



Alberta Environment and Parks (AEP)  
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March 2, 2018

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

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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 January 2018.

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

Sampling Program	Monitoring Activities Conducted By	Sample Analysis Conducted By	Data/Report Review and Prepared By	Electronic Submission Conducted By
Continuous ambient air	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics
Passive	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics
Intermittent	Maxxam Analytics	InnoTech Alberta Inc	InnoTech Alberta Inc	Not Applicable
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 January 2018 was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

THC: LICA owned Thermo 51C analyzer, S/N: 51CLT-77021-384, was removed on January 17 to address the intermittent concentration drops reported in December 2017. It was replaced with another LICA owned Thermo 51C analyzer, S/N: 427408718, on January 17.

A scheduled internal station audit was conducted by a contractor on January 17 and 26. Audit report can be found in this monthly report.

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



Lakeland Industry & Community Association  
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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 2019.

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 #: 2833-2018-01-1-C**

**January 2018**

Prepared for:

**LAKELAND INDUSTRY & COMMUNITY ASSOCIATION**  
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**Attention: MIKE BISAGA**

DATE: **February 22, 2018**

Prepared by: *Maram Ghaleb*

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

## **SUMMARY**

In January 2018, 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.

A scheduled internal station audit was conducted by Maxxam on January 17 and 26. Audit report can be found in Appendix III.

**TRS:** The sample pump failed on January 12. Data was invalidated back to the last valid zero-span check, which was on January 11 at hour 10:00. Thirty-three hours of downtime were incurred as a result.

**THC:** A total of 9 hours of downtime were incurred this month:

- LICA's Thermo 51C, S/N: 51CLT-77021-384 analyzer was removed on January 17 to address the intermittent concentration drops reported in December 2017. It was replaced with another LICA analyzer, a Thermo 51C, S/N: 427408718. Four hours of downtime were incurred as a result of the analyzer replacement.
- A repeat calibration was performed on January 19 to correct an analyzer drift, resulting in five hours of downtime.

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	5	10	14	8.6	NW	1	10	100.0
TRS (ppb)	-	-	-	-	0	1	3	16	1.9	ENE	1	17	95.6
THC (ppm)	-	-	-	-	2.30	3.36	18	1	1.1	ENE	2.75	18	98.8
NO <sub>2</sub> (ppb)	159	-	0	-	7	38	17	22	1.7	E	23	12	100.0
NO (ppb)	-	-	-	-	2	44	16	16	0.4	NE	13	12	100.0
NO <sub>x</sub> (ppb)	-	-	-	-	9	78	17	23	1.3	ENE	36	12	100.0
O <sub>3</sub> (ppb)	82	-	0	-	22.0	36.8	7	12	12.9	WNW	31.8	9	100.0
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	80	30	0	0	5	28	4	9	2.5	ENE	13	4	100.0
RELATIVE HUMIDITY (%)	-	-	-	-	76	94	23	8	6.9	WSW	90	23	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	-13.6	5.7	17	14	10.1	WSW	0.1	19	100.0
VECTOR WS (kph)	-	-	-	-	0.7	17.3	30	21	-	NNW	11.9	9	100.0
VECTOR WD (sec)	-	-	-	-	331 (NNW)	-	-	-	-	-	-	-	100.0

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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 January 3.
- A scheduled internal station audit was conducted by Maxxam on January 17. Audit report can be found in Appendix III.

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

- Operational time for the monitoring period was 95.6 % equivalent to 33 hours of downtime.
- The routine monthly calibration was performed on January 3.
- The sample pump seized and failed on January 12, prompting an immediate site visit. The pump was replaced and a post-repair calibration was performed on the same day. As a shut-down calibration could not be performed due to the pump failure, data was invalidated back to the last valid zero-span check on January 11 at hour 10:00. A total of 33 hours of downtime were incurred as a result.
- A scheduled internal station audit was conducted by Maxxam on January 17. Audit report can be found in Appendix III.

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

- Operational time for the monitoring period was 98.8% equivalent to 9 hours of downtime.
- The routine monthly calibration was performed on January 2.
- A scheduled internal station audit was conducted by Maxxam on January 17. Audit report can be found in Appendix III.
- To address the intermittent concentration drops reported in December 2017, the analyzer was replaced for maintenance following the internal audit on January 17. LICA's Thermo 51C, S/N: 51CLT-77021-384 was removed and replaced with another LICA analyzer, a Thermo 51C, S/N: 427408718. A successful installation calibration was subsequently completed. Troubleshooting/maintenance of the Thermo 51C, S/N: 51CLT-77021-384 at Maxxam shop later revealed a malfunctioning FID detector signal cable. Four hours of downtime were incurred as a result of the analyzer replacement.
- The newly-installed analyzer exhibited instability as it appeared to have required a longer stabilization period following the installation calibration on January 17. This prompted a site visit on January 19 where a successful repeat calibration was performed to correct analyzer drift. Five hours of downtime were incurred as a result.

### **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 January 3.
- A scheduled internal station audit was conducted by Maxxam on January 17. Audit report can be found in Appendix III.

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

- Operational time for the monitoring period was 100%.
- The routine monthly calibration was performed on January 2.
- A scheduled internal station audit was conducted by Maxxam on January 17. Audit report can be found in Appendix III.

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

- Operational time for the monitoring period was 100%.
- The routine monthly calibration was performed on January 2.
- 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%.
- 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%.
- A scheduled internal station audit was conducted by Maxxam on January 26. Audit report can be found in Appendix III.

**AMBIENT TEMPERATURE (AmbTPX)**

- Operational time for the monitoring period was 100%.
- A scheduled internal station audit was conducted by Maxxam on January 26. Audit report can be found in Appendix III.

## **2.0 Project Personnel**

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

## **3.0 Plant Monthly Required AMD Summary**

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

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

## **4.0 Calculations and Results**

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



## 5.0 Methods and Procedures

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

- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-00212: Ambient 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
- MET One Instruments: Operation Manual Document No. 50.5-9800
- 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 - 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**

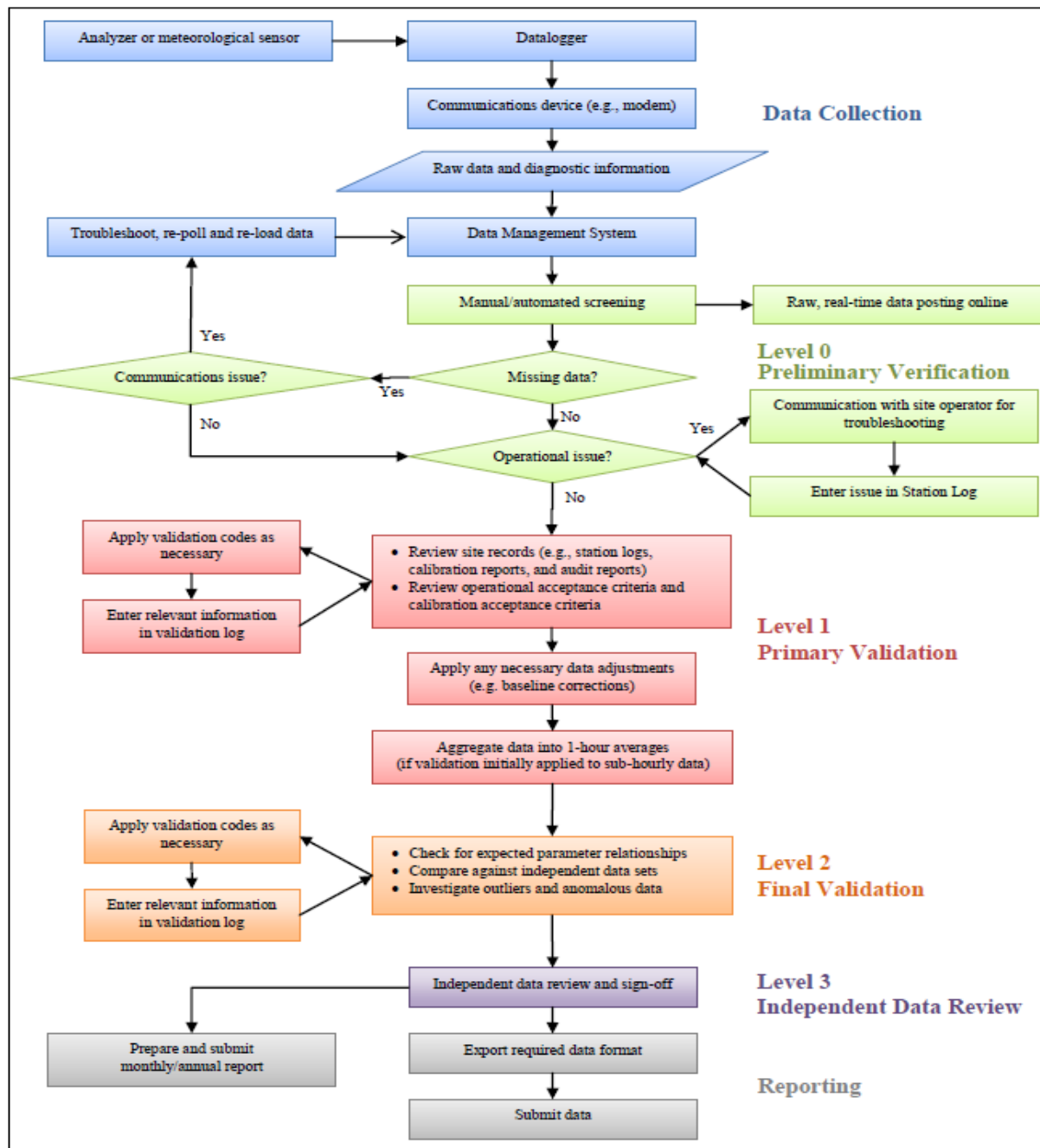
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

**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	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	S	1	1	1	1	0	1	0	24		
2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	S	1	0	0	0	0	0	1	0	24	
3	0	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	S	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	S	0	0	0	0	0	0	0	0	0	0	0	0	24	
5	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	1	0	24
6	0	0	0	0	0	0	0	1	1	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
7	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	
8	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	
9	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	
10	0	0	0	0	0	0	0	0	0	0	1	S	2	2	4	5	3	1	1	0	0	0	0	0	0	0	5	1	24	
11	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
12	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	24	
13	0	0	0	0	0	0	0	S	0	0	0	0	1	2	2	1	1	1	1	0	0	0	0	1	1	0	2	0	24	
14	1	1	1	1	2	2	S	2	2	2	2	2	1	1	2	3	2	1	0	0	0	0	0	0	0	0	3	1	24	
15	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	0	1	0	24	
16	0	0	0	0	S	0	0	0	0	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	24	
17	0	0	0	S	1	1	0	0	0	0	Q	Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
18	0	0	S	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	24	
19	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
20	S	0	0	0	0	1	0	0	1	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	S	0	2	1	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	S	0	0	0	0	24	
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	24	
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	24	
24	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	
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	24	
26	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	
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	24	
28	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	
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	1	1	2	1	1	0	2	0	24		
30	1	0	0	0	0	1	2	1	1	1	1	1	1	1	S	1	1	1	0	1	1	1	0	1	0	2	1	24		
31	1	1	1	1	1	2	1	1	1	2	2	2	S	1	1	1	1	1	0	0	0	0	0	0	0	0	2	1	24	
HOURLY MAX	1	1	1	1	2	2	2	2	2	2	2	2	2	4	5	3	2	1	1	1	1	1	2	1	1					
HOURLY AVG	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					

STATUS FLAG CODES

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

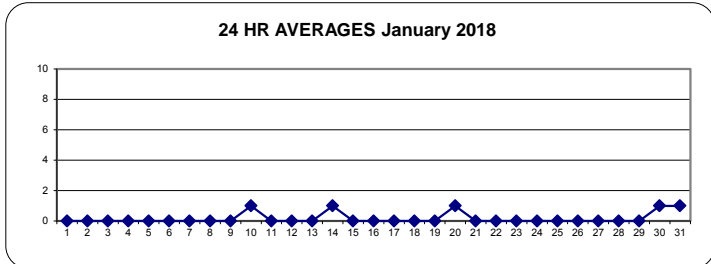
OBJECTIVE LIMIT:

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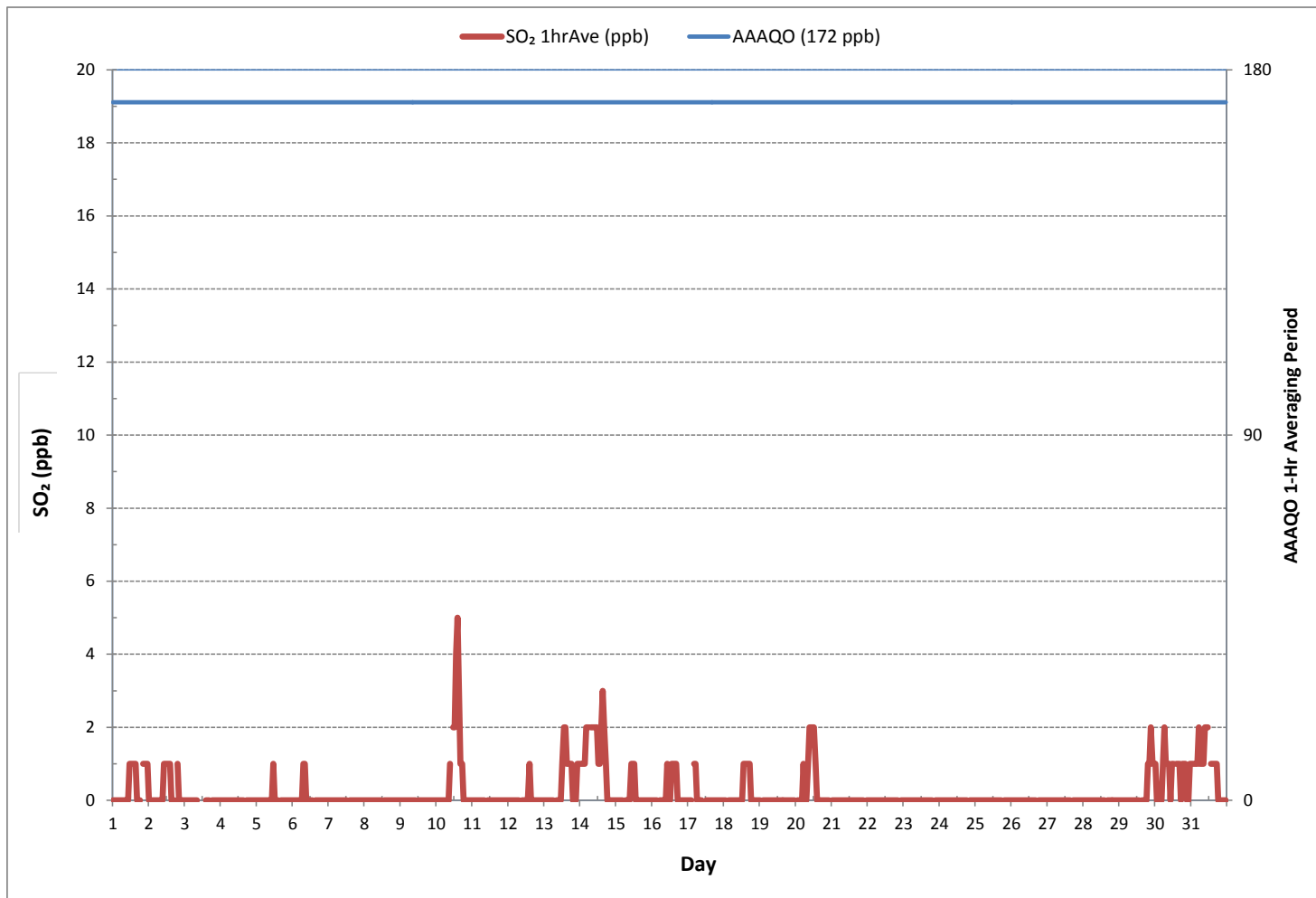
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	112		
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR ON DAY 1		
MAXIMUM 1-HR AVERAGE:	5 ppb @ HOUR ON DAY 10		
MAXIMUM 24-HR AVERAGE:	1 ppb ON DAY 10		
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	744 hrs
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	1	MONTHLY AVERAGE:	0 ppb

24 HR AVERAGES January 2018



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



Wind: LICA COLD LAKE SOUTH  
 Poll.: LICA COLD LAKE SOUTH-SO2[ppb]  
 Monthly: 18/01  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 19.03%

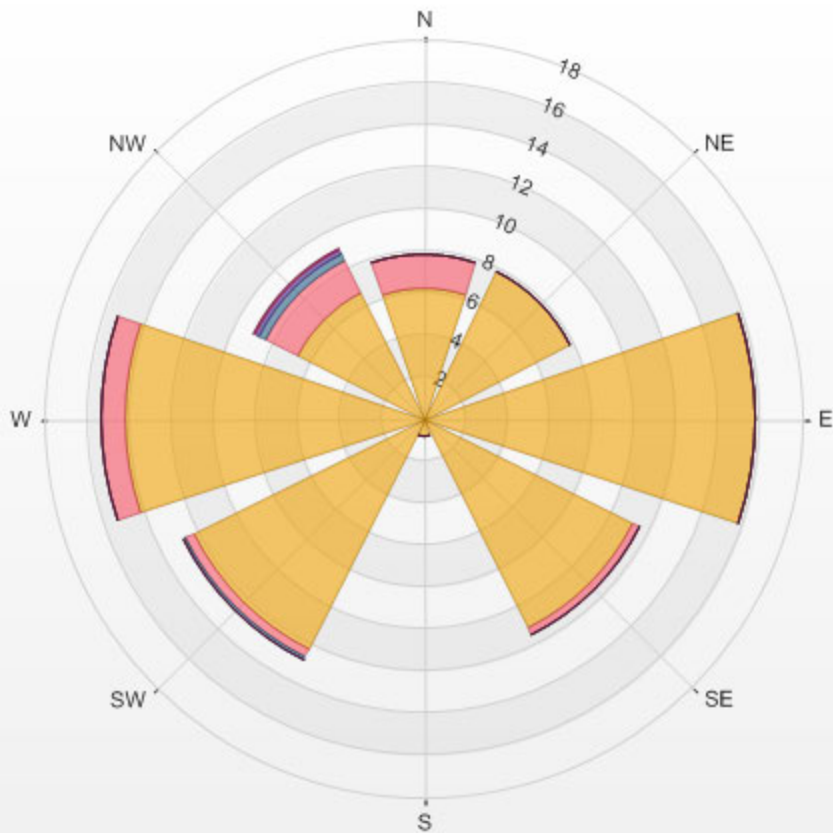
Calm Avg: 0.15 [ppb]

Direction	0.0-1.2	1.2-2.4	2.4-3.6	3.6-4.8	4.8-6.0	>6.0	Total
<b>N</b>	6.3	1.6	0.0	0.0	0.0	0.0	7.8
<b>NE</b>	7.8	0.0	0.0	0.0	0.0	0.0	7.8
<b>E</b>	15.8	0.0	0.0	0.0	0.0	0.0	15.8
<b>SE</b>	11.1	0.4	0.0	0.0	0.0	0.0	11.5
<b>S</b>	0.9	0.0	0.0	0.0	0.0	0.0	0.9
<b>SW</b>	12.2	0.4	0.1	0.0	0.0	0.0	12.8
<b>W</b>	14.2	1.1	0.0	0.0	0.0	0.0	15.3
<b>NW</b>	6.7	1.7	0.4	0.1	0.1	0.0	9.1
<b>Summary</b>	74.9	5.3	0.6	0.1	0.1	0.0	81.0



% Icon	Classes (ppb)	75	0.0-1.2	5	1.2-2.4	1	2.4-3.6	0	3.6-4.8	0	4.8-6.0	0	>6.0
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LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-SO2[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 19.03% Calm Poll Avg: 0.15[ppb]



SO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 18/01 Type: Span



Span Meas Span Ref Span Low Span High

***TOTAL REDUCED SULPHUR***



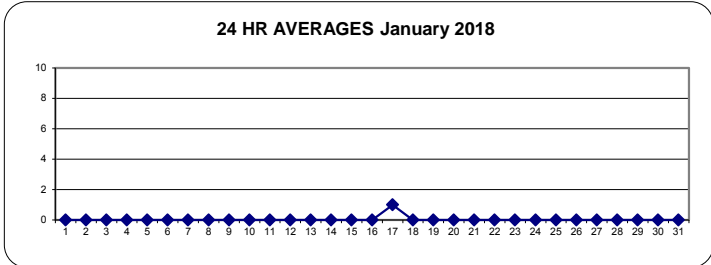
TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)

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	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	
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	24	
3	0	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	1	S	1	0	0	0	0	0	0	0	0	0	1	0	24	
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	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	S	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
8	1	1	1	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
9	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
10	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
11	0	0	0	0	0	0	0	0	0	0	S	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0	0	0	10	
12	X	X	X	X	X	X	X	X	X	X	X	X	C1	C1	C1	C1	C1	C1	C1	0	0	1	0	0	0	0	0	0	1	0	5	
13	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
14	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
15	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
16	0	0	0	0	S	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	24	
17	0	0	1	S	1	1	1	0	0	0	0	Q	Q	Q	0	1	0	1	1	1	0	1	1	1	1	0	1	0	1	0	24	
18	1	1	S	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
19	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	
20	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	24	
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	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	S	0	0	0	0	0	0	0	0	24	
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	24	
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	24	
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	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	S	0	0	0	0	0	0	0	0	0	0	0	0	24	
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
28	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	
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
30	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
31	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	
HOURLY MAX	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	1	1	0	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	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

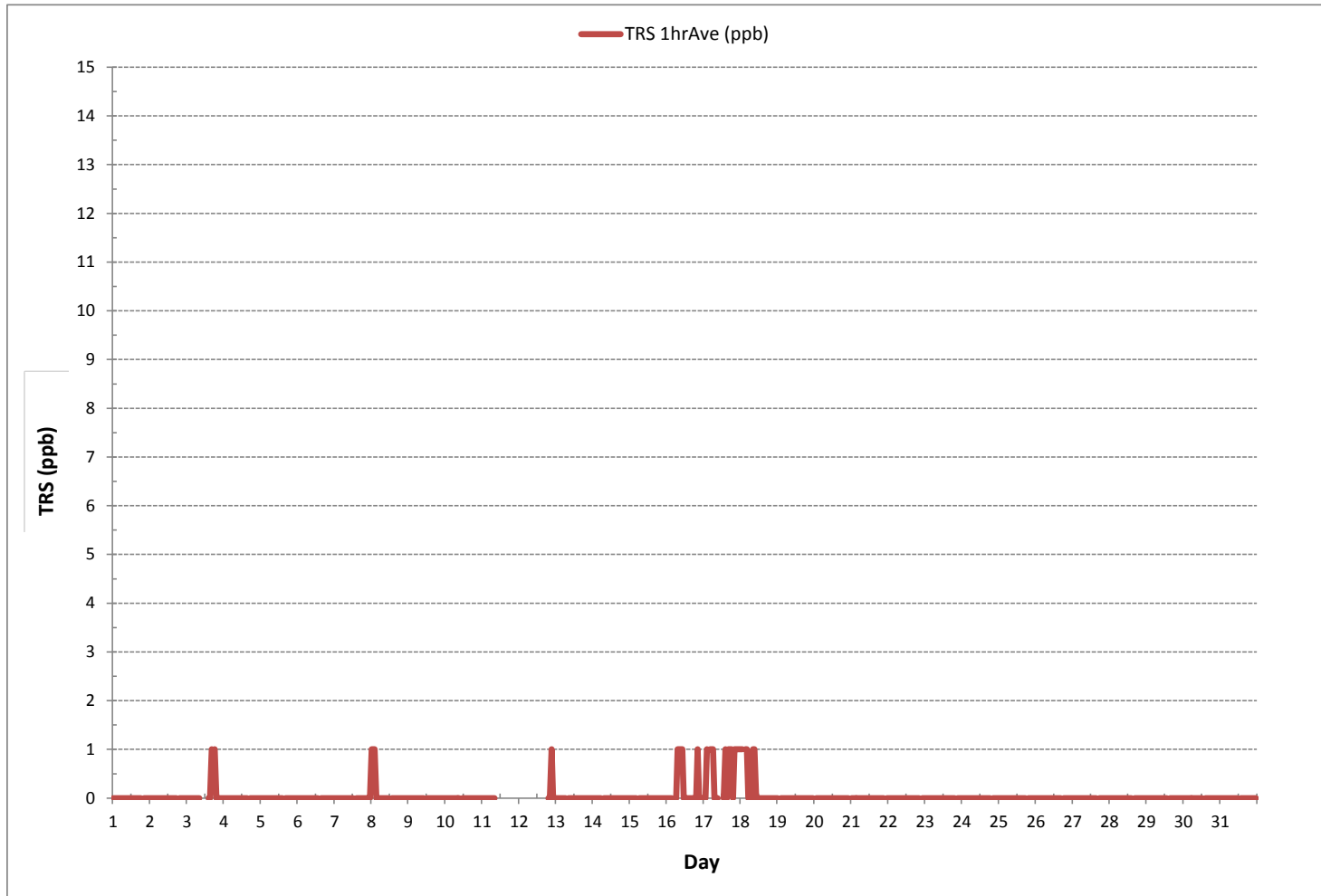
24 HR AVERAGES January 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	29				
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	0	ON DAY	1
MAXIMUM 1-HR AVERAGE:	1	ppb @ HOUR	16	ON DAY	3
MAXIMUM 24-HR AVERAGE:	1	ppb		ON DAY	17
IZS CALIBRATION TIME:	31	hrs	OPERATIONAL TIME:	711	hrs
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:	95.6	%
STANDARD DEVIATION:	0		MONTHLY AVERAGE:	0	ppb

TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)



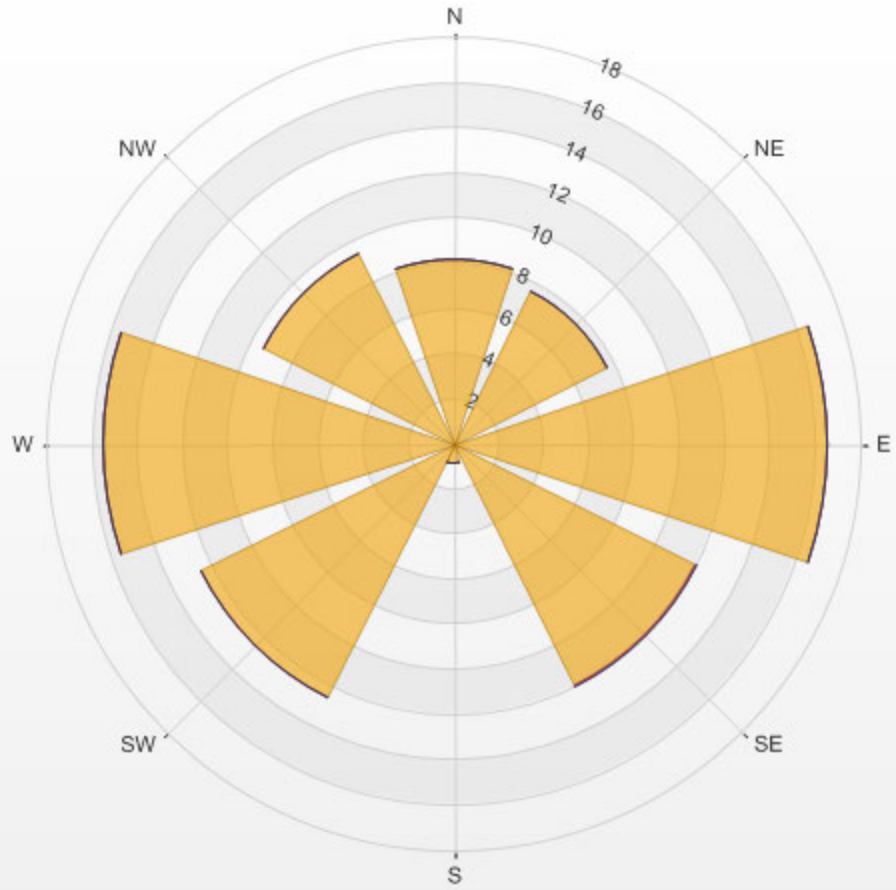
Wind: LICA COLD LAKE SOUTH  
 Poll.: LICA COLD LAKE SOUTH-TRS[ppb]  
 Monthly: 18/01  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 17.29% Calm Avg: 0.36 [ppb]

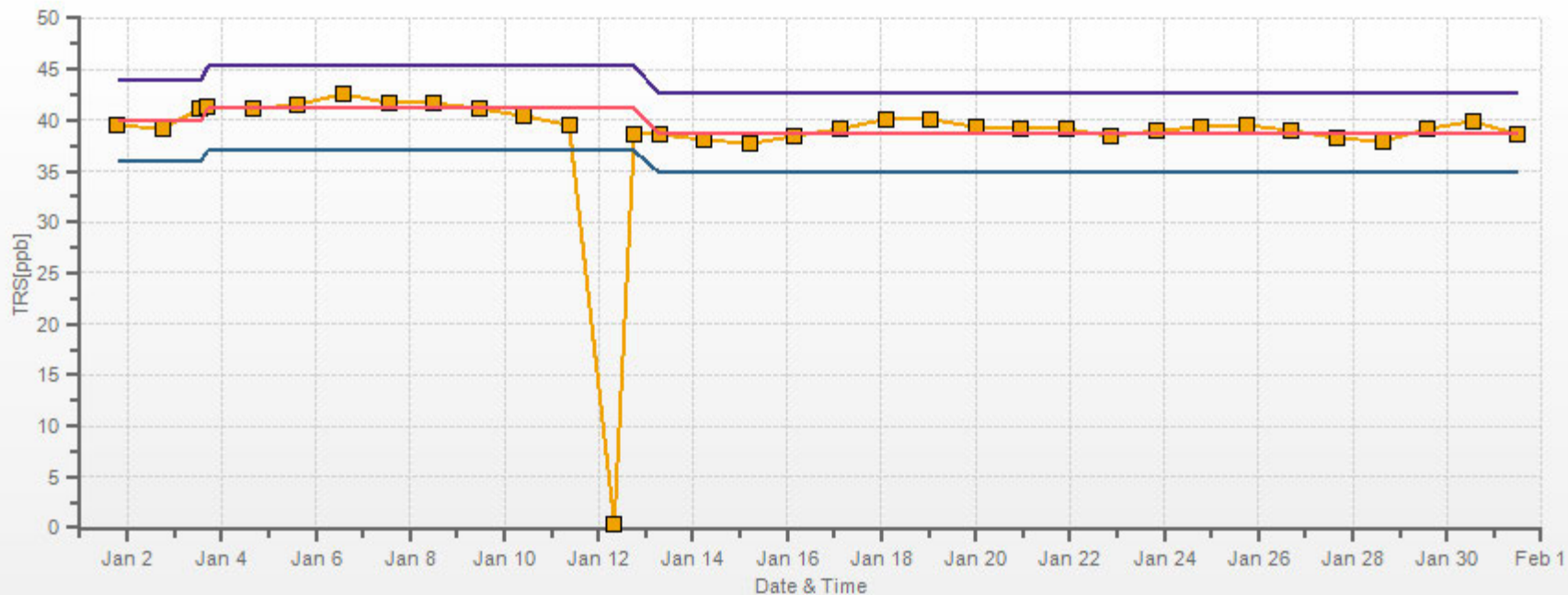
Direction	0.0-0.7	0.7-1.3	1.3-2.0	>2.0	Total
N	8.2	0.0	0.0	0.0	8.2
NE	7.6	0.0	0.0	0.0	7.6
E	16.5	0.0	0.0	0.0	16.5
SE	11.9	0.2	0.0	0.0	12.1
S	0.9	0.0	0.0	0.0	0.9
SW	12.5	0.0	0.0	0.0	12.5
W	15.5	0.0	0.0	0.0	15.5
NW	9.4	0.0	0.0	0.0	9.4
<b>Summary</b>	82.6	0.2	0.0	0.0	82.7

% Icon Classes (ppb) 83 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] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 17.29% Calm Poll Avg: 0.36[ppb]



TRS[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 18/01 Type: Span



Span Meas Span Ref Span Low Span High



***TOTAL HYDROCARBON***



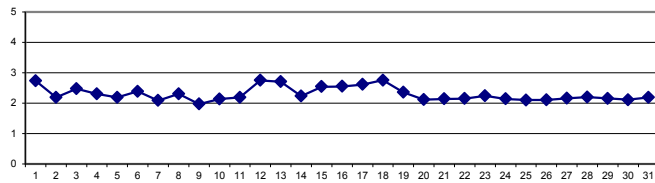
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

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	2.80	2.80	2.82	2.86	2.89	2.87	2.87	2.87	2.85	2.84	2.77	2.74	2.76	2.78	2.72	2.69	2.73	2.74	2.73	S	2.40	2.38	2.45	2.48	2.38	2.89	2.73	24	
2	2.32	2.26	2.26	2.25	2.28	2.24	2.18	2.17	2.19	2.40	2.08	2.02	C	C	C	C	C	2.12	S	2.17	2.15	2.09	2.06	2.13	2.02	2.40	2.19	24	
3	2.12	2.13	2.19	2.27	2.27	2.39	2.35	2.37	2.59	2.71	2.74	2.88	2.94	2.89	2.83	2.83	2.78	S	2.44	2.23	2.25	2.27	2.23	2.24	2.12	2.94	2.48	24	
4	2.22	2.38	2.39	2.28	2.28	2.31	2.38	2.40	2.45	2.69	2.33	2.30	2.31	2.28	2.26	2.24	S	2.26	2.27	2.25	2.23	2.18	2.15	2.15	2.15	2.69	2.30	24	
5	2.17	2.22	2.24	2.26	2.26	2.27	2.25	2.25	2.20	2.16	2.18	2.20	2.18	2.16	2.11	S	2.12	2.08	2.07	2.09	2.12	2.15	2.27	2.30	2.07	2.30	2.19	24	
6	2.43	2.45	2.38	2.28	2.32	2.29	2.38	2.75	2.81	2.67	2.73	2.87	2.76	2.53	S	2.31	2.22	2.13	2.12	2.20	2.11	2.06	2.04	2.01	2.01	2.87	2.38	24	
7	1.99	2.00	2.01	2.00	2.00	1.99	2.00	2.00	2.02	2.04	2.03	1.98	1.97	S	2.00	2.00	2.04	2.09	2.09	2.21	2.25	2.24	2.46	2.57	1.97	2.57	2.09	24	
8	2.71	2.78	2.77	2.75	2.51	2.41	2.38	2.29	2.30	2.16	2.19	2.30	S	2.25	2.27	2.25	2.31	2.26	2.29	2.07	1.96	1.94	1.92	1.99	1.92	2.78	2.31	24	
9	1.95	1.99	1.96	1.97	1.98	1.93	1.97	1.90	1.91	2.06	1.96	S	1.93	1.94	1.97	1.94	2.01	1.99	1.95	2.01	1.97	2.01	2.06	2.01	1.90	2.06	1.97	24	
10	2.05	2.03	2.04	2.10	2.04	2.07	2.11	2.06	2.08	2.09	S	2.10	2.10	2.08	2.15	2.11	2.12	2.21	2.25	2.21	2.22	2.26	2.27	2.43	2.03	2.43	2.14	24	
11	2.33	2.25	2.28	2.21	2.13	2.20	2.22	2.18	2.13	S	2.32	2.19	2.11	2.12	2.10	2.09	2.13	2.13	2.10	2.19	2.18	2.15	2.22	2.29	2.09	2.33	2.18	24	
12	2.28	2.36	2.48	2.50	2.53	2.64	2.72	2.75	S	3.03	2.94	2.80	2.97	3.00	2.89	2.82	2.80	2.91	2.85	2.71	2.76	2.81	2.85	2.83	2.28	3.03	2.75	24	
13	2.82	2.86	2.76	2.84	2.87	2.88	2.85	S	2.84	2.86	2.77	2.58	2.61	2.66	2.56	2.42	2.46	2.76	2.92	2.97	2.87	2.56	2.36	2.23	2.23	2.97	2.71	24	
14	2.13	2.18	2.08	2.07	2.11	2.16	S	2.16	2.19	2.22	2.18	2.14	2.10	2.09	2.14	2.27	2.43	2.35	2.34	2.36	2.42	2.38	2.41	2.45	2.07	2.45	2.23	24	
15	2.50	2.55	2.63	2.80	2.89	S	2.76	2.76	2.74	2.65	2.49	2.46	2.44	2.40	2.29	2.19	2.22	2.31	2.47	2.54	2.59	2.63	2.61	2.54	2.19	2.89	2.54	24	
16	2.59	2.61	2.68	2.69	S	2.55	2.65	2.83	2.90	2.84	2.61	2.27	2.30	2.33	2.34	2.36	2.39	2.43	2.45	2.54	2.66	2.51	2.56	2.60	2.27	2.90	2.55	24	
17	2.84	2.95	2.94	S	2.44	2.49	2.51	2.48	2.35	2.31	2.18	2.17	Q	Q	Q	C1	C1	C1	C1	2.46	2.55	2.78	3.08	3.31	2.17	3.31	2.62	20	
18	3.34	3.36	S	2.87	2.80	2.82	2.74	2.65	2.66	2.74	2.68	2.68	2.83	2.77	2.64	2.71	2.70	2.63	2.66	2.58	2.61	2.64	2.66	2.59	2.58	3.36	2.75	24	
19	2.50	S	2.33	2.35	2.35	2.38	2.40	2.43	2.46	2.44	2.43	2.42	2.42	2.42	2.39	C1	C1	C1	C1	C1	2.26	2.23	2.15	2.11	2.11	2.50	2.36	19	
20	S	2.11	2.13	2.08	2.07	2.11	2.11	2.13	2.12	2.14	2.14	2.14	2.15	2.13	2.16	2.10	2.10	2.07	2.07	2.08	2.14	2.17	2.08	S	2.07	2.17	2.12	24	
21	2.09	2.10	2.12	2.10	2.11	2.14	2.15	2.15	2.17	2.21	2.20	2.17	2.16	2.15	2.16	2.15	2.15	2.15	2.14	2.13	2.13	2.14	S	2.10	2.09	2.21	2.14	24	
22	2.09	2.09	2.09	2.10	2.11	2.12	2.12	2.12	2.10	2.13	2.12	2.11	2.11	2.12	2.14	2.16	2.17	2.24	2.28	2.29	2.26	S	2.23	2.18	2.09	2.29	2.15	24	
23	2.15	2.14	2.16	2.16	2.17	2.18	2.20	2.30	2.31	2.31	2.34	2.34	2.44	2.37	2.27	2.24	2.25	2.24	2.16	S	2.13	2.17	2.19	2.13	2.44	2.24	2.24	24	
24	2.18	2.17	2.17	2.17	2.15	2.15	2.16	2.14	2.14	2.14	2.14	2.14	2.12	2.14	2.14	2.13	2.13	2.13	2.11	S	2.12	2.12	2.12	2.10	2.10	2.18	2.14	24	
25	2.11	2.13	2.12	2.13	2.12	2.12	2.13	2.11	2.12	2.11	2.09	2.08	2.08	2.07	2.09	2.11	2.09	2.10	S	2.09	2.09	2.08	2.08	2.09	2.07	2.13	2.10	24	
26	2.10	2.09	2.08	2.07	2.07	2.10	2.10	2.09	2.10	2.11	2.13	2.10	2.10	2.11	2.11	2.13	2.14	S	2.10	2.10	2.11	2.11	2.12	2.12	2.07	2.14	2.10	24	
27	2.14	2.16	2.17	2.17	2.19	2.18	2.23	2.21	2.21	2.19	2.17	2.16	2.15	2.13	2.13	2.13	S	2.14	2.14	2.13	2.13	2.13	2.15	2.16	2.13	2.23	2.16	24	
28	2.16	2.16	2.15	2.15	2.16	2.16	2.19	2.23	2.25	2.30	2.23	2.15	2.15	2.14	2.13	S	2.18	2.19	2.18	2.26	2.30	2.31	2.25	2.24	2.13	2.31	2.20	24	
29	2.23	2.25	2.23	2.24	2.26	2.28	2.28	2.26	2.25	2.22	2.20	2.20	2.15	2.12	S	2.13	2.09	2.08	2.03	2.02	2.01	2.03	2.02	1.97	1.97	2.28	2.15	24	
30	1.95	1.98	1.96	1.98	2.03	2.05	2.09	2.17	2.20	2.22	2.19	2.17	2.19	S	2.18	2.16	2.15	2.16	2.15	2.12	2.14	2.10	2.10	2.12	1.95	2.22	2.11	24	
31	2.13	2.13	2.14	2.14	2.16	2.16	2.13	2.14	2.17	2.15	2.12	2.14	S	2.13	2.14	2.19	2.20	2.21	2.24	2.27	2.28	2.32	2.34	2.38	2.12	2.38	2.19	24	
HOURLY MAX	3.34	3.36	2.94	2.87	2.89	2.88	2.87	2.87	2.90	3.03	2.94	2.88	2.97	3.00	2.89	2.83	2.80	2.91	2.92	2.97	2.87	2.81	3.08	3.31					
HOURLY AVG	2.31	2.32	2.29	2.29	2.29	2.29	2.32	2.31	2.33	2.37	2.32	2.30	2.32	2.31	2.27	2.27	2.27	2.26	2.28	2.27	2.28	2.26	2.28	2.30					

STATUS FLAG CODES

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

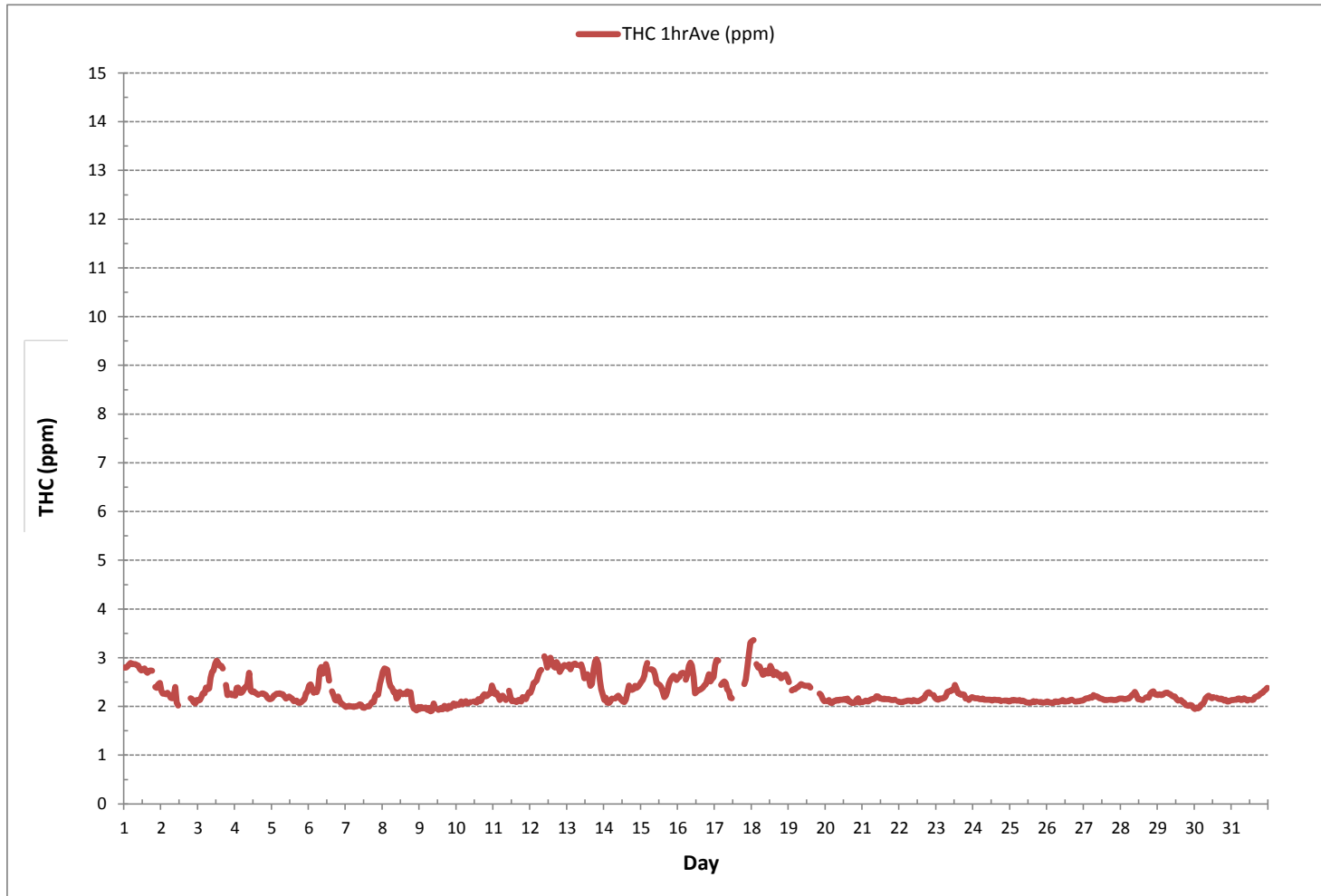
24 HR AVERAGES January 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	695			
MINIMUM 1-HR AVERAGE:	1.90 ppm	@ HOUR	7	ON DAY 9
MAXIMUM 1-HR AVERAGE:	3.36 ppm	@ HOUR	1	ON DAY 18
MAXIMUM 24-HR AVERAGE:	2.75 ppm			ON DAY 18
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	735 hrs	
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	98.8 %	
STANDARD DEVIATION:	0.26	MONTHLY AVERAGE:	2.30 ppm	

TOTAL HYDROCARBONS Hourly Averages (THC ppm)



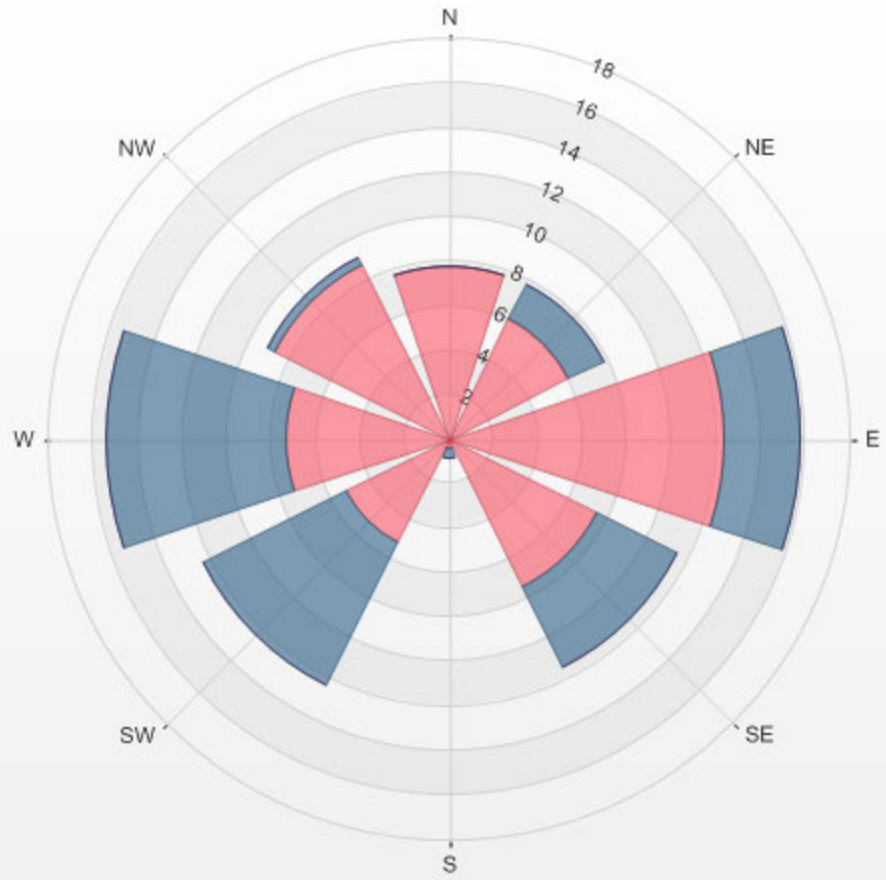
Wind: LICA COLD LAKE SOUTH  
 Poll.: LICA COLD LAKE SOUTH-THC[ppm]  
 Monthly: 18/01  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 19.42% Calm Avg: 2.56 [ppm]

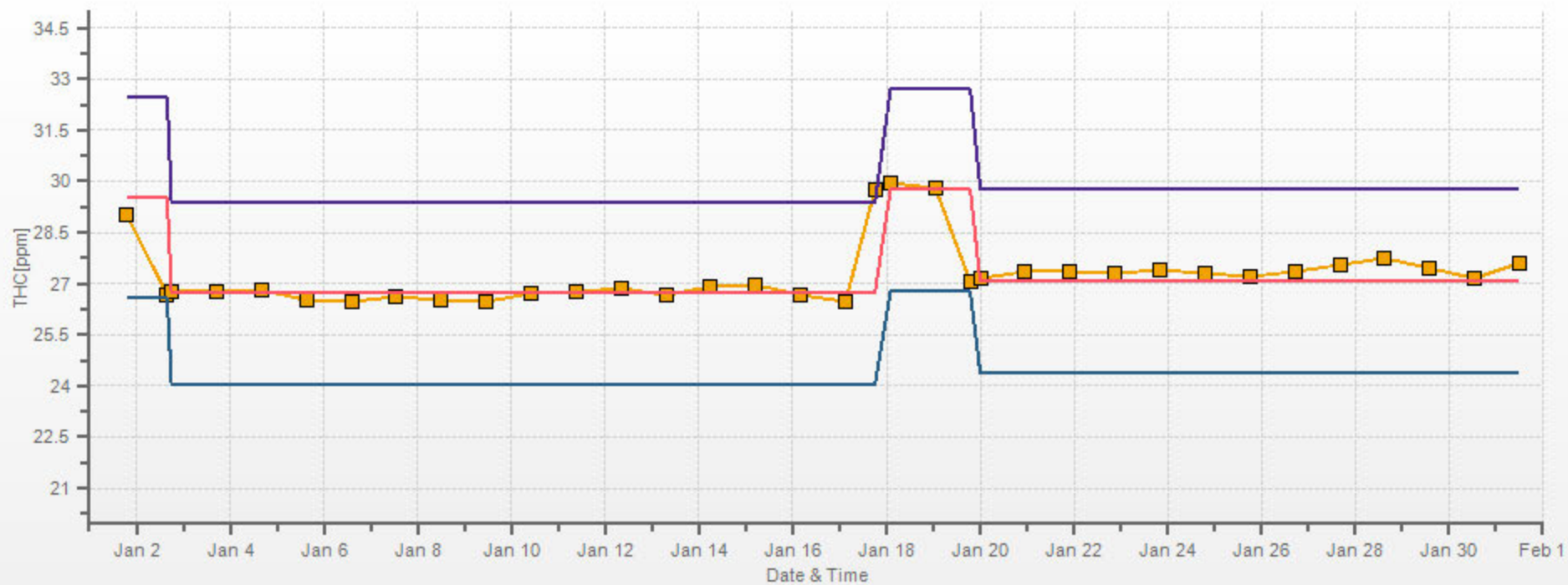
Direction	0.0-1.1	1.1-2.2	2.2-3.4	>3.4	Total
N	0.0	7.8	0.0	0.0	7.8
NE	0.0	6.0	1.7	0.0	7.8
E	0.0	12.4	3.5	0.0	15.8
SE	0.0	7.5	4.0	0.0	11.5
S	0.0	0.4	0.4	0.0	0.9
SW	0.0	5.2	7.2	0.0	12.4
W	0.0	7.3	8.1	0.0	15.4
NW	0.0	8.8	0.3	0.0	9.1
Summary	0.0	55.4	25.2	0.0	80.6

% Icon Classes (ppm) 0 0.0-1.1 55 1.1-2.2 25 2.2-3.4 0 >3.4

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-THC[ppm] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 19.42% Calm Poll Avg: 2.56[ppm]



THC[ppm] Calibration: LICA COLD LAKE SOUTH Monthly: 18/01 Type: Span



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

## ***OXIDES OF NITROGEN***



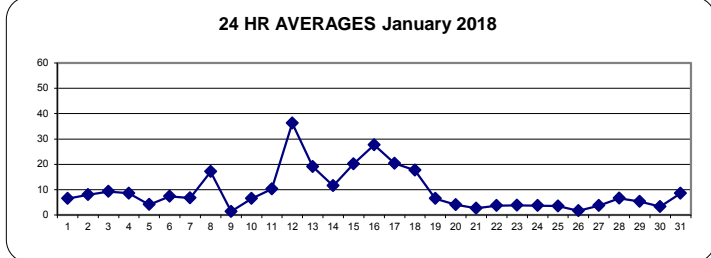
OXIDES OF NITROGEN Hourly Averages (NO<sub>x</sub> ppb)

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	5	5	5	5	5	5	5	5	6	5	5	5	7	7	6	9	8	7	S	9	10	11	11	4	11	7	24	
2	8	6	4	5	8	7	8	11	15	20	17	7	2	4	8	14	13	10	S	5	5	3	2	2	2	20	8	24	
3	2	2	5	6	5	17	6	14	27	C	C	C	C	C	C	C	C	S	17	5	11	13	6	3	2	27	9	24	
4	2	3	6	4	10	12	17	19	25	20	9	9	6	6	6	7	S	8	6	6	6	4	3	4	2	25	9	24	
5	4	3	4	4	4	5	5	4	4	4	4	4	4	4	4	S	5	4	3	3	3	4	6	6	3	6	4	24	
6	4	4	4	4	5	9	5	9	11	11	12	17	15	11	S	9	7	5	5	7	5	4	4	2	2	17	7	24	
7	2	2	2	2	2	2	3	2	3	3	2	1	S	1	S	1	2	3	8	8	10	17	10	28	41	1	41	7	24
8	51	46	38	38	29	20	15	12	13	6	4	8	S	9	12	16	24	22	21	5	2	1	1	1	1	51	17	24	
9	1	1	1	2	1	2	2	2	2	2	1	S	2	2	2	1	1	1	1	1	1	1	1	1	1	2	1	24	
10	1	2	2	2	3	3	3	4	5	7	S	6	5	9	11	9	13	10	11	10	7	9	8	10	1	13	7	24	
11	8	7	6	5	5	12	7	9	9	S	13	9	7	6	6	8	13	12	24	22	13	13	11	12	5	24	10	24	
12	15	13	14	20	24	25	28	38	S	43	49	39	24	41	42	47	50	37	43	33	43	60	60	46	13	60	36	24	
13	30	29	9	15	19	21	17	S	22	21	21	10	11	15	16	16	16	21	26	29	28	21	15	11	9	30	19	24	
14	10	8	4	3	5	6	S	8	10	11	8	6	4	6	8	11	18	16	22	16	19	20	20	26	3	26	12	24	
15	23	21	24	46	52	S	41	38	50	39	8	5	5	5	10	5	8	5	6	9	9	16	23	16	5	52	20	24	
16	27	22	23	21	S	36	50	54	68	75	64	15	8	6	8	8	16	21	18	19	29	19	17	13	6	75	28	24	
17	13	21	14	S	14	14	14	14	10	10	Q	Q	Q	Q	Q	Q	7	6	6	9	11	33	73	78	6	78	20	24	
18	54	51	S	19	23	21	26	22	11	16	7	14	13	11	9	12	11	12	13	14	14	16	11	7	7	54	18	24	
19	5	S	3	3	2	2	4	5	6	5	5	4	3	4	3	6	10	10	15	16	21	8	6	4	2	21	7	24	
20	S	5	4	3	3	4	2	4	6	6	6	7	7	5	4	3	2	3	3	4	4	2	S	2	2	7	4	24	
21	3	2	3	2	2	2	2	2	3	4	5	2	2	3	3	3	3	3	3	2	3	3	S	2	2	5	3	24	
22	2	2	2	2	3	3	4	6	5	4	4	4	4	3	4	3	4	4	5	5	S	3	2	2	2	6	4	24	
23	1	2	2	2	3	3	3	4	5	4	4	5	6	7	5	6	6	5	5	4	S	2	2	3	1	7	4	24	
24	4	4	4	4	3	4	4	6	4	4	3	4	3	3	2	4	5	4	4	S	4	3	3	3	2	6	4	24	
25	2	3	3	3	3	4	4	5	3	4	4	3	4	4	3	4	13	4	2	S	2	2	2	1	1	13	4	24	
26	1	1	1	1	1	1	2	3	2	3	2	2	1	3	3	3	2	S	2	1	1	1	1	1	1	1	3	2	24
27	1	1	2	2	3	3	5	10	9	5	2	2	2	2	3	3	S	6	5	5	4	5	3	3	1	10	4	24	
28	4	2	2	1	2	2	4	4	6	4	2	2	4	4	S	12	9	9	15	18	21	12	11	1	21	7	24		
29	7	4	5	7	6	7	12	9	10	5	4	6	4	4	S	6	5	5	3	3	3	3	3	3	3	12	5	24	
30	5	3	3	3	3	5	5	4	5	4	2	3	3	S	3	4	5	3	3	2	3	2	1	2	1	5	3	24	
31	3	3	3	5	5	5	3	3	9	6	7	S	6	6	8	6	11	13	20	15	18	19	15	3	20	9	24		
HOURLY MAX	54	51	38	46	52	36	50	54	68	75	64	39	24	41	42	47	50	37	43	33	43	60	73	78					
HOURLY AVG	10	9	7	8	8	9	10	11	12	12	10	7	6	7	7	9	10	9	11	10	11	11	12	11					

STATUS FLAG CODES

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

24 HR AVERAGES January 2018

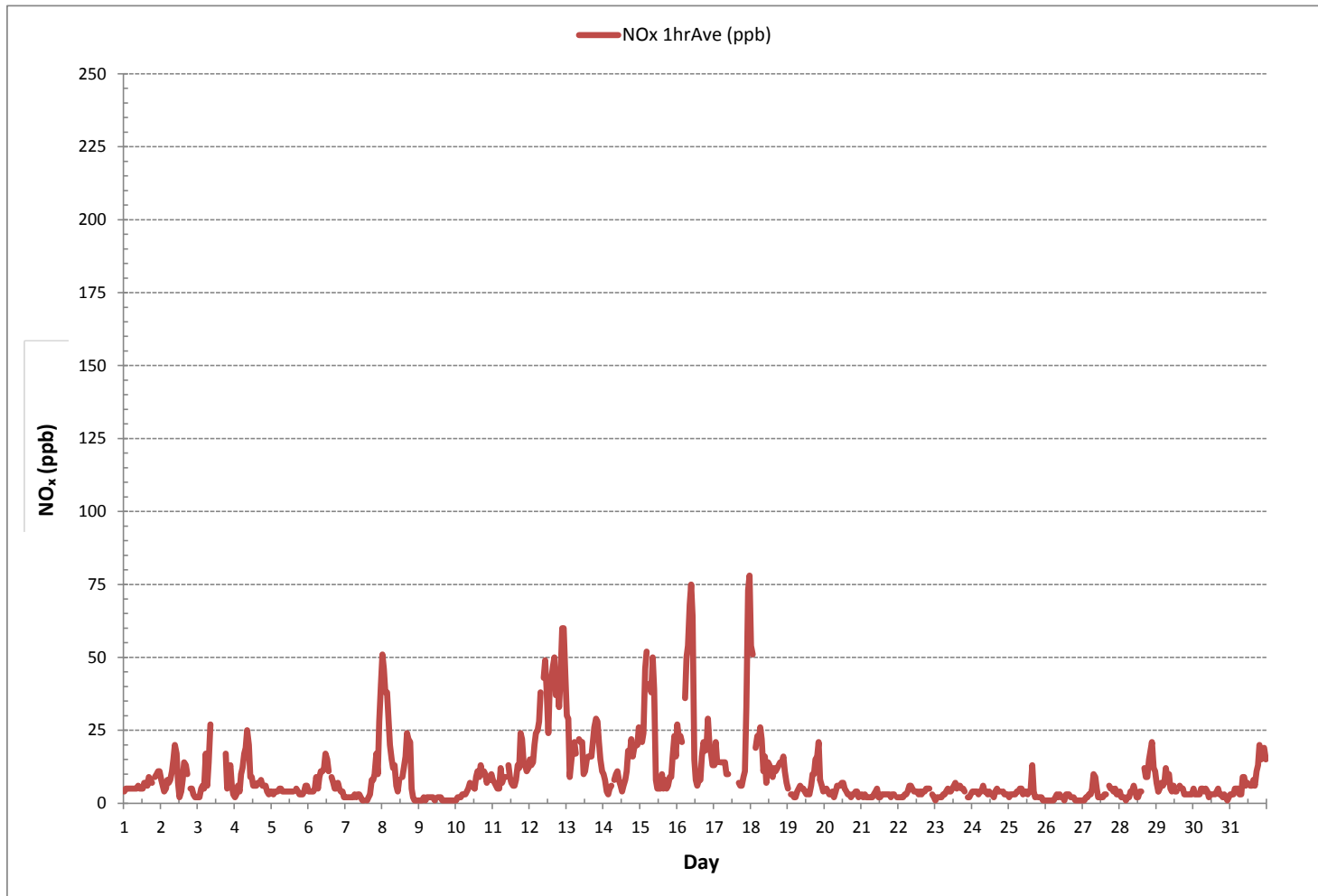


MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	698			
MINIMUM 1-HR AVERAGE:	1 ppb	@ HOUR	11	ON DAY 7
MAXIMUM 1-HR AVERAGE:	78 ppb	@ HOUR	23	ON DAY 17
MAXIMUM 24-HR AVERAGE:	36 ppb			ON DAY 12
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	744 hrs	
MONTHLY CALIBRATION TIME:	8 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	11	MONTHLY AVERAGE:	9 ppb	



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



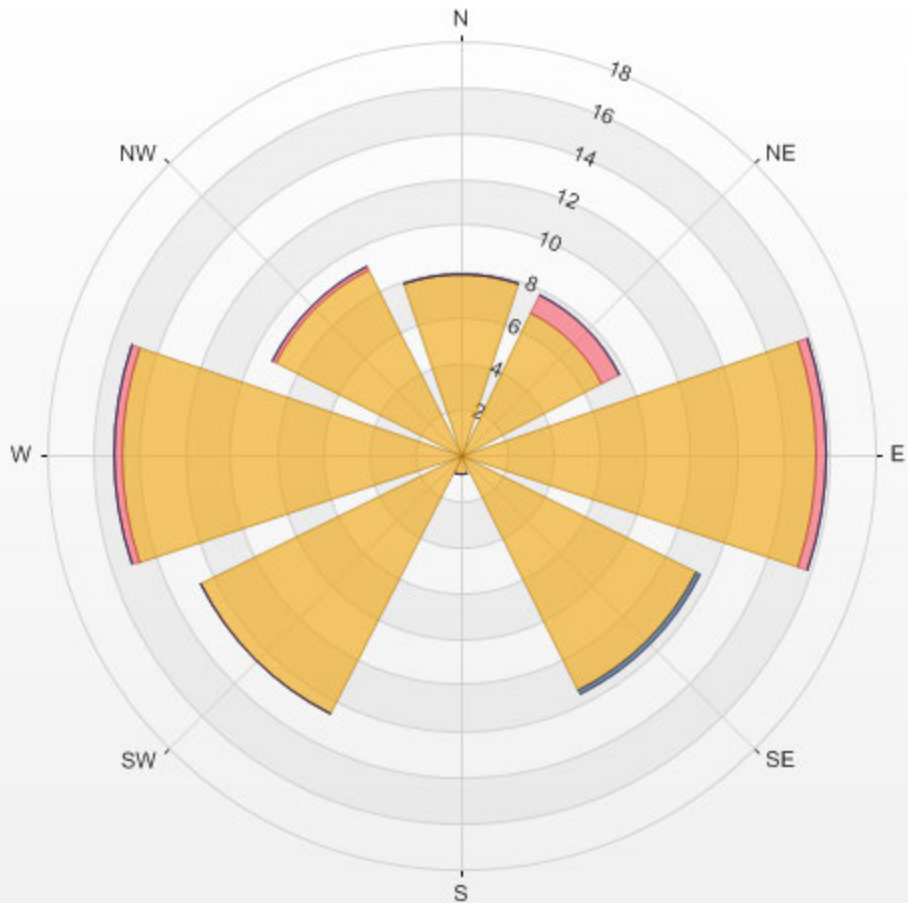
Wind: LICA COLD LAKE SOUTH  
 Poll.: LICA COLD LAKE SOUTH-NOX[ppb]  
 Monthly: 18/01  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 19.08% Calm Avg: 21.79 [ppb]

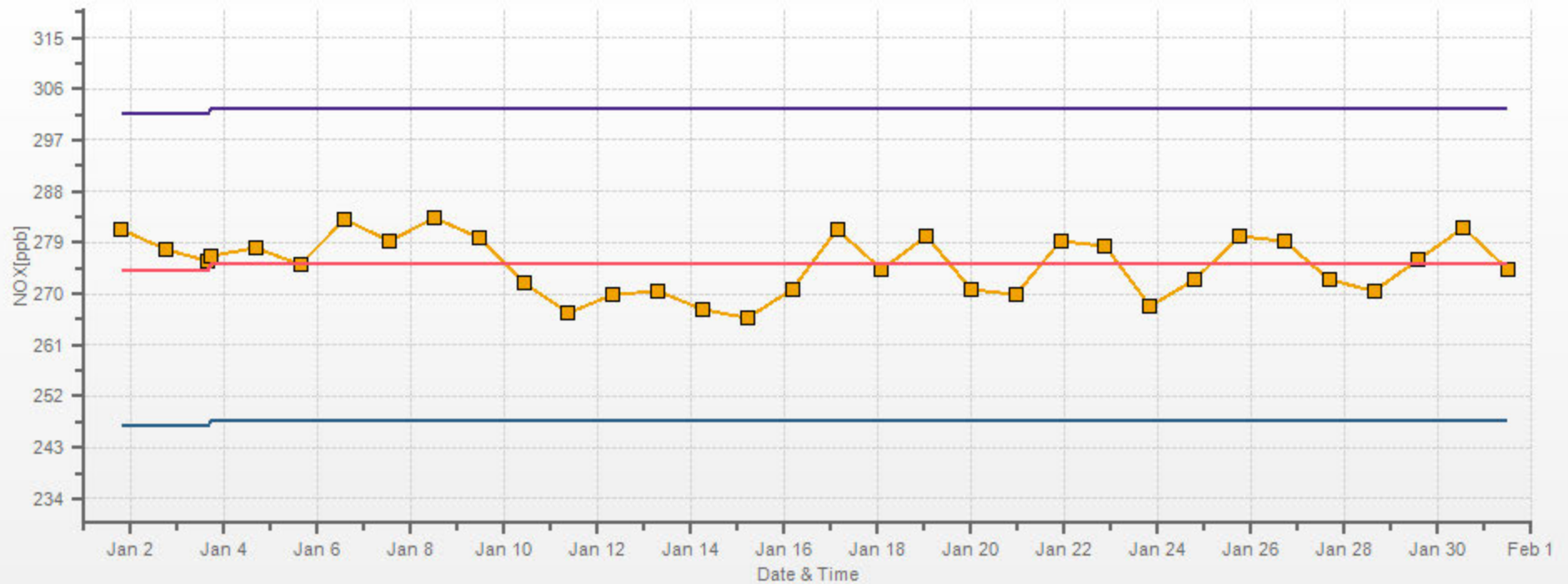
Direction	0.0-26.3	26.3-52.7	52.7-79.0	>79.0	Total
N	7.9	0.0	0.0	0.0	7.9
NE	6.9	0.9	0.0	0.0	7.8
E	15.5	0.4	0.0	0.0	15.9
SE	11.5	0.0	0.1	0.0	11.6
S	0.9	0.0	0.0	0.0	0.9
SW	12.6	0.0	0.0	0.0	12.6
W	14.8	0.3	0.0	0.0	15.1
NW	9.0	0.1	0.0	0.0	9.2
Summary	79.1	1.7	0.1	0.0	80.9

% Icon Classes (ppb) 79 0.0-26.3 2 26.3-52.7 0 52.7-79.0 0 >79.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NOX[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 19.08% Calm Poll Avg: 21.79[ppb]



NOX[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 18/01 Type: Span



Span Meas Span Ref Span Low Span High

***NITRIC OXIDES***



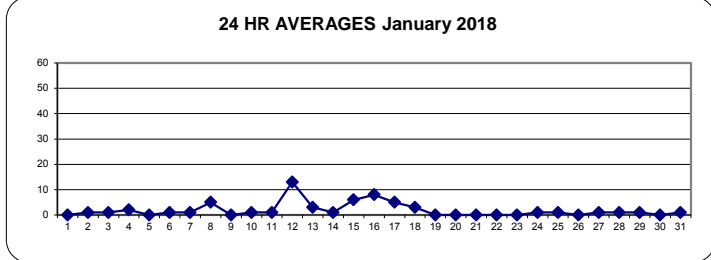
NITRIC OXIDE Hourly Averages (NO ppb)

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	0	1	1	2	2	2	1	1	0	0	0	S	0	0	0	0	0	2	0	24	
2	0	0	0	0	0	0	0	0	0	1	5	5	2	0	1	1	1	1	0	S	0	0	1	0	0	0	5	1	24	
3	0	0	0	0	0	3	0	2	6	C	C	C	C	C	C	C	C	S	3	0	1	1	1	0	0	0	6	1	24	
4	0	0	0	0	2	1	2	3	9	7	2	3	2	2	2	2	S	1	1	1	0	0	0	0	0	0	9	2	24	
5	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	S	0	0	0	0	0	0	1	0	0	0	1	0	24
6	0	0	0	0	0	2	0	0	0	1	3	5	4	2	S	1	0	0	0	0	0	0	0	0	0	0	5	1	24	
7	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	1	2	0	10	17	0	17	1	24	
8	24	21	16	14	7	1	1	1	3	1	1	2	S	2	3	3	4	2	1	0	0	0	0	0	0	0	24	5	24	
9	0	0	0	1	0	0	1	1	0	0	0	S	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
10	0	0	0	0	0	0	0	0	1	2	S	2	1	2	3	1	1	1	1	1	1	1	0	0	0	0	3	1	24	
11	0	0	0	0	0	4	0	1	1	S	4	3	2	2	2	1	1	1	3	1	0	0	0	0	0	0	4	1	24	
12	0	0	0	1	1	2	4	12	S	22	29	23	12	22	20	21	20	10	14	5	14	30	29	18	0	30	13	24		
13	6	8	0	1	1	2	1	S	2	7	8	4	4	6	5	3	1	1	1	1	1	1	0	0	0	0	8	3	24	
14	0	0	0	0	0	0	S	0	1	2	3	2	1	2	2	2	8	2	2	0	1	2	1	3	0	0	8	1	24	
15	1	0	2	19	24	S	15	13	22	19	2	2	2	2	4	1	0	0	0	0	0	1	2	1	0	0	24	6	24	
16	2	1	2	1	S	5	18	23	34	44	37	7	3	2	2	1	2	1	1	1	5	0	0	0	0	44	8	24		
17	0	1	1	S	1	1	1	1	1	1	Q	Q	Q	Q	Q	Q	1	0	0	0	0	10	35	39	0	39	5	24		
18	23	21	S	1	3	3	3	4	1	2	1	4	4	3	2	2	1	0	0	0	0	0	0	0	0	0	23	3	24	
19	0	S	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0	1	1	0	0	0	0	1	0	24		
20	S	0	0	0	0	0	0	0	0	1	1	2	2	1	0	0	0	0	0	0	0	0	0	S	0	2	0	24		
21	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	S	0	0	1	0	24		
22	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	S	0	0	0	1	0	24		
23	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	1	0	0	1	0	S	0	0	0	0	2	0	24		
24	1	0	1	0	0	1	0	2	1	1	1	1	1	1	1	1	1	1	1	S	1	0	1	1	0	2	1	24		
25	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	9	1	0	S	0	0	0	0	0	0	9	1	24		
26	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0	S	0	0	0	0	0	0	0	1	0	24		
27	0	0	0	0	0	0	0	2	2	1	1	1	1	1	1	1	S	1	1	1	0	1	0	0	0	2	1	24		
28	1	0	0	0	0	0	0	0	0	1	1	1	1	2	1	S	2	1	0	1	1	3	1	1	0	3	1	24		
29	1	0	1	1	1	1	2	1	2	1	1	2	1	1	S	1	1	1	0	0	0	0	0	0	0	2	1	24		
30	1	0	0	0	0	0	0	0	0	1	1	1	1	S	1	1	0	0	0	0	0	0	0	0	0	1	0	24		
31	0	0	0	0	0	0	0	0	1	3	2	3	S	2	2	1	1	0	2	0	1	1	0	0	0	3	1	24		
HOURLY MAX	24	21	16	19	24	5	18	23	34	44	37	23	12	22	20	21	20	10	14	5	14	30	35	39						
HOURLY AVG	2	2	1	1	1	1	2	2	3	4	4	3	2	2	2	2	2	1	1	1	1	2	3	3						

STATUS FLAG CODES

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

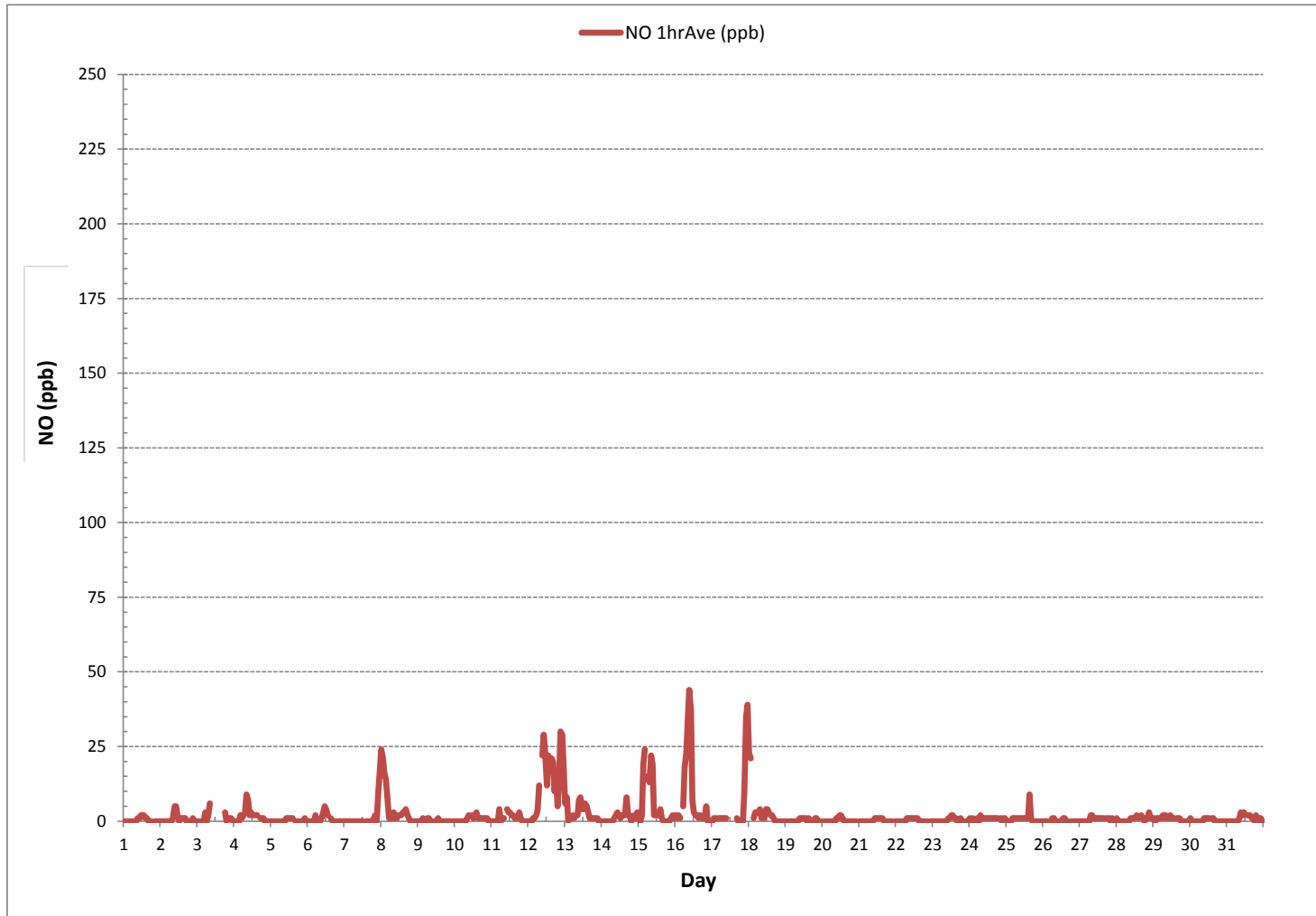
24 HR AVERAGES January 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	354				
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	0	ON DAY 1	
MAXIMUM 1-HR AVERAGE:	44	ppb @ HOUR	16	ON DAY 16	
MAXIMUM 24-HR AVERAGE:	13	ppb		ON DAY 12	
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	744	hrs
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	5		MONTHLY AVERAGE:	2	ppb

NITRIC OXIDE Hourly Averages (NO ppb)



Wind: LICA COLD LAKE SOUTH  
 Poll.: LICA COLD LAKE SOUTH-NO[ppb]  
 Monthly: 18/01  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

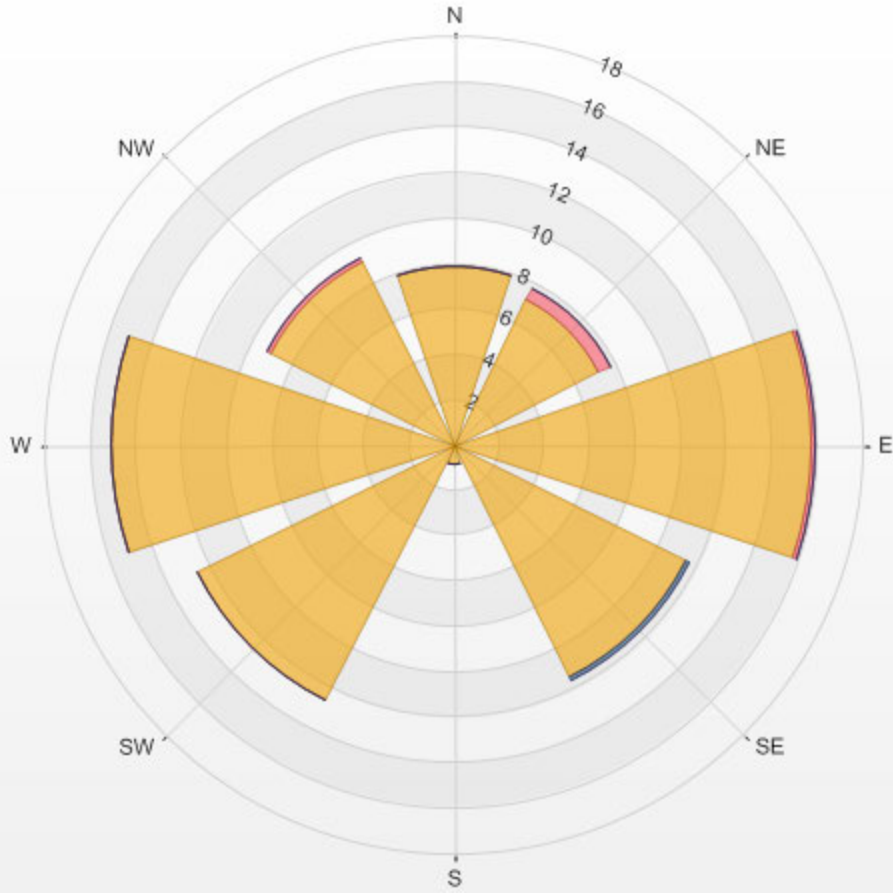
Calm: 19.08% Calm Avg: 5.80 [ppb]

Direction	0.0-15.0	15.0-30.0	30.0-45.0	>45.0	Total
N	7.9	0.0	0.0	0.0	7.9
NE	7.2	0.6	0.0	0.0	7.7
E	15.8	0.1	0.0	0.0	15.9
SE	11.5	0.0	0.1	0.0	11.6
S	0.9	0.0	0.0	0.0	0.9
SW	12.6	0.0	0.0	0.0	12.6
W	15.1	0.0	0.0	0.0	15.1
NW	9.0	0.1	0.0	0.0	9.2
Summary	79.9	0.9	0.1	0.0	80.9



% Icon	Classes (ppb)	80	0.0-15.0	1	15.0-30.0	0	30.0-45.0	0	>45.0
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LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 19.08% Calm Poll Avg: 5.80[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	5	5	5	5	5	5	5	5	5	4	3	4	5	6	6	8	8	7	S	9	9	10	10	3	10	6	24	
2	8	6	4	5	8	7	8	10	13	15	12	5	2	3	6	13	12	9	S	5	5	2	2	2	2	15	7	24	
3	2	2	5	6	5	14	5	12	21	C	C	C	C	C	C	C	C	S	15	5	11	13	5	3	2	21	8	24	
4	2	3	6	4	8	11	16	16	16	13	7	6	4	4	4	6	S	7	6	5	5	4	3	3	2	16	7	24	
5	3	3	4	4	4	4	4	3	4	3	3	3	3	3	4	S	4	4	3	3	3	4	5	6	3	6	4	24	
6	4	4	4	4	5	7	5	9	11	9	9	12	11	8	S	8	7	5	5	7	5	4	3	2	2	12	6	24	
7	2	2	2	1	2	2	2	2	3	3	2	1	1	S	1	1	3	8	7	9	15	9	18	24	1	24	5	24	
8	27	25	22	23	22	19	14	11	10	5	4	6	S	7	9	14	20	20	20	5	2	1	1	1	1	1	27	13	24
9	1	1	1	1	1	1	1	2	2	1	1	S	1	1	1	1	1	1	1	1	1	1	0	1	1	0	2	1	24
10	1	2	2	2	3	3	3	4	5	5	S	4	4	6	8	8	11	9	10	9	7	8	8	9	1	11	6	24	
11	8	7	6	5	5	7	7	9	8	S	8	5	4	4	4	7	12	12	21	21	13	13	11	12	4	21	9	24	
12	14	13	14	19	23	23	24	26	S	21	20	17	12	19	22	25	30	27	29	28	29	30	30	27	12	30	23	24	
13	24	21	9	14	18	19	17	S	20	14	12	6	7	9	11	13	15	20	25	28	27	20	15	11	6	28	16	24	
14	10	7	4	3	5	6	S	8	10	8	6	4	3	4	6	9	11	14	20	15	18	18	19	23	3	23	10	24	
15	22	20	23	28	28	S	26	26	28	20	5	3	3	3	6	4	7	5	6	9	9	15	21	15	3	28	14	24	
16	24	21	22	20	S	31	32	32	34	31	27	9	5	4	6	7	14	20	17	18	23	19	17	13	4	34	19	24	
17	13	19	14	S	13	14	14	13	9	8	Q	Q	Q	Q	Q	Q	7	5	5	8	11	23	38	38	5	38	15	24	
18	31	30	S	18	21	18	23	17	10	14	6	9	9	8	7	10	11	11	12	13	14	16	11	7	6	31	14	24	
19	5	S	3	3	2	2	4	5	5	5	5	3	3	3	5	10	10	15	15	20	7	5	4	2	20	6	24		
20	S	4	4	3	3	4	2	4	6	5	5	5	4	4	3	3	2	3	3	4	4	2	S	2	2	6	4	24	
21	3	2	3	2	2	2	2	2	3	4	4	2	2	3	2	3	3	3	3	2	2	2	S	2	2	4	3	24	
22	2	1	2	2	3	3	3	5	6	4	3	3	3	2	3	3	4	4	5	4	S	3	2	1	6	3	24		
23	1	1	2	2	2	3	3	4	5	4	3	4	5	5	4	5	5	5	3	S	2	2	2	2	1	5	3	24	
24	4	3	3	3	3	3	3	4	3	3	3	3	2	2	2	4	4	3	4	S	3	3	3	2	2	4	3	24	
25	2	2	2	2	3	3	3	4	4	3	3	2	2	3	4	3	1	S	2	2	2	2	1	1	1	4	2	24	
26	1	1	1	1	1	1	1	2	2	2	2	1	1	3	3	2	2	S	1	1	1	1	1	1	1	3	1	24	
27	1	1	2	2	3	3	4	9	7	4	1	1	1	2	2	2	S	4	3	4	3	4	3	3	1	9	3	24	
28	3	2	2	2	1	1	2	3	4	5	3	1	1	2	3	S	10	7	8	13	17	18	11	10	1	18	6	24	
29	6	4	4	6	5	6	11	8	8	4	3	4	3	3	S	4	4	4	3	3	3	3	3	3	3	11	5	24	
30	4	3	2	3	3	4	5	4	4	4	2	2	2	S	2	3	5	3	3	2	3	2	1	2	1	5	3	24	
31	3	3	3	5	5	5	3	3	8	6	4	4	S	4	4	6	5	10	13	18	15	17	19	15	3	19	8	24	
HOURLY MAX	31	30	23	28	28	31	32	32	34	31	27	17	12	19	22	25	30	27	29	28	29	30	38	38					
HOURLY AVG	8	7	6	7	7	8	8	9	9	8	6	5	4	5	5	7	8	8	9	9	9	9	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

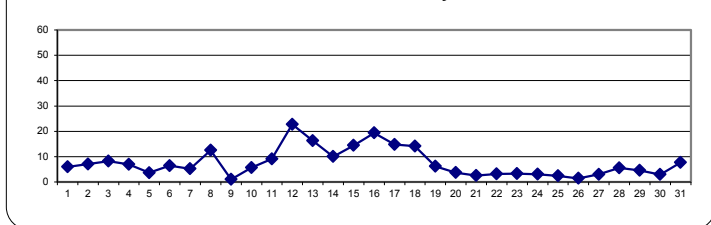
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

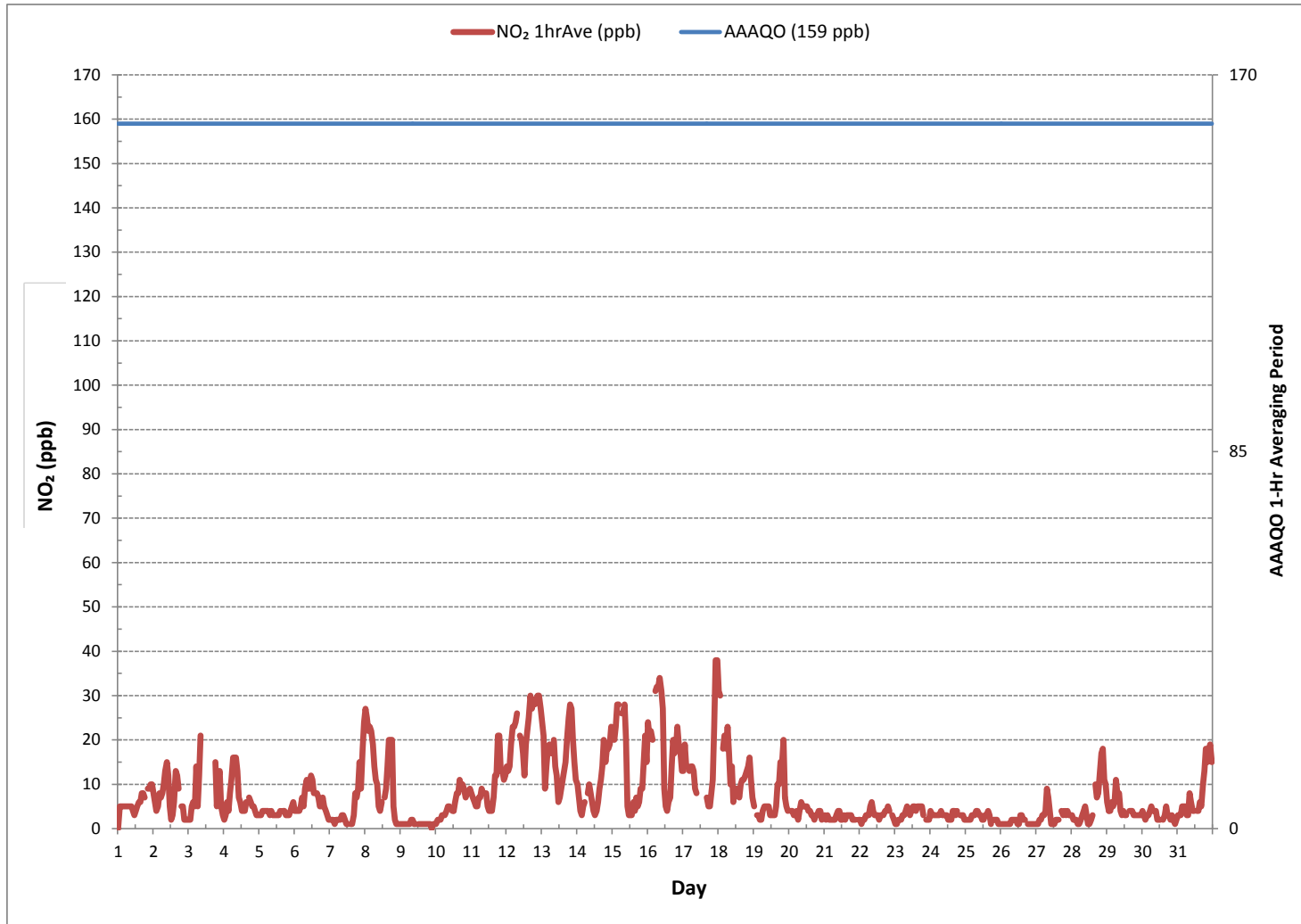
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	697			
MINIMUM 1-HR AVERAGE:	0	ppb	@ HOUR	21 ON DAY 9
MAXIMUM 1-HR AVERAGE:	38	ppb	@ HOUR	22 ON DAY 17
MAXIMUM 24-HR AVERAGE:	23	ppb		ON DAY 12
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	744 hrs
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	7		MONTHLY AVERAGE:	7 ppb

24 HR AVERAGES January 2018



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



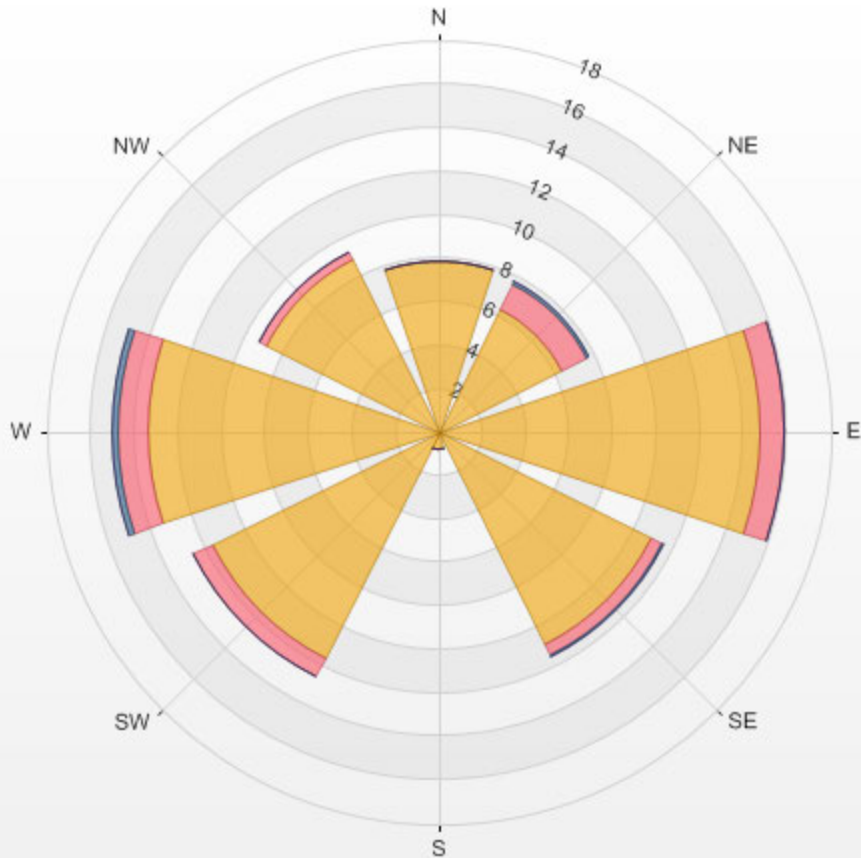
Wind: LICA COLD LAKE SOUTH  
 Poll.: LICA COLD LAKE SOUTH-NO2[ppb]  
 Monthly: 18/01  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 19.08% Calm Avg: 15.99 [ppb]

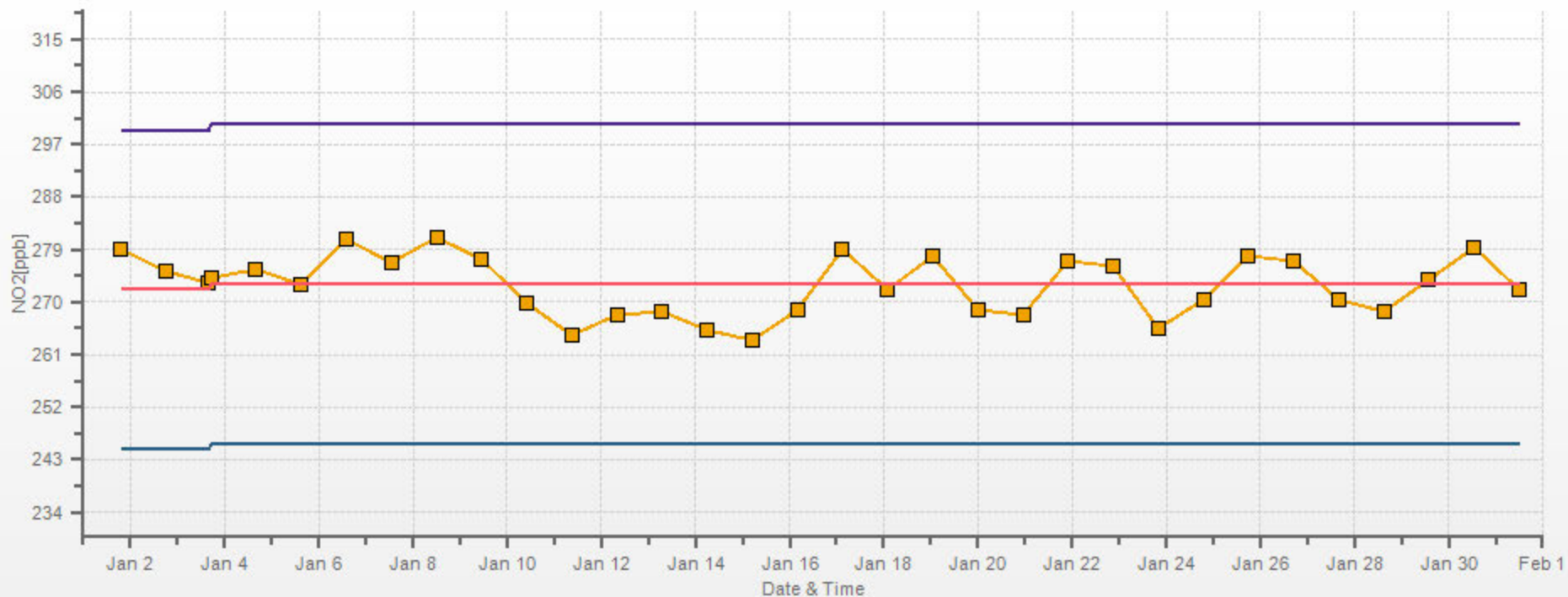
Direction	0.0-13.0	13.0-26.0	26.0-39.0	>39.0	Total
N	7.9	0.0	0.0	0.0	7.9
NE	6.3	1.3	0.1	0.0	7.7
E	14.8	1.2	0.0	0.0	15.9
SE	10.9	0.6	0.1	0.0	11.6
S	0.9	0.0	0.0	0.0	0.9
SW	11.6	1.0	0.0	0.0	12.6
W	13.3	1.4	0.3	0.0	15.1
NW	8.9	0.3	0.0	0.0	9.2
Summary	74.6	5.7	0.6	0.0	80.9

% Icon Classes (ppb) 75 0.0-13.0 6 13.0-26.0 1 26.0-39.0 0 >39.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO2[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 19.08% Calm Poll Avg: 15.99[ppb]



NO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 18/01 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	26.1	24.8	23.7	24.1	24.2	24.7	23.3	22.3	23.1	22.6	25.8	26.5	26.4	26.1	25.9	25.3	21.9	20.5	21.8	S	24.3	24.4	23.9	23.4	20.5	26.5	24.1	24	
2	25.2	28.6	29.4	27.7	21.6	21.8	20.8	21.2	16.8	11.0	21.5	31.3	C	C	C	C	C	26.7	S	31.1	31.4	31.5	32.3	32.4	11.0	32.4	25.7	24	
3	32.3	30.4	26.2	22.1	18.3	9.2	15.3	10.8	4.6	5.8	6.8	12.0	12.9	12.9	13.8	8.2	2.8	S	11.1	21.9	17.4	14.5	20.1	22.3	2.8	32.3	15.3	24	
4	23.0	22.2	19.8	21.1	17.1	12.5	7.4	4.8	4.1	7.1	17.4	18.9	20.3	20.3	19.8	19.3	S	18.1	19.8	20.6	20.2	22.0	22.5	21.9	4.1	23.0	17.4	24	
5	21.4	21.1	20.6	20.3	20.4	19.6	19.8	20.8	20.8	21.1	20.8	21.2	21.8	22.4	23.1	S	23.2	25.3	26.6	25.6	25.0	23.4	20.1	17.9	17.9	26.6	21.8	24	
6	18.0	20.2	19.7	18.3	15.7	14.9	15.4	12.2	10.0	11.7	11.4	8.7	9.9	13.0	S	17.9	22.1	26.2	26.9	26.2	28.1	30.5	30.8	32.7	8.7	32.7	19.2	24	
7	33.8	35.2	34.9	35.5	35.4	35.2	35.2	35.6	34.5	34.8	35.4	36.5	36.8	S	36.5	35.9	32.8	25.2	21.5	16.8	7.5	11.5	6.9	1.3	1.3	36.8	28.5	24	
8	0.8	0.6	0.7	0.7	4.7	6.5	13.6	18.3	18.4	23.7	24.5	23.0	S	23.1	21.8	17.4	9.8	9.2	6.6	22.3	27.4	29.7	30.5	30.3	0.6	30.5	15.8	24	
9	29.7	29.9	30.2	29.6	29.2	28.8	28.6	28.6	28.8	29.4	30.1	S	32.8	33.5	33.9	34.4	34.9	35.1	34.9	34.9	34.5	33.7	32.3	33.3	28.6	35.1	31.8	24	
10	32.5	32.0	31.4	31.9	31.5	31.3	31.3	31.3	31.3	31.1	S	31.9	31.0	29.0	27.4	27.6	24.0	25.6	23.9	25.0	27.5	25.9	25.0	22.5	22.5	32.5	28.8	24	
11	21.8	21.6	20.5	24.2	24.9	20.9	19.6	19.4	21.0	S	23.9	25.7	27.8	28.6	29.3	27.3	21.9	20.9	12.4	9.1	14.7	14.9	16.4	14.1	9.1	29.3	20.9	24	
12	10.4	10.9	10.3	5.6	2.9	2.3	1.6	0.7	S	5.7	9.1	14.2	17.6	15.4	13.6	8.0	2.2	1.3	1.2	0.7	0.7	0.9	0.8	1.6	0.7	17.6	6.0	24	
13	1.7	5.8	17.0	9.6	5.3	3.9	6.7	S	5.4	10.3	16.8	23.5	23.7	22.4	20.2	18.9	15.6	10.4	5.8	3.4	5.1	11.6	16.4	19.1	1.7	23.7	12.1	24	
14	20.0	22.2	28.0	29.5	26.2	24.2	S	20.9	19.4	21.2	24.3	28.3	30.9	30.5	28.2	23.1	19.1	15.8	10.5	11.9	10.1	8.9	6.5	2.5	2.5	30.9	20.1	24	
15	4.8	5.2	3.0	0.7	0.7	S	0.7	0.6	1.4	8.6	27.1	29.7	30.1	30.7	31.7	35.6	32.6	34.2	31.5	27.4	24.7	17.3	13.6	18.9	0.6	35.6	17.9	24	
16	10.5	11.2	7.8	9.3	S	3.1	1.3	0.9	1.7	4.0	14.1	31.1	33.4	34.2	33.0	31.5	23.5	15.2	15.8	12.3	8.1	9.7	9.4	12.3	0.9	34.2	14.5	24	
17	13.8	7.3	14.2	S	15.0	12.8	13.3	16.3	23.7	25.9	31.9	32.9	33.2	34.5	35.6	33.6	Q	Q	32.4	24.6	18.4	8.8	1.4	1.3	1.3	35.6	20.5	24	
18	0.8	0.8	S	9.6	6.6	8.9	8.6	17.7	21.8	17.4	25.9	23.1	26.0	26.7	26.5	24.1	22.9	22.2	21.5	20.9	18.8	14.0	18.3	25.5	0.8	26.7	17.8	24	
19	30.2	S	35.0	33.4	34.6	35.0	33.2	31.6	30.9	32.4	32.5	33.6	34.4	34.6	35.5	32.9	28.2	26.6	18.0	14.8	9.9	25.4	27.2	28.0	9.9	35.5	29.5	24	
20	S	26.2	24.6	23.8	21.4	21.0	26.0	24.2	21.1	21.0	20.5	20.0	19.2	20.1	21.9	25.1	25.8	29.5	28.0	25.1	24.3	25.7	31.8	S	19.2	31.8	23.9	24	
21	31.5	31.5	30.8	31.7	31.6	30.7	29.9	29.5	29.0	27.5	23.0	20.0	20.5	21.9	22.8	23.2	23.2	23.0	22.9	23.2	22.7	22.6	S	23.1	20.0	31.7	25.9	24	
22	24.2	24.8	25.2	25.8	25.4	26.5	25.6	24.7	24.3	25.1	25.5	26.2	26.1	26.8	26.1	25.8	24.8	23.3	24.1	23.5	24.4	S	25.9	28.7	23.3	28.7	25.3	24	
23	29.9	29.8	29.2	28.2	27.9	26.0	23.0	22.5	21.5	22.7	23.1	22.1	19.6	20.3	24.1	24.2	23.7	24.2	25.0	28.5	S	30.5	30.5	25.4	19.6	30.5	25.3	24	
24	20.1	21.4	21.7	22.5	22.9	23.5	23.2	22.0	23.4	23.6	23.9	23.9	25.7	27.2	27.7	26.0	26.7	26.4	26.5	S	26.4	26.7	26.7	27.0	20.1	27.7	24.6	24	
25	27.0	26.3	25.8	26.0	25.8	25.5	25.1	24.5	24.5	25.3	25.4	25.4	25.9	25.7	25.6	24.1	23.8	24.8	S	24.5	24.5	24.8	25.4	25.5	23.8	27.0	25.3	24	
26	26.0	26.2	26.2	26.0	26.1	25.9	25.4	24.5	25.6	25.7	25.7	26.5	26.0	22.4	22.6	23.3	24.1	S	25.4	26.5	27.1	27.6	27.8	27.2	22.4	27.8	25.6	24	
27	27.0	26.0	24.4	23.6	22.0	21.8	19.9	17.1	20.5	24.9	26.8	27.0	27.3	27.6	27.2	26.6	S	24.9	25.4	24.9	25.8	25.1	25.9	26.3	17.1	27.6	24.7	24	
28	27.3	28.3	28.2	28.0	28.3	28.0	26.7	24.7	23.7	23.1	23.5	24.2	24.4	24.0	23.6	S	17.0	19.4	17.1	10.8	8.3	7.7	15.7	16.7	7.7	28.3	21.7	24	
29	21.3	24.0	24.2	23.4	24.0	23.7	20.7	23.2	23.5	27.9	29.4	28.8	29.0	28.5	S	27.2	28.4	28.7	29.8	28.3	26.4	24.6	24.7	25.8	20.7	29.8	25.9	24	
30	26.2	26.2	27.3	26.7	26.2	23.3	20.8	20.4	21.0	22.2	24.7	24.7	23.5	S	24.0	23.6	21.2	21.9	22.6	23.0	22.4	25.3	27.6	27.3	20.4	27.6	24.0	24	
31	26.4	26.6	27.1	26.6	26.9	27.4	29.9	29.8	25.4	28.0	29.7	30.2	S	31.8	31.9	30.0	29.6	24.0	19.5	14.1	15.4	12.0	9.1	11.6	9.1	31.9	24.5	24	
HOURLY MAX	33.8	35.2	35.0	35.5	35.4	35.2	35.2	35.6	34.5	34.8	35.4	36.5	36.8	34.6	36.5	35.9	34.9	35.1	34.9	34.9	34.5	33.7	32.3	33.3					
HOURLY AVG	21.5	21.6	22.9	22.2	21.4	20.6	19.7	20.0	20.0	20.7	23.4	25.0	25.6	25.5	26.2	25.0	22.4	22.5	21.0	20.8	20.1	20.4	20.9	20.9					

**STATUS FLAG CODES**

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

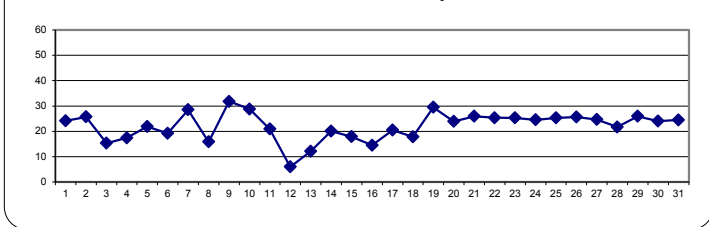
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 82 ppb

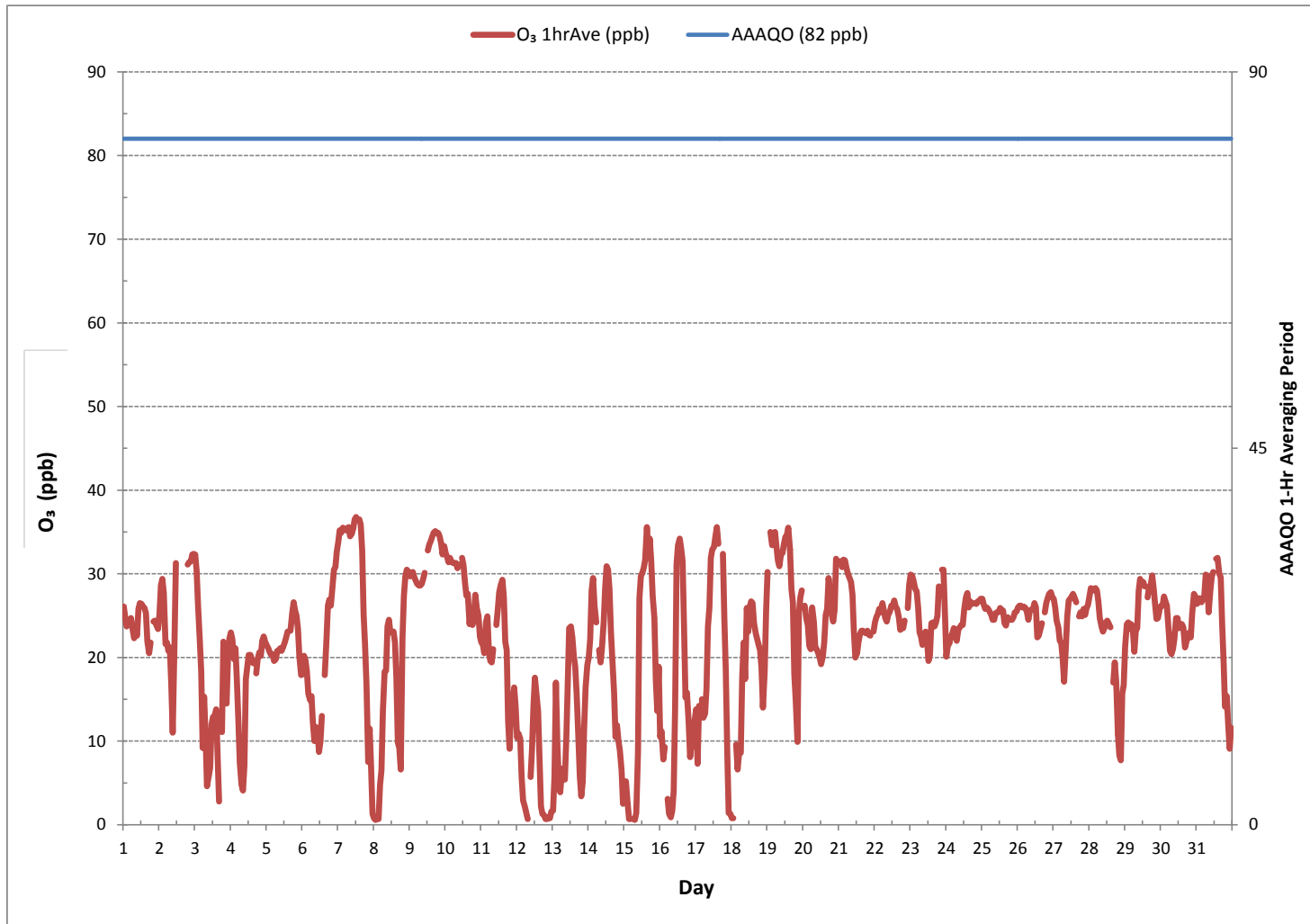
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	705			
MINIMUM 1-HR AVERAGE:	0.6 ppb	@ HOUR	1	ON DAY 8
MAXIMUM 1-HR AVERAGE:	36.8 ppb	@ HOUR	12	ON DAY 7
MAXIMUM 24-HR AVERAGE:	31.8 ppb			ON DAY 9
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	744 hrs	
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	8.4	MONTHLY AVERAGE:	22.0 ppb	

**24 HR AVERAGES January 2018**



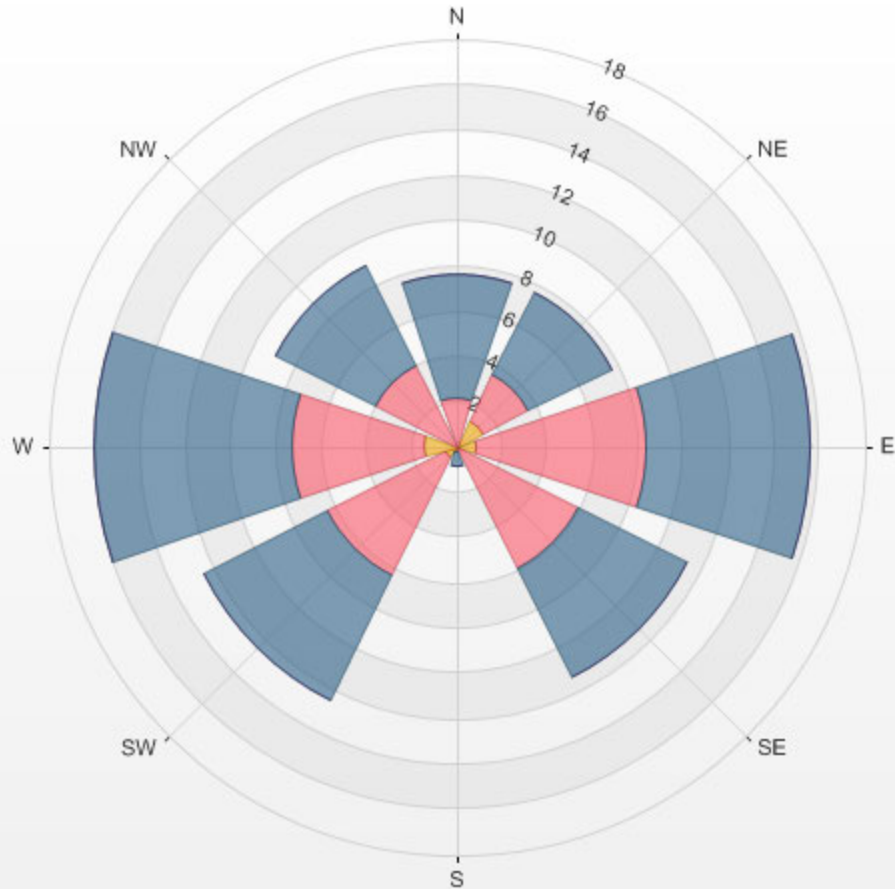
OZONE Hourly Averages (O<sub>3</sub> ppb)



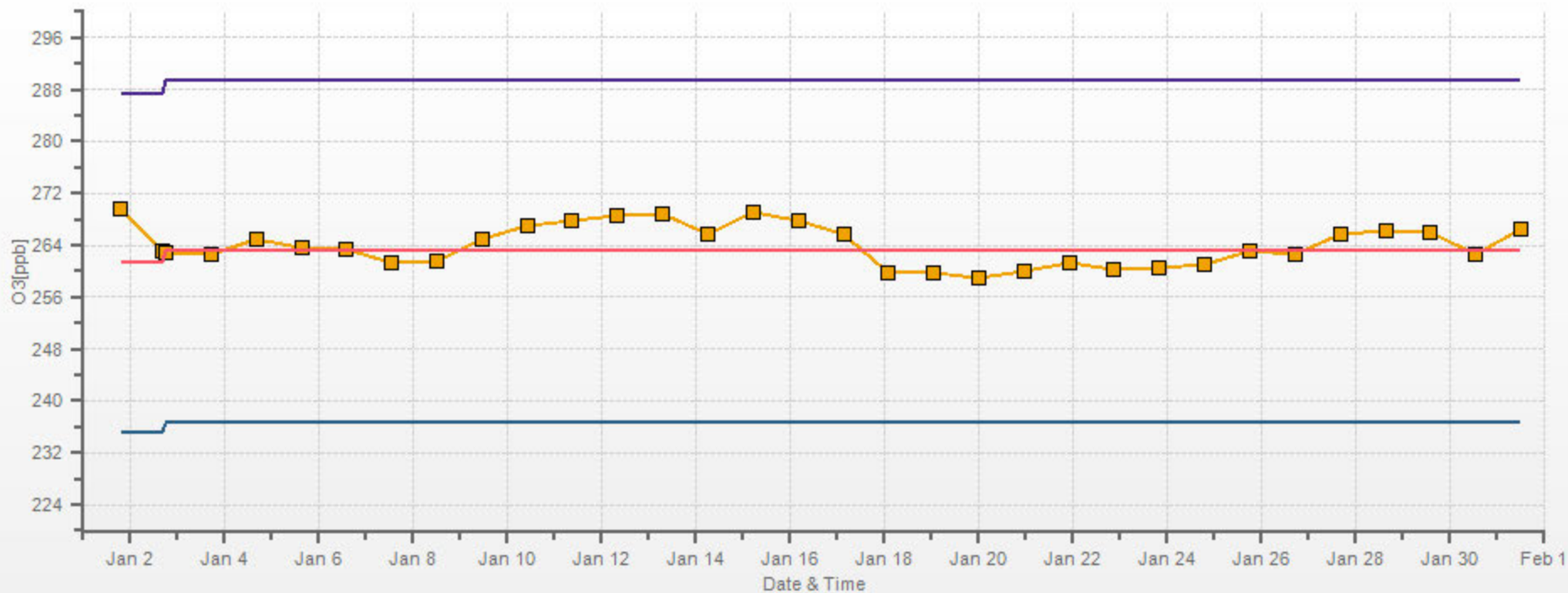


% Icon Classes (ppb) 4 0.0-12.3 34 12.3-24.6 43 24.6-36.9 0 >36.9

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-O3[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 19.32% Calm Poll Avg: 11.82[ppb]



O3[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 18/01 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	1	2	1	2	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	4	5	4	4	4	1	5	2	24
2	5	3	3	3	3	2	2	2	2	2	2	1	1	1	2	2	C	8	4	7	12	3	3	3	1	12	3	24	
3	4	5	6	6	6	7	8	11	12	12	13	17	18	17	16	17	16	13	13	7	8	9	8	8	4	18	11	24	
4	8	8	9	9	10	14	20	19	20	28	24	18	15	13	12	10	12	11	11	10	10	10	10	11	8	28	13	24	
5	10	11	12	12	11	12	12	12	11	11	12	14	14	13	12	12	13	10	8	7	6	6	6	7	6	14	11	24	
6	7	8	7	7	7	7	8	8	10	12	14	15	15	16	14	10	6	3	1	1	1	0	0	0	0	0	16	7	24
7	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	3	0	3	0	24	
8	5	4	4	3	2	2	2	2	2	1	2	2	2	2	2	2	5	4	4	2	1	1	1	1	1	5	2	24	
9	1	1	1	1	1	1	1	1	1	1	1	1	2	3	2	2	2	2	1	1	1	1	1	1	1	3	1	24	
10	2	2	2	2	2	2	2	2	2	3	3	3	3	3	4	3	5	4	3	3	3	3	3	4	2	5	3	24	
11	4	4	0	5	3	0	0	0	3	8	6	2	2	3	5	5	6	10	10	10	0	0	0	0	0	10	4	24	
12	0	0	0	0	0	0	0	0	0	0	5	13	9	11	15	17	20	17	16	0	0	2	15	11	0	20	6	24	
13	1	6	3	5	6	6	5	5	5	5	7	3	4	5	7	8	10	12	11	11	10	8	6	6	1	12	6	24	
14	5	5	4	4	5	5	5	6	6	6	5	5	3	3	4	4	5	7	10	8	6	7	7	10	3	10	6	24	
15	8	7	8	12	13	11	8	8	9	6	2	1	1	1	1	1	1	1	1	1	1	2	4	4	1	13	5	24	
16	6	6	4	3	3	4	4	6	11	6	8	2	1	1	2	3	4	5	4	4	7	4	3	3	1	11	4	24	
17	4	5	8	14	21	19	15	10	5	3	1	1	1	1	1	1	1	1	1	1	1	3	7	8	1	21	6	24	
18	5	5	7	5	4	2	2	2	1	2	2	2	3	4	5	7	6	9	12	11	10	9	7	5	1	12	5	24	
19	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	4	6	2	2	1	1	6	2	24	
20	1	1	1	1	2	3	2	2	3	4	4	5	5	4	4	2	1	1	1	1	2	2	2	3	1	5	2	24	
21	4	5	6	7	8	8	8	8	7	7	8	8	7	7	7	5	4	4	4	3	4	4	4	5	3	8	6	24	
22	6	8	8	7	8	7	8	9	8	9	9	6	6	6	8	9	9	10	9	9	7	6	5	3	3	10	8	24	
23	3	3	4	4	6	7	8	19	19	13	12	13	23	18	8	6	6	5	4	3	2	2	2	7	2	23	8	24	
24	12	12	13	12	11	10	10	11	7	6	6	6	5	3	3	3	4	4	4	5	5	4	4	5	3	13	7	24	
25	5	5	6	7	7	5	4	4	4	4	4	3	3	4	3	3	3	3	2	2	1	1	2	3	1	7	4	24	
26	3	4	5	5	4	3	4	4	4	4	4	4	4	2	2	3	2	2	2	2	2	2	2	2	2	5	3	24	
27	1	1	2	2	2	2	2	3	3	3	2	2	2	2	2	2	2	4	4	3	3	2	2	2	1	4	2	24	
28	3	2	2	2	2	3	3	3	3	4	3	2	2	2	2	3	4	4	3	4	5	6	6	5	2	6	3	24	
29	3	2	2	3	2	2	4	2	4	3	2	2	2	2	2	3	3	2	2	2	3	4	4	3	2	4	3	24	
30	3	3	3	3	3	4	5	6	4	4	3	3	3	2	2	2	2	3	3	3	3	2	2	2	2	6	3	24	
31	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	2	1	24	
HOURLY MAX	12	12	13	14	21	19	20	19	20	28	24	18	23	18	16	17	20	17	16	11	12	10	15	11					
HOURLY AVG	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4					

STATUS FLAG CODES

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

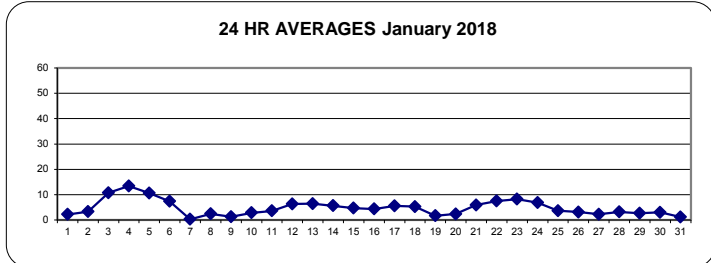
OBJECTIVE LIMIT:

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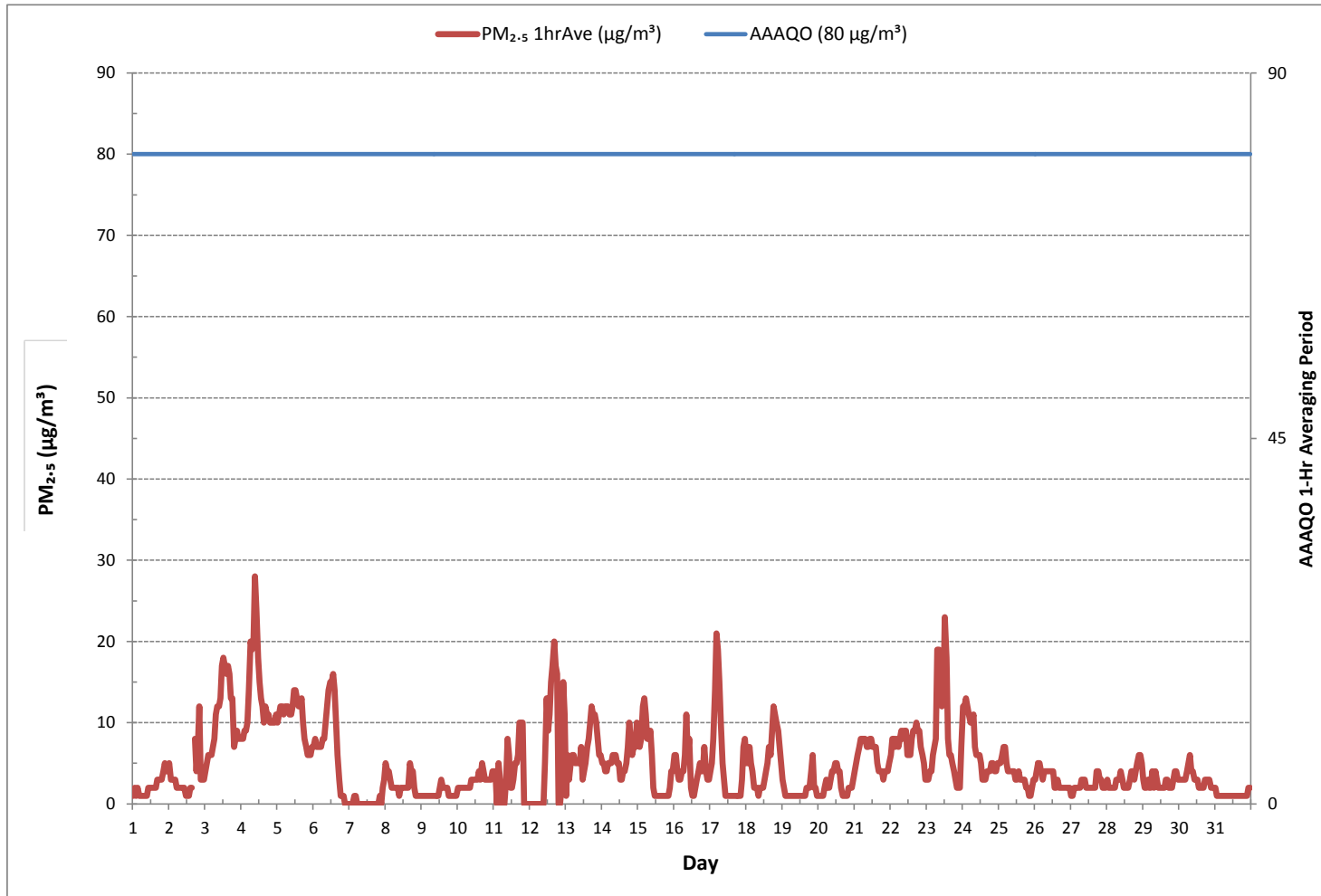
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	701		
MINIMUM 1-HR AVERAGE:	0 µg/m <sup>3</sup> @ HOUR	21 ON DAY	6
MAXIMUM 1-HR AVERAGE:	28 µg/m <sup>3</sup> @ HOUR	9 ON DAY	4
MAXIMUM 24-HR AVERAGE:	13 µg/m <sup>3</sup>	ON DAY	4
MONTHLY CALIBRATION TIME:	1 hrs	OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	4	AMD OPERATION UPTIME:	100.0 %
		MONTHLY AVERAGE:	5 µg/m <sup>3</sup>

24 HR AVERAGES January 2018



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: 18/01  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

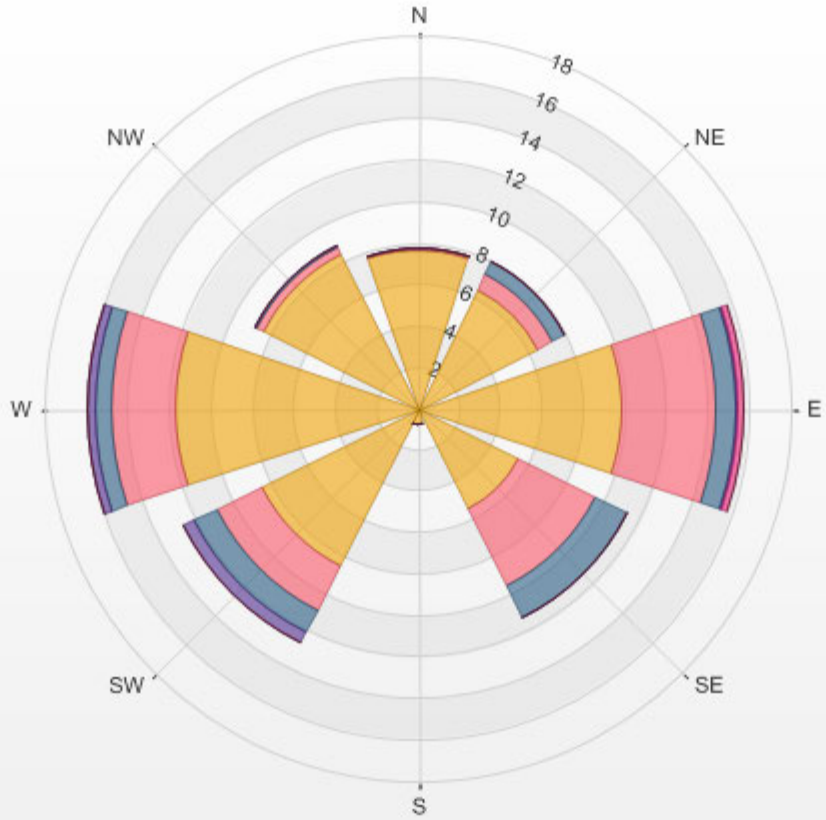
Calm: 18.84%

Calm Avg: 5.32 [ug/m3(L)]

Direction	0.0-5.8	5.8-11.6	11.6-17.4	17.4-23.2	23.2-29.0	>29.0	Total
<b>N</b>	7.7	0.1	0.0	0.0	0.0	0.0	7.8
<b>NE</b>	6.5	0.8	0.7	0.0	0.0	0.0	7.9
<b>E</b>	9.8	4.6	0.9	0.1	0.3	0.0	15.8
<b>SE</b>	5.4	4.2	1.8	0.0	0.0	0.0	11.3
<b>S</b>	0.8	0.0	0.0	0.0	0.0	0.0	0.8
<b>SW</b>	8.5	2.4	1.2	0.5	0.0	0.0	12.7
<b>W</b>	11.7	3.1	0.8	0.4	0.0	0.0	16.0
<b>NW</b>	8.3	0.4	0.1	0.0	0.0	0.0	8.9
<b>Summary</b>	58.7	15.6	5.5	1.1	0.3	0.0	81.1

% Icon Classes (ug/m3(L)) 59 0.0-5.8 16 5.8-11.6 6 11.6-17.4 1 17.4-23.2 0 23.2-29.0 0 >29.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-PM2.5\_2[ug/m3(L)] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 18.84% Calm Poll Avg: 5.32[ug/m3(L)]



## ***WIND SPEED***



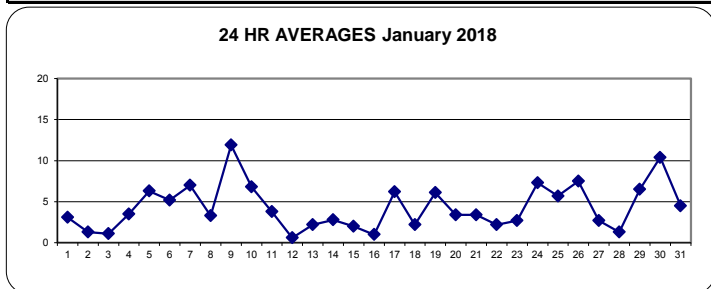
WIND SPEED Hourly Averages (WS kph)

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	0.5	0.9	1.5	1.6	1.9	1.1	0.9	1.2	1.3	1.3	3.6	4.8	4.7	6.4	3.7	1.4	1.5	2.0	3.7	6.0	4.1	8.8	12.1	8.5	0.5	12.1	3.1	24
2	8.8	8.8	7.1	5.2	1.4	5.1	4.3	4.8	1.9	1.2	3.2	5.3	7.2	4.5	2.8	2.4	2.3	1.6	4.9	4.3	5.3	7.2	6.2	6.3	1.2	8.8	1.3	24
3	3.9	1.2	0.9	0.2	0.5	0.9	2.1	0.5	1.9	1.6	1.3	3.1	2.6	3.5	2.3	1.3	1.9	1.7	3.6	4.8	3.1	2.0	3.8	6.8	0.2	6.8	1.1	24
4	7.8	4.1	1.0	5.1	2.6	1.4	1.3	0.2	0.5	2.5	3.0	3.4	3.4	3.3	3.7	4.7	6.0	5.5	5.6	5.8	4.6	5.0	5.3	4.6	0.2	7.8	3.5	24
5	5.9	6.9	5.5	5.0	6.3	5.2	6.3	8.5	8.7	9.6	8.0	7.5	8.1	8.4	7.6	6.2	4.6	7.2	8.3	5.2	5.4	4.5	1.6	2.2	1.6	9.6	6.3	24
6	2.0	3.4	1.3	0.9	0.7	0.7	1.2	4.6	4.1	7.3	5.7	8.8	7.7	8.0	7.4	8.1	9.9	7.3	7.4	9.0	7.5	9.2	8.0	8.7	0.7	9.9	5.2	24
7	8.1	9.3	8.5	10.6	10.4	9.4	11.8	12.4	12.8	9.4	9.6	13.0	12.9	13.6	10.2	5.8	3.1	2.9	3.4	1.6	0.4	2.9	0.5	1.0	0.4	13.6	7.0	24
8	0.9	0.9	0.4	1.7	2.6	1.1	2.5	2.5	2.7	5.3	4.4	2.3	3.3	2.7	3.0	1.9	1.5	2.1	0.7	9.3	12.9	11.9	12.1	12.2	0.4	12.9	3.3	24
9	12.7	13.7	15.4	14.3	14.9	14.8	14.5	11.8	10.1	11.7	12.9	14.5	15.1	12.2	11.5	12.3	14.1	13.9	13.0	12.2	9.9	10.2	13.4	10.5	9.9	15.4	11.9	24
10	10.9	10.2	9.4	13.1	11.0	9.0	10.3	11.2	8.1	8.7	9.8	9.4	8.0	7.1	8.6	5.0	4.6	4.3	4.1	5.8	6.9	7.4	5.3	4.7	4.1	13.1	6.8	24
11	4.8	2.9	3.2	7.5	5.1	2.6	2.3	5.2	6.4	5.6	4.7	6.6	6.9	6.7	5.2	5.4	3.8	2.9	3.1	0.3	0.7	0.5	0.4	0.8	0.3	7.5	3.8	24
12	0.4	0.5	0.8	0.3	1.1	1.1	2.3	0.8	0.7	0.6	1.0	2.6	1.6	2.9	2.8	3.3	1.4	0.9	0.5	0.3	0.4	0.7	0.9	1.1	0.3	3.3	0.6	24
13	0.2	1.4	2.3	0.6	0.8	0.5	0.7	0.5	0.8	0.9	0.5	1.3	3.4	4.0	3.3	3.9	3.9	5.9	2.3	3.9	3.7	5.2	6.4	8.4	0.2	8.4	2.2	24
14	5.6	5.5	9.0	8.2	6.0	6.2	2.8	5.7	5.2	6.8	6.4	4.4	2.6	2.4	4.7	4.9	2.0	2.1	0.8	0.4	0.2	0.5	0.1	1.2	0.1	9.0	2.8	24
15	0.2	0.3	1.0	2.0	1.1	0.9	1.1	1.4	0.7	2.0	8.1	6.0	4.0	5.6	3.8	3.8	2.8	4.6	4.1	1.9	2.0	1.4	3.1	1.2	0.2	8.1	2.0	24
16	2.4	0.7	0.3	1.1	2.5	0.9	1.1	0.4	0.4	0.4	1.9	2.4	4.1	5.6	6.0	4.4	3.9	1.6	2.1	0.3	0.9	1.3	0.2	3.0	0.2	6.0	1.0	24
17	3.1	0.2	6.3	7.5	10.3	6.7	7.4	8.3	11.3	9.2	7.7	11.8	12.2	14.3	10.1	7.4	6.8	5.8	4.4	2.6	1.3	1.5	1.7	1.3	0.2	14.3	6.2	24
18	0.7	1.1	3.6	1.9	1.9	2.2	1.8	3.7	0.5	2.6	1.5	2.8	4.2	6.8	6.2	4.2	7.2	6.6	6.8	5.9	3.4	1.9	5.8	6.9	0.5	7.2	2.2	24
19	6.7	8.7	10.7	6.9	8.5	6.9	7.6	7.9	6.7	7.3	8.8	9.0	9.5	8.0	6.4	5.5	4.8	3.7	2.4	0.4	2.6	4.3	4.0	3.8	0.4	10.7	6.1	24
20	4.2	5.0	5.2	4.3	5.0	7.0	6.2	5.7	5.9	4.2	3.0	3.0	2.0	3.1	3.3	5.9	6.4	4.6	1.9	1.7	2.8	3.6	5.4	5.3	1.7	7.0	3.4	24
21	5.1	4.8	4.2	5.4	4.2	3.9	3.8	2.4	1.2	1.0	3.5	6.9	6.9	6.4	7.4	9.1	9.8	9.8	9.9	10.7	10.0	7.1	9.4	8.3	1.0	10.7	3.4	24
22	10.4	9.1	7.8	6.6	4.9	6.3	7.0	8.3	5.2	5.0	4.2	4.1	3.0	4.0	2.9	4.1	2.9	4.6	7.0	7.2	5.7	5.4	5.0	7.4	2.9	10.4	2.2	24
23	7.0	6.9	6.9	4.2	4.0	0.9	0.9	5.1	6.9	7.4	6.9	8.1	6.9	5.8	6.0	4.0	2.2	3.0	5.3	5.4	6.2	8.8	7.8	4.9	0.9	8.8	2.7	24
24	5.9	6.1	6.1	7.1	6.4	7.7	7.7	9.5	8.8	9.0	8.3	8.6	7.8	7.4	7.7	7.2	6.4	7.4	7.2	6.4	7.7	7.1	7.2	7.2	5.9	9.5	7.3	24
25	6.5	5.7	6.1	5.3	6.6	5.4	5.1	6.3	5.5	4.2	5.8	4.0	5.9	6.6	7.5	5.6	6.5	8.3	7.7	8.3	8.4	7.7	9.5	7.1	4.0	9.5	5.7	24
26	6.7	7.4	8.0	6.7	6.8	8.3	7.6	8.2	6.7	3.1	6.1	6.4	8.5	9.0	7.2	7.4	9.0	9.8	10.3	10.5	10.3	8.6	7.8	8.0	3.1	10.5	7.5	24
27	4.1	4.8	5.2	4.6	4.9	3.9	3.0	3.4	2.8	4.0	4.8	4.7	4.1	5.4	5.3	5.1	5.7	5.0	4.3	4.5	4.5	3.8	4.2	2.7	2.7	5.7	2.7	24
28	2.8	1.9	0.2	1.4	2.0	1.7	2.5	2.9	1.3	1.1	5.0	6.5	6.6	5.2	1.8	1.9	2.1	2.3	0.8	0.7	0.8	2.8	3.0	1.2	0.2	6.6	1.3	24
29	3.4	3.8	4.7	3.4	3.7	3.5	3.5	4.1	5.5	6.1	7.4	8.2	7.9	8.9	9.2	8.5	6.8	7.4	8.2	8.9	9.3	11.8	11.4	6.4	3.4	11.8	6.5	24
30	7.8	4.7	7.3	5.3	5.7	8.8	13.3	15.6	13.0	10.0	12.6	14.3	14.5	14.9	15.5	13.2	7.0	9.8	10.2	15.7	13.8	17.3	15.1	12.5	4.7	17.3	10.4	24
31	12.6	12.2	10.5	9.3	5.4	7.4	9.1	5.4	5.5	6.3	7.1	7.0	6.0	3.8	5.1	4.4	4.4	3.1	0.3	0.2	0.2	0.2	0.8	0.7	0.2	12.6	4.5	24
HOURLY MAX	12.7	13.7	15.4	14.3	14.9	14.8	14.5	15.6	13.0	11.7	12.9	14.5	15.1	14.9	15.5	13.2	14.1	13.9	13.0	15.7	13.8	17.3	15.1	12.5				
HOURLY AVG	0.6	0.8	1.1	0.9	1.0	0.9	1.1	1.1	1.0	0.6	0.7	1.5	1.6	1.3	1.1	0.6	0.3	0.5	0.2	0.7	0.9	0.6	0.7	0.6				

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

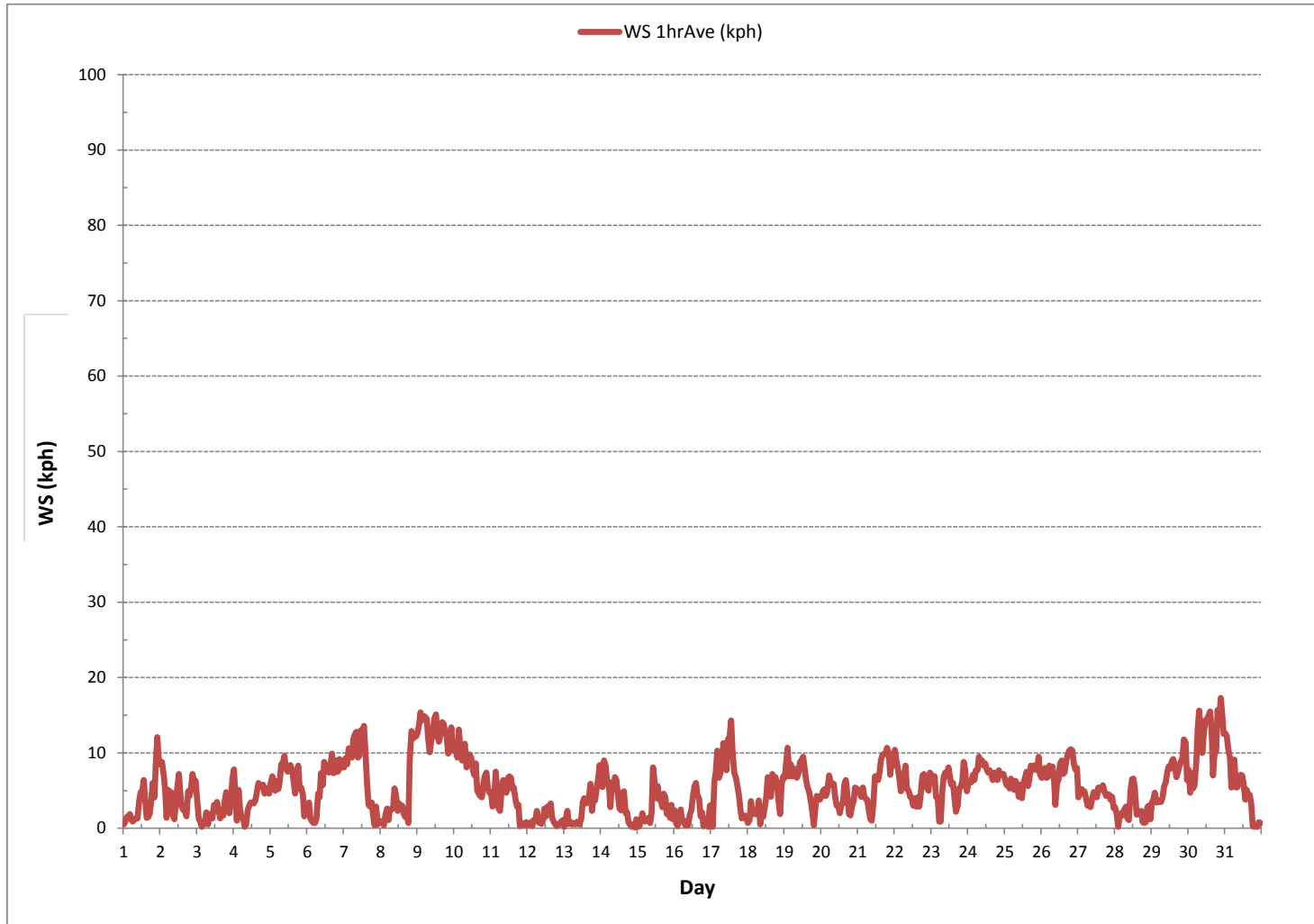
LAST CALIBRATION:	November 9, 2017
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	744
MINIMUM 1-HR AVERAGE:	0.1 kph @ HOUR 22 ON DAY 14
MAXIMUM 1-HR AVERAGE:	17.3 kph @ HOUR 21 ON DAY 30
MAXIMUM 24-HR AVERAGE:	11.9 kph ON DAY 9
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	744 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	3.6
MONTHLY AVERAGE:	0.7 kph

WIND SPEED Hourly Averages (WS kph)



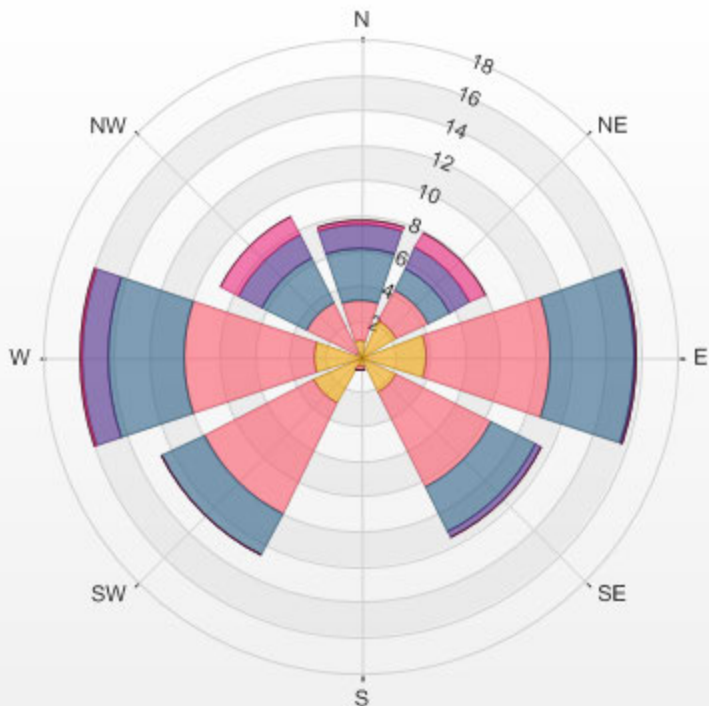
Wind: LICA COLD LAKE SOUTH  
 Monitor: WSP [kph]  
 Monthly: 18/01  
 Type: WindRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 18.82%

Direction	1.8-3.5	3.5-7.0	7.0-10.4	10.4-13.9	13.9-17.4	>17.4	Total
<b>N</b>	0.9	2.3	3.0	1.3	0.3	0.0	7.8
<b>NE</b>	2.3	2.0	1.3	1.3	0.9	0.0	7.9
<b>E</b>	3.8	7.0	4.8	0.1	0.0	0.0	15.7
<b>SE</b>	2.3	6.1	2.8	0.3	0.0	0.0	11.4
<b>S</b>	0.5	0.3	0.0	0.0	0.0	0.0	0.8
<b>SW</b>	3.0	7.0	2.7	0.0	0.0	0.0	12.6
<b>W</b>	2.7	7.4	4.3	1.5	0.1	0.0	16.0
<b>NW</b>	0.3	3.2	2.8	1.5	1.1	0.0	8.9
<b>Summary</b>	15.7	35.2	21.8	6.0	2.4	0.0	81.2

% Icon Classes (kph) 16  1.8-3.5 35  3.5-7.0 22  7.0-10.4 6  10.4-13.9 2  13.9-17.4 0  >17.4

LICA COLD LAKE SOUTH 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 18.82% Calm Wind Avg Speed: 0.89(kph)



***WIND DIRECTION***





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

**WIND DIRECTION Hourly Averages (WD)**

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

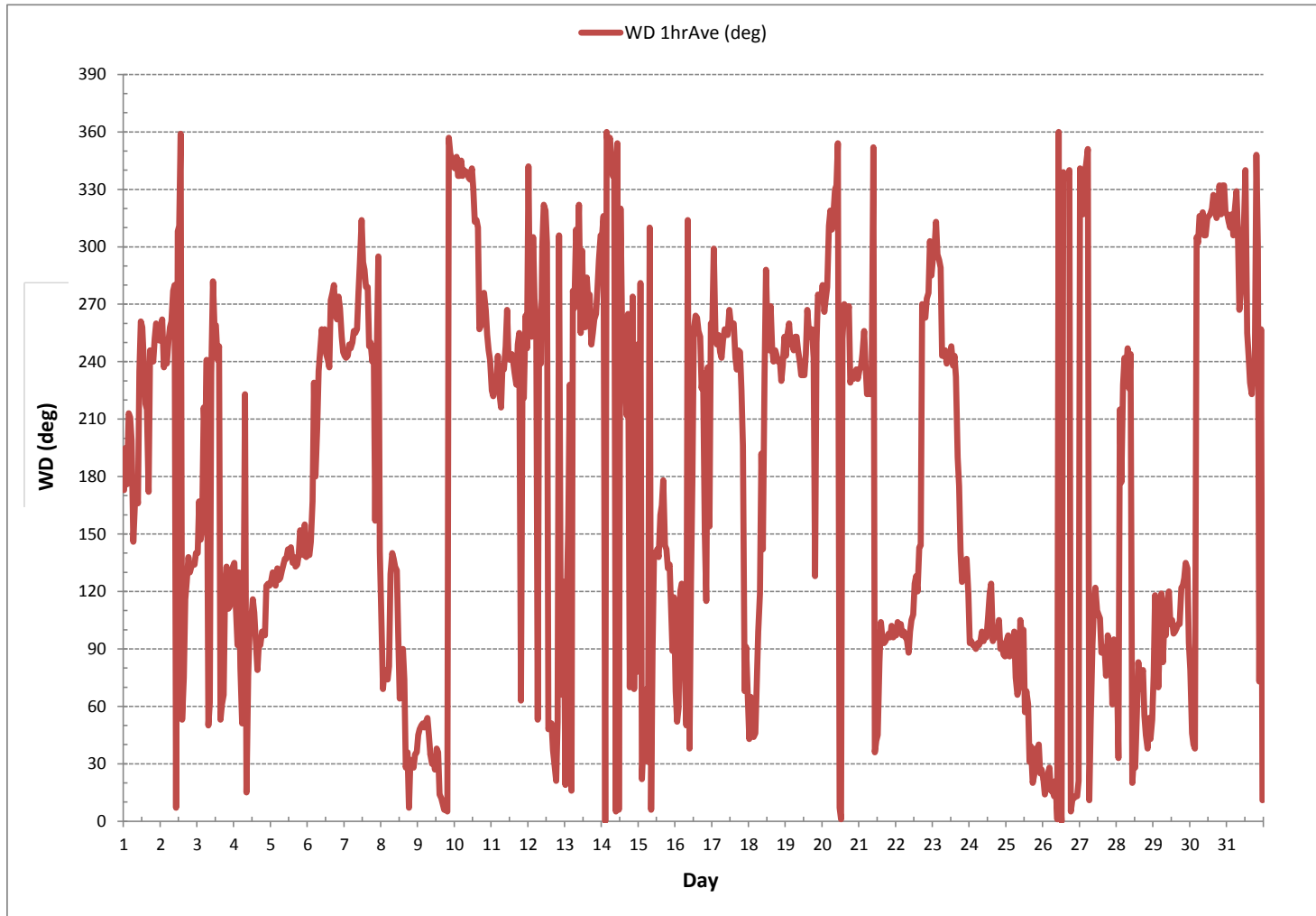
**STATUS FLAG CODES**

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:	744	hrs
STANDARD DEVIATION:	101		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	331 (NNW)	

WIND DIRECTION Hourly Averages (WD)



***STANDARD DEVIATION WIND DIRECTION***



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

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	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	76	69	55	56	47	52	54	47	50	49	34	29	27	18	28	45	56	35	22	16	30	15	15	14	24	
2	12	16	15	12	36	10	15	13	35	51	19	20	19	23	26	21	22	47	26	21	16	17	18	18	24	
3	40	43	58	62	68	37	37	31	33	38	34	24	37	19	35	39	20	34	15	23	15	30	19	20	24	
4	15	22	52	22	25	36	31	52	38	19	23	25	23	27	20	19	15	18	21	20	19	21	21	21	24	
5	21	18	22	24	19	22	21	18	17	16	17	17	14	15	17	15	17	16	16	28	23	15	32	18	24	
6	19	14	37	48	44	48	62	19	23	18	19	17	16	15	16	19	19	21	17	16	20	17	16	15	24	
7	14	16	16	16	16	16	17	17	16	20	21	17	20	21	21	21	14	26	16	32	65	15	36	38	24	
8	42	32	50	23	19	41	32	37	17	11	16	23	22	24	22	33	31	30	41	19	18	17	20	17	24	
9	16	16	15	15	14	14	15	17	17	18	19	18	18	17	18	16	17	17	17	19	17	17	14	13	24	
10	14	17	15	13	15	15	15	14	16	15	16	17	17	17	16	18	27	30	33	28	24	22	25	26	24	
11	23	32	36	22	32	35	36	30	26	29	34	24	23	22	23	21	27	40	40	78	63	63	70	60	24	
12	82	68	47	68	66	65	67	66	64	64	46	29	55	40	27	16	43	64	69	76	75	54	58	56	24	
13	75	54	37	71	70	55	49	69	44	70	63	64	30	27	25	23	19	15	35	22	22	19	16	12	24	
14	14	17	15	21	17	19	27	16	16	17	19	27	43	44	23	18	34	46	46	56	77	72	56	58	24	
15	63	65	60	47	50	56	54	57	66	40	14	15	31	16	33	35	38	27	21	31	30	37	23	42	24	
16	29	52	68	46	39	64	46	64	84	63	40	32	33	18	16	14	12	42	23	54	37	29	73	28	24	
17	25	51	11	13	13	14	15	15	16	15	18	20	18	17	18	18	15	16	14	23	31	21	18	46	24	
18	47	52	11	50	42	30	47	21	53	51	42	31	25	32	20	21	14	10	13	12	18	44	12	14	24	
19	16	18	17	16	15	14	14	15	15	16	14	16	15	17	21	16	15	20	14	35	36	19	18	17	24	
20	18	17	18	18	17	13	15	13	14	20	23	21	33	26	24	20	19	21	17	21	15	16	15	13	24	
21	16	14	15	18	17	22	17	24	52	47	30	16	15	23	22	18	17	17	19	18	19	21	17	21	24	
22	18	23	22	22	23	21	20	19	20	21	25	24	25	25	25	18	27	26	18	17	20	18	16	20	24	
23	19	19	15	19	20	63	47	16	18	14	19	17	18	19	16	31	37	32	14	21	20	19	17	20	24	
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26	17	15	18	18	19	16	16	16	18	20	17	18	17	13	15	14	13	13	16	17	20	17	19	18	24	
27	20	14	17	17	17	19	22	18	29	27	23	26	27	25	22	22	21	21	26	24	24	20	27	29	24	
28	26	32	44	24	23	26	22	26	39	44	29	19	18	19	30	37	25	28	63	54	70	18	19	52	24	
29	31	25	23	27	25	31	28	31	24	24	23	22	23	21	21	23	23	22	23	22	21	15	18	26	24	
30	21	32	18	19	17	14	14	14	15	15	17	14	14	14	16	14	14	14	14	13	13	13	14	12	24	
31	13	12	13	14	25	12	13	23	22	24	21	23	27	28	24	20	19	25	85	71	78	59	54	73	24	

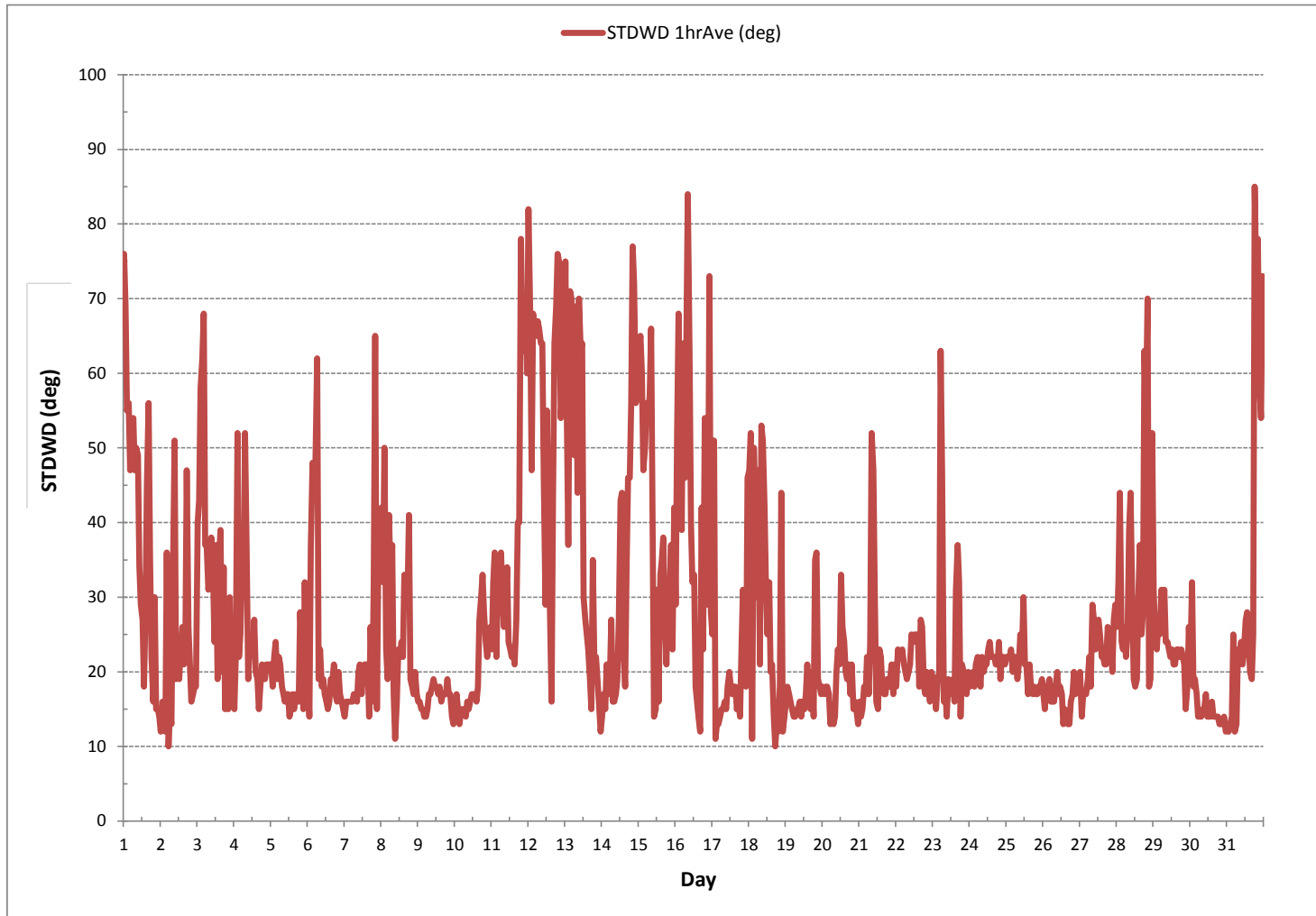
STATUS FLAG CODES

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: 744 hrs

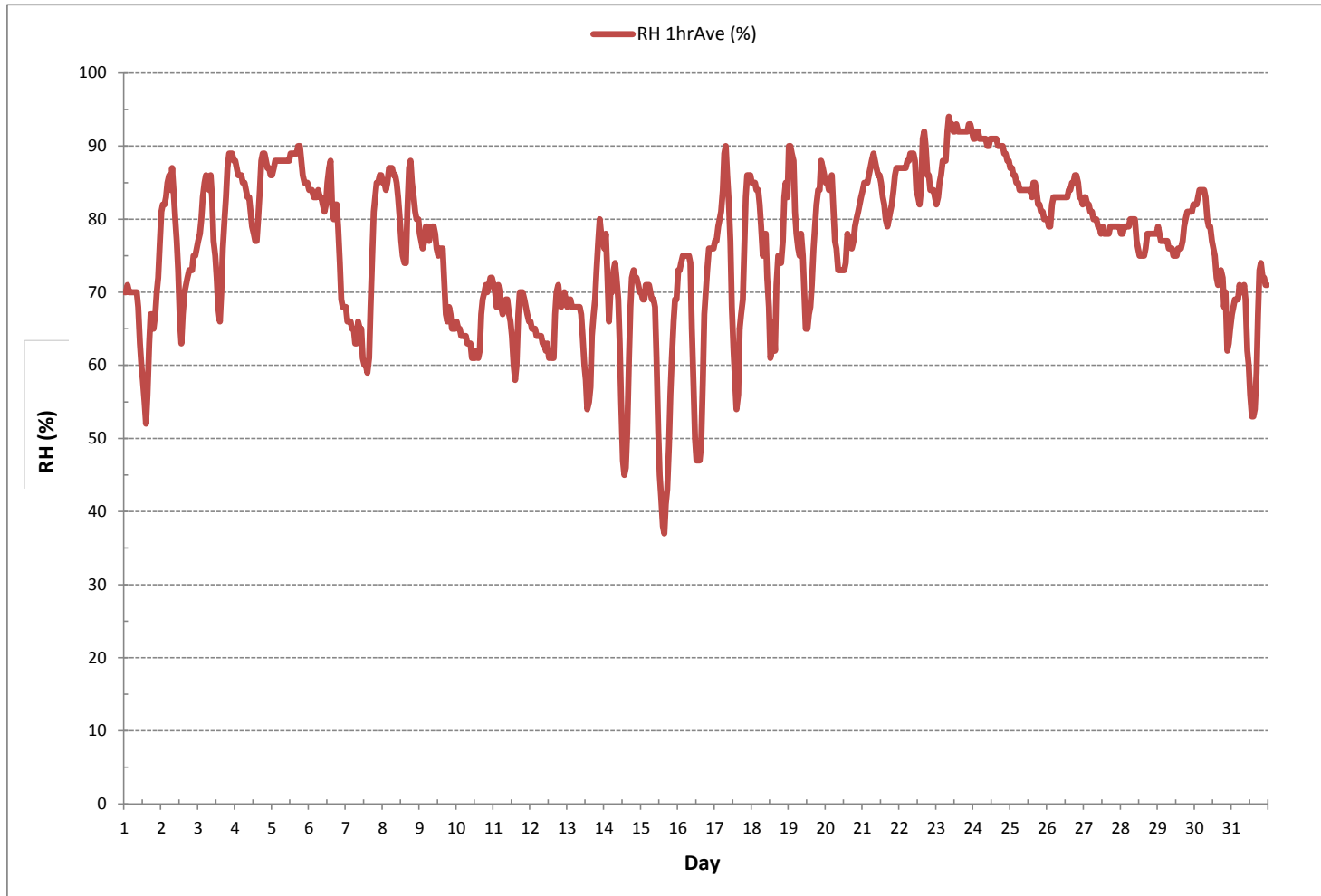
STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



***RELATIVE HUMIDITY***



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





***AMBIENT TEMPERATURE***



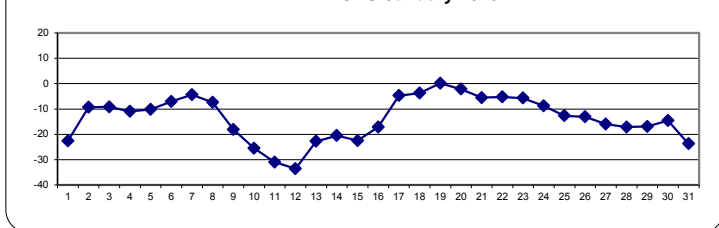
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

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	-27.8	-28.3	-28.9	-28.4	-28.4	-28.7	-29.3	-29.8	-29.1	-27.7	-24.7	-23.1	-21.6	-20.1	-18.5	-18.9	-19.9	-20.3	-18.9	-16.8	-16.0	-14.4	-12.5	-12.2	-29.8	-12.2	-22.7	24	
2	-12.2	-9.9	-9.6	-10.3	-12.8	-11.9	-12.0	-11.3	-12.4	-13.3	-8.5	-6.7	-5.9	-6.0	-7.0	-7.5	-7.8	-7.8	-8.1	-8.3	-8.3	-8.5	-8.5	-8.4	-13.3	-5.9	-9.3	24	
3	-8.9	-8.9	-9.0	-9.8	-11.2	-12.3	-12.9	-13.8	-13.1	-12.6	-10.5	-7.7	-5.6	-3.7	-2.0	-3.0	-6.3	-8.1	-9.0	-9.3	-10.1	-10.7	-10.9	-11.3	-13.8	-2.0	-9.2	24	
4	-11.0	-11.2	-11.1	-10.8	-11.4	-12.3	-12.7	-13.7	-14.4	-13.0	-10.2	-9.2	-8.7	-8.5	-8.5	-9.1	-10.2	-11.2	-11.0	-10.6	-10.6	-11.0	-11.5	-11.8	-14.4	-8.5	-11.0	24	
5	-12.0	-12.0	-11.7	-11.3	-11.0	-10.8	-10.7	-10.6	-10.5	-10.4	-10.1	-9.7	-9.3	-8.9	-8.6	-8.4	-8.3	-8.4	-8.6	-8.8	-9.6	-10.8	-11.8	-12.9	-12.9	-8.3	-10.2	24	
6	-13.2	-13.1	-12.8	-13.1	-13.3	-13.3	-12.6	-11.8	-11.1	-10.1	-8.6	-7.4	-6.3	-4.8	-3.4	-1.8	-1.4	-1.6	-1.8	-1.8	-1.3	-1.0	-1.7	-2.7	-13.3	-1.0	-7.1	24	
7	-3.6	-3.9	-4.2	-4.2	-4.0	-3.8	-2.7	-2.5	-3.0	-2.6	-2.0	-0.9	-0.6	-0.6	-0.3	-0.6	-2.6	-4.5	-7.0	-8.2	-9.7	-10.8	-11.1	-11.5	-11.5	-0.3	-4.4	24	
8	-11.9	-12.2	-11.2	-10.5	-9.1	-8.2	-7.1	-6.6	-6.8	-6.8	-6.2	-5.3	-4.5	-3.4	-2.9	-3.2	-4.9	-5.9	-6.1	-5.6	-8.1	-9.5	-10.7	-11.9	-12.2	-2.9	-7.4	24	
9	-12.7	-13.4	-14.1	-14.7	-15.3	-15.6	-15.8	-16.1	-16.6	-17.3	-17.9	-18.3	-18.8	-18.9	-18.8	-18.8	-19.2	-19.5	-20.1	-20.6	-21.4	-22.3	-23.6	-24.5	-24.5	-12.7	-18.1	24	
10	-24.9	-24.9	-24.9	-24.9	-25.2	-25.3	-25.2	-25.4	-25.6	-25.4	-24.8	-24.6	-24.3	-23.9	-23.9	-24.6	-25.5	-25.7	-26.1	-26.2	-26.3	-27.1	-28.1	-28.9	-28.9	-23.9	-25.5	24	
11	-30.4	-31.8	-33.8	-31.9	-32.3	-33.9	-34.9	-34.0	-33.3	-31.1	-29.2	-27.9	-26.5	-25.0	-24.3	-24.8	-26.8	-28.9	-30.7	-32.2	-33.5	-34.4	-35.3	-36.1	-36.1	-24.3	-31.0	24	
12	-36.9	-37.1	-37.8	-38.1	-38.6	-39.0	-39.4	-39.5	-39.6	-38.3	-33.6	-29.4	-27.0	-25.4	-24.0	-25.8	-27.6	-30.5	-32.3	-33.8	-34.0	-33.3	-32.5	-32.6	-39.6	-24.0	-33.6	24	
13	-33.3	-32.6	-31.1	-31.7	-32.2	-32.2	-32.3	-31.5	-31.3	-29.3	-24.0	-21.2	-19.8	-17.3	-15.4	-14.8	-16.5	-16.7	-16.0	-15.2	-14.1	-13.2	-12.7	-12.6	-33.3	-12.6	-22.8	24	
14	-12.2	-12.7	-13.6	-14.9	-16.7	-18.5	-20.1	-21.5	-21.8	-21.8	-20.9	-19.7	-17.9	-16.8	-18.1	-20.6	-23.3	-24.8	-26.0	-27.0	-28.0	-28.8	-29.6	-29.6	-29.6	-12.2	-20.5	24	
15	-30.2	-30.7	-30.8	-30.6	-30.7	-30.7	-31.1	-31.9	-30.8	-26.7	-21.4	-19.1	-17.0	-15.1	-12.4	-11.4	-12.5	-13.8	-15.6	-17.3	-19.0	-20.2	-20.3	-20.4	-31.9	-11.4	-22.5	24	
16	-21.2	-21.3	-22.6	-23.2	-22.7	-22.9	-23.1	-23.0	-23.3	-19.9	-15.5	-12.3	-10.0	-8.9	-8.6	-8.5	-10.7	-13.2	-14.7	-15.7	-16.5	-17.3	-17.8	-18.6	-23.3	-8.5	-17.1	24	
17	-18.5	-18.2	-16.7	-14.9	-11.8	-10.5	-9.0	-5.5	-1.4	0.1	2.0	4.1	4.9	5.4	5.7	4.7	1.8	-0.2	-1.5	-3.8	-6.0	-7.5	-8.2	-8.2	-18.5	5.7	-4.7	24	
18	-8.4	-8.8	-8.8	-7.7	-8.2	-7.3	-6.1	-4.9	-5.2	-5.0	-3.0	-2.0	0.5	1.5	0.9	1.7	-0.6	-1.7	-1.8	-1.9	-2.5	-4.7	-4.6	-2.3	-8.8	1.7	-3.8	24	
19	-0.4	0.7	1.8	1.7	1.3	0.4	0.0	-0.1	-0.5	-0.2	0.5	1.0	1.5	1.5	1.9	1.6	0.5	-0.9	-1.9	-2.3	-2.1	-1.3	-1.1	-1.1	-2.3	1.9	0.1	24	
20	-1.3	-1.7	-1.5	-1.4	-1.5	-1.7	-2.2	-2.4	-2.7	-2.7	-2.4	-2.1	-1.8	-1.6	-1.5	-1.8	-2.3	-2.3	-2.3	-2.5	-2.7	-2.9	-3.5	-3.8	-3.8	-1.3	-2.2	24	
21	-4.0	-4.2	-4.2	-4.6	-5.0	-5.2	-5.6	-5.7	-5.6	-5.3	-5.0	-5.2	-5.0	-4.7	-5.2	-5.7	-6.1	-6.4	-6.5	-6.7	-6.9	-6.9	-6.8	-6.5	-6.9	-4.0	-5.5	24	
22	-6.1	-5.8	-5.4	-5.2	-5.0	-4.9	-5.1	-5.7	-6.1	-6.2	-6.1	-6.0	-5.5	-5.7	-5.5	-5.9	-6.0	-4.9	-4.3	-4.2	-3.9	-3.8	-3.8	-4.2	-6.2	-3.8	-5.2	24	
23	-4.4	-4.4	-4.5	-4.4	-4.4	-4.2	-4.3	-5.1	-5.6	-6.3	-6.5	-6.8	-6.7	-6.4	-6.2	-6.1	-6.1	-6.3	-6.4	-6.1	-6.2	-6.4	-6.4	-6.8	-6.8	-6.8	-4.2	-5.7	24
24	-7.5	-7.8	-8.1	-8.2	-8.4	-8.5	-8.6	-8.8	-8.8	-8.9	-8.8	-8.5	-8.1	-7.9	-7.7	-7.7	-8.2	-8.7	-9.2	-9.4	-9.8	-10.4	-10.9	-11.4	-11.4	-7.5	-8.8	24	
25	-11.8	-12.1	-12.5	-13.0	-13.5	-13.7	-13.9	-14.1	-14.0	-13.9	-13.8	-13.1	-12.7	-12.4	-11.8	-11.1	-10.8	-11.3	-11.6	-11.7	-11.9	-12.4	-13.1	-13.5	-14.1	-10.8	-12.7	24	
26	-13.7	-13.6	-13.6	-13.7	-13.8	-13.7	-13.8	-13.8	-14.0	-13.7	-13.3	-13.1	-12.7	-12.6	-12.4	-12.2	-12.0	-12.3	-11.9	-11.9	-12.2	-12.7	-13.0	-13.5	-14.0	-11.9	-13.1	24	
27	-13.7	-13.8	-14.1	-14.7	-15.5	-15.8	-16.2	-16.5	-16.4	-16.4	-16.3	-16.1	-15.7	-15.6	-15.4	-15.8	-16.5	-16.9	-17.0	-17.1	-17.1	-17.1	-17.3	-17.3	-17.3	-13.7	-16.0	24	
28	-17.3	-17.1	-16.9	-16.9	-16.9	-16.8	-16.7	-16.4	-15.9	-16.0	-17.0	-17.2	-17.1	-16.2	-15.7	-16.0	-16.7	-17.5	-18.5	-18.5	-19.4	-19.4	-19.4	-18.7	-19.4	-15.7	-17.1	24	
29	-17.8	-18.1	-18.7	-19.1	-19.5	-20.0	-20.5	-20.6	-20.6	-19.7	-18.9	-18.0	-17.4	-16.4	-15.8	-15.4	-15.1	-14.9	-14.2	-13.5	-13.1	-12.6	-12.4	-13.5	-20.6	-12.4	-16.9	24	
30	-14.1	-13.9	-14.3	-14.1	-13.7	-13.5	-12.9	-12.8	-13.2	-13.2	-12.9	-12.8	-12.7	-13.0	-13.5	-14.1	-14.2	-14.5	-14.8	-15.8	-16.7	-18.1	-20.0	-21.0	-21.0	-12.7	-14.6	24	
31	-21.6	-22.3	-23.1	-23.4	-23.9	-24.5	-24.4	-24.4	-24.9	-24.5	-22.8	-21.6	-20.2	-18.8	-18.1	-18.5	-20.2	-22.6	-25.3	-27.0	-28.1	-29.0	-30.2	-30.7	-30.7	-18.1	-23.8	24	
HOURLY MAX	-0.4	0.7	1.8	1.7	1.3	0.4	0.0	-0.1	-0.5	0.1	2.0	4.1	4.9	5.4	5.7	4.7	1.8	-0.2	-1.5	-1.8	-1.3	-1.0	-1.1	-1.1					
HOURLY AVG	-14.9	-15.0	-15.1	-15.1	-15.3	-15.5	-15.5	-15.5	-15.4	-14.8	-13.3	-12.3	-11.4	-10.7	-10.2	-10.4	-11.4	-12.3	-12.8	-13.2	-13.7	-14.1	-14.5	-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

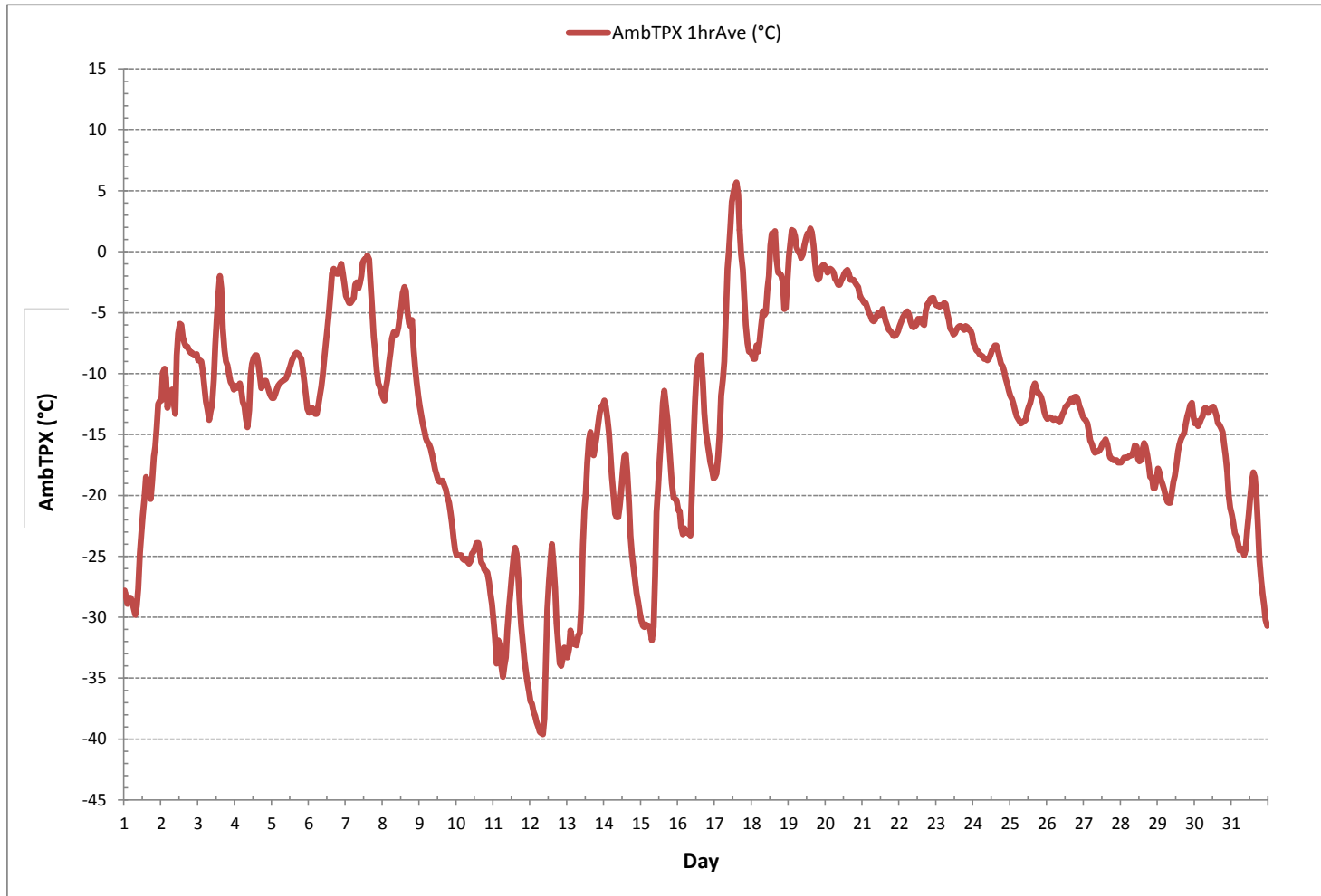
24 HR AVERAGES January 2018



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-39.6 °C	@ HOUR	8	ON DAY	12
MAXIMUM 1-HR AVERAGE:	5.7 °C	@ HOUR	14	ON DAY	17
MAXIMUM 24-HR AVERAGE:	0.1 °C			ON DAY	19
OPERATIONAL TIME:				744	hrs
AMD OPERATION UPTIME:				100.0	%
STANDARD DEVIATION:	9.2			MONTHLY AVERAGE:	-13.6 °C

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



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

***SULPHUR DIOXIDE***



## Thermo 43i Sulphur Dioxide Analyzer Calibration

Date:	January 3, 2018	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	951	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	A few clouds		
Parameter:	Sulphur Dioxide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	9:38	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	14:00	Cal Gas Expiry Date:	July 18, 2019		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		

<b>Analyzer:</b> ID# or Serial Number: 806528242 Last Calibration Date: December 12, 2017 Previous C.F.: 0.999	Range ppb: 500 As Found C.F.: 0.998 New C.F.: 1.000
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<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: 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><td>Point</td><td>ppb</td></tr> <tr><td>High</td><td>380</td></tr> <tr><td>Mid</td><td>180</td></tr> <tr><td>Low</td><td>90</td></tr> </table>	Point	ppb	High	380	Mid	180	Low	90
Point	ppb								
High	380								
Mid	180								
Low	90								

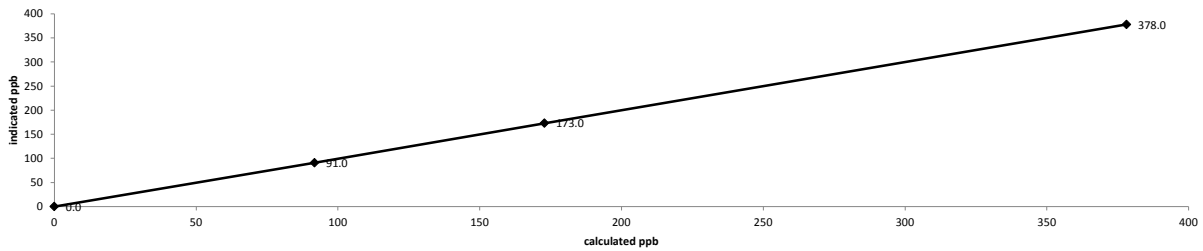
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	4759	0.00	4759	0.0	0.0	n/a
as found high	4889	36.81	4926	378.1	379.0	0.998
adjusted zero	4759	0.00	4759	0.0	0.0	n/a
adjusted high	4889	36.81	4926	378.1	378.0	1.000
mid	4910	16.83	4927	172.8	173.0	0.999
low	4920	8.94	4929	91.8	91.0	1.009
calibrator zero	4759	0.00	4759	0.0	0.0	n/a
<b>Average C.F. =</b>						<b>1.003</b>

**Linear Regression/Calibration Results:**

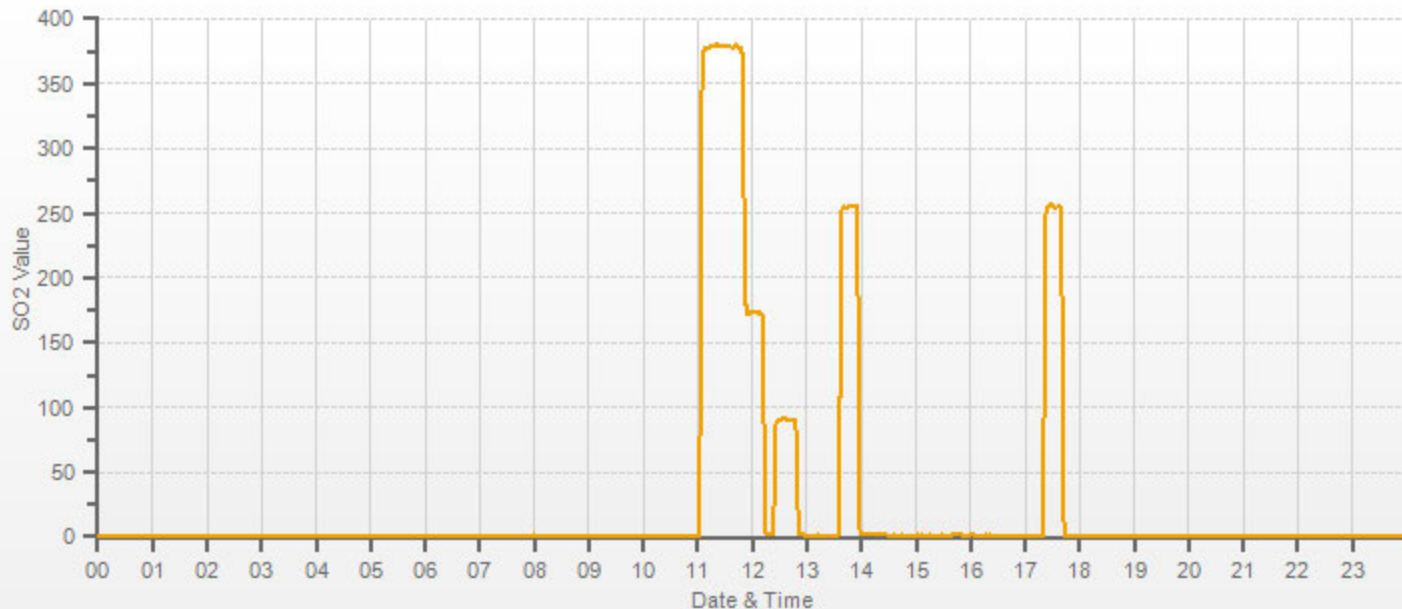
Correlation Coefficient =	1.000		LIMITS
Slope =	1.000		> or = 0.995
b (Intercept as % of full scale) =	0.05%		0.95-1.05
% change in C.F. from last cal =	0.13%		± 3% F.S.
			± 10%

**Thermo 43i Sulphur Dioxide Analyzer Calibration**



<b>As found:</b> Bkg: 8.6 Coef: 0.996 Pmt: -623.8 Flash: 771 Internal: 30.3 Chamber: 44.9 Perm Oven Gas: 35.00 Perm Oven Heater: 34.24 Pressure: 681.6 Sample Flow: 0.476 Lamp Intensity: 96 Converter: n/a Converter Set: n/a Averaging Time: 120 Expected Value: 263.0	<b>As left:</b> Bkg: 8.5 Coef: 0.989 Pmt: -623.5 Flash: 769 Internal: 29.7 Chamber: 45.0 Perm Oven Gas: 35.00 Perm Oven Heater: 34.24 Pressure: 681.3 Sample Flow: 0.476 Lamp Intensity: 96 Converter: n/a Converter Set: n/a Averaging Time: 120 Expected Value: 255.0
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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.



— SO2[ppb]

***TOTAL REDUCED SULPHUR***





## Thermo 450i Total Reduced Sulphur Analyzer Calibration

Date:	January 3, 2018	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	951	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	A few clouds		
Parameter:	Total Reduced Sulphur	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	9:38	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	14:02	Cal Gas Expiry Date:	June 14, 2019		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	CDNOVA/Model CDN-101/#501		

Analyzer:	ID# or Serial Number:	Range ppb:
	812728560	100
	Last Calibration Date:	As Found C.F.:
	December 13, 2017	1.036
	Previous C.F.:	New C.F.:
	1.000	1.000

<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="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>ppb</th> <th></th> </tr> </thead> <tbody> <tr> <td>High</td> <td>78</td> <td>10:47/10:57</td> </tr> <tr> <td>Mid</td> <td>38</td> <td>500</td> </tr> <tr> <td>Low</td> <td>19</td> <td>380</td> </tr> <tr> <td></td> <td></td> <td>0.0</td> </tr> <tr> <td></td> <td></td> <td>0.0</td> </tr> <tr> <td></td> <td></td> <td>0.0</td> </tr> </tbody> </table>	Point	ppb		High	78	10:47/10:57	Mid	38	500	Low	19	380			0.0			0.0			0.0
Point	ppb																					
High	78	10:47/10:57																				
Mid	38	500																				
Low	19	380																				
		0.0																				
		0.0																				
		0.0																				

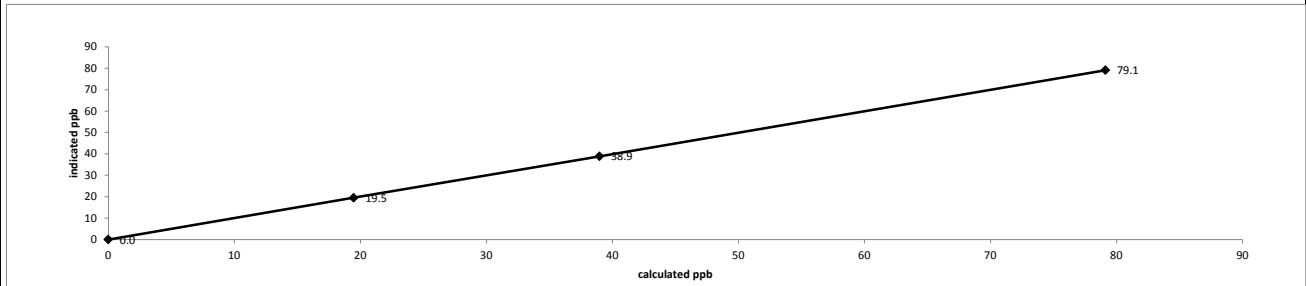
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	7204	0.00	7204	0.0	0.0	n/a
as found high	7143	55.84	7199	79.1	76.4	1.036
adjusted zero	7204	0.00	7204	0.0	0.0	n/a
adjusted high	7143	55.84	7199	79.1	79.1	1.000
mid	7185	27.56	7213	39.0	38.9	1.002
low	7199	13.77	7213	19.5	19.5	0.999
calibrator zero	7204	0.00	7204	0.0	0.0	n/a
<b>Average C.F.=</b>						<b>1.000</b>

**Linear Regression/Calibration Results:**

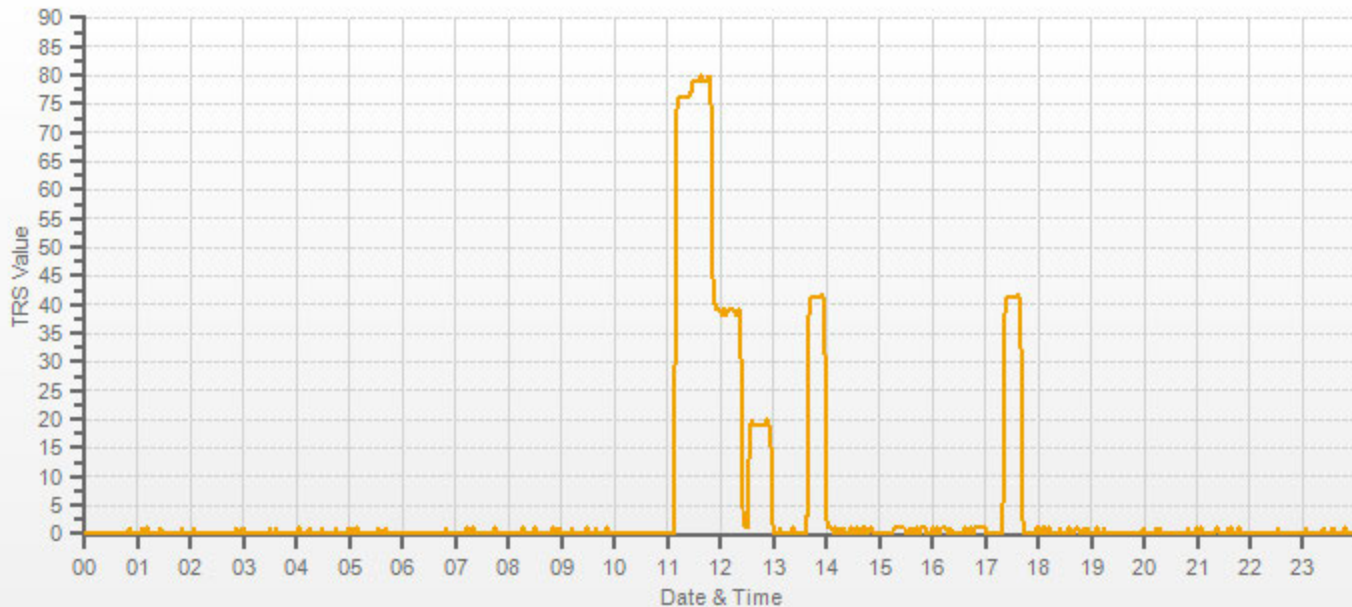
Correlation Coefficient =	1.000	LIMITS
Slope =	1.000	> or = 0.995
b (Intercept as % of full scale)=	0.00%	0.95-1.05
% change in C.F. from last cal=	-3.56%	± 3% F.S.
		± 10%

**Thermo 450i Total Reduced Sulphur Analyzer Calibration**



<b>As found:</b> Bkg: 15.1 Coef: 0.950 Pmt: -650.5 Flash: 745 Internal: 33.2 Chamber: 45.1 Converter Temp: 825 Converter Set: 825 Perm Oven Gas: 45.00 Perm Oven Htr: 44.37 Pressure: 635.5 Sample Flow: 0.489 Lamp Intensity: 92 Averaging Time: 120 Expected Value: 39.9	<b>As left:</b> Bkg: 15.6 Coef: 0.983 Pmt: -650.5 Flash: 745 Internal: 32.7 Chamber: 45.1 Converter Temp: 825 Converter Set: 825 Perm Oven Gas: 45.00 Perm Oven Htr: 44.37 Pressure: 635.5 Sample Flow: 0.491 Lamp Intensity: 92 Averaging Time: 120 Expected Value: 41.2
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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.



— TRS[ppb]



## Thermo 450i Total Reduced Sulphur Analyzer Calibration

Date: <u>January 12, 2018</u>	Barometer/B.P./units: <u>F.S. 05544 expires December 5, 2018</u>	<u>962</u>	millibars
Company/Airshed: <u>LICA</u>	Thermometer/Station Temp: <u>F.S. 170286131 expires April 19, 2019</u>	<u>22</u>	°C
Location/Station Name: <u>Cold Lake South</u>	Weather Conditions: <u>Mainly clear</u>		
Parameter: <u>Total Reduced Sulphur</u>	Calibration Purpose: <u>post repair</u>		
Start Time 24 hr. (mst): <u>12:22</u>	Performed By/Reviewer: <u>Alex Yakupov</u>	<u>Rob Fisher</u>	
End Time 24 hr. (mst): <u>18:53</u>	Cal Gas Expiry Date: <u>June 14, 2019</u>		
Calibration Method: <u>Gas Dilution</u>	Converter Model & s/n (if applicable): <u>CDNOVA/Model CDN-101/#501</u>		

Analyzer: ID# or Serial Number: <u>812728560</u>	Range ppb: <u>100</u>
Last Calibration Date: <u>January 3, 2018</u>	As Found C.F.: <u>n/a</u>
Previous C.F.: <u>1.000</u>	New C.F.: <u>1.000</u>

Calibration Standards: Low Flow Meter ID/Expiry Date: <u>Definer Low 129069 expires February 5, 2018</u> High Flow Meter ID/Expiry Date: <u>Definer High 128686 expires February 5, 2018</u> Calibrator ID/Expiry Date: <u>API id# 627 expires January 27, 2018</u> Cal Gas Cylinder I.D. #: <u>EY 0000654</u> Cal Gas Conc. (ppm): <u>10.2</u>	<b>Standard Calibration Points for Ranges</b> <table border="1" style="margin: auto;"> <tr><td>Point</td><td>ppb</td></tr> <tr><td>High</td><td>78</td></tr> <tr><td>Mid</td><td>38</td></tr> <tr><td>Low</td><td>19</td></tr> </table>	Point	ppb	High	78	Mid	38	Low	19
Point	ppb								
High	78								
Mid	38								
Low	19								

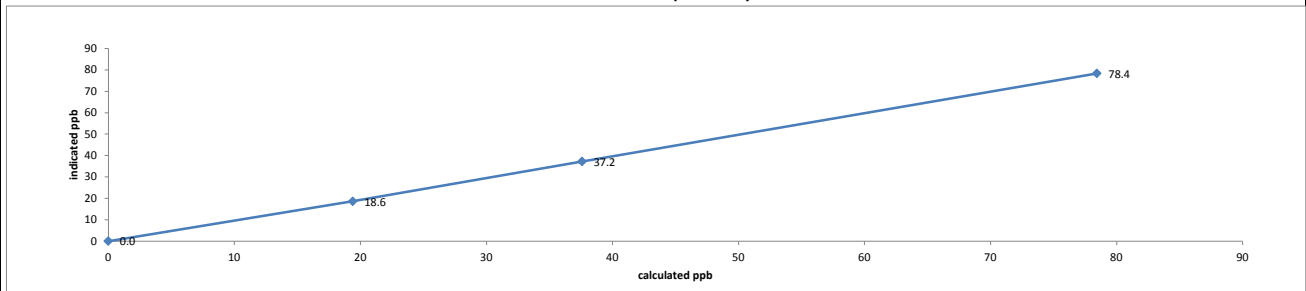
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rates (cc/min)			Total	Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas	Total				
adjusted zero	7443	0.00	7443	7443	0.0	0.0	n/a
adjusted high	7389	57.26	7446	7446	78.4	78.4	1.000
mid	7410	27.41	7437	7437	37.6	37.2	1.011
low	7429	14.15	7443	7443	19.4	18.6	1.043
calibrator zero	7443	0.00	7443	7443	0.0	0.0	n/a
<b>Average C.F.=</b>							<b>1.018</b>

Linear Regression/Calibration Results:

	<b>LIMITS</b>
Correlation Coefficient = <u>1.000</u>	> or = 0.995
Slope = <u>0.997</u>	0.95-1.05
b (Intercept as % of full scale) = <u>0.39%</u>	± 3% F.S.
% change in C.F. from last cal = <u>n/a</u>	n/a

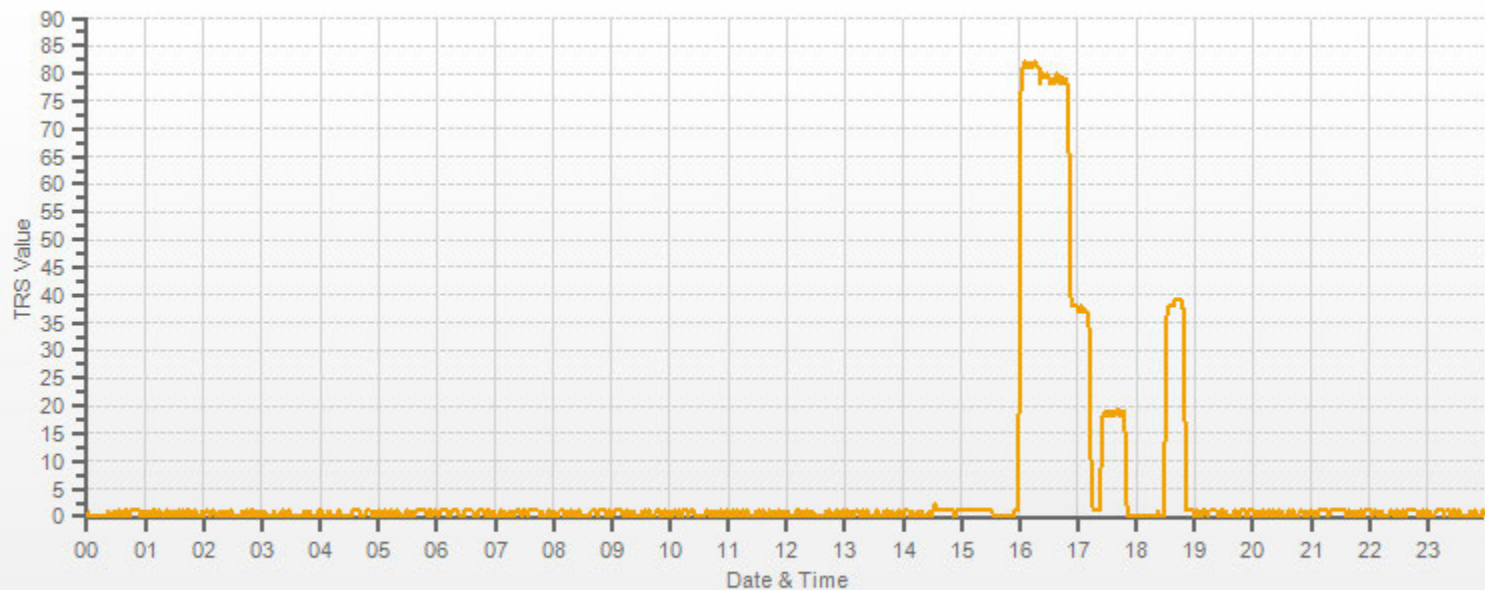
Thermo 450i Total Reduced Sulphur Analyzer Calibration



<b>As found:</b>	<b>As left:</b>
Bkg: <u>n/a</u>	Bkg: <u>14.8</u>
Coef: <u>n/a</u>	Coef: <u>0.944</u>
Pmt: <u>n/a</u>	Pmt: <u>-650.5</u>
Flash: <u>n/a</u>	Flash: <u>742</u>
Internal: <u>n/a</u>	Internal: <u>33.7</u>
Chamber: <u>n/a</u>	Chamber: <u>45.1</u>
Converter Temp: <u>n/a</u>	Converter Temp: <u>825</u>
Converter Set: <u>n/a</u>	Converter Set: <u>825</u>
Perm Oven Gas: <u>n/a</u>	Perm Oven Gas: <u>45.00</u>
Perm Oven Htr: <u>n/a</u>	Perm Oven Htr: <u>44.37</u>
Pressure: <u>n/a</u>	Pressure: <u>643.7</u>
Sample Flow: <u>n/a</u>	Sample Flow: <u>0.501</u>
Lamp Intensity: <u>n/a</u>	Lamp Intensity: <u>92</u>
Averaging Time: <u>n/a</u>	Averaging Time: <u>120</u>
Expected Value: <u>n/a</u>	Expected Value: <u>38.7</u>

**Comments:** The SO2 scrubber check was not performed, see comments below.  
The manifold blower was found to be working normally.

A post-repair calibration was performed after repairing a failed pump. The SO2 scrubber was tested during the monthly calibration on January 3, 2018.



— TRS[ppb]

***TOTAL HYDROCARBON***



# Thermo 51C Total Hydrocarbon THC Analyzer Calibration

Date:	January 2, 2018	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	951	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:	routine monthly		
Start/End Time 24 hr. (mst):	12:37 / 16:30	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 29, 2017	As Found C.F.:	0.924
	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:	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: 50 ppm	
Point	Target ppm
High	38
Mid	18
Low	9

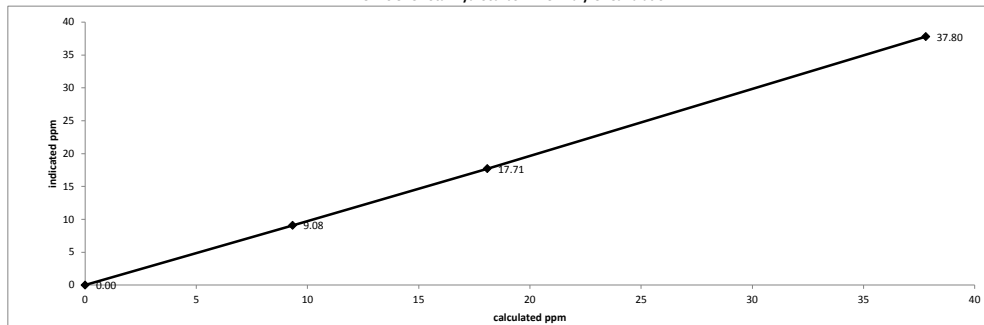
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Diluent	Cal Gas	Total	Calculated Concentration: (ppm)	Indicated Concentration: (ppm)	Correction Factors:
as found zero	2383	0.00	2383	0.0	0.00	n/a
as found high	2477	83.51	2561	37.80	40.90	0.924
adjusted zero	2383	0.00	2383	0.00	0.00	n/a
adjusted high	2477	83.51	2561	37.80	37.80	1.000
mid	2473	39.18	2512	18.08	17.71	1.021
low	2473	20.06	2493	9.33	9.08	1.027
calibrator zero	2383	0.00	2383	0.0	0.00	n/a
Average C.F.=						1.016

### 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) =	0.36%		± 3% F.S.
% change in C.F. from last cal =	7.58%		± 10%

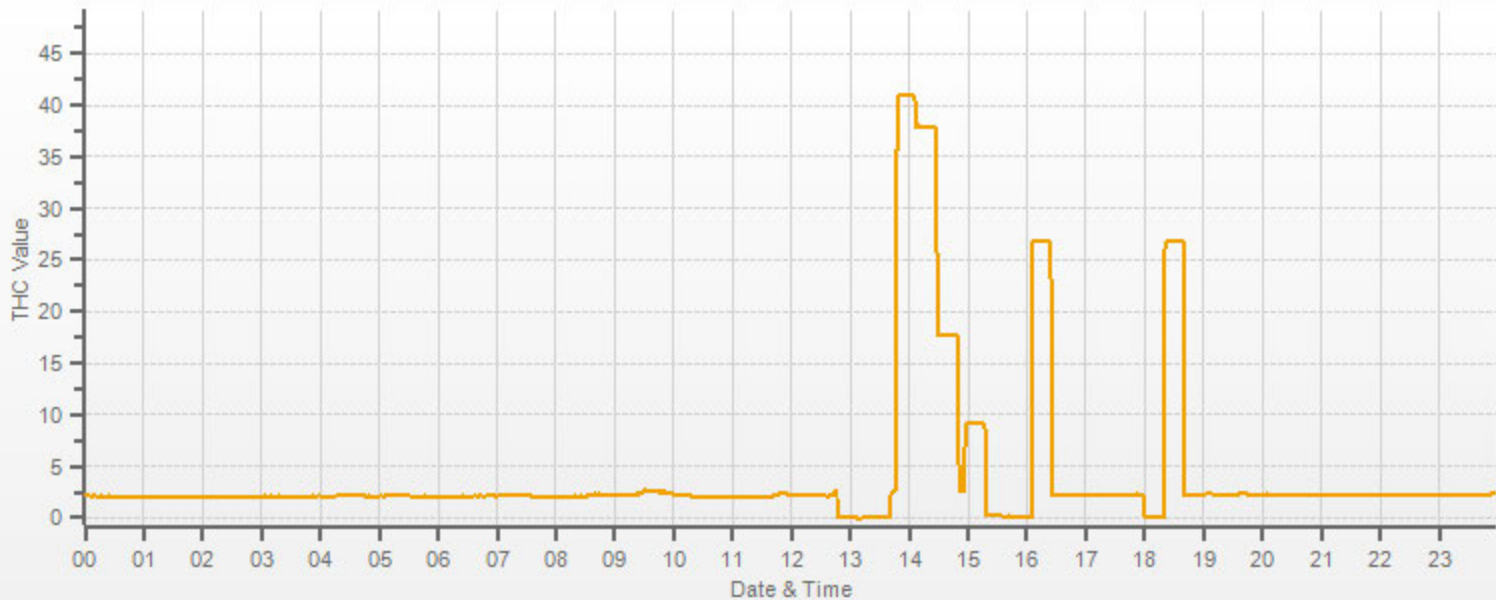
Thermo 51C Total Hydrocarbon THC Analyzer Calibration



H2 cylinder (psi):	450	H2 cylinder (psi):	450
H2 cylinder reg set (psi):	22	H2 cylinder reg set (psi):	22
Span Cylinder (psi):	700	Span Cylinder (psi):	700
Span Cylinder Reg Set (psi):	22	Span Cylinder Reg Set (psi):	22
Zero Air Gen Pressure:	40	Zero Air Gen Pressure:	40
measurement alarms:	None	measurement alarms:	None
service alarms:	None	service alarms:	None
cnt:	1437	cnt:	1488
rng:	1	rng:	1
try:	4	try:	4
flm:	183.2	flm:	183.5
det:	125.9	det:	125.2
Flame:	183	Flame:	183
Filter:	125	Filter:	125
Base:	125	Base:	125
Sample psi:	06.51	Sample psi:	06.51
Internal Air Pressure:	20	Internal Air Pressure:	20
Internal Fuel Pressure:	13	Internal Fuel Pressure:	13
Measured Flow:	586	Measured Flow:	n/a
Expected Value:	29.50	Expected Value:	26.70

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:	January 17, 2018	Barometer/B.P./units:	Brunton 05535 expires December 15, 2018	27.89	inHg
Company/Airshed:	LCA	Thermometer/Station Temp:	F.S. 160348895 expires April 8, 2018	24.8	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	Mainly sunny		
Parameter:	Total Hydrocarbon	Calibration Purpose:	shut down		
Start/End Time 24 hr. (mst):	12:20 / 14:30	Performed By/Reviewer:	Limin Li	Tom Bourque	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	October 28, 2025		

Analyzer:	ID# or Serial Number:	51CLT-77021-384	Range ppm:	50
	Last Calibration Date:	January 2, 2018	As Found C.F.:	1.041
	Previous Cal High Point C.F.:	1.000	New C.F.:	n/a

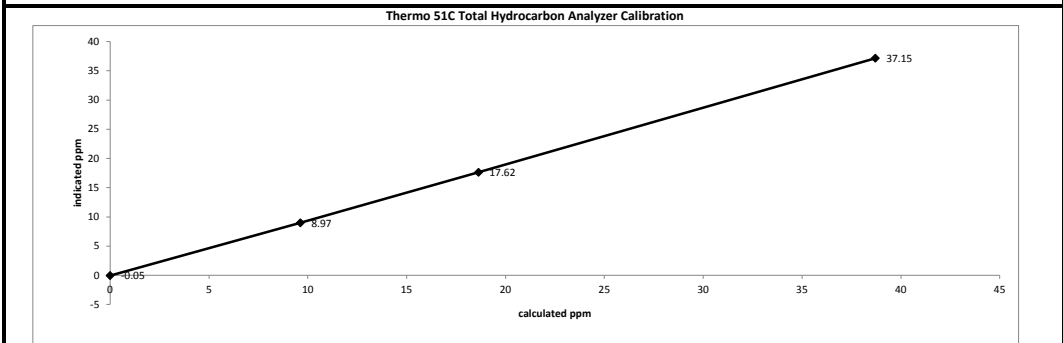
Calibration Standards:		Standard Calibration Points for a Range of:	50 ppm							
Low Flow Meter ID/Expiry Date:	Defender Low 152019 expires December 13, 2018	<table border="1"> <thead> <tr> <th>Point</th> <th>Target ppm</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>38</td> </tr> <tr> <td>Mid</td> <td>18</td> </tr> <tr> <td>Low</td> <td>9</td> </tr> </tbody> </table>	Point	Target ppm	High	38	Mid	18	Low	9
Point	Target ppm									
High	38									
Mid	18									
Low	9									
High Flow Meter ID/Expiry Date:	Defender High 148944 expires December 13, 2018									
Calibrator ID/Expiry Date:	Enviroincs id# 5212 expires February 14, 2018									
Cal Gas Cylinder I.D. #:	LL 119471									
CH <sub>4</sub> /C <sub>2</sub> H <sub>6</sub> Cylinder Conc. (ppm):	599.0      207.0									
CH <sub>4</sub> as propane/total CH <sub>4</sub> equivalents (ppm):	569.3      1168.3									

**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	2518	0.00	2518	0.0	-0.05	n/a
as found high	2437	83.50	2520	38.71	37.15	1.041
mid	2478	40.17	2518	18.64	17.62	1.055
low	2502	20.79	2523	9.63	8.97	1.067
Average C.F.=						1.054

**Linear Regression/Calibration Results:**

Correlation Coefficient =	1.000	LIMITS
Slope =	1.039	> or = 0.995
b (Intercept as % of full scale) =	0.40%	0.90-1.10
% change in C.F. from last cal =	-4.06%	± 3% F.S.
		± 10%



As found:		As left:	
H2 cylinder (psi):	1750	H2 cylinder (psi):	n/a
H2 cylinder reg set (psi):	22	H2 cylinder reg set (psi):	n/a
Span Cylinder (psi):	400	Span Cylinder (psi):	n/a
Span Cylinder Reg Set (psi):	22	Span Cylinder Reg Set (psi):	n/a
Zero Air Gen Pressure:	40	Zero Air Gen Pressure:	n/a
measurement alarms:	None	measurement alarms:	n/a
service alarms:	None	service alarms:	n/a
cnt:	1450	cnt:	n/a
rng:	1	rng:	n/a
try:	1	try:	n/a
flm:	182.1 °C	flm:	n/a
det:	125.7 °C	det:	n/a
Flame:	182 °C	Flame:	n/a
Filter:	125 °C	Filter:	n/a
Base:	125 °C	Base:	n/a
Sample psi:	06.51	Sample psi:	n/a
Internal Air Pressure:	20	Internal Air Pressure:	n/a
Internal Fuel Pressure:	13	Internal Fuel Pressure:	n/a
Measured Flow:	586	Measured Flow:	n/a
Expected Value:	26.70	Expected Value:	n/a

Comments:

The manifold blower was found to be working normally.





# Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	January 17, 2018	Barometer/B.P./units:	Brunton 05535 expires December 15, 2018	27.89	inHg
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 160348895 expires April 8, 2018	24.8	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	Mainly sunny		
Parameter:	Total Hydrocarbon	Calibration Purpose:	installation		
Start/End Time 24 hr. (mst):	16:00 / 18:50	Performed By/Reviewer:	Limin Li	Tom Bourque	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	October 28, 2025		

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

Calibration Standards:	Low Flow Meter ID/Expiry Date:	Defender Low 152019 expires December 13, 2018	Standard Calibration Points for a Range of:	50 ppm
	High Flow Meter ID/Expiry Date:	Defender High 148944 expires December 13, 2018		
	Calibrator ID/Expiry Date:	Enviroconics id# 5212 expires February 14, 2018		
	Cal Gas Cylinder I.D. #:	LL 119471		
	CH <sub>4</sub> /C <sub>3</sub> H <sub>8</sub> Cylinder Conc. (ppm):	599.0      207.0		
	CH <sub>4</sub> as propane/total CH <sub>4</sub> equivalents (ppm):	569.3      1168.3		

Point	Target ppm
High	38
Mid	18
Low	9

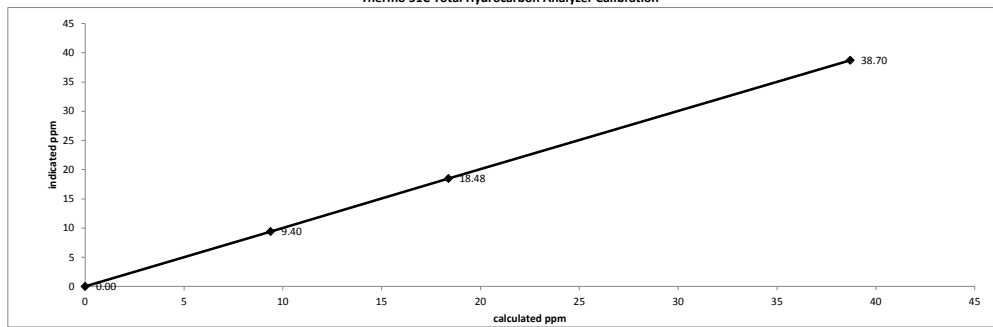
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppm)	Indicated Concentration (ppm)	Correction Factors
	Diluent	Cal Gas	Total			
adjusted zero	2519	0.00	2519	0.0	0.00	n/a
adjusted high	2438	83.55	2522	38.70	38.70	1.000
mid	2491	39.82	2531	18.38	18.48	0.995
low	2522	20.42	2542	9.38	9.40	0.998
calibrator zero	2519	0.00	2519	0.00	0.00	n/a
Average C.F.=						0.998

### Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.000		0.95-1.05
b (Intercept as % of full scale) =	-0.06%		± 3% F.S.
% change in C.F. from last cal =	n/a		n/a

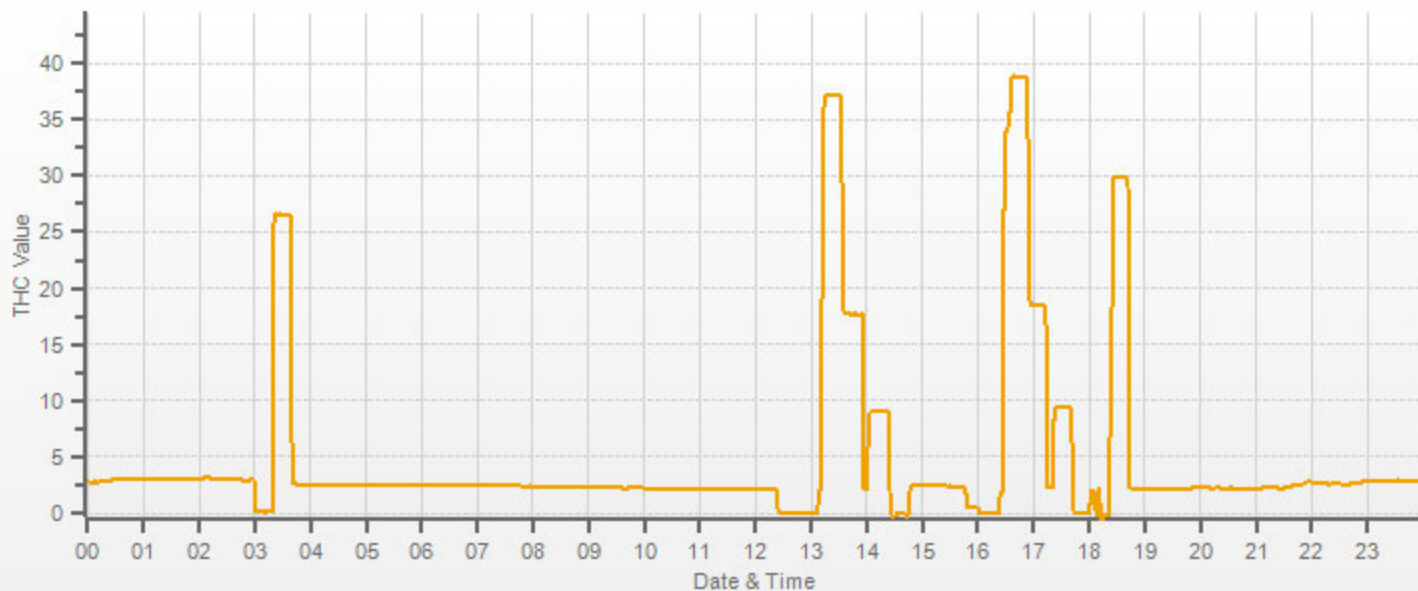
### Thermo 51C Total Hydrocarbon Analyzer Calibration



As found:	As left:		
H2 cylinder (psi):	n/a	H2 cylinder (psi):	1750
H2 cylinder reg set (psi):	n/a	H2 cylinder reg set (psi):	22
Span Cylinder (psi):	n/a	Span Cylinder (psi):	400
Span Cylinder Reg Set (psi):	n/a	Span Cylinder Reg Set (psi):	22
Zero Air Gen Pressure:	n/a	Zero Air Gen Pressure:	40
measurement alarms:	n/a	measurement alarms:	None
service alarms:	n/a	service alarms:	None
cnt:	n/a	cnt:	1463
rng:	n/a	rng:	1
try:	n/a	try:	4
flm:	n/a	flm:	184.9 °C
det:	n/a	det:	125.3 °C
Flame:	n/a	Flame:	184 °C
Filter:	n/a	Filter:	125 °C
Base:	n/a	Base:	125 °C
Sample psi:	n/a	Sample psi:	6.2 psi
Internal Air Pressure:	n/a	Internal Air Pressure:	20 psi
Internal Fuel Pressure:	n/a	Internal Fuel Pressure:	12 psi
Measured Flow:	n/a	Measured Flow:	0.920LPM
Expected Value:	n/a	Expected Value:	29.74

Comments:

The manifold blower was found to be working normally.



— THC[ppm]



## Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	January 19, 2018	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	923	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	A few clouds		
Parameter:	Total Hydrocarbon	Calibration Purpose:	repeat		
Start/End Time 24 hr. (mst):	15:44 / 19:36	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: 427408718	As Found C.F.: 0.901
Last Calibration Date: January 17, 2018	New C.F.: 1.000
Previous Cal High Point C.F.: 1.000	

Calibration Standards:	
Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018	Standard Calibration Points for a Range of: 50 ppm
High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018	
Calibrator ID/Expiry Date: API id# 690 expires March 17, 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	

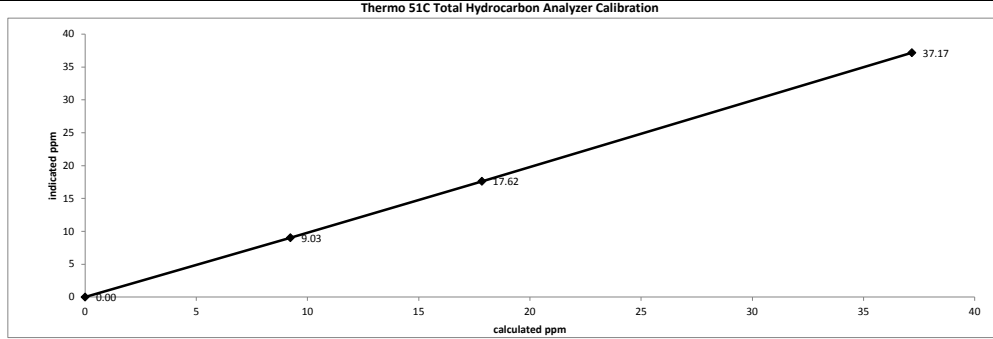
Point	Target ppm
High	38
Mid	18
Low	9

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

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration: (ppm)	Indicated Concentration: (ppm)	Correction Factors:
	Diluent	Cal Gas	Total			
as found zero	2485	0.00	2485	0.0	-0.65	n/a
as found high	2485	82.32	2567	37.18	40.60	0.901
adjusted zero	2485	0.00	2485	0.00	0.00	n/a
adjusted high	2485	82.32	2567	37.18	37.17	1.000
mid	2484	38.83	2523	17.84	17.62	1.013
low	2484	19.94	2504	9.23	9.03	1.022
calibrator zero	2485	0.00	2485	0.0	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) = 0.25%	± 3% F.S.
% change in C.F. from last cal = 9.88%	± 10%

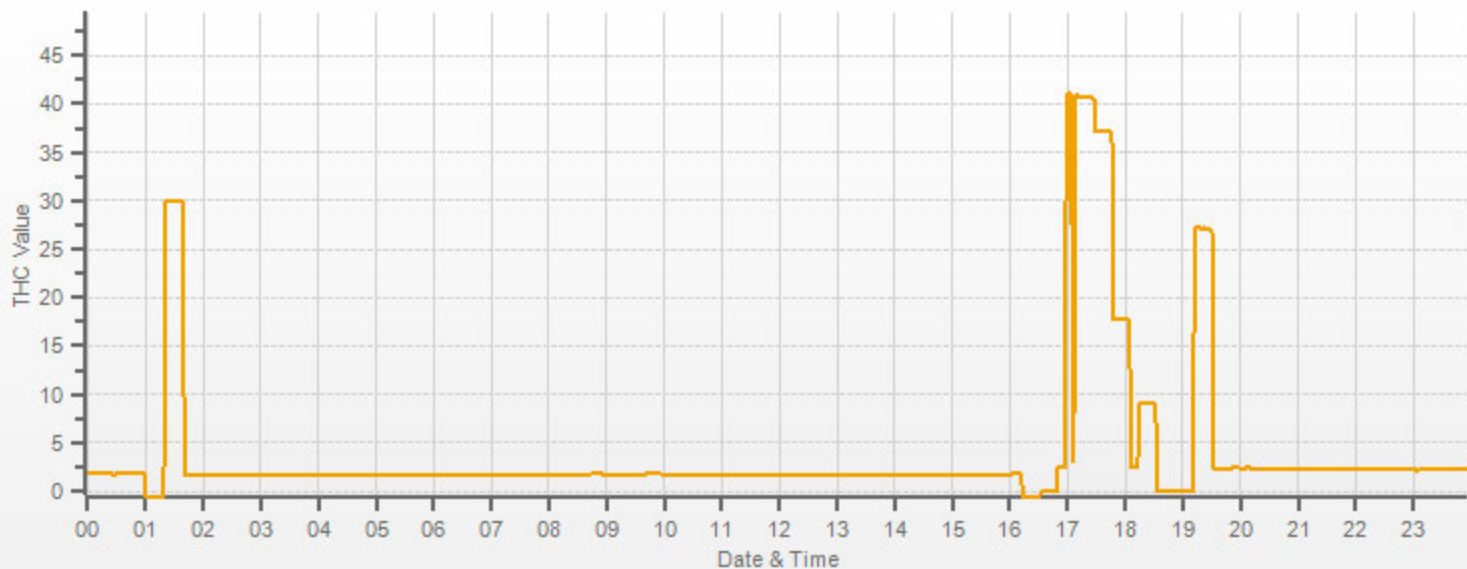


<p style="text-align: center;"><b>As found:</b></p> H2 cylinder (psi): 1700 H2 cylinder reg set (psi): 22 Span Cylinder (psi): 400 Span Cylinder Reg Set (psi): 22 Zero Air Gen Pressure: 40 measurement alarms: None service alarms: None cnt: 1317 rng: 1 try: 4 flm: 181.6 det: 125.7 Flame: 181 Filter: 125 Base: 125 Sample psi: 06.20 Internal Air Pressure: 20 Internal Fuel Pressure: 12 Measured Flow: 0.923 Expected Value: 29.74	<p style="text-align: center;"><b>As left:</b></p> H2 cylinder (psi): 1700 H2 cylinder reg set (psi): 22 Span Cylinder (psi): 400 Span Cylinder Reg Set (psi): 22 Zero Air Gen Pressure: 40 measurement alarms: None service alarms: None cnt: 1293 rng: 1 try: 4 flm: 181.4 det: 125.8 Flame: 181 Filter: 125 Base: 125 Sample psi: 06.20 Internal Air Pressure: 20 Internal Fuel Pressure: 12 Measured Flow: n/a Expected Value: 27.05
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**Comments:**

The manifold blower was found to be working normally.

The analyzer showed drift after the installation calibration on Jan 17, 2018; A repeat calibration was performed after a longer period of stabilization.



— THC[ppm]

***NITROGEN DIOXIDE***



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

Date: January 3, 2018	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	951	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name: Cold Lake South	Weather Conditions: A few clouds		
Start/End Time 24 hr. (mst): 9:38 / 16:21	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: 1505664393	NO =	Previous C.F.: 1.000	As Found C.F.: 0.989	New C.F.: 1.000
Last Calibration Date: December 12, 2017	NO <sub>2</sub> =	1.000	1.000	1.000
Range ppb: 500	NO <sub>x</sub> =	0.999	0.991	1.001

Calibration Standards:		Standard Calibration Points for a Range of: 500 ppb			
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	Point	Target NO (ppb)	Target NO <sub>2</sub> (ppb)	Cc Ozone ?
Calibrator ID/Expiry Date: API id# 627 expires January 27, 2018	Cal Gas Cylinder I.D. #: LL 104222	High	380	250	n/a
Cal Gas Conc. (ppm): 50.7	50.9	Mid	180	145	n/a
		Low	90	50	n/a
		Extra Point #1	n/a	n/a	n/a
		Extra Point #2	n/a	n/a	n/a

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NO <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	4759	0.0	4759	0	0	0.0	0.0	n/a	n/a
as found high	4889	36.8	4926	378.9	380.4	383.0	384.0	0.989	0.991
adjusted zero	4759	0.00	4759	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4889	36.81	4926	378.9	380.4	379.0	380.0	1.000	1.001
mid	4910	16.83	4927	173.2	173.9	174.0	174.0	0.995	0.999
low	4920	8.94	4929	92.0	92.3	92.0	92.0	1.000	1.003
calibrator zero	4759	0.00	4759	0	0	0.0	0.0	n/a	n/a
Average C.F.=								0.998	1.001

**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	4889	36.81	4926	0.0	380.0	380.0	0.0	0.0	0.0	
as found high NO <sub>2</sub>	4889	36.81	4926	230.0	128.0	380.0	252.0	252.0	252.0	1.000
adjusted high NO <sub>2</sub>	4889	36.81	4926	230.0	128.0	380.0	252.0	252.0	252.0	1.000
gpt mid	4889	36.81	4926	135.0	231.0	380.0	149.0	149.0	149.0	1.000
gpt low	4889	36.81	4926	44.0	329.0	380.0	51.0	51.0	51.0	1.000
Average NO <sub>2</sub> C.F.=										1.000

**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 =	1.000	1.001	1.000	0.95-1.05
b (Intercept as % of full scale)=	0.03%	-0.01%	0.00%	± 3% F.S.
% change in C.F. from last cal=	1.08%	0.85%	0.00%	± 10%
NO <sub>2</sub> converter efficiency			0.99	0.96 to 1.04

As found:		As left:	
NO Bkg:	4.1	NO Bkg:	4.1
NO <sub>x</sub> Bkg:	4.5	NO <sub>x</sub> Bkg:	4.3
NO Coef:	1.041	NO Coef:	1.031
NO <sub>2</sub> Coef:	0.990	NO <sub>2</sub> Coef:	0.990
NO <sub>x</sub> Coef:	0.998	NO <sub>x</sub> Coef:	0.999
PMT:	-854.7	PMT:	-854.7
Internal:	28.2	Internal:	28.0
Chamber:	50.2	Chamber:	50.5
Cooler:	-2.9	Cooler:	-3.0
NO <sub>2</sub> Converter:	326	NO <sub>2</sub> Converter:	322.9
NO <sub>2</sub> Converter Set:	325	NO <sub>2</sub> Converter Set:	325
Perm Oven Gas:	35.00	Perm Oven Gas:	35.00
Perm Oven Heater:	34.26	Perm Oven Heater:	34.26
Pressure:	177.2	Pressure:	177.2
Flow:	0.776	Flow:	0.776
Ozonator Flow:	OK	Ozonator Flow:	OK
Expected Value NO:	2	Expected Value NO:	2
Expected Value NO <sub>2</sub> :	272	Expected Value NO <sub>2</sub> :	273
Expected Value NO <sub>x</sub> :	274	Expected Value NO <sub>x</sub> :	275

**Comments:**

The analyzer sample inlet filter was changed.

The manifold blower was found to be working normally.

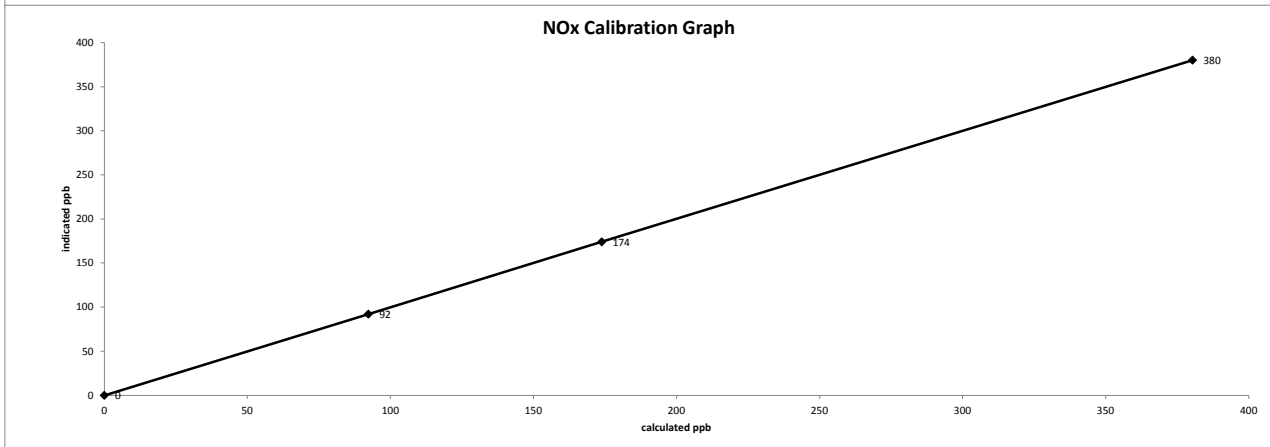
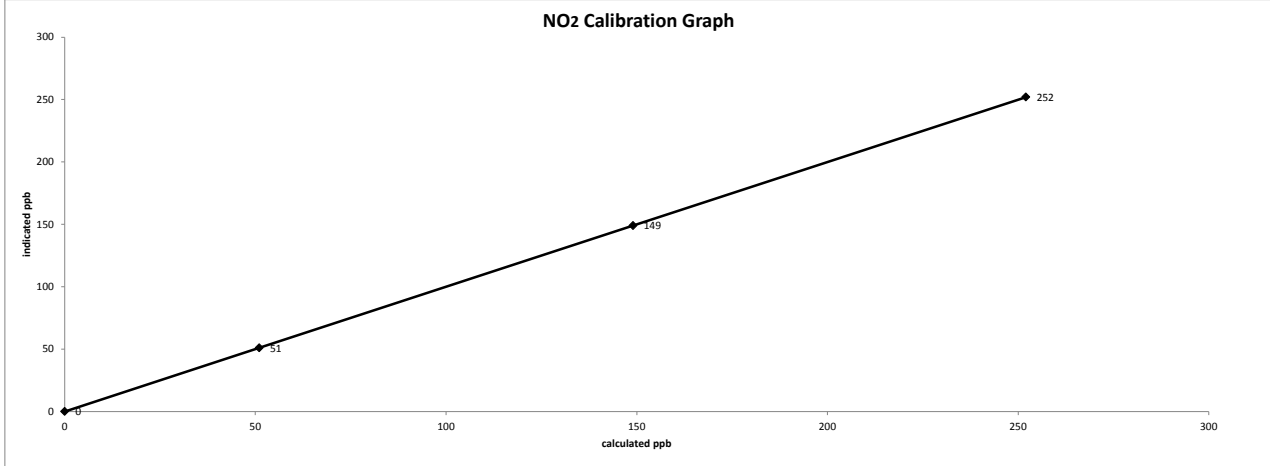
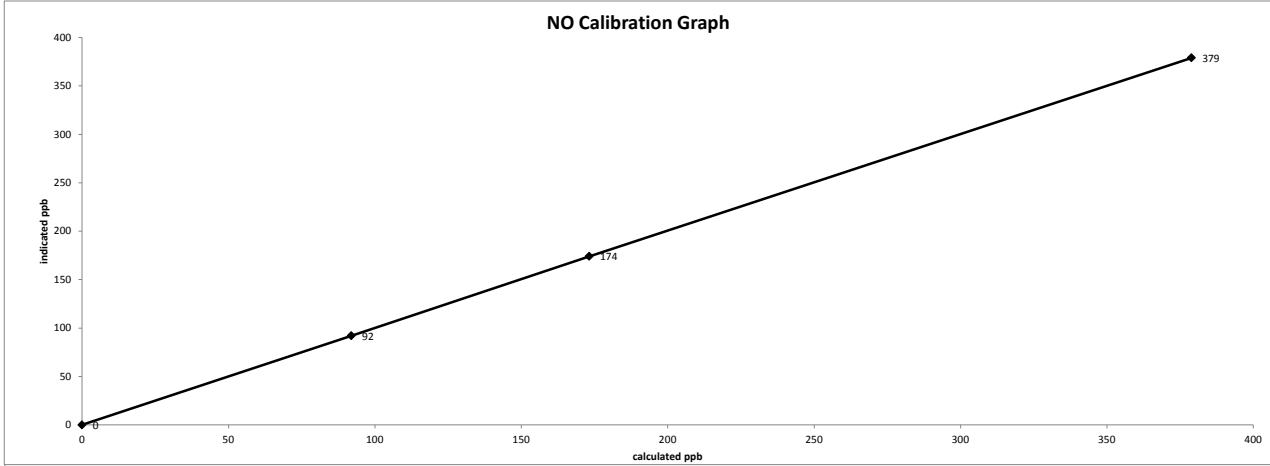
No high point NO<sub>2</sub> adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.

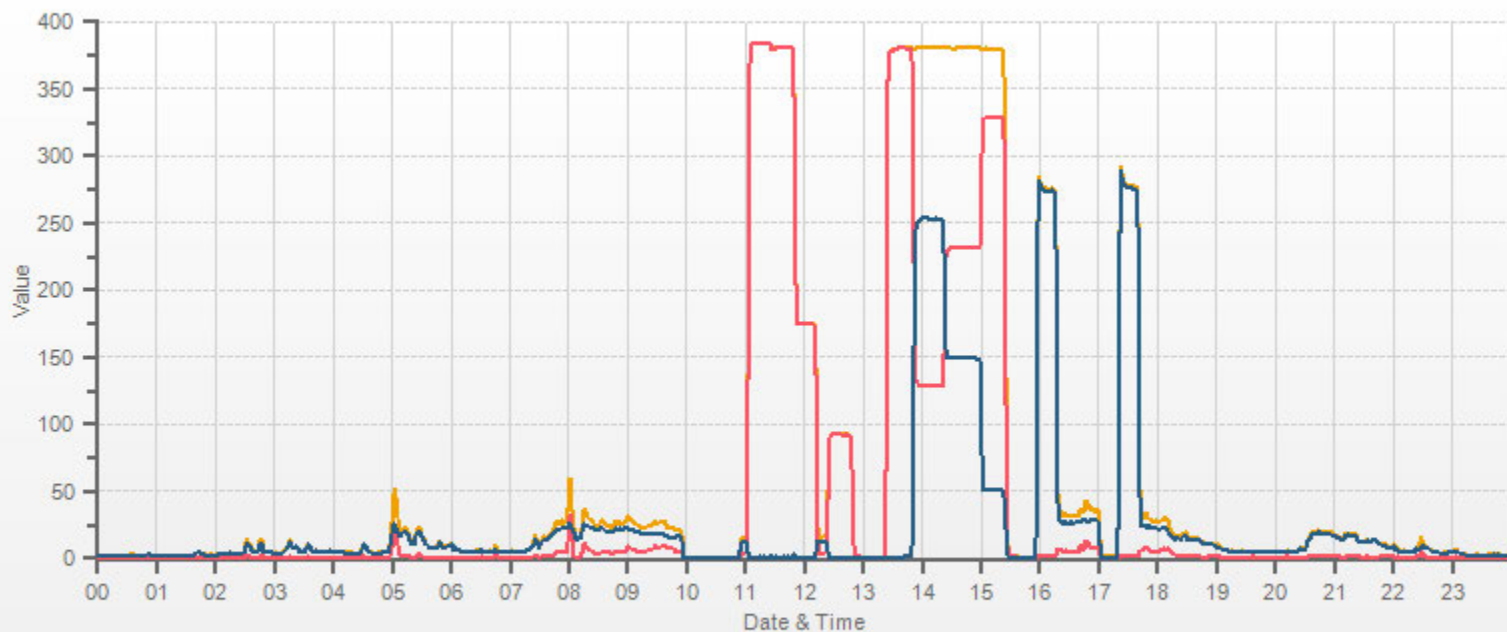
The analyzer cooling fan filter(s) were cleaned.

Date: January 3, 2018  
Company/Airshed: LICA  
Location/Station Name: Cold Lake South

Start/End Time 24 hr. (mst): 9:38 / 16:21  
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> January 2, 2018 <b>Company/Airshed:</b> LICA <b>Location/Station Name:</b> Cold Lake South <b>Start/End Time 24 hr. (mst):</b> 12:37 / 16:44 <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    951    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> December 13, 2017 <b>Previous Cal High Point C.F.:</b> 1.000	<b>Ozone Range ppb:</b> 500 <b>As Found C.F.:</b> 0.992 <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								

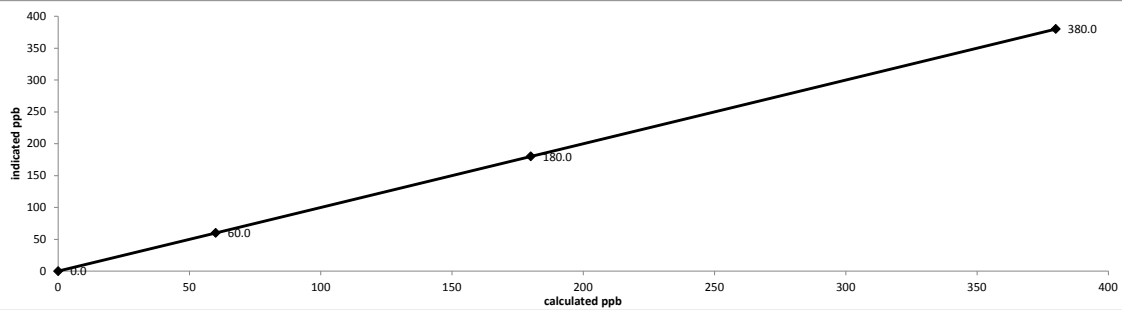
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

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	383.0	0.992
adjusted zero	5000	5000	0.0	0.0	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	180.0	180.0	180.0	1.000
low	5000	5000	60.0	60.0	60.0	1.000
calibrator zero	5000	5000	0.0	n/a	0.0	n/a
<b>Average C.F.=</b>						1.000

**Linear Regression/Calibration Results:**

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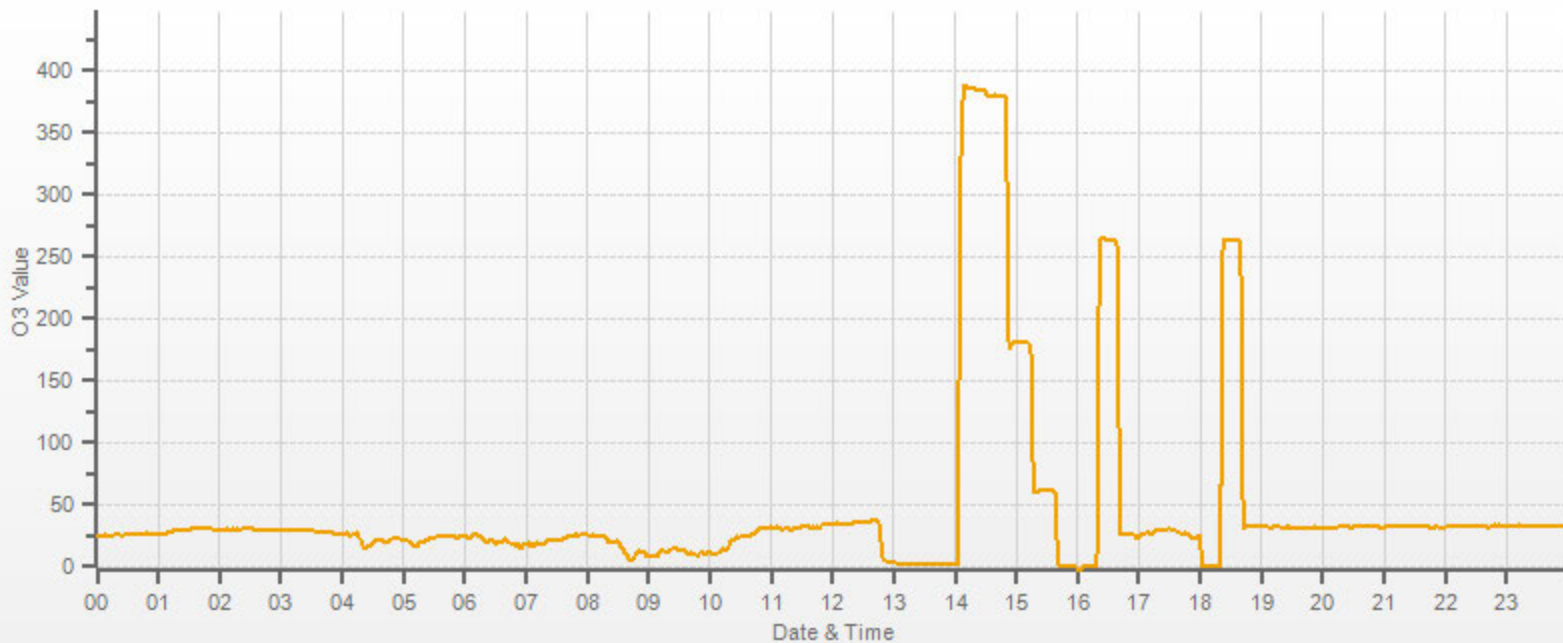
**Thermo 49i Ozone Analyzer Calibration**



<b>As found:</b> O3 Bkg: 0.1 O3 Coef: 0.999 Photo Lamp: 9.6 O3 Lamp: 9.0 Bench: 30.3 Bench Lamp: 53.5 O3 Lamp: 67.4 Pressure: 713.5 Cell A lpm: 0.721 Cell B lpm: 0.762 O3 ppb: 2.4 Cell A ppb: -2.5 Cell B ppb: 7.2 Cell A int: 84310 Cell B int: 85188.0 Expected Value: 261.2	<b>As left:</b> O3 Bkg: 0.1 O3 Coef: 0.990 Photo Lamp: 9.6 O3 Lamp: 9.0 Bench: 30.3 Bench Lamp: 53.5 O3 Lamp: 67.4 Pressure: 713.5 Cell A lpm: 0.721 Cell B lpm: 0.762 O3 ppb: 0.1 Cell A ppb: 4.1 Cell B ppb: -3.9 Cell A int: 84240 Cell B int: 85129.0 Expected Value: 263.0
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**Comments:**

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



— O3[ppb]

***PARTICULATE MATTER 2.5***

## SHARP 5030 Monitor Monthly Audit

<b>Date:</b> January 2, 2018	<b>Performed By/Reviewer:</b> Alex Yakupov
<b>Company:</b> LICA	<b>Tom Bourque</b>
<b>Station Name/Location:</b> Cold Lake South	<b>Start Time (mst):</b> 16:00
<b>Previous Audit Date:</b> December 13, 2017	<b>End Time (mst):</b> 16:47
<b>Parameter:</b> PM 2.5	<b>Calibration Purpose:</b> routine monthly
	<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> -6.0	<b>SHARP P3 (mmHg):</b> 717.00
<b>Reference (°C):</b> -6.5	<b>Reference (mmHg):</b> 713.00
<b>Difference (°C):</b> -0.5	<b>Difference (mmHg):</b> -4.0
<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> -6.0	<b>SHARP P3 (mmHg):</b> 717.00
<b>Reference (°C):</b> -6.5	<b>Reference (mmHg):</b> 713.00
<b>Difference (°C):</b> -0.5	<b>Difference (mmHg):</b> -4.0
<b>As found flows:</b>	
<b>SHARP Airflow l/hr</b> 1000.00	<b>Tolerance lpm +/-</b> 5%
<b>Pump Voltage (%)</b> 48.70	<b>SHARP Airflow (lpm)</b> 16.67
	<b>Reference Airflow (lpm)</b> 16.71
	<b>Difference (%)</b> 0.26%
<b>As left flows (same as above if as found adequate):</b>	
<b>Targets: 1000 l/hr / &lt;90%</b>	<b>Tolerance lpm +/-</b> 5%
<b>SHARP Airflow l/hr</b> 1000.00	<b>SHARP Airflow (lpm)</b> 16.67
<b>Pump Voltage (%)</b> 48.70	<b>Reference Airflow (lpm)</b> 16.71
	<b>Difference (l/min)</b> 0.26%
<b>As found relative humidity:</b>	
<b>Tolerance % +/-</b> 3	<b>As left relative humidity (same as "as found" if adequate):</b>
<b>Sharp RH (%):</b> n/a	<b>Tolerance % +/-</b> 3
<b>Reference RH (%):</b> n/a	<b>Sharp RH (%):</b> n/a
<b>Difference:</b> n/a	<b>Reference RH (%):</b> n/a
	<b>Difference:</b> n/a
<b>Inlet Assembly:</b>	
<b>Inlet Head/Sharp Cut</b> Yes/No?	<b>If no, give reason:</b>
<b>Cleaned:</b> yes	
<b>Comments:</b>	
RH calibration is to be completed during quarterly audit because the RH sensor is located within the monitor and requires disconnecting/equilibrating.	

## ***WIND SYSTEM***



## ***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 Maxxam Operator: Mike

<b>Calibrator:</b>		<b>Flow Measurement Device:</b>	
Make/Model	<u>API 700</u>	Make/Model	<u>Bios Defender 530</u>
Serial Number	<u>690</u>	Serial Number	<u>HI148944 Lo 152019</u>
Last Verification Date	<u>March 30, 2016\</u>	Temperature (°C)	<u>23.3</u>
NO Cylinder S/N	<u>EY0000597</u>	Barometric Pressure	<u>704.3mmHg</u>
NO [PPM]	<u>49.0 NOx [PPM]</u>		<u>49.0</u>
Expiry Date	<u>December 8, 2019</u>		

Dilution Flow (sccm)			
Pt. #1	<u>4898</u>	Pt. #2	<u>4942</u>
		Pt. #3	<u>4953</u>
Gas Flow (sccm)			
Pt. #1	<u>79.2</u>	Pt. #2	<u>38.6</u>
		Pt. #3	<u>19.3</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
4977	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	Limit ± 10%	
4977	79.2	0.7792	0.7792	0.7841	0.0012	0.7854	1%	1%
4981	38.6	0.3797	0.3797	0.3813	0.0006	0.3819	0%	1%
492	19.3	0.1902	0.1902	0.1927	0.0002	0.1929	1%	1%
Absolute Average Percent Difference							1%	1%

**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)=	1.0056	<b>0.90-1.10</b>		m (Slope)=	1.0073
b (Intercept % of FS)=	0.0357	± 3% F.S.		b (Intercept % of FS)=	0.0304

Flow	O <sub>3</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOX	% Diff. Vs Audit gas	
4977	0.000	0.0000	0.7928	0.0014	0.7941	NO <sub>2</sub>	% Diff. Limit
4977	0.500	0.5448	0.2480	0.5391	0.7871	-1%	± 10%
4977	0.250	0.2862	0.5066	0.2861	0.7926	-1%	± 10%
4977	0.100	0.1221	0.6707	0.1193	0.7914	-3%	± 10%
Absolute Average Percent Difference						2%	± 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)=	0.9894	<b>0.90-1.10</b>
b (Intercept % of FS)=	0.0719	± 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>1868</u>
Serial/AMU Number	<u>1809</u>	Last Calibration Date	<u>March 15, 2017</u>
SRM Gas Cylinder No.	<u>CAL018140</u>	Full Scale (ppm)	<u>1.0</u>
Cylinder Conc. (ppm)	<u>48.79</u>	Cylinder Gas Expiry Date	<u>March 28, 2019</u>

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton  
Operator Signature: [Signature]

Date: March 17, 2017  
Location: McIntyre Center Edmonton

<b>Company</b> <u>Maxxam</u>		<b>Operator:</b> <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>		

<b>Dilution Flow (sccm)</b>		
Pt. #1 <u>4879</u>	Pt. #2 <u>4932</u>	Pt. #3 <u>4950</u>
<b>Gas Flow (sccm)</b>		
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%
<b>Absolute Average Percent Difference</b>							3%	2%

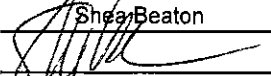
<b>LINEAR REGRESSION ANALYSIS</b>			<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>		
<b>NO</b>		<b>LIMITS</b>		<b>NOx</b>	
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000
m (Slope)=	1.0301	<b>0.90-1.10</b>		m (Slope)=	1.0291
b (Intercept % of FS)=	-0.0919	± 3% F.S.		b (Intercept % 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%
<b>Absolute Average Percent Difference</b>						0%	± 10%

<b>LINEAR REGRESSION ANALYSIS</b>			<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>		
<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>	Make/Model	<u>Thermo 42i</u>
Serial/AMU Number	<u>1809</u>	Serial/AMU Number	<u>1868</u>
SRM Gas Cylinder No.	<u>CAL018140</u>	Last Calibration Date	<u>March 15, 2017</u>
Cylinder Conc. (ppm)	<u>48.79</u>	Full Scale (ppm)	<u>1.0</u>
		Cylinder Gas Expiry Date	<u>March 28, 2019</u>

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton  
Operator Signature: 

Date: March 16, 2017  
Location: McIntyre Center Edmonton

**Company** Maxxam **Operator:** Mike

<b>Calibrator:</b>		<b>Flow Measurement Device:</b>	
Make/Model	<u>Envionics 6100</u>	Make/Model	<u>Bios Defender 530</u>
Serial Number	<u>5212</u>	Serial Number	<u>Hi148944 Lo 152019</u>
Last Verification Date	<u>February 3, 2016</u>	Temperature (°C)	<u>24.6</u>
NO Cylinder S/N	<u>EY0000597</u>	Barometric Pressure	<u>701.4mmHg</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>4919</u>	Pt. #3 <u>4960</u>
Pt. #2	<u>4934</u>	
<b>Gas Flow (sccm)</b>		
Pt. #1	<u>79.2</u>	Pt. #3 <u>19.1</u>
Pt. #2	<u>38.3</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
4987	0.0	0.0000	0.0000	0.0000	0.0002	0.0002	Limit ± 10%	
4998	79.2	0.7765	0.7765	0.7801	-0.0003	0.7798	0%	0%
4977	38.3	0.3775	0.3775	0.3790	0.0000	0.3790	0%	0%
4979	19.1	0.1880	0.1880	0.1888	-0.0001	0.1887	0%	0%
Absolute Average Percent Difference							0%	0%

**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)= 1.0046	<b>0.90-1.10</b>	m (Slope)= 1.0041
b (Intercept % of FS)= -0.0080	± 3% F.S.	b (Intercept % of FS)= 0.0057

Flow	O <sub>3</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOx	% Diff. Vs Audit gas	
4998	0.000	0.0000	0.7799	-0.0008	0.7790	NO <sub>2</sub>	% Diff. Limit
4998	0.500	0.4949	0.2850	0.4909	0.7776	-1%	± 10%
4998	0.275	0.2765	0.5034	0.2742	0.7776	-1%	± 10%
4998	0.100	0.1003	0.6796	0.0989	0.7786	-1%	± 10%
Absolute Average Percent Difference						1%	± 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)= 0.9936	<b>0.90-1.10</b>
b (Intercept % of FS)= -0.0733	± 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>1868</u>
Serial/AMU Number <u>1809</u>	Last Calibration Date <u>February 13, 2017</u>
SRM Gas Cylinder No. <u>CAL018140</u>	Full Scale (ppm) <u>1.0</u>
Cylinder Conc. (ppm) <u>48.79</u>	Cylinder Gas Expiry Date <u>March 28, 2019</u>

COMMENTS: Gas has ~50ppm SO2

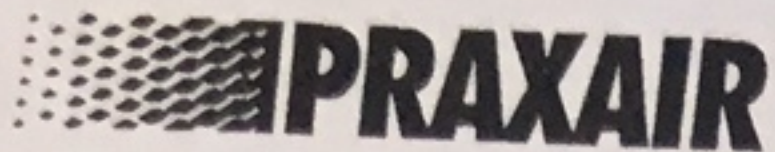
Auditor: Shea Beaton  
Operator Signature: [Signature]

Date: February 14, 2017  
Location: McIntyre Center Edmonton

## ***CALIBRATION GASES***







Praxair  
 5700 South Alameda Street  
 Los Angeles, CA 90058  
 Tel: (323) 585-2154 Fax: (714) 542-6689  
 PGVPID: F22017

DocNumber: 000116115

## CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

**Customer & Order Information:**

PRAXAIR PKG EDMONTON PLT 8  
 9501 34TH ST  
 EDMONTON AB T6B 2X

Praxair Order Number: 45314542  
 Customer P. O. Number: 582-277  
 Customer Reference Number:

Fill Date: 10/12/2017  
 Part Number: NI NO50MS2E-AQ  
 Lot Number: 70086728507  
 Cylinder Style & Outlet: AQ CGA 660  
 Cylinder Pressure & Volume: 2000 psig 82 cu. ft.

**Certified Concentration:**

Expiration Date:	10/24/2020	NIST Traceable
Cylinder Number:	LL104225	Analytical Uncertainty:
51.5 ppm	NITRIC OXIDE	± 0.7 %
49.2 ppm	SULFUR DIOXIDE	± 1 %
Balance	NITROGEN	

**NOx = 51.6 ppm**

**NOx for Reference Only**

**Certification Information:** Certification Date: 10/24/2017 Term: 36 Months Expiration Date: 10/24/2020

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

**Analytical Data:**

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

**1. Component: NITRIC OXIDE**

Requested Concentration: 50 ppm  
 Certified Concentration: 51.5 ppm  
 Instrument Used: Thermo Electron 42i-LS S/N 1030645077  
 Analytical Method: Chemiluminescence  
 Last Multipoint Calibration: 10/14/2017

Reference Standard Type: GMIS  
 Ref. Std. Cylinder #: CC363145  
 Ref. Std. Conc: 50.79 ppm  
 Ref. Std. Traceable to SRM #: vs. 1683b  
 SRM Sample #: 45.-V-42  
 SRM Cylinder #: CAL017897

<b>First Analysis Data:</b>				<b>Date:</b> 10/17/2017
Z: 0	R: 50.8	C: 51.5	Conc: 51.49	
R: 50.8	Z: 0	C: 51.6	Conc: 51.59	
Z: 0	C: 51.6	R: 50.8	Conc: 51.59	
<b>UOM: ppm</b>				<b>Mean Test Assay:</b> 51.557 ppm

<b>Second Analysis Data:</b>				<b>Date:</b> 10/24/2017
Z: 0	R: 50.8	C: 51.4	Conc: 51.39	
R: 50.8	Z: 0	C: 51.5	Conc: 51.49	
Z: 0	C: 51.4	R: 50.8	Conc: 51.39	
<b>UOM: ppm</b>				<b>Mean Test Assay:</b> 51.423 ppm

**2. Component: SULFUR DIOXIDE**

Requested Concentration: 50 ppm  
 Certified Concentration: 49.2 ppm  
 Instrument Used: Ametek 921CE S/N AW-921-S321  
 Analytical Method: Ultraviolet Absorption  
 Last Multipoint Calibration: 10/13/2017

Reference Standard Type: NTRM  
 Ref. Std. Cylinder #: CC72593  
 Ref. Std. Conc: 48.58 ppm  
 Ref. Std. Traceable to SRM #: n/a  
 SRM Sample #: 12070103  
 SRM Cylinder #: N/A

<b>First Analysis Data:</b>				<b>Date:</b> 10/17/2017
Z: 0	R: 48.2	C: 48.8	Conc: 49.151	
R: 48.2	Z: 0	C: 48.8	Conc: 49.151	
Z: 0	C: 48.9	R: 48.3	Conc: 49.251	
<b>UOM: ppm</b>				<b>Mean Test Assay:</b> 49.184 ppm

<b>Second Analysis Data:</b>				<b>Date:</b> 10/24/2017
Z: 0	R: 48.2	C: 48.7	Conc: 49.084	
R: 48.2	Z: 0	C: 48.8	Conc: 49.185	
Z: 0	C: 48.8	R: 48.2	Conc: 49.185	
<b>UOM: ppm</b>				<b>Mean Test Assay:</b> 49.151 ppm

Analyzed by:

Henry Koung

Certified by:

Amalia Real

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









# Calibration Gas Audit

## Single Component Cylinder Gas

File No. 2017-213CGA

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

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

Expiry Date: August 2020

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

**Reference Analyzer:**

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

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

Last Calibration: Date: Sep 22/17 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	<del>0.0000</del>	<del>0.0000</del>	<del>0.0000</del>
5114	39.5	0.0734	0.00772	129.468	9.5
5096	18.5	0.0345	0.00363	275.459	9.5
5089	9.5	0.0178	0.00187	535.684	9.5
Average Cylinder Concentration:					<b>9.5</b>

Previous Stated Concentration PPM: 9.8

Percent variance from Stated: 3

Meets Manufacturer Tolerance. Use manufacturers stated concentration  COMMENTS: \_\_\_\_\_

<=5% Outside Manufacturer Tolerance. Use manufacturers concentration  \_\_\_\_\_

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

Auditor: Al Clark

Operator Signature: *Al Clark*

Date: September 22, 2017

Location: McIntyre Center Edmonton





**Praxair**  
 5700 South Alameda Street  
 Los Angeles, CA 90058  
 Tel: (323) 585-2154 Fax: (714) 542-6689  
 PGVPID: F22017

DocNumber: 000116089

## CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

**Customer & Order Information:**

MAXXAM ANALYTICS INC  
 500 1919 MINNESOTA CRT  
 MISSISSAUGA ON L5N 0C

Praxair Order Number: 44723832  
 Customer P. O. Number: PO0000001677  
 Customer Reference Number:

Fill Date: 10/13/2017  
 Part Number: NI ME600P2E-AQ  
 Lot Number: 70086728604  
 Cylinder Style & Outlet: AQ CGA 350  
 Cylinder Pressure & Volume: 2200 psig 82 cu. ft.

**Certified Concentration:**

Expiration Date:	10/18/2025	NIST Traceable
Cylinder Number:	LL119471	Analytical Uncertainty:
207 ppm	PROPANE	± 0.6 %
599 ppm	METHANE	± 0.3 %
Balance	NITROGEN	

**Certification Information:** Certification Date: 10/18/2017 Term: 96 Months Expiration Date: 10/18/2025

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

**Analytical Data:** (R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

**1. Component: PROPANE**

Requested Concentration: 200 ppm  
 Certified Concentration: 207 ppm  
 Instrument Used: MKS Multigas 2031 FTIR  
 Analytical Method: Fourier Transform Infrared  
 Last Multipoint Calibration: 10/15/2017

Reference Standard Type: GMIS  
 Ref. Std. Cylinder #: CC119142  
 Ref. Std. Conc: 255.6 ppm  
 Ref. Std. Traceable to SRM #: 2644a  
 SRM Sample #: 101-C-45  
 SRM Cylinder #: XF003829B

First Analysis Data:				Date:			
Z:	0	R:	246.85	C:	199.66	Conc:	206.7
R:	246.89	Z:	0	C:	199.69	Conc:	206.72
Z:	0	C:	199.66	R:	246.96	Conc:	206.7
UOM:	ppm		Mean Test Assay:	206.71 ppm			

Second Analysis Data:				Date:			
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	ppm		Mean Test Assay:	0 ppm			

**2. Component: METHANE**

Requested Concentration: 600 ppm  
 Certified Concentration: 599 ppm  
 Instrument Used: MKS Multigas 2031 FTIR  
 Analytical Method: Fourier Transform Infrared  
 Last Multipoint Calibration: 9/27/2017

Reference Standard Type: GMIS  
 Ref. Std. Cylinder #: DT0010335  
 Ref. Std. Conc: 990 ppm  
 Ref. Std. Traceable to SRM #: RGM#DT00  
 SRM Sample #: N/A  
 SRM Cylinder #: DT0007710

First Analysis Data:				Date:			
Z:	0	R:	934.60	C:	566.69	Conc:	600.97
R:	934.66	Z:	0	C:	563.95	Conc:	598.06
Z:	0	C:	564.19	R:	931.33	Conc:	598.32
UOM:	ppm		Mean Test Assay:	599.12 ppm			

Second Analysis Data:				Date:			
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	ppm		Mean Test Assay:	0 ppm			

Analyzed by:

Jenna Lockman

Certified by:

Jose Vasquez

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



# Calibration Gas Audit

## NO Cylinder Gas

File No. 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***  
***INTERNAL AUDIT RESULTS***

COMPANY: LICA PLANT: Cold Lake South DATE: January 17, 2018

Station Location: UTM Coordinates: 54.41409° , -110.23293°  
 Elevation (m): 528m  
 Declination: 12° 44.28' East

**GENERAL**

	Yes	No	n/a	Comments:
Has site location changed from previous audit?		x		
Is site secure?	x			
Are station operating conditions adequate?	x			
Last twelve month's of calibrations available?	x			
All applicable SOP's available in station?				
Site documentation up to date?	x			

**DATA ACQUISITION**

	Yes	No	n/a	Comments:
Are strip charts in use?		x		
Is a digital data logger in use?	x			
Is a telemetry system for data acquisition in use?	x			

**TRAILER COMPONENTS**

	Yes	No	n/a	Comments:
Is a glass sampling manifold installed?	x			
Is sampling manifold clean and free of chips and cracks?	x			
Is a trap in place?	x			
Are spare manifold ports capped?	x			
Is manifold pump properly installed and operative?	x			
If horizontal, is the manifold mounted at a slight upward angle to prevent moisture from getting in to the lines?			x	Vertical installed manifold
Do sample lines extend halfway into manifold?	x			
Are monitor sampling lines connected to manifold?	x			
Are sampling lines clean?	x			
Are monitors properly mounted and secure?	x			
Are monitors properly exhausted from room or scrubbed (NOx pump inlet scrubbed and dated)?	x			
Are zero and span systems operational?	x			

**Meteorological**

	Yes	No	n/a	Comments:
Is wind equipment properly oriented?	x			
Is the wind equipment functioning properly?	x			

	Indicated Value:	Audit Value:	% Difference	Scalar Difference:
Station Temperature °C	24.3	23.6	-2.97	-0.70
Barometric Pressure	n/a	n/a	n/a	n/a
Wind Speed (kph)	13	>10	n/a	n/a
Wind Direction (Deg)	273	W	n/a	n/a
Relative Humidity %	63.8	69.4	n/a	n/a
Ambient Temperature °C	4.7	3.58	-31.28	-1.12
Solar Radiation kW/m <sup>2</sup>	n/a	n/a	n/a	n/a
Precipitation (Tipping Bucket mm)	n/a	n/a	n/a	n/a

Recommendations: Ambient temperature higher around 1 °C.

AUDITOR: Limin Li



## Meteorological System Checklist

Date:	January 26, 2018		
Technician:	Alex Yakupov		
Reviewer:	Tom Bourque		
Station:	Cold Lake South		
Unit:	Make:	Model:	Serial #:
Precipitation Sampler:	n/a	n/a	n/a
Temperature Sensor:	Rotronic	Hydroclip-S3	n/a
Barometric Pressure Sensor:	n/a	n/a	n/a
Relative Humidity Sensor:	Rotronic	Hydroclip-S3	n/a
Anemometer:	n/a	n/a	n/a
AMBIENT TEMPERATURE SENSOR CHECK			
Previous check date:	January 17, 2018		
Parameter:	Temperature @ 2 metres (1 C tolerance)		
Reference Thermometer ID:	F.S. 170286131 expires April 19, 2019		
Reference Temperature (°C):	-12.0		
Station - Ambient Temperature (°C):	-12.9		
Temperature Difference (°C):	0.9		
RELATIVE HUMIDITY (HYGROMETER) SENSOR CHECK			
Previous check date:	January 17, 2018		
Reference Hygrometer ID:	F.S. 170286131 expires April 19, 2019		
Reference Hygrometer % RH- Reading:	79.02		
Station Hygrometer % RH- Reading:	82.04		
Pressure Tolerance +/- 15% of error:	67.17 - 90.87	-3.0%	



### Thermo 43i Sulphur Dioxide Analyzer Calibration

Date:	January 17, 2018	Barometer/B.P./units:	Brunton 05535 expires December 15, 2018	27.89	inHg
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 160348895 expires April 8, 2018	24.8	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	Mainly sunny		
Parameter:	Sulphur Dioxide	Calibration Purpose:	shut down		
Start Time 24 hr. (mst):	10:00	Performed By/Reviewer:	Limin Li	Tom Bourque	
End Time 24 hr. (mst):	12:00	Cal Gas Expiry Date:	October 24, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		

<b>Analyzer:</b>	ID# or Serial Number:	806528242	Range ppb:	500
	Last Calibration Date:	December 12, 2017	As Found C.F.:	1.010
	Previous C.F.:	1.000	New C.F.:	n/a

<b>Calibration Standards:</b>	Low Flow Meter ID/Expiry Date:	Defender Low 152019 expires December 13, 2018	<table border="1"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>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										
	High Flow Meter ID/Expiry Date:	Defender High 148944 expires December 13, 2018									
	Calibrator ID/Expiry Date:	API id# 690 expires March 17, 2018									
	Cal Gas Cylinder I.D. # :	LL 104225									
	Cal Gas Conc. (ppm):	49.2									

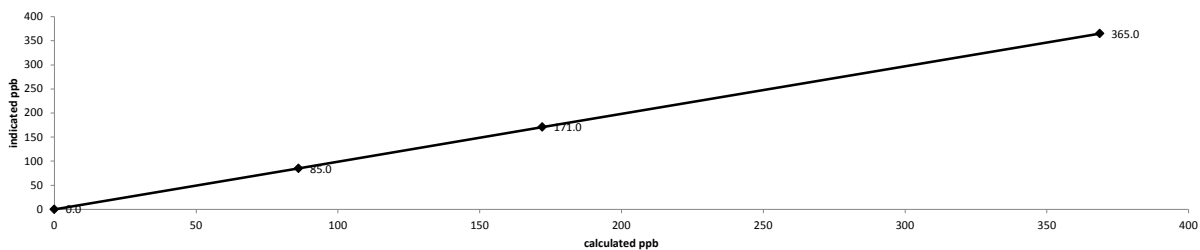
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Diluent	Cal Gas	Total	Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
as found zero	5932	0.00	5932	0.0	0.0	n/a
as found high	5881	44.40	5925	368.7	365.0	1.010
mid	5943	20.86	5964	172.1	171.0	1.006
low	5954	10.44	5964	86.1	85.0	1.013
Average C.F.=						1.010

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS
Slope =	1.010	> or = 0.995
b (Intercept as % of full scale)=	-0.01%	0.90-1.10
% change in C.F. from last cal=	-1.01%	± 3% F.S.
		± 10%

Thermo 43i Sulphur Dioxide Analyzer Calibration



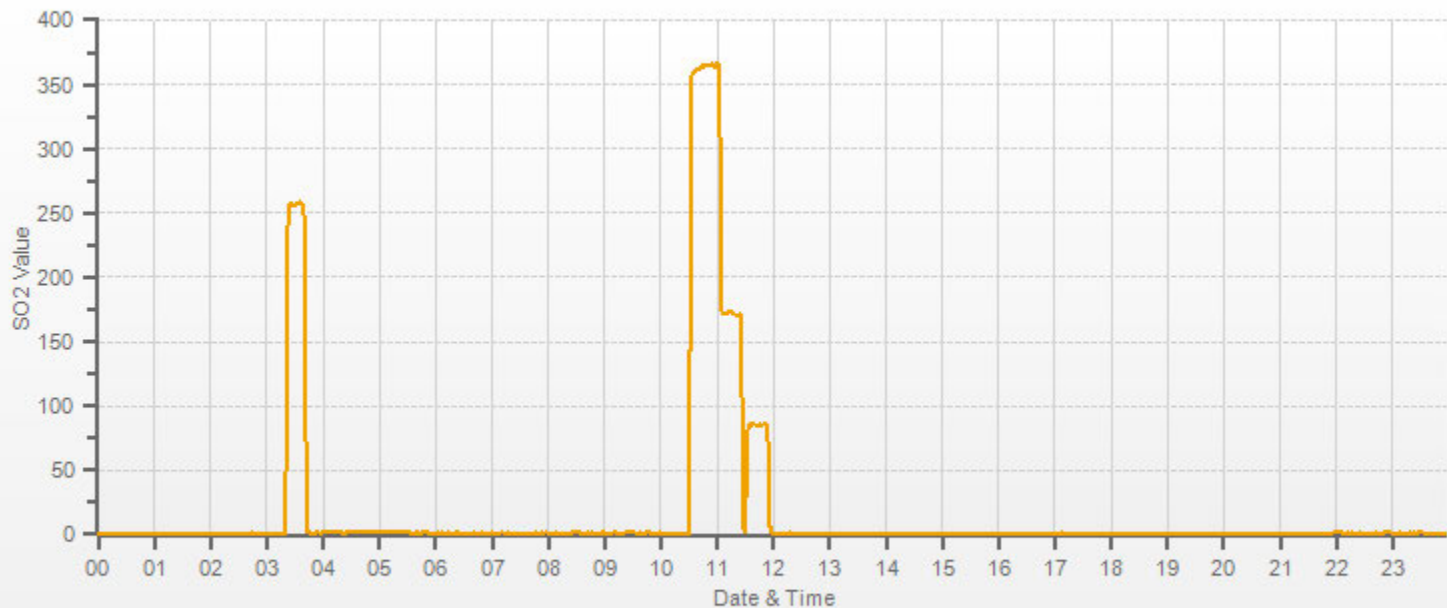
As found:		As left:	
Bkg:	8.5	Bkg:	8.5
Coef:	0.989	Coef:	0.989
Pmt:	-623.8 V	Pmt:	-623.5
Flash:	772 V	Flash:	769
Internal:	30.7 °C	Internal:	29.7
Chamber:	45.0 °C	Chamber:	45.0
Perm Oven Gas:	35.00 °C	Perm Oven Gas:	35.00
Perm Oven Heater:	34.25 °C	Perm Oven Heater:	34.24
Pressure:	674.1 mmHg	Pressure:	681.3
Sample Flow:	0.471 L/Min	Sample Flow:	0.476
Lamp Intensity:	96 S	Lamp Intensity:	96
Averaging Time:	120 Sec	Averaging Time:	120
Expected Value:	255.0	Expected Value:	255.0

**Comments:**

The manifold blower was found to be working normally.

This is an internal audit. Calibration point order is the same as a shutdown verification.





— SO2[ppb]



### Thermo 450i Total Reduced Sulphur Analyzer Calibration

Date: January 17, 2018	Barometer/B.P./units: Brunton 05535 expires December 15, 2018	27.89	inHg
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 160348895 expires April 8, 2018	24.8	°C
Location/Station Name: Cold Lake South	Weather Conditions: Mainly sunny		
Parameter: Total Reduced Sulphur	Calibration Purpose: shut down		
Start Time 24 hr. (mst): 10:00	Performed By/Reviewer: Limin Li	Tom Bourque	
End Time 24 hr. (mst): 12:20	Cal Gas Expiry Date: August 23, 2020		
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): CDNOVA/Model CDN-101/#501		

Analyzer:	Range ppb: 100
ID# or Serial Number: 812728560	As Found C.F.: 1.013
Last Calibration Date: January 12, 2018	New C.F.: n/a
Previous C.F.: 1.000	

<b>Calibration Standards:</b> Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: Envionics id# 5212 expires February 14, 2018 Cal Gas Cylinder I.D. #: LL119500 Cal Gas Conc. (ppm): 9.8	<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								

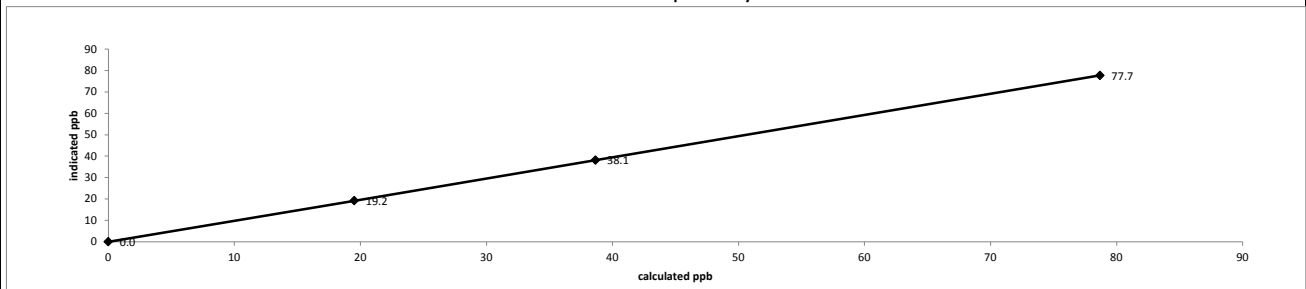
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	7446	0.00	7446	0.0	0.0	n/a
as found high	7435	60.18	7495	78.7	77.7	1.013
mid	7506	29.73	7536	38.7	38.1	1.015
low	7523	15.01	7538	19.5	19.2	1.016
<b>Average C.F.=</b>						<b>1.015</b>

**Linear Regression/Calibration Results:**

Correlation Coefficient =	<u>1.000</u>	LIMITS	> or = 0.995
Slope =	<u>1.013</u>		0.90-1.10
b (Intercept as % of full scale) =	<u>0.04%</u>		± 3% F.S.
% change in C.F. from last cal =	<u>-1.27%</u>		± 10%

#### Thermo 450i Total Reduced Sulphur Analyzer Calibration

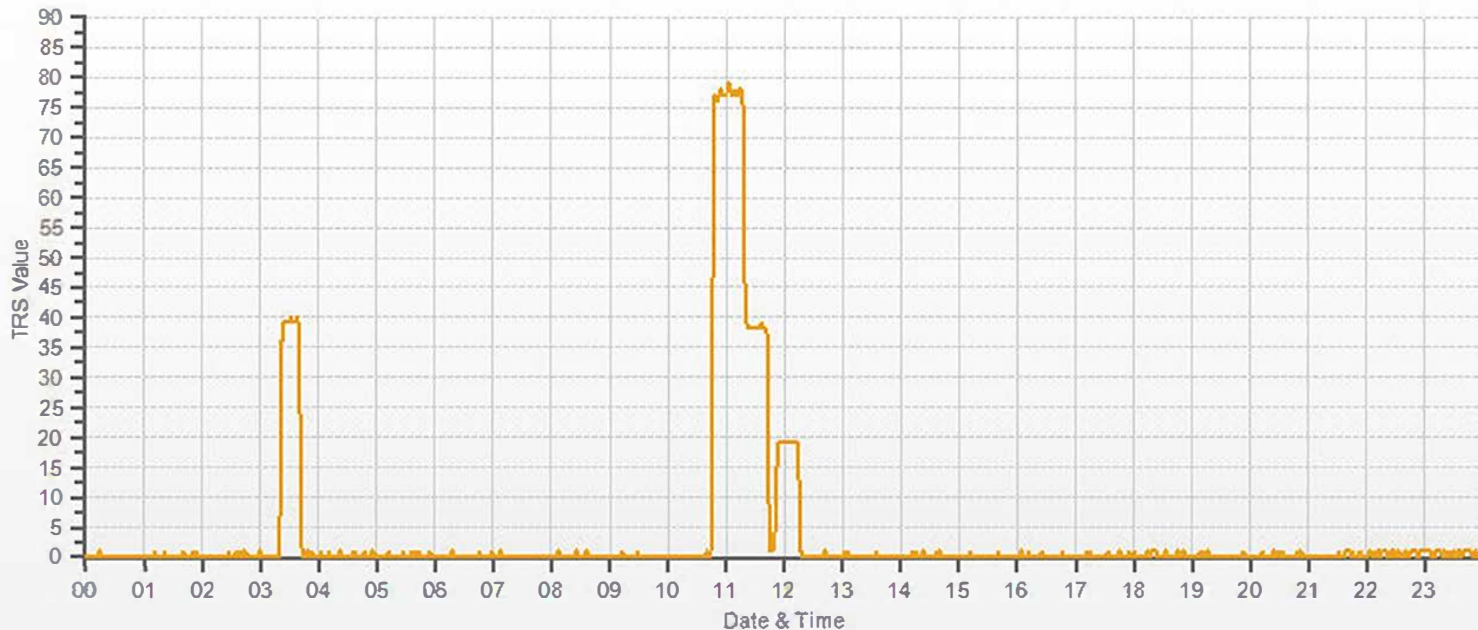


<b>As found:</b> Bkg: <u>15.1</u> Coef: <u>0.944</u> Pmt: <u>-650.5 V</u> Flash: <u>741 V</u> Internal: <u>34.0 °C</u> Chamber: <u>45.1 °C</u> Converter Temp: <u>825 °C</u> Converter Set: <u>825 °C</u> Perm Oven Gas: <u>45.00 °C</u> Perm Oven Htr: <u>44.37 °C</u> Pressure: <u>626.4 mmHg</u> Sample Flow: <u>0.489 LPM</u> Lamp Intensity: <u>%</u> Averaging Time: <u>120 sec</u> Expected Value: <u>38.7</u>	<b>As left:</b> Bkg: <u>15.1</u> Coef: <u>0.944</u> Pmt: <u>-650.5 V</u> Flash: <u>741 V</u> Internal: <u>34.0 °C</u> Chamber: <u>45.1 °C</u> Converter Temp: <u>825 °C</u> Converter Set: <u>825 °C</u> Perm Oven Gas: <u>45.00 °C</u> Perm Oven Htr: <u>44.37 °C</u> Pressure: <u>626.4 mmHg</u> Sample Flow: <u>0.489 LPM</u> Lamp Intensity: <u>%</u> Averaging Time: <u>120 sec</u> Expected Value: <u>38.7</u>
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**Comments:**

The manifold blower was found to be working normally.

This is an internal audit. Calibration point order is the same as a shutdown verification.



— TRS[ppb]



## Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	January 17, 2018	Barometer/B.P./units:	Brunton 05535 expires December 15, 2018	27.89	inHg
Company/Airshed:	LCA	Thermometer/Station Temp:	F.S. 160348895 expires April 8, 2018	24.8	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	Mainly sunny		
Parameter:	Total Hydrocarbon	Calibration Purpose:	shut down		
Start/End Time 24 hr. (mst):	12:20 / 14:30	Performed By/Reviewer:	Limin Li	Tom Bourque	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	October 28, 2025		

<b>Analyzer:</b>	
ID# or Serial Number:	51CLT-77021-384
Range ppm:	50
Last Calibration Date:	January 2, 2018
As Found C.F.:	1.041
Previous Cal High Point C.F.:	1.000
New C.F.:	n/a

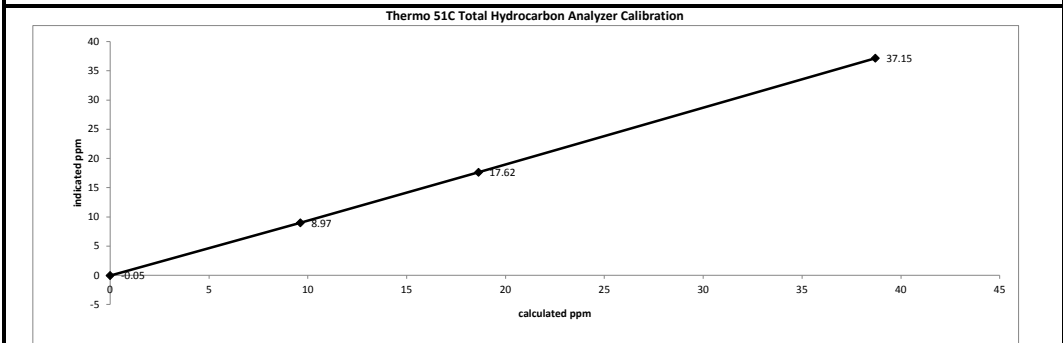
<b>Calibration Standards:</b>	
Low Flow Meter ID/Expiry Date:	Defender Low 152019 expires December 13, 2018
High Flow Meter ID/Expiry Date:	Defender High 148944 expires December 13, 2018
Calibrator ID/Expiry Date:	Envionics id# 5212 expires February 14, 2018
Cal Gas Cylinder I.D. #:	LL 119471
CH <sub>4</sub> /C <sub>2</sub> H <sub>6</sub> Cylinder Conc. (ppm):	599.0      207.0
CH <sub>4</sub> as propane/total CH <sub>4</sub> equivalents (ppm):	569.3      1168.3
<b>Standard Calibration Points for a Range of: 50 ppm</b>	
Point	Target ppm
High	38
Mid	18
Low	9

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

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	Diluent	Cal Gas	Total	(ppm)	(ppm)	
as found zero	2518	0.00	2518	0.0	-0.05	n/a
as found high	2437	83.50	2520	38.71	37.15	1.041
mid	2478	40.17	2518	18.64	17.62	1.055
low	2502	20.79	2523	9.63	8.97	1.067
<b>Average C.F.=</b>						<b>1.054</b>

**Linear Regression/Calibration Results:**

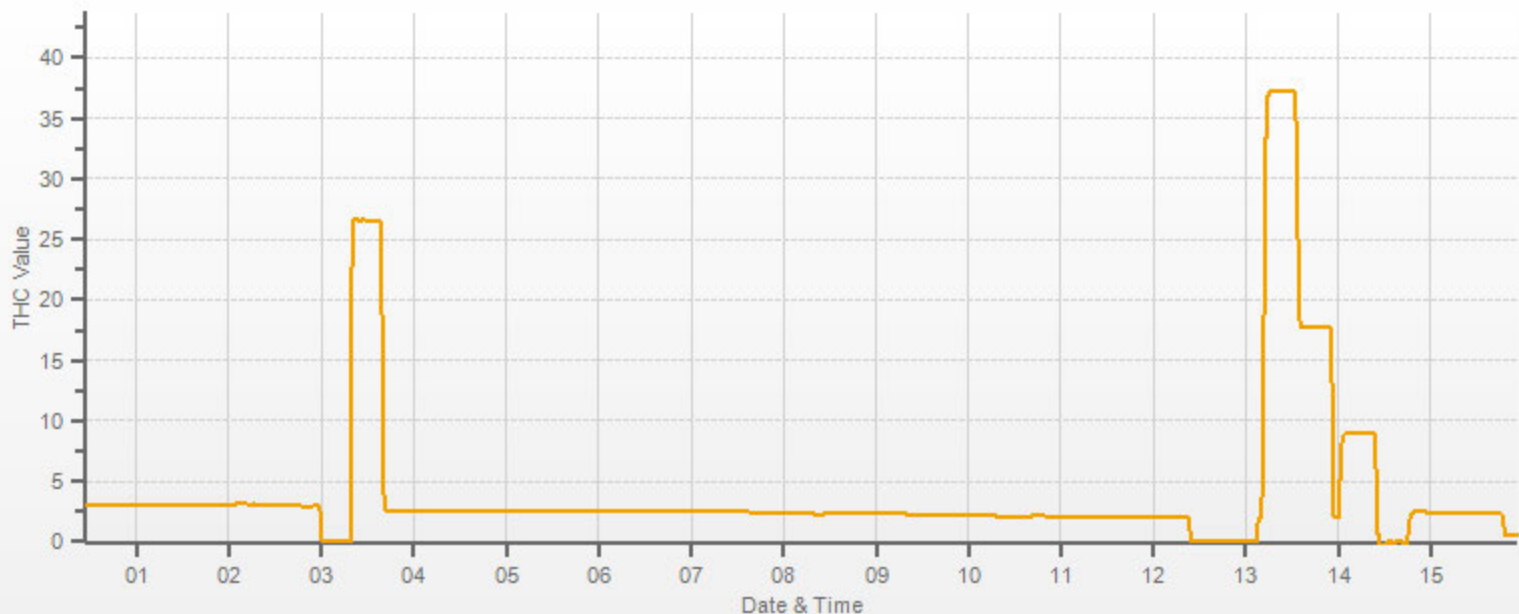
Correlation Coefficient = <b>1.000</b>	<b>LIMITS</b>
Slope = <b>1.039</b>	> or = <b>0.995</b>
b (Intercept as % of full scale) = <b>0.40%</b>	<b>0.90-1.10</b>
% change in C.F. from last cal = <b>-4.06%</b>	<b>± 3% F.S.</b>
	<b>± 10%</b>



As found:	As left:
H2 cylinder (psi): 1750	H2 cylinder (psi): n/a
H2 cylinder reg set (psi): 22	H2 cylinder reg set (psi): n/a
Span Cylinder (psi): 400	Span Cylinder (psi): n/a
Span Cylinder Reg Set (psi): 22	Span Cylinder Reg Set (psi): n/a
Zero Air Gen Pressure: 40	Zero Air Gen Pressure: n/a
measurement alarms: None	measurement alarms: n/a
service alarms: None	service alarms: n/a
cnt: 1450	cnt: n/a
rng: 1	rng: n/a
try: 1	try: n/a
flm: 182.1 °C	flm: n/a
det: 125.7 °C	det: n/a
Flame: 182 °C	Flame: n/a
Filter: 125 °C	Filter: n/a
Base: 125 °C	Base: n/a
Sample psi: 06.51	Sample psi: n/a
Internal Air Pressure: 20	Internal Air Pressure: n/a
Internal Fuel Pressure: 13	Internal Fuel Pressure: n/a
Measured Flow: 586	Measured Flow: n/a
Expected Value: 26.70	Expected Value: n/a

**Comments:**

The manifold blower was found to be working normally.



— THC[ppm]



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

<b>Date:</b> January 17, 2018	<b>Barometer/B.P./units:</b> Brunton 05535 expires December 15, 2018	27.89	inHg
<b>Company/Airshed:</b> LICA	<b>Thermometer/Station Temp:</b> F.S. 160348895 expires April 8, 2018	24.8	°C
<b>Location/Station Name:</b> Cold Lake South	<b>Weather Conditions:</b> Mainly sunny		
<b>Start/End Time 24 hr. (mst):</b> 10:00 / 15:00	<b>Calibration Purpose:</b> shut down		
<b>G.P.T. to be used for Ozone?</b> Yes with 500 ppb NOx full scale	<b>Performed By/Reviewer:</b> Limin Li		Tom Bourque
<b>Calibration Method:</b> Gas Dilution & Gas Phase Titration	<b>Cal Gas Expiry Date:</b> October 24, 2020		

<b>Analyzer:</b>		<b>Correction Factors:</b>		
<b>ID# or Serial Number:</b> 1505664393		<b>Previous C.F.:</b>	<b>As Found C.F.:</b>	<b>New C.F.:</b>
<b>Last Calibration Date:</b> January 3, 2018		NO = 1.000	0.993	n/a
<b>Range ppb:</b> 500		NO <sub>2</sub> = 1.000	1.000	n/a
		NO <sub>x</sub> = 1.001	0.992	n/a

<b>Calibration Standards:</b>		<b>Standard Calibration Points for a Range of: 500 ppb</b>			
<b>Low Flow Meter ID/Expiry Date:</b> Defender Low 152019 expires December 13, 2018		<b>Point</b>	<b>Target NO (ppb)</b>	<b>Target NO<sub>2</sub> (ppb)</b>	<b>Cc Ozone ?</b>
<b>High Flow Meter ID/Expiry Date:</b> Defender High 148944 expires December 13, 2018		<b>High</b>	380	330	<-high ozone
<b>Calibrator ID/Expiry Date:</b> API id# 690 expires March 17, 2018		<b>Mid</b>	180	245	n/a
<b>Cal Gas Cylinder I.D. # :</b> LL 104225		<b>Low</b>	90	175	n/a
<b>Cal Gas Conc. (ppm):</b> 51.5   51.6		<b>Extra Point #1</b>	n/a	133	<-mid ozone
		<b>Extra Point #2</b>	n/a	53	<-low ozone

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	5932	0.0	5932	0	0	0.0	0.0	n/a	n/a
as found high	5881	44.4	5925	386.3	387.0	389.0	390.0	0.993	0.992
mid	5943	20.86	5964	180.1	180.5	181.0	181.0	0.995	0.997
low	5954	10.44	5964	90.2	90.3	91.0	91.0	0.991	0.993
<b>Average C.F.=</b>								0.993	0.994

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO <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	4930	36.68	4967	0.0	381.0	382.0	1.0	0.0	1.0	
as found high NO2	4930	36.68	4967	230.0	120.0	382.0	262.0	261.0	261.0	1.000
gpt mid	4930	36.68	4967	120.0	244.0	382.0	138.0	137.0	137.0	1.000
gpt low	4930	36.68	4967	44.0	324.0	381.0	57.0	57.0	56.0	1.018
<b>Average NO<sub>2</sub> C.F.=</b>										1.006

**Linear Regression/Calibration Results:**

	NO	NOx	NO <sub>2</sub>	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.993	0.993	1.001	0.90-1.10
b (Intercept as % of full scale)=	0.00%	-0.04%	0.03%	± 3% F.S.
% change in C.F. from last cal=	0.70%	0.00%	0.86%	± 10%
NO2 converter efficiency			0.99	0.96 to 1.04

As found:		As left:	
NO Bkg:	4.1	NO Bkg:	4.1
NOx Bkg:	4.3	NOx Bkg:	4.3
NO Coef:	1.031	NO Coef:	1.031
NO2 Coef:	0.990	NO2 Coef:	0.990
NOx Coef:	0.999	NOx Coef:	0.999
PMT:	-854.7 V	PMT:	-854.7
Internal:	28.9 °C	Internal:	28.0
Chamber:	50.2 °C	Chamber:	50.5
Cooler:	-3.1 °C	Cooler:	-3.0
NO2 Converter:	323.9 °C	NO2 Converter:	322.9
NO2 Converter Set:	325 °C	NO2 Converter Set:	325
Perm Oven Gas:	35.00 °C	Perm Oven Gas:	35.00
Perm Oven Heater:	34.26 °C	Perm Oven Heater:	34.26
Pressure:	176.3	Pressure:	177.2
Flow:	0.776	Flow:	0.776
Ozonator Flow:	OK	Ozonator Flow:	OK
Expected Value NO:	2	Expected Value NO:	2
Expected Value NO2:	273	Expected Value NO2:	273
Expected Value NOx:	275	Expected Value NOx:	275

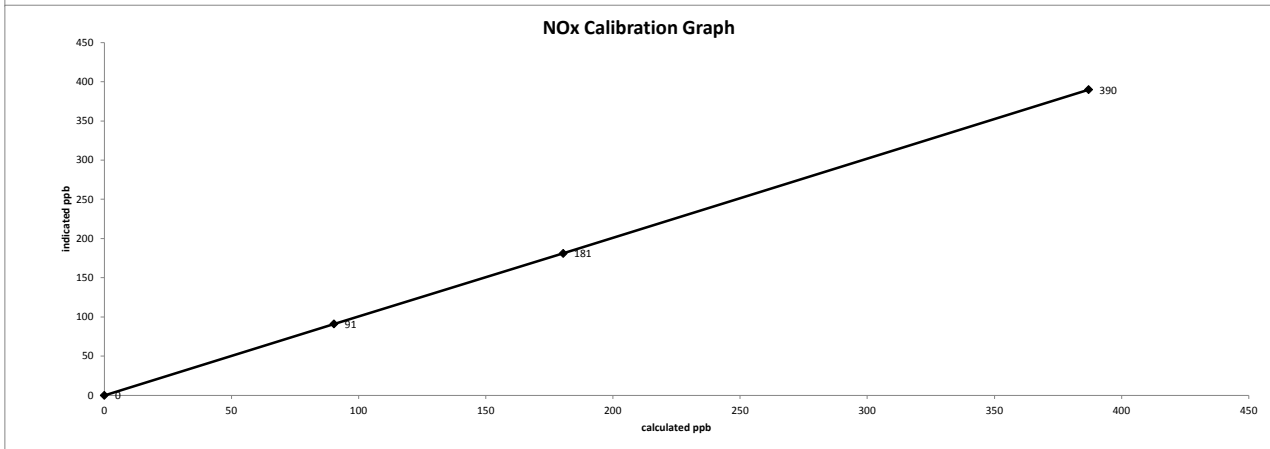
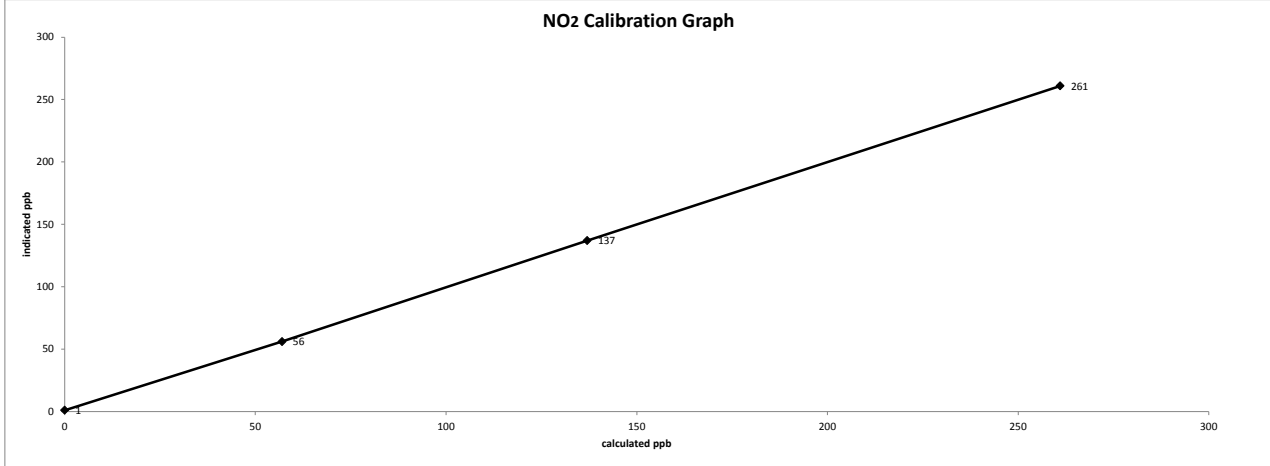
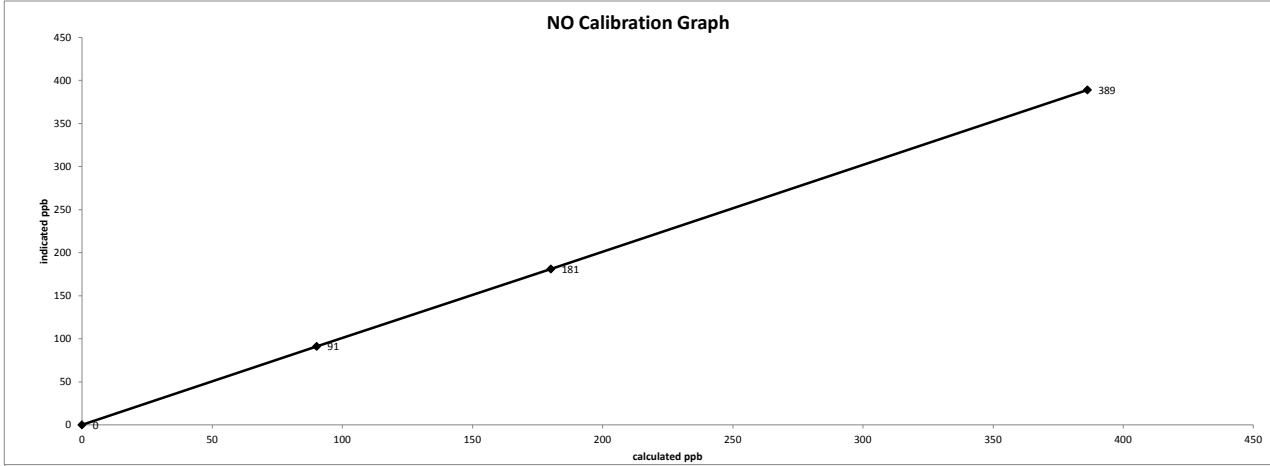
**Comments:**  
 The analyzer sample inlet filter was changed.  
 The manifold blower was found to be working normally.

Discard data from 12:00pm to 13:20pm. Try different GPT value. GPT start 13:21pm. This is an internal audit. Calibration point order is the same as a shutdown verification.

Date: January 17, 2018  
Company/Airshed: LICA  
Location/Station Name: Cold Lake South

Start/End Time 24 hr. (mst): 10:00 / 15:00  
Calibration Purpose: shut down  
Calibration Method: Gas Dilution & Gas Phase Titration

Thermo 42i NO-NO2-NOx Analyzer Calibration





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

Date: January 17, 2018	Barometer/B.P./units: Brunton 05535 expires December 15, 2018	27.89	inHg
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 160348895 expires April 8, 2018	24.8	°C
Location/Station Name: Cold Lake South	Weather Conditions: Mainly sunny		
Start/End Time 24 hr. (mst): 15:00 / 16:05	Calibration Purpose: shut down		
G.P.T. to be used for Ozone? Yes with 500 ppb NOx full scale	Performed By/Reviewer: Limin Li	Tom Bourque	
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: October 24, 2020		

Analyzer:	Correction Factors:												
ID# or Serial Number: 1505664393	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Previous C.F.:</td> <td style="width: 33%;">As Found C.F.:</td> <td style="width: 33%;">New C.F.:</td> </tr> <tr> <td>NO = 1.000</td> <td>0.993</td> <td>n/a</td> </tr> <tr> <td>NO<sub>2</sub> = 1.000</td> <td>1.000</td> <td>n/a</td> </tr> <tr> <td>NOx = 1.001</td> <td>0.992</td> <td>n/a</td> </tr> </table>	Previous C.F.:	As Found C.F.:	New C.F.:	NO = 1.000	0.993	n/a	NO <sub>2</sub> = 1.000	1.000	n/a	NOx = 1.001	0.992	n/a
Previous C.F.:	As Found C.F.:	New C.F.:											
NO = 1.000	0.993	n/a											
NO <sub>2</sub> = 1.000	1.000	n/a											
NOx = 1.001	0.992	n/a											
Last Calibration Date: January 3, 2018													
Range ppb: 500													

Calibration Standards:  Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: API id# 690 expires March 17, 2018 Cal Gas Cylinder I.D.# : LL 104225 Cal Gas Conc. (ppm): 51.5   51.6	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="4" style="text-align: center;">Standard Calibration Points for a Range of: 500 ppb</th> </tr> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO<sub>2</sub> (ppb)</th> <th>Cc Ozone ?</th> </tr> <tr> <td>High</td> <td>380</td> <td>330</td> <td>&lt;--high ozone</td> </tr> <tr> <td>Mid</td> <td>180</td> <td>245</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>90</td> <td>175</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>133</td> <td>&lt;--mid ozone</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>53</td> <td>&lt;--low ozone</td> </tr> </table>	Standard Calibration Points for a Range of: 500 ppb				Point	Target NO (ppb)	Target NO <sub>2</sub> (ppb)	Cc Ozone ?	High	380	330	<--high ozone	Mid	180	245	n/a	Low	90	175	n/a	Extra Point #1	n/a	133	<--mid ozone	Extra Point #2	n/a	53	<--low ozone
Standard Calibration Points for a Range of: 500 ppb																													
Point	Target NO (ppb)	Target NO <sub>2</sub> (ppb)	Cc Ozone ?																										
High	380	330	<--high ozone																										
Mid	180	245	n/a																										
Low	90	175	n/a																										
Extra Point #1	n/a	133	<--mid ozone																										
Extra Point #2	n/a	53	<--low ozone																										

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	5932	0.0	5932	0	0	0.0	0.0	n/a	n/a
as found high	5881	44.4	5925	386.3	387.0	389.0	390.0	0.993	0.992
Average C.F.=								0.993	0.994

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

Point	Diluent	Cal Gas	Total Flow	Calibrator Setting volts or ppb	Indicated NO (ppb)	Indicated NOx (ppb)	Indicated NO <sub>2</sub> (ppb)	NO drop (ppb)	NO <sub>2</sub> gain (ppb)	NO <sub>2</sub> C.F. (ppb)
NOx reference	4930	36.68	4967	0.0	379.0	381.0	2.0	0.0	2.0	
as found high NO2	4930	36.68	4967	300.0	42.0	381.0	339.0	337.0	337.0	1.000
gpt mid	4930	36.68	4967	155.0	204.0	381.0	177.0	175.0	175.0	1.000
gpt low	4930	36.68	4967	75.0	290.0	383.0	93.0	89.0	91.0	0.978
Average NO <sub>2</sub> C.F.=									0.993	

**Linear Regression/Calibration Results:**

	NO	NOx	NO <sub>2</sub>	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.993	0.993	1.007	0.90-1.10
b (Intercept as % of full scale)=	0.00%	-0.04%	0.41%	± 3% F.S.
% change in C.F. from last cal=	0.70%	0.00%	0.86%	± 10%
NO2 converter efficiency			0.99	0.96 to 1.04

<b>As found:</b> NO Bkg: 4.1 NOx Bkg: 4.3 NO Coef: 1.031 NO2 Coef: 0.990 NOx Coef: 0.999 PMT: -854.7 V Internal: 28.9 °C Chamber: 50.2 °C Cooler: -3.1 °C NO2 Converter: 323.9 °C NO2 Converter Set: 325 °C Perm Oven Gas: 35.00 °C Perm Oven Heater: 34.26 °C Pressure: 176.3 Flow: 0.776 Ozonator Flow: OK Expected Value NO: 2 Expected Value NO2: 273 Expected Value NOx: 275	<b>As left:</b> NO Bkg: 4.1 NOx Bkg: 4.3 NO Coef: 1.031 NO2 Coef: 0.990 NOx Coef: 0.999 PMT: -854.7 Internal: 28.0 Chamber: 50.5 Cooler: -3.0 NO2 Converter: 322.9 NO2 Converter Set: 325 Perm Oven Gas: 35.00 Perm Oven Heater: 34.26 Pressure: 177.2 Flow: 0.776 Ozonator Flow: OK Expected Value NO: 2 Expected Value NO2: 273 Expected Value NOx: 275
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**Comments:**  
 The analyzer sample inlet filter was changed.  
 The manifold blower was found to be working normally.

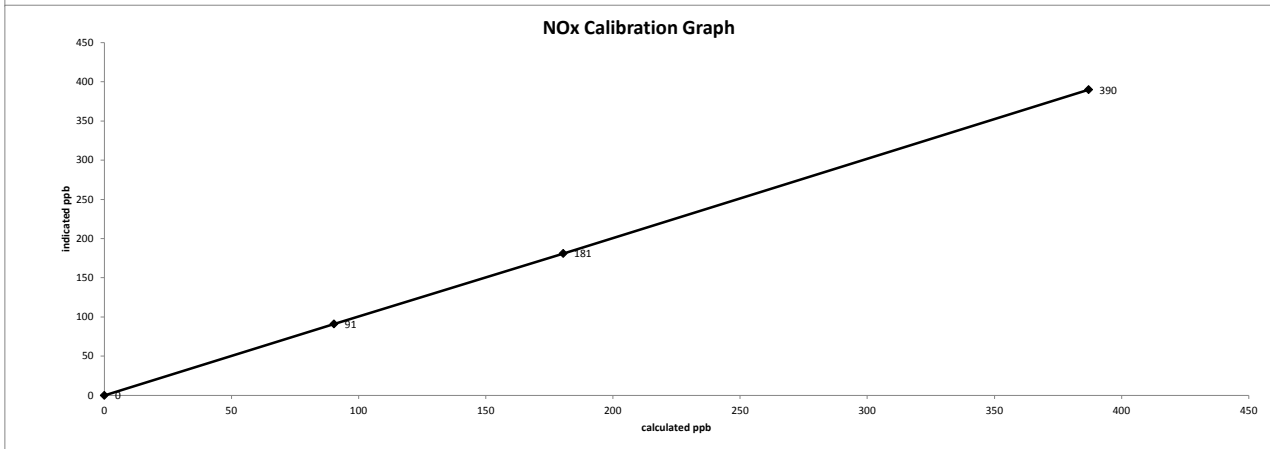
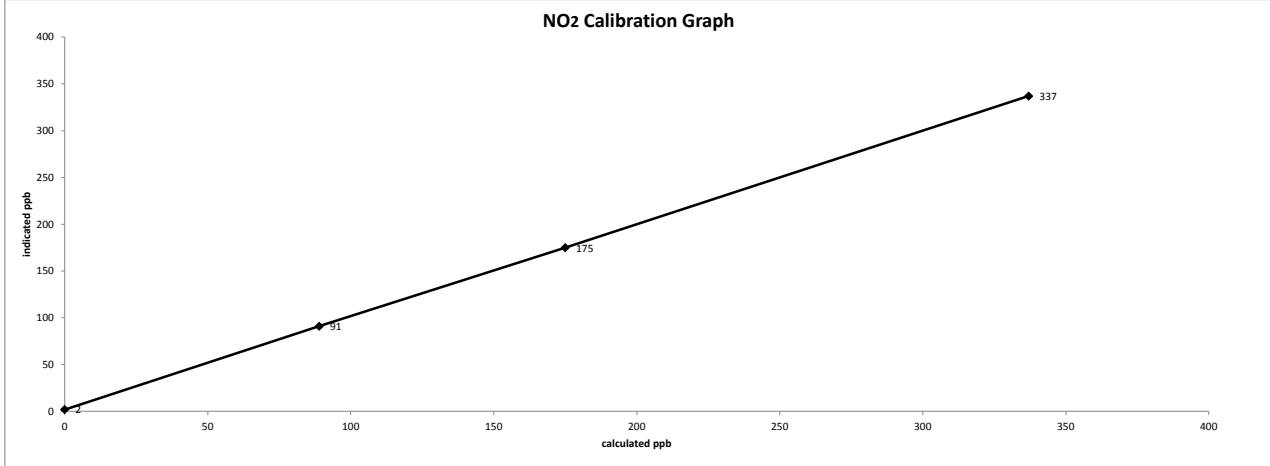
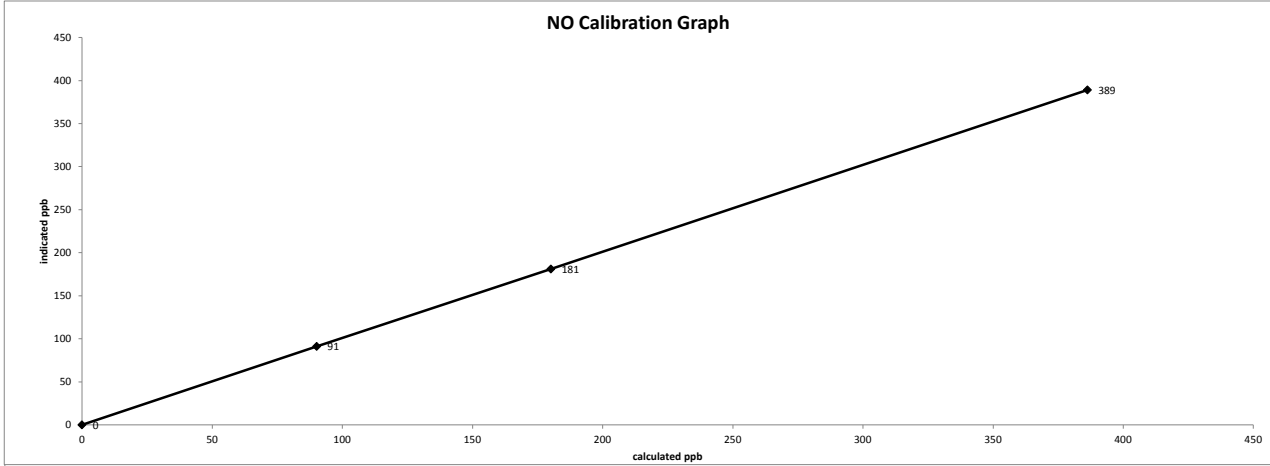
GPT for O3 starts at 15:00. This is an internal audit. Calibration point order is the same as a shutdown verification.

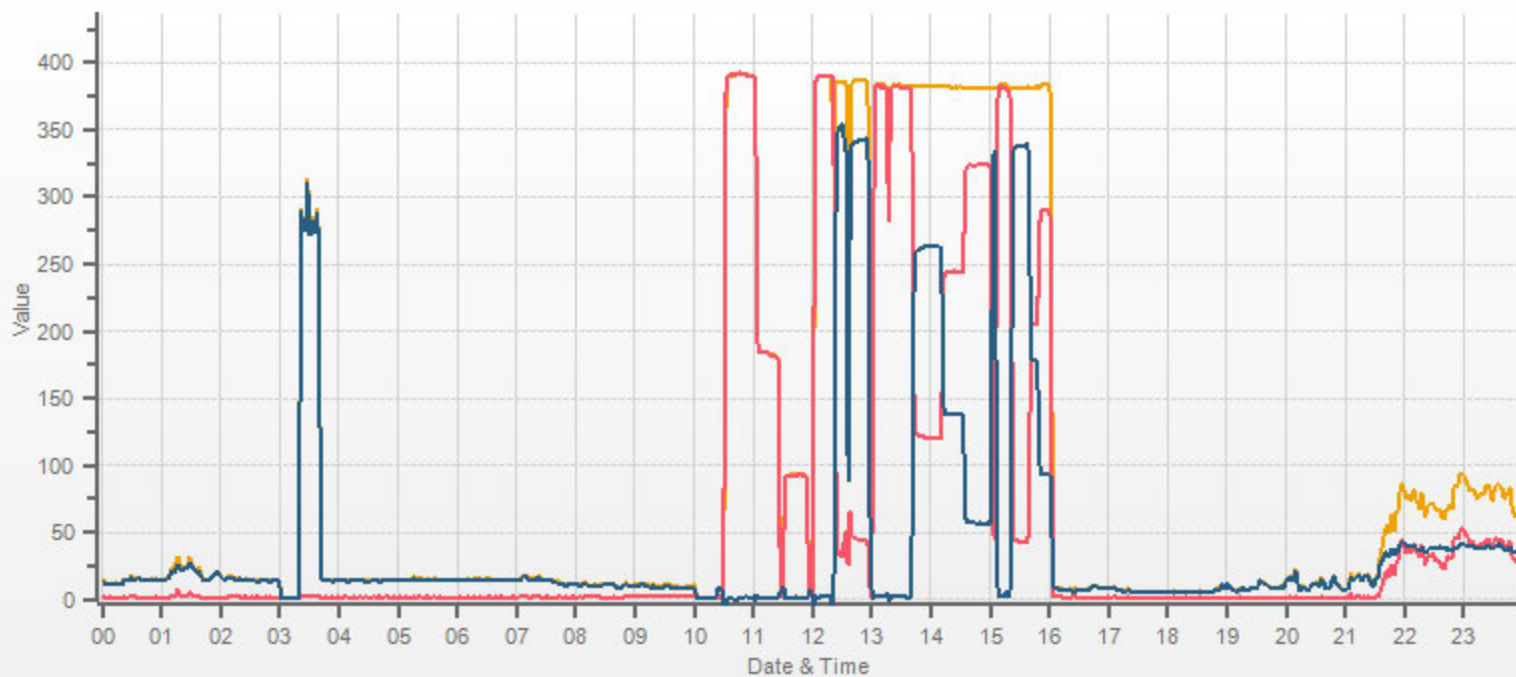


Date: January 17, 2018  
Company/Airshed: LICA  
Location/Station Name: Cold Lake South

Start/End Time 24 hr. (mst): 15:00 / 16:05  
Calibration Purpose: shut down  
Calibration Method: Gas Dilution & Gas Phase Titration

Thermo 42i NO-NO2-NOx Analyzer Calibration





— NOX[ppb] — NO[ppb] — NO2[ppb]



## Thermo 49i Ozone Analyzer Calibration

<b>Date:</b> January 17, 2018	<b>Barometer/B.P./units:</b> Brunton 05535 expires December 15, 2018	inHg
<b>Company/Airshed:</b> LICA	<b>Thermometer/Station Temp:</b> F.S. 160348895 expires April 8, 2018	24 °C
<b>Location/Station Name:</b> Cold Lake South	<b>Weather Conditions:</b> Mainly sunny	
<b>Start/End Time 24 hr. (mst):</b> 16:05 / 18:02	<b>Calibration Purpose:</b> shut down	
<b>Ozone Calibration Method:</b> Direct G.P.T.	<b>Performed By/Reviewer:</b> Limin Li	not yet reviewed
<b>G.P.T. Date:</b> January 17, 2018	<b>Cal Gas Expiry Date:</b> October 24, 2020	

<b>Analyzer:</b>	<b>Ozone Range ppb:</b> 500
<b>ID# or Serial Number:</b> 700419951	<b>As Found C.F.:</b> 1.047
<b>Last Calibration Date:</b> January 2, 2018	<b>New C.F.:</b> n/a
<b>Previous Cal High Point C.F.:</b> 1.000	

<b>Calibration Standards:</b>										
<b>Low Flow Meter ID/Expiry Date:</b> Defender Low 152019 expires December 13, 2018		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Point</th> <th>AMD Required Range of Ozone Calibration Points</th> </tr> <tr> <td>High</td> <td>300-400 ppb</td> </tr> <tr> <td>Mid</td> <td>150-200 ppb</td> </tr> <tr> <td>Low</td> <td>50-100 ppb</td> </tr> </table>	Point	AMD Required Range of Ozone Calibration Points	High	300-400 ppb	Mid	150-200 ppb	Low	50-100 ppb
Point	AMD Required Range of Ozone Calibration Points									
High	300-400 ppb									
Mid	150-200 ppb									
Low	50-100 ppb									
<b>High Flow Meter ID/Expiry Date:</b> Defender High 148944 expires December 13, 2018										
<b>Calibrator ID/Expiry Date:</b> API id# 690 expires March 17, 2018										
<b>Cal Gas Cylinder I.D. #:</b> n/a										

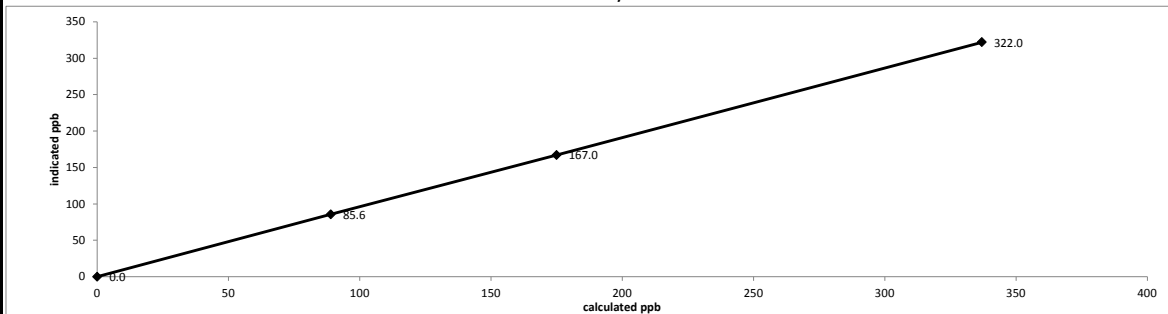
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	4967	4967	0.0	n/a	0.0	n/a
as found high	4967	4967	337.0	337.0	322.0	1.047
mid	4967	4967	175.0	175.0	167.0	1.048
low	4967	4967	89.0	89.0	85.6	1.040
					<b>Average C.F.=</b>	<b>1.045</b>

**Linear Regression/Calibration Results:**

<b>Correlation Coefficient =</b> 1.000	<b>LIMITS</b>
<b>Slope =</b> 1.047	> or = 0.995
<b>b (Intercept as % of full scale)=</b> -0.04%	0.90-1.10
<b>% change in C.F. from last cal=</b> -4.66%	± 3% F.S.
	± 10%

**Thermo 49i Ozone Analyzer Calibration**

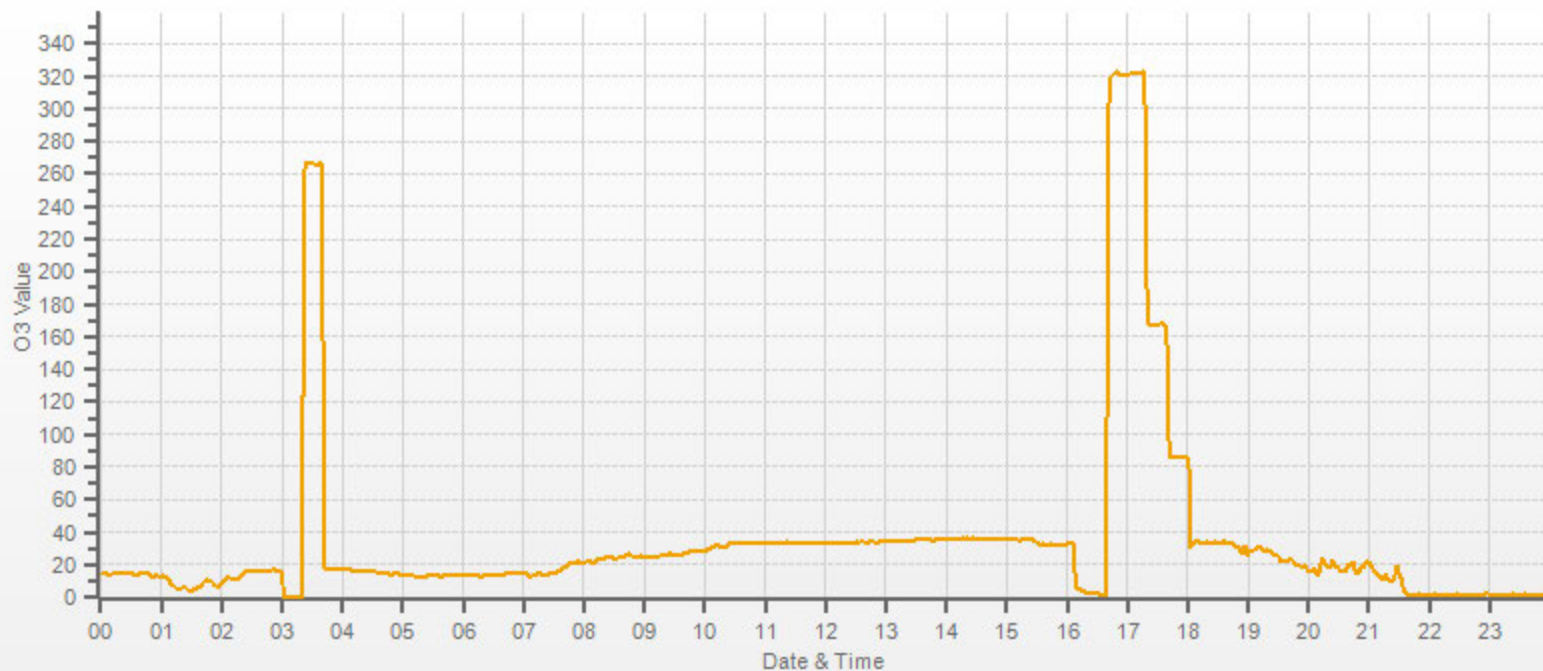


<b>As found:</b>	<b>As left:</b>
O3 Bkg: 0.1	O3 Bkg: 0.1
O3 Coef: 0.990	O3 Coef: 0.990
Photo Lamp: 9.6 V	Photo Lamp: 9.6 V
O3 Lamp: 9.0 V	O3 Lamp: 9.0 V
Bench: 31.3 °C	Bench: 31.3 °C
Bench Lamp: 53.5 °C	Bench Lamp: 53.5 °C
O3 Lamp: 67.4 °C	O3 Lamp: 67.4 °C
Pressure: 701.7 mmHg	Pressure: 701.7 mmHg
Cell A lpm: 0.713	Cell A lpm: 0.713
Cell B lpm: 0.753	Cell B lpm: 0.753
O3 ppb: 33	O3 ppb: 33
Cell A ppb: 22	Cell A ppb: 22
Cell B ppb: 44	Cell B ppb: 44
Cell A int: 83990.0	Cell A int: 83990.0
Cell B int: 84919.0	Cell B int: 84919.0
Expected Value: 263.0	Expected Value: 263.0

**Comments:**

The manifold blower was found to be working normally.

Change zero air at 16:54. This is an internal audit. Calibration point order is the same as a shutdown verification.



— O3[ppb]



# Partisol 2000 Audit

**Date:** January 17, 2018  
**Company:** LICA  
**Station:** Cold Lake South  
**Parameter:** PM 2.5  
**Weather Conditions:** Mainly sunny  
**Start Time (mst):** 15:00  
**End Time (mst):** 15:30  
**Performed By/Reviewer:** Limin Li | not yet reviewed

## Sampler

## Instrument Data

**Make/Model:** R & P  
**ID# or Serial Number:** 2000B2206140102  
**RH (%):** n/a  
**Temperature (°C):** 5.1  
**Pressure (mmHg):** 708.2  
**Set Flow (litres/min):** 16.67

### Reference Standards/I.D./Expiry Date:

**High Flow:** Airmetrics/Chinook High Maxxam ID #4 expires February 3, 2018  
**Digital Manometer:** Dwyer 475 Mark III id# 1 expires April 24, 2018  
**Temperature:** F.S. 160348895 expires April 8, 2018  
**Pressure:** Brunton 05535 expires December 15, 2018

### Temperature/Pressure/Flow Audit

Reference Temperature: ( +/- 2 °C)	5.4	Δ °C	0.3
Reference Pressure: ( +/- 10 mmHg)	706.8	Δ mmHg	-1.4
Reference Flow (+/- 0.84 lpm)	16.75	litres/min	-0.08
Relative Humidity (+/- 1.5%)	n/a	%	n/a

### Internal Leak Check - Manual Mode

#### Partisol 2000 Leak Check:

**Flow Controller Valve Closed (mmHg):** 584.2  
**Pressure reading after 30 Secs. (mmHg):** 584.2  
**Pressure Drop=** 0  
**Pass/Fail?** Pass

### Other Checks:

**Rubber Seal Condition:** okay  
**Inlet Head Cleanliness:** okay  
**Inline Filter Condition:** okay  
**Status Alarms:** None  
**Insulating Jacket Condition:** okay  
**Side Hoods and Dust Filters:** okay  
**Location v.s. AMD:** good  
**Flow Setting Actual or Standard ?:** actual

	As Found	As Left
Did the temperature require adjustment?	No	
Did the ambient pressure require adjustment?	No	
Did the flow require adjustment?	No	

### Recommendations/Comments:

***APPENDIX IV  
MAXIMUM INSTANTANEOUS DATA***



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

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

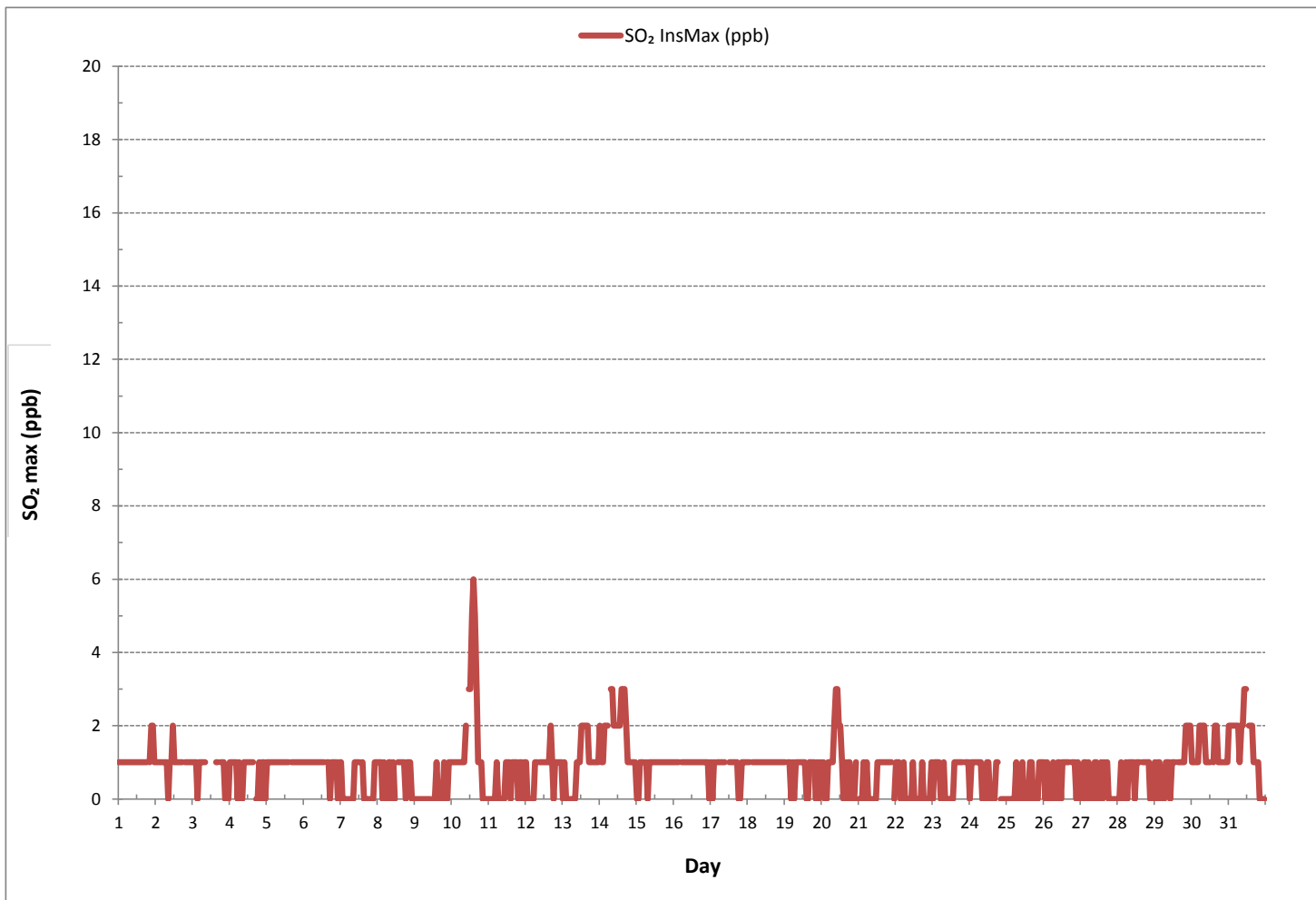
STATUS FLAG CODES

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:	493
MAXIMUM INSTANTANEOUS VALUE:	6 ppb @ HOUR 14 ON DAY 10
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	1

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







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

TOTAL REDUCED SULPHUR Instantaneous Maximum (TRS ppb)

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

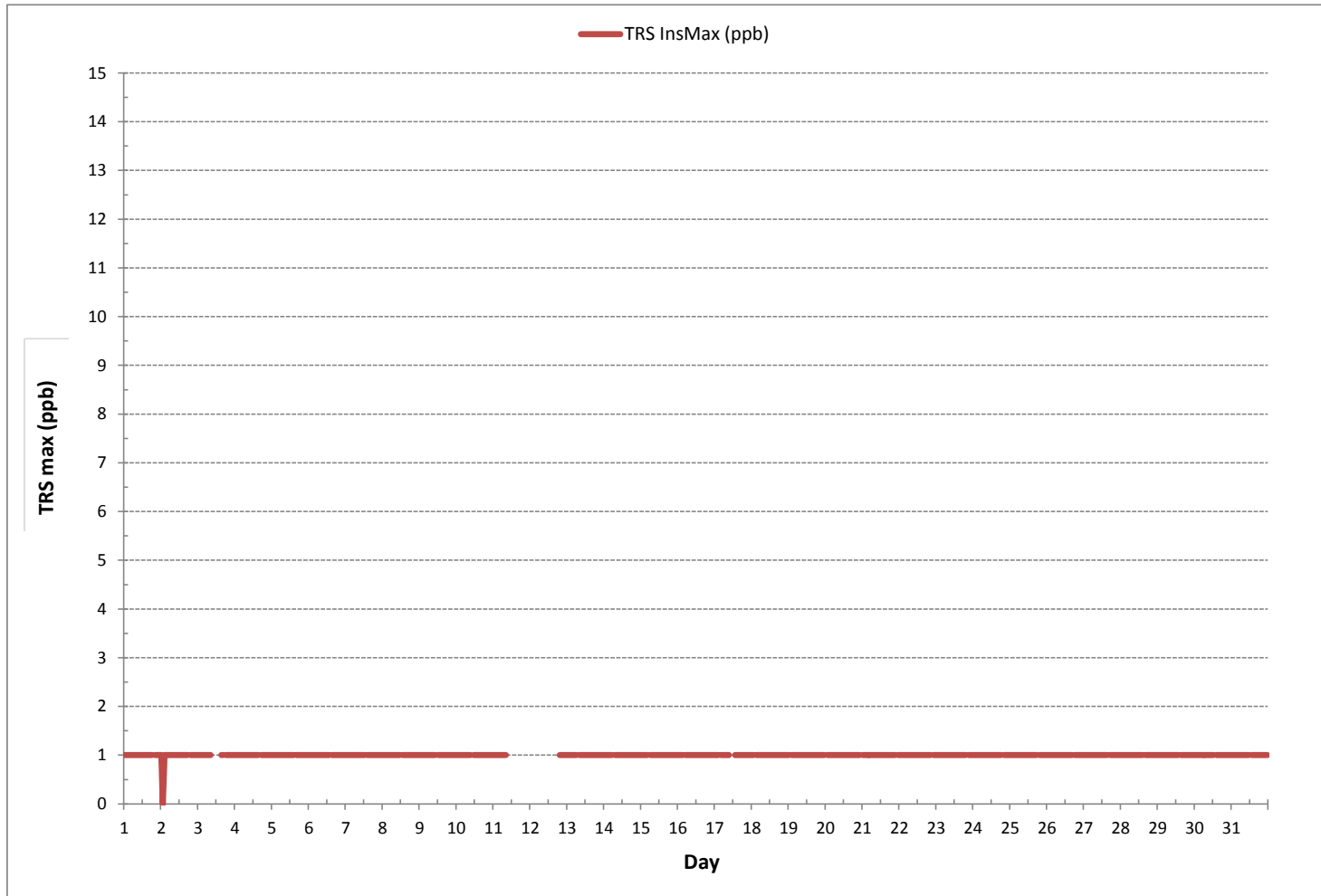
STATUS FLAG CODES

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:	670
MAXIMUM INSTANTANEOUS VALUE:	1 ppb @ HOUR 0 ON DAY 1
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	6 hrs
STANDARD DEVIATION:	0
OPERATIONAL TIME:	711 hrs

TOTAL REDUCED SULPHUR Instantaneous Maximum (TRS ppb)





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

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	2.68	2.67	2.67	2.68	2.71	2.71	2.68	2.68	2.68	2.61	2.52	2.55	2.56	2.50	2.43	2.42	2.40	2.40	2.37	S	2.10	2.08	2.25	2.24	2.08	2.71	2.50	24	
2	2.12	2.06	2.08	2.12	2.24	2.24	2.12	2.15	2.30	2.89	2.31	2.43	C	C	C	C	C	2.50	S	2.37	2.27	2.68	2.18	2.31	2.06	2.89	2.30	24	
3	2.28	2.27	2.34	2.52	2.40	2.95	2.52	2.61	2.80	3.01	2.91	3.02	3.07	3.04	2.98	2.99	3.36	S	2.77	2.39	2.42	2.40	2.36	2.34	2.27	3.36	2.68	24	
4	2.34	2.81	2.92	2.39	2.37	2.50	2.46	2.52	5.76	3.19	2.57	2.42	2.40	2.37	2.34	2.34	S	2.36	2.37	2.34	2.33	2.28	2.28	2.25	2.25	5.76	2.60	24	
5	2.30	2.33	2.36	2.39	2.37	2.37	2.42	2.47	2.33	2.28	2.31	2.37	2.33	2.30	2.40	S	2.36	2.18	2.17	2.18	2.31	2.31	2.42	2.37	2.17	2.47	2.33	24	
6	2.55	2.68	2.58	2.28	2.31	2.28	2.46	2.76	2.83	2.73	2.68	2.99	2.98	2.49	S	2.30	2.27	2.03	2.06	2.11	2.11	1.99	1.93	1.91	1.91	2.99	2.40	24	
7	1.87	1.90	1.94	1.93	1.88	1.88	1.90	1.91	1.93	1.96	1.96	1.93	1.87	S	1.91	1.91	1.97	2.02	2.09	2.24	2.27	2.19	2.53	2.55	1.87	2.55	2.02	24	
8	2.71	2.74	2.73	2.73	2.53	2.37	2.39	2.36	2.34	2.08	2.21	2.49	S	2.24	2.59	2.27	2.31	2.25	2.28	2.21	1.94	1.93	1.93	2.06	1.93	2.74	2.33	24	
9	1.96	1.99	1.97	2.00	2.02	1.96	1.99	1.96	2.09	2.22	2.02	S	2.02	2.06	2.06	2.05	2.13	2.12	2.12	2.13	2.11	2.17	2.22	2.16	1.96	2.22	2.07	24	
10	2.24	2.21	2.24	2.30	2.25	2.31	2.34	2.27	2.34	2.36	S	2.39	2.40	2.40	2.46	2.43	2.80	2.55	2.56	2.56	2.67	2.67	2.83	2.21	2.83	2.44	24		
11	2.77	2.64	2.70	2.68	2.53	2.64	2.67	2.61	2.61	S	3.28	2.95	2.56	2.58	2.65	2.54	2.58	2.58	2.58	2.65	2.63	2.64	2.79	2.76	2.53	3.28	2.68	24	
12	2.73	2.89	2.95	3.00	3.11	3.13	3.17	3.20	S	4.21	3.45	3.30	3.91	3.46	3.32	3.30	3.20	4.75	4.31	3.17	3.29	3.23	3.24	3.20	2.73	4.75	3.37	24	
13	3.26	3.29	3.16	3.20	3.20	3.20	3.23	S	3.21	3.20	3.14	2.98	3.23	3.04	3.01	2.94	3.05	3.23	3.32	3.36	3.35	3.10	2.86	2.68	2.68	3.36	3.14	24	
14	2.55	2.70	2.55	2.51	2.57	2.71	S	2.65	2.68	2.73	2.67	2.64	2.61	2.79	2.71	3.56	4.69	3.71	2.92	2.91	4.12	2.96	3.01	3.04	2.51	4.69	2.96	24	
15	3.08	3.18	3.35	3.44	3.50	S	3.48	3.32	3.36	3.32	3.01	2.98	2.93	2.92	2.79	2.62	2.71	2.83	2.89	3.05	3.01	3.01	2.99	2.98	2.62	3.50	3.08	24	
16	2.95	2.93	3.08	3.01	S	2.86	3.04	3.18	3.88	3.11	3.01	2.51	2.61	2.74	2.54	2.77	3.78	2.67	2.64	3.30	3.57	2.68	2.86	2.80	2.51	3.88	2.98	24	
17	3.11	3.13	3.18	S	2.52	2.55	2.55	2.52	2.58	2.43	2.33	2.09	Q	Q	Q	C1	C1	C1	C1	2.28	2.49	2.84	2.79	3.03	2.09	3.18	2.65	20	
18	2.84	2.87	S	2.41	2.29	2.44	2.17	2.16	2.40	2.61	2.05	2.08	2.17	2.17	1.97	2.38	2.08	1.92	1.94	1.85	1.88	2.05	1.97	1.85	1.85	2.87	2.20	24	
19	1.75	S	1.54	1.56	1.58	1.60	1.61	1.65	1.81	1.84	1.66	1.98	1.69	1.66	1.72	C1	C1	C1	C1	2.32	2.23	2.16	2.11	1.54	2.32	1.80	19		
20	S	2.14	2.14	2.10	2.10	2.13	2.14	2.16	2.14	2.17	2.22	2.26	2.20	2.19	2.40	2.31	2.23	2.16	2.14	2.20	2.23	2.28	2.19	S	2.10	2.40	2.19	24	
21	2.17	2.17	2.20	2.20	2.20	2.22	2.23	2.23	2.26	2.29	2.29	2.25	2.26	2.23	2.23	2.22	2.23	2.23	2.22	2.20	2.20	2.20	S	2.17	2.17	2.29	2.22	24	
22	2.16	2.16	2.17	2.17	2.19	2.20	2.19	2.20	2.19	2.20	2.22	2.35	2.35	2.25	2.23	2.26	2.28	2.35	2.36	2.38	2.38	S	2.33	2.30	2.16	2.38	2.26	24	
23	2.23	2.23	2.25	2.26	2.26	2.29	2.32	2.41	2.44	2.50	2.47	2.62	2.57	2.88	2.41	2.41	2.35	2.38	2.47	2.26	S	2.23	2.29	2.29	2.23	2.88	2.38	24	
24	2.26	2.26	2.29	2.26	2.23	2.25	2.25	2.23	2.23	2.26	2.23	2.23	2.22	2.23	2.23	2.32	2.20	2.22	2.37	S	2.20	2.19	2.20	2.17	2.17	2.37	2.24	24	
25	2.20	2.20	2.20	2.20	2.19	2.17	2.19	2.17	2.41	2.19	2.16	2.14	2.13	2.13	2.20	2.43	2.16	2.14	S	2.17	2.19	2.14	2.16	2.17	2.13	2.43	2.19	24	
26	2.17	2.17	2.17	2.17	2.20	2.20	2.38	2.20	2.23	2.32	2.26	2.23	2.33	2.26	2.29	2.29	2.31	S	2.28	2.28	2.29	2.29	2.32	2.31	2.17	2.38	2.26	24	
27	2.35	2.36	2.38	2.41	2.43	2.43	2.50	2.50	3.06	2.87	2.47	2.44	2.44	2.41	2.81	2.44	S	2.67	2.44	2.43	2.44	2.44	2.47	2.49	2.35	3.06	2.51	24	
28	2.47	2.49	2.47	2.47	2.50	2.50	2.56	2.60	2.62	2.69	2.70	2.51	2.63	2.50	2.51	S	2.57	2.87	2.53	2.69	2.69	2.69	2.63	2.54	2.47	2.87	2.58	24	
29	2.54	2.54	2.51	2.50	2.51	2.53	2.54	2.62	2.49	2.44	2.40	2.44	2.59	2.29	S	2.29	2.25	2.44	2.17	2.16	2.16	2.19	2.19	2.10	2.10	2.62	2.39	24	
30	2.07	2.10	2.07	2.07	2.17	2.14	2.20	2.26	2.35	2.30	2.60	2.23	2.23	S	2.26	2.29	2.25	2.26	2.26	2.23	2.26	2.26	2.23	2.26	2.23	2.07	2.69	2.24	24
31	2.28	2.29	2.29	2.32	2.34	2.35	2.32	2.35	2.46	2.66	2.35	2.37	S	2.38	2.40	2.52	2.50	2.70	2.72	2.67	2.54	2.60	2.74	2.66	2.28	2.74	2.47	24	
HOURLY MAX	3.26	3.29	3.35	3.44	3.50	3.20	3.48	3.32	5.76	4.21	3.45	3.30	3.91	3.46	3.32	3.56	4.69	4.75	4.31	3.36	4.12	3.23	3.24	3.20					
HOURLY AVG	2.43	2.48	2.45	2.41	2.39	2.40	2.43	2.43	2.63	2.59	2.49	2.47	2.49	2.46	2.44	2.48	2.58	2.54	2.49	2.46	2.49	2.43	2.44	2.43					

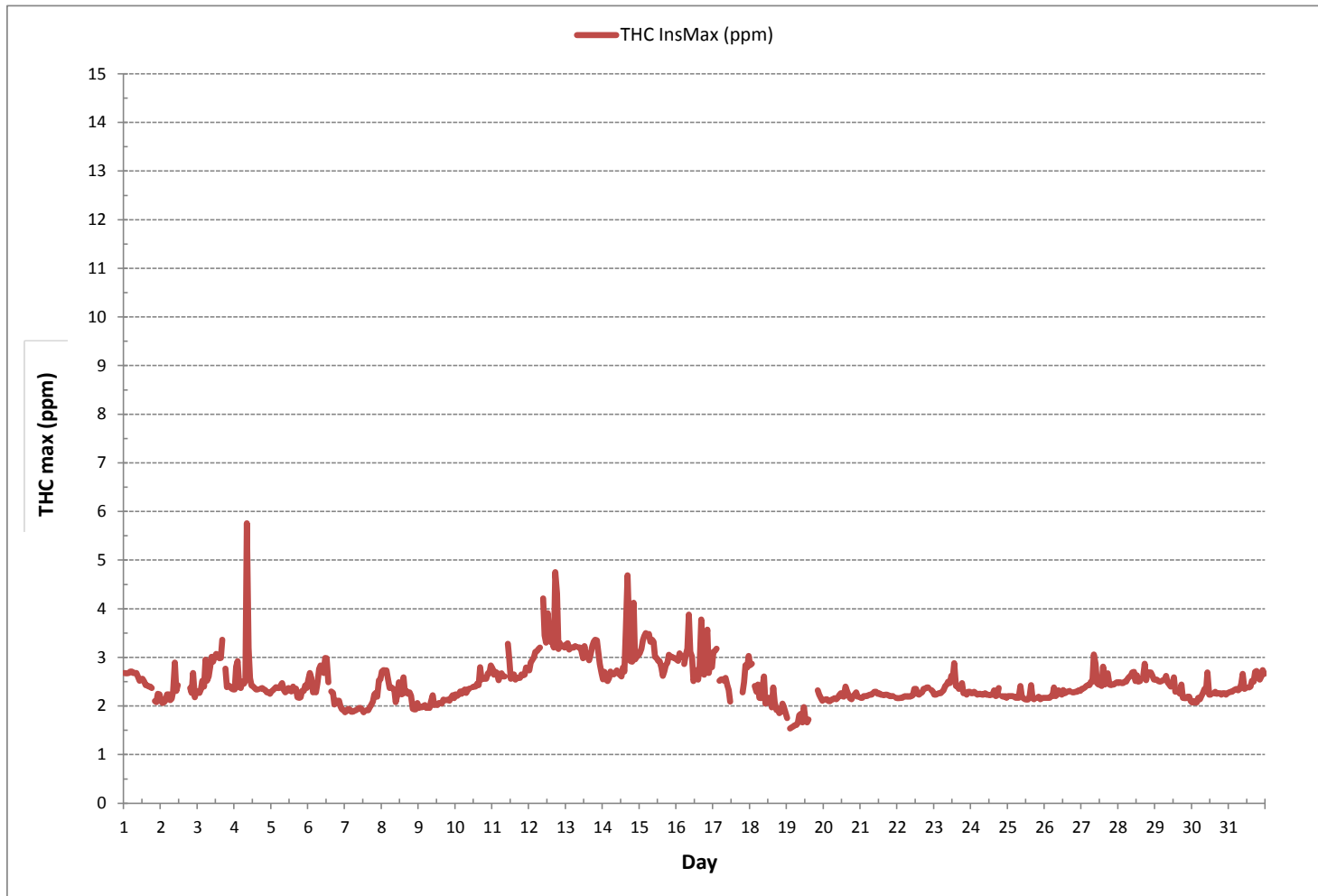
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	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:	5.76 ppm @ HOUR 8 ON DAY 4
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	735 hrs
STANDARD DEVIATION:	0.43

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)





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

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	8	7	7	8	6	8	7	7	9	6	7	8	9	8	9	13	13	9	S	15	11	12	12	6	15	9	24
2	10	9	6	8	21	14	14	17	35	31	31	14	3	13	19	21	24	22	S	7	6	5	5	3	3	35	15	24
3	3	5	17	14	24	54	11	48	63	C	C	C	C	C	C	C	C	S	31	10	21	21	16	8	3	63	23	24
4	3	5	9	7	18	25	22	32	59	29	19	21	21	10	16	16	S	11	10	14	9	7	6	6	3	59	16	24
5	5	5	6	6	5	7	8	5	11	8	8	7	5	12	11	S	8	7	4	6	5	6	17	14	4	17	8	24
6	8	6	8	6	7	71	7	11	14	14	14	21	20	12	S	11	9	7	8	12	10	6	6	4	4	71	13	24
7	4	3	3	3	3	4	4	3	4	4	4	2	1	S	2	4	7	15	19	38	43	16	78	83	1	83	15	24
8	62	57	53	50	43	29	29	30	35	18	6	18	S	13	30	25	44	28	29	16	3	2	2	13	2	62	28	24
9	2	3	2	4	3	3	4	5	4	4	3	S	3	5	6	5	2	1	2	4	2	2	2	2	1	6	3	24
10	2	2	3	3	3	4	4	5	11	17	S	12	7	14	18	11	23	21	14	13	10	14	10	12	2	23	10	24
11	9	10	9	7	7	113	11	14	12	S	35	14	10	9	7	12	20	15	49	31	21	18	17	15	7	113	20	24
12	20	15	19	27	29	30	37	51	S	51	97	62	28	55	52	60	66	50	92	51	67	77	81	64	15	97	51	24
13	42	42	17	20	29	26	21	S	27	36	29	15	14	19	18	20	20	28	30	32	31	26	19	13	13	42	25	24
14	12	15	6	4	7	8	S	12	13	29	11	10	6	11	12	13	137	39	37	26	28	42	32	33	4	137	24	24
15	32	28	39	54	62	S	51	46	79	76	17	10	7	12	79	19	15	9	11	15	14	26	38	28	7	79	33	24
16	38	30	30	30	S	44	83	65	140	88	102	192	47	10	10	14	57	52	34	27	66	30	22	17	10	192	53	24
17	18	33	19	S	15	16	16	18	13	12	Q	Q	Q	Q	Q	Q	Q	9	12	15	23	85	93	93	9	93	31	24
18	64	63	S	30	31	34	39	96	17	33	12	22	18	15	11	24	14	16	15	21	19	23	16	9	9	96	28	24
19	6	S	5	5	4	4	6	8	8	12	16	6	4	5	6	14	16	14	30	38	38	13	8	7	4	38	12	24
20	S	7	7	5	4	5	5	7	8	6	9	25	13	8	7	7	5	6	4	5	5	6	5	S	4	25	7	24
21	4	3	4	5	3	2	3	3	5	7	12	3	6	7	6	5	5	5	5	4	4	5	S	4	2	12	5	24
22	3	3	3	4	5	5	5	11	12	7	13	19	17	7	13	5	6	8	6	7	7	S	4	2	2	19	7	24
23	2	3	2	4	3	16	5	7	10	5	5	10	8	9	6	7	10	12	10	5	S	4	5	5	2	16	7	24
24	6	6	6	5	5	7	5	14	6	5	6	6	6	4	5	9	7	7	7	S	6	5	6	5	4	14	6	24
25	5	5	5	5	5	15	8	17	12	9	7	13	10	13	13	184	9	6	S	4	3	4	2	4	2	184	16	24
26	2	3	2	3	3	3	8	8	5	7	3	4	4	4	3	3	S	S	4	3	5	2	2	7	2	8	4	24
27	2	2	3	3	5	5	6	18	22	10	5	5	3	12	9	6	S	10	18	11	7	9	6	5	2	22	8	24
28	10	7	5	3	3	4	3	6	6	6	8	6	5	8	7	S	20	14	14	29	27	26	20	16	3	29	11	24
29	12	7	15	15	9	18	27	14	18	15	7	16	6	7	S	9	9	14	5	5	4	5	5	5	4	27	11	24
30	8	7	4	5	4	6	6	5	7	5	3	3	7	S	4	5	6	4	3	3	4	3	2	3	2	8	5	24
31	4	4	4	7	9	7	4	6	17	22	7	8	S	9	7	12	14	34	28	49	26	25	29	23	4	49	15	24
HOURLY MAX	64	63	53	54	62	113	83	96	140	88	102	192	47	55	79	184	137	52	92	51	67	85	93	93				
HOURLY AVG	13	13	11	12	13	20	15	20	23	20	18	20	11	12	14	20	21	16	19	17	18	17	19	17				

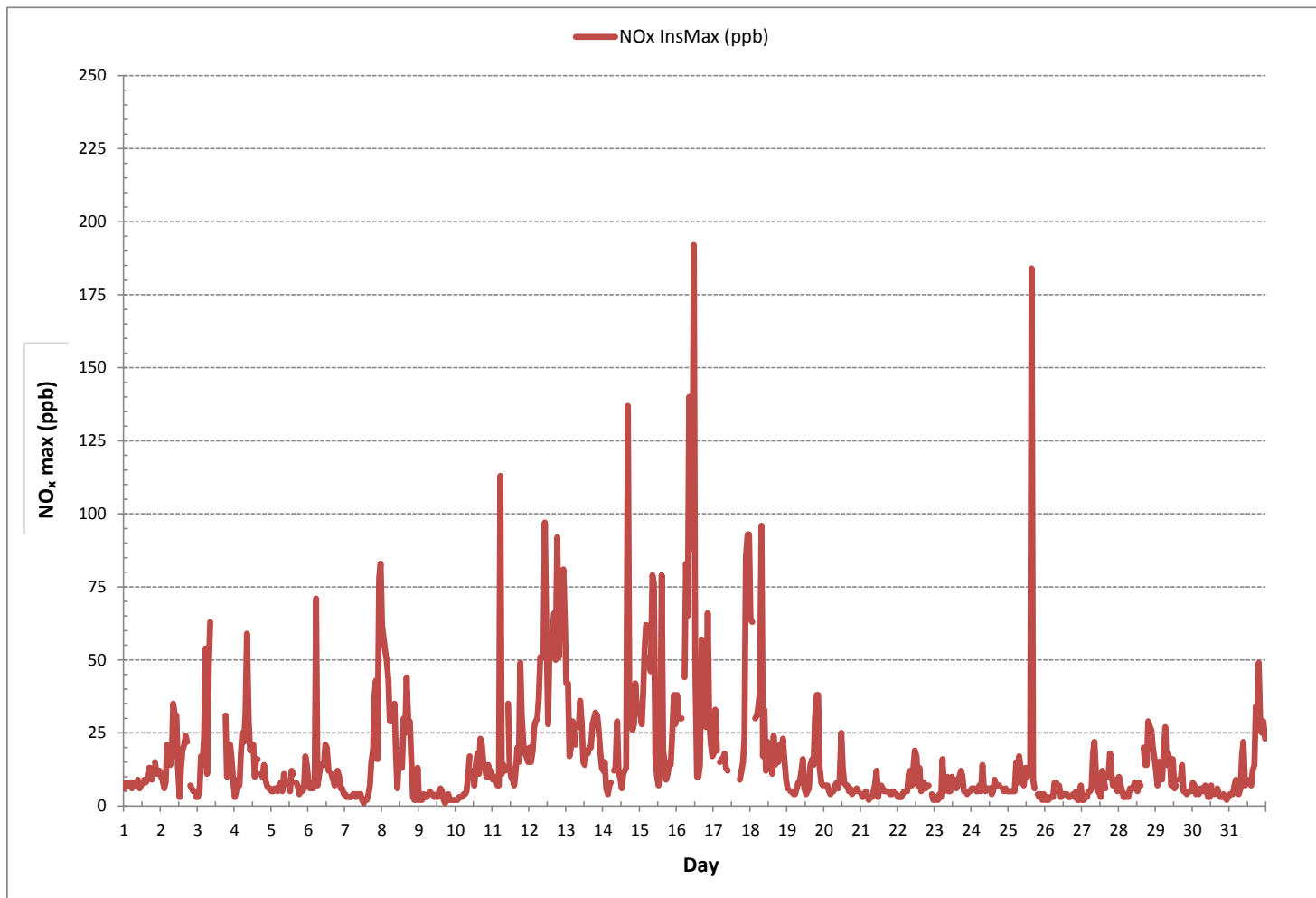
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	697
MAXIMUM INSTANTANEOUS VALUE:	192 ppb @ HOUR 11 ON DAY 16
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	21

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





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

NITRIC OXIDE Instantaneous Maximum (NO ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	1	2	1	1	1	1	1	1	1	2	2	3	3	3	2	2	2	2	1	S	1	1	1	1	1	1	3	2	24
2	2	1	1	1	3	2	3	2	6	12	13	6	1	6	8	4	6	5	S	1	1	16	1	2	1	16	4	24	
3	1	1	4	1	7	27	3	22	35	C	C	C	C	C	C	C	C	S	8	2	2	3	8	1	1	35	8	24	
4	1	1	2	1	7	4	4	10	39	13	7	11	9	4	18	7	S	2	2	10	1	2	3	2	1	39	7	24	
5	1	1	1	1	1	1	2	1	5	2	3	3	1	5	4	S	7	1	0	2	10	1	4	3	0	10	3	24	
6	1	1	2	1	1	26	0	1	3	3	4	8	5	3	S	1	1	1	1	1	1	1	1	1	0	26	3	24	
7	1	1	1	1	1	1	1	1	1	1	1	0	0	S	1	1	0	2	2	10	16	2	50	47	0	50	6	24	
8	33	30	30	21	16	6	5	5	14	5	1	7	S	4	11	7	14	6	6	1	1	1	1	3	1	33	10	24	
9	1	2	1	2	2	2	2	2	1	3	2	S	1	3	3	4	1	0	1	3	1	1	0	1	0	4	2	24	
10	0	0	0	0	0	0	1	0	4	6	S	5	2	5	7	2	8	9	2	5	2	2	1	2	0	9	3	24	
11	0	1	1	1	1	79	1	1	2	S	13	6	4	3	2	2	3	2	16	3	2	1	2	2	0	79	6	24	
12	2	1	1	3	3	5	11	22	S	29	62	38	15	33	29	33	33	23	53	25	36	45	46	33	1	62	25	24	
13	13	15	2	2	6	4	2	S	5	16	13	6	6	7	7	4	3	6	2	4	3	2	1	0	0	16	6	24	
14	1	3	1	1	1	1	S	1	2	7	4	5	2	6	4	2	180	16	8	3	7	20	6	7	1	180	13	24	
15	5	4	13	26	32	S	24	19	47	45	8	10	2	10	44	6	2	1	2	1	1	6	7	6	1	47	14	24	
16	6	4	5	4	S	12	46	32	103	54	64	95	24	3	2	3	43	30	8	6	36	3	2	2	2	103	26	24	
17	2	8	2	S	1	2	1	2	2	3	Q	Q	Q	Q	Q	Q	Q	1	1	1	2	43	53	52	1	53	11	24	
18	30	32	S	4	6	10	12	51	4	13	3	6	6	5	2	5	1	1	1	3	1	2	2	1	1	51	9	24	
19	1	S	1	1	1	1	1	2	1	2	3	2	1	1	1	2	1	1	2	5	5	2	1	1	1	5	2	24	
20	S	2	2	2	1	0	0	0	1	1	3	6	6	2	2	1	1	2	1	0	0	1	1	S	0	6	2	24	
21	1	0	1	2	2	0	0	0	1	1	6	1	4	3	3	1	1	1	1	1	1	3	S	1	0	6	2	24	
22	1	1	1	1	2	1	1	5	3	2	9	6	9	3	3	3	2	2	2	2	2	S	0	1	0	9	3	24	
23	1	2	0	1	1	6	1	1	6	1	2	4	3	3	1	3	2	3	9	1	S	1	1	1	0	9	2	24	
24	2	1	2	1	2	5	1	5	1	3	2	2	2	1	2	2	6	7	2	S	2	1	2	2	1	7	2	24	
25	2	2	2	1	2	9	3	6	5	4	2	11	6	4	6	133	5	5	S	2	4	2	1	2	1	133	10	24	
26	0	1	1	1	1	1	14	3	2	2	1	2	2	1	1	1	S	2	1	2	1	1	3	0	14	2	24		
27	0	0	1	1	1	1	1	5	6	3	2	2	1	3	4	3	S	4	14	7	2	5	2	2	0	14	3	24	
28	6	3	1	0	0	1	0	1	1	1	3	4	3	5	3	S	7	4	5	6	6	7	5	4	0	7	3	24	
29	4	1	7	6	2	4	6	2	8	6	2	3	7	7	S	2	2	8	1	1	1	1	1	1	1	8	4	24	
30	4	4	1	2	1	0	0	0	1	1	1	1	2	S	1	1	1	0	0	0	0	0	0	0	0	4	1	24	
31	0	0	0	1	2	1	0	1	3	13	3	4	S	4	2	4	6	20	6	18	3	3	4	2	0	20	4	24	
HOURLY MAX	33	32	30	26	32	79	46	51	103	54	64	95	24	33	44	133	180	30	53	25	36	45	53	52					
HOURLY AVG	4	4	3	3	4	7	5	7	10	9	9	9	5	5	6	9	13	6	5	4	5	6	7	6					

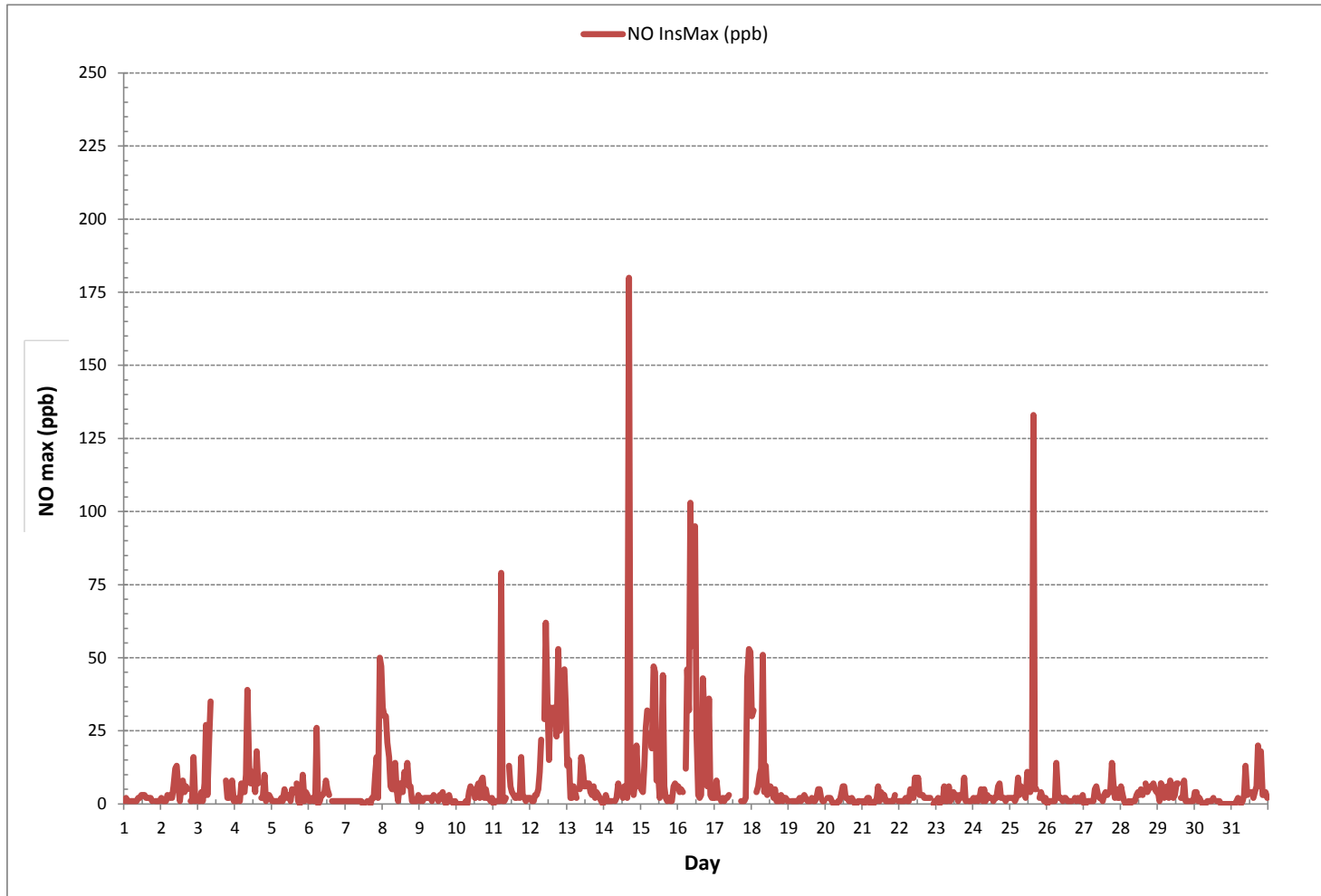
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	650
MAXIMUM INSTANTANEOUS VALUE:	180 ppb @ HOUR 16 ON DAY 14
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	14
OPERATIONAL TIME:	744 hrs

NITRIC OXIDE Instantaneous Maximum (NO ppb)







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

**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	5	7	7	6	8	6	7	7	7	7	5	4	5	6	6	8	12	12	9	S	14	10	12	12	4	14	8	24	
2	9	9	5	7	18	13	13	15	28	20	19	12	3	10	15	17	19	17	S	7	6	5	4	2	2	28	12	24	
3	3	5	13	13	16	27	10	26	28	C	C	C	C	C	C	C	C	S	23	9	20	18	10	6	3	28	15	24	
4	3	4	8	7	12	21	19	22	22	18	12	13	13	6	10	10	S	9	8	8	8	6	4	5	3	22	11	24	
5	4	4	5	6	4	6	6	4	7	6	6	6	4	7	7	S	7	6	4	4	4	6	13	11	4	13	6	24	
6	7	5	6	6	7	46	7	10	12	12	11	14	15	10	S	9	8	7	7	12	10	5	5	3	3	46	10	24	
7	3	2	2	3	2	3	3	3	3	3	3	1	1	S	2	3	7	14	18	29	29	15	31	37	1	37	9	24	
8	30	28	23	30	27	23	24	25	25	13	5	12	S	10	19	20	31	24	24	15	2	1	2	12	1	31	18	24	
9	1	2	1	2	1	2	2	3	3	2	1	S	2	2	3	2	1	1	1	2	1	1	1	1	1	1	3	2	24
10	2	2	3	2	3	4	4	5	8	11	S	8	5	10	12	9	17	13	13	12	9	13	9	11	2	17	8	24	
11	9	9	8	6	6	52	10	13	11	S	22	8	6	6	6	10	18	15	33	28	20	17	16	14	6	52	15	24	
12	18	15	18	24	26	26	26	30	S	24	35	24	14	24	26	30	32	30	49	30	32	33	36	33	14	49	28	24	
13	28	28	15	19	23	22	20	S	24	20	16	9	9	12	12	16	19	23	28	30	30	24	18	12	9	30	20	24	
14	12	12	6	4	6	7	S	11	13	22	8	6	4	8	8	11	35	25	30	24	22	25	26	27	4	35	15	24	
15	27	25	26	30	30	S	29	28	36	31	10	5	4	9	39	14	14	8	9	14	13	23	31	23	4	39	21	24	
16	32	27	27	27	S	34	37	35	43	34	38	110	24	7	8	11	22	27	27	24	32	27	21	17	7	110	30	24	
17	16	27	18	S	14	15	15	17	11	10	Q	Q	Q	Q	Q	Q	Q	Q	8	12	14	21	42	41	41	8	42	20	24
18	35	35	S	26	25	26	30	45	15	22	9	16	12	11	9	20	13	14	14	18	19	21	16	9	9	45	20	24	
19	6	S	4	5	3	3	6	7	7	10	13	4	3	4	5	12	14	14	27	32	32	11	7	6	3	32	10	24	
20	S	5	5	4	3	5	4	6	7	5	7	18	8	6	5	3	4	4	5	4	5	4	5	4	S	3	18	6	24
21	4	2	3	3	2	2	2	4	6	7	2	3	4	5	4	4	4	4	4	3	3	3	3	S	3	2	7	3	24
22	2	2	2	3	4	4	5	9	8	6	6	13	8	6	9	4	4	7	5	6	6	S	3	2	2	13	5	24	
23	2	2	2	3	3	11	4	6	7	4	4	6	6	6	5	6	8	10	8	4	S	3	4	4	2	11	5	24	
24	6	5	4	4	4	6	4	9	4	4	4	4	4	3	3	7	6	5	6	S	4	4	4	4	3	3	9	5	24
25	3	4	3	3	4	6	5	12	8	6	5	4	4	9	8	64	6	3	S	3	2	3	1	2	1	64	7	24	
26	1	2	2	2	2	2	5	4	5	2	2	2	3	3	3	2	S	2	2	2	4	1	1	4	1	5	3	24	
27	1	2	2	3	4	4	6	13	17	8	3	4	2	9	5	4	S	7	8	8	5	6	4	4	1	17	6	24	
28	6	4	4	2	2	3	3	5	5	5	6	2	2	4	4	S	16	13	11	24	22	21	16	12	2	24	8	24	
29	10	6	9	9	8	14	21	12	13	8	5	14	4	4	S	7	7	6	4	4	4	4	4	4	4	4	21	8	24
30	6	4	3	4	3	6	6	5	6	4	2	2	5	S	3	4	5	4	3	3	4	3	2	3	2	6	4	24	
31	4	4	4	6	7	6	4	5	14	18	4	4	S	5	5	9	10	20	22	32	23	22	25	21	4	32	12	24	
HOURLY MAX	35	35	27	30	30	52	37	45	43	34	38	110	24	24	39	64	35	30	49	32	32	42	41	41					
HOURLY AVG	10	10	8	9	9	14	11	13	13	12	10	12	6	7	9	12	13	12	14	14	14	13	12	11					

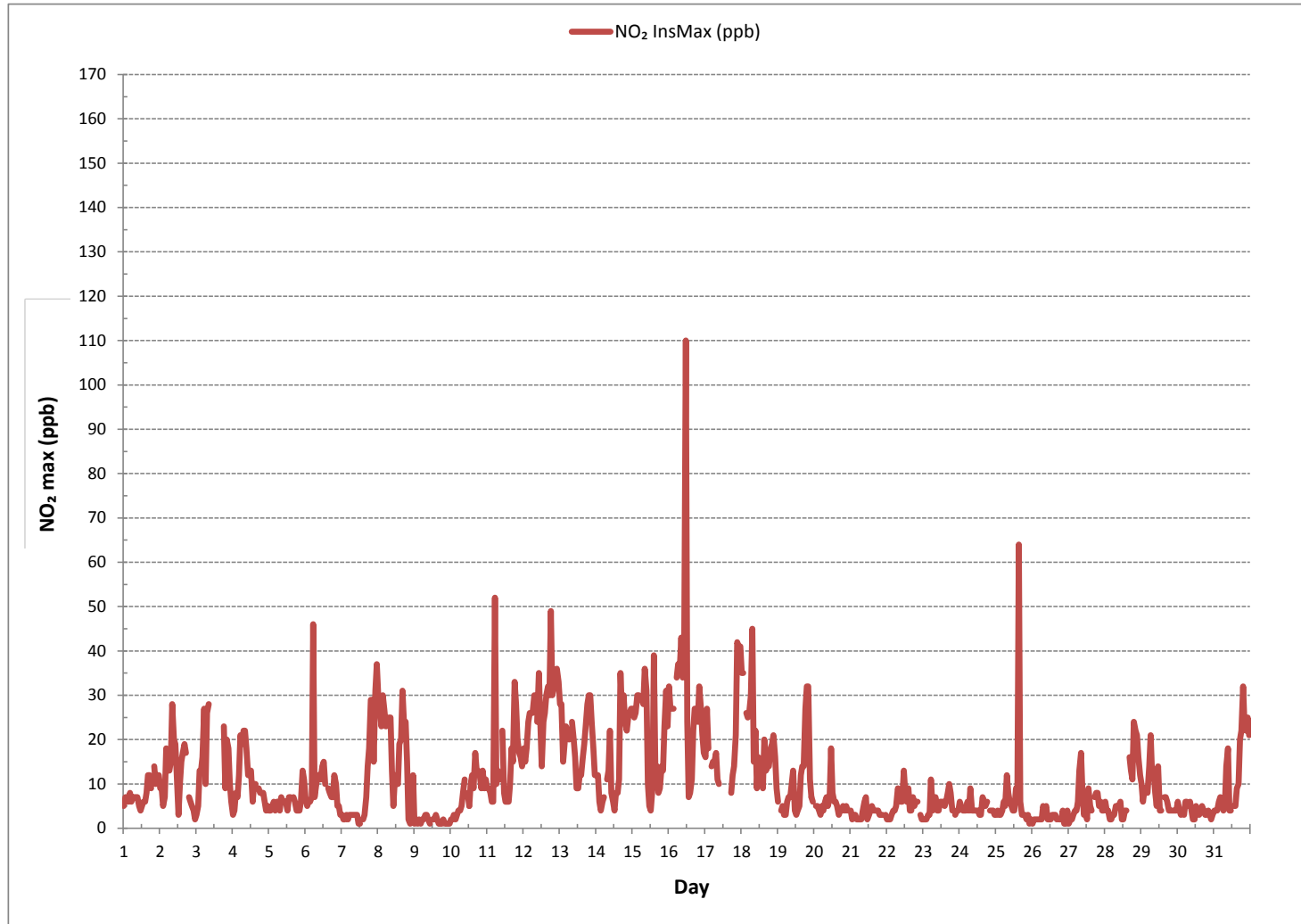
**STATUS FLAG CODES**

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

**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	697
MAXIMUM INSTANTANEOUS VALUE:	110 ppb @ HOUR 11 ON DAY 16
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	11

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





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

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	25.9	25.2	25.3	25.5	25.6	24.9	24.9	24.4	25.3	27.3	27.1	26.7	26.7	26.2	26.5	25.0	22.7	24.7	S	26.2	25.2	25.0	23.6	22.7	27.4	25.5	24	
2	26.4	30.4	29.7	28.8	27.3	25.0	26.1	26.2	25.5	14.4	31.7	34.2	C	C	C	C	C	30.3	S	31.9	32.3	32.2	32.7	32.7	14.4	34.2	28.8	24	
3	32.9	31.7	29.8	26.5	21.0	13.1	18.6	18.5	6.9	8.7	10.9	13.5	13.6	14.2	14.3	14.0	4.9	S	17.9	23.8	23.8	19.8	21.7	23.0	4.9	32.9	18.4	24	
4	23.3	23.3	21.7	22.1	21.5	15.9	11.3	8.7	9.3	12.2	18.9	20.2	20.8	21.1	20.8	20.8	S	20.4	20.8	21.7	21.2	23.0	23.2	22.4	8.7	23.3	19.3	24	
5	21.8	21.4	20.9	20.6	20.6	20.2	20.3	21.4	21.2	21.5	21.2	21.7	22.3	23.2	23.6	S	24.0	26.8	27.3	26.4	26.1	24.3	23.2	20.1	20.1	27.3	22.6	24	
6	20.1	21.4	20.9	20.2	17.1	16.7	16.2	14.3	10.7	12.5	11.8	10.1	12.0	13.9	S	20.3	24.4	27.3	27.7	27.9	29.8	31.4	31.6	33.5	10.1	33.5	20.5	24	
7	34.7	35.6	35.4	36.7	35.7	35.7	35.9	36.2	35.0	35.1	36.8	36.8	37.1	S	37.0	36.5	35.7	31.2	25.9	25.6	13.7	14.7	15.9	3.0	3.0	37.1	30.7	24	
8	0.9	0.8	0.8	1.7	9.0	13.4	23.5	25.0	24.6	25.3	25.2	25.3	S	24.4	24.1	22.6	14.9	11.8	9.8	25.5	28.9	30.4	30.7	30.6	0.8	30.7	18.7	24	
9	29.9	30.3	30.5	29.9	29.5	29.1	29.1	29.1	29.2	29.8	30.5	S	33.5	34.1	34.4	34.8	35.4	35.4	35.1	35.1	35.1	34.2	33.2	33.6	29.1	35.4	32.2	24	
10	33.0	32.4	32.0	32.0	31.7	31.7	31.7	31.6	31.6	32.0	S	32.4	31.7	29.8	28.2	28.5	28.3	27.4	26.4	26.5	28.9	28.9	26.2	25.6	25.6	33.0	29.9	24	
11	22.4	22.4	21.8	25.6	25.6	23.5	21.1	21.2	24.0	S	24.7	26.9	28.8	29.4	29.5	29.1	25.8	23.2	20.9	12.9	20.2	18.0	20.2	15.5	12.9	29.5	23.2	24	
12	13.7	11.9	12.1	7.9	6.0	3.3	3.8	0.8	S	7.6	10.2	17.2	18.9	18.4	15.6	9.7	4.1	4.9	3.9	0.9	0.8	1.6	1.1	6.7	0.8	18.9	7.9	24	
13	11.0	18.3	21.5	20.1	9.3	6.2	11.2	S	8.6	15.4	24.1	25.3	24.6	24.0	21.1	20.5	18.3	13.2	8.5	4.1	8.4	14.6	18.6	19.9	4.1	25.3	15.9	24	
14	21.8	25.6	31.2	30.4	28.8	25.3	S	22.4	20.5	22.6	26.4	29.9	32.2	31.3	30.4	24.9	22.1	19.0	15.1	15.2	14.9	13.1	10.2	4.7	4.7	32.2	22.5	24	
15	7.2	7.8	6.1	1.1	0.8	S	1.1	0.8	2.5	19.5	29.2	30.3	30.7	31.2	36.2	36.7	34.7	35.9	32.7	31.3	28.5	27.6	21.8	22.4	0.8	36.7	20.7	24	
16	16.9	18.2	16.7	17.7	S	6.4	6.7	1.6	2.8	5.7	31.2	33.3	37.0	35.1	34.7	33.3	31.2	20.6	22.0	17.5	14.5	14.4	13.7	15.2	1.6	37.0	19.4	24	
17	15.0	12.5	16.4	S	16.7	13.4	14.3	21.4	26.2	28.3	33.3	33.3	33.8	35.3	35.9	35.6	Q	Q	Q	31.0	24.1	22.0	1.7	1.7	35.9	22.6	24		
18	0.8	1.0	S	14.0	10.5	17.4	14.3	26.7	25.9	25.6	27.3	26.7	28.8	29.2	27.9	27.0	24.4	24.1	24.3	24.6	21.1	18.3	24.7	29.1	0.8	29.2	21.5	24	
19	31.4	S	35.7	34.2	35.1	35.3	34.1	32.9	31.4	33.3	33.5	33.9	34.8	35.0	37.4	36.1	29.9	29.8	24.1	21.5	20.5	27.0	28.0	28.8	20.5	37.4	31.5	24	
20	S	27.9	24.9	24.3	23.0	24.4	27.4	26.1	21.8	21.4	21.4	20.8	19.9	21.4	22.7	26.4	28.2	30.3	29.5	27.4	25.0	29.9	32.7	S	19.9	32.7	25.3	24	
21	31.9	31.7	31.3	32.6	32.7	31.3	30.2	30.1	29.4	28.8	26.5	20.8	21.1	23.2	23.3	23.8	23.6	23.5	23.6	23.5	23.0	23.0	S	23.6	20.8	32.7	26.6	24	
22	24.9	25.2	25.9	26.1	25.9	27.1	26.7	26.7	26.5	26.2	26.5	27.0	27.3	27.4	26.9	26.4	25.9	24.1	24.7	24.6	25.2	S	26.7	30.1	24.1	30.1	26.3	24	
23	30.2	30.1	29.5	28.8	28.5	27.3	25.3	23.5	22.9	23.5	23.5	23.5	20.8	22.4	24.9	24.7	24.3	24.7	29.7	29.8	S	31.3	31.4	30.7	20.8	31.4	26.6	24	
24	20.9	22.3	22.1	23.2	23.6	24.4	23.8	23.5	24.1	24.4	24.7	24.6	27.7	27.6	28.8	27.4	56.6	27.4	27.9	S	27.6	27.3	27.4	27.4	20.9	56.6	26.7	24	
25	27.4	27.0	26.4	26.5	26.2	26.2	25.8	25.6	25.6	26.2	26.2	26.1	26.4	26.5	26.4	25.7	24.4	25.5	S	24.9	24.6	25.2	25.6	26.0	24.4	27.4	25.9	24	
26	26.2	26.5	26.5	26.2	26.5	26.2	26.1	25.5	26.4	26.7	26.2	26.9	26.8	22.7	23.2	23.5	24.7	S	26.4	27.4	27.7	28.2	28.3	27.7	22.7	28.3	26.2	24	
27	27.4	27.0	25.0	24.1	22.9	22.3	20.9	19.6	26.2	26.7	27.4	27.3	27.7	28.2	28.0	27.6	S	26.5	26.4	26.5	26.8	26.2	26.8	27.3	19.6	28.2	25.9	24	
28	28.3	29.4	28.9	28.3	28.6	28.5	28.2	26.4	24.1	24.1	24.4	25.0	24.7	24.7	24.8	S	20.2	21.1	19.6	15.9	13.2	13.1	17.7	19.5	13.1	29.4	23.4	24	
29	24.7	25.0	25.3	24.7	25.0	26.5	25.8	26.2	26.8	30.1	30.1	29.7	29.5	29.1	S	28.6	29.2	29.7	30.4	29.5	27.0	25.6	25.3	26.4	24.7	30.4	27.4	24	
30	26.7	26.8	27.7	27.4	27.0	25.8	22.3	20.9	21.5	24.1	25.3	25.3	23.8	S	24.4	24.6	22.3	22.7	23.0	23.5	23.2	26.7	28.8	28.6	20.9	28.8	24.9	24	
31	27.3	27.3	27.6	27.4	27.6	29.2	30.7	30.7	28.6	29.5	29.9	31.7	S	33.5	32.3	32.0	30.8	27.9	22.3	19.6	17.5	17.4	13.1	13.4	13.1	33.5	26.4	24	
HOURLY MAX	34.7	35.6	35.7	36.7	35.7	35.7	35.9	36.2	35.0	35.1	36.8	36.8	37.1	35.3	37.4	36.7	56.6	35.9	35.1	35.1	35.1	35.1	34.2	33.2	33.6				
HOURLY AVG	22.9	23.2	24.3	23.8	23.0	22.5	21.9	22.3	22.1	22.9	25.5	26.2	26.5	26.5	27.3	26.7	25.7	24.6	23.2	23.3	22.7	23.2	22.9	22.4					

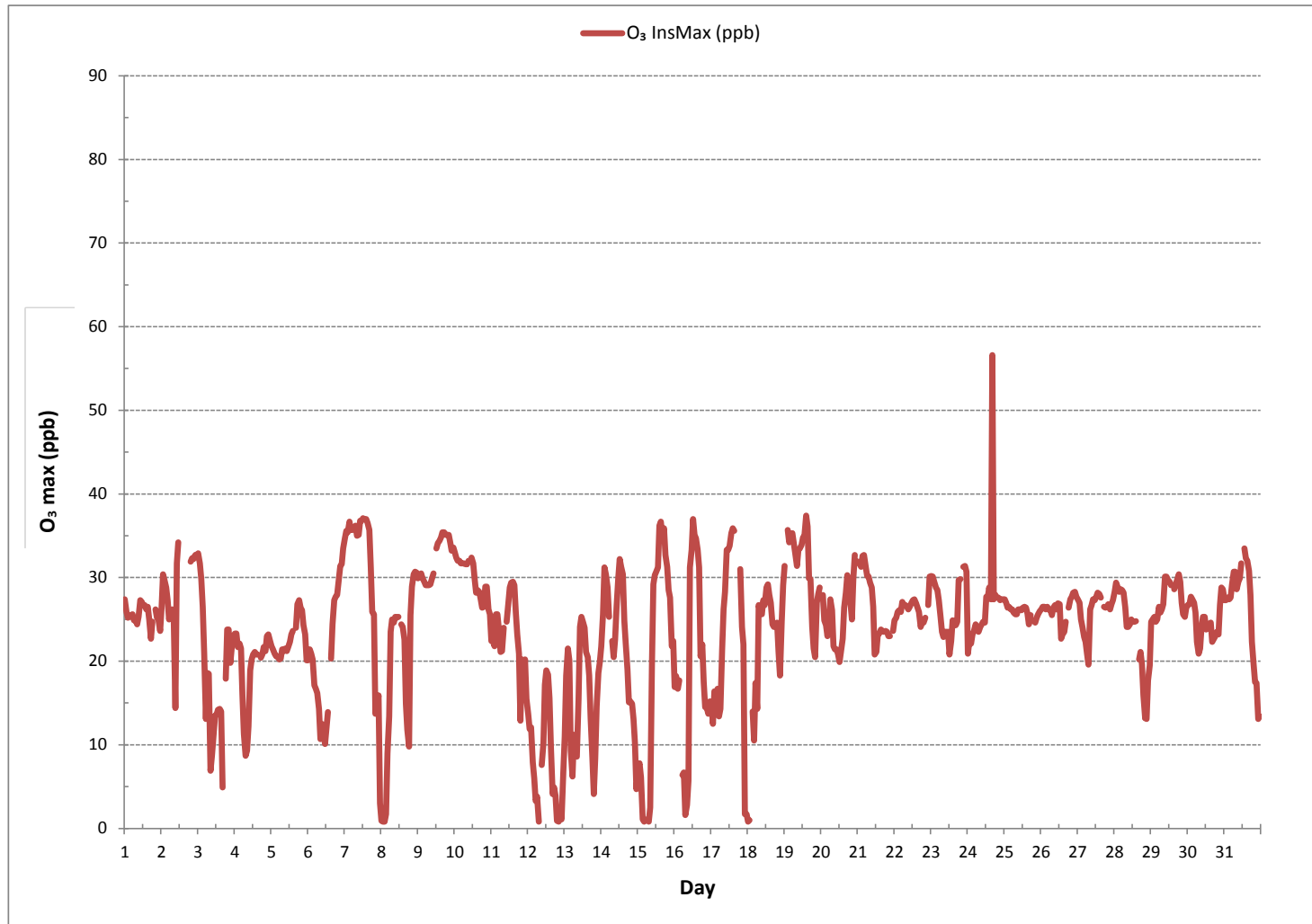
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	704
MAXIMUM INSTANTANEOUS VALUE:	56.6 ppb @ HOUR 16 ON DAY 24
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	7.8

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





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

WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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	4.1	2.8	6.0	4.0	4.1	3.1	3.1	3.2	3.5	3.4	8.7	9.3	8.7	10.7	9.3	5.0	5.4	4.5	8.2	10.6	9.6	14.5	16.2	12.8	2.8	16.2	7.1	24
2	12.6	14.0	9.9	7.7	6.0	7.3	6.6	6.9	4.8	4.5	5.7	10.4	12.4	11.4	6.6	4.2	4.2	4.0	8.6	7.0	9.0	9.6	9.9	9.5	4.0	14.0	8.0	24
3	8.9	4.4	3.6	2.6	4.4	5.4	6.4	4.8	9.9	3.6	3.5	6.6	7.0	6.0	6.1	3.4	3.9	4.8	5.4	9.4	6.8	6.0	5.6	13.2	2.6	13.2	5.9	24
4	12.5	10.6	4.5	11.1	5.7	3.6	4.0	3.7	4.4	4.9	5.4	6.2	6.1	6.1	6.8	9.1	10.4	8.6	10.7	9.5	7.5	9.6	9.9	8.6	3.6	12.5	7.5	24
5	11.0	10.7	10.7	9.6	12.1	11.1	10.4	13.3	13.8	15.0	11.8	11.8	12.5	11.8	11.1	11.2	7.5	12.3	13.2	12.0	8.9	8.1	5.3	4.5	4.5	15.0	10.8	24
6	4.6	5.6	3.9	2.4	6.9	2.5	4.0	9.1	8.0	13.0	11.6	12.2	11.4	12.2	12.2	14.2	14.3	10.5	12.2	13.4	12.0	14.8	13.2	12.2	2.4	14.8	9.9	24
7	10.7	12.6	12.7	13.8	15.6	13.7	15.0	18.5	17.7	12.8	19.0	20.4	20.1	21.6	17.5	11.3	4.4	5.0	5.6	4.6	1.9	5.1	5.1	2.9	1.9	21.6	12.0	24
8	2.7	3.5	2.2	3.5	4.3	3.6	5.5	6.2	5.6	7.5	6.4	4.7	7.2	5.0	5.5	4.8	4.6	4.4	4.1	19.0	18.9	20.4	18.7	18.0	2.2	20.4	7.8	24
9	19.8	20.5	21.3	21.4	21.2	21.0	23.0	17.5	15.3	18.2	20.7	20.8	21.7	20.9	15.8	18.9	21.2	20.6	22.4	19.9	15.2	17.8	19.9	15.5	15.2	23.0	19.6	24
10	15.1	16.6	13.5	16.9	15.2	13.4	17.1	17.9	12.7	15.7	13.7	16.1	13.7	12.4	13.5	9.9	7.4	7.0	6.8	9.3	9.2	9.6	7.5	8.9	6.8	17.9	12.5	24
11	6.5	5.3	7.8	12.5	8.8	5.7	4.6	7.5	9.3	8.8	8.7	11.5	12.1	10.0	9.3	8.9	7.1	5.3	4.7	2.8	3.2	2.5	4.5	3.2	2.5	12.5	7.1	24
12	2.6	3.0	3.5	3.8	3.7	3.3	31.7	3.3	3.7	2.6	3.5	4.7	4.0	5.6	5.3	4.7	5.1	2.8	25.0	2.6	19.2	3.1	4.7	4.4	2.6	31.7	6.5	24
13	3.5	4.4	4.7	4.5	3.5	3.4	3.3	2.4	2.7	4.3	4.2	5.1	6.6	8.0	6.8	6.6	8.9	9.2	5.8	7.5	5.9	7.8	10.4	13.0	2.4	13.0	5.9	24
14	10.6	9.0	14.6	14.6	10.5	10.8	6.3	8.3	7.4	10.0	11.2	8.2	7.7	8.2	7.3	8.6	5.8	4.9	4.1	1.9	8.3	4.2	4.2	5.1	1.9	14.6	8.0	24
15	2.0	3.3	3.6	3.9	3.0	2.6	3.7	7.7	5.0	6.8	12.1	9.2	8.5	9.0	7.8	9.0	5.6	9.4	9.4	4.2	4.7	3.6	4.7	5.1	2.0	12.1	6.0	24
16	4.1	3.5	3.7	4.6	7.7	4.6	4.0	2.6	4.5	2.8	5.7	7.6	8.1	7.9	8.1	6.9	6.5	3.5	4.3	1.5	3.2	10.0	4.0	6.6	1.5	10.0	5.3	24
17	6.7	6.2	10.3	10.3	15.0	10.2	10.2	11.4	14.9	13.3	13.0	17.6	18.1	23.8	14.4	11.9	9.8	9.2	5.8	5.7	3.3	3.9	4.4	3.8	3.3	23.8	10.6	24
18	3.6	3.7	5.4	5.1	4.1	6.2	4.6	8.3	9.7	7.4	6.8	5.8	7.5	12.2	10.5	8.6	11.6	9.8	10.0	10.9	8.1	4.7	9.2	11.1	3.6	12.2	7.7	24
19	11.0	15.6	17.4	10.9	11.7	9.9	11.2	10.9	9.4	11.5	12.8	14.4	13.6	12.0	10.6	9.0	8.7	8.1	4.3	3.0	6.0	6.5	5.9	5.6	3.0	17.4	10.0	24
20	6.3	8.9	6.9	6.2	10.1	10.4	10.8	9.0	9.5	6.5	5.0	5.6	4.2	6.9	7.7	9.7	10.3	8.0	3.9	3.1	4.6	6.3	9.0	7.9	3.1	10.8	7.4	24
21	7.6	7.4	6.1	8.8	7.4	7.7	6.4	4.8	4.7	3.5	8.6	11.1	10.1	11.9	12.8	14.5	15.5	15.0	14.2	15.3	14.9	11.1	15.7	12.2	3.5	15.7	10.3	24
22	15.7	15.2	12.8	10.9	8.4	10.0	11.1	14.1	9.3	9.9	7.7	7.9	7.4	7.3	6.2	6.5	5.5	8.1	11.6	10.3	9.2	9.4	7.8	11.6	5.5	15.7	9.7	24
23	12.0	11.2	11.4	8.7	7.5	3.3	5.6	8.7	12.6	11.1	11.2	12.5	10.4	10.0	10.1	9.1	5.6	6.3	8.1	10.1	12.4	16.1	13.1	9.0	3.3	16.1	9.8	24
24	9.9	10.1	10.4	11.4	12.1	12.9	12.4	15.7	15.4	13.8	14.3	13.9	13.9	12.3	15.9	12.1	12.1	12.2	13.2	11.3	13.4	12.4	11.0	12.1	9.9	15.9	12.7	24
25	9.9	10.1	10.3	9.4	9.9	8.3	8.7	10.9	9.7	8.3	10.5	7.9	9.4	9.5	11.9	9.3	13.2	12.6	12.1	13.3	12.0	12.5	13.8	11.0	7.9	13.8	10.6	24
26	12.0	11.1	13.3	11.4	13.2	13.0	10.6	11.5	11.1	5.2	10.4	10.7	13.2	13.2	10.5	11.5	14.6	14.9	15.9	14.6	16.2	13.1	12.2	11.8	5.2	16.2	12.3	24
27	8.1	7.8	9.4	6.8	8.0	5.8	5.6	6.0	7.2	7.6	8.8	8.9	7.3	9.3	9.4	8.4	9.9	7.8	7.8	8.3	7.7	7.7	8.6	5.1	5.1	9.9	7.8	24
28	6.2	3.9	1.8	3.0	3.2	3.0	4.3	4.8	2.9	2.7	10.8	11.3	10.1	9.3	5.8	3.7	4.1	4.2	5.1	3.6	2.8	5.3	5.2	3.3	1.8	11.3	5.0	24
29	6.9	7.3	8.4	7.6	7.1	8.6	6.2	8.4	8.3	13.2	13.0	13.4	12.3	14.2	14.7	13.8	14.2	10.5	14.8	17.8	17.8	18.4	19.1	12.3	6.2	19.1	12.0	24
30	13.9	13.3	9.8	9.1	11.5	14.4	19.2	26.3	19.4	16.6	20.8	25.1	19.5	19.5	22.4	19.5	10.8	17.1	15.9	23.2	20.5	25.5	23.6	19.7	9.1	26.3	18.2	24
31	18.2	16.1	17.1	14.5	10.6	10.5	15.5	9.6	8.8	9.7	12.1	12.2	9.4	8.4	8.7	7.3	7.1	5.8	4.1	3.6	2.0	2.2	3.8	2.4	2.0	18.2	9.2	24
HOURLY MAX	19.8	20.5	21.3	21.4	21.2	21.0	31.7	26.3	19.4	18.2	20.8	25.1	21.7	23.8	22.4	19.5	21.2	20.6	25.0	23.2	20.5	25.5	23.6	19.7				
HOURLY AVG	9.0	9.0	8.9	8.7	8.8	8.0	9.4	9.5	9.1	8.8	10.2	11.1	10.8	11.2	10.3	9.4	8.9	8.6	9.6	9.3	9.5	9.7	9.9	9.1				

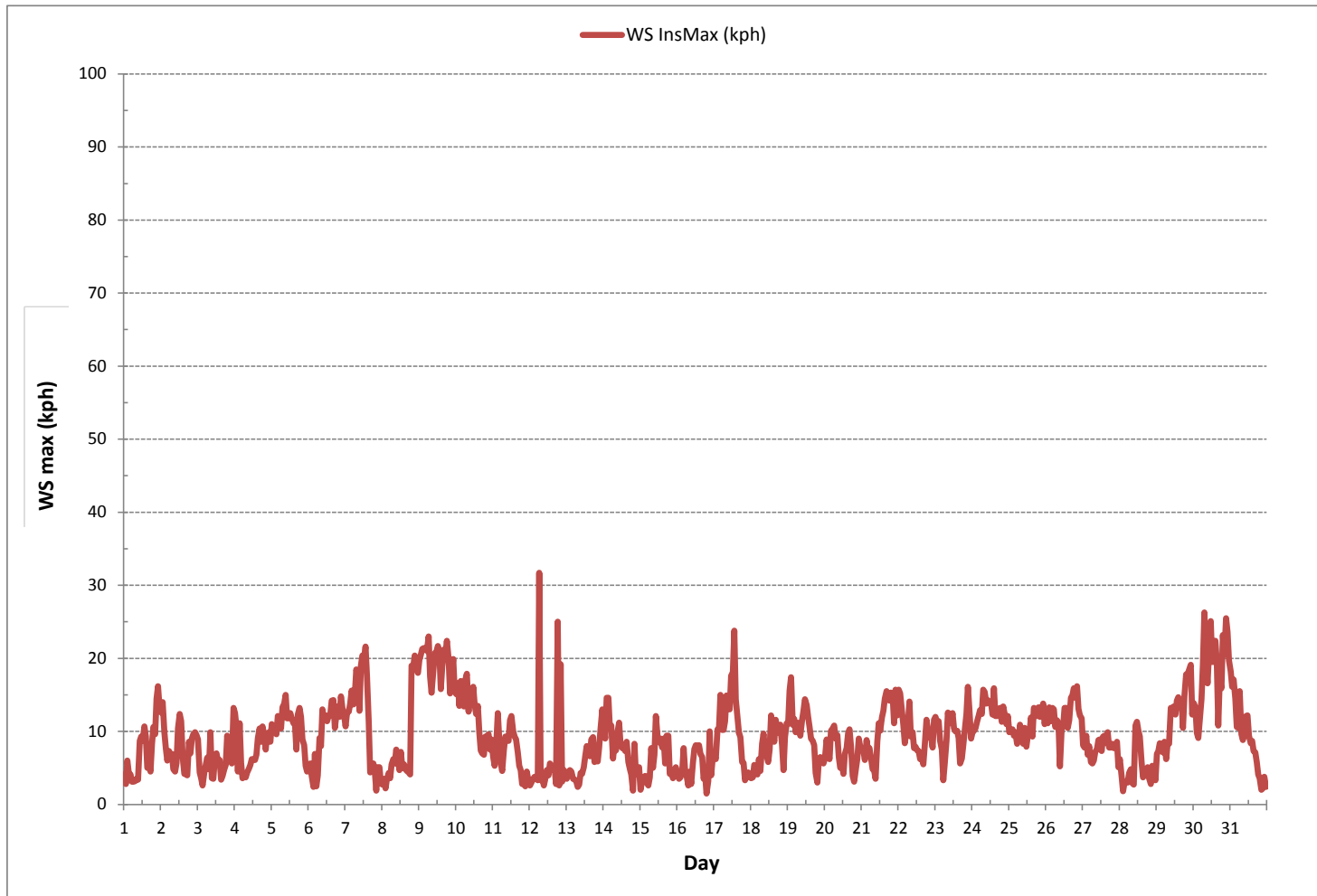
STATUS FLAG CODES

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

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	31.7	kph	@ HOUR	6	ON DAY	12	
OPERATIONAL TIME:						744	hrs

WIND SPEED Instantaneous Maximum (WS kph)



***APPENDIX V***  
***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

February 20, 2017

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



***APPENDIX VI***  
***DATA VALIDATION CERTIFICATION FORM***



### Validation Certificate Form

<b>Client:</b> <u>Lakeland Industry &amp; Community Association</u>	<b>Project #:</b> <u>2833-2018-01-1-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>February 05, 2017</u>
<b>Level 1 Primary Validation</b>	<u>Maram Ghaleb</u>	<b>Date</b> <u>February 05, 2017</u>
<b>Level 2 Final Validation</b>	<u>Maram Ghaleb</u>	<b>Date</b> <u>February 20, 2017</u>
<b>Level 3 Independent Data Review</b>	<u>CSA-Imba</u>	<b>Date</b> <u>February 22, 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)

March 2, 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 January 2018.

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

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

A scheduled internal station audit was conducted by a contractor on January 18. Audit report can be found in this monthly report.

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 us.

Respectfully,



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

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

Michael Bisaga  
Technical Program Manager  
Lakeland Industry & Community Association  
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**AMBIENT AIR MONITORING MONTHLY DATA REPORT  
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
MASKWA CONTINUOUS MONITORING STATION**

**JOB #: 2833-2018-01-30-C**

**January 2018**

Prepared for:

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

**Attention: MIKE BISAGA**

DATE: **February 23, 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 January, 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.

A scheduled internal station audit was conducted by Maxxam on January 18. Audit report can be found in Appendix III.

### **H<sub>2</sub>S:**

- Five hours of downtime were recorded on January 19 due to a repeat calibration performed to address a biased high drift in span response.
- One hour of downtime was incurred on January 29 due to a repeat zero-span check performed to address a biased low drift in span response.

**NO<sub>x</sub>/NO/NO<sub>2</sub>:** Two hours of downtime were incurred on January 25 due to a repeat zero-span check performed to address a biased high drift in span response.

The summary of results is presented on the following pages.

Any deviations or modifications made to the sampling or analytical methods are outlined in Section 1.0, Discussion. On this basis, Maxxam Analytics is issuing this completed report to Lakeland Industry & Community Association, 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	17	2	7	5.5	NW	3	29	100.0
H <sub>2</sub> S (ppb)	10	3	0	0	0	3	12	10	0.4	WNW	1	12	99.2
THC (ppm)	-	-	-	-	2.29	3.13	12	10	0.4	WNW	2.77	1	100.0
NO <sub>2</sub> (ppb)	159	-	0	-	4	27	12	8	0.4	W	9	12	99.7
NO (ppb)	-	-	-	-	1	26	12	12	0.4	W	4	12	99.7
NO <sub>x</sub> (ppb)	-	-	-	-	5	53	12	8	0.4	W	13	12	99.7
RELATIVE HUMIDITY (%)	-	-	-	-	74	90	19	2	3.5	W	85	23	100.0
BAROMETRIC PRESSURE (millibar)	-	-	-	-	940	966	14	22	0.3	WNW	959	14	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	-13.5	6.2	17	14	8.5	WNW	0.0	19	100.0
PRECIPITATION (mm)	-	-	-	-	0.0	0.6	26	7	5.1	NNE	0.2	26	100.0
VECTOR WS (kph)	-	-	-	-	0.6	15.1	9	10	-	NE	11.0	9	100.0
VECTOR WD (sec)	-	-	-	-	354 (N)	-	-	-	-	-	-	-	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 January 4.
- A scheduled internal audit was conducted by Maxxam on January 18. The audit report can be found in Appendix III.
- One instance of maximum instantaneous data was discarded due to brief power outage on January 16 at hour 12:00.

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

- Operational time for the monitoring period was 99.2% equivalent to 6 hours of downtime.
- The routine monthly calibration was performed on January 4.
- A scheduled internal audit was conducted by Maxxam on January 18. The audit report can be found in Appendix III.
- The analyzer spanned close to the upper acceptance limit on January 18 and even closer to the limit on January 19. This prompted an immediate site visit where a repeat calibration was successfully completed. The expected span value was then updated. No further issues were identified. However, five hours of downtime were incurred due to the additional quality check.
- A repeat zero-span check was performed on January 29 at 08:00 to assess span response as the analyzer had spanned towards the lower acceptance limit on January 28. The result was closer to the mean and showed no trending drift, no further action was taken. One hour of downtime was recorded due to the additional zero-span check.
- One instance of maximum instantaneous data was discarded due to brief power outage on January 16 at hour 12:00.

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

- Operational time for the monitoring period was 100%.
- The routine monthly calibration was performed on January 5.
- A scheduled internal audit was conducted by Maxxam on January 18. The audit report can be found in Appendix III.
- One instance of maximum instantaneous data was discarded due to brief power outage on January 16 at hour 12:00.

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

- Operational time for the monitoring period was 99.7% equivalent to two hours of downtime.
- The routine monthly calibration was performed on January 4.
- A scheduled internal audit was conducted by Maxxam on January 18. The audit report can be found in Appendix III.
- A repeat zero-span check was performed on January 25 at 07:00-08:00 to assess span response as the analyzer had spanned towards the upper acceptance limit on January 24. The result was closer to the mean and showed no trending drift, no further action was taken. Two hours of downtime were recorded due to the additional zero-span check.
- One instance of maximum instantaneous data was discarded due to brief power outage on January 16 at hour 12:00.

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

- Operational time for the monitoring period was 100%.
- Wind data is reported as vector wind speed and vector wind direction. Wind direction is defined as the direction from which the wind is blowing from and is measured in degrees from true north.
- One instance of maximum instantaneous data was discarded due to brief power outage on January 16 at hour 12:00.

**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%.
- A scheduled internal audit was conducted by Maxxam on January 18. The audit report can be found in Appendix III.

**AMBIENT TEMPERATURE (AmbTPX)**

- Operational time for the monitoring period was 100%.

**TRAILER**

Four station visits were conducted on January 6, 8, 10 and 11 to address a malfunction of the heating system. All attempts by Maxxam's technician to fix the heater proved abortive. The issue was eventually resolved by an external HVAC technician on January 11. Data was assessed for any impact from unstable station temperature. It was determined that data quality was not affected.

## **2.0 Project Personnel**

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

## **3.0 Plant Monthly Required AMD Summary**

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

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

## **4.0 Calculations and Results**

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

## 5.0 Methods and Procedures

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

- Maxxam AIR SOP-00208: RM Young Wind Monitor Calibration
- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-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 - 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.

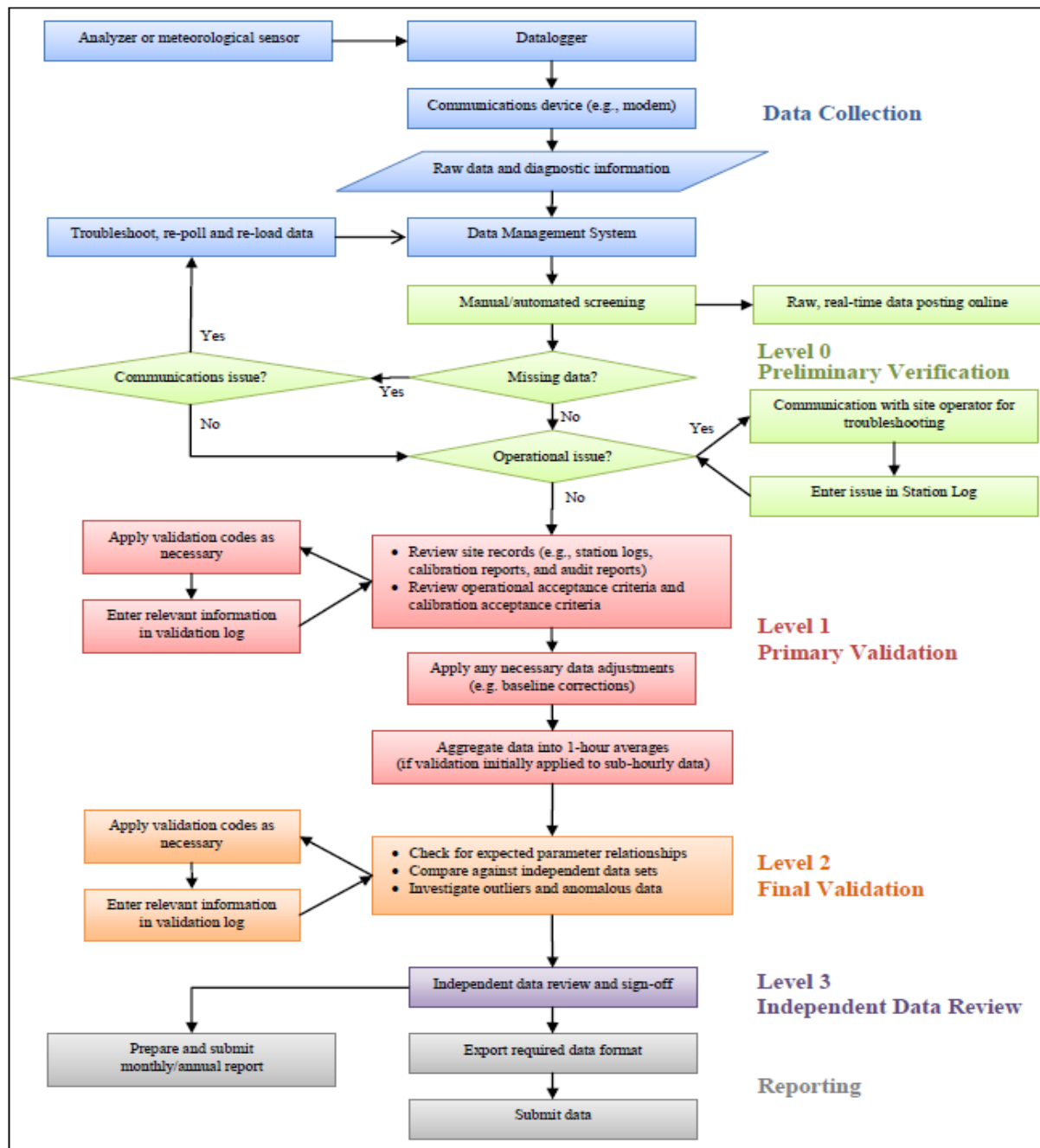
**Level 3 Independent Data Review**

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)**

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

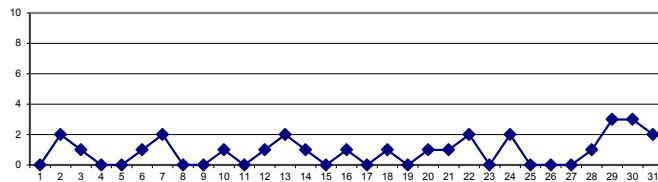
OBJECTIVE LIMIT:

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

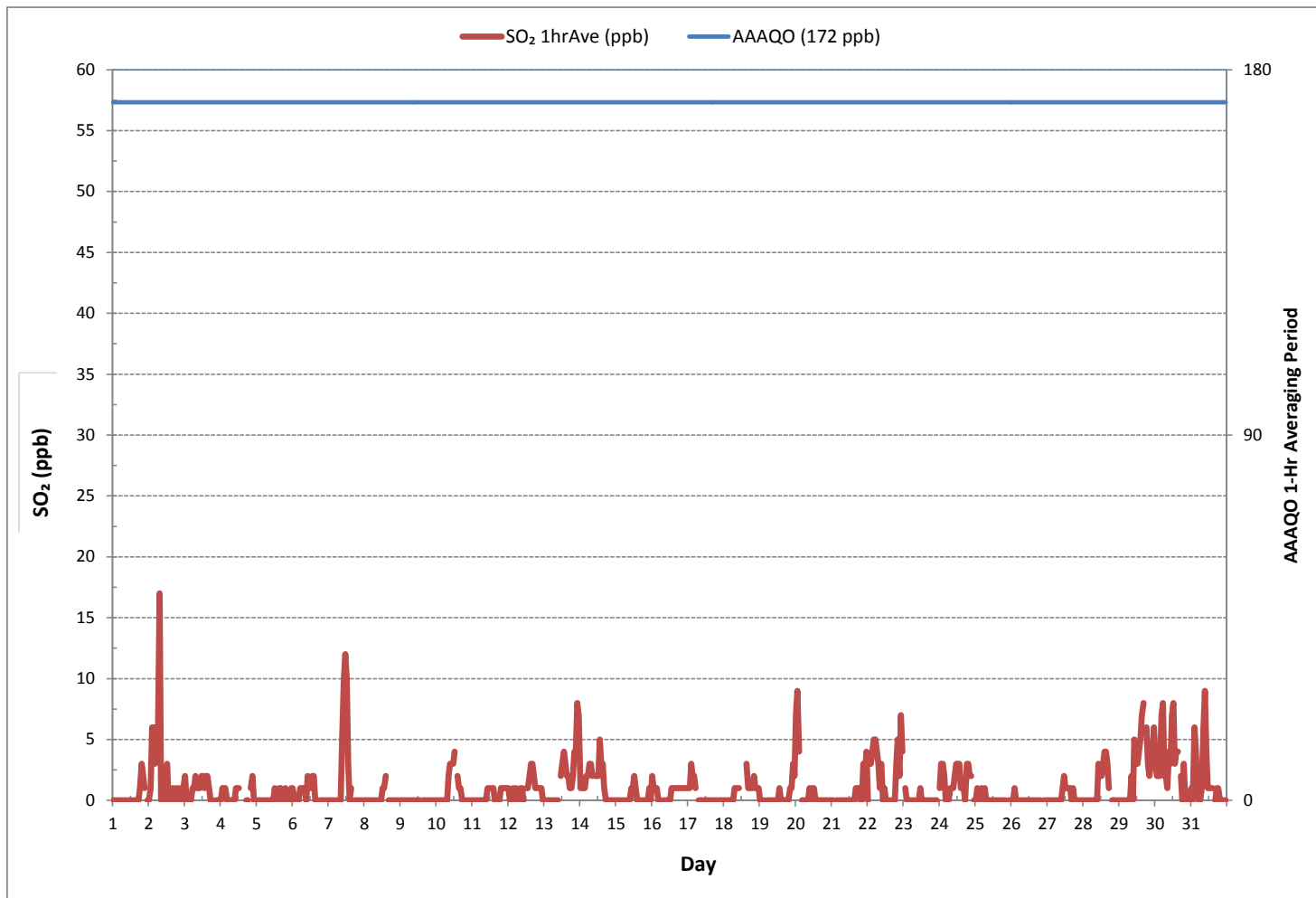
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0
NUMBER OF 24-HR EXCEEDANCES:	0
NUMBER OF NON-ZERO READINGS:	279
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR ON DAY 1
MAXIMUM 1-HR AVERAGE:	17 ppb @ HOUR ON DAY 2
MAXIMUM 24-HR AVERAGE:	3 ppb ON DAY 29
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	4 hrs
OPERATIONAL TIME:	744 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	2
MONTHLY AVERAGE:	1 ppb

**24 HR AVERAGES January 2018**



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



Wind: LICA MASKWA  
 Poll.: LICA MASKWA-SO2[ppb]  
 Monthly: 18/01  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

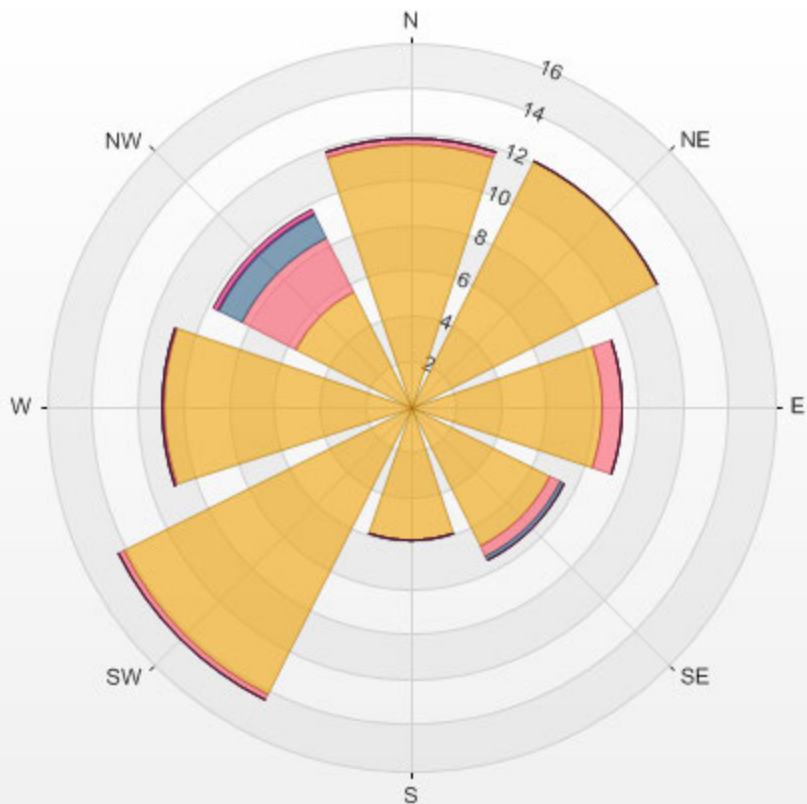
Calm: 18.26%

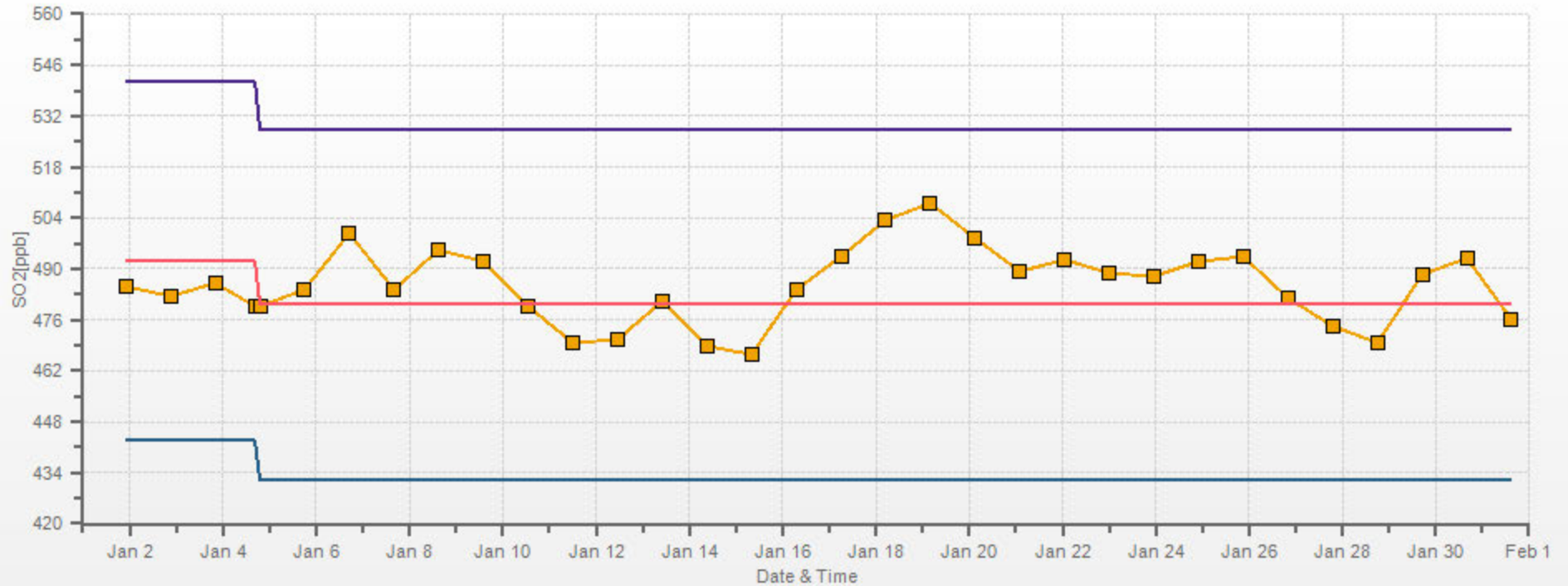
Calm Avg: 0.33 [ppb]

Direction	0.0-3.6	3.6-7.2	7.2-10.8	10.8-14.4	14.4-18.0	>18.0	Total
<b>N</b>	11.6	0.3	0.0	0.0	0.0	0.0	11.8
<b>NE</b>	12.1	0.0	0.0	0.0	0.0	0.0	12.1
<b>E</b>	8.4	0.9	0.0	0.0	0.0	0.0	9.3
<b>SE</b>	6.9	0.6	0.1	0.0	0.0	0.0	7.6
<b>S</b>	5.9	0.0	0.0	0.0	0.0	0.0	5.9
<b>SW</b>	14.1	0.3	0.0	0.0	0.0	0.0	14.4
<b>W</b>	10.8	0.1	0.0	0.0	0.0	0.0	11.0
<b>NW</b>	5.7	2.6	1.1	0.1	0.1	0.0	9.7
<b>Summary</b>	75.5	4.7	1.3	0.1	0.1	0.0	81.8

% Icon	Classes (ppb)	75	5	1	0	0	0
	0.0-3.6						
	3.6-7.2						
	7.2-10.8						
	10.8-14.4						
	14.4-18.0						
	>18.0						

LICA MASKWA Poll.: LICA MASKWA-SO2[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 18.26% Calm Poll Avg: 0.33[ppb]





■ 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	0	0	0	0	0	0	0	0	0	0	1	0	0	0	S	0	0	1	0	24
2	0	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	S	0	0	0	1	0	24
3	0	0	0	0	0	0	0	0	2	1	1	1	1	0	0	0	0	0	0	0	S	0	0	0	0	2	0	24
4	0	0	0	0	0	1	0	0	0	0	0	0	0	C	C	C	C	0	0	S	0	0	0	1	0	1	0	24
5	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	1	0	24
6	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	S	0	0	0	0	0	0	0	1	0	24
7	0	0	0	0	0	0	0	0	0	1	2	1	2	1	0	0	S	0	0	0	0	0	0	0	0	2	0	24
8	0	0	1	1	2	0	0	0	0	0	0	1	0	0	0	S	0	0	0	0	0	0	0	0	0	2	0	24
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	24
10	0	0	0	0	0	0	0	0	0	0	1	0	0	S	0	0	0	0	0	0	0	0	0	0	0	1	0	24
11	0	0	0	0	0	0	0	0	0	0	1	0	0	S	1	0	0	0	0	0	0	0	0	0	0	1	0	24
12	0	0	1	0	1	1	1	2	2	2	3	S	S	0	0	0	0	0	0	0	0	0	0	0	0	3	1	24
13	0	0	0	1	1	1	0	0	0	0	S	0	0	0	1	0	0	0	0	1	1	0	0	0	0	1	0	24
14	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
15	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
16	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	1	1	0	0	1	1	1	1	1	0	1	0	24
17	1	1	1	1	1	0	S	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
18	0	0	0	0	0	S	0	1	0	1	1	Q	Q	Q	0	0	1	1	1	1	0	0	0	0	0	1	0	24
19	0	0	0	0	S	0	0	0	0	0	C1	C1	C1	C1	C1	0	0	0	0	0	0	0	1	0	0	1	0	19
20	1	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
21	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
22	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	24
23	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
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	24
25	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	S	0	0	0	1	0	24
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	24
27	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	1	0	24
28	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
29	0	0	0	0	0	0	0	0	0	S1	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	23
30	0	0	0	1	1	1	0	0	0	1	1	1	1	0	0	0	S	0	0	0	0	0	0	0	0	1	0	24
31	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	1	2	0	2	0	24
HOURLY MAX	1	1	1	1	2	1	1	2	2	2	3	1	2	1	1	1	1	1	1	1	1	1	1	2				
HOURLY AVG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

STATUS FLAG CODES

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

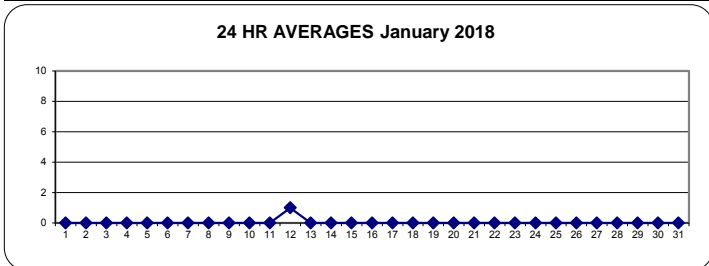
OBJECTIVE LIMIT:

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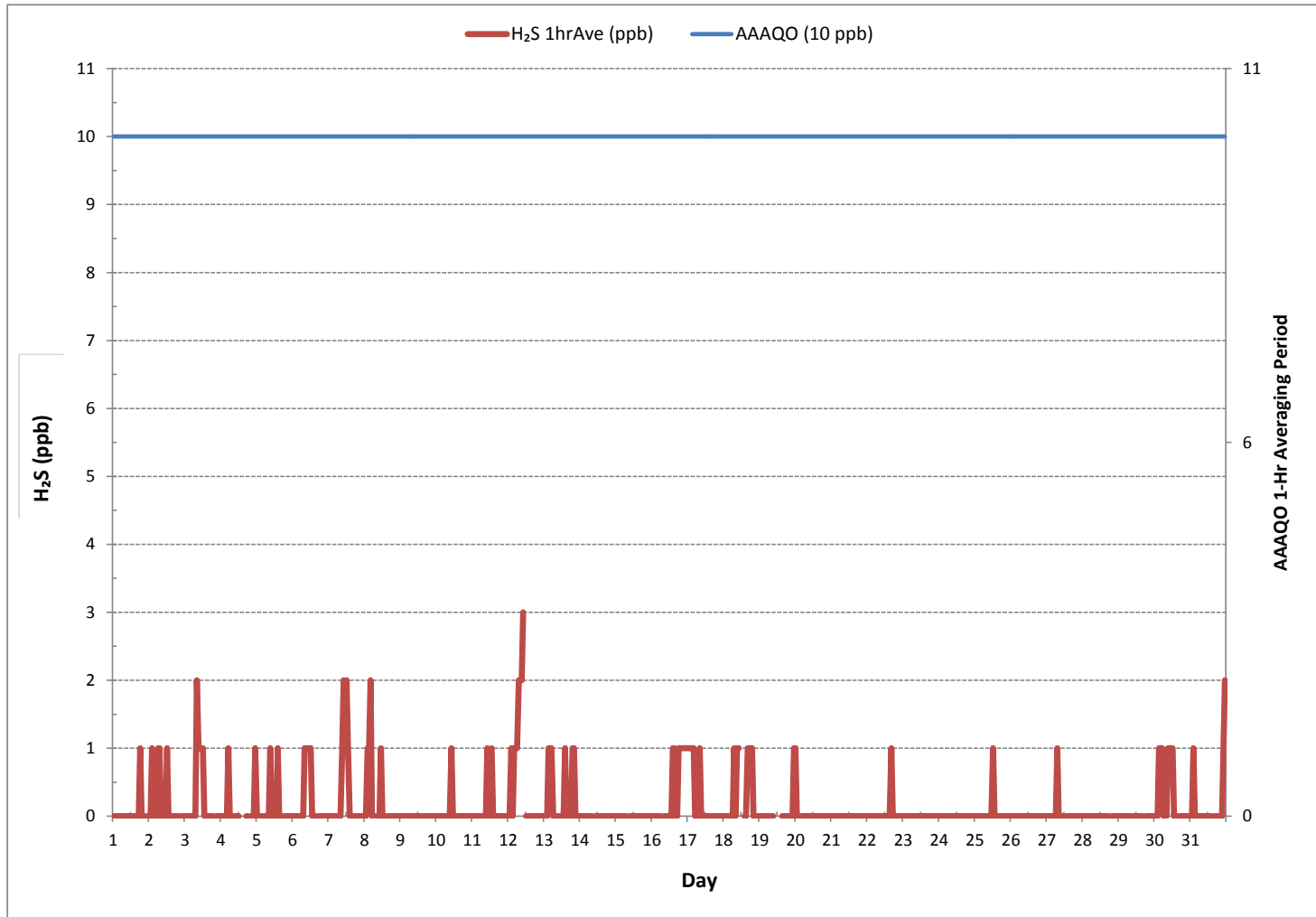
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	81				
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0	ON DAY	1	
MAXIMUM 1-HR AVERAGE:	3 ppb @ HOUR	10	ON DAY	12	
MAXIMUM 24-HR AVERAGE:	1 ppb		ON DAY	12	
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	738	hrs
MONTHLY CALIBRATION TIME:	4	hrs	AMD OPERATION UPTIME:	99.2	%
STANDARD DEVIATION:	0		MONTHLY AVERAGE:	0	ppb

24 HR AVERAGES January 2018



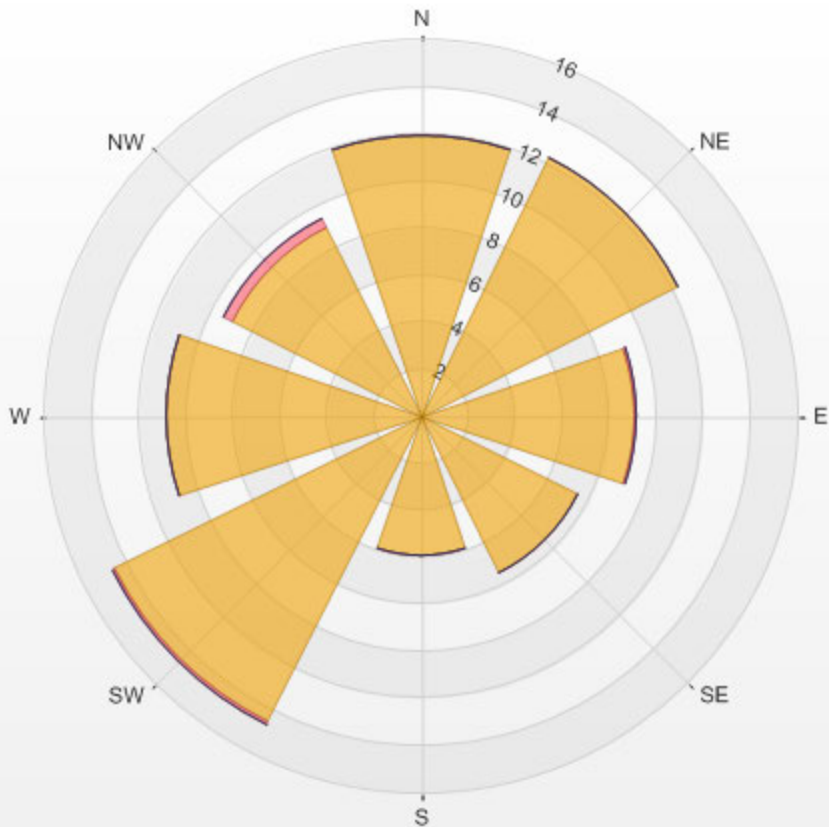
HYDROGEN SULPHIDE Hourly Averages (H<sub>2</sub>S ppb)



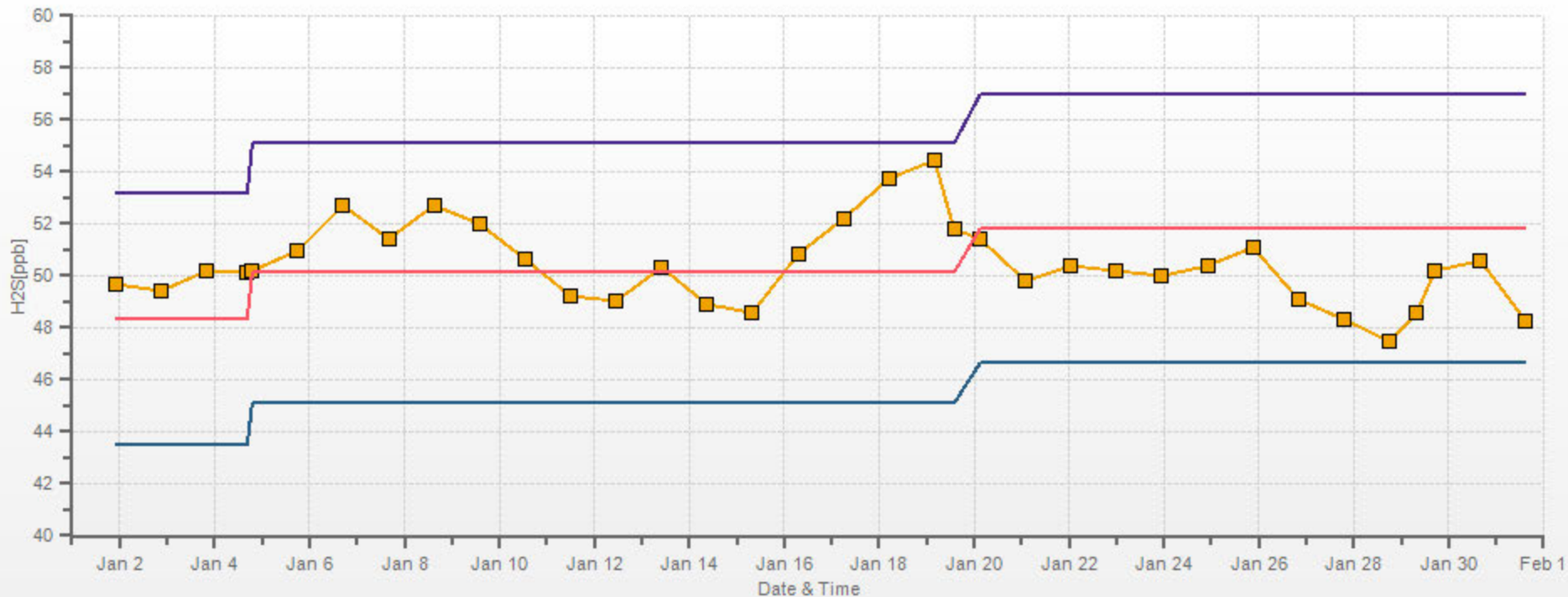


% Icon Classes (ppb) 81 0.0-1.3 1 1.3-2.7 0 2.7-4.0 0 >4.0

LICA MASKWA Poll.: LICA MASKWA-H2S[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 18.42% Calm Poll Avg: 0.30[ppb]



H2S[ppb] Calibration: LICA MASKWA Monthly: 18/01 Type: Span



Span Meas Span Ref Span Low Span High

***TOTAL HYDROCARBON***

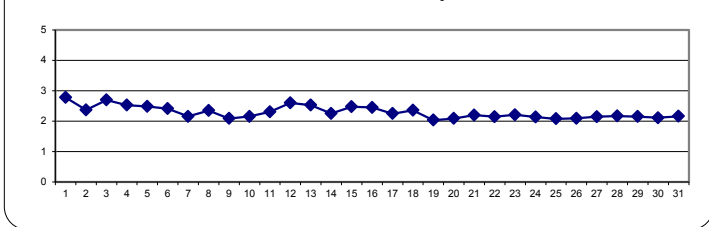
**TOTAL HYDROCARBONS Hourly Averages (THC ppm)**

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	3.03	2.96	2.88	2.81	2.91	2.98	3.04	2.98	2.96	2.93	2.73	2.72	2.74	2.62	2.65	2.67	2.68	2.71	2.66	2.62	2.61	2.52	S	2.40	2.40	3.04	<b>2.77</b>	24	
2	2.38	2.36	2.39	2.37	2.35	2.39	2.38	2.44	2.34	2.35	2.35	2.39	2.40	2.31	2.31	2.33	2.34	2.36	2.41	2.42	2.39	S	2.37	2.42	2.31	2.44	2.37	24	
3	2.53	2.51	2.53	2.57	2.60	2.64	2.63	2.68	2.79	2.74	2.76	2.70	2.61	2.66	2.75	2.76	2.74	2.76	2.99	3.03	S	2.80	2.71	2.57	2.51	3.03	2.70	24	
4	2.52	2.55	2.57	2.63	2.54	2.54	2.53	2.52	2.53	2.54	2.51	2.51	2.49	2.47	2.51	2.50	2.47	2.52	2.55	S	2.55	2.55	2.50	2.48	2.47	2.63	2.53	24	
5	2.50	2.53	2.58	2.61	2.62	2.65	2.66	2.64	2.63	2.61	C	C	C	C	C	2.28	2.27	2.24	S	2.29	2.32	2.37	2.40	2.45	2.24	2.66	2.48	24	
6	2.46	2.48	2.50	2.50	2.54	2.68	2.71	2.75	2.77	2.81	2.68	2.56	2.55	2.67	2.50	2.20	2.13	S	2.05	2.00	1.99	2.00	2.00	2.00	1.99	2.81	2.41	24	
7	2.02	2.04	2.04	2.06	2.06	2.06	2.07	2.07	2.04	2.14	2.13	2.08	2.18	2.05	2.00	2.01	S	2.02	2.08	2.10	2.16	2.43	2.90	2.81	2.00	2.90	2.15	24	
8	2.72	2.51	2.64	2.63	2.55	2.38	2.37	2.37	2.35	2.37	2.38	2.29	2.22	2.30	2.34	S	2.33	2.36	2.34	2.12	2.09	2.09	2.09	2.11	2.09	2.72	2.35	24	
9	2.12	2.12	2.12	2.13	2.09	2.09	2.09	2.08	2.08	2.10	2.09	2.09	2.07	2.07	S	2.06	2.07	2.07	2.05	2.06	2.07	2.08	2.08	2.10	2.05	2.13	2.09	24	
10	2.09	2.10	2.11	2.14	2.17	2.20	2.20	2.23	2.25	2.19	2.16	2.15	2.12	S	2.07	2.05	2.05	2.05	2.04	2.03	2.21	2.46	2.29	2.24	2.03	2.46	2.16	24	
11	2.22	2.22	2.27	2.34	2.33	2.29	2.31	2.31	2.31	2.22	2.28	2.23	S	2.38	2.21	2.27	2.41	2.41	2.37	2.33	2.34	2.32	2.37	2.32	2.21	2.41	2.31	24	
12	2.35	2.46	2.51	2.42	2.58	2.69	2.72	2.78	2.72	2.81	3.13	S	2.30	2.30	2.40	2.55	2.69	2.65	2.49	2.51	2.54	2.59	2.68	2.85	2.30	3.13	2.60	24	
13	2.79	2.80	2.75	2.74	2.71	2.73	2.64	2.56	2.60	2.68	S	2.50	2.45	2.50	2.50	2.50	2.52	2.45	2.37	2.34	2.31	2.25	2.25	2.25	2.25	2.80	2.53	24	
14	2.21	2.15	2.18	2.20	2.21	2.23	2.26	2.27	2.28	S	2.26	2.23	2.19	2.19	2.17	2.18	2.18	2.19	2.22	2.22	2.27	2.42	2.49	2.51	2.15	2.51	2.25	24	
15	2.54	2.50	2.64	2.68	2.53	2.50	2.45	2.37	S	2.41	2.56	2.55	2.53	2.47	2.44	2.40	2.37	2.39	2.38	2.40	2.40	2.42	2.45	2.46	2.37	2.68	2.47	24	
16	2.36	2.32	2.32	2.33	2.33	2.33	2.35	S	2.54	2.57	2.41	2.39	2.38	2.38	2.42	2.43	2.41	2.47	2.53	2.58	2.58	2.60	2.64	2.68	2.32	2.68	2.45	24	
17	2.59	2.53	2.72	2.75	2.72	2.25	S	2.10	2.07	2.06	2.05	2.06	2.05	2.04	2.03	2.04	2.07	2.09	2.14	2.21	2.23	2.26	2.32	2.31	2.03	2.75	2.25	24	
18	2.29	2.36	2.28	2.23	2.17	S	2.21	2.24	2.27	2.32	2.43	2.46	2.34	Q	Q	Q	2.47	2.63	2.70	2.64	2.52	2.27	2.21	2.15	2.15	2.70	2.36	24	
19	2.14	2.15	2.06	2.04	S	2.03	2.03	2.03	2.02	2.03	2.00	1.98	1.96	1.98	2.02	2.02	2.02	2.02	2.01	2.02	2.06	2.05	2.06	2.06	1.96	2.15	2.03	24	
20	2.06	2.05	2.07	S	2.07	2.08	2.10	2.10	2.11	2.12	2.13	2.14	2.14	2.09	2.08	2.07	2.07	2.05	2.04	2.03	2.05	2.08	2.08	2.17	2.03	2.17	2.09	24	
21	2.33	2.27	S	2.31	2.34	2.39	2.41	2.38	2.23	2.13	2.14	2.14	2.14	2.13	2.13	2.13	2.14	2.15	2.13	2.11	2.10	2.13	2.11	2.12	2.10	2.41	2.20	24	
22	2.08	S	2.11	2.13	2.15	2.15	2.13	2.11	2.10	2.10	2.09	2.09	2.09	2.09	2.10	2.19	2.22	2.21	2.24	2.26	2.18	2.22	2.18	2.08	2.26	2.14	24		
23	S	2.12	2.15	2.14	2.16	2.13	2.13	2.13	2.14	2.14	2.32	2.36	2.34	2.34	2.35	2.32	2.31	2.27	2.23	2.14	2.13	2.11	2.11	S	2.11	2.36	2.21	24	
24	2.13	2.14	2.13	2.12	2.12	2.12	2.12	2.15	2.16	2.18	2.27	2.34	2.18	2.13	2.11	2.11	2.11	2.10	2.11	2.10	2.09	2.09	S	2.07	2.07	2.34	2.14	24	
25	2.07	2.08	2.07	2.07	2.08	2.08	2.09	2.07	2.07	2.08	2.08	2.08	2.06	2.07	2.09	2.07	2.08	2.08	2.08	2.08	2.09	S	2.08	2.08	2.06	2.09	2.08	24	
26	2.08	2.08	2.08	2.08	2.07	2.07	2.08	2.09	2.09	2.09	2.10	2.10	2.09	2.09	2.09	2.10	2.10	2.10	2.09	2.09	S	2.12	2.14	2.14	2.07	2.14	2.09	24	
27	2.15	2.14	2.16	2.17	2.18	2.16	2.18	2.20	2.19	2.17	2.14	2.14	2.14	2.13	2.11	2.13	2.11	2.13	2.13	S	2.13	2.13	2.12	2.13	2.11	2.20	2.15	24	
28	2.14	2.14	2.14	2.16	2.18	2.16	2.17	2.18	2.18	2.18	2.17	2.16	2.16	2.17	2.18	2.18	2.18	2.18	2.18	2.18	2.15	S	2.15	2.19	2.17	2.14	2.23	2.17	24
29	2.18	2.19	2.17	2.19	2.18	2.16	2.18	2.20	2.23	2.18	2.20	2.18	2.17	2.17	2.16	2.15	2.17	S	2.12	2.08	2.05	2.04	2.04	2.06	2.04	2.23	2.15	24	
30	2.02	2.00	2.00	2.02	2.05	2.07	2.13	2.18	2.17	2.15	2.11	2.15	2.16	2.16	2.15	2.17	S	2.15	2.14	2.15	2.13	2.11	2.11	2.11	2.00	2.18	2.11	24	
31	2.11	2.11	2.19	2.13	2.12	2.12	2.11	2.13	2.15	2.15	2.15	2.14	2.13	2.11	2.11	S	2.13	2.15	2.13	2.15	2.16	2.16	2.38	2.44	2.11	2.44	2.16	24	
HOURLY MAX	3.03	2.96	2.88	2.81	2.91	2.98	3.04	2.98	2.96	2.93	3.13	2.72	2.74	2.67	2.75	2.76	2.74	2.76	2.99	3.03	2.61	2.80	2.90	2.85					
HOURLY AVG	2.31	2.30	2.31	2.32	2.32	2.31	2.32	2.31	2.31	2.32	2.30	2.27	2.25	2.25	2.25	2.24	2.27	2.27	2.27	2.25	2.24	2.27	2.29	2.29					

**STATUS FLAG CODES**

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

**24 HR AVERAGES January 2018**

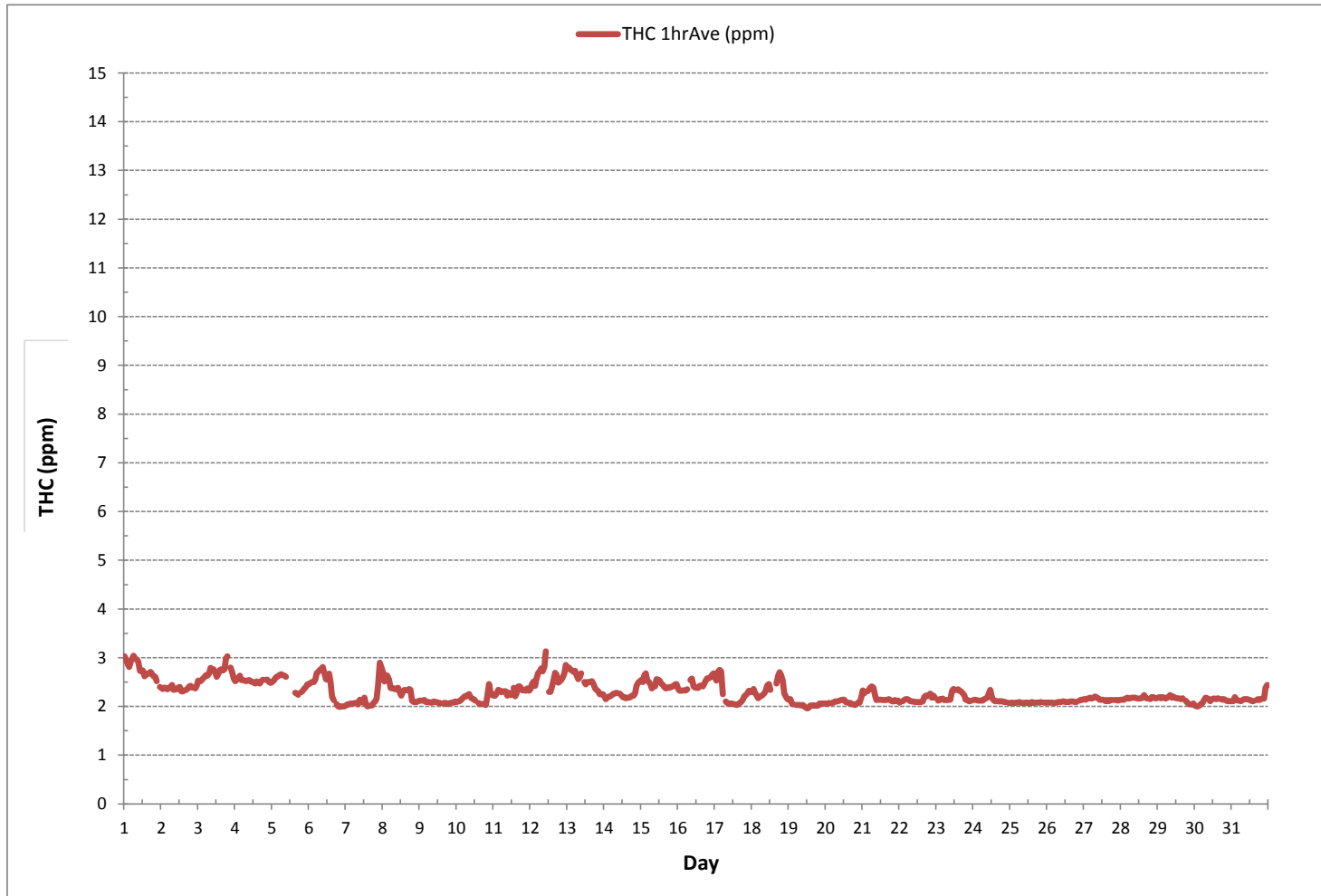


**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	704			
MINIMUM 1-HR AVERAGE:	1.96 ppm	@ HOUR	12	ON DAY 19
MAXIMUM 1-HR AVERAGE:	3.13 ppm	@ HOUR	10	ON DAY 12
MAXIMUM 24-HR AVERAGE:	2.77 ppm			ON DAY 1
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	744 hrs	
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	0.23	MONTHLY AVERAGE:	2.29 ppm	



TOTAL HYDROCARBONS Hourly Averages (THC ppm)





% Icon Classes (ppm)

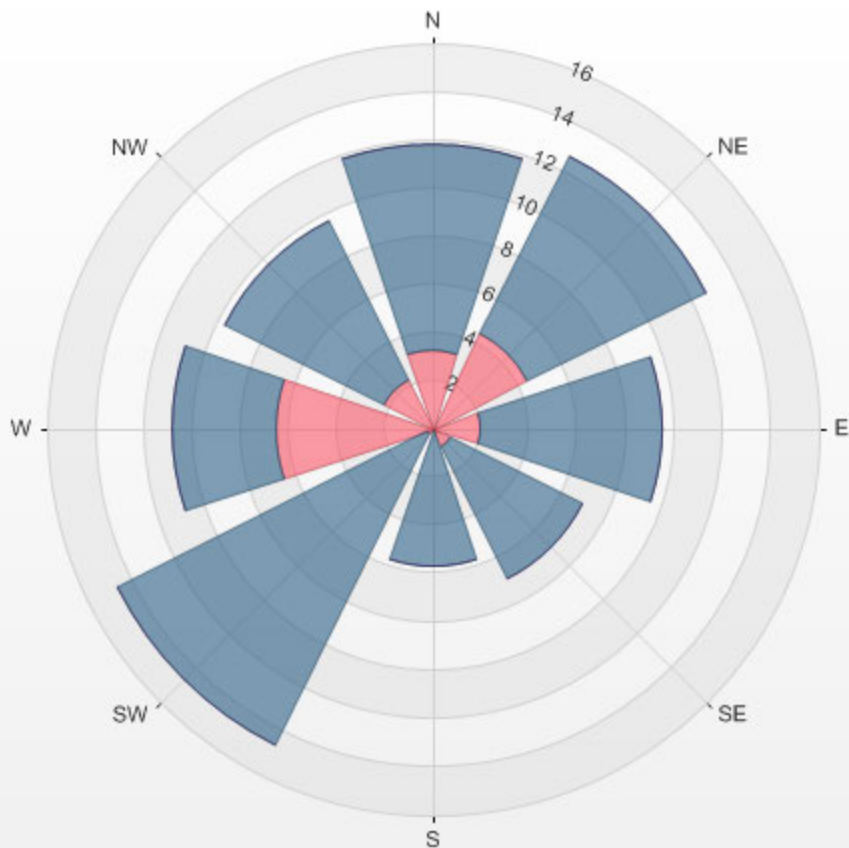
0 0.0-1.0

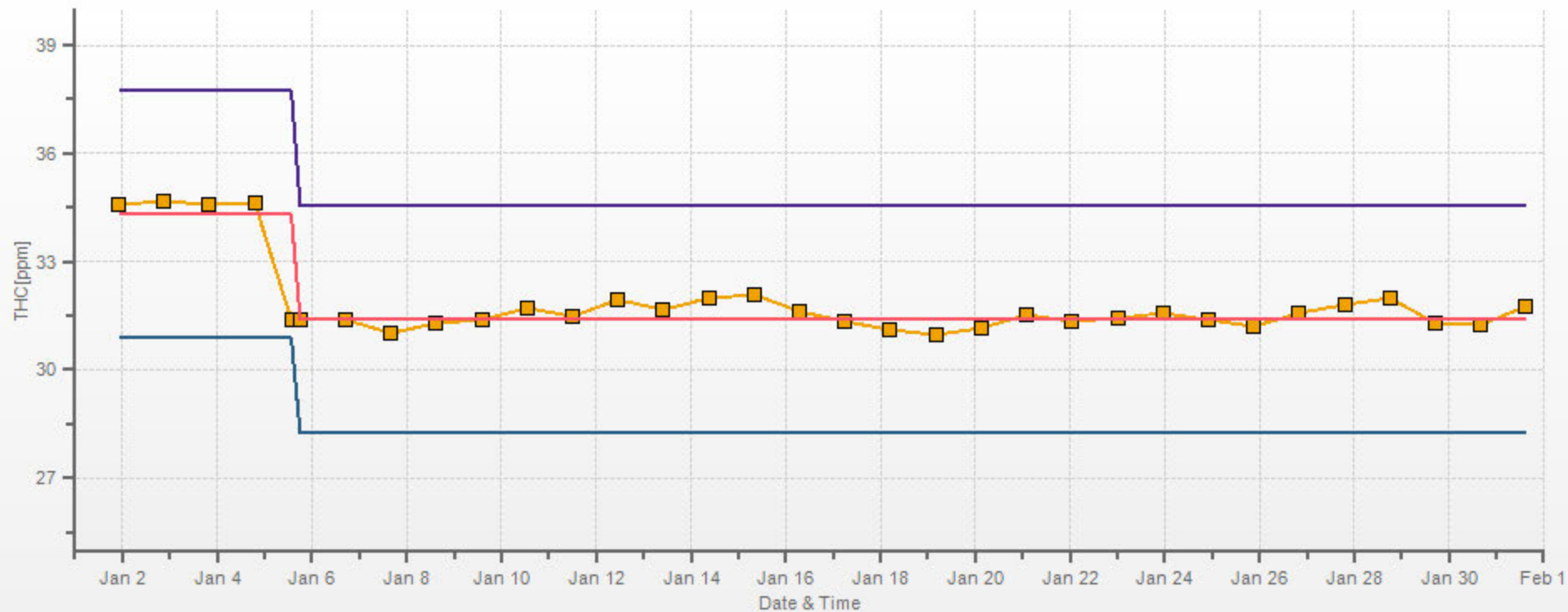
20 1.0-2.1

62 2.1-3.1

0 >3.1

LICA MASKWA Poll.: LICA MASKWA-THC[ppm] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 18.21% Calm Poll Avg: 2.41[ppm]



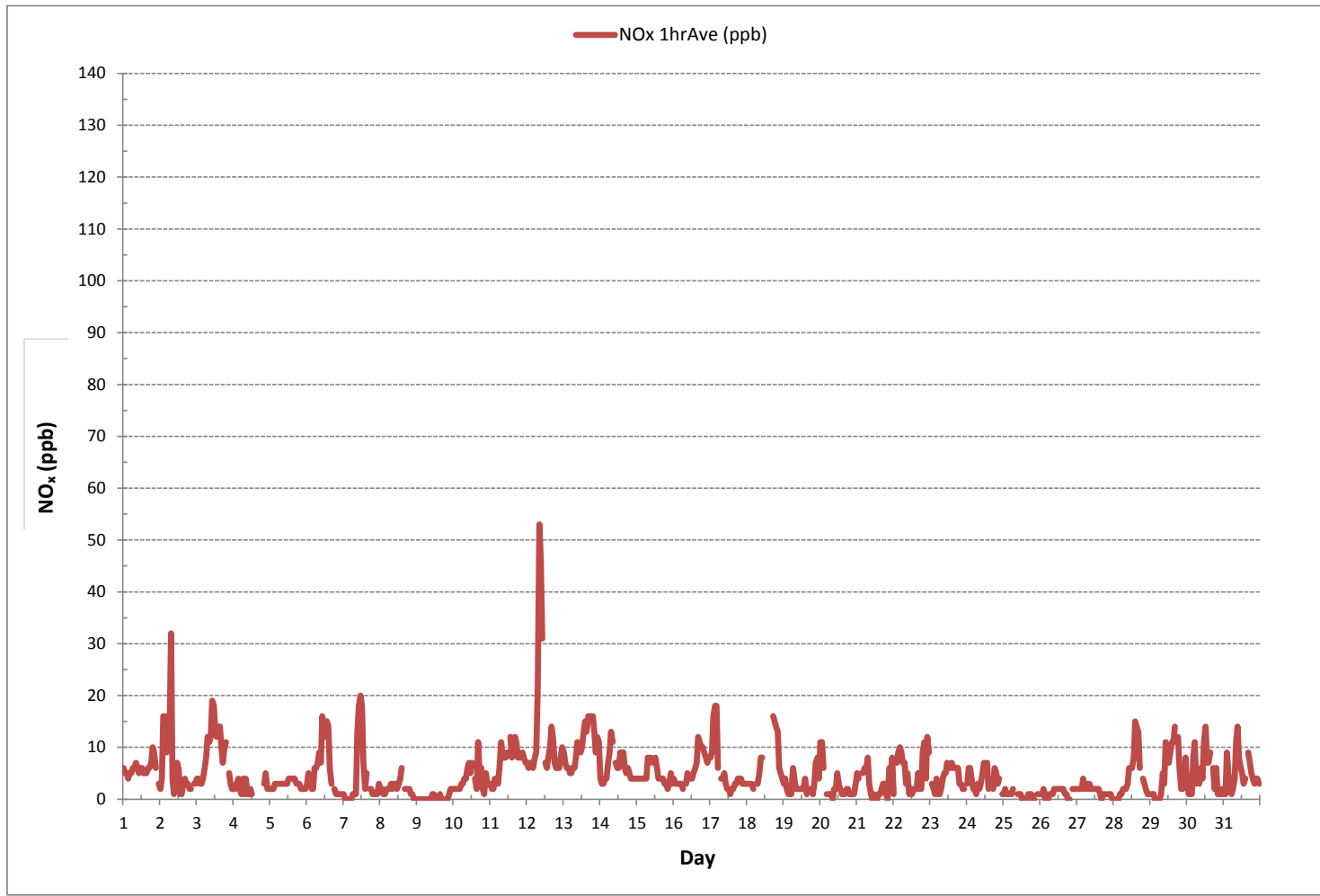


■ Span Meas 
 — Span Ref 
 — Span Low 
 — Span High

## ***OXIDES OF NITROGEN***



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

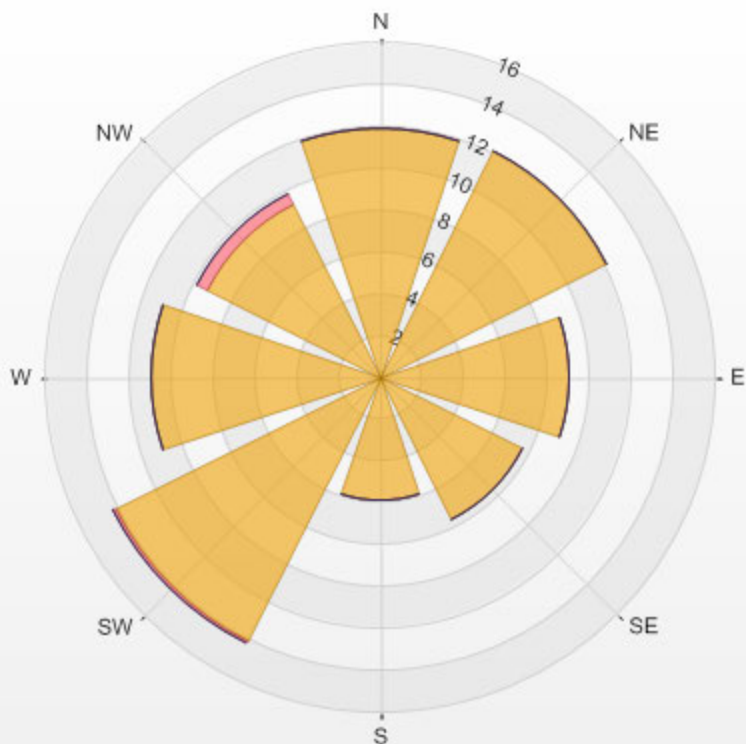




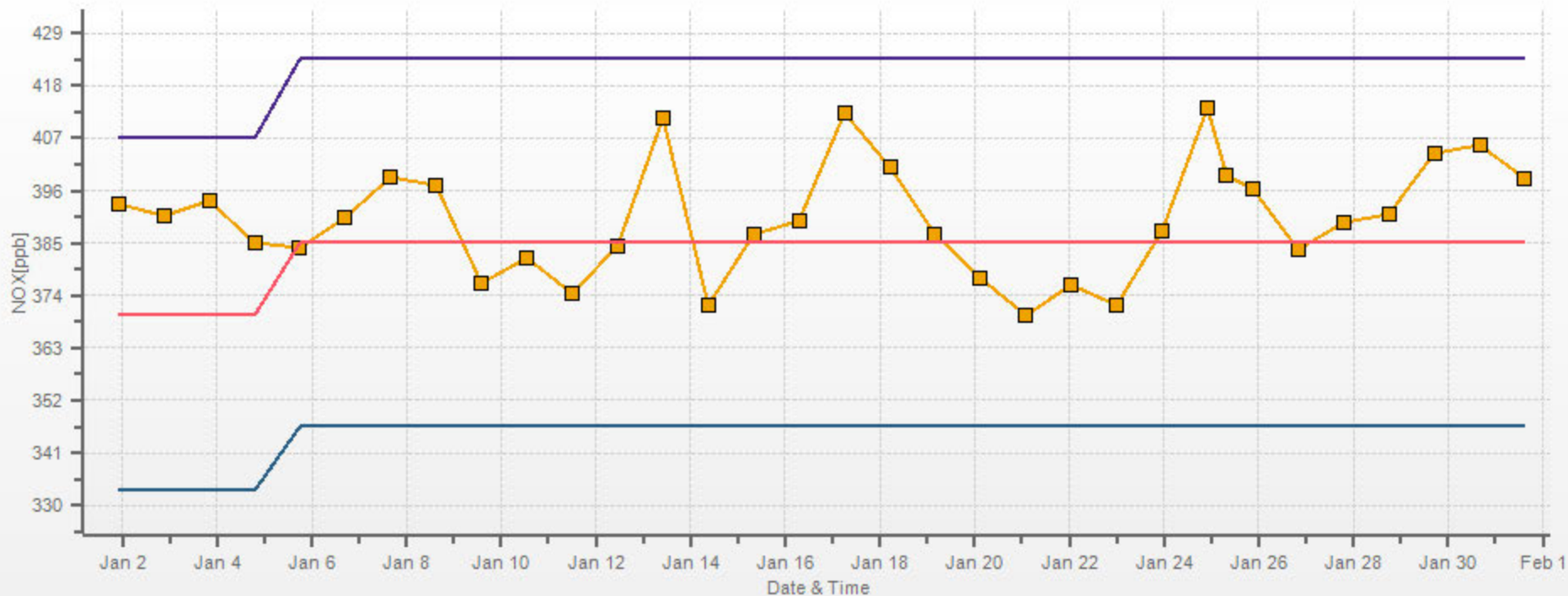


% Icon Classes (ppb) 81 0.0-18.0 1 18.0-36.0 0 36.0-54.0 0 >54.0

LICA MASKWA Poll.: LICA MASKWA-NOX[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 18.42% Calm Poll Avg: 5.62[ppb]



NOX[ppb] Calibration: LICA MASKWA Monthly: 18/01 Type: Span



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

## ***NITRIC OXIDES***

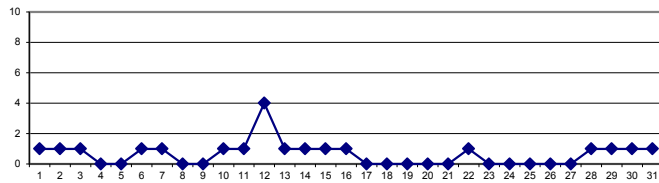
**NITRIC OXIDE Hourly Averages (NO ppb)**

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

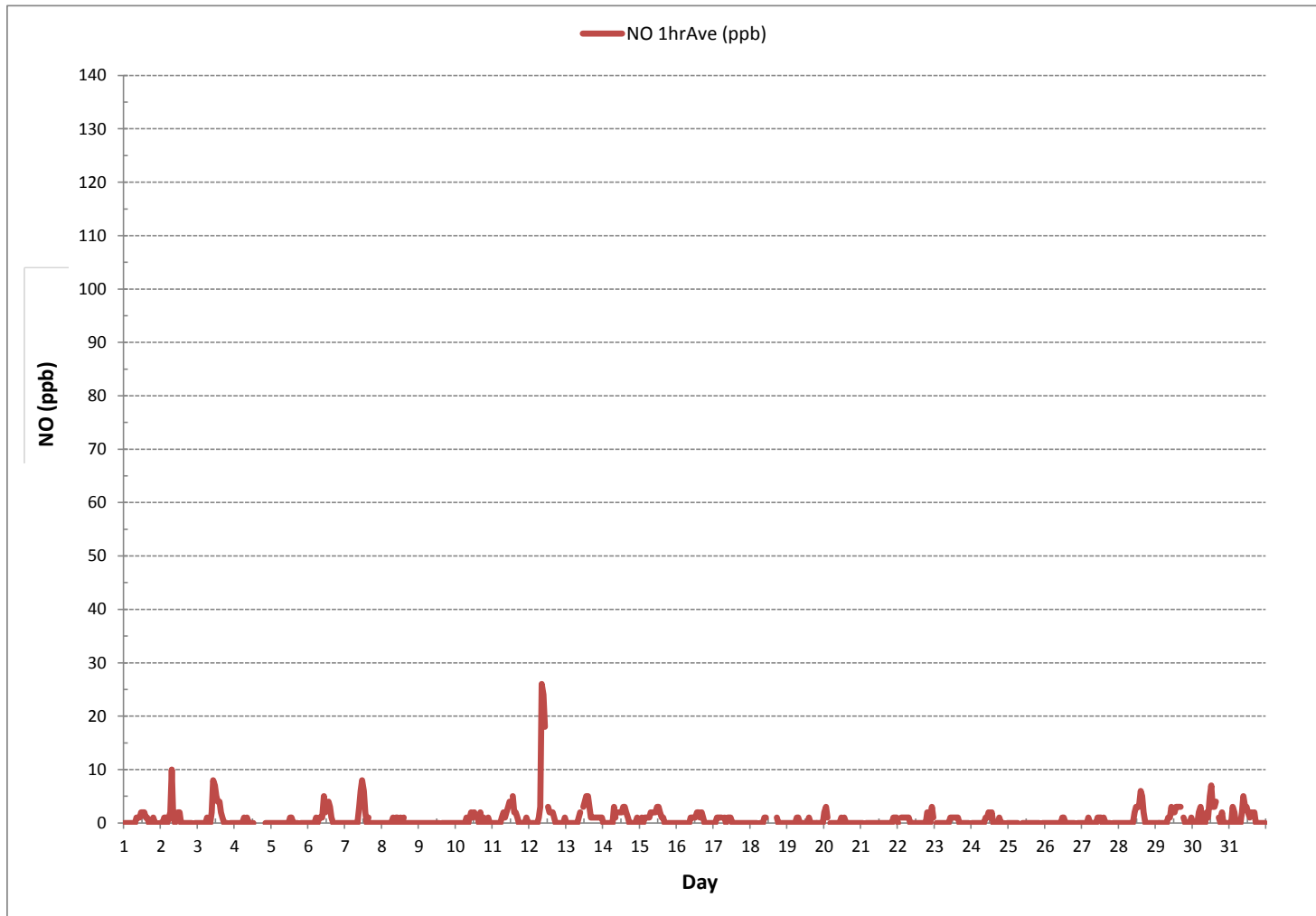
**24 HR AVERAGES January 2018**



**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	221			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	0	ON DAY 1
MAXIMUM 1-HR AVERAGE:	26 ppb	@ HOUR	12	ON DAY 12
MAXIMUM 24-HR AVERAGE:	4 ppb			ON DAY 12
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	742 hrs	
MONTHLY CALIBRATION TIME:	7 hrs	AMD OPERATION UPTIME:	99.7 %	
STANDARD DEVIATION:	2	MONTHLY AVERAGE:	1 ppb	

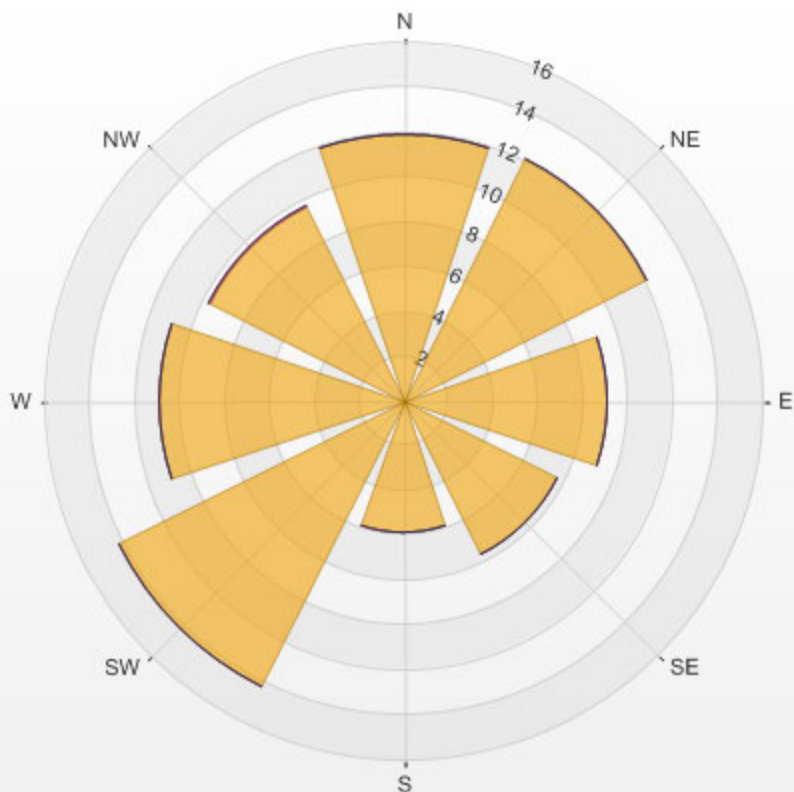
NITRIC OXIDE Hourly Averages (NO ppb)





% Icon Classes (ppb) 81 0.0-8.7 0 8.7-17.3 0 17.3-26.0 0 >26.0

LICA MASKWA Poll.: LICA MASKWA-NO[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 18.42% Calm Poll Avg: 1.01[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	5	5	4	5	5	6	6	6	5	4	4	4	3	4	5	5	6	7	9	9	6	S	3	3	3	9	5	24
2	2	4	15	15	8	14	8	22	3	1	2	5	4	1	1	3	4	3	3	2	2	S	3	3	1	22	6	24	
3	4	4	3	3	4	6	8	12	11	9	11	11	8	7	9	12	9	7	10	10	S	5	3	2	2	12	7	24	
4	2	2	3	4	2	1	3	1	4	1	1	1	1	C	C	C	C	C	C	C	C	3	5	2	2	1	5	2	24
5	2	2	2	3	3	3	3	3	3	3	3	3	3	4	3	3	4	3	3	S	3	2	2	2	2	2	4	3	24
6	3	5	4	2	2	6	5	6	8	6	11	10	11	10	11	6	3	S	2	1	1	1	1	1	1	1	11	5	24
7	1	0	0	0	0	0	1	1	1	10	12	12	12	5	1	4	S	2	2	1	1	1	1	3	0	12	3	24	
8	2	2	1	1	1	2	2	2	2	2	2	2	2	4	5	S	2	2	2	2	2	1	0	0	0	5	2	24	
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	S	1	0	0	0	0	0	0	1	1	2	0	2	0	24
10	2	2	2	2	2	3	3	3	4	5	5	4	5	S	3	2	9	5	4	2	1	4	3	2	1	9	3	24	
11	3	2	2	4	4	3	5	9	7	6	5	5	S	7	5	7	11	11	8	8	8	8	7	7	2	11	6	24	
12	6	6	7	7	6	8	8	17	27	22	13	S	4	4	6	8	13	12	7	6	6	6	7	9	4	27	9	24	
13	8	7	6	6	5	5	6	6	7	9	S	6	6	8	10	11	15	15	15	15	11	8	11	10	5	15	9	24	
14	4	3	3	3	4	6	9	10	10	S	5	4	4	6	7	8	4	5	5	4	4	4	4	4	3	10	5	24	
15	4	3	4	3	3	3	4	6	S	6	4	5	5	4	3	3	4	3	2	2	2	3	4	3	2	6	4	24	
16	4	3	3	3	3	3	2	S	3	4	3	3	3	3	4	6	10	10	10	9	8	8	7	7	2	10	5	24	
17	8	9	15	17	17	6	S	4	3	4	2	2	1	1	1	2	3	3	4	4	4	3	3	3	1	17	5	24	
18	3	3	3	3	2	S	3	3	5	7	7	Q	Q	Q	Q	Q	Q	15	15	14	13	6	5	4	2	15	7	24	
19	3	4	2	1	S	1	4	3	2	2	1	2	2	2	3	1	2	2	2	1	3	7	7	4	1	7	3	24	
20	9	9	5	S	1	1	1	1	0	2	1	4	3	1	1	1	1	2	2	1	1	1	1	3	0	9	2	24	
21	5	4	S	5	5	6	6	8	3	1	0	1	0	0	1	1	2	3	2	1	0	5	4	7	0	8	3	24	
22	1	S	6	8	9	8	6	6	3	5	1	2	1	1	2	2	4	2	2	7	9	3	9	8	1	9	5	24	
23	S	3	2	1	4	1	1	1	3	4	4	6	5	5	5	5	6	6	3	3	2	2	S	1	6	4	24		
24	3	6	5	4	2	2	1	3	2	2	2	5	4	5	2	3	3	2	5	5	3	3	S	1	1	6	3	24	
25	1	2	1	1	1	1	S1	S1	1	1	1	0	0	0	1	1	1	1	1	0	0	S	1	1	0	2	1	22	
26	1	1	2	0	0	0	1	1	1	2	2	2	2	1	1	1	1	1	0	0	S	2	2	2	0	2	1	24	
27	2	2	2	2	3	2	2	2	2	1	1	1	2	1	2	1	0	1	1	S	1	1	1	0	0	3	1	24	
28	0	0	0	0	1	1	2	2	2	2	4	3	3	5	9	10	6	S	3	2	2	2	1	1	0	10	3	24	
29	1	1	1	0	0	0	0	1	4	2	7	5	5	6	8	8	11	S	10	6	2	2	3	7	0	11	4	24	
30	3	1	1	1	6	8	2	3	2	4	3	6	7	4	4	6	S	4	1	4	1	1	1	1	1	8	3	24	
31	1	1	6	4	2	1	2	4	8	9	5	3	3	2	3	S	7	4	5	4	3	4	3	3	1	9	4	24	
HOURLY MAX	9	9	15	17	17	14	9	22	27	22	13	12	12	10	11	12	15	15	15	15	13	8	11	10					
HOURLY AVG	3	3	4	4	4	4	4	5	5	5	4	4	4	4	4	4	5	5	5	4	4	4	3	4					

**STATUS FLAG CODES**

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

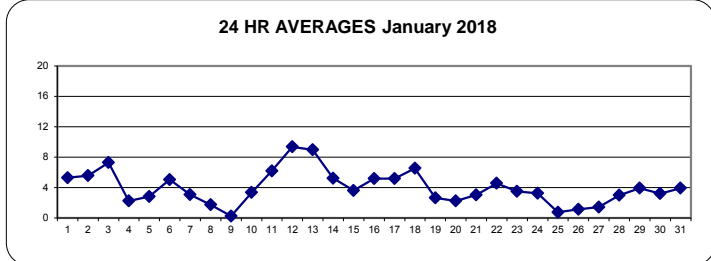
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

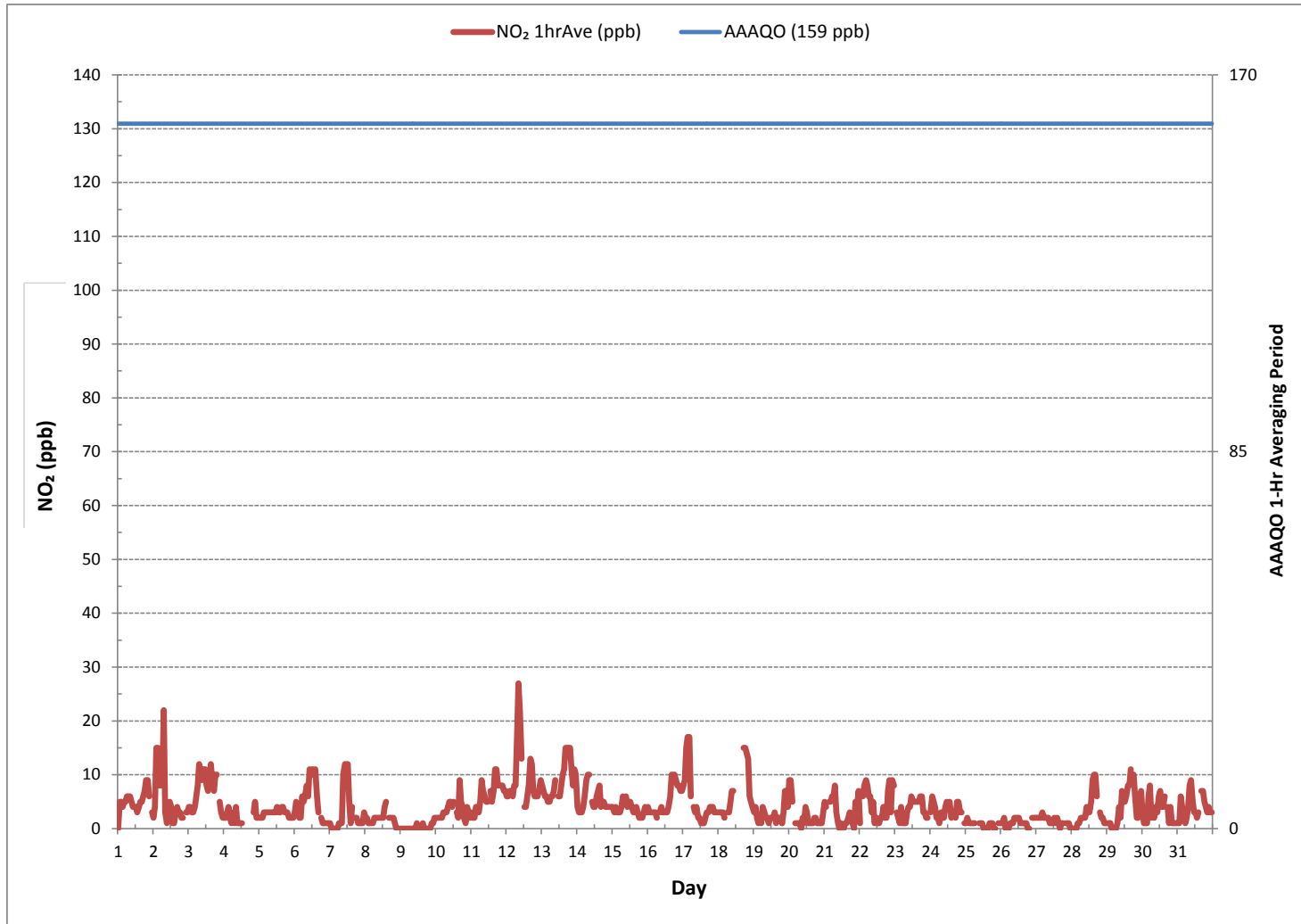
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	646			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	1	ON DAY 7
MAXIMUM 1-HR AVERAGE:	27 ppb	@ HOUR	8	ON DAY 12
MAXIMUM 24-HR AVERAGE:	9 ppb			ON DAY 12
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	742 hrs	
MONTHLY CALIBRATION TIME:	7 hrs	AMD OPERATION UPTIME:	99.7 %	
STANDARD DEVIATION:	4	MONTHLY AVERAGE:	4 ppb	

**24 HR AVERAGES January 2018**



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



Wind: LICA MASKWA  
 Poll.: LICA MASKWA-NO2[ppb]  
 Monthly: 18/01  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 18.42% Calm Avg: 4.62 [ppb]

Direction	0.0-9.3	9.3-18.7	18.7-28.0	>28.0	Total
N	11.8	0.1	0.0	0.0	11.9
NE	12.1	0.0	0.0	0.0	12.1
E	8.6	0.4	0.0	0.0	9.1
SE	7.3	0.3	0.0	0.0	7.6
S	5.8	0.1	0.0	0.0	5.9
SW	11.7	2.6	0.0	0.0	14.2
W	10.1	0.9	0.0	0.0	10.9
NW	8.1	1.6	0.1	0.0	9.8
Summary	75.4	6.0	0.1	0.0	81.6

% Icon Classes (ppb)

75



6



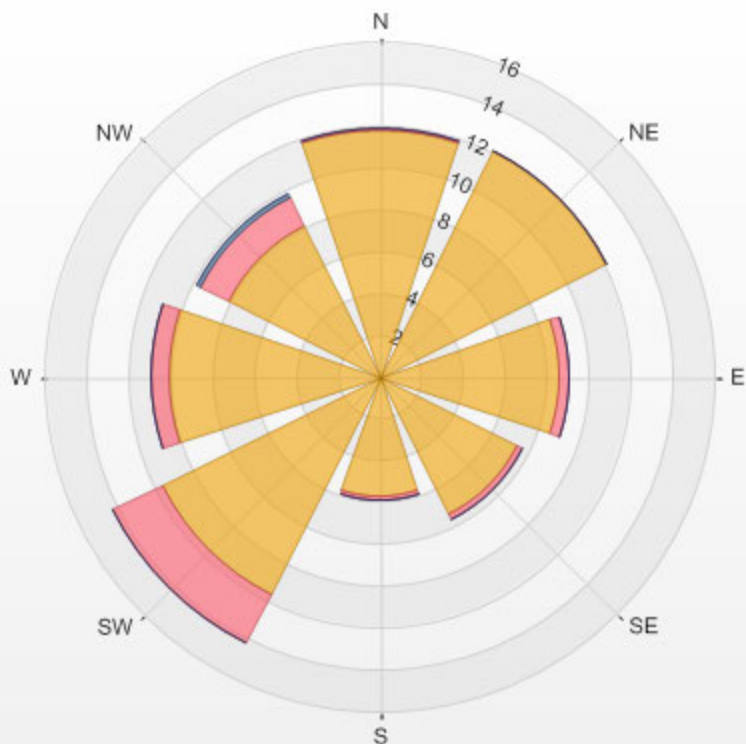
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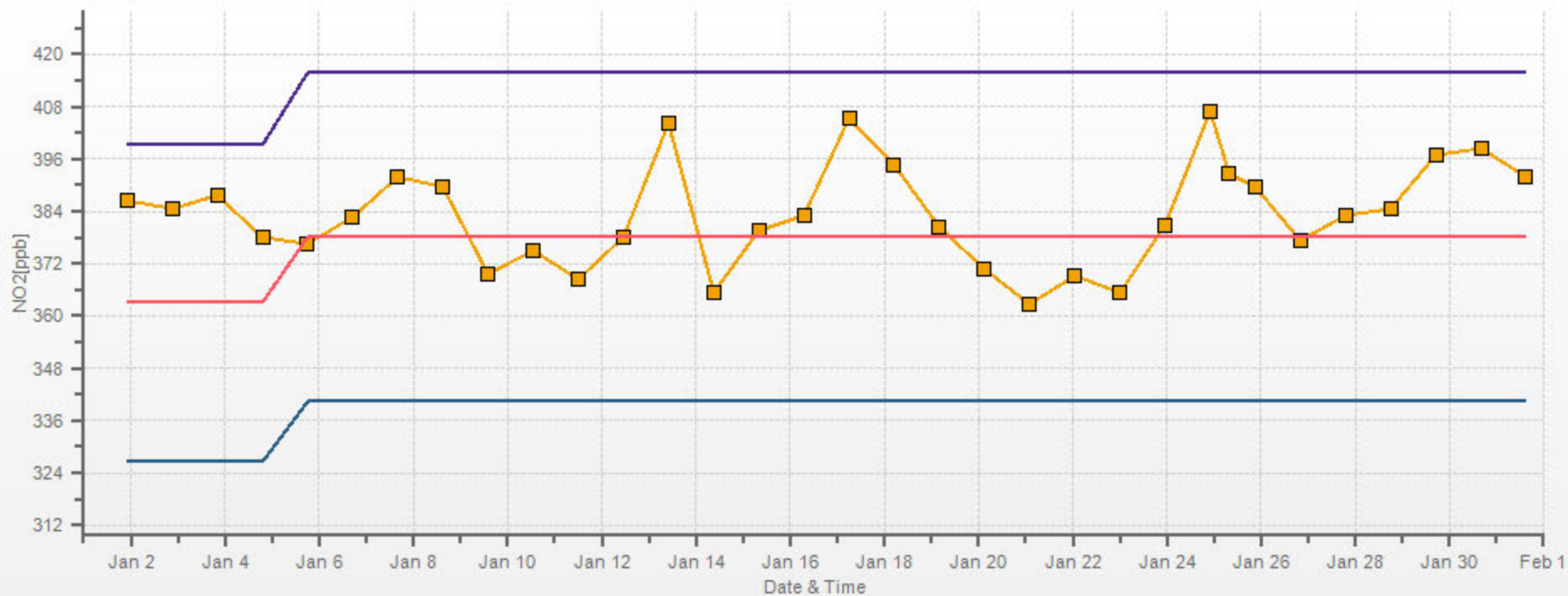
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LICA MASKWA Poll.: LICA MASKWA-NO2[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 18.42% Calm Poll Avg: 4.62[ppb]



NO2[ppb] Calibration: LICA MASKWA Monthly: 18/01 Type: Span



Span Meas Span Ref Span Low Span High

## ***WIND SPEED***

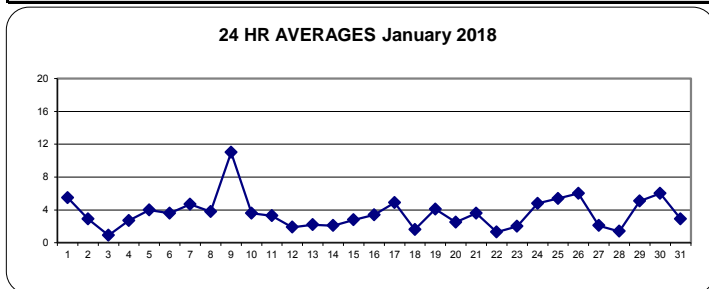
**WIND SPEED Hourly Averages (WS kph)**

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	7.3	6.4	5.3	8.1	7.9	5.9	3.2	4.9	5.1	4.7	6.8	5.6	5.0	7.2	7.8	5.8	6.2	4.5	3.8	6.7	4.5	9.3	9.5	7.4	3.2	9.5	5.5	24
2	8.8	9.7	7.8	9.2	5.6	5.4	5.9	5.5	4.4	3.3	4.6	5.2	5.3	2.8	1.7	0.5	1.0	1.9	1.7	1.0	0.6	2.4	1.7	2.6	0.5	9.7	2.9	24
3	2.3	2.7	1.1	1.3	1.8	3.9	5.5	2.8	3.2	0.2	1.5	1.8	2.6	4.7	3.9	1.4	2.3	2.1	2.5	0.3	1.8	2.1	1.7	2.2	0.2	5.5	0.9	24
4	2.0	1.7	1.6	2.4	1.9	2.5	2.3	1.8	1.7	2.6	4.0	4.2	4.1	3.8	3.9	4.1	3.5	4.1	4.8	3.6	3.0	3.0	4.1	3.9	1.6	4.8	2.7	24
5	4.4	4.0	4.1	3.1	3.7	4.1	4.5	5.0	4.7	5.2	4.5	4.7	4.4	4.5	4.3	4.5	3.4	3.9	4.2	4.0	5.5	4.3	2.9	2.4	2.4	5.5	4.0	24
6	2.1	1.6	2.6	2.0	1.2	1.3	1.7	2.2	2.3	2.8	2.4	3.8	4.0	5.7	4.7	7.8	8.9	6.8	5.5	7.1	8.4	6.6	4.4	4.3	1.2	8.9	3.6	24
7	3.7	4.7	4.1	4.5	5.1	5.7	5.4	6.7	10.1	11.0	11.5	10.5	8.3	8.3	8.4	5.3	3.5	1.9	2.3	1.6	1.0	0.8	1.6	0.2	0.2	11.5	4.7	24
8	1.1	1.1	0.2	0.5	1.7	0.2	1.1	1.3	1.2	0.6	1.1	2.2	3.1	2.1	3.3	2.8	3.2	3.1	4.8	14.4	12.4	12.3	12.8	11.8	0.2	14.4	3.8	24
9	11.9	13.3	11.8	13.4	13.2	13.4	13.4	11.9	13.1	13.9	15.1	14.7	13.7	12.0	8.5	9.6	10.1	9.2	10.0	9.5	8.2	7.7	7.3	6.5	6.5	15.1	11.0	24
10	7.8	7.2	6.5	6.7	6.6	5.1	5.6	4.6	4.3	4.2	4.7	4.7	3.7	4.7	4.0	2.8	1.6	2.2	2.7	3.8	3.2	3.8	3.3	3.6	1.6	7.8	3.6	24
11	3.6	3.2	2.2	3.3	2.9	3.1	3.3	2.6	3.6	3.1	3.2	4.3	6.5	5.8	4.4	6.6	7.0	3.2	2.1	2.6	1.6	2.0	1.3	1.3	1.3	7.0	3.3	24
12	1.6	0.4	0.8	0.6	0.8	1.0	0.3	0.2	0.4	0.1	0.4	3.8	3.7	3.7	5.5	3.5	1.3	3.3	4.4	3.2	5.0	4.3	1.9	1.0	0.1	5.5	1.9	24
13	0.4	2.6	1.8	0.5	0.5	0.2	5.3	4.8	2.8	4.0	4.7	5.4	5.5	4.3	4.2	4.6	2.3	3.4	2.2	2.8	3.3	3.2	2.5	2.9	0.2	5.5	2.2	24
14	2.7	6.1	6.1	4.8	6.7	3.1	2.4	2.1	2.0	1.5	2.2	3.3	3.3	3.4	3.0	2.7	0.4	0.7	0.6	1.9	0.5	0.1	0.3	0.3	0.1	6.7	2.1	24
15	0.2	0.1	0.5	1.2	1.6	0.7	1.0	0.5	1.3	0.5	4.9	5.6	4.7	6.5	7.2	4.6	6.5	6.6	7.0	4.9	5.4	4.9	3.2	3.2	0.1	7.2	2.8	24
16	5.9	5.8	5.0	4.6	6.4	6.2	4.7	3.3	0.7	3.0	7.0	5.6	5.0	5.3	5.6	6.2	2.7	1.8	1.4	1.2	0.3	1.8	2.3	2.4	0.3	7.0	3.4	24
17	3.8	1.7	4.6	3.2	5.4	8.3	8.4	8.8	7.1	7.0	8.2	10.6	9.4	9.2	8.5	6.6	3.5	4.0	5.6	5.4	3.9	4.1	0.7	1.1	0.7	10.6	4.9	24
18	0.7	1.1	2.0	3.7	3.2	3.5	1.7	2.5	1.8	0.6	4.2	4.0	4.5	4.8	3.0	3.1	3.3	3.9	4.8	6.1	3.2	2.9	3.8	3.4	0.6	6.1	1.6	24
19	3.9	3.6	3.5	3.3	3.4	2.9	3.2	4.6	4.1	5.9	6.8	6.6	7.2	7.3	6.4	6.0	4.9	2.1	1.6	0.1	2.5	2.6	4.3	4.1	0.1	7.3	4.1	24
20	5.1	4.3	5.1	4.8	4.5	3.6	3.6	3.4	3.0	2.6	2.4	1.5	2.5	3.0	3.8	3.7	3.5	2.7	2.3	1.4	1.0	0.3	1.7	3.4	0.3	5.1	2.5	24
21	3.4	2.4	1.4	2.8	2.8	1.6	0.4	0.0	5.3	5.9	6.6	6.8	5.3	6.3	6.5	7.0	6.5	5.8	6.6	7.4	7.4	6.0	6.5	6.9	0.0	7.4	3.6	24
22	6.6	6.3	6.7	5.6	5.2	5.1	6.1	5.3	3.6	3.9	2.9	2.6	2.4	2.1	4.1	1.8	1.1	4.2	4.6	5.9	7.1	5.7	6.2	5.9	1.1	7.1	1.3	24
23	5.0	3.4	3.1	3.2	3.0	1.5	0.5	0.4	0.6	1.2	5.0	5.1	5.3	5.3	4.9	5.5	5.7	4.6	1.9	4.3	4.2	5.6	5.3	4.9	0.4	5.7	2.0	24
24	4.4	4.3	3.8	4.0	5.4	5.4	5.8	5.8	6.0	5.3	4.6	5.4	5.1	5.7	5.0	5.0	5.0	4.5	4.5	4.8	5.3	5.3	4.6	4.0	3.8	6.0	4.8	24
25	4.3	4.3	4.2	4.1	4.4	4.0	3.7	4.6	3.5	3.2	5.2	6.0	7.5	7.4	7.4	8.3	6.0	8.2	5.4	6.0	7.7	8.7	7.9	6.1	3.2	8.7	5.4	24
26	4.0	1.7	6.1	5.8	6.6	5.8	3.4	5.1	4.7	3.4	4.8	5.6	6.4	5.9	6.1	6.9	7.5	7.1	8.3	7.3	9.4	8.5	7.6	6.9	1.7	9.4	6.0	24
27	5.4	3.6	2.1	1.1	2.2	3.3	2.3	0.6	1.7	2.9	3.4	2.9	3.3	3.2	4.0	3.1	3.0	2.6	1.9	3.4	2.0	1.7	3.0	2.8	0.6	5.4	2.1	24
28	2.0	2.6	0.2	0.8	0.6	0.5	1.1	1.9	3.9	5.5	4.9	3.5	2.5	0.4	2.7	0.8	2.0	2.4	1.0	0.4	2.0	2.1	2.5	3.1	0.2	5.5	1.4	24
29	3.2	3.2	3.4	3.4	2.7	2.5	2.7	2.9	4.5	6.6	5.8	6.1	6.2	6.5	8.2	9.0	7.8	7.5	7.5	7.7	7.4	8.3	4.9	5.4	2.5	9.0	5.1	24
30	5.8	5.2	6.3	3.0	4.1	6.0	8.5	8.6	7.2	7.1	7.2	7.5	7.5	7.6	7.9	5.8	5.6	5.1	6.7	8.3	7.7	8.3	7.7	6.1	3.0	8.6	6.0	24
31	5.8	5.7	7.1	5.2	4.2	4.3	5.0	3.1	4.3	5.5	5.5	3.6	3.4	3.5	3.0	2.6	1.4	0.3	0.6	1.4	0.9	0.6	0.8	0.3	0.3	7.1	2.9	24
HOURLY MAX	11.9	13.3	11.8	13.4	13.2	13.4	13.4	11.9	13.1	13.9	15.1	14.7	13.7	12.0	8.5	9.6	10.1	9.2	10.0	14.4	12.4	12.3	12.8	11.8				
HOURLY AVG	0.5	0.9	1.0	0.8	0.7	0.9	0.9	0.9	1.3	1.3	1.2	1.2	0.9	0.8	0.8	0.5	0.1	0.1	0.2	0.4	0.6	0.7	0.8	0.8				

**STATUS FLAG CODES**

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

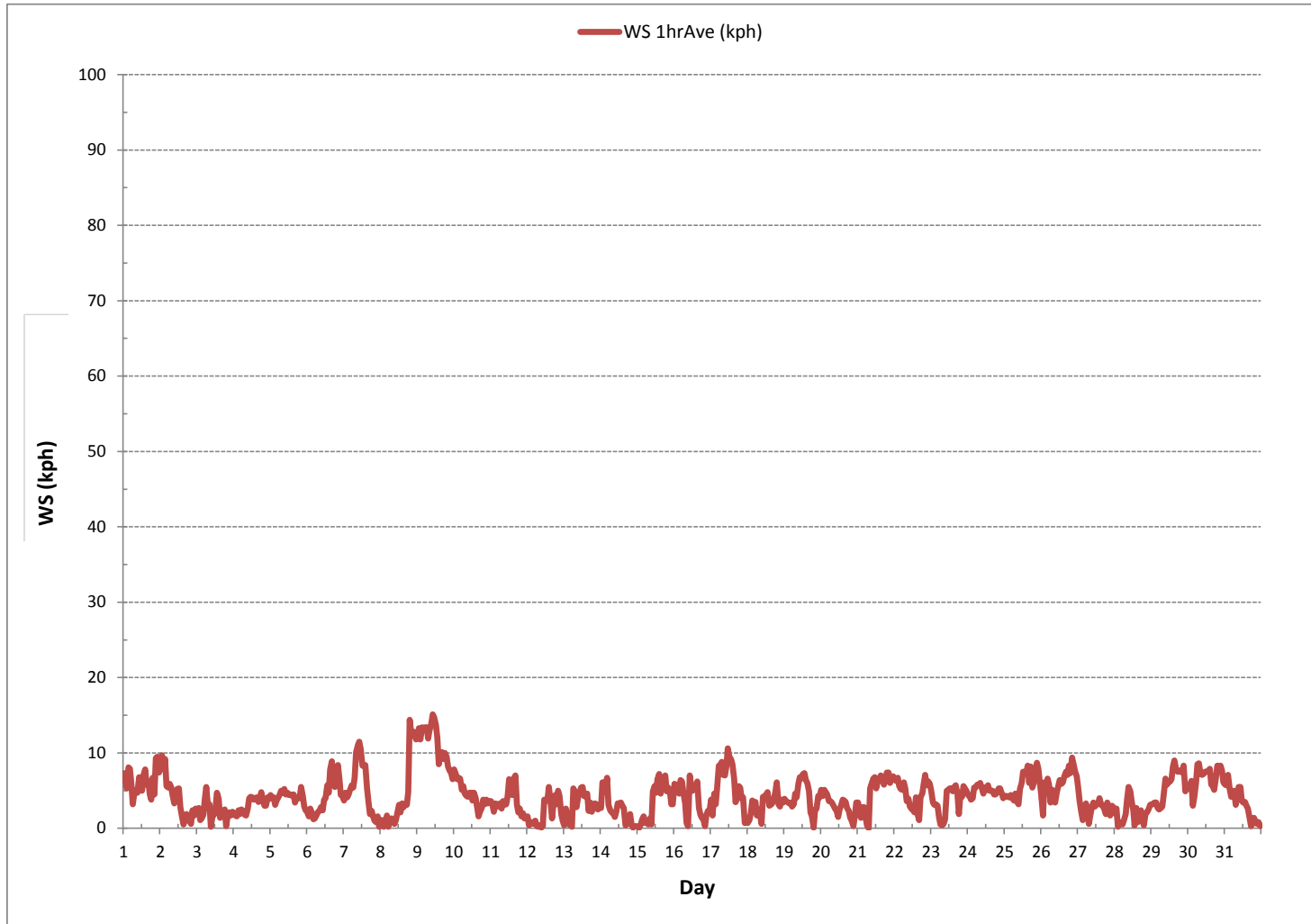
LAST CALIBRATION:	December 28, 2017
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST



**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	743
MINIMUM 1-HR AVERAGE:	0.0 kph @ HOUR 7 ON DAY 21
MAXIMUM 1-HR AVERAGE:	15.1 kph @ HOUR 10 ON DAY 9
MAXIMUM 24-HR AVERAGE:	11.0 kph ON DAY 9
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	744 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	2.7
MONTHLY AVERAGE:	0.6 kph

WIND SPEED Hourly Averages (WS kph)





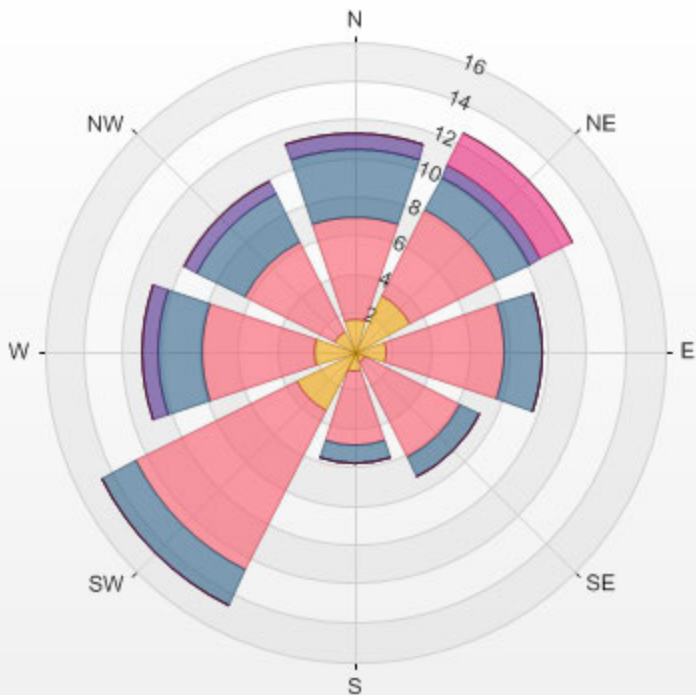
Wind: LICA MASKWA  
 Monitor: WSP [kph]  
 Monthly: 18/01  
 Type: WindRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 17.88%

Direction	1.8-3.0	3.0-6.1	6.1-9.1	9.1-12.2	12.2-15.2	>15.2	Total
<b>N</b>	1.8	5.2	3.5	0.8	0.0	0.0	11.3
<b>NE</b>	3.2	5.0	1.9	0.7	1.9	0.0	12.6
<b>E</b>	1.6	6.2	1.9	0.0	0.0	0.0	9.7
<b>SE</b>	0.7	5.4	1.2	0.0	0.0	0.0	7.3
<b>S</b>	1.1	3.8	0.9	0.0	0.0	0.0	5.8
<b>SW</b>	3.4	9.3	2.0	0.0	0.0	0.0	14.7
<b>W</b>	2.2	5.8	2.3	0.8	0.0	0.0	11.0
<b>NW</b>	1.2	5.1	2.8	0.7	0.0	0.0	9.8
<b>Summary</b>	15.1	45.7	16.5	3.0	1.9	0.0	82.1

% Icon Classes (kph) 15 1.8-3.0 46 3.0-6.1 17 6.1-9.1 3 9.1-12.2 2 12.2-15.2 0 >15.2

LICA MASKWA 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 17.88% Calm Wind Avg Speed: 0.96(kph)



***WIND DIRECTION***



**LAKELAND INDUSTRY & COMMUNITY ASSOCIATION**  
**Maskwa Continuous Monitoring Station - January 2018**

**WIND DIRECTION Hourly Averages (WD)**

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

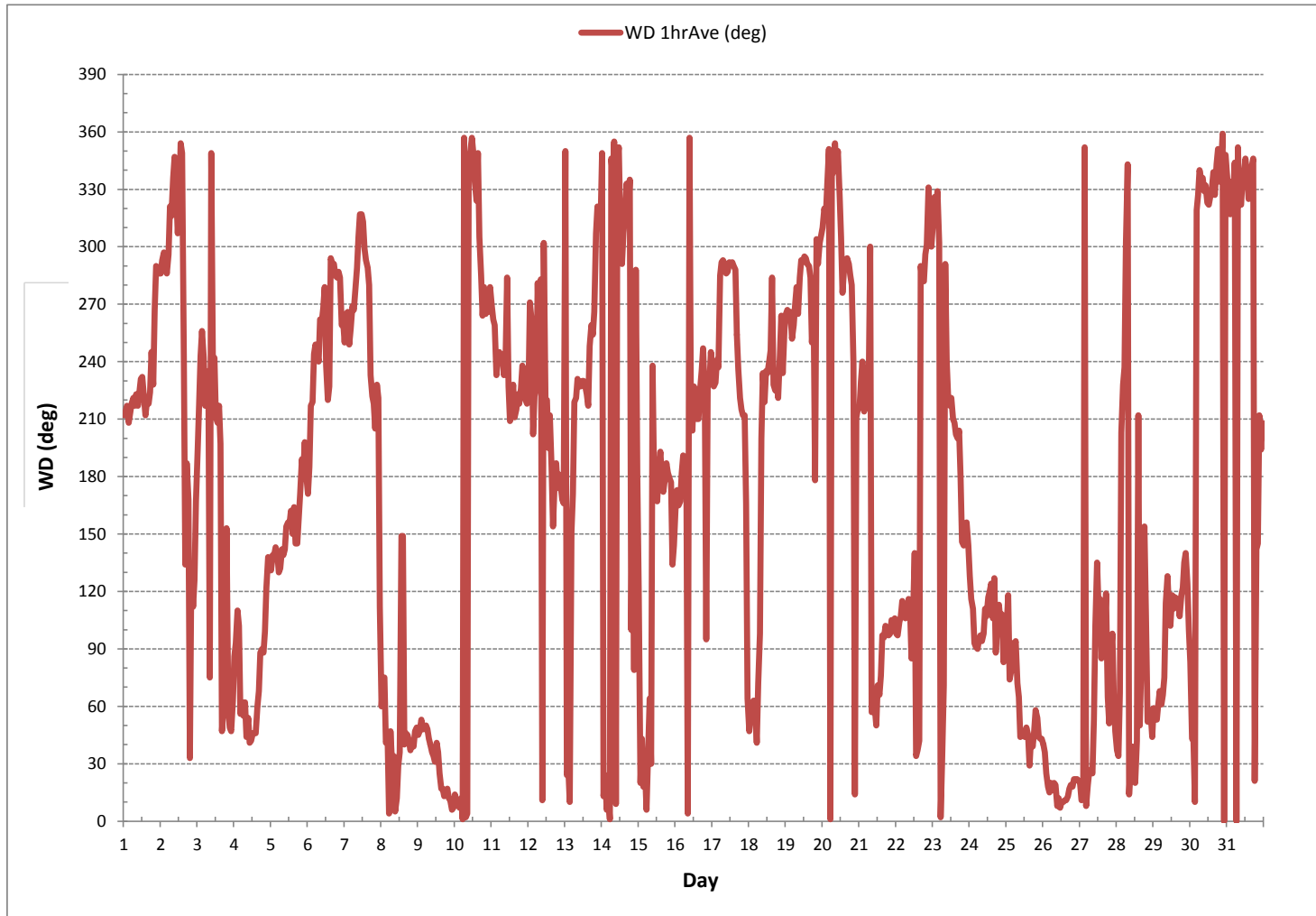
**STATUS FLAG CODES**

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:	0	hrs	OPERATIONAL TIME:	744	hrs
STANDARD DEVIATION:	107		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	354 (N)	

WIND DIRECTION Hourly Averages (WD)



***STANDARD DEVIATION WIND DIRECTION***



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

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	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	16	16	19	18	18	21	22	20	22	25	24	27	30	24	20	25	24	26	37	22	31	22	22	26	24	
2	25	23	23	23	25	25	33	36	35	34	31	30	35	36	47	62	20	29	43	34	44	33	42	30	24	
3	36	33	42	39	30	16	19	39	25	26	48	26	18	15	18	30	20	18	21	54	18	21	28	18	24	
4	22	41	34	29	17	19	18	17	20	18	15	16	21	20	18	23	18	22	25	27	26	37	29	30	24	
5	27	28	29	35	33	34	32	29	30	32	32	34	33	31	32	30	29	34	31	32	27	29	22	25	24	
6	24	37	43	44	37	40	42	33	30	30	32	28	24	20	24	26	24	20	21	29	27	25	32	37	24	
7	33	31	36	31	34	36	34	33	28	28	37	36	34	31	28	28	26	22	23	10	35	53	27	36	24	
8	38	40	57	23	19	34	30	16	26	20	18	15	17	35	38	45	19	20	18	16	17	15	20	20	24	
9	20	21	22	20	21	22	20	18	17	14	15	16	18	15	18	22	21	23	22	20	23	25	25	28	24	
10	23	25	27	26	24	30	29	29	30	32	35	35	32	34	34	32	32	35	26	26	28	24	21	23	24	
11	24	22	33	16	23	19	15	19	15	22	21	25	15	19	23	12	14	17	25	17	27	17	26	14	24	
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13	62	26	15	23	30	26	20	20	35	25	26	25	24	25	22	18	38	24	28	26	28	34	32	30	24	
14	30	21	16	24	23	31	33	24	24	26	37	27	31	21	26	26	32	19	23	16	24	68	49	39	24	
15	62	45	29	22	23	25	40	59	19	39	27	27	36	28	23	22	23	24	21	24	24	25	21	31	24	
16	22	26	25	26	23	23	28	27	62	39	19	21	27	28	24	18	24	25	28	19	61	27	30	23	24	
17	20	35	25	25	18	28	25	25	28	26	28	26	28	27	28	28	25	18	17	13	14	16	40	28	24	
18	37	33	22	18	22	15	60	55	71	52	34	31	26	27	32	28	24	17	20	14	19	26	21	38	24	
19	37	38	34	32	30	30	25	30	32	28	28	27	30	32	29	28	23	34	27	68	31	31	26	28	24	
20	30	38	30	34	34	32	35	37	29	35	32	38	39	40	33	35	29	27	30	38	26	34	45	15	24	
21	15	18	20	16	19	44	66	47	27	21	23	22	27	26	26	28	27	28	27	28	27	28	27	26	24	
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28	27	18	25	27	44	47	37	26	22	16	16	23	37	44	29	48	32	15	39	44	20	17	17	16	24	
29	23	21	17	21	21	22	24	25	36	30	27	26	34	29	28	29	28	27	29	31	33	27	32	32	24	
30	30	23	18	25	32	35	37	37	37	37	40	39	38	38	35	37	39	38	37	36	35	32	29	36	24	
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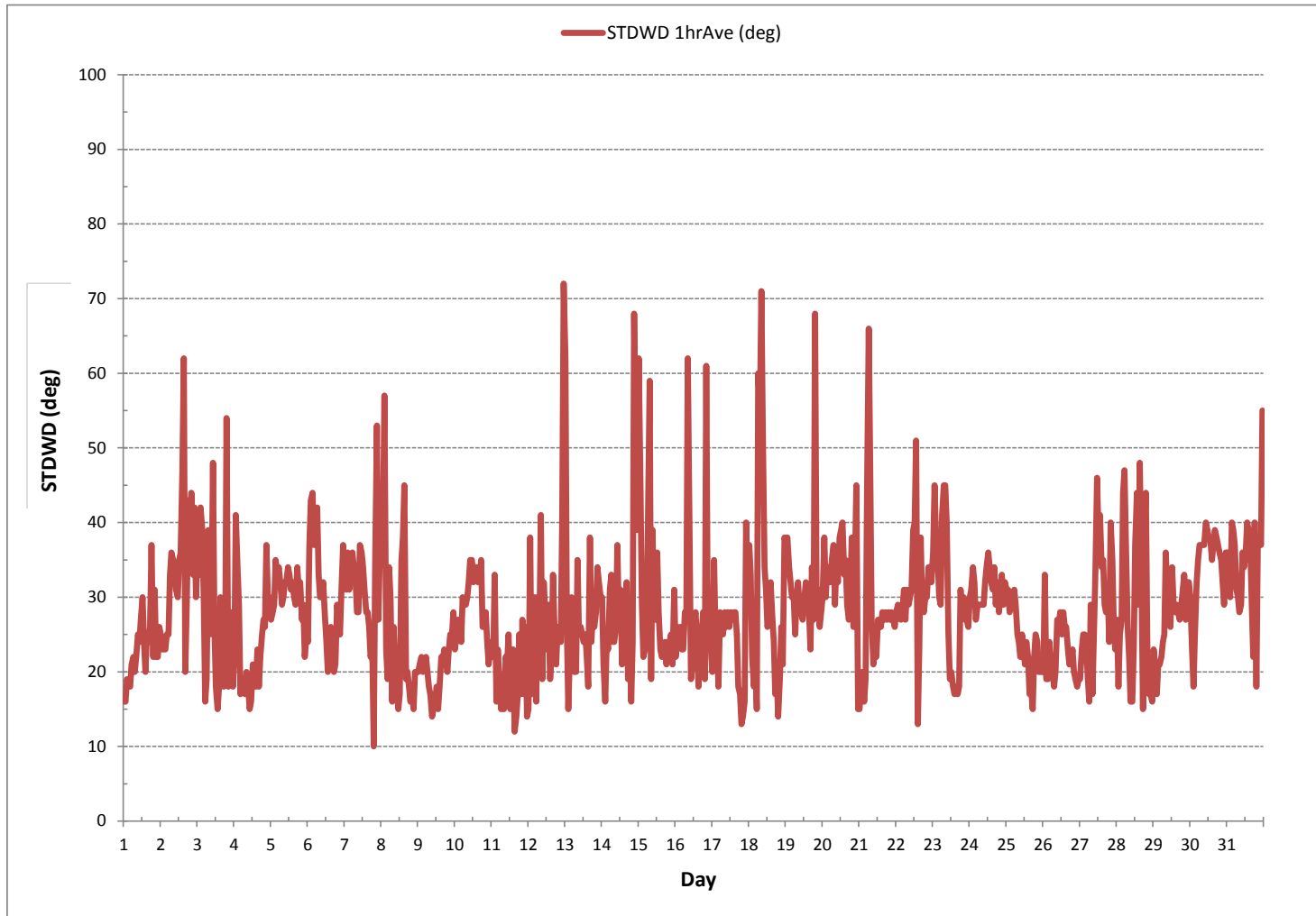
STATUS FLAG CODES

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: 0 hrs OPERATIONAL TIME: 744 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)





***RELATIVE HUMIDITY***

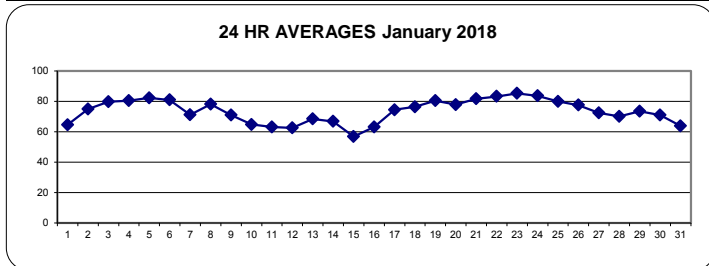
RELATIVE HUMIDITY Hourly Averages (RH %)

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	66	66	66	66	65	66	66	66	65	65	63	58	58	56	56	61	62	63	63	64	67	72	75	75	56	75	65	24	
2	77	77	77	78	80	81	80	80	80	80	74	67	63	63	68	71	74	75	74	75	77	76	75	76	63	81	75	24	
3	78	79	80	82	83	85	84	83	82	82	83	79	71	68	66	75	76	79	84	84	83	82	82	82	66	85	80	24	
4	82	82	82	82	82	82	81	80	79	80	79	78	77	75	78	81	83	83	82	82	82	82	82	81	75	83	80	24	
5	81	81	81	81	82	82	82	82	82	82	82	82	82	82	83	83	84	84	84	84	84	83	82	82	81	81	84	82	24
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7	70	68	66	66	66	66	68	70	69	68	66	65	63	61	60	65	71	77	84	86	84	83	82	82	60	86	71	24	
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13	62	62	62	62	62	62	65	67	67	67	67	64	63	62	62	65	73	77	79	79	79	78	78	77	62	79	68	24	
14	77	77	74	73	71	74	73	72	71	70	65	54	51	49	48	56	67	72	71	70	68	67	66	66	48	77	67	24	
15	65	64	64	63	63	62	64	63	63	65	62	47	42	40	41	44	48	50	51	54	57	60	65	68	40	68	57	24	
16	65	56	58	60	64	64	64	63	67	67	56	52	51	51	50	56	62	68	70	72	75	75	75	50	75	63	24		
17	74	75	74	77	79	86	87	85	83	81	73	67	64	59	56	61	67	71	72	75	79	79	83	56	87	74	24		
18	85	86	85	85	85	85	83	79	79	75	73	63	62	59	66	63	70	73	74	74	78	83	83	85	59	86	76	24	
19	87	89	90	89	88	86	87	85	83	82	79	75	71	68	64	68	73	80	80	81	80	82	82	82	64	90	80	24	
20	80	80	82	83	80	77	76	75	76	76	74	74	75	76	76	75	76	77	78	78	80	81	81	81	74	83	78	24	
21	82	83	84	83	83	83	84	84	83	82	80	78	78	79	81	83	81	79	79	79	81	83	85	85	78	85	82	24	
22	85	85	85	85	85	85	86	86	86	86	83	78	75	77	80	83	85	85	85	84	82	82	82	82	75	86	83	24	
23	82	82	83	84	85	86	87	87	87	86	86	86	85	85	83	84	86	86	86	86	86	86	86	86	82	87	85	24	
24	86	85	85	85	85	84	84	84	84	83	83	83	83	83	83	84	84	84	83	83	83	83	82	82	82	86	84	24	
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26	79	79	79	78	77	77	78	78	78	78	77	76	76	76	77	77	78	78	78	78	78	77	77	77	76	79	78	24	
27	77	77	76	76	76	75	74	75	74	73	71	68	66	65	67	68	71	73	73	73	73	73	72	73	73	65	77	24	
28	72	72	71	73	74	74	74	73	72	70	67	63	58	60	63	65	70	76	75	74	72	71	72	72	58	76	70	24	
29	72	72	72	73	73	73	72	72	73	71	70	69	69	70	71	72	74	77	77	78	78	78	78	78	69	78	73	24	
30	77	77	77	77	77	77	76	74	73	73	71	70	68	67	67	68	70	70	68	67	65	64	64	65	64	77	71	24	
31	67	67	68	68	67	67	67	67	68	66	60	54	50	50	49	53	64	71	71	70	68	67	66	66	49	71	64	24	
HOURLY MAX	87	89	90	89	88	86	87	87	87	87	86	86	85	85	86	84	86	86	86	86	86	86	86	86	86	86	86	86	
HOURLY AVG	75	75	75	75	75	76	76	75	75	75	73	69	68	67	67	69	73	75	75	75	75	75	76	76					

STATUS FLAG CODES

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

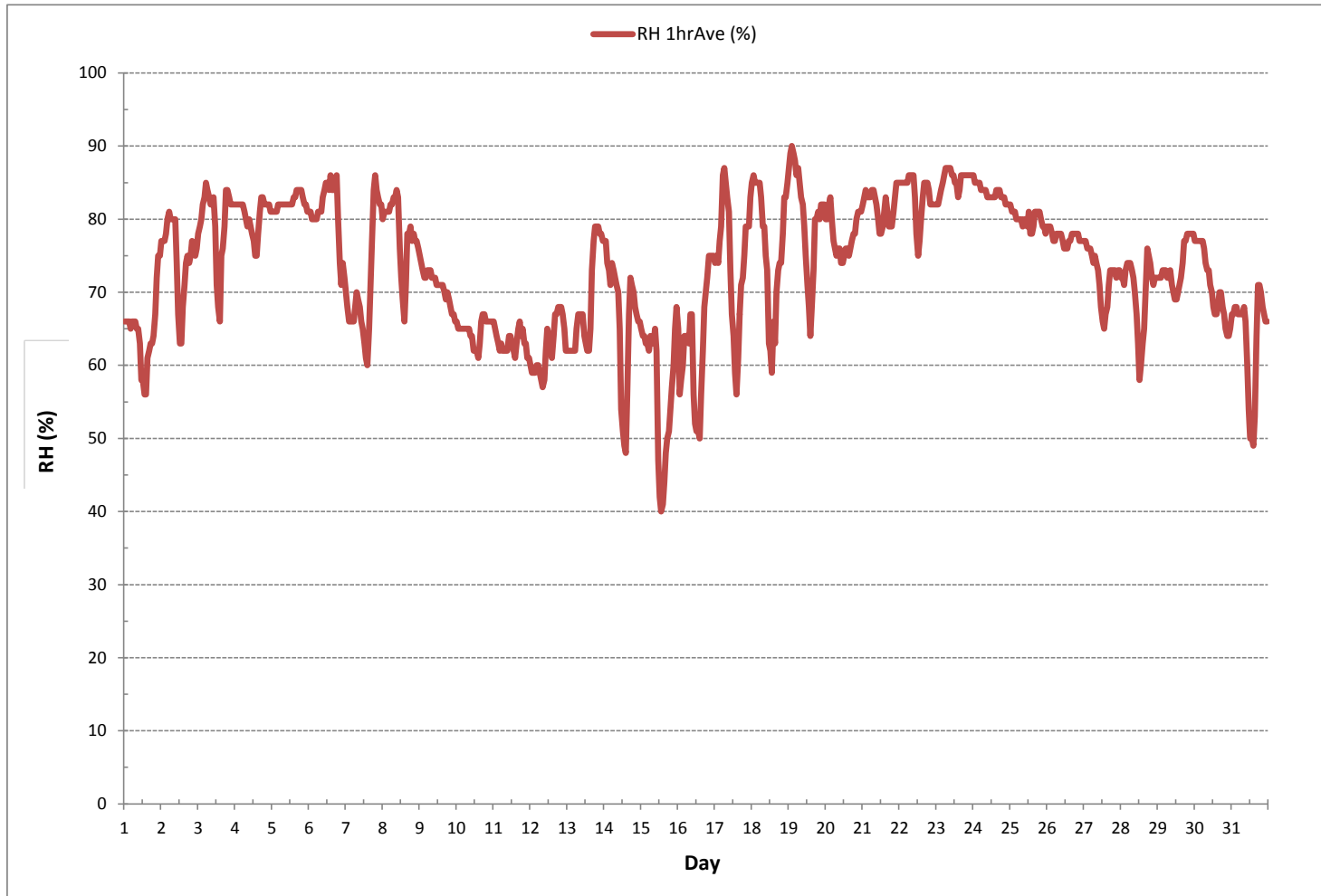
24 HR AVERAGES January 2018



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	40	%	@ HOUR	13	ON DAY	15
MAXIMUM 1-HR AVERAGE:	90	%	@ HOUR	2	ON DAY	19
MAXIMUM 24-HR AVERAGE:	85	%			ON DAY	23
OPERATIONAL TIME:						744 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	9					
MONTHLY AVERAGE:						74 %

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



## ***BAROMETRIC PRESSURE***

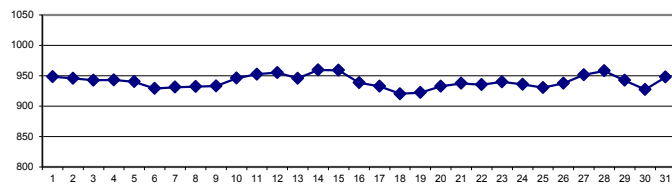
BAROMETRIC PRESSURE Hourly Averages (BP mbar)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	958	958	957	956	955	955	954	954	953	952	951	949	948	947	945	944	943	942	941	940	940	940	940	940	940	940	958	948	24
2	940	941	941	942	943	944	944	946	947	948	948	949	949	948	948	948	948	948	947	947	946	946	946	945	940	949	946	24	
3	944	944	944	943	943	942	942	941	942	942	942	943	943	943	943	943	943	943	943	943	943	943	942	942	942	941	944	943	24
4	942	942	942	942	942	942	942	942	942	942	943	943	943	943	944	944	944	944	944	944	944	944	944	945	942	945	943	24	
5	944	944	944	944	943	943	943	943	942	942	942	941	941	941	940	940	939	938	937	936	936	935	934	933	933	933	944	940	24
6	932	932	931	930	929	928	928	927	927	928	928	929	928	928	928	929	929	930	930	930	930	930	930	930	930	927	932	929	24
7	930	929	929	929	929	929	929	929	929	930	931	932	932	933	933	933	933	933	933	932	933	933	933	933	933	929	933	931	24
8	933	933	933	933	932	932	932	932	932	932	932	932	931	931	931	931	931	931	932	932	933	933	934	934	931	934	932	24	
9	934	934	934	934	933	932	932	932	931	932	931	931	930	930	931	931	932	934	934	935	936	937	938	939	930	939	933	24	
10	940	940	941	942	942	942	943	944	945	946	946	946	947	947	947	948	949	949	950	950	951	951	951	952	940	952	946	24	
11	952	952	953	953	954	954	954	954	954	954	953	952	951	950	950	951	951	952	952	953	953	954	954	954	950	954	953	24	
12	955	955	956	956	956	956	957	958	959	959	958	956	955	954	954	955	955	955	955	954	953	952	952	951	951	951	959	955	24
13	951	950	949	949	948	948	947	945	945	944	944	943	942	942	942	943	944	944	945	945	946	947	948	942	951	946	24		
14	949	950	952	953	954	955	956	957	959	960	960	960	960	961	961	962	962	963	964	964	965	965	966	966	949	966	959	24	
15	966	966	966	966	966	965	964	964	963	963	961	960	959	958	956	956	955	954	953	952	951	950	950	949	949	949	966	959	24
16	947	946	945	945	944	943	942	941	940	940	940	939	938	937	937	936	935	934	934	934	933	933	932	932	932	932	947	939	24
17	932	931	932	932	932	932	933	933	933	933	934	935	935	935	935	934	934	933	933	932	931	930	929	929	929	929	935	933	24
18	928	927	926	925	923	922	921	920	919	919	919	919	919	918	918	918	918	918	918	919	919	918	919	919	918	918	928	920	24
19	919	919	919	919	920	920	920	920	921	921	922	922	923	923	923	924	924	924	924	925	925	926	926	927	919	927	922	24	
20	928	928	929	929	930	930	931	931	932	932	933	933	933	934	934	934	935	935	935	935	936	936	936	937	928	937	933	24	
21	937	937	938	938	938	938	938	938	938	939	939	939	939	938	938	938	938	938	937	937	936	936	936	935	935	939	938	24	
22	934	934	934	934	934	933	933	933	934	934	934	934	934	934	935	936	936	937	937	937	938	938	938	939	933	939	935	24	
23	939	939	940	940	940	940	941	941	941	941	941	941	941	940	940	941	940	940	939	939	939	939	939	939	939	939	941	940	24
24	938	938	938	937	937	937	937	936	936	936	936	936	936	936	935	935	935	935	935	934	934	934	933	933	933	938	936	24	
25	933	933	932	932	931	930	931	930	930	930	930	930	929	929	929	929	929	930	930	930	930	930	931	929	933	930	24		
26	931	932	932	932	932	933	934	934	935	935	936	937	937	938	938	939	940	941	942	943	944	945	946	947	931	947	938	24	
27	947	948	949	949	950	951	951	951	952	952	952	952	952	952	952	952	952	952	952	953	953	954	954	955	947	955	952	24	
28	956	956	957	957	958	958	959	959	959	960	960	960	960	959	959	959	958	958	958	958	957	957	956	956	956	960	958	24	
29	955	955	954	953	953	952	951	950	950	948	947	945	944	942	940	939	937	935	933	931	928	926	924	923	923	955	942	24	
30	920	920	919	919	920	921	922	923	924	925	927	927	928	929	929	930	931	932	932	933	934	936	937	938	919	938	927	24	
31	939	940	941	942	943	944	945	946	947	948	948	949	949	949	950	950	951	951	952	952	952	953	953	954	939	954	948	24	
HOURLY MAX	966	966	966	966	966	965	964	964	963	963	961	960	960	961	961	962	962	963	964	964	965	965	966	966					
HOURLY AVG	940	940	941	940	940	940	941	940	941	941	941	941	940	940	940	940	940	940	940	940	940	940	940	940					

STATUS FLAG CODES

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

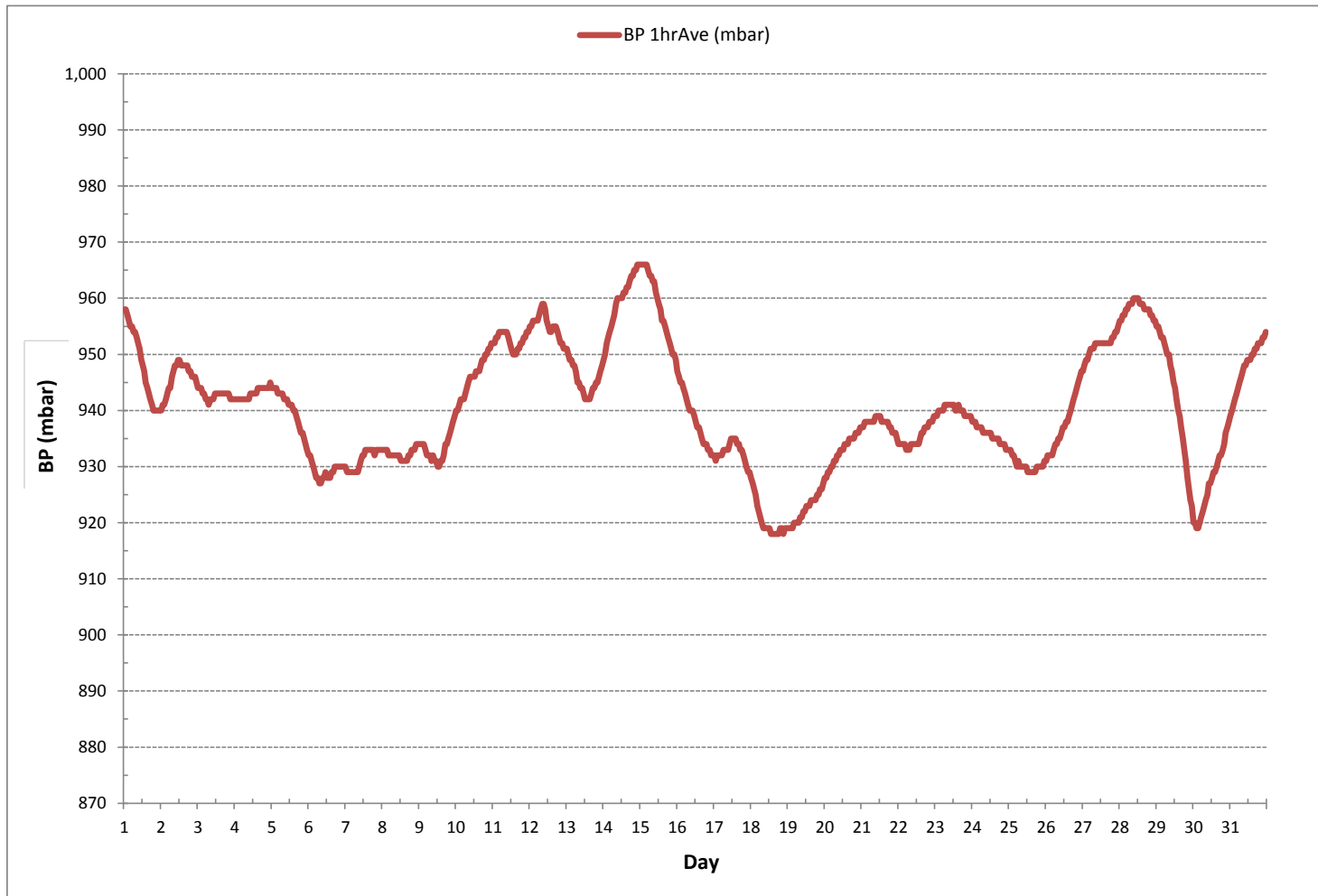
24 HR AVERAGES January 2018



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	918	mbar	@ HOUR	13	ON DAY	18
MAXIMUM 1-HR AVERAGE:	966	mbar	@ HOUR	22	ON DAY	14
MAXIMUM 24-HR AVERAGE:	959	mbar			ON DAY	14
OPERATIONAL TIME:						744 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	11				MONTHLY AVERAGE:	940 mbar

BAROMETRIC PRESSURE Hourly Averages (BP mbar)



***AMBIENT TEMPERATURE***



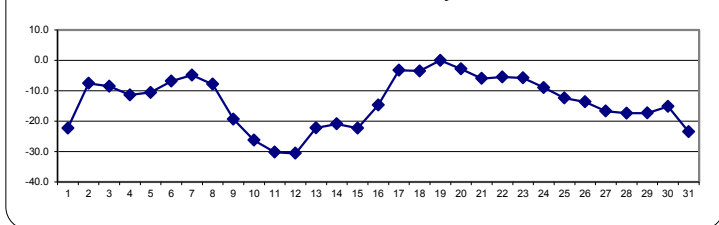
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

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	-27.1	-27.4	-27.6	-27.1	-27.5	-28.3	-29.1	-28.8	-28.3	-27.9	-25.8	-23.0	-21.3	-19.8	-19.3	-20.5	-20.2	-19.9	-18.8	-17.8	-16.3	-13.3	-11.1	-9.9	-29.1	-9.9	-22.3	24
2	-9.2	-8.6	-7.9	-7.4	-8.0	-8.0	-7.7	-7.8	-8.6	-9.2	-8.2	-7.0	-5.9	-5.6	-6.0	-6.3	-6.7	-6.9	-7.6	-7.9	-8.1	-8.0	-7.8	-7.9	-9.2	-5.6	-7.6	24
3	-8.7	-8.9	-9.3	-10.4	-11.1	-9.6	-9.6	-10.1	-11.1	-11.6	-9.1	-4.5	-2.2	-2.3	-1.0	-3.2	-5.7	-8.4	-9.9	-11.0	-11.6	-12.3	-12.9	-11.5	-12.9	-1.0	-8.6	24
4	-11.5	-10.8	-10.1	-10.5	-11.9	-12.3	-13.0	-13.8	-14.7	-13.5	-11.9	-10.0	-9.3	-8.6	-8.7	-9.8	-11.3	-12.0	-11.6	-11.6	-11.5	-11.3	-11.4	-11.8	-14.7	-8.6	-11.4	24
5	-12.1	-12.5	-12.7	-12.4	-12.0	-11.7	-11.4	-11.2	-11.1	-10.8	-10.3	-9.8	-9.3	-9.1	-8.9	-9.0	-9.0	-9.0	-9.0	-8.9	-9.2	-10.1	-11.6	-12.5	-12.7	-8.9	-10.6	24
6	-13.0	-12.8	-12.7	-13.0	-13.1	-12.5	-11.7	-11.6	-10.9	-9.4	-7.1	-5.2	-3.7	-4.3	-3.6	-1.7	-2.0	-2.6	-3.0	-1.8	-0.9	-1.5	-2.8	-3.3	-13.1	-0.9	-6.8	24
7	-3.8	-3.9	-3.9	-4.1	-4.1	-4.1	-4.2	-4.3	-3.3	-2.4	-1.9	-1.5	-1.0	-0.6	-0.5	-1.8	-3.6	-5.8	-7.6	-8.4	-10.1	-11.2	-11.9	-12.5	-12.5	-0.5	-4.9	24
8	-13.6	-13.1	-12.0	-11.2	-11.0	-11.1	-10.1	-9.3	-8.7	-7.6	-5.3	-3.2	-2.8	-2.1	-1.4	-2.9	-5.0	-4.7	-4.3	-6.3	-8.7	-10.0	-11.5	-12.7	-13.6	-1.4	-7.9	24
9	-13.7	-14.5	-15.5	-16.4	-17.1	-17.3	-17.4	-17.9	-18.3	-18.6	-18.8	-19.1	-19.3	-19.2	-18.7	-19.2	-20.0	-20.9	-21.5	-22.1	-23.0	-24.3	-25.2	-25.9	-25.9	-13.7	-19.3	24
10	-25.8	-25.7	-25.6	-25.8	-25.9	-26.0	-26.3	-26.8	-26.4	-25.9	-25.3	-24.5	-24.0	-24.5	-23.9	-25.0	-26.9	-27.5	-27.5	-27.2	-27.7	-28.4	-28.5	-29.2	-29.2	-23.9	-26.3	24
11	-29.2	-29.7	-31.2	-32.3	-33.2	-32.8	-33.7	-33.7	-32.4	-28.9	-25.8	-24.2	-22.0	-24.2	-26.5	-28.7	-31.2	-30.9	-32.3	-32.9	-34.4	-34.7	-34.7	-34.7	-22.0	-30.2	24	
12	-35.6	-36.2	-36.5	-36.3	-34.8	-34.0	-35.4	-37.8	-38.4	-37.0	-32.5	-25.6	-23.4	-21.9	-21.9	-24.0	-27.3	-28.3	-25.7	-26.9	-26.4	-26.6	-28.9	-32.5	-38.4	-21.9	-30.6	24
13	-32.6	-32.4	-32.8	-32.8	-32.9	-32.4	-29.4	-27.0	-27.3	-26.3	-24.0	-21.0	-18.7	-15.9	-14.6	-15.3	-17.0	-15.6	-15.6	-15.2	-14.5	-14.0	-13.3	-13.0	-32.9	-13.0	-22.2	24
14	-13.1	-13.6	-14.8	-16.4	-18.0	-20.3	-21.5	-23.4	-24.9	-25.0	-21.5	-18.0	-16.5	-14.8	-14.1	-17.0	-20.6	-22.3	-24.6	-25.9	-27.7	-28.4	-29.4	-29.8	-29.8	-13.1	-20.9	24
15	-30.4	-31.1	-31.3	-31.8	-32.4	-32.4	-31.6	-31.4	-31.3	-29.0	-20.8	-17.2	-15.2	-13.5	-12.7	-13.2	-14.6	-15.4	-15.5	-16.2	-16.4	-16.4	-17.5	-17.8	-32.4	-12.7	-22.3	24
16	-16.1	-14.6	-15.4	-15.8	-15.3	-15.2	-15.7	-16.1	-20.9	-19.7	-14.1	-11.9	-10.4	-9.0	-8.6	-10.6	-12.4	-14.1	-14.8	-15.4	-16.7	-16.8	-17.2	-16.7	-20.9	-8.6	-14.7	24
17	-14.7	-15.1	-14.8	-15.1	-13.9	-7.3	-4.1	-1.3	0.2	0.8	3.2	4.9	5.4	6.1	6.2	4.0	1.5	-0.2	-0.8	-2.2	-3.8	-4.6	-5.7	-6.6	-15.1	6.2	-3.2	24
18	-7.4	-7.6	-8.0	-7.5	-7.0	-7.1	-6.5	-5.4	-5.7	-4.3	-3.4	0.4	1.7	2.6	0.0	0.9	-1.2	-2.4	-2.7	-2.8	-3.5	-3.8	-2.3	-1.0	-8.0	2.6	-3.5	24
19	-0.3	-0.2	0.0	0.3	-0.2	-0.1	-0.6	0.1	0.1	0.3	1.3	2.3	2.7	2.6	3.0	0.8	-0.5	-2.3	-2.0	-2.1	-1.5	-1.7	-1.3	-1.6	-2.3	3.0	0.0	24
20	-1.6	-1.6	-1.8	-2.1	-2.6	-3.2	-3.6	-3.8	-4.0	-3.6	-2.9	-2.2	-2.0	-2.1	-2.2	-2.4	-2.8	-3.0	-3.2	-3.3	-3.5	-3.7	-3.7	-3.8	-4.0	-1.6	-2.9	24
21	-4.3	-4.8	-4.9	-4.8	-4.9	-5.0	-5.0	-5.0	-5.4	-6.4	-6.7	-6.7	-6.3	-6.1	-5.8	-5.9	-6.4	-6.7	-6.9	-7.1	-7.3	-7.2	-7.0	-6.7	-7.3	-4.3	-6.0	24
22	-6.7	-6.5	-6.2	-5.8	-5.7	-5.8	-5.9	-6.2	-6.5	-6.4	-5.8	-4.9	-4.2	-4.9	-5.5	-5.9	-5.9	-4.9	-4.6	-4.4	-4.3	-4.8	-5.0	-5.0	-6.7	-4.2	-5.5	24
23	-5.1	-5.2	-5.2	-5.3	-5.3	-5.5	-5.6	-5.7	-5.5	-5.0	-5.4	-5.6	-5.4	-5.5	-5.2	-5.6	-6.2	-6.6	-6.5	-6.3	-6.4	-6.7	-6.9	-7.1	-7.1	-5.0	-5.8	24
24	-7.1	-7.8	-8.2	-8.5	-8.7	-8.8	-8.7	-8.9	-9.2	-9.5	-8.8	-8.1	-8.0	-8.2	-8.2	-8.3	-8.8	-9.2	-9.4	-9.7	-10.1	-10.7	-11.2	-11.2	-11.2	-7.1	-9.0	24
25	-11.4	-11.8	-12.2	-12.6	-12.9	-13.0	-13.2	-13.5	-13.7	-13.2	-12.5	-12.1	-11.6	-11.3	-11.3	-11.6	-11.8	-11.6	-11.5	-11.8	-12.7	-13.5	-13.8	-13.7	-13.8	-11.3	-12.4	24
26	-13.4	-13.0	-13.1	-13.1	-13.8	-14.1	-13.9	-14.1	-14.0	-13.7	-13.7	-13.8	-13.6	-13.4	-13.0	-13.1	-13.5	-13.4	-13.1	-13.3	-13.9	-14.5	-14.6	-15.0	-15.0	-13.0	-13.7	24
27	-15.3	-15.8	-16.8	-18.4	-18.6	-17.9	-18.0	-19.0	-18.2	-17.2	-15.8	-14.7	-14.3	-13.8	-14.5	-15.2	-16.7	-17.6	-17.2	-17.4	-17.2	-16.9	-17.2	-17.3	-19.0	-13.8	-16.7	24
28	-17.2	-17.2	-16.9	-17.3	-17.1	-16.8	-16.5	-16.3	-16.6	-17.3	-17.0	-16.0	-14.1	-14.0	-14.6	-14.3	-16.0	-19.2	-20.5	-21.5	-20.2	-20.0	-20.3	-19.9	-21.5	-14.0	-17.4	24
29	-19.9	-20.1	-20.1	-20.0	-20.7	-21.4	-21.7	-21.8	-19.9	-18.6	-17.6	-16.9	-15.6	-15.2	-14.8	-15.0	-15.8	-15.8	-15.1	-14.4	-14.1	-13.8	-13.7	-13.8	-21.8	-13.7	-17.3	24
30	-14.5	-15.2	-14.8	-14.1	-13.9	-13.6	-13.1	-13.5	-13.8	-13.3	-13.0	-12.7	-12.6	-13.3	-14.0	-14.5	-14.9	-15.4	-16.1	-17.0	-17.9	-19.9	-21.1	-21.8	-21.8	-12.6	-15.2	24
31	-22.7	-23.5	-24.0	-24.5	-24.9	-25.1	-25.1	-25.6	-25.8	-24.6	-22.1	-19.3	-17.3	-16.0	-15.4	-16.5	-20.0	-23.2	-25.1	-26.2	-27.3	-28.8	-29.8	-30.2	-30.2	-15.4	-23.5	24
HOURLY MAX	-0.3	-0.2	0.0	0.3	-0.2	-0.1	-0.6	0.1	0.2	0.8	3.2	4.9	5.4	6.1	6.2	4.0	1.5	-0.2	-0.8	-1.8	-0.9	-1.5	-1.3	-1.0				
HOURLY AVG	-14.7	-14.9	-15.0	-15.2	-15.4	-15.2	-15.1	-15.2	-15.4	-14.8	-13.1	-11.4	-10.5	-9.9	-9.7	-10.5	-11.9	-12.7	-13.0	-13.3	-13.7	-14.1	-14.5	-14.7				

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 January 2018

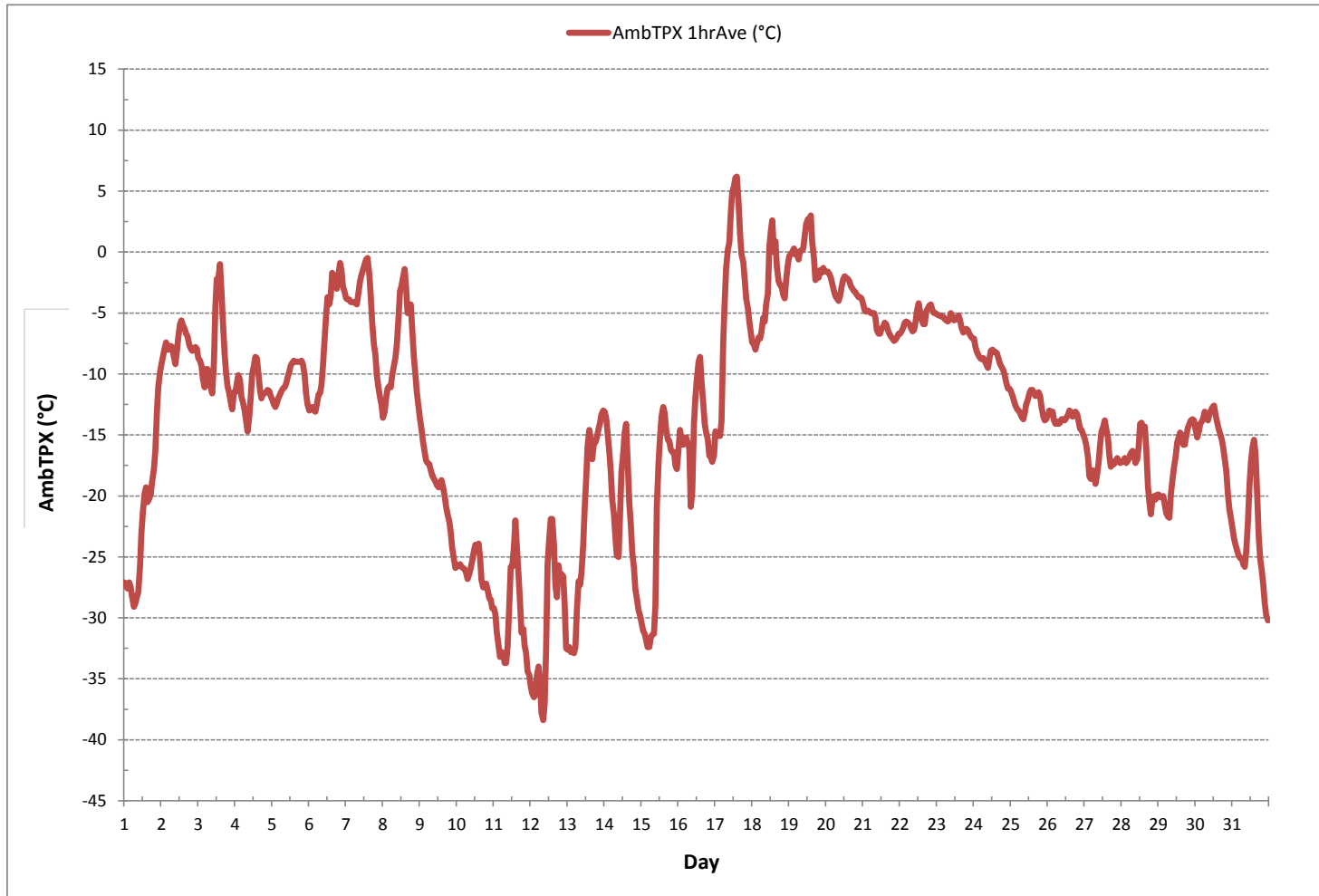


MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-38.4 °C	@ HOUR	8	ON DAY	12
MAXIMUM 1-HR AVERAGE:	6.2 °C	@ HOUR	14	ON DAY	17
MAXIMUM 24-HR AVERAGE:	0.0 °C			ON DAY	19
OPERATIONAL TIME:				744	hrs
AMD OPERATION UPTIME:				100.0	%
STANDARD DEVIATION:	9.0	MONTHLY AVERAGE:		-13.5	°C



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



## ***PRECIPITATION***

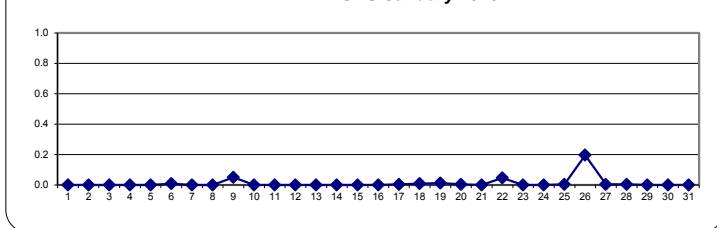
**PRECIPITATION Hourly Averages (mm)**

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.											
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.												
DAY																																							
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	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	0.0	0.0	0.0	0.0	0.0	0.0	24				
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	24			
9	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.5	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	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	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	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	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	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	24			
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	24			
17	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	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	24			
19	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	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	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	24			
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24			
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	24			
26	0.0	0.4	0.2	0.1	0.2	0.2	0.4	0.6	0.3	0.4	0.3	0.5	0.3	0.3	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	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	24			
28	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	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	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	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	24			
HOURLY MAX	0.1	0.4	0.2	0.1	0.2	0.2	0.4	0.6	0.4	0.4	0.4	0.5	0.3	0.3	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2														
HOURLY AVG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0														

**STATUS FLAG CODES**

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

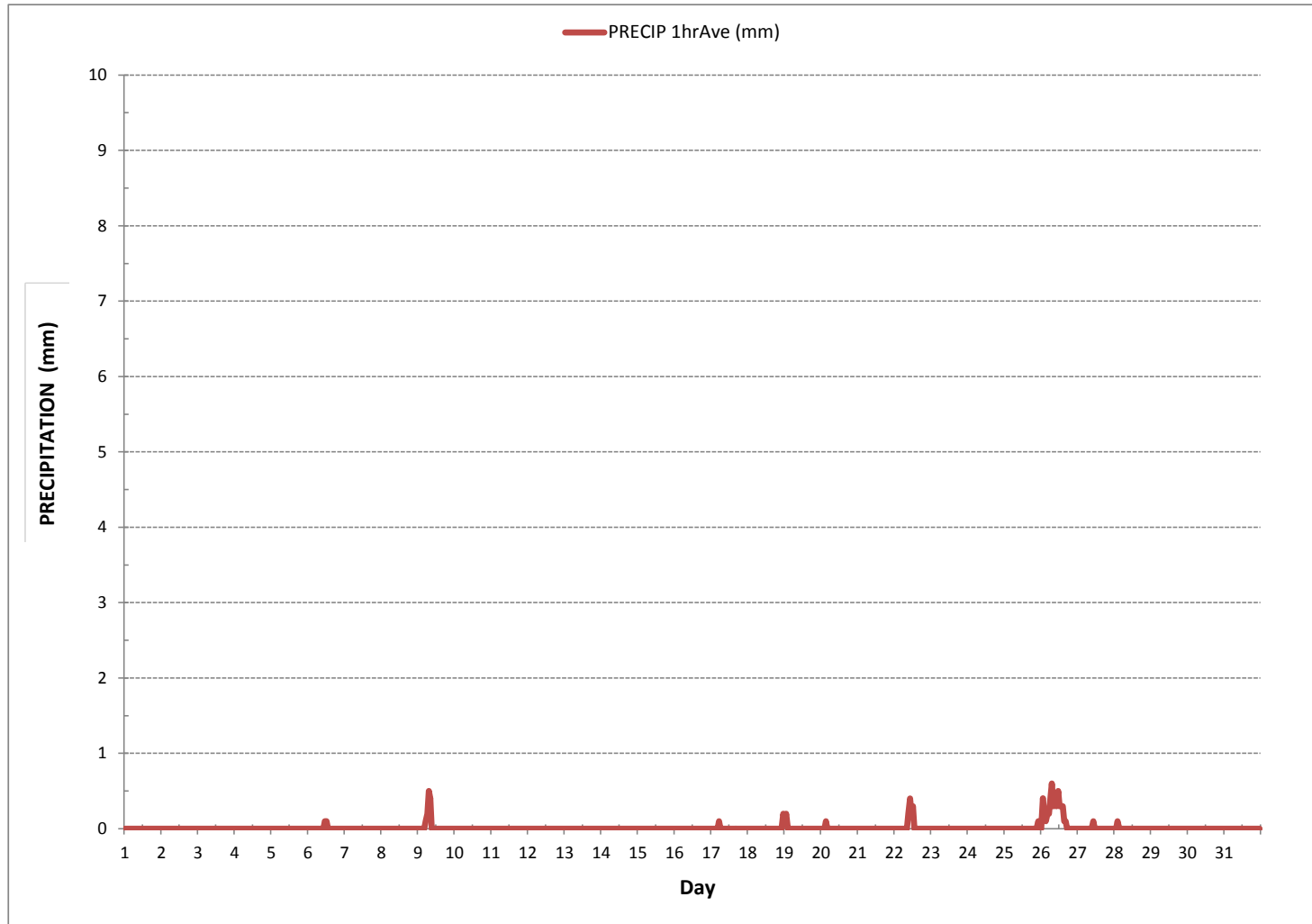
**24 HR AVERAGES January 2018**



**MONTHLY SUMMARY**

MINIMUM 1-HR AVERAGE:	0.0	mm	@ HOUR	0	ON DAY	1
MAXIMUM 1-HR AVERAGE:	0.6	mm	@ HOUR	7	ON DAY	26
MAXIMUM 24-HR AVERAGE:	0.2	mm			ON DAY	26
MONTHLY TOTAL	8.2	mm				
OPERATIONAL TIME:						744 hrs
AMD OPERATION UPTIME:						100.0 %</

**PRECIPITATION Hourly Averages (mm)**



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

## ***SULPHUR DIOXIDE***



## API 100E Sulphur Dioxide Analyzer Calibration

Date:	January 4, 2018	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	943	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	23	°C
Location/Station Name:	Maskwa	Weather Conditions:	Mainly sunny		
Parameter:	Sulphur Dioxide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	12:49	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	17:13	Cal Gas Expiry Date:	July 18, 2019		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		

<b>Analyzer:</b> ID# or Serial Number: 508 Last Calibration Date: December 14, 2017 Previous C.F.: 1.000	Range ppb: 1000 As Found C.F.: 0.996 New C.F.: 0.999
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<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: 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>780</td></tr> <tr><td>Mid</td><td>380</td></tr> <tr><td>Low</td><td>190</td></tr> </table>	Point	ppb	High	780	Mid	380	Low	190
Point	ppb								
High	780								
Mid	380								
Low	190								

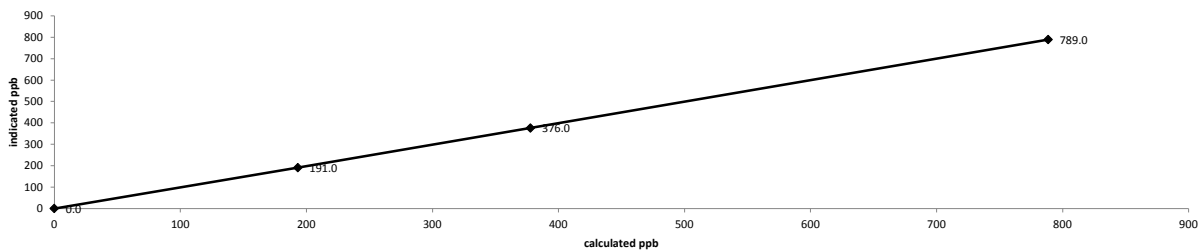
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	4754	0.00	4754	0.0	1.0	n/a
as found high	4853	76.83	4930	788.6	793.0	0.996
adjusted zero	4754	0.00	4754	0.0	0.0	n/a
adjusted high	4853	76.83	4930	788.6	789.0	0.999
mid	4890	36.79	4927	377.8	376.0	1.005
low	4911	18.83	4930	193.3	191.0	1.012
calibrator zero	4754	0.00	4754	0.0	0.0	n/a
<b>Average C.F.=</b>						<b>1.005</b>

**Linear Regression/Calibration Results:**

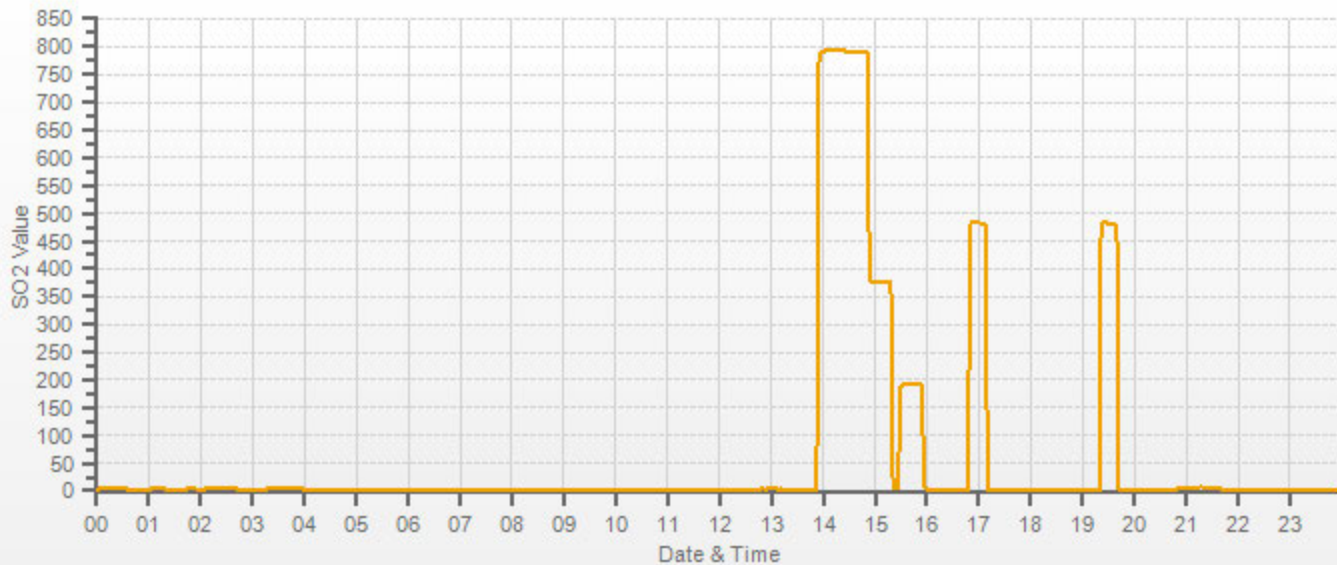
Correlation Coefficient =	1.000	LIMITS
Slope =	0.999	> or = 0.995
b (Intercept as % of full scale)=	0.14%	0.95-1.05
% change in C.F. from last cal=	0.43%	± 3% F.S.
		± 10%

**API 100E Sulphur Dioxide Analyzer Calibration**



<b>As found:</b> Slope: 0.969 Offset: 163.0 Hvps: 483 Rcell Temp: 50.0 Box Temp: 29.9 Pmt Temp: 7.6 Izs Temp: 50.0 Pres: 24.8 Samp Fl: 581 Norm Pmt: 166.5 Uv Lamp: 2401.9 Lamp Ratio: 87.7 Str Lgt: 79.0 Drk Pmt: 10.2 Expected Value: 492.0	<b>As left:</b> Slope: 0.964 Offset: 164.2 Hvps: 483 Rcell Temp: 50.0 Box Temp: 29.8 Pmt Temp: 7.6 Izs Temp: 50.0 Pres: 24.8 Samp Fl: 582 Norm Pmt: 167.0 Uv Lamp: 2401.1 Lamp Ratio: 87.7 Str Lgt: 79.2 Drk Pmt: 10.6 Expected Value: 480.0
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**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: January 4, 2018	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	943	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	23	°C
Location/Station Name: Maskwa	Weather Conditions: Mainly sunny		
Parameter: Hydrogen Sulphide	Calibration Purpose: routine monthly		
Start Time 24 hr. (mst): 12:49	Performed By/Reviewer: Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst): 17:13	Cal Gas Expiry Date: June 14, 2019		
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable):	n/a	

Analyzer:	Range ppb: 100
ID# or Serial Number: 510	As Found C.F.: 1.007
Last Calibration Date: December 14, 2017	New C.F.: 1.001
Previous C.F.: 1.000	

<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	<b>SO2 Scrubber Check (10 minutes):</b> Start/End Time 24 hr.: 13:40 / 13:50 SO2 Analyzer Range: 1000 Target Concentration (ppb): 780 As Found Zero: 0.0 Analyzer Response: (ppb): 0.0 Zero Corrected Result (ppb): 0.0
Point	ppb									
High	78									
Mid	38									
Low	19									

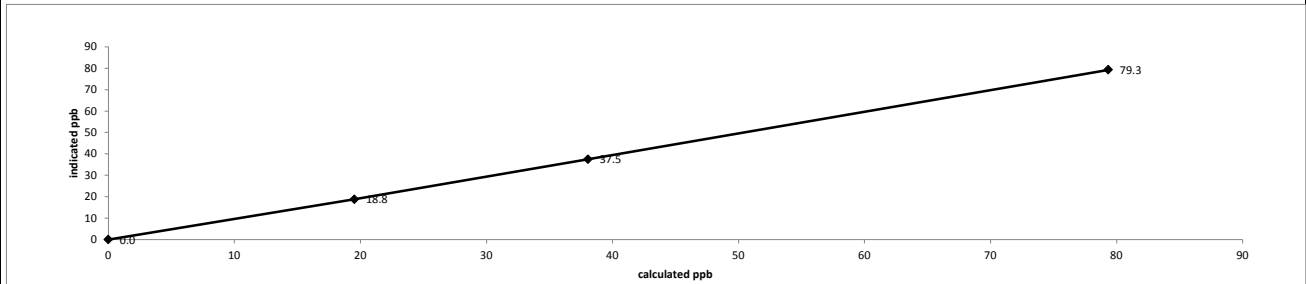
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	7190	0.00	7190	0.0	0.0	n/a
as found high	7124	55.85	7180	79.3	78.8	1.007
adjusted zero	7190	0.00	7190	0.0	0.0	n/a
adjusted high	7124	55.85	7180	79.3	79.3	1.001
mid	7173	26.87	7200	38.1	37.5	1.015
low	7183	13.78	7197	19.5	18.8	1.039
calibrator zero	7190	0.00	7190	0.0	0.0	n/a
<b>Average C.F. =</b>						1.018

**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) = 0.40%	± 3% F.S.
% change in C.F. from last cal = -0.69%	± 10%

**API 101E Hydrogen Sulphide Analyzer Calibration**

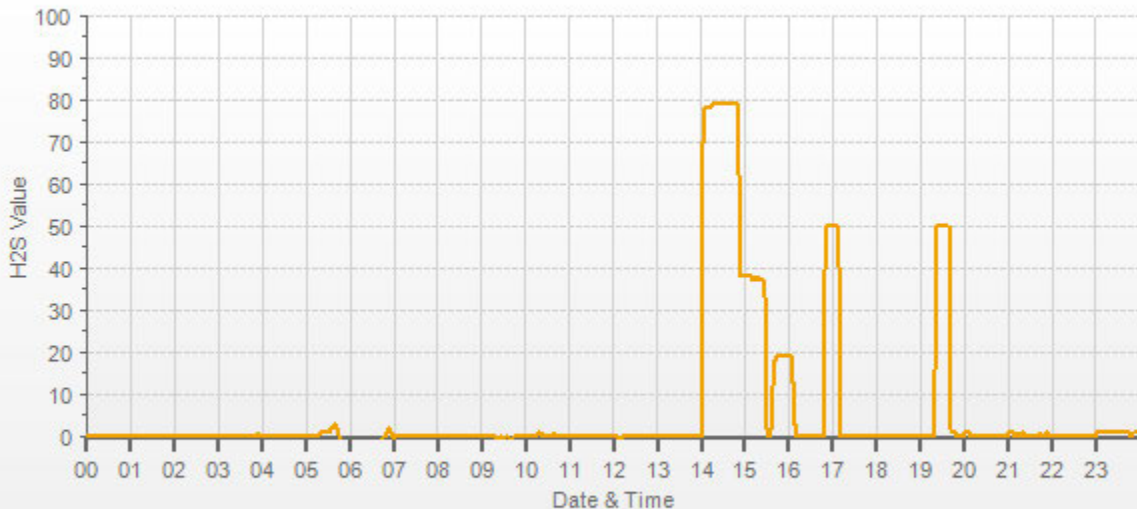


<b>As found:</b> Slope: 1.044 Offset: 34.3 Hvps: 530 Rcell Temp: 50.0 Box Temp: 34.7 Pmt Temp: 8.4 Izs Temp: 45.0 Converter Temp: 314.4 Pres: 20.4 Samp Fl: 531 Uv Lamp: 2890.0 Lamp Ratio: 86.1 Str Lgt: 17.9 Drk Pmt: 34.4 Expected Value: 48.3	<b>As left:</b> Slope: 1.047 Offset: 33.6 Hvps: 530 Rcell Temp: 50.0 Box Temp: 33.9 Pmt Temp: 8.4 Izs Temp: 45.0 Converter Temp: 314.4 Pres: 20.4 Samp Fl: 532 Uv Lamp: 2888.9 Lamp Ratio: 86.0 Str Lgt: 17.6 Drk Pmt: 34.2 Expected Value: 50.1
--	---

**Comments:**

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

H2S[ppb] Station: LICA MASKWA Daily: 18/01/04 Type: AVG 1 Min. [1 Min.]



— H2S[ppb]



## API 101E Hydrogen Sulphide Analyzer Calibration

Date: January 19, 2018	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	922	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name: Maskwa	Weather Conditions: A few clouds		
Parameter: Hydrogen Sulphide	Calibration Purpose: repeat		
Start Time 24 hr. (mst): 10:32	Performed By/Reviewer: Alex Yakupov	Tom Bourque	
End Time 24 hr. (mst): 14:36	Cal Gas Expiry Date: June 14, 2019		
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a		

Analyzer:	Range ppb: 100
ID# or Serial Number: 510	As Found C.F.: 0.975
Last Calibration Date: January 4, 2018	New C.F.: 1.000
Previous C.F.: 1.001	

Calibration Standards:	Standard Calibration Points for Ranges								
Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>78</td></tr> <tr><td>Mid</td><td>38</td></tr> <tr><td>Low</td><td>19</td></tr> </table>	Point	ppb	High	78	Mid	38	Low	19
Point		ppb							
High		78							
Mid		38							
Low	19								
High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018									
Calibrator ID/Expiry Date: Sabio id# 11900613 expires March 16, 2018									
Cal Gas Cylinder I.D. #: EY 0000654									
Cal Gas Conc. (ppm): 10.2									

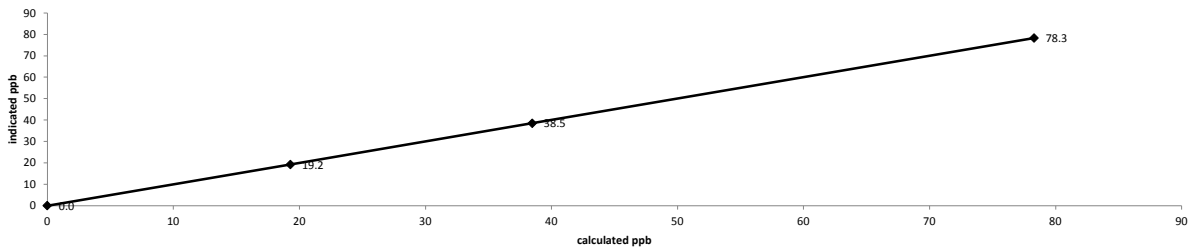
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Calibrator Flow Rates (cc/min)				Calculated	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	Concentration (ppb):		
as found zero	7206	0.00	7206	0.0	0.7	n/a
as found high	7141	55.24	7196	78.3	81.0	0.975
adjusted zero	7206	0.00	7206	0.0	0.0	n/a
adjusted high	7141	55.24	7196	78.3	78.3	1.000
mid	7206	27.29	7233	38.5	38.5	1.000
low	7191	13.63	7205	19.3	19.2	1.005
calibrator zero	7206	0.00	7206	0.0	0.0	n/a
Average C.F. =						1.002

**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) = 0.04%	± 3% F.S.
% change in C.F. from last cal = 2.59%	± 10%

**API 101E Hydrogen Sulphide Analyzer Calibration**

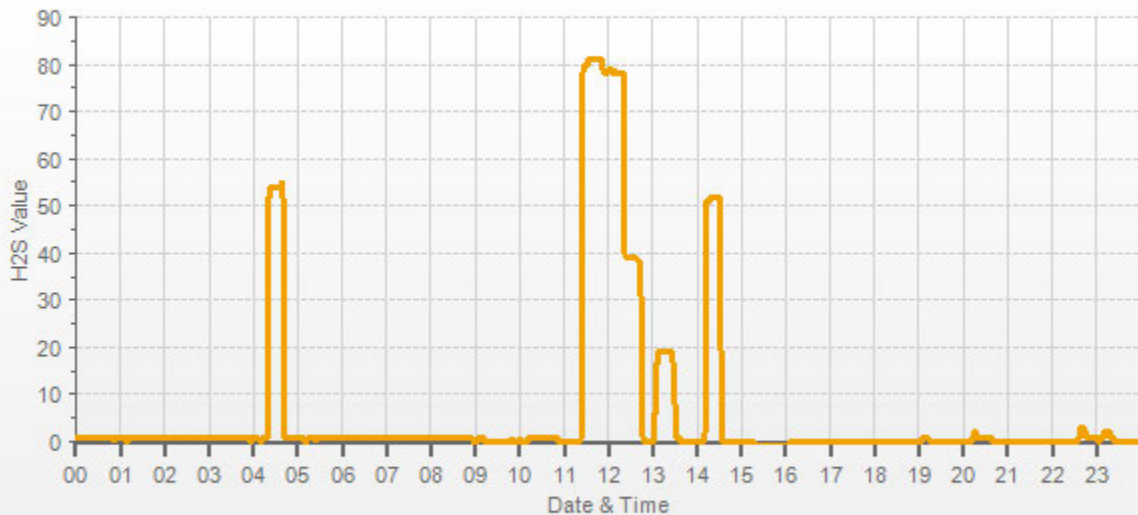


	<b>As found:</b>		<b>As left:</b>
Slope:	1.047	Slope:	1.022
Offset:	33.6	Offset:	34.9
Hvps:	530	Hvps:	530
Rcell Temp:	50.0	Rcell Temp:	50.0
Box Temp:	35.4	Box Temp:	36.7
Pmt Temp:	8.4	Pmt Temp:	8.4
Izs Temp.:	45.0	Izs Temp.:	45.0
Converter Temp:	314.6	Converter Temp:	314.7
Pres:	19.7	Pres:	19.7
Samp Fl:	519	Samp Fl:	518
Uv Lamp:	2878.6	Uv Lamp:	2872.4
Lamp Ratio:	85.7	Lamp Ratio:	85.6
Str Lgt:	17.6	Str Lgt:	17.8
Drk Pmt:	34.1	Drk Pmt:	34.7
Expected Value:	50.1	Expected Value:	51.8

**Comments:** The SO2 scrubber check was not performed, see comments below.  
The manifold blower was found to be working normally.

Repeat calibration was completed to correct positive drift (SPAN readings increased to +8.6%).

H2S[ppb] Station: LICA MASKWA Daily: 18/01/19 Type: AVG 1 Min. [1 Min.]



— H2S[ppb]

***TOTAL HYDROCARBON***



## Thermo 51C Total Hydrocarbon Analyzer Calibration

Date: January 5, 2018	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	942	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	23	°C
Location/Station Name: Maskwa	Weather Conditions: A few clouds		
Parameter: Total Hydrocarbon	Calibration Purpose: routine monthly		
Start/End Time 24 hr. (mst): 10:18 / 14:16	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.: 0.913
Last Calibration Date: December 14, 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: 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>x</sub> equivalents (ppm): 569.3      1159.3	

Point	Target ppm
High	38
Mid	18
Low	9

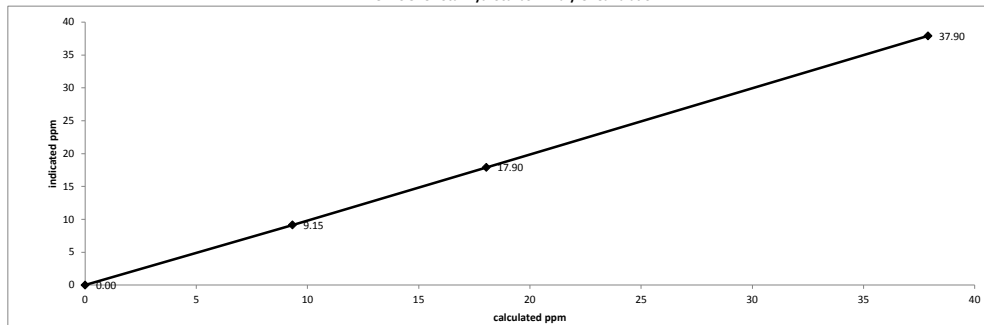
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration: (ppm)	Indicated Concentration: (ppm)	Correction Factors:
	Diluent	Cal Gas	Total			
as found zero	2475	0.00	2475	0.0	0.10	n/a
as found high	2478	83.76	2562	37.90	41.62	0.913
adjusted zero	2475	0.00	2475	0.00	0.00	n/a
adjusted high	2478	83.76	2562	37.90	37.90	1.000
mid	2479	39.19	2518	18.04	17.90	1.008
low	2478	20.09	2498	9.32	9.15	1.019
calibrator zero	2475	0.00	2475	0.0	0.00	n/a
Average C.F. =						1.009

Linear Regression/Calibration Results:

Correlation Coefficient = 1.000	LIMITS > or = 0.995
Slope = 0.999	0.95-1.05
b (Intercept as % of full scale) = 0.20%	± 3% F.S.
% change in C.F. from last cal = 8.72%	± 10%

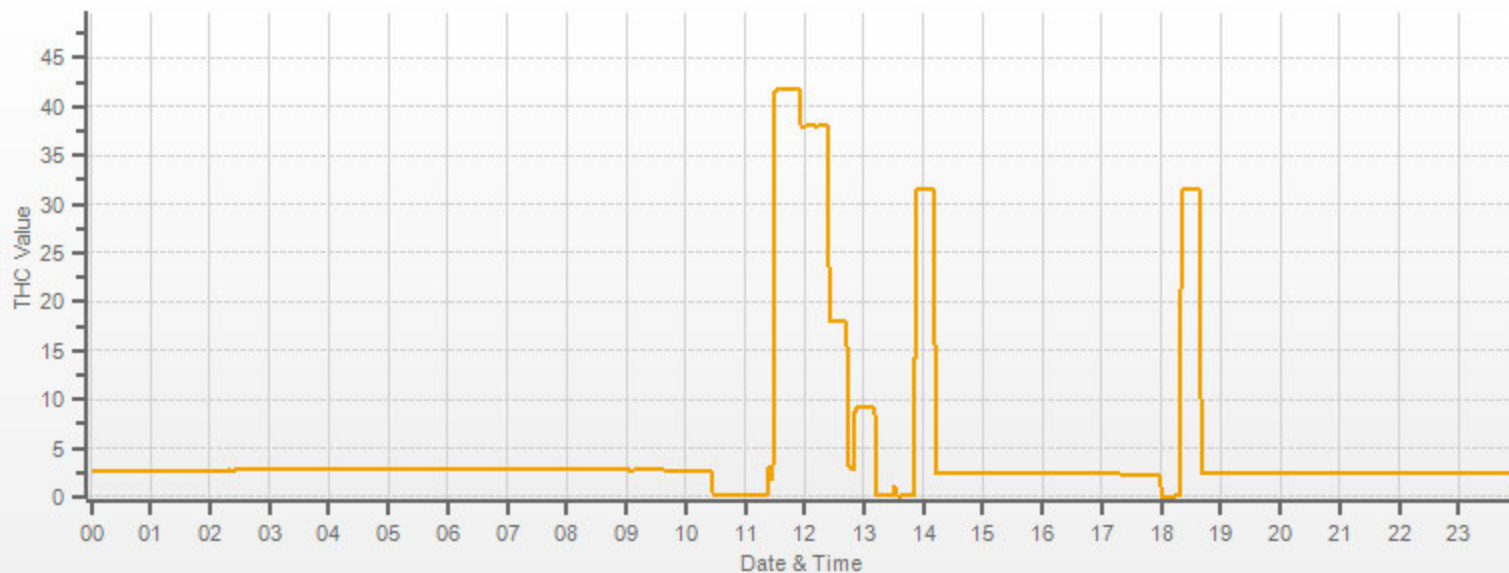
Thermo 51C Total Hydrocarbon Analyzer Calibration



<p style="text-align: center;">As found:</p> H2 cylinder (psi): 750 H2 cylinder reg set (psi): 22 Span Cylinder (psi): 1500 Span Cylinder Reg Set (psi): 22 Zero Air Gen Pressure: 40 measurement alarms: None service alarms: None cnt: 1411 rng: 1 try: 2 flm: 194.0 det: 125.4 Flame: 194 Filter: 125 Base: 125 Sample psi: 07.52 Internal Air Pressure: 20 Internal Fuel Pressure: 13 Measured Flow: 0.9291 Expected Value: 34.30	<p style="text-align: center;">As left:</p> H2 cylinder (psi): 750 H2 cylinder reg set (psi): 22 Span Cylinder (psi): 1500 Span Cylinder Reg Set (psi): 22 Zero Air Gen Pressure: 40 measurement alarms: None service alarms: None cnt: 1405 rng: 1 try: 2 flm: 193.7 det: 125.3 Flame: 193 Filter: 125 Base: 125 Sample psi: 07.52 Internal Air Pressure: 20 Internal Fuel Pressure: 13 Measured Flow: n/a Expected Value: 31.40
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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]



***NITROGEN DIOXIDE***



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

Date: January 4, 2018	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	943	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	23	°C
Location/Station Name: Maskwa	Weather Conditions: Mainly sunny		
Start/End Time 24 hr. (mst): 12:49 / 19:45	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: 2051	Previous C.F.: As Found C.F.: New C.F.:
Last Calibration Date: December 14, 2017	NO = 1.000 0.995 1.000
Range ppb: 1000	NO <sub>2</sub> = 1.000 1.004 1.000
	NOx = 1.000 0.995 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 104222 Cal Gas Conc. (ppm): 50.7   50.9	Standard Calibration Points for a Range of: 1000 ppb																								
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target 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 NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	4754	0.0	4754	0	0	0.0	0.0	n/a	n/a
as found high	4853	76.8	4930	790.1	793.2	794.0	797.0	0.995	0.995
adjusted zero	4754	0.00	4754	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4853	76.83	4930	790.1	793.2	790.0	793.0	1.000	1.000
mid	4890	36.79	4927	378.6	380.1	372.0	374.0	1.018	1.016
low	4911	18.83	4930	193.6	194.4	187.0	189.0	1.036	1.029
calibrator zero	4754	0.00	4754	0	0	0.0	0.0	n/a	n/a
Average C.F.=								1.018	1.015

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	4853	76.83	4930	0.0	789.0	794.0	5.0	0.0	5.0	
as found high NO2	4853	76.83	4930	470.0	292.0	792.0	500.0	497.0	495.0	1.004
adjusted high NO2	4853	76.83	4930	470.0	291.0	794.0	503.0	498.0	498.0	1.000
gpt mid	4853	76.83	4930	255.0	517.0	794.0	277.0	272.0	272.0	1.000
gpt low	4853	76.83	4930	103.0	681.0	794.0	113.0	108.0	108.0	1.000
Average NO <sub>2</sub> C.F.=									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	0.999	1.008	0.95-1.05
b (Intercept as % of full scale)=	-0.40%	-0.34%	0.30%	± 3% F.S.
% change in C.F. from last cal=	0.49%	0.47%	-0.40%	± 10%
NO <sub>2</sub> converter efficiency			0.99	0.96 to 1.04

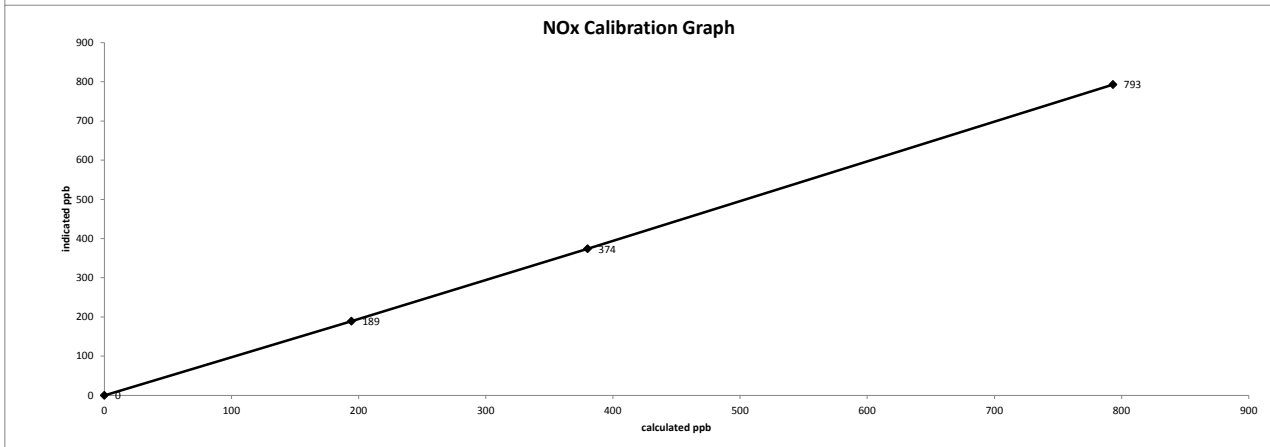
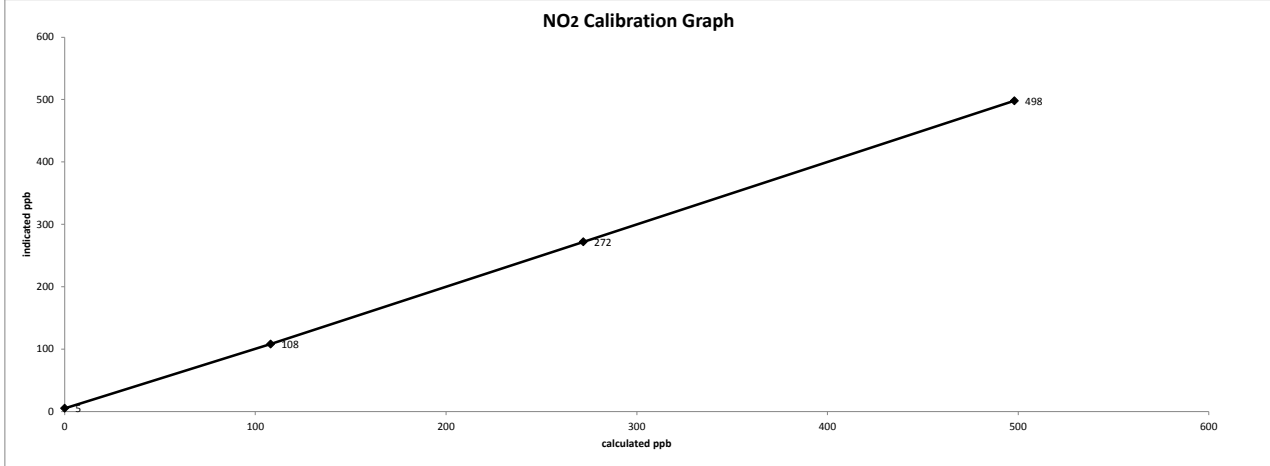
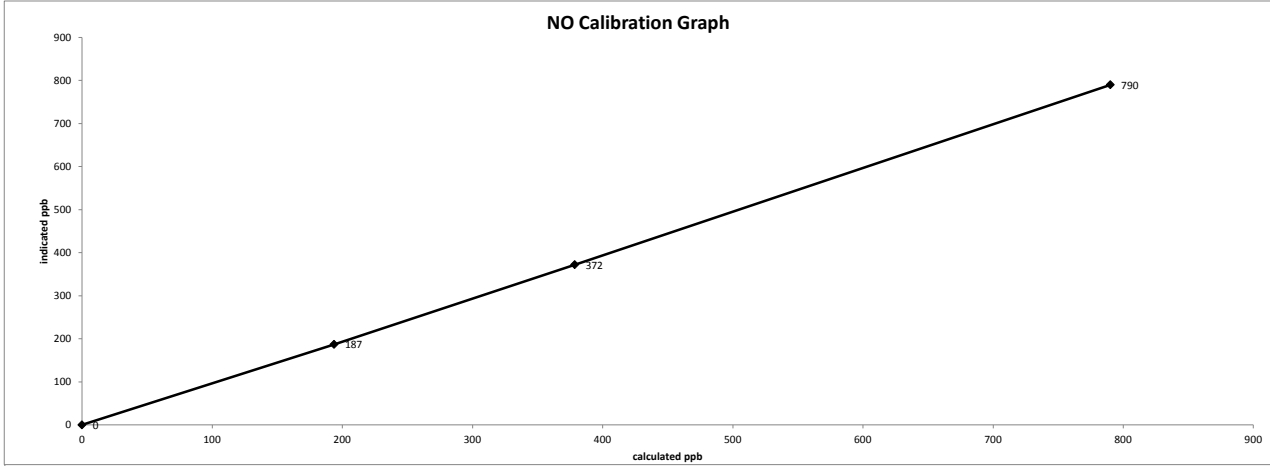
As found:	As left:
NOx SLOPE: 1.049	NOx SLOPE: 1.042
NOx OFFS: -2.1	NOx OFFS: -3.5
NO SLOPE: 1.048	NO SLOPE: 1.041
NO OFFS: -3.3	NO OFFS: -4.0
SAMP FLW: 503	SAMP FLW: 502
OZONE FL: 81	OZONE FL: 81
NORM PMT: -2.7	NORM PMT: -2.1
AZERO: 46.9	AZERO: 46.9
HVPS: 707	HVPS: 707
DCPS: 2578	DCPS: 2571
RCELL: 50.4	RCELL: 49.8
BOX TEMP: 28.2	BOX TEMP: 28.2
IZS TEMP: 43.3	IZS TEMP: 43.3
MOLY TEMP: 315.1	MOLY TEMP: 315.6
RCEL: 7.0	RCEL: 7.0
SAMP: 29.6	SAMP: 29.9
Expected Value NO: 7	Expected Value NO: 7
Expected Value NO <sub>2</sub> : 363	Expected Value NO <sub>2</sub> : 378
Expected Value NOx: 370	Expected Value NOx: 385

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

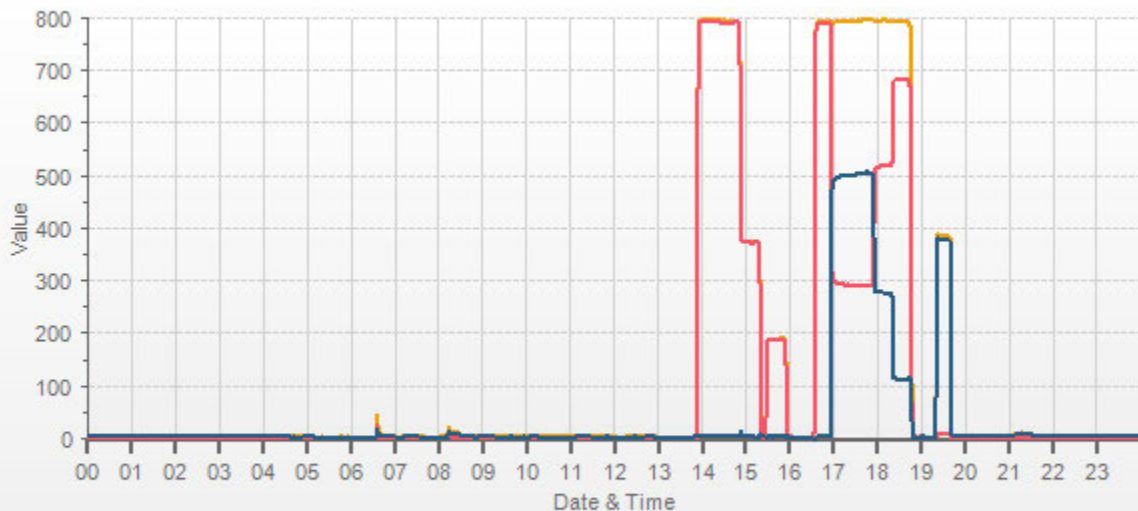
Date: January 4, 2018  
Company/Airshed: LICA  
Location/Station Name: Maskwa

Start/End Time 24 hr. (mst): 12:49 / 19:45  
Calibration Purpose: routine monthly  
Calibration Method: Gas Dilution & Gas Phase Titration

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



Station: LICA MASKWA Daily: 18/01/04 Type: AVG 1 Min. [1 Min.]



— NOX[ppb] — NO[ppb] — NO2[ppb]

## ***WIND SYSTEM***



# Meteorological Sensor Audit/Calibration

## Location Information

Company:	LICA	Performed By:	Alex Yakupov
Audit Location:	Maskwa	Reviewed By:	Rob Fisher
Audit Date:	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
The audit meets AMD requirements.				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>		

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

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO <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)*

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.

<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>1868</u>
Serial/AMU Number	<u>1809</u>	Last Calibration Date	<u>March 15, 2017</u>
SRM Gas Cylinder No.	<u>CAL018140</u>	Full Scale (ppm)	<u>1.0</u>
Cylinder Conc. (ppm)	<u>48.79</u>	Cylinder Gas Expiry Date	<u>March 28, 2019</u>

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton  
Operator Signature: [Signature]

Date: March 16, 2017  
Location: McIntyre Center Edmonton

## ***CALIBRATION GASES***



# Calibration Gas Audit

## Single Component Cylinder Gas

File No. 2016-335CGA

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

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

Expiry Date: July 2019

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model: <u>R&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>0.01662</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
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	
		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>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>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
<b>Average Cylinder Concentration:</b>						<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***  
***INTERNAL AUDIT RESULTS***

COMPANY: LICA PLANT: Maskwa DATE: January 18, 2018

Station Location: UTM Coordinates: 54.604935° , -110.452637°  
 Elevation (m): 607.8m  
 Declination: 12° 53.52' East

**GENERAL**

	Yes	No	n/a	Comments:
Has site location changed from previous audit?		x		
Is site secure?	x			
Are station operating conditions adequate?	x			
Last twelve month's of calibrations available?	x			
All applicable SOP's available in station?				
Site documentation up to date?	x			

**DATA ACQUISITION**

	Yes	No	n/a	Comments:
Are strip charts in use?		x		
Is a digital data logger in use?	x			
Is a telemetry system for data acquisition in use?	x			

**TRAILER COMPONENTS**

	Yes	No	n/a	Comments:
Is a glass sampling manifold installed?	x			
Is sampling manifold clean and free of chips and cracks?	x			
Is a trap in place?	x			
Are spare manifold ports capped?	x			
Is manifold pump properly installed and operative?	x			
If horizontal, is the manifold mounted at a slight upward angle to prevent moisture from getting in to the lines?			x	Vertical installed manifold
Do sample lines extend halfway into manifold?	x			
Are monitor sampling lines connected to manifold?	x			
Are sampling lines clean?	x			
Are monitors properly mounted and secure?	x			
Are monitors properly exhausted from room or scrubbed (NOx pump inlet scrubbed and dated)?	x			
Are zero and span systems operational?	x			

**Meteorological**

	Yes	No	n/a	Comments:
Is wind equipment properly oriented?	x			
Is the wind equipment functioning properly?	x			

	Indicated Value:	Audit Value:	% Difference	Scalar Difference:
Station Temperature °C	24.47	24.52	0.20	0.05
Barometric Pressure	918.1	920.4	0.25	2.30
Wind Speed (kph)	5	0~10	n/a	n/a
Wind Direction (Deg)	289	W	n/a	n/a
Relative Humidity %	66	57.2	n/a	n/a
Ambient Temperature °C	0.1	1.5	93.33	1.40
Solar Radiation kW/m <sup>2</sup>	n/a	n/a	n/a	n/a
Precipitation (Tipping Bucket mm)	1	1	n/a	n/a

Recommendations: Ambient temperature difference 1.4 °C.

AUDITOR: Limin Li





## API 100E Sulphur Dioxide Analyzer Calibration

Date:	January 18, 2018	Barometer/B.P./units:	Brunton 05535 expires December 15, 2018	27.23	inHg
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 160348895 expires April 8, 2018	24.6	°C
Location/Station Name:	Maskwa	Weather Conditions:	Mainly sunny		
Parameter:	Sulphur Dioxide	Calibration Purpose:	shut down		
Start Time 24 hr. (mst):	13:08	Performed By/Reviewer:	Limin Li	Tom Bourque	
End Time 24 hr. (mst):	14:52	Cal Gas Expiry Date:	October 24, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		

Analyzer:	ID# or Serial Number:	508	Range ppb:	1000
	Last Calibration Date:	January 4, 2018	As Found C.F.:	0.970
	Previous C.F.:	0.999	New C.F.:	n/a

Calibration Standards:	Standard Calibration Points for Ranges
Low Flow Meter ID/Expiry Date:	Defender Low 152019 expires December 13, 2018
High Flow Meter ID/Expiry Date:	Defender High 148944 expires December 13, 2018
Calibrator ID/Expiry Date:	Environics id# 5212 expires February 14, 2018
Cal Gas Cylinder I.D. # :	LL 104225
Cal Gas Conc. (ppm):	49.2

Point	ppb
High	780
Mid	380
Low	190

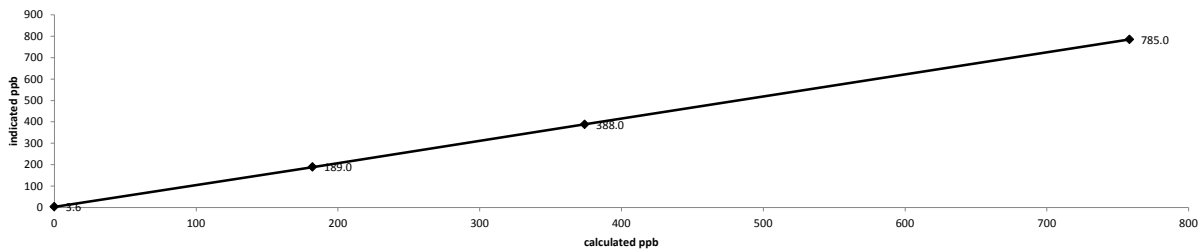
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	5007	0.00	5007	0.0	3.6	n/a
as found high	4953	77.54	5031	758.3	785.0	0.970
mid	4992	38.24	5030	374.0	388.0	0.973
low	5020	18.65	5039	182.1	189.0	0.982
Average C.F. =						0.975

**Linear Regression/Calibration Results:**

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.970		0.90-1.10
b (Intercept as % of full scale) =	-0.24%		± 3% F.S.
% change in C.F. from last cal =	2.86%		± 10%

**API 100E Sulphur Dioxide Analyzer Calibration**

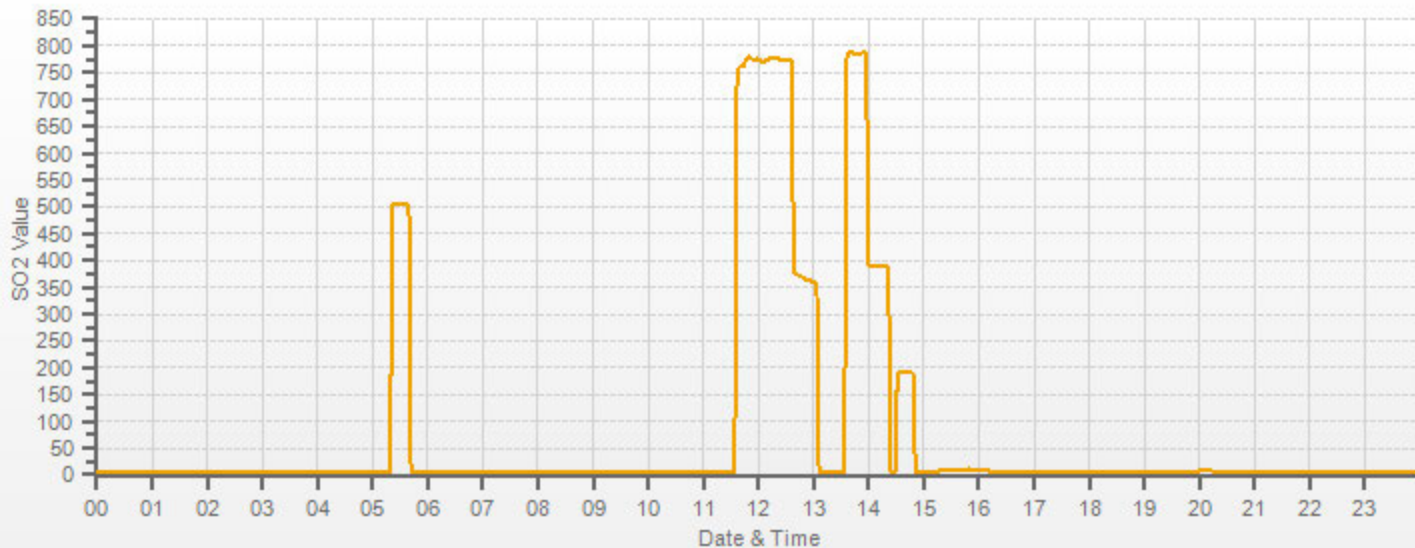


As found:	As left:
Slope:	0.964
Offset:	164.2
Hvps:	483 V
Rcell Temp:	50.0 °C
Box Temp:	30.9 °C
Pmt Temp:	7.7 °C
Izs Temp:	50.0 °C
Pres:	23.9 IN-HG-A
Samp Fl:	570 CC/M
Norm Pmt:	171.3 MV
Uv Lamp:	2386
Lamp Ratio:	87.2 %
Str Lgt:	79.2 PPB
Drk Pmt:	10.4 MV
Drk Lmp:	-0.7 MV
Expected Value:	480.0

**Comments:**

The manifold blower was found to be working normally.

Unstable with calibrator API700 sn:829. Change calibrator Environics 6100 sn:5212 and redo the calibration starting 13:08. This is an internal audit. Calibration point order is the same as a shutdown



— SO2[ppb]



## API 101E Hydrogen Sulphide Analyzer Calibration

Date: January 18, 2018	Barometer/B.P./units: Brunton 05535 expires December 15, 2018	27.23	inHg
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 160348895 expires April 8, 2018	24.6	°C
Location/Station Name: Maskwa	Weather Conditions: Mainly sunny		
Parameter: Hydrogen Sulphide	Calibration Purpose: shut down		
Start Time 24 hr. (mst): 11:00	Performed By/Reviewer: Limin Li	Tom Bourque	
End Time 24 hr. (mst): 13:40	Cal Gas Expiry Date: August 23, 2020		
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): Internal		

Analyzer:	Range ppb: 100
ID# or Serial Number: 510	As Found C.F.: 0.926
Last Calibration Date: January 4, 2018	New C.F.: n/a
Previous C.F.: 1.001	

Calibration Standards: Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: Sabio id# 17200415 expires May 16, 2018 Cal Gas Cylinder I.D. #: LL119500 Cal Gas Conc. (ppm): 9.8	<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								

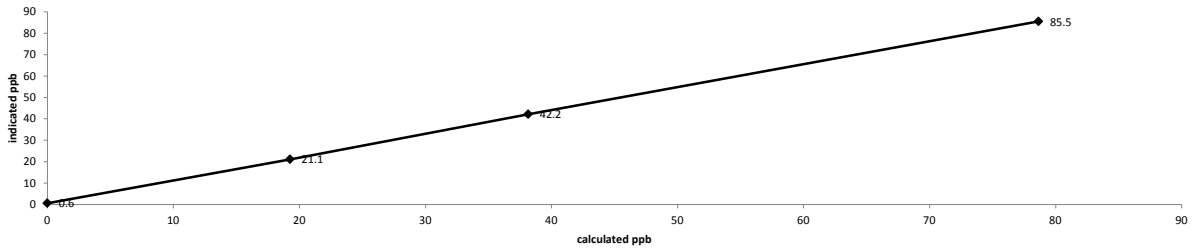
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Calibrator Flow Rates (cc/min)				Calculated	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	Concentration (ppb):		
as found zero	7388	0.00	7388	0.0	0.6	n/a
as found high	7324	59.25	7383	78.6	85.5	0.926
mid	7378	28.84	7407	38.2	42.2	0.917
low	7390	14.55	7405	19.3	21.1	0.939
<b>Average C.F. =</b>						<b>0.928</b>

**Linear Regression/Calibration Results:**

Correlation Coefficient =	1.000		LIMITS
Slope =	0.925		> or = 0.995
b (Intercept as % of full scale) =	-0.53%		0.90-1.10
% change in C.F. from last cal =	7.46%		± 3% F.S.
			± 10%

**API 101E Hydrogen Sulphide Analyzer Calibration**

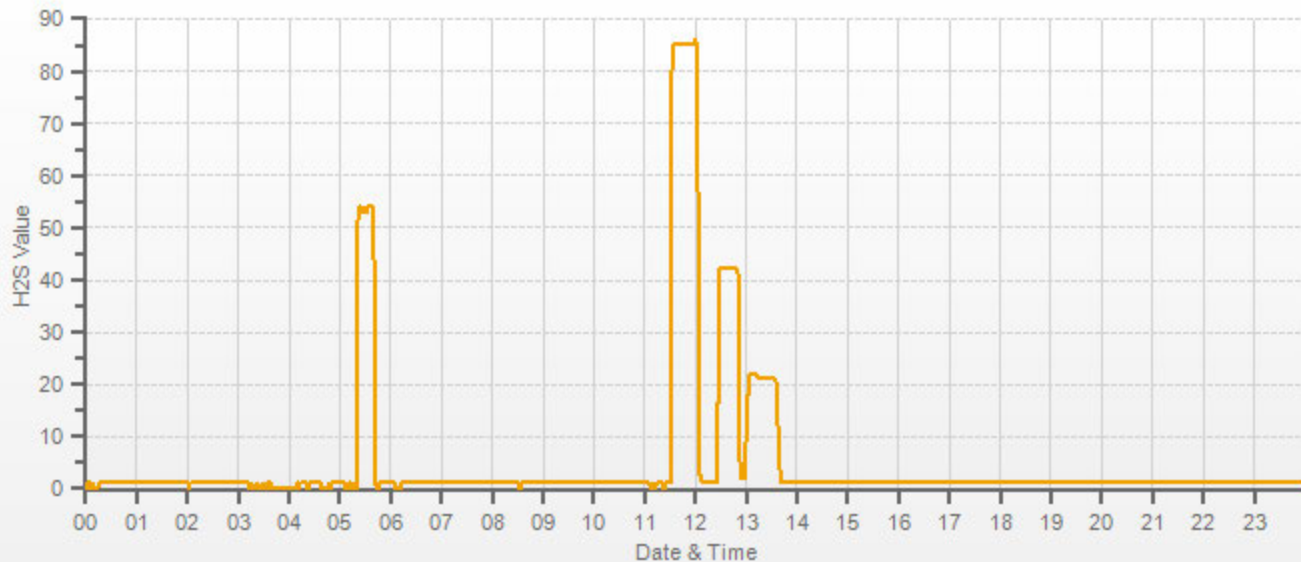


<b>As found:</b> Slope: 1.044 Offset: 34.3 Hvps: 530 Rcell Temp: 50.0 Box Temp: 34.7 Pmt Temp: 8.4 Izs Temp: 45.0 Converter Temp: 314.4 Pres: 20.4 Samp Fl: 531 Uv Lamp: 2878.5 MV Lamp Ratio: 85.7 % Str Lgt: 17.6 PPB Drk Pmt: 34.4 MV Drk Lmp: -2.1 MV Expected Value: 50.1	<b>As left:</b> Slope: 1.044 Offset: 34.3 Hvps: 530 Rcell Temp: 50.0 Box Temp: 34.7 Pmt Temp: 8.4 Izs Temp: 45.0 Converter Temp: 314.4 Pres: 20.4 Samp Fl: 531 Uv Lamp: 2878.5 MV Lamp Ratio: 85.7 % Str Lgt: 17.6 PPB Drk Pmt: 34.4 MV Drk Lmp: -2.1 MV Expected Value: 50.1
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**Comments:**

The manifold blower was found to be working normally.

This is an internal audit. Calibration point order is the same as a shutdown verification.



— H2S[ppb]



# Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	January 18, 2018	Barometer/B.P./units:	Brunton 05535 expires December 15, 2018	27.18	inHg
Company/Airshed:	LCA	Thermometer/Station Temp:	F.S. 160348895 expires April 8, 2018	24.6	°C
Location/Station Name:	Maskwa	Weather Conditions:	Mainly sunny		
Parameter:	Total Hydrocarbon	Calibration Purpose:	shut down		
Start/End Time 24 hr. (mst):	13:40 / 15:21	Performed By/Reviewer:	Limin Li	Tom Bourque	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	October 28, 2025		

Analyzer:	
ID# or Serial Number:	436609738
Range ppm:	50
Last Calibration Date:	January 5, 2018
As Found C.F.:	1.007
Previous Cal High Point C.F.:	1.000
New C.F.:	n/a

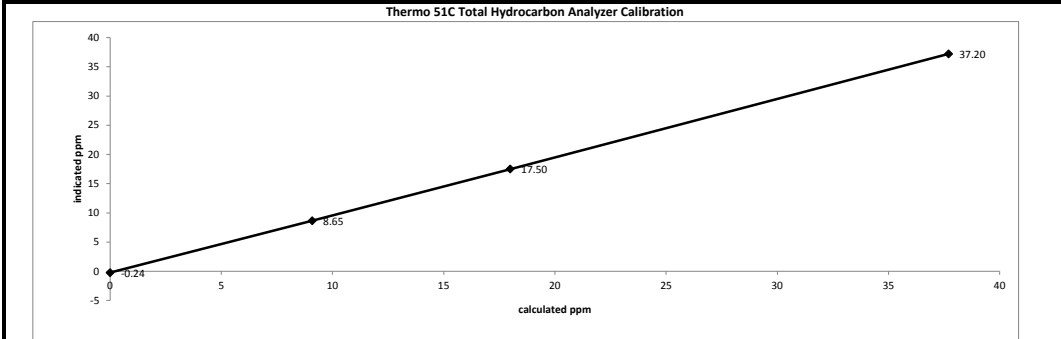
Calibration Standards:	
Low Flow Meter ID/Expiry Date:	Defender Low 152019 expires December 13, 2018
High Flow Meter ID/Expiry Date:	Defender High 148944 expires December 13, 2018
Calibrator ID/Expiry Date:	API id# 829 expires January 27, 2018
Cal Gas Cylinder I.D. #:	LL 119471
CH <sub>4</sub> /C <sub>3</sub> H <sub>8</sub> Cylinder Conc. (ppm):	599.0      207.0
CH <sub>4</sub> as propane/total CH <sub>4</sub> equivalents (ppm):	569.3      1168.3
Standard Calibration Points for a Range of: 50 ppm	
Point	Target ppm
High	38
Mid	18
Low	9

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

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	Diluent	Cal Gas	Total	(ppm)	(ppm)	
as found zero	2479	0.00	2479	0.0	-0.24	n/a
as found high	2401	80.06	2481	37.70	37.20	1.007
mid	2441	38.18	2479	17.99	17.50	1.014
low	2460	19.29	2479	9.09	8.65	1.023
Average C.F. =						1.015

**Linear Regression/Calibration Results:**

Correlation Coefficient =	1.000	LIMITS
Slope =	1.006	> or = 0.995
b (Intercept as % of full scale) =	0.65%	0.90-1.10
% change in C.F. from last cal =	-0.69%	± 3% F.S.
		± 10%

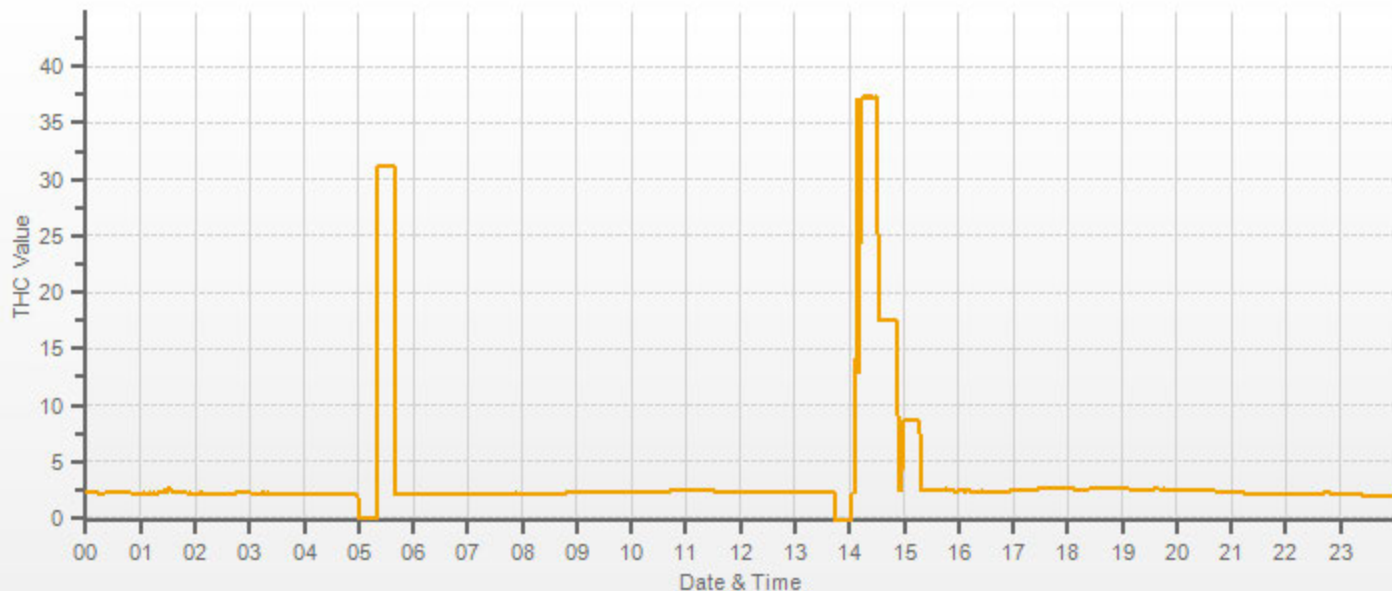


<b>As found:</b>		<b>As left:</b>	
H2 cylinder (psi):	350	H2 cylinder (psi):	350
H2 cylinder reg set (psi):	22	H2 cylinder reg set (psi):	22
Span Cylinder (psi):	1250	Span Cylinder (psi):	1250
Span Cylinder Reg Set (psi):	22	Span Cylinder Reg Set (psi):	22
Zero Air Gen Pressure:	40	Zero Air Gen Pressure:	40
measurement alarms:	None	measurement alarms:	None
service alarms:	None	service alarms:	None
cnt:	3021	cnt:	3021
rng:	1	rng:	1
try:	2	try:	2
flm:	190.3 °C	flm:	190.3 °C
det:	125.8 °C	det:	125.3 °C
Flame:	190 °C	Flame:	190 °C
Filter:	125 °C	Filter:	125 °C
Base:	125 °C	Base:	125 °C
Sample psi:	07.52 PSI	Sample psi:	07.52 PSI
Internal Air Pressure:	20 PSI	Internal Air Pressure:	20 PSI
Internal Fuel Pressure:	13 PSI	Internal Fuel Pressure:	13 PSI
Measured Flow:	0.9291 SLPM	Measured Flow:	n/a
Expected Value:	31.40	Expected Value:	31.40

Comments:

The manifold blower was found to be working normally.

This is an internal audit. Calibration point order is the same as a shutdown verification.



— THC[ppm]



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

Date: January 18, 2018	Barometer/B.P./units: Brunton 05535 expires December 15, 2018	27.23	inHg
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 160348895 expires April 8, 2018	24.6	°C
Location/Station Name: Maskwa	Weather Conditions: Mainly sunny		
Start/End Time 24 hr. (mst): 13:08 / 17:06	Calibration Purpose: shut down		
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Limin Li Tom Bourque		
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: October 24, 2020		

Analyzer:		<b>Correction Factors:</b>		
ID# or Serial Number: 2051	NO =	Previous C.F.: 1.000	As Found C.F.: 0.967	New C.F.: n/a
Last Calibration Date: January 4, 2018	NO <sub>2</sub> =	1.000	0.994	n/a
Range ppb: 1000	NOx =	1.000	0.967	n/a

Calibration Standards:				
Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018	Standard Calibration Points for a Range of: 1000 ppb			
High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018	Point	Target NO (ppb)	Target NO <sub>2</sub> (ppb)	Cc Ozone ?
Calibrator ID/Expiry Date: Envionics id# 5212 expires February 14, 2018	High	780	500	n/a
Cal Gas Cylinder I.D. #: LL 104225	Mid	380	275	n/a
Cal Gas Conc. (ppm): 51.5 51.6	Low	190	100	n/a
	Extra Point #1	n/a	n/a	n/a
	Extra Point #2	n/a	n/a	n/a

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	5007	0.0	5007	0	0	0.1	0.3	n/a	n/a
as found high	4953	77.5	5031	793.7	795.3	821.0	823.0	0.967	0.967
mid	4992	38.24	5030	391.5	392.3	400.0	401.0	0.979	0.979
low	5020	18.65	5039	190.6	191.0	191.0	192.0	0.998	0.996
<b>Average C.F. =</b>								0.981	0.981

**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	4954	77.50	5031	0.0	816.0	819.0	3.0	0.1	3.0	
as found high NO <sub>2</sub>	4954	77.50	5031	500.0	312.0	822.0	510.0	504.0	507.0	0.994
gpt mid	4954	77.50	5031	270.0	543.0	822.0	279.0	273.0	276.0	0.989
gpt low	4954	77.50	5031	95.0	722.0	821.0	99.0	94.0	96.0	0.979
<b>Average NO<sub>2</sub> C.F. =</b>									0.987	

**Linear Regression/Calibration Results:**

	NO	NOx	NO <sub>2</sub>	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.965	0.965	0.999	0.90-1.10
b (Intercept as % of full scale) =	-0.34%	-0.31%	0.25%	± 3% F.S.
% change in C.F. from last cal =	3.31%	0.59%	3.33%	± 10%
NO <sub>2</sub> converter efficiency			0.99	0.96 to 1.04

<p style="text-align: center;"><b>As found:</b></p> NOx SLOPE: 1.042 NOx OFFS: -3.5 NO SLOPE: 1.041 NO OFFS: -4.0 SAMP FLW: 484 CC/M OZONE FL: 79 CC/M NORM PMT: -0.4 MV AZERO: 46.8 MV HVPS: 707 V DCPS: 2570 MV RCCELL: 50.4 °C BOX TEMP: 29.4 °C IZS TEMP: 43.3 °C MOLY TEMP: 315.5 °C RCEL: 6.9 IN-HG-A SAMP: 28.8 IN-HG-A 0 PMT:6.5 °C Expected Value NO: 7 Expected Value NO <sub>2</sub> : 378 Expected Value NOx: 385	<p style="text-align: center;"><b>As left:</b></p> NOx SLOPE: 1.042 NOx OFFS: -3.5 NO SLOPE: 1.041 NO OFFS: -4.0 SAMP FLW: 484 CC/M OZONE FL: 79 CC/M NORM PMT: -0.4 MV AZERO: 46.8 MV HVPS: 707 V DCPS: 2570 MV RCCELL: 50.4 °C BOX TEMP: 29.4 °C IZS TEMP: 43.3 °C MOLY TEMP: 315.5 °C RCEL: 6.9 IN-HG-A SAMP: 28.8 IN-HG-A 0 PMT:6.5 °C Expected Value NO: 7 Expected Value NO <sub>2</sub> : 378 Expected Value NOx: 385
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**Comments:**

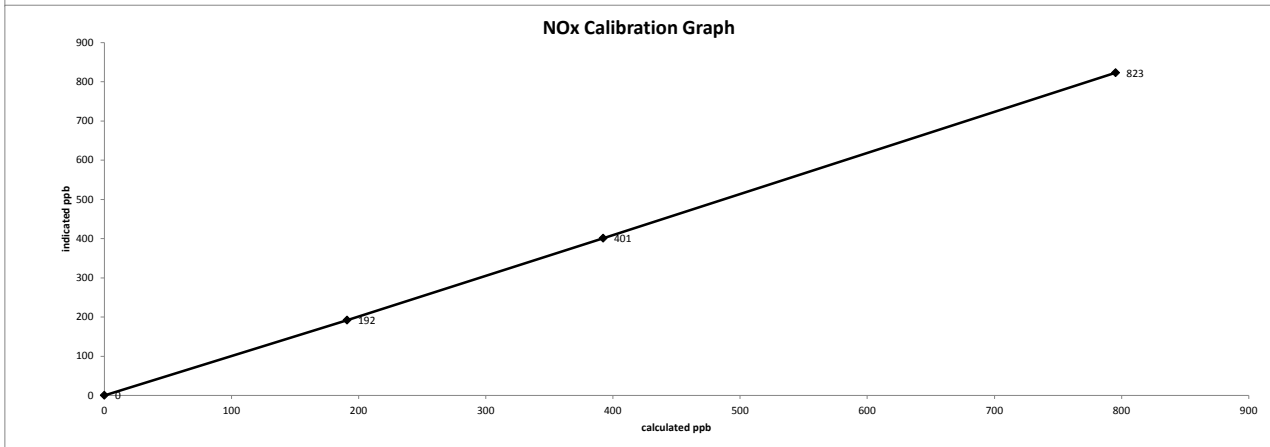
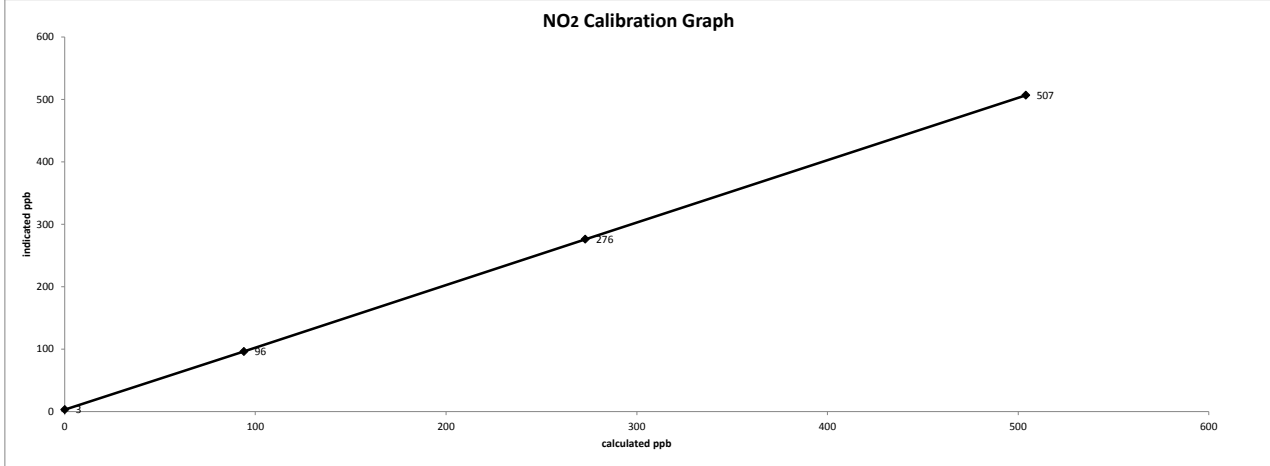
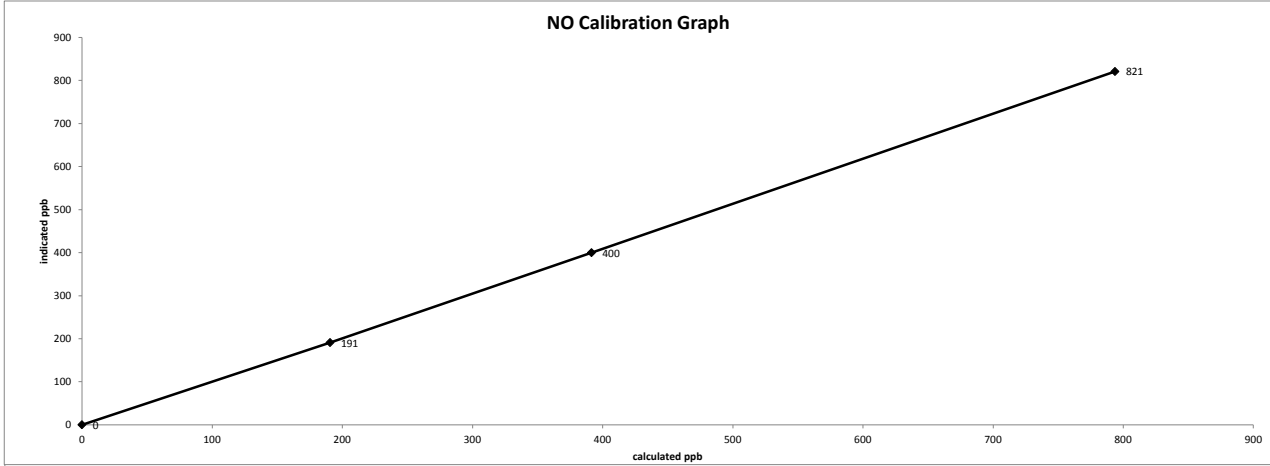
The manifold blower was found to be working normally.

Unstable with calibrator API700 sn:829. Change calibrator Envionics 6100 sn:5212 and re-start the calibration at 13:08. This is an internal audit. Calibration point order is the same as a shutdown verification.

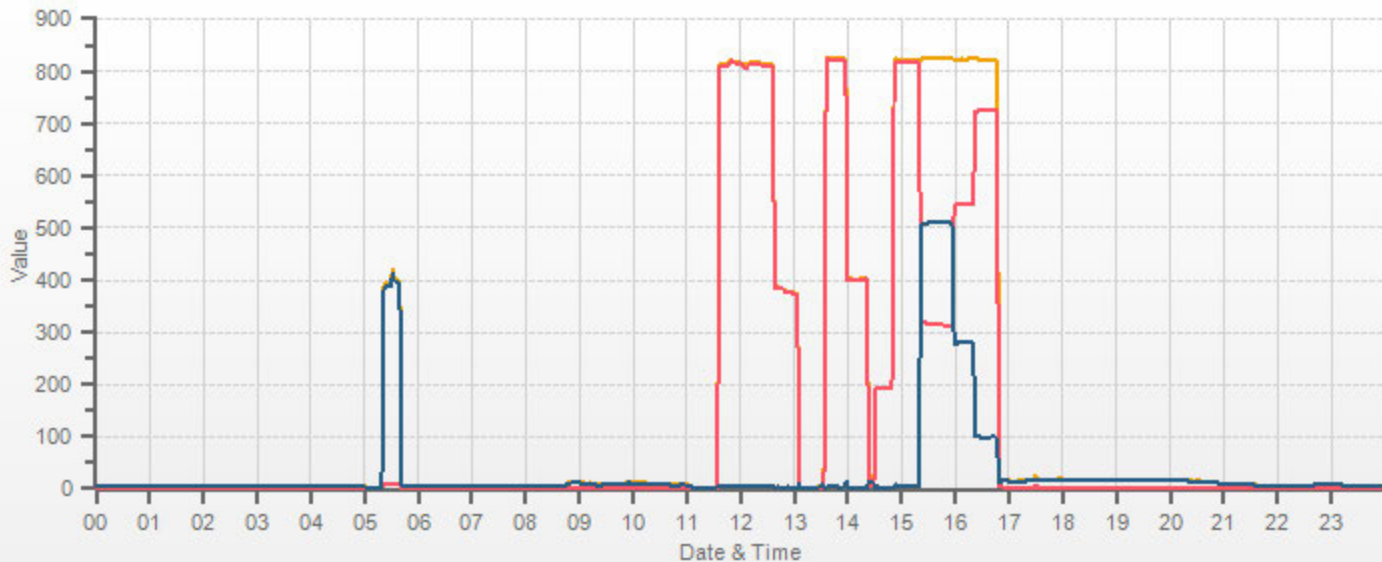
Date: January 18, 2018  
Company/Airshed: LICA  
Location/Station Name: Maskwa

Start/End Time 24 hr. (mst): 13:08 / 17:06  
Calibration Purpose: shut down  
Calibration Method: Gas Dilution & Gas Phase Titration

API 200A NO-NO2-NOx Analyzer Calibration





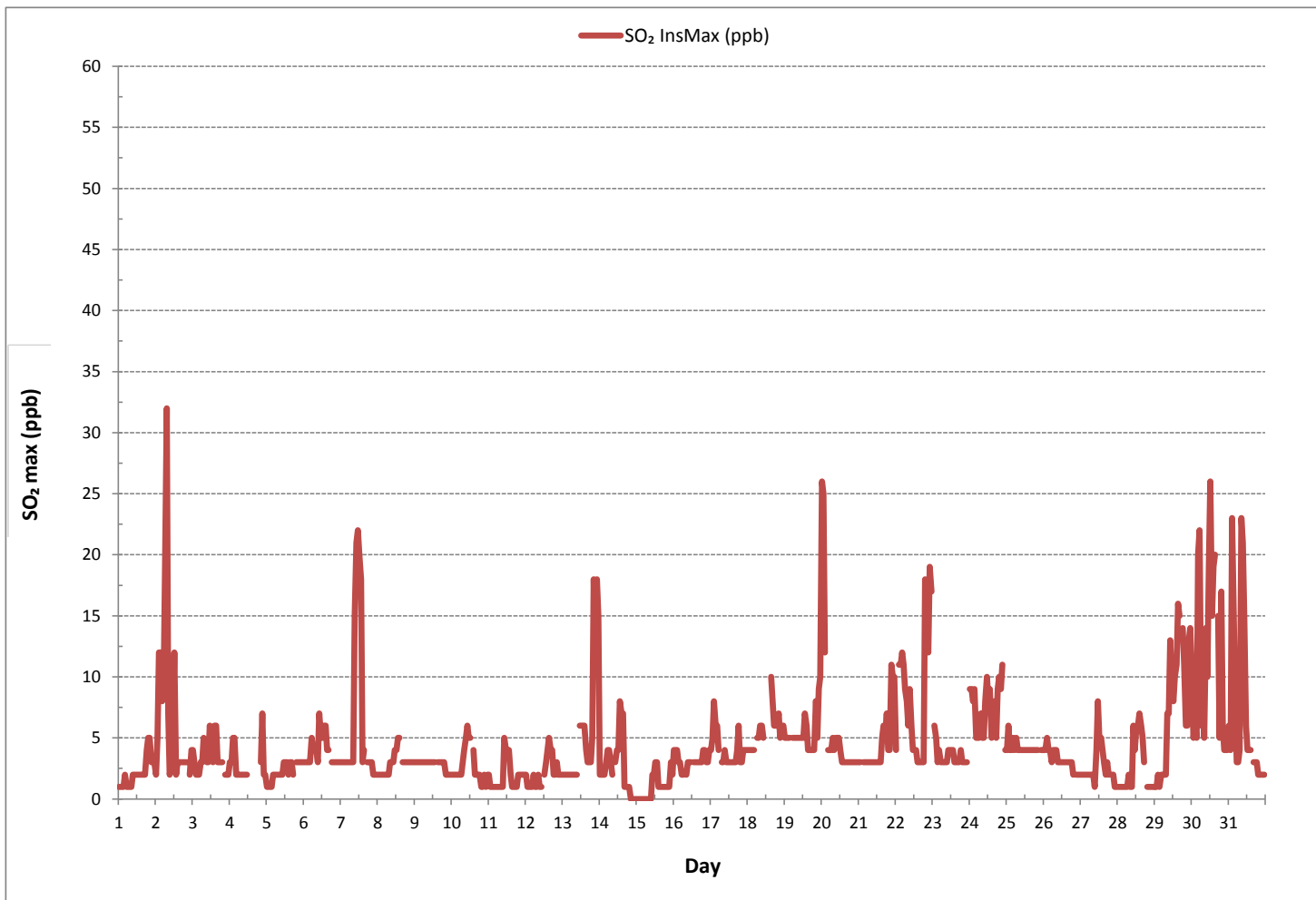


— NOx[ppb] — NO[ppb] — NO2[ppb]

***APPENDIX IV  
MAXIMUM INSTANTANEOUS DATA***



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





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

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

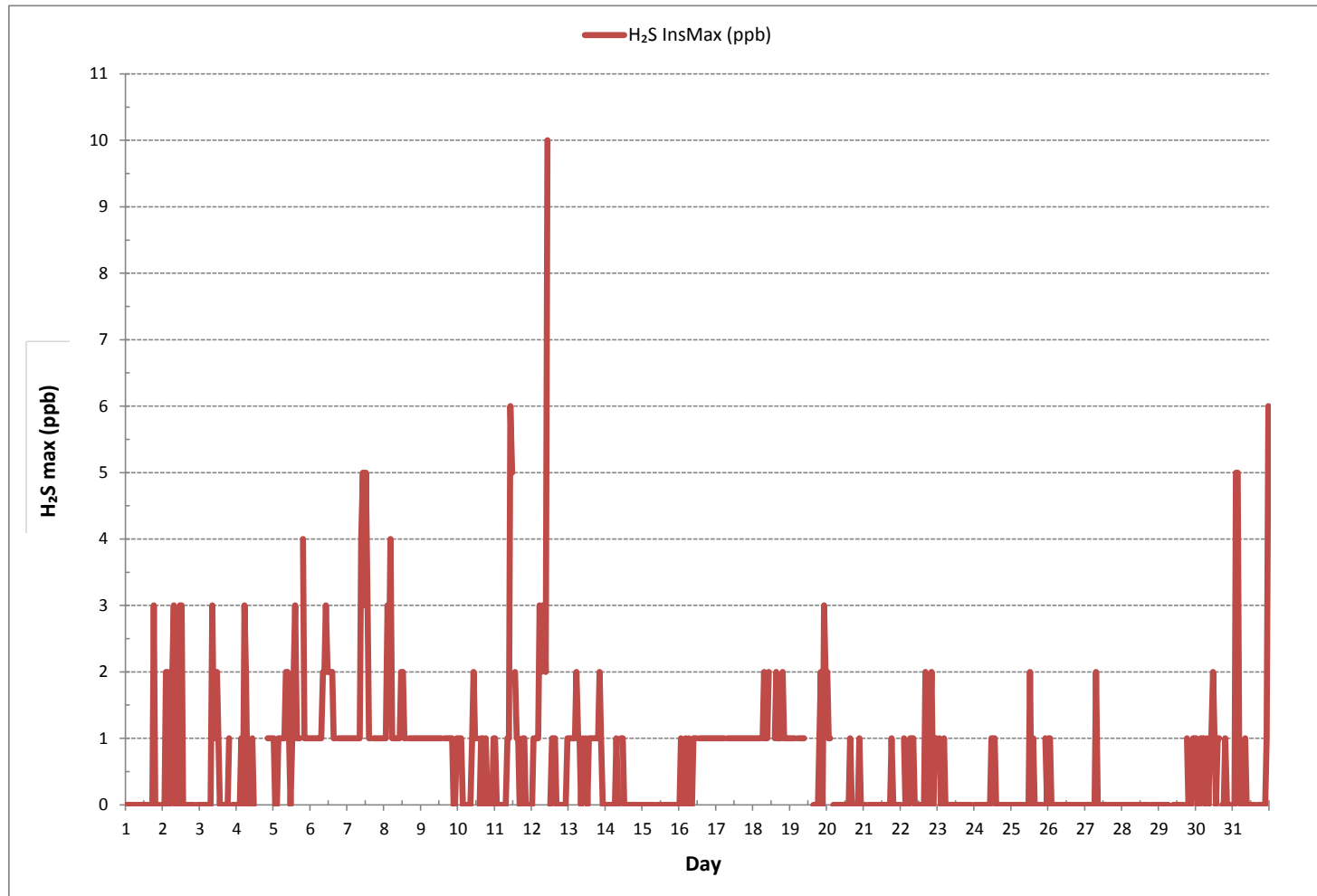
STATUS FLAG CODES

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:	311
MAXIMUM INSTANTANEOUS VALUE:	10 ppb @ HOUR 10 ON DAY 12
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	736 hrs
STANDARD DEVIATION:	1

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





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	3.27	3.18	3.10	3.03	3.13	3.16	3.22	3.21	3.15	3.15	2.99	2.88	2.90	2.76	2.78	2.78	2.79	2.81	2.78	2.72	2.68	2.64	S	2.48	2.48	3.27	2.94	24
2	2.45	2.45	2.72	2.71	2.43	2.57	2.64	2.73	2.43	2.45	2.45	2.66	2.81	2.41	2.43	2.43	2.52	2.51	2.57	2.55	2.51	S	2.49	2.60	2.41	2.81	2.54	24
3	2.67	2.62	2.67	2.69	2.72	2.75	2.73	2.81	3.07	2.84	2.87	2.87	2.75	2.78	2.85	2.94	2.90	2.91	3.53	3.12	S	2.94	2.84	2.72	2.62	3.53	2.85	24
4	2.61	2.64	2.66	2.78	2.72	2.66	2.66	2.63	2.66	2.68	2.68	2.70	3.06	2.60	3.03	2.64	2.61	2.66	3.00	S	2.69	2.69	2.64	2.60	2.60	3.06	2.71	24
5	2.60	2.64	2.69	2.69	2.72	2.72	2.72	2.72	2.70	2.68	C	C	C	C	C	2.32	2.32	2.29	S	2.31	2.33	2.35	2.40	2.44	2.29	2.72	2.54	24
6	2.46	2.47	2.46	2.44	2.55	2.64	2.63	2.67	2.69	2.72	2.78	2.49	2.67	2.66	2.42	2.29	2.01	S	1.93	1.89	1.88	1.91	1.91	1.93	1.88	2.78	2.37	24
7	1.98	1.98	1.99	2.02	2.02	2.04	2.05	2.07	2.04	2.38	2.51	2.48	2.50	2.32	2.18	2.11	S	2.10	2.13	2.13	2.19	2.89	3.69	3.26	1.98	3.69	2.31	24
8	3.05	2.63	2.86	2.69	2.81	2.35	2.37	2.31	2.31	2.34	2.34	2.25	2.15	2.27	2.24	S	2.24	2.26	2.23	2.21	1.98	1.98	1.99	2.01	1.98	3.05	2.34	24
9	2.02	2.04	2.04	2.04	2.01	2.01	2.02	2.01	2.02	2.02	2.01	2.01	1.99	1.99	S	1.98	2.01	2.01	1.98	1.99	2.01	2.02	2.04	2.07	1.98	2.07	2.01	24
10	2.07	2.07	2.09	2.13	2.16	2.17	2.19	2.23	2.26	2.29	2.17	2.15	2.14	S	2.10	2.08	2.10	2.10	2.09	2.08	2.51	2.61	2.41	2.31	2.07	2.61	2.20	24
11	2.31	2.32	2.43	2.46	2.44	2.41	2.44	2.44	2.46	2.38	2.84	2.48	S	2.63	2.42	2.45	2.57	2.55	2.51	2.46	2.51	2.45	2.57	2.46	2.31	2.84	2.48	24
12	2.54	2.64	2.63	2.58	2.70	3.07	2.87	2.92	2.82	3.16	3.75	S	2.38	2.39	2.52	2.72	2.81	2.79	2.58	2.58	2.61	2.64	3.03	3.15	2.38	3.75	2.78	24
13	2.89	3.00	2.89	2.82	2.79	2.78	2.81	2.61	2.72	2.75	S	2.57	2.51	2.54	2.54	2.55	2.60	2.57	2.45	2.54	2.51	2.35	2.36	2.35	3.00	3.00	2.63	24
14	2.29	2.23	2.29	2.29	2.32	2.35	2.38	2.41	2.38	S	2.39	2.36	2.32	2.33	2.29	2.29	2.31	2.32	2.36	2.38	2.41	2.67	2.64	2.66	2.23	2.67	2.38	24
15	2.75	2.96	3.09	2.92	2.75	2.76	2.69	2.57	S	2.63	2.69	2.66	2.64	2.60	2.52	2.52	2.46	2.46	2.44	2.46	2.45	2.47	2.51	2.54	2.44	3.09	2.63	24
16	2.44	2.35	2.44	2.33	2.33	2.33	2.35	S	2.69	2.84	2.38	2.36	P	2.38	2.39	2.41	2.38	2.46	2.51	2.51	2.55	2.63	2.66	2.33	2.84	2.47	2.3	24
17	2.60	2.46	2.75	2.76	2.78	2.42	S	2.04	1.99	1.98	1.95	1.95	1.95	1.95	1.95	1.95	1.98	1.99	2.07	2.10	2.12	2.17	2.28	2.23	1.95	2.78	2.19	24
18	2.17	2.69	2.26	2.21	2.04	S	2.11	2.14	2.15	2.24	2.33	2.35	2.23	Q	Q	Q	2.35	2.55	2.60	2.55	2.46	2.23	2.16	2.11	2.04	2.69	2.30	24
19	2.01	2.01	1.93	1.87	S	1.87	1.89	1.89	1.89	2.05	1.87	1.86	1.83	2.10	1.98	1.89	1.90	1.92	1.92	1.95	2.01	1.96	2.20	2.08	1.83	2.20	1.95	24
20	2.05	2.32	2.10	S	2.01	2.01	2.04	2.04	2.05	2.07	2.07	2.10	2.10	2.07	2.04	2.04	2.04	2.04	2.01	1.99	2.04	2.07	2.07	2.26	1.99	2.32	2.07	24
21	2.32	2.31	S	2.31	2.34	2.38	2.39	2.38	2.35	2.11	2.11	2.11	2.13	2.10	2.10	2.13	2.14	2.13	2.13	2.11	2.07	2.13	2.10	2.10	2.07	2.39	2.19	24
22	2.04	S	2.08	2.10	2.13	2.14	2.12	2.10	2.07	2.07	2.08	2.07	2.07	2.07	2.07	2.36	2.20	2.20	2.36	2.48	2.17	2.32	2.26	2.04	2.48	2.16	24	
23	S	2.13	2.20	2.17	2.19	2.14	2.11	2.13	2.13	2.14	2.34	2.35	2.33	2.32	2.37	2.34	2.31	2.28	2.23	2.14	2.11	2.10	2.10	S	2.10	2.37	2.21	24
24	2.15	2.13	2.13	2.11	2.13	2.10	2.12	2.23	2.32	2.39	2.47	2.57	2.51	2.28	2.07	2.08	2.10	2.07	2.08	2.08	2.05	2.07	S	2.02	2.02	2.57	2.19	24
25	2.02	2.04	2.02	2.02	2.04	2.04	2.07	2.04	2.02	2.02	2.07	2.04	2.02	2.02	2.08	2.02	2.04	2.04	2.04	2.04	2.04	S	2.04	2.04	2.02	2.08	2.04	24
26	2.04	2.04	2.05	2.05	2.05	2.07	2.07	2.08	2.08	2.10	2.10	2.10	2.10	2.10	2.11	2.11	2.13	2.13	2.13	2.13	S	2.19	2.29	2.18	2.04	2.29	2.11	24
27	2.23	2.20	2.21	2.23	2.25	2.23	2.26	2.29	2.26	2.26	2.24	2.23	2.31	2.21	2.20	2.25	2.23	2.25	2.26	S	2.23	2.24	2.23	2.23	2.20	2.31	2.24	24
28	2.25	2.26	2.26	2.32	2.29	2.29	2.31	2.31	2.32	2.32	2.31	2.32	2.31	2.41	2.32	2.43	2.34	2.32	S	2.29	2.35	2.34	2.29	2.29	2.25	2.43	2.32	24
29	2.29	2.28	2.26	2.28	2.26	2.23	2.25	2.26	2.31	2.26	2.26	2.25	2.21	2.20	2.19	2.17	2.20	S	2.14	2.11	2.04	2.02	2.04	2.10	2.02	2.31	2.20	24
30	2.02	1.98	1.98	2.01	2.08	2.13	2.14	2.16	2.16	2.13	2.08	2.26	2.17	2.21	2.26	2.24	S	2.17	2.11	2.23	2.11	2.10	2.10	2.11	1.98	2.26	2.13	24
31	2.11	2.13	2.57	2.47	2.29	2.16	2.17	2.17	2.32	2.23	2.23	2.20	2.20	2.19	2.20	S	2.22	2.26	2.21	2.23	2.23	2.25	2.67	2.78	2.11	2.78	2.28	24
HOURLY MAX	3.27	3.18	3.10	3.03	3.13	3.16	3.22	3.21	3.15	3.16	3.75	2.88	3.06	2.78	3.03	2.94	2.90	2.91	3.53	3.12	2.69	2.94	3.69	3.26				
HOURLY AVG	2.36	2.37	2.40	2.38	2.38	2.37	2.36	2.35	2.36	2.39	2.39	2.33	2.33	2.32	2.31	2.29	2.31	2.32	2.32	2.28	2.28	2.32	2.38	2.37				

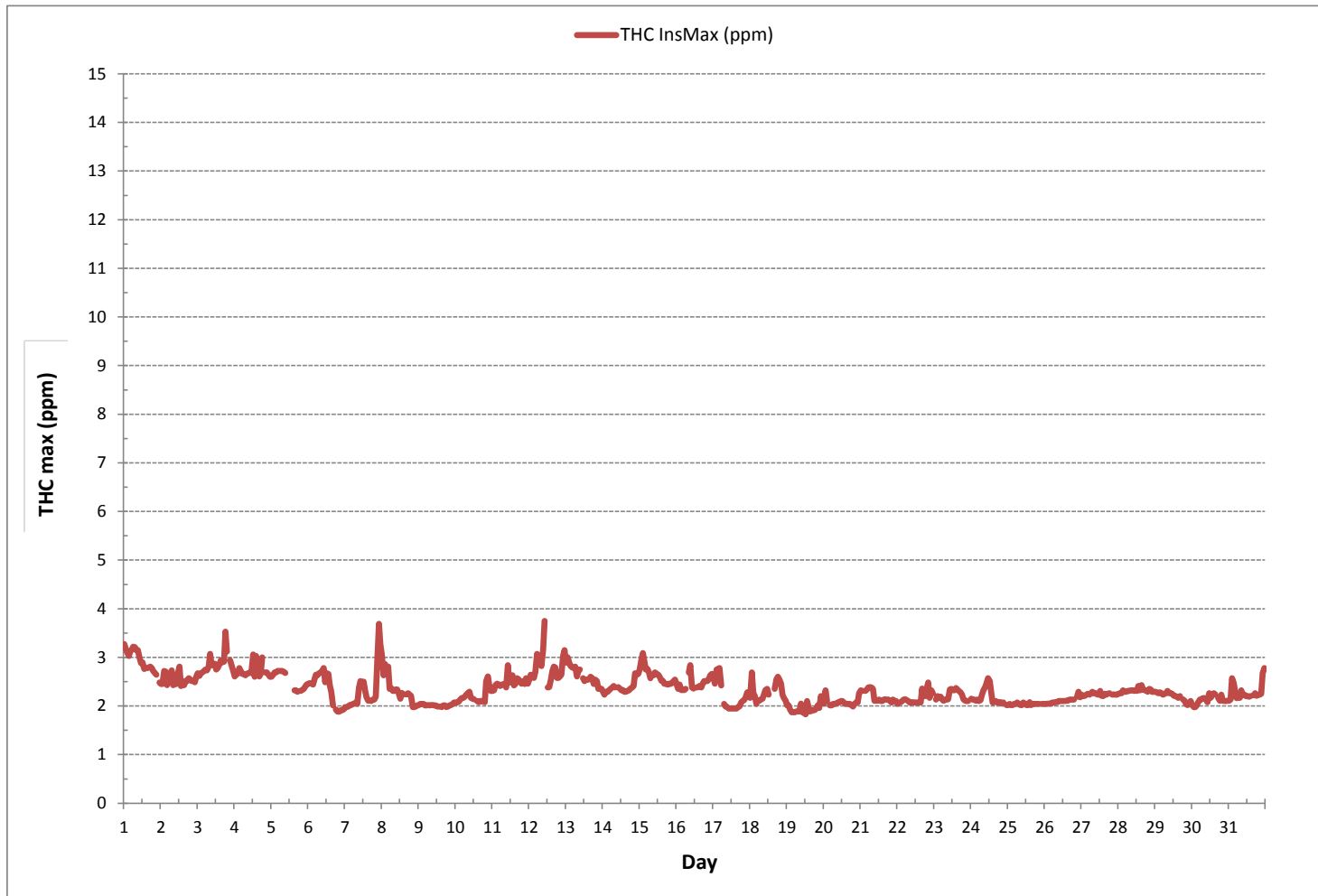
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	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:	3.75 ppm @ HOUR 10 ON DAY 12
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	743 hrs
STANDARD DEVIATION:	0.31

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)







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

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	6	6	5	6	6	6	7	35	7	6	6	7	6	6	6	6	7	9	11	11	8	S	4	4	35	8	24	
2	3	9	26	24	16	18	26	52	25	2	45	32	20	2	3	6	5	4	4	3	3	S	3	4	2	52	15	24	
3	5	4	3	3	4	7	32	15	14	13	48	22	19	29	20	17	13	12	11	11	S	7	4	3	3	48	14	24	
4	3	3	4	5	3	2	56	3	24	2	3	2	C	C	C	C	C	C	C	C	C	6	10	3	3	2	56	8	24
5	3	3	3	4	4	4	4	4	4	4	4	5	6	6	6	6	6	4	S	5	4	3	3	3	3	3	6	4	24
6	6	9	9	4	5	10	9	11	11	11	59	20	21	18	18	14	7	S	5	3	3	3	3	3	3	3	59	11	24
7	3	2	2	4	4	2	6	2	3	33	33	32	32	28	4	8	S	3	3	3	3	2	2	4	8	2	33	10	24
8	4	3	2	2	2	2	3	7	3	4	4	3	4	7	7	S	3	3	3	3	2	1	1	1	1	1	7	3	24
9	1	1	1	0	0	0	0	0	1	1	2	2	2	1	S	2	1	1	1	1	1	1	2	3	3	0	3	1	24
10	3	3	3	3	3	4	4	5	5	9	9	7	20	S	6	4	35	7	39	6	3	58	5	6	3	58	11	24	
11	7	3	3	5	5	4	9	33	27	25	18	19	S	26	11	11	13	13	10	9	9	10	9	9	3	33	13	24	
12	8	8	9	9	9	11	13	33	94	62	75	S	9	8	12	13	16	15	9	8	8	7	12	12	7	94	20	24	
13	10	9	8	7	7	7	30	8	11	13	S	12	14	16	17	16	20	21	21	20	29	20	21	17	7	30	15	24	
14	5	4	4	4	6	9	11	44	16	S	9	10	12	12	13	50	13	7	7	5	5	5	5	4	50	12	24		
15	4	4	5	4	4	4	6	46	S	11	8	8	9	9	6	4	6	6	3	4	3	5	6	4	3	46	7	24	
16	5	5	5	4	4	4	3	S	7	9	6	6	P	17	10	21	40	38	12	12	12	10	9	9	3	40	11	23	
17	10	11	23	23	22	13	S	7	16	31	6	23	3	2	5	6	7	4	6	5	4	4	4	3	2	31	10	24	
18	4	4	4	4	3	S	4	6	13	12	11	Q	Q	Q	Q	Q	Q	Q	18	16	17	9	9	8	3	18	9	24	
19	5	5	3	2	S	2	61	41	4	4	4	5	4	10	10	2	4	4	5	2	7	9	12	10	2	61	9	24	
20	27	27	11	S	2	2	6	2	1	19	6	9	7	31	3	3	4	4	7	2	2	2	2	6	1	31	8	24	
21	6	5	S	6	6	7	9	13	8	1	1	1	1	1	1	5	6	6	7	3	2	12	15	14	1	15	6	24	
22	3	S	13	13	14	13	11	10	7	10	6	3	3	3	3	4	12	5	3	26	37	14	26	23	3	37	11	24	
23	S	6	5	3	6	3	2	4	18	7	9	9	9	8	9	9	7	9	7	6	3	3	2	S	2	18	7	24	
24	10	10	9	10	4	4	6	7	6	5	10	13	10	10	4	6	7	6	10	10	9	12	S	2	2	13	8	24	
25	3	4	2	2	3	2	3	S1	S1	2	2	2	1	1	1	2	2	2	2	1	1	S	2	2	1	4	2	22	
26	2	2	3	2	1	1	3	2	3	6	3	3	3	3	3	3	2	2	1	1	S	3	2	2	1	6	2	24	
27	2	2	2	3	9	3	4	4	5	2	4	5	5	5	5	3	1	3	2	S	2	2	1	1	1	9	3	24	
28	1	1	1	1	3	6	7	4	3	3	11	7	11	13	16	16	15	9	S	4	4	3	2	2	1	16	6	24	
29	2	2	2	2	1	1	2	2	10	10	15	12	10	14	15	16	18	S	18	15	4	3	13	14	1	18	9	24	
30	7	2	2	2	21	24	3	10	4	14	9	27	35	24	20	25	S	18	3	19	3	2	2	3	2	35	12	24	
31	4	3	31	21	9	2	3	8	30	33	18	44	9	15	6	S	40	12	6	6	4	6	4	4	2	44	14	24	
HOURLY MAX	27	27	31	24	22	24	61	52	94	62	75	44	35	31	20	25	50	38	39	26	37	58	26	23					
HOURLY AVG	5	5	7	6	6	6	11	13	14	12	15	12	11	12	9	9	13	9	8	8	7	8	6	6					

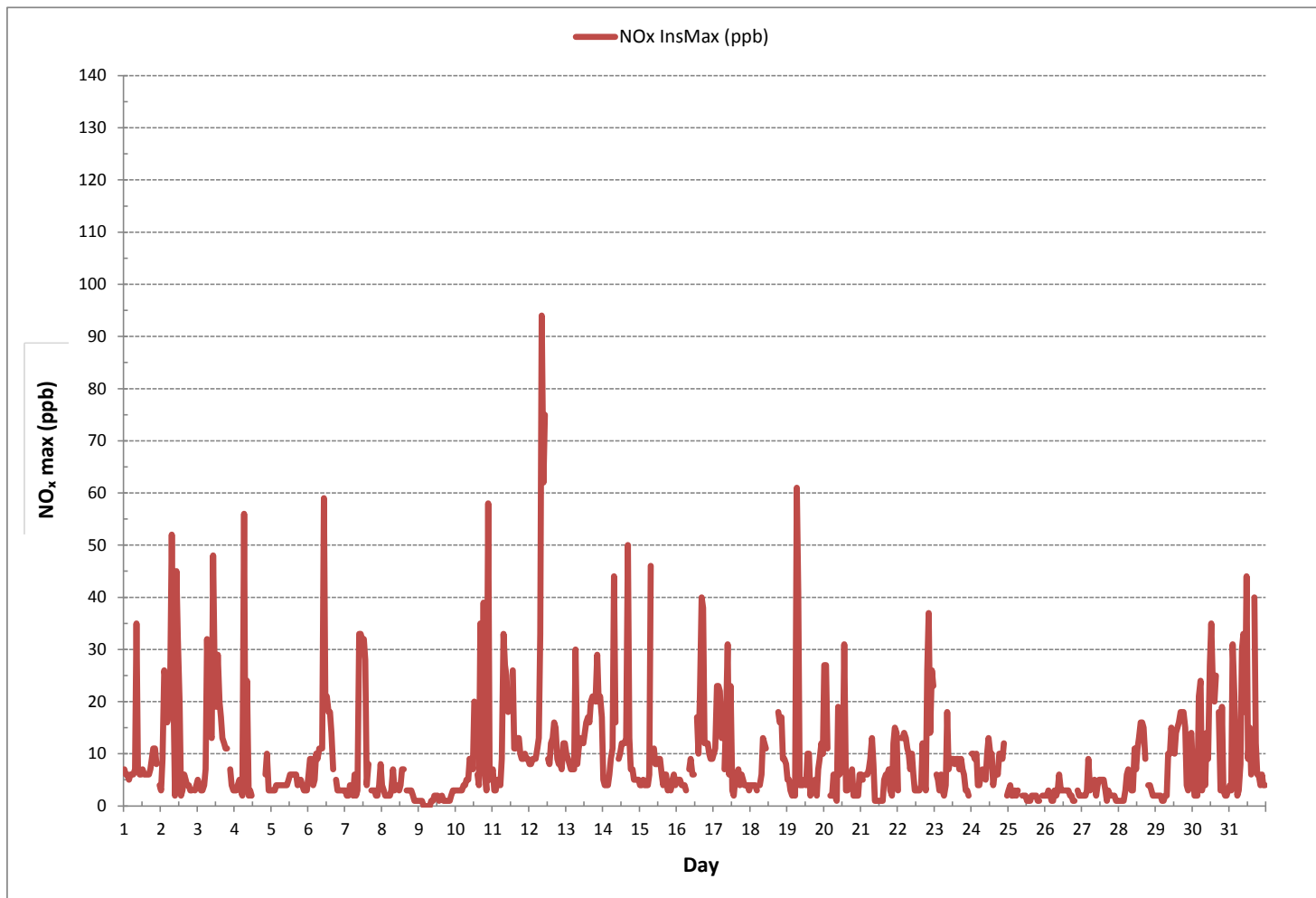
STATUS FLAG CODES

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

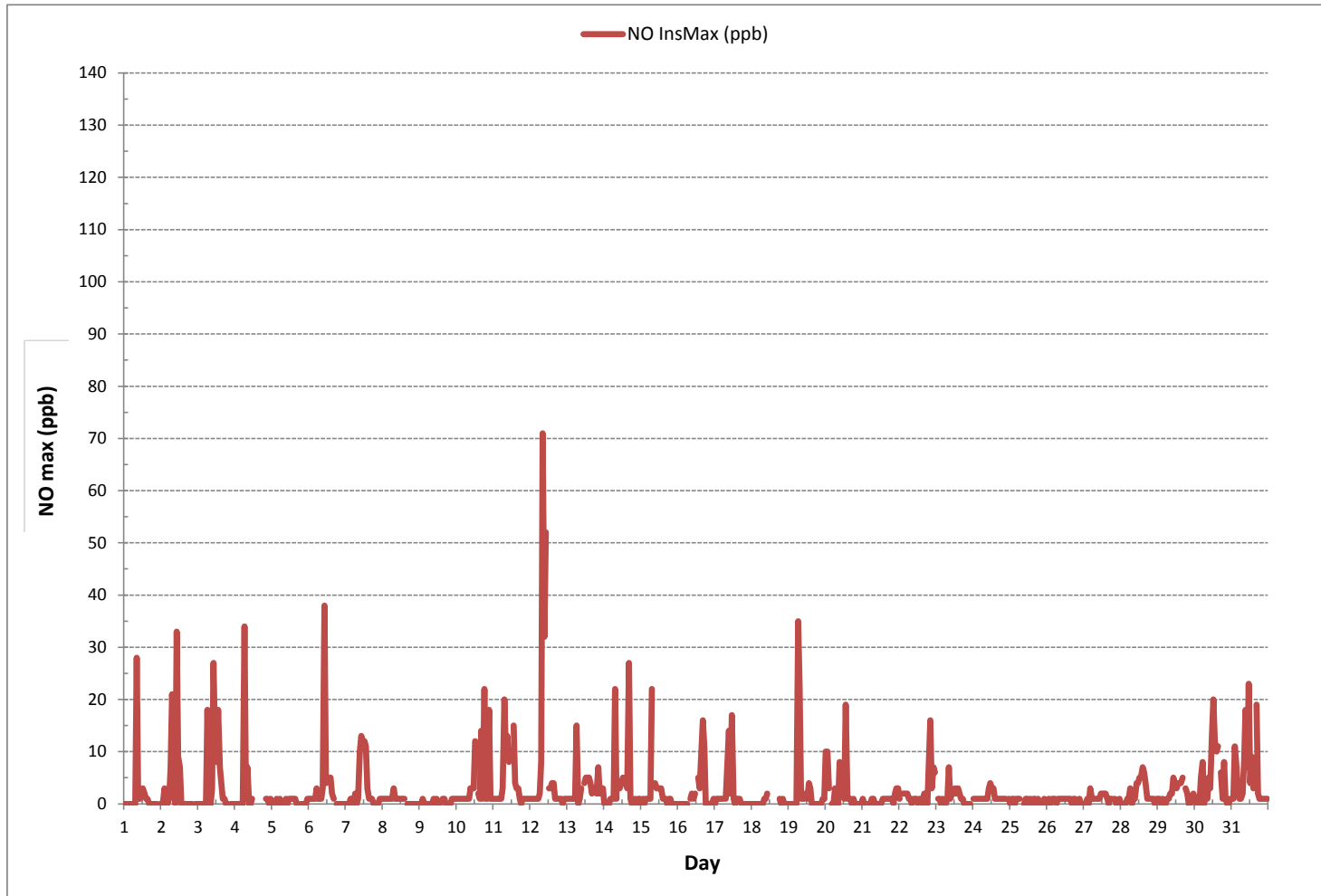
NUMBER OF NON-ZERO READINGS:	690
MAXIMUM INSTANTANEOUS VALUE:	94 ppb @ HOUR 8 ON DAY 12
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	741 hrs
STANDARD DEVIATION:	10

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





NITRIC OXIDE Instantaneous Maximum (NO ppb)





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

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	6	5	5	6	6	7	7	13	6	5	4	5	4	5	5	7	7	10	11	11	8	S	4	4	13	7	24	
2	3	9	23	23	16	18	20	32	13	2	14	23	13	1	3	5	5	5	4	4	4	S	4	4	1	32	11	24	
3	5	5	3	4	5	8	17	15	14	11	22	13	11	14	13	13	13	11	12	12	S	7	5	3	3	22	10	24	
4	3	4	4	5	4	2	26	3	17	2	3	2	C	C	C	C	C	C	C	C	C	5	9	3	3	2	26	6	24
5	3	3	3	4	4	4	4	4	4	4	4	5	5	5	5	6	6	5	S	5	3	3	3	3	4	3	6	4	24
6	5	8	8	4	5	9	8	10	11	8	27	16	16	14	14	12	7	S	5	4	3	2	3	3	3	2	27	9	24
7	3	2	1	3	3	1	4	2	2	24	21	20	20	18	4	7	S	3	3	2	2	1	4	8	1	24	7	24	
8	3	2	2	1	2	2	3	5	3	3	3	3	6	6	S	3	3	3	4	1	1	1	1	1	1	6	3	24	
9	1	1	1	1	0	0	1	0	1	1	1	1	1	1	S	1	1	1	1	1	1	1	2	2	0	2	1	24	
10	3	3	3	3	3	4	4	4	4	7	7	5	8	S	4	4	23	6	20	5	2	39	5	5	2	39	7	24	
11	6	3	3	5	4	4	7	16	17	16	10	10	S	12	7	10	13	13	10	9	9	10	8	8	3	17	9	24	
12	8	8	9	8	8	11	11	24	34	30	25	S	6	5	9	11	15	14	8	8	8	7	11	11	5	34	13	24	
13	10	8	8	7	7	6	17	8	11	11	S	8	8	10	12	14	19	20	19	19	22	18	19	15	6	22	13	24	
14	5	4	4	4	6	8	11	23	15	S	7	7	7	8	9	11	27	11	7	7	5	5	5	5	4	27	9	24	
15	5	4	5	4	4	5	26	S	9	6	6	6	6	4	4	6	5	4	3	3	5	5	4	3	26	6	24		
16	5	5	4	4	4	4	3	S	5	7	4	4	P	12	7	15	25	27	12	11	11	10	8	9	3	27	9	23	
17	10	10	22	22	21	13	S	6	10	18	5	10	3	3	4	5	6	4	6	5	5	5	5	4	3	22	9	24	
18	4	4	4	3	3	S	4	5	12	10	9	Q	Q	Q	Q	Q	Q	Q	17	15	17	9	8	8	3	17	8	24	
19	5	5	3	2	S	3	27	23	4	3	3	4	4	7	7	1	4	4	5	2	7	8	11	10	1	27	7	24	
20	17	17	8	S	1	1	4	2	1	11	4	7	5	11	2	2	4	4	6	1	1	2	2	5	1	17	5	24	
21	6	5	S	6	6	7	8	12	8	1	1	1	1	1	1	4	5	4	6	2	1	10	12	11	1	12	5	24	
22	3	S	11	12	12	11	10	8	6	8	5	3	2	2	3	4	10	4	3	18	22	11	18	17	2	22	9	24	
23	S	5	5	3	5	3	1	3	12	6	7	7	7	6	7	7	8	7	5	3	3	2	S	1	12	5	24		
24	9	8	8	9	4	4	4	6	5	4	8	9	8	8	4	5	7	5	9	10	8	10	S	2	2	10	7	24	
25	3	4	1	1	2	2	3	S1	S1	1	1	1	1	1	1	1	1	2	1	1	1	S	1	1	1	4	1	22	
26	1	1	3	1	1	1	3	2	3	4	2	3	3	2	2	2	1	1	1	1	S	2	2	2	1	4	2	24	
27	2	2	2	3	6	3	3	4	4	2	3	4	3	4	4	3	1	3	2	S	2	1	1	1	1	6	3	24	
28	1	1	1	1	3	4	5	3	3	3	7	4	5	8	10	11	12	8	S	4	4	3	2	2	1	12	5	24	
29	1	1	1	1	1	1	1	2	8	8	11	8	7	10	11	12	14	S	15	12	3	3	12	12	1	15	7	24	
30	6	2	2	2	16	16	3	7	3	8	6	14	15	11	10	14	S	12	3	11	3	2	2	2	2	16	7	24	
31	3	2	20	14	7	1	3	6	21	20	11	22	5	8	4	S	23	10	6	5	4	5	5	4	1	23	9	24	
HOURLY MAX	17	17	23	23	21	18	27	32	34	30	27	23	20	18	14	15	27	27	20	19	22	39	19	17					
HOURLY AVG	5	5	6	6	6	5	8	9	9	8	8	8	7	7	6	7	10	7	7	7	6	7	6	6					

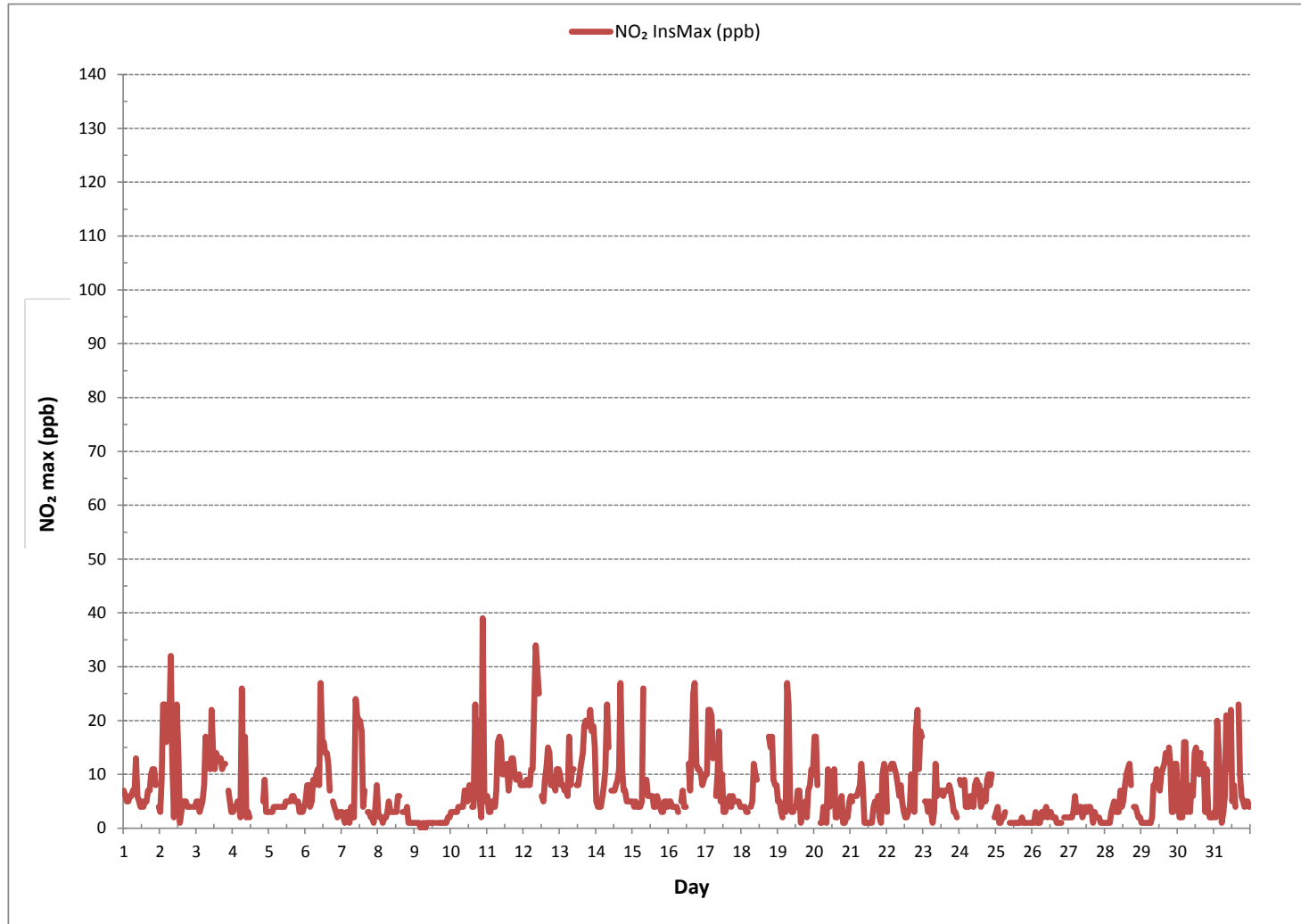
STATUS FLAG CODES

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:	692
MAXIMUM INSTANTANEOUS VALUE:	39 ppb @ HOUR 21 ON DAY 10
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	6
OPERATIONAL TIME:	741 hrs

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





WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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	17.3	15.0	14.2	19.8	18.5	17.0	11.1	17.4	12.8	13.1	22.0	20.0	16.2	19.8	18.9	16.0	16.9	12.9	16.3	19.3	23.6	30.0	27.0	25.2	11.1	30.0	18.3	24				
2	27.6	33.1	23.3	24.3	18.3	16.4	27.7	25.8	19.2	13.4	15.7	21.2	20.6	13.2	10.6	5.4	3.6	6.3	7.3	5.3	4.2	8.4	7.7	8.6	3.6	33.1	15.3	24				
3	7.9	10.0	5.6	6.0	5.9	9.5	14.1	10.5	14.7	4.5	7.4	6.4	6.8	10.7	10.0	4.7	5.3	6.1	6.9	3.8	5.4	5.8	5.5	5.8	3.8	14.7	7.5	24				
4	7.6	9.7	9.4	9.1	5.3	6.8	6.8	5.6	6.0	8.4	8.3	8.4	9.2	8.4	8.2	10.4	8.1	10.3	14.2	12.5	9.1	13.7	12.5	12.4	5.3	14.2	9.2	24				
5	14.1	11.6	12.2	10.1	10.7	14.7	14.8	16.9	15.5	15.3	15.1	15.6	13.8	14.3	13.0	14.0	8.7	13.9	12.5	14.2	16.1	12.2	9.4	8.0	8.0	16.9	13.2	24				
6	6.0	6.8	8.6	7.8	7.1	5.3	6.4	7.3	10.2	9.6	8.3	14.7	11.7	13.9	13.8	26.9	29.1	21.3	18.8	24.5	26.6	30.6	15.6	17.5	5.3	30.6	14.5	24				
7	13.9	24.7	16.9	16.1	26.8	23.8	22.5	28.3	32.8	43.4	44.5	36.1	30.2	26.0	27.2	22.9	12.3	5.9	6.0	4.1	4.8	3.2	6.7	4.8	3.2	44.5	20.2	24				
8	5.7	5.5	4.0	3.8	5.0	2.6	5.1	4.8	4.3	3.3	3.3	6.6	7.6	11.5	11.2	8.2	7.4	7.6	12.8	30.9	27.3	27.5	33.0	27.1	2.6	33.0	11.1	24				
9	33.4	33.2	33.6	33.8	30.8	35.9	33.2	28.5	30.5	29.6	33.0	31.9	32.3	27.3	20.7	26.6	28.7	24.9	28.3	26.6	28.2	27.4	22.6	22.3	20.7	35.9	29.3	24				
10	23.1	21.8	20.4	25.1	19.9	20.6	21.1	20.0	15.9	14.6	16.7	17.2	12.0	21.5	14.4	15.1	6.9	12.3	9.3	13.3	13.4	12.0	11.2	13.1	6.9	25.1	16.3	24				
11	13.0	11.8	8.6	8.7	8.1	8.3	8.3	8.3	9.0	9.1	8.0	13.4	15.2	14.3	11.2	13.0	16.0	8.9	8.0	6.5	9.6	5.4	5.1	3.4	3.4	16.0	9.6	24				
12	4.4	2.4	2.6	3.0	3.1	3.6	2.5	2.8	2.6	1.7	2.6	12.1	12.6	13.0	13.4	9.5	5.2	16.9	18.6	10.7	16.9	16.2	10.0	9.7	1.7	18.6	8.2	24				
13	9.2	5.3	5.1	2.6	3.5	3.7	15.8	13.5	11.6	12.1	14.0	17.4	13.9	12.4	9.4	10.1	15.7	9.6	9.6	11.3	15.8	11.7	9.5	11.0	2.6	17.4	10.6	24				
14	12.5	18.2	17.0	17.5	19.7	13.8	10.2	9.1	8.4	7.5	7.9	9.3	9.5	9.0	8.9	9.0	3.8	3.2	3.8	5.4	5.5	2.7	2.7	2.7	2.7	19.7	9.1	24				
15	3.8	3.2	3.7	4.7	5.0	3.3	5.9	4.2	3.6	11.8	13.9	19.6	15.0	22.5	20.3	17.6	19.3	22.3	23.6	16.1	15.5	18.9	11.5	11.4	3.2	23.6	12.4	24				
16	17.0	17.5	18.6	15.8	19.1	18.1	16.5	14.3	7.6	11.5	16.4	14.2	P	15.0	14.9	15.5	10.5	6.3	7.4	5.9	2.8	7.1	9.2	7.0	2.8	19.1	12.5	23				
17	11.8	14.4	13.0	11.9	13.1	27.9	31.5	32.6	26.8	25.6	28.3	32.0	28.0	29.7	31.4	25.3	14.6	10.7	12.1	13.8	8.4	11.2	7.4	4.7	4.7	32.6	19.4	24				
18	3.4	4.8	6.3	8.9	7.3	7.0	9.3	11.6	11.9	8.8	15.9	14.9	13.6	18.4	11.6	11.4	10.3	10.9	11.9	14.2	9.2	13.0	12.2	14.8	3.4	18.4	10.9	24				
19	17.8	15.4	13.8	17.1	12.7	13.1	13.2	19.4	14.5	18.2	23.4	20.4	26.9	24.1	21.2	21.0	14.3	8.5	8.2	3.5	8.9	12.7	13.8	12.0	3.5	26.9	15.6	24				
20	18.1	18.1	21.5	16.5	19.4	12.4	17.1	16.2	13.0	8.4	9.8	7.5	11.9	11.7	14.7	15.3	10.7	9.9	10.7	8.3	4.9	4.5	6.5	7.9	4.5	21.5	12.3	24				
21	7.4	6.9	5.7	6.4	6.9	8.3	3.6	2.2	15.9	14.4	15.4	15.0	16.1	16.3	20.1	18.7	19.1	19.8	20.6	20.0	24.1	20.7	20.3	22.3	2.2	24.1	14.4	24				
22	22.8	22.2	21.8	18.7	18.8	16.3	22.5	16.9	12.3	13.1	9.3	8.3	6.0	8.5	7.2	5.2	12.9	15.0	14.8	25.3	25.5	20.1	23.5	18.9	5.2	25.5	16.1	24				
23	19.6	14.8	12.7	12.2	11.6	6.0	5.0	4.7	3.6	8.1	12.7	11.8	12.7	11.6	10.1	12.9	13.6	10.8	9.5	12.4	16.4	16.0	16.2	13.4	3.6	19.6	11.6	24				
24	16.7	15.6	13.4	13.7	18.2	16.0	20.4	17.4	19.2	17.8	15.1	18.1	15.6	18.1	17.3	18.7	17.0	14.1	15.4	17.4	16.5	20.5	14.8	12.7	12.7	20.5	16.7	24				
25	14.3	13.7	13.6	11.9	16.0	13.4	12.1	11.5	9.0	8.6	13.7	14.8	22.0	19.6	18.2	22.5	14.0	18.7	15.1	17.7	22.5	21.6	22.1	14.7	8.6	22.5	15.9	24				
26	10.8	8.7	13.6	18.4	22.1	14.2	8.3	13.3	14.0	14.9	18.1	21.1	19.3	18.4	18.4	18.9	21.8	19.9	21.3	21.3	23.2	20.6	17.2	17.2	8.3	23.2	17.3	24				
27	13.3	13.2	5.7	4.6	7.3	9.7	6.2	3.6	4.8	8.2	10.8	10.7	12.0	11.2	14.5	10.6	11.0	9.5	8.0	12.1	9.0	5.9	8.6	7.6	3.6	14.5	9.1	24				
28	5.6	6.6	2.2	3.3	3.2	3.1	8.7	8.5	14.0	12.1	11.6	9.3	8.9	7.3	9.1	6.2	8.6	4.9	3.8	3.5	6.2	4.9	6.0	6.8	2.2	14.0	6.9	24				
29	8.1	7.3	8.0	11.1	8.0	7.0	8.6	9.0	20.4	21.1	16.1	20.1	18.5	18.3	24.2	29.4	24.6	22.3	23.0	23.6	28.4	23.9	23.7	17.4	7.0	29.4	17.6	24				
30	19.4	12.9	14.3	13.9	14.7	22.6	32.4	33.1	29.8	26.2	31.8	27.1	34.6	30.6	27.5	25.6	22.3	25.7	27.1	36.0	36.1	32.3	24.0	26.6	12.9	36.1	26.1	24				
31	32.5	21.8	26.9	23.5	17.7	17.3	23.8	12.9	18.8	18.4	19.7	13.5	11.6	13.2	10.0	10.2	9.1	3.0	2.8	3.4	3.8	4.8	3.8	2.4	2.4	32.5	13.5	24				
HOURLY MAX	33.4	33.2	33.6	33.8	30.8	35.9	33.2	33.1	32.8	43.4	44.5	36.1	34.6	30.6	31.4	29.4	29.1	25.7	28.3	36.0	36.1	32.3	33.0	27.1								
HOURLY AVG	14.1	13.7	12.8	12.9	13.0	12.8	14.3	13.9	14.0	14.0	15.8	16.4	16.1	16.4	15.5	15.4	13.6	12.7	13.2	14.3	15.1	15.0	13.5	12.6								

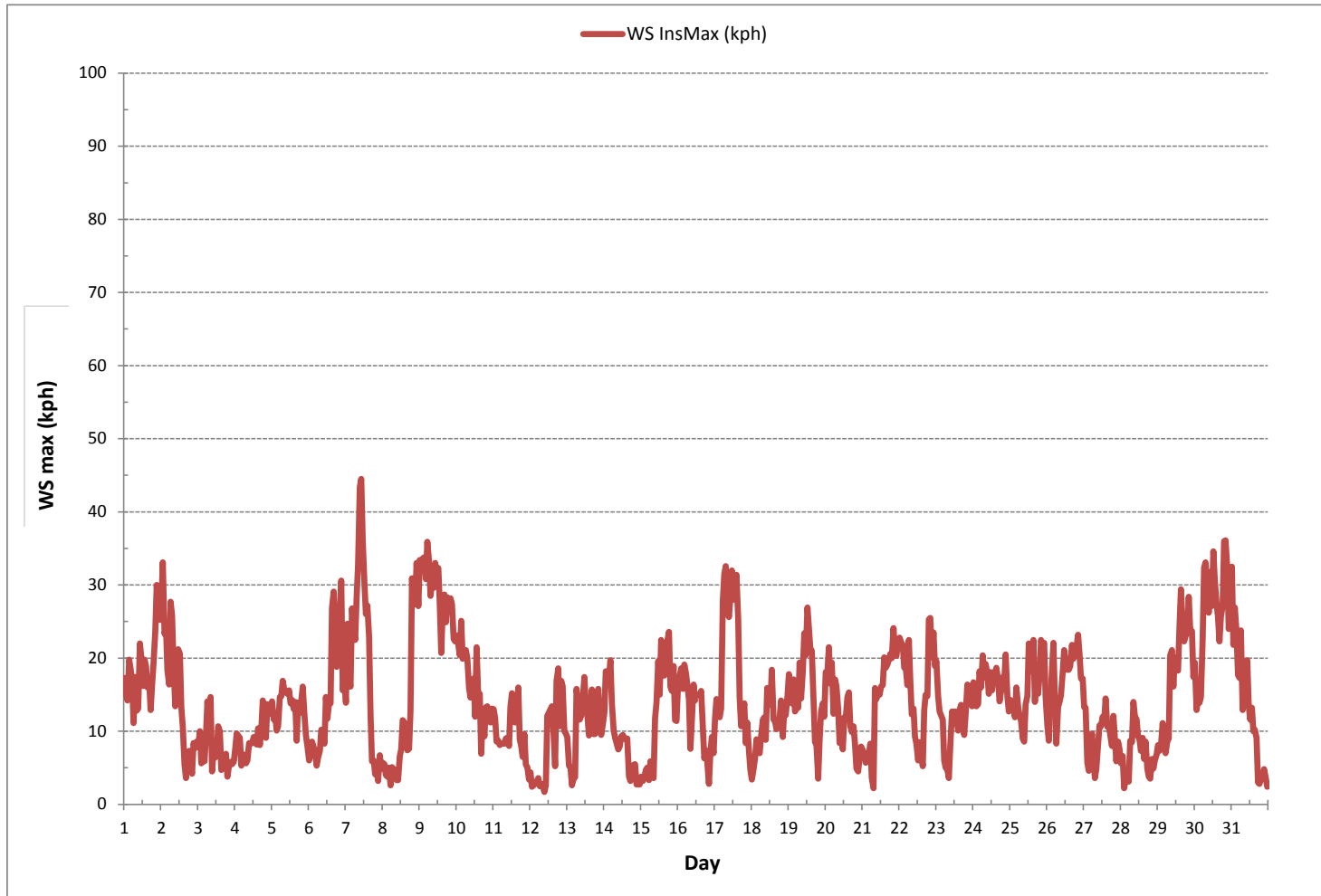
STATUS FLAG CODES

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

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	44.5	kph	@ HOUR	10	ON DAY	7	
OPERATIONAL TIME:						743	hrs

**WIND SPEED Instantaneous Maximum (WS kph)**





***APPENDIX V***  
***REPORT CERTIFICATION FORM***

### Report Certification Form

Alberta Airshed (if applicable)	EPA Approval or Code of Practice Registration # (if applicable)
YES	NA
Company Name (if applicable)	Industrial Operation Name (if applicable)
Lakeland Industry & Community Association	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

February 23, 2017

Report Issued Date (dd-mm-yyyy)

***APPENDIX VI***  
***DATA VALIDATION CERTIFICATION FORM***



### Validation Certificate Form

<b>Client:</b> <u>Lakeland Industry &amp; Community Association</u>	<b>Project #:</b> <u>2833-2018-01-30-C</u>
<b>Site:</b> <u>Maskwa 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>February 05, 2017</u>
<b>Level 1 Primary Validation</b>	<u>Maram Ghaleb</u>	<b>Date</b> <u>February 05, 2017</u>
<b>Level 2 Final Validation</b>	<u>Maram Ghaleb</u>	<b>Date</b> <u>February 20, 2017</u>
<b>Level 3 Independent Data Review</b>	<u>Chris Lynch</u>	<b>Date</b> <u>February 23, 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)

March 2, 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 January 2018.

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

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

A scheduled internal station audit was conducted by a contractor on January 16. Audit report can be found in this monthly report.

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 us.

Respectfully,



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

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

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

**JOB #: 2833-2018-01-31-C**

**January 2018**

Prepared for:

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

**Attention: MIKE BISAGA**

DATE: **February 26, 2018**

Prepared by: *Maram Ghaleb*

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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 January 2018, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the St. Lina Continuous Monitoring Station, near Bonnyville, Alberta. The monitoring station provides continuous meteorological measurements and air quality data for non-compliance parameters, as requested by the Lakeland Industry and Community Association.

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

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

A scheduled internal station audit was conducted by Maxxam on January 16. Audit report can be found in Appendix III.

**All Parameters:** Downtime ranging from 3 to 6 hours were recorded across all parameters on January 15 due to a power failure.

**NO<sub>2</sub>/NO/NO<sub>x</sub>:** The analyzer was placed in "maintenance" mode on January 12 at hours 15:00-17:00 to obtain GPT reference values for an Ozone calibration. This resulted in three hours of downtime.

**O<sub>3</sub>:** A total of 59 hours of downtime were incurred this month due to the following:

- The routine monthly calibration was performed on January 10 but was rejected as the as-found high point did not meet the 20 minutes response time requirement. The calibration was successfully completed on January 12 with an alternate set of calibration equipment. Data between the two calibrations were invalidated, resulting in 52 hours of downtime.
- Two hours of downtime were recorded due to additional quality checks performed on January 20 at 08:00 and 12:00, to address a biased high drift in span response.

The summary of results is presented on the following pages.

Any deviations or modifications made to the sampling or analytical methods are outlined in Section 1.0, Discussion. On this basis, Maxxam Analytics is issuing this completed report to Lakeland Industry & Community Association, 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	17	19	7.4	S	1	1	99.3
H <sub>2</sub> S (ppb)	10	3	0	0	0	1	1	16	18	SW	1	9	99.2
THC (ppm)	-	-	-	-	2.44	3.50	29	2	10.9	ESE	3.00	4	99.2
NO <sub>2</sub> (ppb)	159	-	0	-	3	30	17	1	13.9	W	12	4	98.9
NO (ppb)	-	-	-	-	0	7	23	23	5.3	SW	1	23	98.9
NO <sub>x</sub> (ppb)	-	-	-	-	3	31	17	1	13.9	W	12	4	98.9
O <sub>3</sub> (ppb)	82	-	0	-	27.6	40.0	19	0	11	WSW	37.4	19	92.1
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	80	30	0	0	6	26	4	18	10.5	E	20	4	99.3
RELATIVE HUMIDITY (%)	-	-	-	-	71	85	2	21	8.1	SW	84	22	99.3
BAROMETRIC PRESSURE (millibar)	-	-	-	-	926	948	14	20	7.0	SSE	943	14	99.3
AMBIENT TEMPERATURE (°C)	-	-	-	-	-13.0	5.7	17	13	16.2	W	-1.0	19	99.3
PRECIPITATION (mm)	-	-	-	-	0.0	1.7	9	9	13.5	NNE	0.5	26	99.6
VECTOR WS (kph)	-	-	-	-	2.5	24.4	7	4	-	WSW	17.0	15	99.3
VECTOR WD (sec)	-	-	-	-	238 (SW)	-	-	-	-	-	-	-	99.3

---

## 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

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>), 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 99.3% equivalent to 5 hours of downtime. These were incurred as a result of a power failure that occurred on January 15 at hours 06:00 - 10:00.
- The routine monthly calibration was performed on January 10.
- The O<sub>3</sub> and SO<sub>2</sub> span programs are designed to run concurrently. Three instances of quality checks were recorded on the SO<sub>2</sub> channel on January 12 at hour 20:00 and January 20 at hour 08:00 and 12:00, due to activities on the O<sub>3</sub> channel.
- A scheduled internal audit was conducted by Maxxam on January 16. The audit report can be found in Appendix III.
- One instance of maximum instantaneous data was discarded due to a brief power failure on January 15 at hour 12:00.

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

- Operational time for the monitoring period was 99.2% equivalent to 6 hours of downtime. These were incurred as a result of a power failure that occurred on January 15 at hours 06:00 - 10:00, and the subsequent analyzer recovery at 11:00.
- The routine monthly calibration was performed on January 9.
- A scheduled internal audit was conducted by Maxxam on January 16. The audit report can be found in Appendix III.
- One instance of maximum instantaneous data was discarded due to a brief power failure on January 15 at hour 12:00.

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

- Operational time for the monitoring period was 99.2% equivalent to 6 hours of downtime. These were incurred as a result of a power failure that occurred on January 15 at hours 06:00 - 10:00, and the subsequent analyzer recovery at 11:00.
- The routine monthly calibration was performed on January 9.
- A scheduled internal audit was conducted by Maxxam on January 16. The audit report can be found in Appendix III.
- One instance of maximum instantaneous data was discarded due to a brief power failure on January 15 at hour 12:00.

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

- Operational time for the monitoring period was 98.9% equivalent to 8 hours of downtime.
- The routine monthly calibration was performed on January 10.
- The analyzer was placed in "maintenance" mode on January 12 at hours 15:00-17:00 to obtain GPT reference values for an Ozone calibration. This resulted in three hours of downtime.
- Five hours of downtime were recorded due to a power failure on January 15 from hours 06:00-10:00.
- A scheduled internal audit was conducted by Maxxam on January 16. The audit report can be found in Appendix III.
- One instance of maximum instantaneous data was discarded due to a brief power failure on January 15 at hour 12:00.

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

- Operational time for the monitoring period was 92.1% equivalent to 59 hours of downtime.
- The routine monthly calibration was performed on January 10. Upon review of the calibration report, the calibration was rejected as the as-found high point did not meet the 20 minutes response time requirement. The calibration was successfully completed on January 12 with an alternate set of calibration equipment, after restoring the analyzer to its January 10 as-found settings. Data between the two calibrations were invalidated, resulting in 52 hours of downtime.
- Five hours of downtime were recorded due to a power failure on January 15 from hours 06:00-10:00.
- A scheduled internal audit was conducted by Maxxam on January 16. The audit report can be found in Appendix III.
- The analyzer spanned outside the upper acceptance limit on January 20 at 04:00. A repeat zero-span check was triggered the same day at 08:00 but still spanned outside the upper acceptance limit. The zero-span check was repeated soon after, at hour 12:00 and results were within acceptance limits. No issues were identified. No further action was required. Two hours of downtime were recorded due to the additional zero-span checks.
- One instance of maximum instantaneous data was discarded due to a brief power failure on January 15 at hour 12:00.

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

- Operational time for the monitoring period was 99.3% equivalent to 5 hours of downtime, which were incurred as a result of a power failure that occurred on January 15 at hour 06:00 - 10:00.
- The routine monthly audit was performed on January 18.
- Data was corrected in accordance with AMD (2016), Chapter 6, Table 2, *Zero Adjustment Criteria*. Data recorded between 0 and  $-3 \mu\text{g}/\text{m}^3$  was corrected to  $0 \mu\text{g}/\text{m}^3$ . Data recorded below  $-3 \mu\text{g}/\text{m}^3$  was invalidated. No hourly data was invalidated as all measurements were above  $-3 \mu\text{g}/\text{m}^3$  this month.

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

- Operational time for the monitoring period was 99.3% equivalent to 5 hours of downtime, which were incurred as a result of a power failure that occurred on January 15 at hour 06:00 - 10:00.
- 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.
- One instance of maximum instantaneous data was discarded due to a brief power failure on January 15 at hour 12:00.

**RELATIVE HUMIDITY (RH)**

- Operational time for the monitoring period was 99.3% equivalent to 5 hours of downtime. These were incurred as a result of a power failure that occurred on January 15 at hours 06:00 - 10:00.

**BAROMETRIC PRESSURE (BP)**

- Operational time for the monitoring period was 99.3% equivalent to 5 hours of downtime. These were incurred as a result of a power failure that occurred on January 15 at hours 06:00 - 10:00.

**PRECIPITATION (PRECIP)**

- Operational time for the monitoring period was 99.6% equivalent to 3 hours of downtime. These were incurred as a result of a power failure that occurred on January 15 at hours 07:00 - 09:00.

**AMBIENT TEMPERATURE (AmbTPX)**

- Operational time for the monitoring period was 99.3% equivalent to 5 hours of downtime. These were incurred as a result of a power failure that occurred on January 15 at hours 06:00 - 10:00.



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## **2.0 Project Personnel**

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

## **3.0 Plant Monthly Required AMD Summary**

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

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems 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**

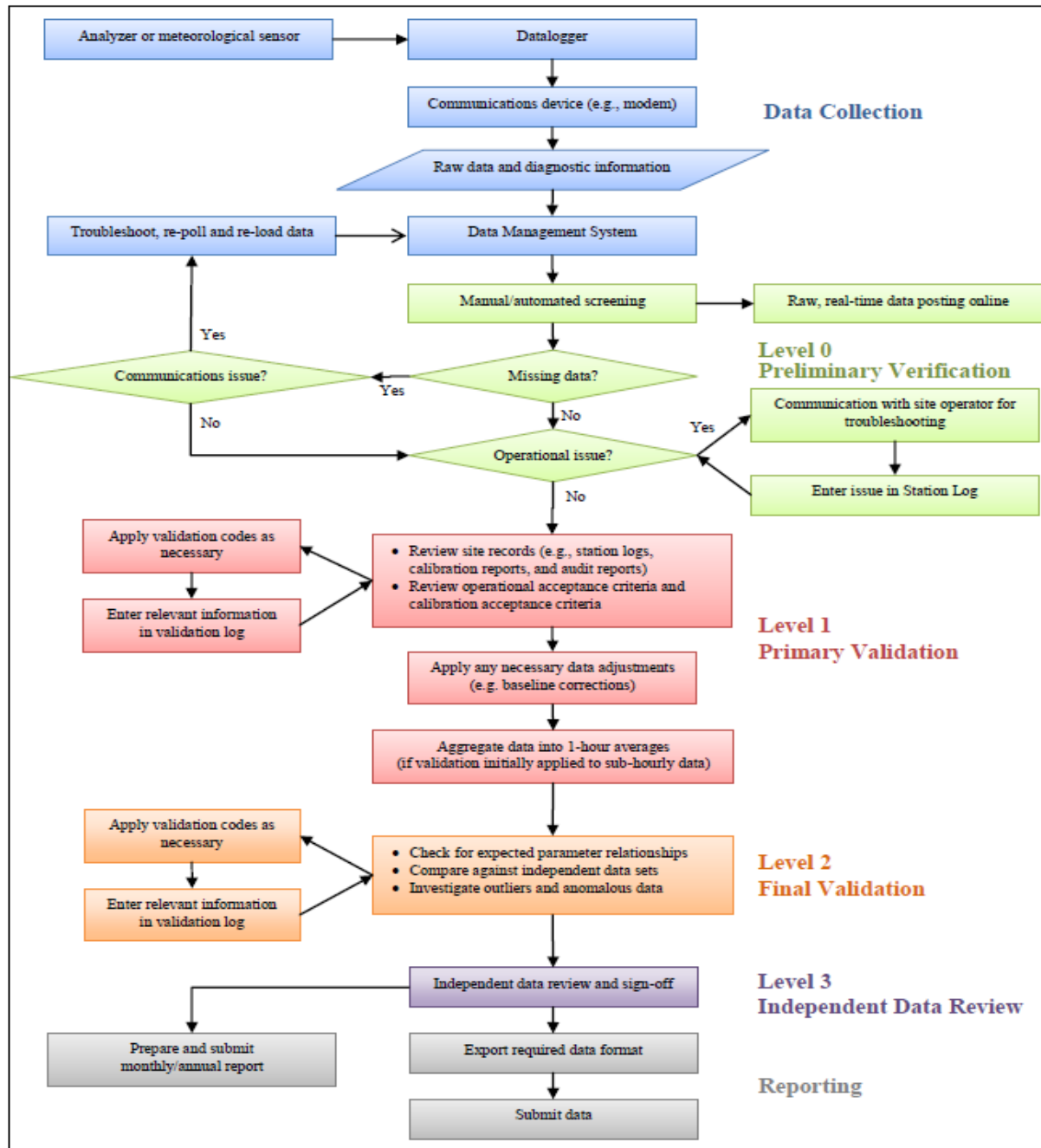
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

**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	S	0	0	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	3	3	1	0	S	0	3	1	24						
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	S	1	0	1	0	24					
3	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	S	0	1	0	1	0	24					
4	2	2	2	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	S	1	1	1	0	2	1	24					
5	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	0	1	1	24					
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	S	0	0	0	0	0	0	0	1	1	24					
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	1	1	0	1	24					
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	0	0	0	0	0	0	0	0	0	1	1	24					
9	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	2	2	0	2	24					
10	2	3	3	2	3	2	1	0	0	1	1	1	1	C	C	C	C	C	0	0	0	0	0	0	0	0	3	1	24					
11	0	0	0	0	0	0	0	0	0	0	0	0	1	S	2	1	1	1	1	1	1	1	1	1	1	1	0	2	1	24				
12	1	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	Q	2	1	1	1	2	1	24				
13	1	1	1	1	1	1	1	1	0	1	1	S	2	2	2	1	1	1	1	1	1	1	1	1	0	0	2	1	24					
14	0	0	0	0	0	0	0	0	0	1	S	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	24					
15	0	0	0	0	0	0	P	P	P	P	P	1	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	19				
16	0	0	0	0	0	1	1	1	S	1	Q	Q	Q	1	2	2	2	1	1	1	1	1	1	1	1	0	2	1	24					
17	1	2	2	1	1	1	0	S	0	0	0	0	0	0	0	0	0	0	2	4	2	1	1	0	0	0	4	1	24					
18	0	0	0	1	0	0	S	0	1	1	1	1	2	1	1	1	1	1	1	0	0	0	0	0	0	0	2	1	24					
19	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	24					
20	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					
21	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					
22	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					
23	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	24					
24	S	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	1	0	24					
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	S	0	0	1	0	24					
26	0	0	0	0	0	0	0	0	0	1	1	1	2	1	1	1	2	1	2	1	1	S	1	1	0	2	1	24						
27	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	S	0	0	0	0	1	1	24					
28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	1	0	1	0	24					
29	1	1	1	0	0	1	2	0	0	0	0	0	0	0	1	1	1	0	S	1	2	2	2	3	0	3	1	24						
30	2	2	2	2	2	2	1	1	1	1	1	1	1	1	0	0	S	0	0	0	0	0	0	0	0	0	2	1	24					
31	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	S	0	0	0	0	0	0	0	0	0	0	1	0	24				
HOURLY MAX	2	3	3	2	3	2	2	1	1	1	1	2	2	2	2	2	2	1	2	4	3	2	2	3	0	1	0	24						
HOURLY AVG	1	1	1	1	1	1	0	0	0	1	0	1	1	1	1	0	1	0	0	0	1	0	0	1	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

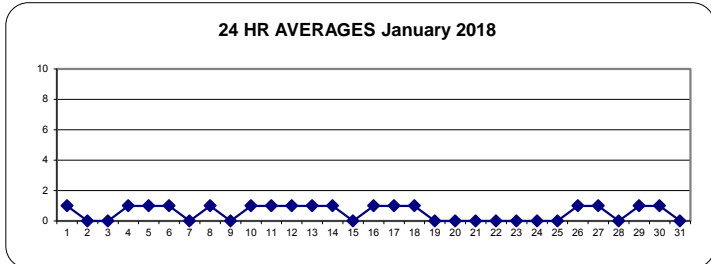
OBJECTIVE LIMIT:

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

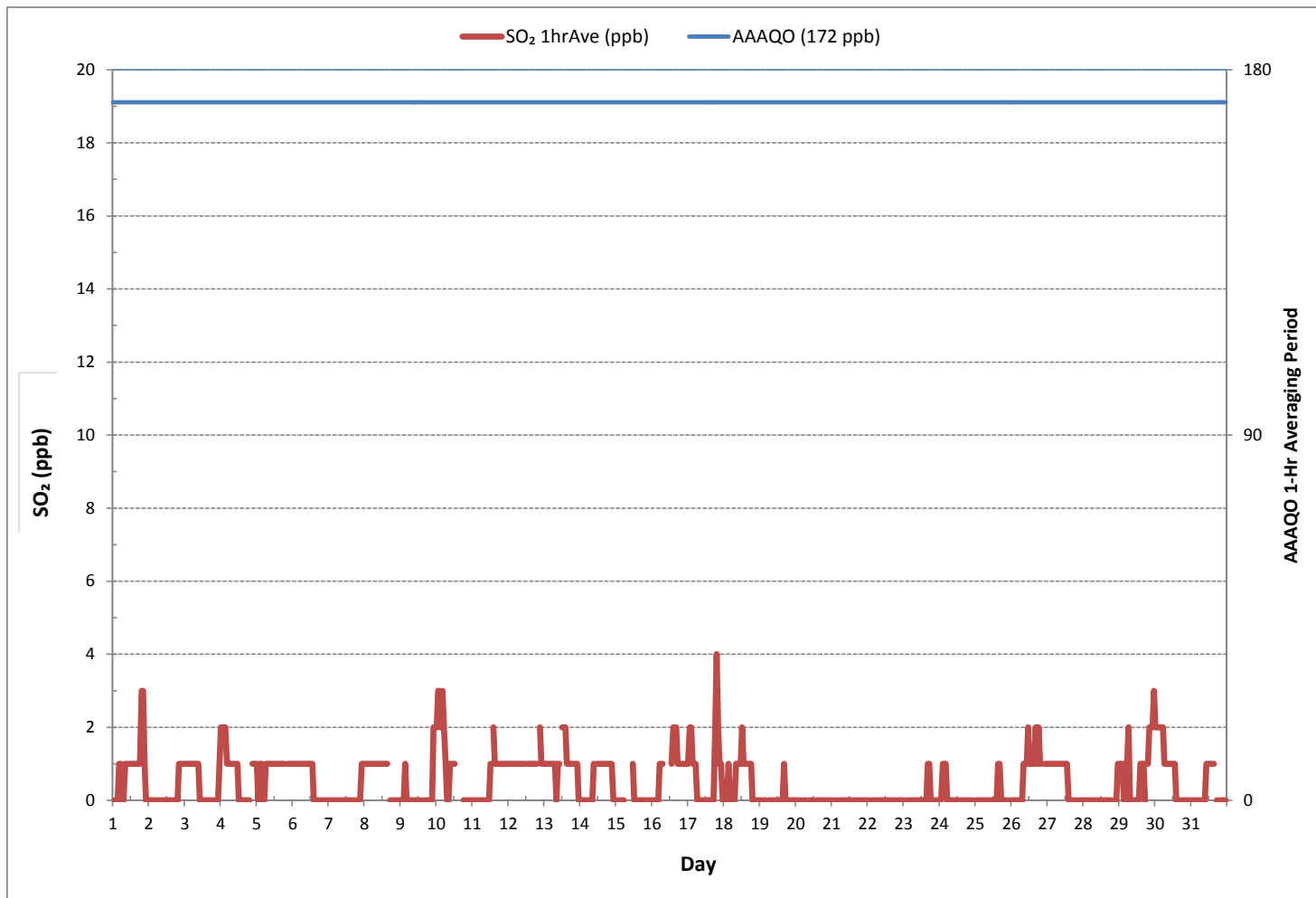
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0
NUMBER OF 24-HR EXCEEDANCES:	0
NUMBER OF NON-ZERO READINGS:	287
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR 1 ON DAY 1
MAXIMUM 1-HR AVERAGE:	4 ppb @ HOUR 19 ON DAY 17
MAXIMUM 24-HR AVERAGE:	1 ppb ON DAY 1
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	739 hrs
AMD OPERATION UPTIME:	99.3 %
STANDARD DEVIATION:	1
MONTHLY AVERAGE:	0 ppb

**24 HR AVERAGES January 2018**



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





Wind: LICA ST. LINA  
 Poll.: LICA ST. LINA-SO2[ppb]  
 Monthly: 18/01  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

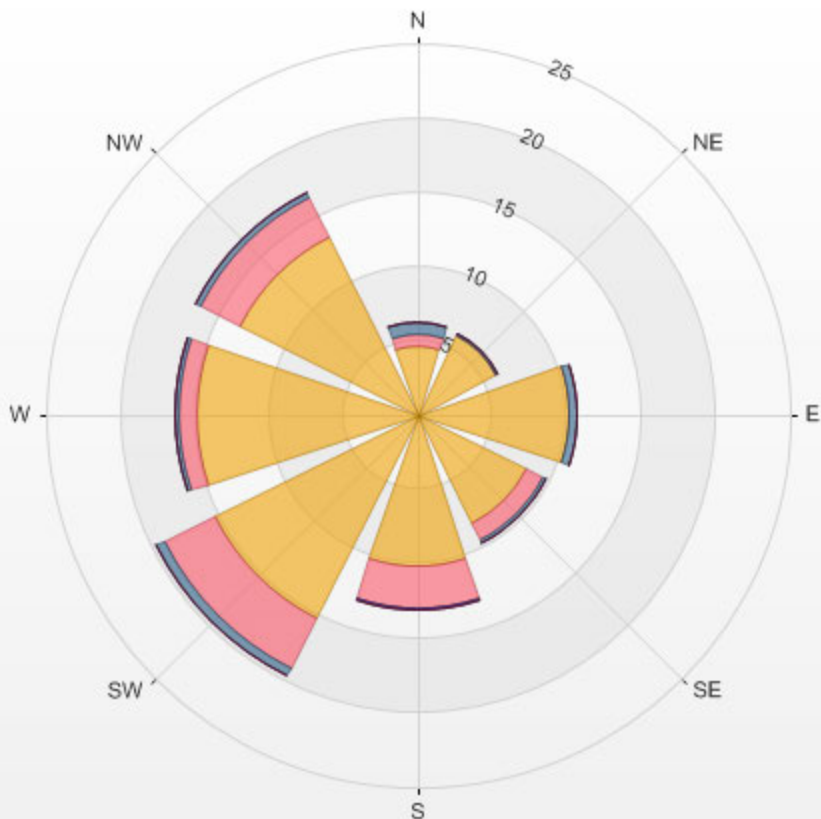
Calm: 1.45%

Calm Avg: 0.41 [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>	4.6	0.9	0.7	0.0	0.0	0.0	6.2
<b>NE</b>	5.9	0.0	0.1	0.0	0.0	0.0	6.1
<b>E</b>	10.3	0.0	0.4	0.0	0.0	0.0	10.7
<b>SE</b>	8.2	1.2	0.3	0.0	0.0	0.0	9.7
<b>S</b>	10.3	2.8	0.0	0.1	0.0	0.0	13.2
<b>SW</b>	15.3	3.8	0.6	0.0	0.0	0.0	19.7
<b>W</b>	14.9	1.2	0.3	0.0	0.0	0.0	16.3
<b>NW</b>	13.4	2.9	0.4	0.0	0.0	0.0	16.8
<b>Summary</b>	82.9	12.6	2.9	0.1	0.0	0.0	98.6

% Icon Classes (ppb) 83 0.0-1.0 13 1.0-2.0 3 2.0-3.0 0 3.0-4.0 0 4.0-5.0 0 >5.0

LICA ST. LINA Poll.: LICA ST. LINA-SO2[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 1.45% Calm Poll Avg: 0.41[ppb]



SO2[ppb] Calibration: LICA ST. LINA Monthly: 18/01 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	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	S	0	1	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	S	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	S	0	0	0	0	24	
4	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	1	0	24
5	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
6	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	1	0	24
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	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	S	0	0	0	0	0	0	0	0	0	0	0	24
9	0	1	1	1	1	1	1	1	1	1	1	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0	1	1	24
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	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	S	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	S	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	S	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	24
14	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
15	0	0	0	0	0	0	P	P	P	P	P	R	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
16	0	0	0	0	0	0	0	0	S	0	0	Q	Q	Q	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
17	1	1	1	0	0	0	0	S	0	0	0	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	S	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	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
20	0	0	0	0	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
21	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
22	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
23	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
24	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
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	24
26	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
27	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
28	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
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	1	1	1	0	1	0	24
30	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	S	0	0	0	0	0	0	0	1	1	24
31	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
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	1	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	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

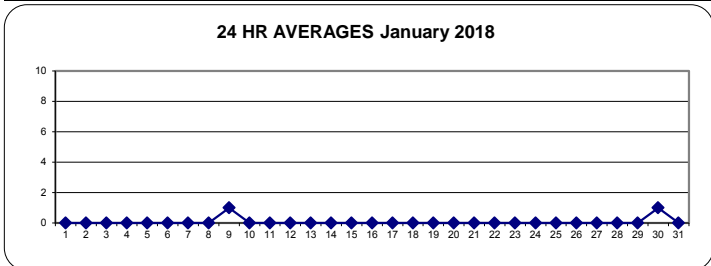
OBJECTIVE LIMIT:

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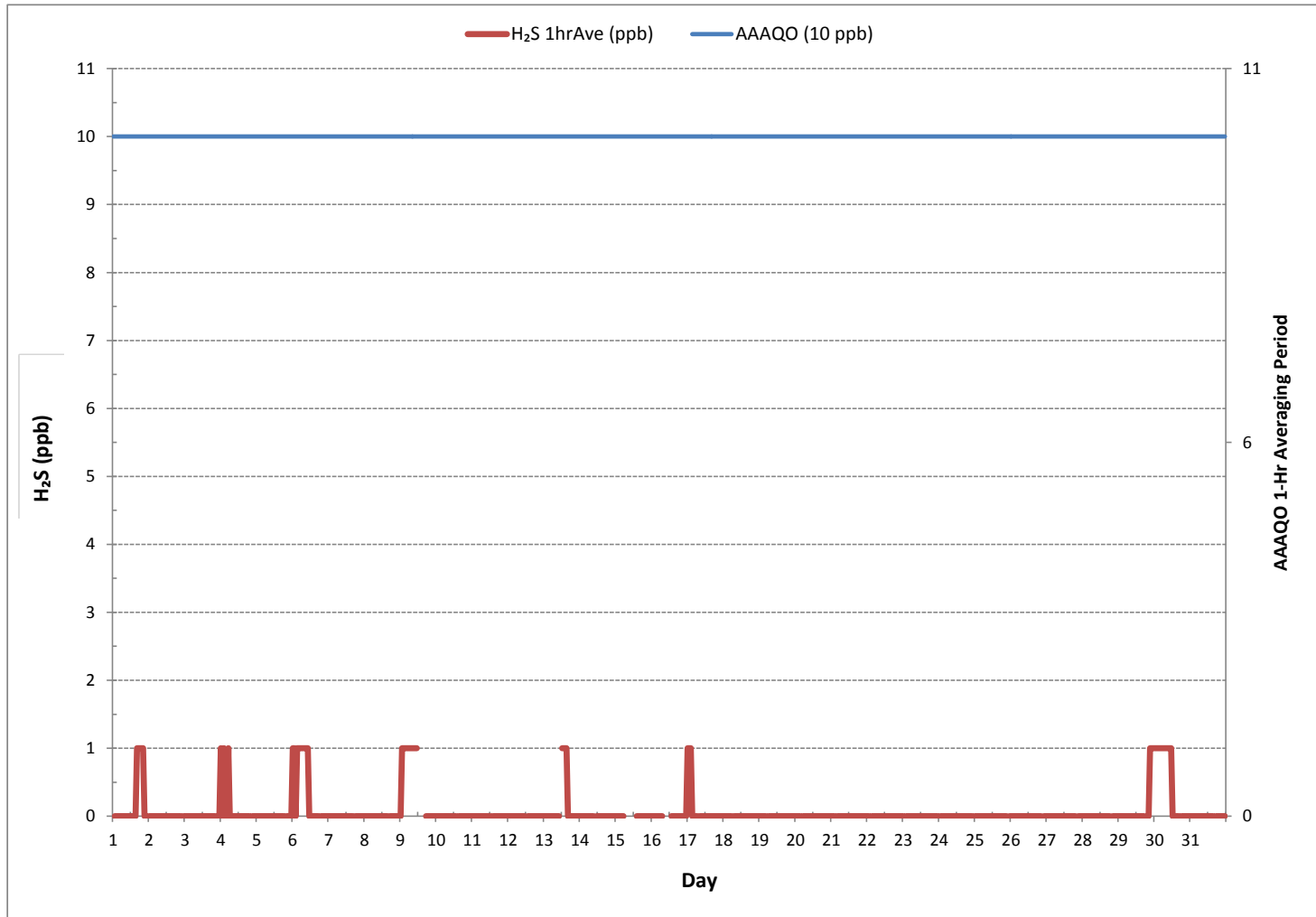
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	51		
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR 1 ON DAY 1		
MAXIMUM 1-HR AVERAGE:	1 ppb @ HOUR 16 ON DAY 1		
MAXIMUM 24-HR AVERAGE:	1 ppb ON DAY 9		
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	738 hrs
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	99.2 %
STANDARD DEVIATION:	0	MONTHLY AVERAGE:	0 ppb

24 HR AVERAGES January 2018



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





% Icon Classes (ppb)

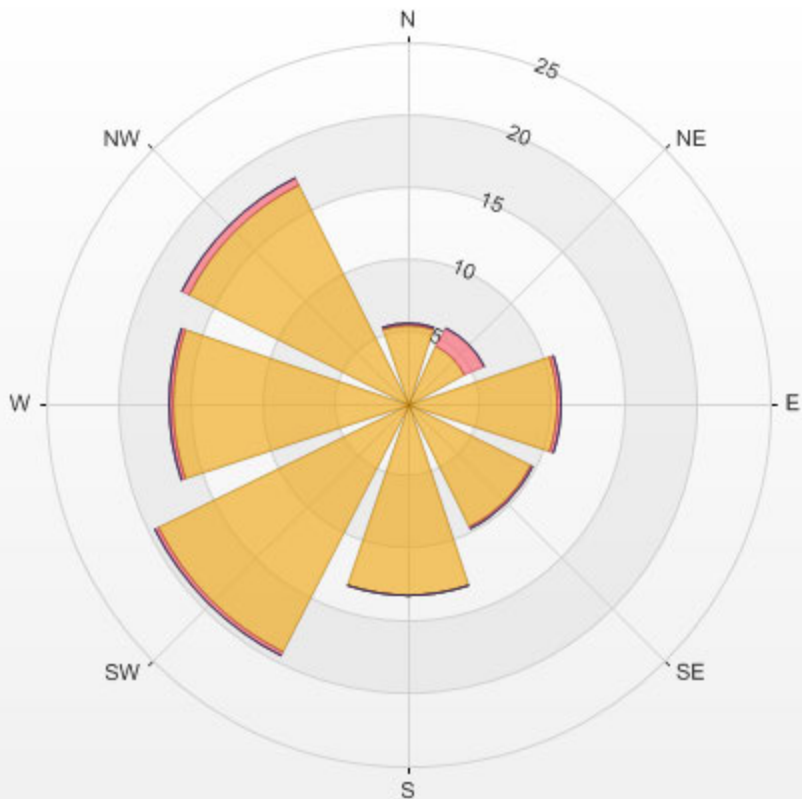
95 0.0-0.7

3 0.7-1.3

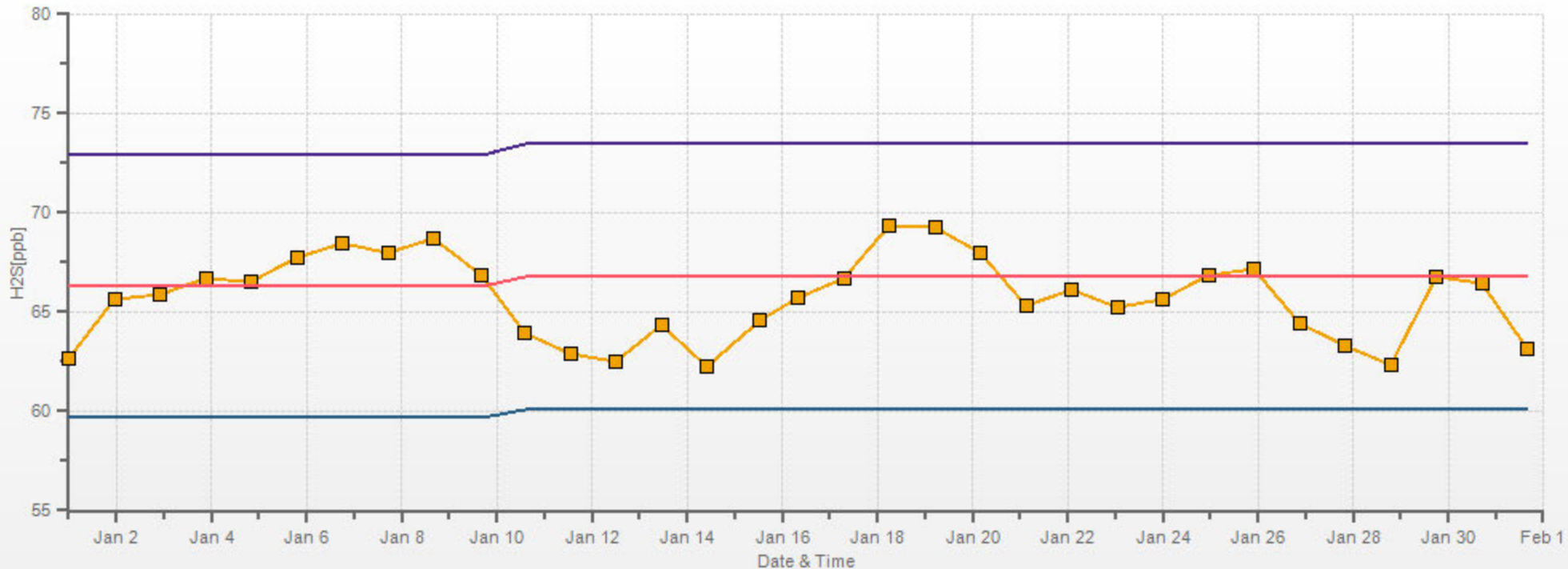
0 1.3-2.0

0 >2.0

LICA ST. LINA Poll.: LICA ST. LINA-H2S[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 1.44% Calm Poll Avg: 0.12[ppb]







Span Meas Span Ref Span Low Span High

***TOTAL HYDROCARBON***

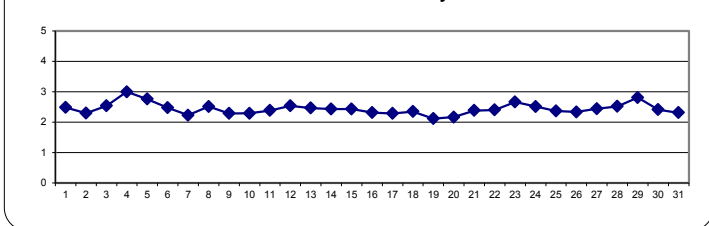
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

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	S	2.46	2.46	2.46	2.47	2.49	2.52	2.51	2.51	2.51	2.52	2.51	2.49	2.49	2.48	2.50	2.51	2.48	2.47	2.49	2.49	2.43	2.37	S	2.37	2.52	2.48	24	
2		2.32	2.29	2.27	2.25	2.25	2.23	2.24	2.28	2.28	2.24	2.25	2.26	2.25	2.26	2.31	2.36	2.33	2.36	2.36	2.37	S	2.49	2.23	2.49	2.29	24		
3		2.47	2.47	2.49	2.49	2.51	2.54	2.58	2.61	2.60	2.40	2.38	2.38	2.44	2.52	2.47	2.52	2.57	2.68	2.66	2.65	2.62	S	2.62	2.72	2.38	2.72	2.54	24
4		2.78	2.79	2.76	2.75	2.73	2.75	2.76	2.81	3.10	2.83	2.81	3.01	3.09	3.05	3.18	3.46	3.23	3.37	3.27	3.23	S	3.10	3.13	2.90	2.73	3.46	3.00	24
5		2.92	2.91	2.84	2.88	2.87	2.86	2.84	2.81	2.81	2.78	2.73	2.72	2.69	2.67	2.73	2.70	2.67	2.65	2.64	S	2.74	2.67	2.68	2.71	2.64	2.92	2.76	24
6		2.72	2.68	2.67	2.68	2.68	2.66	2.67	2.66	2.68	2.65	2.66	2.57	2.45	2.35	2.24	2.40	2.35	2.20	S	2.19	2.19	2.17	2.19	2.19	2.17	2.72	2.47	24
7		2.20	2.21	2.22	2.23	2.24	2.24	2.24	2.21	2.19	2.21	2.23	2.22	2.22	2.21	2.18	2.18	2.21	S	2.22	2.28	2.24	2.27	2.30	2.27	2.18	2.30	2.23	24
8		2.30	2.29	2.44	2.37	2.34	2.31	2.44	2.56	2.72	2.88	2.79	2.65	2.57	2.52	2.59	2.57	S	2.49	2.50	2.61	2.72	2.42	2.33	2.34	2.29	2.88	2.51	24
9		2.33	2.31	2.32	2.31	2.29	2.30	2.30	2.30	2.33	2.32	2.31	2.34	C	C	C	C	2.23	2.22	2.21	2.24	2.25	2.26	2.28	2.28	2.21	2.34	2.29	24
10		2.29	2.32	2.29	2.29	2.30	2.29	2.28	2.27	2.28	2.26	2.28	2.27	2.29	2.30	S	2.29	2.28	2.28	2.31	2.30	2.30	2.29	2.31	2.31	2.26	2.32	2.29	24
11		2.31	2.31	2.33	2.33	2.33	2.36	2.40	2.38	2.38	2.38	2.39	2.41	2.41	S	2.36	2.39	2.40	2.45	2.41	2.40	2.39	2.42	2.42	2.42	2.31	2.45	2.38	24
12		2.44	2.44	2.45	2.49	2.47	2.51	2.52	2.52	2.51	2.52	2.51	2.53	S	2.48	2.49	2.47	2.54	2.89	2.98	2.75	2.57	2.47	2.43	2.42	2.42	2.98	2.54	24
13		2.43	2.44	2.42	2.43	2.42	2.42	2.44	2.46	2.50	2.49	2.55	S	2.65	2.64	2.68	2.60	2.49	2.38	2.35	2.37	2.37	2.41	2.35	2.37	2.35	2.68	2.46	24
14		2.36	2.38	2.36	2.37	2.36	2.34	2.36	2.36	2.39	2.40	S	2.42	2.44	2.42	2.42	2.42	2.47	2.54	2.51	2.51	2.50	2.55	2.46	2.51	2.34	2.55	2.43	24
15		2.43	2.45	2.47	2.50	2.58	2.71	P	P	P	P	P	R	2.46	S	2.36	2.34	2.33	2.45	2.48	2.44	2.37	2.34	2.32	2.32	2.32	2.71	2.43	18
16		2.31	2.29	2.28	2.33	2.33	2.35	2.31	2.37	S	2.32	2.32	2.30	Q	Q	Q	2.30	2.30	2.32	2.34	2.30	2.29	2.31	2.31	2.38	2.28	2.38	2.32	24
17		2.47	2.62	2.55	2.44	2.36	2.27	2.17	S	2.16	2.18	2.18	2.19	2.20	2.18	2.17	2.20	2.24	2.25	2.29	2.31	2.36	2.29	2.29	2.29	2.16	2.62	2.29	24
18		2.28	2.36	2.45	2.57	2.56	2.49	S	2.40	2.39	2.37	2.34	2.32	2.34	2.31	2.31	2.31	2.32	2.31	2.34	2.34	2.31	2.30	2.22	2.13	2.13	2.57	2.35	24
19		2.12	2.13	2.13	2.13	2.12	S	2.12	2.13	2.14	2.15	2.16	2.14	2.13	2.13	2.12	2.10	2.09	2.11	2.10	2.09	2.09	2.10	2.11	2.09	2.16	2.12	24	
20		2.10	2.09	2.09	2.09	S	2.09	2.11	2.12	2.12	2.11	2.10	2.11	2.14	2.15	2.16	2.19	2.21	2.25	2.25	2.27	2.25	2.28	2.27	2.27	2.09	2.28	2.17	24
21		2.28	2.31	2.30	S	2.30	2.29	2.31	2.41	2.42	2.38	2.37	2.37	2.39	2.42	2.40	2.43	2.48	2.42	2.49	2.49	2.44	2.36	2.39	2.38	2.28	2.49	2.38	24
22		2.37	2.38	S	2.41	2.39	2.37	2.41	2.42	2.42	2.41	2.40	2.38	2.39	2.42	2.46	2.48	2.45	2.43	2.40	2.37	2.36	2.39	2.38	2.38	2.36	2.48	2.40	24
23		2.37	S	2.45	2.50	2.55	2.56	2.57	2.60	2.66	2.69	2.73	2.72	2.68	2.64	2.60	2.62	2.72	2.77	2.70	2.66	2.64	2.84	2.91	3.02	2.37	3.02	2.66	24
24		S	2.97	2.91	2.83	2.74	2.57	2.51	2.50	2.47	2.44	2.42	2.42	2.40	2.40	2.40	2.42	2.43	2.44	2.41	2.43	2.41	2.39	2.38	S	2.38	2.97	2.51	24
25		2.37	2.36	2.38	2.31	2.31	2.29	2.30	2.32	2.36	2.35	2.36	2.38	2.38	2.34	2.35	2.30	2.35	2.45	2.44	2.49	2.54	2.45	S	2.38	2.29	2.54	2.37	24
26		2.29	2.28	2.29	2.30	2.28	2.27	2.31	2.31	2.37	2.36	2.33	2.33	2.35	2.33	2.36	2.37	2.37	2.36	2.37	2.37	2.35	S	2.38	2.38	2.27	2.38	2.34	24
27		2.35	2.37	2.38	2.38	2.38	2.42	2.42	2.41	2.43	2.50	2.51	2.49	2.46	2.47	2.46	2.43	2.48	2.42	2.41	2.39	S	2.43	2.53	2.61	2.35	2.61	2.44	24
28		2.50	2.48	2.51	2.52	2.52	2.45	2.44	2.43	2.43	2.44	2.46	2.45	2.45	2.47	2.47	2.48	2.47	2.48	2.50	S	2.55	2.59	2.83	2.98	2.43	2.98	2.52	24
29		3.22	3.46	3.50	3.28	3.36	3.26	3.18	2.96	2.85	2.73	2.65	2.58	2.55	2.55	2.53	2.51	2.53	2.52	S	2.48	2.47	2.47	2.45	2.43	2.43	3.50	2.81	24
30		2.43	2.38	2.38	2.39	2.42	2.48	2.50	2.52	2.51	2.47	2.40	2.41	2.41	2.40	2.39	2.39	2.37	S	2.38	2.36	2.37	2.35	2.33	2.34	2.33	2.52	2.41	24
31		2.31	2.31	2.31	2.31	2.32	2.31	2.32	2.33	2.31	2.31	2.33	2.30	2.31	2.29	2.29	S	2.29	2.29	2.30	2.31	2.31	2.35	2.32	2.29	2.35	2.31	24	
HOURLY MAX		3.22	3.46	3.50	3.28	3.36	3.26	3.18	2.96	3.10	2.88	2.81	3.01	3.09	3.05	3.18	3.46	3.23	3.37	3.27	3.23	2.74	3.10	3.13	3.02				
HOURLY AVG		2.42	2.45	2.46	2.45	2.46	2.45	2.43	2.45	2.46	2.44	2.43	2.42	2.43	2.42	2.43	2.43	2.43	2.46	2.45	2.43	2.41	2.41	2.42	2.44				

STATUS FLAG CODES

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

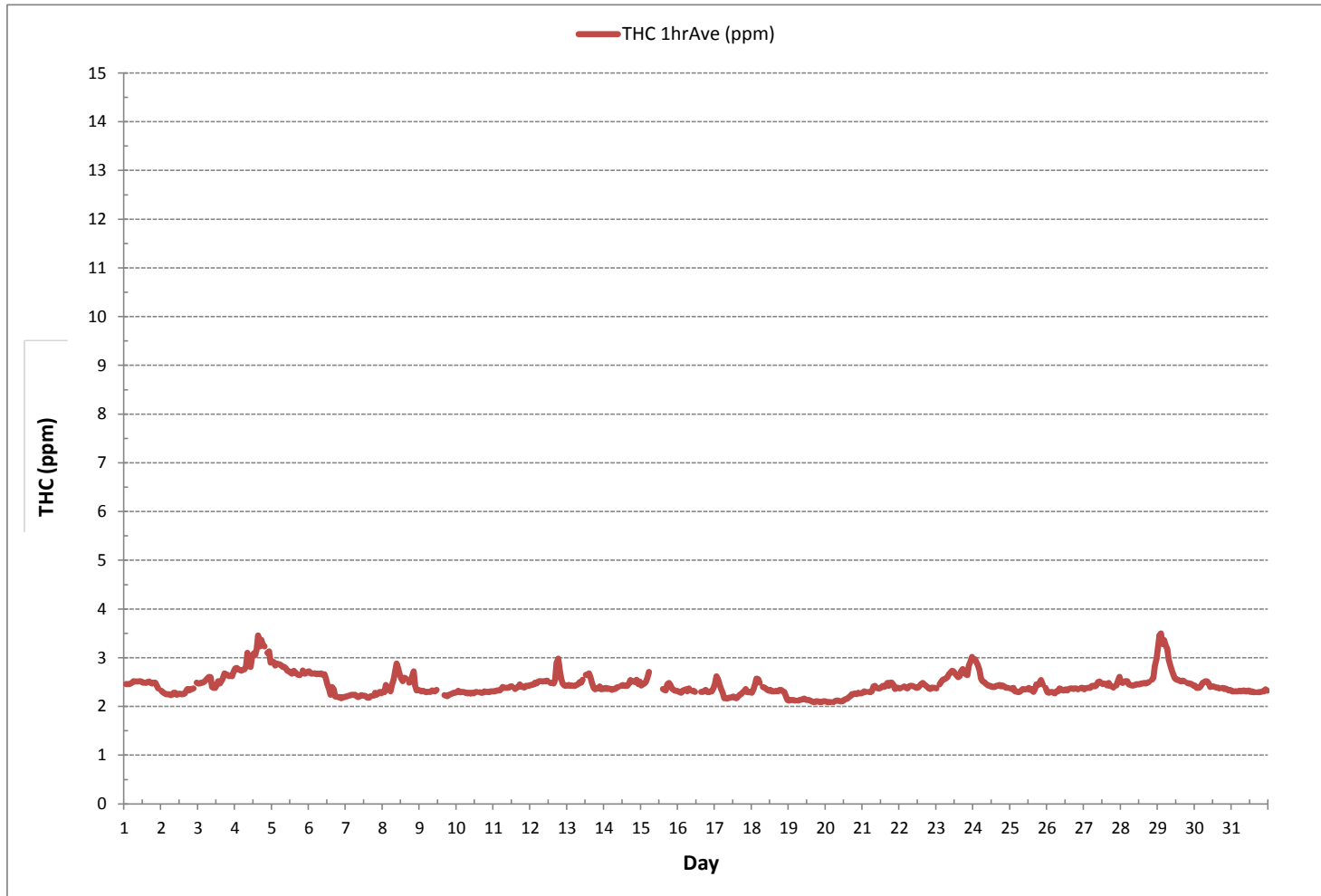
24 HR AVERAGES January 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	699		
MINIMUM 1-HR AVERAGE:	2.09 ppm	@ HOUR	16 ON DAY
MAXIMUM 1-HR AVERAGE:	3.50 ppm	@ HOUR	2 ON DAY
MAXIMUM 24-HR AVERAGE:	3.00 ppm		4 ON DAY
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	738 hrs
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	99.2 %
STANDARD DEVIATION:	0.22	MONTHLY AVERAGE:	2.44 ppm

TOTAL HYDROCARBONS Hourly Averages (THC ppm)





% Icon Classes (ppm)

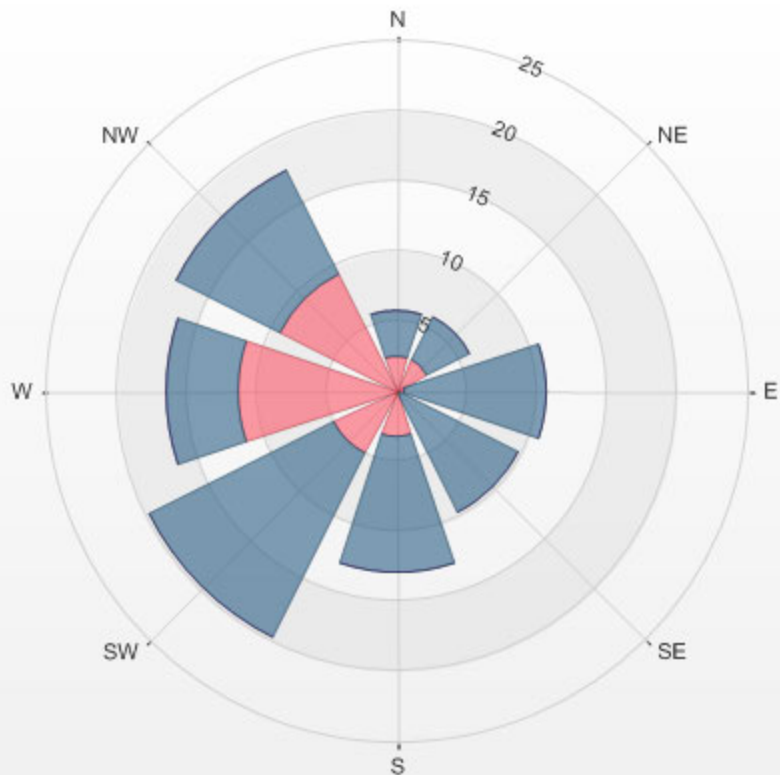
0 0.0-1.2

35 1.2-2.3

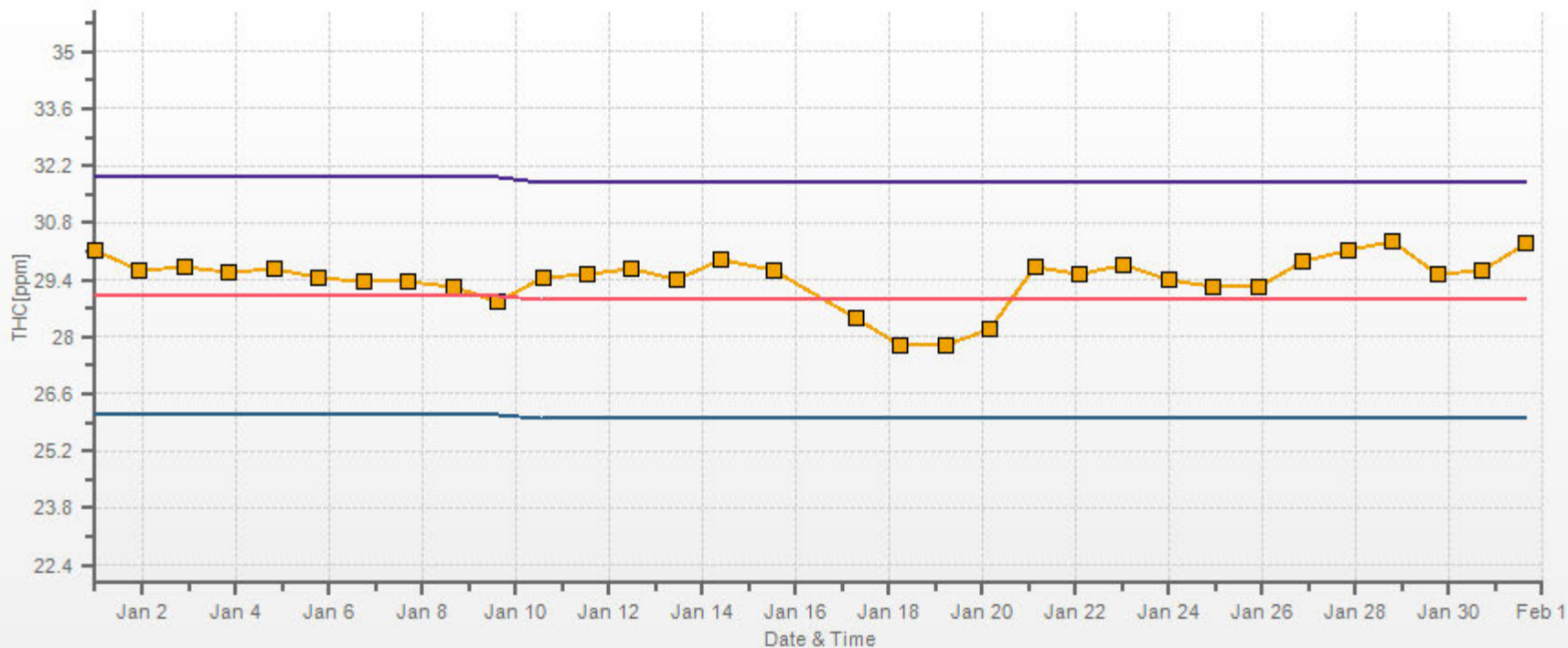
64 2.3-3.5

0 >3.5

LICA ST. LINA Poll.: LICA ST. LINA-THC[ppm] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 1.44% Calm Poll Avg: 2.46[ppm]



THC[ppm] Calibration: LICA ST. LINA Monthly: 18/01 Type: Span



Span Meas Span Ref Span Low Span High

## ***OXIDES OF NITROGEN***





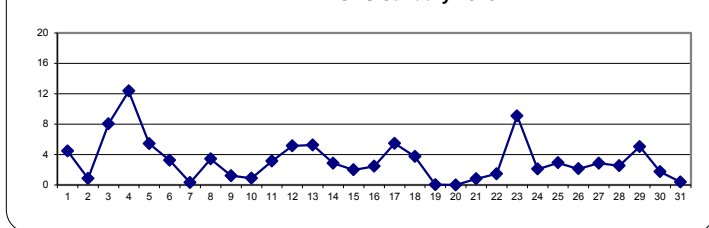
OXIDES OF NITROGEN Hourly Averages (NO<sub>x</sub> ppb)

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

STATUS FLAG CODES

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

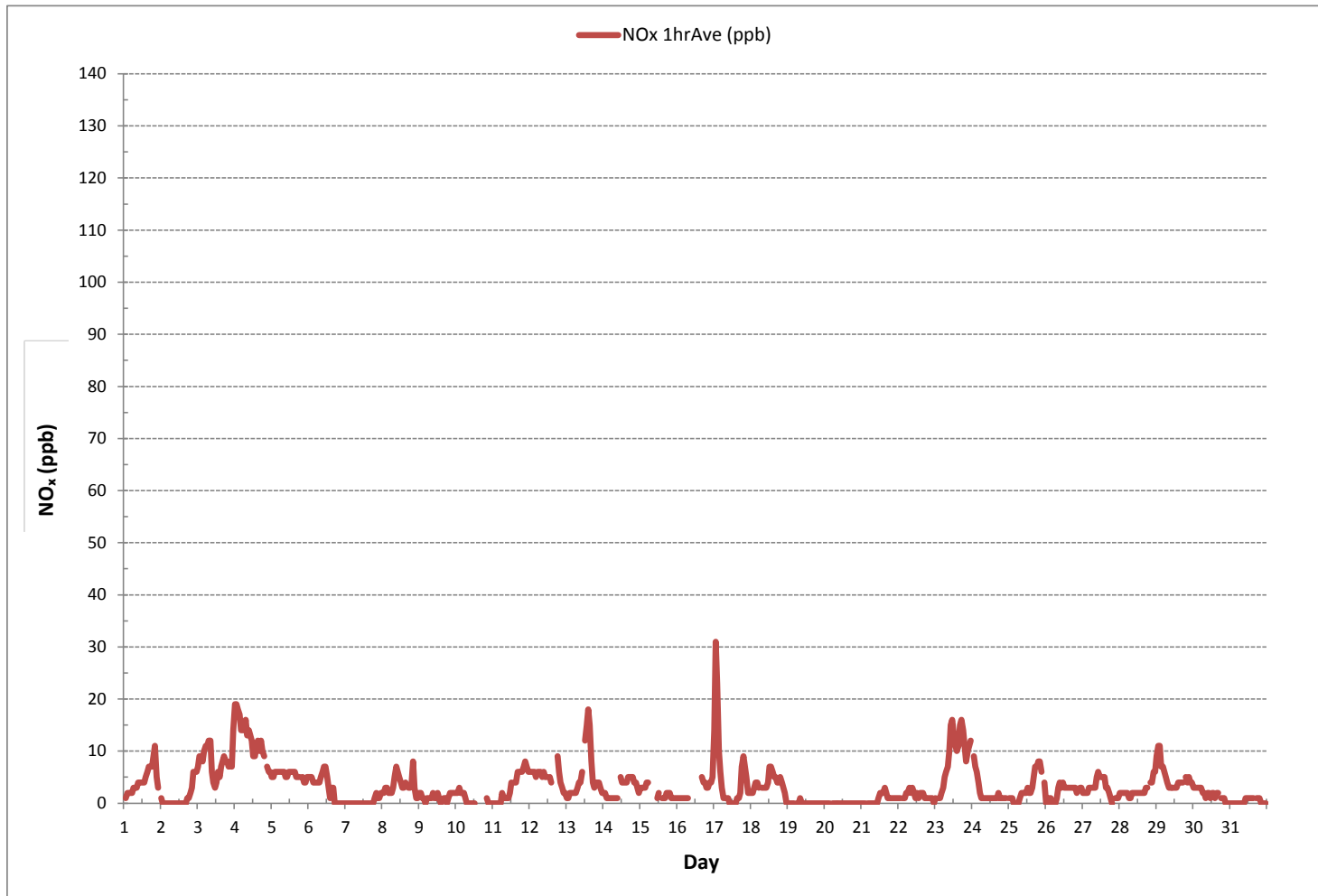
24 HR AVERAGES January 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	544			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	1	ON DAY 2
MAXIMUM 1-HR AVERAGE:	31 ppb	@ HOUR	1	ON DAY 17
MAXIMUM 24-HR AVERAGE:	12 ppb			ON DAY 4
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	736 hrs	
MONTHLY CALIBRATION TIME:	7 hrs	AMD OPERATION UPTIME:	98.9 %	
STANDARD DEVIATION:	4	MONTHLY AVERAGE:	3 ppb	

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





% Icon Classes (ppb)

93



0.0-10.7

5



10.7-21.3

0



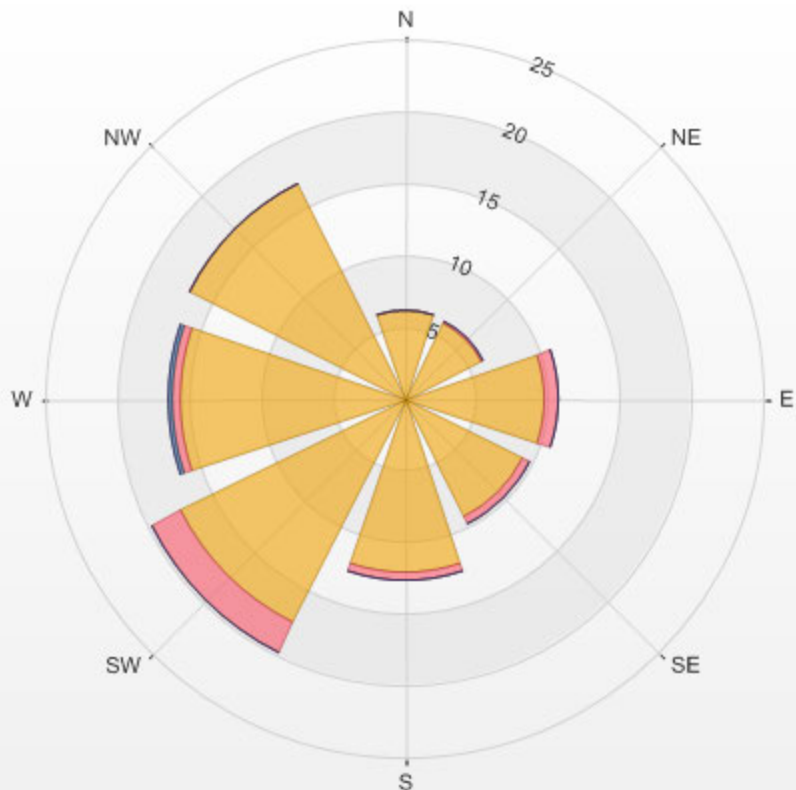
21.3-32.0

0



>32.0

LICA ST. LINA Poll.: LICA ST. LINA-NOX[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 1.45% Calm Poll Avg: 4.02[ppb]



NOX[ppb] Calibration: LICA ST. LINA Monthly: 18/01 Type: Span



Span Meas Span Ref Span Low Span High

***NITRIC OXIDES***

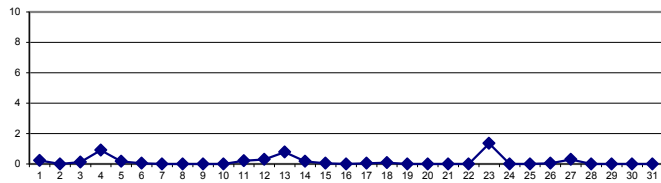
NITRIC OXIDE Hourly Averages (NO ppb)

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	S	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	S	0	1	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	S	0	0	0	24
3	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	S	0	0	0	1	0	24
4	0	0	0	0	0	0	0	0	0	0	2	3	4	4	3	3	2	0	0	0	0	S	0	0	0	0	4	1	24
5	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	S	0	0	0	0	0	1	0	24
6	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	1	0	24
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	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	S	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	S	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	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	24
11	0	0	0	0	0	0	0	0	0	0	0	1	2	S	1	0	1	0	1	0	0	0	0	0	0	0	2	0	24
12	0	0	0	0	0	0	0	0	0	1	1	2	S	1	1	Y	Y	Y	0	0	0	0	0	0	0	0	2	0	21
13	0	0	0	0	0	0	0	0	0	0	1	S	5	5	5	2	0	0	0	0	0	0	0	0	0	0	5	1	24
14	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	24
15	0	0	0	0	0	0	P	P	P	P	P	1	0	S	0	0	0	0	0	0	0	0	0	0	0	0	1	0	19
16	0	0	0	0	0	0	0	0	S	0	Q	Q	Q	Q	Q	Q	0	0	0	0	0	0	0	0	0	0	0	0	24
17	0	1	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
18	0	0	0	0	0	0	S	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
19	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
20	0	0	0	0	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
21	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
22	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
23	0	S	0	0	0	0	0	0	0	3	6	7	6	4	3	1	1	0	0	0	0	0	0	0	0	0	7	1	24
24	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	
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	24	
26	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	S	0	0	0	1	0	24
27	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	0	0	0	0	0	0	S	0	0	0	0	2	0	24
28	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
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	24
30	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
31	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
HOURLY MAX	0	1	0	0	0	0	0	0	0	3	6	7	6	5	5	2	1	0	0	0	0	0	0	0	0	0	0	0	
HOURLY AVG	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	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

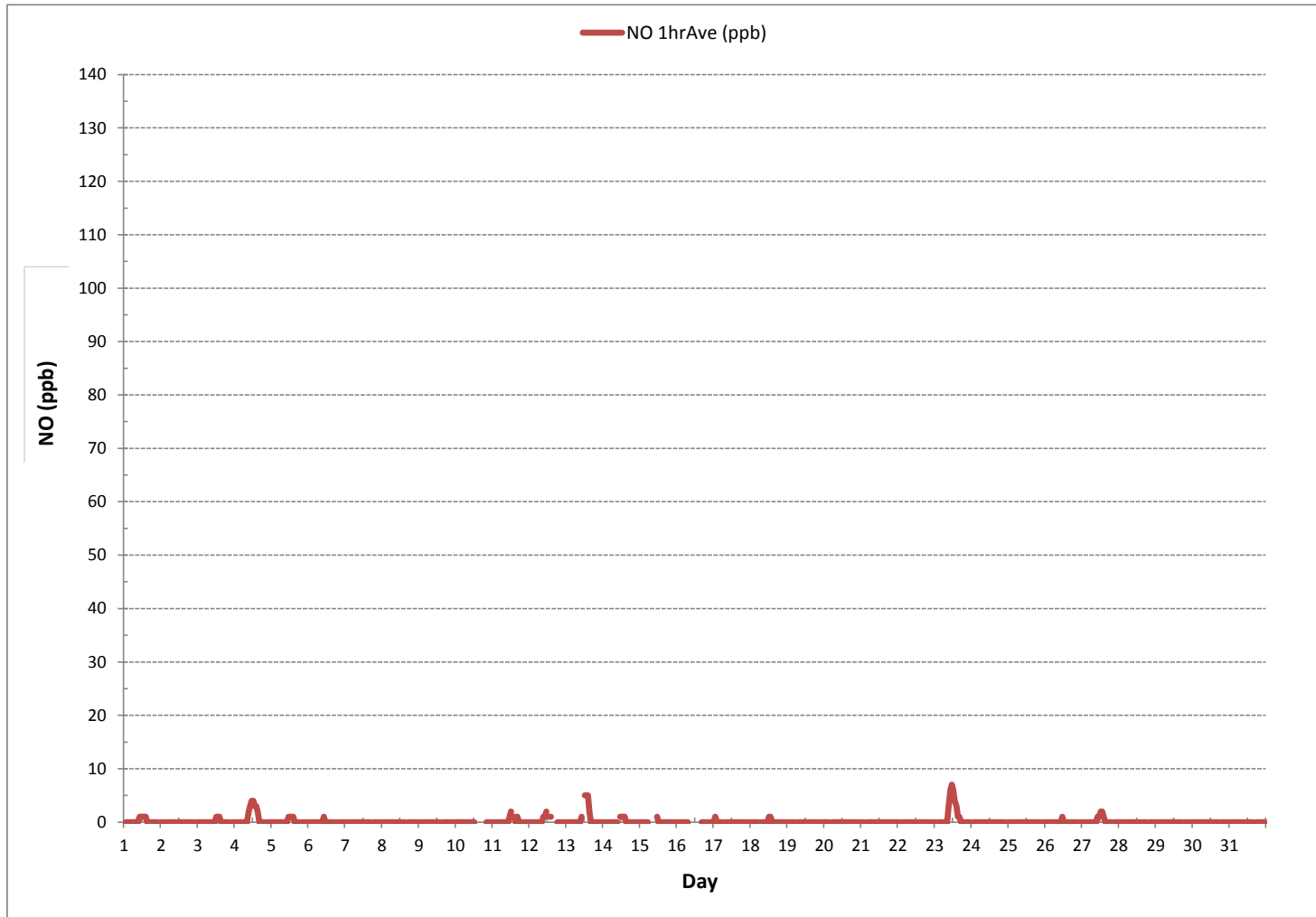
24 HR AVERAGES January 2018



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	56			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	1	ON DAY
MAXIMUM 1-HR AVERAGE:	7 ppb	@ HOUR	23	ON DAY
MAXIMUM 24-HR AVERAGE:	1 ppb			ON DAY
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	736 hrs	
MONTHLY CALIBRATION TIME:	7 hrs	AMD OPERATION UPTIME:	98.9 %	
STANDARD DEVIATION:	1	MONTHLY AVERAGE:	0 ppb	

NITRIC OXIDE Hourly Averages (NO ppb)







% Icon Classes (ppb)

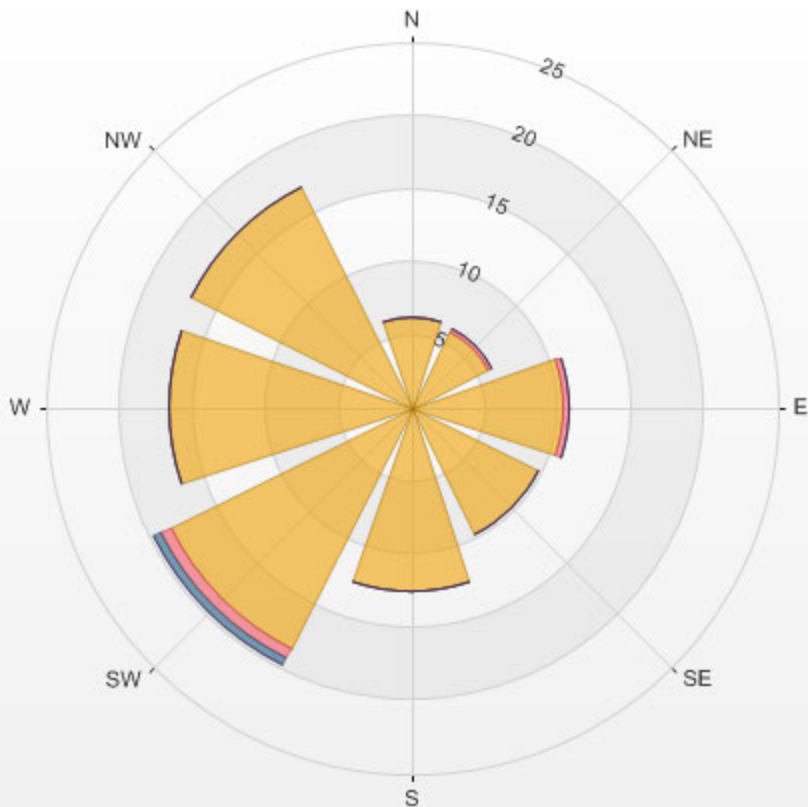
97 0.0-2.7

1 2.7-5.3

1 5.3-8.0

0 >8.0

LICA ST. LINA Poll.: LICA ST. LINA-NO[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 1.45% Calm Poll Avg: 0.07[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	S	1	2	2	2	2	3	3	3	4	3	3	3	3	4	6	7	7	7	9	11	5	3	S	1	11	4	24					
2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	3	6	S	6	0	6	1	24				
3	7	9	9	8	10	11	11	12	12	6	3	2	3	5	5	6	8	9	8	8	7	S	7	14	2	14	8	24					
4	19	19	18	17	14	14	14	16	13	13	10	8	6	6	8	10	10	12	10	9	S	7	6	6	6	19	12	24					
5	5	5	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	S	5	4	4	5	4	6	5	24						
6	5	5	5	4	4	4	4	4	5	6	7	6	5	3	1	3	3	0	S	0	0	0	0	0	0	7	3	24					
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	1	2	1	1	2	0	24						
8	2	2	3	3	2	2	2	3	5	7	6	5	4	3	3	4	S	3	4	8	3	1	1	1	1	8	3	24					
9	2	2	1	1	0	1	1	1	1	2	1	1	2	1	0	S	1	1	0	1	2	2	2	2	0	2	1	24					
10	2	2	3	2	2	2	1	0	0	0	0	0	0	C	C	C	C	C	C	C	1	0	0	0	0	3	1	24					
11	0	0	0	0	0	0	2	1	1	1	1	2	3	S	3	3	5	6	C	6	7	8	7	6	0	8	3	24					
12	6	6	6	6	5	6	6	6	5	5	4	4	S	3	3	Y	Y	Y	9	6	4	3	2	2	2	9	5	21					
13	1	1	2	2	2	2	3	4	4	4	5	S	7	9	13	13	8	4	3	4	4	4	3	2	1	13	4	24					
14	2	2	1	1	1	1	1	1	1	1	S	3	3	3	3	4	5	5	5	5	4	4	3	2	1	5	3	24					
15	3	3	3	3	4	4	P	P	P	P	P	0	1	S	1	1	1	2	2	2	1	1	1	1	0	4	2	19					
16	1	1	1	1	1	1	1	1	S	2	Q	Q	Q	Q	Q	Q	5	4	4	3	3	4	4	5	1	5	2	24					
17	14	30	23	10	6	3	1	S	1	1	0	0	0	0	0	1	1	2	7	9	7	5	2	2	0	30	5	24					
18	2	2	3	4	4	3	S	3	3	3	3	4	6	6	5	5	5	4	4	5	4	3	2	0	0	6	4	24					
19	0	0	0	0	0	S	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24					
20	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24					
21	0	0	0	0	S	0	0	0	0	0	0	1	2	2	2	3	2	1	1	1	1	1	1	1	0	3	1	24					
22	1	1	S	1	1	2	2	3	2	3	2	1	2	1	2	2	2	1	1	1	1	1	1	0	0	3	1	24					
23	1	S	1	1	2	3	5	6	7	8	9	8	8	7	8	9	14	16	14	11	8	10	11	12	1	16	8	24					
24	S	9	7	6	4	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	S	1	9	2	24					
25	1	1	1	0	0	0	0	1	2	2	2	2	3	2	2	3	5	7	7	8	8	6	S	4	0	8	3	24					
26	0	0	1	1	0	0	0	1	3	4	3	3	3	3	3	3	3	3	3	3	2	S	3	3	0	4	2	24					
27	2	2	2	2	3	3	3	3	3	3	5	4	3	3	3	3	3	3	2	1	0	S	1	1	1	0	5	2	24				
28	2	2	2	2	2	2	1	1	2	2	2	2	2	2	2	2	3	3	S	4	4	6	6	1	6	3	24						
29	9	11	11	7	7	6	5	4	3	3	3	3	3	3	3	4	4	4	S	5	4	5	4	4	3	11	5	24					
30	3	3	3	3	3	3	2	2	1	2	2	1	2	2	2	2	S	1	1	1	1	0	0	0	0	3	2	24					
31	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	S	1	1	1	0	0	0	0	0	1	0	24					
HOURLY MAX	19	30	23	17	14	14	14	16	13	13	10	8	8	9	13	13	14	16	14	14	11	11	10	11	14								
HOURLY AVG	3	4	4	3	3	3	3	3	3	3	3	2	3	3	3	3	4	4	4	4	4	4	3	3	3								

**STATUS FLAG CODES**

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

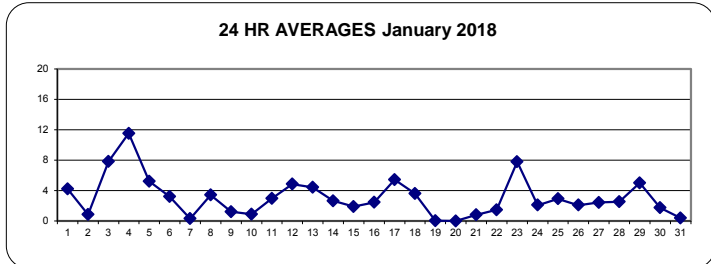
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

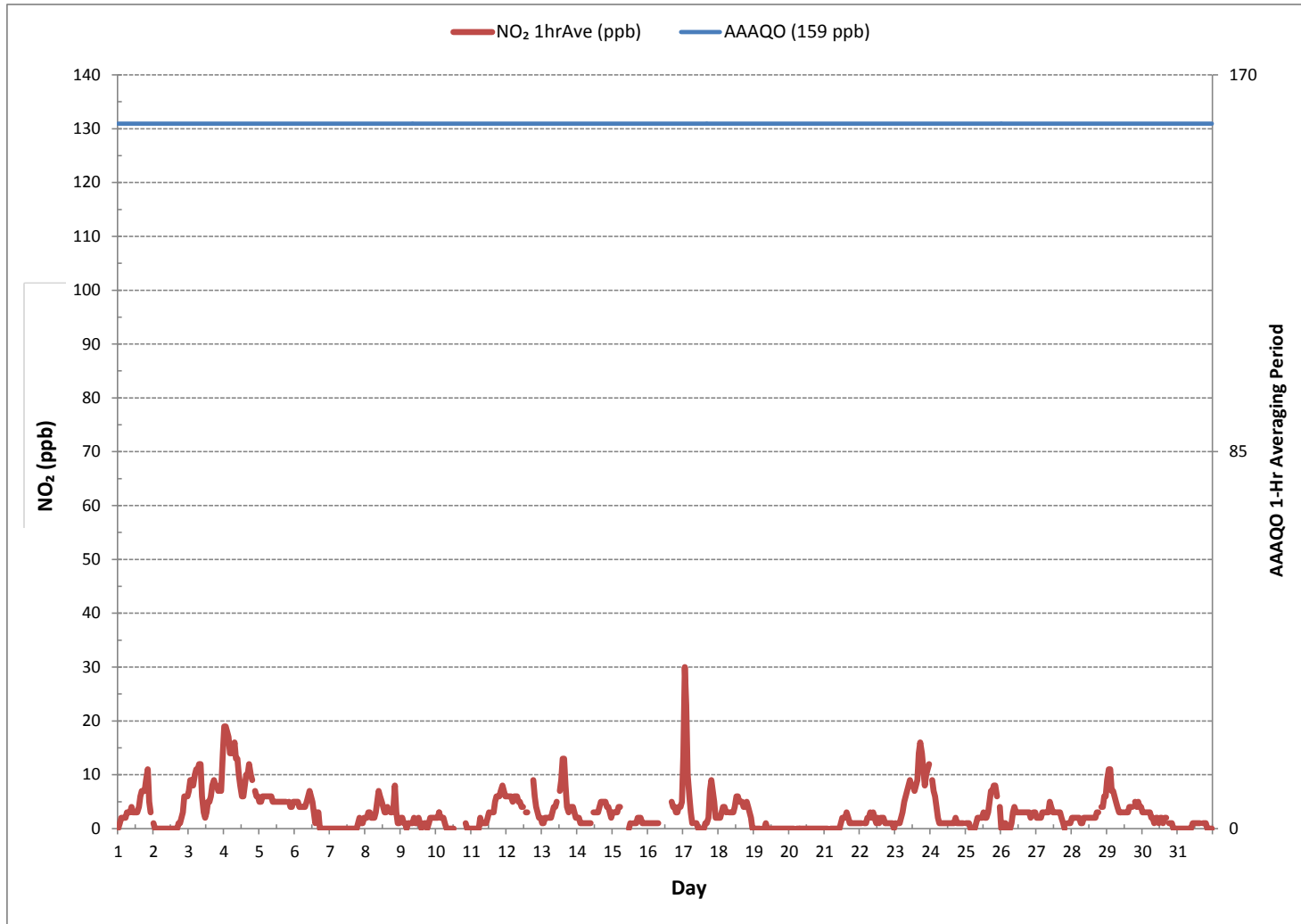
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	543			
MINIMUM 1-HR AVERAGE:	0	ppb	@ HOUR	1 ON DAY 2
MAXIMUM 1-HR AVERAGE:	30	ppb	@ HOUR	1 ON DAY 17
MAXIMUM 24-HR AVERAGE:	12	ppb		ON DAY 4
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	736 hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	98.9 %
STANDARD DEVIATION:	3		MONTHLY AVERAGE:	3 ppb

**24 HR AVERAGES January 2018**



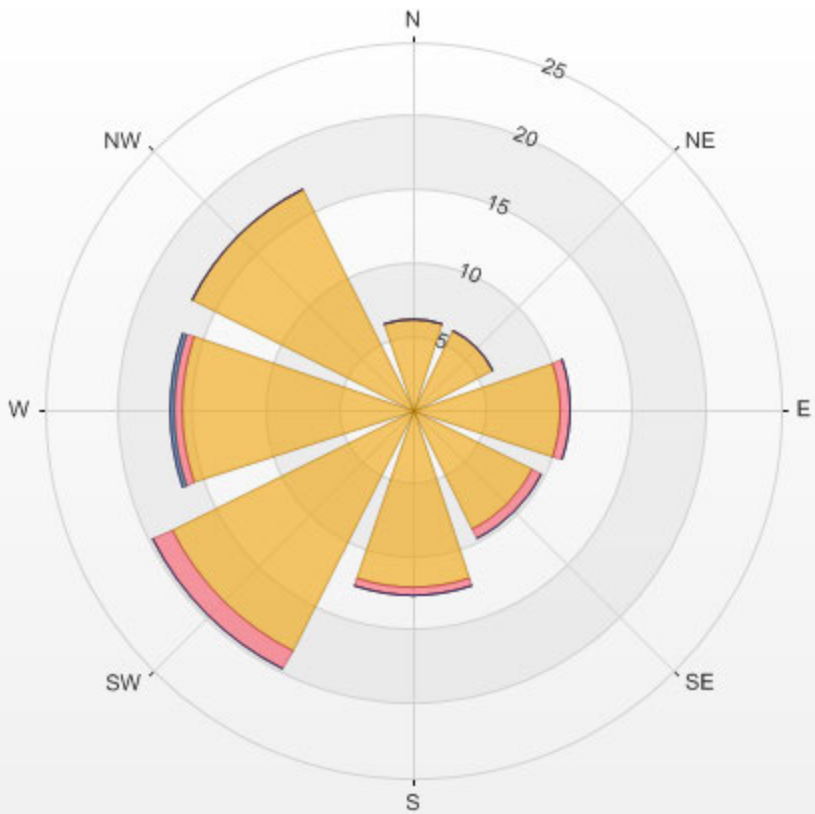
NITROGEN DIOXIDE Hourly Averages (NO<sub>2</sub> ppb)



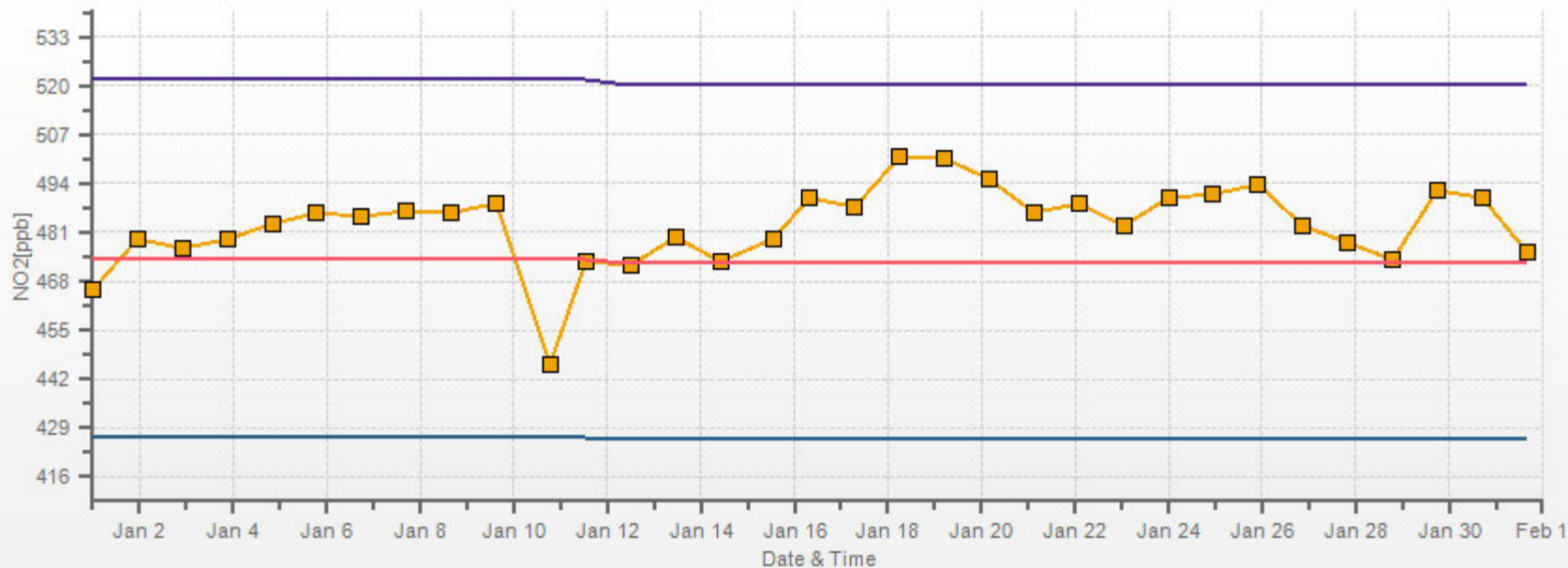


% Icon Classes (ppb) 94 0.0-10.3 4 10.3-20.7 0 20.7-31.0 0 >31.0

LICA ST. LINA Poll.: LICA ST. LINA-NO2[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 1.45% Calm Poll Avg: 3.95[ppb]



NO2[ppb] Calibration: LICA ST. LINA Monthly: 18/01 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	S	30.4	30.0	29.4	28.7	27.8	26.8	26.0	25.8	25.8	26.3	26.8	27.8	28.1	27.3	25.8	24.6	24.8	24.8	24.3	24.9	30.2	32.6	S	24.3	32.6	27.2	24			
2		34.9	35.9	36.1	36.2	35.9	35.8	35.7	35.7	36.0	36.0	35.5	35.6	35.4	34.9	35.4	34.7	34.0	32.0	31.2	29.7	27.1	24.1	S	22.7	22.7	36.2	33.5	24		
3		21.4	19.2	18.4	18.4	16.6	16.0	15.3	15.0	16.1	27.4	30.3	30.9	28.0	23.9	25.9	23.4	20.9	17.8	17.9	18.3	19.1	S	18.3	12.7	12.7	30.9	20.5	24		
4		8.4	8.2	8.6	9.3	10.9	11.0	11.5	9.5	6.9	12.5	15.0	13.7	13.4	14.5	13.7	10.7	10.0	8.2	10.7	11.5	S	15.8	15.7	16.9	6.9	16.9	11.6	24		
5		17.8	17.7	17.1	16.0	15.6	15.6	15.2	16.1	16.5	17.5	18.1	18.9	19.8	20.6	20.8	21.3	22.9	22.7	S	20.0	20.5	20.2	19.3	15.2	15.2	23.1	18.8	24		
6		18.8	18.4	17.8	17.5	16.8	16.9	16.5	15.9	15.3	14.6	14.7	17.3	21.7	28.5	32.8	26.2	27.8	33.6	S	35.1	36.5	38.2	39.3	38.4	14.6	39.3	24.3	24		
7		38.2	37.5	36.9	36.8	37.5	37.3	36.8	36.6	36.8	37.3	36.9	37.2	37.4	37.7	38.3	38.3	36.2	S	36.6	35.0	33.3	33.3	32.2	31.6	31.6	38.3	36.3	24		
8		31.3	32.9	30.5	27.4	29.1	31.1	29.6	28.5	26.3	25.0	27.1	29.7	30.9	31.5	29.8	28.6	S	29.0	27.9	26.9	21.2	23.2	24.5	25.6	21.2	32.9	28.2	24		
9		26.6	27.4	27.8	28.4	29.1	28.4	28.6	28.7	28.4	28.4	30.6	30.9	30.7	31.6	33.7	S	34.3	34.8	34.8	31.6	30.0	30.2	30.2	30.4	26.6	34.8	30.2	24		
10		31.7	32.2	32.1	33.1	32.9	32.8	34.1	34.2	34.1	33.9	34.0	34.1	33.9	Y	Y	Y	Y	Y	X	X	X	X	X	X	31.7	34.2	33.3	13		
11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	13	
12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	C	C	C	C	C	C	C	32.2	33.2	33.3	32.2	33.3	32.9	7
13		33.0	32.8	32.8	32.5	31.9	31.2	30.1	28.9	27.3	26.3	25.2	S	23.2	24.8	24.6	26.3	30.1	33.4	33.6	31.3	30.3	28.6	31.8	32.4	23.2	33.6	29.7	24		
14		32.9	32.1	33.6	32.4	33.5	33.8	34.0	32.9	32.2	31.9	S	30.1	30.9	31.6	31.6	31.4	29.5	28.6	29.4	29.4	30.0	30.3	31.8	33.2	28.6	34.0	31.6	24		
15		32.7	31.8	31.1	29.6	28.0	27.5	P	P	P	P	P	P	35.4	36.5	S	38.3	39.1	39.2	36.6	35.6	35.8	36.6	37.2	37.5	38.0	27.5	39.2	34.8	19	
16		38.5	38.7	38.2	37.3	36.7	36.1	36.1	35.6	S	36.1	36.8	36.4	36.1	36.0	35.5	Q	Q	Q	32.5	32.2	31.5	30.8	30.2	27.4	27.4	38.7	34.9	24		
17		18.0	4.9	9.7	19.2	22.7	29.2	36.5	S	36.2	34.9	35.9	36.7	37.6	39.1	39.5	38.9	38.8	36.5	32.0	29.0	29.8	30.5	34.9	36.5	4.9	39.5	30.7	24		
18		36.0	36.4	34.2	33.0	32.2	31.8	S	31.3	30.6	30.4	31.2	30.9	30.0	31.4	32.9	31.9	31.1	31.4	30.5	28.9	30.9	31.7	34.6	39.3	28.9	39.3	32.3	24		
19		40.0	39.0	39.4	39.2	38.4	S	37.8	37.0	36.3	36.4	37.4	37.8	37.7	38.1	37.8	37.7	37.5	37.4	37.3	37.5	37.0	36.1	34.5	32.5	32.5	40.0	37.4	24		
20		30.1	28.4	29.4	28.9	S	27.1	26.3	26.1	S1	29.5	32.2	34.5	S1	36.6	37.0	36.9	36.7	36.2	35.8	35.7	35.9	35.9	35.7	26.1	37.0	32.9	22			
21		35.1	34.6	33.8	S	31.5	31.5	31.2	30.9	31.8	33.8	34.6	33.5	32.2	31.5	30.7	31.7	34.3	34.8	34.3	35.1	34.9	35.1	34.1	33.3	30.7	35.1	33.2	24		
22		33.0	32.0	S	31.3	30.2	28.2	26.3	25.1	25.2	25.2	26.8	28.1	27.3	27.1	25.8	26.8	27.8	28.6	29.1	29.2	29.6	29.4	29.3	29.2	25.1	33.0	28.3	24		
23		28.8	S	26.0	24.3	22.6	19.3	16.3	15.2	14.0	14.3	14.2	16.0	18.9	21.4	24.8	27.6	21.2	16.5	15.7	13.7	16.4	14.1	12.5	11.8	11.8	28.8	18.5	24		
24		S	15.7	17.7	19.4	22.7	26.3	28.5	29.6	30.7	31.2	31.3	31.2	30.8	30.8	30.6	30.4	29.9	29.4	29.2	28.9	28.6	28.3	27.8	S	15.7	31.3	27.7	24		
25		27.5	27.1	26.9	27.2	27.1	26.8	26.5	26.1	25.1	25.0	24.8	25.3	25.2	25.5	26.0	24.1	20.7	18.3	17.6	16.1	15.2	17.0	S	19.9	15.2	27.5	23.5	24		
26		23.3	23.7	21.0	21.8	24.3	26.2	25.9	22.9	20.4	21.3	23.4	22.5	23.2	23.8	23.9	23.8	23.5	23.3	22.4	22.7	22.8	S	22.0	22.0	20.4	26.2	23.0	24		
27		22.3	22.1	22.6	22.1	20.4	19.4	19.3	19.7	19.0	19.0	20.1	21.5	22.4	22.3	22.6	24.0	23.8	26.3	27.5	28.0	S	26.9	26.0	25.6	19.0	28.0	22.7	24		
28		24.3	24.0	23.7	23.6	23.4	20.0	20.0	20.7	21.2	21.7	21.9	22.2	22.3	22.2	22.0	21.8	21.2	19.9	19.3	S	17.9	17.0	17.0	17.9	17.0	24.3	21.1	24		
29		15.3	13.9	14.5	19.7	20.0	22.0	23.7	25.7	26.8	28.0	28.1	28.3	29.2	28.5	27.3	26.2	25.3	24.3	S	23.7	23.0	22.5	22.6	22.5	13.9	29.2	23.5	24		
30		22.8	23.4	23.3	22.9	21.6	22.1	23.5	23.5	22.6	21.3	21.8	21.3	21.6	21.9	22.4	22.6	22.5	S	22.6	22.8	23.5	25.2	26.5	28.9	21.3	28.9	23.1	24		
31		29.8	30.2	30.2	30.8	31.1	31.6	32.0	31.5	31.2	31.9	32.9	33.4	33.9	34.4	34.9	35.1	S	34.3	34.5	34.7	34.6	34.7	34.6	34.9	29.8	35.1	32.9	24		
HOURLY MAX		40.0	39.0	39.4	39.2	38.4	37.3	37.8	37.0	36.8	37.3	37.4	37.8	37.7	39.1	39.5	39.1	39.2	37.4	37.3	37.5	37.0	38.2	39.3	39.3						
HOURLY AVG		27.9	26.8	26.6	26.7	26.8	26.5	26.8	26.3	25.9	27.0	27.7	28.6	28.5	28.8	29.5	28.7	28.2	28.0	27.9	28.0	27.7	28.1	28.5	27.8						

**STATUS FLAG CODES**

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

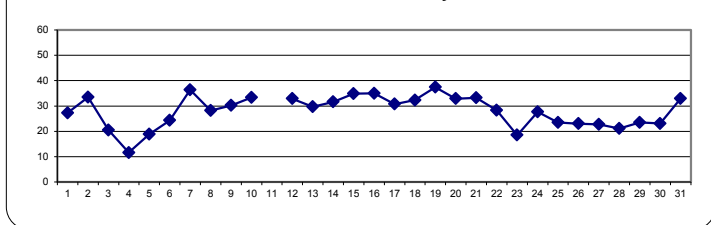
**OBJECTIVE LIMIT:**

**ALBERTA ENVIRONMENT:** 1-HR 82 ppb

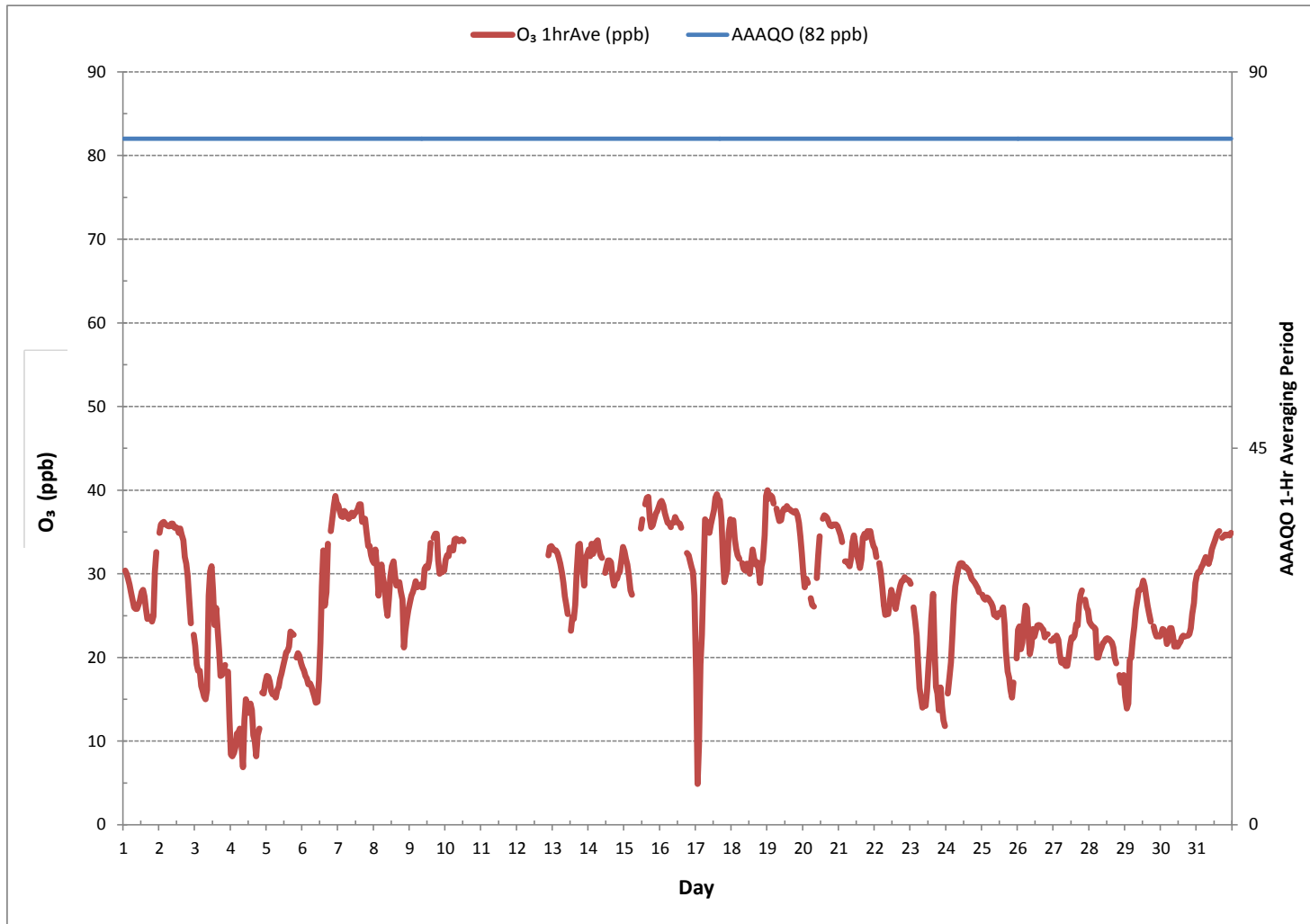
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	648					
MINIMUM 1-HR AVERAGE:	4.9	ppb	@ HOUR	1	ON DAY	17
MAXIMUM 1-HR AVERAGE:	40.0	ppb	@ HOUR	0	ON DAY	19
MAXIMUM 24-HR AVERAGE:	37.4	ppb			ON DAY	19
IZS CALIBRATION TIME:	30	hrs	OPERATIONAL TIME:	685	hrs	
MONTHLY CALIBRATION TIME:	4	hrs	AMD OPERATION UPTIME:	92.1	%	
STANDARD DEVIATION:	7.2		MONTHLY AVERAGE:	27.6	ppb	

**24 HR AVERAGES January 2018**



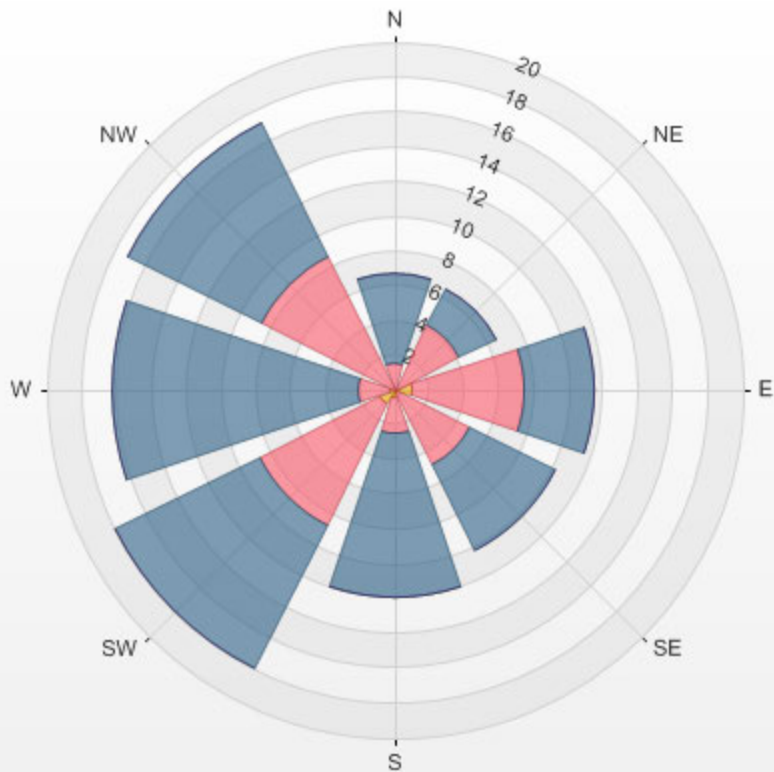
OZONE Hourly Averages (O<sub>3</sub> ppb)



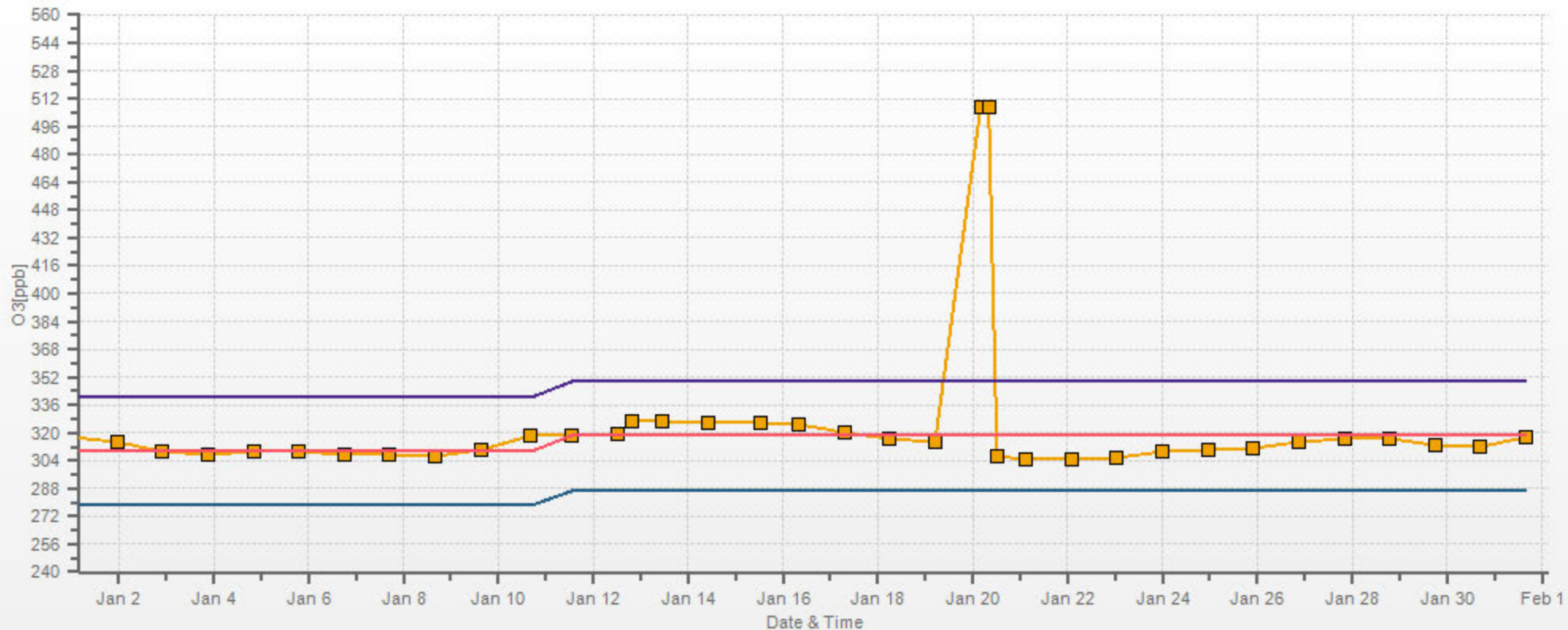


% Icon Classes (ppb) 3 0.0-13.4 37 13.4-26.7 59 26.7-40.1 0 >40.1

LICA ST. LINA Poll.: LICA ST. LINA-O3[ppb] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 1.55% Calm Poll Avg: 24.16[ppb]



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

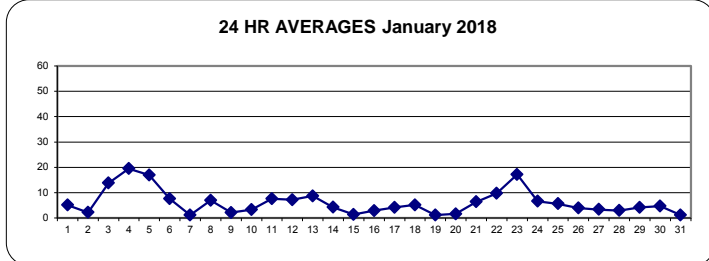
OBJECTIVE LIMIT:

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

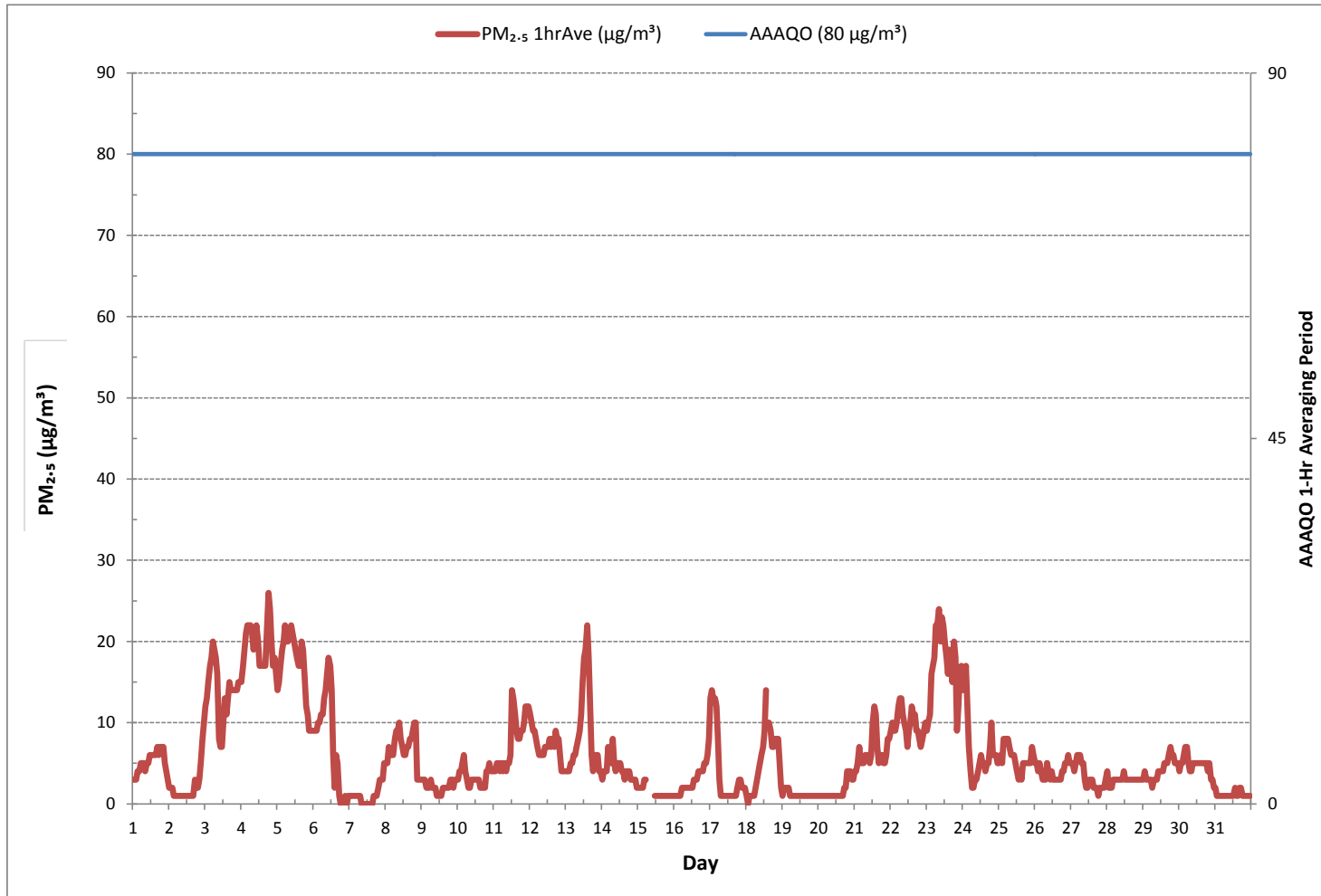
NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	725				
MINIMUM 1-HR AVERAGE:	0 µg/m <sup>3</sup> @ HOUR	18	ON DAY	6	
MAXIMUM 1-HR AVERAGE:	26 µg/m <sup>3</sup> @ HOUR	18	ON DAY	4	
MAXIMUM 24-HR AVERAGE:	20 µg/m <sup>3</sup>		ON DAY	4	
MONTHLY CALIBRATION TIME:	1	hrs	OPERATIONAL TIME:	739	hrs
STANDARD DEVIATION:	5		AMD OPERATION UPTIME:	99.3	%
			MONTHLY AVERAGE:	6	µg/m <sup>3</sup>

24 HR AVERAGES January 2018





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: 18/01  
 Type: PollutionRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

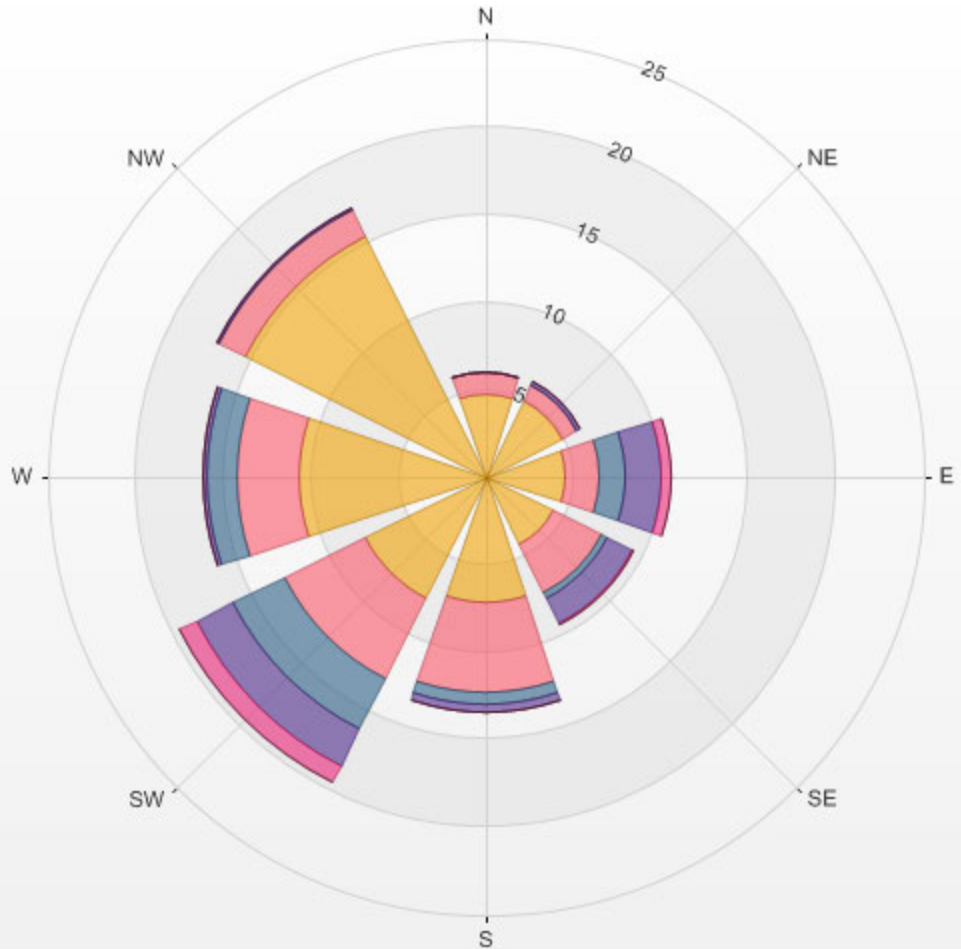
Calm: 1.49%

Calm Avg: 5.74 [ug/m3(L)]

Direction	0.0-5.4	5.4-10.8	10.8-16.2	16.2-21.6	21.6-27.0	>27.0	Total
<b>N</b>	4.8	1.2	0.0	0.0	0.0	0.0	6.0
<b>NE</b>	4.9	1.0	0.0	0.3	0.0	0.0	6.1
<b>E</b>	4.6	1.9	1.5	2.0	0.5	0.0	10.6
<b>SE</b>	4.3	3.1	0.3	1.6	0.1	0.0	9.5
<b>S</b>	7.2	5.2	0.7	0.4	0.0	0.0	13.4
<b>SW</b>	7.7	5.2	3.3	2.3	1.1	0.0	19.6
<b>W</b>	10.7	3.5	1.6	0.3	0.0	0.0	16.2
<b>NW</b>	15.3	1.8	0.0	0.1	0.0	0.0	17.2
<b>Summary</b>	59.6	22.8	7.3	7.1	1.8	0.0	98.5

% Icon	Classes (ug/m3(L))	60	23	7	7	2	0
		0.0-5.4	5.4-10.8	10.8-16.2	16.2-21.6	21.6-27.0	>27.0

LICA ST. LINA Poll.: LICA ST. LINA-PM25[ug/m3(L)] 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 1.49% Calm Poll Avg: 5.74[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	16.6	16.1	15.6	16.9	18.7	16.7	15.3	15.8	15.1	15.5	15.3	14.5	15.0	15.0	14.8	17.6	18.0	18.8	14.9	17.8	16.9	18.3	17.0	15.8	14.5	18.8	15.1	24
2	16.3	16.1	15.0	15.5	13.4	12.2	10.7	10.0	10.8	8.0	5.2	4.5	2.3	1.9	1.8	4.6	4.6	6.4	8.8	9.4	7.2	8.1	5.9	8.5	1.8	16.3	7.1	24
3	9.4	9.3	9.9	9.8	8.7	7.9	9.1	8.8	12.3	16.5	8.5	3.5	2.2	3.4	1.9	3.2	5.0	8.2	8.0	7.3	7.6	7.5	8.1	9.2	1.9	16.5	6.9	24
4	9.8	9.0	7.7	8.0	8.7	4.1	3.5	1.5	4.1	5.2	6.5	2.7	4.9	3.9	5.6	7.4	9.6	11.9	10.5	8.9	9.6	9.3	9.9	10.2	1.5	11.9	3.9	24
5	10.0	11.0	9.4	8.7	9.9	10.0	8.4	10.4	12.4	10.5	10.7	9.4	9.0	8.8	8.8	8.6	11.0	10.4	10.2	10.2	8.0	7.9	6.1	5.9	5.9	12.4	9.0	24
6	6.3	6.3	6.5	7.7	10.3	3.5	8.2	6.6	6.7	7.8	11.8	12.0	10.2	12.5	12.7	8.8	8.6	10.7	12.3	12.4	12.5	13.2	15.6	16.7	3.5	16.7	8.6	24
7	15.9	17.1	16.3	19.3	24.4	23.5	19.1	18.1	16.8	15.0	14.1	16.3	17.4	15.7	12.3	7.6	12.1	9.4	6.7	7.4	7.1	7.2	5.0	2.4	2.4	24.4	12.8	24
8	6.9	5.9	7.5	8.3	11.2	10.9	10.6	9.2	10.0	11.0	9.6	11.2	10.4	11.5	7.9	6.6	4.6	5.4	7.1	8.3	9.7	15.3	14.8	14.6	4.6	15.3	4.1	24
9	17.4	16.2	18.2	19.5	21.0	15.7	11.2	13.7	15.4	13.5	16.4	14.5	13.9	14.3	14.0	16.4	16.5	19.1	17.2	15.2	16.0	17.7	17.7	16.9	11.2	21.0	13.8	24
10	16.7	16.9	13.2	13.1	13.4	11.8	15.0	16.2	11.5	10.8	11.1	8.7	8.0	9.4	10.2	7.5	7.0	5.1	8.1	8.0	7.7	7.9	10.1	9.2	5.1	16.9	10.1	24
11	9.6	8.2	7.4	8.2	7.4	7.4	8.7	10.3	8.7	9.3	7.7	6.5	8.5	10.1	10.6	6.1	5.0	5.8	6.3	7.7	7.7	7.2	7.1	8.1	5.0	10.6	7.1	24
12	8.2	6.8	5.6	5.2	4.5	5.5	5.2	5.7	7.1	8.4	8.2	9.1	10.5	10.6	12.8	10.5	10.3	12.5	15.2	16.3	14.3	15.6	16.8	14.2	4.5	16.8	9.6	24
13	12.9	11.2	13.6	15.4	13.6	14.1	12.0	11.1	14.8	15.0	14.7	16.0	16.7	17.1	16.1	14.9	12.8	13.6	12.4	11.9	10.1	13.3	15.0	15.7	10.1	17.1	9.7	24
14	18.5	14.2	12.5	12.7	11.4	11.5	11.1	8.7	8.5	6.0	8.0	2.8	2.0	2.3	2.7	1.2	1.7	3.5	2.1	5.5	7.0	10.2	11.8	11.0	1.2	18.5	3.5	24
15	12.6	15.5	14.4	15.8	13.9	16.9	P	P	P	P	P	18.4	17.8	15.5	15.3	17.7	17.3	16.3	18.0	18.8	19.6	21.5	19.7	20.5	12.6	21.5	17.0	19
16	21.1	19.4	18.3	17.8	13.8	13.4	8.6	7.8	8.8	8.7	10.5	10.3	7.3	5.7	7.9	6.1	7.3	13.4	12.3	8.4	10.6	8.2	12.2	13.8	5.7	21.1	10.2	24
17	13.0	13.9	18.1	16.0	15.0	16.1	14.1	13.7	15.8	15.5	15.7	20.2	19.6	16.2	13.0	10.7	9.9	8.4	6.5	7.4	9.4	8.7	11.3	14.1	6.5	20.2	11.2	24
18	12.7	12.3	13.6	14.1	12.3	11.2	9.3	10.7	7.2	8.8	14.7	14.8	12.7	15.2	16.1	13.4	8.9	11.4	11.1	8.6	11.5	12.0	12.0	10.5	7.2	16.1	8.9	24
19	11.0	10.8	14.8	14.7	16.2	15.6	12.2	11.3	11.7	11.4	13.1	11.5	7.7	13.5	12.3	7.8	5.0	7.5	10.7	12.8	10.9	9.8	10.1	11.1	5.0	16.2	10.9	24
20	11.1	8.2	8.7	9.8	6.8	7.6	8.4	7.3	6.2	5.0	4.3	5.3	7.0	6.6	6.3	7.0	6.4	6.7	7.8	6.6	6.2	7.3	5.1	3.0	3.0	11.1	5.7	24
21	3.2	8.8	2.1	1.5	0.5	4.6	0.6	2.7	6.7	6.7	6.0	6.8	9.6	10.0	11.8	12.1	15.3	18.9	20.9	20.2	20.1	20.5	21.5	20.8	0.5	21.5	9.0	24
22	21.2	14.9	11.1	10.8	10.7	13.7	4.7	3.1	6.5	3.7	6.2	8.2	6.9	7.5	10.2	9.3	6.5	9.5	8.3	8.2	7.5	6.6	6.8	8.4	3.1	21.2	2.3	24
23	7.8	8.4	8.9	4.3	3.6	7.3	7.4	6.4	5.4	5.0	4.2	5.3	6.1	4.6	4.0	4.4	4.2	6.4	8.3	10.1	8.8	8.8	10.3	11.3	3.6	11.3	2.5	24
24	12.6	11.9	13.8	13.2	13.2	14.3	14.8	13.1	11.3	10.9	10.8	12.7	14.2	14.2	11.8	11.7	10.5	10.2	9.2	10.6	11.0	10.0	7.5	7.3	7.3	14.8	11.1	24
25	6.8	7.7	8.1	9.1	9.0	8.4	6.4	6.8	7.7	8.1	8.1	7.2	7.7	8.1	6.0	9.4	7.3	3.9	1.4	4.1	3.0	3.6	2.4	6.1	1.4	9.4	6.1	24
26	5.7	7.3	7.8	8.5	11.2	13.5	11.1	8.5	11.1	12.5	11.7	13.7	13.5	12.7	13.4	14.3	14.0	13.8	14.5	15.4	12.6	11.4	9.2	9.8	5.7	15.4	11.4	24
27	9.0	8.0	9.0	8.9	7.2	6.3	4.9	4.6	4.6	6.6	6.4	5.6	3.2	4.3	4.5	4.6	5.9	5.6	6.1	5.8	5.0	5.2	4.0	2.9	2.9	9.0	3.7	24
28	1.2	2.9	2.7	3.1	3.0	6.6	8.4	6.9	5.8	5.0	4.4	3.1	1.3	0.7	0.9	3.2	3.9	4.7	4.4	6.2	6.0	5.8	8.1	7.9	0.7	8.4	1.2	24
29	9.9	8.7	10.9	9.8	9.8	11.5	12.3	11.9	11.1	11.7	13.6	13.4	14.8	17.7	17.2	16.0	17.4	18.6	20.2	14.5	18.3	16.1	15.7	14.0	8.7	20.2	13.8	24
30	5.8	6.2	8.7	12.1	17.9	23.4	23.4	20.9	20.3	16.7	19.4	14.6	14.4	15.0	11.6	10.5	11.6	13.0	14.2	14.3	17.2	20.4	19.0	18.1	5.8	23.4	14.5	24
31	14.9	14.0	14.0	14.2	13.5	12.2	10.0	9.3	10.0	11.6	8.6	8.6	8.1	7.9	6.7	5.4	4.5	5.6	7.6	6.3	6.4	5.4	3.9	4.5	3.9	14.9	8.7	24
HOURLY MAX	21.2	19.4	18.3	19.5	24.4	23.5	23.4	20.9	20.3	16.7	19.4	20.2	19.6	17.7	17.2	17.7	18.0	19.1	20.9	20.2	20.1	21.5	21.5	20.8				
HOURLY AVG	2.2	2.3	2.8	3.0	3.2	2.6	3.0	2.9	2.8	3.1	2.9	3.3	3.3	3.4	3.3	2.4	1.8	2.1	1.8	2.2	2.4	1.9	2.2	1.5				

STATUS FLAG CODES

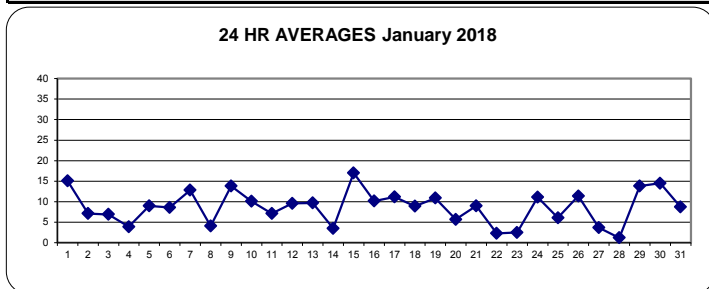
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

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

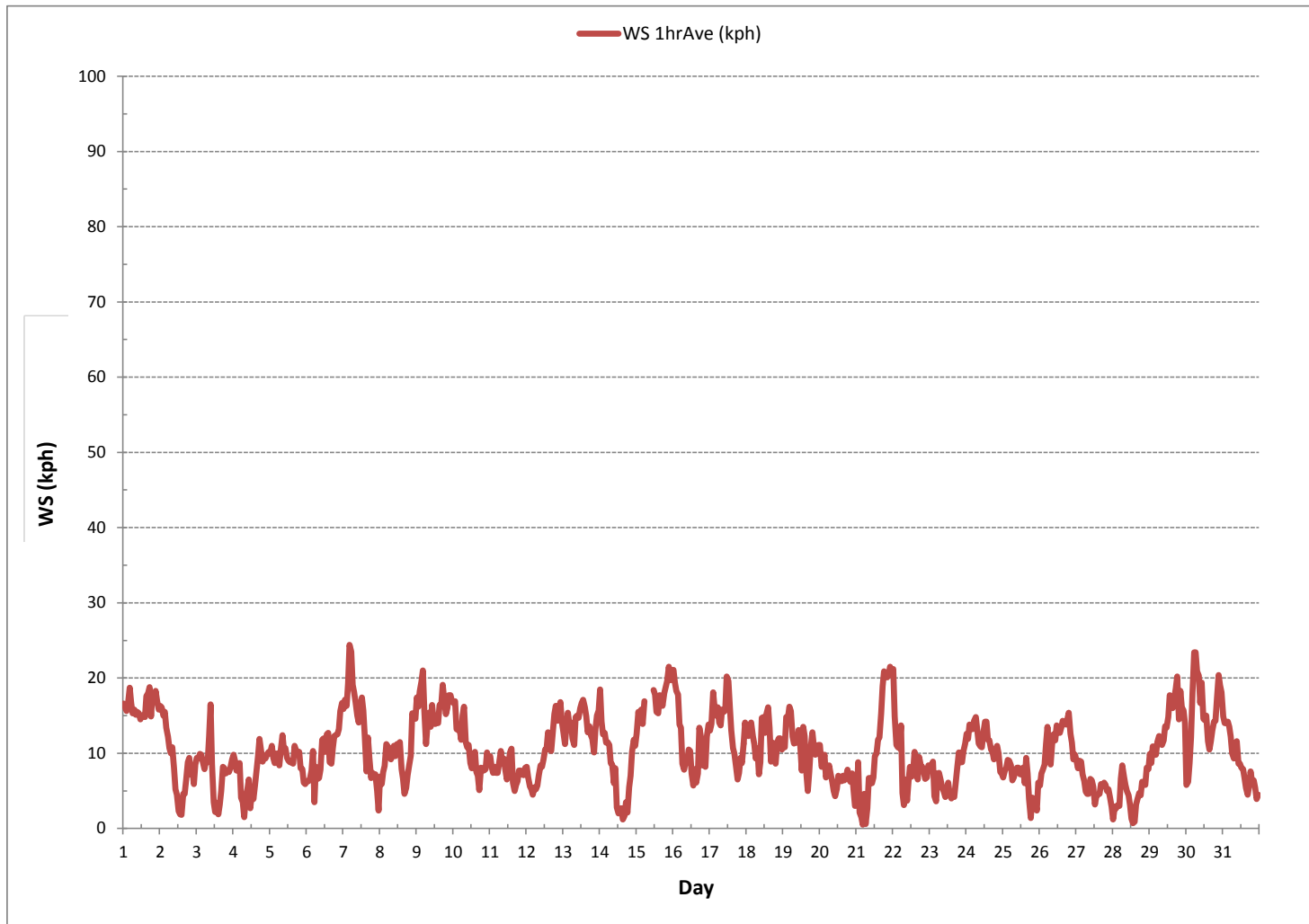
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	739
MINIMUM 1-HR AVERAGE:	0.5 kph @ HOUR 4 ON DAY 21
MAXIMUM 1-HR AVERAGE:	24.4 kph @ HOUR 4 ON DAY 7
MAXIMUM 24-HR AVERAGE:	17.0 kph ON DAY 15
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	739 hrs
AMD OPERATION UPTIME:	99.3 %
STANDARD DEVIATION:	4.6
MONTHLY AVERAGE:	2.5 kph

24 HR AVERAGES January 2018



**WIND SPEED Hourly Averages (WS kph)**



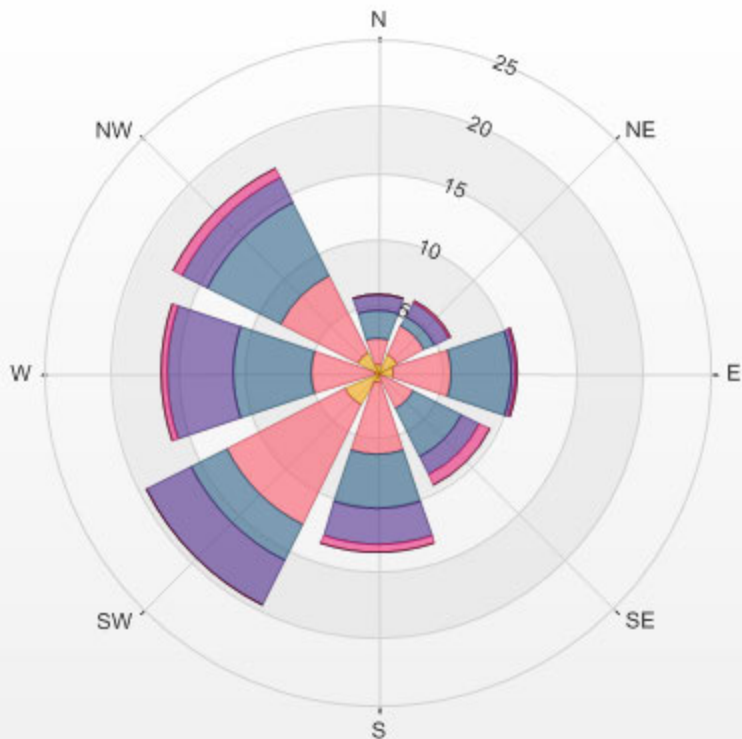
Wind: LICA ST. LINA  
 Monitor: WSP [kph]  
 Monthly: 18/01  
 Type: WindRose  
 Direction: Blowing From (Wind Frequency)  
 Based On 1 Hr.

Calm: 1.49%

Direction	1.8-4.9	4.9-9.8	9.8-14.7	14.7-19.6	19.6-24.5	>24.5	Total
<b>N</b>	0.7	1.9	2.2	1.2	0.0	0.0	6.0
<b>NE</b>	1.6	2.3	0.8	1.2	0.1	0.0	6.1
<b>E</b>	1.2	4.3	4.5	0.4	0.1	0.0	10.6
<b>SE</b>	0.3	2.7	4.1	1.5	1.0	0.0	9.5
<b>S</b>	0.8	5.4	4.1	2.6	0.7	0.0	13.5
<b>SW</b>	2.7	10.0	3.0	3.8	0.0	0.0	19.5
<b>W</b>	0.3	4.7	5.8	5.0	0.4	0.0	16.3
<b>NW</b>	1.8	6.4	6.2	2.2	0.7	0.0	17.2
<b>Summary</b>	9.3	37.8	30.6	17.9	3.0	0.0	98.6

% Icon Classes (kph) 9 1.8-4.9 38 4.9-9.8 31 9.8-14.7 18 14.7-19.6 3 19.6-24.5 0 >24.5

LICA ST. LINA 2018/01/01 00:00 - 2018/01/31 23:00 Calm: 1.49% Calm Wind Avg Speed: 1.13(kph)





***WIND DIRECTION***



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

WIND DIRECTION Hourly Averages (WD)

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

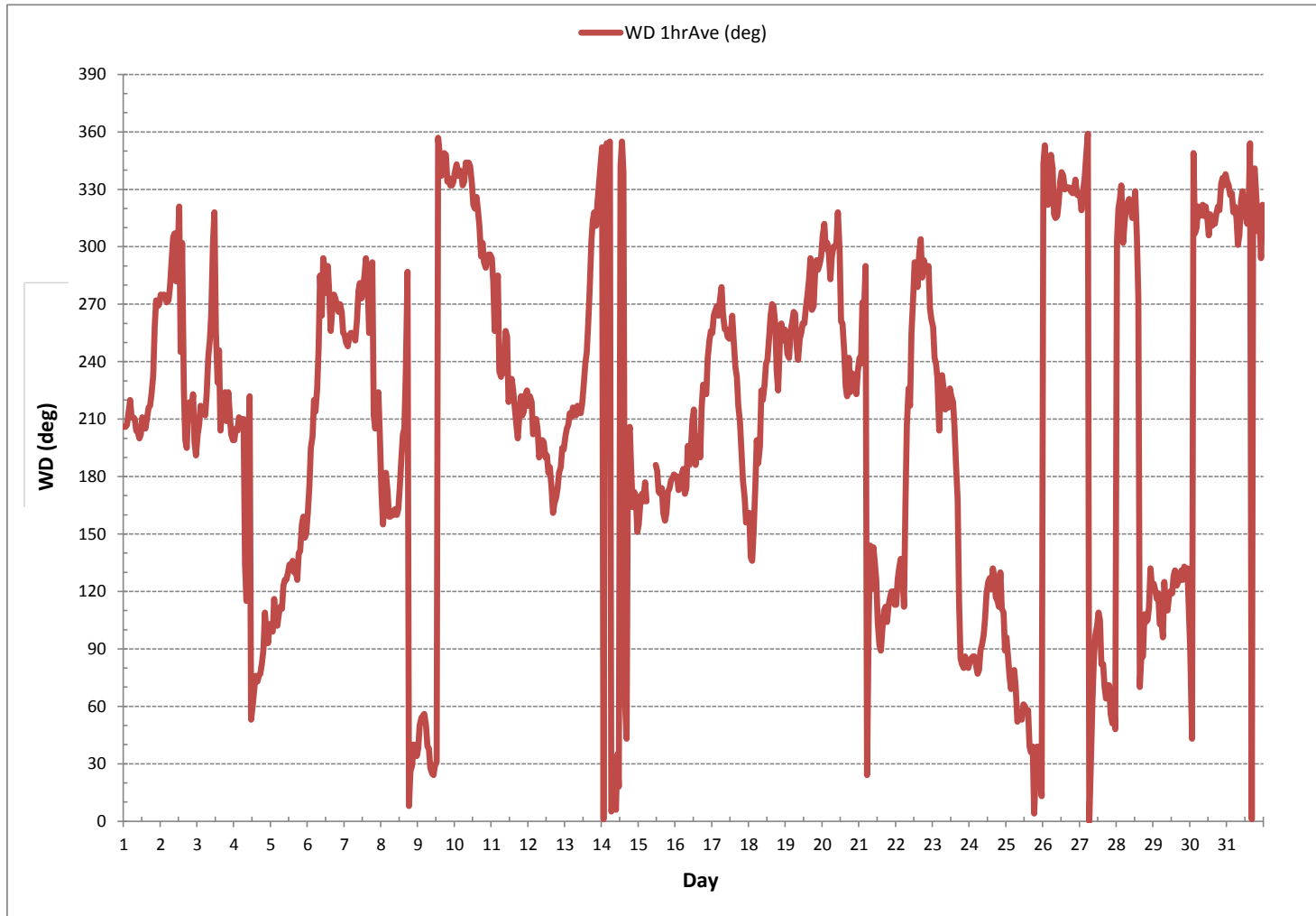
STATUS FLAG CODES

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:	739	hrs
STANDARD DEVIATION:	90		AMD OPERATION UPTIME:	99.3	%
			MONTHLY AVERAGE:	238	(SW)

WIND DIRECTION Hourly Averages (WD)



***STANDARD DEVIATION WIND DIRECTION***



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

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59		
DAY																										
1	9	9	9	7	7	8	7	8	9	9	9	9	9	11	11	10	6	6	6	6	7	9	9	9	24	
2	11	11	11	11	10	10	11	12	12	11	13	19	26	13	19	11	8	6	3	4	5	5	6	6	24	
3	6	5	5	4	3	5	4	6	5	10	14	18	30	13	21	18	8	7	3	5	5	7	5	5	24	
4	6	5	5	6	3	12	28	30	25	15	5	35	7	15	9	8	8	10	12	9	10	10	9	10	24	
5	10	11	11	10	10	10	12	12	13	14	14	15	17	16	14	13	13	14	15	14	16	13	14	14	24	
6	13	14	13	9	5	13	9	17	16	15	16	13	12	15	14	8	9	11	12	11	9	12	11	8	24	
7	8	7	7	9	9	8	8	7	10	15	15	14	14	15	15	12	6	6	12	15	5	5	7	15	24	
8	3	9	9	9	8	9	10	10	11	11	13	13	15	14	13	10	11	9	9	10	10	11	11	12	24	
9	11	12	11	11	11	12	13	12	11	12	12	12	12	18	15	15	17	15	14	16	14	15	13	14	24	
10	17	16	16	15	14	14	14	18	16	16	19	17	16	14	14	15	15	17	12	13	13	13	12	12	24	
11	12	11	10	11	14	10	4	4	5	5	10	8	6	8	6	9	5	6	4	3	3	3	4	2	24	
12	3	4	3	5	4	6	6	9	9	11	12	12	13	14	13	13	11	10	8	8	10	12	12	11	24	
13	10	9	9	7	6	5	6	6	6	6	6	6	5	6	6	8	12	14	14	12	13	13	16	16	24	
14	15	15	19	15	17	15	15	13	9	18	12	22	29	29	22	19	20	37	10	7	9	7	5	8	24	
15	11	9	8	8	10	10	P	P	P	P	P	12	13	14	14	12	12	11	12	11	10	11	12	11	19	
16	10	10	11	10	13	12	13	13	10	12	12	12	11	18	12	12	11	7	5	7	3	7	7	6	24	
17	6	9	9	10	8	11	13	10	8	8	8	7	8	10	8	9	7	5	8	7	6	9	8	10	24	
18	10	12	11	12	14	14	13	11	11	14	5	7	10	8	10	11	8	8	9	10	8	8	8	9	24	
19	8	6	7	9	9	10	10	7	7	6	7	12	12	12	14	15	13	10	10	15	15	15	16	15	24	
20	14	15	16	14	16	14	13	12	14	16	28	23	19	16	12	8	10	6	9	6	8	9	12	17	24	
21	13	7	22	33	61	10	56	23	10	11	15	15	14	12	11	12	12	12	12	13	12	12	12	12	24	
22	12	14	16	14	14	13	26	15	8	18	14	16	16	17	17	17	17	15	16	16	17	17	15	12	24	
23	16	8	11	12	14	10	8	4	7	6	13	5	7	10	13	13	12	10	7	8	10	12	11	13	24	
24	14	13	15	12	13	13	13	14	13	14	14	15	15	15	16	17	15	15	16	14	15	16	17	15	24	
25	16	15	15	16	15	15	15	14	13	14	13	16	16	18	20	15	17	31	42	20	22	17	24	18	24	
26	19	18	17	16	16	17	19	16	15	15	15	17	16	17	15	14	16	15	13	12	14	15	13	12	24	
27	12	11	14	12	15	14	15	13	16	18	19	19	31	24	19	18	13	12	14	15	14	15	17	17	24	
28	40	23	16	16	14	15	14	14	16	17	19	28	28	30	35	24	18	14	13	12	12	13	13	15	24	
29	12	12	12	13	11	13	14	14	15	13	14	15	14	13	14	14	13	13	13	14	12	12	14	13	24	
30	37	20	14	13	15	15	14	14	14	15	13	14	15	14	16	16	14	14	13	13	15	15	14	14	24	
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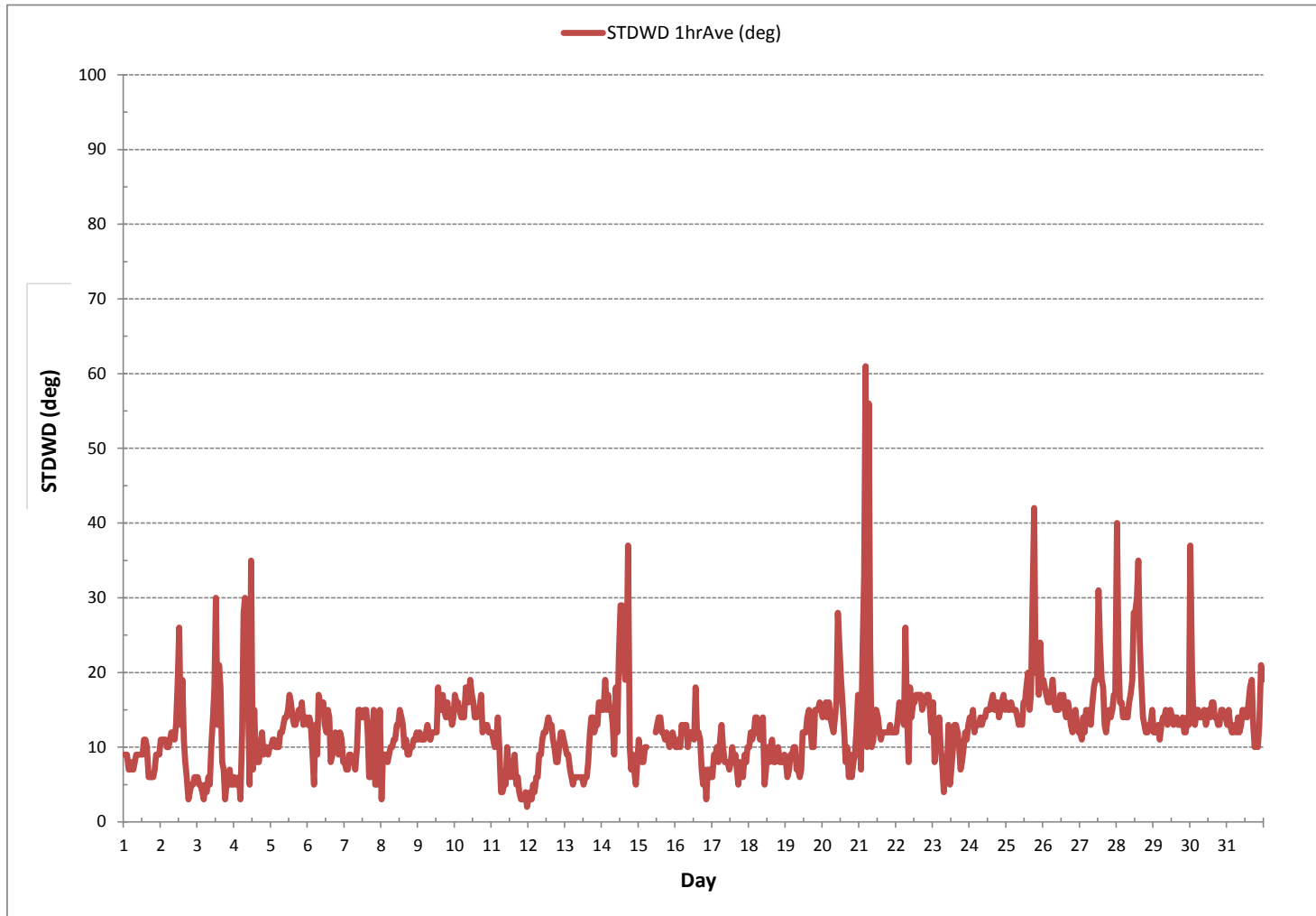
STATUS FLAG CODES

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

LAST CALIBRATION: May 25, 2017

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 739 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



***RELATIVE HUMIDITY***



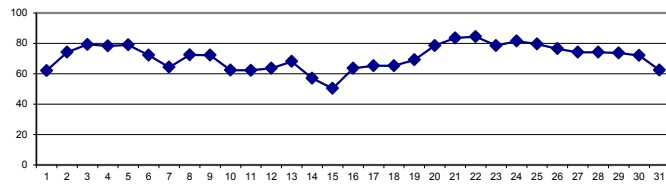
RELATIVE HUMIDITY Hourly Averages (RH %)

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	64	64	64	63	63	63	63	63	59	56	54	53	52	55	59	61	62	63	64	65	70	72	74	52	74	62	24
2	74	74	74	74	74	76	77	78	76	70	71	61	57	64	60	67	72	76	81	84	84	85	85	57	85	74	24	
3	85	85	84	84	84	84	83	84	84	82	75	64	61	67	65	74	78	80	80	82	83	84	85	85	61	85	79	24
4	85	85	84	83	83	84	83	84	82	80	76	67	63	61	67	73	78	80	81	81	80	79	79	79	61	85	78	24
5	78	78	78	78	79	79	79	79	80	80	80	80	79	78	76	78	82	82	81	80	79	79	79	78	76	82	79	24
6	78	78	78	78	78	79	79	80	80	80	81	84	84	73	60	66	69	66	64	64	62	58	55	58	55	84	72	24
7	58	60	61	61	58	60	63	65	66	61	58	56	55	54	58	66	69	70	75	79	80	79	76	54	80	64	24	
8	74	71	70	76	74	70	70	71	72	71	69	66	64	62	66	70	74	75	77	78	80	80	79	62	80	72	24	
9	79	78	78	77	76	75	75	74	74	74	73	72	72	71	71	71	70	69	69	68	67	67	66	66	66	79	72	24
10	65	65	65	64	64	64	63	62	63	62	60	58	56	56	55	57	60	63	65	66	66	66	66	65	55	66	62	24
11	65	65	65	64	64	63	62	63	62	61	59	56	54	54	57	61	65	66	68	67	66	66	66	54	68	62	24	
12	66	66	65	65	64	64	64	64	64	62	61	60	60	60	61	63	65	66	67	66	65	64	65	60	67	64	24	
13	65	66	66	66	67	67	67	67	67	64	62	59	59	64	67	68	72	73	74	77	79	79	69	68	59	79	68	24
14	72	75	75	73	69	67	66	69	71	59	51	42	36	34	36	42	51	54	53	54	55	56	55	34	75	57	24	
15	51	52	54	55	56	55	P	P	P	P	P	35	34	33	35	40	45	50	53	56	60	63	65	65	33	65	50	19
16	64	62	62	64	68	71	71	70	69	62	56	53	49	48	52	55	61	65	68	69	71	72	73	73	48	73	64	24
17	73	73	76	78	78	80	80	79	78	69	59	56	52	46	46	52	57	62	63	63	66	65	59	54	46	80	65	24
18	55	50	54	58	63	67	70	72	73	74	72	62	61	58	55	57	62	62	66	71	72	72	77	83	50	83	65	24
19	79	77	74	71	69	67	67	68	69	65	57	59	62	62	62	66	72	74	74	71	71	72	74	77	57	79	69	24
20	77	75	77	78	78	80	80	82	80	79	76	73	72	69	70	73	77	81	83	85	85	85	84	84	69	85	78	24
21	84	83	83	82	82	83	83	82	84	84	83	83	83	83	84	84	84	85	85	84	84	84	84	84	82	85	84	24
22	85	85	85	85	85	85	85	85	84	84	84	84	84	83	83	83	84	84	84	84	84	85	85	85	83	85	84	24
23	85	84	84	83	82	82	81	80	79	80	81	79	74	64	64	67	74	81	82	81	79	79	79	64	85	78	24	
24	80	80	81	81	81	81	81	81	81	82	82	82	82	82	82	82	82	82	82	82	82	82	81	81	80	82	81	24
25	81	81	81	80	80	79	79	79	79	78	78	79	79	79	79	80	80	80	80	80	80	80	80	78	81	80	24	
26	80	79	78	78	77	77	77	76	76	76	76	76	76	76	76	76	76	76	76	76	76	75	75	75	75	80	77	24
27	75	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	75	74	74	74	74	74	74	74	74	75	74	24
28	74	75	75	75	75	74	74	74	73	73	73	74	74	74	74	73	74	74	74	74	75	74	74	73	75	74	24	
29	73	73	73	73	72	72	72	72	72	72	72	72	72	72	73	74	75	75	75	76	76	77	77	78	72	78	74	24
30	78	78	78	78	77	76	75	75	76	76	74	72	70	69	68	69	69	70	69	69	68	64	65	64	64	78	72	24
31	65	66	68	68	68	68	67	67	66	64	57	52	49	46	46	49	58	64	66	68	68	68	69	70	46	70	62	24
HOURLY MAX	85	85	85	85	85	85	85	85	84	84	84	84	84	84	84	84	84	85	85	85	85	85	85	85	85	85	85	24
HOURLY AVG	73	73	73	73	73	73	74	74	74	72	70	66	64	63	64	66	70	72	72	73	74	74	73	73	46	70	62	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 January 2018

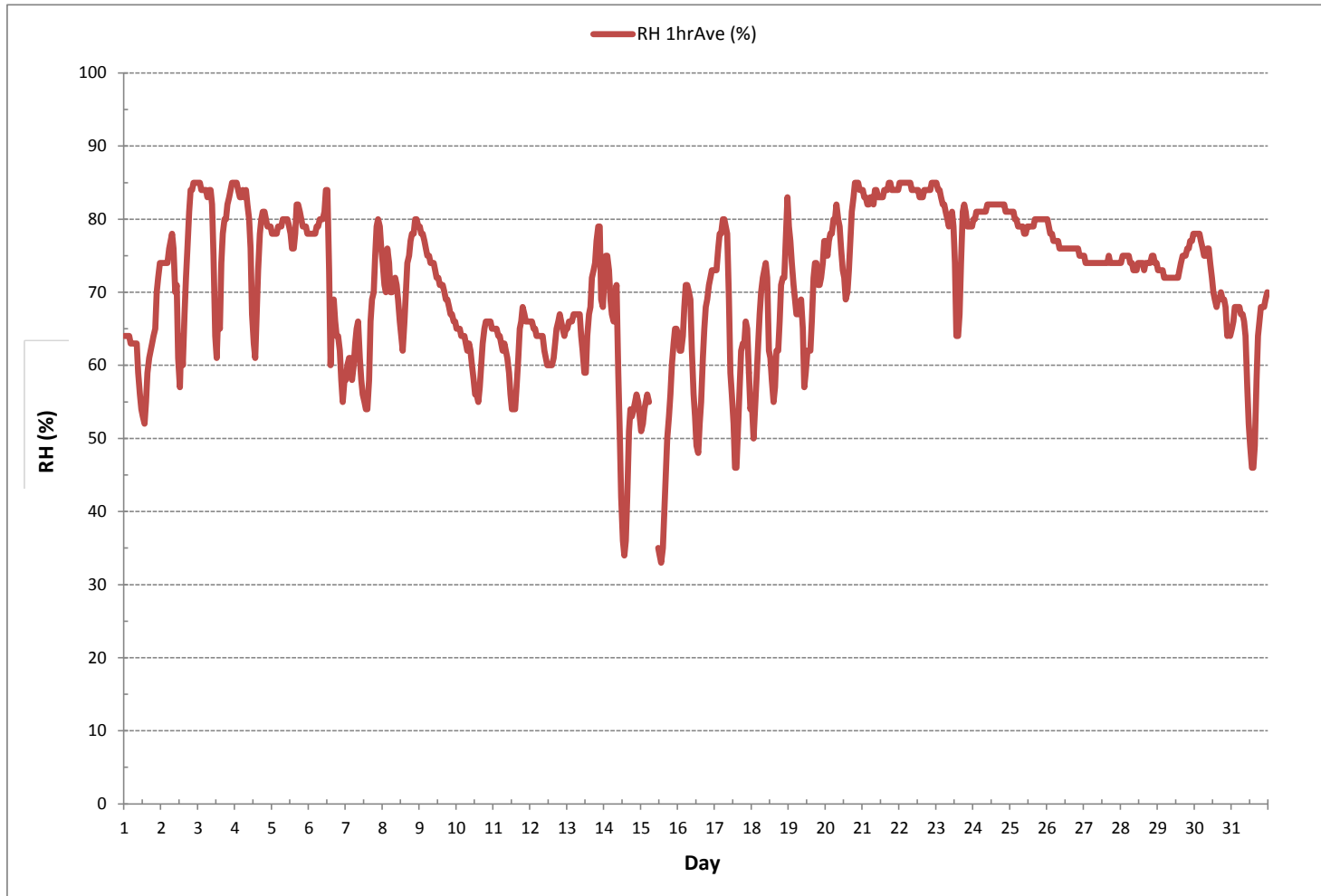


MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	33	%	@ HOUR	13	ON DAY	15
MAXIMUM 1-HR AVERAGE:	85	%	@ HOUR	21	ON DAY	2
MAXIMUM 24-HR AVERAGE:	84	%			ON DAY	22
OPERATIONAL TIME:						739 hrs
AMD OPERATION UPTIME:						99.3 %
STANDARD DEVIATION:	10					MONTHLY AVERAGE: 71 %



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



## ***BAROMETRIC PRESSURE***



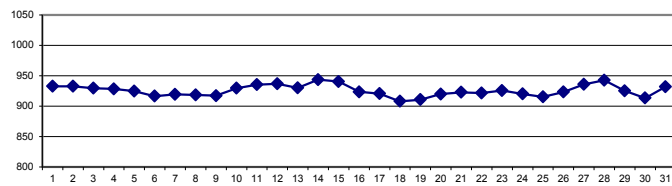
BAROMETRIC PRESSURE Hourly Averages (BP mbar)

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	941	940	939	939	938	937	937	936	935	935	934	933	932	931	930	929	928	928	927	927	927	927	928	928	927	927	941	933	24	
2	928	929	930	930	931	932	932	933	934	934	935	935	935	935	936	935	934	934	933	932	932	932	931	928	928	928	936	933	24	
3	931	930	930	930	929	929	929	928	928	929	930	930	930	930	931	931	930	930	929	929	929	929	929	929	928	928	928	931	930	24
4	928	928	928	928	928	927	927	927	928	928	928	929	929	929	929	929	929	929	929	929	929	929	928	928	929	927	929	928	24	
5	928	928	928	927	927	927	927	927	926	926	926	926	926	925	925	924	924	923	922	921	920	920	919	918	918	918	928	925	24	
6	917	916	916	915	914	914	914	913	914	915	916	917	917	917	918	918	918	918	919	919	919	919	918	918	918	913	919	917	24	
7	918	918	918	918	918	918	918	918	918	919	920	920	920	921	921	921	921	921	920	920	920	920	920	919	918	918	921	919	24	
8	919	919	920	919	919	918	918	918	918	918	918	918	917	917	917	917	918	918	918	918	919	919	919	919	917	917	920	918	24	
9	919	918	917	917	916	916	916	915	915	915	915	915	914	915	915	916	917	918	919	920	920	921	922	923	914	923	917	24		
10	923	924	925	925	926	926	927	928	928	929	930	930	930	930	931	931	932	932	933	933	934	934	935	935	923	935	930	24		
11	935	935	936	936	936	936	937	937	936	936	936	936	935	934	934	934	934	934	934	934	935	935	935	935	934	937	935	24		
12	936	936	937	937	937	938	938	938	939	939	939	939	938	937	937	937	937	936	936	935	934	933	933	932	932	932	939	937	24	
13	932	931	930	930	930	929	929	928	928	928	928	927	928	928	929	929	931	931	932	932	932	933	934	934	927	934	930	24		
14	935	936	937	938	939	940	941	941	942	943	944	945	945	945	946	946	946	947	947	947	948	948	948	948	935	948	943	24		
15	948	948	947	947	947	946	P	P	P	P	P	943	942	941	940	939	939	938	936	935	935	933	933	932	932	932	948	940	19	
16	931	930	929	928	927	927	926	925	924	924	924	924	924	923	922	922	922	921	920	920	919	919	918	918	918	918	931	923	24	
17	918	918	919	920	921	922	922	922	922	923	924	924	924	923	923	923	922	921	920	919	918	917	916	915	915	915	924	921	24	
18	915	914	912	911	909	909	908	907	907	907	907	906	906	906	907	907	907	907	907	907	907	907	907	908	906	915	908	24		
19	908	908	908	908	909	909	909	909	909	910	911	911	911	912	912	912	912	912	912	913	913	914	914	915	908	915	911	24		
20	915	916	916	917	918	918	918	919	919	920	921	921	921	921	922	922	922	922	922	922	922	922	922	923	915	923	920	24		
21	923	924	923	923	923	923	924	924	924	924	925	925	924	924	923	923	923	922	921	921	921	920	920	919	919	925	923	24		
22	919	919	919	920	919	918	919	919	920	920	921	921	921	921	922	923	923	924	924	925	925	925	925	926	918	926	922	24		
23	926	926	926	927	926	926	926	926	926	926	927	927	927	927	927	927	926	926	925	924	923	923	923	923	923	923	927	926	24	
24	922	922	921	921	921	921	920	920	921	921	921	921	920	920	920	920	920	920	920	919	919	919	918	918	918	922	920	24		
25	918	917	917	916	916	915	915	915	915	915	915	915	914	914	914	914	915	915	915	916	916	916	916	916	914	918	915	24		
26	917	917	917	918	918	918	919	920	920	921	922	922	923	923	924	925	926	927	928	929	929	930	931	932	917	932	923	24		
27	933	933	934	934	934	935	935	935	936	936	936	936	936	936	936	936	936	936	936	936	937	937	938	938	933	939	936	24		
28	940	941	941	942	942	943	944	944	944	944	945	945	944	944	944	943	942	942	942	941	941	940	940	939	945	942	24			
29	938	938	937	936	935	934	933	932	932	931	929	928	927	925	923	922	920	918	916	914	912	910	907	905	905	938	925	24		
30	905	905	905	906	907	907	909	910	911	912	913	914	914	915	915	916	917	917	918	919	920	921	922	923	905	923	913	24		
31	924	925	926	927	928	929	929	930	931	932	933	933	934	934	934	935	935	935	935	935	935	935	936	936	936	924	936	932	24	
HOURLY MAX	948	948	947	947	947	946	944	944	944	944	945	945	945	945	946	946	946	947	947	947	948	948	948	948	948	948	948	948	24	
HOURLY AVG	925	925	925	925	925	925	925	925	925	925	926	926	926	926	926	926	926	926	926	926	925	925	925	925	925	925	925	925	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

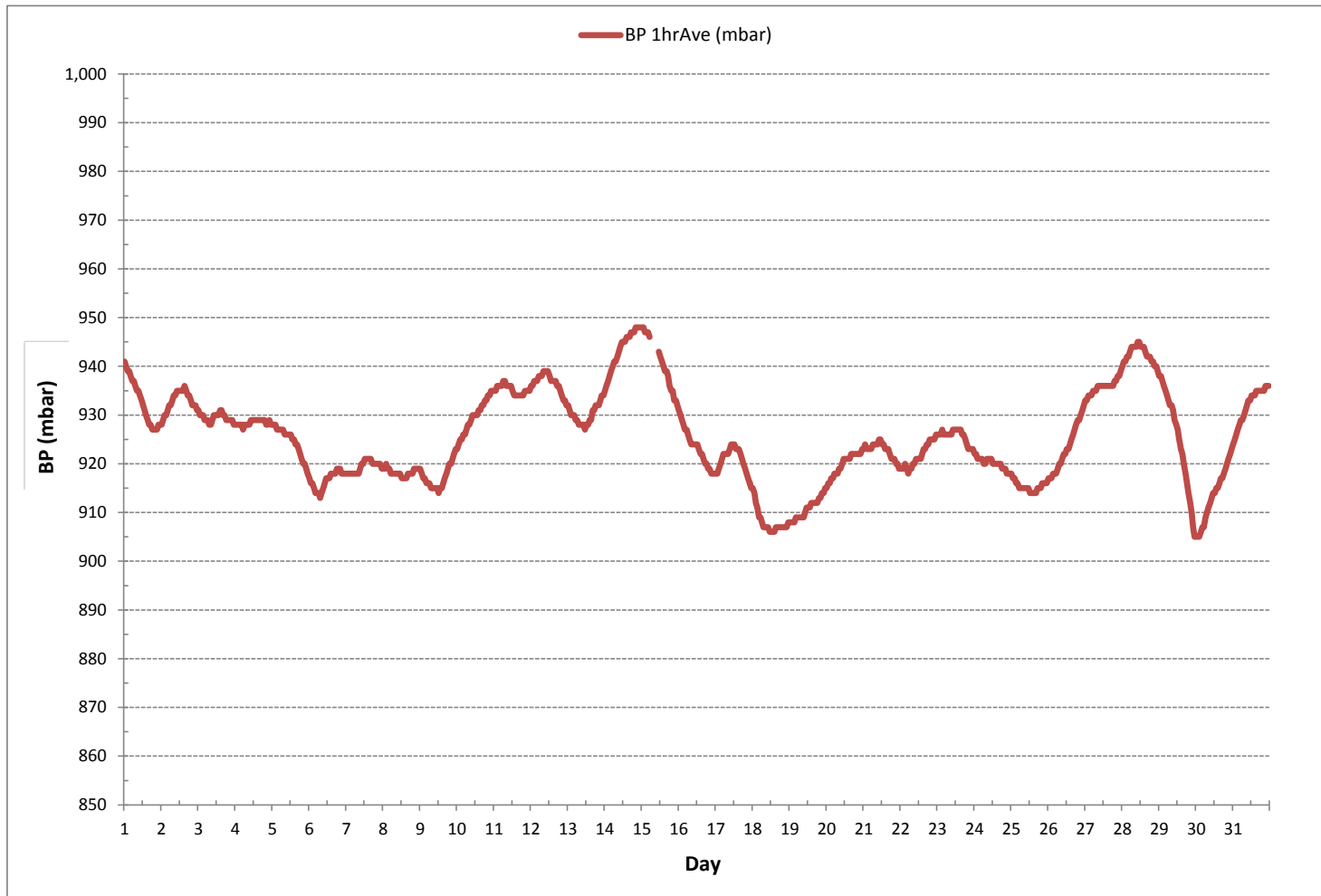
24 HR AVERAGES January 2018



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	905 mbar	@ HOUR	23	ON DAY	29
MAXIMUM 1-HR AVERAGE:	948 mbar	@ HOUR	20	ON DAY	14
MAXIMUM 24-HR AVERAGE:	943 mbar			ON DAY	14
OPERATIONAL TIME:					739 hrs
AMD OPERATION UPTIME:					99.3 %
STANDARD DEVIATION:	9			MONTHLY AVERAGE:	926 mbar

BAROMETRIC PRESSURE Hourly Averages (BP mbar)



***AMBIENT TEMPERATURE***



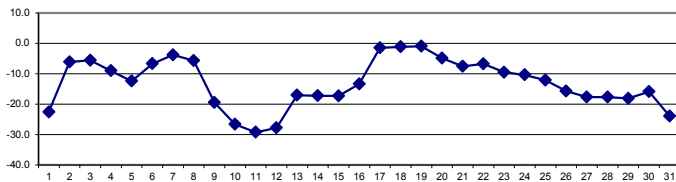
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

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	-28.5	-28.3	-28.4	-28.6	-28.8	-29.2	-29.4	-29.4	-29.4	-27.9	-26.1	-23.9	-21.7	-20.2	-20.8	-21.0	-20.7	-19.7	-18.4	-16.6	-13.3	-11.1	-10.1	-9.9	-29.4	-9.9	-22.6	24
2	-8.5	-7.4	-7.1	-6.8	-6.8	-7.0	-7.3	-7.3	-6.8	-5.4	-5.5	-2.4	-1.5	-3.5	-2.1	-3.9	-5.1	-6.3	-7.3	-7.8	-7.8	-7.5	-7.2	-8.1	-8.5	-1.5	-6.1	24
3	-8.5	-8.6	-8.9	-9.4	-9.3	-9.5	-9.7	-9.6	-9.3	-4.8	-2.3	0.8	1.4	-0.6	0.1	-2.6	-3.9	-4.6	-4.8	-5.2	-5.8	-6.0	-6.7	-7.1	-9.7	1.4	-5.6	24
4	-7.6	-7.7	-7.7	-7.4	-8.1	-8.3	-7.6	-7.7	-10.6	-6.9	-6.0	-3.9	-5.2	-4.8	-6.9	-9.3	-11.0	-11.2	-11.8	-12.7	-12.9	-13.3	-13.8	-14.2	-14.2	-3.9	-9.0	24
5	-14.7	-15.0	-15.0	-15.1	-14.9	-14.8	-13.9	-13.0	-12.5	-12.2	-11.4	-10.0	-8.6	-8.1	-8.8	-9.8	-11.0	-11.0	-11.2	-12.1	-13.1	-13.4	-13.8	-14.1	-15.1	-8.1	-12.4	24
6	-14.1	-14.2	-14.2	-14.1	-14.0	-13.0	-12.6	-11.7	-10.7	-9.8	-7.8	-5.7	-3.1	0.0	1.9	-0.2	-2.0	-1.7	-1.4	-2.1	-2.5	-2.4	-2.2	-3.4	-14.2	1.9	-6.7	24
7	-3.4	-4.3	-4.6	-4.5	-3.6	-4.0	-4.9	-5.3	-5.0	-3.0	-2.0	-0.8	-0.2	0.5	0.3	-1.1	-3.6	-4.4	-4.4	-6.1	-6.9	-7.0	-6.6	-5.9	-7.0	0.5	-3.8	24
8	-5.4	-4.4	-4.5	-6.3	-5.6	-4.8	-5.1	-5.3	-5.4	-5.3	-4.5	-3.5	-3.0	-2.3	-3.5	-4.7	-6.0	-6.2	-6.6	-6.7	-7.0	-9.2	-10.4	-11.7	-11.7	-2.3	-5.7	24
9	-12.8	-13.2	-13.6	-14.6	-15.6	-16.6	-17.2	-17.5	-17.7	-17.8	-18.2	-18.7	-19.2	-19.2	-19.7	-20.3	-21.2	-22.4	-23.2	-24.2	-25.2	-25.9	-26.5	-26.6	-26.6	-12.8	-19.5	24
10	-26.3	-26.2	-26.1	-26.1	-26.7	-26.7	-26.9	-27.2	-26.3	-25.8	-25.0	-24.6	-24.6	-25.3	-25.0	-25.4	-26.7	-27.2	-27.7	-27.5	-27.9	-28.2	-28.6	-29.3	-29.3	-24.6	-26.6	24
11	-29.7	-30.3	-31.3	-31.2	-31.0	-32.9	-34.4	-33.6	-33.3	-30.9	-28.2	-26.2	-25.3	-23.7	-24.3	-25.3	-27.5	-29.1	-29.0	-28.2	-28.5	-29.2	-29.1	-29.2	-34.4	-23.7	-29.2	24
12	-29.1	-29.6	-30.1	-30.5	-30.7	-31.2	-31.3	-30.9	-30.9	-29.6	-27.6	-26.2	-24.6	-23.8	-24.0	-23.9	-25.4	-26.9	-27.6	-27.4	-26.7	-26.2	-26.3	-26.5	-31.3	-23.8	-27.8	24
13	-26.9	-27.3	-27.1	-27.1	-27.0	-26.7	-26.3	-25.8	-25.1	-23.3	-21.4	-17.8	-14.3	-9.9	-7.3	-6.0	-6.4	-6.5	-7.1	-8.7	-9.5	-10.4	-10.8	-11.3	-27.3	-6.0	-17.1	24
14	-11.7	-12.4	-12.6	-13.1	-13.7	-14.7	-16.3	-17.8	-19.5	-18.4	-17.9	-15.3	-14.0	-13.4	-14.8	-17.1	-19.9	-20.9	-21.0	-21.6	-22.0	-22.2	-22.0	-21.4	-22.2	-11.7	-17.2	24
15	-21.0	-21.6	-22.3	-22.6	-23.1	-22.4	P	P	P	P	P	-16.5	-15.1	-13.6	-12.8	-13.1	-14.2	-15.9	-16.3	-16.2	-15.7	-15.4	-15.5	-15.3	-23.1	-12.8	-17.3	19
16	-15.3	-15.2	-15.3	-16.0	-16.1	-16.3	-16.4	-17.1	-17.2	-15.3	-12.7	-11.1	-9.2	-8.3	-9.0	-9.6	-11.4	-12.3	-12.7	-12.8	-13.1	-12.9	-13.1	-12.9	-17.2	-8.3	-13.4	24
17	-12.3	-11.1	-10.6	-7.4	-5.6	-2.1	0.1	1.0	0.7	2.0	3.5	3.9	4.4	5.7	5.2	2.6	0.1	-1.7	-1.9	-2.3	-3.0	-3.2	-3.2	-1.8	-12.3	5.7	-1.5	24
18	-2.3	-1.2	-1.8	-2.1	-2.7	-2.9	-3.0	-3.0	-3.2	-3.2	-2.8	0.3	0.8	1.4	2.6	2.0	0.1	0.3	-0.5	-1.6	-1.9	-1.7	-1.2	-0.5	-3.2	2.6	-1.2	24
19	0.0	-0.3	-0.6	-0.7	-1.2	-1.6	-2.1	-3.1	-4.0	-2.7	0.6	1.1	0.9	1.3	1.7	0.8	-0.5	-1.2	-1.9	-1.6	-1.6	-2.0	-2.3	-2.5	-4.0	1.7	-1.0	24
20	-2.8	-3.1	-3.2	-3.6	-3.8	-4.5	-5.1	-5.7	-5.0	-4.5	-3.8	-3.4	-3.1	-2.6	-3.1	-3.9	-4.9	-6.1	-6.7	-7.0	-7.0	-7.6	-7.7	-8.1	-8.1	-2.6	-4.8	24
21	-8.4	-8.9	-9.6	-10.7	-10.3	-9.5	-9.4	-10.0	-9.2	-8.0	-6.8	-6.5	-6.0	-5.8	-5.9	-5.6	-5.5	-5.8	-6.1	-6.5	-6.7	-6.7	-6.6	-6.6	-10.7	-5.5	-7.5	24
22	-6.7	-6.7	-6.7	-6.7	-6.9	-7.1	-7.1	-7.1	-7.3	-7.2	-6.8	-6.9	-6.6	-6.0	-6.5	-6.7	-6.5	-6.6	-6.8	-6.7	-6.6	-6.6	-6.7	-6.8	-7.3	-6.0	-6.8	24
23	-7.0	-7.6	-8.4	-9.1	-9.9	-10.6	-11.2	-12.5	-13.7	-12.2	-9.6	-6.4	-4.2	-1.9	-2.9	-4.6	-6.9	-9.2	-11.0	-12.8	-14.3	-14.2	-14.0	-13.7	-14.3	-1.9	-9.5	24
24	-12.8	-12.0	-11.3	-11.0	-11.0	-11.2	-11.5	-11.3	-10.7	-10.0	-9.4	-8.9	-8.7	-8.7	-8.8	-9.3	-9.6	-9.7	-9.9	-10.1	-10.4	-10.8	-11.0	-11.0	-12.8	-8.7	-10.4	24
25	-11.0	-11.0	-11.1	-12.0	-12.5	-12.8	-13.1	-13.4	-13.7	-13.6	-12.9	-12.0	-11.3	-11.7	-12.2	-12.4	-12.4	-12.2	-11.9	-11.7	-11.6	-11.6	-11.5	-11.7	-13.7	-11.0	-12.1	24
26	-12.3	-13.0	-13.7	-14.6	-15.2	-15.4	-15.4	-15.3	-15.9	-16.3	-16.1	-16.0	-15.9	-15.8	-15.7	-16.0	-16.3	-16.2	-16.3	-16.6	-16.7	-16.9	-17.2	-17.5	-17.5	-12.3	-15.7	24
27	-18.0	-18.8	-19.0	-19.1	-19.1	-19.0	-18.9	-18.6	-18.6	-18.0	-17.2	-16.2	-13.9	-13.8	-14.8	-15.8	-17.4	-18.2	-18.3	-18.1	-18.2	-18.4	-18.3	-18.2	-19.1	-13.8	-17.7	24
28	-17.9	-17.8	-17.7	-17.4	-17.3	-17.5	-18.3	-18.9	-19.1	-18.4	-17.7	-16.7	-15.7	-15.1	-15.1	-16.4	-17.8	-18.6	-18.5	-18.1	-17.9	-18.1	-18.4	-19.0	-19.1	-15.1	-17.6	24
29	-19.4	-20.1	-20.3	-20.0	-21.2	-21.6	-21.6	-20.6	-20.1	-19.5	-18.5	-17.5	-17.0	-16.6	-16.7	-16.8	-16.9	-16.8	-16.4	-16.2	-15.6	-15.5	-14.8	-14.4	-21.6	-14.4	-18.1	24
30	-13.7	-13.9	-13.8	-14.0	-14.6	-15.1	-15.1	-14.8	-14.6	-14.2	-14.0	-13.7	-13.9	-14.1	-14.7	-15.7	-16.3	-16.9	-17.8	-18.0	-18.3	-19.7	-20.9	-22.5	-22.5	-13.7	-15.8	24
31	-23.6	-24.3	-24.9	-25.6	-26.2	-26.7	-27.2	-27.6	-27.7	-25.5	-22.7	-21.0	-19.5	-18.5	-18.1	-19.1	-22.4	-24.0	-24.5	-24.8	-24.6	-24.9	-25.2	-25.2	-27.7	-18.1	-23.9	24
HOURLY MAX	0.0	-0.3	-0.6	-0.7	-1.2	-1.6	0.1	1.0	0.7	2.0	3.5	3.9	4.4	5.7	5.2	2.6	0.1	0.3	-0.5	-1.6	-1.6	-1.7	-1.2	-0.5				
HOURLY AVG	-13.9	-14.0	-14.2	-14.4	-14.6	-14.7	-14.6	-14.7	-14.8	-13.6	-12.4	-11.2	-10.3	-9.6	-9.7	-10.7	-11.9	-12.6	-12.9	-13.2	-13.3	-13.5	-13.6	-13.8				

STATUS FLAG CODES

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

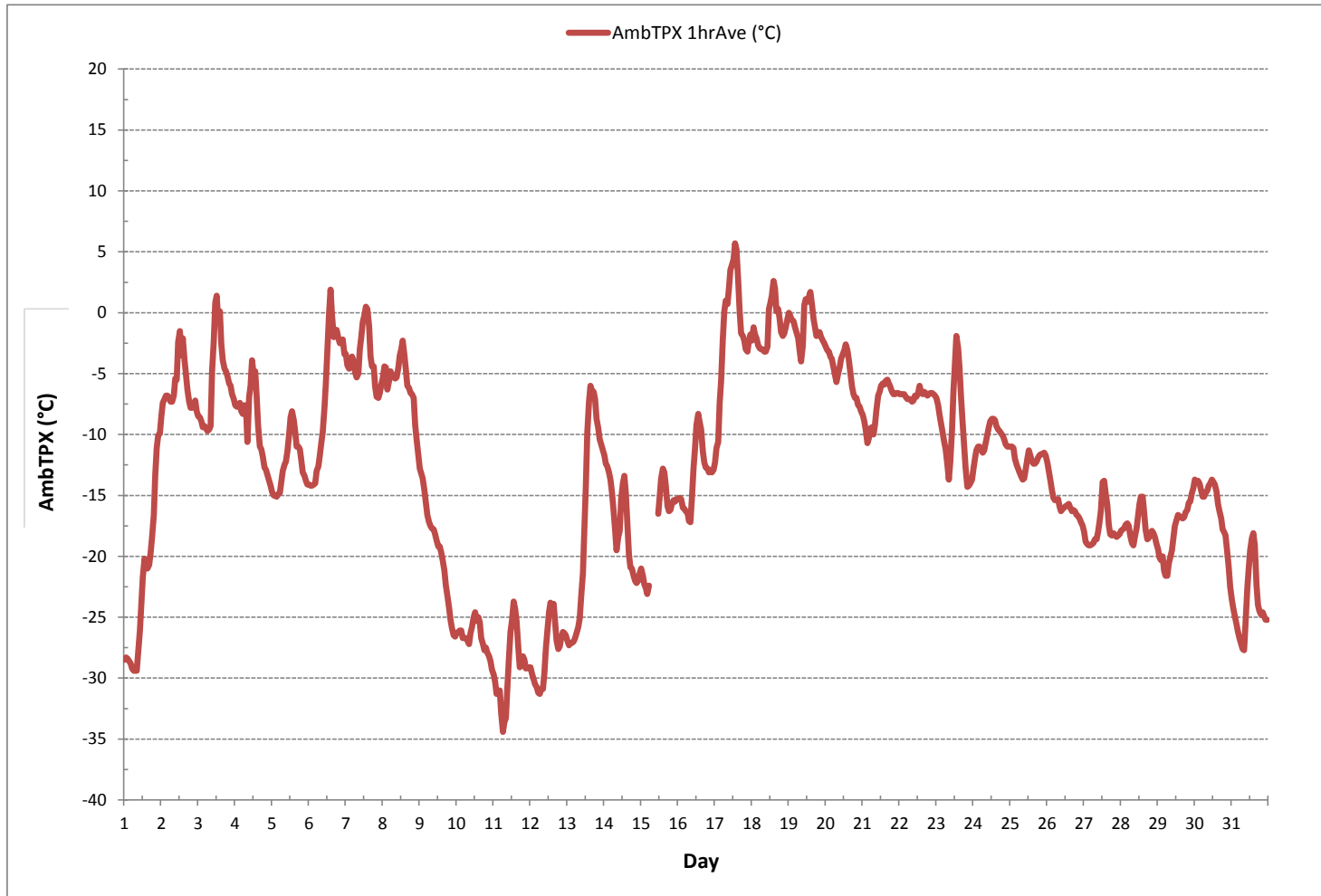
24 HR AVERAGES January 2018



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-34.4 °C	@ HOUR	6	ON DAY	11
MAXIMUM 1-HR AVERAGE:	5.7 °C	@ HOUR	13	ON DAY	17
MAXIMUM 24-HR AVERAGE:	-1.0 °C			ON DAY	19
OPERATIONAL TIME:				739	hrs
AMD OPERATION UPTIME:				99.3	%
STANDARD DEVIATION:	8.5			MONTHLY AVERAGE:	-13.0 °C

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



## ***PRECIPITATION***



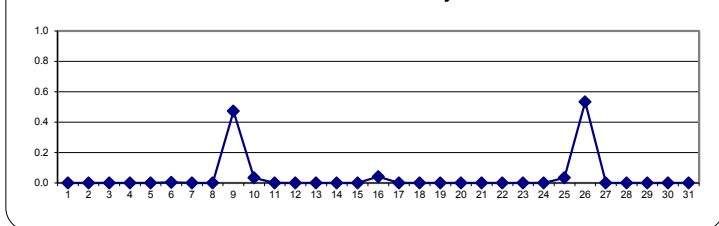
**PRECIPITATION Hourly Averages (mm)**

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	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	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	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	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	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	24
9	0.0	0.0	0.0	0.1	0.4	0.8	1.5	0.6	1.6	1.7	0.8	1.2	0.8	0.5	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
10	0.0	0.0	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	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	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	24
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	P	P	P	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21
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	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	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	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	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	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	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	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	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	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	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	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
26	0.7	0.5	0.4	1.0	0.7	0.5	1.4	0.5	0.5	0.7	0.9	0.9	1.1	0.9	0.6	0.6	0.4	0.2	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	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	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	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	24
HOURLY MAX	0.7	0.5	0.4	1.0	0.7	0.8	1.5	0.6	1.6	1.7	0.9	1.2	1.1	0.9	0.6	0.6	0.4	0.2	0.1	0.2	0.0	0.7	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
HOURLY AVG	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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

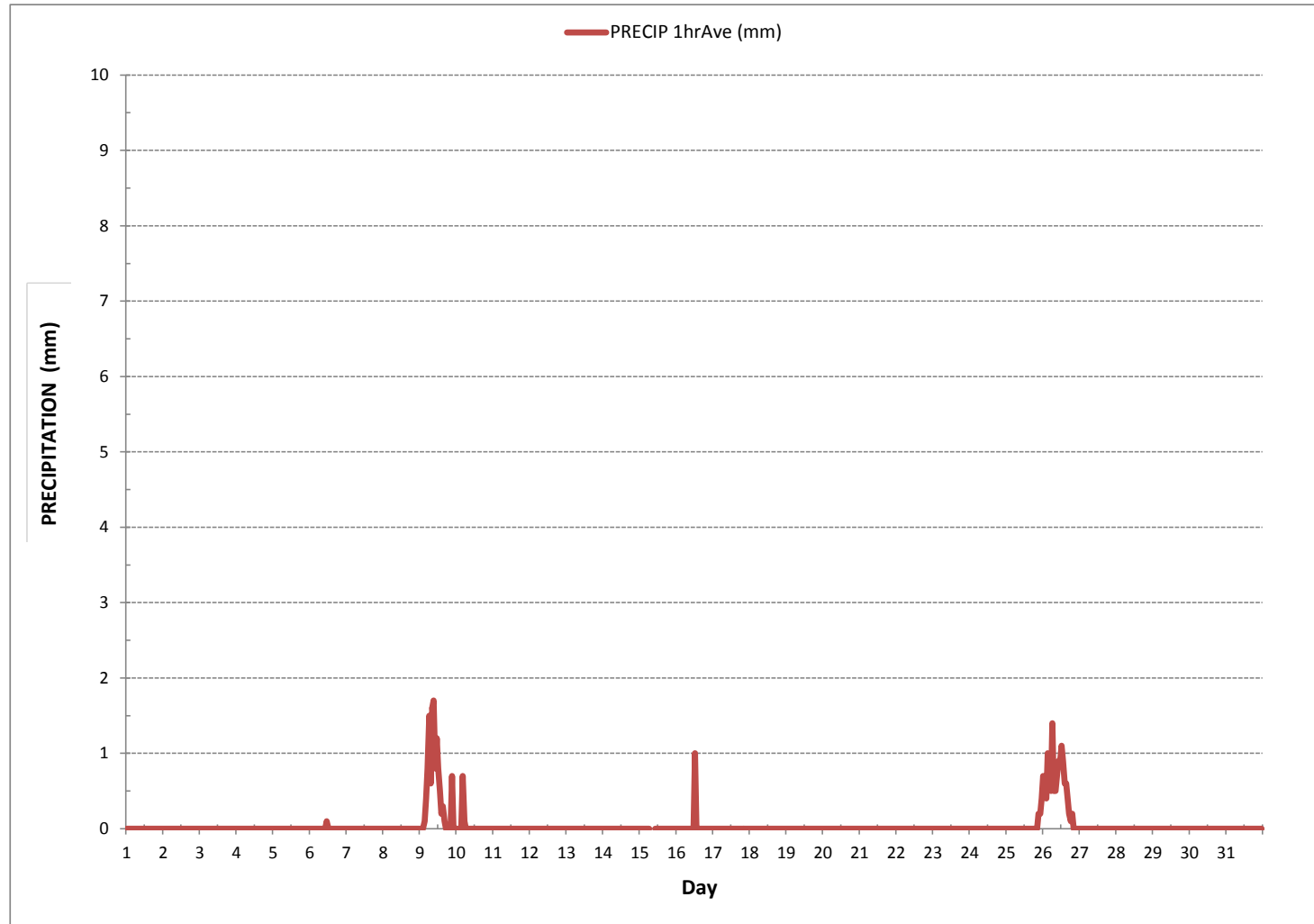
**24 HR AVERAGES January 2018**



**MONTHLY SUMMARY**

MINIMUM 1-HR AVERAGE:	0.0	mm	@ HOUR	0	ON DAY	1
MAXIMUM 1-HR AVERAGE:	1.7	mm	@ HOUR	9	ON DAY	9
MAXIMUM 24-HR AVERAGE:	0.5	mm			ON DAY	26
MONTHLY TOTAL	26.8	mm				
OPERATIONAL TIME:						741 hrs
AMD OPERATION UPTIME:						99.6 %
STANDARD DEVIATION:	0.2					
MONTHLY AVERAGE:						0.0 mm

PRECIPITATION Hourly Averages (mm)



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

***SULPHUR DIOXIDE***



### API 100E Sulphur Dioxide Analyzer Calibration

Date:	January 10, 2018	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	930	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	St. Lina	Weather Conditions:	A few clouds		
Parameter:	Sulphur Dioxide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	12:47	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	17:19	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:	December 7, 2017
Previous C.F.:	1.000
	As Found C.F.:
	1.002
	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

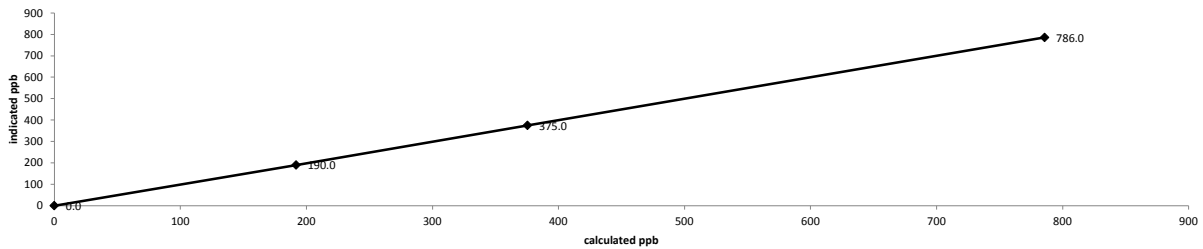
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rates (cc/min)			Total	Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas					
as found zero	4929	0.00		4929	0.0	1.0	n/a
as found high	4860	76.67		4937	785.8	785.0	1.002
adjusted zero	4929	0.00		4929	0.0	0.0	n/a
adjusted high	4860	76.67		4937	785.8	786.0	1.000
mid	4898	36.62		4935	375.5	375.0	1.001
low	4922	18.73		4941	191.8	190.0	1.010
calibrator zero	4929	0.00		4929	0.0	0.0	n/a
Average C.F. =							1.004

**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) =	0.09% ± 3% F.S.
% change in C.F. from last cal =	-0.23% ± 10%

**API 100E Sulphur Dioxide Analyzer Calibration**

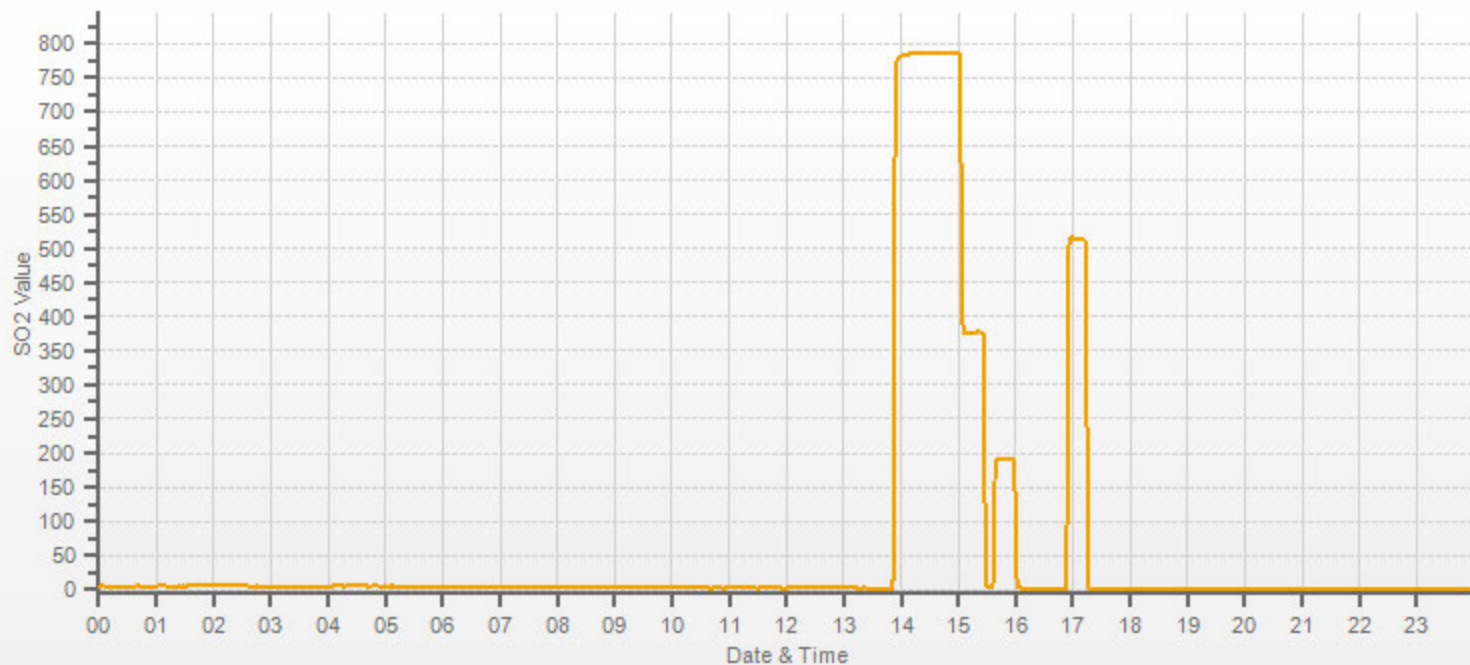


	<b>As found:</b>		<b>As left:</b>
Slope:	0.990	Slope:	0.990
Offset:	142.0	Offset:	143.4
Hvps:	651	Hvps:	651
Rcell Temp:	50.0	Rcell Temp:	50.0
Box Temp:	30.5	Box Temp:	30.9
Pmt Temp:	7.9	Pmt Temp:	7.9
Izs Temp:	45.0	Izs Temp:	45.0
Pres:	24.0	Pres:	24.1
Samp Fl:	608	Samp Fl:	609
Norm Pmt:	143.5	Norm Pmt:	144.0
Uv Lamp:	2883.5	Uv Lamp:	2880.4
Lamp Ratio:	91.7	Lamp Ratio:	91.6
Str Lgt:	70.3	Str Lgt:	71.0
Drk Pmt:	5.4	Drk Pmt:	5.8
Expected Value:	522.0	Expected Value:	511.0

**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: January 9, 2018	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	915	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name: St. Lina	Weather Conditions: Mainly cloudy with snow		
Parameter: Hydrogen Sulphide	Calibration Purpose: routine monthly		
Start Time 24 hr. (mst): 12:11	Performed By/Reviewer: Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst): 17:02	Cal Gas Expiry Date: June 14, 2019		
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a		

<b>Analyzer:</b> ID# or Serial Number: 509 Last Calibration Date: December 7, 2017 Previous C.F.: 1.000	Range ppb: 100 As Found C.F.: 1.006 New C.F.: 1.000
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<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="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>ppb</th> <th></th> </tr> </thead> <tbody> <tr> <td>High</td> <td>78</td> <td>12:54 / 13:04</td> </tr> <tr> <td>Mid</td> <td>38</td> <td>1000</td> </tr> <tr> <td>Low</td> <td>19</td> <td>780</td> </tr> <tr> <td></td> <td></td> <td>0.0</td> </tr> <tr> <td></td> <td></td> <td>0.0</td> </tr> <tr> <td></td> <td></td> <td>0.0</td> </tr> </tbody> </table>	Point	ppb		High	78	12:54 / 13:04	Mid	38	1000	Low	19	780			0.0			0.0			0.0
Point	ppb																					
High	78	12:54 / 13:04																				
Mid	38	1000																				
Low	19	780																				
		0.0																				
		0.0																				
		0.0																				

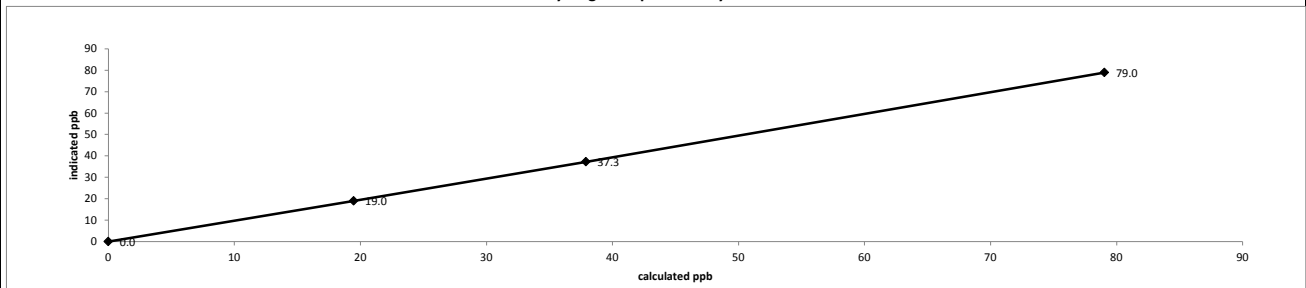
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	7204	0.00	7204	0.0	1.4	n/a
as found high	7139	55.75	7195	79.0	80.0	1.006
adjusted zero	7204	0.00	7204	0.0	0.0	n/a
adjusted high	7139	55.75	7195	79.0	79.0	1.000
mid	7188	26.81	7215	37.9	37.3	1.017
low	7192	13.75	7206	19.5	19.0	1.024
calibrator zero	7204	0.00	7204	0.0	0.0	n/a
<b>Average C.F.=</b>						1.014

**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) = 0.31%	± 3% F.S.
% change in C.F. from last cal = -0.55%	± 10%

**API 101E Hydrogen Sulphide Analyzer Calibration**



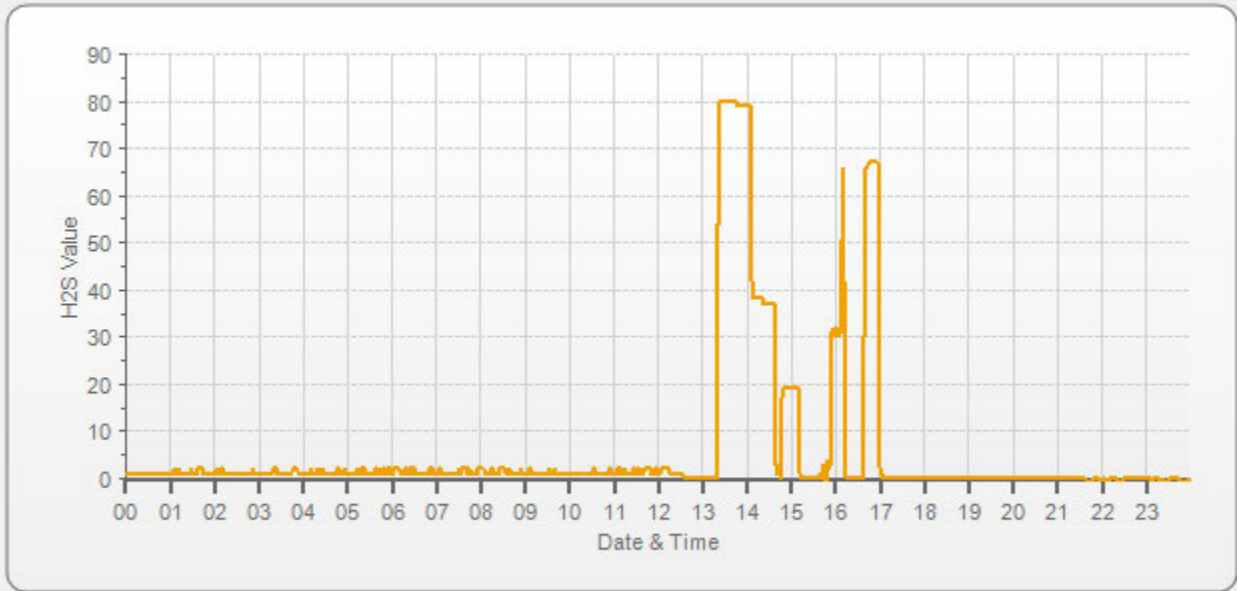
<b>As found:</b> Slope: 0.979 Offset: 67.8 Hvps: 671 Rcell Temp: 50.0 Box Temp: 31.9 Pmt Temp: 8.0 Izs Temp: 48.0 Converter Temp: 314.0 Pres: 20.0 Samp Fl: 517 Uv Lamp: 3231.7 Lamp Ratio: 96.3 Str Lgt: 33.2 Drk Pmt: 0.7 Expected Value: 66.3	<b>As left:</b> Slope: 0.986 Offset: 70.8 Hvps: 671 Rcell Temp: 50.0 Box Temp: 32.4 Pmt Temp: 8.0 Izs Temp: 48.0 Converter Temp: 314.4 Pres: 20.1 Samp Fl: 517 Uv Lamp: 3232.1 Lamp Ratio: 96.3 Str Lgt: 34.9 Drk Pmt: 0.7 Expected Value: 66.8
---	--

**Comments:**

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

The as left IZS check did not trigger due to a loose connection on the back of the datalogger. The second IZS check was successful after the connections were repaired.





— H2S[ppb]

***TOTAL HYDROCARBON***



# Thermo 51i Total Hydrocarbon Analyzer Calibration

Date:	January 9, 2018	Barometer/B.P./units:	F.S. 05544 expires December 5, 2018	915	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name:	St. Lina	Weather Conditions:	Mainly cloudy with snow		
Parameter:	Total Hydrocarbon	Calibration Purpose:	routine monthly		
Start/End Time 24 hr. (mst):	12:11 / 16:08	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 24, 2022		

Analyzer:	ID# or Serial Number:	925436893	Range ppm:	50
	Last Calibration Date:	December 8, 2017	As Found C.F.:	0.988
	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	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:	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>x</sub> equivalents (ppm):	569.3      1159.3		

Point	Target ppm
High	38
Mid	18
Low	9

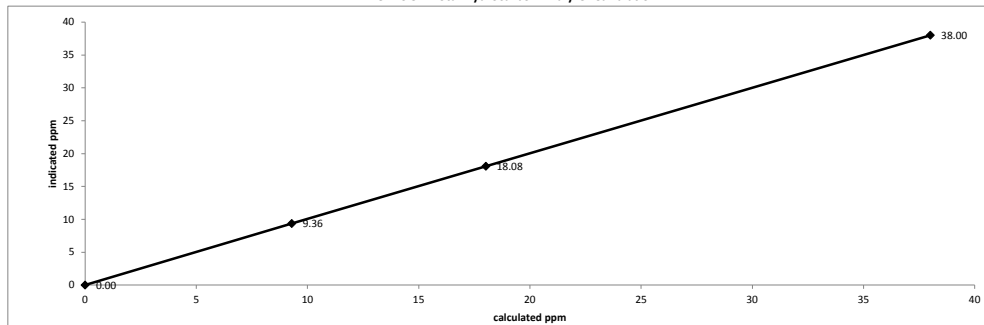
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration: (ppm)	Indicated Concentration: (ppm)	Correction Factors:
	Diluent	Cal Gas	Total			
as found zero	2382	0.00	2382	0.0	0.04	n/a
as found high	2478	83.99	2562	38.00	38.50	0.988
adjusted zero	2382	0.00	2382	0.00	0.00	n/a
adjusted high	2478	83.99	2562	38.00	38.00	1.000
mid	2479	39.14	2518	18.02	18.08	0.997
low	2480	20.04	2500	9.29	9.36	0.993
calibrator zero	2382	0.00	2382	0.0	0.00	n/a
Average C.F.=						0.997

### Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS
Slope =	1.001	> or = 0.995
b (Intercept as % of full scale) =	-0.08%	0.95-1.05
% change in C.F. from last cal =	1.19%	± 3% F.S.
		± 10%

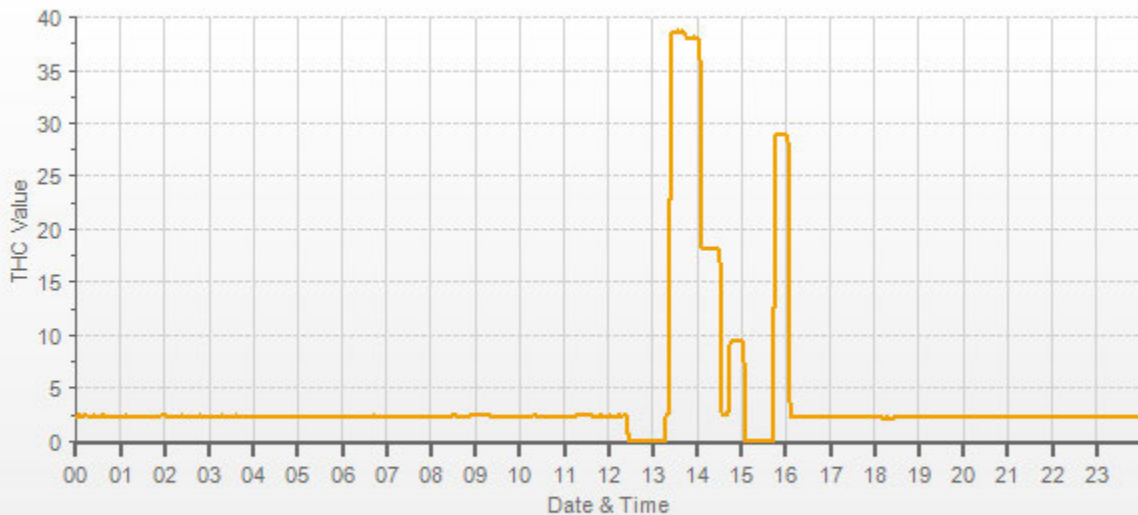
Thermo 51i Total Hydrocarbon Analyzer Calibration



Bkg:	4.27	Bkg:	4.25
Coef:	3.921	Coef:	3.869
H2 cylinder (psi):	1600	H2 cylinder (psi):	1600
H2 cylinder reg set (psi):	50	H2 cylinder reg set (psi):	50
Span Cylinder (psi):	700	Span Cylinder (psi):	700
Span Cylinder Reg Set (psi):	25	Span Cylinder Reg Set (psi):	25
Zero Air Gen Pressure:	45	Zero Air Gen Pressure:	45
Bias Supply:	-298.0	Bias Supply:	-298.0
Detector Base:	125.0	Detector Base:	125.0
Filter:	125.0	Filter:	125.0
Pump:	n/a	Pump:	n/a
Flame:	140.3	Flame:	140.4
Internal:	28.7	Internal:	28.3
Sample:	9.7	Sample:	9.7
Fuel:	19.9	Fuel:	19.9
Air:	39.7	Air:	39.7
Signal:	916	Signal:	924
Status:	LIT	Status:	LIT
Measured Flow:	0.8127	Measured Flow:	n/a
Expected Value:	29.00	Expected Value:	28.90

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] Station: LICA ST. LINA Daily: 18/01/09 Type: AVG 1 Min. [1 Min.]



— THC[ppm]

***NITROGEN DIOXIDE***



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

Date: January 10, 2018	Barometer/B.P./units: F.S. 05544 expires December 5, 2018	930	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 170286131 expires April 19, 2019	22	°C
Location/Station Name: St. Lina	Weather Conditions: A few clouds		
Start/End Time 24 hr. (mst): 12:47 / 19:18	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: 594	NO =	Previous C.F.: 0.997	As Found C.F.: 1.004	New C.F.: 0.998
Last Calibration Date: December 7, 2017	NO <sub>2</sub> =	1.000	0.996	1.000
Range ppb: 1000	NOx =	0.999	1.007	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	4929	0.0	4929	0	0	0.0	0.0	n/a	n/a
as found high	4860	76.7	4937	787.4	790.5	784.0	785.0	1.004	1.007
adjusted zero	4929	0.00	4929	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4860	76.67	4937	787.4	790.5	789.0	791.0	0.998	0.999
mid	4898	36.62	4935	376.2	377.7	378.0	379.0	0.995	0.997
low	4922	18.73	4941	192.2	192.9	192.0	193.0	1.001	1.000
calibrator zero	4929	0.00	4929	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	4860	76.67	4937	0.0	792.0	792.0	1.0	0.0	1.0	
as found high NO2	4860	76.67	4937	490.0	275.0	794.0	520.0	517.0	519.0	0.996
adjusted high NO2	4860	76.67	4937	490.0	274.0	792.0	519.0	518.0	518.0	1.000
gpt mid	4860	76.67	4937	265.0	512.0	790.0	279.0	280.0	278.0	1.007
gpt low	4860	76.67	4937	105.0	685.0	792.0	108.0	107.0	107.0	1.000
Average NO <sub>2</sub> C.F. =										1.002

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	0.999	1.002	0.95-1.05
b (Intercept as % of full scale) =	0.00%	0.02%	0.02%	± 3% F.S.
% change in C.F. from last cal =	-0.73%	-0.80%	0.39%	± 10%
NO2 converter efficiency			0.97	0.96 to 1.04

As found:		As left:	
NOx SLOPE:	1.027	NOx SLOPE:	1.039
NOx OFFS:	1.6	NOx OFFS:	1.6
NO SLOPE:	1.035	NO SLOPE:	1.038
NO OFFS:	0.9	NO OFFS:	0.9
SAMP FLW:	486	SAMP FLW:	486
OZONE FL:	78	OZONE FL:	78
PMT:	13.9	PMT:	19.1
NORM PMT:	0.4	NORM PMT:	1.9
AZERO:	17.8	AZERO:	17.3
HVPS:	767	HVPS:	767
RCCELL TEMP:	50.0	RCCELL TEMP:	50.0
BOX TEMP:	32.1	BOX TEMP:	32.5
PMT TEMP:	6.7	PMT TEMP:	6.7
IZS TEMP:	41.1	IZS TEMP:	41.3
MOLY TEMP:	315.8	MOLY TEMP:	315.8
RCEL:	5.3	RCEL:	5.4
SAMP:	26.3	SAMP:	26.7
Expected Value NO:	6	Expected Value NO:	6
Expected Value NO <sub>2</sub> :	474	Expected Value NO <sub>2</sub> :	474
Expected Value NOx:	479	Expected Value NOx:	479

**Comments:**

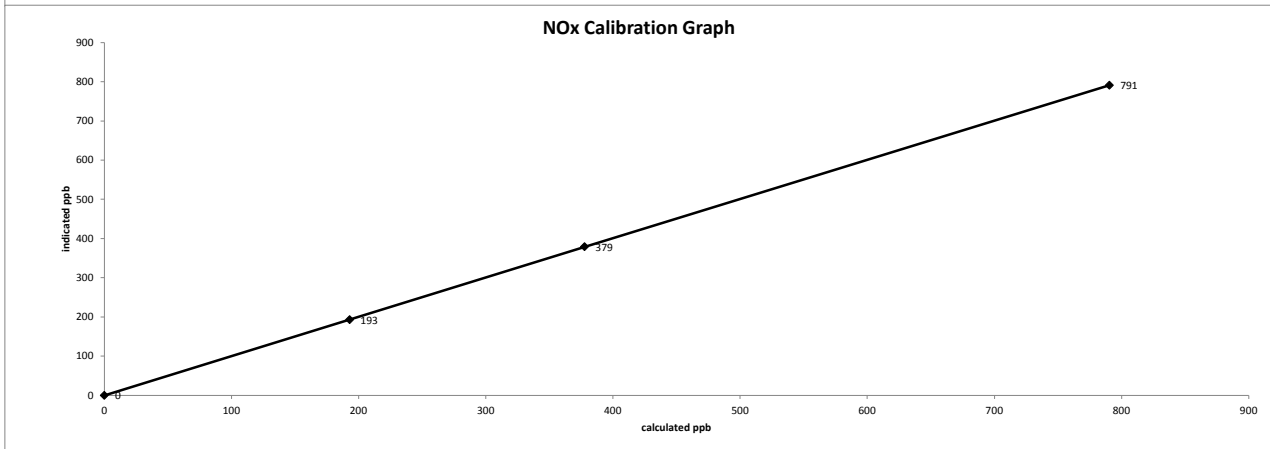
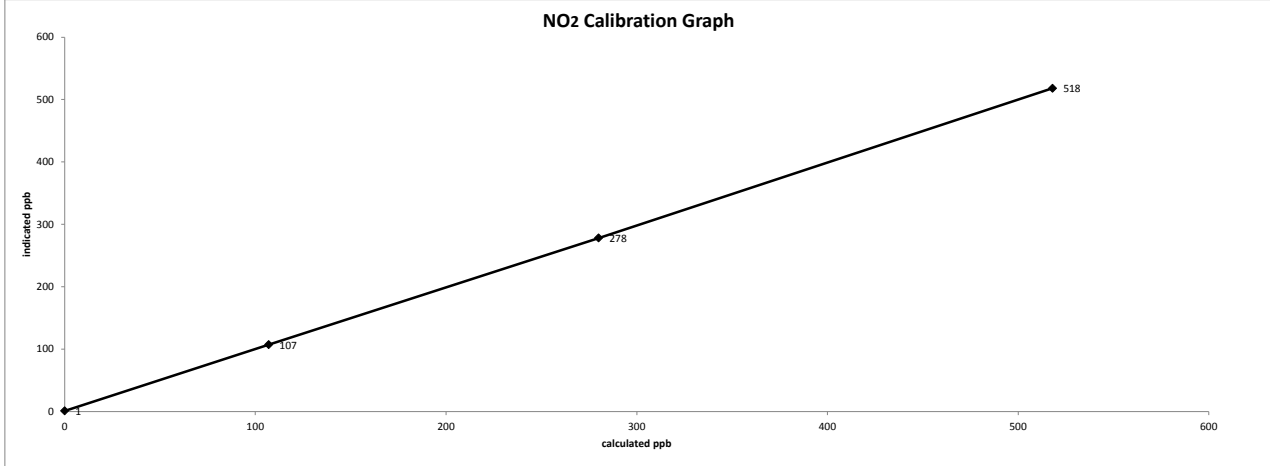
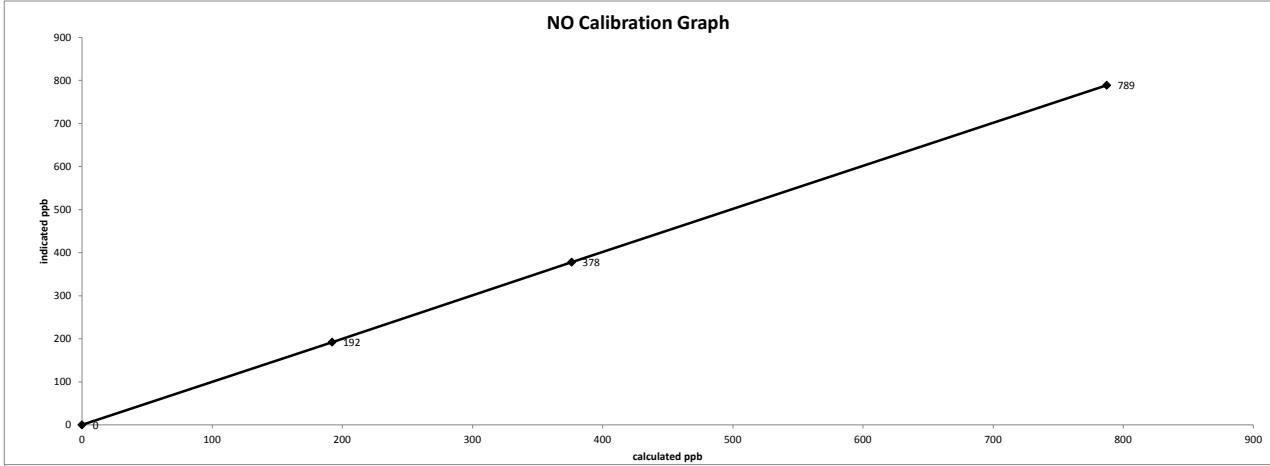
The analyzer sample inlet filter was changed.

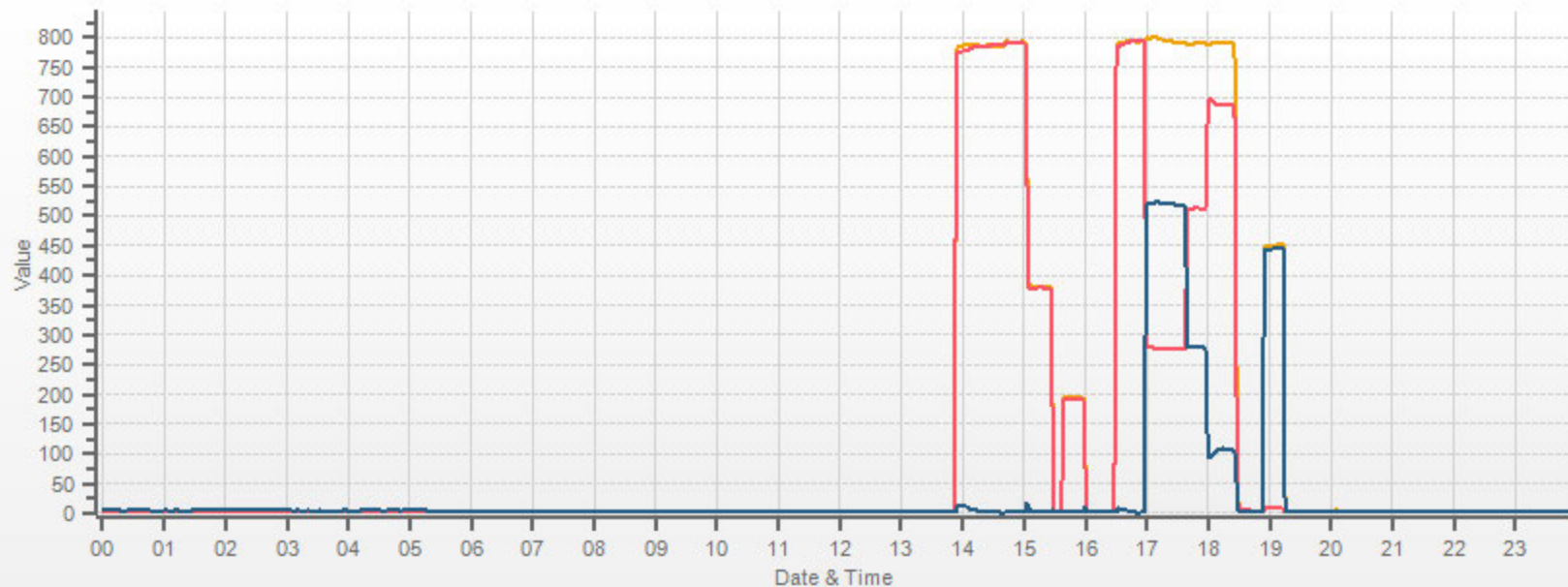
The manifold blower was found to be working normally.

Date: January 10, 2018  
Company/Airshed: LICA  
Location/Station Name: St. Lina

Start/End Time 24 hr. (mst): 12:47 / 19:18  
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> January 12, 2018 <b>Company/Airshed:</b> LICA <b>Location/Station Name:</b> St Lina <b>Start/End Time 24 hr. (mst):</b> 16:59 / 20:36 <b>Ozone Calibration Method:</b> Direct G.P.T. <b>G.P.T. Date:</b> January 12, 2018	<b>Barometer/B.P./units:</b> Brunton 05490 expires December 11, 2018    937    bars <b>Thermometer/Station Temp:</b> F.S. 160459244 expires May 18, 2018    22    °C <b>Weather Conditions:</b> Clear <b>Calibration Purpose:</b> repeat <b>Performed By/Reviewer:</b> Chris Wesson    Rob Fisher <b>Cal Gas Expiry Date:</b> October 24, 2020
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<b>Analyzer:</b> <b>ID# or Serial Number:</b> 1002240371 <b>Last Calibration Date:</b> January 10, 2018 <b>Previous Cal High Point C.F.:</b> 1.000	<b>Ozone Range ppb:</b> 500 <b>As Found C.F.:</b> 1.039 <b>New C.F.:</b> 1.000
---	--

<b>Calibration Standards:</b> <b>Low Flow Meter ID/Expiry Date:</b> Defender 530L # 156151 Expiry Oct 02, 2018 <b>High Flow Meter ID/Expiry Date:</b> Defender 530H 156312 Expiry Dec 1, 2018 <b>Calibrator ID/Expiry Date:</b> Sabio id# 17100415 expires May 16, 2018 <b>Cal Gas Cylinder I.D. #:</b> LL108015	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Point</th> <th>AMD Required Range of Ozone Calibration Points</th> </tr> <tr> <td>High</td> <td>300-400 ppb</td> </tr> <tr> <td>Mid</td> <td>150-200 ppb</td> </tr> <tr> <td>Low</td> <td>50-100 ppb</td> </tr> </table>	Point	AMD Required Range of Ozone Calibration Points	High	300-400 ppb	Mid	150-200 ppb	Low	50-100 ppb
Point	AMD Required Range of Ozone Calibration Points								
High	300-400 ppb								
Mid	150-200 ppb								
Low	50-100 ppb								

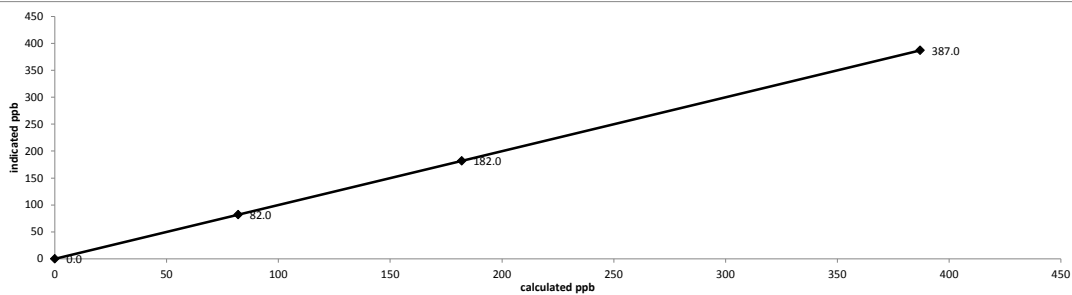
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5010	5010	0.0	n/a	0.5	n/a
as found high	5010	5010	387.0	387.0	373.0	1.039
adjusted zero	5010	5010	0.0	0.0	0.0	n/a
adjusted high	5010	5010	387.0	387.0	387.0	1.000
mid	5010	5010	182.0	182.0	187.0	0.973
low	5010	5010	82.0	82.0	83.0	0.988
calibrator zero	5010	5010	0.0	n/a	0.0	n/a
<b>Average C.F.=</b>						0.987

**Linear Regression/Calibration Results:**

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



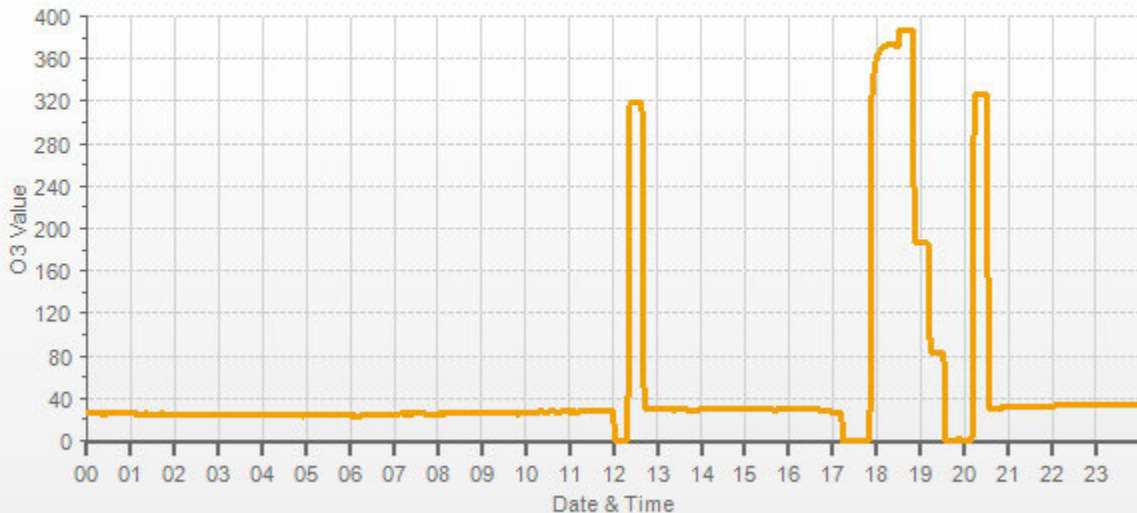
<b>As found:</b> O3 Bkg: -0.5 O3 Coef: 0.965 Photo Lamp: 10.7 O3 Lamp: 8.2 Bench: 28.2 Bench Lamp: 53.6 O3 Lamp: 67.7 Pressure: 688.3 Cell A lpm: 0.736 Cell B lpm: 0.773 O3 ppb: 0.1 Cell A ppb: -0.7 Cell B ppb: 0.9 Cell A int: 79636 Cell B int: 99821.0 Expected Value: 318.0	<b>As left:</b> O3 Bkg: -0.1 O3 Coef: 0.991 Photo Lamp: 10.7 O3 Lamp: 8.2 Bench: 28.1 Bench Lamp: 53.6 O3 Lamp: 67.7 Pressure: 687.1 Cell A lpm: 0.735 Cell B lpm: 0.772 O3 ppb: 0.3 Cell A ppb: 2.6 Cell B ppb: -2.1 Cell A int: 79631 Cell B int: 99823.0 Expected Value: 318.0
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**Comments:**  
 The manifold blower was found to be working normally.

The repeat was performed because the previous calibration as found point did not meet response time requirements. The BKG/COEF were reset to prior to as-found attempts. This analyzer was not producing valid data at the time this calibration was started, the response time failure occurred on January 10th.

O3[ppb] Station: LICA ST. LINA Daily: 18/01/12 Type: AVG 1 Min. [1 Min.]

O3[ppb]

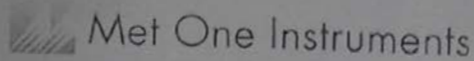


***PARTICULATE MATTER 2.5***

## "I" Series Sharp 5030 Monitor Monthly Audit

<b>Date:</b>	January 18, 2018	<b>Performed By/Reviewer:</b>	Alex Yakupov   Tom Bourque
<b>Company:</b>	LICA	<b>Start Time (mst):</b>	14:23
<b>Station Name/Location:</b>	St. Lina	<b>End Time (mst):</b>	14:55
<b>Previous Audit Date:</b>	December 8, 2017	<b>Calibration Purpose:</b>	routine monthly
<b>Parameter:</b>	PM 2.5	<b>Weather Conditions:</b>	Cloudy/Overcast
<b>SHARP Information and Status:</b>			
<b>Serial Number:</b>	CM1709001	<b>Status:</b>	SAMPLE
<b>Approx. % Tape remaining:</b>	70%	<b>Error Code:</b>	None
<b>Reference Standards/I.D./Expiry Date:</b>			
<b>High Flow:</b>	Airmetrics/Chinook High Maxxam ID #4 expires February 3, 2018		
<b>Digital Manometer:</b>	Dwyer 475 Mark III id# 1 expires April 24, 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>	3	<b>Tolerance mmHg +/-</b>	12
<b>SHARP T1 (°C):</b>	2.3	<b>SHARP P3 (mmHg):</b>	683.20
<b>Reference (°C):</b>	3.5	<b>Reference (mmHg):</b>	680.30
<b>Difference (°C):</b>	1.2	<b>Difference (mmHg):</b>	-2.9
<b>As left temperature and pressure (same as above if as found adequate):</b>			
<b>Tolerance °C +/-</b>	3	<b>Tolerance mmHg +/-</b>	12
<b>SHARP T1 (°C):</b>	2.3	<b>SHARP P3 (mmHg):</b>	683.20
<b>Reference (°C):</b>	3.5	<b>Reference (mmHg):</b>	680.30
<b>Difference (°C):</b>	1.2	<b>Difference (mmHg):</b>	-2.9
<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>	16.43
		<b>Difference (%)</b>	-1.44%
<b>As left flows (same as above if as found adequate):</b>			
<b>Targets: 1000 l/hr / &lt;90%</b>		<b>Tolerance lpm +/-</b>	5%
<b>SHARP Airflow l/hr</b>	1000.00	<b>SHARP Airflow (lpm)</b>	16.67
<b>Pump Voltage (%)</b>	n/a	<b>Reference Airflow (lpm)</b>	16.43
		<b>Difference (l/min)</b>	-1.44%
<b>As found relative humidity:</b>		<b>As left relative humidity (same as "as found" if adequate):</b>	
<b>Tolerance % +/-</b>	5	<b>Tolerance % +/-</b>	5
<b>Sharp RH (%)</b>	57.4	<b>Sharp RH (%)</b>	57.40
<b>Reference RH (%)</b>	54.9	<b>Reference RH (%)</b>	54.91
<b>Difference:</b>	-2.5	<b>Difference:</b>	-2.5
<b>Inlet Assembly:</b>			
<b>Inlet Head/Sharp Cut</b>	Yes/No?	<b>If no, give reason:</b>	
<b>Cleaned:</b>	yes		
<b>Comments:</b>			

## ***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>		

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

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO <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)*

<u>NO</u>		<u>LIMITS</u>		<u>NOx</u>	
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	<b>± 3% F.S.</b>		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)*

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

<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)*

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

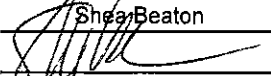
Flow	O <sub>3</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOX	% Diff. Vs Audit gas	
4954	0.000	0.0000	0.7949	0.0005	0.7954	NO <sub>2</sub>	% Diff. Limit
4954	0.510	0.5104	0.2845	0.5072	0.7917	-1%	± 10%
4954	0.250	0.2516	0.5433	0.2514	0.7944	0%	± 10%
4954	0.100	0.1085	0.6864	0.1087	0.7951	0%	± 10%
Absolute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

<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>1868</u>
Serial/AMU Number	<u>1809</u>	Last Calibration Date	<u>March 15, 2017</u>
SRM Gas Cylinder No.	<u>CAL018140</u>	Full Scale (ppm)	<u>1.0</u>
Cylinder Conc. (ppm)	<u>48.79</u>	Cylinder Gas Expiry Date	<u>March 28, 2019</u>

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton  
Operator Signature: 

Date: March 16, 2017  
Location: McIntyre Center Edmonton

## ***CALIBRATION GASES***





# Calibration Gas Audit

## Single Component Cylinder Gas

File No. 2016-334CGA

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

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

Expiry Date: June 2019

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

**Reference Analyzer:**

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

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

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

Calibrator Flows (scm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	<del>0.0000</del>	<del>0.0000</del>	<del>0.0000</del>
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    Date: October 19, 2016

Operator Signature: *Al Clark*    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>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>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	X	X	X	X
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***  
***INTERNAL AUDIT RESULTS***



COMPANY: LICA PLANT: St. Lina DATE: January 16, 2018

Station Location: UTM Coordinates: 54.215961°, -111.503304°  
 Elevation (m): 680m  
 Declination: 13° 24.90' East

**GENERAL**

	Yes	No	n/a	Comments:
Has site location changed from previous audit?		x		
Is site secure?	x			
Are station operating conditions adequate?	x			
Last twelve month's of calibrations available?	x			
All applicable SOP's available in station?		x		
Site documentation up to date?	x			

**DATA ACQUISITION**

	Yes	No	n/a	Comments:
Are strip charts in use?		x		
Is a digital data logger in use?	x			
Is a telemetry system for data acquisition in use?	x			

**TRAILER COMPONENTS**

	Yes	No	n/a	Comments:
Is a glass sampling manifold installed?	x			
Is sampling manifold clean and free of chips and cracks?	x			
Is a trap in place?	x			
Are spare manifold ports capped?	x			
Is manifold pump properly installed and operative?	x			
If horizontal, is the manifold mounted at a slight upward angle to prevent moisture from getting in to the lines?			x	Vertical installed manifold
Do sample lines extend halfway into manifold?	x			
Are monitor sampling lines connected to manifold?	x			
Are sampling lines clean?	x			
Are monitors properly mounted and secure?	x			
Are monitors properly exhausted from room or scrubbed (NOx pump inlet scrubbed and dated)?	x			
Are zero and span systems operational?	x			

**Meteorological**

	Yes	No	n/a	Comments:
Is wind equipment properly oriented?	x			
Is the wind equipment functioning properly?	x			

	Indicated Value:	Audit Value:	% Difference	Scalar Difference:
Station Temperature °C	27.4	26.8	-2.24	-0.60
Barometric Pressure	923.7	931.27	0.81	7.57
Wind Speed (kph)	7.5	8	n/a	n/a
Wind Direction (Deg)	220	SW	n/a	n/a
Relative Humidity %	49	54.6	n/a	n/a
Ambient Temperature °C	-9.4	-9.35	-0.53	0.05
Solar Radiation kW/m <sup>2</sup>	n/a	n/a	n/a	n/a
Precipitation (Tipping Bucket mm)	1	1	n/a	n/a

**Recommendations:**

AUDITOR: Limin Li



## API 100E Sulphur Dioxide Analyzer Calibration

Date: January 16, 2018	Barometer/B.P./units: Brunton 05535 expires December 15, 2018	27.55	inHg
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 160348895 expires April 8, 2018	25	°C
Location/Station Name: St. Lina	Weather Conditions: Mainly sunny		
Parameter: Sulphur Dioxide	Calibration Purpose: shut down		
Start Time 24 hr. (mst): 10:20	Performed By/Reviewer: Limin Li	Tom Bourque	
End Time 24 hr. (mst): 12:30	Cal Gas Expiry Date: October 24, 2020		
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable):	n/a	

Analyzer:	Range ppb: 1000
ID# or Serial Number: 468	As Found C.F.: 0.982
Last Calibration Date: January 10, 2018	New C.F.: n/a
Previous C.F.: 1.000	

Calibration Standards: Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: Sabio id# 17200415 expires May 16, 2018 Cal Gas Cylinder I.D. #: LL 104225 Cal Gas Conc. (ppm): 49.2	<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>780</td></tr> <tr><td>Mid</td><td>380</td></tr> <tr><td>Low</td><td>190</td></tr> </table>	Point	ppb	High	780	Mid	380	Low	190
Point	ppb								
High	780								
Mid	380								
Low	190								

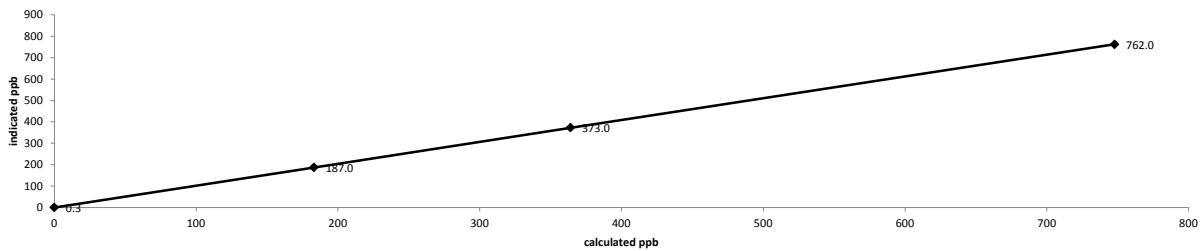
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	4904	0.00	4904	0.0	0.3	n/a
as found high	4829	74.54	4904	747.8	762.0	0.982
mid	4904	36.56	4941	364.0	373.0	0.977
low	4919	18.38	4937	183.2	187.0	0.981
<b>Average C.F. =</b>						<b>0.980</b>

**Linear Regression/Calibration Results:**

Correlation Coefficient =	<b>1.000</b>		LIMITS
Slope =	<b>0.982</b>		> or = 0.995
b (Intercept as % of full scale) =	<b>-0.07%</b>		0.90-1.10
% change in C.F. from last cal =	<b>1.82%</b>		± 3% F.S.
			± 10%

**API 100E Sulphur Dioxide Analyzer Calibration**



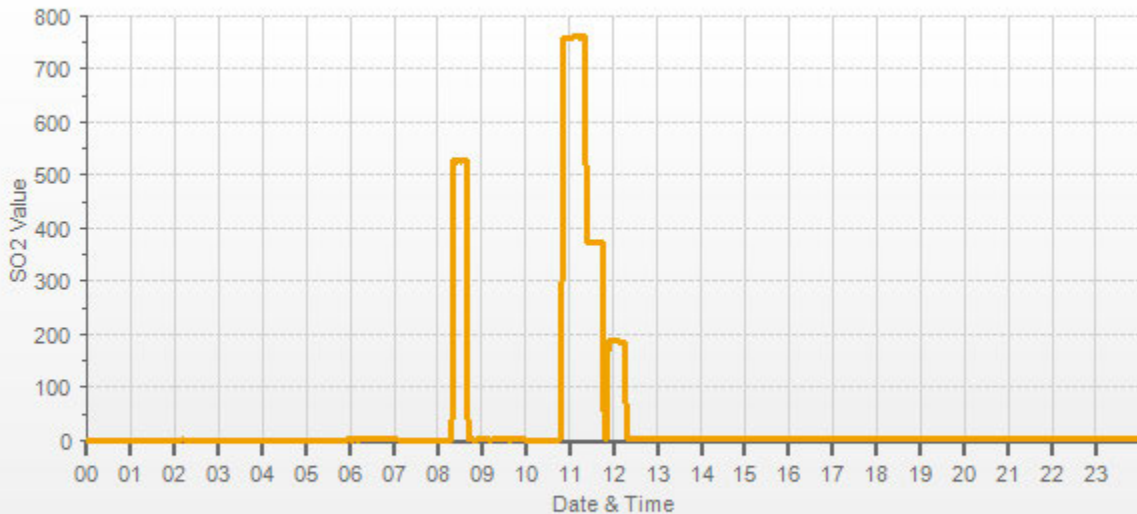
<b>As found:</b> Slope: 0.990 Offset: 143.4 Hvps: 651 V Rcell Temp: 50.0 °C Box Temp: 33.6 °C Pmt Temp: 7.9 °C Izs Temp: 45.0 °C Pres: 23.8 IN-HG-A Samp Fl: 596 CC/M Norm Pmt: 146.9 MV Uv Lamp: 2877 MV Lamp Ratio: 91.4 Str Lgt: 71.0 PPB Drk Pmt: 9.1 M.V Drk Lmp: 6.6 MV Expected Value: 511.0	<b>As left:</b> Slope: 0.990 Offset: 143.4 Hvps: 651 V Rcell Temp: 50.0 °C Box Temp: 33.6 °C Pmt Temp: 7.9 °C Izs Temp: 45.0 °C Pres: 23.8 IN-HG-A Samp Fl: 596 CC/M Norm Pmt: 146.9 MV Uv Lamp: 2877 MV Lamp Ratio: 91.4 Str Lgt: 71.0 PPB Drk Pmt: 9.1 M.V Drk Lmp: 6.6 MV Expected Value: 511.0
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**Comments:**

The manifold blower was found to be working normally.

This is an internal audit. Calibration point order is the same as a shutdown verification.

SO2[ppb] Station: LICA ST. LINA Daily: 18/01/16 Type: AVG 1 Min. [1 Min.]



— SO2[ppb]



## API 101E Hydrogen Sulphide Analyzer Calibration

Date:	January 16, 2018	Barometer/B.P./units:	Brunton 05535 expires December 15, 2018	27.55	inHg
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 170286131 expires April 19, 2019	25	°C
Location/Station Name:	St. Lina	Weather Conditions:	Mainly sunny		
Parameter:	Hydrogen Sulphide	Calibration Purpose:	shut down		
Start Time 24 hr. (mst):	10:20	Performed By/Reviewer:	Limin Li	Tom Bourque	
End Time 24 hr. (mst):	12:30	Cal Gas Expiry Date:	August 23, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		

<b>Analyzer:</b> ID# or Serial Number: 509 Last Calibration Date: January 9, 2018 Previous C.F.: 1.000	Range ppb: 100 As Found C.F.: 0.954 New C.F.: n/a
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<b>Calibration Standards:</b> Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: API id# 829 expires January 27, 2018 Cal Gas Cylinder I.D. #: LL119500 Cal Gas Conc. (ppm): 9.8	<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								

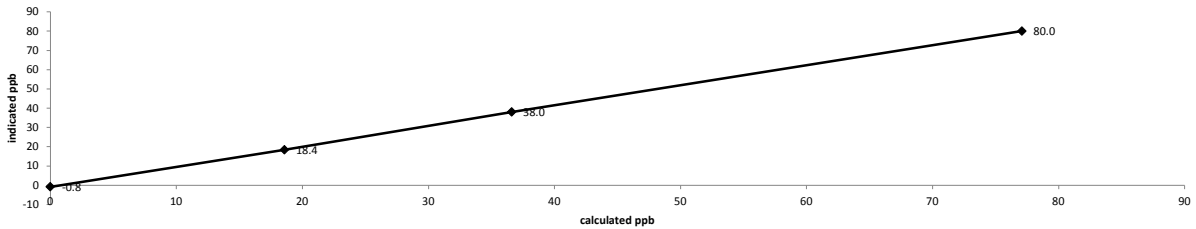
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	7481	0.00	7481	0.0	-0.8	n/a
as found high	7414	58.79	7473	77.1	80.0	0.954
mid	7476	28.03	7504	36.6	38.0	0.943
low	7486	14.22	7500	18.6	18.4	0.968
<b>Average C.F. =</b>						<b>0.955</b>

**Linear Regression/Calibration Results:**

Correlation Coefficient =	1.000		LIMITS
Slope =	0.953		> or = 0.995
b (Intercept as % of full scale) =	0.78%		0.90-1.10
% change in C.F. from last cal =	4.58%		± 3% F.S.
			± 10%

**API 101E Hydrogen Sulphide Analyzer Calibration**



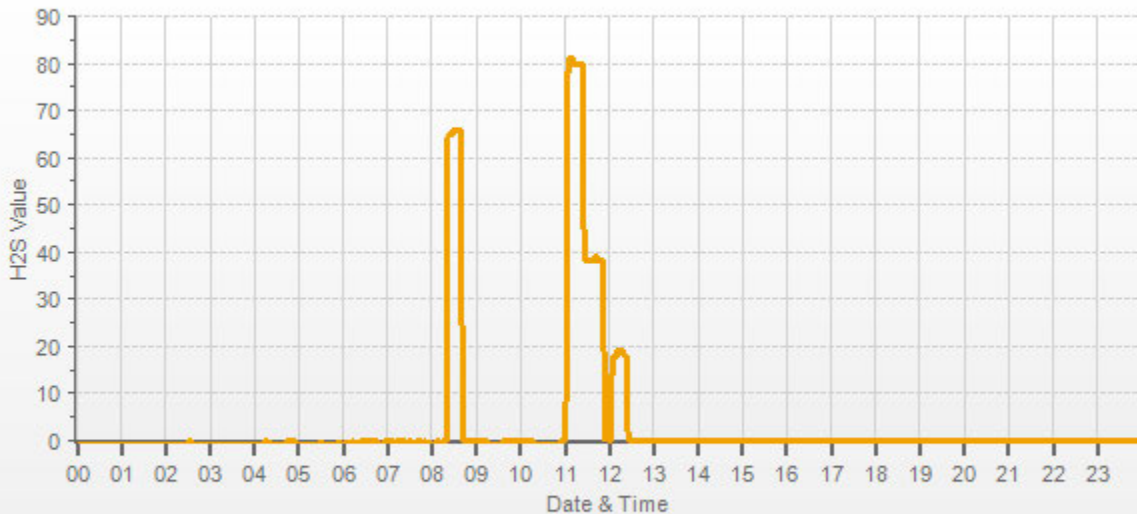
<b>As found:</b> Slope: 0.986 Offset: 70.8 Hvps: 671 V Rcell Temp: 50.0 °C Box Temp: 34.9 °C Pmt Temp: 8.0 °C Izs Temp: 48.0 °C Converter Temp: 314.0 °C Pres: 20.2 IN-HG-A Samp Fl: 518 CC/M Uv Lamp: 3150 MV Lamp Ratio: 93.9 Str Lgt: 34.9 PPB Drk Pmt: 0.9 MV Drk Lmp: 0.5 MV Expected Value: 66.8	<b>As left:</b> Slope: 0.986 Offset: 70.8 Hvps: 671 V Rcell Temp: 50.0 °C Box Temp: 34.9 °C Pmt Temp: 8.0 °C Izs Temp: 48.0 °C Converter Temp: 314.0 °C Pres: 20.2 IN-HG-A Samp Fl: 518 CC/M Uv Lamp: 3150 MV Lamp Ratio: 93.9 Str Lgt: 34.9 PPB Drk Pmt: 0.9 MV Drk Lmp: 0.5 MV Expected Value: 66.8
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**Comments:**

The manifold blower was found to be working normally.

This is an internal audit. Calibration point order is the same as a shutdown verification.

H2S[ppb] Station: LICA ST. LINA Daily: 18/01/16 Type: AVG 1 Min. [1 Min.]



— H2S[ppb]



# Thermo 51i Total Hydrocarbon Analyzer Calibration

Date:	January 16, 2018	Barometer/B.P./units:	Brunton 05535 expires December 15, 2018	27.53	inHg
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. 160348895 expires April 8, 2018	25	°C
Location/Station Name:	St. Lina	Weather Conditions:	Mainly cloudy with snow		
Parameter:	Total Hydrocarbon	Calibration Purpose:	shut down		
Start/End Time 24 hr. (mst):	12:25 / 14:50	Performed By/Reviewer:	Limin Li	Tom Bourque	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	October 28, 2025		

Analyzer:	ID# or Serial Number:	925436893	Range ppm:	50
	Last Calibration Date:	January 9, 2018	As Found C.F.:	0.998
	Previous Cal High Point C.F.:	1.000	New C.F.:	n/a

Calibration Standards:

Low Flow Meter ID/Expiry Date:	Defender Low 152019 expires December 13, 2018
High Flow Meter ID/Expiry Date:	Defender High 148944 expires December 13, 2018
Calibrator ID/Expiry Date:	API id# 829 expires January 27, 2018
Cal Gas Cylinder I.D. #:	LL 119471
CH <sub>4</sub> /C <sub>3</sub> H <sub>8</sub> Cylinder Conc. (ppm):	599.0      207.0
CH <sub>4</sub> as propane/total CH <sub>4</sub> equivalents (ppm):	569.3      1168.3

Standard Calibration Points for a Range of: 50 ppm

Point	Target ppm
High	38
Mid	18
Low	9

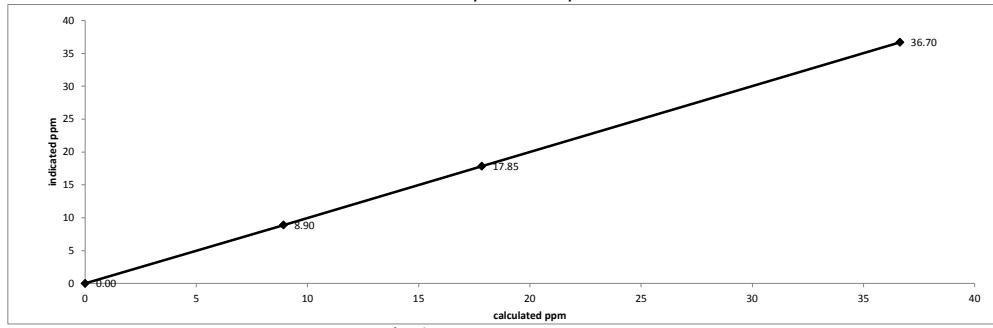
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	Diluent	Cal Gas	Total	(ppm)	(ppm)	
as found zero	2492	0.00	2492	0.0	0.00	n/a
as found high	2489	80.60	2570	36.64	36.70	0.998
mid	2487	38.57	2526	17.84	17.85	0.999
low	2491	19.17	2510	8.92	8.90	1.003
Average C.F.=						1.000

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.998		0.90-1.10
b (Intercept as % of full scale) =	0.04%		± 3% F.S.
% change in C.F. from last cal =	0.17%		± 10%

Thermo 51i Total Hydrocarbon Analyzer Calibration

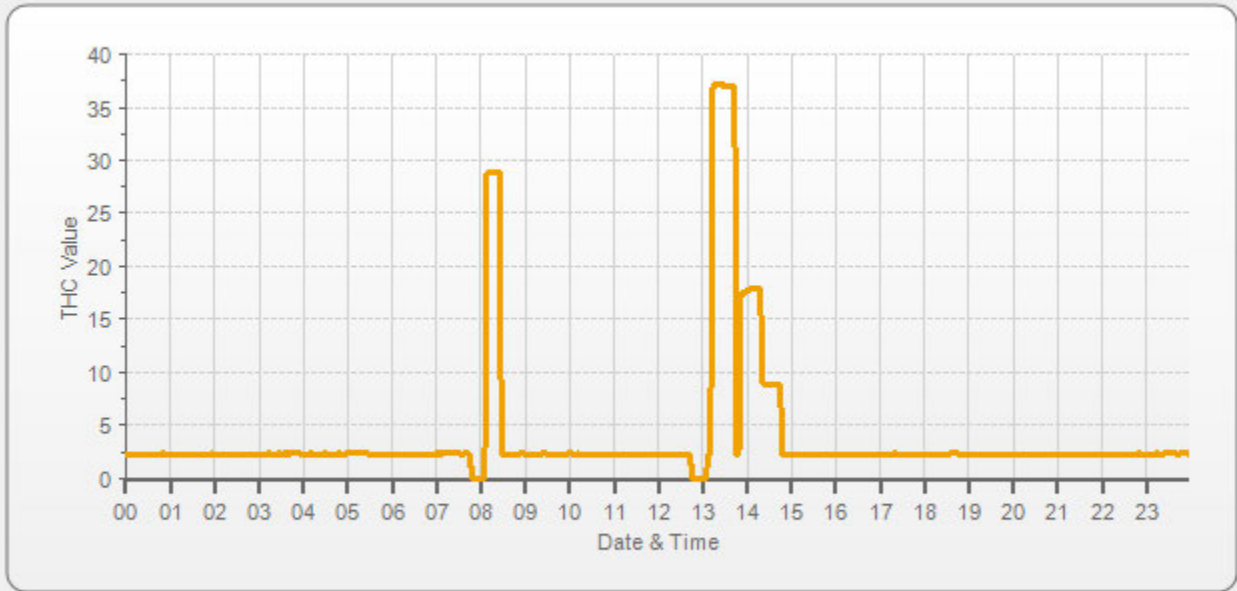


As found:		As left:	
Bkg:	4.25	Bkg:	4.25
Coef:	3.869	Coef:	3.869
H2 cylinder (psi):	1500	H2 cylinder (psi):	1500
H2 cylinder reg set (psi):	50	H2 cylinder reg set (psi):	50
Span Cylinder (psi):	500	Span Cylinder (psi):	500
Span Cylinder Reg Set (psi):	25	Span Cylinder Reg Set (psi):	25
Zero Air Gen Pressure:	45	Zero Air Gen Pressure:	45
Bias Supply:	-298.0 V	Bias Supply:	-298.0 v
Detector Base:	125.0 °C	Detector Base:	125.0 °C
Filter:	125.0 °C	Filter:	125.0 °C
Flame:	140.8 °C	Flame:	140.4 °C
Internal:	31.9 °C	Internal:	31.9 °C
Sample:	9.7 PSI	Sample:	9.7 PSI
Fuel:	19.9 PSI	Fuel:	19.9 PSI
Air:	39.7 PSI	Air:	39.7 PSI
Signal:	1412 HZ	Signal:	1412 HZ
Status:	LIT	Status:	LIT
Measured Flow:	0.830 LPM	Measured Flow:	0.830 LPM
Expected Value:	28.90	Expected Value:	28.90

Comments:

The manifold blower was found to be working normally.

This is an internal audit. Calibration point order is the same as a shutdown verification.



— THC[ppm]



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

Date: January 16, 2018	Barometer/B.P./units: Brunton 05535 expires December 15, 2018	27.55	inHg
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 160348895 expires April 8, 2018	25	°C
Location/Station Name: St. Lina	Weather Conditions: Mainly sunny		
Start/End Time 24 hr. (mst): 10:20/ 14:36	Calibration Purpose: shut down		
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Limin Li Tom Bourque		
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: October 24, 2020		

Analyzer:	<b>Correction Factors:</b>
ID# or Serial Number: 594	Previous C.F.: As Found C.F.: New C.F.:
Last Calibration Date: January 10, 2018	NO = 0.998 0.991 n/a
Range ppb: 1000	NO <sub>2</sub> = 1.000 0.992 n/a
	NOx = 0.999 0.979 n/a

Calibration Standards:  Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018 High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018 Calibrator ID/Expiry Date: Sabio id# 17200415 expires May 16, 2018 Cal Gas Cylinder I.D. #: LL 104225 Cal Gas Conc. (ppm): 51.5 51.6	<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 NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	4904	0.0	4904	0	0	0.3	1.0	n/a	n/a
as found high	4829	74.5	4904	782.8	784.3	790.0	802.0	0.991	0.979
mid	4904	36.56	4941	381.1	381.8	387.0	393.0	0.985	0.974
low	4919	18.38	4937	191.7	192.1	194.0	198.0	0.990	0.975
<b>Average C.F. =</b>								0.989	0.976

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	4880	74.44	4954	0.0	793.0	801.0	8.0	0.3	8.0	
as found high NO <sub>2</sub>	4880	74.44	4954	490.0	295.0	805.0	510.0	498.0	502.0	0.992
gpt mid	4880	74.44	4954	490.0	525.0	800.0	275.0	268.0	267.0	1.004
gpt low	4880	74.44	4954	265.0	703.0	799.0	97.0	90.0	89.0	1.011
<b>Average NO<sub>2</sub> C.F. =</b>									1.002	

Linear Regression/Calibration Results:			
	NO	NOx	NO <sub>2</sub>
Correlation Coefficient =	1.000	1.000	1.000
Slope =	0.991	0.979	1.003
b (Intercept as % of full scale) =	0.09%	0.18%	0.31%
% change in C.F. from last cal =	0.68%	0.80%	1.99%
NO <sub>2</sub> converter efficiency			0.97

LIMITS  
 > or = 0.995  
 0.90-1.10  
 ± 3% F.S.  
 ± 10%  
 0.96 to 1.04

<b>As found:</b> NOx SLOPE: 1.027 NOx OFFS: 1.6 NO SLOPE: 1.035 NO OFFS: 0.9 SAMP FLW: 473 CC/M OZONE FL: 78 CC/M PMT: 13.1 MV NORM PMT: 7.2 MV AZERO: 18.0 MV HVPS: 767 V RCELL TEMP: 50.0 °C BOX TEMP: 35.5 °C PMT TEMP: 6.8 °C IZS TEMP: 41.2 °C MOLY TEMP: 313.9 °C RCEL: 5.3 IN-HG-A SAMP: 26.1 IN-HG-A Expected Value NO: 7 Expected Value NO <sub>2</sub> : 473 Expected Value NOx: 479	<b>As left:</b> NOx SLOPE: 1.027 NOx OFFS: 1.6 NO SLOPE: 1.035 NO OFFS: 0.9 SAMP FLW: 473 CC/M OZONE FL: 78 CC/M PMT: 13.1 MV NORM PMT: 7.2 MV AZERO: 18.0 MV HVPS: 767 V RCELL TEMP: 50.0 °C BOX TEMP: 35.5 °C PMT TEMP: 6.8 °C IZS TEMP: 41.2 °C MOLY TEMP: 313.9 °C RCEL: 5.3 IN-HG-A SAMP: 26.1 IN-HG-A Expected Value NO: 7 Expected Value NO <sub>2</sub> : 473 Expected Value NOx: 479
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Comments:

The manifold blower was found to be working normally.

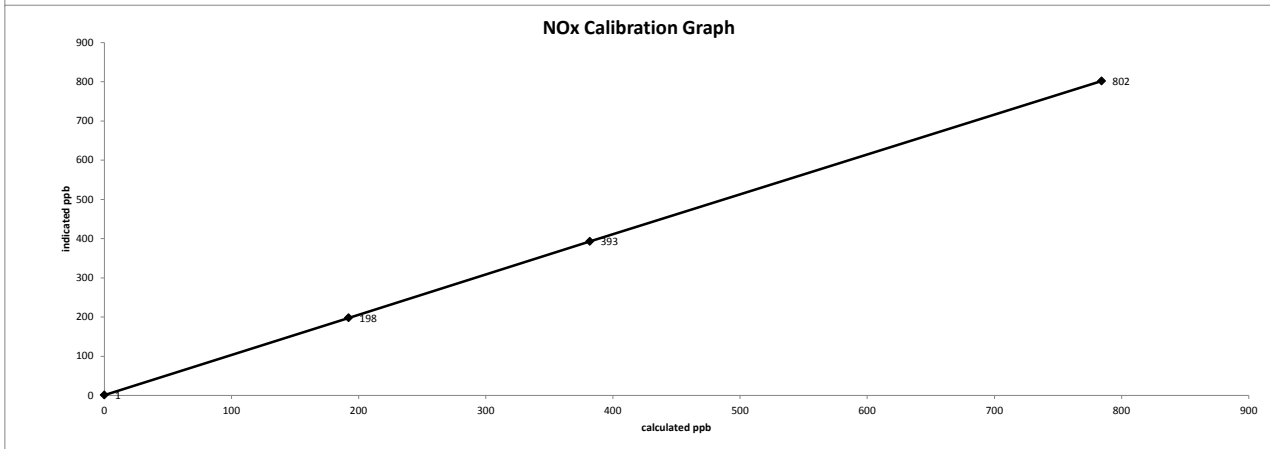
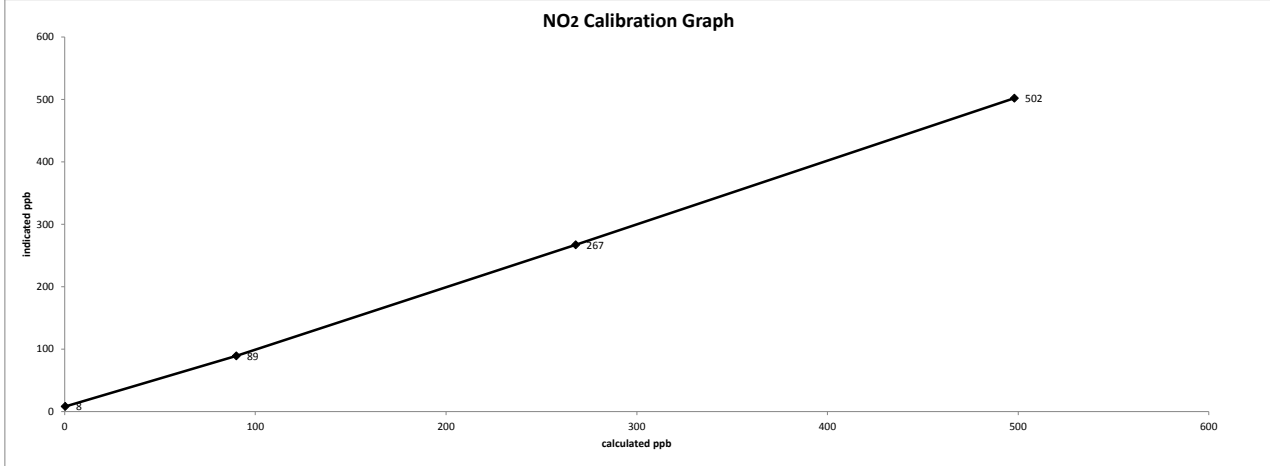
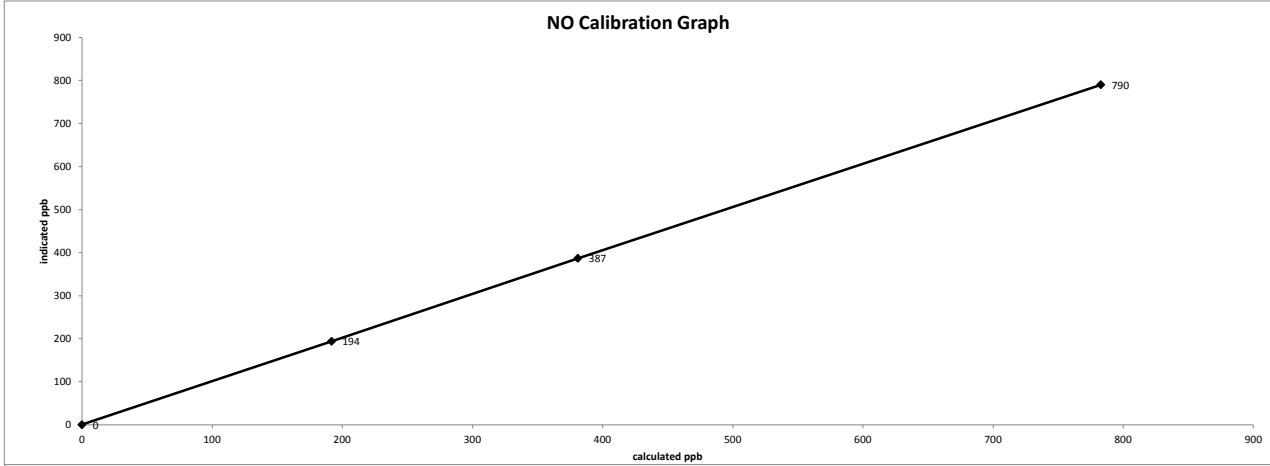
This is an internal audit. Calibration point order is the same as a shutdown verification.



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

Start/End Time 24 hr. (mst): 10:20/ 14:36  
Calibration Purpose: shut down  
Calibration Method: Gas Dilution & Gas Phase Titration

API 200E NO-NO2-NOx Analyzer Calibration





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

<b>Date:</b> January 16, 2018	<b>Barometer/B.P./units:</b> Brunton 05535 expires December 15, 2018	27.55	inHg
<b>Company/Airshed:</b> LICA	<b>Thermometer/Station Temp:</b> F.S. 160348895 expires April 8, 2018	25	°C
<b>Location/Station Name:</b> St. Lina	<b>Weather Conditions:</b> Mainly sunny		
<b>Start/End Time 24 hr. (mst):</b> 14:36/ 15:42	<b>Calibration Purpose:</b> shut down		
<b>G.P.T. to be used for Ozone?</b> No	<b>Performed By/Reviewer:</b> Limin Li		Tom Bourque
<b>Calibration Method:</b> Gas Dilution & Gas Phase Titration	<b>Cal Gas Expiry Date:</b> October 24, 2020		

<b>Analyzer:</b>	<b>Correction Factors:</b>												
<b>ID# or Serial Number:</b> 594	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 33%;">Previous C.F.:</th> <th style="width: 33%;">As Found C.F.:</th> <th style="width: 33%;">New C.F.:</th> </tr> <tr> <td>NO = 0.998</td> <td>0.991</td> <td>n/a</td> </tr> <tr> <td>NO<sub>2</sub> = 1.000</td> <td>0.995</td> <td>n/a</td> </tr> <tr> <td>NOx = 0.999</td> <td>0.979</td> <td>n/a</td> </tr> </table>	Previous C.F.:	As Found C.F.:	New C.F.:	NO = 0.998	0.991	n/a	NO <sub>2</sub> = 1.000	0.995	n/a	NOx = 0.999	0.979	n/a
Previous C.F.:	As Found C.F.:	New C.F.:											
NO = 0.998	0.991	n/a											
NO <sub>2</sub> = 1.000	0.995	n/a											
NOx = 0.999	0.979	n/a											
<b>Last Calibration Date:</b> January 10, 2018													
<b>Range ppb:</b> 1000													

<b>Calibration Standards:</b>	<b>Standard Calibration Points for a Range of: 1000 ppb</b>																								
<b>Low Flow Meter ID/Expiry Date:</b> Defender Low 152019 expires December 13, 2018	<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																						
<b>High Flow Meter ID/Expiry Date:</b> Defender High 148944 expires December 13, 2018																									
<b>Calibrator ID/Expiry Date:</b> Sabio id# 17200415 expires May 16, 2018																									
<b>Cal Gas Cylinder I.D. # :</b> LL 104225																									
<b>Cal Gas Conc. (ppm):</b> 51.5   51.6																									

**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	4904	0.0	4904	0	0	0.3	1.0	n/a	n/a
as found high	4829	74.5	4904	782.8	784.3	790.0	802.0	0.991	0.979
<b>Average C.F.=</b>								0.989	0.976

**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	4880	74.44	4954	0.0	798.0	798.0	0.0	0.3	0.0	
as found high NO2	4880	74.44	4954	490.0	417.0	800.0	383.0	381.0	383.0	0.995
gpt mid	4880	74.44	4954	490.0	619.0	797.0	178.0	179.0	178.0	1.006
gpt low	4880	74.44	4954	265.0	717.0	796.0	80.0	81.0	80.0	1.013
<b>Average NO<sub>2</sub> C.F.=</b>										1.004

**Linear Regression/Calibration Results:**

	NO	NOx	NO <sub>2</sub>	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.991	0.979	0.993	0.90-1.10
b (Intercept as % of full scale)=	0.09%	0.18%	-0.12%	± 3% F.S.
% change in C.F. from last cal=	0.68%	0.52%	1.99%	± 10%
NO <sub>2</sub> converter efficiency			0.97	0.96 to 1.04

<p style="text-align: center;"><b>As found:</b></p> <p>NOx SLOPE: 1.027</p> <p>NOx OFFS: 1.6</p> <p>NO SLOPE: 1.035</p> <p>NO OFFS: 0.9</p> <p>SAMP FLW: 473 CC/M</p> <p>OZONE FL: 78 CC/M</p> <p>PMT: 13.1 MV</p> <p>NORM PMT: 7.2 MV</p> <p>AZERO: 18.0 MV</p> <p>HVPS: 767 V</p> <p>RCELL TEMP: 50.0 °C</p> <p>BOX TEMP: 35.5 °C</p> <p>PMT TEMP: 6.8 °C</p> <p>IZS TEMP: 41.2 °C</p> <p>MOLY TEMP: 313.9 °C</p> <p>RCEL: 5.3 IN-HG-A</p> <p>SAMP: 26.1 IN-HG-A</p> <p>Expected Value NO: 7</p> <p>Expected Value NO<sub>2</sub>: 473</p> <p>Expected Value NOx: 479</p>	<p style="text-align: center;"><b>As left:</b></p> <p>NOx SLOPE: 1.027</p> <p>NOx OFFS: 1.6</p> <p>NO SLOPE: 1.035</p> <p>NO OFFS: 0.9</p> <p>SAMP FLW: 473 CC/M</p> <p>OZONE FL: 78 CC/M</p> <p>PMT: 13.1 MV</p> <p>NORM PMT: 7.2 MV</p> <p>AZERO: 18.0 MV</p> <p>HVPS: 767 V</p> <p>RCELL TEMP: 50.0 °C</p> <p>BOX TEMP: 35.5 °C</p> <p>PMT TEMP: 6.8 °C</p> <p>IZS TEMP: 41.2 °C</p> <p>MOLY TEMP: 313.9 °C</p> <p>RCEL: 5.3 IN-HG-A</p> <p>SAMP: 26.1 IN-HG-A</p> <p>Expected Value NO: 7</p> <p>Expected Value NO<sub>2</sub>: 473</p> <p>Expected Value NOx: 479</p>
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**Comments:**

The manifold blower was found to be working normally.

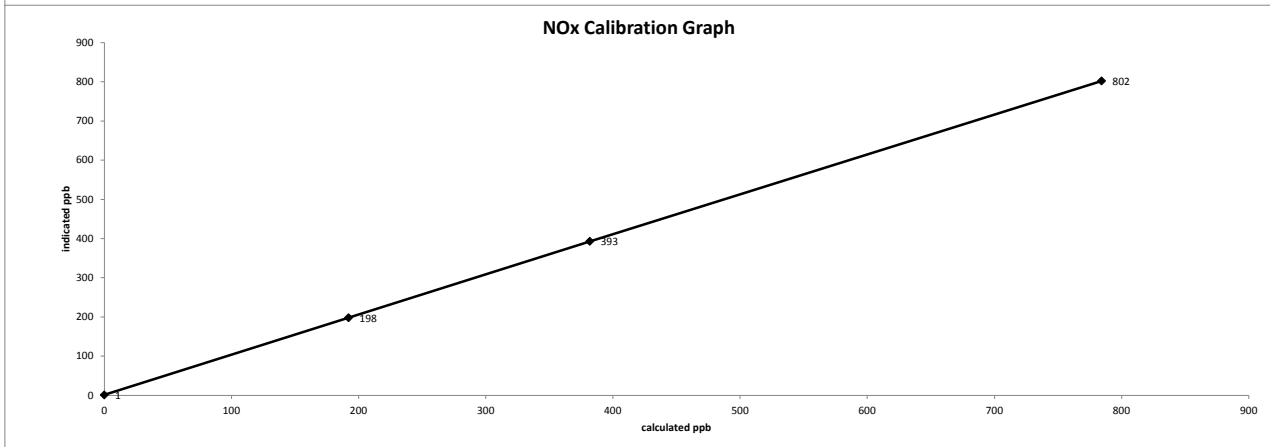
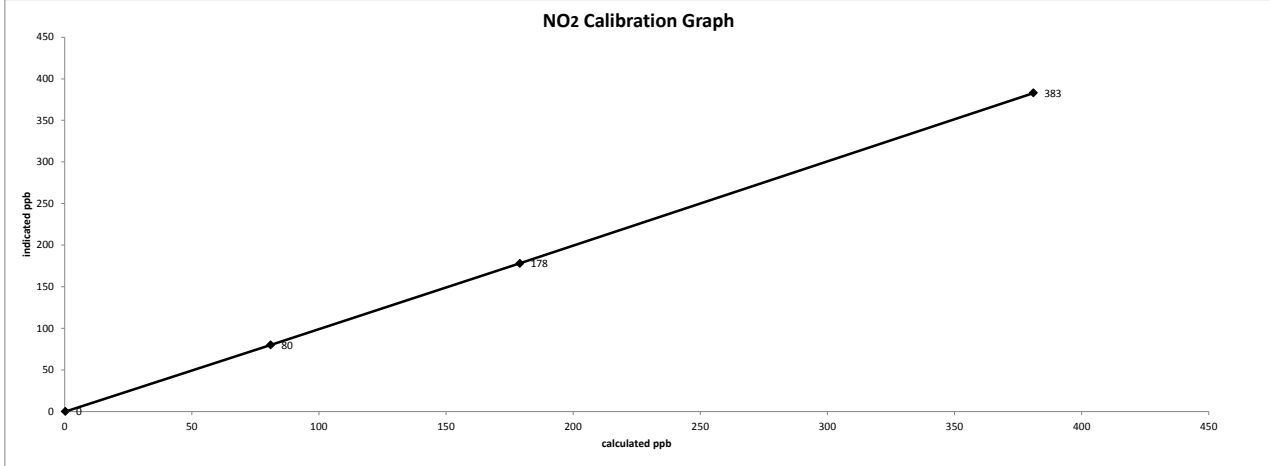
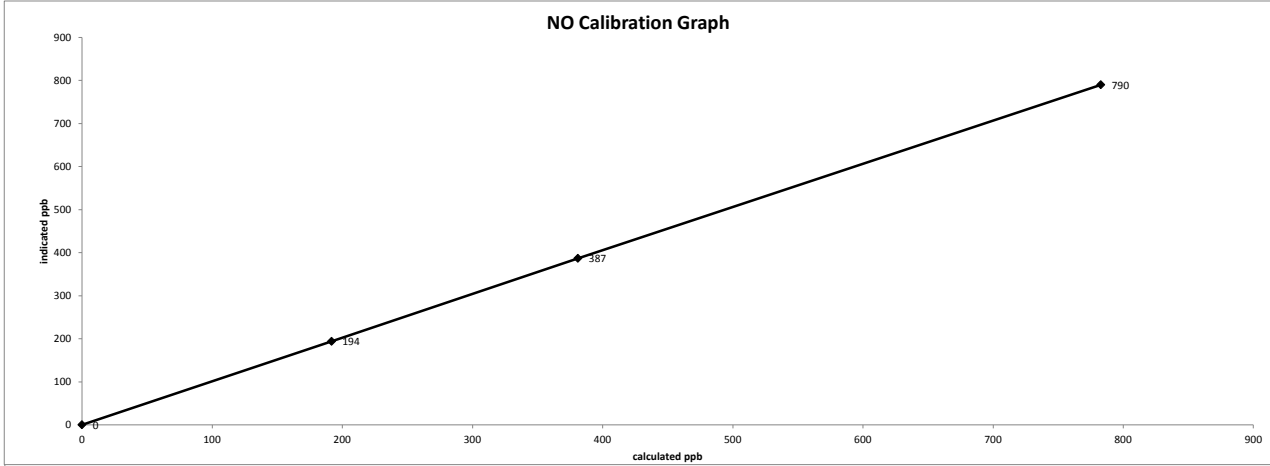
GPT repeated to obtain reference values for Ozone audit

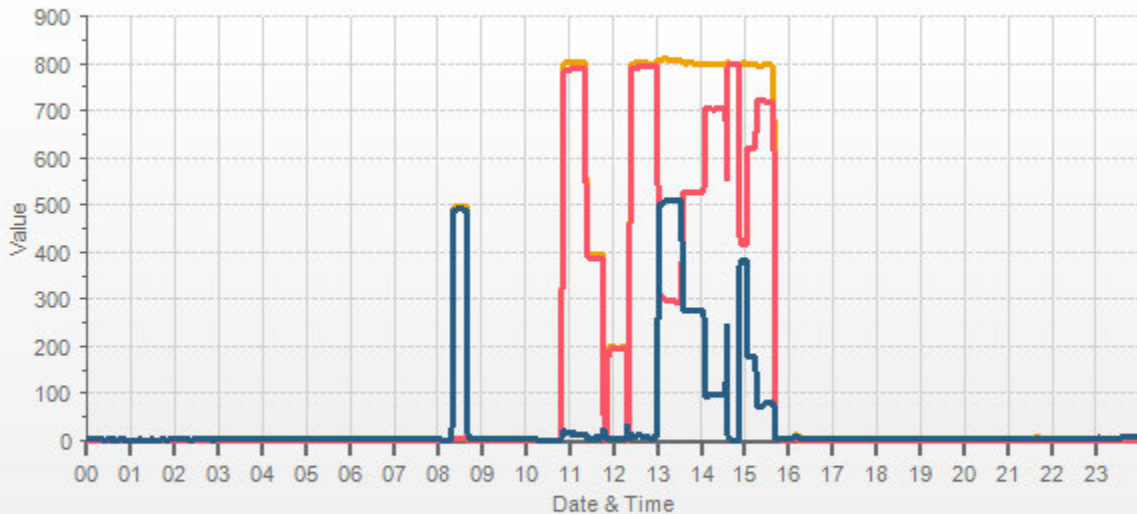
This is an internal audit. Calibration point order is the same as a shutdown verification.

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

Start/End Time 24 hr. (mst): 14:36/ 15:42  
Calibration Purpose: shut down  
Calibration Method: Gas Dilution & Gas Phase Titration

API 200E NO-NO2-NOx Analyzer Calibration





— NOx[ppb] — NO[ppb] — NO2[ppb]



## Thermo 49i Ozone Analyzer Calibration

Date: January 16, 2018	Barometer/B.P./units: Brunton 05535 expires December 15, 2018	27.50	inHg
Company/Airshed: LICA	Thermometer/Station Temp: F.S. 160348895 expires April 8, 2018	25	°C
Location/Station Name: St. Lina	Weather Conditions: Mainly sunny		
Start/End Time 24 hr. (mst): 15:42 / 17:59	Calibration Purpose: shut down		
Ozone Calibration Method: Direct G.P.T.	Performed By/Reviewer: Limin Li	Tom Bourque	
G.P.T. Date: January 16, 2018	Cal Gas Expiry Date: October 24, 2020		

Analyzer: ID# or Serial Number: 10022440371	Ozone Range ppb: 500
Last Calibration Date: January 10, 2018	As Found C.F.: 1.030
Previous Cal High Point C.F.: 1.000	New C.F.: n/a

Calibration Standards:	
Low Flow Meter ID/Expiry Date: Defender Low 152019 expires December 13, 2018	
High Flow Meter ID/Expiry Date: Defender High 148944 expires December 13, 2018	
Calibrator ID/Expiry Date: Sabio id# 17200415 expires May 16, 2018	
Cal Gas Cylinder I.D. #: LL 104222	

Point	AMD Required Range of Ozone Calibration Points
High	300-400 ppb
Mid	150-200 ppb
Low	50-100 ppb

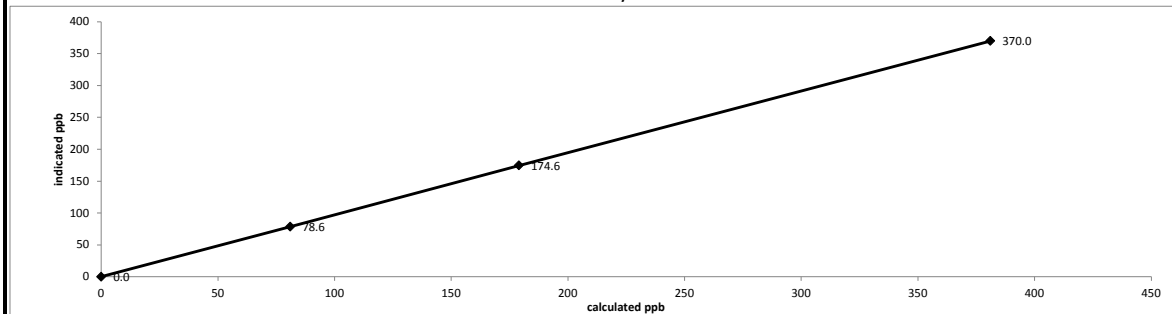
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	4954	4954	0.0	n/a	0.0	n/a
as found high	4954	4954	381.0	381.0	370.0	1.030
mid	4954	4954	179.0	179.0	174.6	1.025
low	4954	4954	81.0	81.0	78.6	1.031
Average C.F.=					1.028	

**Linear Regression/Calibration Results:**

Correlation Coefficient = <u>1.000</u>	LIMITS > or = 0.995
Slope = <u>1.029</u>	0.90-1.10
b (Intercept as % of full scale) = <u>-0.03%</u>	± 3% F.S.
% change in C.F. from last cal = <u>-2.97%</u>	± 10%

Thermo 49i Ozone Analyzer Calibration

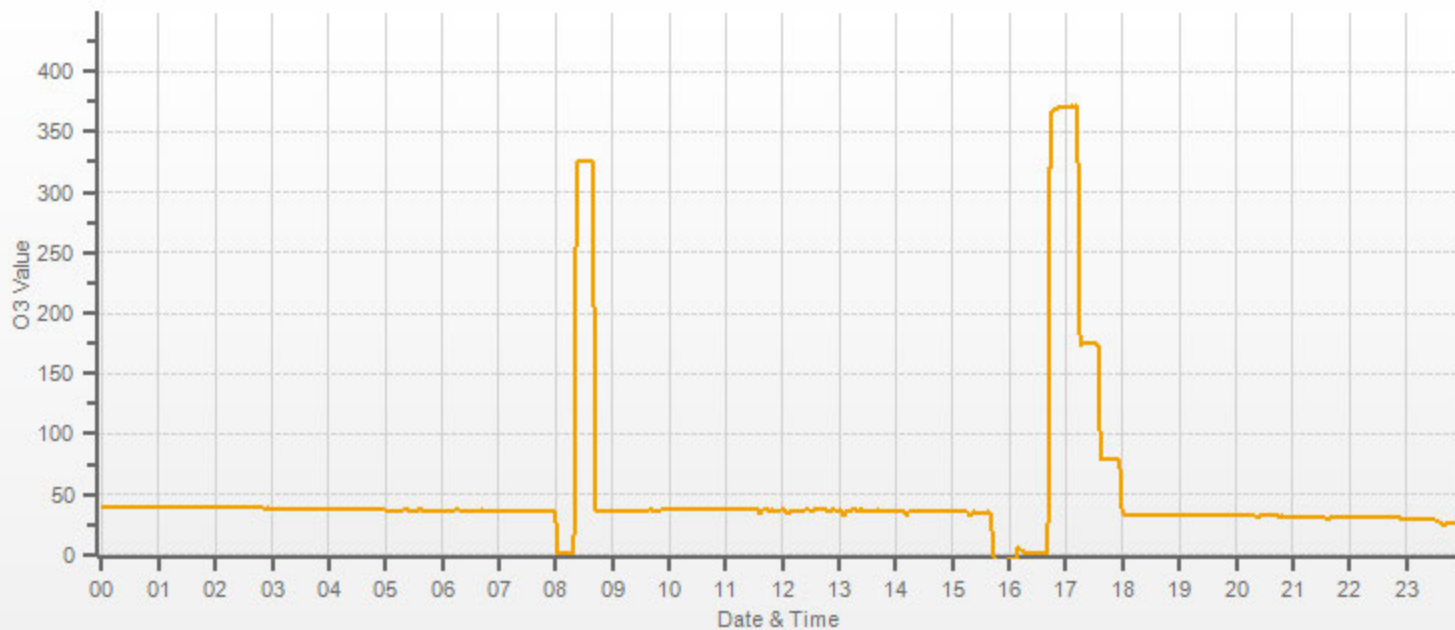


<b>As found:</b> O3 Bkg: <u>-0.1</u> O3 Coef: <u>0.991</u> Photo Lamp: <u>10.7 V</u> O3 Lamp: <u>8.2 V</u> Bench: <u>32.2 °C</u> Bench Lamp: <u>53.7 °C</u> O3 Lamp: <u>67.9 °C</u> Pressure: <u>677.6 MMHG</u> Cell A lpm: <u>0.729 LPM</u> Cell B lpm: <u>0.765 LPM</u> O3 ppb: <u>-2.8</u> Cell A ppb: <u>-2.9</u> Cell B ppb: <u>-3.0</u> Cell A int: <u>79466.0 Hz</u> Cell B int: <u>99513 Hz</u> Expected Value: <u>318.0</u>	<b>As left:</b> O3 Bkg: <u>-0.1</u> O3 Coef: <u>0.991</u> Photo Lamp: <u>10.7 V</u> O3 Lamp: <u>8.2 V</u> Bench: <u>32.2 °C</u> Bench Lamp: <u>53.7 °C</u> O3 Lamp: <u>67.9 °C</u> Pressure: <u>677.6 MMHG</u> Cell A lpm: <u>0.729 LPM</u> Cell B lpm: <u>0.765 LPM</u> O3 ppb: <u>-2.8</u> Cell A ppb: <u>-2.9</u> Cell B ppb: <u>-3.0</u> Cell A int: <u>79466.0 Hz</u> Cell B int: <u>99513 Hz</u> Expected Value: <u>318.0</u>
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**Comments:**

The manifold blower was found to be working normally.

This is an internal audit. Calibration point order is the same as a shutdown verification.



— O3[ppb]

***APPENDIX IV***  
***MAXIMUM INSTANTANEOUS DATA***



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

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	S	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	6	5	3	3	S	1	6	2	24		
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	S	3	2	3	24	
3	3	3	3	3	3	3	3	3	3	3	3	2	2	3	3	3	3	2	2	3	2	S	3	3	2	3	3	24	
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HOURLY MAX	6	5	5	5	5	5	5	5	5	5	5	6	6	6	5	5	5	5	6	7	7	5	5	6					
HOURLY AVG	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3				

STATUS FLAG CODES

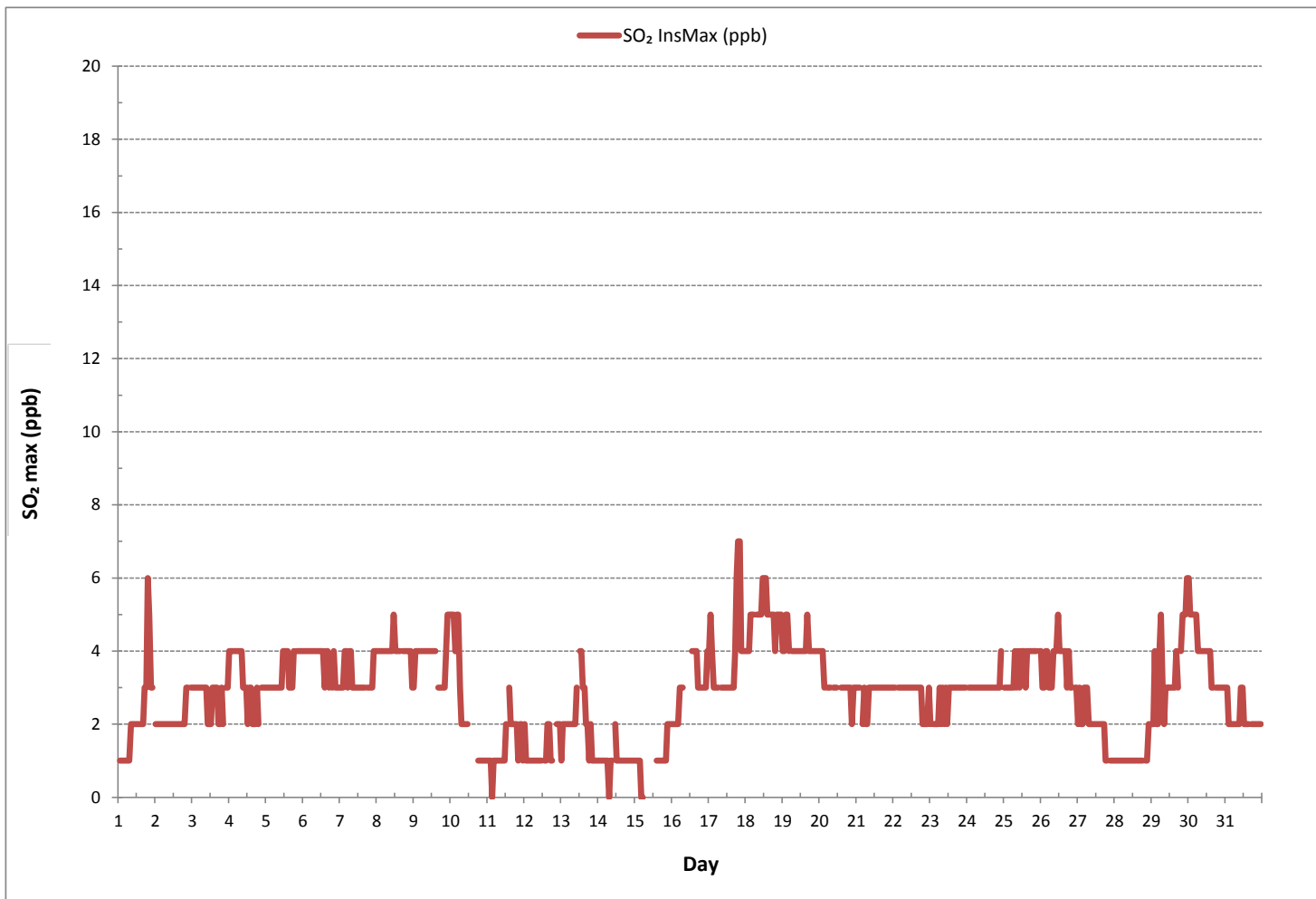
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	688
MAXIMUM INSTANTANEOUS VALUE:	7 ppb @ HOUR 19 ON DAY 17
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	738 hrs
STANDARD DEVIATION:	1

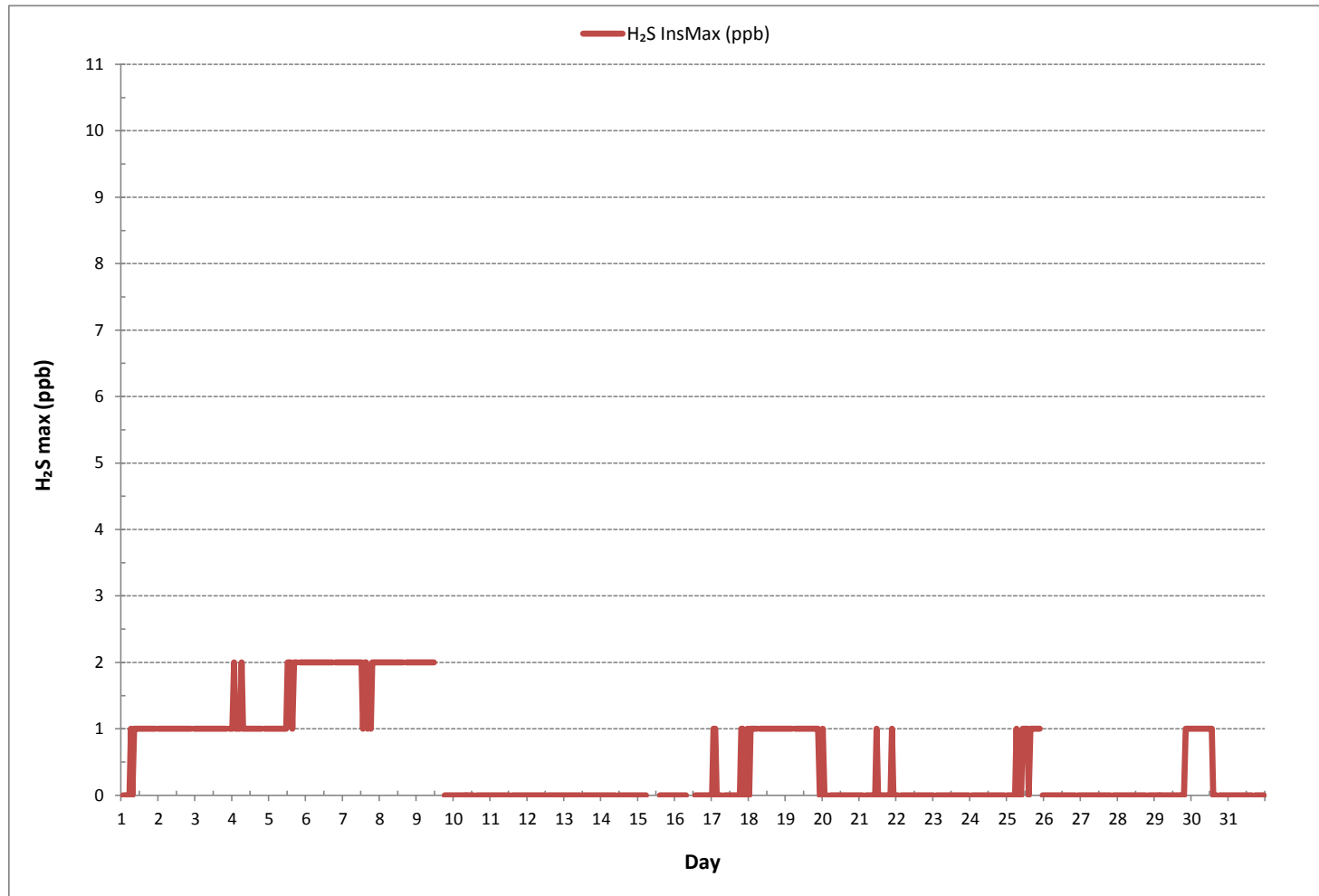


SULPHUR DIOXIDE Instantaneous Maximum (SO<sub>2</sub> ppb)





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





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

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY 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	S	2.58	2.57	2.57	2.60	2.61	2.64	2.64	2.64	2.65	2.66	2.64	2.61	2.62	2.64	2.62	2.66	2.62	2.66	2.64	2.62	2.57	2.54	S	2.54	2.66	2.62	24
2	2.48	2.42	2.42	2.38	2.40	2.39	2.40	2.42	2.47	2.47	2.38	2.42	2.41	2.42	2.41	2.41	2.47	2.56	2.48	2.50	2.50	2.53	S	2.71	2.38	2.71	2.45	24
3	2.61	2.62	2.62	2.64	2.63	2.67	2.72	2.72	2.75	2.55	2.51	2.50	2.58	2.68	2.55	2.62	2.72	2.76	2.77	2.74	2.71	S	2.75	2.86	2.50	2.86	2.66	24
4	2.86	2.86	2.88	2.83	2.81	2.84	2.86	3.01	3.36	2.97	2.93	3.64	3.19	3.30	4.05	4.06	3.89	3.63	3.44	3.51	S	3.48	3.40	3.06	2.81	4.06	3.25	24
5	3.11	3.22	2.93	3.18	3.09	2.96	2.98	2.89	2.90	2.86	2.81	2.81	2.79	2.75	2.80	2.79	2.73	2.71	2.71	S	2.81	2.75	2.78	2.79	2.71	3.22	2.88	24
6	2.81	2.78	2.76	2.77	2.75	2.76	2.77	2.89	2.74	2.79	2.71	2.59	2.50	2.36	2.50	2.51	2.36	S	2.33	2.48	2.36	2.40	2.42	2.40	2.30	2.89	2.59	24
7	2.33	2.33	2.37	2.35	2.36	2.37	2.39	2.33	2.34	2.33	2.36	2.33	2.35	2.31	2.30	2.35	S	2.33	2.48	2.36	2.40	2.42	2.40	2.40	2.30	2.89	2.59	24
8	2.41	2.44	2.76	2.50	2.45	2.41	2.55	2.70	2.90	2.99	2.94	2.80	2.66	2.63	2.66	2.64	S	2.59	2.60	2.81	2.90	2.62	2.37	2.41	2.37	2.99	2.64	24
9	2.41	2.40	2.38	2.37	2.37	2.36	2.37	2.37	2.45	2.45	2.37	2.42	C	C	C	C	C	2.31	2.28	2.31	2.31	2.33	2.33	2.35	2.28	2.45	2.37	24
10	2.37	2.36	2.36	2.35	2.36	2.37	2.36	2.35	2.35	2.40	2.35	2.36	2.39	S	2.38	2.37	2.36	2.40	2.37	2.37	2.39	2.39	2.40	2.40	2.35	2.40	2.37	24
11	2.37	2.40	2.41	2.41	2.40	2.45	2.46	2.45	2.46	2.44	2.44	2.48	2.46	S	2.42	2.44	2.49	2.50	2.48	2.45	2.44	2.49	2.49	2.47	2.37	2.50	2.45	24
12	2.49	2.50	2.53	2.55	2.54	2.58	2.57	2.61	2.55	2.58	2.59	2.57	S	2.55	2.55	2.54	2.71	3.09	3.09	2.92	2.68	2.54	2.49	2.49	2.49	3.09	2.62	24
13	2.49	2.49	2.48	2.50	2.50	2.47	2.49	2.54	2.55	2.55	2.60	S	2.70	2.68	2.75	2.72	2.54	2.50	2.40	2.43	2.44	2.45	2.43	2.44	2.40	2.75	2.53	24
14	2.42	2.45	2.41	2.43	2.42	2.41	2.43	2.42	2.46	2.47	S	2.50	2.51	2.49	2.50	2.53	2.54	2.80	2.64	2.63	2.63	2.67	2.55	2.66	2.41	2.80	2.52	24
15	2.50	2.53	2.54	2.61	2.67	2.81	P	P	P	P	P	R	P	S	2.42	2.42	2.49	2.52	2.56	2.54	2.44	2.41	2.40	2.37	2.37	2.81	2.51	17
16	2.37	2.36	2.36	2.40	2.39	2.40	2.35	S	S	2.37	2.40	2.36	Q	Q	Q	2.35	2.36	2.37	2.38	2.35	2.35	2.33	2.39	2.41	2.33	2.41	2.37	24
17	2.51	2.68	2.60	2.46	2.41	2.30	2.19	S	2.19	2.21	2.19	2.21	2.21	2.19	2.18	2.23	2.25	2.24	2.31	2.33	2.37	2.33	2.30	2.32	2.18	2.68	2.31	24
18	2.29	2.36	2.54	2.56	2.56	2.54	S	2.40	2.37	2.35	2.36	2.33	2.33	2.28	2.30	2.30	2.31	2.33	2.36	2.33	2.31	2.30	2.24	2.14	2.14	2.56	2.36	24
19	2.11	2.13	2.13	2.13	2.11	S	2.11	2.15	2.15	2.18	2.17	2.17	2.14	2.15	2.14	2.13	2.13	2.11	2.15	2.14	2.11	2.14	2.13	2.14	2.11	2.18	2.14	24
20	2.14	2.14	2.14	2.14	S	2.14	2.18	2.18	2.19	2.19	2.18	2.18	2.19	2.24	2.22	2.26	2.28	2.30	2.33	2.35	2.32	2.36	2.35	2.36	2.14	2.36	2.23	24
21	2.37	2.40	2.40	S	2.39	2.41	2.40	2.58	2.59	2.49	2.50	2.53	2.48	2.48	2.49	2.52	2.58	2.52	2.57	2.58	2.57	2.42	2.46	2.42	2.37	2.59	2.48	24
22	2.46	2.45	S	2.48	2.48	2.45	2.49	2.49	2.51	2.49	2.50	2.46	2.46	2.50	2.47	2.57	2.53	2.54	2.48	2.48	2.46	2.47	2.47	2.46	2.45	2.57	2.49	24
23	2.46	S	2.55	2.60	2.64	2.67	2.68	2.70	2.75	2.79	2.83	2.85	2.76	2.75	2.68	2.70	3.04	3.04	2.83	2.73	2.76	2.96	3.02	3.11	2.46	3.11	2.78	24
24	S	3.07	3.01	2.96	2.81	2.68	2.58	2.55	2.55	2.50	2.48	2.48	2.46	2.47	2.46	2.49	2.49	2.50	2.45	2.48	2.46	2.44	2.44	S	2.44	3.07	2.58	24
25	2.40	2.41	2.41	2.35	2.37	2.35	2.36	2.40	2.44	2.40	2.42	2.42	2.50	2.41	2.41	2.38	2.43	2.50	2.49	2.55	2.60	2.53	S	2.49	2.35	2.60	2.44	24
26	2.35	2.33	2.36	2.34	2.35	2.33	2.36	2.40	2.46	2.45	2.40	2.40	2.42	2.39	2.41	2.41	2.44	2.42	2.45	2.44	2.42	S	2.46	2.46	2.33	2.46	2.40	24
27	2.41	2.44	2.45	2.46	2.46	2.48	2.49	2.49	2.54	2.56	2.56	2.56	2.54	2.54	2.55	2.53	2.56	2.55	2.50	2.48	S	2.55	2.71	2.71	2.41	2.71	2.53	24
28	2.59	2.55	2.59	2.60	2.60	2.55	2.50	2.49	2.49	2.53	2.53	2.53	2.51	2.53	2.51	2.54	2.53	2.55	2.56	S	2.60	2.70	2.94	3.05	2.49	3.05	2.59	24
29	3.36	3.57	3.64	3.36	3.42	3.32	3.29	3.12	2.90	2.83	2.72	2.66	2.60	2.60	2.58	2.58	2.58	2.57	S	2.58	2.53	2.53	2.53	2.50	2.50	3.64	2.89	24
30	2.50	2.44	2.41	2.42	2.50	2.53	2.54	2.56	2.58	2.55	2.48	2.48	2.48	2.48	2.44	2.46	2.42	S	2.46	2.46	2.42	2.42	2.41	2.42	2.41	2.58	2.47	24
31	2.40	2.39	2.37	2.40	2.41	2.42	2.42	2.42	2.45	2.42	2.44	2.45	2.44	2.42	2.44	2.43	S	2.44	2.41	2.43	2.43	2.42	2.46	2.42	2.37	2.46	2.42	24
HOURLY MAX	3.36	3.57	3.64	3.36	3.42	3.32	3.29	3.12	3.36	2.99	2.94	3.64	3.19	3.30	4.05	4.06	3.89	3.63	3.44	3.51	2.90	3.48	3.40	3.11				
HOURLY AVG	2.50	2.54	2.55	2.54	2.54	2.53	2.51	2.54	2.56	2.52	2.51	2.53	2.51	2.51	2.53	2.53	2.55	2.56	2.54	2.53	2.49	2.51	2.52	2.52				

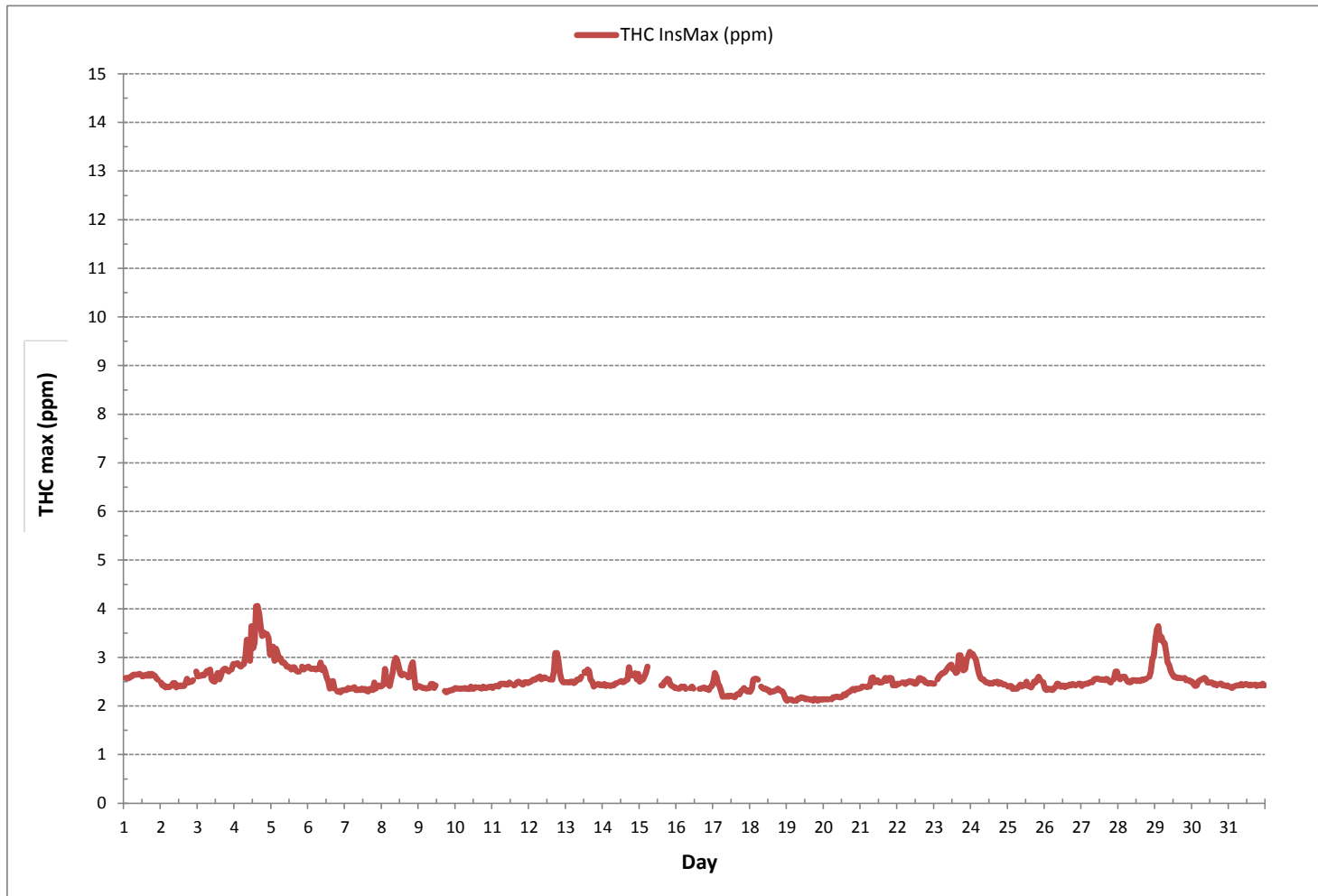
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	696
MAXIMUM INSTANTANEOUS VALUE:	4.06 ppm @ HOUR 15 ON DAY 4
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	737 hrs
STANDARD DEVIATION:	0.26

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)





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

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	S	4	4	4	4	5	5	6	5	6	7	7	7	7	8	9	9	9	10	14	14	10	5	S	4	14	7	24	
2	4	3	2	2	2	2	2	2	2	1	3	5	2	3	4	3	3	4	3	7	7	10	S	10	1	10	4	24	
3	10	12	12	11	13	14	14	15	16	10	24	5	7	10	9	11	12	13	12	11	11	S	13	19	5	24	12	24	
4	23	22	22	22	18	18	19	24	22	19	21	18	13	13	15	17	15	17	16	12	S	11	10	9	9	24	17	24	
5	9	9	9	9	9	9	10	9	9	9	9	9	9	9	9	8	8	8	S	9	8	8	8	8	8	10	9	24	
6	8	8	8	8	8	8	7	7	8	10	11	10	9	7	5	6	6	5	S	3	2	2	2	2	2	11	7	24	
7	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	S	3	3	4	8	4	5	2	8	3	24	
8	5	5	5	5	5	4	5	6	8	10	9	8	7	7	7	8	S	6	6	10	13	7	4	4	4	13	7	24	
9	4	3	3	3	2	3	2	3	4	6	3	3	3	4	2	S	3	3	2	4	4	3	3	4	2	6	3	24	
10	4	4	4	4	3	4	3	2	2	3	2	2	C	C	C	C	C	C	C	C	C	4	2	2	2	2	4	3	24
11	2	2	2	2	2	2	5	3	3	2	4	28	8	S	6	6	59	13	11	27	36	11	9	8	2	59	11	24	
12	42	8	8	8	8	8	8	9	8	11	8	8	S	7	7	Y	Y	Y	13	10	7	5	5	4	4	4	4	21	
13	4	4	4	5	5	5	5	6	7	7	10	S	16	20	22	22	13	10	5	6	6	6	6	4	4	4	22	9	24
14	4	4	4	3	3	3	3	2	3	3	S	6	7	5	6	6	7	8	6	7	6	6	5	4	2	8	5	24	
15	5	5	5	6	6	7	P	P	P	P	P	5	P	S	3	3	4	5	4	4	3	3	3	3	3	7	4	18	
16	3	3	3	3	3	4	3	4	S	4	Q	Q	Q	Q	Q	Q	12	7	6	6	6	8	6	9	3	12	5	24	
17	25	36	31	16	11	7	4	S	3	3	3	11	3	3	4	4	5	6	11	12	11	11	5	4	3	36	10	24	
18	4	5	6	7	6	6	S	6	29	9	14	8	10	9	9	8	8	8	8	8	7	6	6	3	3	29	8	24	
19	2	2	2	3	2	S	3	3	4	3	2	3	3	2	4	2	4	2	2	2	2	2	2	2	2	4	3	24	
20	2	1	2	2	S	2	2	2	6	6	2	3	1	9	2	3	2	2	3	3	4	3	2	2	1	9	3	24	
21	2	2	2	S	3	2	2	3	3	3	3	4	5	5	5	6	4	4	4	3	3	3	3	3	2	6	3	24	
22	3	4	S	4	4	5	5	8	5	5	5	4	5	4	5	4	5	4	4	4	4	4	5	3	3	8	4	24	
23	3	S	4	5	5	8	9	11	11	54	20	20	17	18	18	16	21	20	18	15	12	14	15	15	3	54	15	24	
24	S	14	11	10	8	6	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	S	4	14	5	24	
25	4	4	4	3	3	3	3	3	3	5	5	5	6	6	5	5	7	9	10	9	11	12	10	S	9	3	12	6	24
26	4	2	4	4	3	2	3	6	7	7	17	9	6	7	5	5	6	7	5	5	S	6	5	2	17	6	24		
27	5	5	4	4	6	6	5	5	7	8	8	7	7	7	8	5	5	5	3	3	S	4	4	4	3	8	5	24	
28	5	5	5	5	4	4	4	4	4	5	5	4	5	6	5	5	4	5	6	S	7	7	8	9	4	9	5	24	
29	14	15	16	10	9	9	8	7	6	6	6	5	6	6	6	6	6	7	7	S	7	7	7	7	6	5	16	8	24
30	6	5	5	5	6	5	5	4	4	5	4	4	4	4	4	4	5	S	4	3	3	3	2	2	2	6	4	24	
31	2	2	2	2	2	3	2	2	3	2	4	4	3	3	4	3	S	3	3	3	3	2	3	3	2	4	3	24	
HOURLY MAX	42	36	31	22	18	18	19	24	29	54	24	28	17	20	22	22	59	20	18	27	36	14	15	19					
HOURLY AVG	7	7	7	6	6	6	5	6	7	8	8	7	6	7	7	7	9	7	7	7	7	7	6	5	6				

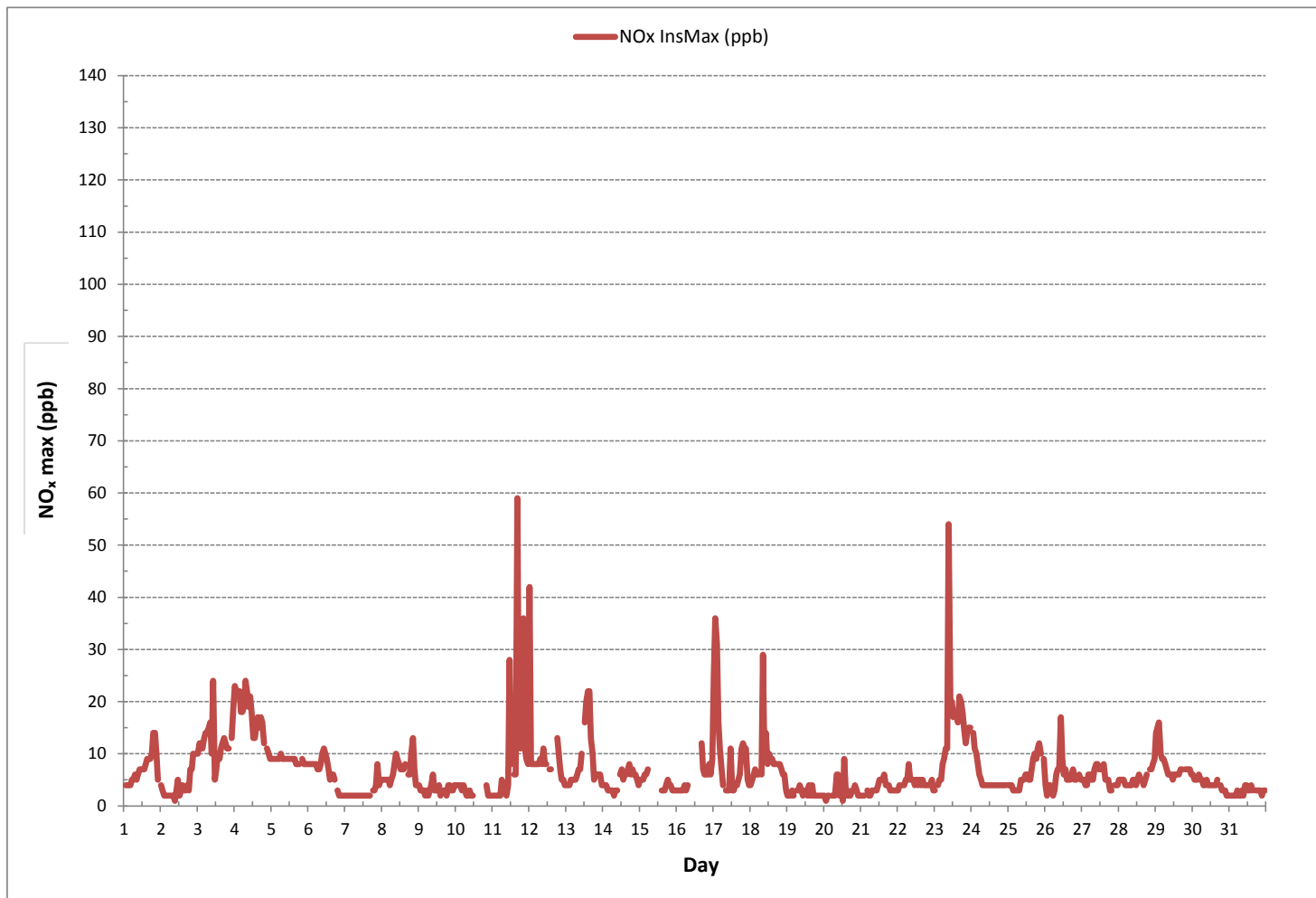
STATUS FLAG CODES

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:	689
MAXIMUM INSTANTANEOUS VALUE:	59 ppb @ HOUR 16 ON DAY 11
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	735 hrs
STANDARD DEVIATION:	6

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





NITRIC OXIDE Instantaneous Maximum (NO ppb)

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

STATUS FLAG CODES

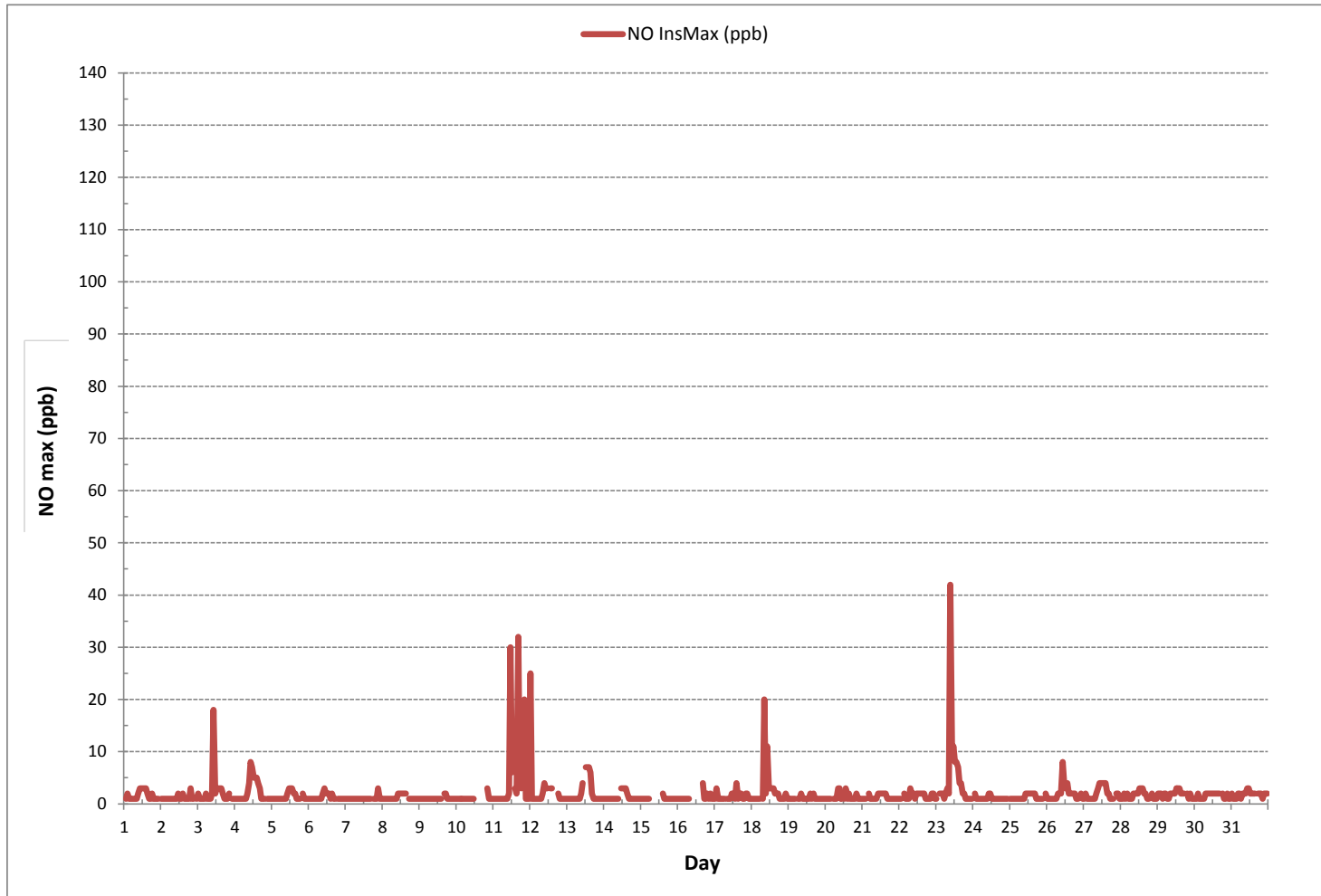
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	689
MAXIMUM INSTANTANEOUS VALUE:	42 ppb @ HOUR 9 ON DAY 23
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	3
OPERATIONAL TIME:	735 hrs



NITRIC OXIDE Instantaneous Maximum (NO ppb)





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

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	S	4	4	5	5	5	5	6	6	6	6	5	5	5	6	9	9	9	9	14	15	10	6	S	4	15	7	24	
2	4	3	3	2	2	2	2	2	2	2	2	4	2	3	3	3	3	4	4	5	7	10	S	10	2	10	4	24	
3	9	12	12	12	14	14	14	15	16	10	13	5	6	8	7	10	11	13	12	12	10	S	13	19	5	19	12	24	
4	23	23	22	22	19	18	19	24	22	18	14	13	9	9	11	14	13	17	16	13	S	11	11	10	9	24	16	24	
5	9	9	10	10	10	10	10	10	9	9	8	8	8	8	8	9	9	9	8	S	8	8	8	8	8	10	9	24	
6	8	8	8	8	8	8	8	8	8	9	10	10	9	7	5	7	7	5	S	3	3	3	2	3	2	10	7	24	
7	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	3	S	3	4	5	6	4	5	2	6	3	24	
8	5	5	6	5	5	5	6	6	9	9	9	7	6	6	6	7	S	6	6	10	13	8	4	4	4	13	7	24	
9	4	4	4	3	3	3	3	3	5	6	3	3	3	3	2	S	3	2	2	4	4	4	4	4	2	6	3	24	
10	4	4	5	4	4	4	3	3	2	3	3	2	C	C	C	C	C	C	C	C	C	3	2	3	2	2	5	3	24
11	2	2	3	3	2	3	5	4	3	3	3	4	6	S	5	5	34	10	9	13	18	11	10	8	2	34	7	24	
12	20	8	9	8	8	9	9	10	8	8	6	6	S	6	6	Y	Y	Y	13	10	8	6	5	5	5	20	8	21	
13	4	4	5	5	5	5	6	6	7	7	7	S	10	13	17	17	13	11	6	6	7	7	6	5	4	17	8	24	
14	5	5	4	4	3	3	3	3	3	S	5	5	4	5	6	7	8	7	7	7	7	6	5	5	3	8	5	24	
15	5	5	5	6	6	7	P	P	P	P	P	4	P	S	3	3	3	5	4	4	4	4	3	3	3	7	4	18	
16	3	3	3	3	4	4	4	4	S	4	Q	Q	Q	Q	Q	Q	9	7	6	6	6	6	7	7	9	3	9	5	24
17	24	35	31	15	12	7	5	S	3	3	3	10	3	2	4	4	4	6	11	13	10	11	6	5	2	35	10	24	
18	5	5	6	7	6	6	S	6	12	8	6	7	8	8	7	7	8	8	8	8	8	7	6	5	3	12	7	24	
19	3	3	3	3	3	S	3	3	3	3	3	3	3	2	3	2	3	2	2	2	2	2	2	2	2	3	3	24	
20	2	2	2	2	S	2	2	2	4	3	2	2	2	6	2	2	3	3	3	3	3	3	3	3	3	2	6	3	24
21	2	3	3	S	3	3	2	3	3	3	3	3	4	4	5	5	4	4	4	4	4	3	4	4	2	5	3	24	
22	4	4	S	4	4	5	5	6	5	5	5	4	4	4	5	5	5	5	4	4	4	4	4	4	4	6	4	24	
23	4	S	4	5	5	8	9	10	11	17	12	12	11	11	12	14	18	20	18	15	13	14	15	16	4	20	12	24	
24	S	13	11	10	9	6	5	5	5	5	4	4	4	4	5	5	5	5	4	4	4	4	4	S	4	13	6	24	
25	4	4	4	3	3	3	3	4	5	4	5	5	5	5	4	6	9	10	10	11	12	10	S	8	3	12	6	24	
26	4	3	5	4	4	3	3	5	7	7	11	6	5	5	5	5	6	6	7	6	5	S	5	5	3	11	5	24	
27	5	5	4	5	6	6	6	5	7	7	7	5	5	5	6	5	6	6	4	3	S	4	4	4	3	7	5	24	
28	6	5	5	5	5	5	4	4	4	4	4	4	4	5	4	4	4	5	6	S	7	7	9	9	4	9	5	24	
29	14	15	16	10	9	9	8	7	6	6	5	4	5	5	5	6	6	7	S	7	7	7	7	6	4	16	8	24	
30	7	6	5	6	6	6	5	4	4	4	4	4	4	3	3	4	4	S	4	4	4	3	3	2	2	7	4	24	
31	2	2	2	2	2	2	2	2	3	2	3	3	3	3	3	3	S	3	3	3	3	3	3	3	3	2	3	3	24
HOURLY MAX	24	35	31	22	19	18	19	24	22	18	14	13	11	13	17	17	34	20	18	15	18	14	15	19					
HOURLY AVG	7	7	7	6	6	6	6	6	6	6	6	5	5	5	5	6	8	7	7	7	7	6	6	6					

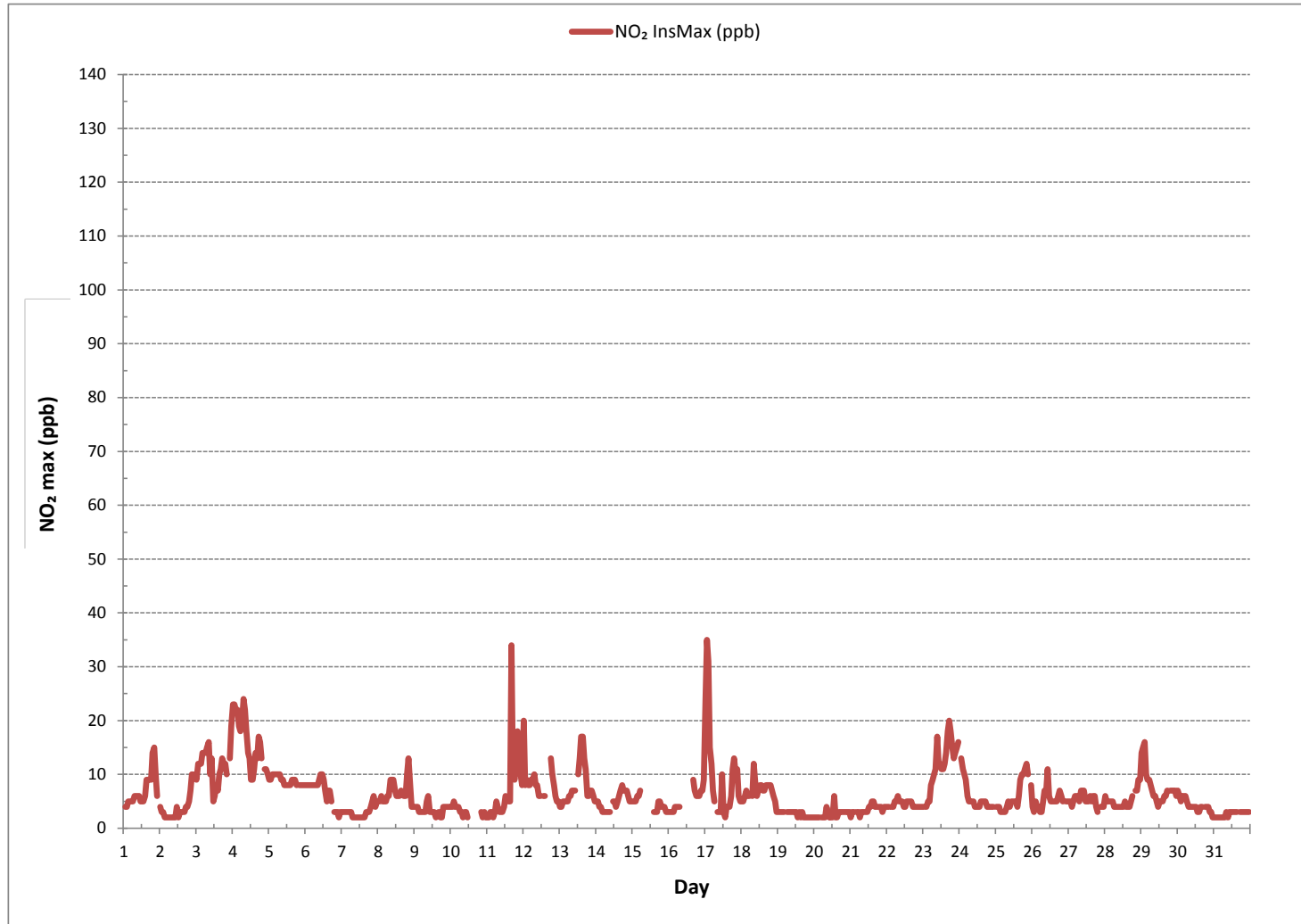
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	689
MAXIMUM INSTANTANEOUS VALUE:	35 ppb @ HOUR 1 ON DAY 17
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	8 hrs
OPERATIONAL TIME:	735 hrs
STANDARD DEVIATION:	4

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





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

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	S	31.1	30.8	30.3	29.7	28.8	27.8	26.8	26.6	26.6	27.1	27.8	28.6	29.1	28.5	27.3	25.4	25.6	25.5	25.5	27.8	32.4	33.6	S	25.4	33.6	28.3	24	
2	36.0	36.6	36.9	36.9	36.7	36.5	36.3	36.6	36.7	36.7	36.7	36.5	36.6	36.0	36.3	36.1	35.3	33.2	32.2	31.0	28.6	26.5	S	23.9	23.9	36.9	34.6	24	
3	23.0	21.3	19.4	19.5	18.1	16.9	16.4	16.2	24.3	29.6	32.1	33.5	30.5	29.4	27.8	27.6	23.0	19.6	19.1	19.6	20.6	S	20.1	16.3	16.2	33.5	22.8	24	
4	10.3	8.9	9.6	10.6	12.6	12.3	12.9	12.9	10.0	14.6	17.4	18.3	14.7	15.6	15.1	13.8	10.7	10.3	12.1	12.4	S	17.3	17.1	18.3	8.9	18.3	13.4	24	
5	18.6	18.4	18.3	17.0	16.4	16.5	16.1	17.4	17.5	18.5	19.0	20.1	20.9	21.7	21.7	22.9	24.6	24.7	23.7	S	20.8	21.4	21.4	20.2	16.1	24.7	19.9	24	
6	19.6	19.4	18.9	18.4	17.9	17.9	17.5	16.7	16.4	15.6	16.8	19.7	26.0	32.7	34.3	30.6	32.7	35.6	S	36.3	38.0	39.9	40.2	39.3	15.6	40.2	26.1	24	
7	39.2	38.3	38.0	37.9	38.3	38.1	37.7	37.6	37.9	38.3	37.6	38.1	38.1	38.9	39.0	39.2	38.3	S	37.3	37.2	34.7	34.7	33.2	32.9	32.9	39.2	37.4	24	
8	32.4	34.7	34.1	28.8	30.6	32.5	31.5	29.8	28.4	26.1	29.6	32.3	32.4	32.6	31.3	30.0	S	30.0	29.3	28.8	23.6	25.5	25.6	27.3	23.6	34.7	29.9	24	
9	27.8	28.5	28.8	29.8	30.0	29.6	29.4	29.8	29.6	31.1	32.1	32.2	31.8	33.8	34.7	S	35.4	35.7	35.7	35.3	30.9	31.2	31.3	31.7	27.8	35.7	31.6	24	
10	33.1	33.2	33.5	34.2	34.2	34.2	35.1	35.2	35.1	35.0	35.1	35.1	Y	Y	Y	Y	Y	Y	X	X	X	X	X	X	33.1	35.2	34.4	12	
11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	33.0	33.8	33.5	7	
12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	C	C	C	C	C	C	33.0	33.8	33.5	7	
13	33.4	33.1	33.1	33.1	32.4	31.8	30.9	29.7	28.1	27.2	26.1	S	23.7	25.8	25.6	28.6	31.5	35.1	34.7	32.2	31.4	30.3	33.0	33.0	23.7	35.1	30.6	24	
14	34.2	32.7	34.7	33.5	34.1	35.0	34.9	33.5	32.6	32.6	S	30.8	32.1	32.3	32.3	32.9	30.9	29.7	29.8	30.0	30.8	31.2	32.6	33.8	29.7	35.0	32.5	24	
15	33.6	32.6	31.9	30.8	28.9	28.5	P	P	P	P	P	36.0	P	S	38.9	39.6	39.6	38.1	36.0	36.6	37.2	37.6	37.9	38.5	28.5	39.6	35.4	18	
16	38.8	39.0	38.8	38.0	37.3	36.4	36.3	36.1	S	36.6	37.2	37.0	36.7	36.6	36.3	Q	Q	Q	35.7	32.5	32.2	31.4	31.0	29.6	29.6	39.0	35.7	24	
17	25.1	10.8	17.5	20.8	25.6	33.9	38.1	S	38.2	35.4	36.6	37.1	38.6	39.7	40.1	39.4	39.3	38.7	34.3	30.3	31.3	33.5	36.6	37.9	10.8	40.1	33.0	24	
18	37.0	37.1	35.3	33.8	32.6	32.4	S	31.7	31.5	31.3	31.9	31.9	30.9	32.2	33.6	32.7	31.6	32.6	31.3	29.6	32.6	32.7	37.6	40.7	29.6	40.7	33.2	24	
19	40.5	39.7	40.0	39.7	39.0	S	38.3	37.7	37.2	37.7	38.4	38.7	38.9	39.1	39.0	39.1	39.0	38.8	38.8	39.3	39.2	38.4	37.3	35.3	35.3	40.5	38.7	24	
20	33.1	31.4	32.2	31.3	S	29.7	28.8	28.5	S1	32.7	33.5	35.7	S1	S1	37.7	37.2	37.1	36.7	36.2	36.0	36.6	36.4	36.1	28.5	37.7	34.2	21		
21	35.6	35.1	34.4	S	32.2	32.4	32.1	31.5	33.7	34.4	36.3	34.1	33.8	32.2	31.5	34.4	35.2	35.6	35.3	35.7	35.5	35.6	35.0	33.7	31.5	36.3	34.1	24	
22	33.5	32.6	S	31.9	31.1	29.6	27.2	25.9	25.6	26.2	28.1	29.3	27.9	28.0	26.6	28.1	28.1	29.3	29.4	30.0	30.0	29.9	30.1	29.6	25.6	33.5	29.0	24	
23	29.6	S	26.9	25.1	23.3	21.5	16.8	16.4	14.4	14.8	14.7	18.3	20.0	23.5	27.4	28.8	25.4	17.7	18.5	15.3	17.0	16.1	13.6	12.6	12.6	29.6	19.9	24	
24	S	16.9	19.1	20.6	24.4	27.7	29.5	30.4	31.4	31.7	31.7	31.7	31.3	31.2	31.2	31.0	30.6	30.0	29.6	29.4	29.2	28.8	28.2	S	16.9	31.7	28.4	24	
25	28.1	27.6	27.4	27.6	27.7	27.2	26.9	26.5	25.9	25.6	25.5	25.9	26.0	26.0	26.5	26.6	21.8	19.3	18.2	16.9	16.4	18.2	S	22.9	16.4	28.1	24.4	24	
26	23.8	24.1	23.5	22.7	25.7	26.8	26.8	25.4	21.5	23.0	24.2	23.5	23.9	24.2	24.2	24.2	23.9	23.8	23.0	23.1	23.1	S	22.5	22.5	21.5	26.8	23.9	24	
27	22.6	22.6	22.9	22.9	21.7	20.0	20.0	20.2	19.6	20.0	21.1	22.1	23.4	23.9	24.3	24.7	24.8	27.3	28.0	28.4	S	27.7	26.5	26.0	19.6	28.4	23.5	24	
28	25.5	24.6	24.1	23.9	23.7	23.4	20.6	21.1	21.8	22.1	22.2	22.5	22.6	22.6	22.5	22.1	21.8	20.8	19.6	S	18.3	17.7	17.9	18.2	17.7	25.5	21.7	24	
29	18.1	15.0	19.1	20.1	20.9	23.1	25.0	26.4	27.4	28.5	28.5	29.1	29.6	29.3	28.0	26.6	25.9	25.0	S	24.0	23.5	22.9	23.0	22.9	15.0	29.6	24.4	24	
30	23.2	23.8	23.8	23.4	22.5	22.7	24.3	24.3	23.2	22.1	22.5	21.8	22.1	22.6	23.0	23.0	23.0	S	23.0	23.4	24.9	26.5	27.4	30.8	21.8	30.8	23.8	24	
31	30.6	31.2	30.9	31.5	31.5	32.4	32.5	31.9	31.7	32.7	33.5	34.0	34.3	35.0	35.3	35.4	S	34.7	35.0	35.3	35.1	35.1	35.2	35.4	30.6	35.4	33.5	24	
HOURLY MAX	40.5	39.7	40.0	39.7	39.0	38.1	38.3	37.7	38.2	38.3	38.4	38.7	38.9	39.7	40.1	39.6	39.6	38.8	38.8	39.3	39.2	39.9	40.2	40.7					
HOURLY AVG	29.1	27.9	28.0	27.6	27.8	27.8	27.8	27.3	27.2	28.1	28.7	29.8	29.1	29.8	30.5	30.1	29.4	29.1	28.9	29.0	28.8	29.3	29.6	29.0					

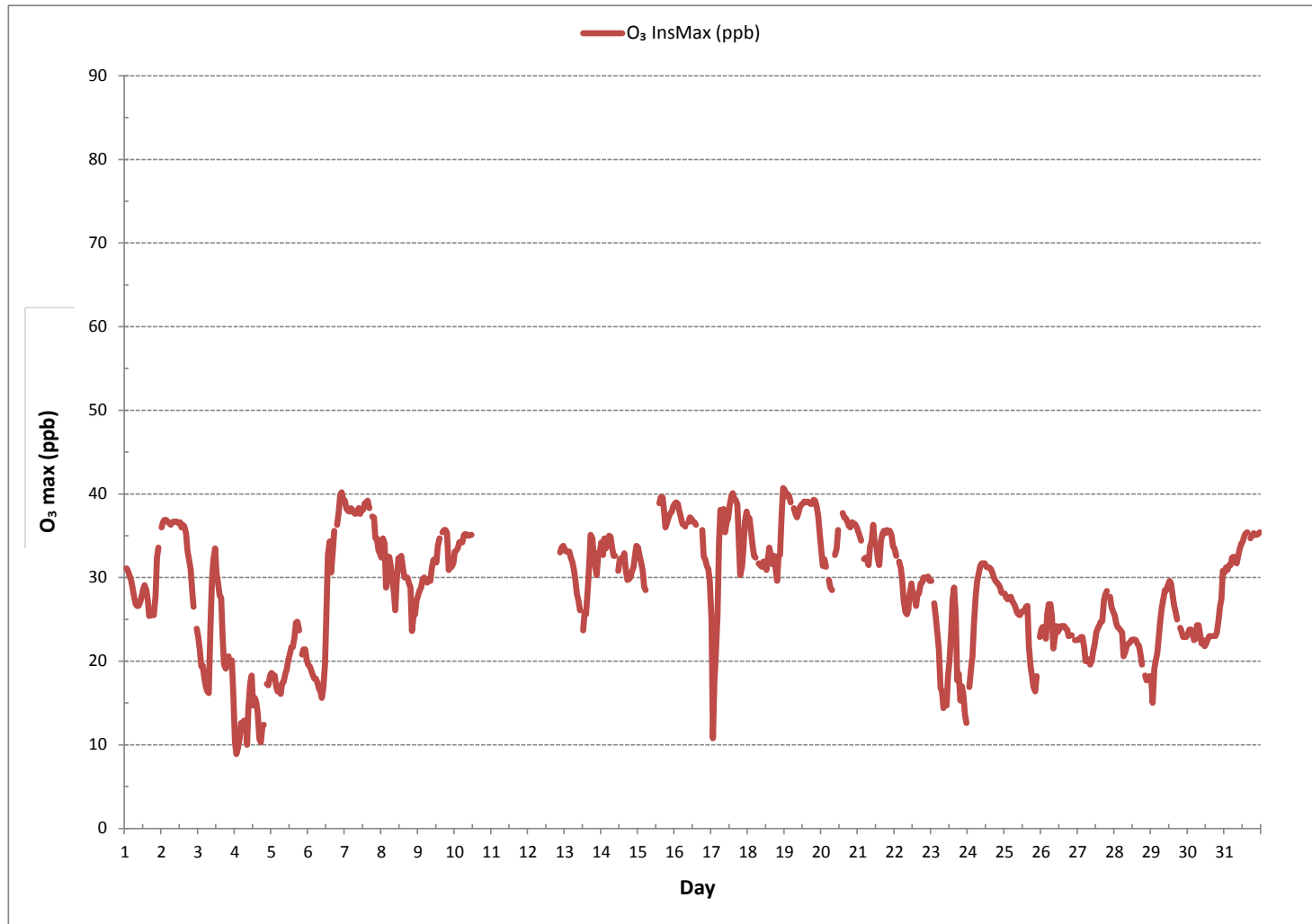
STATUS FLAG CODES

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

MONTHLY SUMMARY

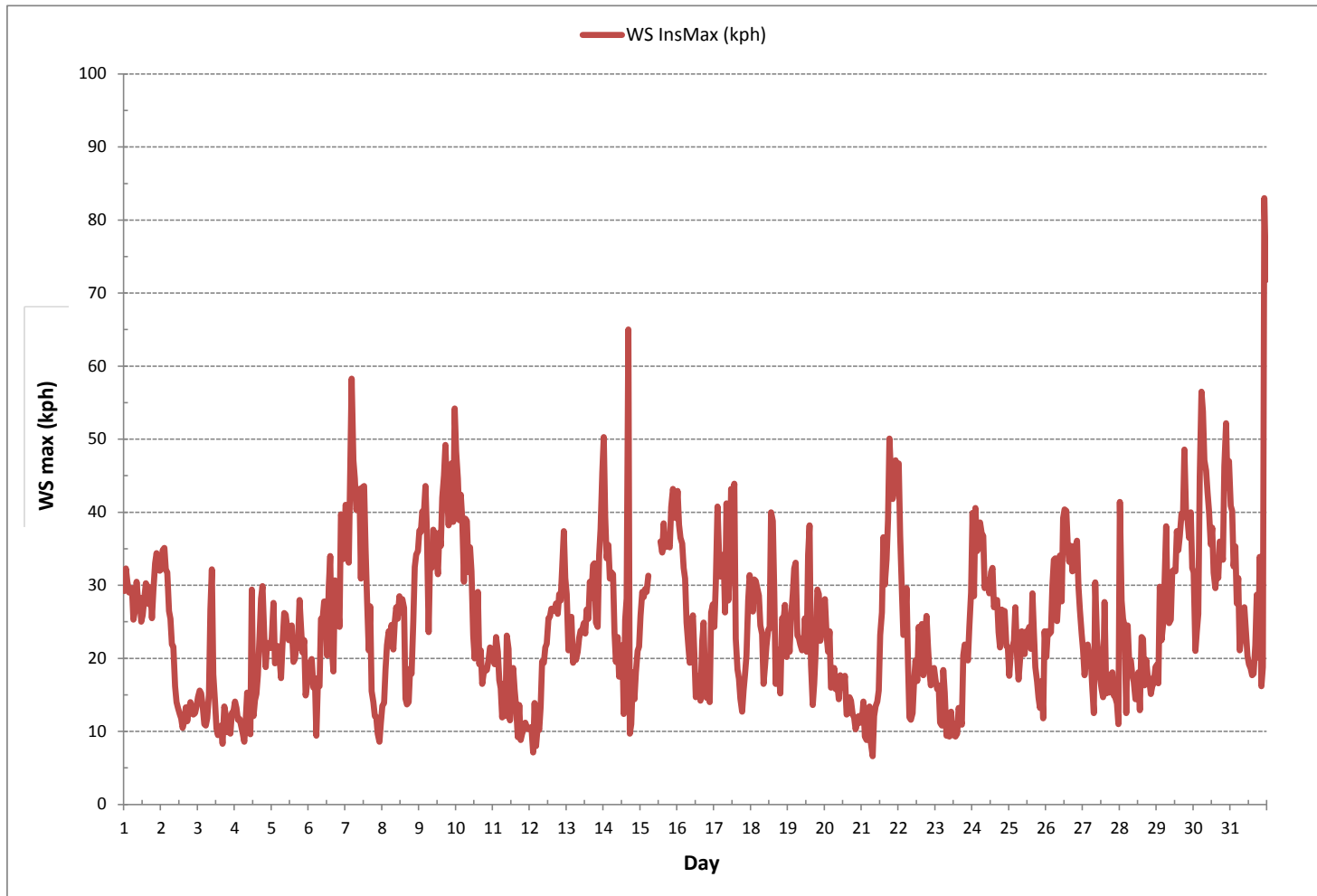
NUMBER OF NON-ZERO READINGS:	645
MAXIMUM INSTANTANEOUS VALUE:	40.7 ppb @ HOUR 23 ON DAY 18
IZS CALIBRATION TIME:	30 hrs
MONTHLY CALIBRATION TIME:	4 hrs
OPERATIONAL TIME:	682 hrs
STANDARD DEVIATION:	7.1

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





WIND SPEED Instantaneous Maximum (WS kph)



***APPENDIX IV***  
***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

February 26, 2017

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

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



### Validation Certificate Form

<b>Client:</b> <u>Lakeland Industry &amp; Community Association</u>	<b>Project #:</b> <u>2833-2018-01-31-C</u>
<b>Site:</b> <u>St. Lina 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>February 05, 2017</u>
<b>Level 1 Primary Validation</b>	<u>Maram Ghaleb</u>	<b>Date</b> <u>February 05, 2017</u>
<b>Level 2 Final Validation</b>	<u>Maram Ghaleb</u>	<b>Date</b> <u>February 23, 2017</u>
<b>Level 3 Independent Data Review</b>	<u>Chris Linka</u>	<b>Date</b> <u>February 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.