



Alberta Environment and Parks (AEP)  
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February 14, 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 December 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 December 2017 was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

Wind System: The Maxxam-Supplied RM Young unit (s/n: 92411) was removed on December 15 (10:00-11:00) and replaced with the LICA-Owned Met One (s/n: F1644) wind system. The Met One unit was removed on October 23 for bi-annual factory calibration.

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.



Lakeland Industry & Community Association  
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Should you have any questions, please don't hesitate to contact us.

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 #: 2833-2017-12-1-C**

**December 2017**

Prepared for:

**LAKELAND INDUSTRY & COMMUNITY ASSOCIATION**

5107 50 ST.

BONNYVILLE, ALBERTA

T9N 2J7

**Attention: MIKE BISAGA**

DATE: **January 26, 2018**

Prepared by: *Maram Ghaleb*

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Reviewed by: *Wunmi Adekanmbi*

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

## **SUMMARY**

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

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

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

**THC:** A loose signal cable inside the analyzer caused intermittent anomalous data and zero response during the month. Fifteen hours of impacted data were invalidated.

**Wind System:** The RM Young unit (s/n: 92411) was removed on December 15 (10:00-11:00) and replaced with the Met One (s/n: F1644) wind system that was removed on October 23 for bi-annual factory calibration. Two hours of downtime were incurred due to the replacement event.

The summary of results is presented on the following pages.

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

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



### Monthly Continuous Data Summary

Lakeland Industry & Community Association						MAXIMUM VALUES							OPERATIONAL TIME (%)
Cold Lake South Continuous Monitoring Station						1-HOUR					24-HOUR		
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
	1-hr	24-hr	1-hr	24-hr									
SO <sub>2</sub> (ppb)	172	48	0	0	0	3	29	10	8.6	NW	1	12	100.0
TRS (ppb)	-	-	-	-	0	1	21	0	4.5	SSW	0	1	100.0
THC (ppm)	-	-	-	-	2.44	3.82	27	11	4	WSW	3.12	27	98.0
NO <sub>2</sub> (ppb)	159	-	0	-	6	29	1	16	0.4	NE	18	1	100.0
NO (ppb)	-	-	-	-	1	45	1	1	1.1	WSW	12	1	100.0
NO <sub>x</sub> (ppb)	-	-	-	-	7	65	1	9	1.1	WSW	30	1	100.0
O <sub>3</sub> (ppb)	82	-	0	-	26.3	42.9	18	15	17.2	NW	37.0	18	100.0
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	80	30	0	0	3	16	3	10	4.8	WSW	9	2	100.0
RELATIVE HUMIDITY (%)	-	-	-	-	70	98	5	19	8.9	N	83	5	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	-10.5	8.0	9	13	10.7	W	3.6	10	100.0
VECTOR WS (kph)	-	-	-	-	4.7	23.2	10	15	-	NW	10.7	18	99.7
VECTOR WD (sec)	-	-	-	-	280 (W)	-	-	-	-	-	-	-	99.7

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## Exceedance Summary Report

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### SO<sub>2</sub> 1-Hour Exceedances

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

### SO<sub>2</sub> 24-Hour Exceedances

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

### NO<sub>2</sub> 1-Hour Exceedances

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

### PM<sub>2.5</sub> 1-Hour Exceedances

Measured concentrations of fine particulate matter were below the 1-hour AAAQO of 80 µg/m<sup>3</sup>.

### PM<sub>2.5</sub> 24-Hour Exceedances

Measured concentrations of fine particulate matter were below the 24-hour AAAQO of 30 µg/m<sup>3</sup>.

### O<sub>3</sub> 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 (SO<sub>2</sub>), Total Reduced Sulphur (TRS), Total Hydrocarbon (THC), Oxides of Nitrogen (NO<sub>x</sub>), Nitric Oxides (NO), Nitrogen Dioxide (NO<sub>2</sub>), Ozone (O<sub>3</sub>), Particulate Matter 2.5 (PM<sub>2.5</sub>), 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 (SO<sub>2</sub>)**

- Operational time for the monitoring period was 100%.
- The routine monthly calibration was performed on December 12.

#### **TOTAL REDUCED SULPHUR (TRS)**

- Operational time for the monitoring period was 100%.
- The routine monthly calibration was performed on December 13.
- One instance of maximum instantaneous data was discarded on December 12 at 10:00, due to a power interruption as a result of interference from station activities.

#### **TOTAL HYDROCARBONS (THC)**

- Operational time for the monitoring period was 98.0% equivalent to 15 hours of downtime.
- The routine monthly calibration was performed on December 12.
- During the monthly data validation process, sporadic, abrupt minute data drops to near zero concentrations were observed between December 20 and December 30. The drop in concentrations was determined to have resulted from a malfunctioning FID detector signal cable. Due to equipment vibrations, the cable transmission to the motherboard may be interrupted intermittently. Transmission resumes after these interruptions without any need for corrective action. As this problem was not apparent during the maintenance event on December 29, the cable was not replaced. The analyzer was replaced for maintenance during the January 2018 routine monthly visit. Data collected on December 20 at hours 03:00-04:00, December 23 at hour 19:00, December 29 at hour 00:00, and December 30 at hours 05:00-08:00, were impacted by this issue and were therefore invalidated. Eight hours of downtime were incurred.
- Initially, the zero air generator was suspected for causing the unstable zero response. Following a successful shut-down calibration on December 29, the zero air generator was inspected but no issues were identified. A successful post-repair calibration was subsequently completed. Seven hour of downtime were incurred as a result.
- As the zero response was also impacted by the loose cable, a segment of the monthly data was not corrected by the daily zero. An abrupt zero drift was observed between the December 5 and December 6 scheduled daily zero checks. The as-found zero from the monthly calibration on December 12 was applied to data from December 6 hour 00:00 (the last point of a plausible zero trend) to December 29 hour 09:00 (the point before the successful shut-down calibration). The zero drift between these points in time was within AMD acceptance limits, the as-found zero was applied to remove bias as it could not be determined when the loose cable impacted zero response.
- As the routine monthly, shut-down and post-repair calibrations met AMD requirements, data processed by this analyzer is considered valid.

#### **OXIDES OF NITROGEN (NO<sub>x</sub>), NITRIC OXIDE (NO) and NITROGEN DIOXIDE (NO<sub>2</sub>)**

- Operational time for the monitoring period was 100%.
- The routine monthly calibration was performed on December 12.

#### **OZONE (O<sub>3</sub>)**

- Operational time for the monitoring period was 100%.
- The routine monthly calibration was performed on December 13.
- One instance of maximum instantaneous data was discarded on December 12 at 10:00, due to a power interruption as a result of interference from station activities.

**PARTICULATE MATTER < 2.5 MICRONS (PM<sub>2.5</sub>)**

- Operational time for the monitoring period was 100%.
- The routine monthly audit was performed on December 13.
- 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  $0 \mu\text{g}/\text{m}^3$ . 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%.
- One instance of maximum instantaneous data was discarded on December 12 at 10:00, due to a power interruption as a result of interference from station activities.
- The RM Young unit (s/n: 92411) was removed on December 15 (10:00-11:00) and replaced with the Met One (s/n: F1644) wind system that was removed on October 23 for bi-annual factory calibration.
- 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%.

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## **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-00208: RM Young Wind Monitor Calibration
- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-00212: Ambient O<sub>3</sub> Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO<sub>2</sub>/NO<sub>x</sub> 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<sub>2.5</sub>) - Thermo 5030 SHARP Unit
- Wind System - RM Young Unit and Met One 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**

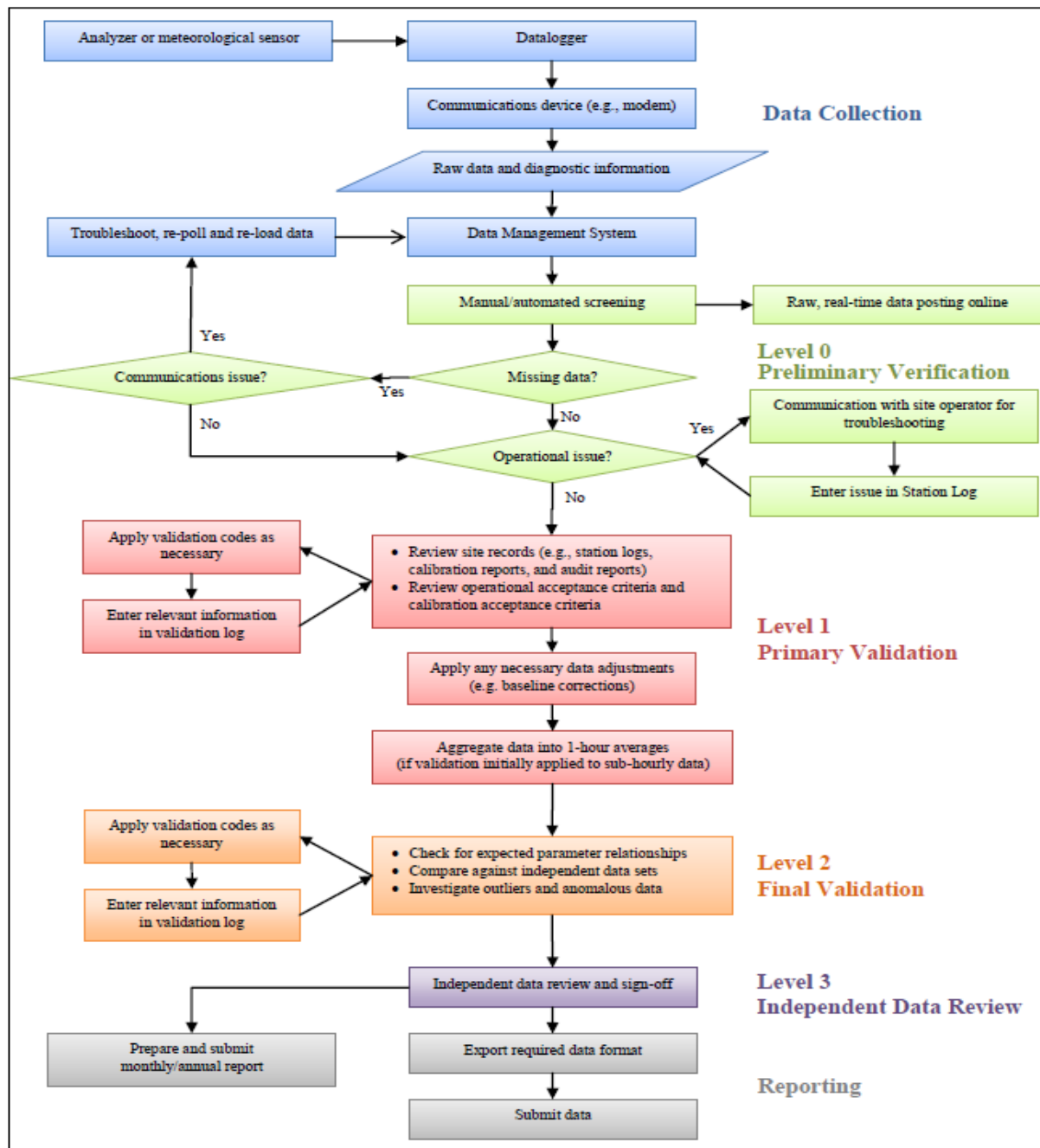
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

**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 (SO<sub>2</sub> 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	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
2	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
3	0	0	S	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	1	0	24	
4	0	S	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
5	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	S	0	0	0	1	0	24	
6	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	S	0	0	0	0	1	0	24	
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	24	
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	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	S	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	S	0	0	0	0	0	0	0	0	0	0	24	
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	1	1	0	0	1	2	0	0	0	2	0	24	
12	2	2	2	2	2	2	1	1	1	1	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	24	
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	2	2	1	1	1	1	1	1	1	0	0	2	0	24	
15	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	1	1	0	0	0	1	0	24	
17	1	0	0	0	0	0	0	0	0	1	1	S	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
18	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	24	
19	1	1	1	1	1	1	1	0	1	S	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	2	1	24	
20	0	0	0	0	0	0	0	0	0	S	0	0	0	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0	2	0	24	
21	0	0	1	1	1	1	1	S	0	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	1	1	24	
22	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
23	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	1	0	24	
24	0	0	0	0	S	1	1	1	0	1	1	1	1	2	2	2	2	2	1	1	1	1	0	0	0	0	0	0	2	1	24	
25	0	0	0	S	1	1	1	1	2	1	1	0	1	2	2	1	1	1	1	1	2	1	0	0	0	0	0	0	2	1	24	
26	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
27	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
28	S	0	0	0	0	0	0	0	0	0	2	1	1	1	2	1	0	0	1	1	2	1	1	S	0	0	0	0	2	1	24	
29	1	0	1	1	2	2	2	2	2	2	3	2	2	2	3	2	1	0	0	0	0	0	S	0	0	0	0	0	3	1	24	
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	24	
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	24	
HOURLY MAX	2	2	2	2	2	2	2	2	2	2	3	2	2	2	3	2	2	2	2	1	1	2	1	1	2	0	0	0	0	0	24	
HOURLY AVG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	

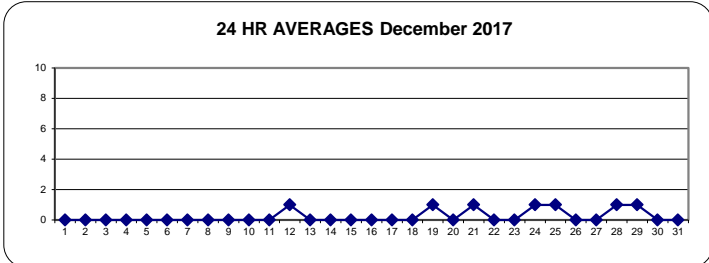
STATUS FLAG CODES

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

OBJECTIVE LIMIT:

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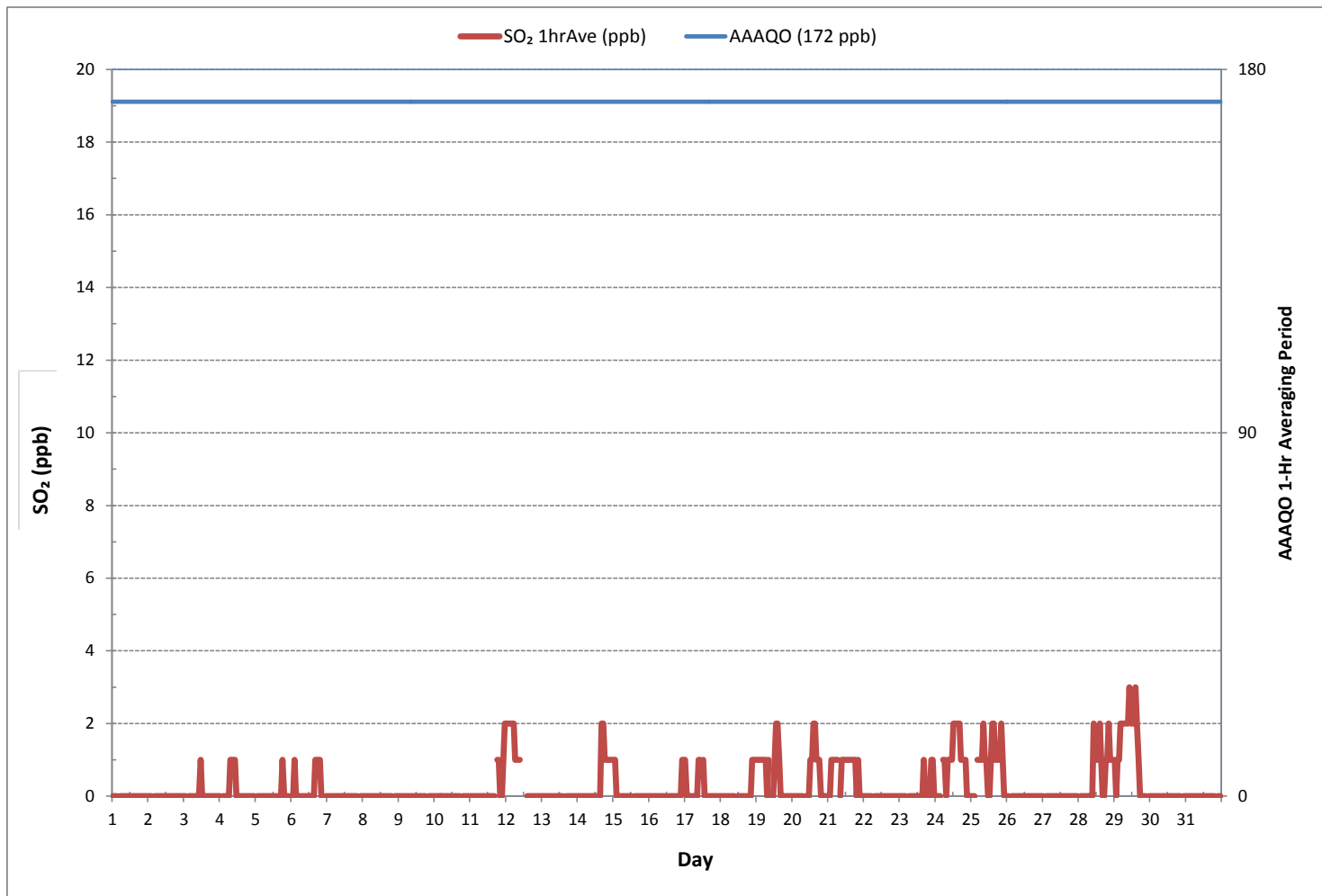
24 HR AVERAGES December 2017



MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0
NUMBER OF 24-HR EXCEEDANCES:	0
NUMBER OF NON-ZERO READINGS:	140
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR ON DAY 1
MAXIMUM 1-HR AVERAGE:	3 ppb @ HOUR 10 ON DAY 29
MAXIMUM 24-HR AVERAGE:	1 ppb ON DAY 12
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	4 hrs
OPERATIONAL TIME:	744 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	1
MONTHLY AVERAGE:	0 ppb

SULPHUR DIOXIDE Hourly Averages (SO<sub>2</sub> ppb)





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

SULPHUR DIOXIDE Instantaneous Maximum (SO<sub>2</sub> 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	S	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	24	
2	0	0	0	S	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24
3	0	0	S	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
4	0	S	0	1	1	1	0	1	2	2	2	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	2	1	24
5	S	0	0	0	0	0	0	0	0	1	0	0	1	1	1	0	1	1	2	0	1	1	1	S	0	2	1	24	
6	0	1	1	1	1	1	0	1	0	1	0	1	0	0	1	1	1	1	1	1	1	1	1	S	0	0	1	1	24
7	0	0	0	1	0	1	0	0	0	1	1	1	0	0	0	1	0	0	0	1	0	S	0	1	0	1	0	1	24
8	0	0	0	1	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0	S	0	1	0	0	1	0	24
9	1	1	0	1	0	1	0	0	1	0	0	1	1	1	1	0	1	1	0	S	1	1	0	0	0	1	1	1	24
10	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	S	1	1	1	1	1	1	0	1	0	24
11	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	S	1	2	1	1	2	3	0	3	1	1	24
12	3	3	3	3	2	2	2	2	2	C	C	C	C	C	C	1	1	1	1	1	1	1	1	1	1	1	3	2	24
13	0	0	1	0	0	0	0	0	0	1	1	1	1	0	0	S	1	1	1	1	1	0	1	1	0	0	1	0	24
14	0	0	0	0	0	1	0	0	0	0	0	0	1	1	S	1	3	3	1	1	1	1	1	2	0	3	1	24	
15	1	1	1	1	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	1	0	0	1	0	1	24
16	0	0	0	0	1	1	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	1	2	1	0	2	0	24
17	1	1	1	1	1	1	1	1	1	1	2	S	1	1	0	0	0	1	0	0	0	0	0	0	0	2	1	1	24
18	0	0	0	1	0	0	0	0	0	0	S	0	0	0	1	0	0	1	0	0	1	1	1	1	1	0	1	0	24
19	1	1	1	1	2	1	1	1	1	S	1	1	2	3	2	2	1	1	0	0	1	0	0	0	0	0	3	1	24
20	0	0	0	0	0	0	0	0	S	1	1	1	2	3	3	3	2	1	1	1	0	1	0	1	0	3	1	1	24
21	1	1	1	1	1	1	1	S	1	1	1	2	2	1	1	1	1	1	1	1	1	1	0	0	0	2	1	1	24
22	1	1	1	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	24
23	1	0	0	1	1	S	1	0	0	0	0	0	0	1	0	2	1	1	1	1	1	1	1	1	0	2	1	1	24
24	1	1	0	1	S	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	2	1	1	1	0	2	1	24
25	0	1	0	S	1	2	2	2	2	2	2	1	1	2	3	4	2	2	2	1	1	2	1	1	1	0	4	2	24
26	1	1	S	0	0	0	0	1	0	0	1	1	1	1	1	1	1	0	1	0	0	1	0	0	0	1	0	1	24
27	1	S	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	0	0	1	0	1	1	0	1	1	1	24
28	S	1	0	1	0	0	1	1	0	1	3	2	2	3	3	1	1	1	2	3	3	2	1	S	0	3	1	1	24
29	1	1	2	2	3	3	3	2	3	3	3	3	2	3	3	2	2	1	1	0	0	1	S	0	0	3	2	1	24
30	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	0	1	0	0	S	0	0	0	1	0	1	24
31	1	0	0	0	0	1	1	0	0	1	1	1	1	1	1	1	0	1	0	1	S	0	0	1	0	1	1	1	24
HOURLY MAX	3	3	3	3	3	3	3	2	3	3	3	3	2	3	3	4	3	3	2	3	3	3	2	2	3				
HOURLY AVG	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					

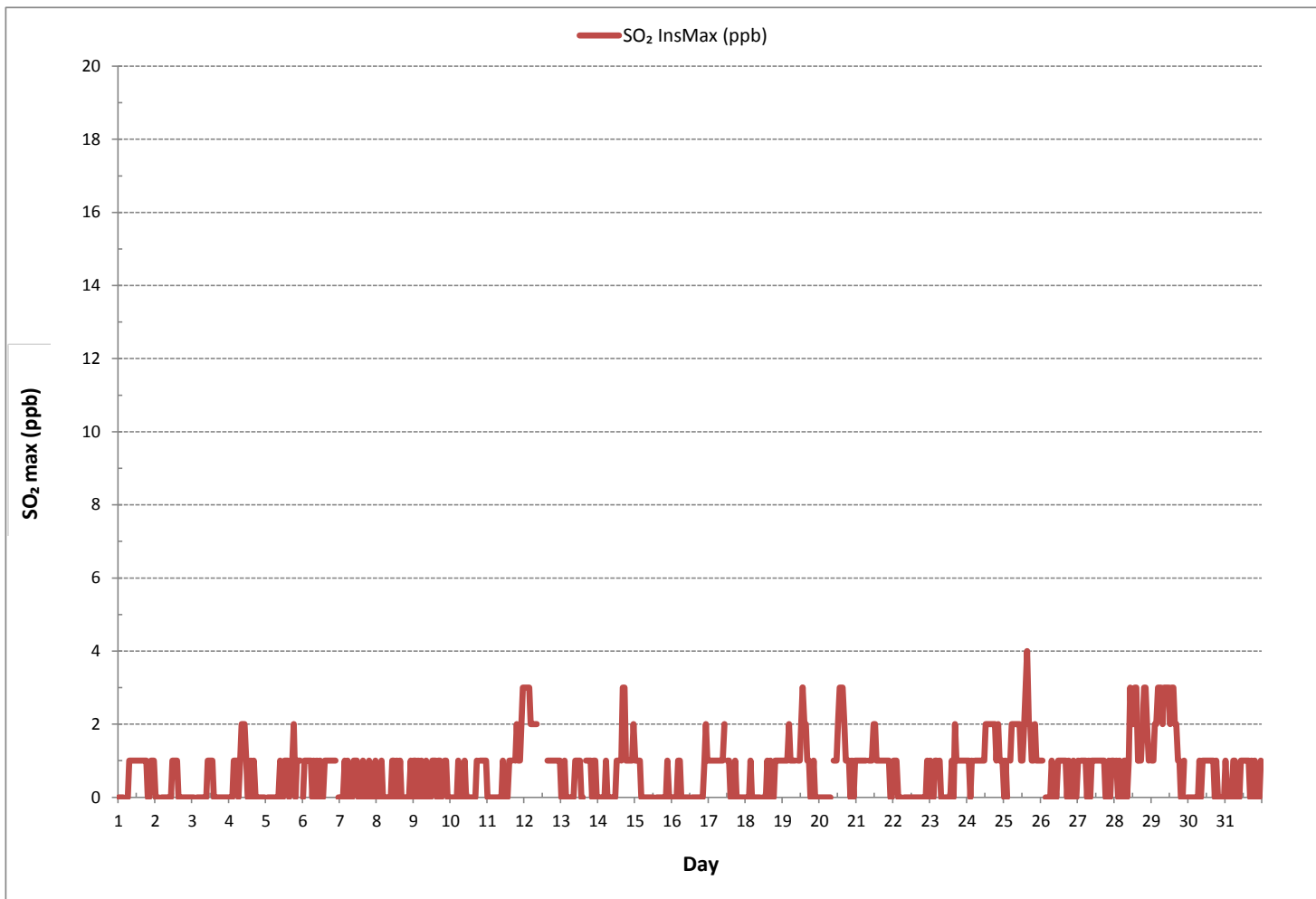
STATUS FLAG CODES

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:	377
MAXIMUM INSTANTANEOUS VALUE:	4 ppb @ HOUR 15 ON DAY 25
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	1





Wind: LICA COLD LAKE SOUTH  
 Poll.: LICA COLD LAKE SOUTH-SO2[ppb]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

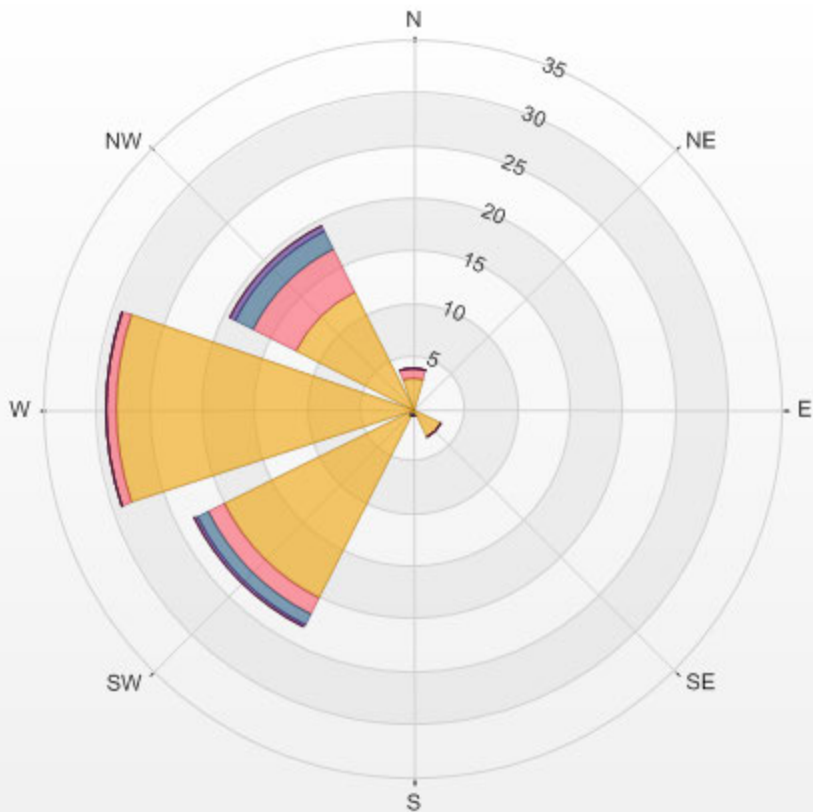
Calm: 20.34%

Calm Avg: 0.15 [ppb]

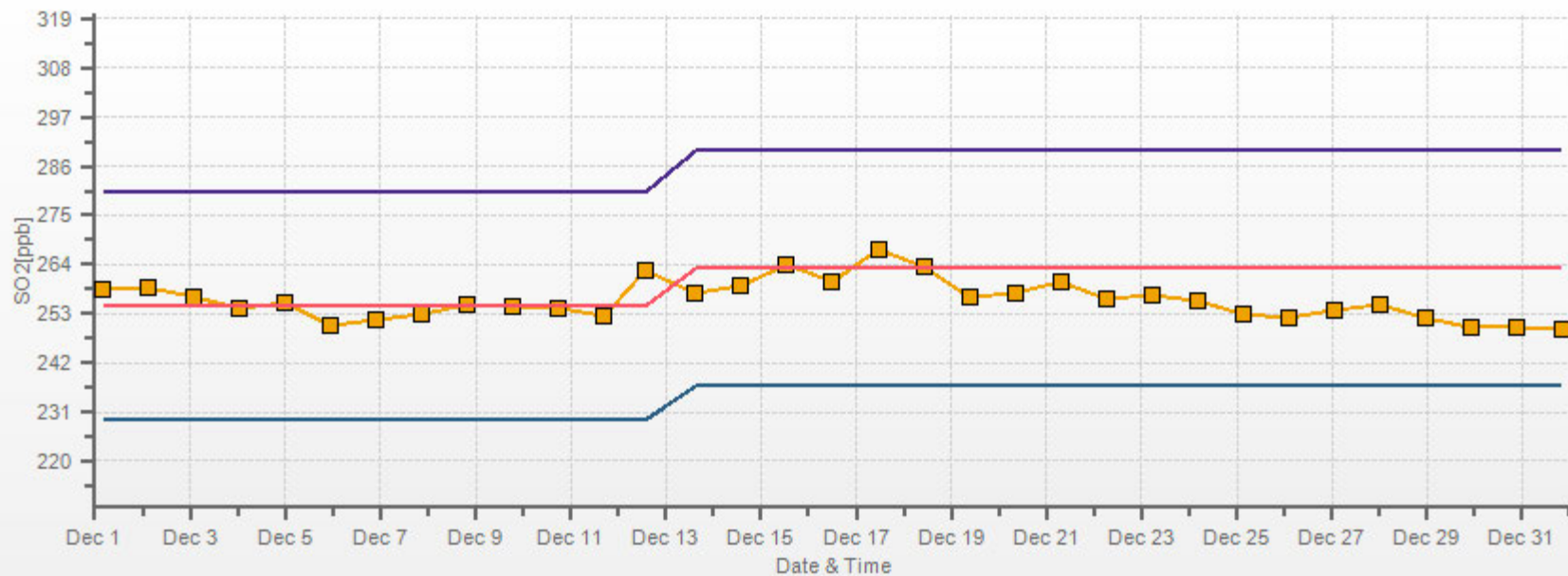
Direction	0.0-0.8	0.8-1.6	1.6-2.4	2.4-3.2	3.2-4.0	>4.0	Total
<b>N</b>	3.0	0.9	0.1	0.0	0.0	0.0	4.0
<b>NE</b>	0.1	0.0	0.0	0.0	0.0	0.0	0.1
<b>E</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>SE</b>	3.0	0.0	0.0	0.0	0.0	0.0	3.0
<b>S</b>	0.6	0.0	0.1	0.0	0.0	0.0	0.7
<b>SW</b>	20.1	1.7	1.1	0.3	0.0	0.0	23.2
<b>W</b>	28.2	1.0	0.0	0.0	0.0	0.0	29.2
<b>NW</b>	12.5	4.6	1.9	0.6	0.0	0.0	19.5
<b>Summary</b>	67.4	8.1	3.3	0.9	0.0	0.0	79.7

% Icon	Classes (ppb)	67	8	3	1	0	0
	0.0-0.8						
	0.8-1.6						
	1.6-2.4						
	2.4-3.2						
	3.2-4.0						
	>4.0						

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-SO2[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 20.34% Calm Poll Avg: 0.15[ppb]



SO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/12 Type: Span



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

***TOTAL REDUCED SULPHUR***

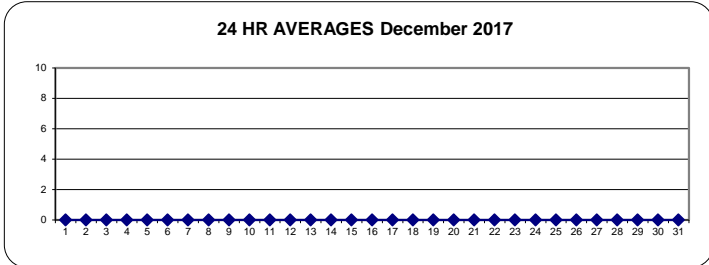
TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)

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.
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	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
2	0	0	0	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
3	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
4	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
5	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	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	S	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	S	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	S	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	S	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	S	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	S	0	0	0	0	0	0	0	0	24
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	24
13	0	0	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	24
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	24
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	24
16	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
17	0	0	0	0	0	0	0	0	0	0	0	S	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	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
19	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
20	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
21	1	0	0	0	0	0	1	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	24
22	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
23	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
24	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
25	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
26	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
27	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
28	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	24
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	24
30	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
31	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
HOURLY MAX	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HOURLY AVG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

STATUS FLAG CODES

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

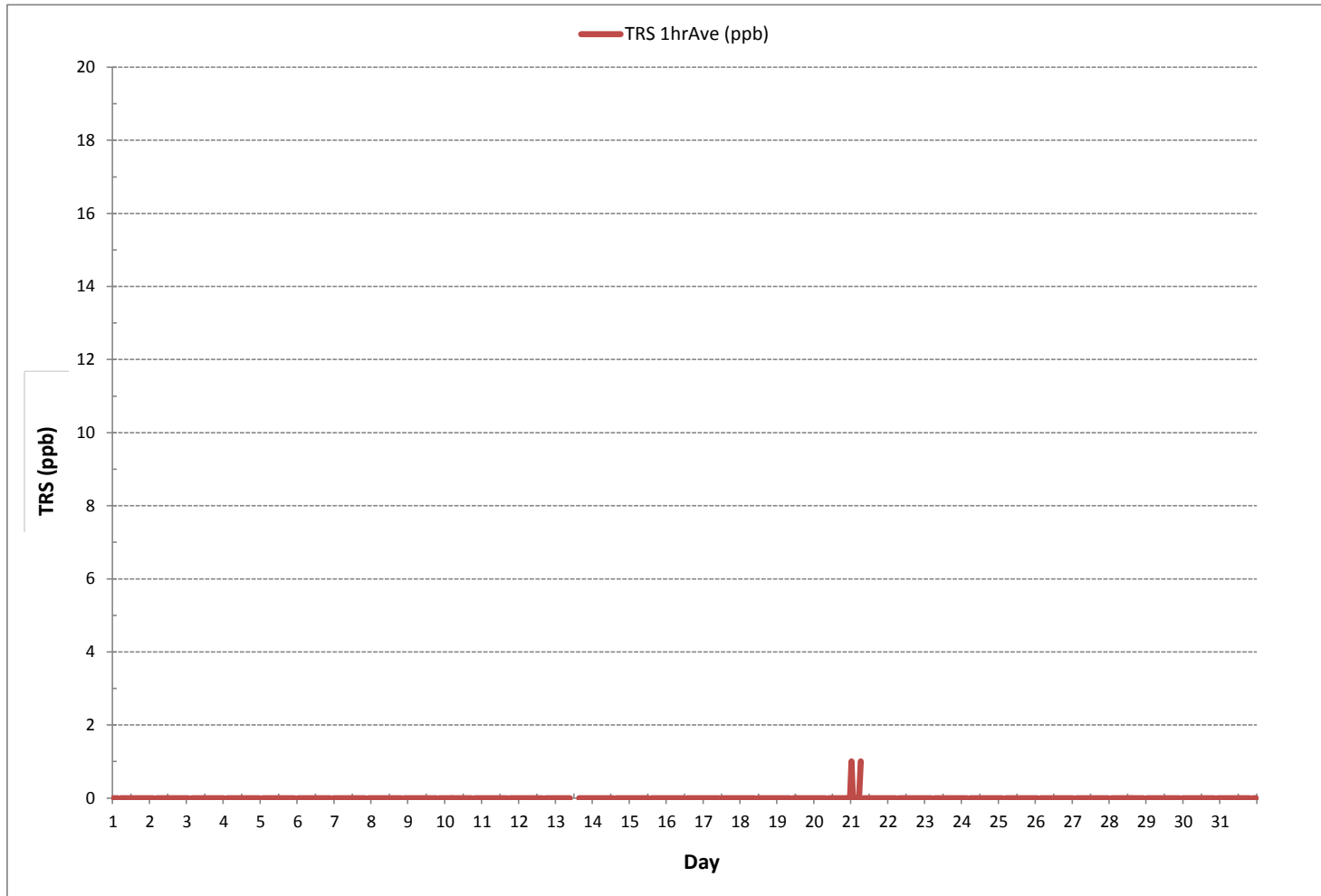
24 HR AVERAGES December 2017



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	0	ON DAY	21
MAXIMUM 24-HR AVERAGE:	0	ppb		ON DAY	1
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	744	hrs
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	0		MONTHLY AVERAGE:	0	ppb

TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Cold Lake South Continuous Monitoring Station - December 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	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
2	1	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
3	1	1	S	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	24
4	0	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	1	24
5	S	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	S	0	1	24
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	24
7	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	0	1	24
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	24
9	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	0	1	24
10	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	S	1	1	1	1	1	0	1	24
11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	24
12	1	1	1	1	1	1	1	1	1	1	X	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	23
13	1	1	1	1	1	1	1	1	1	1	C	C	C	C	C	1	1	1	1	1	1	1	1	1	1	1	1	24
14	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
15	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	24
16	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
17	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
18	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
19	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
20	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
21	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
22	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
23	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
24	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
25	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
26	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	24
27	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
28	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	24
29	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	1	24
30	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	1	24
31	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	24
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	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	1	

STATUS FLAG CODES

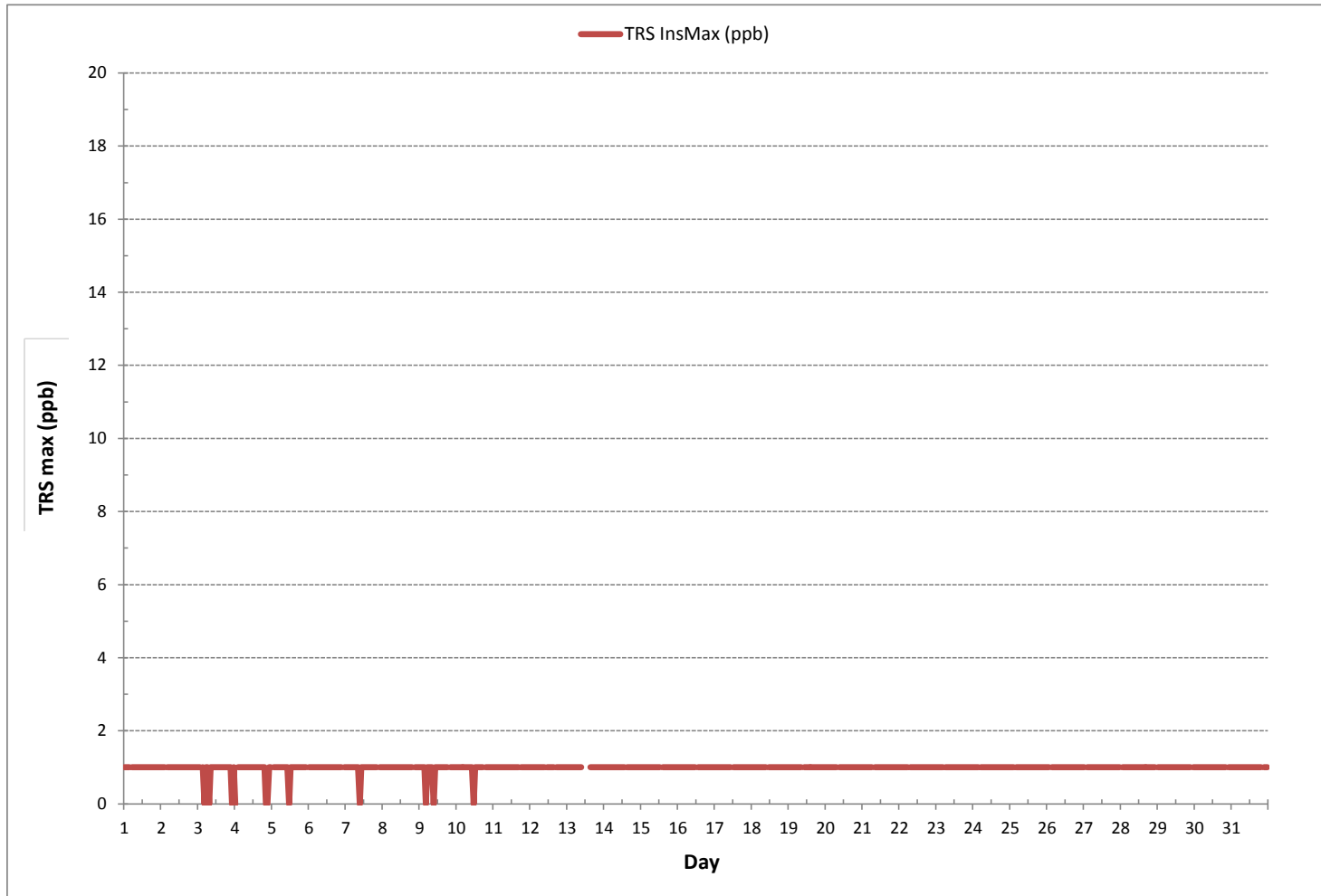
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	695
MAXIMUM INSTANTANEOUS VALUE:	1 ppb @ HOUR 0 ON DAY 1
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	0
OPERATIONAL TIME:	743 hrs



TOTAL REDUCED SULPHUR Instantaneous Maximum (TRS ppb)



Wind: LICA COLD LAKE SOUTH  
 Poll.: LICA COLD LAKE SOUTH-TRS[ppb]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

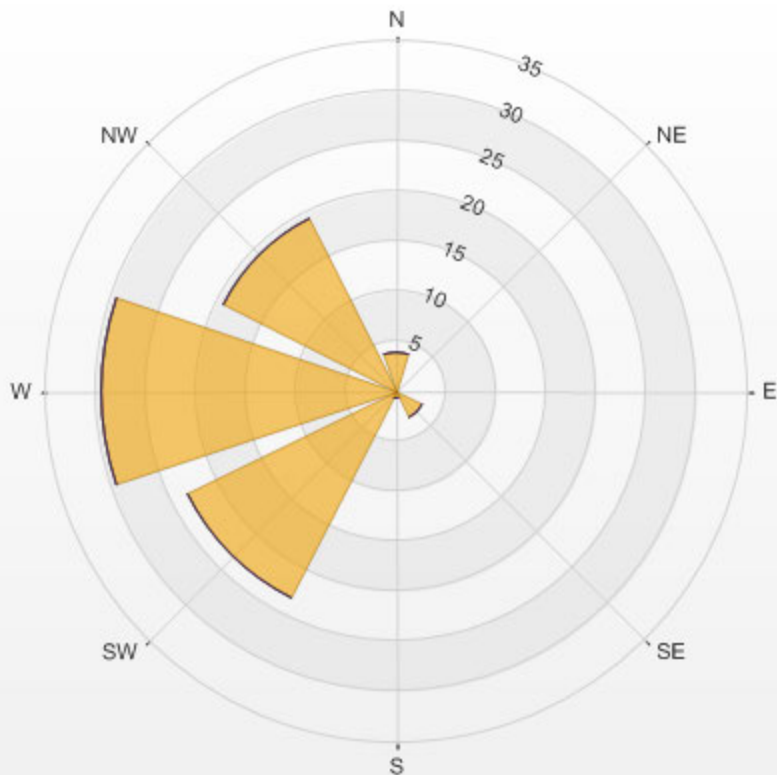
Calm: 20.34%

Calm Avg: 0.26 [ppb]

Direction	0.0-0.7	0.7-1.3	1.3-2.0	>2.0	Total
<b>N</b>	4.0	0.0	0.0	0.0	4.0
<b>NE</b>	0.1	0.0	0.0	0.0	0.1
<b>E</b>	0.0	0.0	0.0	0.0	0.0
<b>SE</b>	3.0	0.0	0.0	0.0	3.0
<b>S</b>	0.7	0.0	0.0	0.0	0.7
<b>SW</b>	23.2	0.0	0.0	0.0	23.2
<b>W</b>	29.5	0.0	0.0	0.0	29.5
<b>NW</b>	19.2	0.0	0.0	0.0	19.2
<b>Summary</b>	79.7	0.0	0.0	0.0	79.7

% Icon Classes (ppb) 80 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] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 20.34% Calm Poll Avg: 0.26[ppb]



TRS[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/12 Type: Span



Span Meas Span Ref Span Low Span High

***TOTAL HYDROCARBON***

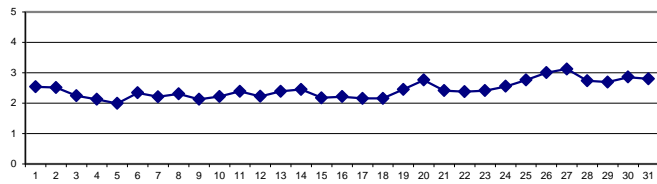
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	2.21	2.23	2.46	2.32	S	2.39	2.47	2.68	2.66	2.68	2.55	2.39	2.49	2.45	2.43	2.49	2.60	2.64	2.63	2.57	2.58	2.71	2.87	2.85	2.21	2.87	2.54	24	
2	2.88	2.91	2.93	S	2.93	2.89	2.88	2.90	2.90	2.84	2.59	2.35	2.22	2.18	2.17	2.18	2.27	2.27	2.19	2.21	2.22	2.29	2.28	2.28	2.17	2.93	2.51	24	
3	2.30	2.30	S	2.34	2.34	2.35	2.40	2.40	2.43	2.47	2.23	2.15	2.28	2.29	2.13	2.05	2.02	2.03	2.06	2.11	2.20	2.22	2.26	2.20	2.02	2.47	2.24	24	
4	2.20	S	2.23	2.02	2.02	2.05	2.04	2.08	2.06	2.15	2.14	2.11	2.19	2.09	2.11	2.10	2.11	2.18	2.12	2.13	2.17	2.15	2.16	2.20	2.02	2.23	2.12	24	
5	S	2.18	2.23	2.28	2.33	2.07	1.91	1.94	1.94	1.90	1.88	1.88	1.90	1.92	1.91	1.92	1.95	1.99	1.98	1.91	1.94	1.95	1.95	S	1.88	2.33	1.99	24	
6	2.23	2.25	2.27	2.30	2.32	2.32	2.39	2.41	2.58	2.47	2.32	2.30	2.29	2.31	2.28	2.32	2.42	2.36	2.35	2.34	2.34	2.35	S	2.30	2.23	2.58	2.34	24	
7	2.20	2.20	2.24	2.24	2.22	2.24	2.24	2.30	2.35	2.18	2.20	2.17	2.14	2.13	2.13	2.15	2.17	2.18	2.17	2.19	2.29	S	2.22	2.29	2.13	2.35	2.21	24	
8	2.27	2.30	2.29	2.32	2.37	2.39	2.41	2.42	2.28	2.25	2.23	2.22	2.21	2.19	2.22	2.23	2.35	2.36	2.40	2.41	S	2.37	2.28	2.26	2.19	2.42	2.31	24	
9	2.21	2.15	2.17	2.20	2.19	2.19	2.18	2.08	2.06	2.08	2.10	2.13	2.08	2.04	2.04	2.07	2.12	2.12	2.13	S	2.11	2.11	2.12	2.15	2.04	2.21	2.12	24	
10	2.16	2.20	2.27	2.26	2.26	2.26	2.31	2.32	2.32	2.29	2.24	2.21	2.14	2.08	2.10	2.14	2.17	2.17	S	2.17	2.20	2.23	2.27	2.27	2.08	2.32	2.22	24	
11	2.28	2.35	2.39	2.47	2.47	2.49	2.48	2.54	2.59	2.62	2.61	2.46	2.40	2.37	2.33	2.32	2.28	S	2.25	2.23	2.24	2.20	2.28	2.27	2.20	2.62	2.39	24	
12	2.21	2.22	2.20	2.21	2.20	2.24	2.21	2.19	2.26	2.30	C	C	C	C	2.16	2.14	2.16	2.19	2.22	2.25	2.29	2.28	2.25	2.28	2.14	2.30	2.22	24	
13	2.37	2.38	2.39	2.37	2.43	2.52	2.57	2.54	2.50	2.45	2.42	2.34	2.27	2.26	2.24	S	2.35	2.34	2.32	2.34	2.36	2.40	2.37	2.34	2.24	2.57	2.39	24	
14	2.40	2.43	2.44	2.46	2.49	2.50	2.52	2.62	2.66	2.48	2.45	2.39	2.34	2.33	S	2.34	2.44	2.54	2.52	2.48	2.37	2.30	2.35	2.45	2.30	2.66	2.45	24	
15	2.46	2.45	2.34	2.33	2.29	2.26	2.29	2.22	2.11	2.07	2.00	2.04	2.05	S	2.03	2.05	2.08	2.08	2.13	2.18	2.12	2.12	2.14	2.17	2.00	2.46	2.17	24	
16	2.16	2.20	2.12	2.15	2.16	2.18	2.20	2.22	2.25	2.22	2.24	2.23	S	2.18	2.21	2.24	2.24	2.25	2.22	2.27	2.27	2.25	2.20	2.23	2.12	2.27	2.21	24	
17	2.27	2.29	2.31	2.31	2.32	2.30	2.30	2.24	2.24	2.23	2.19	S	2.08	2.08	2.02	2.01	2.04	2.06	2.05	2.03	2.04	2.04	2.05	2.05	2.01	2.32	2.15	24	
18	2.06	2.10	2.10	2.09	2.12	2.13	2.18	2.16	2.14	2.15	S	2.14	2.09	2.10	2.13	2.15	2.17	2.20	2.20	2.21	2.23	2.25	2.25	2.26	2.06	2.26	2.16	24	
19	2.33	2.35	2.38	2.39	2.39	2.40	2.41	2.43	2.43	S	2.43	2.42	2.40	2.39	2.39	2.42	2.49	2.45	2.46	2.50	2.52	2.61	2.64	2.69	2.33	2.69	2.45	24	
20	2.62	2.66	2.68	X	X	3.20	3.31	2.09	S	3.40	3.17	2.73	2.50	2.51	2.54	2.64	2.64	2.60	2.54	2.67	2.90	2.92	2.90	2.71	2.09	3.40	2.76	22	
21	2.61	2.57	2.52	2.46	2.40	2.41	2.42	S	2.42	2.39	2.37	2.38	2.36	2.38	2.37	2.37	2.39	2.41	2.39	2.38	2.41	2.39	2.37	2.37	2.36	2.61	2.41	24	
22	2.37	2.39	2.40	2.42	2.47	2.43	S	2.44	2.45	2.39	2.41	2.44	2.34	2.32	2.32	2.34	2.33	2.31	2.31	2.33	2.35	2.35	2.36	2.35	2.31	2.47	2.37	24	
23	2.34	2.40	2.44	2.41	2.35	S	2.37	2.37	2.34	2.38	2.41	2.39	2.39	2.41	2.39	2.40	2.41	2.45	2.48	X	2.49	2.57	2.49	2.47	2.34	2.57	2.42	23	
24	2.47	2.45	2.42	2.40	S	2.41	2.48	2.49	2.51	2.53	2.54	2.53	2.53	2.53	2.57	2.61	2.66	2.67	2.66	2.64	2.66	2.70	2.68	2.40	2.70	2.55	24		
25	2.67	2.99	3.16	S	2.87	2.79	2.88	2.90	2.75	2.64	2.60	2.57	2.57	2.59	2.63	2.66	2.71	2.72	2.76	2.81	2.83	2.83	2.80	2.79	2.57	3.16	2.76	24	
26	2.80	2.85	S	3.09	3.15	3.14	3.10	3.21	3.27	3.31	3.15	3.01	2.79	2.71	2.71	2.72	2.75	2.80	2.82	2.88	3.00	3.19	3.31	3.35	2.71	3.35	3.00	24	
27	3.33	S	3.20	3.19	3.14	3.13	3.16	3.18	3.19	3.20	3.52	3.82	3.41	3.16	3.41	3.40	2.95	2.88	2.81	2.81	2.81	2.71	2.70	2.69	2.69	3.82	3.12	24	
28	S	2.64	2.65	2.70	2.74	2.77	2.78	2.85	2.85	3.01	2.79	2.66	2.64	2.70	2.61	2.63	2.66	2.70	2.73	2.76	2.76	2.72	2.76	S	2.61	3.01	2.73	24	
29	X	2.79	2.84	2.87	2.88	2.91	2.88	2.85	2.87	3.02	C1	C1	C1	C1	C1	C1	C1	C1	2.27	2.32	2.36	2.41	2.49	S	2.62	2.27	3.02	2.69	16
30	2.67	2.75	2.80	2.83	2.85	X	X	X	X	3.29	3.60	3.37	3.46	2.91	2.73	2.73	2.68	2.65	2.64	2.75	2.56	S	2.50	2.50	2.50	3.60	2.86	20	
31	2.52	2.58	2.63	2.69	2.83	2.93	3.00	3.11	3.09	3.02	2.91	2.83	2.87	2.81	2.72	2.63	2.68	2.74	2.67	2.63	S	2.74	2.86	2.88	2.52	3.11	2.80	24	
HOURLY MAX	3.33	2.99	3.20	3.19	3.15	3.20	3.31	3.21	3.27	3.40	3.60	3.82	3.46	3.16	3.41	3.40	2.95	2.88	2.82	2.88	3.00	3.19	3.31	3.35					
HOURLY AVG	2.41	2.43	2.47	2.43	2.48	2.49	2.51	2.49	2.50	2.55	2.51	2.45	2.41	2.37	2.34	2.36	2.37	2.39	2.38	2.40	2.40	2.43	2.44	2.45					

STATUS FLAG CODES

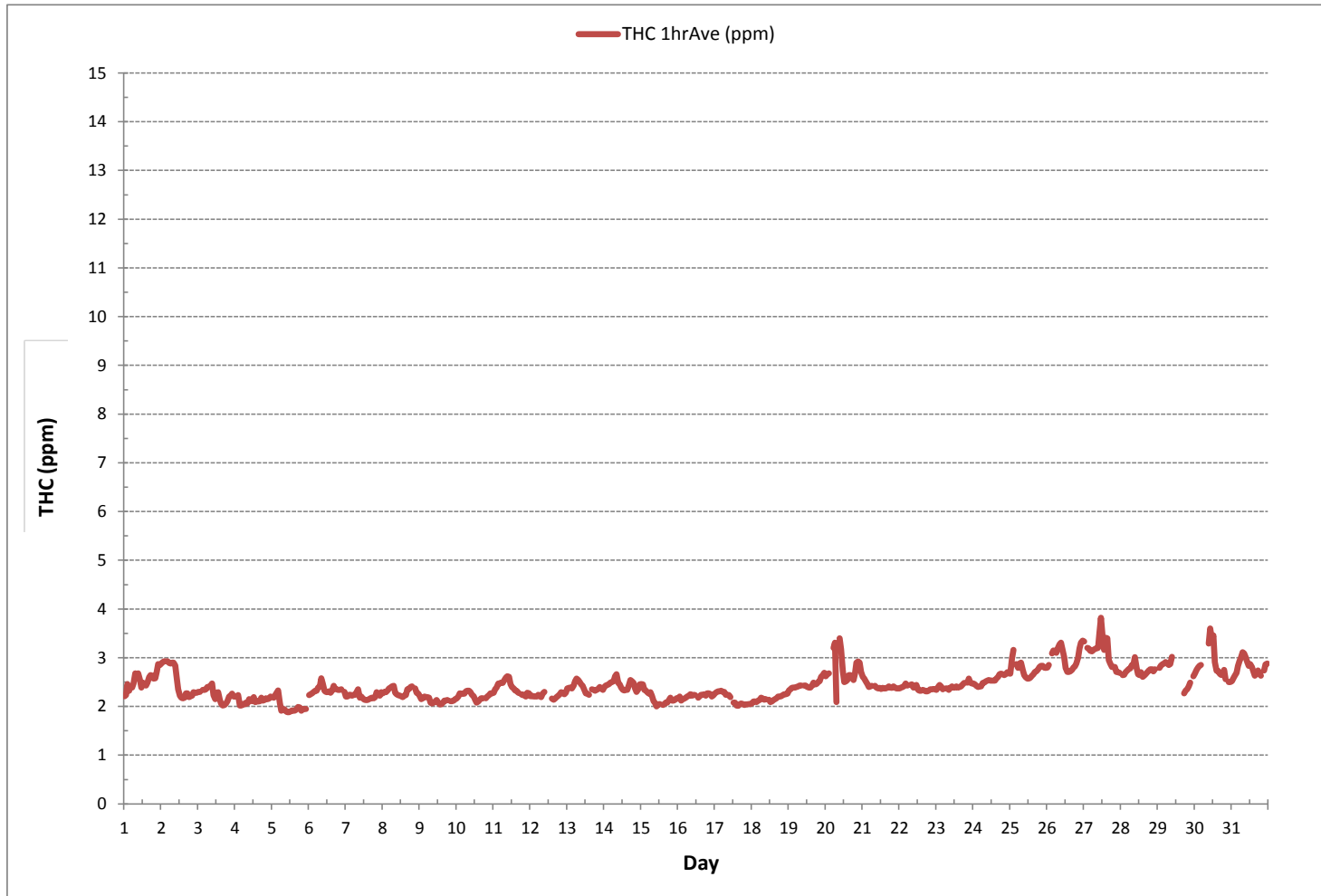
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

24 HR AVERAGES December 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	693		
MINIMUM 1-HR AVERAGE:	1.88 ppm	@ HOUR	10 ON DAY 5
MAXIMUM 1-HR AVERAGE:	3.82 ppm	@ HOUR	11 ON DAY 27
MAXIMUM 24-HR AVERAGE:	3.12 ppm		ON DAY 27
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	729 hrs
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	98.0 %
STANDARD DEVIATION:	0.31	MONTHLY AVERAGE:	2.44 ppm





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Cold Lake South Continuous Monitoring Station - December 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 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	2.42	2.43	2.67	2.53	S	2.74	2.73	2.93	2.89	2.98	4.06	2.65	2.71	2.77	2.61	2.71	2.78	3.11	3.14	2.77	2.77	2.99	3.05	3.01	2.42	4.06	2.85	24
2	3.04	3.08	3.20	S	3.18	3.07	3.05	3.11	3.11	3.04	3.13	2.84	2.40	2.37	2.39	2.34	2.49	2.68	2.36	2.37	2.40	2.55	2.52	2.46	2.34	3.20	2.75	24
3	2.46	2.58	S	2.55	2.53	2.53	2.61	2.59	3.35	2.68	2.98	2.45	2.62	2.52	2.48	2.40	2.34	2.25	2.43	2.55	2.46	2.62	2.80	2.46	2.25	3.35	2.58	24
4	2.46	S	2.49	2.30	2.27	2.30	2.30	2.31	2.31	2.59	2.40	2.62	2.70	2.34	2.55	2.33	2.35	3.01	2.45	2.33	2.42	2.44	2.36	2.39	2.27	3.01	2.44	24
5	S	2.39	2.47	2.55	2.62	2.40	2.18	2.46	3.57	2.31	2.19	2.21	2.24	2.27	2.27	2.30	2.40	2.54	2.42	2.31	2.39	2.37	2.40	S	2.18	3.57	2.42	24
6	2.42	2.43	2.46	2.47	2.58	2.61	2.62	2.61	3.11	2.77	3.64	2.48	2.69	2.52	2.55	2.71	2.89	2.61	2.52	2.52	2.52	2.55	S	2.52	2.42	3.64	2.64	24
7	2.37	2.40	2.42	2.40	2.40	2.43	2.45	2.50	2.74	2.64	2.58	2.43	3.04	2.34	2.31	2.48	2.36	2.40	2.36	2.37	2.46	S	2.46	2.49	2.31	3.04	2.47	24
8	2.48	2.48	2.48	2.51	2.58	2.55	2.61	2.71	2.55	2.48	2.45	2.42	2.40	2.50	2.61	2.47	2.77	2.61	2.61	2.61	S	2.56	2.48	2.46	2.40	2.77	2.54	24
9	2.42	2.34	2.37	2.37	2.37	2.37	2.37	2.27	2.24	2.31	2.52	2.37	2.28	2.39	2.27	2.34	2.43	2.36	2.31	S	2.31	2.28	2.31	2.33	2.24	2.52	2.34	24
10	2.34	2.43	2.45	2.46	2.43	2.45	2.52	2.50	2.49	2.48	2.49	2.40	2.33	2.35	2.31	2.31	2.34	2.37	S	2.37	2.37	2.40	2.45	2.46	2.31	2.52	2.41	24
11	2.46	2.55	2.58	2.67	2.65	2.68	2.67	2.74	3.58	3.05	2.98	3.07	2.61	2.71	2.61	2.80	2.67	S	2.43	2.46	2.50	2.42	2.52	2.48	2.42	3.58	2.69	24
12	2.39	2.39	2.39	2.40	2.39	2.42	2.40	2.37	2.74	C	C	C	C	C	2.45	2.40	2.34	2.36	2.40	2.46	2.49	2.46	2.45	2.49	2.34	2.74	2.43	24
13	2.56	2.58	2.58	2.55	2.64	2.74	2.77	2.74	3.07	2.67	2.64	2.53	2.46	2.56	2.49	S	2.53	2.52	2.51	2.52	2.56	2.58	2.58	2.52	2.46	3.07	2.60	24
14	2.61	2.62	2.64	2.64	2.68	2.68	2.77	2.86	3.19	2.71	2.74	2.65	3.87	2.55	S	2.55	2.83	2.80	2.74	2.68	2.58	2.49	2.62	2.65	2.49	3.87	2.75	24
15	2.68	2.64	2.55	2.52	2.49	2.43	2.49	2.46	2.43	2.31	2.21	2.21	2.22	S	2.22	2.24	2.31	2.27	2.34	2.40	2.34	2.31	2.34	2.37	2.21	2.68	2.38	24
16	2.37	2.40	2.34	2.34	2.34	2.37	2.39	2.40	2.49	2.43	2.43	2.45	S	2.39	2.55	3.04	2.49	2.45	2.40	2.45	2.46	2.46	2.37	2.43	2.34	3.04	2.43	24
17	2.48	2.46	2.53	2.52	2.52	2.49	2.51	2.45	2.43	2.43	2.49	S	2.27	2.27	2.30	2.21	2.29	2.28	2.24	2.21	2.24	2.22	2.24	2.24	2.21	2.53	2.36	24
18	2.24	2.28	2.31	2.27	2.30	2.33	2.37	2.36	2.36	2.34	S	2.37	2.28	2.46	2.31	2.34	2.37	2.39	2.40	2.39	2.43	2.43	2.43	2.46	2.24	2.46	2.36	24
19	2.52	2.53	2.58	2.58	2.58	2.58	2.59	2.62	2.67	S	2.64	2.62	2.61	2.67	2.68	2.64	2.98	2.70	2.80	2.71	2.76	2.92	2.86	2.89	2.52	2.98	2.68	24
20	2.83	2.88	2.89	X	X	3.48	3.82	4.50	S	3.93	3.54	3.18	2.86	2.79	2.76	3.23	2.93	2.81	3.14	3.01	3.26	3.14	3.13	2.95	2.76	4.50	3.19	22
21	2.84	2.76	2.71	2.71	2.58	2.58	2.62	S	2.67	2.58	2.61	2.58	2.55	2.56	3.36	2.56	2.58	2.58	2.59	2.56	2.58	2.58	2.55	2.55	2.55	3.36	2.65	24
22	2.56	2.58	2.58	2.62	2.65	2.64	S	2.64	2.67	2.81	2.74	2.91	2.55	2.61	2.53	2.52	2.50	2.49	2.49	2.52	2.53	2.52	2.55	2.53	2.49	2.91	2.60	24
23	2.52	2.64	2.62	2.65	2.54	S	2.56	2.58	2.55	2.61	2.62	2.59	2.61	2.61	2.61	2.59	2.61	2.65	2.74	X	2.71	2.80	2.76	2.70	2.52	2.80	2.63	23
24	2.68	2.65	2.60	2.59	S	2.61	2.68	2.68	2.71	2.76	2.74	2.73	2.71	2.73	2.73	2.77	2.81	2.86	2.86	2.92	2.84	2.89	2.94	2.89	2.59	2.94	2.76	24
25	2.89	3.29	3.39	S	3.08	3.01	3.13	3.10	3.01	2.88	2.80	2.77	2.77	2.78	2.83	2.89	2.92	2.92	2.99	3.04	3.02	3.02	3.00	3.00	2.77	3.39	2.98	24
26	3.02	3.05	S	3.35	3.38	3.38	3.35	3.45	3.51	3.51	3.48	3.26	3.05	2.91	2.95	2.92	2.98	3.01	3.02	3.13	3.27	3.42	3.54	3.56	2.91	3.56	3.24	24
27	3.54	S	3.45	3.39	3.35	3.32	3.99	3.38	3.54	3.41	4.06	4.15	3.78	3.57	5.05	3.94	3.69	3.15	2.99	3.02	3.04	2.93	2.89	2.89	2.89	5.05	3.50	24
28	S	2.83	2.83	2.91	2.95	2.96	2.98	3.05	3.14	3.24	3.11	2.89	2.83	3.24	2.80	2.83	2.86	2.91	2.92	3.01	2.99	2.91	2.96	S	2.80	3.24	2.96	24
29	X	3.02	3.04	3.08	3.08	3.11	3.08	3.05	3.08	3.69	C1	C1	C1	C1	C1	C1	C1	3.05	2.46	2.43	2.49	2.53	S	2.68	2.43	3.69	2.92	16
30	2.71	2.77	2.81	2.83	2.86	X	X	X	X	3.45	4.15	4.23	4.41	2.94	2.71	3.01	2.71	3.52	2.59	3.32	2.53	S	2.55	2.43	4.41	4.41	3.08	20
31	2.49	2.55	2.58	2.67	2.83	2.92	3.01	3.08	3.08	2.98	2.95	2.92	2.83	2.77	2.68	2.59	2.77	7.42	2.61	2.56	S	2.74	2.78	2.80	2.49	7.42	2.98	24
HOURLY MAX	3.54	3.29	3.45	3.39	3.38	3.48	3.99	4.50	3.58	3.93	4.15	4.23	4.41	3.57	5.05	3.94	3.69	7.42	3.14	3.32	3.27	3.42	3.54	3.56				
HOURLY AVG	2.60	2.62	2.66	2.62	2.67	2.70	2.75	2.78	2.87	2.83	2.91	2.75	2.74	2.62	2.65	2.64	2.64	2.84	2.61	2.62	2.61	2.64	2.65	2.62				

STATUS FLAG CODES

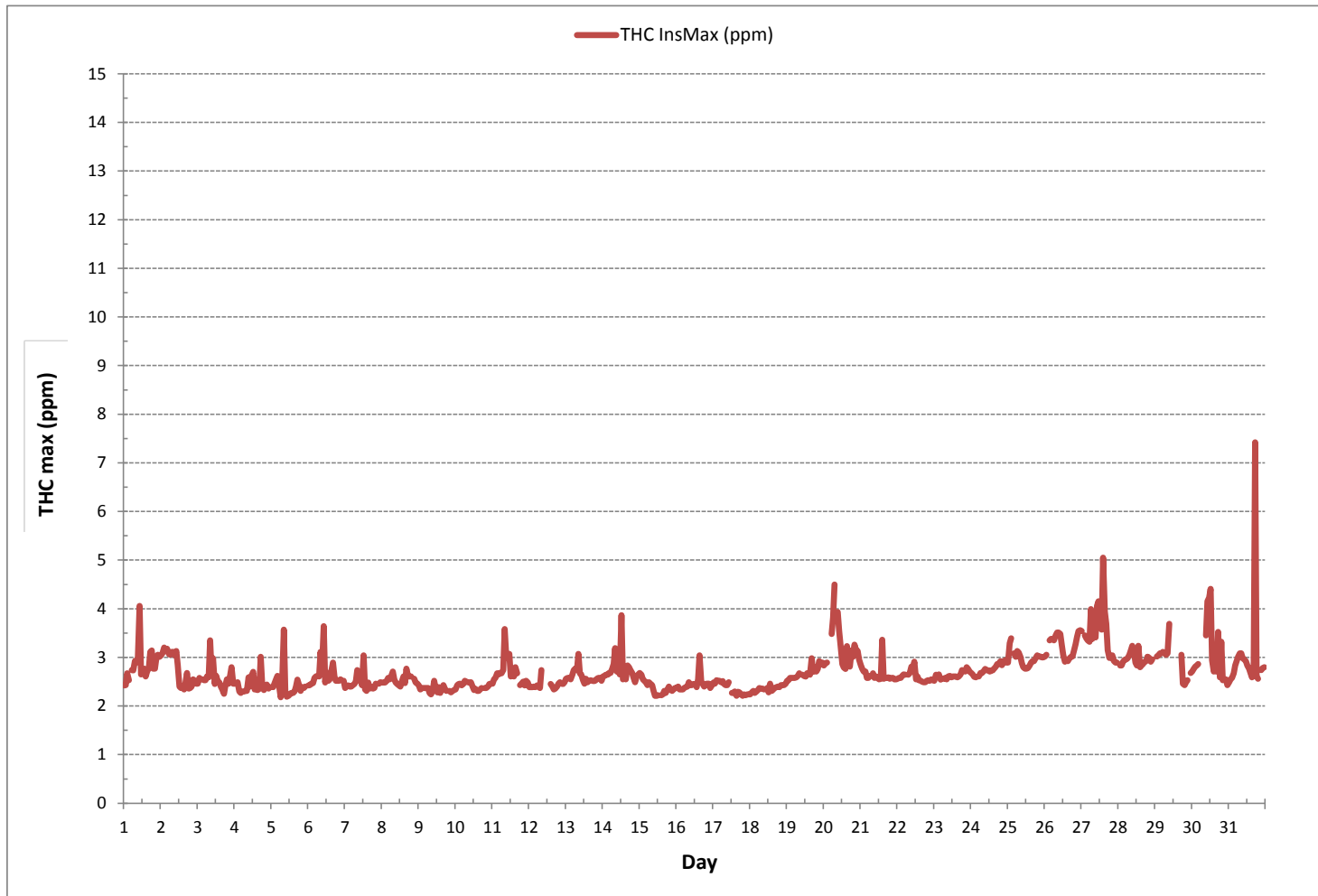
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	692
MAXIMUM INSTANTANEOUS VALUE:	7.42 ppm @ HOUR 17 ON DAY 31
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	729 hrs
STANDARD DEVIATION:	0.41



TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)



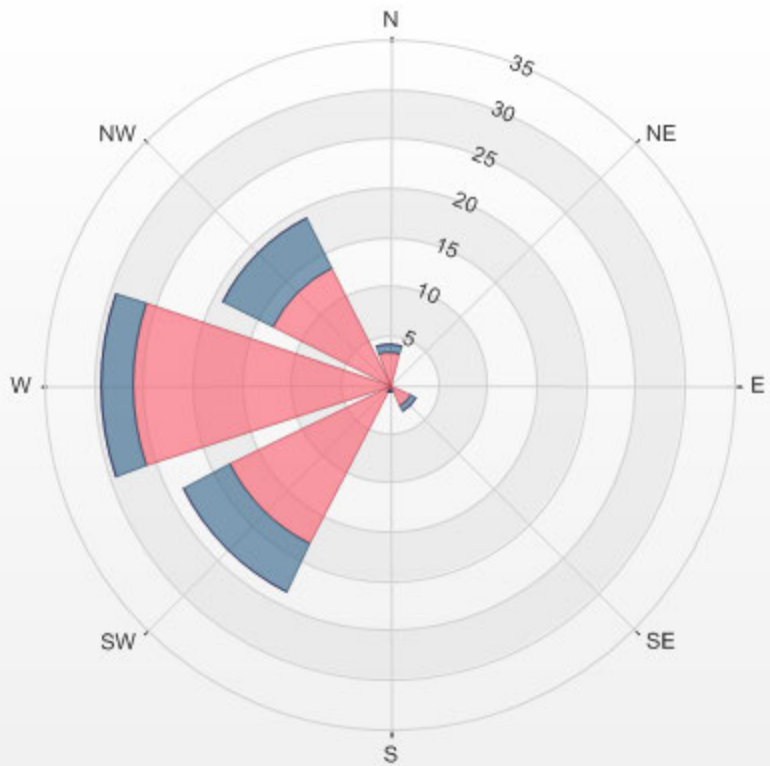
Wind: LICA COLD LAKE SOUTH  
 Poll.: LICA COLD LAKE SOUTH-THC[ppm]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 20.17% Calm Avg: 2.70 [ppm]

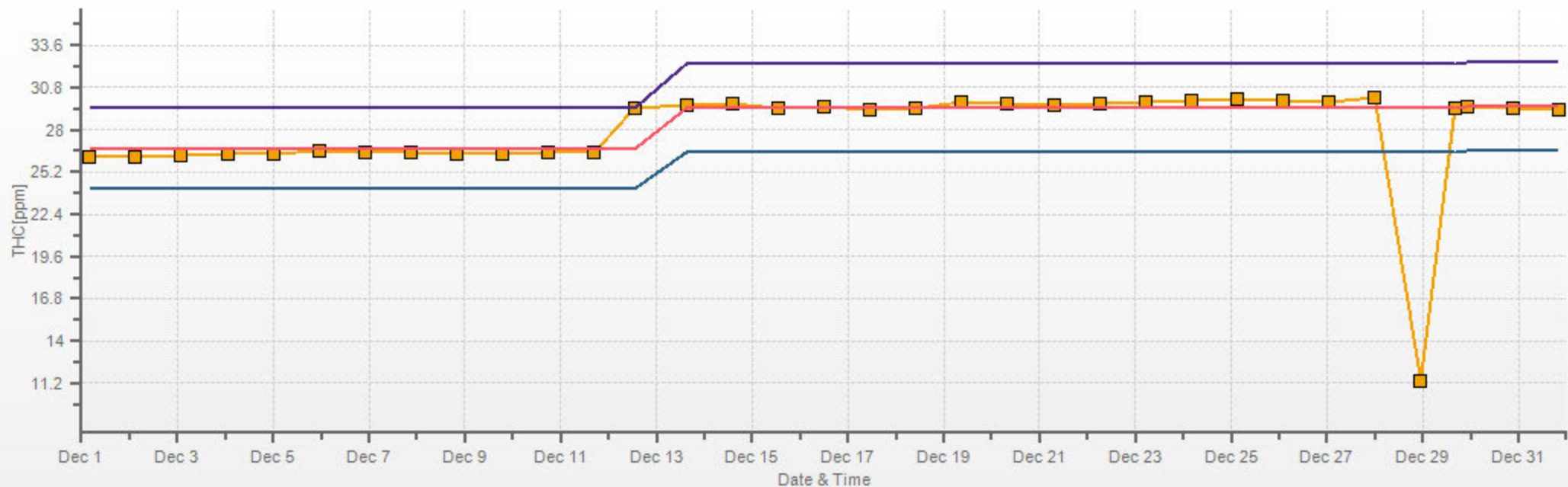
Direction	0.0-1.3	1.3-2.6	2.6-3.8	>3.8	Total
N	0.0	3.3	0.7	0.0	4.1
NE	0.0	0.2	0.0	0.0	0.2
E	0.0	0.0	0.0	0.0	0.0
SE	0.0	2.5	0.6	0.0	3.1
S	0.0	0.6	0.2	0.0	0.7
SW	0.0	18.1	5.4	0.0	23.5
W	0.0	26.0	3.3	0.0	29.3
NW	0.0	13.4	5.7	0.0	19.0
Summary	0.0	64.0	15.8	0.0	79.8

% Icon	Classes (ppm)	0	0.0-1.3	64	1.3-2.6	16	2.6-3.8	0	>3.8
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LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-THC[ppm] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 20.17% Calm Poll Avg: 2.70[ppm]



THC[ppm] Calibration: LICA COLD LAKE SOUTH Monthly: 17/12 Type: Span



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

## ***OXIDES OF NITROGEN***



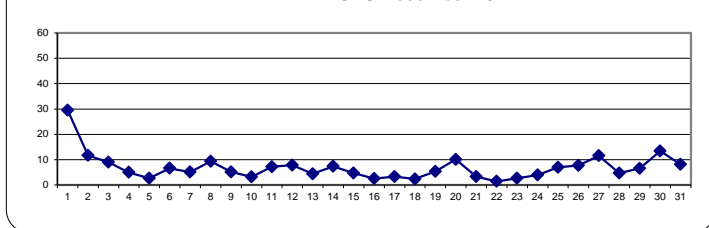
OXIDES OF NITROGEN Hourly Averages (NO<sub>x</sub> ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	7	8	20	10	S	19	25	44	51	65	63	28	33	22	21	30	41	55	43	29	24	15	13	13	7	65	30	24	
2	16	11	12	S	13	9	11	15	17	21	15	10	9	9	9	9	11	12	9	9	9	11	12	9	9	21	12	24	
3	8	6	S	10	9	11	19	12	12	14	8	7	10	11	9	6	3	4	6	5	7	8	13	8	3	19	9	24	
4	6	S	7	2	2	1	4	5	8	5	2	3	3	4	8	16	15	6	4	4	3	3	3	3	1	16	5	24	
5	S	5	4	6	10	6	3	2	2	2	1	1	1	1	1	1	1	2	4	1	2	2	1	S	1	10	3	24	
6	1	2	3	3	3	4	3	4	10	8	8	6	4	6	7	7	9	12	12	13	11	9	S	8	1	13	7	24	
7	4	5	5	5	5	5	5	6	8	6	5	3	3	4	5	5	5	4	5	7	S	5	6	3	8	5	24		
8	5	6	7	8	8	8	9	13	16	14	12	9	8	6	9	11	16	11	9	11	S	8	6	5	5	16	9	24	
9	5	5	6	6	7	5	5	5	6	6	6	6	4	4	3	3	4	4	4	S	5	8	6	6	3	8	5	24	
10	5	7	5	4	3	4	5	5	4	5	4	3	2	1	1	1	1	1	2	S	2	2	2	3	3	1	7	3	24
11	2	3	3	4	4	4	7	9	10	12	13	9	5	5	5	7	10	S	8	8	9	10	8	10	2	13	7	24	
12	10	11	10	11	10	11	12	15	16	16	C	C	C	C	C	C	3	2	2	3	4	1	2	2	1	16	8	24	
13	4	4	5	4	7	8	8	9	11	8	8	5	4	1	1	S	3	2	1	1	1	1	2	2	2	1	11	4	24
14	3	4	4	5	5	5	12	12	7	8	6	4	4	4	S	11	11	12	8	8	7	7	9	13	3	13	7	24	
15	14	14	10	9	7	6	6	6	4	3	2	2	2	S	1	1	1	2	3	4	3	3	3	3	3	1	14	5	24
16	3	3	1	1	1	2	2	3	3	2	2	2	S	2	3	3	3	3	3	2	3	2	3	3	6	1	6	3	24
17	6	3	4	4	3	3	4	3	4	4	5	4	2	1	2	3	2	3	3	2	2	2	3	3	1	6	3	24	
18	3	3	3	3	4	4	4	3	4	5	S	3	1	1	1	1	1	1	1	1	1	1	2	3	2	5	2	24	
19	2	2	3	2	3	3	2	1	3	S	3	2	4	6	5	7	11	10	10	7	7	10	10	9	1	11	5	24	
20	7	6	6	8	8	13	14	19	S	22	20	8	4	5	6	9	11	11	11	9	10	9	9	7	4	22	10	24	
21	5	5	5	5	5	5	6	S	6	4	3	2	3	2	2	3	3	3	2	2	2	1	1	1	1	6	3	24	
22	1	1	1	2	2	1	S	3	3	1	1	1	1	1	1	2	2	1	1	1	1	2	2	2	1	3	1	24	
23	2	2	2	2	1	S	2	1	1	1	2	1	2	1	3	3	2	2	3	3	5	11	5	4	1	11	3	24	
24	4	3	2	2	S	2	3	2	2	2	2	2	3	3	3	4	5	5	5	6	7	7	9	7	2	9	4	24	
25	7	11	13	S	11	9	10	9	6	3	2	1	2	6	7	7	9	10	10	8	6	5	1	13	7	7	24		
26	6	6	S	10	10	10	8	8	9	13	10	6	5	4	4	4	5	9	5	6	8	12	8	11	4	13	8	24	
27	13	S	11	9	8	7	7	8	9	14	17	18	16	13	30	21	12	9	9	10	8	6	6	4	4	30	12	24	
28	S	3	3	5	4	3	4	6	9	11	12	5	4	2	3	4	2	2	3	7	5	3	3	S	2	12	5	24	
29	3	5	8	9	10	10	10	6	5	7	7	5	3	6	6	4	6	7	6	6	6	8	S	8	3	10	7	24	
30	8	10	11	11	13	15	13	9	10	16	27	22	21	19	15	16	12	11	11	11	10	S	9	8	8	27	13	24	
31	9	10	9	7	8	8	10	10	9	10	11	8	8	7	8	6	9	11	7	7	S	5	5	4	4	11	8	24	
HOURLY MAX	16	14	20	11	13	19	25	44	51	65	63	28	33	22	30	30	41	55	43	29	24	15	13	13					
HOURLY AVG	6	6	6	6	6	7	8	8	9	10	10	6	6	5	6	7	7	8	7	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

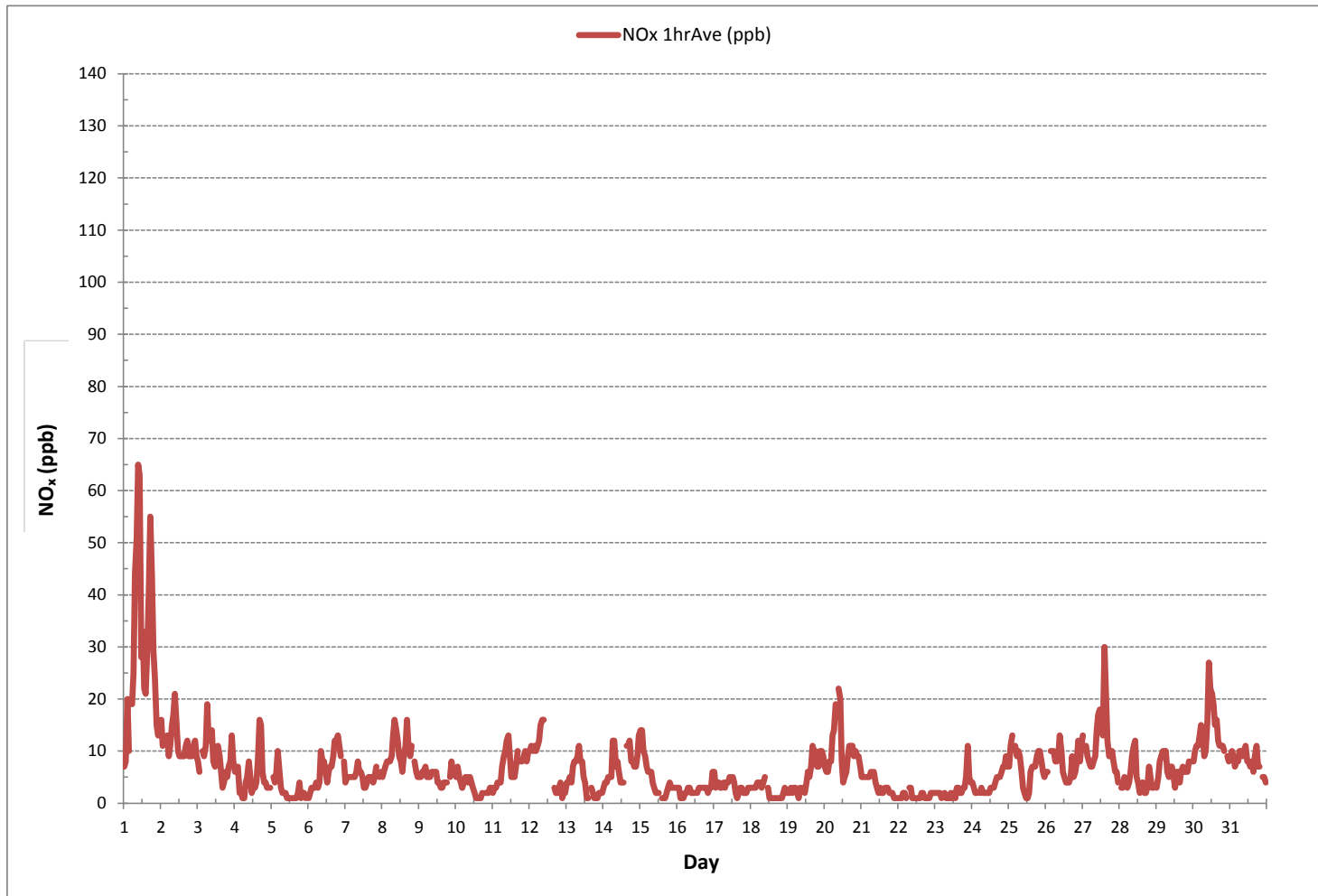
24 HR AVERAGES December 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	706			
MINIMUM 1-HR AVERAGE:	1 ppb	@ HOUR	5	ON DAY
MAXIMUM 1-HR AVERAGE:	65 ppb	@ HOUR	9	ON DAY
MAXIMUM 24-HR AVERAGE:	30 ppb			ON DAY
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	744 hrs	
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	7	MONTHLY AVERAGE:	7	ppb

OXIDES OF NITROGEN Hourly Averages (NO<sub>x</sub> ppb)





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

OXIDES OF NITROGEN Instantaneous Maximum (NO<sub>x</sub> ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	18	20	24	19	S	37	36	59	83	87	74	55	55	45	41	47	70	67	64	38	37	25	16	19	16	87	45	24
2	22	15	19	S	21	15	15	26	25	28	32	17	10	13	14	12	13	30	12	10	12	43	41	14	10	43	20	24
3	18	11	S	16	15	15	29	14	21	20	12	11	13	13	13	8	6	11	11	8	11	12	29	12	6	29	14	24
4	9	S	12	4	3	3	2	7	20	12	8	7	5	4	7	44	26	68	9	6	5	4	6	4	2	68	12	24
5	S	18	6	8	13	10	3	3	3	4	2	1	2	1	1	1	2	5	2	4	3	5	S	1	18	5	24	
6	2	3	5	4	6	8	7	6	18	16	10	10	6	12	11	16	15	16	15	15	12	11	S	12	2	18	10	24
7	4	7	6	7	6	6	7	9	13	8	9	7	5	4	5	7	7	7	6	8	9	S	7	9	4	13	7	24
8	8	7	8	10	11	10	10	26	48	38	27	13	11	11	15	18	25	19	12	16	S	10	7	6	6	48	16	24
9	7	6	8	7	9	7	6	33	10	9	8	7	4	6	6	4	7	5	S	7	10	9	7	4	4	33	8	24
10	8	9	6	6	4	5	7	6	5	6	13	6	3	2	1	1	1	3	S	3	3	3	4	5	1	13	5	24
11	3	4	4	5	6	6	11	12	13	15	19	14	11	10	9	17	17	S	10	10	15	15	9	12	3	19	11	24
12	12	13	11	11	14	12	14	18	20	C	C	C	C	C	C	C	C	2	2	4	4	2	2	3	2	20	9	24
13	7	6	9	6	8	10	10	11	16	13	9	6	5	2	2	S	4	2	1	1	2	5	4	4	1	16	6	24
14	5	5	5	6	7	7	50	19	13	11	9	7	6	13	S	23	15	19	11	12	7	8	10	15	5	50	12	24
15	17	15	12	10	9	7	7	6	4	3	2	2	S	2	1	1	3	4	6	6	4	4	4	4	1	17	6	24
16	4	4	2	2	2	2	3	4	5	3	3	4	S	5	4	9	4	5	3	3	4	3	4	21	2	21	4	24
17	11	4	7	7	4	4	6	4	4	5	8	S	5	7	4	1	3	9	5	2	2	3	4	4	1	11	5	24
18	4	4	3	4	5	4	11	5	7	7	S	5	2	1	2	1	1	1	2	3	2	4	2	1	1	11	4	24
19	3	3	3	3	3	3	3	2	5	S	5	4	6	7	6	20	20	21	16	9	9	13	14	11	2	21	8	24
20	10	7	10	11	14	16	18	29	S	29	34	13	6	7	7	13	19	13	21	11	13	11	11	7	6	34	14	24
21	8	5	5	5	5	6	9	S	7	5	4	3	4	2	13	3	3	4	3	3	3	2	1	2	1	13	5	24
22	2	1	2	4	3	3	S	5	6	2	2	3	4	1	2	3	4	2	2	2	2	4	3	4	1	6	3	24
23	3	3	3	3	2	S	4	2	5	3	9	5	4	3	11	4	3	6	6	6	8	14	10	6	2	14	5	24
24	5	5	3	3	S	2	3	3	2	3	3	3	4	4	3	4	6	9	9	8	9	9	15	7	2	15	5	24
25	8	14	17	S	16	10	12	10	8	3	4	2	1	5	9	10	11	12	14	13	12	9	8	7	1	17	9	24
26	7	7	S	12	12	12	10	12	11	15	15	8	6	6	5	6	8	27	7	9	11	23	9	16	5	27	11	24
27	20	S	13	11	11	8	10	13	12	18	21	20	19	18	37	32	51	10	10	13	10	7	6	6	6	51	16	24
28	S	5	5	7	5	7	7	10	12	14	32	9	5	4	5	21	2	3	5	13	9	4	5	S	2	32	9	24
29	5	7	10	12	14	14	12	9	7	9	8	7	4	8	8	9	17	13	8	11	9	10	S	9	4	17	10	24
30	9	11	12	15	20	19	17	11	24	26	37	28	23	21	17	31	15	28	12	13	12	S	12	12	9	37	18	24
31	13	14	18	11	11	10	16	17	22	12	21	13	33	13	13	11	41	57	11	14	S	8	11	6	6	57	17	24
HOURLY MAX	22	20	24	19	21	37	50	59	83	87	74	55	55	45	41	47	70	68	64	38	37	43	41	21				
HOURLY AVG	9	8	9	8	9	9	12	12	16	15	15	10	9	9	9	13	14	16	10	9	9	10	9	8				

STATUS FLAG CODES

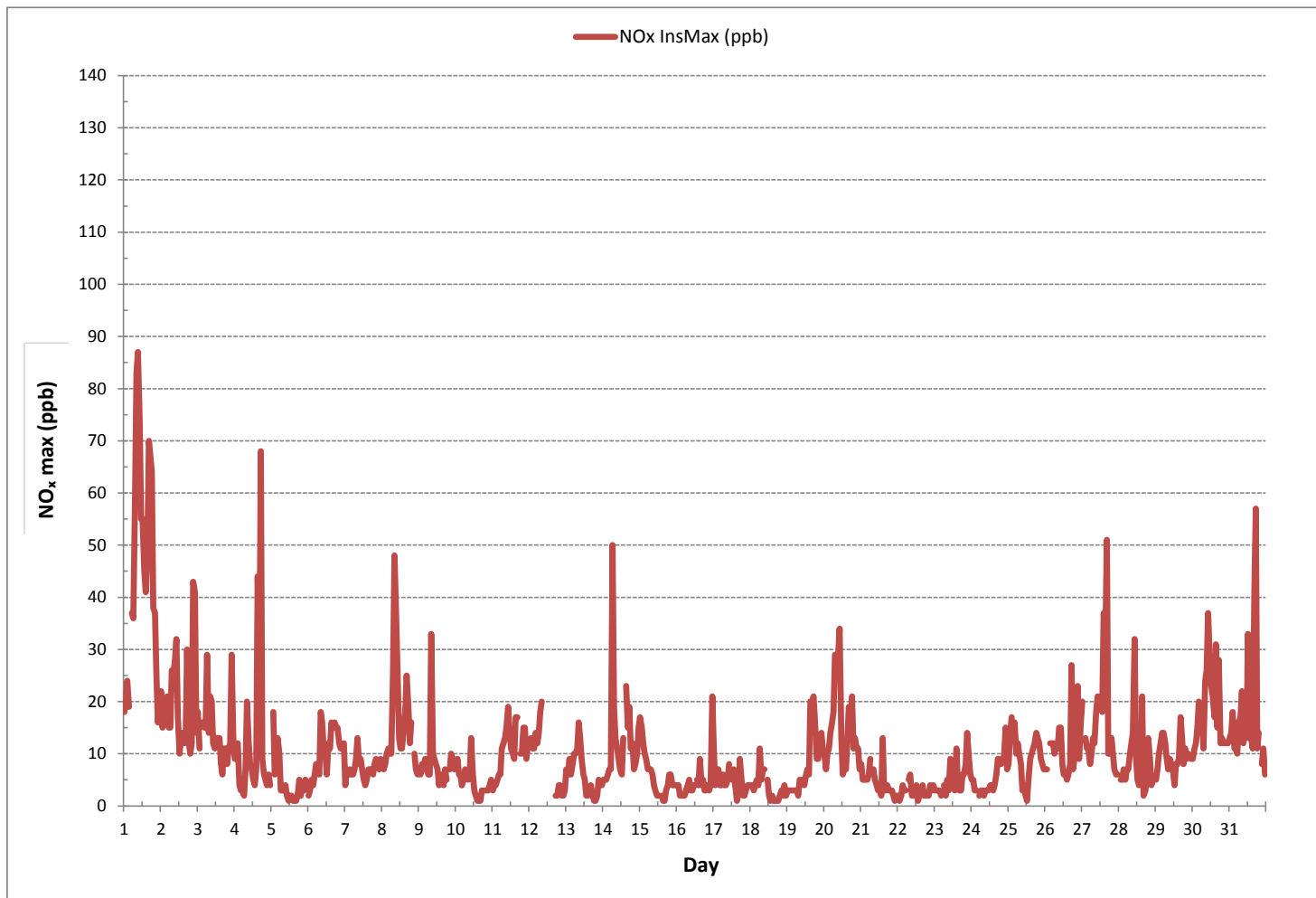
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	704
MAXIMUM INSTANTANEOUS VALUE:	87 ppb @ HOUR 9 ON DAY 1
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	11



OXIDES OF NITROGEN Instantaneous Maximum (NO<sub>x</sub> ppb)



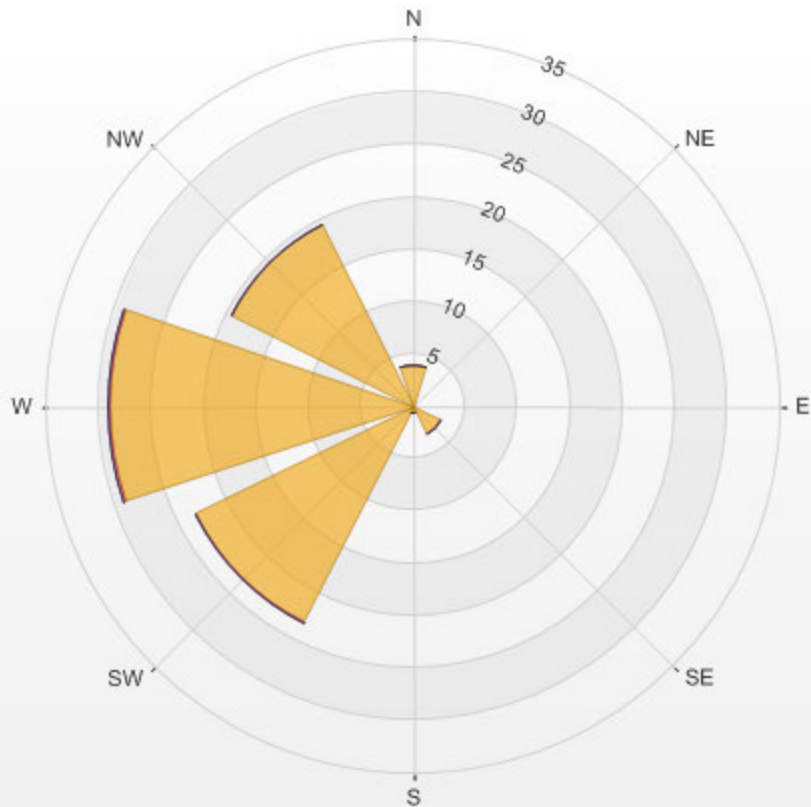
Wind: LICA COLD LAKE SOUTH  
 Poll.: LICA COLD LAKE SOUTH-NOX[ppb]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 20.40% Calm Avg: 12.34 [ppb]

Direction	0.0-22.0	22.0-44.0	44.0-66.0	>66.0	Total
N	4.0	0.0	0.0	0.0	4.0
NE	0.1	0.0	0.0	0.0	0.1
E	0.0	0.0	0.0	0.0	0.0
SE	3.0	0.0	0.0	0.0	3.0
S	0.7	0.0	0.0	0.0	0.7
SW	23.1	0.1	0.0	0.0	23.3
W	28.8	0.3	0.0	0.0	29.1
NW	19.4	0.0	0.0	0.0	19.4
Summary	79.2	0.4	0.0	0.0	79.6

% Icon Classes (ppb) 79 0.0-22.0 0 22.0-44.0 0 44.0-66.0 0 >66.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NOX[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 20.40% Calm Poll Avg: 12.34[ppb]



NOX[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/12 Type: Span



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

***NITRIC OXIDES***

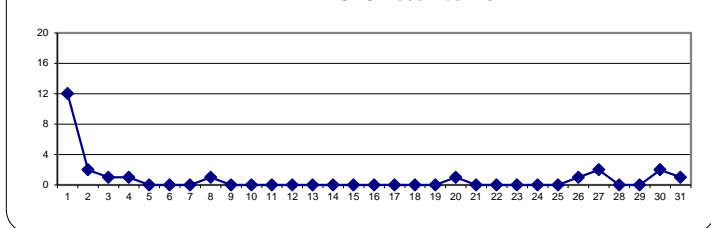
NITRIC OXIDE Hourly Averages (NO ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.				
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.					
DAY																																
1	0	1	2	0	S	4	8	25	32	45	42	13	15	7	5	7	13	26	16	8	4	1	1	0	0	45	12	24				
2	1	0	1	S	2	1	2	5	7	12	7	3	2	2	1	1	0	1	0	0	1	1	1	0	0	12	2	24				
3	1	0	S	1	1	1	4	0	2	4	2	2	3	4	2	1	0	0	0	0	0	0	1	0	0	4	1	24				
4	0	S	0	0	0	0	0	0	1	1	1	1	1	1	1	1	4	0	0	0	0	0	0	0	0	4	1	24				
5	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				
6	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	S	0	0	1	0	24				
7	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	S	0	0	0	1	0	24				
8	0	0	0	0	0	0	0	0	4	2	2	2	2	1	1	1	0	1	0	0	S	0	0	0	0	4	1	24				
9	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	S	0	0	0	0	0	1	0	24				
10	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	S	0	0	0	0	0	0	1	0	24				
11	0	0	0	0	0	0	0	0	0	1	2	2	1	1	1	1	0	S	0	0	0	0	0	0	0	2	0	24				
12	0	0	0	0	0	0	0	1	1	2	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	2	0	24				
13	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	S	0	0	0	0	0	0	0	0	0	1	0	24				
14	0	0	0	0	0	0	2	1	0	1	1	1	1	1	S	1	0	0	0	0	0	0	0	0	0	2	0	24				
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	24				
16	0	0	0	0	0	0	0	0	0	0	0	1	S	0	0	0	0	0	0	0	0	0	0	1	0	1	0	24				
17	0	0	0	0	0	0	0	0	0	0	1	S	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24				
18	0	0	0	0	0	0	1	0	0	0	S	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24				
19	0	0	0	0	0	0	0	0	0	S	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	1	0	24				
20	0	0	0	0	0	0	1	3	S	8	8	2	1	1	0	1	1	0	1	0	0	0	0	0	0	8	1	24				
21	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				
22	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				
23	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				
24	0	0	0	0	S	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	24				
25	0	0	0	S	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	0	24				
26	0	0	S	0	0	0	0	0	1	4	3	2	1	1	1	0	0	1	0	0	0	1	0	0	0	4	1	24				
27	0	S	0	0	0	0	0	0	1	4	7	8	7	5	13	5	2	0	0	1	0	0	0	0	0	13	2	24				
28	S	0	0	0	0	0	0	0	0	2	4	1	1	0	1	1	0	0	0	0	0	0	S	0	0	4	0	24				
29	0	0	0	0	0	0	0	0	0	1	2	1	1	2	1	1	0	0	0	0	0	0	S	0	0	2	0	24				
30	0	0	0	0	0	1	0	0	1	5	13	11	9	7	4	2	0	1	0	0	0	S	0	0	0	13	2	24				
31	0	0	0	0	0	0	0	0	0	2	4	3	3	2	1	1	2	0	S	0	0	0	0	0	0	4	1	24				
HOURLY MAX	1	1	2	1	2	4	8	25	32	45	42	13	15	7	13	7	13	26	16	8	4	1	1	1								
HOURLY AVG	0	0	0	0	0	0	1	1	2	3	4	2	2	1	1	1	1	1	1	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

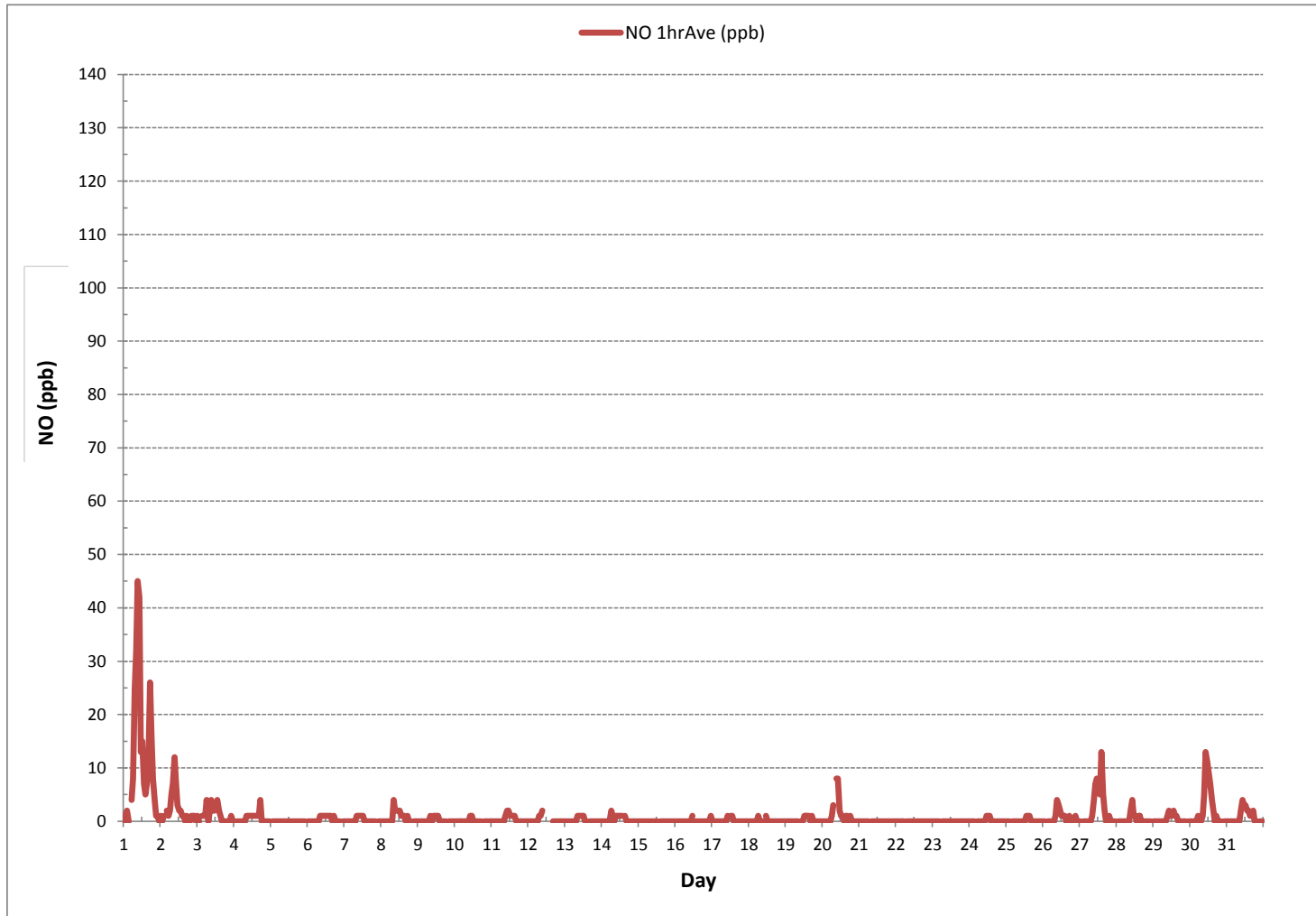
24 HR AVERAGES December 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	194			
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0	ON DAY	1
MAXIMUM 1-HR AVERAGE:	45 ppb @ HOUR	1	ON DAY	1
MAXIMUM 24-HR AVERAGE:	12 ppb		ON DAY	1
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	744 hrs	
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	3	MONTHLY AVERAGE:	1 ppb	

NITRIC OXIDE Hourly Averages (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Cold Lake South Continuous Monitoring Station - December 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	2	6	4	2	S	16	15	36	62	61	50	33	26	19	12	19	34	34	36	15	11	5	4	1	1	1	62	22	24				
2	3	2	3	S	8	5	5	13	13	18	17	5	3	8	4	1	2	15	1	1	2	15	13	1	1	1	18	7	24				
3	5	3	S	5	3	3	14	2	8	7	3	4	5	4	4	1	1	0	0	2	1	1	6	1	0	14	4	24					
4	1	S	1	0	0	1	1	1	7	3	3	3	2	1	5	24	7	46	1	1	0	4	3	1	0	46	5	24					
5	S	10	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	2	1	3	S	0	10	1	24					
6	0	1	1	0	3	1	1	0	4	5	2	2	1	2	3	2	1	5	1	1	1	2	S	2	0	5	2	24					
7	1	1	1	2	1	1	1	1	5	1	2	2	1	1	1	1	0	1	1	1	1	S	1	2	0	5	1	24					
8	2	0	1	1	1	1	1	10	30	10	6	3	3	3	3	2	3	3	2	2	S	1	1	1	0	30	4	24					
9	1	1	1	1	1	1	1	1	10	1	2	2	2	1	2	1	1	3	1	S	1	1	1	1	1	1	10	2	24				
10	2	1	1	1	1	1	1	1	1	5	1	1	1	0	0	0	0	0	S	0	0	0	0	0	1	0	5	1	24				
11	1	1	1	1	1	1	2	1	2	3	4	4	3	3	2	7	6	S	2	1	1	3	1	1	1	1	7	2	24				
12	1	1	1	1	2	1	1	2	4	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	1	0	4	1	24				
13	1	1	3	1	1	1	1	1	3	2	2	1	1	1	1	S	0	0	0	0	0	0	1	1	2	0	3	1	24				
14	1	1	1	1	2	1	30	3	2	2	2	4	1	8	S	3	3	3	2	1	0	0	1	1	0	30	3	24					
15	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	0	0	1	1	1	1	1	2	1	2	0	2	1	24				
16	1	1	0	1	1	1	1	1	2	0	1	8	S	1	1	4	5	1	1	1	1	1	1	13	0	13	2	24					
17	1	0	1	1	1	0	0	0	1	2	S	1	2	1	0	0	4	1	1	0	1	1	1	1	0	4	1	24					
18	1	1	1	1	1	1	10	1	1	1	S	1	0	0	0	0	0	0	0	1	0	0	0	0	0	10	1	24					
19	0	0	1	0	0	0	0	0	1	S	1	1	2	2	1	6	7	7	3	0	1	2	1	2	0	7	2	24					
20	1	1	4	1	2	2	2	9	S	15	18	4	6	2	1	7	10	1	6	1	1	1	1	0	0	18	4	24					
21	1	0	0	0	1	1	2	S	0	1	1	1	1	0	3	0	0	0	0	0	0	0	1	1	0	3	1	24					
22	1	0	1	1	1	1	S	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0	1	1	24					
23	1	1	1	1	0	S	1	0	1	1	7	4	1	1	5	0	0	2	1	1	1	1	1	2	0	7	1	24					
24	1	1	1	0	S	0	0	0	0	1	1	1	1	1	1	1	0	2	2	1	1	1	4	0	0	4	1	24					
25	2	1	3	S	2	1	2	0	1	1	1	1	0	1	2	2	1	2	1	2	1	0	0	1	0	3	1	24					
26	1	1	S	1	1	0	0	2	2	5	5	3	2	2	2	1	0	9	1	0	1	7	0	0	0	9	2	24					
27	1	S	1	1	1	1	1	2	2	7	10	10	9	7	18	13	31	2	1	3	1	1	0	1	0	31	5	24					
28	S	1	1	1	0	1	2	1	2	3	24	3	1	1	9	0	0	0	1	1	0	1	0	S	0	24	2	24					
29	1	1	2	2	2	2	2	0	2	2	2	2	2	3	2	3	4	4	2	1	0	1	S	1	0	4	2	24					
30	1	1	0	3	2	3	1	1	13	12	17	14	11	10	6	13	1	10	0	2	1	S	1	1	0	17	5	24					
31	1	1	4	1	0	1	2	1	3	4	8	6	11	4	4	2	16	39	1	2	S	1	1	0	0	39	5	24					
HOURLY MAX	5	10	4	5	8	16	30	36	62	61	50	33	26	19	18	24	34	46	36	15	11	15	13	13									
HOURLY AVG	1	1	1	1	1	2	3	3	6	6	7	4	3	3	3	4	4	6	2	1	1	2	2	1									

STATUS FLAG CODES

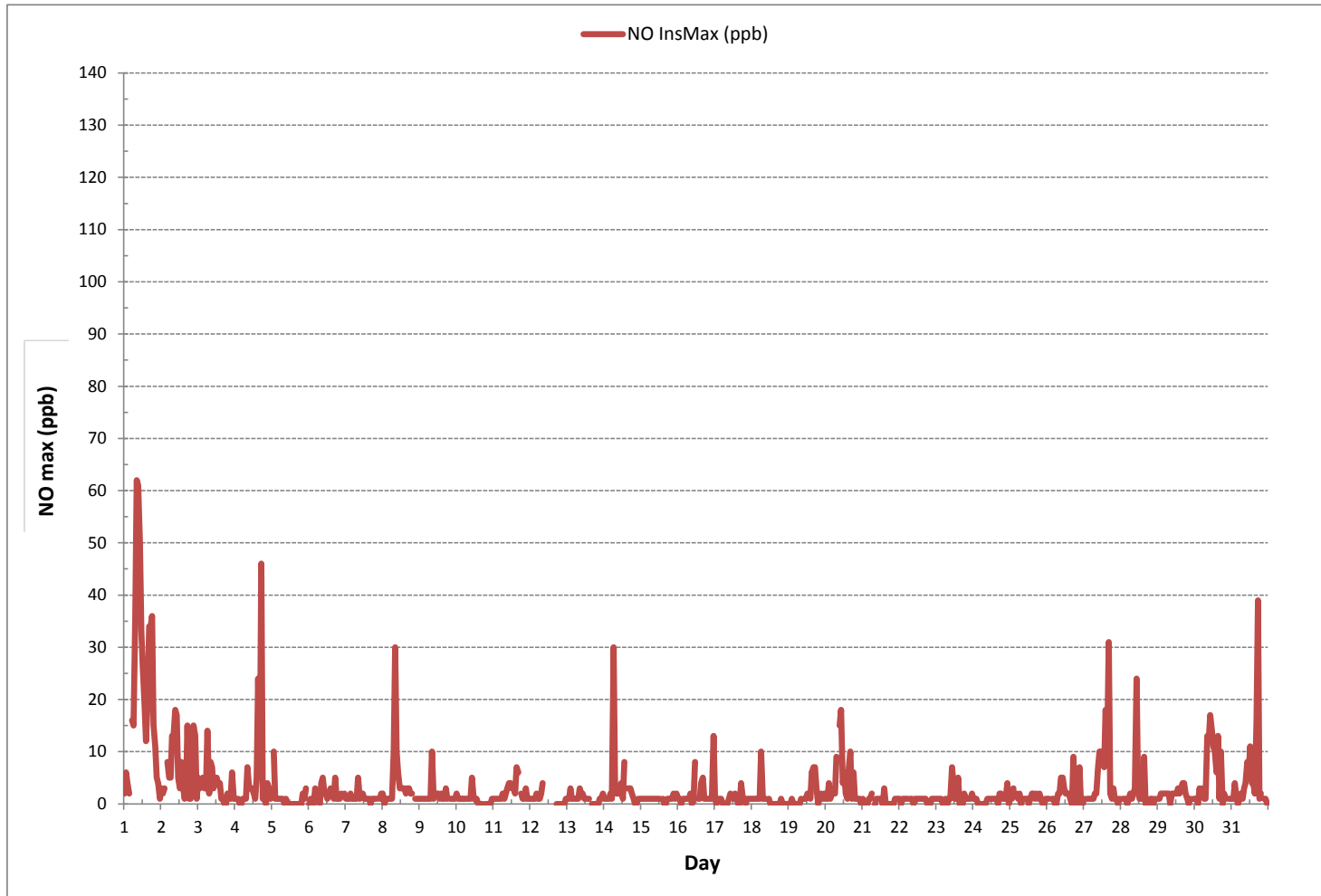
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	580
MAXIMUM INSTANTANEOUS VALUE:	62 ppb @ HOUR 8 ON DAY 1
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	6
OPERATIONAL TIME:	744 hrs



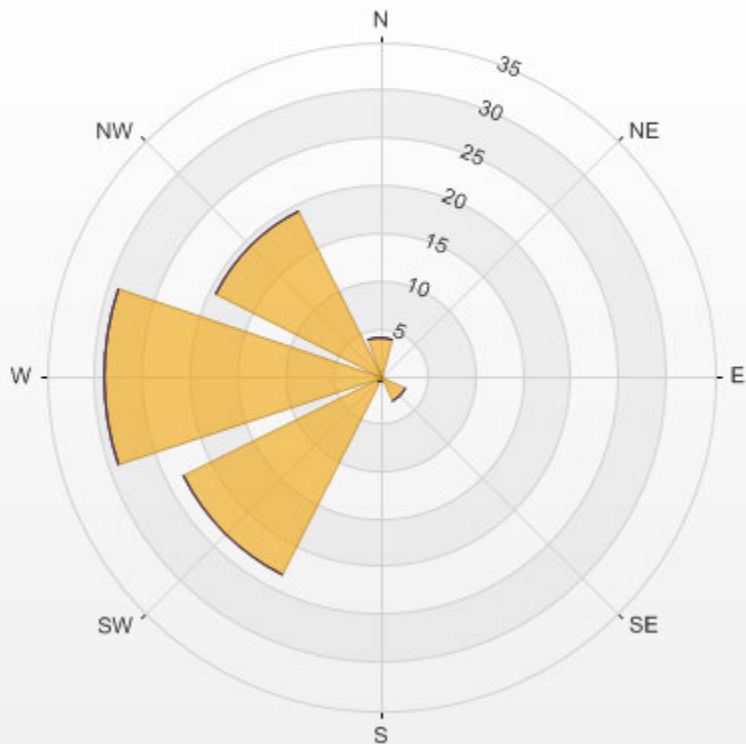
NITRIC OXIDE Instantaneous Maximum (NO ppb)





% Icon	Classes (ppb)	80	0.0-15.3	0	15.3-30.7	0	30.7-46.0	0	>46.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 20.40% Calm Poll Avg: 2.58[ppb]



***NITROGEN DIOXIDE***

**NITROGEN DIOXIDE Hourly Averages (NO<sub>2</sub> 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	6	7	18	10	S	14	17	19	19	20	20	15	18	15	16	23	29	29	27	22	20	14	13	13	6	29	18	24					
2	15	11	11	S	11	9	9	11	10	9	8	7	6	7	8	8	10	11	9	9	8	10	10	8	6	15	9	24					
3	7	5	S	9	8	10	15	11	10	10	6	6	7	8	7	5	3	4	6	4	7	8	12	8	3	15	8	24					
4	6	S	7	2	2	1	1	4	4	7	4	2	2	2	3	6	15	11	6	4	4	3	3	3	1	15	4	24					
5	S	4	4	6	10	6	2	2	2	2	1	1	1	1	1	1	1	1	1	4	1	2	1	1	S	1	10	3	24				
6	1	1	3	3	2	3	3	4	9	7	6	5	3	5	6	7	9	11	12	13	10	9	S	7	1	13	6	24					
7	4	4	5	5	5	5	5	6	7	5	5	4	2	3	3	5	5	5	4	5	7	S	5	5	2	7	5	24					
8	5	6	7	8	8	7	9	13	12	12	9	7	7	5	8	11	15	11	8	10	S	8	6	5	5	15	9	24					
9	5	5	5	6	7	5	5	5	5	5	5	5	4	3	3	3	3	4	4	S	5	8	5	6	3	8	5	24					
10	5	7	5	4	3	4	4	4	4	5	3	3	2	1	1	1	1	2	S	2	2	2	3	2	1	7	3	24					
11	2	3	3	4	4	4	7	9	9	11	11	7	4	4	4	7	9	S	8	8	9	9	8	10	2	11	7	24					
12	10	11	9	10	10	11	12	14	15	14	C	C	C	C	C	C	3	2	1	3	4	1	2	2	1	15	7	24					
13	3	4	5	4	7	7	8	9	10	7	6	4	3	1	1	S	2	2	1	1	1	2	2	2	1	10	4	24					
14	3	4	4	4	5	5	10	11	6	7	5	3	3	3	S	11	10	11	8	8	7	7	9	12	3	12	7	24					
15	14	14	10	9	7	5	6	5	4	3	2	2	2	S	1	1	1	2	3	4	3	2	2	2	1	14	5	24					
16	3	3	1	1	1	2	2	3	3	1	1	2	S	2	2	3	3	3	3	2	2	2	3	5	1	5	2	24					
17	5	3	4	4	3	3	4	3	4	4	4	S	4	3	1	1	2	3	3	2	2	2	3	3	1	5	3	24					
18	3	3	2	3	4	3	3	3	4	4	S	3	1	1	1	1	1	1	1	1	1	1	2	3	2	1	4	2	24				
19	2	2	3	2	3	3	2	1	3	S	3	2	3	5	5	6	11	9	9	7	7	9	10	9	1	11	5	24					
20	7	6	6	7	8	13	14	16	S	14	12	6	3	4	5	8	10	10	10	8	10	9	9	7	3	16	9	24					
21	5	5	5	5	5	5	6	S	6	4	3	2	3	2	2	3	3	3	2	2	2	1	1	1	1	6	3	24					
22	1	1	1	1	2	1	S	3	3	1	1	1	1	1	1	1	2	1	1	1	1	1	2	2	1	3	1	24					
23	1	2	2	2	1	S	2	1	1	1	2	1	1	1	2	3	2	2	3	4	10	4	3	1	10	2	24						
24	4	3	2	2	S	2	3	2	2	2	2	2	3	2	2	4	5	5	5	5	7	7	9	7	2	9	4	24					
25	6	10	13	S	10	8	10	9	6	3	2	1	2	5	7	7	7	9	9	9	8	6	5	1	13	7	24						
26	6	6	S	10	10	10	8	8	8	10	7	4	3	3	3	4	5	8	5	6	8	11	8	11	3	11	7	24					
27	13	S	10	9	8	7	7	8	9	11	9	9	9	8	17	16	10	9	8	9	8	6	6	4	4	17	9	24					
28	S	3	3	5	4	3	4	6	8	9	8	4	3	1	2	3	2	2	3	7	5	3	3	S	1	9	4	24					
29	3	5	7	9	10	10	10	6	5	6	5	3	2	4	5	4	6	7	6	6	6	8	S	8	2	10	6	24					
30	8	9	11	11	13	15	13	9	9	11	15	11	11	12	11	13	12	10	11	10	10	S	9	8	8	15	11	24					
31	9	10	9	7	8	8	10	10	9	8	8	5	5	6	6	8	9	7	7	S	5	5	4	4	4	10	7	24					
HOURLY MAX	15	14	18	11	13	15	17	19	19	20	20	15	18	15	17	23	29	29	27	22	20	14	13	13	6	29	18	24					
HOURLY AVG	6	5	6	6	6	6	7	7	7	7	6	4	4	4	5	6	7	7	6	6	6	6	6	6	6	4	10	7	24				

**STATUS FLAG CODES**

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

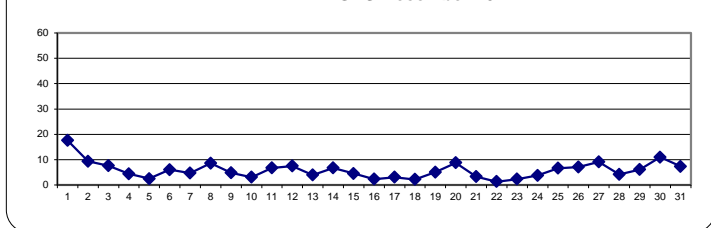
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

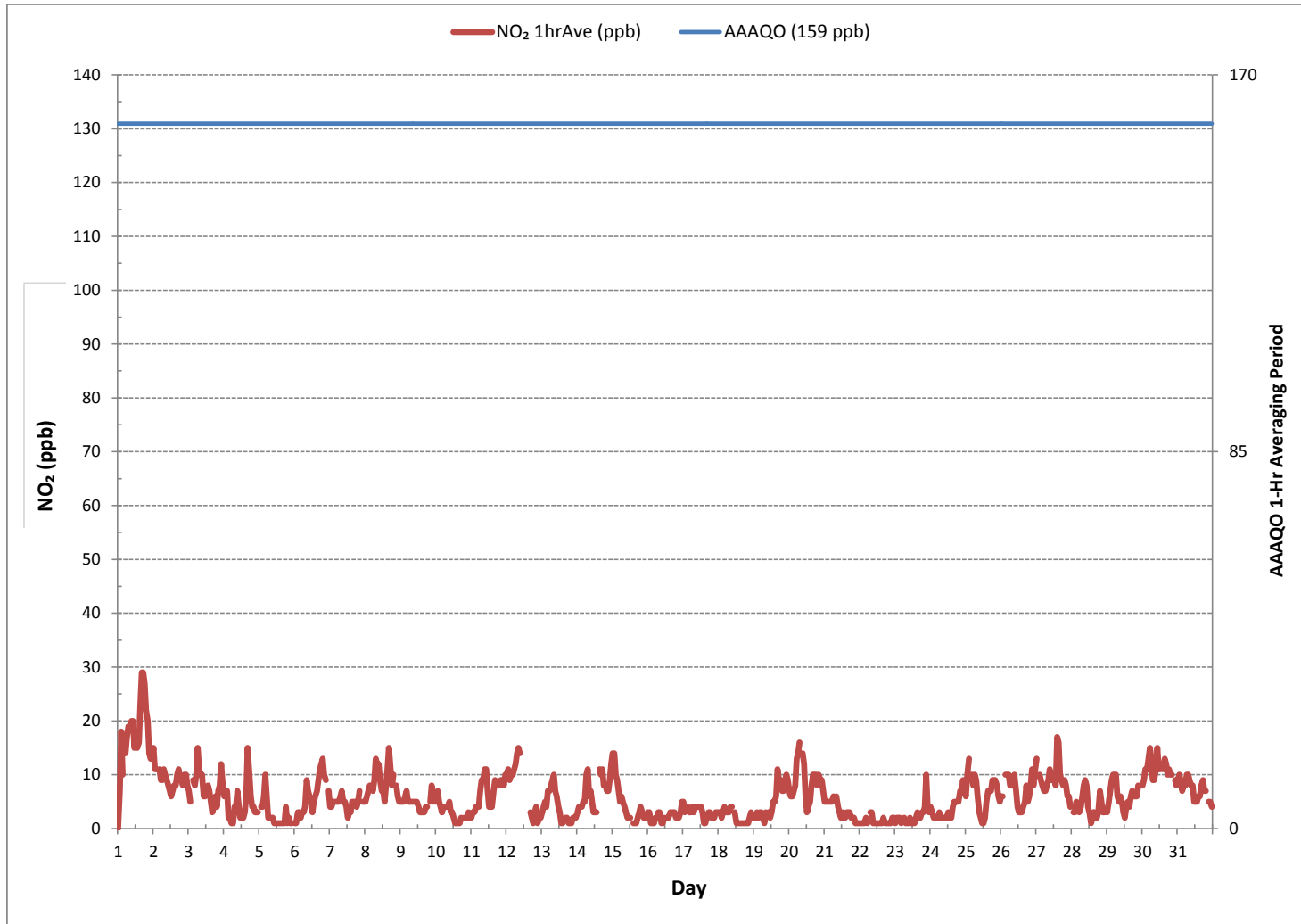
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	706			
MINIMUM 1-HR AVERAGE:	1 ppb	@ HOUR	5	ON DAY 4
MAXIMUM 1-HR AVERAGE:	29 ppb	@ HOUR	16	ON DAY 1
MAXIMUM 24-HR AVERAGE:	18 ppb			ON DAY 1
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	744 hrs	
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	4	MONTHLY AVERAGE:	6 ppb	

**24 HR AVERAGES December 2017**



NITROGEN DIOXIDE Hourly Averages (NO<sub>2</sub> ppb)





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

NITROGEN DIOXIDE Instantaneous Maximum (NO<sub>2</sub> ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.					
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.						
DAY																																	
1	18	17	21	17	S	21	22	23	25	26	24	23	28	25	29	30	35	33	32	24	26	21	14	18	14	35	24	24	14	35	24	24	
2	20	14	17	S	13	12	11	14	13	11	15	12	7	8	11	11	12	20	11	9	11	29	28	13	7	29	14	24	7	29	14	24	
3	13	8	S	14	13	13	19	12	15	13	9	7	8	9	9	7	6	10	11	6	10	12	23	11	6	23	11	24	6	23	11	24	
4	9	S	11	4	2	2	2	6	13	10	6	3	3	3	4	22	24	31	8	5	5	4	4	4	2	31	8	24	2	31	8	24	
5	S	9	6	8	11	9	3	3	2	3	1	1	2	2	1	1	1	2	5	2	3	2	3	S	1	11	4	24	1	11	4	24	
6	1	2	4	4	4	7	6	5	13	12	8	8	5	10	9	13	14	15	15	15	12	10	S	10	1	15	9	24	1	15	9	24	
7	4	6	5	6	6	5	7	8	11	7	7	5	3	3	4	7	7	7	5	7	9	S	6	7	3	11	6	24	3	11	6	24	
8	6	7	8	10	10	9	10	21	32	28	21	10	9	7	13	16	22	19	11	14	S	9	7	5	5	32	13	24	5	32	13	24	
9	6	5	8	6	8	6	6	6	26	9	8	6	5	4	5	4	5	4	S	6	10	8	6	4	6	4	26	7	24	6	10	8	24
10	7	9	6	5	3	5	6	5	5	6	8	6	2	1	1	1	1	2	S	2	2	3	4	4	1	9	4	24	1	9	4	24	
11	3	3	4	5	6	5	11	12	12	13	15	11	7	7	8	12	14	S	10	10	15	14	8	12	3	15	9	24	3	15	9	24	
12	11	12	10	11	12	12	14	17	17	C	C	C	C	C	C	C	C	2	2	4	4	2	2	3	2	17	8	24	2	17	8	24	
13	6	5	7	5	8	9	9	10	13	11	8	5	4	1	1	S	4	2	1	1	1	1	4	4	3	1	13	5	24	1	13	5	24
14	4	5	4	5	6	6	22	18	11	9	8	4	4	7	S	20	14	17	9	12	7	8	10	14	4	22	10	24	4	22	10	24	
15	16	15	11	9	8	6	7	7	5	4	2	2	2	S	2	1	1	3	4	5	5	3	3	3	1	16	5	24	3	16	5	24	
16	3	3	1	1	2	2	2	4	4	4	2	2	4	S	3	3	6	4	5	3	3	3	3	3	13	1	13	3	24	1	13	3	24
17	9	4	6	6	4	4	6	3	4	4	6	S	4	5	3	1	2	5	4	2	2	3	3	3	1	9	4	24	3	9	4	24	
18	4	4	3	4	5	4	4	4	6	6	S	3	1	1	1	1	1	1	1	2	2	2	4	2	1	6	3	24	1	6	3	24	
19	3	3	3	3	3	3	3	2	4	S	4	3	5	5	5	14	15	15	15	9	8	13	13	10	2	15	7	24	2	15	7	24	
20	9	6	9	10	13	15	16	20	S	18	16	9	4	6	6	12	14	13	16	11	12	10	10	7	4	20	11	24	4	20	11	24	
21	7	5	5	5	5	6	7	S	7	4	3	3	3	2	10	3	3	4	3	2	2	2	1	1	1	10	4	24	1	10	4	24	
22	1	1	2	3	3	2	S	5	5	1	1	2	3	1	1	2	2	1	1	1	1	1	3	2	3	1	5	2	24	1	5	2	24
23	2	3	3	3	2	S	3	1	4	2	3	2	4	2	7	3	3	3	5	6	8	13	10	6	1	13	4	24	1	13	4	24	
24	4	4	3	2	S	2	3	3	2	2	3	2	3	2	3	4	6	7	7	7	8	9	12	8	2	12	5	24	2	12	5	24	
25	8	13	14	S	14	10	11	10	8	3	3	1	1	3	8	9	10	10	13	12	11	9	8	7	1	14	9	24	1	14	9	24	
26	7	7	S	11	11	12	10	11	10	11	10	5	4	4	4	5	8	19	7	9	10	16	9	15	4	19	9	24	4	19	9	24	
27	19	S	12	10	10	8	9	12	11	12	12	11	10	12	20	19	22	10	9	10	10	7	6	6	6	22	12	24	6	22	12	24	
28	S	4	4	7	5	6	6	10	10	11	14	6	4	3	4	15	2	3	4	12	9	3	4	S	2	15	7	24	2	15	7	24	
29	4	6	9	11	12	11	11	8	6	7	6	5	3	6	6	6	15	11	8	10	9	9	S	9	3	15	8	24	3	15	8	24	
30	9	11	12	12	18	18	17	9	12	15	19	13	12	13	12	19	14	18	12	12	11	S	12	11	9	19	14	24	9	19	14	24	
31	13	13	14	11	11	9	15	17	18	10	13	7	22	8	10	9	25	21	11	12	S	7	10	6	6	25	13	24	6	25	13	24	
HOURLY MAX	20	17	21	17	18	21	22	23	32	28	24	23	28	25	29	30	35	33	32	24	26	29	28	18									
HOURLY AVG	8	7	8	7	8	8	9	10	11	9	9	6	6	6	7	9	10	10	8	8	8	8	8	8									

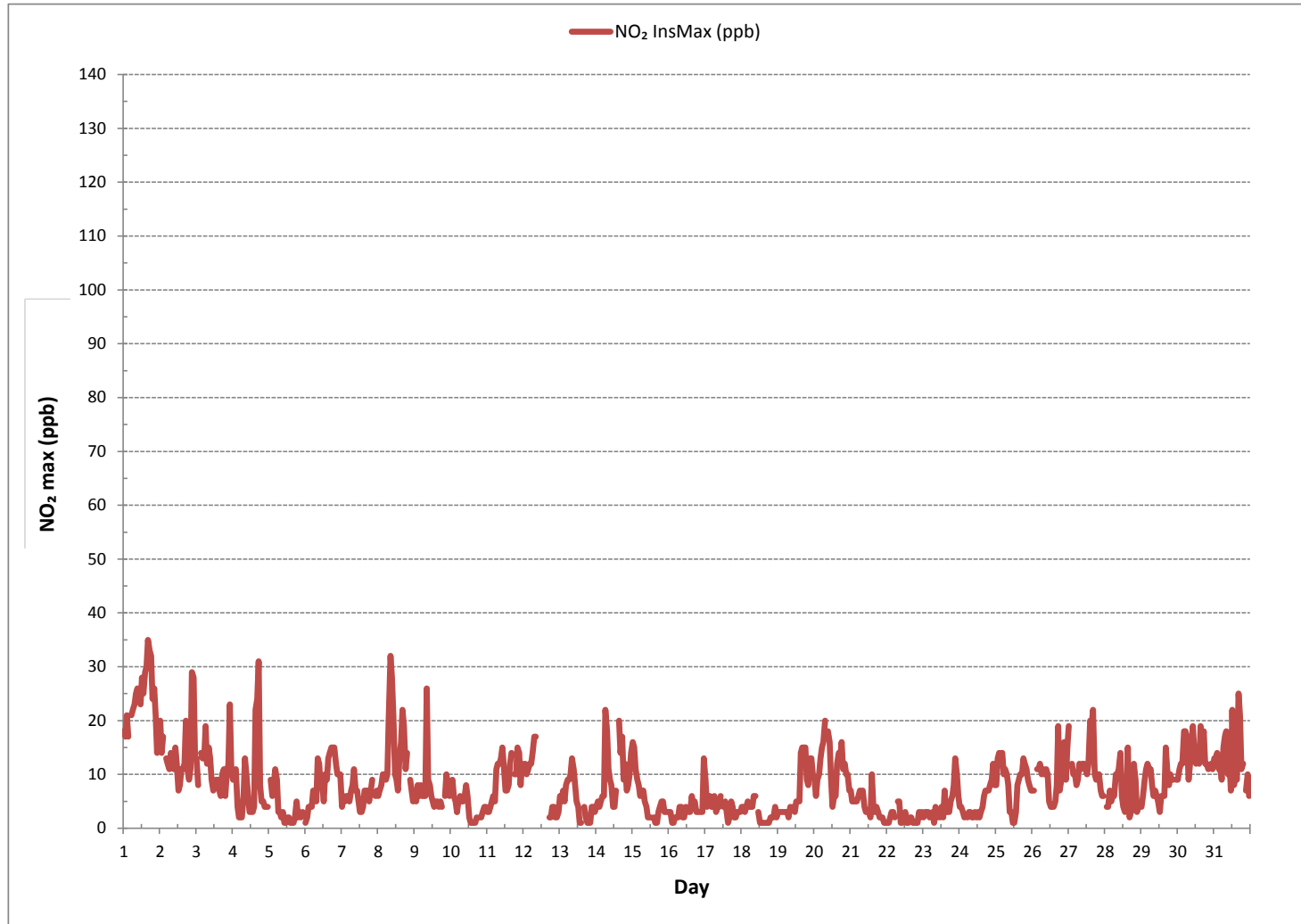
STATUS FLAG CODES

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:	704
MAXIMUM INSTANTANEOUS VALUE:	35 ppb @ HOUR 16 ON DAY 1
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	6

NITROGEN DIOXIDE Instantaneous Maximum (NO<sub>2</sub> ppb)





Wind: LICA COLD LAKE SOUTH  
 Poll.: LICA COLD LAKE SOUTH-NO2[ppb]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 20.40% Calm Avg: 9.76 [ppb]

Direction	0.0-10.0	10.0-20.0	20.0-30.0	>30.0	Total
N	4.0	0.0	0.0	0.0	4.0
NE	0.1	0.0	0.0	0.0	0.1
E	0.0	0.0	0.0	0.0	0.0
SE	2.6	0.4	0.0	0.0	3.0
S	0.4	0.3	0.0	0.0	0.7
SW	18.0	5.3	0.0	0.0	23.3
W	27.1	2.0	0.0	0.0	29.1
NW	19.4	0.0	0.0	0.0	19.4
Summary	71.6	8.0	0.0	0.0	79.6

% Icon Classes (ppb)

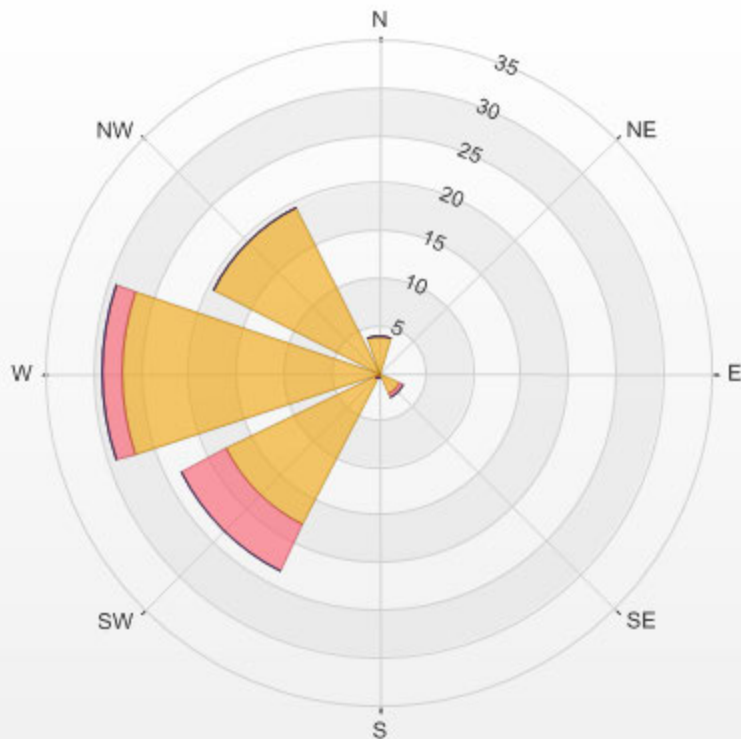
72 0.0-10.0

8 10.0-20.0

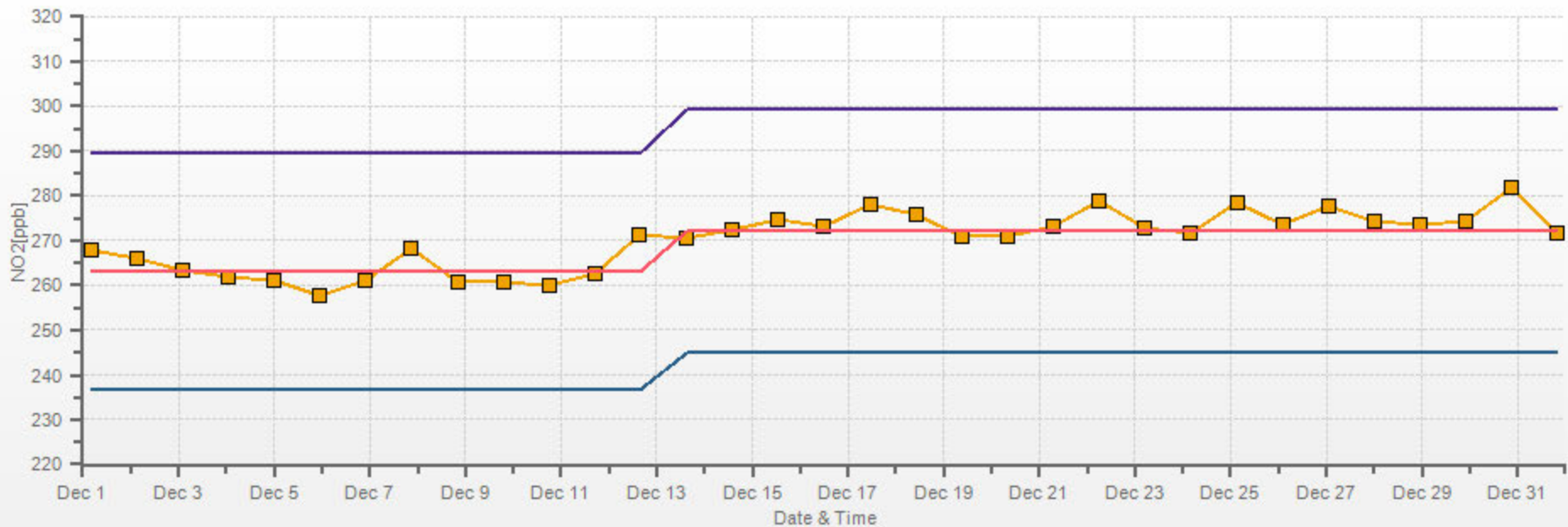
0 20.0-30.0

0 >30.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO2[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 20.40% Calm Poll Avg: 9.76[ppb]



NO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/12 Type: Span



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

# ***OZONE***



OZONE Hourly Averages (O<sub>3</sub> 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	14.7	13.0	3.8	7.1	S	2.9	0.7	0.5	1.0	2.4	5.2	18.6	18.4	20.6	16.8	10.6	3.0	0.8	1.3	2.9	3.9	11.2	13.8	13.0	0.5	20.6	8.1	24	
2	7.5	7.7	5.4	S	3.0	3.5	2.4	1.0	1.6	4.1	14.2	23.3	26.2	27.0	26.1	25.4	22.7	20.2	23.7	23.2	23.4	18.2	12.5	12.1	1.0	27.0	14.5	24	
3	10.6	10.9	S	7.2	6.7	5.6	2.6	5.7	7.0	10.2	20.4	23.0	21.6	21.4	23.2	26.9	30.1	28.3	22.8	23.3	21.9	17.2	9.9	12.9	2.6	30.1	16.1	24	
4	14.3	S	14.5	30.6	32.3	33.2	34.4	30.1	27.7	24.0	27.6	33.3	33.0	33.6	33.3	29.6	19.7	21.9	29.0	30.5	29.8	30.4	30.0	28.8	14.3	34.4	28.3	24	
5	S	26.1	24.7	21.5	18.2	24.7	31.5	32.5	32.6	33.2	34.2	34.6	35.1	35.2	35.8	36.5	36.6	35.1	31.5	33.3	30.0	30.4	31.8	S	18.2	36.6	31.1	24	
6	32.4	31.1	29.9	28.2	26.8	26.7	24.9	23.1	21.2	26.2	29.5	31.6	33.4	32.0	32.0	30.3	26.9	23.8	21.6	20.1	21.9	23.4	S	26.3	20.1	33.4	27.1	24	
7	30.9	30.2	27.6	28.1	30.2	31.7	31.7	30.9	30.9	34.7	35.7	37.7	39.5	40.0	39.7	38.4	37.8	37.5	37.6	36.1	33.2	S	35.3	33.7	27.6	40.0	34.3	24	
8	33.5	32.3	29.4	28.2	26.8	25.7	24.5	20.4	22.6	26.8	31.7	34.1	34.8	36.7	34.8	30.5	24.3	27.4	29.9	24.7	S	25.9	29.9	29.2	20.4	36.7	28.9	24	
9	30.1	31.7	31.2	32.1	31.8	34.0	33.8	34.8	35.9	34.5	34.5	35.3	39.0	39.8	38.6	38.0	37.7	36.8	36.5	S	34.7	31.2	34.0	33.6	30.1	39.8	34.8	24	
10	32.3	31.6	33.1	35.5	36.0	34.6	34.4	34.1	34.7	33.9	34.4	37.0	40.1	41.2	40.3	40.1	39.2	37.0	S	35.0	34.2	33.9	31.6	29.8	29.8	41.2	35.4	24	
11	30.8	31.9	31.9	29.7	28.8	27.5	25.3	22.8	23.9	23.9	25.0	27.5	30.5	30.1	30.3	26.3	21.9	S	22.8	21.9	13.9	12.1	16.7	20.2	12.1	31.9	25.0	24	
12	19.4	18.3	19.7	17.9	18.8	17.3	15.7	13.2	13.1	14.3	19.0	23.6	25.9	27.0	28.0	31.4	S	36.9	37.9	36.0	34.5	36.4	35.6	34.6	13.1	37.9	25.0	24	
13	31.8	30.5	29.1	29.4	25.2	23.3	21.8	21.6	20.9	24.4	C	C	C	C	C	36.7	36.0	36.3	37.0	36.7	36.3	34.5	34.9	34.9	20.9	37.0	30.6	24	
14	33.7	32.2	31.2	29.1	27.4	26.1	18.6	13.9	22.5	24.1	26.9	29.6	29.8	30.2	S	20.9	22.4	19.7	27.2	20.9	21.0	19.8	16.8	12.6	12.6	33.7	24.0	24	
15	9.8	10.1	13.2	14.1	15.9	18.1	19.0	22.2	27.2	29.0	30.4	31.1	31.0	S	30.7	32.1	33.5	32.0	28.7	27.8	32.2	33.5	33.9	34.4	9.8	34.4	25.6	24	
16	33.7	33.4	36.8	36.6	36.0	35.1	34.6	33.3	33.0	35.1	35.0	34.4	S	36.6	35.3	33.8	32.8	30.2	29.4	29.4	29.8	29.7	29.1	25.9	25.9	36.8	33.0	24	
17	23.5	26.4	25.2	25.1	25.8	27.0	25.2	27.8	27.8	27.0	27.0	S	28.8	29.8	34.9	36.1	34.8	32.5	31.9	35.8	36.2	35.3	34.7	35.1	23.5	36.2	30.2	24	
18	33.8	33.5	34.7	34.5	33.0	33.2	32.8	32.8	32.4	32.8	S	34.9	37.3	37.0	39.3	42.9	42.8	42.9	42.6	41.7	40.7	38.9	37.5	37.9	32.4	42.9	37.0	24	
19	37.5	37.1	35.4	35.5	34.9	34.2	34.1	34.3	32.8	S	31.5	32.6	32.1	31.0	30.8	27.7	20.5	19.6	17.9	19.1	16.9	14.4	13.7	12.6	12.6	37.5	27.7	24	
20	14.9	15.3	14.5	12.1	12.6	9.0	7.6	3.9	S	5.1	12.2	24.7	30.5	30.7	29.1	25.5	22.2	20.5	18.1	19.8	16.5	17.3	15.1	21.5	3.9	30.7	17.3	24	
21	25.0	26.7	26.5	25.9	24.8	23.3	21.2	S	24.4	28.5	31.5	30.9	30.8	31.4	31.7	31.4	31.9	32.0	33.9	35.8	35.6	36.4	36.4	36.4	21.2	36.4	30.1	24	
22	35.9	35.3	34.8	34.0	33.0	33.0	S	31.5	31.0	33.7	34.6	35.1	35.4	35.5	35.5	34.7	34.6	35.2	35.1	34.7	33.9	33.0	31.8	31.8	31.0	35.9	34.0	24	
23	31.5	30.2	29.3	30.4	34.9	S	34.3	35.3	36.2	36.8	35.7	35.8	35.6	35.4	34.5	33.4	36.1	35.0	32.5	30.6	27.9	21.6	29.9	32.2	21.6	36.8	32.8	24	
24	32.3	32.6	33.2	33.8	S	35.2	33.9	36.2	36.3	35.2	34.9	36.0	35.4	35.7	35.6	34.5	32.7	31.6	30.5	30.7	29.5	26.5	23.5	23.8	23.5	36.3	32.6	24	
25	22.0	19.6	16.8	S	22.0	24.1	22.8	23.7	28.3	32.9	34.6	36.6	36.9	35.7	32.0	30.1	28.3	26.2	24.8	21.9	22.4	22.0	22.6	22.6	16.8	36.9	26.5	24	
26	21.0	19.0	S	13.2	13.6	12.2	14.1	13.9	12.5	11.1	21.2	26.1	30.0	31.6	32.0	30.4	26.5	22.0	23.6	20.0	16.2	14.6	17.1	14.4	11.1	32.0	19.8	24	
27	11.6	S	15.7	15.6	16.5	15.9	15.7	13.1	11.8	11.1	10.9	13.3	16.8	19.2	9.9	11.1	17.7	20.3	21.0	21.0	22.4	25.0	25.0	26.7	9.9	26.7	16.8	24	
28	S	27.3	26.5	23.9	22.8	22.0	20.5	16.9	18.9	19.2	23.2	28.6	29.8	31.4	31.5	31.8	32.1	31.4	29.6	24.7	25.9	28.4	27.8	S	16.9	32.1	26.1	24	
29	28.3	25.3	23.1	20.2	20.8	21.3	21.7	25.3	27.4	26.8	28.5	31.8	32.6	31.7	31.2	32.1	29.1	26.3	25.6	22.1	20.1	17.9	S	15.8	15.8	32.6	25.4	24	
30	15.0	13.9	12.4	13.5	10.3	7.6	10.2	13.2	11.7	10.8	11.7	15.8	17.9	20.3	22.4	21.5	21.9	22.5	19.8	19.7	21.2	S	19.3	19.9	7.6	22.5	16.2	24	
31	18.2	15.0	14.6	15.8	15.4	14.7	13.3	13.6	14.8	16.1	19.7	26.2	27.7	28.8	28.3	29.2	24.4	22.2	20.5	21.0	S	23.3	22.7	24.5	13.3	29.2	20.4	24	
HOURLY MAX	37.5	37.1	36.8	36.6	36.0	35.2	34.6	36.2	36.3	36.8	35.7	37.7	40.1	41.2	40.3	42.9	42.8	42.9	42.6	41.7	40.7	38.9	37.5	37.9					
HOURLY AVG	24.7	25.1	24.3	24.4	23.6	22.8	22.1	22.1	23.4	23.6	26.2	29.8	30.9	31.6	31.2	30.3	28.7	28.1	27.3	26.7	26.4	25.6	26.0	25.4					

STATUS FLAG CODES

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

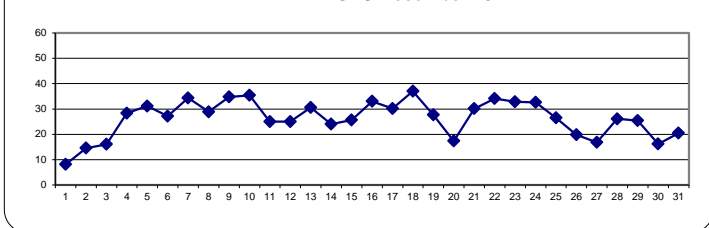
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 82 ppb

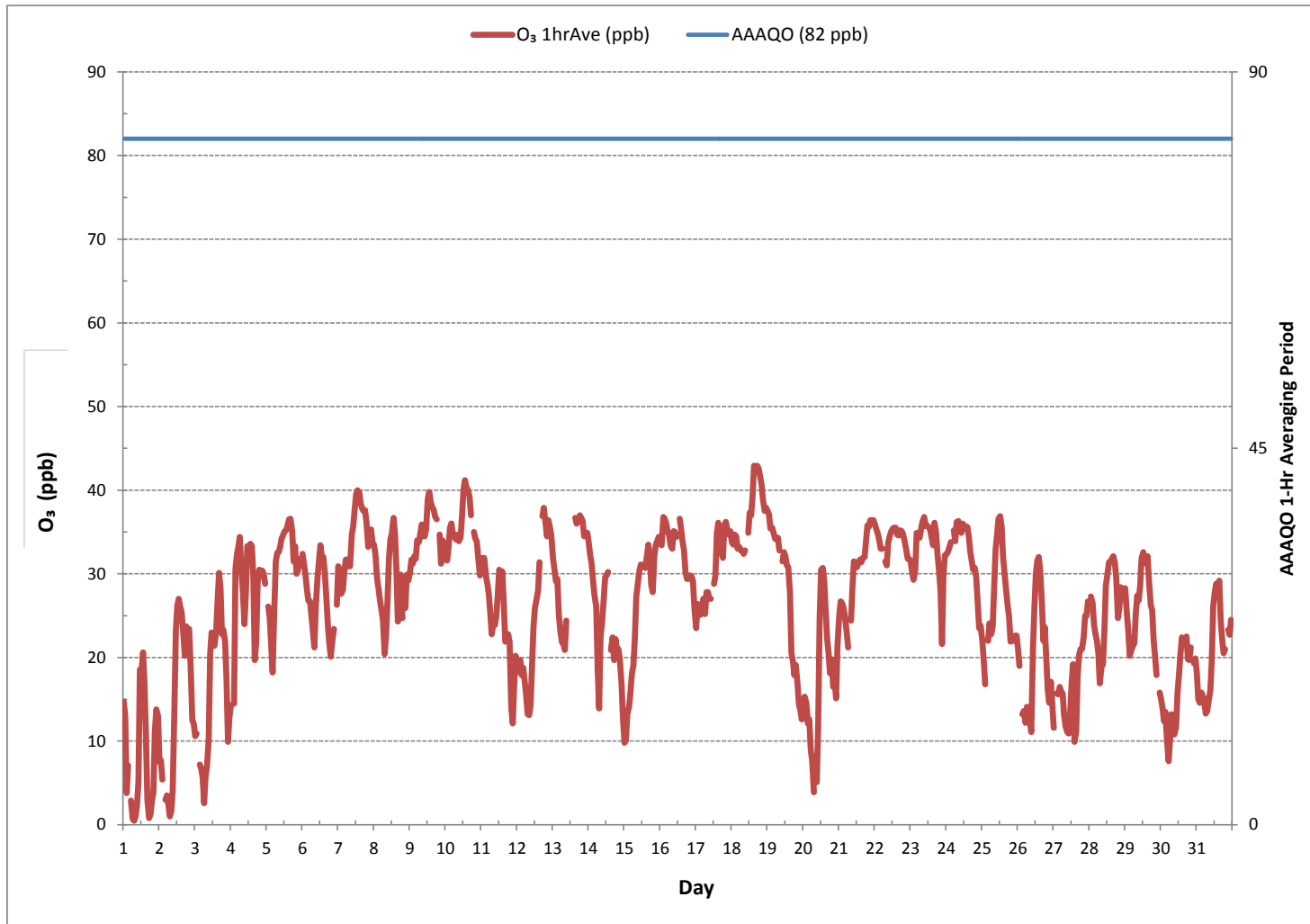
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	707			
MINIMUM 1-HR AVERAGE:	0.5 ppb	@ HOUR	7	ON DAY 1
MAXIMUM 1-HR AVERAGE:	42.9 ppb	@ HOUR	15	ON DAY 18
MAXIMUM 24-HR AVERAGE:	37.0 ppb			ON DAY 18
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	744 hrs	
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	9.0	MONTHLY AVERAGE:	26.3 ppb	

24 HR AVERAGES December 2017



OZONE Hourly Averages (O<sub>3</sub> ppb)





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

OZONE Instantaneous Maximum (O<sub>3</sub> 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	17.1	16.4	6.3	8.1	S	5.4	1.1	0.0	0.6	3.1	9.2	24.5	24.3	22.3	21.4	14.9	10.0	0.1	2.1	10.5	10.4	13.7	13.7	13.1	0.0	24.5	10.8	24
2	9.2	8.4	6.4	S	3.4	3.6	3.1	1.6	2.7	5.1	20.7	23.8	25.9	26.8	26.4	25.6	24.3	22.0	24.7	23.2	24.3	20.9	14.3	13.4	1.6	26.8	15.6	24
3	12.2	11.8	S	10.3	8.1	6.1	5.8	6.4	9.0	15.9	22.4	22.6	21.4	21.1	24.0	27.7	30.4	29.9	24.1	24.1	22.1	19.2	14.0	15.1	5.8	30.4	17.6	24
4	15.9	S	25.5	30.8	32.4	32.7	34.2	32.9	28.3	25.0	31.7	33.0	32.6	33.2	33.0	32.2	24.0	28.8	29.8	30.1	29.2	29.8	29.5	28.5	15.9	34.2	29.7	24
5	S	26.1	25.0	22.1	19.0	29.2	31.3	32.0	33.5	33.5	33.5	34.4	34.5	34.5	35.3	36.1	36.1	35.1	32.7	33.2	30.7	29.9	32.0	S	19.0	36.1	31.4	24
6	31.7	31.2	29.8	28.6	27.4	26.9	25.8	24.3	23.0	28.9	30.1	31.9	33.0	32.7	33.3	31.2	27.4	25.6	22.7	20.1	22.4	22.9	S	28.5	20.1	33.3	27.8	24
7	30.7	30.7	27.4	27.9	29.9	32.0	31.9	31.3	32.4	35.0	35.7	38.1	39.9	39.5	39.1	38.5	37.7	37.4	37.3	36.4	33.8	S	35.3	33.3	27.4	39.9	34.4	24
8	33.2	32.0	29.5	28.6	27.3	27.3	25.1	30.5	29.8	33.0	34.2	35.9	36.4	36.1	32.4	27.4	30.7	31.0	26.7	S	28.3	29.9	29.5	25.1	36.4	30.5	24	
9	30.2	31.3	31.0	32.0	31.6	34.7	34.2	34.5	36.7	35.4	35.1	35.3	39.4	39.3	38.8	37.6	37.3	36.7	36.1	S	35.6	32.4	33.8	33.3	30.2	39.4	34.9	24
10	32.6	32.6	33.6	35.6	35.9	34.2	34.2	33.6	34.5	34.4	35.1	37.6	40.5	40.5	39.8	39.5	38.9	37.6	S	34.8	33.6	33.5	31.8	30.2	30.2	40.5	35.4	24
11	30.8	31.7	31.7	29.8	28.8	27.4	26.5	26.6	25.6	24.7	25.8	28.8	30.2	30.1	30.2	28.2	24.4	S	23.6	22.3	18.9	15.0	20.6	20.6	15.0	31.7	26.2	24
12	19.0	18.0	19.2	18.3	18.5	16.8	15.6	14.9	14.0	15.3	X	23.8	26.1	26.8	29.1	32.7	S	37.6	37.4	36.7	34.7	36.4	35.1	34.8	14.0	37.6	25.5	23
13	33.0	30.5	29.8	29.9	27.7	24.3	21.8	21.8	22.9	25.6	C	C	C	C	C	37.1	36.8	37.3	37.4	37.1	36.7	35.9	36.2	35.6	21.8	37.4	31.4	24
14	34.7	33.3	31.6	29.8	28.8	27.3	25.1	17.9	24.2	25.0	28.6	31.3	31.3	31.0	S	26.4	26.2	21.5	23.0	22.3	22.1	20.6	18.5	14.3	14.3	34.7	25.9	24
15	11.3	12.1	14.1	15.5	17.4	19.8	19.8	27.3	28.8	29.9	31.2	31.6	31.8	S	31.0	33.3	34.1	33.6	29.7	30.1	33.2	34.2	35.3	35.0	11.3	35.3	27.0	24
16	34.1	35.0	37.3	37.1	36.5	35.7	35.1	33.9	34.2	35.7	35.7	35.7	S	38.2	35.9	35.4	33.5	31.6	29.9	30.2	30.3	30.3	29.8	28.2	28.2	38.2	33.9	24
17	26.2	26.9	26.4	26.2	26.4	27.6	27.6	29.2	28.8	27.9	27.7	S	30.1	30.4	36.1	36.7	36.4	34.2	33.5	36.7	36.7	36.0	35.4	36.2	26.2	36.7	31.3	24
18	35.6	34.2	35.4	35.0	34.4	33.8	33.3	33.3	33.2	33.5	S	36.7	37.7	37.3	42.4	43.5	43.2	43.5	42.9	42.3	41.6	39.9	38.5	38.4	33.2	43.5	37.8	24
19	39.1	38.2	36.2	36.2	35.6	34.5	35.0	34.8	34.2	S	32.4	33.6	33.0	32.0	31.5	31.6	23.5	23.5	22.0	22.1	20.1	16.4	15.9	13.4	13.4	39.1	29.3	24
20	17.1	16.4	16.1	13.8	14.8	10.0	8.7	6.9	S	7.2	19.3	28.8	31.7	31.9	30.1	27.7	25.9	22.7	21.2	20.6	18.6	18.0	19.0	22.7	6.9	31.9	19.5	24
21	26.7	26.8	26.8	26.2	25.5	24.3	22.3	S	26.8	30.2	31.9	31.9	31.7	31.6	32.2	31.7	32.4	32.4	35.7	36.8	36.5	36.8	36.7	36.8	22.3	36.8	30.9	24
22	36.5	36.1	36.0	35.3	33.8	34.1	S	32.2	32.9	34.5	35.3	35.6	36.1	36.2	36.2	35.4	35.1	35.6	35.7	35.1	34.5	34.1	32.6	39.0	32.2	39.0	35.1	24
23	31.9	31.3	30.4	33.3	35.9	S	35.3	36.4	36.8	37.6	37.1	36.5	36.6	36.7	35.7	33.9	37.4	36.5	34.1	32.7	30.7	24.7	33.6	33.2	24.7	37.6	34.3	24
24	32.9	33.8	34.2	35.3	S	36.2	35.1	37.6	37.0	35.9	36.1	36.8	36.4	36.5	36.6	35.6	34.2	32.3	31.6	31.7	30.4	28.2	25.1	25.2	25.1	37.6	33.7	24
25	23.6	22.6	18.5	S	24.6	24.9	23.5	24.7	32.0	34.1	36.4	37.4	37.5	37.0	35.6	30.8	30.2	28.3	28.3	22.7	23.2	23.6	24.1	24.1	18.5	37.5	28.2	24
26	22.6	20.2	S	14.3	15.2	14.0	14.9	14.7	13.8	13.4	26.4	27.4	31.3	32.3	32.4	32.0	28.9	26.4	25.3	21.5	19.2	18.3	18.9	17.4	13.4	32.4	21.8	24
27	14.9	S	17.9	16.8	17.7	17.1	17.2	14.6	13.1	13.4	12.8	15.6	20.1	20.9	15.0	14.9	20.7	22.4	21.8	22.4	23.5	25.9	25.8	28.6	12.8	28.6	18.8	24
28	S	28.3	27.0	26.4	24.0	23.6	22.4	19.3	20.2	20.9	25.6	30.1	31.3	31.7	32.4	32.6	32.4	32.3	30.1	28.9	28.3	28.8	28.3	S	19.3	32.6	27.5	24
29	29.1	27.1	24.4	21.2	21.5	22.1	22.7	28.0	27.9	27.4	29.9	32.8	33.0	33.2	31.6	32.6	32.0	30.2	28.3	24.1	22.0	19.6	S	16.8	16.8	33.2	26.8	24
30	16.7	16.2	13.4	14.8	13.4	10.0	12.9	14.0	13.0	11.9	13.4	17.4	19.5	21.7	22.7	22.3	24.0	24.7	20.9	21.9	22.1	S	21.1	21.3	10.0	24.7	17.8	24
31	21.2	18.0	16.8	16.7	16.1	16.1	14.9	15.1	16.7	16.9	24.9	27.9	29.2	29.2	29.4	30.8	28.6	25.9	23.6	25.3	S	28.0	25.9	27.1	14.9	30.8	22.8	24
HOURLY MAX	39.1	38.2	37.3	37.1	36.5	36.2	35.3	37.6	37.0	37.6	37.1	38.1	40.5	40.5	42.4	43.5	43.2	43.5	42.9	42.3	41.6	39.9	38.5	39.0				
HOURLY AVG	25.9	26.1	25.4	25.4	24.5	23.7	23.3	23.5	24.9	24.9	28.5	30.9	31.8	32.1	32.2	31.6	30.4	29.9	28.6	28.1	27.8	26.9	27.3	26.7				

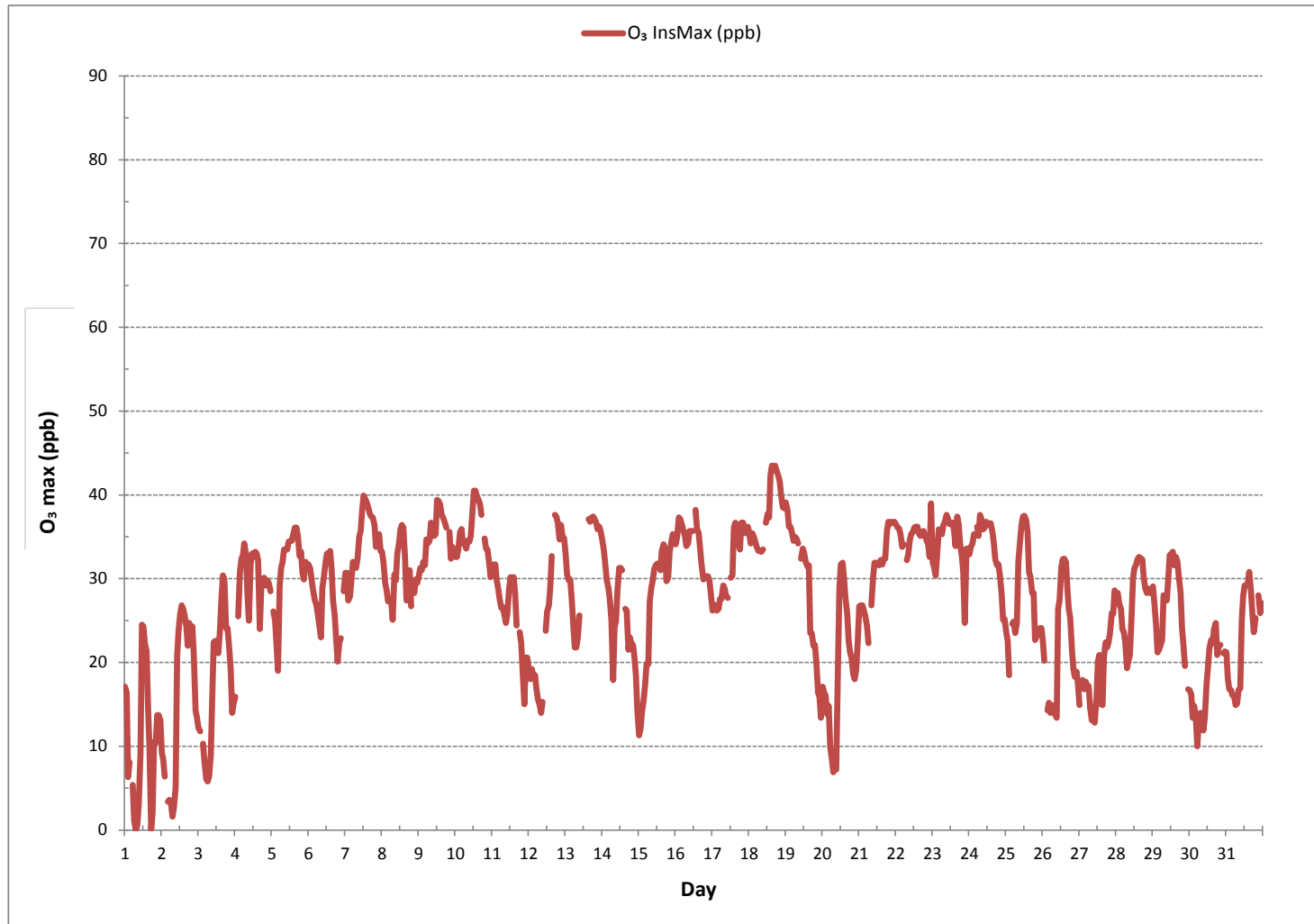
STATUS FLAG CODES

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:	705
MAXIMUM INSTANTANEOUS VALUE:	43.5 ppb @ HOUR 15 ON DAY 18
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	743 hrs
STANDARD DEVIATION:	8.5

OZONE Instantaneous Maximum (O<sub>3</sub> ppb)





Wind: LICA COLD LAKE SOUTH  
 Poll.: LICA COLD LAKE SOUTH-O3[ppb]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 20.34% Calm Avg: 14.53 [ppb]

Direction	0.0-14.3	14.3-28.7	28.7-43.0	>43.0	Total
N	0.0	0.4	3.6	0.0	4.0
NE	0.0	0.0	0.1	0.0	0.1
E	0.0	0.0	0.0	0.0	0.0
SE	0.0	1.1	1.9	0.0	3.0
S	0.1	0.6	0.0	0.0	0.7
SW	1.7	13.9	7.5	0.0	23.2
W	1.4	7.4	20.6	0.0	29.5
NW	0.0	4.0	15.2	0.0	19.2
Summary	3.3	27.5	48.9	0.0	79.7

% Icon Classes (ppb)

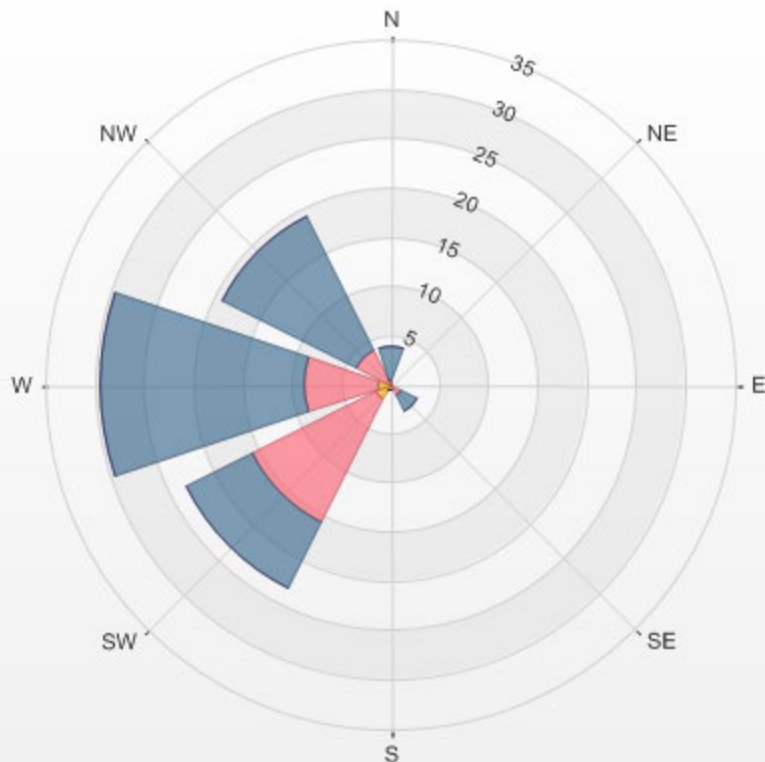
3 0.0-14.3

27 14.3-28.7

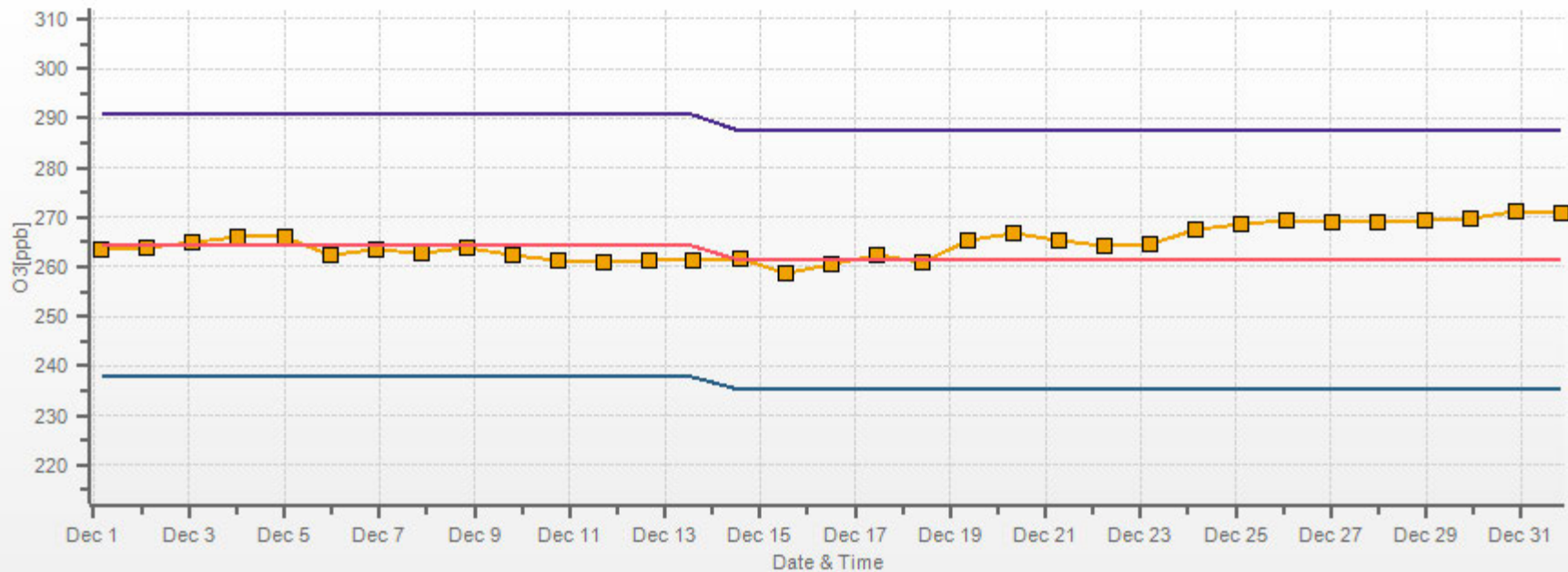
49 28.7-43.0

0 >43.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-O3[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 20.34% Calm Poll Avg: 14.53[ppb]



O3[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/12 Type: Span



Span Meas Span Ref Span Low Span High

***PARTICULATE MATTER 2.5***



PARTICULATE MATTER < 2.5 MICRONS Hourly Averages (PM<sub>2.5</sub> µg/m<sup>3</sup>)

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	11	7	7	7	8	9	9	10	9	7	8	5	5	6	9	8	12	7	6	7	9	9	9	3	12	8	24
2	10	10	10	10	10	10	9	9	9	10	15	15	13	10	10	10	9	7	5	5	5	6	5	6	5	15	9	24	
3	6	7	6	7	7	7	10	9	8	12	16	14	11	7	4	3	1	1	1	1	1	1	2	2	1	16	6	24	
4	2	2	2	1	1	1	0	1	2	3	2	0	0	0	1	1	1	1	2	1	1	1	1	2	0	3	1	24	
5	3	3	4	5	5	2	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	1	24	
6	0	0	0	1	1	1	1	1	1	1	2	2	2	4	3	4	7	9	8	8	7	6	4	3	0	9	3	24	
7	4	4	4	5	5	5	5	4	4	3	3	2	2	2	2	2	2	2	2	2	2	3	5	6	2	6	3	24	
8	6	8	8	6	5	5	5	6	8	6	6	5	5	7	8	10	13	11	11	10	9	8	6	6	5	13	7	24	
9	6	6	5	5	5	4	4	4	5	7	7	6	7	5	3	3	3	4	4	4	4	4	4	4	3	7	5	24	
10	4	4	6	7	8	8	8	7	6	6	6	5	3	2	1	0	0	0	0	0	0	0	0	0	0	8	3	24	
11	0	1	1	1	1	1	1	1	2	3	2	1	1	2	2	4	5	7	7	6	6	7	10	0	10	3	24		
12	11	10	10	10	9	10	11	10	11	10	8	6	7	7	7	8	7	6	4	4	4	4	4	5	4	11	8	24	
13	5	6	7	8	8	9	9	8	7	5	4	3	C	2	2	1	1	1	1	1	1	2	2	1	9	4	24		
14	1	1	1	1	1	1	1	2	2	1	1	1	1	2	2	4	5	4	5	6	6	6	9	1	9	3	24		
15	12	12	12	11	9	7	5	3	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	12	3	24	
16	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	24		
17	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	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	24	
19	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3	5	5	7	6	4	6	6	7	0	7	2	24	
20	7	9	8	7	7	6	6	8	11	9	6	3	3	3	6	7	7	5	6	6	7	7	5	2	2	11	6	24	
21	3	4	5	6	9	10	11	12	10	6	5	6	6	4	3	2	2	1	1	0	0	0	0	0	0	12	4	24	
22	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	3	0	3	1	24	
23	3	4	6	4	1	1	1	1	1	1	1	1	1	2	3	4	1	1	2	2	2	2	1	1	1	6	2	24	
24	1	1	1	1	1	2	2	3	4	4	4	4	3	3	3	4	4	4	3	3	2	2	2	3	1	4	3	24	
25	2	3	5	4	3	3	3	3	4	4	5	3	2	2	2	2	2	2	2	2	3	3	3	3	2	5	3	24	
26	2	0	0	2	3	0	0	0	0	2	2	2	2	2	2	2	4	5	5	5	7	9	8	10	0	10	3	24	
27	15	7	16	15	13	12	11	11	10	10	8	5	4	3	4	4	4	3	4	3	2	2	2	2	2	16	7	24	
28	2	1	1	2	2	2	3	4	5	4	2	1	1	1	2	1	1	0	1	1	1	0	0	0	0	5	2	24	
29	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	3	3	2	7	9	7	0	0	0	0	9	2	24	
30	0	0	0	0	0	0	0	0	0	3	12	7	4	1	1	1	1	2	4	3	2	2	3	3	0	12	2	24	
31	5	9	5	4	4	4	4	4	3	4	3	2	1	4	2	2	2	3	3	3	2	1	1	1	1	9	3	24	
HOURLY MAX	15	12	16	15	13	12	11	12	11	12	16	15	13	10	10	10	13	11	12	10	9	9	9	10					
HOURLY AVG	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	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

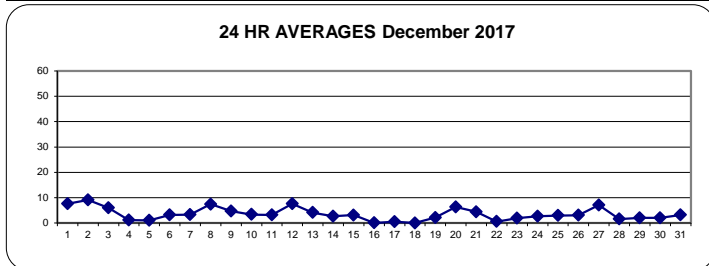
OBJECTIVE LIMIT:

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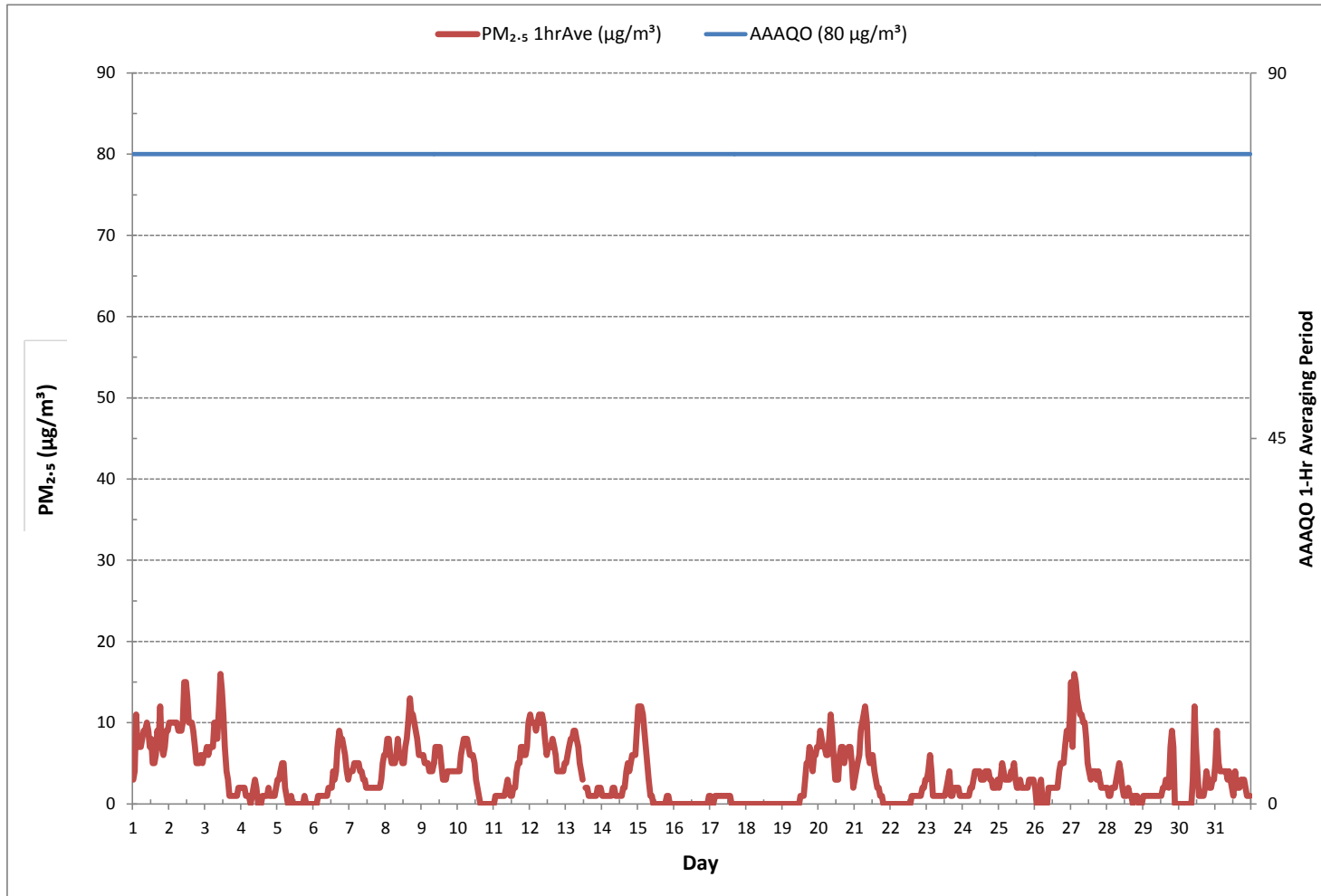
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	587				
MINIMUM 1-HR AVERAGE:	0 µg/m <sup>3</sup> @ HOUR	6	ON DAY	4	
MAXIMUM 1-HR AVERAGE:	16 µg/m <sup>3</sup> @ HOUR	10	ON DAY	3	
MAXIMUM 24-HR AVERAGE:	9 µg/m <sup>3</sup>		ON DAY	2	
MONTHLY CALIBRATION TIME:	1	hrs	OPERATIONAL TIME:	744	hrs
STANDARD DEVIATION:	3		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	3	µg/m <sup>3</sup>

24 HR AVERAGES December 2017



PARTICULATE MATTER < 2.5 MICRONS Hourly Averages (PM<sub>2.5</sub> µg/m<sup>3</sup>)



Wind: LICA COLD LAKE SOUTH  
 Poll.: LICA COLD LAKE SOUTH-PM2.5\_2[ug/m3(L)]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

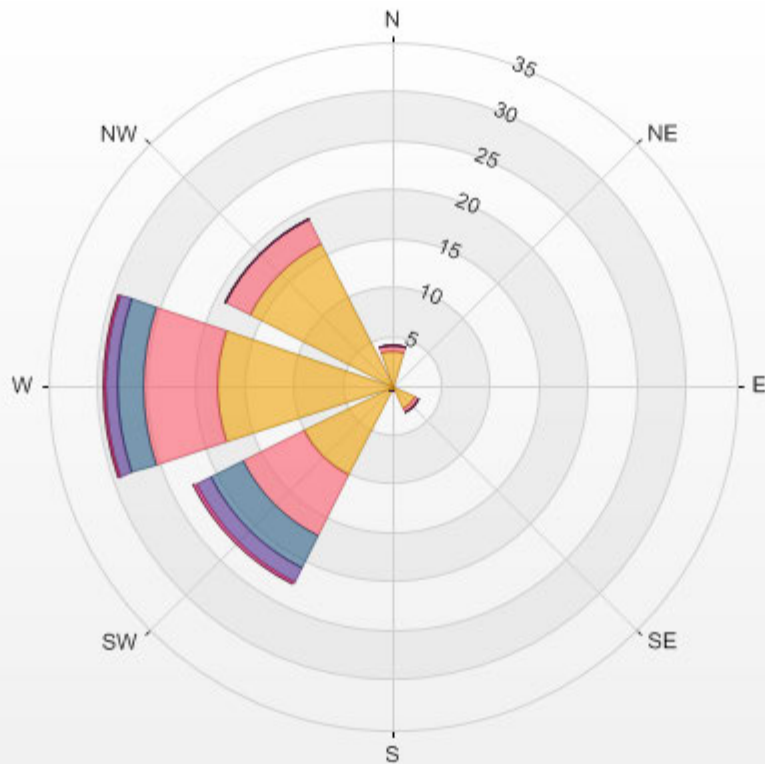
Calm: 20.87%

Calm Avg: 5.30 [ug/m3(L)]

Direction	0.0-3.4	3.4-6.8	6.8-10.2	10.2-13.6	13.6-17.0	>17.0	Total
<b>N</b>	3.7	0.5	0.0	0.0	0.0	0.0	4.2
<b>NE</b>	0.1	0.0	0.0	0.0	0.0	0.0	0.1
<b>E</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>SE</b>	2.7	0.3	0.0	0.0	0.0	0.0	3.0
<b>S</b>	0.5	0.1	0.0	0.0	0.0	0.0	0.7
<b>SW</b>	10.2	6.9	3.7	1.6	0.3	0.0	22.6
<b>W</b>	17.9	7.5	2.6	1.4	0.1	0.0	29.4
<b>NW</b>	16.1	2.9	0.1	0.0	0.0	0.0	19.1
<b>Summary</b>	51.2	18.2	6.4	3.0	0.4	0.0	79.2

% Icon Classes (ug/m3(L)) 51 0.0-3.4 18 3.4-6.8 6 6.8-10.2 3 10.2-13.6 0 13.6-17.0 0 >17.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-PM2.5\_2[ug/m3(L)] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 20.87% Calm Poll Avg: 5.30[ug/m3(L)]





***WIND SPEED***



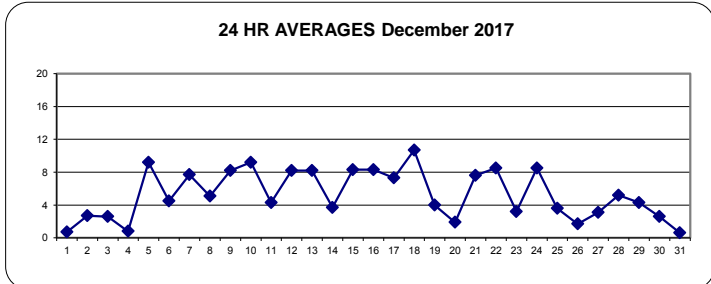
WIND SPEED Hourly Averages (WS kph)

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 MIN.	DAILY MAX.	24-HR AVG.	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59				
DAY 1	0.7	1.0	1.4	0.3	0.4	0.1	0.1	0.4	0.4	1.1	0.1	0.9	1.0	2.7	0.7	1.5	0.4	0.8	1.4	1.1	1.3	4.4	5.5	3.5	0.1	5.5	0.7	24
2	0.4	1.0	0.4	0.3	0.2	0.6	0.2	0.2	0.5	0.9	5.0	7.0	6.1	4.9	4.2	5.0	4.7	4.4	5.8	6.2	5.5	2.6	0.2	0.2	0.2	7.0	2.7	24
3	0.4	0.7	0.2	0.7	0.2	0.2	0.4	1.0	1.3	3.2	4.8	4.7	6.6	6.5	6.3	6.4	5.0	3.8	3.5	4.2	4.3	1.1	0.4	1.1	0.2	6.6	2.6	24
4	0.7	0.4	1.4	6.4	8.3	4.5	6.7	7.3	4.9	1.9	2.4	4.3	4.8	5.0	6.0	3.3	2.3	2.5	4.7	3.8	5.9	5.4	6.0	3.6	0.4	8.3	0.8	24
5	3.5	2.3	2.5	4.5	6.6	8.5	10.7	9.6	10.8	11.4	17.8	22.3	20.5	18.6	18.9	18.9	18.8	11.5	7.5	8.9	8.6	7.9	9.5	9.1	2.3	22.3	9.2	24
6	9.8	7.1	3.2	0.4	1.7	1.9	1.5	1.8	4.3	6.0	7.5	7.2	7.9	6.7	9.4	7.9	7.4	7.1	7.7	7.0	6.8	6.7	6.1	4.9	0.4	9.8	4.5	24
7	7.0	5.0	4.0	5.1	7.3	8.5	6.9	10.4	9.6	10.2	9.6	8.9	12.8	11.5	9.1	8.5	7.8	8.1	7.2	5.1	5.0	6.5	6.0	4.6	4.0	12.8	7.7	24
8	4.7	5.0	4.9	4.7	3.9	4.2	5.0	2.4	3.6	4.9	6.8	5.0	6.9	7.7	5.6	3.9	3.9	6.4	6.5	5.3	4.8	6.0	6.8	6.4	2.4	7.7	5.1	24
9	6.4	6.9	6.3	7.3	8.2	10.6	10.4	11.5	10.1	7.2	7.5	7.0	9.3	10.7	10.3	10.0	9.0	7.1	7.7	8.7	7.3	6.1	8.2	6.1	6.1	11.5	8.2	24
10	5.5	5.7	6.4	7.6	6.7	5.1	6.3	7.1	10.3	4.8	6.2	9.6	14.2	21.9	19.6	23.2	21.2	18.9	16.9	15.3	12.0	11.9	4.7	3.6	3.6	23.2	9.2	24
11	3.9	7.9	6.3	6.0	5.4	5.2	4.4	5.5	5.9	6.1	3.5	3.0	5.6	5.8	5.4	4.0	2.7	1.5	4.4	2.2	0.7	1.5	4.8	7.0	0.7	7.9	4.3	24
12	6.1	7.2	7.5	5.7	5.8	6.2	6.8	6.0	7.0	8.1	9.9	10.4	8.4	8.8	9.3	8.7	11.2	16.5	19.0	16.3	11.5	11.0	10.1	6.8	5.7	19.0	8.2	24
13	6.9	5.9	6.7	5.3	5.5	7.7	7.8	8.2	7.0	8.7	11.4	12.5	10.7	14.2	13.8	16.1	13.9	14.0	16.4	12.7	6.8	5.5	5.4	6.4	5.3	16.4	8.2	24
14	8.8	7.9	6.2	5.9	4.8	1.6	3.2	2.0	6.2	5.0	6.1	3.9	3.2	3.1	1.2	1.1	1.9	1.9	3.9	5.6	5.0	6.6	4.0	4.3	1.1	8.8	3.7	24
15	2.4	6.4	3.6	4.2	3.5	5.5	6.6	8.4	11.7	10.3	Y	Y	13.1	14.5	14.9	12.3	11.9	8.8	6.6	7.9	9.4	8.1	9.7	10.7	2.4	14.9	8.3	22
16	9.8	10.0	13.6	11.3	12.0	12.1	10.4	7.5	9.3	12.6	8.8	8.5	9.9	11.6	9.2	7.0	7.1	7.9	6.7	7.0	6.7	5.8	6.7	1.7	1.7	13.6	8.3	24
17	1.2	2.8	1.6	1.9	2.5	2.9	1.7	6.4	5.4	8.3	9.2	11.1	12.1	11.4	15.3	12.9	9.4	10.0	11.2	14.6	12.6	10.6	9.3	9.2	1.2	15.3	7.3	24
18	7.0	8.3	10.9	9.9	9.2	11.1	11.5	10.2	11.0	9.6	10.3	13.2	16.2	16.4	19.1	17.2	15.7	14.8	10.4	10.2	7.6	8.6	14.4	12.2	7.0	19.1	10.7	24
19	10.8	7.8	7.1	8.6	9.1	10.3	9.1	7.6	7.1	6.1	6.5	7.5	2.8	3.0	3.3	1.8	1.4	1.0	0.5	1.0	0.5	1.0	0.5	0.3	0.3	10.8	4.0	24
20	1.3	1.3	0.5	1.1	3.5	1.7	0.8	0.7	0.5	0.5	1.6	4.3	7.0	5.3	4.8	0.8	1.5	3.0	2.1	2.0	1.3	1.2	1.2	1.8	0.5	7.0	1.9	24
21	4.5	7.1	6.4	7.4	7.1	7.0	5.9	6.9	7.3	9.9	13.9	15.6	13.2	11.9	11.7	9.8	10.5	10.4	12.2	12.1	11.0	8.5	7.9	8.6	4.5	15.6	7.6	24
22	8.4	10.3	8.3	5.9	6.4	7.0	6.8	6.9	7.0	6.8	8.2	10.3	13.1	12.3	13.5	13.3	11.3	10.6	9.8	8.3	6.7	5.1	4.5	5.6	4.5	13.5	8.5	24
23	6.4	6.9	5.7	8.2	12.7	9.2	7.6	7.0	7.0	5.0	2.9	4.3	3.7	4.1	2.0	0.6	5.6	5.1	4.4	1.8	3.5	4.2	7.1	8.2	0.6	12.7	3.2	24
24	7.7	6.7	5.9	10.9	11.7	14.1	12.1	17.0	15.6	10.2	11.5	14.4	12.7	12.6	10.1	7.2	6.4	5.8	5.6	5.4	1.1	1.3	2.1	1.1	1.1	17.0	8.5	24
25	3.0	3.5	3.3	5.0	3.1	4.6	4.4	3.3	5.6	6.8	7.8	7.4	6.1	6.0	6.7	7.4	2.6	3.5	2.8	3.5	3.9	1.7	0.8	0.5	0.5	7.8	3.6	24
26	1.3	0.9	0.7	3.9	3.0	0.8	0.5	0.7	1.2	0.7	4.0	6.1	3.8	5.0	3.8	2.9	1.6	0.6	0.7	0.8	0.4	0.3	0.6	0.3	0.3	6.1	1.7	24
27	0.7	0.7	0.9	0.6	0.3	1.0	0.7	0.7	1.1	0.7	2.4	3.9	5.6	6.7	7.0	4.8	4.6	5.3	6.8	5.7	4.4	4.2	3.2	4.6	0.3	7.0	3.1	24
28	4.8	3.9	3.1	1.6	2.0	1.8	1.2	3.4	4.3	4.7	7.9	8.9	12.6	14.6	12.2	8.9	8.1	7.6	6.5	3.9	6.1	6.0	4.8	6.6	1.2	14.6	5.2	24
29	5.3	4.0	3.7	3.9	5.7	5.3	4.3	6.3	9.5	6.6	8.6	9.5	7.4	7.6	6.7	3.6	3.1	4.2	3.7	0.6	0.5	2.0	0.7	0.5	0.5	9.5	4.3	24
30	0.9	0.5	0.3	1.1	0.5	1.3	1.2	2.0	0.6	0.3	3.2	4.5	6.3	5.2	4.4	4.4	5.6	4.9	5.2	5.0	4.5	2.4	0.8	0.1	0.1	6.3	2.6	24
31	1.0	1.0	0.9	0.8	0.2	0.7	0.8	0.6	0.8	0.5	0.4	1.2	3.5	2.0	1.6	2.5	0.9	0.7	1.1	1.6	1.2	0.2	1.6	2.0	0.2	3.5	0.6	24
HOURLY MAX	10.8	10.3	13.6	11.3	12.7	14.1	12.1	17.0	15.6	12.6	17.8	22.3	20.5	21.9	19.6	23.2	21.2	18.9	19.0	16.3	12.6	11.9	14.4	12.2				
HOURLY AVG	4.6	4.7	4.3	4.7	5.1	5.2	5.0	5.5	6.0	5.8	6.9	7.9	8.6	9.0	8.7	7.7	7.0	6.8	6.7	6.3	5.5	5.0	4.9	4.6				

STATUS FLAG CODES

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

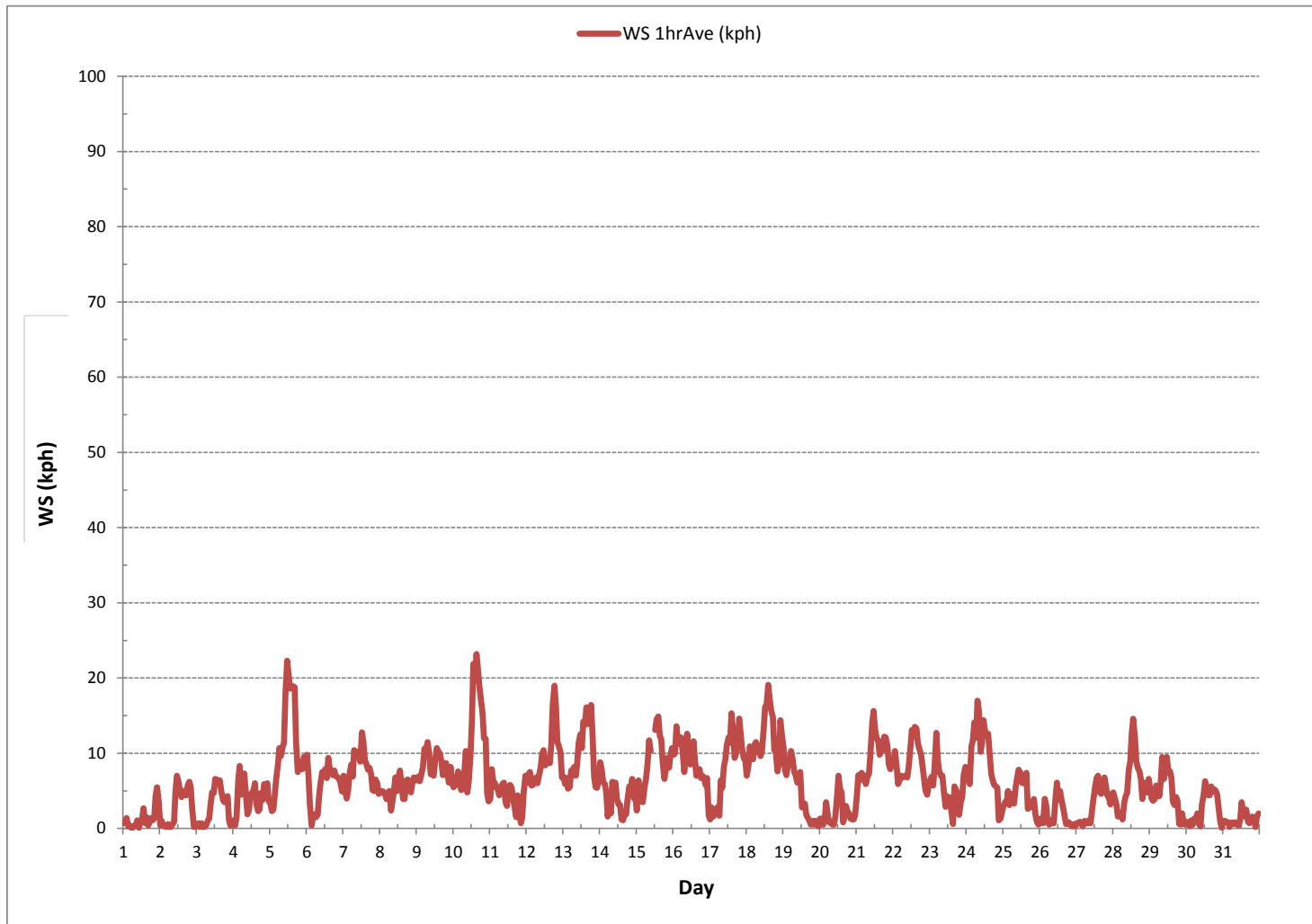
LAST CALIBRATION: November 9, 2017  
DECLINATION: MAGNETIC DECLINATION 19 DEGREE EAST



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	742
MINIMUM 1-HR AVERAGE:	0.1 kph @ HOUR 5 ON DAY 1
MAXIMUM 1-HR AVERAGE:	23.2 kph @ HOUR 15 ON DAY 10
MAXIMUM 24-HR AVERAGE:	10.7 kph ON DAY 18
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	742 hrs
AMD OPERATION UPTIME:	99.7 %
STANDARD DEVIATION:	4.3
MONTHLY AVERAGE:	4.7 kph

WIND SPEED Hourly Averages (WS kph)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Cold Lake South Continuous Monitoring Station - December 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	3.2	7.4	3.8	2.4	2.3	1.9	1.4	2.7	2.0	6.2	2.5	3.3	3.9	5.3	3.1	5.1	3.1	3.2	4.7	5.1	3.2	7.8	8.7	9.4	1.4	9.4	4.2	24
2	4.7	3.6	2.9	1.9	3.3	3.0	3.4	3.3	2.4	3.4	7.7	11.7	10.0	7.8	6.7	7.6	6.4	6.6	7.5	9.9	8.2	5.9	2.4	1.8	1.8	11.7	5.5	24
3	2.2	3.3	2.0	2.6	3.1	2.6	4.0	3.5	2.8	8.3	7.9	7.2	10.3	9.5	10.3	9.1	8.8	5.0	5.1	6.4	6.6	3.3	2.7	3.3	2.0	10.3	5.4	24
4	3.3	2.7	8.5	13.0	14.2	7.6	11.4	11.1	9.1	5.2	7.6	8.6	9.8	8.1	10.3	5.5	5.0	6.4	8.4	9.0	9.5	8.8	8.8	5.8	2.7	14.2	8.2	24
5	6.3	4.3	6.0	8.6	10.5	12.9	14.5	13.9	14.9	18.2	27.0	32.3	28.7	27.3	28.8	26.5	31.9	17.5	15.6	16.2	18.4	14.9	17.6	15.6	4.3	32.3	17.9	24
6	15.7	15.0	7.4	2.6	3.6	4.4	3.9	5.1	8.1	11.0	10.7	11.4	13.4	11.1	13.2	13.2	10.8	9.9	12.1	11.7	9.5	9.2	9.4	9.6	2.6	15.7	9.7	24
7	12.7	8.3	5.4	7.7	10.9	11.8	11.9	16.0	15.8	13.8	13.1	15.2	17.0	16.3	13.3	11.8	11.7	10.3	9.9	7.7	7.7	10.8	8.8	6.9	5.4	17.0	11.5	24
8	6.6	7.7	6.9	6.5	6.3	6.4	8.0	5.5	6.8	9.5	10.2	8.5	10.4	10.4	9.9	7.4	5.9	9.1	8.5	6.9	6.6	9.0	10.0	8.2	5.5	10.4	8.0	24
9	8.9	10.2	9.6	9.8	11.0	16.0	14.0	14.3	13.5	11.3	11.4	10.5	15.8	15.1	14.6	14.3	11.8	10.7	10.3	11.4	11.0	9.5	11.2	8.5	8.5	16.0	11.9	24
10	10.0	8.1	8.5	11.7	9.5	7.9	9.2	10.4	14.4	14.0	11.5	17.2	25.3	37.4	28.8	35.6	31.4	31.5	25.3	28.6	23.8	19.7	11.6	6.7	6.7	37.4	18.3	24
11	7.5	11.7	10.5	8.5	8.1	6.6	7.2	10.2	9.7	11.0	6.5	6.3	10.8	10.7	9.2	6.1	5.3	5.1	6.8	4.7	2.2	3.2	10.3	9.2	2.2	11.7	7.8	24
12	9.3	11.6	12.9	9.6	8.6	8.4	10.2	10.6	9.8	12.8	P	16.0	12.5	12.6	14.5	20.6	18.3	22.4	25.9	23.7	18.7	14.9	14.7	10.2	8.4	25.9	14.3	23
13	9.5	8.9	10.2	8.0	8.1	10.3	9.8	10.8	9.3	13.8	17.1	19.9	16.7	22.2	21.8	28.0	23.4	22.4	24.7	21.8	10.9	8.5	9.0	11.0	8.0	28.0	14.8	24
14	11.7	12.3	8.9	9.7	7.4	4.2	5.3	5.6	8.7	6.9	9.3	7.4	6.4	5.5	3.9	4.0	4.7	6.1	6.8	8.4	8.8	10.4	6.7	7.6	3.9	12.3	7.4	24
15	5.5	9.6	6.6	6.5	7.6	8.8	10.2	14.8	17.2	Y	Y	Y	22.3	21.9	29.3	19.1	19.1	16.4	11.6	11.6	14.6	14.6	14.9	14.5	5.5	29.3	14.1	21
16	13.4	14.5	21.2	18.4	20.4	17.4	15.2	11.9	13.9	21.9	16.5	14.0	14.9	19.6	16.0	10.9	11.9	13.2	10.2	10.0	11.1	9.6	10.0	4.1	4.1	21.9	14.2	24
17	5.1	7.2	4.4	4.8	5.2	5.5	4.5	11.4	11.9	12.3	18.2	15.7	18.6	15.4	28.1	22.9	13.6	15.8	16.5	24.6	18.3	15.4	13.2	14.8	4.4	28.1	13.5	24
18	11.9	12.6	14.2	13.0	13.2	17.3	14.6	15.4	14.6	14.0	15.9	21.3	28.0	28.1	30.9	25.8	27.4	28.0	17.2	18.8	14.8	17.7	20.3	20.9	11.9	30.9	19.0	24
19	18.7	14.3	15.1	13.7	14.5	15.2	14.9	12.4	10.5	9.4	9.9	11.5	7.2	6.8	6.8	4.5	2.4	2.7	5.0	2.4	12.8	2.3	5.9	2.4	2.3	18.7	9.2	24
20	7.4	3.4	2.5	2.2	6.6	6.4	3.4	3.0	6.0	2.9	4.7	8.0	11.3	9.4	9.0	3.6	4.2	6.5	5.6	3.7	3.6	3.2	3.5	4.1	2.2	11.3	5.2	24
21	11.9	11.2	10.2	10.6	10.6	10.2	9.8	9.9	13.0	17.0	24.4	22.4	20.1	17.5	17.4	16.4	19.1	20.1	20.4	21.5	17.7	15.3	12.9	13.2	9.8	24.4	15.5	24
22	13.8	16.6	14.9	8.3	10.6	10.6	9.6	10.1	10.7	12.1	16.0	18.5	22.1	20.4	21.6	22.9	17.1	15.3	15.8	12.8	11.0	9.8	6.9	8.9	6.9	22.9	14.0	24
23	12.6	10.6	9.2	17.6	20.4	17.1	10.4	11.1	10.2	9.4	6.6	7.1	6.7	6.9	6.0	4.7	9.2	7.1	7.8	3.9	5.3	7.3	10.8	11.9	3.9	20.4	9.6	24
24	13.8	9.3	9.6	17.4	17.2	23.3	21.6	28.8	24.7	18.6	19.4	23.0	20.4	20.5	20.0	17.6	10.3	9.6	7.1	8.9	9.8	6.5	7.1	5.8	5.8	28.8	15.4	24
25	8.0	6.1	9.4	9.0	7.9	9.5	7.3	6.3	9.3	10.7	11.3	10.8	10.1	11.1	10.6	12.4	5.1	6.7	4.5	5.5	6.3	4.7	1.9	2.6	1.9	12.4	7.8	24
26	4.1	2.9	3.1	6.6	6.0	3.5	1.7	10.1	2.9	4.2	9.4	10.3	7.4	8.2	6.5	4.7	2.7	2.4	2.1	2.1	1.8	7.6	1.5	2.4	1.5	10.3	4.8	24
27	3.0	4.1	2.0	2.3	2.7	3.4	2.6	3.5	2.8	5.3	6.8	7.0	13.1	11.0	10.6	7.7	7.4	8.6	9.6	8.1	7.6	7.5	4.6	7.1	2.0	13.1	6.2	24
28	7.0	6.9	5.6	3.5	4.5	2.8	3.1	6.0	6.7	9.9	11.0	15.6	19.0	22.7	17.4	14.1	12.0	12.2	9.4	8.2	10.3	9.4	6.4	8.9	2.8	22.7	9.7	24
29	8.6	7.8	7.3	6.3	9.8	7.6	8.1	12.3	13.1	12.0	12.7	16.1	14.4	13.4	12.6	8.6	4.9	6.0	6.4	2.9	3.2	4.6	2.6	2.2	2.2	16.1	8.5	24
30	3.9	3.0	2.5	3.1	3.4	4.5	2.7	5.3	2.8	3.2	6.8	7.4	10.2	8.4	6.7	6.4	7.8	6.7	8.0	8.1	7.6	5.1	2.9	3.2	2.5	10.2	5.4	24
31	5.7	3.9	3.9	3.7	2.4	2.3	3.9	2.0	5.3	2.9	2.9	5.1	6.9	5.5	5.2	4.3	2.8	3.2	10.6	4.0	3.3	2.7	4.3	5.1	2.0	10.6	4.2	24
HOURLY MAX	18.7	16.6	21.2	18.4	20.4	23.3	21.6	28.8	24.7	21.9	27.0	32.3	28.7	37.4	30.9	35.6	31.9	31.5	25.9	28.6	23.8	19.7	20.3	20.9				
HOURLY AVG	8.6	8.4	7.9	8.1	8.7	8.7	8.3	9.6	9.8	10.4	11.6	13.0	14.3	14.4	14.3	12.9	11.5	11.2	10.9	10.6	9.8	9.0	8.4	7.9				

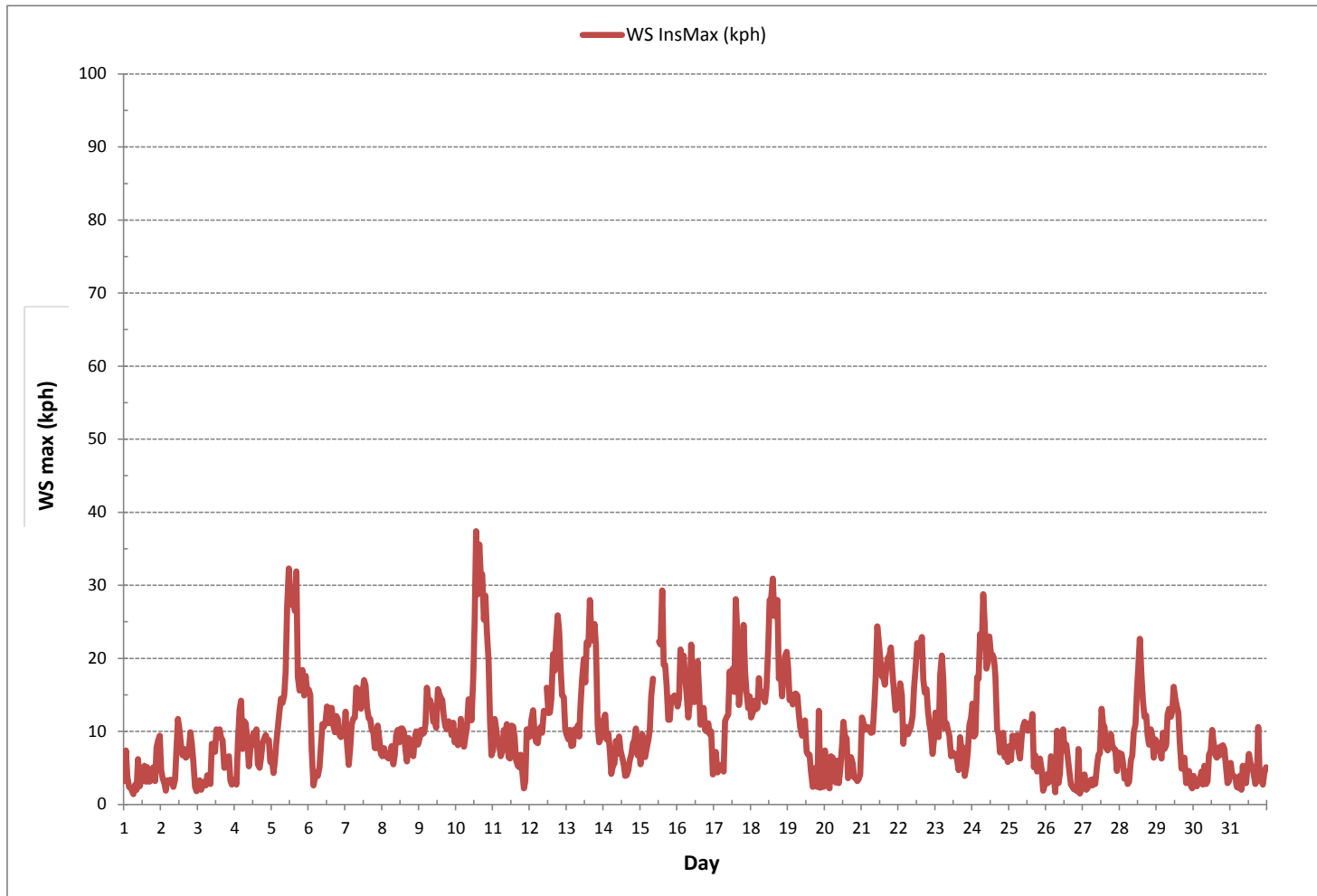
STATUS FLAG CODES

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

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	37.4 kph	@ HOUR	13	ON DAY	10
OPERATIONAL TIME:	740 hrs				

WIND SPEED Instantaneous Maximum (WS kph)






Wind: LICA COLD LAKE SOUTH  
 Monitor: WSP [kph]  
 Monthly: 17/12  
 Type: WindRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

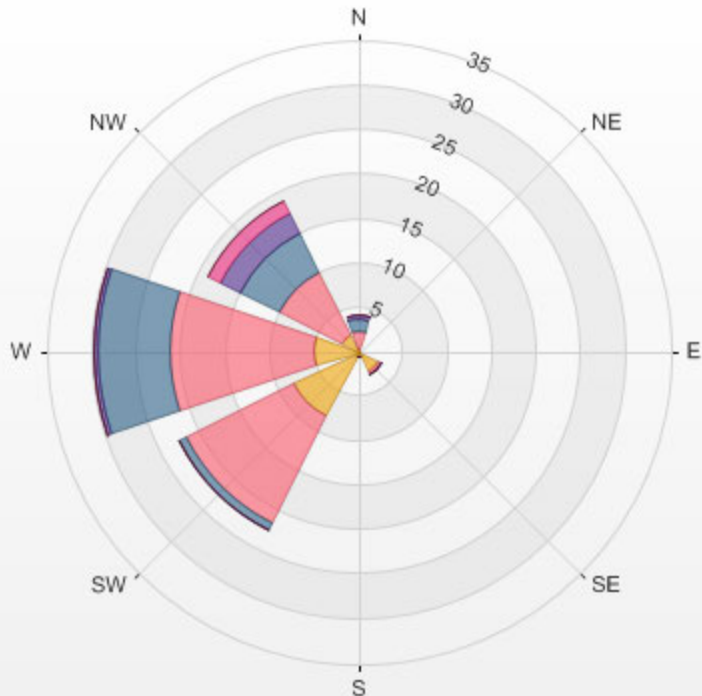
Calm: 20.75%

Direction	1.8-4.7	4.7-9.3	9.3-14.0	14.0-18.6	18.6-23.3	>23.3	Total
<b>N</b>	0.4	2.0	1.2	0.5	0.0	0.0	4.2
<b>NE</b>	0.0	0.1	0.0	0.0	0.0	0.0	0.1
<b>E</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>SE</b>	2.4	0.5	0.0	0.0	0.0	0.0	3.0
<b>S</b>	0.7	0.0	0.0	0.0	0.0	0.0	0.7
<b>SW</b>	8.1	13.5	0.9	0.0	0.0	0.0	22.5
<b>W</b>	5.0	16.2	8.1	0.5	0.0	0.0	29.8
<b>NW</b>	2.2	7.8	5.0	2.4	1.6	0.0	19.0
<b>Summary</b>	18.7	40.2	15.2	3.5	1.6	0.0	79.3

% Icon Classes (kph) 19 40 15 4 2 0

Icon	Classes (kph)	%
	1.8-4.7	19
	4.7-9.3	40
	9.3-14.0	15
	14.0-18.6	4
	18.6-23.3	2
	>23.3	0

LICA COLD LAKE SOUTH 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 20.75% Calm Wind Avg Speed: 0.84(kph)



***WIND DIRECTION***





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Cold Lake South Continuous Monitoring Station - December 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	WSW	NW	SE	S	ESE	SE	ESE	SE	SSE	WSW	S	NNW	NE	SE	W	ESE	NE	SE	SSE	SW	SSW	WSW	WSW	SW	SW	SW	24	
2	SW	SW	SE	S	WSW	WSW	SW	NNE	SSW	W	WSW	WSW	WSW	SW	SW	SW	SW	SW	SW	SW	WSW	WSW	WSW	SSW	SSW	SSW	SW	24
3	SSW	SSW	ESE	SE	WSW	SSW	N	SSE	SW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	W	W	SW	SW	WSW	SW	SE	WSW	WSW	WSW	24	
4	W	NW	NNW	NW	NW	NNW	NNW	N	N	NNE	NW	W	WSW	WSW	WSW	SW	SE	SE	SE	SE	SE	SE	SE	SE	SE	W	24	
5	SE	SSE	WSW	WSW	WSW	W	W	W	W	WNW	WNW	NW	NW	NW	NW	NW	NW	NW	NNW	N	NNE	NNE	N	NNW	NW	NW	24	
6	NNW	N	N	N	W	SE	SSE	SW	WSW	SW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	SW	SW	WSW	WSW	WSW	W	WSW	WSW	24	
7	WNW	W	WSW	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	WNW	W	W	W	W	W	W	24	
8	W	WSW	WSW	WSW	WSW	WSW	WSW	SW	SSW	SW	WSW	SW	SW	WSW	WSW	SW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	SW	SW	WSW	24	
9	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	W	W	SW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	24
10	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	W	WSW	SW	WSW	W	WNW	WNW	NW	NW	NW	NW	NNW	NNW	NNW	NNW	NW	WNW	WNW	24	
11	W	W	W	W	WSW	WSW	WSW	SW	WSW	WSW	WSW	SW	SW	WSW	SW	SW	SSW	SW	WSW	S	SSW	SW	WSW	WSW	WSW	WSW	24	
12	WSW	WSW	WSW	WSW	WSW	WSW	SW	WSW	WSW	WSW	W	W	W	W	WNW	WNW	NW	NW	NW	NNW	NNW	NNW	NNW	WNW	WNW	WNW	W	24
13	W	W	WSW	W	WSW	WSW	WSW	WSW	WSW	WSW	WSW	W	W	WNW	WNW	NW	NNW	NNW	NNW	NNW	NNW	NW	WNW	WNW	W	WNW	24	
14	W	WNW	WNW	WNW	W	SW	SSE	S	WSW	WSW	SW	SW	WSW	SW	SSE	SSW	SSW	SSW	SSW	SW	SW	SW	SW	SW	W	WSW	24	
15	WSW	WSW	WSW	SW	WSW	WSW	WSW	W	W	Y	Y	W	WNW	WNW	WNW	WNW	W	WSW	WSW	W	W	W	W	W	W	W	22	
16	WSW	W	WNW	W	W	W	W	W	W	WNW	W	W	W	W	W	WSW	WSW	SW	SW	SW	WSW	SW	SW	SE	W	24		
17	S	SSW	SSE	S	S	SSW	SSW	SW	SW	SW	WSW	WSW	WSW	WSW	WNW	WNW	WSW	WSW	W	W	W	W	W	WSW	WSW	WSW	24	
18	WSW	WSW	W	WSW	WSW	WSW	W	WSW	W	W	W	WNW	WNW	NW	NW	NW	NW	NW	NW	WNW	WNW	NW	NW	NW	WNW	WNW	24	
19	NW	NW	NW	NW	NW	NW	NNW	NW	NNW	NW	NW	NW	WNW	SW	SW	SSW	S	S	SE	SSW	SSW	S	SW	S	NW	24		
20	SSW	SSW	W	SSW	WSW	WSW	SW	SSW	SW	NE	WSW	SW	SW	SW	SW	SSW	SSE	SSW	SSW	SSW	SSE	S	S	S	SW	24		
21	SSW	SW	SW	SW	WSW	WSW	W	WNW	NW	NW	NNW	NW	NNW	NW	NNW	NW	NW	NW	NW	NW	NW	WNW	WNW	WNW	WNW	WNW	24	
22	WNW	NW	WNW	W	W	W	W	W	W	WNW	WNW	WNW	WNW	WNW	W	W	W	W	WNW	WNW	WNW	W	W	W	W	W	24	
23	W	WNW	WNW	NW	N	N	NNW	N	NNE	N	ESE	SE	SE	SE	SE	W	NNW	NNW	N	WNW	WNW	WSW	W	W	NW	24		
24	W	W	W	NNW	NNW	NNW	N	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NW	NW	NW	WNW	WNW	WNW	SSW	WSW	WSW	WSW	NW	24		
25	WSW	WSW	WSW	W	W	W	WNW	WNW	NNW	NNW	NNW	N	NNW	NNW	NW	NW	NW	NW	WNW	WNW	WNW	WSW	SSW	WSW	NW	24		
26	SW	SW	SSW	WSW	WSW	W	S	WSW	WSW	NNW	WSW	WSW	WSW	WSW	SW	SSW	SSW	SSW	SSW	SW	SSW	SSW	SSE	NNW	WSW	24		
27	W	W	SE	WNW	WSW	SW	W	W	WSW	WSW	W	WSW	W	SW	WSW	WSW	WSW	WSW	WSW	WSW	SW	SW	WSW	WSW	WSW	WSW	24	
28	WSW	WSW	WSW	W	SW	SSW	SW	WSW	W	WNW	NW	NW	NNW	NNW	NNW	NNW	NNW	NNW	NW	NNW	WNW	NNW	NNW	NW	NW	NW	24	
29	NW	NW	WNW	WNW	NW	WNW	WNW	NW	NW	NW	NNW	NW	WNW	WNW	W	W	WSW	WSW	W	SW	SW	SW	SW	W	WNW	24		
30	WSW	NW	WSW	W	NW	W	WSW	W	NNW	NW	WSW	W	SW	SW	SW	SW	SW	SW	SW	SW	WSW	WSW	WSW	W	WSW	24		
31	WNW	WNW	NW	SW	SE	SW	SW	SW	SSW	WNW	NW	S	ESE	SE	ESE	SE	ESE	SW	WSW	SW	S	WSW	SE	SSE	S	24		

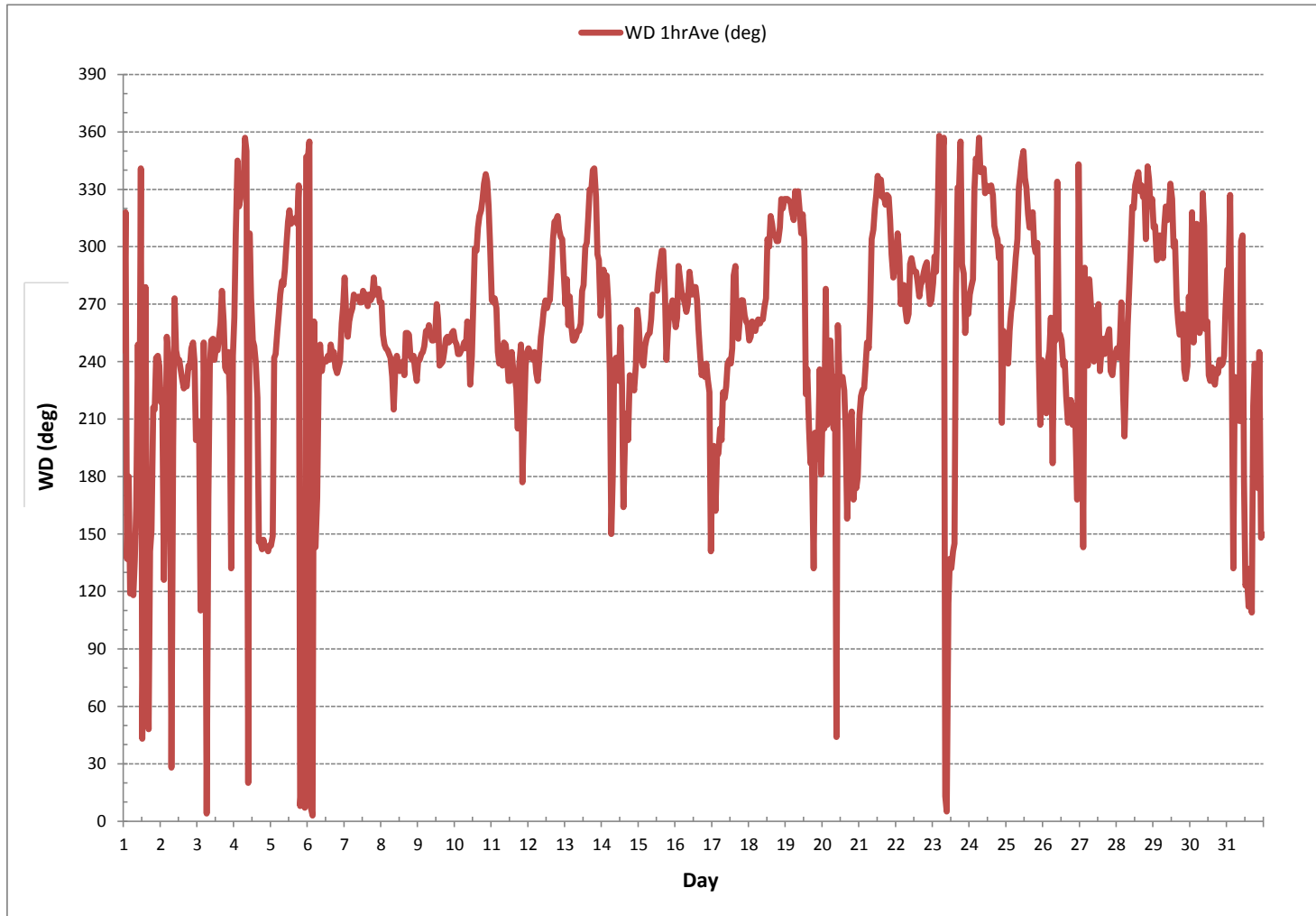
STATUS FLAG CODES

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

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

MONTHLY CALIBRATION TIME:	0 hrs	OPERATIONAL TIME:	742 hrs
STANDARD DEVIATION:	59	AMD OPERATION UPTIME:	99.7 %
		MONTHLY AVERAGE:	280 (W)

WIND DIRECTION Hourly Averages (WD)



***STANDARD DEVIATION WIND DIRECTION***



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Cold Lake South Continuous Monitoring Station - December 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	38	64	36	40	34	31	23	56	10	36	48	51	41	32	41	50	52	47	39	51	28	14	17	23	24
2	52	44	46	37	29	32	41	58	15	51	14	15	15	13	12	13	12	12	10	11	13	37	60	42	24
3	32	29	58	50	59	60	65	52	20	38	18	19	17	18	17	15	17	11	10	12	11	37	39	34	24
4	57	58	45	16	13	15	16	15	16	21	25	23	19	21	16	16	19	32	15	28	19	19	16	20	24
5	23	27	29	17	15	17	19	20	19	20	17	16	15	15	16	16	14	14	15	18	20	18	19	15	24
6	15	16	19	40	29	33	27	47	17	15	15	17	15	16	16	14	14	14	12	13	13	16	18	24	
7	20	17	10	14	16	18	21	19	18	19	19	19	19	19	19	17	18	16	17	18	20	17	17	14	24
8	15	11	11	13	11	11	13	38	24	20	16	14	13	14	14	19	10	10	10	9	11	10	13	14	24
9	13	13	12	15	14	14	15	15	15	15	15	17	19	18	15	15	15	14	12	13	13	13	14	24	
10	10	11	10	13	12	11	15	15	16	30	17	18	20	20	20	16	14	15	16	16	15	15	15	17	24
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14	18	18	18	16	17	28	23	20	14	15	14	20	23	15	36	34	29	43	20	15	12	12	16	17	24
15	25	15	14	17	13	15	16	16	17	19	Y	Y	19	19	20	19	19	18	16	16	19	19	20	18	22
16	16	17	20	21	19	20	19	18	17	20	19	21	20	21	21	16	14	15	16	16	16	18	16	43	24
17	52	43	43	50	41	38	58	19	25	14	16	17	16	18	22	21	17	17	17	19	19	18	17	17	24
18	16	17	17	16	17	16	16	16	17	19	19	20	20	19	16	15	14	15	16	18	12	13	13	15	24
19	14	13	14	13	15	13	15	18	14	12	14	13	40	36	34	24	17	33	58	22	38	35	49	48	24
20	32	29	41	40	16	53	43	27	48	52	48	18	18	20	20	54	41	20	36	45	54	58	50	54	24
21	33	22	16	16	19	17	19	19	17	14	15	14	17	15	16	17	15	16	15	15	13	19	21	20	24
22	17	14	17	17	18	19	18	17	18	20	21	21	20	20	20	20	20	21	21	20	18	18	18	17	24
23	19	19	17	16	17	17	17	17	18	18	41	20	26	19	43	51	14	14	18	29	18	22	19	19	24
24	20	20	20	16	15	16	18	14	14	18	18	17	17	17	16	15	11	11	12	16	26	44	51	32	24
25	27	28	40	28	31	27	23	22	14	13	17	20	23	25	22	12	19	22	32	30	26	40	40	48	24
26	40	47	56	30	36	43	43	62	39	64	31	26	33	23	27	24	25	41	43	39	59	53	37	73	24
27	43	58	42	60	52	46	47	45	36	36	38	30	26	19	21	22	19	20	18	22	21	18	21	20	24
28	22	24	27	38	32	26	50	33	27	25	13	18	15	15	15	13	13	13	12	30	17	14	14	24	
29	31	41	44	40	33	30	36	27	16	25	18	17	21	28	30	40	41	36	39	69	59	42	60	55	24
30	47	85	68	65	65	59	50	47	61	67	41	38	27	28	25	24	23	30	27	31	30	38	62	54	24
31	73	81	75	58	64	57	67	52	56	57	61	54	30	48	46	31	55	61	48	39	45	75	49	46	24

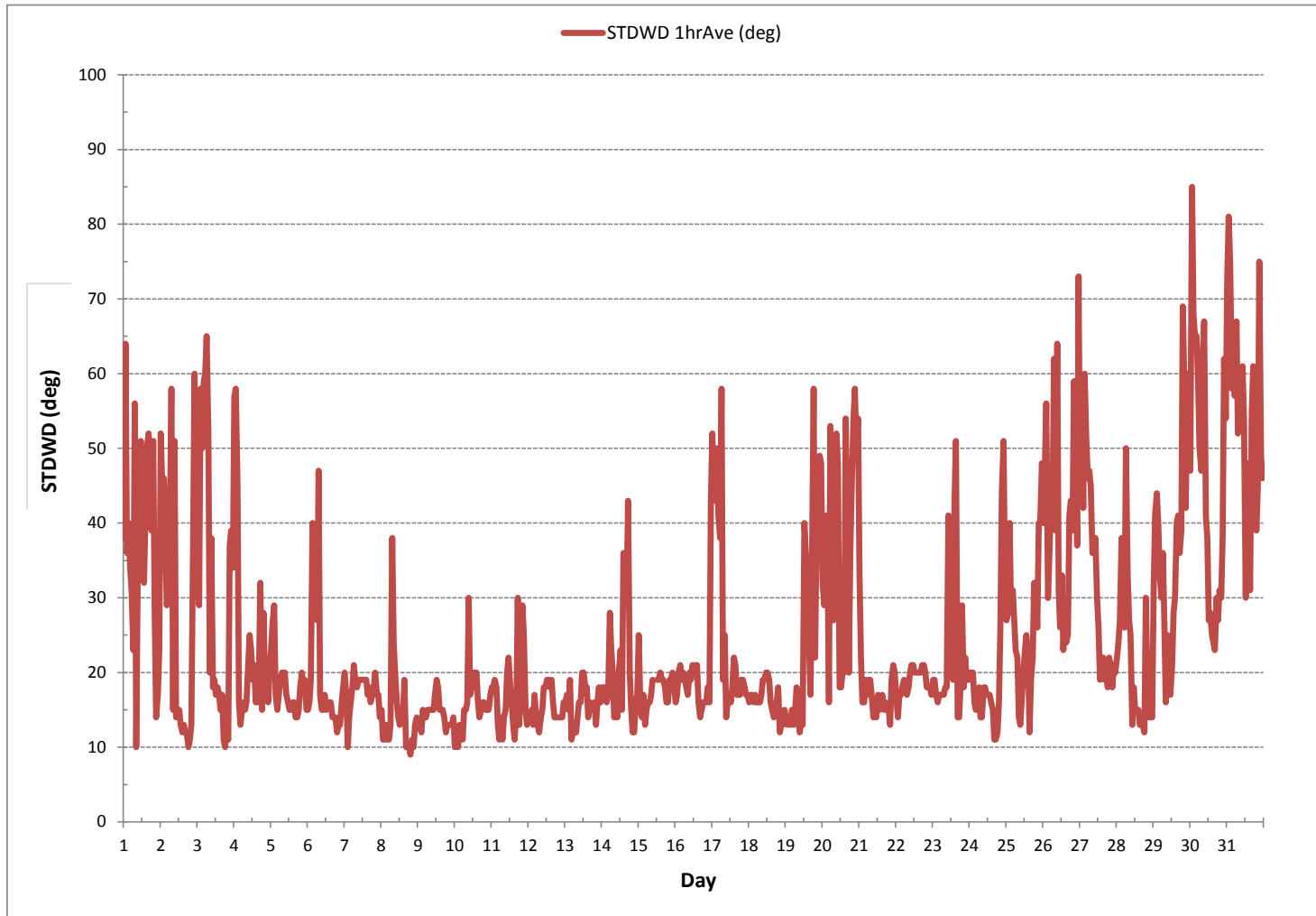
STATUS FLAG CODES

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

LAST CALIBRATION: November 9, 2017

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 742 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



***RELATIVE HUMIDITY***



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

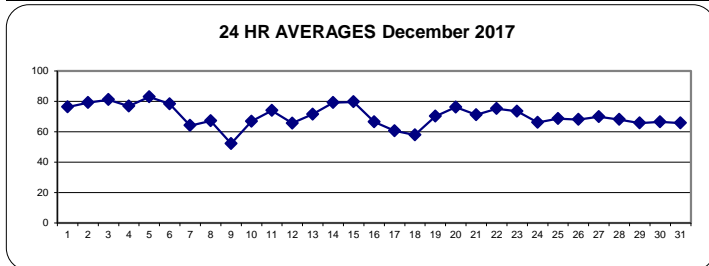
RELATIVE HUMIDITY Hourly Averages (RH %)

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	86	86	87	86	85	84	83	82	81	77	76	62	58	54	56	62	72	78	81	81	80	78	77	78	54	87	76	24
2	85	87	87	85	84	82	82	81	80	78	77	72	65	61	63	68	73	79	83	85	85	87	86	84	61	87	79	24
3	82	81	81	81	80	82	83	84	84	86	89	87	80	74	71	73	74	77	83	83	83	84	83	81	71	89	81	24
4	81	83	83	79	78	80	74	74	74	74	69	69	67	66	68	73	78	80	80	80	80	82	85	87	66	87	77	24
5	87	88	88	89	90	91	90	86	80	75	71	68	67	67	67	69	74	90	96	98	97	92	88	84	67	98	83	24
6	82	83	83	84	86	86	87	88	86	81	76	71	67	65	62	65	70	73	76	78	81	82	83	83	62	88	78	24
7	79	79	84	84	79	74	73	70	68	62	57	53	49	47	48	51	54	56	57	59	63	63	63	66	47	84	64	24
8	68	71	74	75	77	81	79	79	80	73	64	58	54	52	51	56	66	67	62	69	67	67	60	62	51	81	67	24
9	62	60	60	57	57	54	55	54	54	54	51	46	37	37	41	46	49	52	52	53	55	57	55	55	37	62	52	24
10	60	59	61	61	64	64	59	56	50	66	66	56	48	55	71	75	76	79	79	77	76	78	80	90	48	90	67	24
11	88	74	72	75	78	80	80	81	78	74	67	63	62	62	64	69	72	75	74	75	82	82	78	70	62	88	74	24
12	68	67	66	68	68	70	70	72	72	72	71	68	66	63	62	59	57	55	56	58	63	66	68	71	55	72	66	24
13	75	76	77	75	78	79	81	83	83	80	75	70	64	58	59	59	60	62	65	66	68	71	74	77	58	83	71	24
14	78	80	83	85	87	88	90	91	91	87	82	75	68	70	71	72	71	74	75	76	76	76	77	78	68	91	79	24
15	82	84	85	91	94	95	95	96	91	84	77	72	71	74	78	78	71	76	84	79	68	65	62	59	59	96	80	24
16	61	61	64	66	69	71	77	75	67	66	72	64	59	57	57	59	63	70	72	72	72	69	64	68	57	77	66	24
17	71	62	61	58	56	54	57	57	57	58	57	55	55	56	54	60	64	66	65	62	68	69	67	66	54	71	61	24
18	69	67	65	67	68	67	66	65	64	62	60	57	58	60	50	38	39	42	46	50	53	58	58	59	38	69	58	24
19	61	63	68	70	70	70	69	69	69	70	70	68	62	60	61	66	75	78	79	79	77	77	76	77	60	79	70	24
20	76	76	76	75	76	78	78	77	77	75	72	73	70	68	70	73	76	81	81	82	83	83	83	83	68	83	76	24
21	80	77	76	76	75	75	76	72	72	73	69	66	72	72	68	74	71	72	69	66	65	63	63	67	63	80	71	24
22	71	72	74	79	82	82	83	83	83	78	73	69	67	65	65	67	69	75	75	76	77	78	80	81	65	83	75	24
23	82	82	84	79	72	71	75	76	80	75	73	73	72	72	71	71	62	64	67	72	73	74	72	70	62	84	73	24
24	74	76	78	76	70	66	64	62	62	62	59	58	57	55	54	58	62	66	69	71	71	73	73	72	54	78	66	24
25	72	73	73	73	72	72	71	71	69	66	64	61	59	60	63	67	70	70	71	70	70	70	70	69	59	73	69	24
26	69	69	69	69	68	69	68	68	67	67	65	66	64	62	60	64	71	72	71	70	71	71	71	71	60	72	68	24
27	71	71	71	71	71	70	70	70	70	69	68	67	65	63	66	67	71	72	72	72	72	72	72	72	63	72	70	24
28	72	72	72	73	74	75	74	73	74	73	71	66	63	59	56	58	61	63	65	68	68	67	69	68	56	75	68	24
29	68	68	68	69	69	68	68	68	67	66	64	61	59	58	57	58	64	67	68	69	69	68	68	68	57	69	66	24
30	68	67	67	67	67	67	66	66	67	66	64	63	63	62	59	62	67	69	69	70	70	70	70	69	59	70	66	24
31	69	69	69	68	68	68	68	68	68	67	60	58	57	53	52	55	64	69	71	71	71	72	71	71	52	72	66	24
HOURLY MAX	88	88	88	91	94	95	95	96	91	87	89	87	80	74	78	78	78	90	96	98	97	92	88	90				
HOURLY AVG	74	74	74	75	75	75	75	74	73	72	69	65	62	61	61	63	66	70	71	72	73	73	72	73				

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
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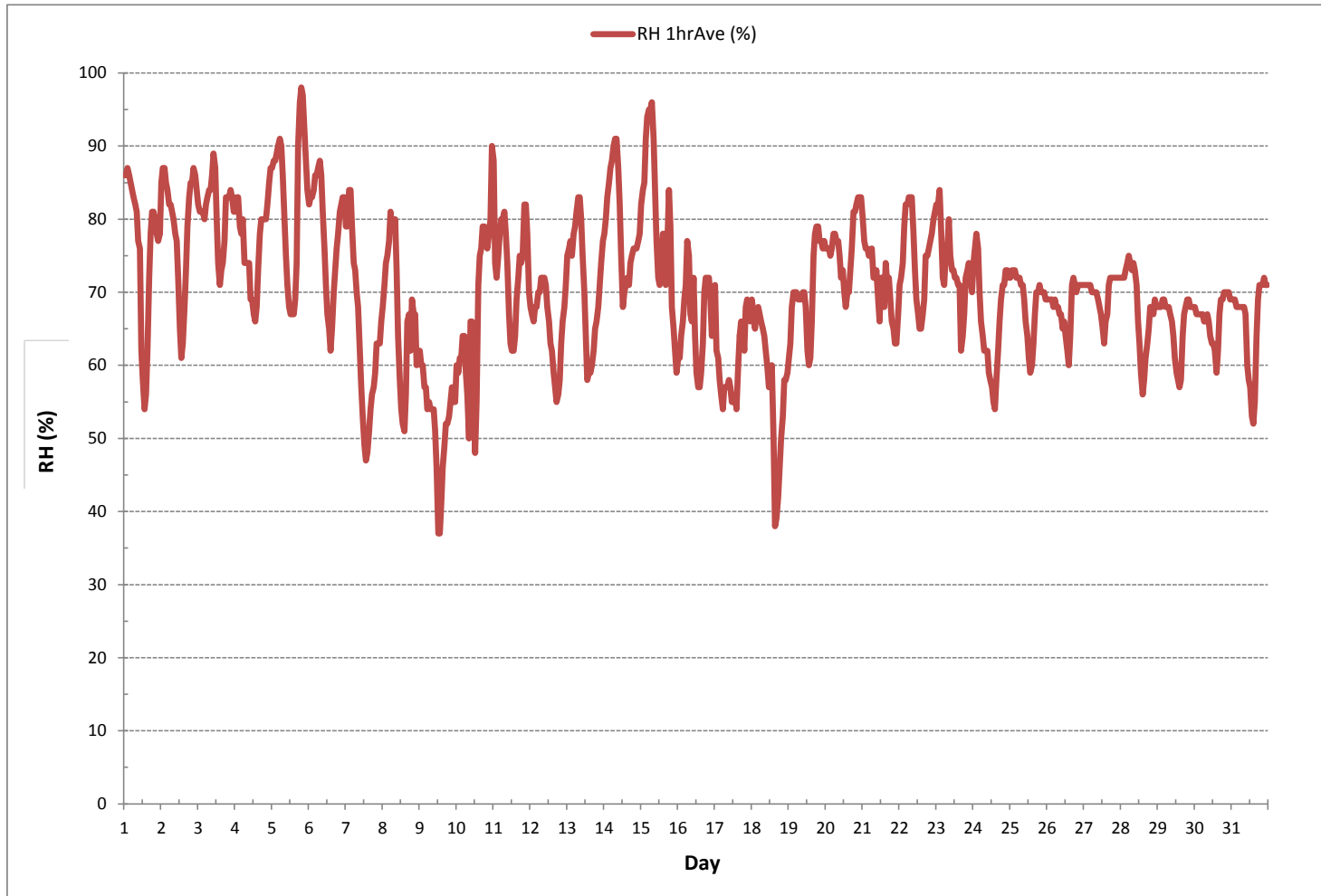
24 HR AVERAGES December 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	37	%	@ HOUR	12	ON DAY	9
MAXIMUM 1-HR AVERAGE:	98	%	@ HOUR	19	ON DAY	5
MAXIMUM 24-HR AVERAGE:	83	%			ON DAY	5
OPERATIONAL TIME:						744 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	10					MONTHLY AVERAGE: 70 %

RELATIVE HUMIDITY Hourly Averages (RH %)





***AMBIENT TEMPERATURE***



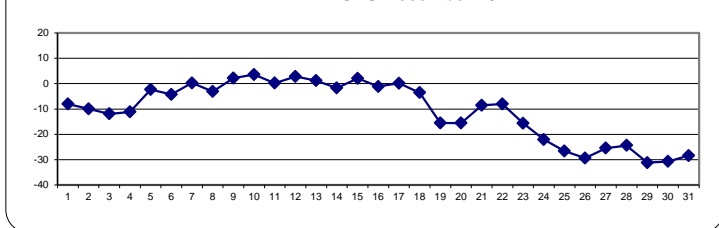
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

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	-10.0	-10.8	-11.2	-12.2	-13.0	-13.9	-14.4	-15.0	-14.9	-12.6	-9.6	-2.4	-1.0	0.0	-0.1	-1.6	-4.3	-6.6	-7.6	-7.5	-7.0	-6.0	-5.9	-6.2	-15.0	0.0	-8.1	24	
2	-8.7	-11.0	-12.1	-13.1	-14.2	-14.9	-15.6	-15.9	-16.1	-14.1	-8.8	-5.7	-4.0	-2.9	-3.2	-4.4	-5.8	-7.2	-7.6	-8.0	-8.7	-10.9	-12.5	-14.0	-16.1	-2.9	-10.0	24	
3	-15.1	-16.0	-16.2	-16.1	-15.2	-13.8	-12.7	-11.9	-12.8	-12.1	-9.2	-8.1	-7.3	-6.4	-6.1	-6.8	-7.9	-9.4	-12.5	-12.2	-12.3	-14.6	-15.7	-15.2	-16.2	-6.1	-11.9	24	
4	-14.2	-13.5	-12.6	-10.0	-9.8	-10.0	-10.2	-10.6	-11.2	-11.4	-10.4	-10.5	-10.1	-10.0	-10.2	-11.3	-12.8	-12.8	-12.2	-11.7	-11.3	-11.0	-10.8	-10.1	-14.2	-9.8	-11.2	24	
5	-9.5	-8.9	-8.3	-8.0	-7.6	-5.1	-1.9	-1.0	-0.8	-0.2	0.5	1.0	1.4	1.4	1.4	1.3	1.1	0.1	-0.1	-1.3	-2.3	-2.9	-3.4	-4.1	-9.5	1.4	-2.4	24	
6	-4.5	-4.7	-4.7	-4.6	-4.7	-4.7	-4.7	-4.7	-4.2	-4.4	-4.3	-3.6	-2.9	-2.2	-1.9	-2.8	-3.8	-4.5	-5.1	-5.6	-6.0	-5.6	-4.8	-4.0	-6.0	-1.9	-4.3	24	
7	-2.8	-2.8	-4.2	-4.3	-3.0	-1.9	-2.0	-1.7	-1.4	0.4	1.6	2.8	4.0	4.8	4.7	3.7	3.0	2.4	2.0	1.2	0.1	0.1	0.1	-0.9	-4.3	4.8	0.2	24	
8	-1.4	-2.3	-3.2	-3.7	-4.4	-5.1	-5.0	-5.3	-5.7	-4.5	-2.6	-0.8	0.4	0.7	1.1	-0.5	-3.5	-4.1	-3.2	-5.1	-4.9	-5.3	-3.4	-4.2	-5.7	1.1	-3.2	24	
9	-4.0	-3.0	-2.4	-1.0	-0.5	0.8	0.7	0.8	0.8	1.4	2.4	4.5	7.4	8.0	7.2	5.4	4.6	3.6	3.0	2.8	2.4	2.1	2.4	2.5	-4.0	8.0	2.2	24	
10	1.1	1.0	0.5	0.6	0.1	-0.1	1.6	2.5	4.2	4.2	4.0	5.7	7.9	7.4	5.6	5.2	4.8	4.5	4.5	4.5	4.4	4.2	3.9	3.1	-0.1	7.9	3.6	24	
11	3.2	2.9	1.8	0.6	-0.4	-1.2	-1.6	-2.3	-2.2	-1.7	0.1	1.1	1.3	2.0	1.8	1.2	1.0	0.6	0.9	0.2	-1.6	-1.8	-1.2	0.2	-2.3	3.2	0.2	24	
12	0.7	1.0	1.3	1.0	1.4	1.1	1.2	1.0	1.1	1.4	2.4	4.1	4.7	5.1	5.5	5.7	5.6	5.4	4.9	4.1	3.2	2.4	1.9	1.0	0.7	5.7	2.8	24	
13	0.0	-0.2	-0.6	0.0	-0.5	-0.8	-1.1	-1.2	-0.8	0.0	1.5	2.6	3.7	4.5	4.1	3.8	3.5	3.2	2.9	2.4	1.8	0.8	-0.1	-0.7	-1.2	4.5	1.2	24	
14	-1.0	-1.3	-2.1	-2.9	-3.6	-4.2	-5.4	-6.4	-5.9	-5.0	-4.0	-2.0	0.1	0.0	0.1	-0.1	0.0	-0.2	0.0	0.3	0.4	0.7	0.9	1.0	-6.4	1.0	-1.7	24	
15	1.0	0.9	1.3	1.1	1.3	1.5	1.8	2.4	3.2	3.6	4.3	4.6	4.3	3.8	3.3	2.7	2.7	2.1	0.8	0.3	0.6	0.3	0.0	0.1	0.0	4.6	2.0	24	
16	-0.5	-0.5	0.3	0.1	-0.5	-0.7	-1.2	-1.4	-0.7	-0.3	-0.4	0.2	0.8	1.0	1.1	0.1	-1.1	-2.4	-3.0	-3.6	-3.9	-3.7	-3.3	-4.2	-4.2	1.1	-1.2	24	
17	-5.2	-3.9	-3.6	-2.9	-2.4	-2.0	-2.0	-1.6	-1.4	-0.9	0.2	1.7	2.8	3.4	4.7	3.9	2.9	1.9	1.7	2.1	1.2	0.8	0.9	0.6	-5.2	4.7	0.1	24	
18	-0.8	-1.4	-1.4	-1.9	-2.5	-2.7	-2.9	-3.3	-3.3	-2.8	-2.1	-1.3	-1.4	-1.7	-1.8	-2.9	-3.7	-4.2	-5.1	-5.9	-6.6	-7.9	-8.7	-9.8	-9.8	-0.8	-3.6	24	
19	-10.9	-11.8	-13.0	-13.7	-14.1	-14.1	-14.2	-14.3	-14.7	-15.1	-15.0	-14.7	-13.5	-13.2	-13.3	-14.3	-16.3	-17.8	-18.5	-19.0	-20.0	-20.4	-20.6	-20.4	-20.6	-10.9	-15.5	24	
20	-20.6	-20.9	-21.6	-21.7	-21.1	-18.8	-18.0	-19.3	-20.2	-18.7	-14.6	-13.0	-11.9	-11.3	-11.1	-10.7	-10.8	-11.2	-11.9	-12.9	-13.7	-13.4	-14.4	-12.6	-21.7	-10.7	-15.6	24	
21	-11.7	-11.2	-10.7	-10.0	-8.7	-8.3	-8.2	-7.2	-7.7	-8.5	-8.4	-8.4	-8.8	-8.6	-8.5	-8.6	-8.4	-8.2	-8.0	-7.9	-7.7	-7.5	-7.4	-7.6	-11.7	-7.2	-8.6	24	
22	-7.9	-8.4	-8.6	-9.1	-9.1	-8.7	-8.7	-8.9	-9.2	-8.0	-7.1	-6.5	-6.3	-5.7	-5.7	-6.4	-6.9	-7.3	-7.7	-8.3	-9.0	-9.1	-9.6	-10.0	-10.0	-5.7	-8.0	24	
23	-10.0	-9.9	-10.0	-10.0	-10.8	-12.5	-14.0	-15.0	-15.5	-16.1	-16.6	-16.7	-16.6	-16.6	-16.5	-16.1	-16.4	-17.6	-18.5	-20.2	-20.9	-21.0	-19.5	-18.5	-21.0	-9.9	-15.6	24	
24	-17.8	-16.8	-15.9	-15.9	-16.5	-17.2	-18.9	-20.8	-22.8	-23.7	-23.3	-23.0	-22.5	-22.1	-22.7	-23.6	-24.3	-24.9	-25.1	-25.4	-26.8	-27.6	-28.7	-28.7	-28.7	-15.9	-22.1	24	
25	-28.8	-27.1	-26.7	-25.7	-25.5	-25.1	-25.0	-25.1	-25.2	-25.3	-25.1	-24.4	-23.9	-23.9	-25.0	-26.0	-27.5	-28.0	-29.2	-29.0	-30.0	-31.0	-31.7	-31.7	-23.9	-26.7	24		
26	-32.4	-33.0	-33.2	-32.9	-32.3	-33.2	-33.6	-34.0	-34.3	-32.1	-28.0	-27.1	-24.3	-23.3	-22.5	-23.5	-25.7	-27.4	-28.4	-29.1	-29.1	-28.8	-28.7	-27.8	-34.3	-22.5	-29.4	24	
27	-27.3	-27.5	-27.3	-26.9	-27.1	-27.8	-27.9	-28.2	-28.6	-28.1	-26.2	-23.9	-22.5	-21.8	-22.4	-22.7	-23.8	-24.5	-25.1	-25.5	-25.1	-24.3	-23.7	-23.3	-28.6	-21.8	-25.5	24	
28	-22.5	-21.9	-21.4	-21.3	-21.8	-22.5	-24.4	-24.9	-22.7	-22.9	-21.8	-21.9	-22.7	-23.1	-24.0	-25.2	-26.1	-26.9	-28.0	-28.3	-28.9	-29.8	-30.2	-30.2	-30.2	-21.3	-24.4	24	
29	-30.7	-31.5	-32.0	-33.0	-32.8	-32.8	-32.5	-32.4	-31.9	-31.7	-30.9	-30.8	-29.2	-28.4	-27.6	-27.5	-28.7	-29.7	-30.6	-31.8	-32.6	-33.1	-33.5	-33.8	-33.8	-27.5	-31.2	24	
30	-34.0	-34.3	-34.6	-34.9	-35.0	-35.3	-35.4	-35.1	-35.0	-33.5	-30.9	-29.3	-27.5	-26.1	-24.9	-25.4	-26.7	-27.1	-27.6	-27.9	-28.0	-28.9	-29.7	-30.3	-35.4	-24.9	-30.7	24	
31	-30.9	-31.2	-31.6	-31.8	-32.1	-32.2	-32.3	-32.4	-32.6	-31.0	-26.7	-24.9	-24.3	-23.0	-22.3	-22.4	-24.4	-26.3	-27.7	-28.4	-28.5	-28.2	-28.5	-28.3	-32.6	-22.3	-28.4	24	
HOURLY MAX	3.2	2.9	1.8	1.1	1.4	1.5	1.8	2.5	4.2	4.2	4.3	5.7	7.9	8.0	7.2	5.7	5.6	5.4	4.9	4.5	4.4	4.2	3.9	3.1					
HOURLY AVG	-11.5	-11.6	-11.7	-11.7	-11.8	-11.8	-11.9	-12.0	-12.0	-11.4	-10.0	-8.7	-7.8	-7.4	-7.3	-8.0	-8.9	-9.8	-10.3	-10.8	-11.2	-11.6	-11.7	-11.9					

STATUS FLAG CODES

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

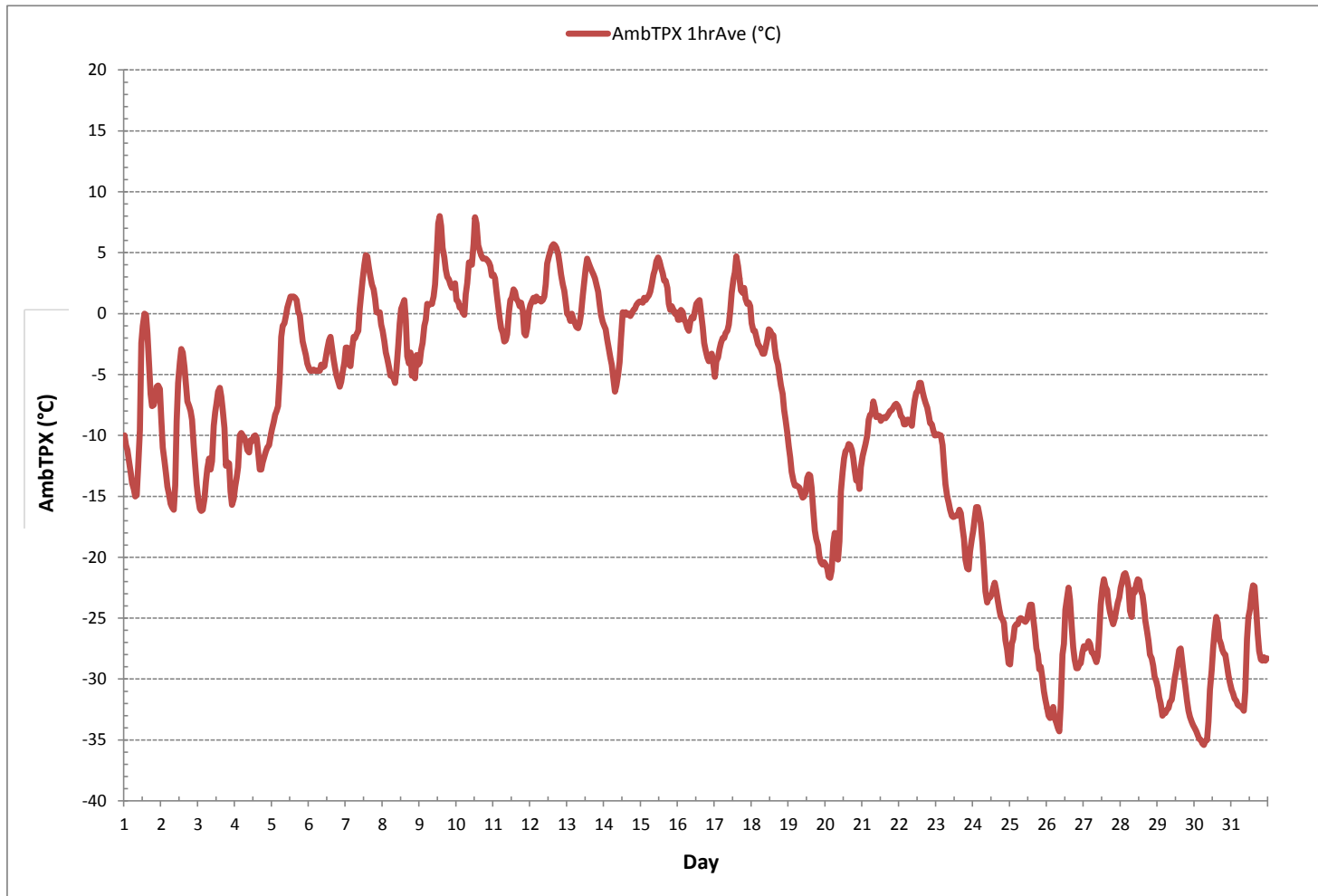
24 HR AVERAGES December 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-35.4 °C	@ HOUR	6	ON DAY	30
MAXIMUM 1-HR AVERAGE:	8.0 °C	@ HOUR	13	ON DAY	9
MAXIMUM 24-HR AVERAGE:	3.6 °C			ON DAY	10
OPERATIONAL TIME:				744	hrs
AMD OPERATION UPTIME:				100.0	%
STANDARD DEVIATION:	11.6			MONTHLY AVERAGE:	-10.5 °C

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



***APPENDIX II***  
***EQUIPMENT CALIBRATION RESULTS***

***SULPHUR DIOXIDE***



## Thermo 43i Sulphur Dioxide Analyzer Calibration

Date: December 12, 2017	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	934	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name: Cold Lake South	Weather Conditions: Cloudy/Overcast		
Parameter: Sulphur Dioxide	Calibration Purpose: routine monthly		
Start Time 24 hr. (mst): 9:56	Performed By/Reviewer: Alex Yakupov		Rob Fisher
End Time 24 hr. (mst): 14:09	Cal Gas Expiry Date: July 18, 2019		
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a		

Analyzer ID# or Serial Number: 80652842	Range ppb: 500
Last Calibration Date: November 9, 2017	As Found C.F.: 1.018
Previous C.F.: 0.999	New C.F.: 0.999

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: API id# 627 expires January 27, 2018 Cal Gas Cylinder I.D. #: LL 104222 Cal Gas Conc. (ppm): 50.6	<b>Standard Calibration Points for Ranges</b> <table border="1" style="margin: auto;"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>380</td></tr> <tr><td>Mid</td><td>180</td></tr> <tr><td>Low</td><td>90</td></tr> </table>	Point	ppb	High	380	Mid	180	Low	90
Point	ppb								
High	380								
Mid	180								
Low	90								

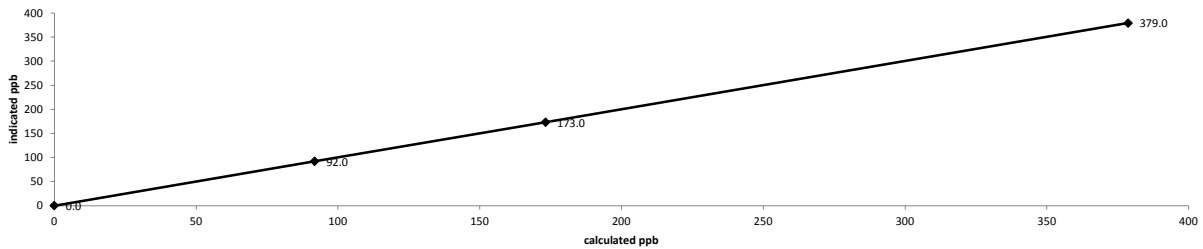
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Calibrator Flow Rates (cc/min)				Calculated	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	Concentration (ppb):		
as found zero	4934	0.00	4934	0.0	0.0	n/a
as found high	4899	36.94	4936	378.7	372.0	1.018
adjusted zero	4934	0.00	4934	0.0	0.0	n/a
adjusted high	4899	36.94	4936	378.7	379.0	0.999
mid	4922	16.91	4939	173.2	173.0	1.001
low	4934	8.97	4943	91.8	92.0	0.998
calibrator zero	4934	0.00	4934	0.0	0.0	n/a
Average C.F. =						1.000

**Linear Regression/Calibration Results:**

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.999		0.95-1.05
b (Intercept as % of full scale) =	0.01%		± 3% F.S.
% change in C.F. from last cal =	-1.90%		± 10%

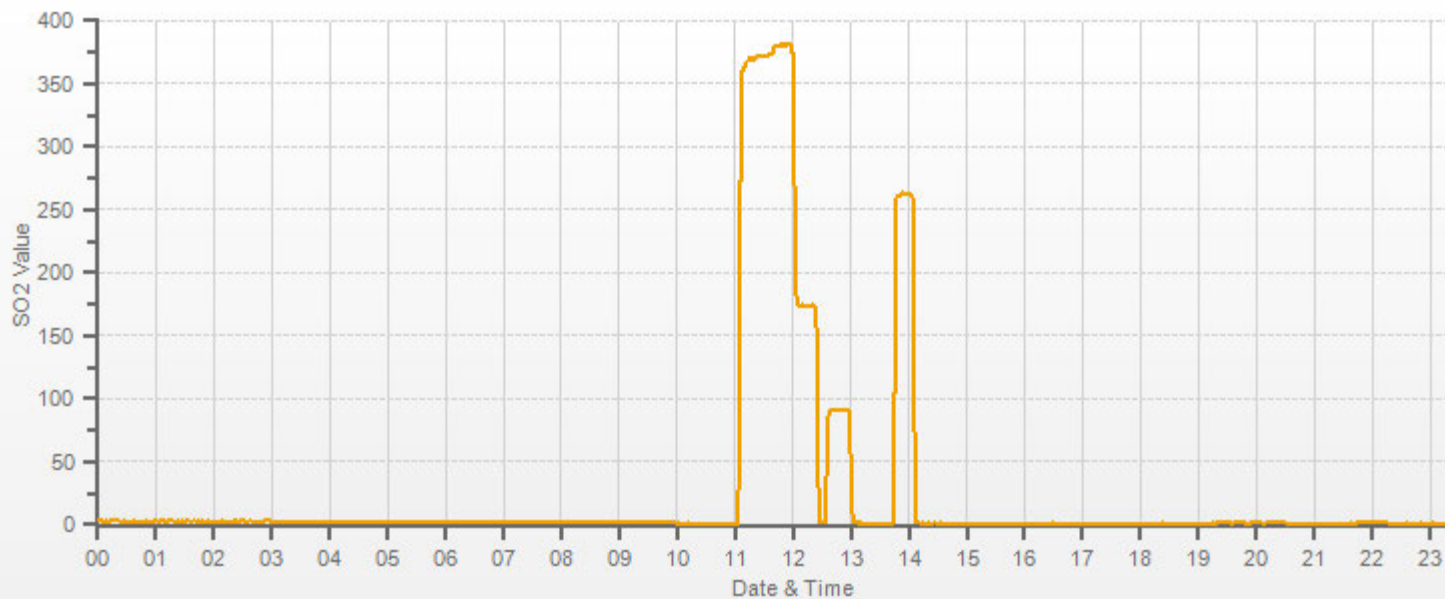
**Thermo 43i Sulphur Dioxide Analyzer Calibration**



As found:	As left:
Bkg: 8.4	Bkg: 8.6
Coef: 0.977	Coef: 0.996
Pmt: -623.8	Pmt: -623.8
Flash: 767	Flash: 764
Internal: 30.7	Internal: 31.3
Chamber: 45.0	Chamber: 45.2
Perm Oven Gas: 35.00	Perm Oven Gas: 35.00
Perm Oven Heater: 34.25	Perm Oven Heater: 34.25
Pressure: 675.6	Pressure: 675.3
Sample Flow: 0.473	Sample Flow: 0.473
Lamp Intensity: 96	Lamp Intensity: 96
Converter: n/a	Converter: n/a
Converter Set: n/a	Converter Set: n/a
Averaging Time: 120	Averaging Time: 120
Expected Value: 254.8	Expected Value: 263.0

**Comments:**

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



— SO2[ppb]

***TOTAL REDUCED SULPHUR***





## Thermo 450i Total Reduced Sulphur Analyzer Calibration

Date:	December 13, 2017	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	944	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	Mainly sunny		
Parameter:	Total Reduced Sulphur	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	10:15	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	14:30	Cal Gas Expiry Date:	June 14, 2019		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	CDNOVA Model CDN-101 / #501		

Analyzer:	Range ppb:
ID# or Serial Number:	100
Last Calibration Date:	As Found C.F.:
November 9, 2017	1.029
Previous C.F.:	New C.F.:
1.000	1.000

Calibration Standards:	Standard Calibration Points for Ranges
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:	API id# 627 expires January 27, 2018
Cal Gas Cylinder I.D. # :	EY 0000654
Cal Gas Conc. (ppm):	10.2

Point	ppb
High	78
Mid	38
Low	19

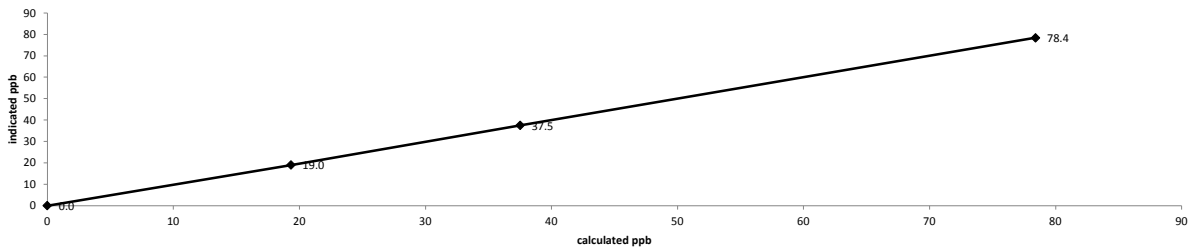
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Calibrator Flow Rates (cc/min)				Calculated	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	Concentration (ppb):		
as found zero	7193	0.00	7193	0.0	0.0	n/a
as found high	7383	57.20	7440	78.4	76.2	1.029
adjusted zero	7193	0.00	7193	0.0	0.0	n/a
adjusted high	7383	57.20	7440	78.4	78.4	1.000
mid	7422	27.40	7449	37.5	37.5	1.001
low	7435	14.12	7449	19.3	19.0	1.018
calibrator zero	7193	0.00	7193	0.0	0.0	n/a
Average C.F. =						1.006

### Linear Regression/Calibration Results:

	<b>LIMITS</b>	
Correlation Coefficient =	1.000	> or = 0.995
Slope =	0.999	0.95-1.05
b (Intercept as % of full scale) =	0.13%	± 3% F.S.
% change in C.F. from last cal =	-2.91%	± 10%

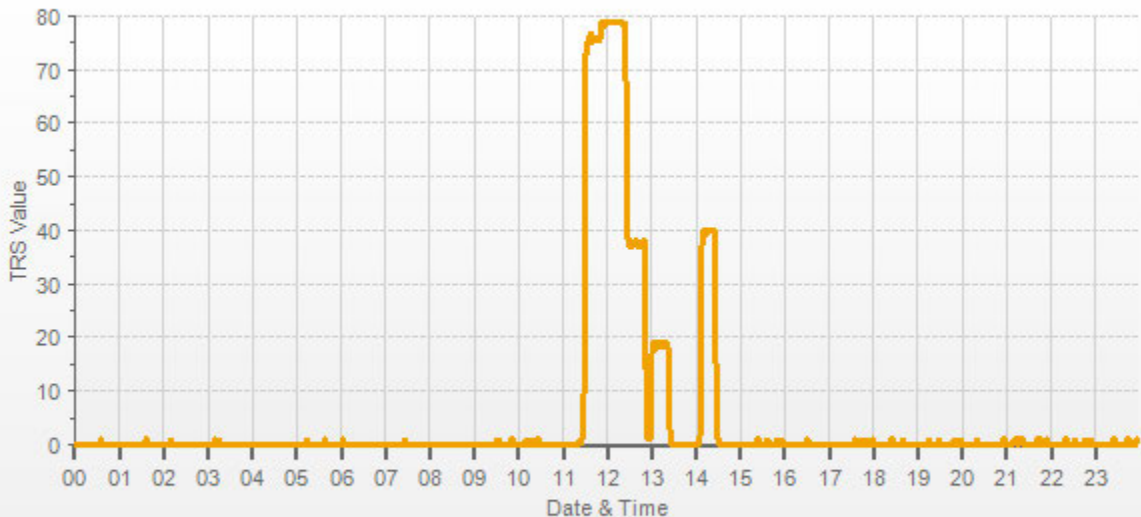
### Thermo 450i Total Reduced Sulphur Analyzer Calibration



	<b>As found:</b>	<b>As left:</b>
Bkg:	14.6	15.0
Coef:	0.924	0.950
Pmt:	-650.5	-650.8
Flash:	741	740
Internal:	33.7	34.0
Chamber:	45.1	45.0
Converter Temp:	825	825
Converter Set:	825	825
Perm Oven Gas:	45.00	45.00
Perm Oven Htr:	44.37	44.37
Pressure:	633.1	635.8
Sample Flow:	0.490	0.491
Lamp Intensity:	91	91
Averaging Time:	120	120
Expected Value:	39.2	39.9

#### Comments:

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



— TRS[ppb]

***TOTAL HYDROCARBON***



## Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	December 12, 2017	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	934	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	Cloudy/Overcast		
Parameter:	Total Hydrocarbon	Calibration Purpose:	routine monthly		
Start/End Time 24 hr. (mst):	9:56 / 13:46	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	December 24, 2022		

Analyzer:	Range ppm:
ID# or Serial Number: 812728560	50
Last Calibration Date: November 9, 2017	As Found C.F.: 1.070
Previous Cal High Point C.F.: 1.000	New C.F.: 1.000

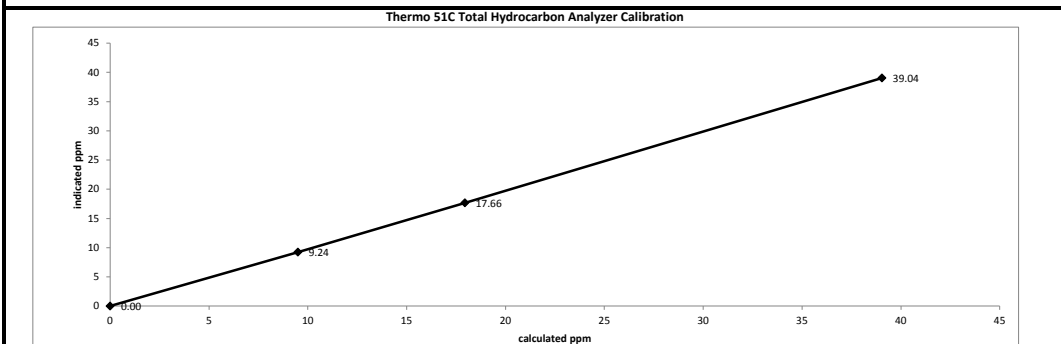
Calibration Standards:	
Low Flow Meter ID/Expiry Date:	Definer Low 129069 expires February 5, 2018
High Flow Meter ID/Expiry Date:	Definer High 128686 expires February 5, 2018
Calibrator ID/Expiry Date:	Sabio id# 11900613 expires March 16, 2018
Cal Gas Cylinder I.D. #:	LL 165367
CH <sub>4</sub> /C <sub>3</sub> H <sub>8</sub> Cylinder Conc. (ppm):	590.0      207.0
CH <sub>4</sub> as propane/total CH <sub>4</sub> 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	2343	0.00	2343	0.0	0.10	n/a
as found high	2262	78.84	2341	39.04	36.60	1.070
adjusted zero	2343	0.00	2343	0.00	0.00	n/a
adjusted high	2262	78.84	2341	39.04	39.04	1.000
mid	2316	36.41	2352	17.95	17.66	1.016
low	2335	19.29	2354	9.50	9.24	1.028
calibrator zero	2343	0.00	2343	0.0	0.00	n/a
Average C.F.=						1.015

Linear Regression/Calibration Results:

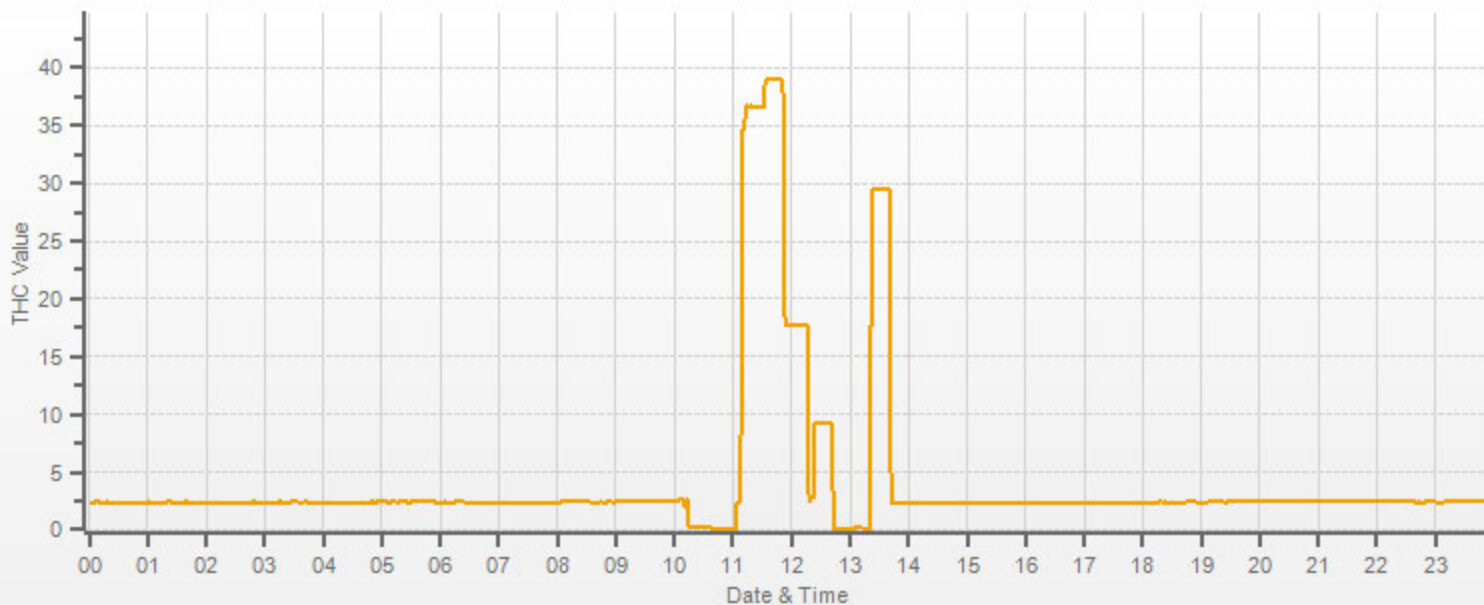
Correlation Coefficient = 1.000	LIMITS > or = 0.995
Slope = 0.998	0.95-1.05
b (Intercept as % of full scale) = 0.33%	± 3% F.S.
% change in C.F. from last cal = -6.96%	± 10%



<p>As found:</p> <p>H2 cylinder (psi): 1100</p> <p>H2 cylinder reg set (psi): 22</p> <p>Span Cylinder (psi): 1200</p> <p>Span Cylinder Reg Set (psi): 22</p> <p>Zero Air Gen Pressure: 41</p> <p>measurement alarms: None</p> <p>service alarms: None</p> <p>cnt: 1393</p> <p>rng: 1</p> <p>try: 0</p> <p>flm: 182.1</p> <p>det: 125.8</p> <p>Flame: 182</p> <p>Filter: 125</p> <p>Base: 125</p> <p>Sample psi: 06.51</p> <p>Internal Air Pressure: 20</p> <p>Internal Fuel Pressure: 13</p> <p>Measured Flow: 598</p> <p>Expected Value: 26.72</p>	<p>As left:</p> <p>H2 cylinder (psi): 1100</p> <p>H2 cylinder reg set (psi): 22</p> <p>Span Cylinder (psi): 1200</p> <p>Span Cylinder Reg Set (psi): 22</p> <p>Zero Air Gen Pressure: 41</p> <p>measurement alarms: None</p> <p>service alarms: None</p> <p>cnt: 1377</p> <p>rng: 1</p> <p>try: 0</p> <p>flm: 181.3</p> <p>det: 125.7</p> <p>Flame: 181</p> <p>Filter: 125</p> <p>Base: 125</p> <p>Sample psi: 06.51</p> <p>Internal Air Pressure: 20</p> <p>Internal Fuel Pressure: 13</p> <p>Measured Flow: n/a</p> <p>Expected Value: 29.40</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.



— THC[ppm]



# Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	December 29, 2017	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	964	millibars
Company/Airshed:	LUCA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	CLS	Weather Conditions:	Mainly sunny		
Parameter:	Total Hydrocarbon	Calibration Purpose:	shut down		
Start/End Time 24 hr. (mst):	10:32 / 13:09	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 24, 2022		

Analyzer:	ID# or Serial Number:	427408718	Range ppm:	50
	Last Calibration Date:	December 12, 2017	As Found C.F.:	0.984
	Previous Cal High Point C.F.:	1.000	New C.F.:	n/a

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

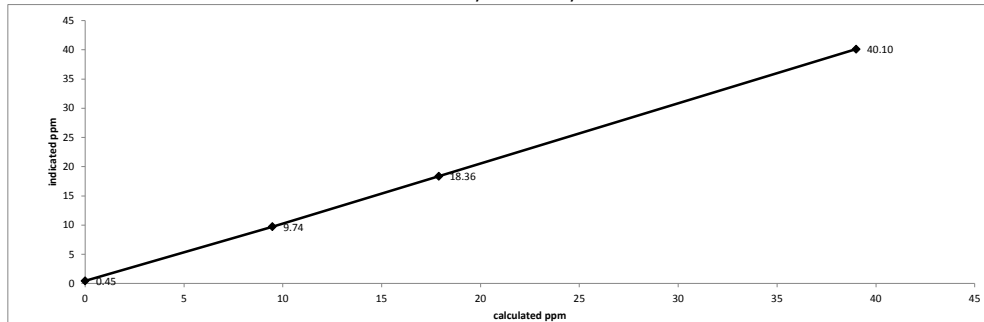
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration: (ppm)	Indicated Concentration: (ppm)	Correction Factors:
	Diluent	Cal Gas	Total			
as found zero	2347	0.00	2347	0.0	0.45	n/a
as found high	2261	78.73	2340	39.00	40.10	0.984
mid	2310	36.21	2346	17.89	18.36	0.999
low	2329	19.19	2348	9.47	9.74	1.020
Average C.F.=						1.001

### Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.981		0.90-1.10
b (Intercept as % of full scale) =	-0.49%		± 3% F.S.
% change in C.F. from last cal =	1.63%		± 10%

Thermo 51C Total Hydrocarbon Analyzer Calibration



<b>As found:</b>		<b>As left:</b>	
H2 cylinder (psi):	500	H2 cylinder (psi):	n/a
H2 cylinder reg set (psi):	22	H2 cylinder reg set (psi):	n/a
Span Cylinder (psi):	800	Span Cylinder (psi):	n/a
Span Cylinder Reg Set (psi):	22	Span Cylinder Reg Set (psi):	n/a
Zero Air Gen Pressure:	41	Zero Air Gen Pressure:	n/a
measurement alarms:	None	measurement alarms:	n/a
service alarms:	None	service alarms:	n/a
cnt:	1386	cnt:	n/a
rng:	1	rng:	n/a
try:	0	try:	n/a
flm:	183.8	flm:	n/a
det:	125.6	det:	n/a
Flame:	183	Flame:	n/a
Filter:	125	Filter:	n/a
Base:	125	Base:	n/a
Sample psi:	06.50	Sample psi:	n/a
Internal Air Pressure:	20	Internal Air Pressure:	n/a
Internal Fuel Pressure:	13	Internal Fuel Pressure:	n/a
Measured Flow:	588	Measured Flow:	n/a
Expected Value:	29.40	Expected Value:	n/a

Comments:

No zero adjustment was required/made.  
 No high point adjustment was required/made.  
 The manifold blower was found to be working normally.

The THC measurements were too low. A shutdown calibration was completed to inspect the Zero Air generator.

### Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	December 29, 2017	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	964	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	Mainly sunny		
Parameter:	Total Hydrocarbon	Calibration Purpose:	post repair		
Start/End Time 24 hr. (mst):	13:36 / 16:51	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 24, 2022		

Analyzer:	
ID# or Serial Number:	427408718
Last Calibration Date:	n/a
Previous Cal High Point C.F.:	n/a
Range ppm:	50
As Found C.F.:	n/a
New C.F.:	1.000

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:	Sablo id# 11900613 expires March 16, 2018
Cal Gas Cylinder I.D. #:	LL 165367
CH <sub>4</sub> /C <sub>3</sub> H <sub>8</sub> Cylinder Conc. (ppm):	590.0      207.0
CH <sub>4</sub> as propane/total CH <sub>4</sub> equivalents (ppm):	569.3      1159.3

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

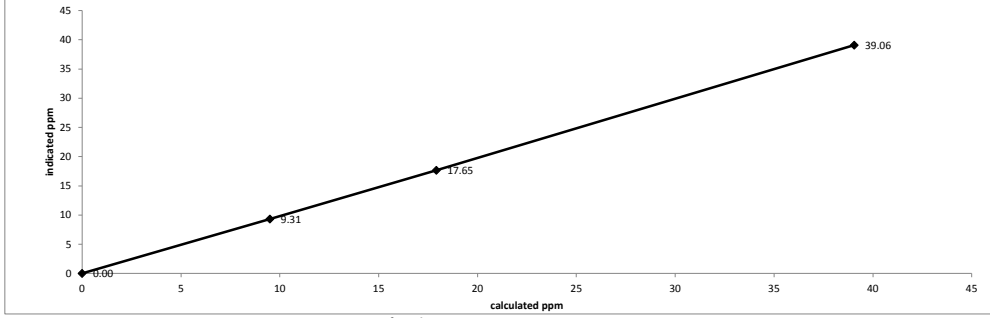
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppm)	Indicated Concentration (ppm)	Correction Factors
	Diluent	Cal Gas	Total			
adjusted zero	2342	0.00	2342	0.0	0.00	n/a
adjusted high	2258	78.73	2337	39.05	39.06	1.000
mid	2308	36.24	2344	17.92	17.65	1.015
low	2326	19.22	2345	9.50	9.31	1.021
calibrator zero	2342	0.00	2342	0.00	0.00	n/a
Average C.F.=						1.012

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.999		0.95-1.05
b (Intercept as % of full scale)=	0.28%		± 3% F.S.
% change in C.F. from last cal=	n/a		n/a

Thermo 51C Total Hydrocarbon Analyzer Calibration

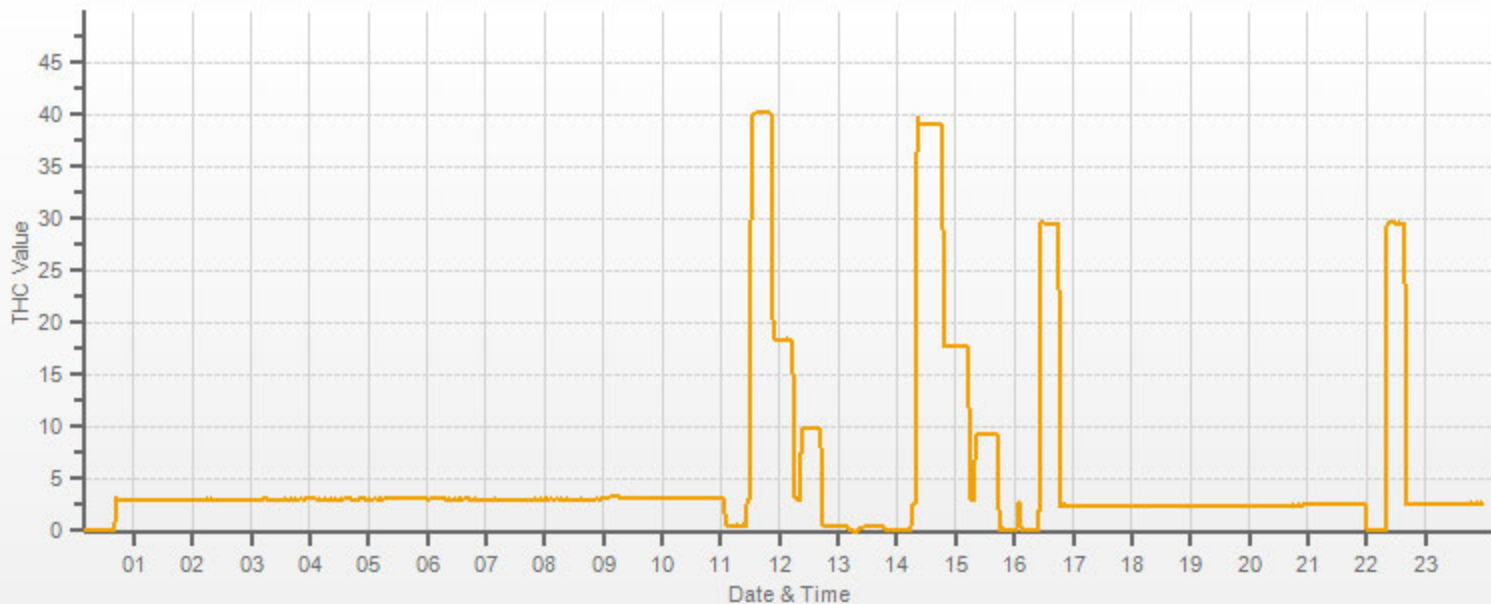


As found:		As left:	
H2 cylinder (psi):	n/a	H2 cylinder (psi):	500
H2 cylinder reg set (psi):	n/a	H2 cylinder reg set (psi):	22
Span Cylinder (psi):	n/a	Span Cylinder (psi):	800
Span Cylinder Reg Set (psi):	n/a	Span Cylinder Reg Set (psi):	22
Zero Air Gen Pressure:	n/a	Zero Air Gen Pressure:	41
measurement alarms:	n/a	measurement alarms:	None
service alarms:	n/a	service alarms:	None
cnt:	n/a	cnt:	1530
rng:	n/a	rng:	1
try:	n/a	try:	4
flm:	n/a	flm:	184.1
det:	n/a	det:	125.2
Flame:	n/a	Flame:	184
Filter:	n/a	Filter:	125
Base:	n/a	Base:	125
Sample psi:	n/a	Sample psi:	06.51
Internal Air Pressure:	n/a	Internal Air Pressure:	20
Internal Fuel Pressure:	n/a	Internal Fuel Pressure:	13
Measured Flow:	n/a	Measured Flow:	587
Expected Value:	n/a	Expected Value:	29.50

Comments:

The manifold blower was found to be working normally.

Zero Air generator was inspected and no failures were found.



— THC[ppm]



***NITROGEN DIOXIDE***



## Thermo 42i NO-NO2-NOx Analyzer Calibration

<b>Date:</b> December 12, 2017 <b>Company/Airshed:</b> LICA <b>Location/Station Name:</b> Cold Lake South <b>Start/End Time 24 hr. (mst):</b> 9:56 / 16:12 <b>G.P.T. to be used for Ozone?</b> No <b>Calibration Method:</b> Gas Dilution & Gas Phase Titration	<b>Barometer/B.P./units:</b> F.S. 05544 expires December 5, 2018    934    millibars <b>Thermometer/Station Temp:</b> F.S. 170286131 expires April 19, 2019    22    °C <b>Weather Conditions:</b> Cloudy/Overcast <b>Calibration Purpose:</b> routine monthly <b>Performed By/Reviewer:</b> Alex Yakupov    Rob Fisher <b>Cal Gas Expiry Date:</b> July 18, 2019
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<b>Analyzer:</b> <b>ID# or Serial Number:</b> 1505664393 <b>Last Calibration Date:</b> November 9, 2017 <b>Range ppb:</b> 500	<b>Correction Factors:</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>NO =</td> <td>1.000</td> <td>1.037</td> <td>0.998</td> </tr> <tr> <td>NO<sub>2</sub> =</td> <td>1.000</td> <td>1.000</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>0.999</td> <td>1.041</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	1.037	0.998	NO <sub>2</sub> =	1.000	1.000	1.000	NOx =	0.999	1.041	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	1.037	0.998														
NO <sub>2</sub> =	1.000	1.000	1.000														
NOx =	0.999	1.041	1.000														

<b>Calibration Standards:</b> <b>Low Flow Meter ID/Expiry Date:</b> Definer Low 129069 expires February 5, 2018 <b>High Flow Meter ID/Expiry Date:</b> Definer High 128686 expires February 5, 2018 <b>Calibrator ID/Expiry Date:</b> API id# 627 expires January 27, 2018 <b>Cal Gas Cylinder I.D. #:</b> LL 104222 <b>Cal Gas Conc. (ppm):</b> 50.7    50.9	<b>Standard Calibration Points for a Range of: 500 ppb</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO<sub>2</sub> (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>380</td> <td>250</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>180</td> <td>145</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>90</td> <td>50</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO <sub>2</sub> (ppb)	Cc Ozone ?	High	380	250	n/a	Mid	180	145	n/a	Low	90	50	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO <sub>2</sub> (ppb)	Cc Ozone ?																						
High	380	250	n/a																						
Mid	180	145	n/a																						
Low	90	50	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	4934	0.0	4934	0	0	0.0	0.0	n/a	n/a
as found high	4899	36.94	4936	379.4	380.9	366.0	366.0	1.037	1.041
adjusted zero	4934	0.00	4934	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4899	36.94	4936	379.4	380.9	380.0	381.0	0.998	1.000
mid	4922	16.91	4939	173.6	174.3	174.0	174.0	0.998	1.002
low	4934	8.97	4943	92.0	92.4	92.0	92.0	1.000	1.004
calibrator zero	4934	0.00	4934	0	0	0.0	0.0	n/a	n/a
<b>Average C.F. =</b>								0.999	1.002

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO <sub>2</sub>	NO drop	NO <sub>2</sub> gain	NO <sub>2</sub> C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4899	36.94	4936	0.0	381.0	381.0	0.0	0.0	0.0	
as found high NO2	4899	36.94	4936	230.0	131.0	381.0	250.0	250.0	250.0	1.000
adjusted high NO2	4899	36.94	4936	230.0	131.0	381.0	250.0	250.0	250.0	1.000
gpt mid	4899	36.94	4936	126.0	245.0	381.0	136.0	136.0	136.0	1.000
gpt low	4899	36.94	4936	43.0	332.0	381.0	49.0	49.0	49.0	1.000
<b>Average NO<sub>2</sub> C.F. =</b>									1.000	

**Linear Regression/Calibration Results:**

	NO	NOx	NO <sub>2</sub>	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.998	1.000	1.000	0.95-1.05
b (Intercept as % of full scale) =	0.00%	-0.04%	0.00%	± 3% F.S.
% change in C.F. from last cal =	-3.67%	-4.18%	0.00%	± 10%
NO <sub>2</sub> converter efficiency			0.99	0.96 to 1.04

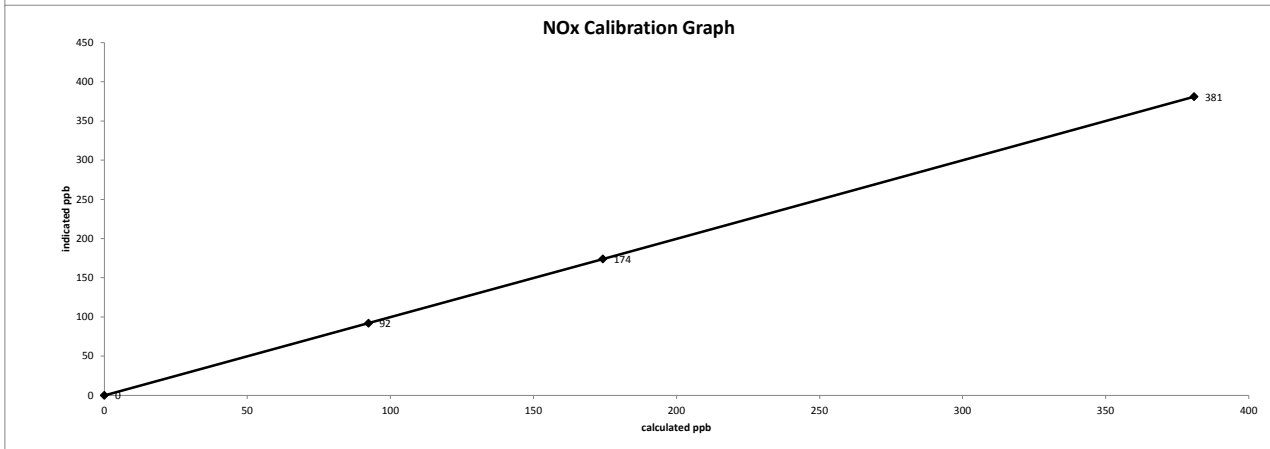
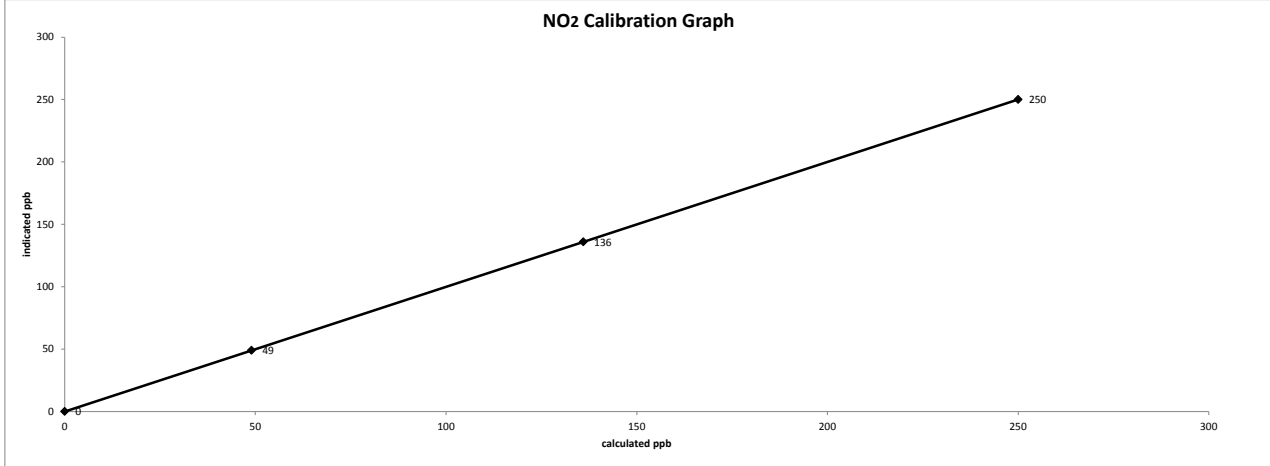
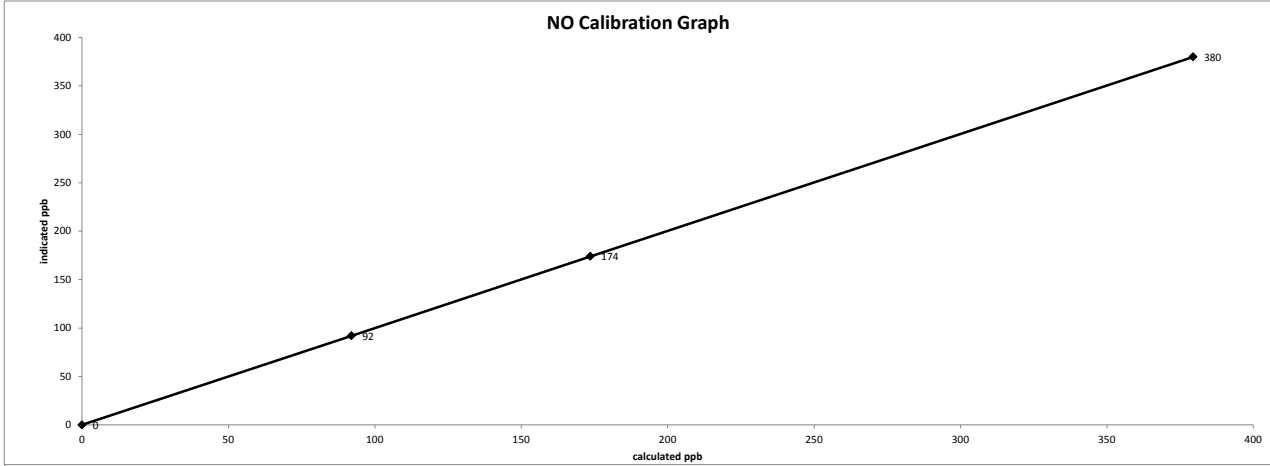
	As found:		As left:
NO Bkg:	3.9	NO Bkg:	4.1
NOx Bkg:	4.1	NOx Bkg:	4.5
NO Coef:	0.999	NO Coef:	1.041
NO <sub>2</sub> Coef:	0.999	NO <sub>2</sub> Coef:	0.990
NOx Coef:	1.000	NOx Coef:	0.998
PMT:	-854.7	PMT:	-854.7
Internal:	28.9	Internal:	29.6
Chamber:	50.5	Chamber:	50.1
Cooler:	-3.1	Cooler:	-3.0
NO <sub>2</sub> Converter:	323.9	NO <sub>2</sub> Converter:	325.8
NO <sub>2</sub> Converter Set:	325.0	NO <sub>2</sub> Converter Set:	325.0
Perm Oven Gas:	35.00	Perm Oven Gas:	35.00
Perm Oven Heater:	34.27	Perm Oven Heater:	34.28
Pressure:	175.4	Pressure:	175.4
Flow:	0.769	Flow:	0.770
Ozonator Flow:	OK	Ozonator Flow:	OK
Expected Value NO:	3	Expected Value NO:	2
Expected Value NO <sub>2</sub> :	263	Expected Value NO <sub>2</sub> :	272
Expected Value NOx:	267	Expected Value NOx:	274

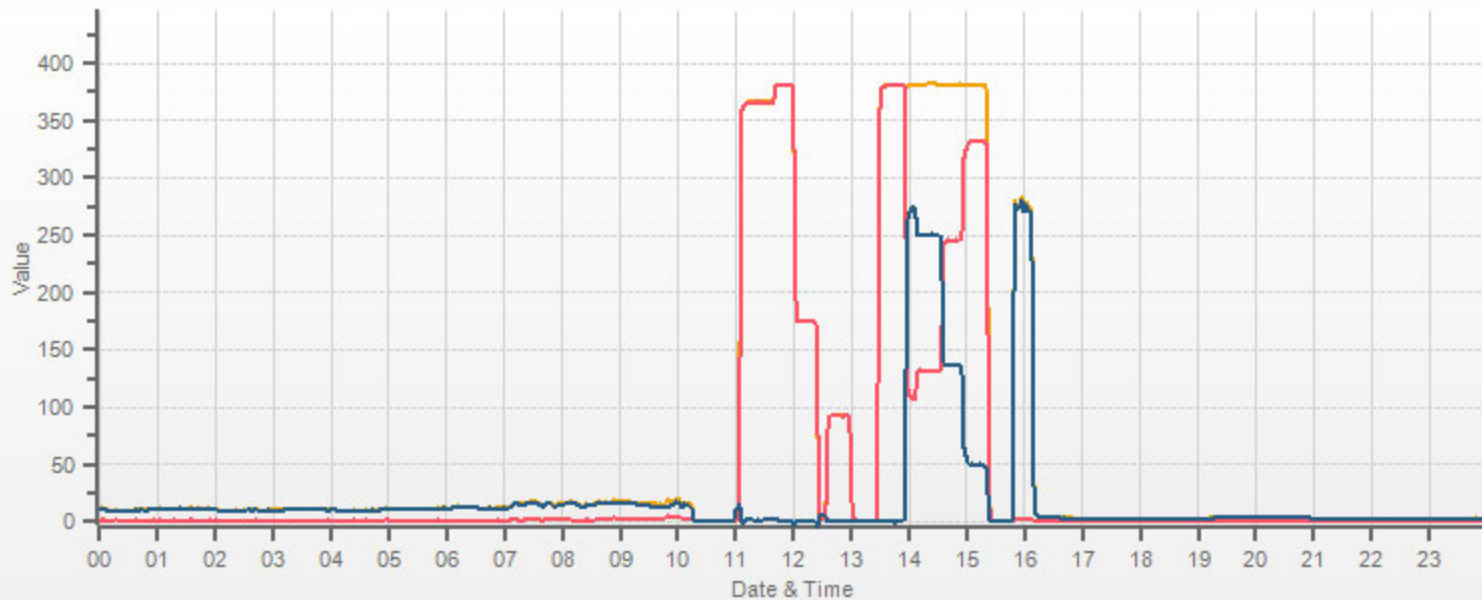
**Comments:**  
 The analyzer sample inlet filter was changed.  
 The manifold blower was found to be working normally.  
 The analyzer cooling fan filter(s) were cleaned.

Date: December 12, 2017  
Company/Airshed: LICA  
Location/Station Name: Cold Lake South

Start/End Time 24 hr. (mst): 9:56 / 16:12  
Calibration Purpose: routine monthly  
Calibration Method: Gas Dilution & Gas Phase Titration

Thermo 42i NO-NO2-NOx Analyzer Calibration





— NOX[ppb] — NO[ppb] — NO2[ppb]

## ***OZONE***



## Thermo 49i Ozone Analyzer Calibration

<b>Date:</b> December 13, 2017 <b>Company/Airshed:</b> LICA <b>Location/Station Name:</b> Cold Lake South <b>Start/End Time 24 hr. (mst):</b> 10:15 / 14:54 <b>Ozone Calibration Method:</b> Varying UV Lamp Power <b>G.P.T. Date:</b> n/a-done by Varying UV Lamp Power	<b>Barometer/B.P./units:</b> F.S. 05544 expires December 5, 2018    944    millibars <b>Thermometer/Station Temp:</b> F.S. 170286131 expires April 19, 2019    22    °C <b>Weather Conditions:</b> Mainly sunny <b>Calibration Purpose:</b> routine monthly <b>Performed By/Reviewer:</b> Alex Yakupov    Rob Fisher <b>Cal Gas Expiry Date:</b> n/a-done by Varying UV Lamp Power
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<b>Analyzer:</b> <b>ID# or Serial Number:</b> 700419951 <b>Last Calibration Date:</b> November 9, 2017 <b>Previous Cal High Point C.F.:</b> 1.000	<b>Ozone Range ppb:</b> 500 <b>As Found C.F.:</b> 0.995 <b>New C.F.:</b> 1.000
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<b>Calibration Standards:</b>									
<b>Low Flow Meter ID/Expiry Date:</b> Definer Low 129069 expires February 5, 2018 <b>High Flow Meter ID/Expiry Date:</b> Definer High 128686 expires February 5, 2018 <b>Calibrator ID/Expiry Date:</b> Sabio id# 11900613 expires March 16, 2018 <b>Cal Gas Cylinder I.D. # :</b> n/a	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Point</th> <th>AMD Required Range of Ozone Calibration Points</th> </tr> <tr> <td>High</td> <td>300-400 ppb</td> </tr> <tr> <td>Mid</td> <td>150-200 ppb</td> </tr> <tr> <td>Low</td> <td>50-75 ppb</td> </tr> </table>	Point	AMD Required Range of Ozone Calibration Points	High	300-400 ppb	Mid	150-200 ppb	Low	50-75 ppb
Point	AMD Required Range of Ozone Calibration Points								
High	300-400 ppb								
Mid	150-200 ppb								
Low	50-75 ppb								

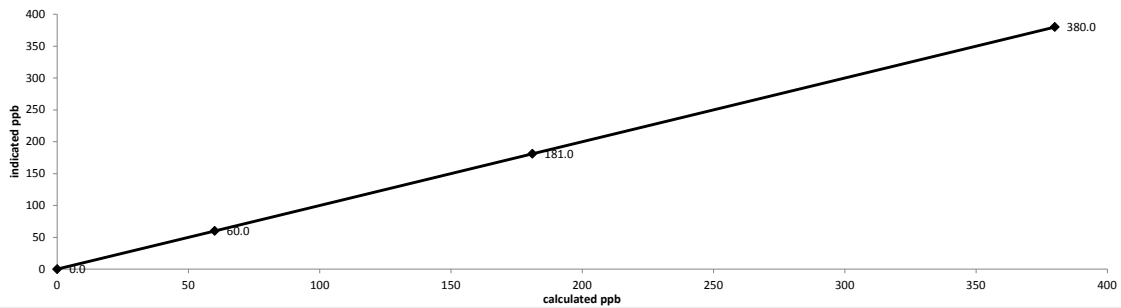
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5000	5000	0.0	n/a	0.0	n/a
as found high	5000	5000	380.0	380.0	382.0	0.995
adjusted zero	5000	5000	0.0	0.0	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	181.0	181.0	181.0	1.000
low	5000	5000	60.0	60.0	60.0	1.000
calibrator zero	5000	5000	0.0	n/a	0.0	n/a
<b>Average C.F. =</b>						1.000

**Linear Regression/Calibration Results:**

<b>Correlation Coefficient =</b> 1.000	<b>LIMITS</b>
<b>Slope =</b> 1.000	> or = 0.995
<b>b (Intercept as % of full scale) =</b> 0.00%	0.95-1.05
<b>% change in C.F. from last cal =</b> 0.52%	± 3% F.S.
	± 10%

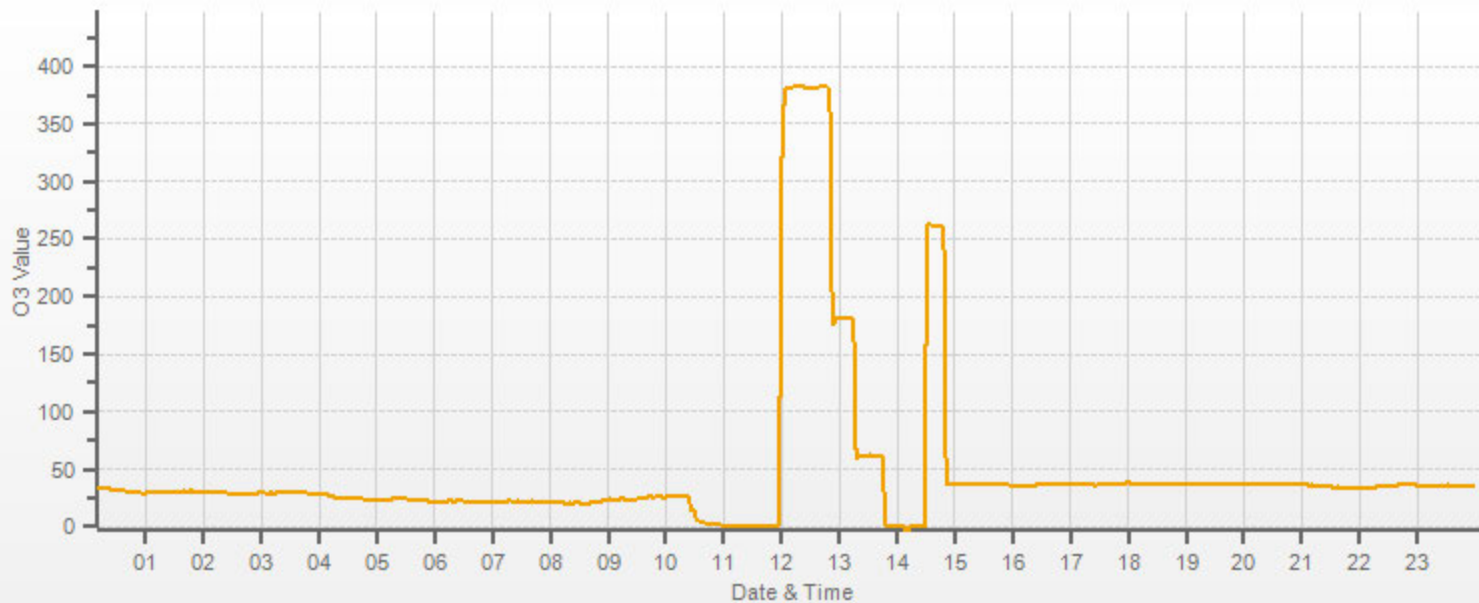
**Thermo 49i Ozone Analyzer Calibration**



<b>As found:</b> O3 Bkg: 1.1 O3 Coef: 1.004 Photo Lamp: 9.6 O3 Lamp: 9.0 Bench: 30.3 Bench Lamp: 53.5 O3 Lamp: 67.4 Pressure: 708.6 Cell A lpm: 0.718 Cell B lpm: 0.759 O3 ppb: 0.8 Cell A ppb: 1.6 Cell B ppb: -0.1 Cell A int: 84692 Cell B int: 85469.0 Expected Value: 264.2	<b>As left:</b> O3 Bkg: 0.1 O3 Coef: 0.999 Photo Lamp: 9.6 O3 Lamp: 9.0 Bench: 30.7 Bench Lamp: 53.5 O3 Lamp: 67.4 Pressure: 709.8 Cell A lpm: 0.719 Cell B lpm: 0.760 O3 ppb: 0.1 Cell A ppb: -2.5 Cell B ppb: 2.7 Cell A int: 84660 Cell B int: 85490.0 Expected Value: 261.2
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**Comments:**

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



— O3[ppb]

***PARTICULATE MATTER***



## SHARP 5030 Monitor Monthly Audit

<b>Date:</b>	December 13, 2017	<b>Performed By/Reviewer:</b>	Alex Yakupov   Tom Bourque
<b>Company:</b>	LICA	<b>Start Time (mst):</b>	11:56
<b>Station Name/Location:</b>	Cold Lake South	<b>End Time (mst):</b>	12:21
<b>Previous Audit Date:</b>	November 20, 2017	<b>Calibration Purpose:</b>	routine monthly
<b>Parameter:</b>	PM 2.5	<b>Weather Conditions:</b>	Mainly sunny

<b>SHARP Information and Status:</b>			
<b>Serial Number:</b>	CM-2209	<b>Status:</b>	0.00
<b>Approx. % Tape remaining:</b>	4/5	<b>Error Code:</b>	0.00

<b>Reference Standards/I.D./Expiry Date:</b>	
<b>High Flow:</b>	Airmetrics/Chinook High Maxxam ID #2 expires March 24, 2018
<b>Digital Manometer:</b>	Dwyer 475 Mark III id# 3 expires January 3, 2018
<b>Temperature:</b>	F.S. 170286131 expires April 19, 2019
<b>Pressure:</b>	F.S. 05544 expires December 5, 2018
<b>RH:</b>	F.S. 170286131 expires April 19, 2019

<b>As found temperature and pressure:</b>			
<b>Tolerance °C +/-</b>	5	<b>Tolerance mmHg +/-</b>	10
<b>SHARP T1 (°C):</b>	5.0	<b>SHARP P3 (mmHg):</b>	710.00
<b>Reference (°C):</b>	5.3	<b>Reference (mmHg):</b>	708.00
<b>Difference (°C):</b>	0.3	<b>Difference (mmHg):</b>	-2.0

<b>As left temperature and pressure (same as above if as found adequate):</b>			
<b>Tolerance °C +/-</b>	5	<b>Tolerance mmHg +/-</b>	10
<b>SHARP T1 (°C):</b>	5.0	<b>SHARP P3 (mmHg):</b>	710.00
<b>Reference (°C):</b>	5.3	<b>Reference (mmHg):</b>	708.00
<b>Difference (°C):</b>	0.3	<b>Difference (mmHg):</b>	-2.0

<b>As found flows:</b>			
<b>SHARP Airflow l/hr</b>	1000.00	<b>Tolerance lpm +/-</b>	5%
<b>Pump Voltage (%)</b>	47.80	<b>SHARP Airflow (lpm)</b>	16.67
		<b>Reference Airflow (lpm)</b>	16.24
		<b>Difference (%)</b>	-2.63%

<b>As left flows (same as above if as found adequate):</b>			
<b>Targets: 1000 l/hr / &lt;90%</b>			
<b>SHARP Airflow l/hr</b>	1000.00	<b>Tolerance lpm +/-</b>	5%
<b>Pump Voltage (%)</b>	47.30	<b>SHARP Airflow (lpm)</b>	16.67
		<b>Reference Airflow (lpm)</b>	16.50
		<b>Difference (l/min)</b>	-1.01%

<b>As found relative humidity:</b>		<b>As left relative humidity (same as "as found" if adequate):</b>	
<b>Tolerance % +/-</b>	3	<b>Tolerance % +/-</b>	3
<b>Sharp RH (%):</b>	n/a	<b>Sharp RH (%):</b>	n/a
<b>Reference RH (%):</b>	n/a	<b>Reference RH (%):</b>	n/a
<b>Difference:</b>	n/a	<b>Difference:</b>	n/a

<b>Inlet Assembly:</b>		
<b>Inlet Head/Sharp Cut</b>	<b>Yes/No?</b>	<b>If no, give reason:</b>
<b>Cleaned:</b>	yes	

**Comments:**

RH calibration is to be completed during quarterly audit because the RH sensor is located within the monitor and requires disconnecting/equilibrating.

## ***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** Maxxam/SIA **Operator:** Chris

<b>Calibrator:</b>		<b>Flow Measurement Device:</b>	
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>		

<b>Dilution Flow (sccm)</b>		
Pt. #1	<u>4892</u>	Pt. #3 <u>4951</u>
Pt. #2	<u>4975</u>	
<b>Gas Flow (sccm)</b>		
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 <sub>2</sub>	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)*

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

Flow	O <sub>3</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOX	% Diff. Vs Audit gas	
4972	0	0.0000	0.7867	0.0014	0.7881	NO <sub>2</sub>	% 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)*

<b>NO<sub>2</sub></b>	<b>LIMITS</b>
Correlation= 1.0000	≥ 0.995
m (Slope)= 0.9924	<b>0.90-1.10</b>
b (Intercept % of FS)= 0.1755	± 3% F.S.

<b>AENV Standards</b>	<b>NO<sub>x</sub> Analyzer</b>
<b>Audit Calibrator</b>	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>	
<b>Calibrator:</b>		<b>Flow Measurement Device:</b>	
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 NOx [PPM]</u>		<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 <sub>2</sub>	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)*

<b>NO</b>		<b>LIMITS</b>		<b>NOx</b>	
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000
m (Slope)=	1.0301	<b>0.90-1.10</b>		m (Slope)=	1.0291
b (Intercept % of FS)=	-0.0919	± 3% F.S.		b (Intercept % of FS)=	-0.0881

Flow	O <sub>2</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOX	% Diff. Vs Audit gas	
4954	0.000	0.0000	0.7949	0.0005	0.7954	NO <sub>2</sub>	% 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)*

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

<b>AENV Standards</b>	<b>NO<sub>x</sub> Analyzer</b>
<b>Audit Calibrator</b>	
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

## 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&amp;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	
		CH4	C3H8			CH4	C3H8
2600	0.0	0.00	0.00	<del>0.02005</del>	<del>49.883</del>	<del>602</del>	<del>206</del>
2569	51.5	12.06	11.37	0.02005	49.883	602	206
3549	22.3	3.77	3.57	0.00628	159.148	600	207
3523	10.4	1.77	1.70	0.00295	338.750	600	209
Average Cylinder Concentration:						<b>600</b>	<b>207</b>

<b><u>CH4</u></b>	<b><u>C3H8</u></b>
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. 2016-336CGA

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

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

Expiry Date: July 2019

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Teco 146i</u>			Make/Model	<u>Bios DC2</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>AMU 1659</u>
Last Verification Date	<u>October 19, 2019</u>			Temp. °C	<u>24.5 C</u>
Gas Type	<u>NO</u>	Conc.	<u>48.79</u>	B.P.	<u>706 mmhg</u>
Cylinder Number	<u>CAL018188</u>				
Expiry Date	<u>March 2019</u>				

**Reference Analyzer:**

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

Instrument Settings    Zero: 4.4      Span: 1.080      Range: 1.0

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

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

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

**Cylinder gas tolerances based on NO only**

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

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

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

Auditor: Al Clark      Date: October 19, 2016

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

***APPENDIX III  
REPORT CERTIFICATION FORM***

### Report Certification Form

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

January 26, 2017

Report Issued Date (dd-mm-yyyy)

***APPENDIX IV***  
***DATA VALIDATION CERTIFICATION FORM***



### Validation Certificate Form

<b>Client:</b> <u>Lakeland Industry &amp; Community Association</u>	<b>Project #:</b> <u>2833-2017-12-1-C</u>
<b>Site:</b> <u>Cold Lake South Continuous Monitoring Station</u>	<b>Contact:</b> <u>Mike Bisaga</u>

<b>Level 0 Preliminary Verification</b>	<u>Maram Ghaleb</u>	<b>Date</b> <u>January 22, 2017</u>
<b>Level 1 Primary Validation</b>	<u>Maram Ghaleb</u>	<b>Date</b> <u>January 22, 2017</u>
<b>Level 2 Final Validation</b>	<u>Maram Ghaleb</u>	<b>Date</b> <u>January 26, 2017</u>
<b>Level 3 Independent Data Review</b>	<u>CSA Smith</u>	<b>Date</b> <u>January 26, 2017</u>
<b>Post-Final Validation</b>	<u>NA</u>	<b>Date</b> <u>NA</u>

<b>Notes</b>
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](mailto: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 December 2017.

The air monitoring program consists of continuous air monitoring results for Sulphur Dioxide (SO<sub>2</sub>), Hydrogen Sulphide (H<sub>2</sub>S), Total Hydrocarbon (THC), Oxides of Nitrogen (NO<sub>x</sub>), Nitric Oxides (NO), Nitrogen Dioxide (NO<sub>2</sub>), 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 December 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.

NO<sub>x</sub>/NO/NO<sub>2</sub>: The NO<sub>x</sub> gas concentration 50.7 ppm labelled as “Calculated NO<sub>x</sub>” on the calibration record is not the actual concentration on the certificate of analysis, which is 50.9 ppm. A sample of affected calculations has been rerun and the error has no significant effect on the calibration. The NO<sub>x</sub> calibration still meets the AMD calibration criteria.

Wind System: On December 28, the Met One wind system (S/N: H10703) was removed and replaced with an RM Young unit (S/N: 92411) to address an issue of anomalously high readings recorded on the maximum instantaneous channel.

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.



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

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](mailto:mbisaga@otonabee.ca)

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

Lily Lin  
Data & Reporting Specialist  
587-225-2248  
[rebbaca@gmail.com](mailto:rebbaca@gmail.com)



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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 #: 2833-2017-12-30-C**

**December 2017**

Prepared for:

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

**Attention: MIKE BISAGA**

DATE: **January 25, 2018**

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 December, 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.

**H<sub>2</sub>S:** A repeat zero-span check was performed on December 14 at 07:00-08:00, as the analyzer spanned towards the lower acceptance limit on December 13. Two hours of downtime were recorded as a result.

**NO<sub>x</sub>/NO/NO<sub>2</sub>:** Three hours of downtime were recorded this month:

- A repeat zero-span check was performed on December 14 at 07:00-08:00, as the analyzer spanned towards the lower acceptance limit on December 13. Two hours of downtime were recorded as a result.
- A repeat zero-span check was performed on December 19 at 06:00, as the analyzer spanned towards the upper acceptance limit on December 18. One hour of downtime was recorded as a result.
- The NO<sub>x</sub> gas concentration 50.7 ppm labelled as "Calculated NO<sub>x</sub>" on the calibration record is not the actual concentration on the certificate of analysis, which is 50.9 ppm. A sample of affected calculations has been rerun and the error has no significant effect on the calibration. The NO<sub>x</sub> calibration still meets the AMD calibration criteria.

**Wind System:** On December 28, the Met One wind system (S/N: H10703) was removed and replaced with an RM Young unit (S/N: 92411), to address an issue of anomalously high readings recorded on the maximum instantaneous channel. The impacted instances of maximum instantaneous data, from December 19 at hour 20:00 to December 28 at hour 13:00, were invalidated.

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 <sub>2</sub> (ppb)	172	48	0	0	1	13	12	15	9.5	NW	4	12	100.0
H <sub>2</sub> S (ppb)	10	3	0	0	0	3	30	6	1.0	WSW	1	12	99.7
THC (ppm)	-	-	-	-	2.42	3.57	2	5	5.9	SSW	2.80	31	100.0
NO <sub>2</sub> (ppb)	159	-	0	-	6	32	7	23	4.6	WNW	15	12	99.6
NO (ppb)	-	-	-	-	1	13	20	20	4.4	SW	2	12	99.6
NO <sub>x</sub> (ppb)	-	-	-	-	6	36	7	23	4.6	WNW	17	12	99.6
RELATIVE HUMIDITY (%)	-	-	-	-	70	91	15	7	4.7	WSW	82	14	100.0
BAROMETRIC PRESSURE (millibar)	-	-	-	-	944	965	31	4	0.2	W	963	31	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	-10.7	9.2	9	14	7.6	W	3.5	9	100.0
PRECIPITATION (mm)	-	-	-	-	0.0	1.1	5	19	10.0	NNE	0.2	5	100.0
VECTOR WS (kph)	-	-	-	-	3.6	16.7	10	13	-	WNW	8.1	18	100.0
VECTOR WD (sec)	-	-	-	-	275 (W)	-	-	-	-	-	-	-	100.0

---

## Exceedance Summary Report

---

### SO<sub>2</sub> 1-Hour Exceedances

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

### SO<sub>2</sub> 24-Hour Exceedances

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

### H<sub>2</sub>S 1-Hour Exceedances

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

### H<sub>2</sub>S 24-Hour Exceedances

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

### NO<sub>2</sub> 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 (SO<sub>2</sub>), Hydrogen Sulphide (H<sub>2</sub>S), Total Hydrocarbon (THC), Oxides of Nitrogen (NO<sub>x</sub>), Nitric Oxides (NO), Nitrogen Dioxide (NO<sub>2</sub>), 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 (SO<sub>2</sub>)**

- Operational time for the monitoring period was 100%.
- The routine monthly calibration was performed on December 14.

### **HYDROGEN SULPHIDE (H<sub>2</sub>S)**

- Operational time for the monitoring period was 99.7% equivalent to two hours of downtime.
- The routine monthly calibration was performed on December 14 during which the perm tube was changed. The new expected value was set on December 17 after perm tube had stabilized.
- A repeat zero-span check was performed on December 14 at 07:00-08:00, as the analyzer spanned towards the lower acceptance limit on December 13. The results were closer to the mean, no further action was required. Two hours of downtime were recorded due to the additional zero-span check.

### **TOTAL HYDROCARBONS (THC)**

- Operational time for the monitoring period was 100%.
- The routine monthly calibration was performed on December 14.

### **OXIDES OF NITROGEN (NO<sub>x</sub>), NITRIC OXIDE (NO) and NITROGEN DIOXIDE (NO<sub>2</sub>)**

- Operational time for the monitoring period was 99.6% equivalent to three hours of downtime.
- The routine monthly calibration was performed on December 14.
- A repeat zero-span check was performed on December 14 at 07:00-08:00, as the analyzer spanned towards the lower acceptance limit on December 13. The results were closer to the mean, no further action was required. Two hours of downtime were recorded due to the additional zero-span check.
- A repeat zero-span check was performed on December 19 at 06:00, as the analyzer spanned towards the upper acceptance limit on December 18. 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.
- The NO<sub>x</sub> gas concentration 50.7 ppm labelled as Calculated NO<sub>x</sub> on the calibration record is not the actual concentration on the certificate of analysis, which is 50.9 ppm. A sample of affected calculations has been rerun and the error has no significant effect on the calibration. The NO<sub>x</sub> calibration still meets the AMD calibration criteria.

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

- Operational time for the monitoring period was 100%.
- Between December 19 and December 28, anomalously high maximum instantaneous readings were recorded. This might have been caused by an observed intermittent bird activity at the station. However, as a precaution, the Met One unit (S/N: H10703) was removed on December 28 (14:00-18:00) and replaced with an RM Young (S/N: 92411) unit. The RM Young unit was calibrated on site. The issue appeared to be resolved after the replacement.
- A detailed minute data review was performed. When the wind speed variance from one minute to the next consecutive minute was greater than 5 kph, that minute and the corresponding wind direction minute data was discarded. The hourly averages were then re-calculated. As the instantaneous channel does not collect minute data, maximum instantaneous data were invalidated from December 19 at hour 20:00 to December 28 at hour 13:00 due to this issue.
- 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-00208: RM Young Wind Monitor Calibration
- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO<sub>2</sub>/NO<sub>x</sub> Monitoring
- Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring
- Maxxam AIR SOP-00242: Precipitation Collector Installation/Maintenance

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

- Sulphur Dioxide - API 100E UV Fluorescent Analyzer
- Hydrogen Sulphide - API 101E UV Fluorescent Analyzer
- Total Hydrocarbons - Thermo 51C FID Analyzer
- Oxides of Nitrogen - API 200A Chemiluminescent Analyzer
- Wind System - Met One Unit & RM Young 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**

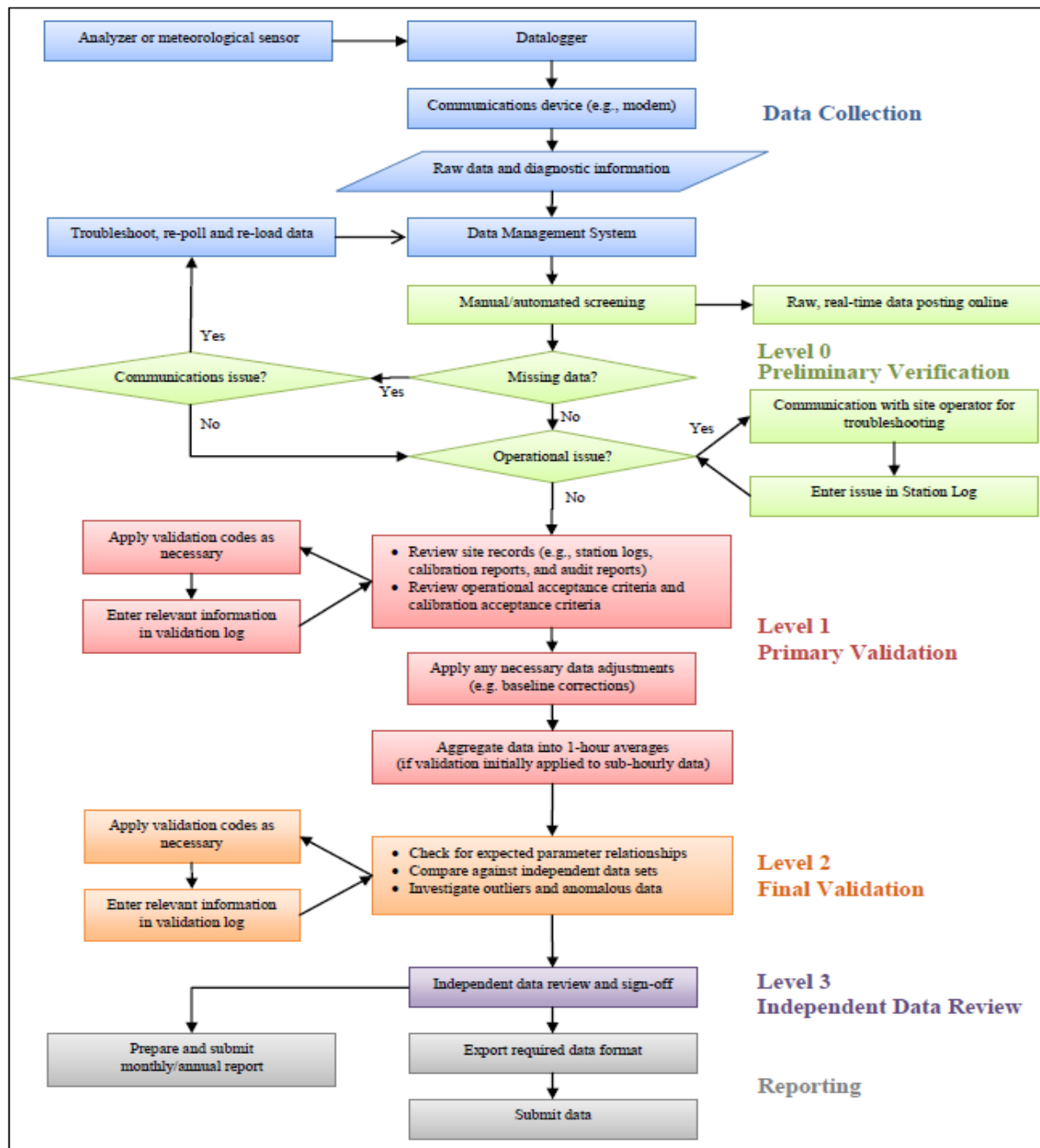
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

**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

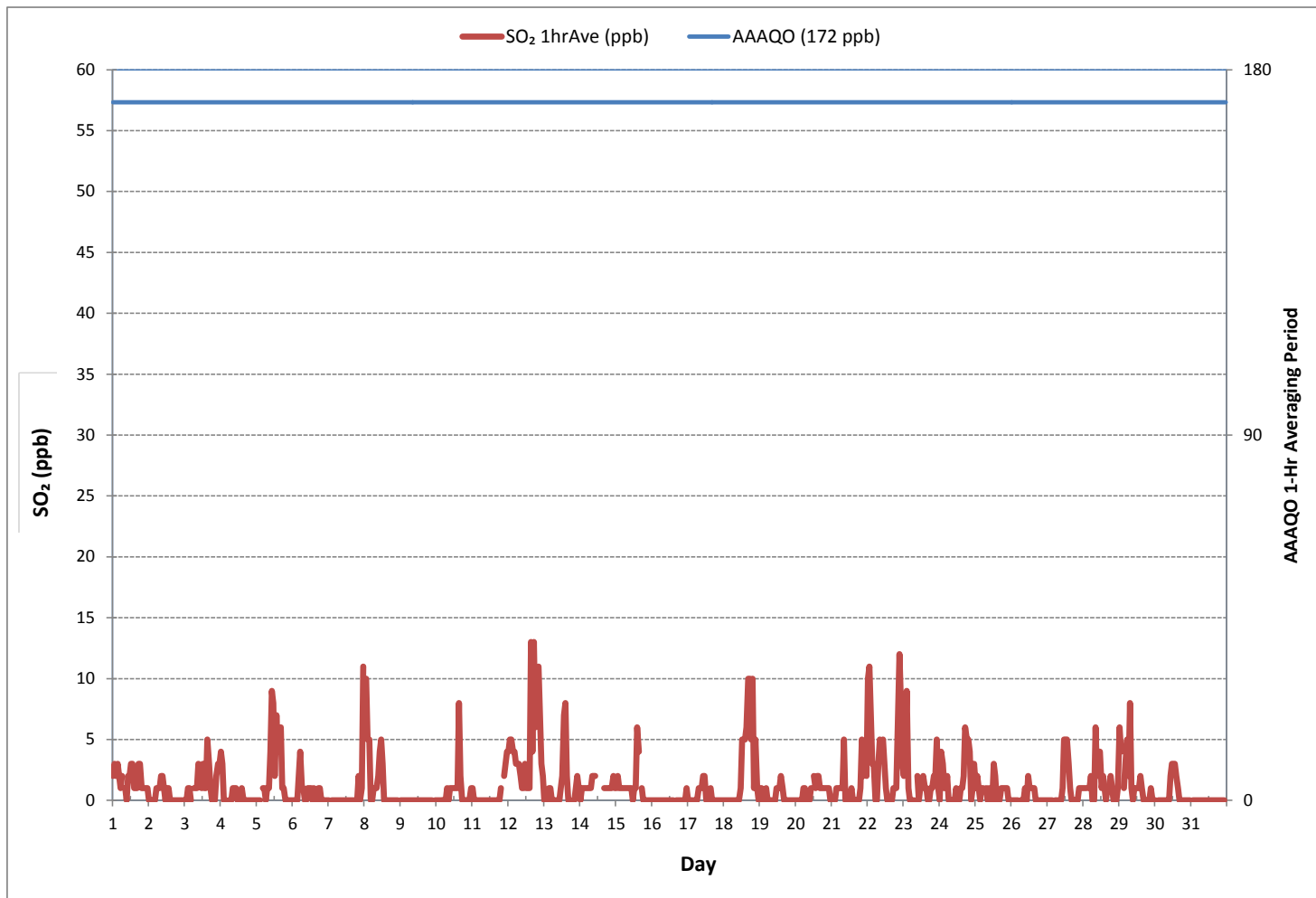
***APPENDIX I***  
***CONTINUOUS MONITORING DATA RESULTS***



***SULPHUR DIOXIDE***



SULPHUR DIOXIDE Hourly Averages (SO<sub>2</sub> ppb)





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

SULPHUR DIOXIDE Instantaneous Maximum (SO<sub>2</sub> ppb)

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

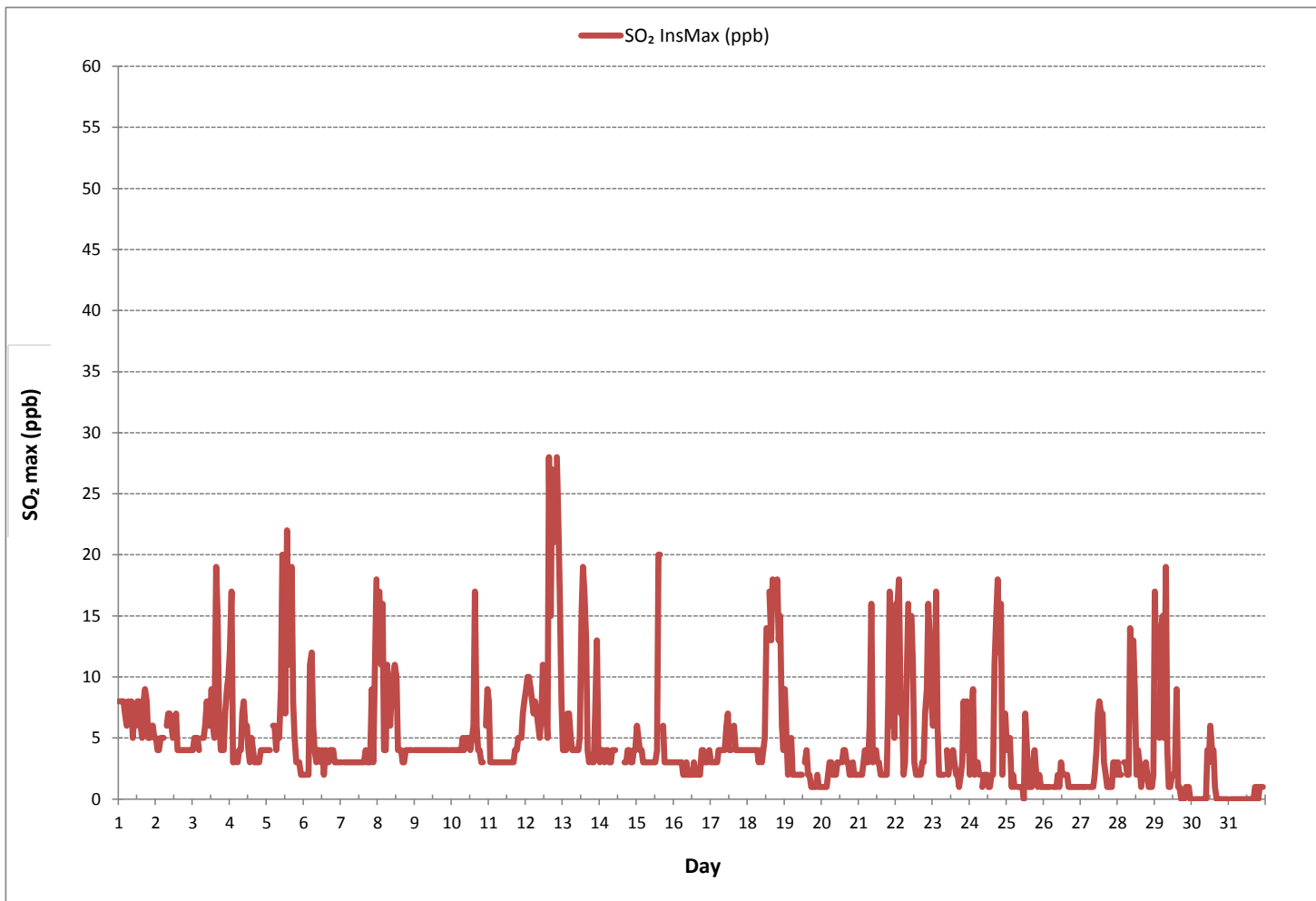
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	668
MAXIMUM INSTANTANEOUS VALUE:	28 ppb @ HOUR 15 ON DAY 12
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	4
OPERATIONAL TIME:	744 hrs

SULPHUR DIOXIDE Instantaneous Maximum (SO<sub>2</sub> ppb)



Wind: LICA MASKWA  
 Poll.: LICA MASKWA-SO2[ppb]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

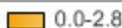
Calm: 9.83%

Calm Avg: 0.36 [ppb]

Direction	0.0-2.8	2.8-5.6	5.6-8.4	8.4-11.2	11.2-14.0	>14.0	Total
<b>N</b>	9.0	0.0	0.0	0.0	0.0	0.0	9.0
<b>NE</b>	1.1	0.0	0.0	0.0	0.0	0.0	1.1
<b>E</b>	0.1	0.0	0.0	0.0	0.0	0.0	0.1
<b>SE</b>	0.1	0.1	0.0	0.0	0.0	0.0	0.3
<b>S</b>	3.4	0.0	0.0	0.0	0.0	0.0	3.4
<b>SW</b>	27.4	1.9	0.0	0.0	0.0	0.0	29.2
<b>W</b>	28.4	2.6	0.0	0.1	0.1	0.0	31.2
<b>NW</b>	8.0	4.1	2.1	1.1	0.4	0.0	15.8
<b>Summary</b>	77.5	8.7	2.1	1.3	0.6	0.0	90.2

% Icon Classes (ppb)

77



9



2



1



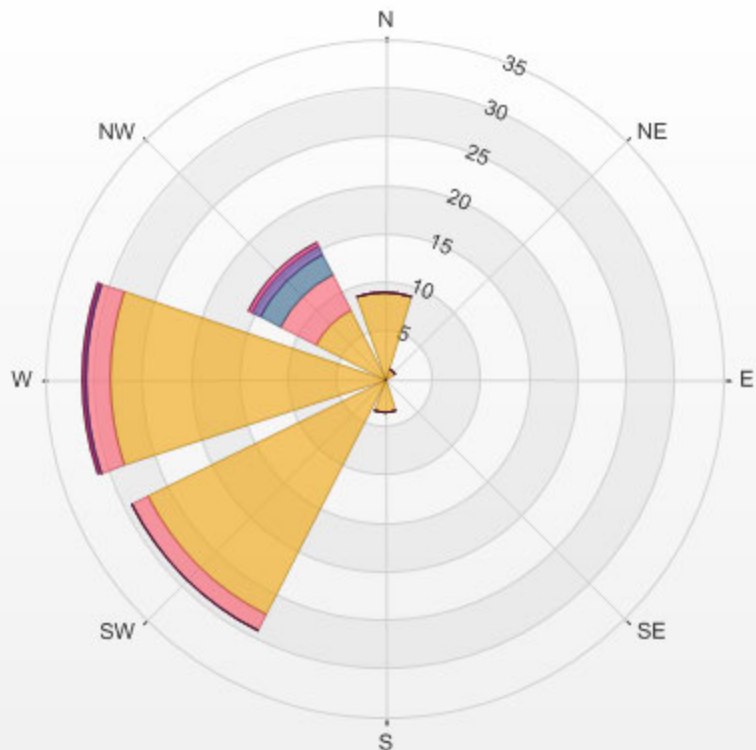
1



0



LICA MASKWA Poll.: LICA MASKWA-SO2[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 9.83% Calm Poll Avg: 0.36[ppb]



SO2[ppb] Calibration: LICA MASKWA Monthly: 17/12 Type: Span



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



***HYDROGEN SULPHIDE***



HYDROGEN SULPHIDE Hourly Averages (H<sub>2</sub>S 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	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
2	0	0	0	0	1	1	S	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
3	0	0	0	0	1	S	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	24
4	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
5	0	0	0	S	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
6	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	24
7	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	24
8	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	0	1	0	24
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	24
10	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
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	24
12	0	0	0	1	0	0	0	1	1	1	0	1	1	0	1	1	0	1	0	S	1	1	0	1	0	0	1	1	24
13	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	S	0	0	0	0	0	0	0	1	0	24
14	0	0	0	0	0	0	0	S1	S1	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	22
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	S	1	1	0	1	0	1	0	0	0	2	0	24
16	0	0	0	1	0	0	1	1	1	1	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	1	0	24
17	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
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	1	0	1	0	0	0	0	0	1	0	24
19	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
20	0	0	0	1	1	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
21	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
22	1	0	1	0	0	0	0	1	0	S	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	24
23	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	24
24	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	1	0	24
25	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	0	1	1	24
26	1	0	1	0	1	0	S	0	1	1	0	1	1	0	1	0	1	1	1	1	0	0	1	1	1	0	1	1	24
27	1	1	1	0	S	2	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	24
28	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	24
29	0	0	S	1	0	1	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	24
30	1	S	1	1	0	1	3	1	1	1	2	3	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	1	24
31	S	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	1	0	24	
HOURLY MAX	1	1	1	1	1	2	3	1	1	1	2	3	1	1	2	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
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

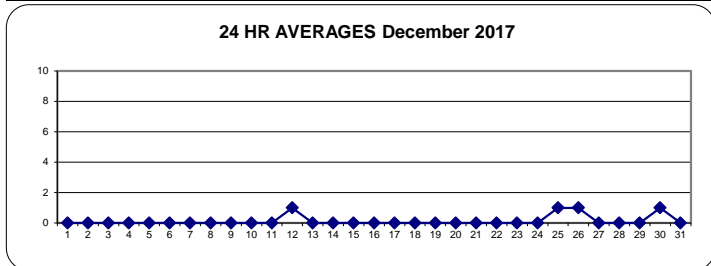
OBJECTIVE LIMIT:

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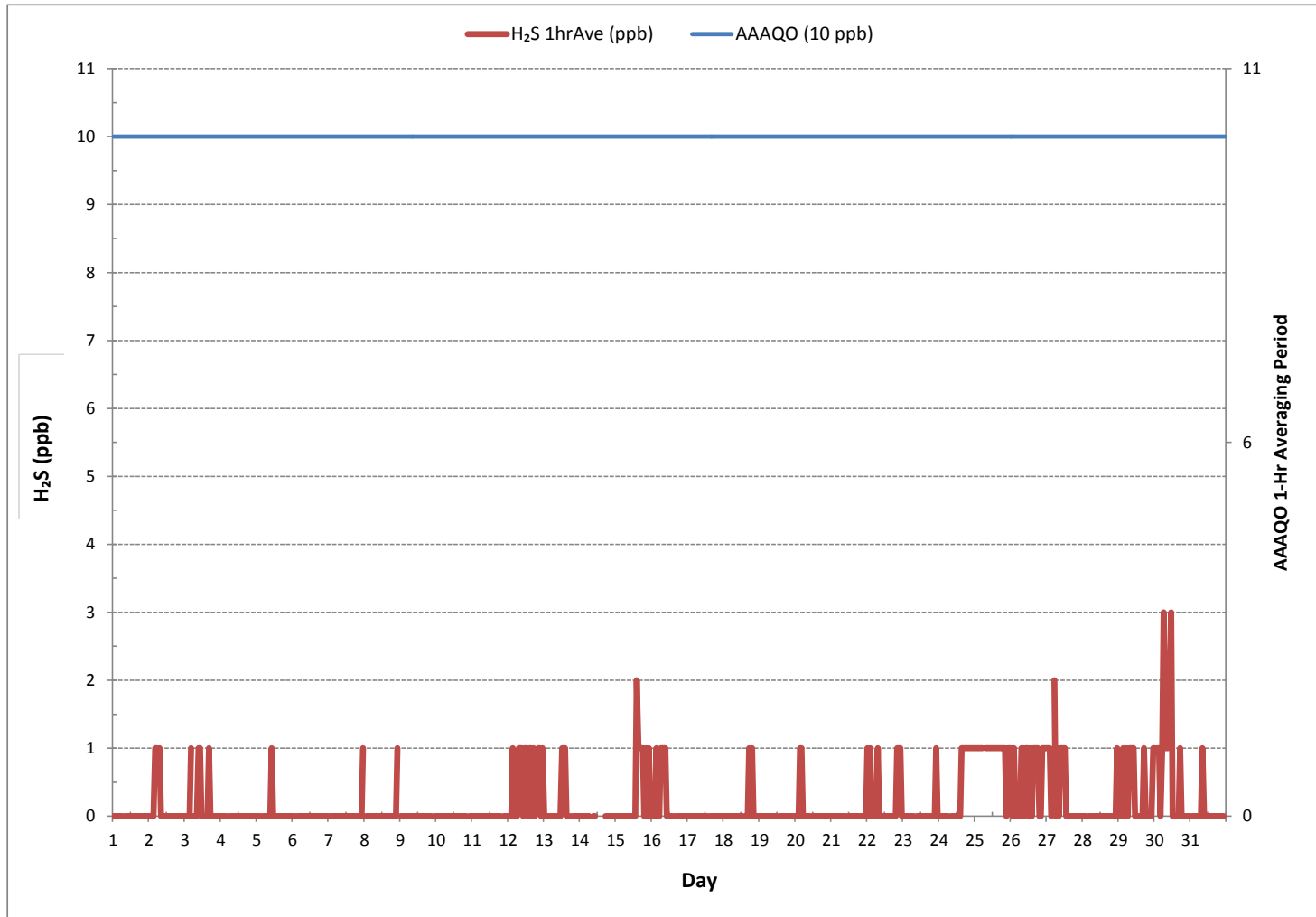
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	122				
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0	ON DAY	1	
MAXIMUM 1-HR AVERAGE:	3 ppb @ HOUR	6	ON DAY	30	
MAXIMUM 24-HR AVERAGE:	1 ppb		ON DAY	12	
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	742	hrs
MONTHLY CALIBRATION TIME:	6	hrs	AMD OPERATION UPTIME:	99.7	%
STANDARD DEVIATION:	0		MONTHLY AVERAGE:	0	ppb

24 HR AVERAGES December 2017



HYDROGEN SULPHIDE Hourly Averages (H<sub>2</sub>S ppb)





HYDROGEN SULPHIDE Instantaneous Maximum (H<sub>2</sub>S ppb)

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

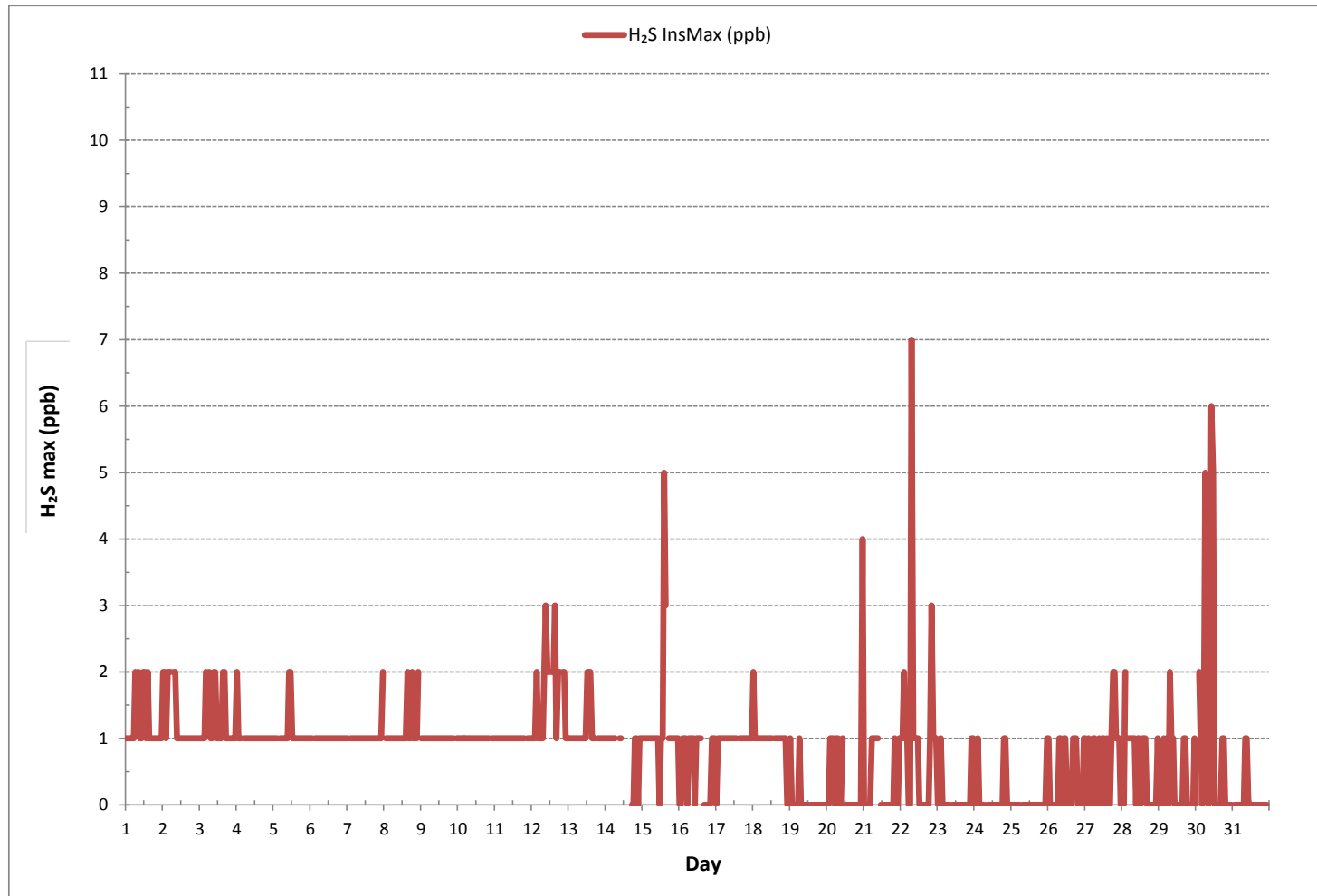
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	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:	482
MAXIMUM INSTANTANEOUS VALUE:	7 ppb @ HOUR 7 ON DAY 22
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	742 hrs
STANDARD DEVIATION:	1

HYDROGEN SULPHIDE Instantaneous Maximum (H<sub>2</sub>S ppb)



Wind: LICA MASKWA  
 Poll.: LICA MASKWA-H2S[ppb]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 9.87% Calm Avg: 0.55 [ppb]

Direction	0.0-1.3	1.3-2.7	2.7-4.0	>4.0	Total
N	9.0	0.0	0.0	0.0	9.0
NE	1.1	0.0	0.0	0.0	1.1
E	0.1	0.0	0.0	0.0	0.1
SE	0.3	0.0	0.0	0.0	0.3
S	3.4	0.0	0.0	0.0	3.4
SW	28.8	0.1	0.0	0.0	28.9
W	31.2	0.1	0.0	0.0	31.3
NW	15.7	0.1	0.0	0.0	15.9
Summary	89.7	0.4	0.0	0.0	90.1

% Icon Classes (ppb)

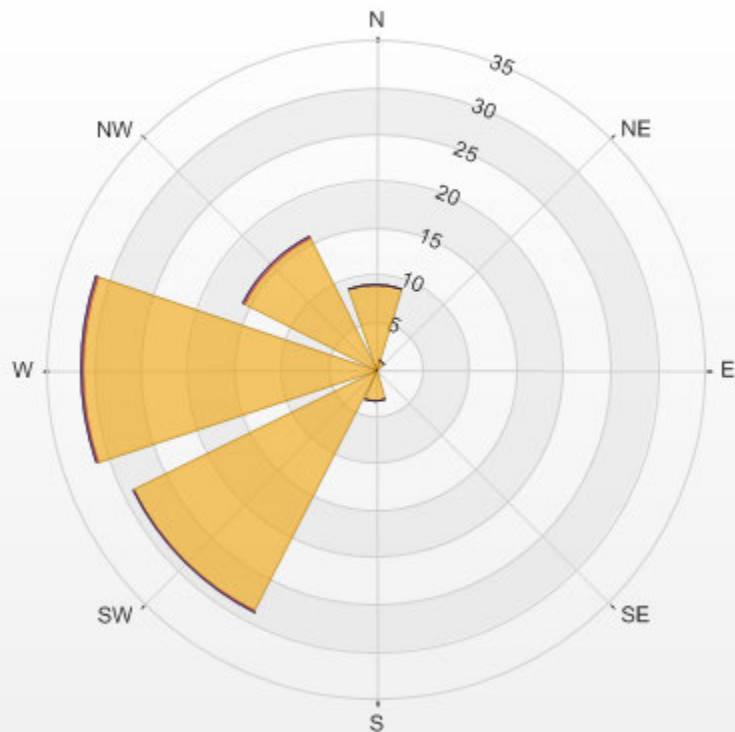
90 0.0-1.3

0 1.3-2.7

0 2.7-4.0

0 >4.0

LICA MASKWA Poll.: LICA MASKWA-H2S[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 9.87% Calm Poll Avg: 0.55[ppb]



H2S[ppb] Calibration: LICA MASKWA Monthly: 17/12 Type: Span



Span Meas Span Ref Span Low Span High



***TOTAL HYDROCARBON***

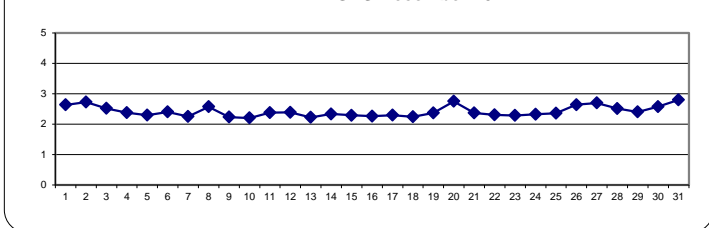
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	2.43	2.43	2.48	2.52	2.58	2.61	2.62	S	2.69	2.61	2.57	2.58	2.60	2.53	2.58	2.67	2.64	2.63	2.69	2.75	2.80	2.86	2.82	2.89	2.43	2.89	2.63	24	
2	3.00	3.10	3.10	3.05	3.33	3.57	S	2.95	2.75	2.65	2.61	2.51	2.82	2.68	2.41	2.54	2.46	2.40	2.37	2.36	2.38	2.42	2.59	2.54	2.36	3.57	2.72	24	
3	2.55	2.54	2.57	2.60	2.67	S	2.61	2.58	2.61	2.89	3.13	2.57	2.36	2.31	2.28	2.34	2.74	2.30	2.30	2.33	2.41	2.41	2.38	2.44	2.28	3.13	2.52	24	
4	2.39	2.29	2.28	2.27	S	2.28	2.30	2.31	2.33	2.34	2.34	2.31	2.32	2.33	2.36	2.43	2.49	2.43	2.37	2.37	2.41	2.48	2.59	2.60	2.27	2.60	2.37	24	
5	2.57	2.56	2.59	S	2.29	2.26	2.21	2.21	2.21	2.25	2.31	2.23	2.22	2.25	2.24	2.24	2.24	2.24	2.24	2.24	2.25	2.27	2.28	2.30	2.21	2.59	2.29	24	
6	2.30	2.30	S	2.33	2.35	2.35	2.33	2.31	2.34	2.35	2.44	2.61	2.69	2.52	2.42	2.42	2.45	2.50	2.57	2.49	2.36	2.31	2.29	2.29	2.29	2.69	2.41	24	
7	2.29	S	2.27	2.26	2.25	2.24	2.24	2.23	2.23	2.23	2.27	2.24	2.23	2.21	2.21	2.24	2.24	2.24	2.24	2.24	2.31	2.28	2.26	2.32	2.21	2.32	2.25	24	
8	S	2.35	2.44	2.33	2.29	2.30	2.30	2.31	2.32	2.29	2.28	2.29	2.30	2.60	2.81	2.93	3.04	3.15	2.86	2.83	2.80	2.85	2.94	S	2.28	3.15	2.57	24	
9	2.51	2.37	2.25	2.25	2.23	2.22	2.22	2.21	2.21	2.21	2.22	2.21	2.19	2.16	2.15	2.17	2.19	2.20	2.20	2.23	2.24	2.24	S	2.20	2.15	2.51	2.23	24	
10	2.20	2.21	2.19	2.24	2.34	2.40	2.29	2.30	2.19	2.15	2.18	2.22	2.11	2.11	2.12	2.15	2.14	2.16	2.17	2.17	2.18	S	2.20	2.24	2.11	2.40	2.20	24	
11	2.25	2.24	2.24	2.26	2.27	2.27	2.28	2.32	2.34	2.33	2.32	2.36	2.41	2.44	2.61	2.48	2.48	2.49	2.50	2.49	S	2.37	2.42	2.47	2.24	2.61	2.38	24	
12	2.59	2.66	2.62	2.72	2.70	2.66	2.64	2.52	2.56	2.56	2.24	2.21	2.16	2.14	2.12	2.24	2.12	2.17	2.14	S	2.31	2.29	2.25	2.26	2.12	2.72	2.39	24	
13	2.24	2.24	2.23	2.26	2.25	2.23	2.23	2.21	2.20	2.21	2.21	2.23	2.23	2.27	2.25	2.20	2.22	2.22	S	2.22	2.21	2.23	2.24	2.20	2.20	2.27	2.23	24	
14	2.22	2.22	2.21	2.22	2.23	2.22	2.20	2.24	2.33	2.33	2.23	2.42	2.43	2.29	C	C	C	C	C	S	2.43	2.43	2.49	2.54	2.53	2.20	2.54	2.33	24
15	2.52	2.57	2.64	2.70	2.60	2.30	2.20	2.24	2.14	2.14	2.14	2.14	2.14	2.15	2.33	2.26	S	2.18	2.19	2.19	2.24	2.26	2.22	2.21	2.14	2.70	2.29	24	
16	2.24	2.21	2.21	2.23	2.21	2.21	2.23	2.24	2.24	2.24	2.24	2.23	2.23	2.22	S	2.25	2.26	2.34	2.38	2.35	2.34	2.35	2.38	2.21	2.38	2.26	2.24	24	
17	2.40	2.38	2.39	2.38	2.38	2.38	2.34	2.33	2.37	2.36	2.37	2.39	2.30	2.21	S	2.20	2.23	2.23	2.21	2.21	2.20	2.20	2.21	2.22	2.20	2.40	2.30	24	
18	2.21	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.22	2.23	2.24	2.25	2.28	S	2.25	2.27	2.29	2.29	2.26	2.29	2.24	2.25	2.26	2.27	2.21	2.29	2.25	24	
19	2.28	2.28	2.28	2.28	2.29	2.29	2.29	2.29	2.29	2.31	2.30	2.29	S	2.28	2.29	2.29	2.31	2.37	2.44	2.42	2.54	2.58	2.66	2.72	2.28	2.72	2.36	24	
20	2.76	2.84	2.84	2.87	2.81	2.70	2.68	2.66	2.74	3.11	3.41	S	3.14	2.76	2.59	2.48	2.47	2.47	2.53	2.57	2.61	2.79	2.73	2.64	2.47	3.41	2.75	24	
21	2.56	2.48	2.45	2.40	2.43	2.50	2.55	2.41	2.34	2.29	S	2.30	2.30	2.31	2.30	2.30	2.30	2.30	2.29	2.29	2.33	2.33	2.33	2.31	2.29	2.56	2.37	24	
22	2.36	2.36	2.38	2.33	2.32	2.28	2.28	2.40	2.34	S	2.31	2.29	2.26	2.25	2.26	2.25	2.26	2.26	2.26	2.28	2.41	2.32	2.31	2.29	2.25	2.41	2.31	24	
23	2.27	2.30	2.30	2.25	2.26	2.27	2.28	2.28	S	2.27	2.28	2.27	2.27	2.26	2.26	2.27	2.28	2.30	2.32	2.34	2.38	2.33	2.33	2.28	2.25	2.38	2.29	24	
24	2.28	2.31	2.29	2.26	2.27	2.28	2.30	S	2.32	2.34	2.34	2.33	2.32	2.32	2.32	2.34	2.35	2.36	2.35	2.40	2.38	2.31	2.32	2.38	2.26	2.40	2.32	24	
25	2.33	2.34	2.34	2.31	2.33	2.36	S	2.36	2.37	2.37	2.34	2.33	2.34	2.34	2.33	2.34	2.35	2.38	2.38	2.37	2.39	2.41	2.42	2.44	2.31	2.44	2.36	24	
26	2.44	2.47	2.48	2.50	2.50	S	2.49	2.59	2.78	3.10	2.85	2.57	2.51	2.54	2.71	2.65	2.63	2.57	2.59	2.77	2.78	2.70	2.73	2.76	2.44	3.10	2.64	24	
27	2.78	2.79	2.83	2.88	S	3.00	3.06	3.10	3.12	3.10	3.13	2.90	2.73	2.55	2.42	2.39	2.38	2.39	2.40	2.39	2.41	2.40	2.42	2.49	2.38	3.13	2.70	24	
28	2.71	2.75	2.67	S	2.75	2.90	2.92	2.81	2.66	2.39	2.38	2.35	2.33	2.36	2.38	2.34	2.39	2.38	2.48	2.39	2.35	2.34	2.36	2.36	2.33	2.92	2.51	24	
29	2.39	2.42	S	2.37	2.39	2.42	2.53	2.59	2.37	2.38	2.38	2.38	2.36	2.35	2.35	2.36	2.37	2.37	2.39	2.39	2.41	2.41	2.45	2.44	2.35	2.59	2.40	24	
30	2.44	S	2.53	2.54	2.47	2.47	2.66	2.56	2.51	2.53	2.62	2.57	2.45	2.37	2.48	2.72	2.75	2.77	2.77	2.71	2.71	2.59	2.52	2.51	2.37	2.77	2.58	24	
31	S	2.52	2.67	2.73	2.89	2.93	2.85	2.88	2.86	2.85	2.70	2.56	2.50	2.56	2.60	2.76	2.81	2.86	2.77	2.87	2.85	2.97	3.15	3.20	S	2.50	3.20	2.80	24
HOURLY MAX	3.00	3.10	3.10	3.05	3.33	3.57	3.06	3.10	3.12	3.11	3.41	2.90	3.14	2.76	2.81	2.93	3.04	3.15	2.87	2.85	2.97	3.15	3.20	2.89					
HOURLY AVG	2.43	2.44	2.45	2.43	2.44	2.45	2.43	2.44	2.43	2.45	2.45	2.37	2.38	2.36	2.37	2.39	2.41	2.40	2.40	2.41	2.43	2.44	2.45	2.41					

STATUS FLAG CODES

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

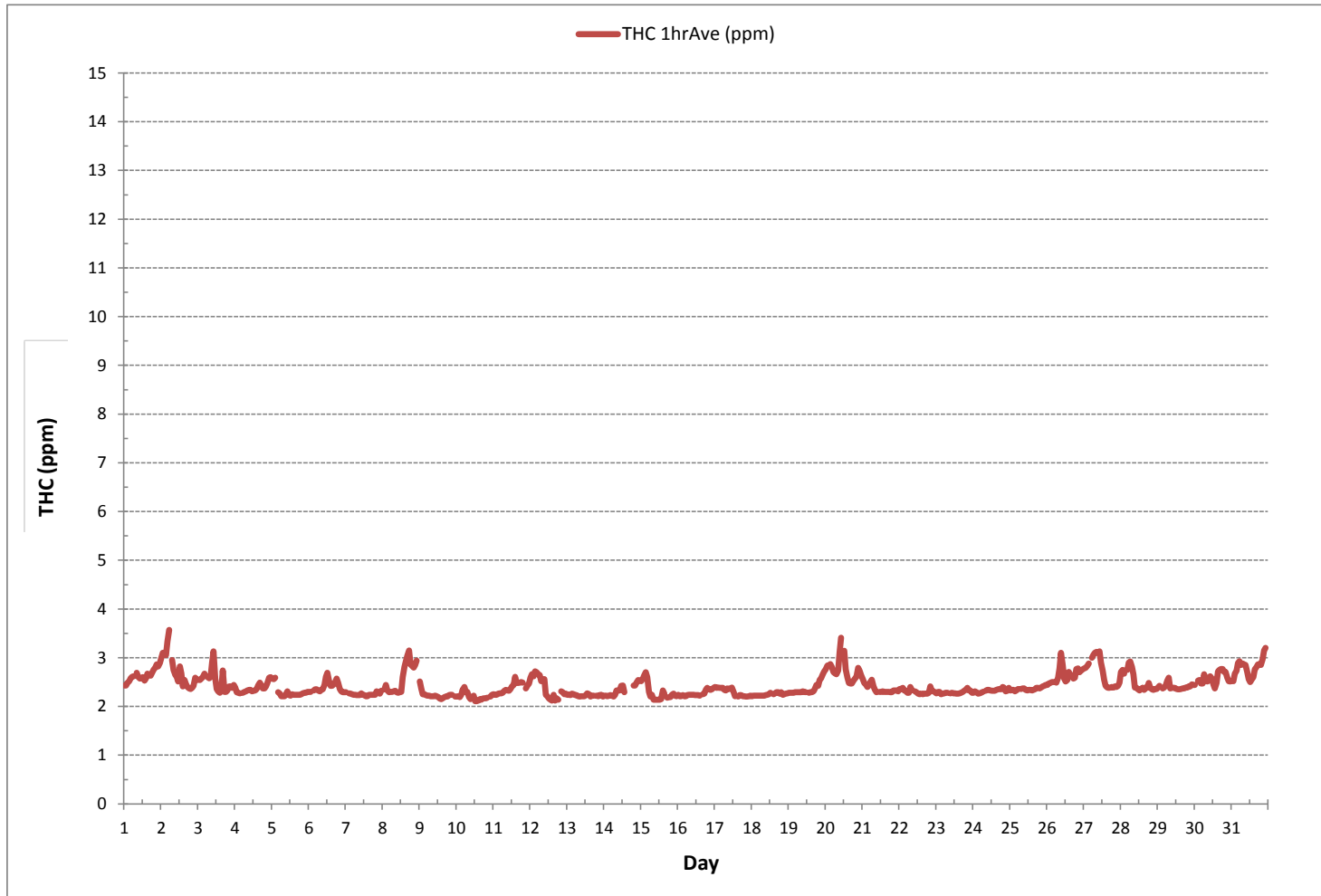
24 HR AVERAGES December 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	707			
MINIMUM 1-HR AVERAGE:	2.11 ppm	@ HOUR	12	ON DAY 10
MAXIMUM 1-HR AVERAGE:	3.57 ppm	@ HOUR	5	ON DAY 2
MAXIMUM 24-HR AVERAGE:	2.80 ppm			ON DAY 31
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	744	hrs
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	0.23	MONTHLY AVERAGE:	2.42	ppm

TOTAL HYDROCARBONS Hourly Averages (THC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Maskwa Continuous Monitoring Station - December 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	2.29	2.29	2.40	2.38	2.46	2.46	2.48	S	2.54	2.49	2.42	2.43	2.45	2.39	2.46	2.52	2.51	2.48	2.58	2.60	2.68	2.71	2.68	2.76	2.29	2.76	2.50	24	
2	2.91	3.06	2.97	3.00	3.55	3.55	S	2.83	2.74	2.57	2.55	2.53	2.83	2.83	2.29	2.41	2.35	2.29	2.22	2.21	2.23	2.35	2.54	2.43	2.21	3.55	2.66	24	
3	2.41	2.41	2.43	2.46	2.60	S	2.51	2.45	2.52	2.97	3.03	2.97	2.29	2.20	2.17	2.62	3.01	2.20	2.20	2.26	2.37	2.41	2.35	2.58	2.17	3.03	2.50	24	
4	2.50	2.24	2.18	2.20	S	2.20	2.22	2.24	2.29	2.26	2.26	2.20	2.22	2.23	2.26	2.39	2.41	2.38	2.29	2.26	2.32	2.38	2.49	2.46	2.18	2.50	2.30	24	
5	2.46	2.43	2.49	S	2.23	2.33	2.11	2.12	2.11	2.26	2.27	2.23	2.17	2.20	2.20	2.24	2.22	2.21	2.20	2.23	2.26	2.27	2.29	2.30	2.11	2.49	2.25	24	
6	2.32	2.32	S	2.35	2.38	2.37	2.36	2.32	2.35	2.35	2.51	2.70	2.71	2.60	2.41	2.43	2.43	2.51	2.57	2.52	2.43	2.29	2.26	2.26	2.26	2.71	2.42	24	
7	2.26	S	2.23	2.23	2.22	2.21	2.20	2.20	2.17	2.18	2.26	2.20	2.20	2.17	2.18	2.20	2.20	2.20	2.20	2.18	2.38	2.30	2.23	2.27	2.17	2.38	2.22	24	
8	S	2.35	2.48	2.30	2.26	2.24	2.29	2.29	2.30	2.23	2.23	2.23	2.36	2.62	2.82	2.88	3.01	3.15	2.94	2.77	2.75	2.80	2.87	S	2.23	3.15	2.55	24	
9	2.53	2.51	2.15	2.17	2.14	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.11	2.06	2.09	2.12	2.12	2.12	2.12	2.17	2.17	2.17	S	2.12	2.06	2.53	2.16	24	
10	2.14	2.17	2.12	2.18	2.36	2.41	2.27	2.27	2.20	2.14	2.17	2.17	2.08	2.11	2.09	2.15	2.09	2.11	2.11	2.12	2.14	S	2.15	2.26	2.08	2.41	2.17	24	
11	2.21	2.20	2.20	2.21	2.23	2.21	2.23	2.29	2.29	2.27	2.26	2.29	2.36	2.51	2.64	2.43	2.42	2.42	2.42	2.42	2.41	S	2.29	2.33	2.43	2.20	2.64	2.33	24
12	2.55	2.58	2.57	2.66	2.68	2.61	2.60	2.46	2.57	2.61	2.26	2.33	2.09	2.09	2.09	2.36	2.03	2.15	2.09	S	2.41	2.32	2.20	2.22	2.03	2.68	2.37	24	
13	2.14	2.15	2.15	2.20	2.19	2.17	2.18	2.17	2.12	2.12	2.14	2.14	2.32	4.00	3.06	2.15	2.18	2.17	S	2.17	2.18	2.20	2.23	2.18	2.12	4.00	2.29	24	
14	2.20	2.20	2.20	2.21	2.22	2.22	2.20	2.30	2.35	2.36	2.38	2.58	2.55	2.35	C	C	C	C	C	C	2.46	2.46	2.51	2.55	2.55	2.20	2.58	2.36	24
15	2.62	2.65	2.66	2.74	2.70	2.51	2.22	2.29	2.15	2.14	2.15	2.14	2.14	2.20	2.62	2.39	S	2.20	2.18	2.20	2.29	2.27	2.26	2.21	2.14	2.74	2.34	24	
16	2.29	2.23	2.23	2.24	2.24	2.23	2.24	2.26	2.27	2.26	2.26	2.26	2.24	2.26	2.24	S	2.29	2.27	2.38	2.39	2.35	2.35	2.33	2.38	2.23	2.39	2.28	24	
17	2.41	2.35	2.36	2.35	2.35	2.35	2.29	2.27	2.32	2.30	2.29	2.32	2.29	2.15	S	2.20	2.17	2.17	2.14	2.14	2.12	2.12	2.15	2.17	2.12	2.41	2.25	24	
18	2.15	2.18	2.17	2.17	2.18	2.20	2.20	2.18	2.20	2.20	2.20	2.26	2.29	S	2.32	2.38	2.36	2.35	2.33	2.35	2.26	2.32	2.29	2.32	2.15	2.38	2.25	24	
19	2.41	2.33	2.33	2.35	2.36	2.36	2.38	2.38	2.38	2.39	2.41	2.41	S	2.39	2.39	2.41	2.45	2.54	2.68	2.54	2.99	2.79	2.88	2.85	2.33	2.99	2.50	24	
20	2.92	2.96	2.97	2.97	3.02	2.81	2.81	2.82	3.03	3.40	3.63	S	3.31	2.99	2.78	2.60	2.57	2.55	2.63	2.68	2.79	2.92	2.92	2.76	2.55	3.63	2.91	24	
21	2.66	2.57	2.54	2.46	2.51	2.60	2.61	2.57	2.52	2.33	S	2.35	2.36	2.38	2.38	2.38	2.38	2.38	2.38	2.36	2.38	2.49	2.43	2.43	2.33	2.66	2.46	24	
22	2.57	2.63	2.58	2.51	2.43	2.38	2.38	3.03	2.49	S	2.49	2.57	2.39	2.35	2.38	2.35	2.36	2.38	2.38	2.48	3.13	2.51	2.49	2.49	2.35	3.13	2.51	24	
23	2.41	2.49	2.58	2.36	2.36	2.39	2.39	2.41	S	2.39	2.39	2.39	2.38	2.38	2.38	2.41	2.42	2.43	2.46	2.46	2.67	2.49	2.46	2.45	2.36	2.67	2.43	24	
24	2.41	2.51	2.54	2.41	2.42	2.44	2.46	S	2.48	2.51	2.51	2.51	2.51	2.51	2.51	2.51	2.58	2.58	2.60	2.88	2.84	2.51	2.55	2.66	2.41	2.88	2.54	24	
25	2.55	2.55	2.66	2.51	2.55	2.57	S	2.57	2.58	2.57	2.55	2.52	2.63	2.54	2.54	2.54	2.57	2.63	2.61	2.57	2.63	2.64	2.63	2.70	2.51	2.70	2.58	24	
26	2.66	2.78	2.72	2.72	2.72	S	2.72	2.84	3.27	3.33	3.25	2.78	2.75	2.78	2.96	2.96	2.82	2.78	2.81	3.02	3.03	2.88	2.92	2.95	2.66	3.33	2.89	24	
27	2.95	2.94	3.00	3.06	S	3.16	3.22	3.26	3.28	3.28	3.31	3.22	2.96	2.76	2.63	2.54	2.54	2.54	2.57	2.55	2.57	2.57	2.60	2.76	2.54	3.31	2.89	24	
28	2.88	2.93	2.85	S	3.00	3.09	3.12	3.06	3.04	2.58	2.81	2.58	2.52	2.69	2.63	2.63	2.58	2.60	S	5.26	2.61	2.57	2.58	2.58	2.52	5.26	2.86	24	
29	2.73	2.73	S	2.60	2.75	2.73	4.08	4.37	2.60	2.61	2.63	2.63	2.60	2.60	2.64	2.63	2.64	2.63	2.63	2.63	2.66	2.66	2.70	2.69	2.60	4.37	2.79	24	
30	2.69	S	3.01	2.88	2.72	2.79	3.18	2.85	2.79	2.82	3.06	2.99	2.75	2.61	2.87	2.97	3.03	3.03	3.03	3.01	2.96	2.92	2.78	2.78	2.61	3.18	2.89	24	
31	S	2.84	2.97	3.09	3.18	3.21	3.10	3.12	3.12	3.09	3.06	2.81	2.76	2.82	2.88	3.00	3.06	3.15	3.10	3.09	3.25	3.40	3.43	S	2.76	3.43	3.07	24	
HOURLY MAX	2.95	3.06	3.01	3.09	3.55	3.55	4.08	4.37	3.28	3.40	3.63	3.22	3.31	4.00	3.06	3.00	3.06	3.15	5.26	3.09	3.25	3.40	3.43	2.95					
HOURLY AVG	2.49	2.50	2.51	2.48	2.52	2.51	2.52	2.56	2.51	2.50	2.53	2.46	2.45	2.49	2.48	2.47	2.48	2.45	2.55	2.48	2.55	2.51	2.52	2.48					

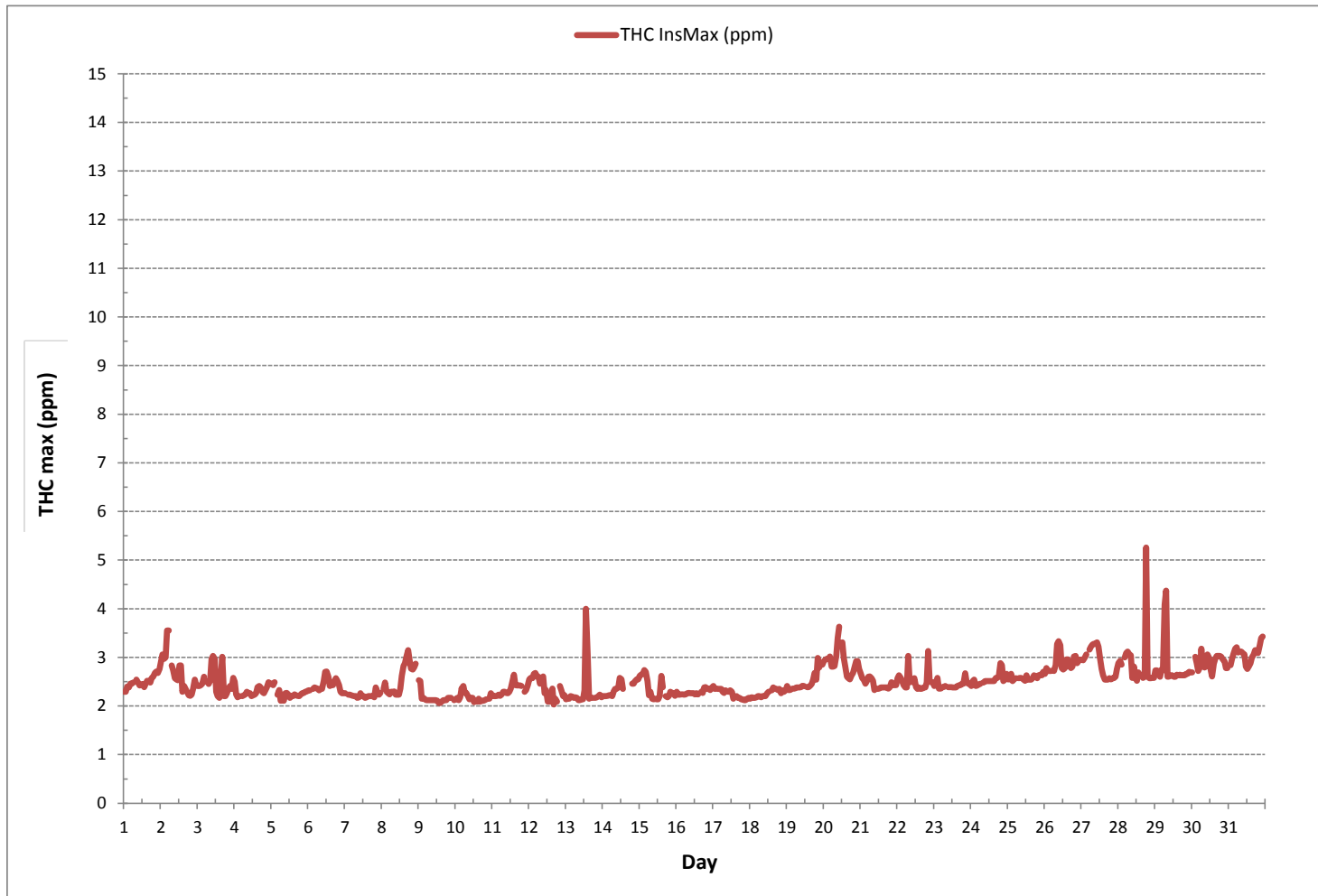
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	707
MAXIMUM INSTANTANEOUS VALUE:	5.26 ppm @ HOUR 18 ON DAY 28
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	0.33

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)



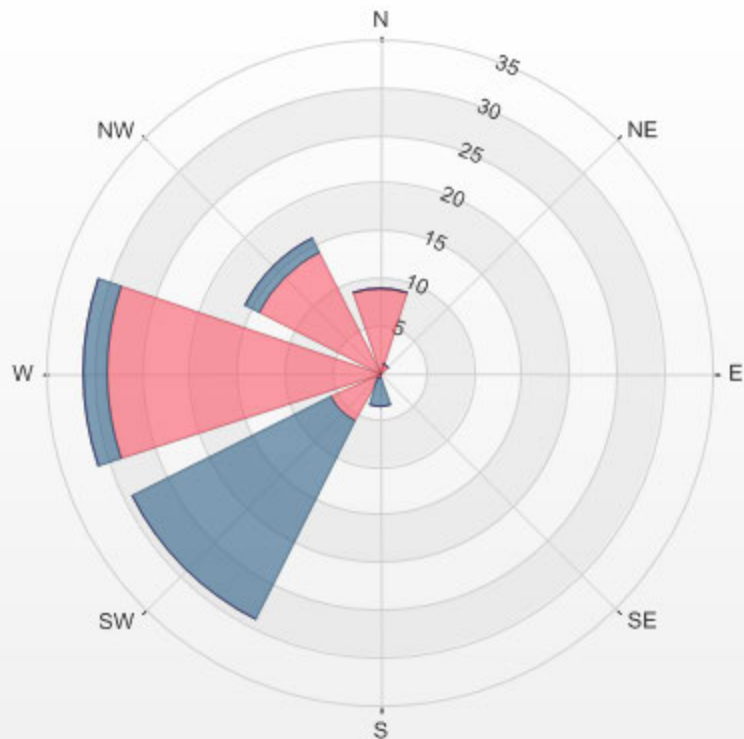
Wind: LICA MASKWA  
 Poll.: LICA MASKWA-THC[ppm]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 9.83% Calm Avg: 2.64 [ppm]

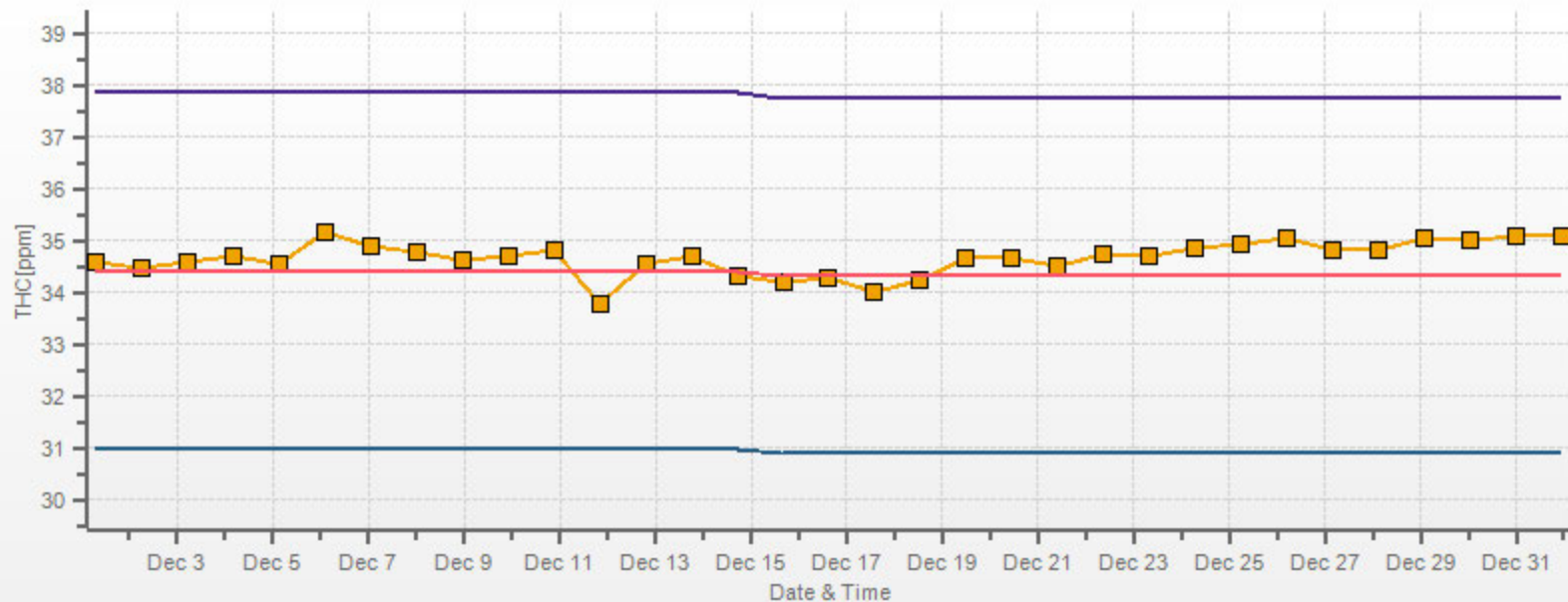
Direction	0.0-1.2	1.2-2.4	2.4-3.6	>3.6	Total
N	0.0	9.0	0.0	0.0	9.0
NE	0.0	1.1	0.0	0.0	1.1
E	0.0	0.1	0.0	0.0	0.1
SE	0.0	0.0	0.3	0.0	0.3
S	0.0	0.7	2.9	0.0	3.6
SW	0.0	5.7	23.4	0.0	29.1
W	0.0	28.6	2.6	0.0	31.2
NW	0.0	14.1	1.7	0.0	15.8
Summary	0.0	59.4	30.8	0.0	90.2

% Icon Classes (ppm) 0 0.0-1.2 59 1.2-2.4 31 2.4-3.6 0 >3.6

LICA MASKWA Poll.: LICA MASKWA-THC[ppm] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 9.83% Calm Poll Avg: 2.64[ppm]



THC[ppm] Calibration: LICA MASKWA Monthly: 17/12 Type: Span



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



## ***OXIDES OF NITROGEN***



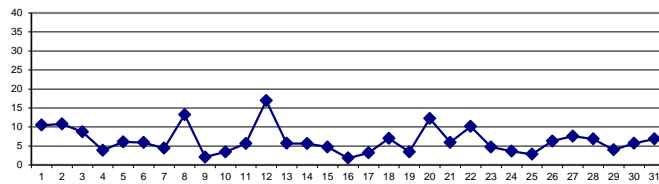
OXIDES OF NITROGEN Hourly Averages (NO<sub>x</sub> ppb)

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

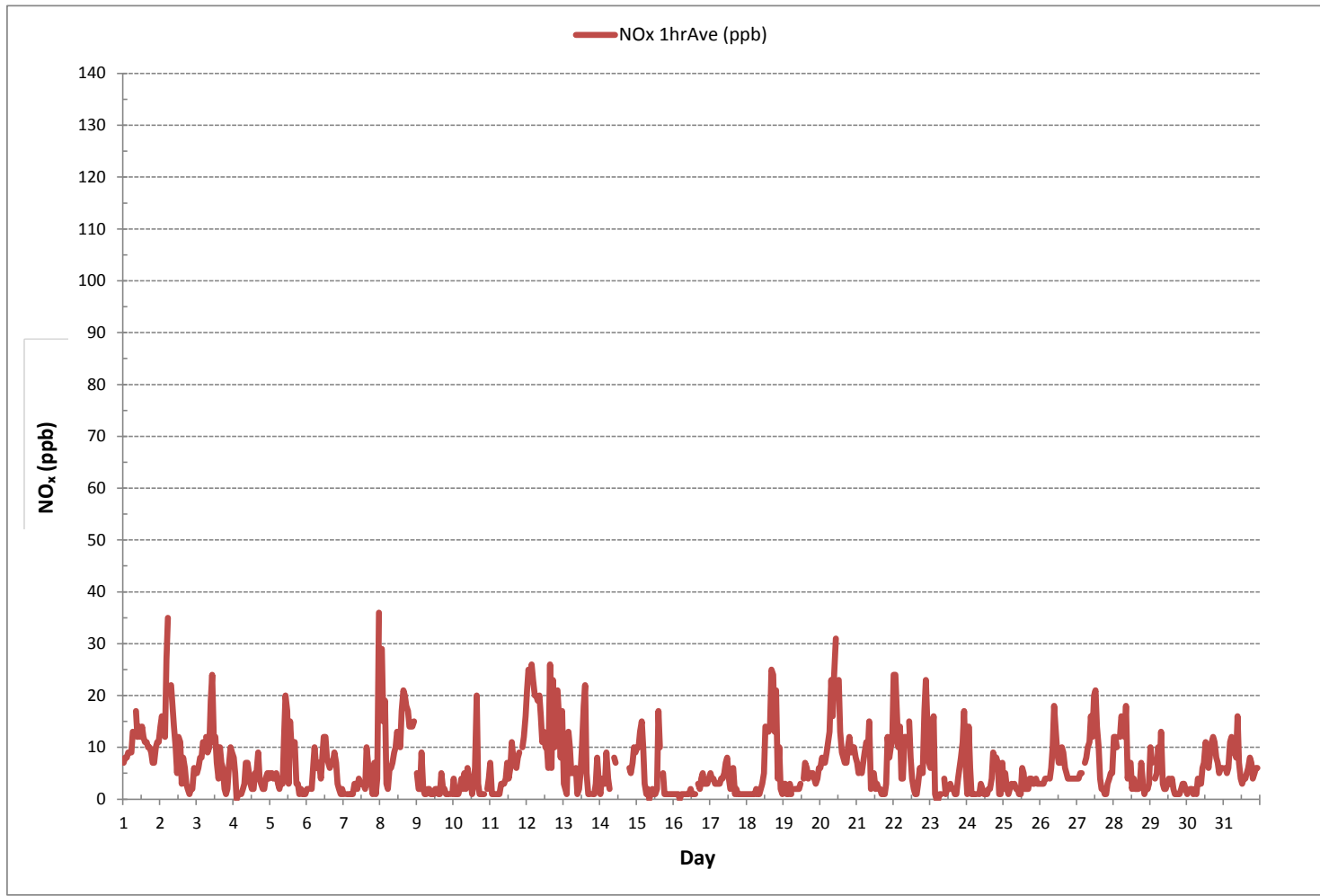
24 HR AVERAGES December 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	696			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	2	ON DAY 4
MAXIMUM 1-HR AVERAGE:	36 ppb	@ HOUR	23	ON DAY 7
MAXIMUM 24-HR AVERAGE:	17 ppb			ON DAY 12
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	741 hrs	
MONTHLY CALIBRATION TIME:	8 hrs	AMD OPERATION UPTIME:	99.6 %	
STANDARD DEVIATION:	6	MONTHLY AVERAGE:	6 ppb	

OXIDES OF NITROGEN Hourly Averages (NO<sub>x</sub> ppb)





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

OXIDES OF NITROGEN Instantaneous Maximum (NO<sub>x</sub> ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	7	9	10	10	10	10	16	S	28	13	25	13	18	14	13	12	13	13	10	8	8	12	12	13	7	28	13	24
2	16	16	16	16	38	38	S	29	24	17	16	10	16	17	8	12	7	6	2	2	2	5	8	6	2	38	14	24
3	6	7	9	9	55	S	56	13	15	22	26	21	15	18	6	23	16	12	7	1	2	11	17	12	1	56	16	24
4	13	21	0	1	S	1	2	4	13	27	13	16	4	3	7	6	49	4	3	2	2	3	5	3	0	49	9	24
5	4	4	4	S	9	6	2	6	4	15	41	39	7	55	27	19	29	8	5	0	1	1	0	0	0	55	12	24
6	2	2	S	2	17	20	35	10	32	7	11	16	13	9	9	28	7	11	10	4	1	1	1	1	1	35	11	24
7	0	S	1	0	0	0	1	3	4	4	7	49	21	25	3	40	81	4	23	0	19	2	21	43	0	81	15	24
8	S	38	23	41	6	2	23	13	10	17	15	21	16	13	37	26	24	18	118	13	14	14	14	S	2	118	23	24
9	6	3	3	21	13	0	5	7	1	0	0	2	41	34	4	3	47	2	5	0	0	0	S	0	0	47	9	24
10	12	3	0	0	2	4	2	7	4	14	21	3	0	7	10	32	6	1	1	0	0	S	6	14	0	32	6	24
11	12	4	0	0	0	0	1	3	9	3	7	14	4	8	15	12	9	6	7	9	S	9	13	16	0	16	7	24
12	24	27	27	28	26	20	24	20	29	18	27	23	17	26	22	51	12	39	27	S	41	35	22	19	12	51	26	24
13	8	3	0	23	24	12	29	50	25	1	19	12	43	38	49	18	0	0	S	0	0	5	17	10	0	50	17	24
14	0	6	6	4	9	8	2	S1	S1	11	8	C	C	C	C	C	C	C	C	7	7	9	11	10	0	11	7	22
15	16	17	16	17	14	7	2	3	1	7	20	14	1	5	37	38	S	14	0	1	1	1	1	1	0	38	10	24
16	0	2	1	0	0	0	1	1	1	2	2	3	3	3	24	S	9	2	6	6	4	3	3	4	0	24	3	24
17	5	4	3	3	3	4	5	5	4	6	9	10	5	4	S	11	1	1	1	1	0	0	1	0	0	11	4	24
18	0	0	0	0	0	0	9	2	2	3	4	9	47	S	30	23	38	39	30	32	24	27	7	3	0	47	14	24
19	16	20	0	4	6	1	S1	S1	2	3	2	3	S	6	12	8	4	6	9	6	4	4	6	7	0	20	6	22
20	7	9	8	8	10	12	35	44	22	30	34	S	27	16	25	30	9	7	11	13	10	11	10	9	7	44	17	24
21	7	6	6	6	9	10	35	14	51	4	S	34	2	3	17	4	2	1	1	11	30	12	18	13	1	51	13	24
22	31	33	34	17	17	7	35	31	35	S	32	23	26	3	2	1	28	9	7	17	20	33	21	15	1	35	21	24
23	11	17	28	8	0	0	1	1	S	5	2	3	4	2	2	2	2	4	7	18	16	26	27	0	28	8	24	
24	3	21	13	1	2	2	2	S	2	4	3	2	2	2	3	2	16	23	31	19	24	3	11	14	1	31	9	24
25	9	9	7	1	4	3	S	3	3	2	1	2	10	9	3	2	2	6	7	4	4	5	3	4	1	10	4	24
26	3	4	3	4	4	S	4	7	16	20	19	12	9	10	11	11	7	6	4	4	4	5	4	3	20	8	24	
27	4	6	5	5	S	7	13	15	11	61	27	24	27	26	22	7	2	3	2	2	4	4	5	10	2	61	13	24
28	13	13	10	S	15	17	20	14	24	15	21	13	3	4	3	2	2	3	101	4	1	2	2	3	1	101	13	24
29	21	14	S	10	20	21	10	26	8	6	3	3	4	4	11	2	2	2	2	1	3	4	3	2	1	26	8	24
30	2	S	2	2	2	2	2	23	2	3	12	10	20	13	9	11	12	13	13	9	7	6	7	6	2	23	8	24
31	S	7	5	10	11	12	10	9	8	61	8	4	4	6	4	6	8	9	29	5	7	6	6	S	4	61	11	24
HOURLY MAX	31	38	34	41	55	38	56	50	51	61	41	49	47	55	49	51	81	39	118	32	41	35	26	43				
HOURLY AVG	9	11	8	9	11	8	14	13	13	13	15	14	14	13	15	15	16	9	16	6	9	8	9	9				

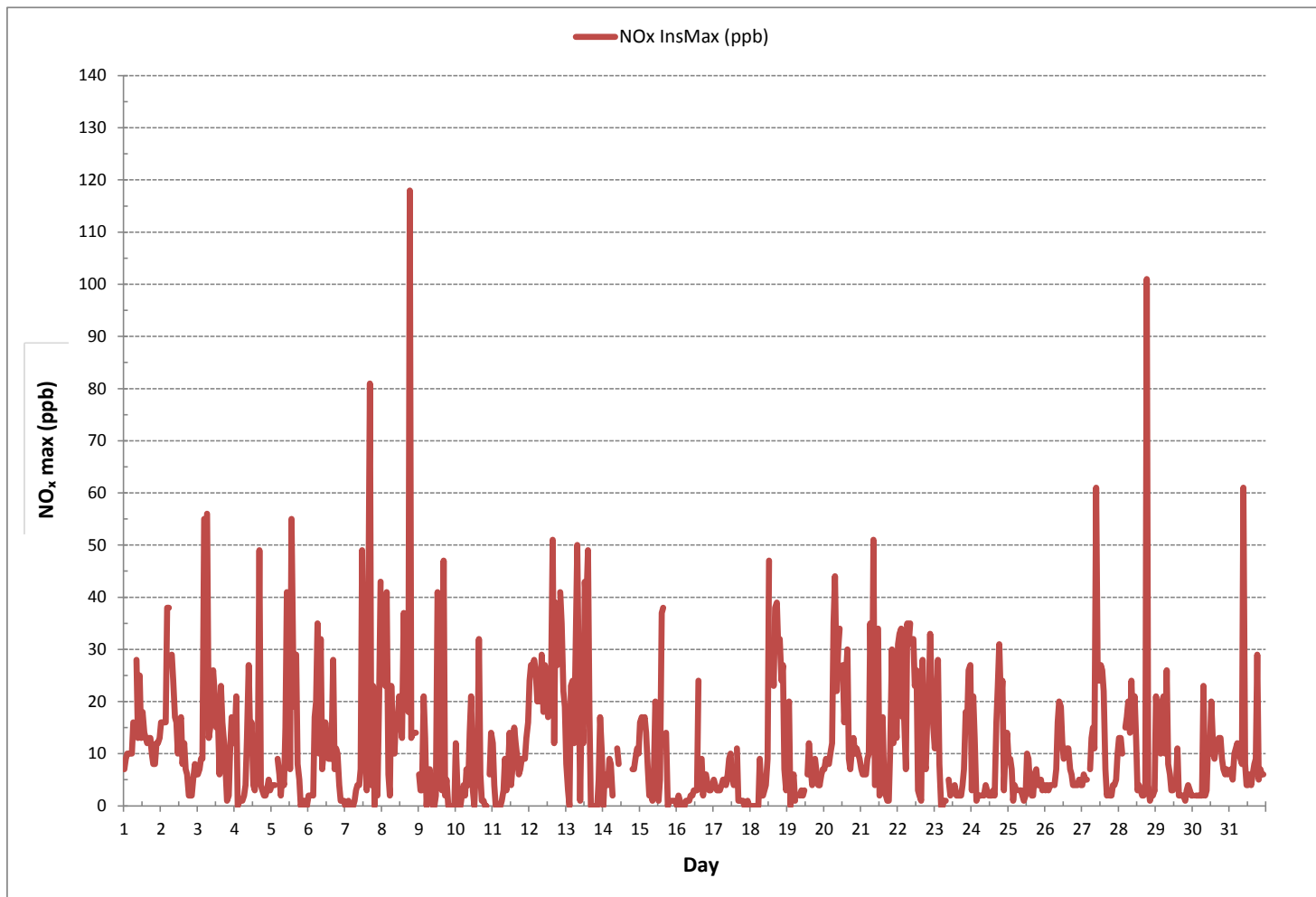
STATUS FLAG CODES

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:	652
MAXIMUM INSTANTANEOUS VALUE:	118 ppb @ HOUR 18 ON DAY 8
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	740 hrs
STANDARD DEVIATION:	13

OXIDES OF NITROGEN Instantaneous Maximum (NO<sub>x</sub> ppb)



Wind: LICA MASKWA  
 Poll.: LICA MASKWA-NOX[ppb]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 9.93%

Calm Avg: 5.63 [ppb]

Direction	0.0-12.3	12.3-24.7	24.7-37.0	>37.0	Total
N	8.8	0.0	0.0	0.0	8.8
NE	1.2	0.0	0.0	0.0	1.2
E	0.1	0.0	0.0	0.0	0.1
SE	0.3	0.0	0.0	0.0	0.3
S	3.5	0.0	0.0	0.0	3.5
SW	21.7	6.3	0.7	0.0	28.8
W	29.5	1.7	0.3	0.0	31.5
NW	11.5	4.2	0.3	0.0	16.0
Summary	76.6	12.2	1.3	0.0	90.1

% Icon Classes (ppb)

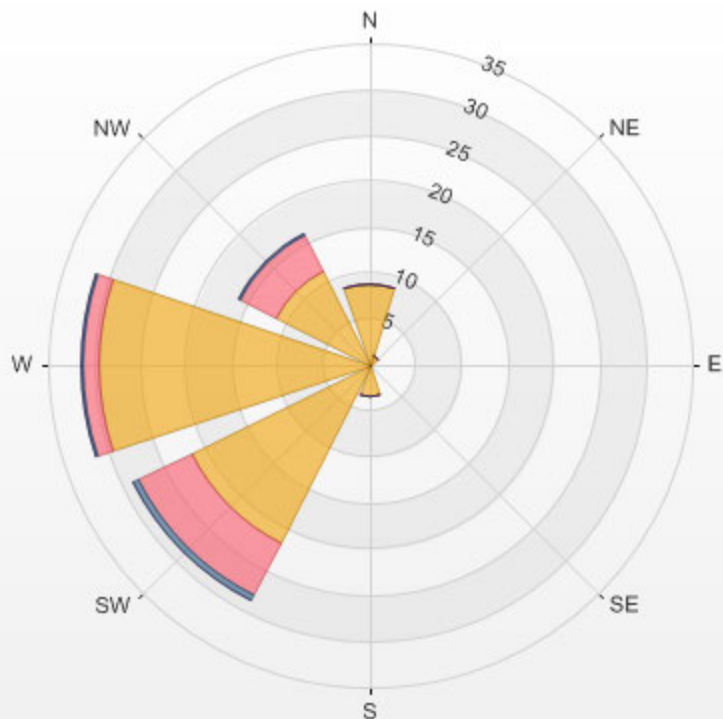
77 0.0-12.3

12 12.3-24.7

1 24.7-37.0

0 >37.0

LICA MASKWA Poll.: LICA MASKWA-NOX[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 9.93% Calm Poll Avg: 5.63[ppb]



NOX[ppb] Calibration: LICA MASKWA Monthly: 17/12 Type: Span



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



***NITRIC OXIDES***

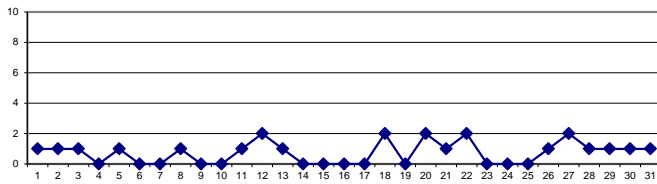
NITRIC OXIDE Hourly Averages (NO ppb)

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

STATUS FLAG CODES

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

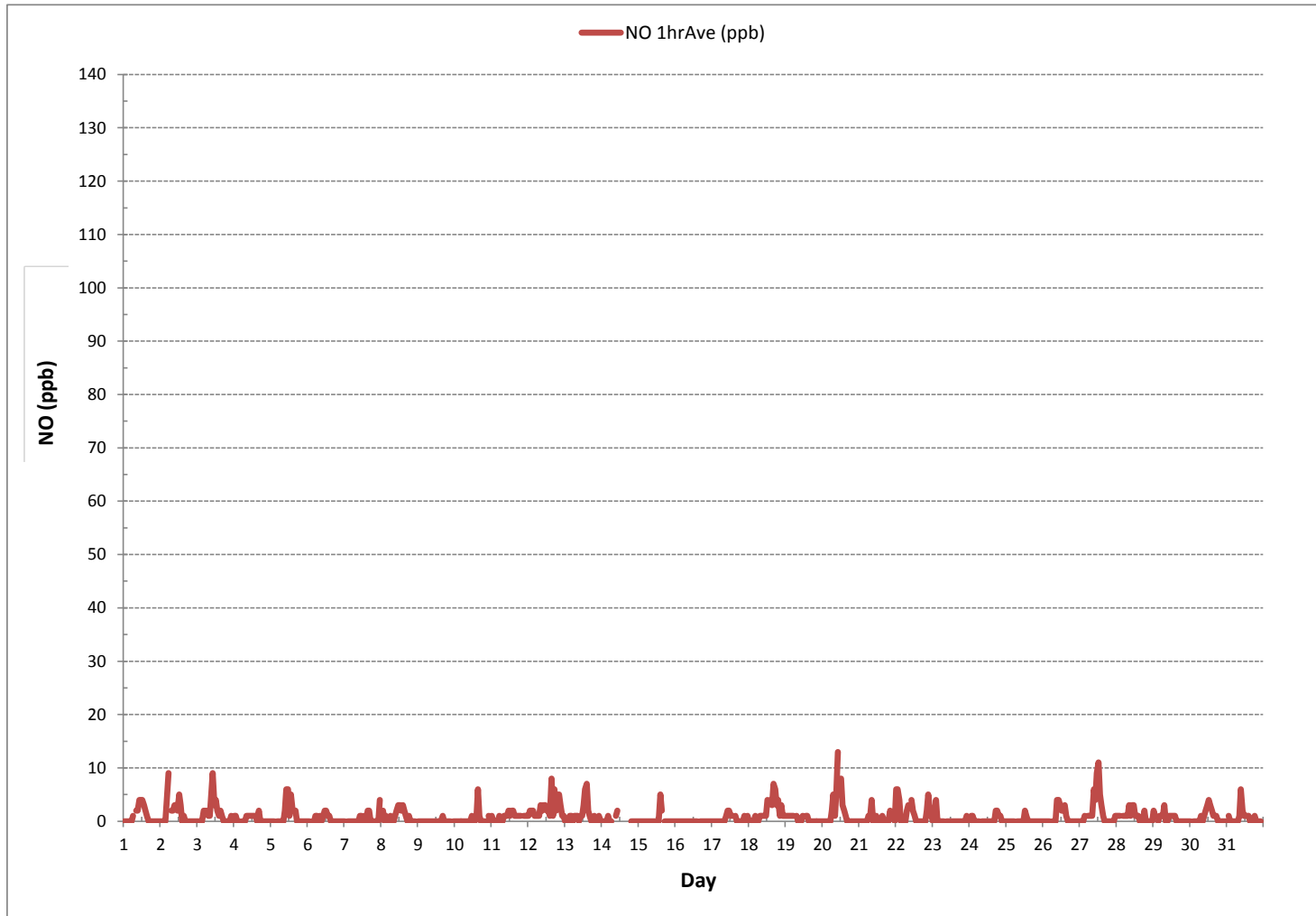
24 HR AVERAGES December 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	281			
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0	ON DAY	1
MAXIMUM 1-HR AVERAGE:	13 ppb @ HOUR	20	ON DAY	20
MAXIMUM 24-HR AVERAGE:	2 ppb		ON DAY	12
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	741 hrs	
MONTHLY CALIBRATION TIME:	8 hrs	AMD OPERATION UPTIME:	99.6 %	
STANDARD DEVIATION:	2	MONTHLY AVERAGE:	1 ppb	

NITRIC OXIDE Hourly Averages (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Maskwa Continuous Monitoring Station - December 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	1	0	1	S	7	3	10	4	6	4	2	1	0	0	0	0	0	0	0	0	0	0	0	10	2	24				
2	0	0	0	0	12	11	S	5	5	4	4	3	6	6	1	1	0	0	0	0	0	0	0	0	0	0	0	12	3	24				
3	0	0	0	0	28	S	38	2	3	8	11	7	5	12	2	4	3	1	2	0	0	1	1	0	0	0	38	6	24					
4	2	6	0	0	S	0	0	1	4	18	7	8	3	1	2	0	28	0	0	0	0	0	0	0	0	0	28	3	24					
5	0	0	1	S	0	0	1	0	1	4	18	19	2	28	16	11	9	1	0	0	0	0	0	0	0	0	28	5	24					
6	0	0	S	0	4	4	14	3	17	1	3	4	2	1	2	1	14	0	0	0	0	0	0	0	0	0	17	3	24					
7	0	S	0	0	0	0	0	0	0	0	3	28	16	14	1	21	42	0	4	0	0	0	1	8	0	42	6	24						
8	S	5	0	8	0	0	5	1	2	3	3	6	4	3	13	5	3	0	65	0	0	0	0	0	S	0	65	6	24					
9	0	0	0	0	0	0	1	1	0	0	0	0	32	15	1	0	18	0	0	0	0	0	S	0	0	32	3	24						
10	0	0	0	0	0	0	0	0	0	0	7	0	0	0	1	11	0	0	0	0	0	S	1	1	0	11	1	24						
11	1	0	0	0	0	0	0	0	1	0	1	5	0	1	4	2	1	0	0	0	0	S	0	0	0	0	5	1	24					
12	1	2	2	3	1	0	2	1	8	2	15	5	3	19	14	18	2	11	12	S	11	8	3	1	0	19	6	24						
13	0	0	0	0	2	0	16	28	12	0	8	1	20	15	18	5	0	0	S	0	0	0	3	0	0	28	6	24						
14	0	0	0	0	0	0	0	S1	S1	3	2	C	C	C	C	C	C	C	C	0	1	1	0	1	0	3	1	22						
15	1	1	0	1	1	0	0	0	0	1	8	10	0	1	15	16	S	1	0	0	0	0	0	0	0	0	16	2	24					
16	0	0	0	0	0	0	0	0	0	1	1	0	1	1	14	S	3	0	1	0	0	0	0	0	0	0	14	1	24					
17	0	1	0	0	0	0	0	0	0	1	3	4	1	2	S	1	0	0	0	0	0	0	0	0	0	0	4	1	24					
18	0	0	0	0	0	0	1	1	1	1	1	2	21	S	11	5	12	11	6	7	4	6	1	1	0	21	4	24						
19	3	6	0	1	1	0	S1	S1	0	1	0	1	S	1	3	1	0	0	1	0	0	0	1	0	0	6	1	22						
20	0	1	1	1	1	1	18	25	4	11	17	S	10	5	13	17	1	0	0	1	0	1	0	0	0	25	6	24						
21	0	0	0	0	0	0	17	3	27	1	S	13	0	1	10	1	0	0	0	3	7	1	4	1	0	27	4	24						
22	9	11	10	1	1	0	19	15	15	S	14	7	17	2	0	0	14	2	0	1	3	10	4	3	0	19	7	24						
23	1	1	8	2	0	0	0	0	S	1	0	0	0	1	0	0	0	0	0	1	2	1	2	2	0	8	1	24						
24	0	3	2	0	0	0	0	S	0	1	1	1	1	0	0	0	3	6	9	5	7	0	1	3	0	9	2	24						
25	0	1	1	0	0	1	S	0	0	0	0	0	4	3	1	1	0	0	1	0	0	0	0	0	0	4	1	24						
26	0	0	0	0	0	S	1	0	2	6	6	5	3	3	3	3	1	0	0	0	0	0	0	0	0	6	1	24						
27	0	0	0	0	S	1	3	4	1	39	12	12	14	10	14	1	0	0	0	0	0	0	0	0	0	39	5	24						
28	0	1	0	S	1	0	4	1	7	4	10	5	1	1	1	0	0	0	56	0	0	0	0	0	0	56	4	24						
29	4	1	S	2	5	5	2	9	1	1	1	1	1	1	4	0	0	0	0	0	0	0	0	0	0	9	2	24						
30	0	S	0	0	0	0	0	13	0	1	4	4	8	5	3	1	1	0	0	0	0	0	0	0	0	13	2	24						
31	S	0	0	0	0	0	0	0	1	42	3	1	1	2	1	1	0	0	13	0	1	0	0	0	S	0	42	3	24					
HOURLY MAX	9	11	10	8	28	11	38	28	27	42	18	28	32	28	18	21	42	11	65	7	11	10	4	8	0	42	3	24						
HOURLY AVG	1	1	1	1	2	1	5	4	4	5	6	5	6	5	6	4	5	1	6	1	1	1	1	1	0	42	3	24						

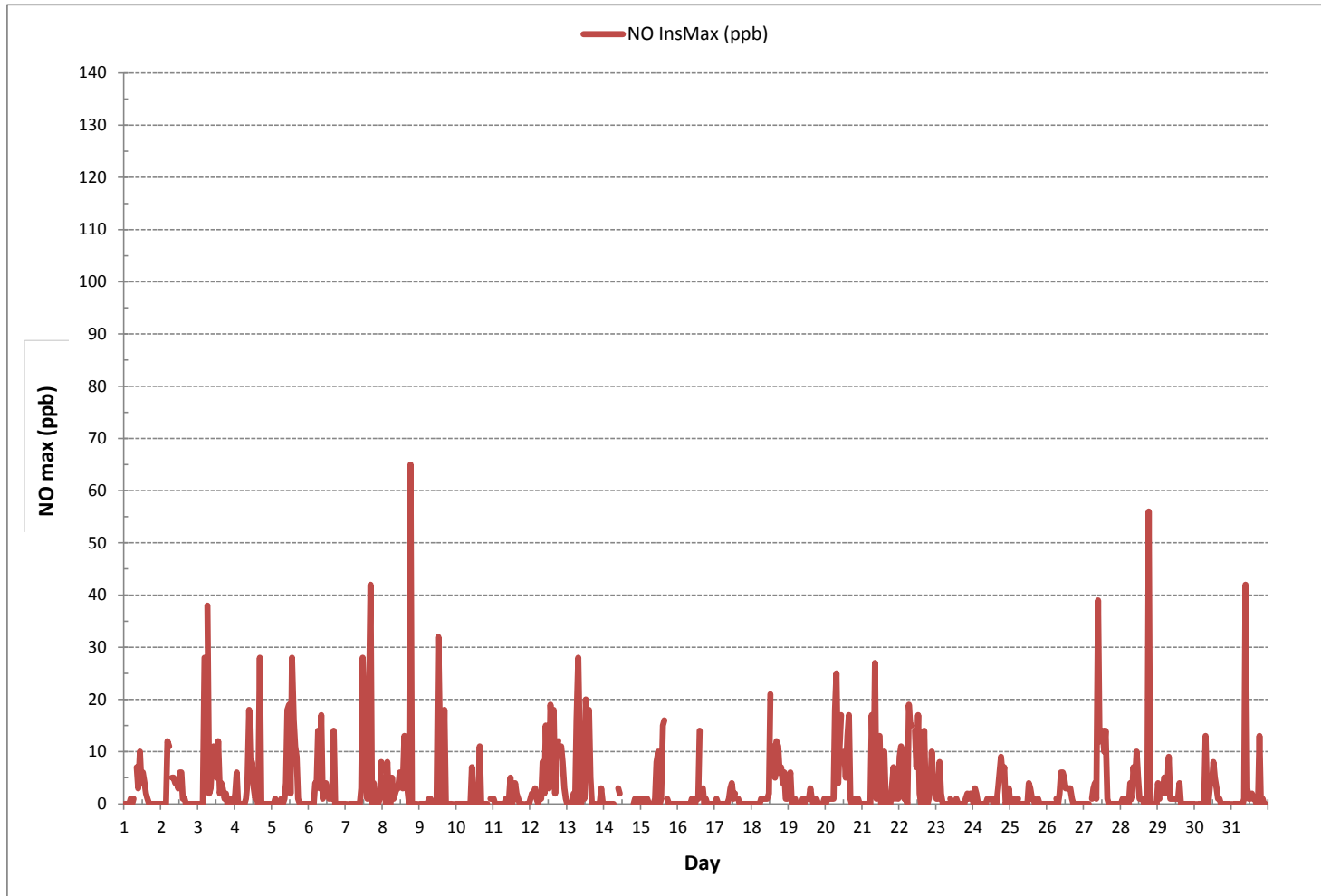
STATUS FLAG CODES

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:	354
MAXIMUM INSTANTANEOUS VALUE:	65 ppb @ HOUR 18 ON DAY 8
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	7
OPERATIONAL TIME:	740 hrs

NITRIC OXIDE Instantaneous Maximum (NO ppb)



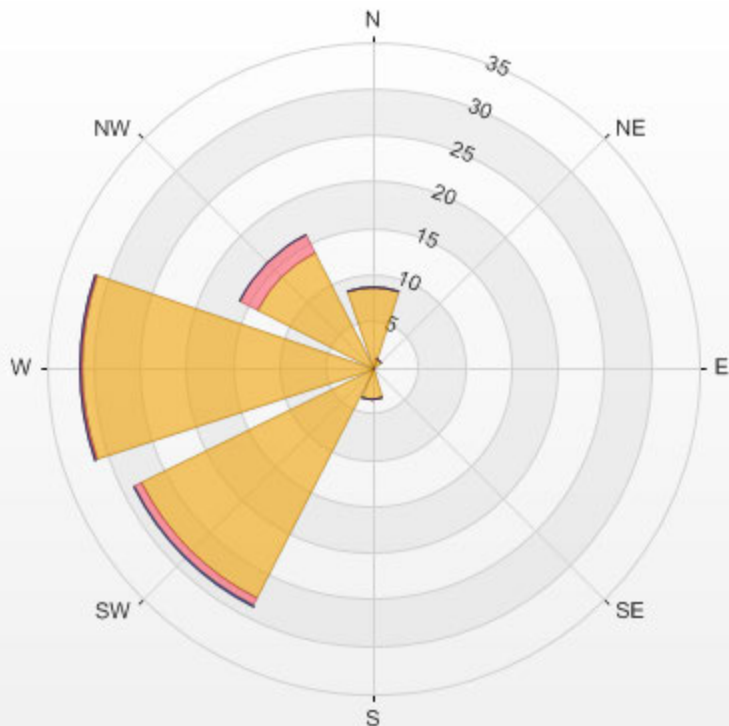
Wind: LICA MASKWA  
 Poll.: LICA MASKWA-NO[ppb]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 9.93% Calm Avg: 0.61 [ppb]

Direction	0.0-4.7	4.7-9.3	9.3-14.0	>14.0	Total
N	8.8	0.0	0.0	0.0	8.8
NE	1.2	0.0	0.0	0.0	1.2
E	0.1	0.0	0.0	0.0	0.1
SE	0.3	0.0	0.0	0.0	0.3
S	3.5	0.0	0.0	0.0	3.5
SW	27.8	0.9	0.1	0.0	28.8
W	31.2	0.1	0.1	0.0	31.5
NW	13.8	2.2	0.0	0.0	16.0
Summary	86.6	3.2	0.3	0.0	90.1

% Icon Classes (ppb) 87 0.0-4.7 3 4.7-9.3 0 9.3-14.0 0 >14.0

LICA MASKWA Poll.: LICA MASKWA-NO[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 9.93% Calm Poll Avg: 0.61[ppb]



***NITROGEN DIOXIDE***



**NITROGEN DIOXIDE Hourly Averages (NO<sub>2</sub> 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	6	8	8	9	9	9	13	S	15	10	10	8	9	9	9	10	10	9	9	7	7	10	11	11	6	15	9	24	
2	13	15	14	12	23	26	S	21	16	12	7	4	8	7	3	7	6	3	2	1	2	2	6	5	1	26	9	24	
3	5	6	8	8	9	S	11	8	9	14	15	7	8	5	3	8	6	6	2	1	2	6	10	8	1	15	7	24	
4	7	3	0	1	S	1	2	3	6	5	4	3	1	1	4	5	7	4	3	2	2	4	5	4	0	7	3	24	
5	5	5	4	S	5	3	1	4	3	10	14	11	3	10	7	8	9	3	3	1	2	1	1	1	1	14	5	24	
6	2	2	S	2	6	9	6	6	6	4	7	9	10	6	6	6	6	7	9	7	3	2	1	2	1	10	5	24	
7	1	S	1	1	1	1	1	3	3	2	3	2	2	2	2	7	5	3	3	1	7	1	4	32	1	32	4	24	
8	S	27	14	18	3	2	6	6	7	8	8	10	9	8	14	19	19	18	15	13	14	14	15	S	2	27	12	24	
9	5	2	2	9	2	1	1	2	2	1	1	1	2	2	1	1	4	2	2	1	1	1	S	1	1	9	2	24	
10	4	1	1	1	2	4	2	5	2	6	3	3	1	3	5	14	3	1	1	1	0	S	2	4	0	14	3	24	
11	7	1	0	1	1	0	1	3	3	2	3	5	3	4	8	7	6	6	7	8	S	9	12	15	0	15	5	24	
12	20	23	22	23	21	19	19	17	17	13	8	10	8	8	5	19	5	17	8	S	17	12	7	16	5	23	15	24	
13	3	2	1	12	10	5	4	3	4	1	1	4	7	12	15	3	0	1	S	0	1	2	7	2	0	15	4	24	
14	0	4	3	3	8	3	2	S1	S1	7	6	C	C	C	C	C	C	C	C	6	5	7	10	9	0	10	5	22	
15	10	10	13	15	10	3	1	2	0	1	2	1	1	2	12	7	S	5	1	1	1	1	1	1	0	15	4	24	
16	1	1	1	1	0	1	1	1	1	1	1	2	1	1	1	S	2	1	4	5	3	2	3	4	0	5	2	24	
17	5	4	3	3	3	3	3	3	4	4	5	6	3	1	S	5	1	1	1	1	1	0	1	1	0	6	3	24	
18	1	1	1	1	0	1	1	1	1	1	2	4	10	S	9	11	19	19	10	17	3	8	1	0	0	19	5	24	
19	2	2	0	1	2	1	S1	1	1	2	1	2	S	3	6	5	4	4	5	5	4	3	4	6	0	6	3	23	
20	6	8	7	7	9	11	11	18	15	18	17	S	15	10	8	7	7	7	10	11	9	10	9	8	6	18	10	24	
21	7	5	5	5	7	8	10	8	11	1	S	3	2	2	1	1	1	1	1	1	2	9	7	9	11	1	11	5	24
22	18	19	13	10	13	4	4	11	9	S	11	6	3	1	1	1	2	6	5	5	16	18	12	6	1	19	8	24	
23	6	11	13	1	0	0	1	1	S	4	1	1	2	3	2	2	1	1	4	6	8	11	16	7	0	16	4	24	
24	1	13	5	1	1	1	1	S	1	3	2	1	1	1	2	2	3	8	6	7	6	1	1	6	1	13	3	24	
25	2	4	2	1	2	3	S	3	2	2	1	1	4	4	1	2	2	4	3	3	3	4	3	3	1	4	3	24	
26	3	3	3	4	4	S	4	6	10	14	9	6	4	5	8	8	6	5	4	4	4	4	4	3	3	14	5	24	
27	3	4	5	4	S	6	7	9	10	10	7	11	11	9	6	3	2	2	1	1	3	3	4	5	1	11	5	24	
28	12	12	9	S	11	16	14	12	15	3	4	4	1	2	1	1	3	5	2	1	2	2	2	2	1	16	6	24	
29	8	6	S	3	4	8	5	9	3	2	2	2	3	2	3	1	1	1	1	1	2	3	3	2	1	9	3	24	
30	1	S	1	1	1	1	1	3	2	2	4	4	6	5	5	8	11	12	11	8	7	5	6	5	1	12	5	24	
31	S	5	5	6	11	11	9	8	7	11	5	3	2	3	3	5	6	8	7	4	5	6	6	S	2	11	6	24	
HOURLY MAX	20	27	22	23	23	26	19	21	17	18	17	11	15	12	15	19	19	19	15	17	17	18	16	32					
HOURLY AVG	6	7	6	6	6	6	5	6	6	6	5	5	5	5	5	6	5	6	5	4	5	5	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

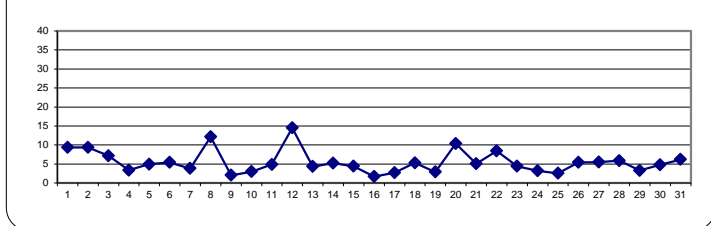
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

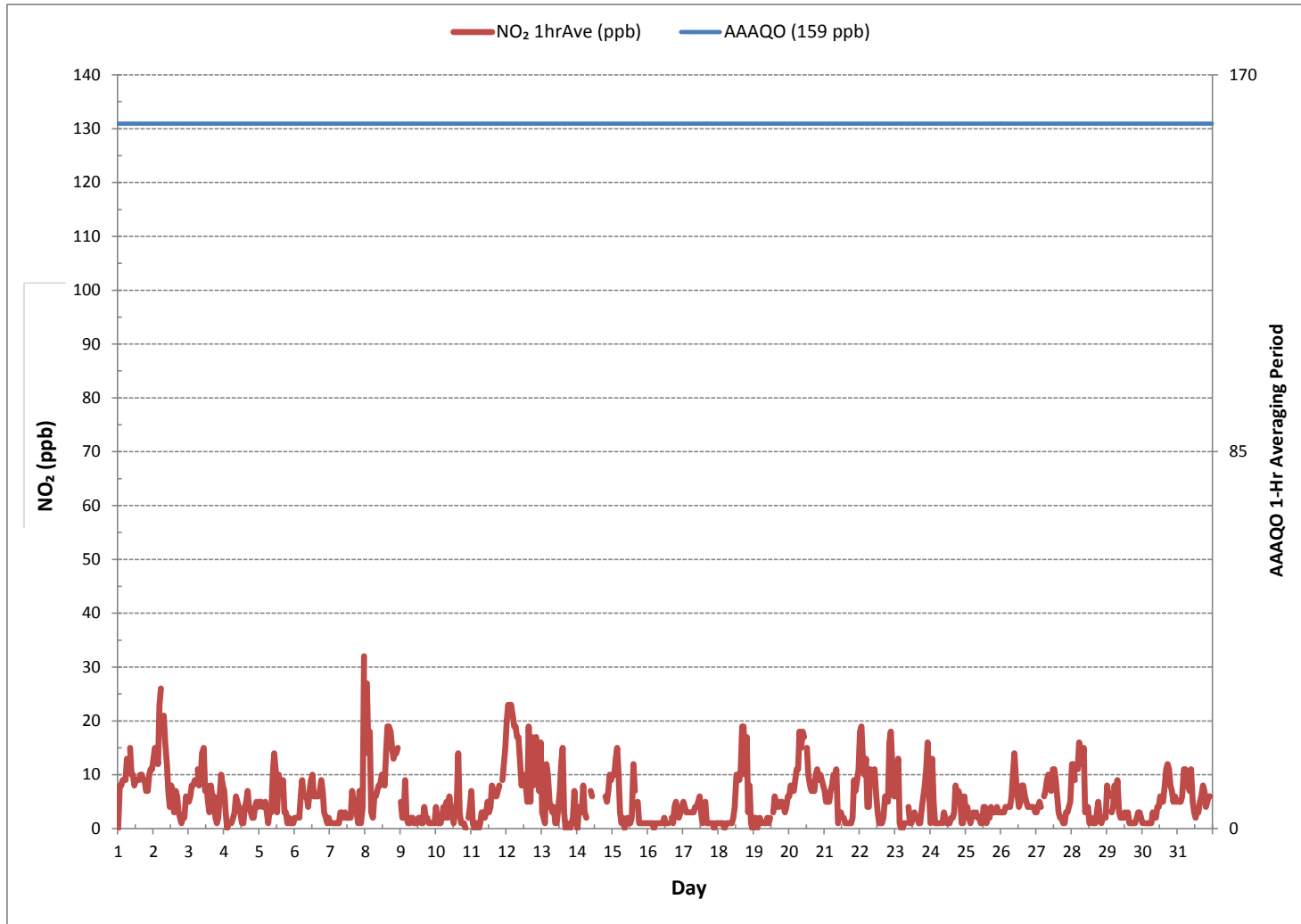
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	686			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	2	ON DAY 4
MAXIMUM 1-HR AVERAGE:	32 ppb	@ HOUR	23	ON DAY 7
MAXIMUM 24-HR AVERAGE:	15 ppb			ON DAY 12
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	741 hrs	
MONTHLY CALIBRATION TIME:	8 hrs	AMD OPERATION UPTIME:	99.6 %	
STANDARD DEVIATION:	5	MONTHLY AVERAGE:	6 ppb	

**24 HR AVERAGES December 2017**



NITROGEN DIOXIDE Hourly Averages (NO<sub>2</sub> ppb)





**LAKELAND INDUSTRY & COMMUNITY ASSOCIATION**  
**Maskwa Continuous Monitoring Station - December 2017**

**NITROGEN DIOXIDE Instantaneous Maximum (NO<sub>2</sub> ppb)**

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	7	9	11	11	10	10	15	S	22	11	15	10	13	11	11	13	13	10	8	8	12	12	13	7	22	12	24		
2	16	16	16	16	27	27	S	23	20	14	11	7	10	11	7	10	8	6	3	2	3	5	8	7	2	27	12	24	
3	6	8	9	8	29	S	24	11	12	15	15	14	10	11	5	18	14	12	5	1	2	10	17	11	1	29	12	24	
4	11	15	1	1	S	1	3	4	10	13	6	10	2	2	5	6	23	5	4	2	2	4	5	4	1	23	6	24	
5	4	4	4	S	9	5	1	7	5	13	25	21	5	28	15	14	20	7	5	1	2	1	1	1	1	28	9	24	
6	2	2	S	2	14	16	24	8	17	6	8	12	11	8	7	8	17	8	11	10	4	1	1	1	1	24	9	24	
7	1	S	1	1	1	1	2	4	4	4	5	23	10	12	3	23	46	4	19	1	19	2	19	35	1	46	10	24	
8	S	34	23	34	6	2	20	12	10	15	13	15	12	11	24	21	21	18	61	14	14	14	14	S	2	61	19	24	
9	6	3	4	4	21	13	1	4	6	2	1	1	13	19	3	31	3	5	1	1	1	1	S	1	1	31	6	24	
10	13	4	1	1	3	5	3	7	4	14	14	3	1	8	10	21	5	1	1	0	0	S	6	13	0	21	6	24	
11	11	4	0	1	1	1	2	4	7	3	5	9	3	7	11	11	8	6	8	9	S	10	13	17	0	17	7	24	
12	23	25	25	26	25	21	23	20	21	17	13	18	14	17	14	34	11	28	22	S	30	27	19	19	11	34	21	24	
13	8	4	1	23	24	13	17	25	14	1	13	11	25	23	31	13	1	1	S	1	1	5	15	11	1	31	12	24	
14	1	7	7	5	9	9	3	S1	S1	8	6	C	C	C	C	C	C	C	C	7	7	9	11	10	1	11	7	22	
15	15	15	15	17	14	7	2	3	1	7	12	6	1	4	22	22	S	14	1	1	1	1	1	1	1	1	22	8	24
16	1	1	1	1	1	1	1	1	1	1	1	3	3	3	11	S	6	2	6	5	4	3	3	4	1	11	3	24	
17	5	4	4	3	3	3	5	5	4	4	7	7	4	3	S	11	1	1	1	1	1	0	1	1	0	11	3	24	
18	1	1	1	1	0	1	8	2	1	2	4	7	27	S	20	18	27	28	24	25	20	22	6	3	0	28	11	24	
19	13	15	0	4	5	1	S1	S1	1	3	2	3	S	4	10	7	4	5	8	6	4	4	5	7	0	15	5	22	
20	7	8	8	8	10	11	20	23	19	19	18	S	17	11	15	14	8	8	11	13	10	10	10	8	7	23	12	24	
21	7	6	5	6	9	10	21	13	28	3	S	26	2	3	10	3	2	1	1	9	23	11	15	13	1	28	10	24	
22	23	24	24	15	16	7	20	21	24	S	21	15	11	3	2	1	16	9	7	15	18	22	17	13	1	24	15	24	
23	10	16	20	7	0	1	1	1	S	5	1	3	3	4	2	2	2	2	4	7	16	15	24	25	0	25	7	24	
24	3	18	11	1	1	1	2	S	2	4	3	1	1	1	2	2	13	17	22	14	18	3	10	12	1	22	7	24	
25	8	8	6	1	4	3	S	3	3	1	1	1	7	6	2	2	3	5	7	4	4	5	3	4	1	8	4	24	
26	3	4	4	4	S	4	7	14	14	13	7	5	7	9	9	7	6	4	4	5	4	5	4	3	14	6	24		
27	4	6	5	5	S	7	10	11	11	24	15	13	13	17	12	5	3	3	2	3	4	5	5	10	2	24	8	24	
28	13	13	10	S	15	17	16	14	18	11	11	8	3	4	3	2	2	4	45	4	1	3	3	3	1	45	10	24	
29	17	13	S	8	15	17	9	17	7	5	2	3	3	3	7	2	2	2	2	1	3	4	3	2	1	17	6	24	
30	1	S	1	1	1	1	2	12	3	3	8	7	11	8	7	10	11	13	13	9	7	5	7	6	1	13	6	24	
31	S	7	5	10	11	12	10	8	8	23	6	3	3	4	4	5	8	9	16	5	6	7	7	S	3	23	8	24	
HOURLY MAX	23	34	25	34	29	27	24	25	28	24	25	26	27	28	31	34	46	28	61	25	30	27	24	35					
HOURLY AVG	8	10	8	8	10	7	10	10	10	9	9	9	8	9	10	11	11	8	11	6	8	8	9	9					

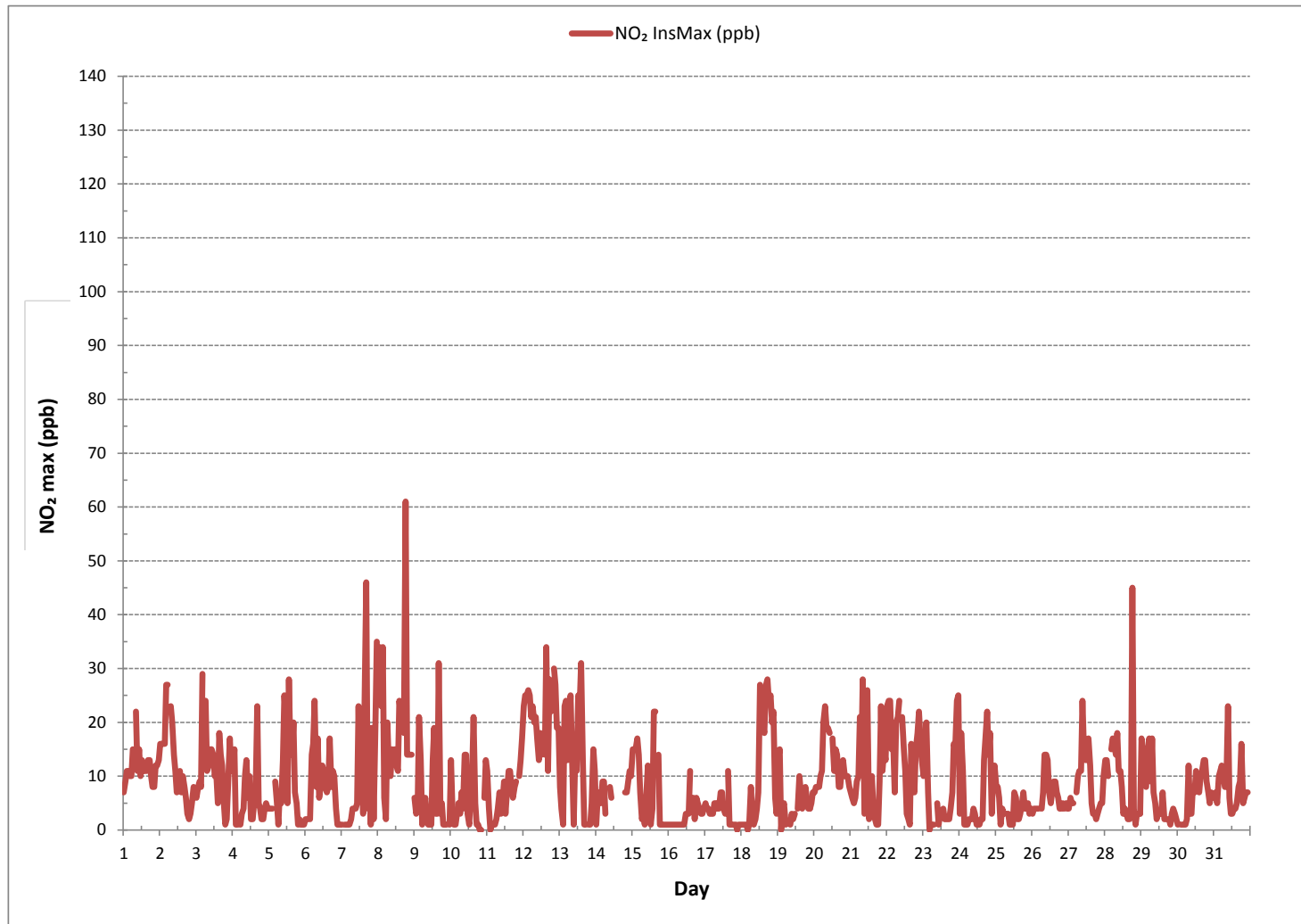
**STATUS FLAG CODES**

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:	693
MAXIMUM INSTANTANEOUS VALUE:	61 ppb @ HOUR 18 ON DAY 8
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	740 hrs
STANDARD DEVIATION:	8

NITROGEN DIOXIDE Instantaneous Maximum (NO<sub>2</sub> ppb)



Wind: LICA MASKWA  
 Poll.: LICA MASKWA-NO2[ppb]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 9.93%

Calm Avg: 5.02 [ppb]

Direction	0.0-11.0	11.0-22.0	22.0-33.0	>33.0	Total
N	8.8	0.0	0.0	0.0	8.8
NE	1.2	0.0	0.0	0.0	1.2
E	0.1	0.0	0.0	0.0	0.1
SE	0.3	0.0	0.0	0.0	0.3
S	3.3	0.1	0.0	0.0	3.5
SW	21.9	6.3	0.6	0.0	28.8
W	29.9	1.3	0.3	0.0	31.5
NW	12.7	3.3	0.0	0.0	16.0
Summary	78.1	11.1	0.9	0.0	90.1

% Icon Classes (ppb)

78

0.0-11.0

11

11.0-22.0

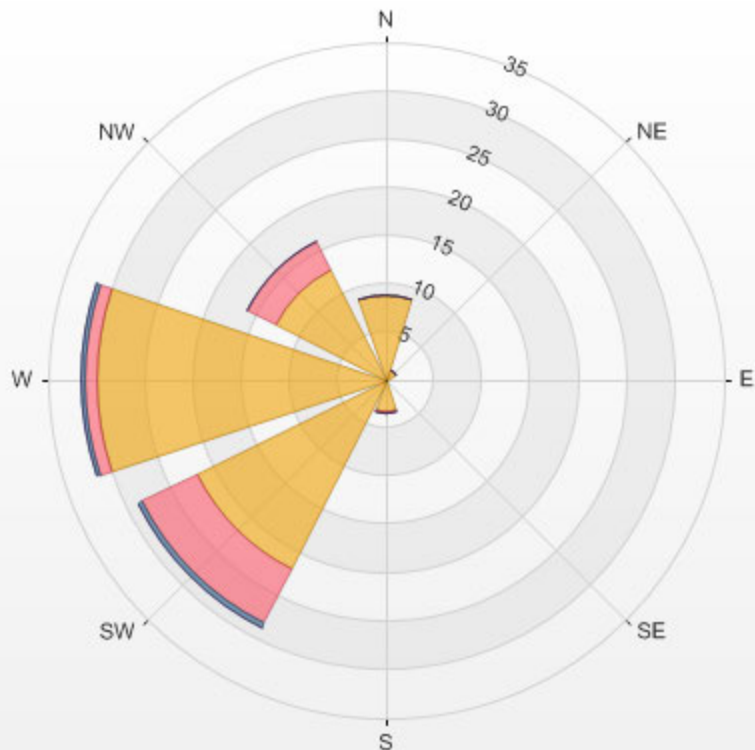
1

22.0-33.0

0

>33.0

LICA MASKWA Poll.: LICA MASKWA-NO2[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 9.93% Calm Poll Avg: 5.02[ppb]



NO<sub>2</sub>[ppb] Calibration: LICA MASKWA Monthly: 17/12 Type: Span



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

***WIND SPEED***





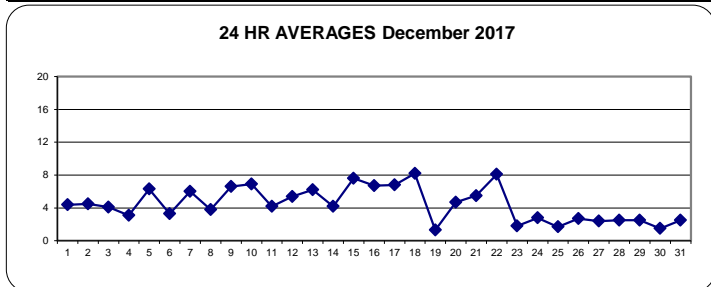
WIND SPEED Hourly Averages (WS kph)

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 MIN.	DAILY MAX.	24-HR AVG.	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59				
DAY 1	5.9	4.4	4.3	5.2	6.7	4.9	6.7	5.0	6.9	7.0	4.3	3.5	1.7	3.4	5.1	1.6	3.4	5.7	3.7	4.6	6.0	4.1	4.3	3.6	1.6	7.0	4.4	24
2	3.4	3.5	2.3	5.3	9.1	5.9	6.8	7.7	4.8	4.6	3.7	4.2	5.7	5.1	3.9	3.1	3.2	3.1	3.7	4.0	2.6	3.6	6.6	6.1	2.3	9.1	4.5	24
3	4.4	5.4	4.2	4.1	3.8	5.8	4.8	5.1	4.1	5.1	5.3	6.8	7.3	7.3	7.1	6.2	5.6	4.4	3.3	2.5	3.2	4.2	3.4	3.4	2.5	7.3	4.1	24
4	4.7	5.0	5.6	6.3	6.6	5.4	5.2	3.9	4.1	4.0	3.6	4.4	3.8	4.5	3.7	3.8	2.7	4.2	4.8	5.0	4.1	4.3	4.2	2.7	2.7	6.6	3.1	24
5	2.1	2.1	3.0	5.1	8.8	11.3	10.8	9.9	10.0	10.7	10.9	11.5	10.6	10.3	10.1	10.6	9.6	6.7	6.6	9.9	9.5	8.3	7.8	7.7	2.1	11.5	6.3	24
6	5.3	2.8	2.4	2.2	3.0	3.4	3.4	2.7	3.2	3.4	5.9	5.8	6.9	6.0	5.4	5.3	5.6	5.5	4.8	4.5	3.9	5.9	7.3	7.2	2.2	7.3	3.3	24
7	5.8	6.7	8.1	7.2	7.5	7.6	7.6	8.3	7.4	5.4	4.7	7.1	7.2	8.5	8.0	5.2	4.7	4.3	4.5	2.1	3.3	4.2	4.9	4.6	2.1	8.5	6.0	24
8	5.0	4.4	3.6	3.1	3.3	3.4	3.1	3.7	3.4	3.6	4.3	3.2	3.7	5.4	4.2	5.0	4.3	5.5	4.7	6.2	6.6	3.8	4.3	3.9	3.1	6.6	3.8	24
9	3.4	5.8	10.2	11.6	10.3	8.3	7.0	6.6	5.1	7.5	8.0	9.1	10.5	6.6	7.5	5.6	5.3	6.9	4.2	3.0	5.3	5.6	5.5	4.8	3.0	11.6	6.6	24
10	5.4	4.0	3.5	3.3	3.8	4.9	3.9	5.5	8.7	6.3	6.2	7.7	16.5	16.5	15.7	14.6	12.1	11.1	10.0	9.4	8.0	5.5	4.8	4.2	3.3	16.5	6.9	24
11	4.2	5.5	5.1	4.0	4.1	3.5	3.2	3.9	4.1	4.1	3.8	3.6	5.6	5.7	5.4	4.1	4.9	6.4	6.1	6.6	5.0	5.8	6.6	4.2	3.2	6.6	4.2	24
12	4.0	4.8	5.2	6.1	7.3	6.6	5.7	5.1	4.6	5.1	7.3	7.7	6.3	10.1	11.4	9.6	10.2	9.5	9.4	7.2	6.4	6.7	5.4	4.5	4.0	11.4	5.4	24
13	4.7	4.0	4.3	4.2	4.0	4.4	5.4	5.2	4.8	5.7	7.9	11.3	10.0	10.3	9.3	9.9	8.9	8.9	7.5	8.1	6.4	5.8	5.4	3.8	3.8	11.3	6.2	24
14	5.0	4.6	3.3	2.8	2.8	2.9	2.5	2.9	4.8	4.2	4.3	6.5	5.6	6.4	5.8	6.2	6.0	6.5	4.5	5.5	5.7	4.8	3.3	3.1	2.5	6.5	4.2	24
15	2.6	5.2	4.2	5.0	3.1	5.9	4.2	4.9	7.9	10.5	11.8	12.4	13.1	11.5	11.6	12.5	10.5	7.7	6.3	8.8	9.5	11.0	8.1	5.9	2.6	13.1	7.6	24
16	8.2	11.2	9.7	9.5	9.1	8.2	9.1	6.7	8.3	9.1	6.6	9.2	7.9	9.3	7.9	4.2	4.3	4.1	6.7	6.8	7.8	7.5	8.8	8.7	4.1	11.2	6.7	24
17	5.9	9.0	7.5	6.9	7.5	8.4	7.1	8.0	8.0	9.0	7.9	7.0	7.6	11.5	14.5	8.6	5.2	6.2	10.4	10.1	9.4	8.4	8.4	7.0	5.2	14.5	6.8	24
18	6.6	7.2	7.7	7.2	6.3	8.6	9.5	9.1	9.1	9.2	10.7	11.5	10.6	10.3	12.1	9.7	10.7	10.0	8.0	7.4	5.4	7.4	5.8	4.9	4.9	12.1	8.2	24
19	5.6	5.6	6.4	5.7	6.9	5.2	7.0	5.8	5.1	3.6	3.7	3.5	4.4	2.5	2.4	2.2	2.7	3.8	2.7	1.6	1.6	2.4	3.0	2.0	1.6	7.0	1.3	24
20	1.2	1.8	1.8	1.9	3.1	2.0	1.8	3.0	3.3	5.8	4.5	4.6	4.1	6.7	6.7	5.2	5.2	4.0	7.2	8.9	8.7	8.4	8.5	9.0	1.2	9.0	4.7	24
21	9.2	9.5	8.0	7.9	5.2	3.7	3.6	6.9	6.3	7.9	8.5	7.4	7.5	7.7	6.7	6.9	6.2	6.3	8.0	6.2	7.9	8.8	8.8	7.8	3.6	9.5	5.5	24
22	7.9	7.5	7.7	6.7	6.4	6.5	7.4	7.8	8.5	8.6	7.9	10.0	10.5	9.9	10.8	9.7	10.0	9.1	9.3	8.8	8.3	6.3	5.5	6.3	5.5	10.8	8.1	24
23	6.2	5.8	6.7	8.0	8.3	3.8	7.3	6.3	5.3	3.1	3.7	4.6	4.9	4.6	4.2	4.0	2.4	3.7	3.4	2.1	3.1	5.0	5.2	5.5	2.1	8.3	1.8	24
24	5.7	8.0	6.4	7.7	7.1	9.0	11.3	10.2	10.6	6.2	8.2	6.9	6.8	7.5	7.4	5.4	4.7	5.3	5.9	5.9	5.1	3.6	3.4	3.7	3.4	11.3	2.8	24
25	3.1	3.4	2.8	1.1	2.2	2.2	1.3	2.1	2.6	3.2	4.6	5.1	4.6	5.1	4.6	4.2	3.6	3.0	4.2	2.2	2.4	2.0	1.2	2.1	1.1	5.1	1.7	24
26	1.9	2.7	1.9	2.7	3.5	1.7	2.5	3.2	5.4	2.9	3.7	3.9	3.8	5.9	5.0	5.2	4.7	2.4	1.9	1.8	1.3	1.4	1.5	1.9	1.3	5.9	2.7	24
27	1.5	1.5	1.7	1.1	1.4	1.4	1.4	1.9	1.5	1.5	2.3	3.1	3.6	4.5	4.8	3.4	1.9	4.1	3.9	2.9	2.8	4.2	5.3	5.8	1.1	5.8	2.4	24
28	5.2	3.5	2.8	3.5	3.4	3.5	3.4	3.1	5.1	6.4	6.5	7.1	7.7	7.6	C	C	C	C	C	3.2	3.6	4.1	3.2	3.0	2.8	7.7	2.5	24
29	2.9	3.0	2.8	4.5	3.6	2.8	5.0	6.0	3.8	2.8	4.1	4.8	4.5	4.5	3.5	3.0	2.3	1.8	2.0	1.1	1.8	0.9	2.0	1.1	0.9	6.0	2.5	24
30	0.9	0.6	0.3	0.8	0.9	1.1	1.1	1.9	1.5	1.4	1.1	1.8	4.0	2.2	3.9	4.1	3.2	2.8	2.4	2.2	1.7	1.3	1.1	0.3	4.1	1.5	24	
31	0.5	1.7	1.5	1.3	0.3	0.1	0.2	0.7	0.3	0.3	1.9	3.0	3.0	5.2	5.0	3.8	1.9	1.7	3.7	2.3	5.1	5.9	6.7	7.9	0.1	7.9	2.5	24
HOURLY MAX	9.2	11.2	10.2	11.6	10.3	11.3	11.3	10.2	10.6	10.7	11.8	12.4	16.5	16.5	15.7	14.6	12.1	11.1	10.4	10.1	9.5	11.0	8.8	9.0				
HOURLY AVG	4.5	4.8	4.7	4.9	5.1	4.9	5.1	5.3	5.4	5.4	5.7	6.4	6.8	7.2	7.1	6.1	5.5	5.5	5.5	5.2	5.2	5.2	5.2	4.8				

STATUS FLAG CODES

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

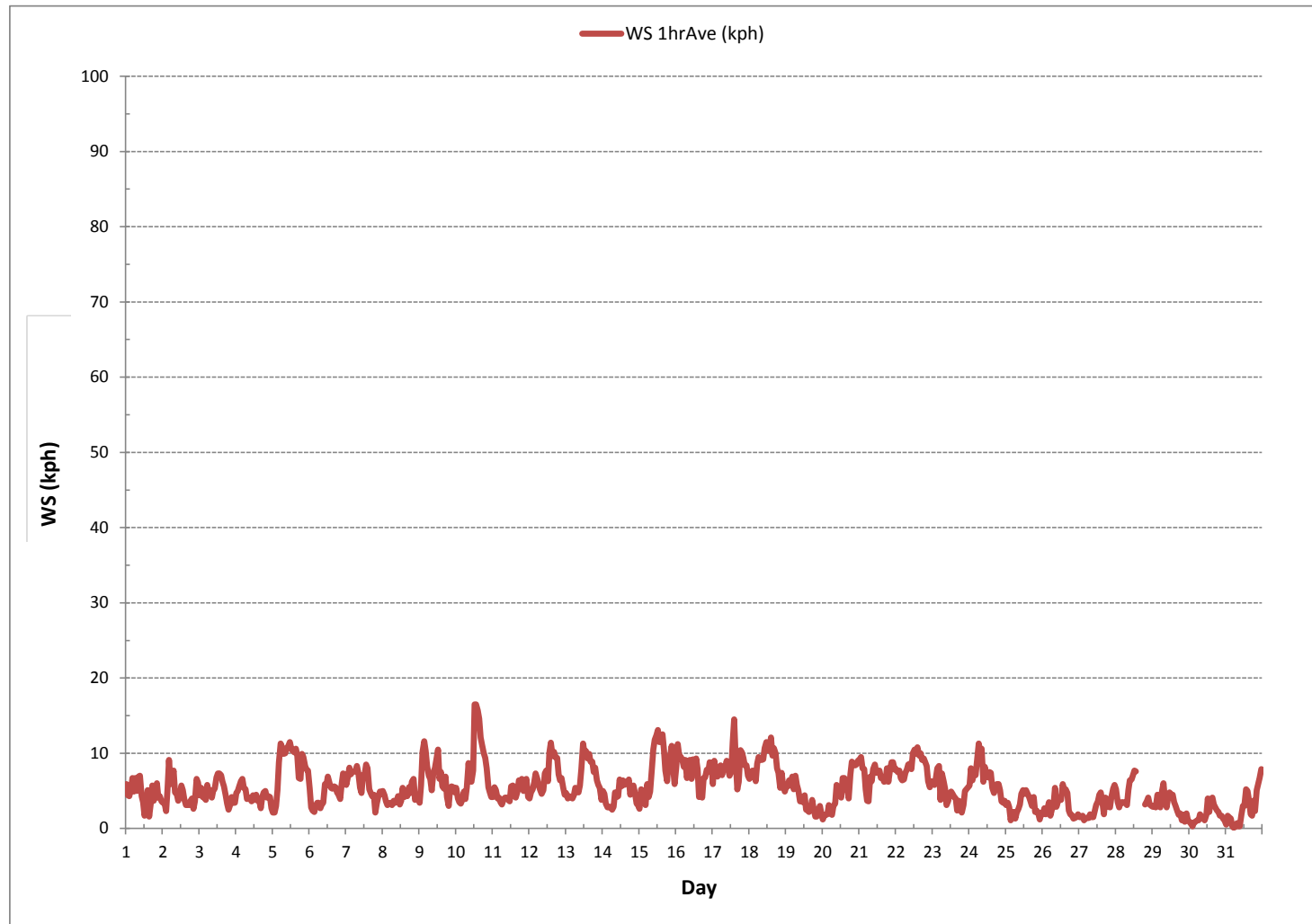
LAST CALIBRATION:	December 28, 2017
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	739
MINIMUM 1-HR AVERAGE:	0.1 kph @ HOUR 5 ON DAY 31
MAXIMUM 1-HR AVERAGE:	16.5 kph @ HOUR 12 ON DAY 10
MAXIMUM 24-HR AVERAGE:	8.2 kph ON DAY 18
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	744 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	2.7
MONTHLY AVERAGE:	3.8 kph

WIND SPEED Hourly Averages (WS kph)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Maskwa Continuous Monitoring Station - December 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	16.4	15.9	9.8	11.6	13.1	11.0	14.9	13.3	16.2	15.7	11.3	9.8	6.3	10.2	13.2	8.1	11.8	15.1	12.4	15.5	15.3	13.5	10.9	10.7	6.3	16.4	12.6	24	
2	8.0	8.5	7.6	18.4	18.6	13.5	15.4	16.4	12.7	12.7	10.7	13.3	13.3	17.0	12.5	12.3	13.5	7.2	8.1	11.8	10.9	10.7	16.3	14.6	7.2	18.6	12.7	24	
3	11.8	12.9	12.7	9.4	12.1	14.0	13.1	13.5	11.3	11.6	16.5	25.8	24.7	20.3	20.3	25.6	17.1	15.3	13.6	13.1	13.5	13.7	13.5	13.3	9.4	25.8	15.4	24	
4	16.0	17.7	23.0	26.9	31.7	18.4	20.2	14.9	17.3	13.5	12.9	15.1	14.9	14.4	12.4	10.5	9.4	11.8	12.7	15.1	12.7	12.9	13.3	9.9	9.4	31.7	15.7	24	
5	6.6	10.5	11.3	18.1	30.7	42.5	33.9	34.4	33.2	33.7	53.9	49.7	45.1	38.3	39.8	37.2	38.1	25.4	24.1	28.1	26.0	29.3	30.0	23.0	6.6	53.9	31.0	24	
6	15.3	10.7	11.6	9.7	13.4	16.4	15.1	12.2	11.3	9.1	12.9	13.7	16.3	16.8	15.1	16.6	17.0	14.6	13.1	12.9	14.4	22.3	23.2	19.9	9.1	23.2	14.7	24	
7	17.3	20.8	22.7	26.9	21.6	28.4	23.5	24.7	23.6	18.8	15.5	21.2	24.7	24.5	27.1	17.7	15.7	14.6	16.0	8.4	12.9	14.2	17.7	14.4	8.4	28.4	19.7	24	
8	14.8	11.6	11.1	12.0	11.9	11.6	11.3	12.2	11.1	11.6	13.3	12.9	11.6	11.6	11.1	10.1	8.5	14.0	12.7	12.9	15.5	9.8	10.9	11.8	8.5	15.5	11.9	24	
9	9.3	23.4	32.4	32.4	40.9	26.0	26.9	23.4	18.8	25.1	27.1	30.8	29.5	29.9	38.1	21.0	25.4	23.0	15.0	15.5	15.9	17.7	17.9	15.1	9.3	40.9	24.2	24	
10	15.3	13.5	14.2	10.9	11.3	15.1	13.4	16.6	52.7	49.7	23.6	39.2	58.0	54.3	50.3	60.7	53.4	46.9	41.6	40.3	31.3	27.8	20.6	16.6	10.9	60.7	32.4	24	
11	14.2	22.5	14.8	14.2	13.3	12.0	13.7	15.3	11.6	13.4	14.2	10.9	13.1	13.3	14.6	10.5	11.3	17.5	17.3	17.9	12.1	15.5	18.8	19.0	10.5	22.5	14.6	24	
12	12.0	15.1	13.5	18.1	15.5	14.6	14.4	13.4	11.8	17.2	26.7	26.2	22.5	38.7	33.7	31.7	36.1	38.5	36.1	29.3	18.4	24.6	19.5	15.1	11.8	38.7	22.6	24	
13	16.6	14.0	15.7	18.6	14.6	16.8	18.6	20.3	18.7	24.3	37.0	34.4	32.8	36.8	33.0	38.3	36.3	45.3	31.5	44.2	30.4	24.4	19.2	11.6	11.6	45.3	26.4	24	
14	15.1	15.5	13.1	12.0	11.1	11.3	8.6	12.5	13.5	10.0	9.1	15.7	14.6	15.7	13.5	17.8	14.8	17.5	17.7	14.4	14.4	15.5	11.8	11.8	8.6	17.8	13.6	24	
15	8.7	14.6	11.0	12.3	13.3	22.3	18.4	17.7	26.2	40.0	41.6	38.7	39.2	44.9	55.8	41.2	37.5	25.1	32.6	33.3	39.4	39.4	35.2	24.5	8.7	55.8	29.7	24	
16	32.2	37.6	34.2	30.9	32.8	30.2	29.8	22.7	30.4	33.9	22.3	29.5	27.8	34.2	28.2	21.2	17.9	14.4	15.5	16.4	18.4	16.2	20.0	18.8	14.4	37.6	25.6	24	
17	17.7	20.8	17.7	17.9	21.4	21.2	18.4	19.6	21.9	23.4	23.8	33.5	26.9	56.0	65.7	40.3	23.2	28.4	39.4	36.2	29.2	27.3	24.7	19.9	17.7	65.7	28.1	24	
18	20.3	21.8	28.0	28.4	22.8	32.7	33.9	31.5	35.2	33.1	34.2	40.7	40.5	43.6	46.0	36.6	40.1	38.8	33.3	28.4	28.2	29.8	25.0	19.9	19.9	46.0	32.2	24	
19	23.6	22.5	23.2	21.2	31.1	23.6	19.0	17.3	16.2	19.7	15.1	15.1	14.2	19.8	13.8	13.3	14.4	10.7	23.4	22.8	X	X	X	X	10.7	31.1	19.0	20	
20	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	-	-	-	-
21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
22	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	-	-	-	-
23	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	-	-	-	-
24	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	-	-	-	-
25	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	-	-	-	-
26	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	-	-	-	-
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	C	C	C	C	C	13.3	15.4	10.2	10.0	7.8	7.8	15.4	11.3	10	
29	10.8	14.9	15.1	13.0	13.6	13.6	15.5	21.6	16.2	13.8	16.7	15.8	14.0	14.1	12.7	10.3	11.5	8.2	7.2	5.5	7.3	3.0	5.8	4.8	3.0	21.6	11.9	24	
30	3.1	3.7	2.8	3.8	3.4	3.9	4.0	7.0	6.9	8.0	3.5	6.0	9.4	7.3	8.3	10.6	7.1	5.8	7.4	7.4	5.4	5.7	4.9	3.3	2.8	10.6	5.8	24	
31	3.1	4.1	4.5	4.0	2.1	2.0	2.9	3.4	2.2	3.0	10.1	9.9	9.5	10.5	13.6	12.6	3.8	7.0	10.2	8.9	13.7	16.2	15.1	20.6	2.0	20.6	8.0	24	
HOURLY MAX	32.2	37.6	34.2	32.4	40.9	42.5	33.9	34.4	52.7	49.7	53.9	49.7	58.0	56.0	65.7	60.7	53.4	46.9	41.6	44.2	39.4	39.4	35.2	24.5					
HOURLY AVG	14.0	16.0	15.9	16.9	18.2	18.2	17.5	17.5	19.0	20.1	20.5	23.1	23.1	26.0	26.3	22.9	21.1	20.2	20.0	19.6	18.2	18.2	17.5	14.8					

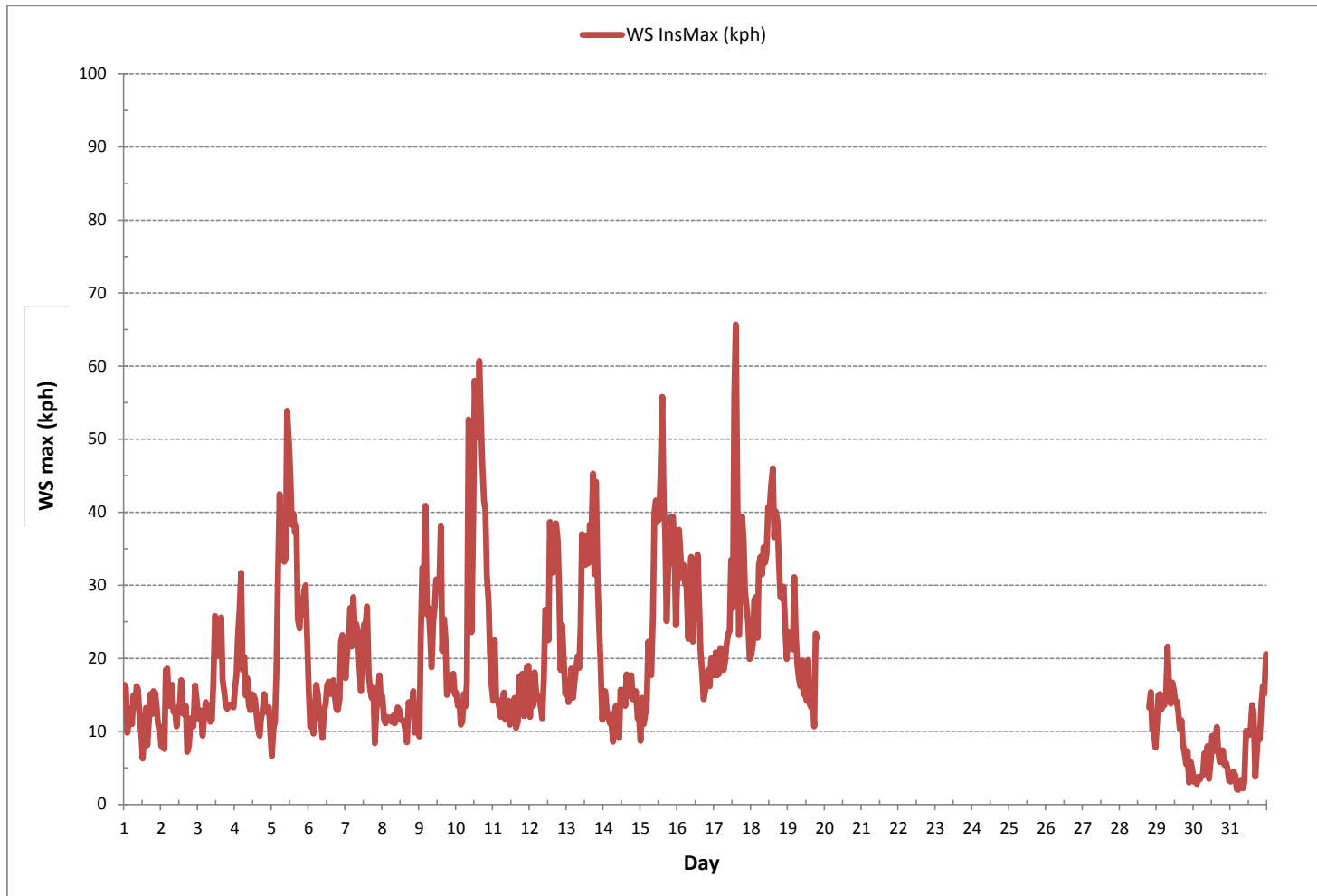
STATUS FLAG CODES

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

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	65.7	kph	@ HOUR	14	ON DAY	17	
OPERATIONAL TIME:						534	hrs

WIND SPEED Instantaneous Maximum (WS kph)



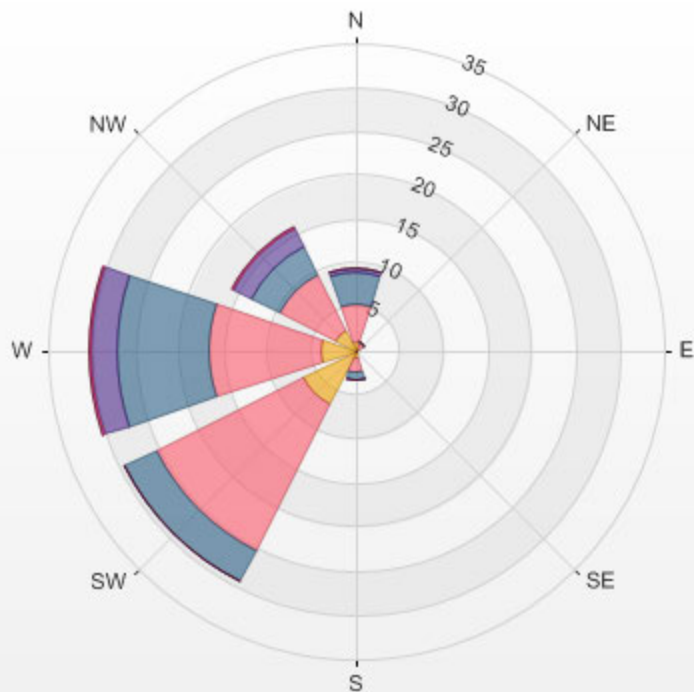
Wind: LICA MASKWA  
 Monitor: WSP [kph]  
 Monthly: 17/12  
 Type: WindRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 10.01%

Direction	1.8-3.4	3.4-6.7	6.7-10.1	10.1-13.4	13.4-16.8	>16.8	Total
<b>N</b>	1.1	4.3	3.5	0.4	0.0	0.0	9.3
<b>NE</b>	0.4	0.7	0.1	0.0	0.0	0.0	1.2
<b>E</b>	0.0	0.1	0.0	0.0	0.0	0.0	0.1
<b>SE</b>	0.1	0.1	0.0	0.0	0.0	0.0	0.3
<b>S</b>	0.8	1.8	0.8	0.0	0.0	0.0	3.4
<b>SW</b>	6.8	18.7	3.9	0.0	0.0	0.0	29.4
<b>W</b>	4.1	12.6	10.6	2.8	0.4	0.0	30.4
<b>NW</b>	2.7	6.9	3.8	2.2	0.3	0.0	15.8
<b>Summary</b>	16.0	45.2	22.7	5.4	0.7	0.0	90.0

% Icon Classes (kph) 16 1.8-3.4 45 3.4-6.7 23 6.7-10.1 5 10.1-13.4 1 13.4-16.8 0 >16.8

LICA MASKWA 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 10.01% Calm Wind Avg Speed: 1.01(kph)



***WIND DIRECTION***



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Maskwa Continuous Monitoring Station - December 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	SSW	SW	SSW	SW	SSW	SW	SSW	SSW	SSW	SSW	SW	SSW	SSW	SW	SSW	S	ESE	SSE	SSW	SSW	SSW	SW	SW	SSW	SSW	SSW	24
2	SW	SSW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SW	SW	SW	SW	SW	W	WSW	WSW	SW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	24
3	SSW	SW	SW	SSW	SSW	SSW	SSW	SW	SW	SW	SW	SW	W	WNW	W	W	WNW	WNW	W	WSW	SW	WSW	WNW	WNW	WNW	WSW	24
4	WNW	W	WSW	WSW	NW	S	WSW	WSW	WNW	W	W	WNW	WSW	WSW	SW	SSW	S	S	S	S	S	S	S	S	S	SW	24
5	SSW	SW	WSW	W	WNW	WNW	WNW	WNW	WNW	WNW	NW	NW	NW	NW	NW	NW	NW	NW	NW	NNE	NNE	NNE	ENE	NE	NW	24	
6	NE	NE	ESE	S	W	WNW	WNW	WSW	WSW	SW	SSW	SW	SSW	SSW	SW	SW	SW	SW	WSW	WSW	W	WNW	W	WSW	24		
7	W	W	WNW	W	W	W	W	W	W	W	WSW	W	W	WNW	WNW	W	W	W	W	WSW	W	W	W	WNW	W	24	
8	WNW	WNW	WNW	WSW	WSW	W	WSW	WSW	WSW	WSW	WSW	W	SSW	SSW	SSW	SSW	SSW	SW	SW	SSW	SSW	SW	SW	SW	SW	24	
9	SSW	W	WNW	WNW	W	W	W	W	W	W	W	W	W	WNW	W	W	WSW	WSW	WNW	WSW	WSW	W	W	W	W	24	
10	W	W	WSW	WSW	SW	WSW	WSW	SW	W	W	SW	WSW	WNW	WNW	WNW	NW	NW	NNW	NNW	NW	W	WNW	NW	WNW	WNW	24	
11	W	W	W	W	W	W	WSW	WSW	W	WSW	W	WSW	SSW	SSW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SW	SW	WSW	SW	24	
12	SW	SW	SW	SW	SW	SW	SW	SW	S	WSW	W	WNW	WNW	WNW	WNW	NW	NW	NW	NW	WNW	WNW	WNW	WNW	WNW	W	24	
13	W	W	W	W	W	W	W	W	W	W	W	W	W	WNW	WNW	NW	NW	W	WNW	WSW	SW	WSW	NW	W	W	24	
14	W	W	WSW	W	W	WSW	WSW	SW	SW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SW	SW	SSW	SW	SW	SW	SW	24	
15	SW	SW	SSW	SSW	WSW	W	WSW	WSW	W	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	W	W	W	W	W	W	24	
16	W	WNW	WNW	WNW	W	W	W	W	WNW	WNW	WNW	W	W	WNW	W	WSW	WSW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	24	
17	SSW	SSW	SSW	SSW	SSW	SSW	SW	SSW	SSW	SSW	SW	WSW	W	WNW	W	W	W	W	W	W	W	WNW	WNW	W	WSW	24	
18	W	W	W	W	W	W	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	NW	NW	WNW	NW	NW	NW	NW	NW	NW	W	SW	24	
19	NW	WNW	SW	NW	NW	WNW	E	SE	ENE	NE	SSE	SW	SSW	SSE	SW	SW	SSW	SSW	SW	SSW	SSW	S	SW	WSW	SW	24	
20	S	SW	W	W	SW	W	SW	SW	SW	SW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	24	
21	SSW	SSW	SSW	SW	SW	WSW	W	NW	NW	NW	NW	NW	W	WNW	NW	NW	NW	NW	NW	NW	NW	WNW	WNW	WNW	WNW	24	
22	NW	NW	WNW	WNW	WNW	W	WNW	WNW	WNW	NW	WNW	WNW	WNW	WNW	WNW	W	WNW	WNW	WNW	WNW	WNW	WNW	NW	WNW	WNW	WNW	24
23	WNW	WNW	NW	SSW	NNE	ENE	NNE	NNE	NNE	NE	ENE	NE	NE	ENE	NE	E	E	NE	SE	WSW	W	W	W	W	N	24	
24	W	WNW	NW	SSW	SSE	ESE	NNE	NE	SSE	WSW	WSW	W	W	NNW	WNW	NNW	NW	NNW	NW	NNW	NW	W	NW	WNW	WNW	24	
25	WSW	WNW	W	S	SSW	W	W	WSW	E	ESE	SSE	S	NW	WNW	W	WSW	S	NW	NW	W	W	WSW	WSW	WSW	WSW	24	
26	WSW	SW	W	SW	SW	SW	SW	SW	SSW	WSW	SW	SW	SW	SSW	SW	SSW	SSW	SSW	SW	WSW	SSW	SW	ESE	ENE	SW	24	
27	SSE	WSW	S	WSW	WSW	S	SSW	SW	WSW	SSW	W	WNW	W	W	W	WSW	W	WSW	WSW	SW	SSW	SSW	SSW	SSW	SSW	24	
28	SSW	SSW	SW	SW	SSW	SW	WSW	WNW	NW	NW	WNW	W	NW	C	C	C	C	C	WNW	SW	ENE	SE	ESE	W	24		
29	NW	NW	WNW	NW	NNW	W	WNW	NW	WSW	SSW	WSW	SW	WSW	WSW	WNW	WNW	W	WSW	WSW	W	W	SW	SW	SW	W	24	
30	SW	W	ESE	ESE	SE	SW	W	WSW	SSE	ESE	W	WSW	SW	W	SW	SW	SW	SW	SW	SW	SW	WSW	S	SSE	SW	24	
31	SSW	SSW	SW	WSW	WSW	SW	SW	SW	S	SW	SW	SW	SSW	SSW	SSW	S	SE	SE	SSW	SW	SW	SW	SSW	SSW	SSW	24	

STATUS FLAG CODES

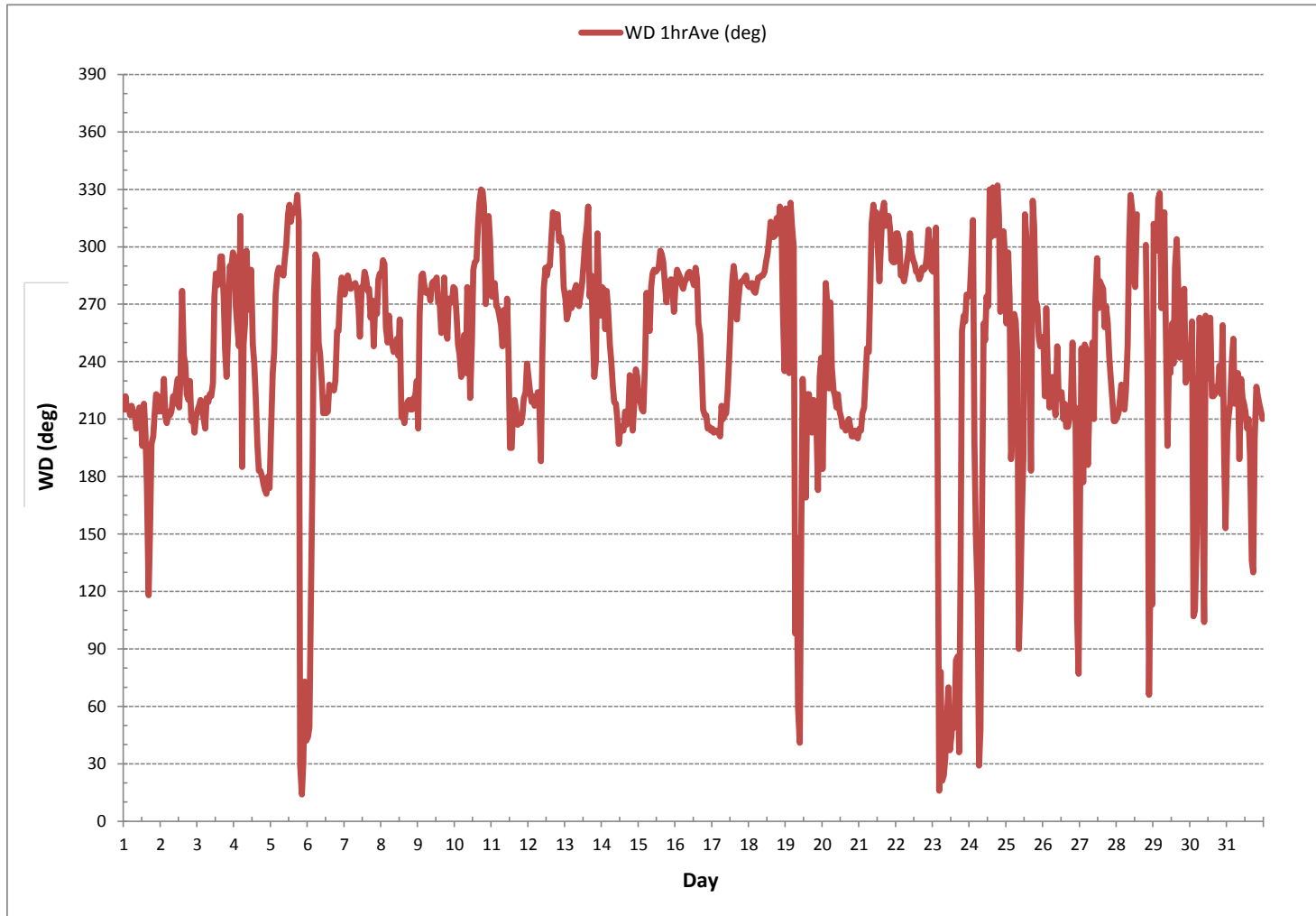
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	December 28, 2017
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	5	hrs	OPERATIONAL TIME:	744	hrs
STANDARD DEVIATION:	58		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	264	(W)



WIND DIRECTION Hourly Averages (WD)



***STANDARD DEVIATION WIND DIRECTION***



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Maskwa Continuous Monitoring Station - December 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	22	30	14	15	11	13	14	16	13	16	21	23	48	23	20	59	28	19	40	22	19	28	19	24	24	
2	21	13	24	12	10	16	12	13	18	17	25	25	18	28	28	28	26	19	14	21	27	15	15	18	24	
3	17	15	18	17	19	17	30	27	21	18	23	30	25	25	26	36	27	21	22	29	24	24	27	33	24	
4	35	36	36	34	32	30	35	37	39	33	41	33	37	35	29	20	23	20	21	27	28	29	30	30	24	
5	28	39	29	24	23	27	27	25	24	24	27	33	37	35	38	34	33	32	38	18	19	20	23	23	24	
6	19	25	48	41	37	43	44	29	31	24	18	21	18	21	24	21	21	17	18	26	26	25	27	22	24	
7	22	22	22	24	25	26	25	23	24	26	25	25	26	24	22	20	19	25	27	55	26	24	23	21	24	
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12	25	22	19	18	14	16	18	27	47	24	22	29	26	26	24	28	33	31	33	32	28	30	30	27	24	
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14	26	27	26	31	25	26	26	19	16	16	14	18	18	17	19	24	21	26	31	21	17	24	33	32	24	
15	36	19	18	18	31	24	32	29	32	25	26	26	25	28	29	27	28	28	28	27	28	27	33	34	24	
16	29	25	26	29	27	30	28	28	28	31	30	29	31	30	29	33	34	29	19	18	18	16	14	15	24	
17	17	16	18	21	21	18	26	19	24	20	29	37	39	30	28	27	34	30	28	31	27	28	26	28	24	
18	26	22	27	27	28	27	25	27	26	24	28	27	30	32	36	34	32	32	31	35	40	37	40	40	24	
19	40	39	33	36	35	38	24	29	19	18	31	45	37	56	54	20	14	11	27	44	53	26	34	34	24	
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25	53	46	37	76	32	37	52	32	29	28	29	31	36	39	36	31	28	45	37	51	38	45	54	35	24	
26	46	40	52	41	26	57	39	31	19	46	25	30	27	19	23	16	13	16	52	49	51	53	60	40	24	
27	60	62	54	50	49	72	66	41	60	66	50	47	40	33	31	36	48	39	35	36	36	23	12	13	24	
28	18	24	38	32	32	22	39	42	39	36	37	37	34	35	C	C	C	C	C	33	35	21	23	18	24	
29	31	32	35	30	31	38	25	34	36	35	34	34	31	35	35	32	37	39	24	37	26	24	16	41	24	
30	35	22	47	43	53	40	20	23	27	48	30	28	23	38	24	15	12	13	15	16	19	27	39	38	24	
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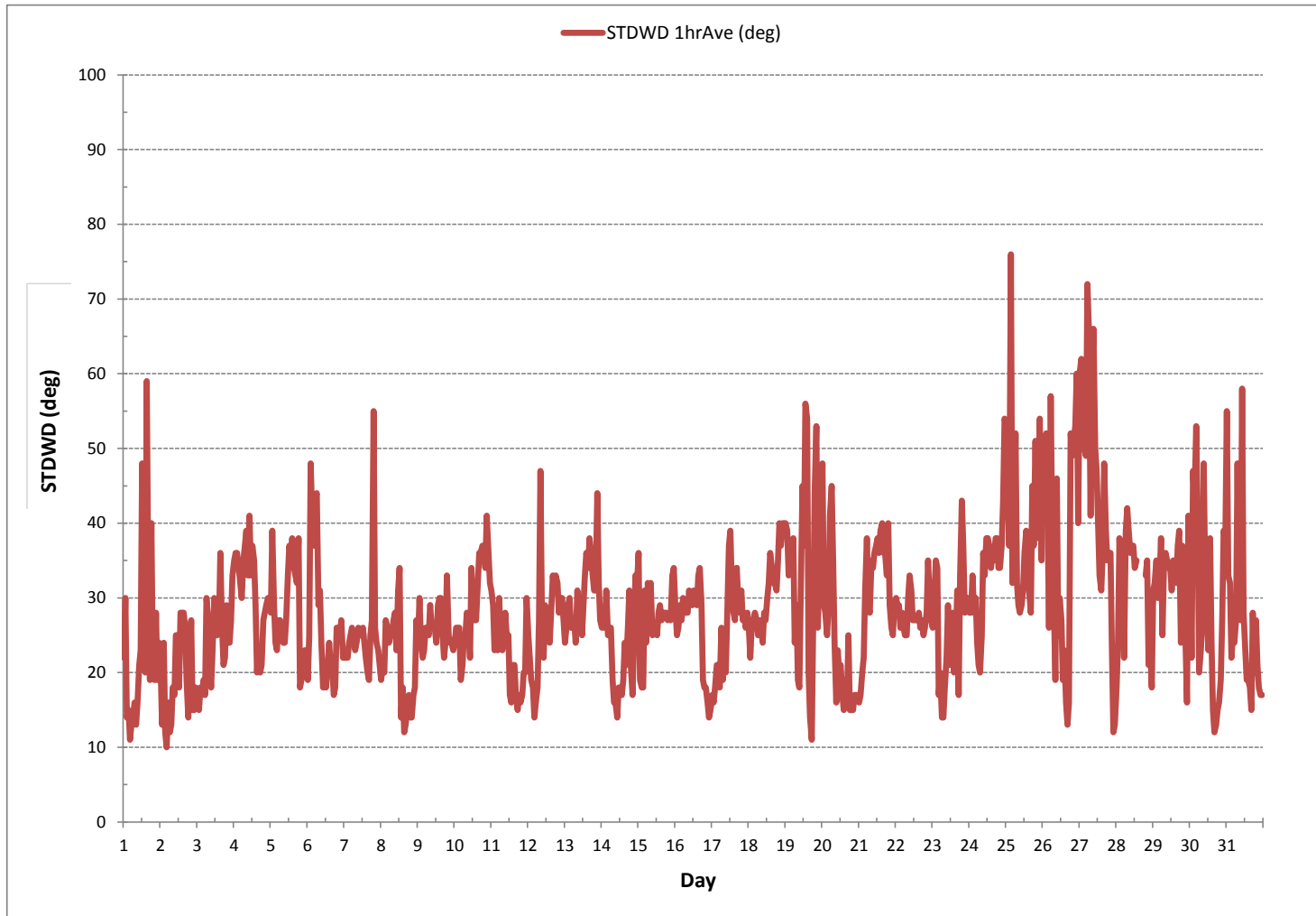
STATUS FLAG CODES

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: December 28, 2017

CALIBRATION TIME: 5 hrs OPERATIONAL TIME: 744 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



***RELATIVE HUMIDITY***



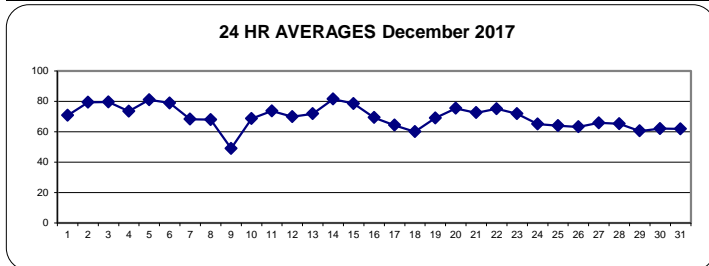
RELATIVE HUMIDITY Hourly Averages (RH %)

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	74	73	78	78	78	82	80	80	79	73	68	60	54	51	59	65	73	67	67	70	69	71	73	76	51	82	71	24	
2	81	85	84	84	82	83	84	83	83	83	75	65	64	63	67	71	76	82	86	86	85	85	84	83	63	86	79	24	
3	83	83	83	82	81	83	83	83	83	83	82	81	74	67	66	69	72	78	82	83	83	82	82	82	66	83	80	24	
4	81	80	77	75	74	73	71	72	73	72	70	64	62	60	63	72	77	77	77	77	77	79	80	80	60	81	73	24	
5	80	81	82	84	88	87	86	85	83	80	76	70	70	70	71	73	80	88	88	88	86	84	83	81	70	88	81	24	
6	82	83	84	85	84	84	83	84	84	79	77	75	72	69	68	70	72	74	76	81	83	83	80	80	68	85	79	24	
7	82	82	79	77	76	73	72	71	69	68	63	54	49	47	51	58	64	66	68	72	75	74	74	73	47	82	68	24	
8	74	74	76	78	77	76	79	77	73	74	64	55	50	51	53	61	67	65	66	65	64	69	72	71	50	79	68	24	
9	74	66	53	52	52	51	51	51	51	47	44	37	34	35	33	38	44	45	49	55	54	52	53	54	33	74	49	24	
10	54	56	58	59	61	62	58	55	52	76	72	52	51	66	80	82	82	83	81	79	79	80	84	86	51	86	69	24	
11	84	75	74	77	80	80	80	79	80	75	70	61	61	63	65	68	71	73	74	77	78	75	73	75	61	84	74	24	
12	75	76	75	75	74	75	77	77	80	79	73	64	64	61	60	60	59	60	62	65	69	71	73	75	59	80	70	24	
13	77	78	76	76	76	77	78	80	80	80	71	65	63	59	60	63	64	66	68	71	71	75	81	59	81	72	24		
14	83	84	84	87	88	88	88	88	87	87	85	79	74	73	76	77	78	78	78	78	79	80	80	78	73	88	82	24	
15	81	80	82	86	89	90	90	91	90	85	80	76	73	77	78	74	72	79	82	75	68	64	60	61	60	91	78	24	
16	61	66	74	73	79	81	81	76	71	73	71	63	60	59	57	63	66	67	66	69	71	73	72	70	57	81	69	24	
17	69	65	64	62	61	61	58	69	65	65	62	56	54	54	64	69	68	68	61	67	73	72	68	67	54	73	64	24	
18	68	69	69	70	70	66	64	64	63	62	59	60	62	65	48	43	44	47	51	55	57	59	61	63	43	70	60	24	
19	65	66	69	69	69	69	68	68	70	72	68	64	61	57	59	69	75	76	75	74	73	73	73	73	57	76	69	24	
20	72	71	71	72	74	75	74	74	74	75	76	75	74	74	74	75	75	78	79	80	79	80	80	79	71	80	75	24	
21	79	78	78	78	79	79	78	75	75	74	70	68	67	68	70	72	73	73	69	68	66	65	66	72	65	79	73	24	
22	73	75	76	79	78	79	80	81	78	75	72	72	68	66	65	68	74	77	77	78	78	77	78	79	65	81	75	24	
23	80	80	79	74	73	77	76	73	70	69	68	67	66	64	65	67	68	74	73	73	73	72	72	72	64	80	72	24	
24	73	74	74	72	70	68	65	64	63	63	60	56	56	53	54	60	64	67	67	68	68	68	68	68	53	74	65	24	
25	67	67	67	67	67	67	67	66	66	66	64	59	57	54	54	61	65	66	66	66	65	65	64	64	54	67	64	24	
26	63	63	63	63	63	62	62	62	63	63	64	63	62	59	58	63	67	67	66	65	64	64	64	64	58	67	63	24	
27	65	65	65	66	66	66	66	65	66	66	66	66	66	61	60	58	65	68	69	69	68	68	68	69	68	58	69	66	24
28	69	69	70	70	70	70	69	69	70	69	67	62	60	56	54	58	62	64	66	65	64	64	64	64	54	70	65	24	
29	64	63	63	62	62	62	62	61	61	61	60	56	54	51	50	58	61	64	64	63	63	62	62	62	50	64	61	24	
30	62	62	62	61	61	61	61	61	61	62	63	61	59	53	54	61	64	67	67	66	65	66	65	65	53	67	62	24	
31	64	64	63	63	63	62	62	62	62	64	60	52	50	50	50	56	64	67	66	66	66	66	66	66	50	67	62	24	
HOURLY MAX	84	85	84	87	89	90	90	91	90	87	85	81	74	77	80	82	82	88	88	88	88	86	85	84	86				
HOURLY AVG	73	73	73	73	73	73	73	72	72	72	69	63	61	60	61	65	68	70	71	71	71	71	72	72					

STATUS FLAG CODES

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

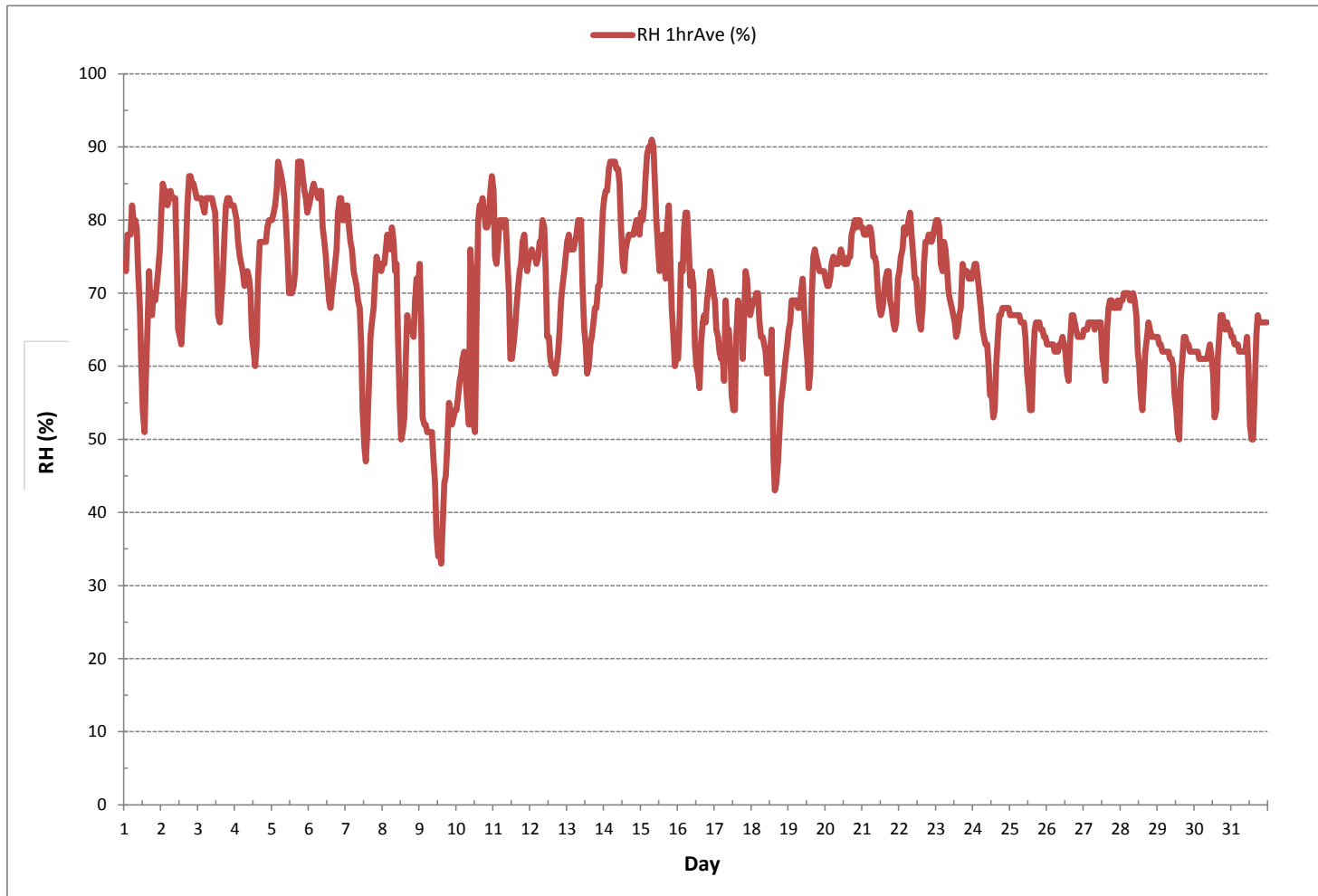
24 HR AVERAGES December 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	33	%	@ HOUR	14	ON DAY	9
MAXIMUM 1-HR AVERAGE:	91	%	@ HOUR	7	ON DAY	15
MAXIMUM 24-HR AVERAGE:	82	%			ON DAY	14
OPERATIONAL TIME:						744 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	10					MONTHLY AVERAGE: 70 %

**RELATIVE HUMIDITY Hourly Averages (RH %)**



## ***BAROMETRIC PRESSURE***





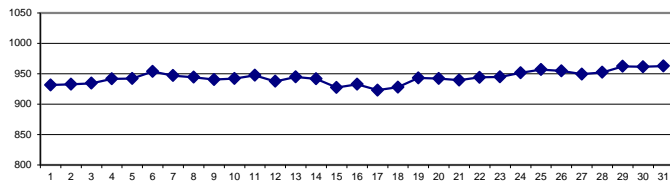
BAROMETRIC PRESSURE Hourly Averages (BP mbar)

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	932	932	932	932	932	932	932	932	932	932	932	933	933	933	932	931	931	930	930	930	930	930	930	930	930	930	930	933	931	24
2	930	930	930	931	931	931	931	932	932	932	933	934	934	934	934	934	934	934	934	934	934	934	934	934	934	934	930	934	933	24
3	933	933	933	933	933	932	932	932	932	932	933	933	934	934	935	935	936	936	937	937	937	937	938	938	939	932	939	934	934	24
4	939	940	940	941	942	942	943	943	944	944	944	944	944	944	943	942	941	940	939	938	937	936	936	936	936	936	936	944	942	24
5	936	935	935	935	936	936	936	937	937	938	939	941	942	943	944	945	946	947	948	949	950	952	953	954	935	935	954	942	24	
6	955	955	956	956	957	956	957	957	957	956	956	955	955	954	953	952	952	951	951	950	949	949	949	949	949	949	949	957	954	24
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10	942	942	942	942	941	941	941	941	941	939	939	938	938	938	940	941	943	944	945	946	947	948	948	948	948	948	948	942	24	
11	949	949	950	950	950	950	950	950	950	950	950	950	949	948	947	947	946	945	944	943	942	941	940	940	940	940	950	948	24	
12	939	938	938	937	936	935	935	934	934	934	935	936	935	935	935	936	938	939	940	941	941	942	942	942	942	934	942	937	24	
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15	930	929	929	928	928	927	926	926	925	925	926	926	926	926	926	927	928	928	928	928	929	929	929	929	929	925	930	927	24	
16	930	930	930	931	931	931	932	932	933	934	934	934	934	934	934	934	934	934	934	933	933	933	932	932	930	930	934	932	24	
17	929	928	927	926	925	924	923	923	922	921	921	921	920	921	921	922	922	922	922	922	922	922	922	922	922	920	929	923	24	
18	922	922	922	923	923	923	923	924	924	925	926	926	927	928	929	930	931	932	933	934	934	935	936	937	922	922	937	928	24	
19	938	939	940	941	942	942	943	943	944	944	945	945	944	944	944	944	944	944	944	943	944	943	943	943	938	945	945	943	24	
20	943	943	943	943	943	943	943	943	943	943	943	943	943	943	943	942	942	942	942	941	941	940	940	939	939	939	943	942	24	
21	938	937	936	936	935	935	935	935	936	937	938	938	939	940	940	941	942	943	943	944	944	944	944	944	944	935	944	939	24	
22	944	944	945	945	945	945	945	945	945	945	945	945	944	944	943	943	943	943	943	943	943	943	943	943	943	943	945	944	24	
23	943	943	943	943	944	944	944	944	944	944	944	944	943	944	944	944	945	946	947	947	947	947	946	946	943	947	945	24		
24	945	945	945	946	947	947	949	950	951	953	954	953	953	953	953	954	954	954	954	955	955	955	955	955	945	955	951	24		
25	955	955	955	955	955	955	956	956	957	957	957	957	957	956	956	957	958	959	959	959	959	959	959	959	955	959	959	957	24	
26	959	958	958	957	957	957	957	957	956	956	955	954	953	952	952	953	953	953	953	953	953	952	952	952	952	959	955	24		
27	951	951	951	950	950	950	950	949	949	949	949	948	948	948	948	948	949	949	950	949	949	949	949	949	948	951	949	24		
28	949	949	949	949	949	949	949	949	949	950	951	951	952	952	952	954	954	955	956	956	956	957	958	958	949	958	958	952	24	
29	959	959	960	960	961	962	962	962	963	964	964	963	962	962	962	963	963	964	964	964	963	963	963	963	959	964	964	962	24	
30	963	962	961	960	960	960	960	960	961	961	961	960	959	959	960	961	961	962	963	963	963	963	964	964	959	964	964	961	24	
31	964	964	964	964	965	965	965	965	965	965	964	963	962	962	962	961	961	962	962	961	961	960	959	959	959	959	965	963	24	
HOURLY MAX	964	964	964	964	965	965	965	965	965	965	964	963	962	962	962	963	963	964	964	964	964	963	963	964	964					
HOURLY AVG	943	943	943	943	943	943	943	943	943	944	944	944	944	944	943	944	944	944	944	944	944	944	944	944	944					

STATUS FLAG CODES

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

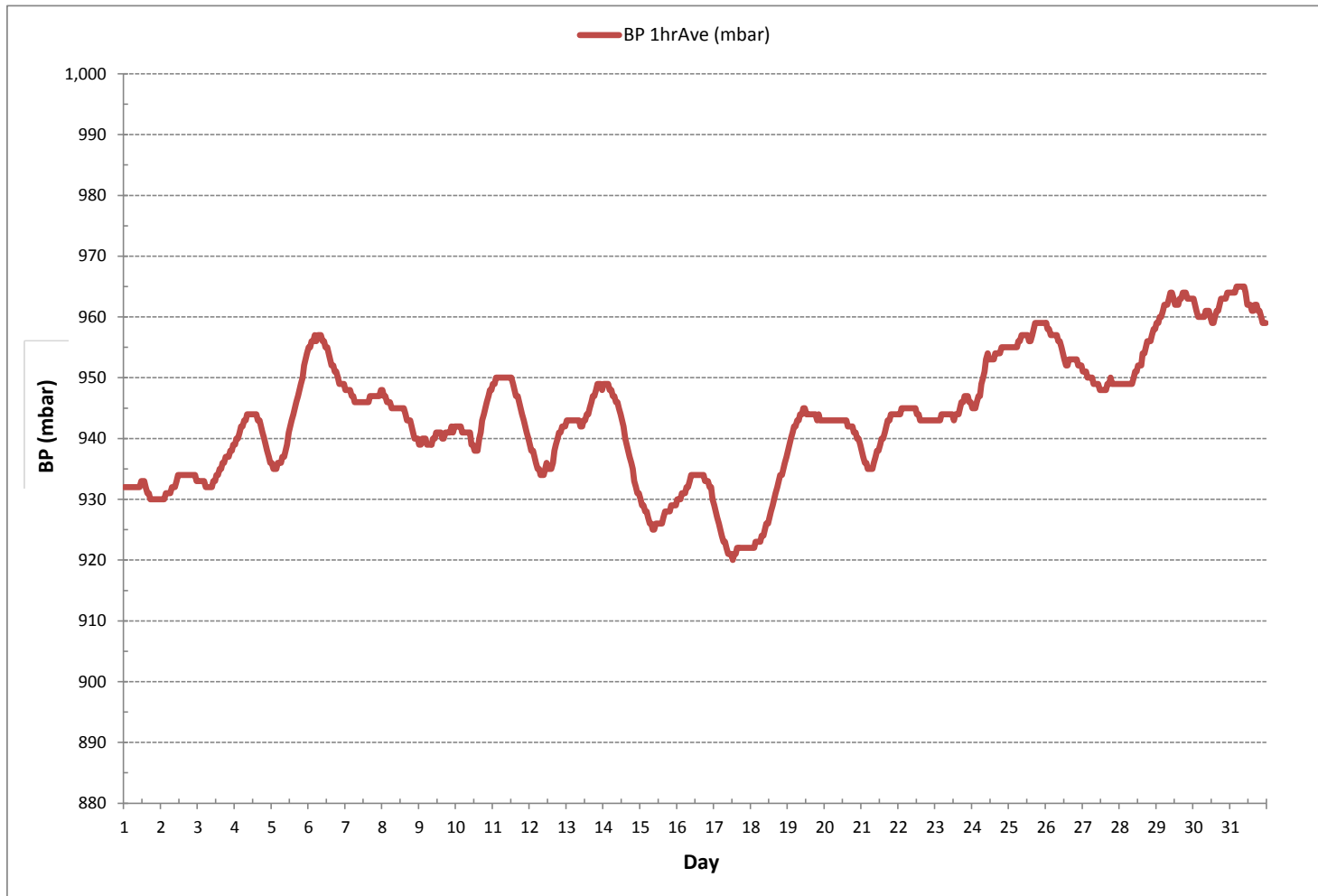
24 HR AVERAGES December 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	920 mbar	@ HOUR	12	ON DAY	17
MAXIMUM 1-HR AVERAGE:	965 mbar	@ HOUR	4	ON DAY	31
MAXIMUM 24-HR AVERAGE:	963 mbar			ON DAY	31
OPERATIONAL TIME:					744 hrs
AMD OPERATION UPTIME:					100.0 %
STANDARD DEVIATION:	10	MONTHLY AVERAGE:			944 mbar

BAROMETRIC PRESSURE Hourly Averages (BP mbar)



***AMBIENT TEMPERATURE***



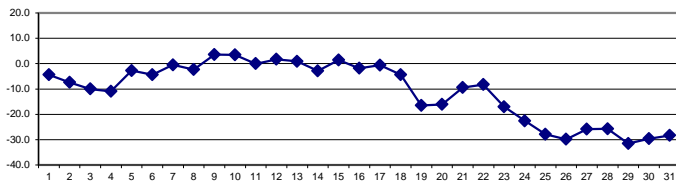
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

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	-4.3	-4.3	-5.8	-5.9	-6.3	-7.7	-7.2	-7.8	-7.3	-6.1	-4.3	-1.1	1.0	2.0	-1.0	-2.9	-5.0	-3.5	-3.2	-4.1	-3.8	-4.5	-5.3	-6.5	-7.8	2.0	-4.4	24	
2	-8.5	-9.6	-10.6	-11.0	-8.7	-9.5	-9.1	-8.7	-8.9	-8.3	-5.2	-1.6	-2.0	-1.4	-2.6	-4.1	-5.7	-7.4	-8.4	-8.3	-8.6	-9.9	-10.1	-10.0	-11.0	-1.4	-7.4	24	
3	-10.9	-10.8	-11.4	-11.8	-12.1	-10.2	-9.8	-9.6	-10.6	-10.0	-8.1	-7.5	-6.0	-4.5	-4.8	-7.1	-8.7	-10.6	-12.1	-13.1	-14.0	-13.1	-12.2	-11.1	-14.0	-4.5	-10.0	24	
4	-10.5	-10.3	-10.2	-10.3	-10.5	-10.6	-11.0	-11.4	-11.9	-12.3	-11.3	-9.7	-9.5	-9.0	-9.6	-12.1	-13.4	-12.4	-12.1	-11.6	-11.3	-11.0	-10.8	-10.4	-13.4	-9.0	-11.0	24	
5	-9.9	-9.6	-9.4	-9.1	-5.0	-3.0	-1.9	-1.7	-2.0	-1.4	-0.1	1.1	1.1	1.1	0.8	0.5	0.1	-0.5	-0.4	-1.6	-2.7	-3.5	-4.2	-4.8	-9.9	1.1	-2.8	24	
6	-5.1	-5.3	-5.1	-5.1	-4.4	-3.7	-3.6	-4.2	-4.6	-4.2	-3.9	-3.8	-3.4	-2.9	-2.7	-3.9	-5.0	-6.0	-6.3	-6.3	-5.5	-4.5	-3.2	-3.5	-6.3	-2.7	-4.4	24	
7	-4.1	-3.9	-2.9	-2.4	-2.2	-1.7	-1.7	-1.4	-1.2	-0.8	0.7	3.8	5.1	5.7	4.4	2.2	0.4	-0.1	-0.6	-1.8	-2.5	-2.4	-2.6	-2.2	-4.1	5.7	-0.5	24	
8	-2.6	-2.9	-3.6	-4.1	-4.1	-4.0	-4.7	-4.0	-3.1	-3.4	-0.8	2.2	3.8	3.2	2.2	-0.6	-2.7	-2.5	-3.2	-3.0	-3.1	-4.7	-5.8	-5.2	-5.8	3.8	-2.4	24	
9	-5.5	-2.5	1.8	2.5	2.5	2.8	2.7	2.4	2.4	3.8	4.9	7.5	8.6	8.7	9.2	7.4	5.2	4.8	3.3	1.7	2.2	3.0	2.9	2.7	-5.5	9.2	3.5	24	
10	2.7	2.0	1.3	0.9	0.3	0.2	1.5	2.4	5.1	4.6	4.9	7.4	8.0	5.9	4.2	3.8	3.4	3.3	3.6	3.7	3.5	3.3	2.8	2.5	0.2	8.0	3.4	24	
11	2.5	2.4	0.6	-0.8	-1.7	-2.2	-2.4	-2.6	-3.1	-2.1	-0.2	2.5	2.5	2.5	1.7	0.8	0.4	0.3	0.2	-0.5	-0.9	-0.2	-0.2	-0.9	-3.1	2.5	-0.1	24	
12	-1.2	-1.4	-1.1	-1.0	-0.3	-0.2	-0.4	0.1	-1.0	-0.1	2.5	5.2	4.9	5.5	5.7	5.4	4.9	4.2	3.5	2.5	1.5	0.8	0.4	-0.4	-1.4	5.7	1.7	24	
13	-1.0	-1.2	-0.8	-0.4	-0.4	-0.6	-0.7	-0.9	-0.6	-0.5	2.0	3.7	4.0	4.7	4.2	3.1	2.6	2.4	2.0	1.4	0.6	0.6	-0.4	-2.3	-2.3	4.7	0.9	24	
14	-2.6	-3.1	-3.7	-4.8	-5.4	-5.6	-6.1	-6.4	-6.2	-4.3	-2.5	-1.5	-1.2	-1.8	-1.4	-1.1	-1.0	-0.7	-0.9	-0.8	-0.4	0.0	-0.4	0.0	-6.3	4.0	-2.9	24	
15	0.1	0.2	0.4	0.4	0.5	1.3	1.7	1.8	2.5	2.8	3.5	3.9	4.2	3.2	2.7	2.2	2.0	0.8	-0.1	0.0	0.0	0.0	-0.1	-0.7	-0.7	4.2	1.4	24	
16	-0.7	-0.4	-0.8	-1.1	-1.7	-1.9	-2.1	-2.2	-1.6	-1.3	-0.7	-0.1	0.6	0.5	1.0	-1.2	-2.3	-3.0	-3.1	-3.8	-4.2	-4.8	-4.9	-5.1	-5.1	1.0	-1.9	24	
17	-5.4	-4.7	-4.5	-3.9	-3.5	-3.2	-2.5	-2.9	-2.5	-2.3	-1.1	1.7	3.6	5.0	3.7	2.4	1.9	1.0	2.0	0.9	-0.1	-0.2	0.3	-0.1	-5.4	5.0	-0.6	24	
18	-1.1	-1.8	-2.1	-2.6	-3.1	-2.9	-3.0	-3.3	-3.5	-3.3	-2.1	-1.9	-2.1	-2.3	-2.9	-4.0	-4.8	-5.4	-6.4	-7.1	-8.1	-9.2	-10.6	-11.7	-11.7	-1.1	-4.4	24	
19	-12.6	-13.3	-14.4	-14.7	-14.7	-14.8	-15.1	-15.5	-16.5	-17.0	-15.8	-14.6	-14.0	-12.7	-13.2	-16.3	-18.5	-19.1	-19.0	-20.4	-21.2	-21.6	-21.1	-21.2	-21.6	-12.6	-16.6	24	
20	-22.5	-23.0	-23.0	-22.4	-20.2	-17.8	-19.4	-19.6	-20.1	-18.2	-16.0	-13.4	-12.4	-12.3	-12.3	-12.2	-12.0	-13.2	-12.9	-12.7	-12.7	-13.0	-12.8	-12.2	-23.0	-12.0	-16.1	24	
21	-12.3	-12.1	-11.7	-10.7	-10.3	-10.1	-9.7	-8.8	-9.3	-9.7	-9.7	-9.1	-8.9	-9.0	-9.0	-9.1	-9.0	-8.9	-8.6	-8.5	-8.2	-8.0	-8.1	-8.6	-12.3	-8.0	-9.5	24	
22	-8.7	-9.0	-8.9	-9.4	-9.2	-9.2	-9.1	-9.1	-8.5	-7.7	-6.9	-6.4	-5.9	-5.6	-5.6	-7.1	-7.9	-8.2	-9.0	-9.5	-9.6	-10.1	-9.9	-10.1	-5.6	-8.3	24		
23	-10.2	-10.2	-10.1	-10.6	-12.4	-15.9	-16.6	-17.2	-17.8	-18.4	-17.6	-17.0	-16.9	-16.7	-16.5	-16.6	-18.8	-21.5	-21.5	-22.7	-22.6	-21.4	-20.5	-19.5	-22.7	-10.1	-17.1	24	
24	-18.2	-16.7	-16.6	-16.7	-17.4	-18.0	-20.3	-22.7	-24.1	-24.9	-24.7	-23.6	-23.0	-21.9	-22.1	-23.7	-24.6	-24.9	-25.1	-25.6	-26.2	-26.7	-27.1	-27.7	-27.7	-16.6	-22.6	24	
25	-28.5	-28.1	-27.3	-27.0	-26.4	-26.3	-26.8	-28.6	-29.4	-28.4	-27.3	-25.1	-24.4	-23.6	-23.7	-26.1	-27.6	-29.1	-28.9	-30.1	-30.9	-31.5	-31.8	-32.1	-32.1	-23.6	-27.9	24	
26	-33.1	-32.3	-32.3	-32.9	-33.2	-34.6	-34.4	-33.9	-32.8	-31.9	-29.3	-25.4	-23.6	-22.2	-22.2	-24.3	-26.2	-28.3	-30.0	-31.1	-31.3	-31.1	-30.3	-29.7	-34.6	-22.2	-29.9	24	
27	-29.0	-29.0	-29.1	-27.9	-28.1	-28.3	-28.1	-28.6	-28.1	-27.8	-25.4	-23.3	-21.0	-20.5	-20.1	-23.0	-25.0	-25.9	-26.4	-25.9	-24.7	-24.6	-25.8	-24.8	-29.1	-20.1	-25.9	24	
28	-24.3	-23.9	-23.1	-22.4	-22.8	-24.9	-25.3	-25.5	-24.1	-23.6	-23.1	-21.8	-23.3	-23.1	-23.3	-25.4	-26.8	-28.1	-29.0	-29.3	-29.9	-30.7	-31.4	-32.1	-32.1	-21.8	-25.7	24	
29	-32.3	-32.5	-32.8	-32.9	-33.3	-33.7	-33.5	-32.8	-33.4	-33.4	-31.8	-29.5	-28.2	-26.6	-25.8	-28.1	-29.3	-30.9	-31.4	-32.1	-32.2	-33.3	-33.4	-33.7	-33.7	-25.8	-31.5	24	
30	-33.8	-32.8	-32.6	-32.4	-33.8	-34.7	-33.2	-33.9	-34.1	-32.7	-30.2	-26.0	-24.8	-21.5	-21.9	-24.5	-26.1	-27.6	-28.4	-28.8	-29.2	-29.2	-28.8	-29.9	-34.7	-21.5	-29.6	24	
31	-30.8	-31.2	-31.8	-32.2	-32.3	-32.8	-33.0	-32.8	-33.2	-32.3	-28.4	-24.0	-22.3	-21.9	-21.7	-23.8	-26.6	-28.3	-26.9	-27.4	-26.8	-26.8	-26.9	-26.8	-33.2	-21.7	-28.4	24	
HOURLY MAX	2.7	2.4	1.8	2.5	2.5	2.8	2.7	2.4	5.1	4.6	4.9	7.5	8.6	8.7	9.2	7.4	5.2	4.8	3.6	3.7	3.5	3.3	2.9	2.7					
HOURLY AVG	-11.8	-11.7	-11.7	-11.7	-11.6	-11.7	-11.8	-11.9	-11.9	-11.5	-10.0	-8.0	-7.3	-6.8	-7.2	-8.7	-9.9	-10.6	-10.9	-11.5	-11.7	-11.9	-12.0	-12.2					

STATUS FLAG CODES

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

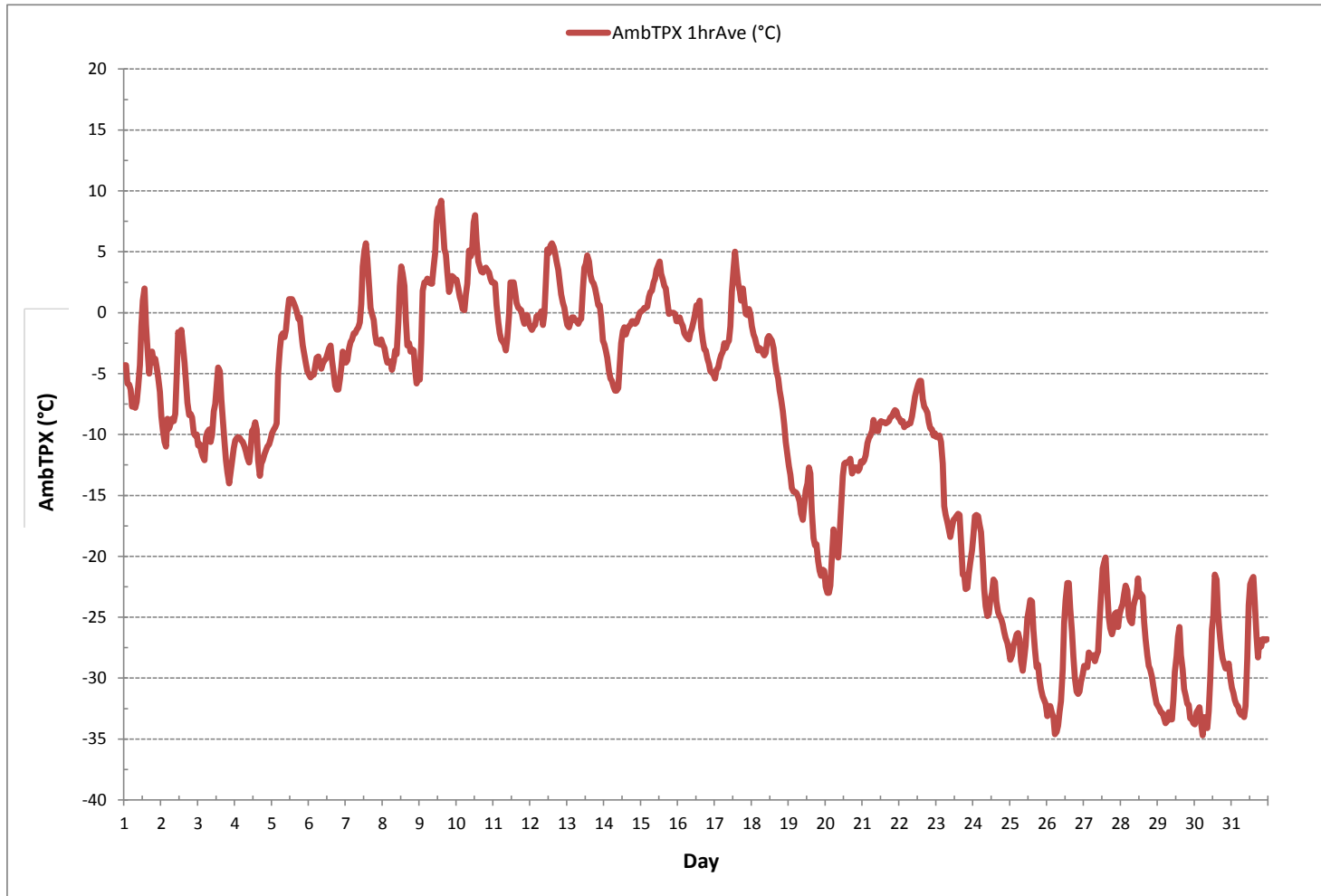
24 HR AVERAGES December 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-34.7 °C	@ HOUR	5	ON DAY	30
MAXIMUM 1-HR AVERAGE:	9.2 °C	@ HOUR	14	ON DAY	9
MAXIMUM 24-HR AVERAGE:	3.5 °C			ON DAY	9
OPERATIONAL TIME:				744	hrs
AMD OPERATION UPTIME:				100.0	%
STANDARD DEVIATION:	11.7			MONTHLY AVERAGE:	-10.7 °C

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



## ***PRECIPITATION***

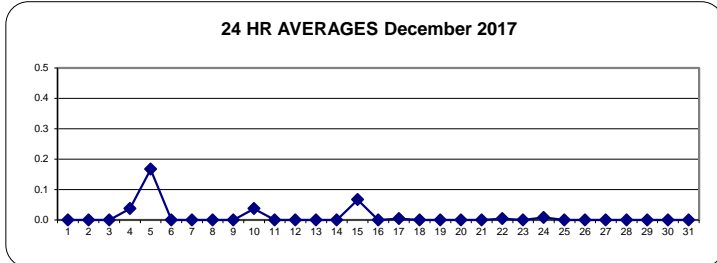
**PRECIPITATION Hourly Averages (mm)**

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
5	0.1	0.3	0.2	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.2	1.1	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.2	24
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
15	0.0	0.0	0.0	0.6	0.5	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	24
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	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	0.1	0.0	24
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
22	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
24	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
HOURLY MAX	0.1	0.3	0.2	0.6	0.5	0.3	1.0	0.3	0.2	0.1	0.0	0.0	0.0	0.2	0.3	0.1	0.2	0.6	0.2	1.1	0.0	0.3	0.3	0.3	0.0	0.0	0.0	0.0	24
HOURLY AVG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24

**STATUS FLAG CODES**

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

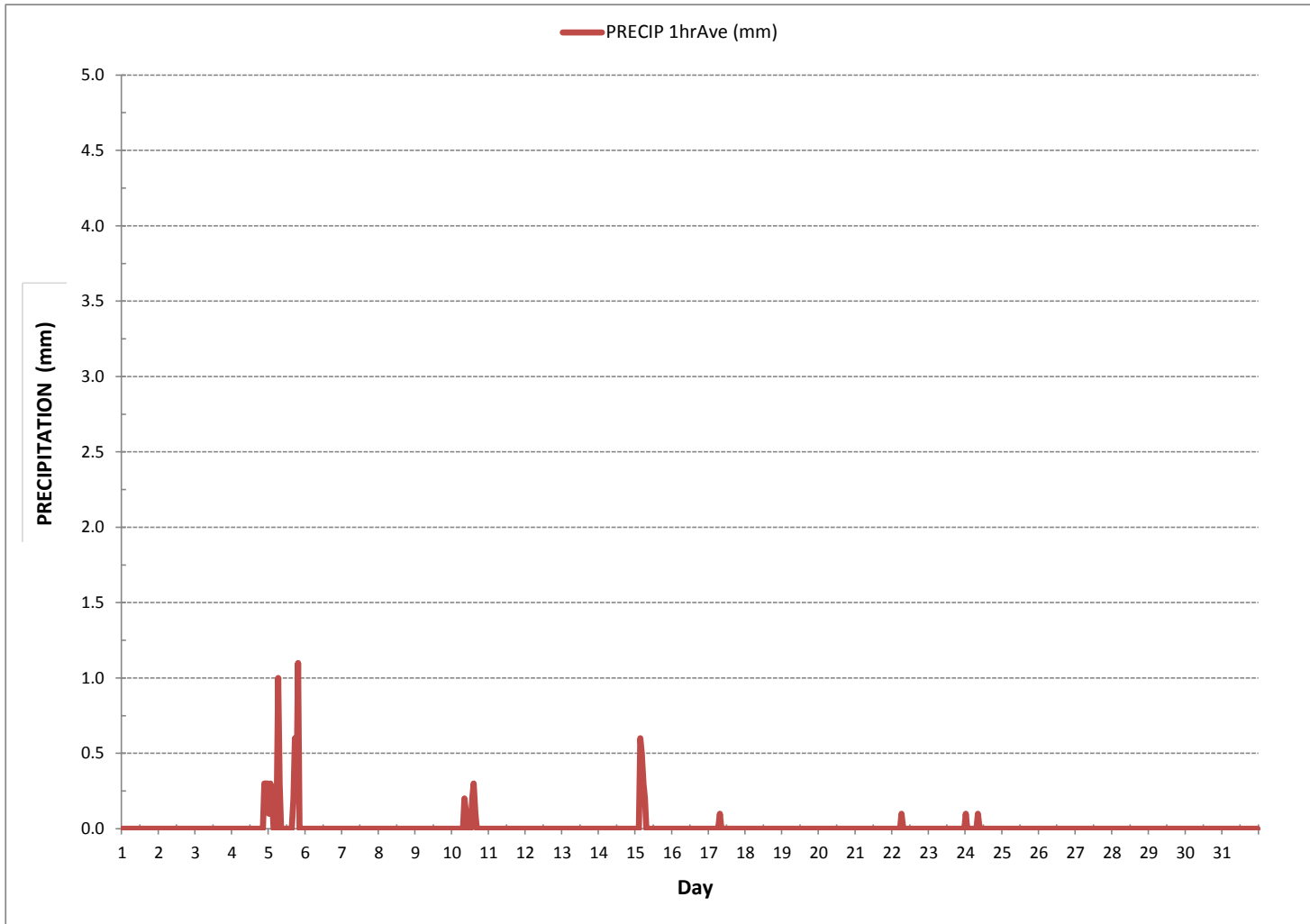
**24 HR AVERAGES December 2017**



**MONTHLY SUMMARY**

MINIMUM 1-HR AVERAGE:	0.0 mm	@ HOUR	0	ON DAY	1
MAXIMUM 1-HR AVERAGE:	1.1 mm	@ HOUR	19	ON DAY	5
MAXIMUM 24-HR AVERAGE:	0.2 mm			ON DAY	5
MONTHLY TOTAL	7.8 mm				
OPERATIONAL TIME:				744 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:	December 14, 2017	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	944	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:	Sulphur Dioxide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	11:18	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	15:39	Cal Gas Expiry Date:	July 18, 2019		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		

Analyzer:	Range ppb:
ID# or Serial Number:	508
Last Calibration Date:	November 2, 2017
Previous C.F.:	1.000
	As Found C.F.:
	1.060
	New C.F.:
	1.000

Calibration Standards:	Standard Calibration Points for Ranges
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:	API id# 627 expires January 27, 2018
Cal Gas Cylinder I.D. # :	LL 104222
Cal Gas Conc. (ppm):	50.6

Point	ppb
High	780
Mid	380
Low	190

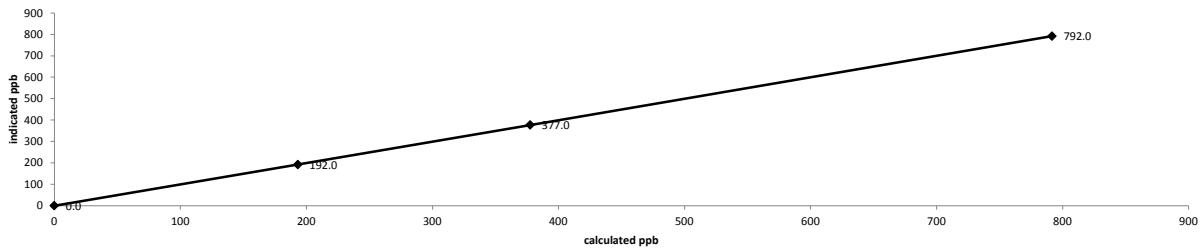
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Calibrator Flow Rates (cc/min)				Calculated	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	Concentration (ppb):		
as found zero	4757	0.00	4757	0.0	2.3	n/a
as found high	4851	77.10	4928	791.7	749.0	1.060
adjusted zero	4757	0.00	4757	0.0	0.0	n/a
adjusted high	4851	77.10	4928	791.7	792.0	1.000
mid	4905	36.88	4942	377.6	377.0	1.002
low	4923	18.88	4942	193.3	192.0	1.007
calibrator zero	4757	0.00	4757	0.0	0.0	n/a
Average C.F. =						1.003

**Linear Regression/Calibration Results:**

	<b>LIMITS</b>
Correlation Coefficient =	1.000 > or = 0.995
Slope =	0.999 0.95-1.05
b (Intercept as % of full scale) =	0.07% ± 3% F.S.
% change in C.F. from last cal =	-6.02% ± 10%

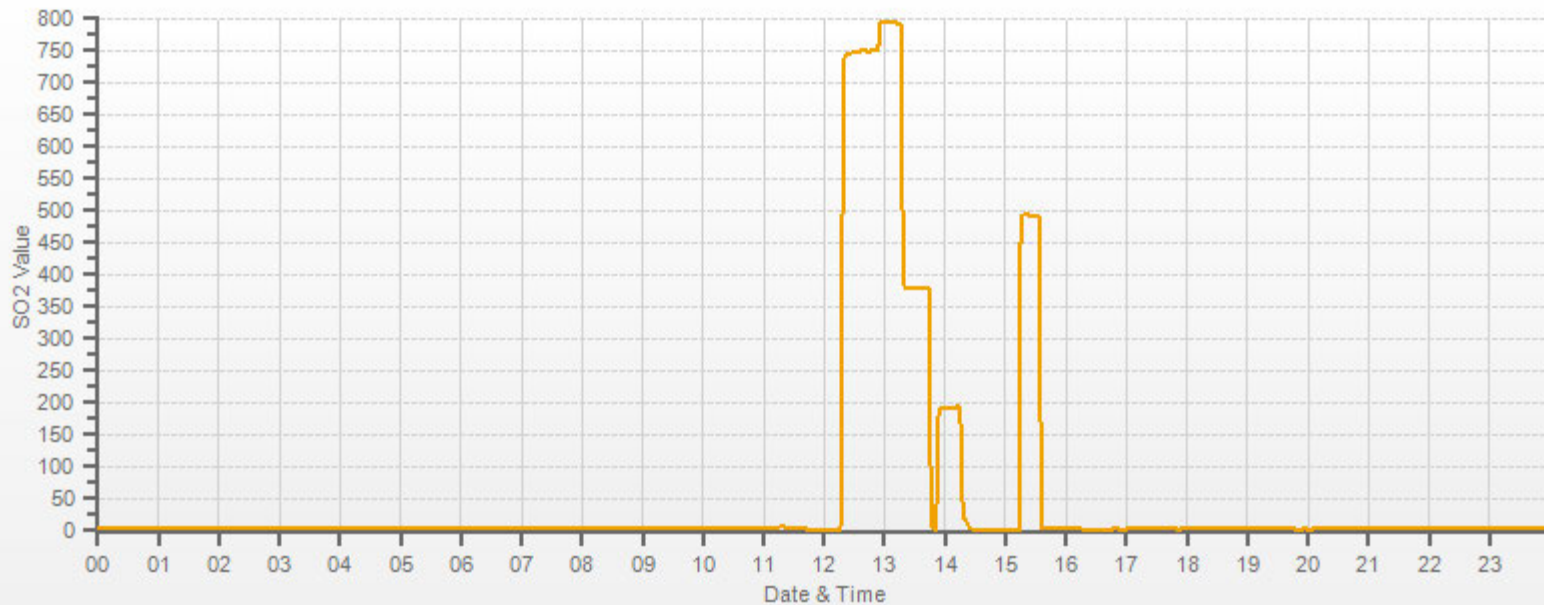
**API 100E Sulphur Dioxide Analyzer Calibration**



	As found:		As left:
Slope:	0.914	Slope:	0.969
Offset:	157.9	Offset:	163.0
Hvps:	483	Hvps:	483
Rcell Temp:	50.0	Rcell Temp:	50.0
Box Temp:	30.0	Box Temp:	31.3
Pmt Temp:	7.6	Pmt Temp:	7.6
Izs Temp:	50.0	Izs Temp:	50.0
Pres:	24.8	Pres:	24.6
Samp Fl:	582	Samp Fl:	581
Norm Pmt:	162.3	Norm Pmt:	163.1
Uv Lamp:	2419.9	Uv Lamp:	2416.1
Lamp Ratio:	88.2	Lamp Ratio:	88.3
Str Lgt:	72.2	Str Lgt:	79.0
Drk Pmt:	10.3	Drk Pmt:	10.7
Expected Value:	450.0	Expected Value:	492.0

**Comments:**

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



— SO2[ppb]

***HYDROGEN SULPHIDE***



## API 101E Hydrogen Sulphide Analyzer Calibration

Date:	December 14, 2017	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	944	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:	routine monthly		
Start Time 24 hr. (mst):	11:18	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	15:18	Cal Gas Expiry Date:	June 14, 2019		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		

Analyzer:	Range ppb:
ID# or Serial Number:	100
Last Calibration Date:	As Found C.F.:
November 2, 2017	1.081
Previous C.F.:	New C.F.:
1.000	1.000

Calibration Standards:	Standard Calibration Points for Ranges
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:	API id# 627 expires January 27, 2018
Cal Gas Cylinder I.D. # :	EY 0000654
Cal Gas Conc. (ppm):	10.2

Point	ppb
High	78
Mid	38
Low	19

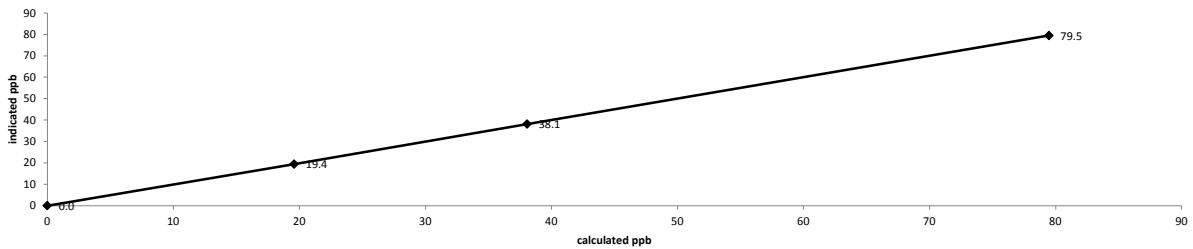
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	7175	0.00	7175	0.0	0.5	n/a
as found high	7126	55.96	7182	79.5	74.0	1.081
adjusted zero	7175	0.00	7175	0.0	0.0	n/a
adjusted high	7126	55.96	7182	79.5	79.5	1.000
mid	7174	26.88	7201	38.1	38.1	0.999
low	7182	13.82	7196	19.6	19.4	1.010
calibrator zero	7175	0.00	7175	0.0	0.0	n/a
Average C.F. =						1.003

**Linear Regression/Calibration Results:**

	<b>LIMITS</b>
Correlation Coefficient =	1.000 > or = 0.995
Slope =	0.999 0.95-1.05
b (Intercept as % of full scale) =	0.07% ± 3% F.S.
% change in C.F. from last cal =	-8.13% ± 10%

**API 101E Hydrogen Sulphide Analyzer Calibration**



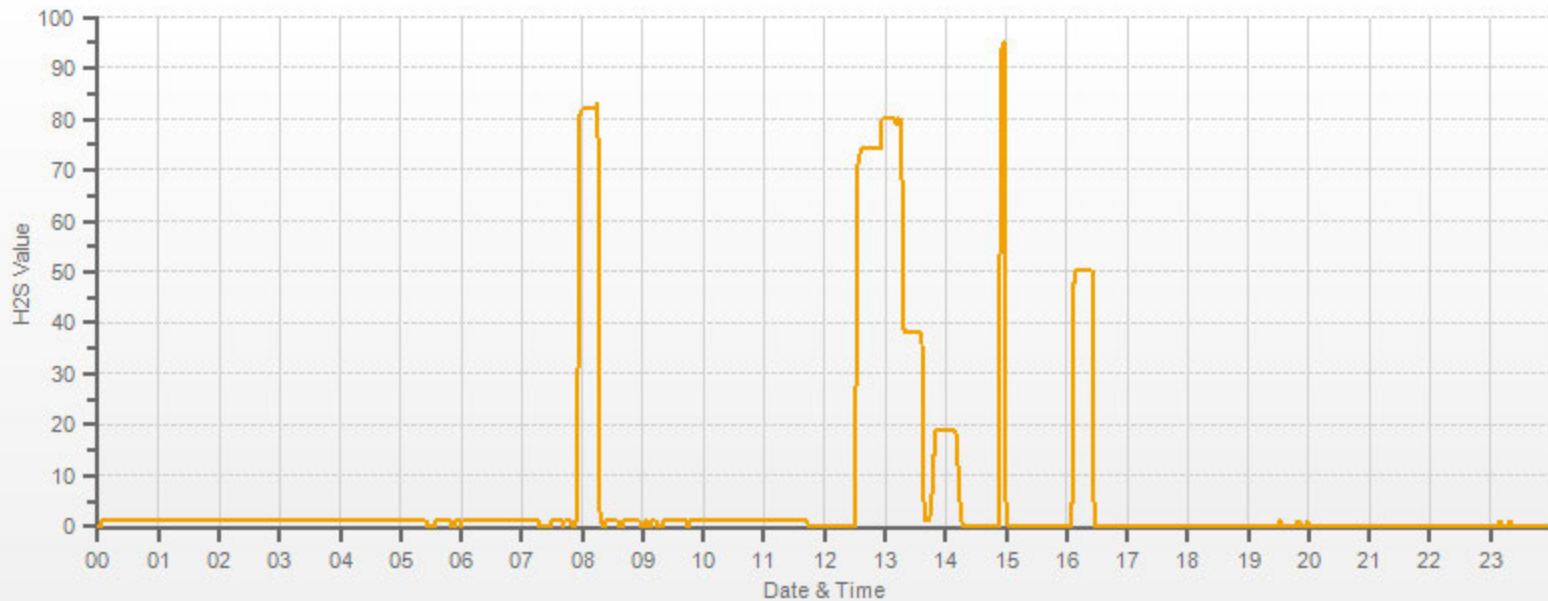
<p style="text-align: center;"><b>As found:</b></p> Slope: 0.943 Offset: 32.5 Hvps: 530 Rcell Temp: 50.0 Box Temp: 34.4 Pmt Temp: 8.4 Izs Temp: 32.9 Converter Temp: 314.8 Pres: 20.4 Samp Fl: 533 Uv Lamp: 2909.3 Lamp Ratio: 86.6 Str Lgt: 15.3 Drk Pmt: 36.2 Expected Value: 85.7	<p style="text-align: center;"><b>As left:</b></p> Slope: 1.044 Offset: 34.3 Hvps: 530 Rcell Temp: 50.0 Box Temp: 35.1 Pmt Temp: 8.4 Izs Temp: 45.0 Converter Temp: 315.3 Pres: 30.3 Samp Fl: 531 Uv Lamp: 2903.5 Lamp Ratio: 86.6 Str Lgt: 17.9 Drk Pmt: 36.2 Expected Value: 47.0
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**Comments:**

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

The analyzer perm tube was changed , the new expected value will be updated once the perm tube temperature has stabilized.

9F3 H2S perm tube (with a lower emitting rate) was installed



— H2S[ppb]

***TOTAL HYDROCARBON***





## Thermo 51C Total Hydrocarbon Analyzer Calibration

Date: December 14, 2017	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	944	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: Total Hydrocarbon	Calibration Purpose: routine monthly		
Start/End Time 24 hr. (mst): 14:40 / 18:15	Performed By/Reviewer: Alex Yakupov	Rob Fisher	
Calibration Method: Gas Dilution	Cal Gas Expiry Date: November 24, 2022		

Analyzer:	Range ppm: 50
ID# or Serial Number: 436609738	As Found C.F.: 0.995
Last Calibration Date: November 22, 2017	New C.F.: 1.000
Previous Cal High Point C.F.: 1.000	

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 <sub>4</sub> /C <sub>3</sub> H <sub>8</sub> Cylinder Conc. (ppm): 590.0      207.0	
CH <sub>4</sub> as propane/total CH <sub>4</sub> equivalents (ppm): 569.3      1159.3	

Point	Target ppm
High	38
Mid	18
Low	9

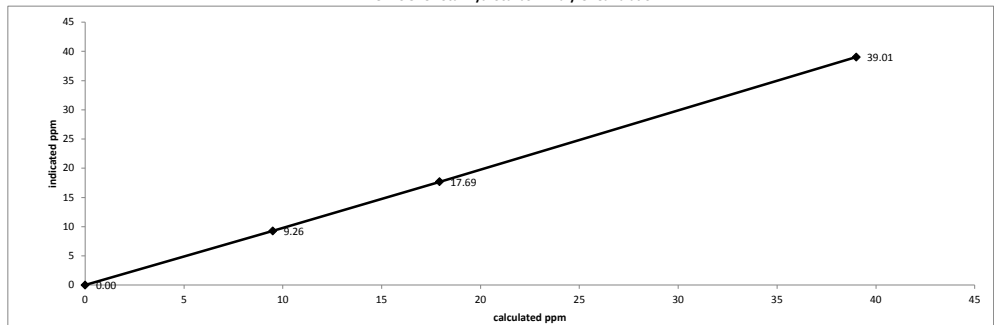
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Diluent	Cal Gas	Total	(ppm)	(ppm)	
as found zero	2346	0.00	2346	0.0	-0.18	n/a
as found high	2265	78.87	2344	39.01	39.04	0.995
adjusted zero	2346	0.00	2346	0.00	0.00	n/a
adjusted high	2265	78.87	2344	39.01	39.01	1.000
mid	2312	36.31	2348	17.93	17.69	1.013
low	2332	19.25	2351	9.49	9.26	1.025
calibrator zero	2346	0.00	2346	0.0	0.00	n/a
Average C.F.=						1.013

Linear Regression/Calibration Results:

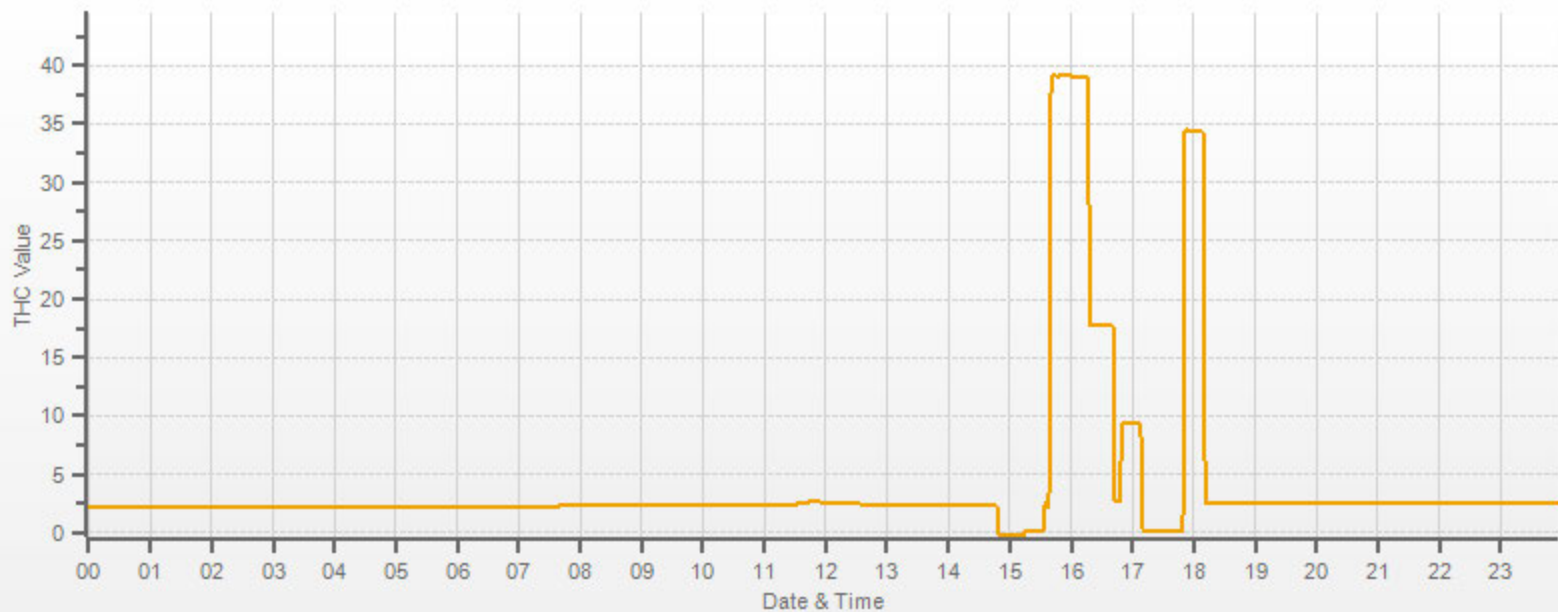
Correlation Coefficient = 1.000	LIMITS
Slope = 0.998	> or = 0.995
b (Intercept as % of full scale) = 0.29%	0.95-1.05
% change in C.F. from last cal = 0.55%	± 3% F.S.
	± 10%

Thermo 51C Total Hydrocarbon Analyzer Calibration



**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.



— THC[ppm]

***NITROGEN DIOXIDE***



## API 200A NO-NO2-NOx Analyzer Calibration

<b>Date:</b> December 14, 2017 <b>Company/Airshed:</b> LICA <b>Location/Station Name:</b> Maskwa <b>Start/End Time 24 hr. (mst):</b> 11:18 / 18:30 <b>G.P.T. to be used for Ozone?</b> No <b>Calibration Method:</b> Gas Dilution & Gas Phase Titration	<b>Barometer/B.P./units:</b> F.S. 05544 expires December 5, 2018      944      millibars <b>Thermometer/Station Temp:</b> F.S. 170286131 expires April 19, 2019      22      °C <b>Weather Conditions:</b> Mainly sunny <b>Calibration Purpose:</b> routine monthly <b>Performed By/Reviewer:</b> Alex Yakupov      Rob Fisher <b>Cal Gas Expiry Date:</b> July 18, 2019
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<b>Analyzer:</b> <b>ID# or Serial Number:</b> 2051 <b>Last Calibration Date:</b> November 23, 2017 <b>Range ppb:</b> 1000	<b>Correction Factors:</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>NO =</td> <td>0.999</td> <td>1.012</td> <td>1.000</td> </tr> <tr> <td>NO<sub>2</sub> =</td> <td>1.000</td> <td>1.002</td> <td>1.000</td> </tr> <tr> <td>NO<sub>x</sub> =</td> <td>0.999</td> <td>1.016</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	0.999	1.012	1.000	NO <sub>2</sub> =	1.000	1.002	1.000	NO <sub>x</sub> =	0.999	1.016	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	0.999	1.012	1.000														
NO <sub>2</sub> =	1.000	1.002	1.000														
NO <sub>x</sub> =	0.999	1.016	1.000														

<b>Calibration Standards:</b> <b>Low Flow Meter ID/Expiry Date:</b> Definer Low 129069 expires February 5, 2018 <b>High Flow Meter ID/Expiry Date:</b> Definer High 128686 expires February 5, 2018 <b>Calibrator ID/Expiry Date:</b> API id# 627 expires January 27, 2018 <b>Cal Gas Cylinder I.D. #:</b> LL 104222 <b>Cal Gas Conc. (ppm):</b> 50.7      50.9	<b>Standard Calibration Points for a Range of: 1000 ppb</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO<sub>2</sub> (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 <sub>2</sub> (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 <sub>2</sub> (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NO <sub>x</sub>	Indicated NO	Indicated NO <sub>x</sub>	NO C.F.	NO <sub>x</sub> C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	4757	0.0	4757	0	0	-1.0	-1.0	n/a	n/a
as found high	4851	77.1	4928	793.2	796.3	783.0	783.0	1.012	1.016
adjusted zero	4757	0.00	4757	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4851	77.10	4928	793.2	796.3	793.0	796.0	1.000	1.000
mid	4905	36.88	4942	378.4	379.8	374.0	377.0	1.012	1.008
low	4923	18.88	4942	193.7	194.5	189.0	189.0	1.025	1.029
calibrator zero	4757	0.00	4757	0	0	0.0	0.0	n/a	n/a
<b>Average C.F.=</b>								1.012	1.012

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NO <sub>x</sub>	Indicated NO <sub>2</sub>	NO drop	NO <sub>2</sub> gain	NO <sub>2</sub> C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NO <sub>x</sub> reference	4851	77.10	4928	0.0	794.0	798.0	4.0	0.0	4.0	
as found high NO <sub>2</sub>	4851	77.10	4928	480.0	288.0	798.0	509.0	506.0	505.0	1.002
adjusted high NO <sub>2</sub>	4851	77.10	4928	480.0	288.0	798.0	510.0	506.0	506.0	1.000
gpt mid	4851	77.10	4928	260.0	520.0	800.0	279.0	274.0	275.0	0.996
gpt low	4851	77.10	4928	87.0	704.0	798.0	94.0	90.0	90.0	1.000
<b>Average NO<sub>2</sub> C.F.=</b>									0.999	

**Linear Regression/Calibration Results:**

	NO	NO <sub>x</sub>	NO <sub>2</sub>	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.999	0.998	1.005	0.95-1.05
b (Intercept as % of full scale)=	-0.27%	-0.27%	0.24%	± 3% F.S.
% change in C.F. from last cal=	-1.28%	-1.68%	-0.20%	± 10%
NO <sub>2</sub> converter efficiency			1.00	0.96 to 1.04

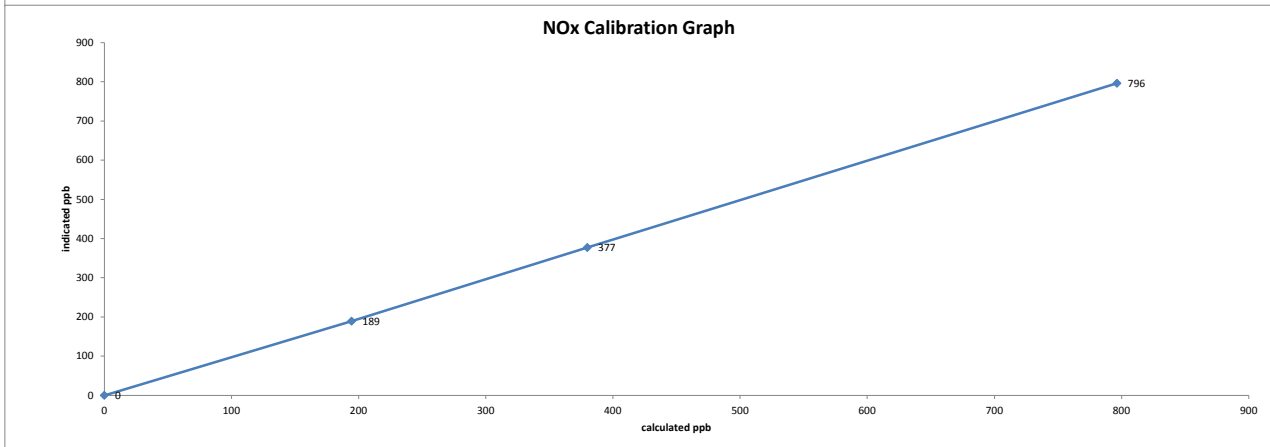
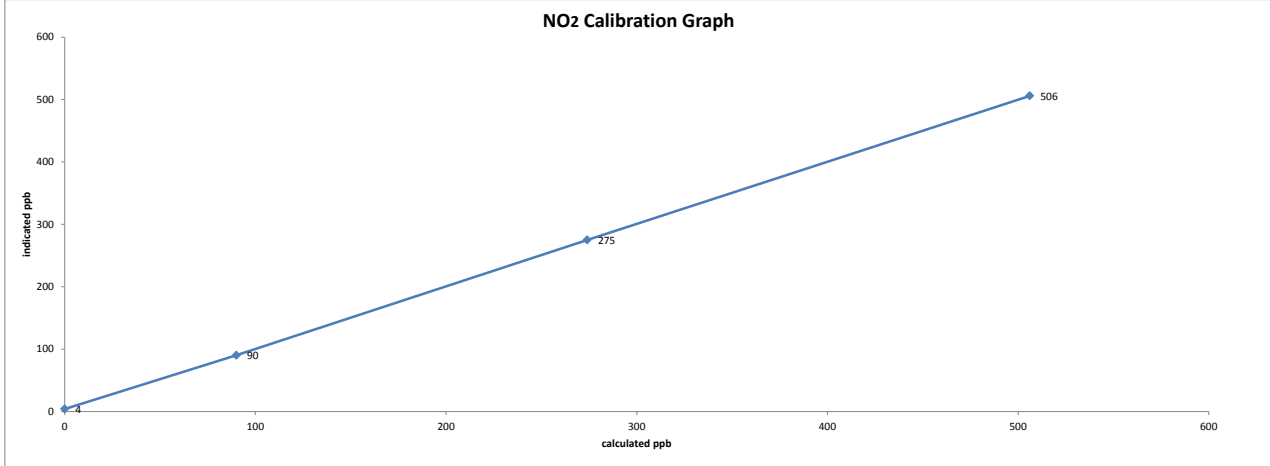
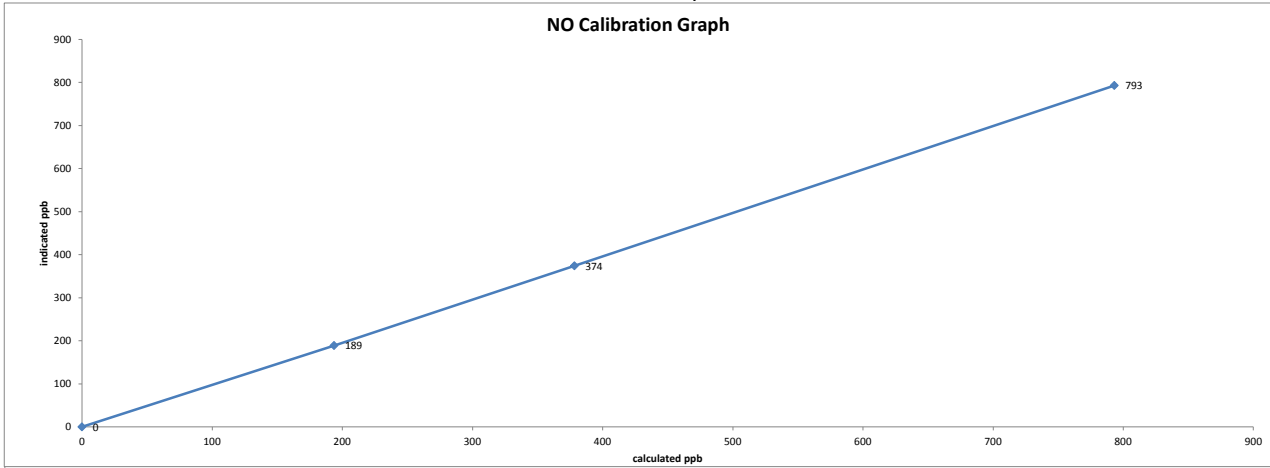
As found:		As left:	
NO <sub>x</sub> SLOPE:	1.034	NO <sub>x</sub> SLOPE:	1.049
NO <sub>x</sub> OFFS:	0.2	NO <sub>x</sub> OFFS:	-2.1
NO SLOPE:	1.036	NO SLOPE:	1.048
NO OFFS:	-1.8	NO OFFS:	-3.3
SAMP FLW:	503	SAMP FLW:	500
OZONE FL:	81	OZONE FL:	81
NORM PMT:	-4.2	NORM PMT:	-2.5
AZERO:	47.2	AZERO:	47.2
HVPS:	707	HVPS:	707
DCPS:	2578	DCPS:	2577
RCCELL:	50.0	RCCELL:	50.7
BOX TEMP:	28.2	BOX TEMP:	30.2
IZS TEMP:	43.0	IZS TEMP:	43.0
MOLY TEMP:	314.4	MOLY TEMP:	315.9
RCEL:	7.0	RCEL:	7.0
SAMP:	29.8	SAMP:	29.7
Expected Value NO:	7	Expected Value NO:	7
Expected Value NO <sub>2</sub> :	367	Expected Value NO <sub>2</sub> :	367
Expected Value NO <sub>x</sub> :	374	Expected Value NO <sub>x</sub> :	374

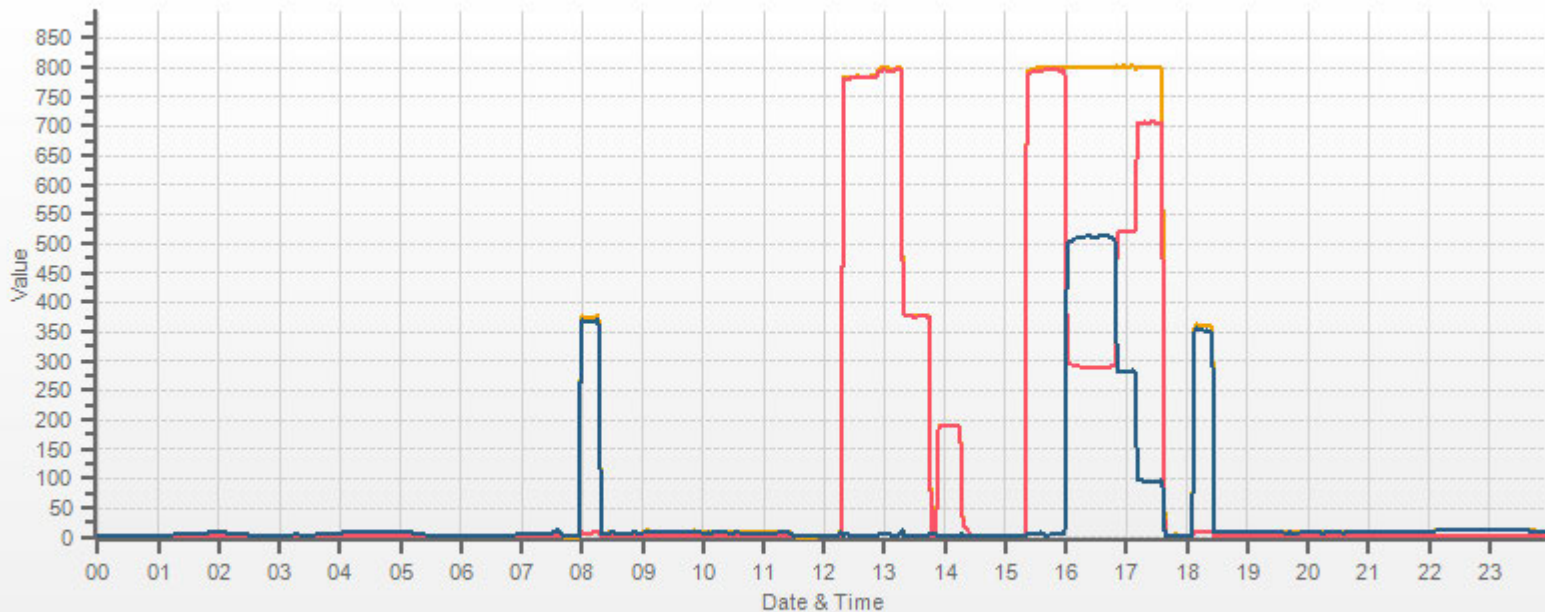
**Comments:**  
 The analyzer sample inlet filter was changed.  
 The manifold blower was found to be working normally.  
 The analyzer cooling fan filter(s) were cleaned.

Date: December 14, 2017  
Company/Airshed: LICA  
Location/Station Name: Maskwa

Start/End Time 24 hr. (mst): 11:18 / 18:30  
Calibration Purpose: routine monthly  
Calibration Method: Gas Dilution & Gas Phase Titration

API 200A NO-NO<sub>2</sub>-NO<sub>x</sub> Analyzer Calibration





— NOX[ppb] — NO[ppb] — NO2[ppb]

## ***WIND SYSTEM***



## Sonic Wind Sensor Certificate of Calibration

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

Instrument Condition Within Tolerance: As Found  As Left

Corrective Action: No Adjustment  Adjust  Repair

Preventative Maintenance

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

Quality Control Manual Revision: September 16, 2013 MP42201 Rev. G.  
 All Work Performed per Customer Purchase Order Requirements.  
 Calibration Document No. 50.5-6100

**Test Equipment Used for Calibration of Instruments**

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

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

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





# Meteorological Sensor Audit/Calibration

## Location Information

Company:	LICA	Performed By:	Alex Yakupov
Audit Location:	Maskwa	Reviewed By:	Rob Fisher
Audit Date:	December 28, 2017	Start/End Time (mst):	14:16 / 18:15
Calibration Purpose:	installation	Weather Conditions:	Mix of sun and clouds

## Wind Sensor Information

Sensor ID Data:		Sensor Outputs:	
Sensor Make:	RM Young	Velocity Voltage Output Range:	0-1 V
Sensor Model:	05305VK	Velocity Unit Output Range:	0-200 km/h
Serial #:	92411	Direction Voltage Output Range:	0-1 V
Previous Cal/Audit Date:	October 23, 2017	Direction Unit Output Range:	0-360 degrees

## Wind Calibrator Information

Calibrator I.D. and Expiry Date: RM Young 18802 id# CA03309 expires September 25, 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	18.5	18.5	0.996	
2000	36.9	36.9	36.9	1.000	
3000	55.3	55.4	55.4	0.999	
4000	73.7	73.9	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	147.6	147.6	0.999	
9000	165.9	166.0	166.0	0.999	
10000	184.3	184.4	184.4	0.999	
			The audit meets AMD requirements.	Average Correction Factor=	0.999

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

Generated Wind Direction 0-360 (Up)	Generated Wind Direction 360-0 (Down)	Indicated Wind Direction 0-360 (Up)	Indicated Wind Direction 360-0 (Down)	Degrees Difference 0-360 (Up)	Degrees Difference 360-0 (Down)	Average Absolute Degrees Difference
0	355	0	356	0.0	-0.8	0.4
30	330	32	332	-1.6	-1.8	1.7
60	300	62	302	-2.0	-2.2	2.1
90	270	91	272	-1.4	-1.7	1.6
120	240	121	242	-1.3	-1.5	1.4
150	210	151	212	-1.2	-2.0	1.6
180	180	181	181	-1.4	-1.0	1.2
210	150	212	151	-2.4	-0.7	1.6
240	120	242	121	-2.2	-1.2	1.7
270	90	272	91	-2.4	-1.1	1.7
300	60	302	61	-2.0	-1.4	1.7
330	30	332	31	-2.0	-1.1	1.6
355	0	356	0	-0.8	0.4	0.6
				Average Absolute Degrees Difference=		1.4

## Comments:

The Sonic Wind System was removed due high unrealistic mesurements. The RM Young Wind System was installed.

## ***CALIBRATORS***

**Company** Maxxam/SIA **Operator:** Chris

<b>Calibrator:</b>		<b>Flow Measurement Device:</b>	
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>		

<b>Dilution Flow (sccm)</b>		
Pt. #1	<u>4892</u>	Pt. #3 <u>4951</u>
Pt. #2	<u>4975</u>	
<b>Gas Flow (sccm)</b>		
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 <sub>2</sub>	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)*

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

Flow	O <sub>3</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOX	% Diff. Vs Audit gas	
4972	0	0.0000	0.7867	0.0014	0.7881	NO <sub>2</sub>	% 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)*

<b>NO<sub>2</sub></b>	<b>LIMITS</b>
Correlation= 1.0000	≥ 0.995
m (Slope)= 0.9924	<b>0.90-1.10</b>
b (Intercept % of FS)= 0.1755	± 3% F.S.

<b>AENV Standards</b>	<b>NO<sub>x</sub> Analyzer</b>
<b>Audit Calibrator</b>	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>	
<b>Calibrator:</b>		<b>Flow Measurement Device:</b>	
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 <sub>2</sub>	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 <sub>3</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOX	% Diff. Vs Audit gas	
4954	0.000	0.0000	0.7949	0.0005	0.7954	NO <sub>2</sub>	% 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 <sub>2</sub>	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 Audit Calibrator	NO <sub>x</sub> Analyzer
Make/Model <u>Thermo 146i</u>	Make/Model <u>Thermo 42i</u>
Serial/AMU Number <u>1809</u>	Serial/AMU Number <u>1868</u>
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: [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:
<b>Make/Model:</b> <u>R&amp;R MFC 201</u>	<b>Make/Model:</b> <u>Bios DC2</u>
<b>Serial Number:</b> <u>AMU 1690</u>	<b>Serial Number:</b> <u>AMY 1659</u>
<b>Last Verification Date:</b> <u>October 19, 2016</u>	<b>Temp. °C:</b> <u>24.5 C</u>
<b>Gas Type:</b> <u>SO2</u> <b>Conc.</b> <u>98.07</u>	<b>B.P.</b> <u>706 mmhg</u>
<b>Cylinder Number:</b> <u>CA:016625</u>	
<b>Expiry Date:</b> <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	<del>0.01662</del>	<del>60.183</del>	<del>50.0</del>
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
<b>Average Cylinder Concentration:</b>					<b>50.0</b>

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:
<b>Make/Model:</b> <u>R&amp;R MFC 201</u>	<b>Make/Model:</b> <u>Bios DC2</u>
<b>Serial Number:</b> <u>AMU 1690</u>	<b>Serial Number:</b> <u>AMU 1659</u>
<b>Last Verification Date:</b> <u>October 19, 2016</u>	<b>Temp. °C:</b> <u>24.0 C</u>
<b>Gas Type:</b> <u>H2S</u> <b>Conc.</b> <u>20.43</u>	<b>B.P.</b> <u>706 mmhg</u>
<b>Cylinder Number:</b> <u>CAL015584</u>	
<b>Expiry Date:</b> <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			
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:					<b>10.1</b>

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

## CH<sub>4</sub> / C<sub>3</sub>H<sub>8</sub> Cylinder Gas

File No. 2015-029CGA

**Company:** Maxxam                      **Operators name:** Limin Li  
**Cylinder #:** LL165367   **Conc CH<sub>4</sub> (PPM)** 590/207   **Tolerance (%)** 2   **Certified By:** Praxair

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>R&amp;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>CH<sub>4</sub></u>	Conc.	<u>999.2</u>	B.P.	<u>703 mmhg</u>
Cylinder Number	<u>D751932</u>				
Gas Type	<u>C<sub>3</sub>H<sub>8</sub></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 <sub>4</sub>	C <sub>3</sub> H <sub>8</sub>			CH <sub>4</sub>	C <sub>3</sub> H <sub>8</sub>
Dilution	Gas						
<del>2600</del>	<del>0.0</del>	<del>0.00</del>	<del>0.00</del>	<del>X</del>	<del>X</del>	<del>X</del>	<del>X</del>
2569	51.5	12.06	11.37	0.02005	49.883	602	206
3549	22.3	3.77	3.57	0.00628	159.148	600	207
3523	10.4	1.77	1.70	0.00295	338.750	600	209
Average Cylinder Concentration:						<b>600</b>	<b>207</b>

	<b><u>CH<sub>4</sub></u></b>		<b><u>C<sub>3</sub>H<sub>8</sub></u></b>
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 CH<sub>4</sub> 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. 2016-336CGA

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

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

Expiry Date: July 2019

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Teco 146i</u>			Make/Model	<u>Bios DC2</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>AMU 1659</u>
Last Verification Date	<u>October 19, 2019</u>			Temp. °C	<u>24.5 C</u>
Gas Type	<u>NO</u>	Conc.	<u>48.79</u>	B.P.	<u>706 mmhg</u>
Cylinder Number	<u>CAL018188</u>				
Expiry Date	<u>March 2019</u>				

**Reference Analyzer:**

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

Instrument Settings    Zero: 4.4      Span: 1.080      Range: 1.0

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

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

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

**Cylinder gas tolerances based on NO only**

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

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

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

Auditor: Al Clark      Date: October 19, 2016

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

***APPENDIX III  
REPORT CERTIFICATION FORM***

### Report Certification Form

Alberta Airshed (if applicable)	EPA Approval or Code of Practice Registration # (if applicable)
YES	NA
Company Name (if applicable)	Industrial Operation Name (if applicable)
Lakeland Industry & Community Association	Maskwa Continuous Monitoring Station
Name of the Representative of the Person Responsible (Last, First, Middle)	Position / Title of the Representative of the Person Responsible
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

January 25, 2018

Report Issued Date (dd-mm-yyyy)

***APPENDIX IV  
DATA VALIDATION CERTIFICATION FORM***



### Validation Certificate Form

<b>Client:</b> <u>Lakeland Industry &amp; Community Association</u>	<b>Project #:</b> <u>2833-2017-12-30-C</u>
<b>Site:</b> <u>Maskwa Continuous Monitoring Station</u>	<b>Contact:</b> <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u>Maram ghaieb</u>	Date <u>January 11, 2018</u>
Level 1 Primary Validation	<u>Maram ghaieb</u>	Date <u>January 11, 2018</u>
Level 2 Final Validation	<u>Maram ghaieb</u>	Date <u>January 22, 2018</u>
Level 3 Independent Data Review	<u>CSA-Lmhq</u>	Date <u>January 25, 2018</u>
Post-Final Validation	<u>NA</u>	Date <u>NA</u>

<b>Notes</b>
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](mailto: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 December 2017.

The air monitoring program consists of continuous air monitoring results for Sulphur Dioxide (SO<sub>2</sub>), Hydrogen Sulphide (H<sub>2</sub>S), Total Hydrocarbon (THC), Oxides of Nitrogen (NO<sub>x</sub>), Nitric Oxides (NO), Nitrogen Dioxide (NO<sub>2</sub>), Ozone (O<sub>3</sub>), Particulate Matter 2.5 (PM<sub>2.5</sub>), 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 December 2017 was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016), with the exception of PM<sub>2.5</sub>.

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

**Non-Conformance:** There was one 1-Hr contravention for the parameter of PM<sub>2.5</sub> recorded this month: concentration of 103 µg/m<sup>3</sup> on December 20 at hour 13:00 AEP reference number: 333044..

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,



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

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

Michael Bisaga  
Technical Program Manager  
Lakeland Industry & Community Association  
780-266-7068  
[mbisaga@otonabee.ca](mailto:mbisaga@otonabee.ca)

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

Lily Lin  
Data & Reporting Specialist  
587-225-2248  
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**AMBIENT AIR MONITORING MONTHLY DATA REPORT**  
**LAKELAND INDUSTRY & COMMUNITY ASSOCIATION**  
**ST. LINA CONTINUOUS MONITORING STATION**

**JOB #: 2833-2017-12-31-C**

**December 2017**

Prepared for:

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

**Attention: MIKE BISAGA**

DATE: **January 26, 2018**

Prepared by: *Maram Ghaleb*

---

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

Reviewed by: *Wunmi Adekanmbi*

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



## SUMMARY

In December 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 PM<sub>2.5</sub>, was compliant with the requirements outlined in the AMD, 2016.

There was one 1-Hr contravention for the parameter of PM<sub>2.5</sub> recorded this month: concentration of 103 µg/m<sup>3</sup> on December 20 at hour 13:00. This event was reported to AEP under reference number: 333044.

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

**Power failure:** Due to a power failure, one hour of data was discarded on December 22, at hour 08:00. The precipitation channel was not impacted.

**H<sub>2</sub>S:** The analyzer began exhibiting negative span drift on December 25. On December 30, at hours 15:00-16:00, an as-found response check was performed to assess the functionality of the analyzer. The results met AMD requirements. However, two hours of downtime were incurred as a result of the additional quality check.

**WS/WD:** Wind speed data collected on December 25 at hour 06:00 was invalidated as it was considered an anomalous spike. Hourly wind speed average data collected on December 30 at hour 02:00 became invalid after the minute data spikes were invalidated as more than 15 minutes of data were impacted.

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 <sub>2</sub> (ppb)	172	48	0	0	0	4	12	0	13.7	SW	2	12	99.9
H <sub>2</sub> S (ppb)	10	3	0	0	0	1	12	4	14.3	SW	0	1	99.6
THC (ppm)	-	-	-	-	2.33	2.88	31	17	10.4	SSE	2.59	31	99.9
NO <sub>2</sub> (ppb)	159	-	0	-	2	22	14	20	13.1	SW	6	1	99.9
NO (ppb)	-	-	-	-	0	2	1	1	9.7	S	0	1	99.9
NO <sub>x</sub> (ppb)	-	-	-	-	2	22	14	20	13.1	SW	6	1	99.9
O <sub>3</sub> (ppb)	82	-	0	-	32.3	44.3	7	16	14.5	WNW	40.9	7	99.9
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	80	30	1	0	5	103	20	13	13.7	SW	26	20	99.9
RELATIVE HUMIDITY (%)	-	-	-	-	65	88	5	2	18.3	WNW	78	14	99.9
BAROMETRIC PRESSURE (millibar)	-	-	-	-	930	947	29	10	4.6	WNW	945	29	99.9
AMBIENT TEMPERATURE (°C)	-	-	-	-	-10.6	8.4	10	12	29.3	W	3.1	10	99.9
PRECIPITATION (mm)	-	-	-	-	0.0	0.7	4	22	10.8	SSW	0.1	5	100.0
VECTOR WS (kph)	-	-	-	-	8.3	34.0	10	13	-	WNW	18.9	5	99.6
VECTOR WD (sec)	-	-	-	-	270 (W)	-	-	-	-	-	-	-	99.6

## Exceedance Summary Report

---

### SO<sub>2</sub> 1-Hour Exceedances

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

### SO<sub>2</sub> 24-Hour Exceedances

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

### H<sub>2</sub>S 1-Hour Exceedances

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

### H<sub>2</sub>S 24-Hour Exceedances

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

### NO<sub>2</sub> 1-Hour Exceedances

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

### PM<sub>2.5</sub> 1-Hour Exceedances

DATE	TIME (MST)	READING (µg/m <sup>3</sup> )	WS (kph)	WD (deg)	ESRD Reference #
December 20	13:00	103	13.7	229	333044

### PM<sub>2.5</sub> 24-Hour Exceedances

Measured concentrations of fine particulate matter were below the 24-hour AAAQO of 30 µg/m<sup>3</sup>.

### O<sub>3</sub> 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 (SO<sub>2</sub>), Hydrogen Sulphide (H<sub>2</sub>S), Total Hydrocarbon (THC), Oxides of Nitrogen (NO<sub>x</sub>), Nitric Oxides (NO), Nitrogen Dioxide (NO<sub>2</sub>), Ozone (O<sub>3</sub>), Particulate Matter 2.5 (PM<sub>2.5</sub>), 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 (SO<sub>2</sub>)**

- Operational time for the monitoring period was 99.9% equivalent to 1 hour of downtime, which was incurred as a result of a power failure that occurred on December 22 at hour 08:00.
- The routine monthly calibration was performed on December 7.
- The O<sub>3</sub> and SO<sub>2</sub> span programs are designed to run concurrently. One instance of quality check was recorded on the SO<sub>2</sub> channel on December 8 spanning from hour 13:00 to 14:00 due to activities on the O<sub>3</sub> channel.

#### **HYDROGEN SULPHIDE (H<sub>2</sub>S)**

- Operational time for the monitoring period was 99.6% equivalent to 3 hours of downtime.
- The routine monthly calibration was performed on December 7.
- Due to a power failure, one hour of data was discarded on December 22, at hour 08:00.
- The analyzer began exhibiting negative span drift on December 25. On December 30, at hours 15:00-16:00, an as-found response check was performed to assess the functionality of the analyzer. The results met AMD requirements. However, two hours of downtime were incurred due to the additional quality check.

#### **TOTAL HYDROCARBONS (THC)**

- Operational time for the monitoring period was 99.9% equivalent to 1 hours of downtime, which was incurred as a result of a power failure that occurred on December 22 at hour 08:00.
- The power failure disrupted the automatic execution of the zero-span check that was scheduled at hour 10:00. A zero-span check was manually triggered on the same day at hour 13:00.
- The routine monthly calibration was performed on December 8.

#### **OXIDES OF NITROGEN (NO<sub>x</sub>), NITRIC OXIDE (NO) and NITROGEN DIOXIDE (NO<sub>2</sub>)**

- Operational time for the monitoring period was 99.9% equivalent to 1 hour of downtime, which was incurred as a result of a power failure that occurred on December 22 at hour 08:00.
- The routine monthly calibration was performed on December 7.

#### **OZONE (O<sub>3</sub>)**

- Operational time for the monitoring period was 99.9% equivalent to 1 hour of downtime, which was incurred as a result of a power failure that occurred on December 22 at hour 08:00.
- The O<sub>3</sub> and SO<sub>2</sub> span programs are designed to run concurrently. An additional quality check was recorded on the O<sub>3</sub> channel on December 7 at hour 15:00 due to activities on the SO<sub>2</sub> channel.
- The routine monthly calibration was performed on December 8.

#### **PARTICULATE MATTER < 2.5 MICRONS (PM<sub>2.5</sub>)**

- Operational time for the monitoring period was 99.9% equivalent to 1 hour of downtime, which was incurred as a result of a power failure that occurred on December 22 at hour 08:00.
- The routine monthly audit was performed on December 8.
- One 1-Hr contravention was recorded this month: concentration of 103 µg/m<sup>3</sup> on December 20 at hour 13:00. This event was reported to AEP under reference number: 333044.
- Data was corrected in accordance with AMD (2016), Chapter 6, Table 2, Zero Adjustment Criteria. Data recorded between 0 and -3 µg/m<sup>3</sup> were corrected to 0 µg/m<sup>3</sup>. No hourly data were invalidated as all measurements were above - 3 µg/m<sup>3</sup> this month.

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

- Operational time for the monitoring period was 99.6% equivalent to three hours of downtime.
- Due to a power failure, one hour of data was discarded on December 22, at hour 08:00.
- Data collected on December 25 at hour 06:00 was invalidated as it was considered an anomalous spike.
- Maximum instantaneous data were invalidated on December 2 at hour 10:00, December 19 at 13:00-14:00 and 22:00, December 25 at hours 00:00-01:00 and 05:00-06:00, December 27 at hour 17:00, and December 30 at hours 00:00 to 13:00, as they were considered anomalous spikes. Review of the minute data, bracketing the spike, did not support the validity of the elevated measurement.
- Hourly data collected on December 30 at hour 02:00 became invalid after the minute data spikes were invalidated as more than 15 minutes of data were impacted.
- 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 99.9% equivalent to 1 hour of downtime, which was incurred as a result of a power failure that occurred on December 22 at hour 08:00.

#### **BAROMETRIC PRESSURE (BP)**

- Operational time for the monitoring period was 99.9% equivalent to 1 hour of downtime, which was incurred as a result of a power failure that occurred on December 22 at hour 08:00.

#### **PRECIPITATION (PRECIP)**

- Operational time for the monitoring period was 100%. The precipitation channel was not impacted by the power failure that occurred on December 22.

#### **AMBIENT TEMPERATURE (AmbTPX)**

- Operational time for the monitoring period was 99.9% equivalent to 1 hour of downtime, which was incurred as a result of a power failure that occurred on December 22 at hour 08:00.



---

## **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, with the exception of PM<sub>2.5</sub>, was compliant with the requirements outlined in the AMD, 2016.

There was one 1-Hr contravention for the parameter of PM<sub>2.5</sub> recorded this month: concentration of 103 µg/m<sup>3</sup> on December 20 at hour 13:00. This event was reported to AEP under reference number: 333044.

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

## **4.0 Calculations and Results**

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

## 5.0 Methods and Procedures

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

- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-00212: Ambient O<sub>3</sub> Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO<sub>2</sub>/NO<sub>x</sub> Monitoring
- Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring
- Maxxam AIR SOP-00242: Precipitation Collector Installation/Maintenance
- Maxxam AIR SOP-00010: Thermo Model 5030i SHARP Monitor
- 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 51i FID Analyzer
- Oxides of Nitrogen - API 200E Chemiluminescent Analyzer
- Ozone - Thermo 49i Photometric Analyzer
- Particulate Matter (PM<sub>2.5</sub>) - 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**

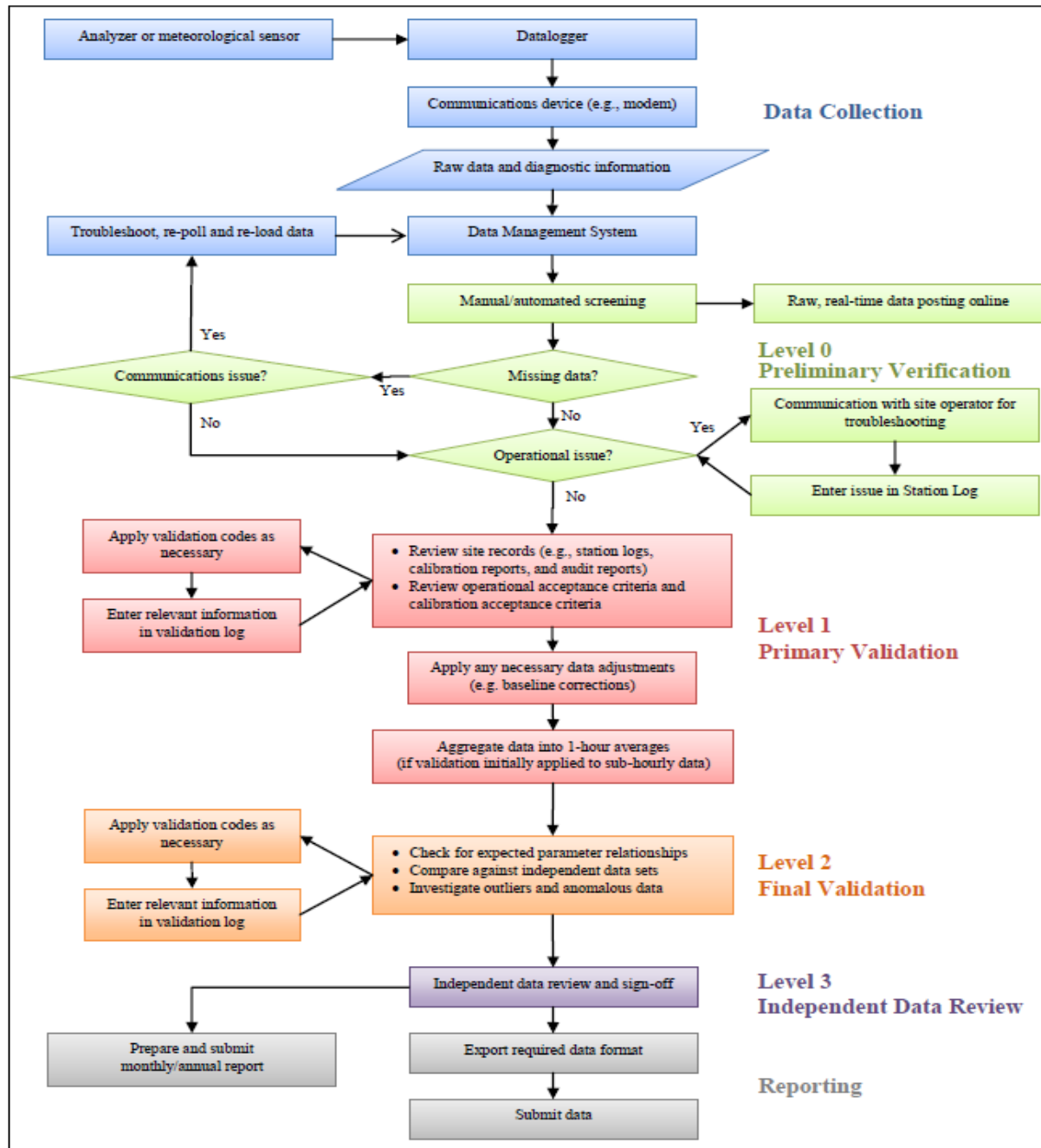
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

**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 (SO<sub>2</sub> ppb)**

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

**STATUS FLAG CODES**

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

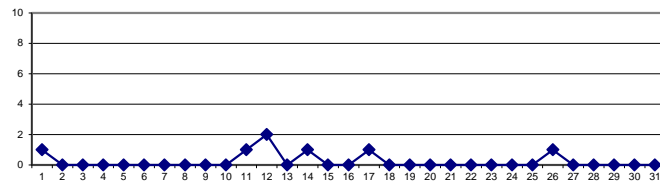
**OBJECTIVE LIMIT:**

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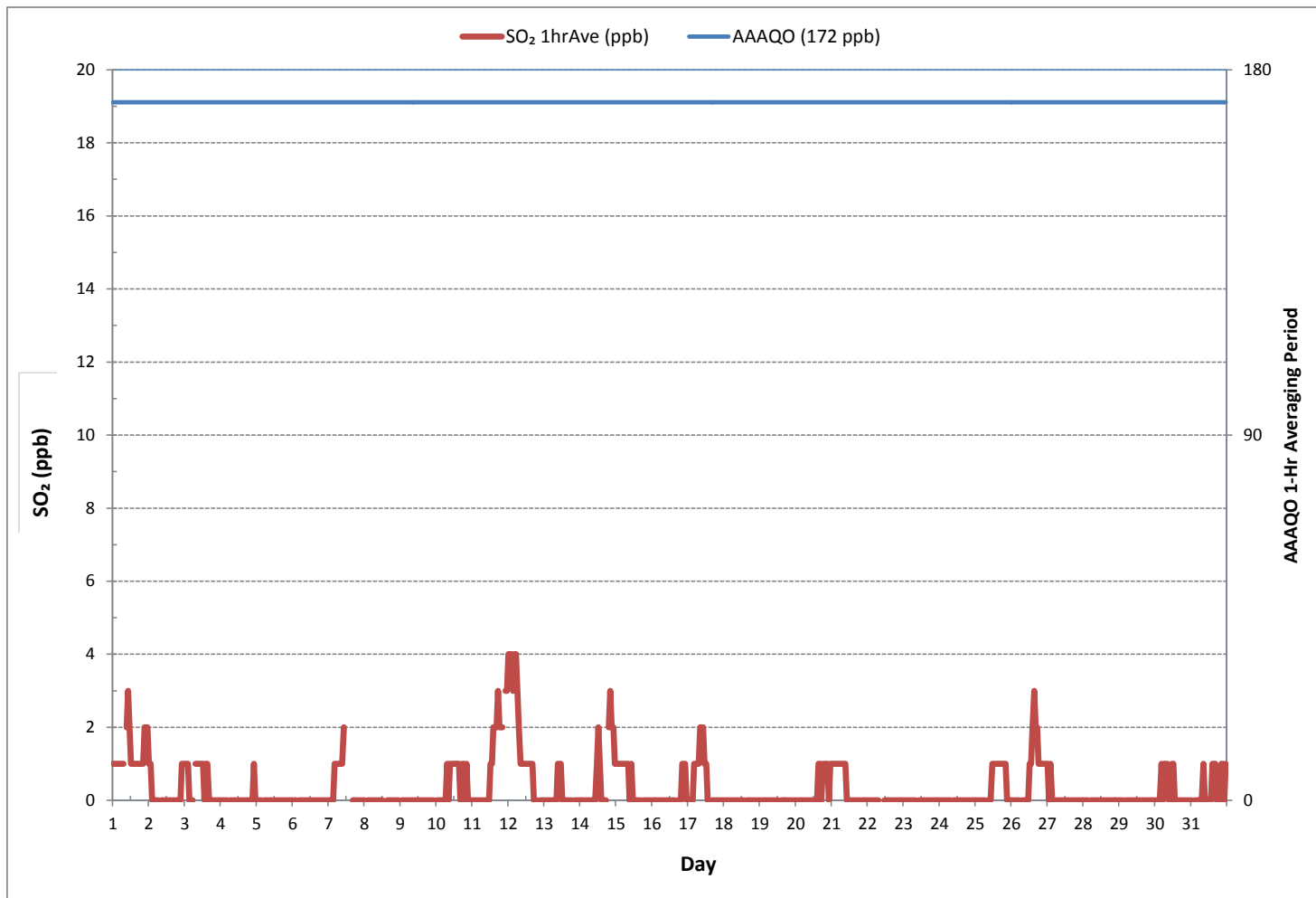
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	172		
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	2 ON DAY	2
MAXIMUM 1-HR AVERAGE:	4 ppb @ HOUR	0 ON DAY	12
MAXIMUM 24-HR AVERAGE:	2 ppb	ON DAY	12
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	743 hrs
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	99.9 %
STANDARD DEVIATION:	1	MONTHLY AVERAGE:	0 ppb

**24 HR AVERAGES December 2017**



SULPHUR DIOXIDE Hourly Averages (SO<sub>2</sub> ppb)







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

SULPHUR DIOXIDE Instantaneous Maximum (SO<sub>2</sub> ppb)

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

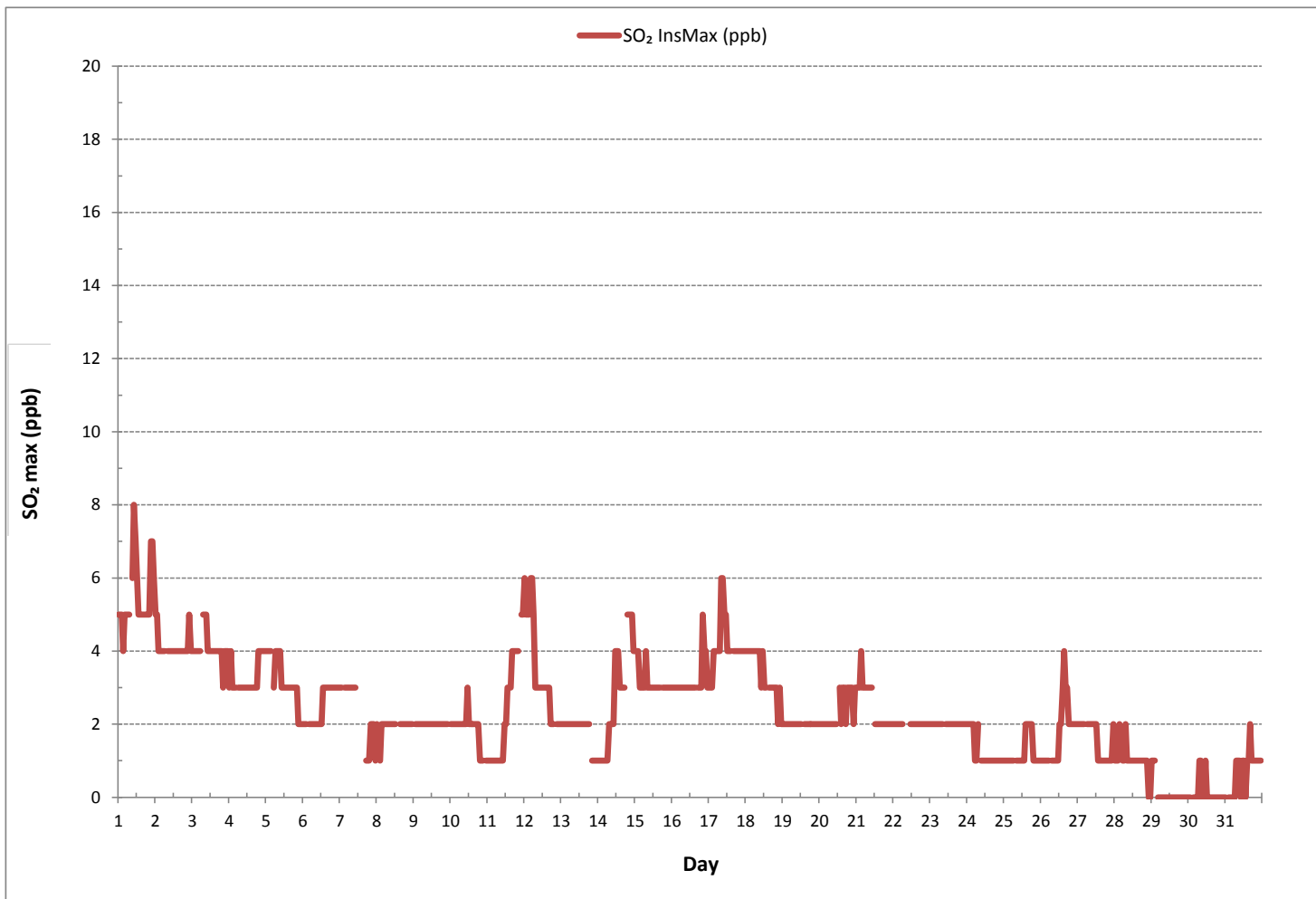
STATUS FLAG CODES

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:	652
MAXIMUM INSTANTANEOUS VALUE:	8 ppb @ HOUR 10 ON DAY 1
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	742 hrs
STANDARD DEVIATION:	1

SULPHUR DIOXIDE Instantaneous Maximum (SO<sub>2</sub> ppb)



Wind: LICA ST. LINA  
 Poll.: LICA ST. LINA-SO2[ppb]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 0.29%

Calm Avg: 0.27 [ppb]

Direction	0.0-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0	>5.0	Total
<b>N</b>	5.3	0.0	0.0	0.0	0.0	0.0	5.3
<b>NE</b>	0.9	0.0	0.0	0.0	0.0	0.0	0.9
<b>E</b>	0.7	0.0	0.0	0.0	0.0	0.0	0.7
<b>SE</b>	0.4	0.0	0.1	0.0	0.0	0.0	0.6
<b>S</b>	9.1	1.6	0.3	0.1	0.0	0.0	11.1
<b>SW</b>	19.3	2.6	1.3	1.0	0.1	0.0	24.3
<b>W</b>	31.2	1.4	0.4	0.0	0.0	0.0	33.1
<b>NW</b>	23.4	0.4	0.0	0.0	0.0	0.0	23.8
<b>Summary</b>	90.3	6.0	2.1	1.1	0.1	0.0	100.0

% Icon Classes (ppb)

90 0.0-1.0

6 1.0-2.0

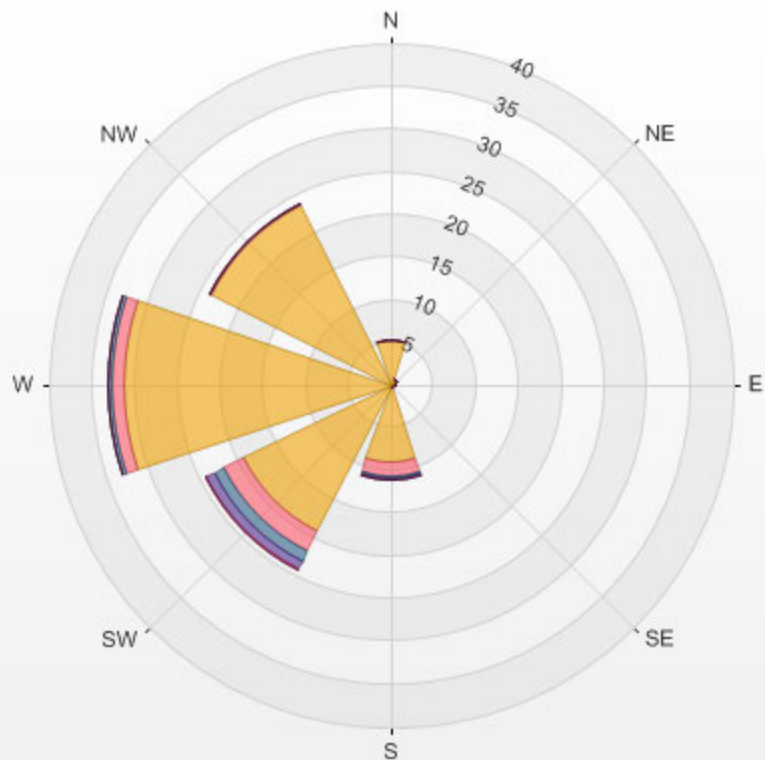
2 2.0-3.0

1 3.0-4.0

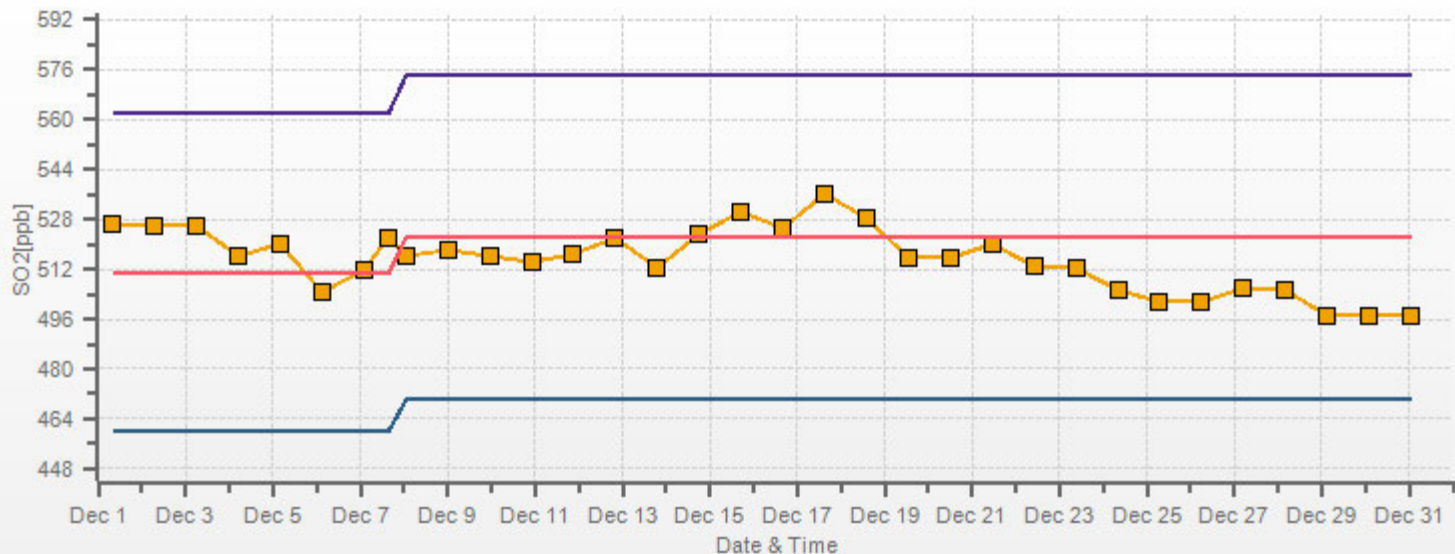
0 4.0-5.0

0 >5.0

LICA ST. LINA Poll.: LICA ST. LINA-SO<sub>2</sub>[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 0.29% Calm Poll Avg: 0.27[ppb]



SO2[ppb] Calibration: LICA ST. LINA Monthly: 17/12 Type: Span



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

***HYDROGEN SULPHIDE***



HYDROGEN SULPHIDE Hourly Averages (H<sub>2</sub>S 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	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
2	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
3	0	0	0	0	0	0	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
4	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
5	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
6	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
7	0	0	S	0	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
8	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
9	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	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	S	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	S	0	0	0	0	0	0	0	0	24
12	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	1	0	24
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	24
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	24
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	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	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	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	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
19	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
20	0	0	0	0	0	0	0	0	0	0	0	0	0	S	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	S	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	P	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
23	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
24	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
25	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
26	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
27	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
28	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
29	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
30	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	C1	C1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22
31	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
HOURLY MAX	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
HOURLY AVG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

STATUS FLAG CODES

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

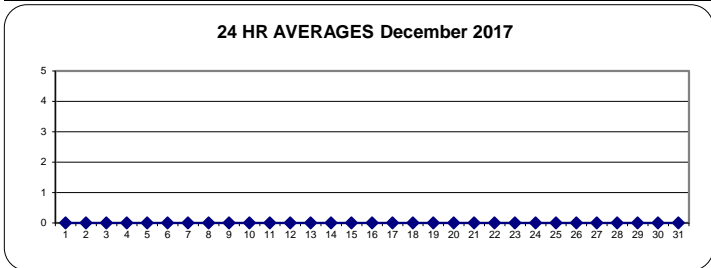
OBJECTIVE LIMIT:

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

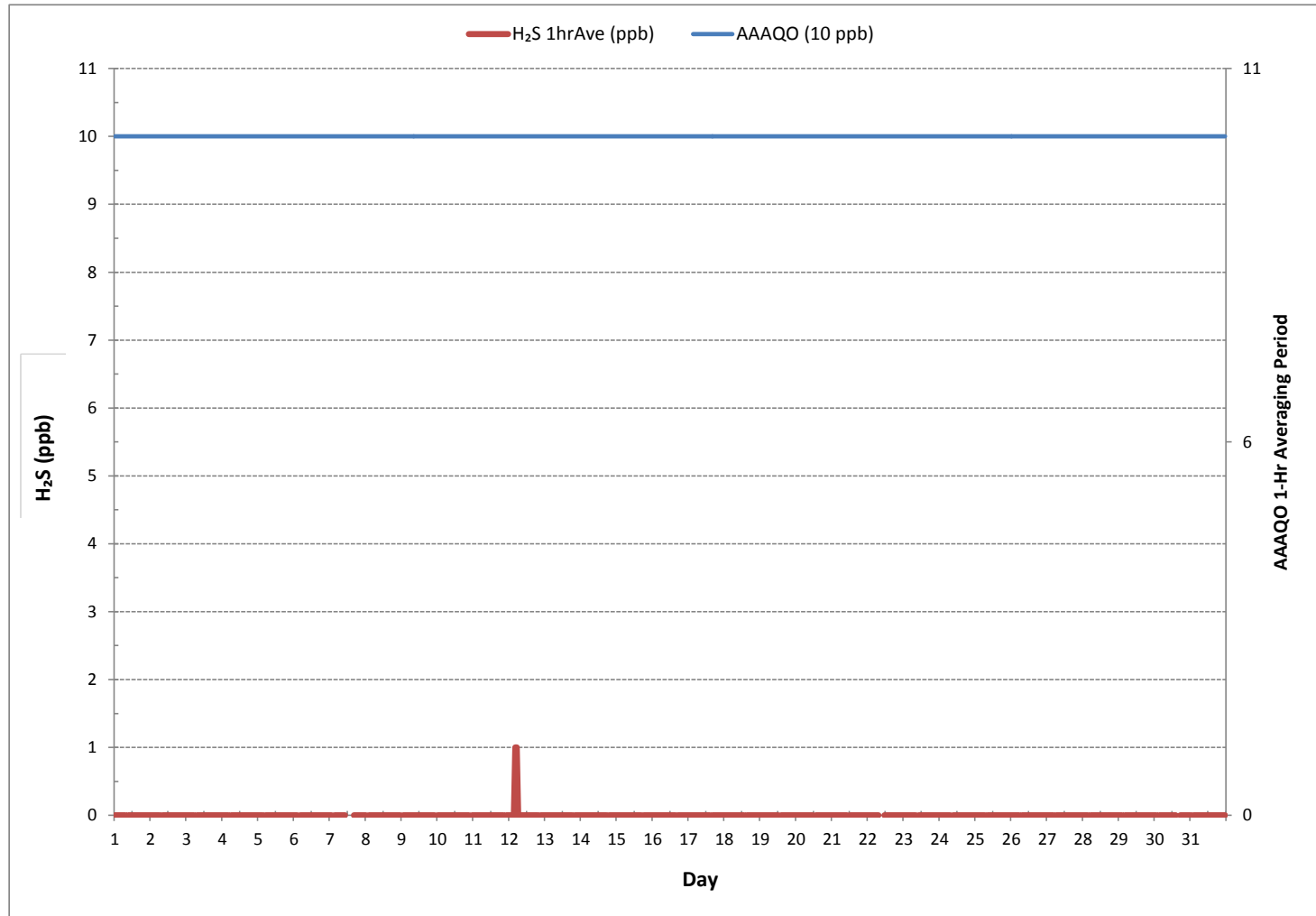
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0
NUMBER OF 24-HR EXCEEDANCES:	0
NUMBER OF NON-ZERO READINGS:	2
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR 0 ON DAY 1
MAXIMUM 1-HR AVERAGE:	1 ppb @ HOUR 4 ON DAY 12
MAXIMUM 24-HR AVERAGE:	0 ppb ON DAY 1
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	741 hrs
AMD OPERATION UPTIME:	99.6 %
STANDARD DEVIATION:	0
MONTHLY AVERAGE:	0 ppb

24 HR AVERAGES December 2017



HYDROGEN SULPHIDE Hourly Averages (H<sub>2</sub>S ppb)







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

HYDROGEN SULPHIDE Instantaneous Maximum (H<sub>2</sub>S ppb)

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

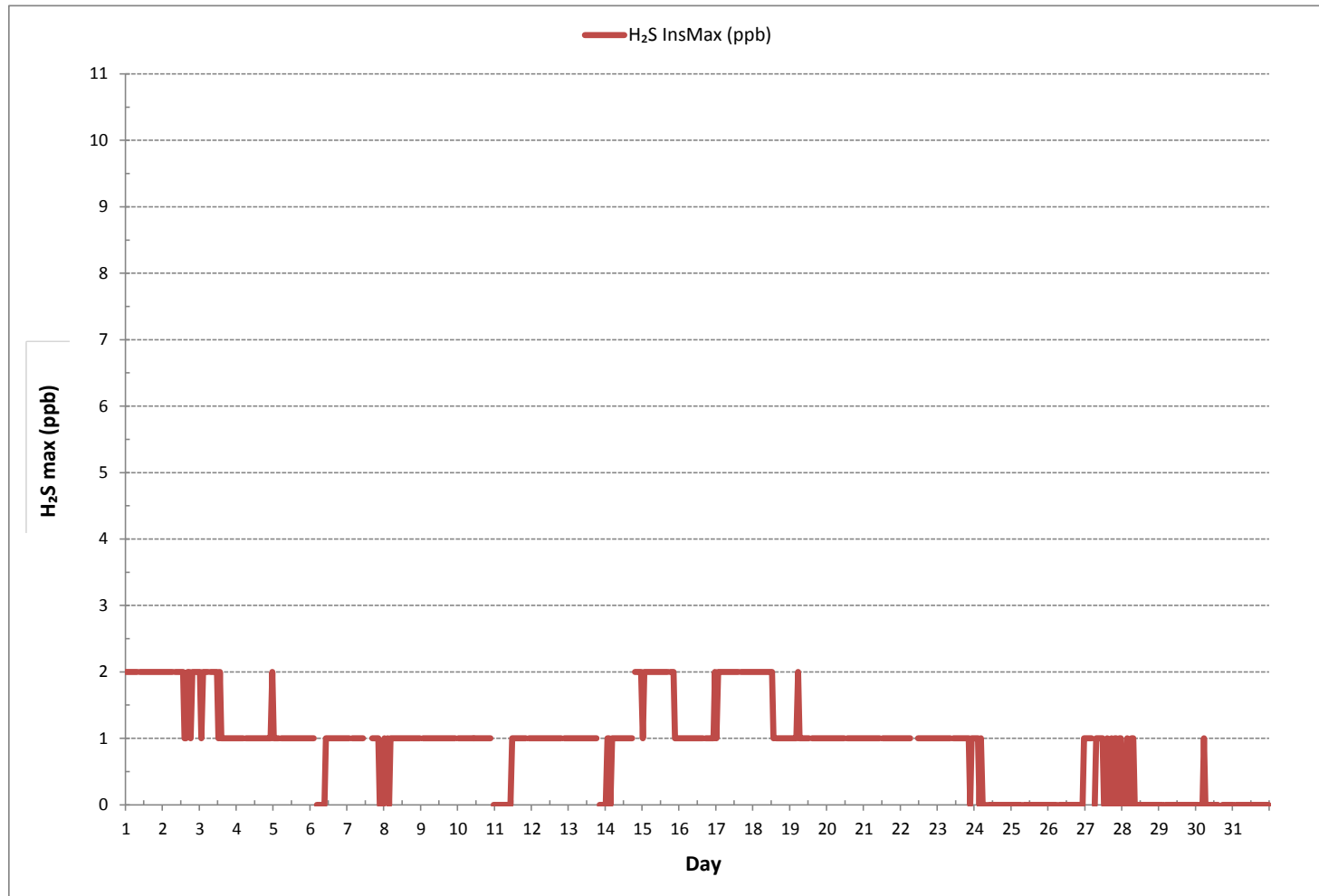
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	517
MAXIMUM INSTANTANEOUS VALUE:	2 ppb @ HOUR 0 ON DAY 1
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	740 hrs
STANDARD DEVIATION:	1

HYDROGEN SULPHIDE Instantaneous Maximum (H<sub>2</sub>S ppb)





% Icon Classes (ppb)

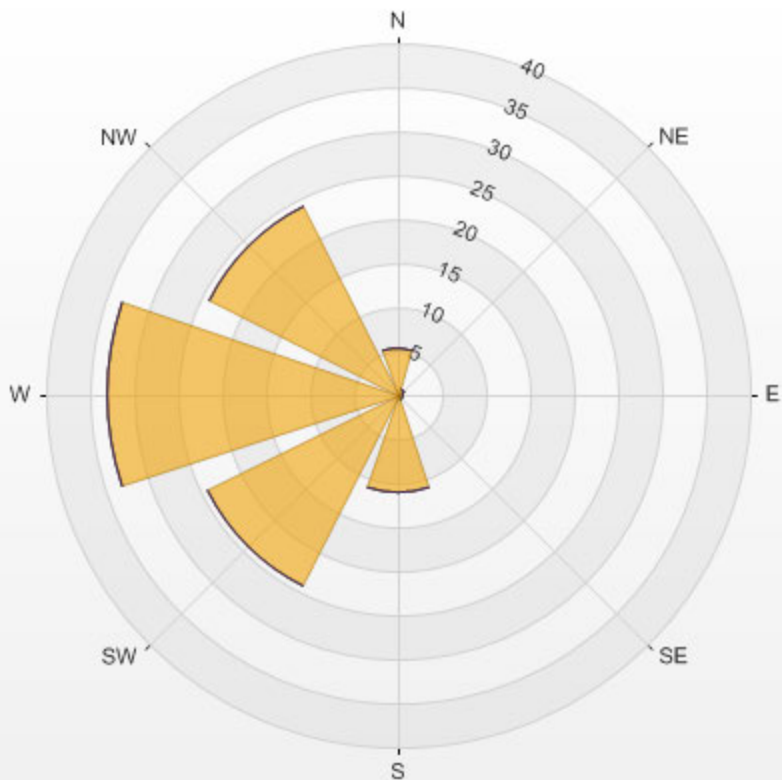
100 0.0-0.7

0 0.7-1.3

0 1.3-2.0

0 >2.0

LICA ST. LINA Poll.: LICA ST. LINA-H2S[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 0.28% Calm Poll Avg: 0.12[ppb]



H2S[ppb] Calibration: LICA ST. LINA Monthly: 17/12 Type: Span



Span Meas Span Ref Span Low Span High

***TOTAL HYDROCARBON***



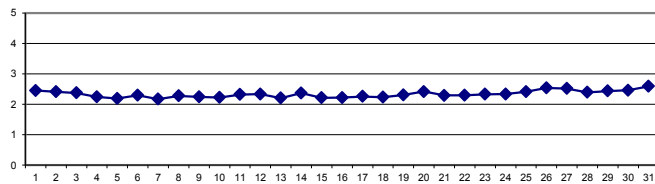
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	2.38	2.41	2.43	2.43	2.46	2.51	2.53	2.56	S	2.54	2.44	2.50	2.46	2.37	2.37	2.37	2.38	2.40	2.44	2.47	2.46	2.49	2.49	2.45	2.37	2.56	2.45	24
2	2.44	2.38	2.42	2.43	2.48	2.45	2.50	S	2.48	2.45	2.43	2.42	2.36	2.34	2.31	2.32	2.33	2.31	2.37	2.40	2.41	2.44	2.46	2.46	2.31	2.50	2.41	24
3	2.47	2.51	2.52	2.51	2.44	2.39	S	2.42	2.46	2.47	2.48	2.42	2.33	2.26	2.22	2.20	2.21	2.27	2.38	2.36	2.32	2.32	2.32	2.29	2.20	2.52	2.37	24
4	2.28	2.28	2.27	2.26	2.22	S	2.22	2.20	2.21	2.20	2.22	2.22	2.21	2.23	2.22	2.23	2.25	2.25	2.22	2.25	2.24	2.28	2.30	2.29	2.20	2.30	2.24	24
5	2.29	2.22	2.16	2.16	S	2.15	2.15	2.16	2.15	2.16	2.16	2.17	2.17	2.16	2.14	2.17	2.19	2.20	2.21	2.21	2.22	2.23	2.24	2.25	2.14	2.29	2.19	24
6	2.24	2.24	2.23	S	2.25	2.23	2.25	2.26	2.25	2.27	2.31	2.33	2.34	2.35	2.37	2.37	2.36	2.36	2.33	2.31	2.30	2.28	2.25	2.24	2.23	2.37	2.29	24
7	2.24	2.25	S	2.23	2.23	2.21	2.22	2.20	2.22	2.21	2.18	2.15	2.12	2.13	2.11	2.12	2.12	2.14	2.13	2.11	2.12	2.15	2.16	2.17	2.11	2.25	2.17	24
8	2.18	S	2.20	2.20	2.22	2.26	2.25	2.22	2.26	2.28	C	C	C	C	2.32	2.37	2.36	2.32	2.31	2.32	2.33	2.31	2.30	2.26	2.18	2.37	2.28	24
9	S	2.24	2.26	2.25	2.25	2.22	2.25	2.22	2.22	2.21	2.20	2.20	2.22	2.28	2.29	2.28	2.29	2.28	2.26	2.24	2.23	2.24	2.21	S	2.20	2.29	2.24	24
10	2.27	2.28	2.29	2.31	2.32	2.32	2.31	2.32	2.27	2.23	2.27	2.28	2.18	2.16	2.15	2.15	2.14	2.13	2.15	2.14	2.15	2.16	S	2.18	2.13	2.32	2.22	24
11	2.16	2.18	2.21	2.21	2.21	2.22	2.24	2.26	2.28	2.30	2.31	2.32	2.36	2.35	2.37	2.38	2.43	2.41	2.40	2.41	2.42	S	2.43	2.47	2.16	2.47	2.32	24
12	2.52	2.57	2.59	2.59	2.59	2.55	2.51	2.46	2.38	2.31	2.24	2.20	2.20	2.19	2.20	2.20	2.18	2.20	2.21	2.21	S	2.21	2.21	2.20	2.18	2.59	2.34	24
13	2.21	2.22	2.22	2.22	2.23	2.23	2.21	2.23	2.22	2.20	2.19	2.15	2.17	2.20	2.20	2.20	2.18	2.20	2.19	S	2.20	2.20	2.21	2.22	2.15	2.23	2.20	24
14	2.22	2.26	2.26	2.25	2.26	2.28	2.29	2.30	2.30	2.36	2.38	2.44	2.38	2.38	2.39	2.39	2.41	2.44	S	2.50	2.55	2.55	2.48	2.42	2.22	2.55	2.37	24
15	2.36	2.35	2.39	2.38	2.23	2.20	2.22	2.20	2.19	2.18	2.16	2.14	2.16	2.14	2.15	2.17	2.17	S	2.17	2.17	2.19	2.20	2.19	2.19	2.14	2.39	2.21	24
16	2.17	2.19	2.19	2.18	2.19	2.18	2.17	2.18	2.19	2.19	2.18	2.20	2.19	2.19	2.20	2.23	S	2.25	2.25	2.27	2.27	2.27	2.32	2.36	2.17	2.36	2.22	24
17	2.34	2.33	2.32	2.33	2.32	2.30	2.33	2.32	2.34	2.30	2.27	2.21	2.18	2.17	S	2.17	2.18	2.18	2.18	2.19	2.20	2.20	2.21	2.17	2.34	2.26	2.24	24
18	2.20	2.20	2.20	2.19	2.19	2.20	2.21	2.20	2.21	2.22	2.24	2.22	2.23	2.22	S	2.24	2.25	2.27	2.28	2.26	2.24	2.28	2.30	2.38	2.19	2.38	2.24	24
19	2.24	2.25	2.24	2.32	2.26	2.26	2.31	2.26	2.26	2.29	2.28	2.26	2.26	S	2.26	2.26	2.57	2.30	2.38	2.31	2.33	2.42	2.33	2.34	2.24	2.57	2.30	24
20	2.50	2.39	2.36	2.37	2.41	2.43	2.41	2.41	2.41	2.40	2.39	S	2.40	2.43	2.43	2.48	2.53	2.47	2.39	2.40	2.44	2.37	2.35	2.35	2.53	2.42	24	
21	2.35	2.37	2.37	2.40	2.42	2.43	2.38	2.34	2.27	2.23	2.22	S	2.23	2.22	2.22	2.24	2.22	2.23	2.21	2.22	2.27	2.27	2.29	2.28	2.21	2.43	2.29	24
22	2.31	2.28	2.28	2.27	2.28	2.28	2.25	2.26	P	2.33	2.31	2.29	2.28	S	S	2.29	2.27	2.29	2.29	2.30	2.33	2.31	2.34	2.33	2.25	2.34	2.29	23
23	2.31	2.32	2.35	2.33	2.31	2.31	2.30	2.30	2.33	S	2.38	2.34	2.33	2.34	2.34	2.35	2.33	2.30	2.28	2.28	2.30	2.45	2.37	2.30	2.28	2.45	2.33	24
24	2.30	2.29	2.29	2.31	2.26	2.26	2.28	2.29	S	2.30	2.31	2.33	2.32	2.33	2.33	2.36	2.33	2.45	2.44	2.34	2.42	2.40	2.40	2.38	2.26	2.45	2.34	24
25	2.34	2.37	2.39	2.35	2.39	2.42	2.36	S	2.36	2.43	2.40	2.39	2.38	2.40	2.39	2.40	2.39	2.45	2.50	2.55	2.45	2.53	2.41	2.43	2.34	2.55	2.41	24
26	2.41	2.42	2.44	2.48	2.46	2.46	S	2.46	2.47	2.56	2.57	2.53	2.45	2.45	2.43	2.43	2.57	2.57	2.52	2.68	2.76	2.74	2.76	2.78	2.41	2.78	2.54	24
27	2.75	2.70	2.65	2.60	2.64	S	2.58	2.60	2.68	2.64	2.57	2.52	2.49	2.43	2.42	2.42	2.50	2.35	2.36	2.38	2.40	2.42	2.43	2.42	2.35	2.75	2.52	24
28	2.44	2.42	2.41	2.41	S	2.40	2.44	2.44	2.52	2.39	2.33	2.35	2.32	2.32	2.34	2.35	2.46	2.48	2.41	2.35	2.36	2.34	2.34	2.37	2.32	2.52	2.39	24
29	2.36	2.37	2.48	S	2.41	2.42	2.46	2.43	2.50	2.48	2.46	2.47	2.45	2.45	2.45	2.42	2.42	2.42	2.39	2.38	2.38	2.45	2.49	2.51	2.36	2.51	2.44	24
30	2.50	2.42	S	2.39	2.39	2.46	2.51	2.53	2.51	2.45	2.43	2.42	2.44	2.52	2.53	2.41	2.40	2.47	2.45	2.47	2.46	2.48	2.47	2.47	2.39	2.53	2.46	24
31	2.53	S	2.56	2.56	2.55	2.51	2.50	2.52	2.54	2.56	2.57	2.62	2.60	2.54	2.55	2.57	2.68	2.88	2.81	2.72	2.63	2.59	2.57	2.52	2.50	2.88	2.59	24
HOURLY MAX	2.75	2.70	2.65	2.60	2.64	2.55	2.58	2.60	2.68	2.64	2.57	2.62	2.60	2.54	2.55	2.57	2.68	2.88	2.81	2.72	2.76	2.74	2.76	2.78				
HOURLY AVG	2.34	2.33	2.34	2.34	2.34	2.33	2.33	2.33	2.34	2.34	2.33	2.33	2.30	2.30	2.31	2.31	2.33	2.34	2.33	2.34	2.34	2.36	2.35	2.35				

STATUS FLAG CODES

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

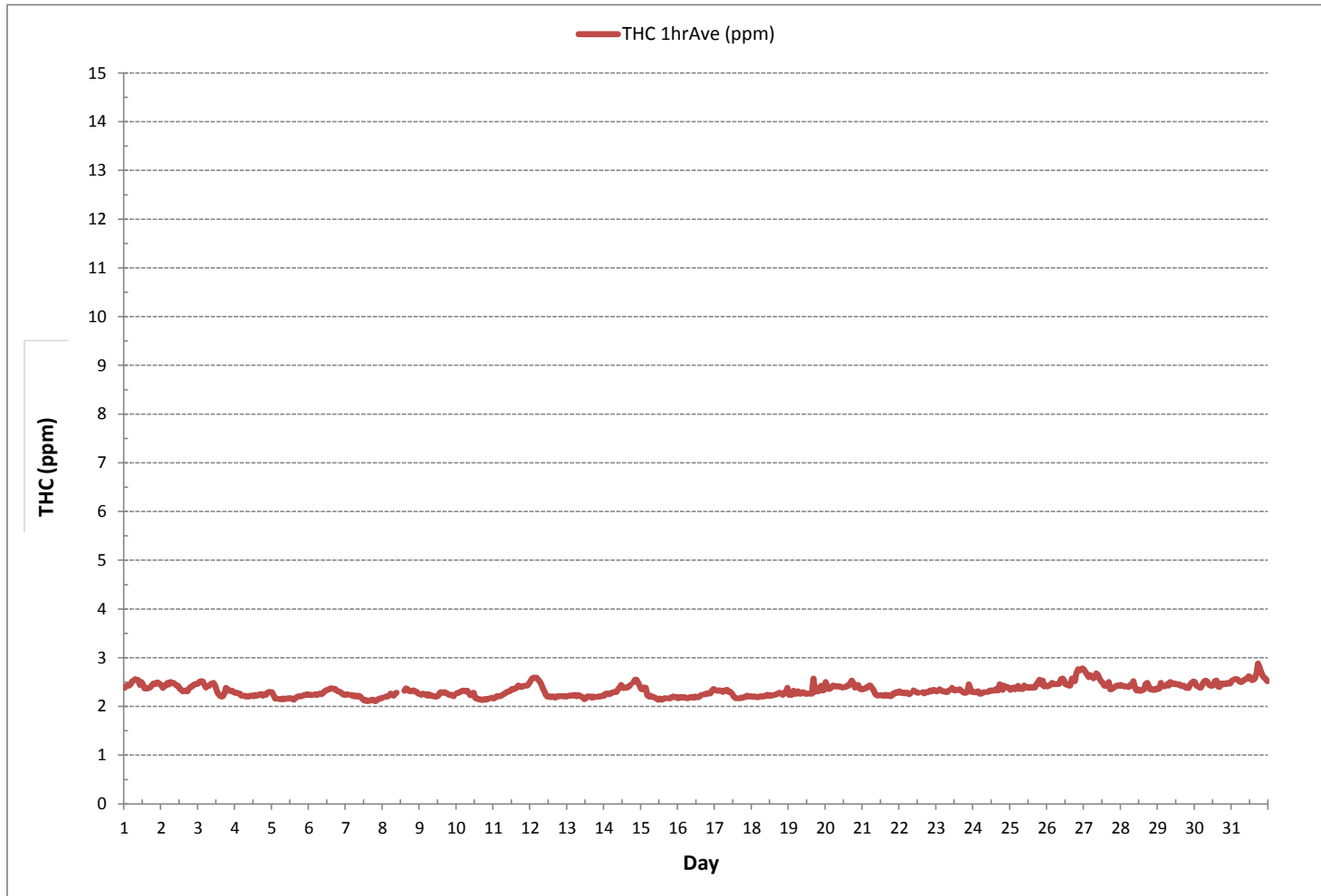
24 HR AVERAGES December 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	706
MINIMUM 1-HR AVERAGE:	2.11 ppm @ HOUR 14 ON DAY 7
MAXIMUM 1-HR AVERAGE:	2.88 ppm @ HOUR 17 ON DAY 31
MAXIMUM 24-HR AVERAGE:	2.59 ppm ON DAY 31
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	4 hrs
OPERATIONAL TIME:	743 hrs
AMD OPERATION UPTIME:	99.9 %
STANDARD DEVIATION:	0.13
MONTHLY AVERAGE:	2.33 ppm

TOTAL HYDROCARBONS Hourly Averages (THC ppm)







LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
 St. Lina Continuous Monitoring Station - December 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 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	2.42	2.44	2.44	2.45	2.46	2.53	2.54	2.56	S	2.55	2.50	2.55	2.48	2.41	2.41	2.37	2.39	2.42	2.45	2.48	2.48	2.50	2.50	2.49	2.37	2.56	2.47	24	
2	2.46	2.42	2.46	2.46	2.50	2.46	2.54	S	2.52	2.49	2.49	2.46	2.37	2.38	2.36	2.35	2.35	2.35	2.44	2.44	2.45	2.48	2.49	2.49	2.35	2.54	2.44	24	
3	2.51	2.59	2.60	2.55	2.53	2.44	S	2.49	2.52	2.55	2.55	2.50	2.43	2.32	2.32	2.28	2.26	2.39	2.45	2.45	2.40	2.41	2.40	2.39	2.26	2.60	2.45	24	
4	2.39	2.37	2.37	2.37	2.33	S	2.32	2.33	2.30	2.32	2.33	2.33	2.35	2.33	2.33	2.33	2.35	2.36	2.33	2.35	2.35	2.37	2.41	2.39	2.30	2.41	2.35	24	
5	2.40	2.32	2.29	2.24	S	2.25	2.24	2.28	2.25	2.26	2.26	2.26	2.28	2.26	2.26	2.26	2.28	2.30	2.30	2.30	2.31	2.33	2.35	2.35	2.24	2.40	2.29	24	
6	2.33	2.33	2.33	S	2.33	2.32	2.36	2.37	2.36	2.40	2.40	2.44	2.44	2.45	2.48	2.46	2.48	2.45	2.44	2.42	2.41	2.39	2.36	2.36	2.32	2.48	2.40	24	
7	2.36	2.36	S	2.33	2.33	2.29	2.32	2.30	2.30	2.30	2.26	2.25	2.21	2.21	2.19	2.21	2.21	2.22	2.21	2.19	2.21	2.23	2.22	2.24	2.19	2.36	2.26	24	
8	2.25	S	2.26	2.28	2.29	2.33	2.33	2.30	2.33	2.36	C	C	C	C	C	2.45	2.44	2.39	2.39	2.40	2.42	2.40	2.42	2.36	2.25	2.45	2.36	24	
9	S	2.35	2.36	2.36	2.33	2.30	2.35	2.31	2.30	2.30	2.30	2.29	2.32	2.37	2.37	2.37	2.37	2.37	2.37	2.35	2.33	2.34	2.32	2.30	S	2.29	2.37	2.33	24
10	2.36	2.37	2.39	2.39	2.41	2.40	2.41	2.41	2.39	2.34	2.37	2.37	2.28	2.27	2.27	2.25	2.24	2.24	2.26	2.24	2.28	2.28	S	2.29	2.24	2.41	2.33	24	
11	2.28	2.30	2.32	2.30	2.33	2.34	2.35	2.38	2.39	2.41	2.42	2.44	2.48	2.48	2.50	2.49	2.54	2.54	2.53	2.54	2.54	S	2.57	2.58	2.28	2.58	2.44	24	
12	2.62	2.68	2.67	2.70	2.70	2.64	2.60	2.54	2.46	2.40	2.33	2.28	2.26	2.24	2.25	2.24	2.24	2.24	2.25	2.25	S	2.25	2.25	2.26	2.24	2.70	2.41	24	
13	2.28	2.26	2.29	2.29	2.30	2.30	2.32	2.32	2.34	2.30	2.30	2.28	2.30	2.33	2.32	2.33	2.33	2.36	2.36	S	2.36	2.37	2.37	2.36	2.26	2.37	2.32	24	
14	2.37	2.39	2.37	2.39	2.40	2.41	2.41	2.42	2.42	2.45	2.50	2.53	2.48	2.46	2.48	2.48	2.52	2.53	S	2.60	2.62	2.63	2.58	2.50	2.37	2.63	2.48	24	
15	2.46	2.44	2.48	2.48	2.36	2.30	2.30	2.29	2.27	2.26	2.25	2.24	2.24	2.21	2.24	2.25	2.25	S	2.25	2.26	2.26	2.29	2.28	2.28	2.21	2.48	2.30	24	
16	2.28	2.28	2.28	2.29	2.29	2.29	2.29	2.29	2.30	2.29	2.31	2.31	2.31	2.31	2.33	2.35	S	2.37	2.38	2.41	2.37	2.39	2.45	2.48	2.28	2.48	2.33	24	
17	2.46	2.44	2.42	2.44	2.41	2.41	2.42	2.42	2.44	2.39	2.39	2.37	2.31	2.29	2.28	S	2.26	2.26	2.29	2.33	2.28	2.32	2.29	2.29	2.26	2.46	2.36	24	
18	2.28	2.28	2.29	2.26	2.28	2.29	2.28	2.29	2.30	2.29	2.29	2.28	2.30	2.29	S	2.30	2.35	2.36	2.42	2.48	2.46	2.50	2.53	2.76	2.26	2.76	2.35	24	
19	2.32	2.47	2.35	2.58	2.46	2.36	2.60	2.35	2.37	2.58	2.39	2.36	2.45	S	2.39	2.37	4.69	2.76	2.98	2.46	2.46	2.71	3.39	2.46	2.32	4.69	2.62	24	
20	2.88	2.54	2.45	2.46	2.50	2.54	2.50	2.49	2.48	2.50	2.48	S	2.50	2.52	2.54	2.60	2.64	2.58	2.49	2.53	2.51	2.48	2.45	2.45	2.88	2.53	24		
21	2.46	2.46	2.46	2.49	2.53	2.53	2.51	2.46	2.42	2.37	2.33	S	2.33	2.33	2.35	2.36	2.32	2.36	2.39	2.36	2.44	2.42	2.42	2.46	2.32	2.53	2.42	24	
22	2.43	2.45	2.42	2.41	2.42	2.45	2.41	P	P	2.46	2.45	2.44	2.43	S	S	2.43	2.41	2.43	2.42	2.44	2.48	2.48	2.49	2.46	2.41	2.49	2.44	22	
23	2.53	2.49	2.50	2.58	2.43	2.43	2.43	2.43	2.83	S	2.52	2.48	2.48	2.46	2.48	2.49	2.49	2.43	2.43	2.41	2.48	2.88	2.80	2.46	2.41	2.88	2.52	24	
24	2.46	2.44	2.48	2.54	2.44	2.41	2.46	2.48	S	2.46	2.49	2.48	2.54	2.59	2.53	2.60	2.54	2.96	2.86	2.58	3.19	3.17	2.97	3.13	2.41	3.19	2.64	24	
25	2.49	2.55	2.55	2.49	2.72	3.08	2.68	S	2.50	2.58	2.54	2.52	2.53	2.61	2.57	2.64	2.54	2.71	2.77	2.89	2.80	2.93	2.55	2.58	2.49	3.08	2.64	24	
26	2.54	2.58	2.59	2.60	2.60	2.58	S	2.60	2.66	2.70	2.71	2.68	2.59	2.58	2.57	2.57	2.83	2.75	2.67	2.85	2.93	2.88	2.89	2.94	2.54	2.94	2.69	24	
27	2.88	2.84	2.80	2.72	3.46	S	2.70	2.80	2.89	2.80	2.70	2.72	2.64	2.62	2.58	2.67	2.72	2.49	2.49	2.50	2.53	2.55	2.55	2.57	2.49	3.46	2.71	24	
28	2.57	2.58	2.57	2.54	S	2.55	2.58	2.57	2.73	2.70	2.50	2.50	2.46	2.46	2.46	2.49	2.71	2.75	2.64	2.49	2.50	2.48	2.53	2.46	2.75	2.56	24		
29	2.53	2.51	3.81	S	2.67	2.60	2.62	2.66	2.77	2.71	2.67	2.68	2.75	2.83	2.83	2.67	2.60	2.75	2.68	2.52	2.53	2.62	2.62	2.68	2.51	3.81	2.71	24	
30	2.81	2.57	S	2.53	2.53	2.72	2.86	2.77	2.76	2.60	2.59	2.54	2.63	2.66	2.67	2.60	2.54	2.61	2.59	2.60	2.59	2.66	2.59	2.66	2.53	2.86	2.64	24	
31	2.68	S	2.71	2.71	2.71	2.66	2.63	2.66	2.70	2.71	2.70	2.75	2.75	2.67	2.70	2.72	2.94	3.03	2.97	2.85	2.77	2.71	2.68	2.65	2.63	3.03	2.74	24	
HOURLY MAX	2.88	2.84	3.81	2.72	3.46	3.08	2.86	2.80	2.89	2.80	2.71	2.75	2.75	2.83	2.83	2.72	4.69	3.03	2.98	2.89	3.19	3.17	3.39	3.13					
HOURLY AVG	2.47	2.45	2.49	2.46	2.48	2.46	2.46	2.45	2.48	2.46	2.44	2.44	2.43	2.43	2.43	2.43	2.53	2.49	2.49	2.46	2.49	2.52	2.52	2.50					

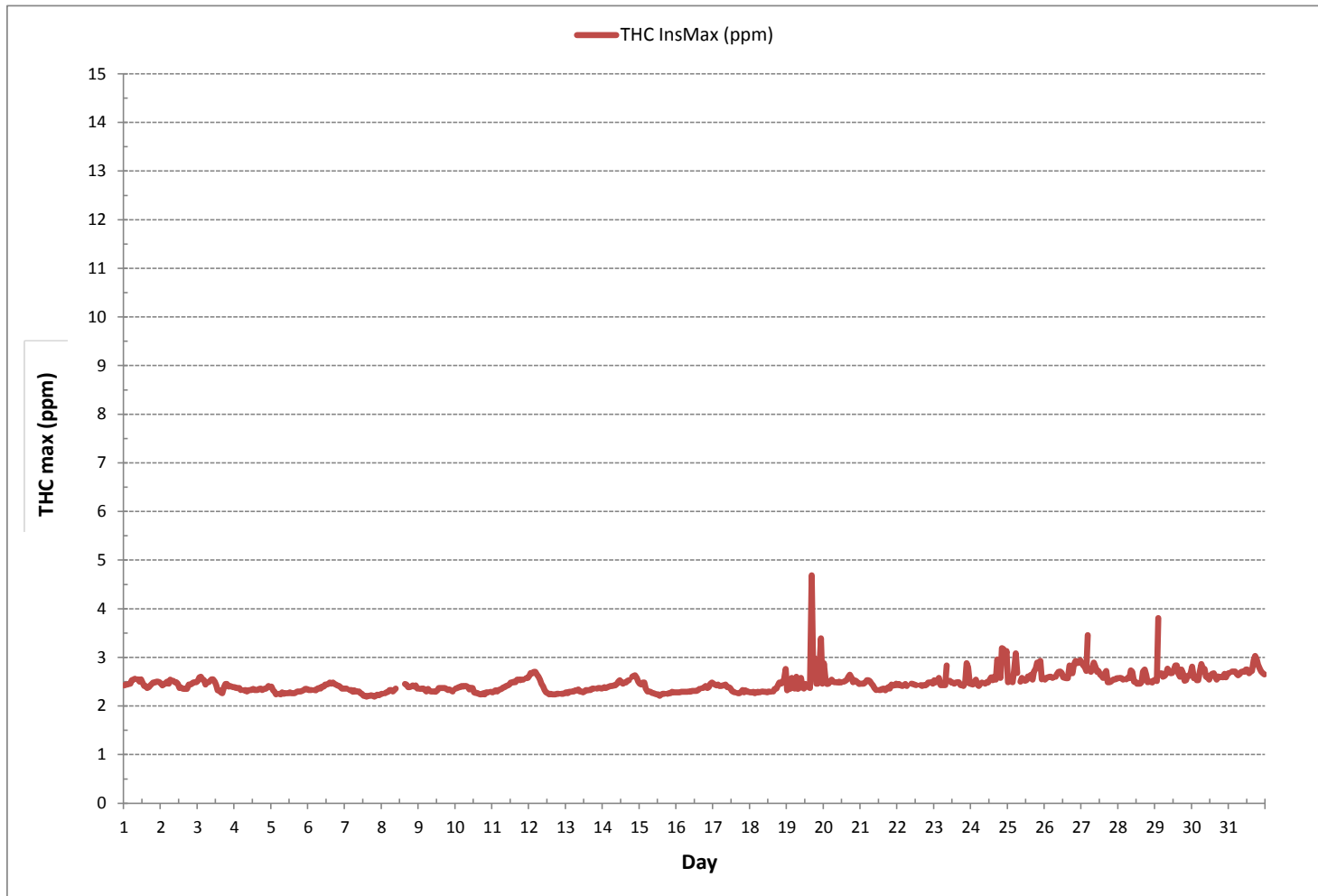
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	704
MAXIMUM INSTANTANEOUS VALUE:	4.69 ppm @ HOUR 16 ON DAY 19
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	742 hrs
STANDARD DEVIATION:	0.20

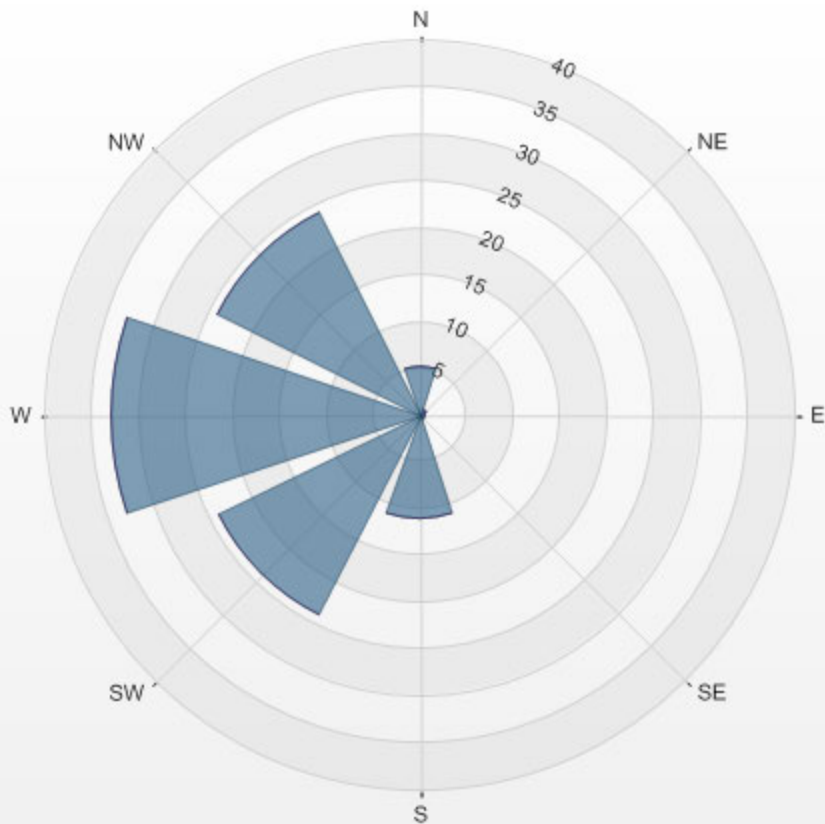
TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)



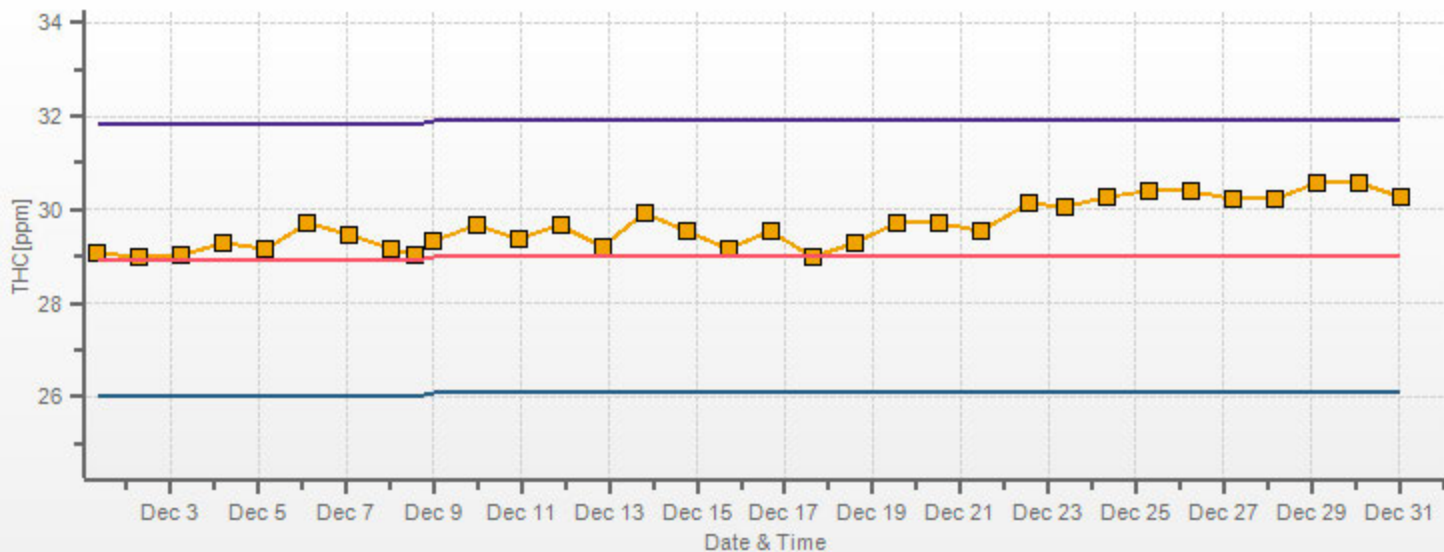


% Icon Classes (ppm) 0 0.0-1.0 0 1.0-1.9 100 1.9-2.9 0 >2.9

LICA ST. LINA Poll.: LICA ST. LINA-THC[ppm] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 0.28% Calm Poll Avg: 2.35[ppm]



THC[ppm] Calibration: LICA ST. LINA Monthly: 17/12 Type: Span



Span Meas Span Ref Span Low Span High

## ***OXIDES OF NITROGEN***



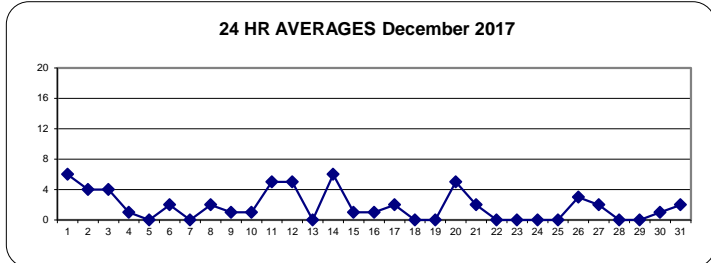
OXIDES OF NITROGEN Hourly Averages (NO<sub>x</sub> ppb)

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

STATUS FLAG CODES

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

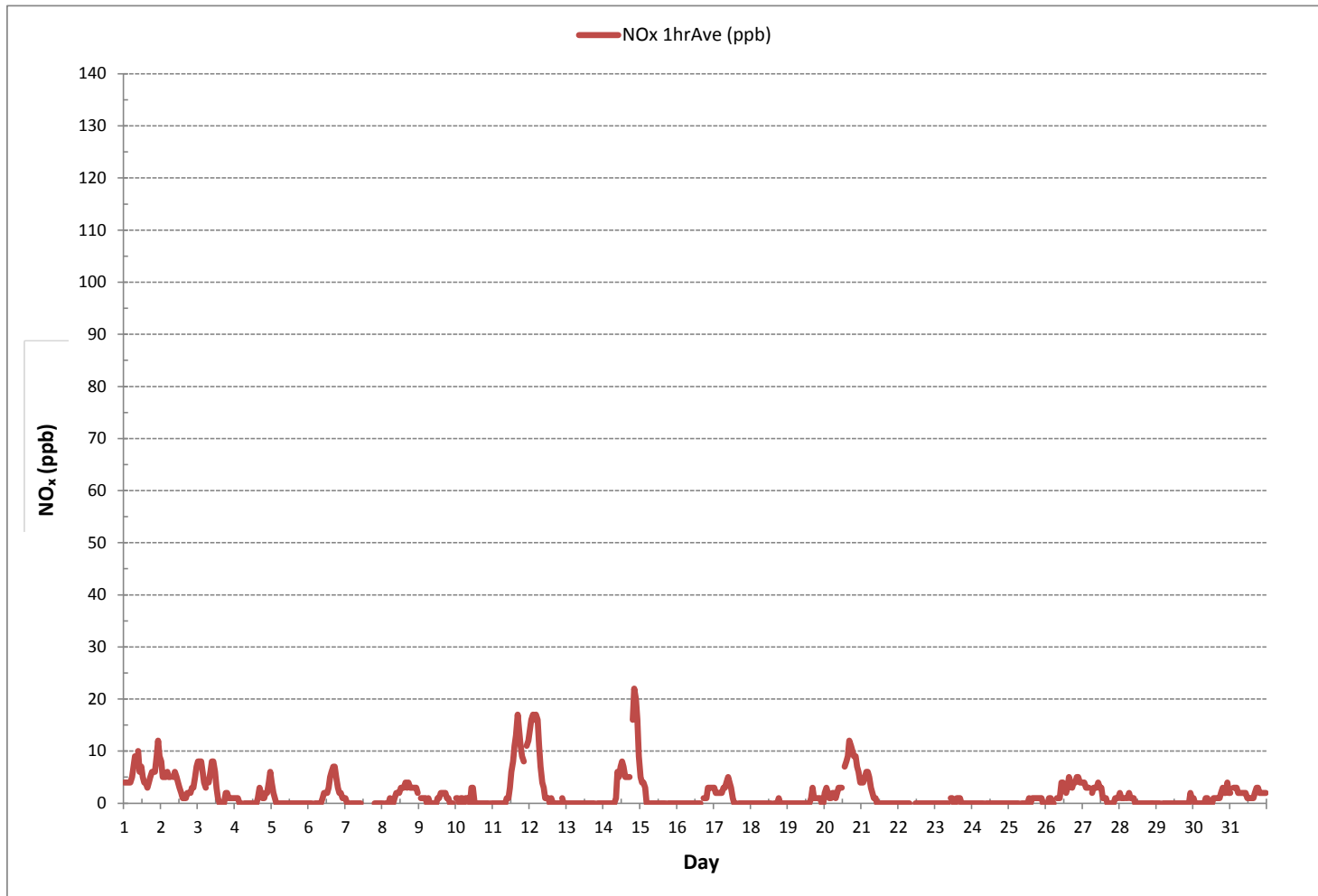
24 HR AVERAGES December 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	342			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	14	ON DAY 3
MAXIMUM 1-HR AVERAGE:	22 ppb	@ HOUR	20	ON DAY 14
MAXIMUM 24-HR AVERAGE:	6 ppb			ON DAY 1
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	743 hrs	
MONTHLY CALIBRATION TIME:	8 hrs	AMD OPERATION UPTIME:	99.9 %	
STANDARD DEVIATION:	3	MONTHLY AVERAGE:	2 ppb	

OXIDES OF NITROGEN Hourly Averages (NO<sub>x</sub> ppb)







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

OXIDES OF NITROGEN Instantaneous Maximum (NO<sub>x</sub> 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	6	6	5	5	6	8	9	13	S	14	10	11	8	6	7	5	6	8	8	8	8	13	15	13	5	15	9	24	
2	10	8	6	7	8	7	7	S	7	10	7	6	14	5	3	2	3	50	4	4	5	5	8	9	2	50	8	24	
3	11	11	10	9	7	5	S	6	10	10	10	8	5	2	2	2	1	2	5	4	2	3	2	2	1	11	6	24	
4	2	2	2	1	1	S	1	3	1	2	2	1	1	1	1	6	48	3	3	3	50	4	6	50	1	50	8	24	
5	6	4	2	1	S	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	1	24	
6	0	0	0	S	1	1	1	1	1	2	5	4	20	4	4	6	8	9	18	7	5	4	3	2	2	0	20	5	24
7	2	1	S	1	1	1	1	11	2	1	2	C	C	C	C	C	C	C	C	2	1	1	1	1	1	11	2	24	
8	1	S	1	1	1	2	2	2	4	4	11	5	6	7	25	35	6	6	8	5	4	5	5	4	1	35	7	24	
9	S	3	3	2	2	2	2	2	2	2	2	2	2	4	23	3	6	3	2	2	1	2	1	S	1	23	3	24	
10	2	2	2	2	2	2	2	2	2	9	29	4	2	1	1	1	1	2	1	1	1	1	S	1	1	29	3	24	
11	1	1	1	1	1	1	1	1	2	2	27	40	10	11	14	15	19	19	26	10	10	S	13	14	1	40	10	24	
12	16	18	19	17	18	18	14	9	6	4	4	2	2	2	2	2	1	1	1	1	S	4	1	1	1	19	7	24	
13	1	1	1	1	1	1	2	1	1	1	17	1	1	1	1	19	1	1	2	S	1	1	1	1	1	19	3	24	
14	1	1	1	1	1	1	2	1	9	80	12	9	15	12	28	6	10	8	S	23	24	23	20	15	1	80	13	24	
15	8	6	6	5	3	2	2	2	2	1	1	1	1	2	1	1	1	S	2	1	1	1	1	1	1	8	2	24	
16	1	1	1	1	1	1	1	1	18	1	1	1	1	1	1	2	S	2	3	2	5	6	5	5	1	18	3	24	
17	4	4	4	4	4	4	4	5	5	6	6	5	3	1	1	S	2	10	1	1	1	1	1	1	1	10	3	24	
18	1	1	1	1	1	1	1	1	2	2	1	2	1	2	S	1	2	2	3	2	1	1	1	1	1	3	1	24	
19	1	1	0	1	1	1	1	1	6	1	1	2	2	S	2	5	40	6	3	3	3	2	2	2	0	40	4	24	
20	5	6	4	3	3	4	5	4	4	6	5	23	S	10	11	61	29	36	14	11	13	10	8	6	3	61	12	24	
21	6	6	7	8	8	8	6	4	28	17	2	S	5	3	1	2	1	1	1	1	1	1	1	1	1	28	5	24	
22	1	1	1	1	1	1	1	P	P	1	S	2	1	2	1	1	1	1	1	2	1	1	3	1	1	3	1	22	
23	1	1	1	1	1	2	1	1	1	S	3	2	2	2	2	3	3	1	1	1	1	2	1	1	1	3	2	24	
24	1	1	1	1	1	1	1	2	S	2	2	2	3	3	2	2	2	1	4	1	2	1	2	2	1	4	2	24	
25	1	2	2	2	2	2	2	S	2	3	2	2	3	3	3	3	3	3	4	4	4	3	2	2	1	4	3	24	
26	2	2	3	3	2	2	S	3	3	4	6	7	5	6	5	7	6	5	6	6	7	7	6	6	2	7	5	24	
27	6	6	6	5	5	S	5	5	5	6	6	6	5	4	4	5	2	2	2	2	2	2	3	3	2	6	4	24	
28	4	4	3	3	S	4	4	3	3	6	3	1	3	23	2	2	2	2	2	3	1	2	1	2	1	23	4	24	
29	1	2	2	S	2	2	1	1	1	26	2	1	2	13	1	3	2	2	3	2	5	9	4	1	26	4	24		
30	3	2	S	2	1	2	2	2	3	10	2	2	4	4	3	4	3	3	5	4	4	4	39	9	1	39	5	24	
31	3	S	5	5	5	4	4	4	4	4	4	4	3	3	3	3	5	6	5	5	4	4	4	4	3	6	4	24	
HOURLY MAX	16	18	19	17	18	18	14	13	28	80	29	40	15	23	28	61	48	50	26	23	50	23	39	50					
HOURLY AVG	4	4	3	3	3	3	3	3	5	8	6	6	4	5	5	7	7	7	4	4	6	4	6	6					

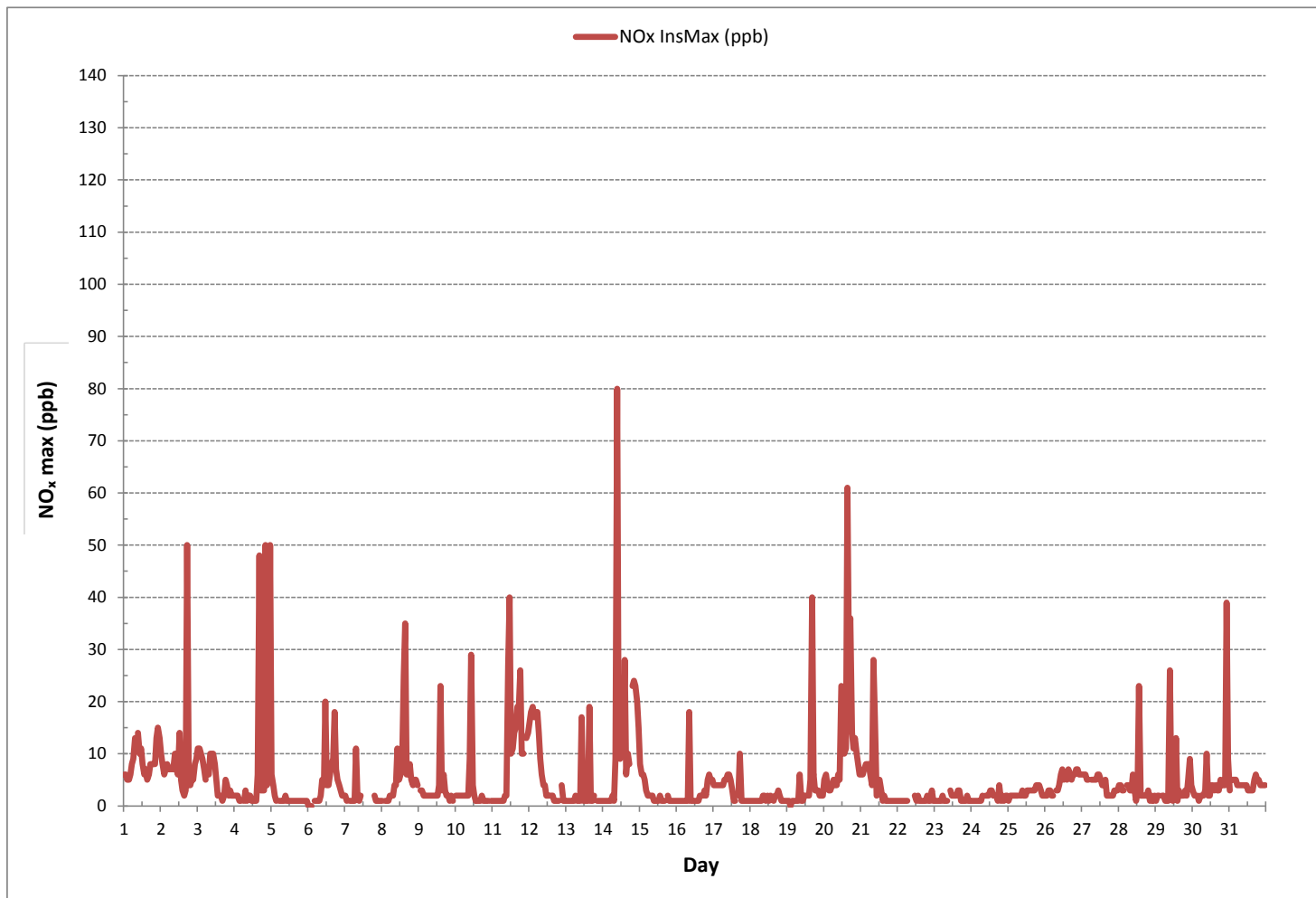
STATUS FLAG CODES

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:	698
MAXIMUM INSTANTANEOUS VALUE:	80 ppb @ HOUR 9 ON DAY 14
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	742 hrs
STANDARD DEVIATION:	7

OXIDES OF NITROGEN Instantaneous Maximum (NO<sub>x</sub> ppb)





% Icon Classes (ppb)

94

0.0-7.7

4

7.7-15.3

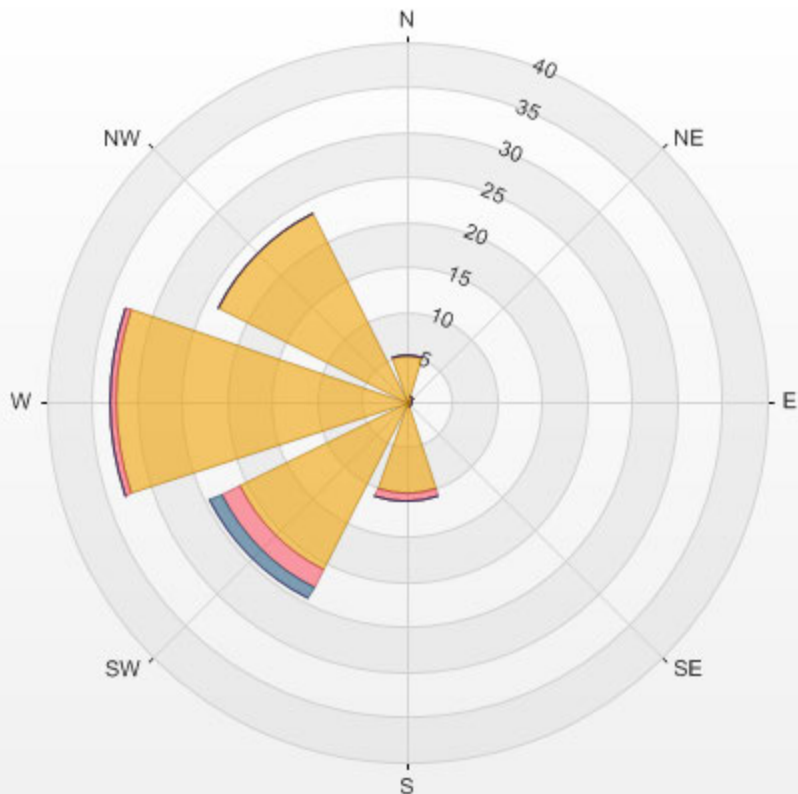
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15.3-23.0

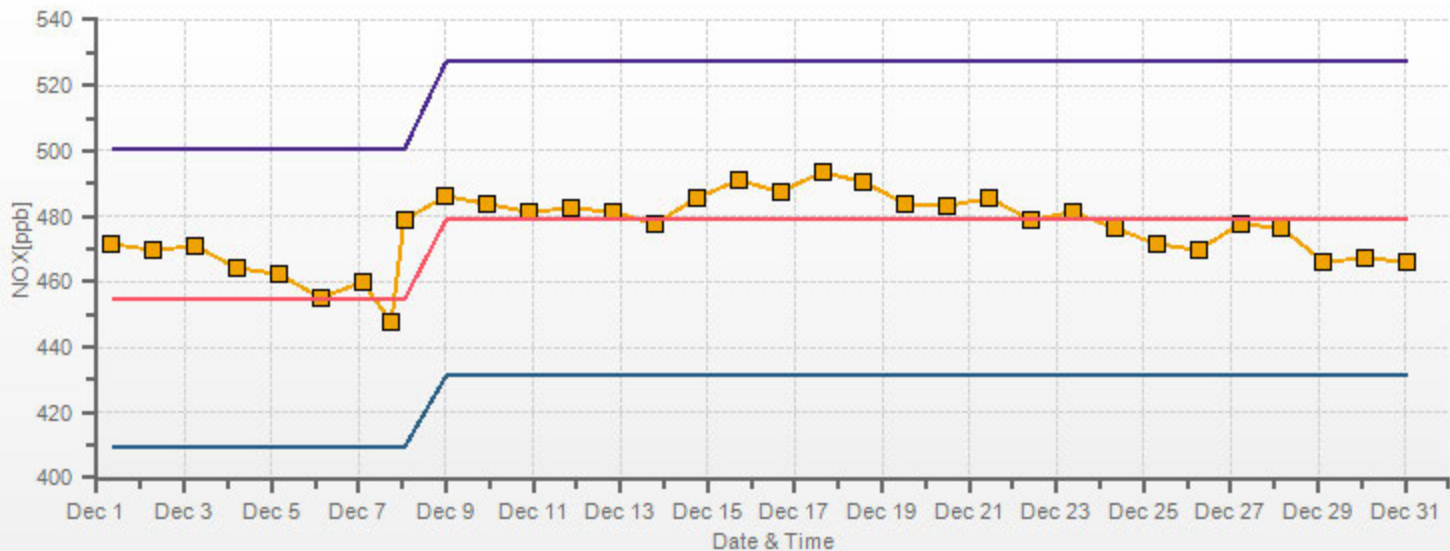
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>23.0

LICA ST. LINA Poll.: LICA ST. LINA-NOX[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 0.29% Calm Poll Avg: 0.24[ppb]



NOX[ppb] Calibration: LICA ST. LINA Monthly: 17/12 Type: Span



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

***NITRIC OXIDES***

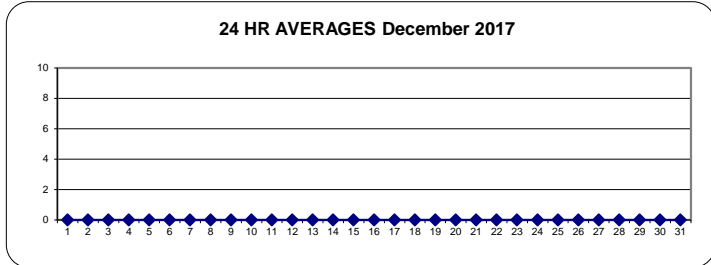
**NITRIC OXIDE Hourly Averages (NO ppb)**

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

**STATUS FLAG CODES**

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

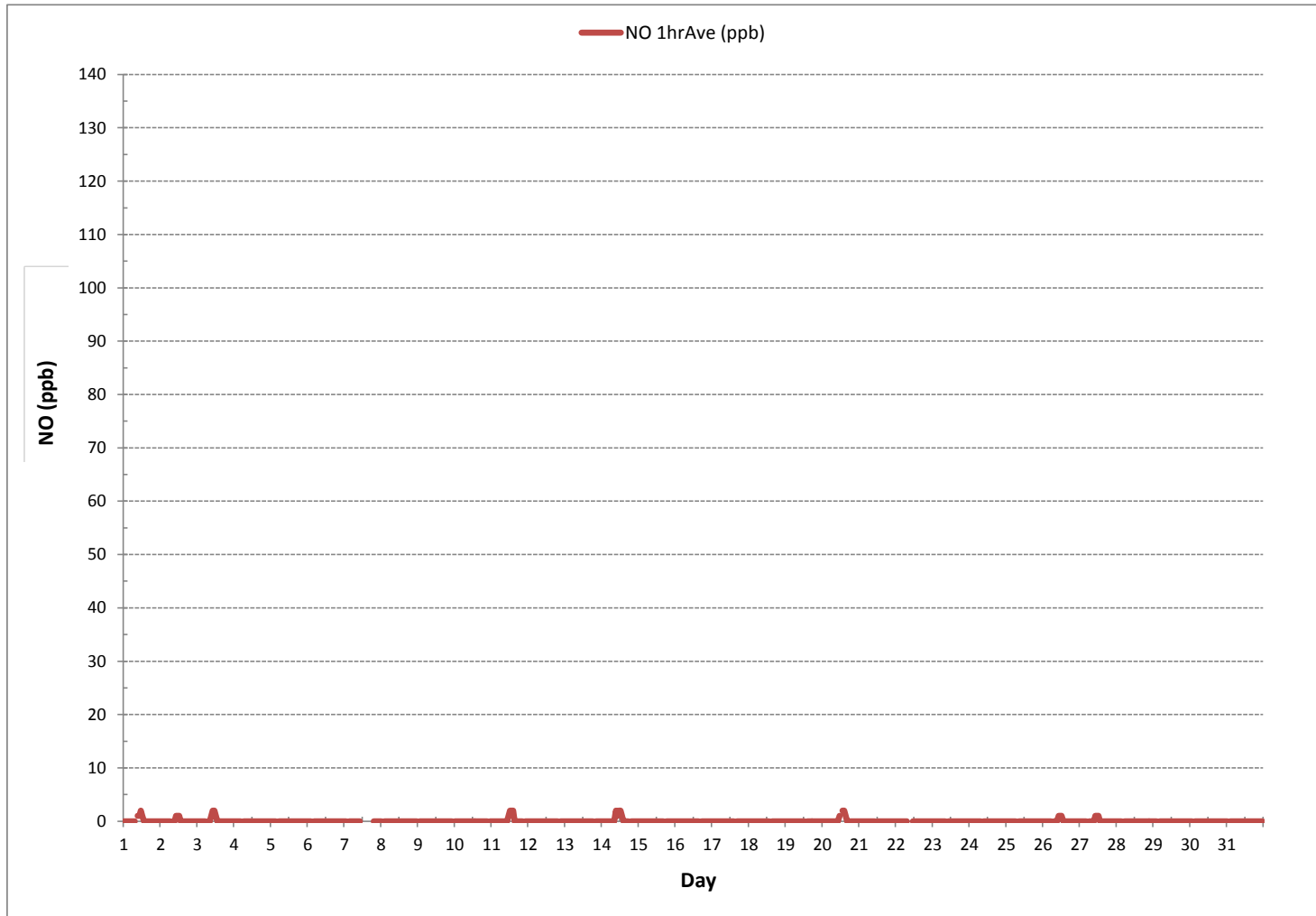
**24 HR AVERAGES December 2017**



**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	30				
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	0	ON DAY	1
MAXIMUM 1-HR AVERAGE:	2	ppb @ HOUR	1	ON DAY	1
MAXIMUM 24-HR AVERAGE:	0	ppb		ON DAY	1
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	743	hrs
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:	99.9	%
STANDARD DEVIATION:	0		MONTHLY AVERAGE:	0	ppb

NITRIC OXIDE Hourly Averages (NO ppb)







LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
St. Lina Continuous Monitoring Station - December 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	1	1	1	1	1	1	1	1	2	S	3	3	4	3	2	2	1	1	2	1	1	1	1	1	1	1	1	1	4	2	24	
2	1	1	1	1	1	1	1	1	S	1	4	3	3	6	2	1	1	1	29	1	1	1	1	1	1	1	1	1	29	3	24	
3	1	1	1	1	1	1	S	2	2	3	3	3	2	1	1	2	1	1	1	2	1	1	1	1	1	1	1	3	1	24		
4	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	4	32	1	1	1	1	12	1	2	22	1	32	4	24			
5	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	1	1	24		
6	1	1	1	S	1	1	1	1	1	1	3	2	9	2	2	2	2	1	9	1	1	1	1	1	1	1	1	9	2	24		
7	1	1	S	1	1	1	1	12	1	1	2	C	C	C	C	C	C	C	C	1	0	0	0	0	0	0	12	2	24			
8	0	S	0	0	0	0	0	0	2	1	4	1	2	2	13	16	1	1	4	0	0	0	0	0	0	0	16	2	24			
9	S	0	0	0	0	0	1	0	1	0	0	0	1	1	9	0	1	1	0	0	0	0	0	0	S	0	9	1	24			
10	0	0	0	0	0	0	0	0	1	2	15	1	1	0	0	0	0	1	0	0	0	0	0	S	0	15	1	24				
11	0	0	0	0	0	0	0	0	1	0	12	22	4	4	4	2	1	1	11	0	0	S	1	0	0	22	3	24				
12	1	0	0	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	S	1	0	1	0	1	0	24		
13	0	0	0	0	0	0	0	0	0	0	6	0	1	0	0	15	0	0	1	S	0	0	1	0	0	15	1	24				
14	0	0	0	0	0	0	1	1	3	53	6	4	6	5	9	1	2	1	S	1	1	1	1	1	1	0	53	4	24			
15	1	1	0	1	0	0	0	0	0	0	0	1	0	2	0	1	0	S	1	0	0	0	0	0	0	2	0	24				
16	0	0	0	0	0	0	1	1	12	1	1	0	0	0	0	1	S	1	1	0	1	1	0	1	0	12	1	24				
17	0	0	0	1	0	1	1	1	0	1	1	2	1	1	1	S	1	7	0	1	0	1	0	0	0	7	1	24				
18	0	1	0	1	0	0	1	0	1	1	1	1	1	1	S	1	2	0	1	1	1	1	1	0	1	2	1	24				
19	0	0	0	0	1	1	0	1	2	1	1	1	1	S	1	3	21	1	1	1	1	0	0	0	0	21	2	24				
20	0	0	0	1	1	1	1	1	1	1	2	15	S	4	3	36	12	22	2	2	3	1	1	1	1	36	5	24				
21	0	1	1	1	1	1	1	1	16	10	1	S	2	1	0	0	0	0	0	0	0	0	0	0	0	16	2	24				
22	0	1	0	1	0	1	0	P	P	1	S	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	22				
23	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			
24	1	1	1	1	1	1	1	1	S	1	1	1	1	1	2	1	1	1	1	2	1	2	1	1	1	2	1	24				
25	1	1	1	1	1	1	1	S	1	1	1	1	1	2	2	1	1	1	1	2	1	1	1	1	1	2	1	24				
26	1	1	1	1	1	1	S	1	1	2	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	3	1	24				
27	1	1	1	1	1	S	1	1	1	2	2	2	3	2	2	2	1	1	1	1	1	1	1	1	1	3	1	24				
28	1	1	1	1	S	1	1	1	1	3	2	1	2	14	1	1	1	2	1	2	1	1	1	1	1	14	2	24				
29	1	1	1	S	1	1	1	1	1	19	2	1	2	9	1	2	1	1	1	1	1	1	2	1	1	19	2	24				
30	1	1	S	1	1	1	1	1	1	3	1	1	3	3	2	2	1	2	1	1	1	1	23	4	1	23	2	24				
31	1	S	1	1	1	1	1	1	1	1	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	24			
HOURLY MAX	1	1	1	1	1	1	1	12	16	53	15	22	6	14	13	36	32	29	11	2	12	1	23	22								
HOURLY AVG	1	1	1	1	1	1	1	1	2	4	3	3	2	2	2	3	3	3	1	1	1	1	2	1								

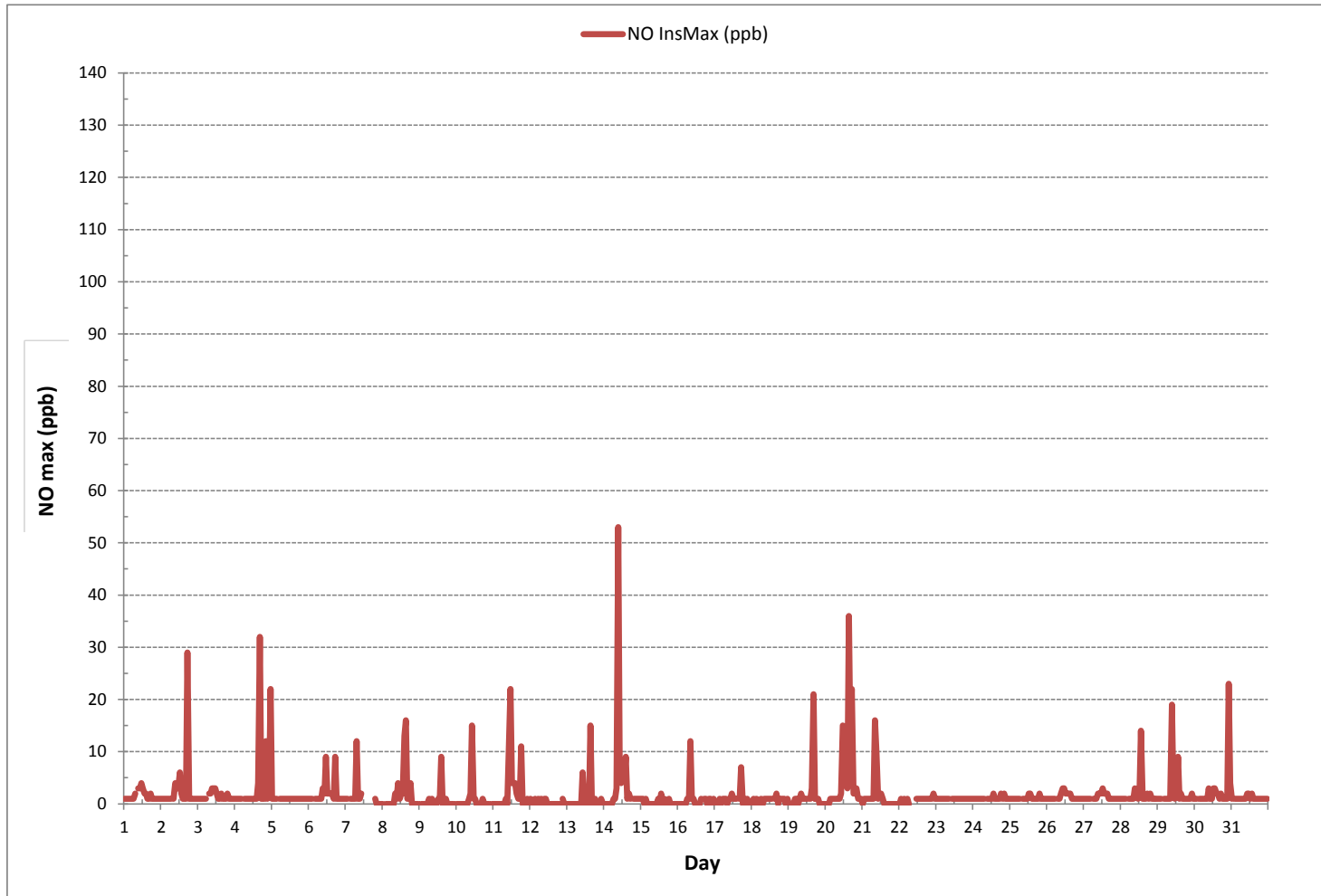
STATUS FLAG CODES

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:	531
MAXIMUM INSTANTANEOUS VALUE:	53 ppb @ HOUR 9 ON DAY 14
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	4
OPERATIONAL TIME:	742 hrs

NITRIC OXIDE Instantaneous Maximum (NO ppb)



Wind: LICA ST. LINA  
 Poll.: LICA ST. LINA-NO[ppb]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 0.29%

Calm Avg: 0.04 [ppb]

Direction	0.0-1.0	1.0-2.0	2.0-3.0	>3.0	Total
N	5.3	0.0	0.0	0.0	5.3
NE	0.9	0.0	0.0	0.0	0.9
E	0.7	0.0	0.0	0.0	0.7
SE	0.6	0.0	0.0	0.0	0.6
S	10.4	0.6	0.1	0.0	11.1
SW	23.5	1.0	0.0	0.0	24.5
W	32.8	0.3	0.0	0.0	33.1
NW	23.5	0.0	0.0	0.0	23.5
Summary	97.7	1.9	0.1	0.0	100.0

% Icon Classes (ppb)

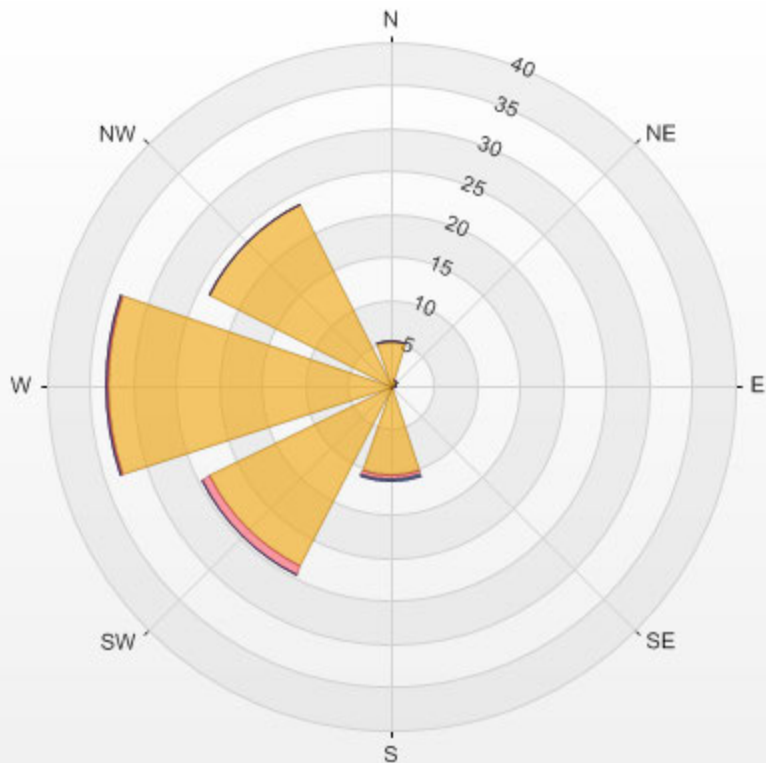
98 0.0-1.0

2 1.0-2.0

0 2.0-3.0

0 >3.0

LICA ST. LINA Poll.: LICA ST. LINA-NO[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 0.29% Calm Poll Avg: 0.04[ppb]



***NITROGEN DIOXIDE***

**NITROGEN DIOXIDE Hourly Averages (NO<sub>2</sub> ppb)**

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

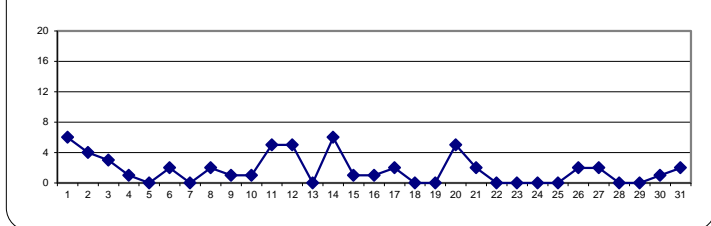
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

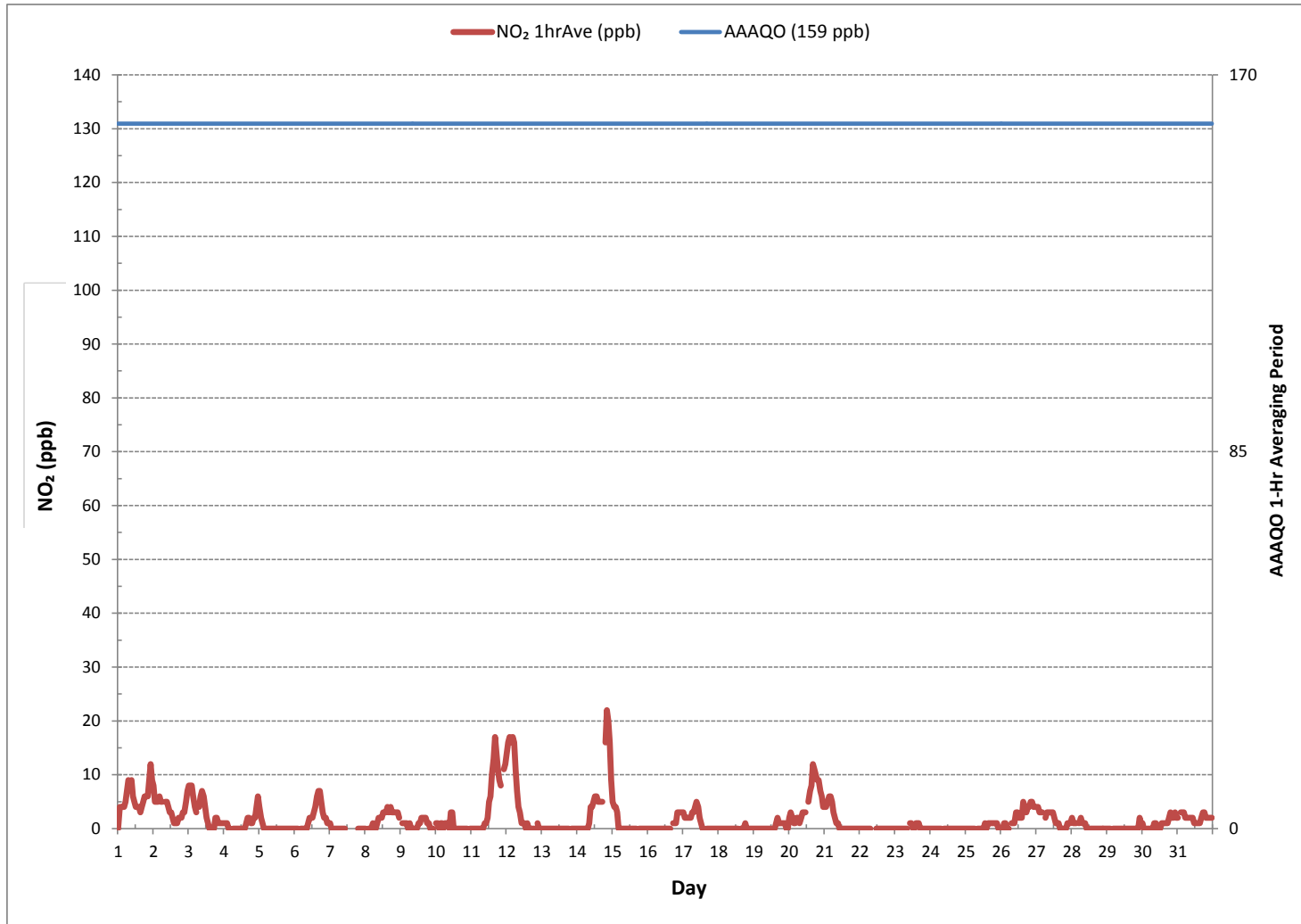
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	342			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	14	ON DAY 3
MAXIMUM 1-HR AVERAGE:	22 ppb	@ HOUR	20	ON DAY 14
MAXIMUM 24-HR AVERAGE:	6 ppb			ON DAY 1
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	743 hrs	
MONTHLY CALIBRATION TIME:	8 hrs	AMD OPERATION UPTIME:	99.9 %	
STANDARD DEVIATION:	3	MONTHLY AVERAGE:	2 ppb	

**24 HR AVERAGES December 2017**



NITROGEN DIOXIDE Hourly Averages (NO<sub>2</sub> ppb)





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

NITROGEN DIOXIDE Instantaneous Maximum (NO<sub>2</sub> 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	6	5	5	5	6	8	9	11	S	11	8	7	5	5	6	4	6	7	7	7	8	13	14	13	4	14	8	24	
2	9	7	6	7	8	7	7	S	6	6	5	4	10	3	2	2	2	23	4	4	4	5	7	9	2	23	6	24	
3	11	10	10	8	6	5	S	6	9	8	8	6	4	2	1	1	1	2	4	3	2	2	2	2	1	11	5	24	
4	2	1	1	1	1	S	0	2	1	1	1	0	0	1	1	3	18	2	2	2	39	3	5	28	0	39	5	24	
5	6	3	2	1	S	1	1	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	6	1	24	
6	0	0	0	S	1	1	1	1	1	1	2	3	15	3	4	5	7	8	10	6	4	3	3	2	2	0	15	4	24
7	1	1	S	1	1	1	1	2	1	1	1	C	C	C	C	C	C	C	C	1	1	1	1	1	1	2	1	24	
8	2	S	2	2	2	2	2	2	3	3	8	4	4	5	13	21	5	5	6	5	5	5	5	4	2	21	5	24	
9	S	3	3	3	2	2	2	2	2	2	2	2	2	4	16	4	5	4	3	3	2	2	2	S	2	16	3	24	
10	2	2	2	3	2	3	2	3	3	3	8	15	4	2	1	1	1	2	1	1	1	1	S	1	1	15	3	24	
11	1	1	1	1	1	1	1	2	2	2	15	20	7	8	12	16	20	19	15	11	11	S	12	14	1	20	8	24	
12	16	19	19	18	18	18	15	10	6	4	3	2	2	2	2	2	1	2	2	1	S	3	2	2	2	1	19	7	24
13	2	2	2	1	2	2	2	2	2	2	1	13	1	1	1	1	6	2	1	2	S	1	1	1	1	1	13	2	24
14	2	2	2	1	1	2	2	2	7	38	7	7	9	9	20	7	9	9	S	23	24	23	20	15	1	38	10	24	
15	8	6	6	6	3	2	2	2	2	2	2	1	2	1	2	2	1	S	2	2	2	1	1	1	1	1	8	3	24
16	1	1	1	1	1	1	1	1	11	1	1	1	1	1	1	2	S	2	3	3	5	6	5	5	1	11	2	24	
17	5	4	4	4	4	4	4	5	6	6	5	4	3	2	2	S	2	5	1	1	2	2	1	1	1	6	3	24	
18	1	1	1	1	1	1	1	1	2	2	1	2	2	1	2	S	1	1	2	3	2	1	1	1	1	1	3	1	24
19	1	1	1	1	1	1	1	2	4	2	2	1	2	S	1	3	20	6	3	4	4	3	3	3	1	20	3	24	
20	6	6	4	4	3	4	4	4	4	6	4	11	S	7	9	26	18	17	13	11	11	10	8	6	3	26	9	24	
21	6	6	7	8	8	7	6	4	12	7	2	S	4	2	2	2	1	1	1	1	1	1	1	1	1	12	4	24	
22	1	1	1	1	1	1	1	P	P	2	S	2	2	2	2	1	2	2	2	2	2	2	2	2	1	2	2	22	
23	2	2	2	2	2	2	1	1	2	S	3	3	2	2	3	3	3	2	1	2	2	2	1	2	1	3	2	24	
24	2	2	2	2	2	1	1	3	S	2	2	2	3	2	3	2	3	2	1	2	1	2	2	3	2	1	3	2	24
25	2	3	3	2	2	2	3	S	2	3	2	2	2	3	3	4	4	4	3	4	3	3	3	3	2	4	3	24	
26	3	2	3	4	3	3	S	4	3	4	5	5	4	5	5	7	7	6	6	7	8	7	7	7	2	8	5	24	
27	7	6	6	6	5	S	5	5	5	5	5	5	4	3	3	4	3	3	3	3	3	3	4	4	3	7	4	24	
28	4	4	4	4	S	4	4	4	3	5	2	2	2	11	2	2	2	2	2	3	2	2	2	2	2	11	3	24	
29	2	2	2	S	2	2	2	2	2	9	2	2	2	5	1	3	2	2	3	3	5	7	4	1	9	3	24		
30	4	3	S	2	2	2	2	2	3	8	2	2	3	3	3	3	3	3	5	5	4	4	18	6	2	18	4	24	
31	4	S	5	5	5	4	4	4	4	4	4	3	3	3	3	4	5	6	6	5	5	5	5	4	3	6	4	24	
HOURLY MAX	16	19	19	18	18	18	15	11	12	38	15	20	10	11	20	26	20	23	15	23	39	23	20	28					
HOURLY AVG	4	4	4	4	3	3	3	3	4	5	4	4	3	3	4	5	5	5	4	4	5	4	5	5					

STATUS FLAG CODES

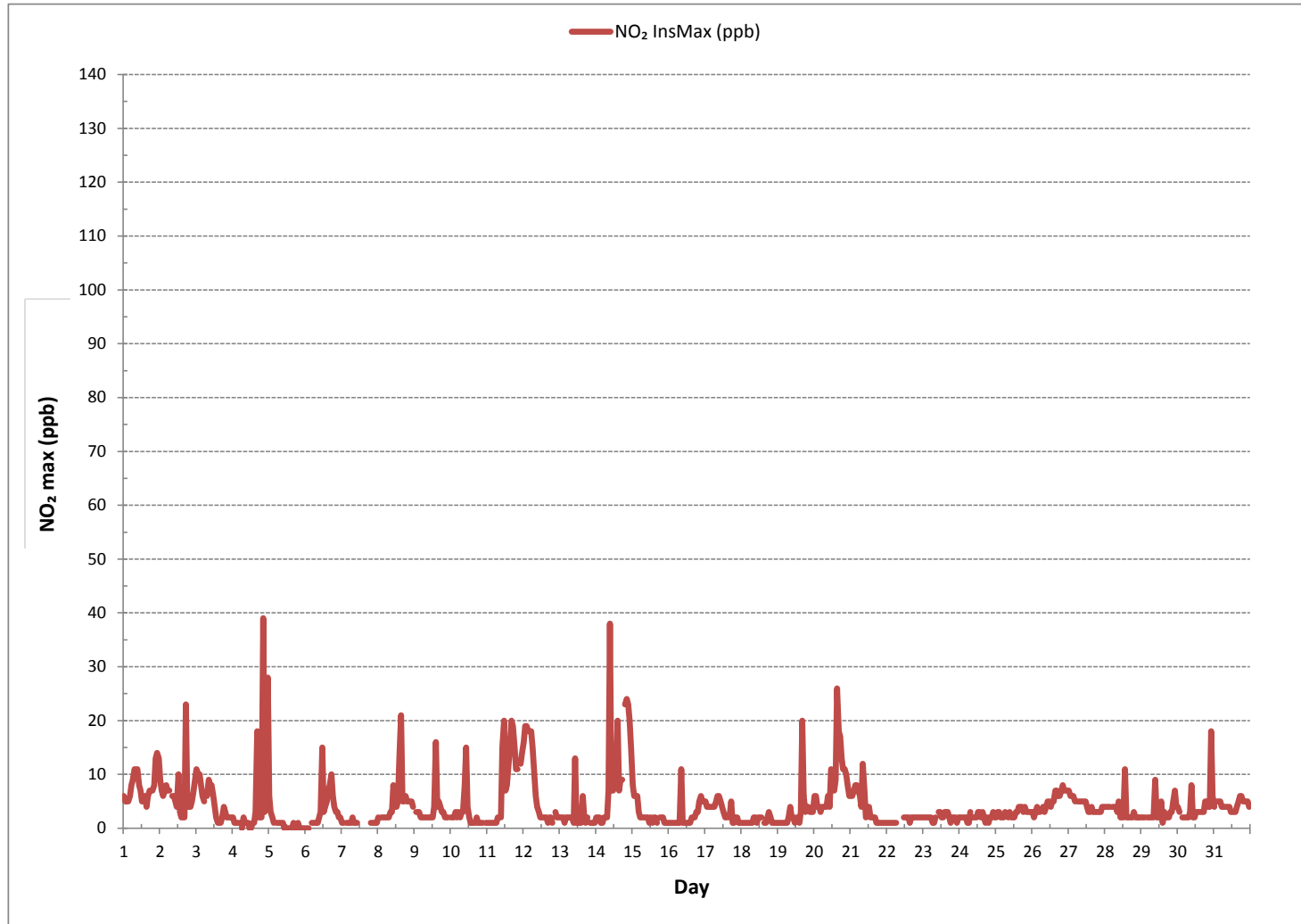
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	684
MAXIMUM INSTANTANEOUS VALUE:	39 ppb @ HOUR 20 ON DAY 4
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	742 hrs
STANDARD DEVIATION:	5



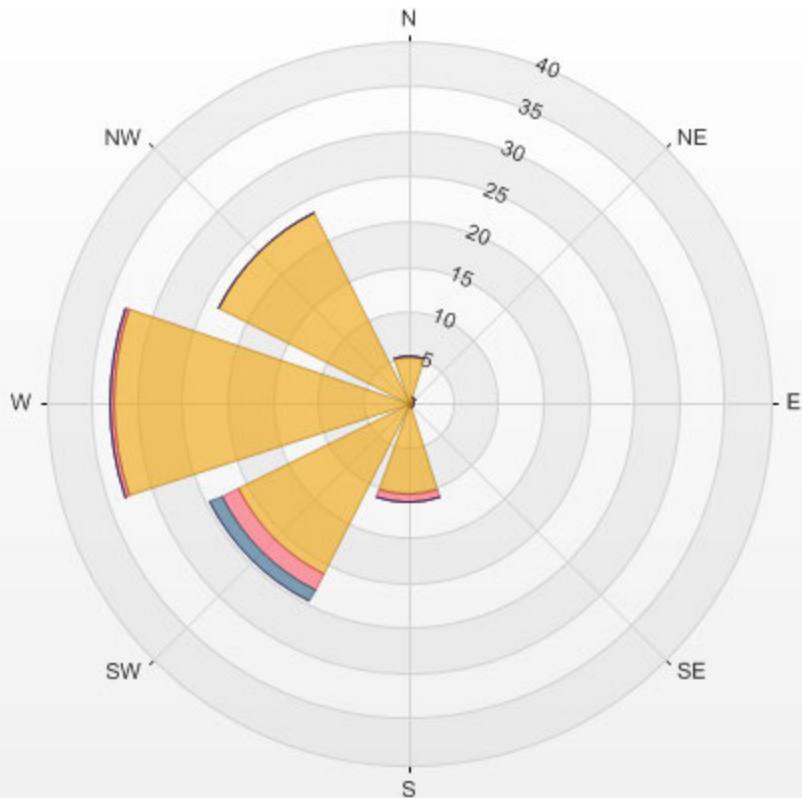
NITROGEN DIOXIDE Instantaneous Maximum (NO<sub>2</sub> ppb)





% Icon Classes (ppb) 95 0.0-7.7 3 7.7-15.3 1 15.3-23.0 0 >23.0

LICA ST. LINA Poll.: LICA ST. LINA-NO2[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 0.29% Calm Poll Avg: 0.19[ppb]



NO2[ppb] Calibration: LICA ST. LINA Monthly: 17/12 Type: Span



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

# ***OZONE***

**OZONE Hourly Averages (O<sub>3</sub> 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	26.0	25.7	25.8	25.3	23.5	21.3	19.1	17.4	S	18.8	26.9	25.6	28.5	31.0	31.8	32.1	30.9	28.9	25.8	24.5	22.9	19.3	17.6	20.8	17.4	32.1	24.8	24	
2	22.2	25.7	24.5	23.7	21.3	22.0	20.3	S	23.9	25.2	27.7	29.9	32.1	32.8	33.7	33.4	32.4	31.8	30.1	29.1	28.6	27.5	24.8	21.9	20.3	33.7	27.2	24	
3	19.4	18.5	18.5	19.6	23.7	24.2	S	22.8	20.7	20.5	22.1	25.2	29.4	32.4	35.3	35.9	35.8	33.3	27.4	28.4	29.1	29.0	29.6	30.2	18.5	35.9	26.6	24	
4	29.6	30.1	29.9	30.5	33.6	S	34.5	35.3	35.7	35.1	35.1	35.3	35.1	34.3	33.7	32.6	31.7	31.5	31.8	30.8	29.4	27.8	25.5	23.6	23.6	35.7	31.8	24	
5	26.4	31.0	33.5	34.8	S	36.0	36.2	36.5	36.9	37.6	38.0	38.1	38.1	38.3	38.5	38.4	38.4	38.3	38.7	38.4	38.0	37.5	37.0	36.8	26.4	38.7	36.6	24	
6	37.3	37.5	36.9	S	35.9	35.7	35.0	34.9	35.1	33.2	31.7	32.8	32.4	31.2	30.4	28.5	26.8	27.3	29.4	31.0	32.1	33.2	34.8	35.0	26.8	37.5	33.0	24	
7	35.3	35.8	S	37.3	37.4	37.7	38.2	37.7	38.2	39.5	41.1	42.1	43.0	43.9	44.2	Q	44.3	44.1	44.0	43.7	43.3	43.2	43.0	42.6	35.3	44.3	40.9	24	
8	42.4	S	41.7	41.5	40.0	38.7	39.4	40.2	38.4	36.3	C	C	C	C	C	C	34.5	33.3	33.6	34.5	33.8	33.6	34.4	33.9	36.2	33.3	42.4	37.0	24
9	S	37.2	35.6	36.4	37.6	38.3	37.3	38.3	38.0	38.0	38.3	39.0	39.8	39.1	39.8	39.4	37.8	38.2	39.2	39.4	40.6	41.3	42.6	S	35.6	42.6	38.7	24	
10	39.4	38.8	39.1	37.5	37.6	37.1	36.5	35.3	37.5	40.5	36.7	37.2	41.8	42.1	41.8	41.2	40.6	40.2	38.7	38.3	38.5	38.3	S	37.9	35.3	42.1	38.8	24	
11	37.7	37.4	37.5	37.5	37.2	36.6	35.8	34.5	33.5	32.9	32.1	29.9	28.3	28.5	26.7	24.3	18.2	18.6	20.3	21.3	21.3	S	19.5	18.3	18.2	37.7	29.0	24	
12	16.4	14.4	13.9	14.9	13.8	14.4	18.6	22.5	26.7	29.4	32.8	35.2	35.5	35.4	35.1	37.6	39.7	39.2	38.6	38.0	S	37.0	36.6	36.7	13.8	39.7	28.8	24	
13	36.7	36.0	35.6	34.8	34.3	33.8	32.8	31.8	33.0	33.5	35.6	37.8	38.2	37.9	37.9	38.3	38.6	39.1	S	39.2	38.4	38.0	36.7	31.8	39.2	36.1	24		
14	36.0	35.3	34.9	34.4	34.9	32.6	30.7	30.9	28.0	23.7	23.2	20.9	22.5	22.9	23.5	22.9	21.3	19.2	S	10.2	7.5	8.0	12.0	18.5	7.5	36.0	24.1	24	
15	22.9	23.6	22.3	23.6	31.8	33.6	31.4	32.1	32.9	33.2	34.5	34.8	34.6	34.5	35.7	38.0	36.2	S	37.5	37.4	37.8	38.0	37.7	37.0	22.3	38.0	33.1	24	
16	36.5	36.4	36.3	36.6	36.6	37.0	36.7	36.6	36.7	37.0	37.2	37.1	37.1	37.3	36.5	34.2	S	34.8	32.4	31.3	28.7	26.3	25.6	23.7	23.7	37.3	34.2	24	
17	24.4	24.1	24.8	23.8	23.3	24.0	23.8	23.4	23.6	26.3	28.5	31.2	33.3	35.1	35.2	S	36.4	37.0	38.3	38.2	37.2	37.1	36.9	37.4	23.3	38.3	30.6	24	
18	38.1	38.3	38.2	36.9	37.2	37.7	37.4	37.1	36.7	36.6	36.8	37.7	37.8	37.8	S	39.7	42.9	41.8	41.6	41.7	41.6	40.9	40.6	39.9	36.6	42.9	38.9	24	
19	38.9	38.7	38.7	38.8	39.5	38.8	38.1	37.0	35.5	35.0	34.9	34.5	33.8	S	34.3	33.0	31.8	31.2	31.6	31.8	31.6	30.6	32.8	33.2	30.6	39.5	35.0	24	
20	29.3	27.3	28.2	28.1	25.7	25.0	24.4	26.1	25.9	25.1	25.2	25.9	S	23.0	21.3	20.6	14.5	13.3	15.4	16.9	17.2	19.3	22.3	24.8	13.3	29.3	22.8	24	
21	25.8	25.3	23.0	20.8	20.0	20.8	24.4	28.4	34.5	36.3	35.7	S	35.8	35.5	35.7	34.7	35.1	36.7	36.9	36.8	36.5	37.6	38.0	37.2	20.0	38.0	31.8	24	
22	37.2	37.0	36.5	36.2	36.1	36.2	36.2	35.8	P	35.8	S	35.8	35.6	35.7	36.6	37.2	36.2	35.7	35.9	35.5	35.8	35.5	35.0	34.7	34.7	37.2	36.0	23	
23	34.2	33.7	33.3	33.4	33.7	34.7	36.8	36.6	35.5	S	34.7	34.8	36.0	37.1	37.4	36.3	36.2	38.8	38.7	37.4	37.1	37.3	37.0	36.1	33.3	38.8	35.9	24	
24	35.3	34.5	34.2	35.2	35.8	36.6	36.9	35.3	S	36.3	35.7	35.3	35.7	35.8	35.6	35.1	35.7	36.4	36.3	36.5	36.6	36.5	35.2	35.9	34.2	36.9	35.8	24	
25	35.1	34.1	33.6	35.6	35.8	36.1	36.1	S	34.6	31.5	30.6	32.5	32.4	32.2	33.2	31.9	30.7	31.2	31.5	31.0	31.1	31.4	31.7	31.5	30.6	36.1	32.8	24	
26	32.0	31.5	29.4	29.0	30.2	30.4	S	29.7	29.8	28.3	25.8	27.3	30.2	31.7	31.2	28.6	29.9	30.6	27.8	25.4	24.0	24.7	24.2	24.2	24.0	32.0	28.5	24	
27	24.5	24.6	25.4	26.5	26.8	S	26.5	25.5	22.9	21.4	21.4	23.5	25.5	30.2	32.6	33.3	33.6	33.3	33.1	32.7	31.3	29.7	28.3	27.7	21.4	33.6	27.8	24	
28	26.5	27.3	28.1	29.1	S	28.9	29.2	29.6	31.0	31.3	32.5	32.9	33.6	33.1	32.5	31.4	30.5	31.0	32.9	33.5	33.6	32.9	32.5	32.2	26.5	33.6	31.1	24	
29	32.0	31.6	31.7	S	30.3	29.7	29.9	30.0	30.0	30.2	31.0	32.1	32.8	33.7	34.3	33.8	34.1	35.0	34.9	34.9	35.2	32.3	29.0	29.6	29.0	35.2	32.1	24	
30	31.1	33.0	S	35.0	34.9	34.8	33.3	34.0	32.7	32.8	33.3	35.0	33.9	30.8	31.0	33.1	32.8	31.4	29.9	29.2	30.2	29.5	29.1	30.9	29.1	35.0	32.2	24	
31	30.0	S	28.0	27.8	28.9	29.7	29.8	29.5	29.2	30.2	30.2	31.7	33.2	34.3	33.4	32.5	30.7	28.6	28.3	28.7	29.0	29.6	29.4	29.6	27.8	34.3	30.1	24	
HOURLY MAX	42.4	38.8	41.7	41.5	40.0	38.8	39.4	40.2	38.4	40.5	41.1	42.1	43.0	43.9	44.2	41.2	44.3	44.1	44.0	43.7	43.3	43.2	43.0	42.6					
HOURLY AVG	31.3	31.2	31.0	31.2	31.6	31.8	31.9	31.9	32.0	31.7	32.0	32.7	34.0	34.1	34.1	33.5	33.2	32.9	33.4	32.2	32.0	32.1	31.3	31.4					

**STATUS FLAG CODES**

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

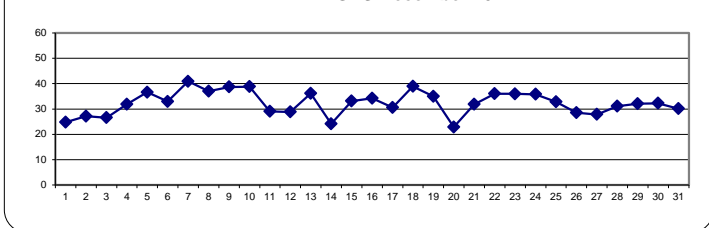
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 82 ppb

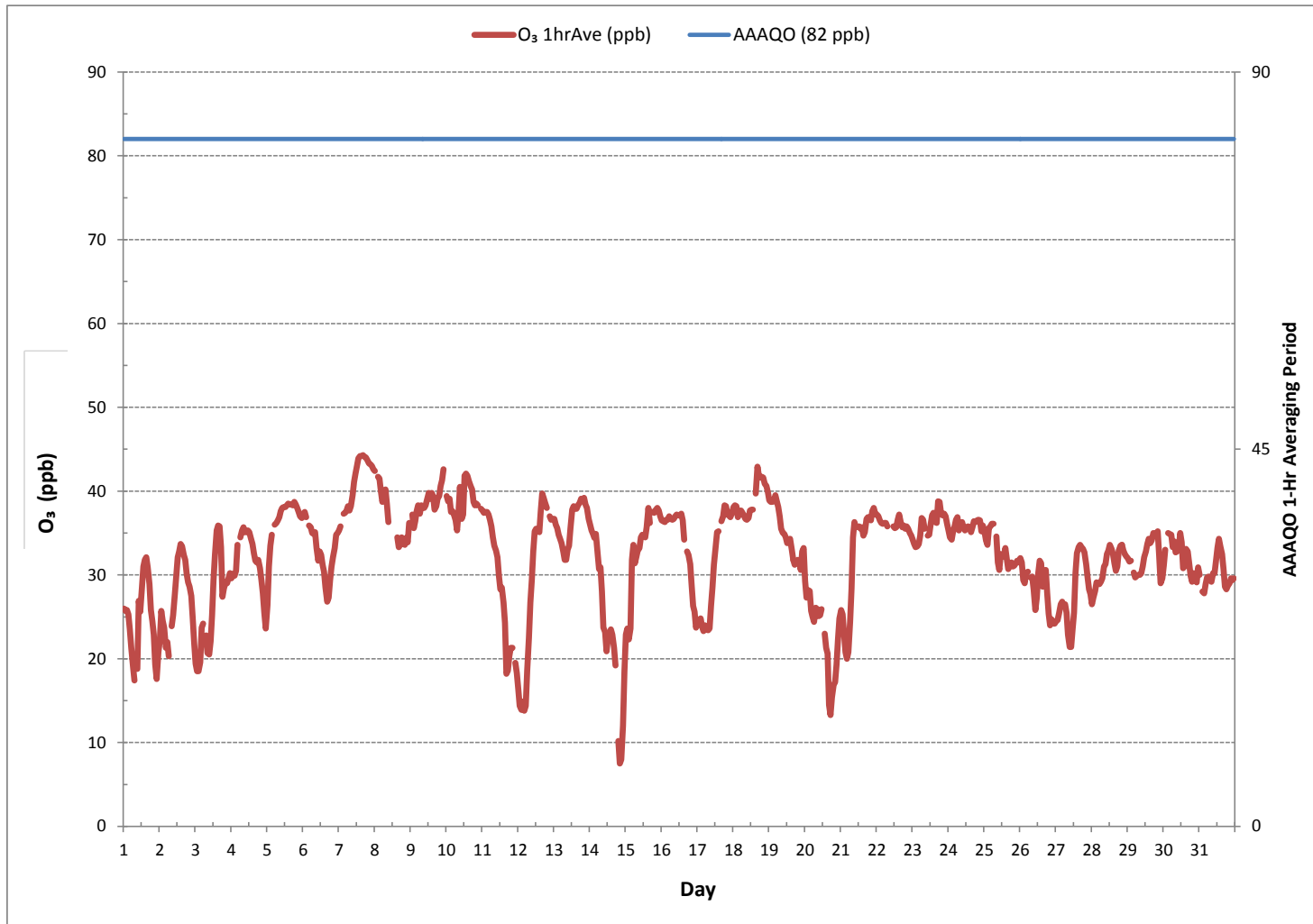
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	705			
MINIMUM 1-HR AVERAGE:	7.5 ppb	@ HOUR	20	ON DAY 14
MAXIMUM 1-HR AVERAGE:	44.3 ppb	@ HOUR	16	ON DAY 7
MAXIMUM 24-HR AVERAGE:	40.9 ppb			ON DAY 7
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	743 hrs	
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	99.9 %	
STANDARD DEVIATION:	6.2	MONTHLY AVERAGE:	32.3 ppb	

**24 HR AVERAGES December 2017**



OZONE Hourly Averages (O<sub>3</sub> ppb)





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

OZONE Instantaneous Maximum (O<sub>3</sub> 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	27.4	27.1	26.8	26.2	25.6	23.2	20.6	19.5	S	23.0	31.0	29.6	30.6	32.4	33.2	33.2	32.1	31.4	27.7	25.9	24.3	22.8	23.0	23.0	19.5	33.2	26.9	24	
2	25.0	27.3	25.6	25.6	23.0	23.8	21.4	S	25.6	26.8	30.1	31.7	33.4	33.9	34.6	34.4	33.6	33.0	32.9	30.3	29.7	29.5	27.2	23.8	21.4	34.6	28.8	24	
3	21.4	19.9	20.0	22.3	25.5	25.2	S	24.3	22.5	21.8	24.3	27.6	32.5	34.2	37.0	36.9	36.9	36.2	30.1	29.7	30.1	30.0	30.6	31.0	19.9	37.0	28.3	24	
4	30.8	31.0	30.8	32.2	35.0	S	35.6	36.5	36.6	36.2	36.1	36.5	36.1	35.3	34.8	33.8	33.8	32.5	32.6	32.4	31.0	29.1	27.4	25.2	25.2	36.6	33.1	24	
5	30.8	32.7	35.1	35.7	S	36.9	36.9	37.3	37.9	38.5	38.8	38.8	38.9	39.0	39.2	39.9	39.2	39.2	39.5	39.2	38.9	38.4	38.0	37.9	30.8	39.9	37.7	24	
6	38.1	38.8	38.5	S	36.7	36.5	36.0	35.8	36.2	36.1	33.0	33.9	33.6	32.2	31.9	30.0	28.1	28.6	31.2	32.4	33.1	34.8	36.0	36.2	28.1	38.8	34.2	24	
7	36.3	37.9	S	38.4	38.4	38.9	39.4	38.6	39.3	41.1	42.5	43.2	44.4	44.7	45.1	Q	Q	45.0	44.8	44.6	44.0	43.9	43.8	43.5	36.3	45.1	41.8	24	
8	43.1	S	42.4	42.4	41.5	39.7	41.0	41.6	39.8	38.0	C	C	C	C	C	36.0	35.1	34.9	35.6	34.9	35.1	35.6	35.3	37.9	34.9	43.1	38.3	24	
9	S	38.8	36.5	37.7	38.8	39.3	38.5	39.6	38.8	38.9	39.4	39.9	40.7	40.5	41.4	41.4	39.2	39.9	40.1	40.9	41.7	42.6	43.6	S	36.5	43.6	39.9	24	
10	41.1	39.9	40.1	39.1	38.5	38.1	37.6	36.7	40.3	41.8	39.8	41.1	43.0	43.2	43.0	42.0	41.7	41.3	40.1	39.3	39.4	39.3	S	38.8	36.7	43.2	40.2	24	
11	38.5	38.4	38.4	38.4	38.2	37.7	37.2	35.7	34.7	34.0	33.5	32.4	29.5	29.7	28.6	27.1	21.6	20.1	21.8	22.6	22.6	S	20.2	19.9	19.9	38.5	30.5	24	
12	18.3	15.8	15.3	16.1	15.4	18.2	21.7	25.4	29.2	30.6	34.8	36.3	36.3	36.5	36.3	39.8	40.6	40.5	39.4	39.0	S	37.9	37.5	37.6	15.3	40.6	30.4	24	
13	37.5	36.8	36.6	36.0	35.1	34.9	34.0	33.1	33.2	33.8	35.3	37.9	38.9	39.1	38.9	38.8	39.4	40.1	40.1	S	40.3	39.3	39.3	37.9	33.1	40.3	37.2	24	
14	37.1	36.3	35.8	35.3	35.8	34.9	31.9	31.8	31.3	26.1	25.6	22.7	24.0	24.2	24.6	24.2	22.9	21.4	S	14.3	9.0	9.8	15.8	22.1	9.0	37.1	26.0	24	
15	24.7	24.6	24.6	27.4	35.8	36.7	32.4	34.2	34.8	34.6	35.4	35.9	35.7	35.3	38.8	38.9	37.5	S	38.4	38.1	38.8	38.8	38.5	38.3	24.6	38.9	34.7	24	
16	37.2	37.1	37.1	37.5	37.5	37.9	37.5	37.3	37.6	37.9	38.1	38.0	38.0	38.1	37.6	36.1	S	33.8	33.6	32.5	31.0	27.7	26.6	25.1	25.1	38.1	35.3	24	
17	25.5	25.1	26.1	25.1	24.2	26.0	25.2	25.0	26.0	29.3	30.4	33.2	35.3	36.1	36.1	S	38.8	38.8	39.6	39.4	38.3	38.0	37.9	38.5	24.2	39.6	32.1	24	
18	39.1	39.2	39.2	38.5	38.3	38.4	38.3	37.8	37.5	37.3	37.6	38.5	38.6	38.5	S	43.4	44.0	43.2	42.5	42.6	42.7	41.5	41.5	40.9	37.3	44.0	40.0	24	
19	39.7	39.4	39.7	40.7	40.9	39.7	39.2	38.3	37.0	36.0	35.7	35.6	35.0	S	35.2	34.8	34.7	33.9	33.8	33.2	32.6	32.5	33.8	34.4	32.5	40.9	36.3	24	
20	33.6	29.3	30.0	29.8	27.2	29.5	26.8	27.3	27.4	26.1	26.5	28.5	S	36.6	26.1	22.5	22.5	19.6	15.0	17.5	18.1	18.6	20.9	24.4	26.2	15.0	33.6	24.9	24
21	26.8	26.5	25.5	22.1	21.1	22.2	26.6	31.4	37.0	38.5	37.2	S	36.6	36.6	36.9	35.4	36.5	38.0	37.7	37.6	37.5	38.5	38.8	38.4	21.1	38.8	33.2	24	
22	37.9	37.8	37.5	37.0	36.9	36.9	36.9	P	P	36.9	S	36.6	36.5	36.5	37.7	38.0	37.3	36.3	36.6	36.5	36.6	36.2	36.0	35.3	35.3	38.0	36.9	22	
23	35.1	34.6	34.0	34.2	35.0	36.7	37.8	37.8	36.8	S	35.6	36.5	37.7	38.6	38.5	37.7	38.3	40.5	40.2	38.6	38.1	38.1	38.1	37.0	34.0	40.5	37.2	24	
24	36.6	35.7	35.1	36.5	36.7	38.0	37.8	37.3	S	37.6	36.9	36.3	37.0	36.8	36.7	36.0	37.0	37.4	37.4	37.2	37.5	37.6	36.5	38.0	35.1	38.0	36.9	24	
25	36.6	36.5	36.7	37.0	37.4	37.7	37.6	S	36.7	34.6	32.1	33.6	33.5	34.2	34.3	33.1	32.1	32.5	32.4	31.9	32.1	32.4	32.6	32.6	31.9	37.7	34.4	24	
26	33.2	32.4	32.5	30.9	31.2	31.6	S	30.8	31.0	30.0	27.0	30.1	32.5	33.1	33.1	30.8	31.3	31.6	29.8	26.6	25.0	25.8	25.5	25.2	25.0	33.2	30.0	24	
27	25.4	25.5	26.8	27.8	27.7	S	27.7	27.2	24.4	22.7	23.1	25.1	28.0	32.6	34.0	34.3	34.4	34.3	34.0	33.9	32.7	31.0	29.8	28.9	22.7	34.4	29.2	24	
28	27.7	28.5	29.5	30.3	S	29.7	30.1	31.2	31.8	33.2	33.4	33.9	34.8	34.2	33.4	32.9	31.6	32.4	34.3	34.5	34.3	33.9	33.2	33.0	27.7	34.8	32.3	24	
29	32.9	32.5	32.9	S	31.2	30.6	30.8	30.8	30.8	31.3	32.5	33.1	34.0	34.8	35.1	34.7	35.7	36.0	35.8	35.8	36.2	36.7	33.1	33.4	30.6	36.7	33.5	24	
30	33.4	36.3	S	36.1	35.9	35.8	35.1	35.4	33.9	34.3	34.7	36.5	36.7	33.1	33.1	35.0	34.2	33.4	31.4	30.8	31.3	30.5	31.9	32.7	30.5	36.7	34.0	24	
31	31.4	S	29.1	28.8	30.6	30.5	30.6	30.4	30.8	31.2	31.4	33.1	34.7	35.3	34.6	33.6	32.3	29.7	29.1	29.5	29.8	30.4	30.3	30.4	28.8	35.3	31.2	24	
HOURLY MAX	43.1	39.9	42.4	42.4	41.5	39.7	41.0	41.6	40.3	41.8	42.5	43.2	44.4	44.7	45.1	43.4	44.0	45.0	44.8	44.6	44.0	43.9	43.8	43.5					
HOURLY AVG	32.7	32.5	32.4	32.6	32.9	33.3	33.2	33.1	33.5	33.3	33.5	34.3	35.4	35.3	35.4	35.0	34.5	34.4	34.7	33.4	33.1	33.5	32.9	32.8					

STATUS FLAG CODES

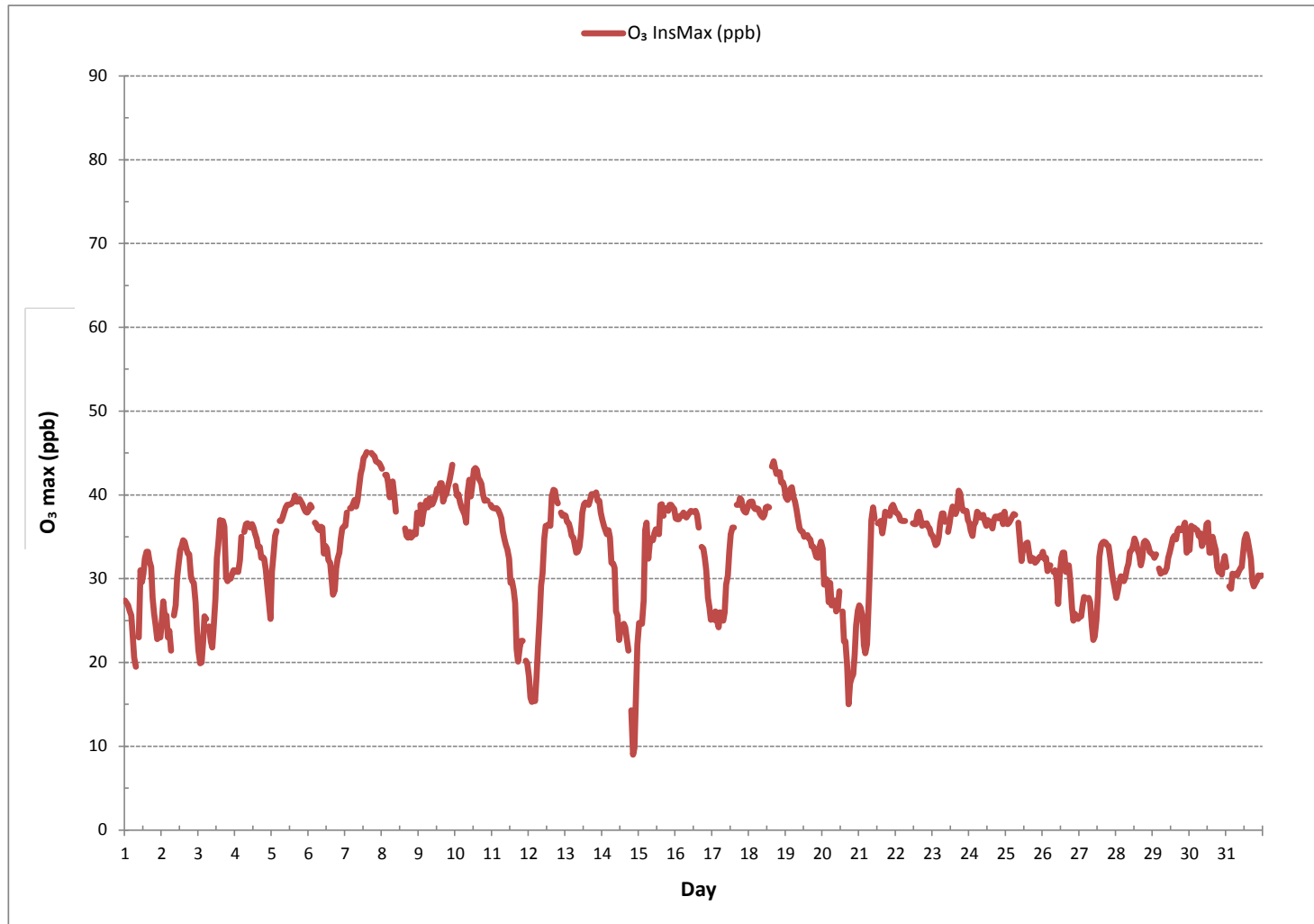
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	703
MAXIMUM INSTANTANEOUS VALUE:	45.1 ppb @ HOUR 14 ON DAY 7
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	742 hrs
STANDARD DEVIATION:	5.9



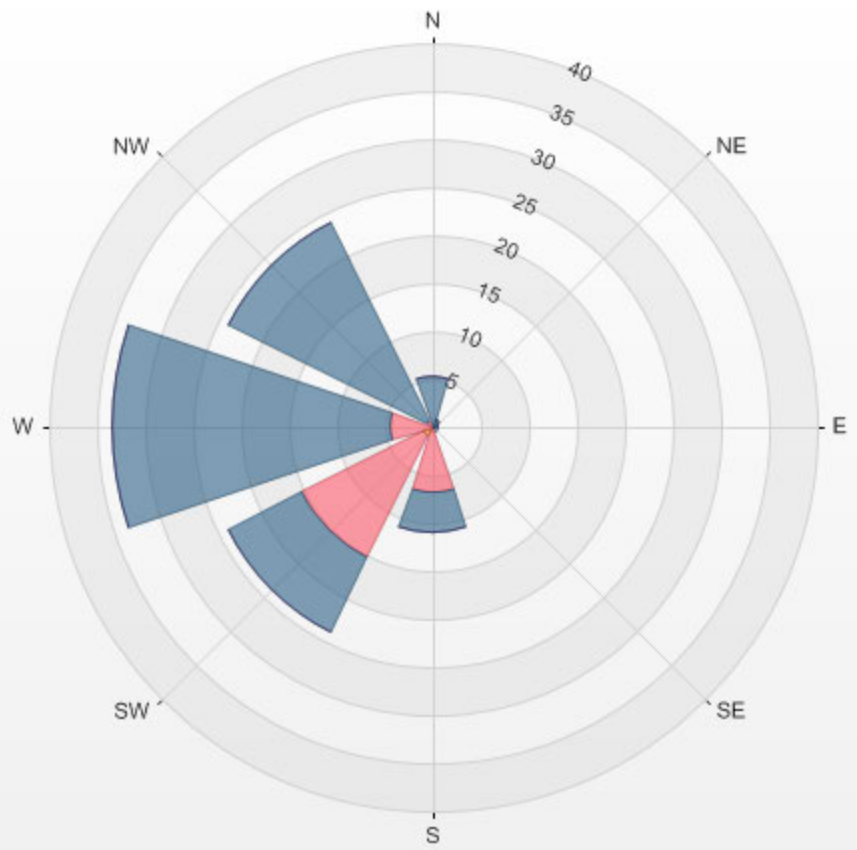
OZONE Instantaneous Maximum (O<sub>3</sub> ppb)



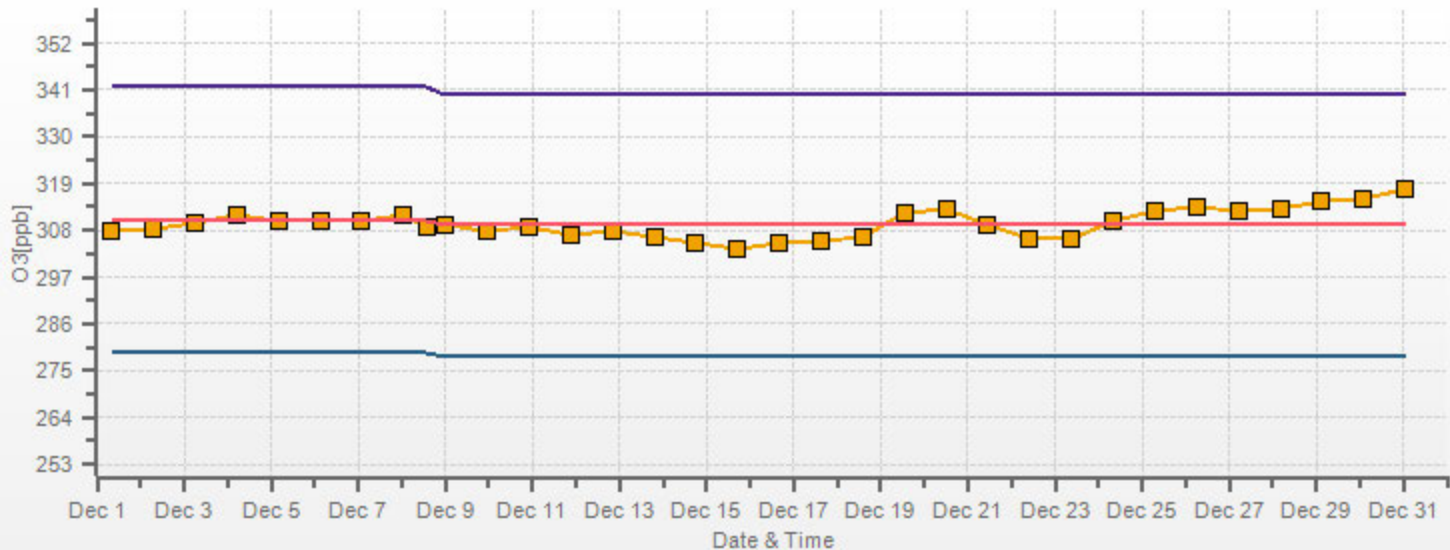


% Icon	Classes (ppb)	1		0.0-14.8	26		14.8-29.6	72		29.6-44.4	0		>44.4
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LICA ST. LINA Poll.: LICA ST. LINA-O3[ppb] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 0.28% Calm Poll Avg: 34.09[ppb]



O3[ppb] Calibration: LICA ST. LINA Monthly: 17/12 Type: Span



Span Meas Span Ref Span Low Span High

***PARTICULATE MATTER 2.5***



PARTICULATE MATTER < 2.5 MICRONS Hourly Averages (PM<sub>2.5</sub> µg/m<sup>3</sup>)

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	7	8	7	5	6	9	10	10	10	7	7	6	5	5	5	5	5	6	6	7	8	8	8	5	10	7	24	
2	8	10	11	12	16	18	23	24	19	17	13	10	8	7	7	6	7	8	9	12	13	11	10	11	6	24	12	24	
3	12	14	15	15	13	18	22	37	41	44	35	23	10	5	2	2	2	3	7	7	6	7	5	4	2	44	15	24	
4	4	4	4	5	3	2	2	1	1	1	1	1	2	2	2	2	2	3	3	4	4	5	6	7	1	7	3	24	
5	7	6	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	2	24
6	1	1	1	2	2	2	2	2	3	4	3	4	5	6	6	8	8	7	7	8	8	8	8	7	8	1	8	5	24
7	7	6	5	6	5	5	5	4	4	3	3	2	2	2	2	2	2	2	2	2	4	5	5	5	2	7	4	24	
8	5	4	4	3	3	4	5	5	7	8	8	10	9	9	C	7	7	6	6	6	6	8	8	7	3	10	6	24	
9	7	9	12	10	9	9	9	7	5	5	4	4	5	5	6	6	6	5	5	6	6	7	8	8	4	12	7	24	
10	10	10	11	10	9	9	9	9	8	7	7	6	4	2	2	2	1	1	2	2	2	1	1	1	1	11	5	24	
11	1	1	1	1	1	1	1	2	3	3	4	5	10	11	12	13	12	10	9	10	10	10	10	10	1	13	6	24	
12	10	11	11	11	11	11	10	9	7	6	6	7	8	8	9	10	11	12	10	11	11	11	11	10	6	12	10	24	
13	10	9	8	8	7	6	5	4	4	3	4	4	3	3	3	3	2	2	1	1	1	1	1	2	1	10	4	24	
14	2	2	2	3	3	3	3	4	4	4	7	9	9	9	9	8	8	9	9	11	10	11	11	10	2	11	7	24	
15	8	7	7	8	5	4	5	3	3	2	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	8	3	24	
16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	2	1	24	
17	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	0	0	1	1	1	1	1	0	2	1	24	
18	1	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1	2	3	3	1	2	3	3	0	3	1	24	
19	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	2	1	24	
20	2	3	2	3	3	4	4	3	3	4	21	77	80	103	51	41	36	36	35	30	30	28	21	15	2	103	26	24	
21	14	13	14	15	18	16	12	10	8	6	5	3	4	3	3	6	3	1	1	1	1	1	1	2	1	18	7	24	
22	2	2	2	2	2	2	2	3	P	2	2	2	2	2	1	1	1	1	1	2	2	2	2	2	1	3	2	23	
23	3	3	3	3	2	2	1	2	1	1	2	2	1	1	1	1	1	1	1	1	3	2	2	1	2	1	3	2	24
24	2	2	2	2	1	1	1	2	3	5	5	5	4	4	3	4	3	3	2	3	5	5	3	3	1	5	3	24	
25	4	4	4	3	3	2	3	3	4	16	4	4	4	4	3	3	3	2	2	2	2	14	5	2	2	16	4	24	
26	2	3	3	3	3	3	3	3	4	4	7	8	7	6	5	5	4	4	4	5	6	5	5	2	8	4	24		
27	5	5	5	4	4	5	5	5	5	5	7	7	6	4	2	2	2	2	2	2	2	3	3	3	2	7	4	24	
28	3	3	3	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	24	
29	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	4	1	4	1	24	
30	3	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	2	4	3	4	3	4	4	3	2	4	3	24	
31	4	4	4	4	4	3	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3	3	3	2	4	3	24	
HOURLY MAX	14	14	15	15	18	18	23	37	41	44	35	77	80	103	51	41	36	36	35	30	30	28	21	15					
HOURLY AVG	5	5	5	5	5	5	5	5	5	6	5	7	6	7	5	5	4	4	5	5	5	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

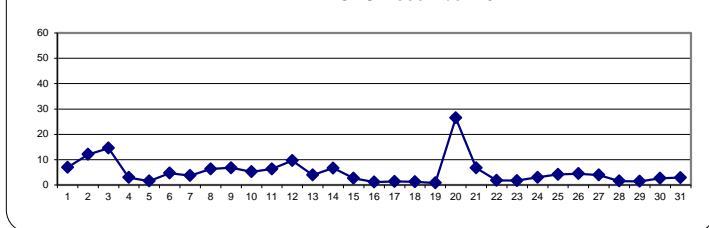
OBJECTIVE LIMIT:

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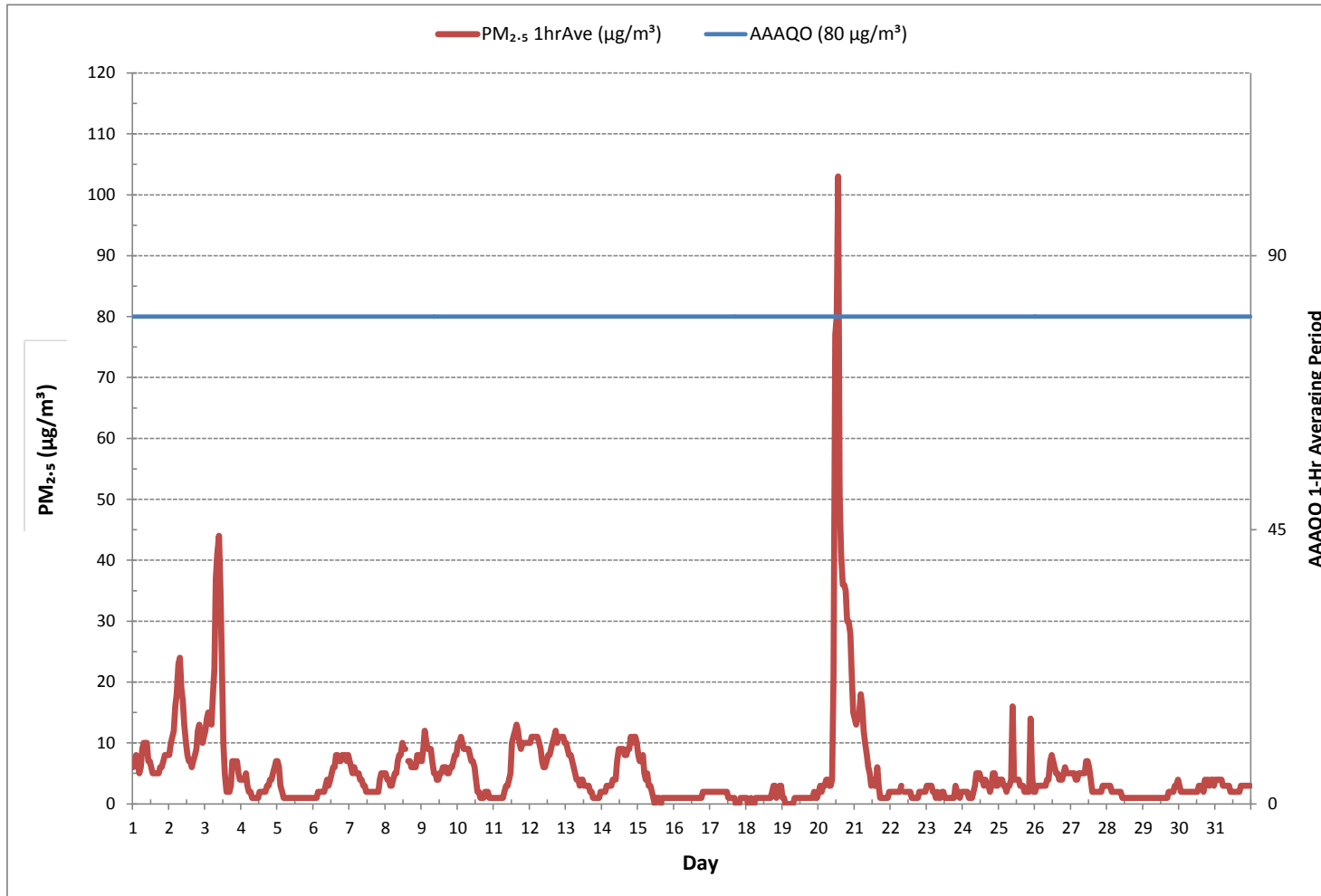
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	1				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	727				
MINIMUM 1-HR AVERAGE:	0 µg/m <sup>3</sup> @ HOUR	11	ON DAY	15	
MAXIMUM 1-HR AVERAGE:	103 µg/m <sup>3</sup> @ HOUR	13	ON DAY	20	
MAXIMUM 24-HR AVERAGE:	26 µg/m <sup>3</sup>		ON DAY	20	
MONTHLY CALIBRATION TIME:	1	hrs	OPERATIONAL TIME:	743	hrs
STANDARD DEVIATION:	8		AMD OPERATION UPTIME:	99.9	%
			MONTHLY AVERAGE:	5	µg/m <sup>3</sup>

24 HR AVERAGES December 2017



PARTICULATE MATTER < 2.5 MICRONS Hourly Averages (PM<sub>2.5</sub> µg/m<sup>3</sup>)



Wind: LICA ST. LINA  
 Poll.: LICA ST. LINA-PM25[ug/m3(L)]  
 Monthly: 17/12  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 0.27%

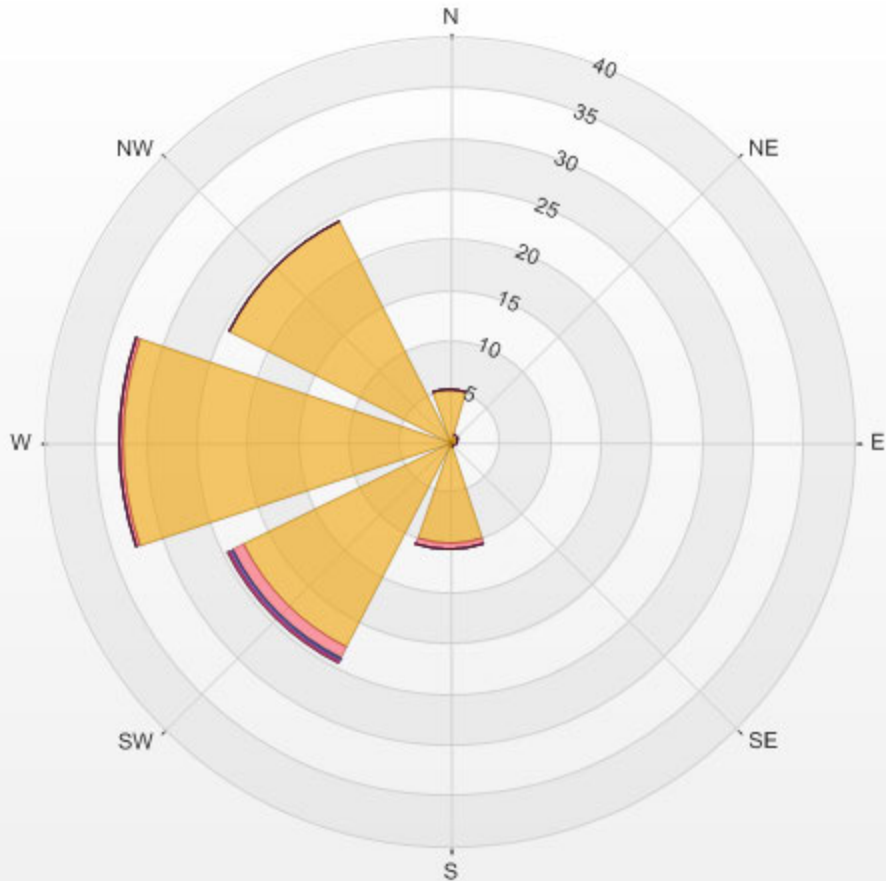
Calm Avg: 1.48 [ug/m3(L)]

Direction	0.0-20.8	20.8-41.6	41.6-62.4	62.4-83.2	83.2-104.0	>104.0	Total
<b>N</b>	5.1	0.0	0.0	0.0	0.0	0.0	5.1
<b>NE</b>	1.0	0.0	0.0	0.0	0.0	0.0	1.0
<b>E</b>	0.8	0.0	0.0	0.0	0.0	0.0	0.8
<b>SE</b>	0.5	0.0	0.0	0.0	0.0	0.0	0.5
<b>S</b>	10.0	0.7	0.0	0.0	0.0	0.0	10.7
<b>SW</b>	22.7	1.2	0.1	0.3	0.1	0.0	24.5
<b>W</b>	32.3	0.3	0.1	0.0	0.0	0.0	32.8
<b>NW</b>	24.4	0.0	0.0	0.0	0.0	0.0	24.4
<b>Summary</b>	96.9	2.2	0.3	0.3	0.1	0.0	100.0



% Icon	Classes (ug/m3(L))	97	0.0-20.8	2	20.8-41.6	0	41.6-62.4	0	62.4-83.2	0	83.2-104.0	0	>104.0
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LICA ST. LINA Poll.: LICA ST. LINA-PM25[ug/m3(L)] 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 0.27% Calm Poll Avg: 1.48[ug/m3(L)]



***WIND SPEED***



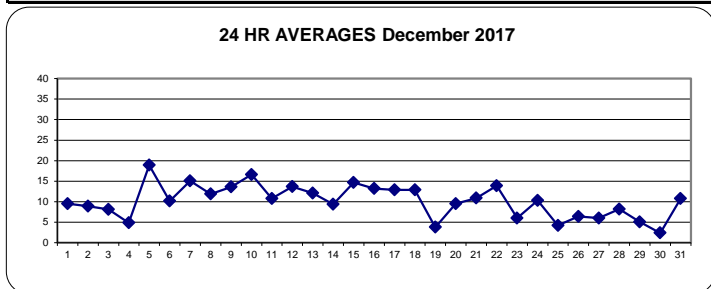
WIND SPEED Hourly Averages (WS kph)

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	11.0	10.2	10.8	8.9	8.6	9.2	8.7	9.7	8.4	9.4	7.4	9.7	10.9	13.1	13.1	13.0	11.5	11.5	10.4	11.4	11.4	11.4	9.5	10.6	7.4	13.1	9.5	24				
2	10.9	10.1	9.8	10.0	9.0	10.2	9.1	10.2	11.6	10.2	10.8	9.2	11.2	8.7	6.9	9.1	8.4	7.6	9.0	7.3	9.7	9.7	9.9	9.6	6.9	11.6	8.9	24				
3	9.4	7.6	8.4	7.6	9.4	8.8	10.6	11.3	10.9	10.1	11.2	10.7	8.8	8.2	9.7	7.2	7.7	5.8	10.8	10.4	11.7	8.4	8.8	7.8	5.8	11.7	8.1	24				
4	7.0	6.8	6.6	7.0	15.3	10.8	8.7	8.5	7.4	2.1	3.9	5.5	7.9	8.8	6.5	5.8	8.4	9.7	11.8	11.3	12.0	11.2	10.8	10.1	2.1	15.3	4.9	24				
5	11.9	13.8	18.3	18.4	16.1	18.4	17.8	17.9	19.2	23.9	22.5	25.7	25.1	23.6	24.8	22.2	19.8	17.0	18.2	17.0	20.1	21.1	17.6	17.2	11.9	25.7	18.9	24				
6	13.5	13.8	10.6	9.5	8.8	8.2	7.0	10.9	12.0	9.0	8.3	9.8	16.0	13.6	12.8	13.6	12.8	12.9	11.7	13.0	13.4	15.9	15.7	15.1	7.0	16.0	10.2	24				
7	14.7	15.3	16.3	16.0	15.6	17.0	17.2	20.1	20.1	17.9	15.0	15.0	18.0	17.6	15.6	13.0	14.5	14.5	14.0	13.2	13.0	13.6	12.6	13.2	12.6	20.1	15.1	24				
8	12.5	13.7	14.3	11.7	12.8	15.0	14.2	13.8	12.1	8.4	9.5	8.2	7.5	7.6	7.5	7.5	12.0	14.7	14.5	13.1	14.6	16.1	16.7	16.8	7.5	16.8	11.9	24				
9	15.0	14.9	15.4	14.8	16.3	17.1	17.9	16.1	18.5	15.4	15.0	16.1	16.0	12.3	11.8	12.4	10.7	12.7	11.5	10.3	10.9	9.3	10.8	11.8	9.3	18.5	13.6	24				
10	11.3	13.0	11.4	12.3	12.7	13.9	14.6	12.2	11.5	15.5	25.3	26.0	29.3	34.0	33.2	33.7	26.1	23.3	16.5	14.5	15.2	13.4	11.5	10.0	10.0	34.0	16.6	24				
11	9.5	10.3	11.6	9.9	9.7	10.6	10.6	13.6	12.4	9.7	7.9	10.1	10.2	11.0	11.5	12.4	13.4	12.2	12.8	14.4	14.5	13.4	14.4	14.1	7.9	14.5	10.8	24				
12	13.7	12.0	13.9	13.5	14.3	13.8	15.6	14.2	13.3	15.2	15.4	19.8	18.5	23.7	20.3	19.2	21.8	18.3	18.5	15.4	14.3	10.9	9.8	11.1	9.8	23.7	13.7	24				
13	9.3	8.6	8.0	9.9	12.2	13.4	11.0	11.7	11.1	12.3	14.7	14.1	19.9	20.0	17.3	17.5	16.7	16.5	18.5	16.6	14.2	12.1	9.6	10.1	8.0	20.0	12.1	24				
14	10.1	8.9	10.3	9.5	9.2	7.7	11.6	10.4	7.8	8.1	8.8	10.0	9.4	8.7	9.1	7.5	10.4	13.0	12.7	14.3	13.1	13.9	13.5	12.1	7.5	14.3	9.4	24				
15	13.2	13.0	11.1	8.4	10.8	12.3	11.0	16.1	17.0	16.4	18.3	23.3	24.0	22.3	22.0	11.8	16.5	16.1	18.0	14.5	13.1	13.7	15.5	18.5	8.4	24.0	14.7	24				
16	20.3	19.3	16.1	15.6	16.6	17.0	16.7	17.1	17.4	17.0	14.6	13.2	16.3	15.9	15.5	16.3	15.3	12.0	10.6	11.4	11.4	10.0	11.0	12.6	10.0	20.3	13.2	24				
17	11.6	13.4	15.6	11.5	11.3	13.0	11.0	12.5	14.6	17.1	18.4	20.5	22.4	23.2	16.0	12.4	15.3	16.3	14.5	10.0	10.4	12.6	12.5	13.2	10.0	23.2	12.9	24				
18	12.6	13.1	12.4	11.8	11.6	11.1	11.4	12.6	12.6	15.3	17.3	18.9	17.5	21.7	18.9	17.5	14.6	11.9	11.5	9.3	10.3	9.7	10.1	7.8	7.8	21.7	12.9	24				
19	11.1	10.4	13.8	8.6	9.4	13.3	9.1	9.6	7.1	5.1	7.6	6.9	1.8	2.5	1.5	3.2	4.1	4.6	3.4	4.3	3.8	6.3	2.5	2.7	1.5	13.8	3.8	24				
20	6.7	7.4	6.9	7.2	7.8	7.0	8.0	7.3	7.6	8.9	10.2	9.0	12.9	13.7	11.6	11.1	8.7	9.7	9.4	10.6	10.6	13.8	12.6	14.5	6.7	14.5	9.5	24				
21	13.9	12.2	13.1	14.7	13.3	10.5	10.4	8.8	13.2	17.8	19.2	20.3	19.1	17.3	17.2	17.2	15.8	17.5	15.6	12.5	13.5	13.5	12.0	12.7	8.8	20.3	10.9	24				
22	12.4	14.6	14.2	13.1	12.7	12.6	13.5	13.3	P	12.4	13.4	15.7	16.1	13.6	14.3	15.5	14.4	15.4	14.7	14.4	16.2	14.9	12.6	12.1	12.1	16.2	13.9	23				
23	11.6	12.8	12.4	11.6	12.1	11.8	9.4	6.4	2.6	6.5	6.4	7.3	7.2	6.2	4.1	2.9	5.9	9.4	13.1	13.3	10.6	9.1	9.3	9.3	2.6	13.3	6.0	24				
24	10.5	10.6	9.5	14.2	18.0	17.8	17.0	18.3	19.2	15.5	16.5	15.6	11.8	11.6	12.1	9.9	9.3	8.1	8.2	7.8	7.7	6.2	7.1	7.1	6.2	19.2	10.3	24				
25	3.0	5.1	4.9	5.5	5.0	2.7	X	5.5	7.1	6.5	5.3	5.6	5.9	6.2	7.1	7.6	8.0	9.0	6.3	5.5	5.8	5.8	6.1	6.4	2.7	9.0	4.2	23				
26	4.4	5.7	6.2	6.4	6.7	5.5	8.9	8.6	8.1	6.4	5.7	4.5	5.5	4.5	4.0	4.5	6.9	10.4	9.4	9.7	10.4	10.8	8.5	6.9	4.0	10.8	6.4	24				
27	6.3	5.4	5.2	4.3	3.5	5.5	6.1	5.3	7.7	8.0	6.5	7.9	8.2	8.9	7.4	6.2	6.4	6.0	7.8	12.9	14.0	10.0	6.7	6.0	3.5	14.0	6.0	24				
28	7.1	9.6	8.8	9.3	10.4	9.2	10.9	8.4	8.1	11.3	14.9	17.4	16.2	14.7	12.8	9.9	6.9	8.3	9.5	10.9	8.8	8.7	9.3	8.0	6.9	17.4	8.2	24				
29	8.5	7.3	6.9	7.2	7.0	6.4	7.1	5.5	6.9	7.5	4.6	6.3	6.1	6.2	6.1	5.0	4.9	5.2	4.7	7.9	5.8	2.6	3.6	5.4	2.6	8.5	5.1	24				
30	3.5	11.3	X	6.9	6.7	5.4	5.7	6.3	4.2	2.3	4.5	1.8	1.7	2.9	4.5	6.2	5.8	6.0	6.9	5.7	3.6	4.5	6.1	6.6	1.7	11.3	2.4	23				
31	7.3	7.4	8.6	7.6	8.2	9.7	9.7	11.1	12.3	12.0	9.9	10.3	13.0	12.5	11.3	11.4	11.4	10.4	12.4	14.0	12.4	14.3	14.0	15.3	7.3	15.3	10.8	24				
HOURLY MAX	20.3	19.3	18.3	18.4	18.0	18.4	17.9	20.1	20.1	23.9	25.3	26.0	29.3	34.0	33.2	33.7	26.1	23.3	18.5	17.0	20.1	21.1	17.6	18.5								
HOURLY AVG	10.4	10.9	11.0	10.4	11.0	11.1	11.4	11.4	11.4	11.4	11.9	12.7	13.4	13.4	12.5	11.7	11.8	11.8	11.8	11.5	11.5	11.2	10.7	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

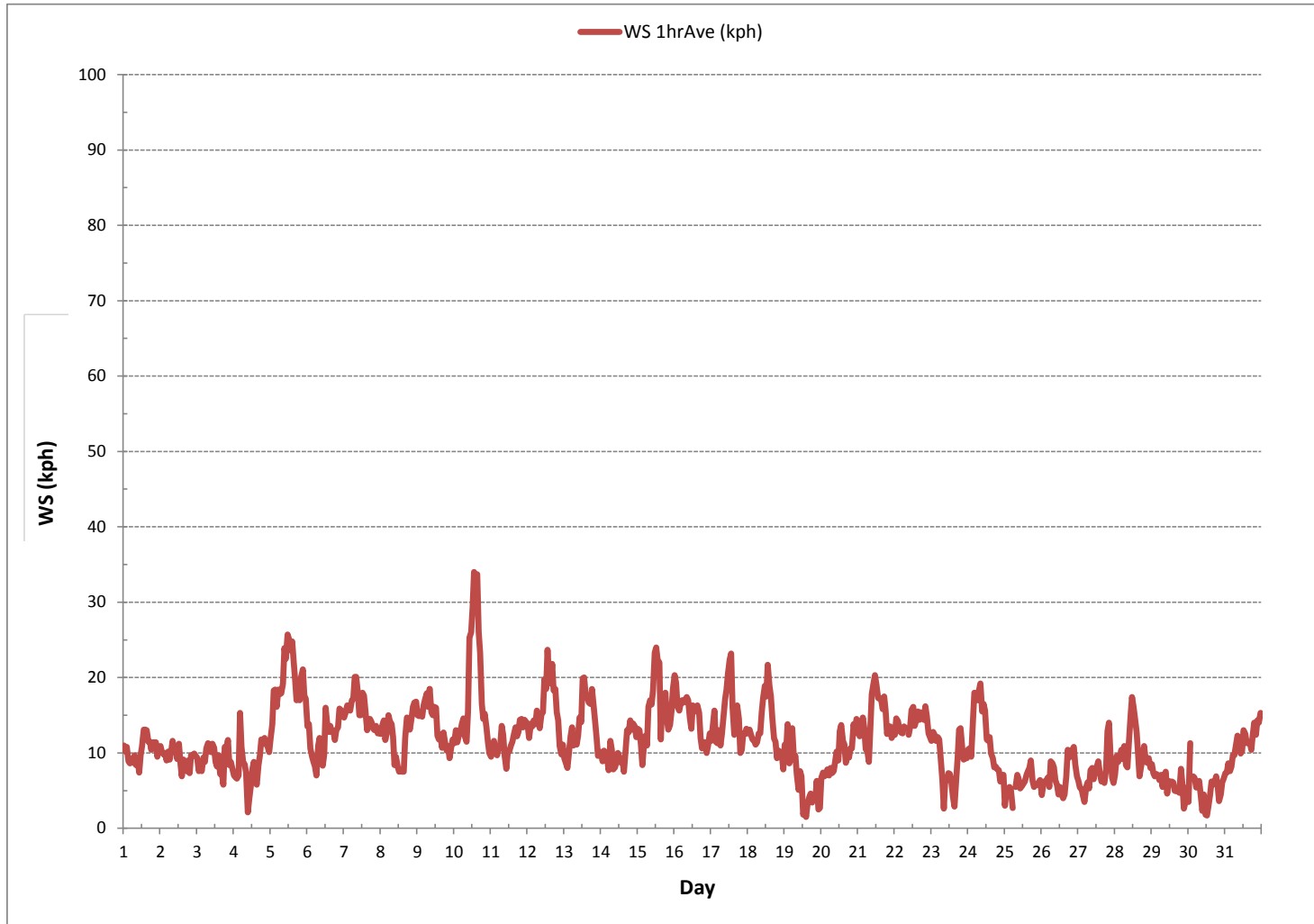
LAST CALIBRATION:	May 25, 2017
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	741
MINIMUM 1-HR AVERAGE:	1.5 kph @ HOUR 14 ON DAY 19
MAXIMUM 1-HR AVERAGE:	34.0 kph @ HOUR 13 ON DAY 10
MAXIMUM 24-HR AVERAGE:	18.9 kph ON DAY 5
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	741 hrs
AMD OPERATION UPTIME:	99.6 %
STANDARD DEVIATION:	4.7
MONTHLY AVERAGE:	8.3 kph

WIND SPEED Hourly Averages (WS kph)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
St. Lina Continuous Monitoring Station - December 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	21.8	16.4	14.6	11.9	12.6	13.2	13.7	13.8	14.8	15.4	14.2	23.1	27.1	31.1	30.3	27.3	20.9	20.5	19.2	18.7	18.1	25.9	16.1	16.7	11.9	31.1	19.1	24	
2	18.1	16.1	14.4	19.8	10.6	15.0	13.4	21.4	24.8	15.4	X	17.2	22.0	21.3	15.2	17.2	16.1	11.7	13.9	11.0	16.7	16.7	14.7	13.2	10.6	24.8	16.3	23	
3	13.0	11.6	14.8	15.2	18.5	17.4	16.9	22.6	15.8	22.4	25.4	21.1	18.9	19.6	29.2	19.8	18.6	15.0	23.0	21.5	19.6	17.4	19.3	19.4	11.6	29.2	19.0	24	
4	16.0	14.5	13.0	29.7	35.9	31.4	21.5	26.8	21.5	35.5	13.8	17.0	21.7	15.4	17.4	18.0	21.5	20.6	27.2	25.0	23.7	19.6	16.0	14.3	13.0	35.9	21.5	24	
5	28.6	30.8	42.2	46.4	38.2	48.7	42.2	47.8	42.0	60.6	54.2	61.2	62.9	60.2	55.7	52.2	52.0	40.8	45.2	39.1	48.7	44.6	39.3	42.2	28.6	62.9	46.9	24	
6	32.5	38.6	24.4	18.5	18.7	14.5	15.6	23.5	26.4	18.9	14.8	18.1	23.1	20.4	19.2	24.4	18.5	20.2	20.8	25.7	28.1	31.0	28.1	32.3	14.5	38.6	23.2	24	
7	24.6	30.3	32.3	26.4	28.2	31.9	31.4	44.5	42.1	44.2	30.6	31.1	39.6	38.3	34.1	29.1	30.2	31.0	28.9	28.2	28.4	28.8	26.4	26.0	24.6	44.5	31.9	24	
8	25.6	23.3	28.4	21.8	26.2	27.0	31.2	27.9	18.3	12.4	15.3	13.9	11.6	10.0	9.4	10.2	18.7	24.4	25.0	17.4	22.6	30.3	30.6	42.0	9.4	42.0	21.8	24	
9	23.4	27.5	28.8	21.6	33.6	45.0	33.4	41.5	43.5	28.6	32.3	29.1	38.1	22.9	20.1	18.1	17.2	20.2	17.9	18.3	22.0	17.9	20.8	19.8	17.2	45.0	26.7	24	
10	17.2	17.9	17.1	14.8	18.5	19.6	22.9	21.2	27.1	43.5	55.1	57.3	83.1	86.4	84.2	82.9	63.8	57.0	38.9	31.0	32.3	29.2	27.5	21.8	14.8	86.4	40.4	24	
11	19.7	20.1	22.2	20.0	16.8	18.3	15.0	26.6	24.0	19.0	12.8	14.4	17.7	17.3	22.3	19.2	19.6	17.7	17.9	21.2	22.0	17.9	18.5	19.0	12.8	26.6	19.1	24	
12	18.3	17.7	20.5	18.1	19.7	20.9	27.3	29.0	26.9	30.2	34.1	46.6	43.7	56.5	47.7	48.3	48.5	42.6	40.6	35.8	32.3	33.2	20.5	22.0	17.7	56.5	32.5	24	
13	20.3	17.9	15.0	14.6	20.7	23.7	20.2	19.6	18.3	25.1	32.1	39.1	45.2	48.3	43.1	40.0	39.5	52.8	43.4	45.2	42.8	29.0	28.0	21.3	14.6	52.8	31.1	24	
14	19.4	17.4	19.8	15.4	17.0	13.7	23.8	21.5	13.5	13.5	17.4	19.0	18.1	16.4	19.2	14.6	19.8	23.7	17.8	21.1	20.7	19.8	23.7	20.0	13.5	23.8	18.6	24	
15	26.0	19.9	18.1	13.5	28.2	30.1	20.5	42.8	45.9	36.7	43.5	63.0	63.0	52.5	69.8	25.9	41.2	36.0	47.8	35.3	36.0	28.2	41.5	40.2	13.5	69.8	37.7	24	
16	46.1	43.3	40.6	36.9	44.6	45.4	37.1	42.8	47.0	45.2	36.9	31.7	40.0	42.6	34.3	26.6	30.7	26.8	19.3	20.0	28.1	20.0	29.4	25.9	19.3	47.0	35.1	24	
17	24.6	28.8	39.7	23.3	27.9	25.1	26.4	26.4	28.1	40.9	45.5	43.7	51.8	53.1	58.4	32.3	42.1	37.6	34.7	29.7	21.7	20.7	22.0	27.3	20.7	58.4	33.8	24	
18	24.8	33.9	24.4	28.3	27.3	23.5	25.0	24.8	31.7	40.4	43.0	42.1	41.5	46.7	50.2	46.7	38.4	32.7	27.5	24.6	22.0	22.6	21.5	20.2	20.2	50.2	31.8	24	
19	25.7	24.1	40.3	25.9	23.5	37.1	23.0	27.1	19.7	19.5	23.0	24.1	12.9	X	X	7.2	7.7	11.4	13.8	6.6	11.0	17.1	X	10.9	6.6	40.3	19.6	21	
20	16.1	18.9	10.1	12.5	12.0	9.9	11.2	10.3	11.4	12.7	15.2	15.6	22.8	20.6	16.9	16.7	13.8	18.0	15.2	20.6	21.9	26.7	24.9	27.2	9.9	27.2	16.7	24	
21	26.7	23.2	21.1	20.2	17.4	17.4	25.0	21.5	31.1	46.3	47.8	47.5	44.3	39.5	43.4	40.8	37.1	47.1	46.9	37.5	37.0	32.7	32.5	32.7	17.4	47.8	34.0	24	
22	30.8	32.7	39.9	30.1	32.9	32.0	31.7	P	P	30.9	33.1	38.3	35.5	35.5	38.2	39.0	32.6	36.3	33.5	31.5	38.8	35.7	29.8	25.4	25.4	39.9	33.8	22	
23	27.8	27.6	28.5	31.1	38.4	30.9	32.0	27.3	12.5	19.1	19.1	19.7	23.0	18.4	14.9	24.3	26.7	29.3	42.3	33.2	27.5	18.1	23.4	24.0	12.5	42.3	25.8	24	
24	21.9	21.0	21.9	39.6	48.1	48.6	43.1	47.0	50.9	45.0	44.8	40.4	36.9	29.7	29.9	26.1	21.8	17.4	18.3	16.5	18.1	16.3	19.6	28.6	16.3	50.9	31.3	24	
25	X	X	14.6	7.0	22.1	X	X	44.4	20.0	18.1	20.0	18.3	20.5	18.3	19.2	18.5	20.2	19.5	15.2	14.5	13.0	13.4	15.7	20.0	7.0	44.4	18.6	20	
26	19.0	8.2	7.8	9.7	10.4	8.0	15.6	11.7	13.4	14.8	13.6	14.3	15.2	11.7	13.0	13.9	17.2	18.9	19.4	21.8	20.2	21.5	24.6	18.3	7.8	24.6	15.1	24	
27	17.5	14.6	13.7	7.8	9.5	7.4	13.3	19.0	16.9	17.2	16.5	21.4	20.5	23.1	19.4	18.3	14.7	X	18.7	21.8	26.1	20.0	13.9	9.1	7.4	26.1	16.5	23	
28	17.0	19.7	24.0	23.2	22.3	13.8	21.4	19.6	18.7	44.1	44.2	45.0	44.2	44.4	33.2	23.3	15.8	18.0	20.2	40.2	26.8	22.2	22.8	18.7	13.8	45.0	26.8	24	
29	18.7	22.2	20.7	14.1	15.9	17.6	15.6	14.3	15.0	15.2	12.8	16.7	16.3	20.7	15.4	34.3	37.5	24.1	19.3	20.9	30.8	44.8	8.2	8.2	8.2	44.8	20.0	24	
30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	8.4	8.6	8.4	7.9	9.4	7.7	10.6	10.5	9.1	11.1	7.7	11.1	9.2	10
31	10.8	14.1	12.1	16.5	17.4	19.4	19.1	22.0	26.1	30.1	24.6	24.4	30.5	29.2	28.1	27.2	24.6	21.2	26.1	31.2	31.7	31.9	31.0	30.3	10.8	31.9	24.2	24	
HOURLY MAX	46.1	43.3	42.2	46.4	48.1	48.7	43.1	47.8	50.9	60.6	55.1	63.0	83.1	86.4	84.2	82.9	63.8	57.0	47.8	45.2	48.7	44.8	41.5	42.2					
HOURLY AVG	22.5	22.5	22.8	21.1	23.8	24.4	23.7	27.2	25.8	28.7	28.8	30.5	33.1	32.8	31.3	27.5	26.9	26.7	26.0	24.9	25.8	24.6	23.3	22.8					

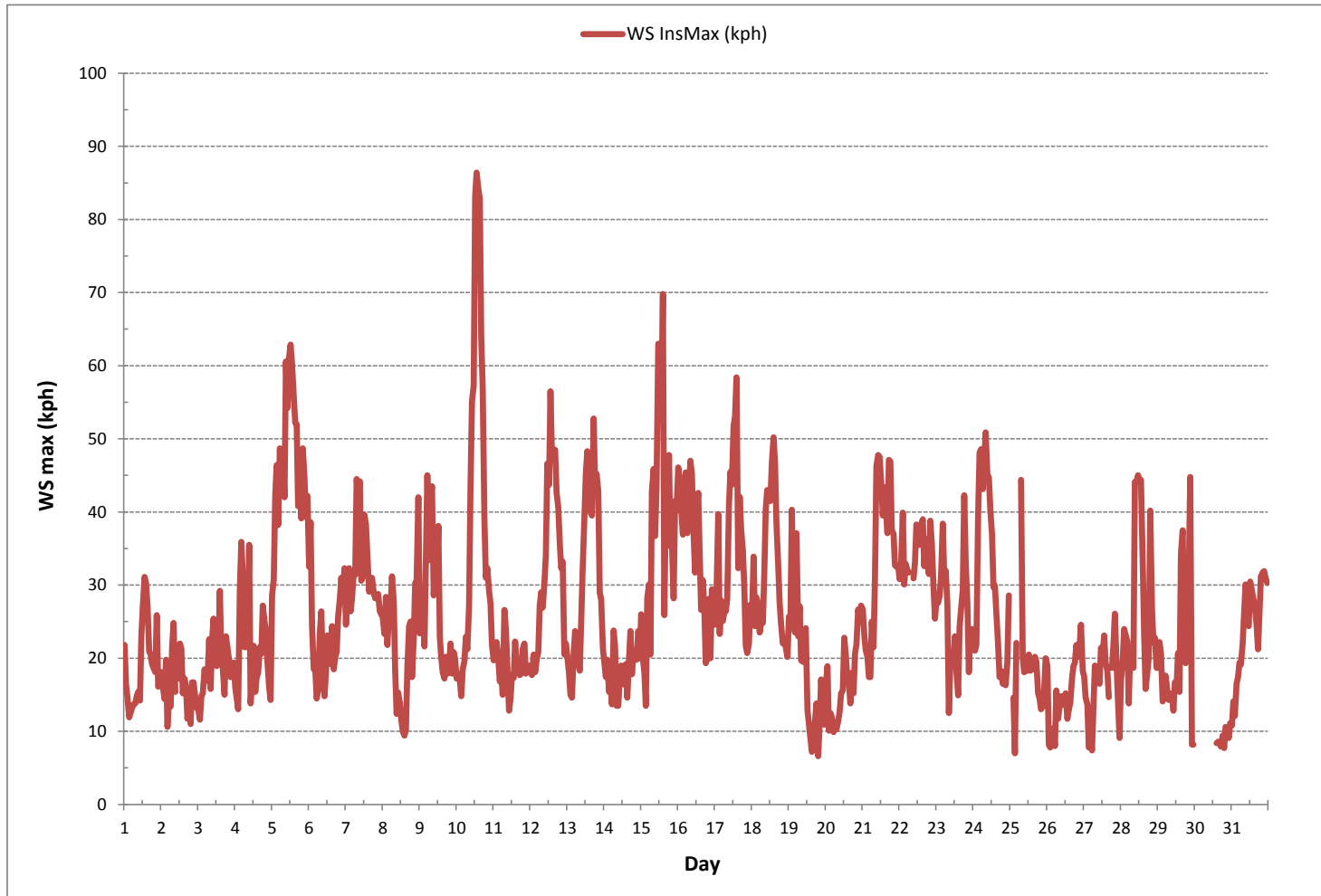
STATUS FLAG CODES

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

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	86.4	kph	@ HOUR	13	ON DAY	10	
OPERATIONAL TIME:						719	hrs

WIND SPEED Instantaneous Maximum (WS kph)



Wind: LICA ST. LINA  
 Monitor: WSP [kph]  
 Monthly: 17/12  
 Type: WindRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 0.27%

Direction	1.8-6.8	6.8-13.6	13.6-20.5	20.5-27.3	27.3-34.1	>34.1	Total
<b>N</b>	1.2	2.3	1.6	0.0	0.0	0.0	5.1
<b>NE</b>	0.9	0.0	0.0	0.0	0.0	0.0	0.9
<b>E</b>	0.4	0.4	0.0	0.0	0.0	0.0	0.8
<b>SE</b>	0.3	0.3	0.0	0.0	0.0	0.0	0.5
<b>S</b>	2.2	8.1	0.4	0.0	0.0	0.0	10.7
<b>SW</b>	5.4	15.7	3.6	0.0	0.0	0.0	24.7
<b>W</b>	2.0	17.4	12.6	0.5	0.1	0.0	32.7
<b>NW</b>	2.4	11.2	8.0	2.3	0.4	0.0	24.3
<b>Summary</b>	14.8	55.3	26.2	2.8	0.5	0.0	100.0

% Icon Classes (kph)

15  1.8-6.8

55  6.8-13.6

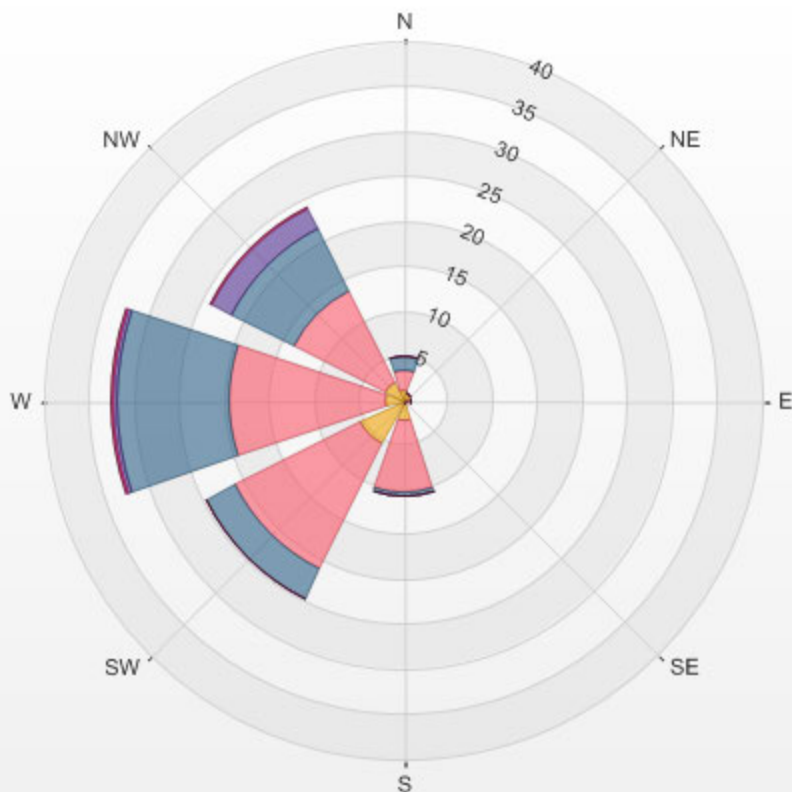
26  13.6-20.5

3  20.5-27.3

1  27.3-34.1

0  >34.1

LICA ST. LINA 2017/12/01 00:00 - 2017/12/31 23:00 Calm: 0.27% Calm Wind Avg Speed: 1.57(kph)





***WIND DIRECTION***



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
St. Lina Continuous Monitoring Station - December 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	SSW	SSW	SW	SW	SSW	SSW	SSW	SSW	SW	SSW	S	S	SSW	S	S	S	SSW	SSW	SSW	SW	WSW	WSW	W	W	SSW	24
2	W	W	WSW	WSW	WSW	WSW	SSW	WSW	WSW	WSW	WSW	WSW	W	W	WSW	WSW	WSW	WSW	SW	SW	SSW	SSW	SW	SSW	WSW	24
3	SW	SSW	SSW	SSW	SSW	SSW	SW	SW	WSW	WSW	W	W	WNW	WNW	WNW	WNW	WNW	SW	WSW	WSW	WSW	WSW	W	W	WSW	24
4	W	WNW	NW	NW	NNW	NW	NW	NW	NNW	NW	W	WSW	WSW	SW	SSW	S	S	S	S	S	SSW	SSW	SSW	SW	WSW	24
5	WSW	W	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	NW	NW	NW	NW	NW	NW	WNW	WNW	WNW	NW	NNW	NNW	NNW	NNW	WNW	24
6	NNW	NNW	NW	WNW	WNW	W	WSW	W	W	WSW	SW	SSW	SW	SW	SW	SW	SW	SW	WSW	WSW	W	W	W	W	W	24
7	WSW	W	W	W	W	WSW	W	W	W	W	W	W	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	W	24
8	W	W	W	W	WSW	W	W	W	WSW	WSW	WSW	WSW	SW	SW	SW	SW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	W	WSW	24
9	W	WSW	WSW	WSW	WSW	WSW	WSW	W	W	WSW	WSW	WSW	WSW	SW	SW	SW	SW	SW	WSW	WSW	WSW	W	W	W	WSW	24
10	WSW	WSW	WSW	SW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	WSW	W	WNW	WNW	WNW	NW	NW	WNW	WNW	WNW	WNW	WNW	WNW	W	24
11	W	W	W	W	W	W	WSW	WSW	W	W	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	24
12	SW	SW	SW	SW	SW	WSW	WSW	W	W	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	NW	NW	NW	WNW	WNW	WNW	W	24
13	W	W	W	WSW	W	W	W	WSW	W	W	W	W	WNW	NW	WNW	WNW	NW	NW	NNW	NNW	NNW	NNW	NW	W	WNW	24
14	W	W	W	W	W	SW	WSW	WSW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SW	SW	SW	SW	SW	SW	SW	SW	24
15	WSW	WSW	SW	WSW	W	W	W	W	W	W	WNW	WNW	W	W	W	WSW	WSW	WSW	WSW	SW	SW	SSW	SSW	S	S	24
16	W	W	W	W	W	W	W	W	W	WNW	WNW	W	W	W	WSW	WSW	WSW	WSW	SW	SW	SSW	SSW	S	S	W	24
17	S	S	SSW	SSW	SSW	SSW	SSW	SSW	SW	SW	WSW	WSW	W	W	W	W	W	WSW	W	W	WSW	WSW	WSW	W	WSW	24
18	W	W	W	WSW	W	W	W	W	W	W	W	WNW	WNW	WNW	NW	NW	WNW	WNW	WNW	WNW	W	WNW	WNW	NW	WNW	24
19	NNW	NNW	NNW	NNW	NNW	NNW	NW	NNW	NNW	NNW	N	N	NNW	SW	SSW	SW	SW	SSW	SW	SSW	SSW	S	SSW	S	NW	24
20	S	S	SW	SW	SW	SW	SW	SW	SSW	SW	SW	SSW	SW	SW	SW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	24
21	SSW	SSW	SW	SW	SW	WSW	WNW	NW	NW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NW	NW	NW	NW	NW	WNW	24
22	WNW	NW	NW	WNW	WNW	WNW	WNW	WNW	P	WNW	WNW	WNW	WNW	WNW	WNW	WNW	W	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	23
23	WNW	WNW	WNW	NW	NNW	NNW	NNW	NNW	NE	E	ENE	E	ENE	ENE	NE	N	N	N	N	N	NNW	NW	W	W	NNW	24
24	WSW	WSW	W	NNW	NNW	N	N	N	N	N	N	NNW	NNW	NNW	NW	NW	NW	NW	NW	NW	NW	NW	WNW	NNW	NNW	24
25	WSW	SW	WSW	SW	W	WNW	X	NNE	NNE	NNE	NNE	N	NNW	NNW	NW	NW	NW	NW	NW	NW	NW	WNW	WNW	W	W	23
26	W	WSW	SW	SW	SW	SW	SW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	S	SSE	SSE	S	S	S	S	S	S	S	24
27	S	SSW	SSW	SW	SW	SW	WSW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	W	WSW	WSW	W	WSW	SW	SW	24
28	SW	WSW	WSW	WSW	WSW	SW	W	W	WNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	WNW	NW	NW	NNW	N	NNW	NNW	NW	NW	24
29	NNW	NNW	NNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	WNW	NW	NW	WNW	WNW	W	W	WNW	WNW	N	N	SW	SW	SSW	WNW	24
30	SSW	NE	X	E	ENE	SSE	SSE	SSE	S	SSW	NNE	NE	SW	SW	SW	SW	SW	SW	SW	SW	SSW	SSW	SSW	SSW	S	23
31	SSW	S	SSW	S	S	S	S	S	S	S	S	S	S	S	S	SSE	SSE	SSE	SSE	S	S	SSW	SSW	SSW	S	24

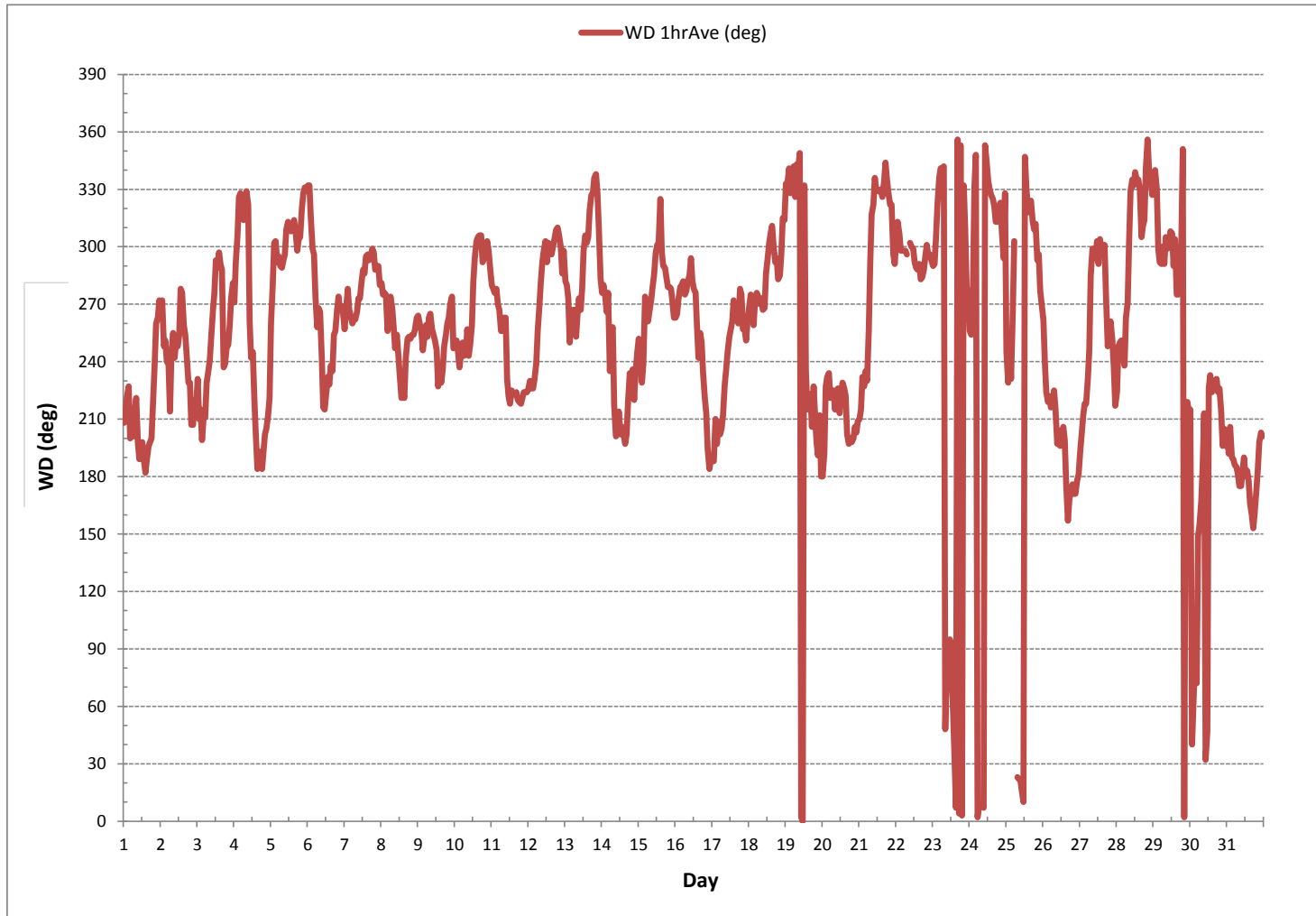
STATUS FLAG CODES

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

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

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	741	hrs
STANDARD DEVIATION:	62		AMD OPERATION UPTIME:	99.6	%
			MONTHLY AVERAGE:	270 (W)	

WIND DIRECTION Hourly Averages (WD)



***STANDARD DEVIATION WIND DIRECTION***



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
 St. Lina Continuous Monitoring Station - December 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	8	6	3	5	5	5	5	4	9	7	8	11	9	11	11	10	10	10	10	6	6	7	6	7	24
2	6	7	4	5	5	4	5	5	5	4	6	9	7	14	14	7	5	4	5	8	5	6	5	4	24
3	4	5	8	6	8	10	7	8	5	7	10	13	17	17	15	16	14	12	7	5	5	7	9	13	24
4	10	12	12	16	15	14	14	16	19	22	18	12	13	10	13	14	13	11	11	12	10	8	6	5	24
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12	4	5	5	4	4	5	6	7	11	13	14	15	16	15	15	15	15	14	14	14	12	13	12	12	24
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22	14	14	15	16	15	15	15	16	P	16	17	16	15	16	16	15	15	15	15	15	14	14	14	14	23
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25	36	21	13	6	10	30	X	14	6	9	13	15	19	17	13	12	11	11	13	11	10	11	10	9	23
26	14	4	6	4	4	3	3	3	5	8	9	11	13	12	13	15	8	7	9	10	8	10	10	12	24
27	11	10	9	6	6	4	5	14	12	12	16	16	17	19	18	16	12	12	7	5	5	6	7	24	
28	8	7	11	7	5	5	7	10	12	13	19	15	16	15	15	13	12	12	12	13	16	14	11	10	24
29	9	13	9	11	13	14	14	15	12	12	16	15	15	19	17	20	17	18	14	15	18	35	6	5	24
30	44	47	X	22	33	12	11	10	18	42	6	23	45	11	6	3	3	3	2	4	6	8	4	5	23
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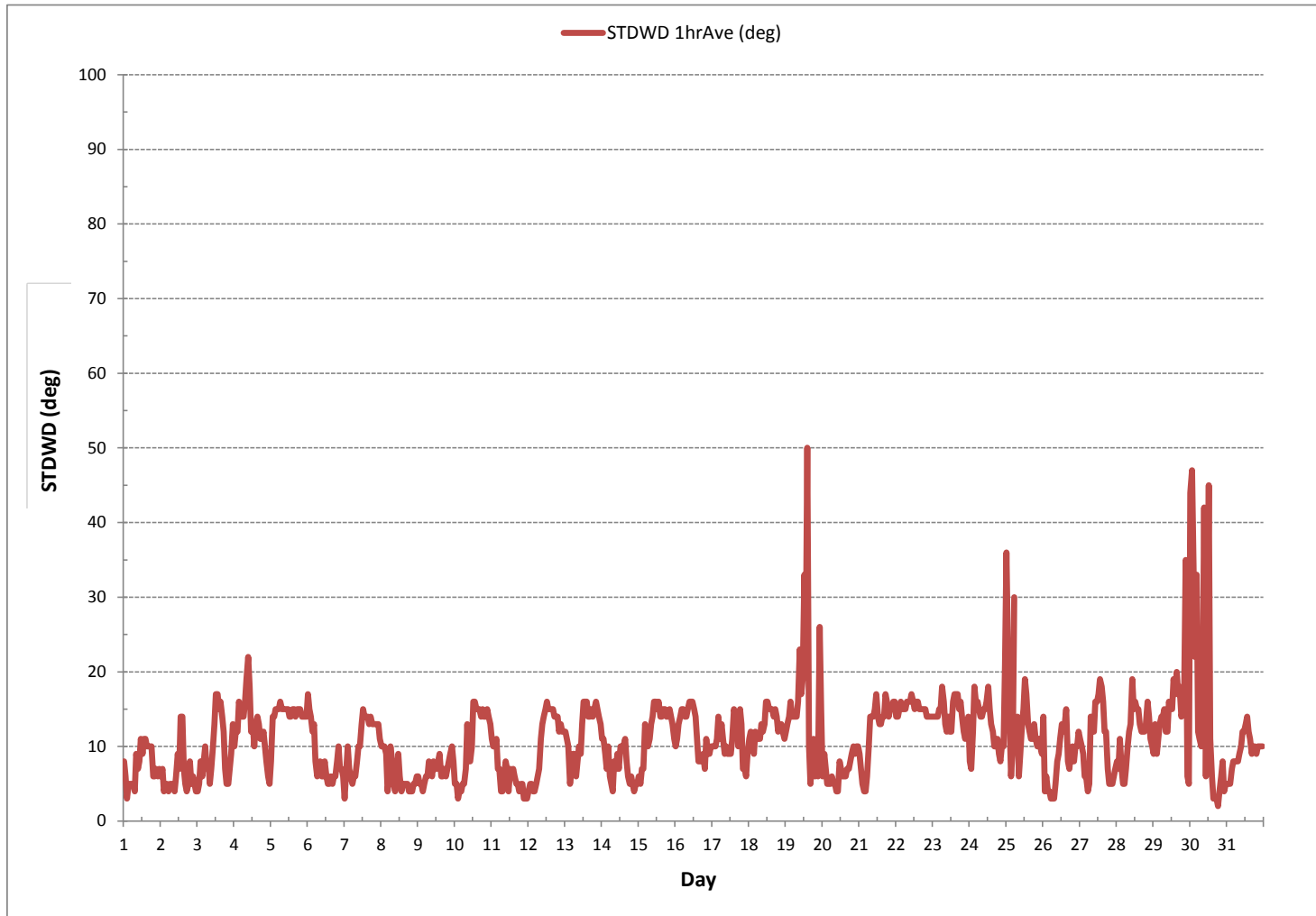
STATUS FLAG CODES

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: 741 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



***RELATIVE HUMIDITY***



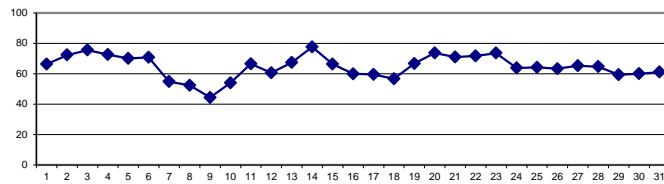
RELATIVE HUMIDITY Hourly Averages (RH %)

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	64	66	68	72	75	77	77	78	77	71	59	59	56	53	55	57	59	62	66	70	72	70	66	64	53	78	66	24
2	64	66	71	74	76	77	81	82	78	71	62	58	58	60	62	66	71	75	79	79	81	81	81	82	58	82	72	24
3	84	82	82	81	82	81	81	81	81	81	80	77	72	68	62	61	64	67	76	78	76	75	72	71	61	84	76	24
4	72	71	72	75	73	73	73	72	73	70	58	55	60	67	70	73	76	77	77	78	79	81	83	84	55	84	73	24
5	86	87	88	88	88	86	80	72	66	61	56	56	56	57	65	66	66	67	64	63	63	65	67	69	56	88	70	24
6	70	71	71	72	72	75	79	76	71	69	68	64	62	63	64	67	70	72	74	74	74	74	73	73	62	79	71	24
7	74	72	66	66	66	67	66	66	63	56	51	42	39	38	40	42	44	45	47	49	52	53	54	57	38	74	55	24
8	57	58	59	59	63	64	61	59	61	58	49	43	40	40	41	46	53	50	50	51	51	50	49	44	40	64	52	24
9	45	47	50	50	51	47	49	45	45	43	41	37	36	38	40	44	47	45	44	45	43	43	43	46	36	51	44	24
10	51	51	50	52	50	49	51	54	51	53	50	44	41	48	54	55	58	61	62	62	61	62	63	64	41	64	54	24
11	65	66	66	66	67	68	69	71	70	64	62	62	62	61	63	66	70	71	72	71	68	67	67	61	72	67	24	
12	66	65	65	65	66	67	65	63	62	63	61	53	51	50	54	54	53	55	56	59	62	64	67	67	50	67	61	24
13	69	70	71	73	74	74	75	77	77	73	67	60	55	54	57	60	62	63	63	65	66	68	71	75	54	77	67	24
14	76	78	78	80	79	83	85	84	84	80	76	73	70	71	74	76	78	79	79	78	76	77	75	73	70	85	78	24
15	72	72	73	72	71	77	81	77	73	71	60	55	59	58	74	73	64	62	60	59	58	56	56	57	55	81	66	24
16	59	59	59	58	58	59	59	59	59	58	56	54	49	49	52	60	65	66	66	68	66	68	65	67	49	68	60	24
17	67	66	61	62	63	60	60	62	63	59	54	52	55	52	54	56	60	63	56	57	61	62	63	62	52	67	60	24
18	60	60	61	63	61	61	62	61	61	60	57	54	57	59	59	54	43	47	48	50	51	54	56	60	43	63	57	24
19	65	66	64	64	66	67	68	70	71	64	60	58	53	56	55	64	69	72	74	74	75	75	75	75	53	75	67	24
20	75	74	74	74	74	73	73	73	71	68	66	65	67	68	72	76	79	80	80	79	79	78	77	65	80	74	24	
21	77	77	77	77	75	74	72	69	66	66	69	63	62	68	72	75	74	68	68	70	75	69	68	71	62	77	71	24
22	71	69	69	73	75	76	76	77	P	73	71	70	68	65	61	65	71	68	70	74	74	76	78	79	61	79	72	23
23	79	79	80	79	77	73	70	75	78	77	74	74	71	68	68	71	73	70	69	68	71	73	74	74	68	80	74	24
24	74	74	74	74	71	66	65	65	62	58	54	52	48	48	52	57	62	65	67	68	69	69	70	69	48	74	64	24
25	69	68	68	68	67	67	67	67	67	65	62	58	56	53	56	60	64	65	66	66	66	66	65	64	53	69	64	24
26	64	64	63	63	63	63	63	63	63	61	60	59	59	57	59	62	66	67	67	67	67	67	66	66	57	67	63	24
27	66	66	67	67	67	67	66	66	66	65	64	62	60	55	59	64	67	68	68	67	67	67	67	67	55	68	65	24
28	68	69	69	70	70	70	69	70	69	62	60	56	58	56	59	63	64	63	63	63	63	63	63	64	56	70	65	24
29	64	63	62	62	63	62	62	61	61	57	52	50	49	49	52	56	61	63	63	63	63	62	62	49	64	59	24	
30	63	64	64	64	64	63	64	63	63	62	57	55	48	44	50	55	60	62	63	64	63	62	63	62	44	64	60	24
31	63	63	63	63	63	63	63	63	62	59	57	55	54	54	55	57	61	62	63	64	65	64	64	64	54	65	61	24
HOURLY MAX	86	87	88	88	88	86	85	84	84	81	80	77	72	71	74	76	78	79	80	80	81	81	83	84				
HOURLY AVG	68	68	68	69	69	69	69	68	67	65	61	57	56	56	58	61	63	65	65	66	66	67	67	67				

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	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 December 2017

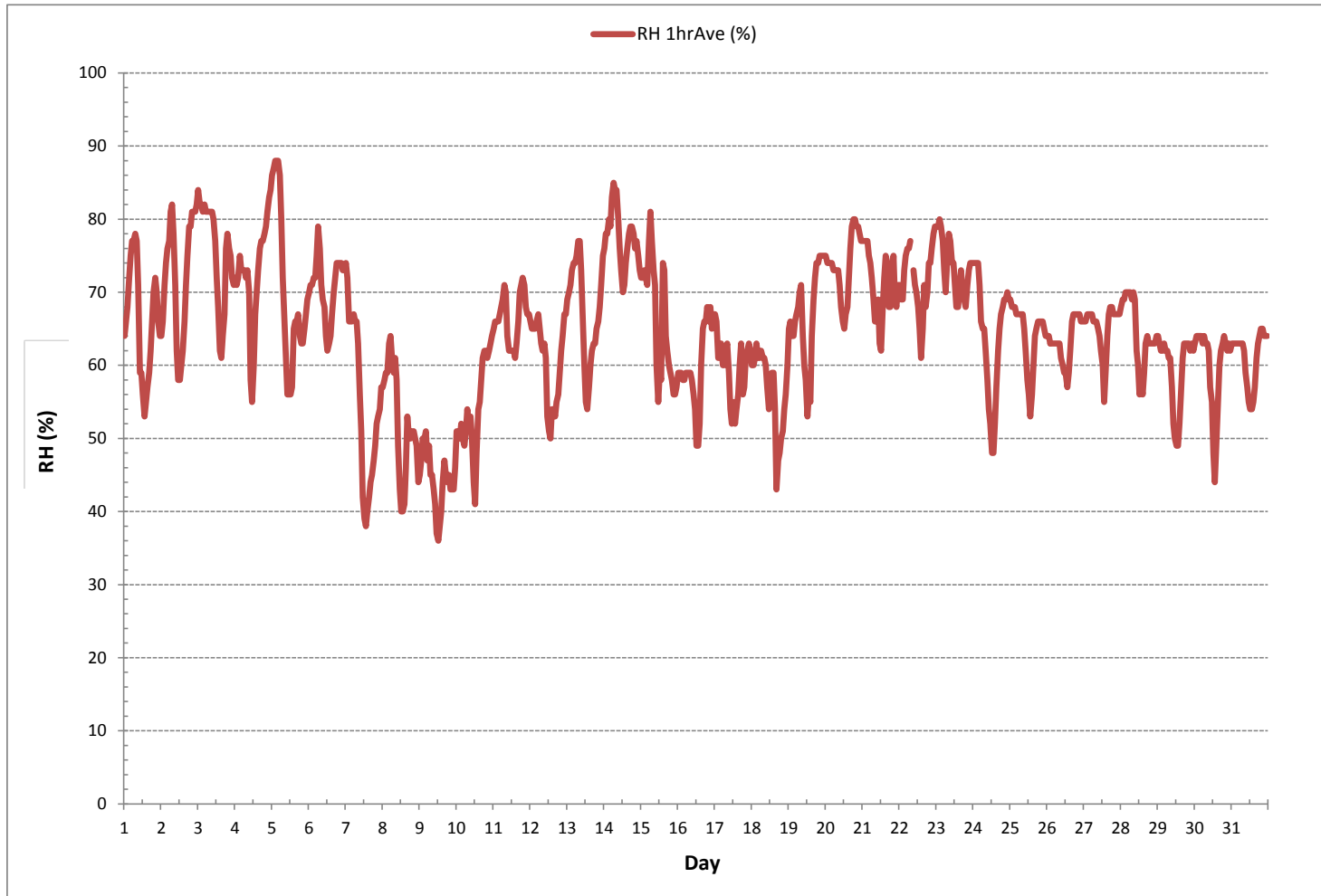


MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	36	%	@ HOUR	12	ON DAY	9
MAXIMUM 1-HR AVERAGE:	88	%	@ HOUR	2	ON DAY	5
MAXIMUM 24-HR AVERAGE:	78	%			ON DAY	14
OPERATIONAL TIME:						743 hrs
AMD OPERATION UPTIME:						99.9 %
STANDARD DEVIATION:	10					MONTHLY AVERAGE: 65 %



**RELATIVE HUMIDITY Hourly Averages (RH %)**



***BAROMETRIC PRESSURE***



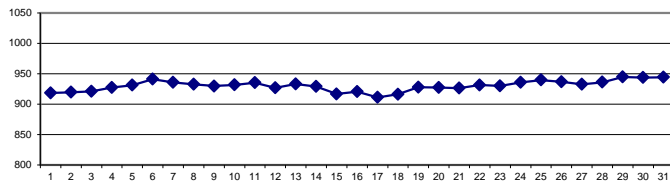
BAROMETRIC PRESSURE Hourly Averages (BP mbar)

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	920	920	919	919	919	919	919	918	918	918	919	919	919	919	918	918	918	917	917	917	917	917	918	918	917	920	918	918	24	
2	918	918	918	918	918	918	918	918	919	919	920	921	921	921	921	921	921	921	921	921	921	920	920	920	918	921	920	24	24	
3	920	920	919	919	919	919	919	919	919	919	920	920	921	921	922	922	923	923	924	924	924	924	924	925	925	919	925	921	24	
4	926	926	926	927	928	928	929	929	929	930	930	930	930	929	929	928	928	927	926	925	924	924	923	923	923	923	930	927	24	
5	922	923	924	925	926	926	926	927	927	928	929	930	931	932	934	935	935	936	937	937	938	939	940	941	922	941	931	24	24	
6	942	943	943	944	943	943	943	943	943	943	943	943	942	941	941	940	939	939	939	938	938	938	938	937	937	937	944	941	24	
7	936	936	936	936	936	935	935	934	934	935	935	936	936	936	936	936	936	936	936	936	936	936	936	936	934	936	936	24	24	
8	936	935	935	935	934	934	933	933	933	932	933	933	933	933	933	932	931	931	931	931	930	930	929	929	929	929	936	932	24	
9	929	929	929	929	929	929	928	928	929	929	930	930	931	931	930	930	930	930	930	930	930	931	931	931	931	928	931	930	24	
10	931	931	931	930	930	930	930	931	930	930	929	929	929	929	930	931	932	933	934	935	935	936	936	937	929	929	937	932	24	
11	937	937	938	938	938	938	938	938	937	938	938	938	937	937	936	935	935	933	932	931	931	930	930	929	929	929	938	935	24	
12	928	927	926	926	925	924	924	923	924	925	925	926	926	926	926	926	928	929	930	930	931	931	931	931	923	931	927	24	24	
13	931	931	932	932	931	931	931	931	931	931	932	932	932	933	933	934	935	935	936	936	937	938	938	937	931	938	933	24	24	
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15	918	918	917	917	917	916	916	915	915	915	915	915	916	916	916	916	917	917	917	918	918	918	918	918	915	918	917	24	24	
16	918	918	919	919	920	920	921	921	922	922	923	923	923	923	922	922	922	921	920	920	919	918	917	917	917	923	921	24	24	
17	916	914	914	913	912	911	911	910	910	910	910	910	910	910	911	911	911	911	911	912	911	911	911	911	911	910	916	911	24	
18	910	911	911	911	911	912	912	913	913	914	915	915	916	917	918	919	920	920	921	921	922	922	923	924	910	924	916	24	24	
19	925	925	926	927	927	927	928	928	929	930	930	930	929	929	929	929	929	928	928	928	928	928	927	927	925	924	928	927	24	
20	927	927	927	927	928	928	927	927	928	928	928	928	928	928	928	928	928	928	928	927	927	926	926	925	924	924	928	927	24	
21	924	923	923	922	922	922	922	922	923	924	925	926	926	927	927	928	929	930	931	931	931	931	932	932	932	922	932	926	24	24
22	932	932	932	932	932	932	932	932	P	932	933	932	932	932	932	931	931	931	931	930	930	930	930	930	930	930	933	931	23	
23	930	929	929	930	930	930	930	929	929	929	928	928	928	928	928	929	929	930	931	931	931	932	932	931	928	932	930	24	24	
24	931	931	931	931	932	933	933	934	935	937	938	938	938	938	938	938	938	938	938	938	938	938	938	938	931	938	936	24	24	
25	938	938	938	938	938	938	938	938	939	939	940	940	940	941	941	941	941	941	941	941	941	941	941	941	938	941	940	24	24	
26	940	940	940	940	939	939	938	938	938	938	938	937	936	936	936	935	935	935	934	934	934	934	933	933	933	940	937	24	24	
27	933	933	933	932	932	932	932	932	932	932	933	933	932	932	932	933	933	933	933	933	933	933	933	933	932	933	933	24	24	
28	933	933	933	933	933	933	933	933	934	935	936	936	936	937	937	937	938	938	939	939	939	940	941	933	941	936	24	24		
29	941	941	942	943	943	944	945	945	946	946	947	947	946	946	946	946	946	946	946	946	945	945	945	944	941	947	945	24	24	
30	944	943	943	942	941	941	942	942	942	942	942	943	943	944	944	944	945	945	945	946	946	946	946	941	946	944	24	24		
31	946	946	946	946	946	946	946	946	945	945	946	945	945	944	944	944	944	944	943	943	942	942	941	941	946	944	24	24		
HOURLY MAX	946	946	946	946	946	946	946	946	946	946	947	947	946	946	946	946	946	947	946	946	946	946	946	946	946	941	946	944	24	
HOURLY AVG	930	930	930	930	929	929	929	929	930	930	930	930	930	931	931	931	931	931	931	931	931	931	931	930	931	931	931	931	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

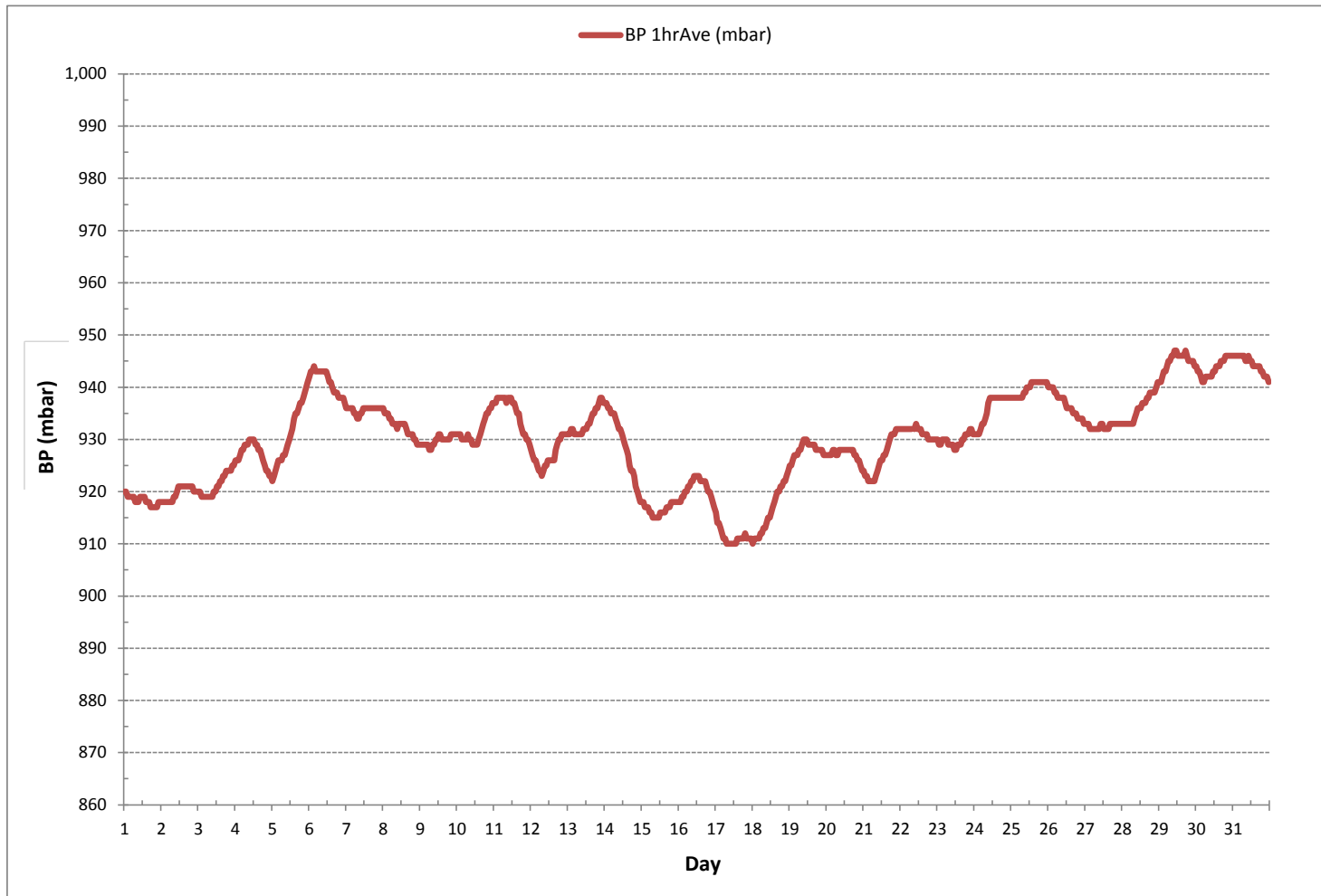
24 HR AVERAGES December 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	910	mbar	@ HOUR	7	ON DAY	17
MAXIMUM 1-HR AVERAGE:	947	mbar	@ HOUR	10	ON DAY	29
MAXIMUM 24-HR AVERAGE:	945	mbar			ON DAY	29
OPERATIONAL TIME:						743 hrs
AMD OPERATION UPTIME:						99.9 %
STANDARD DEVIATION:	9				MONTHLY AVERAGE:	930 mbar

BAROMETRIC PRESSURE Hourly Averages (BP mbar)



***AMBIENT TEMPERATURE***



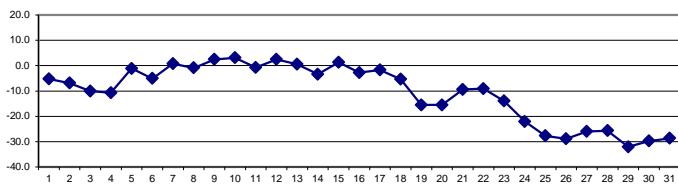
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

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	-4.6	-5.2	-6.0	-7.0	-8.0	-8.8	-8.8	-8.9	-8.6	-7.5	-3.3	-3.4	-2.7	-1.5	-1.9	-2.7	-3.5	-3.9	-4.7	-5.8	-6.2	-5.6	-4.3	-3.7	-8.9	-1.5	-5.3	24	
2	-4.0	-4.2	-5.8	-6.6	-7.7	-8.2	-9.9	-9.6	-8.8	-7.2	-4.9	-3.2	-3.0	-3.4	-3.6	-4.8	-6.1	-7.1	-8.6	-9.1	-9.8	-9.7	-9.9	-10.5	-10.5	-3.0	-6.9	24	
3	-10.7	-11.6	-11.9	-12.5	-12.3	-11.9	-11.6	-11.4	-11.3	-10.3	-10.6	-8.8	-5.9	-4.8	-5.5	-6.5	-8.1	-9.4	-11.6	-11.9	-11.7	-11.5	-10.5	-10.2	-12.5	-4.8	-10.1	24	
4	-10.5	-10.3	-10.4	-10.4	-10.7	-11.5	-11.8	-12.2	-12.6	-11.9	-8.6	-8.0	-9.6	-11.1	-11.1	-11.4	-12.0	-12.4	-11.9	-11.1	-10.5	-10.0	-9.0	-7.9	-12.6	-7.9	-10.7	24	
5	-5.7	-3.6	-2.6	-1.9	-1.5	-1.1	-1.2	-1.1	-0.7	0.3	1.2	1.3	1.5	1.6	0.0	-0.1	-0.2	-0.7	-1.3	-2.0	-2.3	-2.3	-2.5	-2.5	-5.7	1.6	-1.1	24	
6	-2.6	-2.8	-3.1	-4.8	-6.0	-6.9	-8.2	-8.2	-7.4	-7.2	-7.1	-5.6	-4.3	-4.1	-4.1	-4.7	-5.2	-5.2	-5.2	-4.8	-4.2	-3.8	-3.4	-3.5	-8.2	-2.6	-5.1	24	
7	-4.1	-3.8	-2.2	-2.5	-3.1	-3.6	-3.2	-3.3	-2.7	-0.4	1.3	4.7	6.2	6.9	6.0	5.2	4.3	3.7	3.1	2.4	1.4	1.1	0.8	0.0	-4.1	6.9	0.8	24	
8	-0.3	-0.7	-1.0	-1.4	-3.2	-3.9	-2.9	-2.2	-3.7	-3.3	-0.7	1.4	2.5	2.8	2.6	1.1	-1.5	-1.1	-1.3	-1.7	-1.8	-1.4	-1.0	0.7	-3.9	2.8	-0.9	24	
9	1.1	0.4	-0.7	-0.5	-0.5	0.6	0.1	1.1	1.3	1.8	2.9	4.7	5.8	5.7	5.3	4.1	2.6	2.8	3.2	3.0	3.6	3.9	4.3	3.0	-0.7	5.8	2.5	24	
10	1.6	1.3	1.4	0.3	0.3	0.3	0.9	0.9	3.4	5.0	4.8	6.6	8.4	7.2	5.9	5.5	4.4	3.9	2.9	2.3	2.3	1.9	1.4	0.8	0.3	8.4	3.1	24	
11	0.1	-0.4	-0.8	-1.1	-1.8	-2.2	-3.0	-3.2	-2.7	-1.0	-0.3	-0.1	0.8	1.9	2.1	1.3	0.6	-0.5	-1.2	-1.6	-1.6	-1.3	-1.2	-1.2	-3.2	2.1	-0.8	24	
12	-1.0	-0.6	-0.5	-0.1	-0.2	-0.2	0.7	1.7	3.1	3.8	5.1	6.2	6.4	6.3	4.9	4.6	4.5	3.9	3.3	2.6	1.8	1.1	0.2	0.2	-1.0	6.4	2.4	24	
13	-0.3	-0.5	-0.4	-1.0	-0.8	-0.6	-0.9	-1.1	-1.3	-0.3	1.3	3.2	4.3	4.4	3.5	2.3	1.4	1.1	0.9	0.8	0.5	0.1	-1.0	-2.4	-2.4	4.4	0.6	24	
14	-3.2	-3.7	-4.0	-4.5	-4.4	-5.9	-6.5	-6.2	-7.2	-6.3	-4.7	-3.5	-2.2	-1.8	-2.3	-2.6	-2.8	-2.6	-1.7	-1.4	-1.3	-1.5	-1.0	-0.5	-7.2	-0.5	-3.4	24	
15	0.5	0.7	0.7	0.9	2.7	2.7	2.0	2.4	2.8	2.8	4.5	4.9	3.6	3.5	1.2	0.5	1.0	0.7	0.2	-0.5	-1.0	-1.2	-1.6	-2.0	-2.0	4.9	1.3	24	
16	-2.3	-2.4	-2.5	-2.3	-2.1	-1.9	-1.8	-1.9	-1.8	-1.6	-1.1	-0.5	0.7	0.8	0.0	-2.0	-3.5	-4.1	-4.7	-5.6	-5.6	-6.5	-6.5	-7.2	-7.2	0.8	-2.8	24	
17	-6.9	-6.6	-5.4	-5.2	-5.1	-4.5	-4.1	-3.7	-3.8	-2.1	0.0	1.8	1.8	3.7	3.7	3.1	1.5	0.5	0.4	0.1	-1.8	-2.6	-3.4	-3.5	-6.9	3.7	-1.8	24	
18	-3.5	-3.4	-3.6	-4.4	-4.3	-4.5	-5.1	-5.3	-5.4	-5.0	-3.7	-2.3	-2.8	-3.3	-3.4	-4.3	-5.6	-6.4	-7.0	-7.8	-8.4	-8.9	-9.5	-10.2	-10.2	-2.3	-5.3	24	
19	-11.1	-12.2	-13.0	-13.9	-14.6	-15.5	-16.3	-17.1	-17.4	-15.2	-14.3	-13.7	-12.4	-13.3	-13.1	-15.6	-17.0	-17.6	-17.8	-17.8	-18.1	-18.9	-18.3	-18.2	-18.9	-11.1	-15.5	24	
20	-18.4	-19.0	-19.0	-19.1	-19.4	-19.8	-20.1	-19.8	-19.8	-18.1	-16.1	-13.9	-12.2	-11.1	-10.2	-10.7	-12.8	-13.7	-13.6	-13.3	-13.0	-12.7	-13.3	-13.1	-20.1	-10.2	-15.5	24	
21	-12.7	-12.4	-11.7	-10.8	-9.8	-9.2	-8.2	-7.5	-7.3	-7.3	-8.5	-8.1	-7.6	-8.7	-9.7	-9.8	-9.7	-9.5	-9.4	-9.4	-9.5	-9.5	-9.5	-9.9	-12.7	-7.3	-9.4	24	
22	-9.6	-9.1	-8.9	-9.0	-9.1	-9.1	-9.2	P	-8.8	-8.4	-7.9	-7.4	-6.4	-6.6	-7.6	-8.8	-9.5	-10.1	-10.5	-10.6	-11.2	-11.3	-11.3	-11.3	-6.4	-9.1	-9.1	23	
23	-11.1	-10.8	-10.8	-10.5	-10.6	-11.3	-11.8	-12.4	-13.4	-13.8	-13.7	-13.3	-12.8	-12.7	-13.1	-13.8	-14.0	-14.3	-15.0	-17.1	-18.7	-19.7	-20.1	-19.5	-20.1	-10.5	-13.9	24	
24	-19.1	-18.7	-17.7	-16.2	-16.3	-17.2	-18.1	-19.4	-22.4	-23.0	-22.7	-22.3	-21.3	-20.9	-21.9	-23.2	-24.9	-25.6	-25.8	-26.1	-26.4	-26.6	-27.1	-26.3	-27.1	-16.2	-22.1	24	
25	-27.7	-28.2	-28.7	-27.2	-26.8	-26.6	-26.7	-27.6	-28.1	-28.3	-26.0	-23.7	-23.2	-22.9	-24.3	-26.3	-28.5	-29.4	-30.1	-30.5	-30.6	-30.9	-31.3	-31.7	-31.7	-22.9	-27.7	24	
26	-31.6	-32.1	-32.9	-33.3	-32.8	-32.9	-32.7	-33.0	-33.0	-31.2	-28.6	-25.8	-24.3	-22.7	-23.1	-24.8	-26.2	-26.3	-27.1	-27.6	-27.9	-27.5	-27.6	-27.6	-33.3	-22.7	-28.8	24	
27	-26.7	-26.5	-26.4	-26.5	-26.9	-27.2	-27.4	-27.5	-28.0	-28.2	-27.0	-25.3	-23.5	-21.8	-22.9	-24.4	-25.5	-26.3	-26.9	-26.3	-26.2	-25.3	-25.4	-25.3	-28.2	-21.8	-26.0	24	
28	-24.4	-23.6	-23.1	-22.4	-23.0	-24.1	-23.9	-23.2	-23.1	-23.2	-21.7	-23.2	-23.1	-24.2	-24.6	-25.8	-27.8	-28.6	-29.2	-29.8	-30.3	-30.8	-31.1	-31.7	-31.7	-21.7	-25.7	24	
29	-32.1	-32.6	-33.2	-33.2	-34.0	-34.6	-34.9	-35.4	-35.5	-34.0	-31.1	-29.5	-28.2	-27.2	-27.9	-29.0	-30.9	-31.2	-31.6	-31.6	-31.6	-32.8	-33.6	-33.3	-35.5	-27.2	-32.0	24	
30	-33.1	-32.1	-32.2	-32.3	-32.5	-32.4	-32.9	-32.6	-32.8	-29.1	-27.2	-23.9	-22.1	-21.8	-24.5	-26.9	-29.1	-29.7	-30.3	-30.6	-30.6	-31.0	-31.4	-31.4	-33.1	-21.8	-29.7	24	
31	-31.8	-31.6	-32.2	-32.0	-32.0	-31.5	-31.3	-31.4	-31.4	-29.8	-28.1	-25.7	-24.6	-23.8	-24.2	-25.0	-26.4	-27.4	-27.9	-28.3	-28.2	-27.7	-28.1	-28.3	-32.2	-23.8	-28.7	24	
HOURLY MAX	1.6	1.3	1.4	0.9	2.7	2.7	2.0	2.4	3.4	5.0	5.1	6.6	8.4	7.2	6.0	5.5	4.5	3.9	3.3	3.0	3.6	3.9	4.3	3.0					
HOURLY AVG	-11.2	-11.2	-11.2	-11.3	-11.5	-11.7	-11.9	-11.9	-12.0	-11.0	-9.6	-8.3	-7.5	-7.2	-7.8	-8.8	-10.0	-10.5	-11.0	-11.3	-11.6	-11.7	-11.8	-11.9					

STATUS FLAG CODES

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

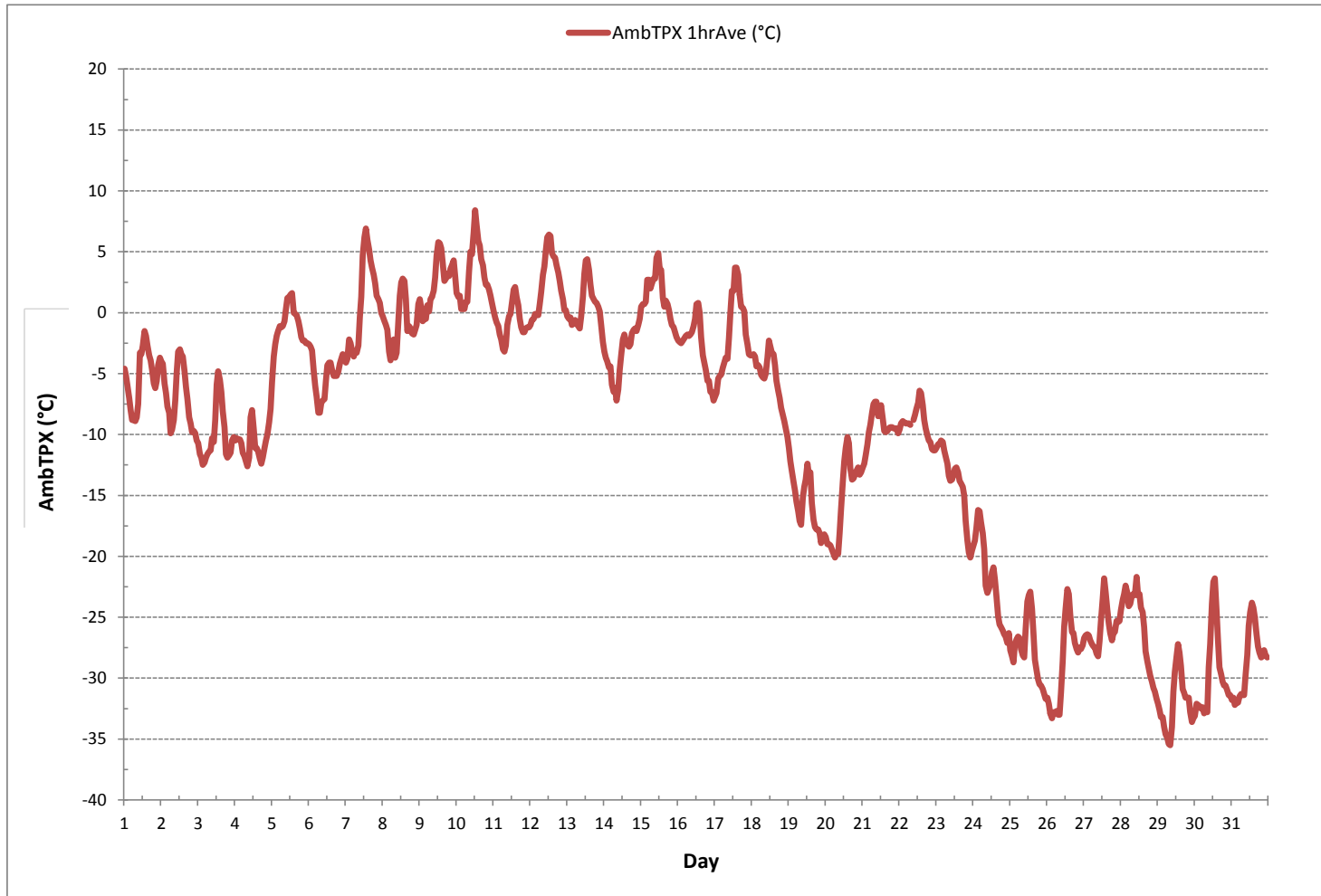
24 HR AVERAGES December 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-35.5 °C	@ HOUR	8	ON DAY	29
MAXIMUM 1-HR AVERAGE:	8.4 °C	@ HOUR	12	ON DAY	10
MAXIMUM 24-HR AVERAGE:	3.1 °C			ON DAY	10
OPERATIONAL TIME: 743 hrs					
AMD OPERATION UPTIME: 99.9 %					
STANDARD DEVIATION:	11.5	MONTHLY AVERAGE:			-10.6 °C

**AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)**



## ***PRECIPITATION***



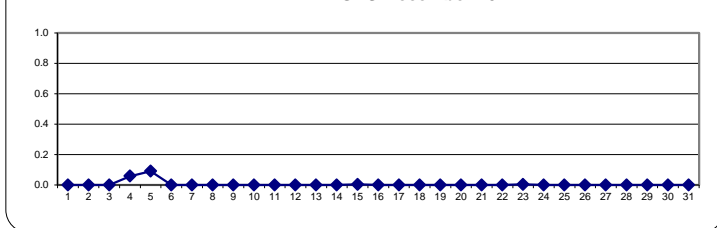
**PRECIPITATION Hourly Averages (mm)**

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.									
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.										
DAY																																					
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.7	0.4	0.0	0.7	0.1	0.0	0.6	0.1	0.0	0.0	0.0	0.0	24	
5	0.6	0.3	0.6	0.2	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
15	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
28	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
HOURLY MAX	0.6	0.3	0.6	0.2	0.1	0.4	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	0.3	0.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
HOURLY AVG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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

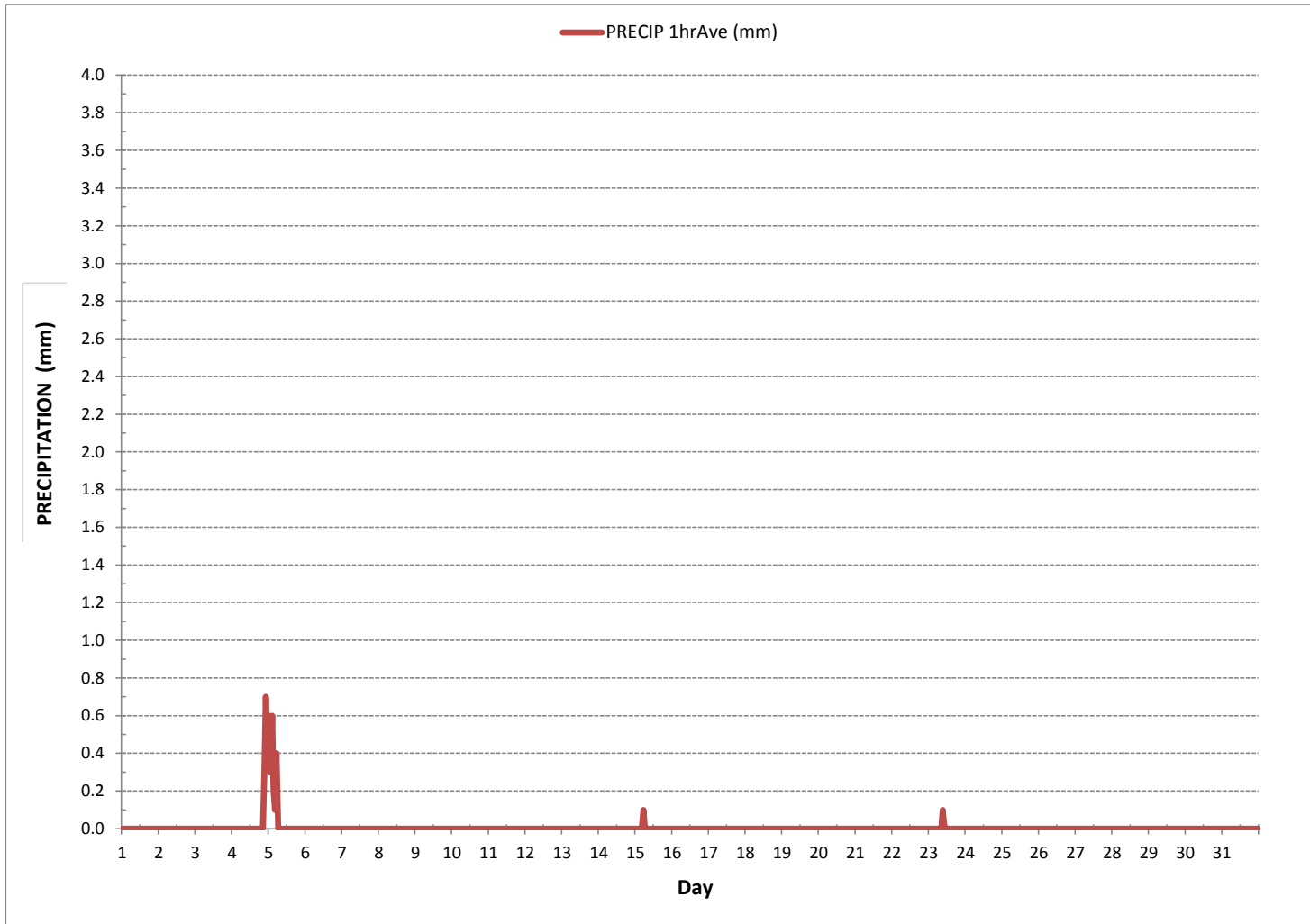
**24 HR AVERAGES December 2017**



**MONTHLY SUMMARY**

MINIMUM 1-HR AVERAGE:	0.0	mm	@ HOUR	0	ON DAY	1
MAXIMUM 1-HR AVERAGE:	0.7	mm	@ HOUR	22	ON DAY	4
MAXIMUM 24-HR AVERAGE:	0.1	mm			ON DAY	5
MONTHLY TOTAL	3.8	mm				
OPERATIONAL TIME:						744 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	0.0					MONTHLY AVERAGE: 0.0 mm

PRECIPITATION Hourly Averages (mm)



***APPENDIX II  
EQUIPMENT CALIBRATION RESULTS***

***SULPHUR DIOXIDE***



## API 100E Sulphur Dioxide Analyzer Calibration

Date:	December 7, 2017	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	935	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:	Sulphur Dioxide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	11:25	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	16:11	<input checked="" type="checkbox"/> Cal Gas Expiry Date:	July 18, 2019		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		

Analyzer:	Range ppb:
ID# or Serial Number:	468
Last Calibration Date:	November 7, 2017
Previous C.F.:	1.000
	As Found C.F.:
	1.001
	New C.F.:
	1.000

Calibration Standards:	Standard Calibration Points for Ranges
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:	API id# 627 expires January 27, 2018
Cal Gas Cylinder I.D. # :	LL 104222
Cal Gas Conc. (ppm):	50.6

Point	ppb
High	780
Mid	380
Low	190

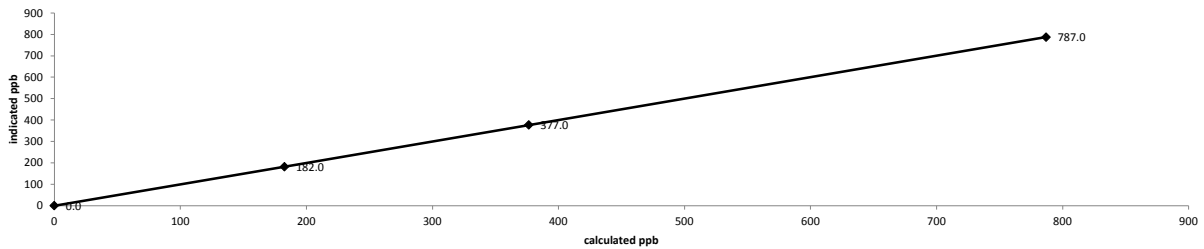
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Calibrator Flow Rates (cc/min)				Calculated	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	Concentration (ppb):		
as found zero	4939	0.00	4939	0.0	2.0	n/a
as found high	4862	76.81	4939	786.9	788.0	1.001
adjusted zero	4939	0.00	4939	0.0	0.0	n/a
adjusted high	4862	76.81	4939	786.9	787.0	1.000
mid	4907	36.79	4944	376.5	377.0	0.999
low	4939	17.89	4957	182.6	182.0	1.003
calibrator zero	4939	0.00	4939	0.0	0.0	n/a
Average C.F. =						1.001

**Linear Regression/Calibration Results:**

	<b>LIMITS</b>
Correlation Coefficient =	1.000 > or = 0.995
Slope =	1.000 0.95-1.05
b (Intercept as % of full scale) =	0.02% ± 3% F.S.
% change in C.F. from last cal =	-0.12% ± 10%

**API 100E Sulphur Dioxide Analyzer Calibration**

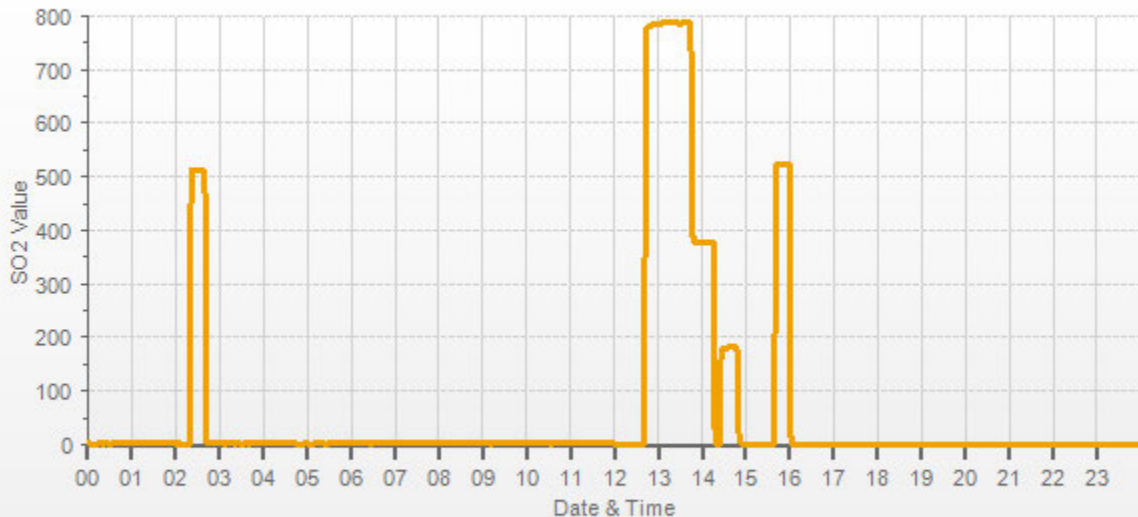


	As found:		As left:
Slope:	0.987	Slope:	0.990
Offset:	138.1	Offset:	142.0
Hvps:	651	Hvps:	651
Rcell Temp:	50.0	Rcell Temp:	50.0
Box Temp:	32.8	Box Temp:	34.8
Pmt Temp:	7.9	Pmt Temp:	7.9
Izs Temp:	45.0	Izs Temp:	45.0
Pres:	24.0	Pres:	24.0
Samp Fl:	606	Samp Fl:	604
Norm Pmt:	142.8	Norm Pmt:	141.1
Uv Lamp:	2903.8	Uv Lamp:	2911.2
Lamp Ratio:	92.1	Lamp Ratio:	92.4
Str Lgt:	68.2	Str Lgt:	70.3
Drk Pmt:	5.3	Drk Pmt:	6.1
Expected Value:	510.7	Expected Value:	522.0

**Comments:**

The analyzer sample inlet filter was changed.

The manifold blower was found to be working normally.



— SO2[ppb]

***HYDROGEN SULPHIDE***



## API 101E Hydrogen Sulphide Analyzer Calibration

Date: December 7, 2017	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	935	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: Hydrogen Sulphide	Calibration Purpose: routine monthly		
Start Time 24 hr. (mst): 11:25	Performed By/Reviewer: Alex Yakupov		Rob Fisher
End Time 24 hr. (mst): 15:26	Cal Gas Expiry Date: June 14, 2019		
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a		

Analyzer ID# or Serial Number: 509	Range ppb: 100
Last Calibration Date: November 7, 2017	As Found C.F.: 1.018
Previous C.F.: 1.000	New C.F.: 1.000

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. #: EY 0000654 Cal Gas Conc. (ppm): 10.2	Standard Calibration Points for Ranges <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>78</td></tr> <tr><td>Mid</td><td>38</td></tr> <tr><td>Low</td><td>19</td></tr> </table> <div style="text-align: right; margin-top: 10px;">         12:05 / 12:15          1000          780          0.0          0.0          0.0       </div>	Point	ppb	High	78	Mid	38	Low	19
Point	ppb								
High	78								
Mid	38								
Low	19								

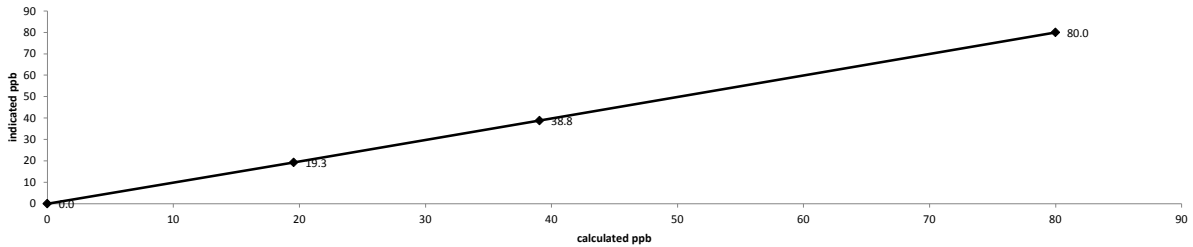
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Calibrator Flow Rates (cc/min)				Calculated	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	Concentration (ppb):		
as found zero	7214	0.00	7214	0.0	0.4	n/a
as found high	7141	56.44	7197	80.0	79.0	1.018
adjusted zero	7214	0.00	7214	0.0	0.0	n/a
adjusted high	7141	56.44	7197	80.0	80.0	1.000
mid	7204	27.69	7232	39.1	38.8	1.007
low	7216	13.86	7230	19.6	19.3	1.013
calibrator zero	7214	0.00	7214	0.0	0.0	n/a
Average C.F. =						1.007

**Linear Regression/Calibration Results:**

	<b>LIMITS</b>
Correlation Coefficient = 1.000	> or = 0.995
Slope = 0.999	0.95-1.05
b (Intercept as % of full scale) = 0.16%	± 3% F.S.
% change in C.F. from last cal = -1.77%	± 10%

**API 101E Hydrogen Sulphide Analyzer Calibration**



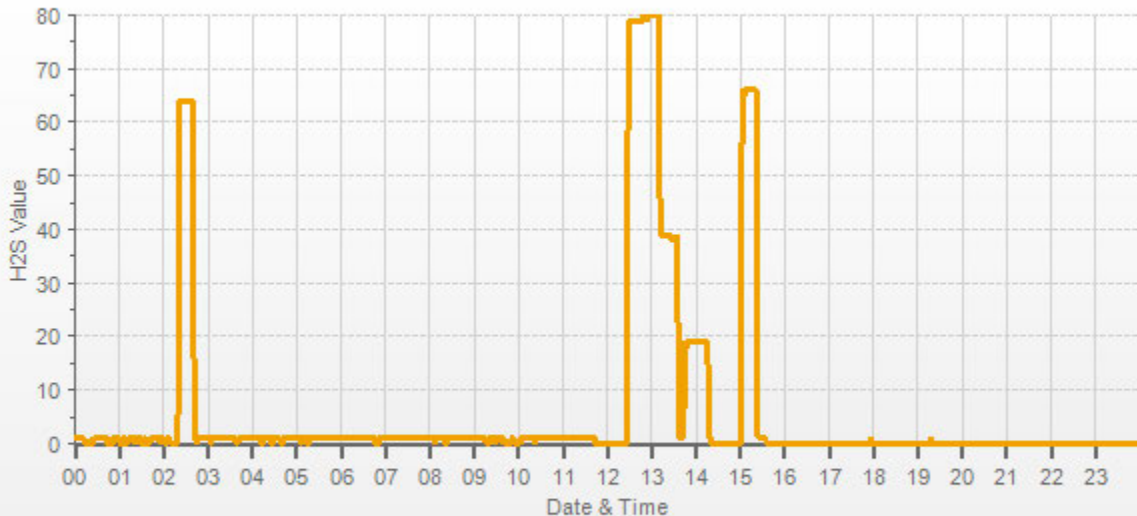
<b>As found:</b> Slope: 0.957 Offset: 66.8 Hvps: 671 Rcell Temp: 50.0 Box Temp: 33.7 Pmt Temp: 8.0 Izs Temp: 48.0 Converter Temp: 314.0 Pres: 20.6 Samp Fl: 526 Uv Lamp: 3283.0 Lamp Ratio: 97.9 Str Lgt: 32.0 Drk Pmt: 0.7 Expected Value: 64.5	<b>As left:</b> Slope: 0.979 Offset: 67.8 Hvps: 671 Rcell Temp: 50.0 Box Temp: 36.0 Pmt Temp: 8.0 Izs Temp: 48.0 Converter Temp: 315.8 Pres: 20.5 Samp Fl: 524 Uv Lamp: 3279.2 Lamp Ratio: 97.8 Str Lgt: 33.2 Drk Pmt: 0.7 Expected Value: 66.3
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**Comments:**

The analyzer sample inlet filter was changed.

The manifold blower was found to be working normally.





— H2S[ppb]



### API 101E Hydrogen Sulphide Analyzer Calibration

Date: December 30, 2017	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	944	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	20	°C
Location/Station Name: St. Lina	Weather Conditions: Mainly sunny		
Parameter: Hydrogen Sulphide	Calibration Purpose: as found		
Start Time 24 hr. (mst): 15:10	Performed By/Reviewer: Alex Yakupov   Rob Fisher		
End Time 24 hr. (mst): 16:45	Cal Gas Expiry Date: June 14, 2019		
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a		

Analyzer ID# or Serial Number: 509	Range ppb: 100
Last Calibration Date: December 7, 2017	As Found C.F.: 1.033
Previous C.F.: 1.000	New C.F.: n/a

<b>Calibration Standards:</b> 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. #: EY 0000654 Cal Gas Conc. (ppm): 10.2	<b>Standard Calibration Points for Ranges</b> <table border="1" style="margin: auto;"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>78</td></tr> <tr><td>Mid</td><td>38</td></tr> <tr><td>Low</td><td>19</td></tr> </table>	Point	ppb	High	78	Mid	38	Low	19
Point	ppb								
High	78								
Mid	38								
Low	19								

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

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	7143	0.00	7143	0.0	-0.3	n/a
as found high	7093	55.58	7149	79.3	76.5	1.033
<b>Average C.F.=</b>						n/a

Linear Regression/Calibration Results:

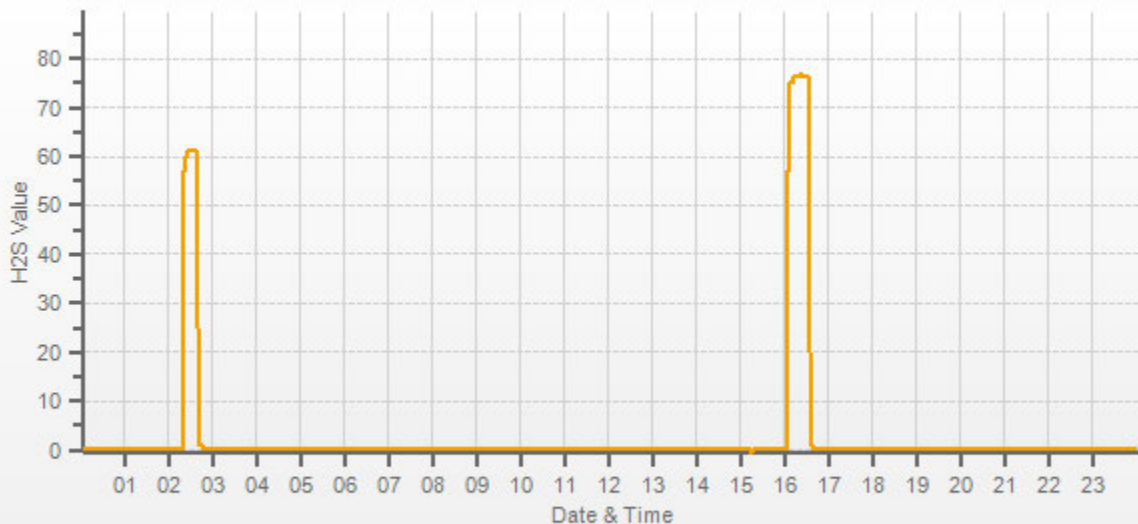
	<b>LIMITS</b>	
Correlation Coefficient =	n/a	n/a
Slope =	n/a	n/a
b (Intercept as % of full scale)=	n/a	n/a
% change in C.F. from last cal=	-3.26%	n/a

<b>As found:</b> Slope: 0.979 Offset: 67.8 Hvps: 671 Rcell Temp: 50.0 Box Temp: 31.1 Pmt Temp: 8.0 Izs Temp: 48.0 Converter Temp: 314.2 Pres: 20.9 Samp Fl: 535 Uv Lamp: 3169.5 Lamp Ratio: 94.5 Str Lgt: 33.2 Drk Pmt: 0.7 Expected Value: 66.3	<b>As left:</b> Slope: 0.979 Offset: 67.8 Hvps: 671 Rcell Temp: 50.0 Box Temp: 31.8 Pmt Temp: 8.0 Izs Temp: 48.0 Converter Temp: 314.8 Pres: 20.9 Samp Fl: 535 Uv Lamp: 3166.8 Lamp Ratio: 94.5 Str Lgt: 33.2 Drk Pmt: 0.7 Expected Value: 66.3
---	--

**Comments:**

No high point adjustment was required/made. The manifold blower was found to be working normally.  
 No zero adjustment was required/made.

An "As Found" calibration was completed because the H2S span result was 61.4/66.3 (-7.4%) on December 29, 2017 and 61.1/66.3 (-7.8%) on December 30, 2017.



— H2S[ppb]

***TOTAL HYDROCARBON***



## Thermo 51i Total Hydrocarbon THC Analyzer Calibration

Date:	December 8, 2017	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	935	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	St. Lina	Weather Conditions:	Mainly sunny		
Parameter:	Total Hydrocarbon	Calibration Purpose:	routine monthly		
Start/End Time 24 hr. (mst):	10:16 / 14:03	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 24, 2022		

Analyzer:	Range ppm:	
ID# or Serial Number:	925436893	50
Last Calibration Date:	November 26, 2017	As Found C.F.:
Previous Cal High Point C.F.:	1.001	New C.F.:
		1.000

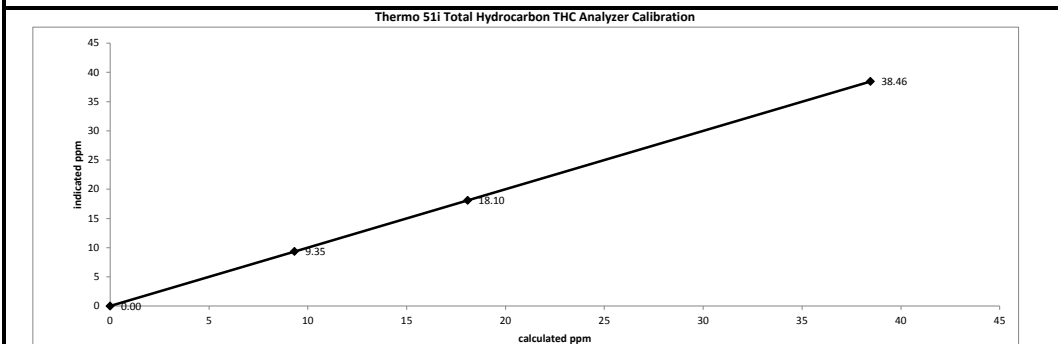
Calibration Standards:	
Low Flow Meter ID/Expiry Date:	Definer Low 129069 expires February 5, 2018
High Flow Meter ID/Expiry Date:	Definer High 128686 expires February 5, 2018
Calibrator ID/Expiry Date:	API id# 627 expires January 27, 2018
Cal Gas Cylinder I.D. #:	LL 165367
CH <sub>4</sub> /C <sub>3</sub> H <sub>8</sub> Cylinder Conc. (ppm):	590.0      207.0
CH <sub>4</sub> as propane/total CH <sub>4</sub> equivalents (ppm):	569.3      1159.3
Standard Calibration Points for a Range of: <b>50 ppm</b>	
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	2405	0.00	2405	0.0	0.00	n/a
as found high	2475	84.93	2560	38.46	38.10	1.009
adjusted zero	2405	0.00	2405	0.00	0.00	n/a
adjusted high	2475	84.93	2560	38.46	38.46	1.000
mid	2478	39.27	2517	18.09	18.10	0.999
low	2482	20.13	2502	9.33	9.35	0.998
calibrator zero	2405	0.00	2405	0.0	0.00	n/a
Average C.F. =						0.999

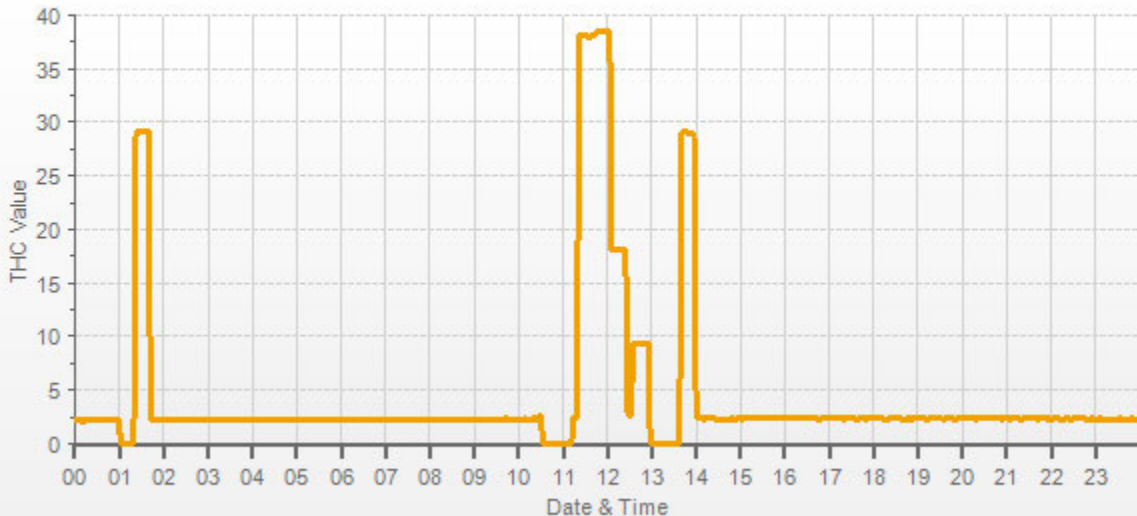
Linear Regression/Calibration Results:

Correlation Coefficient =	1.000		LIMITS
Slope =	1.000		> or = 0.995
b (Intercept as % of full scale) =	-0.02%		0.95-1.05
% change in C.F. from last cal =	-0.84%		± 3% F.S.
			± 10%



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.	

THC[ppm]



***NITROGEN DIOXIDE***



## API 200E NO-NO2-NOx Analyzer Calibration

Date: December 7, 2017	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	935	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		
Start/End Time 24 hr. (mst): 11:25 / 18:41	Calibration Purpose: routine monthly		
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: 954	Previous C.F.:	As Found C.F.:	New C.F.:	
Last Calibration Date: November 7, 2017	NO = 1.002	1.035	0.997	
Range ppb: 1000	NO <sub>2</sub> = 1.000	1.008	1.000	
	NOx = 1.001	1.033	0.999	

Calibration Standards:

Low Flow Meter ID/Expiry Date: Definer Low 129069 expires February 5, 2018	Standard Calibration Points for a Range of: 1000 ppb			
High Flow Meter ID/Expiry Date: Definer High 128686 expires February 5, 2018	Point	Target NO (ppb)	Target NO <sub>2</sub> (ppb)	Cc Ozone ?
Calibrator ID/Expiry Date: API id# 627 expires January 27, 2018	High	780	500	n/a
Cal Gas Cylinder I.D. #: LL 104222	Mid	380	275	n/a
Cal Gas Conc. (ppm): 50.7   50.9	Low	190	100	n/a
	Extra Point #1	n/a	n/a	n/a
	Extra Point #2	n/a	n/a	n/a

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	4939	0.0	4939	0	0	0.0	1.0	n/a	n/a
as found high	4862	76.8	4939	788.5	791.6	762.0	767.0	1.035	1.033
adjusted zero	4939	0.00	4939	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4862	76.81	4939	788.5	791.6	791.0	792.0	0.997	0.999
mid	4907	36.79	4944	377.3	378.8	378.0	379.0	0.998	0.999
low	4939	17.89	4957	183.0	183.7	183.0	184.0	1.000	0.998
calibrator zero	4939	0.00	4939	0	0	0.0	0.0	n/a	n/a
Average C.F. =								0.998	0.999

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO <sub>2</sub>	NO drop	NO <sub>2</sub> gain	NO <sub>2</sub> C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4862	76.81	4939	0.0	794.0	790.0	-4.0	0.0	-4.0	
as found high NO2	4862	76.81	4939	500.0	270.0	787.0	516.0	524.0	520.0	1.008
adjusted high NO2	4862	76.81	4939	500.0	271.0	791.0	519.0	523.0	523.0	1.000
gpt mid	4862	76.81	4939	275.0	512.0	790.0	277.0	282.0	281.0	1.004
gpt low	4862	76.81	4939	100.0	693.0	789.0	97.0	101.0	101.0	1.000
Average NO <sub>2</sub> C.F. =										1.001

Linear Regression/Calibration Results:

	NO	NOx	NO <sub>2</sub>	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.997	1.000	0.995	0.95-1.05
b (Intercept as % of full scale) =	-0.03%	0.01%	-0.25%	± 3% F.S.
% change in C.F. from last cal =	-3.27%	-3.24%	-0.77%	± 10%
NO2 converter efficiency			0.97	0.96 to 1.04

As found:		As left:	
NOx SLOPE:	0.995	NOx SLOPE:	1.027
NOx OFFS:	2.6	NOx OFFS:	1.6
NO SLOPE:	0.998	NO SLOPE:	1.035
NO OFFS:	-0.2	NO OFFS:	0.9
SAMP FLW:	486	SAMP FLW:	486
OZONE FL:	78	OZONE FL:	78
PMT:	20.7	PMT:	20.7
NORM PMT:	8.7	NORM PMT:	0.8
AZERO:	17.8	AZERO:	18.9
HVPS:	767	HVPS:	767
RCCELL TEMP:	50.0	RCCELL TEMP:	50.0
BOX TEMP:	34.4	BOX TEMP:	36.6
PMT TEMP:	6.8	PMT TEMP:	6.8
IZS TEMP:	41.0	IZS TEMP:	41.2
MOLY TEMP:	314.4	MOLY TEMP:	315.8
RCEL:	5.4	RCEL:	5.4
SAMP:	26.2	SAMP:	26.3
Expected Value NO:	7	Expected Value NO:	6
Expected Value NO <sub>2</sub> :	448	Expected Value NO <sub>2</sub> :	474
Expected Value NOx:	455	Expected Value NOx:	479

**Comments:**

The analyzer sample inlet filter was changed.

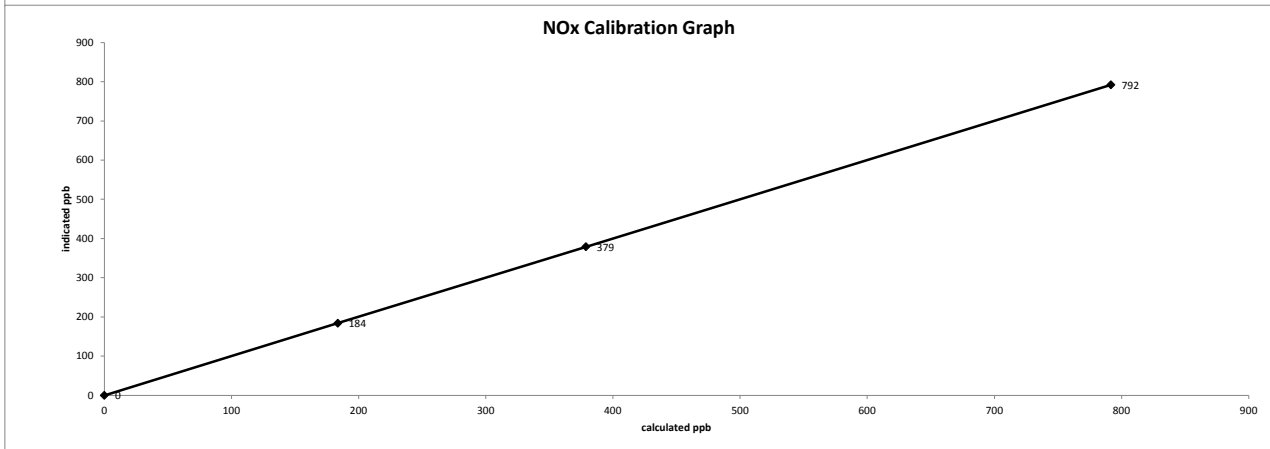
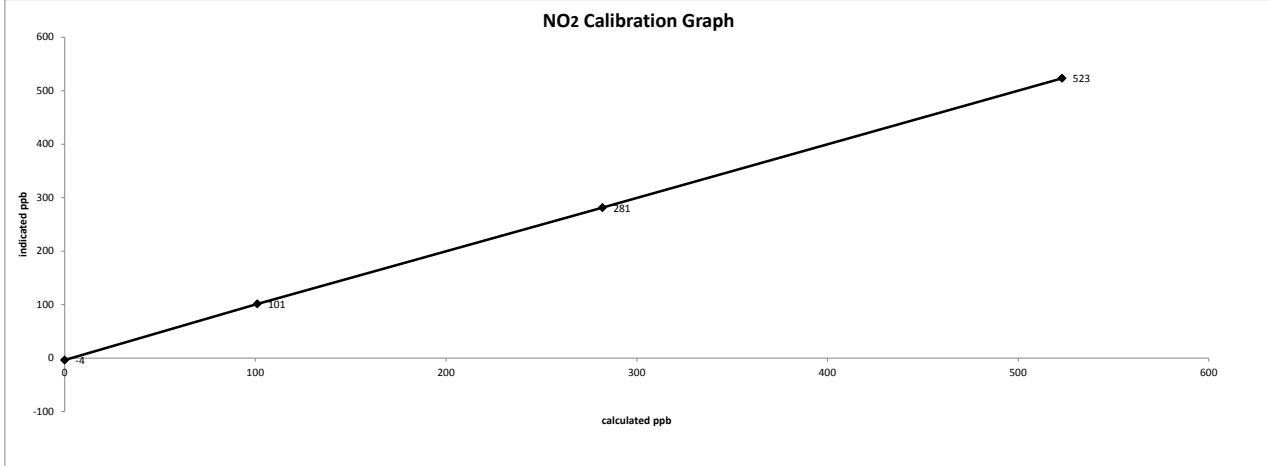
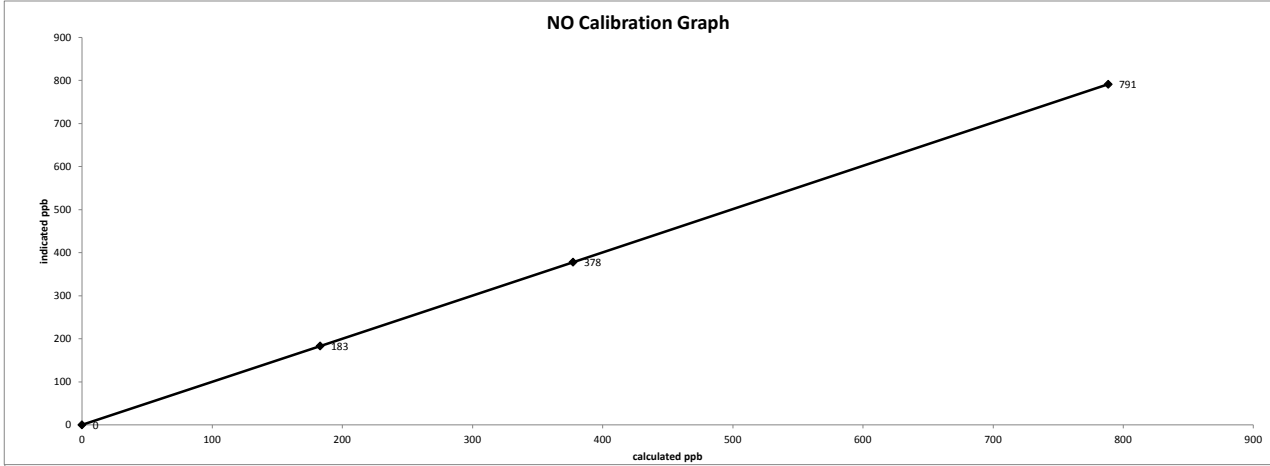
The manifold blower was found to be working normally.

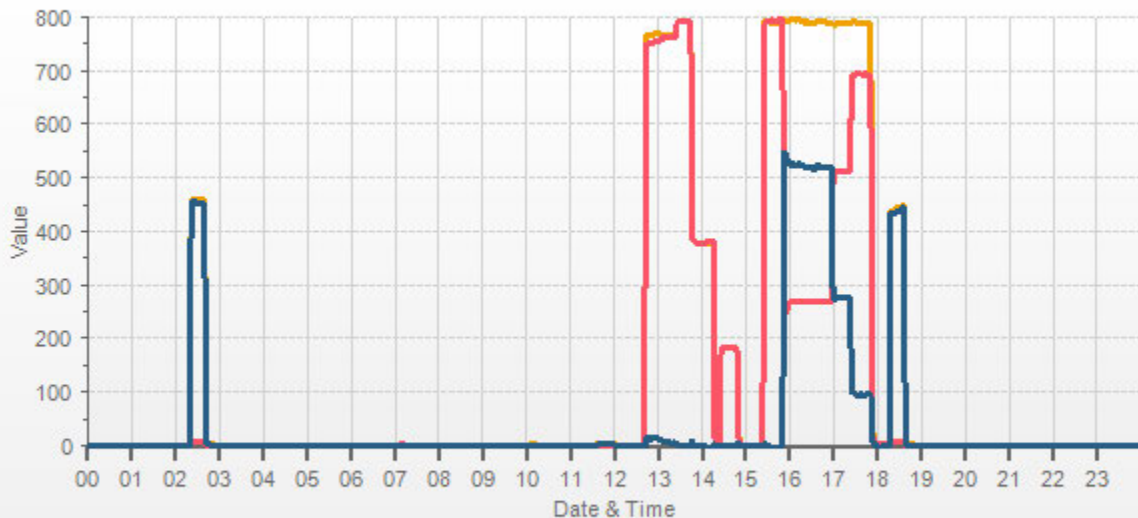


Date: December 7, 2017  
Company/Airshed: LICA  
Location/Station Name: St. Lina

Start/End Time 24 hr. (mst): 11:25 / 18:41  
Calibration Purpose: routine monthly  
Calibration Method: Gas Dilution & Gas Phase Titration

API 200E NO-NO2-NOx Analyzer Calibration





— NOX[ppb] — NO[ppb] — NO2[ppb]

## ***OZONE***



## Thermo 49i Ozone Analyzer Calibration

<b>Date:</b> December 8, 2017 <b>Company/Airshed:</b> LICA <b>Location/Station Name:</b> St. Lina <b>Start/End Time 24 hr. (mst):</b> 10:16 / 14:34 <b>Ozone Calibration Method:</b> Varying UV Lamp Power <b>G.P.T. Date:</b> n/a-done by Varying UV Lamp Power	<b>Barometer/B.P./units:</b> F.S. 05544 expires December 5, 2018    935    millibars <b>Thermometer/Station Temp:</b> F.S. 170286131 expires April 19, 2019    22    °C <b>Weather Conditions:</b> Mainly sunny <b>Calibration Purpose:</b> routine monthly <b>Performed By/Reviewer:</b> Alex Yakupov    Rob Fisher <b>Cal Gas Expiry Date:</b> n/a-done by Varying UV Lamp Power
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<b>Analyzer:</b> <b>ID# or Serial Number:</b> 10022440371 <b>Last Calibration Date:</b> November 8, 2017 <b>Previous Cal High Point C.F.:</b> 1.000	<b>Ozone Range ppb:</b> 500 <b>As Found C.F.:</b> 0.995 <b>New C.F.:</b> 1.000
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<b>Calibration Standards:</b> <b>Low Flow Meter ID/Expiry Date:</b> Definer Low 129069 expires February 5, 2018 <b>High Flow Meter ID/Expiry Date:</b> Definer High 128686 expires February 5, 2018 <b>Calibrator ID/Expiry Date:</b> Sabio id# 11900613 expires March 16, 2018 <b>Cal Gas Cylinder I.D. #:</b> n/a	<table border="1" style="margin: auto;"> <tr> <th>Point</th> <th>AMD Required Range of Ozone Calibration Points</th> </tr> <tr> <td>High</td> <td>300-400 ppb</td> </tr> <tr> <td>Mid</td> <td>150-200 ppb</td> </tr> <tr> <td>Low</td> <td>50-75 ppb</td> </tr> </table>	Point	AMD Required Range of Ozone Calibration Points	High	300-400 ppb	Mid	150-200 ppb	Low	50-75 ppb
Point	AMD Required Range of Ozone Calibration Points								
High	300-400 ppb								
Mid	150-200 ppb								
Low	50-75 ppb								

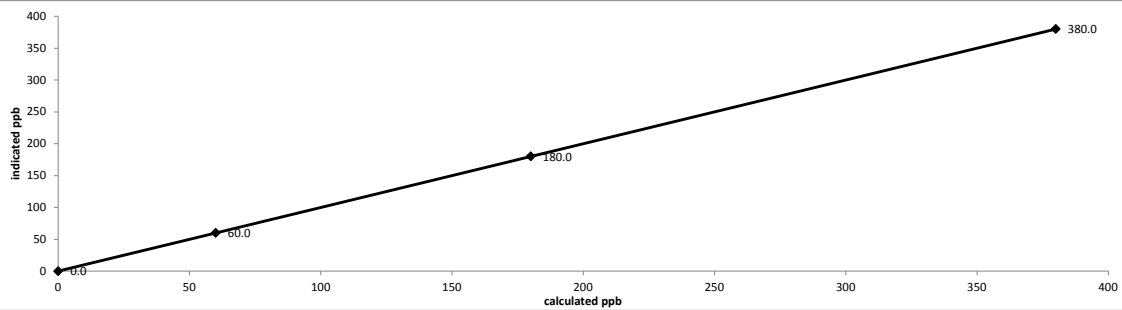
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5000	5000	0.0	n/a	0.0	n/a
as found high	5000	5000	380.0	380.0	382.0	0.995
adjusted zero	5000	5000	0.0	0.0	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	180.0	180.0	180.0	1.000
low	5000	5000	60.0	60.0	60.0	1.000
calibrator zero	5000	5000	0.0	n/a	0.0	n/a
<b>Average C.F. =</b>						1.000

**Linear Regression/Calibration Results:**

<b>Correlation Coefficient =</b> 1.000	<b>LIMITS</b>
<b>Slope =</b> 1.000	> or = 0.995
<b>b (Intercept as % of full scale) =</b> 0.00%	0.95-1.05
<b>% change in C.F. from last cal =</b> 0.52%	± 3% F.S.
	± 10%

**Thermo 49i Ozone Analyzer Calibration**

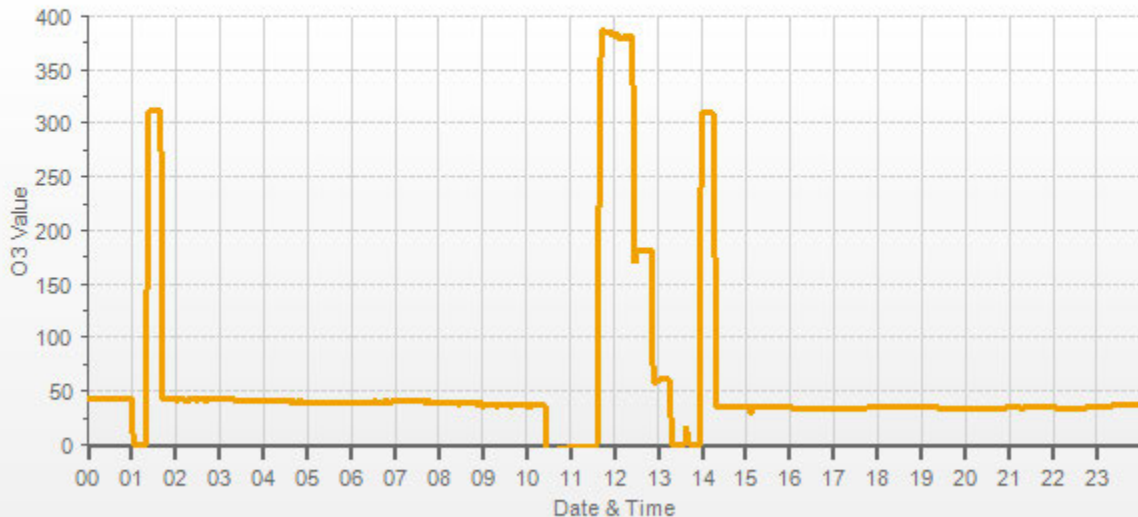


As found:	As left:
O3 Bkg: -0.5	O3 Bkg: -0.5
O3 Coef: 0.969	O3 Coef: 0.965
Photo Lamp: 10.7	Photo Lamp: 10.7
O3 Lamp: 8.2	O3 Lamp: 8.2
Bench: 31.5	Bench: 32.4
Bench Lamp: 53.7	Bench Lamp: 53.7
O3 Lamp: 67.9	O3 Lamp: 67.9
Pressure: 684.1	Pressure: 684.1
Cell A lpm: 0.734	Cell A lpm: 0.733
Cell B lpm: 0.780	Cell B lpm: 0.781
O3 ppb: -5.0	O3 ppb: 0.2
Cell A ppb: -2.0	Cell A ppb: 1.0
Cell B ppb: -8.0	Cell B ppb: -0.5
Cell A int: 79963	Cell A int: 79867
Cell B int: 100452.0	Cell B int: 100350.0
Expected Value: 310.4	Expected Value: 309.0

**Comments:**

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

O3[ppb]



***PARTICULATE MATTER***

## "I" Series Sharp 5030 Monitor Monthly Audit

<b>Date:</b> December 8, 2017	<b>Performed By/Reviewer:</b> Alex Yakupov   Tom Bourque
<b>Company:</b> LICA	<b>Start Time (mst):</b> 13:47
<b>Station Name/Location:</b> St. Lina	<b>End Time (mst):</b> 14:34
<b>Previous Audit Date:</b> November 28, 2017	<b>Calibration Purpose:</b> routine monthly
<b>Parameter:</b> PM 2.5	<b>Weather Conditions:</b> Mainly sunny

<b>SHARP Information and Status:</b>	
<b>Serial Number:</b> CM1709001	<b>Status:</b> SAMPLE
<b>Approx. % Tape remaining:</b> 5/5	<b>Error Code:</b> None

<b>Reference Standards/I.D./Expiry Date:</b>	
<b>High Flow:</b> Airmetrics/Chinook High Maxxam ID #2 expires March 24, 2018	
<b>Digital Manometer:</b> Dwyer 475 Mark III id# 3 expires January 3, 2018	
<b>Temperature:</b> F.S. 170286131 expires April 19, 2019	
<b>Pressure:</b> F.S. 05544 expires December 5, 2018	
<b>RH:</b> F.S. 170286131 expires April 19, 2019	

<b>As found temperature and pressure:</b>			
<b>Tolerance °C +/-</b>	<b>3</b>	<b>Tolerance mmHg +/-</b>	<b>12</b>
<b>SHARP T1 (°C):</b>	4.0	<b>SHARP P3 (mmHg):</b>	701.00
<b>Reference (°C):</b>	3.6	<b>Reference (mmHg):</b>	701.00
<b>Difference (°C):</b>	-0.4	<b>Difference (mmHg) :</b>	0.0

<b>As left temperature and pressure (same as above if as found adequate):</b>			
<b>Tolerance °C +/-</b>	<b>3</b>	<b>Tolerance mmHg +/-</b>	<b>12</b>
<b>SHARP T1 (°C):</b>	3.6	<b>SHARP P3 (mmHg):</b>	701.00
<b>Reference (°C):</b>	3.6	<b>Reference (mmHg):</b>	701.00
<b>Difference (°C):</b>	0.0	<b>Difference (mmHg) :</b>	0.0

<b>As found flows:</b>			
<b>SHARP Airflow l/hr</b>	1000.00	<b>Tolerance lpm +/-</b>	5%
<b>Pump Voltage (%)</b>	n/a	<b>SHARP Airflow (lpm)</b>	16.67
		<b>Reference Airflow (lpm)</b>	16.66
		<b>Difference (%)</b>	-0.04%

<b>As left flows (same as above if as found adequate):</b>			
<b>Targets: 1000 l/hr / &lt;90%</b>			
<b>SHARP Airflow l/hr</b>	1000.00	<b>Tolerance lpm +/-</b>	5%
<b>Pump Voltage (%)</b>	n/a	<b>SHARP Airflow (lpm)</b>	16.67
		<b>Reference Airflow (lpm)</b>	16.66
		<b>Difference (l/min)</b>	-0.04%

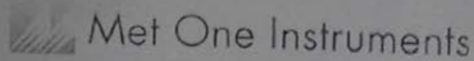
<b>As found relative humidity:</b>		<b>As left relative humidity (same as "as found" if adequate):</b>	
<b>Tolerance % +/-</b>	<b>5</b>	<b>Tolerance % +/-</b>	<b>5</b>
<b>Sharp RH (%):</b>	37.7	<b>Sharp RH (%):</b>	38.70
<b>Reference RH (%):</b>	38.7	<b>Reference RH (%):</b>	38.70
<b>Difference:</b>	1.0	<b>Difference:</b>	0.0

<b>Inlet Assembly:</b>		
<b>Inlet Head/Sharp Cut</b>	<b>Yes/No?</b>	<b>If no, give reason:</b>
<b>Cleaned:</b>	yes	

<b>Comments:</b>
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## ***WIND SYSTEM***





# Sonic Wind Sensor Certificate of Calibration

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

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

QC Inspection *Chris Paul*

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

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

Quality Control Manual Revision: September 16, 2013 MP42201 Rev. G.  
 All Work Performed per Customer Purchase Order Requirements.  
 Calibration Document No. 50.5-6100

### Test Equipment Used for Calibration of Instruments

Description	Manufacturer	Model No.	Serial No.	Cal Date	Cal Due	Voltage Accuracy	Time Base Accuracy
Data Acquisition	Campbell Scientific	CR1000	6569	4/06/2015	4/06/2018	+/- 3mV	< 6 ppm
NIST Cupset	Met One Instruments	170-41	3309	1/26/2017	1/26/2022	Accuracy < 0.15 mph or 1% WS	

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

**Firmware Version: 3194-01 R2.62**

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

## ***CALIBRATORS***

**Company** Maxxam/SIA **Operator:** Chris

<b>Calibrator:</b>		<b>Flow Measurement Device:</b>	
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>		

<b>Dilution Flow (sccm)</b>		
Pt. #1	<u>4892</u>	Pt. #3 <u>4951</u>
Pt. #2	<u>4975</u>	
<b>Gas Flow (sccm)</b>		
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 <sub>2</sub>	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)*

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

Flow	O <sub>3</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOX	% Diff. Vs Audit gas	
4972	0	0.0000	0.7867	0.0014	0.7881	NO <sub>2</sub>	% 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)*

<b>NO<sub>2</sub></b>	<b>LIMITS</b>
Correlation= 1.0000	≥ 0.995
m (Slope)= 0.9924	<b>0.90-1.10</b>
b (Intercept % of FS)= 0.1755	± 3% F.S.

<b>AENV Standards</b>	<b>NO<sub>x</sub> Analyzer</b>
<b>Audit Calibrator</b>	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 Date: January 27, 2017  
Operator Signature: \_\_\_\_\_ Location: McIntyre Center Edmonton

Company <u>Maxxam</u>		Operator: <u>Mike</u>	
<b>Calibrator:</b>		<b>Flow Measurement Device:</b>	
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 <sub>2</sub>	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)*

<b>NO</b>		<b>LIMITS</b>		<b>NOx</b>	
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000
m (Slope)=	1.0301	<b>0.90-1.10</b>		m (Slope)=	1.0291
b (Intercept % of FS)=	-0.0919	± 3% F.S.		b (Intercept % of FS)=	-0.0881

Flow	O <sub>3</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOX	% Diff. Vs Audit gas	
4954	0.000	0.0000	0.7949	0.0005	0.7954	NO <sub>2</sub>	% 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)*

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

<b>AENV Standards</b>	<b>NO<sub>x</sub> Analyzer</b>
<b>Audit Calibrator</b>	
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. 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&amp;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	<del>0.000</del>	<del>0.000</del>	<del>0.000</del>
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:					<b>50.0</b>

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

## CH<sub>4</sub> / C<sub>3</sub>H<sub>8</sub> Cylinder Gas

File No. 2015-029CGA

**Company:** Maxxam                      **Operators name:** Limin Li  
**Cylinder #:** LL165367   **Conc CH<sub>4</sub> (PPM)** 590/207   **Tolerance (%)** 2   **Certified By:** Praxair

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>R&amp;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>CH<sub>4</sub></u>	Conc.	<u>999.2</u>	B.P.	<u>703 mmhg</u>
Cylinder Number	<u>D751932</u>				
Gas Type	<u>C<sub>3</sub>H<sub>8</sub></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	
Dilution	Gas	CH <sub>4</sub>	C <sub>3</sub> H <sub>8</sub>			CH <sub>4</sub>	C <sub>3</sub> H <sub>8</sub>
2600	0.0	0.00	0.00	<del>0.02005</del>	<del>49.883</del>	<del>602</del>	<del>206</del>
2569	51.5	12.06	11.37	0.02005	49.883	602	206
3549	22.3	3.77	3.57	0.00628	159.148	600	207
3523	10.4	1.77	1.70	0.00295	338.750	600	209
Average Cylinder Concentration:						<b>600</b>	<b>207</b>

	<b>CH<sub>4</sub></b>	<b>C<sub>3</sub>H<sub>8</sub></b>
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 CH<sub>4</sub> 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. 2016-336CGA

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

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

Expiry Date: July 2019

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Teco 146i</u>			Make/Model	<u>Bios DC2</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>AMU 1659</u>
Last Verification Date	<u>October 19, 2019</u>			Temp. °C	<u>24.5 C</u>
Gas Type	<u>NO</u>	Conc.	<u>48.79</u>	B.P.	<u>706 mmhg</u>
Cylinder Number	<u>CAL018188</u>				
Expiry Date	<u>March 2019</u>				

**Reference Analyzer:**

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

Instrument Settings    Zero: 4.4      Span: 1.080      Range: 1.0

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

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

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

**Cylinder gas tolerances based on NO only**

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

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

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

Auditor: Al Clark      Date: October 19, 2016

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

***APPENDIX III  
REPORT CERTIFICATION FORM***

### Report Certification Form

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

January 24, 2018

\_\_\_\_\_  
 Report Issued Date (dd-mm-yyyy)

***APPENDIX IV***  
***DATA VALIDATION CERTIFICATION FORM***



### Validation Certificate Form

<b>Client:</b> <u>Lakeland Industry &amp; Community Association</u>	<b>Project #:</b> <u>2833-2017-12-31-C</u>
<b>Site:</b> <u>St. Lina Continuous Monitoring Station</u>	<b>Contact:</b> <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u>Maram ghaieb</u>	Date <u>January 12, 2018</u>
Level 1 Primary Validation	<u>Maram ghaieb</u>	Date <u>January 12, 2018</u>
Level 2 Final Validation	<u>Maram ghaieb</u>	Date <u>January 22, 2018</u>
Level 3 Independent Data Review	<u>CSA-LMB</u>	Date <u>January 24, 2018</u>
Post-Final Validation	<u>NA</u>	Date <u>NA</u>

<b>Notes</b>
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.