Analyzer ID# or Serial Number: 925436893	Range ppm: 50
Last Calibration Date: n/a	As Found C.F.: n/a
Previous Cal High Point C.F.: n/a	New C.F.: 1.001

Calibration Standards:

Low Flow Meter ID/Expiry Date: Defender Low 153358 expires January 19, 2018	Standard Calibration Points for a Range of: 50 ppm
High Flow Meter ID/Expiry Date: Defender High 152571 expires January 19, 2018	
Calibrator ID/Expiry Date: Sabio id# 17100415 expires May 16, 2018	
Cal Gas Cylinder I.D. #: LL165372	
CH ₄ /C ₂ H ₆ Cylinder Conc. (ppm): 606.0 212.0	
CH ₄ as propane/total CH ₄ equivalents (ppm): 583.0 1189.0	

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

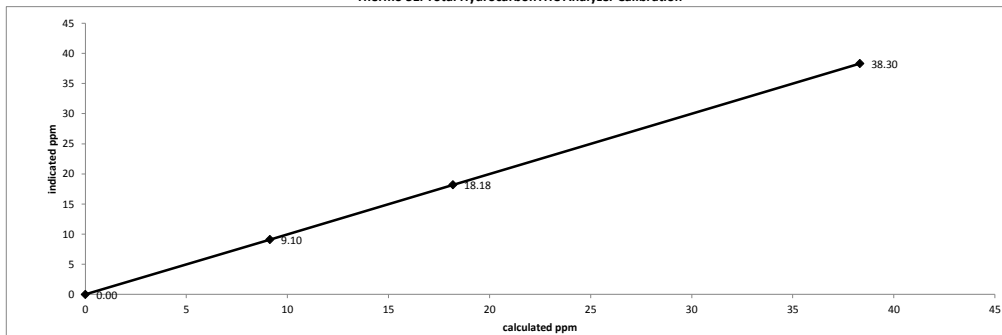
Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	Diluent	Cal Gas	Total	(ppm)	(ppm)	
adjusted zero	2483	0.00	2483	0.0	0.00	n/a
adjusted high	2401	79.97	2481	38.32	38.30	1.001
mid	2448	38.03	2486	18.19	18.18	1.000
low	2468	19.11	2487	9.13	9.10	1.004
calibrator zero	2483	0.00	2483	0.00	0.00	n/a

Average C.F. = 1.002

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 51i Total Hydrocarbon THC Analyzer Calibration

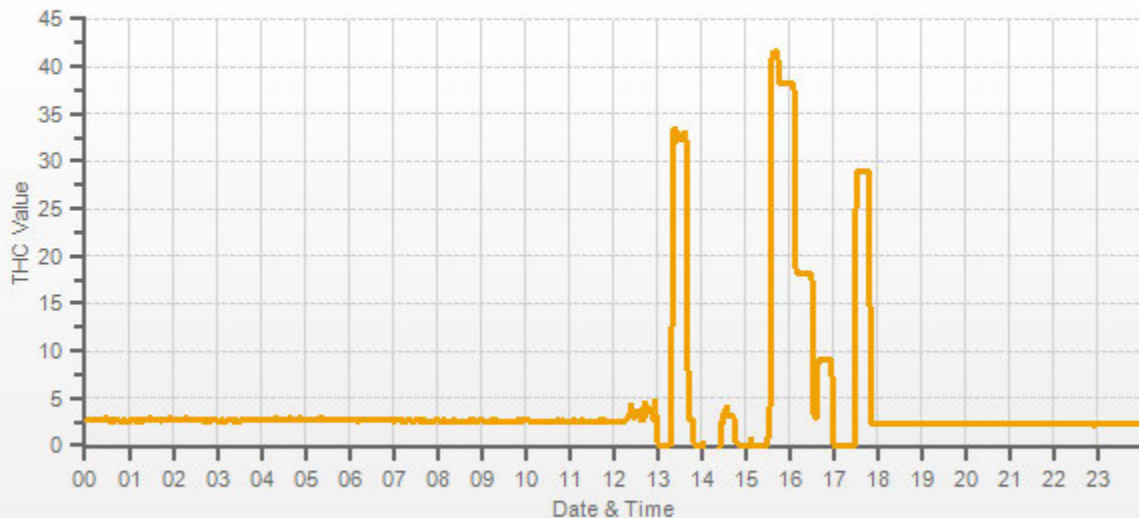


As found:	As left:
Bkg: 4.58	Bkg: 4.22
Coef: 4.199	Coef: 3.877
H2 cylinder (psi): 350	H2 cylinder (psi): 350
H2 cylinder reg set (psi): 50	H2 cylinder reg set (psi): 50
Span Cylinder (psi): 1500	Span Cylinder (psi): 1500
Span Cylinder Reg Set (psi): 25	Span Cylinder Reg Set (psi): 25
Zero Air Gen Pressure: 45	Zero Air Gen Pressure: 45
Bias Supply: -297.8	Bias Supply: -298.0
Detector Base: 125.0	Detector Base: 125.0
Filter: 125.1	Filter: 125.0
Pump: _____	Pump: _____
Flame: 139.5	Flame: 139.7
Internal: 26.5	Internal: 28.0
Sample: 9.7	Sample: 9.7
Fuel: 19.9	Fuel: 19.9
Air: 39.8	Air: 39.8
Signal: 915	Signal: 907
Status: LIT	Status: LIT
Measured Flow: 0.81	Measured Flow: n/a
Expected Value: 32.60	Expected Value: 28.90

Comments:
The manifold blower was found to be working normally.

The November 25, 2017 calibration failed due to instability possibly caused by the zero air generator. A Maxxam zero air generator was installed and the failed generator was sent for maintenance. The install calibration demonstrates acceptable stability.

Flow measurements after mid-point



— THC[ppm]

NITROGEN DIOXIDE



API 200E NO-NO2-NOx Analyzer Calibration

Date: November 7, 2017	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	27.8	inHg
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	24	°C
Location/Station Name: St. Lina	Weather Conditions: Mainly cloudy with snow		
Start/End Time 24 hr. (mst): 09:28 / 15:50	Calibration Purpose: routine monthly		
G.P.T. to be used for Ozone? Yes with 1000 ppb NOx full scale	Performed By/Reviewer: Limin Li / Tom Bourque		
Calibration Method: Gas Dilution & Varying UV Lamp Power	Cal Gas Expiry Date: December 8, 2019		

Analyzer:	Correction Factors:
ID# or Serial Number: 594	NO = Previous C.F.: 0.997 As Found C.F.: 1.047 New C.F.: 1.002
Last Calibration Date: October 4, 2017	NO₂ = 0.984 0.979 1.000
Range ppb: 1000	NOx = 0.997 1.047 1.001

Calibration Standards:

Low Flow Meter ID/Expiry Date: DC-2 Low 1662 expires February 2, 2018 High Flow Meter ID/Expiry Date: DC-2 High 2272 expires February 2, 2018 Calibrator ID/Expiry Date: Sabio id# 17200415 expires May 16, 2018 Cal Gas Cylinder I.D. #: EY0000769 Cal Gas Conc. (ppm): 51.1 51.2	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>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>	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
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	4903	0.0	4903	0	0	2.0	1.0	n/a	n/a
as found high	4843	58.7	4902	612.2	613.4	587.0	587.0	1.047	1.047
adjusted zero	4903	0.00	4903	0.0	0.0	2.0	1.0	n/a	n/a
adjusted high	4843	58.73	4902	612.2	613.4	613.0	614.0	1.002	1.001
mid	4886	36.79	4923	381.9	382.6	385.0	386.0	0.997	0.994
low	4900	18.42	4918	191.4	191.8	195.0	196.0	0.992	0.983
calibrator zero	4903	0.00	4903	0	0	2.0	0.0	n/a	n/a
Average C.F. =								0.997	0.993

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	4868	58.76	4927	0.0	614.0	613.0	1.0	2.0	1.0	
as found high NO2	4868	58.76	4927	375.0	243.0	621.0	380.0	371.0	379.0	0.979
adjusted high NO2	4868	58.76	4927	375.0	243.0	613.0	372.0	371.0	371.0	1.000
gpt mid	4868	58.76	4927	190.0	429.0	612.0	185.0	185.0	184.0	1.005
gpt low	4868	58.76	4927	80.0	543.0	612.0	72.0	71.0	71.0	1.000
Average NO₂ C.F. =									1.002	

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.002	1.001	0.998	0.95-1.05
b (Intercept as % of full scale) =	0.30%	0.27%	-0.08%	± 3% F.S.
% change in C.F. from last cal =	-4.97%	-4.99%	0.52%	± 10%
NO2 converter efficiency			0.98	0.96 to 1.04

	As found:		As left:
NOx SLOPE:	0.950	NOx SLOPE:	0.995
NOx OFFS:	4.0	NOx OFFS:	2.6
NO SLOPE:	0.953	NO SLOPE:	.998
NO OFFS:	-0.1	NO OFFS:	-0.2
SAMP FLW:	487 CC/M	SAMP FLW:	487 CC/M
OZONE FL:	78 CC/M	OZONE FL:	78 CC/M
PMT:	22.3 MV	PMT:	22.3 MV
NORM PMT:	2.0 MV	NORM PMT:	2.1 MV
AZERO:	17.6 MV	AZERO:	17.7 MV
HVPS:	767 V	HVPS:	767 V
RCCELL TEMP:	50.0 °C	RCCELL TEMP:	50.0 °C
BOX TEMP:	34.6 °C	BOX TEMP:	34.6 °C
PMT TEMP:	6.7 °C	PMT TEMP:	6.7 °C
IZS TEMP:	45.3 °C	IZS TEMP:	41.2 °C
MOLY TEMP:	314.0 °C	MOLY TEMP:	315.2 °C
RCEL:	5.4 IN-HG-A	RCEL:	5.4 IN-HG-A
SAMP:	26.8 IN-HG-A	SAMP:	26.3 IN-HG-A
Expected Value NO:	10	Expected Value NO:	7
Expected Value NO ₂ :	580	Expected Value NO ₂ :	448
Expected Value NOx:	588	Expected Value NOx:	455

Comments:

The analyzer sample inlet filter was changed.

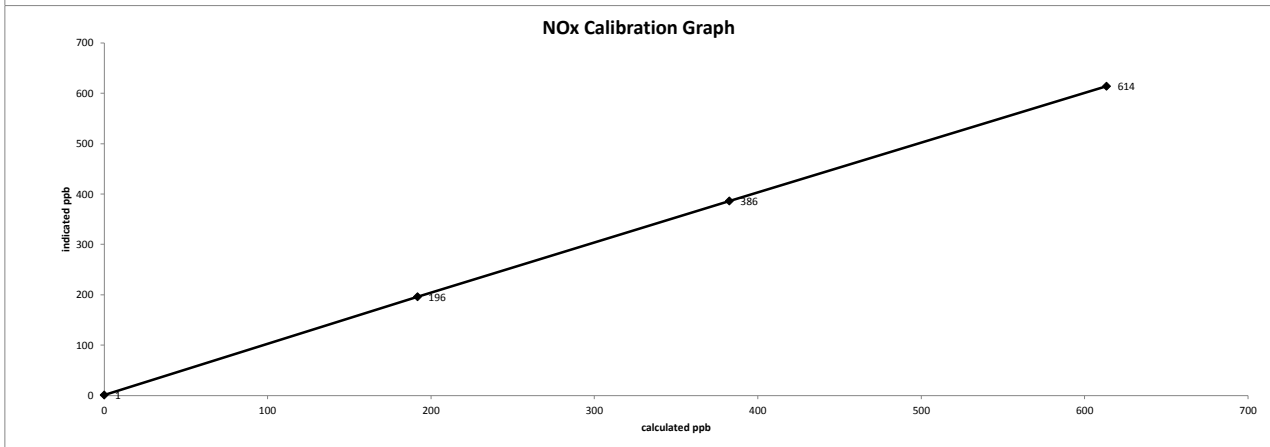
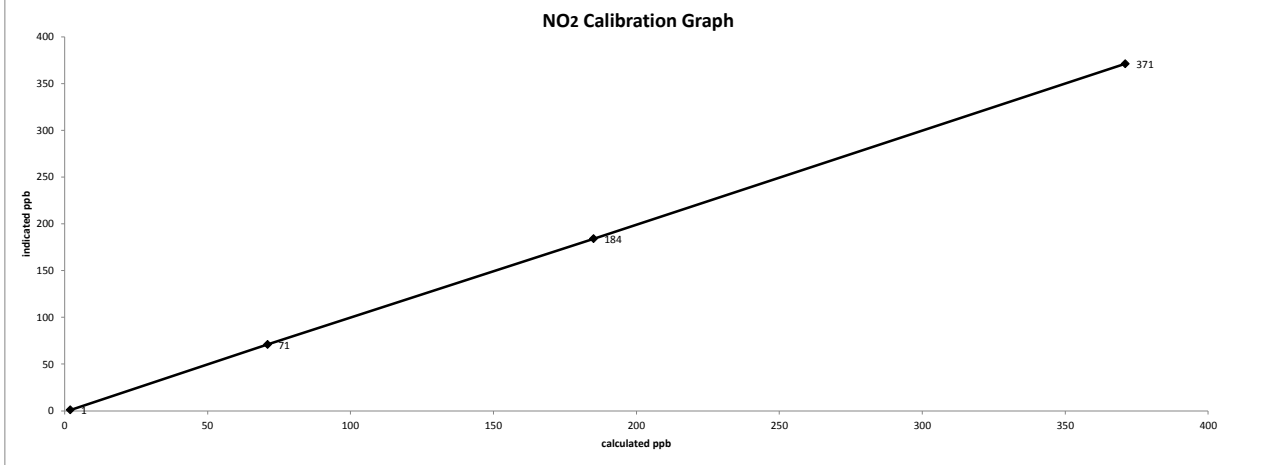
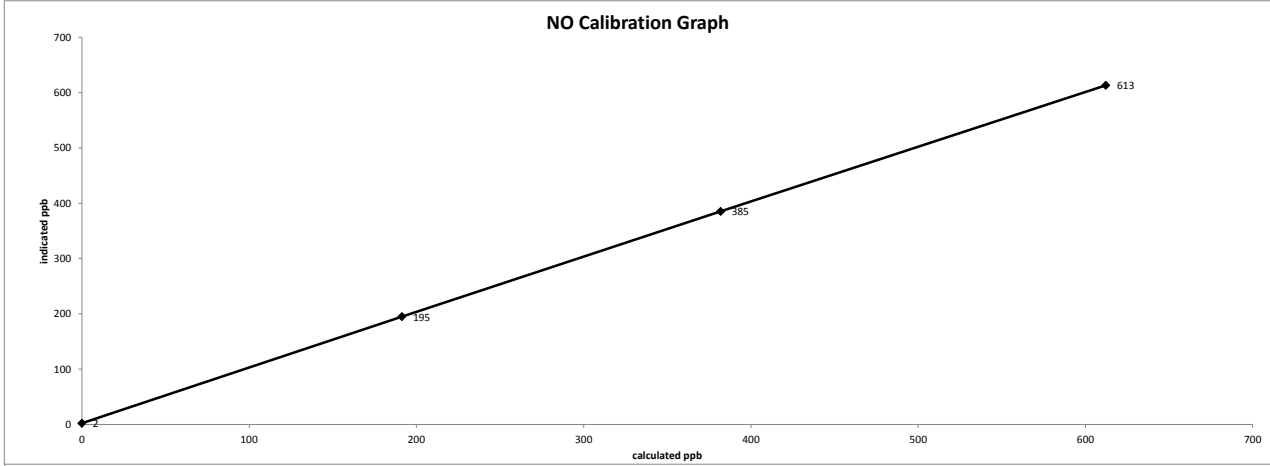
The manifold blower was found to be working normally.

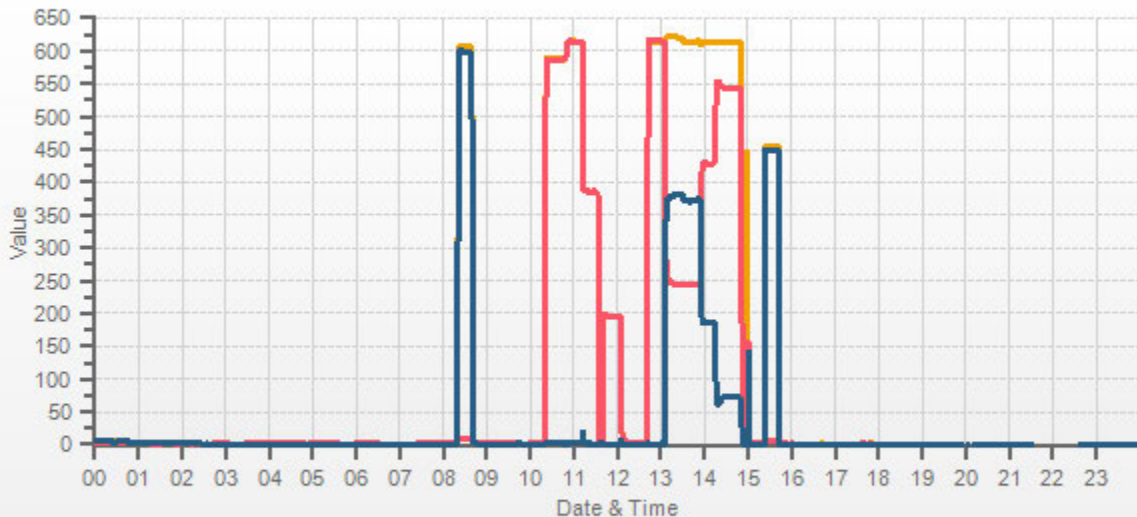
Flow measurements after mid-point

Date: November 7, 2017
Company/Airshed: LICA
Location/Station Name: St. Lina

Start/End Time 24 hr. (mst): 09:28 / 15:50
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Varying UV Lamp Power

API 200E NO-NO2-NOx Analyzer Calibration





— NOX[ppb] — NO[ppb] — NO2[ppb]

OZONE



Thermo 49i Ozone Analyzer Calibration

Date: November 8, 2017 Company/Airshed: LICA Location/Station Name: St. Lina Start/End Time 24 hr. (mst): 12:18 / 16:45 Ozone Calibration Method: Varying UV Lamp Power G.P.T. Date: n/a-done by Varying UV Lamp Power	Barometer/B.P./units: Brunton 05490 expires December 5, 2017 27.84 inHg Thermometer/Station Temp: F.S. 160348895 expires April 8, 2018 24 °C Weather Conditions: Mainly cloudy with sunny breaks Calibration Purpose: routine monthly Performed By/Reviewer: Limin Li Tom Bourque Cal Gas Expiry Date: n/a-done by Varying UV Lamp Power
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Analyzer: ID# or Serial Number: 1002240371 Last Calibration Date: October 5, 2017 Previous Cal High Point C.F.: 1.000	Ozone Range ppb: 500 As Found C.F.: 1.001 New C.F.: 1.000
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Calibration Standards:									
Low Flow Meter ID/Expiry Date: DC-2 Low 1662 expires February 2, 2018 High Flow Meter ID/Expiry Date: DC-2 High 2272 expires February 2, 2018 Calibrator ID/Expiry Date: Sabio id# 11900613 expires March 16, 2018 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								

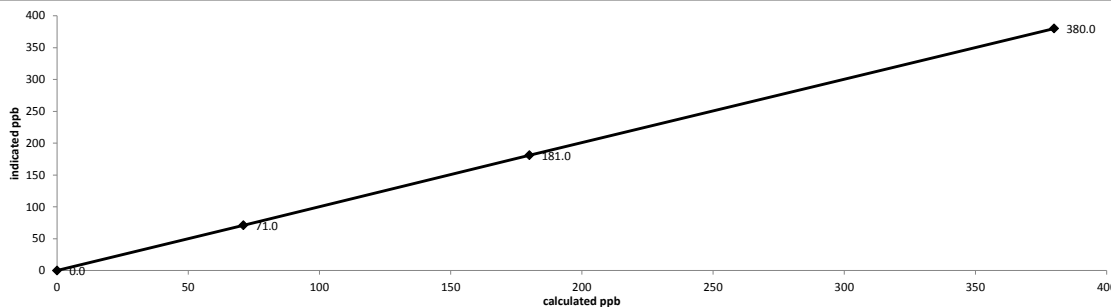
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

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	5200	5200	0.0	n/a	-0.8	n/a
as found high	5200	5200	380.0	380.0	379.0	1.001
adjusted zero	5200	5200	0.0	0.0	0.0	n/a
adjusted high	5200	5200	380.0	380.0	380.0	1.000
mid	5200	5200	180.0	180.0	181.0	0.994
low	5200	5200	71.0	71.0	71.0	1.000
calibrator zero	5200	5200	0.0	n/a	0.4	n/a
Average C.F. =						0.998

Linear Regression/Calibration Results:

Correlation Coefficient = 1.000 Slope = 1.000 b (Intercept as % of full scale) = -0.04% % change in C.F. from last cal = -0.05%	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: -0.1 O3 Coef: 0.966 Photo Lamp: 10.7 V O3 Lamp: 8.2 V Bench: 31.6 °C Bench Lamp: 53.6 °C O3 Lamp: 67.9 °C Pressure: 663.8 mmHg Cell A lpm: 0.733 L/min Cell B lpm: 0.781 L/min O3 ppb: 28.9 Cell A ppb: 31.7 Cell B ppb: 26.1 Cell A int: 80662 Cell B int: 101100.0 Expected Value: 301.0	As left: O3 Bkg: -0.5 O3 Coef: 0.969 Photo Lamp: 10.7 V O3 Lamp: 8.2 V Bench: 31.6 °C Bench Lamp: 53.6 °C O3 Lamp: 67.9 °C Pressure: 663.8 mmHg Cell A lpm: 0.733 L/min Cell B lpm: 0.781 L/min O3 ppb: 28.9 Cell A ppb: 31.7 Cell B ppb: 26.1 Cell A int: 80662 Cell B int: 101100.0 Expected Value: 310.4
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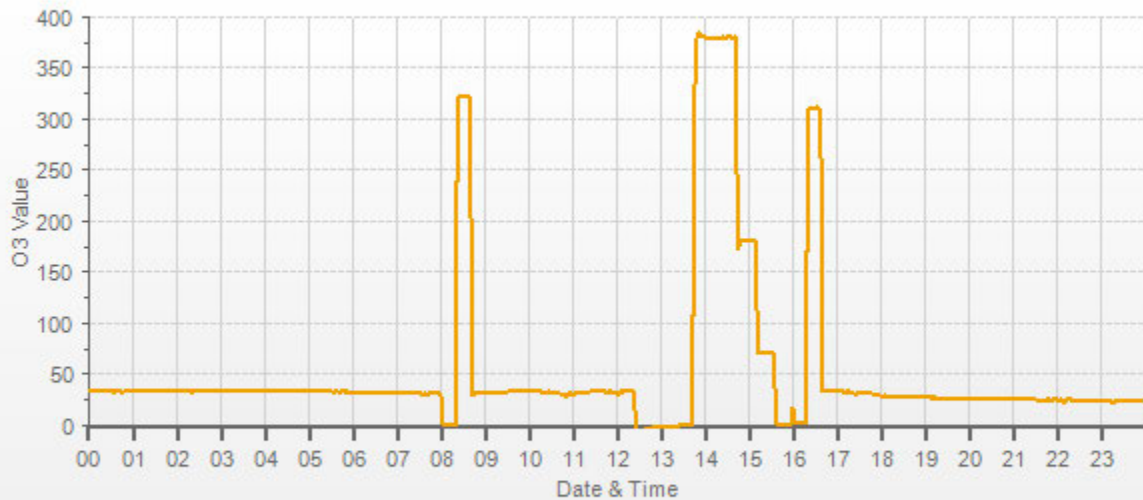
Comments:

The manifold blower was found to be working normally.

Redo monthly calibration with Alex Sabio 2010D calibrator.

Flow measurements after mid-point

O3[ppb] Station: LICA ST. LINA Daily: 17/11/08 Type: AVG 1 Min. [1 Min.]



— O3[ppb]

PARTICULATE MATTER

Thermo 5030i SHARP Monitor Quarterly Audit/Calibration

Date: <u>November 28, 2017</u>	Performed By/Reviewer: <u>Alex Yakupov</u> not yet reviewed
Company: <u>LICA</u>	Start Time (mst): <u>13:24</u>
Station Name/Location: <u>St Lina</u>	End Time (mst): <u>16:10</u>
Previous Audit Date: <u>October 16, 2017</u>	Calibration Purpose: <u>quarterly</u>
Parameter: <u>PM 2.5</u>	Weather Conditions: <u>Mainly sunny</u>

SHARP 5030i Information and Status:			
Serial Number: <u>CM17091001</u>	Filter Tape Counter	<u>457 / when left was reset to 1</u>	

Reference Standards: Air Flow			
Make: <u>Dwyer</u>	Orifice: <u>Chinook</u>	Pressure: <u>Fisher Scientific</u>	Temp / RH: <u>Fisher Scientific</u>
Model: <u>475 Mk.III</u>	<u>CHN0901</u>	<u>n/a</u>	<u>11-661-7A, 11745843</u>
Serial Number: <u>#3</u>	<u>#2</u>	<u>05544</u>	<u>170286131</u>
Calibration Date: <u>January 1, 2017</u>	<u>March 24, 2017</u>	<u>December 5, 2017</u>	<u>April 19, 2017</u>

Ambient Temperature (°C)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	-1.20	-1.4	0.2	-1.20	-1.4	0.2
#2	-1.17	-1.4	0.2	-1.17	-1.4	0.2
#3	-1.13	-1.4	0.3	-1.13	-1.4	0.3
Average	-1.2	-1.4	0.2	-1.2	-1.4	0.2
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	45.56	47.4	-1.8	45.70	45.7	0.0
#2	45.56	47.4	-1.8	45.72	45.7	0.0
#3	45.59	47.4	-1.8	45.74	45.7	0.0
Average	45.6	47.4	-1.8	45.7	45.7	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	23.95	23.7	0.3	23.95	23.7	0.3
#2	23.93	23.7	0.3	23.93	23.7	0.3
#3	23.96	23.7	0.3	23.96	23.7	0.3
Average	23.9	23.7	0.3	23.9	23.7	0.3
Temp Limit: ± 2°C						

Barometric Pressure (mmHg)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	689.3	690.3	-1.0	689.3	690.3	-1.0
BP Limit: ± 2 mmHg						

Nephelometer Relative Humidity (%RH)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	13.71	14.0	-0.3	13.71	14.0	-0.3
RH Limit: ± 2 %RH						

Nephelometer Temperature (%RH)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	22.70	22.2	0.5	22.70	22.2	0.5
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						

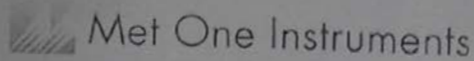
Detector Calibration (Auto)						
As Found:			As Left:			
Detector Auto Calibration Completed: <u>YES</u>			Variable	Value		
			HIGH VOLT	1380		
			BETA REF TH	310		
			ALPHA TH	790		
			DIFF HV	4		

Mass Coefficient (Auto)						
Zero			Span			
Variable	Value		Variable	Value		
MASS COEF	7017.3		MASS COEF	6995.6		
FOIL VALUE	1045		FOIL VALUE	1045		
Beta Avg	9649		Beta Avg	8310		
difference	n/a		difference	-0.3		
Foil Set: 4804						

Flow Calibration (L/min)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	16.91	16.65	0.26	16.67	16.66	0.01
#2	16.94	16.67	0.27	16.67	16.68	-0.01
#3	16.94	16.66	0.28	16.67	16.67	0.00
Average	16.93	16.66	0.27	16.67	16.67	0.00
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	16.67	16.67	0.00	16.61	16.62	-0.01
Leak Limit: 0.08 L/min LEAK RATE: -0.01						

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 <u>Maxxam</u>		Operator: <u>Micheal Espiritu</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>Mesa Defender 530</u>
Serial Number	<u>17200415</u>	Serial Number	<u>L-152019 H-148944</u>
Last Verification Date	<u>May 2016</u>	Temperature (°C)	<u>25.0 C</u>
NO Cylinder S/N	<u>EY0000597</u>	Barometric Pressure	<u>697 mmhg</u>
NO [PPM]	<u>49.0</u>	NOx [PPM]	<u>49.0</u>
Expiry Date	<u>December 2019</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
5028	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
4930	78.7	0.783	0.783	0.809	-0.012	0.797	3%	2%
4936	38.6	0.383	0.383	0.396	-0.006	0.390	3%	2%
4935	19.4	0.193	0.193	0.199	-0.003	0.196	3%	2%
Absolute Average Percent Difference							3%	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)= 1.0334	0.90-1.10	m (Slope)= 1.0181
b (Intercept % of FS)= -0.0105	± 3% F.S.	b (Intercept % of FS)= -0.0148

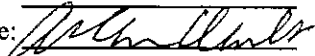
Flow	O ₂ Conc (LC)	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4930	0.000	0.000	0.806	-0.013	0.795	NO ₂	% Diff. Limit
4930	1.425	0.523	0.283	0.511	0.794	0%	± 10%
4930	0.825	0.278	0.528	0.266	0.795	0%	± 10%
4930	0.386	0.095	0.711	0.085	0.796	3%	± 10%
Absolute Average Percent Difference						1%	± 10%

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

NO ₂	LIMITS
Correlation= 1.0000	≥ 0.995
m (Slope)= 0.9998	0.90-1.10
b (Intercept % of FS)= -1.1702	± 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>CAL018101</u>	Last Calibration Date	<u>May 16, 2017</u>
Cylinder Conc. (ppm)	<u>48.79</u>	Full Scale (ppm)	<u>1.0</u>
		Cylinder Gas Expiry Date	<u>March 2019</u>

COMMENTS: Contains 50.4 ppm SO₂.

Auditor: Al Clark
Operator Signature: 

Date: May 16, 2017
Location: McIntyre Center Edmonton

Company Maxxam Operator: Mike

Calibrator:			Flow Measurement Device:		
Make/Model	<u>EnviroNics 2000</u>		Make/Model	<u>Bios Defender 530</u>	
Serial Number	<u>1991</u>		Serial Number	<u>HI148944 Lo 152019</u>	
Last Verification Date	<u>March 31, 2016</u>		Temperature (°C)	<u>24.5</u>	
NO Cylinder S/N	<u>EY0000597</u>		Barometric Pressure	<u>699</u>	
NO [PPM]	<u>49.0</u>	NOx [PPM] <u>49.0</u>			
Expiry Date	<u>December 8, 2019</u>				

Dilution Flow (sccm)					
Pt. #1	<u>4902</u>	Pt. #2	<u>4935</u>	Pt. #3	<u>4957</u>
Gas Flow (sccm)					
Pt. #1	<u>79.3</u>	Pt. #2	<u>38.7</u>	Pt. #3	<u>19.4</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
4976	0.0	0.0000	0.0000	0.0001	0.0000	0.0001	Limit ± 10%	
4981	79.3	0.7801	0.7801	0.7898	0.0000	0.7898	1%	1%
4972	38.7	0.3814	0.3814	0.3841	0.0002	0.3843	1%	1%
4976	19.4	0.1910	0.1910	0.1913	0.0003	0.1916	0%	0%
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)= 1.0130	0.90-1.10	m (Slope)= 1.0129
b (Intercept % of FS)= -0.1190	± 3% F.S.	b (Intercept % of FS)= -0.1029

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4981	0.000	0.0000	0.7925	-0.0001	0.7924	NO ₂	% Diff. Limit
4981	0.400	0.5347	0.2578	0.5279	0.7857	-1%	± 10%
4981	0.200	0.2490	0.5435	0.2478	0.7913	0%	± 10%
4981	0.090	0.1090	0.6835	0.1095	0.7927	1%	± 10%
Absolute Average Percent Difference						0%	± 10%

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

NO ₂	LIMITS
Correlation= 1.0000	≥ 0.995
m (Slope)= 0.9864	0.90-1.10
b (Intercept % of FS)= 0.1136	± 3% F.S.

AENV Standards	NO _x Analyzer
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>March 15, 2017</u>
SRM Gas Cylinder No. <u>CAL018140</u>	Full Scale (ppm) <u>1.0</u>
Cylinder Conc. (ppm) <u>48.79</u>	Cylinder Gas Expiry Date <u>March 28, 2019</u>

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton Date: March 16, 2017

Operator Signature: [Signature] Location: McIntyre Center Edmonton

Company <u>Maxxam</u>		Operator: <u>Mike</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010D</u>	Make/Model	<u>Bios Defender 530</u>
Serial Number	<u>11900613</u>	Serial Number	<u>HI148944 Lo 152019</u>
Last Verification Date	<u>March 31, 2016</u>	Temperature (°C)	<u>23.9</u>
NO Cylinder S/N	<u>EY0000769</u>	Barometric Pressure	<u>698mmHg</u>
NO [PPM]	<u>51.1</u>	NOx [PPM]	<u>51.2</u>
Expiry Date	<u>December 8, 2019</u>		

Dilution Flow (sccm)		
Pt. #1 <u>4879</u>	Pt. #2 <u>4932</u>	Pt. #3 <u>4950</u>
Gas Flow (sccm)		
Pt. #1 <u>74.5</u>	Pt. #2 <u>36.4</u>	Pt. #3 <u>18.2</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
4965	0.0	0.0000	0.0000	0.0001	0.0000	0.0001	Limit ± 10%	
4954	74.5	0.7685	0.7700	0.7915	0.0008	0.7923	3%	3%
4968	36.4	0.3744	0.3751	0.3832	0.0006	0.3838	2%	2%
4968	18.2	0.1872	0.1876	0.1916	0.0002	0.1918	2%	2%
Absolute Average Percent Difference							3%	2%

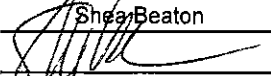
LINEAR REGRESSION ANALYSIS			<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>		
NO		LIMITS		NOx	
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000
m (Slope)=	1.0301	0.90-1.10		m (Slope)=	1.0291
b (Intercept % of FS)=	-0.0919	± 3% F.S.		b (Intercept % of FS)=	-0.0881

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4954	0.000	0.0000	0.7949	0.0005	0.7954	NO ₂	% Diff. Limit
4954	0.510	0.5104	0.2845	0.5072	0.7917	-1%	± 10%
4954	0.250	0.2516	0.5433	0.2514	0.7944	0%	± 10%
4954	0.100	0.1085	0.6864	0.1087	0.7951	0%	± 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)=	0.9926	0.90-1.10			
b (Intercept % of FS)=	0.0925	± 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>CAL018140</u>	Last Calibration Date	<u>March 15, 2017</u>
Cylinder Conc. (ppm)	<u>48.79</u>	Full Scale (ppm)	<u>1.0</u>
		Cylinder Gas Expiry Date	<u>March 28, 2019</u>

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton
Operator Signature: 

Date: March 16, 2017
Location: McIntyre Center Edmonton

Company <u>Maxxam</u>		Operator: <u>Micheal Espiritu</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>Mesa Defender 530</u>
Serial Number	<u>17200415</u>	Serial Number	<u>L-152019 H-148944</u>
Last Verification Date	<u>May 2016</u>	Temperature (°C)	<u>25.0 C</u>
NO Cylinder S/N	<u>EY0000597</u>	Barometric Pressure	<u>697 mmhg</u>
NO [PPM]	<u>49.0</u>	NOx [PPM]	<u>49.0</u>
Expiry Date	<u>December 2019</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
5028	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
4930	78.7	0.783	0.783	0.809	-0.012	0.797	3%	2%
4936	38.6	0.383	0.383	0.396	-0.006	0.390	3%	2%
4935	19.4	0.193	0.193	0.199	-0.003	0.196	3%	2%
Absolute Average Percent Difference							3%	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)= 1.0334	0.90-1.10	m (Slope)= 1.0181
b (Intercept % of FS)= -0.0105	± 3% F.S.	b (Intercept % of FS)= -0.0148

Flow	O ₂ Conc (LC)	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4930	0.000	0.000	0.806	-0.013	0.795	NO ₂	% Diff. Limit
4930	1.425	0.523	0.283	0.511	0.794	0%	± 10%
4930	0.825	0.278	0.528	0.266	0.795	0%	± 10%
4930	0.386	0.095	0.711	0.085	0.796	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)= 0.9998	0.90-1.10	
b (Intercept % of FS)= -1.1702	± 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>CAL018101</u>	Last Calibration Date <u>May 16, 2017</u>
Cylinder Conc. (ppm) <u>48.79</u>	Full Scale (ppm) <u>1.0</u>
	Cylinder Gas Expiry Date <u>March 2019</u>

COMMENTS: Contains 50.4 ppm SO₂.

Auditor: Al Clark
Operator Signature:

Date: May 16, 2017
Location: McIntyre Center Edmonton

CALIBRATION GASES



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-213CGA

Company: Maxxam **Operator's Name:** C. Wesson
Cylinder #: LL119500 **Concentration PPM:** 9.8 **Tolerance(%):** 2 **Certified By:** Praxair
Expiry Date: August 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>September 22, 2017</u>	Temp. °C: <u>23.5 C</u>
Gas Type: <u>H2S</u> Conc. <u>20.43</u>	B.P. <u>705 mmhg</u>
Cylinder Number: <u>CAL015272</u>	
Expiry Date: <u>January 2019</u>	

Reference Analyzer:
 Make/Model: Teco 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 22.4 Span: 1.091 Range: 0.1
 Last Calibration: Date: Sep 22/17 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	0.0000	0.0000	0.0000	0.0000
5114	39.5	0.0734	0.00772	129.468	9.5
5096	18.5	0.0345	0.00363	275.459	9.5
5089	9.5	0.0178	0.00187	535.684	9.5
Average Cylinder Concentration:					9.5

Previous Stated Concentration PPM: 9.8

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: September 22, 2017
 Location: McIntyre Center Edmonton



Calibration Gas Audit

CH4 / C3H8 Cylinder Gas

File No. 2015-092CGA

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

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

Flow Measurement Device:
 Make/Model Bios DC-2
 Serial Number Blos D
 Temp. °C 24.5
 B.P. 688mmHg

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

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

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

Cylinder gas tolerances based on CH4 only

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

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



Calibration Gas Audit

NO Cylinder Gas

File No. 2016-437CGA

Company: Maxxam **Operators name:** Chris
Cylinder #: EY0000769 **Conc (PPM)** 51.1 **Tolerance (%)** 0.7 **Certified By:** Praxair
Expiry Date: December 8, 2019

Reference Calibrator and Gas:				Flow Measurement Device:			
Make/Model	<u>Thermo 146i</u>			Make/Model	<u>Bios Definer 220</u>		
Serial Number	<u>AMU 1809</u>			Serial Number	<u>AMU 1941</u>		
Last Verification Date	<u>January 26, 2017</u>			Temp.°C	<u>24.4</u>		
Gas Type	<u>NO</u>	Conc.	<u>48.79</u>	B.P.	<u>704.7</u>		
Cylinder Number	<u>CAL018140</u>						
Expiry Date	<u>March 25, 2019</u>						

Reference Analyzer:

Make/Model Thermo 42i Serial/AMU Number: AMU 1868
Instrument Settings Zero: 4.5 Span: 1.110 Range: 1.0
Last Calibration: Date: 25-Jan-17 C.F. 1.000 Done By: SB

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
4911	0.0	0.000	0.000	XXXX	XXXX	XXXX	XXXX
4918	77.4	0.822	0.822	0.016	63.540	52.2	52.2
4918	38.5	0.408	0.408	0.008	127.740	52.2	52.1
4915	19.2	0.202	0.202	0.004	255.990	51.7	51.7
Average Cylinder Concentration:						52.0	52.0

NO	NOx
Previous Stated Concentration PPM: <u>51.1</u>	<u>51.2</u>
Percent variance from Stated: <u>1.8</u>	<u>1.6</u>

Cylinder gas tolerances based on NO only

Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:**
< =5% Outside Manufacturer Tolerance. Use manufacturers concentration 50.5 PPM SO2
> 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Shea Beaton Date: January 26, 2017
Operator Signature: _____ Location: McIntyre Center Edmonton

***APPENDIX III
REPORT CERTIFICATION FORM***

Report Certification Form

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

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

Maram ghaleb

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

December 29, 2017

Report Issued Date (dd-mm-yyyy)

APPENDIX IV
DATA VALIDATION CERTIFICATION FORM



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2017-11-31-C</u>
Site: <u>St. Lina Continuous Monitoring Station</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u>Maram ghaleb</u>	Date <u>December 26, 2017</u>
Level 1 Primary Validation	<u>Maram ghaleb</u>	Date <u>December 26, 2017</u>
Level 2 Final Validation	<u>Maram ghaleb</u>	Date <u>December 28, 2017</u>
Level 3 Independent Data Review	<u>CSA/mbq</u>	Date <u>December 29, 2017</u>
Post-Final Validation	<u>NA</u>	Date <u>NA</u>

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