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

**JOB #: 2833-2016-12-01-C**

**December 2016**

Prepared for:

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

DATE: **February 6, 2017**

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## **SUMMARY**

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

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

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

**SO<sub>2</sub>**: Two hours of downtime were recorded due to additional quality checks performed in response to a depleted permeation tube.

**THC**: Twenty-eight hours of downtime were recorded due to a malfunction of the zero air generator and the subsequent corrective actions performed.

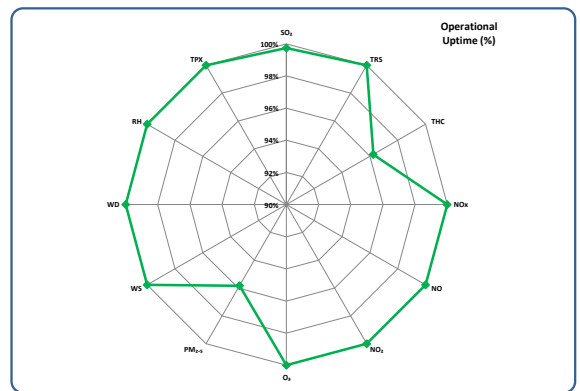
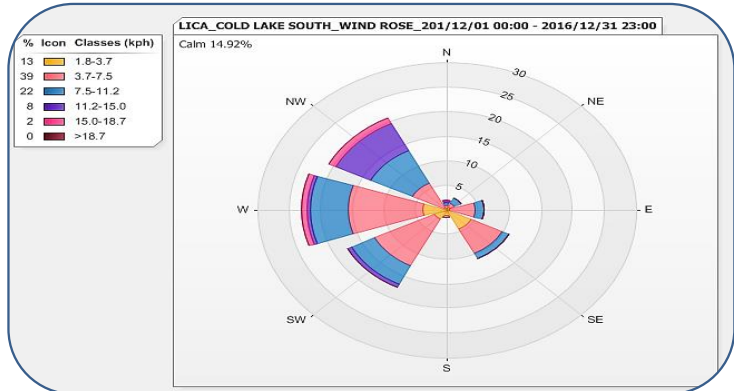
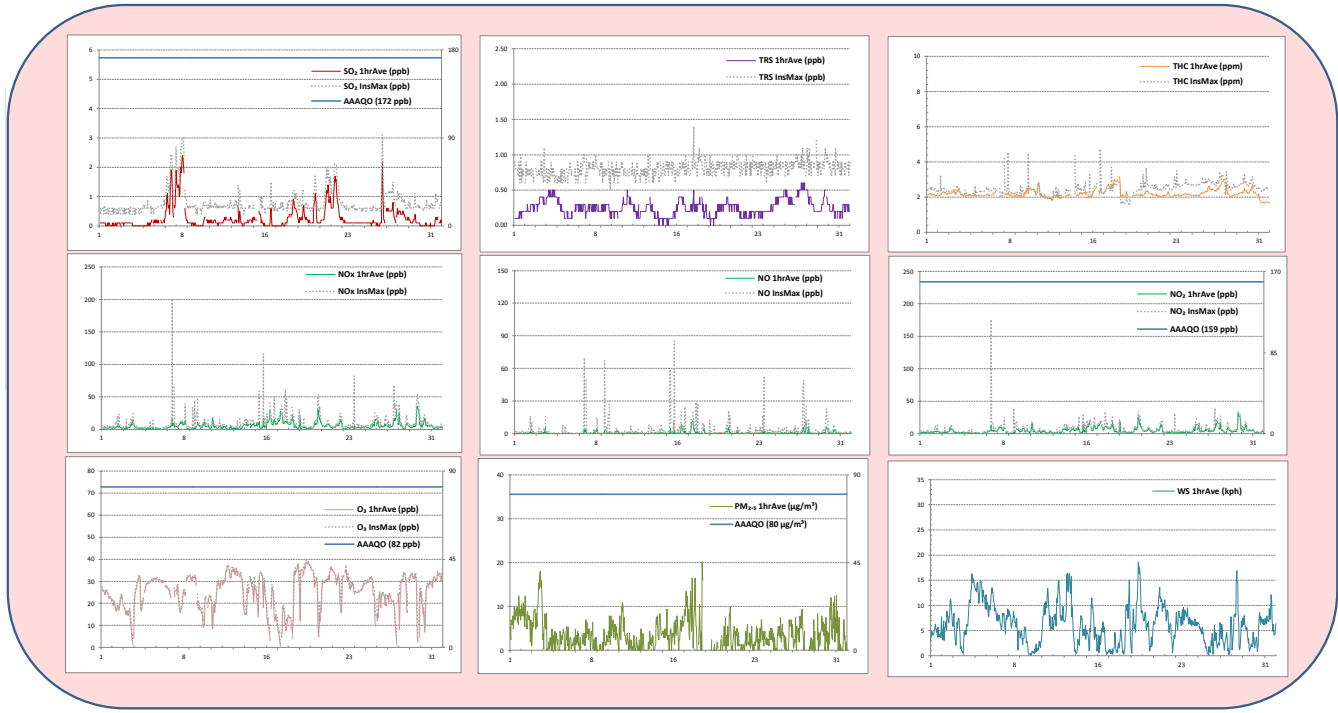
**PM<sub>2.5</sub>**: Thirty-one hours of data were recorded at concentrations less than  $-3 \mu\text{g}/\text{m}^3$  this month, rendering the data invalid.

The summary of results is presented on the following pages.

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

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

Pollutants		Monthly Records		1-Hour Records					24-Hour Records			
Name	Unit	Avg. Conc.	Uptime	Maximum			AAAQO Objective	Exceed. Hours	Maximum		AAAQO Objective	Exceed. Days
				Conc.	Date	Hour			Conc.	Date		
SO <sub>2</sub>	ppb	0.3	99.7%	2.4	December 8	13	172	0	1.3	December 8	48	0
TRS	ppb	0.3	100.0%	0.6	December 27	VAR	-	-	0.5	December 27	-	-
THC	ppm	2.19	96.2%	3.17	December 18	8	-	-	2.58	December 17	-	-
NO <sub>x</sub>	ppb	5.3	100.0%	36.0	December 29	16	-	-	13.6	December 17	-	-
NO	ppb	0.6	100.0%	11.7	December 17	9	-	-	2.9	December 17	-	-
NO <sub>2</sub>	ppb	4.6	100.0%	30.9	December 29	16	159	0	10.7	December 17	-	-
O <sub>3</sub>	ppb	24.6	100.0%	38.9	December 19	14	82	0	34.3	December 19	-	-
PM <sub>2.5</sub>	µg/m <sup>3</sup>	3.7	95.8%	20.2	December 18	16	80	0	10.1	December 3	30	0
WS	%	3.2	100.0%	18.6	December 19	15	-	-	12.6	December 5	-	-
WD	degree	280 (W)	100.0%	-	-	-	-	-	-	-	-	-
RH	mm	73	100.0%	98	December 19, 19	5, 6	-	-	92	December 2	-	-
AmbTPX	°C	-14.0	100.0%	2.4	December 21, 21	20, 21	-	-	0.1	December 22	-	-



**Monthly Update**

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

**Operational Issues**

- **SO<sub>2</sub>**: Two hours of downtime were recorded due to additional quality checks performed in response to a depleted permeation tube.
- **THC**: Twenty-eight hours of downtime were recorded due to a malfunction of the zero air generator and the subsequent corrective actions performed.
- **PM<sub>2.5</sub>**: Thirty-one hours of data were recorded at concentrations less than -3 µg/m<sup>3</sup> this month, rendering the data invalid.

### Monthly Continuous Data Summary

Lakeland Industry & Community Association Cold Lake Continuous Monitoring Station						MAXIMUM VALUES							OPERATIONAL TIME (%)
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	1-HOUR			24-HOUR		
	1-hr	24-hr	1-hr	24-hr				WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY		
SO <sub>2</sub> (ppb)	172	48	0	0	0.3	2.4	8	13	7.2	WNW	1.3	8	99.7
TRS (ppb)	-	-	-	-	0.3	0.6	27	VAR	VAR	VAR	0.5	27	100.0
THC (ppm)	-	-	-	-	2.19	3.17	18	8	0.3	SSE	2.58	17	96.2
NO <sub>2</sub> (ppb)	159	-	0	-	4.6	30.9	29	16	1.4	ENE	10.7	17	100.0
NO (ppb)	-	-	-	-	0.6	11.7	17	9	0.9	NW	2.9	17	100.0
NO <sub>x</sub> (ppb)	-	-	-	-	5.3	36.0	29	16	1.4	ENE	13.6	17	100.0
O <sub>3</sub> (ppb)	82	-	0	-	24.6	38.9	19	14	15.3	W	34.3	19	100.0
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	80	30	0	0	3.7	20.2	18	16	9.2	W	10.1	3	95.8
RELATIVE HUMIDITY (%)	-	-	-	-	73	98	19, 19	5, 6	9.2 5.3	SW SW	92	2	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	-14.0	2.4	21, 21	20, 21	10.4 9.7	WSW WSW	0.1	22	100.0
VECTOR WS (kph)	-	-	-	-	3.2	18.6	19	15	-	W	12.6	5	100.0
VECTOR WD (sec)	-	-	-	-	280 (W)	-	-	-	-	-	-	-	100.0

VAR-VARIOUS



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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.*

### Volatile Organics (VOCs) Data Summary

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Sample Collection Date	Maximum Reading (ppb)	Volatile Organic Compound
December 2, 2016	1.01	n-Butane
December 8, 2016	2.03	n-Hexane
December 14, 2016	1.20	Acetone
December 20, 2016	2.20	Ethanol
December 26, 2016	2.62	n-Butane

Note: NA

### Polycyclic Aromatic Hydrocarbons (PAHs) Data Summary

Sample Collection Date	Maximum Reading ( $\mu\text{g}/\text{puf}$ )	Semi-Volatile Organic
December 2, 2016	0.17	Phenanthrene
December 8, 2016	0.35	2-Methylnaphthalene
December 14, 2016	0.88	2-Methylnaphthalene
December 20, 2016	0.75	2-Methylnaphthalene
December 26, 2016	0.55	Naphthalene

Note: NA

### Partisol Sampler Summary

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Sample Collection Date	Concentration (mg)
December 2, 2016	0.195
December 8, 2016	0.050
December 14, 2016	0.091
December 20, 2016	0.070
December 26, 2016	0.096

Note: NA

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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 non-continuous monitoring data results for Partisol, VOCs, PAHs and the Passive monitoring program are also included in this report.

Sample filters for all continuous air monitors are changed before the calibration begins. The sample manifold is cleaned during the site visit each month.

Control checks, consisting of a zero and span, are conducted daily on all continuous air monitors. In place of the air sample, zero air (from scrubbed air or gas cylinders) is used for zero checks, and a known concentration of the pollutant being analyzed is used for span checks. These checks are controlled by automatic timers and valves. The total zero span cycle is completed within an hour, the commencement of the zero span cycle is at the beginning of the hour.

Multipoint calibrations are done a minimum of once a month for each continuous air monitor. An additional calibration is required under the following conditions: 1) within three days after the initial start-up and stabilization of a newly installed instrument, 2) prior to shut-down or moving of an instrument which has been working to specification, and 3) when major repair has been done on the instrument.

Time during the first multi-point calibration is not considered downtime (Data is flagged as C). If more than one calibration is performed during the month, the time during the additional calibration is considered as downtime (Data is flagged as C1).

Only one zero/span check is run per day. Time during the zero/span check is not considered as downtime (Data is flagged as S). If an extra zero/span check is performed, the time during the additional check is considered as downtime (Data is flagged as S1).

The AMD requires each instrument and accompanying data recording system to be operational 90% of the time, at a minimum, for each monthly monitoring period.

All sampling, analysis, and QA/QC for this project was performed by Maxxam Analytics and complies with the Alberta Air Monitoring Directive.

Data contained in this monthly report has undergone the verification and validation based on the requirements of the AMD Chapter 6: Ambient Data Quality (August 3, 2016). The descriptions of the data verification and validation process can be found in Section 5 of this report. Instantaneous data, where applicable, is provided for reference purposes and has not undergone zero correction.

Hourly/minute data have been reviewed based on daily zero/span results and multi-point calibration results. Data may be considered invalid if a zero-corrected span check in excess of +/- 10% of the span concentration (established by the previous multi-point calibration) is encountered and/or significant differences in the calibration factor occurs (greater than 10%).

Trailer inspection was conducted on December 7. No issues were identified.

### **SULPHUR DIOXIDE (SO<sub>2</sub>)**

The routine monthly calibration was performed on December 6. The analyzer spanned towards the lower acceptance limit on December 14, as the permeation tube was depleted. An additional zero/span check conducted on December 15 confirmed the drift. Following an as-found response check the same day, the permeation tube was replaced. The new perm tube was allowed time to stabilize and the expected span value was updated on December 18. Three hours of downtime were recorded due to this event.

Two hours of maximum instantaneous data were invalidated on December 7, at hour 13:00 and December 19, at hour 13:00, due to brief power outages.

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

The routine monthly calibration was performed on December 6. There were no operational issues that impacted hourly data this month.

Two hours of maximum instantaneous data were invalidated on December 7, at hour 13:00 and December 19, at hour 13:00, due to brief power outages.

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

The routine monthly calibration was performed on December 7, during which the fuel gas was replenished. A low reading alarm was triggered on December 13. This prompted an immediate site visit where a successful as-found response check was completed and maintenance was performed on the zero air generator. A successful zero/span check was performed afterwards. A low reading alarm was again triggered on December 14. The data was monitored closely and other instances were encountered during the month where lower than historical readings were recorded. Troubleshooting was performed on December 19 and a repeat multipoint calibration was completed. It was discovered that the zero air generator pressure switch was malfunctioning intermittently. All minute data was reviewed, data corresponding to the malfunction were discarded and the hourly averages were re-calculated. In cases where more than 25% minute data were impacted, that hourly average was invalidated. Twenty-eight hours of downtime were recorded due to this malfunction and the subsequent corrective actions performed.

### **NITROGEN DIOXIDE (NO<sub>2</sub>)**

The routine monthly calibration was performed on December 6. There were no operational issues that impacted hourly data this month.

Two hours of maximum instantaneous data were invalidated on December 7, at hour 13:00 and December 19, at hour 13:00, due to brief power outages.

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

The routine monthly calibration was performed on December 7. There were no operational issues that impacted hourly data this month.

One hour of maximum instantaneous data was invalidated on December 19, at hour 13:00, due to a brief power outage.

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

Two routine TEOM audits were performed this month. The first audit was completed on December 7. The TEOM unit started recording many negative readings on December 18. This prompted an immediate site visit on December 19, during which the second bi-monthly audit was successfully completed. All the parameter checks were within tolerance limits. Both the FDMS and sample filters were replaced during the audits.

Data was corrected in accordance with AMD (2016), Chapter 6, Table 2, *Zero Adjustment Criteria*. Data recorded between 0 and  $-3 \mu\text{g}/\text{m}^3$  was corrected to  $0 \mu\text{g}/\text{m}^3$ . Data recorded below  $-3 \mu\text{g}/\text{m}^3$  was invalidated. Thirty-one hours of data were invalidated as the data was below  $-3 \mu\text{g}/\text{m}^3$  this month.



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

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

There were no operational issues that impacted hourly data this month. Two hours of maximum instantaneous data were invalidated on December 7, at hour 13:00 and December 19, at hour 13:00, due to brief power outages.

**RELATIVE HUMIDITY (RH)**

No operational issues were identified this month.

**AMBIENT TEMPERATURE (AmbTPX)**

No operational issues were identified this month.

**VOC SAMPLES**

The sampler was programmed to run for 24 hours every 6<sup>th</sup> day per the NAPS (North American Pollution Surveillance Schedule). The routine calibration for the VOC sampler was completed on December 19.

Samples were collected on December 2, 8, 14, 20 and 26. Analytical results are included in this report. VOC results are reported in ppb.

**PAH SAMPLES**

The sampler was programmed to run for 24 hours every 6<sup>th</sup> day per the NAPS (North American Pollution Surveillance Schedule). The routine calibration for the PAH sampler was completed on December 28.

Samples were collected on December 2, 8, 14, 20 and 26. Analytical results are included in this report. PAH results are reported in ug.

**PARTISOL SAMPLES**

The sampler was programmed to run for 24 hours every 6<sup>th</sup> day per the NAPS (North American Pollution Surveillance Schedule).

Samples were collected on December 2, 8, 14, 20 and 26. Analytical results are included in this report. Partisol results are reported in mg.

**PASSIVE SAMPLES**

No samples were collected this month as sample collection is scheduled to be performed every two months.

## **2.0 Project Personnel**

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

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

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

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

## **4.0 Calculations and Results**

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

## 5.0 Methods and Procedures

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

- Maxxam AIR SOP-00208: RM Young Wind Monitor Calibration
- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-00212: Ambient O<sub>3</sub> Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO<sub>2</sub>/NO<sub>x</sub> Monitoring
- Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring
- Maxxam AIR SOP-00215: TEOM Operation
- Maxxam AIR SOP-00225: The Collection of VOCs in Ambient Air Using Canister and Xontech
- Maxxam PTC SOP-00151: Mass Determination of Particulate Matter (PM<sub>2.5</sub> and PM<sub>10</sub>)

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>) - R&P 1405F TEOM Unit
- Wind System - Met One Unit
- Relative Humidity - Met One Unit
- Ambient Temperature - Met One Unit
- Datalogger - ESC 8832
- Partisol - R&P 2000H Unit
- VOC - XONTECH 910A Gaseous Air Sampler
- PAH - TISCH PUF Plus Sampler

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

**Level 0 Preliminary Verification**

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

**Level 1 Primary Validation**

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

**Level 2 Final Validation**

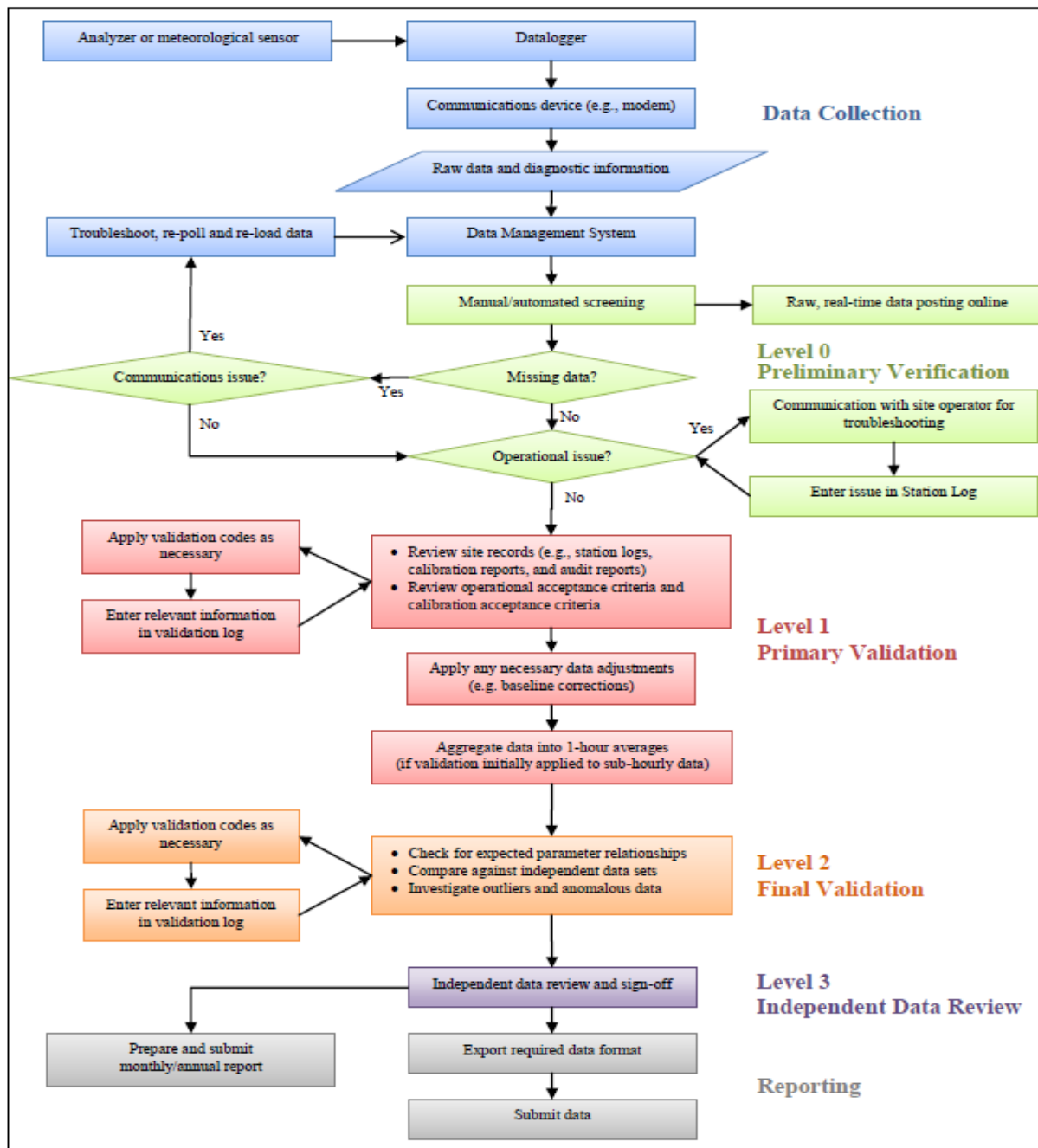
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

**Level 3 Independent Data Review**

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

**Post-Final Validation**

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



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

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

***SULPHUR DIOXIDE***

**SULPHUR DIOXIDE Hourly Averages (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	0.1	S	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	24					
2	S	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	S	0.0	0.0	0.1	0.1	0.1	24					
3	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	S	0.1	0.0	0.1	0.1	0.1	0.1	24					
4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.1	0.0	0.1	24					
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.2	S	0.1	0.1	0.2	0.0	0.2	0.1	0.1	24					
6	0.2	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.1	C	C	C	C	0.2	0.1	0.1	0.1	0.1	0.1	S	0.2	0.1	0.2	0.3	0.1	0.3	0.2	0.1	24					
7	0.5	0.5	0.6	1.0	1.1	0.8	0.6	0.6	0.7	0.4	0.9	1.3	1.9	1.9	1.7	1.1	0.5	0.3	S	0.7	0.6	0.7	1.4	1.9	0.3	1.9	0.9	0.9	24						
8	1.5	1.4	1.3	1.3	1.4	1.3	1.0	1.1	1.7	2.0	1.8	1.9	2.3	2.4	2.3	2.1	1.8	S	0.6	0.4	0.4	0.2	0.2	0.2	0.2	2.4	1.3	24							
9	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.1	S	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	24					
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.3	0.3	S	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.0	0.3	0.1	0.1	24					
11	0.1	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	S	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.0	0.2	0.1	24					
12	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.3	S	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.1	0.3	0.2	0.1	24					
13	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	S	0.7	0.6	0.1	0.2	0.5	0.4	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.7	0.2	0.1	24					
14	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	S	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.3	0.2	0.0	0.3	0.1	0.1	24					
15	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	S	C1	C1	0.5	0.4	0.4	0.4	0.3	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.5	0.2	0.2	22						
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.1	0.4	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	0.1	24					
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	24					
18	0.1	0.3	0.3	0.3	0.3	0.4	0.4	S	0.3	0.4	0.4	0.4	0.6	0.8	0.9	0.8	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.4	0.3	0.1	0.9	0.5	0.1	24					
19	0.2	0.2	0.1	0.2	0.3	0.2	S	0.3	0.2	0.2	0.4	0.6	0.7	0.5	0.3	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.1	0.2	0.1	0.7	0.3	0.2	0.1	24					
20	0.2	0.1	0.1	0.1	0.1	S	0.1	0.1	0.1	0.1	0.6	0.8	0.8	1.1	1.0	0.8	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.1	0.3	0.2	0.1	24				
21	0.1	0.1	0.2	0.2	S	0.2	0.2	0.2	0.2	0.4	0.5	0.6	0.8	1.0	1.2	1.1	1.2	1.4	1.2	0.8	0.9	0.8	1.0	0.8	0.1	1.4	0.7	0.2	0.1	24					
22	0.6	0.6	0.6	S	0.6	0.9	1.3	1.5	1.7	1.5	1.6	1.4	1.1	0.9	0.8	0.7	0.6	0.4	0.3	0.3	0.2	0.3	0.3	0.2	0.2	1.7	0.8	0.2	0.1	24					
23	0.3	0.2	S	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	24				
24	0.1	S	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	24				
25	S	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	S	0.0	0.2	0.1	0.1	0.1	0.1	24				
26	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	1.1	2.2	1.4	0.6	0.2	0.2	0.1	0.1	S	0.5	0.0	2.2	0.3	0.2	0.1	0.1	24				
27	0.5	0.6	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.7	0.8	0.6	0.3	0.3	0.2	0.2	0.1	S	0.3	0.5	0.1	0.8	0.5	0.2	0.1	0.1	24				
28	0.6	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	S	0.2	0.3	0.2	0.2	0.6	0.4	0.2	0.1	0.1	24				
29	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.3	0.1	0.1	0.1	S	0.1	0.1	0.1	0.1	0.1	0.1	0.4	0.2	0.1	0.1	24				
30	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	24				
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.3	0.2	0.2	0.3	0.3	S	0.1	0.1	0.1	0.2	0.1	0.2	0.0	0.0	0.3	0.1	0.1	0.1	24				
HOURLY MAX	1.5	1.4	1.3	1.3	1.4	1.3	1.3	1.5	1.7	2.0	1.8	1.9	2.3	2.4	2.3	2.2	1.8	1.4	1.2	0.8	0.9	0.8	1.4	1.9											
HOURLY AVG	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2											

**STATUS FLAG CODES**

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

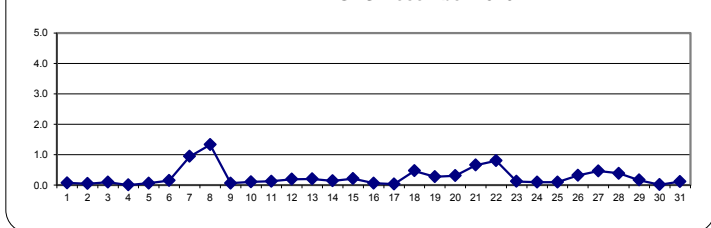
**OBJECTIVE LIMIT:**

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

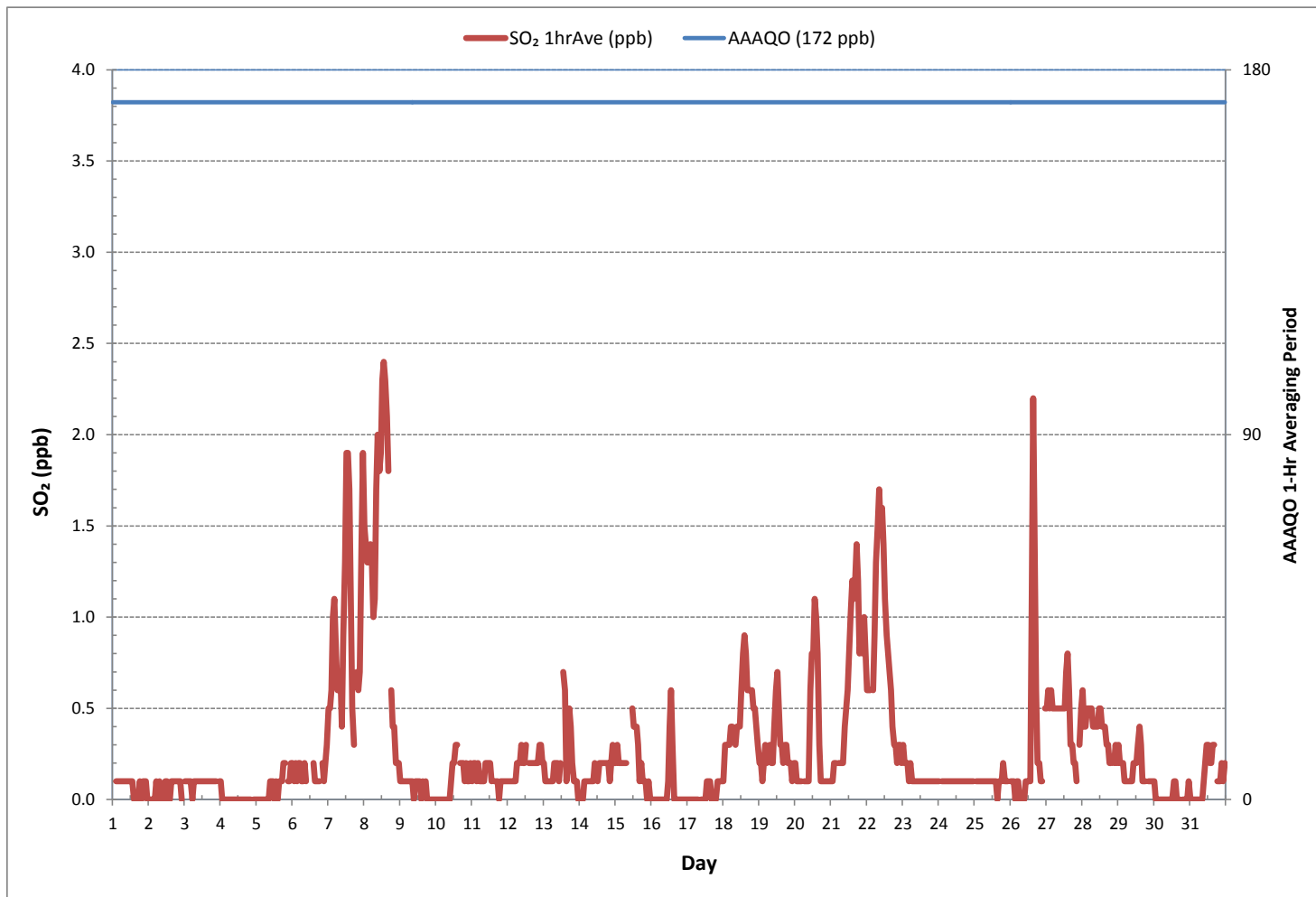
NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	560				
MINIMUM 1-HR AVERAGE:	0.0 ppb @ HOUR(S)	VAR	ON DAY(S)	VAR	
MAXIMUM 1-HR AVERAGE:	2.4 ppb @ HOUR(S)	13	ON DAY(S)	8	
MAXIMUM 24-HR AVERAGE:	1.3 ppb		ON DAY(S)	8	
			VAR-VARIOUS		
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	742	hrs
MONTHLY CALIBRATION TIME:	4	hrs	AMD OPERATION UPTIME:	99.7	%
STANDARD DEVIATION:	0.4		MONTHLY AVERAGE:	0.3	ppb

**24 HR AVERAGES December 2016**





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





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

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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY 1	0.4	S	0.6	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.4	0.7	0.7	0.6	0.6	0.4	0.4	0.4	0.6	0.6	0.4	0.6	0.6	0.4	0.4	0.7	0.5	24	
2	S	0.4	0.4	0.4	0.6	0.6	0.4	0.6	0.4	0.6	0.6	0.6	0.6	0.4	0.4	0.6	0.6	0.4	0.4	0.6	0.6	0.6	0.4	S	0.4	0.6	0.5	24	
3	0.6	0.6	0.6	0.6	0.4	0.4	0.6	0.4	0.6	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.4	0.6	0.4	0.4	0.4	0.6	0.7	S	0.4	0.4	0.7	0.5	24
4	0.4	0.4	0.6	0.6	0.6	0.4	0.6	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.4	0.4	0.6	0.6	0.6	0.4	0.4	S	0.6	0.6	0.4	0.6	0.5	24	
5	0.6	0.7	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.4	0.6	0.6	S	0.6	0.4	0.6	0.4	0.9	0.6	24	
6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	C	C	C	C	C	0.7	0.7	0.7	0.6	0.6	S	0.7	0.9	0.7	0.8	0.6	0.9	0.7	24	
7	1.0	1.2	1.2	1.7	1.6	1.5	1.2	1.2	1.4	1.0	1.5	2.1	2.5	P	2.4	1.8	1.1	0.9	S	1.2	1.2	1.3	2.1	2.7	0.9	2.7	1.5	23	
8	2.0	2.0	1.8	2.0	2.0	2.0	1.5	1.8	2.3	2.6	2.6	2.6	2.9	3.0	3.0	3.0	2.4	S	1.2	0.9	0.9	0.9	0.7	0.7	0.7	3.0	1.9	24	
9	0.6	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.7	S	0.7	0.4	0.4	0.6	0.4	0.6	0.6	0.4	0.7	0.6	24	
10	0.6	0.6	0.6	0.6	0.5	0.6	0.4	0.6	0.6	0.6	0.8	0.7	0.7	0.7	0.9	S	0.7	0.7	0.7	0.6	0.7	0.7	0.6	0.7	0.4	0.9	0.6	24	
11	0.6	0.9	0.7	0.6	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.8	0.8	0.6	S	0.7	0.6	0.7	0.6	0.7	0.6	0.6	0.6	0.6	0.7	0.6	0.9	0.7	24
12	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.7	0.7	0.7	0.7	0.6	0.6	S	0.7	0.7	0.6	0.6	0.7	0.6	0.7	0.9	0.8	0.7	0.6	0.9	0.7	24	
13	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.7	0.9	0.9	0.7	0.9	S	1.3	1.4	0.7	0.9	1.2	1.0	0.8	0.6	0.6	0.7	0.6	0.6	1.4	0.8	24	
14	0.6	0.6	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	S	0.6	0.7	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.4	0.7	0.6	24	
15	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	S	C1	C1	1.0	0.9	0.9	1.0	0.7	0.6	1.0	0.6	0.7	0.6	0.6	0.6	0.6	0.6	1.0	0.7	22	
16	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	S	0.6	0.7	1.0	1.5	0.9	0.6	0.6	0.6	0.8	0.5	0.6	0.5	0.8	0.6	0.4	1.5	0.7	24	
17	0.6	0.5	0.5	0.6	0.5	0.6	0.6	0.5	S	0.6	0.8	0.6	0.6	0.8	0.7	0.8	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.8	0.6	24	
18	0.5	0.8	0.6	0.6	0.9	0.8	0.8	S	0.6	0.8	0.9	0.8	1.1	1.2	1.2	0.9	1.1	1.1	0.9	1.1	0.9	1.1	0.9	0.7	0.5	1.2	0.9	24	
19	0.7	0.6	0.5	0.7	0.9	0.8	S	0.7	0.6	0.6	0.9	1.2	1.1	P	0.7	0.6	0.7	0.8	0.8	0.6	0.6	0.6	0.7	0.7	0.5	1.2	0.7	23	
20	0.6	0.6	0.6	0.5	0.6	S	0.6	0.5	0.6	0.6	1.1	1.2	1.4	1.7	1.5	1.4	0.8	0.8	0.6	0.6	0.5	0.6	0.5	0.5	0.5	1.7	0.8	24	
21	0.6	0.6	0.6	0.6	S	0.6	0.6	0.6	0.7	0.9	1.1	1.1	1.4	1.7	2.0	1.6	1.7	2.0	1.8	1.5	1.6	1.4	1.7	1.5	0.6	2.0	1.2	24	
22	1.1	1.2	1.1	S	1.4	1.4	1.8	2.1	2.1	2.1	2.1	2.1	1.9	1.5	1.4	1.4	1.1	0.9	0.9	0.9	0.8	0.7	0.7	0.8	0.7	2.1	1.4	24	
23	0.8	0.7	S	0.7	0.6	0.7	0.6	0.6	0.5	0.7	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.7	0.5	0.8	0.6	24
24	0.6	S	0.7	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.5	0.6	0.6	0.6	0.5	0.7	0.6	24	
25	S	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.7	0.6	0.6	0.6	S	0.5	0.7	0.6	24	
26	0.6	0.5	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.9	2.0	3.1	2.4	1.2	0.8	0.8	0.6	0.7	S	1.1	0.5	3.1	0.9	24
27	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.1	1.1	1.1	1.2	1.1	1.1	1.4	1.5	1.2	0.9	0.9	0.7	0.7	0.7	S	0.9	0.9	0.7	1.5	1.1	24	
28	1.2	1.1	0.9	1.1	1.1	1.1	1.1	1.1	1.1	0.8	0.9	0.9	0.9	0.8	0.8	0.9	0.7	0.7	0.6	0.6	S	0.6	0.7	0.7	0.6	1.2	0.9	24	
29	0.8	0.7	0.6	0.8	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.9	1.1	0.8	0.6	0.6	0.6	S	0.7	0.6	0.7	0.6	0.6	1.1	0.7	24	
30	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.9	0.6	0.6	S	0.7	0.6	0.6	0.7	0.6	0.5	0.9	0.6	24	
31	0.7	0.7	0.8	0.6	0.7	0.6	0.6	0.6	0.6	0.7	0.8	1.1	0.9	0.9	0.8	0.9	0.9	S	0.6	0.7	0.7	0.8	0.8	0.7	0.6	1.1	0.7	24	
HOURLY MAX	2.0	2.0	1.8	2.0	2.0	2.0	1.8	2.1	2.3	2.6	2.6	2.6	2.9	3.0	3.0	3.1	2.4	2.0	1.8	1.5	1.6	1.4	2.1	2.7					
HOURLY AVG	0.7	0.7	0.7	0.7	0.8	0.8	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.0	1.0	1.0	0.8	0.8	0.7	0.7	0.7	0.7	0.8						

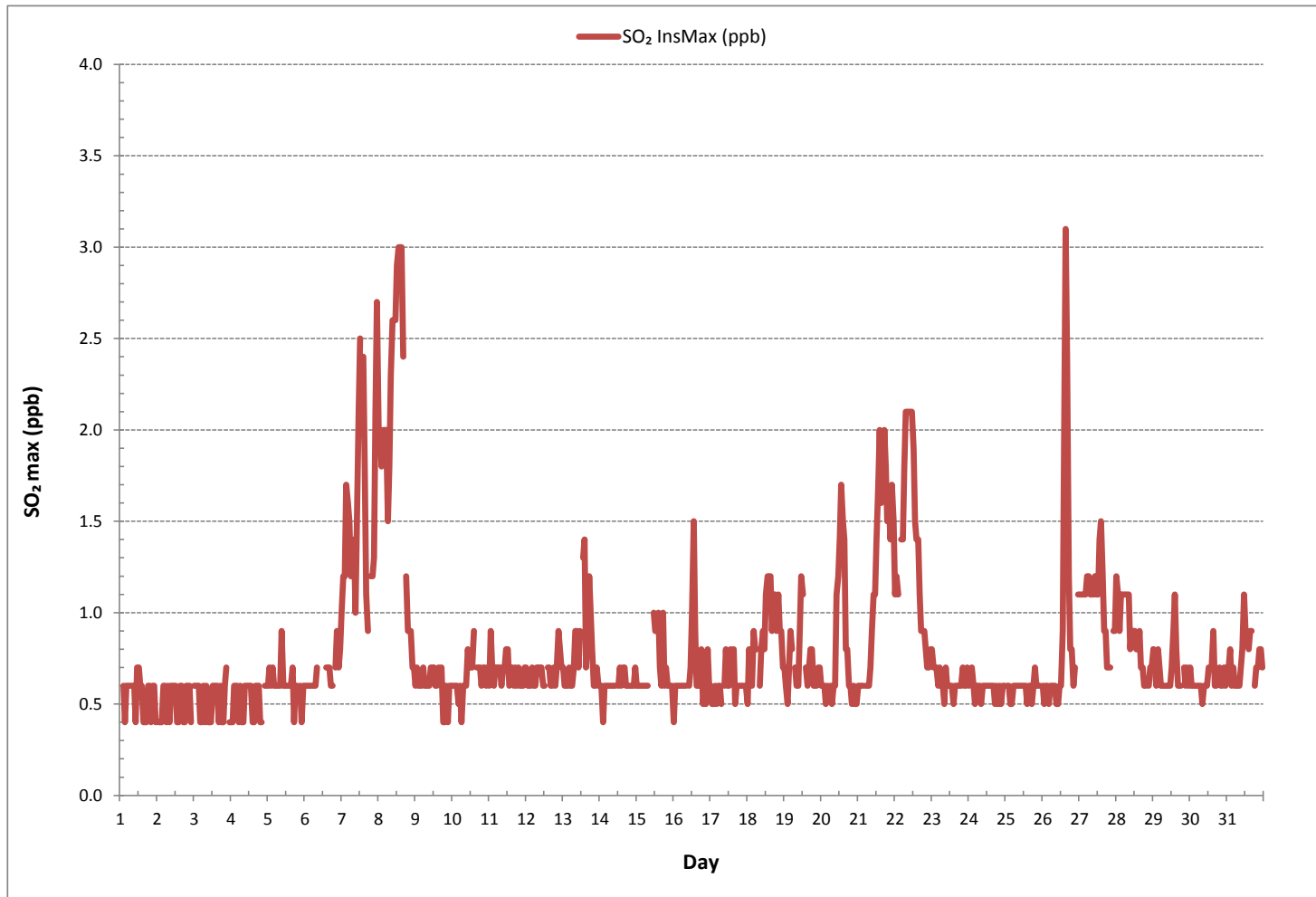
**STATUS FLAG CODES**

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

**MONTHLY SUMMARY**




NUMBER OF NON-ZERO READINGS:	702
MAXIMUM INSTANTANEOUS VALUE:	3.1 ppb @ HOUR(S) 15 ON DAY(S) 26
	VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	740 hrs
STANDARD DEVIATION:	0.4

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

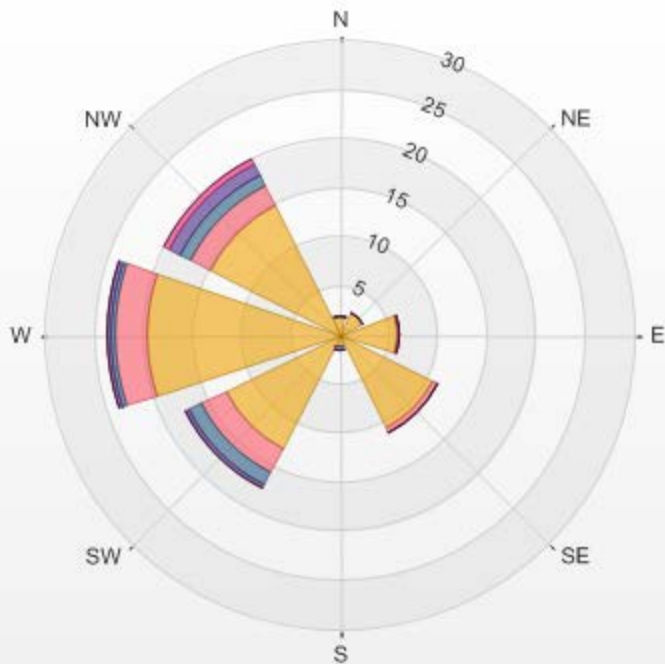


Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-SO2[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 15.24% Valid Data: 94.35% Calm Avg: 0.12 [ppb]

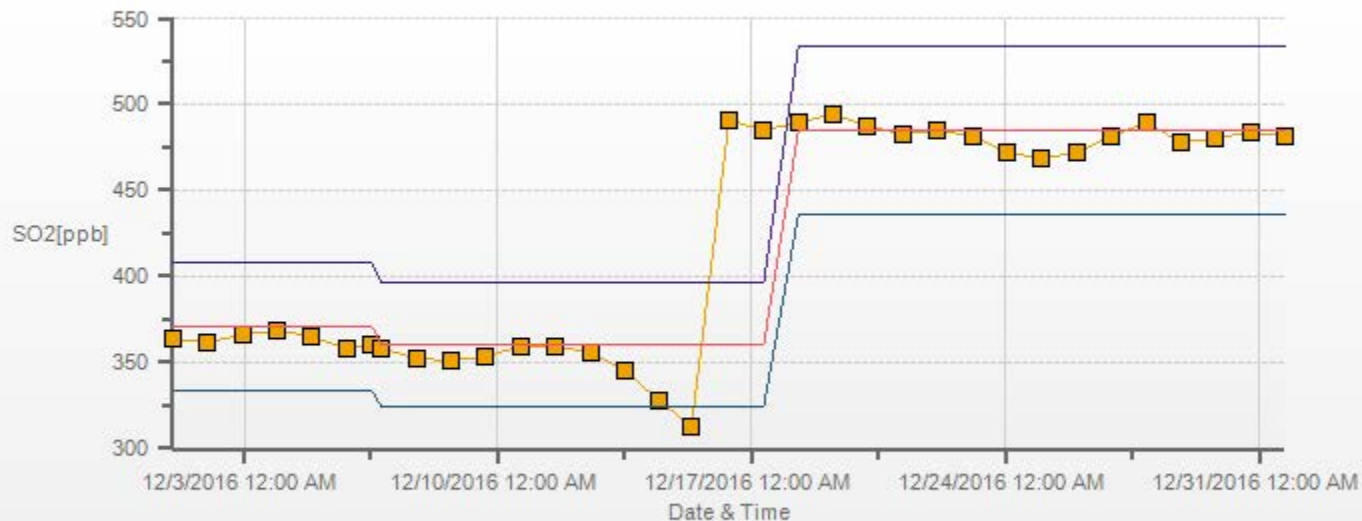
Direction	0.0-0.5	0.5-1.0	1.0-1.5	1.5-2.0	2.0-2.5	>2.5	Total
N	1.85	0.14	0	0	0	0	1.99
NE	2.56	0	0	0	0	0	2.56
E	5.98	0.14	0	0	0	0	6.12
SE	10.54	0.71	0	0	0	0	11.25
S	1.14	0.14	0.28	0	0.14	0	1.7
SW	12.96	2.71	1.42	0.43	0	0	17.52
W	19.66	3.13	0.57	0.28	0	0	23.64
NW	14.81	2.14	1.28	1.14	0.57	0	19.94
Summary	69.5	9.11	3.55	1.85	0.71	0	84.72

% Icon	Classes (ppb)	70		0.0-0.5	9		0.5-1.0	4		1.0-1.5	2		1.5-2.0	1		2.0-2.5	0		>2.5
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**LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-SO2[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 15.24% Calm Poll Avg: 0.12[ppb]**



SO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 2016/12 Type: Span



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

***TOTAL REDUCED SULPHUR***

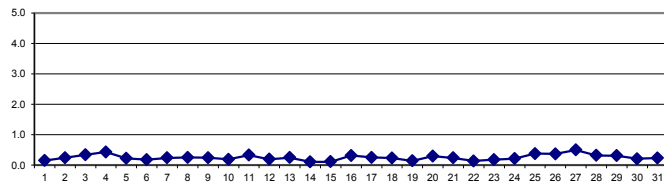
TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	0.2	S	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	24
2	S	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.2	S	0.2	0.2	0.3	0.2	24
3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.3	S	0.3	0.2	0.4	0.3	24	
4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.4	0.5	0.4	0.4	S	0.4	0.4	0.4	0.4	0.4	24	
5	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	S	0.2	0.1	0.2	0.1	0.2	0.1	24	
6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	C	C	C	C	0.2	0.2	0.3	0.2	0.3	S	0.3	0.3	0.3	0.2	0.1	0.3	0.2	24	
7	0.3	0.3	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.1	0.2	0.2	S	0.2	0.2	0.3	0.3	0.2	0.1	0.3	0.2	24	
8	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.2	S	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	24	
9	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	S	0.3	0.3	0.2	0.2	0.1	0.2	0.2	0.1	0.3	0.2	24	
10	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	S	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	24	
11	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.4	0.4	S	0.3	0.4	0.3	0.4	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	24	
12	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.3	S	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.3	24	
13	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	S	0.4	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.4	24	
14	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.0	0.1	S	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.1	24	
15	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.1	S	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.0	0.2	24	
16	0.3	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	S	0.4	0.4	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.4	24	
17	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	S	0.2	0.3	0.2	0.3	0.4	0.5	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.5	0.3	24	
18	0.3	0.3	0.3	0.4	0.3	0.3	0.3	S	0.4	0.3	0.2	0.3	0.2	0.1	0.2	0.2	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4	24	
19	0.1	0.2	0.1	0.0	0.1	0.1	S	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.3	0.2	0.3	0.2	0.2	0.3	0.2	0.0	0.3	24	
20	0.3	0.3	0.2	0.3	0.2	S	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.2	0.4	24	
21	0.3	0.3	0.2	0.3	S	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.3	24	
22	0.1	0.1	0.1	S	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	24	
23	0.2	0.2	S	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.1	0.2	24	
24	0.2	S	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.2	24	
25	S	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	S	0.3	0.5	0.4	24	
26	0.5	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	S	0.4	0.3	0.5	0.4	24	
27	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	S	0.5	0.5	0.4	24	
28	0.5	0.5	0.5	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	S	0.2	0.2	0.2	0.2	0.2	0.5	0.3	24	
29	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	S	0.4	0.4	0.4	0.3	0.3	0.2	0.5	0.3	24	
30	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.1	0.1	0.2	0.2	S	0.1	0.2	0.2	0.2	0.2	0.1	0.3	0.2	24	
31	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.3	0.3	S	0.3	0.2	0.2	0.3	0.2	0.2	0.1	0.3	0.2	24	
HOURLY MAX	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.4	0.5	0.5					
HOURLY AVG	0.3	0.3	0.2	0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2					

STATUS FLAG CODES

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

24 HR AVERAGES December 2016

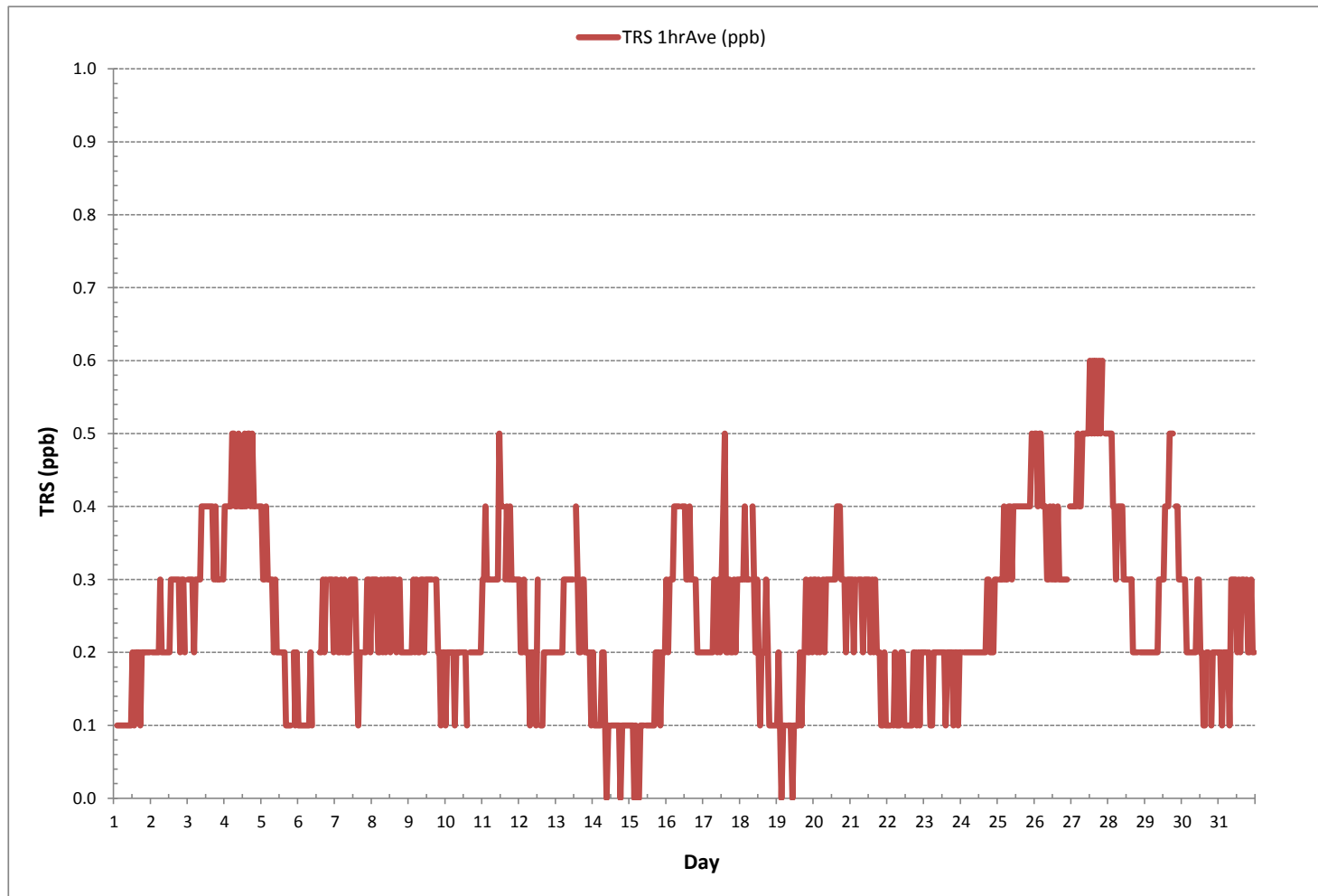


MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	700			
MINIMUM 1-HR AVERAGE:	0.0	ppb @ HOUR(S)	VAR	ON DAY(S) VAR
MAXIMUM 1-HR AVERAGE:	0.6	ppb @ HOUR(S)	VAR	ON DAY(S) 27
MAXIMUM 24-HR AVERAGE:	0.5	ppb		ON DAY(S) 27
				VAR-VARIOUS
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	744
MONTHLY CALIBRATION TIME:	4	hrs	AMD OPERATION UPTIME:	100.0
STANDARD DEVIATION:	0.1		MONTHLY AVERAGE:	0.3
				ppb



TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)





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

**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	0.7	S	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.9	0.8	0.6	0.8	1.0	0.8	0.6	0.8	0.7	0.8	0.7	0.7	0.8	0.6	1.0	0.8	24	
2	S	0.6	0.7	0.9	0.7	0.7	0.8	0.7	0.8	0.8	0.7	0.8	0.8	0.7	0.7	0.8	0.8	0.8	0.8	0.6	0.7	0.7	0.7	S	0.6	0.9	0.7	24	
3	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.8	0.7	0.8	0.8	0.8	0.9	0.7	0.9	0.7	0.7	0.6	0.8	1.1	0.7	0.6	S	0.7	0.6	1.1	0.8	24	
4	0.8	0.7	0.6	0.6	0.8	0.8	0.8	0.6	0.7	0.7	0.9	0.8	0.7	0.8	0.7	0.8	0.8	0.7	0.7	0.6	0.7	S	0.7	0.7	0.6	0.9	0.7	24	
5	0.6	0.6	0.7	0.7	0.6	0.7	0.7	0.6	0.8	0.6	0.8	0.6	0.6	0.6	0.6	0.8	0.7	0.7	0.6	0.7	S	0.8	0.7	0.6	0.6	0.8	0.7	24	
6	0.7	0.7	0.8	0.8	0.9	0.8	0.8	0.7	0.8	C	C	C	C	C	0.7	0.8	0.7	0.6	0.7	S	0.8	0.9	0.6	0.7	0.6	0.9	0.8	24	
7	0.8	0.8	0.7	0.7	0.9	0.7	0.8	0.8	0.8	0.9	1.0	0.9	1.0	P	0.7	0.6	0.8	1.0	S	0.7	0.8	0.8	0.9	0.8	0.6	1.0	0.8	23	
8	0.9	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.8	0.8	0.8	0.8	1.0	0.9	0.9	0.8	S	0.8	0.8	0.8	0.8	0.7	0.8	0.7	1.0	0.8	24	
9	0.9	0.8	0.8	0.9	0.6	0.8	0.7	0.7	0.8	0.7	0.8	0.8	0.7	0.8	0.8	0.8	S	0.9	0.8	0.6	0.8	0.5	0.6	0.8	0.5	0.9	0.8	24	
10	0.8	0.9	0.7	0.8	0.7	0.8	0.6	0.7	0.8	0.8	0.7	0.9	0.7	0.8	0.6	S	0.7	0.8	0.7	0.8	0.8	0.8	0.9	0.8	0.6	0.9	0.8	24	
11	0.9	0.8	0.8	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.8	0.8	0.8	S	0.7	0.8	0.8	0.8	0.8	0.7	0.7	0.9	0.7	0.7	0.9	0.8	24	
12	0.7	0.7	0.7	0.8	0.7	0.6	0.7	0.7	0.9	0.8	0.7	0.7	0.7	S	0.7	0.7	0.6	0.8	0.8	0.7	0.7	0.8	0.8	0.7	0.6	0.9	0.7	24	
13	0.8	0.7	0.8	0.8	0.6	0.7	0.8	0.7	0.7	1.0	0.9	0.6	S	1.0	0.8	0.8	0.8	0.8	0.8	0.6	0.8	0.6	0.7	0.7	0.6	1.0	0.8	24	
14	0.8	0.8	0.7	0.8	0.8	0.9	0.8	0.9	0.8	0.6	0.7	S	0.9	0.8	0.7	0.7	0.7	0.8	0.8	0.9	0.8	0.7	0.7	0.8	0.6	0.9	0.8	24	
15	0.8	0.9	0.8	0.9	0.8	0.9	0.7	0.8	0.9	0.8	S	0.8	0.8	0.9	0.7	0.8	0.9	0.9	0.8	0.8	0.7	0.6	0.8	0.7	0.6	0.9	0.8	24	
16	0.7	0.7	0.8	0.8	0.7	0.7	0.7	0.9	0.8	S	0.8	0.8	0.8	0.9	0.8	0.9	0.8	0.8	0.7	0.8	1.0	0.9	0.7	0.8	0.7	1.0	0.8	24	
17	0.8	0.8	0.9	0.8	0.7	0.7	0.7	0.8	S	0.9	0.9	0.8	0.9	1.1	1.4	0.8	0.8	0.9	0.9	0.8	0.8	0.7	0.8	0.9	0.7	1.4	0.9	24	
18	1.0	0.9	1.1	1.0	0.9	1.0	S	0.9	0.8	0.8	0.8	0.8	0.7	0.8	1.0	0.9	0.9	0.9	0.9	0.7	0.8	0.8	0.8	0.7	0.7	1.1	0.9	24	
19	0.8	0.9	1.0	0.7	0.9	0.8	S	0.7	0.9	0.9	0.8	0.8	0.7	P	0.8	0.7	0.9	0.9	0.8	0.9	0.9	0.8	0.9	0.8	0.7	1.0	0.8	23	
20	0.9	0.9	0.9	0.9	0.7	S	0.9	0.8	0.8	0.7	0.9	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.7	0.7	0.8	0.7	0.9	0.8	0.7	0.9	0.8	24	
21	0.8	0.9	0.8	1.0	S	0.8	0.9	0.8	0.9	0.8	0.8	0.8	0.9	0.8	1.0	1.0	1.0	0.9	0.9	0.8	0.7	0.7	0.7	0.9	0.7	1.0	0.9	24	
22	0.8	0.8	0.7	S	0.8	0.9	0.9	0.9	0.8	0.7	1.0	0.7	0.9	0.9	0.8	0.8	0.8	0.8	0.9	0.7	0.9	0.7	0.9	0.9	0.7	1.0	0.8	24	
23	0.8	1.0	S	0.9	0.8	0.9	0.9	0.9	0.8	0.9	0.9	0.8	0.7	0.8	0.8	0.9	0.8	0.8	0.9	0.8	0.7	0.9	0.8	0.8	0.9	0.7	1.0	0.8	24
24	0.8	S	0.7	0.7	0.9	0.9	0.8	0.6	0.8	0.8	0.7	0.9	0.8	0.8	0.9	0.7	0.9	0.8	0.9	0.7	0.8	0.7	0.9	0.8	0.6	0.9	0.8	24	
25	S	0.8	0.8	0.9	0.9	0.8	1.0	0.8	0.8	0.7	0.8	0.9	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.9	0.9	0.8	0.8	S	0.7	1.0	0.8	24	
26	0.7	0.9	0.8	0.8	0.9	0.9	0.7	0.8	0.7	0.8	0.9	0.9	0.8	0.8	0.8	0.9	0.8	0.8	0.9	0.8	0.9	0.8	S	0.9	0.7	0.9	0.8	24	
27	1.0	1.0	0.9	1.0	0.9	0.9	0.8	0.9	0.9	0.8	0.8	0.9	1.0	0.8	0.9	1.1	0.9	0.8	0.9	0.8	0.9	S	0.7	0.8	0.7	1.1	0.9	24	
28	0.8	1.1	0.9	1.0	0.9	0.7	1.1	0.8	0.9	0.9	0.7	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.9	0.9	S	1.2	0.8	0.8	0.7	1.2	0.9	24	
29	0.9	0.7	0.9	0.8	0.8	0.9	0.8	0.7	0.8	0.8	0.8	0.9	0.9	0.9	0.8	0.9	0.9	1.1	1.0	S	1.0	0.9	1.0	0.9	0.7	1.1	0.9	24	
30	0.9	0.9	0.8	0.9	0.8	0.8	0.7	0.7	0.8	0.8	0.9	0.8	0.9	0.9	0.8	0.7	1.1	0.9	S	0.8	0.9	0.8	0.8	0.9	0.7	1.1	0.8	24	
31	0.8	0.8	0.7	0.7	0.9	0.7	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.9	0.8	0.9	S	0.8	0.8	0.9	0.7	0.8	0.9	0.7	0.9	0.8	24		
HOURLY MAX	1.0	1.1	1.1	1.0	0.9	0.9	1.1	0.9	0.9	1.0	1.0	0.9	1.0	1.1	1.4	1.1	1.1	1.1	1.0	1.1	1.0	1.2	1.0	0.9					
HOURLY AVG	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	

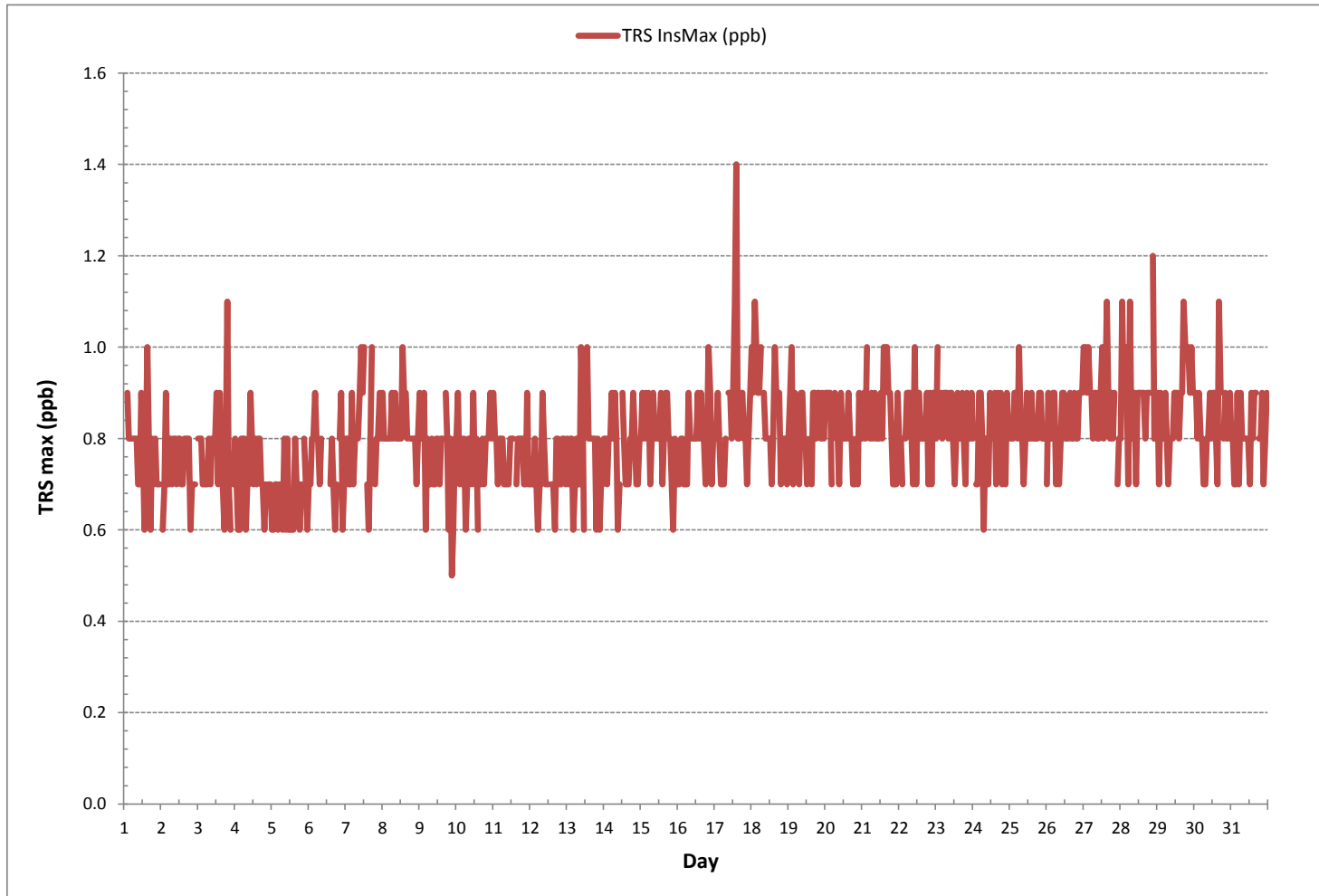
**STATUS FLAG CODES**

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

**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	704
MAXIMUM INSTANTANEOUS VALUE:	1.4 ppb @ HOUR(S) 14 ON DAY(S) 17
	VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	742 hrs
STANDARD DEVIATION:	0.1

TOTAL REDUCED SULPHUR Instantaneous Maximum (TRS ppb)

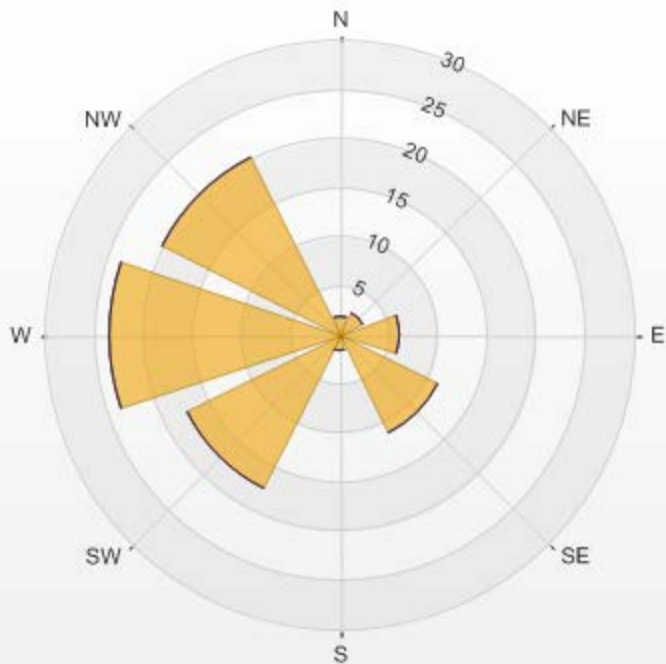


Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-TRS[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 15.20% Valid Data: 94.62% Calm Avg: 0.28 [ppb]

Direction	0.0-0.6	0.6-1.2	1.2-1.8	>1.8	Total
N	1.99	0	0	0	1.99
NE	2.56	0	0	0	2.56
E	6.11	0	0	0	6.11
SE	11.22	0	0	0	11.22
S	1.7	0	0	0	1.7
SW	17.47	0	0	0	17.47
W	23.58	0	0	0	23.58
NW	20.17	0	0	0	20.17
Summary	84.8	0	0	0	84.8

% Icon Classes (ppb) 85 0.0-0.6 0 0.6-1.2 0 1.2-1.8 0 >1.8

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-TRS[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 15.20% Calm Poll Avg: 0.28[ppb]



TRS[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 2016/12 Type: Span



Span Meas Span Ref Span Low Span High

***TOTAL HYDROCARBON***

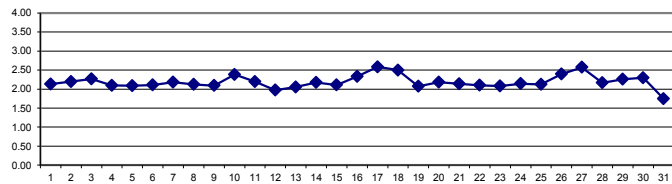
**TOTAL HYDROCARBONS Hourly Averages (THC ppm)**

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	2.06	S	2.11	2.16	2.15	2.17	2.17	2.19	2.23	2.18	2.11	2.13	2.14	2.13	2.13	2.16	2.14	2.13	2.13	2.10	2.10	2.08	2.08	2.05	2.05	2.05	2.23	2.13	24
2	S	2.09	2.09	2.10	2.11	2.10	2.15	2.14	2.21	2.26	2.27	2.27	2.31	2.32	2.27	2.22	2.25	2.26	2.18	2.16	2.14	2.16	2.22	S	2.09	2.32	2.19	24	
3	2.24	2.24	2.20	2.21	2.23	2.23	2.24	2.26	2.28	2.27	2.31	2.37	2.23	2.20	2.17	2.15	2.21	2.27	2.34	2.37	2.34	2.44	S	2.35	2.15	2.44	2.27	24	
4	2.23	2.14	2.15	2.14	2.10	2.10	2.09	2.08	2.07	2.06	2.05	2.07	2.05	2.09	2.11	2.09	2.07	2.07	2.09	2.10	S	2.06	2.07	2.05	2.05	2.23	2.09	24	
5	2.07	2.08	2.07	2.08	2.08	2.08	2.10	2.11	2.10	2.18	2.05	2.06	2.07	2.09	2.08	2.09	2.11	2.11	2.10	2.09	S	2.08	2.07	2.06	2.05	2.18	2.09	24	
6	2.07	2.07	2.07	2.07	2.09	2.09	2.10	2.09	X	2.13	2.17	2.12	2.11	2.12	2.15	2.07	2.10	2.09	2.09	S	2.11	2.14	2.13	2.16	2.07	2.17	2.11	23	
7	2.20	2.20	2.23	2.24	2.26	2.30	2.35	2.38	2.39	C	C	C	C	C	2.04	2.08	2.05	2.08	S	2.06	2.10	2.07	2.07	X	2.04	2.39	2.18	23	
8	2.19	2.19	2.16	2.19	2.19	2.17	2.21	2.18	2.11	2.27	2.13	2.11	2.08	2.13	2.07	2.11	2.14	S	2.06	2.03	2.02	2.08	2.03	2.04	2.02	2.27	2.13	24	
9	2.06	2.02	2.09	2.15	2.13	2.12	2.07	2.04	2.09	2.05	2.04	2.10	2.03	2.02	2.08	2.05	S	2.04	2.01	2.09	2.18	2.19	2.19	2.29	2.01	2.29	2.09	24	
10	2.27	2.40	2.45	2.52	2.19	2.51	2.47	2.44	2.50	2.54	X	2.38	2.46	2.45	2.42	S	2.46	2.36	2.34	2.33	2.18	2.20	2.23	2.25	2.18	2.54	2.38	23	
11	2.35	2.60	2.85	2.82	2.51	2.29	2.11	2.19	2.19	2.14	2.17	X	2.07	2.04	S	2.03	2.01	2.04	2.05	2.02	2.00	1.98	1.93	1.93	1.93	2.85	2.20	23	
12	2.00	1.94	1.91	1.99	1.96	1.92	1.95	1.86	1.81	1.85	2.01	2.00	X	S	1.96	2.00	2.04	2.00	2.05	2.02	1.95	2.14	2.07	1.99	1.81	2.14	1.97	23	
13	1.92	1.97	1.97	1.95	1.99	1.94	X	X	X	C1	C1	C1	S	2.03	2.08	2.05	2.10	2.14	2.13	2.11	2.13	2.15	2.10	2.12	1.92	2.15	2.05	18	
14	X	X	X	X	X	X	X	X	X	2.34	2.17	S	2.12	2.09	2.12	2.14	2.14	2.10	2.13	2.19	2.26	2.18	2.24	2.18	2.09	2.34	2.17	15	
15	2.17	2.20	2.17	2.20	2.26	2.26	2.24	2.30	2.35	2.12	S	2.03	1.96	1.93	1.98	2.02	1.99	2.05	2.05	2.02	1.99	2.04	2.07	2.10	1.93	2.35	2.11	24	
16	2.14	2.31	2.33	2.36	2.43	2.48	2.49	2.50	2.61	S	X	X	X	2.15	2.18	2.27	2.39	2.50	2.36	2.24	2.22	2.22	2.23	2.14	2.61	2.33	21		
17	2.27	2.27	2.34	2.36	2.41	2.46	2.54	2.65	S	2.77	2.72	2.57	2.56	2.55	2.59	2.52	2.59	2.70	2.62	2.58	2.61	2.75	2.98	3.00	2.27	3.00	2.58	24	
18	2.94	2.90	2.88	2.91	2.94	2.91	2.97	S	3.17	3.16	3.09	2.86	2.06	2.04	2.06	2.07	2.07	2.15	2.05	2.02	2.00	2.02	2.06	2.09	2.00	3.17	2.50	24	
19	2.15	2.33	2.20	2.09	2.04	2.03	S	1.89	1.84	1.81	C1	C1	C1	C1	C1	2.02	2.11	2.10	2.10	2.11	2.11	2.12	2.11	2.11	1.81	2.33	2.07	19	
20	2.16	2.17	2.15	2.10	2.08	S	2.07	2.08	2.17	2.15	2.08	2.09	2.07	2.09	2.12	2.16	2.20	2.24	2.19	2.35	2.36	2.31	2.33	2.36	2.07	2.36	2.18	24	
21	2.31	2.22	2.20	2.20	S	2.18	2.16	2.17	2.20	2.15	2.12	2.11	2.11	2.12	2.11	2.13	2.12	2.10	2.09	2.16	2.06	2.05	2.05	2.07	2.05	2.31	2.14	24	
22	2.05	2.05	2.05	S	2.04	2.03	2.05	2.07	2.08	2.10	2.14	2.08	2.05	2.04	2.08	2.10	2.13	2.17	2.18	2.31	2.24	2.17	2.07	2.03	2.03	2.31	2.10	24	
23	2.01	2.00	S	2.00	2.02	2.03	2.03	2.04	2.13	2.15	2.09	2.10	2.09	2.10	2.09	2.11	2.14	2.15	2.13	2.08	2.08	2.08	2.09	2.10	2.00	2.15	2.08	24	
24	2.10	S	2.12	2.14	2.15	2.15	2.14	2.16	2.18	2.20	2.19	2.16	2.14	2.13	2.13	2.15	2.15	2.17	2.14	2.14	2.11	2.10	2.11	2.11	2.10	2.20	2.14	24	
25	S	2.09	2.10	2.08	2.09	2.09	2.10	2.11	2.09	2.09	2.08	2.08	2.10	2.09	2.08	2.08	2.13	2.17	2.17	2.17	2.25	2.27	2.25	S	2.08	2.27	2.13	24	
26	2.21	2.23	2.24	2.28	2.36	2.29	2.32	2.28	2.33	2.41	2.55	2.58	2.63	2.47	2.45	2.46	2.46	2.39	2.40	2.46	2.44	2.45	S	2.40	2.21	2.63	2.40	24	
27	2.37	2.34	2.36	2.34	2.39	2.38	2.51	2.42	2.48	2.51	2.63	2.65	2.62	2.65	2.71	2.79	2.88	2.87	2.90	2.94	3.00	S	2.28	2.14	2.14	3.00	2.57	24	
28	2.21	2.83	2.64	2.22	2.25	2.13	2.13	2.11	2.10	2.08	2.02	1.99	2.02	2.03	2.03	2.06	2.10	2.11	2.12	2.17	S	2.10	2.12	2.17	1.99	2.83	2.16	24	
29	2.16	2.16	2.14	2.17	2.22	2.19	2.22	2.23	2.25	2.24	2.25	2.27	2.23	2.24	2.24	2.28	2.38	2.48	2.35	S	2.36	2.39	2.22	2.24	2.14	2.48	2.26	24	
30	2.20	2.22	2.23	2.23	2.30	2.42	2.37	2.43	2.49	2.59	2.74	2.46	2.31	2.26	2.22	2.20	2.23	2.29	S	2.15	2.14	2.10	2.11	2.11	2.10	2.74	2.30	24	
31	2.16	1.93	1.84	1.76	1.71	1.70	1.70	1.72	1.72	1.72	1.70	1.72	1.68	1.68	1.71	1.73	1.75	S	1.70	1.70	1.71	1.72	1.70	1.70	1.68	2.16	1.75	24	
HOURLY MAX	2.94	2.90	2.88	2.91	2.94	2.91	2.97	2.65	3.17	3.16	3.09	2.86	2.63	2.65	2.71	2.79	2.88	2.87	2.90	2.94	3.00	2.75	2.98	3.00					
HOURLY AVG	2.19	2.22	2.22	2.21	2.20	2.20	2.22	2.18	2.23	2.23	2.24	2.21	2.17	2.15	2.15	2.15	2.19	2.22	2.18	2.18	2.18	2.16	2.14	2.16					

**STATUS FLAG CODES**

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

**24 HR AVERAGES December 2016**

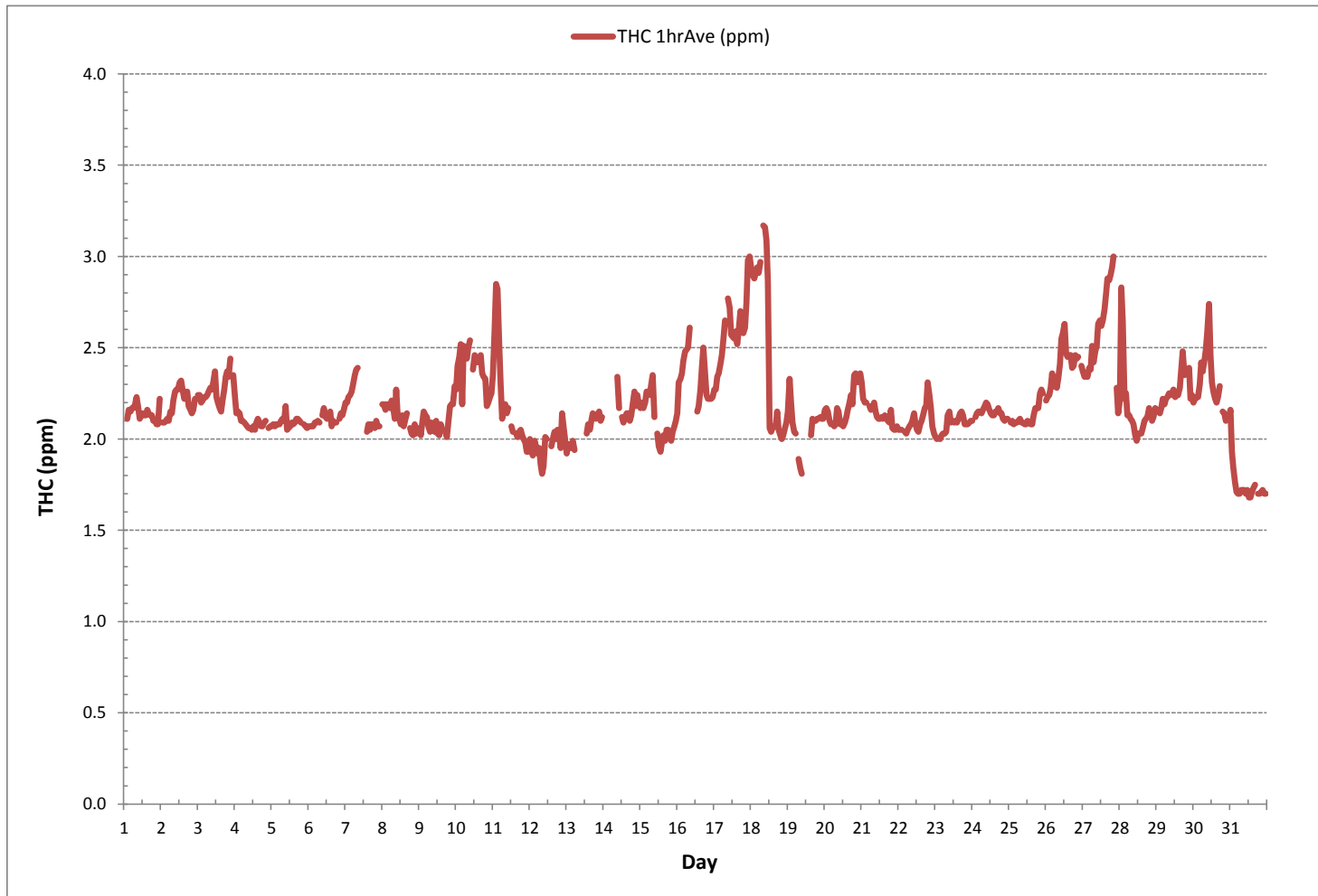


**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	678				
MINIMUM 1-HR AVERAGE:	1.68 ppm	@ HOUR(S)	12, 13	ON DAY(S)	31, 31
MAXIMUM 1-HR AVERAGE:	3.17 ppm	@ HOUR(S)	8	ON DAY(S)	18
MAXIMUM 24-HR AVERAGE:	2.58 ppm			ON DAY(S)	17
				VAR-VARIOUS	
IZS CALIBRATION TIME:	33 hrs	OPERATIONAL TIME:		716 hrs	
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:		96.2 %	
STANDARD DEVIATION:	0.22	MONTHLY AVERAGE:		2.19 ppm	



TOTAL HYDROCARBONS Hourly Averages (THC ppm)





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

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
DAY 1	2.32	S	2.38	2.41	2.41	2.43	2.43	2.44	2.58	2.55	2.37	2.59	2.43	2.43	2.40	2.41	2.40	2.52	2.38	2.38	2.35	2.34	2.34	2.31	2.31	2.59	2.42	24	
2	S	2.35	2.34	2.37	2.37	2.34	3.22	2.35	2.50	2.47	2.49	2.50	2.49	2.55	2.46	2.49	2.44	2.40	2.37	2.29	2.29	2.28	2.32	S	2.28	3.22	2.44	24	
3	2.34	2.32	2.31	2.34	2.32	2.32	2.34	2.35	2.37	2.35	2.41	2.44	2.35	2.29	2.28	2.22	2.55	2.68	2.60	2.53	2.43	2.59	S	2.47	2.22	2.68	2.40	24	
4	2.37	2.23	2.22	2.20	2.17	2.14	2.13	2.13	2.14	2.12	2.14	2.38	2.13	2.14	2.23	2.20	2.14	2.14	2.12	2.14	2.16	S	2.13	2.16	2.12	2.38	2.18	24	
5	2.17	2.16	2.17	2.19	2.20	2.20	2.23	2.26	2.25	2.64	2.23	2.32	2.23	2.26	2.29	2.28	2.32	2.34	2.34	2.31	S	2.31	2.31	2.29	2.16	2.64	2.27	24	
6	2.31	2.32	2.31	2.32	2.34	2.34	2.35	2.35	X	2.52	2.59	2.41	2.46	2.43	2.47	2.34	2.38	2.40	2.37	S	2.37	2.38	2.37	2.40	2.31	2.59	2.39	23	
7	2.43	2.52	2.45	2.43	2.44	2.49	2.52	2.55	2.53	C	C	C	C	C	C	2.47	2.25	2.23	2.26	S	2.23	2.31	2.23	2.25	X	2.23	2.55	23	
8	4.19	2.37	2.34	2.37	2.35	2.34	2.37	2.35	4.55	3.01	2.31	2.34	2.25	2.26	2.22	2.25	2.29	S	2.20	2.17	2.17	2.23	2.17	2.20	2.17	4.55	2.49	24	
9	2.20	2.15	2.31	2.31	2.32	2.26	2.23	2.20	2.23	2.22	2.20	2.69	2.25	2.17	2.20	2.53	S	2.37	2.12	2.20	2.31	2.28	2.34	2.37	2.12	2.69	2.28	24	
10	2.34	2.53	2.55	2.57	4.50	2.55	2.49	2.46	2.52	2.57	X	2.43	2.45	2.42	2.38	S	2.43	2.40	2.34	2.41	2.12	2.14	2.16	2.20	2.12	4.50	2.50	23	
11	2.31	2.57	2.82	2.76	2.63	2.28	2.03	2.12	2.16	2.06	2.09	X	1.98	2.09	S	2.13	1.94	1.98	1.98	1.97	1.94	1.92	1.90	1.91	1.90	2.82	2.16	23	
12	1.98	1.97	1.91	2.00	1.98	1.94	1.97	1.91	1.85	1.92	2.37	2.07	X	S	2.06	2.12	2.59	2.12	2.29	2.12	2.06	2.44	2.41	2.35	1.85	2.59	2.11	23	
13	2.04	2.10	2.10	2.07	2.18	2.16	X	X	X	C1	C1	C1	S	2.23	2.49	2.28	2.44	2.44	2.37	2.37	2.32	2.34	2.31	2.37	2.04	2.49	2.27	18	
14	X	X	X	X	X	X	X	X	X	4.35	2.46	S	2.59	2.35	2.41	2.40	2.78	2.50	2.37	2.44	2.49	2.43	2.53	2.37	2.35	4.35	2.61	15	
15	2.37	2.40	2.37	2.38	2.46	2.59	2.43	2.52	2.90	2.75	S	2.25	2.12	2.09	2.13	2.16	2.17	3.28	2.19	2.17	2.13	2.20	2.23	2.23	2.09	3.28	2.37	24	
16	2.31	2.50	2.47	2.49	2.60	2.63	2.63	2.68	2.78	S	X	X	X	2.32	2.29	2.34	4.74	3.51	2.44	2.26	2.18	2.18	2.18	2.18	2.18	4.74	2.59	21	
17	2.22	2.21	2.27	2.27	2.31	2.35	2.47	2.56	S	2.69	2.61	2.52	2.37	2.35	2.40	2.37	3.69	3.16	2.38	2.35	2.52	2.65	2.81	2.82	2.21	3.69	2.54	24	
18	2.71	2.71	2.71	2.77	2.72	2.59	2.64	S	2.82	2.83	2.74	2.64	1.86	1.66	1.67	1.75	1.70	1.81	1.64	1.63	1.60	1.60	1.66	1.69	1.60	2.83	2.18	24	
19	1.75	1.99	1.95	1.69	1.61	1.60	S	1.60	1.60	1.87	C1	C1	C1	C1	C1	C1	2.24	2.25	2.27	2.30	2.31	2.34	2.34	2.36	1.60	2.36	2.00	18	
20	2.43	2.45	2.43	2.40	2.39	S	2.40	2.42	2.81	2.64	2.43	2.43	2.46	3.31	2.53	2.58	2.77	2.87	2.61	3.02	3.66	2.80	2.69	2.74	2.39	3.66	2.66	24	
21	2.74	2.59	2.58	2.59	S	2.55	2.53	2.55	2.68	2.61	2.53	2.49	2.58	2.66	2.48	2.49	2.71	2.52	2.47	2.62	2.41	2.41	2.43	2.43	2.41	2.74	2.55	24	
22	2.40	2.42	2.40	S	2.40	2.40	2.42	2.43	2.44	2.56	2.64	2.49	2.46	2.45	2.46	2.77	2.62	2.58	2.58	2.74	2.76	2.61	2.50	2.40	2.40	2.77	2.52	24	
23	2.40	2.40	S	2.42	2.43	2.45	2.46	2.49	2.81	3.15	2.89	2.83	2.55	2.56	3.49	2.61	2.74	2.80	2.70	2.59	2.62	2.61	2.61	2.64	2.40	3.49	2.66	24	
24	2.64	S	2.68	2.69	2.71	2.71	2.71	2.74	2.76	3.07	2.80	2.84	2.71	2.71	2.71	2.80	2.74	2.77	2.71	2.74	2.71	2.68	2.71	2.68	2.64	3.07	2.74	24	
25	S	2.67	2.69	2.67	2.67	2.68	2.68	2.68	2.67	2.65	2.64	2.64	2.74	2.64	2.64	2.64	2.71	2.74	2.74	2.77	2.86	2.98	3.13	S	2.64	3.13	2.72	24	
26	2.83	2.74	2.77	2.77	3.05	2.83	2.89	2.77	2.86	3.01	2.98	3.04	3.07	2.92	2.86	2.84	2.86	2.80	2.86	2.86	2.86	2.83	2.90	S	2.74	2.74	3.07	2.87	24
27	2.74	2.64	2.68	2.65	2.89	2.76	2.95	2.77	2.90	2.81	2.98	3.45	3.08	2.98	3.02	3.17	3.26	3.29	3.20	3.20	3.20	3.32	S	3.01	2.43	3.45	2.96	24	
28	2.65	3.45	3.30	2.96	2.93	2.49	2.49	2.46	2.68	2.46	2.42	2.40	2.43	2.46	2.45	2.55	2.58	2.76	2.61	2.71	S	2.55	2.59	2.64	2.40	3.45	2.65	24	
29	2.64	2.61	2.59	2.64	2.67	2.65	2.71	2.68	2.71	2.75	2.75	2.72	2.70	2.74	3.11	2.87	2.86	3.26	2.83	S	2.83	2.86	2.68	2.67	2.59	3.26	2.76	24	
30	2.62	2.67	2.65	2.62	2.84	2.86	2.77	2.95	3.04	3.14	3.17	2.96	2.68	2.64	2.56	2.56	2.72	S	2.49	2.49	2.46	2.49	2.46	2.46	2.46	3.17	2.72	24	
31	2.52	2.58	2.52	2.42	2.36	2.34	2.37	2.40	2.40	2.45	2.40	2.52	2.40	2.40	2.43	2.48	2.56	S	2.49	2.49	2.52	2.52	2.52	2.55	2.34	2.58	2.46	24	
HOURLY MAX	4.19	3.45	3.30	2.96	4.50	2.86	3.22	2.95	4.55	4.35	3.17	3.45	3.08	3.31	3.49	3.17	4.74	3.51	3.20	3.20	3.66	2.98	3.13	2.82					
HOURLY AVG	2.46	2.45	2.46	2.44	2.53	2.42	2.50	2.43	2.61	2.65	2.55	2.58	2.45	2.45	2.47	2.44	2.62	2.61	2.43	2.43	2.45	2.42	2.42	2.40					

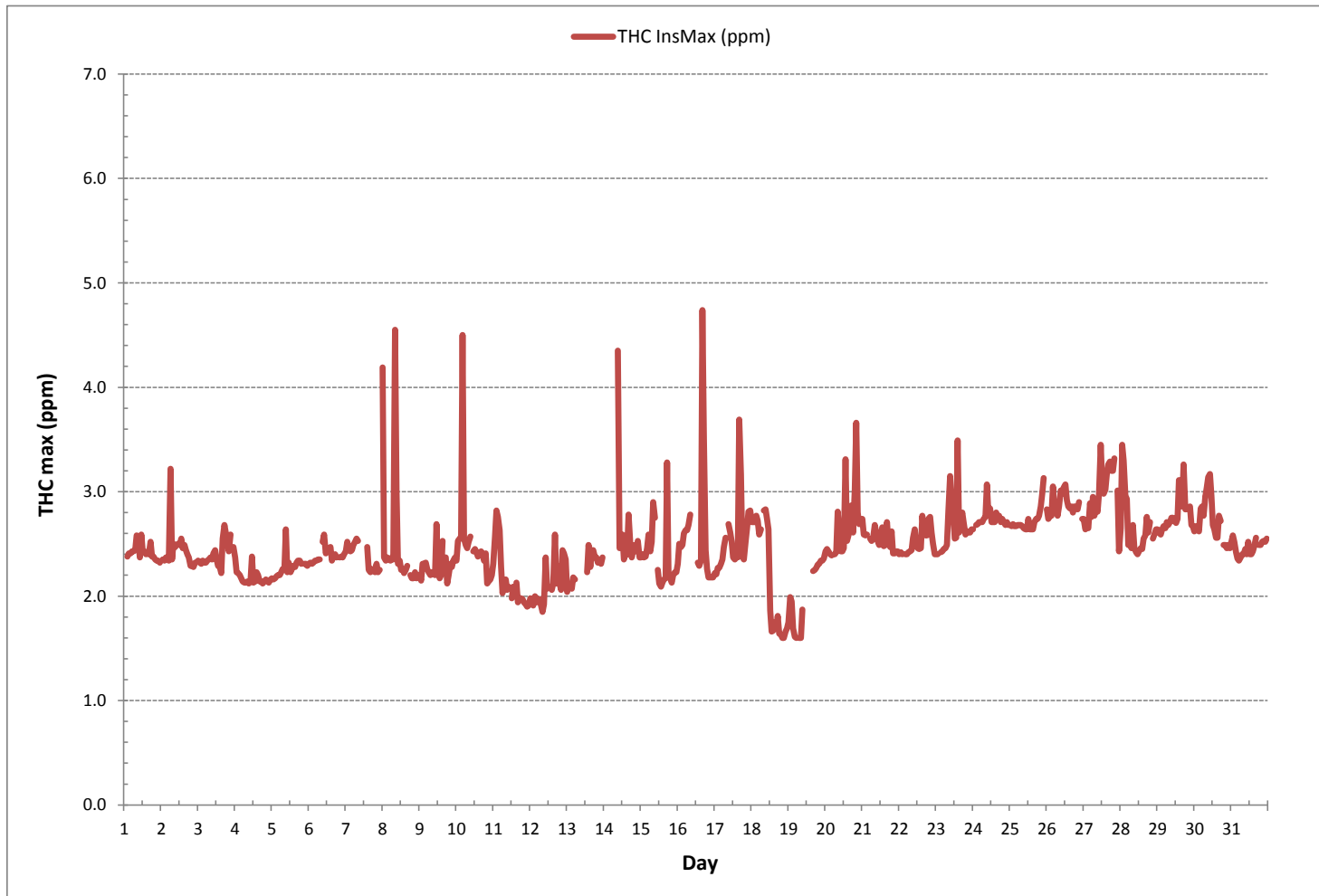
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	677
MAXIMUM INSTANTANEOUS VALUE:	4.74 ppm @ HOUR(S) 16 ON DAY(S) 16
	VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	715 hrs
STANDARD DEVIATION:	0.35

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

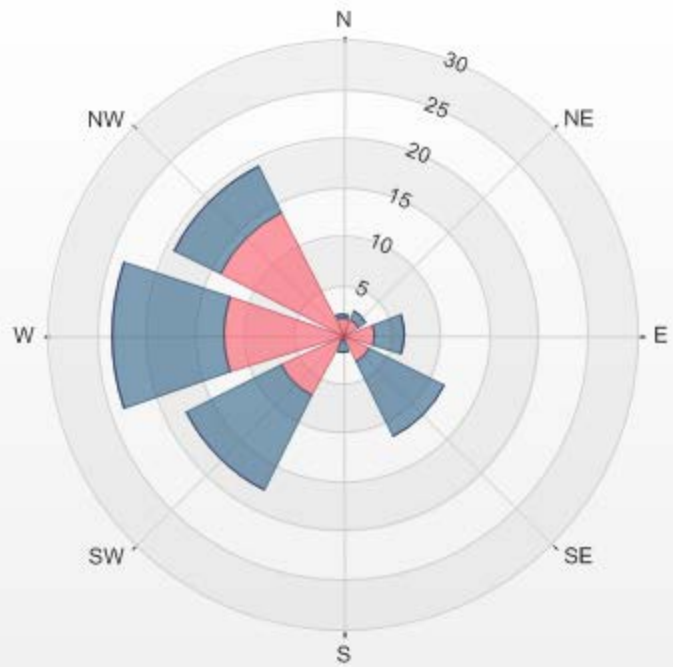


Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-THC[ppm] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 14.90% Valid Data: 91.13% Calm Avg: 2.40 [ppm]

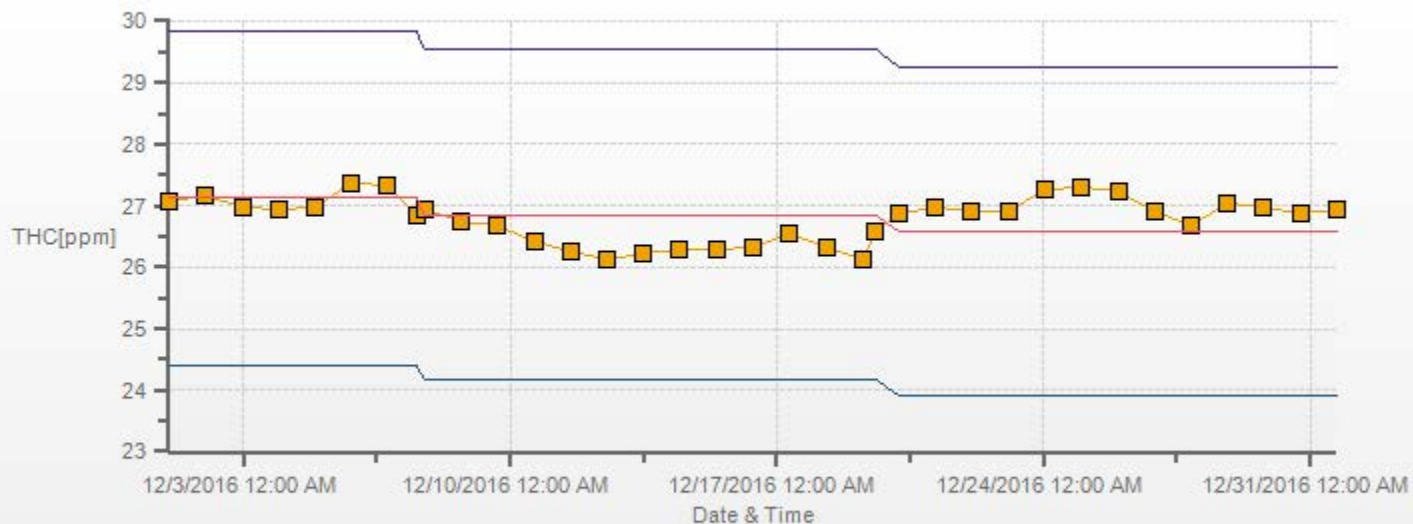
Direction	0.0-1.1	1.1-2.1	2.1-3.2	>3.2	Total
N	0	1.77	0.29	0	2.06
NE	0	1.77	0.88	0	2.65
E	0	3.24	3.1	0	6.34
SE	0	2.95	8.7	0	11.65
S	0	0.59	1.18	0	1.77
SW	0	6.93	10.77	0	17.7
W	0	12.09	11.5	0	23.59
NW	0	13.86	5.46	0	19.32
Summary	0	43.2	41.88	0	85.08

% Icon	Classes (ppm)	0	0.0-1.1	43	1.1-2.1	42	2.1-3.2	0	>3.2
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**LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-THC[ppm] 01/12/2016 00:00 - 31/12/2016 23:00**  
**Calm: 14.90% Calm Poll Avg: 2.40[ppm]**



THC[ppm] Calibration: LICA COLD LAKE SOUTH Monthly: 2016/12 Type: Span



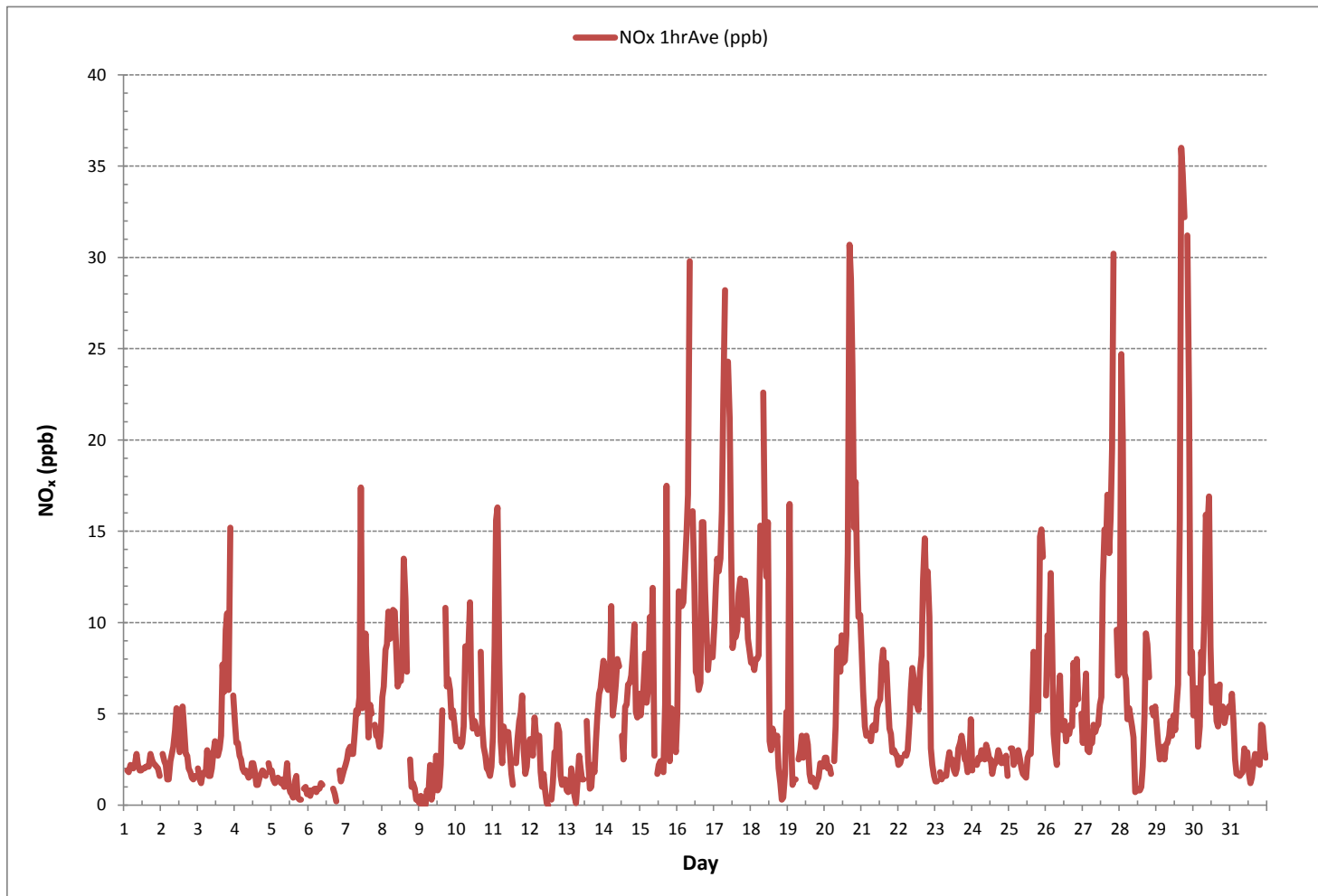
■ Span Meas 
 — Span Ref 
 — Span Low 
 — Span High

## ***OXIDES OF NITROGEN***





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





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

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	1.3	S	6.0	3.4	4.3	4.3	4.0	4.3	4.2	3.9	4.1	3.8	5.2	4.2	4.1	3.6	2.9	6.1	3.8	3.8	4.3	4.1	3.7	3.8	1.3	6.1	4.1	24
2	S	4.7	3.8	3.7	2.6	2.5	10.4	11.4	7.5	13.6	20.3	20.3	5.2	11.3	23.0	8.3	6.3	5.1	4.0	3.2	2.5	2.5	2.4	S	2.4	23.0	7.9	24
3	3.4	2.3	2.0	2.8	3.0	3.3	15.7	2.4	2.3	3.2	3.9	8.0	4.2	4.6	6.5	6.8	15.4	11.3	15.4	15.9	8.3	28.9	S	8.6	2.0	28.9	7.7	24
4	7.3	5.2	5.4	5.1	4.7	3.8	4.0	3.4	3.3	2.4	2.4	3.7	3.7	3.0	2.3	2.0	3.2	2.9	3.2	2.8	2.6	S	3.3	3.0	2.0	7.3	3.6	24
5	3.0	2.4	2.5	2.4	2.9	2.5	2.7	2.7	1.9	2.5	12.7	2.9	2.4	2.8	2.4	7.6	13.7	1.3	1.5	1.5	S	2.3	2.1	2.1	1.3	13.7	3.5	24
6	2.8	1.5	1.9	1.9	2.2	2.1	2.3	2.2	2.3	C	C	C	C	C	C	C	2.7	2.5	2.3	S	3.8	3.8	4.1	3.6	1.5	4.1	2.6	24
7	3.9	4.6	5.1	5.1	5.1	5.1	7.2	8.9	8.3	9.9	201.2	10.5	8.3	P	64.6	7.6	10.8	12.5	S	8.3	5.5	5.6	4.5	7.3	3.9	201.2	18.6	23
8	7.6	8.4	10.6	11.0	12.6	11.8	13.9	14.9	13.4	10.9	11.8	8.5	8.8	11.2	39.6	22.5	9.9	S	4.2	3.3	3.8	3.2	4.2	2.1	2.1	39.6	10.8	24
9	2.3	3.6	2.1	3.0	1.8	3.2	1.9	33.3	2.3	2.6	3.0	43.7	4.3	5.0	13.0	30.0	S	46.3	14.0	11.9	11.6	7.4	7.3	7.4	1.8	46.3	11.3	24
10	5.5	6.9	5.5	5.5	7.8	7.1	12.9	13.0	13.2	17.0	9.4	6.3	10.0	6.7	6.5	S	14.0	7.2	6.8	4.7	4.5	4.7	3.6	4.8	3.6	17.0	8.0	24
11	7.4	12.5	20.2	19.2	15.1	5.9	4.6	6.9	6.3	5.6	6.5	5.5	3.5	2.9	S	4.3	7.2	14.7	8.9	9.2	6.0	3.9	5.0	5.8	2.9	20.2	8.1	24
12	6.8	5.6	5.0	8.0	6.9	6.0	6.4	4.8	5.1	7.7	2.8	2.1	1.1	S	1.9	4.4	6.4	5.9	7.3	6.8	4.6	2.8	3.6	4.2	1.1	8.0	5.1	24
13	3.8	3.0	3.8	4.7	2.8	2.4	1.5	3.0	14.2	6.0	6.3	5.2	S	16.4	7.4	7.7	4.1	4.2	3.3	7.1	8.9	9.2	10.5	10.6	1.5	16.4	6.4	24
14	13.9	16.4	10.6	9.3	11.3	16.7	7.5	11.0	13.5	12.7	10.9	S	14.4	6.0	10.5	11.5	13.0	12.1	10.8	13.5	13.9	9.3	8.4	8.3	6.0	16.7	11.5	24
15	8.1	8.8	9.3	12.3	7.5	9.9	13.4	45.9	58.9	14.9	S	3.3	6.0	4.2	5.2	12.1	13.4	116.2	16.6	6.2	18.0	9.9	6.5	5.0	3.3	116.2	17.9	24
16	16.0	24.3	13.9	16.3	17.5	18.8	20.4	27.3	44.4	S	21.1	14.2	12.2	11.0	11.5	10.5	42.3	50.2	21.4	15.7	11.2	12.1	12.4	12.9	10.5	50.2	19.9	24
17	16.0	18.3	16.5	16.4	18.6	22.8	32.9	33.5	S	35.8	27.4	26.1	11.0	12.5	12.2	14.2	46.5	61.2	19.6	14.3	46.5	16.8	14.7	12.7	11.0	61.2	23.8	24
18	10.6	10.5	9.9	12.4	10.7	11.1	25.2	S	34.1	18.6	21.7	21.9	8.9	5.5	6.8	6.0	9.5	8.1	4.9	3.2	1.9	2.7	4.0	31.1	1.9	34.1	12.1	24
19	10.7	22.4	15.4	2.3	2.4	2.4	S	4.2	5.0	17.7	3.9	5.4	5.7	P	3.7	2.4	2.4	2.3	2.0	2.4	2.7	4.4	4.1	3.5	2.0	22.4	5.8	23
20	4.5	4.4	3.2	3.3	3.8	S	4.1	8.4	12.7	12.0	9.6	15.9	12.1	13.8	14.2	28.2	46.5	53.6	35.7	25.4	35.4	20.7	14.1	12.7	3.2	53.6	17.1	24
21	10.8	8.8	6.5	5.1	S	6.0	5.0	6.4	6.9	5.4	8.7	7.6	7.2	15.5	13.7	11.7	9.2	8.8	6.1	5.8	4.4	6.2	4.2	3.9	3.9	15.5	7.6	24
22	3.3	3.9	5.0	S	4.0	3.6	5.0	6.7	7.4	10.2	10.0	7.8	7.1	7.3	9.7	12.6	24.5	24.3	18.5	18.5	21.2	5.8	3.6	3.1	3.1	24.5	9.7	24
23	2.6	2.8	S	4.4	3.2	4.1	4.2	3.5	7.2	6.9	7.1	5.5	4.6	4.9	6.3	6.3	7.3	5.4	5.5	4.4	9.4	3.6	4.7	82.5	2.6	82.5	8.5	24
24	4.1	S	4.1	3.7	4.6	5.0	8.4	5.3	4.2	8.3	5.7	5.4	5.5	4.1	4.5	7.8	4.9	5.2	6.3	4.6	5.4	4.0	5.5	3.2	3.2	8.4	5.2	24
25	S	4.9	6.2	5.3	4.5	5.4	5.7	5.0	4.4	4.7	5.0	3.1	6.9	5.0	5.8	10.5	14.2	12.4	9.9	11.7	24.5	27.3	27.2	S	3.1	27.3	9.5	24
26	9.9	21.0	11.6	14.9	18.0	5.8	4.6	4.1	7.3	15.7	5.7	5.5	6.4	4.5	5.5	5.1	6.7	6.7	14.5	11.7	22.6	10.9	S	9.9	4.1	22.6	9.9	24
27	5.0	9.0	13.9	4.5	4.9	8.7	6.1	6.7	5.8	5.5	5.9	8.2	7.3	53.3	68.2	33.6	39.7	20.8	26.8	27.8	46.9	S	20.5	9.6	4.5	68.2	19.1	24
28	12.5	39.0	33.5	16.4	13.4	6.7	8.2	6.9	5.4	5.7	1.8	1.4	1.5	1.5	1.9	3.9	12.2	21.8	19.7	9.5	S	8.4	8.8	7.6	1.4	39.0	10.8	24
29	6.9	5.0	3.5	4.9	5.3	4.5	6.5	6.2	6.8	9.6	5.8	7.1	6.8	9.6	9.1	36.4	50.0	54.1	40.0	S	40.3	29.0	12.6	17.7	3.5	54.1	16.4	24
30	7.1	9.3	12.5	5.1	8.2	14.1	9.0	20.5	22.1	22.1	20.7	13.1	6.8	7.8	11.4	7.5	9.1	10.4	S	6.5	5.9	7.8	7.9	7.5	5.1	22.1	11.0	24
31	6.4	7.5	6.8	3.6	2.4	3.6	3.0	3.6	2.7	4.0	3.7	4.2	4.5	2.0	2.4	3.7	4.6	S	3.2	4.1	6.1	8.7	5.9	4.5	2.0	8.7	4.4	24
HOURLY MAX	16.0	39.0	33.5	19.2	18.6	22.8	32.9	45.9	58.9	35.8	201.2	43.7	14.4	53.3	68.2	36.4	50.0	116.2	40.0	27.8	46.9	29.0	27.2	82.5				
HOURLY AVG	7.0	9.6	8.5	7.2	7.1	7.0	8.6	10.5	11.1	10.2	15.8	9.5	6.6	8.8	12.9	11.3	15.1	20.5	11.6	9.1	13.2	9.2	7.6	10.3				

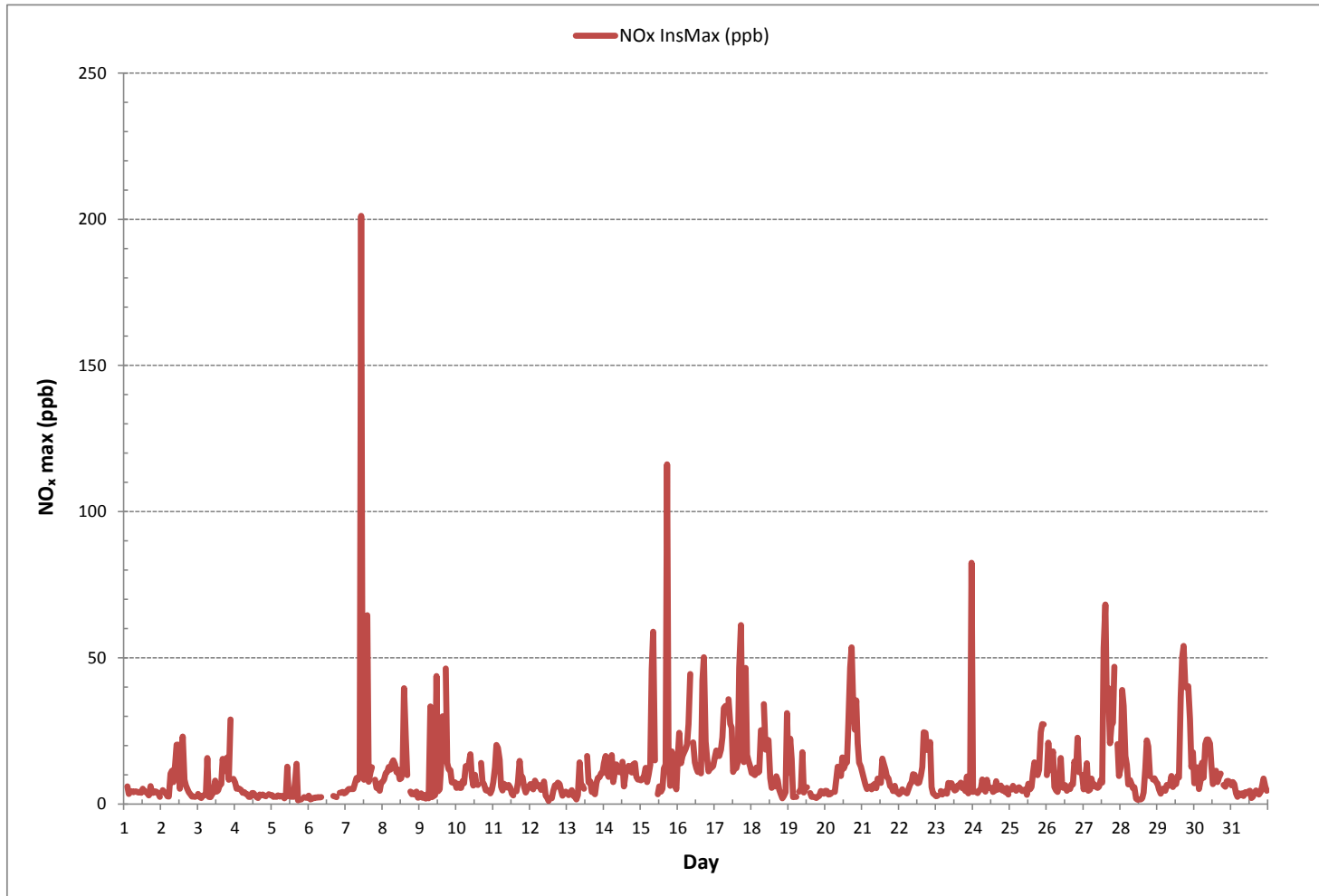
STATUS FLAG CODES

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:	702
MAXIMUM INSTANTANEOUS VALUE:	201.2 ppb @ HOUR(S) 10 ON DAY(S) 7
	VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	13.1
OPERATIONAL TIME:	742 hrs

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

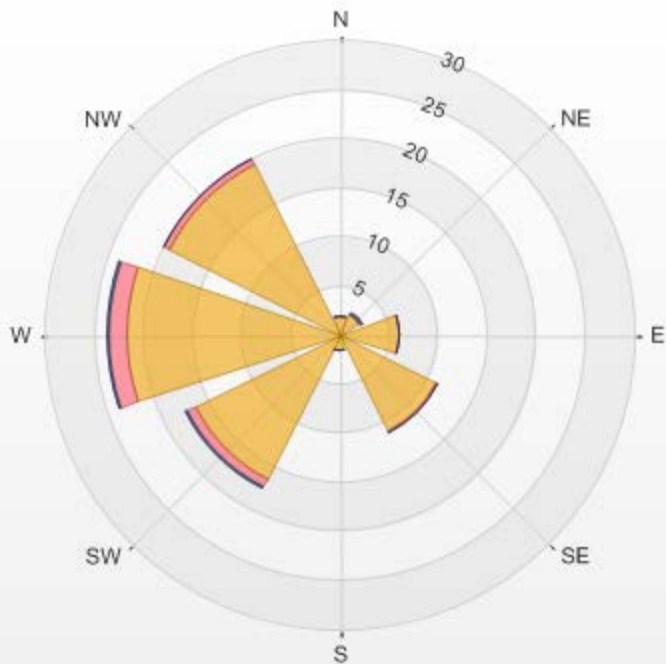


Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NOX[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 15.24% Valid Data: 94.35% Calm Avg: 11.16 [ppb]

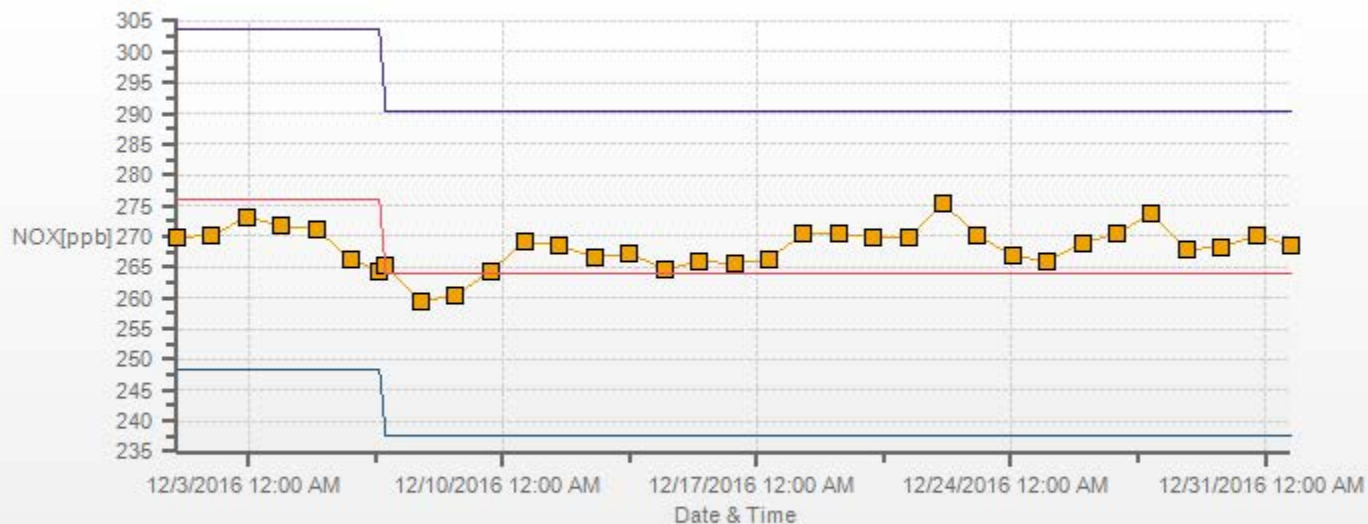
Direction	0.0-12.0	12.0-24.1	24.1-36.1	>36.1	Total
N	1.99	0	0	0	1.99
NE	2.28	0.14	0.14	0	2.56
E	6.13	0	0	0	6.13
SE	10.97	0.28	0	0	11.25
S	1.71	0	0	0	1.71
SW	16.38	1	0.14	0	17.52
W	21.65	1.85	0.14	0	23.64
NW	19.52	0.43	0	0	19.95
Summary	80.63	3.7	0.42	0	84.75

% Icon Classes (ppb) 81 0.0-12.0 4 12.0-24.1 0 24.1-36.1 0 >36.1

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NOX[ppb] 01/12/2016 00:00 - 31/12/2016 23:00  
Calm: 15.24% Calm Poll Avg: 11.16[ppb]



NOX[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 2016/12 Type: Span



Span Meas Span Ref Span Low Span High

## ***NITRIC OXIDES***

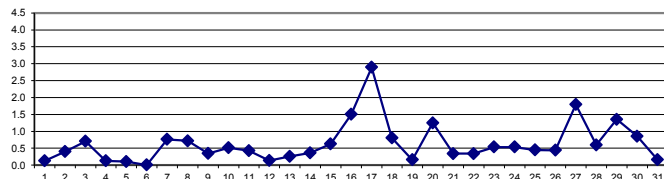
**NITRIC OXIDE Hourly Averages (NO ppb)**

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.			
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.				
DAY																															
1	0.0	S	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.0	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.0	0.2	0.1	0.0	0.2	0.1	24
2	S	0.2	0.0	0.1	0.0	0.0	0.2	0.3	0.3	0.7	1.4	2.0	0.4	0.9	1.4	0.4	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.0	S	0.0	2.0	0.4	24		
3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.1	0.3	0.6	0.5	0.5	0.4	0.4	1.1	0.5	1.2	1.9	0.6	7.0	S	0.8	0.0	7.0	0.7	24			
4	0.3	0.1	0.5	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.5	0.1	24			
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	0.3	0.2	0.2	0.1	0.4	0.4	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.7	0.1	24			
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	C	C	C	C	C	C	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24			
7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.9	4.9	1.4	1.7	3.8	2.9	0.5	0.4	0.5	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.8	24		
8	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.9	0.4	1.0	1.2	1.5	1.9	2.2	4.5	2.2	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.7	24		
9	0.0	0.1	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.3	0.6	0.3	0.3	0.6	1.2	S	2.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	2.2	0.3	24			
10	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.8	3.0	1.7	1.6	1.8	1.3	0.8	S	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.5	24			
11	0.1	0.3	0.5	0.6	0.3	0.1	0.1	0.3	0.3	0.7	1.3	1.2	0.7	0.4	S	0.4	0.1	0.6	0.3	0.4	0.3	0.2	0.3	0.3	0.1	1.3	0.4	24			
12	0.2	0.3	0.1	0.3	0.2	0.3	0.2	0.0	0.1	0.2	0.1	0.0	0.0	S	0.0	0.0	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.1	24			
13	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.4	0.2	0.3	0.4	S	1.8	0.9	0.5	0.0	0.0	0.0	0.2	0.5	0.0	0.2	0.1	0.0	1.8	0.3	24			
14	0.2	0.1	0.1	0.0	0.2	0.5	0.0	0.1	0.1	1.0	1.5	S	1.0	0.4	0.6	0.3	0.2	0.7	0.2	0.4	0.3	0.0	0.1	0.3	0.0	1.5	0.4	24			
15	0.2	0.4	0.3	0.3	0.0	0.1	0.2	0.9	4.8	0.5	S	0.3	0.6	0.5	0.3	0.4	0.2	3.4	0.2	0.1	0.4	0.3	0.0	0.0	0.0	4.8	0.6	24			
16	0.3	0.7	0.1	0.2	0.5	0.8	0.6	0.9	8.7	S	5.3	4.4	2.5	2.1	1.4	0.6	2.3	2.4	0.4	0.0	0.0	0.1	0.1	0.1	0.0	8.7	1.5	24			
17	0.2	0.3	0.3	0.1	0.6	1.7	5.4	10.8	S	11.7	11.5	6.4	3.5	3.6	2.6	1.3	0.5	1.4	0.6	0.4	2.0	0.9	0.4	0.3	0.1	11.7	2.9	24			
18	0.2	0.1	0.0	0.2	0.1	0.0	1.1	S	3.2	2.5	3.7	4.9	0.6	0.3	0.4	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.1	0.6	0.0	4.9	0.8	24			
19	0.1	0.5	0.1	0.0	0.0	0.0	S	0.0	0.0	0.4	0.2	0.4	0.5	0.5	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.5	0.2	24			
20	0.2	0.1	0.0	0.0	0.1	S	0.1	0.1	0.3	0.7	1.2	2.2	1.9	1.7	1.3	1.4	4.7	5.8	3.0	1.0	1.7	0.6	0.3	0.3	0.0	5.8	1.2	24			
21	0.2	0.1	0.1	0.0	S	0.2	0.2	0.3	0.2	0.3	0.7	1.0	0.8	1.1	0.9	0.5	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.2	0.0	1.1	0.3	24			
22	0.1	0.2	0.2	S	0.1	0.0	0.1	0.2	0.1	0.4	0.6	0.7	1.1	0.8	0.8	0.6	0.6	0.6	0.6	0.1	0.1	0.2	0.1	0.0	0.1	1.1	0.3	24			
23	0.1	0.2	S	0.2	0.1	0.5	0.4	0.4	0.5	0.7	0.6	0.6	0.5	0.4	0.8	0.6	0.7	0.5	0.4	0.3	0.9	0.3	0.5	2.1	0.1	2.1	0.5	24			
24	0.4	S	0.4	0.3	0.4	0.4	0.6	0.7	0.6	1.0	0.8	0.8	0.8	0.5	0.6	0.5	0.5	0.5	0.5	0.4	0.5	0.4	0.4	0.3	0.3	1.0	0.5	24			
25	S	0.4	0.4	0.4	0.4	0.3	0.4	0.5	0.2	0.2	0.3	0.3	0.7	0.6	0.4	1.0	0.4	0.2	0.2	0.2	1.0	0.7	0.7	S	0.2	1.0	0.5	24			
26	0.2	0.4	0.1	0.1	0.1	0.1	0.1	0.0	0.1	1.1	0.8	1.0	1.2	0.9	0.8	0.3	0.2	0.2	0.9	0.1	0.8	0.3	S	0.3	0.0	1.2	0.4	24			
27	0.1	0.6	0.7	0.0	0.1	0.1	0.0	0.2	0.1	0.2	0.7	1.4	1.6	6.0	5.7	4.6	1.8	0.8	1.4	2.5	11.4	S	0.9	0.4	0.0	11.4	1.8	24			
28	0.7	6.6	2.4	0.4	0.2	0.3	0.3	0.3	0.1	0.3	0.0	0.0	0.1	0.0	0.1	0.2	0.1	0.3	0.1	0.2	S	0.3	0.4	0.3	0.0	6.6	0.6	24			
29	0.3	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.5	0.6	1.0	0.7	0.9	0.9	1.7	5.1	6.1	5.2	S	4.6	1.3	0.3	0.6	0.1	6.1	1.4	24			
30	0.2	0.2	0.3	0.2	0.1	0.4	0.2	0.6	1.5	3.2	4.0	2.5	1.4	1.2	1.3	0.3	0.1	0.6	S	0.1	0.2	0.3	0.3	0.4	0.1	4.0	0.9	24			
31	0.2	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.4	0.6	0.2	0.1	0.2	0.2	0.1	S	0.0	0.0	0.4	0.2	0.2	0.3	0.0	0.6	0.2	24			
HOURLY MAX	0.7	6.6	2.4	0.6	0.6	1.7	5.4	10.8	8.7	11.7	11.5	6.4	3.5	6.0	5.7	4.6	5.1	6.1	5.2	2.5	11.4	7.0	0.9	2.1							
HOURLY AVG	0.2	0.4	0.2	0.1	0.1	0.2	0.4	0.7	0.8	1.1	1.6	1.3	1.0	1.2	1.1	0.7	0.7	1.0	0.5	0.3	0.9	0.5	0.2	0.3							

**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 December 2016**

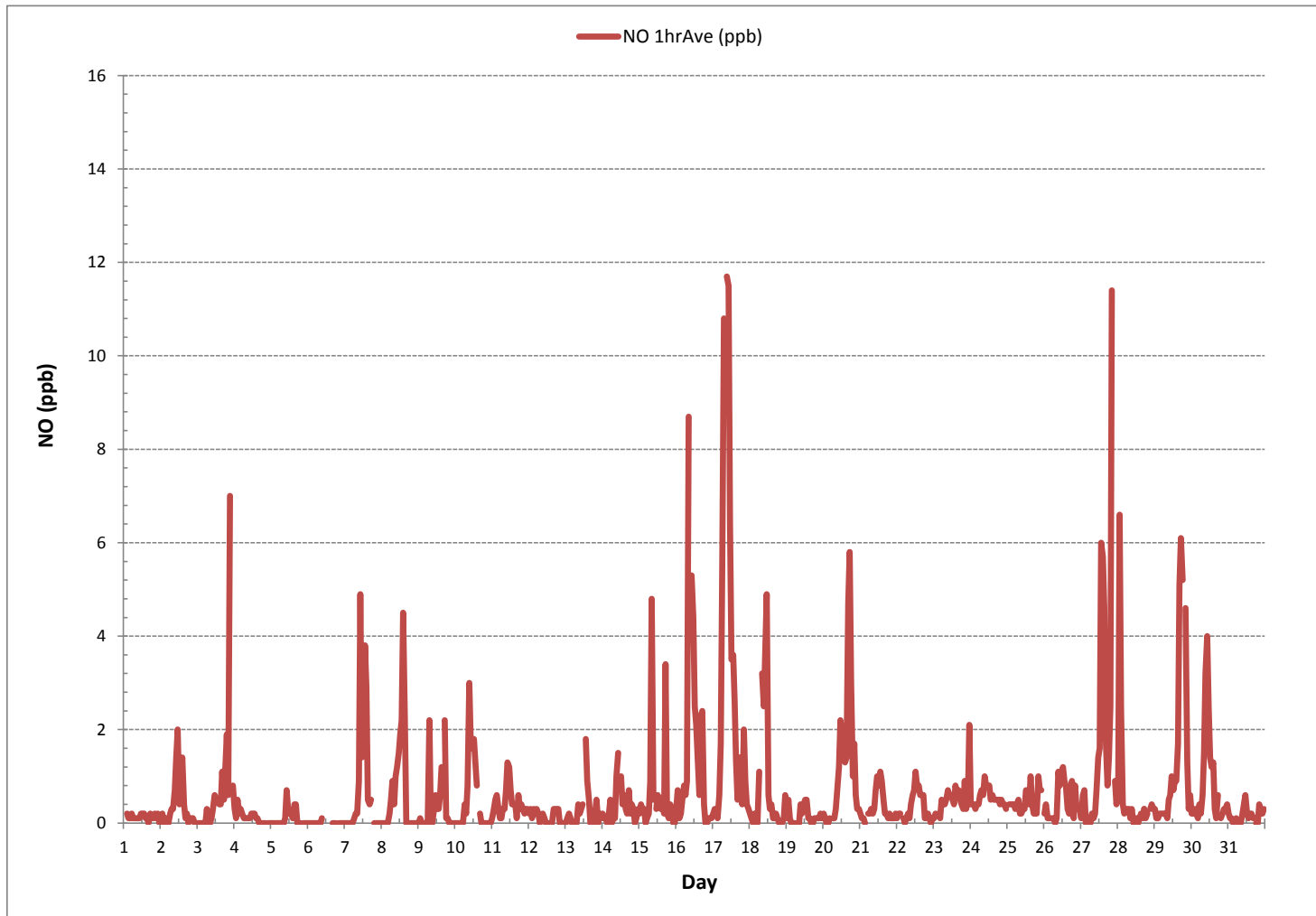


**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	548			
MINIMUM 1-HR AVERAGE:	0.0 ppb	@ HOUR(S)	VAR	ON DAY(S) VAR
MAXIMUM 1-HR AVERAGE:	11.7 ppb	@ HOUR(S)	9	ON DAY(S) 17
MAXIMUM 24-HR AVERAGE:	2.9 ppb			ON DAY(S) 17
				VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs	OPERATIONAL TIME:	744 hrs	
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	1.3	MONTHLY AVERAGE:	0.6 ppb	



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





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

NITRIC OXIDE Instantaneous Maximum (NO ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.				
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.					
DAY																																
1	0.3	S	1.8	0.8	0.8	1.8	1.4	1.3	0.8	0.5	0.5	1.3	2.6	1.0	0.8	0.9	0.3	2.6	0.9	0.9	1.4	0.6	0.9	1.1	0.3	2.6	1.1	24				
2	S	1.3	0.5	0.4	0.5	0.4	3.9	4.4	4.9	5.6	9.7	16.2	2.2	6.2	10.3	1.4	0.9	3.1	0.8	0.6	1.7	0.4	0.4	S	0.4	16.2	3.4	24				
3	0.4	0.4	0.2	0.4	0.5	0.8	6.4	0.5	0.3	0.4	0.9	2.8	0.9	2.1	2.7	2.4	4.0	2.9	4.1	5.0	1.4	15.3	S	2.2	0.2	15.3	2.5	24				
4	1.7	0.9	1.8	1.9	1.8	1.4	1.5	0.8	0.8	0.4	0.5	0.9	0.9	0.8	0.9	0.5	0.4	0.2	0.3	0.2	0.2	S	0.2	0.2	0.2	1.9	0.8	24				
5	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	8.1	0.9	0.6	0.6	0.9	4.0	6.9	0.3	0.4	0.4	S	0.5	0.5	0.5	0.2	8.1	1.2	24				
6	0.5	0.3	0.4	0.3	0.4	0.6	0.4	0.3	0.3	C	C	C	C	C	C	C	0.4	0.2	0.2	S	0.2	0.5	1.0	0.3	0.2	1.0	0.4	24				
7	0.2	0.2	0.4	0.4	0.4	0.4	0.9	1.8	1.2	2.3	69.6	3.4	2.2	P	49.0	2.2	4.1	3.6	S	0.4	0.2	0.2	0.2	0.3	0.2	69.6	6.5	23				
8	0.3	0.4	0.4	0.5	0.5	1.4	2.1	4.4	1.0	1.9	3.9	2.1	2.4	3.4	14.5	9.0	0.6	S	0.4	0.8	0.4	0.9	0.9	0.8	0.3	14.5	2.3	24				
9	0.5	1.0	1.0	1.0	0.5	1.0	0.4	67.1	0.2	0.8	0.9	5.7	2.3	2.3	6.1	18.7	S	30.3	2.7	1.9	0.8	0.4	0.5	0.5	0.2	67.1	6.4	24				
10	0.5	0.5	0.5	0.5	1.6	0.9	2.8	1.4	2.6	5.3	2.6	3.1	3.8	2.2	1.5	S	1.3	1.0	1.2	0.6	0.6	1.4	1.0	1.5	0.5	5.3	1.7	24				
11	1.3	1.7	1.7	2.1	1.3	0.8	1.0	1.2	1.3	1.5	2.4	2.3	1.3	1.0	S	1.3	1.8	7.2	1.7	1.5	2.2	1.4	1.4	1.7	0.8	7.2	1.8	24				
12	1.8	1.9	1.0	1.8	1.0	2.4	1.3	0.8	1.7	3.9	0.7	0.6	0.4	S	0.6	0.8	2.6	1.8	1.9	1.4	0.6	0.2	0.5	0.9	0.2	3.9	1.3	24				
13	1.0	1.2	1.7	0.9	0.4	0.3	0.4	0.3	8.1	3.6	3.6	2.6	S	6.7	4.0	5.3	0.4	0.4	0.4	1.4	3.1	0.5	0.9	0.9	0.3	8.1	2.1	24				
14	1.5	0.9	1.3	0.8	2.3	2.6	0.9	1.2	1.2	4.9	2.2	S	7.6	2.2	2.8	3.8	4.3	4.3	2.1	2.6	1.7	1.0	1.5	1.4	0.8	7.6	2.4	24				
15	1.3	2.3	2.1	2.2	1.3	1.1	2.1	58.1	58.9	7.1	S	0.9	2.6	1.5	1.5	10.7	2.7	85.3	3.4	2.1	2.1	1.9	0.8	0.5	0.5	85.3	11.0	24				
16	4.3	4.0	1.0	2.2	7.2	5.7	2.7	4.6	20.2	S	7.2	5.3	6.5	4.1	6.2	2.4	21.9	24.6	3.2	1.2	0.9	1.2	1.6	1.3	0.9	24.6	6.1	24				
17	1.6	1.6	1.7	1.1	2.0	6.4	13.6	14.4	S	19.6	14.9	14.1	4.3	4.8	4.0	3.5	21.4	29.0	3.0	1.6	28.1	2.9	2.7	1.6	1.1	29.0	8.6	24				
18	1.6	0.9	0.7	1.4	1.4	1.2	4.4	S	8.9	5.2	9.1	7.6	2.0	0.9	1.2	1.2	1.0	1.3	0.7	0.5	0.7	0.8	0.9	12.3	0.5	12.3	2.9	24				
19	1.2	2.9	1.2	0.4	0.4	0.4	S	0.4	0.4	6.9	0.7	1.1	1.1	P	0.7	0.9	0.4	0.5	0.7	0.7	0.9	0.9	1.8	1.2	0.4	6.9	1.2	23				
20	1.1	0.9	0.8	0.6	0.9	S	1.1	1.0	2.6	1.3	2.2	6.0	7.6	4.7	2.6	8.1	13.8	21.0	11.7	5.1	16.7	2.6	2.5	2.0	0.6	21.0	5.1	24				
21	2.1	1.1	0.9	0.8	S	1.6	1.4	1.2	1.2	1.1	2.9	2.1	1.4	6.7	1.8	3.9	2.5	2.5	1.1	1.2	0.8	0.8	1.1	0.9	0.8	6.7	1.8	24				
22	0.9	1.1	1.1	S	0.5	0.4	0.7	1.8	0.6	1.6	1.6	2.0	3.1	1.3	1.4	2.2	8.0	4.7	0.8	0.8	1.4	0.7	0.5	0.8	0.4	8.0	1.7	24				
23	0.5	1.1	S	1.4	0.9	6.4	1.4	1.6	2.2	3.0	2.6	2.1	2.0	2.1	6.2	2.5	5.2	1.4	1.4	1.1	16.5	1.6	2.1	53.1	0.5	53.1	5.1	24				
24	2.2	S	1.7	1.1	1.3	1.6	2.9	2.1	1.8	3.5	3.3	2.6	4.2	2.9	2.0	2.0	2.2	3.4	2.0	1.6	3.4	1.3	1.8	1.1	1.1	4.2	2.3	24				
25	S	1.7	1.6	1.3	2.0	2.2	1.7	5.2	1.2	1.2	1.6	1.4	2.6	2.0	3.7	2.5	2.2	3.3	2.6	3.7	5.3	4.9	S	1.2	5.3	2.5	24					
26	2.1	5.6	0.9	0.7	1.4	1.0	1.2	0.8	0.8	4.1	2.2	1.8	2.3	1.4	1.4	1.3	1.6	1.2	5.2	1.3	7.7	2.0	S	2.2	0.7	7.7	2.2	24				
27	0.5	2.0	4.8	0.9	1.3	2.0	1.4	1.6	0.9	0.9	2.0	3.0	2.6	40.5	48.9	30.2	20.4	3.5	7.2	8.5	25.5	S	5.2	2.2	0.5	48.9	9.4	24				
28	3.9	13.6	6.4	1.8	1.6	2.0	1.4	1.3	0.8	0.8	0.4	0.4	0.5	0.4	0.8	0.9	1.2	3.3	2.5	1.8	S	1.6	2.6	1.6	0.4	13.6	2.2	24				
29	1.2	1.1	1.2	1.2	1.2	1.6	1.4	1.4	0.9	3.4	1.7	3.0	1.7	2.2	4.8	7.2	15.3	22.8	10.9	S	11.2	3.5	1.4	4.0	0.9	22.8	4.5	24				
30	1.2	0.9	2.1	2.0	1.0	2.3	1.7	3.8	3.8	8.0	5.7	4.2	1.9	2.1	3.8	2.2	1.1	3.1	S	1.2	1.3	2.0	1.3	1.6	0.9	8.0	2.5	24				
31	0.9	0.7	0.8	0.8	0.8	1.2	0.8	0.8	0.4	0.7	0.8	1.4	1.6	0.7	0.5	0.9	0.8	S	0.5	1.0	2.2	2.5	1.0	1.7	0.4	2.5	1.0	24				
HOURLY MAX	4.3	13.6	6.4	2.2	7.2	6.4	13.6	67.1	58.9	19.6	69.6	16.2	7.6	40.5	49.0	30.2	21.9	85.3	11.7	8.5	28.1	15.3	5.2	53.1								
HOURLY AVG	1.3	1.8	1.4	1.1	1.2	1.7	2.1	6.2	4.3	3.4	5.7	3.5	2.6	4.0	6.3	4.6	5.0	9.2	2.6	1.7	4.7	1.9	1.5	3.5								

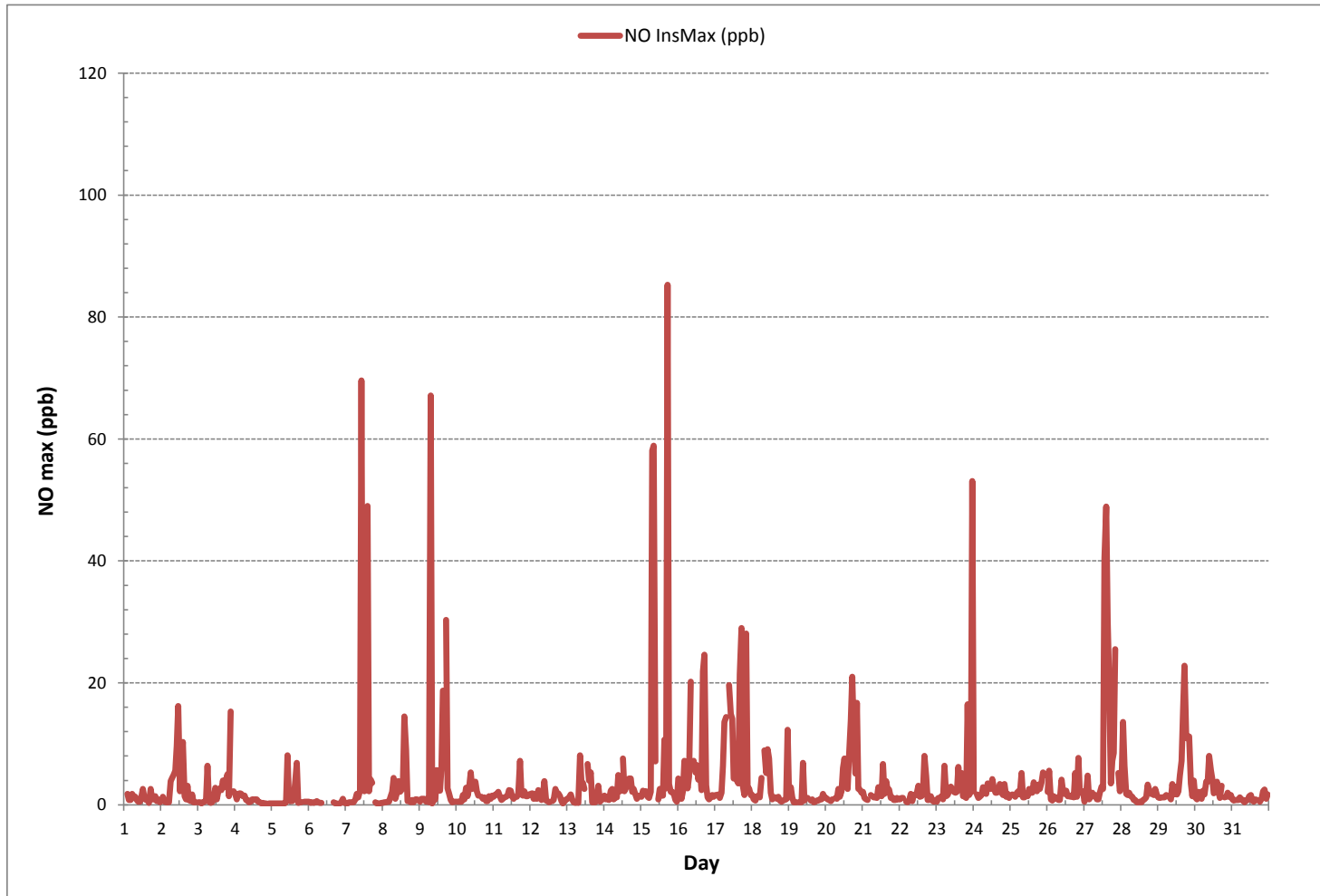
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	702
MAXIMUM INSTANTANEOUS VALUE:	85.3 ppb @ HOUR(S) 17 ON DAY(S) 15
VAR-VARIOUS	
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	7.6
OPERATIONAL TIME:	742 hrs

NITRIC OXIDE Instantaneous Maximum (NO ppb)



Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 15.24% Valid Data: 94.35% Calm Avg: 1.40 [ppb]

Direction	0.0-3.9	3.9-7.9	7.9-11.8	>11.8	Total
N	1.99	0	0	0	1.99
NE	2.42	0.14	0	0	2.56
E	6.13	0	0	0	6.13
SE	11.11	0.14	0	0	11.25
S	1.71	0	0	0	1.71
SW	17.09	0.43	0	0	17.52
W	23.08	0.43	0.14	0	23.65
NW	19.37	0.57	0	0	19.94
Summary	82.9	1.71	0.14	0	84.75

% Icon Classes (ppb)

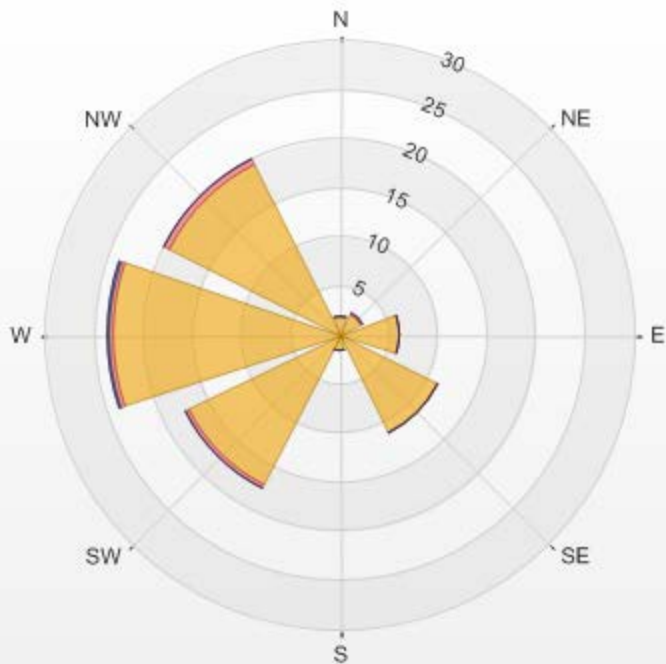
83 0.0-3.9

2 3.9-7.9

0 7.9-11.8

0 >11.8

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 15.24% Calm Poll Avg: 1.40[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	0.7	S	1.8	1.7	2.1	1.9	1.9	2.1	2.7	2.0	1.7	1.7	1.8	1.9	1.9	2.1	2.1	2.6	2.4	2.3	2.1	2.0	1.8	1.9	0.7	2.7	2.0	24		
2	S	2.6	2.4	2.1	1.4	1.4	2.2	2.6	2.9	3.4	4.0	2.9	2.5	3.6	4.0	3.6	2.7	2.4	2.0	1.7	1.4	1.3	1.5	S	1.3	4.0	2.5	24		
3	2.0	1.3	1.2	1.7	1.8	1.7	2.7	1.6	1.6	1.9	2.5	2.9	2.4	2.3	2.7	3.4	6.6	5.7	8.4	8.6	5.8	8.2	S	5.3	1.2	8.6	3.6	24		
4	4.2	3.3	2.9	2.5	2.2	1.9	1.7	1.8	1.7	1.5	1.5	2.1	2.1	1.6	0.9	1.0	1.5	1.7	1.9	1.8	1.6	S	2.3	1.8	0.9	4.2	2.0	24		
5	1.9	1.4	1.2	1.3	1.5	1.4	1.2	1.4	1.0	1.2	1.6	0.8	0.5	0.5	0.3	0.9	1.2	0.4	0.3	0.3	S	0.9	1.0	0.6	0.3	1.9	1.0	24		
6	0.8	0.5	0.8	0.8	0.9	0.7	0.9	0.9	1.2	1.0	C	C	C	C	C	C	C	0.9	0.6	0.2	S	1.9	1.3	1.6	1.9	0.2	1.9	1.0	24	
7	2.2	2.5	3.0	3.2	2.8	2.8	3.9	5.0	4.8	4.9	12.5	4.0	5.0	5.5	4.4	3.2	5.1	4.5	S	4.4	3.8	3.8	3.2	4.0	2.2	12.5	4.3	24		
8	5.9	6.5	8.5	8.8	10.6	8.9	9.1	9.7	10.1	7.5	5.3	5.3	5.0	6.0	9.1	9.1	7.3	S	2.5	0.9	1.2	0.8	0.3	0.2	0.2	10.6	6.0	24		
9	0.1	0.5	0.0	0.2	0.0	0.8	0.5	0.0	0.3	0.8	1.0	2.1	0.5	0.6	1.6	4.0	S	8.6	6.4	6.8	6.2	4.8	5.2	4.3	0.0	8.6	2.4	24		
10	3.5	3.6	3.5	3.2	3.3	4.3	8.2	7.5	7.6	8.1	3.5	2.6	2.8	3.0	3.1	S	8.2	4.4	3.2	2.7	2.0	1.9	1.6	2.1	1.6	8.2	4.1	24		
11	3.6	8.4	15.1	15.6	7.6	3.4	2.2	4.0	3.5	2.9	2.6	1.6	1.0	0.7	S	2.0	3.5	4.0	4.7	5.6	2.9	1.5	1.9	3.1	0.7	15.6	4.4	24		
12	3.4	3.3	2.6	4.5	3.6	3.3	3.6	1.8	1.0	1.5	0.6	0.1	0.0	S	0.3	1.2	2.7	2.5	4.1	3.8	1.6	1.1	1.4	1.4	0.0	4.5	2.1	24		
13	0.8	0.6	0.7	1.9	1.1	0.5	0.1	1.2	2.3	1.8	1.1	1.0	S	2.8	1.6	0.4	1.0	2.2	1.8	3.3	4.4	6.1	6.3	7.1	0.1	7.1	2.2	24		
14	7.7	7.2	6.5	6.3	6.9	10.4	4.9	5.6	6.6	6.9	6.1	S	2.9	2.2	4.8	5.1	6.4	6.1	6.9	7.8	9.5	5.1	4.8	5.8	2.2	10.4	6.2	24		
15	4.6	5.4	6.1	7.9	5.6	6.2	10.1	6.6	7.1	2.2	S	1.4	1.6	1.8	1.6	1.4	5.3	14.1	5.0	2.2	4.9	4.9	3.5	2.9	1.4	14.1	4.9	24		
16	4.6	11.0	10.8	10.6	10.6	12.3	14.3	16.1	21.2	S	10.7	7.7	4.8	5.0	4.9	6.1	13.2	13.1	11.4	9.5	7.4	8.5	8.3	8.0	4.6	21.2	10.0	24		
17	9.6	11.6	13.1	12.7	12.9	14.4	16.8	17.5	S	12.6	9.7	7.5	5.1	5.8	6.6	6.9	6.1	S	11.1	11.0	11.4	10.0	10.3	10.5	8.7	8.2	5.1	17.5	10.7	24
18	7.6	7.8	7.4	7.8	7.9	8.1	14.2	S	19.4	11.4	8.8	10.6	2.9	2.7	3.9	3.6	3.1	3.6	1.9	1.2	0.3	0.4	1.6	4.5	0.3	19.4	6.1	24		
19	3.7	16.0	3.8	1.1	1.4	1.4	S	2.5	3.0	3.4	2.3	2.8	3.3	2.7	1.5	1.2	1.5	1.2	0.9	1.2	1.4	2.1	2.0	2.0	0.9	16.0	2.7	24		
20	2.4	2.5	2.0	2.0	1.6	S	2.3	4.1	8.2	7.9	6.1	7.1	5.9	6.2	8.0	12.4	26.0	23.0	21.0	14.2	16.0	12.5	10.0	10.1	1.6	26.0	9.2	24		
21	8.3	6.1	4.2	3.7	S	3.6	3.4	4.0	4.2	3.9	4.6	4.5	5.0	6.6	7.6	6.4	7.6	5.8	4.1	3.7	2.8	2.9	2.6	2.5	2.5	8.3	4.7	24		
22	2.0	2.1	2.4	S	2.7	2.7	3.0	4.3	6.2	7.1	6.2	4.9	4.4	4.4	6.6	7.7	11.7	14.0	11.4	12.7	10.1	3.1	2.1	1.6	1.6	14.0	5.8	24		
23	1.3	1.1	S	1.5	1.4	1.1	1.2	1.2	1.8	2.2	1.8	1.8	1.4	1.2	1.2	2.4	2.8	3.3	2.8	2.2	1.5	1.5	1.7	2.6	1.1	3.3	1.8	24		
24	1.5	S	1.9	1.8	2.2	2.1	2.4	2.0	1.9	2.3	2.2	1.7	1.7	1.2	1.6	1.8	2.0	2.6	2.3	1.9	2.0	1.9	2.3	1.4	1.2	2.6	1.9	24		
25	S	2.7	2.7	1.9	2.0	2.2	2.6	1.9	1.7	1.5	1.2	1.1	1.9	2.3	2.4	4.2	8.0	6.7	5.0	5.0	13.7	14.4	13.0	S	1.1	14.4	4.5	24		
26	5.8	9.0	8.8	12.6	8.6	3.8	2.8	2.1	4.9	6.0	3.3	3.0	3.4	2.7	3.4	3.6	4.2	4.1	6.8	5.4	7.2	5.6	S	4.7	2.1	12.6	5.3	24		
27	3.4	5.1	6.5	2.9	2.8	3.4	3.4	4.2	3.9	4.0	3.6	4.0	4.3	6.2	9.3	9.4	15.1	13.0	14.4	17.0	18.8	S	8.7	6.7	2.8	18.8	7.4	24		
28	7.3	18.0	17.7	6.8	6.7	4.4	4.9	4.6	4.2	3.4	0.7	0.8	0.8	0.8	0.9	1.9	4.9	9.2	8.6	6.8	S	4.9	4.5	5.1	0.7	18.0	5.6	24		
29	4.1	3.3	2.4	2.9	3.0	2.4	3.1	3.2	3.7	4.1	3.3	3.9	3.4	4.6	5.7	13.9	30.9	28.5	27.0	S	26.6	20.9	6.9	7.8	2.4	30.9	9.4	24		
30	4.6	5.9	6.1	3.0	4.2	8.0	6.9	9.8	14.4	11.8	12.9	6.2	4.2	4.4	5.2	4.3	4.2	6.0	S	5.3	4.3	4.5	4.9	5.0	3.0	14.4	6.4	24		
31	4.9	6.0	4.6	2.5	1.6	1.6	1.7	1.8	2.9	2.3	2.4	1.5	1.1	1.4	2.0	2.7	S	2.3	2.2	4.0	4.1	2.8	2.3	1.1	6.0	2.6	24			
HOURLY MAX	9.6	18.0	17.7	15.6	12.9	14.4	16.8	17.5	21.2	12.6	12.9	10.6	5.9	6.6	9.3	13.9	30.9	28.5	27.0	17.0	26.6	20.9	13.0	10.1						
HOURLY AVG	3.9	5.4	5.0	4.5	4.0	4.0	4.5	4.4	5.2	4.4	4.3	3.4	2.8	3.1	3.7	4.4	6.8	7.1	6.2	5.2	6.1	4.9	4.0	4.0						

**STATUS FLAG CODES**

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

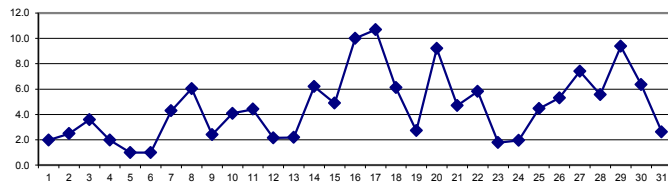
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

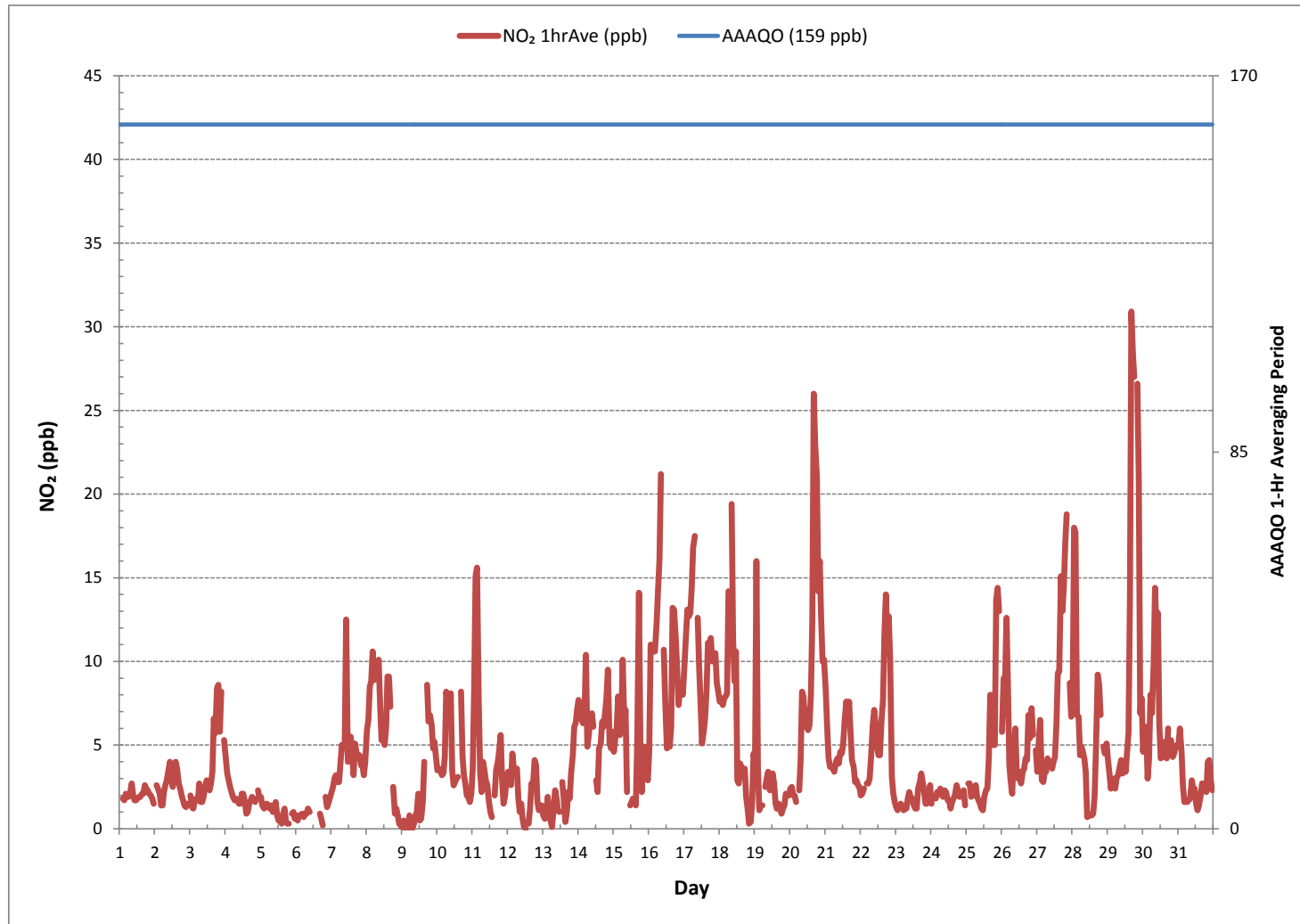
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	701			
MINIMUM 1-HR AVERAGE:	0.0 ppb	@ HOUR(S)	VAR , 12	ON DAY(S) 9 , 12
MAXIMUM 1-HR AVERAGE:	30.9 ppb	@ HOUR(S)	16	ON DAY(S) 29
MAXIMUM 24-HR AVERAGE:	10.7 ppb			ON DAY(S) 17
				VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs	OPERATIONAL TIME:	744 hrs	
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	4.3	MONTHLY AVERAGE:	4.6 ppb	

**24 HR AVERAGES December 2016**



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







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

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	1.1	S	4.5	2.7	3.5	3.2	2.7	3.2	3.6	3.4	3.5	2.4	2.8	3.1	3.1	2.8	2.7	5.9	3.1	3.5	3.6	3.5	2.7	3.1	1.1	5.9	3.2	24
2	S	3.8	3.2	3.2	2.0	2.0	6.4	7.3	5.3	9.0	13.3	9.4	4.6	7.2	13.4	6.9	5.3	3.8	3.5	2.6	2.2	2.0	2.0	S	2.0	13.4	5.4	24
3	2.9	1.9	1.7	2.4	2.5	2.5	9.4	2.0	2.0	2.8	3.2	5.2	3.2	2.9	4.2	5.6	11.3	8.5	12.2	12.1	6.9	13.6	S	7.1	1.7	13.6	5.5	24
4	5.6	4.5	4.1	3.7	3.6	3.1	2.9	2.7	2.4	1.9	2.0	3.1	2.9	2.4	1.6	1.5	2.8	2.5	2.8	2.4	2.4	S	3.1	2.8	1.5	5.6	2.9	24
5	2.7	2.2	2.3	2.2	2.5	2.2	2.4	2.4	1.6	2.0	4.8	1.9	1.6	2.0	1.4	4.6	7.1	1.0	1.1	1.2	S	1.9	1.8	1.5	1.0	7.1	2.4	24
6	2.2	1.4	1.5	1.8	1.8	1.8	1.8	1.9	2.1	C	C	C	C	C	C	C	2.3	2.3	1.9	S	3.5	3.1	3.3	3.3	1.4	3.5	2.3	24
7	3.6	4.3	4.7	4.8	4.8	4.9	6.5	7.4	7.3	7.6	176.0	7.1	6.1	P	15.7	5.9	7.6	9.2	S	8.0	5.3	5.5	4.3	7.2	3.6	176.0	14.3	23
8	7.5	8.4	10.3	10.7	12.2	10.3	12.1	13.9	12.5	9.7	8.1	6.6	6.3	8.4	25.2	16.2	9.4	S	3.9	2.5	3.5	2.4	3.2	1.8	1.8	25.2	8.9	24
9	1.8	2.4	1.4	2.0	1.2	2.4	1.6	3.1	1.9	2.0	2.3	39.4	1.9	2.5	6.9	19.4	S	17.7	11.3	10.5	10.9	7.1	6.9	7.2	1.2	39.4	7.1	24
10	5.3	6.6	5.1	5.1	7.0	6.6	11.7	11.9	10.7	11.5	6.7	4.0	6.1	4.5	4.9	S	12.8	6.4	5.7	4.5	3.8	3.6	2.9	3.9	2.9	12.8	6.6	24
11	6.9	11.7	18.9	18.4	14.0	5.6	4.0	6.4	5.5	4.3	4.3	3.3	2.4	2.1	S	3.6	6.4	7.6	7.7	7.8	5.3	3.1	3.9	5.1	2.1	18.9	6.9	24
12	5.4	4.8	4.3	6.7	6.0	5.3	5.3	4.0	3.7	4.4	2.2	1.4	0.8	S	1.4	3.9	5.3	4.1	5.7	6.0	4.2	2.4	2.9	3.3	0.8	6.7	4.1	24
13	2.9	1.8	2.2	4.0	2.4	2.0	1.1	2.7	7.0	2.8	2.8	2.9	S	9.7	4.2	2.5	3.8	4.0	2.8	5.7	6.4	8.9	9.7	10.1	1.1	10.1	4.5	24
14	12.6	15.4	9.8	8.6	10.2	14.8	6.9	10.1	12.6	10.5	8.6	S	9.4	3.7	8.1	8.1	9.6	9.0	9.0	12.9	12.6	8.9	7.2	7.6	3.7	15.4	9.8	24
15	7.2	7.3	8.2	10.3	6.6	8.6	12.7	11.7	26.6	9.3	S	2.4	3.5	3.1	3.7	5.6	11.3	30.8	15.2	6.0	15.9	9.0	6.3	4.4	2.4	30.8	9.8	24
16	11.7	20.7	13.5	14.4	12.6	15.0	17.9	22.7	24.2	S	14.4	8.9	6.7	7.1	6.7	8.9	22.6	25.7	18.2	14.5	10.7	11.0	11.0	12.0	6.7	25.7	14.4	24
17	14.7	17.2	15.3	15.3	16.9	17.0	19.5	19.6	S	18.9	12.5	12.3	6.7	7.6	8.7	12.2	24.8	33.9	16.5	13.1	18.1	14.3	13.0	11.2	6.7	33.9	15.6	24
18	9.3	9.7	9.2	10.8	9.9	10.1	21.3	S	25.4	16.6	12.7	14.4	6.6	4.9	5.7	5.1	8.8	6.8	4.6	2.6	1.3	1.8	3.3	22.1	1.3	25.4	9.7	24
19	9.6	20.5	14.4	1.9	2.0	2.0	S	3.8	4.6	10.8	3.2	4.3	4.5	P	3.0	2.0	2.1	1.8	1.5	1.8	2.1	3.5	3.0	2.7	1.5	20.5	4.8	23
20	3.6	3.6	2.9	2.9	3.0	S	3.1	7.9	12.4	11.0	7.4	10.0	7.4	11.2	12.0	21.8	33.7	33.1	24.4	22.1	26.7	19.0	12.0	11.8	2.9	33.7	13.2	24
21	10.0	8.4	6.0	4.5	S	4.7	4.3	5.4	6.1	4.9	6.0	5.8	6.0	10.5	11.8	8.4	8.9	7.5	5.4	4.7	3.8	5.9	3.5	3.4	3.4	11.8	6.3	24
22	2.7	3.1	4.3	S	3.4	3.3	4.3	6.0	7.1	8.7	8.7	6.5	5.6	6.1	8.4	10.5	17.6	19.5	17.8	17.8	19.6	5.4	3.1	2.2	2.2	19.6	8.3	24
23	2.1	1.9	S	2.9	2.5	2.7	2.9	1.9	5.2	5.1	4.4	3.8	2.7	2.8	2.7	4.3	5.1	4.2	4.2	3.4	3.5	2.6	2.7	31.3	1.9	31.3	4.6	24
24	2.8	S	2.6	2.9	3.2	4.0	5.6	3.8	3.1	4.9	3.5	3.1	4.3	2.3	2.7	5.8	4.0	4.0	4.5	3.5	3.2	3.0	3.9	2.6	2.3	5.8	3.6	24
25	S	3.6	4.6	4.0	3.1	3.6	3.9	3.4	3.1	3.6	3.4	2.0	4.6	3.2	3.8	7.1	12.0	10.6	8.5	9.3	21.3	22.0	22.6	S	2.0	22.6	7.4	24
26	8.9	15.3	10.9	14.4	17.5	5.1	4.2	3.3	7.0	11.7	4.3	3.8	4.2	3.1	4.2	4.3	5.6	5.6	11.6	10.8	15.1	10.0	S	7.8	3.1	17.5	8.2	24
27	4.5	7.1	9.2	3.5	4.0	7.0	4.5	5.8	5.1	4.9	4.2	5.7	5.0	26.6	39.1	15.7	20.5	17.4	19.9	19.7	23.4	S	16.1	8.0	3.5	39.1	12.0	24
28	9.3	25.8	27.1	15.5	13.1	6.1	7.1	6.1	5.0	5.0	1.3	1.0	1.0	1.0	1.3	3.1	11.3	18.6	17.2	8.9	S	7.6	6.5	6.4	1.0	27.1	8.9	24
29	6.0	4.3	2.7	3.8	4.4	3.2	5.2	5.2	5.9	6.2	4.2	4.8	5.1	7.5	7.9	29.1	35.2	34.2	29.2	S	29.5	25.9	12.0	13.5	2.7	35.2	12.4	24
30	6.4	8.8	11.0	4.4	7.6	11.8	8.5	17.2	18.6	14.4	15.5	9.6	4.8	5.5	7.6	5.9	8.5	8.1	S	6.1	5.2	6.0	6.8	6.1	4.4	18.6	8.9	24
31	5.6	7.0	6.0	3.3	2.0	2.5	2.2	2.9	2.3	3.3	3.0	3.1	3.0	1.3	1.8	2.9	3.9	S	2.7	3.8	5.0	6.1	5.0	3.8	1.3	7.0	3.6	24
HOURLY MAX	14.7	25.8	27.1	18.4	17.5	17.0	21.3	22.7	26.6	18.9	176.0	39.4	9.4	26.6	39.1	29.1	35.2	34.2	29.2	22.1	29.5	25.9	22.6	31.3				
HOURLY AVG	6.0	8.1	7.4	6.4	6.2	5.8	6.7	6.9	8.0	7.3	11.9	6.5	4.5	5.6	7.6	8.1	10.7	11.9	9.4	7.9	9.5	7.6	6.4	7.4				

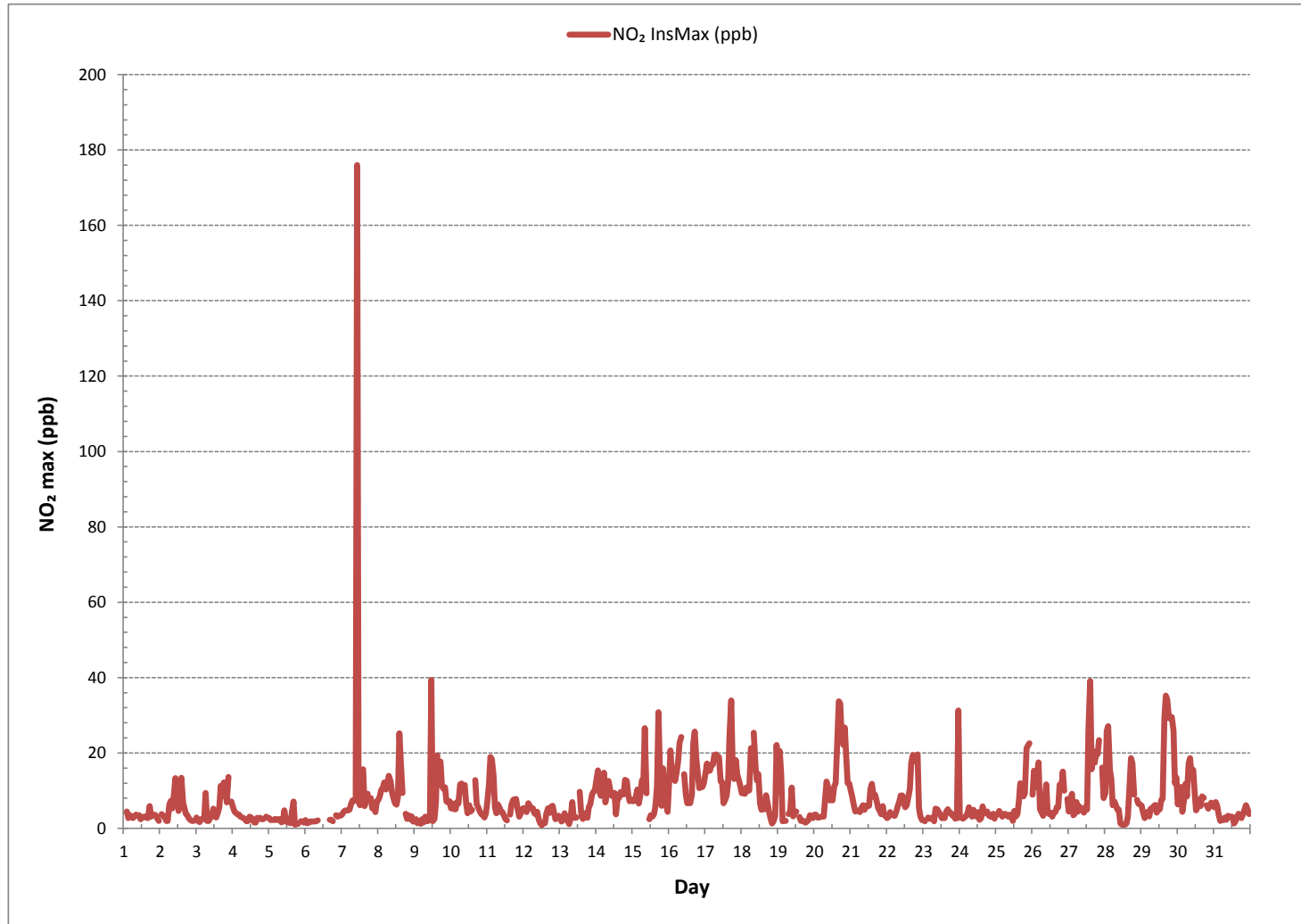
STATUS FLAG CODES

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:	702
MAXIMUM INSTANTANEOUS VALUE:	176.0 ppb @ HOUR(S) 10 ON DAY(S) 7
VAR-VARIOUS	
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	7 hrs
OPERATIONAL TIME:	742 hrs
STANDARD DEVIATION:	9.0

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

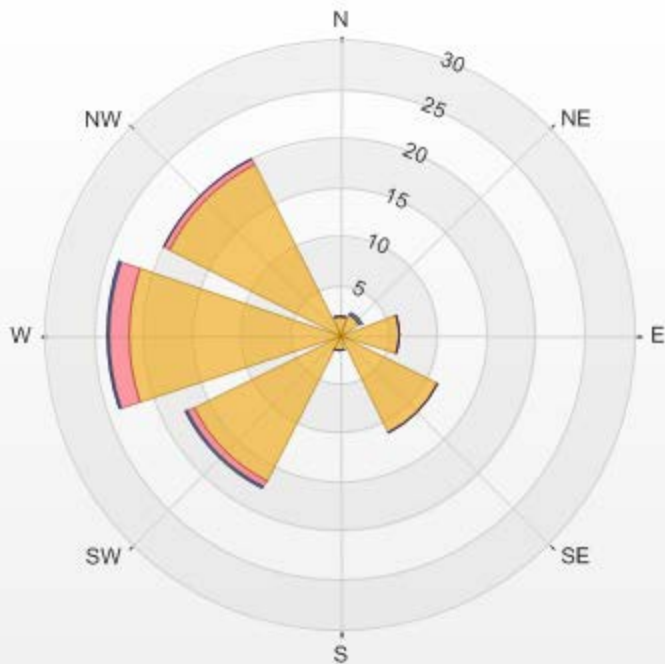


Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO2[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 15.24% Valid Data: 94.35% Calm Avg: 9.76 [ppb]

Direction	0.0-10.3	10.3-20.7	20.7-31.0	>31.0	Total
N	1.99	0	0	0	1.99
NE	2.28	0	0.28	0	2.56
E	6.13	0	0	0	6.13
SE	11.25	0	0	0	11.25
S	1.71	0	0	0	1.71
SW	16.67	0.71	0.14	0	17.52
W	21.51	1.99	0.14	0	23.64
NW	19.52	0.43	0	0	19.95
Summary	81.06	3.13	0.56	0	84.75

% Icon Classes (ppb) 81 0.0-10.3 3 10.3-20.7 1 20.7-31.0 0 >31.0

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO2[ppb] 01/12/2016 00:00 - 31/12/2016 23:00  
Calm: 15.24% Calm Poll Avg: 9.76[ppb]



NO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 2016/12 Type: Span



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

## ***OZONE***

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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	28.5	S	26.7	26.2	25.4	25.5	25.3	24.6	23.9	24.7	25.5	25.9	25.4	24.9	24.2	23.6	22.8	22.5	22.0	22.3	22.3	22.1	22.0	21.4	21.4	28.5	24.2	24	
2	S	20.2	18.9	19.2	20.7	20.1	18.4	17.5	16.6	16.3	17.2	18.3	18.8	17.4	16.8	17.0	17.8	20.0	22.1	22.7	23.4	23.1	20.7	S	16.3	23.4	19.2	24	
3	18.6	18.4	18.2	17.6	16.9	16.4	14.9	16.3	16.5	15.9	14.4	14.4	15.2	16.8	17.1	16.1	10.8	11.1	5.7	3.3	3.3	1.2	S	4.1	1.2	18.6	13.2	24	
4	18.3	21.9	24.3	25.3	26.4	27.0	29.3	29.7	30.1	31.0	31.7	32.5	31.6	27.9	19.2	16.3	16.4	18.8	20.7	20.5	22.3	S	24.9	25.8	16.3	32.5	24.9	24	
5	26.3	27.6	28.2	28.6	28.9	29.2	29.3	29.0	29.2	29.3	29.4	29.8	30.2	30.4	30.7	30.3	29.7	30.7	30.8	31.0	S	31.0	30.6	31.3	26.3	31.3	29.6	24	
6	31.2	31.3	31.0	30.8	30.6	30.6	30.3	30.1	29.7	29.9	30.1	29.5	29.3	29.6	30.2	30.3	29.6	29.3	29.3	S	27.6	27.8	27.3	27.0	27.0	31.3	29.7	24	
7	27.1	26.8	26.2	25.9	26.0	25.4	23.9	22.6	22.8	C	C	C	C	C	C	C	25.6	23.3	22.9	S	24.2	24.2	24.7	28.1	27.0	22.6	28.1	25.1	24
8	22.5	20.5	17.7	17.0	15.8	17.5	17.1	17.2	17.8	20.6	24.1	24.2	25.5	25.2	24.0	23.4	24.9	S	29.9	31.6	31.0	32.0	32.2	32.4	15.8	32.4	23.7	24	
9	32.5	32.3	31.8	31.0	30.7	29.8	30.2	31.6	31.7	31.5	31.9	31.7	32.4	31.9	30.5	27.9	S	21.1	19.8	17.6	17.4	18.3	17.1	17.1	17.1	32.5	27.3	24	
10	17.0	17.3	15.4	15.8	15.0	13.3	9.1	10.4	10.2	11.7	20.0	22.4	22.5	22.8	22.7	S	18.1	20.4	21.7	22.6	23.5	23.4	23.1	22.0	9.1	23.5	18.3	24	
11	20.6	16.3	9.3	8.4	15.4	18.0	19.7	15.7	17.6	19.8	20.2	22.8	26.6	29.1	S	29.8	28.1	27.8	26.9	26.7	29.5	30.3	30.1	29.0	8.4	30.3	22.5	24	
12	27.9	28.6	30.2	28.8	29.8	30.4	30.0	32.5	34.5	34.3	35.7	36.8	37.6	S	36.3	34.6	32.3	31.9	31.3	31.6	34.1	35.3	35.1	34.4	27.9	37.6	32.8	24	
13	35.2	35.6	34.9	33.1	33.6	34.8	35.4	33.9	32.5	33.0	33.8	34.2	S	31.9	32.8	33.7	32.7	31.6	31.6	29.0	27.3	22.4	19.5	17.7	17.7	35.6	31.3	24	
14	15.2	15.1	14.9	15.5	14.8	16.6	26.7	25.9	25.2	24.7	26.9	S	30.9	31.7	29.4	29.3	27.7	27.8	25.9	22.3	20.5	28.3	28.1	26.1	14.8	31.7	23.9	24	
15	26.8	26.5	23.5	21.6	20.7	17.9	13.7	21.8	28.3	32.8	S	34.3	33.7	32.9	33.1	32.5	28.0	18.0	27.1	29.9	27.0	24.5	21.6	20.4	13.7	34.3	25.9	24	
16	17.6	13.9	10.4	11.0	9.9	10.0	7.1	6.4	2.9	S	17.5	21.8	27.2	26.6	26.1	24.6	15.9	13.7	12.1	13.8	14.9	12.7	12.4	11.4	2.9	27.2	14.8	24	
17	9.3	7.1	6.3	5.5	4.4	3.0	0.9	0.6	S	4.5	8.3	15.6	18.7	18.3	17.6	15.3	10.5	9.5	7.5	8.1	10.0	9.9	12.7	13.5	0.6	18.7	9.4	24	
18	14.2	13.8	13.9	13.4	13.3	12.8	8.0	S	3.9	9.4	11.5	13.7	33.3	34.3	33.1	34.3	35.1	34.5	35.9	35.9	37.5	37.2	34.4	28.8	3.9	37.5	23.6	24	
19	24.5	11.8	23.7	34.3	35.3	35.5	S	32.0	34.2	33.2	36.8	36.3	35.6	36.4	38.9	38.7	37.9	37.9	38.5	38.5	38.3	37.2	37.1	37.1	11.8	38.9	34.3	24	
20	36.3	35.6	35.3	35.0	35.0	S	34.4	31.9	27.2	27.4	29.3	28.9	30.4	30.9	29.0	23.3	7.2	5.3	4.7	15.6	12.7	11.9	14.8	16.7	4.7	36.3	24.3	24	
21	22.1	27.3	29.7	29.5	S	29.6	30.2	29.4	29.6	30.5	30.4	30.9	31.2	30.9	30.9	31.9	30.5	32.3	34.3	35.1	36.3	35.6	35.0	35.0	22.1	36.3	31.2	24	
22	35.3	34.8	34.2	S	33.3	33.2	32.6	30.8	28.3	28.2	30.2	31.9	32.5	32.6	29.7	27.6	21.0	16.7	16.1	15.7	21.5	31.8	31.9	32.1	15.7	35.3	28.8	24	
23	32.0	32.8	S	34.0	33.6	35.1	33.6	31.1	30.3	31.0	31.7	30.1	28.3	27.0	26.3	26.7	27.9	27.3	28.1	29.4	29.2	27.5	25.3	24.6	24.6	35.1	29.7	24	
24	24.1	S	24.8	25.1	24.9	25.2	24.9	24.9	25.1	25.0	25.1	25.6	25.7	26.0	25.7	26.1	26.1	26.2	27.7	28.4	28.3	28.7	29.1	30.1	24.1	30.1	26.2	24	
25	S	29.0	29.0	29.9	29.8	29.5	29.4	30.0	30.3	30.9	31.4	31.7	31.2	30.8	30.6	29.0	23.8	24.2	23.6	19.8	11.2	9.8	9.6	S	9.6	31.7	26.1	24	
26	15.1	12.2	13.6	13.5	18.0	22.4	24.2	24.1	19.4	18.0	23.2	24.0	23.7	25.1	24.3	24.1	23.2	22.9	19.2	21.3	18.9	20.3	S	22.4	12.2	25.1	20.6	24	
27	23.4	22.2	20.7	24.3	23.9	23.2	22.7	21.5	21.1	20.6	20.7	20.7	20.6	20.0	18.5	15.4	8.9	8.7	5.9	2.3	1.2	S	20.1	24.1	1.2	24.3	17.9	24	
28	22.2	8.2	12.1	24.8	24.2	29.7	29.5	30.2	30.0	30.7	33.8	33.9	33.6	33.4	32.4	30.7	25.3	17.9	15.8	17.0	S	29.9	30.0	29.4	8.2	33.9	26.3	24	
29	31.2	31.6	32.7	32.9	32.6	33.1	32.2	31.2	31.4	31.0	32.1	32.1	32.8	31.6	29.5	21.4	4.8	2.6	3.2	S	4.1	7.3	25.0	23.2	2.6	33.1	24.8	24	
30	25.5	23.0	20.6	19.4	18.4	15.2	16.7	12.4	6.9	7.8	13.0	21.8	26.4	27.6	28.2	28.7	28.6	27.0	S	28.6	29.2	28.9	28.6	28.3	6.9	29.2	22.2	24	
31	28.3	26.9	28.2	30.5	31.7	31.6	31.5	31.2	30.5	29.8	30.8	31.0	33.0	33.7	32.9	32.5	32.4	S	32.0	32.0	29.9	31.1	33.0	34.1	26.9	34.1	31.2	24	
HOURLY MAX	36.3	35.6	35.3	35.0	35.3	35.5	35.4	33.9	34.5	34.3	36.8	36.8	37.6	36.4	38.9	38.7	37.9	37.9	38.5	38.5	38.3	37.2	37.1	37.1					
HOURLY AVG	24.4	23.1	22.9	23.6	24.0	24.1	23.7	24.2	23.9	24.6	25.7	27.1	28.4	28.2	27.6	26.7	23.4	22.1	22.4	23.3	22.6	24.3	25.5	25.1					

**STATUS FLAG CODES**

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

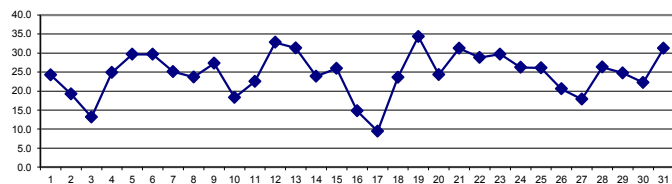
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 82 ppb

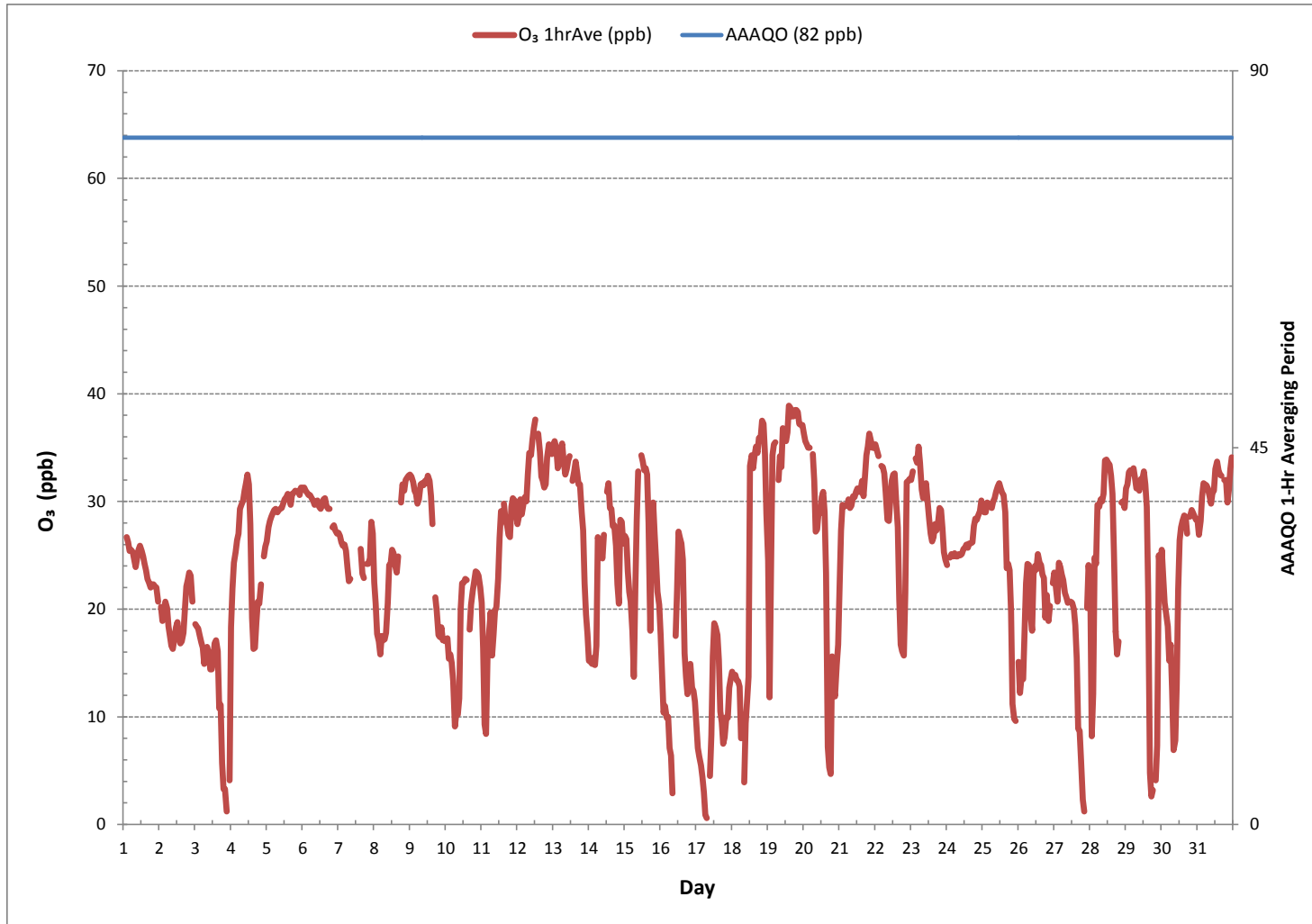
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	705					
MINIMUM 1-HR AVERAGE:	0.6	ppb	@ HOUR(S)	7	ON DAY(S)	17
MAXIMUM 1-HR AVERAGE:	38.9	ppb	@ HOUR(S)	14	ON DAY(S)	19
MAXIMUM 24-HR AVERAGE:	34.3	ppb			ON DAY(S)	19
					VAR-VARIOUS	
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	744	hrs	
MONTHLY CALIBRATION TIME:	6	hrs	AMD OPERATION UPTIME:	100.0	%	
STANDARD DEVIATION:	8.2		MONTHLY AVERAGE:	24.6	ppb	

**24 HR AVERAGES December 2016**



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







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

**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	29.0	S	27.5	26.9	26.0	26.1	26.0	25.8	24.7	25.7	26.2	26.5	26.0	25.6	25.0	24.8	23.6	23.4	22.7	23.3	23.3	22.8	22.7	22.7	22.7	29.0	25.1	24
2	S	21.5	19.7	20.8	21.1	20.8	19.4	18.1	17.2	17.1	18.7	19.4	19.7	18.4	17.8	18.0	18.6	21.4	23.1	23.1	24.5	24.5	21.8	S	17.1	24.5	20.2	24
3	19.2	19.0	18.6	18.3	17.4	17.1	15.7	16.9	17.1	16.7	15.0	14.9	16.6	17.5	17.8	17.2	14.7	13.1	8.9	5.5	5.7	2.9	S	12.3	2.9	19.2	14.7	24
4	22.4	25.0	25.3	26.6	27.5	29.2	30.0	30.1	30.8	31.6	32.8	33.0	32.5	30.5	23.3	17.1	17.2	20.9	21.1	21.5	23.0	S	25.8	26.3	17.1	33.0	26.2	24
5	26.8	28.6	28.7	29.2	29.3	29.8	29.6	29.3	29.5	29.5	30.1	30.1	30.6	30.8	31.0	31.0	30.5	31.0	31.1	31.4	S	31.4	31.0	31.6	26.8	31.6	30.1	24
6	31.7	31.7	31.3	31.1	31.0	30.8	30.8	30.5	30.1	30.6	30.4	30.2	29.6	30.1	30.8	30.8	30.3	29.9	29.8	S	28.0	28.3	27.7	27.4	27.4	31.7	30.1	24
7	27.7	27.5	26.9	26.5	26.8	26.9	25.2	23.1	23.4	C	C	C	C	C	C	26.9	25.3	23.9	S	25.9	25.2	27.1	28.9	28.6	23.1	28.9	26.2	24
8	23.6	22.5	19.3	17.7	17.4	18.4	18.4	18.7	19.2	23.1	25.3	26.0	26.5	25.9	26.2	24.7	26.1	S	31.3	32.2	32.1	32.5	32.8	33.0	17.4	33.0	24.9	24
9	33.0	33.0	32.5	31.6	31.3	30.8	31.6	32.7	32.1	32.1	32.4	32.7	32.8	32.5	31.4	30.4	S	24.2	22.7	19.3	20.6	19.6	18.6	17.8	17.8	33.0	28.5	24
10	18.6	18.6	18.4	17.4	18.1	14.3	11.9	12.9	14.5	19.9	22.3	22.9	23.6	23.8	23.5	S	20.4	21.5	22.7	23.3	23.9	23.7	23.6	22.8	11.9	23.9	20.1	24
11	21.5	18.9	13.8	10.1	18.3	19.2	20.8	18.3	19.3	20.0	21.1	24.4	28.5	30.8	S	30.4	29.5	29.0	27.8	28.6	30.4	30.8	30.8	29.8	10.1	30.8	24.0	24
12	28.5	29.3	30.9	30.2	31.1	31.1	31.4	35.1	35.3	34.9	36.9	37.6	38.0	S	36.8	36.0	33.3	32.2	32.0	32.1	36.3	36.3	36.0	35.5	28.5	38.0	33.8	24
13	36.5	36.3	35.4	34.3	34.2	35.4	35.9	35.1	33.9	33.7	34.2	34.6	S	33.0	33.7	34.2	34.0	32.2	32.2	30.6	28.3	27.1	21.9	19.5	19.5	36.5	32.4	24
14	18.6	18.7	17.4	16.9	15.7	25.2	27.8	29.8	29.2	26.9	28.0	S	32.2	32.0	31.1	30.8	28.9	29.6	27.1	25.8	23.3	32.2	30.5	27.5	15.7	32.2	26.3	24
15	27.7	28.0	24.8	23.3	23.7	20.0	16.0	29.6	32.7	33.7	S	35.2	34.6	33.6	33.9	33.1	32.0	24.9	30.1	31.6	29.3	28.1	22.8	21.9	16.0	35.2	28.3	24
16	19.7	17.1	11.3	13.8	11.1	11.0	9.4	7.9	6.3	S	20.4	25.3	28.6	27.7	27.4	25.9	21.5	20.8	17.7	17.4	17.2	14.5	14.3	13.8	6.3	28.6	17.4	24
17	11.3	9.3	8.1	7.3	7.8	5.1	1.9	2.4	S	6.7	10.9	18.2	19.0	18.9	18.6	17.2	12.7	10.9	10.1	11.9	13.1	12.1	14.3	14.6	1.9	19.0	11.4	24
18	14.6	14.5	14.2	13.9	13.6	13.2	13.0	S	7.3	11.5	12.8	25.8	34.8	34.8	33.5	36.1	35.9	35.9	36.5	37.0	38.0	38.0	36.4	33.6	7.3	38.0	25.4	24
19	29.4	18.2	33.3	35.4	35.9	36.2	S	34.8	35.4	37.0	37.9	37.1	35.9	P	39.6	39.6	38.4	38.2	38.7	39.0	38.7	38.0	37.4	37.3	18.2	39.6	36.0	23
20	37.1	36.1	35.9	35.4	35.4	S	35.1	34.1	30.8	29.4	29.7	30.1	32.2	31.9	31.2	27.3	16.9	12.6	9.4	20.6	21.1	15.9	17.7	19.5	9.4	37.1	27.2	24
21	24.9	28.6	31.0	30.3	S	29.9	30.7	30.1	30.8	31.1	30.8	31.5	31.5	31.9	32.0	32.4	31.9	33.3	35.6	35.9	36.8	36.5	35.7	35.3	24.9	36.8	32.1	24
22	35.7	35.3	34.7	S	34.1	33.5	33.5	31.9	29.4	29.1	31.0	32.3	33.6	33.5	31.1	28.6	27.3	21.5	19.9	18.9	31.8	32.9	32.6	32.4	18.9	35.7	30.6	24
23	32.7	33.2	S	34.8	34.2	37.4	34.8	32.4	31.0	32.0	33.3	31.8	28.8	27.9	26.9	28.3	29.7	28.6	28.9	30.2	30.2	29.2	26.5	25.3	25.3	37.4	30.8	24
24	24.6	S	25.3	25.8	25.8	25.8	25.8	25.8	25.6	26.1	26.1	26.2	26.4	26.4	26.5	26.8	26.8	27.6	28.5	29.1	29.1	29.2	30.1	30.8	24.6	30.8	27.0	24
25	S	30.2	29.8	30.7	30.7	30.4	30.5	30.7	31.2	31.9	31.9	32.3	32.2	31.5	31.7	30.8	27.3	27.7	26.4	24.8	17.8	15.9	14.4	S	14.4	32.3	28.2	24
26	21.8	13.5	15.0	14.9	23.5	23.6	25.5	25.2	23.2	22.3	23.6	24.7	24.7	25.5	25.0	24.4	24.4	24.3	21.7	24.0	22.0	22.7	S	23.3	13.5	25.5	22.6	24
27	24.0	23.3	24.1	24.6	24.3	24.0	23.6	22.3	22.0	21.2	21.2	21.1	21.1	21.5	19.6	18.2	13.5	10.6	8.8	3.4	3.1	S	24.2	24.7	3.1	24.7	19.3	24
28	24.9	23.8	29.1	29.6	30.8	30.5	30.4	31.2	30.8	33.0	34.1	34.2	34.1	33.8	33.2	32.0	29.4	24.9	18.6	24.7	S	31.3	31.5	30.7	18.6	34.2	29.9	24
29	32.6	32.3	33.2	33.6	33.3	33.8	33.3	32.4	32.4	32.2	33.2	32.9	33.9	33.6	31.0	28.9	13.7	7.5	5.5	S	10.4	18.6	27.2	26.1	5.5	33.9	27.5	24
30	26.8	25.0	23.3	21.2	21.4	17.5	18.0	16.5	9.1	9.1	16.8	25.7	27.0	28.3	29.1	29.2	29.4	28.3	S	29.1	29.8	29.5	29.7	28.9	9.1	29.8	23.9	24
31	28.9	27.9	29.4	31.2	32.0	32.0	31.9	31.7	31.1	30.2	32.0	32.0	34.2	34.1	33.5	33.8	33.5	S	33.0	33.3	31.3	32.0	34.7	35.9	27.9	35.9	32.2	24
HOURLY MAX	37.1	36.3	35.9	35.4	35.9	37.4	35.9	35.1	35.4	37.0	37.9	37.6	38.0	34.8	39.6	39.6	38.4	38.2	38.7	39.0	38.7	38.0	37.4	37.3				
HOURLY AVG	26.0	25.1	24.9	24.8	25.4	25.3	24.9	25.8	25.5	26.1	26.9	28.6	29.3	28.8	28.7	28.2	25.9	24.5	24.2	25.3	25.0	26.3	27.0	26.5				

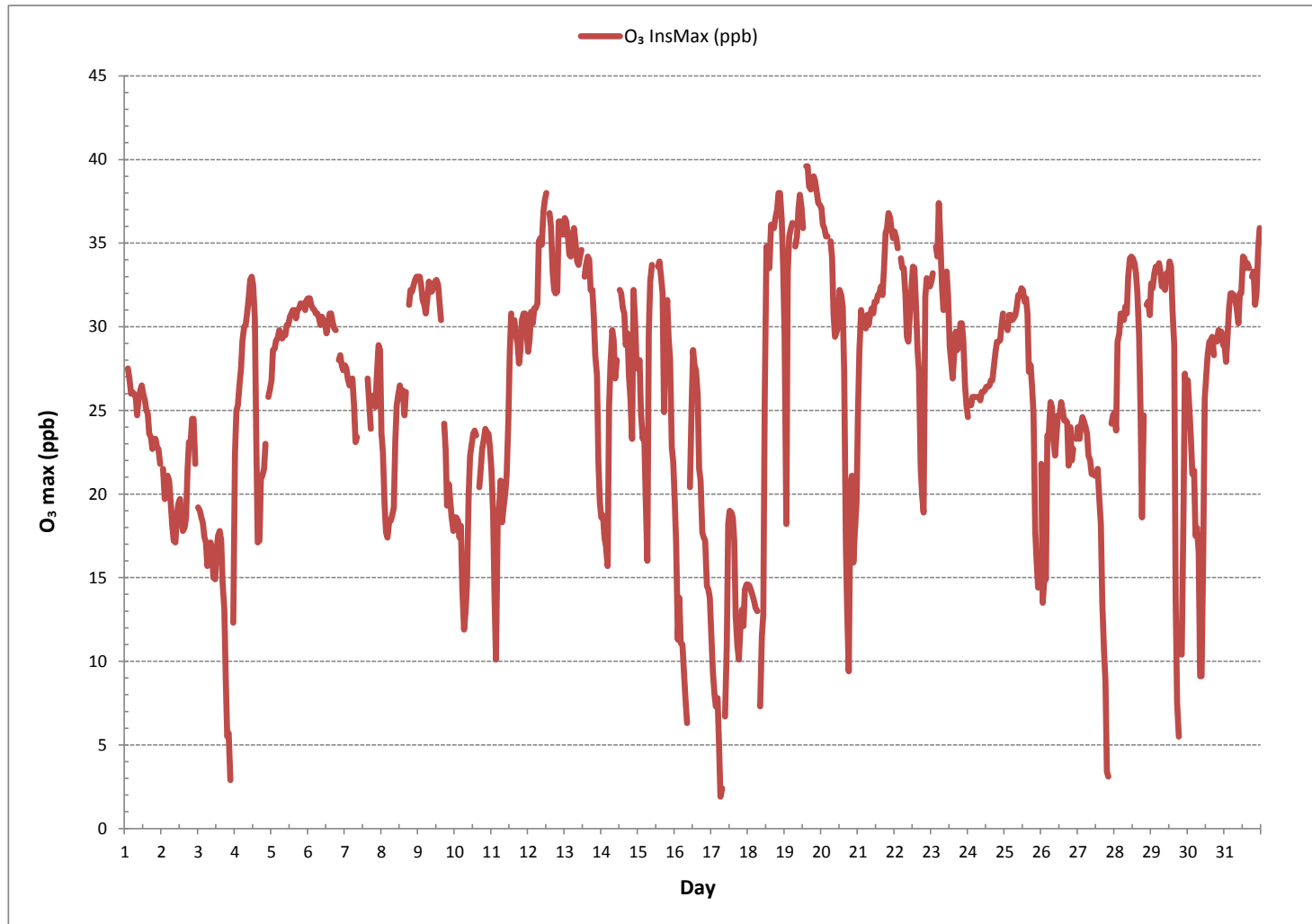
**STATUS FLAG CODES**

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

**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	704
MAXIMUM INSTANTANEOUS VALUE:	39.6 ppb @ HOUR(S) 14, 15 ON DAY(S) 19, 19
	VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	743 hrs
STANDARD DEVIATION:	7.5

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

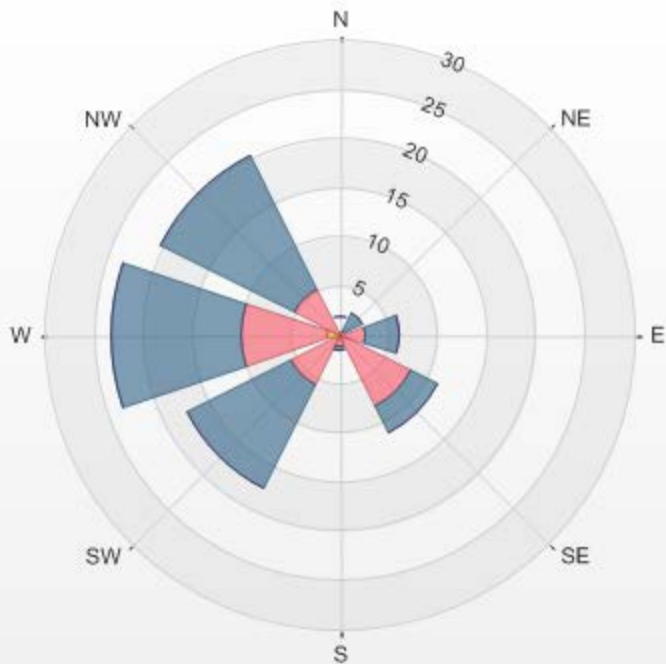


Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-O3[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 15.20% Valid Data: 94.62% Calm Avg: 13.15 [ppb]

Direction	0.0-13.0	13.0-26.0	26.0-39.0	>39.0	Total
N	0	0.14	1.85	0	1.99
NE	0.28	0.28	1.99	0	2.55
E	0	2.56	3.55	0	6.11
SE	0.28	7.95	2.98	0	11.21
S	0	1.28	0.43	0	1.71
SW	0.57	5.11	11.79	0	17.47
W	1.28	8.81	13.21	0	23.3
NW	0	5.11	15.34	0	20.45
Summary	2.41	31.24	51.14	0	84.79

% Icon	Classes (ppb)	2	0.0-13.0	31	13.0-26.0	51	26.0-39.0	0	>39.0

**LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-03[ppb] 01/12/2016 00:00 - 31/12/2016 23:00** Calm: 15.20% Calm Poll Avg: 13.15[ppb]



O3[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 2016/12 Type: Span



Span Meas Span Ref Span Low Span High

## ***PARTICULATE MATTER 2.5***

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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	5.4	2.4	6.9	5.9	6.9	5.9	7.9	4.9	7.9	9.9	8.4	6.9	8.4	9.4	7.9	9.9	6.4	7.5	5.9	12.4	7.9	7.9	9.4	8.4	2.4	12.4	7.5	24
2	7.9	10.4	7.9	9.4	7.9	10.9	9.9	6.9	5.4	12.4	8.9	7.5	6.4	4.9	8.9	8.4	7.9	6.9	7.5	7.9	1.9	2.4	6.9	1.0	1.0	12.4	7.4	24
3	1.0	5.4	6.4	5.4	8.9	8.9	9.4	9.4	4.9	5.5	8.4	5.4	9.9	10.4	12.4	15.4	14.0	16.4	18.0	15.9	14.4	15.9	13.5	7.5	1.0	18.0	10.1	24
4	2.4	3.9	0.4	5.4	5.4	8.4	4.9	5.9	8.4	0.0	0.4	0.0	0.0	1.9	1.0	0.4	2.9	1.4	1.0	0.0	4.9	0.0	1.4	2.4	0.0	8.4	2.6	24
5	3.4	0.0	0.0	4.4	0.0	2.9	3.9	2.9	1.4	2.5	0.0	0.0	0.0	0.0	4.4	3.4	1.4	1.9	3.4	2.4	3.4	4.9	4.4	3.9	0.0	4.9	2.3	24
6	0.0	1.4	0.0	2.4	5.4	2.4	3.4	1.0	5.4	0.0	0.0	1.9	2.9	2.9	2.4	0.4	1.4	1.4	1.0	1.9	1.4	2.9	0.0	0.0	0.0	5.4	1.7	24
7	4.9	1.4	1.9	3.4	1.9	4.4	1.0	3.9	1.9	1.0	0.0	2.9	0.5	C	C	3.9	1.9	1.4	3.9	3.9	1.0	2.4	7.0	0.0	7.0	2.7	24	
8	2.9	6.4	3.9	3.9	4.9	2.4	4.9	4.9	4.4	0.0	1.0	4.4	3.4	3.9	6.4	0.4	2.4	0.0	0.0	2.4	2.9	0.0	2.9	1.4	0.0	6.4	2.9	24
9	0.0	0.0	0.0	0.0	0.0	0.4	1.4	0.4	1.4	0.0	0.0	0.0	1.9	0.0	1.9	4.9	2.9	1.4	1.0	1.9	1.4	3.4	2.4	2.4	0.0	4.9	1.2	24
10	1.9	4.4	2.9	7.9	3.4	1.4	7.9	5.4	3.4	5.0	6.0	7.0	4.4	2.9	5.9	4.4	5.9	2.4	5.4	3.4	3.9	2.9	1.4	1.0	1.0	7.9	4.2	24
11	0.0	5.9	7.9	2.9	2.4	5.4	9.9	8.9	10.9	9.9	4.4	5.0	7.5	3.4	3.4	2.4	1.4	1.4	3.9	2.9	2.4	0.0	0.4	3.9	0.0	10.9	4.4	24
12	1.0	0.4	1.0	2.4	0.0	1.0	0.0	0.0	0.0	3.4	1.4	0.0	0.0	0.0	1.9	2.9	1.4	0.0	1.0	0.0	0.0	2.4	0.0	0.0	0.0	3.4	0.8	24
13	1.4	4.9	0.0	0.0	1.9	3.9	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.4	0.4	4.4	2.9	1.4	2.4	0.0	4.9	1.2	24
14	1.0	2.9	1.9	3.4	0.0	0.0	0.0	0.4	1.0	1.4	6.9	7.5	5.9	7.9	3.4	2.9	2.4	6.9	8.4	8.4	5.9	3.4	3.4	3.9	0.0	8.4	3.7	24
15	3.9	4.4	4.4	2.9	4.9	3.4	2.9	4.4	4.9	3.4	9.4	2.9	2.4	3.4	1.4	0.0	3.4	3.9	4.9	4.9	0.0	2.4	3.9	2.9	0.0	9.4	3.6	24
16	3.4	3.9	6.4	1.4	6.9	5.9	4.4	3.4	7.9	6.4	5.4	3.4	0.0	2.4	2.4	4.4	6.9	5.9	4.4	5.9	7.9	5.5	6.0	6.5	0.0	7.9	4.9	24
17	6.5	9.4	7.9	8.4	13.5	10.5	9.9	12.4	6.5	9.0	9.4	4.0	2.5	7.9	13.5	9.9	4.4	8.4	16.5	5.5	0.5	7.0	7.9	9.0	0.5	16.5	8.4	24
18	16.5	10.9	5.5	5.5	0.0	0.0	X	X	1.4	6.5	10.5	7.6	0.0	1.9	4.4	0.0	20.2	16.0	X	X	X	X	X	X	0.0	20.2	6.7	16
19	X	X	X	X	X	X	X	X	X	0.0	0.0	0.0	0.0	2.5	C	C	0.0	0.0	0.4	1.4	0.0	0.0	0.0	0.0	0.0	2.5	0.3	15
20	0.5	1.9	0.5	X	0.0	0.0	0.0	X	0.0	2.5	X	3.4	0.0	1.0	1.9	5.5	5.0	1.0	7.5	0.0	1.4	3.4	1.0	0.0	0.0	7.5	1.8	21
21	5.5	1.0	2.9	4.4	8.4	7.9	9.9	2.5	0.0	0.0	1.0	0.0	2.5	3.4	5.5	5.0	4.0	0.0	4.4	3.4	4.0	5.0	1.0	1.9	0.0	9.9	3.5	24
22	4.0	1.0	1.4	X	0.0	0.5	1.4	0.0	0.0	0.5	1.4	1.0	0.0	0.0	1.9	1.9	4.4	1.0	2.9	5.5	6.0	1.4	1.9	1.4	0.0	6.0	1.7	23
23	1.0	4.0	0.5	1.0	1.9	5.5	1.9	0.0	0.0	1.4	0.0	1.4	1.9	1.0	2.5	4.4	5.5	1.9	5.0	0.0	1.4	2.5	0.4	5.0	0.0	5.5	2.1	24
24	5.0	1.9	7.0	7.0	4.4	2.5	4.4	1.9	1.0	3.4	4.4	2.5	2.5	1.4	2.9	1.4	2.5	1.4	2.5	1.0	4.4	2.9	2.5	5.0	1.0	7.0	3.2	24
25	2.5	2.5	5.0	1.9	4.0	2.9	0.0	2.9	2.5	0.0	0.0	0.5	0.0	0.0	2.9	4.4	5.5	3.4	5.5	4.4	2.9	7.5	1.9	1.9	0.0	7.5	2.7	24
26	4.4	6.0	3.4	4.0	3.4	0.5	3.4	0.0	2.9	1.9	0.0	0.0	0.0	0.0	0.0	2.5	7.0	5.5	5.5	6.0	7.0	5.5	2.9	5.9	0.0	7.0	3.2	24
27	4.0	1.4	0.5	1.4	2.5	1.9	7.5	1.0	0.0	5.5	4.4	4.0	2.5	5.0	1.9	7.5	7.9	6.5	5.0	7.9	9.4	8.4	4.4	2.9	0.0	9.4	4.3	24
28	0.0	0.0	4.4	X	X	X	X	X	X	X	0.0	0.0	0.0	1.0	0.0	1.9	2.9	0.5	2.5	0.0	X	0.0	7.0	0.0	0.0	7.0	1.3	16
29	4.4	1.4	0.0	X	0.0	X	2.5	8.4	0.4	0.0	4.0	1.0	1.4	4.0	4.0	5.0	7.9	6.0	4.4	6.5	5.5	3.4	6.0	0.0	0.0	8.4	3.5	22
30	2.5	7.5	1.9	3.4	4.4	0.0	0.0	4.0	1.4	4.0	9.9	7.0	12.0	6.0	3.4	2.5	7.0	9.4	10.9	5.0	12.4	1.9	7.5	4.0	0.0	12.4	5.3	24
31	12.5	4.0	9.0	4.0	0.0	1.9	7.5	1.4	0.0	1.4	1.0	0.0	0.0	0.0	0.0	1.0	7.0	7.0	2.5	3.4	1.0	0.0	1.9	0.0	0.0	12.5	2.8	24
HOURLY MAX	16.5	10.9	9.0	9.4	13.5	10.9	9.9	12.4	10.9	12.4	10.5	7.6	12.0	10.4	13.5	15.4	20.2	16.4	18.0	15.9	14.4	15.9	13.5	9.0				
HOURLY AVG	3.7	3.7	3.4	3.9	3.6	3.6	4.4	3.6	2.9	3.2	3.6	2.8	2.5	3.0	3.7	3.8	5.0	4.3	4.6	4.4	4.2	3.5	3.6	3.1				

**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

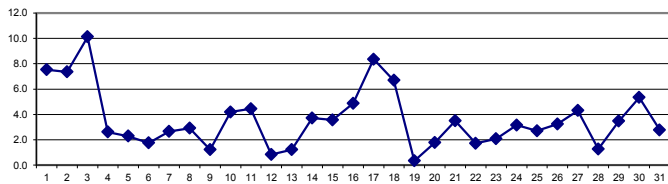
OBJECTIVE LIMIT:

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

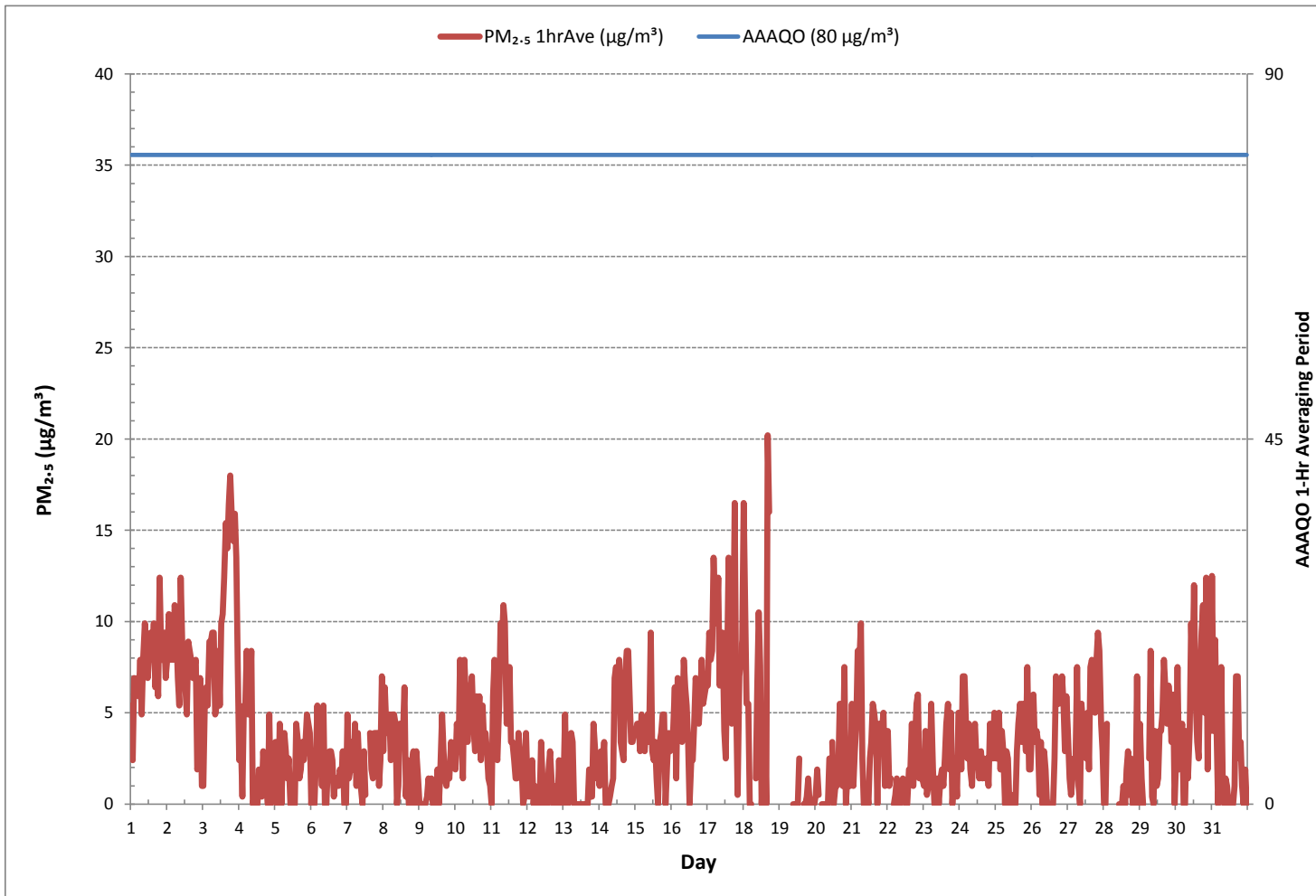
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF 24-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	577			
MINIMUM 1-HR AVERAGE:	0.0 µg/m <sup>3</sup>	@ HOUR(S)	VAR	ON DAY(S) VAR
MAXIMUM 1-HR AVERAGE:	20.2 µg/m <sup>3</sup>	@ HOUR(S)	16	ON DAY(S) 18
MAXIMUM 24-HR AVERAGE:	10.1 µg/m <sup>3</sup>			ON DAY(S) 3
				VAR-VARIOUS
MONTHLY CALIBRATION TIME:	4 hrs	OPERATIONAL TIME:	713 hrs	
STANDARD DEVIATION:	3.4	AMD OPERATION UPTIME:	95.8 %	
		MONTHLY AVERAGE:	3.7 µg/m <sup>3</sup>	

**24 HR AVERAGES December 2016**



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



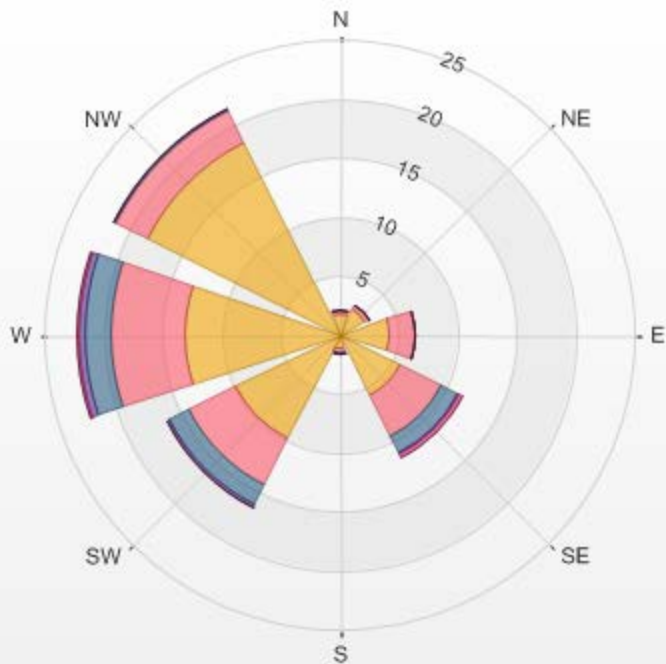


Wind: LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-PM25[ug/m<sup>3</sup>(L)] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 15.11% Valid Data: 95.16% Calm Avg: 5.52 [ug/m<sup>3</sup>]

Direction	0.0-4.1	4.1-8.1	8.1-12.2	12.2-16.2	16.2-20.3	>20.3	Total
N	1.84	0.28	0	0	0	0	2.12
NE	2.4	0.42	0	0	0	0	2.82
E	4.24	2.12	0	0	0	0	6.36
SE	5.79	3.95	1.41	0.28	0.28	0	11.71
S	1.27	0.28	0.14	0	0	0	1.69
SW	9.89	4.38	1.84	0.28	0	0	16.39
W	13.14	6.21	2.26	0.56	0.14	0	22.31
NW	18.22	3.11	0.14	0	0	0	21.47
Summary	56.79	20.75	5.79	1.12	0.42	0	84.87

% Icon Classes (ug/m3(L)) 57  0.0-4.1 21  4.1-8.1 6  8.1-12.2 1  12.2-16.2 0  16.2-20.3 0  >20.3

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-PM25[ug/m3(L)] 01/12/2016 00:00 - 31/12/2016 23:00  
 Calm: 15.11% Calm Poll Avg: 5.52[ug/m3(L)]



## ***WIND SPEED***



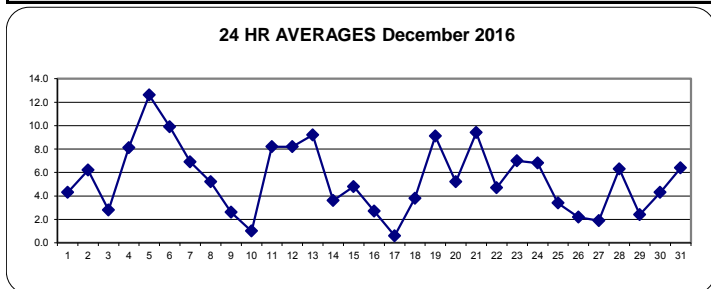
WIND SPEED Hourly Averages (WS kph)

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	3.5	3.6	4.8	4.8	4.2	4.2	4.1	4.5	5.1	5.4	6.3	5.3	5.2	4.7	5.3	3.7	5.7	4.8	3.8	4.1	3.9	4.5	3.6	4.1	3.5	6.3	4.3	24
2	4.8	4.2	3.2	5.5	6.9	3.0	4.8	5.7	5.6	6.8	5.1	8.9	7.7	8.0	6.9	6.5	7.2	8.5	11.1	11.2	10.5	9.4	7.7	6.3	3.0	11.2	6.2	24
3	5.8	6.7	8.4	5.6	4.0	3.2	2.1	2.4	4.8	6.7	5.5	7.4	7.5	7.4	5.8	4.3	1.4	1.9	1.6	1.0	0.8	0.7	0.5	2.2	0.5	8.4	2.8	24
4	4.8	4.1	4.6	5.1	4.2	4.5	6.3	5.9	5.9	7.7	9.2	11.1	10.5	10.5	10.9	13.0	13.2	16.3	14.5	15.4	14.7	14.9	13.8	13.8	4.1	16.3	8.1	24
5	13.0	13.3	13.2	12.7	14.4	14.6	13.5	11.5	10.4	12.5	13.2	14.7	14.9	14.8	13.6	11.8	10.6	13.1	12.1	11.7	11.6	10.3	9.4	12.1	9.4	14.9	12.6	24
6	9.1	10.3	10.7	9.8	8.1	7.8	9.9	9.2	9.1	9.5	12.0	12.3	13.5	12.6	12.6	11.2	10.6	10.2	8.9	9.3	9.5	8.2	7.2	6.9	6.9	13.5	9.9	24
7	8.4	7.4	6.9	8.1	7.7	7.4	6.2	6.1	5.2	5.6	6.6	8.5	7.9	8.1	8.4	6.3	5.9	4.3	6.8	8.0	7.2	7.8	9.3	8.8	4.3	9.3	6.9	24
8	7.8	8.9	8.4	8.1	8.0	6.1	5.5	6.1	7.0	6.9	8.8	7.8	7.9	7.2	6.5	6.7	5.7	7.4	5.8	4.5	1.1	4.6	4.9	4.8	1.1	8.9	5.2	24
9	4.3	3.5	4.0	4.9	4.3	3.3	2.2	3.4	3.4	3.5	5.7	5.7	5.7	4.3	2.6	2.9	2.8	1.6	0.6	0.5	0.3	0.3	0.2	0.5	0.2	5.7	2.6	24
10	0.3	0.1	0.9	0.8	0.6	0.6	0.8	0.4	1.4	0.7	1.5	2.3	0.8	1.0	1.5	1.0	1.4	2.5	2.9	2.1	1.6	2.8	2.8	3.8	0.1	3.8	1.0	24
11	5.1	6.8	7.8	8.0	9.7	10.4	8.1	9.0	10.7	9.8	9.5	11.8	13.4	12.7	9.7	9.1	6.0	7.9	5.0	5.5	5.6	5.4	7.6	6.2	5.0	13.4	8.2	24
12	5.1	6.2	8.0	7.3	8.3	7.4	5.9	10.2	11.4	10.5	12.8	14.8	15.0	13.1	11.7	7.7	7.9	7.0	7.9	7.1	8.1	9.8	7.0	7.0	5.1	15.0	8.2	24
13	6.7	6.8	7.2	7.9	9.5	15.6	16.4	13.7	12.7	14.7	16.3	15.5	13.3	12.4	15.2	15.8	7.7	9.7	7.6	4.5	3.9	2.6	0.9	1.2	0.9	16.4	9.2	24
14	0.6	0.5	0.5	0.6	1.7	3.3	2.7	2.3	2.1	5.0	5.9	7.2	8.0	7.2	7.4	5.3	4.0	4.6	5.3	4.5	4.0	6.0	3.3	4.6	0.5	8.0	3.6	24
15	5.1	4.5	4.5	4.1	3.0	1.0	1.3	5.4	4.8	7.1	10.1	11.5	9.5	9.7	8.5	7.6	3.6	3.3	5.7	4.9	3.7	4.2	0.9	1.5	0.9	11.5	4.8	24
16	2.5	4.1	0.6	1.4	3.8	4.0	2.2	3.8	5.4	4.7	5.2	6.7	5.5	4.7	5.7	4.6	1.8	1.1	0.5	0.2	0.7	0.5	1.0	1.0	0.2	6.7	2.7	24
17	0.7	1.2	1.0	1.2	0.4	0.8	0.5	1.4	0.3	0.9	1.0	1.8	2.9	4.6	2.6	1.4	0.6	1.0	0.6	1.6	2.5	1.6	1.5	2.9	0.3	4.6	0.6	24
18	3.0	5.2	4.9	3.4	2.3	0.6	1.0	0.3	0.3	0.6	1.7	4.0	9.4	10.0	9.0	10.3	9.2	7.4	11.1	12.6	15.0	7.9	3.8	2.2	0.3	15.0	3.8	24
19	1.1	0.5	4.4	6.8	9.3	9.2	5.3	5.5	6.2	4.7	7.2	10.4	11.0	11.1	15.3	18.6	18.1	16.4	17.6	15.7	13.6	9.0	8.5	9.0	0.5	18.6	9.1	24
20	8.6	8.0	6.9	7.1	7.0	8.2	8.7	7.8	5.2	6.0	6.4	5.8	5.7	6.8	4.4	1.6	0.9	1.8	1.8	3.7	1.8	2.6	4.3	5.4	0.9	8.7	5.2	24
21	6.8	6.3	6.3	6.5	7.6	7.9	8.9	7.9	7.7	9.6	9.4	11.6	11.9	13.6	11.5	11.6	10.7	11.2	10.9	8.8	10.4	9.7	9.6	10.0	6.3	13.6	9.4	24
22	11.1	9.6	8.6	6.9	7.4	9.1	8.9	8.7	6.4	4.6	5.0	6.3	6.4	6.1	3.7	3.2	2.4	0.7	1.8	2.5	4.1	3.5	3.6	4.8	0.7	11.1	4.7	24
23	7.6	8.6	6.8	6.1	5.2	7.8	8.9	8.9	7.6	7.7	7.0	6.0	7.4	8.0	9.1	6.3	9.6	7.7	7.1	9.1	8.8	8.7	7.7	7.9	5.2	9.6	7.0	24
24	8.4	9.5	7.8	7.2	6.3	7.5	7.6	6.3	7.1	6.5	5.9	7.0	6.3	6.8	6.2	6.3	6.0	7.3	6.8	6.0	5.9	6.7	6.0	6.4	5.9	9.5	6.8	24
25	6.6	6.4	6.3	5.4	5.6	4.9	5.2	5.1	4.3	5.7	4.7	4.7	3.0	3.1	2.5	2.6	1.5	1.8	1.8	0.7	0.5	0.4	0.2	1.8	0.2	6.6	3.4	24
26	0.8	0.8	0.6	1.2	3.0	2.1	4.4	2.3	0.3	2.1	3.8	6.0	3.0	4.6	4.3	4.5	2.4	1.5	1.8	2.5	2.6	2.1	4.3	6.6	0.3	6.6	2.2	24
27	6.0	3.5	3.4	6.2	4.6	3.2	2.4	2.3	1.1	1.9	2.8	3.1	3.6	4.6	4.1	2.8	0.9	1.5	0.2	0.6	0.6	2.8	7.5	7.7	0.2	7.7	1.9	24
28	5.7	1.1	2.7	3.6	4.6	8.0	8.2	8.3	7.7	8.2	14.6	16.9	15.0	14.3	8.5	6.4	2.1	1.2	1.5	2.3	5.2	6.9	6.7	5.7	1.1	16.9	6.3	24
29	7.4	6.2	6.4	8.0	6.6	5.8	5.8	5.2	5.7	5.5	4.3	3.0	2.5	3.4	0.9	1.0	1.4	1.6	2.4	1.8	1.8	1.8	4.7	2.6	0.9	8.0	2.4	24
30	3.7	1.8	1.6	2.5	2.8	3.7	3.5	0.8	1.4	2.3	5.6	6.8	8.6	8.2	6.3	7.7	6.8	6.7	7.3	6.4	7.2	6.3	6.1	7.1	0.8	8.6	4.3	24
31	7.4	7.2	6.3	7.4	7.9	6.9	6.9	7.0	6.8	9.4	8.8	7.2	9.9	12.1	10.7	7.2	5.3	4.9	6.2	4.1	4.2	4.2	4.7	6.4	4.1	12.1	6.4	24
HOURLY MAX	13.0	13.3	13.2	12.7	14.4	15.6	16.4	13.7	12.7	14.7	16.3	16.9	15.0	14.8	15.3	18.6	18.1	16.4	17.6	15.7	15.0	14.9	13.8	13.8				
HOURLY AVG	2.4	2.1	2.2	2.5	2.8	3.1	2.8	3.1	3.3	3.4	4.2	4.7	4.7	4.6	4.4	3.9	2.9	2.9	3.0	2.9	2.9	2.6	2.2	2.6				

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

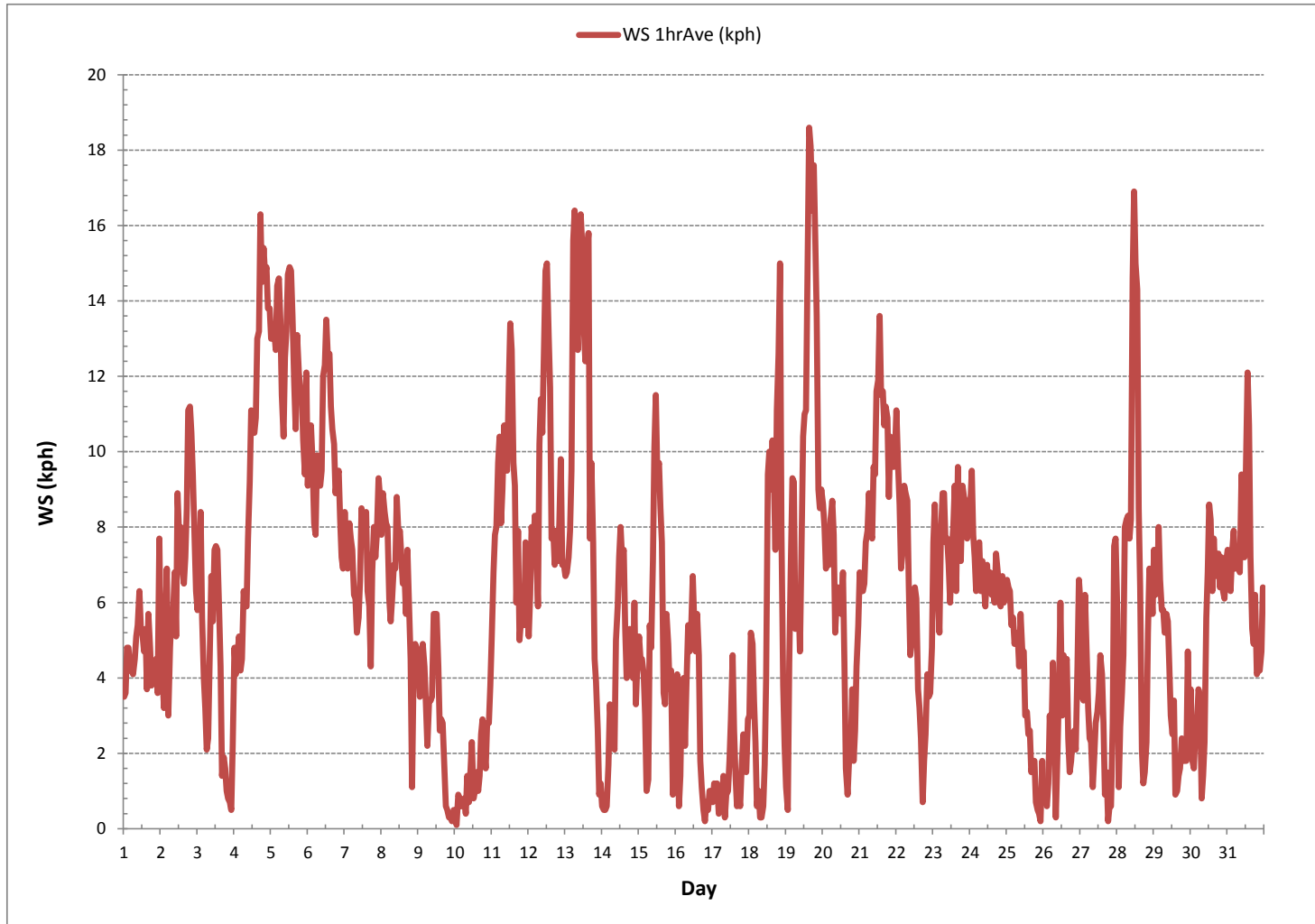
LAST CALIBRATION:	April 1, 2015
DECLINATION:	MAGNETIC DECLINATION 14 DEGREE EAST



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	744
MINIMUM 1-HR AVERAGE:	0.1 kph @ HOUR(S) 1 ON DAY(S) 10
MAXIMUM 1-HR AVERAGE:	18.6 kph @ HOUR(S) 15 ON DAY(S) 19
MAXIMUM 24-HR AVERAGE:	12.6 kph ON DAY(S) 5
	VAR-VARIOUS
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	744 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	3.8
MONTHLY AVERAGE:	3.2 kph

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





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

WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	8.7	8.8	8.7	9.7	10.1	8.2	6.9	7.4	9.5	9.4	13.2	9.5	10.6	8.6	9.1	7.6	8.8	8.8	9.4	8.8	7.5	8.3	10.2	9.5	6.9	13.2	9.1	24
2	8.7	9.6	7.4	9.0	10.8	7.2	10.0	10.4	9.7	10.6	9.6	13.4	11.9	13.0	10.9	11.6	10.0	13.5	15.5	17.9	17.4	12.9	11.2	10.9	7.2	17.9	11.4	24
3	9.4	10.6	14.2	13.3	8.4	6.3	4.1	5.7	10.1	12.2	9.2	11.5	11.1	13.3	12.1	9.7	3.2	5.6	3.7	2.1	2.0	2.7	3.5	4.9	2.0	14.2	7.9	24
4	7.7	6.6	7.7	8.3	6.4	7.0	9.2	9.3	9.9	12.6	14.1	15.3	17.0	17.3	18.7	20.9	18.4	24.0	26.5	22.3	21.2	22.1	21.7	20.5	6.4	26.5	15.2	24
5	21.6	22.0	21.1	18.8	19.5	22.3	18.4	16.0	15.2	18.0	18.9	20.2	23.6	21.1	19.5	20.4	16.6	20.5	17.6	20.7	18.5	16.5	17.5	19.8	15.2	23.6	19.3	24
6	15.7	16.1	15.4	16.5	12.7	14.0	17.1	14.6	13.4	14.9	17.8	17.5	20.0	19.7	18.6	16.4	16.3	15.2	13.3	12.8	13.7	14.5	12.5	10.8	10.8	20.0	15.4	24
7	12.3	12.8	12.3	13.4	12.1	11.0	9.8	9.4	8.0	8.0	11.5	12.4	12.9	P	12.3	9.7	10.6	7.3	12.0	10.5	10.2	10.6	13.2	11.4	7.3	13.4	11.0	23
8	10.5	13.0	12.3	11.6	10.7	11.2	7.1	8.6	11.3	10.8	13.0	11.8	12.1	11.0	11.3	11.5	9.5	11.2	8.9	8.0	7.2	7.1	6.7	7.5	6.7	13.0	10.2	24
9	7.4	6.1	7.5	9.0	6.5	7.3	4.9	6.4	7.0	8.2	8.0	8.6	8.6	7.5	5.8	4.8	5.5	3.2	3.1	2.2	1.6	1.9	5.6	2.8	1.6	9.0	5.8	24
10	2.1	1.7	2.3	3.6	4.9	2.1	2.4	1.4	2.8	8.9	5.5	4.8	4.4	4.3	3.7	3.5	5.9	5.9	5.0	4.4	3.9	6.6	4.6	7.3	1.4	8.9	4.3	24
11	11.8	10.9	12.3	12.1	14.0	15.9	16.3	13.0	16.9	13.6	15.9	17.9	17.5	18.0	16.3	17.6	9.6	13.2	9.2	9.4	11.5	10.0	12.4	9.8	9.2	18.0	13.5	24
12	8.6	10.5	11.4	10.1	14.1	11.7	10.7	20.4	19.0	16.9	21.5	25.9	22.4	21.7	19.6	12.1	12.3	10.7	12.9	12.4	16.2	14.5	15.6	16.5	8.6	25.9	15.3	24
13	15.6	11.7	12.8	12.1	15.5	27.2	26.3	20.5	19.1	22.5	23.3	22.4	20.6	23.2	23.3	26.1	15.7	18.8	12.2	6.8	5.6	4.8	2.7	4.0	2.7	27.2	16.4	24
14	1.9	2.6	3.3	2.6	3.8	9.5	6.4	6.4	5.1	9.5	10.7	11.8	13.4	12.0	11.7	10.2	6.3	6.7	7.2	6.3	7.2	12.5	5.7	7.4	1.9	13.4	7.5	24
15	8.2	6.8	7.3	7.1	4.5	3.6	5.0	8.8	6.6	11.1	15.5	19.8	14.3	15.5	12.3	13.5	5.4	6.1	10.8	8.2	6.4	6.9	3.3	3.6	3.3	19.8	8.8	24
16	7.5	7.6	3.2	32.0	6.5	8.5	5.3	5.7	7.3	7.7	8.6	10.9	9.5	7.8	10.0	8.2	4.0	4.3	4.7	2.8	3.3	3.8	2.5	3.2	2.5	32.0	7.3	24
17	3.5	3.5	2.6	3.7	21.6	3.8	3.1	13.6	3.7	2.6	2.5	4.8	5.0	7.3	4.5	3.1	1.9	2.2	2.4	3.6	5.4	4.0	4.6	5.4	1.9	21.6	4.9	24
18	7.1	7.4	8.4	6.5	5.4	2.9	3.3	2.1	1.9	3.9	3.7	7.7	15.5	15.2	13.0	15.2	15.5	14.0	22.6	20.1	25.3	20.9	6.3	5.9	1.9	25.3	10.4	24
19	4.2	2.9	9.1	10.8	13.9	15.8	13.1	11.4	11.0	16.9	12.8	17.2	16.6	P	27.2	29.6	27.3	27.4	23.5	23.7	22.8	14.6	12.7	12.5	2.9	29.6	16.4	23
20	11.7	12.4	10.4	11.2	10.5	12.7	13.5	13.1	9.4	8.1	10.5	12.1	10.1	10.9	8.9	6.6	4.2	5.3	6.7	7.0	5.2	5.5	5.8	7.1	4.2	13.5	9.1	24
21	10.1	9.9	10.2	11.0	10.6	12.6	12.7	12.9	11.4	14.6	14.5	16.7	16.0	18.1	18.3	18.8	15.3	16.6	16.1	12.5	17.7	14.4	13.8	14.2	9.9	18.8	14.1	24
22	16.4	13.5	12.5	10.6	11.2	13.4	14.5	12.1	11.8	7.9	8.4	11.2	11.4	8.9	5.9	6.0	4.2	3.3	4.6	4.0	6.6	7.0	5.3	7.5	3.3	16.4	9.1	24
23	14.5	12.8	11.0	9.1	9.8	12.5	13.4	13.7	11.6	12.3	11.4	9.5	10.6	11.6	13.2	10.6	15.5	12.1	11.4	14.3	13.9	12.9	11.7	13.6	9.1	15.5	12.2	24
24	14.8	14.2	15.7	14.1	12.7	10.6	12.2	12.2	12.8	9.8	11.0	11.3	13.8	11.9	10.5	12.2	11.0	11.8	11.3	9.0	9.9	11.2	11.1	11.6	9.0	15.7	11.9	24
25	11.1	9.9	10.5	10.4	10.8	8.8	10.3	9.8	7.1	9.6	8.6	8.0	7.4	5.8	4.8	4.7	3.5	4.1	2.8	2.0	3.6	1.9	3.0	6.2	1.9	11.1	6.9	24
26	4.3	4.7	2.9	2.9	5.8	5.7	8.8	4.3	2.4	6.9	7.4	11.2	8.6	8.2	9.3	9.4	6.5	4.1	7.2	6.4	5.6	4.5	7.8	11.2	2.4	11.2	6.5	24
27	9.9	6.3	8.2	10.9	8.7	7.8	7.3	5.0	3.7	5.0	6.8	7.4	7.8	7.5	7.0	5.3	3.6	4.3	3.1	2.1	3.2	8.1	10.0	10.8	2.1	10.9	6.7	24
28	9.3	5.4	9.4	8.2	7.9	10.8	11.4	12.1	11.6	13.5	23.5	24.5	23.7	20.1	14.1	10.5	4.6	4.1	3.9	5.5	8.2	9.8	10.5	8.5	3.9	24.5	11.3	24
29	10.2	9.8	10.1	11.7	9.4	8.8	9.8	9.7	9.5	7.3	6.5	6.5	4.9	6.0	4.7	2.1	3.2	3.2	4.6	3.6	3.4	4.7	8.1	4.9	2.1	11.7	6.8	24
30	6.1	3.6	4.0	4.5	5.5	6.2	6.8	8.1	4.5	5.0	8.7	11.2	13.0	13.0	10.2	10.7	11.3	10.0	11.0	9.1	10.5	8.8	9.5	9.6	3.6	13.0	8.4	24
31	10.6	10.5	10.0	11.9	12.6	11.8	13.4	11.2	13.5	14.9	14.6	10.6	16.7	19.0	16.5	11.8	10.6	7.6	8.4	8.6	8.6	6.3	7.7	10.6	6.3	19.0	11.6	24
HOURLY MAX	21.6	22.0	21.1	32.0	21.6	27.2	26.3	20.5	19.1	22.5	23.5	25.9	23.7	23.2	27.2	29.6	27.3	27.4	26.5	23.7	25.3	22.1	21.7	20.5				
HOURLY AVG	1.6	22.0	21.1	32.0	21.6	27.2	26.3	20.5	19.1	22.5	23.5	25.9	23.7	23.2	27.2	29.6	27.3	27.4	26.5	23.7	25.3	22.1	21.7	20.5				

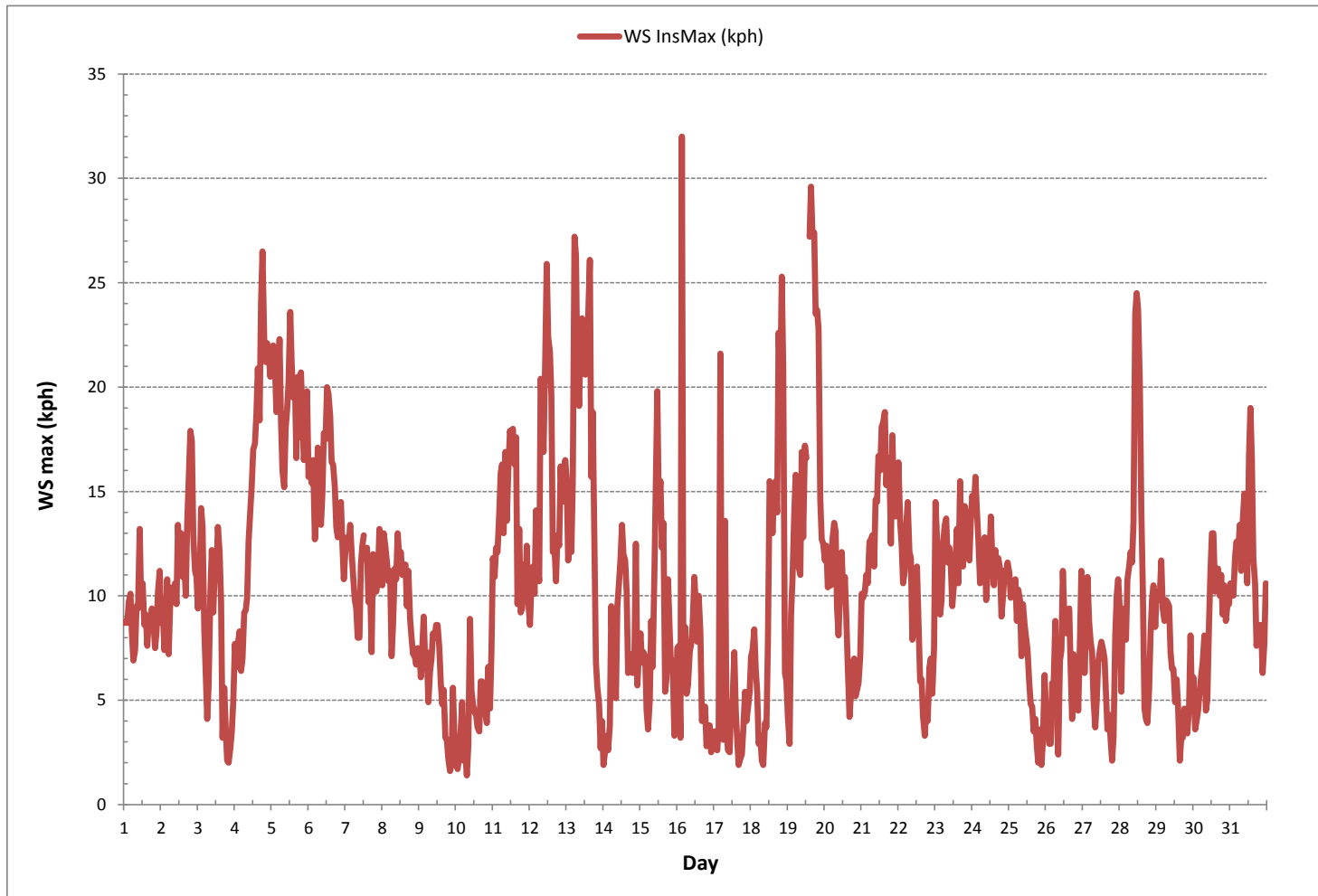
STATUS FLAG CODES

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

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	32.0	kph	@ HOUR(S)	3	ON DAY(S)	16
					VAR-VARIOUS	
OPERATIONAL TIME:					742	hrs

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



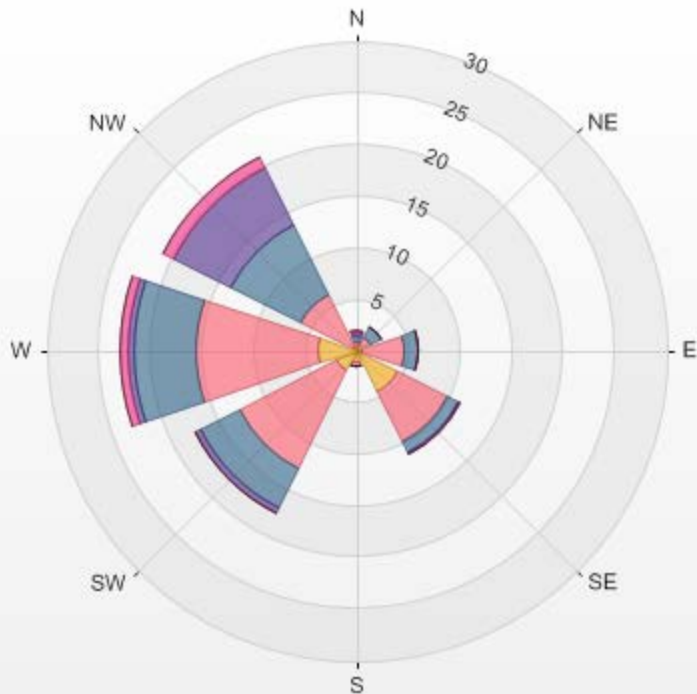
Wind: LICA COLD LAKE SOUTH Monitor: WSP [kph] Monthly: 12/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 14.92% Valid Data: 100.00%

Direction	1.8-3.7	3.7-7.5	7.5-11.2	11.2-15.0	15.0-18.7	>18.7	Total
N	0.27	0.67	0.54	0.4	0.13	0	2.01
NE	0.67	0.81	1.21	0	0	0	2.69
E	0.54	4.03	1.48	0	0	0	6.05
SE	4.44	5.38	1.21	0.13	0	0	11.16
S	1.21	0.4	0	0	0	0	1.61
SW	2.15	10.62	4.17	0.67	0	0	17.61
W	3.76	11.83	6.05	0.54	0.81	0	22.99
NW	0.4	5.65	7.53	6.18	1.21	0	20.97
Summary	13.44	39.39	22.19	7.92	2.15	0	85.09



% Icon Classes (kph) 13 1.8-3.7 39 3.7-7.5 22 7.5-11.2 8 11.2-15.0 2 15.0-18.7 0 >18.7

LICA COLD LAKE SOUTH 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 14.92% Calm Wind Avg Speed: 0.93(kph)



***WIND DIRECTION***



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

WIND DIRECTION Hourly Averages (WD)

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

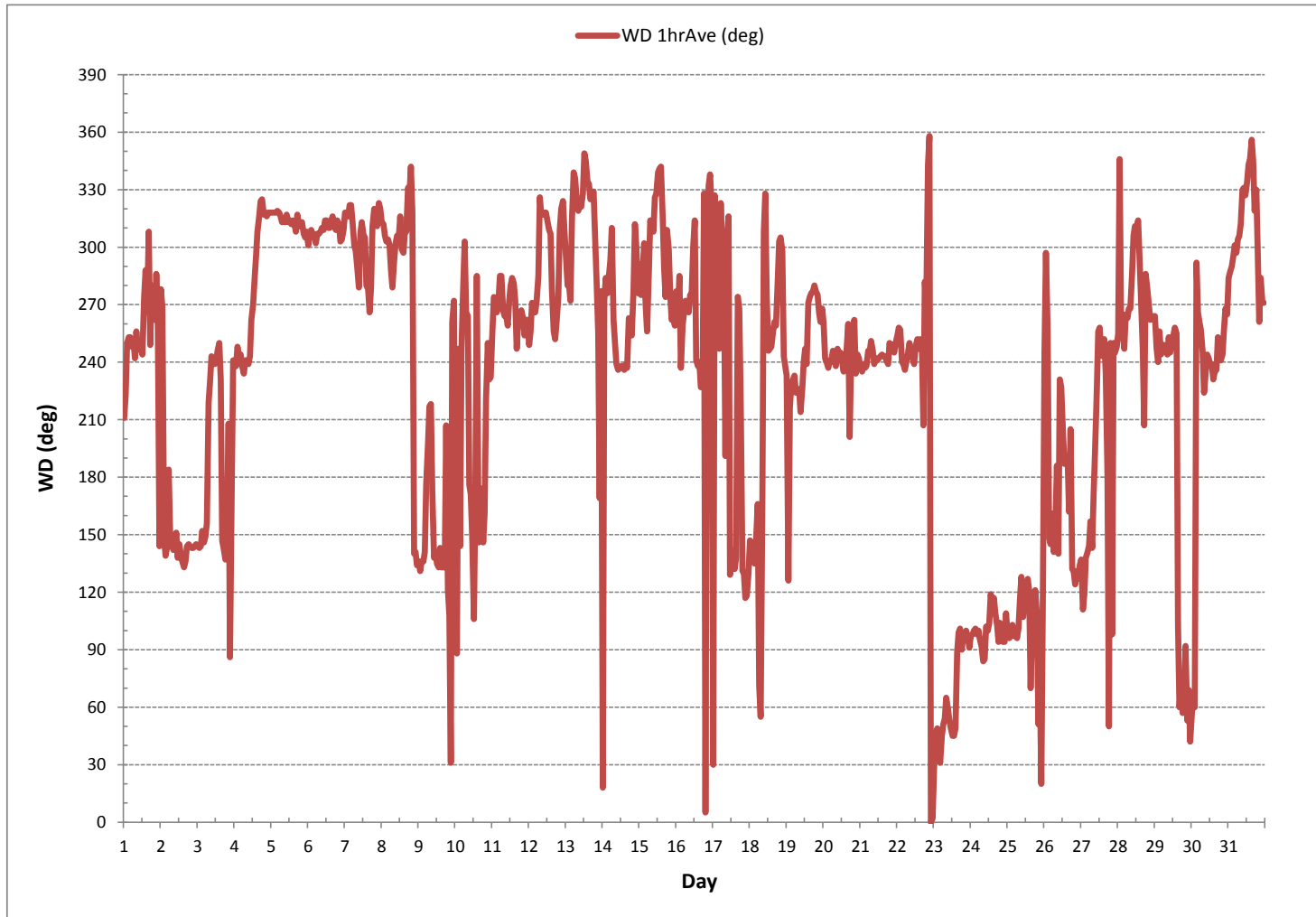
STATUS FLAG CODES

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

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	744	hrs
STANDARD DEVIATION:	80		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	280	(W)

WIND DIRECTION Hourly Averages (WD)



***STANDARD DEVIATION WIND DIRECTION***



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

**STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)**

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	RDGS.	
DAY																										
1	38	29	23	24	26	26	22	21	22	25	24	24	26	31	24	28	18	22	27	27	29	24	24	28	24	
2	23	26	23	13	19	42	28	23	18	15	30	20	19	17	18	19	16	15	16	15	16	14	16	17	24	
3	18	18	15	28	27	29	38	41	26	20	22	20	20	22	21	25	45	53	38	32	61	49	68	48	24	
4	20	20	17	17	16	18	16	18	18	18	19	19	19	21	19	17	14	14	15	15	14	14	16	14	24	
5	16	16	16	16	13	14	13	15	15	15	15	16	16	15	15	16	17	13	14	16	15	17	19	16	24	
6	18	16	16	18	18	17	14	14	16	15	15	17	15	17	16	13	14	15	16	14	14	16	18	15	24	
7	15	14	14	13	13	12	14	15	18	17	20	15	16	16	20	19	16	18	12	10	11	13	13	12	24	
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14	62	68	68	71	37	30	25	51	24	19	20	20	19	19	17	18	15	17	13	13	23	18	18	17	24	
15	19	21	22	18	23	62	56	14	16	13	15	17	15	15	17	13	26	28	17	23	25	28	62	48	24	
16	47	42	48	65	36	38	50	47	37	42	32	22	26	32	25	26	28	59	62	69	71	75	78	53	24	
17	68	58	69	53	67	66	72	54	52	59	55	50	29	16	29	22	47	52	59	52	38	47	46	32	24	
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19	58	68	26	17	18	20	26	29	21	31	20	19	20	18	19	20	20	20	19	20	19	18	18	18	24	
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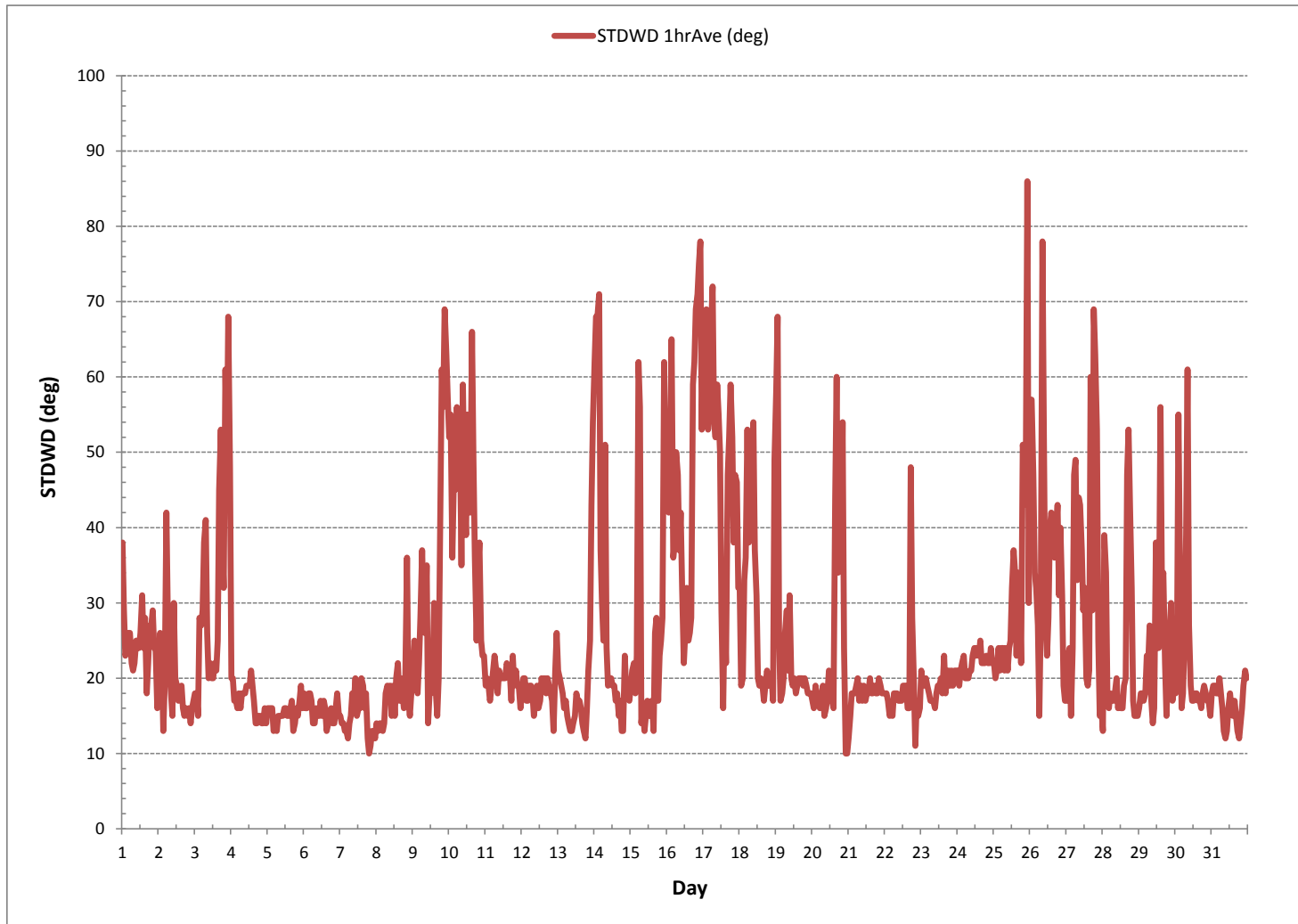
**STATUS FLAG CODES**

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

LAST CALIBRATION: April 1, 2015

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 744 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



***RELATIVE HUMIDITY***





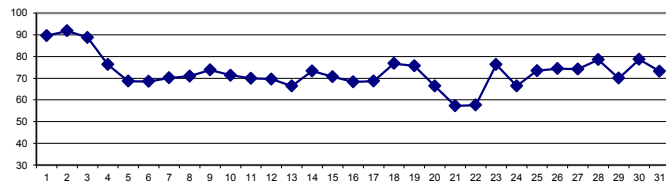
RELATIVE HUMIDITY Hourly Averages (RH %)

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	81	82	84	84	86	87	88	89	89	90	90	90	90	90	91	91	92	93	93	93	93	94	94	94	94	81	94	90	24
2	94	94	93	93	94	94	94	94	93	93	94	94	93	92	92	93	92	91	90	89	88	88	87	88	89	87	94	92	24
3	89	89	90	89	88	89	89	89	89	90	90	89	88	86	85	86	90	92	92	91	88	87	87	87	85	92	89	24	
4	84	81	80	79	79	79	76	76	76	72	71	70	71	81	78	78	82	76	71	76	77	77	71	70	70	84	76	24	
5	69	70	72	74	74	71	72	71	70	68	66	66	63	63	63	64	69	70	70	71	68	67	69	68	63	74	69	24	
6	71	73	72	70	69	71	70	70	70	69	67	67	65	64	64	66	66	67	68	68	68	69	70	70	64	73	69	24	
7	70	71	70	70	70	71	73	73	73	73	68	66	66	65	63	65	70	73	73	73	73	73	70	71	63	73	70	24	
8	72	72	73	73	73	73	73	73	73	73	71	70	68	65	64	65	67	69	72	73	73	72	73	72	64	73	71	24	
9	71	71	73	73	74	74	76	77	77	77	76	75	75	75	73	73	74	74	73	73	72	72	72	71	71	77	74	24	
10	71	71	70	71	70	70	70	70	70	70	70	70	69	69	70	72	73	74	74	74	73	73	74	74	69	74	71	24	
11	75	74	74	74	73	69	67	70	69	69	68	64	62	63	62	64	68	70	72	73	74	75	75	74	62	75	70	24	
12	76	76	76	75	76	76	77	71	63	61	59	55	54	55	57	63	72	77	77	79	74	75	73	73	54	79	70	24	
13	73	79	76	80	80	79	65	62	64	60	59	59	63	58	53	52	57	58	61	67	70	72	74	72	52	80	66	24	
14	73	73	73	73	75	74	73	75	74	74	73	72	69	66	70	70	72	72	74	77	78	77	76	77	66	78	73	24	
15	78	77	76	75	74	75	76	76	75	73	65	60	61	64	62	62	68	73	72	70	70	71	72	71	60	78	71	24	
16	70	70	70	70	69	69	69	69	69	69	68	68	63	61	62	66	70	71	71	70	69	69	68	68	61	71	68	24	
17	68	68	67	67	67	67	67	67	67	66	66	67	64	67	67	70	72	71	71	72	72	72	73	73	64	73	69	24	
18	74	74	75	75	76	76	77	78	78	79	80	82	87	82	73	75	85	76	68	70	70	73	77	82	68	87	77	24	
19	86	87	87	87	95	98	98	96	90	88	73	57	54	50	50	76	83	72	68	69	66	64	62	60	50	98	76	24	
20	61	64	68	70	71	72	70	69	70	66	58	52	48	47	49	53	68	75	78	74	76	79	78	77	47	79	66	24	
21	72	68	65	64	66	72	74	74	69	63	59	54	52	49	48	48	50	48	47	47	46	46	46	47	46	74	57	24	
22	47	48	49	52	52	53	54	56	56	54	52	49	49	52	55	60	64	68	69	69	71	74	77	47	47	77	58	24	
23	79	79	80	77	78	75	79	82	80	74	71	72	75	76	77	75	74	75	75	77	77	75	73	71	82	76	24		
24	71	70	70	70	69	69	69	69	69	68	67	65	64	63	62	63	63	63	63	64	65	66	67	66	62	71	66	24	
25	69	73	73	74	75	75	75	75	74	73	70	68	67	68	70	75	78	77	77	76	76	75	75	75	67	78	73	24	
26	74	74	75	76	77	77	77	76	76	76	74	72	67	65	65	69	72	77	77	77	78	78	79	77	65	79	74	24	
27	76	76	76	74	75	75	75	75	76	74	72	70	67	66	66	67	73	78	80	80	81	78	78	72	66	81	74	24	
28	73	77	79	72	73	74	79	83	89	87	72	69	69	67	76	81	83	85	88	90	83	81	79	75	67	90	79	24	
29	72	72	70	69	70	71	74	76	74	72	64	59	57	58	57	62	70	76	77	77	77	78	73	75	57	78	70	24	
30	78	80	83	86	84	85	85	84	84	82	83	76	69	67	68	71	75	80	82	82	81	77	73	73	67	86	79	24	
31	72	72	72	71	77	87	83	81	76	71	67	62	63	66	67	69	73	75	74	75	73	71	71	62	87	73	24		
HOURLY MAX	94	94	93	93	95	98	98	96	93	94	94	93	92	92	93	92	92	93	93	93	93	94	94	94					
HOURLY AVG	74	74	75	74	75	76	76	76	75	74	71	68	67	66	66	69	73	74	74	75	74	74	74	73					

STATUS FLAG CODES

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

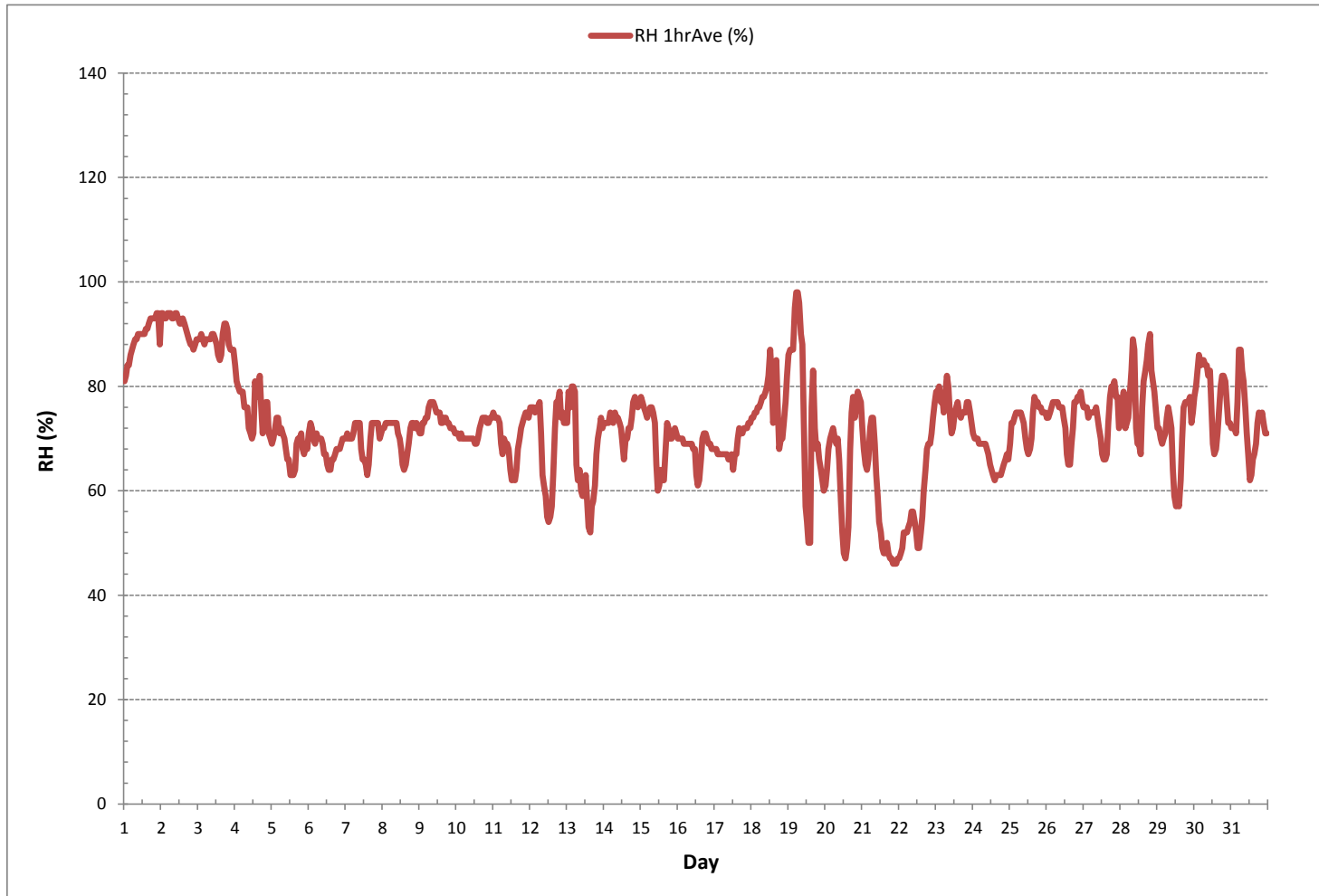
24 HR AVERAGES December 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	46	%	@ HOUR(S)	VAR	ON DAY(S)	21
MAXIMUM 1-HR AVERAGE:	98	%	@ HOUR(S)	5, 6	ON DAY(S)	19, 19
MAXIMUM 24-HR AVERAGE:	92	%			ON DAY(S)	2
					VAR-VARIOUS	
OPERATIONAL TIME:						744 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	9					
MONTHLY AVERAGE:						73 %

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



***AMBIENT TEMPERATURE***



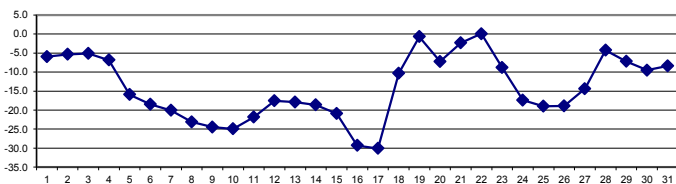
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

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	-4.7	-4.8	-4.9	-5.3	-5.5	-5.8	-6.0	-6.1	-6.4	-6.3	-6.1	-6.1	-5.9	-5.9	-6.1	-6.1	-6.4	-6.4	-6.3	-6.3	-6.4	-6.5	-6.4	-6.3	-6.5	-4.7	-6.0	24	
2	-6.2	-6.2	-6.1	-6.0	-6.2	-6.2	-6.4	-6.4	-6.2	-5.8	-5.4	-5.4	-5.4	-4.9	-4.5	-4.5	-4.4	-4.0	-3.9	-4.3	-4.7	-5.2	-5.1	-4.8	-6.4	-3.9	-5.3	24	
3	-4.5	-4.4	-4.6	-4.7	-4.6	-4.5	-4.4	-4.2	-4.4	-4.6	-4.2	-3.8	-3.2	-2.7	-2.3	-2.4	-3.5	-4.5	-5.9	-7.4	-8.7	-9.4	-9.9	-9.4	-9.9	-2.3	-5.1	24	
4	-5.8	-5.7	-6.3	-6.6	-7.1	-7.3	-6.8	-6.9	-7.1	-5.8	-4.6	-3.7	-3.4	-3.2	-3.6	-4.3	-5.6	-6.8	-8.2	-9.5	-10.8	-11.8	-11.9	-12.0	-12.0	-3.2	-6.9	24	
5	-12.1	-12.5	-13.1	-13.9	-14.4	-15.1	-15.8	-16.2	-16.4	-15.8	-15.4	-15.3	-15.5	-15.8	-16.2	-16.6	-16.8	-16.9	-17.3	-17.5	-17.9	-18.4	-18.7	-18.8	-18.8	-18.8	-12.1	-15.9	24
6	-19.0	-18.9	-19.0	-19.1	-19.0	-18.9	-19.1	-19.3	-19.4	-18.9	-18.4	-17.8	-17.2	-16.8	-16.7	-17.3	-18.0	-18.5	-19.0	-18.7	-18.8	-18.9	-18.5	-18.5	-19.4	-16.7	-18.5	24	
7	-18.3	-18.8	-19.0	-19.1	-19.5	-20.0	-20.6	-21.0	-21.4	-21.6	-20.2	-19.5	-19.2	-18.9	-17.9	-18.2	-19.4	-20.1	-20.7	-21.0	-21.6	-21.8	-22.0	-22.2	-22.2	-22.2	-17.9	-20.1	24
8	-22.7	-23.2	-23.9	-24.4	-24.8	-25.0	-25.4	-25.6	-24.8	-24.1	-23.3	-22.9	-22.4	-21.8	-21.7	-21.6	-21.6	-21.8	-22.2	-22.5	-22.2	-22.2	-22.6	-22.9	-25.6	-21.6	-23.2	24	
9	-23.2	-23.4	-23.5	-24.2	-24.6	-24.4	-23.7	-23.3	-23.5	-23.5	-23.6	-23.6	-23.0	-22.5	-22.1	-22.5	-23.7	-25.0	-26.0	-27.0	-27.2	-27.4	-27.8	-28.4	-28.4	-22.1	-24.5	24	
10	-28.9	-28.8	-29.6	-29.7	-29.8	-30.2	-30.2	-30.0	-29.9	-28.2	-25.8	-24.3	-22.8	-22.2	-21.8	-21.7	-21.5	-21.4	-21.2	-20.6	-20.3	-20.1	-20.0	-19.9	-30.2	-19.9	-25.0	24	
11	-19.6	-19.7	-20.0	-20.4	-21.3	-22.4	-23.8	-24.3	-24.8	-24.6	-23.9	-23.0	-22.4	-22.1	-21.9	-22.0	-21.8	-21.7	-22.0	-21.3	-20.2	-20.4	-20.4	-20.7	-24.8	-19.6	-21.9	24	
12	-20.7	-20.0	-19.7	-19.8	-19.6	-19.1	-19.2	-18.8	-19.5	-19.4	-19.1	-18.3	-17.4	-16.3	-15.9	-16.0	-16.5	-16.2	-15.8	-15.3	-14.7	-14.2	-14.6	-15.2	-20.7	-14.2	-17.6	24	
13	-15.0	-14.7	-15.0	-14.9	-14.3	-14.6	-15.7	-16.5	-16.9	-16.5	-15.9	-15.6	-16.1	-16.8	-16.6	-17.7	-18.8	-19.3	-20.0	-21.2	-22.1	-23.9	-25.7	-26.7	-26.7	-14.3	-17.9	24	
14	-27.2	-26.1	-24.9	-23.6	-22.0	-19.9	-18.4	-18.1	-18.3	-19.1	-18.5	-18.2	-17.4	-16.3	-15.7	-14.9	-14.7	-14.8	-15.9	-17.8	-17.1	-16.0	-16.1	-16.9	-27.2	-14.7	-18.7	24	
15	-18.2	-18.0	-19.9	-20.7	-22.3	-21.7	-20.4	-19.2	-18.6	-19.1	-18.1	-17.9	-17.8	-18.3	-18.1	-19.3	-20.6	-22.9	-23.0	-23.1	-23.7	-25.5	-27.7	-28.9	-28.9	-17.8	-21.0	24	
16	-29.8	-29.5	-30.3	-30.9	-31.4	-31.2	-32.1	-32.3	-32.2	-29.8	-27.2	-25.6	-24.2	-23.5	-23.6	-24.6	-26.4	-28.3	-29.7	-30.8	-31.7	-32.3	-32.9	-33.4	-33.4	-23.5	-29.3	24	
17	-33.7	-33.9	-34.3	-34.6	-34.8	-35.1	<b>-35.3</b>	<b>-35.3</b>	-35.2	-34.1	-33.5	-25.4	-24.8	-24.2	-24.5	-25.8	-27.2	-28.1	-28.4	-28.0	-27.5	-26.6	-25.9	<b>-35.3</b>	-24.2	-30.1	24		
18	-24.4	-23.3	-22.5	-21.7	-20.6	-19.4	-18.6	-18.2	-17.2	-15.9	-14.5	-11.7	-4.5	-3.2	-2.3	-1.9	-1.8	-1.3	0.0	-0.1	-0.2	-0.4	-1.1	-3.3	-24.4	0.0	-10.3	24	
19	-5.5	-6.0	-4.5	-1.4	-0.5	-0.2	-0.5	-0.7	-0.4	-0.5	1.0	1.7	2.3	1.7	2.3	0.5	0.0	0.5	0.6	-0.4	-0.7	-1.4	-2.0	-1.9	-6.0	2.3	-0.7	24	
20	-2.4	-3.6	-5.0	-5.4	-5.7	-6.1	-6.0	-5.9	-6.8	-6.4	-4.8	-3.4	-2.3	-2.3	-2.8	-4.3	-8.1	-10.9	-12.8	-12.0	-13.1	-14.7	-14.7	-14.1	-14.7	-2.3	-7.2	24	
21	-11.8	-9.5	-8.3	-7.3	-6.4	-6.6	-5.7	-5.4	-4.2	-3.1	-2.2	-0.8	-0.3	0.5	1.2	1.2	0.6	1.2	1.5	1.2	<b>2.4</b>	<b>2.4</b>	2.1	1.8	-11.8	<b>2.4</b>	-2.3	24	
22	1.9	1.7	1.7	1.0	0.9	0.7	0.5	0.1	-0.4	-0.4	0.2	1.0	1.7	1.9	1.4	0.5	-0.5	-1.1	-2.0	-2.2	-2.0	-1.6	-1.8	-1.7	-2.2	1.9	<b>0.1</b>	24	
23	-1.8	-2.5	-3.0	-3.3	-3.7	-4.8	-6.0	-7.1	-8.0	-8.6	-8.8	-8.8	-9.0	-9.4	-10.3	-10.8	-11.9	-12.2	-12.7	-13.2	-13.5	-13.7	-14.1	-14.8	-14.8	-1.8	-8.8	24	
24	-15.8	-16.7	-17.0	-17.1	-17.2	-17.4	-17.6	-17.7	-18.0	-17.9	-17.5	-17.3	-16.9	-16.4	-16.5	-17.0	-17.4	-17.7	-17.8	-18.0	-18.2	-18.3	-18.2	-18.2	-18.3	-15.8	-17.4	24	
25	-18.4	-18.5	-18.7	-18.6	-18.7	-18.6	-18.5	-18.6	-18.5	-18.3	-17.6	-17.1	-17.1	-16.8	-16.6	-16.8	-17.9	-18.8	-19.7	-21.1	-21.9	-22.8	-23.6	-23.4	-23.6	-16.6	-19.0	24	
26	-23.9	-23.9	-22.7	-21.0	-19.6	-18.8	-19.0	-19.3	-20.5	-20.9	-18.8	-17.7	-16.8	-15.4	-14.9	-15.2	-16.3	-17.3	-18.8	-18.5	-19.3	-19.2	-18.6	-17.8	-23.9	-14.9	-18.9	24	
27	-17.7	-17.1	-17.2	-16.5	-16.5	-16.1	-15.5	-15.0	-15.0	-14.3	-13.7	-13.0	-12.4	-11.8	-11.7	-11.9	-12.9	-14.1	-15.2	-16.1	-16.9	-17.4	-10.3	-7.3	-17.7	-7.3	-14.4	24	
28	-6.7	-8.9	-8.4	-4.9	-4.7	-3.7	-3.7	-3.5	-3.0	-2.3	-2.5	-2.4	-2.3	-2.5	-2.9	-3.3	-4.0	-5.6	-6.8	-5.0	-4.3	-3.5	-3.4	-8.9	-2.3	-4.3	24		
29	-3.0	-3.3	-4.3	-5.1	-6.3	-7.2	-8.5	-9.6	-9.2	-8.9	-7.1	-6.0	-5.2	-5.6	-5.7	-6.4	-7.9	-9.3	-9.7	-9.6	-9.2	-9.2	-8.3	-8.4	-9.7	-3.0	-7.2	24	
30	-8.4	-8.7	-9.8	-12.2	-11.8	-12.1	-12.5	-13.6	-15.1	-14.6	-11.3	-9.2	-7.9	-7.3	-7.1	-7.7	-8.0	-8.3	-8.0	-7.8	-7.7	-6.8	-6.1	-6.6	-15.1	-6.1	-9.5	24	
31	-7.0	-7.2	-7.0	-6.7	-6.7	-7.1	-7.2	-7.2	-7.3	-7.6	-7.7	-7.5	-6.9	-7.4	-8.0	-8.8	-9.8	-11.1	-11.7	-11.1	-11.0	-10.4	-10.0	-9.8	-11.7	-6.7	-8.4	24	
HOURLY MAX	1.9	1.7	1.7	1.0	0.9	0.7	0.5	0.1	-0.4	-0.4	1.0	1.7	1.7	1.9	2.3	1.2	0.6	1.2	1.5	1.2	2.4	2.4	2.1	1.8					
HOURLY AVG	-14.7	-14.7	-14.9	-14.8	-14.8	-14.8	-14.9	-15.0	-15.1	-14.8	-13.8	-12.9	-12.2	-11.8	-11.7	-12.1	-12.9	-13.6	-14.1	-14.5	-14.6	-14.8	-14.7	-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

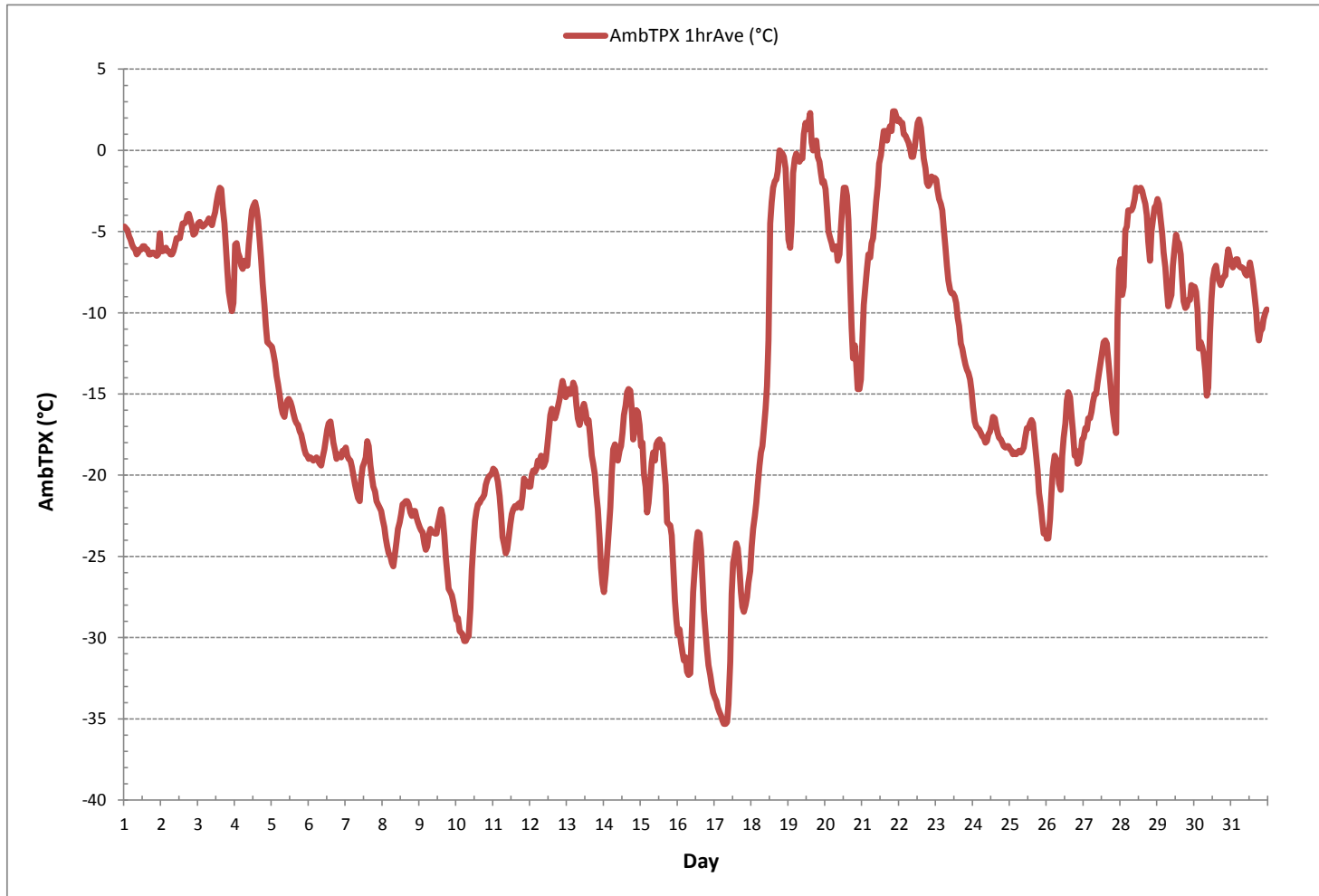
24 HR AVERAGES December 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-35.3 °C	@ HOUR(S)	6 , 7	ON DAY(S)	17 , 17
MAXIMUM 1-HR AVERAGE:	2.4 °C	@ HOUR(S)	20 , 21	ON DAY(S)	21 , 21
MAXIMUM 24-HR AVERAGE:	0.1 °C			ON DAY(S)	22
				VAR-VARIOUS	
OPERATIONAL TIME:				744	hrs
AMD OPERATION UPTIME:				100.0	%
STANDARD DEVIATION:	8.8			MONTHLY AVERAGE:	-14.0 °C

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



***APPENDIX II***  
***NON-CONTINUOUS MONITORING DATA RESULTS***

## ***VOC RESULTS***

**Maxxam Analytics**

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6167  
 Location: Cold Lake South Canister ID: 85589  
 Station ID: LICA 01 Installation Date/Time (mst): Nov 28, 2016 @ 09:52  
 Sample ID: LICA/VOC/CLS/Dec 02, 2016 Removal Date/Time (mst): Dec 05, 2016 @ 10:56

**Date and Time Information**

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>Dec 02, 2016</u>	<u>00:00</u>	<u>Dec 03, 2016 00:00</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.0</u>	<u>+23.8</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>0.52</u>	<u>24.0</u>

**Deployment/Collection and Maintenance Checklist**

Initial leak check deployment vacuum (in. Hg) = - @ - mst  
 Final leak check deployment vacuum (in. Hg) = - @ - mst  
 Total leak rate = - psi over - minutes  
 Timer reset to zero prior to sampling? YES (yes/no)  
 Date of last flow calibration: Sep 02, 2016 (due every 3 months)  
 Last date of sample line & fitting replacement: Nov 09, 2016 (due every 6 months)

\*\*Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required\*\*

Comments: Date of last audit: Sep 02, 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Dec 05, 2016

**Sample ID: 16120042-003**

Customer ID: LICA  
 Cust Samp ID: LICA/VOC/CLS/Dec 2, 2016





## Volatile Organics Data Results

Date: December 2, 2016  
Canister ID: S5589

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.02
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	< 0.02
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	< 0.01
2,2-Dimethylbutane	< 0.01
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	< 0.02
2,4-Dimethylpentane	< 0.01
2-Methylheptane	< 0.01
2-Methylhexane	0.02
2-Methylpentane	0.07
3-Methylheptane	< 0.02
3-Methylhexane	0.02
3-Methylpentane	0.04
Acetone	0.60
Acrolein	< 0.3
Benzene	0.07
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	< 0.01
Carbon tetrachloride	0.13
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.02
Chloromethane	0.47
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.03
cis-2-Pentene	< 0.02
Cyclohexane	0.03
Cyclopentane	0.02
Dibromochloromethane	< 0.01
Ethanol	< 0.3
Ethyl acetate	< 0.4
Ethylbenzene	< 0.01
Freon-11	0.39
Freon-113	0.06

## Volatile Organics Data Results

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Date: December 2, 2016  
Canister ID: S5589

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.73
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.64
Isopentane	0.32
Isoprene	< 0.01
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	< 0.03
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.05
Methylcyclopentane	0.04
Methylene chloride	< 0.3
n-Butane	1.01
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.02
n-Hexane	0.08
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.20
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	< 0.01
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.04
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	< 0.01
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

**Maxxam Analytics**

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6167  
 Location: Cold Lake South Canister ID: 1679  
 Station ID: LICA 01 Installation Date/Time (mst): Dec 05, 2016 @ 10:56  
 Sample ID: LICA/VOC/CLS/Dec 08, 2016 Removal Date/Time (mst): Dec 13, 2016 @ 13:21

**Date and Time Information**

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>Dec 08, 2016</u>	<u>00:00</u>	<u>00:00 Dec 09, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.0</u>	<u>+23.5</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>6.52</u>	<u>24.0</u>

**Deployment/Collection and Maintenance Checklist**

Initial leak check deployment vacuum (in. Hg) = - @ - mst  
 Final leak check deployment vacuum (in. Hg) = - @ - mst  
 Total leak rate = - psi over - minutes  
 Timer reset to zero prior to sampling? YES (yes/no)  
 Date of last flow calibration: Sep 02, 2016 (due every 3 months)  
 Last date of sample line & fitting replacement: Nov 09, 2016 (due every 6 months)

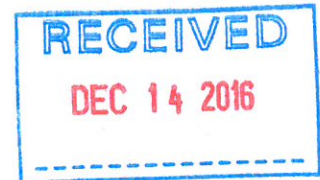
\*\*Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required\*\*

Comments: Date of last audit : Sep 02, 2016

No pressure gauge on the canister. The data was taken from a pressure gauge on the sampler.

Deployment Technician Signature: Alex Yakupov  
 Collection Technician Signature: Alex Yakupov Date: Dec 13, 2016

**Sample ID: 16120122-003**  
 Customer ID: LICA  
 Cust Samp ID: LICA/VOC/CLS/ Dec 8, 2016



## Volatile Organics Data Results

Date: December 8, 2016  
Canister ID: 1679

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.03
1,2-Dichloropropane	0.02
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.14
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	< 0.01
2,2-Dimethylbutane	0.02
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	< 0.02
2,4-Dimethylpentane	< 0.01
2-Methylheptane	0.01
2-Methylhexane	0.02
2-Methylpentane	0.07
3-Methylheptane	< 0.02
3-Methylhexane	< 0.02
3-Methylpentane	0.06
Acetone	0.80
Acrolein	< 0.3
Benzene	0.07
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	0.04
Carbon tetrachloride	0.17
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.03
Chloromethane	0.61
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	< 0.02
cis-2-Pentene	< 0.02
Cyclohexane	< 0.02
Cyclopentane	0.02
Dibromochloromethane	< 0.01
Ethanol	< 0.3
Ethyl acetate	< 0.4
Ethylbenzene	< 0.01
Freon-11	0.45
Freon-113	0.04

## Volatile Organics Data Results

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Date: December 8, 2016  
Canister ID: 1679

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.03
Freon-12	0.99
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.35
Isopentane	0.37
Isoprene	< 0.01
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	< 0.03
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.03
Methylcyclopentane	0.05
Methylene chloride	0.50
n-Butane	0.61
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.03
n-Hexane	2.03
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.20
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	0.01
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.04
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	< 0.01
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

**Maxxam Analytics**

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6167  
 Location: Cold Lake South Canister ID: S5670  
 Station ID: LICA 01 Installation Date/Time (mst): Dec 13, 2016 @ 13:21  
 Sample ID: LICA/VOC/CLS/Dec 14, 2016 Removal Date/Time (mst): Dec 19, 2016 @ 11:35

**Date and Time Information**

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

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.0</u>	<u>-24.0</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>6.52</u>	<u>21.0</u>

**Deployment/Collection and Maintenance Checklist**

Initial leak check deployment vacuum (in. Hg) = - @ - mst  
 Final leak check deployment vacuum (in. Hg) = - @ - mst  
 Total leak rate = - psi over - minutes  
 Timer reset to zero prior to sampling? YES (yes/no)  
 Date of last flow calibration: Sep 02, 2016 (due every 3 months)  
 Last date of sample line & fitting replacement: Nov 09, 2016 (due every 6 months)

\*\*Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required\*\*

Comments: Date of last audit : Sep 02, 2016  
Quarterly audit of the sampler was performed after the canister was removed on December 19, 2016

Deployment Technician Signature: Alex Vakupov

Collection Technician Signature: Alex Vakupov Date: Dec 19, 2016

**Sample ID: 16120203-003**

Customer ID: LICA  
 Cust Samp ID: LICA/VOC/CLS/Dec 14, 2016



## Volatile Organics Data Results

Date: December 14, 2016  
Canister ID: S5670

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.04
1,2-Dichloropropane	0.02
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	0.04
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.08
1-Hexene	< 0.02
1-Pentene	0.01
2,2,4-Trimethylpentane	0.01
2,2-Dimethylbutane	0.01
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	0.02
2,4-Dimethylpentane	< 0.01
2-Methylheptane	< 0.01
2-Methylhexane	0.02
2-Methylpentane	0.06
3-Methylheptane	< 0.02
3-Methylhexane	0.02
3-Methylpentane	0.03
Acetone	1.20
Acrolein	< 0.3
Benzene	0.11
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	< 0.01
Carbon tetrachloride	0.15
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.04
Chloromethane	0.69
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.02
cis-2-Pentene	< 0.02
Cyclohexane	0.04
Cyclopentane	0.02
Dibromochloromethane	0.02
Ethanol	0.50
Ethyl acetate	< 0.4
Ethylbenzene	< 0.01
Freon-11	0.44
Freon-113	0.08



## Volatile Organics Data Results

Date: December 14, 2016  
Canister ID: S5670

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.03
Freon-12	0.90
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.45
Isopentane	0.26
Isoprene	< 0.01
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	< 0.03
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.08
Methylcyclopentane	0.07
Methylene chloride	< 0.3
n-Butane	0.81
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.02
n-Hexane	0.05
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.10
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	< 0.01
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.06
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.05
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02



Maxxam Analytics

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6167  
 Location: Cold Lake South Canister ID: 2448  
 Station ID: LICA 01 Installation Date/Time (mst): Dec 19, 2016 @ 11:35  
 Sample ID: LICA/VOC/CLS/Dec 20, 2016 Removal Date/Time (mst): Dec 22, 2016 @ 09:31

Date and Time Information

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

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.0</u>	<u>+24.0</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>6.52</u>	<u>24.0</u>

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) = -27.0 @ 11:35 mst  
 Final leak check deployment vacuum (in. Hg) = -27.0 @ 12:35 mst  
 Total leak rate = 0.0 psi over 60 minutes  
 Timer reset to zero prior to sampling? YES (yes/no)  
 Date of last flow calibration: Dec 19, 2016 (due every 3 months)  
 Last date of sample line & fitting replacement: Nov 09, 2016 (due every 6 months)

**\*\*Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required\*\***

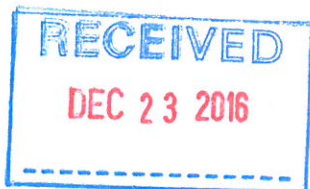
Comments: Leak check and flow audit was conducted.  
No issues.  
The canister is not equipped with a pressure gauge. The data was  
taken from the pressure gauge on the sampler.

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Dec 22, 2016

Sample ID: 16120222-001

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



## Volatile Organics Data Results

Date: December 20, 2016  
Canister ID: 2448

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.04
1,2-Dichloropropane	0.03
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	0.03
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.08
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	0.02
2,2-Dimethylbutane	0.02
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	0.02
2,3-Dimethylpentane	0.03
2,4-Dimethylpentane	0.01
2-Methylheptane	< 0.01
2-Methylhexane	0.03
2-Methylpentane	0.06
3-Methylheptane	< 0.02
3-Methylhexane	0.03
3-Methylpentane	0.05
Acetone	1.20
Acrolein	< 0.3
Benzene	0.12
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	0.07
Carbon tetrachloride	0.14
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.04
Chloromethane	0.72
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.03
cis-2-Pentene	< 0.02
Cyclohexane	0.04
Cyclopentane	0.02
Dibromochloromethane	0.02
Ethanol	2.20
Ethyl acetate	< 0.4
Ethylbenzene	0.01
Freon-11	0.43
Freon-113	0.07

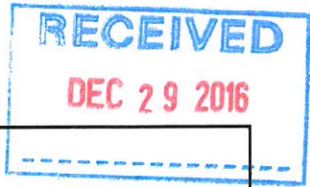
## Volatile Organics Data Results

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Date: December 20, 2016  
Canister ID: 2448

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.02
Freon-12	0.89
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.59
Isopentane	0.39
Isoprene	< 0.01
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	0.03
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.06
Methylcyclopentane	0.07
Methylene chloride	0.30
n-Butane	1.19
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.03
n-Hexane	0.57
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.20
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	0.01
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	0.06
Tetrahydrofuran	< 0.4
Toluene	0.09
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.05
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Sample ID: 16120231-003



Customer ID: LICA  
Cust Samp ID: LICAVOC/CLS/Dec 26, 2016

Maxxam Analytics

Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6167  
Location: Cold Lake South Canister ID: 14987  
Station ID: LICA 01 Installation Date/Time (mst): Dec 22, 2016 @ 09:31  
Sample ID: LICA/VOC/CLS/Dec 26, 2016 Removal Date/Time (mst): Dec 27, 2016 @ 09:48

Date and Time Information

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

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>- 27.0</u>	<u>+ 23.8</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>6.52</u>	<u>24.0</u>

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) = - @ - mst  
 Final leak check deployment vacuum (in. Hg) = - @ - mst  
 Total leak rate = - psi over - minutes  
 Timer reset to zero prior to sampling? YES (yes/no)  
 Date of last flow calibration: Dec 19, 2016 (due every 3 months)  
 Last date of sample line & fitting replacement: Nov 09, 2016 (due every 6 months)

\*\*Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required\*\*

Comments: The canister is not equiped with a pressure gauge.

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Dec 27, 2016

## Volatile Organics Data Results

Date: December 26, 2016  
Canister ID: 14987

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.04
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.09
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	0.02
2,2-Dimethylbutane	0.02
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	0.03
2,3-Dimethylpentane	0.03
2,4-Dimethylpentane	0.01
2-Methylheptane	0.01
2-Methylhexane	0.04
2-Methylpentane	0.14
3-Methylheptane	< 0.02
3-Methylhexane	0.04
3-Methylpentane	0.07
Acetone	1.60
Acrolein	< 0.3
Benzene	0.14
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	< 0.01
Carbon tetrachloride	0.15
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.04
Chloromethane	0.97
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.05
cis-2-Pentene	< 0.02
Cyclohexane	0.05
Cyclopentane	0.03
Dibromochloromethane	0.02
Ethanol	1.10
Ethyl acetate	< 0.4
Ethylbenzene	< 0.01
Freon-11	0.45
Freon-113	0.07

## Volatile Organics Data Results

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Date: December 26, 2016  
Canister ID: 14987

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.04
Freon-12	1.09
Hexachloro-1,3-butadiene	< 0.50
Isobutane	1.31
Isopentane	0.71
Isoprene	< 0.01
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	< 0.03
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.08
Methylcyclopentane	0.07
Methylene chloride	< 0.3
n-Butane	2.62
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.05
n-Hexane	0.34
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.50
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	0.01
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.07
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.06
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

## ***PAH RESULTS***



Sample ID: 16120042-004

Customer ID: LICA

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

Priority: Normal

### TISCH PUF PLUS Sample Collection Data Sheet

Client:	<u>LICA</u>	Puf+ S/N:	<u>9102</u>
Location:	<u>Cold Lake South</u>	Motor S/N:	<u>1138/100-1020</u>
Station ID:	<u>LICA 01</u>	Installation Date/Time:	<u>Nov 28, 2016 / 09:44</u>
Field Sample ID:	<u>LICA/PUF/CLS/Dec 02, 2016</u>	Removal Date/Time:	<u>Dec 05, 2016 / 10:42</u>

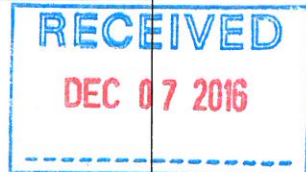
### Sample Data Collection Information

Sample Date:	<u>Dec 02, 2016</u>	Average Pressure (mmHg)	<u>712</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q <sub>std</sub> )	<u>229</u>
End Time (mst):	<u>00:00 Dec 03, 2016</u>	Average Temperature (°C)	<u>-4.7</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (Vstd m <sup>3</sup> )	<u>330.18</u>

### Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	NO
Average temperature appears correct?	<input checked="" type="radio"/> YES	NO
Average pressure appears correct?	<input checked="" type="radio"/> YES	NO
Any error messages? (if yes list below)	YES	<input checked="" type="radio"/> NO
Sample duration 24 hours?	<input checked="" type="radio"/> YES	NO
Date of last calibration/audit:	<u>Sep 02, 2016</u>	
Other observations?	<u>n/a</u>	



Deployed By:	<u>Alex Yakupov</u>	
Collected By:	<u>Alex Yakupov</u>	Date: <u>Dec 05, 2016</u>



## Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: December 2, 2016  
PUF S/N: 9102

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.10
2-Methylnaphthalene	0.16
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.09
Acenaphthylene	0.05
Acridine	< 0.01
Anthracene	< 0.01
Benzo(a)anthracene	0.03
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	0.04
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	< 0.01
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.05
Fluorene	0.08
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.08
Perylene	< 0.01
Phenanthrene	0.17
Pyrene	0.08
Retene	0.03

Sample ID: 16120122-004

Customer ID: LICA

Cust Samp ID: LICA/PUF/CLS/ Dec 8,  
2016

**TISCH PUF PLUS Sample Collection Data Sheet**

Client:	LICA	Puf+ S/N:	TE-11
Location:	Cold Lake South	Motor S/N:	1138/100-1020
Station ID:	LICA 01	Installation Date/Time:	Dec 05, 2016/10:42
Field Sample ID:	LICA/PUF/CLS/Dec 08, 2016	Removal Date/Time:	Dec 13, 2016/13:11

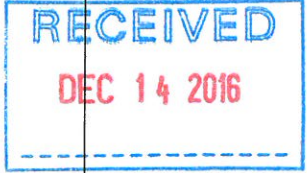
**Sample Data Collection Information**

Sample Date:	Dec 08, 2016	Average Pressure (mmHg)	734
Start Time (mst):	00:00	Average Flow (Q <sub>std</sub> )	229
End Time (mst):	00:00 Dec 09, 2016	Average Temperature (°C)	-22.1
Elapsed Time (Hours):	24.0	Volume (V <sub>std</sub> m <sup>3</sup> )	330.16

**Sample Recovery Checklist**

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average temperature appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average pressure appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Any error messages? (if yes list below)	<input type="radio"/> YES	<input checked="" type="radio"/> NO
Sample duration 24 hours?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Date of last calibration/audit:	Sep 02, 2016	
Other observations?		



Deployed By:	Alex Yakupov
Collected By:	Alex Yakupov
Date:	Dec 13, 2016

## Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

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Date: December 8, 2016  
PUF S/N: TE-11

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.17
2-Methylnaphthalene	0.35
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.04
Acenaphthylene	0.03
Acridine	< 0.01
Anthracene	< 0.01
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	0.02
Benzo(c)phenanthrene	0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	0.01
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	0.02
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.04
Fluorene	0.05
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.35
Perylene	< 0.01
Phenanthrene	0.13
Pyrene	0.02
Retene	0.04

Sample ID: 16120203-004

AIR FC

Customer ID: LICA

Cust Samp ID: LICA/PUF/CLS/Dec 14, 2016

### MISCH PUF PLUS Sample Collection Data Sheet

Client:	<u>LICA</u>	Puf+ S/N:	<u>TE-07</u>
Location:	<u>Cold Lake South</u>	Motor S/N:	<u>1138/100-1020</u>
Station ID:	<u>LICA 01</u>	Installation Date/Time:	<u>Dec 13, 2016 / 13:11</u>
Field Sample ID:	<u>LICA/PUF/CLS/Dec 14, 2016</u>	Removal Date/Time:	<u>Dec 19, 2016 / 12:21</u>

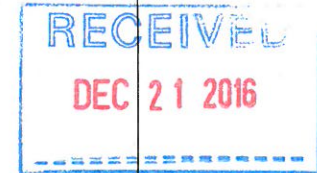
### Sample Data Collection Information

Sample Date:	<u>Dec 14, 2016</u>	Average Pressure (mmHg)	<u>720</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q <sub>std</sub> )	<u>229</u>
End Time (mst):	<u>00:00 Dec 15, 2016</u>	Average Temperature (°C)	<u>-17.4</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (V <sub>std</sub> m <sup>3</sup> )	<u>330.17</u>

### Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average temperature appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average pressure appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Any error messages? (if yes list below)	YES	<input checked="" type="radio"/> NO
Sample duration 24 hours?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Date of last calibration/audit:	<u>Sep 02, 2016</u>	
Other observations?	<u>n/a</u>	



Deployed By: Alex Yakupov

Collected By: Alex Yakupov Date: Dec 19, 2016

## Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

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Date: December 14, 2016  
PUF S/N: TE-07

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.53
2-Methylnaphthalene	0.88
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.08
Acenaphthylene	0.05
Acridine	< 0.01
Anthracene	< 0.01
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	0.03
Benzo(c)phenanthrene	0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	0.03
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	0.02
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.07
Fluorene	0.17
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.84
Perylene	< 0.01
Phenanthrene	0.24
Pyrene	0.03
Retene	0.15

TISCH PUF PLUS Sample Collection Data Sheet			
Client:	<u>LICA</u>	Puff S/N:	<u>TE-05</u>
Location:	<u>Cold Lake South</u>	Motor S/N:	<u>1138 / 100-1020</u>
Station ID:	<u>LICA 01</u>	Installation Date/Time:	<u>Dec 19, 2016 / 12:21</u>
Field Sample ID:	<u>LICA/<sup>PUF</sup>CL S/Dec 20, 2016</u>	Removal Date/Time:	<u>Dec 22, 2016 / 09:48</u>
<u>A.V.</u> <b>Sample Data Collection Information</b>			
Sample Date:	<u>Dec 20, 2016</u>	Average Pressure (mmHg)	<u>704</u>
Start Time (mst):	<u>09:00</u>	Average Flow (Q <sub>std</sub> )	<u>229</u>
End Time (mst):	<u>00:00 Dec 21, 2016</u>	Average Temperature (°C)	<u>-6.6</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (V <sub>std</sub> m <sup>3</sup> )	<u>330.20</u>
Sample Recovery Checklist			
(circle one)			
Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Average temperature appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Average pressure appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Any error messages? (if yes list below)	<input type="radio"/> YES	<input checked="" type="radio"/> NO	
Sample duration 24 hours?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Date of last calibration/audit:	<u>Sep 02, 2016</u>		
Other observations?	<u>na</u>		
		<div style="text-align: center; color: blue; font-weight: bold; font-size: 1.2em;">RECEIVED</div> <div style="text-align: center; color: red; font-weight: bold; font-size: 1.1em;">DEC 23 2016</div>	
		<b>Sample ID:</b> 16120222-002 <b>Customer ID:</b> LICA <b>Cust Samp ID:</b> LICA/PUF/CLS/Dec 20, 2016	
Deployed By:	<u>Alex Yakupov</u>		
Collected By:	<u>Alex Yakupov</u>		<u>Date: Dec 22, 2016</u>

## Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

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Date: December 20, 2016  
PUF S/N: TE-05

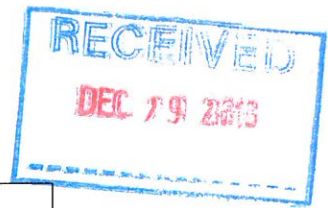
PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.43
2-Methylnaphthalene	0.75
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.06
Acenaphthylene	0.04
Acridine	< 0.01
Anthracene	0.03
Benzo(a)anthracene	0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	< 0.01
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	< 0.01
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.04
Fluorene	0.09
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.62
Perylene	< 0.01
Phenanthrene	0.17
Pyrene	0.03
Retene	0.05



Sample ID: 16120231-004

Customer ID: LICA

Cust Samp ID: LICA/PUF/CLS/Dec 26, 2016



### TISCH PUF PLUS Sample Collection Data Sheet

Client:	<u>LICA</u>	Puf+ S/N:	<u>TE-08</u>
Location:	<u>Cold Lake South</u>	Motor S/N:	<u>1138/100-1020</u>
Station ID:	<u>LICA 01</u>	Installation Date/Time:	<u>Dec 22, 2016 / 09:48</u>
Field Sample ID:	<u>LICA/PUF/CLS/Dec 26, 2016</u>	Removal Date/Time:	<u>Dec 27, 2016 / 10:11</u>

### Sample Data Collection Information

Sample Date:	<u>Dec 26, 2016</u>	Average Pressure (mmHg)	<u>714</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q <sub>std</sub> )	<u>22.9</u>
End Time (mst):	<u>00:00 Dec 27, 2016</u>	Average Temperature (°C)	<u>-18.0 °</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (Vstd m <sup>3</sup> )	<u><del>26.454</del> 330.17</u>

### Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	NO
Average temperature appears correct?	<input checked="" type="radio"/> YES	NO
Average pressure appears correct?	<input checked="" type="radio"/> YES	NO
Any error messages? (if yes list below)	YES	<input checked="" type="radio"/> NO
Sample duration 24 hours?	<input checked="" type="radio"/> YES	NO
Date of last calibration/audit:	<u>Sep 02, 2016</u>	
Other observations?	<u>n/a</u>	

Deployed By: Alex Yakupov

Collected By: Alex Yakupov Date: Dec 27, 2016



## Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

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Date: December 26, 2016  
PUF S/N: TE-08

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.29
2-Methylnaphthalene	0.43
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.05
Acenaphthylene	0.03
Acridine	< 0.01
Anthracene	0.02
Benzo(a)anthracene	0.02
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	< 0.01
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	0.01
Chrysene	< 0.01
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	0.04
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.06
Fluorene	0.09
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.55
Perylene	< 0.01
Phenanthrene	0.22
Pyrene	0.04
Retene	0.08

***PARTISOL RESULTS***

Sample ID: 16120045-001

Customer ID: LICA

Cust Samp ID: P6193027

AIR FCD-01318/2

Partisol Sample Data Sheet

Priority: Normal



Date Sampled: Dec 02, 2016
Location: Cold Lake South
Parameter: TSP PM10
Filter #: P 619 3027

PM2.5

Start Time: 00:00 Dec 02, 2016
End Time: 00:00 Dec 03, 2016
Status: OK
Std Vol: 25.143
Valid Time: 24:00
Total Time: 24.0

Comments: Weather Conditions, etc.

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

Technician Signature: Alex Yakupov

Data: Dec 05, 2016
Time: 11:16

Programming

- 1) Make sure system is in "Stop Mode"
2) "ESC" to Time Screen then "Program"
3) Enter Beg 1 0:00
4) Enter Dur 24:00:00
5) Enter Beg D dd-Aug
6) Enter End D dd-Aug
7) "Stop/Run"

Note: Beginning & End Date should be same date

Sample ID: 16120121-001

AIR FCD-01318/2

Partisol Sample Data Sheet

Customer ID: LICA

Cust Samp ID: LICA Fit # P6193026

Priority: Normal



Date Sampled: Dec 08, 2016

Location: Cold Lake South

Parameter: TSP PM10

PM2.5

Filter #: P6193026

Start Time 00:00 Dec 08, 2016

End Time 00:00 Dec 09, 2016

Status OK

Std Vol 27.643

Valid Time 24:00

Total Time 24.0

Comments: Weather Conditions, etc.

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

Technician Signature: Alex Yakupov
Date: Dec 13, 2016
Time: 13:53

Programming

- 1) Make sure system is in "Stop Mode"
2) "ESC" to Time Screen then "Program"
3) Enter Beg 1 0:00
4) Enter Dur 24:00:00
5) Enter Beg D dd-Aug
6) Enter End D dd-Aug
7) "Stop/Run"

Note: Beginning & End Date should be same date

Sample ID: 16120201-001

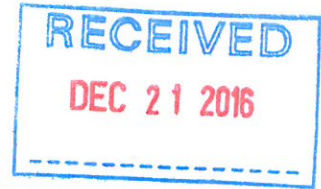
Customer ID: LICA

AIR FCD-01318/2

Cust Samp ID: LICA Fil # P6193049

Partisol Sample Data Sheet

Priority: Normal



Date Sampled: Dec 14, 2016
Location: Cold Lake South
Parameter: TSP PM10
Filter #: P 619 3049

PM2.5

Start Time 00:00 Dec 14, 2016
End Time 00:00 Dec 15, 2016
Status OK
Std Vol 26.660
Valid Time 24:00
Total Time 24.0

Comments: Weather Conditions, etc.

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

Technician Signature: Alex Yankupov
Date: Dec 19, 2016
Time: 12:15

- Programming
1) Make sure system is in "Stop Mode"
2) "ESC" to Time Screen then "Program"
3) Enter Beg 1 0:00
4) Enter Dur 24:00:00
5) Enter Beg D dd-Aug
6) Enter End D dd-Aug
7) "Stop/Run"
Note: Beginning & End Date should be same date

### Partisol Sample Data Sheet

Date Sampled: Dec 20, 2016  
 Location: Cold Lane South  
 Parameter: TSP PM10  
 Filter #: P 619 30 25  
 Start Time 00:00 Dec 20, 2016  
 End Time 00:00 Dec 21, 2016  
 Status OK  
 Std Vol 25.021  
 Valid Time 24:00  
 Total Time 24.0

PM2.5

Sample ID: 16120221-001

Customer ID: LICA

Cust Samp ID: Flt # P6193025

Priority: Normal



Comments: Weather Conditions, etc.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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

Technician Signature: Alex Yakupov  
 Date: Dec 22, 2016  
 Time: 10:06

Programming

- 1) Make sure system is in "Stop Mode"
- 2) "ESC" to Time Screen then "Program"
- 3) Enter Beg 1 0:00
- 4) Enter Dur 24:00:00
- 5) Enter Beg D dd-Aug
- 6) Enter End D dd-Aug
- 7) "Stop/Run"

Note: Beginning & End  
 Date should be same date



Sample ID: 16120230-001

Customer ID: LICA

Cust Samp ID: Filter # P6129414

artisol Sample Data Sheet

AIR FCD-01318/2



Priority: Normal

Date Sampled: Dec 26, 2016

Location: Cold Lake South

Parameter: TSP PM10

PM2.5

Filter #: P 612 94 14

Start Time 00:00 Dec 26, 2016

End Time 00:00 Dec 27, 2016

Status OK

Std Vol 26.454

Valid Time 24.0

Total Time 24.0

Comments: Weather Conditions, etc.

n/a

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Sample inlet cleaned on Oct 24, 2016

Date of last calibration: Oct 24, 2016

Technician Signature:

Alex Yakupov  
Date: Dec 27, 2016  
Time: 10:22

Programming

- 1) Make sure system is in "Stop Mode"
- 2) "ESC" to Time Screen then "Program"
- 3) Enter Beg 1 0:00
- 4) Enter Dur 24:00:00
- 5) Enter Beg D dd-Aug
- 6) Enter End D dd-Aug
- 7) "Stop/Run"

Note: Beginning & End Date should be same date

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### Partisol Sampler Results

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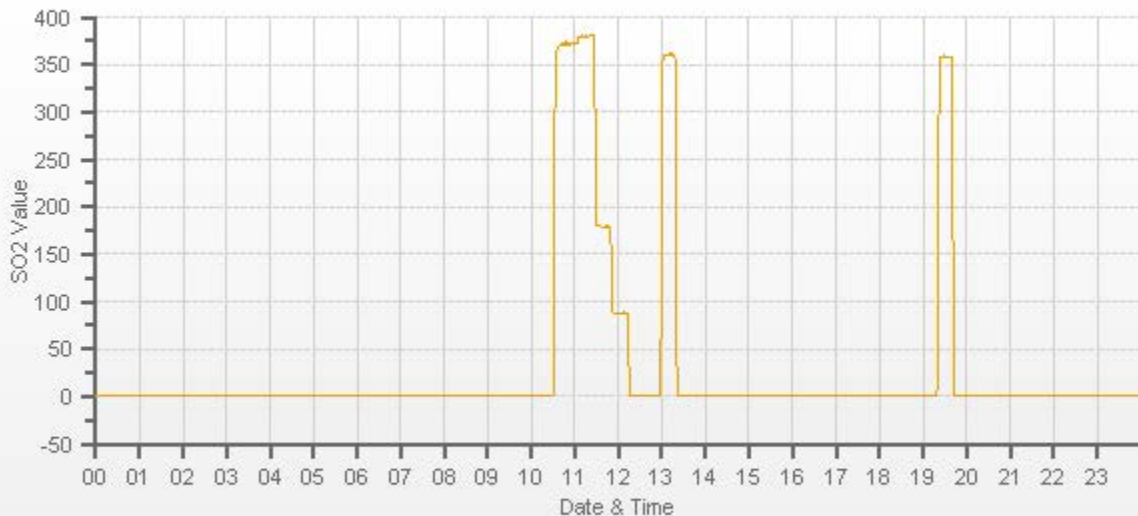
Date	Filter NO.	Concentration (mg)
December	P6193027	0.195
December	P6193026	0.050
December	P6193049	0.091
December	P6193025	0.070
December	P6129414	0.096



***APPENDIX III***  
***EQUIPMENT CALIBRATION RESULTS***

***SULPHUR DIOXIDE***





— SO2[ppb]



## Thermo 43i Sulphur Dioxide Analyzer Calibration

Date: December 15, 2016	Barometric Pressure: 0.945 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Cold Lake South	Weather Conditions: A few clouds
Parameter: Sulphur Dioxide	Calibration Purpose: as found
Start Time 24 hr. (mst): 9:33	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
End Time 24 hr. (mst): 10:49	Cal Gas Expiry Date: July 18, 2019
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:		
ID# or Serial Number: 806528242	Range ppb: 500	Station SO2 Analyzer Range?
Last Calibration Date: December 6, 2016	As Found C.F.: 0.990	ppb
Previous C.F.: 1.001	New C.F.: n/a	

Calibrator:	Standard Calibration Points for Ranges								
Flow Meter ID's: n/a	<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								
Make & Model: API 700									
Serial #: 627									
Cal Gas Cylinder I.D. #: LL104222									
Cal Gas Conc. (ppm): 50.6									

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

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	5000	0.00	5000	0.0	0.0	n/a
as found high	4965	37.50	5003	379.3	383.0	0.990
Average C.F.=						n/a

Linear Regression/Calibration Results:

Correlation Coefficient =	n/a	LIMITS	> or = 0.995
Slope =	n/a		.95-1.05
b (Intercept as % of full scale)=	n/a		± 3% F.S.
% change in C.F. from last cal=	1.06%		± 10%

As found:	As left:
BKG: 7.9	BKG: 7.9
COEF: 0.985	COEF: 0.985
PMT: -623.5	PMT: -623.5
FLASH: 774	FLASH: 774
INTERNAL: 28.7	INTERNAL: 28.9
CHAMBER: 45.0	CHAMBER: 45.0
PERM OVEN GAS: 45.00	PERM OVEN GAS: 45.00
PERM OVEN HEATER: 44.20	PERM OVEN HEATER: 44.20
PRESSURE: 684.3	PRESSURE: 684.5
SAMPLE FLOW: 0.477	SAMPLE FLOW: 0.477
LAMP INTENSITY: 96	LAMP INTENSITY: 96
CONVERTER: n/a	CONVERTER: n/a
CONVERTER SET: n/a	CONVERTER SET: n/a
Expected Value: 360.0	Expected Value: 360.0

Comments:

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

As Found calibration completed because ZS check (SPAN) was low (about 10%). Depleted perm tube suspected.

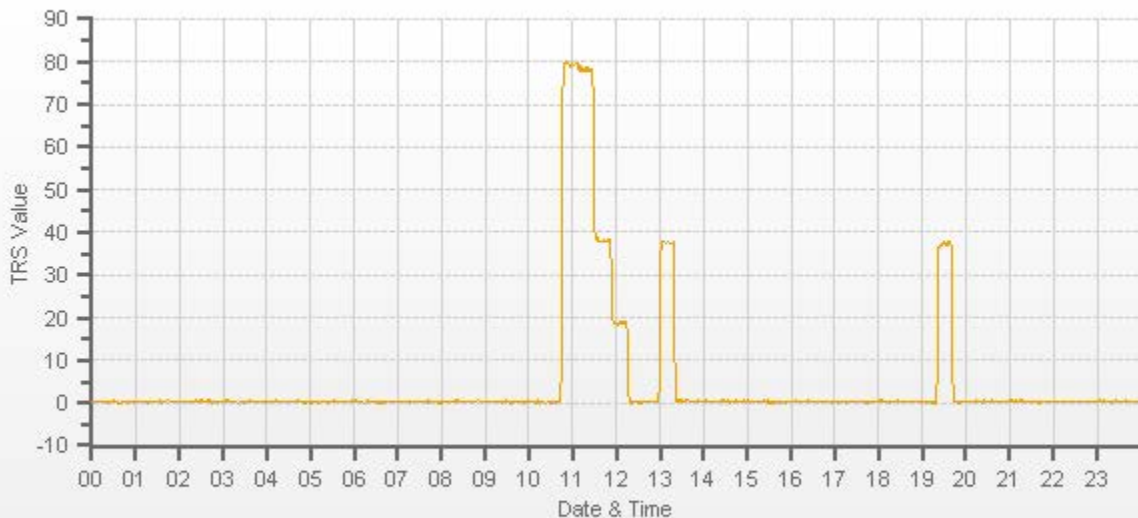


— SO2[ppb]

***TOTAL REDUCED SULPHUR***

<b>Thermo 450i Total Reduced Sulphur Analyzer Calibration</b>									
<b>Date:</b> December 6, 2016 <b>Company/Airshed:</b> LICA <b>Location/Station Name:</b> Cold Lake South <b>Parameter:</b> Total Reduced Sulphur <b>Start Time 24 hr. (mst):</b> 9:48 <b>End Time 24 hr. (mst):</b> 13:23 <b>Calibration Method:</b> Gas Dilution	<b>Barometric Pressure:</b> 0.947 atm <b>Station Temperature °C:</b> 22 <b>Weather Conditions:</b> A few clouds <b>Calibration Purpose:</b> routine monthly <b>Performed By/Reviewer:</b> Alex Yakupov / Trina Whitsitt <b>Cal Gas Expiry Date:</b> June 14, 2019 <b>Converter Model &amp; s/n (if applicable):</b> CDNova CDN-101 #501								
<b>Analyzer:</b> <b>ID# or Serial Number:</b> 812728560 <b>Last Calibration Date:</b> November 9, 2016 <b>Previous C.F.:</b> 0.988	<b>Range ppb:</b> 100 <b>As Found C.F.:</b> 0.978 <b>New C.F.:</b> 1.000 <b>Station SO2 Analyzer Range?</b> 500 ppb								
<b>Calibrator:</b> <b>Flow Meter ID's:</b> n/a <b>Make &amp; Model:</b> SABIO 2010 D <b>Serial #:</b> 11900613 <b>Cal Gas Cylinder I.D. # :</b> EY 0000654 <b>Cal Gas Conc. (ppm):</b> 10.2	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>ppb</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>78</td> </tr> <tr> <td>Mid</td> <td>38</td> </tr> <tr> <td>Low</td> <td>19</td> </tr> </tbody> </table> <b>SO<sub>2</sub> Scrubber Check (10 mins.)</b> <b>Start/End Time 24 hr.:</b> 10:29/10:39 <b>Target Concentration (ppb):</b> 380 <b>Result (ppb):</b> 0 <b>Zero Corrected Result (ppb):</b> 0 <b>**warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**</b>	Point	ppb	High	78	Mid	38	Low	19
Point	ppb								
High	78								
Mid	38								
Low	19								
<b>ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015</b>									
<b>Calibrator Flow Rates (cc/min)</b>									
Point	Diluent	Cal Gas	Total						
as found zero	7500	0.00	7500						
as found high	7442	57.40	7499						
adjusted zero	7500	0.00	7500						
adjusted high	7442	57.40	7499						
mid	7471	27.90	7499						
low	7485	14.00	7499						
calibrator zero	7500	0.00	7500						
			Average C.F.= 1.003						
<b>Linear Regression/Calibration Results:</b>									
Correlation Coefficient =	1.000	LIMITS	> or = 0.995						
Slope =	0.999	b (Intercept as % of full scale)=	± 3% F.S.						
% change in C.F. from last cal=	0.98%	% change in C.F. from last cal=	± 10%						
<b>Thermo 450i Total Reduced Sulphur Analyzer Calibration</b>									
<b>As found:</b> BKG: 14.3 COEF: 0.974 PMT: -650.5 FLASH: 738 INTERNAL: 30.6 CHAMBER: 45.0 CONVERTER TEMP: 825 CONVERTER SET: 825 PERM OVEN GAS: 44.99 PERM OVEN HTR: 44.37 PRESSURE: 664.2 SAMPLE FLOW: 0.513 LAMP INTENSITY: 92 Expected Value: 38.0		<b>As left:</b> BKG: 14.0 COEF: 0.956 PMT: -650.5 FLASH: 742 INTERNAL: 31.3 CHAMBER: 44.9 CONVERTER TEMP: 825 CONVERTER SET: 825 PERM OVEN GAS: 45.00 PERM OVEN HTR: 44.38 PRESSURE: 662.4 SAMPLE FLOW: 0.514 LAMP INTENSITY: 91 Expected Value: 37.0							
<b>Comments:</b>									
The analyzer sample inlet filter was changed.		The analyzer cooling fan filter(s) were cleaned.							
No zero adjustment was required/made. As found zero value copied to adjusted zero value for linearity calculation purposes.									

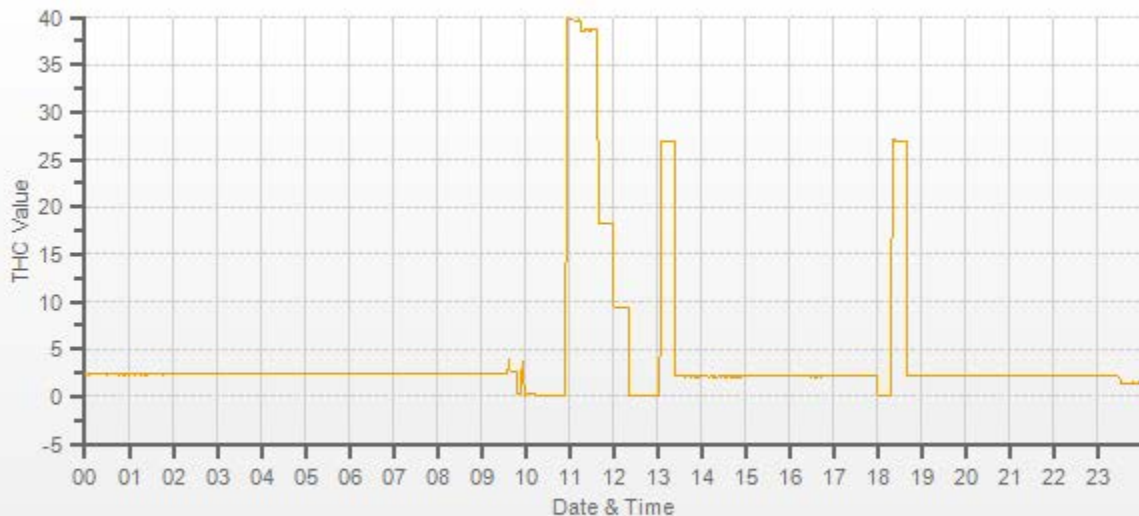




— TRS[ppb]

***TOTAL HYDROCARBON***

<b style="font-size: 1.2em;">Thermo 51C Total Hydrocarbon Analyzer Calibration</b>																																																																							
<b>Date:</b> December 7, 2016 <input checked="" type="checkbox"/> Remote <b>Company/Airshed:</b> LICA <b>Location/Station Name:</b> Cold Lake South <b>Parameter:</b> Total Hydrocarbon <b>Start/End Time 24 hr. (mst):</b> 9:31 / 13:29 <b>Calibration Method:</b> Gas Dilution	<b>Barometric Pressure:</b> 0.959 atm <b>Station Temperature °C:</b> 22 <b>Weather Conditions:</b> Light snow <b>Calibration Purpose:</b> routine monthly <b>Performed By/Reviewer:</b> Alex Yakupov   Trina Whitsitt <b>Cal Gas Expiry Date:</b> November 25, 2023																																																																						
<b>Analyzer:</b> <b>ID# or Serial Number:</b> 427408718 <b>Range ppm:</b> 50 <b>Last Calibration Date:</b> November 9, 2016 <b>As Found C.F.:</b> 0.975 <b>Previous Cal High Point C.F.:</b> 1.000 <b>New C.F.:</b> 0.999																																																																							
<b>Calibrator:</b> <b>Flow Meter ID's:</b> n/a <b>Make &amp; Model:</b> API 700 <b>Serial #:</b> 627 <b>Cal Gas Cylinder I.D. #:</b> LL165372 <b>CH<sub>4</sub>/C<sub>3</sub>H<sub>8</sub> Cylinder Conc. (ppm):</b> 606.0      212.0 <b>CH<sub>4</sub> as propane/total CH<sub>4</sub> equivalents (ppm):</b> 583.0      1189.0																																																																							
<b>Standard Calibration Points for a Range of: 50 ppm</b>																																																																							
<table border="1" style="margin: auto;"> <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																																																														
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<b>ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015</b>																																																																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">Calibrator Flow Rates (cc/min)</th> <th>Calculated Concentration:</th> <th>Indicated Concentration:</th> <th>Correction Factors:</th> </tr> <tr> <th>Point</th> <th>Diluent</th> <th>Cal Gas</th> <th>Total</th> <th>(ppm)</th> <th>(ppm)</th> <th></th> </tr> </thead> <tbody> <tr> <td>as found zero</td> <td>1999</td> <td>0.00</td> <td>1999</td> <td>0.0</td> <td>0.10</td> <td>n/a</td> </tr> <tr> <td>as found high</td> <td>1938</td> <td>65.00</td> <td>2003</td> <td>38.58</td> <td>39.66</td> <td>0.975</td> </tr> <tr> <td>adjusted zero</td> <td>1999</td> <td>0.00</td> <td>1999</td> <td>0.00</td> <td>0.00</td> <td>n/a</td> </tr> <tr> <td>adjusted high</td> <td>1938</td> <td>65.00</td> <td>2003</td> <td>38.58</td> <td>38.62</td> <td>0.999</td> </tr> <tr> <td>mid</td> <td>1970</td> <td>31.00</td> <td>2001</td> <td>18.42</td> <td>18.22</td> <td>1.011</td> </tr> <tr> <td>low</td> <td>1986</td> <td>16.00</td> <td>2002</td> <td>9.50</td> <td>9.34</td> <td>1.017</td> </tr> <tr> <td>calibrator zero</td> <td>1999</td> <td>0.00</td> <td>1999</td> <td>0.0</td> <td>0.00</td> <td>n/a</td> </tr> <tr> <td colspan="6" style="text-align: right;"><b>Average C.F. =</b></td> <td>1.009</td> </tr> </tbody> </table>		Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:	Point	Diluent	Cal Gas	Total	(ppm)	(ppm)		as found zero	1999	0.00	1999	0.0	0.10	n/a	as found high	1938	65.00	2003	38.58	39.66	0.975	adjusted zero	1999	0.00	1999	0.00	0.00	n/a	adjusted high	1938	65.00	2003	38.58	38.62	0.999	mid	1970	31.00	2001	18.42	18.22	1.011	low	1986	16.00	2002	9.50	9.34	1.017	calibrator zero	1999	0.00	1999	0.0	0.00	n/a	<b>Average C.F. =</b>						1.009
Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:																																																																	
Point	Diluent	Cal Gas	Total	(ppm)	(ppm)																																																																		
as found zero	1999	0.00	1999	0.0	0.10	n/a																																																																	
as found high	1938	65.00	2003	38.58	39.66	0.975																																																																	
adjusted zero	1999	0.00	1999	0.00	0.00	n/a																																																																	
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<b>Average C.F. =</b>						1.009																																																																	
<b>Linear Regression/Calibration Results:</b> <table style="margin: auto;"> <tr> <td>Correlation Coefficient =</td> <td>1.000</td> <td>LIMITS</td> <td>&gt; or = 0.995</td> </tr> <tr> <td>Slope =</td> <td>0.998</td> <td></td> <td>.95-1.05</td> </tr> <tr> <td>b (Intercept as % of full scale) =</td> <td>0.23%</td> <td></td> <td>± 3% F.S.</td> </tr> <tr> <td>% change in C.F. from last cal =</td> <td>2.47%</td> <td></td> <td>± 10%</td> </tr> </table>		Correlation Coefficient =	1.000	LIMITS	> or = 0.995	Slope =	0.998		.95-1.05	b (Intercept as % of full scale) =	0.23%		± 3% F.S.	% change in C.F. from last cal =	2.47%		± 10%																																																						
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<b>Thermo 51C Total Hydrocarbon Analyzer Calibration</b>																																																																							
<b>As found:</b> H2 cylinder (psi): 200 H2 cylinder reg set (psi): 22 Span Cylinder (psi): 1700 Span Cylinder Reg Set (psi): 22 Zero Air Gen Pressure: 36 measurement alarms: None service alarms: None cnt: 1283 rng: 1 try: 0 flm: 179.5 det: 126.6 Flame: 179 Filter: 126 Base: 126 Sample psi: 06.52 Internal Air Pressure: 20 Internal Fuel Pressure: 14 Measured Flow: 0.9465 Expected Value: 27.12	<b>As left:</b> H2 cylinder (psi): 2000 H2 cylinder reg set (psi): 22 Span Cylinder (psi): 1700 Span Cylinder Reg Set (psi): 22 Zero Air Gen Pressure: 36 measurement alarms: None service alarms: None cnt: 1339 rng: 1 try: 0 flm: 180.6 det: 125.3 Flame: 180 Filter: 125 Base: 125 Sample psi: 06.52 Internal Air Pressure: 20 Internal Fuel Pressure: 14 Measured Flow: 0.9461 Expected Value: 26.85																																																																						
<b>Comments:</b> The analyzer sample inlet filter was changed. A new hydrogen cylinder was installed. The analyzer cooling fan filter(s) were cleaned.																																																																							



— THC[ppm]



### Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	December 13, 2016	Barometric Pressure:	0.938 atm
Company/Airshed:	LICA	Station Temperature °C:	22
Location/Station Name:	Cold Lake South	Weather Conditions:	Mix of sun and clouds
Parameter:	Total Hydrocarbon	Calibration Purpose:	as found
Start/End Time 24 hr. (mst):	10:37 / 11:31	Performed By/Reviewer:	Alex Yakupov / Trina Whitsitt
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 25, 2023

Analyzer:	ID# or Serial Number:	427408718	Range ppm:	50
	Last Calibration Date:	December 7, 2016	As Found C.F.:	1.012
	Previous Cal High Point C.F.:	0.999	New C.F.:	n/a

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

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	1999	0.00	1999	0.0	0.00	n/a
as found high	1938	65.00	2003	38.58	38.11	1.012
Average C.F.=						n/a

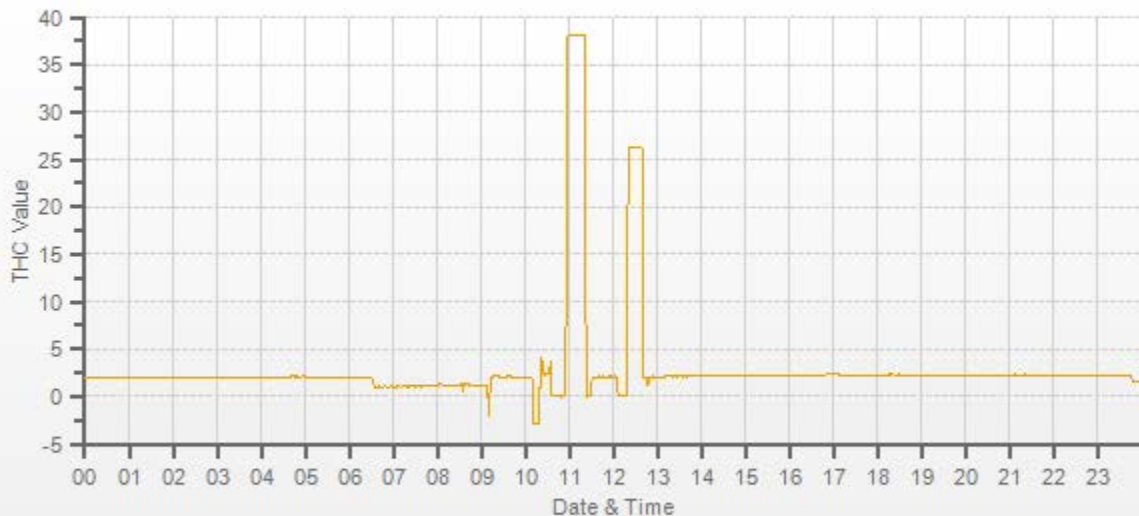
#### Linear Regression/Calibration Results:

Correlation Coefficient =	n/a	LIMITS	> or = 0.995
Slope =	n/a		.95-1.05
b (Intercept as % of full scale)=	n/a		± 3% F.S.
% change in C.F. from last cal=	-1.35%		± 10%

As found:	As left:
H2 cylinder (psi): 1800	H2 cylinder (psi): 1800
H2 cylinder reg set (psi): 22	H2 cylinder reg set (psi): 22
Span Cylinder (psi): 1600	Span Cylinder (psi): 1600
Span Cylinder Reg Set (psi): 22	Span Cylinder Reg Set (psi): 22
Zero Air Gen Pressure: 36	Zero Air Gen Pressure: 36
measurement alarms: None	measurement alarms: None
service alarms: None	service alarms: None
cnt: 1324	cnt: 1351
rng: 1	rng: 1
try: 1	try: 1
flm: 180.8	flm: 180.9
det: 125.9	det: 125.8
Flame: 180	Flame: 180
Filter: 125	Filter: 125
Base: 125	Base: 125
Sample psi: 06.52	Sample psi: 06.52
Internal Air Pressure: 20	Internal Air Pressure: 20
Internal Fuel Pressure: 14	Internal Fuel Pressure: 14
Measured Flow: 0.9407	Measured Flow: 0.9404
Expected Value: 26.85	Expected Value: 26.85

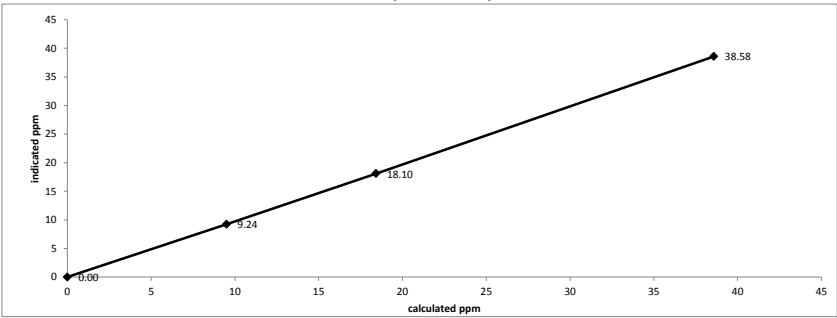
Comments:

"As Found" calibration completed to relocate the ZERO Air generator from the floor level because lower temperature at the bottom of the trailer affected operations of the ZERO Air. It was relocated on the back desktop. After the calibration a scheduled 2S check was triggered automatically.

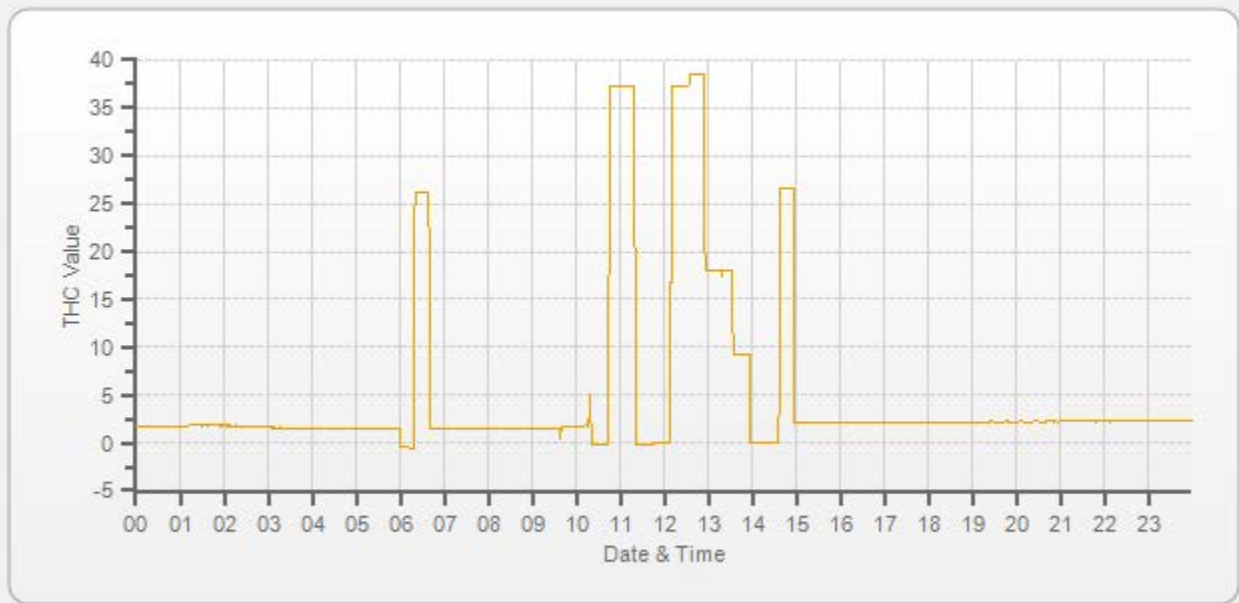


— THC[ppm]

<b style="margin-left: 10px;">Thermo 51C Total Hydrocarbon Analyzer Calibration</b>									
<b>Date:</b> December 19, 2016 <b>Company/Airshed:</b> LICA <b>Location/Station Name:</b> Cold Lake South <b>Parameter:</b> Total Hydrocarbon <b>Start/End Time 24 hr. (mst):</b> 10:10 / 11:20 <b>Calibration Method:</b> Gas Dilution	<b>Barometric Pressure:</b> 0.917 atm <b>Station Temperature °C:</b> 22 <b>Weather Conditions:</b> A few clouds <b>Calibration Purpose:</b> as found <b>Performed By/Reviewer:</b> Alex Yakupov / Trina Whitsitt <b>Cal Gas Expiry Date:</b> November 25, 2023								
<b>Analyzer:</b> ID# or Serial Number: 427408718      Range ppm: 50 Last Calibration Date: December 13, 2016      As Found C.F.: 1.030 Previous Cal High Point C.F.: 1.012      New C.F.: n/a									
<b>Calibrator:</b> Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. #: LL16S372 CH <sub>4</sub> /C <sub>3</sub> H <sub>8</sub> Cylinder Conc. (ppm): 606.0      212.0 CH <sub>4</sub> as propane/total CH <sub>4</sub> equivalents (ppm): 583.0      1189.0									
<b>Standard Calibration Points for a Range of: 50 ppm</b>									
<table border="1" style="margin: auto;"> <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								
<i>ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015</i>									
<b>Calibrator Flow Rates (cc/min)</b>									
	Calculated Concentration:	Indicated Concentration:	Correction Factors:						
Point	Diluent	Cal Gas	Total	(ppm)	(ppm)	Correction Factors:			
as found zero	1999	0.00	1999	0.0	-0.19	n/a			
as found high	1938	65.00	2003	38.58	37.26	1.030			
Average C.F. =						n/a			
<b>Linear Regression/Calibration Results:</b>									
				LIMITS					
Correlation Coefficient =				> or = 0.995					
Slope =				.95-1.05					
b (Intercept as % of full scale)=				± 3% F.S.					
% change in C.F. from last cal=				± 10%					
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H2 cylinder (psi): 1600      H2 cylinder (psi): n/a H2 cylinder reg set (psi): 22      H2 cylinder reg set (psi): n/a Span Cylinder (psi): 1500      Span Cylinder (psi): n/a Span Cylinder Reg Set (psi): 22      Span Cylinder Reg Set (psi): n/a Zero Air Gen Pressure: 37      Zero Air Gen Pressure: n/a measurement alarms: None      measurement alarms: n/a service alarms: None      service alarms: n/a cnt: 1248      cnt: n/a rng: 1      rng: n/a try: 0      try: n/a flm: 179.5      flm: n/a det: 125.8      det: n/a Flame: 179      Flame: n/a Filter: 125      Filter: n/a Base: 125      Base: n/a Sample psi: 06.52      Sample psi: n/a Internal Air Pressure: 20      Internal Air Pressure: n/a Internal Fuel Pressure: 14      Internal Fuel Pressure: n/a Measured Flow: 0.9483      Measured Flow: n/a Expected Value: 26.85      Expected Value: n/a									
<b>Comments:</b>   									
"As Found" calibration completed because of lower than usual average daily readings recorded. "As Found" calibration will be followed by Repeat calibration to correct ZERO, therefore the "As Left" information was marked n/a.									


<b style="font-size: 1.2em; margin-left: 10px;">Thermo 51C Total Hydrocarbon Analyzer Calibration</b>																																																																					
<b>Date:</b> December 19, 2016 <b>Company/Airshed:</b> UICA <b>Location/Station Name:</b> Cold Lake South <b>Parameter:</b> Total Hydrocarbon <b>Start/End Time 24 hr. (mst):</b> 11:29 / 15:02 <b>Calibration Method:</b> Gas Dilution	<b>Barometric Pressure:</b> 0.917 atm <b>Station Temperature °C:</b> 22 <b>Weather Conditions:</b> A few clouds <b>Calibration Purpose:</b> repeat <b>Performed By/Reviewer:</b> Alex Yakupov / Trina Whitsitt <b>Cal Gas Expiry Date:</b> November 25, 2023																																																																				
<b>Analyzer:</b> <b>ID# or Serial Number:</b> 427408718 <b>Range ppm:</b> 50 <b>Last Calibration Date:</b> December 13, 2016 <b>As Found C.F.:</b> 1.030 <b>Previous Cal High Point C.F.:</b> 1.012 <b>New C.F.:</b> 1.000																																																																					
<b>Calibrator:</b> <b>Flow Meter ID's:</b> n/a <b>Make &amp; Model:</b> API 700 <b>Serial #:</b> 627 <b>Cal Gas Cylinder I.D. #:</b> LL165372 <b>CH<sub>4</sub>/C<sub>2</sub>H<sub>6</sub> Cylinder Conc. (ppm):</b> 606.0      212.0 <b>CH<sub>4</sub> as propane/total CH<sub>4</sub> equivalents (ppm):</b> 583.0      1189.0																																																																					
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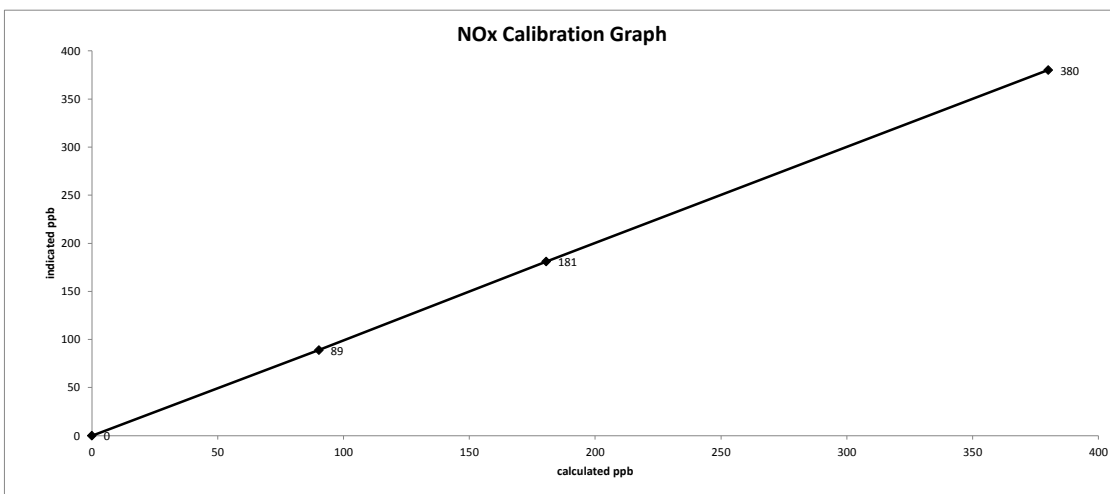
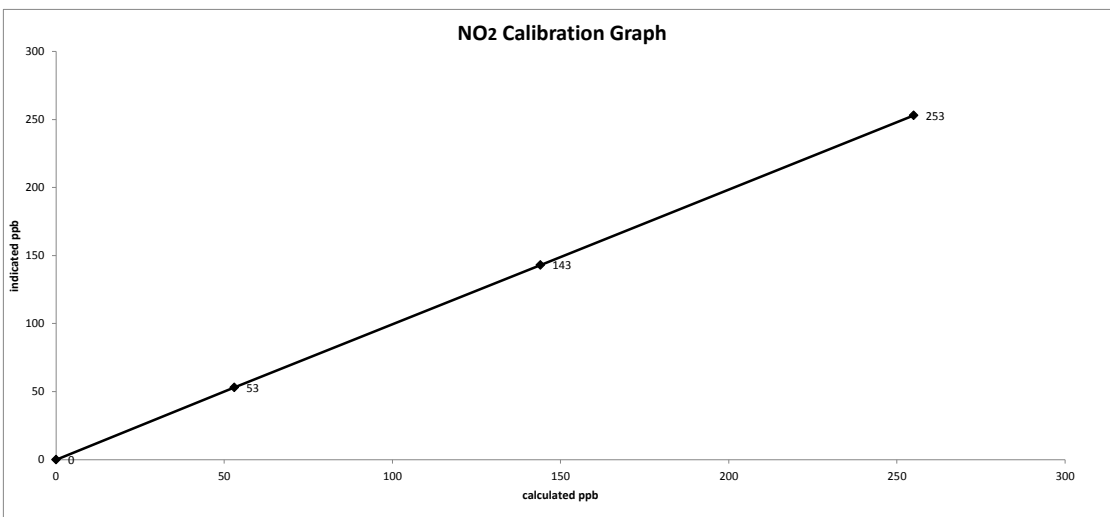
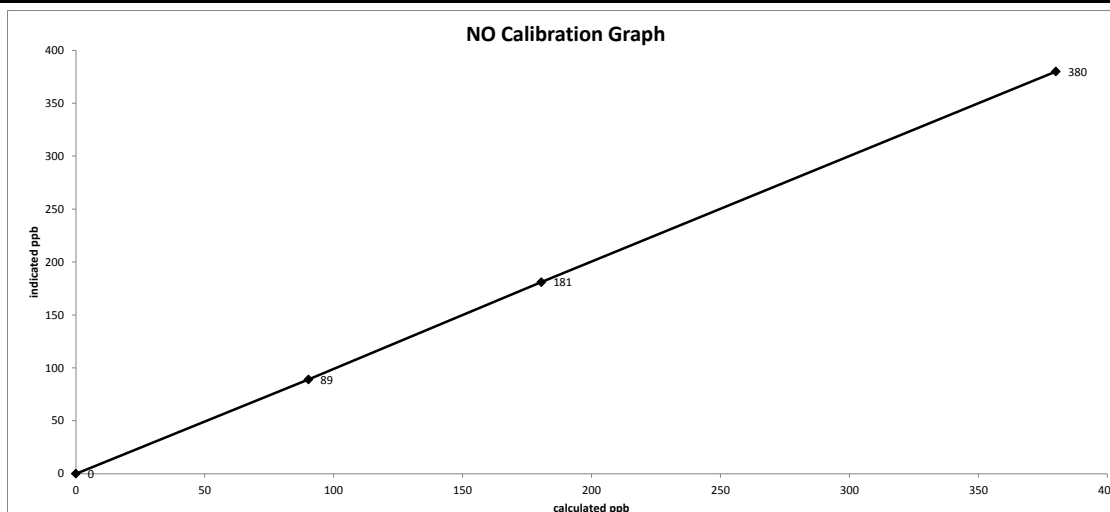
— THC[ppm]

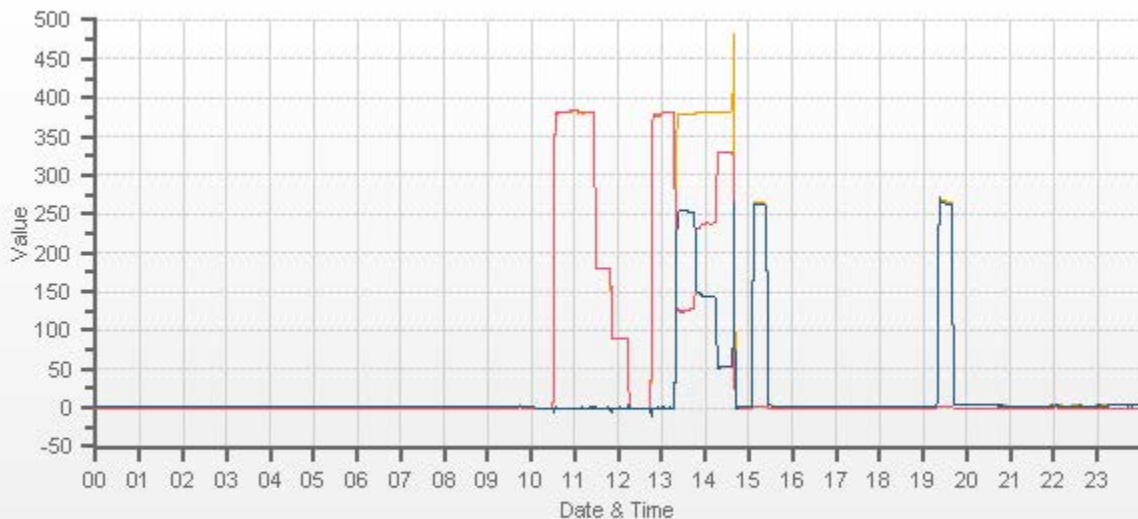
***NITROGEN DIOXIDE***

 <b>Thermo 42i NO-NO2-NOx Analyzer Calibration</b>																																																																																																					
<input checked="" type="checkbox"/> remove																																																																																																					
Date: December 6, 2016 Company/Airshed: LICA Location/Station Name: Cold Lake South Start/End Time 24 hr. (mst): 9:48 / 15:29 G.P.T. to be used for Ozone?: No Calibration Method: Gas Dilution & Gas Phase Titration	Barometric Pressure: 0.947 atm Station Temperature °C: 22 Weather Conditions: A few clouds Calibration Purpose: routine monthly Performed By/Reviewer: Alex Yakupov   Trina Whitsitt Cal Gas Expiry Date: July 18, 2019																																																																																																				
<b>Analyzer:</b> ID# or Serial Number: 1505664393 Last Calibration Date: November 8, 2016 Range ppb: 500	<b>Correction Factors:</b> <table border="1" style="width:100%; text-align: center;"> <tr> <td></td> <td>Previous C.F.:</td> <td>As Found C.F.:</td> <td>New C.F.:</td> </tr> <tr> <td>NO =</td> <td>0.998</td> <td>0.990</td> <td>1.000</td> </tr> <tr> <td>NO<sub>2</sub> =</td> <td>1.000</td> <td>1.008</td> <td>1.008</td> </tr> <tr> <td>NOx =</td> <td>0.998</td> <td>0.990</td> <td>1.000</td> </tr> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	0.998	0.990	1.000	NO <sub>2</sub> =	1.000	1.008	1.008	NOx =	0.998	0.990	1.000																																																																																				
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Date: December 6, 2016  
Company/Airshed: LICA  
Location/Station Name: Cold Lake South

Start/End Time 24 hr. (mst): 9:48 / 15:29  
Calibration Purpose: routine monthly  
Calibration Method: Gas Dilution & Gas Phase Titration

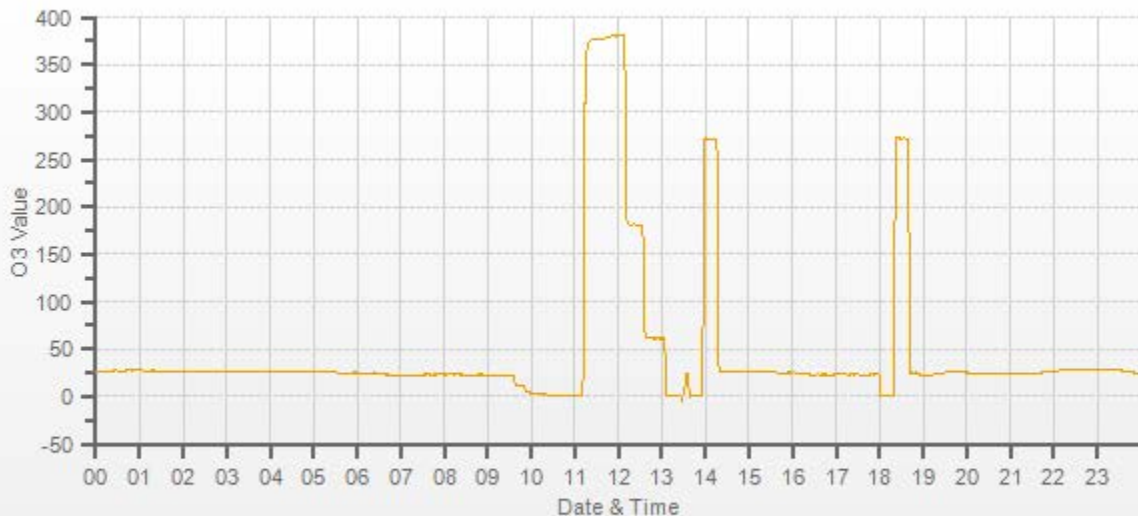




NOX[ppb] NO[ppb] NO2[ppb]

## ***OZONE***

<span style="font-size: 1.2em; font-weight: bold; margin-left: 10px;">Thermo 49i Ozone Analyzer Calibration</span>																																																																									
Date: <u>December 7, 2016</u>		<input type="checkbox"/> remove Barometric Pressure: <u>0.959 atm</u>		Company/Airshed: <u>LICA</u>																																																																					
Location/Station Name: <u>Cold Lake South</u>		Station Temperature °C: <u>22</u>		Weather Conditions: <u>Light snow</u>																																																																					
Start/End Time 24 hr. (mst): <u>9:31 / 14:11</u>		Calibration Purpose: <u>routine monthly</u>		Performed By/Reviewer: <u>Alex Yakupov</u> / <u>Trina Whitsitt</u>																																																																					
Ozone Calibration Method: <u>Varying UV Lamp Power</u>		G.P.T. Date: <u>n/a-done by Varying UV Lamp Power</u>		Cal Gas Expiry Date: <u>n/a</u>																																																																					
<b>Analyzer:</b>																																																																									
ID# or Serial Number: <u>700419591</u>		Ozone Range ppb: <u>500</u>		Last Calibration Date: <u>November 9, 2016</u>																																																																					
Previous Cal High Point C.F.: <u>1.000</u>		As Found C.F.: <u>1.005</u>		New C.F.: <u>1.000</u>																																																																					
<b>Calibrator:</b>																																																																									
Flow Meter ID's: <u>n/a</u>		Make & Model: <u>SABIO 2010 D</u>		Serial #: <u>11900613</u>																																																																					
Cal Gas Cylinder I.D. #: <u>n/a</u>		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Point</th> <th>AMD Required Range of Ozone Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>300-400 ppb</td> </tr> <tr> <td>Mid</td> <td>150-200 ppb</td> </tr> <tr> <td>Low</td> <td>50-75 ppb</td> </tr> </tbody> </table>				Point	AMD Required Range of Ozone Calibration Points	High	300-400 ppb	Mid	150-200 ppb	Low	50-75 ppb																																																												
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No ZERO adjustment made.																																																																									



— O3[ppb]



***PARTICULATE MATTER***



# R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: December 7, 2016  
 Company: LICA  
 Station Name/Location: Cold Lake South  
 Previous Audit Date: November 25, 2016  
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whitsitt  
 Start Time (mst): 13:33  
 End Time (mst): 14:41  
 Calibration Purpose: Bi-monthly #1  
 Weather Conditions: Light snow

### 1400A Information and Status:

ID# or Serial Number: 1405A201620804      As Found Filter Loading %: 28.59  
 Ko Factor: 14578      As Left Filter Loading %: 19.85  
 Ambient Temperature °C: -18.46      As Found Noise: 0.003  
 Ambient Pressure atm: 0.957      As Left Noise: 0.000  
 Main Flow Reading lpm: 3.00      Pump Vacuum: 0.35  
 Aux Flow Reading lpm: 13.67      Warnings: none

### Reference Standards:

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

### As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.01	0.10	0.01	0.10
	limit	0.15	<del>0.15</del>	0.15	<del>0.15</del>
Bypass Flow	actual	0.00	0.17	0.00	0.17
	limit	0.60	<del>0.60</del>	0.60	<del>0.60</del>

### As left leak check (same as above if as found passes):

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.01	0.10	0.01	0.10
	limit	0.15	<del>0.15</del>	0.15	<del>0.15</del>
Bypass Flow	actual	0.00	0.17	0.00	0.17
	limit	0.60	<del>0.60</del>	0.60	<del>0.60</del>

### As found temperature and pressure:

tolerance +/- 2.0°C		tolerance +/- 0.01 atm	
1405F temperature °C:	-18.5	1405F pressure atm:	0.957
reference temperature °C:	-18.1	reference pressure:	0.959
difference °C:	0.4	difference :	-0.002

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

tolerance +/- 2.0°C		tolerance +/- 0.01 atm	
1405F temperature °C:	-18.1	1405F pressure atm:	0.959
reference temperature °C:	-18.1	reference pressure:	0.959
difference °C:	0.0	difference :	0.000

### As found flows:

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: 3.00	1400A total/aux flow lpm: 16.67
reference main flow lpm: 3.02	reference total/aux flow lpm: 16.86
difference lpm: 0.02	difference lpm: 0.19

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

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: 3.00	1400A total/aux flow lpm: 16.67
reference main flow lpm: 3.02	reference total/aux flow lpm: 16.86
difference lpm: 0.02	difference lpm: 0.19

### K<sub>o</sub> Audit:

Last K<sub>o</sub> audit date: November 25, 2016  
 1405F K<sub>o</sub> factor: 14578  
 Measured K<sub>o</sub> factor: 14754.1000  
 % difference: 1.21

### Comments:

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



# R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: December 19, 2016  
 Company: LICA  
 Station Name/Location: Cold Lake South  
 Previous Audit Date: December 7, 2016  
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whatsitt  
 Start Time (mst): 14:34  
 End Time (mst): 15:31  
 Calibration Purpose: Bi-monthly #2  
 Weather Conditions: A few clouds

### 1400A Information and Status:

ID# or Serial Number: 1405A201620804      As Found Filter Loading %: 32.16  
 Ko Factor: 14578      As Left Filter Loading %: 17.73  
 Ambient Temperature °C: 2.55      As Found Noise: 0.003  
 Ambient Pressure atm: 0.915      As Left Noise: 0.000  
 Main Flow Reading lpm: 3.00      Pump Vacuum: 0.35  
 Aux Flow Reading lpm: 13.67      Warnings: none

### Reference Standards:

	Flow:	Pressure:	Temperature:
Make:	Dwyer	BRUNTON	FLUKE
Model:	475 Mark III	BIO	1551A Ex STIK
Serial Number:	#2	BPO 14	4295
Calibration Date:	January 15, 2016	July 7, 2016	November 15, 2016

### As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.02	0.11	0.02	0.11
	limit	0.15	<del>0.15</del>	0.15	<del>0.15</del>
Bypass Flow	actual	0.00	0.20	0.00	0.20
	limit	0.60	<del>0.60</del>	0.60	<del>0.60</del>

### As left leak check (same as above if as found passes):

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.02	0.11	0.02	0.11
	limit	0.15	<del>0.15</del>	0.15	<del>0.15</del>
Bypass Flow	actual	0.00	0.20	0.00	0.20
	limit	0.60	<del>0.60</del>	0.60	<del>0.60</del>

### As found temperature and pressure:

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: 2.6	1405F pressure atm: 0.915
reference temperature °C: 2.5	reference pressure: 0.915
difference °C: 0.0	difference : 0.000

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

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: 2.6	1405F pressure atm: 0.915
reference temperature °C: 2.5	reference pressure: 0.915
difference °C: 0.0	difference : 0.000

### As found flows:

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: 3.00	1400A total/aux flow lpm: 16.67
reference main flow lpm: 3.04	reference total/aux flow lpm: 16.74
difference lpm: 0.04	difference lpm: 0.07

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

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: 3.00	1400A total/aux flow lpm: 16.67
reference main flow lpm: 3.04	reference total/aux flow lpm: 16.74
difference lpm: 0.04	difference lpm: 0.07

### K<sub>o</sub> Audit:

Last K<sub>o</sub> audit date: November 25, 2016  
 1405F K<sub>o</sub> factor: 14578  
 Measured K<sub>o</sub> factor: 14754.1000  
 % difference: 1.21

### Comments:

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

## ***WIND SYSTEM***



Met One Instruments  
1600 NW Washington Blvd.  
Grants Pass, Oregon 97526  
Telephone 541-471-7111  
Facsimile 541-471-7116

Regional Service  
3206 Main St. Suite 106  
Rowlett, Texas 75088  
Telephone 972-412-4715  
Facsimile 972-412-4716

### Sonic Wind Sensor Certificate of Calibration

Sensor Model No: 50.5H Sonic Sensor Serial No: F1644  
 Customer: \_\_\_\_\_ P.O. No: \_\_\_\_\_ Sales Order: \_\_\_\_\_  
 Final Calibration By: Kevin Ricks Calibration Date: 04-01-15  
 Quality Control Inspected By: AJR Inspection Date: APR 03 2015  
 New Unit  Repair/Adjust  Re-Calibration  As Found   
 Unit Within Tolerance as Found  Unit Within Tolerance as Left

#### Calibration Equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal. Due
Digital Multimeter 1	Agilent/HP	34401A	MY41039534	4/11/2015
Digital Multimeter 2	Agilent/HP	34401A	US36094551	8/26/2015
Frequency Counter	Agilent/HP	53131A	MY40009285	5/22/2015
Standard Sensor	MOI	010C-1	P22383	7/11/2017
Temperature Probe	MOI	920005/PC8340	E3402	9/03/2015

Test 1: Average Wind Tunnel Speed: 3.08 Meters per Second FirmwareVersion: 3194-01 R2.62

WD Setting (Deg)	WD Output (Volts)	WD Indication (Deg)	WD Error (+/- 3 Deg)	WS Standard (m/s)	WS Output (Volts)	WS Indication (m/s)	WS Error (+/- .20 m/s)	Output Type:
30	.084	30.3	.3	3.06	.059	2.96	-.1	0 to 1 volt <input checked="" type="checkbox"/>
60	.165	59.3	-.7	3.07	.059	2.94	-.13	0 to 2.5 volt <input type="checkbox"/>
120	.334	120.2	.2	3.08	.059	2.94	-.14	0 to 5 volt <input type="checkbox"/>
150	.415	149.5	-.5	3.07	.059	2.94	-.13	RS-232 <input checked="" type="checkbox"/>
210	.583	210	0	3.08	.059	2.95	-.12	SDI-12 <input type="checkbox"/>
240	.668	240.3	.3	3.08	.06	2.98	-.1	RS-422 <input type="checkbox"/>
300	.834	300.4	.4	3.07	.06	3.02	-.04	RS-485 <input type="checkbox"/>
330	.916	329.8	-.2	3.09	.059	2.97	-.12	<input type="checkbox"/>

Test 2: Average Wind Tunnel Speed: 11.85 Meters per Second Output Range: 0-50 m/s

WD Setting (Deg)	WD Output (Volts)	WD Indication (Deg)	WD Error (+/- 3 Deg)	WS Standard (m/s)	WS Output (Volts)	WS Indication (m/s)	WS Error (+/- .24 m/s)	Test Items:
30	.081	29.3	-.7	11.79	.235	11.76	-.04	Array Alignment <input checked="" type="checkbox"/>
60	.165	59.5	-.5	11.85	.237	11.87	.01	Jumper Config <input checked="" type="checkbox"/>
120	.331	119.1	-.9	11.85	.236	11.81	-.03	Firmware Config <input checked="" type="checkbox"/>
150	.415	149.3	-.7	11.88	.236	11.8	-.08	Zero Calibration <input checked="" type="checkbox"/>
210	.582	209.5	-.5	11.81	.236	11.79	-.02	Low Speed Test OK <input checked="" type="checkbox"/>
240	.666	239.9	-.1	11.88	.235	11.73	-.16	High Speed Test OK <input checked="" type="checkbox"/>
300	.833	299.7	-.3	11.87	.235	11.73	-.13	Sensor Function <input checked="" type="checkbox"/>
330	.915	329.6	-.4	11.84	.238	11.9	.06	Physical Inspection <input checked="" type="checkbox"/>

The standards used for this calibration have accuracies equal to or greater than the instruments tested. These standards are on record and traceable to NIST to the extent allowed by the institute's calibration facility. Unless otherwise stated hereon, all instruments are calibrated to meet the manufacturer's published specifications. The calibration system complies with MIL-STD-45662A. Calibration performed by direct comparison to the above standard following test procedure: 50.5-6100 Rev E

***VOC SAMPLER***

## Maxxam Analytics

### XONTECK FLOW RATE VERIFICATION/CALIBRATION

Client:	LICA	Date:	December 19, 2016
Location:	Cold Lake South	Last Cal. Date:	September 2, 2016
Station ID:	LICA 01	Start Time 24 hr. (mst):	11:35
Sampler s/n:	6167	End Time 24 hr. (mst):	12:48
Purpose:	Routine Quarterly	Performed By/Reviewer:	Alex Yakupov   Trina Whatsitt
<b>Pressure Standard:</b>		<b>Flow Standard:</b>	
Make/Model	BRUNTON	DC-2/BIOS international	
S/N or ID#:	BPO 14	2293	
Certification Date:	July 7, 2016		

The desired flow rate can be calculated using the equation provided by USEPA Method T0-14 Section 9.1.3.1.

$$F = \frac{(P \times V)}{(T \times 60)} = \frac{1.59 \times 6000}{24 \times 60} = \boxed{6.64 \text{ cc/min}}$$

= target flow rate

where;

- F= flow rate in cc/min
- P= final canister in atmosphere absolute
- V= volume of canister in c.c.
- T= sampling period in hours
- bp= barometric pressure in atmospheres

enter:

bp	0.914	atm
P=	1.59446	(atm)+.68046
V=	6000	cubic centimetres
T=	24	hours

### XONTECK QUARTERLY FLOW VERIFICATION/CALIBRATION

FLOW RATE VERIFICATION			
<u>Volumetric Flow rate</u> =	10.00	(cc/min)	As found pot setting = 6.52
Target Flow Rate (cc/min) =	6.64		
% Difference =	33.56%		
FLOW RATE CALIBRATION			
<u>Volumetric Flow rate</u> =	n/a	(cc/min)	Adjusted pot setting = n/a
Target Flow Rate (cc/min) =	6.64		
% Difference =	n/a		

### XONTECK MAINTENANCE

Item:	Most Recent Date Completed:
1. Replace sample line and fittings from sampler to canister every 6 months.	November 9, 2016
2. Purge line from manifold--> sampler with zero air every 6 months.	December 19, 2016
3. Sample system cleaning every 2 years.	
4. Perform 12 hour leak check procedure every 6 months.	December 19, 2016

**COMMENTS:**

No sample flow adjustments made. Formula calculates target flow rate when a canister has 0.0 psi of initial pressure. The actual sampling is done with initial vacuum of -27 in Hg. The calculation is not used with evacuated canisters. Target flow of 6.74 cc/m is too low to fill the canister to the required pressure of about 24 psi over 24 hour period. Flow target of 10.0 cc/m is used for sampling. Leak check result: 0.0 psi.

***PUF SAMPLER***





**TISCH PUF PLUS SAMPLER AUDIT**

Date: December 28, 2016		PUF PLUS Serial #: 100-1020	
Company/Airshed: LICA		Performed By/Reviewer: Alex Yakupov   Trina Whitsitt	
Location/Station Name: Cold Lake South		Weather Conditions: Light snow	
Reference Standards:		Flow:	Pressure:
Make: Dwyer		Brunton	Temperature: FLUKE
Model: 475 Mark III		BIO	1551A Ex STIK
Serial Number: #2		BPO14	4295
Calibration Date: January 15, 2016		July 8, 2016	November 15, 2016

**TISCH PUF PLUS PRESSURE AND TEMPERATURE AUDIT**

<b>AS FOUND</b> Reference Barometric Pressure (mmHg):	705.06	<b>AS FOUND</b> Reference Temperature (°C):	-2.8
<b>AS FOUND</b> PUF PLUS Barometric Pressure (mmHg):	706	<b>AS FOUND</b> PUF PLUS Temperature (°C):	-2.4
% Difference (+/- 2% max.): -0.13%		% Difference (+/- 2 °C max.): -0.4	
<b>**IF THE PRESSURE DEVIATES BY MORE THAN +/- 2% A FLOW CALIBRATION IS REQUIRED**</b>		<b>**IF THE TEMPERATURE DEVIATES BY MORE THAN +/- 2 °C A FLOW CALIBRATION IS REQUIRED**</b>	

**TISCH PUF PLUS FLOW AUDIT**

**Flow Audit Calculations:**

Calibrated Orifice Certification Date:	October 20, 2016
Enter Barometric Pressure from refrence (inHg)	27.76
Barometric Pressure (mmHg)	706.0
Enter Ambient Temperature from reference °C	-2.4
Enter "m" variable from calibrated orifice	6.08663
Enter "b" variable from calibrated orifice	-0.04218
Enter Δp in. H <sub>2</sub> O	1.82
Standardized Flow lpm=	231.06
Flow Set Point lpm=	230.00
% Difference (+/- 2% max.)=	-0.46%
<b>**IF THE FLOW DEVIATES BY MORE THAN +/- 2% A FLOW CALIBRATION IS REQUIRED**</b>	

**TISCH PUF PLUS PRESSURE CALIBRATION**

Reference Barometric Pressure <b>AFTER CALIBRATION</b> (mmHg):	n/a
PUF Barometric Pressure <b>AFTER CALIBRATION</b> (mmHg):	n/a
% Difference:	n/a
<b>Max 2.0%</b>	

Calibration Point (mmHg):	Δp (in. H <sub>2</sub> O) required for target barometric pressure:	As Found barometric pressure (mmHg):	As Left barometric pressure (mmHg):	% Difference vs. Calibration Target:
745.06	1.57	n/a	n/a	n/a
725.06	0.79	n/a	n/a	n/a
705.06	0.00	n/a	n/a	n/a
685.06	-0.79	n/a	n/a	n/a
665.06	-1.57	n/a	n/a	n/a
% Difference (+/- 2% max.)=				n/a

**TISCH PUF PLUS TEMPERATURE CALIBRATION**

Temperature Calibrator Certification Date:	n/a
Reference Temperature <b>AFTER CALIBRATION</b> (°C):	n/a
TISCH PUF PLUS Temperature <b>AFTER CALIBRATION</b> (°C):	n/a
Difference (°C):	n/a
<b>Max 2.0 °C</b>	

Calibration Point (°C):	As Found (°C)	As Left (°C)	+/- Difference (°C)
20	n/a	n/a	n/a
-20	n/a	n/a	n/a
40	n/a	n/a	n/a
0	n/a	n/a	n/a
-30	n/a	n/a	n/a
% Difference (+/- 2 °C max.)			n/a

**TISCH PUF PLUS FLOW CALIBRATION**

**Flow Calibration Calculations:**

Calibrated Orifice Certification Date:	n/a
Enter Barometric Pressure from refrence (inHg)	n/a
Barometric Pressure (mmHg)	n/a
Enter Ambient Temperature from reference °C	n/a
Enter "m" variable from calibrated orifice	n/a
Enter "b" variable from calibrated orifice	n/a
Enter Δp in. H <sub>2</sub> O	n/a
Standardized Flow lpm=	n/a
Flow Set Point lpm=	230.00
% Difference (+/- 2% max.)=	n/a
<b>**IF THE FLOW DEVIATES BY MORE THAN +/- 2% A FLOW CALIBRATION IS REQUIRED**</b>	

**R, A1 and A0 Factors:**

	As Found/As Left Pressure:	As Found/As Left Temperature:	As Found/As Left Flow:
<b>A0</b>	14823.1796	-6613.4765	0.2879
<b>A1</b>	22.8942	0.1641	16.8673
<b>R</b>	0.0000	0.0000	0.0000

Notes: NA

## ***CALIBRATORS***



# Calibrator Performance Audit

## Oxides Of Nitrogen

File No. 2015-119

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>API 700</u>	Make/Model	<u>NA</u>
Serial Number	<u>627</u>	Serial Number	<u>NA</u>
Last Verification Date	<u>April 1 2015</u>	Temperature (°C)	<u>NA</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>NA</u>
NO/NOx Concentration	<u>50.3/50.3</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>
		Pt. #3	<u>5000</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>
		Pt. #3	<u>18.9</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO <sub>2</sub>	NOx	NO	NOx
5007	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5003	77.5	0.779	0.779	0.787	-0.001	0.786	1%	1%
5004	37.8	0.380	0.380	0.383	0.000	0.383	1%	1%
5001	18.9	0.190	0.190	0.191	0.000	0.191	1%	1%
Absolute Average Percent Difference							1%	1%

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

<u>NO</u>	<u>LIMITS</u>	<u>NOx</u>	
Correlation=	1.0000	≥ 0.990	Correlation= 1.0000
m (Slope)=	1.0106	0.90-1.10	m (Slope)= 1.0092
b (Intercept % of FS)=	-0.0566	± 3% F.S.	b (Intercept % of FS)= -0.0368

Flow	O <sub>2</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOX	% Diff. Vs Audit gas	
5003	0	0.000	0.787	0.001	0.788	NO <sub>2</sub>	% Diff. Limit
5003	0.5	0.493	0.294	0.498	0.792	1%	± 10%
5003	0.25	0.256	0.531	0.262	0.792	2%	± 10%
5003	0.1	0.108	0.679	0.110	0.789	1%	± 10%
Absolute Average Percent Difference						1.2%	± 10%

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

<u>NO<sub>x</sub></u>	<u>LIMITS</u>	
Correlation=	1.0000	≥ 0.995
m (Slope)=	1.0089	0.90-1.10
b (Intercept % of FS)=	0.1591	± 3% F.S.

AENV Standards Audit Calibrator	NO <sub>x</sub> Analyzer
Make/Model <u>Thermo 146i</u>	Make/Model <u>Thermo 42i</u>
Serial/AMU Number <u>1809</u>	Serial/AMU Number <u>1868</u>
	Last Calibration Date <u>February 1, 2016</u>
	Full Scale (ppm) <u>1</u>

COMMENTS: Flows not manually measured - calibration system audited as it is currently being operated.

Auditor: Shea Beaton  
Operator Signature: [Signature]

Date: February 3, 2016  
Location: McIntyre Center Edmonton



# Calibrator Performance Audit

## Oxides Of Nitrogen

File No. 2015-165

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>None</u>
Serial Number	<u>11900613</u>	Serial Number	<u>None</u>
Last Verification Date	<u>April 1, 2015</u>	Temperature (°C)	<u>23.5</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>706 mmHg</u>
NO/NOx Concentration	<u>50.3ppm/50.3ppm</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5001</u>	Pt. #2	<u>5000</u>
		Pt. #3	<u>5000</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>
		Pt. #3	<u>18.9</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO <sub>2</sub>	NOx	NO	NOx
4999	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5001	77.5	0.779	0.779	0.775	0.000	0.775	-1%	-1%
5000	37.8	0.380	0.380	0.376	0.001	0.377	-1%	-1%
5000	18.9	0.190	0.190	0.188	0.001	0.189	-1%	-1%
Absolute Average Percent Difference							1%	1%

LINEAR REGRESSION ANALYSIS				<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)=	0.9950	0.90-1.10		m (Slope)=	0.9946		
b (Intercept % of FS)=	-0.0773	± 3% F.S.		b (Intercept % of FS)=	-0.0167		

Flow	O <sub>3</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOx	% Diff. Vs Audit gas	
5001	0	0.000	0.772	0.000	0.772	NO <sub>2</sub>	% Diff. Limit
5001	0.51	0.507	0.265	0.506	0.772	0%	± 10%
5001	0.25	0.252	0.520	0.254	0.773	1%	± 10%
5001	0.1	0.110	0.662	0.109	0.772	-1%	± 10%
Absolute Average Percent Difference						0.1%	± 10%

LINEAR REGRESSION ANALYSIS				<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)=	0.9992	0.90-1.10					
b (Intercept % of FS)=	0.0171	± 3% F.S.					

AENV Standards		NO <sub>x</sub> Analyzer	
<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>
		Last Calibration Date	<u>March 28, 2016</u>
		Full Scale (ppm)	<u>1</u>

COMMENTS: NO Cyl has 49.9ppb SO2 - Flows Not Manually Measured

Auditor: Shea Beaton  
 Operator Signature:

Date: March 31, 2016  
 Location: McIntyre Center Edmonton

## ***CALIBRATION GASES***







# Calibration Gas Audit

## CH4 / C3H8 Cylinder Gas

File No. 2015-092CGA

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

**Reference Calibrator and Gas:**

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

**Flow Measurement Device:**

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

**Reference Analyzer:**

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

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

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

**Cylinder gas tolerances based on CH4 only**

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

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





# Calibration Gas Audit

## NO Cylinder Gas

File No. 2016-336CGA

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

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

Expiry Date: July 2019

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

**Reference Analyzer:**

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

Instrument Settings    Zero: 4.4      Span: 1.080      Range: 1.0

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

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

***VOCS SAMPLES***

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
LICA/VOC/Bonnyville/Dec 2, 2016	S5623	Ambient Air	02-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120042	<b>REPORT CREATED:</b>	03-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120042-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	08-Dec-16
16120042-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	08-Dec-16
16120042-001	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-001	1,2-Dichloroethane	I	0.03	ppbv	0.01	AC-058	08-Dec-16
16120042-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16120042-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-001	1-Butene	I	0.03	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	2,2,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	2,2-Dimethylbutane	I	0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	2,3-Dimethylpentane	I	0.02	ppbv	0.02	AC-058	08-Dec-16

**Report certified by:** Graham Knox, Team Lead

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

**Date:** January-03-17

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
LICA/VOC/Bonnyville/Dec 2, 2016	S5623	Ambient Air	02-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120042	<b>REPORT CREATED:</b>	03-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120042-001	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	2-Methylheptane	I	0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	2-Methylhexane	I	0.04	ppbv	0.01	AC-058	08-Dec-16
16120042-001	2-Methylpentane	I	0.08	ppbv	0.01	AC-058	08-Dec-16
16120042-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	3-Methylhexane	I	0.03	ppbv	0.02	AC-058	08-Dec-16
16120042-001	3-Methylpentane	I	0.05	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Acetone		2.6	ppbv	0.4	AC-058	08-Dec-16
16120042-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16120042-001	Benzene		0.44	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Carbon disulfide	I	0.22	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Carbon tetrachloride	I	0.13	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Chloroform	I	0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Chloromethane		0.50	ppbv	0.02	AC-058	08-Dec-16
16120042-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-001	cis-2-Butene	I	0.04	ppbv	0.02	AC-058	08-Dec-16
16120042-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Cyclohexane	I	0.04	ppbv	0.02	AC-058	08-Dec-16

<b>Report certified by:</b>	Graham Knox, Team Lead	<b>On behalf of:</b>	PJ Pretorius, Manager, Analysis and Testing Services
<b>Date:</b>	January-03-17	<b>Inquiries:</b>	(780) 632 8455
		<b>E-mail:</b>	EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
LICA/VOC/Bonnyville/Dec 2, 2016	S5623	Ambient Air	02-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120042	<b>REPORT CREATED:</b>	03-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120042-001	Cyclopentane	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Ethanol		0.6	ppbv	0.3	AC-058	08-Dec-16
16120042-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-001	Ethylbenzene	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Freon-11		0.35	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Freon-113	I	0.06	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Freon-12		0.73	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	08-Dec-16
16120042-001	Isobutane		0.73	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Isopentane		0.46	ppbv	0.03	AC-058	08-Dec-16
16120042-001	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Isopropyl alcohol		2.1	ppbv	0.4	AC-058	08-Dec-16
16120042-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	m,p-Xylene	I	0.08	ppbv	0.03	AC-058	08-Dec-16
16120042-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	08-Dec-16
16120042-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	08-Dec-16
16120042-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16120042-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	08-Dec-16
16120042-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-001	Methylcyclohexane	I	0.05	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Methylcyclopentane	I	0.05	ppbv	0.02	AC-058	08-Dec-16

<b>Report certified by:</b>	Graham Knox, Team Lead	<b>On behalf of:</b>	PJ Pretorius, Manager, Analysis and Testing Services
<b>Date:</b>	January-03-17	<b>Inquiries:</b>	(780) 632 8455
		<b>E-mail:</b>	EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/Bonnyville/Dec 2, 2016	S5623	Ambient Air	02-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120042	<b>REPORT CREATED:</b>	03-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120042-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16120042-001	n-Butane		1.15	ppbv	0.03	AC-058	08-Dec-16
16120042-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	08-Dec-16
16120042-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-001	n-Heptane	I	0.04	ppbv	0.01	AC-058	08-Dec-16
16120042-001	n-Hexane	I	0.10	ppbv	0.01	AC-058	08-Dec-16
16120042-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	n-Pentane		0.3	ppbv	0.1	AC-058	08-Dec-16
16120042-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	08-Dec-16
16120042-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	08-Dec-16
16120042-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	08-Dec-16
16120042-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	o-Xylene	I	0.03	ppbv	0.01	AC-058	08-Dec-16
16120042-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	08-Dec-16
16120042-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-001	Toluene	I	0.27	ppbv	0.01	AC-058	08-Dec-16
16120042-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-001	trans-2-Butene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16

**Report certified by:** Graham Knox, Team Lead

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

**Date:** January-03-17

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca



PO Bag 4000  
 Vegreville, Alberta  
 Canada T9C 1T4  
 (780) 632-8211

**ENVIRONMENTAL ANALYTICAL SERVICES**

TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/Bonnyville/Dec 2, 2016	S5623	Ambient Air	02-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120042	<b>REPORT CREATED:</b>	03-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120042-001	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	08-Dec-16
16120042-001	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	08-Dec-16

**Report certified by:** Graham Knox, Team Lead

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

**Date:** January-03-17

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca



<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/ Dec 8, 2016	1679	Ambient Air	08-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16
16120122-003	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	17-Dec-16
16120122-003	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	17-Dec-16
16120122-003	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-003	1,2-Dichloroethane	I	0.03	ppbv	0.01	AC-058	17-Dec-16
16120122-003	1,2-Dichloropropane	I	0.02	ppbv	0.01	AC-058	17-Dec-16
16120122-003	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	1,3-Butadiene	I	0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	17-Dec-16
16120122-003	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-003	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-003	1-Butene	I	0.14	ppbv	0.02	AC-058	17-Dec-16
16120122-003	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	2,2,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	2,2-Dimethylbutane	I	0.02	ppbv	0.01	AC-058	17-Dec-16
16120122-003	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	2,3-Dimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16

<b>Report certified by:</b> Krista Gegolick, Account Coordinator	<b>On behalf of:</b> PJ Pretorius, Manager, Analysis and Testing Services
<b>Date:</b> Friday, January 13, 2017	<b>Inquiries:</b> (780) 632 8455 <b>E-mail:</b> EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/ Dec 8, 2016	1679	Ambient Air	08-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-003	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	2-Methylheptane	I	0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	2-Methylhexane	I	0.02	ppbv	0.01	AC-058	17-Dec-16
16120122-003	2-Methylpentane	I	0.07	ppbv	0.01	AC-058	17-Dec-16
16120122-003	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	3-Methylhexane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	3-Methylpentane	I	0.06	ppbv	0.01	AC-058	17-Dec-16
16120122-003	Acetone		0.8	ppbv	0.4	AC-058	17-Dec-16
16120122-003	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	17-Dec-16
16120122-003	Benzene	I	0.07	ppbv	0.01	AC-058	17-Dec-16
16120122-003	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	Carbon disulfide	I	0.04	ppbv	0.01	AC-058	17-Dec-16
16120122-003	Carbon tetrachloride	I	0.17	ppbv	0.01	AC-058	17-Dec-16
16120122-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	Chloroform	I	0.03	ppbv	0.02	AC-058	17-Dec-16
16120122-003	Chloromethane		0.61	ppbv	0.02	AC-058	17-Dec-16
16120122-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16
16120122-003	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	Cyclohexane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16

<b>Report certified by:</b> Krista Gegolick, Account Coordinator	<b>On behalf of:</b> PJ Pretorius, Manager, Analysis and Testing Services
<b>Date:</b> Friday, January 13, 2017	<b>Inquiries:</b> (780) 632 8455 <b>E-mail:</b> EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/ Dec 8, 2016	1679	Ambient Air	08-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-003	Cyclopentane	I	0.02	ppbv	0.01	AC-058	17-Dec-16
16120122-003	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	Ethanol	K, T, U	< 0.3	ppbv	0.3	AC-058	17-Dec-16
16120122-003	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-003	Ethylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	Freon-11		0.45	ppbv	0.02	AC-058	17-Dec-16
16120122-003	Freon-113	I	0.04	ppbv	0.01	AC-058	17-Dec-16
16120122-003	Freon-114	I	0.03	ppbv	0.02	AC-058	17-Dec-16
16120122-003	Freon-12		0.99	ppbv	0.02	AC-058	17-Dec-16
16120122-003	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	17-Dec-16
16120122-003	Isobutane		0.35	ppbv	0.02	AC-058	17-Dec-16
16120122-003	Isopentane		0.37	ppbv	0.03	AC-058	17-Dec-16
16120122-003	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-003	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	m,p-Xylene	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-003	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16
16120122-003	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	17-Dec-16
16120122-003	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	17-Dec-16
16120122-003	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	17-Dec-16
16120122-003	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-003	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	17-Dec-16
16120122-003	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-003	Methylcyclohexane	I	0.03	ppbv	0.01	AC-058	17-Dec-16
16120122-003	Methylcyclopentane	I	0.05	ppbv	0.02	AC-058	17-Dec-16

**Report certified by:** Krista Gegolick, Account Coordinator

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

**Date:** Friday, January 13, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/ Dec 8, 2016	1679	Ambient Air	08-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-003	Methylene chloride		0.5	ppbv	0.3	AC-058	17-Dec-16
16120122-003	n-Butane		0.61	ppbv	0.03	AC-058	17-Dec-16
16120122-003	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	17-Dec-16
16120122-003	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-003	n-Heptane	I	0.03	ppbv	0.01	AC-058	17-Dec-16
16120122-003	n-Hexane		2.03	ppbv	0.01	AC-058	17-Dec-16
16120122-003	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	n-Pentane	I	0.2	ppbv	0.1	AC-058	17-Dec-16
16120122-003	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	17-Dec-16
16120122-003	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	17-Dec-16
16120122-003	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	17-Dec-16
16120122-003	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	o-Xylene	I	0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16
16120122-003	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	17-Dec-16
16120122-003	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16
16120122-003	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16
16120122-003	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-003	Toluene	I	0.04	ppbv	0.01	AC-058	17-Dec-16
16120122-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16
16120122-003	trans-2-Butene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-003	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-003	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16

**Report certified by:** Krista Gegolick, Account Coordinator

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

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**Inquiries:** (780) 632 8455

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 Vegreville, Alberta  
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# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/ Dec 8, 2016	1679	Ambient Air	08-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120122-003	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	17-Dec-16
16120122-003	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	17-Dec-16

**Report certified by:** Krista Gegolick, Account Coordinator

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

**Date:** Friday, January 13, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 14, 2016	S5670	Ambient Air	14-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17
16120203-003	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	03-Jan-17
16120203-003	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	03-Jan-17
16120203-003	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	03-Jan-17
16120203-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	03-Jan-17
16120203-003	1,2-Dichloroethane	I	0.04	ppbv	0.01	AC-058	03-Jan-17
16120203-003	1,2-Dichloropropane	I	0.02	ppbv	0.01	AC-058	03-Jan-17
16120203-003	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	1,3-Butadiene	I	0.04	ppbv	0.02	AC-058	03-Jan-17
16120203-003	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	03-Jan-17
16120203-003	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-003	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-003	1-Butene	I	0.08	ppbv	0.02	AC-058	03-Jan-17
16120203-003	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	1-Pentene	I	0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	2,2,4-Trimethylpentane	I	0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	2,2-Dimethylbutane	I	0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	2,3-Dimethylpentane	I	0.02	ppbv	0.02	AC-058	03-Jan-17

<b>Report certified by:</b>	Krista Gegolick, Account Coordinator	<b>On behalf of:</b>	PJ Pretorius, Manager, Analysis and Testing Services
<b>Date:</b>	Thursday, January 19, 2017	<b>Inquiries:</b>	(780) 632 8455
		<b>E-mail:</b>	EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 14, 2016	S5670	Ambient Air	14-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-003	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	2-Methylhexane	I	0.02	ppbv	0.01	AC-058	03-Jan-17
16120203-003	2-Methylpentane	I	0.06	ppbv	0.01	AC-058	03-Jan-17
16120203-003	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	3-Methylhexane	I	0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	3-Methylpentane	I	0.03	ppbv	0.01	AC-058	03-Jan-17
16120203-003	Acetone		1.2	ppbv	0.4	AC-058	03-Jan-17
16120203-003	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	03-Jan-17
16120203-003	Benzene	I	0.11	ppbv	0.01	AC-058	03-Jan-17
16120203-003	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	Carbon disulfide	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	Carbon tetrachloride	I	0.15	ppbv	0.01	AC-058	03-Jan-17
16120203-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	Chloroform	I	0.04	ppbv	0.02	AC-058	03-Jan-17
16120203-003	Chloromethane		0.69	ppbv	0.02	AC-058	03-Jan-17
16120203-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17
16120203-003	cis-2-Butene	I	0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	Cyclohexane	I	0.04	ppbv	0.02	AC-058	03-Jan-17

<b>Report certified by:</b>	Krista Gegolick, Account Coordinator	<b>On behalf of:</b>	PJ Pretorius, Manager, Analysis and Testing Services
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		<b>E-mail:</b>	EAS.Results@innotechalberta.ca



<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 14, 2016	S5670	Ambient Air	14-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-003	Cyclopentane	I	0.02	ppbv	0.01	AC-058	03-Jan-17
16120203-003	Dibromochloromethane	I	0.02	ppbv	0.01	AC-058	03-Jan-17
16120203-003	Ethanol		0.5	ppbv	0.3	AC-058	03-Jan-17
16120203-003	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-003	Ethylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	Freon-11		0.44	ppbv	0.02	AC-058	03-Jan-17
16120203-003	Freon-113	I	0.08	ppbv	0.01	AC-058	03-Jan-17
16120203-003	Freon-114	I	0.03	ppbv	0.02	AC-058	03-Jan-17
16120203-003	Freon-12		0.90	ppbv	0.02	AC-058	03-Jan-17
16120203-003	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	03-Jan-17
16120203-003	Isobutane		0.45	ppbv	0.02	AC-058	03-Jan-17
16120203-003	Isopentane	I	0.26	ppbv	0.03	AC-058	03-Jan-17
16120203-003	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-003	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	m,p-Xylene	K, T, U	< 0.03	ppbv	0.03	AC-058	03-Jan-17
16120203-003	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17
16120203-003	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	03-Jan-17
16120203-003	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	03-Jan-17
16120203-003	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	03-Jan-17
16120203-003	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-003	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	03-Jan-17
16120203-003	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	03-Jan-17
16120203-003	Methylcyclohexane	I	0.08	ppbv	0.01	AC-058	03-Jan-17
16120203-003	Methylcyclopentane	I	0.07	ppbv	0.02	AC-058	03-Jan-17

**Report certified by:** Krista Gegolick, Account Coordinator

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

**Date:** Thursday, January 19, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca



<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 14, 2016	S5670	Ambient Air	14-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-003	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	03-Jan-17
16120203-003	n-Butane		0.81	ppbv	0.03	AC-058	03-Jan-17
16120203-003	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	03-Jan-17
16120203-003	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-003	n-Heptane	I	0.02	ppbv	0.01	AC-058	03-Jan-17
16120203-003	n-Hexane	I	0.05	ppbv	0.01	AC-058	03-Jan-17
16120203-003	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	n-Pentane	I	0.1	ppbv	0.1	AC-058	03-Jan-17
16120203-003	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	03-Jan-17
16120203-003	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	03-Jan-17
16120203-003	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	03-Jan-17
16120203-003	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	o-Xylene	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17
16120203-003	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	03-Jan-17
16120203-003	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17
16120203-003	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17
16120203-003	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-003	Toluene	I	0.06	ppbv	0.01	AC-058	03-Jan-17
16120203-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-003	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17
16120203-003	trans-2-Butene	I	0.05	ppbv	0.01	AC-058	03-Jan-17
16120203-003	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-003	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17

**Report certified by:** Krista Gegolick, Account Coordinator

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

**Date:** Thursday, January 19, 2017

**Inquiries:** (780) 632 8455

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# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 14, 2016	S5670	Ambient Air	14-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120203-003	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	03-Jan-17
16120203-003	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	03-Jan-17

**Report certified by:** Krista Gegolick, Account Coordinator

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

**Date:** Thursday, January 19, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 20, 2016	2448	Ambient Air	20-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120222	<b>REPORT CREATED:</b>	23-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120222-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17
16120222-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	05-Jan-17
16120222-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	05-Jan-17
16120222-001	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120222-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120222-001	1,2-Dichloroethane	I	0.04	ppbv	0.01	AC-058	05-Jan-17
16120222-001	1,2-Dichloropropane	I	0.03	ppbv	0.01	AC-058	05-Jan-17
16120222-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	1,3-Butadiene	I	0.03	ppbv	0.02	AC-058	05-Jan-17
16120222-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	05-Jan-17
16120222-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-001	1-Butene	I	0.08	ppbv	0.02	AC-058	05-Jan-17
16120222-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-001	2,2,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	05-Jan-17
16120222-001	2,2-Dimethylbutane	I	0.02	ppbv	0.01	AC-058	05-Jan-17
16120222-001	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-001	2,3-Dimethylbutane	I	0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	2,3-Dimethylpentane	I	0.03	ppbv	0.02	AC-058	05-Jan-17

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Monday, January 23, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 20, 2016	2448	Ambient Air	20-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120222	<b>REPORT CREATED:</b>	23-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120222-001	2,4-Dimethylpentane	I	0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-001	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-001	2-Methylhexane	I	0.03	ppbv	0.01	AC-058	05-Jan-17
16120222-001	2-Methylpentane	I	0.06	ppbv	0.01	AC-058	05-Jan-17
16120222-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	3-Methylhexane	I	0.03	ppbv	0.02	AC-058	05-Jan-17
16120222-001	3-Methylpentane	I	0.05	ppbv	0.01	AC-058	05-Jan-17
16120222-001	Acetone		1.2	ppbv	0.4	AC-058	05-Jan-17
16120222-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	05-Jan-17
16120222-001	Benzene	I	0.12	ppbv	0.01	AC-058	05-Jan-17
16120222-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-001	Carbon disulfide	I	0.07	ppbv	0.01	AC-058	05-Jan-17
16120222-001	Carbon tetrachloride	I	0.14	ppbv	0.01	AC-058	05-Jan-17
16120222-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	Chloroform	I	0.04	ppbv	0.02	AC-058	05-Jan-17
16120222-001	Chloromethane		0.72	ppbv	0.02	AC-058	05-Jan-17
16120222-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17
16120222-001	cis-2-Butene	I	0.03	ppbv	0.02	AC-058	05-Jan-17
16120222-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	Cyclohexane	I	0.04	ppbv	0.02	AC-058	05-Jan-17

<b>Report certified by:</b> Graham Knox, Team Lead	<b>On behalf of:</b> PJ Pretorius, Manager, Analysis and Testing Services
<b>Date:</b> Monday, January 23, 2017	<b>Inquiries:</b> (780) 632 8455 <b>E-mail:</b> EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 20, 2016	2448	Ambient Air	20-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120222	<b>REPORT CREATED:</b>	23-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120222-001	Cyclopentane	I	0.02	ppbv	0.01	AC-058	05-Jan-17
16120222-001	Dibromochloromethane	I	0.02	ppbv	0.01	AC-058	05-Jan-17
16120222-001	Ethanol		2.2	ppbv	0.3	AC-058	05-Jan-17
16120222-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-001	Ethylbenzene	I	0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-001	Freon-11		0.43	ppbv	0.02	AC-058	05-Jan-17
16120222-001	Freon-113	I	0.07	ppbv	0.01	AC-058	05-Jan-17
16120222-001	Freon-114	I	0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	Freon-12		0.89	ppbv	0.02	AC-058	05-Jan-17
16120222-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	05-Jan-17
16120222-001	Isobutane		0.59	ppbv	0.02	AC-058	05-Jan-17
16120222-001	Isopentane		0.39	ppbv	0.03	AC-058	05-Jan-17
16120222-001	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-001	m,p-Xylene	I	0.03	ppbv	0.03	AC-058	05-Jan-17
16120222-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17
16120222-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	05-Jan-17
16120222-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	05-Jan-17
16120222-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	05-Jan-17
16120222-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	05-Jan-17
16120222-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120222-001	Methylcyclohexane	I	0.06	ppbv	0.01	AC-058	05-Jan-17
16120222-001	Methylcyclopentane	I	0.07	ppbv	0.02	AC-058	05-Jan-17

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Monday, January 23, 2017

**Inquiries:** (780) 632 8455

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<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 20, 2016	2448	Ambient Air	20-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120222	<b>REPORT CREATED:</b>	23-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120222-001	Methylene chloride		0.3	ppbv	0.3	AC-058	05-Jan-17
16120222-001	n-Butane		1.19	ppbv	0.03	AC-058	05-Jan-17
16120222-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	05-Jan-17
16120222-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-001	n-Heptane	I	0.03	ppbv	0.01	AC-058	05-Jan-17
16120222-001	n-Hexane		0.57	ppbv	0.01	AC-058	05-Jan-17
16120222-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	n-Pentane	I	0.2	ppbv	0.1	AC-058	05-Jan-17
16120222-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	05-Jan-17
16120222-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	05-Jan-17
16120222-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	05-Jan-17
16120222-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-001	o-Xylene	I	0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17
16120222-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	05-Jan-17
16120222-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17
16120222-001	Tetrachloroethylene	I	0.06	ppbv	0.04	AC-058	05-Jan-17
16120222-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-001	Toluene	I	0.09	ppbv	0.01	AC-058	05-Jan-17
16120222-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17
16120222-001	trans-2-Butene	I	0.05	ppbv	0.01	AC-058	05-Jan-17
16120222-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17

<b>Report certified by:</b> Graham Knox, Team Lead	<b>On behalf of:</b> PJ Pretorius, Manager, Analysis and Testing Services
<b>Date:</b> Monday, January 23, 2017	<b>Inquiries:</b> (780) 632 8455 <b>E-mail:</b> EAS.Results@innotechalberta.ca



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**ENVIRONMENTAL ANALYTICAL SERVICES**

TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 20, 2016	2448	Ambient Air	20-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120222	<b>REPORT CREATED:</b>	23-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120222-001	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	05-Jan-17
16120222-001	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	05-Jan-17

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Monday, January 23, 2017

**Inquiries:** (780) 632 8455

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<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 26, 2016	14987	Ambient Air	26-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120231	<b>REPORT CREATED:</b>	18-Jan-17	<b>REPORT REVISED:</b> 23-Jan-17
			<b>VERSION:</b>	Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120231-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17
16120231-003	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	09-Jan-17
16120231-003	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	09-Jan-17
16120231-003	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	09-Jan-17
16120231-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	09-Jan-17
16120231-003	1,2-Dichloroethane	I	0.04	ppbv	0.01	AC-058	09-Jan-17
16120231-003	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	09-Jan-17
16120231-003	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-003	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-003	1-Butene	I	0.09	ppbv	0.02	AC-058	09-Jan-17
16120231-003	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	2,2,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	09-Jan-17
16120231-003	2,2-Dimethylbutane	I	0.02	ppbv	0.01	AC-058	09-Jan-17
16120231-003	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	2,3-Dimethylbutane	I	0.03	ppbv	0.02	AC-058	09-Jan-17
16120231-003	2,3-Dimethylpentane	I	0.03	ppbv	0.02	AC-058	09-Jan-17

<b>Report certified by:</b>	Graham Knox, Team Lead	<b>On behalf of:</b>	PJ Pretorius, Manager, Analysis and Testing Services	
<b>Date:</b>	January-23-17	<b>Inquiries:</b>	(780) 632 8455	<b>E-mail:</b> EAS.Results@innotechalberta.ca



<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 26, 2016	14987	Ambient Air	26-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120231	<b>REPORT CREATED:</b>	18-Jan-17	<b>REPORT REVISED:</b> 23-Jan-17
			<b>VERSION:</b>	Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120231-003	2,4-Dimethylpentane	I	0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	2-Methylheptane	I	0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	2-Methylhexane	I	0.04	ppbv	0.01	AC-058	09-Jan-17
16120231-003	2-Methylpentane	I	0.14	ppbv	0.01	AC-058	09-Jan-17
16120231-003	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	3-Methylhexane	I	0.04	ppbv	0.02	AC-058	09-Jan-17
16120231-003	3-Methylpentane	I	0.07	ppbv	0.01	AC-058	09-Jan-17
16120231-003	Acetone		1.6	ppbv	0.4	AC-058	09-Jan-17
16120231-003	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	09-Jan-17
16120231-003	Benzene	I	0.14	ppbv	0.01	AC-058	09-Jan-17
16120231-003	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	Carbon disulfide	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	Carbon tetrachloride	I	0.15	ppbv	0.01	AC-058	09-Jan-17
16120231-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	Chloroform	I	0.04	ppbv	0.02	AC-058	09-Jan-17
16120231-003	Chloromethane		0.97	ppbv	0.02	AC-058	09-Jan-17
16120231-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17
16120231-003	cis-2-Butene	I	0.05	ppbv	0.02	AC-058	09-Jan-17
16120231-003	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	Cyclohexane	I	0.05	ppbv	0.02	AC-058	09-Jan-17

<b>Report certified by:</b>	Graham Knox, Team Lead	<b>On behalf of:</b>	PJ Pretorius, Manager, Analysis and Testing Services	
<b>Date:</b>	January-23-17	<b>Inquiries:</b>	(780) 632 8455	<b>E-mail:</b> EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 26, 2016	14987	Ambient Air	26-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120231	<b>REPORT CREATED:</b>	18-Jan-17	<b>REPORT REVISED:</b> 23-Jan-17
			<b>VERSION:</b>	Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120231-003	Cyclopentane	I	0.03	ppbv	0.01	AC-058	09-Jan-17
16120231-003	Dibromochloromethane	I	0.02	ppbv	0.01	AC-058	09-Jan-17
16120231-003	Ethanol		1.1	ppbv	0.3	AC-058	09-Jan-17
16120231-003	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-003	Ethylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	Freon-11		0.45	ppbv	0.02	AC-058	09-Jan-17
16120231-003	Freon-113	I	0.07	ppbv	0.01	AC-058	09-Jan-17
16120231-003	Freon-114	I	0.04	ppbv	0.02	AC-058	09-Jan-17
16120231-003	Freon-12		1.09	ppbv	0.02	AC-058	09-Jan-17
16120231-003	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	09-Jan-17
16120231-003	Isobutane		1.31	ppbv	0.02	AC-058	09-Jan-17
16120231-003	Isopentane		0.71	ppbv	0.03	AC-058	09-Jan-17
16120231-003	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-003	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	m,p-Xylene	K, T, U	< 0.03	ppbv	0.03	AC-058	09-Jan-17
16120231-003	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17
16120231-003	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	09-Jan-17
16120231-003	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	09-Jan-17
16120231-003	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	09-Jan-17
16120231-003	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-003	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	09-Jan-17
16120231-003	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	09-Jan-17
16120231-003	Methylcyclohexane	I	0.08	ppbv	0.01	AC-058	09-Jan-17
16120231-003	Methylcyclopentane	I	0.07	ppbv	0.02	AC-058	09-Jan-17

<b>Report certified by:</b>	Graham Knox, Team Lead	<b>On behalf of:</b>	PJ Pretorius, Manager, Analysis and Testing Services	
<b>Date:</b>	January-23-17	<b>Inquiries:</b>	(780) 632 8455	<b>E-mail:</b> EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 26, 2016	14987	Ambient Air	26-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120231	<b>REPORT CREATED:</b>	18-Jan-17	<b>REPORT REVISED:</b> 23-Jan-17
				<b>VERSION:</b> Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120231-003	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	09-Jan-17
16120231-003	n-Butane		2.62	ppbv	0.03	AC-058	09-Jan-17
16120231-003	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	09-Jan-17
16120231-003	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-003	n-Heptane	I	0.05	ppbv	0.01	AC-058	09-Jan-17
16120231-003	n-Hexane		0.34	ppbv	0.01	AC-058	09-Jan-17
16120231-003	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	n-Pentane		0.5	ppbv	0.1	AC-058	09-Jan-17
16120231-003	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	09-Jan-17
16120231-003	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	09-Jan-17
16120231-003	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	09-Jan-17
16120231-003	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	o-Xylene	I	0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17
16120231-003	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	09-Jan-17
16120231-003	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17
16120231-003	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17
16120231-003	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-003	Toluene	I	0.07	ppbv	0.01	AC-058	09-Jan-17
16120231-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-003	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17
16120231-003	trans-2-Butene	I	0.06	ppbv	0.01	AC-058	09-Jan-17
16120231-003	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-003	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17

<b>Report certified by:</b>	Graham Knox, Team Lead	<b>On behalf of:</b>	PJ Pretorius, Manager, Analysis and Testing Services	
<b>Date:</b>	January-23-17	<b>Inquiries:</b>	(780) 632 8455	<b>E-mail:</b> EAS.Results@innotechalberta.ca



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**ENVIRONMENTAL ANALYTICAL SERVICES**

TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/CLS/Dec 26, 2016	14987	Ambient Air	26-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120231	<b>REPORT CREATED:</b>	18-Jan-17	<b>REPORT REVISED:</b> 23-Jan-17
				<b>VERSION:</b> Version 02

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120231-003	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	09-Jan-17
16120231-003	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	09-Jan-17

<b>Report certified by:</b> Graham Knox, Team Lead	<b>On behalf of:</b> PJ Pretorius, Manager, Analysis and Testing Services
<b>Date:</b> January-23-17	<b>Inquiries:</b> (780) 632 8455 <b>E-mail:</b> EAS.Results@innotechalberta.ca

***PAHS SAMPLES***

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/PUF/CLS/Dec 2, 2016	9102	Air Filter	02-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120042	<b>REPORT CREATED:</b>	03-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120042-004	1-Methylnaphthalene		0.10	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	2-Methylnaphthalene		0.16	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Acenaphthene		0.09	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Acenaphthylene		0.05	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Benzo(a)anthracene		0.03	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Benzo(a)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Benzo(b,j,k)fluoranthene		0.04	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Benzo(e)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Chrysene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Fluoranthene		0.05	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Fluorene		0.08	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Naphthalene		0.08	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Phenanthrene		0.17	ug/puf	0.01	NA-017	11-Dec-16

**Report certified by:** Rebecca Holgate, Account Coordinator

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

**Date:** January-03-17

**Inquiries:** (780) 632 8455

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# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/PUF/CLS/Dec 2, 2016	9102	Air Filter	02-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120042	<b>REPORT CREATED:</b>	03-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120042-004	Pyrene		0.08 ug/puf	0.01	NA-017	11-Dec-16
16120042-004	Retene		0.03 ug/puf	0.01	NA-017	11-Dec-16

**Report certified by:** Rebecca Holgate, Account Coordinator

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

**Date:** January-03-17

**Inquiries:** (780) 632 8455

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<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/PUF/CLS/ Dec 8, 2016	TE11	Air Filter	08-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-004	1-Methylnaphthalene		0.17	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	2-Methylnaphthalene		0.35	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	3-Methylcholanthrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Acenaphthene		0.04	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Acenaphthylene		0.03	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Acridine	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Anthracene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Benzo(a)anthracene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Benzo(a)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Benzo(b,j,k)fluoranthene		0.02	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Benzo(c)phenanthrene		0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Benzo(e)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Benzo(ghi)perylene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Chrysene		0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Dibenzo(a,i)pyrene		0.02	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Fluoranthene		0.04	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Fluorene		0.05	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Naphthalene		0.35	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Perylene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Phenanthrene		0.13	ug/PUF	0.01	NA-017	24-Dec-16

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Friday, January 13, 2017

**Inquiries:** (780) 632 8455

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# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<b>CLIENT SAMPLE ID</b> LICA/PUF/CLS/ Dec 8, 2016	<b>CANISTER ID</b> TE11	<b>Matrix</b> Air Filter	<b>DATE SAMPLED</b> 08-Dec-16 0:00	
<b>DESCRIPTION:</b> Cold Lake South	<b>REPORT NUMBER:</b> 16120122		<b>REPORT CREATED:</b> 13-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-004	Pyrene		0.02	ug/PUF	0.01	NA-017	24-Dec-16
16120122-004	Retene		0.04	ug/PUF	0.01	NA-017	24-Dec-16

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Friday, January 13, 2017

**Inquiries:** (780) 632 8455

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<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/PUF/CLS/Dec 14, 2016	TE-07	Air Filter	14-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-004	1-Methylnaphthalene		0.53	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	2-Methylnaphthalene		0.88	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	3-Methylcholanthrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Acenaphthene		0.08	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Acenaphthylene		0.05	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Acridine	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Anthracene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Benzo(a)anthracene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Benzo(a)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Benzo(b,j,k)fluoranthene		0.03	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Benzo(c)phenanthrene		0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Benzo(e)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Benzo(ghi)perylene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Chrysene		0.03	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Dibenzo(a,i)pyrene		0.02	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Fluoranthene		0.07	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Fluorene		0.17	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Naphthalene		0.84	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Perylene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Phenanthrene		0.24	ug/PUF	0.01	NA-017	24-Dec-16

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Thursday, January 19, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca



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 Vegreville, Alberta  
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 (780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
LICA/PUF/CLS/Dec 14, 2016	TE-07	Air Filter	14-Dec-16 0:00
<b>DESCRIPTION:</b>	Cold Lake South		
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120203-004	Pyrene		0.03 ug/PUF	0.01	NA-017	24-Dec-16
16120203-004	Retene		0.15 ug/PUF	0.01	NA-017	24-Dec-16

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Thursday, January 19, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/PUF/CLS/Dec 20, 2016	TE05	Air Filter	20-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120222	<b>REPORT CREATED:</b>	23-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120222-002	1-Methylnaphthalene		0.43	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	2-Methylnaphthalene		0.75	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Acenaphthene		0.06	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Acenaphthylene		0.04	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Acridine	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Anthracene		0.03	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Benzo(a)anthracene		0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Benzo(a)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Benzo(e)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Benzo(ghi)perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Chrysene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Fluoranthene		0.04	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Fluorene		0.09	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Naphthalene		0.62	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Phenanthrene		0.17	ug/Filter	0.01	NA-017	17-Jan-17

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Monday, January 23, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca



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# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/PUF/CLS/Dec 20, 2016	TE05	Air Filter	20-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120222	<b>REPORT CREATED:</b>	23-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120222-002	Pyrene		0.03	ug/Filter	0.01	NA-017	17-Jan-17
16120222-002	Retene		0.05	ug/Filter	0.01	NA-017	17-Jan-17

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Monday, January 23, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/PUF/CLS/Dec 26, 2016	TE-08	Air Filter	26-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120231	<b>REPORT CREATED:</b>	18-Jan-17	<b>REPORT REVISED:</b> 23-Jan-17
			<b>VERSION:</b>	Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120231-004	1-Methylnaphthalene		0.29	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	2-Methylnaphthalene		0.43	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	3-Methylcholanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Acenaphthene		0.05	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Acenaphthylene		0.03	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Acridine	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Anthracene		0.02	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Benzo(a)anthracene		0.02	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Benzo(a)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Benzo(e)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Benzo(ghi)perylene		0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Chrysene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Dibenzo(a,i)pyrene		0.04	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Fluoranthene		0.06	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Fluorene		0.09	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Naphthalene		0.55	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Phenanthrene		0.22	ug/Filter	0.01	NA-017	17-Jan-17

<b>Report certified by:</b>	Graham Knox, Team Lead	<b>On behalf of:</b>	PJ Pretorius, Manager, Analysis and Testing Services	
<b>Date:</b>	January-23-17	<b>Inquiries:</b>	(780) 632 8455	<b>E-mail:</b> EAS.Results@innotechalberta.ca



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# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/PUF/CLS/Dec 26, 2016	TE-08	Air Filter	26-Dec-16	0:00
<b>DESCRIPTION:</b>	Cold Lake South			
<b>REPORT NUMBER:</b>	16120231	<b>REPORT CREATED:</b>	18-Jan-17	<b>REPORT REVISED:</b> 23-Jan-17
			<b>VERSION:</b>	Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120231-004	Pyrene		0.04	ug/Filter	0.01	NA-017	17-Jan-17
16120231-004	Retene		0.08	ug/Filter	0.01	NA-017	17-Jan-17

**Report certified by:** Graham Knox, Team Lead

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

**Date:** January-23-17

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

***PARTISOL SAMPLES***





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**ENVIRONMENTAL ANALYTICAL SERVICES**

TEST REPORT

<p><b>RESULTS:</b> Adewunmi Adekanmbi          Lakeland Industry and Community Assn          4000, 19 St NE</p> <p>Calgary          AB T2E 6P8</p> <p><b>INVOICE:</b> Arianna Cook 780 812 2182          PO Box 8237          5107W-50 St          Bonnyville          AB T9N 2J5</p>	<p><b>CLIENT SAMPLE ID</b> P6193027</p> <p><b>CANISTER ID</b></p> <p><b>Matrix</b> Air Filter</p> <p><b>Priority</b> Normal</p> <p><b>DESCRIPTION:</b> Cold Lake South</p> <p><b>DATE SAMPLED:</b> 02-Dec-16 0:00</p> <p><b>REPORT CREATED:</b> 18-Jan-17</p> <p><b>DATE RECEIVED:</b> 07-Dec-16</p> <p><b>REPORT NUMBER:</b> 16120045</p> <p><b>VERSION:</b> Version 01</p>
---	--

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120045-001	Particulate Weight		0.195	mg	0.004	AC-029	09-Dec-16

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

**Date:** Wednesday, January 18, 2017      **Inquiries:** (780) 632 8455      **E-mail:** EAS.Results@innotechalberta.ca



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**ENVIRONMENTAL ANALYTICAL SERVICES**

TEST REPORT

<p><b>RESULTS:</b> Adewunmi Adekanmbi          Lakeland Industry and Community Assn          4000, 19 St NE</p> <p>Calgary          AB T2E 6P8</p> <p><b>INVOICE:</b> Arianna Cook 780 812 2182          PO Box 8237          5107W-50 St          Bonnyville          AB T9N 2J5</p>	<p><b>CLIENT SAMPLE ID</b>          LICA Filter # P6193026</p> <p><b>CANISTER ID</b></p> <p><b>Matrix</b>          Air Filter</p> <p><b>Priority</b>          Normal</p> <p><b>DESCRIPTION:</b> Cold Lake South</p> <p><b>DATE SAMPLED:</b> 08-Dec-16 0:00</p> <p><b>REPORT CREATED:</b> 23-Jan-17</p> <p><b>DATE RECEIVED:</b> 14-Dec-16</p> <p><b>REPORT NUMBER:</b> 16120121</p> <p><b>VERSION:</b> Version 01</p>
---	---

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120121-001	Particulate Weight		0.050	mg	0.004	AC-029	16-Dec-16

**Report certified by:** Graham Knox, Team Lead      **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

**Date:** Monday, January 23, 2017      **Inquiries:** (780) 632 8455      **E-mail:** EAS.Results@innotechalberta.ca



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**ENVIRONMENTAL ANALYTICAL SERVICES**

TEST REPORT

<p><b>RESULTS:</b> Adewunmi Adekanmbi          Lakeland Industry and Community Assn          4000, 19 St NE</p> <p>Calgary          AB T2E 6P8</p> <p><b>INVOICE:</b> Arianna Cook 780 812 2182          PO Box 8237          5107W-50 St          Bonnyville          AB T9N 2J5</p>	<p><b>CLIENT SAMPLE ID</b>          LICA Flter # P6193049</p> <p><b>CANISTER ID</b></p> <p><b>Matrix</b>          Air Filter</p> <p><b>Priority</b>          Normal</p> <p><b>DESCRIPTION:</b> Cold Lake South</p> <p><b>DATE SAMPLED:</b> 14-Dec-16 0:00</p> <p><b>REPORT CREATED:</b> 19-Jan-17</p> <p><b>DATE RECEIVED:</b> 21-Dec-16</p> <p><b>REPORT NUMBER:</b> 16120201</p> <p><b>VERSION:</b> Version 01</p>
---	--

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120201-001	Particulate Weight		0.091	mg	0.004	AC-029	29-Dec-16

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

**Date:** Thursday, January 19, 2017      **Inquiries:** (780) 632 8455      **E-mail:** EAS.Results@innotechalberta.ca



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 Canada T9C 1T4  
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# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<p><b>RESULTS:</b> Adewunmi Adekanmbi          Lakeland Industry and Community Assn          4000, 19 St NE</p> <p>Calgary          AB T2E 6P8</p> <p><b>INVOICE:</b> Arianna Cook 780 812 2182          PO Box 8237          5107W-50 St          Bonnyville          AB T9N 2J5</p>	<p><b>CLIENT SAMPLE ID</b>          Flt # P6193025</p> <p><b>CANISTER ID</b></p> <p><b>Matrix</b>          Air Filter</p> <p><b>Priority</b>          Normal</p> <p><b>DESCRIPTION:</b> Cold Lake South</p> <p><b>DATE SAMPLED:</b> 20-Dec-16 0:00</p> <p><b>REPORT CREATED:</b> 18-Jan-17</p> <p><b>DATE RECEIVED:</b> 23-Dec-16</p> <p><b>REPORT NUMBER:</b> 16120221</p> <p><b>VERSION:</b> Version 01</p>
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Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120221-001	Particulate Weight		0.070	mg	0.004	AC-029	29-Dec-16

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

**Date:** Wednesday, January 18, 2017      **Inquiries:** (780) 632 8455      **E-mail:** EAS.Results@innotechalberta.ca



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**ENVIRONMENTAL ANALYTICAL SERVICES**

TEST REPORT

<p><b>RESULTS:</b> Adewunmi Adekanmbi          Lakeland Industry and Community Assn          4000, 19 St NE</p> <p>Calgary          AB T2E 6P8</p> <p><b>INVOICE:</b> Arianna Cook 780 812 2182          PO Box 8237          5107W-50 St          Bonnyville          AB T9N 2J5</p>	<p><b>CLIENT SAMPLE ID</b>          Filter # P6129414</p> <p><b>CANISTER ID</b></p> <p><b>Matrix</b>          Air Filter</p> <p><b>Priority</b>          Normal</p> <p><b>DESCRIPTION:</b> Cold Lake South</p> <p><b>DATE SAMPLED:</b> 26-Dec-16 0:00</p> <p><b>REPORT CREATED:</b> 23-Jan-17</p> <p><b>DATE RECEIVED:</b> 29-Dec-16</p> <p><b>REPORT NUMBER:</b> 16120230</p> <p><b>VERSION:</b> Version 01</p>
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Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120230-001	Particulate Weight		0.096	mg	0.004	AC-029	06-Jan-17

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

**Date:** Monday, January 23, 2017      **Inquiries:** (780) 632 8455      **E-mail:** EAS.Results@innotechalberta.ca

***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 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>
Kim Wilson	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.

*Kim Wilson*

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

06-02-2017  
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>0-2016-12-0-C</u>
<b>Site:</b> <u>Cold Lake Continuous Monitoring Station</u>	<b>Contact:</b> <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u>Kim Wilson</u>	Date <u>22-Jan-17</u>
Level 1 Primary Validation	<u>Kim Wilson</u>	Date <u>22-Jan-17</u>
Level 2 Final Validation	<u>Kim Wilson</u>	Date <u>30-Jan-17</u>
Level 3 Independent Data Review	<u>Chris Smith</u>	Date <u>06-Feb-17</u>
Post-Final Validation	<u>NA</u>	Date <u>NA</u>

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



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

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

**JOB #: 2833-2016-12-30-C**

**December 2016**

Prepared for:

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

**Attention: MIKE BISAGA**

DATE: **January 30, 2017**

Prepared by:

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

---

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

Reviewed by:

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

---

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

## **SUMMARY**

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

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

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

**H<sub>2</sub>S:** Thirteen hours of downtime were recorded this month. Seven hours were attributed to additional quality checks performed to address a span drift occurrence. The other six hours were recorded due to an analyzer replacement event that occurred on December 14.

**THC/CH<sub>4</sub>/NMHC:** Seven hours of downtime were recorded on December 20 due to an analyzer flame-out event.

**Wind Data:** One hour of data collected on December 17 at hour 02:00 was invalidated as the data was anomalous.

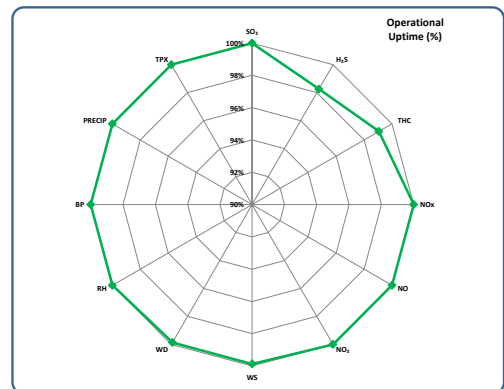
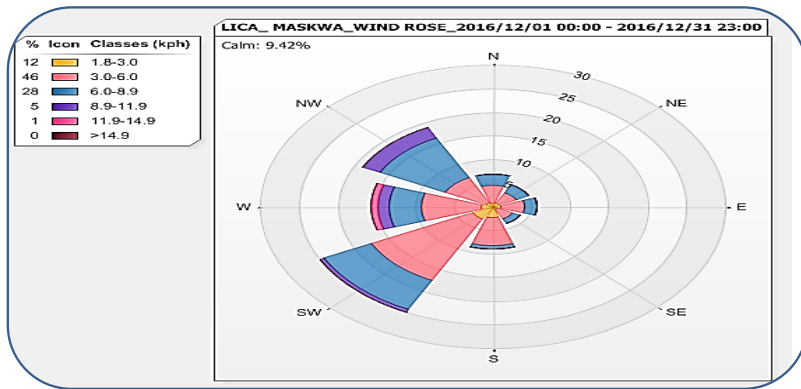
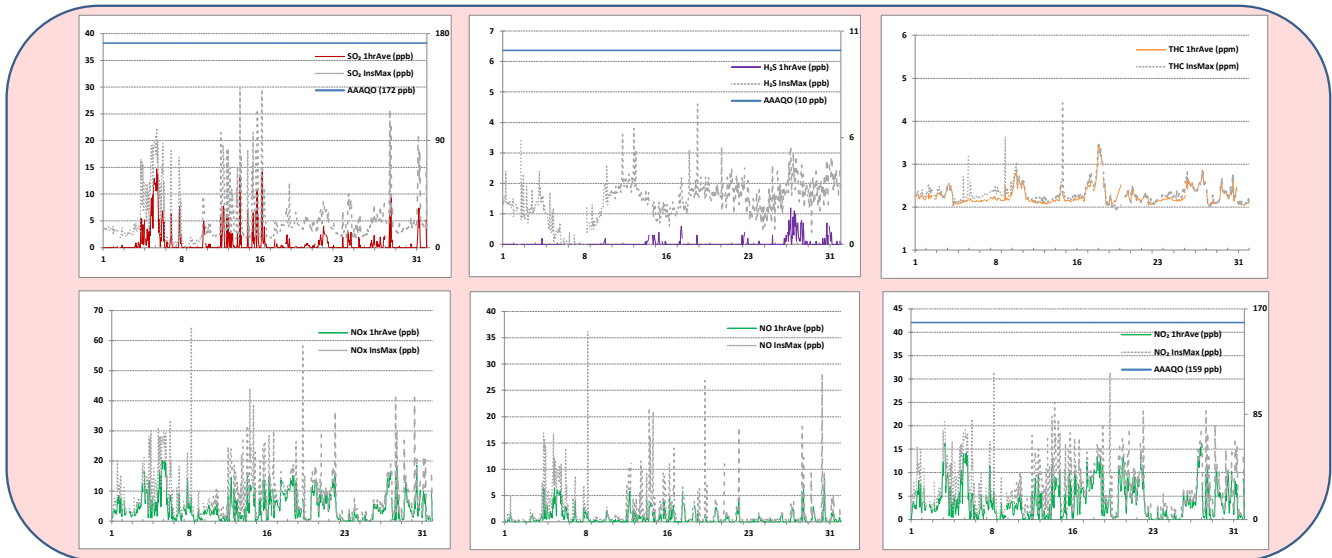
The summary of results is presented on the following pages.

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.

December 2016 Monthly Report Summary

Pollutants		Monthly Records		1-Hour Records					24-Hour Records			
Name	Unit	Avg. Conc.	Uptime	Maximum			AAAQO Objective	Exceed. Hours	Maximum		AAAQO Objective	Exceed. Days
				Conc.	Date	Hour			Conc.	Date		
SO <sub>2</sub>	ppb	1.0	100.0%	14.7	December 6	3	172	0	5.8	December 6	48	0
H <sub>2</sub> S	ppb	0.0	98.3%	1.2	December 27	9	10	0	0.5	December 27	3	0
THC	ppm	2.26	99.1%	3.45	December 18	0	-	-	2.67	December 18	-	-
NO <sub>x</sub>	ppb	4.6	100.0%	20.3	December 6	3	-	-	9.3	December 18	-	-
NO	ppb	0.7	100.0%	8.3	December 30	11	-	-	3.0	December 5	-	-
NO <sub>2</sub>	ppb	3.9	100.0%	16.4	December 27	23	159	0	8.4	December 18	-	-
WS	kph	2.0	99.9%	14.8	December 19	18	-	-	8.3	December 5	-	-
WD	degree	272 (W)	99.9%	-	-	-	-	-	-	-	-	-
RH	%	71	100.0%	89	December 19, 19	4, 5	-	-	86	December 2, 3	-	-
BP	mbar	939	100.0%	965	December 7, 8	23, VAR	-	-	964	December 8	-	-
PRECIP	mm	0.0	100.0%	0.3	VAR	VAR	-	-	0.1	December 25	-	-
AmbTPX	°C	-14.4	100.0%	2.9	December 19	13	-	-	-0.9	December 22	-	-



**Monthly Update**

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

**Operational Issues**

- H<sub>2</sub>S:** Thirteen hours of downtime were recorded this month. Seven hours were attributed to additional quality checks performed to address a span drift occurrence. The other six hours were recorded due to an analyzer replacement event that occurred on December 14.
- THC/CH4/NMHC:** Seven hours of downtime were recorded on December 20 due to an analyzer flame-out event.
- Wind Data:** One hour of data collected on December 17 at hour 02:00 was invalidated as the data was considered anomalous.

### Monthly Continuous Data Summary

Lakeland Industry & Community Association Maskwa Continuous Monitoring Station						MAXIMUM VALUES							OPERATIONAL TIME (%)
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	1-HOUR			24-HOUR		
	1-hr	24-hr	1-hr	24-hr				HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
SO <sub>2</sub> (ppb)	172	48	0	0	1.0	14.7	6	3	7.6	NW	5.8	6	100.0
H <sub>2</sub> S (ppb)	10	3	0	0	0.0	1.2	27	9	2.9	SSW	0.5	27	98.3
THC (ppm)	-	-	-	-	2.26	3.45	18	0	4.6	SSW	2.67	18	99.1
NO <sub>2</sub> (ppb)	159	-	0	-	3.9	16.4	27	23	7.8	SSW	8.4	18	100.0
NO (ppb)	-	-	-	-	0.7	8.3	30	11	6.3	SSW	3.0	5	100.0
NO <sub>x</sub> (ppb)	-	-	-	-	4.6	20.3	6	3	7.6	NW	9.3	18	100.0
RELATIVE HUMIDITY (%)	-	-	-	-	71	89	19, 19	4, 5	8.4 7.9	SSW SW	86	2, 3	100.0
BAROMETRIC PRESSURE (millibar)	-	-	-	-	939	965	7, 8	23, VAR	2.0 VAR	NNW VAR	964	8	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	-14.4	2.9	19	13	8.7	W	-0.9	22	100.0
PRECIPITATION (mm)	-	-	-	-	0.0	0.3	VAR	VAR	VAR	VAR	0.1	25	100.0
VECTOR WS (kph)	-	-	-	-	2.0	14.8	19	18	-	WNW	8.3	5	99.9
VECTOR WD (sec)	-	-	-	-	272 (W)	-	-	-	-	-	-	-	99.9

VAR-VARIOUS

---

## 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.

### 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).

Sample filters for all continuous air monitors are changed before the calibration begins. The sample manifold is cleaned during the site visit each month.

Control checks, consisting of a zero and span, are conducted daily on all continuous air monitors. In place of the air sample, zero air (from scrubbed air or gas cylinders) is used for zero checks, and a known concentration of the pollutant being analyzed is used for span checks. These checks are controlled by automatic timers and valves. The total zero span cycle is completed within an hour, the commencement of the zero span cycle is at the beginning of the hour.

Multipoint calibrations are done a minimum of once a month for each continuous air monitor. An additional calibration is required under the following conditions: 1) within three days after the initial start-up and stabilization of a newly installed instrument, 2) prior to shut-down or moving of an instrument which has been working to specification, and 3) when major repair has been done on the instrument.

Time during the first multi-point calibration is not considered downtime (Data is flagged as C). If more than one calibration is performed during the month, the time during the additional calibration is considered as downtime (Data is flagged as C1).

Only one zero/span check is run per day. Time during the zero/span check is not considered as downtime (Data is flagged as S). If an extra zero/span check is performed, the time during the additional check is considered as downtime (Data is flagged as S1).

The AMD requires each instrument and accompanying data recording system to be operational 90% of the time, at a minimum, for each monthly monitoring period.

All sampling, analysis, and QA/QC for this project was performed by Maxxam Analytics and complies with the Alberta Air Monitoring Directive.

Data contained in this monthly report has undergone the verification and validation based on the requirements of the AMD Chapter 6: [Ambient Data Quality \(August 3, 2016\)](#). The descriptions of the data verification and validation process can be found in Section 5 of this report. Instantaneous data, where applicable, is provided for reference purposes and has not undergone zero correction.



Hourly/minute data have been reviewed based on daily zero/span results and multi-point calibration results. Data may be considered invalid if a zero-corrected span check in excess of +/- 10% of the span concentration (established by the previous multi-point calibration) is encountered and/or significant differences in the calibration factor occurs (greater than 10%).

Trailer inspection was conducted on December 2. No issues were identified.

### **SULPHUR DIOXIDE (SO<sub>2</sub>)**

The routine monthly calibration was performed on December 2. No operational issues were identified this month.

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

The routine monthly calibration was performed on December 2. The analyzer exhibited a biased high span response on December 6. An additional span check was performed on December 7 and the result exceeded the upper acceptance limit. As a corrective action, a full repeat calibration was completed on December 8. The results met AMD, 2016 requirements. Seven hours of downtime were recorded due to this event.

Following a shut-down calibration on the Maxxam-supplied API 101E S/N: 722 analyzer, the LICA-owned analyzer, API 101E S/N: 511, was reinstalled onsite on December 14 after it had been earlier removed for maintenance. An installation calibration was completed afterwards. Six hours of downtime were recorded due to this replacement event.

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

The routine monthly calibration was performed on December 2. Seven hours of data collected on December 20 from hour 03:00 to hour 09:00 were invalidated due to an analyzer flame-out event. A successful zero/span check was performed after analyzer functionality was restored.

### **NITROGEN DIOXIDE (NO<sub>2</sub>)**

The routine monthly calibration was performed on December 2. No operational issues were identified this month.

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

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

One hour of data collected on December 17 at hour 02:00 and nine hours of maximum instantaneous data collected about the same period, were invalidated as the data were considered anomalous. This is likely due to low ambient temperatures.

### **RELATIVE HUMIDITY (RH)**

No operational issues were identified this month.

**BAROMETRIC PRESSURE (BP)**

No operational issues were identified this month

**PRECIPITATION (PRECIP)**

No operational issues were identified this month.

**AMBIENT TEMPERATURE (AmbTPX)**

No operational issues were identified this month.

## **2.0 Project Personnel**

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

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

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

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

## **4.0 Calculations and Results**

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

## 5.0 Methods and Procedures

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

- Maxxam AIR SOP-00208: RM Young Wind Monitor Calibration
- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO<sub>2</sub>/NO<sub>x</sub> Monitoring
- Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring
- Maxxam AIR SOP-00242: Precipitation Collector Installation/Maintenance

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

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

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

**Level 0 Preliminary Verification**

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

**Level 1 Primary Validation**

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

**Level 2 Final Validation**

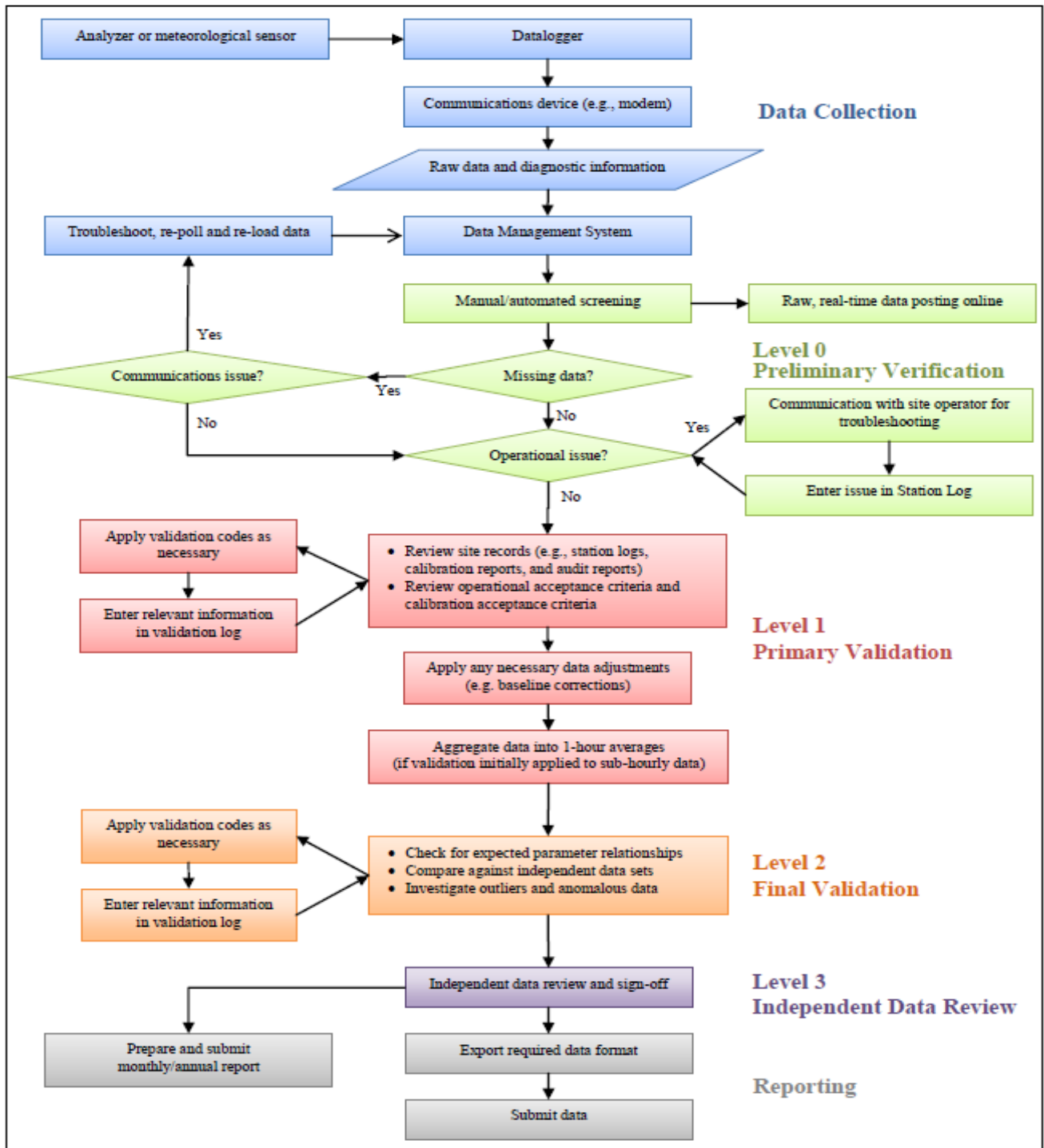
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

**Level 3 Independent Data Review**

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

**Post-Final Validation**

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



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

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

***SULPHUR DIOXIDE***



**SULPHUR DIOXIDE Hourly Averages (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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	
2	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.2	C	C	C	C	C	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
3	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	S	0.1	0.9	0.0	0.0	0.1	0.0	0.6	1.0	0.7	0.0	0.0	0.0	5.4	3.5	5.4	0.7	2.0	4.3	0.5	0.6	1.9	5.2	0.0	0.0	5.4	1.4	24									
5	S	1.7	0.5	0.4	1.8	3.5	1.3	3.0	2.0	0.0	2.9	4.1	2.2	5.5	9.3	7.2	5.9	9.8	3.6	10.6	12.5	13.0	11.8	S	0.0	0.0	13.0	5.1	24									
6	12.1	10.6	12.0	14.7	10.8	13.7	9.9	2.8	5.3	2.0	2.1	0.1	2.8	1.2	4.5	6.4	6.4	6.9	3.5	1.2	4.7	0.0	S	0.0	0.0	0.0	14.7	5.8	24									
7	0.1	0.2	1.1	0.3	0.0	0.0	0.0	0.0	0.0	0.5	1.0	1.8	6.4	0.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	S	0.1	0.0	0.0	0.0	6.4	0.6	24									
8	0.0	0.0	0.0	0.0	0.0	0.0	4.6	7.6	5.8	0.8	2.4	0.9	0.3	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	7.6	1.0	24									
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	24									
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	4.8	4.9	3.4	2.4	S	0.8	0.4	0.0	0.1	0.2	0.0	0.0	4.9	0.8	24										
11	0.0	0.0	0.6	0.5	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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.1	24									
12	0.0	0.0	0.0	0.0	0.0	0.3	6.0	0.0	0.3	1.9	3.6	7.2	7.8	7.3	1.7	0.0	S	0.0	0.0	2.5	6.2	0.0	2.4	5.6	0.0	7.8	2.3	24										
13	1.7	0.2	0.1	2.9	0.4	0.0	0.0	2.6	1.3	2.7	0.4	0.4	0.1	0.3	0.0	S	0.0	0.0	0.1	0.2	2.7	0.1	0.0	0.0	0.0	2.9	0.7	24										
14	0.0	0.8	13.6	0.6	1.8	2.2	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	0.7	7.0	0.0	0.0	0.0	0.0	13.6	1.2	24										
15	0.0	0.0	0.0	0.0	0.0	0.0	2.9	1.3	6.5	0.8	2.2	0.0	0.0	S	6.9	1.6	0.0	10.8	3.9	5.7	1.5	0.8	0.0	0.0	0.0	10.8	2.0	24										
16	0.0	0.0	0.0	1.8	10.3	14.2	1.7	1.1	0.8	1.2	3.9	0.2	S	0.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.2	1.6	24										
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.5	S	0.2	0.2	0.7	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.1	24									
18	0.0	0.4	0.5	0.2	0.0	0.0	0.2	0.0	0.0	0.0	S	0.9	0.7	1.5	2.4	1.1	0.0	0.0	0.0	1.7	1.0	0.0	0.0	0.0	0.0	2.4	0.5	24										
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24									
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	S	0.4	0.4	0.8	0.5	0.8	0.5	0.5	0.3	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.2	24									
21	0.0	0.2	0.4	0.0	0.0	0.0	0.7	S	0.0	0.0	0.0	0.1	0.0	0.0	0.8	1.4	0.6	0.5	1.5	2.4	1.8	1.4	0.4	0.8	0.0	2.4	0.6	24										
22	1.3	2.8	4.0	3.1	2.5	S	2.4	2.2	2.1	1.9	1.0	0.8	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	1.2	24										
23	0.0	0.4	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	2.0	0.1	24										
24	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	3.0	2.0	1.0	1.3	0.4	0.6	2.0	2.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.6	24										
25	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	1.2	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.2	24										
26	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	0.7	0.5	1.4	0.7	0.0	0.0	0.6	0.7	2.3	0.8	0.0	2.3	0.3	24										
27	0.4	S	0.0	0.3	1.1	1.2	0.3	0.2	0.6	0.2	0.2	0.3	2.0	1.1	0.1	0.0	0.0	0.0	0.0	0.2	1.7	2.0	1.5	2.2	0.0	2.2	0.7	24										
28	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	6.5	0.0	8.1	9.4	2.2	1.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	9.4	1.4	24										
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.3	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	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.7	0.0	24										
31	0.0	0.5	2.2	4.6	5.2	7.4	3.7	5.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	5.2	1.6	0.0	0.0	7.4	1.6	24										
HOURLY MAX	12.1	10.6	13.6	14.7	10.8	14.2	9.9	7.6	6.5	2.7	6.5	7.2	8.1	9.4	9.3	7.2	6.4	10.8	3.9	10.6	12.5	13.0	11.8	5.6														
HOURLY AVG	0.5	0.6	1.2	1.0	1.2	1.5	1.0	0.9	0.9	0.5	1.1	0.8	1.2	1.1	1.4	1.0	0.9	1.2	0.5	1.0	1.4	0.8	0.8	0.5														

**STATUS FLAG CODES**

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

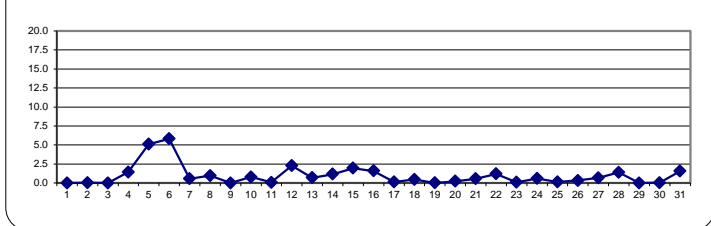
**OBJECTIVE LIMIT:**

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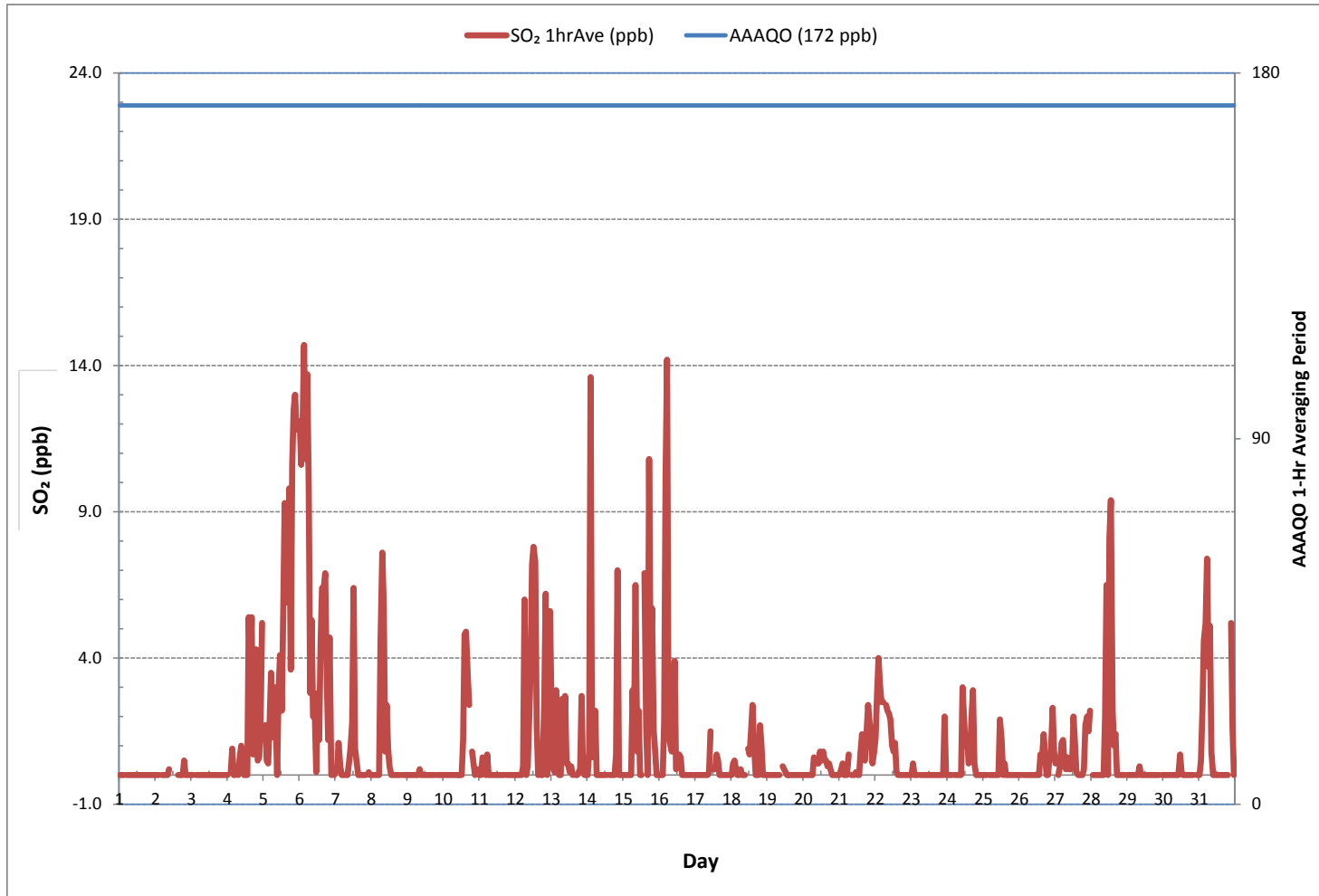
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF 24-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	269			
MINIMUM 1-HR AVERAGE:	0.0 ppb @ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	14.7 ppb @ HOUR(S)	3	ON DAY(S)	6
MAXIMUM 24-HR AVERAGE:	5.8 ppb		ON DAY(S)	6
			VAR-VARIOUS	
IZS CALIBRATION TIME:	33 hrs	OPERATIONAL TIME:	744 hrs	
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	2.3	MONTHLY AVERAGE:	1.0 ppb	

**24 HR AVERAGES December 2016**



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





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

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	3.3	3.2	3.2	4.0	S	3.5	3.3	3.2	3.7	3.7	3.7	3.8	3.9	3.7	3.2	3.2	3.5	3.6	3.7	3.5	3.4	3.4	4.0	3.7	3.2	4.0	3.5	24
2	3.6	3.0	3.0	S	3.3	3.3	3.1	3.0	3.0	3.5	C	C	C	C	C	1.9	2.0	2.4	3.2	3.7	2.6	2.3	2.4	2.4	1.9	3.7	2.9	24
3	2.4	2.7	S	2.2	2.2	2.2	2.5	2.4	2.9	2.5	2.4	2.6	3.0	3.3	3.0	2.5	2.4	2.5	2.4	2.4	2.4	3.0	3.4	4.5	2.2	4.5	2.7	24
4	3.2	S	3.8	4.6	3.2	3.0	3.6	3.7	4.2	4.2	4.0	3.2	3.0	3.0	16.5	12.6	16.3	7.8	9.5	15.7	6.7	6.9	12.7	12.7	3.0	16.5	7.1	24
5	S	11.7	7.0	4.8	10.6	11.9	6.9	10.4	9.1	3.0	12.3	11.8	10.5	13.0	19.1	16.5	16.5	19.2	11.2	16.7	18.7	18.6	20.1	S	3.0	20.1	12.7	24
6	20.7	17.1	21.5	22.3	15.7	20.1	18.5	9.4	12.8	9.3	10.6	1.8	11.9	5.2	13.1	15.3	13.8	19.5	9.6	6.7	12.4	1.7	S	1.3	1.3	22.3	12.6	24
7	1.3	1.7	2.2	1.6	0.8	0.7	0.8	0.7	1.0	1.5	2.1	15.1	18.1	2.4	2.6	0.8	0.4	0.6	1.0	0.5	0.5	S	1.1	1.1	0.4	18.1	2.5	24
8	0.5	0.8	1.0	0.8	0.9	1.2	16.9	14.0	13.4	1.9	9.0	4.0	1.8	0.8	0.8	0.8	0.7	0.4	0.2	0.2	S	0.2	0.2	0.2	0.2	16.9	3.1	24
9	0.2	0.0	0.0	0.1	0.2	0.4	0.9	1.2	1.8	1.9	1.3	0.9	1.6	1.4	1.0	0.5	0.8	0.5	0.7	S	0.8	1.0	1.3	1.4	0.0	1.9	0.9	24
10	1.4	1.2	1.2	1.1	1.4	1.4	1.6	1.8	1.7	1.9	2.2	2.5	2.2	9.5	9.2	8.0	6.6	5.6	S	3.9	3.3	2.7	3.5	3.5	1.1	9.5	3.4	24
11	2.7	3.6	4.5	4.0	2.4	4.8	3.6	2.4	2.4	2.2	2.2	2.2	2.2	2.5	2.1	2.1	S	2.1	2.3	2.4	2.4	2.5	2.4	2.1	4.8	2.7	24	
12	2.4	2.4	2.4	2.6	2.4	7.9	21.5	2.5	6.2	8.4	9.8	19.2	18.2	14.3	10.7	2.9	S	2.1	3.0	13.8	18.5	3.5	12.6	18.5	2.1	21.5	8.9	24
13	8.9	3.9	3.4	15.0	9.7	2.5	2.4	11.0	9.1	10.0	6.0	7.3	3.2	3.2	2.9	S	1.7	1.8	11.1	7.8	15.2	3.5	1.9	1.6	1.6	15.2	6.2	24
14	1.6	9.8	30.0	10.2	17.3	12.7	3.5	3.8	3.2	2.0	2.5	2.5	2.3	2.6	S	1.9	1.9	2.0	2.0	11.2	18.3	2.0	2.2	4.2	1.6	30.0	6.5	24
15	2.0	2.0	2.4	2.0	2.2	2.6	15.2	8.9	21.6	9.4	10.0	3.3	2.1	S	18.1	9.7	2.4	23.8	25.8	21.8	11.1	5.2	2.1	1.8	1.8	25.8	8.9	24
16	2.1	1.9	1.8	16.8	29.6	27.2	11.6	4.8	7.8	7.8	11.2	5.6	S	4.8	3.5	2.3	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.8	29.6	6.7	24
17	1.8	1.9	2.1	2.0	2.2	2.2	2.4	2.2	2.5	3.0	4.9	S	3.2	3.2	4.8	4.8	2.7	2.7	2.8	2.7	3.0	3.0	3.0	3.2	1.8	4.9	2.9	24
18	3.7	4.3	4.3	4.1	3.9	3.8	4.3	3.8	3.8	3.7	S	6.6	5.9	7.5	6.9	6.5	3.9	3.9	3.9	12.1	7.6	5.5	3.7	3.7	3.7	12.1	5.1	24
19	3.9	3.8	3.8	3.8	3.9	4.4	4.5	4.5	4.8	S	6.6	5.6	5.6	4.5	4.6	4.3	4.3	4.2	4.0	3.8	3.7	3.8	3.8	3.8	3.7	6.6	4.3	24
20	3.5	3.6	3.7	3.4	3.5	3.4	4.8	5.1	S	5.6	4.8	5.6	5.6	5.1	5.1	4.6	4.6	4.7	4.3	4.0	3.7	4.3	3.7	3.3	3.3	5.6	4.3	24
21	3.0	5.2	4.8	4.6	4.3	5.1	4.6	S	3.1	3.2	4.0	5.0	3.3	4.3	5.5	5.8	6.0	5.0	6.7	6.7	7.3	7.3	4.5	5.2	3.0	7.3	5.0	24
22	6.0	8.7	8.7	8.7	7.0	7.3	S	6.9	6.7	7.2	6.5	5.7	5.1	6.5	4.3	4.1	4.1	4.1	3.8	3.8	3.7	3.6	3.5	3.5	3.5	8.7	5.6	24
23	4.1	4.6	3.5	3.1	3.2	S	2.7	2.7	2.8	2.7	2.5	2.6	2.4	2.4	2.5	2.6	2.3	2.3	2.1	2.4	2.2	4.5	6.8	3.2	2.1	6.8	3.1	24
24	2.8	3.2	3.0	2.8	S	4.3	1.8	1.8	1.8	1.8	9.5	10.0	7.6	9.0	7.2	8.3	8.1	8.9	7.8	3.9	2.4	2.2	2.0	1.9	1.8	10.0	4.9	24
25	3.7	2.0	2.2	S	1.8	4.7	2.9	4.5	2.4	2.9	5.5	5.9	6.0	2.7	6.2	2.7	2.2	2.2	2.1	2.1	2.2	2.2	2.3	2.2	1.8	6.2	3.2	24
26	2.4	2.4	S	2.4	2.6	2.4	3.6	3.2	3.0	3.4	3.3	3.2	3.9	3.9	5.1	4.8	5.9	5.6	4.2	4.5	5.4	5.6	8.1	5.6	2.4	8.1	4.1	24
27	5.1	S	4.8	5.6	5.9	6.4	5.1	5.0	5.4	5.0	5.1	5.8	7.7	7.0	5.1	4.8	4.8	4.8	4.8	6.2	7.1	7.8	8.5	8.2	4.8	8.5	5.9	24
28	S	5.1	4.6	4.5	4.3	4.5	4.2	4.3	4.7	7.3	25.8	5.8	17.5	23.2	7.6	6.7	7.2	3.7	3.7	3.5	3.3	3.4	3.2	S	3.2	25.8	7.2	24
29	3.1	3.0	3.1	2.8	2.8	2.7	3.9	3.7	4.5	4.0	3.6	3.7	3.3	3.0	3.0	3.0	3.2	3.6	3.4	3.5	3.6	3.6	S	3.6	2.7	4.5	3.4	24
30	3.6	3.6	3.5	3.6	3.7	3.7	4.0	3.6	3.8	4.3	5.1	5.7	5.2	3.7	4.2	4.0	3.8	4.8	4.6	5.8	5.2	S	4.2	4.4	3.5	5.8	4.3	24
31	4.3	6.4	11.9	19.2	20.7	14.9	12.5	18.2	10.8	4.1	4.3	4.5	4.3	4.5	4.3	4.3	4.0	3.8	3.7	3.6	S	14.1	11.7	3.7	3.6	20.7	8.4	24
HOURLY MAX	20.7	17.1	30.0	22.3	29.6	27.2	21.5	18.2	21.6	10.0	25.8	19.2	18.2	23.2	19.1	16.5	16.5	23.8	25.8	21.8	18.7	18.6	20.1	18.5				
HOURLY AVG	3.7	4.2	5.2	5.6	5.9	5.8	5.9	5.1	5.5	4.4	6.2	5.6	5.9	5.5	6.3	5.1	4.7	5.3	5.0	6.0	6.2	4.5	4.9	4.0				

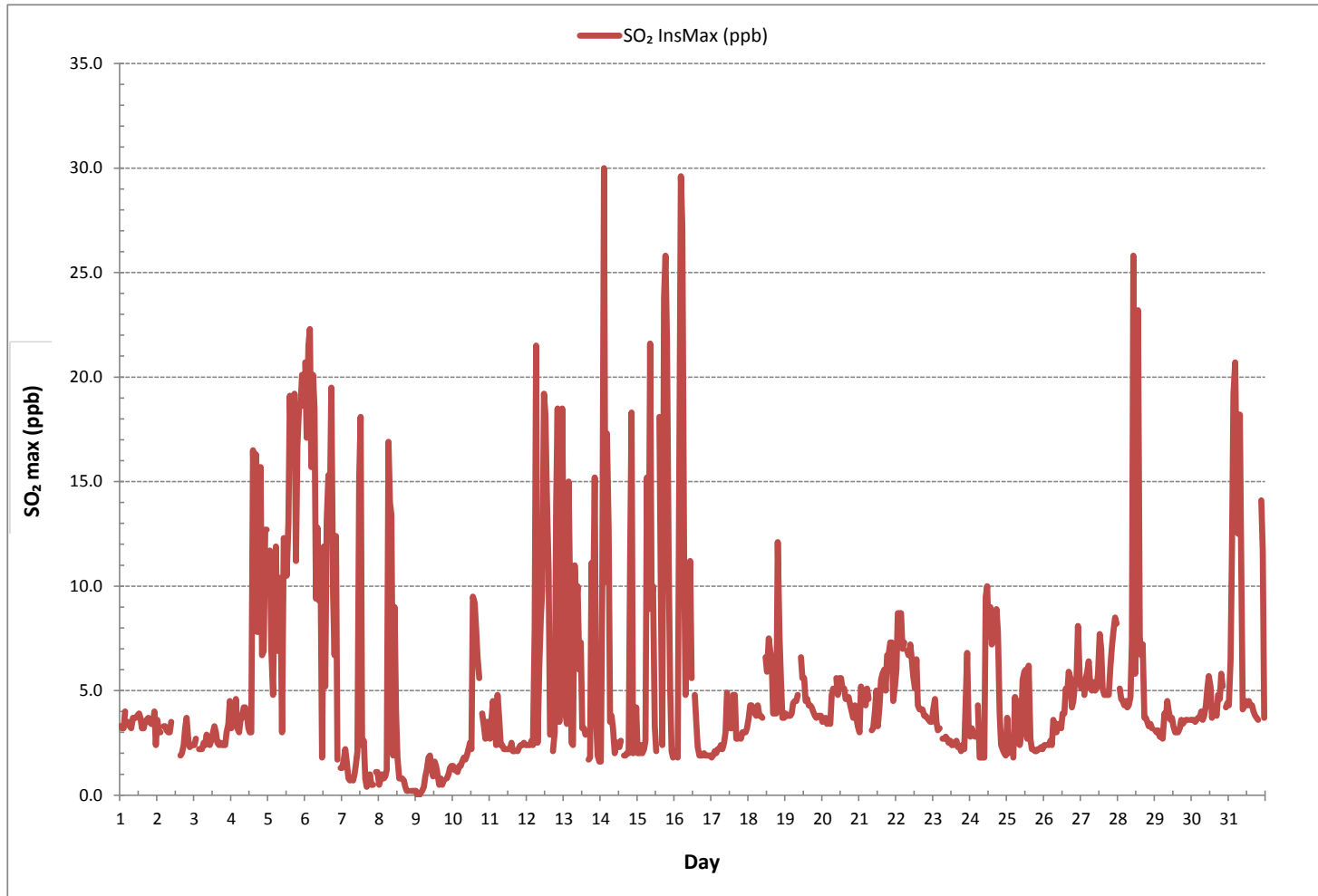
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	704
MAXIMUM INSTANTANEOUS VALUE:	30.0 ppb @ HOUR(S) 2 ON DAY(S) 14
VAR-VARIOUS	
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	4.8
OPERATIONAL TIME:	744 hrs

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

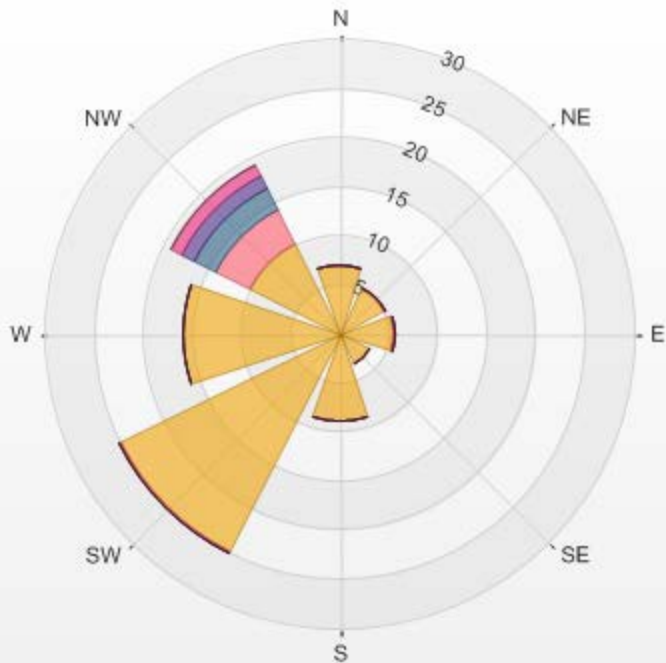


Wind: LICA MASKWA Poll.: LICA MASKWA-SO2[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 9.36% Valid Data: 94.76% Calm Avg: 0.19 [ppb]

Direction	0.0-3.0	3.0-5.9	5.9-8.9	8.9-11.8	11.8-14.8	>14.8	Total
N	6.95	0	0	0	0	0	6.95
NE	5.11	0.14	0	0	0	0	5.25
E	5.53	0.14	0	0	0	0	5.67
SE	3.55	0	0	0	0	0	3.55
S	8.94	0	0	0	0	0	8.94
SW	24.82	0.28	0	0	0	0	25.1
W	16.03	0	0	0	0	0	16.03
NW	10.35	3.83	2.41	1.42	1.13	0	19.14
Summary	81.28	4.39	2.41	1.42	1.13	0	90.63

% Icon	Classes (ppb)	81		0.0-3.0	4		3.0-5.9	2		5.9-8.9	1		8.9-11.8	1		11.8-14.8	0		>14.8
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LICA MASKWA Poll.: LICA MASKWA-SO<sub>2</sub>[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 9.36% Calm Poll  
Avg: 0.19[ppb]



SO2[ppb] Calibration: LICA MASKWA Monthly: 2016/12 Type: Span



Span Meas Span Ref Span Low Span High

***HYDROGEN SULPHIDE***





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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C	C	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
3	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
4	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	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	24
5	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	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	S1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	23
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C1	C1	C1	C1	C1	C1	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	18
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
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	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
14	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.3	C1	C1	C1	C1	C1	C1	0.3	0.0	0.0	0.0	0.3	0.2	0.2	0.1	0.0	0.3	0.1	18
15	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.1	0.0	0.0	0.0	0.0	S	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
17	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.4	0.6	0.5	0.2	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	24
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	24
23	0.0	0.0	0.3	0.3	0.4	S	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	24
24	0.0	0.0	0.0	0.0	S	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	0.1	0.0	0.0	24
25	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24
26	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.1	0.3	0.0	0.3	0.0	24	
27	0.1	S	0.4	0.3	0.1	0.8	0.3	0.5	0.5	1.2	0.1	0.0	0.3	0.2	0.9	0.6	0.3	1.1	0.6	0.6	1.0	0.2	0.1	0.7	0.0	1.2	0.5	24	
28	S	0.7	0.3	0.2	0.1	0.2	0.1	0.7	0.7	0.8	0.4	0.0	0.4	0.7	0.3	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	S	0.0	0.8	0.3	24	
29	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	S	0.0	0.0	0.1	0.0	24	
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.5	0.7	0.0	0.3	0.0	S	0.6	0.4	0.0	0.7	0.1	24	
31	0.3	0.1	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	S	0.1	0.0	0.0	0.0	0.4	0.1	24	
HOURLY MAX	0.3	0.7	0.4	0.4	0.4	0.8	0.3	0.7	0.7	1.2	0.4	0.2	0.4	0.7	0.9	0.6	0.5	1.1	0.6	0.6	1.0	0.2	0.6	0.7					
HOURLY AVG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1					

STATUS FLAG CODES

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

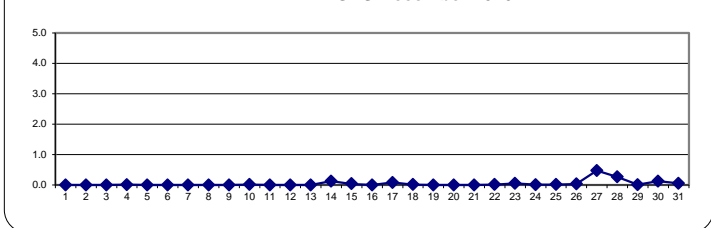
OBJECTIVE LIMIT:

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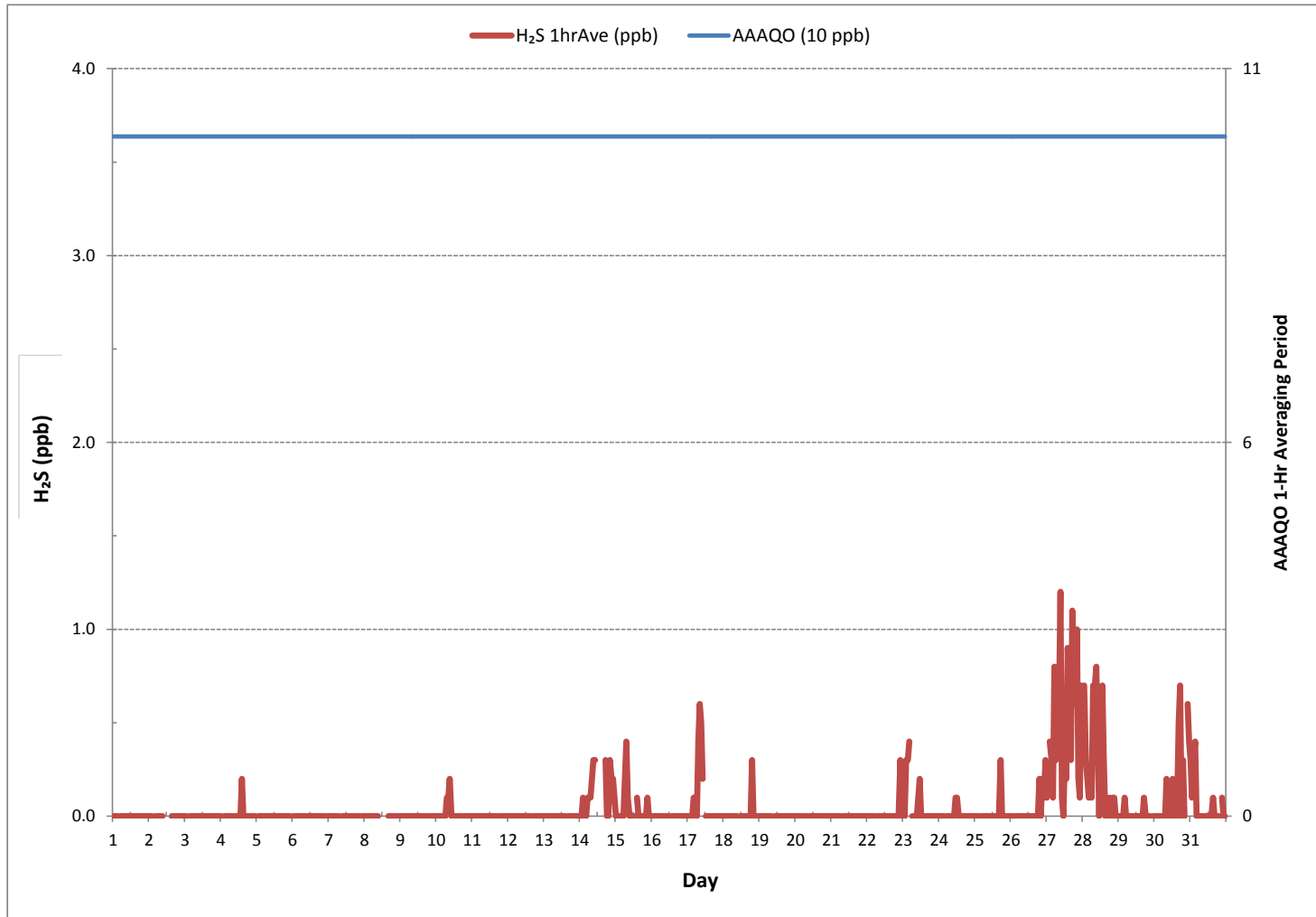
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF 24-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	94			
MINIMUM 1-HR AVERAGE:	0.0 ppb @ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	1.2 ppb @ HOUR(S)	9	ON DAY(S)	27
MAXIMUM 24-HR AVERAGE:	0.5 ppb		ON DAY(S)	27
			VAR-VARIOUS	
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	731 hrs	
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	98.3 %	
STANDARD DEVIATION:	0.1	MONTHLY AVERAGE:	0.0 ppb	

24 HR AVERAGES December 2016



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





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

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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	1.5	1.3	1.4	1.6	S	1.4	2.4	1.4	1.4	1.3	1.4	1.3	1.3	1.4	1.3	1.4	1.4	1.3	1.2	1.3	1.3	1.3	1.5	1.3	1.2	2.4	1.4	24
2	1.1	1.1	1.2	S	1.3	1.3	1.1	1.2	1.2	1.1	C	C	C	C	C	3.4	0.8	2.0	1.0	0.9	0.9	2.3	0.9	1.0	0.8	3.4	1.3	24
3	0.8	0.9	S	1.0	1.9	1.1	1.2	0.7	1.0	1.0	1.2	1.0	1.0	1.1	1.3	1.2	1.8	1.0	1.1	1.2	1.1	1.2	1.2	1.3	0.7	1.9	1.1	24
4	1.2	S	1.4	1.3	1.3	1.3	1.5	2.2	2.4	1.6	1.9	1.4	1.5	1.4	1.6	1.5	1.6	1.1	1.3	1.3	1.1	1.1	1.0	1.0	1.0	2.4	1.4	24
5	S	1.0	0.8	0.8	0.5	0.5	0.5	1.7	0.4	0.4	0.4	0.5	1.1	0.4	0.5	1.2	0.1	0.3	0.2	0.2	0.4	0.4	0.5	S	0.1	1.7	0.6	24
6	0.4	0.5	0.4	0.5	0.4	0.7	0.4	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	S	0.0	0.0	0.7	0.2	24
7	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	S1	S1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.4	0.0	22
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C1	C1	C1	C1	C1	C1	1.2	0.4	0.5	0.6	S	0.7	0.6	0.6	0.0	1.2	0.3	18
9	0.5	0.5	0.5	0.6	1.3	0.6	0.7	0.5	0.8	0.6	0.6	0.6	0.6	0.7	0.9	0.8	0.7	0.8	0.7	S	0.9	1.1	1.0	0.9	0.5	1.3	0.7	24
10	0.9	1.2	1.2	1.2	1.2	1.4	1.6	1.9	2.0	1.9	1.8	1.4	2.6	2.3	1.3	1.6	1.6	1.7	S	1.6	1.7	1.6	1.7	1.8	0.9	2.6	1.6	24
11	1.7	1.7	1.7	1.7	1.6	1.7	1.7	1.5	1.9	1.7	1.7	1.7	1.7	1.7	1.9	1.8	1.9	S	1.9	1.7	1.9	2.1	2.3	3.6	1.5	3.6	1.9	24
12	2.0	2.2	2.0	1.9	2.0	2.2	2.2	2.0	2.0	1.8	2.0	2.0	2.2	2.3	2.1	2.1	S	1.9	1.7	2.1	2.2	2.0	2.0	2.7	1.7	2.7	2.1	24
13	3.8	2.2	1.9	2.0	3.1	1.9	1.8	1.9	1.8	1.8	1.8	1.8	1.6	1.7	1.5	S	1.7	1.5	1.4	1.4	1.5	1.5	1.4	1.4	1.4	3.8	1.8	24
14	1.4	1.4	1.8	1.4	1.5	1.4	1.3	1.4	1.7	1.4	1.4	C1	C1	C1	C1	C1	C1	1.3	1.1	0.9	1.4	1.1	1.3	1.3	0.9	1.8	1.4	18
15	0.9	0.8	0.7	0.7	0.8	0.9	1.1	1.4	1.3	0.7	1.1	1.2	0.9	S	1.2	1.1	1.0	1.4	1.1	1.2	1.3	1.3	1.0	0.9	0.7	1.4	1.0	24
16	1.1	1.3	0.9	1.0	0.9	1.0	0.6	1.2	1.1	1.1	1.1	1.0	S	1.4	1.1	1.1	1.2	1.2	1.1	1.0	0.9	0.9	1.1	1.1	0.6	1.4	1.1	24
17	1.1	1.1	1.3	1.3	1.7	1.5	1.2	1.9	1.9	2.2	1.5	S	1.4	1.2	1.3	1.1	1.1	1.1	1.4	1.4	1.0	1.2	1.1	1.4	1.0	2.2	1.4	24
18	1.5	1.5	3.1	1.8	1.8	1.6	1.7	1.7	1.9	1.7	S	1.8	1.7	1.5	1.5	2.1	2.0	1.6	2.0	2.3	4.6	1.6	1.5	1.5	1.5	4.6	1.9	24
19	1.8	1.8	1.7	2.2	1.8	1.8	1.8	1.9	1.8	S	1.9	1.8	1.5	1.9	2.2	1.6	1.7	2.0	2.0	1.7	2.2	2.1	1.8	1.6	1.5	2.2	1.9	24
20	1.5	1.4	1.4	1.5	1.7	1.7	1.5	1.7	S	1.7	1.6	1.5	1.7	1.9	1.7	1.8	2.0	1.6	1.7	1.6	1.6	1.5	1.5	1.6	1.4	2.0	1.6	24
21	1.5	3.2	1.1	1.3	2.1	2.1	2.1	S	1.6	1.6	1.7	1.2	1.5	1.5	2.2	1.9	1.6	1.9	1.6	2.0	2.3	2.1	2.0	2.5	1.1	3.2	1.9	24
22	2.2	2.0	1.8	1.8	1.0	2.0	S	1.5	1.8	2.0	2.3	1.7	2.0	1.7	2.1	1.8	1.3	1.8	1.8	1.8	1.5	1.6	2.2	2.0	1.0	2.3	1.8	24
23	2.0	1.7	2.1	1.8	2.5	S	1.5	1.2	1.1	1.0	1.8	2.1	1.8	1.3	1.4	0.8	1.1	1.1	0.9	1.0	0.9	1.2	1.2	1.5	0.8	2.5	1.4	24
24	1.3	1.1	1.1	1.1	S	0.8	1.7	1.5	0.9	0.9	1.3	1.6	1.8	1.5	1.0	1.0	0.7	1.1	1.3	0.6	0.5	1.3	1.3	0.6	0.5	1.8	1.1	24
25	0.6	1.1	1.0	S	1.2	0.7	1.2	1.2	1.0	1.9	1.2	1.7	1.7	1.2	0.9	0.7	1.8	2.6	1.5	1.1	1.2	1.7	0.5	1.4	0.5	2.6	1.3	24
26	1.3	1.6	S	2.3	2.4	2.0	1.2	1.8	1.9	1.4	2.0	1.5	1.1	1.6	1.8	1.0	1.3	1.8	1.6	1.8	1.6	1.7	1.7	2.0	1.0	2.4	1.7	24
27	1.7	S	2.1	1.9	1.7	2.7	2.1	2.3	3.1	3.2	2.7	1.6	2.3	2.3	2.5	3.0	2.2	2.5	2.1	1.8	2.5	2.9	2.3	2.3	1.6	3.2	2.3	24
28	S	2.4	1.8	1.5	1.4	1.5	1.8	2.1	2.3	2.6	2.3	1.5	1.8	2.3	1.9	1.2	1.7	1.6	1.9	2.0	2.0	1.8	1.6	S	1.2	2.6	1.9	24
29	1.8	1.4	1.2	1.7	2.1	1.4	1.7	0.4	1.6	1.6	2.2	2.0	1.4	1.3	1.4	1.9	2.0	2.4	2.3	1.6	1.9	1.2	S	1.4	0.4	2.4	1.6	24
30	1.9	1.1	1.7	2.0	2.1	1.9	1.6	1.7	2.0	1.8	1.3	2.3	2.3	1.6	1.5	1.7	2.8	2.6	2.1	2.3	1.3	S	2.6	2.4	1.1	2.8	1.9	24
31	2.3	2.2	2.4	2.9	2.7	2.3	2.0	1.8	2.3	1.9	2.0	2.2	2.3	2.5	2.0	2.2	1.9	2.0	1.7	1.4	S	2.4	2.2	1.6	1.4	2.9	2.1	24
HOURLY MAX	3.8	3.2	3.1	2.9	3.1	2.7	2.4	2.3	3.1	3.2	2.7	2.3	2.6	2.5	2.5	3.4	2.8	2.6	2.3	2.3	4.6	2.9	2.6	3.6				
HOURLY AVG	1.4	1.4	1.4	1.4	1.5	1.4	1.4	1.4	1.5	1.4	1.5	1.4	1.5	1.5	1.4	1.5	1.4	1.5	1.3	1.3	1.4	1.5	1.4	1.5				

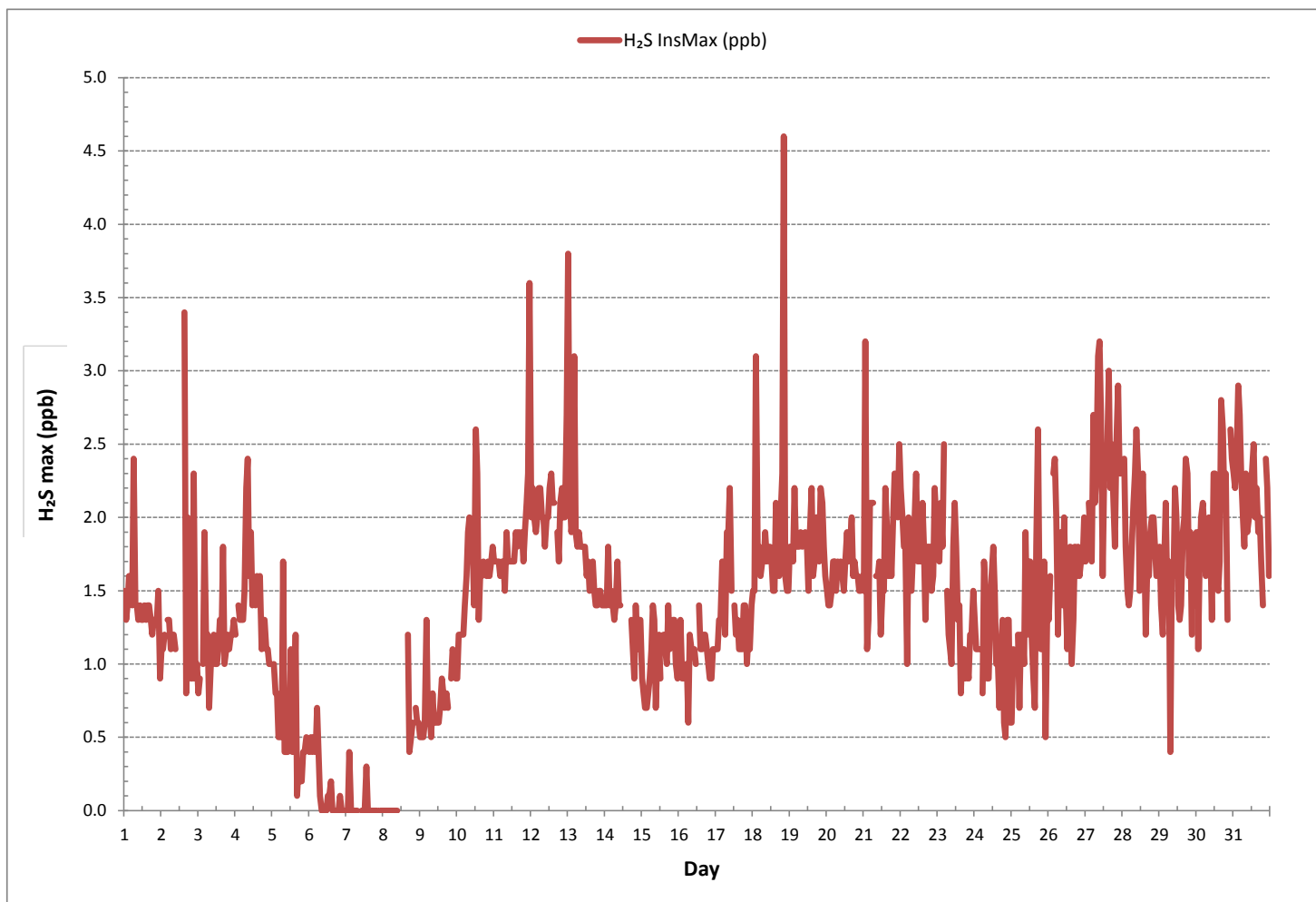
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	653
MAXIMUM INSTANTANEOUS VALUE:	4.6 ppb @ HOUR(S) 20 ON DAY(S) 18
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	730 hrs
STANDARD DEVIATION:	0.7

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



Wind: LICA MASKWA Poll.: LICA MASKWA-H2S[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 9.54% Valid Data: 93.01% Calm Avg: 0.03 [ppb]

Direction	0.0-0.6	0.6-1.3	1.3-1.9	>1.9	Total
N	6.5	0	0	0	6.5
NE	5.35	0	0	0	5.35
E	5.78	0	0	0	5.78
SE	3.61	0	0	0	3.61
S	8.82	0.29	0	0	9.11
SW	23.99	0.87	0	0	24.86
W	15.9	0.43	0	0	16.33
NW	18.79	0.14	0	0	18.93
Summary	88.74	1.73	0	0	90.47

% Icon Classes (ppb)

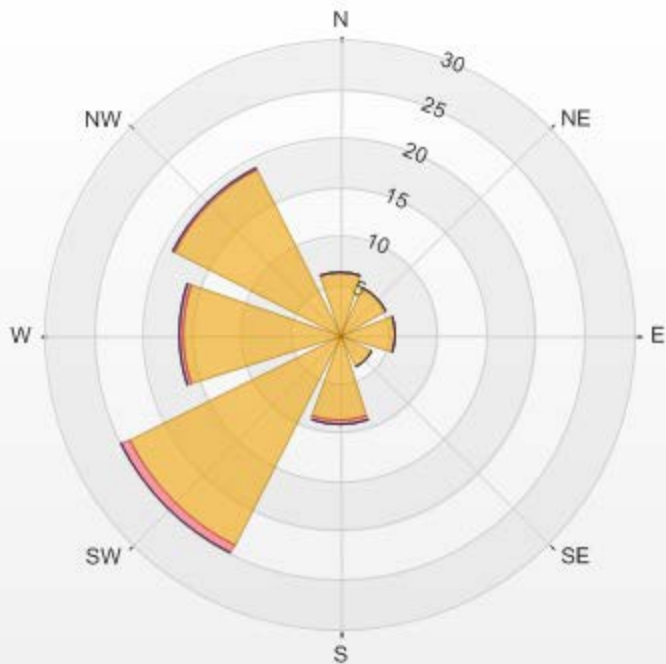
89 0.0-0.6

2 0.6-1.3

0 1.3-1.9

0 >1.9

LICA MASKWA Poll.: LICA MASKWA-H2S[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 9.54% Calm Poll  
Avg: 0.03[ppb]



H2S[ppb] Calibration: LICA MASKWA Monthly: 2016/12 Type: Span



Span Meas Span Ref Span Low Span High

***TOTAL HYDROCARBON***



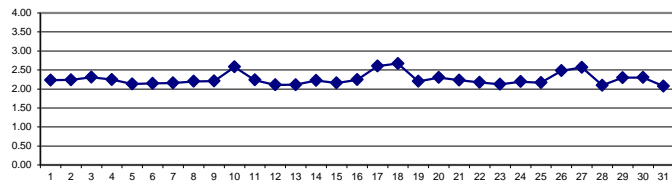
**TOTAL HYDROCARBONS Hourly Averages (THC ppm)**

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	2.25	2.26	2.25	2.27	S	2.28	2.27	2.20	2.20	2.20	2.22	2.24	2.25	2.27	2.29	2.25	2.22	2.20	2.19	2.18	2.17	2.18	2.22	2.17	2.17	2.29	2.23	24
2	2.25	2.24	2.26	S	2.25	2.32	2.19	2.28	2.25	2.21	2.26	2.23	2.27	2.25	C	C	C	C	2.19	2.19	2.18	2.19	2.20	2.28	2.18	2.32	2.24	24
3	2.29	2.31	S	2.31	2.33	2.33	2.30	2.28	2.30	2.36	2.34	2.26	2.24	2.23	2.24	2.22	2.26	2.23	2.27	2.32	2.34	2.36	2.46	2.48	2.22	2.48	2.31	24
4	2.40	S	2.55	2.50	2.52	2.39	2.47	2.47	2.40	2.38	2.34	2.23	2.03	2.05	2.13	2.11	2.12	2.08	2.08	2.08	2.07	2.07	2.07	2.09	2.03	2.55	2.24	24
5	S	2.09	2.09	2.08	2.09	2.11	2.10	2.11	2.11	2.10	2.11	2.17	2.13	2.13	2.15	2.14	2.14	2.15	2.13	2.14	2.16	2.16	2.21	S	2.08	2.21	2.13	24
6	2.15	2.17	2.18	2.20	2.17	2.17	2.14	2.13	2.14	2.13	2.13	2.13	2.12	2.12	2.13	2.14	2.14	2.15	2.14	2.14	2.14	2.12	S	2.12	2.12	2.20	2.14	24
7	2.13	2.14	2.16	2.13	2.13	2.14	2.15	2.15	2.16	2.17	2.17	2.17	2.17	2.16	2.14	2.14	2.15	2.16	2.17	2.17	2.17	S	2.19	2.21	2.13	2.21	2.16	24
8	2.22	2.23	2.22	2.20	2.19	2.20	2.22	2.25	2.24	2.21	2.23	2.19	2.18	2.16	2.16	2.20	2.20	2.21	2.21	2.19	S	2.18	2.15	2.15	2.15	2.25	2.20	24
9	2.15	2.15	2.15	2.15	2.15	2.15	2.18	2.22	2.49	2.16	2.17	2.20	2.18	2.21	2.19	2.17	2.16	2.17	2.19	S	2.22	2.35	2.28	2.29	2.15	2.49	2.21	24
10	2.35	2.42	2.42	2.54	2.65	2.72	2.73	2.78	2.73	2.83	2.70	2.43	2.46	2.64	2.67	2.65	2.60	2.52	S	2.47	2.43	2.46	2.54	2.58	2.35	2.83	2.58	24
11	2.58	2.52	2.50	2.41	2.38	2.28	2.21	2.21	2.19	2.17	2.20	2.19	2.17	2.15	2.13	2.13	2.14	S	2.14	2.15	2.16	2.16	2.11	2.13	2.11	2.58	2.24	24
12	2.16	2.16	2.12	2.10	2.09	2.11	2.10	2.09	2.09	2.09	2.10	2.10	2.12	2.14	2.14	2.09	S	2.11	2.08	2.13	2.10	2.08	2.09	2.11	2.08	2.16	2.11	24
13	2.12	2.08	2.07	2.09	2.07	2.08	2.08	2.09	2.10	2.10	2.09	2.09	2.12	2.12	2.11	S	2.12	2.13	2.14	2.14	2.15	2.15	2.14	2.14	2.07	2.15	2.11	24
14	2.14	2.17	2.19	2.17	2.16	2.17	2.16	2.15	2.14	2.15	2.28	2.38	2.51	2.47	S	2.27	2.30	2.29	2.25	2.19	2.18	2.14	2.15	2.16	2.14	2.51	2.22	24
15	2.14	2.15	2.15	2.16	2.16	2.16	2.15	2.14	2.15	2.13	2.14	2.13	2.13	S	2.17	2.16	2.15	2.18	2.16	2.19	2.21	2.18	2.16	2.16	2.13	2.21	2.16	24
16	2.17	2.18	2.18	2.20	2.24	2.20	2.19	2.22	2.23	2.23	2.23	2.18	S	2.16	2.16	2.14	2.14	2.22	2.30	2.33	2.40	2.42	2.43	2.45	2.14	2.45	2.24	24
17	2.48	2.50	2.50	2.48	2.50	2.48	2.49	2.60	2.63	2.61	2.56	S	2.41	2.38	2.39	2.44	2.49	2.52	2.61	2.63	2.81	2.93	2.99	3.37	2.38	3.37	2.60	24
18	3.45	3.43	3.31	3.25	3.20	3.23	3.18	3.11	3.02	2.97	S	2.70	2.46	2.45	2.51	2.39	2.14	2.09	2.04	2.13	2.11	2.05	2.05	2.06	2.04	3.45	2.67	24
19	2.11	2.18	2.29	2.24	2.16	2.06	2.06	2.08	2.11	S	2.13	2.14	2.16	2.12	2.14	2.16	2.20	2.23	2.27	2.30	2.33	2.36	2.39	2.42	2.06	2.42	2.20	24
20	2.45	2.47	2.52	X	X	X	X	X	X	X	S	2.25	2.27	2.24	2.25	2.32	2.34	2.39	2.37	2.27	2.21	2.17	2.16	2.13	2.13	2.52	2.30	17
21	2.11	2.30	2.41	2.39	2.29	2.31	2.41	S	2.25	2.26	2.28	2.22	2.17	2.15	2.22	2.20	2.20	2.17	2.18	2.18	2.16	2.14	2.13	2.15	2.11	2.41	2.23	24
22	2.15	2.18	2.21	2.21	2.21	2.27	S	2.32	2.26	2.24	2.27	2.29	2.21	2.23	2.24	2.04	2.08	2.07	2.06	2.08	2.12	2.06	2.06	2.07	2.04	2.32	2.17	24
23	2.07	2.07	2.08	2.06	2.07	S	2.09	2.09	2.12	2.12	2.13	2.13	2.14	2.15	2.15	2.16	2.16	2.15	2.14	2.14	2.15	2.15	2.18	2.17	2.06	2.18	2.12	24
24	2.18	2.20	2.19	2.18	S	2.18	2.18	2.18	2.18	2.19	2.24	2.21	2.20	2.22	2.19	2.20	2.21	2.22	2.22	2.20	2.17	2.17	2.16	2.16	2.16	2.24	2.19	24
25	2.15	2.15	2.15	S	2.14	2.16	2.18	2.14	2.14	2.15	2.15	2.18	2.17	2.15	2.14	2.15	2.15	2.20	2.18	2.17	2.19	2.20	2.21	2.21	2.14	2.21	2.17	24
26	2.21	2.28	S	2.45	2.51	2.69	2.41	2.55	2.62	2.55	2.60	2.54	2.52	2.48	2.50	2.51	2.54	2.57	2.46	2.45	2.42	2.41	2.37	2.37	2.21	2.69	2.48	24
27	2.40	S	2.41	2.40	2.40	2.42	2.47	2.52	2.55	2.58	2.58	2.56	2.59	2.63	2.69	2.86	2.85	2.76	2.64	2.51	2.56	2.57	2.54	2.59	2.40	2.86	2.57	24
28	S	2.31	2.21	2.08	2.06	2.05	2.05	2.05	2.09	2.11	2.06	2.08	2.11	2.13	2.08	2.10	2.08	2.09	2.10	2.09	2.08	2.08	S	2.05	2.31	2.10	24	
29	2.09	2.09	2.11	2.12	2.12	2.15	2.19	2.26	2.41	2.58	2.57	2.50	2.41	2.36	2.35	2.34	2.31	2.33	2.34	2.36	2.33	2.27	S	2.24	2.09	2.58	2.30	24
30	2.23	2.22	2.19	2.22	2.28	2.31	2.37	2.28	2.32	2.35	2.44	2.75	2.47	2.15	2.14	2.26	2.23	2.26	2.34	2.46	2.38	S	2.13	2.11	2.11	2.75	2.30	24
31	2.07	2.07	2.10	2.14	2.06	2.06	2.08	2.07	2.05	2.05	2.05	2.05	2.05	2.06	2.07	2.07	2.07	2.09	2.09	S	2.10	2.11	2.08	2.05	2.14	2.08	24	
HOURLY MAX	3.45	3.43	3.31	3.25	3.20	3.23	3.18	3.11	3.02	2.97	2.70	2.75	2.59	2.64	2.69	2.86	2.85	2.76	2.64	2.63	2.81	2.93	2.99	3.37				
HOURLY AVG	2.26	2.27	2.28	2.28	2.27	2.28	2.27	2.28	2.29	2.29	2.27	2.26	2.25	2.24	2.24	2.24	2.24	2.24	2.22	2.24	2.25	2.24	2.24	2.27				

**STATUS FLAG CODES**

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

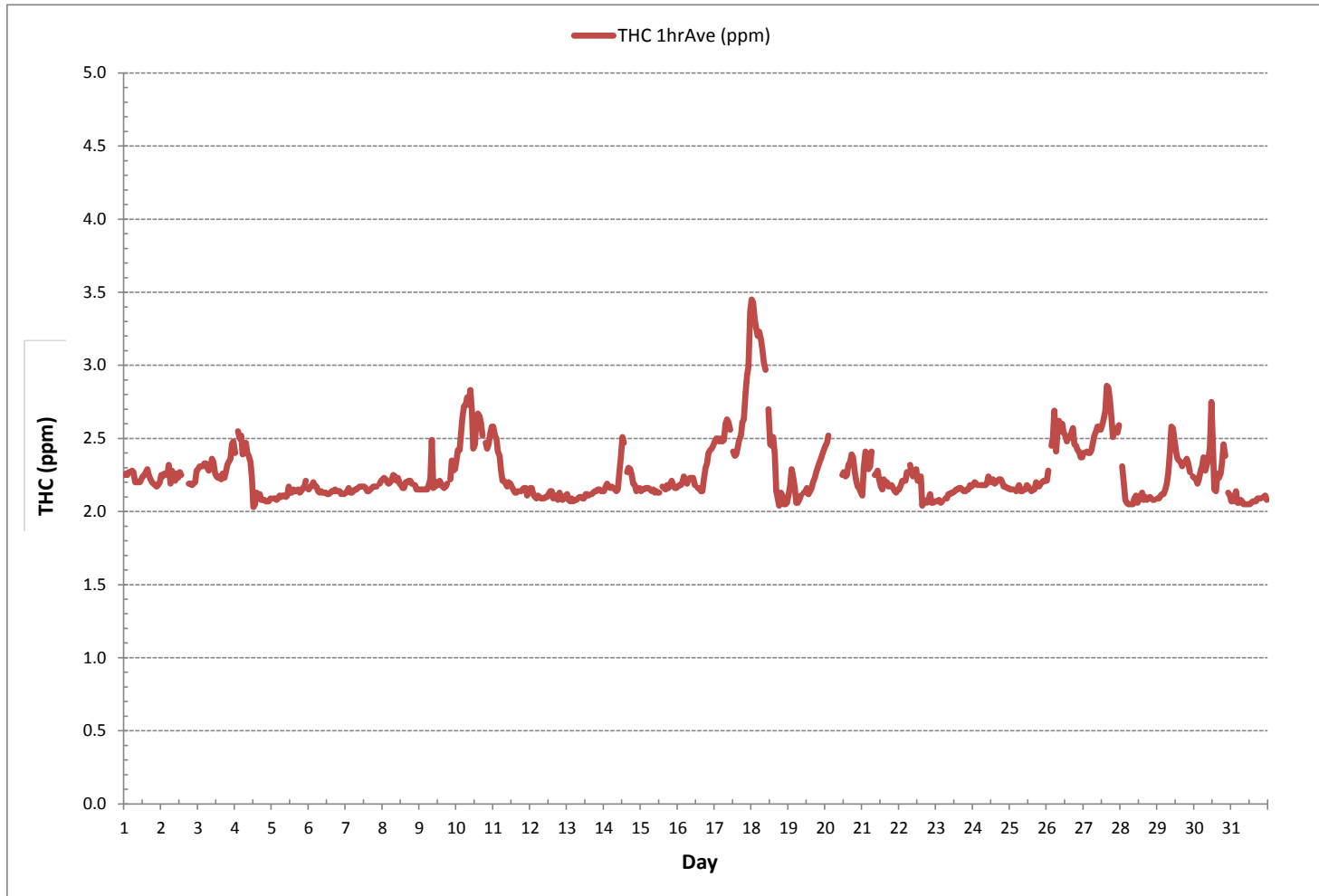
**24 HR AVERAGES December 2016**



**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	700		
MINIMUM 1-HR AVERAGE:	2.03 ppm	@ HOUR(S)	12 ON DAY(S) 4
MAXIMUM 1-HR AVERAGE:	3.45 ppm	@ HOUR(S)	0 ON DAY(S) 18
MAXIMUM 24-HR AVERAGE:	2.67 ppm		ON DAY(S) 18
			VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs	OPERATIONAL TIME:	737 hrs
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	99.1 %
STANDARD DEVIATION:	0.20	MONTHLY AVERAGE:	2.26 ppm

TOTAL HYDROCARBONS Hourly Averages (THC ppm)





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

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
DAY 1	2.32	2.35	2.29	2.29	S	2.33	2.39	2.26	2.23	2.23	2.26	2.26	2.32	2.30	2.30	2.41	2.30	2.26	2.24	2.23	2.23	2.21	2.23	2.30	2.21	2.41	2.28	24	
2	2.32	2.29	2.35	S	2.49	2.54	2.36	2.43	2.45	2.31	2.42	2.33	2.43	2.38	C	C	C	C	2.27	2.26	2.24	2.23	2.27	2.30	2.23	2.54	2.35	24	
3	2.30	2.41	S	2.39	2.42	2.48	2.41	2.29	2.30	2.38	2.36	2.29	2.23	2.23	2.24	2.21	2.27	2.21	2.29	2.33	2.35	2.36	2.46	2.51	2.21	2.51	2.34	24	
4	2.41	S	2.54	2.54	2.55	2.41	2.48	2.52	2.39	2.41	2.35	2.33	2.04	2.09	2.17	2.18	2.20	2.09	2.12	2.14	2.09	2.09	2.09	2.12	2.04	2.55	2.28	24	
5	S	2.14	2.12	2.12	2.14	2.20	2.14	2.17	2.17	2.14	2.18	2.71	2.23	2.21	2.23	2.23	2.23	2.23	2.23	2.23	2.26	2.44	3.24	S	2.12	3.24	2.27	24	
6	2.27	2.26	2.57	2.52	2.29	2.29	2.27	2.21	2.24	2.23	2.23	2.20	2.21	2.21	2.24	2.26	2.24	2.26	2.26	2.23	2.24	2.23	S	2.23	2.20	2.57	2.27	24	
7	2.23	2.24	2.26	2.26	2.26	2.26	2.26	2.27	2.29	2.29	2.29	2.31	2.32	2.32	2.29	2.29	2.31	2.32	2.32	2.32	2.32	2.35	S	2.35	2.36	2.23	2.36	2.29	24
8	2.38	2.39	2.39	2.36	2.35	2.35	2.39	2.42	2.42	2.35	2.50	2.36	2.35	2.30	2.41	2.45	2.35	2.39	2.36	2.39	S	2.35	2.29	2.29	2.29	2.50	2.37	24	
9	2.27	2.27	2.27	2.27	2.26	2.27	2.35	2.67	3.64	2.29	2.38	2.44	2.32	2.44	2.39	2.27	2.26	2.29	2.32	S	2.39	2.61	2.42	2.41	2.26	3.64	2.41	24	
10	2.46	2.55	2.54	2.67	2.76	2.82	2.87	2.93	2.84	3.02	2.92	2.51	2.60	2.72	2.73	2.66	2.63	S	2.55	2.49	2.51	2.66	2.66	2.46	3.02	2.69	2.4	24	
11	2.63	2.60	2.57	2.46	2.44	2.35	2.29	2.23	2.23	2.20	2.23	2.23	2.20	2.18	2.15	2.15	2.17	S	2.17	2.18	2.20	2.20	2.17	2.17	2.15	2.63	2.28	24	
12	2.18	2.18	2.15	2.12	2.11	2.23	2.20	2.11	2.12	2.11	2.12	2.17	2.23	2.23	2.20	2.12	S	2.20	2.11	2.23	2.21	2.10	2.15	2.29	2.10	2.29	2.17	24	
13	2.26	2.12	2.12	2.20	2.11	2.12	2.12	2.14	2.14	2.15	2.14	2.14	2.17	2.17	2.17	S	2.17	2.18	2.20	2.20	2.23	2.21	2.20	2.20	2.11	2.26	2.17	24	
14	2.20	2.29	2.30	2.24	2.24	2.27	2.32	2.23	2.20	2.26	2.41	2.49	2.58	2.58	S	2.33	4.43	2.35	2.35	2.33	2.36	2.20	2.20	2.21	2.20	4.43	2.41	24	
15	2.20	2.20	2.20	2.20	2.20	2.21	2.24	2.21	2.23	2.20	2.20	2.17	2.18	S	2.26	2.23	2.21	2.29	2.26	2.29	2.33	2.29	2.20	2.21	2.17	2.33	2.23	24	
16	2.23	2.23	2.23	2.28	2.32	2.32	2.26	2.29	2.32	2.33	2.32	2.24	S	2.24	2.21	2.20	2.20	2.35	2.35	2.45	2.48	2.46	2.49	2.51	2.20	2.51	2.32	24	
17	2.63	2.57	2.57	2.54	2.76	2.57	2.58	2.81	2.72	2.69	2.64	S	2.51	2.44	2.45	2.49	2.54	2.60	2.66	2.76	2.95	3.02	3.29	3.41	2.44	3.41	2.70	24	
18	3.50	3.50	3.36	3.26	3.21	3.38	3.18	3.12	3.05	2.98	S	2.81	2.48	2.45	2.54	2.48	2.20	2.08	2.02	2.17	2.17	2.01	2.01	2.02	2.01	3.50	2.69	24	
19	2.07	2.15	2.26	2.21	2.17	2.03	2.01	2.04	2.04	S	2.05	2.04	2.04	1.95	1.95	1.96	1.96	1.98	1.98	1.98	2.01	1.99	2.01	2.01	1.95	2.26	2.04	24	
20	2.02	2.04	2.05	X	X	X	X	X	X	X	S	2.24	2.26	2.26	2.26	2.32	2.33	2.41	2.41	2.30	2.23	2.18	2.17	2.13	2.02	2.41	2.23	17	
21	2.11	2.41	2.45	2.49	2.33	2.39	2.42	S	2.26	2.27	2.29	2.29	2.17	2.17	2.26	2.21	2.23	2.17	2.18	2.17	2.17	2.15	2.11	2.12	2.11	2.49	2.25	24	
22	2.12	2.17	2.18	2.20	2.20	2.24	S	2.31	2.26	2.23	2.29	2.30	2.21	2.24	2.26	2.09	2.12	2.10	2.07	2.07	2.20	2.08	2.07	2.07	2.07	2.31	2.18	24	
23	2.10	2.08	2.10	2.07	2.10	S	2.12	2.12	2.14	2.15	2.17	2.17	2.18	2.18	2.18	2.20	2.20	2.20	2.20	2.20	2.20	2.27	2.29	2.28	2.07	2.29	2.17	24	
24	2.28	2.33	2.29	2.26	S	2.26	2.24	2.24	2.26	2.29	2.36	2.33	2.29	2.35	2.26	2.29	2.35	2.35	2.35	2.31	2.24	2.28	2.23	2.24	2.23	2.36	2.29	24	
25	2.28	2.24	2.23	S	2.21	2.29	2.41	2.21	2.21	2.21	2.23	2.32	2.24	2.21	2.20	2.21	2.21	2.26	2.26	2.23	2.41	2.33	2.32	2.29	2.20	2.41	2.26	24	
26	2.46	2.60	S	2.69	2.66	2.84	2.60	2.66	2.66	2.63	2.63	2.60	2.56	2.51	2.51	2.52	2.57	2.58	2.54	2.44	2.44	2.41	2.38	2.36	2.36	2.84	2.56	24	
27	2.41	S	2.41	2.38	2.38	2.41	2.45	2.51	2.52	2.56	2.57	2.52	2.57	2.61	2.71	2.85	2.82	2.79	2.63	2.54	2.51	2.52	2.54	2.57	2.38	2.85	2.56	24	
28	S	2.41	2.20	2.08	2.02	2.04	2.01	2.02	2.02	2.14	2.15	2.05	2.11	2.18	2.28	2.12	2.18	2.10	2.15	2.11	2.10	2.10	2.10	S	2.01	2.41	2.12	24	
29	2.10	2.11	2.13	2.14	2.14	2.17	2.23	2.31	2.57	2.66	2.66	2.57	2.46	2.38	2.38	2.35	2.39	2.36	2.39	2.46	2.42	2.33	S	2.29	2.10	2.66	2.35	24	
30	2.26	2.27	2.21	2.24	2.35	2.38	2.47	2.29	2.38	2.36	2.60	2.81	2.69	2.20	2.23	2.26	2.23	2.29	2.36	2.46	2.44	S	2.11	2.10	2.10	2.81	2.35	24	
31	2.07	2.08	2.18	2.20	2.07	2.07	2.14	2.12	2.04	2.05	2.07	2.05	2.05	2.07	2.07	2.08	2.10	2.10	2.11	2.10	S	2.15	2.20	2.10	2.04	2.20	2.10	24	
HOURLY MAX	3.50	3.50	3.36	3.26	3.21	3.38	3.18	3.12	3.64	3.02	2.92	2.81	2.69	2.72	2.73	2.85	4.43	2.79	2.66	2.76	2.95	3.02	3.29	3.41					
HOURLY AVG	2.31	2.33	2.33	2.35	2.34	2.36	2.35	2.35	2.38	2.35	2.35	2.34	2.31	2.29	2.29	2.29	2.36	2.29	2.27	2.29	2.31	2.29	2.32	2.30					

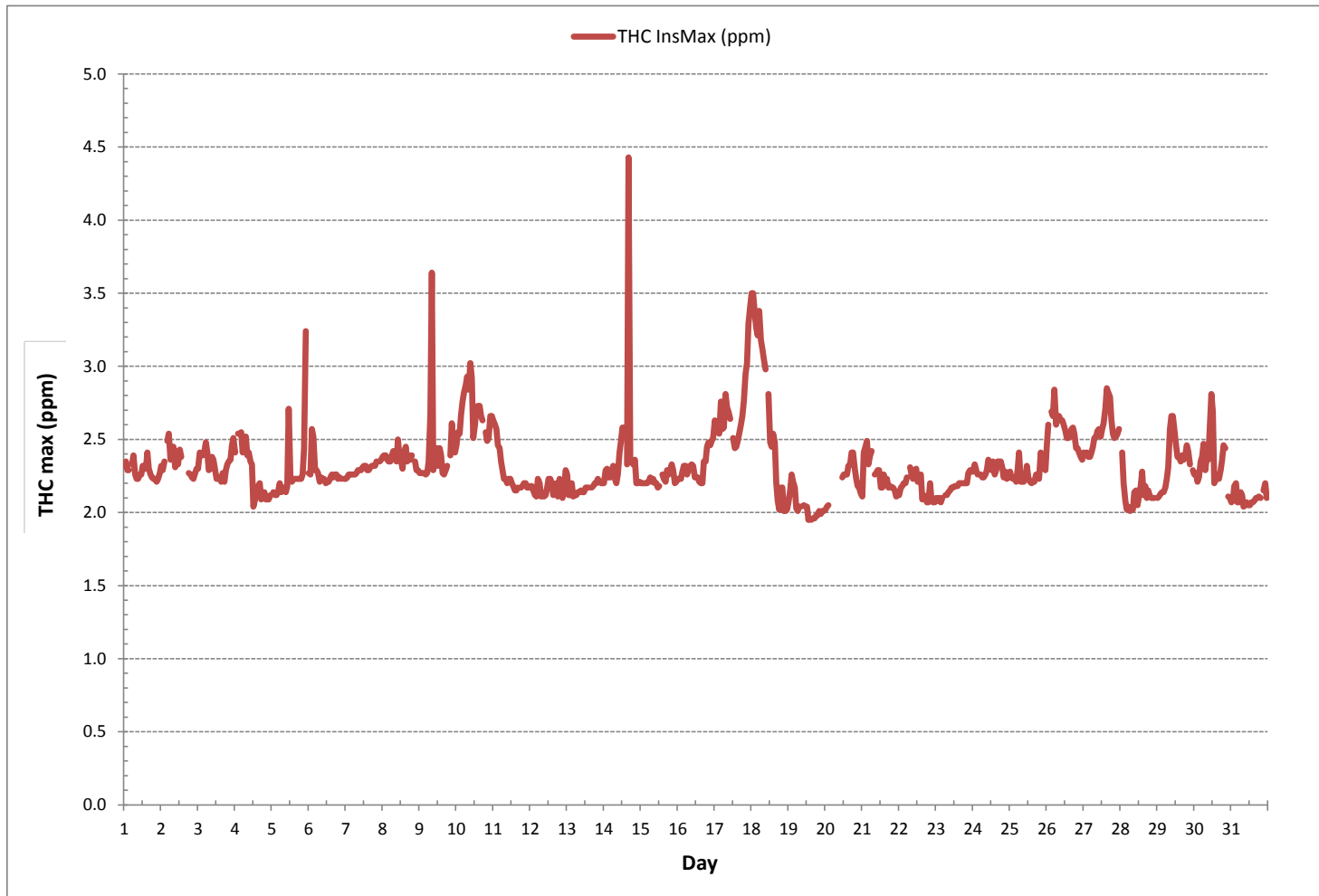
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	700
MAXIMUM INSTANTANEOUS VALUE:	4.43 ppm @ HOUR(S) 16 ON DAY(S) 14
	VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	4 hrs
OPERATIONAL TIME:	737 hrs
STANDARD DEVIATION:	0.24

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

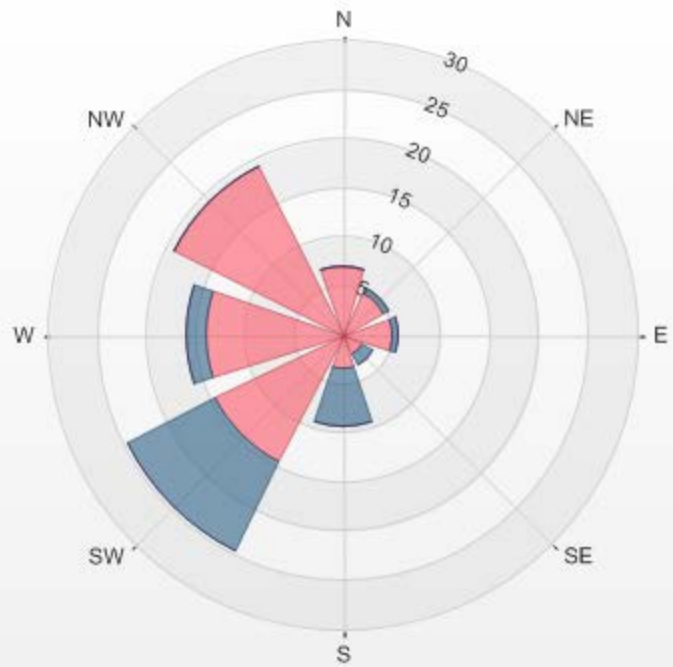


Wind: LICA MASKWA Poll.: LICA MASKWA-THC[ppm] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 9.44% Valid Data: 93.95% Calm Avg: 2.41 [ppm]

Direction	0.0-1.2	1.2-2.3	2.3-3.5	>3.5	Total
N	0	7.01	0	0	7.01
NE	0	4.72	0.57	0	5.29
E	0	5.01	0.72	0	5.73
SE	0	2.29	1.14	0	3.43
S	0	3.43	5.87	0	9.3
SW	0	14.45	10.16	0	24.61
W	0	13.88	2	0	15.88
NW	0	19.31	0	0	19.31
Summary	0	70.1	20.46	0	90.56

% Icon Classes (ppm) 0 0.0-1.2 70 1.2-2.3 20 2.3-3.5 0 >3.5

LICA MASKWA Poll.: LICA MASKWA-THC[ppm] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 9.44% Calm Poll Avg: 2.41[ppm]



THC[ppm] Calibration: LICA MASKWA Monthly: 2016/12 Type: Span



Span Meas Span Ref Span Low Span High

## ***OXIDES OF NITROGEN***



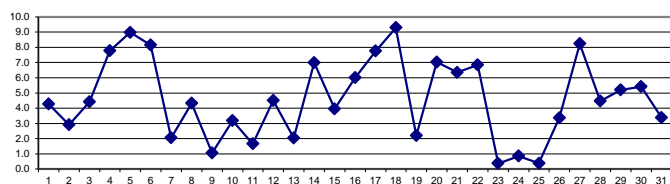
OXIDES OF NITROGEN Hourly Averages (NO<sub>x</sub> ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	0.9	1.2	1.6	3.4	S	4.0	2.9	2.8	3.5	3.0	2.3	3.3	3.7	7.9	6.8	5.9	8.5	8.2	5.4	2.6	6.1	7.5	3.1	3.6	0.9	8.5	4.3	24	
2	3.1	3.6	3.8	S	6.9	3.8	1.9	2.0	2.3	3.3	C	C	C	C	C	C	C	3.3	2.6	3.0	2.3	1.4	1.4	1.9	1.4	6.9	2.9	24	
3	2.0	2.2	S	3.7	1.8	1.7	1.8	1.9	2.4	3.6	2.7	3.2	4.5	5.2	5.7	3.9	4.5	4.2	5.4	4.6	5.0	7.9	11.1	12.5	1.7	12.5	4.4	24	
4	9.7	S	16.0	16.6	9.8	5.8	9.1	9.3	10.5	10.6	10.3	5.6	1.1	1.7	13.5	9.1	12.0	1.1	5.8	7.1	1.3	1.0	3.4	8.4	1.0	16.6	7.8	24	
5	S	5.9	2.3	1.7	3.8	6.3	3.4	6.2	4.7	1.6	5.2	10.2	6.1	9.2	16.4	10.9	11.8	15.4	4.7	14.6	19.4	20.2	17.5	S	1.6	20.2	9.0	24	
6	19.7	18.8	17.1	20.3	14.8	18.9	13.5	5.5	7.7	3.3	2.7	0.5	3.0	1.3	6.0	8.5	7.0	8.0	3.8	0.8	4.7	0.0	S	1.5	0.0	20.3	8.1	24	
7	0.6	0.6	1.1	0.3	0.1	0.5	0.2	1.9	1.5	2.4	3.2	4.3	9.4	3.6	2.0	0.9	0.7	0.1	2.0	1.7	1.3	S	4.7	4.0	0.1	9.4	2.0	24	
8	3.3	3.8	4.0	2.5	2.0	2.5	8.2	14.2	11.0	4.3	6.3	4.3	5.3	3.8	2.7	4.6	8.0	2.9	1.8	1.6	S	2.1	0.2	0.0	0.0	14.2	4.3	24	
9	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	2.2	4.1	1.2	0.8	1.1	0.3	0.8	0.3	0.6	0.9	0.4	S	3.1	2.6	2.1	3.1	0.0	4.1	1.1	24	
10	3.5	3.2	2.5	2.5	2.7	3.1	3.5	4.1	4.4	5.3	4.8	2.1	1.9	2.0	2.3	3.3	3.4	2.4	S	3.9	2.3	2.2	3.2	4.7	1.9	5.3	3.2	24	
11	3.7	4.2	5.1	5.6	2.1	5.2	2.0	1.3	1.4	0.2	0.4	0.6	0.2	0.5	0.6	0.0	0.0	S	1.7	0.8	1.0	1.2	0.0	0.2	0.0	5.6	1.7	24	
12	0.3	0.8	0.6	1.3	0.0	4.8	8.2	0.0	0.0	2.6	5.2	8.6	12.8	14.6	6.3	4.5	S	1.0	1.4	10.6	9.6	0.0	2.9	7.4	0.0	14.6	4.5	24	
13	6.3	2.4	5.3	7.1	0.4	0.0	0.0	2.8	2.0	3.0	0.7	1.1	0.9	1.9	1.4	S	1.8	0.0	0.5	1.1	4.1	3.7	0.4	0.0	0.0	7.1	2.0	24	
14	0.1	4.3	16.2	4.1	3.4	5.9	2.6	4.9	12.1	11.6	10.1	10.6	11.0	11.6	S	8.5	8.8	7.0	4.9	11.1	11.0	0.0	0.3	0.7	0.0	16.2	7.0	24	
15	0.3	0.5	0.4	0.8	1.1	2.1	6.4	2.0	7.5	2.0	3.1	0.2	0.2	S	13.6	4.2	3.5	13.8	4.2	10.4	5.5	7.2	1.6	0.4	0.2	13.8	4.0	24	
16	1.8	1.9	0.3	3.8	12.7	14.9	5.6	10.5	6.9	7.5	7.1	1.7	S	10.7	6.8	3.1	1.1	3.0	6.7	5.6	6.2	6.9	6.6	6.7	0.3	14.9	6.0	24	
17	6.1	4.9	4.8	4.8	4.5	3.3	3.7	6.2	13.6	11.7	12.7	S	9.8	9.3	8.6	9.2	9.1	9.0	8.1	6.6	7.3	7.7	7.6	9.7	3.3	13.6	7.8	24	
18	10.4	10.8	10.6	10.3	10.3	10.4	11.7	13.7	13.1	12.1	S	15.3	11.6	13.2	15.0	11.7	3.5	1.5	0.8	12.8	9.2	3.4	1.1	1.1	0.8	15.3	9.3	24	
19	1.6	2.7	4.4	3.1	2.0	1.3	2.6	2.6	4.2	S	7.4	6.7	4.5	1.1	0.6	1.4	0.7	0.6	0.6	0.2	0.6	0.5	0.5	0.6	0.2	7.4	2.2	24	
20	0.6	0.5	0.8	0.6	0.5	0.5	6.4	10.8	S	12.0	9.5	9.9	8.4	8.9	10.0	13.6	12.9	13.7	12.2	8.3	5.3	7.4	7.1	1.8	0.5	13.7	7.0	24	
21	1.3	5.5	8.9	8.9	6.1	6.2	10.3	S	5.7	5.1	6.5	6.8	4.0	4.2	7.2	8.8	7.4	5.9	8.1	9.1	7.2	5.8	3.1	3.9	1.3	10.3	6.3	24	
22	4.1	6.6	9.1	7.4	7.0	8.6	S	13.9	11.0	11.8	13.0	12.3	8.1	10.9	15.4	6.7	3.9	2.5	1.2	1.3	0.7	0.6	0.8	0.6	0.6	15.4	6.8	24	
23	1.0	2.2	0.4	0.0	0.0	S	1.3	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.6	0.0	0.0	2.6	0.4	24	
24	0.0	0.4	0.0	0.1	S	1.4	0.2	0.0	0.0	0.0	3.4	3.1	1.8	1.6	1.1	1.0	1.9	2.3	0.9	0.4	0.0	0.0	0.0	0.0	0.0	3.4	0.9	24	
25	0.1	0.0	0.0	S	1.1	1.1	0.4	0.4	0.3	0.3	0.5	1.9	1.6	0.0	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.4	24
26	0.0	0.0	S	1.2	0.5	0.5	2.2	5.3	5.8	4.3	4.7	4.2	4.6	4.1	4.8	4.3	5.7	4.2	3.3	3.1	3.5	4.1	4.5	2.4	0.0	5.8	3.4	24	
27	2.4	S	3.4	2.5	3.6	3.9	3.0	3.5	3.6	4.4	3.9	4.2	8.7	9.0	8.8	13.6	14.3	12.6	11.1	11.6	15.2	15.6	13.8	16.6	2.4	16.6	8.2	24	
28	S	7.8	3.6	0.8	0.5	0.6	0.5	0.4	1.1	8.9	15.2	0.2	12.4	18.5	9.2	5.5	7.7	0.9	2.5	1.6	0.4	0.0	0.1	S	0.0	18.5	4.5	24	
29	2.1	0.9	0.5	0.6	0.6	0.6	4.8	5.8	9.8	12.4	12.9	10.1	8.4	6.2	6.2	6.5	4.9	5.8	5.5	4.5	3.9	3.0	S	3.5	0.5	12.9	5.2	24	
30	2.3	1.7	1.2	1.2	2.2	2.6	7.0	4.2	6.5	8.7	10.3	18.7	11.9	2.1	1.6	4.6	3.5	4.6	6.2	10.3	8.1	S	3.3	1.8	1.2	18.7	5.4	24	
31	1.1	3.4	7.8	9.8	6.7	9.0	5.7	7.4	1.8	0.0	0.3	1.1	1.5	1.3	0.6	0.9	1.1	0.8	0.9	0.1	S	9.7	6.4	0.3	0.0	9.8	3.4	24	
HOURLY MAX	19.7	18.8	17.1	20.3	14.8	18.9	13.5	14.2	13.6	12.4	15.2	18.7	12.8	18.5	16.4	13.6	14.3	15.4	12.2	14.6	19.4	20.2	17.5	16.6					
HOURLY AVG	3.0	3.5	4.5	4.3	3.7	4.3	4.3	4.8	5.2	5.3	5.7	5.2	5.5	5.7	6.0	5.4	5.1	4.5	3.8	5.0	5.0	4.2	3.8	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

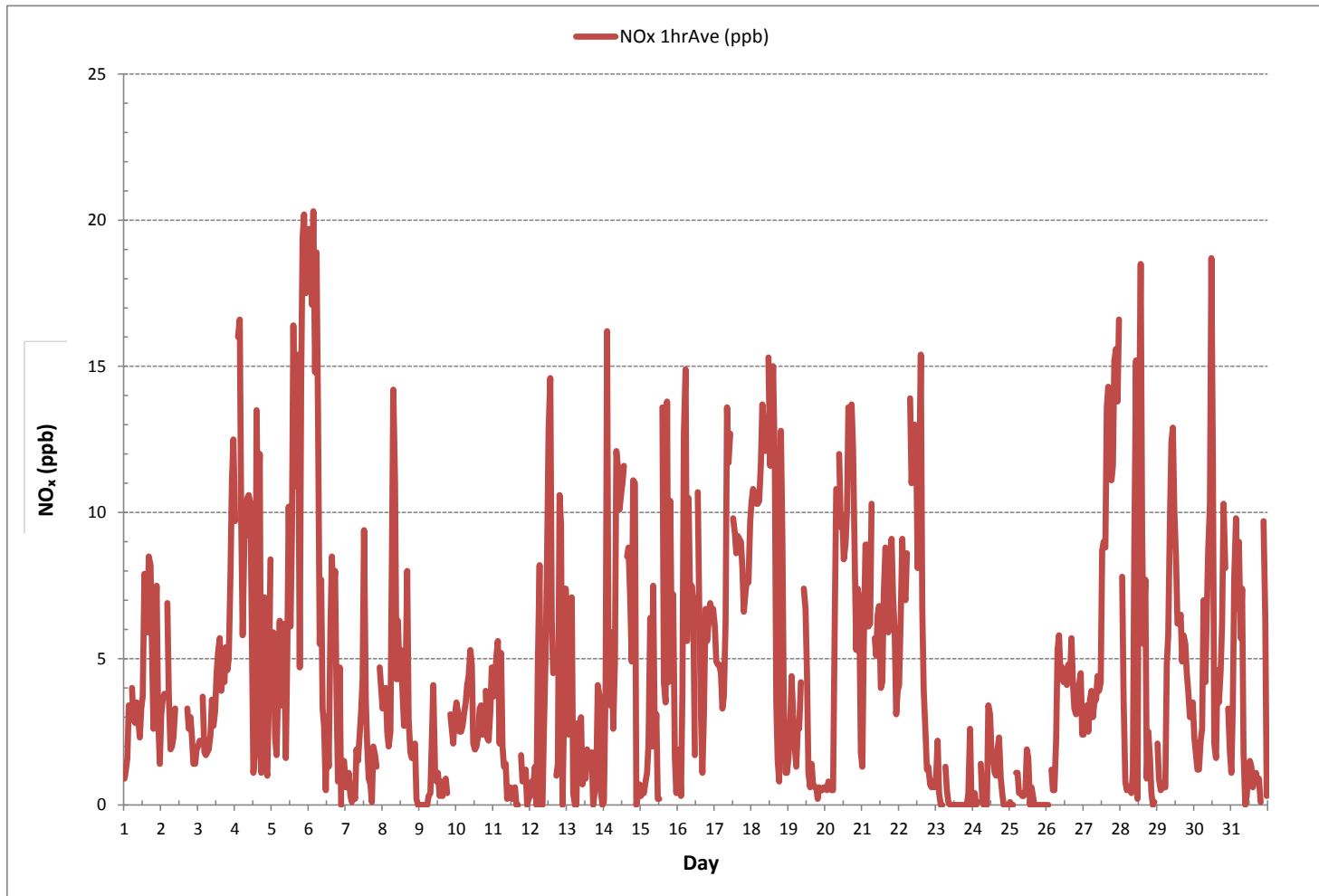
24 HR AVERAGES December 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	645			
MINIMUM 1-HR AVERAGE:	0.0	ppb @ HOUR(S)	VAR	ON DAY(S) VAR
MAXIMUM 1-HR AVERAGE:	20.3	ppb @ HOUR(S)	3	6
MAXIMUM 24-HR AVERAGE:	9.3	ppb		18
				VAR-VARIOUS
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	744
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	100.0
STANDARD DEVIATION:	4.4		MONTHLY AVERAGE:	4.6
				ppb

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





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

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	1.8	1.8	3.0	5.9	S	7.6	5.3	5.9	5.9	7.1	5.3	6.5	6.5	20.6	11.2	10.0	12.4	11.8	10.0	7.1	15.2	15.2	5.9	6.5	1.8	20.6	8.2	24	
2	5.9	5.3	5.9	S	11.2	5.9	3.6	3.0	3.6	4.7	C	C	C	C	C	C	C	4.1	3.5	3.5	3.0	1.8	2.4	3.0	1.8	11.2	4.4	24	
3	3.0	3.5	S	7.6	2.4	2.4	3.0	3.5	3.5	6.4	4.1	4.7	5.9	7.1	7.7	5.9	6.4	5.3	7.1	7.1	7.1	11.8	14.1	19.4	2.4	19.4	6.5	24	
4	12.4	S	21.2	18.8	15.2	7.1	12.4	12.4	15.2	12.4	12.4	14.1	2.4	5.3	28.2	21.2	27.5	5.3	26.9	29.9	4.7	3.0	10.6	14.7	2.4	29.9	14.5	24	
5	S	17.6	6.5	4.1	13.5	13.5	13.0	12.4	10.6	7.6	17.6	20.6	31.1	15.8	28.1	20.0	28.2	25.3	11.2	21.7	28.2	27.0	25.3	S	4.1	31.1	18.1	24	
6	29.3	24.7	28.7	25.9	19.4	29.3	22.9	10.6	15.2	10.0	10.0	3.0	7.6	4.7	13.5	33.4	14.7	20.0	10.6	7.0	10.6	1.2	S	4.1	1.2	33.4	15.5	24	
7	1.8	1.8	1.8	1.3	1.2	1.3	1.2	11.2	3.0	3.6	4.7	13.5	18.2	7.6	3.6	3.0	2.4	1.8	3.6	2.4	2.4	S	6.5	5.3	1.2	18.2	4.5	24	
8	4.1	5.3	5.3	4.7	3.6	3.6	17.6	22.9	17.0	5.9	9.4	6.5	6.5	5.3	5.3	5.9	64.5	5.3	3.0	3.0	S	4.7	1.8	0.6	0.6	64.5	9.2	24	
9	0.6	0.6	0.6	0.0	0.0	0.6	2.4	1.8	8.2	10.0	3.0	2.4	2.4	1.8	2.4	1.3	2.4	2.4	2.4	S	5.9	3.6	3.6	4.7	0.0	10.0	2.7	24	
10	4.7	4.7	4.1	3.6	4.1	4.7	5.9	5.9	7.6	7.6	7.1	4.1	3.6	4.1	4.1	6.5	5.9	4.1	S	8.2	4.1	4.1	7.6	7.6	3.6	8.2	5.4	24	
11	5.3	7.1	10.6	10.0	4.1	10.0	8.2	4.1	3.6	1.8	1.8	1.8	3.0	4.1	0.6	1.2	S	4.7	1.8	2.4	2.4	1.2	1.2	1.8	0.6	10.6	4.1	24	
12	1.2	1.8	1.8	5.3	0.6	14.7	24.7	0.6	3.0	8.2	12.9	24.1	24.1	22.3	16.4	18.8	S	4.1	8.2	17.0	18.8	1.2	8.8	16.4	0.6	24.7	11.1	24	
13	12.9	10.0	9.4	13.0	9.4	0.6	0.6	9.4	7.6	8.8	3.6	12.4	3.0	22.3	3.6	S	26.9	1.2	8.8	8.2	13.0	10.0	1.8	0.6	0.6	26.9	8.6	24	
14	1.8	15.8	31.7	8.2	16.4	14.1	5.9	11.8	44.0	20.5	25.2	16.4	14.1	13.5	S	12.4	38.7	10.0	7.6	16.4	22.9	1.2	1.2	3.0	1.2	44.0	15.3	24	
15	1.3	1.2	1.8	1.8	1.8	3.0	13.5	8.2	20.0	7.6	10.6	5.3	1.2	S	24.1	12.9	6.4	25.9	25.2	25.9	13.0	13.5	4.7	1.2	1.2	25.9	10.0	24	
16	3.6	3.0	1.8	12.4	28.7	28.2	10.0	14.7	12.4	11.8	11.8	5.3	S	18.2	14.7	29.9	3.6	5.9	12.3	7.1	8.2	9.4	8.2	8.2	1.8	29.9	11.7	24	
17	8.2	6.5	5.9	5.9	5.9	5.3	6.5	8.2	16.4	15.8	14.7	S	13.0	11.2	11.2	11.8	10.6	10.6	10.6	8.8	9.4	9.4	10.0	11.2	5.3	16.4	9.9	24	
18	12.4	12.4	12.4	11.8	11.8	12.4	13.5	16.4	17.6	15.8	S	17.6	15.8	18.8	17.6	15.8	7.1	3.5	2.4	26.4	15.2	13.0	3.5	10.6	2.4	26.4	13.2	24	
19	3.5	3.5	5.3	4.7	3.0	3.0	4.1	4.1	5.3	S	11.2	58.1	7.1	1.8	1.2	15.2	1.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	58.1	5.9	24
20	0.6	0.6	1.2	0.6	0.6	1.2	10.0	15.2	S	16.4	12.9	13.5	13.0	12.4	11.8	18.2	17.0	18.2	14.1	10.6	6.5	13.0	10.0	3.0	0.6	18.2	9.6	24	
21	2.4	9.4	10.0	14.1	8.8	11.2	29.3	S	8.8	5.9	7.1	10.0	4.7	5.9	9.4	10.0	11.2	8.2	10.6	10.6	8.8	9.4	3.5	4.7	2.4	29.3	9.3	24	
22	5.3	10.0	10.0	10.0	7.6	11.8	S	16.4	13.0	18.2	15.2	14.1	10.0	18.2	36.4	18.1	4.7	4.1	1.8	1.8	1.2	1.2	1.2	0.6	0.6	36.4	10.0	24	
23	1.8	3.0	1.2	0.0	0.0	S	3.5	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	4.1	0.6	0.0	4.1	0.7	24	
24	0.6	1.2	0.6	0.6	S	3.0	0.6	0.0	0.0	0.0	7.6	5.9	3.6	3.0	4.1	4.1	4.1	4.1	4.1	1.2	1.2	0.0	0.0	0.0	0.0	7.6	2.2	24	
25	0.6	0.0	0.0	S	3.0	2.4	0.6	1.2	0.6	1.2	2.4	3.0	3.0	1.2	3.0	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.0	24	
26	0.0	0.0	S	2.4	1.2	1.2	3.6	7.1	6.4	5.3	4.7	5.3	4.7	5.3	5.3	7.1	5.9	4.1	4.1	4.1	4.1	5.3	6.4	3.6	0.0	7.1	4.3	24	
27	3.0	S	5.9	4.1	4.7	5.3	4.1	4.7	4.7	8.8	5.3	6.4	11.2	11.2	11.2	17.0	14.7	12.4	15.2	17.0	17.0	18.2	19.4	3.0	19.4	10.4	24		
28	S	16.4	5.3	3.0	1.8	1.8	3.0	1.2	3.5	12.4	41.1	3.0	22.9	29.9	20.6	10.6	13.5	3.0	8.8	5.2	0.6	0.0	0.6	S	0.0	41.1	9.5	24	
29	4.1	1.2	0.6	0.6	0.6	1.2	26.9	12.9	11.8	13.5	15.2	11.8	8.8	7.1	7.6	10.6	7.0	6.5	5.9	5.3	4.7	3.6	S	5.9	0.6	26.9	7.5	24	
30	3.0	1.8	1.8	1.8	3.6	3.6	41.1	5.9	8.2	11.8	15.2	20.6	17.6	4.1	4.7	5.3	4.7	7.1	8.2	14.1	13.5	S	5.9	3.0	1.8	41.1	9.0	24	
31	1.8	9.4	12.4	21.7	17.0	13.5	11.2	20.6	14.7	0.6	0.6	2.4	1.8	2.4	1.2	1.2	1.8	1.2	1.2	0.6	S	15.2	10.6	1.8	0.6	21.7	7.2	24	
HOURLY MAX	29.3	24.7	31.7	25.9	28.7	29.3	41.1	22.9	44.0	20.5	41.1	58.1	31.1	29.9	36.4	33.4	64.5	25.9	26.9	29.9	28.2	27.0	25.3	19.4					
HOURLY AVG	4.7	6.2	7.1	7.0	6.9	7.5	10.3	8.4	9.7	8.7	10.1	10.8	9.2	9.8	10.8	11.2	12.0	7.3	7.7	9.0	8.4	6.9	6.1	5.6					

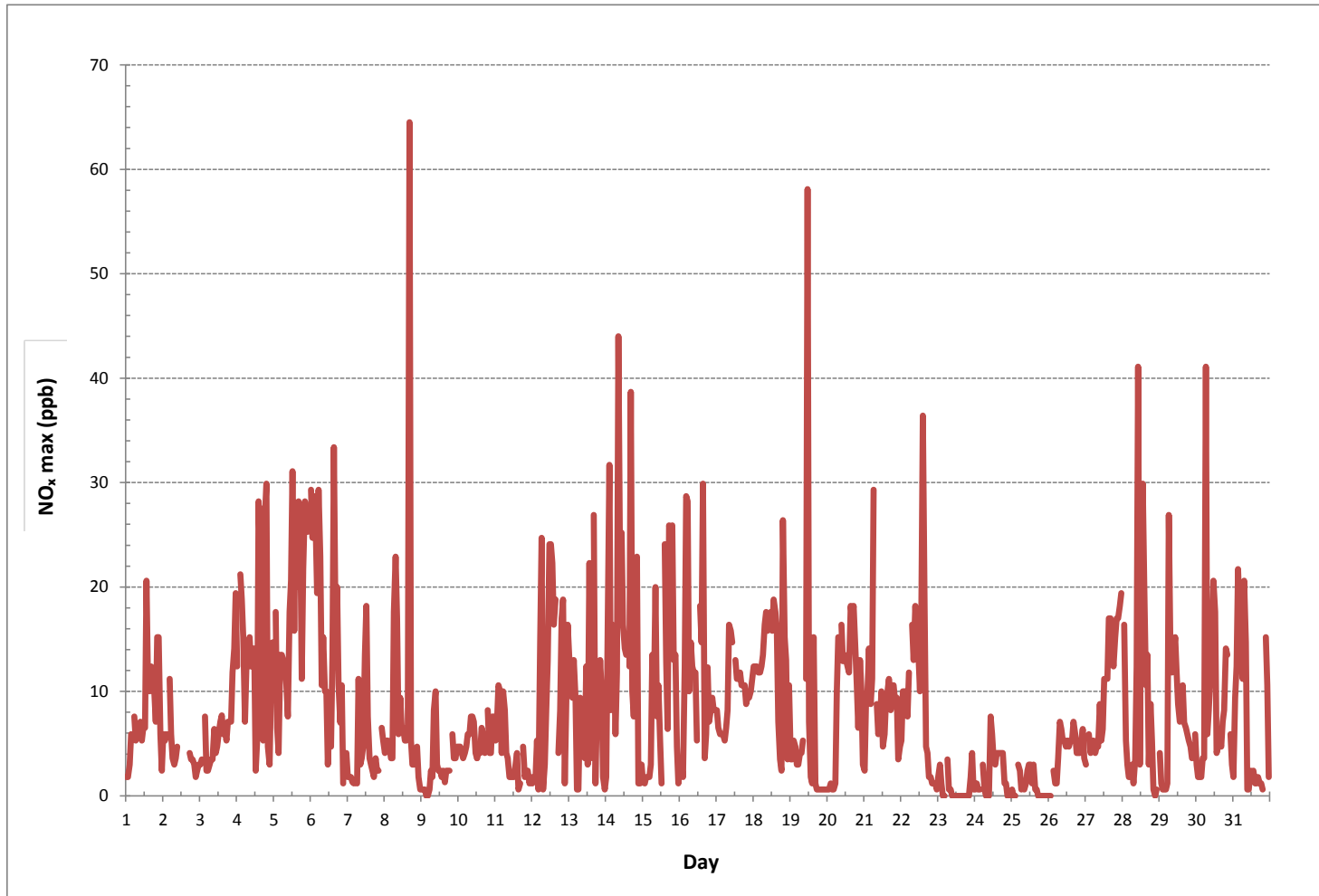
STATUS FLAG CODES

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:	670
MAXIMUM INSTANTANEOUS VALUE:	64.5 ppb @ HOUR(S) 16 ON DAY(S) 8
VAR-VARIOUS	
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	8.1
OPERATIONAL TIME:	744 hrs

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

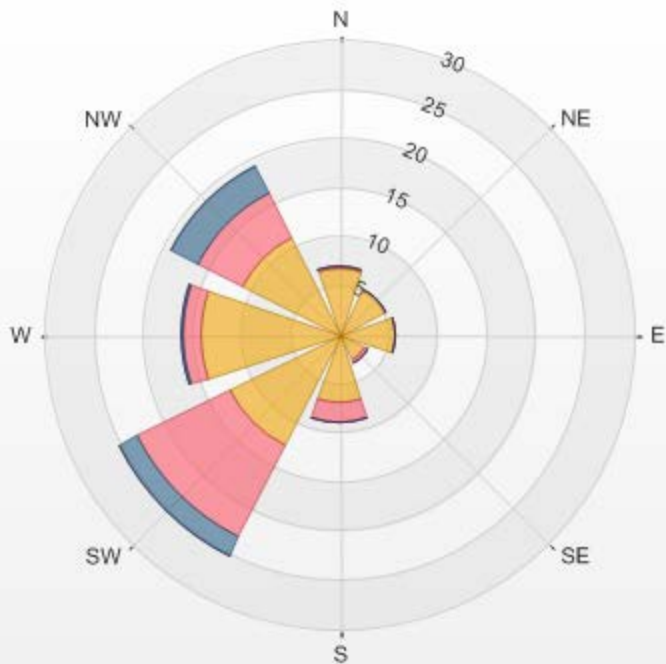


Wind: LICA MASKWA Poll.: LICA MASKWA-NOX[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr  
 Calm: 9.39% Valid Data: 94.49% Calm Avg: 3.65 [ppb]

Direction	0.0-6.8	6.8-13.5	13.5-20.3	>20.3	Total
N	6.83	0.14	0	0	6.97
NE	5.26	0	0	0	5.26
E	5.69	0	0	0	5.69
SE	2.84	0.43	0	0	3.27
S	6.97	1.99	0	0	8.96
SW	12.52	10.53	2.13	0	25.18
W	14.22	1.71	0.14	0	16.07
NW	11.1	5.12	2.99	0	19.21
Summary	65.43	19.92	5.26	0	90.61

% Icon	Classes (ppb)	65	20	5	0		
	0.0-6.8		6.8-13.5		13.5-20.3		>20.3

LICA MASKWA Poll.: LICA MASKWA-NOX[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 9.39% Calm Poll  
Avg: 3.65[ppb]



NOX[ppb] Calibration: LICA MASKWA Monthly: 2016/12 Type: Span



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

***NITRIC OXIDES***



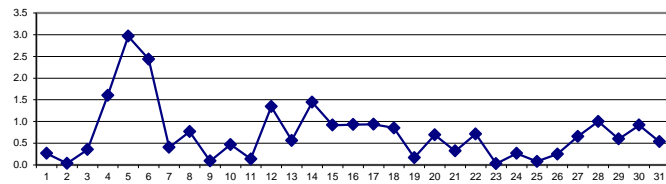
**NITRIC OXIDE Hourly Averages (NO ppb)**

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	0.0	0.0	0.1	0.0	S	0.0	0.1	0.4	0.4	0.3	0.1	0.6	0.6	1.8	0.7	0.5	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	1.8	0.3	24
2	0.0	0.0	0.0	S	0.0	0.1	0.0	0.1	0.0	0.3	C	C	C	C	C	C	C	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24
3	0.0	0.0	S	0.0	0.0	0.0	0.1	0.1	0.0	0.8	0.6	0.9	1.1	1.3	1.2	0.6	0.3	0.1	0.2	0.0	0.2	0.1	0.3	0.3	0.0	1.3	0.4	24	
4	0.3	S	0.3	0.4	0.2	0.0	0.3	0.5	0.7	1.0	1.3	0.9	0.3	0.4	6.6	4.7	6.1	0.6	2.9	3.3	0.7	0.5	1.6	3.2	0.0	6.6	1.6	24	
5	S	1.5	0.7	0.6	1.2	2.0	0.9	1.7	1.3	0.7	2.3	4.5	2.6	3.8	6.5	3.4	3.6	4.8	1.2	4.5	6.0	6.1	5.3	S	0.6	6.5	3.0	24	
6	5.5	5.3	5.1	6.0	3.4	5.2	3.8	1.1	2.1	1.1	1.0	0.4	1.3	0.8	2.6	2.9	2.2	2.7	1.3	0.6	1.6	0.0	S	0.0	0.0	6.0	2.4	24	
7	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.6	0.2	0.3	0.7	1.5	4.0	1.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	4.0	0.4	24	
8	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.8	1.6	0.7	2.2	1.7	1.8	1.2	0.6	0.7	1.9	0.4	0.3	0.2	S	0.3	0.2	0.0	0.0	2.8	0.8	24	
9	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2	0.4	0.4	0.3	0.1	0.2	0.1	0.1	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.4	0.1	24	
10	0.0	0.0	0.2	0.2	0.2	0.1	0.1	0.3	0.5	1.4	2.2	1.0	1.0	1.1	0.8	0.5	0.3	0.0	S	0.4	0.2	0.1	0.1	0.1	0.0	2.2	0.5	24	
11	0.0	0.2	0.3	0.2	0.0	0.5	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.4	0.0	0.0	S	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.5	0.1	24	
12	0.0	0.1	0.0	0.0	0.0	0.5	2.3	0.0	0.0	1.3	2.3	3.9	5.3	5.8	2.0	1.6	S	0.1	0.2	1.0	2.3	0.0	0.5	1.7	0.0	5.8	1.3	24	
13	1.0	0.0	0.3	1.5	0.3	0.0	0.0	0.8	0.7	1.3	0.7	0.7	0.6	1.0	0.7	S	0.6	0.0	0.5	0.5	1.0	0.4	0.4	0.0	0.0	1.5	0.6	24	
14	0.1	1.0	4.4	0.4	0.6	0.7	0.1	0.6	3.0	2.7	3.7	3.4	3.2	2.9	S	1.2	1.9	0.5	0.0	0.7	2.1	0.0	0.0	0.0	0.0	4.4	1.4	24	
15	0.0	0.0	0.0	0.2	0.2	0.2	1.0	0.4	1.6	0.8	1.4	0.2	0.2	S	4.4	1.2	0.6	3.8	1.3	2.2	1.0	0.4	0.0	0.0	0.0	4.4	0.9	24	
16	0.0	0.0	0.0	0.8	3.6	4.6	0.3	1.0	0.5	1.4	2.4	0.8	S	3.2	1.5	1.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	4.6	0.9	24	
17	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	2.8	5.8	S	3.6	3.3	2.2	1.2	0.2	0.2	0.1	0.0	0.2	0.2	0.1	0.3	0.0	5.8	0.9	24	
18	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.3	1.1	1.7	S	3.2	2.7	2.6	1.8	0.6	0.0	0.0	0.0	1.6	0.5	0.0	0.4	0.2	0.0	3.2	0.9	24	
19	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	S	0.8	1.4	0.8	0.2	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.2	24	
20	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	S	1.0	2.2	2.8	2.4	2.5	2.0	1.3	0.3	0.2	0.0	0.0	0.0	0.3	0.3	0.0	0.0	2.8	0.7	24	
21	0.0	0.0	0.0	0.0	0.0	0.1	0.5	S	0.3	0.5	1.1	1.4	0.6	0.6	0.9	0.7	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.3	24	
22	0.0	0.0	0.0	0.0	0.0	0.1	S	0.3	0.3	1.1	2.2	2.4	1.6	3.0	4.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.7	24	
23	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.6	0.0	24	
24	0.0	0.2	0.0	0.1	S	0.2	0.1	0.0	0.0	0.0	1.0	1.0	0.8	0.6	0.5	0.2	0.4	0.3	0.3	0.4	0.0	0.0	0.0	0.0	0.0	1.0	0.3	24	
25	0.1	0.0	0.0	S	0.0	0.3	0.0	0.0	0.0	0.0	0.2	0.6	0.5	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	24	
26	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	1.1	1.2	1.3	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.3	24	
27	0.0	S	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.7	0.9	1.1	2.6	2.7	2.2	2.3	0.8	0.2	0.0	0.3	0.5	0.3	0.2	0.1	0.0	2.7	0.7	24	
28	S	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.9	5.4	0.1	4.8	7.2	2.0	0.6	0.4	0.1	0.3	0.0	0.0	0.0	0.0	S	0.0	7.2	1.0	24	
29	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.3	0.4	1.5	2.9	2.6	2.3	1.3	0.9	0.6	0.2	0.1	0.0	0.0	0.0	0.1	S	0.0	0.0	2.9	0.6	24	
30	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.2	0.3	1.2	3.0	8.3	4.8	0.6	0.2	0.6	0.0	0.0	0.1	0.0	0.0	S	0.0	0.0	0.0	8.3	0.9	24	
31	0.1	0.1	0.7	1.7	1.3	1.5	1.0	1.9	0.4	0.0	0.3	0.4	0.5	0.5	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	1.9	0.5	24	
HOURLY MAX	5.5	5.3	5.1	6.0	3.6	5.2	3.8	2.8	3.0	2.8	5.8	8.3	5.3	7.2	6.6	4.7	6.1	4.8	2.9	4.5	6.0	6.1	5.3	3.2					
HOURLY AVG	0.3	0.3	0.4	0.4	0.4	0.6	0.5	0.5	0.6	0.9	1.7	1.6	1.8	1.8	1.6	1.0	0.7	0.5	0.3	0.5	0.6	0.3	0.4	0.2					

**STATUS FLAG CODES**

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

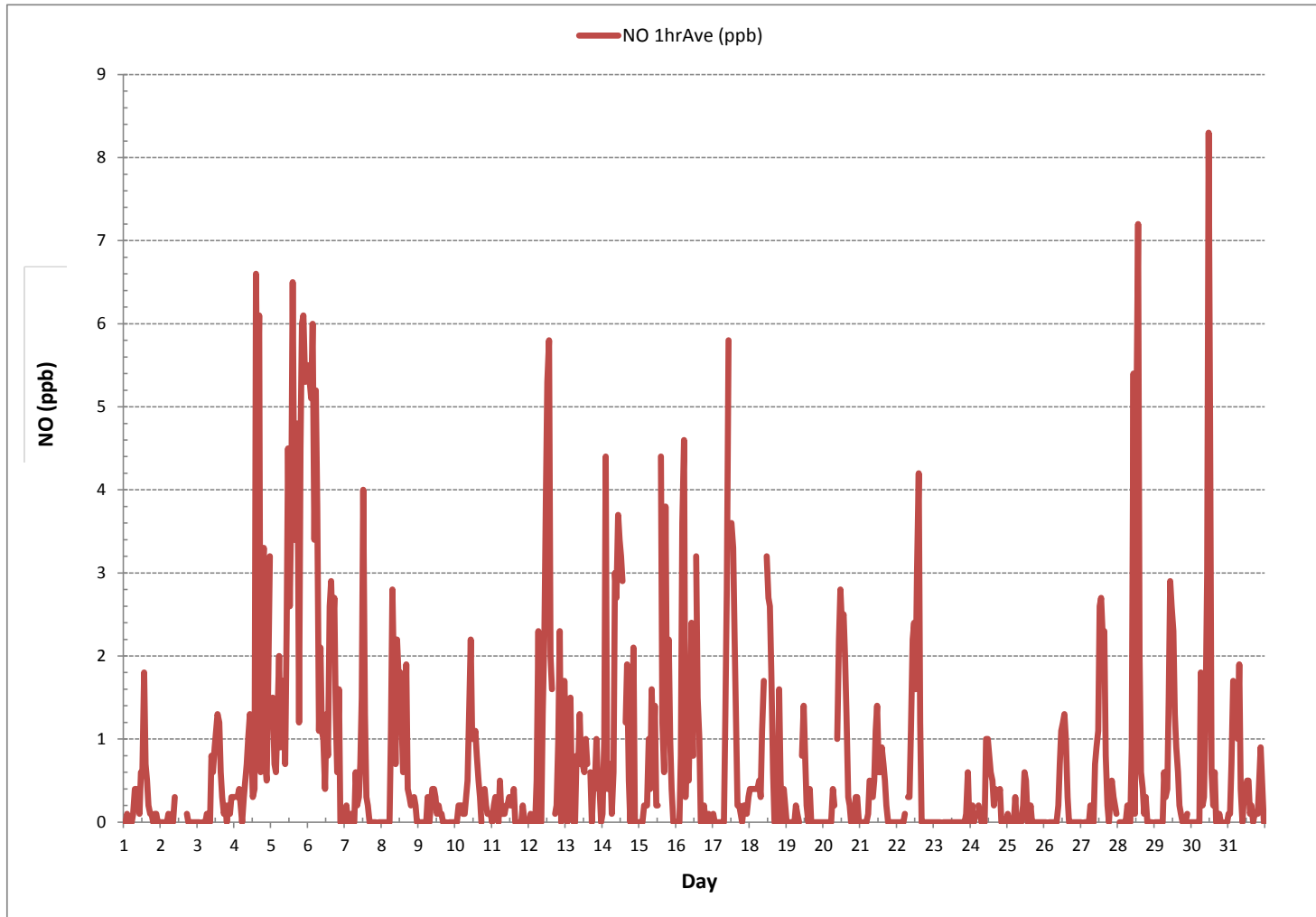
**24 HR AVERAGES December 2016**



**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	431				
MINIMUM 1-HR AVERAGE:	0.0	ppb @ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 1-HR AVERAGE:	8.3	ppb @ HOUR(S)	11	ON DAY(S)	30
MAXIMUM 24-HR AVERAGE:	3.0	ppb		ON DAY(S)	5
				VAR-VARIOUS	
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	744	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	1.3		MONTHLY AVERAGE:	0.7	ppb

NITRIC OXIDE Hourly Averages (NO ppb)





NITRIC OXIDE Instantaneous Maximum (NO ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	0.0	0.0	0.5	0.0	S	0.0	0.5	1.7	1.1	1.1	0.5	0.5	5.1	1.1	0.5	0.5	0.5	0.5	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	5.1	0.7	24
2	0.0	0.0	0.0	S	0.0	0.5	0.0	0.5	0.0	0.5	C	C	C	C	C	C	C	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.2	24
3	0.0	0.0	S	0.0	0.0	0.0	0.5	0.5	0.5	2.3	0.5	1.1	1.1	1.7	1.7	0.5	1.1	0.5	1.1	0.0	0.5	0.5	0.5	0.5	0.0	2.3	0.7	24	
4	0.5	S	0.5	0.5	0.5	0.5	0.5	1.7	1.7	1.1	2.3	7.5	0.5	0.5	16.9	13.4	15.7	2.3	14.6	13.4	1.7	1.1	3.9	5.7	0.5	16.9	4.7	24	
5	S	5.7	1.7	1.1	4.5	3.9	3.9	3.4	2.8	7.5	7.5	13.4	16.8	6.9	12.2	6.9	11.7	9.3	3.4	6.9	9.9	9.9	8.7	S	1.1	16.8	7.2	24	
6	10.5	7.5	10.5	9.3	5.7	11.1	7.5	2.3	5.1	3.4	3.4	1.1	2.8	2.3	5.7	14.0	4.5	6.9	2.8	2.3	3.4	0.5	S	0.0	0.0	14.0	5.3	24	
7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	4.5	0.5	0.5	1.7	5.7	8.7	2.8	1.1	1.1	0.5	0.5	0.5	0.5	0.5	S	0.5	0.5	0.5	8.7	1.5	24	
8	0.5	0.5	0.5	0.5	0.5	0.5	4.5	6.9	3.4	1.1	3.4	2.3	2.3	1.7	1.1	1.1	36.2	0.5	0.5	0.5	S	0.5	0.5	0.5	0.5	36.2	3.0	24	
9	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.1	1.1	1.1	0.5	1.1	0.5	0.5	0.5	0.5	0.5	S	0.5	0.5	0.5	0.5	0.5	1.1	0.6	24	
10	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.1	2.3	2.8	1.6	1.1	1.7	1.1	0.5	0.5	0.5	S	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2.8	0.9	24	
11	0.5	0.5	0.5	0.5	0.5	1.7	1.1	0.5	0.5	0.5	1.1	0.5	1.1	1.1	0.5	0.5	S	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.7	0.7	24	
12	0.5	0.5	0.5	0.5	0.5	3.4	6.9	0.5	1.1	2.8	9.3	10.5	10.5	8.7	5.7	11.1	S	0.5	0.5	3.4	4.5	0.5	1.6	3.9	0.5	11.1	3.8	24	
13	2.8	0.0	0.5	4.5	2.8	0.0	0.0	1.7	1.7	2.8	1.7	5.7	1.1	11.6	1.1	S	9.8	0.5	2.3	2.2	2.3	0.5	0.5	0.5	0.0	11.6	2.5	24	
14	0.5	3.4	9.3	0.5	3.4	2.3	0.5	1.1	21.6	5.7	16.3	6.3	3.4	3.4	S	1.7	21.0	2.3	0.5	2.3	4.6	0.0	0.0	0.0	0.0	21.6	4.8	24	
15	0.5	0.0	0.0	0.5	0.5	0.5	2.8	1.1	3.9	2.3	3.4	1.7	0.5	S	9.3	3.4	1.7	8.7	7.5	7.5	2.8	1.1	0.5	0.5	0.0	9.3	2.6	24	
16	0.5	0.5	0.5	3.4	11.1	10.5	1.1	3.4	2.3	2.8	3.9	2.3	S	6.3	4.6	14.0	0.5	0.5	1.7	0.5	0.5	0.5	0.5	0.5	0.5	14.0	3.1	24	
17	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2.8	4.6	6.9	S	4.6	3.9	2.8	2.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	6.9	1.6	24	
18	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2.8	2.8	S	3.9	3.4	3.4	2.8	1.1	0.0	0.0	0.0	5.7	2.3	0.0	1.1	6.3	0.0	6.3	1.7	24		
19	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0	S	1.1	26.8	1.1	0.5	0.5	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.8	1.6	24	
20	0.0	0.0	0.0	0.0	0.0	1.1	1.1	S	1.7	4.5	4.5	3.4	3.4	2.8	2.3	0.5	1.1	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	4.5	1.2	24	
21	0.5	0.0	0.0	0.0	0.5	0.5	11.0	S	1.1	1.1	1.7	2.3	0.5	1.1	1.1	1.1	1.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	1.0	24	
22	0.5	0.0	0.0	0.0	0.0	S	1.7	1.1	3.3	3.3	2.8	2.3	6.9	18.0	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.0	18.0	2.0	24	
23	0.0	0.0	0.0	0.5	0.0	S	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0	0.5	0.2	24	
24	0.0	0.5	0.5	0.5	S	0.5	0.5	0.5	0.5	0.0	1.7	1.7	1.1	1.1	1.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0	0.0	1.7	0.6	24	
25	0.5	0.5	0.5	S	0.5	0.5	0.0	0.5	0.0	0.5	0.5	1.1	1.1	0.5	1.1	0.5	0.5	0.5	0.5	0.5	0.0	0.5	0.5	0.5	0.0	1.1	0.5	24	
26	0.5	0.5	S	0.5	0.5	0.5	0.5	0.5	0.5	1.1	1.1	1.7	1.7	1.7	1.7	1.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0	0.0	1.7	0.8	24	
27	0.5	S	0.0	0.0	0.5	0.5	0.5	0.5	0.5	3.4	1.1	1.7	3.4	3.4	3.4	3.9	1.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0	3.9	1.2	24	
28	S	0.5	0.0	0.0	0.5	0.0	1.1	0.0	0.0	1.7	18.1	0.5	9.3	12.2	7.5	1.7	1.1	0.5	1.1	0.5	0.0	0.0	0.0	S	0.0	18.1	2.6	24	
29	0.0	0.0	0.0	0.0	0.0	0.0	9.3	2.8	0.5	2.3	2.8	2.8	2.3	1.7	1.1	0.5	0.5	0.5	0.5	0.0	0.5	0.5	S	0.0	0.0	9.3	1.2	24	
30	0.5	0.0	0.0	0.0	0.5	0.0	28.0	0.5	0.5	2.3	5.8	9.3	7.5	1.1	1.1	1.1	0.5	0.0	0.5	0.5	0.0	S	0.0	0.5	0.0	28.0	2.6	24	
31	0.5	0.5	1.7	4.5	3.4	2.3	1.7	5.1	2.8	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	S	2.3	1.1	0.0	5.1	1.4	24	
HOURLY MAX	10.5	7.5	10.5	9.3	11.1	11.1	28.0	6.9	21.6	7.5	18.1	26.8	16.8	12.2	18.0	14.0	36.2	9.3	14.6	13.4	9.9	9.9	8.7	6.3					
HOURLY AVG	0.8	0.8	1.0	1.0	1.3	1.4	2.9	1.5	2.0	2.1	3.7	4.2	3.2	3.3	3.7	3.4	3.9	1.3	1.4	1.7	1.3	0.8	0.9	0.8					

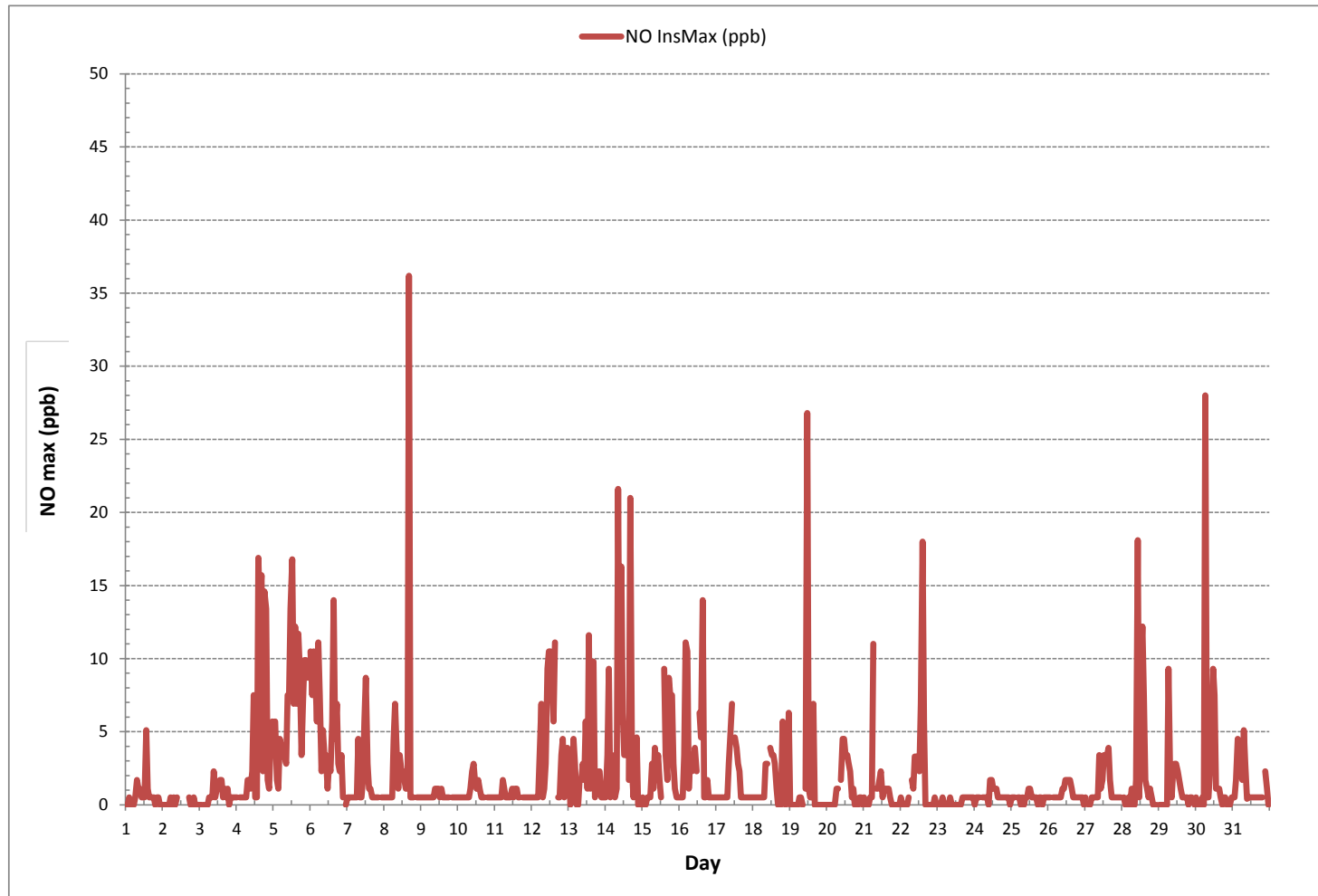
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	575
MAXIMUM INSTANTANEOUS VALUE:	36.2 ppb @ HOUR(S) 16 ON DAY(S) 8
	VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	3.7
OPERATIONAL TIME:	744 hrs

NITRIC OXIDE Instantaneous Maximum (NO ppb)



Wind: LICA MASKWA Poll.: LICA MASKWA-NO[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 9.39% Valid Data: 94.49% Calm Avg: 0.28 [ppb]

Direction	0.0-2.8	2.8-5.6	5.6-8.4	>8.4	Total
N	6.97	0	0	0	6.97
NE	5.26	0	0	0	5.26
E	5.69	0	0	0	5.69
SE	3.13	0.14	0	0	3.27
S	8.68	0.28	0	0	8.96
SW	23.61	1.42	0.14	0	25.17
W	15.79	0.28	0	0	16.07
NW	14.08	3.98	1.14	0	19.2
Summary	83.21	6.1	1.28	0	90.59

% Icon Classes (ppb)

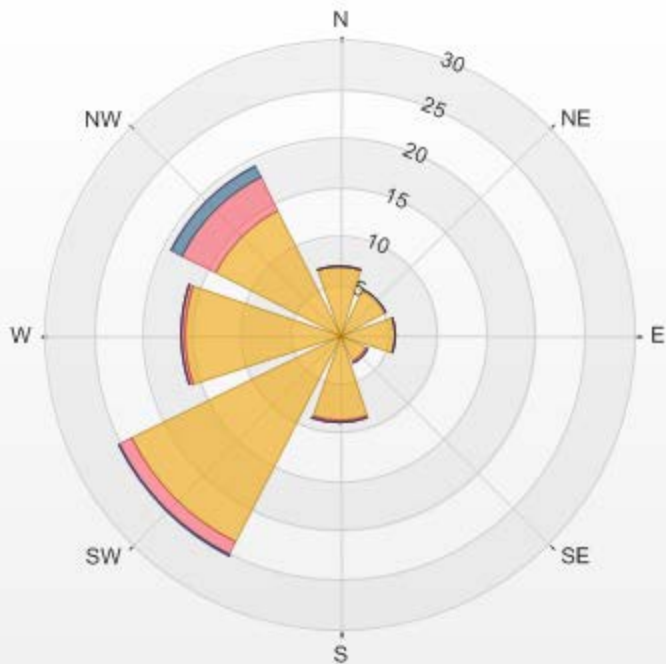
83 0.0-2.8

6 2.8-5.6

1 5.6-8.4

0 >8.4

LICA MASKWA Poll.: LICA MASKWA-NO[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 9.39% Calm Poll  
Avg: 0.28[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	0.9	1.2	1.5	3.4	S	4.0	2.8	2.4	3.1	2.8	2.2	2.7	3.1	6.1	6.1	5.3	8.3	8.1	5.3	2.6	6.0	7.4	3.1	3.6	0.9	8.3	4.0	24
2	3.0	3.5	3.8	S	6.8	3.7	1.9	1.9	2.3	3.0	C	C	C	C	C	C	C	3.2	2.6	3.0	2.3	1.4	1.4	1.9	1.4	6.8	2.9	24
3	2.0	2.2	S	3.7	1.8	1.7	1.8	1.8	2.3	2.8	2.1	2.4	3.4	4.0	4.5	3.4	4.3	4.1	5.1	4.6	4.7	7.8	10.8	12.2	1.7	12.2	4.1	24
4	9.3	S	15.7	16.2	9.6	5.7	8.8	8.8	9.8	9.6	9.0	4.7	0.8	1.4	6.9	4.4	6.0	0.5	2.9	3.8	0.6	0.4	1.9	5.2	0.4	16.2	6.2	24
5	S	4.4	1.5	1.1	2.5	4.2	2.5	4.5	3.4	0.9	2.9	5.7	3.5	5.4	9.9	7.6	8.1	10.6	3.4	10.1	13.4	14.1	12.1	S	0.9	14.1	6.0	24
6	14.1	13.5	12.0	14.2	11.4	13.7	9.7	4.3	5.6	2.2	1.7	0.1	1.6	0.5	3.4	5.6	4.9	5.2	2.5	0.2	3.1	0.0	S	1.5	0.0	14.2	5.7	24
7	0.6	0.3	1.1	0.3	0.0	0.5	0.2	1.3	1.3	2.1	2.5	2.8	5.4	2.3	1.7	0.8	0.7	0.1	2.0	1.7	1.3	S	4.7	4.0	0.0	5.4	1.6	24
8	3.3	3.8	4.0	2.5	2.0	2.5	7.1	11.4	9.4	3.6	4.1	2.6	3.5	2.6	2.1	3.9	6.1	2.5	1.5	1.3	S	1.8	0.0	0.0	0.0	11.4	3.5	24
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	2.0	3.7	0.8	0.4	1.0	0.1	0.7	0.3	0.6	0.9	0.4	S	3.1	2.6	2.1	3.1	0.0	3.7	1.0	24
10	3.5	3.2	2.3	2.3	2.5	3.1	3.4	3.8	3.9	3.9	2.7	1.1	0.9	1.0	1.5	2.7	3.1	2.4	S	3.5	2.1	2.1	3.1	4.6	0.9	4.6	2.7	24
11	3.7	4.0	4.8	5.4	2.1	4.7	1.9	1.2	1.2	0.0	0.1	0.3	0.0	0.3	0.2	0.0	0.0	S	1.7	0.8	0.8	1.2	0.0	0.2	0.0	5.4	1.5	24
12	0.2	0.7	0.6	1.2	0.0	4.3	6.0	0.0	0.0	1.3	2.9	4.7	7.5	8.8	4.2	2.9	S	0.9	1.2	9.6	7.3	0.0	2.4	5.7	0.0	9.6	3.1	24
13	5.3	2.4	5.1	5.6	0.1	0.0	1.9	1.4	1.8	0.0	0.4	0.3	0.9	0.7	S	1.2	0.0	0.1	0.5	3.1	3.3	0.0	0.0	0.0	0.0	5.6	1.5	24
14	0.0	3.4	11.8	3.7	2.8	5.1	2.5	4.3	9.1	8.9	6.4	7.2	7.9	8.8	S	7.3	6.8	6.5	4.8	10.4	8.8	0.0	0.3	0.7	0.0	11.8	5.5	24
15	0.3	0.5	0.4	0.7	1.0	1.9	5.3	1.5	6.0	1.2	1.7	0.0	0.0	S	9.2	3.0	2.9	10.0	2.9	8.2	4.4	6.8	1.6	0.4	0.0	10.0	3.0	24
16	1.8	1.9	0.3	3.0	9.1	10.4	5.3	9.6	6.4	6.2	4.7	0.9	S	7.5	5.3	2.1	1.1	3.0	6.5	5.6	6.2	6.8	6.6	6.7	0.3	10.4	5.1	24
17	6.0	4.9	4.8	4.8	4.5	3.3	3.7	6.2	12.3	8.9	6.9	S	6.2	6.0	6.4	8.1	9.0	8.9	8.0	6.5	7.1	7.5	7.5	9.4	3.3	12.3	6.8	24
18	10.1	10.5	10.2	9.9	9.9	9.9	11.1	13.4	12.0	10.4	S	12.1	8.9	10.6	13.3	11.1	3.4	1.5	0.8	11.2	8.7	3.4	0.7	0.9	0.7	13.4	8.4	24
19	1.6	2.7	4.4	3.1	2.0	1.3	2.5	2.5	4.2	S	6.6	5.3	3.7	0.9	0.6	1.0	0.7	0.6	0.6	0.2	0.5	0.5	0.5	0.6	0.2	6.6	2.0	24
20	0.6	0.5	0.8	0.6	0.5	0.5	6.0	10.6	S	11.0	7.3	7.1	6.0	6.4	8.1	12.3	12.7	13.4	12.2	8.3	5.3	7.1	6.7	1.8	0.5	13.4	6.3	24
21	1.3	5.5	8.9	8.9	6.1	6.1	9.8	S	5.4	4.6	5.4	5.4	3.4	3.6	6.3	8.1	7.0	5.7	8.1	9.1	7.1	5.8	3.1	3.9	1.3	9.8	6.0	24
22	4.1	6.6	9.1	7.4	7.0	8.6	S	13.6	10.8	10.6	10.8	9.9	6.5	7.9	11.3	5.4	3.9	2.5	1.2	1.3	0.7	0.6	0.8	0.6	0.6	13.6	6.1	24
23	1.0	2.2	0.4	0.0	0.0	S	1.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.0	0.0	0.0	2.2	0.3	24
24	0.0	0.2	0.0	0.0	S	1.2	0.1	0.0	0.0	0.0	2.4	2.2	1.0	1.0	0.6	0.7	1.5	2.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.6	24
25	0.0	0.0	0.0	S	1.1	0.8	0.4	0.4	0.3	0.3	0.3	1.3	1.1	0.0	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.3	24
26	0.0	0.0	S	1.2	0.5	0.5	2.2	5.3	5.8	4.0	4.0	3.2	3.4	2.8	3.8	4.1	5.7	4.2	3.3	3.1	3.5	4.1	4.5	2.4	0.0	5.8	3.1	24
27	2.4	S	3.4	2.5	3.6	3.9	2.9	3.5	3.6	3.8	3.0	3.1	6.1	6.3	6.6	11.2	13.5	12.4	11.1	11.3	14.7	15.3	13.6	16.4	2.4	16.4	7.6	24
28	S	7.8	3.6	0.8	0.5	0.6	0.3	0.4	1.1	8.0	9.7	0.1	7.6	11.3	7.3	4.8	7.3	0.8	2.3	1.6	0.4	0.0	0.1	S	0.0	11.3	3.5	24
29	2.1	0.9	0.5	0.6	0.6	0.6	4.2	5.5	9.4	11.0	10.0	7.5	6.1	4.9	5.3	5.9	4.7	5.7	5.5	4.5	3.9	2.9	S	3.5	0.5	11.0	4.6	24
30	2.2	1.7	1.2	1.2	2.2	2.6	5.1	4.0	6.1	7.5	7.3	10.4	7.2	1.4	1.4	4.0	3.5	4.6	6.1	10.3	8.1	S	3.3	1.8	1.2	10.4	4.5	24
31	1.0	3.3	7.1	8.2	5.4	7.5	4.8	5.6	1.4	0.0	0.0	0.8	1.0	0.8	0.4	0.7	1.0	0.7	0.7	0.0	S	8.7	6.0	0.3	0.0	8.7	2.8	24
HOURLY MAX	14.1	13.5	15.7	16.2	11.4	13.7	11.1	13.6	12.3	11.0	10.8	12.1	8.9	11.3	13.3	12.3	13.5	13.4	12.2	11.3	14.7	15.3	13.6	16.4				
HOURLY AVG	2.8	3.2	4.1	3.9	3.3	3.8	3.8	4.4	4.7	4.5	4.1	3.6	3.7	3.9	4.4	4.4	4.4	4.0	3.5	4.4	4.4	3.9	3.4	3.2				

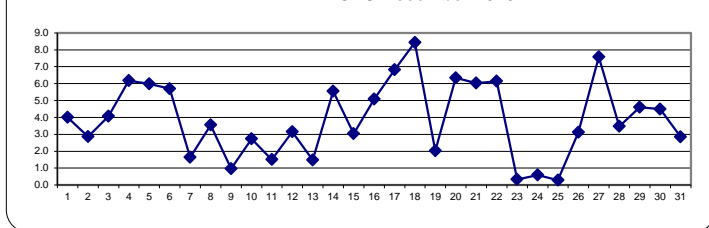
**STATUS FLAG CODES**

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

OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

**24 HR AVERAGES December 2016**

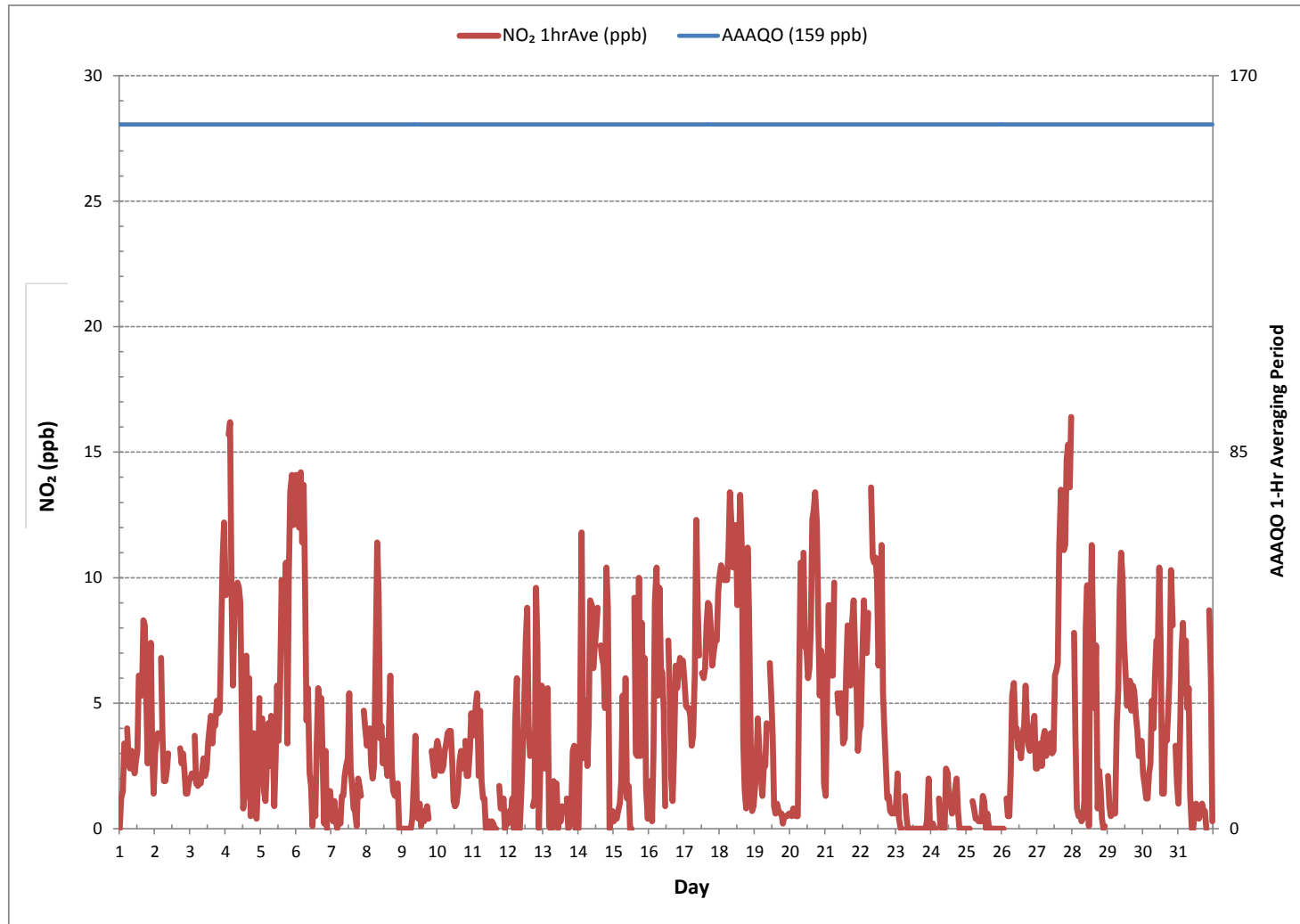


**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	629				
MINIMUM 1-HR AVERAGE:	0.0	ppb	@ HOUR(S)	VAR	ON DAY(S)
MAXIMUM 1-HR AVERAGE:	16.4	ppb	@ HOUR(S)	23	ON DAY(S)
MAXIMUM 24-HR AVERAGE:	8.4	ppb			ON DAY(S)
					VAR-VARIOUS
1ZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	744	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	3.6		MONTHLY AVERAGE:	3.9	ppb



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





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

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	1.5	2.1	2.7	5.6	S	7.9	5.0	4.4	5.6	6.2	5.0	6.2	6.2	15.6	9.7	9.7	12.1	11.5	9.7	6.7	15.0	15.0	6.2	6.7	1.5	15.6	7.7	24
2	5.6	5.6	6.2	S	10.9	5.6	3.3	2.7	3.3	3.9	C	C	C	C	C	C	C	3.8	3.8	3.8	3.2	2.1	2.7	2.7	2.1	10.9	4.3	24
3	2.7	3.3	S	7.9	2.7	2.1	2.7	2.7	3.3	4.4	3.8	3.8	5.0	5.6	6.7	5.0	5.6	5.0	6.7	6.7	6.7	11.5	13.9	19.1	2.1	19.1	6.0	24
4	12.1	S	20.9	18.5	15.0	7.3	12.1	10.9	13.9	12.1	10.3	8.5	2.1	4.4	11.5	9.1	12.1	3.3	13.3	16.7	2.7	2.1	6.7	9.1	2.1	20.9	10.2	24
5	S	12.1	4.9	3.3	9.1	9.1	9.1	8.5	7.9	2.7	9.7	11.5	15.5	8.5	16.1	13.3	16.1	16.2	7.9	14.4	18.5	17.3	16.7	S	2.7	18.5	11.3	24
6	19.1	17.3	17.9	17.3	14.4	18.5	15.6	8.5	10.3	6.2	6.7	2.1	4.4	2.7	8.5	21.4	10.9	12.7	7.3	4.9	7.9	0.9	S	3.8	0.9	21.4	10.4	24
7	1.5	1.5	2.1	1.5	0.9	1.5	1.5	7.9	2.7	2.7	3.8	7.3	9.7	5.0	2.7	2.1	1.5	2.1	3.3	2.1	2.1	S	6.7	5.0	0.9	9.7	3.4	24
8	3.9	5.0	5.0	4.4	3.3	3.8	13.3	16.7	13.9	5.6	6.2	4.4	4.4	3.8	4.4	5.0	31.4	5.6	2.7	2.7	S	5.0	1.5	0.3	0.3	31.4	6.6	24
9	0.3	0.3	0.3	0.0	0.0	0.3	1.5	2.1	7.9	9.1	2.1	1.5	1.5	1.5	1.5	1.5	2.1	2.1	2.1	S	5.6	3.3	3.9	4.4	0.0	9.1	2.4	24
10	5.0	4.4	3.9	3.3	4.4	4.4	5.6	5.0	6.2	6.2	4.4	2.7	2.1	3.3	3.3	6.2	5.6	4.4	S	7.9	4.4	3.9	7.3	7.9	2.1	7.9	4.9	24
11	5.0	6.7	10.3	9.7	3.9	9.1	6.8	3.3	2.7	0.9	1.5	0.9	1.5	2.1	3.3	0.3	0.9	S	4.4	2.1	2.7	2.7	1.5	1.5	0.3	10.3	3.6	24
12	1.5	1.5	2.1	5.0	0.3	11.5	17.9	0.3	2.7	5.6	7.3	13.8	13.8	14.4	10.3	7.9	S	3.8	7.9	13.9	15.0	0.9	7.9	12.7	0.3	17.9	7.7	24
13	9.7	10.3	9.1	9.1	6.7	0.3	0.9	7.3	6.2	6.2	2.1	6.7	2.1	10.9	2.7	S	17.3	0.9	6.7	6.7	11.5	9.7	1.5	0.3	0.3	17.3	6.3	24
14	1.5	13.3	22.1	7.9	13.3	11.5	5.6	11.5	25.0	15.6	17.9	10.4	10.9	10.3	S	10.9	21.4	8.5	7.9	16.2	18.5	0.9	0.9	3.3	0.9	25.0	11.5	24
15	1.5	1.5	1.5	1.5	1.5	3.3	10.9	6.7	16.2	5.6	7.3	3.3	0.9	S	15.0	9.1	5.0	17.3	17.9	18.5	10.3	12.7	4.4	1.5	0.9	18.5	7.5	24
16	3.3	3.3	1.5	9.1	17.3	17.3	9.1	11.5	9.7	9.1	8.5	3.3	S	12.1	10.3	17.3	3.9	5.6	10.9	6.8	7.9	8.5	7.9	7.9	1.5	17.3	8.8	24
17	7.9	6.2	5.6	6.2	5.6	5.0	6.2	7.9	14.4	12.7	7.9	S	8.5	7.3	9.1	9.7	10.4	10.3	10.3	8.5	9.1	9.1	9.7	10.9	5.0	14.4	8.6	24
18	12.1	12.1	12.1	11.5	11.5	12.1	13.3	16.2	15.0	13.3	S	14.9	12.1	15.0	15.5	15.0	7.3	3.3	2.1	20.3	13.9	12.7	3.3	5.0	2.1	20.3	11.7	24
19	3.8	3.8	5.6	4.4	3.3	2.7	3.8	3.3	5.6	S	9.7	31.4	6.2	1.5	0.9	9.7	0.9	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	31.4	4.3	24
20	0.3	0.3	1.5	0.9	0.3	1.5	9.7	13.9	S	15.6	9.1	9.1	9.1	9.1	9.1	17.3	16.7	16.7	13.9	10.3	6.7	12.1	9.7	2.7	0.3	17.3	8.5	24
21	2.7	9.1	10.3	13.9	9.1	10.9	19.1	S	7.9	5.0	6.2	7.9	3.8	5.6	8.5	9.7	10.9	7.3	10.9	10.3	9.1	9.1	3.3	4.4	2.7	19.1	8.5	24
22	5.0	9.7	9.7	9.7	7.3	11.5	S	16.2	12.1	15.0	13.3	11.5	7.9	11.5	23.2	12.1	5.0	4.4	1.5	1.5	0.9	0.9	0.9	0.9	0.9	23.2	8.3	24
23	2.1	3.3	0.9	0.3	0.3	S	3.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	3.3	0.3	0.0	3.3	0.7	24
24	0.3	0.9	0.3	0.3	S	2.7	0.3	0.3	0.3	0.3	5.6	4.4	2.7	2.1	3.3	3.3	3.8	3.8	0.9	0.9	0.9	0.3	0.0	0.0	0.0	5.6	1.7	24
25	0.3	0.0	0.0	S	2.7	2.1	0.9	0.9	0.3	0.9	1.5	2.1	2.1	0.9	2.1	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.8	24
26	0.0	0.0	S	2.7	0.9	0.9	3.3	6.8	6.2	5.0	4.4	3.3	3.8	3.3	4.4	4.4	6.8	5.6	4.4	3.8	4.4	5.0	6.2	3.3	0.0	6.8	3.9	24
27	3.3	S	6.2	3.8	5.0	5.0	3.8	4.4	4.4	5.6	4.4	5.0	7.9	7.9	9.1	13.3	15.0	14.4	12.7	15.0	16.7	16.7	17.9	19.1	3.3	19.1	9.4	24
28	S	16.1	5.0	2.7	1.5	2.1	1.5	1.5	3.8	11.5	23.2	2.1	13.3	18.5	13.3	9.1	13.3	2.7	7.9	4.9	0.3	0.3	0.3	S	0.3	23.2	7.0	24
29	4.4	1.5	0.9	0.9	0.9	0.9	20.3	10.3	11.5	12.1	12.1	8.5	6.7	5.6	6.2	10.3	6.7	6.2	5.6	5.0	4.4	3.3	S	5.6	0.9	20.3	6.5	24
30	2.7	2.1	1.5	1.5	3.3	3.3	15.0	5.6	7.9	9.7	9.7	10.9	10.3	3.3	3.8	5.0	4.4	6.8	7.9	14.4	13.3	S	6.2	2.7	1.5	15.0	6.6	24
31	1.5	9.1	10.9	16.7	13.9	10.9	9.7	15.6	11.5	0.3	0.3	2.1	1.5	2.1	0.9	0.9	1.5	1.5	0.3	S	13.3	9.7	1.5	0.3	16.7	6.0	24	
HOURLY MAX	19.1	17.3	22.1	18.5	17.3	18.5	20.3	16.7	25.0	15.6	23.2	31.4	15.5	18.5	23.2	21.4	31.4	17.3	17.9	20.3	18.5	17.3	17.9	19.1				
HOURLY AVG	4.2	5.6	6.2	6.2	5.8	6.2	7.7	7.1	8.0	7.0	7.0	6.9	6.1	6.7	7.4	8.2	8.6	6.2	6.5	7.5	7.3	6.2	5.5	4.9				

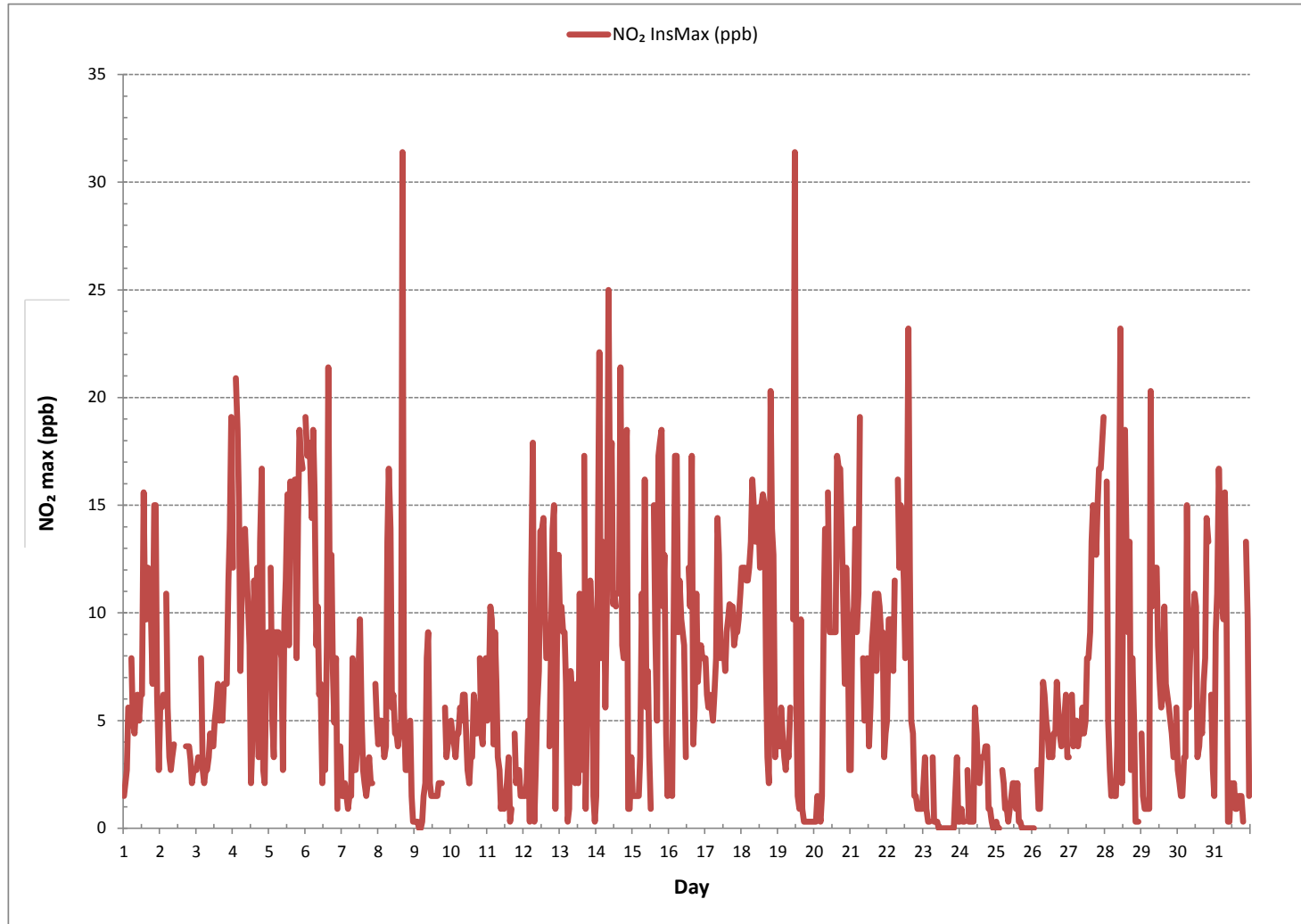
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	678
MAXIMUM INSTANTANEOUS VALUE:	31.4 ppb @ HOUR(S) 16, 11 ON DAY(S) 8, 19
	VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	5.4
OPERATIONAL TIME:	744 hrs

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

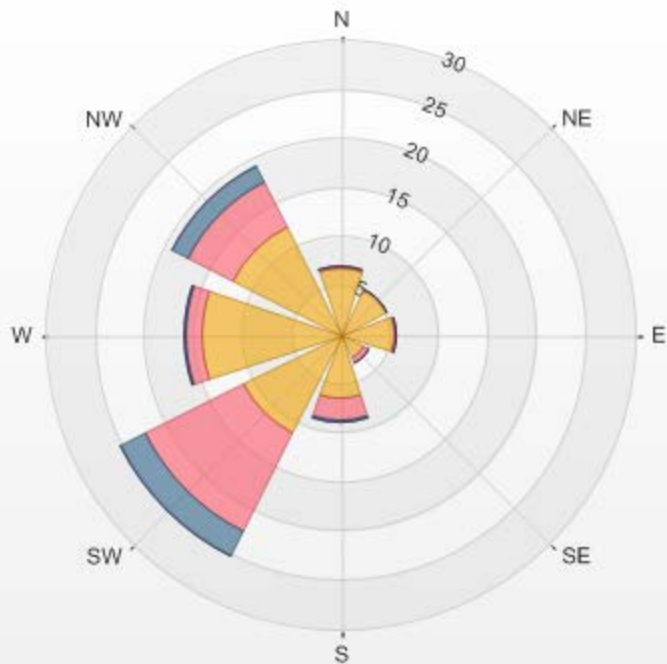


Wind: LICA MASKWA Poll.: LICA MASKWA-NO2[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 9.39% Valid Data: 94.49% Calm Avg: 3.37 [ppb]

Direction	0.0-5.5	5.5-11.0	11.0-16.5	>16.5	Total
N	6.83	0.14	0	0	6.97
NE	5.26	0	0	0	5.26
E	5.55	0.14	0	0	5.69
SE	2.56	0.71	0	0	3.27
S	6.54	2.28	0.14	0	8.96
SW	11.1	11.24	2.84	0	25.18
W	14.22	1.56	0.28	0	16.06
NW	12.38	4.98	1.85	0	19.21
Summary	64.44	21.05	5.11	0	90.6

% Icon	Classes (ppb)	64	 0.0-5.5	21	 5.5-11.0	5	 11.0-16.5	0	 >16.5
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LICA MASKWA Poll.: LICA MASKWA-NO2[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 9.39% Calm Poll  
Avg: 3.37[ppb]



NO2[ppb] Calibration: LICA MASKWA Monthly: 2016/12 Type: Span



Span Meas Span Ref Span Low Span High

***WIND SPEED***

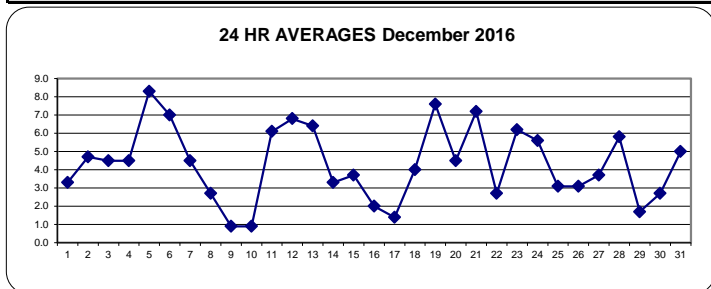
WIND SPEED Hourly Averages (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59				
DAY 1	4.8	4.3	3.8	3.1	5.2	4.1	3.5	4.5	3.7	3.8	3.8	3.2	3.4	2.9	2.3	2.5	3.6	2.5	3.4	2.4	3.2	3.2	3.1	2.6	2.3	5.2	3.3	24
2	2.5	0.6	2.3	3.2	3.8	4.8	5.5	5.6	4.4	5.5	5.0	6.5	5.6	6.4	6.1	5.2	5.1	5.9	6.0	5.4	7.3	6.7	6.8	5.6	0.6	7.3	4.7	24
3	5.4	4.8	5.2	5.1	5.1	4.6	5.4	5.0	4.9	5.0	4.6	4.4	4.1	4.4	4.1	4.9	4.4	5.7	5.0	2.9	3.2	4.8	6.1	6.9	2.9	6.9	4.5	24
4	6.2	5.6	5.8	5.7	6.9	5.8	6.7	5.5	5.7	6.1	5.2	4.4	5.9	7.9	7.9	7.4	8.4	8.9	8.9	8.8	8.5	8.4	8.9	9.2	4.4	9.2	4.5	24
5	8.1	8.0	8.3	8.8	8.8	8.0	9.0	9.1	8.9	8.7	8.6	9.0	8.7	9.0	8.4	7.4	7.6	7.7	8.0	8.5	8.2	7.3	7.7	8.4	7.3	9.1	8.3	24
6	7.9	7.8	8.9	7.6	6.6	6.2	7.0	6.6	7.6	7.6	7.8	6.7	6.5	7.6	6.9	6.8	7.3	7.5	7.9	7.4	6.6	6.2	6.3	5.4	5.4	8.9	7.0	24
7	5.9	5.4	5.6	6.3	4.9	4.5	4.3	5.0	5.3	5.3	5.2	4.7	5.9	5.7	5.1	4.3	4.5	4.1	3.4	3.7	3.1	3.1	3.3	2.0	2.0	6.3	4.5	24
8	2.2	3.1	3.1	2.3	2.4	2.9	4.0	4.0	4.6	3.5	4.4	4.4	4.3	3.9	4.1	5.0	2.4	1.4	0.7	1.4	1.7	2.4	4.8	3.0	0.7	5.0	2.7	24
9	3.6	2.8	3.1	2.6	2.9	0.2	1.2	3.5	2.0	2.9	3.5	2.4	2.2	3.1	2.3	2.9	3.1	2.8	1.9	0.1	0.3	0.6	0.8	0.7	0.1	3.6	0.9	24
10	0.2	1.0	0.4	0.7	0.4	1.0	0.9	1.3	0.5	0.4	0.4	3.2	3.0	2.8	0.5	2.5	1.8	1.0	2.9	1.5	2.6	3.2	3.2	2.6	0.2	3.2	0.9	24
11	3.4	4.2	6.3	7.7	8.3	8.8	7.7	9.0	7.4	7.5	6.7	8.0	10.0	9.1	8.1	6.9	5.3	4.2	3.7	3.5	4.5	4.4	4.2	3.7	3.4	10.0	6.1	24
12	4.0	4.3	7.1	9.0	8.3	7.7	7.1	6.8	6.4	8.7	9.1	9.9	9.3	9.9	9.0	6.9	5.0	5.6	7.6	7.9	6.7	6.4	5.6	8.0	4.0	9.9	6.8	24
13	8.1	6.3	8.6	10.3	8.4	8.7	8.2	7.6	7.4	9.3	9.4	9.1	8.7	9.6	8.2	6.7	6.3	5.4	4.3	5.5	5.4	4.3	3.9	3.7	3.7	10.3	6.4	24
14	3.8	3.8	4.8	2.8	3.9	5.0	4.4	4.5	2.3	3.6	5.3	6.7	6.6	5.2	5.9	5.0	3.8	3.6	3.8	5.4	4.3	2.3	3.1	2.9	2.3	6.7	3.3	24
15	2.2	0.8	0.3	2.5	0.1	2.4	4.1	4.2	5.8	5.8	5.6	6.6	5.4	5.6	6.7	3.3	4.3	7.1	5.3	6.3	6.8	4.5	2.2	2.3	0.1	7.1	3.7	24
16	2.5	2.4	2.3	4.2	4.6	4.6	1.8	1.3	1.6	3.6	4.8	3.3	2.9	4.1	3.5	2.5	0.9	4.4	3.1	2.4	2.2	1.4	0.7	0.5	0.5	4.8	2.0	24
17	0.7	0.7	X	1.2	1.1	0.4	1.3	0.6	0.9	2.6	0.4	0.6	4.1	4.2	3.6	1.9	0.7	0.9	1.9	3.1	2.8	2.4	1.3	3.7	0.4	4.2	1.4	23
18	4.6	4.7	3.4	3.0	2.9	1.2	1.5	2.2	6.0	5.9	6.0	5.5	5.5	5.9	5.1	5.2	4.3	4.2	9.2	9.8	8.4	5.2	3.2	3.5	1.2	9.8	4.0	24
19	5.5	7.5	7.9	7.1	8.4	7.9	5.7	6.5	5.3	9.3	7.5	8.1	6.4	8.7	13.6	12.0	13.1	13.7	14.8	13.2	11.5	10.1	9.2	9.8	5.3	14.8	7.6	24
20	8.3	5.9	4.5	4.7	4.8	4.8	6.6	4.2	5.7	6.1	6.0	5.9	5.8	4.4	6.6	3.0	5.2	3.3	3.2	3.2	2.9	3.7	3.7	5.2	2.9	8.3	4.5	24
21	3.2	5.8	7.9	7.0	7.0	7.1	7.6	7.7	6.3	5.8	7.3	6.6	7.4	5.9	5.9	6.3	8.0	9.3	8.9	9.0	9.0	8.7	8.7	9.0	3.2	9.3	7.2	24
22	8.4	4.8	4.6	5.1	5.0	4.4	5.4	6.6	5.4	4.9	5.5	6.8	7.1	4.0	2.7	3.3	2.7	1.8	1.7	1.6	4.3	5.0	5.0	5.2	1.6	8.4	2.7	24
23	6.1	7.9	5.6	6.2	6.7	5.7	5.7	6.3	6.7	6.7	5.8	7.2	8.0	8.0	7.5	6.5	7.2	6.7	5.4	6.5	5.2	5.7	6.1	8.0	5.2	8.0	6.2	24
24	7.1	6.7	6.3	6.1	5.7	5.4	6.0	5.6	5.8	7.7	7.3	7.0	5.5	4.8	4.6	4.3	4.8	5.1	4.8	5.6	5.2	4.4	5.3	6.1	4.3	7.7	5.6	24
25	6.8	5.5	6.5	5.0	4.8	4.2	3.8	4.2	4.2	3.8	3.1	2.7	2.7	3.1	3.4	1.9	2.9	1.7	1.6	1.4	0.7	2.3	1.6	0.7	0.7	6.8	3.1	24
26	0.5	0.4	0.7	0.6	0.9	1.4	4.1	4.6	3.0	5.0	5.9	6.0	6.6	6.9	6.1	3.9	3.7	5.7	7.3	2.6	3.0	2.8	4.4	2.5	0.4	7.3	3.1	24
27	3.0	3.6	2.1	3.7	1.5	3.4	3.8	2.4	3.4	2.9	3.5	3.9	3.9	4.4	4.8	4.1	2.7	5.6	6.7	7.2	6.8	6.6	6.1	7.8	1.5	7.8	3.7	24
28	5.1	4.5	3.6	5.8	8.4	8.9	8.1	8.2	8.1	10.6	9.5	7.9	8.7	8.7	7.2	5.2	3.9	1.9	1.0	4.2	5.6	4.5	5.7	5.1	1.0	10.6	5.8	24
29	5.6	6.8	4.5	4.6	4.3	4.1	4.5	6.6	6.9	6.6	3.3	6.0	5.4	3.8	2.3	2.3	1.7	2.4	3.1	3.2	3.7	4.2	3.3	3.9	1.7	6.9	1.7	24
30	2.9	4.7	3.1	1.2	1.9	1.8	3.2	1.7	2.0	1.9	6.1	6.3	5.0	5.6	6.1	7.1	6.0	4.2	4.8	4.9	4.0	4.1	3.3	3.1	1.2	7.1	2.7	24
31	4.5	5.2	6.1	7.2	5.5	5.4	5.9	6.3	5.8	6.0	5.5	6.4	6.6	7.4	6.0	6.1	4.8	3.4	6.5	4.8	3.8	4.4	5.4	7.0	3.4	7.4	5.0	24
HOURLY MAX	8.4	8.0	8.9	10.3	8.8	8.9	9.0	9.1	8.9	10.6	9.5	9.9	10.0	9.9	13.6	12.0	13.1	13.7	14.8	13.2	11.5	10.1	9.2	9.8				
HOURLY AVG	1.6	1.5	1.7	2.0	1.9	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.7	2.8	2.6	2.0	1.8	1.7	2.1	2.4	2.3	1.8	1.7	1.8				

STATUS FLAG CODES

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

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

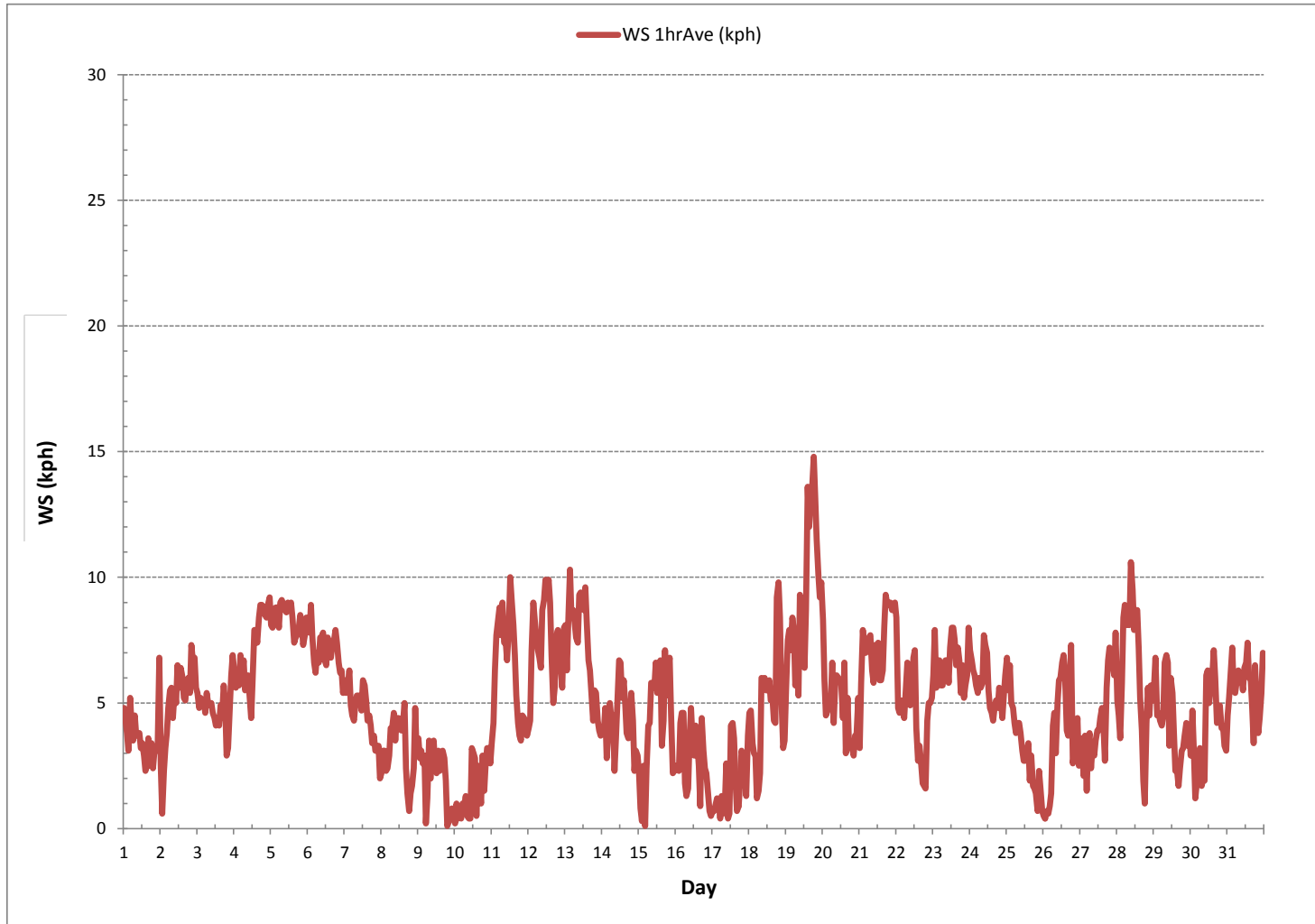


MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	743
MINIMUM 1-HR AVERAGE:	0.1 kph @ HOUR(S) 19 , 4 ON DAY(S) 9 , 15
MAXIMUM 1-HR AVERAGE:	14.8 kph @ HOUR(S) 18 ON DAY(S) 19
MAXIMUM 24-HR AVERAGE:	8.3 kph ON DAY(S) 5
	VAR-VARIOUS
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	743 hrs
AMD OPERATION UPTIME:	99.9 %
STANDARD DEVIATION:	2.4
MONTHLY AVERAGE:	2.0 kph



WIND SPEED Hourly Averages (WS kph)





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

WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	14.9	13.3	12.2	13.7	12.9	15.5	14.0	14.2	13.1	12.9	16.4	13.1	17.7	12.7	14.6	15.6	11.6	13.5	13.5	13.5	12.9	12.9	12.5	14.2	11.6	17.7	13.8	24
2	12.2	11.6	13.7	12.9	11.1	14.6	14.7	14.8	15.5	18.4	15.1	19.5	18.4	17.5	16.9	13.7	14.4	21.2	18.8	19.2	22.5	21.4	18.1	15.9	11.1	22.5	16.3	24
3	15.9	17.5	14.8	16.2	14.2	12.0	16.0	15.6	16.8	15.7	15.3	20.6	14.4	20.8	12.0	15.1	13.1	14.8	14.8	10.5	11.6	12.9	14.6	15.6	10.5	20.8	15.0	24
4	14.2	11.6	14.0	14.2	15.7	14.0	14.3	16.0	17.5	18.4	14.4	19.0	25.1	27.3	39.5	28.9	32.9	33.1	35.2	32.0	36.1	33.4	32.6	33.5	11.6	39.5	23.9	24
5	36.1	28.0	34.7	39.0	33.7	30.7	30.7	32.7	39.2	35.9	36.2	37.9	38.6	31.1	37.0	34.4	32.9	29.6	45.4	27.6	28.9	25.2	31.1	30.9	25.2	45.4	33.6	24
6	32.2	31.1	28.0	32.0	27.2	22.1	26.3	26.3	25.1	26.9	29.6	27.4	25.0	26.7	27.6	30.0	24.7	26.3	32.2	31.3	28.0	26.6	23.2	21.2	21.2	32.2	27.4	24
7	20.8	24.1	21.7	25.4	19.9	17.9	18.4	19.9	22.6	25.0	18.0	17.5	20.7	20.4	16.6	32.9	19.7	18.2	16.9	41.2	14.5	19.1	16.9	77.0	14.5	77.0	23.6	24
8	24.3	21.9	22.1	82.7	35.5	16.0	28.5	16.6	26.5	18.2	20.8	20.1	70.5	16.4	18.6	88.2	65.6	47.0	21.2	50.0	34.0	42.5	25.3	34.2	16.0	88.2	35.3	24
9	17.3	47.6	28.5	22.8	62.6	19.7	62.1	16.6	23.5	15.7	16.2	18.6	31.3	13.5	57.9	12.0	11.8	16.4	27.2	54.6	34.4	83.2	27.6	26.5	11.8	83.2	31.2	24
10	74.0	32.9	26.3	32.9	26.7	23.2	33.4	33.8	29.2	39.1	83.0	11.1	14.2	28.9	23.0	17.1	24.1	25.6	17.3	22.0	22.6	17.1	11.1	18.3	11.1	83.0	28.6	24
11	18.4	20.4	23.4	25.3	31.3	39.0	24.7	30.1	26.1	29.8	29.6	32.5	42.3	30.0	35.7	28.0	23.4	46.3	18.8	16.2	21.0	16.9	64.3	32.7	16.2	64.3	29.4	24
12	16.3	18.8	29.4	39.0	27.4	29.1	29.6	29.1	24.7	31.1	40.3	56.8	35.8	35.7	28.0	32.4	21.2	22.1	32.9	25.4	34.8	24.1	27.8	35.1	16.3	56.8	30.3	24
13	30.7	27.1	29.6	32.9	33.3	47.8	51.5	27.9	31.5	36.4	41.4	42.7	33.0	47.1	34.0	32.2	32.0	20.4	18.4	18.2	22.3	36.8	28.0	29.2	18.2	51.5	32.7	24
14	64.3	25.9	30.9	23.2	43.4	24.7	19.1	18.9	25.0	11.4	12.7	17.9	17.9	16.8	14.2	16.8	11.0	12.2	19.5	24.3	18.9	17.7	15.3	18.4	11.0	64.3	21.7	24
15	29.7	30.9	71.7	17.5	26.5	21.2	17.5	17.1	23.9	25.9	20.1	24.7	24.6	24.1	24.7	57.9	20.6	27.8	21.9	21.7	24.0	21.0	25.2	42.3	17.1	71.7	27.6	24
16	18.2	25.6	29.9	28.3	26.3	21.7	20.6	19.3	39.7	30.9	21.0	26.8	17.1	39.7	28.3	82.3	28.7	12.7	12.2	20.2	34.7	35.8	X	58.6	12.2	82.3	29.5	23
17	32.9	51.9	X	X	63.1	47.4	43.5	X	X	55.3	54.8	25.8	14.3	17.1	18.2	X	22.6	X	23.7	32.5	23.0	32.0	X	16.2	14.3	63.1	33.8	17
18	13.8	13.4	70.9	17.5	17.5	18.2	18.8	11.4	14.6	14.0	16.2	15.5	21.4	19.9	17.0	16.8	16.9	19.5	32.2	31.5	30.0	22.5	12.0	8.9	8.9	70.9	20.4	24
19	12.7	17.1	18.4	17.0	25.4	27.8	15.1	17.7	17.9	43.6	21.8	20.1	31.0	38.5	48.2	50.8	56.7	42.5	50.1	42.0	43.4	34.6	34.2	33.8	12.7	56.7	31.7	24
20	25.9	26.9	17.7	17.7	22.7	19.0	15.7	11.6	15.8	14.9	17.3	15.5	12.9	11.3	18.6	10.2	13.2	11.6	12.7	13.1	15.7	11.8	14.3	23.8	10.2	26.9	16.2	24
21	16.6	12.4	20.6	23.0	20.3	22.4	19.1	20.8	17.0	18.4	18.8	29.1	28.2	27.2	22.6	23.0	25.4	26.7	30.2	26.0	34.6	27.3	26.0	23.2	12.4	34.6	23.3	24
22	23.8	18.9	19.8	13.1	10.7	17.7	16.2	16.8	13.7	11.6	13.1	13.5	17.1	14.5	8.9	12.6	9.1	10.2	10.5	10.0	11.6	14.0	18.0	13.2	8.9	23.8	14.1	24
23	15.7	18.1	12.4	15.5	17.9	15.5	18.4	20.8	16.2	20.1	18.1	16.6	19.0	22.8	27.4	19.9	15.7	17.3	16.2	20.7	17.3	24.3	27.8	25.6	12.4	27.8	19.1	24
24	27.1	29.3	26.3	21.2	20.4	20.1	23.6	20.8	22.1	24.1	26.5	19.7	19.9	19.5	15.4	16.6	17.7	19.3	18.2	20.0	18.4	19.3	21.7	22.0	15.4	29.3	21.2	24
25	25.0	20.8	21.7	19.3	28.5	16.4	16.4	15.5	13.1	15.7	13.1	15.7	12.4	15.4	13.5	9.8	33.1	15.4	41.4	14.9	31.6	45.6	23.0	73.5	9.8	73.5	23.0	24
26	76.6	X	19.1	28.9	53.9	87.8	12.2	13.5	19.3	13.5	14.0	17.5	16.7	18.4	17.9	14.6	11.6	19.5	23.6	16.2	26.7	56.0	16.2	19.5	11.6	87.8	26.7	23
27	16.6	17.4	15.5	12.7	17.3	12.4	13.2	10.9	12.2	14.6	10.7	13.8	12.0	11.3	11.3	11.3	12.2	17.7	17.5	17.5	15.7	18.6	14.0	17.3	10.7	18.6	14.3	24
28	14.9	12.4	13.3	21.2	30.4	31.7	27.2	26.0	31.7	33.1	40.7	32.0	38.1	27.6	30.4	21.1	16.6	11.3	10.9	14.6	18.4	14.8	18.4	17.8	10.9	40.7	23.1	24
29	19.9	26.0	17.7	19.2	14.4	14.2	12.4	16.0	14.6	14.4	9.1	12.7	12.7	12.2	10.3	9.8	11.3	11.6	12.9	11.6	11.3	11.6	10.9	11.3	9.1	26.0	13.7	24
30	12.7	15.7	14.2	8.9	21.4	26.7	15.5	33.7	11.9	10.9	16.4	16.2	17.5	27.8	25.4	18.8	17.3	10.0	12.7	12.2	13.7	17.7	14.9	12.7	8.9	33.7	16.9	24
31	16.2	16.6	22.3	25.4	18.7	20.6	22.3	22.3	21.4	21.2	20.3	36.4	22.5	24.5	21.2	18.1	20.4	12.7	27.3	21.2	19.2	17.5	21.6	28.7	12.7	36.4	21.6	24
HOURLY MAX	76.6	51.9	71.7	82.7	63.1	87.8	62.1	33.8	39.7	55.3	83.0	56.8	70.5	47.1	57.9	88.2	65.6	47.0	50.1	54.6	43.4	83.2	64.3	77.0				
HOURLY AVG	25.5	27.9	29.7	26.7	26.8	24.7	22.9	25.4	23.9	23.1	23.9	22.8	23.9	23.1	23.7	28.8	22.2	23.8	22.8	23.6	23.6	26.3	29.7	27.5				

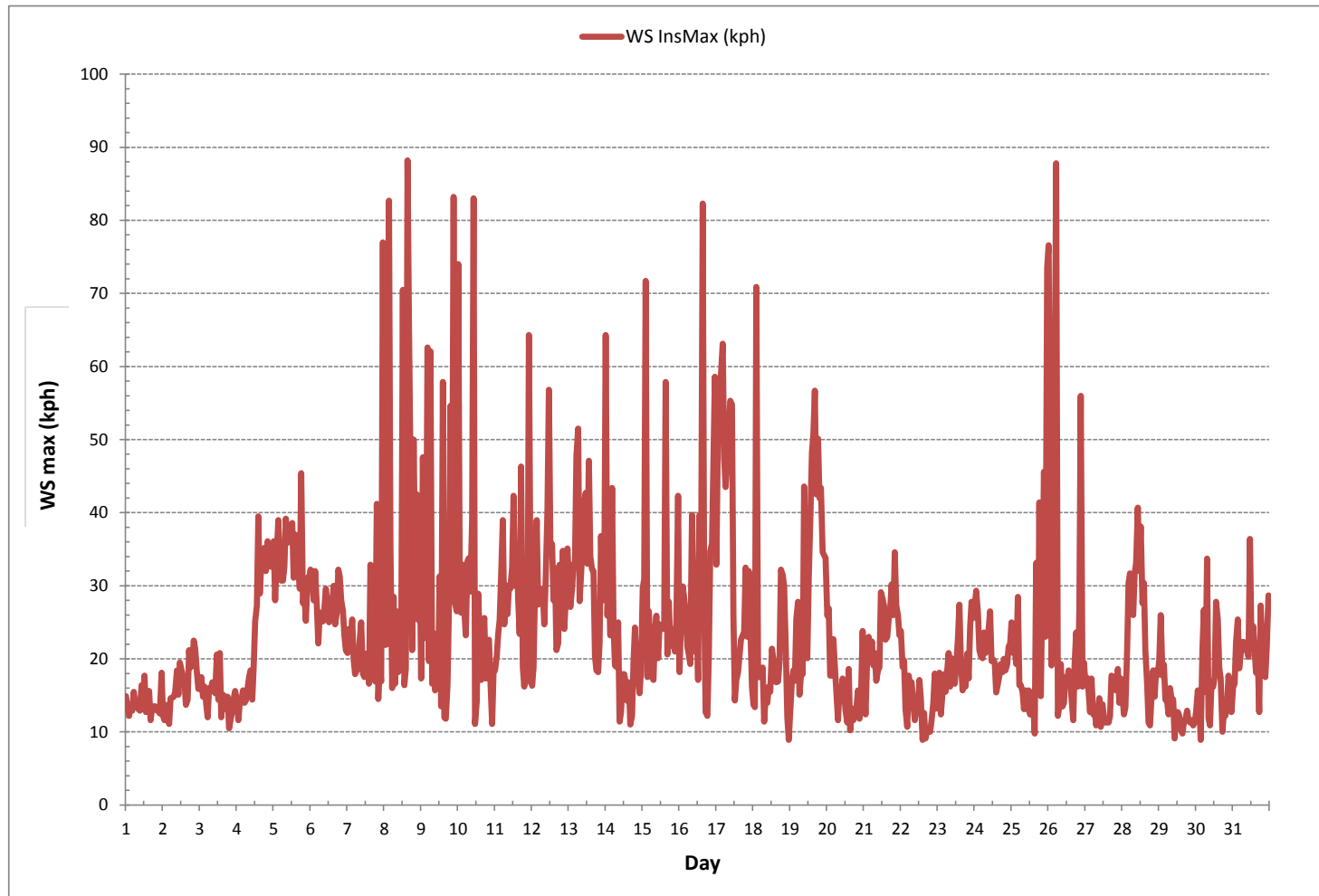
STATUS FLAG CODES

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

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	88.2	kph	@ HOUR(S)	15	ON DAY(S)	18	
VAR-VARIOUS							
OPERATIONAL TIME:						735	hrs

WIND SPEED Instantaneous Maximum (WS kph)

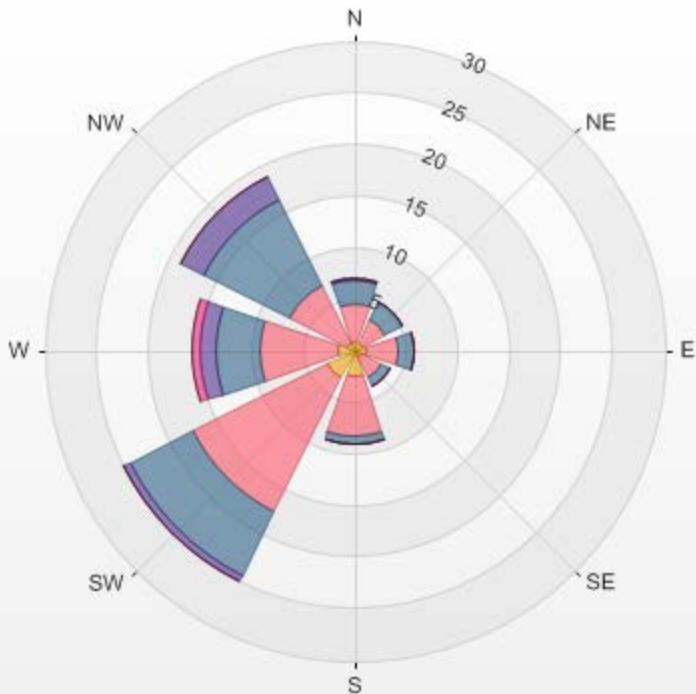


Wind: LICA MASKWA Monitor: WSP [kph] Monthly: 12/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 9.42% Valid Data: 99.87%

Direction	1.8-3.0	3.0-6.0	6.0-8.9	8.9-11.9	11.9-14.9	>14.9	Total
N	0.81	3.77	2.29	0.13	0	0	7
NE	0.94	2.42	1.88	0	0	0	5.24
E	1.08	3.1	1.62	0	0	0	5.8
SE	0.81	2.02	1.08	0	0	0	3.91
S	2.42	5.92	0.67	0	0	0	9.01
SW	2.96	14.54	6.86	0.67	0	0	25.03
W	1.62	7.67	4.17	1.48	0.81	0	15.75
NW	0.94	6.06	9.29	2.56	0	0	18.85
Summary	11.58	45.5	27.86	4.84	0.81	0	90.59

% Icon Classes (kph) 12 1.8-3.0 46 3.0-6.0 28 6.0-8.9 5 8.9-11.9 1 11.9-14.9 0 >14.9

LICA MASKWA 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 9.42% Calm Wind Avg Speed: 0.94(kph)



***WIND DIRECTION***



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

WIND DIRECTION Hourly Averages (WD)

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

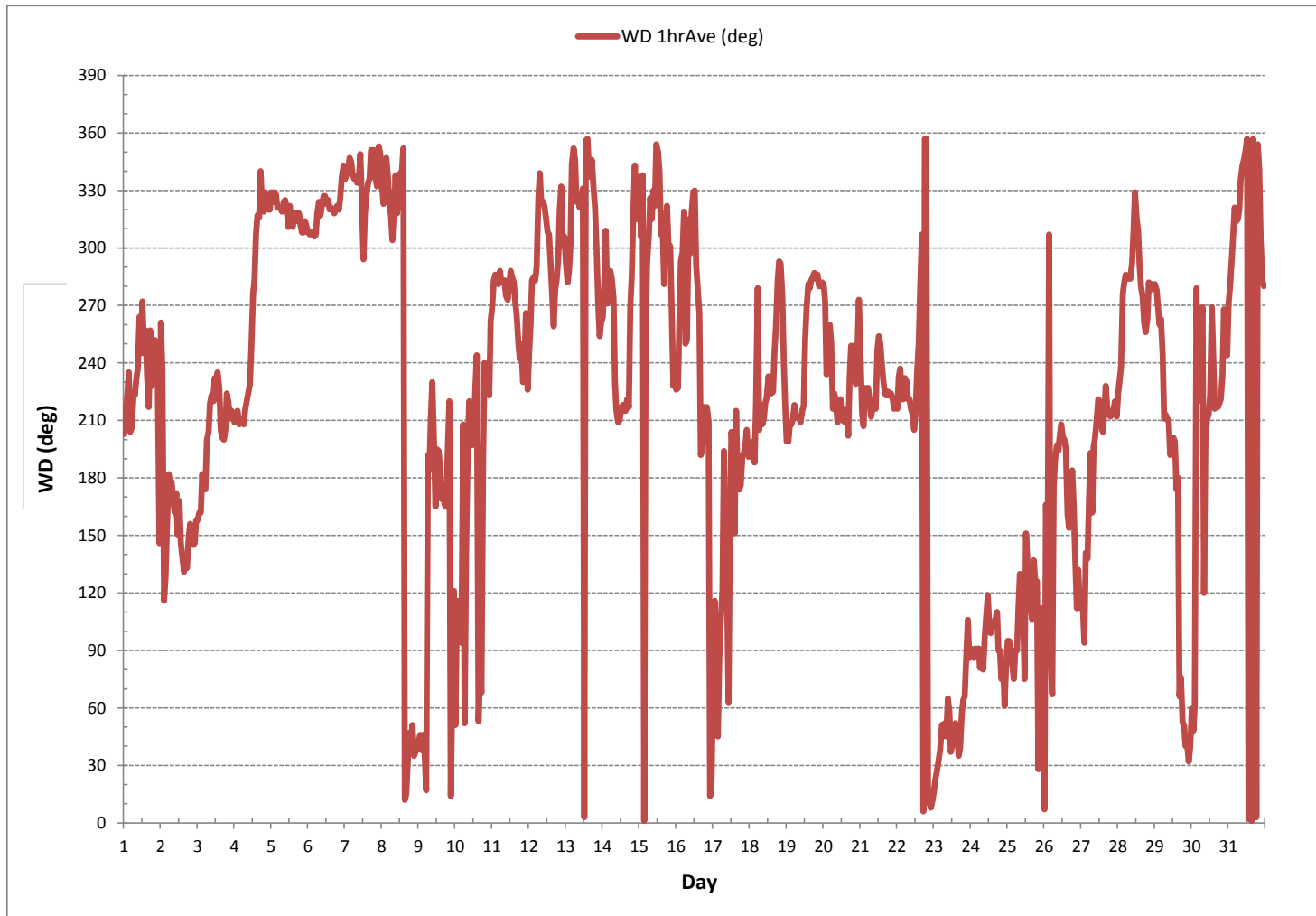
STATUS FLAG CODES

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

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

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	743	hrs
STANDARD DEVIATION:	90		AMD OPERATION UPTIME:	99.9	%
			MONTHLY AVERAGE:	272	(W)

WIND DIRECTION Hourly Averages (WD)





***STANDARD DEVIATION WIND DIRECTION***



**LAKELAND INDUSTRY & COMMUNITY ASSOCIATION**  
**Maskwa Continuous Monitoring Station - December 2016**

**STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)**

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	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	24	26	33	34	19	31	38	33	33	36	37	36	41	38	45	32	27	41	29	37	39	34	36	38	24	
2	39	56	31	31	29	25	25	25	27	29	30	25	27	25	25	24	28	30	29	28	24	26	26	27	24	
3	28	30	30	23	29	25	24	22	34	31	29	36	30	35	31	21	20	19	30	26	24	17	15	14	24	
4	14	14	15	14	15	14	13	19	17	27	25	37	34	27	34	35	35	32	37	39	39	39	36	37	24	
5	38	39	40	38	36	37	36	37	35	38	38	34	38	36	35	34	39	36	40	35	34	39	37	35	24	
6	34	31	30	34	37	37	38	40	36	33	36	38	39	38	38	36	37	36	42	42	35	41	38	35	24	
7	37	40	37	33	36	37	37	35	34	33	31	37	28	33	38	38	43	39	34	30	39	37	32	34	24	
8	27	28	32	39	41	35	34	38	34	36	35	39	38	34	33	22	27	33	55	43	45	35	17	22	24	
9	20	19	18	26	20	51	44	12	27	36	32	41	45	34	44	16	15	13	17	53	45	61	42	52	24	
10	61	55	59	44	52	38	44	26	51	47	78	27	40	33	57	29	28	56	40	44	36	32	34	36	24	
11	36	34	30	27	27	32	30	27	31	32	35	34	30	30	33	33	33	37	32	37	25	24	31	21	24	
12	34	38	26	26	25	29	33	39	40	36	38	37	36	33	27	30	36	32	30	27	37	37	32	29	24	
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14	31	31	36	32	34	35	30	30	24	20	18	21	22	24	21	22	21	15	27	26	34	41	34	37	24	
15	42	62	51	34	45	50	35	35	36	34	33	35	37	36	35	46	31	36	40	26	24	28	27	29	24	
16	30	30	42	33	40	45	58	52	43	34	33	37	41	33	35	33	50	9	17	20	21	27	70	58	24	
17	50	55	X	64	60	65	33	61	52	77	68	48	28	24	20	26	58	52	28	19	33	39	55	26	23	
18	27	24	29	31	30	52	40	25	16	19	21	23	30	23	24	25	38	37	26	29	27	30	27	16	24	
19	13	14	15	15	19	26	21	17	20	18	19	20	36	36	31	31	29	26	27	25	27	28	28	25	24	
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21	30	17	13	23	21	24	19	18	21	24	21	39	36	39	34	28	23	24	26	24	26	21	19	20	24	
22	21	36	35	19	14	24	24	17	19	20	16	13	19	28	31	33	35	27	26	32	13	19	24	19	24	
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25	26	29	24	27	26	28	31	27	26	32	33	40	56	41	31	22	18	51	37	40	56	33	43	54	24	
26	66	72	55	53	39	29	25	21	25	20	18	23	22	20	21	26	23	25	26	45	28	25	20	39	24	
27	24	34	50	36	66	37	28	37	29	44	27	35	28	21	18	22	37	18	15	15	15	14	17	13	24	
28	24	22	26	28	24	23	24	27	26	27	34	37	36	34	28	33	30	41	46	24	20	26	23	27	24	
29	26	29	31	30	28	27	36	14	13	14	17	15	17	20	22	19	30	21	19	20	16	15	15	15	24	
30	19	16	26	39	22	44	24	38	39	29	22	18	24	32	27	20	20	19	16	20	30	35	30	30	24	
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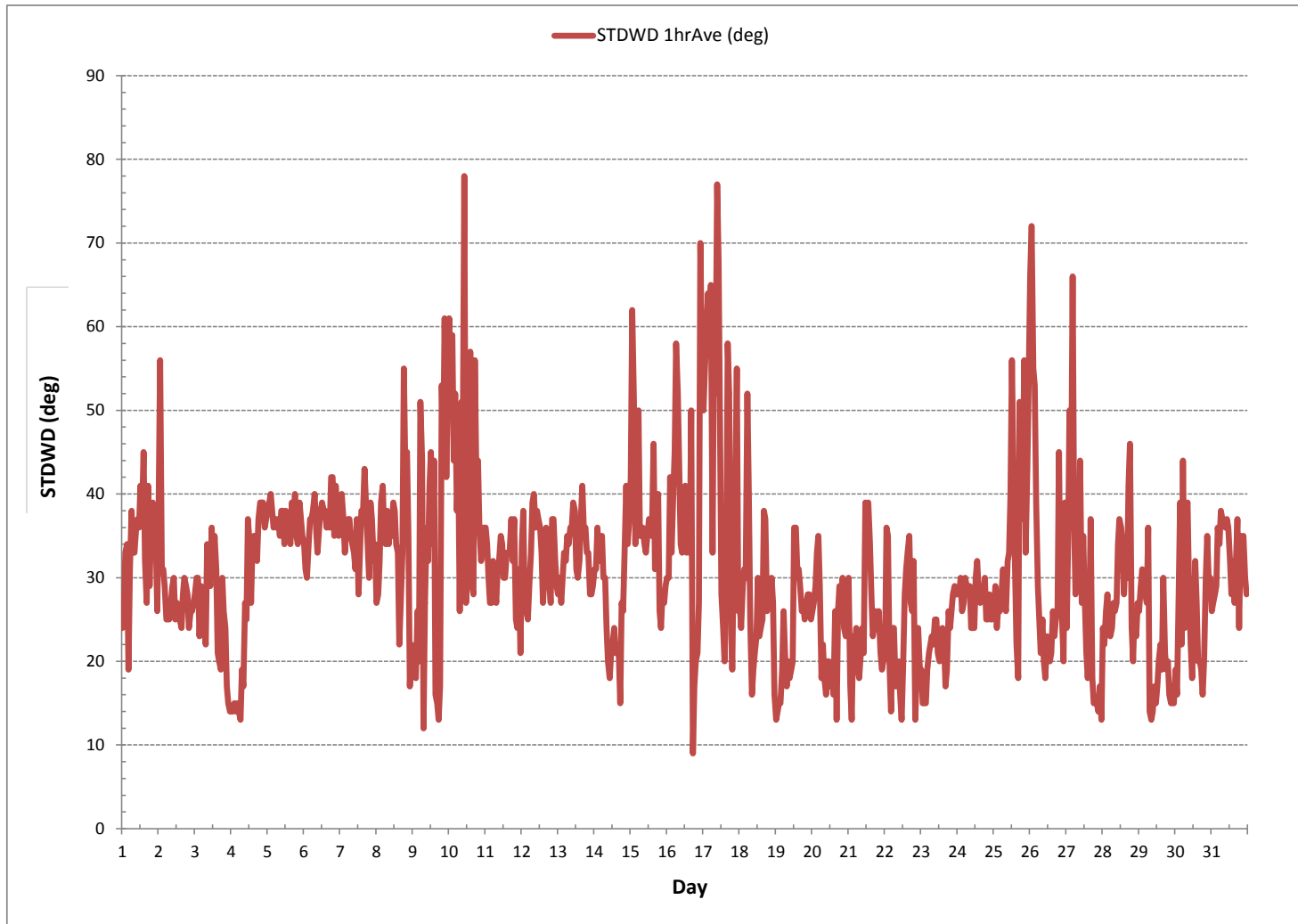
**STATUS FLAG CODES**

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

LAST CALIBRATION: March 30, 2016

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 743 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



***RELATIVE HUMIDITY***



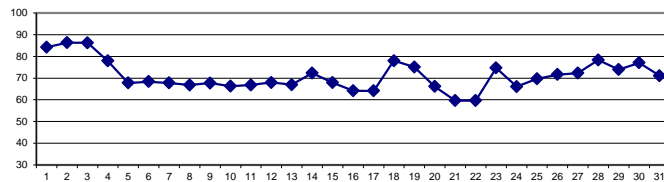
RELATIVE HUMIDITY Hourly Averages (RH %)

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

STATUS FLAG CODES

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

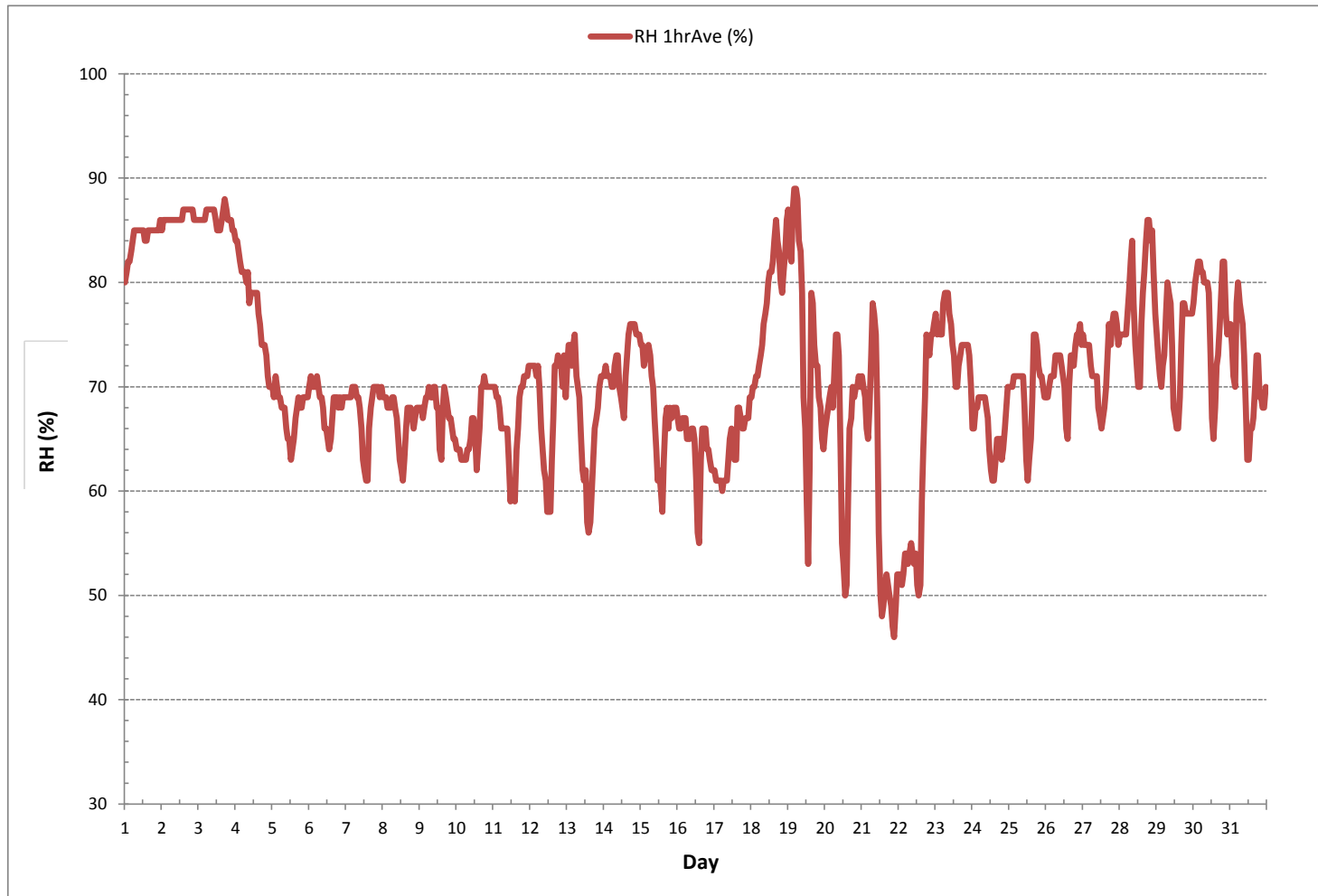
24 HR AVERAGES December 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	46	%	@ HOUR(S)	21	ON DAY(S)	21
MAXIMUM 1-HR AVERAGE:	89	%	@ HOUR(S)	4, 5	ON DAY(S)	19, 19
MAXIMUM 24-HR AVERAGE:	86	%			ON DAY(S)	2, 3
					VAR-VARIOUS	
OPERATIONAL TIME:						744 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	8					
MONTHLY AVERAGE:						71 %

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



## ***BAROMETRIC PRESSURE***

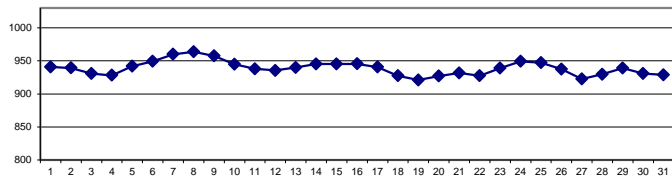
**BAROMETRIC PRESSURE Hourly Averages (BP mbar)**

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	938	939	939	939	939	939	939	939	940	940	940	940	940	941	941	942	942	942	943	943	943	943	943	944	938	944	941	24	
2	944	944	944	944	943	943	943	942	942	941	941	940	939	938	938	937	937	936	935	935	934	934	933	933	933	933	944	939	24
3	932	932	932	932	931	931	931	931	931	931	931	931	931	931	931	930	930	930	929	929	929	929	929	929	929	929	932	931	24
4	928	928	928	927	927	926	926	926	926	926	926	926	926	926	926	927	928	929	930	931	931	932	933	934	926	934	928	24	
5	934	935	936	936	937	938	939	939	940	941	942	942	943	943	943	944	945	945	945	946	946	946	947	947	934	947	942	24	
6	947	947	947	947	947	948	948	948	948	949	949	949	949	949	949	950	950	951	951	951	952	952	953	953	947	953	949	24	
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9	961	961	961	961	960	960	960	960	960	960	959	958	958	957	956	956	956	955	955	955	955	954	953	953	952	952	961	958	24
10	952	951	951	950	949	949	948	947	946	946	945	943	943	942	943	942	942	941	941	941	941	941	941	940	940	940	952	945	24
11	940	940	940	940	940	940	939	939	939	939	939	938	938	937	937	937	936	936	936	936	935	935	935	934	934	940	938	24	
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13	936	935	935	934	935	935	936	937	937	938	939	939	940	941	941	942	943	944	944	944	945	945	945	946	934	946	940	24	
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16	946	946	946	946	945	945	945	946	946	946	946	945	945	945	944	945	945	946	945	945	945	945	945	945	944	946	945	24	
17	945	944	944	944	943	943	943	943	942	942	940	939	939	939	939	939	939	939	938	938	937	936	935	935	935	945	941	24	
18	934	933	932	931	930	929	929	928	928	927	926	926	925	925	924	924	924	924	925	925	926	927	926	926	924	934	927	24	
19	925	924	924	924	923	922	921	920	X	918	917	917	916	916	917	917	918	919	921	922	923	924	925	926	916	926	921	23	
20	926	927	928	928	927	927	928	927	927	927	927	927	926	926	925	925	925	926	926	927	928	928	929	930	925	930	927	24	
21	931	931	932	932	933	933	933	933	933	933	933	933	932	932	932	931	931	931	930	930	930	929	929	929	929	929	933	932	24
22	929	929	928	928	928	927	927	926	926	926	926	926	926	926	926	927	927	927	927	928	929	929	930	926	930	927	24		
23	931	932	933	934	934	935	936	937	937	938	939	940	940	940	941	942	942	943	943	944	944	945	945	945	931	945	939	24	
24	946	946	947	947	947	948	948	949	949	950	950	950	950	950	950	950	950	950	950	950	950	949	950	946	950	949	24		
25	949	949	949	949	948	948	948	948	948	948	948	948	947	947	946	946	946	946	946	946	946	945	945	944	944	949	947	24	
26	943	943	942	942	941	941	940	940	940	939	939	938	937	936	936	935	935	934	933	932	932	930	929	929	929	943	937	24	
27	929	928	927	926	925	924	924	923	923	923	922	921	921	920	920	920	920	920	920	920	920	920	920	920	920	929	922	24	
28	920	921	922	922	923	924	924	925	926	927	928	930	930	931	932	933	934	935	935	936	937	937	938	939	920	939	930	24	
29	939	940	941	941	942	942	942	942	942	942	941	942	941	940	939	939	938	937	936	935	934	933	933	933	933	933	942	939	24
30	932	932	933	933	933	933	933	933	933	933	933	933	932	932	931	930	929	929	928	927	926	925	925	924	924	933	931	24	
31	924	924	924	925	925	925	925	925	926	927	927	928	929	930	931	931	932	933	934	934	935	935	936	924	936	929	24		
HOURLY MAX	965	965	965	965	965	965	965	965	965	964	964	964	963	963	963	963	963	963	963	963	964	964	964	965					
HOURLY AVG	939	939	939	939	939	939	939	940	939	939	939	938	938	938	938	939	939	939	939	939	939	939	939						

**STATUS FLAG CODES**

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

**24 HR AVERAGES December 2016**

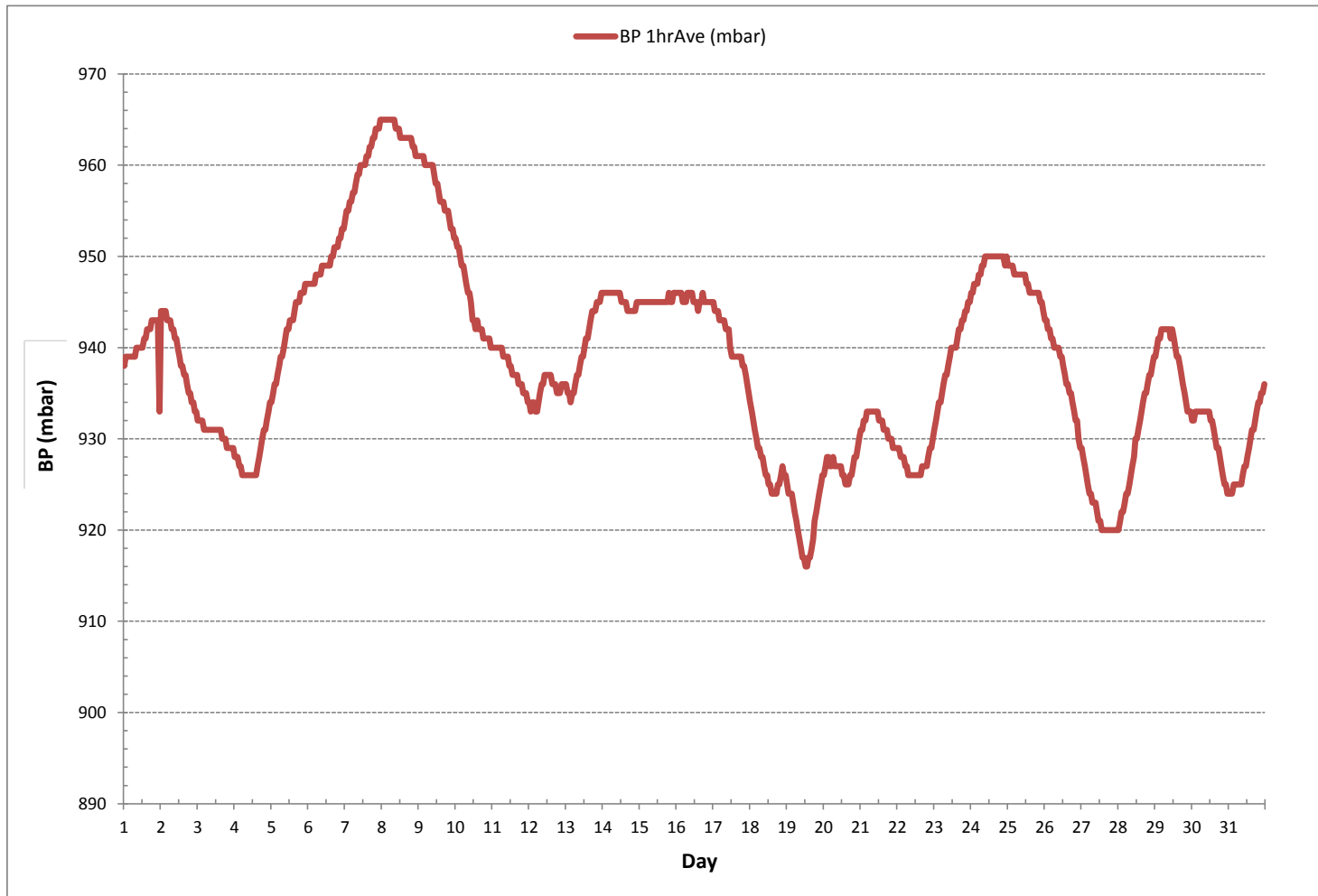


**MONTHLY SUMMARY**

MINIMUM 1-HR AVERAGE:	916 mbar	@ HOUR(S)	8	ON DAY(S)	19
MAXIMUM 1-HR AVERAGE:	965 mbar	@ HOUR(S)	23 , VAR	ON DAY(S)	7 , 8
MAXIMUM 24-HR AVERAGE:	964 mbar			ON DAY(S)	8
				VAR-VARIOUS	
		OPERATIONAL TIME:		743	hrs
		AMD OPERATION UPTIME:		99.9	%
STANDARD DEVIATION:	11	MONTHLY AVERAGE:		939	mbar



**BAROMETRIC PRESSURE Hourly Averages (BP mbar)**



***AMBIENT TEMPERATURE***



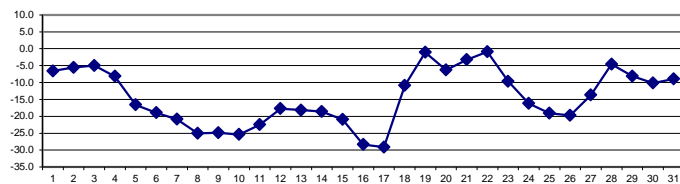
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

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	-5.6	-5.8	-5.9	-6.2	-6.4	-6.7	-6.9	-7.1	-7.0	-6.7	-6.6	-6.4	-6.3	-6.3	-6.4	-6.6	-6.9	-6.9	-7.0	-7.1	-7.1	-7.1	-7.1	-6.9	-7.1	-5.6	-6.6	24	
2	-6.8	-6.5	-6.3	-6.2	-6.3	-6.3	-6.2	-6.4	-6.3	-6.1	-5.8	-5.2	-5.1	-4.8	-4.8	-4.8	-4.8	-4.7	-4.6	-4.4	-4.6	-5.0	-5.5	-5.7	-6.8	-4.4	-5.6	24	
3	-5.5	-5.3	-5.1	-5.0	-5.1	-5.1	-5.1	-5.1	-5.1	-4.8	-4.4	-3.9	-3.3	-3.1	-3.0	-3.5	-4.8	-4.8	-4.7	-6.8	-7.7	-6.6	-6.2	-6.0	-7.7	-3.0	-5.0	24	
4	-6.4	-7.2	-7.6	-7.9	-8.4	-8.7	-9.2	-9.1	-8.8	-6.9	-6.1	-4.9	-3.7	-4.0	-4.5	-5.7	-7.1	-8.6	-9.7	-11.0	-12.0	-12.5	-12.7	-12.8	-12.8	-3.7	-8.1	24	
5	-13.0	-13.5	-14.3	-14.9	-15.3	-16.0	-16.4	-16.7	-16.6	-16.3	-15.9	-15.8	-16.1	-16.5	-16.7	-17.0	-17.2	-17.5	-17.7	-18.1	-18.8	-19.0	-19.2	-19.3	-19.3	-19.3	-13.0	-16.6	24
6	-19.3	-19.3	-19.5	-19.6	-19.4	-19.5	-19.6	-19.7	-19.8	-19.5	-18.5	-17.9	-17.2	-16.6	-17.1	-18.2	-19.0	-19.5	-19.6	-19.6	-19.5	-19.1	-18.9	-18.9	-19.8	-16.6	-19.0	24	
7	-19.1	-19.6	-19.7	-20.0	-20.6	-21.1	-21.6	-22.0	-22.4	-21.9	-20.7	-20.1	-18.5	-17.4	-17.0	-18.5	-19.7	-20.7	-21.7	-22.4	-23.2	-23.9	-24.3	-25.3	-25.3	-25.3	-17.0	-20.9	24
8	-26.0	-25.8	-25.5	-25.7	-25.7	-25.9	-25.9	-25.5	-24.9	-24.2	-24.2	-22.2	-22.0	-21.3	-21.6	-22.4	-24.8	-27.0	-27.8	-28.8	-29.1	-26.8	-25.1	-24.4	-29.1	-21.3	-25.1	24	
9	-24.2	-24.4	-24.6	-24.2	-24.0	-23.6	-23.6	-24.9	-25.2	-23.5	-22.8	-20.7	-21.2	-19.9	-20.4	-22.9	-25.0	-26.4	-27.5	-28.4	-28.9	-29.6	-30.0	-30.6	-30.6	-19.9	-24.9	24	
10	-31.1	-31.5	-31.5	-31.8	-32.0	-31.9	-31.8	-30.9	-30.8	-29.5	-24.9	-22.1	-20.9	-19.7	-20.4	-20.8	-21.6	-21.4	-21.1	-20.9	-20.7	-20.7	-20.6	-20.3	-32.0	-19.7	-25.4	24	
11	-20.4	-20.4	-20.4	-21.1	-22.8	-24.2	-24.8	-24.8	-24.1	-23.3	-22.0	-22.3	-22.2	-21.4	-22.3	-22.2	-22.6	-23.1	-22.1	-21.7	-22.1	-22.1	-22.1	-22.9	-24.8	-20.4	-22.5	24	
12	-21.7	-20.7	-20.6	-19.9	-19.0	-18.9	-18.6	-19.9	-20.7	-20.2	-19.5	-18.0	-16.9	-16.0	-16.1	-16.5	-16.4	-16.0	-15.1	-14.7	-14.5	-14.8	-15.3	-15.4	-21.7	-14.5	-17.7	24	
13	-15.2	-15.4	-15.0	-14.4	-14.6	-15.5	-16.7	-17.5	-17.7	-16.8	-16.1	-15.5	-16.7	-17.0	-17.1	-18.4	-19.6	-20.4	-21.3	-21.7	-22.1	-23.0	-23.7	-24.4	-24.4	-14.4	-18.2	24	
14	-23.8	-22.1	-20.0	-19.7	-19.3	-18.5	-18.3	-18.5	-20.5	-20.1	-18.3	-17.9	-17.5	-16.6	-16.4	-16.1	-17.3	-18.4	-18.7	-17.6	-16.3	-16.8	-17.7	-19.2	-23.8	-16.1	-18.6	24	
15	-18.3	-20.6	-22.6	-20.8	-20.1	-19.2	-18.1	-18.6	-19.0	-19.0	-18.5	-17.9	-18.5	-18.5	-18.7	-20.4	-21.7	-22.1	-22.9	-23.6	-24.0	-24.9	-26.9	-27.8	-27.8	-17.9	-20.9	24	
16	-28.2	-28.9	-29.1	-28.3	-27.6	-27.7	-29.5	-30.7	-30.9	-29.1	-26.6	-24.1	-23.1	-21.5	-21.8	-24.8	-27.6	-29.2	-29.5	-31.2	-31.7	-32.2	-33.2	-34.0	-34.0	-21.5	-28.4	24	
17	-33.9	-34.3	-34.6	-34.5	-34.7	-35.1	-34.9	-33.9	-33.3	-30.8	-28.2	-23.0	-22.0	-21.3	-21.4	-24.0	-26.4	-27.8	-28.8	-28.7	-28.1	-27.2	-27.0	-24.6	-35.1	-21.3	-29.1	24	
18	-23.4	-22.7	-22.1	-21.5	-20.7	-19.6	-18.6	-17.8	-16.5	-15.0	-12.9	-9.6	-6.2	-5.2	-4.8	-4.5	-3.5	-2.9	-2.2	-1.5	-1.6	-1.9	-2.7	-4.6	-23.4	-1.5	-10.9	24	
19	-5.0	-3.5	-3.0	-2.4	-1.7	-1.1	-1.2	-1.2	-1.3	-0.8	0.9	0.8	1.5	2.9	1.6	-0.2	-0.4	-0.4	-1.4	-1.4	-1.7	-2.2	-2.4	-2.6	-5.0	2.9	-1.1	24	
20	-3.0	-3.6	-4.2	-4.7	-5.0	-4.9	-6.0	-7.7	-7.8	-7.7	-5.7	-3.4	-2.7	-1.7	-2.6	-5.3	-7.7	-8.4	-9.3	-9.3	-10.2	-10.2	-10.4	-10.4	-10.4	-1.7	-6.3	24	
21	-10.0	-9.5	-9.3	-8.0	-6.9	-7.3	-8.3	-8.3	-7.4	-6.6	-4.7	-1.3	0.3	0.9	1.1	0.4	-0.1	0.2	0.3	0.7	1.7	2.4	1.1	0.2	-10.0	2.4	-3.3	24	
22	0.3	0.1	0.4	0.0	-0.7	-0.7	-0.5	-0.8	-1.3	-1.1	-0.7	-0.8	0.7	1.5	1.5	0.4	-0.5	-2.3	-3.6	-3.1	-2.8	-2.5	-2.4	-2.5	-3.6	1.5	-0.9	24	
23	-2.6	-3.2	-3.7	-3.9	-4.4	-5.6	-6.6	-7.8	-9.0	-9.7	-9.8	-9.8	-10.0	-11.2	-12.0	-13.1	-13.5	-13.7	-13.6	-13.6	-13.6	-13.4	-13.6	-14.2	-14.2	-2.6	-9.7	24	
24	-14.6	-15.0	-15.8	-16.2	-16.4	-16.5	-16.8	-17.0	-17.2	-17.1	-16.4	-15.6	-15.1	-15.0	-14.8	-15.2	-16.4	-16.6	-16.7	-16.5	-16.8	-16.9	-17.2	-17.4	-17.4	-14.6	-16.2	24	
25	-17.5	-17.7	-17.8	-17.8	-17.8	-17.6	-17.6	-17.7	-17.8	-17.9	-17.1	-15.6	-14.6	-15.1	-15.3	-17.4	-19.8	-21.2	-22.3	-22.9	-24.3	-24.5	-25.4	-25.4	-25.4	-14.6	-19.1	24	
26	-26.0	-25.9	-23.9	-21.8	-20.4	-19.4	-18.8	-19.1	-20.3	-20.5	-19.2	-18.0	-17.5	-15.9	-15.3	-16.7	-18.1	-18.1	-18.2	-19.2	-20.2	-20.9	-19.9	-19.3	-26.0	-15.3	-19.7	24	
27	-19.3	-17.7	-17.8	-16.9	-16.5	-15.8	-15.4	-15.5	-15.1	-14.8	-14.0	-13.1	-12.0	-11.8	-11.9	-12.6	-13.7	-13.7	-12.1	-10.8	-10.9	-10.2	-9.0	-8.3	-19.3	-8.3	-13.7	24	
28	-8.4	-7.0	-6.4	-4.6	-3.8	-3.9	-3.8	-3.6	-3.5	-3.2	-3.1	-3.6	-3.3	-2.8	-3.3	-3.8	-3.9	-4.7	-6.2	-6.3	-6.1	-5.9	-4.7	-4.2	-8.4	-2.8	-4.6	24	
29	-3.9	-3.3	-3.6	-4.3	-5.8	-6.5	-8.2	-9.5	-9.8	-10.0	-8.6	-7.3	-7.2	-7.1	-7.2	-8.3	-10.2	-11.3	-11.2	-10.7	-10.5	-10.3	-10.2	-10.1	-11.3	-3.3	-8.1	24	
30	-10.4	-10.6	-11.9	-13.1	-12.8	-13.2	-13.4	-13.9	-15.0	-12.8	-11.2	-9.1	-7.1	-5.0	-5.1	-7.6	-8.9	-9.9	-10.2	-9.9	-9.0	-7.7	-7.8	-8.7	-15.0	-5.0	-10.2	24	
31	-8.9	-8.2	-7.4	-7.1	-7.5	-7.7	-7.7	-7.8	-8.2	-8.6	-8.1	-7.1	-7.8	-8.3	-9.0	-9.8	-10.8	-12.2	-11.5	-10.4	-10.2	-10.1	-10.0	-9.9	-12.2	-7.1	-8.9	24	
HOURLY MAX	0.3	0.1	0.4	0.0	-0.7	-0.7	-0.5	-0.8	-1.3	-0.8	0.9	0.8	1.5	2.9	1.6	0.4	-0.1	0.2	0.3	0.7	1.7	2.4	1.1	0.2					
HOURLY AVG	-15.2	-15.1	-15.1	-14.9	-14.9	-15.0	-15.2	-15.5	-15.6	-15.0	-13.9	-12.6	-12.0	-11.5	-11.7	-12.8	-13.9	-14.5	-14.8	-14.9	-15.0	-15.0	-15.2	-15.3					

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

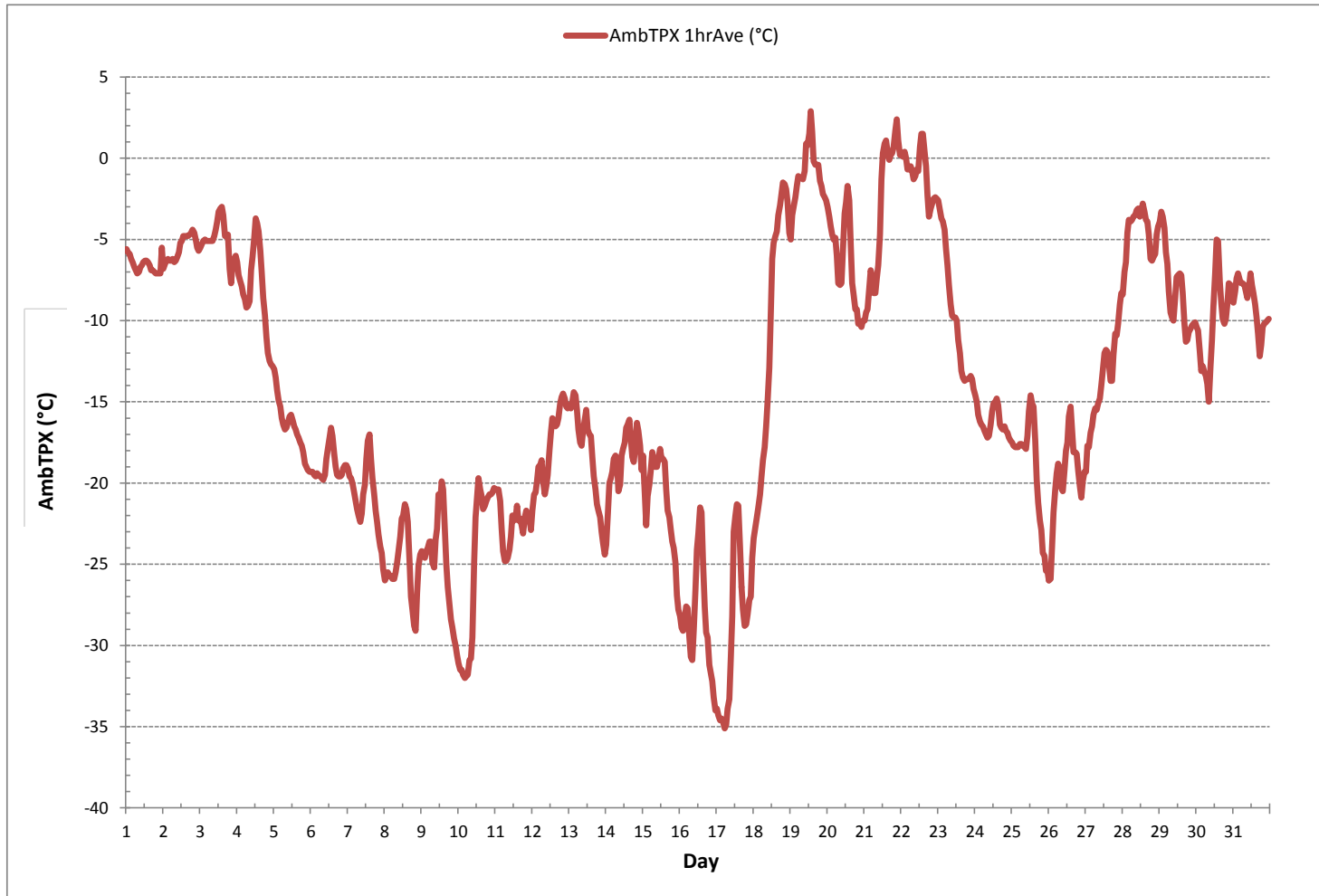
24 HR AVERAGES December 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-35.1 °C	@ HOUR(S)	5	ON DAY(S)	17
MAXIMUM 1-HR AVERAGE:	2.9 °C	@ HOUR(S)	13	ON DAY(S)	19
MAXIMUM 24-HR AVERAGE:	-0.9 °C			ON DAY(S)	22
				VAR-VARIOUS	
OPERATIONAL TIME:				744	hrs
AMD OPERATION UPTIME:				100.0	%
STANDARD DEVIATION:	8.7			MONTHLY AVERAGE:	-14.4 °C

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



## ***PRECIPITATION***



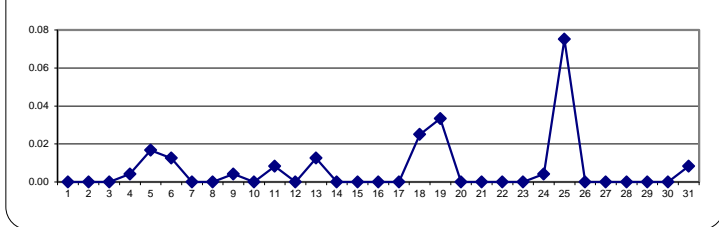
PRECIPITATION Hourly Averages (mm)

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

STATUS FLAG CODES

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

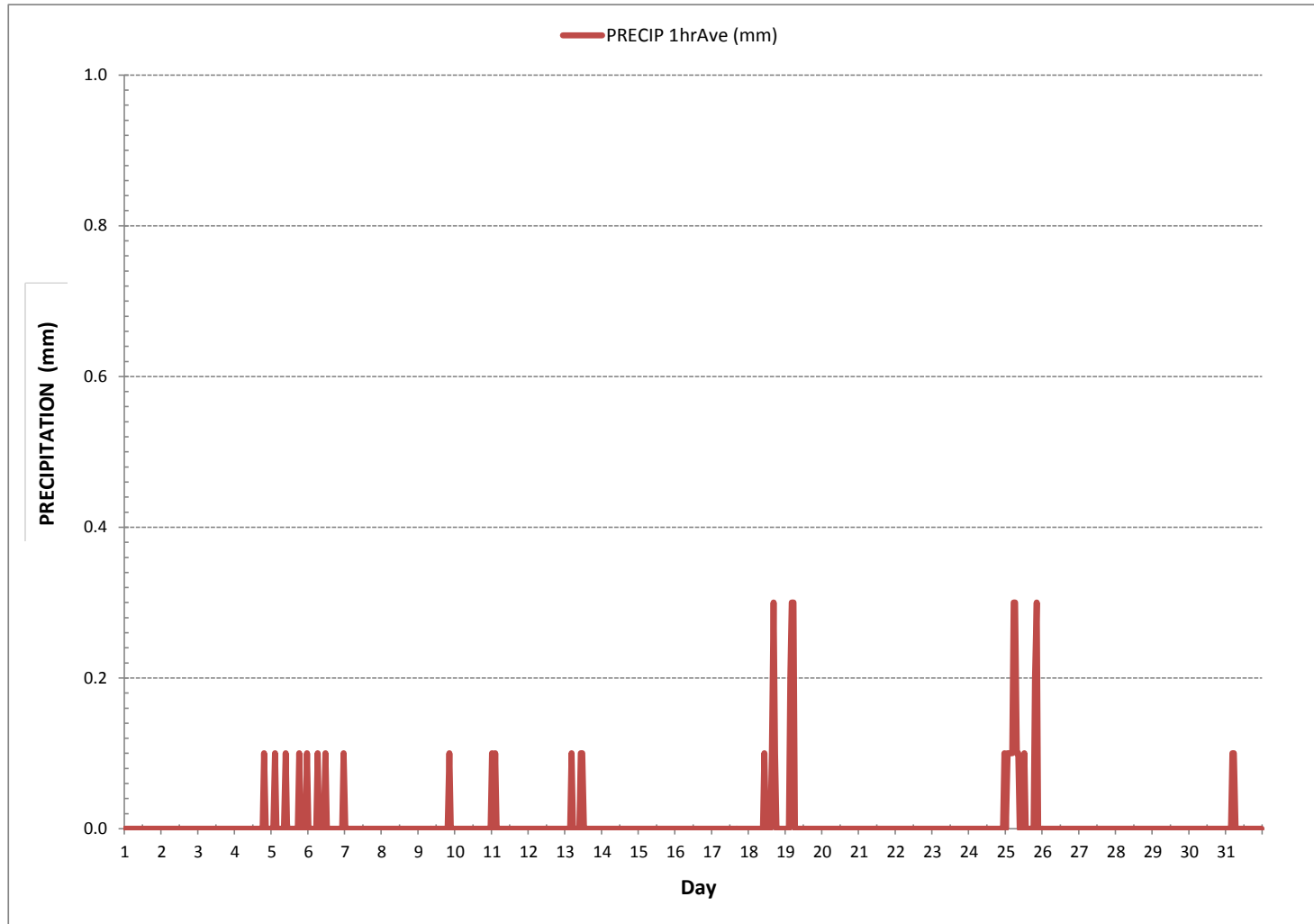
24 HR AVERAGES December 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	0.0 mm	@ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	0.3 mm	@ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 24-HR AVERAGE:	0.1 mm			ON DAY(S)	25
MONTHLY TOTAL	4.9 mm			VAR-VARIOUS	
OPERATIONAL TIME:					744 hrs
AMD OPERATION UPTIME:					100.0 %
STANDARD DEVIATION:	0.0			MONTHLY AVERAGE:	0.0 mm

PRECIPITATION Hourly Averages (mm)



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



***SULPHUR DIOXIDE***



## API 100E Sulphur Dioxide Analyzer Calibration

Date: December 2, 2016	Barometric Pressure: 0.931 atm
Company/Airshed: LICA	Station Temperature °C: 20
Location/Station Name: Maskwa	Weather Conditions: A few clouds
Parameter: Sulphur Dioxide	Calibration Purpose: routine monthly
Start Time 24 hr. (mst): 10:01	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
End Time 24 hr. (mst): 14:27	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	Range ppb: 1000	Station SO2 Analyzer Range?
Last Calibration Date: November 1, 2016	As Found C.F.: 1.016	ppb
Previous C.F.: 1.000	New C.F.: 1.000	

<b>Calibrator:</b>	<b>Standard Calibration Points for Ranges</b>								
Flow Meter ID's: n/a	<table border="1" style="margin: auto;"> <tr><td>Point</td><td>ppb</td></tr> <tr><td>High</td><td>780</td></tr> <tr><td>Mid</td><td>380</td></tr> <tr><td>Low</td><td>190</td></tr> </table>	Point	ppb	High	780	Mid	380	Low	190
Point	ppb								
High	780								
Mid	380								
Low	190								
Make & Model: API 700									
Serial #: 627									
Cal Gas Cylinder I.D. #: LL104222									
Cal Gas Conc. (ppm): 50.6									

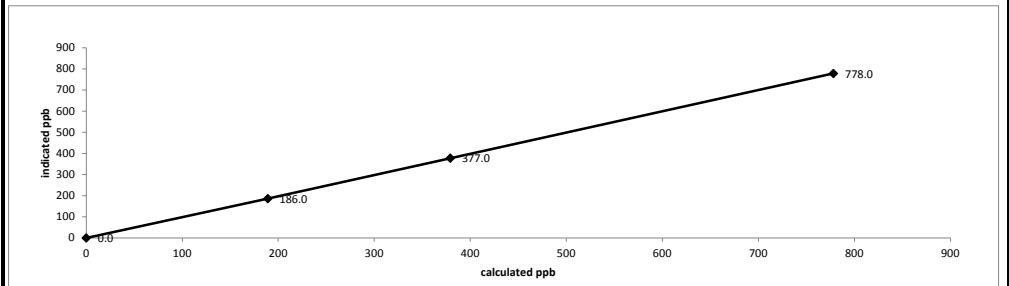
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	5000	0.00	5000	0.0	1.9	n/a
as found high	4923	76.90	5000	778.2	768.0	1.016
adjusted zero	5000	0.00	5000	0.0	0.0	n/a
adjusted high	4923	76.90	5000	778.2	778.0	1.000
mid	4966	37.50	5004	379.2	377.0	1.006
low	4982	18.70	5001	189.2	186.0	1.017
calibrator zero	5000	0.00	5000	0.0	0.0	n/a
Average C.F. =						1.008

**Linear Regression/Calibration Results:**

Correlation Coefficient =	1.000	LIMITS
Slope =	0.999	> or = 0.995
b (Intercept as % of full scale) =	0.17%	.95-1.05
% change in C.F. from last cal =	-1.59%	± 3% F.S.
		± 10%

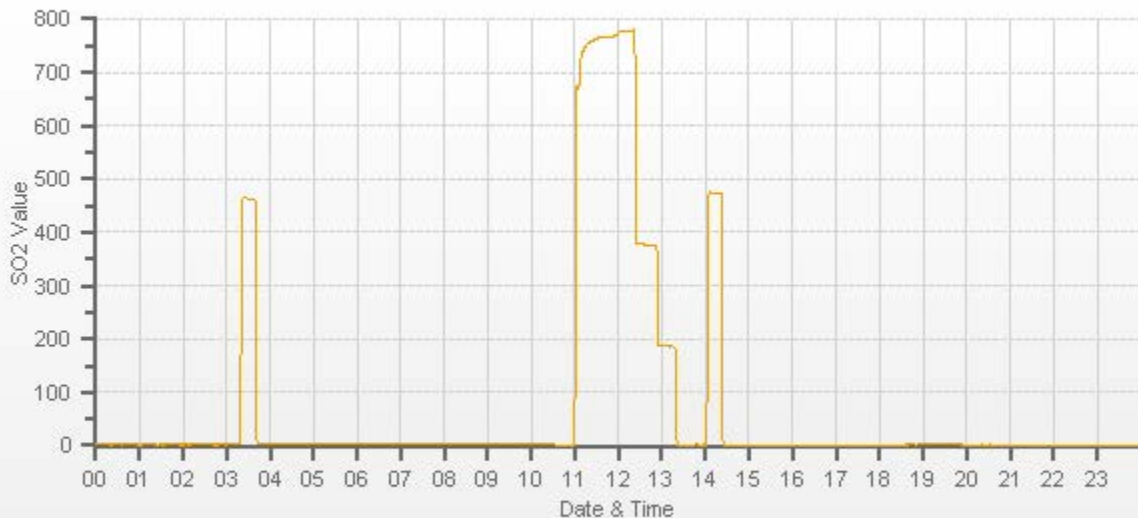
**API 100E Sulphur Dioxide Analyzer Calibration**



<b>As found:</b>	<b>As left:</b>
SLOPE: 0.999	SLOPE: 1.013
OFFSET: 115.5	OFFSET: 119.0
HVPS: 479	HVPS: 479
RCELL TEMP: 50.0	RCELL TEMP: 50.0
BOX TEMP: 28.6	BOX TEMP: 31.8
PMT TEMP: 7.7	PMT TEMP: 7.7
IZS TEMP: 45.0	IZS TEMP: 45.0
PRES: 24.7	PRES: 24.6
SAMP FL: 622	SAMP FL: 620
NORM PMT: 119.0	NORM PMT: 120.3
UV LAMP: 2881.7	UV LAMP: 2875.9
LAMP RATIO: 96.9	LAMP RATIO: 96.7
STR. LGT: 57.7	STR. LGT: 60.3
DRK PMT: 9.8	DRK PMT: 10.8
DRK LMP: -0.4	DRK LMP: -0.5
Expected Value: 475.0	Expected Value: 475.0

**Comments:**  
The analyzer sample inlet filter was changed.

The EV has not changed after the calibration.



— SO2[ppb]

***HYDROGEN SULPHIDE***



## API 101E Hydrogen Sulphide Analyzer Calibration

Date: December 2, 2016	Barometric Pressure: 0.931 atm
Company/Airshed: LICA	Station Temperature °C: 20
Location/Station Name: Maskwa	Weather Conditions: A few clouds
Parameter: Hydrogen Sulphide	Calibration Purpose: routine monthly
Start Time 24 hr. (mst): 10:01	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
End Time 24 hr. (mst): 14:58	Cal Gas Expiry Date: June 14, 2019
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	
ID# or Serial Number: 722	Range ppb: 100 Station SO2 Analyzer Range?
Last Calibration Date: November 1, 2016	As Found C.F.: 1.026 1000 ppb
Previous C.F.: 1.000	New C.F.: 0.999

Calibrator: Flow Meter ID's: n/a Make & Model: SABIO 2010 D Serial #: 11900613 Cal Gas Cylinder I.D. #: EY0000654 Cal Gas Conc. (ppm): 10.2	<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>SO<sub>2</sub> Scrubber Check (10 mins.)</b> Start/End Time 24 hr.: 10:50/11:02 Target Concentration (ppb): 780 Result (ppb): 1 Zero Corrected Result (ppb): 1 <b>**warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**</b>
Point	ppb									
High	78									
Mid	38									
Low	19									

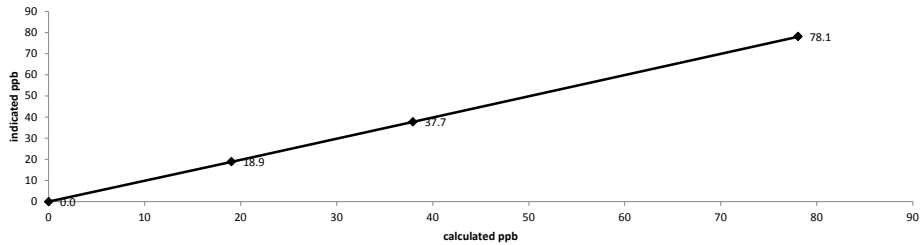
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	7500	0.00	7500	0.0	0.6	n/a
as found high	7443	57.40	7500	78.1	76.7	1.026
adjusted zero	7500	0.00	7500	0.0	0.0	n/a
adjusted high	7443	57.40	7500	78.1	78.1	0.999
mid	7471	27.90	7499	37.9	37.7	1.007
low	7486	14.00	7500	19.0	18.9	1.007
calibrator zero	7500	0.00	7500	0.0	0.0	n/a
Average C.F.=						1.005

**Linear Regression/Calibration Results:**

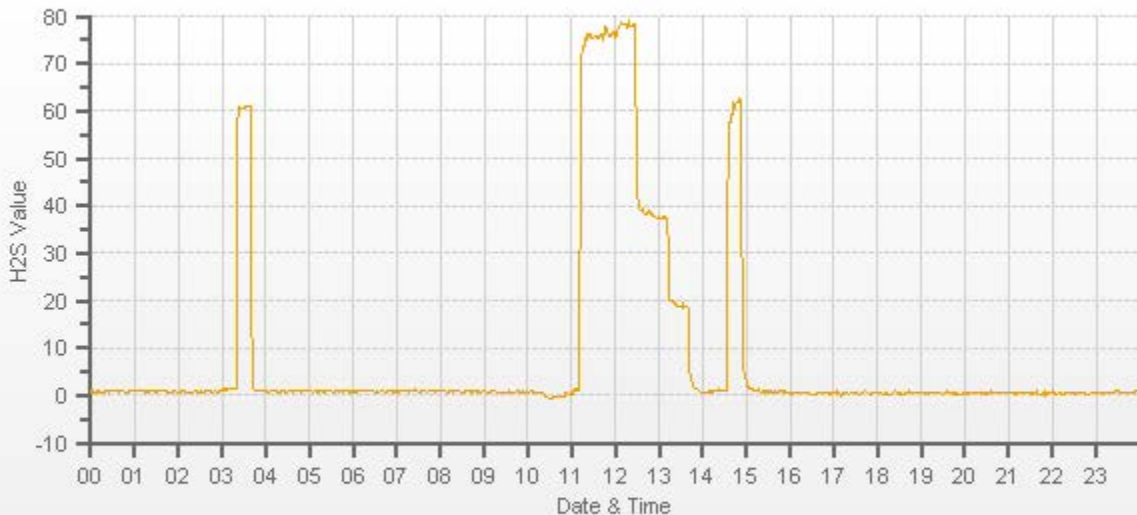
Correlation Coefficient =	1.000	LIMITS
Slope =	0.999	> or = 0.995
b (Intercept as % of full scale) =	0.12%	.95-1.05
% change in C.F. from last cal =	-2.58%	± 3% F.S.
		± 10%

**API 101E Hydrogen Sulphide Analyzer Calibration**



<b>As found:</b> SLOPE: 0.938 OFFSET: 83.0 HVPS: 583 RCELL TEMP: 50.0 BOX TEMP: 29.6 PMT TEMP: 8.2 IZS TEMP: 48.0 Converter Temp: 315.2 PRES: 23.4 SAMP FL: 619 UV LAMP: 3320.0 LAMP RATIO: 100.2 STR. LGT: 38.9 DRK PMT: 23.3 DRK LMP: 3.7 Expected Value: 63.7	<b>As left:</b> SLOPE: 0.966 OFFSET: 84.9 HVPS: 583 RCELL TEMP: 50.0 BOX TEMP: 31.7 PMT TEMP: 8.2 IZS TEMP: 48.0 Converter Temp: 314.7 PRES: 23.3 SAMP FL: 614 UV LAMP: 3322.9 LAMP RATIO: 100.3 STR. LGT: 41.0 DRK PMT: 24.0 DRK LMP: 3.5 Expected Value: 62.2
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**Comments:**  
The analyzer sample inlet filter was changed.



— H2S[ppb]



## API 101E Hydrogen Sulphide Analyzer Calibration

<b>Date:</b> December 8, 2016 <b>Company/Airshed:</b> LICA <b>Location/Station Name:</b> Maskwa <b>Parameter:</b> Hydrogen Sulphide <b>Start Time 24 hr. (mst):</b> 10:39 <b>End Time 24 hr. (mst):</b> 11:39 <b>Calibration Method:</b> Gas Dilution	<b>Barometric Pressure:</b> 0.951 atm <b>Station Temperature °C:</b> 21 <b>Weather Conditions:</b> A few clouds <b>Calibration Purpose:</b> as found <b>Performed By/Reviewer:</b> Alex Yakupov   Trina Whitsitt <b>Cal Gas Expiry Date:</b> June 14, 2019 <b>Converter Model &amp; s/n (if applicable):</b> n/a
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<b>Analyzer:</b> <b>ID# or Serial Number:</b> 722 <b>Last Calibration Date:</b> December 2, 2016 <b>Previous C.F.:</b> 0.999	<b>Range ppb:</b> 100 <b>As Found C.F.:</b> 1.052 <b>New C.F.:</b> n/a <b>Station SO2 Analyzer Range?</b> 1000 ppb
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<b>Calibrator:</b> <b>Flow Meter ID's:</b> n/a <b>Make &amp; Model:</b> API 700 <b>Serial #:</b> 627 <b>Cal Gas Cylinder I.D. # :</b> EY0000654 <b>Cal Gas Conc. (ppm):</b> 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>SO<sub>2</sub> Scrubber Check (10 mins.)</b> <b>Start/End Time 24 hr.:</b> <b>Target Concentration (ppb):</b> 780 <b>Result (ppb):</b> <b>Zero Corrected Result (ppb):</b> 1 <b>**warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**</b>
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:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	7500	0.00	7500	0.0	-1.0	n/a
as found high	7442	57.40	7499	78.1	73.2	1.052
<b>Average C.F. =</b>						n/a

**Linear Regression/Calibration Results:**

<b>Correlation Coefficient =</b> n/a <b>Slope =</b> n/a <b>b (Intercept as % of full scale) =</b> n/a <b>% change in C.F. from last cal =</b> -5.32%	<b>LIMITS</b> <b>&gt; or = 0.995</b> <b>.95-1.05</b> <b>± 3% F.S.</b> <b>± 10%</b>
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<b>As found:</b> SLOPE: 0.966 OFFSET: 84.9 HVPS: 583 RCELL TEMP: 50.0 BOX TEMP: 30.9 PMT TEMP: 8.2 IZS TEMP: 48.0 Converter Temp: 314.9 PRES: 24.1 SAMP FL: 635 UV LAMP: 3326.2 LAMP RATIO: 100.5 STR. LGT: 41.0 DRK PMT: 23.7 DRK LMP: 3.6 Expected Value: 62.2	<b>As left:</b> SLOPE: 0.966 OFFSET: 84.9 HVPS: 583 RCELL TEMP: 50.0 BOX TEMP: 30.8 PMT TEMP: 8.2 IZS TEMP: 48.0 Converter Temp: 315.2 PRES: 24.1 SAMP FL: 635 UV LAMP: 3324.1 LAMP RATIO: 100.5 STR. LGT: 41.0 DRK PMT: 24.0 DRK LMP: 3.5 Expected Value: 62.2
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**Comments:**

As Found Calibration completed because daily SPAN check result drifted over 10%.



## API 101E Hydrogen Sulphide Analyzer Calibration

Date: December 8, 2016	Barometric Pressure: 0.951 atm
Company/Airshed: LICA	Station Temperature °C: 21
Location/Station Name: Maskwa	Weather Conditions: A few clouds
Parameter: Hydrogen Sulphide	Calibration Purpose: repeat
Start Time 24 hr. (mst): 11:57	Performed By/Reviewer: Alex Yakupov   Trina Whitsitt
End Time 24 hr. (mst): 15:55	Cal Gas Expiry Date: June 14, 2019
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:		
ID# or Serial Number: 722	Range ppb: 100	Station SO <sub>2</sub> Analyzer Range?
Last Calibration Date: December 2, 2016	As Found C.F.: 0.998	1000 ppb
Previous C.F.: 0.999	New C.F.: 0.996	

Calibrator: Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. #: EY0000654 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	SO <sub>2</sub> Scrubber Check (10 mins.) Start/End Time 24 hr.: Target Concentration (ppb): 780 Result (ppb): Zero Corrected Result (ppb): 0 <b>**warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**</b>
Point	ppb									
High	78									
Mid	38									
Low	19									

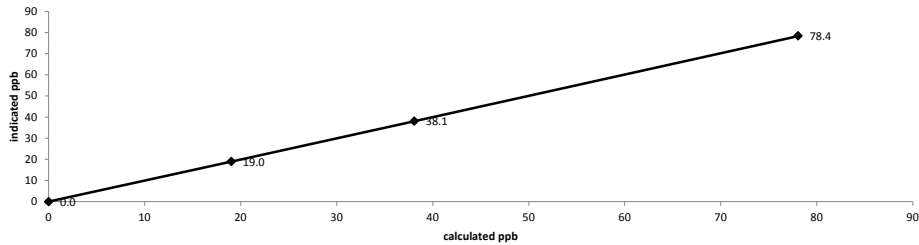
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	7500	0.00	7500	0.0	-1.0	n/a
as found high	7443	57.40	7500	78.1	77.2	0.998
adjusted zero	7500	0.00	7500	0.0	0.0	n/a
adjusted high	7443	57.40	7500	78.1	78.4	0.996
mid	7472	28.00	7500	38.1	38.1	0.999
low	7491	14.00	7505	19.0	19.0	1.001
calibrator zero	7500	0.00	7500	0.0	0.0	n/a
Average C.F.=						0.999

**Linear Regression/Calibration Results:**

Correlation Coefficient = <u>1.000</u>	<b>LIMITS</b> > or = 0.995
Slope = <u>0.995</u>	.95-1.05
b (Intercept as % of full scale) = <u>0.07%</u>	± 3% F.S.
% change in C.F. from last cal = <u>0.08%</u>	± 10%

API 101E Hydrogen Sulphide Analyzer Calibration

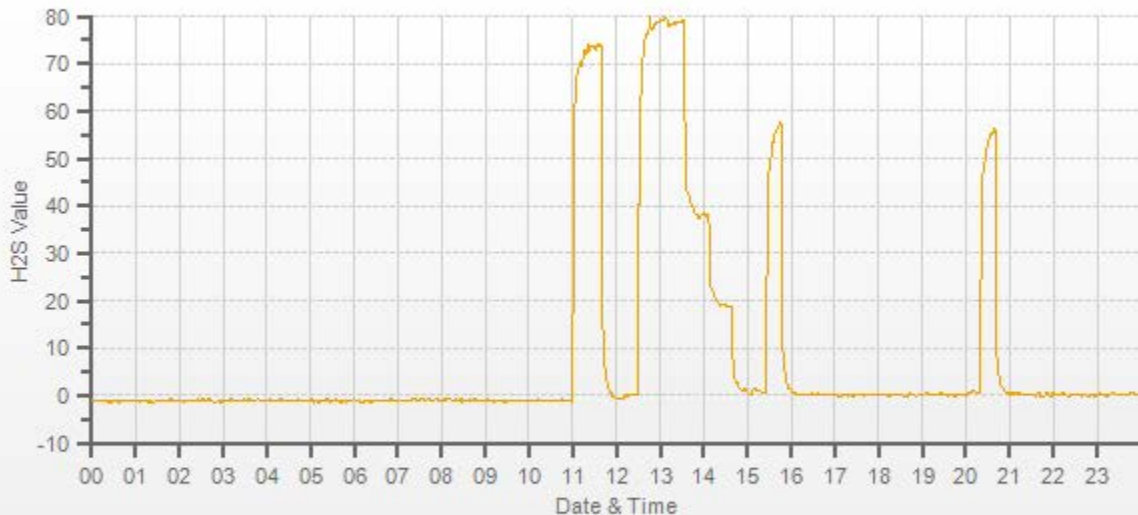


<b>As found:</b> SLOPE: <u>0.966</u> OFFSET: <u>84.9</u> HVPS: <u>583</u> RCELL TEMP: <u>50.0</u> BOX TEMP: <u>30.8</u> PMT TEMP: <u>8.2</u> IZS TEMP: <u>48.0</u> Converter Temp: <u>315.2</u> PRES: <u>24.1</u> SAMP FL: <u>635</u> UV LAMP: <u>3324.1</u> LAMP RATIO: <u>100.5</u> STR. LGT: <u>41.0</u> DRK PMT: <u>24.0</u> DRK LMP: <u>3.5</u> Expected Value: <u>62.2</u>	<b>As left:</b> SLOPE: <u>1.006</u> OFFSET: <u>82.6</u> HVPS: <u>583</u> RCELL TEMP: <u>50.0</u> BOX TEMP: <u>31.1</u> PMT TEMP: <u>8.2</u> IZS TEMP: <u>48.0</u> Converter Temp: <u>314.6</u> PRES: <u>24.1</u> SAMP FL: <u>634</u> UV LAMP: <u>3297.7</u> LAMP RATIO: <u>100.4</u> STR. LGT: <u>41.5</u> DRK PMT: <u>23.8</u> DRK LMP: <u>3.5</u> Expected Value: <u>56.9</u>
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Comments:

Repeat calibration completed because As Found High point was over 5%. Three points re-calibration required to correct ZERO, High Point, and the EV.





— H2S[ppb]



## API 101E Hydrogen Sulphide Analyzer Calibration

Date: December 14, 2016	Barometric Pressure: 0.923 atm
Company/Airshed: LICA	Station Temperature °C: 21
Location/Station Name: Maskwa	Weather Conditions: A few clouds
Parameter: Hydrogen Sulphide	Calibration Purpose: shut down
Start Time 24 hr. (mst): 11:16	Performed By/Reviewer: Alex Yakupov   Trina Whitsitt
End Time 24 hr. (mst): 13:05	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: 722	Range ppb: 100	Station SO2 Analyzer Range? 1000 ppb
Last Calibration Date: December 8, 2016	As Found C.F.: 0.961	
Previous C.F.: 0.996	New C.F.: n/a	

<b>Calibrator:</b>	<b>Standard Calibration Points for Ranges</b>	<b>SO<sub>2</sub> Scrubber Check (10 mins.)</b>								
Flow Meter ID's: n/a	<table border="1" style="width: 100%; border-collapse: collapse;"><tr><th>Point</th><th>ppb</th></tr><tr><td>High</td><td>78</td></tr><tr><td>Mid</td><td>38</td></tr><tr><td>Low</td><td>19</td></tr></table>	Point	ppb	High	78	Mid	38	Low	19	Start/End Time 24 hr.: Target Concentration (ppb): 780 Result (ppb): 0 Zero Corrected Result (ppb): -1
Point	ppb									
High	78									
Mid	38									
Low	19									
Make & Model: API 700		**warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**								
Serial #: 627										
Cal Gas Cylinder I.D. #: EY0000654										
Cal Gas Conc. (ppm): 10.2										

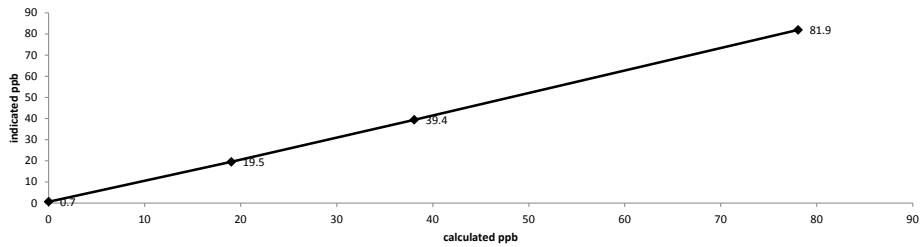
*ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015*

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration: (ppb)	Indicated Concentration: (ppb)	Correction Factors (C.F.):
	Diluent	Cal Gas	Total			
as found zero	7500	0.00	7500	0.0	0.7	n/a
as found high	7443	57.40	7500	78.1	81.9	0.961
mid	7472	28.00	7500	38.1	39.4	0.984
low	7491	14.00	7505	19.0	19.5	1.012
Average C.F. =						0.986

**Linear Regression/Calibration Results:**

Correlation Coefficient =	1.000	<b>LIMITS</b>
Slope =	0.958	> or = 0.995
b (Intercept as % of full scale) =	-0.10%	0.90-1.10
% change in C.F. from last cal =	3.48%	± 3% F.S.
		± 10%

**API 101E Hydrogen Sulphide Analyzer Calibration**



<p style="text-align: center;"><b>As found:</b></p> SLOPE: 1.006 OFFSET: 82.6 HVPS: 583 RCELL TEMP: 50.0 BOX TEMP: 30.7 PMT TEMP: 8.2 IZS TEMP: 48.0 Converter Temp: 315.1 PRES: 23.5 SAMP FL: 620 UV LAMP: 3334.7 LAMP RATIO: 100.7 STR. LGT: 41.5 DRK PMT: 23.5 DRK LMP: 3.6 Expected Value: 56.9	<p style="text-align: center;"><b>As left:</b></p> SLOPE: n/a OFFSET: n/a HVPS: n/a RCELL TEMP: n/a BOX TEMP: n/a PMT TEMP: n/a IZS TEMP: n/a Converter Temp: n/a PRES: n/a SAMP FL: n/a UV LAMP: n/a LAMP RATIO: n/a STR. LGT: n/a DRK PMT: n/a DRK LMP: n/a Expected Value: n/a
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**Comments:**

Shutdown calibration completed to replace Maxxam's analyzer #722 with LICA's analyzer #511, which came back after repair.



## API 101E Hydrogen Sulphide Analyzer Calibration

Date: December 14, 2016	Barometric Pressure: 0.923 atm
Company/Airshed: LICA	Station Temperature °C: 21
Location/Station Name: Maskwa	Weather Conditions: A few clouds
Parameter: Hydrogen Sulphide	Calibration Purpose: installation
Start Time 24 hr. (mst): 13:30	Performed By/Reviewer: Alex Yakupov   Trina Whitsitt
End Time 24 hr. (mst): 16:42	Cal Gas Expiry Date: June 14, 2019
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:		
ID# or Serial Number: 511	Range ppb: 100	Station SO2 Analyzer Range? _____
Last Calibration Date: n/a	As Found C.F.: n/a	1000 ppb
Previous C.F.: n/a	New C.F.: 0.999	

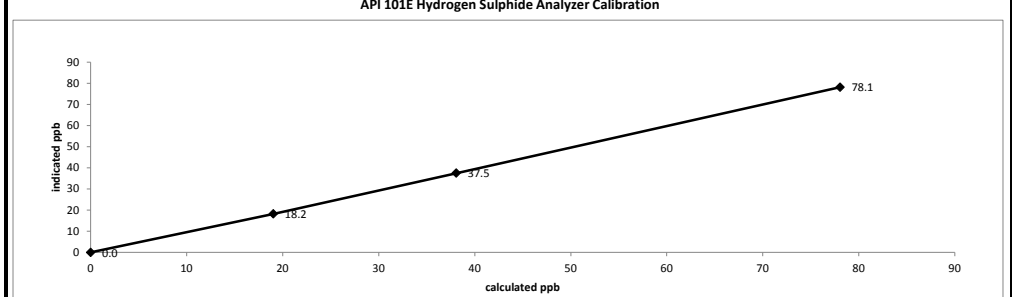
Calibrator: Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. #: EY0000654 Cal Gas Conc. (ppm): 10.2	<b>Standard Calibration Points for Ranges</b> <table border="1" style="margin: auto;"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>78</td></tr> <tr><td>Mid</td><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 mins.)</b> Start/End Time 24 hr.: 13:58/14:08 Target Concentration (ppb): 780 Result (ppb): 0 Zero Corrected Result (ppb): 0 <b>**warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**</b>
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:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
adjusted zero	7500	0.00	7500	0.0	0.0	n/a
adjusted high	7443	57.40	7500	78.1	78.1	0.999
mid	7472	28.00	7500	38.1	37.5	1.015
low	7491	14.00	7505	19.0	18.2	1.045
calibrator zero	7500	0.00	7500	0.0	0.0	n/a
<b>Average C.F.=</b>						1.020

Linear Regression/Calibration Results:

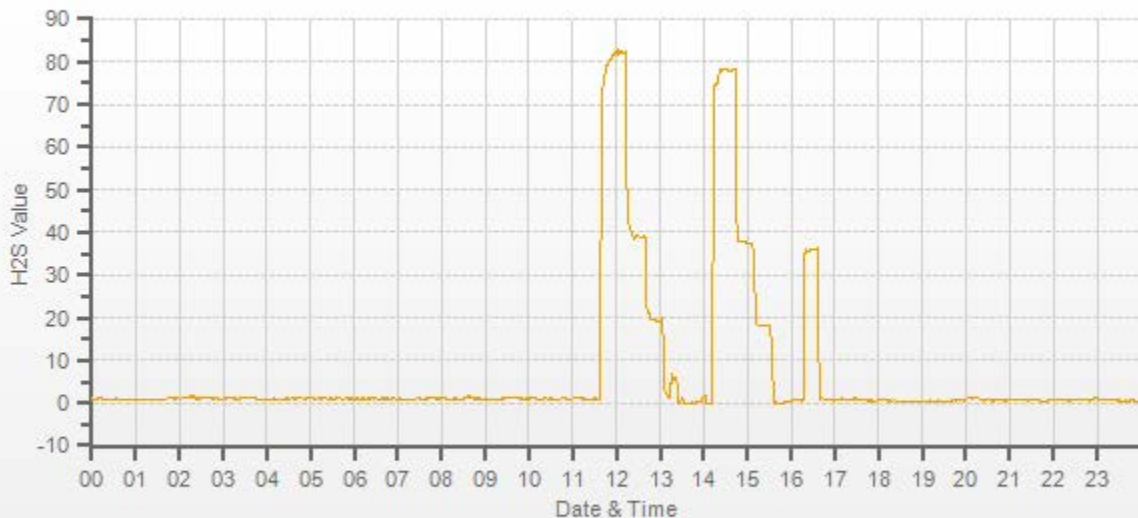
Correlation Coefficient = 1.000	LIMITS > or = 0.995
Slope = 0.996	.95-1.05
b (Intercept as % of full scale) = 0.46%	± 3% F.S.
% change in C.F. from last cal = n/a	± 10%



As found:	As left:
SLOPE: n/a	SLOPE: 0.958
OFFSET: n/a	OFFSET: 44.2
HVPS: n/a	HVPS: 596
RCELL TEMP: n/a	RCELL TEMP: 50.0
BOX TEMP: n/a	BOX TEMP: 31.4
PMT TEMP: n/a	PMT TEMP: 7.8
IZS TEMP: n/a	IZS TEMP: 45.0
Converter Temp: n/a	Converter Temp: 314.7
PRES: n/a	PRES: 22.0
SAMP FL: n/a	SAMP FL: 617
UV LAMP: n/a	UV LAMP: 2588.0
LAMP RATIO: n/a	LAMP RATIO: 99.7
STR. LGT: n/a	STR. LGT: 21.2
DRK PMT: n/a	DRK PMT: 44.1
DRK LMP: n/a	DRK LMP: 7.3
Expected Value: n/a	Expected Value: 36.0

**Comments:**  
The analyzer sample inlet filter was changed.

Installation calibration completed to install LICA's analyzer, which was repaired



— H2S[ppb]

***TOTAL HYDROCARBON***



# Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	December 2, 2016	Barometric Pressure:	0.931 atm
Company/Airshed:	UCA	Station Temperature °C:	20
Location/Station Name:	Maskwa	Weather Conditions:	A few clouds
Parameter:	Total Hydrocarbon	Calibration Purpose:	routine monthly
Start/End Time 24 hr. (mst):	14:13 / 17:17	Performed By/Reviewer:	Alex Yakupov / Trina Whitsitt
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 25, 2023

Analyzer:	ID# or Serial Number:	436609738	Range ppm:	50
	Last Calibration Date:	November 1, 2016	As Found C.F.:	1.003
	Previous Cal High Point C.F.:	1.000	New C.F.:	1.000

Calibrator:	Flow Meter ID's:	n/a	Standard Calibration Points for a Range of:	50 ppm
	Make & Model:	SABIO 2010 D		
	Serial #:	11900613		
	Cal Gas Cylinder I.D. #:	LL165372		
	CH <sub>4</sub> /C <sub>3</sub> H <sub>8</sub> Cylinder Conc. (ppm):	606.0      212.0		
	CH <sub>4</sub> as propane/total CH <sub>4</sub> equivalents (ppm):	583.0      1189.0		

Point	Target ppm
High	38
Mid	18
Low	9

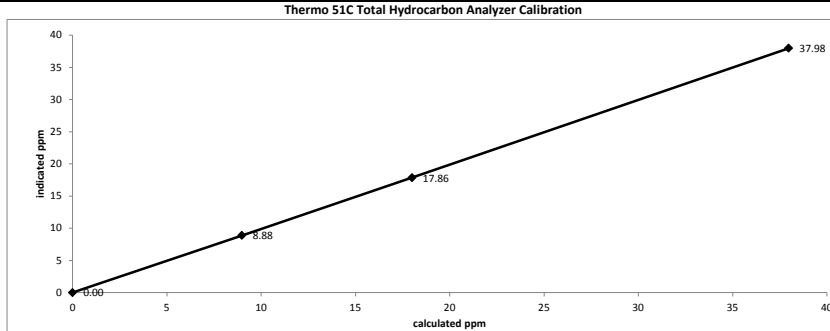
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration (ppm)	Indicated Concentration (ppm)	Correction Factors:
	Diluent	Cal Gas	Total			
as found zero	1999	0.00	1999	0.0	0.00	n/a
as found high	1937	63.90	2001	37.97	37.84	1.003
adjusted zero	1999	0.00	1999	0.00	0.00	n/a
adjusted high	1937	63.90	2001	37.97	37.98	1.000
mid	1971	30.30	2001	18.00	17.86	1.008
low	1985	15.10	2000	8.98	8.88	1.011
calibrator zero	1999	0.00	1999	0.0	0.00	n/a

Average C.F. = 1.006

### Linear Regression/Calibration Results:

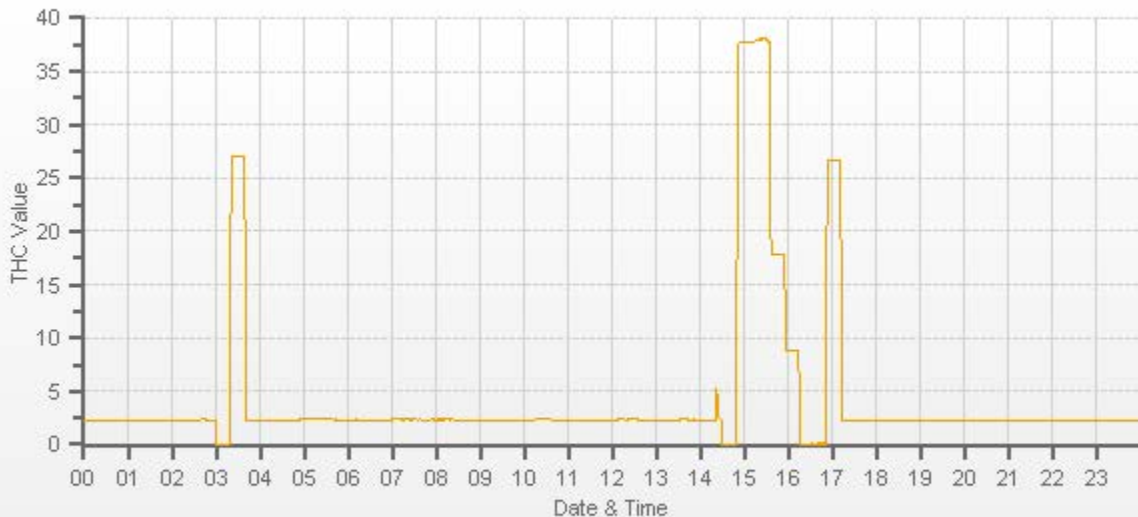
Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.999		.95-1.05
b (Intercept as % of full scale) =	0.14%		± 3% F.S.
% change in C.F. from last cal =	-0.35%		± 10%



<b>As found:</b>	<b>As left:</b>
H2 cylinder (psi): 1200	H2 cylinder (psi): 1200
H2 cylinder reg set (psi): 22	H2 cylinder reg set (psi): 22
Span Cylinder (psi): 1700	Span Cylinder (psi): 1700
Span Cylinder Reg Set (psi): 22	Span Cylinder Reg Set (psi): 22
Zero Air Gen Pressure: 38	Zero Air Gen Pressure: 38
measurement alarms: None	measurement alarms: None
service alarms: None	service alarms: None
cnt: 1082	cnt: 1094
rng: 1	rng: 1
try: 0	try: 0
flm: 186.6	flm: 186.6
det: 125.5	det: 125.5
Flame: 186	Flame: 186
Filter: 125	Filter: 125
Base: 125	Base: 125
Sample psi: 07.50	Sample psi: 07.50
Internal Air Pressure: 20	Internal Air Pressure: 20
Internal Fuel Pressure: 12	Internal Fuel Pressure: 12
Measured Flow: 0.8980	Measured Flow: 0.8984
Expected Value: 26.79	Expected Value: 26.68

Comments: The analyzer sample inlet filter was changed. No zero adjustment was required/made. As found zero value copied to adjusted zero value for linearity calculation purposes.

The analyzer cooling fan filter(s) were cleaned.



— THC[ppm]

***NITROGEN DIOXIDE***





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

<b>Date:</b> December 2, 2016 <b>Company/Airshed:</b> LICA <b>Location/Station Name:</b> Maskwa <b>Start/End Time 24 hr. (mst):</b> 10:01 / 16:24 <b>G.P.T. to be used for Ozone?</b> No <b>Calibration Method:</b> Gas Dilution & Gas Phase Titration	<b>Barometric Pressure:</b> 0.931 atm <b>Station Temperature °C:</b> 20 <b>Weather Conditions:</b> A few clouds <b>Calibration Purpose:</b> routine monthly <b>Performed By/Reviewer:</b> Alex Yakupov / Trina Whitsitt <b>Cal Gas Expiry Date:</b> July 18, 2019
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<b>Analyzer:</b>  <b>ID# or Serial Number:</b> 1899 <b>Last Calibration Date:</b> November 16, 2016 <b>Range ppb:</b> 1000	<b>Correction Factors:</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>NO =</td> <td>1.000</td> <td>0.997</td> <td>1.000</td> </tr> <tr> <td>NO<sub>2</sub> =</td> <td>1.000</td> <td>1.000</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>1.000</td> <td>0.998</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	0.997	1.000	NO <sub>2</sub> =	1.000	1.000	1.000	NOx =	1.000	0.998	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	0.997	1.000														
NO <sub>2</sub> =	1.000	1.000	1.000														
NOx =	1.000	0.998	1.000														

<b>Calibrator:</b>  <b>Flow Meter ID's:</b> n/a <b>Make &amp; Model:</b> API 700 <b>Serial #:</b> 627 <b>Cal Gas Cylinder I.D. #:</b> LL104222 <b>NO/NOx Gas Conc. (ppm):</b> 50.7   50.7	<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**

Point	Diluent	Cal Gas	Total Flow	Calculated NO (ppb)	Calculated NOx (ppb)	Indicated NO (ppb)	Indicated NOx (ppb)	NO C.F.	NOx C.F.
as found zero	5000	0.0	5000	0	0	0.0	1.0	n/a	n/a
as found high	4923	76.9	5000	779.8	779.8	782.0	782.0	0.997	0.998
adjusted zero	5000	0.00	5000	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4923	76.90	5000	779.8	779.8	780.0	780.0	1.000	1.000
mid	4966	37.50	5004	380.0	380.0	374.0	374.0	1.016	1.016
low	4982	18.70	5001	189.6	189.6	183.0	183.0	1.036	1.036
calibrator zero	5000	0.00	5000	0	0	0.0	0.0	n/a	n/a
<b>Average C.F.=</b>								1.017	1.017

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

Point	Diluent	Cal Gas	Total Flow	Calibrator Setting (volts or ppb)	Indicated NO (ppb)	Indicated NOx (ppb)	Indicated NO <sub>2</sub> (ppb)	NO drop (ppb)	NO <sub>2</sub> gain (ppb)	NO <sub>2</sub> C.F. (ppb)
NOx reference	4923	76.90	5000	0.0	778.0	779.0	1.0	0.0	1.0	
as found high NO <sub>2</sub>	4799	76.90	4876	475.0	279.0	779.0	500.0	499.0	499.0	1.000
adjusted high NO <sub>2</sub>	4799	76.90	4876	475.0	279.0	779.0	500.0	499.0	499.0	1.000
gpt mid	4799	76.90	4876	260.0	504.0	779.0	275.0	274.0	274.0	1.000
gpt low	4799	76.90	4876	95.0	680.0	779.0	99.0	98.0	98.0	1.000
<b>Average NO<sub>2</sub> C.F.=</b>										1.000

**Linear Regression/Calibration Results:**

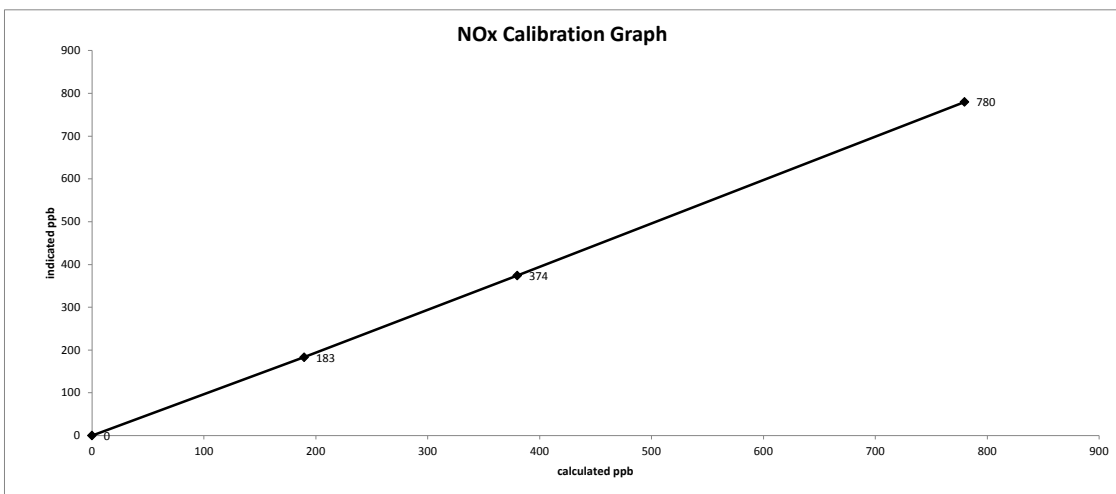
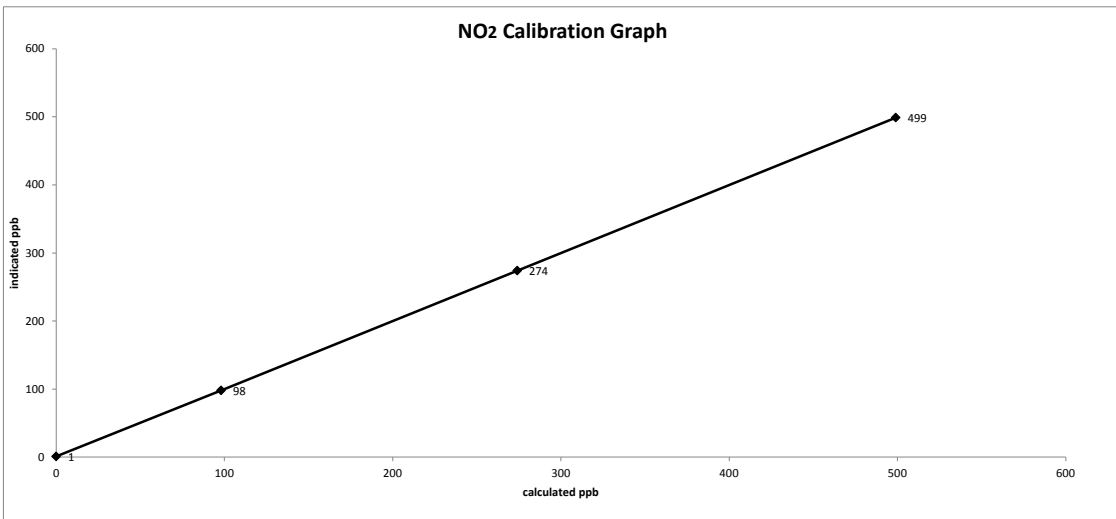
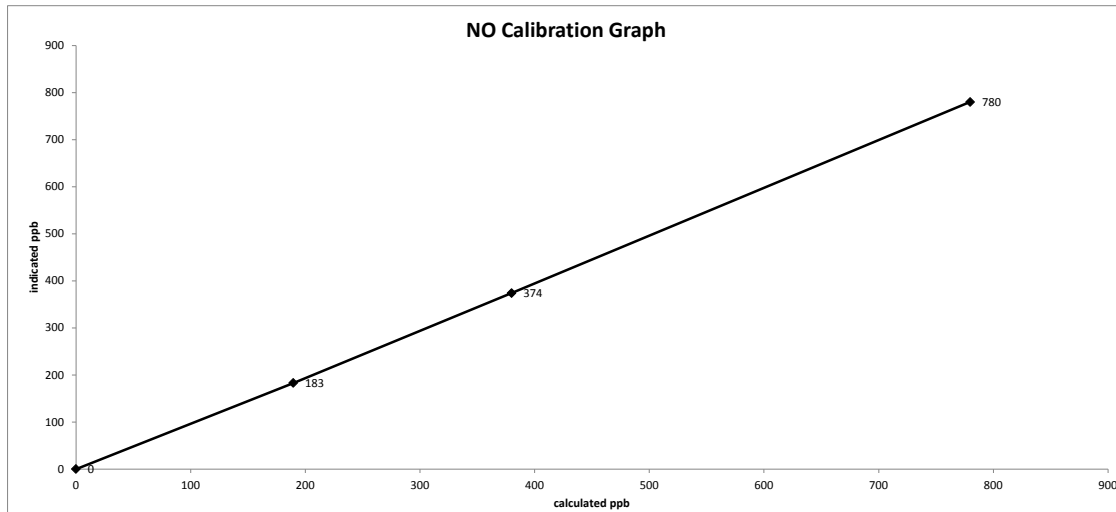
	NO	NOx	NO <sub>2</sub>	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.997	0.997	1.002	.95-1.05
b (Intercept as % of full scale)=	-0.39%	-0.39%	0.06%	± 3% F.S.
% change in C.F. from last cal- NO <sub>2</sub> converter efficiency	0.28%	0.16%	0.00%	± 10%
			1.00	0.96 to 1.04

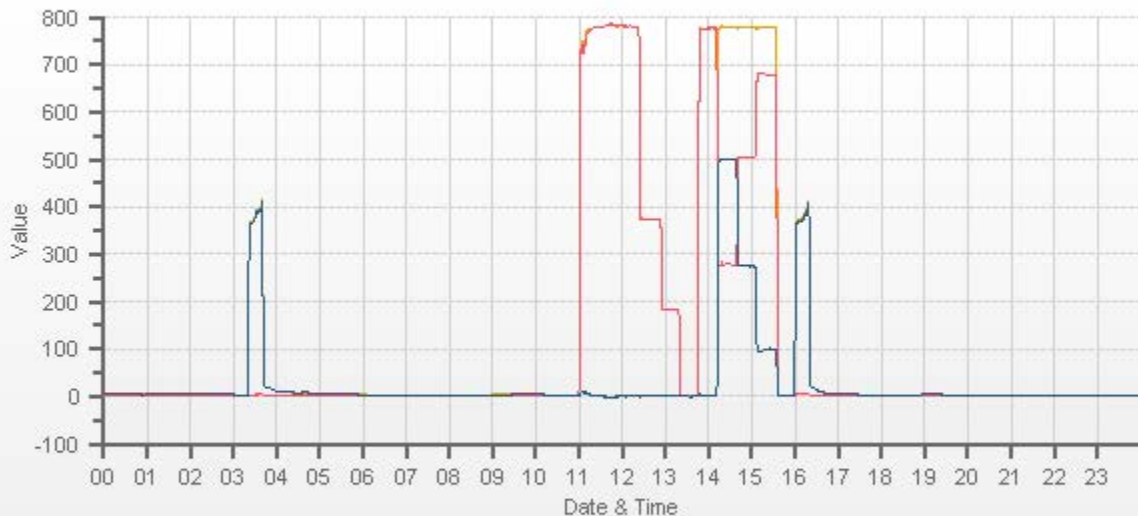
As found:		As left:	
NOx SLOPE:	0.961	NOx SLOPE:	0.958
NOx OFFS:	-0.2	NOx OFFS:	0.6
NO SLOPE:	0.974	NO SLOPE:	0.968
NO OFFS:	-0.8	NO OFFS:	-1.0
SAMP FLW:	554	SAMP FLW:	551
OZONE FL:	78	OZONE FL:	78
NORM PMT:	2.2	NORM PMT:	-0.6
AZERO:	21.9	AZERO:	22.7
HVPS:	686	HVPS:	686
DCPS:	2581	DCPS:	2573
RCELL:	50.3	RCELL:	50.5
BOX TEMP:	27.3	BOX TEMP:	31.4
IZS TEMP:	45.3	IZS TEMP:	45.2
MOLY TEMP:	315.9	MOLY TEMP:	315.3
RCEL:	5.7	RCEL:	5.6
SAMP:	26.6	SAMP:	26.4
Expected Value NO:	3.9	Expected Value NO:	4.2
Expected Value NO <sub>2</sub> :	392.0	Expected Value NO <sub>2</sub> :	393.0
Expected Value NOx:	396.0	Expected Value NOx:	398.0

**Comments:**  
 The analyzer sample inlet filter was changed. No high point NO<sub>2</sub> adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.

Date: December 2, 2016  
Company/Airshed: LICA  
Location/Station Name: Maskwa

Start/End Time 24 hr. (mst): 10:01 / 16:24  
Calibration Purpose: routine monthly  
Calibration Method: Gas Dilution & Gas Phase Titration





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

## ***WIND SYSTEM***







## ***CALIBRATORS***



# Calibrator Performance Audit

## Oxides Of Nitrogen

File No. 2015-119

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>API 700</u>	Make/Model	<u>NA</u>
Serial Number	<u>627</u>	Serial Number	<u>NA</u>
Last Verification Date	<u>April 1 2015</u>	Temperature (°C)	<u>NA</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>NA</u>
NO/NOx Concentration	<u>50.3/50.3</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>
		Pt. #3	<u>5000</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>
		Pt. #3	<u>18.9</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO <sub>2</sub>	NOx	NO	NOx
5007	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5003	77.5	0.779	0.779	0.787	-0.001	0.786	1%	1%
5004	37.8	0.380	0.380	0.383	0.000	0.383	1%	1%
5001	18.9	0.190	0.190	0.191	0.000	0.191	1%	1%
Absolute Average Percent Difference							1%	1%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
<u>NO</u>		<u>LIMITS</u>		<u>NOx</u>			
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000		
m (Slope)=	1.0106	0.90-1.10		m (Slope)=	1.0092		
b (Intercept % of FS)=	-0.0566	± 3% F.S.		b (Intercept % of FS)=	-0.0368		

Flow	O <sub>2</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOX	% Diff. Vs Audit gas	
						NO <sub>2</sub>	% Diff. Limit
5003	0	0.000	0.787	0.001	0.788		
5003	0.5	0.493	0.294	0.498	0.792	1%	± 10%
5003	0.25	0.256	0.531	0.262	0.792	2%	± 10%
5003	0.1	0.108	0.679	0.110	0.789	1%	± 10%
Absolute Average Percent Difference						1.2%	± 10%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
<u>NO<sub>x</sub></u>		<u>LIMITS</u>					
Correlation=	1.0000	≥ 0.995					
m (Slope)=	1.0089	0.90-1.10					
b (Intercept % of FS)=	0.1591	± 3% F.S.					

AENV Standards		NO <sub>x</sub> Analyzer	
Audit Calibrator			
Make/Model	<u>Thermo 146i</u>	Make/Model	<u>Thermo 42i</u>
Serial/AMU Number	<u>1809</u>	Serial/AMU Number	<u>1868</u>
		Last Calibration Date	<u>February 1, 2016</u>
		Full Scale (ppm)	<u>1</u>

COMMENTS: Flows not manually measured - calibration system audited as it is currently being operated.

Auditor: Shea Beaton  
 Operator Signature: [Signature]

Date: February 3, 2016  
 Location: McIntyre Center Edmonton



# Calibrator Performance Audit

## Oxides Of Nitrogen

File No. 2015-165

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>None</u>
Serial Number	<u>11900613</u>	Serial Number	<u>None</u>
Last Verification Date	<u>April 1, 2015</u>	Temperature (°C)	<u>23.5</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>706 mmHg</u>
NO/NOx Concentration	<u>50.3ppm/50.3ppm</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5001</u>	Pt. #2	<u>5000</u>
		Pt. #3	<u>5000</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>
		Pt. #3	<u>18.9</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO <sub>2</sub>	NOx	NO	NOx
4999	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5001	77.5	0.779	0.779	0.775	0.000	0.775	-1%	-1%
5000	37.8	0.380	0.380	0.376	0.001	0.377	-1%	-1%
5000	18.9	0.190	0.190	0.188	0.001	0.189	-1%	-1%
Absolute Average Percent Difference							1%	1%

LINEAR REGRESSION ANALYSIS				<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)=	0.9950	0.90-1.10		m (Slope)=	0.9946		
b (Intercept % of FS)=	-0.0773	± 3% F.S.		b (Intercept % of FS)=	-0.0167		

Flow	O <sub>3</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOx	% Diff. Vs Audit gas	
5001	0	0.000	0.772	0.000	0.772	NO <sub>2</sub>	% Diff. Limit
5001	0.51	0.507	0.265	0.506	0.772	0%	± 10%
5001	0.25	0.252	0.520	0.254	0.773	1%	± 10%
5001	0.1	0.110	0.662	0.109	0.772	-1%	± 10%
Absolute Average Percent Difference						0.1%	± 10%

LINEAR REGRESSION ANALYSIS				<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)=	0.9992	0.90-1.10					
b (Intercept % of FS)=	0.0171	± 3% F.S.					

AENV Standards		NO <sub>x</sub> Analyzer	
<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>
		Last Calibration Date	<u>March 28, 2016</u>
		Full Scale (ppm)	<u>1</u>

COMMENTS: NO Cyl has 49.9ppb SO2 - Flows Not Manually Measured

Auditor: Shea Beaton  
 Operator Signature: [Signature]

Date: March 31, 2016  
 Location: McIntyre Center Edmonton



## ***CALIBRATION GASES***



# Calibration Gas Audit

## Single Component Cylinder Gas

File No. 2016-335CGA

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

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

**Expiry Date:** July 2019

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

**Reference Analyzer:**

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

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

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

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

**Previous Stated Concentration PPM:** 50.6

**Percent variance from Stated:** 1

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

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

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

**Auditor:** Al Clark

**Operator Signature:** *Al Clark*

**Date:** October 19, 2016

**Location:** McIntyre Center Edmonton



# Calibration Gas Audit

## Single Component Cylinder Gas

File No. 2016-334CGA

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

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

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

Calibrator Flows (scm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	<del>0.00752</del>	<del>132.895</del>	<del>10.2</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  
**Operator Signature:** *Al Clark*

**Date:** October 19, 2016  
**Location:** McIntyre Center Edmonton



# Calibration Gas Audit

## CH4 / C3H8 Cylinder Gas

File No. 2015-092CGA

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

**Reference Calibrator and Gas:**

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

**Flow Measurement Device:**

Make/Model Bios DC-2  
 Serial Number Bios D  
 Temp. °C 24.5  
 B.P. 688mmHg

**Reference Analyzer:**

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

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

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

**Cylinder gas tolerances based on CH4 only**

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

Auditor: Shea Beaton  
 Operator Signature: \_\_\_\_\_

Date: January 19, 2016  
 Location: McIntyre Center Edmonton



# Calibration Gas Audit

## NO Cylinder Gas

File No. 2016-336CGA

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

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

Expiry Date: July 2019

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

**Reference Analyzer:**

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

Instrument Settings    Zero: 4.4      Span: 1.080      Range: 1.0

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

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

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

**Cylinder gas tolerances based on NO only**

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

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

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

Auditor: Al Clark      Date: October 19, 2016

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

***APPENDIX III  
REPORT CERTIFICATION FORM***

### Report Certification Form

<b>Alberta Airshed</b> (if applicable)	<b>EPA Approval or Code of Practice Registration #</b> (if applicable)
YES	NA
<b>Company Name</b> (if applicable)	<b>Industrial Operation Name</b> (if applicable)
Lakeland Industry & Community Association	Maskwa 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>
Wunmi Adekanmbi	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.



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

30-Jan-17  
\_\_\_\_\_  
Report Issued Date (dd-mm-yyyy)





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





### Validation Certificate Form

<b>Client:</b> <u>Lakeland Industry &amp; Community Association</u>	<b>Project #:</b> <u>2833-2016-12-30-C</u>
<b>Site:</b> <u>Maskwa Continuous Monitoring Station</u>	<b>Contact:</b> <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u></u>	Date <u>18-Jan-17</u>
Level 1 Primary Validation	<u></u>	Date <u>24-Jan-17</u>
Level 2 Final Validation	<u></u>	Date <u>24-Jan-17</u>
Level 3 Independent Data Review	<u></u>	Date <u>30-Jan-17</u>
Post-Final Validation	<u>NA</u>	Date <u>NA</u>

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



MAXXAM ANALYTICS  
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T2E 6P7

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Toll Free 800-386-7247  
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**AMBIENT AIR MONITORING MONTHLY DATA REPORT**  
**LAKELAND INDUSTRY & COMMUNITY ASSOCIATION**  
**ST. LINA CONTINUOUS MONITORING STATION**

**JOB #: 2833-2016-12-31-C**

**December 2016**

Prepared for:

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

**Attention: MIKE BISAGA**

DATE: **January 30, 2017**

Prepared by: *Kim Wilson*

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Kim Wilson, Env. Tech  
Project Manager, Customer Service - Air Services

Reviewed by: *Wunmi Adekanmbi*

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

## **SUMMARY**

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

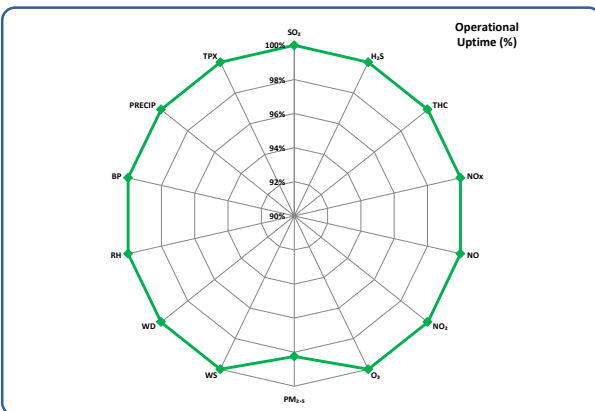
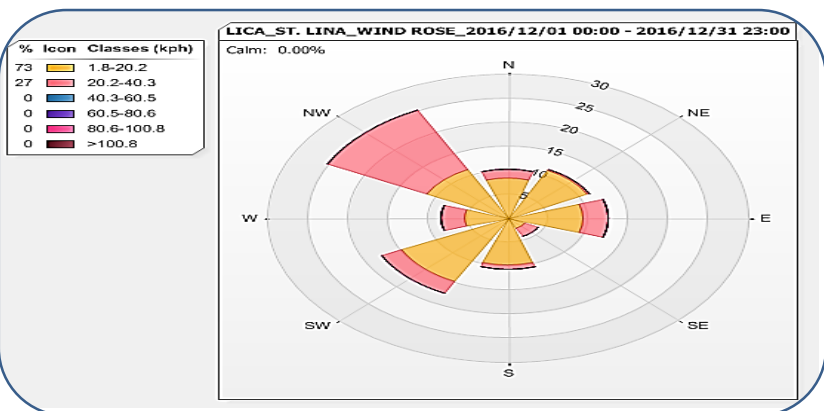
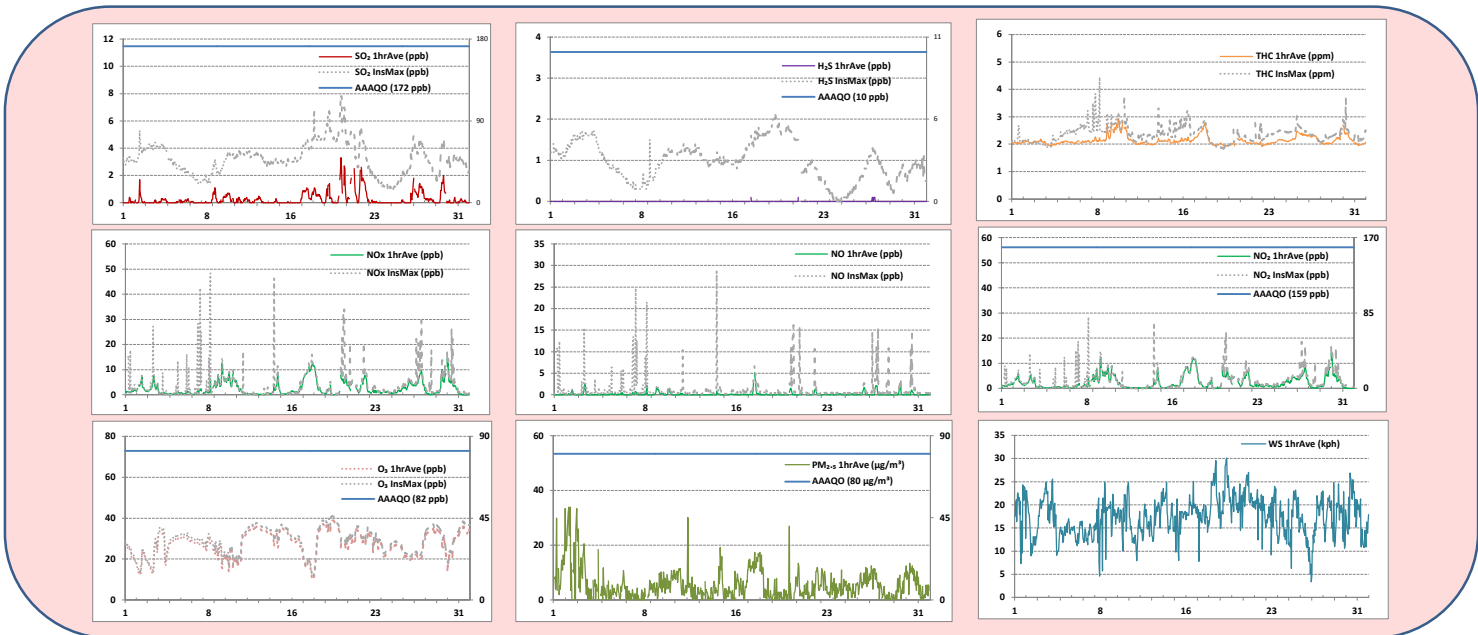
- **PM<sub>2.5</sub>**: Thirteen hours of data were recorded at concentrations less than  $-3.0 \mu\text{g}/\text{m}^3$ , rendering the data invalid.

The summary of results is presented on the following pages.

Any deviations or modifications made to the sampling or analytical methods are outlined in Section 1.0, Discussion. On this basis, Maxxam Analytics is issuing this completed report to Lakeland Industry & Community Association, 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 403-219-3689 or toll-free at 1-800-386-7247.

Pollutants		Monthly Records		1-Hour Records					24-Hour Records			
Name	Unit	Avg. Conc.	Uptime	Maximum			AAAQO Objective	Exceed. Hours	Maximum		AAAQO Objective	Exceed. Days
				Conc.	Date	Hour			Conc.	Date		
SO <sub>2</sub>	ppb	0.3	100.0%	3.3	December 20	12	172	0	1.1	December 22	48	0
H <sub>2</sub> S	ppb	0.0	100.0%	0.1	VAR	VAR	10	0	0.0	ALL	3	0
THC	ppm	2.14	100.0%	2.93	December 10	8	-	-	2.63	December 10	-	-
NO <sub>x</sub>	ppb	2.5	100.0%	14.3	December 29	23	-	-	9.4	December 17	-	-
NO	ppb	0.2	100.0%	5.1	December 17	12	-	-	0.8	December 17	-	-
NO <sub>2</sub>	ppb	2.3	100.0%	14.2	December 29	23	159	0	8.6	December 17	-	-
O <sub>3</sub>	ppb	27.3	100.0%	39.0	December 19	VAR	82	0	36.9	December 19	-	-
PM <sub>2.5</sub>	µg/m <sup>3</sup>	5.5	98.3%	33.9	December 2	VAR	80	0	19.4	December 2	30	0
WS	kph	17.4	100.0%	30.1	December 19	13	-	-	22.1	December 21	-	-
WD	degree	306 (NW)	100.0%	-	-	-	-	-	-	-	-	-
RH	%	69	100.0%	87	December 2, 3	VAR, 10	-	-	86	December 2	-	-
BP	mbar	924	100.0%	948	December 7, 8	VAR	-	-	947	December 8	-	-
PRECIP	mm	0.0	100.0%	0.3	December 25, 25	1, 2	-	-	0.1	December 25	-	-
AmbTPX	°C	-13.2	100.0%	3.1	December 19	13	-	-	-0.1	December 19	-	-



**Monthly Update**

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

**Operational Issues**

- \* PM<sub>2.5</sub>: Thirteen hours of data were recorded at concentrations less than -3 µg/m<sup>3</sup>, rendering the data invalid.

### Monthly Continuous Data Summary

Lakeland Industry & Community Association St. Lina Continuous Monitoring Station						MAXIMUM VALUES							OPERATIONAL TIME (%)
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	1-HOUR			24-HOUR		
	1-hr	24-hr	1-hr	24-hr				HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
SO <sub>2</sub> (ppb)	172	48	0	0	0.3	3.3	20	12	20.3	NNW	1.1	22	100.0
H <sub>2</sub> S (ppb)	10	3	0	0	0.0	0.1	VAR	VAR	VAR	VAR	0.0	ALL	100.0
THC (ppm)	-	-	-	-	2.14	2.93	10	8	18.8	WSW	2.63	10	100.0
NO <sub>2</sub> (ppb)	159	-	0	-	2.3	14.2	29	23	18.9	SSE	8.6	17	100.0
NO (ppb)	-	-	-	-	0.2	5.1	17	12	18.9	NNW	0.8	17	100.0
NO <sub>x</sub> (ppb)	-	-	-	-	2.5	14.3	29	23	18.9	SSE	9.4	17	100.0
O <sub>3</sub> (ppb)	82	-	0	-	27.3	39.0	19	VAR	VAR	VAR	36.9	19	100.0
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	80	30	0	0	5.5	33.9	2	VAR	VAR	VAR	19.4	2	98.3
RELATIVE HUMIDITY (%)	-	-	-	-	69	87	2, 3	VAR, 10	VAR, 20.9	VAR, NW	86	2	100.0
BAROMETRIC PRESSURE (millibar)	-	-	-	-	924	948	7, 8	VAR, VAR	VAR, VAR	VAR, VAR	947	8	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	-13.2	3.1	19	13	30.1	WSW	-0.1	19	100.0
PRECIPITATION (mm)	-	-	-	-	0.0	0.3	25, 25	1, 2	11.8 11.1	ENE E	0.1	25	100.0
VECTOR WS (kph)	-	-	-	-	17.4	30.1	19	13	-	WSW	22.1	21	100.0
VECTOR WD (sec)	-	-	-	-	306 (NW)	-	-	-	-	-	-	-	100.0

VAR-VARIOUS

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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.

### 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).

Sample filters for all continuous air monitors are changed before the calibration begins. The sample manifold is cleaned during the site visit each month.

Control checks, consisting of a zero and span, are conducted daily on all continuous air monitors. In place of the air sample, zero air (from scrubbed air or gas cylinders) is used for zero checks, and a known concentration of the pollutant being analyzed is used for span checks. These checks are controlled by automatic timers and valves. The total zero span cycle is completed within an hour, the commencement of the zero span cycle is at the beginning of the hour.

Multipoint calibrations are done a minimum of once a month for each continuous air monitor. An additional calibration is required under the following conditions: 1) within three days after the initial start-up and stabilization of a newly installed instrument, 2) prior to shut-down or moving of an instrument which has been working to specification, and 3) when major repair has been done on the instrument.

Time during the first multi-point calibration is not considered downtime (Data is flagged as C). If more than one calibration is performed during the month, the time during the additional calibration is considered as downtime (Data is flagged as C1).

Only one zero/span check is run per day. Time during the zero/span check is not considered as downtime (Data is flagged as S). If an extra zero/span check is performed, the time during the additional check is considered as downtime (Data is flagged as S1).

The AMD requires each instrument and accompanying data recording system to be operational 90% of the time, at a minimum, for each monthly monitoring period.

All sampling, analysis, and QA/QC for this project was performed by Maxxam Analytics and complies with the Alberta Air Monitoring Directive.

Data contained in this monthly report has undergone the verification and validation based on the requirements of the AMD Chapter 6: Ambient Data Quality (August 3, 2016). The descriptions of the data verification and validation process can be found in Section 5 of this report. Instantaneous data, where applicable, is provided for reference purposes and has not undergone zero correction.

Hourly/minute data have been reviewed based on daily zero/span results and multi-point calibration results. Data may be considered invalid if a zero-corrected span check in excess of +/- 10% of the span concentration (established by the previous multi-point calibration) is encountered and/or significant differences in the calibration factor occurs (greater than 10%).



### **SULPHUR DIOXIDE (SO<sub>2</sub>)**

The routine monthly calibration was performed on December 21. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on December 2 at 22:00 was invalidated due to a brief power outage.

The Ozone and SO<sub>2</sub> span programs are designed to run concurrently. An additional quality check was recorded on the SO<sub>2</sub> channel, on December 20, during the post-calibration zero-span check on the Ozone analyzer.

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

The routine monthly calibration was performed on December 21. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on December 2 at 22:00 was invalidated due to a brief power outage.

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

The routine monthly calibration was performed on December 20. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on December 2 at 22:00 was invalidated due to a brief power outage.

### **NITROGEN DIOXIDE (NO<sub>2</sub>)**

The routine monthly calibration was performed on December 21. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on December 2 at 22:00 was invalidated due to a brief power outage.

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

The routine monthly calibration was performed on December 20. There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on December 2 at 22:00 was invalidated due to a brief power outage.

The Ozone and SO<sub>2</sub> span programs are designed to run concurrently. An additional quality check was recorded on the Ozone channel, on December 21, during the post-calibration zero-span check on the SO<sub>2</sub> analyzer.

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

Two routine audits were performed this month: one was completed on December 8 and the other audit was performed on December 20. Both the FDMS and sample filters were replaced on December 20.

Data was corrected in accordance with AMD (2016), Chapter 6, Table 2, *Zero Adjustment Criteria*. Data recorded between 0 and -3 µg/m<sup>3</sup> was corrected to 0 µg/m<sup>3</sup>. Data recorded below -3 µg/m<sup>3</sup> was invalidated. Thirteen hours of data were invalidated as the data was below -3 µg/m<sup>3</sup> this month.

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

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

There were no operational issues that impacted hourly data this month. Maximum instantaneous data collected on December 2 at 22:00 was invalidated due to a brief power outage. Four hours of maximum instantaneous data collected between December 7 and December 8 were discarded as the data were considered anomalous. This is likely due to low ambient temperatures.

**RELATIVE HUMIDITY (RH)**

No operational issues were identified this month.

**BAROMETRIC PRESSURE (BP)**

No operational issues were identified this month.

**PRECIPITATION (PRECIP)**

No operational issues were identified this month.

**AMBIENT TEMPERATURE (AmbTPX)**

No operational issues were identified this month.

## **2.0 Project Personnel**

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

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

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

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

## **4.0 Calculations and Results**

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

## 5.0 Methods and Procedures

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

- Maxxam AIR SOP-00208: RM Young Wind Monitor Calibration
- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-00212: Ambient O<sub>3</sub> Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO<sub>2</sub>/NO<sub>x</sub> Monitoring
- Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring
- Maxxam AIR SOP-00215: TEOM Operation
- Maxxam AIR SOP-00242: Precipitation Collector Installation/Maintenance

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

- Sulphur Dioxide - API 100E UV Fluorescent Analyzer
- Hydrogen Sulphide - API 101E UV Fluorescent Analyzer
- Total Hydrocarbons - Thermo 51C FID Analyzer
- Oxides of Nitrogen - API 200E Chemiluminescent Analyzer
- Ozone - Thermo 49i Photometric Analyzer
- Particulate Matter (PM<sub>2.5</sub>) - R&P 1405F TEOM Unit
- Wind System - Met One Unit
- Relative Humidity - Met One Unit
- Barometric Pressure - Met One Unit
- Ambient Temperature - Met One Unit
- Precipitation - Met One Unit
- Datalogger - ESC 8832

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

**Level 0 Preliminary Verification**

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

**Level 1 Primary Validation**

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

**Level 2 Final Validation**

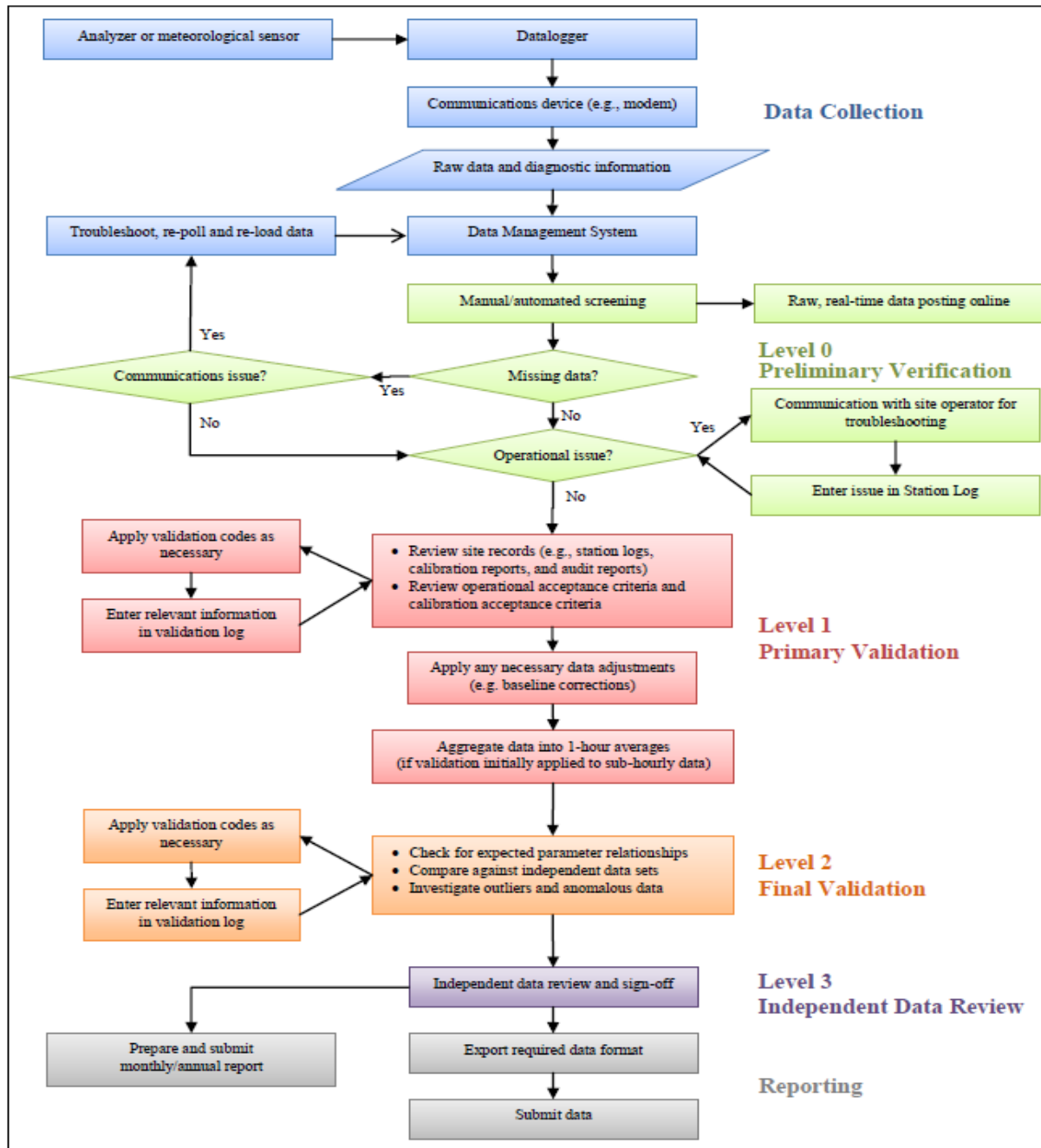
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

**Level 3 Independent Data Review**

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

**Post-Final Validation**

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



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

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

***SULPHUR DIOXIDE***



SULPHUR DIOXIDE Hourly Averages (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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.2	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	24	
2	0.0	0.0	0.2	S	0.0	0.0	0.0	0.0	0.0	0.1	0.2	1.7	0.9	0.5	0.4	0.3	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.7	0.2	24		
3	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.0	24			
4	0.0	S	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.0	0.0	0.1	0.0	0.0	0.3	0.1	24			
5	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	S	0.0	0.0	0.1	0.0	24			
6	0.2	0.2	0.1	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.2	0.1	S	0.0	0.0	0.0	0.3	0.1	24			
7	0.0	0.1	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	S	0.0	0.0	0.0	0.0	0.1	0.0	24			
8	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	S	0.0	0.2	0.2	0.0	0.0	0.2	0.0	24			
9	0.3	0.7	0.8	0.6	0.9	1.1	0.8	0.3	0.3	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	S	0.1	0.1	0.1	0.4	0.0	0.0	1.1	0.3	24			
10	0.4	0.5	0.4	0.4	0.4	0.6	0.5	0.5	0.7	0.7	0.7	0.6	0.7	0.5	0.3	0.1	0.2	0.1	S	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.7	0.4	24			
11	0.0	0.0	0.0	0.1	0.3	0.1	0.0	0.2	0.4	0.4	0.2	0.2	0.0	0.0	0.1	0.0	0.0	S	0.2	0.1	0.2	0.3	0.2	0.3	0.0	0.0	0.4	0.1	24			
12	0.3	0.4	0.3	0.2	0.1	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	S	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.0	0.4	0.1	24			
13	0.3	0.2	0.3	0.5	0.3	0.4	0.4	0.2	0.2	0.1	0.0	0.1	0.1	0.0	0.1	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	24			
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	0.1	S	0.1	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	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	S	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.0	0.0	0.3	0.0	24			
17	0.5	0.7	0.9	0.9	0.8	0.9	0.8	0.8	0.9	0.9	1.1	S	1.0	1.0	0.7	0.3	0.3	0.3	0.3	0.2	0.3	0.6	0.7	0.8	0.2	0.0	1.1	0.7	24			
18	0.6	0.7	1.0	1.1	1.0	0.9	0.5	0.5	0.6	0.5	S	0.6	0.5	0.6	0.5	0.5	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.5	24			
19	0.0	0.0	0.0	0.1	0.6	0.9	1.0	0.5	1.3	S	1.3	1.4	0.3	0.4	0.4	0.3	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.4	24			
20	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	S	1.7	1.9	2.8	3.3	2.1	1.2	0.7	Q	Q	1.3	2.7	2.5	1.2	0.4	0.2	0.0	3.3	1.1	24				
21	0.1	0.0	0.2	0.4	0.3	0.3	0.3	S	1.4	1.7	1.8	C	C	C	C	C	2.5	1.8	0.8	0.7	0.5	0.5	0.3	0.0	0.0	2.5	0.8	24				
22	0.0	0.0	0.1	0.7	1.1	2.4	S	2.6	2.4	1.6	1.8	1.8	1.7	1.6	1.5	1.5	1.2	0.9	0.8	0.6	0.4	0.3	0.1	0.2	0.0	2.6	1.1	24				
23	0.1	0.0	0.0	0.0	0.0	S	0.1	0.2	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	24				
24	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.2	0.0	24				
26	0.1	0.2	S	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.3	0.2	0.5	0.9	1.3	0.0	1.3	0.2	24				
27	1.8	S	1.0	0.8	0.8	0.8	0.6	0.6	0.6	0.4	0.6	0.9	1.3	1.4	1.1	1.1	1.2	1.2	1.0	0.7	1.0	0.9	0.5	0.3	0.3	1.8	0.9	24				
28	S	0.3	0.2	0.3	0.2	0.2	0.3	0.3	0.1	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.0	0.0	S	0.0	0.0	0.3	0.2	24			
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.9	0.9	1.3	1.5	1.4	1.5	2.0	1.5	0.8	0.8	0.7	0.7	S	0.0	0.0	2.0	0.6	24			
30	0.1	0.0	0.1	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.2	0.1	0.0	0.0	S	0.0	0.0	0.0	0.4	0.1	24				
31	0.1	0.0	0.0	0.1	0.2	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.3	0.1	24			
HOURLY MAX	1.8	0.7	1.0	1.1	1.1	2.4	1.0	2.6	2.4	1.7	1.9	2.8	3.3	2.1	1.5	1.5	2.5	1.8	1.3	2.7	2.5	1.2	0.9	1.3								
HOURLY AVG	0.2	0.1	0.2	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.1	0.2								

STATUS FLAG CODES

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

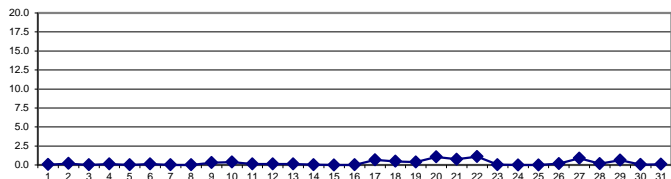
OBJECTIVE LIMIT:

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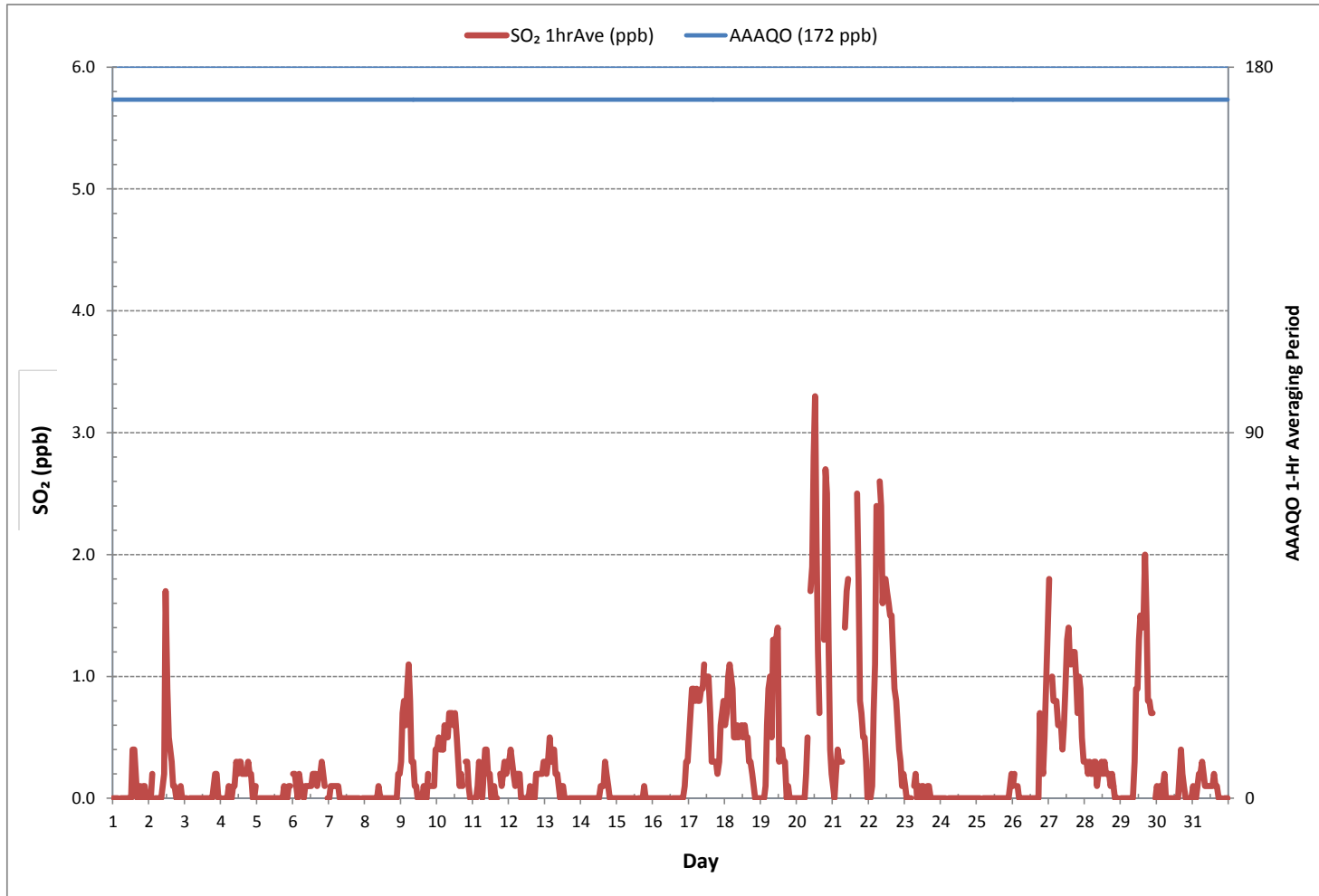
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	361				
MINIMUM 1-HR AVERAGE:	0.0 ppb @ HOUR(S)	VAR	ON DAY(S)	VAR	
MAXIMUM 1-HR AVERAGE:	3.3 ppb @ HOUR(S)	12	ON DAY(S)	20	
MAXIMUM 24-HR AVERAGE:	1.1 ppb		ON DAY(S)	22	
			VAR-VARIOUS		
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	744	hrs
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	0.5		MONTHLY AVERAGE:	0.3	ppb

24 HR AVERAGES December 2016



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





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

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	3.3	3.0	3.1	3.2	S	2.8	2.9	3.1	3.3	3.2	3.2	3.1	3.0	3.5	3.3	3.3	3.2	3.1	3.1	3.0	3.1	3.1	3.1	2.9	2.8	3.5	3.1	24
2	3.0	3.1	3.1	S	3.0	3.0	3.1	3.2	3.3	3.4	3.5	5.3	4.7	4.2	3.9	3.9	3.6	3.9	3.8	3.7	3.9	3.9	P	3.9	3.0	5.3	3.7	23
3	3.9	3.9	S	4.0	3.9	3.9	4.0	4.0	4.3	4.2	4.1	4.1	4.2	4.3	4.1	4.1	3.9	4.2	4.2	4.4	4.4	4.4	4.3	4.2	3.9	4.4	4.1	24
4	4.0	S	4.1	4.2	4.1	4.1	4.1	4.1	4.1	4.1	4.3	4.2	4.2	4.3	4.1	4.2	3.9	3.9	4.0	3.9	3.9	3.7	3.7	3.7	3.7	4.3	4.0	24
5	S	3.2	3.3	3.3	3.2	3.0	3.1	3.3	3.1	3.0	2.9	2.7	3.0	2.9	2.8	3.0	2.8	2.8	2.8	2.5	2.6	2.7	2.7	S	2.5	3.3	2.9	24
6	2.7	2.7	2.6	2.4	2.5	2.5	2.4	2.3	2.6	2.5	2.5	2.2	2.2	2.5	2.3	2.3	2.2	2.3	2.2	2.4	2.1	2.2	S	2.0	2.0	2.7	2.4	24
7	2.0	2.1	2.0	2.0	2.0	2.2	2.1	1.7	1.7	1.7	1.7	1.7	1.8	1.7	1.7	1.7	1.7	1.4	1.4	1.4	1.6	S	1.5	1.5	1.4	2.2	1.8	24
8	1.5	1.5	1.5	1.6	1.7	1.6	1.6	1.7	1.9	2.1	1.8	1.5	1.4	1.5	1.5	1.4	1.8	1.5	1.5	1.5	S	2.1	2.1	2.0	1.4	2.1	1.7	24
9	2.3	2.7	2.8	2.6	2.9	3.2	2.9	2.6	2.5	2.2	2.2	2.1	2.3	2.3	2.1	2.3	2.1	2.3	2.4	S	2.5	2.5	2.5	2.8	2.1	3.2	2.5	24
10	2.8	3.1	3.1	3.1	3.2	3.3	3.3	3.3	3.5	3.7	3.7	3.7	3.8	3.5	3.4	3.3	3.4	3.4	S	3.5	3.6	3.4	3.2	3.3	2.8	3.8	3.4	24
11	3.3	3.1	3.3	3.4	3.7	3.4	3.4	3.7	3.8	3.6	3.8	3.5	3.4	3.5	3.5	3.4	S	3.6	3.6	3.5	3.5	3.5	3.6	3.7	3.1	3.8	3.5	24
12	3.8	3.7	3.7	3.6	3.7	3.6	3.7	3.8	3.4	3.3	3.4	3.4	3.5	3.4	3.4	3.5	S	3.5	3.5	3.5	3.7	3.6	3.7	3.5	3.3	3.8	3.6	24
13	3.7	3.5	3.6	3.7	3.7	3.7	3.6	3.5	3.5	3.2	3.1	3.1	3.4	3.1	3.0	S	2.9	3.0	3.0	2.8	2.9	2.6	2.7	3.0	2.6	3.7	3.2	24
14	2.8	2.7	2.9	2.8	2.8	3.1	2.8	2.8	2.8	2.7	3.0	3.0	3.0	3.3	S	3.1	3.3	3.3	3.2	3.0	2.9	2.9	3.0	3.0	2.7	3.3	3.0	24
15	2.9	2.9	2.9	3.1	2.8	2.9	2.9	3.0	3.0	2.8	2.9	2.9	S	2.7	3.0	2.9	3.0	3.4	3.0	3.0	3.0	3.1	3.1	3.0	2.7	3.4	3.0	24
16	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.1	3.0	3.3	3.2	3.0	S	3.0	3.1	3.1	3.0	3.0	3.1	3.1	3.2	3.3	3.5	3.4	3.0	3.5	3.1	24
17	3.8	3.9	4.2	4.2	4.1	4.2	4.3	4.2	4.4	4.3	4.4	S	4.6	4.4	4.2	3.9	3.9	4.0	3.9	3.9	4.0	4.4	4.7	4.7	3.8	4.7	4.2	24
18	4.5	4.5	6.8	5.1	4.8	4.8	4.6	4.7	4.6	4.6	S	4.9	4.8	4.9	4.9	4.9	4.6	4.7	4.7	4.7	4.6	4.7	4.7	4.6	4.5	6.8	4.8	24
19	4.6	4.9	4.9	5.2	5.4	5.7	5.8	5.5	6.6	S	6.6	6.9	5.3	5.2	5.3	5.2	5.1	4.9	4.8	4.7	4.8	4.6	4.5	4.7	4.5	6.9	5.3	24
20	4.5	4.5	4.5	4.7	4.5	4.7	4.7	5.5	S	6.3	6.5	7.9	7.8	7.8	5.6	5.2	Q	Q	6.1	7.0	6.8	5.6	4.9	4.4	4.4	7.9	5.7	24
21	4.3	4.1	4.5	4.5	4.3	4.3	4.2	S	5.0	5.2	4.9	C	C	C	C	C	5.0	4.8	3.3	3.4	3.1	3.1	2.9	2.6	2.6	5.2	4.1	24
22	2.6	2.6	3.3	3.7	4.5	5.7	S	5.4	5.2	4.9	4.6	4.5	4.5	4.3	4.1	4.3	4.1	3.5	3.2	3.2	3.0	2.7	2.5	2.7	2.5	5.7	3.9	24
23	2.4	2.3	2.5	2.1	2.1	S	2.3	2.2	1.9	1.9	2.0	2.1	1.9	1.8	1.8	1.9	1.8	1.7	1.5	1.7	1.7	1.3	1.3	1.5	1.3	2.5	1.9	24
24	1.4	1.4	1.4	1.5	S	1.2	1.3	1.3	1.2	1.2	1.1	1.1	1.3	1.3	1.3	1.4	1.2	0.9	1.1	1.2	1.1	1.2	1.0	0.9	1.5	1.2	24	
25	1.1	1.2	1.2	S	1.0	1.1	1.2	1.2	1.2	1.2	1.0	1.3	1.3	1.4	1.4	1.6	1.5	1.4	1.5	1.4	1.6	1.7	2.1	2.1	1.0	2.1	1.4	24
26	2.0	2.3	S	2.2	2.0	2.1	1.9	1.9	2.0	2.0	2.3	2.4	2.6	2.4	2.5	2.5	2.5	2.7	3.8	3.2	3.5	3.7	4.0	4.7	1.9	4.7	2.7	24
27	5.0	S	4.3	4.0	3.9	4.0	4.0	3.7	3.6	3.6	4.0	4.0	4.7	4.6	4.3	4.5	4.6	4.4	4.5	4.1	4.1	4.2	3.9	3.6	3.6	5.0	4.2	24
28	S	3.3	3.5	3.5	3.2	3.1	3.2	3.2	3.0	2.9	2.9	2.9	2.7	2.8	2.7	2.6	2.6	2.2	2.2	2.0	1.9	1.9	1.9	S	1.9	3.5	2.7	24
29	1.7	1.9	1.6	1.9	1.9	1.7	1.8	1.9	2.1	3.1	3.5	3.4	3.9	4.3	4.2	4.2	4.7	4.7	3.6	3.7	3.7	S	3.0	1.6	4.7	3.1	24	
30	3.1	2.9	3.4	3.0	3.4	3.5	2.6	2.7	2.7	2.8	2.9	2.8	2.9	2.9	3.4	3.4	3.7	3.4	3.4	3.2	3.3	S	3.1	3.1	2.6	3.7	3.1	24
31	3.1	3.1	3.2	3.2	3.5	3.2	3.3	3.1	3.1	3.1	3.0	2.9	2.8	2.8	2.9	2.6	2.9	2.6	2.6	2.7	S	2.2	2.3	2.3	2.2	3.5	2.9	24
HOURLY MAX	5.0	4.9	6.8	5.2	5.4	5.7	5.8	5.5	6.6	6.3	6.6	7.9	7.8	7.8	5.6	5.2	5.1	4.9	6.1	7.0	6.8	5.6	4.9	4.7				
HOURLY AVG	3.1	3.0	3.3	3.3	3.3	3.3	3.1	3.2	3.2	3.2	3.3	3.4	3.4	3.4	3.2	3.2	3.2	3.1	3.2	3.2	3.2	3.2	3.1	3.1				

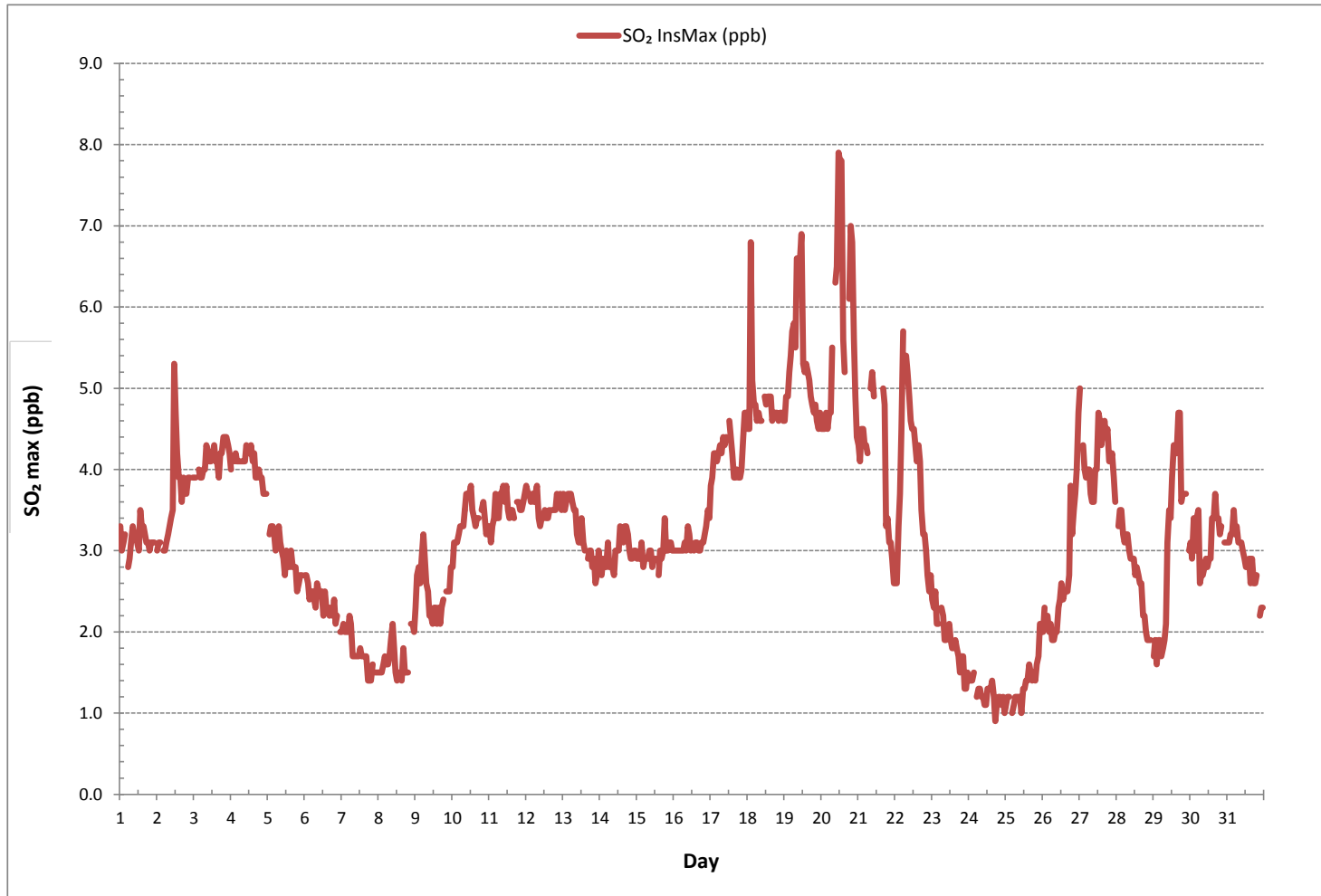
STATUS FLAG CODES

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:	703
MAXIMUM INSTANTANEOUS VALUE:	7.9 ppb @ HOUR(S) 11 ON DAY(S) 20
VAR-VARIOUS	
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	743 hrs
STANDARD DEVIATION:	1.1

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

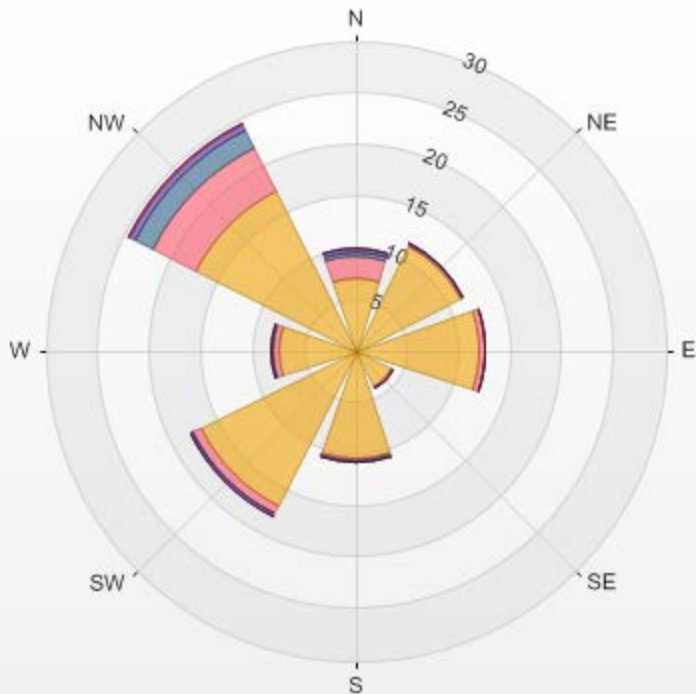


Wind: LICA ST. LINA Poll.: LICA ST. LINA-SO2[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 0.00% Valid Data: 94.49% Calm Avg: 0.00 [ppb]

Direction	0.0-0.7	0.7-1.4	1.4-2.0	2.0-2.7	2.7-3.4	>3.4	Total
N	7.11	1.99	0.57	0.28	0	0	9.95
NE	11.38	0.14	0.14	0	0	0	11.66
E	12.09	0.57	0	0	0	0	12.66
SE	3.84	0.14	0	0	0	0	3.98
S	10.38	0.28	0.14	0	0	0	10.8
SW	16.79	0.85	0	0.28	0	0	17.92
W	7.54	0.57	0.14	0	0	0	8.25
NW	17.35	4.55	1.99	0.57	0.28	0	24.74
Summary	86.48	9.09	2.98	1.13	0.28	0	100

% Icon Classes (ppb)	86	 0.0-0.7	9	 0.7-1.4	3	 1.4-2.0	1	 2.0-2.7	0	 2.7-3.4	0	 >3.4
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LICA ST. LINA Poll.: LICA ST. LINA-SO<sub>2</sub>[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 0.00%



SO2[ppb] Calibration: LICA ST. LINA Monthly: 2016/12 Type: Span



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

***HYDROGEN SULPHIDE***





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

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

STATUS FLAG CODES

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

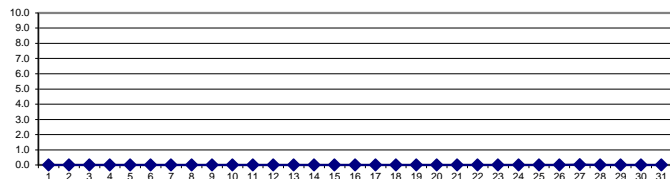
OBJECTIVE LIMIT:

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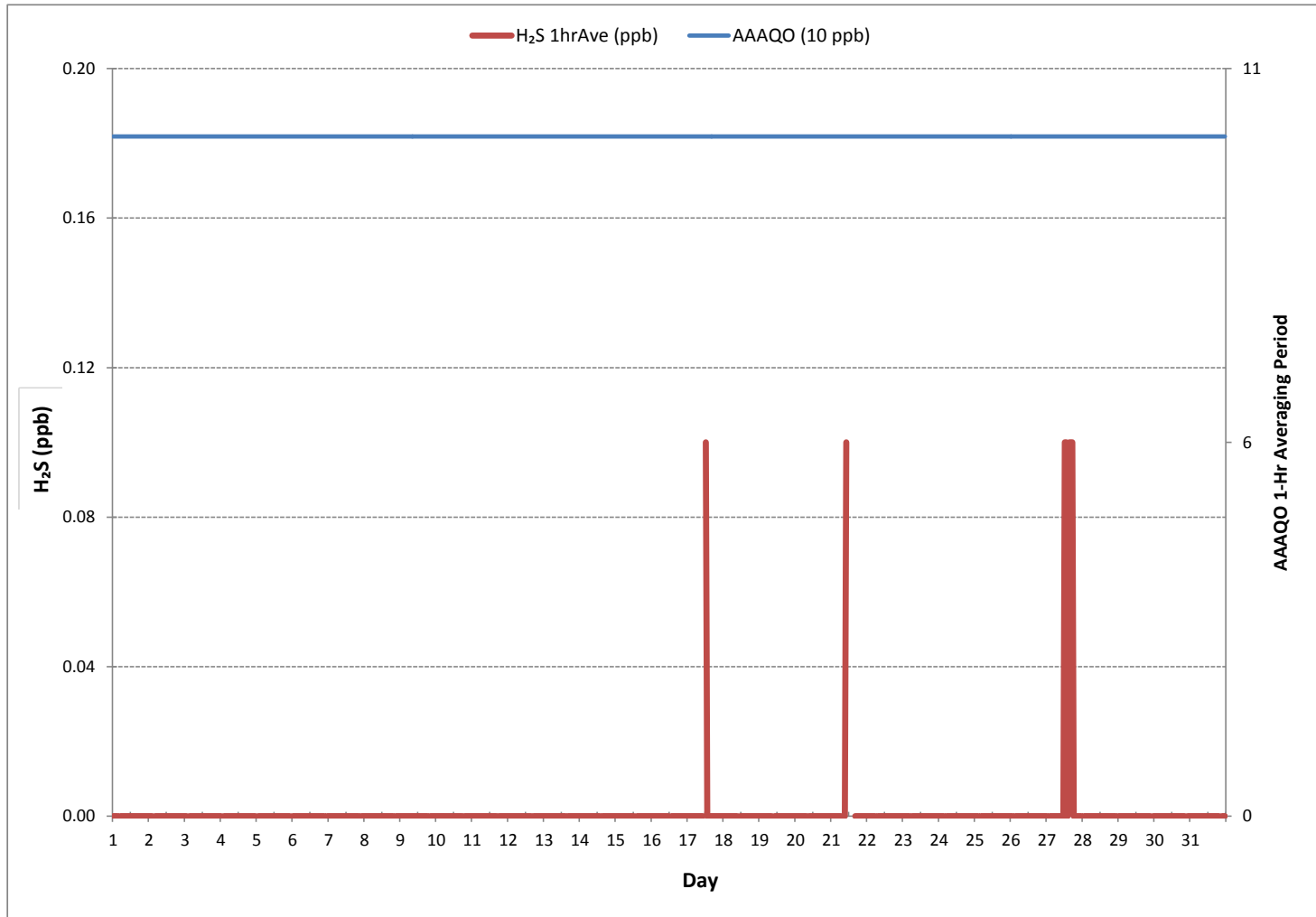
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF 24-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	7					
MINIMUM 1-HR AVERAGE:	0.0	ppb	@ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	0.1	ppb	@ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 24-HR AVERAGE:	0.0	ppb			ON DAY(S)	ALL
					VAR-VARIOUS	
IZS CALIBRATION TIME:	33	hrs		OPERATIONAL TIME:	744	hrs
MONTHLY CALIBRATION TIME:	5	hrs		AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	0.0			MONTHLY AVERAGE:	0.0	ppb

24 HR AVERAGES December 2016



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





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

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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	1.2	1.2	1.2	1.2	S	1.4	1.2	1.2	1.3	1.3	1.2	1.3	1.2	1.2	1.2	1.1	1.2	1.1	1.2	1.2	1.0	1.1	1.1	1.1	1.0	1.4	1.2	24	
2	1.2	1.1	1.1	S	1.1	1.1	1.2	1.3	1.2	1.2	1.4	1.4	1.3	1.3	1.3	1.4	1.4	1.5	1.4	1.5	1.5	1.6	P	1.6	1.1	1.6	1.3	23	
3	1.6	1.5	S	1.5	1.5	1.6	1.5	1.5	1.5	1.6	1.5	1.7	1.7	1.7	1.7	1.5	1.6	1.6	1.6	1.6	1.6	1.7	1.6	1.6	1.5	1.7	1.6	24	
4	1.6	S	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.6	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.4	1.4	1.4	1.3	1.3	1.3	1.7	1.6	24	
5	S	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.1	1.0	1.1	1.0	1.0	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.8	0.8	S	0.8	1.2	1.0	24	
6	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.7	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.6	S	0.6	0.6	0.9	0.8	24	
7	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.5	0.4	S	0.3	0.3	0.3	0.6	0.5	24	
8	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.7	0.4	0.4	0.5	0.4	S	0.3	0.4	0.5	0.3	0.7	0.4	24	
9	0.4	0.4	0.5	0.5	1.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.7	0.8	0.8	0.8	S	0.9	0.9	0.8	0.9	0.4	1.5	0.7	24	
10	0.9	0.9	0.9	0.9	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.2	1.1	1.2	1.1	1.1	1.2	1.2	1.3	S	1.2	1.2	1.2	1.3	1.3	0.9	1.3	1.1	24
11	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.2	1.2	1.2	S	1.2	1.3	1.3	1.3	1.3	1.3	1.4	1.1	1.4	1.2	24
12	1.3	1.2	1.3	1.2	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.3	1.2	1.1	1.2	S	1.2	1.2	1.2	1.3	1.3	1.2	1.4	1.3	1.1	1.4	1.2	24
13	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.1	1.2	1.1	1.1	1.1	1.0	1.0	S	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	0.9	1.3	1.1	24	
14	0.9	0.8	0.8	0.9	0.9	0.9	0.9	0.9	1.0	1.0	0.9	0.9	1.0	1.0	S	1.0	1.0	1.2	1.1	1.0	1.0	0.9	1.1	1.0	0.8	1.2	1.0	24	
15	1.0	1.0	0.9	1.0	0.9	0.9	1.1	1.0	0.9	1.0	1.0	0.9	0.9	S	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.1	0.9	24
16	0.9	0.9	0.9	0.9	1.0	1.0	0.9	1.0	0.8	0.9	0.9	1.0	S	1.0	0.9	0.9	0.9	1.1	1.1	1.1	1.0	1.1	1.0	1.1	0.8	1.1	1.0	24	
17	1.2	1.2	1.3	1.2	1.3	1.3	1.3	1.3	1.4	1.3	1.3	S	1.6	1.5	1.4	1.4	1.5	1.3	1.5	1.5	1.7	1.5	1.7	1.6	1.2	1.7	1.4	24	
18	1.7	1.6	1.5	1.8	1.6	1.6	1.6	1.6	1.6	1.5	S	1.6	1.7	1.6	1.7	1.6	1.6	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.8	1.6	24	
19	1.7	1.7	1.7	1.8	1.8	1.8	1.9	1.9	2.0	S	2.0	2.0	2.1	2.1	2.0	2.0	1.9	1.8	1.9	1.8	1.9	1.8	1.9	1.7	1.7	2.1	1.9	24	
20	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	S	1.7	1.8	1.8	1.9	1.9	1.8	1.7	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.9	1.7	24	
21	1.6	1.6	1.5	1.5	1.5	1.5	1.4	S	1.5	1.5	1.5	C	C	C	C	C	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.8	0.7	1.6	1.2	24	
22	0.7	0.8	0.7	0.8	0.8	0.9	S	0.9	0.9	0.9	0.9	1.0	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	1.0	0.9	24	
23	0.7	0.6	0.6	0.5	0.6	S	0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.7	0.4	24	
24	0.2	0.1	0.2	0.2	S	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.2	0.1	24	
25	0.0	0.0	0.0	S	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.2	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.2	0.0	0.3	0.1	24
26	0.4	0.4	S	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.3	0.8	0.6	24	
27	0.8	S	1.0	0.9	0.9	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.3	1.2	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.0	1.1	0.8	1.3	1.1	24	
28	S	1.0	0.9	1.0	0.9	1.0	0.9	0.8	0.9	0.8	0.7	0.7	0.6	0.6	0.6	0.7	0.6	0.5	0.4	0.4	0.4	0.5	0.4	S	0.4	1.0	0.7	24	
29	0.4	0.3	0.3	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.6	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8	S	0.8	0.2	0.8	0.5	24	
30	0.9	0.9	0.8	0.7	0.7	0.6	0.7	0.6	0.5	0.5	0.6	0.7	0.8	0.7	0.7	0.7	0.8	0.7	0.8	0.8	0.8	S	0.9	0.9	0.5	0.9	0.7	24	
31	0.9	0.9	1.0	0.8	0.8	0.9	0.9	0.9	0.9	0.8	0.9	0.8	0.9	0.8	0.8	1.1	0.6	0.6	1.1	0.6	S	0.5	0.5	0.5	0.5	1.1	0.8	24	
HOURLY MAX	1.7	1.7	1.7	1.8	1.8	1.8	1.9	1.9	2.0	1.7	2.0	2.0	2.1	2.1	2.0	2.0	1.9	1.8	1.9	1.8	1.9	1.8	1.9	1.7	1.7				
HOURLY AVG	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0				

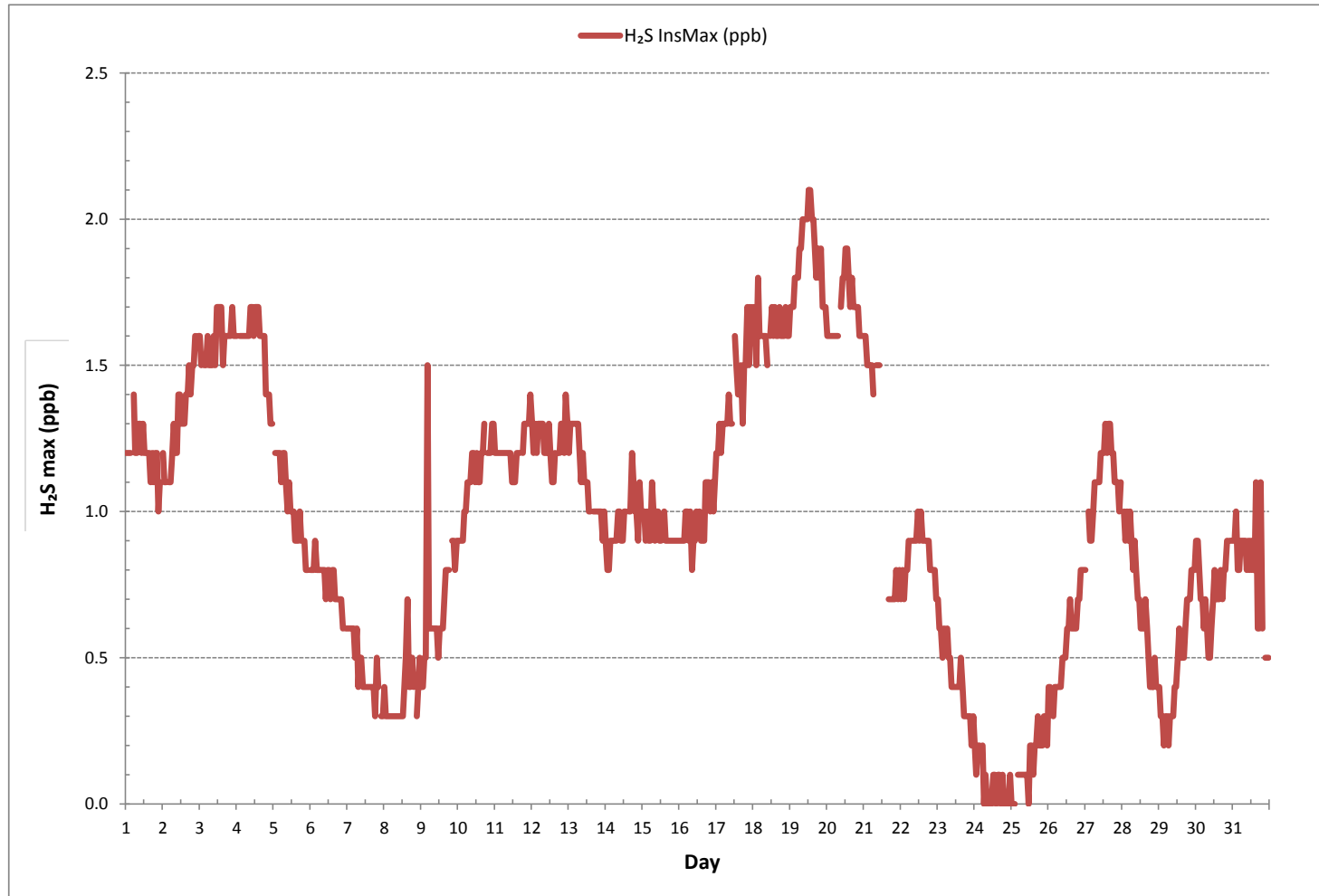
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	690
MAXIMUM INSTANTANEOUS VALUE:	2.1 ppb @ HOUR(S) 12, 13 ON DAY(S) 19, 19
	VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	743 hrs
STANDARD DEVIATION:	0.5

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

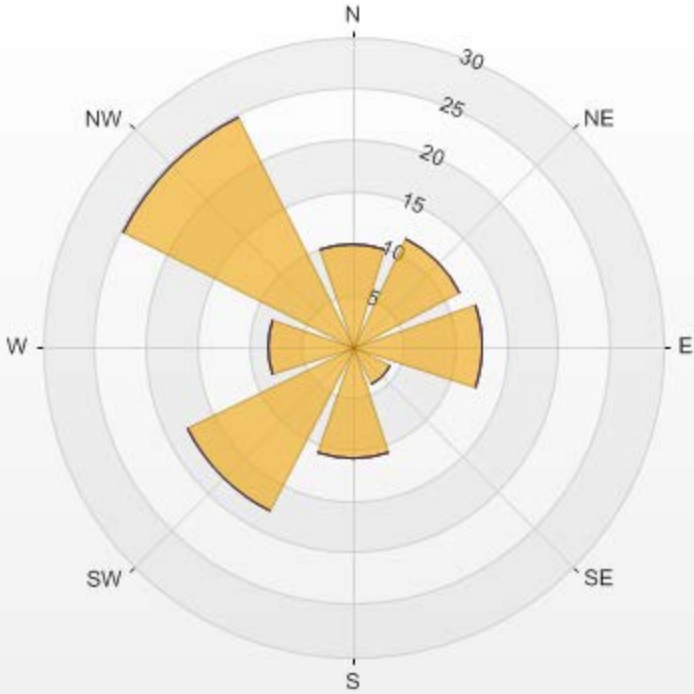


Wind: LICA ST. LINA Poll.: LICA ST. LINA-H2S[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 0.00% Valid Data: 94.76% Calm Avg: 0.00 [ppb]

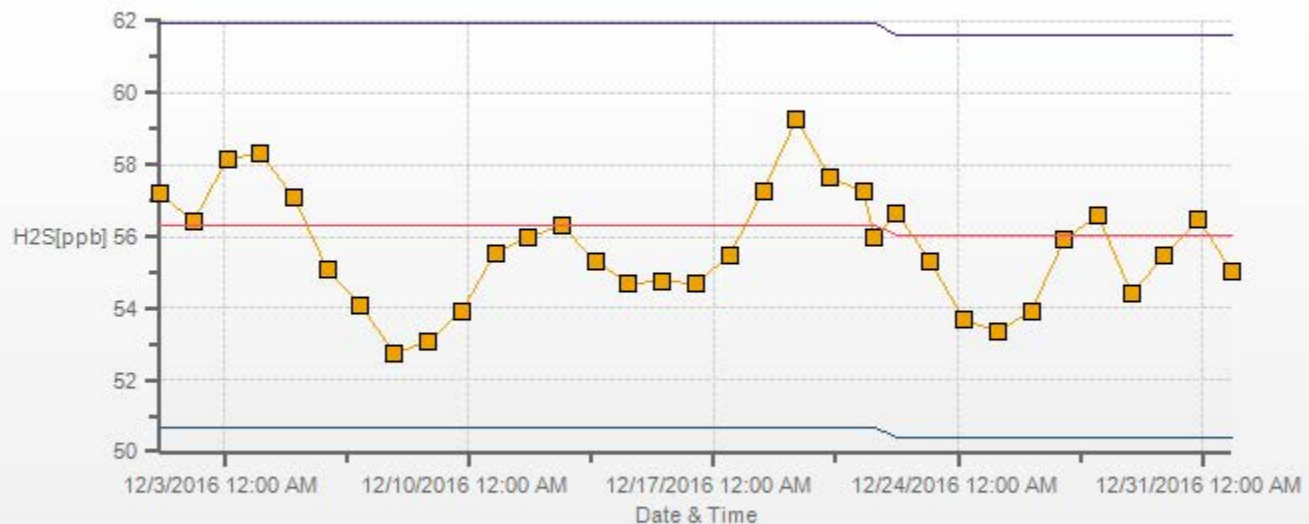
Direction	0.0-0.6	0.6-1.2	1.2-1.8	>1.8	Total
N	9.93	0	0	0	9.93
NE	11.63	0	0	0	11.63
E	12.62	0	0	0	12.62
SE	3.97	0	0	0	3.97
S	10.78	0	0	0	10.78
SW	17.87	0	0	0	17.87
W	8.23	0	0	0	8.23
NW	24.96	0	0	0	24.96
Summary	100	0	0	0	100

% Icon Classes (ppb)	100	0.0-0.6	0	0.6-1.2	0	1.2-1.8	0	>1.8
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LICA ST. LINA Poll.: LICA ST. LINA-H2S[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 0.00%



### H2S[ppb] Calibration: LICA ST. LINA Monthly: 2016/12 Type: Span



Span Meas    Span Ref    Span Low    Span High

***TOTAL HYDROCARBON***





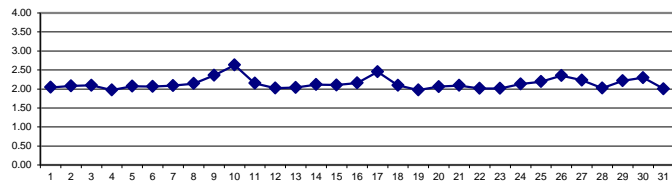
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	2.07	2.06	2.03	2.03	S	2.06	2.07	2.07	2.05	2.03	2.02	2.01	2.00	2.02	2.06	2.03	2.03	2.02	2.04	2.05	2.05	2.06	2.06	2.05	2.00	2.07	2.04	24	
2	2.06	2.06	2.08	S	2.08	2.09	2.10	2.12	2.11	2.12	2.13	2.09	2.05	2.05	2.04	2.06	2.04	2.03	2.03	2.06	2.07	2.09	2.09	2.11	2.03	2.13	2.08	24	
3	2.12	2.10	S	2.09	2.10	2.08	2.09	2.09	2.11	2.11	2.11	2.13	2.19	2.19	2.12	2.09	2.09	2.07	2.05	2.05	2.07	2.10	2.06	2.03	2.03	2.19	2.10	24	
4	2.01	S	1.97	1.96	1.98	1.95	1.95	1.96	1.95	1.96	1.93	1.93	1.94	1.97	2.01	2.00	1.97	1.98	1.98	1.99	1.98	1.99	2.03	2.03	1.93	2.03	1.97	24	
5	S	2.03	2.03	2.04	2.04	2.03	2.05	2.06	2.07	2.09	2.06	2.08	2.07	2.09	2.08	2.10	2.12	2.12	2.11	2.09	2.08	2.08	2.10	S	2.03	2.12	2.07	24	
6	2.07	2.07	2.06	2.07	2.08	2.09	2.08	2.06	2.05	2.03	2.04	2.03	2.04	2.04	2.01	2.05	2.09	2.10	2.10	2.11	2.11	2.12	S	2.04	2.01	2.12	2.07	24	
7	2.05	2.03	2.05	2.09	2.12	2.09	2.07	2.09	2.08	2.07	2.10	2.11	2.08	2.08	2.10	2.12	2.14	2.12	2.08	2.08	2.07	S	2.06	2.07	2.03	2.14	2.08	24	
8	2.09	2.11	2.14	2.11	2.11	2.14	2.22	2.27	2.23	2.11	2.11	2.09	2.13	2.10	2.12	2.17	2.23	2.14	2.12	2.12	S	2.12	2.13	2.09	2.27	2.14	24		
9	2.15	2.16	2.12	2.10	2.16	2.15	2.17	2.38	2.73	2.45	2.38	2.28	2.21	2.20	2.24	2.32	2.60	2.80	2.67	S	2.53	2.45	2.42	2.54	2.10	2.80	2.36	24	
10	2.61	2.56	2.52	2.63	2.71	2.65	2.60	2.88	2.93	2.83	2.63	2.48	2.46	2.41	2.49	2.57	2.75	2.79	S	2.59	2.61	2.57	2.61	2.63	2.41	2.93	2.63	24	
11	2.49	2.49	2.39	2.21	2.22	2.17	2.15	2.15	2.17	2.17	2.17	2.13	2.14	2.14	2.08	2.06	2.06	S	2.03	2.02	2.00	2.00	2.01	2.00	2.49	2.15	24		
12	2.00	2.00	2.03	2.00	2.00	2.00	2.02	2.06	2.03	2.01	2.06	2.07	2.06	2.07	2.06	2.06	S	1.99	1.97	1.99	2.00	2.03	2.04	2.02	1.97	2.07	2.02	24	
13	2.01	2.01	1.99	1.98	1.99	2.00	1.97	1.97	1.99	1.99	2.00	2.01	2.00	2.01	2.02	S	2.06	2.07	2.09	2.16	2.22	2.12	2.10	2.10	1.97	2.22	2.04	24	
14	2.10	2.12	2.14	2.10	2.10	2.11	2.10	2.10	2.14	2.15	2.13	2.12	2.11	2.10	S	2.08	2.17	2.18	2.17	2.17	2.09	2.06	2.04	2.04	2.04	2.18	2.11	24	
15	2.05	2.05	2.04	2.04	2.08	2.15	2.12	2.05	2.05	2.08	2.10	2.09	2.06	S	2.08	2.11	2.12	2.13	2.09	2.15	2.23	2.22	2.12	2.12	2.04	2.23	2.10	24	
16	2.13	2.12	2.19	2.18	2.21	2.19	2.17	2.11	2.14	2.26	2.24	2.14	S	2.10	2.11	2.07	2.13	2.12	2.14	2.14	2.15	2.15	2.17	2.22	2.07	2.26	2.16	24	
17	2.24	2.24	2.24	2.25	2.25	2.27	2.29	2.33	2.37	2.41	2.41	S	2.45	2.45	2.46	2.52	2.56	2.53	2.63	2.69	2.72	2.77	2.67	2.60	2.24	2.77	2.45	24	
18	2.55	2.48	2.39	2.31	2.29	2.17	2.12	2.09	2.05	2.02	S	2.02	2.02	1.99	1.98	1.96	1.96	1.97	1.95	1.96	1.97	1.97	1.97	1.97	1.95	2.55	2.09	24	
19	1.96	1.96	1.99	2.00	2.02	2.02	2.03	2.01	2.03	S	1.99	1.98	1.95	1.93	1.93	1.94	1.95	1.95	1.93	1.94	1.95	1.94	1.95	1.96	1.93	2.03	1.97	24	
20	1.98	1.98	1.98	1.98	1.98	1.99	2.00	2.02	S	2.09	2.03	1.99	1.94	C	C	C	C	2.20	2.18	2.20	2.17	2.15	2.14	2.16	1.94	2.20	2.06	24	
21	2.17	2.21	2.20	2.18	2.15	2.12	2.10	S	2.11	2.12	2.14	2.09	2.04	2.04	2.05	2.06	2.05	2.05	2.04	2.04	2.05	2.02	2.03	2.03	2.02	2.21	2.09	24	
22	2.02	2.02	2.03	2.02	2.04	2.05	S	2.05	2.04	2.04	2.05	2.04	2.00	2.01	2.00	2.02	2.00	2.07	2.09	2.00	1.99	1.92	1.94	1.94	1.92	2.09	2.02	24	
23	1.95	1.95	1.98	1.97	1.98	S	1.98	2.01	1.98	2.00	2.04	2.01	2.00	2.00	2.01	2.04	2.05	2.06	2.06	2.04	2.04	2.06	2.06	1.95	2.06	2.01	24		
24	2.05	2.06	2.08	2.08	S	2.11	2.14	2.15	2.15	2.17	2.16	2.16	2.15	2.15	2.17	2.16	2.15	2.16	2.14	2.13	2.13	2.13	2.12	2.12	2.05	2.17	2.13	24	
25	2.11	2.09	2.09	S	2.09	2.11	2.12	2.12	2.13	2.14	2.15	2.15	2.16	2.20	2.20	2.18	2.18	2.18	2.18	2.20	2.19	2.27	2.38	2.48	2.48	2.09	2.48	2.19	24
26	2.46	2.44	S	2.41	2.39	2.38	2.38	2.35	2.35	2.41	2.34	2.31	2.33	2.37	2.36	2.32	2.31	2.35	2.32	2.30	2.29	2.30	2.35	2.30	2.29	2.46	2.35	24	
27	2.30	S	2.30	2.28	2.27	2.25	2.27	2.30	2.29	2.30	2.32	2.31	2.30	2.28	2.30	2.26	2.23	2.19	2.16	2.10	2.09	2.10	2.10	2.07	2.07	2.32	2.23	24	
28	S	2.03	2.02	2.03	2.01	2.02	2.01	2.00	1.99	2.03	2.03	2.01	2.04	2.04	2.02	2.04	2.02	2.01	2.04	2.05	2.02	2.02	2.03	S	1.99	2.05	2.02	24	
29	2.04	2.05	2.08	2.10	2.11	2.11	2.11	2.13	2.15	2.17	2.19	2.22	2.24	2.22	2.22	2.20	2.25	2.19	2.16	2.37	2.36	2.41	S	2.70	2.04	2.70	2.22	24	
30	2.65	2.67	2.47	2.38	2.36	2.41	2.42	2.37	2.38	2.40	2.40	2.27	2.24	2.21	2.19	2.18	2.17	2.17	2.15	2.12	2.11	S	2.04	2.03	2.03	2.67	2.30	24	
31	2.01	2.06	2.03	2.01	2.03	2.00	2.00	1.98	1.94	1.97	1.98	1.97	1.98	1.98	1.98	1.99	2.01	2.01	2.01	2.02	S	2.02	2.04	2.07	1.94	2.07	2.00	24	
HOURLY MAX	2.65	2.67	2.52	2.63	2.71	2.65	2.60	2.88	2.93	2.83	2.63	2.48	2.46	2.45	2.49	2.57	2.75	2.80	2.67	2.69	2.72	2.77	2.67	2.70					
HOURLY AVG	2.16	2.15	2.13	2.13	2.14	2.13	2.13	2.15	2.16	2.16	2.15	2.11	2.11	2.12	2.12	2.13	2.15	2.16	2.13	2.13	2.15	2.15	2.14	2.16					

STATUS FLAG CODES

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

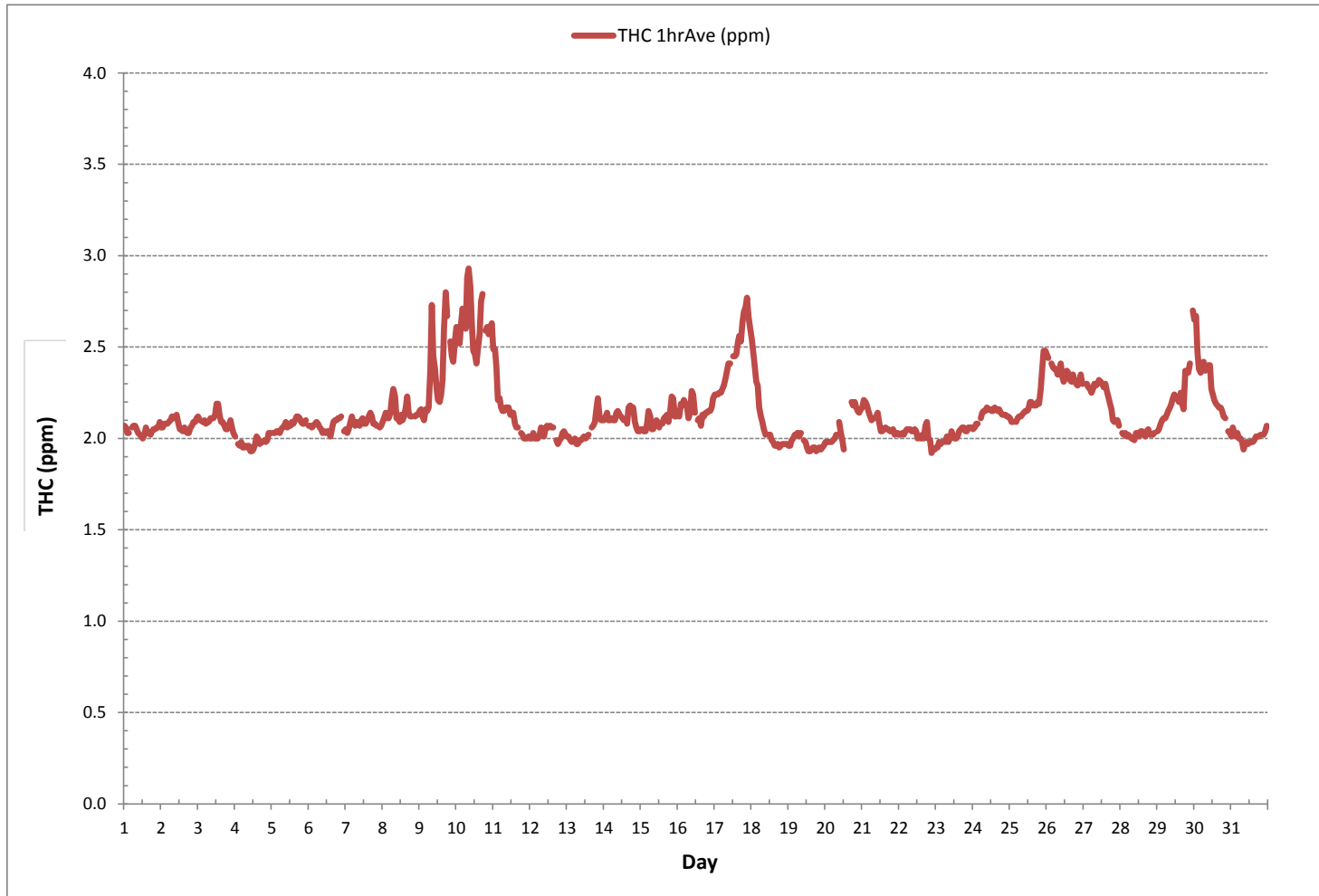
24 HR AVERAGES December 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	707		
MINIMUM 1-HR AVERAGE:	1.92 ppm	@ HOUR(S)	21 ON DAY(S) 22
MAXIMUM 1-HR AVERAGE:	2.93 ppm	@ HOUR(S)	8 ON DAY(S) 10
MAXIMUM 24-HR AVERAGE:	2.63 ppm		ON DAY(S) 10
			VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs	OPERATIONAL TIME:	744 hrs
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	0.17	MONTHLY AVERAGE:	2.14 ppm

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





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

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	2.11	2.12	2.08	2.08	S	2.11	2.11	2.11	2.11	2.08	2.07	2.05	2.22	2.48	2.69	2.48	2.14	2.08	2.11	2.11	2.13	2.11	2.11	2.12	2.05	2.69	2.17	24
2	2.13	2.14	2.14	S	2.14	2.14	2.15	2.17	2.15	2.15	2.17	2.11	2.08	2.07	2.04	2.05	2.04	2.01	2.04	2.04	2.04	2.04	P	2.08	2.01	2.17	2.10	23
3	2.07	2.05	S	2.04	2.04	2.02	2.04	2.01	2.04	2.04	2.04	2.08	2.11	2.11	2.05	2.01	2.01	1.99	1.96	1.96	1.99	2.01	1.98	1.95	1.95	2.11	2.03	24
4	1.92	S	1.89	1.89	1.91	1.89	1.89	1.89	1.89	1.92	1.91	2.11	2.10	2.15	2.33	2.20	2.10	2.17	2.20	2.18	2.12	2.17	2.20	2.20	1.89	2.33	2.05	24
5	S	2.17	2.20	2.20	2.20	2.27	2.44	2.23	2.35	2.32	2.27	2.39	2.36	2.35	2.41	2.44	2.38	2.44	2.44	2.48	2.51	2.35	2.41	S	2.17	2.51	2.35	24
6	2.51	2.41	2.41	2.47	2.41	2.47	2.44	2.50	2.41	2.41	2.55	2.44	2.47	2.47	2.36	2.57	2.51	2.57	2.51	2.63	2.60	2.61	S	2.58	2.36	2.63	2.49	24
7	2.72	2.60	2.67	2.72	2.61	2.66	2.56	2.54	2.70	2.57	2.69	2.66	2.64	2.66	2.72	3.22	2.84	2.81	2.49	2.48	2.44	S	2.44	2.44	2.44	3.22	2.65	24
8	2.48	2.48	3.49	2.49	2.49	3.14	3.51	3.84	3.28	2.66	2.47	2.44	2.86	2.76	2.94	3.09	4.44	2.51	2.47	2.48	S	2.47	2.47	2.44	2.44	4.44	2.86	24
9	2.47	2.49	2.44	2.41	2.48	2.44	2.50	2.91	3.12	2.85	2.69	2.56	2.49	2.47	2.51	2.61	3.00	3.08	2.94	S	2.75	2.70	2.66	2.81	2.41	3.12	2.67	24
10	2.82	2.78	2.69	2.92	2.91	2.87	2.85	3.10	3.10	3.00	2.94	2.64	2.63	2.54	2.69	2.72	2.94	2.92	S	3.51	3.73	2.66	2.73	2.72	2.54	3.73	2.89	24
11	2.78	2.98	2.76	2.66	2.56	2.41	2.32	2.38	2.25	2.29	2.38	2.36	2.47	2.35	2.29	2.13	2.13	S	2.11	2.09	2.09	2.08	2.08	2.08	2.08	2.98	2.35	24
12	2.11	2.23	2.41	2.17	2.15	2.27	2.27	2.32	2.32	2.14	2.36	2.38	2.32	2.38	2.35	2.32	S	2.08	2.08	2.30	2.29	2.28	2.39	2.29	2.08	2.41	2.27	24
13	2.35	2.33	2.32	2.32	2.27	2.28	2.32	2.13	2.14	2.23	2.29	2.26	2.22	2.26	2.32	S	2.35	2.26	2.38	3.12	3.31	2.32	2.30	2.29	2.13	3.31	2.36	24
14	2.29	2.56	2.81	2.29	2.39	2.50	2.32	2.33	2.38	2.38	2.38	2.35	2.35	2.32	S	2.32	2.42	2.44	2.41	2.94	2.69	2.28	2.28	2.26	2.26	2.94	2.42	24
15	2.28	2.26	2.26	2.26	2.75	2.76	2.78	2.26	2.28	2.78	2.54	2.54	2.53	S	2.61	2.57	2.57	2.86	2.53	2.95	2.79	2.81	2.72	2.54	2.26	2.95	2.58	24
16	2.53	2.75	2.94	2.64	2.84	2.69	2.76	3.12	3.23	3.25	3.19	2.81	S	2.66	2.95	2.29	2.35	2.35	2.35	2.35	2.35	2.35	2.36	2.47	2.29	3.25	2.68	24
17	2.45	2.44	2.45	2.45	2.44	2.45	2.49	2.51	2.54	2.59	2.61	S	2.61	2.60	2.63	2.67	2.69	2.67	2.79	2.84	2.85	2.91	2.82	2.75	2.44	2.91	2.62	24
18	2.66	2.60	2.53	2.42	2.38	2.31	2.18	2.16	2.14	2.08	S	2.04	2.04	2.01	1.98	1.97	1.95	1.95	1.94	1.92	1.98	1.91	1.89	1.89	1.89	2.66	2.13	24
19	1.86	1.85	1.88	1.88	1.89	1.89	1.89	1.86	1.88	S	1.85	1.86	1.83	1.83	1.88	1.91	1.98	1.95	1.95	1.98	1.91	1.95	1.92	1.95	1.83	1.98	1.90	24
20	1.98	1.98	1.98	2.01	2.02	2.05	2.05	2.10	S	2.54	2.11	2.08	C	C	C	C	C	2.38	2.60	2.51	2.32	2.29	2.26	2.32	1.98	2.60	2.20	24
21	2.32	2.35	2.35	2.35	2.32	2.29	2.28	S	2.28	2.29	2.32	2.26	2.20	2.22	2.20	2.20	2.18	2.20	2.15	2.15	2.17	2.13	2.13	2.13	2.13	2.35	2.24	24
22	2.11	2.11	2.11	2.11	2.13	2.14	S	2.78	2.15	2.15	2.17	2.18	2.14	2.14	2.17	2.48	2.20	2.83	2.66	2.67	2.78	2.13	2.14	2.17	2.11	2.83	2.29	24
23	2.18	2.19	2.23	2.22	2.25	S	2.28	2.29	2.29	2.29	2.41	2.35	2.29	2.30	2.32	2.32	2.35	2.36	2.38	2.35	2.35	2.38	2.38	2.38	2.18	2.41	2.31	24
24	2.38	2.38	2.41	2.41	S	2.45	2.45	2.47	2.49	2.50	2.49	2.50	2.50	2.49	2.54	2.49	2.49	2.51	2.47	2.47	2.47	2.47	2.44	2.45	2.38	2.54	2.47	24
25	2.45	2.42	2.44	S	2.41	2.42	2.44	2.44	2.44	2.45	2.45	2.45	2.47	2.51	2.50	2.49	2.47	2.44	2.49	2.45	2.61	2.67	3.03	2.81	2.41	3.03	2.51	24
26	2.73	2.69	S	2.66	2.63	2.63	2.61	2.57	2.58	2.61	2.56	2.49	2.50	2.54	2.51	2.49	2.44	2.49	2.44	2.41	2.41	2.45	2.49	2.38	2.38	2.73	2.54	24
27	2.38	S	2.36	2.35	2.33	2.32	2.33	2.35	2.35	2.38	2.38	2.36	2.35	2.32	2.33	2.32	2.29	2.26	2.20	2.14	2.12	2.13	2.11	2.10	2.10	2.38	2.29	24
28	S	2.08	2.08	2.08	2.08	2.11	2.10	2.11	2.10	2.20	2.35	2.26	2.23	2.30	2.30	2.35	2.20	2.23	2.26	2.25	2.26	2.28	2.28	S	2.08	2.35	2.20	24
29	2.28	2.29	2.32	2.32	2.32	2.33	2.35	2.35	2.35	2.41	2.41	2.42	2.42	2.41	2.41	2.51	2.47	2.32	2.70	2.54	2.57	2.54	S	2.90	2.28	2.90	2.43	24
30	2.82	2.85	2.69	2.50	2.50	3.68	2.81	2.54	2.51	2.53	2.54	2.44	2.36	2.30	2.28	2.26	2.26	2.26	2.23	2.20	2.17	S	2.13	2.17	2.13	3.68	2.48	24
31	2.32	2.38	2.38	2.35	2.39	2.44	2.38	2.33	2.10	2.32	2.26	2.23	2.18	2.14	2.14	2.17	2.19	2.20	2.20	2.22	S	2.47	2.44	2.51	2.10	2.51	2.29	24
HOURLY MAX	2.82	2.98	3.49	2.92	2.91	3.68	3.51	3.84	3.28	3.25	3.19	2.81	2.86	2.76	2.95	3.22	4.44	3.08	2.94	3.51	3.73	2.91	3.03	2.90				
HOURLY AVG	2.36	2.38	2.40	2.33	2.35	2.41	2.40	2.42	2.40	2.41	2.40	2.34	2.34	2.35	2.39	2.40	2.43	2.39	2.35	2.42	2.44	2.34	2.34	2.35				

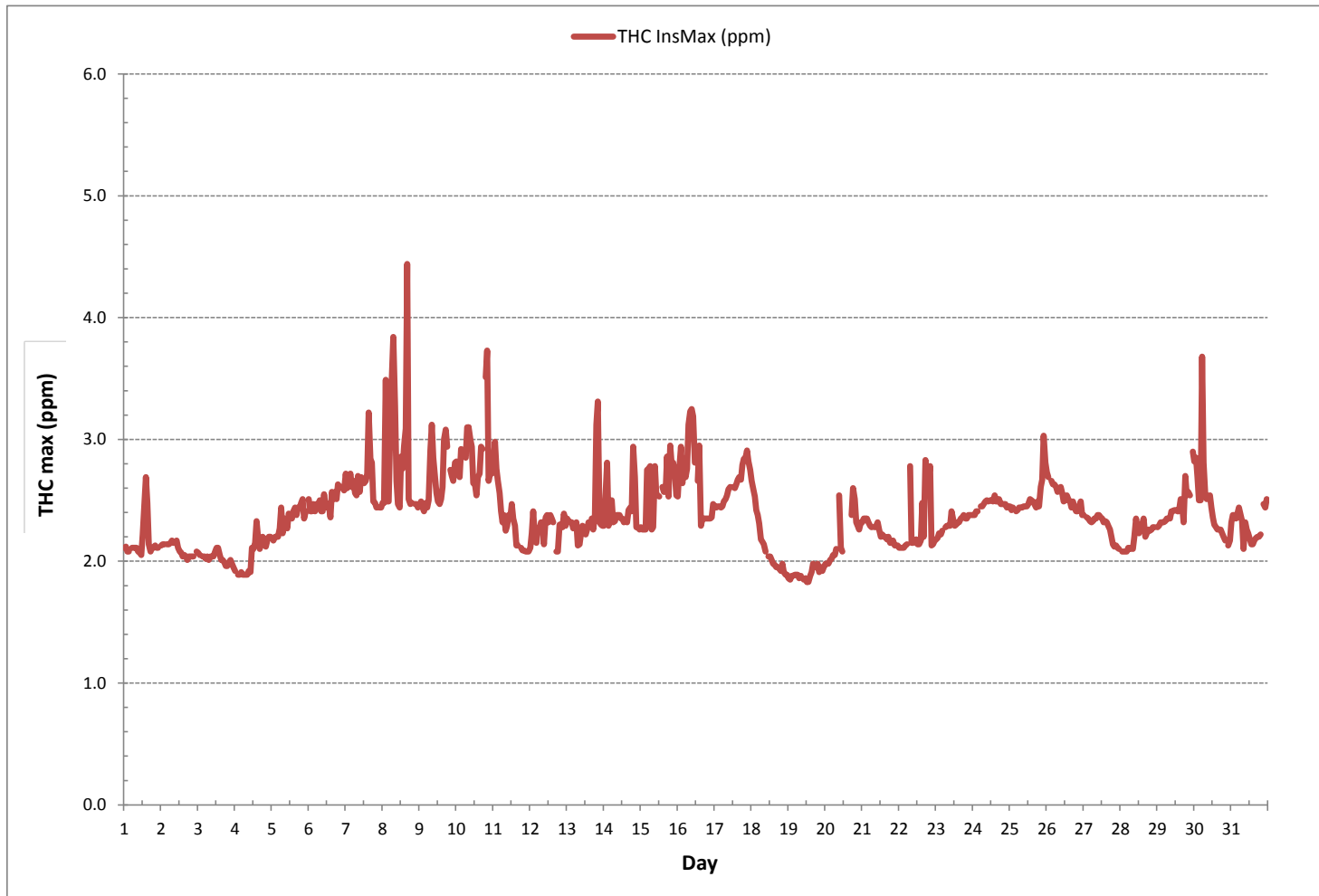
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	705
MAXIMUM INSTANTANEOUS VALUE:	4.44 ppm @ HOUR(S) 16 ON DAY(S) 8
	VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	743 hrs
STANDARD DEVIATION:	0.31

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

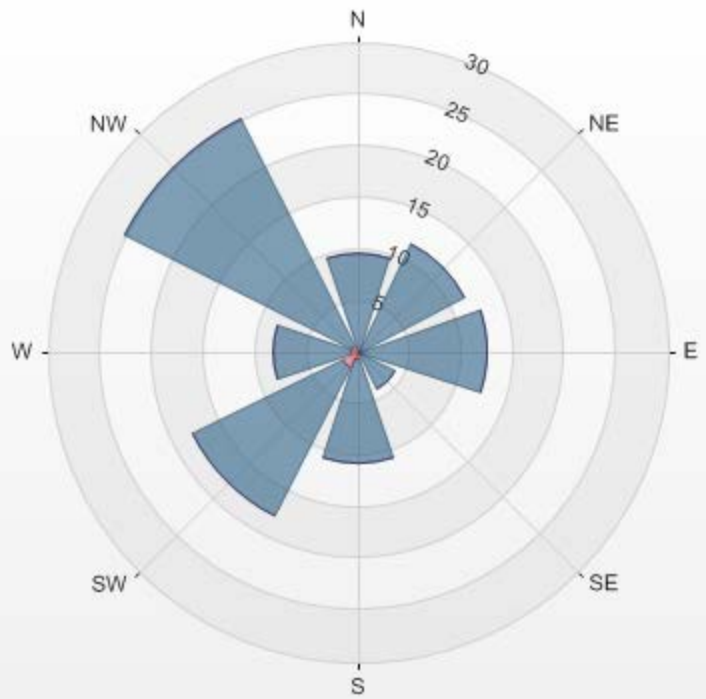


Wind: LICA ST. LINA Poll.: LICA ST. LINA-THC[ppm] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 0.00% Valid Data: 94.76% Calm Avg: 0.00 [ppm]

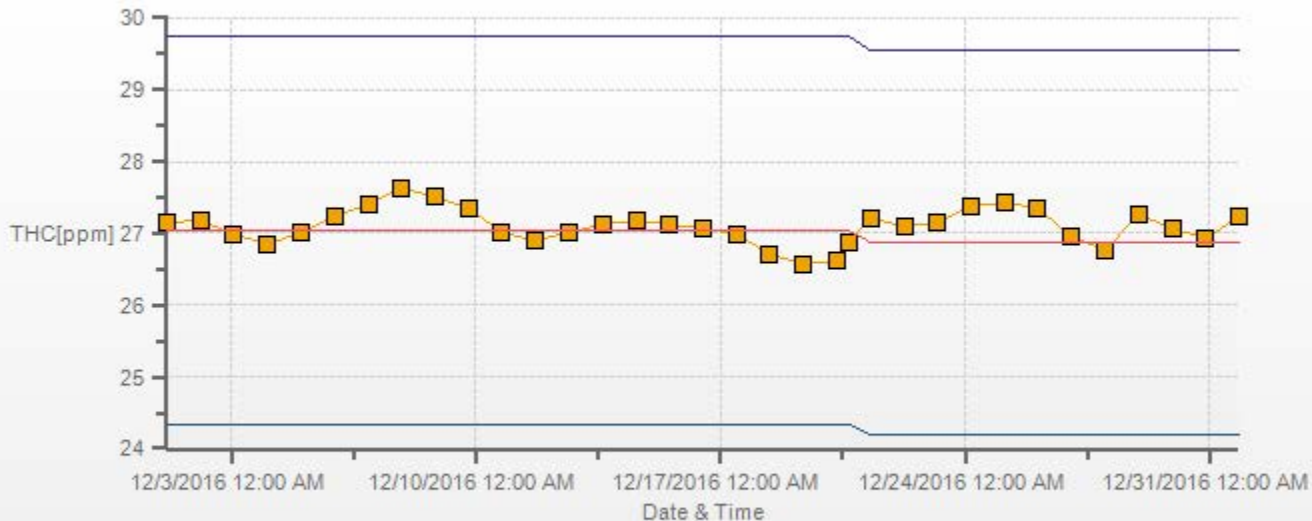
Direction	0.0-1.0	1.0-2.0	2.0-2.9	>2.9	Total
N	0	0	9.65	0	9.65
NE	0	0	11.63	0	11.63
E	0	0	12.62	0	12.62
SE	0	0	3.97	0	3.97
S	0	0.85	9.93	0	10.78
SW	0	1.7	16.17	0	17.87
W	0	0.71	7.52	0	8.23
NW	0	0.71	24.54	0	25.25
Summary	0	3.97	96.03	0	100

% Icon Classes (ppm) 0 0.0-1.0 4 1.0-2.0 96 2.0-2.9 0 >2.9

LICA ST. LINA Poll.: LICA ST. LINA-THC[ppm] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 0.00%



THC[ppm] Calibration: LICA ST. LINA Monthly: 2016/12 Type: Span



Span Meas Span Ref Span Low Span High

## ***OXIDES OF NITROGEN***





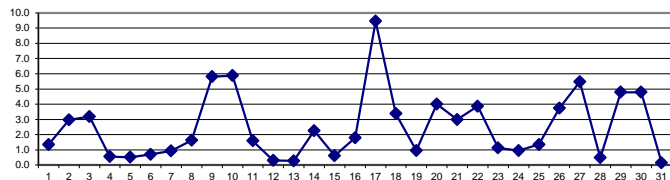
OXIDES OF NITROGEN Hourly Averages (NO<sub>x</sub> ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	1.1	0.9	1.3	1.2	S	1.0	1.2	0.9	1.1	0.9	1.1	0.8	0.9	1.7	1.8	1.5	1.3	1.3	1.7	1.9	1.9	1.7	1.8	1.9	0.8	1.9	1.3	24	
2	2.0	2.2	2.5	S	3.5	3.8	3.4	3.9	4.3	5.0	4.8	7.3	3.9	2.8	2.8	2.7	2.3	2.0	1.8	1.5	1.4	1.4	1.4	1.4	1.4	1.4	7.3	3.0	24
3	1.2	1.2	S	1.6	1.9	2.0	2.3	2.2	2.5	3.4	4.2	5.5	7.3	7.7	4.9	3.5	3.0	2.1	2.4	2.7	3.6	4.4	2.4	1.3	1.2	7.7	3.2	24	
4	0.8	S	0.7	0.6	0.6	0.6	0.5	0.6	0.8	0.9	1.1	0.7	0.7	0.6	0.4	0.4	0.7	0.1	0.3	0.3	0.2	0.2	0.3	0.4	0.1	1.1	0.5	24	
5	S	0.5	0.2	0.4	0.2	0.2	0.3	0.2	0.3	0.5	0.2	0.3	0.4	0.9	0.6	0.7	0.8	0.9	0.8	0.8	0.6	0.7	0.7	S	0.2	0.9	0.5	24	
6	0.9	0.8	0.6	0.5	0.4	0.4	0.3	0.5	0.3	0.6	0.5	0.8	1.2	0.7	1.3	1.0	1.1	0.9	0.7	1.1	0.6	0.5	S	0.3	0.3	1.3	0.7	24	
7	0.2	0.2	0.1	0.1	0.1	0.1	0.5	0.4	0.4	0.5	1.2	1.4	1.6	1.5	0.5	1.8	2.1	2.3	1.7	2.4	1.5	S	0.4	0.2	0.1	2.4	0.9	24	
8	0.4	0.8	0.7	0.7	1.1	1.0	1.5	1.7	1.1	1.1	1.1	0.4	1.2	1.0	3.3	6.3	1.2	0.7	1.2	1.1	S	3.0	3.4	3.5	0.4	6.3	1.6	24	
9	4.3	5.6	4.6	2.7	4.9	4.4	3.5	5.6	8.0	6.0	6.1	4.3	3.3	3.9	3.7	5.0	12.3	12.6	8.3	S	7.2	6.0	5.2	6.0	2.7	12.6	5.8	24	
10	6.6	5.7	4.9	6.0	6.6	5.8	5.7	8.2	8.5	7.1	5.4	3.6	3.3	3.2	4.4	5.8	8.0	9.1	S	5.9	5.3	5.1	5.2	5.7	3.2	9.1	5.9	24	
11	4.0	3.3	3.8	3.6	2.5	1.8	1.4	1.9	2.4	2.4	2.1	1.1	1.2	0.8	0.8	0.2	0.2	S	0.6	0.7	0.4	0.4	0.5	0.3	0.2	4.0	1.6	24	
12	0.4	0.4	0.3	0.4	0.5	0.3	0.4	0.4	0.3	0.3	0.3	0.1	0.3	0.4	0.0	0.2	S	0.4	0.4	0.1	0.3	0.3	0.1	0.2	0.0	0.5	0.3	24	
13	0.2	0.0	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.3	0.1	0.2	0.1	0.0	S	0.5	0.4	0.4	0.7	0.9	0.4	0.3	0.5	0.0	0.9	0.3	24	
14	0.3	0.5	0.2	0.3	0.6	0.8	0.8	0.9	1.4	4.2	2.1	1.8	2.0	2.5	S	3.3	6.5	8.1	5.7	3.7	2.5	1.7	1.1	0.7	0.2	8.1	2.2	24	
15	0.6	0.4	0.4	0.3	0.1	0.3	0.3	0.4	0.4	0.3	0.4	0.3	0.5	S	0.5	0.7	0.6	0.9	1.0	0.8	0.9	1.1	1.3	1.5	0.1	1.5	0.6	24	
16	1.4	1.6	1.4	1.2	1.1	1.0	0.9	1.3	1.1	1.2	1.1	1.1	S	0.9	0.8	1.2	1.3	3.0	3.5	2.4	2.3	2.7	4.1	4.6	0.8	4.6	1.8	24	
17	6.2	6.7	7.1	7.4	8.1	8.0	8.3	8.4	8.6	8.7	9.0	S	11.1	10.0	9.2	9.8	10.2	10.1	11.2	12.0	12.3	11.9	11.4	11.6	6.2	12.3	9.4	24	
18	11.6	10.9	9.8	8.0	7.4	6.0	4.4	3.0	2.3	1.8	S	2.5	2.2	1.6	1.5	1.1	0.8	0.8	0.3	0.1	0.3	0.2	0.3	0.7	0.1	11.6	3.4	24	
19	0.6	0.5	0.4	0.9	2.1	1.9	2.2	1.5	2.4	S	3.9	3.8	0.6	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.0	3.9	0.9	24	
20	0.0	0.2	0.1	0.1	0.2	0.4	0.7	1.3	S	7.9	6.5	6.3	6.3	5.6	6.3	5.3	4.5	4.8	4.8	7.4	8.1	6.8	4.9	3.6	0.0	8.1	4.0	24	
21	3.8	4.7	3.6	3.2	2.6	2.4	1.6	S	4.0	4.8	4.8	C	C	C	C	C	C	C	3.0	2.6	2.2	1.9	1.5	1.1	1.1	4.8	3.0	24	
22	1.0	1.0	1.1	1.8	2.1	3.9	S	5.8	4.5	4.1	5.5	6.4	6.5	7.8	7.4	7.1	6.8	5.4	3.9	2.1	1.1	1.1	1.3	1.2	1.0	7.8	3.9	24	
23	1.0	0.7	0.7	0.6	0.9	S	1.4	2.0	1.3	0.8	1.6	1.4	1.8	0.9	0.9	1.2	1.8	1.2	1.2	0.8	0.8	1.1	0.8	1.1	0.6	2.0	1.1	24	
24	0.6	0.6	0.8	0.7	S	1.3	1.3	1.1	1.1	1.4	1.1	0.9	1.1	1.4	1.4	1.4	1.0	0.8	0.6	0.5	0.5	0.6	0.5	1.0	0.5	1.4	0.9	24	
25	0.7	0.6	0.5	S	0.6	1.2	1.4	1.2	0.6	0.7	0.8	1.0	1.2	1.9	1.9	1.7	1.3	1.6	1.6	1.2	1.8	2.4	2.4	2.6	0.5	2.6	1.3	24	
26	2.6	3.4	S	2.6	3.2	2.7	2.6	2.0	2.0	3.2	3.2	4.1	5.4	5.7	5.9	4.9	4.4	4.5	4.6	4.0	3.9	3.7	3.8	3.5	2.0	5.9	3.7	24	
27	4.1	S	3.7	3.5	3.5	4.1	4.1	4.4	4.7	5.5	6.3	7.1	8.0	8.4	8.5	9.0	9.6	8.0	6.6	3.9	3.9	4.0	3.2	1.7	1.7	9.6	5.5	24	
28	S	1.5	1.1	0.7	0.5	0.5	0.3	0.5	0.4	0.4	0.2	0.0	0.0	0.4	0.2	0.3	0.1	0.5	0.5	0.5	0.5	0.7	0.7	S	0.0	1.5	0.5	24	
29	0.7	0.8	0.9	0.8	0.7	0.7	0.7	1.2	1.3	2.5	5.8	6.7	9.5	10.0	5.4	5.7	5.1	4.9	8.1	7.5	8.5	8.3	S	14.3	0.7	14.3	4.8	24	
30	11.2	12.6	8.9	5.3	5.1	5.2	5.8	4.7	4.8	5.6	5.6	4.6	3.4	3.4	3.3	3.8	3.6	3.5	3.3	2.2	2.0	S	1.2	0.9	0.9	12.6	4.8	24	
31	0.7	0.3	0.2	0.4	0.3	0.2	0.4	0.4	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	S	0.2	0.0	0.0	0.0	0.7	0.1	24
HOURLY MAX	11.6	12.6	9.8	8.0	8.1	8.0	8.3	8.4	8.6	8.7	9.0	7.3	11.1	10.0	9.2	9.8	12.3	12.6	11.2	12.0	12.3	11.9	11.4	14.3					
HOURLY AVG	2.4	2.4	2.1	1.9	2.1	2.1	1.9	2.2	2.4	2.7	2.9	2.6	2.9	3.0	2.7	3.0	3.1	3.1	2.7	2.4	2.6	2.5	2.1	2.5					

STATUS FLAG CODES

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

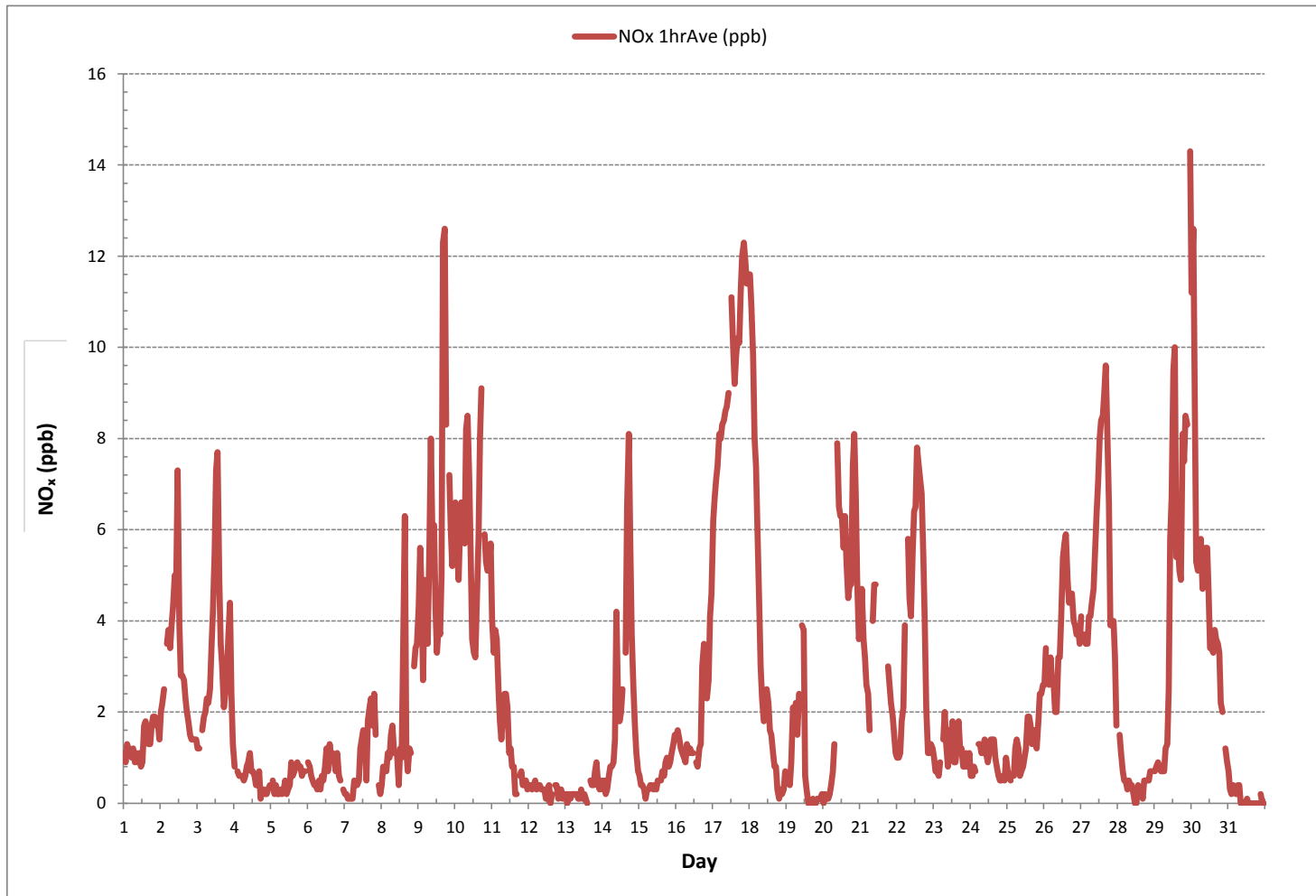
24 HR AVERAGES December 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	680				
MINIMUM 1-HR AVERAGE:	0.0 ppb	@ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 1-HR AVERAGE:	14.3 ppb	@ HOUR(S)	23	ON DAY(S)	29
MAXIMUM 24-HR AVERAGE:	9.4 ppb			ON DAY(S)	17
				VAR-VARIOUS	
IZS CALIBRATION TIME:	33 hrs	OPERATIONAL TIME:	744 hrs		
MONTHLY CALIBRATION TIME:	7 hrs	AMD OPERATION UPTIME:	100.0 %		
STANDARD DEVIATION:	2.7	MONTHLY AVERAGE:	2.5 ppb		

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





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

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	0.5	0.6	0.7	0.7	S	15.0	15.4	0.9	3.4	2.4	17.7	2.0	0.9	2.1	3.0	1.8	2.1	1.7	3.3	4.0	2.6	1.9	2.1	1.9	0.5	17.7	3.8	24	
2	1.8	2.3	2.6	S	3.9	4.1	3.6	4.1	4.3	5.1	5.9	8.2	5.9	3.3	3.2	3.0	2.4	2.4	2.1	1.7	1.6	1.8	P	1.7	1.6	8.2	3.4	23	
3	1.6	1.5	S	1.9	2.2	2.1	4.9	2.3	3.7	4.6	4.7	27.2	8.4	8.4	6.1	4.1	4.5	2.1	2.4	4.0	3.8	4.6	3.4	1.3	1.3	27.2	4.8	24	
4	0.7	S	0.6	0.2	0.2	0.2	0.2	0.2	8.7	0.5	0.9	0.4	0.4	0.2	0.0	0.2	1.7	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	0.7	24
5	S	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.1	0.9	0.0	0.0	0.0	3.8	0.2	0.3	0.9	13.5	0.0	0.1	0.0	0.0	0.0	S	0.0	13.5	0.9	24	
6	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	1.8	0.7	1.1	16.2	1.4	2.3	2.3	10.6	1.1	0.0	2.1	0.2	0.7	S	0.0	0.0	16.2	1.8	24	
7	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.6	2.0	15.6	28.4	5.3	0.5	5.5	21.2	42.4	3.8	24.8	4.3	S	0.2	0.0	0.0	42.4	6.9	24	
8	0.3	0.5	0.3	0.5	0.6	0.7	3.0	6.0	0.8	1.4	1.7	0.0	14.7	1.5	37.5	48.4	3.9	0.4	1.4	0.9	S	2.8	3.0	3.5	0.0	48.4	5.8	24	
9	4.5	5.4	4.9	2.9	5.3	4.2	3.9	7.2	8.2	6.6	6.0	4.9	3.4	3.9	4.1	6.0	14.6	14.3	9.3	S	7.2	6.1	5.2	6.4	2.9	14.6	6.3	24	
10	6.8	5.8	4.9	6.8	6.8	5.9	6.3	9.3	9.2	7.9	6.6	3.9	3.6	3.4	6.3	6.3	9.8	9.7	S	6.4	5.5	5.4	5.5	5.9	3.4	9.8	6.4	24	
11	5.1	3.9	3.9	4.2	2.8	2.2	1.5	2.0	2.3	2.5	2.5	1.2	1.2	0.9	17.2	0.5	1.5	S	0.8	0.6	0.5	0.4	0.3	0.2	0.2	17.2	2.5	24	
12	1.0	0.0	0.1	0.4	0.3	0.2	0.2	0.2	0.4	0.0	0.4	0.0	0.8	1.9	0.0	0.0	S	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.3	24
13	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	S	0.9	0.1	0.7	3.0	1.5	0.1	0.1	0.2	0.0	3.0	0.4	24	
14	0.0	0.4	0.0	0.0	0.5	0.6	1.0	2.3	2.9	46.3	10.1	1.5	1.7	2.5	S	4.7	9.1	11.4	6.0	4.0	2.8	1.6	0.9	0.7	0.0	46.3	4.8	24	
15	0.3	0.3	0.1	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.1	0.0	S	0.1	0.8	0.9	1.8	1.2	0.5	0.4	0.7	0.8	0.9	0.0	1.8	0.4	24	
16	0.9	0.9	0.9	0.4	0.5	0.4	0.3	1.6	0.4	0.6	0.9	0.9	S	1.2	0.4	2.4	1.8	4.5	6.3	3.7	2.1	4.2	4.2	4.9	0.3	6.3	1.9	24	
17	6.5	6.8	7.1	7.6	8.3	8.3	9.4	8.7	8.8	9.3	10.4	S	12.6	10.7	11.5	10.9	10.7	11.0	13.9	16.0	12.9	12.6	11.9	12.1	6.5	16.0	10.3	24	
18	12.0	11.3	10.7	9.0	7.9	7.2	5.4	3.6	2.8	2.4	S	2.9	2.9	1.9	1.6	1.5	1.1	1.0	0.4	0.2	0.6	0.4	0.6	0.7	0.2	12.0	3.8	24	
19	0.7	0.4	0.4	1.8	2.0	1.8	2.2	1.5	2.9	S	4.9	5.2	1.0	0.7	0.0	0.1	0.0	0.5	0.0	0.2	0.1	0.1	0.7	0.4	0.0	5.2	1.2	24	
20	0.1	0.2	0.2	0.2	0.3	1.2	0.9	2.4	S	10.9	7.5	13.1	22.6	6.0	10.8	32.3	27.0	34.0	5.4	7.9	8.1	7.6	5.5	3.8	0.1	34.0	9.0	24	
21	4.3	5.1	3.7	3.4	2.6	20.5	2.3	S	4.5	5.1	5.8	C	C	C	C	C	C	3.6	3.0	4.1	2.2	1.9	1.7	1.7	20.5	4.6	24		
22	1.4	1.4	1.7	2.4	2.7	5.1	S	6.4	5.2	5.6	7.5	20.7	7.2	10.2	8.4	9.3	8.9	7.8	4.9	3.1	1.7	1.6	2.0	1.7	1.4	20.7	5.5	24	
23	1.5	1.4	1.2	1.2	1.5	S	2.0	2.9	2.3	1.2	3.6	3.2	2.9	1.5	1.5	2.1	2.3	1.6	1.6	1.1	1.1	1.3	1.3	1.5	1.1	3.6	1.8	24	
24	0.9	0.7	1.1	0.9	S	1.8	2.1	1.5	1.2	2.0	1.5	1.1	1.6	1.9	1.8	1.6	1.1	1.0	0.7	0.7	1.1	1.0	1.1	1.5	0.7	2.1	1.3	24	
25	1.4	0.9	0.9	S	1.0	1.9	1.9	1.9	0.9	1.0	1.3	1.7	1.6	3.1	2.6	2.6	1.9	2.4	2.4	2.0	2.6	3.2	3.1	3.4	0.9	3.4	2.0	24	
26	3.5	5.0	S	3.4	4.2	4.1	3.6	2.9	3.1	3.9	4.5	5.3	6.4	6.6	7.4	6.0	5.5	5.8	5.3	4.8	4.5	4.5	4.5	4.3	2.9	7.4	4.7	24	
27	4.8	S	4.5	4.2	4.4	22.3	5.0	5.1	5.4	20.6	8.8	10.0	9.6	21.9	11.0	13.4	29.5	9.4	8.0	5.9	5.0	5.0	4.4	3.4	3.4	29.5	9.6	24	
28	S	2.8	1.9	1.7	1.2	1.2	1.4	2.2	2.0	5.5	0.8	0.5	0.7	17.8	0.8	1.1	0.6	1.2	0.9	0.9	0.9	1.0	1.2	S	0.5	17.8	2.2	24	
29	1.5	1.4	1.4	1.5	1.3	1.3	1.2	1.8	1.8	4.2	6.9	8.0	12.9	13.9	6.3	6.5	6.3	5.6	12.5	8.9	10.0	9.6	S	16.9	1.2	16.9	6.2	24	
30	12.1	14.4	14.0	6.4	5.9	7.4	7.4	5.9	5.9	26.5	6.5	22.3	4.3	4.3	10.7	4.7	5.8	4.8	4.2	3.0	2.7	S	2.6	1.7	1.7	26.5	8.0	24	
31	1.4	1.0	0.8	1.1	1.0	0.8	0.8	1.6	0.4	0.6	1.1	1.0	1.3	0.4	0.4	0.4	0.5	0.6	0.6	0.6	S	0.6	0.4	0.4	0.4	1.6	0.8	24	
HOURLY MAX	12.1	14.4	14.0	9.0	8.3	22.3	15.4	9.3	9.2	46.3	17.7	27.2	28.4	21.9	37.5	48.4	29.5	42.4	13.9	24.8	12.9	12.6	11.9	16.9					
HOURLY AVG	2.6	2.6	2.4	2.2	2.3	4.0	3.0	2.8	3.1	6.0	4.4	5.6	6.1	4.9	5.4	6.2	6.5	6.6	3.4	3.8	3.0	2.8	2.4	2.8					

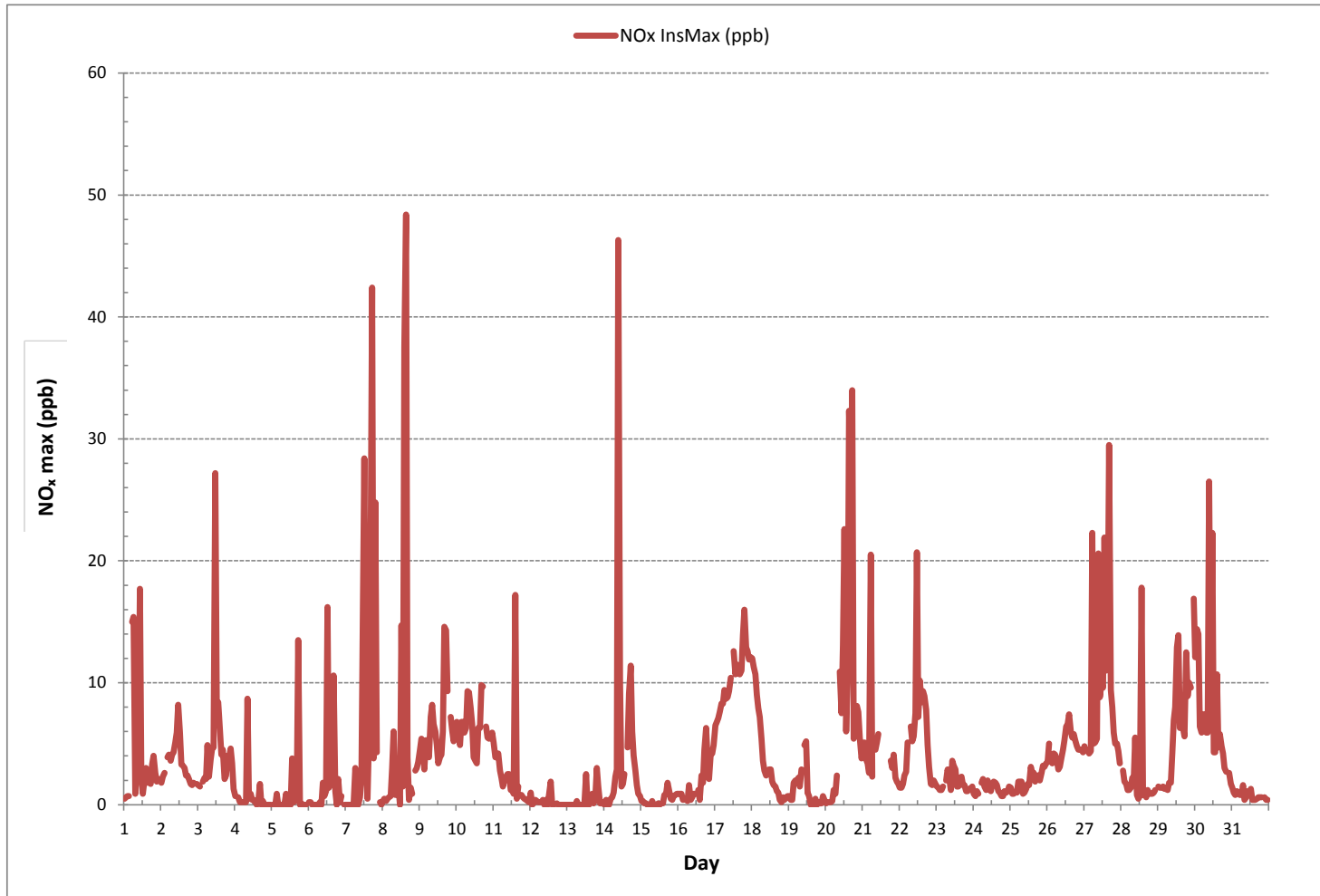
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	628
MAXIMUM INSTANTANEOUS VALUE:	48.4 ppb @ HOUR(S) 15 ON DAY(S) 8
VAR-VARIOUS	
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	5.7
OPERATIONAL TIME:	743 hrs

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

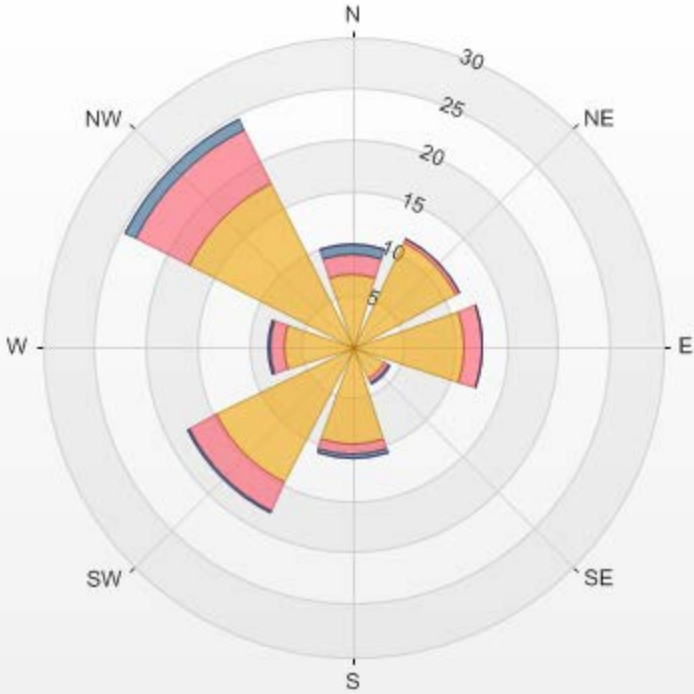


Wind: LICA ST. LINA Poll.: LICA ST. LINA-NOX[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 0.00% Valid Data: 94.49% Calm Avg: 0.00 [ppb]

Direction	0.0-4.8	4.8-9.6	9.6-14.4	>14.4	Total
N	6.97	1.99	1	0	9.96
NE	11.24	0.43	0	0	11.67
E	10.81	1.85	0	0	12.66
SE	3.56	0.28	0.14	0	3.98
S	9.53	1	0.28	0	10.81
SW	14.79	2.99	0.14	0	17.92
W	6.69	1.42	0.14	0	8.25
NW	17.64	5.83	1.28	0	24.75
Summary	81.23	15.79	2.98	0	100

% Icon Classes (ppb)	81	0.0-4.8	16	4.8-9.6	3	9.6-14.4	0	>14.4
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LICA ST. LINA Poll.: LICA ST. LINA-NOX[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 0.00%



NOX[ppb] Calibration: LICA ST. LINA Monthly: 2016/12 Type: Span



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

## ***NITRIC OXIDES***



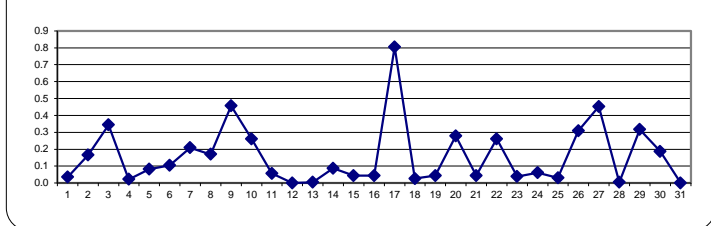
**NITRIC OXIDE Hourly Averages (NO ppb)**

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.			
DAY																														
1	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.2	0.0	24	
2	0.0	0.0	0.0	S	0.3	0.2	0.0	0.0	0.0	0.0	0.4	0.7	1.0	0.6	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
3	0.0	0.0	S	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.7	1.3	2.4	2.2	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24	
4	0.0	S	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	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	24	
5	S	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.2	0.1	0.1	0.1	0.2	0.3	0.1	0.0	0.0	S	0.0	0.0	0.3	0.1	24	
6	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.4	0.0	0.5	0.3	0.2	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.5	0.1	24	
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.6	0.5	0.1	0.5	0.5	0.8	0.4	0.5	0.1	S	0.0	0.0	0.0	0.0	0.8	0.2	24	
8	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.2	0.2	1.2	2.1	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	2.1	0.2	24	
9	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.9	1.5	1.5	1.2	1.3	0.9	0.7	0.5	0.2	0.3	S	0.4	0.3	0.2	0.1	0.0	0.0	1.5	0.5	24	
10	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	1.1	1.4	1.0	0.8	0.5	0.5	0.3	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.3	24	
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.0	0.2	0.1	0.3	0.0	0.0	S	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	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	S	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	S	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24	
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.3	0.2	0.2	0.2	S	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.1	24
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	S	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.0	24	
16	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	S	0.1	0.0	0.2	0.0	0.1	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	24	
17	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	1.2	2.7	S	5.1	3.9	2.5	1.3	0.3	0.2	0.2	0.3	0.1	0.2	0.0	0.1	0.0	0.0	5.1	0.8	24	
18	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24	
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.6	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	0.6	0.0	24	
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.6	1.2	1.5	1.5	0.9	0.5	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.3	24
21	0.0	0.0	0.0	0.0	0.0	0.1	0.0	S	0.0	0.1	0.5	C	C	C	C	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	24	
22	0.0	0.0	0.0	0.0	0.0	S	0.3	0.0	0.2	0.6	1.2	1.3	1.3	0.7	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.3	24	
23	0.0	0.0	0.0	0.0	0.0	S	0.1	0.1	0.0	0.0	0.1	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.0	24	
24	0.0	0.0	0.0	0.0	S	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.2	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	24	
25	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24	
26	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	1.1	1.7	1.7	1.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.3	24	
27	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.8	2.1	2.1	2.0	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.5	24	
28	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.1	0.0	24	
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	1.4	2.2	2.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.1	0.0	2.2	0.3	24	
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.1	1.1	0.7	0.5	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	1.1	0.2	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	S	0.0	0.0	0.0	0.0	0.0	0.0	24	
HOURLY MAX	0.3	0.1	0.1	0.2	0.3	0.2	0.1	0.3	0.3	1.2	2.7	1.8	5.1	3.9	2.5	2.1	0.5	0.8	0.4	0.5	0.4	0.3	0.2	0.1						
HOURLY AVG	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.5	0.8	0.6	0.5	0.3	0.1	0.1	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

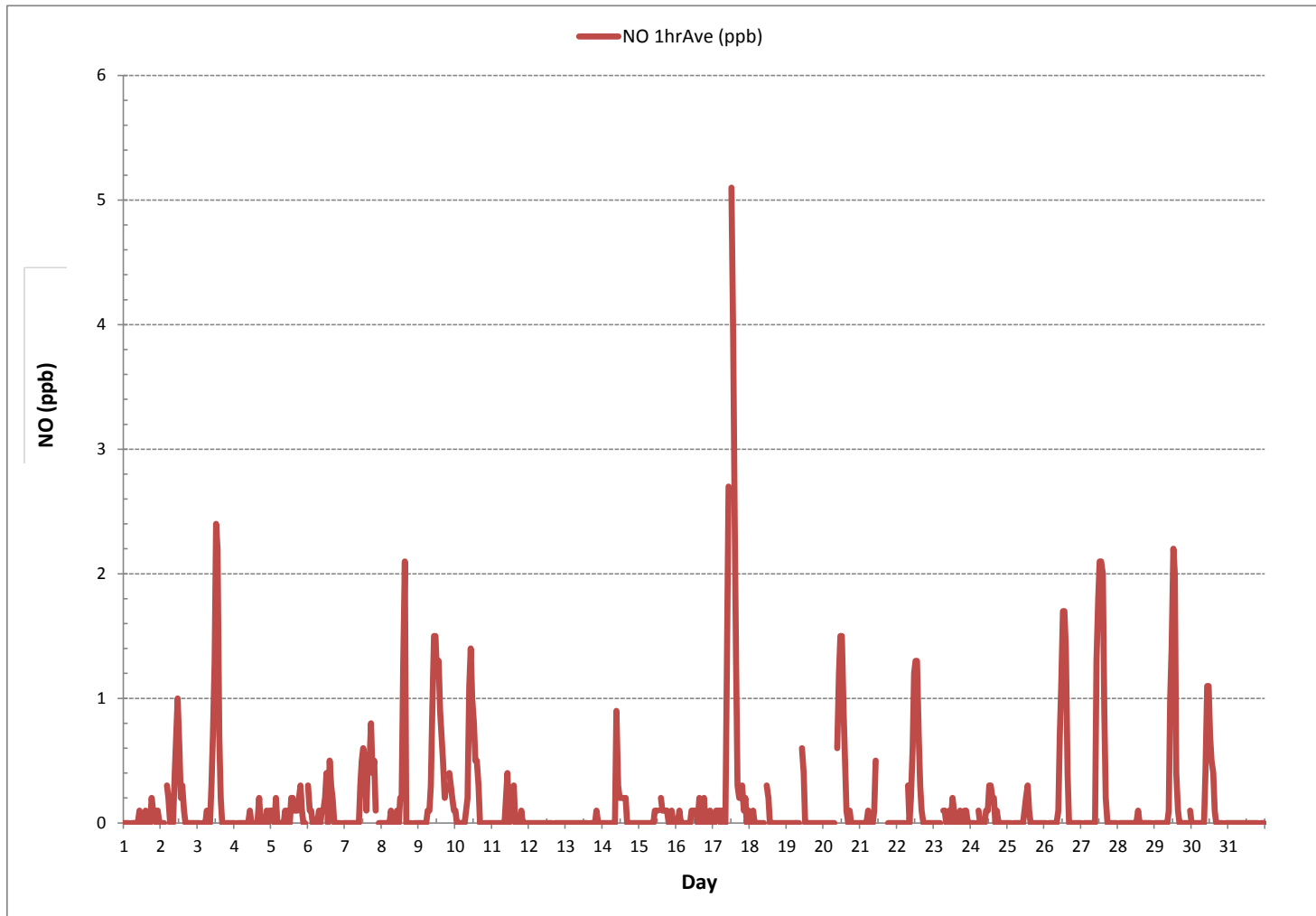
**24 HR AVERAGES December 2016**



**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	217			
MINIMUM 1-HR AVERAGE:	0.0 ppb	@ HOUR(S)	VAR	ON DAY(S) ALL
MAXIMUM 1-HR AVERAGE:	5.1 ppb	@ HOUR(S)	12	ON DAY(S) 17
MAXIMUM 24-HR AVERAGE:	0.8 ppb			ON DAY(S) 17
				VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs	OPERATIONAL TIME:	744 hrs	
MONTHLY CALIBRATION TIME:	7 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	0.4	MONTHLY AVERAGE:	0.2 ppb	

NITRIC OXIDE Hourly Averages (NO ppb)





NITRIC OXIDE Instantaneous Maximum (NO ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	0.3	0.1	0.2	0.4	S	10.7	10.9	0.3	1.9	1.3	12.4	1.0	0.3	0.9	1.0	0.6	0.8	0.3	1.6	1.4	0.6	0.3	0.4	0.3	0.1	12.4	2.1	24	
2	0.1	0.2	0.3	S	0.9	0.5	0.3	0.2	0.3	0.7	1.0	1.3	1.3	0.6	0.7	0.4	0.1	0.2	0.3	0.1	0.2	0.4	P	0.2	0.1	1.3	0.5	23	
3	0.1	0.4	S	0.3	0.3	0.3	3.2	0.1	1.3	1.7	1.3	15.5	3.6	3.0	1.5	0.7	1.6	0.3	0.6	0.8	0.1	0.3	0.3	0.2	0.1	15.5	1.6	24	
4	0.1	S	0.4	0.2	0.3	0.3	0.2	0.3	3.6	0.4	0.7	0.4	0.6	0.4	0.3	0.8	1.7	0.1	0.6	0.4	0.4	0.2	0.2	0.4	0.1	3.6	0.6	24	
5	S	0.4	0.4	1.2	0.3	0.3	0.1	0.1	0.1	1.1	0.4	0.4	0.6	2.5	0.6	0.4	1.2	6.4	0.7	0.6	0.4	0.3	0.5	S	0.1	6.4	0.9	24	
6	0.6	0.4	0.3	0.3	0.4	0.3	0.4	0.6	0.4	1.3	0.7	0.9	5.6	0.7	2.1	1.9	6.1	0.9	0.4	0.9	0.2	0.3	S	0.6	0.2	6.1	1.1	24	
7	0.4	0.4	0.3	0.4	0.4	0.3	1.7	0.2	0.3	0.6	1.4	12.9	13.5	3.3	0.4	2.2	11.2	24.7	2.2	12.5	2.1	S	0.4	0.4	0.2	24.7	4.0	24	
8	0.1	0.4	0.4	0.2	0.4	0.2	1.8	2.3	0.4	0.6	0.7	0.4	8.9	1.5	17.0	21.5	1.2	0.4	0.4	0.4	S	0.6	0.6	0.6	0.1	21.5	2.7	24	
9	0.4	0.4	0.3	0.4	0.4	0.4	0.5	0.4	0.5	1.3	2.0	1.9	1.5	1.7	1.1	1.2	0.7	0.4	0.4	S	0.7	0.6	0.6	0.5	0.3	2.0	0.8	24	
10	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.9	1.9	2.0	1.5	1.5	1.0	1.5	1.0	0.3	0.6	S	0.6	0.8	0.6	0.3	0.3	0.3	2.0	0.8	24	
11	0.5	0.3	0.3	0.3	0.5	0.4	0.4	0.7	0.4	0.9	1.2	0.4	0.7	0.7	10.4	0.4	0.2	S	0.6	0.5	0.3	0.3	0.3	0.3	0.2	10.4	0.9	24	
12	0.6	0.2	0.0	0.4	0.6	0.4	0.4	0.7	0.6	0.4	0.4	0.4	1.0	1.6	0.4	0.2	S	0.3	0.6	0.4	0.3	0.1	0.3	0.3	0.0	1.6	0.5	24	
13	0.1	0.1	0.3	0.1	0.2	0.4	0.4	0.4	0.3	0.4	0.4	0.4	2.0	0.4	0.2	S	1.2	0.6	0.6	1.2	1.3	0.5	0.6	0.5	0.1	2.0	0.5	24	
14	0.3	0.7	0.5	0.2	0.4	0.5	0.8	1.2	1.5	28.8	3.9	0.9	1.1	1.1	S	1.8	1.3	1.8	0.6	0.6	0.6	0.7	0.7	0.5	0.2	28.8	2.2	24	
15	0.4	0.2	0.3	0.2	0.2	0.4	0.4	0.4	0.5	0.4	0.6	0.5	0.6	S	0.7	0.7	1.7	0.8	1.0	0.7	0.6	0.6	0.4	0.5	0.2	1.7	0.6	24	
16	0.4	0.5	0.7	0.2	0.4	0.5	0.4	0.9	0.5	0.5	0.7	0.9	S	1.2	0.5	1.2	0.6	1.2	1.4	0.6	0.6	1.8	1.5	0.4	0.2	1.8	0.8	24	
17	0.5	0.6	0.7	0.7	0.6	0.7	1.0	0.5	1.0	2.5	4.2	S	6.7	5.0	4.2	2.3	1.0	0.9	2.2	3.1	0.8	0.8	0.6	0.8	0.5	6.7	1.8	24	
18	0.8	0.5	0.7	0.6	0.7	0.6	0.6	0.5	0.6	0.6	S	1.1	0.9	0.7	0.5	0.4	0.5	0.7	0.4	0.3	0.5	0.1	0.3	0.3	0.1	1.1	0.6	24	
19	0.4	0.2	0.1	0.4	0.4	0.3	0.4	0.3	0.8	S	1.1	0.8	0.6	0.6	0.3	0.5	0.1	0.6	0.5	0.2	0.2	0.2	0.6	0.4	0.1	1.1	0.4	24	
20	0.3	0.4	0.3	0.3	0.5	0.4	0.4	0.6	S	2.6	2.3	3.8	11.0	1.7	2.4	13.1	13.4	16.2	0.6	0.6	0.4	0.8	0.6	0.5	0.3	16.2	3.2	24	
21	0.5	0.4	0.4	0.4	0.6	15.8	0.2	S	0.9	0.9	2.0	C	C	C	C	C	C	C	0.6	0.3	0.4	0.3	0.1	0.1	0.1	15.8	1.5	24	
22	0.4	0.1	0.0	0.2	0.3	0.2	S	0.9	0.2	0.9	2.1	10.7	1.9	2.6	1.3	0.8	1.3	0.1	0.1	0.1	0.1	0.2	0.4	0.1	0.0	10.7	1.1	24	
23	0.2	0.2	0.0	0.1	0.5	S	0.5	0.4	0.4	0.2	0.5	0.4	0.6	0.5	0.3	0.4	0.3	0.6	0.5	0.6	0.3	0.6	0.3	0.5	0.0	0.6	0.4	24	
24	0.2	0.2	0.2	0.2	S	0.4	0.5	0.2	0.5	0.4	0.5	0.5	0.7	0.8	0.6	0.5	0.2	0.3	0.2	0.3	0.3	0.5	0.3	0.2	0.2	0.8	0.4	24	
25	0.4	0.2	0.2	S	0.4	0.5	0.4	0.3	0.2	0.5	0.5	0.6	0.9	1.1	0.8	0.6	0.3	0.5	0.4	0.3	0.4	0.5	0.4	0.4	0.2	1.1	0.5	24	
26	0.2	0.2	S	0.5	0.4	0.4	0.4	0.2	0.4	0.8	1.8	2.1	2.7	2.6	2.6	1.2	1.1	0.8	0.3	0.4	0.6	0.3	0.5	0.2	0.2	2.7	0.9	24	
27	0.2	S	0.6	0.4	0.4	14.6	0.4	0.4	0.2	1.9	3.7	3.2	3.4	11.2	4.3	2.6	15.5	1.3	0.3	0.4	0.5	0.3	0.2	0.5	0.2	15.5	2.9	24	
28	S	0.6	0.4	0.4	0.2	0.2	0.4	0.9	0.7	2.7	0.5	0.4	0.6	10.8	0.3	0.6	0.4	0.6	0.4	0.6	0.3	0.2	0.2	S	0.2	10.8	1.0	24	
29	0.7	0.4	0.2	0.4	0.5	0.3	0.4	0.9	0.3	0.8	1.9	2.4	3.7	4.0	1.4	0.7	0.6	0.4	0.6	0.3	0.5	0.5	S	0.7	0.2	4.0	1.0	24	
30	0.7	0.5	0.5	0.3	0.5	0.4	0.9	0.5	0.4	10.4	2.1	14.2	1.4	1.3	1.4	0.8	1.7	1.6	0.5	0.3	0.4	S	0.6	0.2	0.2	14.2	1.8	24	
31	0.4	0.2	0.3	0.5	0.4	0.4	0.4	0.6	0.5	0.4	0.6	0.6	0.8	0.2	0.4	0.5	0.4	0.4	0.4	0.4	S	0.4	0.3	0.3	0.2	0.8	0.4	24	
HOURLY MAX	0.8	0.7	0.7	1.2	0.9	15.8	10.9	2.3	3.6	28.8	12.4	15.5	13.5	11.2	17.0	21.5	15.5	24.7	2.2	12.5	2.1	1.8	1.5	0.8					
HOURLY AVG	0.4	0.3	0.3	0.4	0.4	1.7	1.0	0.5	0.7	2.3	1.8	2.8	2.7	2.2	2.0	2.1	2.3	2.2	0.7	1.0	0.5	0.5	0.4	0.4					

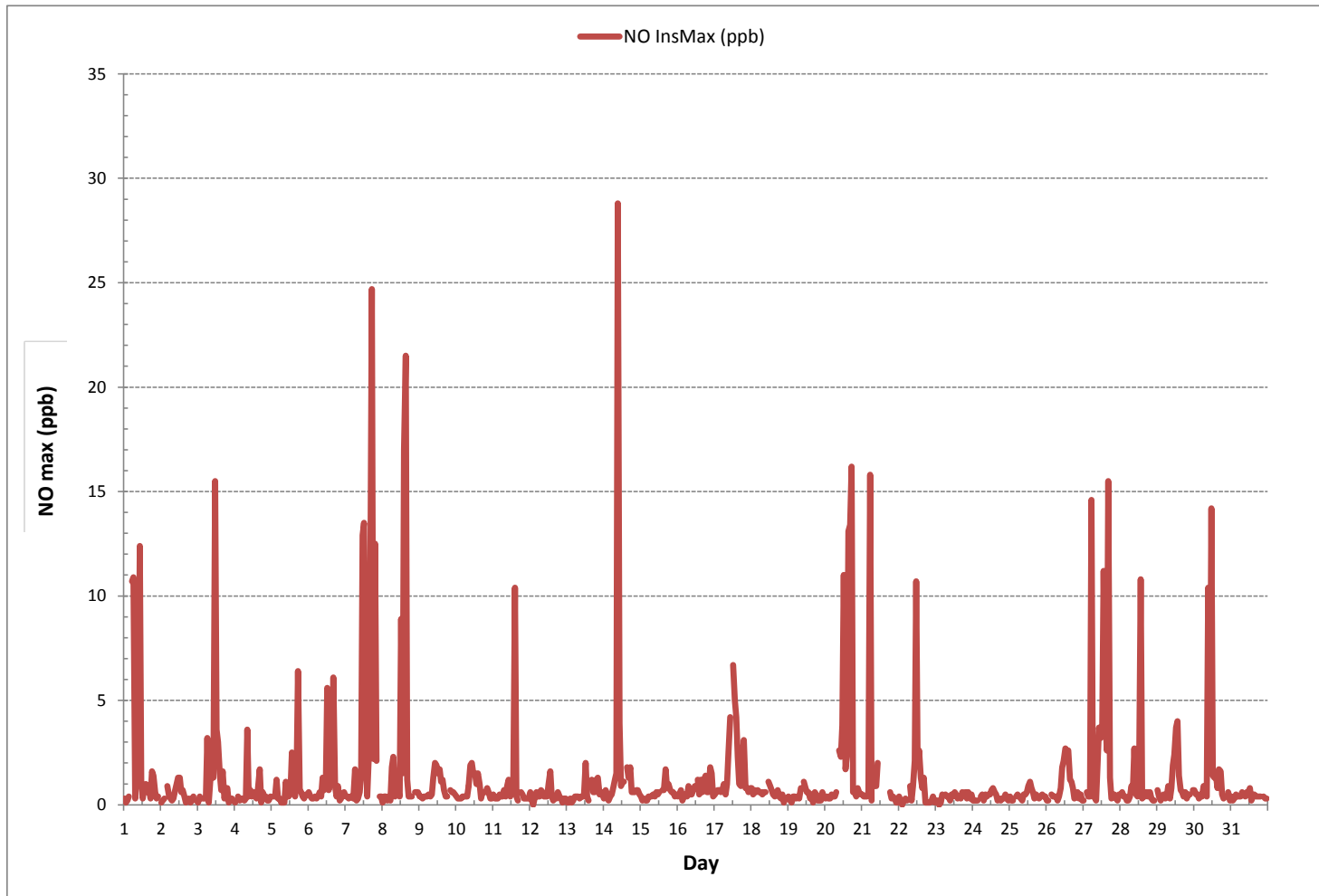
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	700
MAXIMUM INSTANTANEOUS VALUE:	28.8 ppb @ HOUR(S) 9 ON DAY(S) 14
	VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	2.8
OPERATIONAL TIME:	743 hrs

NITRIC OXIDE Instantaneous Maximum (NO ppb)



Wind: LICA ST. LINA Poll.: LICA ST. LINA-NO[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 0.00% Valid Data: 94.49% Calm Avg: 0.00 [ppb]

Direction	0.0-1.7	1.7-3.5	3.5-5.2	>5.2	Total
N	9.25	0.43	0.28	0	9.96
NE	11.66	0	0	0	11.66
E	12.52	0.14	0	0	12.66
SE	3.98	0	0	0	3.98
S	10.81	0	0	0	10.81
SW	17.92	0	0	0	17.92
W	8.25	0	0	0	8.25
NW	23.61	1.14	0	0	24.75
Summary	98	1.71	0.28	0	100

% Icon Classes (ppb)

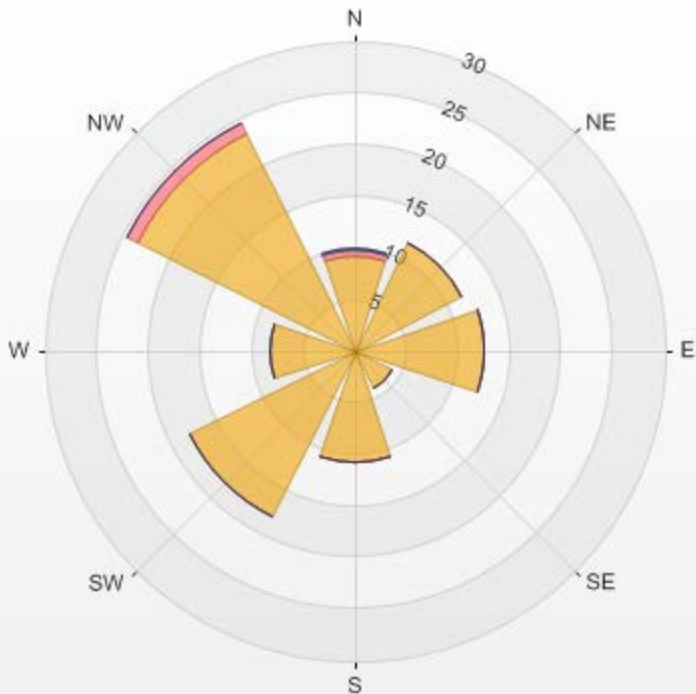
98 0.0-1.7

2 1.7-3.5

0 3.5-5.2

0 >5.2

LICA ST. LINA Poll.: LICA ST. LINA-NO[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 0.00%



***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	1.1	0.9	1.3	1.2	S	0.9	1.2	0.9	1.1	0.9	1.0	0.8	0.9	1.7	1.7	1.5	1.3	1.3	1.5	1.8	1.8	1.7	1.8	1.8	0.8	1.8	1.3	24	
2	2.0	2.2	2.4	S	3.3	3.6	3.4	3.9	4.3	4.6	4.1	6.3	3.3	2.6	2.6	2.6	2.3	2.0	1.8	1.5	1.4	1.4	1.4	1.4	1.4	1.4	6.3	2.8	24
3	1.2	1.2	S	1.6	1.9	2.0	2.2	2.2	2.5	3.0	3.5	4.2	4.9	5.5	4.2	3.3	3.0	2.1	2.4	2.7	3.6	4.4	2.4	1.3	1.2	5.5	2.8	24	
4	0.8	S	0.7	0.6	0.6	0.6	0.5	0.6	0.8	0.9	1.0	0.7	0.7	0.6	0.4	0.4	0.5	0.1	0.3	0.2	0.2	0.2	0.3	0.4	0.1	1.0	0.5	24	
5	S	0.4	0.1	0.2	0.2	0.2	0.3	0.2	0.3	0.5	0.2	0.2	0.3	0.6	0.5	0.7	0.7	0.8	0.5	0.5	0.5	0.6	0.7	S	0.1	0.8	0.4	24	
6	0.6	0.7	0.6	0.5	0.4	0.4	0.3	0.4	0.3	0.6	0.4	0.6	0.8	0.7	0.8	0.7	0.8	0.9	0.7	1.1	0.6	0.5	S	0.3	0.3	1.1	0.6	24	
7	0.2	0.2	0.1	0.1	0.1	0.1	0.5	0.4	0.4	0.5	0.9	0.8	1.1	1.0	0.5	1.3	1.5	1.5	1.3	2.0	1.4	S	0.4	0.2	0.1	2.0	0.7	24	
8	0.4	0.8	0.7	0.7	1.1	1.0	1.4	1.7	1.1	1.1	1.0	0.4	1.0	0.8	2.1	4.1	1.2	0.7	1.2	1.1	S	3.0	3.4	3.5	0.4	4.1	1.5	24	
9	4.3	5.6	4.6	2.7	4.9	4.4	3.4	5.5	7.7	5.2	4.5	2.9	2.1	2.6	2.8	4.3	11.8	12.4	8.1	S	6.7	5.8	5.0	5.8	2.1	12.4	5.4	24	
10	6.5	5.7	4.9	6.0	6.6	5.7	5.6	8.1	8.3	6.0	3.9	2.6	2.6	2.7	3.9	5.5	8.0	9.1	S	5.9	5.3	5.1	5.2	5.7	2.6	9.1	5.6	24	
11	4.0	3.3	3.8	3.6	2.5	1.8	1.4	1.9	2.4	2.2	1.7	1.0	0.9	0.7	0.6	0.2	0.2	S	0.6	0.6	0.4	0.4	0.5	0.3	0.2	4.0	1.5	24	
12	0.4	0.4	0.3	0.4	0.5	0.3	0.4	0.4	0.3	0.3	0.3	0.1	0.3	0.4	0.0	0.2	S	0.4	0.4	0.1	0.3	0.3	0.1	0.2	0.0	0.5	0.3	24	
13	0.2	0.0	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.3	0.1	0.2	0.1	0.0	S	0.5	0.4	0.4	0.7	0.8	0.4	0.3	0.5	0.0	0.8	0.3	24	
14	0.3	0.5	0.2	0.3	0.6	0.8	0.8	0.9	1.4	3.3	1.8	1.6	1.8	2.3	S	3.1	6.5	8.1	5.7	3.7	2.5	1.7	1.1	0.7	0.2	8.1	2.2	24	
15	0.6	0.4	0.4	0.3	0.1	0.3	0.3	0.4	0.4	0.3	0.3	0.2	0.4	S	0.3	0.6	0.4	0.8	0.9	0.8	0.8	1.0	1.3	1.5	0.1	1.5	0.6	24	
16	1.4	1.6	1.3	1.2	1.1	1.0	0.9	1.3	1.1	1.2	1.0	1.1	S	0.8	0.8	1.0	1.3	2.8	3.3	2.4	2.3	2.7	4.0	4.6	0.8	4.6	1.7	24	
17	6.2	6.7	7.0	7.3	8.0	8.0	8.3	8.4	8.6	7.5	6.3	S	6.0	6.1	6.7	8.5	9.9	9.9	11.0	11.7	12.2	11.7	11.4	11.5	6.0	12.2	8.6	24	
18	11.6	10.9	9.7	8.0	7.4	6.0	4.4	3.0	2.3	1.8	S	2.2	2.0	1.5	1.5	1.1	0.8	0.8	0.3	0.1	0.3	0.2	0.3	0.7	0.1	11.6	3.3	24	
19	0.6	0.5	0.4	0.9	2.1	1.9	2.2	1.5	2.4	S	3.4	3.4	0.5	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.0	3.4	0.9	24	
20	0.0	0.2	0.1	0.1	0.2	0.4	0.7	1.3	S	7.3	5.2	4.8	4.7	4.7	5.8	5.1	4.5	4.7	4.8	7.4	8.1	6.8	4.9	3.6	0.0	8.1	3.7	24	
21	3.8	4.7	3.6	3.2	2.6	2.2	1.6	S	4.0	4.7	4.3	C	C	C	C	C	C	C	3.0	2.6	2.2	1.9	1.5	1.1	1.1	4.7	2.9	24	
22	1.0	1.0	1.1	1.8	2.1	3.9	S	5.5	4.5	3.9	4.9	5.3	5.2	6.5	6.7	6.8	6.7	5.4	3.9	2.1	1.1	1.1	1.3	1.2	1.0	6.8	3.6	24	
23	1.0	0.7	0.7	0.6	0.9	S	1.3	1.9	1.3	0.8	1.5	1.4	1.6	0.7	0.9	1.2	1.8	1.1	1.1	0.8	0.8	1.0	0.8	1.1	0.6	1.9	1.1	24	
24	0.6	0.6	0.8	0.7	S	1.2	1.3	1.1	1.1	1.4	1.0	0.8	0.8	1.1	1.2	1.2	1.0	0.8	0.6	0.5	0.5	0.5	1.0	0.5	1.4	0.9	24		
25	0.7	0.6	0.5	S	0.6	1.1	1.4	1.2	0.6	0.7	0.8	0.9	0.9	1.5	1.8	1.7	1.3	1.6	1.6	1.2	1.8	2.4	2.4	2.6	0.5	2.6	1.3	24	
26	2.6	3.4	S	2.6	3.2	2.7	2.6	2.0	2.0	3.1	2.6	3.0	3.6	4.1	4.5	4.5	4.4	4.5	4.6	4.0	3.9	3.7	3.8	3.5	2.0	4.6	3.4	24	
27	4.1	S	3.7	3.5	3.5	4.1	4.1	4.4	4.7	5.4	5.0	5.3	5.9	6.3	6.5	8.1	9.4	8.0	6.6	3.9	3.9	4.0	3.2	1.7	1.7	9.4	5.0	24	
28	S	1.5	1.1	0.7	0.5	0.5	0.3	0.5	0.4	0.4	0.2	0.0	0.0	0.3	0.2	0.3	0.1	0.5	0.5	0.5	0.5	0.7	0.7	S	0.0	1.5	0.5	24	
29	0.7	0.8	0.9	0.8	0.7	0.7	0.7	1.2	1.3	2.4	4.8	5.3	7.3	8.0	5.0	5.6	5.1	4.9	8.1	7.5	8.5	8.3	S	14.2	0.7	14.2	4.5	24	
30	11.2	12.6	8.9	5.3	5.1	5.2	5.8	4.7	4.8	5.2	4.5	3.5	2.7	2.9	3.0	3.7	3.6	3.5	3.3	2.2	2.0	S	1.2	0.9	0.9	12.6	4.6	24	
31	0.7	0.3	0.2	0.4	0.3	0.2	0.4	0.4	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.2	0.0	0.0	0.0	0.0	0.7	0.1	24
HOURLY MAX	11.6	12.6	9.7	8.0	8.0	8.0	8.3	8.4	8.6	7.5	6.3	6.3	7.3	8.0	6.7	8.5	11.8	12.4	11.0	11.7	12.2	11.7	11.4	14.2					
HOURLY AVG	2.4	2.4	2.1	1.9	2.1	2.0	1.9	2.2	2.4	2.5	2.3	2.1	2.2	2.3	2.2	2.7	3.1	3.1	2.6	2.3	2.6	2.5	2.1	2.5					

**STATUS FLAG CODES**

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

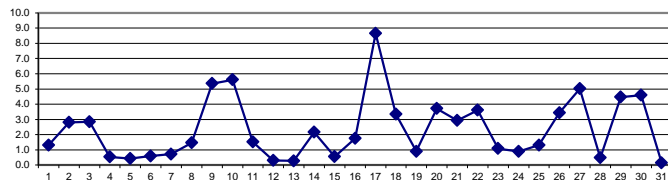
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

**MONTHLY SUMMARY**

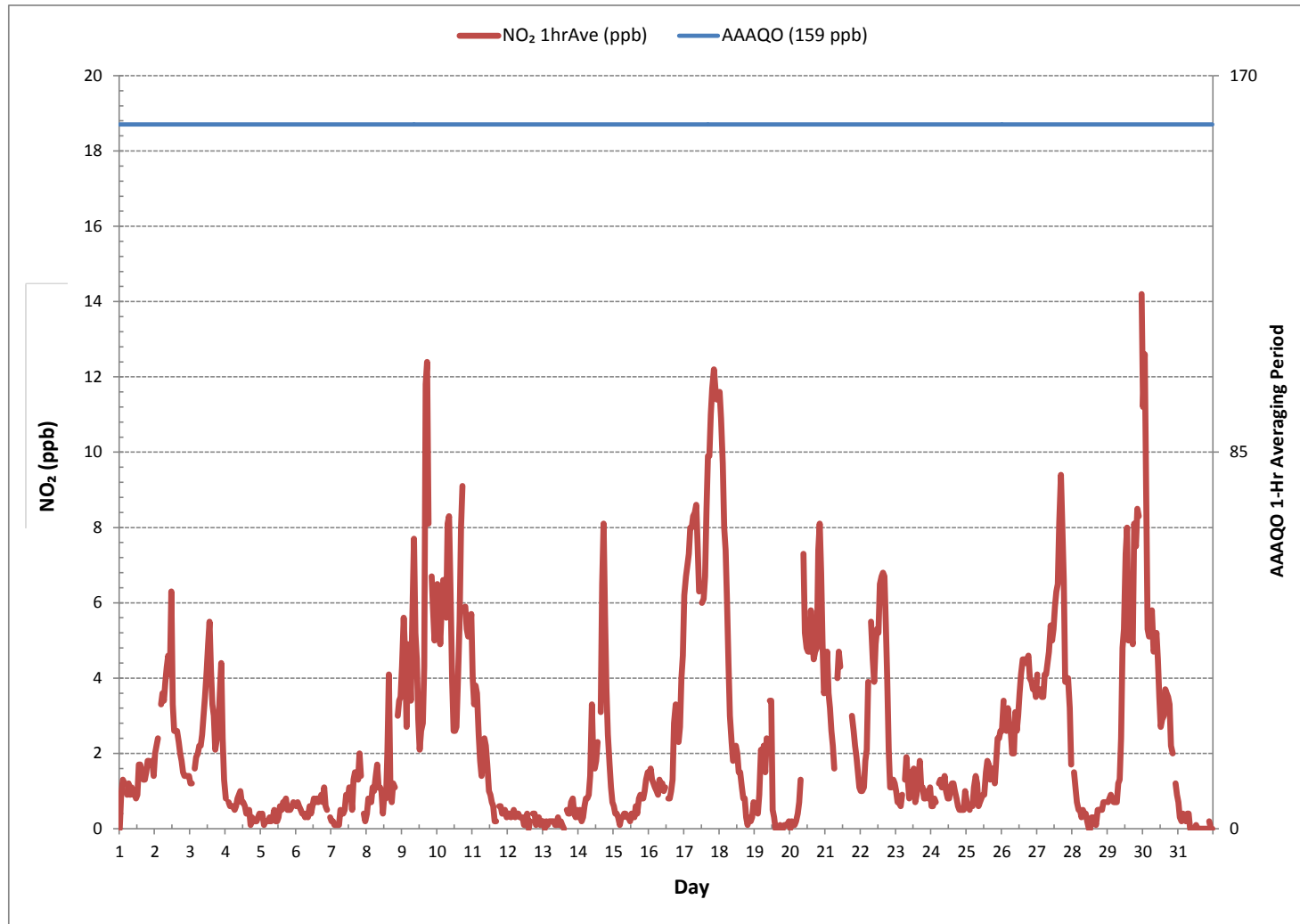
NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	680				
MINIMUM 1-HR AVERAGE:	0.0	ppb	@ HOUR(S)	VAR	ON DAY(S)
MAXIMUM 1-HR AVERAGE:	14.2	ppb	@ HOUR(S)	23	29
MAXIMUM 24-HR AVERAGE:	8.6	ppb			17
					VAR-VARIOUS
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	744	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	2.6		MONTHLY AVERAGE:	2.3	ppb

**24 HR AVERAGES December 2016**





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





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

**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	0.9	0.9	0.9	0.9	S	4.3	9.0	0.9	1.6	1.3	8.0	1.3	1.1	1.7	2.0	1.7	1.6	1.7	1.9	2.8	2.3	1.9	2.1	2.1	0.9	9.0	2.3	24	
2	2.3	2.6	2.7	S	3.9	3.9	3.6	4.1	4.7	5.0	5.2	7.4	5.0	3.1	3.1	3.1	2.9	2.6	2.2	2.2	1.7	2.0	P	2.0	1.7	7.4	3.4	23	
3	2.0	1.7	S	2.2	2.2	2.2	2.6	2.7	2.9	3.4	3.9	13.9	5.8	6.1	4.9	3.7	3.2	2.6	2.5	3.6	4.1	4.7	3.6	1.5	1.5	13.9	3.7	24	
4	0.9	S	0.6	0.6	0.5	0.6	0.6	0.7	7.6	0.9	0.7	0.6	0.4	0.4	0.2	0.2	0.3	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	7.6	0.7	24
5	S	0.1	0.0	0.4	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	3.7	0.2	0.4	0.4	8.4	0.2	0.2	0.1	0.2	0.3	S	0.0	8.4	0.7	24	
6	0.4	0.4	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.9	0.1	0.5	12.5	1.2	1.1	1.0	4.5	0.7	0.4	1.8	0.7	0.6	S	0.1	0.0	12.5	1.2	24	
7	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.3	0.3	0.5	1.3	3.0	15.0	4.3	0.5	4.2	12.7	18.8	2.5	13.8	2.6	S	0.2	0.0	0.0	18.8	3.5	24	
8	0.5	0.8	0.6	0.7	0.8	1.1	1.6	4.1	1.0	1.3	1.4	0.3	6.4	0.6	21.1	28.4	3.3	0.9	1.4	1.0	S	3.0	3.2	3.7	0.3	28.4	3.8	24	
9	4.7	5.5	5.1	3.3	5.4	4.3	4.0	7.6	8.3	6.5	4.9	3.5	2.2	2.6	3.6	5.9	14.6	14.5	9.4	S	7.2	6.0	5.4	6.6	2.2	14.6	6.1	24	
10	6.9	6.3	5.3	6.9	6.7	6.1	6.4	9.4	9.3	7.5	5.1	2.9	2.7	3.2	5.5	5.8	10.1	10.0	S	6.1	5.4	5.6	5.6	5.7	2.7	10.1	6.3	24	
11	5.3	3.6	3.9	4.2	2.8	2.2	1.6	2.0	2.4	2.4	2.2	1.0	0.9	0.7	6.7	0.4	2.0	S	0.7	0.6	0.4	0.4	0.4	0.3	0.3	6.7	2.0	24	
12	0.4	0.3	0.3	0.2	0.2	0.3	0.1	0.2	0.2	0.0	0.1	0.0	0.1	0.6	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	24
13	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	S	0.0	0.0	0.5	2.0	0.4	0.1	0.0	0.1	0.0	2.0	0.2	24	
14	0.2	0.1	0.0	0.1	0.4	0.7	1.0	1.2	1.8	26.3	6.1	1.3	1.6	2.3	S	3.3	9.1	10.4	6.0	4.2	3.0	1.3	1.1	0.6	0.0	26.3	3.6	24	
15	0.3	0.4	0.1	0.1	0.1	0.1	0.1	0.3	0.0	0.0	0.1	0.2	0.2	S	0.0	0.7	0.4	1.2	0.7	0.5	0.4	0.8	0.9	1.0	0.0	1.2	0.4	24	
16	1.0	0.9	0.7	0.6	0.6	0.6	0.2	0.9	0.4	0.4	0.6	0.4	S	0.2	0.4	1.8	1.5	3.6	5.3	3.5	2.1	2.6	4.1	5.0	0.2	5.3	1.6	24	
17	6.5	6.9	7.2	7.5	8.5	8.3	8.8	8.8	8.9	8.0	7.2	S	6.7	6.3	7.5	9.8	10.4	10.4	11.9	12.7	12.3	12.0	11.7	11.7	6.3	12.7	9.1	24	
18	12.0	11.2	10.5	9.0	8.0	6.9	5.6	3.7	3.2	2.4	S	2.6	2.6	1.7	1.8	1.7	1.2	1.2	0.6	0.3	0.4	0.5	0.6	0.6	0.3	12.0	3.8	24	
19	0.4	0.5	0.5	1.7	1.9	1.7	2.0	1.4	3.0	S	4.2	4.3	0.9	0.4	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.0	4.3	1.0	24	
20	0.2	0.3	0.1	0.2	0.2	0.8	0.7	2.0	S	8.8	6.1	10.2	12.9	4.6	8.5	19.0	14.3	22.7	5.3	7.8	8.1	7.6	5.2	3.7	0.1	22.7	6.5	24	
21	4.3	5.1	3.7	3.5	2.6	5.9	2.2	S	4.5	4.5	4.7	C	C	C	C	C	C	C	3.6	3.3	3.9	2.6	2.4	2.0	2.0	5.9	3.7	24	
22	1.8	1.6	2.1	2.6	3.1	5.4	S	6.5	5.5	5.0	6.1	11.7	6.1	7.8	7.4	8.6	8.9	7.9	4.9	3.4	1.7	1.7	2.0	1.8	1.6	11.7	4.9	24	
23	1.7	1.4	1.5	1.6	1.6	S	1.9	2.7	2.2	1.4	3.4	3.2	2.5	1.4	1.6	2.3	2.4	1.7	1.5	1.2	1.3	1.7	1.5	1.5	1.2	3.4	1.9	24	
24	1.3	0.9	1.1	1.0	S	1.9	1.7	1.6	1.5	1.8	1.7	0.9	1.1	1.4	1.7	1.5	1.5	1.1	1.1	1.1	1.1	1.0	1.1	1.7	1.8	0.9	1.9	1.4	24
25	1.5	1.0	1.0	S	1.2	2.0	2.0	1.7	1.3	1.3	1.2	1.2	1.5	2.4	2.3	2.3	2.1	2.6	2.4	2.1	3.0	3.2	3.4	3.5	1.0	3.5	2.0	24	
26	4.0	5.1	S	3.5	4.3	4.2	3.7	3.2	3.5	3.9	3.2	3.8	4.3	4.8	5.3	5.3	5.4	5.6	5.7	5.0	4.7	4.6	4.6	4.5	3.2	5.7	4.4	24	
27	5.0	S	4.5	4.1	4.2	11.5	4.9	5.2	5.5	18.6	5.7	7.4	6.7	11.7	7.6	10.8	17.0	9.3	8.1	6.0	4.9	5.2	4.3	3.2	3.2	18.6	7.5	24	
28	S	2.0	1.6	1.6	1.4	1.3	1.1	1.3	1.6	3.8	1.1	0.9	0.8	10.5	0.9	1.2	0.9	1.2	1.2	1.1	1.1	1.1	1.1	S	0.8	10.5	1.8	24	
29	1.1	1.3	1.5	1.4	1.5	1.3	1.3	1.7	2.0	3.7	5.5	6.1	9.4	10.1	5.5	6.6	6.2	6.0	12.4	9.2	10.0	9.8	S	16.5	1.1	16.5	5.7	24	
30	12.1	14.2	13.9	6.5	6.1	7.2	7.3	5.8	6.1	16.7	5.4	8.5	3.3	3.4	10.1	4.4	4.4	4.8	4.1	3.0	2.6	S	1.8	1.8	1.8	16.7	6.7	24	
31	1.4	1.3	1.1	1.1	1.1	1.0	1.2	1.5	0.7	0.8	1.0	0.9	1.2	0.8	0.7	0.8	0.9	0.8	0.6	0.9	S	0.5	0.6	0.6	0.5	1.5	0.9	24	
HOURLY MAX	12.1	14.2	13.9	9.0	8.5	11.5	9.0	9.4	9.3	26.3	8.0	13.9	15.0	11.7	21.1	28.4	17.0	22.7	12.4	13.8	12.3	12.0	11.7	16.5					
HOURLY AVG	2.7	2.6	2.4	2.3	2.4	2.9	2.6	2.7	3.0	4.6	3.2	3.4	4.0	3.4	3.8	4.7	4.9	5.2	3.2	3.3	3.0	2.8	2.4	2.8					

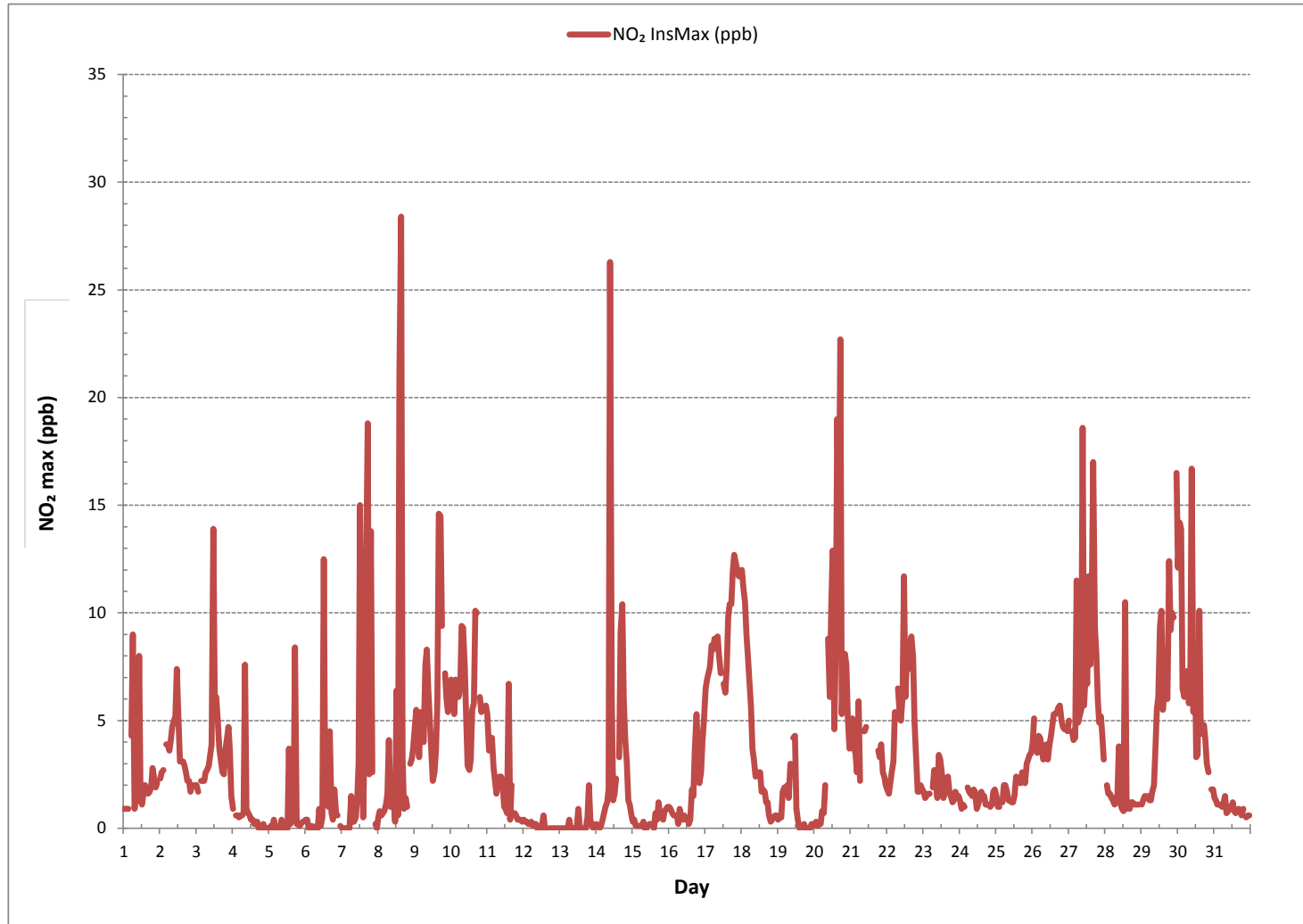
**STATUS FLAG CODES**

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

**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	640
MAXIMUM INSTANTANEOUS VALUE:	28.4 ppb @ HOUR(S) 15 ON DAY(S) 8
VAR-VARIOUS	
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	3.8
OPERATIONAL TIME:	743 hrs

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

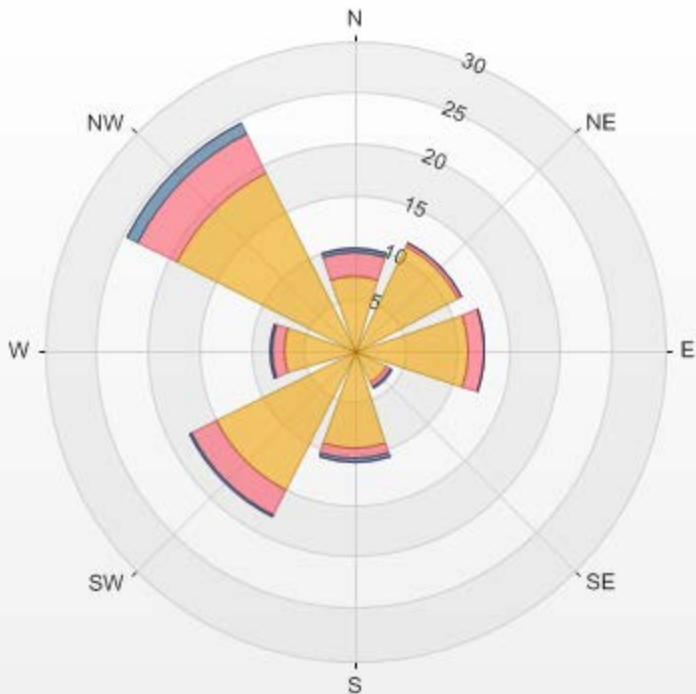


Wind: LICA ST. LINA Poll.: LICA ST. LINA-NO2[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 0.00% Valid Data: 94.49% Calm Avg: 0.00 [ppb]

Direction	0.0-4.8	4.8-9.5	9.5-14.3	>14.3	Total
N	7.25	2.28	0.43	0	9.96
NE	11.24	0.43	0	0	11.67
E	10.95	1.71	0	0	12.66
SE	3.56	0.28	0.14	0	3.98
S	9.53	1	0.28	0	10.81
SW	15.08	2.7	0.14	0	17.92
W	6.83	1.28	0.14	0	8.25
NW	19.2	4.41	1.14	0	24.75
Summary	83.64	14.09	2.27	0	100

% Icon Classes (ppb) 84 0.0-4.8 14 4.8-9.5 2 9.5-14.3 0 >14.3

LICA ST. LINA Poll.: LICA ST. LINA-NO2[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 0.00%



NO2[ppb] Calibration: LICA ST. LINA Monthly: 2016/12 Type: Span



Span Meas Span Ref Span Low Span High

# ***OZONE***

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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.			
DAY																														
1	27.4	26.9	26.1	25.8	S	25.6	24.8	24.9	24.6	25.0	24.7	24.6	23.3	21.1	20.9	21.4	21.2	21.2	20.8	20.0	19.1	19.0	18.5	18.1	18.1	27.4	22.8	24		
2	17.2	16.8	15.8	S	13.6	13.3	13.9	13.3	13.0	12.2	15.0	15.8	22.2	24.1	23.4	22.4	22.7	21.8	21.1	20.6	19.5	18.9	18.9	18.6	12.2	24.1	18.0	24		
3	18.4	18.1	S	17.2	16.7	16.4	15.8	15.0	14.2	13.8	13.3	13.4	12.9	15.1	21.3	24.9	26.5	28.6	28.4	27.5	25.3	23.2	27.5	29.7	12.9	29.7	20.1	24		
4	31.1	S	33.7	33.4	33.2	33.1	33.2	32.7	32.1	32.1	32.5	33.0	29.4	21.3	17.1	16.8	18.2	20.2	21.7	22.8	23.7	25.0	25.7	26.2	16.8	33.7	27.3	24		
5	S	27.8	28.3	28.6	28.9	29.1	29.1	29.0	28.9	28.8	29.5	29.7	29.8	29.4	30.0	29.8	29.8	29.8	30.0	30.3	30.6	30.7	30.5	S	27.8	30.7	29.5	24		
6	30.4	30.8	30.9	30.8	30.9	30.7	30.6	30.5	30.3	30.2	30.1	30.0	30.0	30.1	29.8	29.7	29.6	29.3	29.0	28.6	28.7	28.6	S	29.1	28.6	30.9	29.9	24		
7	29.1	29.0	28.9	28.6	28.4	28.2	27.9	27.6	27.4	27.5	27.5	27.9	28.1	28.1	28.4	28.3	27.4	26.7	26.9	26.3	26.2	S	28.0	27.8	26.2	29.1	27.8	24		
8	26.8	25.7	25.4	25.4	25.5	26.5	24.5	23.8	25.0	27.4	28.7	30.1	30.9	30.3	29.3	27.6	28.2	28.2	27.5	27.0	S	24.7	24.2	25.1	23.8	30.9	26.9	24		
9	23.4	22.6	24.8	27.1	23.5	24.3	24.7	21.5	18.9	22.8	22.8	26.3	27.6	27.6	26.2	24.1	15.7	14.9	18.7	S	20.1	21.4	22.4	20.6	14.9	27.6	22.7	24		
10	19.6	20.4	21.5	20.0	19.5	20.9	20.7	13.6	14.5	18.4	22.5	25.3	25.7	25.6	23.8	21.6	16.7	15.0	S	19.0	19.4	19.1	18.3	17.5	13.6	25.7	19.9	24		
11	20.4	19.8	18.1	15.9	17.9	20.0	21.2	20.2	18.8	18.6	21.8	27.0	28.1	30.1	31.9	32.2	31.4	S	31.4	31.8	32.0	32.3	32.1	32.8	15.9	32.8	25.5	24		
12	33.0	33.3	33.9	33.9	33.9	34.5	34.9	35.0	34.7	34.9	35.0	34.4	34.5	34.7	35.0	35.4	S	35.4	35.5	35.9	35.8	35.5	35.6	35.4	33.0	35.9	34.8	24		
13	34.8	34.8	34.6	34.7	34.6	34.3	34.1	33.8	34.1	34.5	34.5	34.6	34.4	34.4	34.4	S	33.8	33.4	32.8	32.0	31.9	31.8	31.8	31.9	31.8	34.8	33.7	24		
14	32.3	32.3	32.6	32.2	31.6	31.2	31.2	30.7	29.2	26.1	28.8	30.8	31.5	31.9	S	32.6	27.7	25.3	26.3	28.6	31.4	33.1	34.2	34.9	25.3	34.9	30.7	24		
15	35.1	34.7	35.4	35.4	35.1	34.5	34.4	34.4	34.3	33.9	33.4	33.4	33.1	S	33.1	32.2	31.8	31.3	31.1	30.9	30.6	29.9	29.4	29.3	29.3	35.4	32.9	24		
16	29.0	28.6	28.8	28.8	28.5	28.5	28.8	28.1	28.5	28.6	28.7	28.6	S	18.9	19.0	18.8	17.1	15.0	14.2	11.9	10.1	9.8	10.4	11.0	11.3	9.8	19.7	15.6	24	
17	19.7	18.8	18.3	18.0	16.8	16.4	16.1	15.8	15.8	17.2	19.2	S	18.9	19.0	18.8	17.1	15.0	14.2	11.9	10.1	9.8	10.4	11.0	11.3	9.8	19.7	15.6	24		
18	12.0	14.0	17.1	19.5	20.7	25.2	28.8	30.4	32.2	33.5	S	33.9	34.3	35.2	35.6	36.6	36.9	36.9	37.3	37.3	36.8	36.2	35.6	35.7	12.0	37.3	30.5	24		
19	36.8	36.7	36.0	34.8	33.1	33.8	34.6	37.6	35.5	S	33.8	34.9	38.6	38.9	39.0	S	38.9	39.0	39.0	39.0	39.0	38.4	37.9	37.9	37.2	36.5	33.1	39.0	36.9	24
20	36.3	35.8	35.6	35.6	35.1	34.1	33.6	32.4	S	25.7	28.9	30.2	30.6	C	C	C	C	C	C	27.3	25.7	24.6	26.1	28.4	29.2	24.6	36.3	30.8	24	
21	28.0	24.8	27.4	28.3	29.6	29.9	30.6	S	27.8	28.0	29.7	29.0	27.3	27.8	28.7	Q	28.8	32.0	34.5	34.7	34.1	33.8	33.8	34.3	24.8	34.7	30.1	24		
22	34.5	33.9	33.5	33.0	32.6	30.4	S	28.1	28.2	29.1	28.4	28.5	28.9	26.7	26.9	29.2	28.2	28.9	29.0	32.6	34.2	33.5	32.2	31.5	26.7	34.5	30.5	24		
23	31.3	31.5	31.3	31.0	28.8	S	25.1	23.3	25.6	28.3	26.8	28.3	27.9	30.1	29.2	28.2	26.7	25.9	24.8	26.1	28.0	28.0	28.0	27.2	23.3	31.5	27.9	24		
24	28.0	27.2	24.8	24.1	S	21.3	21.2	21.4	21.7	21.5	22.2	22.5	22.3	22.4	22.4	22.5	23.2	23.2	23.2	23.7	24.2	25.1	25.8	25.1	21.2	28.0	23.4	24		
25	25.3	25.8	26.2	S	26.8	26.4	26.4	26.8	27.2	26.9	26.8	26.7	26.6	26.0	25.7	25.8	25.9	25.6	25.4	26.1	25.1	24.2	23.2	22.7	22.7	27.2	25.8	24		
26	22.3	20.9	S	21.7	21.1	21.3	21.1	21.5	21.1	20.2	20.6	20.1	19.5	19.3	19.4	19.9	19.9	20.0	20.0	21.0	21.9	22.0	22.5	22.7	19.3	22.7	20.9	24		
27	22.0	S	22.2	22.4	22.3	21.8	20.9	19.9	19.3	19.0	19.0	19.6	20.0	20.5	20.5	20.6	20.9	22.7	24.2	27.7	27.7	27.1	28.0	30.4	19.0	30.4	22.6	24		
28	S	31.7	32.3	32.7	33.0	32.9	33.4	33.4	33.6	33.3	33.5	33.3	33.3	34.1	34.4	34.6	34.9	34.2	33.3	33.5	32.9	32.7	33.3	S	31.7	34.9	33.4	24		
29	34.5	34.4	34.0	33.9	33.6	33.6	33.3	33.0	32.5	31.0	28.1	27.8	26.0	25.7	28.7	28.4	30.1	28.1	23.3	23.4	21.4	22.2	S	14.5	14.5	34.5	28.8	24		
30	17.0	15.7	19.4	22.1	21.4	21.2	19.8	21.2	20.7	20.9	21.4	24.9	26.5	27.8	30.4	30.0	30.3	29.6	29.3	30.1	29.9	S	31.7	31.3	15.7	31.7	24.9	24		
31	31.9	32.9	33.6	33.1	33.0	33.1	32.5	33.2	35.2	35.9	35.1	36.0	35.2	34.7	34.1	33.6	32.8	31.9	32.9	33.1	S	34.2	34.5	34.4	31.9	36.0	33.8	24		
HOURLY MAX	36.8	36.7	36.0	35.6	35.1	34.5	34.9	37.6	35.5	35.9	35.1	36.0	38.6	38.9	39.0	38.9	39.0	39.0	39.0	38.4	37.9	37.9	37.2	36.5						
HOURLY AVG	27.2	27.1	27.9	27.9	27.2	27.1	26.9	26.4	26.2	26.2	26.7	28.0	27.9	27.6	27.9	27.6	27.0	26.9	27.4	27.7	27.2	27.3	27.8	27.1						

**STATUS FLAG CODES**

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

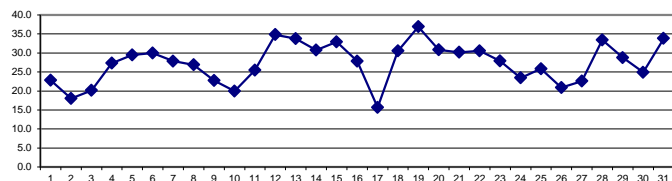
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 82 ppb

**MONTHLY SUMMARY**

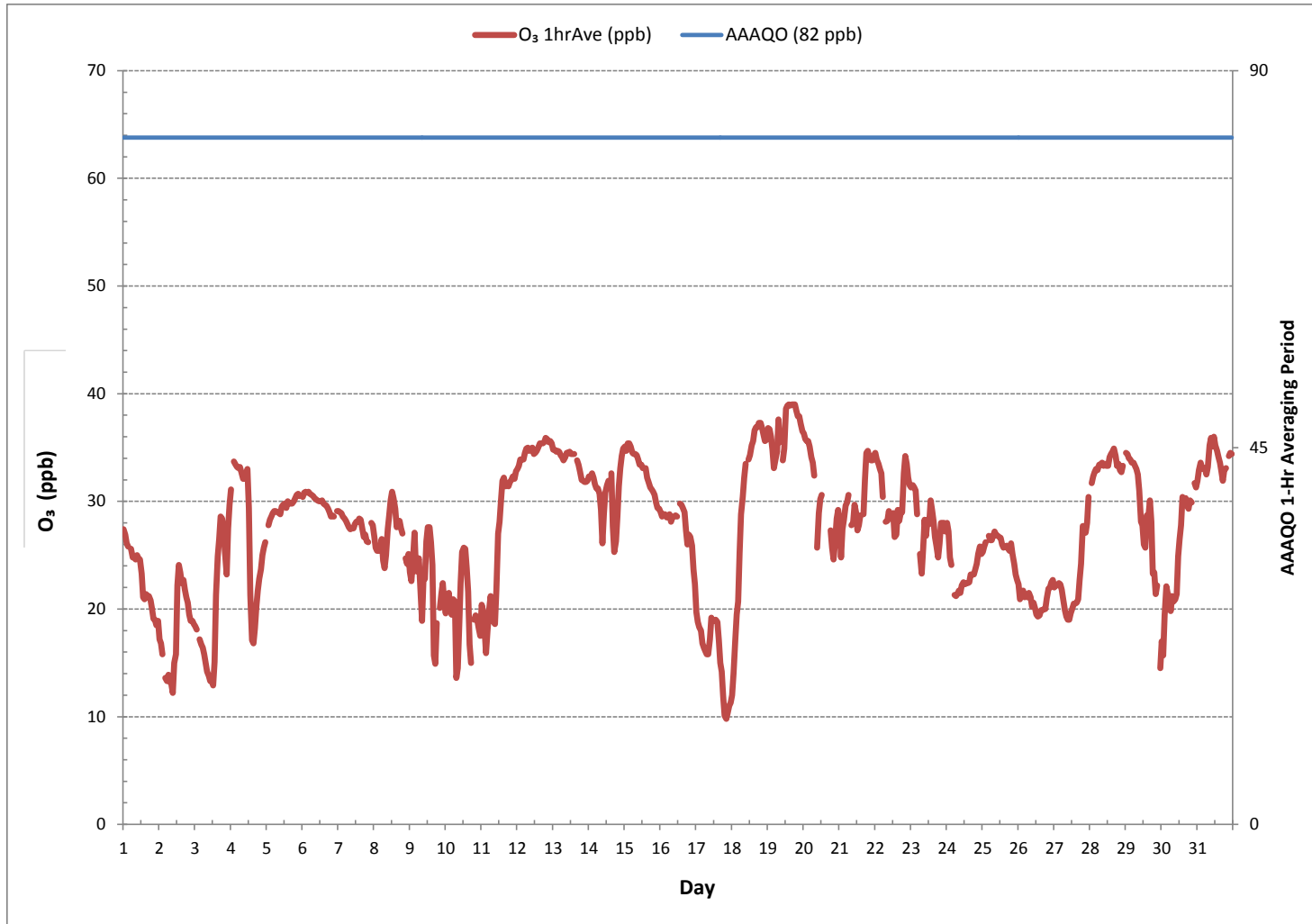
NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	705				
MINIMUM 1-HR AVERAGE:	9.8 ppb	@ HOUR(S)	20	ON DAY(S)	17
MAXIMUM 1-HR AVERAGE:	39.0 ppb	@ HOUR(S)	VAR	ON DAY(S)	19
MAXIMUM 24-HR AVERAGE:	36.9 ppb			ON DAY(S)	19
				VAR-VARIOUS	
IZS CALIBRATION TIME:	33 hrs	OPERATIONAL TIME:	744 hrs		
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0 %		
STANDARD DEVIATION:	6.2	MONTHLY AVERAGE:	27.3 ppb		

**24 HR AVERAGES December 2016**





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





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

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	28.9	28.5	27.6	27.0	S	27.0	26.2	26.2	25.7	26.1	26.1	25.6	24.8	22.9	22.1	22.3	22.1	21.8	21.9	20.9	19.7	19.6	19.1	18.6	18.6	28.9	23.9	24
2	17.9	17.4	16.4	S	15.2	13.9	14.2	14.1	13.6	13.3	17.3	17.4	24.4	25.1	25.1	23.1	23.5	22.9	21.7	21.3	20.6	19.5	P	19.2	13.3	25.1	19.0	23
3	19.1	18.8	S	18.0	17.5	17.4	17.0	16.1	15.2	15.0	14.6	14.7	14.3	18.7	23.9	27.0	28.6	30.1	29.8	29.3	27.8	25.5	30.6	32.2	14.3	32.2	21.8	24
4	33.4	S	35.4	35.0	34.7	34.6	34.9	34.4	33.6	33.6	34.3	34.8	32.9	29.3	18.6	18.3	21.4	22.1	23.2	24.7	26.2	26.8	27.4	27.8	18.3	35.4	29.5	24
5	S	29.4	29.8	30.1	30.4	30.5	30.6	30.5	30.4	30.5	31.0	31.3	31.4	30.9	31.7	31.7	31.3	31.4	31.5	32.1	32.2	32.4	32.1	S	29.4	32.4	31.1	24
6	32.1	32.6	32.6	32.5	32.4	32.3	32.1	32.1	31.8	31.8	31.7	31.5	31.7	31.5	33.0	31.3	31.2	30.8	30.5	30.1	30.1	30.1	S	30.5	30.1	33.0	31.6	24
7	30.5	30.4	30.3	30.1	29.8	29.6	29.6	29.2	28.9	29.2	29.2	29.6	29.8	29.8	30.1	30.3	29.7	28.8	28.9	28.4	28.4	S	29.5	29.3	28.4	30.5	29.5	24
8	29.1	27.3	27.2	27.2	27.2	28.9	27.2	26.1	28.2	29.2	30.8	32.2	32.4	32.2	31.3	30.6	30.0	29.7	29.2	28.5	S	26.9	26.2	27.0	26.1	32.4	28.9	24
9	25.2	24.0	27.7	28.9	27.6	26.0	26.1	25.6	21.9	25.6	26.0	28.6	29.1	28.5	25.5	22.5	18.1	20.2	S	21.4	22.6	23.5	22.3	18.1	29.1	25.0	24	
10	20.5	21.5	22.6	21.9	20.7	23.0	23.1	17.4	16.9	20.2	25.1	26.6	26.4	26.5	25.5	23.0	21.5	17.3	S	19.9	20.5	19.9	19.7	19.1	16.9	26.6	21.7	24
11	21.8	21.1	19.7	18.2	19.4	22.1	22.3	21.8	20.5	20.1	27.7	28.4	30.5	32.5	33.5	33.6	33.2	S	32.9	33.2	33.5	34.2	33.8	34.3	18.2	34.3	27.3	24
12	34.4	34.8	35.6	35.8	35.6	36.2	36.6	36.7	36.5	36.7	37.0	36.2	36.3	36.7	36.9	37.2	S	37.2	37.5	37.7	37.7	37.3	37.3	37.3	34.4	37.7	36.6	24
13	36.6	36.6	36.3	36.3	36.3	36.1	36.0	35.6	36.0	36.2	36.1	36.3	36.2	36.1	36.1	S	35.7	35.2	34.7	34.3	33.8	33.8	33.5	33.9	33.5	36.6	35.6	24
14	34.2	34.0	34.3	33.9	33.4	33.0	32.6	32.2	28.9	31.8	32.9	33.5	33.8	S	34.6	33.2	28.4	29.1	30.9	34.1	34.8	36.5	36.7	28.4	36.7	33.0	24	
15	36.9	36.5	37.0	37.0	36.7	36.3	36.1	36.1	36.0	35.7	35.1	35.0	34.8	S	35.0	34.0	33.5	32.9	32.9	32.5	32.1	31.6	30.8	30.8	30.8	37.0	34.6	24
16	30.5	30.0	30.4	30.4	30.1	30.1	30.3	29.7	30.0	30.1	30.1	30.1	S	31.2	31.2	30.9	30.5	30.0	27.8	28.2	28.0	27.2	26.2	24.2	24.2	31.2	29.4	24
17	21.9	20.1	19.4	19.5	17.9	17.3	16.9	16.5	16.9	18.3	20.3	S	20.1	19.7	20.3	18.8	16.4	15.3	13.6	11.8	11.2	11.8	12.0	12.6	11.2	21.9	16.9	24
18	13.8	16.1	19.6	21.4	22.5	28.8	31.3	32.1	34.4	35.1	S	35.4	36.2	37.0	37.5	38.3	38.5	38.8	39.0	39.0	38.4	38.1	37.6	38.0	13.8	39.0	32.5	24
19	38.5	38.8	38.0	37.9	35.8	35.7	37.9	39.9	39.6	S	36.5	38.8	40.6	40.6	41.1	41.1	40.8	40.7	40.8	40.2	39.6	39.4	39.4	38.2	35.7	41.1	39.1	24
20	38.1	37.5	37.2	37.0	36.9	35.8	35.2	34.4	S	28.5	31.5	32.1	C	C	C	C	C	C	29.2	27.8	26.1	28.9	32.2	32.4	26.1	38.1	33.0	24
21	30.9	27.7	29.5	30.8	31.4	31.9	32.9	S	30.4	31.0	31.7	31.0	30.5	30.0	Q	Q	31.6	35.3	36.6	36.5	36.0	35.4	35.5	36.2	27.7	36.6	32.5	24
22	36.2	35.7	35.3	34.8	34.4	33.1	S	30.0	30.5	30.9	30.5	30.5	31.4	29.2	29.6	32.1	32.1	32.5	31.9	35.8	36.1	35.2	34.6	33.1	29.2	36.2	32.8	24
23	33.0	33.2	33.0	33.0	31.2	S	27.7	25.5	29.7	30.5	28.9	30.8	30.6	33.0	32.9	30.8	28.5	28.4	26.4	28.4	29.7	29.6	29.4	28.8	25.5	33.2	30.1	24
24	29.3	29.1	26.8	25.5	S	22.9	22.7	22.7	23.2	23.1	23.8	23.8	23.8	23.9	23.9	24.3	24.7	24.7	24.7	25.5	25.8	27.3	27.6	27.1	22.7	29.3	25.1	24
25	27.0	27.6	28.0	S	28.5	28.4	28.4	28.8	28.9	28.5	28.2	28.2	28.1	28.0	27.2	27.4	27.3	27.0	27.1	27.4	26.9	25.6	24.8	24.2	24.2	28.9	27.5	24
26	24.0	22.9	S	23.2	22.6	22.9	22.6	22.7	22.7	21.5	21.9	21.4	21.0	20.6	20.6	21.4	21.4	21.5	22.5	23.2	23.2	23.9	23.9	20.6	24.0	22.3	24	
27	23.2	S	23.5	23.8	23.7	23.4	22.5	21.7	20.8	20.6	20.7	21.1	21.9	22.2	22.3	22.9	23.8	24.7	27.4	30.1	30.2	29.4	30.5	33.2	20.6	33.2	24.5	24
28	S	33.8	34.2	34.8	34.9	34.9	35.4	35.4	35.4	35.4	35.6	35.3	35.8	36.2	36.3	36.7	37.0	36.9	35.4	35.8	35.7	35.1	35.6	S	33.8	37.0	35.5	24
29	36.6	36.5	36.0	36.0	35.6	35.4	35.2	34.8	34.3	33.9	30.8	29.6	29.3	29.7	30.6	30.5	31.8	31.4	28.4	25.7	23.8	23.8	S	18.6	18.6	36.6	31.2	24
30	18.8	18.0	23.6	24.0	23.5	24.2	23.8	23.8	22.9	22.9	24.3	28.0	28.4	31.3	32.1	31.8	32.2	31.9	31.4	31.9	31.8	S	33.5	33.2	18.0	33.5	27.3	24
31	33.9	35.4	35.4	35.3	35.4	35.2	34.7	36.6	38.5	38.5	37.7	38.2	37.7	36.9	36.5	35.8	35.6	34.4	35.5	35.5	S	36.6	36.9	36.7	33.9	38.5	36.2	24
HOURLY MAX	38.5	38.8	38.0	37.9	36.9	36.3	37.9	39.9	39.6	38.5	37.7	38.8	40.6	40.6	41.1	41.1	40.8	40.7	40.8	40.2	39.6	39.4	39.4	38.2				
HOURLY AVG	28.8	28.8	29.7	29.6	29.0	28.9	28.8	28.3	28.2	28.0	28.9	29.8	29.8	29.8	29.8	29.5	29.3	29.0	29.4	29.5	29.0	29.0	30.0	28.9				

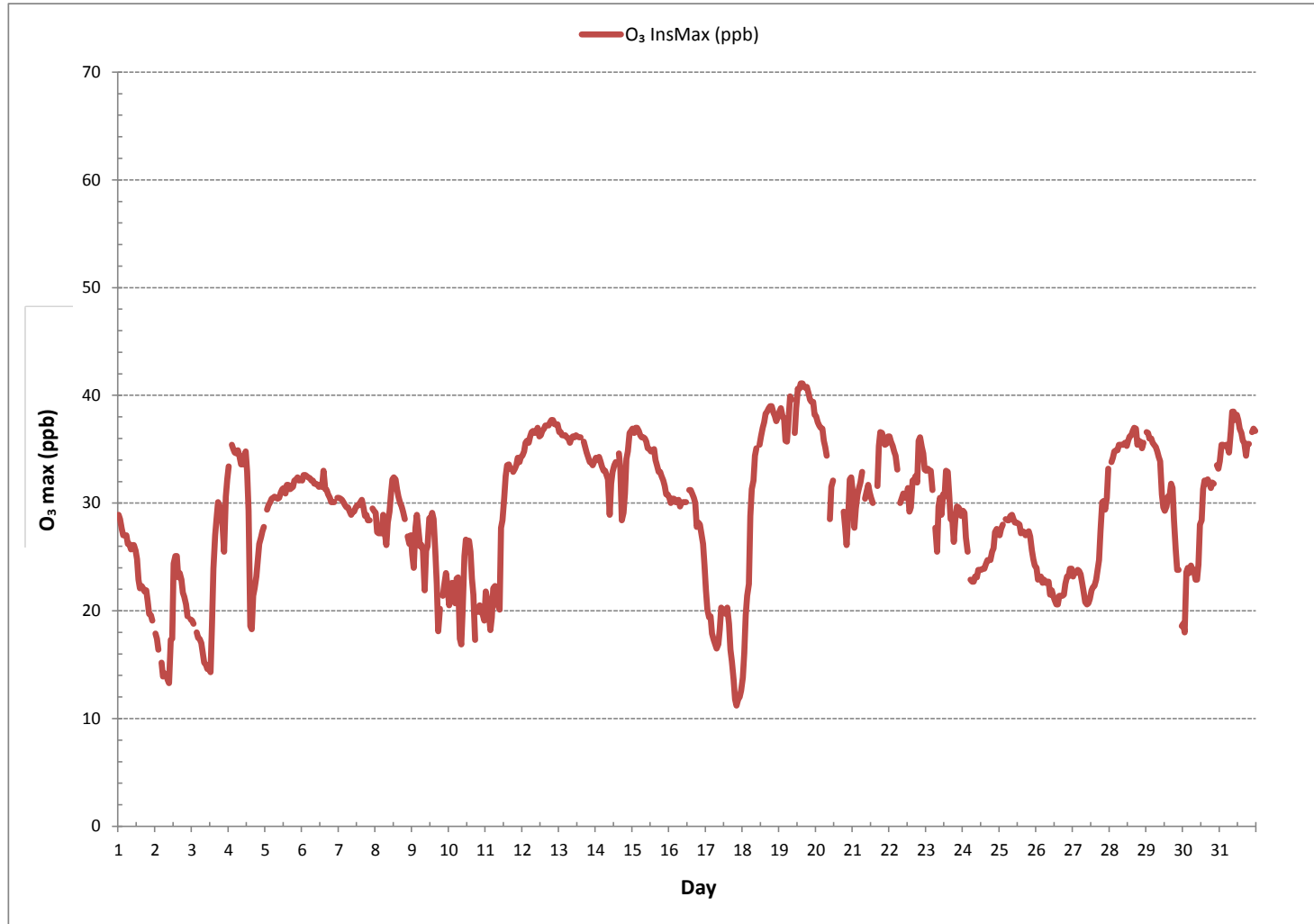
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	702
MAXIMUM INSTANTANEOUS VALUE:	41.1 ppb @ HOUR(S) 14, 15 ON DAY(S) 19, 19
VAR-VARIOUS	
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	743 hrs
STANDARD DEVIATION:	6.3

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

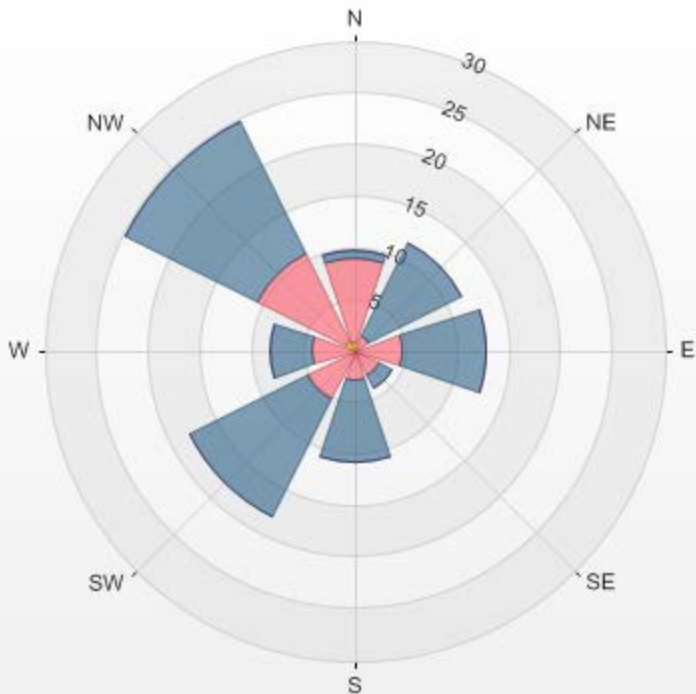


Wind: LICA ST. LINA Poll.: LICA ST. LINA-O3[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 0.00% Valid Data: 94.35% Calm Avg: 0.00 [ppb]

Direction	0.0-13.3	13.3-26.7	26.7-40.0	>40.0	Total
N	0.85	8.12	0.71	0	9.68
NE	0	1.57	10.11	0	11.68
E	0	4.7	7.98	0	12.68
SE	0	2.71	1.28	0	3.99
S	0	2.85	7.98	0	10.83
SW	0	5.13	12.82	0	17.95
W	0	4.13	4.13	0	8.26
NW	1	9.54	14.39	0	24.93
Summary	1.85	38.75	59.4	0	100

% Icon Classes (ppb) 2 0.0-13.3 39 13.3-26.7 59 26.7-40.0 0 >40.0

LICA ST. LINA Poll.: LICA ST. LINA-O3[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 0.00%



O3[ppb] Calibration: LICA ST. LINA Monthly: 2016/12 Type: Span



Span Meas Span Ref Span Low Span High

***PARTICULATE MATTER 2.5***



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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	12.4	X	7.9	8.4	3.9	8.4	29.9	3.4	X	11.4	11.4	1.9	5.0	3.9	6.4	9.9	14.5	10.9	10.9	16.4	13.4	12.9	16.4	17.9	1.9	29.9	10.8	22
2	17.9	17.9	19.9	24.4	28.9	31.4	33.9	23.4	33.9	33.9	3.4	13.4	0.0	X	10.4	10.9	9.9	21.0	0.0	0.0	25.4	30.9	33.4	21.4	0.0	33.9	19.4	23
3	X	25.9	4.4	4.4	11.9	2.9	15.4	11.4	9.9	7.9	15.4	17.9	20.5	16.4	12.0	9.5	3.9	1.9	7.5	2.5	0.0	4.4	0.0	1.0	0.0	25.9	9.0	23
4	3.8	0.0	4.0	0.0	1.1	X	7.2	0.0	X	5.0	7.4	0.5	5.8	5.6	3.2	X	18.4	0.0	0.0	X	X	1.9	1.6	4.9	0.0	18.4	3.7	19
5	2.9	0.0	11.8	6.5	1.8	4.4	3.1	0.9	0.0	0.9	5.4	X	6.9	0.0	0.0	1.0	3.7	1.4	0.3	2.5	5.4	3.5	1.9	4.3	0.0	11.8	3.0	23
6	2.9	3.0	2.4	2.4	1.3	3.3	5.8	5.5	3.4	2.4	1.4	0.2	1.1	5.0	3.2	5.1	6.0	6.9	10.7	7.7	4.9	4.0	5.1	0.8	0.2	10.7	3.9	24
7	0.0	5.0	0.9	0.2	1.2	3.3	0.1	0.0	2.3	0.3	0.0	2.1	3.8	2.1	0.6	0.0	0.0	2.3	0.0	0.0	0.1	4.4	0.0	1.6	0.0	5.0	1.3	24
8	0.9	0.0	0.0	0.0	0.0	0.2	3.7	0.0	2.7	0.6	0.0	0.0	4.2	1.2	X	0.2	C	C	0.8	2.0	1.4	4.4	7.2	5.4	0.0	7.2	1.7	23
9	3.7	5.9	4.7	4.1	2.7	5.9	4.4	6.2	2.7	1.6	4.0	4.2	6.2	0.0	1.4	4.2	5.2	9.7	4.9	4.2	10.2	5.4	2.9	7.2	0.0	10.2	4.7	24
10	4.4	10.2	7.9	6.2	2.4	7.9	3.9	4.1	9.2	7.5	4.1	4.7	7.0	6.7	2.7	4.8	8.6	10.7	8.2	7.2	9.0	8.1	10.9	7.9	2.4	10.9	6.8	24
11	9.4	7.4	10.5	10.4	10.4	6.4	9.4	11.4	11.2	10.9	11.5	7.5	5.1	1.8	2.6	7.4	6.8	2.0	1.6	3.5	3.8	5.3	2.5	3.1	1.6	11.5	6.7	24
12	5.0	30.1	4.6	4.6	5.1	6.1	4.2	2.4	1.1	8.4	0.9	0.0	0.9	4.6	0.6	5.6	0.0	1.0	1.5	0.0	2.6	4.6	2.6	2.1	0.0	30.1	4.1	24
13	2.0	2.9	4.4	3.4	0.0	3.4	0.0	1.7	2.7	1.8	X	6.7	0.0	3.8	2.9	2.8	2.3	0.2	1.3	0.5	0.0	0.4	0.2	4.5	0.0	6.7	2.1	23
14	2.6	2.7	0.2	4.2	5.5	6.8	5.4	2.4	4.5	2.9	3.0	3.3	1.4	4.2	12.2	5.9	8.4	19.1	12.9	10.9	15.8	6.4	5.4	1.9	0.2	19.1	6.2	24
15	0.0	1.0	4.1	2.4	0.5	4.0	2.4	3.3	1.1	1.4	4.9	2.5	3.3	2.9	2.5	0.0	0.0	3.4	0.4	1.5	0.0	5.0	10.4	7.5	0.0	10.4	2.7	24
16	3.9	5.4	8.4	9.5	6.9	6.9	5.0	1.4	4.0	7.9	5.9	1.9	1.9	2.9	6.9	0.0	2.9	0.4	5.0	5.0	4.5	6.9	6.5	10.9	0.0	10.9	5.0	24
17	10.9	14.5	11.9	14.9	11.4	10.4	12.4	11.4	11.9	12.9	14.0	9.9	13.0	17.4	11.4	12.4	11.9	15.5	14.5	14.0	16.9	16.0	16.0	17.4	9.9	17.4	13.5	24
18	10.4	14.5	16.4	9.4	10.4	11.9	9.4	0.9	3.9	4.0	0.9	3.5	0.0	0.0	2.9	7.9	1.4	0.9	0.4	0.9	3.4	0.9	0.4	0.0	0.0	16.4	4.8	24
19	0.0	1.9	1.9	2.4	7.5	0.0	0.9	0.0	7.9	0.0	2.4	2.4	2.9	0.0	0.0	2.9	0.9	2.9	0.0	0.0	0.9	0.0	2.4	3.9	0.0	7.9	1.8	24
20	0.4	1.4	1.9	3.4	0.0	1.9	0.4	1.4	2.9	26.9	0.0	5.9	3.9	0.9	0.0	0.0	C	C	0.0	2.4	2.9	4.4	8.4	8.4	0.0	26.9	3.5	24
21	7.5	5.0	8.4	13.4	11.9	6.4	1.4	3.4	2.4	1.4	2.4	1.4	2.9	0.0	0.0	5.4	2.9	2.4	1.9	5.9	2.4	6.9	0.4	2.9	0.0	13.4	4.1	24
22	2.4	0.0	0.9	1.4	1.4	1.4	3.9	6.9	1.4	2.4	5.9	0.4	3.9	5.9	10.4	10.4	11.9	11.4	9.0	3.9	3.4	3.9	5.4	5.4	0.0	11.9	4.7	24
23	5.0	11.4	10.9	9.9	5.9	3.4	9.5	10.4	8.4	3.9	3.4	5.0	2.4	2.9	1.9	1.9	2.9	0.9	2.9	5.4	9.9	3.4	1.9	3.9	0.9	11.4	5.3	24
24	6.4	3.4	7.9	0.0	2.4	5.9	5.9	0.9	4.4	2.4	2.9	3.4	5.9	5.9	4.9	1.4	10.9	4.4	3.4	1.9	4.0	7.5	5.0	5.4	0.0	10.9	4.4	24
25	5.9	6.9	3.4	4.4	5.4	0.4	5.9	3.9	5.9	3.4	4.4	2.9	0.9	0.9	1.4	5.9	2.4	2.9	1.9	0.9	3.4	5.9	5.4	5.9	0.4	6.9	3.8	24
26	6.4	5.0	1.9	3.9	6.4	9.0	9.9	7.5	5.0	4.4	6.4	5.4	9.4	9.9	9.4	5.9	11.9	8.4	4.9	11.4	9.0	5.9	8.4	6.9	1.9	11.9	7.2	24
27	9.5	9.5	7.5	12.4	9.9	10.9	3.9	5.9	11.4	9.9	11.4	7.5	9.0	9.9	6.9	6.4	4.4	6.4	5.4	0.4	5.4	6.4	5.4	4.0	0.4	12.4	7.5	24
28	2.9	0.9	1.9	1.9	5.0	2.9	0.4	0.0	1.4	0.0	1.9	0.0	1.4	0.0	2.9	0.0	0.4	0.0	0.9	2.4	1.4	0.9	0.4	1.9	0.0	5.0	1.3	24
29	0.9	0.0	0.9	0.4	3.4	0.0	3.9	7.5	7.9	2.9	6.9	9.0	4.9	4.4	0.4	3.4	2.4	5.4	6.9	2.4	8.4	9.9	8.4	10.9	0.0	10.9	4.6	24
30	12.4	7.5	10.4	9.9	8.4	1.9	8.4	13.4	10.4	9.9	11.4	10.4	12.4	9.4	11.4	6.9	10.9	8.4	5.4	8.4	3.4	10.4	7.9	5.4	1.9	13.4	8.9	24
31	8.4	1.9	2.4	5.4	0.9	0.0	0.0	2.9	5.0	0.0	0.0	1.4	1.9	0.9	2.4	5.4	2.9	1.9	5.4	1.4	5.4	3.4	X	0.4	0.0	8.4	2.6	23
HOURLY MAX	17.9	30.1	19.9	24.4	28.9	31.4	33.9	23.4	33.9	33.9	15.4	17.9	20.5	17.4	12.2	12.4	18.4	21.0	14.5	16.4	25.4	30.9	33.4	21.4				
HOURLY AVG	5.4	6.7	6.0	5.9	5.6	5.6	6.8	5.0	6.2	6.1	5.1	4.5	4.8	4.3	4.5	4.8	5.8	5.6	4.2	4.2	5.9	6.3	6.1	6.0				

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

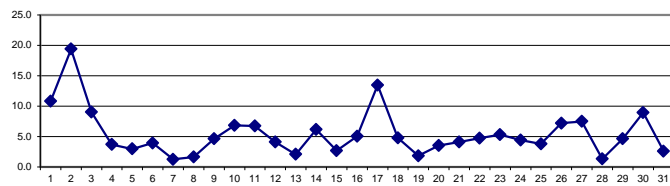
OBJECTIVE LIMIT:

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

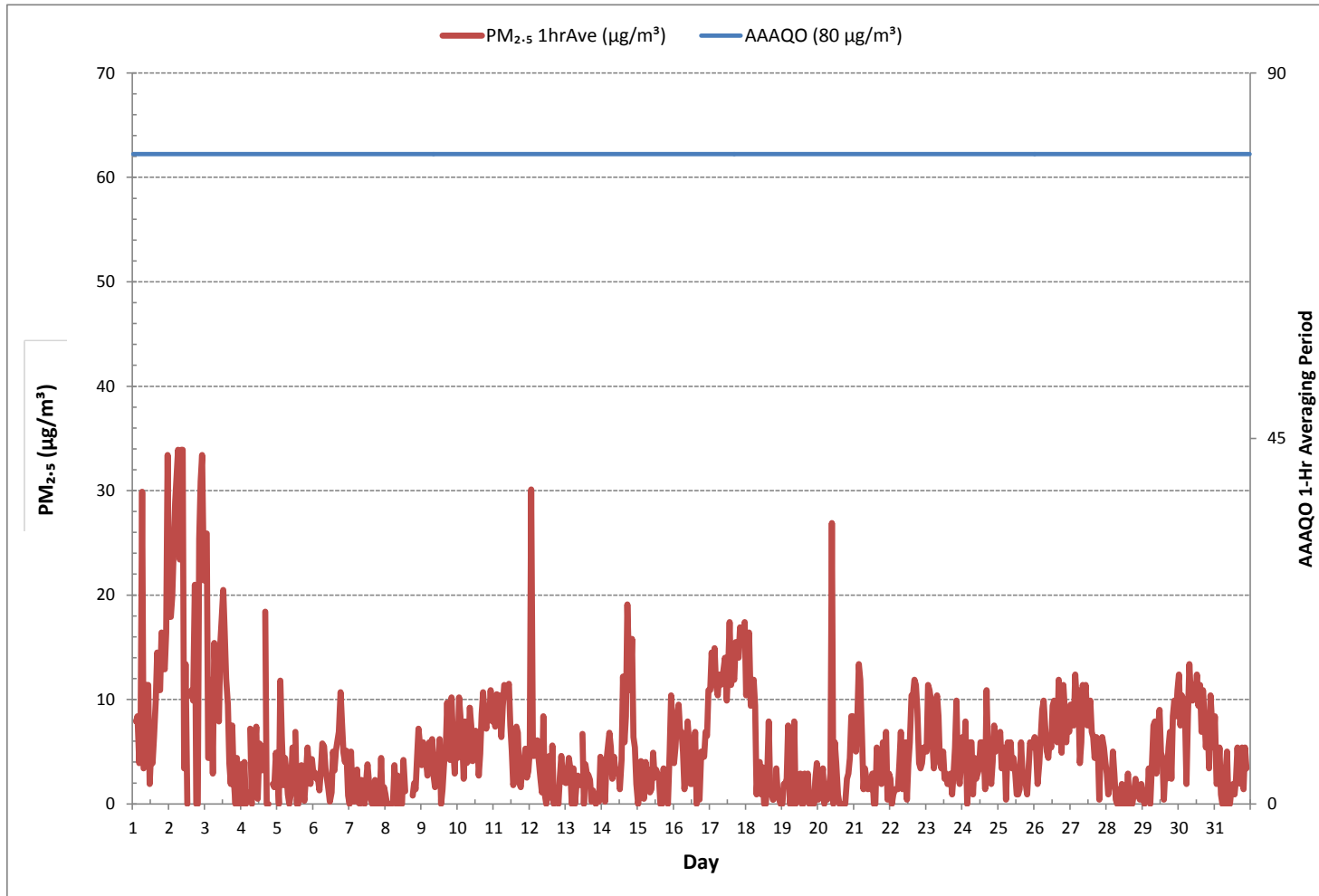
NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF 24-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	652					
MINIMUM 1-HR AVERAGE:	0.0	µg/m <sup>3</sup>	@ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 1-HR AVERAGE:	33.9	µg/m <sup>3</sup>	@ HOUR(S)	VAR	ON DAY(S)	2
MAXIMUM 24-HR AVERAGE:	19.4	µg/m <sup>3</sup>			ON DAY(S)	2
					VAR-VARIOUS	
MONTHLY CALIBRATION TIME:	4	hrs	OPERATIONAL TIME:	731 hrs		
STANDARD DEVIATION:	5.5		AMD OPERATION UPTIME:	98.3 %		
			MONTHLY AVERAGE:	5.5 µg/m <sup>3</sup>		

24 HR AVERAGES December 2016





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

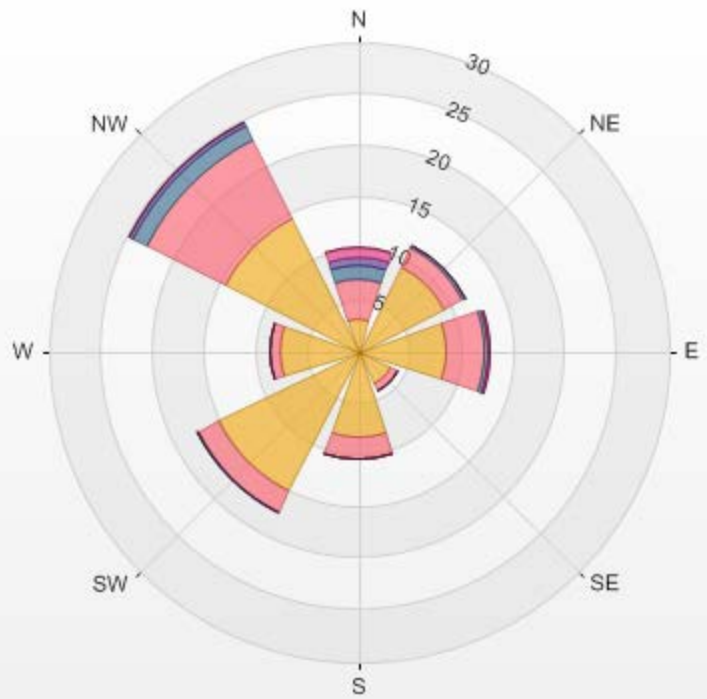


Wind: LICA ST. LINA Poll.: LICA ST. LINA-PM25[ug/m3(L)] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 0.00% Valid Data: 97.58% Calm Avg: 0.00 [ug/m<sup>3</sup>]

Direction	0.0-6.8	6.8-13.6	13.6-20.4	20.4-27.2	27.2-34.0	>34.0	Total
N	3.17	3.86	1.38	0.83	0.83	0	10.07
NE	9.23	2.07	0.28	0	0	0	11.58
E	8.54	3.72	0.28	0	0.14	0	12.68
SE	3.58	0.69	0	0	0	0	4.27
S	8.26	2.2	0	0	0	0	10.46
SW	15.15	2.2	0.14	0	0	0	17.49
W	7.58	0.96	0	0	0	0	8.54
NW	14.33	8.54	1.65	0.28	0.14	0	24.94
Summary	69.84	24.24	3.73	1.11	1.11	0	100

% Icon Classes (ug/m3(L)) 70 0.0-6.8 24 6.8-13.6 4 13.6-20.4 1 20.4-27.2 1 27.2-34.0 0 >34.0

LICA ST. LINA Poll.: LICA ST. LINA-PM25[ug/m3(L)] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 0.00%



***WIND SPEED***



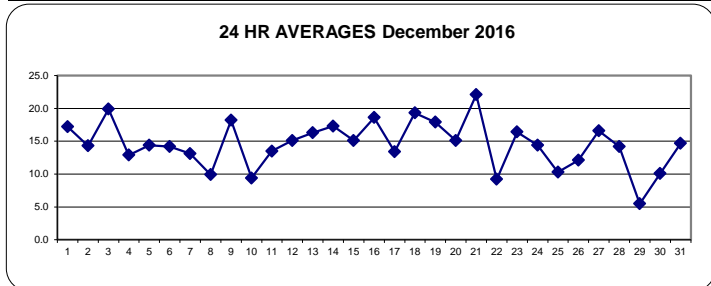
WIND SPEED Hourly Averages (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	17.4	17.8	20.1	21.1	16.4	19.8	22.6	22.3	21.1	21.6	17.9	20.9	10.4	7.3	16.5	9.5	11.6	24.3	23.4	21.0	23.9	23.8	22.9	21.7	7.3	24.3	17.2	24
2	22.5	23.1	21.0	20.8	19.3	18.3	18.0	17.2	14.5	12.8	9.0	11.6	9.5	9.8	11.7	13.1	12.1	11.3	13.1	11.3	11.3	13.1	12.8	14.1	9.0	23.1	14.3	24
3	14.8	15.2	17.7	17.5	18.7	20.3	21.2	20.5	19.2	20.4	20.9	20.9	20.6	21.4	22.5	22.3	23.7	23.5	24.9	22.5	22.3	22.9	16.7	20.1	14.8	24.9	19.9	24
4	16.4	16.0	18.4	20.7	18.9	20.4	24.9	25.6	20.6	16.8	15.2	20.0	20.4	15.5	17.9	14.9	9.1	9.6	9.9	10.0	10.1	11.6	14.0	14.4	9.1	25.6	12.9	24
5	15.2	14.7	13.7	14.5	14.0	11.9	12.2	13.5	14.5	15.3	13.4	14.4	14.9	15.9	14.0	16.1	16.5	17.0	16.2	14.0	13.7	14.5	14.8	14.9	11.9	17.0	14.4	24
6	15.2	14.5	14.4	15.1	15.2	15.4	14.2	13.4	12.3	11.8	12.3	11.2	13.5	13.8	11.7	13.2	15.0	16.4	16.3	16.3	15.5	16.5	15.5	12.8	11.2	16.5	14.2	24
7	12.6	11.9	12.2	14.2	14.8	13.9	12.2	12.7	12.3	11.4	13.7	14.3	13.5	14.6	15.9	15.3	15.2	14.0	12.6	11.9	12.1	12.1	12.4	15.5	11.4	15.9	13.1	24
8	14.5	15.8	16.1	14.8	15.8	19.0	11.8	19.6	21.5	7.6	4.6	13.5	16.8	15.8	17.8	19.0	5.7	21.5	19.5	18.3	21.7	24.9	21.4	8.2	4.6	24.9	9.9	24
9	18.4	19.5	18.8	19.1	19.2	19.6	19.5	19.8	19.3	20.7	19.7	13.2	13.4	16.9	22.3	21.3	17.6	17.9	18.9	17.8	15.8	18.2	17.6	17.1	13.2	22.3	18.2	24
10	18.8	19.3	19.4	17.1	16.2	16.6	18.9	17.3	18.8	14.8	13.0	10.1	19.3	16.3	22.2	21.8	22.2	21.4	14.3	14.8	21.9	23.9	24.4	24.9	10.1	24.9	9.4	24
11	21.7	17.3	17.0	14.7	15.4	14.5	13.5	11.9	12.0	12.7	12.9	11.7	12.6	13.5	11.8	10.6	7.9	9.5	12.8	15.0	16.7	14.9	18.6	15.5	7.9	21.7	13.5	24
12	15.1	14.3	14.1	14.7	12.3	12.2	13.2	15.9	18.4	20.2	18.3	17.4	19.0	17.5	15.3	14.8	14.9	16.4	15.3	13.2	15.1	17.7	17.5	15.1	12.2	20.2	15.1	24
13	13.5	13.0	12.1	12.2	13.4	16.7	21.1	15.6	17.0	18.4	19.4	19.7	18.6	20.3	20.5	19.6	19.0	15.0	17.6	19.7	22.7	22.7	19.9	22.0	12.1	22.7	16.3	24
14	23.5	20.7	20.8	21.6	21.4	22.5	22.8	24.9	18.1	17.9	14.5	13.9	15.4	14.9	14.8	16.7	17.2	19.2	20.4	18.0	17.3	14.3	14.4	15.1	13.9	24.9	17.3	24
15	14.3	17.6	9.8	14.1	16.7	21.3	14.7	10.7	8.0	13.1	18.2	18.6	13.7	15.8	18.4	18.6	18.5	18.4	17.1	17.9	18.0	18.4	18.6	17.4	8.0	21.3	15.1	24
16	16.8	18.4	17.8	17.7	17.9	17.7	18.1	22.2	20.0	20.6	19.8	19.9	17.9	19.5	20.1	25.1	19.3	20.0	20.2	19.9	19.1	18.2	19.0	19.6	16.8	25.1	18.6	24
17	17.2	19.0	19.0	7.8	16.3	18.4	18.2	16.5	17.0	16.1	18.7	19.0	18.9	20.1	16.7	16.4	15.9	19.8	18.0	17.3	17.4	14.1	16.6	15.4	7.8	20.1	13.4	24
18	15.9	16.4	17.9	18.8	20.6	25.1	24.2	24.4	25.0	25.3	26.8	24.2	24.8	27.7	29.6	28.2	22.0	21.1	20.5	19.7	18.5	17.1	22.6	21.0	15.9	29.6	19.3	24
19	15.0	14.9	18.3	18.2	18.8	18.0	23.0	20.9	20.7	21.8	28.4	28.8	29.8	30.1	26.9	23.8	26.3	24.4	23.3	20.6	21.6	21.3	18.9	16.1	14.9	30.1	17.9	24
20	19.7	20.3	23.4	19.5	18.6	23.9	22.2	22.6	22.7	21.0	18.9	19.6	20.3	18.3	20.4	18.7	23.3	24.5	14.5	20.3	22.0	22.1	15.2	18.8	14.5	24.5	15.1	24
21	22.8	20.9	23.8	19.7	22.6	23.7	25.6	26.1	26.5	25.1	24.1	27.0	21.0	20.7	20.4	20.5	22.5	21.2	21.6	19.6	19.7	20.7	19.5	20.8	19.5	27.0	22.1	24
22	20.7	19.2	19.1	21.0	20.3	22.3	23.3	12.4	21.3	19.3	20.3	19.8	18.8	22.2	18.5	10.4	21.9	19.8	18.8	20.2	17.8	16.8	15.1	10.4	23.3	9.2	24	
23	16.3	16.8	16.1	17.0	18.0	17.2	19.6	17.9	18.1	16.5	20.4	9.2	18.9	21.6	17.7	15.2	22.0	22.3	24.0	20.5	23.5	16.5	16.6	13.5	9.2	24.0	16.4	24
24	13.3	11.7	12.0	12.6	14.3	19.1	20.9	17.4	17.6	18.4	15.3	18.3	18.6	15.0	13.1	14.8	12.5	13.4	14.6	11.5	16.7	15.5	16.7	21.3	11.5	21.3	14.4	24
25	11.3	11.8	11.1	10.9	14.7	6.3	18.8	19.0	17.4	21.2	23.0	22.4	21.1	22.6	23.2	21.5	19.6	17.1	18.1	21.6	20.9	14.1	14.6	15.1	6.3	23.2	10.3	24
26	17.2	16.2	16.3	16.7	18.0	15.2	14.9	14.1	13.9	13.4	16.0	13.7	11.3	10.8	12.9	12.2	12.3	9.1	7.8	10.8	7.4	5.0	7.2	3.4	3.4	18.0	12.1	24
27	4.8	10.1	9.8	13.5	11.8	14.6	13.3	16.1	14.5	15.7	17.4	22.0	20.4	19.3	19.8	17.7	17.7	19.5	20.8	19.9	22.7	22.6	18.9	23.0	4.8	23.0	16.6	24
28	16.8	15.6	15.8	12.2	12.0	14.5	16.1	17.2	18.6	19.5	21.5	21.3	20.7	22.0	19.4	20.2	18.8	20.9	15.0	16.1	15.9	12.1	24.8	11.7	11.7	24.8	14.2	24
29	11.0	11.9	14.0	16.4	20.4	19.5	20.0	20.4	24.5	19.1	16.7	19.9	18.9	18.3	19.8	19.2	18.1	13.1	12.1	22.9	12.6	10.6	11.4	18.9	10.6	24.5	5.5	24
30	17.4	16.0	14.6	14.2	13.7	19.6	21.7	14.8	26.9	26.1	25.5	24.6	21.4	21.2	25.4	23.3	22.6	22.9	19.4	17.4	21.2	15.2	17.2	21.1	13.7	26.9	10.1	24
31	20.4	19.0	19.8	20.0	17.4	18.4	21.3	12.4	10.9	14.8	13.4	11.4	11.3	11.1	10.8	13.9	14.5	11.2	10.9	16.3	15.0	13.9	15.9	17.9	10.8	21.3	14.7	24
HOURLY MAX	23.5	23.1	23.8	21.6	22.6	25.1	25.6	26.1	26.9	26.1	28.4	28.8	29.8	30.1	29.6	28.2	26.3	24.5	24.9	22.9	23.9	24.9	24.8	24.9				
HOURLY AVG	2.7	3.4	4.0	4.1	4.0	4.3	6.2	6.9	7.5	6.6	7.1	8.0	6.0	5.7	5.0	3.6	4.2	3.5	2.6	2.3	1.4	0.2	1.0	1.2				

STATUS FLAG CODES

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

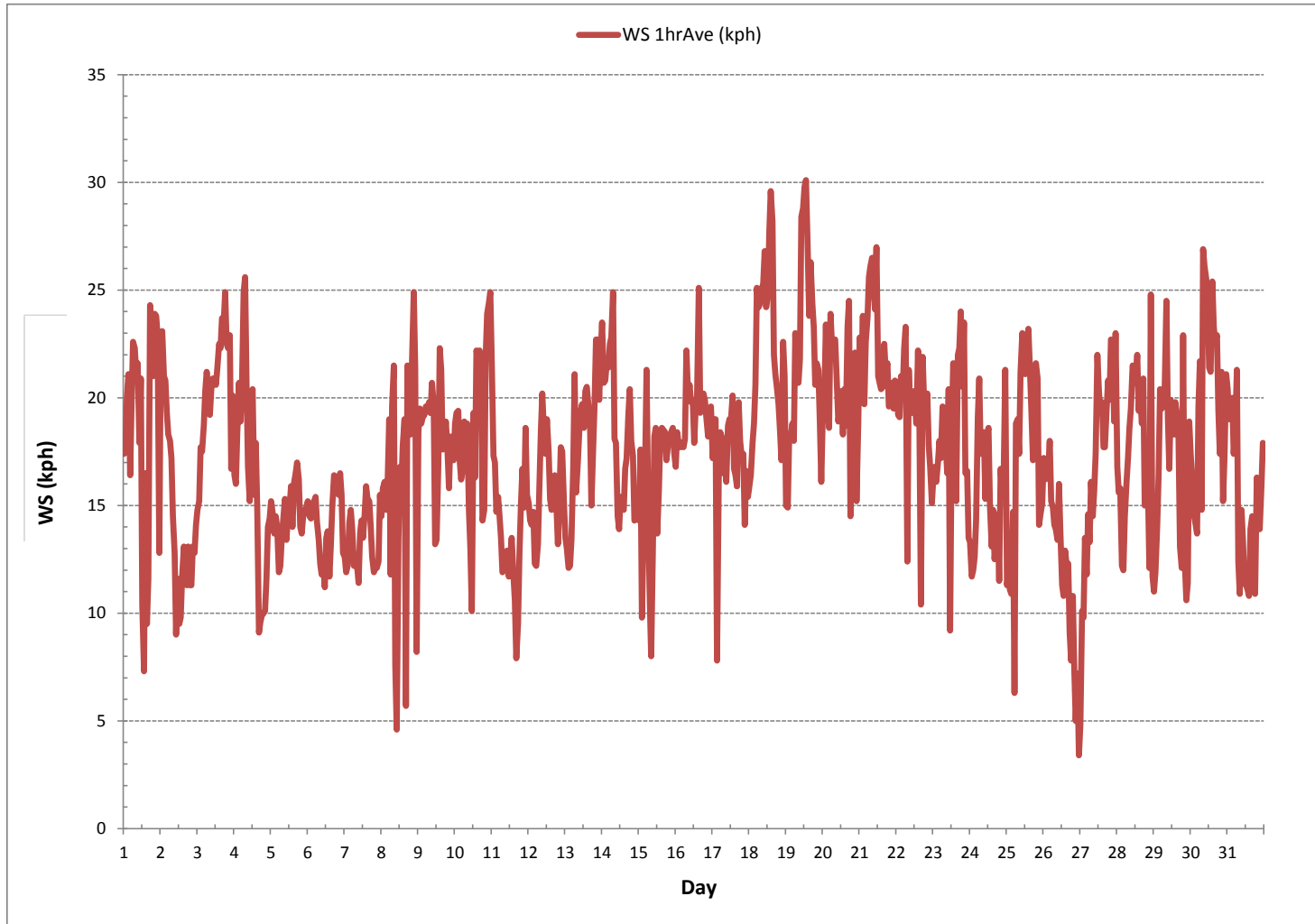
LAST CALIBRATION:	September 12, 2016
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	744
MINIMUM 1-HR AVERAGE:	3.4 kph @ HOUR(S) 23 ON DAY(S) 26
MAXIMUM 1-HR AVERAGE:	30.1 kph @ HOUR(S) 13 ON DAY(S) 19
MAXIMUM 24-HR AVERAGE:	22.1 kph ON DAY(S) 21
	VAR-VARIOUS
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	744 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	4.3
MONTHLY AVERAGE:	17.4 kph

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





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

WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	27.5	28.6	31.2	33.0	31.1	30.5	31.4	31.0	28.8	29.7	29.5	31.3	30.1	31.2	30.3	31.6	31.0	30.1	28.8	31.6	30.1	28.8	28.2	28.6	27.5	33.0	30.2	24	
2	27.3	29.0	27.5	35.6	34.7	28.0	27.7	26.1	25.6	24.8	24.1	25.5	24.6	25.5	25.1	26.8	26.5	27.1	28.0	24.6	26.6	26.3	P	25.3	24.1	35.6	27.1	23	
3	26.7	29.0	27.6	28.6	27.4	29.9	29.3	27.9	29.0	27.5	27.9	27.9	26.6	26.4	27.8	28.5	28.6	28.1	31.0	31.2	30.1	32.3	35.6	35.2	26.4	35.6	29.2	24	
4	36.9	37.9	39.1	40.0	40.2	37.3	42.6	41.0	42.8	40.1	38.4	40.6	40.2	36.4	32.3	26.8	34.5	30.3	38.4	31.1	32.7	34.7	33.6	36.0	26.8	42.8	36.8	24	
5	43.3	42.5	46.7	36.8	43.6	37.9	36.8	41.0	36.8	33.3	37.4	43.8	38.1	38.1	35.5	31.8	33.3	34.2	33.1	33.1	37.9	35.3	35.7	34.9	31.8	46.7	37.5	24	
6	34.1	36.8	30.4	31.4	31.4	28.7	27.6	28.2	27.9	28.9	27.9	27.5	31.4	35.5	32.9	30.9	36.0	38.3	28.9	26.4	29.6	28.5	27.0	27.0	26.4	38.3	30.6	24	
7	28.7	26.1	27.7	28.5	26.8	25.7	27.6	26.3	26.7	24.4	26.5	27.2	25.9	27.9	27.4	25.0	25.8	24.7	27.2	26.0	25.8	29.2	54.2	X	24.4	54.2	30.5	23	
8	53.7	51.9	59.4	48.8	80.6	X	51.5	43.5	40.5	54.0	55.0	33.5	31.8	36.2	38.0	37.5	X	X	65.1	74.0	32.9	33.0	32.7	46.2	31.8	80.6	55.2	21	
9	33.5	44.9	21.3	28.4	22.8	24.1	23.8	23.8	24.3	39.6	33.3	29.6	28.8	35.1	35.1	35.7	31.5	26.0	26.1	26.3	27.4	25.8	26.9	26.7	21.3	44.9	29.2	24	
10	25.4	27.4	26.9	27.4	26.1	25.4	33.5	75.4	47.4	32.8	25.4	33.3	35.9	42.5	50.1	37.2	40.3	36.1	42.8	51.8	46.9	42.5	44.3	40.6	25.4	75.4	38.2	24	
11	37.5	28.3	29.6	28.5	29.4	32.6	27.8	30.7	30.4	29.8	30.9	33.5	32.9	33.8	26.8	23.0	26.1	27.8	27.8	29.4	28.1	30.7	29.6	23.0	37.5	29.9	24		
12	30.9	31.1	27.5	32.1	31.0	29.2	35.3	41.8	40.1	45.4	33.1	31.2	49.5	37.3	32.8	36.8	31.3	30.5	32.5	32.7	29.0	47.1	38.9	38.8	27.5	49.5	35.2	24	
13	28.0	39.9	35.7	32.8	35.8	46.4	55.8	43.1	40.9	40.8	38.2	46.2	41.6	45.0	44.3	36.9	32.9	29.1	27.8	34.7	39.2	32.5	30.9	34.0	27.8	55.8	38.0	24	
14	35.1	35.8	36.9	36.7	35.1	36.6	37.0	37.4	21.5	26.1	25.7	27.4	25.5	25.7	24.7	27.5	21.1	35.7	31.9	34.1	32.5	34.0	33.3	31.4	21.1	37.4	31.2	24	
15	32.8	29.2	28.5	28.8	39.7	41.7	32.7	32.9	27.4	33.9	32.3	34.6	34.0	30.3	31.1	29.6	28.9	32.6	31.9	31.6	27.8	30.7	32.9	35.7	27.4	41.7	32.2	24	
16	32.4	32.9	31.1	31.8	30.9	27.6	34.8	34.7	33.3	34.1	36.6	40.3	39.2	40.5	43.4	45.3	44.2	24.5	24.2	25.2	22.5	22.1	24.5	23.9	22.1	45.3	32.5	24	
17	25.9	24.1	25.0	23.6	23.4	22.2	23.0	22.7	24.2	24.3	31.5	29.4	27.8	28.7	29.8	29.7	26.5	25.8	24.0	26.7	24.3	23.2	25.1	24.9	22.2	31.5	25.7	24	
18	25.0	23.7	23.0	24.2	31.9	36.4	36.5	38.0	37.7	39.7	48.3	39.8	43.9	54.7	51.1	56.8	52.0	54.0	47.6	46.2	32.5	29.9	29.5	46.2	23.0	56.8	39.5	24	
19	38.5	31.0	30.0	29.1	26.7	26.4	31.7	37.7	35.6	36.5	51.2	64.5	74.3	69.3	68.2	65.3	72.8	55.2	61.2	44.4	47.9	45.0	42.8	44.4	26.4	74.3	47.1	24	
20	37.6	43.7	42.8	39.3	42.1	38.2	34.0	30.5	31.0	30.5	23.6	27.8	24.7	25.0	26.4	24.1	30.6	30.3	30.7	31.4	30.1	31.5	35.2	32.8	23.6	43.7	32.2	24	
21	33.4	30.3	32.1	37.2	42.8	35.3	39.0	41.2	39.1	35.3	34.8	46.7	32.9	30.7	26.7	28.0	31.2	29.2	40.2	35.4	33.9	30.4	29.8	36.5	26.7	46.7	34.7	24	
22	33.7	26.9	24.9	28.4	28.4	30.2	28.6	29.0	25.5	23.4	23.4	25.2	25.1	23.6	28.4	29.3	30.3	29.3	27.5	25.7	25.8	26.6	27.3	26.0	23.4	33.7	27.2	24	
23	27.7	29.3	27.3	26.1	36.1	27.5	35.1	34.7	34.7	26.1	31.9	32.1	31.9	34.1	36.9	34.7	36.0	35.3	48.0	42.9	39.7	41.4	38.7	37.1	26.1	48.0	34.4	24	
24	35.4	34.9	34.7	36.0	36.8	36.2	35.7	35.7	39.7	39.2	40.8	41.1	40.1	41.8	37.5	37.9	38.4	37.4	36.4	35.5	39.6	43.9	35.5	34.7	34.7	43.9	37.7	24	
25	35.6	34.9	34.3	33.7	34.0	42.9	31.5	32.4	30.9	37.0	35.9	37.9	37.1	40.4	36.6	40.1	30.9	32.2	32.7	36.4	26.5	41.1	28.7	22.6	22.6	42.9	34.5	24	
26	28.7	23.0	23.2	22.2	23.0	24.5	23.4	22.9	22.3	24.0	26.1	26.5	23.9	24.5	25.0	24.1	22.1	22.3	25.3	25.0	22.3	20.4	21.1	18.2	18.2	28.7	23.5	24	
27	21.9	23.1	28.9	23.9	24.1	23.5	23.7	27.2	22.1	23.0	23.9	27.0	25.0	24.6	23.1	23.7	22.9	25.9	33.0	37.3	37.0	40.0	36.4	45.0	21.9	45.0	27.8	24	
28	43.0	38.0	34.9	33.0	33.2	33.9	34.2	36.4	38.7	33.6	56.6	48.7	46.3	51.8	39.6	37.5	40.0	35.1	34.4	32.7	32.1	31.4	31.2	31.9	31.2	56.6	37.8	24	
29	32.1	34.7	36.5	35.6	36.2	37.1	36.7	38.8	32.9	25.7	22.9	23.5	22.6	24.4	34.1	27.5	24.6	32.8	32.9	29.9	34.7	33.2	33.2	32.2	22.6	38.8	31.5	24	
30	31.2	33.0	32.1	31.2	24.7	32.4	31.4	32.5	32.9	33.8	31.8	34.1	33.2	37.6	40.4	37.8	28.1	32.7	36.7	37.5	43.0	36.7	36.0	34.5	24.7	43.0	34.0	24	
31	30.4	31.8	30.8	31.5	30.0	30.5	30.1	27.3	27.5	25.7	25.5	26.8	26.8	26.0	25.8	27.1	31.0	27.7	25.9	32.5	30.8	25.5	27.7	30.6	25.5	32.5	28.6	24	
HOURLY MAX	53.7	51.9	59.4	48.8	80.6	46.4	55.8	75.4	47.4	54.0	56.6	64.5	74.3	69.3	68.2	65.3	72.8	55.2	65.1	74.0	47.9	47.1	54.2	46.2					
HOURLY AVG	32.7	32.7	31.9	31.7	33.5	33.9	33.2	34.6	32.2	32.4	33.2	34.3	33.9	35.0	34.7	33.5	35.7	34.6	34.3	34.2	32.3	32.6	32.9	34.9					

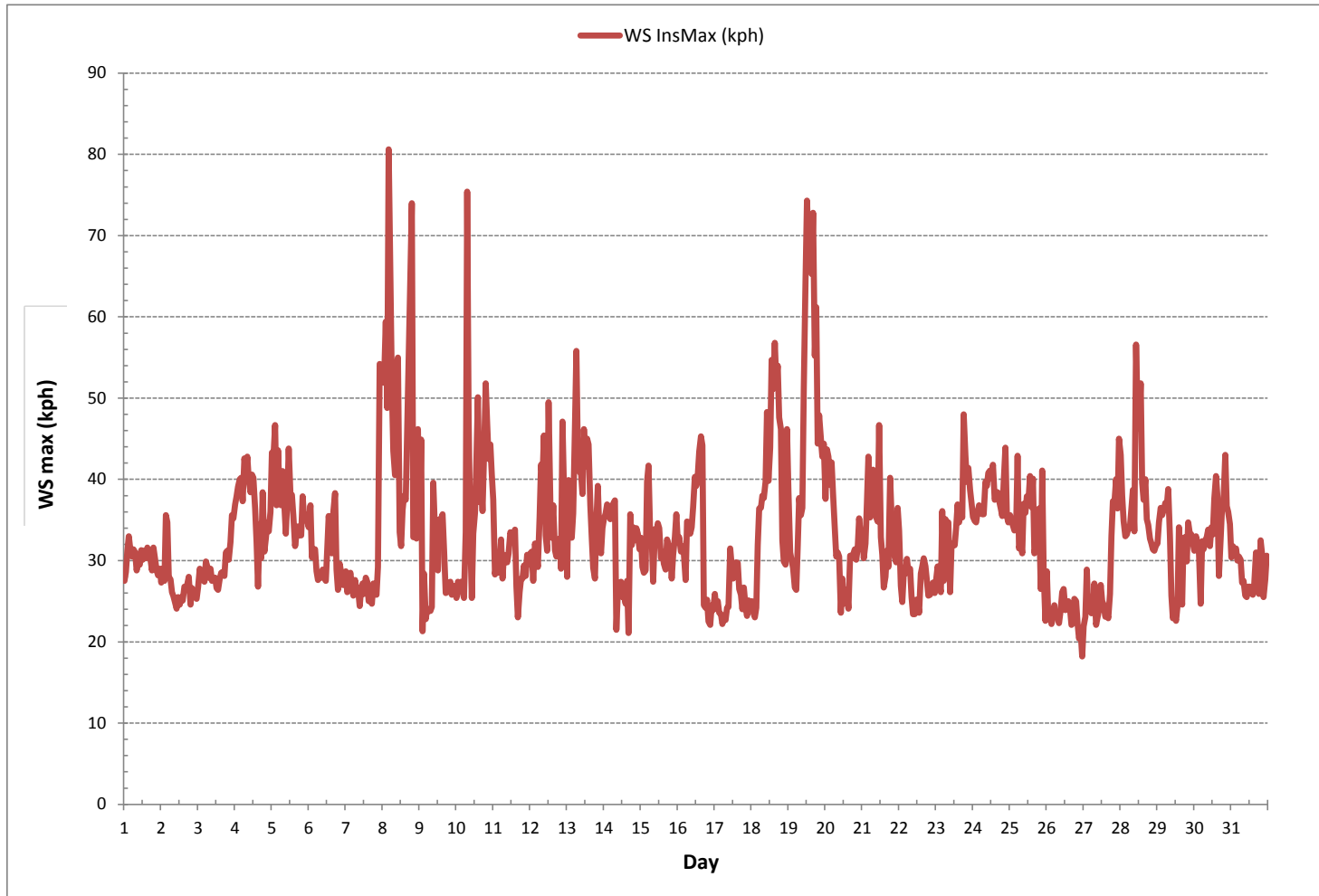
STATUS FLAG CODES

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

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	80.6	kph	@ HOUR(S)	4	ON DAY(S)	8
					VAR-VARIOUS	
OPERATIONAL TIME:					739	hrs

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



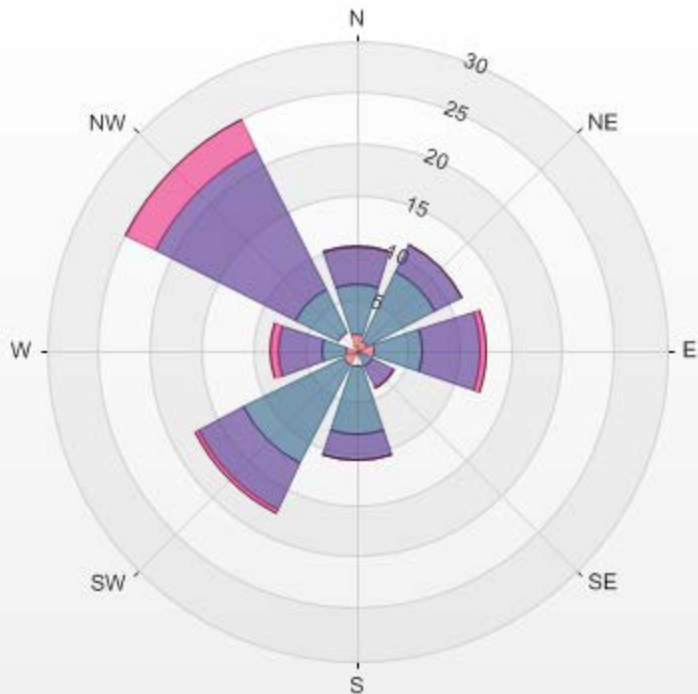


Wind: LICA ST. LINA Monitor: WSP [kph] Monthly: 12/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 0.00% Valid Data: 100.00%

Direction	1.8-6.0	6.0-12.1	12.1-18.1	18.1-24.2	24.2-30.2	>30.2	Total
N	0.4	1.34	4.84	3.49	0.13	0	10.2
NE	0	1.08	7.53	2.82	0	0	11.43
E	0	1.75	4.7	5.51	0.54	0	12.5
SE	0	0.27	1.48	2.28	0.13	0	4.16
S	0.13	1.34	6.59	2.55	0	0	10.61
SW	0	1.48	10.75	4.97	0.4	0	17.6
W	0	1.08	2.28	4.3	0.67	0	8.33
NW	0.13	1.88	4.7	15.05	3.36	0	25.12
Summary	0.66	10.22	42.87	40.97	5.23	0	100

% Icon Classes (kph) 1 1.8-6.0 10 6.0-12.1 43 12.1-18.1 41 18.1-24.2 5 24.2-30.2 0 >30.2

LICA ST. LINA 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 0.00%



***WIND DIRECTION***



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

WIND DIRECTION Hourly Averages (WD)

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

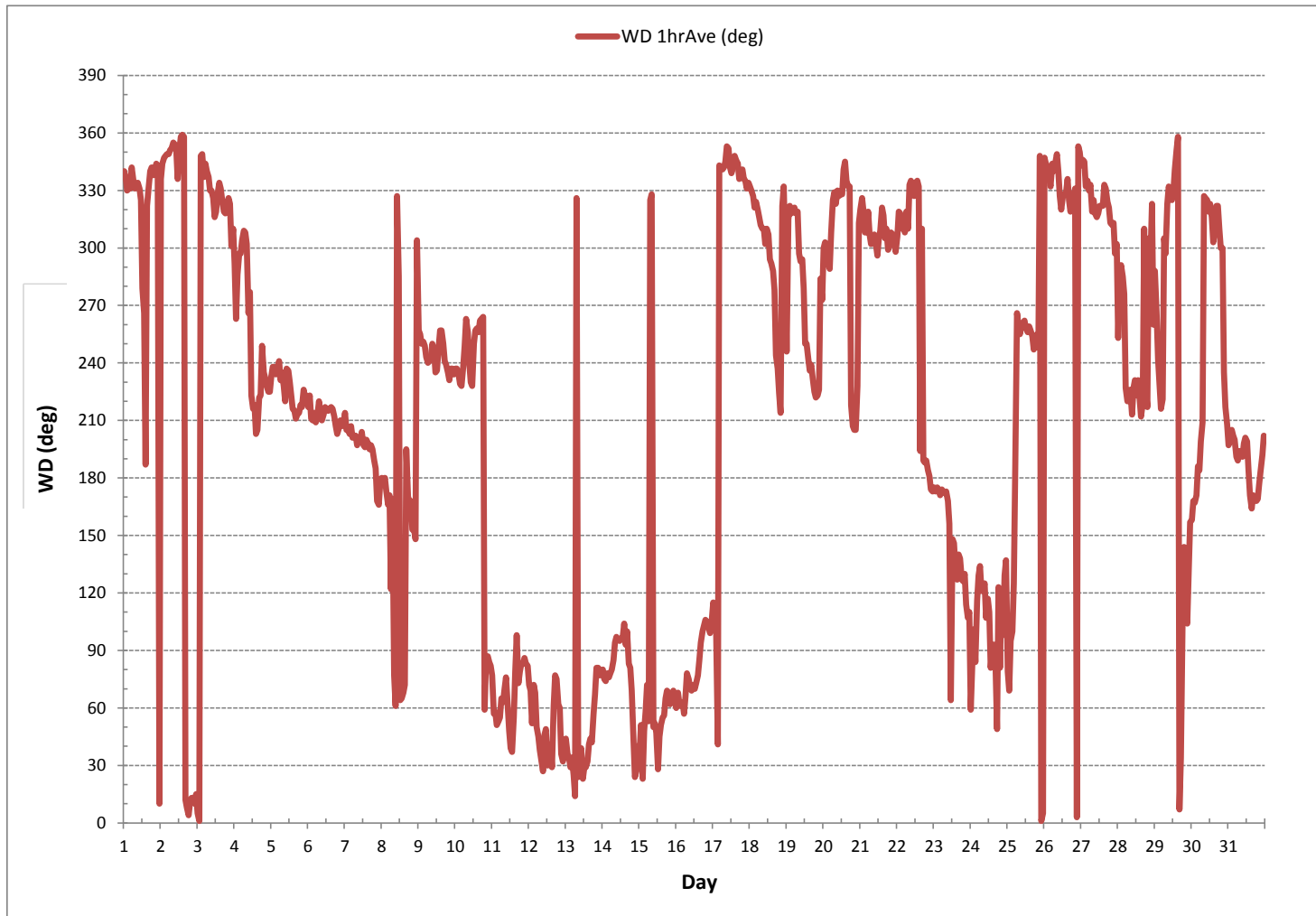
STATUS FLAG CODES

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

LAST CALIBRATION:	September 12, 2016
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	0 hrs	OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	105	AMD OPERATION UPTIME:	100.0 %
		MONTHLY AVERAGE:	306 (NW)

WIND DIRECTION Hourly Averages (WD)



***STANDARD DEVIATION WIND DIRECTION***



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

**STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)**

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59		
DAY																										
1	10	11	13	22	47	9	14	18	9	12	38	31	54	78	50	75	68	10	5	40	8	5	5	5	24	
2	6	4	5	4	6	11	6	8	11	14	35	22	31	30	20	20	21	25	17	24	25	19	17	14	24	
3	12	14	9	10	8	9	11	8	10	9	9	8	7	5	4	5	5	13	30	24	21	53	44	24	24	
4	57	60	53	46	50	45	26	23	45	56	61	40	22	21	16	19	38	34	41	38	36	31	25	23	24	
5	24	27	29	27	28	32	30	27	25	21	28	26	25	21	23	18	17	17	17	22	23	25	23	21	24	
6	20	22	19	17	20	18	19	21	24	25	24	27	22	22	26	23	19	15	14	13	14	16	16	22	24	
7	22	23	19	14	15	15	18	17	18	17	15	15	15	13	12	11	10	12	12	11	10	14	12	6	24	
8	7	6	5	7	7	23	53	31	32	77	81	55	35	41	33	32	47	20	6	4	23	22	38	51	24	
9	7	4	2	3	2	2	13	12	16	8	14	53	52	40	4	6	5	7	19	28	39	24	28	32	24	
10	21	16	17	33	37	33	17	25	19	45	52	66	28	55	23	8	12	8	44	51	42	12	12	7	24	
11	7	12	14	19	16	17	17	24	26	22	23	32	29	26	28	31	41	35	16	11	10	12	7	14	24	
12	15	17	19	15	24	27	26	21	29	33	17	16	23	19	22	25	16	12	16	23	17	19	19	21	24	
13	23	28	33	31	26	24	29	50	45	38	25	38	38	31	28	19	24	47	30	19	13	2	5	4	24	
14	4	7	6	5	5	4	5	5	2	4	8	9	7	8	7	6	4	6	4	7	34	54	53	47	24	
15	50	34	66	50	37	8	37	65	74	54	22	17	52	38	18	14	10	19	8	7	7	8	7	9	24	
16	10	8	9	9	8	9	7	2	4	7	10	18	33	27	36	10	21	3	4	4	3	3	9	11	24	
17	32	16	10	24	3	3	3	2	5	3	5	4	5	5	6	5	5	5	4	8	5	9	8	10	24	
18	9	8	7	5	4	23	25	28	25	16	19	26	24	28	23	30	47	42	47	45	44	36	10	41	24	
19	60	42	9	11	8	8	14	31	11	11	10	33	36	35	28	22	23	26	30	40	37	41	53	60	24	
20	47	43	38	49	51	29	21	14	10	22	5	5	4	5	3	4	11	9	25	11	16	20	42	31	24	
21	25	10	24	43	32	17	16	7	9	8	8	8	8	6	5	6	7	8	10	10	11	7	10	10	24	
22	8	6	5	6	6	6	6	34	3	3	4	3	3	4	16	42	55	12	6	7	5	6	8	11	24	
23	9	7	7	7	6	7	4	6	6	8	23	70	38	26	47	57	24	25	26	40	27	56	56	62	24	
24	63	69	70	68	59	45	38	52	53	49	60	48	49	58	65	63	66	63	59	66	54	61	52	36	24	
25	69	68	61	69	59	54	6	7	8	6	6	8	6	6	6	4	3	6	7	4	8	28	4	6	24	
26	3	3	4	4	5	7	7	10	8	10	13	15	17	19	15	13	14	25	34	17	27	39	25	61	24	
27	50	21	23	12	16	10	11	9	8	8	7	3	3	4	3	4	4	5	8	42	32	31	48	36	24	
28	55	59	59	61	66	62	57	53	48	39	24	20	24	21	20	31	45	40	55	54	44	59	22	56	24	
29	58	69	62	56	44	48	47	48	20	3	5	3	4	4	3	4	5	59	47	8	60	66	54	7	24	
30	5	5	5	6	7	7	15	42	6	12	5	8	10	9	26	33	4	15	43	52	42	53	50	28	24	
31	27	17	15	17	14	11	12	30	25	12	16	24	22	25	23	15	11	17	21	8	11	13	12	16	24	

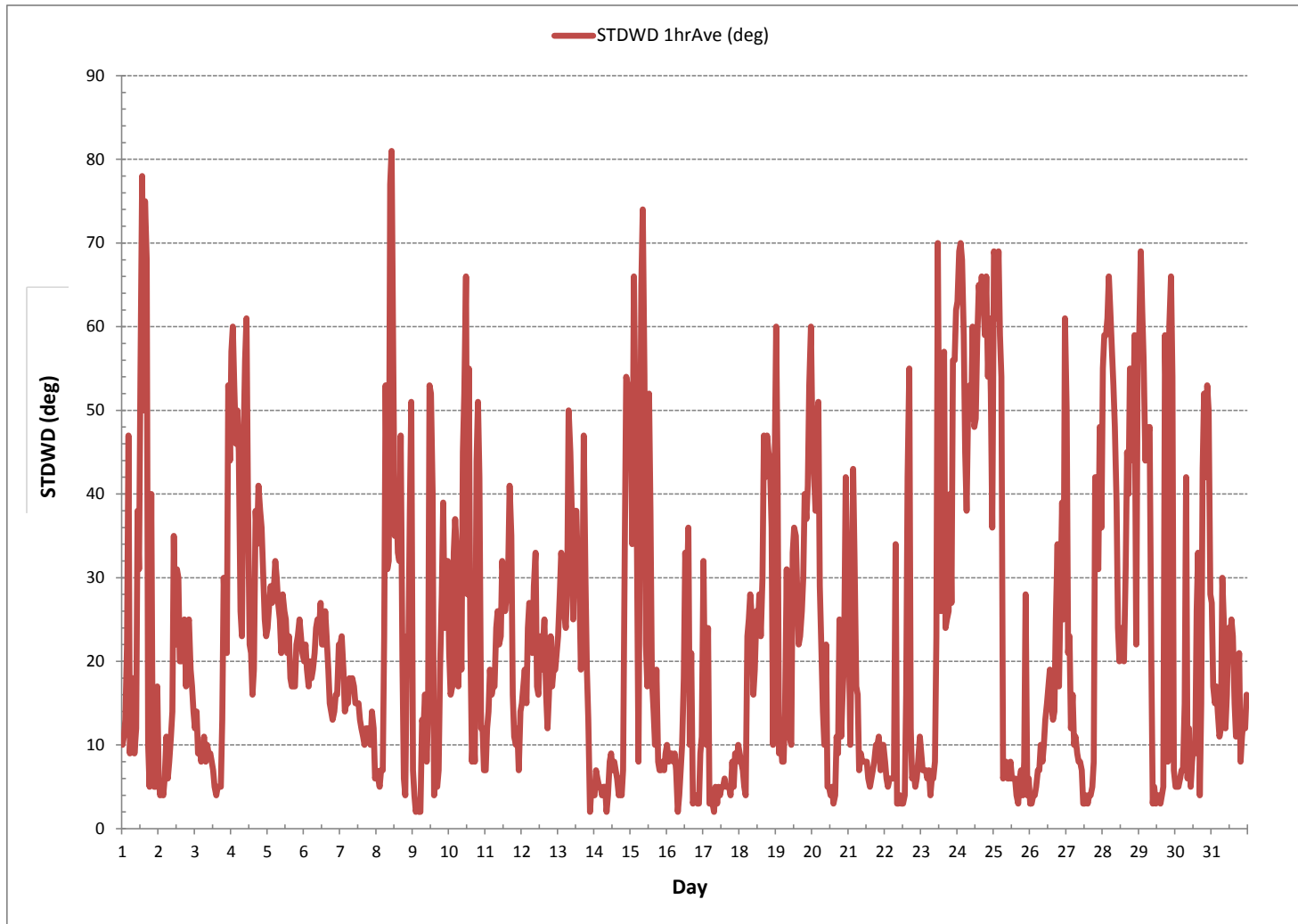
**STATUS FLAG CODES**

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

LAST CALIBRATION: September 12, 2016

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 744 hrs

**STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)**





***RELATIVE HUMIDITY***



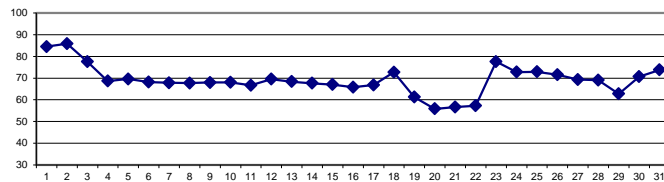
RELATIVE HUMIDITY Hourly Averages (RH %)

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

STATUS FLAG CODES

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

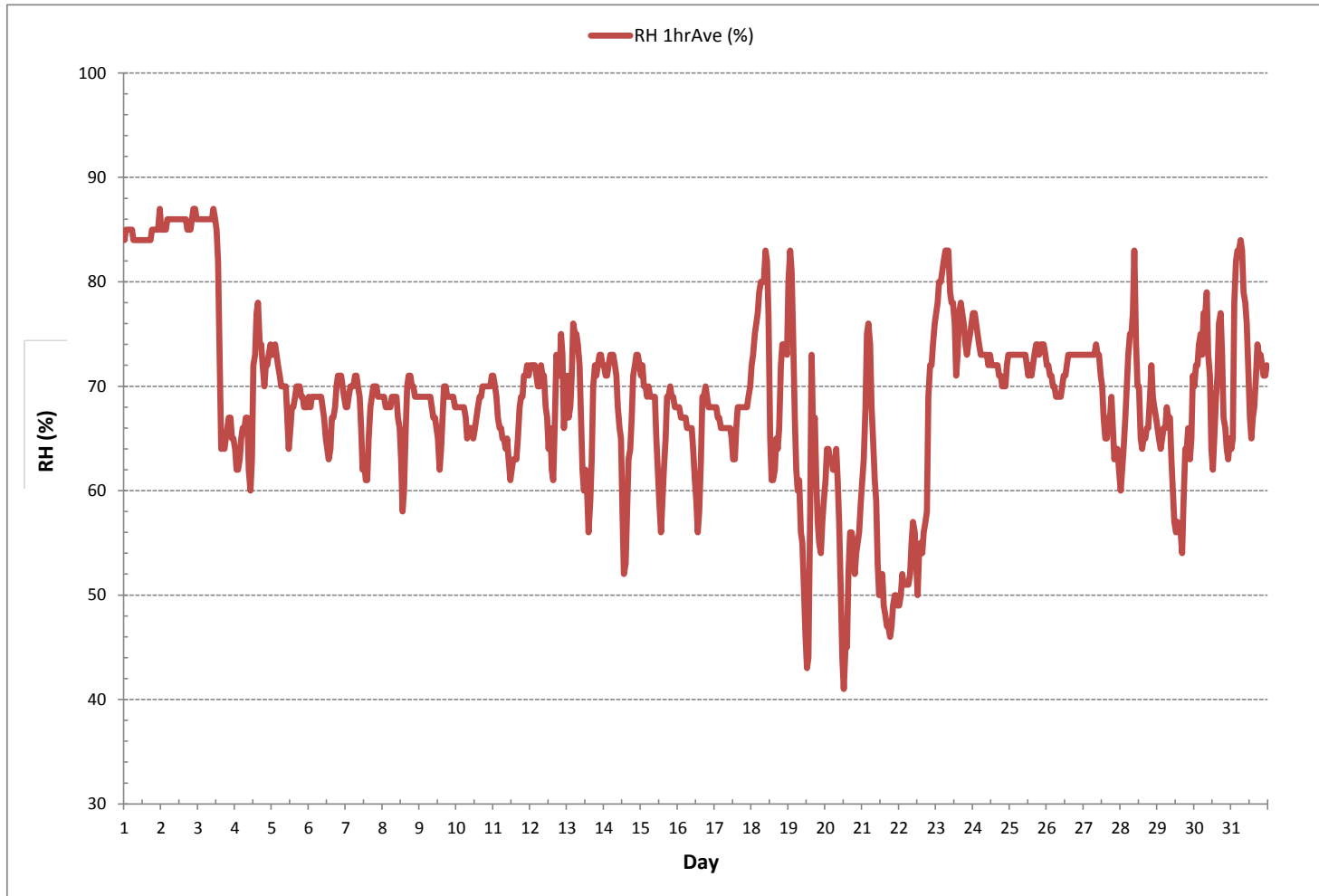
24 HR AVERAGES December 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	41	%	@ HOUR(S)	12	ON DAY(S)	20
MAXIMUM 1-HR AVERAGE:	87	%	@ HOUR(S)	VAR , 10	ON DAY(S)	2 , 3
MAXIMUM 24-HR AVERAGE:	86	%			ON DAY(S)	2
					VAR-VARIOUS	
				OPERATIONAL TIME:		744 hrs
				AMD OPERATION UPTIME:		100.0 %
STANDARD DEVIATION:	8			MONTHLY AVERAGE:		69 %

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



## ***BAROMETRIC PRESSURE***



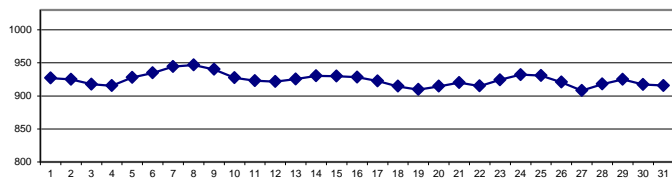
BAROMETRIC PRESSURE Hourly Averages (BP mbar)

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

STATUS FLAG CODES

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

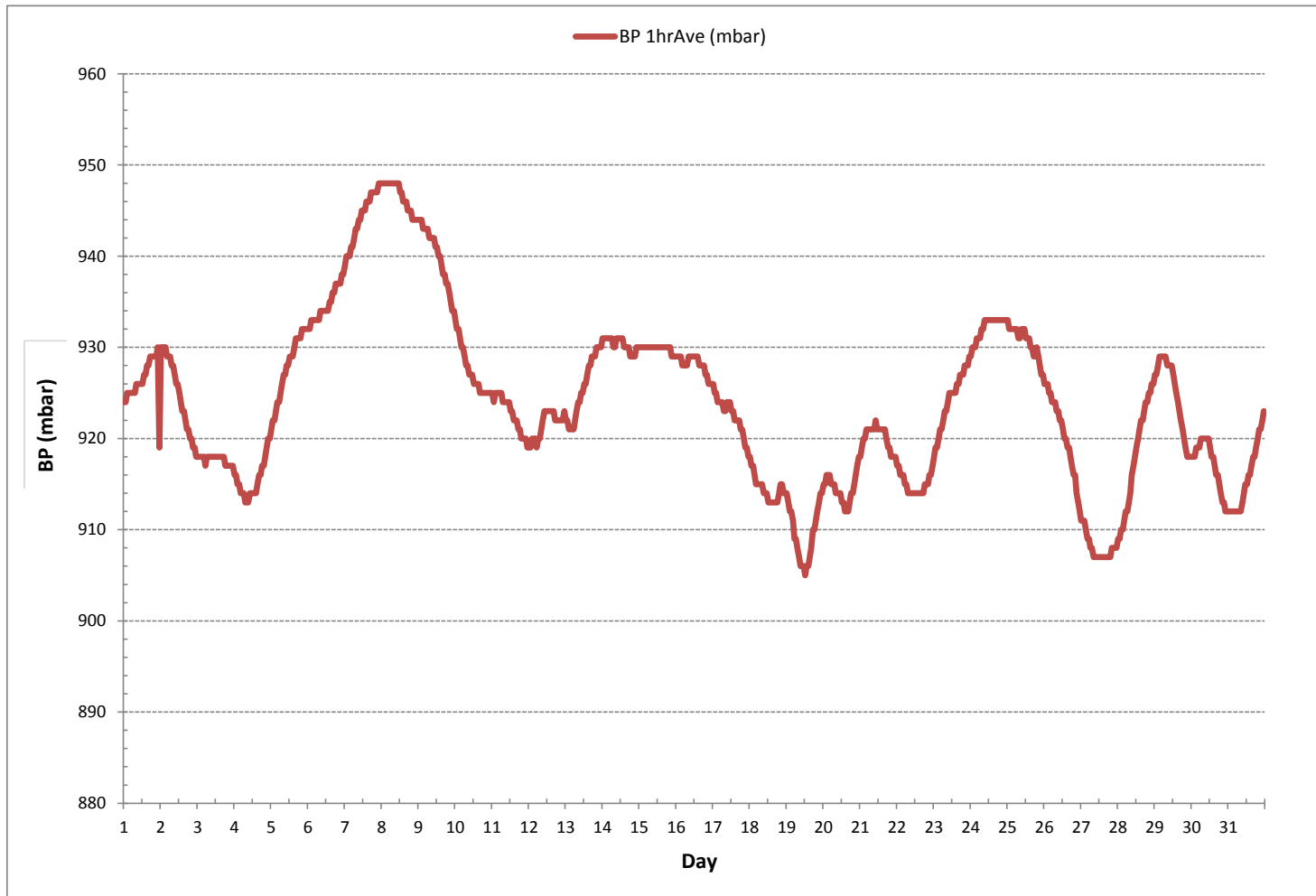
24 HR AVERAGES December 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	905 mbar	@ HOUR(S)	12	ON DAY(S)	19
MAXIMUM 1-HR AVERAGE:	948 mbar	@ HOUR(S)	VAR , VAR	ON DAY(S)	7 , 8
MAXIMUM 24-HR AVERAGE:	947 mbar			ON DAY(S)	8
				VAR-VARIOUS	
		OPERATIONAL TIME:		744	hrs
		AMD OPERATION UPTIME:		100.0	%
STANDARD DEVIATION:	9	MONTHLY AVERAGE:		924	mbar

**BAROMETRIC PRESSURE Hourly Averages (BP mbar)**



***AMBIENT TEMPERATURE***



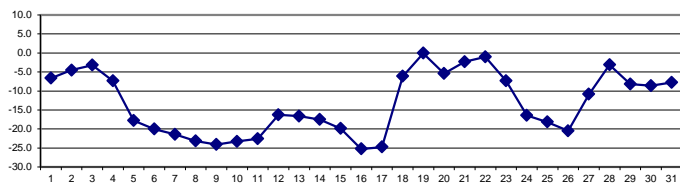
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

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	-6.9	-7.0	-7.1	-7.2	-7.3	-7.4	-7.4	-7.3	-7.3	-7.0	-6.7	-6.6	-6.5	-6.5	-6.5	-6.7	-6.5	-6.4	-6.3	-6.1	-5.9	-5.8	-5.7	-5.7	-7.4	-5.7	-6.7	24	
2	-5.5	-5.5	-5.4	-5.3	-5.2	-5.0	-5.0	-4.9	-4.8	-4.6	-4.4	-4.0	-3.6	-3.7	-3.6	-3.7	-3.8	-3.9	-4.1	-4.2	-4.3	-4.5	-4.7	-5.0	-5.5	-3.6	-4.5	24	
3	-5.2	-5.3	-5.2	-5.1	-5.0	-5.0	-4.9	-4.7	-4.6	-4.3	-3.5	-3.2	-1.9	-0.1	1.1	0.4	-1.3	-1.7	-1.8	-2.4	-2.8	-3.1	-3.5	-3.8	-5.3	1.1	-3.2	24	
4	-3.9	-4.1	-4.3	-4.9	-5.6	-6.2	-6.3	-6.6	-6.8	-5.5	-4.2	-3.3	-4.1	-4.7	-5.3	-5.7	-7.7	-9.4	-10.4	-11.8	-12.5	-13.5	-14.1	-14.5	-14.5	-3.3	-7.3	24	
5	-14.9	-15.2	-15.6	-16.1	-16.7	-17.3	-17.7	-18.1	-18.1	-18.0	-17.6	-17.4	-17.5	-17.5	-17.9	-18.2	-18.6	-19.1	-19.2	-19.6	-19.6	-19.9	-20.1	-20.1	-20.1	-20.1	-14.9	-17.8	24
6	-20.1	-20.1	-20.2	-20.2	-20.3	-20.5	-20.3	-20.2	-20.1	-19.6	-19.0	-18.5	-18.4	-18.2	-18.9	-19.6	-20.0	-20.4	-20.7	-21.1	-21.2	-21.4	-21.2	-20.4	-21.4	-18.2	-20.0	24	
7	-20.3	-20.4	-21.1	-21.5	-21.6	-21.7	-21.9	-22.1	-22.0	-21.6	-20.6	-19.5	-19.7	-19.1	-19.3	-20.9	-21.9	-22.2	-22.5	-22.6	-22.6	-22.4	-22.7	-23.3	-23.3	-19.1	-21.4	24	
8	-23.3	-24.0	-24.7	-25.1	-24.6	-23.7	-23.3	-23.2	-23.0	-22.3	-21.4	-21.4	-20.2	-18.7	-19.5	-21.5	-23.1	-23.4	-24.1	-24.8	-25.3	-25.4	-25.7	-25.7	-25.7	-18.7	-23.2	24	
9	-26.1	-26.2	-25.9	-25.7	-26.3	-26.1	-25.9	-25.8	-25.4	-24.6	-23.3	-21.1	-19.6	-18.6	-20.0	-21.9	-23.5	-23.8	-24.1	-24.5	-24.7	-24.8	-24.9	-25.1	-26.3	-18.6	-24.1	24	
10	-25.6	-25.6	-25.4	-25.8	-25.8	-25.7	-25.8	-28.1	-28.2	-25.6	-22.9	-20.4	-20.5	-20.5	-20.8	-21.6	-22.1	-22.2	-21.8	-21.2	-20.9	-20.7	-20.5	-20.4	-28.2	-20.4	-23.3	24	
11	-20.1	-20.7	-22.4	-24.5	-26.0	-26.6	-27.0	-26.9	-26.3	-25.5	-23.6	-22.8	-22.3	-21.8	-20.9	-20.7	-21.1	-21.0	-21.3	-21.0	-20.3	-19.7	-19.8	-19.3	-27.0	-19.3	-22.6	24	
12	-19.0	-18.9	-18.8	-19.2	-18.8	-18.2	-17.3	-16.7	-17.2	-17.8	-17.0	-16.0	-15.3	-14.9	-14.8	-14.5	-15.1	-14.9	-14.8	-14.3	-14.3	-14.2	-14.5	-14.8	-19.2	-14.2	-16.3	24	
13	-15.0	-14.6	-14.0	-13.9	-13.8	-13.7	-14.0	-16.1	-16.8	-16.5	-15.1	-15.7	-15.5	-15.7	-16.1	-16.9	-17.9	-18.9	-19.5	-19.9	-20.2	-20.1	-19.7	-19.4	-20.2	-13.7	-16.6	24	
14	-19.6	-18.6	-18.3	-18.9	-19.6	-20.6	-21.0	-21.8	-22.3	-21.6	-19.0	-17.1	-14.8	-12.9	-12.9	-13.3	-15.1	-15.2	-15.8	-15.8	-16.0	-16.4	-16.6	-16.9	-22.3	-12.9	-17.5	24	
15	-16.9	-17.6	-17.7	-17.3	-16.8	-16.7	-16.8	-17.9	-18.4	-18.4	-18.2	-18.3	-17.4	-17.1	-19.2	-20.8	-22.0	-23.2	-23.5	-24.1	-24.3	-24.5	-24.9	-24.5	-24.9	-16.7	-19.9	24	
16	-25.1	-26.0	-26.3	-26.6	-27.1	-27.2	-27.2	-28.2	-27.6	-25.4	-22.9	-21.7	-20.7	-19.8	-20.8	-22.5	-24.8	-25.8	-26.0	-26.2	-26.8	-27.2	-27.1	-27.1	-28.2	-19.8	-25.3	24	
17	-27.2	-26.9	-26.2	-26.6	-27.1	-28.0	-28.1	-27.8	-27.7	-25.9	-22.6	-21.6	-20.8	-19.8	-22.1	-23.5	-24.2	-24.6	-24.9	-24.8	-24.5	-24.0	-22.8	-21.7	-28.1	-19.8	-24.7	24	
18	-20.2	-18.5	-16.5	-15.2	-14.0	-11.8	-10.0	-8.9	-7.9	-6.4	-4.9	-3.8	-2.4	-1.7	-1.2	-0.4	-0.7	-0.5	-0.4	-0.3	-0.5	-0.6	-0.8	-0.1	-20.2	-0.1	-6.2	24	
19	-0.2	-0.6	-0.7	-0.5	-0.5	-0.3	0.3	1.0	1.2	0.8	0.9	1.7	2.6	3.1	1.3	-0.4	-0.1	-0.8	-0.9	-1.1	-1.4	-1.6	-2.5	-3.2	-3.2	3.1	-0.1	24	
20	-3.6	-4.3	-4.3	-4.4	-4.6	-4.9	-5.8	-6.8	-6.7	-5.4	-3.7	-2.4	-1.8	-2.8	-3.0	-6.2	-7.4	-7.4	-7.2	-6.5	-6.8	-7.1	-7.8	-8.5	-8.5	-1.8	-5.4	24	
21	-8.9	-9.3	-7.8	-6.9	-6.0	-6.0	-4.6	-4.1	-3.3	-2.6	-1.2	-0.4	-1.0	-0.6	0.4	1.1	0.9	0.3	0.8	0.9	0.8	1.0	0.5	0.5	-9.3	1.1	-2.3	24	
22	0.4	-0.1	-0.6	-0.2	-0.4	-0.3	-0.3	-0.6	-1.6	-2.1	-1.9	-1.2	0.2	-0.6	-0.6	-0.4	-1.0	-1.2	-1.3	-1.8	-2.0	-2.4	-2.9	-3.0	-3.0	0.4	-1.1	24	
23	-3.1	-3.4	-4.2	-4.0	-4.3	-4.3	-4.4	-4.6	-5.0	-5.0	-5.7	-6.0	-6.3	-7.3	-8.6	-9.3	-9.8	-11.0	-11.8	-12.6	-13.2	-13.6	-13.8	-13.8	-13.8	-3.1	-7.3	24	
24	-13.8	-14.0	-14.4	-14.7	-15.4	-16.2	-16.4	-16.6	-16.8	-17.0	-16.9	-16.7	-16.0	-15.8	-16.1	-16.9	-17.8	-17.7	-17.6	-17.6	-17.4	-17.6	-17.6	-17.9	-17.9	-13.8	-16.5	24	
25	-18.2	-18.4	-18.5	-18.5	-18.7	-18.8	-18.9	-18.9	-18.9	-18.6	-17.7	-15.6	-15.7	-16.0	-15.8	-17.4	-19.1	-18.8	-18.0	-18.1	-18.7	-19.3	-19.5	-19.9	-19.9	-15.6	-18.2	24	
26	-20.6	-21.5	-21.7	-22.3	-22.8	-23.0	-23.4	-23.6	-23.8	-23.3	-21.5	-20.4	-19.2	-18.6	-17.8	-17.9	-18.7	-19.1	-19.2	-19.2	-19.0	-18.9	-18.9	-18.1	-23.8	-17.8	-20.5	24	
27	-17.2	-17.1	-17.3	-16.4	-15.6	-15.3	-15.1	-15.3	-14.9	-14.4	-13.0	-10.6	-9.1	-7.8	-7.0	-6.7	-6.6	-6.7	-7.2	-6.2	-5.5	-5.7	-5.5	-4.5	-17.3	-4.5	-10.9	24	
28	-3.7	-4.3	-4.2	-4.1	-4.1	-4.4	-4.4	-3.8	-3.2	-2.9	-1.7	-1.3	-0.8	-0.7	-0.8	-0.9	-1.3	-2.1	-2.6	-2.8	-4.2	-5.2	-5.7	-6.1	-6.1	-0.7	-3.1	24	
29	-6.2	-6.6	-6.7	-7.0	-7.6	-8.0	-8.9	-8.9	-9.6	-9.2	-8.9	-8.0	-7.4	-7.5	-7.5	-7.6	-7.4	-8.0	-9.2	-9.2	-9.2	-8.9	-9.2	-10.0	-10.0	-6.2	-8.2	24	
30	-9.7	-9.6	-10.0	-10.9	-11.0	-10.6	-11.5	-11.5	-12.6	-12.2	-11.5	-8.9	-6.8	-6.6	-5.6	-6.2	-7.5	-7.5	-6.6	-5.7	-5.6	-6.0	-6.2	-6.4	-12.6	-5.6	-8.6	24	
31	-6.1	-5.6	-6.0	-6.1	-6.2	-6.5	-6.5	-6.6	-7.5	-7.5	-6.9	-6.3	-5.8	-5.7	-6.6	-7.5	-9.1	-10.4	-11.0	-11.0	-10.7	-10.4	-10.3	-11.0	-5.6	-7.8	24		
HOURLY MAX	0.4	-0.1	-0.6	-0.2	-0.4	-0.3	0.3	1.0	1.2	0.8	0.9	1.7	2.6	3.1	1.3	1.1	0.9	0.3	0.8	0.9	0.8	1.0	0.5	0.5					
HOURLY AVG	-13.7	-13.9	-13.9	-14.0	-14.2	-14.2	-14.2	-14.4	-14.4	-13.9	-12.8	-11.9	-11.2	-10.9	-11.1	-11.8	-12.7	-13.1	-13.3	-13.3	-13.5	-13.6	-13.8	-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 December 2016

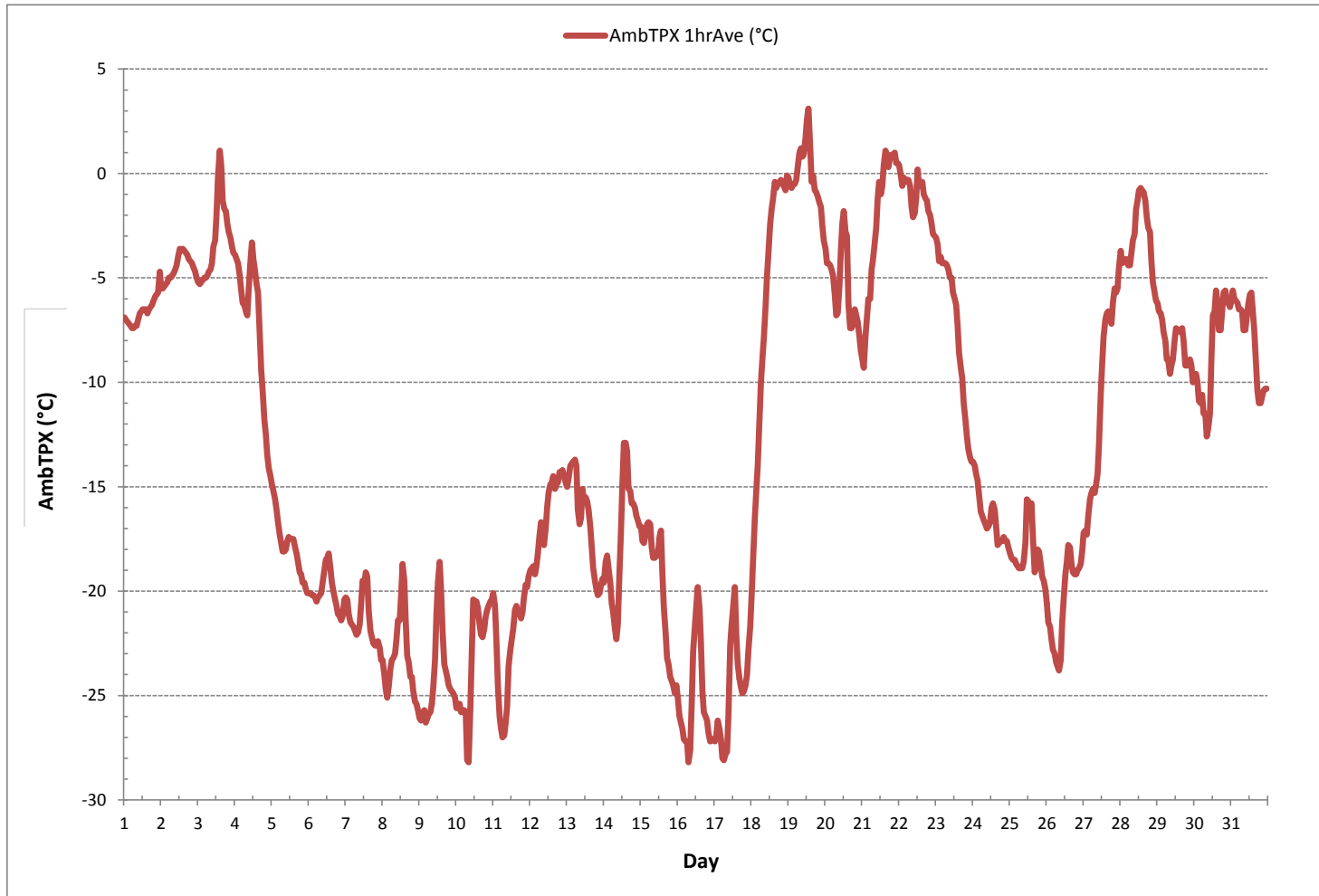


MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-28.2 °C	@ HOUR(S)	8 , 7	ON DAY(S)	10 , 16
MAXIMUM 1-HR AVERAGE:	3.1 °C	@ HOUR(S)	13	ON DAY(S)	19
MAXIMUM 24-HR AVERAGE:	-0.1 °C			ON DAY(S)	19
				VAR-VARIOUS	
OPERATIONAL TIME:				744	hrs
AMD OPERATION UPTIME:				100.0	%
STANDARD DEVIATION:	8.4			MONTHLY AVERAGE:	-13.2 °C



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



## ***PRECIPITATION***

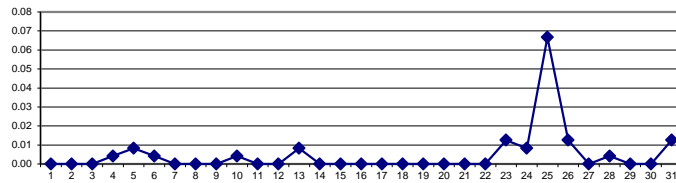
PRECIPITATION Hourly Averages (mm)

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

STATUS FLAG CODES

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

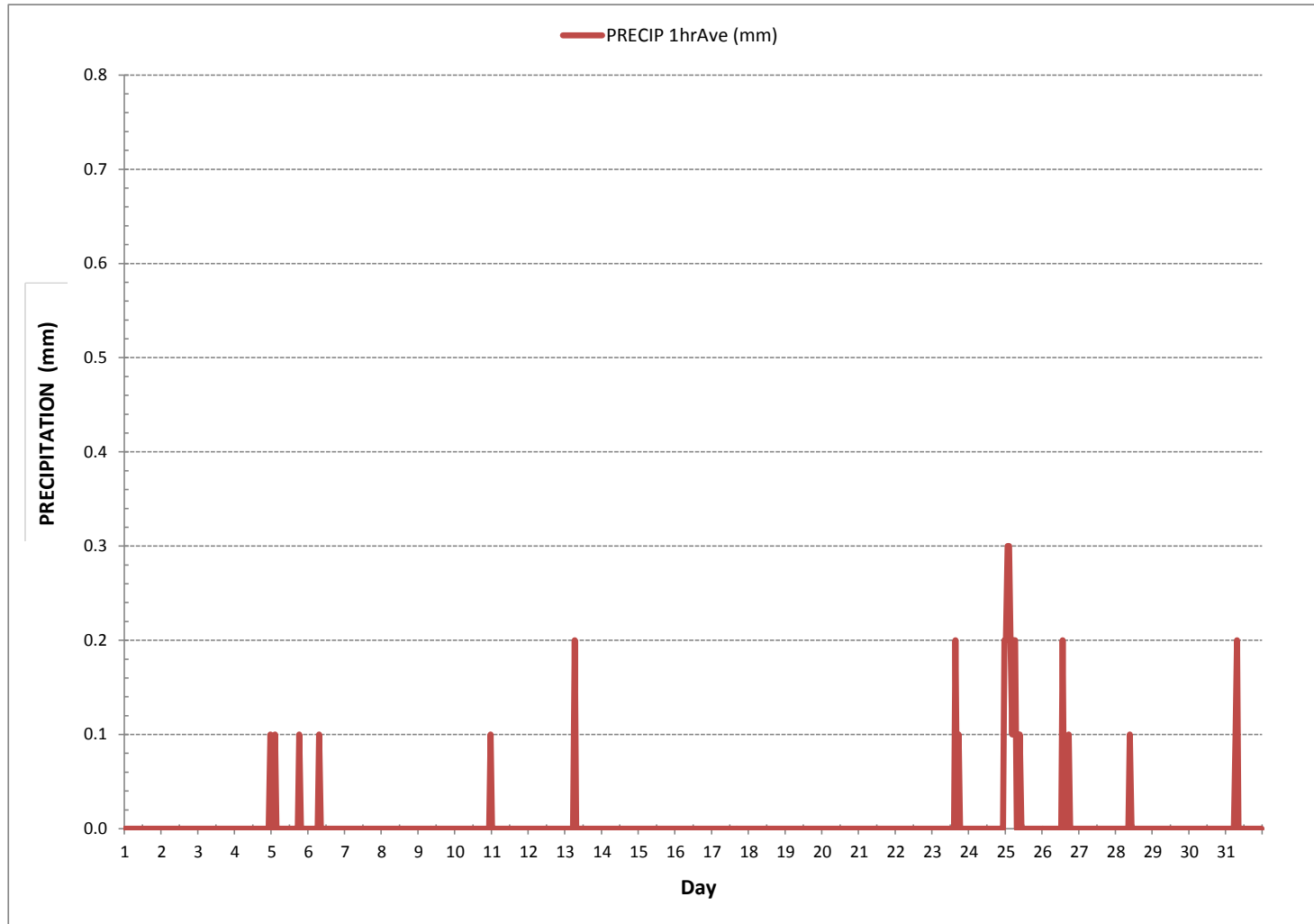
24 HR AVERAGES December 2016



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	0.0 mm	@ HOUR(S)	VAR	ON DAY(S)	ALL
MAXIMUM 1-HR AVERAGE:	0.3 mm	@ HOUR(S)	1, 2	ON DAY(S)	25, 25
MAXIMUM 24-HR AVERAGE:	0.1 mm			ON DAY(S)	25
MONTHLY TOTAL	3.5 mm			VAR-VARIOUS	
OPERATIONAL TIME:				744 hrs	
AMD OPERATION UPTIME:				100.0 %	
STANDARD DEVIATION:	0.0			MONTHLY AVERAGE:	0.0 mm

PRECIPITATION Hourly Averages (mm)



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

***SULPHUR DIOXIDE***



## API 100E Sulphur Dioxide Analyzer Calibration

Date: December 21, 2016	Barometric Pressure: 0.912 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: St. Lina	Weather Conditions: A few clouds
Parameter: Sulphur Dioxide	Calibration Purpose: routine monthly
Start Time 24 hr. (mst): 11:36	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
End Time 24 hr. (mst): 15:37	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: 468	Range ppb: 1000	Station SO2 Analyzer Range? ppb
Last Calibration Date: November 2, 2016	As Found C.F.: 0.997	
Previous C.F.: 1.000	New C.F.: 0.999	

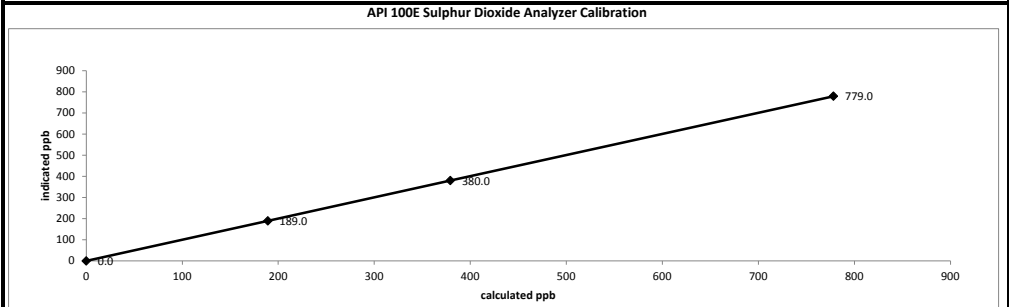
<b>Calibrator:</b>	<b>Standard Calibration Points for Ranges</b>								
Flow Meter ID's: n/a	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Point</td><td>ppb</td></tr> <tr><td>High</td><td>780</td></tr> <tr><td>Mid</td><td>380</td></tr> <tr><td>Low</td><td>190</td></tr> </table>	Point	ppb	High	780	Mid	380	Low	190
Point	ppb								
High	780								
Mid	380								
Low	190								
Make & Model: API 700									
Serial #: 627									
Cal Gas Cylinder I.D. #: LL104222									
Cal Gas Conc. (ppm): 50.6									

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

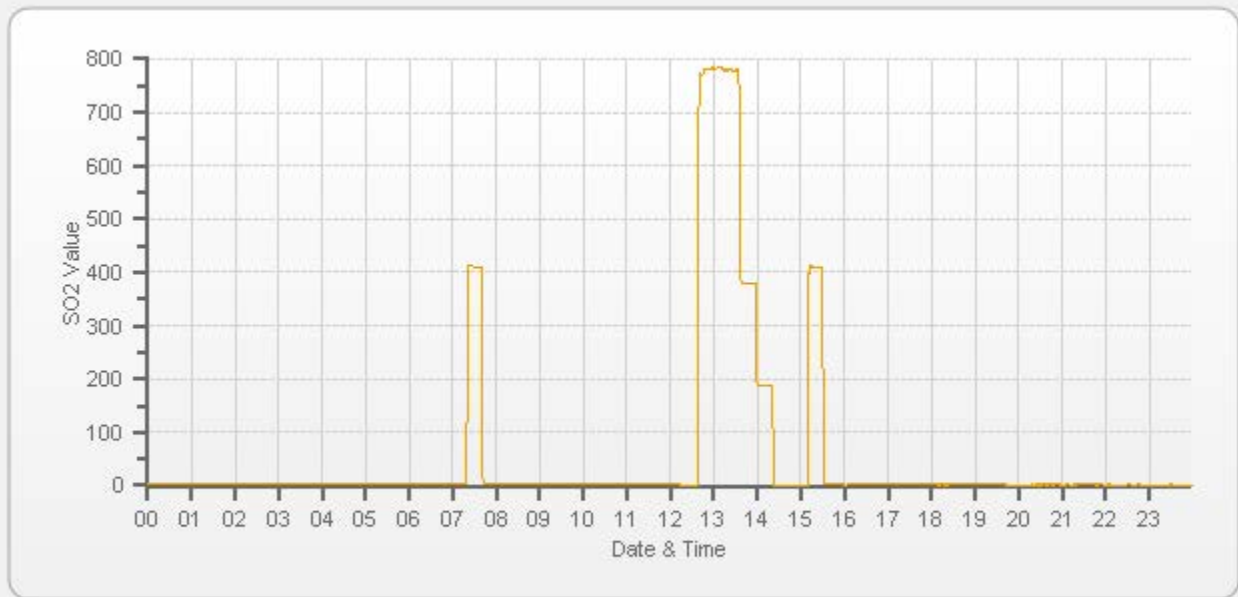
Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	5000	0.00	5000	0.0	2.6	n/a
as found high	4923	76.90	5000	778.2	783.0	0.997
adjusted zero	5000	0.00	5000	0.0	0.0	n/a
adjusted high	4923	76.90	5000	778.2	779.0	0.999
mid	4966	37.50	5004	379.2	380.0	0.998
low	4982	18.70	5001	189.2	189.0	1.001
calibrator zero	5000	0.00	5000	0.0	0.0	n/a
Average C.F.=					0.999	

**Linear Regression/Calibration Results:**

Correlation Coefficient = <u>1.000</u>	<b>LIMITS</b>
Slope = <u>0.999</u>	> or = 0.995
b (Intercept as % of full scale) = <u>0.01%</u>	.95-1.05
% change in C.F. from last cal = <u>0.28%</u>	± 3% F.S.
	± 10%



**Comments:**  
The analyzer sample inlet filter was changed.



— SO2[ppb]



***HYDROGEN SULPHIDE***



## API 101E Hydrogen Sulphide Analyzer Calibration

Date: December 21, 2016	Barometric Pressure: 0.912 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: St. Lina	Weather Conditions: A few clouds
Parameter: Hydrogen Sulphide	Calibration Purpose: routine monthly
Start Time 24 hr. (mst): 11:36	Performed By/Reviewer: Alex Yakupov Trina Whitsitt
End Time 24 hr. (mst): 15:33	Cal Gas Expiry Date: June 14, 2019
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:	
ID# or Serial Number: 509	Range ppb: 100
Last Calibration Date: November 2, 2016	As Found C.F.: 0.978
Previous C.F.: 1.001	New C.F.: 0.998

Calibrator: Flow Meter ID's: n/a Make & Model: SABIO 2010 D Serial #: 11900613 Cal Gas Cylinder I.D. #: EY0000654 Cal Gas Conc. (ppm): 10.2	<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>SO<sub>2</sub> Scrubber Check (10 mins.)</b> Start/End Time 24 hr.: 12:33/12:43 Target Concentration (ppb): 780 Result (ppb): 0.7 Zero Corrected Result (ppb): 1 **warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**
Point	ppb									
High	78									
Mid	38									
Low	19									

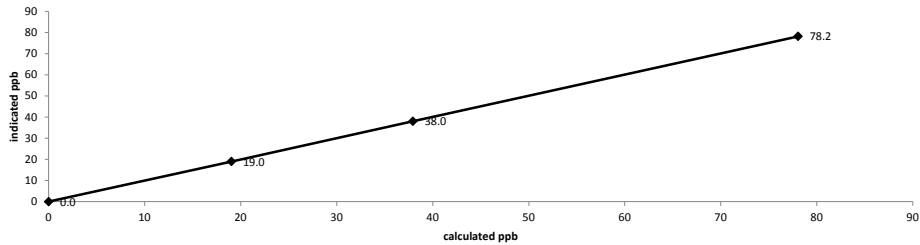
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	7500	0.00	7500	0.0	1.0	n/a
as found high	7443	57.40	7500	78.1	80.8	0.978
adjusted zero	7500	0.00	7500	0.0	0.0	n/a
adjusted high	7443	57.40	7500	78.1	78.2	0.998
mid	7471	27.90	7499	37.9	38.0	0.999
low	7486	14.00	7500	19.0	19.0	1.002
calibrator zero	7500	0.00	7500	0.0	0.0	n/a
Average C.F.=						1.000

**Linear Regression/Calibration Results:**

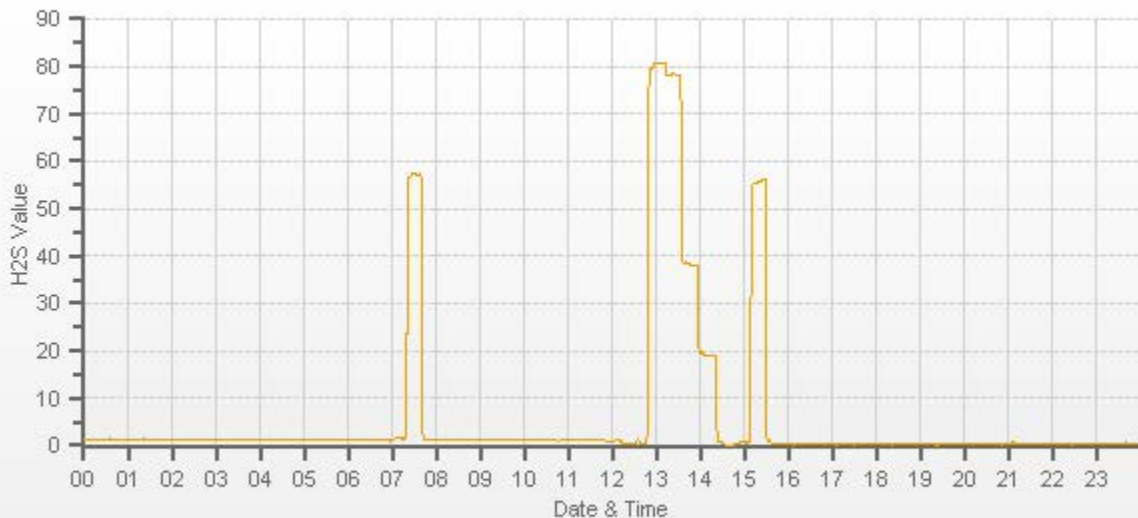
Correlation Coefficient = 1.000	LIMITS > or = 0.995
Slope = 0.998	.95-1.05
b (Intercept as % of full scale) = 0.03%	± 3% F.S.
% change in C.F. from last cal = 2.28%	± 10%

API 101E Hydrogen Sulphide Analyzer Calibration



<b>As found:</b> SLOPE: 0.934 OFFSET: 51.2 HVPS: 675 RCELL TEMP: 50.0 BOX TEMP: 31.8 PMT TEMP: 8.0 IZS TEMP: 48.0 Converter Temp: 314.8 PRES: 20.3 SAMP FL: 554 UV LAMP: 3571.7 LAMP RATIO: 95.6 STR. LGT: 23.9 DRK PMT: 0.4 DRK LMP: 0.3 Expected Value: 56.3	<b>As left:</b> SLOPE: 0.919 OFFSET: 53.1 HVPS: 675 RCELL TEMP: 50.0 BOX TEMP: 33.2 PMT TEMP: 8.0 IZS TEMP: 48.0 Converter Temp: 315.2 PRES: 20.3 SAMP FL: 551 UV LAMP: 3564.8 LAMP RATIO: 95.5 STR. LGT: 24.4 DRK PMT: 0.5 DRK LMP: 0.5 Expected Value: 56.0
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**Comments:**  
The analyzer sample inlet filter was changed.



— H2S[ppb]

***TOTAL HYDROCARBON***



## Thermo 51C Total Hydrocarbon Analyzer Calibration

Date: December 20, 2016	Barometric Pressure: 0.906 atm
Company/Airshed: UICA	Station Temperature °C: 22
Location/Station Name: St. Lina	Weather Conditions: Mix of sun and clouds
Parameter: Total Hydrocarbon	Calibration Purpose: routine monthly
Start/End Time 24 hr. (mst): 12:59 / 16:56	Performed By/Reviewer: Alex Yakupov / Trina Whitsitt
Calibration Method: Gas Dilution	Cal Gas Expiry Date: November 25, 2023

Analyzer:	
ID# or Serial Number: 51CLT-77021-384	Range ppm: 50
Last Calibration Date: November 2, 2016	As Found C.F.: 1.007
Previous Cal High Point C.F.: 0.999	New C.F.: 1.000

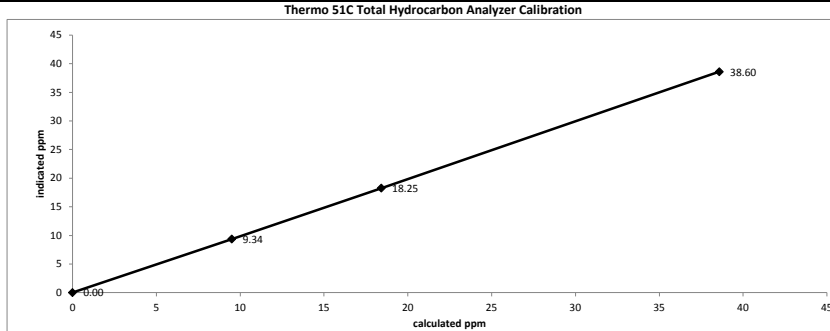
Calibrator:	
Flow Meter ID's: n/a	Standard Calibration Points for a Range of: 50 ppm
Make & Model: API 700	
Serial #: 627	
Cal Gas Cylinder I.D. #: LL165372	
CH <sub>4</sub> /C <sub>2</sub> H <sub>6</sub> Cylinder Conc. (ppm): 606.0      212.0	
CH <sub>4</sub> as propane/total CH <sub>4</sub> equivalents (ppm): 583.0      1189.0	

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

Point	Calibrator Flow Rates (cc/min)			Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Diluent	Cal Gas	Total	(ppm)	(ppm)	
as found zero	1999	0.00	1999	0.0	-0.10	n/a
as found high	1938	65.00	2003	38.58	38.20	1.007
adjusted zero	1999	0.00	1999	0.00	0.00	n/a
adjusted high	1938	65.00	2003	38.58	38.60	1.000
mid	1970	31.00	2001	18.42	18.25	1.009
low	1986	16.00	2002	9.50	9.34	1.017
calibrator zero	1999	0.00	1999	0.0	0.00	n/a
<b>Average C.F. =</b>						<b>1.009</b>

**Linear Regression/Calibration Results:**

Correlation Coefficient = <b>1.000</b>	LIMITS
Slope = <b>0.999</b>	> or = 0.995
b (Intercept as % of full scale) = <b>0.21%</b>	.95-1.05
% change in C.F. from last cal = <b>-0.84%</b>	± 3% F.S.
	± 10%



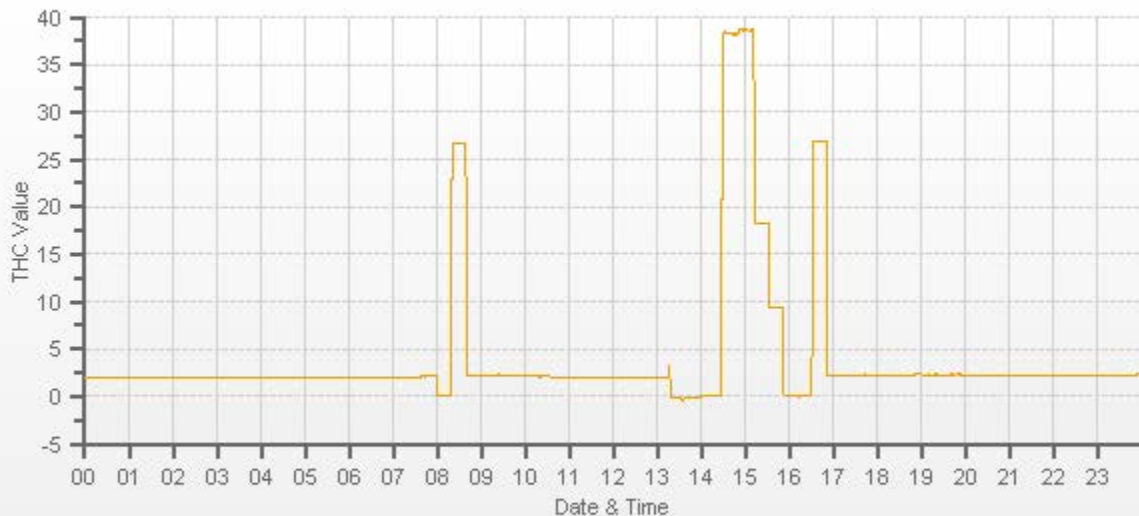
<p style="text-align: center; font-weight: bold; font-size: small;">As found:</p> <p>H2 cylinder (psi): 150</p> <p>H2 cylinder reg set (psi): 22</p> <p>Span Cylinder (psi): 1200</p> <p>Span Cylinder Reg Set (psi): 22</p> <p>Zero Air Gen Pressure: 47</p> <p>measurement alarms: None</p> <p>service alarms: None</p> <p>cnt: 1731</p> <p>rng: 1</p> <p>try: 1</p> <p>flm: 188.7</p> <p>det: 125.9</p> <p>Flame: 188</p> <p>Filter: 125</p> <p>Base: 125</p> <p>Sample psi: 06.90</p> <p>Internal Air Pressure: 20</p> <p>Internal Fuel Pressure: 13</p> <p>Measured Flow: 1.030</p> <p>Expected Value: 27.04</p>	<p style="text-align: center; font-weight: bold; font-size: small;">As left:</p> <p>H2 cylinder (psi): 2100</p> <p>H2 cylinder reg set (psi): 24</p> <p>Span Cylinder (psi): 1200</p> <p>Span Cylinder Reg Set (psi): 22</p> <p>Zero Air Gen Pressure: 47</p> <p>measurement alarms: None</p> <p>service alarms: None</p> <p>cnt: 1761</p> <p>rng: 1</p> <p>try: 1</p> <p>flm: 189.4</p> <p>det: 125.5</p> <p>Flame: 189</p> <p>Filter: 125</p> <p>Base: 125</p> <p>Sample psi: 06.90</p> <p>Internal Air Pressure: 20</p> <p>Internal Fuel Pressure: 13</p> <p>Measured Flow: n/a</p> <p>Expected Value: 26.87</p>
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**Comments:**

The analyzer sample inlet filter was changed.

A new hydrogen cylinder was installed.

The analyzer cooling fan filter(s) were cleaned.



— THC[ppm]

***NITROGEN DIOXIDE***



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

Date: December 21, 2016	Barometric Pressure: 0.912 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: St. Lina	Weather Conditions: A few clouds
Start/End Time 24 hr. (mst): 11:36 / 17:38	Calibration Purpose: routine monthly
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Alex Yakupov   Trina Whitsitt
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: July 18, 2019

<b>Analyzer:</b>  ID# or Serial Number: 594 Last Calibration Date: November 2, 2016 Range ppb: 1000	<b>Correction Factors:</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>NO =</td> <td>0.999</td> <td>1.005</td> <td>1.000</td> </tr> <tr> <td>NO<sub>2</sub> =</td> <td>1.006</td> <td>1.006</td> <td>1.006</td> </tr> <tr> <td>NOx =</td> <td>0.999</td> <td>1.006</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	0.999	1.005	1.000	NO <sub>2</sub> =	1.006	1.006	1.006	NOx =	0.999	1.006	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	0.999	1.005	1.000														
NO <sub>2</sub> =	1.006	1.006	1.006														
NOx =	0.999	1.006	1.000														

<b>Calibrator:</b> Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. #: LL104222 NO/NOx Gas Conc. (ppm): 50.7   50.9	<b>Standard Calibration Points for a Range of: 1000 ppb</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO<sub>2</sub> (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> <td>500</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>275</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>190</td> <td>100</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO <sub>2</sub> (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO <sub>2</sub> (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	5000	0.0	5000	0	0	0.0	1.0	n/a	n/a
as found high	4923	76.9	5000	779.8	779.8	776.0	776.0	1.005	1.006
adjusted zero	5000	0.00	5000	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4923	76.90	5000	779.8	779.8	780.0	780.0	1.000	1.000
mid	4966	37.50	5004	380.0	380.0	379.0	379.0	1.003	1.003
low	4982	18.70	5001	189.6	189.6	189.0	189.0	1.003	1.003
calibrator zero	5000	0.00	5000	0	0	0.0	0.0	n/a	n/a
Average C.F.=								1.002	1.002

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO <sub>2</sub>	NO drop	NO <sub>2</sub> gain	NO <sub>2</sub> C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	4923	76.90	5000	0.0	782.0	780.0	-2.0	0.0	-2.0	
as found high NO <sub>2</sub>	4799	76.90	4876	490.0	272.0	778.0	505.0	510.0	507.0	1.006
adjusted high NO <sub>2</sub>	4799	76.90	4876	490.0	272.0	778.0	505.0	510.0	507.0	1.006
gpt mid	4799	76.90	4876	270.0	499.0	778.0	279.0	283.0	281.0	1.007
gpt low	4799	76.90	4876	100.0	679.0	779.0	101.0	103.0	103.0	1.000
Average NO <sub>2</sub> C.F.=									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 =	1.000	1.000	1.004	.95-1.05
b (Intercept as % of full scale)=	-0.05%	-0.05%	-0.10%	± 3% F.S.
% change in C.F. from last cal=	-0.59%	-0.72%	0.01%	± 10%
NO <sub>2</sub> converter efficiency			1.00	0.96 to 1.04

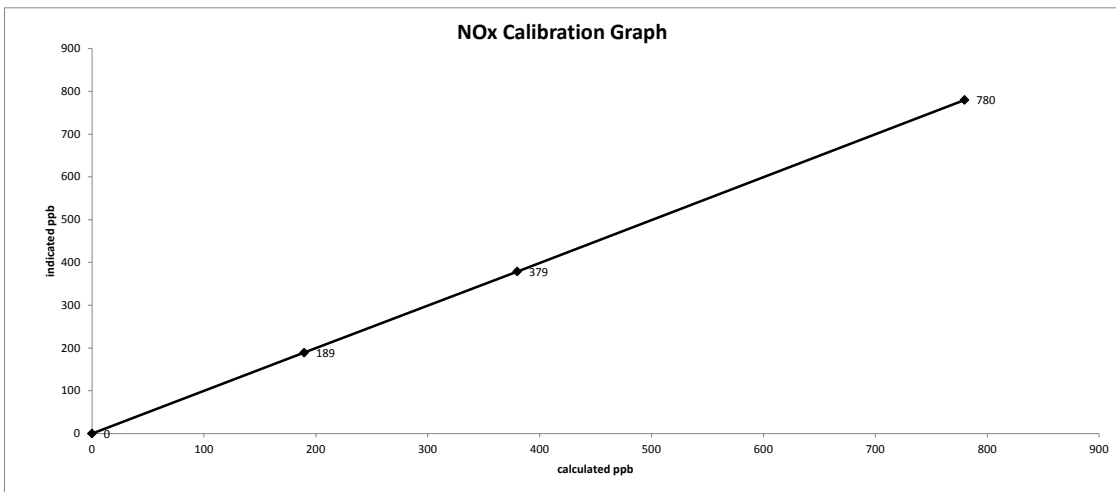
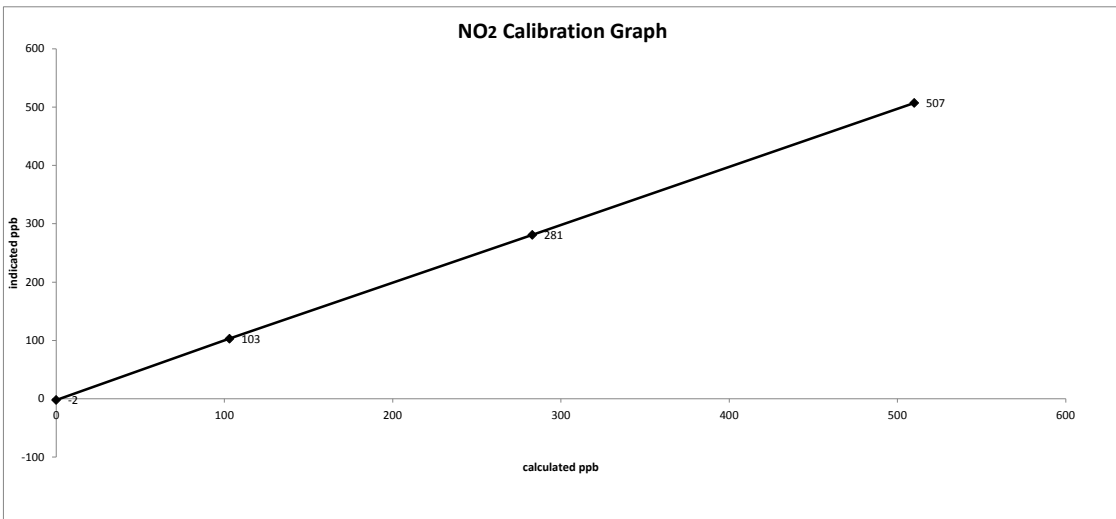
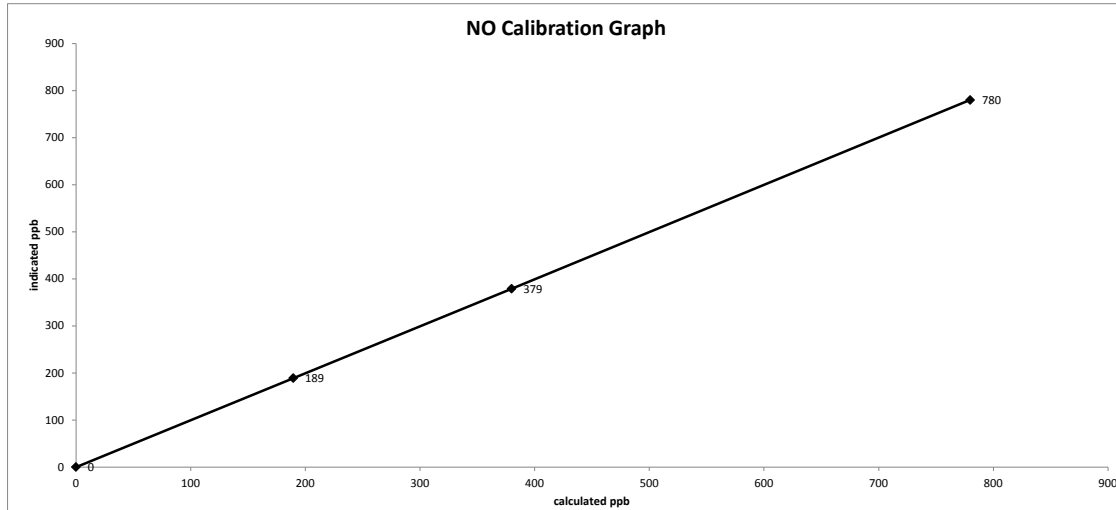
As found:		As left:	
NOx SLOPE:	0.986	NOx SLOPE:	0.990
NOx OFFS:	2.6	NOx OFFS:	1.2
NO SLOPE:	0.996	NO SLOPE:	1.001
NO OFFS:	0.5	NO OFFS:	0.8
SAMP FLW:	479	SAMP FLW:	479
OZONE FL:	77	OZONE FL:	77
PMT:	27.5	PMT:	14.0
NORM PMT:	6.6	NORM PMT:	3.3
AZERO:	16.4	AZERO:	16.7
HVPS:	767	HVPS:	767
RCELL TEMP:	50.0	RCELL TEMP:	50.0
BOX TEMP:	31.6	BOX TEMP:	33.2
PMT TEMP:	6.7	PMT TEMP:	6.7
IZS TEMP:	45.3	IZS TEMP:	45.0
MOLY TEMP:	314.0	MOLY TEMP:	315.3
RCEL:	5.1	RCEL:	5.1
SAMP:	26.4	SAMP:	26.0
Expected Value NO:	7.2	Expected Value NO:	7.3
Expected Value NO <sub>2</sub> :	498.0	Expected Value NO <sub>2</sub> :	502.0
Expected Value NOx:	505.0	Expected Value NOx:	509.0

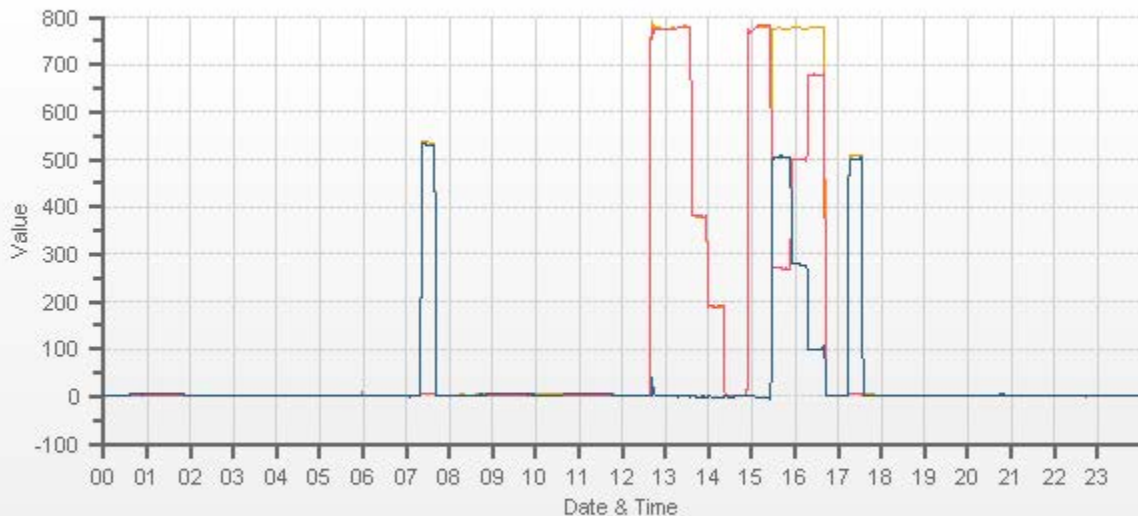
**Comments:**  
 The analyzer sample inlet filter was changed. No high point NO<sub>2</sub> adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.



Date: December 21, 2016  
Company/Airshed: LICA  
Location/Station Name: St. Lina

Start/End Time 24 hr. (mst): 11:36 / 17:38  
Calibration Purpose: routine monthly  
Calibration Method: Gas Dilution & Gas Phase Titration





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

# ***OZONE***

# Maxxam Thermo 49i Ozone Analyzer Calibration

A Bureau Veritas Group Company

**Date:** December 20, 2016  
**Company/Airshed:** LICA  
**Location/Station Name:** St. Lina  
**Start/End Time 24 hr. (mst):** 12:59 / 17:18  
**Ozone Calibration Method:** Varying UV Lamp Power  
**G.P.T. Date:** n/a-done by Varying UV Lamp Power  
**Barometric Pressure:** 0.906 atm  
**Station Temperature °C:** 22  
**Weather Conditions:** Mix of sun and clouds  
**Calibration Purpose:** routine monthly  
**Performed By/Reviewer:** Alex Yakupov / Trina Whitsitt  
**Cal Gas Expiry Date:** n/a

**Analyzer:**  
**ID# or Serial Number:** 1002240371  
**Last Calibration Date:** November 2, 2016  
**Previous Cal High Point C.F.:** 1.000  
**Ozone Range ppb:** 500  
**As Found C.F.:** 0.990  
**New C.F.:** 1.000

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

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

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

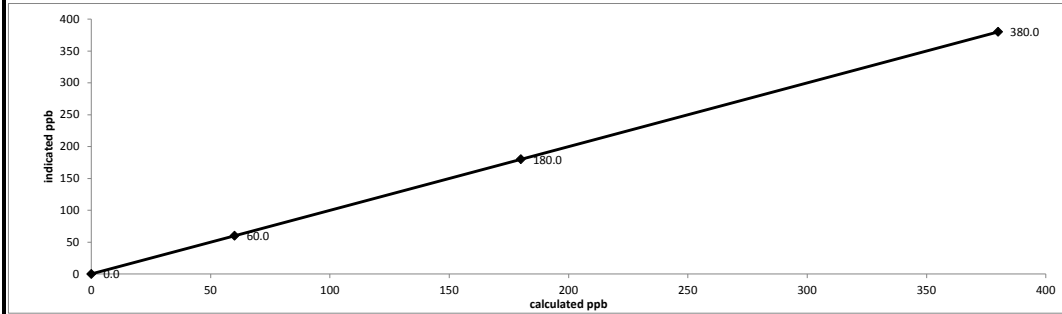
Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5000	5000	0.0	n/a	0.0	n/a
as found high	5000	5000	380.0	380.0	384.0	0.990
adjusted zero	5000	5000	0.0	0.0	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	180.0	180.0	180.0	1.000
low	5000	5000	60.0	60.0	60.0	1.000
calibrator zero	5000	5000	0.0	n/a	0.0	n/a
Average C.F. =						1.000

Linear Regression/Calibration Results:

**Correlation Coefficient =** 1.000  
**Slope =** 1.000  
**b (Intercept as % of full scale) =** 0.00%  
**% change in C.F. from last cal =** 1.04%

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

Thermo 49i Ozone Analyzer Calibration



**As found:**

O3 Bkg: 0.9  
 O3 Coef: 0.975  
 Photo Lamp: 9.4  
 O3 Lamp: 7.8  
 Bench: 27.4  
 Bench Lamp: 53.6  
 O3 Lamp: 67.9  
 Pressure: 668.7  
 Cell A lpm: 0.718  
 Cell B lpm: 0.714  
 O3 ppb: -0.9  
 Cell A ppb: -0.9  
 Cell B ppb: -9.5  
 Cell A int: 56351  
 Expected Value: 375.0

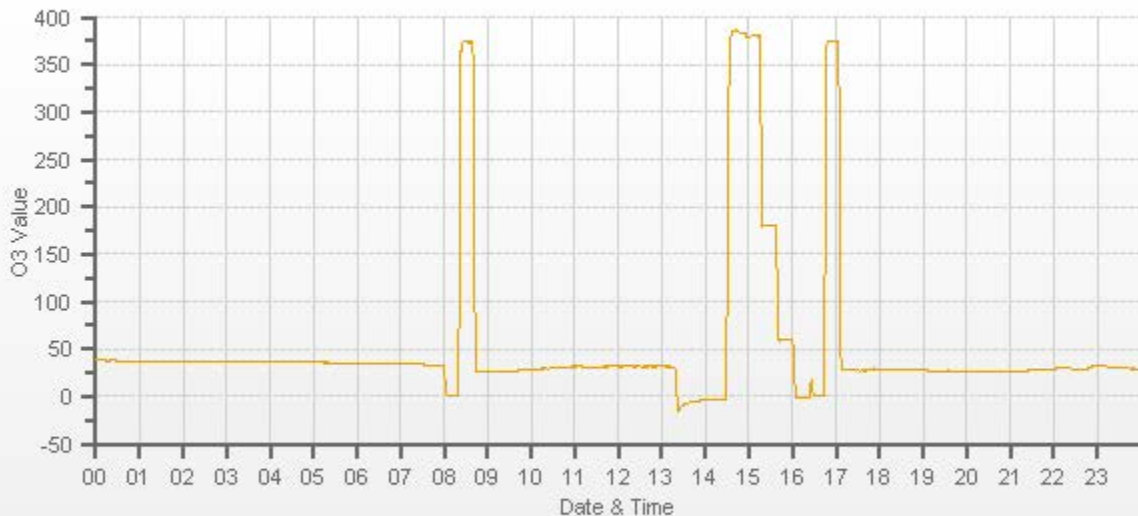
**As left:**

O3 Bkg: 0.9  
 O3 Coef: 0.967  
 Photo Lamp: 9.4  
 O3 Lamp: 7.8  
 Bench: 27.9  
 Bench Lamp: 53.6  
 O3 Lamp: 67.8  
 Pressure: 668.7  
 Cell A lpm: 0.719  
 Cell B lpm: 0.713  
 O3 ppb: -2.0  
 Cell A ppb: 0.3  
 Cell B ppb: -4.4  
 Cell A int: 56310  
 Expected Value: 375.0

Comments:

The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned.

No ZERO adjustment was made. The EV has not changed after the calibration.



— O3[ppb]

***PARTICULATE MATTER***



# R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: December 8, 2016  
 Company: LICA  
 Station Name/Location: St. Lina  
 Previous Audit Date: November 22, 2016  
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whitsitt  
 Start Time (mst): 16:52  
 End Time (mst): 17:47  
 Calibration Purpose: Bi-monthly #1  
 Weather Conditions: A few clouds

## 1400A Information and Status:

ID# or Serial Number:	<u>1405A208301003</u>	As Found Filter Loading %:	<u>33.90</u>
Ko Factor:	<u>13125</u>	As Left Filter Loading %:	<u>23.16</u>
Ambient Temperature °C:	<u>-22.97</u>	As Found Noise:	<u>0.004</u>
Ambient Pressure atm:	<u>0.940</u>	As Left Noise:	<u>0.000</u>
Main Flow Reading lpm:	<u>3.00</u>	Pump Vacuum:	<u>0.31</u>
Aux Flow Reading lpm:	<u>13.67</u>	Warnings:	<u>None</u>

## Reference Standards:

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

## As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	-0.05	0.00	-0.05
	limit	0.15	<del>0.15</del>	0.15	<del>0.15</del>
Bypass Flow	actual	0.00	-0.79	0.00	-0.79
	limit	0.60	<del>0.60</del>	0.60	<del>0.60</del>

## As left leak check (same as above if as found passes):

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	-0.05	0.00	-0.05
	limit	0.15	<del>0.15</del>	0.15	<del>0.15</del>
Bypass Flow	actual	0.00	-0.79	0.00	-0.79
	limit	0.60	<del>0.60</del>	0.60	<del>0.60</del>

## As found temperature and pressure:

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: <u>-23.0</u>	1405F pressure atm: <u>0.940</u>
reference temperature °C: <u>-23.4</u>	reference pressure: <u>0.941</u>
difference °C: <u>-0.4</u>	difference: <u>-0.001</u>

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

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: <u>-23.4</u>	1405F pressure atm: <u>0.941</u>
reference temperature °C: <u>-23.4</u>	reference pressure: <u>0.941</u>
difference °C: <u>0.0</u>	difference: <u>0.000</u>

## As found flows:

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: <u>3.00</u>	1400A total/aux flow lpm: <u>16.67</u>
reference main flow lpm: <u>2.99</u>	reference total/aux flow lpm: <u>16.92</u>
difference lpm: <u>-0.01</u>	difference lpm: <u>0.25</u>

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

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: <u>3.00</u>	1400A total/aux flow lpm: <u>16.67</u>
reference main flow lpm: <u>2.99</u>	reference total/aux flow lpm: <u>16.92</u>
difference lpm: <u>-0.01</u>	difference lpm: <u>0.25</u>

## K<sub>o</sub> Audit:

Last K<sub>o</sub> audit date: December 8, 2016  
 1405F K<sub>o</sub> factor: 13125  
 Measured K<sub>o</sub> factor: 13191.9000  
 % difference: 0.51

## Comments:

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



# R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: December 20, 2016  
 Company: LICA  
 Station Name/Location: St. Lina  
 Previous Audit Date: December 8, 2016  
 Parameter: PM 2.5

remove color

Performed By/Reviewer: Alex Yakupov | Trina Whitsitt  
 Start Time (mst): 16:33  
 End Time (mst): 17:25  
 Calibration Purpose: Bi-monthly #2  
 Weather Conditions: Mix of sun and clouds

### 1400A Information and Status:

ID# or Serial Number: 1405A208301003 As Found Filter Loading %: 31.24  
 Ko Factor: 13125 As Left Filter Loading %: 19.37  
 Ambient Temperature °C: -7.00 As Found Noise: 0.003  
 Ambient Pressure atm: 0.907 As Left Noise: 0.000  
 Main Flow Reading lpm: 3.00 Pump Vacuum: 0.29  
 Aux Flow Reading lpm: 13.67 Warnings: None

### Reference Standards:

	Flow:	Pressure:	Temperature:
Make:	<u>Dwyer</u>	<u>BRUNTON</u>	<u>FLUKE</u>
Model:	<u>475 Mark III</u>	<u>BIO</u>	<u>1551A Ex STIK</u>
Serial Number:	<u>#2</u>	<u>BPO 14</u>	<u>4295</u>
Calibration Date:	<u>January 15, 2016</u>	<u>July 7, 2016</u>	<u>November 15, 2016</u>

### As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	-0.05	0.00	-0.05
	limit	0.15	<del>0.15</del>	0.15	<del>0.15</del>
Bypass Flow	actual	0.00	-0.87	0.00	-0.87
	limit	0.60	<del>0.60</del>	0.60	<del>0.60</del>

### As left leak check (same as above if as found passes):

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	-0.05	0.00	-0.05
	limit	0.15	<del>0.15</del>	0.15	<del>0.15</del>
Bypass Flow	actual	0.00	-0.87	0.00	-0.87
	limit	0.60	<del>0.60</del>	0.60	<del>0.60</del>

### As found temperature and pressure:

1405F temperature °C: <u>-7.0</u>	1405F pressure atm: <u>0.907</u>
reference temperature °C: <u>-6.8</u>	reference pressure: <u>0.907</u>
difference °C: <u>0.2</u>	difference: <u>0.000</u>

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

1405F temperature °C: <u>-6.8</u>	1405F pressure atm: <u>0.907</u>
reference temperature °C: <u>-6.8</u>	reference pressure: <u>0.907</u>
difference °C: <u>0.0</u>	difference: <u>0.000</u>

### As found flows:

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm/+/- 7%
1405F main flow lpm: <u>3.00</u>	1400A total/aux flow lpm: <u>16.67</u>
reference main flow lpm: <u>3.02</u>	reference total/aux flow lpm: <u>17.07</u>
difference lpm: <u>0.02</u>	difference lpm: <u>0.40</u>

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

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm/+/- 7%
1405F main flow lpm: <u>3.00</u>	1400A total/aux flow lpm: <u>16.67</u>
reference main flow lpm: <u>3.02</u>	reference total/aux flow lpm: <u>17.07</u>
difference lpm: <u>0.02</u>	difference lpm: <u>0.40</u>

### K<sub>o</sub> Audit:

Last K<sub>o</sub> audit date: December 8, 2016  
 1405F K<sub>o</sub> factor: 13125  
 Measured K<sub>o</sub> factor: 13191.9000  
 % difference: 0.51

### Comments:

The TEOM sample filter was changed. The TEOM intake head and associated sharp cut components were cleaned.  
 The 47 mm FDMS filter was changed.



## ***WIND SYSTEM***



## ***CALIBRATORS***



# Calibrator Performance Audit

## Oxides Of Nitrogen

File No. 2015-119

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>API 700</u>	Make/Model	<u>NA</u>
Serial Number	<u>627</u>	Serial Number	<u>NA</u>
Last Verification Date	<u>April 1 2015</u>	Temperature (°C)	<u>NA</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>NA</u>
NO/NOx Concentration	<u>50.3/50.3</u>		

Dilution Flow (sccm)					
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>	Pt. #3	<u>5000</u>
Gas Flow (sccm)					
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>	Pt. #3	<u>18.9</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO <sub>2</sub>	NOx	NO	NOx
5007	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5003	77.5	0.779	0.779	0.787	-0.001	0.786	1%	1%
5004	37.8	0.380	0.380	0.383	0.000	0.383	1%	1%
5001	18.9	0.190	0.190	0.191	0.000	0.191	1%	1%
Absolute Average Percent Difference							1%	1%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
<u>NO</u>		<u>LIMITS</u>		<u>NOx</u>			
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000		
m (Slope)=	1.0106	0.90-1.10		m (Slope)=	1.0092		
b (Intercept % of FS)=	-0.0566	± 3% F.S.		b (Intercept % of FS)=	-0.0368		

Flow	O <sub>2</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOX	% Diff. Vs Audit gas	
						NO <sub>2</sub>	% Diff. Limit
5003	0	0.000	0.787	0.001	0.788		
5003	0.5	0.493	0.294	0.498	0.792	1%	± 10%
5003	0.25	0.256	0.531	0.262	0.792	2%	± 10%
5003	0.1	0.108	0.679	0.110	0.789	1%	± 10%
Absolute Average Percent Difference						1.2%	± 10%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
<u>NO<sub>x</sub></u>		<u>LIMITS</u>					
Correlation=	1.0000	≥ 0.995					
m (Slope)=	1.0089	0.90-1.10					
b (Intercept % of FS)=	0.1591	± 3% F.S.					

AENV Standards		NO <sub>x</sub> Analyzer	
Audit Calibrator			
Make/Model	<u>Thermo 146i</u>	Make/Model	<u>Thermo 42i</u>
Serial/AMU Number	<u>1809</u>	Serial/AMU Number	<u>1868</u>
		Last Calibration Date	<u>February 1, 2016</u>
		Full Scale (ppm)	<u>1</u>

COMMENTS: Flows not manually measured - calibration system audited as it is currently being operated.

Auditor: Shea Beaton  
 Operator Signature: [Signature]

Date: February 3, 2016  
 Location: McIntyre Center Edmonton



# Calibrator Performance Audit

## Oxides Of Nitrogen

File No. 2015-165

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>None</u>
Serial Number	<u>11900613</u>	Serial Number	<u>None</u>
Last Verification Date	<u>April 1, 2015</u>	Temperature (°C)	<u>23.5</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>706 mmHg</u>
NO/NOx Concentration	<u>50.3ppm/50.3ppm</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5001</u>	Pt. #2	<u>5000</u>
		Pt. #3	<u>5000</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>
		Pt. #3	<u>18.9</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO <sub>2</sub>	NOx	NO	NOx
4999	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5001	77.5	0.779	0.779	0.775	0.000	0.775	-1%	-1%
5000	37.8	0.380	0.380	0.376	0.001	0.377	-1%	-1%
5000	18.9	0.190	0.190	0.188	0.001	0.189	-1%	-1%
Absolute Average Percent Difference							1%	1%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
<u>NO</u>		<u>LIMITS</u>		<u>NOx</u>			
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000		
m (Slope)=	0.9950	0.90-1.10		m (Slope)=	0.9946		
b (Intercept % of FS)=	-0.0773	± 3% F.S.		b (Intercept % of FS)=	-0.0167		

Flow	O <sub>3</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOx	% Diff. Vs Audit gas	
5001	0	0.000	0.772	0.000	0.772	NO <sub>2</sub>	% Diff. Limit
5001	0.51	0.507	0.265	0.506	0.772	0%	± 10%
5001	0.25	0.252	0.520	0.254	0.773	1%	± 10%
5001	0.1	0.110	0.662	0.109	0.772	-1%	± 10%
Absolute Average Percent Difference						0.1%	± 10%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
<u>NO<sub>2</sub></u>		<u>LIMITS</u>					
Correlation=	1.0000	≥ 0.995					
m (Slope)=	0.9992	0.90-1.10					
b (Intercept % of FS)=	0.0171	± 3% F.S.					

AENV Standards		NO <sub>x</sub> Analyzer	
Audit Calibrator			
Make/Model	<u>Thermo 146i</u>	Make/Model	<u>Thermo 42i</u>
Serial/AMU Number	<u>1809</u>	Serial/AMU Number	<u>1868</u>
		Last Calibration Date	<u>March 28, 2016</u>
		Full Scale (ppm)	<u>1</u>

COMMENTS: NO Cyl has 49.9ppb SO2 - Flows Not Manually Measured

Auditor: Shea Beaton  
 Operator Signature: [Signature]

Date: March 31, 2016  
 Location: McIntyre Center Edmonton

## ***CALIBRATION GASES***



# Calibration Gas Audit

## Single Component Cylinder Gas

File No. 2016-335CGA

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

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

**Reference Analyzer:**  
**Make/Model:** Teco 43C **Serial/AMU Number:** 1623  
**Instrument Settings:** **Zero:** 9.2 **Span:** 1.024 **Range:** 1.0  
**Last Calibration:** **Date:** Oct 19/16 **C.F.** 1.000 **Done By:** Al Clark

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.000	<del>0.0000</del>	<del>0.0000</del>	<del>0.0000</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

## 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:**

**Make/Model:** R&R MFC 201  
**Serial Number:** AMU 1690  
**Last Verification Date:** October 19, 2016  
**Gas Type:** H2S **Conc.** 20.43  
**Cylinder Number:** CAL015584  
**Expiry Date:** January 2019

**Flow Measurement Device:**

**Make/Model:** Bios DC2  
**Serial Number:** AMU 1659  
**Temp. °C:** 24.0 C  
**B.P.** 706 mmhg

**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>0.00752</del>	<del>132.895</del>	<del>10.2</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  
**Operator Signature:** *Al Clark*

**Date:** October 19, 2016  
**Location:** McIntyre Center Edmonton





# Calibration Gas Audit

## CH4 / C3H8 Cylinder Gas

File No. 2015-092CGA

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

**Reference Calibrator and Gas:**

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

**Flow Measurement Device:**

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

**Reference Analyzer:**

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

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

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

**Cylinder gas tolerances based on CH4 only**

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

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



# Calibration Gas Audit

## NO Cylinder Gas

File No. 2016-336CGA

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

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

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

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

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

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

**Auditor:** Al Clark **Date:** October 19, 2016  
**Operator Signature:** *Al Clark* **Location:** McIntyre Center Edmonton

***APPENDIX III  
REPORT CERTIFICATION FORM***

### Report Certification Form

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

*Kim Wilson*

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

30-Jan-17  
 \_\_\_\_\_  
 Report Issued Date (dd-mm-yyyy)

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



### Validation Certificate Form

<b>Client:</b> <u>Lakeland Industry &amp; Community Association</u>	<b>Project #:</b> <u>2833-2016-12-31-C</u>
<b>Site:</b> <u>St. Lina Continuous Monitoring Station</u>	<b>Contact:</b> <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u>Kim Wilson</u>	Date <u>23-Jan-17</u>
Level 1 Primary Validation	<u>Kim Wilson</u>	Date <u>26-Jan-17</u>
Level 2 Final Validation	<u>Kim Wilson</u>	Date <u>26-Jan-17</u>
Level 3 Independent Data Review	<u>MSB</u>	Date <u>30-Jan-17</u>
Post-Final Validation	<u>NA</u>	Date <u>NA</u>

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



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

**JOB #: 2833-2016-12-35-C**

**December 2016**

Prepared for:

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

**Attention: MIKE BISAGA**

DATE: **February 3, 2017**

Prepared by:

*Kim Wilson*

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Kim Wilson, Env.Tech  
Project Manager, Customer Service - Air Services

Reviewed by:

*Wunmi Adekanmbi*

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

## SUMMARY

In December 2016, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the Bonnyville 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.

**SO<sub>2</sub>:** Four hours of downtime were recorded due to an additional calibration performed to address an instability in the temperature of the zero/span system.

**No<sub>x</sub>/NO/NO<sub>2</sub>:** Six hours of downtime were recorded due to an additional calibration performed to address an instability in the temperature of the zero/span system.

**PM<sub>2.5</sub>:** Fourteen hours of data were recorded this month at concentrations less than -3 µg/m<sup>3</sup>, rendering the data invalid.

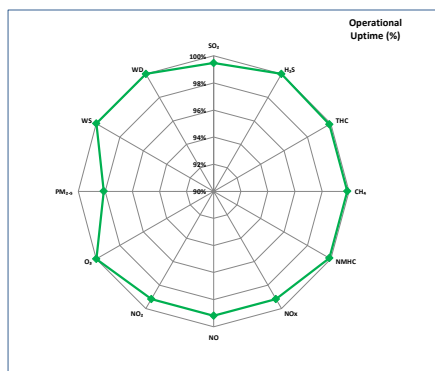
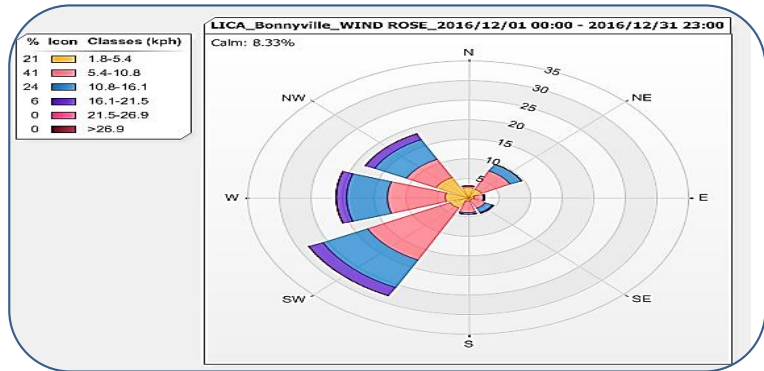
The summary of results is presented on the following pages.

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

Should you have any questions concerning the results or if we can be of further assistance, please contact us at 403-478-9471 or toll-free at 1-800-386-7247.



Pollutants		Monthly Records		1-Hour Records					24-Hour Records				
Name	Unit	Avg. Conc.	Uptime	Maximum			AAAQO Objective	Exceed. Hours	Maximum		AAAQO Objective	Exceed. Days	
				Conc.	Date	Hour			Conc.	Date			
SO <sub>2</sub>	ppb	0.1	99.5%	4.8	December 2	20	172	0	0.6	December 2	48	0	
H <sub>2</sub> S	ppb	0.1	100.0%	2.0	December 9	9	10	0	0.8	December 17	3	0	
THC	ppm	2.18	99.9%	3.86	December 17	17	-	-	3.38	December 17	-	-	
CH <sub>4</sub>	ppm	2.18	99.9%	3.69	December 17	17	-	-	3.34	December 17	-	-	
NMHC	ppm	0.00	99.9%	0.30	December 9	20	-	-	0.05	December 17	-	-	
NO <sub>x</sub>	ppb	11.6	99.2%	122.1	December 9	9	-	-	52.2	December 17	-	-	
NO	ppb	3.6	99.2%	88.8	December 9	9	-	-	27.6	December 17	-	-	
NO <sub>2</sub>	ppb	8.0	99.2%	35.0	December 17	1	159	0	24.5	December 17	-	-	
O <sub>3</sub>	ppb	23.6	100.0%	38.6	December 19	13	82	0	36.6	December 19	-	-	
PM <sub>2.5</sub>	µg/m <sup>3</sup>	5.7	98.1%	31.1	December 14	21	80	0	14.0	December 17	30	0	
WS	kph	4.4	100.0%	21.2	December 13	5	-	-	15.2	December 21	-	-	
WD	degree	262 (W)	100.0%	-	-	-	-	-	-	-	-	-	



**Monthly Update**

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

**Operational Issues**

- SO<sub>2</sub>**: Four hours of downtime were recorded due to an additional calibration performed to address an instability in the temperature of the zero/span system.
- NO<sub>x</sub>/NO/NO<sub>2</sub>**: Six hours of downtime were recorded due to an additional calibration performed to address an instability in the temperature of the zero/span system.
- PM<sub>2.5</sub>**: Fourteen hours of data were recorded this month at concentrations less than -3 µg/m<sup>3</sup>, rendering the data invalid.

### Monthly Continuous Data Summary

Lakeland Industry & Community Association Bonnyville Continuous Monitoring Station						MAXIMUM VALUES							OPERATIONAL TIME (%)
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	1-HOUR			24-HOUR		
	1-hr	24-hr	1-hr	24-hr				HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
SO <sub>2</sub> (ppb)	172	48	0	0	0.1	4.8	2	20	15.1	SE	0.6	2	99.5
H <sub>2</sub> S (ppb)	10	3	0	0	0.1	2.0	9	9	0.6	NW	0.8	17	100.0
THC (ppm)	-	-	-	-	2.18	3.86	17	17	0.4	NW	3.38	17	99.9
CH <sub>4</sub> (ppm)	-	-	-	-	2.18	3.69	17	17	0.4	NW	3.34	17	99.9
NMHC (ppm)	-	-	-	-	0.00	0.30	9	20	2.0	SSE	0.05	17	99.9
NO <sub>2</sub> (ppb)	159	-	0	-	8.0	35.0	17	1	0.8	NNW	24.5	17	99.2
NO (ppb)	-	-	-	-	3.6	88.8	9	9	0.6	NW	27.6	17	99.2
NO <sub>x</sub> (ppb)	-	-	-	-	11.6	122.1	9	9	0.6	NW	52.2	17	99.2
O <sub>3</sub> (ppb)	82	-	0	-	23.6	38.6	19	13	16.5	WSW	36.6	19	100.0
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	80	30	0	0	5.7	31.1	14	21	6.1	WNW	14.0	17	98.1
VECTOR WS (kph)	-	-	-	-	4.4	21.2	13	5	-	WNW	15.2	21	100.0
VECTOR WD (sec)	-	-	-	-	262 (W)	-	-	-	-	-	-	-	100.0

VAR-VARIOUS

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## 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.*

### Volatile Organics (VOCs) Data Summary

Sample Collection Date	Maximum Reading (ppb)	Volatile Organic Compound
December 2, 2016	2.60	Acetone
December 8, 2016	1.20	Acetone
December 14, 2016	1.50	Acetone
December 20, 2016	7.90	Methylene chloride
December 26, 2016	3.21	n-Butane

Note: N/A

### Polycyclic Aromatic Hydrocarbons (PAHs) Data Summary

Sample Collection Date	Maximum Reading ( $\mu\text{g}/\text{puf}$ )	Semi-Volatile Organic
December 2, 2016	0.21	2-Methylnaphthalene
December 8, 2016	0.87	Naphthalene
December 14, 2016	1.87	Naphthalene
December 20, 2016	0.66	2-Methylnaphthalene
December 26, 2016	1.15	Naphthalene

Note: N/A

### Volatilic Organics (VOCs) Data Summary - NMHC Canister System

---

Sample Collection Date	Maximum Reading (ppb)	Volatile Organic Compound
December 7, 2016	3.00	Ethanol
December 17, 2016	3.04	n-Butane
December 31, 2016	2.40	Acetone

**Note:** N/A

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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), Methane (CH<sub>4</sub>), Non-Methane Hydrocarbon (NMHC), 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>), Wind Speed (WS), Wind Direction (WD) and Standard Deviation Wind Direction (STDWD). The non-continuous monitoring data results for VOCs, PAHs and NMHC canister monitoring are also included in this report.

Sample filters for all continuous air monitors are changed before the calibration begins. The sample manifold is cleaned during the site visit each month.

Control checks, consisting of a zero and span, are conducted daily on all continuous air monitors. In place of the air sample, zero air (from scrubbed air or gas cylinders) is used for zero checks, and a known concentration of the pollutant being analyzed is used for span checks. These checks are controlled by automatic timers and valves. The total zero span cycle is completed within an hour, the commencement of the zero span cycle is at the beginning of the hour.

Multipoint calibrations are done a minimum of once a month for each continuous air monitor. An additional calibration is required under the following conditions: 1) within three days after the initial start-up and stabilization of a newly installed instrument, 2) prior to shut-down or moving of an instrument which has been working to specification, and 3) when major repair has been done on the instrument.

Time during the first multi-point calibration is not considered downtime (Data is flagged as C). If more than one calibration is performed during the month, the time during the additional calibration is considered as downtime (Data is flagged as C1).

Only one zero/span check is run per day. Time during the zero/span check is not considered as downtime (Data is flagged as S). If an extra zero/span check is performed, the time during the additional check is considered as downtime (Data is flagged as S1).

The AMD requires each instrument and accompanying data recording system to be operational 90% of the time, at a minimum, for each monthly monitoring period.

All sampling, analysis, and QA/QC for this project was performed by Maxxam Analytics and complies with the Alberta Air Monitoring Directive.

Data contained in this monthly report has undergone the verification and validation based on the requirements of the AMD Chapter 6: Ambient Data Quality (August 3, 2016). The descriptions of the data verification and validation process can be found in Section 5 of this report. Instantaneous data, where applicable, is provided for reference purposes and has not undergone zero correction.

Hourly/minute data have been reviewed based on daily zero/span results and multi-point calibration results. Data may be considered invalid if a zero-corrected span check in excess of +/- 10% of the span concentration (established by the previous multi-point calibration) is encountered and/or significant differences in the calibration factor occurs (greater than 10%).

### **SULPHUR DIOXIDE (SO<sub>2</sub>)**

The routine monthly calibration was performed on December 16. The analyzer did not span correctly on December 23. A successful multipoint calibration was completed the same day. During the site visit, the oven temperature of the zero/span system was adjusted in order to meet the requirement for expected span values to fall within 40-80% of analyzer full scale. As the calibration results met the AMD, 2016 requirements, no data was discarded due to this event. Four hours of downtime were, however, recorded due to the additional calibration.

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

The routine monthly calibration was performed on December 16.  
No operational issues were identified this month.

### **TOTAL HYDROCARBONS (THC), METHANE (CH<sub>4</sub>) and NON-METHANE HYDROCARBONS (NMHC)**

The routine monthly calibration was performed on December 15. The span gas was replenished on December 27. A zero/span check was triggered afterwards, causing one hour of downtime.

### **NITROGEN DIOXIDE (NO<sub>2</sub>)**

The routine monthly calibration was performed on December 16. The analyzer did not span correctly on December 23. A successful multipoint calibration was completed the same day. During the site visit, the oven temperature of the zero/span system was adjusted in order to meet the requirement for expected span values to fall within 40-80% of analyzer full scale. As the calibration results met the AMD, 2016 requirements, no data was discarded due to this event. Six hours of downtime were, however, recorded due to the additional calibration.

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

The routine monthly calibration was performed on December 15.  
No operational issues were identified this month.

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

Two routine TEOM audits were performed this month: one was completed on December 15 and the other audit was performed on December 22. The sample filter was replaced and a new sample pump was installed on December 22. 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. Fourteen hours of data were invalidated as the data was below  $-3 \mu\text{g}/\text{m}^3$  this month.

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

Wind data is reported as vector wind speed and vector wind direction. Wind direction is defined as the direction from which the wind is blowing from and is measured in degrees from true north.  
No operational issues were identified this month.

### **VOC SAMPLES**

The sampler was programmed to run for 24 hours every 6<sup>th</sup> day per the NAPS (North American Pollution Surveillance Schedule).

Samples were collected on December 2, 8, 14, 20 and 26. Analytical results are included in this report. VOC values are reported in ppb.

### **PAH SAMPLES**

The sampler was programmed to run for 24 hours every 6<sup>th</sup> day per the NAPS (North American Pollution Surveillance Schedule).

Samples were collected on December 2, 8, 14, 20 and 26. Analytical results are included in this report. PAH values are reported in ug.

### **NMHC CANISTER SAMPLES**

The canister sampler is programmed to draw in a whole air sample when the 5-minute average concentration of NMHC is above 0.30 ppm. A representative sample of ambient air is collected over a one-hour period when the canister event is triggered.

Three canister events were recorded this month. The date, time and initial 5-min average concentration measurements are as follows:

- December 7 at 06:35 - 0.41 ppm
- December 17 at 10:10 - 0.33 ppm
- December 31 at 05:35 - 0.46 ppm

Other five-minute averages recorded at concentrations above 0.30 ppm, are not considered sample-collection events as they occurred between events, before the canisters were replaced. Analytical results are included in this report. The values for NMHC canister samples are reported in ppb.

## **2.0 Project Personnel**

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

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

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

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

## **4.0 Calculations and Results**

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

## 5.0 Methods and Procedures

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

- Maxxam AIR SOP-00001 - Methane, Non-Methane Hydrocarbon Analyzer Monitoring
- Maxxam AIR SOP-00208: RM Young Wind Monitor Calibration
- Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
- Maxxam AIR SOP-00212: Ambient O<sub>3</sub> Monitoring
- Maxxam AIR SOP-00213: Ambient NO/NO<sub>2</sub>/NO<sub>x</sub> Monitoring
- Maxxam AIR SOP-00215: TEOM Operation
- Maxxam AIR SOP-00225: The Collection of VOCs in Ambient Air Using Canister and Xontech

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

- Sulphur Dioxide - API 100E UV Fluorescent Analyzer
- Hydrogen Sulphide - API 101E UV Fluorescent Analyzer
- Methane, Non-Methane Hydrocarbon - Thermo 55i FID Analyzer
- Oxides of Nitrogen - API 200E Chemiluminescent Analyzer
- Ozone - Thermo 49i Photometric Analyzer
- Particulate Matter (PM<sub>2.5</sub>) - R&P 1405F TEOM Unit
- Wind System - RM Young Unit
- Datalogger - ESC 8832
- VOC - XONTECH 910A Gaseous Air Sampler

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

**Level 0 Preliminary Verification**

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

**Level 1 Primary Validation**

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

**Level 2 Final Validation**

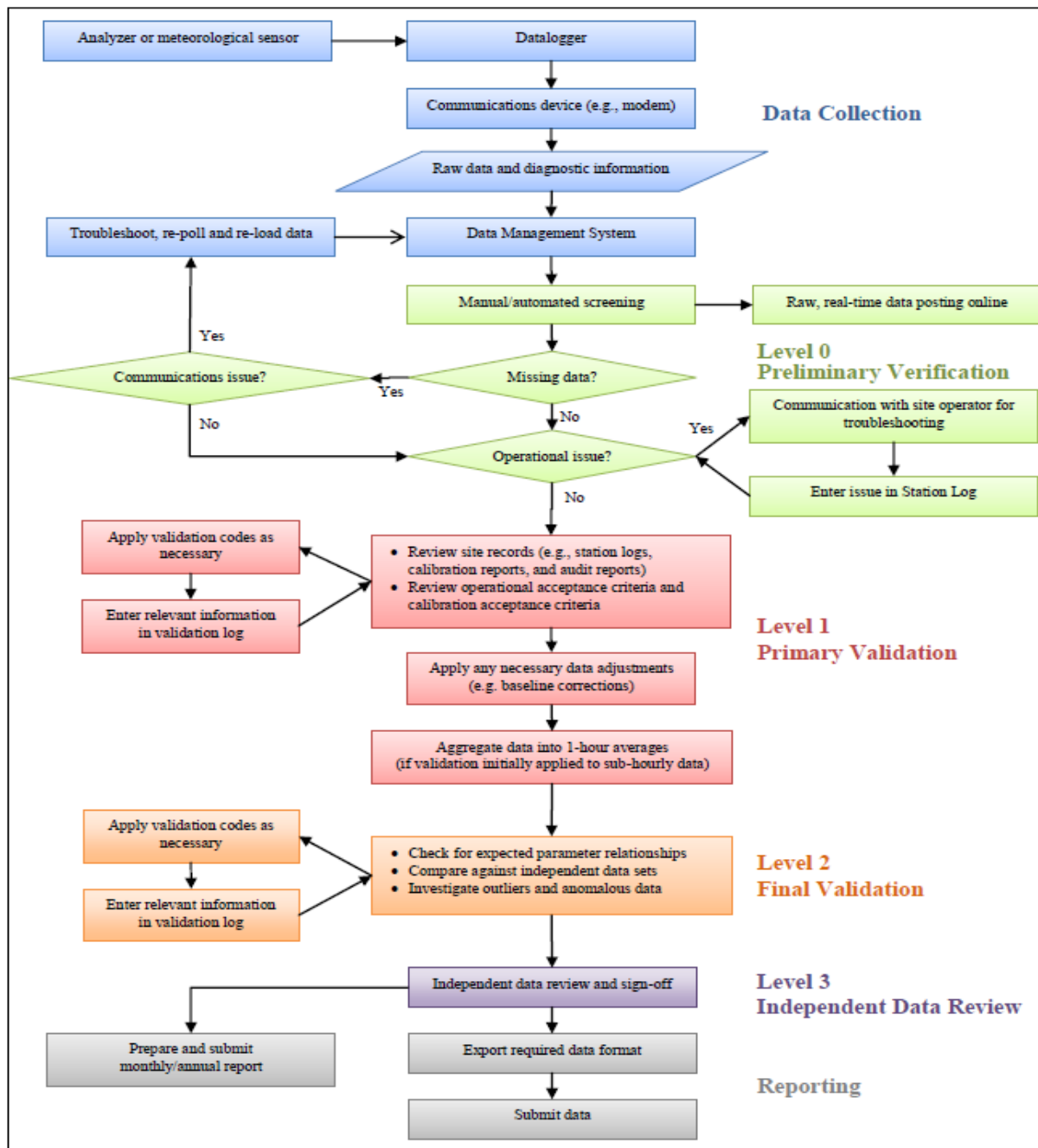
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

**Level 3 Independent Data Review**

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

**Post-Final Validation**

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



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

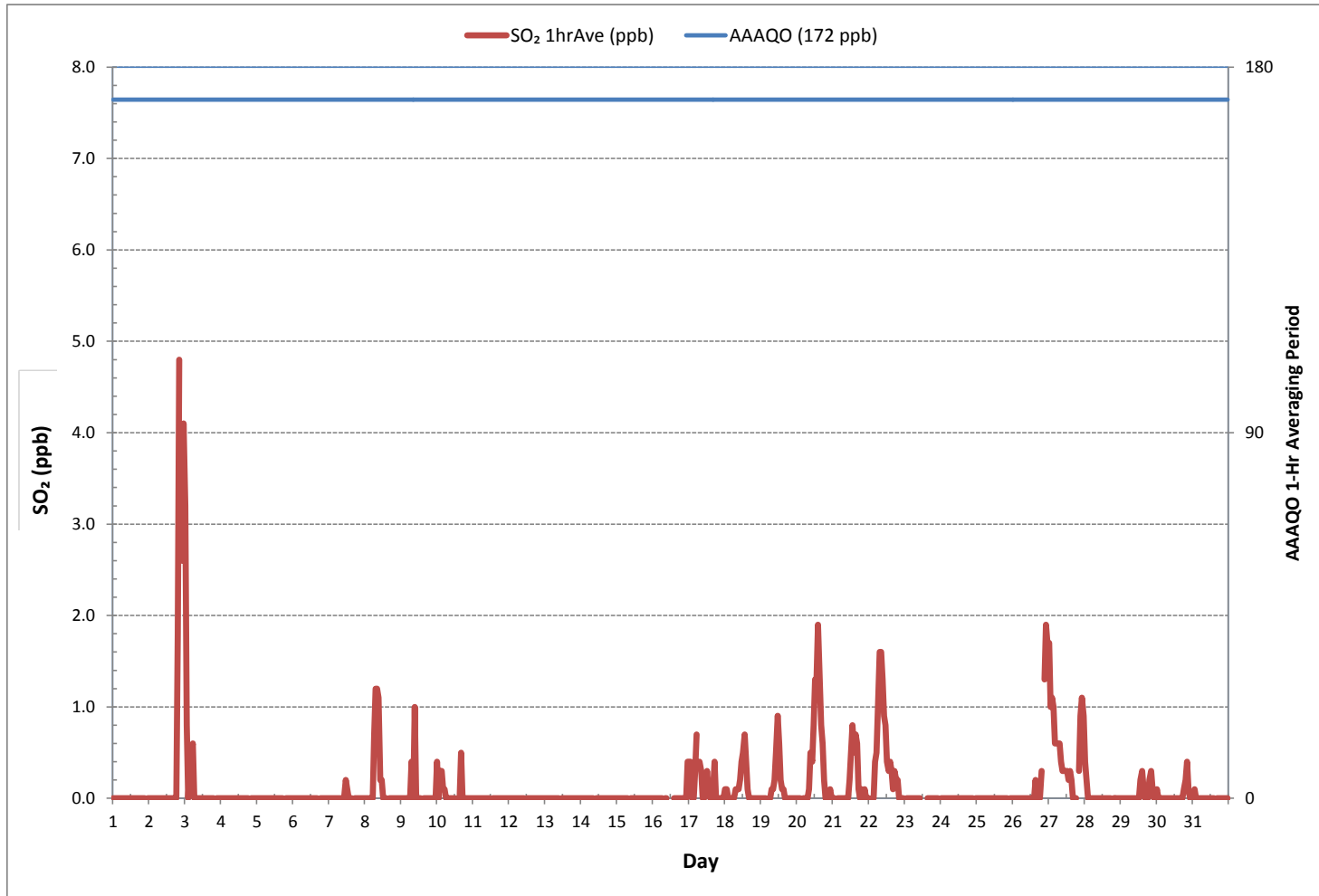
***APPENDIX I***  
***CONTINUOUS MONITORING DATA RESULTS***



***SULPHUR DIOXIDE***



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





**LAKELAND INDUSTRY & COMMUNITY ASSOCIATION**  
**Bonnyville Continuous Monitoring Station - December 2016**

**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	1.8	1.9	1.7	1.8	1.9	1.9	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.5	1.6	1.4	1.6	1.6	1.5	1.5	S	1.5	1.4	1.9	1.7	24	
2	1.5	1.3	1.4	1.5	1.6	1.7	1.5	1.7	1.8	1.8	1.7	1.9	2.0	2.3	2.3	2.3	2.1	2.3	2.3	8.8	9.3	S	6.3	8.0	1.3	9.3	2.9	24	
3	7.4	4.1	3.3	3.7	4.0	4.0	3.2	2.8	2.7	2.5	2.6	2.7	2.8	2.9	2.8	2.7	3.1	3.1	2.9	2.8	S	2.7	2.9	2.9	2.5	7.4	3.2	24	
4	2.8	2.8	2.9	3.0	2.8	2.8	3.0	3.0	3.1	2.9	2.9	3.1	2.9	2.9	2.8	2.8	2.9	2.7	2.6	S	2.6	2.3	2.3	2.1	2.1	3.1	2.8	24	
5	2.0	2.0	2.2	2.2	1.8	1.7	1.7	1.7	1.5	1.4	1.3	1.3	1.3	1.5	1.2	1.3	1.3	1.2	S	1.2	1.2	1.2	1.3	1.0	1.0	2.2	1.5	24	
6	1.0	1.1	1.1	1.0	0.9	1.2	1.0	1.0	0.9	0.8	0.7	0.8	0.7	0.7	0.9	0.8	0.7	S	1.1	0.6	0.6	0.5	0.7	0.6	0.6	0.5	1.2	0.8	24
7	0.6	0.5	0.6	0.6	0.5	0.6	0.4	0.2	0.3	0.3	1.0	1.1	0.9	0.8	0.3	0.1	S	0.0	0.2	0.2	0.2	0.0	0.1	0.0	0.0	1.1	0.4	24	
8	0.0	0.0	0.0	0.0	0.0	0.2	1.6	1.8	1.6	1.6	1.3	0.8	0.4	0.2	0.2	S	0.1	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.0	1.8	0.6	24	
9	0.3	0.4	0.4	0.4	1.1	0.7	0.2	2.0	2.0	2.6	1.5	0.5	0.6	0.7	S	1.1	0.6	0.6	0.8	0.9	1.7	1.2	1.2	1.5	0.2	2.6	1.0	24	
10	2.4	1.8	2.0	2.0	2.1	2.0	1.7	1.5	1.5	2.3	2.0	2.0	2.1	S	1.8	2.6	3.1	2.1	1.8	1.7	1.8	1.8	2.2	2.1	1.5	3.1	2.0	24	
11	2.0	1.9	1.9	2.1	2.0	1.8	1.9	1.6	1.8	1.8	1.9	2.1	S	1.8	1.7	1.8	1.8	1.6	1.7	1.7	1.8	1.9	2.0	1.8	1.6	2.1	1.8	24	
12	1.9	2.1	2.1	1.7	2.0	2.1	2.1	2.1	1.7	1.7	1.7	S	1.7	1.8	1.9	1.8	1.8	1.9	1.9	2.1	2.2	2.1	1.8	2.1	1.7	2.2	1.9	24	
13	2.2	2.1	2.1	2.0	2.1	2.2	2.1	1.8	1.7	1.7	S	1.5	1.5	1.7	1.6	1.6	1.5	1.3	1.3	1.2	1.7	1.2	1.2	0.9	0.9	2.2	1.7	24	
14	1.0	1.1	1.0	1.1	1.0	1.2	1.2	1.0	1.0	S	1.0	1.1	1.2	1.3	1.4	1.6	1.6	1.5	1.5	1.7	1.4	1.5	1.5	1.3	1.0	1.7	1.3	24	
15	1.4	1.3	1.3	1.2	1.3	1.4	1.4	1.3	S	1.2	1.3	1.2	1.2	1.3	1.4	1.3	1.5	1.3	1.5	1.5	1.3	1.1	1.2	1.3	1.1	1.5	1.3	24	
16	1.4	1.2	1.3	1.2	1.5	1.3	1.2	S	1.3	1.4	C	C	C	C	1.2	1.8	1.4	1.3	1.7	1.4	1.2	1.2	2.1	2.6	1.2	2.6	1.5	24	
17	2.6	3.5	2.3	2.4	3.0	3.0	S	4.0	2.8	2.1	2.8	2.7	2.8	2.6	2.3	2.6	3.1	3.3	2.1	2.3	2.1	2.4	2.5	2.7	2.1	4.0	2.7	24	
18	3.1	3.1	3.0	3.2	3.0	S	3.1	3.5	3.5	3.5	3.7	3.9	4.1	4.3	4.0	3.8	3.7	3.5	3.6	3.5	3.3	3.3	3.4	3.5	3.0	4.3	3.5	24	
19	3.2	3.4	3.6	3.5	S	3.7	4.0	4.3	4.1	4.2	4.7	5.0	4.6	4.2	4.1	4.1	3.9	3.9	3.8	3.4	3.4	3.5	3.3	3.2	3.2	5.0	3.9	24	
20	3.2	3.1	3.0	S	2.9	3.1	3.1	3.3	3.7	4.1	4.0	4.5	4.9	4.8	7.3	5.6	4.7	4.4	3.7	3.5	3.9	3.3	3.5	3.4	2.9	7.3	4.0	24	
21	2.9	2.8	S	2.9	2.7	2.9	2.9	3.0	3.3	3.5	3.4	3.7	4.1	4.3	4.1	4.2	4.3	3.7	3.5	3.7	3.6	3.7	3.5	3.4	2.7	4.3	3.5	24	
22	3.2	S	3.4	3.7	4.1	4.2	4.8	5.2	5.5	5.1	4.6	4.2	3.9	3.7	3.9	3.8	3.7	3.7	3.6	4.0	3.2	2.9	2.9	2.9	2.9	5.5	3.9	24	
23	S	2.7	2.8	2.6	2.4	2.4	2.3	2.1	2.2	2.0	C1	C1	C1	C1	C1	1.2	1.0	1.1	1.0	1.1	1.0	0.9	0.9	S	0.9	2.8	1.7	19	
24	0.8	0.8	0.8	0.6	0.8	0.8	0.4	0.5	0.5	0.4	0.1	0.4	0.4	0.5	0.4	0.4	0.2	0.4	0.4	0.4	0.1	0.3	S	0.3	0.1	0.8	0.5	24	
25	0.3	0.2	0.2	0.4	0.6	0.5	0.5	0.4	0.5	0.3	0.2	0.5	0.5	0.5	0.4	0.5	0.6	0.8	0.6	0.6	0.9	S	0.5	0.7	0.2	0.9	0.5	24	
26	0.9	0.9	1.0	0.8	1.2	1.0	1.4	1.3	1.6	1.5	1.5	1.5	1.6	1.9	1.9	2.9	2.9	2.1	2.5	2.9	S	4.5	4.6	4.5	0.8	4.6	2.0	24	
27	4.6	3.8	3.8	4.0	3.7	3.4	3.6	3.7	3.5	3.5	3.5	3.6	3.8	3.5	3.7	4.0	3.7	3.4	3.5	S	3.7	4.3	4.5	4.2	3.4	4.6	3.8	24	
28	3.7	3.2	3.2	2.9	3.0	2.9	2.8	2.8	2.5	2.5	2.5	2.4	2.2	2.2	2.2	2.3	2.3	1.9	S	1.5	2.3	1.7	1.6	1.3	1.3	3.7	2.4	24	
29	1.3	1.3	1.2	1.2	1.1	1.2	1.2	1.0	1.3	1.2	1.4	1.6	2.3	2.3	2.5	2.5	2.1	S	2.1	2.4	2.5	2.4	2.3	2.1	1.0	2.5	1.8	24	
30	2.3	2.1	1.9	2.0	2.5	2.2	2.1	2.0	2.1	2.2	2.3	2.5	2.3	2.2	2.5	2.5	S	2.6	2.8	2.9	3.0	2.8	2.7	2.6	1.9	3.0	2.4	24	
31	2.7	2.7	2.7	2.7	2.6	2.7	2.7	2.6	2.6	2.5	2.5	2.7	2.3	2.3	2.1	S	1.9	1.9	1.8	1.7	1.7	1.7	1.7	1.7	1.7	2.7	2.3	24	
HOURLY MAX	7.4	4.1	3.8	4.0	4.1	4.2	4.8	5.2	5.5	5.1	4.7	5.0	4.9	4.8	7.3	5.6	4.7	4.4	3.8	8.8	9.3	4.5	6.3	8.0					
HOURLY AVG	2.2	2.0	1.9	2.0	2.0	2.0	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.0	2.0	2.1	2.2	2.0	2.2	2.2					

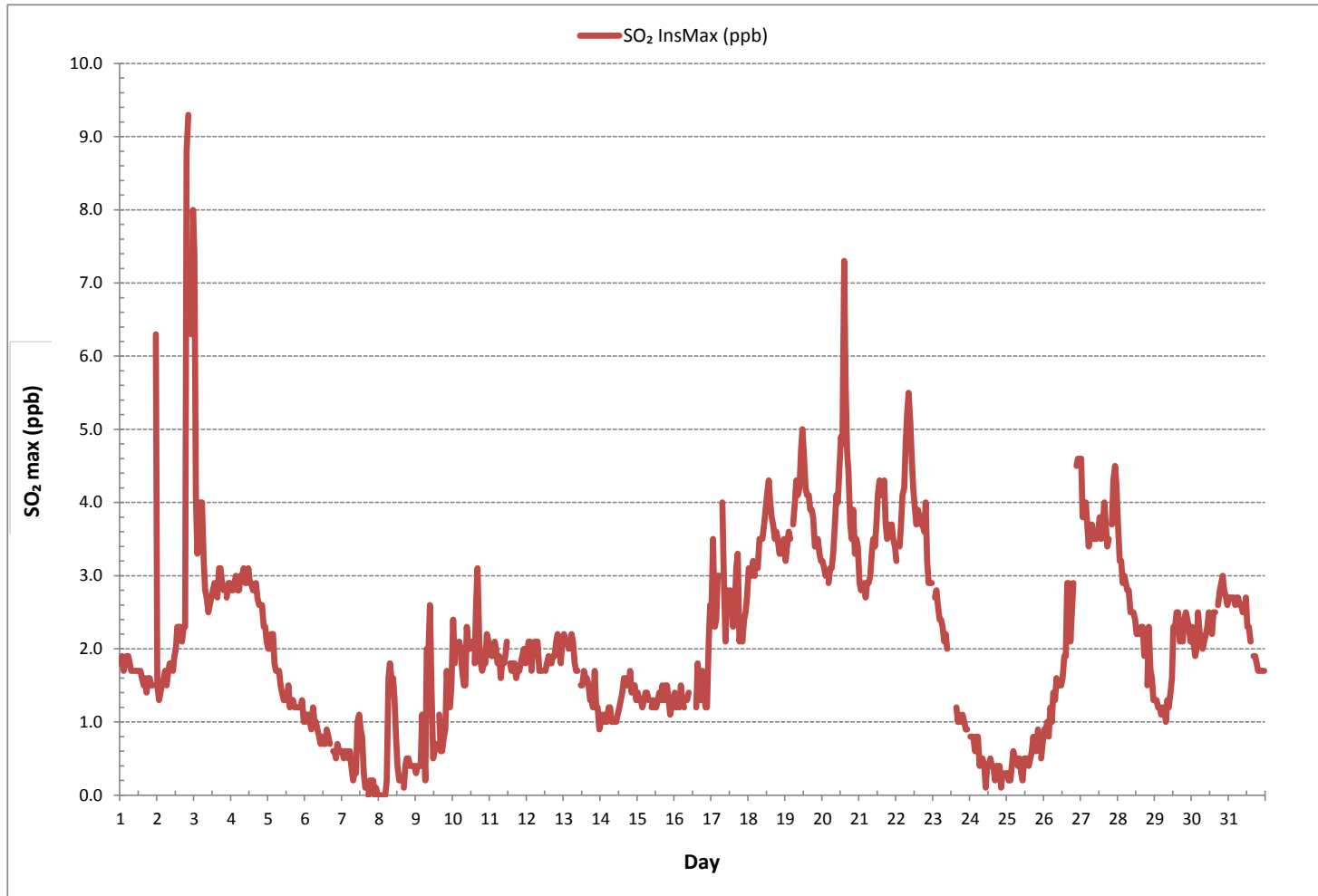
**STATUS FLAG CODES**

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

**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	695
MAXIMUM INSTANTANEOUS VALUE:	9.3 ppb @ HOUR(S) 20 ON DAY(S) 2
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	4 hrs
STANDARD DEVIATION:	1.3
OPERATIONAL TIME:	739 hrs

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

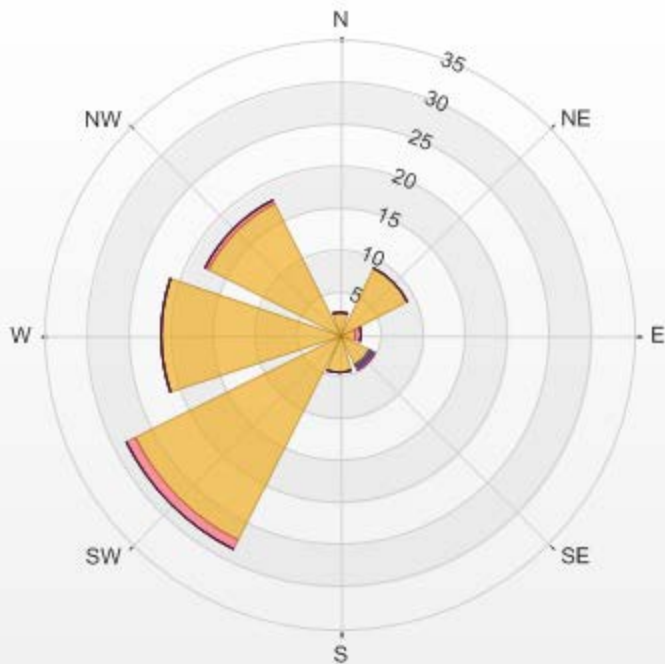


Wind: LICA Bonnyville Poll.: LICA Bonnyville-SO2[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr  
 Calm: 8.53% Valid Data: 94.49% Calm Avg: 0.15 [ppb]

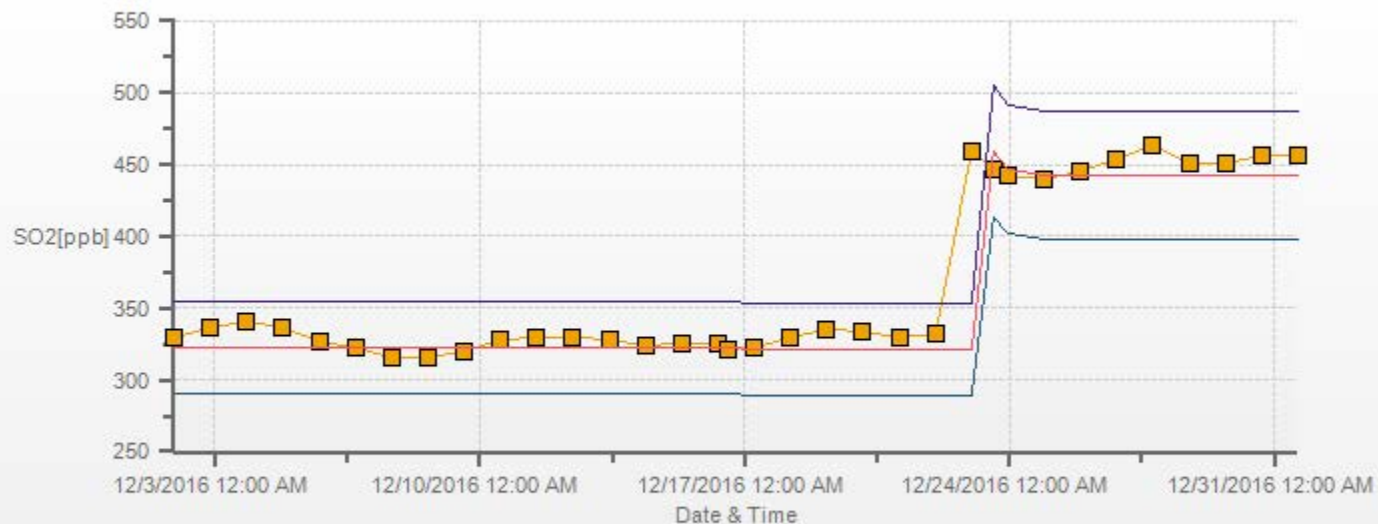
Direction	0.0-1.0	1.0-2.0	2.0-2.9	2.9-3.9	3.9-4.9	>4.9	Total
N	2.84	0	0	0	0	0	2.84
NE	8.96	0	0	0	0	0	8.96
E	1.85	0.85	0	0	0	0	2.7
SE	3.98	0.14	0.14	0.14	0.28	0	4.68
S	4.55	0	0	0	0	0	4.55
SW	27.17	1.28	0	0	0	0	28.45
W	21.34	0	0	0	0	0	21.34
NW	17.5	0.43	0	0	0	0	17.93
Summary	88.19	2.7	0.14	0.14	0.28	0	91.45

% Icon Classes (ppb) 88 0.0-1.0 3 1.0-2.0 0 2.0-2.9 0 2.9-3.9 0 3.9-4.9 0 >4.9

LICA Bonnyville Poll.: LICA Bonnyville-SO<sub>2</sub>[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 8.53% Calm  
Poll Avg: 0.15[ppb]



SO2[ppb] Calibration: LICA Bonnyville Monthly: 2016/12 Type: Span



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



***HYDROGEN SULPHIDE***



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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	S	0.0	0.0	0.0	0.1	0.0	24
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	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	S	0.0	0.0	0.0	0.1	0.0	24
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	S	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.1	0.2	0.3	0.1	0.0	0.1	S	0.0	0.0	0.1	0.2	0.0	0.0	0.3	0.1	24
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.1	0.0	S	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.1	24
6	0.2	0.0	0.0	0.0	0.0	0.3	0.3	0.2	0.2	0.1	0.0	0.3	0.0	0.0	0.3	0.0	0.0	S	0.2	0.0	0.2	0.2	0.1	0.0	0.0	0.0	0.3	0.1	24
7	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.1	0.0	0.2	0.0	0.0	0.2	0.0	0.2	0.0	24	
8	0.0	0.2	0.0	0.2	0.2	0.0	0.0	0.1	0.0	0.3	0.2	0.2	0.2	0.2	0.2	0.5	S	0.5	0.6	0.7	0.5	0.6	0.2	0.4	0.5	0.0	0.7	0.3	24
9	0.1	0.4	0.3	0.5	0.7	0.8	0.5	1.4	1.1	2.0	0.5	0.2	0.5	0.3	S	0.2	0.4	0.3	0.4	0.2	0.2	0.3	0.5	0.6	0.1	2.0	0.5	24	
10	1.0	0.6	0.8	0.7	0.6	0.8	1.0	0.5	0.5	0.8	0.5	0.5	0.3	S	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.4	24	
11	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	24	
12	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.1	0.2	0.0	S	0.1	0.2	0.1	0.4	0.0	0.0	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.4	0.1	24
13	0.0	0.2	0.1	0.1	0.2	0.2	0.0	0.2	0.1	0.0	S	0.0	0.0	0.0	0.0	0.1	0.3	0.2	0.1	0.0	0.2	0.1	0.1	0.0	0.0	0.3	0.1	24	
14	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.4	0.4	0.3	0.2	0.0	0.4	0.1	24	
15	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.1	S	0.1	0.0	0.1	0.1	0.0	0.2	0.4	0.6	0.2	0.3	0.1	0.2	0.1	0.0	0.0	0.0	0.6	0.1	24	
16	0.0	0.0	0.1	0.1	0.7	0.5	0.3	S	0.2	0.5	C	C	C	C	0.5	0.1	0.3	0.2	0.3	0.1	0.1	0.1	0.5	1.6	0.0	1.6	0.3	24	
17	1.6	1.5	0.7	0.6	1.0	1.6	S	1.4	1.1	0.8	1.2	1.1	1.4	0.9	0.2	0.7	1.0	1.2	0.5	0.3	0.2	0.2	0.0	0.1	0.0	1.6	0.8	24	
18	0.1	0.0	0.0	0.1	0.0	S	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0	24	
19	0.4	0.0	0.0	0.0	S	0.0	0.0	0.1	0.0	0.1	0.6	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.6	0.1	24	
20	0.0	0.1	0.0	S	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.5	0.4	1.0	0.8	0.6	0.8	0.6	0.6	0.4	0.4	0.3	0.0	0.0	1.0	0.3	24	
21	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	24	
22	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.2	0.0	0.2	0.4	0.0	0.0	0.1	0.0	0.4	0.1	24	
23	S	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.1	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	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.2	0.4	S	0.5	0.6	0.0	0.6	0.1	24	
26	0.1	0.2	0.7	0.4	0.2	0.1	0.2	0.0	0.6	0.2	0.0	0.0	0.1	0.1	0.0	0.2	0.2	0.1	0.2	0.4	S	0.3	0.1	0.0	0.0	0.7	0.2	24	
27	0.2	0.0	0.0	0.3	0.1	0.1	0.2	0.4	0.4	0.1	0.1	0.0	0.1	0.4	0.1	0.4	0.6	0.4	0.0	S	0.0	0.0	0.0	0.0	0.0	0.6	0.2	24	
28	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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24	
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.6	0.5	S	0.2	0.2	0.3	0.1	0.2	0.1	0.0	0.6	0.1	24	
30	0.2	0.1	0.1	0.2	0.2	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.3	0.1	24	
31	0.1	0.0	0.1	0.0	0.0	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	S	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	24	
HOURLY MAX	1.6	1.5	0.8	0.7	1.0	1.6	1.0	1.4	1.1	2.0	1.2	1.1	1.4	0.9	1.0	0.8	1.0	1.2	0.7	0.6	0.6	0.4	0.5	1.6					
HOURLY AVG	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2					

STATUS FLAG CODES

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

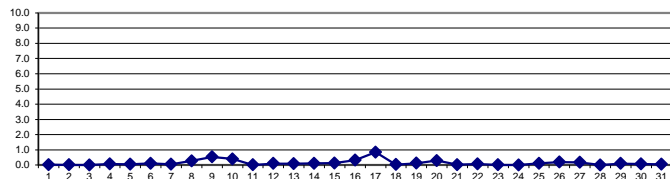
OBJECTIVE LIMIT:

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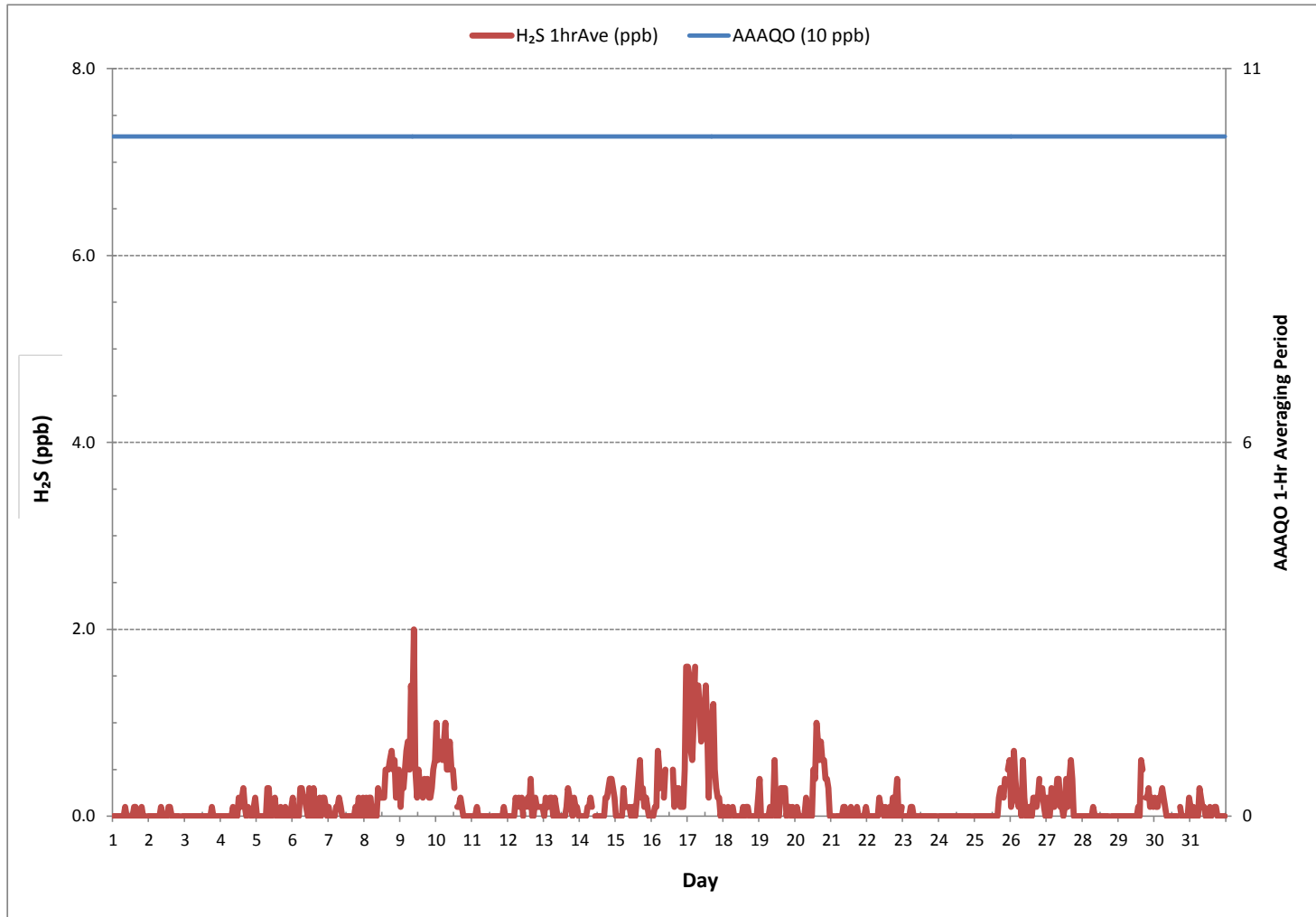
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF 24-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	313					
MINIMUM 1-HR AVERAGE:	0.0	ppb	@ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 1-HR AVERAGE:	2.0	ppb	@ HOUR(S)	9	ON DAY(S)	9
MAXIMUM 24-HR AVERAGE:	0.8	ppb			ON DAY(S)	17
					VAR-VARIOUS	
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	744	hrs	
MONTHLY CALIBRATION TIME:	4	hrs	AMD OPERATION UPTIME:	100.0	%	
STANDARD DEVIATION:	0.3		MONTHLY AVERAGE:	0.1	ppb	

24 HR AVERAGES December 2016



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





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Bonnyville Continuous Monitoring Station - December 2016

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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	0.4	0.4	0.5	0.2	0.5	0.5	0.3	0.4	0.4	0.3	0.2	0.3	0.3	0.1	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.0	S	0.2	0.0	0.5	0.3	24	
2	0.0	0.1	0.3	0.3	0.4	0.4	0.3	0.2	0.6	0.4	0.3	0.3	0.5	0.6	0.6	0.6	0.4	0.4	0.5	0.6	0.5	S	0.7	0.5	0.0	0.7	0.4	24	
3	0.6	0.4	0.5	0.5	0.8	0.6	0.6	0.5	0.6	0.6	0.5	0.5	0.6	0.6	0.8	0.8	0.7	1.1	0.6	S	0.7	0.6	0.7	0.4	1.1	0.6	24		
4	0.5	0.7	0.6	0.6	0.6	0.6	0.5	0.6	0.7	0.5	0.3	0.6	0.7	0.6	0.8	0.9	0.7	0.6	0.6	S	0.5	0.4	0.5	0.7	0.3	0.9	0.6	24	
5	0.7	0.5	0.4	0.1	0.2	0.1	0.4	0.5	0.6	0.3	0.1	0.3	0.5	0.2	0.0	0.1	0.4	0.3	S	0.2	0.1	0.0	0.0	0.2	0.0	0.7	0.3	24	
6	0.2	0.3	0.0	0.1	0.1	0.4	0.3	0.2	0.2	0.3	0.1	0.4	0.3	0.1	0.2	0.2	0.2	S	0.2	0.0	0.2	0.1	0.1	0.0	0.0	0.4	0.2	24	
7	0.2	0.2	0.2	0.4	0.0	0.1	0.1	0.2	0.2	0.0	0.0	0.0	0.1	0.1	0.0	0.0	S	0.0	0.3	0.1	0.1	0.1	0.1	0.0	0.2	0.0	0.4	0.1	24
8	0.0	0.3	0.0	0.2	0.2	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	S	0.2	0.3	0.5	0.3	0.2	0.2	0.1	0.1	0.0	0.5	0.1	24	
9	0.0	0.2	0.1	0.2	0.7	0.8	0.4	2.1	1.9	2.5	1.4	0.2	0.4	0.3	S	0.1	0.3	0.4	0.5	0.3	0.2	0.5	0.6	1.0	0.0	2.5	0.7	24	
10	1.4	1.0	1.0	0.8	1.0	1.5	1.4	0.8	0.8	1.2	0.9	0.8	0.7	S	0.4	0.4	0.6	0.5	0.5	0.3	0.3	0.4	0.5	0.3	0.3	1.5	0.8	24	
11	0.4	0.5	0.5	0.6	0.4	0.4	0.4	0.4	0.1	0.2	0.2	0.4	S	0.3	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.3	0.1	0.6	0.4	24	
12	0.3	0.2	0.3	0.2	0.5	0.5	0.3	0.5	0.3	0.5	0.2	S	0.4	0.4	0.4	0.6	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.5	0.2	0.6	0.4	24	
13	0.5	0.4	0.4	0.3	0.5	0.4	0.3	0.5	0.4	0.3	S	0.1	0.3	0.4	0.3	0.4	0.4	0.4	0.3	0.2	0.6	0.3	0.4	0.0	0.0	0.6	0.4	24	
14	0.1	0.2	0.2	0.3	0.0	0.3	0.5	0.3	0.4	S	0.2	0.2	0.0	0.1	0.1	0.4	0.2	0.4	0.4	0.5	0.7	0.8	0.6	0.5	0.0	0.8	0.3	24	
15	0.1	0.2	0.2	0.2	0.2	0.5	0.3	0.2	S	0.3	0.1	0.3	0.2	0.2	0.3	0.6	0.9	0.3	0.5	0.3	0.3	0.3	0.2	0.2	0.1	0.9	0.3	24	
16	0.2	0.1	0.2	0.5	1.1	0.7	0.4	S	0.6	0.6	C	C	C	C	0.5	0.9	0.3	0.4	1.0	0.5	0.4	0.3	1.3	1.9	0.1	1.9	0.6	24	
17	2.1	3.0	1.3	1.1	2.0	2.1	S	3.1	1.7	1.4	1.9	1.6	1.8	1.6	1.0	1.4	1.6	1.8	0.9	0.8	0.7	0.9	0.7	0.6	0.6	3.1	1.5	24	
18	0.6	0.5	0.9	0.9	0.7	S	0.8	0.6	0.5	0.5	0.5	0.5	0.7	0.8	0.6	0.8	0.8	0.6	0.8	0.8	0.3	0.8	0.6	3.2	0.3	3.2	0.8	24	
19	2.1	0.6	0.6	0.6	S	0.5	0.9	0.9	0.7	1.1	1.7	1.7	1.3	0.7	1.2	1.2	1.0	1.0	0.7	0.9	0.8	0.7	0.9	0.7	0.5	2.1	1.0	24	
20	0.7	0.7	0.4	S	0.5	0.6	0.5	0.7	0.4	0.6	0.5	0.5	1.1	1.4	3.2	1.6	2.1	1.5	1.9	2.3	1.4	0.8	0.7	0.4	0.4	3.2	1.1	24	
21	0.5	0.9	S	0.3	0.6	0.6	0.5	0.3	0.6	0.6	0.5	0.4	0.4	0.7	0.5	0.5	0.7	0.8	0.5	0.3	0.2	0.6	0.5	0.9	0.2	0.9	0.5	24	
22	0.5	S	1.0	0.8	0.5	0.5	0.5	0.7	0.9	0.8	0.8	0.5	0.7	0.7	0.7	0.7	0.6	1.1	0.9	0.8	1.1	0.8	0.5	0.7	0.5	1.1	0.7	24	
23	S	0.5	0.4	0.6	0.5	0.8	0.5	0.3	0.3	0.4	0.3	0.4	0.3	0.2	0.1	0.2	0.4	0.2	0.1	0.1	0.2	0.0	0.0	S	0.0	0.8	0.3	24	
24	0.3	0.5	0.4	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.2	0.2	0.0	0.1	0.1	0.3	0.3	0.1	0.1	0.0	0.1	0.2	S	0.0	0.0	0.5	0.1	24	
25	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.2	0.3	0.2	0.5	0.5	0.5	0.7	0.5	0.8	S	0.8	1.0	0.0	1.0	0.3	24	
26	0.6	0.7	1.1	0.8	0.8	0.5	0.6	0.4	1.2	0.7	0.4	0.2	0.5	0.4	0.5	0.7	1.6	0.7	0.6	1.1	S	1.2	0.5	0.6	0.2	1.6	0.7	24	
27	0.8	0.9	0.5	1.0	0.6	0.7	0.8	1.0	0.9	0.7	1.0	0.8	1.0	1.2	0.9	1.3	1.7	1.7	0.9	S	0.7	0.7	0.7	0.6	0.5	1.7	0.9	24	
28	0.6	0.7	0.6	0.6	0.5	0.6	0.7	0.8	0.6	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.6	0.3	S	0.4	0.3	0.2	0.3	0.4	0.2	0.8	0.5	24	
29	0.4	0.2	0.4	0.3	0.3	0.4	0.2	0.3	0.4	0.2	0.2	0.2	0.6	0.7	0.5	1.0	1.0	S	0.6	0.6	0.6	0.6	0.6	0.7	0.5	1.0	0.5	24	
30	0.6	0.5	0.6	0.7	0.6	0.7	0.6	0.6	0.5	0.4	0.5	0.4	0.5	0.5	0.3	0.3	S	0.7	0.5	0.5	0.6	0.4	0.5	0.8	0.3	0.8	0.5	24	
31	0.8	0.7	0.7	0.4	0.5	0.7	0.8	0.7	0.6	0.6	0.5	0.4	0.5	0.6	0.5	S	0.6	0.6	0.5	0.5	0.4	0.5	0.4	0.3	0.3	0.8	0.6	24	
HOURLY MAX	2.1	3.0	1.3	1.1	2.0	2.1	1.4	3.1	1.9	2.5	1.9	1.7	1.8	1.6	3.2	1.6	2.1	1.8	1.9	2.3	1.4	1.2	1.3	3.2					
HOURLY AVG	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.6	0.5	0.4	0.5	0.5	0.5	0.6	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.6					

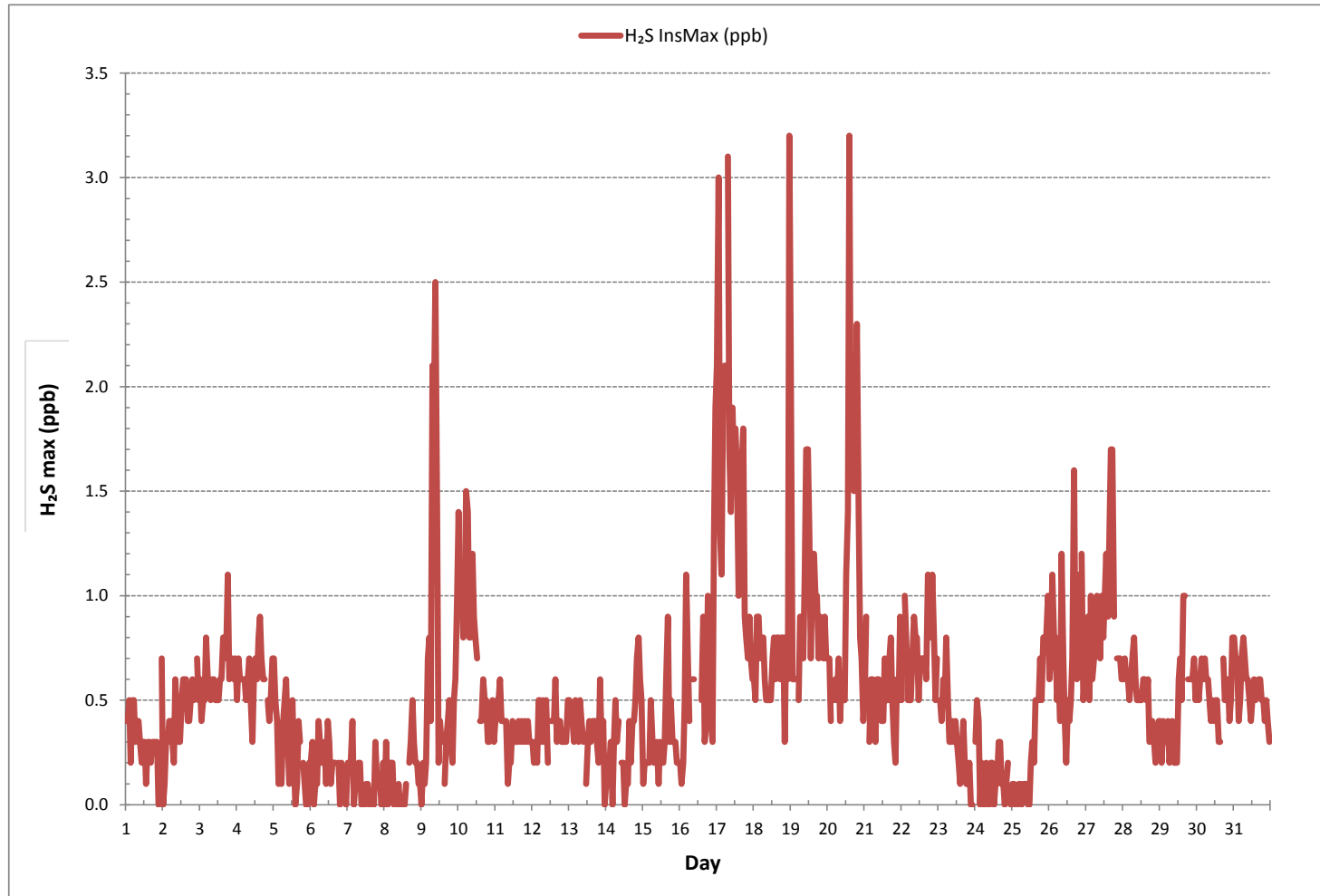
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	664
MAXIMUM INSTANTANEOUS VALUE:	3.2 ppb @ HOUR(S) 23, 14 ON DAY(S) 18, 20
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	4 hrs
STANDARD DEVIATION:	0.4
OPERATIONAL TIME:	744 hrs

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



Wind: LICA Bonnyville Poll.: LICA Bonnyville-H2S[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 8.47% Valid Data: 95.16% Calm Avg: 0.61 [ppb]

Direction	0.0-0.7	0.7-1.4	1.4-2.1	>2.1	Total
N	2.54	0.28	0	0	2.82
NE	9.32	0.28	0	0	9.6
E	2.68	0	0	0	2.68
SE	4.66	0	0	0	4.66
S	4.52	0	0	0	4.52
SW	27.97	0.28	0	0	28.25
W	20.76	0.42	0	0	21.18
NW	17.66	0.14	0	0	17.8
Summary	90.11	1.4	0	0	91.51

% Icon Classes (ppb)

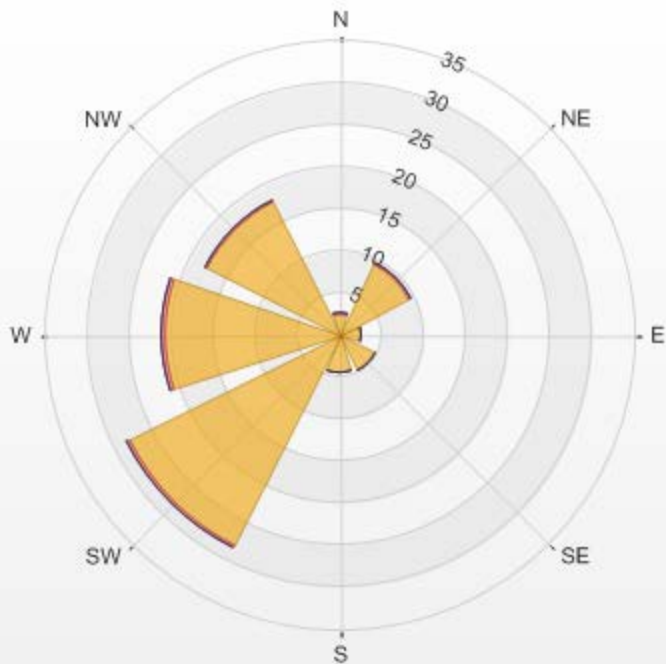
90 0.0-0.7

1 0.7-1.4

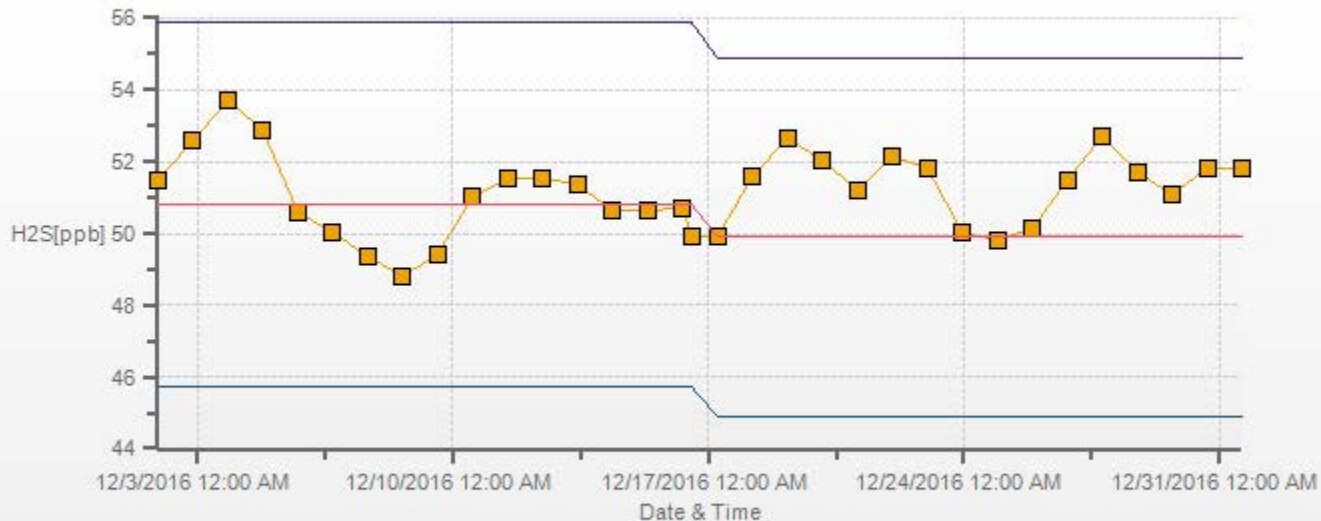
0 1.4-2.1

0 >2.1

LICA Bonnyville Poll.: LICA Bonnyville-H2S[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 8.47% Calm  
Poll Avg: 0.61[ppb]



### H2S[ppb] Calibration: LICA Bonnyville Monthly: 2016/12 Type: Span



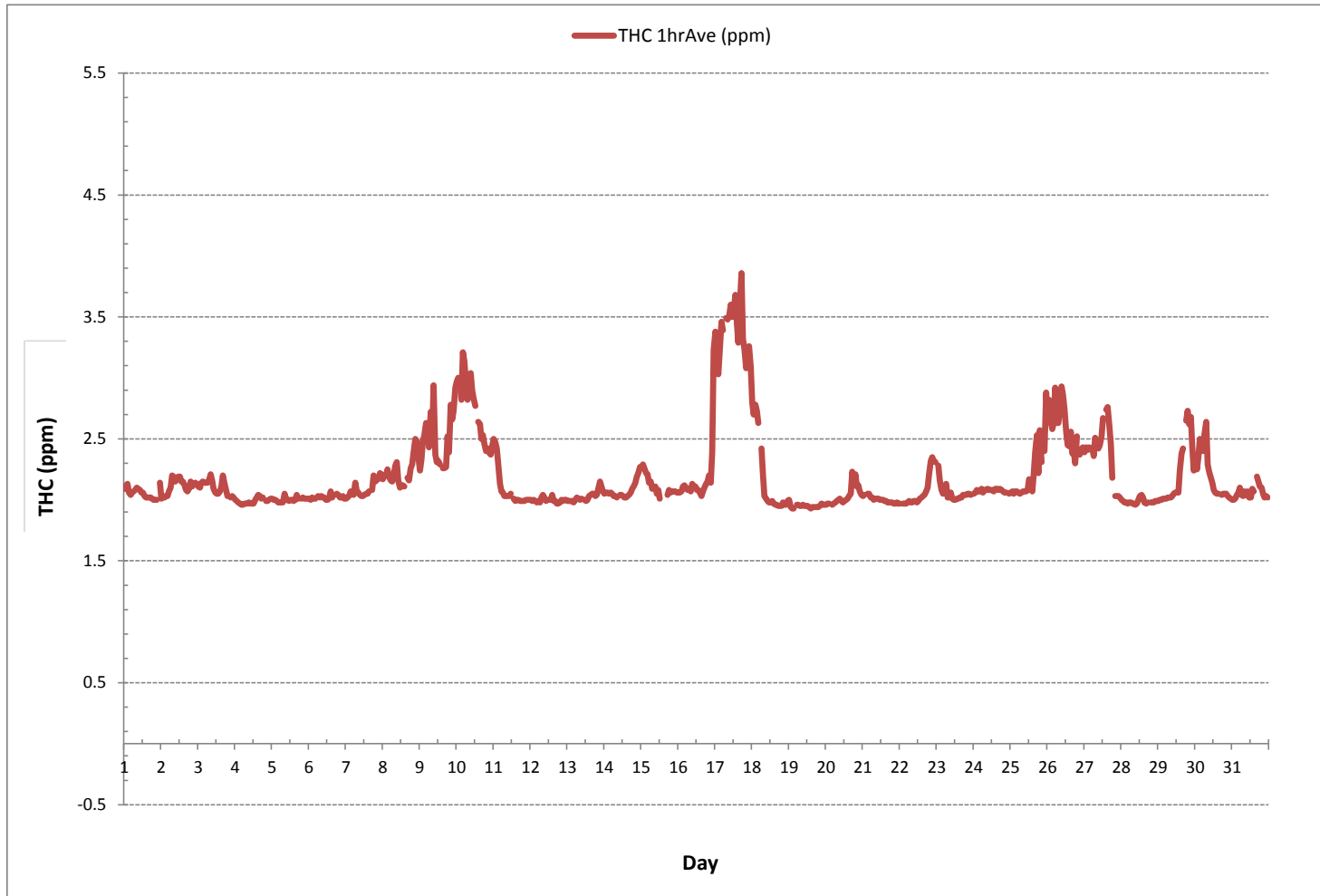
Span Meas Span Ref Span Low Span High



***TOTAL HYDROCARBON***



TOTAL HYDROCARBONS Hourly Averages (THC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Bonnyville Continuous Monitoring Station - December 2016

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	2.11	2.15	2.16	2.09	2.05	2.22	2.08	2.09	2.10	2.10	2.08	2.07	2.30	2.04	2.04	2.03	2.21	2.08	2.01	2.01	2.01	2.02	S	2.02	2.01	2.30	2.09	24
2	2.02	2.05	2.07	2.06	2.08	2.15	2.14	2.24	2.24	2.17	2.33	2.33	2.39	2.56	2.29	2.19	2.11	2.07	2.12	2.18	2.13	S	2.20	2.16	2.02	2.56	2.19	24
3	2.17	2.12	2.27	2.22	2.14	2.20	2.15	2.20	2.24	2.22	2.10	2.07	2.05	2.06	2.14	2.17	2.76	2.19	2.09	2.07	S	2.05	2.18	2.03	2.03	2.76	2.17	24
4	2.02	2.00	1.99	1.98	1.97	1.98	1.98	1.98	1.98	1.99	1.98	1.98	1.98	2.15	2.15	2.07	2.06	2.09	2.06	S	2.01	2.00	2.04	2.06	1.97	2.15	2.02	24
5	2.16	2.08	2.03	2.03	2.00	2.00	2.01	2.01	2.51	2.03	2.02	2.02	2.09	2.01	2.02	2.10	2.79	2.25	S	2.04	2.16	2.05	2.03	2.05	2.00	2.79	2.11	24
6	2.04	2.02	2.61	2.06	2.05	2.05	2.08	2.08	2.24	2.05	2.08	2.36	2.04	2.12	2.28	2.05	2.36	S	2.08	2.07	2.06	2.08	2.05	2.16	2.02	2.61	2.13	24
7	2.06	2.77	2.23	2.08	2.51	2.05	2.59	2.17	2.16	2.06	2.06	2.07	2.07	2.09	2.07	2.42	S	2.27	2.51	2.19	2.21	2.26	2.38	2.33	2.05	2.77	2.24	24
8	2.25	2.31	2.33	2.28	2.29	2.39	2.25	2.42	2.43	2.54	2.36	2.28	2.34	2.24	2.31	S	2.31	2.28	2.48	2.55	2.68	2.64	2.74	2.61	2.24	2.74	2.40	24
9	2.42	2.54	2.92	2.72	2.81	2.97	2.61	3.34	2.72	3.38	3.08	2.33	2.33	2.43	S	2.34	2.40	2.44	6.24	2.79	7.21	3.33	3.27	3.39	2.33	7.21	3.13	24
10	3.58	3.50	3.20	3.00	3.72	3.74	3.25	2.95	3.10	3.90	3.08	3.00	2.91	S	2.73	2.77	2.67	2.96	2.63	2.66	2.64	2.66	2.41	2.47	2.41	3.90	3.02	24
11	2.52	2.50	2.47	2.37	2.21	2.09	2.08	2.04	2.04	2.04	2.03	2.41	S	2.27	2.01	2.01	2.01	2.01	1.99	2.00	2.01	2.01	2.01	2.00	1.99	2.52	2.14	24
12	2.00	2.00	2.00	2.00	1.99	2.63	2.03	2.17	2.17	2.11	2.08	S	2.62	2.04	3.84	2.03	2.61	2.61	1.98	1.99	2.21	2.03	2.06	2.14	1.98	3.84	2.23	24
13	2.04	2.09	2.00	2.00	2.00	2.04	2.15	2.12	2.08	2.03	S	2.04	2.04	2.07	2.11	2.12	2.13	2.20	2.09	2.09	2.15	2.27	2.18	2.09	2.00	2.27	2.09	24
14	2.06	2.07	2.08	2.36	2.15	2.08	2.06	2.05	2.03	S	2.06	2.04	2.04	2.03	2.03	2.04	2.05	2.09	2.10	2.18	2.27	2.36	2.30	2.44	2.03	2.44	2.13	24
15	2.99	2.87	2.95	2.33	2.32	2.19	2.30	2.28	S	2.76	2.14	2.25	2.09	C	C	C	C	2.07	2.16	2.08	2.12	2.10	2.08	2.07	2.07	2.99	2.32	24
16	2.09	2.07	2.10	2.17	2.19	2.11	2.11	S	2.17	2.34	2.29	2.30	2.29	2.67	2.07	2.06	2.08	2.22	2.21	2.18	2.30	2.16	2.88	4.15	2.06	4.15	2.31	24
17	3.78	3.86	3.59	4.29	4.30	4.14	S	4.48	4.76	3.85	4.61	3.94	4.25	4.17	3.79	3.97	5.20	7.85	3.89	3.40	3.18	3.26	3.37	3.31	3.18	7.85	4.14	24
18	2.99	2.82	2.90	2.91	2.74	S	2.56	2.37	2.05	2.03	2.01	1.99	2.00	2.00	1.99	2.07	1.97	1.96	1.97	1.96	2.06	1.97	2.02	2.17	1.96	2.99	2.24	24
19	2.07	1.96	1.93	1.96	S	2.05	1.97	1.98	2.00	2.09	1.96	1.96	1.96	1.95	1.95	2.26	1.95	1.95	1.96	1.97	1.96	1.98	1.97	1.97	1.93	2.26	1.99	24
20	1.97	1.98	1.98	S	1.97	1.98	2.00	2.00	2.02	2.02	2.01	1.99	2.01	2.03	2.03	2.13	2.24	3.53	2.18	2.47	2.33	2.55	2.17	2.09	1.97	3.53	2.16	24
21	2.05	2.07	S	2.06	2.07	2.07	2.09	2.02	2.03	2.02	2.03	2.03	2.03	2.01	2.00	2.01	1.99	2.00	1.99	1.99	1.98	1.99	1.99	1.98	1.98	2.09	2.02	24
22	1.99	S	1.99	1.98	1.99	1.99	2.03	1.99	2.00	2.02	2.00	2.00	2.00	2.00	2.04	2.13	2.07	2.09	2.26	2.84	2.64	2.50	2.79	2.72	1.98	2.84	2.18	24
23	S	2.55	2.33	2.26	2.49	2.34	2.55	2.07	2.09	2.19	2.05	2.03	2.02	2.05	2.03	2.04	2.05	2.08	2.08	2.06	2.07	2.08	2.12	S	2.02	2.55	2.17	24
24	2.10	2.09	2.10	2.09	2.09	2.11	2.08	2.14	2.16	2.48	2.17	2.12	2.12	2.11	2.30	2.27	2.18	2.17	2.22	2.15	2.11	2.15	S	2.14	2.08	2.48	2.16	24
25	2.22	2.14	2.11	2.20	2.26	2.10	2.12	2.15	2.22	2.15	2.18	2.37	2.49	2.74	2.25	2.67	3.25	3.69	3.10	3.70	2.44	S	2.95	4.41	2.10	4.41	2.60	24
26	3.70	4.33	2.76	2.68	2.88	3.38	3.01	2.65	2.95	3.17	3.07	2.82	2.67	2.49	2.82	3.38	2.42	4.62	3.07	3.45	S	2.93	3.02	3.38	2.42	4.62	3.12	24
27	3.38	2.98	2.96	3.07	2.97	2.80	3.25	4.32	3.04	3.72	2.49	2.89	3.47	S1	S1	3.70	3.15	2.73	2.37	S	2.05	2.04	2.04	2.03	2.03	4.32	2.93	22
28	2.02	2.00	1.99	1.98	1.99	1.99	2.00	1.99	1.98	2.01	2.03	2.04	2.23	2.14	2.07	2.01	1.98	2.00	S	2.01	1.99	1.99	2.27	2.00	1.98	2.27	2.03	24
29	2.00	2.01	2.01	2.01	2.02	2.02	2.04	2.04	2.02	2.04	2.02	2.07	2.27	2.12	2.92	3.61	3.16	S	2.91	2.92	2.91	3.16	2.78	2.36	2.00	3.61	2.41	24
30	2.53	2.55	2.59	3.13	3.27	2.49	2.98	4.23	2.42	2.29	2.19	2.17	2.11	2.08	2.06	2.10	S	2.08	2.05	2.06	2.05	2.04	2.03	2.02	2.02	4.23	2.41	24
31	2.02	2.05	2.04	2.11	2.11	2.57	2.15	2.07	2.65	2.11	2.23	2.09	2.13	2.45	2.20	S	2.57	2.40	2.55	2.37	2.25	2.08	2.04	2.04	2.02	2.65	2.23	24
HOURLY MAX	3.78	4.33	3.59	4.29	4.30	4.14	3.25	4.48	4.76	3.90	4.61	3.94	4.25	4.17	3.84	3.97	5.20	7.85	6.24	3.70	7.21	3.33	3.37	4.41				
HOURLY AVG	2.38	2.42	2.36	2.35	2.39	2.36	2.29	2.42	2.35	2.40	2.30	2.27	2.31	2.26	2.31	2.38	2.45	2.59	2.46	2.36	2.42	2.30	2.36	2.43				

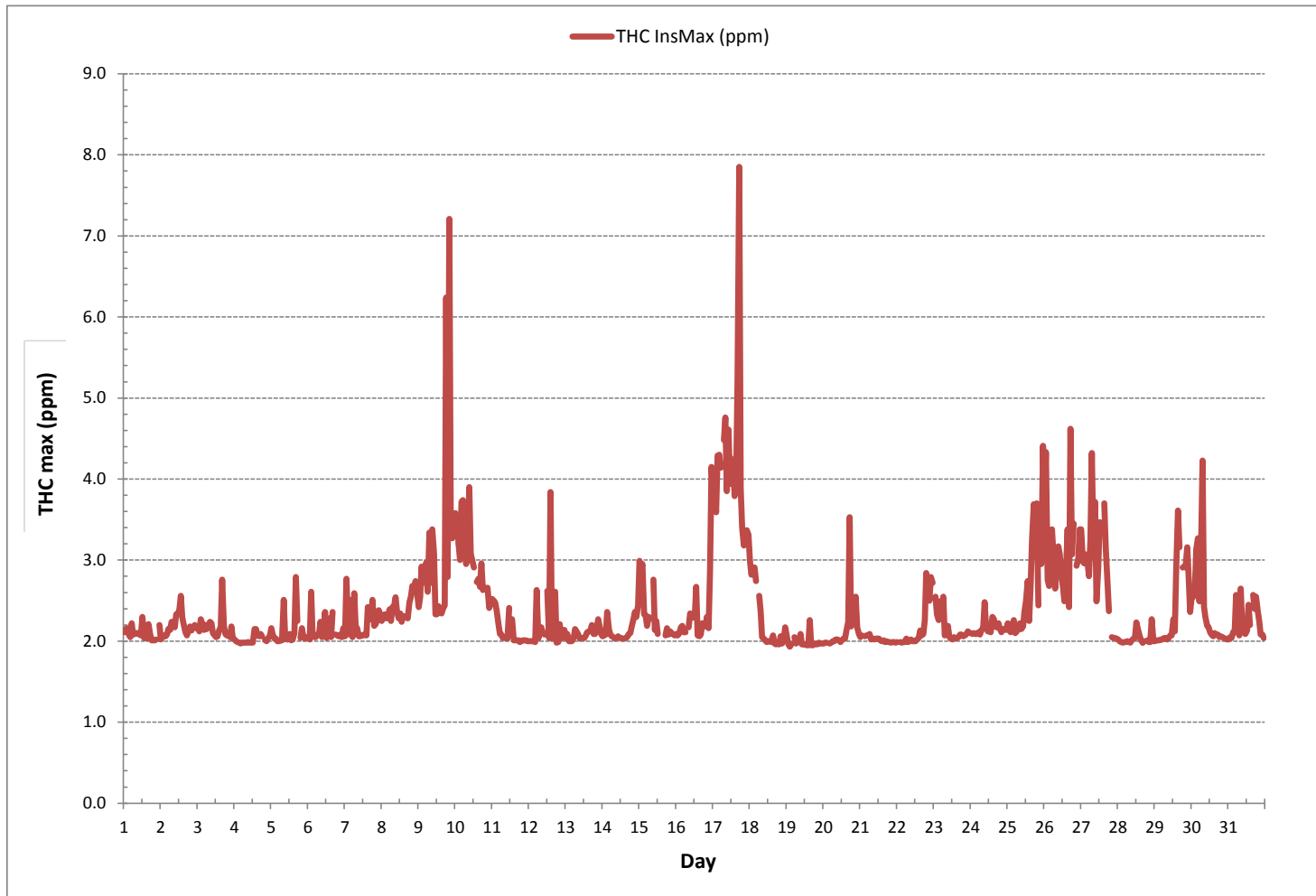
STATUS FLAG CODES

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:	706
MAXIMUM INSTANTANEOUS VALUE:	7.85 ppm @ HOUR(S) 17 ON DAY(S) 17
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	4 hrs
OPERATIONAL TIME:	742 hrs
STANDARD DEVIATION:	0.60

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

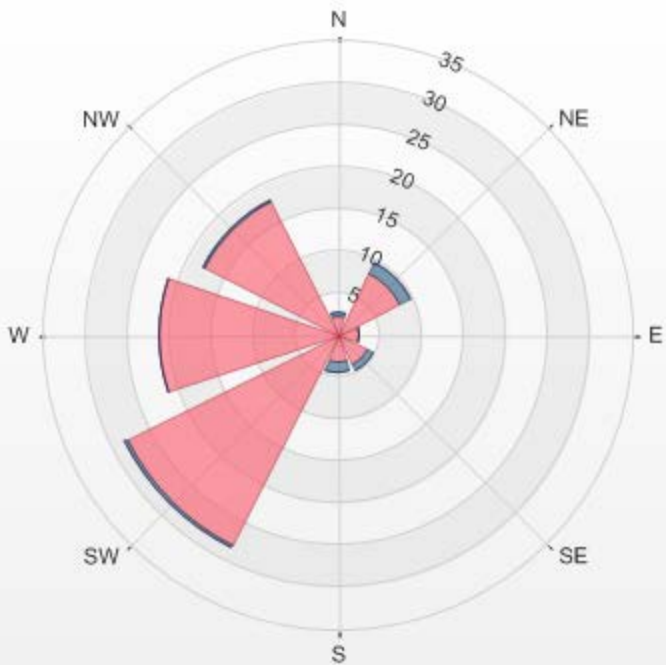


Wind: LICA Bonnyville Poll.: LICA Bonnyville-THC55[ppm] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr  
 Calm: 8.22% Valid Data: 94.89% Calm Avg: 2.87 [ppm]

Direction	0.0-1.3	1.3-2.6	2.6-3.9	>3.9	Total
N	0	2.27	0.57	0	2.84
NE	0	8.22	1.42	0	9.64
E	0	2.55	0.14	0	2.69
SE	0	4.11	0.57	0	4.68
S	0	3.26	1.27	0	4.53
SW	0	27.9	0.42	0	28.32
W	0	21.25	0	0	21.25
NW	0	17.56	0.28	0	17.84
Summary	0	87.12	4.67	0	91.79

% Icon Classes (ppm) 0 0.0-1.3 87 1.3-2.6 5 2.6-3.9 0 >3.9

LICA Bonnyville Poll.: LICA Bonnyville-THC55[ppm] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 8.22% Calm  
 Poll Avg: 2.87[ppm]



THC55[ppm] Calibration: LICA Bonnyville Monthly: 2016/12 Type: Span



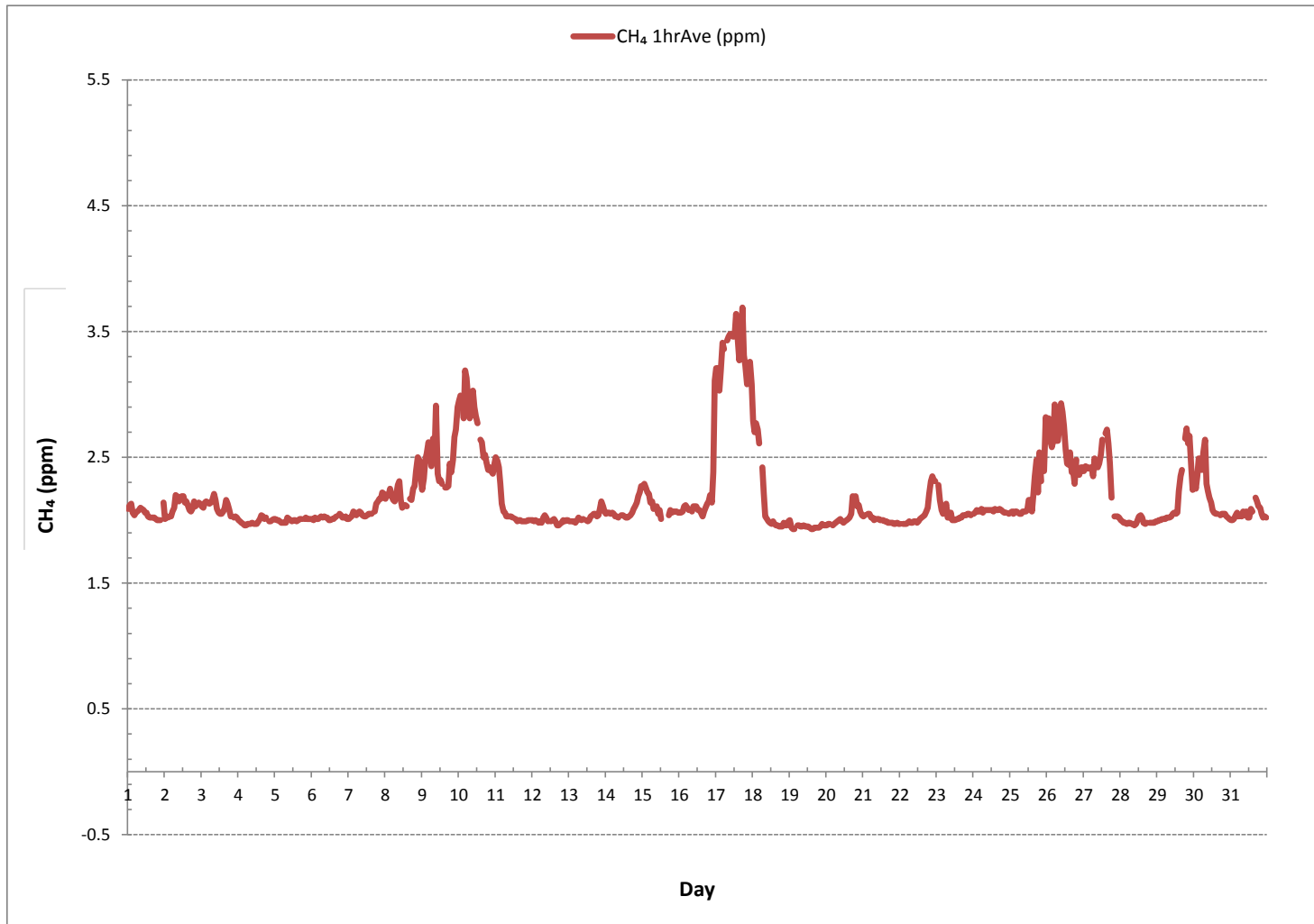
■ Span Meas 
 — Span Ref 
 — Span Low 
 — Span High



***METHANE***



METHANE Hourly Averages (CH<sub>4</sub> ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Bonnyville Continuous Monitoring Station - December 2016

METHANE MAX Instantaneous Maximum (CH<sub>4</sub> ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	2.11	2.15	2.17	2.09	2.05	2.22	2.09	2.10	2.11	2.10	2.09	2.08	2.08	2.04	2.04	2.03	2.10	2.09	2.02	2.01	2.01	2.02	S	2.02	2.01	2.22	2.08	24
2	2.03	2.05	2.05	2.06	2.09	2.16	2.14	2.25	2.25	2.17	2.33	2.34	2.39	2.26	2.29	2.19	2.12	2.08	2.12	2.19	2.14	S	2.17	2.16	2.03	2.39	2.18	24
3	2.18	2.12	2.16	2.17	2.15	2.16	2.15	2.20	2.24	2.22	2.11	2.08	2.05	2.06	2.09	2.16	2.38	2.20	2.09	2.08	S	2.05	2.19	2.03	2.03	2.38	2.14	24
4	2.02	2.00	2.00	1.98	1.97	1.98	1.98	1.98	1.99	1.99	1.98	1.98	1.98	2.01	2.04	2.08	2.06	2.09	2.06	S	2.01	2.00	2.04	2.06	1.97	2.09	2.01	24
5	2.16	2.08	2.03	2.03	2.00	2.01	2.01	2.02	2.06	2.03	2.02	2.02	2.03	2.01	2.02	2.11	2.07	2.03	S	2.04	2.17	2.05	2.03	2.05	2.00	2.17	2.05	24
6	2.04	2.02	2.56	2.06	2.06	2.05	2.08	2.09	2.24	2.06	2.08	2.37	2.04	2.13	2.03	2.05	2.06	S	2.08	2.07	2.06	2.09	2.05	2.17	2.02	2.56	2.11	24
7	2.06	2.70	2.22	2.09	2.47	2.06	2.11	2.11	2.16	2.06	2.06	2.07	2.07	2.09	2.08	2.08	S	2.11	2.19	2.19	2.22	2.26	2.38	2.33	2.06	2.70	2.18	24
8	2.25	2.31	2.33	2.28	2.29	2.39	2.25	2.42	2.44	2.53	2.36	2.20	2.35	2.25	2.31	S	2.28	2.29	2.48	2.41	2.68	2.64	2.75	2.62	2.20	2.75	2.40	24
9	2.42	2.53	2.87	2.73	2.81	2.90	2.52	3.23	2.65	3.24	3.06	2.33	2.33	2.43	S	2.35	2.40	2.44	2.77	2.74	2.85	3.22	3.19	3.29	2.33	3.29	2.75	24
10	3.43	3.42	3.16	3.01	3.61	3.62	3.25	2.92	3.10	3.76	3.05	2.99	2.91	S	2.73	2.76	2.68	2.72	2.63	2.66	2.64	2.66	2.42	2.47	2.42	3.76	2.98	24
11	2.52	2.50	2.46	2.38	2.22	2.10	2.09	2.04	2.04	2.04	2.03	2.04	S	2.28	2.01	2.01	2.01	2.01	2.00	2.00	2.01	2.01	2.01	2.00	2.00	2.52	2.12	24
12	2.00	2.00	2.00	2.00	1.99	2.02	2.03	2.18	2.18	2.12	2.08	S	2.04	2.04	2.16	2.03	2.07	2.04	1.98	1.98	2.22	2.03	2.07	2.14	1.98	2.22	2.06	24
13	2.04	2.09	2.00	2.00	2.00	2.04	2.16	2.12	2.08	2.03	S	2.04	2.04	2.07	2.12	2.13	2.14	2.21	2.10	2.10	2.16	2.27	2.19	2.10	2.00	2.27	2.10	24
14	2.06	2.07	2.09	2.36	2.16	2.08	2.06	2.05	2.03	S	2.07	2.04	2.05	2.03	2.03	2.04	2.05	2.09	2.11	2.18	2.16	2.36	2.30	2.44	2.03	2.44	2.13	24
15	2.88	2.77	2.89	2.33	2.33	2.20	2.30	2.28	S	2.71	2.15	2.25	2.09	C	C	C	C	2.08	2.17	2.08	2.12	2.10	2.08	2.07	2.07	2.89	2.31	24
16	2.10	2.08	2.11	2.17	2.20	2.12	2.11	S	2.10	2.17	2.29	2.31	2.29	2.63	2.08	2.06	2.09	2.22	2.20	2.18	2.30	2.16	2.81	3.92	2.06	3.92	2.29	24
17	3.42	3.73	3.50	4.02	4.08	3.96	S	4.22	4.58	3.65	4.40	3.84	4.16	4.02	3.65	3.82	4.63	7.18	3.80	3.28	3.18	3.25	3.37	3.24	3.18	7.18	3.96	24
18	2.90	2.76	2.79	2.80	2.67	S	2.49	2.37	2.05	2.03	2.01	2.00	2.00	2.00	1.98	1.97	1.97	1.96	1.96	1.96	2.06	1.97	2.02	2.17	1.96	2.90	2.21	24
19	2.08	1.96	1.93	1.95	S	2.06	1.97	1.98	2.00	2.05	1.95	1.96	1.96	1.95	1.95	1.96	1.94	1.95	1.95	1.96	1.96	1.98	1.98	1.98	1.93	2.08	1.97	24
20	1.97	1.98	1.98	S	1.98	1.98	2.01	2.00	2.02	2.02	2.01	1.99	2.01	2.03	2.03	2.07	2.14	2.84	2.18	2.41	2.18	2.47	2.17	2.09	1.97	2.84	2.11	24
21	2.05	2.08	S	2.06	2.07	2.05	2.05	2.02	2.03	2.02	2.03	2.03	2.03	2.01	2.00	2.01	1.99	2.00	1.99	1.99	1.98	1.99	1.98	1.98	1.98	2.08	2.02	24
22	1.99	S	1.98	1.98	1.99	1.99	2.04	1.99	2.00	2.03	2.00	2.00	2.01	2.02	2.05	2.04	2.07	2.09	2.14	2.78	2.58	2.50	2.73	2.67	1.98	2.78	2.16	24
23	S	2.55	2.33	2.26	2.43	2.34	2.50	2.08	2.10	2.19	2.05	2.03	2.02	2.05	2.03	2.04	2.06	2.08	2.09	2.06	2.07	2.08	2.13	S	2.02	2.55	2.16	24
24	2.11	2.10	2.11	2.09	2.10	2.12	2.08	2.15	2.17	2.13	2.17	2.13	2.13	2.12	2.31	2.27	2.19	2.18	2.22	2.16	2.12	2.16	S	2.15	2.08	2.31	2.15	24
25	2.22	2.15	2.12	2.21	2.26	2.11	2.13	2.16	2.22	2.16	2.18	2.37	2.42	2.68	2.25	2.58	3.08	3.49	2.99	3.45	2.41	S	2.88	4.15	2.11	4.15	2.55	24
26	3.53	4.14	2.76	2.68	2.89	3.32	2.94	2.65	2.96	3.18	3.07	2.82	2.67	2.48	2.69	3.26	2.43	4.35	2.97	3.20	S	2.82	2.91	3.25	2.43	4.35	3.04	24
27	3.25	2.90	2.87	2.95	2.86	2.69	3.13	4.07	2.95	3.54	2.48	2.79	3.37	S1	S1	3.52	2.96	2.60	2.32	S	2.05	2.04	2.04	2.03	2.03	4.07	2.83	22
28	2.02	2.00	1.99	1.99	1.98	1.99	2.00	1.99	1.97	2.01	2.03	2.04	2.22	2.15	2.08	2.01	1.98	2.00	S	2.01	2.00	1.98	2.00	2.00	1.97	2.22	2.02	24
29	2.00	2.01	2.01	2.01	2.02	2.02	2.04	2.04	2.03	2.04	2.08	2.07	2.10	2.13	2.78	3.32	3.03	S	2.87	2.92	2.84	3.06	2.77	2.36	2.00	3.32	2.37	24
30	2.54	2.54	2.54	3.05	3.18	2.44	2.94	3.98	2.42	2.29	2.19	2.17	2.12	2.08	2.06	2.06	S	2.06	2.06	2.06	2.06	2.04	2.03	2.03	2.03	3.98	2.39	24
31	2.02	2.05	2.04	2.11	2.11	2.11	2.16	2.08	2.59	2.12	2.22	2.09	2.14	2.43	2.20	S	2.50	2.40	2.50	2.37	2.25	2.08	2.08	2.04	2.02	2.59	2.20	24
HOURLY MAX	3.53	4.14	3.50	4.02	4.08	3.96	3.25	4.22	4.58	3.76	4.40	3.84	4.16	4.02	3.65	3.82	4.63	7.18	3.80	3.45	3.18	3.25	3.37	4.15				
HOURLY AVG	2.35	2.39	2.34	2.33	2.37	2.31	2.26	2.39	2.33	2.36	2.29	2.25	2.27	2.23	2.22	2.32	2.34	2.48	2.31	2.33	2.26	2.29	2.34	2.40				

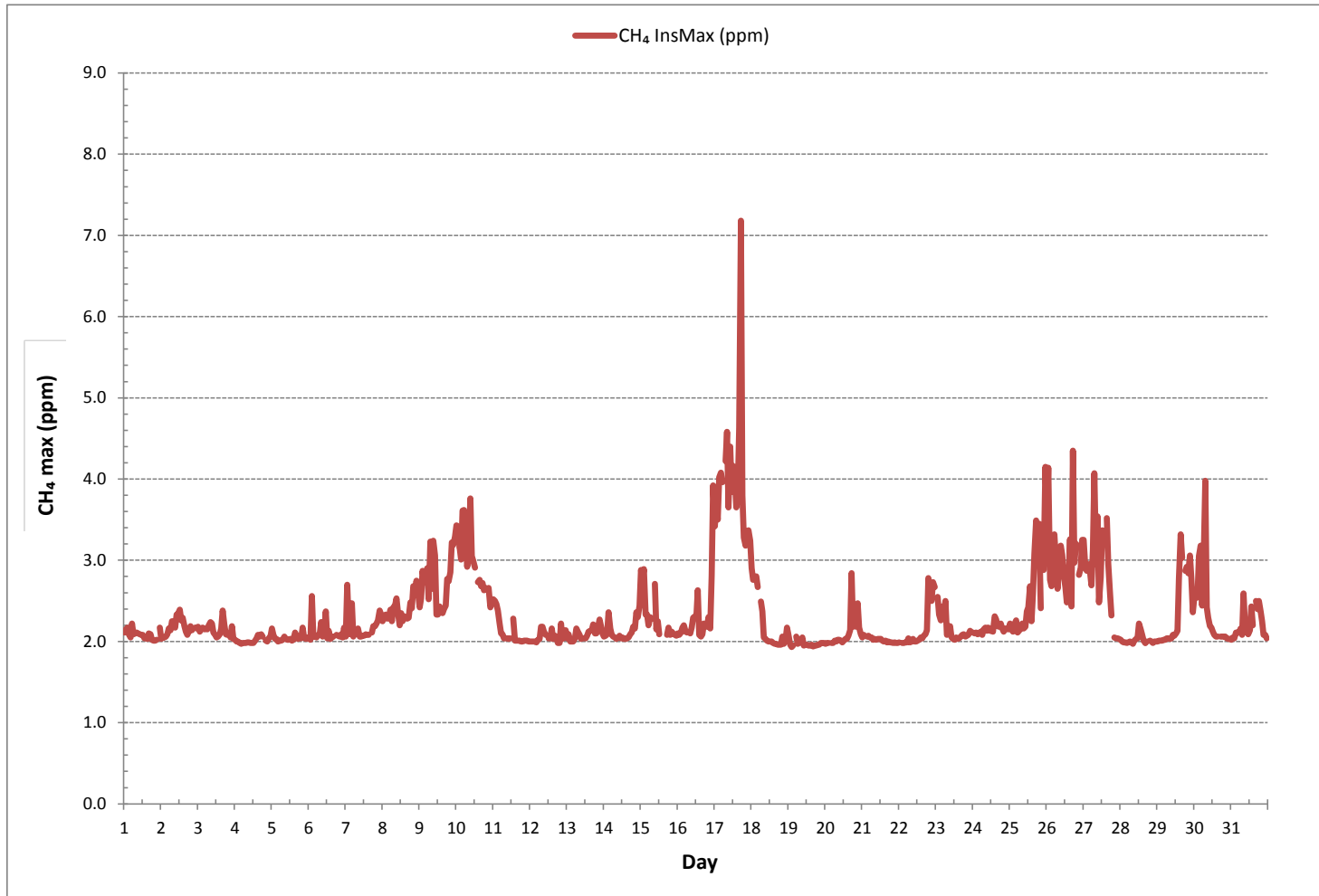
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	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:	706
MAXIMUM INSTANTANEOUS VALUE:	7.18 ppm @ HOUR(S) 17 ON DAY(S) 17
VAR-VARIOUS	
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	4 hrs
STANDARD DEVIATION:	0.50
OPERATIONAL TIME:	742 hrs

METHANE MAX Instantaneous Maximum (CH<sub>4</sub> ppm)

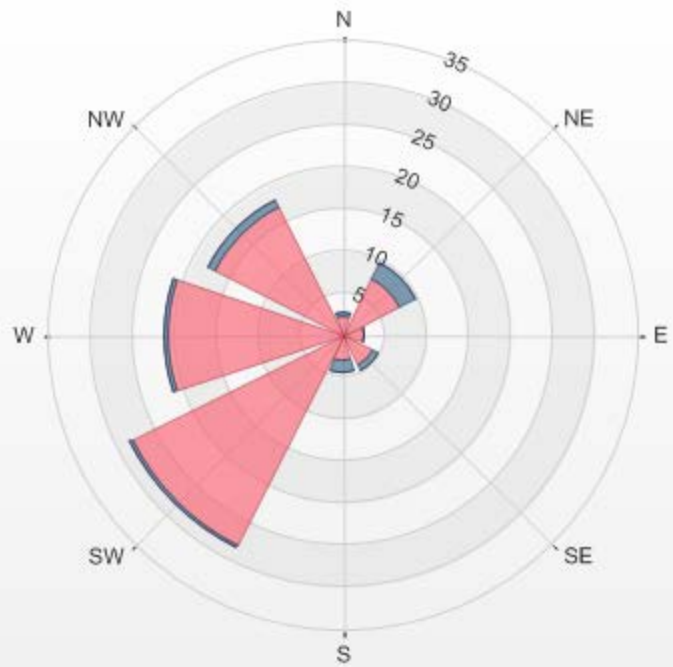


Wind: LICA Bonnyville Poll.: LICA Bonnyville-CH4[ppm] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 8.22% Valid Data: 94.89% Calm Avg: 2.85 [ppm]

Direction	0.0-1.2	1.2-2.5	2.5-3.7	>3.7	Total
N	0	2.27	0.57	0	2.84
NE	0	7.51	2.12	0	9.63
E	0	2.55	0.14	0	2.69
SE	0	3.97	0.71	0	4.68
S	0	3.12	1.42	0	4.54
SW	0	27.9	0.42	0	28.32
W	0	20.82	0.42	0	21.24
NW	0	16.86	0.99	0	17.85
Summary	0	85	6.79	0	91.79

% Icon Classes (ppm) 0 0.0-1.2 85 1.2-2.5 7 2.5-3.7 0 >3.7

LICA Bonnyville Poll.: LICA Bonnyville-CH4[ppm] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 8.22% Calm  
Poll Avg: 2.85[ppm]



CH4[ppm] Calibration: LICA Bonnyville Monthly: 2016/12 Type: Span



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



***NON-METHANE HYDROCARBON***



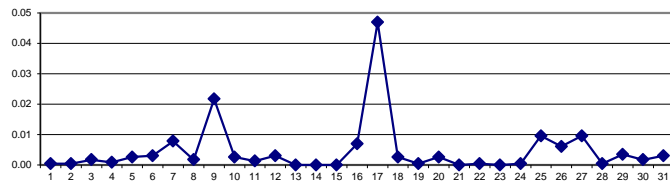
NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.01	0.00	24
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.01	0.00	24
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.04	0.00	24
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	24
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.01	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	24
7	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.01	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.01	24
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.01	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	24
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.03	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.07	0.00	0.30	0.00	0.01	0.02	0.00	0.30	0.02	0.00	24
10	0.01	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	S	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	24
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	24
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.01	0.00	0.03	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	24
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	C	C	C	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
16	0.00	0.00	0.00	0.00	0.00	0.00	S	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.12	0.00	0.12	0.01	0.00	24
17	0.17	0.05	0.01	0.03	0.05	0.03	S	0.05	0.02	0.02	0.11	0.04	0.09	0.03	0.02	0.02	0.15	0.17	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.17	0.05	0.00	24
18	0.01	0.01	0.02	0.01	0.01	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	24
19	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24
20	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	24
21	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
22	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	24
23	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	24
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.01	0.00	24
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.04	0.05	0.01	0.03	0.00	S	0.00	0.07	0.00	0.07	0.01	0.00	24
26	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.01	0.01	0.04	S	0.01	0.01	0.01	0.00	0.04	0.01	0.00	24
27	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.03	S1	0.04	0.04	0.03	0.01	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.01	23
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	24
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.02	S	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.00	24
30	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24
31	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
HOURLY MAX	0.17	0.05	0.02	0.03	0.05	0.07	0.08	0.07	0.04	0.03	0.11	0.04	0.09	0.03	0.06	0.04	0.15	0.17	0.07	0.04	0.30	0.01	0.01	0.12					
HOURLY AVG	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.01					

STATUS FLAG CODES

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

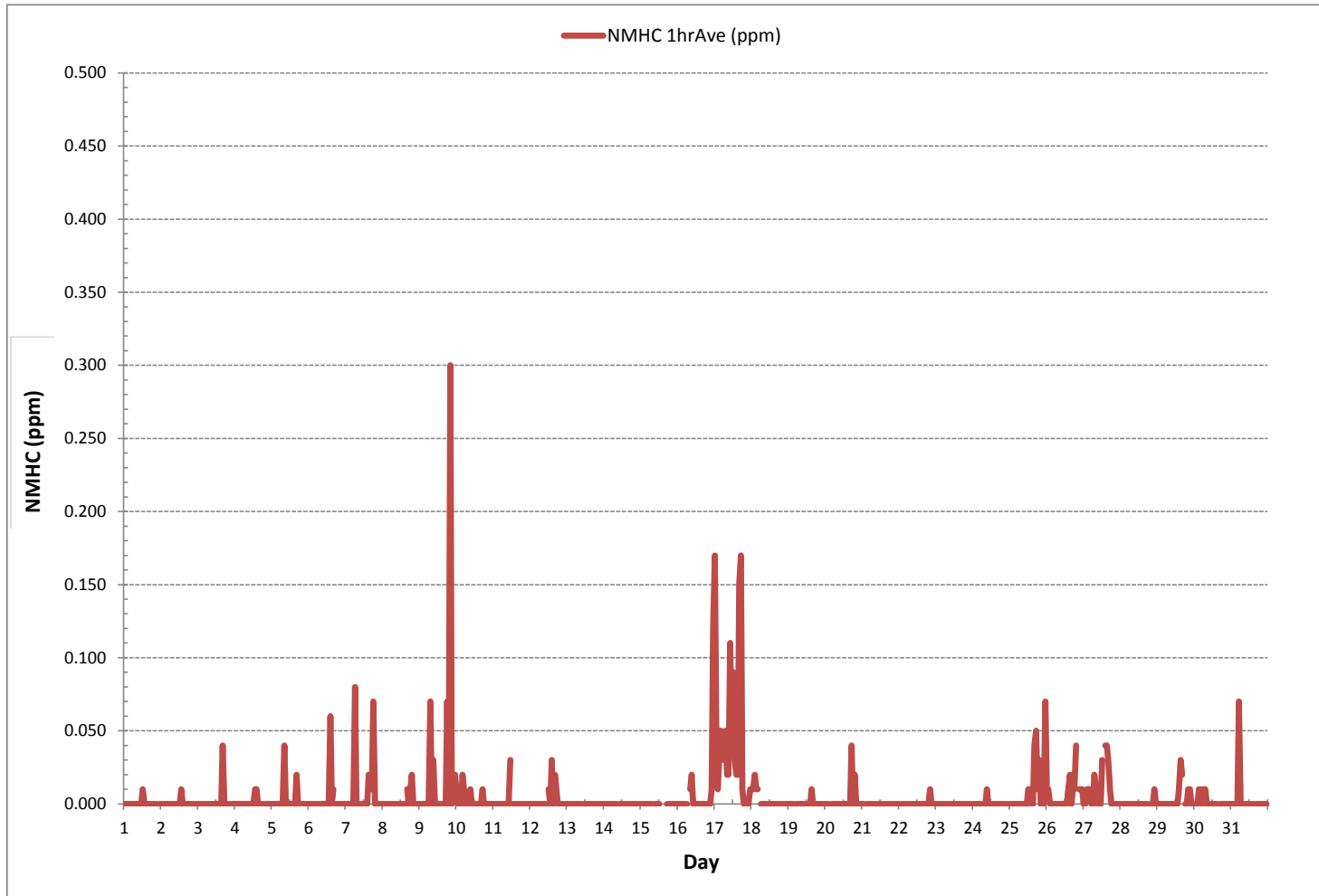
24 HR AVERAGES December 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	103			
MINIMUM 1-HR AVERAGE:	0.00	ppm @ HOUR(S)	VAR	ON DAY(S) ALL
MAXIMUM 1-HR AVERAGE:	0.30	ppm @ HOUR(S)	20	ON DAY(S) 9
MAXIMUM 24-HR AVERAGE:	0.05	ppm		ON DAY(S) 17
				VAR-VARIOUS
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	743
MONTHLY CALIBRATION TIME:	4	hrs	AMD OPERATION UPTIME:	99.9
STANDARD DEVIATION:	0.02		MONTHLY AVERAGE:	0.00
				ppm

NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Bonnyville Continuous Monitoring Station - December 2016

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.25	0.02	24	
2	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.07	0.00	0.00	0.44	0.03	24
3	0.00	0.00	0.11	0.05	0.00	0.08	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.06	0.60	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.60	0.04	24	
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.16	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.16	0.01	24	
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.73	0.22	S	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.07	24	
6	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.32	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.03	24	
7	0.00	0.08	0.00	0.00	0.04	0.00	0.54	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.36	S	0.19	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.07	24	
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.16	0.16	0.00	0.00	S	0.10	0.07	0.25	0.20	0.00	0.00	0.00	0.00	0.00	0.25	0.05	24	
9	0.00	0.00	0.06	0.00	0.08	0.07	0.14	0.40	0.09	0.15	0.07	0.00	0.00	0.00	S	0.00	0.04	0.00	3.81	0.05	4.42	0.11	0.10	0.12	0.00	4.42	0.42	24	
10	0.16	0.09	0.14	0.07	0.12	0.14	0.16	0.07	0.01	0.14	0.09	0.04	0.00	S	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.06	24	
11	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.02	24	
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.61	0.00	1.69	0.00	0.58	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.69	0.15	24	
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.11	0.00	24	
15	0.12	0.10	0.07	0.00	0.00	0.00	0.00	0.00	S	0.06	0.00	0.00	0.00	C	C	C	C	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.11	0.02	24	
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.11	0.22	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.42	0.00	0.42	0.04	24	
17	0.36	0.25	0.09	0.26	0.22	0.16	S	0.31	0.22	0.19	0.80	0.17	0.25	0.18	0.14	0.22	0.57	0.69	0.15	0.12	0.07	0.06	0.05	0.09	0.05	0.80	0.24	24	
18	0.14	0.10	0.13	0.15	0.12	S	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.04	24	
19	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.02	24	
20	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.15	0.69	0.00	0.29	0.23	0.07	0.00	0.04	0.00	0.69	0.07	24		
21	0.00	0.00	S	0.00	0.00	0.05	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.01	24	
22	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.16	0.06	0.17	0.00	0.06	0.06	0.00	0.17	0.03	24		
23	S	0.00	0.00	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.05	0.00	24	
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.36	0.02	24	
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.08	0.00	0.10	0.18	0.21	0.12	0.25	0.08	S	0.07	0.25	0.00	0.25	0.06	24	
26	0.16	0.19	0.10	0.00	0.00	0.07	0.07	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.15	0.21	0.00	0.26	0.12	0.26	S	0.11	0.12	0.14	0.00	0.26	0.09	24	
27	0.14	0.10	0.10	0.12	0.12	0.11	0.11	0.25	0.11	0.17	0.00	0.11	0.16	S1	S1	0.18	0.37	0.15	0.06	S	0.00	0.00	0.00	0.00	0.00	0.37	0.11	22	
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.28	0.00	0.00	0.28	0.01	24		
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.26	0.29	0.17	S	0.08	0.04	0.11	0.11	0.00	0.00	0.00	0.29	0.05	24	
30	0.03	0.05	0.06	0.08	0.11	0.07	0.09	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	S	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.04	24	
31	0.00	0.00	0.00	0.00	0.00	0.55	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.03	0.00	S	0.07	0.02	0.07	0.05	0.00	0.00	0.00	0.00	0.00	0.55	0.04	24	
HOURLY MAX	0.36	0.25	0.14	0.26	0.22	0.55	0.54	0.40	0.51	0.36	0.80	0.40	0.61	0.44	1.69	0.36	0.73	0.69	3.81	0.29	4.42	0.11	0.28	0.42					
HOURLY AVG	0.04	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.04	0.05	0.03	0.03	0.06	0.03	0.10	0.08	0.15	0.12	0.18	0.05	0.18	0.02	0.03	0.04					

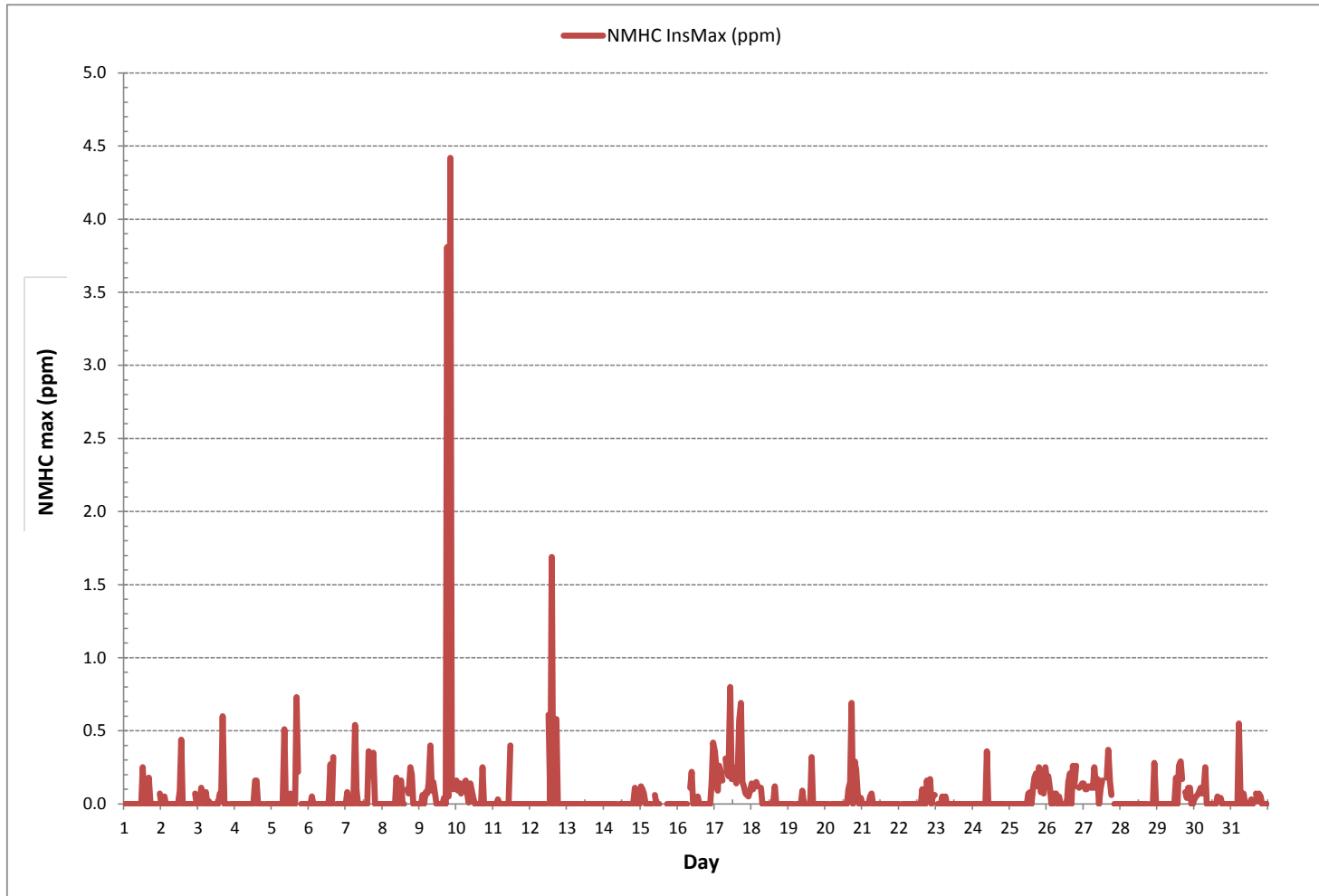
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	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:	196
MAXIMUM INSTANTANEOUS VALUE:	4.42 ppm @ HOUR(S) 20 ON DAY(S) 9
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	4 hrs
OPERATIONAL TIME:	742 hrs
STANDARD DEVIATION:	0.25

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)

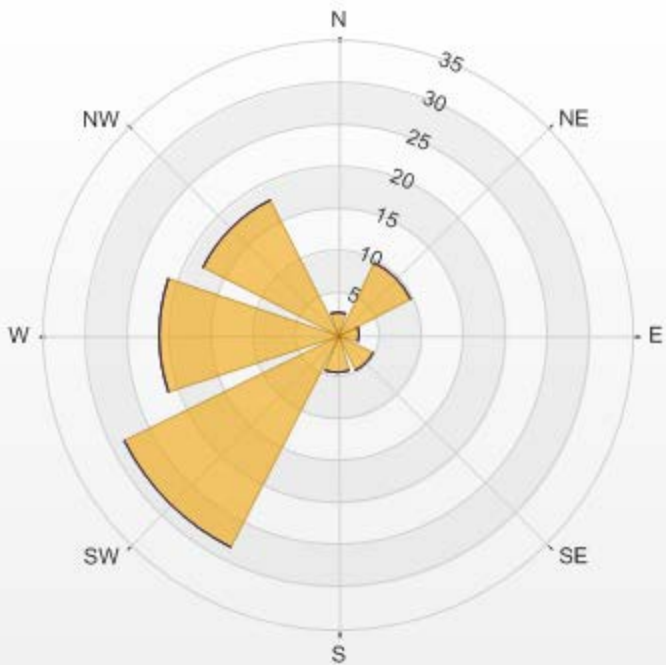


Wind: LICA Bonnyville Poll.: LICA Bonnyville-NMHC[ppm] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 8.22% Valid Data: 94.89% Calm Avg: 0.03 [ppb]

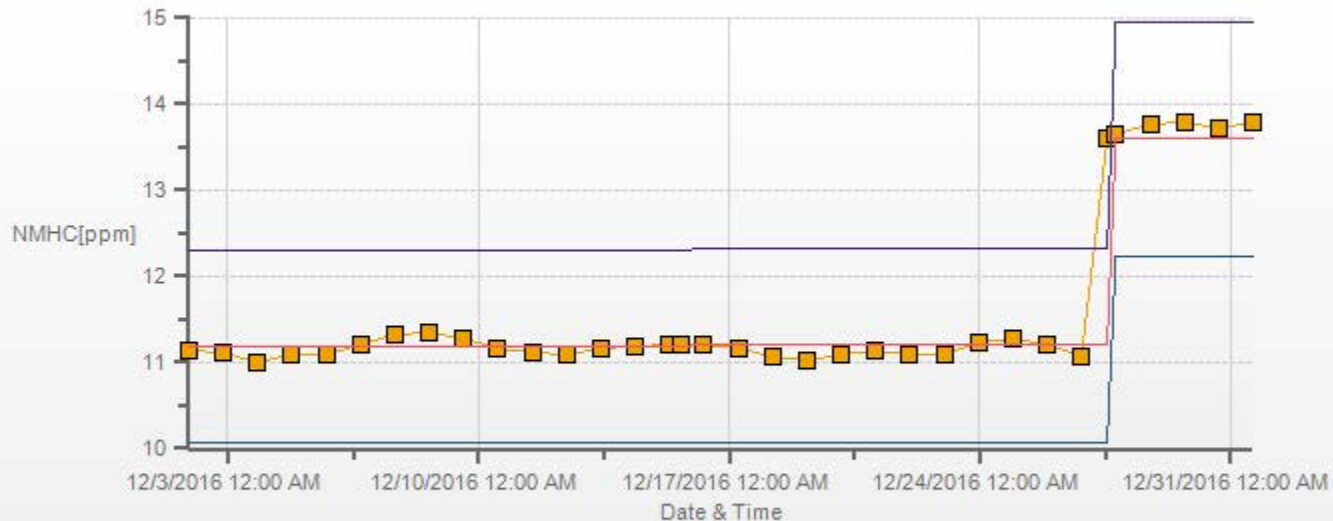
Direction	0.0-0.6	0.6-1.3	1.3-1.9	>1.9	Total
N	2.83	0	0	0	2.83
NE	9.63	0	0	0	9.63
E	2.69	0	0	0	2.69
SE	4.67	0	0	0	4.67
S	4.53	0	0	0	4.53
SW	28.33	0	0	0	28.33
W	21.25	0	0	0	21.25
NW	17.85	0	0	0	17.85
Summary	91.78	0	0	0	91.78

% Icon Classes (ppm) 92 0.0-0.6 0 0.6-1.3 0 1.3-1.9 0 >1.9

LICA Bonnyville Poll.: LICA Bonnyville-NMHC[ppm] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 8.22% Calm  
 Poll Avg: 0.03[ppm]



NMHC[ppm] Calibration: LICA Bonnyville Monthly: 2016/12 Type: Span



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



## ***OXIDES OF NITROGEN***



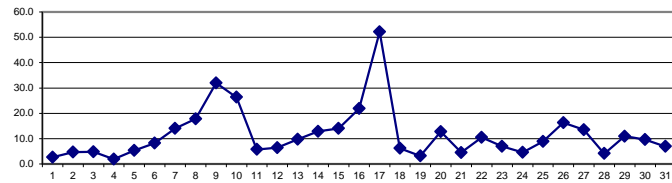
OXIDES OF NITROGEN Hourly Averages (NO<sub>x</sub> ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	2.2	2.2	2.7	1.7	1.1	0.9	1.4	1.9	2.8	2.1	1.6	2.4	3.6	4.0	3.0	4.1	6.4	5.8	2.9	1.8	2.5	1.7	S	3.2	0.9	6.4	2.7	24
2	2.3	1.8	1.3	1.9	2.1	3.3	3.6	4.3	6.6	4.5	6.1	6.1	11.4	10.8	8.5	9.4	4.3	4.1	2.5	3.4	2.7	S	3.8	2.4	1.3	11.4	4.7	24
3	2.2	1.6	1.9	1.6	1.4	1.9	1.9	2.3	3.4	3.2	2.1	3.0	4.2	4.8	6.5	7.3	16.7	15.4	13.3	4.3	S	5.4	3.1	3.2	1.4	16.7	4.8	24
4	2.0	0.9	0.4	0.0	0.0	0.0	0.8	0.4	0.4	0.9	0.9	2.2	3.0	3.2	3.1	4.5	3.5	3.8	3.9	S	2.9	2.7	3.0	2.7	0.0	4.5	2.0	24
5	2.8	2.6	2.8	2.8	2.7	3.1	3.8	4.6	11.2	7.8	6.0	4.2	6.6	5.6	5.0	6.5	8.0	6.4	S	5.9	5.6	5.5	7.1	5.4	2.6	11.2	5.3	24
6	4.7	3.8	5.1	6.4	7.7	10.5	9.7	10.3	15.6	10.5	8.9	5.6	4.8	5.7	9.1	10.2	12.2	S	13.0	9.2	6.8	7.9	6.6	4.6	3.8	15.6	8.2	24
7	5.1	5.0	7.4	12.9	12.7	13.8	21.5	27.0	21.5	10.9	8.0	7.8	8.8	7.9	7.7	10.7	S	22.5	24.5	20.9	24.3	15.0	13.4	13.1	5.0	27.0	14.0	24
8	17.9	18.6	11.9	15.3	18.2	11.9	12.1	13.0	17.7	23.8	14.3	9.2	8.0	8.6	9.0	S	30.2	25.7	25.4	23.9	23.5	31.1	23.3	17.2	8.0	31.1	17.8	24
9	15.4	17.3	19.8	26.6	41.0	39.4	24.9	88.7	60.6	122.1	26.5	10.5	8.8	10.0	S	23.3	25.8	19.7	22.6	19.5	13.6	26.5	33.0	39.1	8.8	122.1	31.9	24
10	62.1	39.9	41.4	28.3	40.9	46.2	44.5	31.7	22.9	50.7	32.3	24.8	18.8	S	15.4	16.5	14.3	14.7	12.0	10.2	9.7	9.3	11.4	7.8	7.8	62.1	26.3	24
11	10.4	10.5	14.2	9.2	10.7	8.6	7.6	5.2	4.7	4.2	5.3	5.9	S	8.2	5.0	5.2	3.4	1.4	1.8	1.9	1.6	1.8	3.3	1.8	1.4	14.2	5.7	24
12	1.8	2.8	4.2	5.2	3.8	4.8	12.6	6.8	8.9	10.3	5.8	S	6.7	4.8	9.8	14.0	10.2	6.7	2.8	6.1	5.4	3.4	5.2	5.5	1.8	14.0	6.4	24
13	6.5	5.7	4.3	3.8	5.9	4.1	4.8	8.2	9.4	11.1	S	5.9	5.2	5.7	7.0	12.5	13.1	15.0	11.0	14.7	21.8	20.9	22.8	4.9	3.8	22.8	9.8	24
14	3.3	8.0	11.0	11.5	12.0	17.7	20.6	10.8	11.9	S	6.8	4.2	4.5	4.6	4.2	9.2	9.1	13.5	17.7	16.7	23.7	32.3	20.1	22.0	3.3	32.3	12.8	24
15	17.4	13.3	11.0	14.0	11.4	17.9	16.5	9.3	S	17.9	12.3	11.5	5.9	5.9	8.1	15.4	28.0	19.6	23.0	20.0	19.5	12.2	6.0	7.8	5.9	28.0	14.1	24
16	14.2	14.1	12.8	19.2	29.3	25.0	20.9	S	26.9	37.6	C	C	C	C	C	C	9.2	10.8	16.1	9.1	9.8	6.0	31.5	79.4	6.0	79.4	21.9	24
17	81.2	82.7	47.7	50.9	67.3	89.9	S	76.2	67.4	42.0	59.5	59.0	66.8	50.9	42.8	49.3	62.4	79.9	29.2	25.7	17.0	20.7	17.2	13.8	13.8	89.9	52.2	24
18	13.9	13.2	16.1	13.6	12.2	S	10.5	6.1	3.5	3.3	3.4	2.8	3.6	5.0	3.7	2.3	2.3	2.6	4.1	3.7	3.9	7.1	4.0	2.1	2.1	16.1	6.2	24
19	6.0	1.1	0.3	0.6	S	2.9	3.1	5.0	5.5	2.9	2.9	5.0	4.8	3.1	3.8	2.8	3.7	3.4	3.0	3.7	3.5	2.5	2.5	1.7	0.3	6.0	3.2	24
20	0.8	0.8	1.1	S	2.0	1.3	2.0	3.9	5.7	7.7	7.5	7.7	9.0	13.0	48.6	27.1	16.0	44.4	31.2	20.7	18.8	9.7	8.8	4.9	0.8	48.6	12.7	24
21	3.5	3.5	S	4.0	3.7	3.3	3.6	3.7	4.5	4.9	5.3	6.0	7.0	8.2	7.0	9.1	7.0	4.5	4.1	3.3	2.4	2.7	1.7	1.5	1.5	9.1	4.5	24
22	1.1	S	2.0	2.0	2.2	4.3	5.7	4.6	4.9	5.5	7.1	8.1	8.8	7.8	11.4	14.0	11.3	26.5	22.5	21.4	25.4	21.0	13.8	11.2	1.1	26.5	10.5	24
23	S	9.5	9.3	6.6	6.2	9.5	16.0	6.7	5.8	6.4	8.2	C1	C1	C1	C1	C1	C1	6.4	3.9	4.2	4.5	4.5	3.7	S	3.7	16.0	7.0	18
24	4.1	3.2	3.6	2.9	3.4	4.2	3.9	4.0	4.1	4.1	5.2	6.1	5.5	6.1	5.6	4.3	4.6	5.1	7.0	4.4	5.4	3.8	S	4.4	2.9	7.0	4.6	24
25	3.9	4.7	4.0	3.9	4.8	4.6	4.2	4.6	5.5	4.9	5.0	5.9	3.8	6.4	4.9	10.0	13.2	19.1	15.0	20.5	13.6	S	12.4	29.0	3.8	29.0	8.9	24
26	15.0	19.7	22.7	18.8	16.0	19.0	14.4	9.9	25.0	22.7	18.1	13.0	8.8	8.9	10.5	18.6	16.0	10.9	13.4	30.6	S	21.2	11.3	11.2	8.8	30.6	16.3	24
27	12.4	9.3	8.4	9.4	9.6	13.9	12.8	18.0	20.3	8.9	9.9	12.4	21.8	16.7	17.0	26.3	30.3	17.4	8.9	S	6.7	7.6	8.0	5.7	5.7	30.3	13.6	24
28	3.2	1.7	1.5	1.1	1.8	2.6	2.4	1.7	2.3	5.1	4.9	5.2	6.7	8.6	16.5	7.5	5.0	2.6	S	4.9	4.4	2.7	1.3	1.3	1.1	16.5	4.1	24
29	1.3	1.3	1.1	1.3	0.8	0.8	1.5	2.0	5.9	2.3	6.5	6.3	12.2	17.7	14.4	40.4	34.0	S	20.3	23.9	19.1	18.7	12.5	7.7	0.8	40.4	11.0	24
30	9.9	10.2	12.1	17.8	19.6	19.1	19.9	21.6	9.3	6.4	7.8	7.6	6.8	6.4	5.0	5.2	S	7.1	6.4	6.7	4.9	3.3	2.9	4.8	2.9	21.6	9.6	24
31	4.0	4.1	4.3	4.7	4.2	4.5	4.4	4.8	5.7	4.8	8.0	7.3	5.7	8.4	6.0	S	13.9	14.9	13.0	9.7	8.8	7.0	5.8	4.9	4.0	14.9	6.9	24
HOURLY MAX	81.2	82.7	47.7	50.9	67.3	89.9	44.5	88.7	67.4	122.1	59.5	59.0	66.8	50.9	48.6	49.3	62.4	79.9	31.2	30.6	25.4	32.3	33.0	79.4				
HOURLY AVG	11.0	10.4	9.5	9.9	11.8	13.0	10.4	13.2	13.3	15.0	10.2	9.1	9.7	9.2	10.7	13.5	14.8	14.8	12.9	12.1	10.8	10.8	10.3	10.8				

STATUS FLAG CODES

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

24 HR AVERAGES December 2016



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	697			
MINIMUM 1-HR AVERAGE:	0.0	ppb @ HOUR(S)	VAR	ON DAY(S) 4
MAXIMUM 1-HR AVERAGE:	122.1	ppb @ HOUR(S)	9	ON DAY(S) 9
MAXIMUM 24-HR AVERAGE:	52.2	ppb		ON DAY(S) 17
				VAR-VARIOUS
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	738
MONTHLY CALIBRATION TIME:	6	hrs	AMD OPERATION UPTIME:	99.2
STANDARD DEVIATION:	13.5		MONTHLY AVERAGE:	11.6
				ppb





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Bonnyville Continuous Monitoring Station - December 2016

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	3.3	3.2	3.5	3.3	2.3	3.4	2.7	20.0	4.8	15.7	6.1	17.3	15.5	10.1	25.4	18.4	40.7	20.0	14.2	3.0	40.9	3.8	S	4.5	2.3	40.9	12.3	24	
2	3.5	3.1	2.1	4.3	3.7	5.0	5.3	27.8	31.5	7.6	15.7	8.6	39.1	59.5	34.9	43.0	10.0	24.1	4.2	12.2	4.1	S	17.6	3.7	2.1	59.5	16.1	24	
3	3.7	3.8	3.2	3.4	2.7	11.0	4.0	4.5	5.6	5.8	3.7	5.4	15.9	6.9	33.1	11.3	84.9	67.6	76.2	10.1	S	36.3	9.1	4.7	2.7	84.9	18.0	24	
4	3.9	3.1	2.5	1.0	1.6	0.9	3.8	3.7	1.4	2.2	2.1	3.7	4.8	5.7	4.9	7.7	6.3	6.5	8.7	S	4.7	5.0	7.2	4.7	0.9	8.7	4.2	24	
5	5.0	5.9	5.0	5.1	5.5	5.4	6.4	7.7	16.9	10.9	9.4	7.1	11.6	7.4	7.8	10.0	31.8	8.8	S	13.4	8.6	11.1	10.5	8.2	5.0	31.8	9.5	24	
6	7.9	5.9	8.6	11.0	10.9	14.3	13.8	17.7	19.6	16.3	12.8	10.0	6.8	12.3	14.4	13.7	15.2	S	18.4	15.1	13.2	10.6	9.0	7.3	5.9	19.6	12.4	24	
7	9.9	8.1	14.4	17.8	18.5	17.9	25.8	33.8	33.2	20.7	10.6	11.1	11.9	10.7	10.5	17.0	S	39.9	30.1	24.5	44.6	23.9	18.0	17.2	8.1	44.6	20.4	24	
8	22.0	28.6	15.4	20.1	24.3	14.7	16.3	17.4	24.5	31.7	23.8	33.3	13.9	12.0	12.7	S	39.6	41.8	30.0	30.5	33.2	39.3	29.4	21.0	12.0	41.8	25.0	24	
9	23.1	21.2	23.9	33.6	60.2	69.2	36.7	137.8	129.5	167.4	98.1	31.5	12.5	17.5	S	34.4	32.4	27.3	55.5	68.3	24.7	48.4	48.7	67.0	12.5	167.4	55.2	24	
10	101.0	57.9	63.4	36.0	57.9	63.4	53.3	44.6	27.5	78.8	44.7	34.9	22.6	S	19.4	22.3	20.3	32.4	17.3	14.0	14.5	15.1	15.7	9.7	9.7	101.0	37.7	24	
11	12.6	13.3	20.2	13.2	14.2	11.5	10.6	7.2	6.3	6.0	7.5	12.5	S	13.8	8.6	6.7	6.4	3.1	3.6	4.3	2.7	4.3	40.5	3.1	2.7	40.5	10.1	24	
12	2.7	4.0	5.2	6.9	4.6	7.3	17.5	11.3	14.5	20.5	8.0	S	11.3	8.9	16.3	38.3	15.9	9.3	4.1	8.1	9.3	6.1	7.4	7.2	2.7	38.3	10.6	24	
13	9.5	9.2	5.6	6.4	7.6	6.4	7.8	12.7	16.1	16.7	S	7.2	7.0	8.2	9.4	28.8	18.8	18.3	15.9	25.3	35.4	27.3	35.5	9.2	5.6	35.5	15.0	24	
14	16.6	14.3	13.1	14.7	23.1	23.2	32.1	30.3	61.4	S	32.9	21.5	21.8	21.0	25.9	56.4	37.8	43.0	43.2	65.4	37.7	52.6	43.3	35.6	13.1	65.4	33.3	24	
15	24.4	17.1	13.3	21.4	16.8	29.5	25.1	16.4	S	26.5	17.3	26.3	8.9	8.4	12.6	22.5	59.3	25.5	29.3	29.9	26.3	25.4	8.9	12.1	8.4	59.3	21.9	24	
16	19.0	19.7	18.3	28.4	40.4	33.3	27.7	S	86.0	49.4	C	C	C	C	C	C	36.9	44.9	87.1	97.8	42.7	34.4	74.3	106.1	18.3	106.1	49.8	24	
17	102.1	147.7	85.1	76.9	92.9	107.2	S	174.5	80.6	58.8	84.5	75.7	75.3	60.3	50.1	57.9	111.5	108.4	52.6	54.6	20.2	31.9	25.8	16.9	16.9	174.5	76.2	24	
18	18.8	16.0	31.9	20.4	14.5	S	20.5	8.8	4.7	5.0	5.1	3.6	5.0	14.7	6.5	3.1	3.4	3.3	7.2	6.5	6.9	13.2	7.0	8.4	3.1	31.9	10.2	24	
19	14.7	1.8	0.7	0.7	S	7.3	24.5	43.1	15.5	15.7	4.8	6.5	6.3	15.3	17.8	4.9	4.5	4.7	4.3	4.6	4.8	3.4	3.3	4.6	0.7	43.1	9.3	24	
20	2.0	2.1	1.8	S	2.5	1.5	3.3	32.2	8.2	25.1	53.7	27.1	26.5	49.6	354.4	96.3	60.5	84.8	78.1	74.4	138.2	17.8	17.2	7.8	1.5	354.4	50.7	24	
21	5.0	7.5	S	4.8	4.5	4.5	4.4	6.8	6.8	7.2	7.7	7.4	9.1	9.6	9.2	13.5	11.7	12.6	15.5	4.5	3.8	4.3	2.5	2.0	2.0	15.5	7.2	24	
22	1.5	S	2.7	2.7	3.1	6.1	8.8	6.7	10.3	28.4	33.2	20.9	31.9	39.6	22.2	21.9	15.7	44.0	35.6	34.1	30.7	27.4	20.6	14.0	1.5	44.0	20.1	24	
23	S	11.9	13.2	10.6	9.5	13.4	24.8	13.0	10.1	9.7	C1	C1	C1	C1	C1	C1	C1	13.3	5.3	6.0	7.2	6.4	5.4	S	5.3	24.8	10.7	17	
24	7.2	5.1	5.3	4.5	4.9	6.4	5.4	5.9	6.0	5.8	8.0	8.2	7.1	16.2	16.7	6.0	8.2	13.4	15.9	7.7	9.2	5.3	S	5.8	4.5	16.7	8.0	24	
25	5.2	6.4	5.6	6.3	7.0	6.6	6.1	7.0	8.1	6.8	6.6	12.1	5.9	8.3	6.5	14.5	20.0	22.4	25.7	32.3	42.4	S	33.2	47.2	5.2	47.2	14.9	24	
26	44.2	29.4	27.5	25.2	25.1	25.9	23.0	11.7	40.8	38.5	50.7	28.8	23.8	27.5	20.6	27.3	130.0	49.9	44.7	50.8	S	52.2	15.2	33.1	11.7	130.0	36.8	24	
27	16.1	13.5	10.2	12.4	24.6	20.5	60.6	27.7	56.9	38.1	46.8	47.0	29.6	58.2	54.2	88.2	69.3	33.7	19.4	S	9.5	9.7	9.7	8.7	8.7	88.2	33.2	24	
28	5.3	3.5	2.8	2.4	3.4	3.8	3.7	3.3	5.5	7.0	7.0	8.0	12.2	13.6	51.2	11.1	9.4	5.3	S	7.0	7.1	6.1	2.4	2.1	2.1	51.2	8.0	24	
29	2.7	2.3	2.6	3.1	11.4	22.4	7.0	35.2	70.0	21.0	25.5	20.6	87.7	99.3	50.6	63.1	43.6	S	28.6	27.2	23.8	22.8	16.4	10.1	2.3	99.3	30.3	24	
30	14.2	18.7	19.0	25.5	45.2	27.6	40.4	87.6	24.3	20.0	11.9	26.2	38.5	27.4	31.0	9.2	S	9.6	10.7	12.1	6.7	5.1	4.6	6.9	4.6	87.6	22.7	24	
31	6.0	6.2	6.4	7.6	6.3	8.0	7.8	8.3	9.2	7.8	13.6	11.4	9.7	13.7	9.4	S	23.1	22.3	19.0	19.1	12.7	10.3	8.8	8.6	6.0	23.1	11.1	24	
HOURLY MAX	102.1	147.7	85.1	76.9	92.9	107.2	60.6	174.5	129.5	167.4	98.1	75.7	87.7	99.3	354.4	96.3	130.0	108.4	87.1	97.8	138.2	52.6	74.3	106.1					
HOURLY AVG	17.1	16.4	14.4	14.3	18.3	19.3	17.6	28.8	27.9	25.7	23.3	19.1	20.4	23.4	33.4	27.7	34.5	29.0	27.6	26.3	23.0	19.3	18.9	16.6					

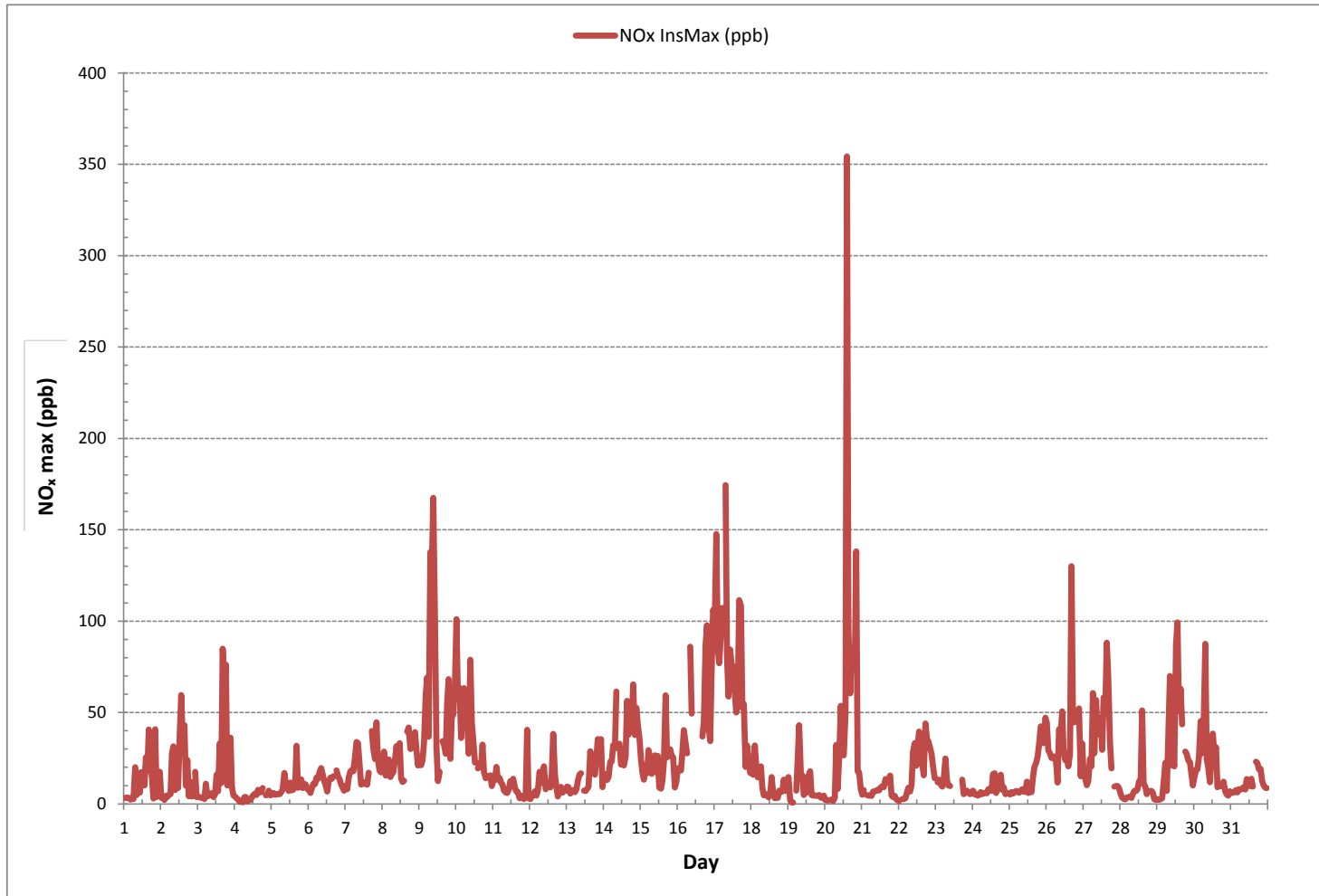
STATUS FLAG CODES

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

MONTHLY SUMMARY





NUMBER OF NON-ZERO READINGS:	699
MAXIMUM INSTANTANEOUS VALUE:	354.4 ppb @ HOUR(S) 14 ON DAY(S) 20
VAR-VARIOUS	
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	737 hrs
STANDARD DEVIATION:	27.2

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

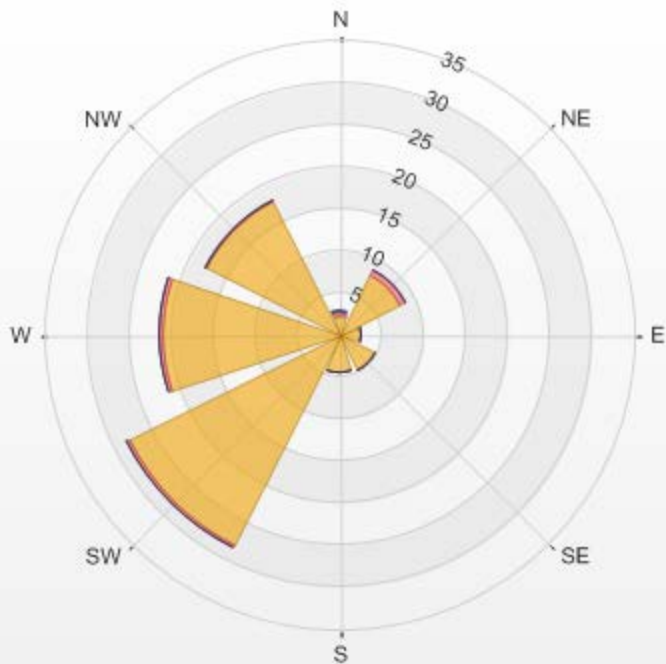


Wind: LICA Bonnyville Poll.: LICA Bonnyville-NOX[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 8.58% Valid Data: 93.95% Calm Avg: 37.18 [ppb]

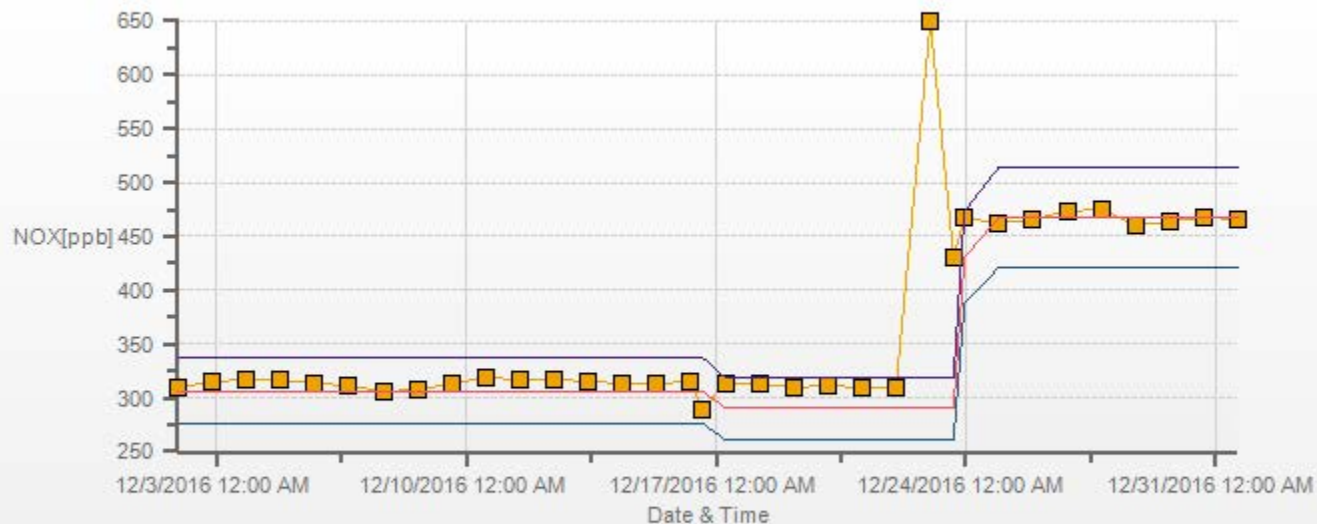
Direction	0.0-30.0	30.0-60.0	60.0-90.0	>90.0	Total
N	2.29	0.43	0.14	0	2.86
NE	8.01	0.72	0	0	8.73
E	2.58	0.14	0	0	2.72
SE	4.72	0	0	0	4.72
S	4.58	0	0	0	4.58
SW	27.9	0.43	0	0	28.33
W	21.03	0.43	0	0	21.46
NW	17.6	0.43	0	0	18.03
Summary	88.71	2.58	0.14	0	91.43

% Icon	Classes (ppb)	89	 0.0-30.0	3	 30.0-60.0	0	 60.0-90.0	0	 >90.0
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**LICA Bonnyville Poll.: LICA Bonnyville-NOX[ppb] 01/12/2016 00:00 - 31/12/2016 23:00** Calm: 8.58% Calm  
**Poll Avg: 37.18[ppb]**



NOX[ppb] Calibration: LICA Bonnyville Monthly: 2016/12 Type: Span



Span Meas Span Ref Span Low Span High



***NITRIC OXIDES***

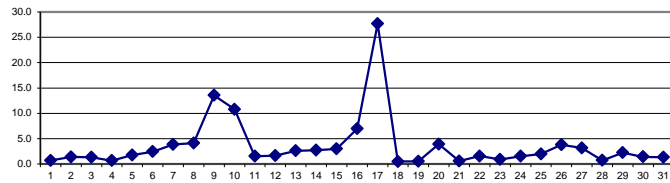
**NITRIC OXIDE Hourly Averages (NO ppb)**

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	0.1	0.2	0.3	0.1	0.2	0.2	0.4	0.3	0.6	0.5	0.4	0.7	1.7	1.2	0.8	1.2	1.9	1.5	1.3	0.5	1.0	0.3	S	0.5	0.1	1.9	0.7	24
2	0.3	0.2	0.1	0.2	0.4	0.7	0.8	0.7	2.2	0.8	1.6	1.7	4.4	4.2	3.0	4.2	1.4	1.4	0.5	0.8	0.6	S	1.3	0.5	0.1	4.4	1.4	24
3	0.3	0.3	0.3	0.1	0.2	0.2	0.1	0.1	0.2	0.4	0.5	1.0	1.6	1.6	2.2	1.6	6.5	5.5	5.5	0.9	S	1.2	0.0	0.0	0.0	6.5	1.3	24
4	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.2	0.3	0.3	1.0	1.0	1.7	1.6	1.8	1.7	S	1.3	1.2	1.4	1.0	1.0	0.0	1.8	0.7	24
5	1.0	0.8	1.0	1.1	1.3	1.4	1.4	1.7	2.9	2.4	2.4	2.0	3.1	2.4	2.0	2.3	2.5	2.0	S	1.6	1.5	1.4	1.5	1.2	0.8	3.1	1.8	24
6	1.1	1.2	2.0	1.6	1.8	2.4	2.4	3.1	4.3	3.2	3.3	2.8	2.7	2.8	3.1	2.9	3.1	S	3.2	2.5	2.0	1.7	1.6	1.4	1.1	4.3	2.4	24
7	2.0	1.8	1.7	2.4	2.8	3.1	4.5	6.9	6.0	3.6	3.6	3.8	4.2	3.4	2.9	3.4	S	5.5	6.0	4.9	6.4	4.3	3.2	2.7	1.7	6.9	3.9	24
8	3.4	3.8	3.0	3.3	3.6	2.6	2.7	3.0	3.7	7.4	5.6	4.1	3.1	3.6	3.1	S	6.9	6.0	5.0	4.4	4.0	6.2	3.4	2.6	2.6	7.4	4.1	24
9	2.5	2.3	2.4	4.1	13.7	14.0	4.7	57.1	33.2	88.8	15.2	5.1	4.3	4.1	S	6.9	6.1	4.3	5.5	5.5	2.7	6.3	8.9	13.7	2.3	88.8	13.5	24
10	33.3	16.2	16.6	7.2	16.8	22.7	22.5	11.4	5.3	29.8	17.4	13.3	9.8	S	5.2	4.4	3.1	4.0	2.7	1.5	1.7	1.4	1.1	0.9	0.9	33.3	10.8	24
11	1.2	1.4	3.5	2.2	3.2	2.5	2.0	1.4	1.3	1.5	2.2	2.8	S	3.3	1.6	1.2	0.7	0.3	0.6	0.6	0.5	0.4	0.9	0.3	0.3	3.5	1.5	24
12	0.5	0.4	0.7	0.6	0.6	0.6	3.0	2.3	3.1	3.1	2.4	S	2.8	2.0	3.4	3.4	1.7	0.7	0.5	0.9	1.2	1.3	1.6	1.6	0.4	3.4	1.7	24
13	1.5	1.0	0.7	0.9	1.4	1.4	1.8	2.9	2.8	3.4	S	2.9	2.5	2.7	3.0	4.2	4.0	3.7	3.5	3.9	4.3	3.3	3.9	0.6	0.6	4.3	2.6	24
14	0.6	0.7	1.0	2.2	2.8	2.1	3.0	1.7	5.5	S	3.2	1.7	2.3	1.7	1.4	4.3	2.1	2.3	3.3	1.7	3.4	7.4	4.0	4.1	0.6	7.4	2.7	24
15	2.7	2.3	2.2	1.9	2.0	1.9	2.4	1.9	S	5.0	3.9	4.2	2.7	2.8	2.9	4.1	6.3	4.6	5.3	4.3	3.5	1.3	0.4	0.5	0.4	6.3	3.0	24
16	2.4	2.0	1.7	3.7	6.6	4.2	3.6	S	7.4	13.7	C	C	C	C	C	C	2.9	2.7	5.3	2.1	1.5	0.5	13.3	45.0	0.5	45.0	7.0	24
17	46.5	47.8	19.7	21.3	36.5	57.4	S	46.6	38.6	21.2	38.0	38.7	45.0	31.0	22.2	24.2	33.7	49.4	6.7	5.6	0.8	3.0	1.8	0.2	0.2	57.4	27.6	24
18	0.4	0.4	0.7	0.4	0.3	S	0.4	0.1	0.3	0.6	0.7	0.5	0.8	1.0	0.8	0.3	0.3	0.3	0.2	0.6	1.0	0.9	0.3	0.2	0.1	1.0	0.5	24
19	0.4	0.2	0.0	0.0	S	0.2	0.8	2.0	1.4	0.6	0.6	1.4	1.1	0.7	0.8	0.6	0.5	0.5	0.2	0.2	0.1	0.0	0.2	0.1	0.0	2.0	0.5	24
20	0.0	0.0	0.0	S	0.0	0.0	0.1	0.7	0.9	1.6	2.3	2.5	3.1	5.3	26.4	10.0	4.0	12.8	6.1	6.2	5.8	0.9	0.9	0.1	0.0	26.4	3.9	24
21	0.0	0.0	S	0.1	0.1	0.2	0.1	0.4	0.5	0.6	1.1	1.2	1.3	1.5	1.3	1.6	0.9	0.7	0.7	0.4	0.1	0.2	0.0	0.1	0.0	1.6	0.6	24
22	0.0	S	0.1	0.0	0.0	0.2	0.6	0.2	0.5	0.8	1.7	2.9	3.4	2.4	2.8	1.7	1.3	3.8	3.0	3.1	2.4	2.4	1.9	1.0	0.0	3.8	1.6	24
23	S	1.1	1.3	0.3	0.3	0.4	1.7	0.3	0.3	0.9	2.1	C1	C1	C1	C1	C1	C1	1.5	0.6	0.7	0.9	0.9	0.8	S	0.3	2.1	0.9	18
24	1.0	0.8	0.8	0.7	1.0	1.3	1.1	1.2	1.2	1.4	1.9	2.6	2.3	2.5	2.7	1.6	1.5	1.6	3.0	1.4	1.8	1.3	S	1.1	0.7	3.0	1.6	24
25	1.2	1.3	1.1	1.0	1.2	1.2	1.0	1.2	1.2	1.3	1.5	2.4	1.3	2.0	1.3	2.5	2.5	3.1	2.6	3.4	2.2	S	1.7	7.7	1.0	7.7	2.0	24
26	3.6	3.2	2.4	0.9	0.7	1.0	1.9	0.3	7.0	7.6	7.3	5.7	3.9	4.1	3.9	5.6	6.1	2.2	3.8	7.4	S	4.7	2.2	2.0	0.3	7.6	3.8	24
27	2.0	1.4	1.0	1.1	1.0	1.3	1.2	2.6	3.3	1.8	3.8	5.0	8.8	6.8	6.1	9.9	11.1	2.9	0.8	S	0.3	0.3	0.2	0.1	0.1	11.1	3.2	24
28	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.1	0.5	1.0	1.4	2.3	2.5	5.8	1.1	0.2	0.1	S	0.4	0.3	0.2	0.0	0.1	0.0	5.8	0.7	24
29	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.3	2.4	0.1	2.1	2.2	4.8	7.1	3.4	11.4	6.1	S	2.2	2.9	2.0	1.9	1.8	0.7	0.0	11.4	2.3	24
30	0.9	1.4	1.8	3.1	2.1	1.5	2.3	2.4	1.1	0.6	2.5	3.1	3.1	2.5	1.6	0.8	S	1.0	0.4	0.6	0.1	0.0	0.0	0.1	0.0	3.1	1.4	24
31	0.0	0.2	0.3	0.2	0.6	0.7	0.8	1.0	0.8	1.3	2.7	2.4	2.0	2.9	1.9	S	2.5	2.9	2.8	2.0	1.3	0.8	0.5	0.2	0.0	2.9	1.3	24
HOURLY MAX	46.5	47.8	19.7	21.3	36.5	57.4	22.5	57.1	38.6	88.8	38.0	38.7	45.0	31.0	26.4	24.2	33.7	49.4	6.7	7.4	6.4	7.4	13.3	45.0				
HOURLY AVG	3.6	3.1	2.2	2.0	3.4	4.2	2.3	5.1	4.6	6.8	4.5	4.2	4.6	3.9	4.2	4.3	4.3	4.5	2.9	2.4	1.9	1.9	2.0	3.0				

**STATUS FLAG CODES**

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

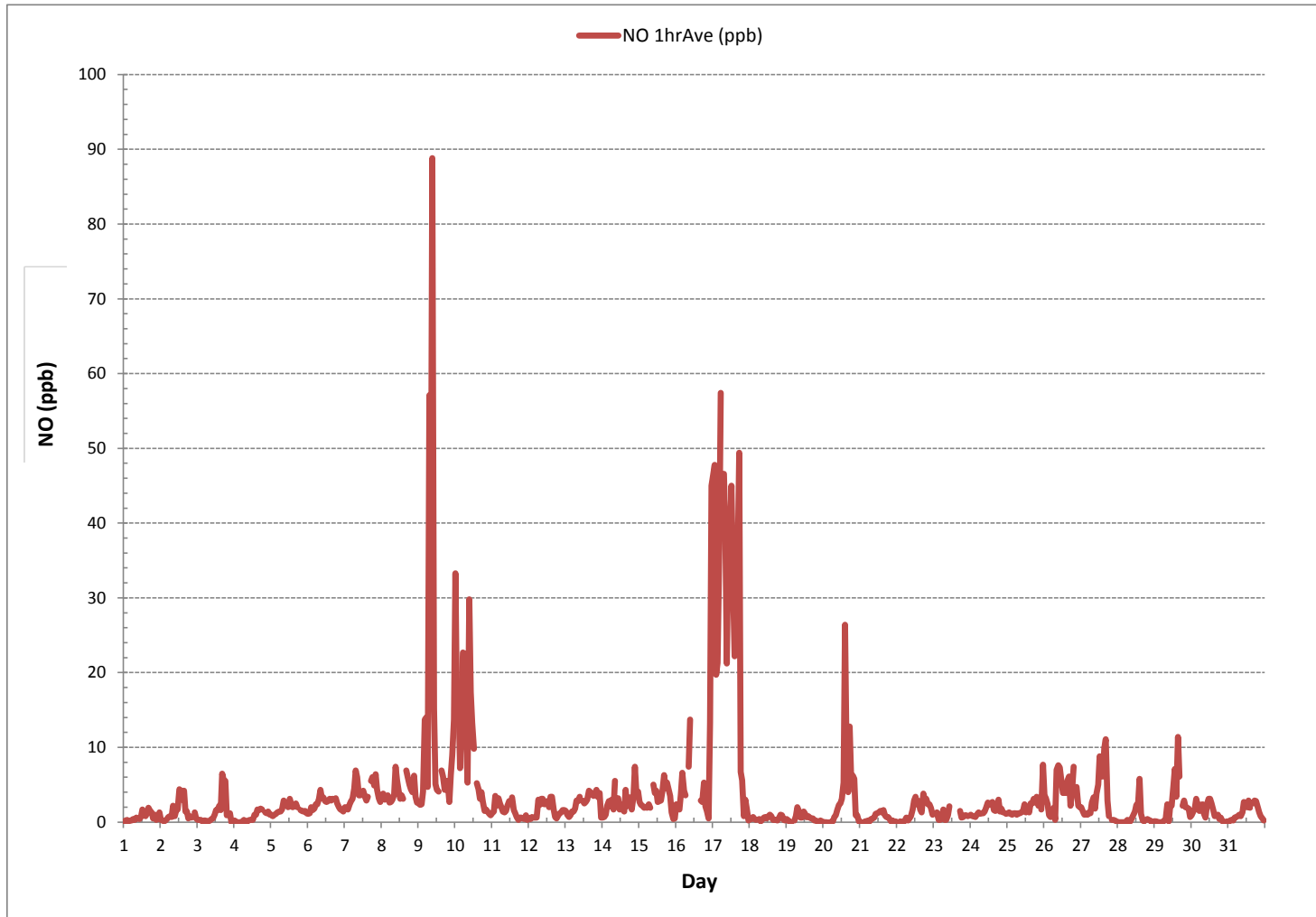
**24 HR AVERAGES December 2016**



**MONTHLY SUMMARY**

NUMBER OF NON-ZERO READINGS:	664			
MINIMUM 1-HR AVERAGE:	0.0 ppb	@ HOUR(S)	VAR	ON DAY(S)
MAXIMUM 1-HR AVERAGE:	88.8 ppb	@ HOUR(S)	9	9
MAXIMUM 24-HR AVERAGE:	27.6 ppb			17
				VAR-VARIOUS
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	738 hrs	
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	99.2 %	
STANDARD DEVIATION:	7.7	MONTHLY AVERAGE:	3.6 ppb	

NITRIC OXIDE Hourly Averages (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Bonnyville Continuous Monitoring Station - December 2016

NITRIC OXIDE Instantaneous Maximum (NO ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	0.3	0.3	0.5	0.3	0.5	1.9	1.0	4.7	2.1	11.8	1.1	4.5	5.8	2.2	12.4	10.8	26.4	11.1	11.6	1.0	38.2	0.9	S	0.7	0.3	38.2	6.5	24
2	0.4	0.6	0.0	0.6	0.9	1.0	1.2	29.8	19.0	2.4	5.1	3.1	24.0	22.4	21.9	22.2	4.4	21.2	1.2	8.5	1.5	S	11.5	1.1	0.0	29.8	8.9	24
3	0.9	0.9	0.6	0.4	0.8	7.1	0.5	0.8	0.6	1.0	1.1	2.6	7.8	3.2	19.0	3.6	47.3	42.3	59.1	3.1	S	17.4	1.6	0.4	0.4	59.1	9.7	24
4	0.6	0.3	0.4	0.1	0.3	0.1	1.9	1.7	0.2	1.0	1.2	0.7	0.8	2.5	1.7	4.2	3.0	3.0	4.3	S	2.4	2.2	2.9	2.0	0.1	4.3	1.6	24
5	2.1	2.4	2.1	2.3	2.7	2.3	2.6	3.0	5.4	3.5	3.6	3.3	5.9	3.3	3.1	3.6	15.4	3.5	S	4.0	3.2	3.3	2.8	2.3	2.1	15.4	3.7	24
6	2.1	2.0	3.8	3.0	2.8	3.7	3.9	5.9	6.6	4.7	5.1	5.2	3.9	6.4	4.7	4.1	5.1	S	4.8	4.3	4.3	2.6	2.7	2.3	2.0	6.6	4.1	24
7	4.6	3.4	2.9	4.4	4.5	4.0	6.3	10.7	10.1	5.7	5.6	5.5	5.8	4.7	4.1	5.6	S	26.9	7.9	6.4	12.3	8.0	5.3	4.5	2.9	26.9	6.9	24
8	5.1	6.8	4.7	4.5	6.8	3.5	4.3	3.9	6.2	9.8	9.9	19.6	6.3	4.8	4.9	S	10.6	13.3	6.5	6.9	7.8	10.2	6.2	5.4	3.5	19.6	7.3	24
9	5.5	5.0	4.1	6.6	27.8	30.6	11.7	98.3	91.2	127.7	69.2	15.6	6.2	7.2	S	11.1	8.6	7.2	29.4	41.1	6.4	17.1	17.4	32.5	4.1	127.7	29.5	24
10	70.4	30.0	34.4	10.4	29.5	37.6	29.2	20.0	7.2	49.6	24.5	19.2	11.3	S	7.2	7.0	6.3	21.2	4.1	3.0	3.6	4.1	2.8	1.7	1.7	70.4	18.9	24
11	1.7	2.5	5.1	3.2	4.5	3.3	2.7	2.1	1.5	1.9	2.9	6.1	S	6.0	2.8	1.5	1.0	0.6	1.2	1.5	0.8	0.9	22.4	0.6	0.6	22.4	3.3	24
12	0.9	0.7	1.0	0.8	0.9	1.2	4.0	3.4	3.9	6.4	3.3	S	4.1	3.3	5.9	25.1	2.9	1.0	0.8	1.6	2.4	2.4	3.2	3.1	0.7	25.1	3.6	24
13	2.6	2.1	1.6	1.9	2.1	2.0	3.1	4.2	5.2	5.5	S	3.7	3.6	3.8	4.6	9.9	6.8	5.0	5.2	6.5	7.7	7.0	8.0	1.2	1.2	9.9	4.5	24
14	9.3	1.6	1.5	3.4	5.8	2.9	5.2	4.0	40.7	S	22.4	7.6	18.6	13.7	17.3	38.5	16.1	21.8	25.3	29.3	11.3	15.7	11.8	7.5	1.5	40.7	14.4	24
15	5.1	3.8	4.7	4.4	4.5	4.6	4.0	3.5	S	8.0	6.4	10.3	4.3	5.8	5.2	7.5	16.5	6.2	8.7	7.9	7.1	3.9	1.4	1.4	1.4	16.5	5.9	24
16	4.2	3.9	4.2	6.1	11.1	6.6	6.3	S	54.5	19.6	C	C	C	C	C	C	25.4	28.7	75.9	72.3	18.6	22.2	40.3	64.8	3.9	75.9	27.3	24
17	62.3	110.0	52.2	45.0	60.2	77.0	S	132.6	51.4	32.5	59.4	47.8	52.0	39.1	25.9	30.5	79.5	75.4	26.2	29.0	2.9	7.8	6.5	1.2	1.2	132.6	48.1	24
18	2.0	1.4	4.3	1.5	0.9	S	2.7	0.3	0.6	2.1	2.1	1.0	1.3	5.5	2.0	0.4	0.8	0.5	0.3	1.1	2.5	1.7	1.8	1.9	0.3	5.5	1.7	24
19	1.4	0.3	0.0	0.1	S	0.5	13.6	25.8	8.0	10.1	1.5	2.1	2.1	9.8	10.5	1.8	1.2	1.0	0.8	0.8	1.0	0.5	0.9	1.3	0.0	25.8	4.1	24
20	0.5	0.7	0.8	S	0.8	0.5	1.1	10.6	2.3	10.0	27.0	16.2	15.7	41.6	221.0	57.0	32.4	44.4	47.4	43.2	71.3	4.1	4.7	1.5	0.5	221.0	28.5	24
21	0.8	0.7	S	0.8	0.8	1.7	1.3	2.6	2.1	2.1	2.7	2.3	2.1	2.4	2.6	5.0	3.5	2.1	6.6	1.2	0.8	1.0	0.6	0.5	0.5	6.6	2.0	24
22	0.3	S	0.4	0.4	0.5	0.7	2.2	1.7	3.2	15.6	17.6	15.4	21.0	20.7	7.4	4.2	3.3	11.2	7.3	7.6	5.6	5.2	3.4	2.3	0.3	21.0	6.8	24
23	S	2.7	2.8	1.1	1.4	1.8	4.4	1.7	1.7	2.9	C1	C1	C1	C1	C1	C1	C1	3.1	1.7	2.2	2.3	2.0	1.7	S	1.1	4.4	2.2	17
24	2.3	2.0	1.8	1.9	2.0	2.4	2.0	2.0	2.1	2.5	3.0	3.6	3.3	6.9	5.7	3.1	3.4	5.4	7.0	2.8	4.4	2.2	S	1.7	1.7	7.0	3.2	24
25	2.2	2.2	1.9	2.1	2.0	1.9	1.7	2.2	2.1	2.4	2.7	6.0	2.5	2.9	2.3	3.9	5.1	5.2	8.2	8.2	23.4	S	18.9	19.2	1.7	23.4	5.6	24
26	16.5	7.0	3.9	3.5	2.3	5.0	4.5	0.9	15.8	20.0	27.8	15.8	13.6	11.6	8.0	12.9	121.5	21.2	21.0	19.9	S	22.2	3.7	13.1	0.9	121.5	17.0	24
27	3.5	2.5	1.7	2.3	16.1	3.6	35.5	5.9	30.2	17.8	41.1	36.4	12.6	31.8	28.2	60.4	42.1	17.9	7.7	S	1.6	1.0	1.3	1.2	1.0	60.4	17.5	24
28	0.9	0.7	0.6	0.7	0.8	0.6	1.0	1.2	0.8	1.3	1.7	2.4	4.1	4.9	31.2	2.3	0.8	0.7	S	1.2	1.0	1.3	0.6	0.7	0.6	31.2	2.7	24
29	1.0	0.8	0.9	0.9	7.7	16.1	3.1	13.4	40.9	6.3	13.2	13.1	47.0	59.0	20.4	26.5	9.7	S	5.2	4.5	3.4	3.8	3.1	2.2	0.8	59.0	13.1	24
30	2.7	5.5	5.7	7.5	11.6	5.2	12.1	31.6	14.1	3.1	5.3	16.5	29.0	17.6	17.1	3.0	S	3.1	3.3	3.5	1.1	0.8	0.9	1.0	0.8	31.6	8.8	24
31	1.0	1.4	1.5	1.6	2.3	2.8	3.0	2.3	2.7	6.1	4.2	3.7	5.7	3.9	S	5.0	5.6	5.1	4.6	4.2	3.7	3.1	1.7	1.0	6.1	3.4	24	
HOURLY MAX	70.4	110.0	52.2	45.0	60.2	77.0	35.5	132.6	91.2	127.7	69.2	47.8	52.0	59.0	221.0	60.4	121.5	75.4	75.9	72.3	71.3	22.2	40.3	64.8				
HOURLY AVG	7.1	6.8	5.0	4.1	7.2	7.7	5.9	14.4	14.4	13.0	13.3	10.4	11.4	12.5	17.9	13.5	18.0	14.1	13.6	11.3	8.7	6.0	6.6	6.0				

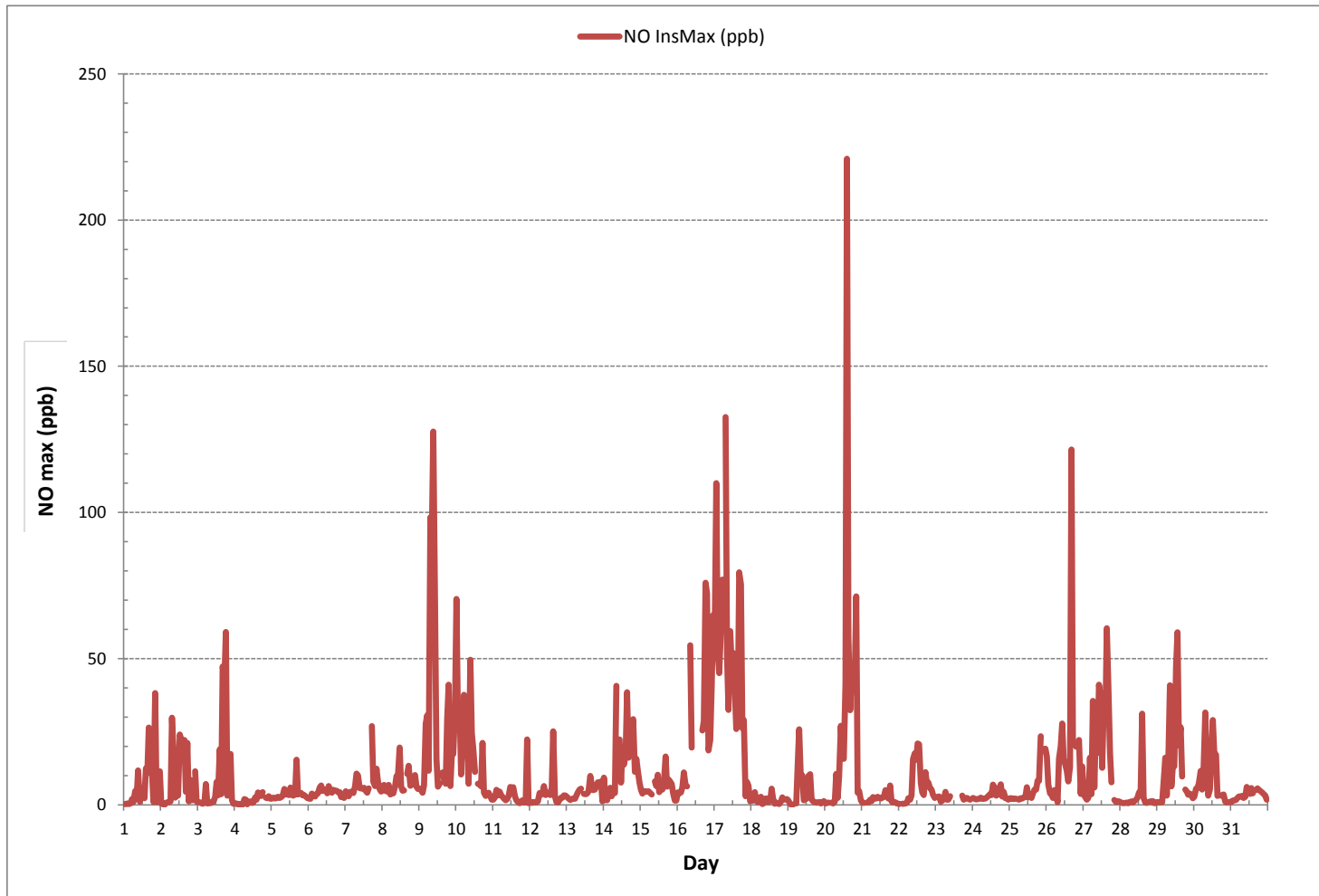
STATUS FLAG CODES

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:	697
MAXIMUM INSTANTANEOUS VALUE:	221.0 ppb @ HOUR(S) 14 ON DAY(S) 20
VAR-VARIOUS	
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	6 hrs
STANDARD DEVIATION:	18.4
OPERATIONAL TIME:	737 hrs

NITRIC OXIDE Instantaneous Maximum (NO ppb)

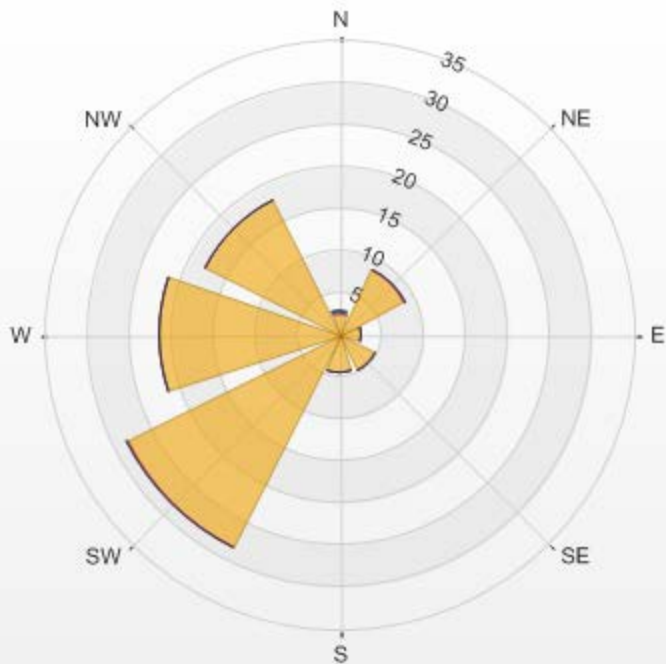


Wind: LICA Bonnyville Poll.: LICA Bonnyville-NO[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 8.58% Valid Data: 93.95% Calm Avg: 17.65 [ppb]

Direction	0.0-19.3	19.3-38.7	38.7-58.0	>58.0	Total
N	2.58	0.14	0.14	0	2.86
NE	8.58	0.14	0	0	8.72
E	2.72	0	0	0	2.72
SE	4.72	0	0	0	4.72
S	4.58	0	0	0	4.58
SW	28.18	0.14	0	0	28.32
W	21.46	0	0	0	21.46
NW	18.03	0	0	0	18.03
Summary	90.85	0.42	0.14	0	91.41

% Icon Classes (ppb) 91 0.0-19.3 0 19.3-38.7 0 38.7-58.0 0 >58.0

LICA Bonnyville Poll.: LICA Bonnyville-NO[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 8.58% Calm Poll  
Avg: 17.65[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	2.1	1.9	2.4	1.6	0.9	0.7	1.0	1.5	2.2	1.6	1.3	1.7	1.9	2.8	2.2	2.8	4.5	4.3	1.7	1.3	1.5	1.4	S	2.7	0.7	4.5	2.0	24
2	2.0	1.6	1.3	1.7	1.7	2.6	2.9	3.6	4.5	3.6	4.6	4.4	7.0	6.5	5.4	5.2	2.9	2.6	2.0	2.7	2.1	S	2.5	1.9	1.3	7.0	3.3	24
3	2.0	1.3	1.6	1.5	1.2	1.7	1.8	2.2	3.2	2.7	1.6	2.0	2.6	3.3	4.3	5.7	10.2	9.9	7.8	3.4	S	4.2	3.1	3.2	1.2	10.2	3.5	24
4	1.8	0.9	0.4	0.0	0.0	0.0	0.5	0.3	0.4	0.7	0.6	1.8	2.7	2.3	2.1	2.7	1.9	2.1	2.2	S	1.6	1.6	1.6	1.7	0.0	2.7	1.3	24
5	1.8	1.8	1.8	1.7	1.4	1.7	2.4	2.9	8.3	5.4	3.6	2.1	3.5	3.2	3.0	4.2	5.5	4.4	S	4.3	4.0	4.1	5.6	4.2	1.4	8.3	3.5	24
6	3.6	2.7	3.1	4.8	6.0	8.1	7.3	7.2	11.3	7.2	5.6	2.8	2.1	2.9	6.0	7.3	9.1	S	9.7	6.7	4.8	6.2	5.0	3.2	2.1	11.3	5.8	24
7	3.1	3.3	5.7	10.5	9.9	10.7	17.0	20.1	15.4	7.3	4.4	4.1	4.6	4.5	4.8	7.3	S	17.0	18.5	15.9	17.9	10.7	10.2	10.4	3.1	20.1	10.1	24
8	14.5	14.9	8.8	12.0	14.6	9.3	9.4	10.0	14.0	16.5	8.8	5.1	4.9	5.0	5.9	S	23.3	19.7	20.4	19.6	19.5	25.0	19.8	14.6	4.9	25.0	13.7	24
9	13.0	15.0	17.4	22.5	27.4	25.5	20.2	31.6	27.4	33.3	11.3	5.5	4.5	5.9	S	16.4	19.6	15.5	17.2	14.0	10.9	20.2	24.1	25.3	4.5	33.3	18.4	24
10	28.8	23.7	24.8	21.1	24.2	23.5	22.0	20.3	17.6	20.9	14.9	11.5	9.0	S	10.2	12.0	11.2	10.7	9.3	8.7	8.0	7.9	10.2	6.9	6.9	28.8	15.5	24
11	9.3	9.1	10.8	7.0	7.5	6.1	5.6	3.8	3.4	2.7	3.1	3.1	S	4.9	3.4	4.0	2.7	1.1	1.2	1.3	1.0	1.4	2.4	1.4	1.0	10.8	4.2	24
12	1.3	2.4	3.6	4.6	3.2	4.1	9.6	4.6	5.7	7.2	3.5	S	3.8	2.9	6.4	10.6	8.5	6.0	2.2	5.2	4.2	2.1	3.7	3.9	1.3	10.6	4.8	24
13	5.0	4.7	3.6	2.9	4.5	2.7	3.1	5.4	6.6	7.7	S	3.0	2.7	3.0	3.9	8.3	9.1	11.3	7.4	10.8	17.4	17.6	18.9	4.3	2.7	18.9	7.1	24
14	2.6	7.3	10.0	9.2	9.2	15.6	17.6	9.0	6.4	S	3.7	2.5	2.2	2.9	2.8	4.9	6.9	11.2	14.4	14.9	20.2	24.8	16.1	18.0	2.2	24.8	10.1	24
15	14.7	11.0	8.8	12.1	9.5	16.0	14.0	7.4	S	12.9	8.4	7.2	3.2	3.0	5.2	11.3	21.7	15.0	17.7	15.7	16.0	10.9	5.6	7.3	3.0	21.7	11.1	24
16	11.8	12.1	11.0	15.6	22.7	20.8	17.3	S	19.5	23.9	C	C	C	C	C	C	6.3	8.1	10.8	7.0	8.2	5.6	18.1	34.4	5.6	34.4	14.9	24
17	34.7	35.0	27.9	29.6	30.8	32.5	S	29.6	28.8	20.8	21.5	20.3	21.8	20.0	20.6	25.1	28.7	30.5	22.5	20.1	16.1	17.7	15.4	13.6	13.6	35.0	24.5	24
18	13.5	12.8	15.4	13.3	11.8	S	10.1	6.0	3.3	2.7	2.7	2.3	2.8	3.9	2.8	2.1	2.1	2.3	3.9	3.1	2.9	6.2	3.7	1.9	1.9	15.4	5.7	24
19	5.6	0.8	0.3	0.6	S	2.7	2.4	3.0	4.1	2.3	2.3	3.6	3.7	2.4	3.0	2.3	3.1	2.9	2.8	3.5	3.4	2.4	2.3	1.6	0.3	5.6	2.7	24
20	0.8	0.8	1.1	S	1.9	1.3	1.9	3.2	4.8	6.1	5.2	5.2	5.9	7.7	22.3	17.0	12.0	31.6	25.1	14.5	13.0	8.8	7.9	4.8	0.8	31.6	8.8	24
21	3.5	3.5	S	3.9	3.6	3.2	3.5	3.3	3.9	4.3	4.2	4.8	5.8	6.7	5.7	7.5	6.1	3.9	3.5	2.9	2.3	2.5	1.7	1.4	1.4	7.5	4.0	24
22	1.1	S	1.9	2.0	2.2	4.0	5.1	4.4	4.4	4.7	5.4	5.2	5.4	5.4	8.5	12.2	10.0	22.7	19.5	18.3	23.0	18.6	11.9	10.2	1.1	23.0	9.0	24
23	S	8.3	8.0	6.3	5.9	9.1	14.2	6.4	5.4	5.5	6.0	C1	C1	C1	C1	C1	C1	4.9	3.3	3.4	3.7	3.6	2.9	S	2.9	14.2	6.1	18
24	3.0	2.3	2.8	2.2	2.3	2.9	2.7	2.8	2.8	2.7	3.3	3.5	3.2	3.6	2.9	2.7	3.1	3.4	4.0	3.0	3.6	2.5	S	3.3	2.2	4.0	3.0	24
25	2.7	3.4	2.8	2.9	3.6	3.4	3.2	3.4	4.3	3.6	3.5	3.5	2.4	4.4	3.6	7.5	10.6	16.0	12.3	17.1	11.3	S	10.7	21.3	2.4	21.3	6.8	24
26	11.4	16.5	20.4	17.9	15.3	18.0	12.5	9.7	18.1	15.1	10.8	7.3	5.0	4.9	6.7	13.0	9.9	8.7	9.6	23.1	S	16.5	9.0	9.2	4.9	23.1	12.5	24
27	10.4	7.9	7.5	8.4	8.5	12.6	11.5	15.4	17.0	7.2	6.1	7.4	12.9	9.8	10.9	16.3	19.2	14.5	8.1	S	6.3	7.3	7.8	5.6	5.6	19.2	10.4	24
28	3.2	1.7	1.4	1.1	1.8	2.6	2.1	1.5	2.1	4.6	3.9	3.8	4.4	6.1	10.7	6.4	4.9	2.5	S	4.4	4.2	2.5	1.2	1.3	1.1	10.7	3.4	24
29	1.2	1.2	1.1	1.3	0.8	0.8	1.3	1.8	3.5	2.2	4.4	4.1	7.3	10.6	10.9	29.0	27.9	S	18.1	20.9	17.1	16.8	10.7	7.1	0.8	29.0	8.7	24
30	9.0	8.8	10.2	14.7	17.5	17.7	17.6	19.1	8.2	5.8	5.3	4.4	3.7	3.9	3.4	4.3	S	6.1	6.1	6.1	4.8	3.3	2.9	4.6	2.9	19.1	8.2	24
31	4.0	3.9	4.0	4.5	3.5	3.8	3.6	3.8	4.9	3.5	5.3	4.9	3.7	5.5	4.1	S	11.4	12.1	10.2	7.7	7.5	6.2	5.4	4.6	3.5	12.1	5.6	24
HOURLY MAX	34.7	35.0	27.9	29.6	30.8	32.5	22.0	31.6	28.8	33.3	21.5	20.3	21.8	20.0	22.3	29.0	28.7	31.6	25.1	23.1	23.0	25.0	24.1	34.4				
HOURLY AVG	7.4	7.4	7.3	7.9	8.4	8.8	8.1	8.1	8.7	8.2	5.7	4.9	5.1	5.3	6.5	9.2	10.4	10.4	10.1	9.6	8.8	8.9	8.3	7.8				

**STATUS FLAG CODES**

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

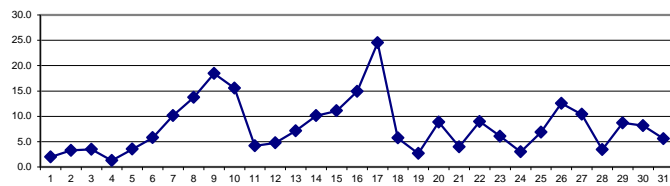
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

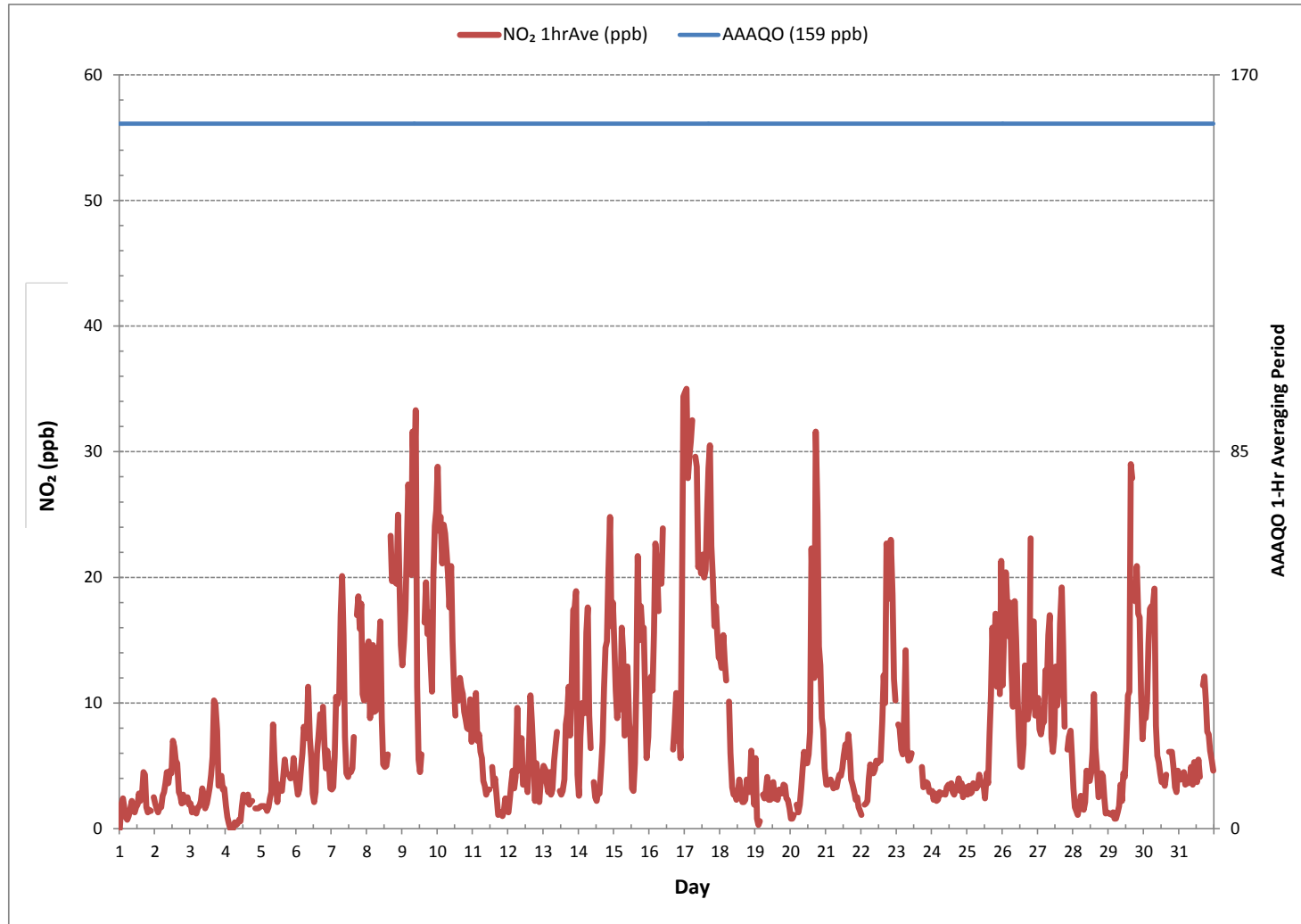
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	697					
MINIMUM 1-HR AVERAGE:	0.0	ppb	@ HOUR(S)	VAR	ON DAY(S)	4
MAXIMUM 1-HR AVERAGE:	35.0	ppb	@ HOUR(S)	1	ON DAY(S)	17
MAXIMUM 24-HR AVERAGE:	24.5	ppb			ON DAY(S)	17
					VAR-VARIOUS	
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	738	hrs	
MONTHLY CALIBRATION TIME:	6	hrs	AMD OPERATION UPTIME:	99.2	%	
STANDARD DEVIATION:	7.1		MONTHLY AVERAGE:	8.0	ppb	

**24 HR AVERAGES December 2016**



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





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Bonnyville Continuous Monitoring Station - December 2016

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	3.6	3.5	4.0	3.9	2.7	2.1	2.2	15.4	4.1	7.1	6.0	16.3	10.0	9.1	18.6	10.4	17.7	12.3	5.8	3.1	3.0	4.3	S	4.8	2.1	18.6	7.4	24
2	3.8	3.0	2.5	4.0	3.4	4.6	4.9	6.5	13.8	5.4	10.9	6.6	20.4	49.1	14.9	24.5	6.0	8.2	3.7	11.7	4.0	S	10.3	3.5	2.5	49.1	9.8	24
3	3.5	3.5	3.3	3.6	2.8	4.7	4.1	4.8	5.7	5.7	3.3	3.7	10.0	5.0	16.9	8.9	42.0	26.5	29.8	7.4	S	22.4	7.5	4.8	2.8	42.0	10.0	24
4	3.8	3.2	2.7	1.5	1.5	1.4	2.5	2.5	1.6	2.1	1.8	3.6	4.7	3.9	3.5	5.0	4.0	3.9	4.9	S	3.7	3.1	4.7	3.5	1.4	5.0	3.2	24
5	3.5	3.9	3.5	3.7	3.7	3.9	4.6	5.0	12.2	8.0	6.3	4.4	6.0	4.7	5.1	7.2	19.8	6.2	S	9.7	5.9	8.4	8.7	6.6	3.5	19.8	6.6	24
6	6.1	4.4	5.2	8.7	9.1	11.3	10.3	12.3	14.7	12.0	8.6	5.4	3.8	6.3	10.3	10.1	11.7	S	13.9	11.2	9.4	8.6	7.2	5.4	3.8	14.7	9.0	24
7	5.9	5.3	12.0	14.1	14.5	14.9	19.4	23.4	23.9	15.6	6.3	6.3	6.5	7.0	7.0	12.7	S	20.6	22.6	18.7	32.5	18.0	13.1	13.1	5.3	32.5	14.5	24
8	19.0	22.6	11.2	16.7	20.2	12.0	12.5	14.1	18.8	22.3	15.3	16.8	9.1	8.1	9.4	S	29.2	28.5	23.9	24.3	25.9	30.0	23.4	17.9	8.1	30.0	18.7	24
9	18.0	18.1	20.6	27.5	33.0	38.6	25.4	40.2	39.7	40.9	29.6	20.2	6.6	10.8	S	23.5	24.1	19.9	29.3	31.0	19.3	31.2	31.6	35.2	6.6	40.9	26.7	24
10	33.7	29.7	29.7	25.6	29.5	27.6	24.8	24.8	20.6	29.4	20.6	15.9	11.7	S	12.7	15.5	14.7	17.4	13.7	11.6	12.0	11.5	14.0	8.9	8.9	33.7	19.8	24
11	11.6	11.2	15.7	10.5	10.7	8.9	8.6	5.9	5.4	4.9	5.3	7.0	S	8.4	6.3	6.2	6.0	3.1	3.0	3.3	2.9	3.9	18.9	3.2	2.9	18.9	7.4	24
12	2.5	4.2	5.0	6.7	4.7	6.8	14.2	8.6	11.5	14.7	5.4	S	7.7	6.2	11.7	23.9	13.8	9.0	4.3	7.7	4.3	3.9	5.5	6.6	2.5	23.9	8.4	24
13	8.6	7.6	5.5	5.0	6.0	5.4	5.6	9.0	11.2	11.6	S	4.6	4.5	4.9	5.9	18.9	12.5	14.3	12.6	19.2	27.8	20.6	28.5	8.7	4.5	28.5	11.2	24
14	8.7	13.5	12.8	12.8	18.7	20.9	27.5	26.5	30.8	S	16.1	15.5	12.9	9.1	9.7	20.6	21.8	23.0	22.7	37.1	26.8	37.4	32.4	28.3	8.7	37.4	21.1	24
15	19.6	13.5	12.5	18.3	15.2	25.7	21.5	13.3	S	20.2	11.3	16.1	5.4	5.2	8.6	18.0	42.6	19.8	21.0	22.4	19.6	21.8	8.6	11.4	5.2	42.6	17.0	24
16	15.5	16.5	14.9	22.5	29.6	27.3	22.3	S	32.9	30.2	C	C	C	C	C	C	22.0	24.9	31.6	25.8	28.3	20.8	34.5	44.0	14.9	44.0	26.1	24
17	41.0	42.6	33.9	32.4	33.7	38.5	S	45.7	30.2	26.5	26.8	28.3	23.9	22.1	24.1	28.8	33.3	35.5	26.5	31.2	18.1	24.3	19.8	16.4	16.4	45.7	29.7	24
18	17.8	15.5	31.3	19.6	14.3	S	18.3	9.0	4.9	4.5	4.3	3.9	4.7	11.1	5.3	3.4	3.4	3.7	7.3	6.3	5.2	12.7	7.4	7.3	3.4	31.3	9.6	24
19	14.8	2.1	1.6	1.5	S	7.9	12.1	24.1	13.9	5.7	3.9	5.0	5.3	5.8	11.7	4.2	4.5	4.5	4.4	4.8	4.7	3.9	3.4	3.9	1.5	24.1	6.7	24
20	2.0	2.0	1.9	S	2.5	1.8	2.9	22.7	6.8	18.4	28.4	12.9	14.7	21.6	153.9	60.0	29.8	45.5	36.8	35.9	69.3	14.3	12.8	7.2	1.8	153.9	26.3	24
21	4.8	7.7	S	4.5	4.2	3.8	4.3	5.1	5.5	5.7	5.6	6.2	7.5	7.7	7.5	9.2	8.8	11.5	9.6	4.0	3.7	3.8	2.3	2.1	2.1	11.5	5.9	24
22	1.9	S	2.8	2.8	3.3	6.2	7.3	5.6	7.7	13.8	16.0	10.3	15.3	20.1	15.0	18.1	14.5	33.4	28.6	27.3	26.9	22.4	17.7	12.5	1.9	33.4	14.3	24
23	S	10.5	11.0	10.0	9.0	12.5	20.8	11.6	8.8	7.9	C1	C1	C1	C1	C1	C1	C1	10.7	4.4	4.5	5.6	5.0	4.4	S	4.4	20.8	9.1	17
24	5.4	3.6	4.3	3.2	3.7	5.2	4.4	4.4	4.2	4.1	5.4	5.1	4.4	11.7	11.5	4.2	5.3	8.4	9.2	5.5	5.5	4.0	S	4.7	3.2	11.7	5.5	24
25	4.2	4.9	4.4	4.8	5.5	5.1	5.0	5.4	6.5	5.0	4.9	6.4	4.0	5.9	5.0	11.4	16.5	18.2	17.6	24.5	22.4	S	18.2	28.7	4.0	28.7	10.2	24
26	27.8	23.0	24.0	23.1	23.0	21.6	19.0	11.5	26.1	18.6	30.8	18.2	15.3	16.9	14.0	18.0	19.1	28.8	25.9	31.3	S	30.3	13.1	21.8	11.5	31.3	21.8	24
27	12.9	11.7	9.2	10.6	12.8	18.4	29.2	22.8	30.3	20.7	17.1	12.8	17.2	30.4	26.4	30.5	35.4	21.3	12.8	S	8.5	9.3	9.3	7.9	7.9	35.4	18.2	24
28	5.3	3.3	2.7	2.5	3.5	3.8	3.6	3.2	5.1	6.5	5.7	6.5	8.5	9.0	22.0	9.8	8.7	5.3	S	6.3	6.6	6.0	2.1	2.2	2.1	22.0	6.0	24
29	2.2	2.4	2.3	2.9	6.8	12.2	4.5	25.2	29.9	15.1	12.7	9.6	44.6	40.8	31.5	36.7	34.2	S	23.8	23.7	20.6	20.4	14.6	9.1	2.2	44.6	18.5	24
30	11.9	13.3	13.8	18.2	33.3	22.9	32.1	56.8	14.5	18.7	7.2	13.1	13.7	12.6	14.2	6.5	S	8.2	8.3	9.2	6.1	4.9	4.2	6.5	4.2	56.8	15.2	24
31	5.8	5.7	5.4	6.6	5.1	6.5	5.9	6.1	7.7	5.7	8.1	7.8	6.5	8.4	6.1	S	18.8	17.1	15.2	14.9	10.6	9.8	7.6	7.4	5.1	18.8	8.6	24
HOURLY MAX	41.0	42.6	33.9	32.4	33.7	38.6	32.1	56.8	39.7	40.9	30.8	28.3	44.6	49.1	153.9	60.0	42.6	45.5	36.8	37.1	69.3	37.4	34.5	44.0				
HOURLY AVG	10.8	10.4	10.3	10.9	12.2	12.8	12.7	15.7	15.0	13.6	11.6	10.3	10.9	12.9	17.5	16.5	18.6	16.9	16.3	16.3	15.3	14.4	13.3	11.5				

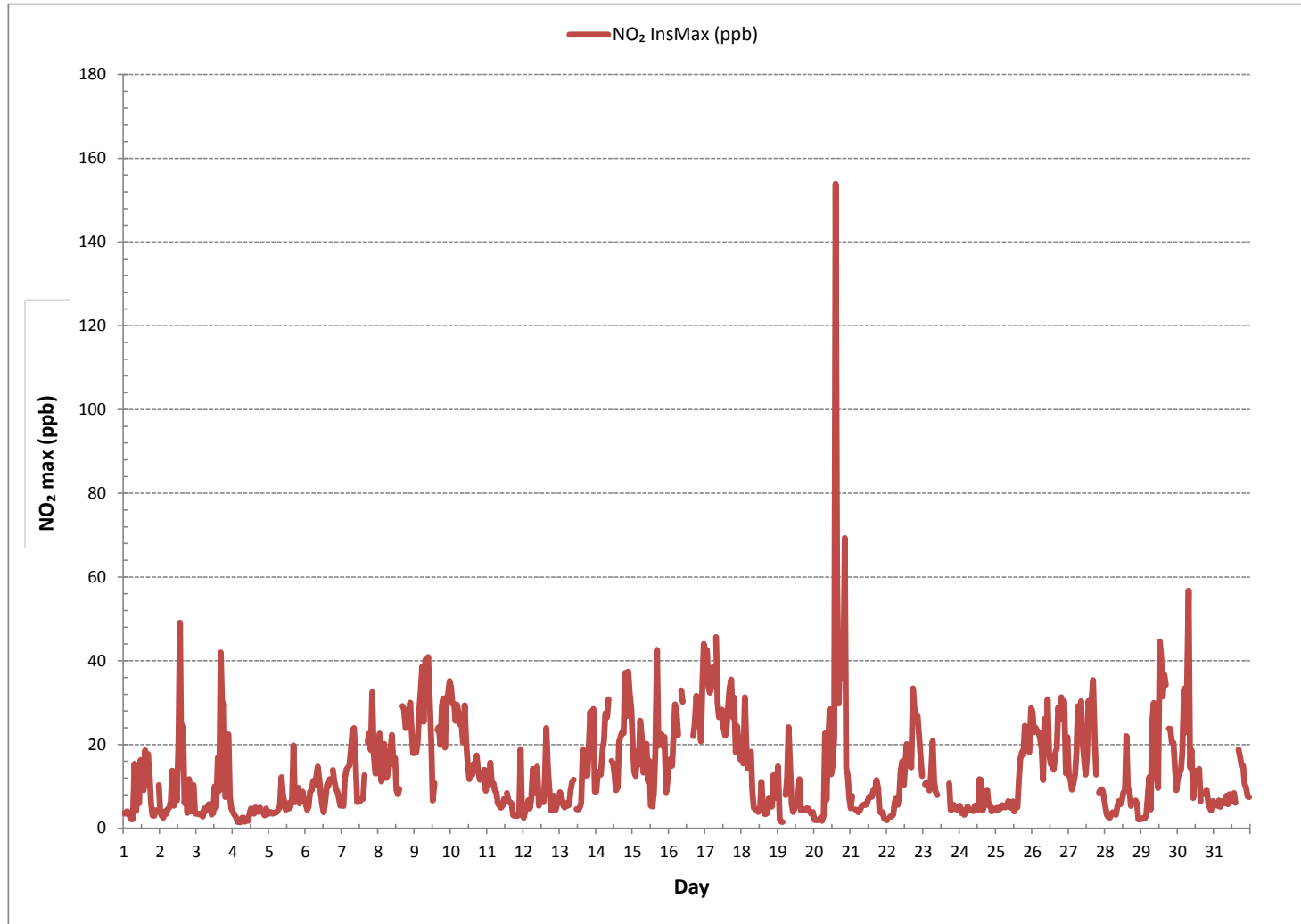
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	699
MAXIMUM INSTANTANEOUS VALUE:	153.9 ppb @ HOUR(S) 14 ON DAY(S) 20
VAR-VARIOUS	
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	737 hrs
STANDARD DEVIATION:	11.6

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



Wind: LICA Bonnyville Poll.: LICA Bonnyville-NO2[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 8.58% Valid Data: 93.95% Calm Avg: 19.53 [ppb]

Direction	0.0-11.7	11.7-23.4	23.4-35.1	>35.1	Total
N	1.57	0.86	0.43	0	2.86
NE	6.58	1.72	0.43	0	8.73
E	2	0.57	0.14	0	2.71
SE	4.15	0.57	0	0	4.72
S	3.58	1	0	0	4.58
SW	26.61	1.57	0.14	0	28.32
W	16.6	4.43	0.43	0	21.46
NW	14.02	3.58	0.43	0	18.03
Summary	75.11	14.3	2	0	91.41

% Icon Classes (ppb)

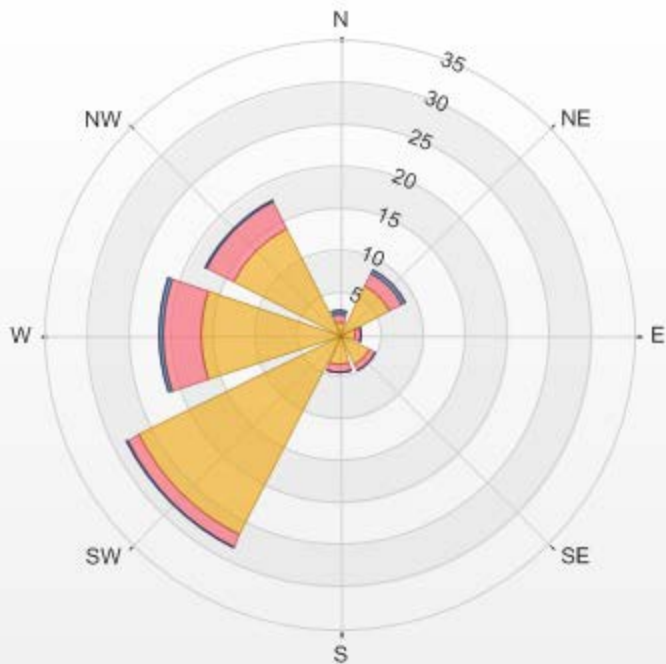
75 0.0-11.7

14 11.7-23.4

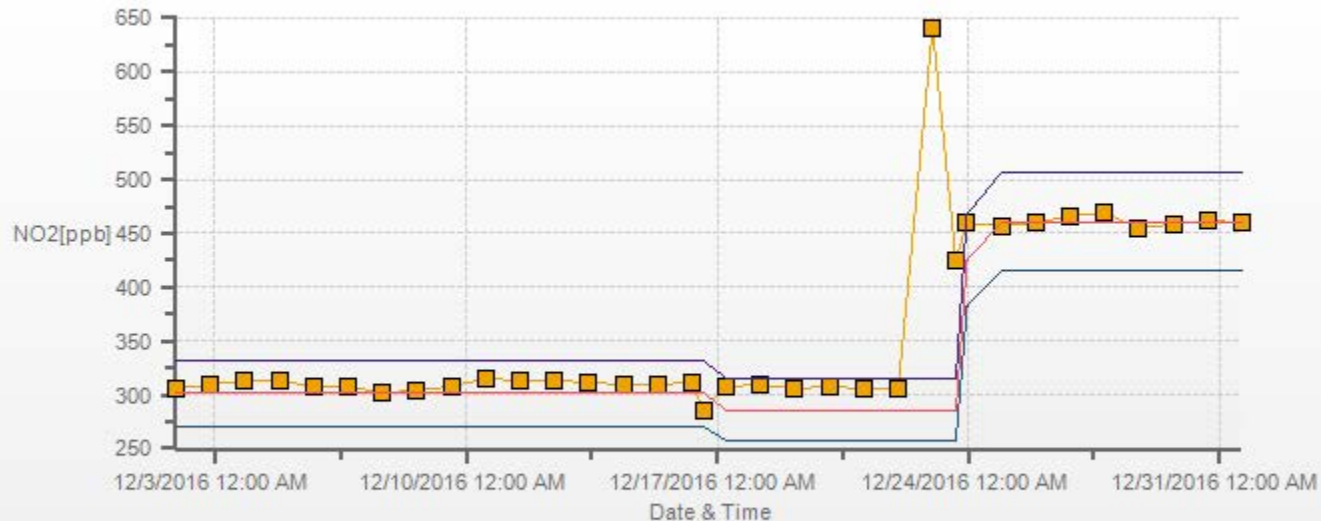
2 23.4-35.1

0 >35.1

LICA Bonnyville Poll.: LICA Bonnyville-NO2[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 8.58% Calm  
Poll Avg: 19.53[ppb]



NO2[ppb] Calibration: LICA Bonnyville Monthly: 2016/12 Type: Span



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

# ***OZONE***



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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	27.0	26.5	26.0	27.0	27.5	27.6	27.3	27.0	26.4	26.4	26.7	26.2	25.4	24.2	25.1	24.1	22.1	21.7	23.5	22.9	22.5	22.6	S	21.2	21.2	27.6	25.1	24	
2	19.8	20.0	20.5	20.1	19.7	18.6	17.9	16.8	17.5	17.6	16.2	16.4	15.9	17.0	19.3	20.7	22.2	22.5	22.6	21.4	21.3	S	19.3	19.5	15.9	22.6	19.3	24	
3	18.6	17.9	16.3	16.1	15.8	15.4	15.8	15.4	14.4	14.8	16.2	16.4	17.1	16.5	15.0	12.8	10.1	10.5	18.7	23.8	S	23.9	23.1	25.4	10.1	25.4	17.0	24	
4	28.0	29.1	30.8	31.5	32.0	32.3	32.2	32.5	32.6	32.5	33.3	32.4	30.0	25.5	19.2	16.3	17.3	19.0	19.4	S	24.2	24.6	24.9	25.0	16.3	33.3	27.2	24	
5	25.8	26.6	27.1	27.8	28.5	28.9	28.6	28.2	23.7	26.5	28.3	29.5	28.7	28.9	29.1	28.5	27.4	28.1	S	29.3	29.1	29.2	28.1	29.2	23.7	29.5	28.0	24	
6	29.6	30.4	29.9	28.3	28.5	25.8	26.3	26.1	22.9	26.7	27.9	29.8	30.2	29.4	26.5	25.5	23.7	S	23.5	25.6	26.6	25.4	26.2	27.5	22.9	30.4	27.1	24	
7	27.6	27.6	25.0	20.2	20.3	19.8	16.9	13.3	16.7	23.5	25.6	25.7	25.6	25.9	25.5	23.1	S	12.2	16.5	12.8	14.3	11.9	17.2	18.0	17.7	11.9	27.6	20.5	24
8	13.7	14.1	18.9	16.3	15.7	20.7	21.8	20.7	16.2	15.0	23.5	27.3	27.5	28.0	27.1	S	12.2	14.8	12.9	12.2	11.3	6.8	11.1	15.1	6.8	28.0	17.5	24	
9	16.6	13.1	9.7	5.6	1.7	2.5	4.4	1.7	1.9	2.8	19.3	23.9	24.0	23.2	S	16.2	12.5	15.6	13.2	15.1	16.6	9.4	7.0	5.2	1.7	24.0	11.4	24	
10	1.7	3.2	3.6	7.1	2.8	2.3	2.3	5.2	8.1	6.3	10.7	14.1	16.2	S	16.5	14.8	15.9	16.4	17.3	17.0	18.0	18.2	15.9	17.3	1.7	18.2	10.9	24	
11	15.0	15.6	14.8	17.4	13.6	14.2	15.4	19.6	20.1	21.0	22.2	23.8	S	28.0	29.9	29.0	30.9	32.4	31.7	31.9	31.9	31.0	32.2	13.6	32.4	24.1	24		
12	32.7	32.3	31.5	31.0	32.4	31.9	27.8	32.1	31.2	31.1	34.8	S	34.6	34.1	30.7	27.3	29.0	31.4	34.7	32.4	33.9	35.7	33.7	33.7	27.3	35.7	32.2	24	
13	32.7	32.4	33.1	34.8	32.4	33.6	33.2	30.9	30.0	29.4	S	33.7	33.8	33.6	31.8	27.7	26.4	25.1	28.0	25.6	19.9	17.6	17.2	27.9	17.2	34.8	29.2	24	
14	28.8	25.6	25.1	26.9	27.4	22.8	21.2	25.8	25.7	S	29.5	30.3	31.7	32.3	32.8	30.6	27.7	24.4	20.2	17.7	16.7	13.6	20.6	17.9	13.6	32.8	25.0	24	
15	20.2	22.6	24.2	23.2	27.1	20.7	23.1	29.4	S	25.1	28.6	29.2	32.4	C	C	C	C	21.1	18.0	19.5	19.2	22.5	26.1	24.8	18.0	32.4	24.1	24	
16	21.0	20.1	20.2	17.0	12.0	12.9	15.2	S	14.0	12.2	18.7	23.9	26.2	26.5	26.6	27.0	25.2	22.9	21.3	22.1	21.5	24.4	13.1	2.0	2.0	27.0	19.4	24	
17	2.1	1.7	2.4	1.1	1.2	1.0	S	1.2	1.4	5.9	6.4	7.7	7.7	8.7	7.5	3.6	1.3	1.4	2.2	4.4	8.1	7.9	8.6	10.7	1.0	10.7	4.5	24	
18	12.1	13.1	10.7	13.7	15.3	S	19.3	26.0	31.4	32.5	33.5	34.6	34.6	33.7	35.1	36.3	36.8	36.8	35.1	36.6	37.0	33.4	35.0	34.1	10.7	37.0	29.0	24	
19	29.6	35.9	37.5	37.7	S	35.3	34.3	36.6	35.7	37.2	37.6	35.7	36.2	38.6	38.2	38.2	37.3	37.8	38.0	37.3	37.0	37.2	37.3	36.6	29.6	38.6	36.6	24	
20	36.6	36.3	36.1	S	35.3	35.3	34.1	32.5	30.2	29.2	30.6	31.4	30.5	28.8	26.8	23.2	23.5	7.0	10.1	17.8	21.1	24.0	26.0	30.1	7.0	36.6	27.7	24	
21	30.1	29.8	S	29.9	29.9	30.9	29.8	30.4	30.0	30.3	30.8	31.4	31.0	31.2	32.2	30.8	32.1	34.0	35.6	36.8	36.5	35.6	35.4	35.8	29.8	36.8	32.2	24	
22	35.4	S	35.7	35.1	34.7	32.6	30.6	30.9	30.6	29.5	30.2	31.1	30.7	29.9	27.5	24.6	25.1	14.2	15.1	16.8	11.4	16.1	21.7	23.2	11.4	35.7	26.6	24	
23	S	24.4	23.7	25.3	27.4	24.2	19.6	28.8	28.2	26.5	27.2	27.5	28.0	27.8	25.8	24.1	23.1	25.1	27.5	28.1	27.7	27.8	28.2	S	19.6	28.8	26.2	24	
24	25.2	24.4	22.6	22.8	23.0	22.7	23.1	23.1	23.1	23.3	23.0	23.1	23.4	23.4	23.9	24.4	24.1	23.6	24.4	25.5	25.6	26.4	S	27.2	22.6	27.2	24.0	24	
25	27.8	27.4	28.1	28.2	27.7	27.8	27.8	27.5	26.6	27.1	27.4	27.9	29.0	27.6	28.6	25.1	22.1	17.6	18.9	14.8	13.7	S	13.7	6.9	6.9	29.0	23.9	24	
26	10.7	6.5	3.1	7.8	10.3	7.0	13.7	16.1	8.3	9.9	14.8	18.7	21.5	21.4	19.7	15.1	16.9	18.6	19.4	8.2	S	14.4	19.2	18.9	3.1	21.5	13.9	24	
27	17.7	20.0	20.3	19.1	18.8	15.1	15.6	12.3	10.1	18.3	18.5	18.1	14.4	16.6	14.4	10.4	8.0	14.1	23.0	S	27.4	25.0	24.1	26.5	8.0	27.4	17.7	24	
28	29.9	32.5	33.3	33.2	33.2	32.8	33.0	33.6	32.9	31.4	32.5	31.1	29.1	28.4	25.7	30.0	31.6	34.1	S	32.6	32.9	34.0	34.0	34.6	25.7	34.6	32.0	24	
29	35.1	35.1	35.2	34.8	34.7	34.4	33.5	33.2	32.2	32.9	31.2	31.1	29.3	26.8	25.8	10.2	11.2	S	17.9	13.4	16.3	15.3	21.1	24.3	10.2	35.2	26.7	24	
30	22.4	22.1	19.5	13.7	9.2	7.9	8.8	7.6	17.7	21.5	24.0	26.6	28.7	29.1	28.8	28.6	S	29.1	29.0	27.6	28.7	30.1	30.5	29.2	7.6	30.5	22.6	24	
31	31.0	31.4	30.7	30.4	31.2	31.6	31.4	30.8	29.2	30.9	29.2	30.2	32.3	30.3	30.7	S	24.5	23.6	25.2	28.5	28.7	30.4	30.7	32.2	23.6	32.3	29.8	24	
HOURLY MAX	36.6	36.3	37.5	37.7	35.3	35.3	34.3	36.6	35.7	37.2	37.6	35.7	36.2	38.6	38.2	38.2	37.3	37.8	38.0	37.3	37.0	37.2	37.3	36.6					
HOURLY AVG	23.5	23.3	23.2	22.8	22.3	22.3	22.8	23.2	22.3	23.2	25.3	26.3	26.9	26.7	25.7	23.2	22.2	22.0	22.0	22.7	23.3	23.5	23.5	23.7					

**STATUS FLAG CODES**

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

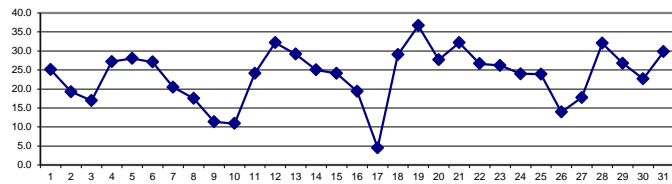
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 82 ppb

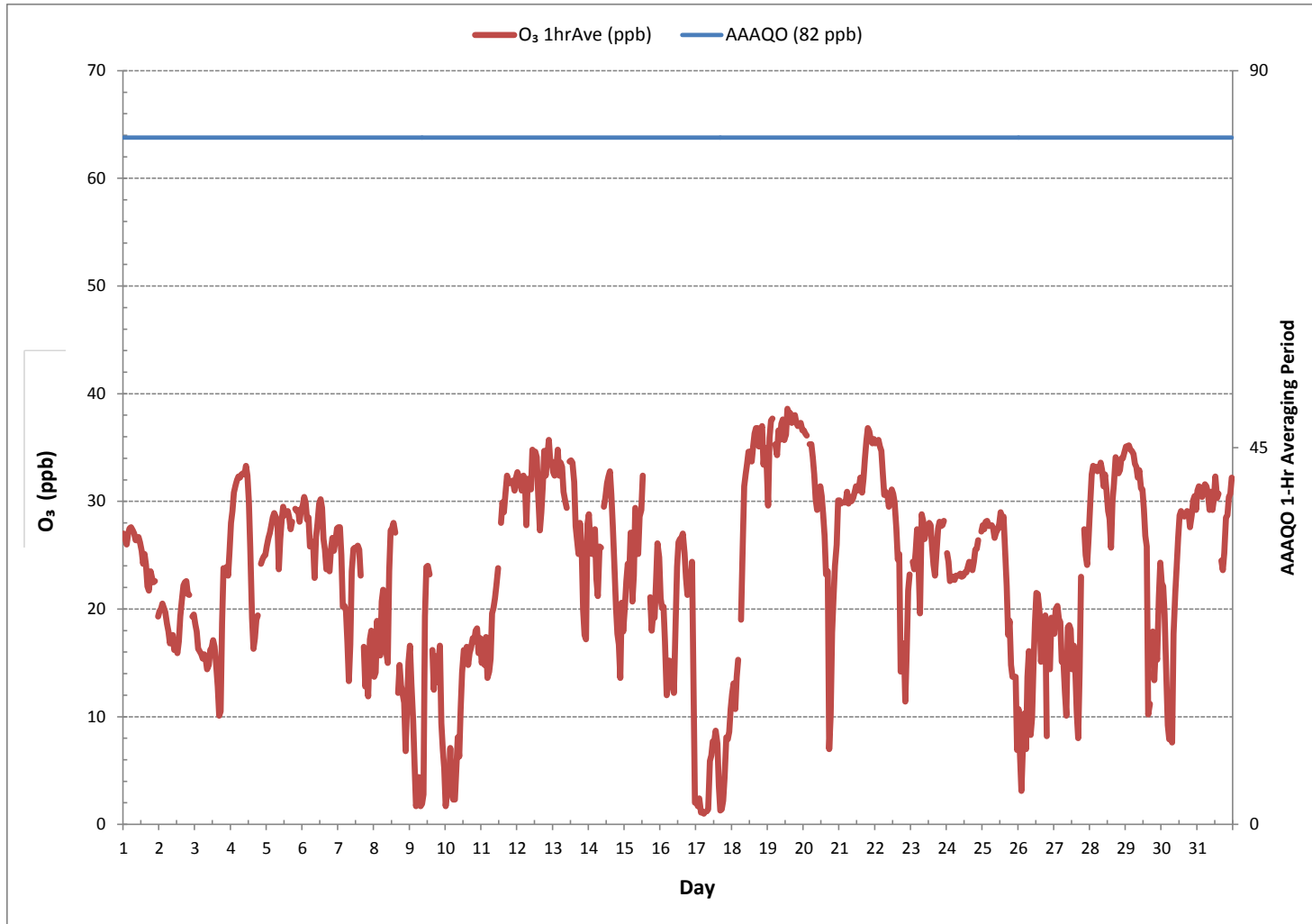
**MONTHLY SUMMARY**

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	708				
MINIMUM 1-HR AVERAGE:	1.0 ppb	@ HOUR(S)	5	ON DAY(S)	17
MAXIMUM 1-HR AVERAGE:	38.6 ppb	@ HOUR(S)	13	ON DAY(S)	19
MAXIMUM 24-HR AVERAGE:	36.6 ppb			ON DAY(S)	19
				VAR-VARIOUS	
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	744 hrs		
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	100.0 %		
STANDARD DEVIATION:	8.7	MONTHLY AVERAGE:	23.6 ppb		

**24 HR AVERAGES December 2016**



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





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Bonnyville Continuous Monitoring Station - December 2016

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	27.7	27.5	27.8	28.1	28.4	28.4	28.1	28.0	28.0	27.7	27.5	27.1	27.0	26.3	26.7	26.0	25.4	25.1	24.8	23.5	23.3	23.5	S	22.5	22.5	28.4	26.5	24	
2	20.6	20.7	21.5	20.7	20.7	19.7	18.5	17.9	18.9	18.8	17.3	17.7	18.5	19.4	21.2	23.1	23.3	23.5	23.1	22.9	22.3	S	20.1	20.2	17.3	23.5	20.5	24	
3	19.7	19.1	17.4	17.0	16.5	16.5	16.8	16.0	15.4	16.8	17.0	17.4	18.3	17.4	16.4	14.1	14.9	18.8	23.8	27.8	S	25.8	24.1	26.9	14.1	27.8	18.9	24	
4	28.8	30.2	31.6	32.3	32.6	32.8	32.9	32.9	33.1	33.2	34.1	34.0	31.6	29.7	22.8	17.9	19.2	19.8	21.8	S	24.8	25.4	26.1	26.3	17.9	34.1	28.4	24	
5	26.4	27.5	28.1	28.7	29.7	29.7	30.0	29.2	27.8	28.8	30.3	30.7	30.2	30.0	30.7	29.9	29.8	30.0	S	31.7	31.2	31.2	29.7	32.3	26.4	32.3	29.7	24	
6	31.0	31.0	30.7	30.2	30.3	28.7	28.2	28.1	25.8	28.7	30.7	31.2	31.0	30.9	29.8	27.7	27.0	S	25.3	28.1	29.6	28.2	27.7	28.7	25.3	31.2	29.1	24	
7	28.5	28.8	27.8	22.8	23.3	22.9	19.7	16.5	21.8	26.1	27.2	26.9	26.9	27.5	26.7	26.9	S	18.9	15.4	15.7	14.7	18.6	19.5	19.8	14.7	28.8	22.7	24	
8	17.4	20.4	20.4	18.0	21.3	23.0	24.5	23.4	21.3	18.9	27.5	29.0	29.4	29.3	29.9	S	20.8	21.0	16.5	17.3	16.0	10.9	16.7	17.1	10.9	29.9	21.3	24	
9	19.2	15.7	11.7	9.7	3.7	6.1	8.7	3.9	4.6	5.1	25.4	24.8	24.7	25.8	S	20.7	16.2	17.8	15.0	18.5	19.9	16.0	11.7	12.3	3.7	25.8	14.7	24	
10	4.0	5.2	6.9	9.4	5.3	6.1	4.2	8.1	12.4	12.6	14.0	16.4	17.6	S	17.7	17.1	17.9	18.5	19.7	19.1	20.6	19.9	18.5	18.3	4.0	20.6	13.5	24	
11	16.5	16.7	16.8	19.1	15.9	15.4	17.7	21.2	20.8	22.3	23.4	26.6	S	29.7	31.2	30.6	32.6	33.7	32.5	32.5	33.1	32.9	32.2	33.1	15.4	33.7	25.5	24	
12	33.2	33.2	32.3	32.8	33.4	33.4	31.2	34.4	34.0	35.4	36.3	S	35.9	35.7	34.4	30.4	32.8	33.8	36.2	34.1	35.9	36.9	35.8	35.6	30.4	36.9	34.2	24	
13	34.7	33.9	36.3	36.9	34.6	35.1	34.7	33.8	32.5	32.0	S	34.7	35.0	35.0	32.9	31.5	29.4	28.2	30.0	30.4	24.6	21.8	26.1	29.1	21.8	36.9	31.9	24	
14	30.3	28.8	28.4	30.7	31.9	28.0	27.2	29.4	29.1	S	30.9	31.3	32.6	33.4	33.9	32.8	30.3	27.7	25.3	19.5	24.1	26.1	34.3	21.8	19.5	34.3	29.0	24	
15	24.0	24.5	26.0	29.2	31.5	30.4	26.9	32.8	S	30.2	30.9	31.6	33.8	C	C	C	C	23.8	21.6	24.3	22.9	27.8	28.2	27.2	21.6	33.8	27.8	24	
16	23.7	24.3	24.1	21.3	18.6	21.4	22.2	S	20.1	18.3	23.3	26.9	28.1	28.2	28.8	29.1	28.4	26.1	26.9	26.3	25.6	26.7	26.6	4.8	4.8	29.1	23.9	24	
17	3.5	3.4	6.4	1.7	3.1	1.4	S	2.4	2.7	11.2	10.8	9.0	8.7	10.3	9.6	5.5	1.8	2.7	4.8	7.2	9.6	10.5	10.5	12.1	1.4	12.1	6.5	24	
18	13.8	14.7	12.7	15.7	16.8	S	22.1	31.3	32.3	33.4	34.3	35.4	35.3	34.4	36.3	37.0	37.7	37.5	37.7	38.4	38.4	36.6	37.0	35.8	12.7	38.4	30.6	24	
19	35.1	37.2	38.6	39.0	S	37.5	35.0	38.6	38.4	39.2	38.6	36.5	38.0	39.5	39.8	39.8	38.8	39.0	39.3	38.3	38.1	38.1	38.1	37.6	35.0	39.8	38.2	24	
20	37.5	37.1	36.8	S	36.1	35.9	35.1	34.1	32.2	30.6	32.0	33.1	32.6	31.5	31.2	30.0	30.4	14.7	15.4	23.3	24.1	26.0	28.7	31.3	14.7	37.5	30.4	24	
21	31.2	31.3	S	30.4	30.4	31.5	31.5	31.5	30.7	31.3	31.9	32.3	31.6	32.8	33.2	32.5	33.2	35.4	37.1	37.5	37.2	36.5	35.9	36.3	30.4	37.5	33.2	24	
22	36.3	S	36.2	35.5	35.3	34.0	32.3	32.0	31.7	31.3	31.7	32.9	32.5	31.3	31.0	28.7	27.8	22.8	25.1	22.2	16.2	19.5	24.6	25.1	16.2	36.3	29.4	24	
23	S	27.2	26.6	29.2	29.7	28.0	28.0	31.6	30.3	29.3	29.1	29.9	30.2	29.4	28.0	25.8	24.9	26.7	28.7	29.2	29.0	29.2	29.3	S	24.9	31.6	28.6	24	
24	26.3	25.3	24.1	23.5	23.8	24.1	24.4	24.1	24.1	24.5	24.4	24.4	24.4	24.5	24.9	25.8	25.1	25.1	27.0	26.9	26.7	27.5	S	28.5	23.5	28.5	25.2	24	
25	29.1	28.7	29.0	29.1	29.1	28.8	29.0	29.0	28.2	28.2	28.7	29.4	29.9	29.1	29.8	27.8	25.1	21.6	22.9	19.5	19.2	S	19.7	18.3	18.3	29.9	26.5	24	
26	16.7	11.7	4.9	12.4	14.9	9.3	15.9	17.3	17.3	11.7	16.7	20.8	22.3	22.2	21.8	20.2	20.6	23.3	24.3	15.9	S	17.3	21.1	21.5	4.9	24.3	17.4	24	
27	19.8	22.2	21.7	21.1	20.8	19.7	20.1	18.2	19.4	20.1	20.4	20.4	19.5	19.4	18.5	15.3	13.3	19.7	26.9	S	28.5	27.2	24.6	28.5	13.3	28.5	21.1	24	
28	31.7	33.5	33.8	33.7	33.8	33.4	34.1	34.1	33.9	33.2	33.9	32.8	31.2	33.2	32.3	32.9	33.5	35.0	S	34.0	35.0	35.3	34.9	35.3	31.2	35.3	33.7	24	
29	35.7	35.6	35.8	35.4	35.1	35.0	34.6	34.0	33.8	33.7	32.8	32.5	31.2	30.3	30.2	16.7	16.7	S	21.5	17.0	18.9	19.8	24.4	25.6	16.7	35.8	29.0	24	
30	24.5	24.4	22.9	17.7	13.4	12.0	12.1	14.2	22.1	24.5	25.7	29.2	30.4	30.7	30.2	29.6	S	30.4	29.9	30.2	29.6	30.9	31.2	31.0	12.0	31.2	25.1	24	
31	32.9	32.5	31.6	32.0	32.5	32.6	32.8	32.6	32.6	32.0	31.0	32.0	34.1	32.6	32.8	S	31.0	28.1	28.2	31.5	32.2	33.4	33.1	34.3	28.1	34.3	32.1	24	
HOURLY MAX	37.5	37.2	38.6	39.0	36.1	37.5	35.1	38.6	38.4	39.2	38.6	36.5	38.0	39.5	39.8	39.8	38.8	39.0	39.3	38.4	38.4	38.1	38.1	37.6	35.0	39.8	38.2	24	
HOURLY AVG	25.3	25.1	25.0	24.8	24.4	24.7	25.3	25.4	25.2	25.6	27.3	27.9	28.4	28.6	28.0	25.9	25.3	25.1	25.1	25.6	25.9	26.2	26.6	25.9					

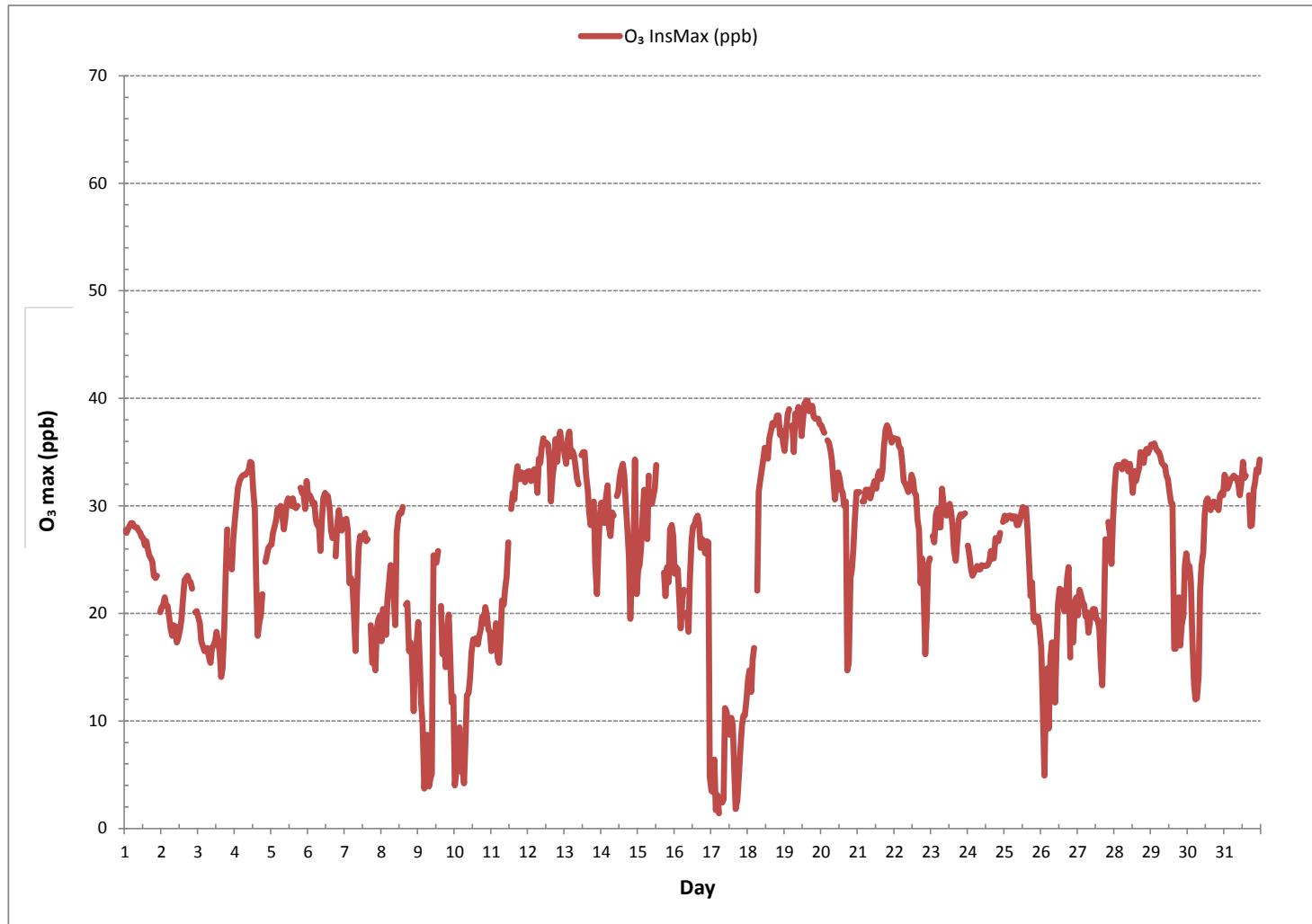
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	708
MAXIMUM INSTANTANEOUS VALUE:	39.8 ppb @ HOUR(S) 14, 15 ON DAY(S) 19, 19
VAR-VARIOUS	
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	4 hrs
STANDARD DEVIATION:	8.1
OPERATIONAL TIME:	744 hrs

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



Wind: LICA Bonnyville Poll.: LICA Bonnyville-O3[ppb] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 8.47% Valid Data: 95.16% Calm 8.99 [ppb]

Direction	0.0-14.0	14.0-28.0	28.0-42.0	>42.0	Total
N	0.85	1.84	0.14	0	3
NE	1.13	7.2	1.27	0	#
E	0.42	2.26	0	0	3
SE	0.28	4.38	0	0	5
S	1.13	3.11	0.28	0	5
SW	0.71	8.47	19.07	0	#
W	1.69	10.88	8.62	0	#
NW	1.55	9.32	6.92	0	#
Summary	7.76	47.46	36.3	0	#

% Icon Classes (ppb)

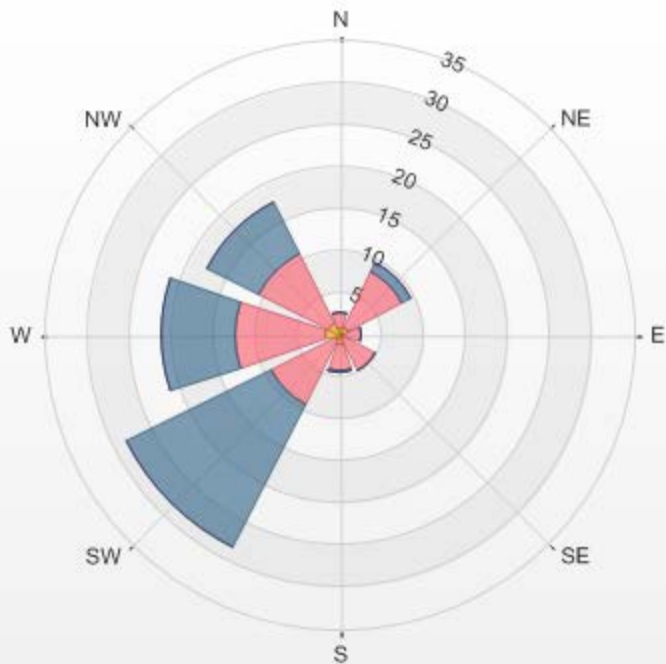
8 0.0-14.0

47 14.0-28.0

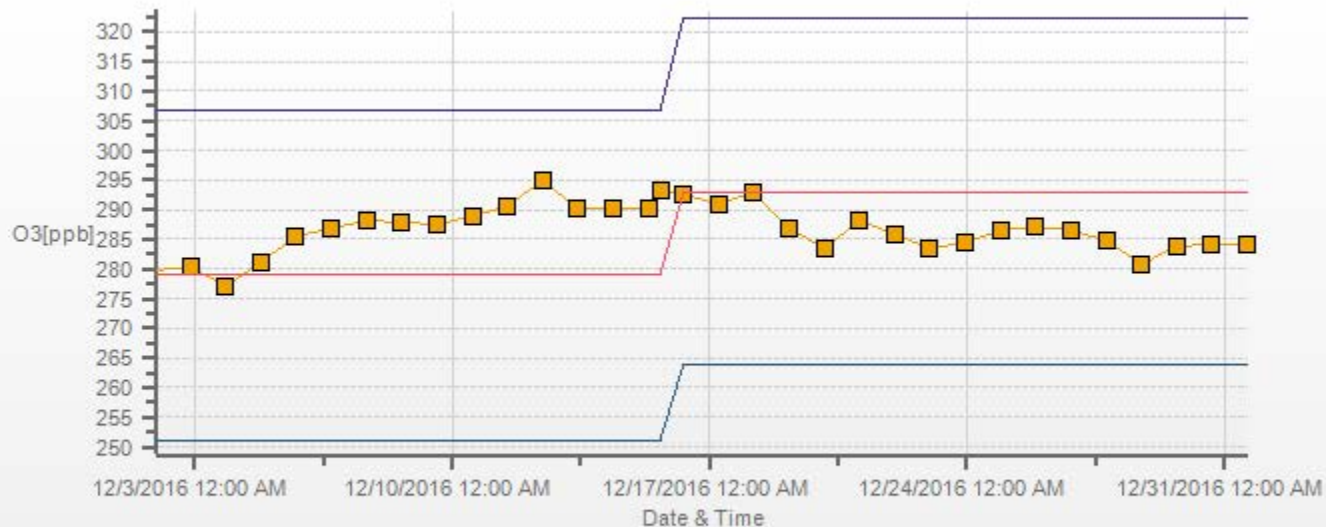
36 28.0-42.0

0 >42.0

LICA Bonnyville Poll.: LICA Bonnyville-O3[ppb] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 8.47% Calm Poll Avg: 8.99[ppb]



O3[ppb] Calibration: LICA Bonnyville Monthly: 2016/12 Type: Span



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

***PARTICULATE MATTER 2.5***





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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	12.2	4.2	10.1	10.6	11.2	13.2	9.7	5.7	6.2	12.7	6.7	4.7	3.7	0.2	18.7	4.7	0.0	0.0	2.7	8.7	6.2	11.2	7.7	7.2	0.0	18.7	7.4	24
2	13.7	12.2	8.7	7.2	11.2	10.6	12.2	3.2	8.2	12.7	12.2	7.2	18.7	8.2	0.0	22.7	1.7	7.2	8.2	9.2	9.7	9.2	3.7	10.1	0.0	22.7	9.5	24
3	10.1	19.2	14.2	13.7	16.1	15.2	8.1	12.2	15.2	17.7	0.7	14.2	12.2	13.8	18.3	16.2	26.7	25.7	13.8	4.8	7.3	7.6	2.4	3.2	0.7	26.7	12.9	24
4	0.0	2.5	3.6	X	0.0	X	0.0	3.2	2.3	0.0	0.0	7.2	X	8.2	5.6	4.2	0.0	1.6	3.0	10.6	0.6	0.9	4.2	0.0	0.0	10.6	2.7	21
5	0.0	0.0	0.0	7.7	0.0	2.1	0.7	5.1	7.6	1.7	2.6	5.7	0.0	0.0	2.6	4.6	2.8	0.3	1.1	3.2	4.2	3.7	2.6	2.6	0.0	7.7	2.5	24
6	0.0	1.7	3.2	0.0	12.8	5.0	4.2	5.3	2.3	3.2	6.1	3.6	5.2	0.1	1.6	4.3	5.5	5.0	7.7	0.4	2.8	1.0	2.3	1.4	0.0	12.8	3.5	24
7	2.5	3.7	2.2	7.7	9.5	5.0	19.5	11.3	8.0	5.2	6.7	5.0	2.3	4.7	5.2	5.7	2.4	16.8	3.1	6.0	9.7	3.9	6.0	1.7	1.7	19.5	6.4	24
8	3.7	2.9	1.4	4.9	1.2	0.0	5.2	0.0	2.2	3.1	5.7	0.0	0.0	0.3	0.0	0.4	0.2	4.0	7.7	4.7	4.4	2.7	2.9	5.5	0.0	7.7	2.6	24
9	1.3	4.3	7.7	2.4	8.5	4.2	6.3	5.6	14.8	11.1	2.9	6.6	0.0	0.0	2.1	6.5	8.2	8.0	12.0	7.4	4.2	11.0	11.8	9.6	0.0	14.8	6.5	24
10	7.5	9.4	8.8	6.7	11.4	5.9	8.9	1.7	8.3	5.8	4.7	8.2	8.5	8.6	3.1	7.0	9.3	3.9	5.0	4.2	8.9	6.5	3.9	8.3	1.7	11.4	6.9	24
11	10.4	14.1	5.6	5.1	17.7	12.7	15.4	10.9	5.4	8.0	9.6	8.6	4.5	6.2	4.0	2.1	3.7	1.7	0.7	2.9	6.2	4.4	5.4	3.2	0.7	17.7	7.0	24
12	0.5	0.0	2.3	5.6	2.2	0.0	5.2	7.9	0.7	0.0	0.5	0.7	0.4	2.9	6.0	10.9	1.4	3.2	1.4	1.3	4.5	3.4	0.3	0.0	0.0	10.9	2.6	24
13	0.9	0.0	1.7	9.4	0.0	0.0	0.3	1.6	0.0	2.5	1.5	1.7	2.9	0.0	3.0	1.9	5.2	5.2	1.4	2.3	10.8	5.5	4.7	0.7	0.0	10.8	2.6	24
14	1.7	5.3	4.0	5.3	0.0	5.0	10.3	7.3	9.0	3.6	3.5	3.5	3.3	5.7	2.4	9.9	9.7	14.8	20.4	21.8	26.0	31.1	14.2	8.5	0.0	31.1	9.4	24
15	4.4	4.1	5.6	3.2	5.0	7.7	5.0	2.0	2.2	1.2	0.0	5.1	6.0	4.5	4.7	5.3	C	0.0	1.2	1.4	8.0	0.0	5.4	6.5	0.0	8.0	3.8	24
16	8.3	13.1	9.3	9.6	9.4	10.7	8.6	13.3	5.2	13.4	12.7	8.5	8.7	2.5	7.4	7.3	8.1	7.3	10.7	12.2	6.6	5.6	6.9	17.2	2.5	17.2	9.3	24
17	11.6	12.3	7.2	12.7	13.0	10.2	13.8	14.7	8.5	16.7	9.7	17.8	15.7	24.3	17.1	8.9	19.8	17.6	19.7	16.6	10.7	17.6	8.2	12.7	7.2	24.3	14.0	24
18	19.5	8.2	5.6	2.7	10.4	10.6	7.7	12.3	5.0	7.3	5.2	6.1	2.7	0.0	1.4	0.2	0.0	0.5	2.2	1.5	4.6	0.0	0.7	1.2	0.0	19.5	4.8	24
19	0.8	1.0	0.2	3.2	2.7	3.2	5.1	0.0	0.0	3.2	1.2	3.7	0.0	2.7	2.7	1.6	4.7	5.1	0.7	4.7	2.2	0.0	1.2	6.2	0.0	6.2	2.3	24
20	3.7	0.7	5.6	0.2	X	0.2	2.7	3.7	0.2	1.6	1.1	4.7	0.0	0.0	4.2	0.7	5.2	6.7	0.0	X	X	0.0	2.2	7.7	0.0	7.7	2.4	21
21	2.2	0.0	11.2	15.7	19.7	7.2	3.7	9.2	8.2	3.7	3.2	4.1	4.7	5.6	2.2	0.0	0.0	2.2	2.7	4.7	3.2	5.2	0.2	0.0	0.0	19.7	5.0	24
22	3.7	0.2	2.7	0.7	0.2	3.2	4.2	0.0	6.2	5.2	0.0	C	C	2.7	3.2	4.2	4.7	7.7	5.2	6.7	7.7	8.2	1.7	0.0	0.0	8.2	3.7	24
23	0.7	3.7	4.2	6.7	6.7	1.7	6.2	0.0	0.0	6.7	0.0	0.0	0.2	3.7	3.7	0.0	4.7	3.2	X	2.2	6.2	9.2	4.2	4.2	0.0	9.2	3.4	23
24	0.0	2.2	5.2	5.1	1.2	7.2	6.7	9.7	2.2	1.2	3.2	6.2	5.7	3.7	3.7	7.2	3.2	2.2	3.7	1.7	2.2	0.0	2.7	9.2	0.0	9.7	4.0	24
25	1.2	1.2	4.2	5.2	2.7	7.7	0.0	3.2	5.7	0.7	5.7	6.2	5.2	9.7	X	0.2	X	5.2	6.7	5.2	6.7	4.7	X	6.7	0.0	9.7	4.5	21
26	5.7	8.2	10.6	4.7	1.2	2.2	0.0	2.2	4.7	3.7	1.7	3.7	0.2	2.7	7.7	7.2	1.7	6.7	7.7	12.2	14.2	12.2	4.7	1.1	0.0	14.2	5.3	24
27	6.7	5.7	8.7	8.7	12.2	6.7	11.2	9.2	14.2	12.2	1.2	3.7	9.6	11.2	12.7	15.2	21.1	12.7	7.2	0.2	3.2	7.2	6.2	0.0	0.0	21.1	8.6	24
28	X	X	20.7	X	2.2	1.6	3.2	0.0	1.6	1.2	13.7	5.1	0.0	7.7	8.7	3.2	1.1	1.6	1.6	3.2	0.7	4.1	4.7	6.7	0.0	20.7	4.4	21
29	1.6	0.0	2.7	5.1	0.0	4.7	1.2	2.7	1.2	6.7	6.6	7.7	4.1	6.2	3.7	3.7	10.1	10.6	1.2	1.2	2.7	9.2	5.1	5.1	0.0	10.6	4.3	24
30	3.7	0.0	3.2	5.1	4.1	7.7	20.2	4.1	11.2	10.1	6.7	6.7	2.2	7.2	14.7	13.2	6.2	11.2	15.7	15.7	15.7	3.2	5.6	9.7	0.0	20.2	8.5	24
31	10.6	9.2	1.6	1.2	2.2	5.1	4.7	5.2	X	0.2	5.1	8.7	2.7	2.7	0.0	1.2	4.1	3.2	2.2	1.7	4.2	3.7	3.2	3.2	0.0	10.6	3.7	23
HOURLY MAX	19.5	19.2	20.7	15.7	19.7	15.2	20.2	14.7	15.2	17.7	13.7	17.8	18.7	24.3	18.7	22.7	26.7	25.7	20.4	21.8	26.0	31.1	14.2	17.2				
HOURLY AVG	5.0	5.0	5.9	6.1	6.5	5.9	6.7	5.7	5.3	5.9	4.7	5.6	4.5	5.1	5.7	5.8	5.9	6.4	6.0	5.9	6.8	6.2	4.7	5.2				

STATUS FLAG CODES

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

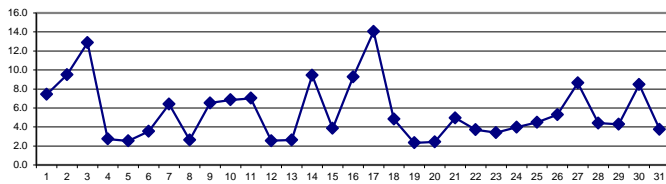
OBJECTIVE LIMIT:

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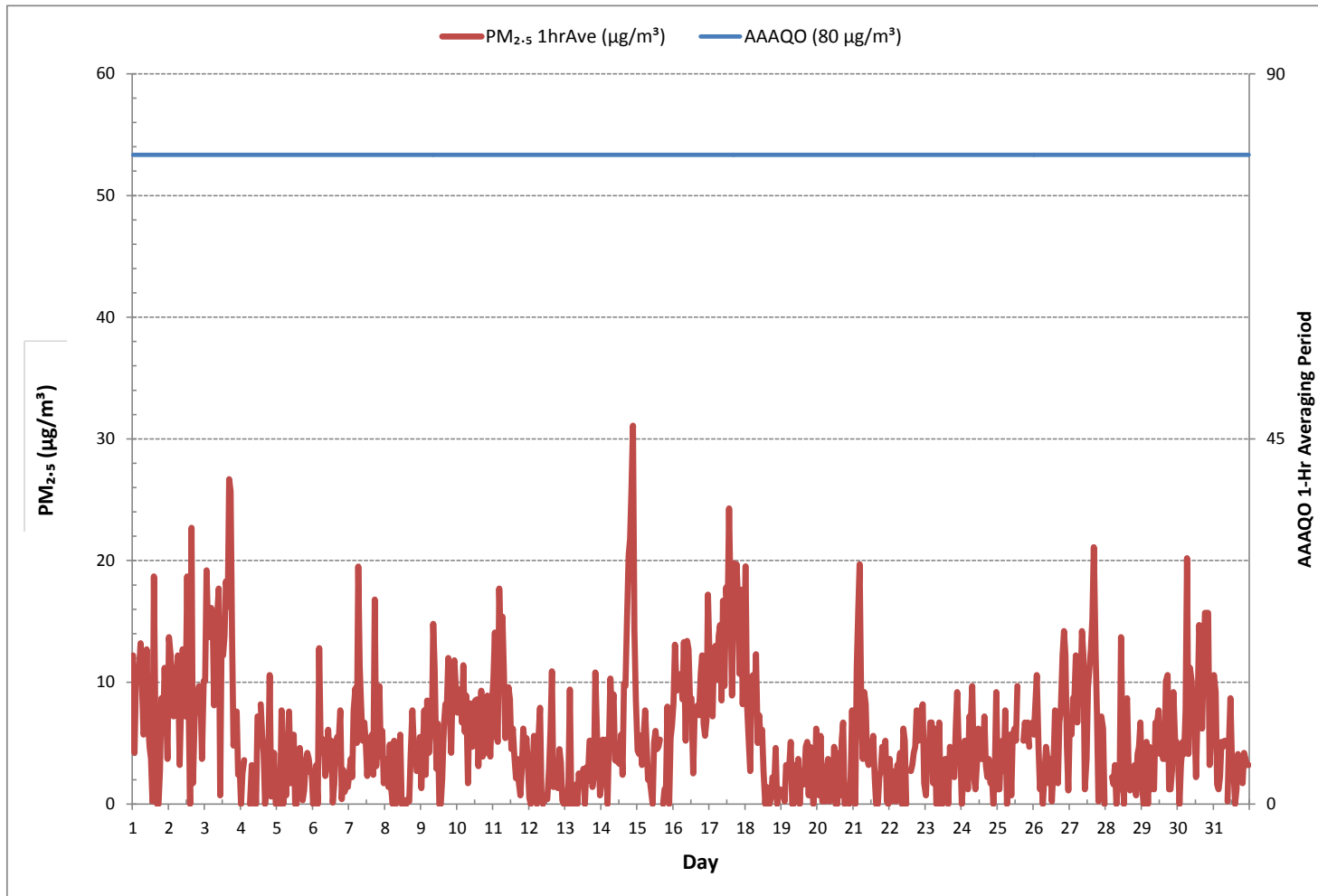
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF 24-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	656					
MINIMUM 1-HR AVERAGE	0.0	µg/m <sup>3</sup>	@ HOUR(S)	VAR	ON DAY(S)	VAR
MAXIMUM 1-HR AVERAGE:	31.1	µg/m <sup>3</sup>	@ HOUR(S)	21	ON DAY(S)	14
MAXIMUM 24-HR AVERAGE:	14.0	µg/m <sup>3</sup>			ON DAY(S)	17
					VAR-VARIOUS	
MONTHLY CALIBRATION TIME:	3	hrs	OPERATIONAL TIME:	730	hrs	
STANDARD DEVIATION:	5.0		AMD OPERATION UPTIME:	98.1	%	
			MONTHLY AVERAGE:	5.7	µg/m <sup>3</sup>	

24 HR AVERAGES December 2016



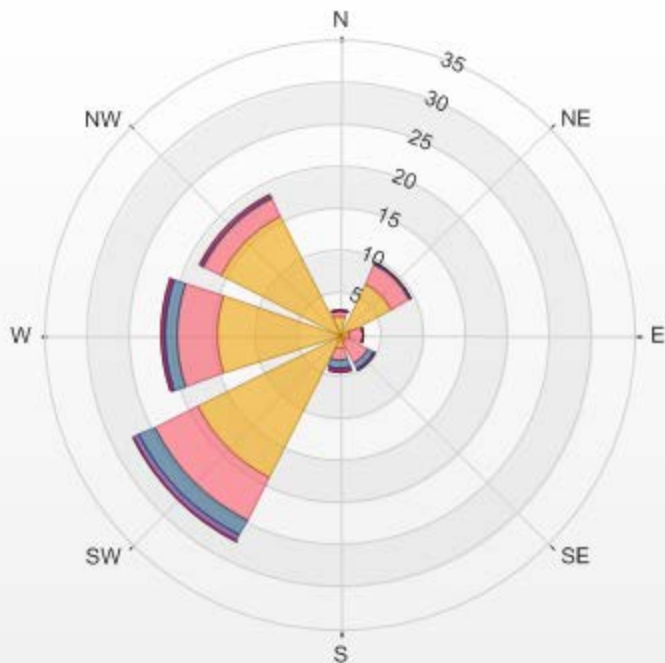
PARTICULATE MATTER < 2.5 MICRONS Hourly Averages (PM<sub>2.5</sub> µg/m<sup>3</sup>)



Wind: LICA Bonnyville Poll.: LICA Bonnyville-PM25[ug/m3(L)] Monthly: 12/2016 Type: PollutionRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 8.39% Valid Data: 97.72% Calm Avg: 9.67 [ppb]

Direction	0.0-6.2	6.2-12.5	12.5-18.7	18.7-25.0	25.0-31.2	>31.2	Total
N	2.2	0.69	0.14	0	0	0	3.03
NE	6.88	2.48	0.14	0	0	0	9.5
E	1.24	1.51	0	0	0	0	2.75
SE	0.96	2.75	0.69	0.28	0	0	4.68
S	1.65	1.51	0.96	0.14	0.14	0	4.4
SW	18.98	5.64	2.06	0.69	0.14	0	27.51
W	14.58	4.81	1.38	0.28	0.14	0	21.19
NW	15.68	2.48	0.28	0	0.14	0	18.58
Summary	62.17	21.87	5.65	1.39	0.56	0	91.64

LICA Bonnyville Poll.: LICA Bonnyville-PM25[ug/m3(L)] 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 8.39% Calm  
 Poll Avg: 9.67[ug/m3(L)]



% Icon Classes (ug/m3(L))	62	22	6	1	1	0
0.0-6.2	6.2-12.5	12.5-18.7	18.7-25.0	25.0-31.2	>31.2	

JOB #: 2833-2016-12-35-C Page 93 of 238

***WIND SPEED***



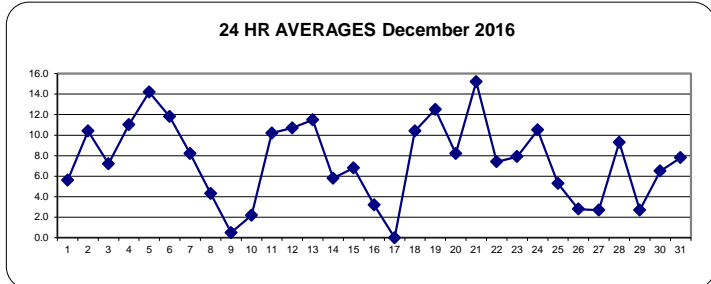
WIND SPEED Hourly Averages (WS kph)

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	8.9	8.5	9.0	6.1	5.9	5.7	5.1	6.3	5.5	8.0	9.6	9.0	7.1	5.1	4.5	4.4	4.0	4.3	5.0	6.5	3.5	6.2	4.4	5.1	3.5	9.6	5.6	24
2	3.8	5.3	7.5	7.5	7.3	9.1	9.4	9.3	9.4	12.2	10.0	9.7	8.4	8.2	8.7	12.1	12.6	15.9	17.3	14.7	15.1	13.2	13.2	12.7	3.8	17.3	10.4	24
3	11.0	10.1	9.9	9.0	8.1	9.4	7.0	9.8	10.4	9.9	11.3	10.1	10.3	7.0	5.7	6.6	6.4	5.5	7.0	8.0	7.1	5.4	6.8	10.5	5.4	11.3	7.2	24
4	9.9	10.1	8.7	8.6	11.2	10.5	12.2	12.2	12.9	13.2	14.6	12.0	11.2	14.5	14.5	14.1	16.1	12.7	14.5	18.5	17.7	16.8	15.5	15.2	8.6	18.5	11.0	24
5	15.5	14.9	14.3	15.2	16.0	15.8	17.9	17.7	10.9	13.4	15.5	16.2	15.4	16.0	16.7	16.2	13.7	13.9	10.8	11.8	12.2	11.3	10.2	11.3	10.2	17.9	14.2	24
6	11.8	13.7	12.7	10.9	10.6	11.6	11.1	11.4	10.7	11.5	12.1	14.6	15.7	14.9	11.7	12.7	10.9	9.9	10.2	11.5	11.0	10.0	11.6	11.6	9.9	15.7	11.8	24
7	12.2	11.5	9.2	7.3	8.1	7.6	5.5	6.5	8.2	9.7	11.3	10.9	11.4	11.0	9.4	8.9	8.6	6.7	5.9	6.7	6.1	6.7	4.1	4.2	4.1	12.2	8.2	24
8	4.3	4.8	5.2	5.2	4.4	4.5	5.7	5.9	4.3	3.2	6.1	5.4	4.2	5.6	4.9	4.8	3.0	3.8	4.0	3.9	3.8	3.6	3.8	3.4	3.0	6.1	4.3	24
9	3.6	2.9	2.9	1.3	2.1	2.2	0.9	0.2	0.1	0.6	3.5	3.0	1.3	1.2	3.4	4.2	6.1	5.0	4.3	4.1	2.0	0.2	1.6	0.6	0.1	6.1	0.5	24
10	1.5	3.0	3.1	2.3	2.1	2.2	5.0	3.7	0.3	1.3	1.7	3.2	3.0	4.3	4.3	4.6	5.1	5.3	3.0	1.7	2.4	1.8	2.0	4.6	0.3	5.3	2.2	24
11	6.5	6.7	9.5	11.5	12.3	10.8	9.7	11.3	12.2	12.9	11.8	13.0	16.6	15.0	10.9	10.4	9.4	11.0	10.3	9.8	9.7	7.4	6.1	9.0	6.1	16.6	10.2	24
12	9.3	10.9	10.2	9.4	10.5	10.6	10.8	13.9	11.6	10.2	14.3	13.9	15.7	16.7	9.9	5.9	7.8	9.0	11.6	10.4	14.7	16.0	12.2	14.0	5.9	16.7	10.7	24
13	12.8	10.9	12.3	18.3	17.0	21.2	17.3	11.7	12.2	12.2	16.1	18.2	18.8	16.8	16.1	11.1	8.3	8.4	9.3	7.3	5.6	4.8	4.8	5.1	4.8	21.2	11.5	24
14	5.8	4.2	5.3	7.5	7.3	5.7	5.8	5.5	5.4	5.9	10.2	11.7	12.2	8.5	9.3	8.8	5.8	6.9	5.4	4.4	4.9	6.1	5.3	5.0	4.2	12.2	5.8	24
15	4.2	3.7	5.1	4.5	6.7	4.9	7.3	10.9	7.6	7.8	7.9	7.8	13.7	11.7	9.8	5.2	6.7	9.5	7.6	7.4	6.0	4.5	5.9	6.0	3.7	13.7	6.8	24
16	6.9	4.8	4.9	6.7	5.5	3.9	4.1	3.7	3.1	5.7	4.2	4.1	4.3	2.1	4.4	3.3	5.1	3.6	1.4	3.3	2.9	2.0	0.6	0.1	0.1	6.9	3.2	24
17	0.4	0.8	1.4	0.3	1.0	0.9	1.4	2.4	0.3	0.3	0.9	0.4	0.7	1.0	1.8	0.8	0.1	0.4	0.6	1.3	0.1	2.6	3.2	8.3	0.1	8.3	0.0	24
18	5.7	8.6	8.9	9.0	13.4	11.2	8.8	9.4	12.7	15.0	16.6	15.7	16.3	15.7	15.4	13.5	13.2	12.0	9.4	16.2	15.5	7.8	6.3	5.7	5.7	16.6	10.4	24
19	6.5	7.9	9.1	15.0	17.6	12.4	11.3	10.6	9.6	17.2	17.1	17.6	15.8	16.5	19.3	19.9	19.6	19.3	17.0	11.6	9.9	10.0	9.9	9.3	6.5	19.9	12.5	24
20	9.9	9.7	11.7	11.5	11.3	13.5	12.9	11.3	13.2	12.1	10.9	7.2	5.1	6.7	4.8	6.9	5.9	1.9	3.8	5.0	4.8	5.4	5.9	7.1	1.9	13.5	8.2	24
21	8.1	10.6	10.7	13.2	14.0	14.2	13.1	13.8	13.9	15.8	14.9	16.1	14.6	13.1	17.1	17.0	15.8	19.5	16.9	20.4	18.1	17.2	21.0	19.7	8.1	21.0	15.2	24
22	18.9	16.4	15.2	12.0	11.7	9.9	8.7	10.1	9.7	8.9	8.9	8.7	6.9	6.7	5.9	6.2	5.4	4.5	4.2	4.8	2.6	4.0	4.5	4.0	2.6	18.9	7.4	24
23	4.0	5.8	4.8	4.8	3.8	1.7	3.9	6.3	7.9	9.0	9.3	9.2	9.6	10.0	11.2	10.7	12.0	11.9	10.8	12.2	10.9	10.4	10.6	11.3	1.7	12.2	7.9	24
24	10.6	11.4	11.2	11.4	12.3	10.4	11.4	10.4	10.0	10.2	12.4	10.5	12.0	12.3	11.3	12.3	10.4	7.7	10.3	8.3	8.9	10.8	9.4	9.7	7.7	12.4	10.5	24
25	8.4	8.4	8.8	8.6	7.8	8.7	8.6	6.9	6.0	6.8	6.5	6.3	6.8	6.4	6.8	4.8	4.2	3.2	3.5	3.3	0.9	1.1	1.3	1.2	0.9	8.8	5.3	24
26	0.1	1.1	0.2	0.6	3.8	1.2	6.6	4.3	1.4	1.4	3.1	5.2	9.9	6.7	1.2	2.5	4.8	6.4	5.8	0.3	2.0	5.8	8.6	6.6	0.1	9.9	2.8	24
27	4.6	7.8	6.9	3.8	2.6	1.2	1.4	2.3	1.2	2.6	1.4	0.0	1.1	0.3	0.1	0.0	3.4	7.3	7.4	11.1	10.6	11.4	12.0	12.0	0.0	12.0	2.7	24
28	11.8	12.3	11.3	9.8	9.5	8.5	9.9	11.1	9.7	11.3	13.3	14.7	8.7	5.7	7.6	8.3	9.0	11.1	8.1	8.3	8.6	9.5	9.3	9.9	5.7	14.7	9.3	24
29	10.7	10.8	11.0	8.7	7.6	7.2	6.2	6.4	6.7	8.2	8.1	9.2	7.5	2.9	0.3	3.7	4.4	5.4	6.0	5.7	5.1	4.1	6.2	7.9	0.3	11.0	2.7	24
30	4.7	3.6	4.5	3.9	2.6	2.6	3.9	5.8	7.6	9.0	9.9	9.9	9.8	7.9	9.5	8.4	11.4	10.1	9.3	9.8	11.6	11.8	9.7	8.2	2.6	11.8	6.5	24
31	8.2	9.3	9.0	9.9	10.3	9.0	11.0	9.4	9.0	11.1	7.6	7.3	10.6	7.0	10.7	10.5	5.4	6.7	6.4	7.5	4.5	6.6	5.7	6.3	4.5	11.1	7.8	24
HOURLY MAX	18.9	16.4	15.2	18.3	17.6	21.2	17.9	17.7	13.9	17.2	17.1	18.2	18.8	16.8	19.3	19.9	19.6	19.5	17.3	20.4	18.1	17.2	21.0	19.7				
HOURLY AVG	4.1	4.2	4.2	4.5	4.7	4.5	4.1	4.4	4.4	5.1	5.4	5.5	5.8	5.3	4.5	4.0	3.8	3.8	3.4	4.4	4.3	3.9	3.5	3.9				

STATUS FLAG CODES

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

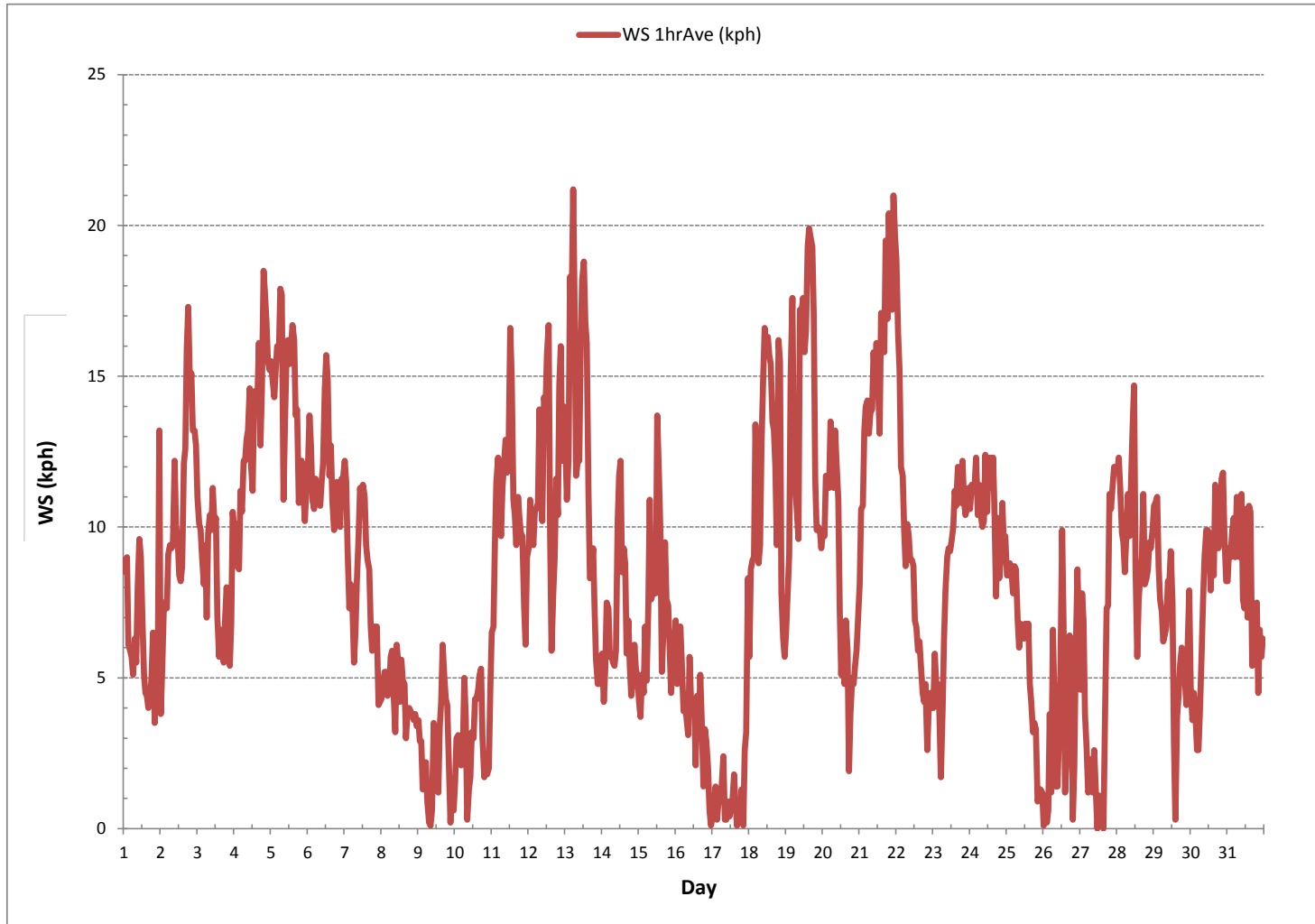
LAST CALIBRATION:	January 26, 2016
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	742
MINIMUM 1-HR AVERAGE:	0.0 kph @ HOUR(S) 11, 15 ON DAY(S) 27, 27
MAXIMUM 1-HR AVERAGE:	21.2 kph @ HOUR(S) 5 ON DAY(S) 13
MAXIMUM 24-HR AVERAGE:	15.2 kph ON DAY(S) 21
	VAR-VARIOUS
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	744 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	4.5
MONTHLY AVERAGE:	4.4 kph

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





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Bonnyville Continuous Monitoring Station - December 2016

WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	18.3	18.3	18.5	18.4	13.6	12.5	13.6	14.1	13.9	14.0	17.3	17.4	17.2	15.3	14.8	13.2	10.5	12.0	14.0	12.5	9.6	13.7	10.1	14.1	9.6	18.5	14.5	24
2	9.1	9.7	13.7	12.2	12.4	19.0	18.0	14.5	16.4	21.0	19.4	20.9	18.1	17.0	17.6	23.8	22.8	34.5	33.0	27.5	29.1	26.6	26.8	23.8	9.1	34.5	20.3	24
3	23.1	18.9	19.2	15.2	14.1	14.6	12.5	16.8	16.3	16.6	17.6	19.2	20.5	15.5	11.8	10.0	9.1	8.6	11.1	16.6	15.7	9.9	19.4	20.8	8.6	23.1	15.5	24
4	19.9	19.4	17.3	15.9	18.7	21.0	21.2	24.7	27.6	26.8	29.3	31.7	27.8	33.4	33.7	29.9	41.5	36.4	36.8	41.2	39.0	36.0	35.2	32.5	15.9	41.5	29.0	24
5	33.6	30.5	28.9	35.4	35.2	34.2	37.2	39.9	22.4	27.5	32.7	37.5	32.0	31.0	33.6	31.9	27.4	29.3	24.9	33.3	25.1	25.2	21.7	31.0	21.7	39.9	30.9	24
6	24.7	25.9	24.6	23.7	22.8	23.6	21.2	24.2	22.8	27.4	30.8	30.9	30.2	33.4	25.7	24.6	25.1	19.3	19.9	26.8	26.4	21.9	23.7	28.9	19.3	33.4	25.4	24
7	25.2	25.6	20.3	16.4	15.8	14.1	12.5	15.7	16.2	19.4	21.5	22.1	23.9	22.9	17.6	19.9	16.8	14.1	13.1	13.0	12.5	13.7	9.7	8.1	8.1	25.6	17.1	24
8	7.8	8.1	9.5	10.0	9.9	9.0	12.1	12.7	7.5	6.8	12.7	11.7	8.8	10.5	10.3	10.6	7.4	8.1	8.9	8.4	6.9	7.3	6.4	6.3	6.3	12.7	9.1	24
9	6.5	5.6	5.5	3.1	6.0	6.5	4.6	2.5	2.0	4.1	7.9	6.8	5.3	7.5	8.1	11.7	12.9	11.1	9.1	8.1	6.8	4.1	6.2	4.9	2.0	12.9	6.5	24
10	5.0	5.9	8.3	7.3	6.8	6.2	9.6	9.0	5.0	4.3	5.6	8.9	7.5	10.7	9.6	11.1	12.6	14.2	9.4	5.7	6.3	6.3	6.5	12.2	4.3	14.2	8.1	24
11	14.9	16.8	21.5	26.7	25.9	28.9	24.1	25.4	28.4	29.8	28.8	30.0	38.4	36.3	25.3	28.3	22.4	25.8	22.2	22.2	20.5	18.1	13.8	18.5	13.8	38.4	24.7	24
12	20.7	28.4	25.3	22.8	24.4	26.1	26.9	36.2	27.4	32.4	29.7	34.8	39.1	35.1	31.4	19.7	18.1	21.6	27.5	24.9	30.3	35.1	30.2	29.2	18.1	39.1	28.2	24
13	28.2	28.7	36.2	40.7	45.9	52.3	44.2	28.3	26.4	30.5	43.6	40.3	41.3	48.3	33.9	29.5	17.6	18.4	23.4	14.0	11.5	11.1	11.3	9.4	9.4	52.3	29.8	24
14	11.1	10.4	14.9	15.2	16.5	14.4	15.8	10.7	9.5	9.9	15.7	17.1	18.0	17.8	16.4	14.8	10.9	13.5	13.2	9.4	11.6	15.1	14.5	9.5	9.4	18.0	13.6	24
15	9.4	7.9	16.5	12.2	15.0	11.1	17.1	22.4	15.1	18.0	17.2	25.2	31.0	22.5	20.4	12.1	17.8	18.5	16.7	15.1	13.9	9.6	11.6	14.3	7.9	31.0	16.3	24
16	15.4	11.9	12.3	13.0	12.7	9.9	9.4	9.0	9.7	12.1	8.9	9.5	9.7	8.2	8.5	6.1	9.3	8.2	6.1	8.3	5.9	6.5	4.5	5.6	4.5	15.4	9.2	24
17	3.9	5.7	6.1	2.9	3.6	4.9	4.6	7.2	3.3	3.3	6.1	3.7	6.2	5.7	5.9	4.5	2.0	2.7	5.9	5.9	4.9	8.1	7.9	16.1	2.0	16.1	5.5	24
18	16.8	15.8	13.7	14.1	21.5	17.4	14.0	23.1	26.5	28.7	33.7	35.6	32.1	35.7	34.1	32.1	28.2	28.6	25.6	42.0	38.5	24.8	14.1	9.6	9.6	42.0	25.3	24
19	12.4	14.7	20.3	27.1	33.4	22.8	17.6	32.0	19.3	37.1	37.2	37.6	37.9	40.6	49.3	55.3	56.7	50.3	47.9	32.3	24.9	23.1	21.0	16.1	12.4	56.7	32.0	24
20	16.9	16.4	22.6	24.0	20.5	29.6	25.5	22.2	23.3	21.7	20.2	15.8	15.0	11.4	10.7	12.1	12.4	13.5	7.2	8.8	9.8	10.0	13.9	18.3	7.2	29.6	16.7	24
21	17.1	18.2	20.6	24.2	25.3	30.6	23.8	31.3	27.1	28.6	31.7	36.4	35.1	30.5	31.3	35.6	29.0	28.9	28.1	51.9	34.4	34.5	32.4	34.9	17.1	51.9	30.1	24
22	29.8	30.4	34.5	23.2	25.2	18.6	19.6	21.1	16.8	13.5	13.2	14.4	11.8	11.8	11.2	12.9	11.7	11.0	9.7	10.8	5.8	7.4	9.6	8.6	5.8	34.5	15.9	24
23	8.6	12.3	10.3	11.5	9.7	6.7	12.5	15.7	19.2	19.8	20.6	19.1	21.8	22.9	24.5	24.7	25.4	25.7	25.2	26.8	24.7	22.2	23.3	25.9	6.7	26.8	19.1	24
24	24.1	24.0	25.0	27.2	23.9	22.3	22.7	22.5	22.4	23.8	25.6	22.6	27.5	25.6	26.0	24.9	23.6	18.8	24.8	19.1	19.5	22.2	20.8	22.7	18.8	27.5	23.4	24
25	20.4	19.4	19.5	18.1	17.4	18.1	18.5	17.2	14.3	17.3	14.7	13.6	13.4	12.3	14.0	10.8	8.6	10.2	9.0	8.9	4.0	5.2	7.0	7.1	4.0	20.4	13.3	24
26	6.6	4.7	2.6	4.1	8.2	11.4	13.2	8.4	7.6	7.1	6.8	11.4	17.6	13.2	6.0	12.0	11.6	13.6	15.2	7.7	6.7	14.0	17.7	13.5	2.6	17.7	10.0	24
27	10.4	15.4	16.0	12.6	11.7	8.2	7.1	8.5	9.4	8.5	7.2	4.1	4.3	4.4	2.4	5.4	10.6	10.8	15.0	22.4	19.5	22.7	24.5	21.7	2.4	24.5	11.8	24
28	24.4	26.2	22.4	18.8	22.7	19.7	20.7	20.5	19.5	27.1	35.3	34.4	26.2	10.8	24.2	23.6	22.5	23.6	20.4	17.7	21.1	21.0	19.5	20.1	10.8	35.3	22.6	24
29	20.7	22.4	18.6	17.5	15.4	15.7	11.3	13.8	11.6	13.0	12.6	15.1	13.8	7.8	4.0	8.5	10.6	13.1	13.4	12.6	14.1	11.3	17.1	19.0	4.0	22.4	13.9	24
30	10.3	8.9	8.9	8.3	8.9	10.3	11.8	14.5	14.4	19.2	19.9	17.4	19.2	16.3	17.4	16.3	17.8	19.5	19.5	18.7	21.3	24.8	20.8	18.2	8.3	24.8	15.9	24
31	19.0	22.4	21.2	24.5	21.2	18.8	27.8	20.3	23.6	23.7	17.4	16.4	23.6	15.9	20.7	21.1	14.3	15.8	15.4	21.8	10.2	17.4	12.1	19.8	10.2	27.8	19.4	24
HOURLY MAX	33.6	30.5	36.2	40.7	45.9	52.3	44.2	39.9	28.4	37.1	43.6	40.3	41.3	48.3	49.3	55.3	56.7	50.3	47.9	51.9	39.0	36.0	35.2	34.9				
HOURLY AVG	16.6	17.1	17.9	17.6	18.2	18.0	17.8	18.9	16.9	19.1	20.7	21.3	21.8	20.3	19.4	19.3	18.3	18.7	18.4	19.2	17.1	17.1	16.2	17.4				

STATUS FLAG CODES

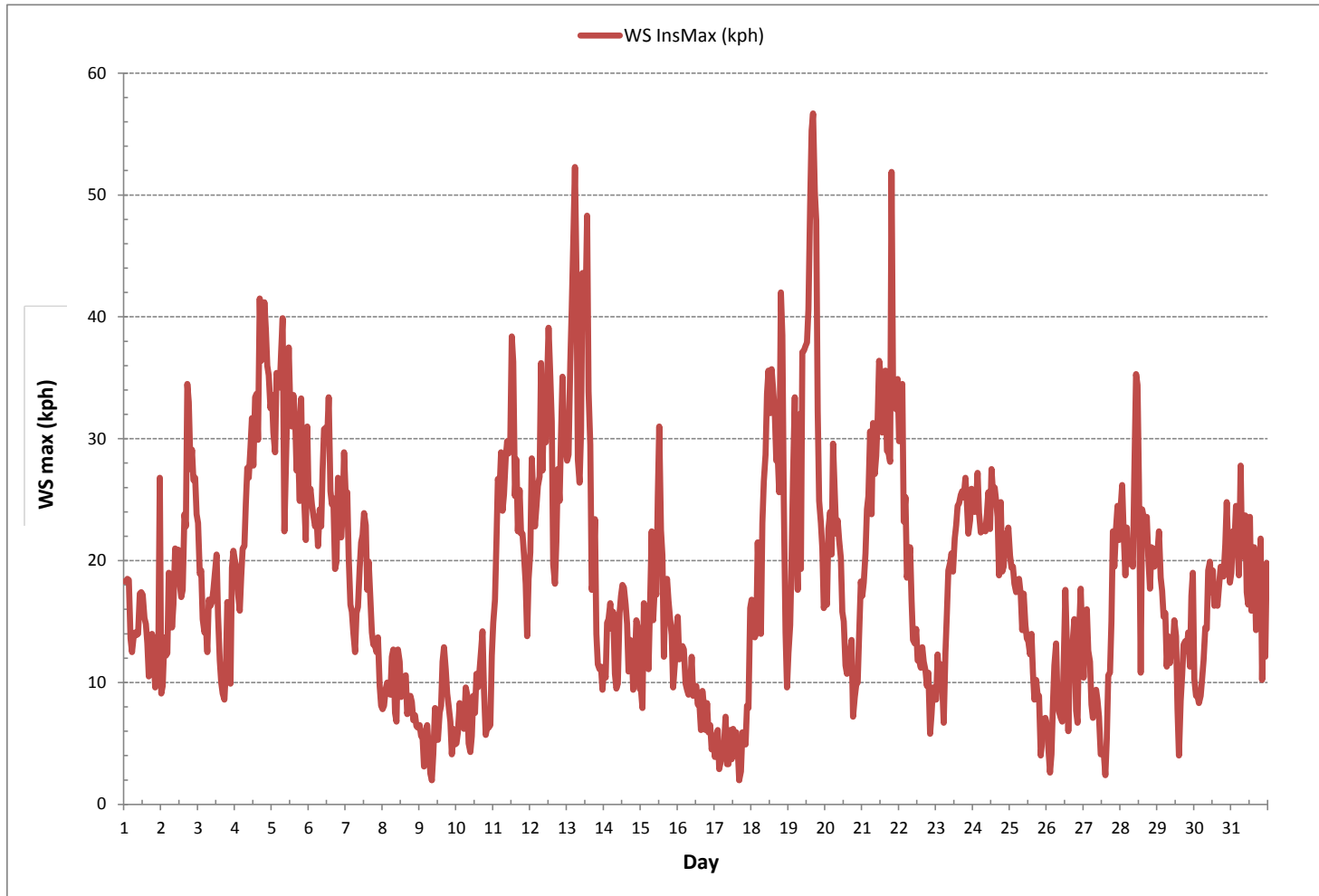
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	56.7	kph	@ HOUR(S)	16	ON DAY(S)	19
					VAR-VARIOUS	
OPERATIONAL TIME:					744	hrs








WIND SPEED Instantaneous Maximum (WS kph)

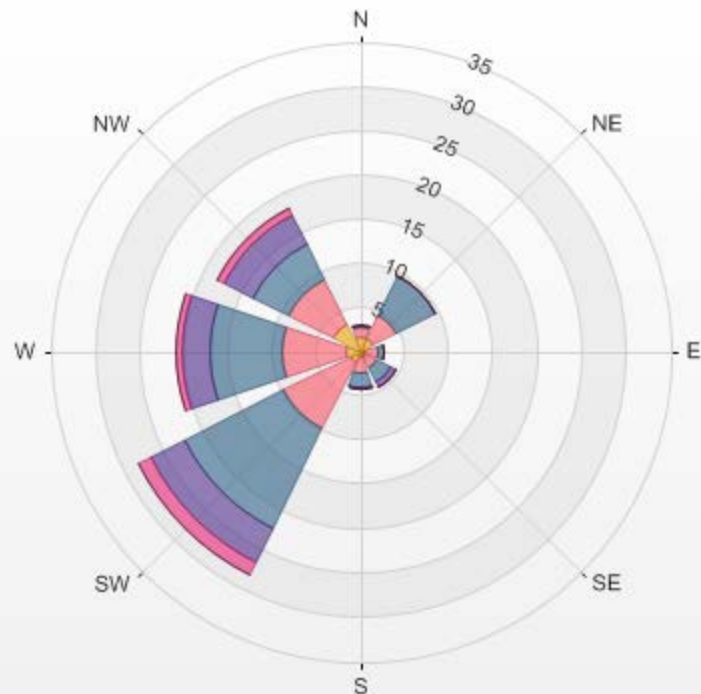


Wind: LICA Bonnyville Monitor: WSP [kph] Monthly: 12/2016 Type: WindRose Direction: Blowing From (Wind Frequency) Based On 1 Hr.  
 Calm: 8.33% Valid Data: 100.00%

Direction	1.8-4.3	4.3-8.5	8.5-12.8	12.8-17.0	17.0-21.3	>21.3	Total
N	1.75	1.08	0.27	0	0	0	3.1
NE	1.61	2.96	4.97	0	0	0	9.54
E	0.4	1.61	0.67	0	0	0	2.68
SE	0.67	1.34	1.75	0.67	0.13	0	4.56
S	0.67	1.88	1.61	0.13	0	0	4.29
SW	1.34	8.47	12.5	4.3	1.61	0	28.22
W	1.75	7.26	8.06	3.23	0.67	0	20.97
NW	3.49	5.65	4.57	3.49	1.08	0	18.28
Summary	11.68	30.25	34.4	11.82	3.49	0	91.64

% Icon Classes (kph)	12		1.8-4.3	30		4.3-8.5	34		8.5-12.8	12		12.8-17.0	3		17.0-21.3	0		>21.3
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LICA Bonnyville 01/12/2016 00:00 - 31/12/2016 23:00 Calm: 8.33% Calm Wind Avg Speed: 0.84(kph)



***WIND DIRECTION***



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Bonnyville Continuous Monitoring Station - December 2016

WIND DIRECTION Hourly Averages (WD)

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

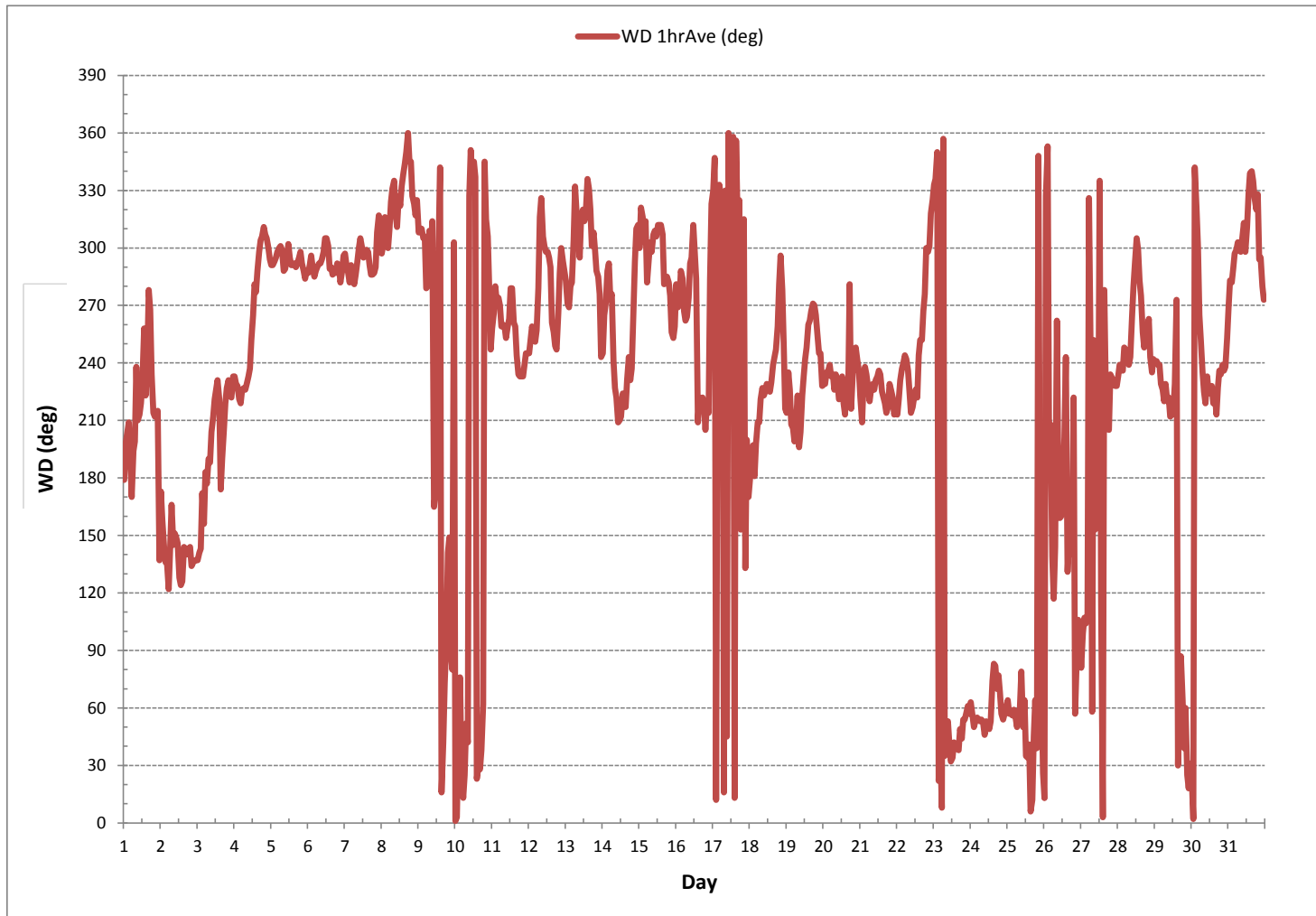
STATUS FLAG CODES

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:	January 26, 2016
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	744	hrs
STANDARD DEVIATION:	88		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	262 (W)	

WIND DIRECTION Hourly Averages (WD)



***STANDARD DEVIATION WIND DIRECTION***



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION  
Bonnyville Continuous Monitoring Station - December 2016

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	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	15	20	15	23	27	27	27	19	20	14	13	17	19	21	24	28	25	22	23	17	29	18	23	19	24	
2	17	13	13	14	13	14	12	11	12	10	12	17	16	16	15	12	12	13	12	13	13	14	13	13	24	
3	13	12	12	13	15	11	15	11	10	11	10	15	15	15	9	7	8	7	8	9	11	13	11	13	24	
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17	2	7	11	6	9	6	14	15	11	32	15	21	17	24	21	15	8	15	31	34	48	43	20	12	24	
18	21	11	9	9	7	7	9	10	14	13	14	14	14	15	15	15	15	17	17	17	15	14	12	8	24	
19	7	12	13	9	7	9	8	14	9	11	13	14	16	18	19	19	19	19	18	18	16	13	15	11	24	
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27	19	14	16	40	53	33	26	44	31	45	63	46	23	36	14	33	20	5	7	13	13	13	13	24		
28	13	13	12	13	17	15	14	13	14	18	17	16	14	12	16	15	17	16	16	17	17	15	12	14	24	
29	12	13	12	11	11	10	10	10	8	9	10	6	9	19	22	17	20	23	19	20	24	23	23	16	24	
30	19	16	10	8	13	14	20	15	10	10	11	12	12	16	12	12	6	11	12	12	13	13	12	16	24	
31	17	14	15	14	13	13	14	13	14	13	14	15	13	12	13	12	11	10	11	13	13	13	15	16	24	

STATUS FLAG CODES

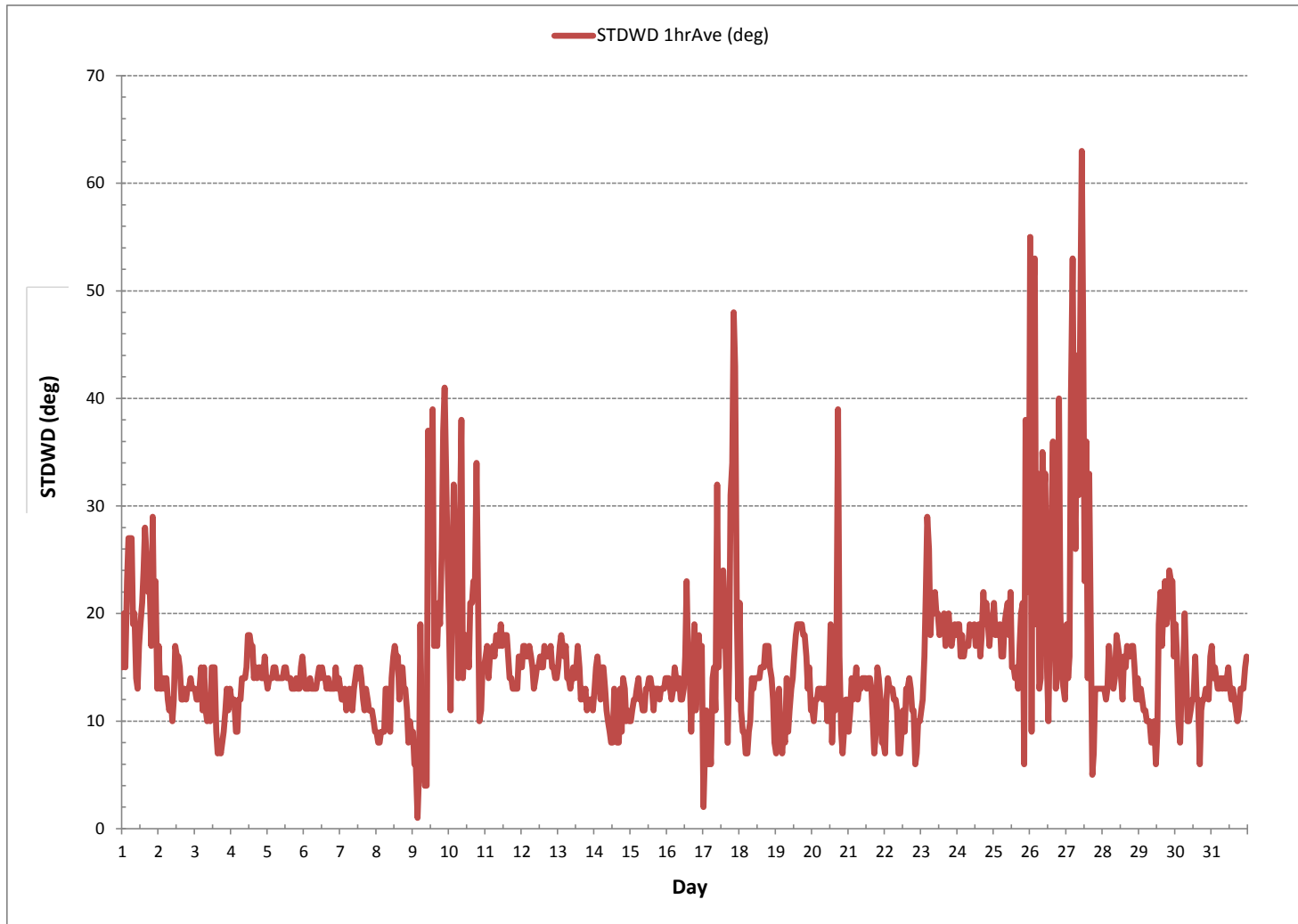
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION: January 26, 2016

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 744 hrs



STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



***APPENDIX II***  
***NON-CONTINUOUS MONITORING DATA RESULTS***

## ***VOC RESULTS***

**Maxxam Analytics**

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6200  
 Location: Bonnyville - AER Canister ID: FE-03 (A.V) 55623  
 Station ID: LICA 37 Installation Date/Time (mst): Nov 28, 2016 @ 13:42  
 Sample ID: LICA/VOC/Bonnyville/Dec 02, 2016 Removal Date/Time (mst): Dec 05, 2016 @ 13:31

**Date and Time Information**

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>Dec 02, 2016</u>	<u>00:00</u>	<u>00:00</u> <u>Dec 03, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.0</u>	<u>+19.4</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>4.94</u>	<u>26</u>

**Deployment/Collection and Maintenance Checklist**

Initial leak check deployment vacuum (in. Hg) = — @ — mst  
 Final leak check deployment vacuum (in. Hg) = — @ — mst  
 Total leak rate = — psi over — minutes  
 Timer reset to zero prior to sampling? YES (yes/no)  
 Date of last flow calibration: Oct 07, 2016 (due every 3 months)  
 Last date of sample line & fitting replacement: Sep 28, 2016 (due every 6 months)

**\*\*Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required\*\***

Comments: Date of last audit - Oct 07, 2016

Deployment Technician Signature: Alex Yankov

Collection Technician Signature: Alex Yankov Date: Dec 05, 2016

**Sample ID: 16120042-001**

Customer ID: LICA  
 Cust Samp ID: LICA/VOC/Bonnyville/Dec 2, 2016



## Volatile Organics Data Results

Date: December 2, 2016  
Canister ID: S5623

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.03
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.03
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	< 0.01
2,2-Dimethylbutane	0.01
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	0.02
2,4-Dimethylpentane	< 0.01
2-Methylheptane	0.01
2-Methylhexane	0.04
2-Methylpentane	0.08
3-Methylheptane	< 0.02
3-Methylhexane	0.03
3-Methylpentane	0.05
Acetone	2.60
Acrolein	< 0.3
Benzene	0.44
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	0.22
Carbon tetrachloride	0.13
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.02
Chloromethane	0.50
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.04
cis-2-Pentene	< 0.02
Cyclohexane	0.04
Cyclopentane	0.02
Dibromochloromethane	< 0.01
Ethanol	0.60
Ethyl acetate	< 0.4
Ethylbenzene	0.02
Freon-11	0.35
Freon-113	0.06

## Volatile Organics Data Results

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Date: December 2, 2016  
Canister ID: S5623

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.73
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.73
Isopentane	0.46
Isoprene	< 0.01
Isopropyl alcohol	2.10
Isopropylbenzene	< 0.01
m,p-Xylene	0.08
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.05
Methylcyclopentane	0.05
Methylene chloride	< 0.3
n-Butane	1.15
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.04
n-Hexane	0.10
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.30
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	0.03
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.27
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	< 0.01
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

**Maxxam Analytics**

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6200  
 Location: Bonnyville - AER Canister ID: S5643  
 Station ID: LICA 37 Installation Date/Time (mst): Dec 05, 2016 @ 13:31  
 Sample ID: LICA/VOC/Bonnyville/Dec 08, 2016 Removal Date/Time (mst): Dec 12, 2016 @ 19:09

**Date and Time Information**

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
<u>Dec 08, 2016</u>	<u>00:00</u>	<u>00:00</u> <u>Dec 09, 2016</u>	<u>24.0</u>

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.0</u>	<u>+18.5</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>4.94</u>	<u>26</u>

**Deployment/Collection and Maintenance Checklist**

Initial leak check deployment vacuum (in. Hg) = — @ — mst  
 Final leak check deployment vacuum (in. Hg) = — @ — mst  
 Total leak rate = — psi over — minutes  
 Timer reset to zero prior to sampling? YES (yes/no)  
 Date of last flow calibration: Oct 07, 2016 (due every 3 months)  
 Last date of sample line & fitting replacement: Sep 28, 2016 (due every 6 months)

**\*\*Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required\*\***

Comments: Date of last audit - Oct 07, 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Dec 12, 2016

**Sample ID: 16120122-001**

Customer ID: LICA  
 Cust Samp ID: LICA/VOC/Bonnyville/ Dec 8, 2016



## Volatile Organics Data Results

Date: December 8, 2016  
Canister ID: S5643

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.04
1,2-Dichloropropane	0.01
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.16
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	< 0.01
2,2-Dimethylbutane	0.01
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	0.03
2,4-Dimethylpentane	< 0.01
2-Methylheptane	0.01
2-Methylhexane	0.04
2-Methylpentane	0.09
3-Methylheptane	< 0.02
3-Methylhexane	0.04
3-Methylpentane	0.05
Acetone	1.20
Acrolein	< 0.3
Benzene	0.64
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	0.01
Carbon tetrachloride	0.17
Chlorobenzene	< 0.02
Chloroethane	0.02
Chloroform	0.04
Chloromethane	0.70
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	< 0.02
cis-2-Pentene	< 0.02
Cyclohexane	0.11
Cyclopentane	0.02
Dibromochloromethane	< 0.01
Ethanol	0.40
Ethyl acetate	< 0.4
Ethylbenzene	0.03
Freon-11	0.46
Freon-113	0.04



## Volatile Organics Data Results

Date: December 8, 2016  
Canister ID: S5643

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.03
Freon-12	0.97
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.49
Isopentane	0.27
Isoprene	< 0.01
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	0.17
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.16
Methylcyclopentane	0.09
Methylene chloride	< 0.3
n-Butane	0.76
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.06
n-Hexane	0.11
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.20
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	0.08
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.86
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	< 0.01
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Maxxam Analytics

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6200  
 Location: Bonnyville - AER Canister ID: 14717  
 Station ID: LICA 37 Installation Date/Time (mst): Dec 12, 2016 @ 16:09  
 Sample ID: LICA/Bonnyville/VOC/Dec 14, 2016 Removal Date/Time (mst): Dec 19, 2016 @ 18:47

Date and Time Information

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

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>- 27.0</u>	<u>+ 19.5</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>4.94</u>	<u>26</u>

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) = - @ - mst  
 Final leak check deployment vacuum (in. Hg) = - @ - mst  
 Total leak rate = - psi over - minutes  
 Timer reset to zero prior to sampling? YES (yes/no)  
 Date of last flow calibration: Oct 07, 2016 (due every 3 months)  
 Last date of sample line & fitting replacement: Sep 28, 2016 (due every 6 months)

**\*\*Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required\*\***

Comments: Date of last audit - Oct 07, 2016

The canister is not equipped with a pressure gauge  
The data was taken from the pressure gauge on the sampler

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Dec 19, 2016

Sample ID: 16120203-001

Customer ID: LICA  
 Cust Samp ID: LICA/VOC/Bonnyville/Dec 14, 2016



## Volatile Organics Data Results

Date: December 14, 2016  
Canister ID: 14717

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.03
1,2-Dichloropropane	0.02
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.06
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	0.01
2,2-Dimethylbutane	< 0.01
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	< 0.02
2,4-Dimethylpentane	< 0.01
2-Methylheptane	< 0.01
2-Methylhexane	0.02
2-Methylpentane	0.04
3-Methylheptane	< 0.02
3-Methylhexane	0.02
3-Methylpentane	0.03
Acetone	1.50
Acrolein	< 0.3
Benzene	0.16
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	< 0.01
Carbon tetrachloride	0.15
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.04
Chloromethane	0.77
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.04
cis-2-Pentene	< 0.02
Cyclohexane	< 0.02
Cyclopentane	0.01
Dibromochloromethane	0.02
Ethanol	1.00
Ethyl acetate	< 0.4
Ethylbenzene	0.01
Freon-11	0.44
Freon-113	0.08

## Volatile Organics Data Results

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Date: December 14, 2016  
Canister ID: 14717

PARAMETERS	CONCENTRATION (PPB)
Freon-113	0.08
Freon-114	0.03
Freon-12	0.94
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.65
Isopentane	0.28
Isoprene	< 0.01
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	< 0.03
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.03
Methylcyclopentane	0.03
Methylene chloride	< 0.3
n-Butane	1.09
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.03
n-Hexane	0.05
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.20
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	< 0.01
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.07
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.03
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Maxxam Analytics

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6200  
 Location: Bonnyville - AER Canister ID: 15007  
 Station ID: LICA 37 Installation Date/Time (mst): Dec 19, 2016 @ 18:47  
 Sample ID: LICA/VOC/Bonnyville/Dec 20, 2016 Removal Date/Time (mst): Dec 22, 2016 @ 13:49

Date and Time Information

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

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>-27.9</u>	<u>+18.5</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>4.94</u>	<u>26</u>

Deployment/Collection and Maintenance Checklist

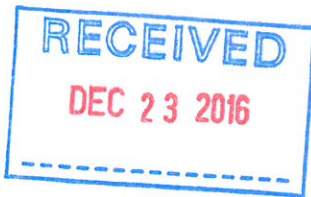
Initial leak check deployment vacuum (in. Hg) = - @ - mst  
 Final leak check deployment vacuum (in. Hg) = - @ - mst  
 Total leak rate = - psi over - minutes  
 Timer reset to zero prior to sampling? YES (yes/no)  
 Date of last flow calibration: Oct 07, 2016 (due every 3 months)  
 Last date of sample line & fitting replacement: Sep 28, 2016 (due every 6 months)

**\*\*Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required\*\***

Comments: Date of last audit - Oct 07, 2016

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Dec 22, 2016



Sample ID: 16120222-003  
 Customer ID: LICA  
 Cust Samp ID: LICA/VOC/Bonnyville/Dec 20, 2016

## Volatile Organics Data Results

Date: December 20, 2016  
Canister ID: 15007

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.05
1,2-Dichloropropane	0.03
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.06
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	0.01
2,2-Dimethylbutane	< 0.01
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	< 0.02
2,4-Dimethylpentane	< 0.01
2-Methylheptane	< 0.01
2-Methylhexane	0.03
2-Methylpentane	0.09
3-Methylheptane	< 0.02
3-Methylhexane	0.02
3-Methylpentane	0.20
Acetone	1.30
Acrolein	< 0.3
Benzene	0.11
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	< 0.01
Carbon tetrachloride	0.15
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.14
Chloromethane	0.73
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.03
cis-2-Pentene	< 0.02
Cyclohexane	0.04
Cyclopentane	0.02
Dibromochloromethane	0.02
Ethanol	2.60
Ethyl acetate	< 0.4
Ethylbenzene	< 0.01
Freon-11	0.43
Freon-113	0.08

## Volatile Organics Data Results

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Date: December 20, 2016  
Canister ID: 15007

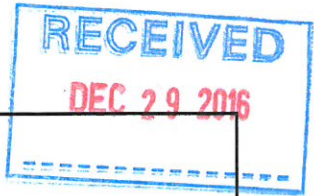
PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.03
Freon-12	0.92
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.92
Isopentane	0.45
Isoprene	< 0.01
Isopropyl alcohol	0.40
Isopropylbenzene	< 0.01
m,p-Xylene	< 0.03
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.03
Methylcyclopentane	0.27
Methylene chloride	7.90
n-Butane	1.74
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.03
n-Hexane	1.17
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.50
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	0.01
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.06
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.05
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02



Sample ID: 16120231-001

Customer ID: LICA

Cust Samp ID: LICAVOC/Bonnyville/Dec 26, 2016



Maxxam Analytics

VOC Sample Collection Data Sheet Alberta Air FCD AIR FCD-01320 / 2

Client: LICA Sampler S/N: 6200  
 Location: Bonnyville -AER Canister ID: 2489  
 Station ID: LICA 37 Installation Date/Time (mst): Dec 22, 2016 @ 13:49  
 Sample ID: LICA/VOC/Bonnyville/Dec 26, 2016 Removal Date/Time (mst): Dec 27, 2016 @ 12:19

Date and Time Information

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

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
<u>- 27.1</u>	<u>+18.5</u>

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
<u>10.0</u>	<u>4.94</u>	<u>26</u>

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) = — @ — mst  
 Final leak check deployment vacuum (in. Hg) = — @ — mst  
 Total leak rate = — psi over — minutes  
 Timer reset to zero prior to sampling? YES (yes/no)  
 Date of last flow calibration: Oct 07, 2016 (due every 3 months)  
 Last date of sample line & fitting replacement: Sep 28, 2016 (due every 6 months)

\*\*Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required\*\*

Comments: Date of last audit - Oct 07, 2016  
The canister is not equipped with a pressure gauge.

Deployment Technician Signature: Alex Yakupov  
 Collection Technician Signature: Alex Yakupov Date: Dec 27, 2016



## Volatile Organics Data Results

Date: December 26, 2016  
Canister ID: 2489

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.02
1,1,2,2-Tetrachloroethane	< 0.02
1,1,2-Trichloroethane	< 0.02
1,1-Dichloroethane	< 0.02
1,1-Dichloroethylene	< 0.04
1,2,3-Trimethylbenzene	< 0.05
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	< 0.03
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.04
1,2-Dichloropropane	0.02
1,3,5-Trimethylbenzene	< 0.02
1,3-Butadiene	0.04
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.14
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	0.03
2,2-Dimethylbutane	0.03
2,3,4-Trimethylpentane	0.01
2,3-Dimethylbutane	0.06
2,3-Dimethylpentane	0.06
2,4-Dimethylpentane	0.02
2-Methylheptane	0.03
2-Methylhexane	0.06
2-Methylpentane	0.17
3-Methylheptane	< 0.02
3-Methylhexane	0.06
3-Methylpentane	0.10
Acetone	1.70
Acrolein	< 0.3
Benzene	0.25
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	0.02
Carbon tetrachloride	0.13
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.04
Chloromethane	0.89
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.05
cis-2-Pentene	< 0.02
Cyclohexane	0.11
Cyclopentane	0.05
Dibromochloromethane	0.02
Ethanol	2.70
Ethyl acetate	< 0.4
Ethylbenzene	0.02
Freon-11	0.39
Freon-113	0.07

## Volatile Organics Data Results

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Date: December 26, 2016  
Canister ID: 2489

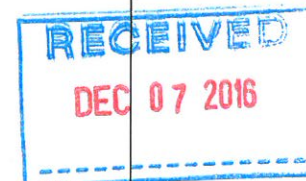
PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.03
Freon-12	0.92
Hexachloro-1,3-butadiene	< 0.50
Isobutane	1.48
Isopentane	0.95
Isoprene	< 0.01
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	0.06
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	< 0.3
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.18
Methylcyclopentane	0.13
Methylene chloride	< 0.3
n-Butane	3.21
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.08
n-Hexane	0.20
n-Nonane	0.02
n-Octane	0.03
n-Pentane	0.60
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	0.03
o-Xylene	0.03
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.15
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.07
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

## ***PAH RESULTS***

Customer ID: LICA

Cust Samp ID: LICA/PUF/Bonnyville/Dec 2, 2016

TISCH PUF PLUS Sample Collection Data Sheet			
Client:	<u>LICA</u>	Puff S/N:	<u>TE-03</u>
Location:	<u>Bonnyville - AER</u>	Motor S/N:	<u>1139/100-1015</u>
Station ID:	<u>LICA 37</u>	Installation Date/Time:	<u>NOV 28, 2016 / 13:52</u>
Field Sample ID:	<u>LICA/PUF/Bonnyville/Dec 02, 2016</u>	Removal Date/Time:	<u>Dec 05/2016 / 13:22</u>
Sample Data Collection Information			
Sample Date:	<u>Dec 02, 2016</u>	Average Pressure (mmHg)	<u>703</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q <sub>std</sub> )	<u>229</u>
End Time (mst):	<u>00:00 Dec 03, 2016</u>	Average Temperature (°C)	<u>-4.5°</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (V <sub>std</sub> m <sup>3</sup> )	<u>330.16</u>
Sample Recovery Checklist			
(circle one)			
Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES		NO
Average temperature appears correct?	<input checked="" type="radio"/> YES		NO
Average pressure appears correct?	<input checked="" type="radio"/> YES		NO
Any error messages? (if yes list below)	YES		<input checked="" type="radio"/> NO
Sample duration 24 hours?	<input checked="" type="radio"/> YES		NO
Date of last calibration/audit:	<u>Oct 07, 2016</u>		
Other observations?	<u>n/a</u>		
Deployed By:	<u>Alex Yakupov</u>		
Collected By:	<u>Alex Yakupov</u>		<u>Dec 05, 2016</u>



## Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

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Date: December 2 , 2016  
PUF S/N: TE-03

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.14
2-Methylnaphthalene	0.21
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.09
Acenaphthylene	0.06
Acridine	< 0.01
Anthracene	< 0.01
Benzo(a)anthracene	0.04
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	0.05
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	< 0.01
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.05
Fluorene	0.08
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.11
Perylene	< 0.01
Phenanthrene	0.17
Pyrene	0.06
Retene	0.02

Sample ID: 16120122-002

AIR FCD-01321/2

Customer ID: LICA

Cust Samp ID: LICA/PUF/Bonnyville/ Dec 8, 2016

### TISCH PUF PLUS Sample Collection Data Sheet

Client:	<u>LICA</u>	Puf+ S/N:	<u>TE-09</u>
Location:	<u>Bonnyville - AER</u>	Motor S/N:	<u>1139 / 100 - 1015</u>
Station ID:	<u>LICA 37</u>	Installation Date/Time:	<u>Dec 05, 2016 / 13:22</u>
Field Sample ID:	<u>LICA/PUF/Bonnyville/Dec 08, 2016</u>	Removal Date/Time:	<u>Dec 12, 2016 / 16:19</u>

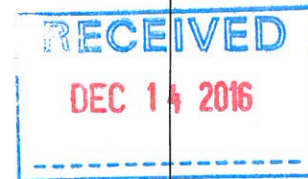
### Sample Data Collection Information

Sample Date:	<u>Dec 08, 2016</u>	Average Pressure (mmHg)	<u>705</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q <sub>std</sub> )	<u>229</u>
End Time (mst):	<u>00:00 Dec 09, 2016</u>	Average Temperature (°C)	<u>-22.6</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (V <sub>std</sub> m <sup>3</sup> )	<u>330.14</u>

### Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average temperature appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average pressure appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Any error messages? (if yes list below)	YES	<input checked="" type="radio"/> NO
Sample duration 24 hours?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Date of last calibration/audit:	<u>Oct 07, 2016</u>	
Other observations?	<u>1/9</u>	



Deployed By:	<u>Alex Yakupov</u>	
Collected By:	<u>Alex Yakupov</u>	Date: <u>Dec 12, 2016</u>

## Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: December 8, 2016  
PUF S/N: TE-09

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.36
2-Methylnaphthalene	0.74
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.08
Acenaphthylene	0.06
Acridine	< 0.01
Anthracene	0.04
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	0.03
Benzo(c)phenanthrene	0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	< 0.01
Chrysene	0.02
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	0.02
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.07
Fluorene	0.10
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.87
Perylene	< 0.01
Phenanthrene	0.29
Pyrene	0.04
Retene	0.15

Sample ID: 16120203-002

AIR FCD-01321/2

Customer ID: LICA  
Cust Samp ID: LICA/PUF/Bonnyville/Dec 14, 2016

TISCH PUF PLUS Sample Collection Data Sheet			
Client:	<u>LICA</u>	Puf+ S/N:	<u>A13-02</u>
Location:	<u>Bonnyville - AER</u>	Motor S/N:	<u>1139/100-1015</u>
Station ID:	<u>LICA 37</u>	Installation Date/Time:	<u>Dec 12, 2016/16:19</u>
Field Sample ID:	<u>LICA / PUF / Bonnyville / Dec 14, 2016</u>	Removal Date/Time:	<u>Dec 19, 2016 / 19:03</u>
Sample Data Collection Information			
Sample Date:	<u>Dec 14, 2016</u>	Average Pressure (mmHg)	<u>692</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q <sub>std</sub> )	<u>229</u>
End Time (mst):	<u>00:00 Dec 15, 2016</u>	Average Temperature (°C)	<u>-17.5</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (V <sub>std</sub> m <sup>3</sup> )	<u>330.16</u>
Sample Recovery Checklist			
(circle one)			
Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES		NO
Average temperature appears correct?	<input checked="" type="radio"/> YES		NO
Average pressure appears correct?	<input checked="" type="radio"/> YES		NO
Any error messages? (if yes list below)	YES		<input checked="" type="radio"/> NO
Sample duration 24 hours?	<input checked="" type="radio"/> YES		NO
Date of last calibration/audit:	<u>Oct 07, 2016</u>		
Other observations?	<u>n/a</u>		
Deployed By:	<u>Alex Yakupov</u>		
Collected By:	<u>Alex Yakupov</u>	Date:	<u>Dec 19, 2016</u>





## Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: December 14, 2016  
PUF S/N: A13-02

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.73
2-Methylnaphthalene	1.20
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.15
Acenaphthylene	0.18
Acridine	< 0.01
Anthracene	0.10
Benzo(a)anthracene	0.03
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	0.08
Benzo(c)phenanthrene	0.02
Benzo(e)pyrene	0.02
Benzo(ghi)perylene	< 0.01
Chrysene	0.07
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	0.02
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.21
Fluorene	0.34
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	1.87
Perylene	0.01
Phenanthrene	0.85
Pyrene	0.14
Retene	1.51

TISCH PUF PLUS Sample Collection Data Sheet			
Client:	LICA	Puf+ S/N:	TE-04
Location:	Bonnyville - AER	Motor S/N:	1139 / 100-1015
Station ID:	LICA 37	Installation Date/Time:	Dec 19, 2016 / 19:03
Field Sample ID:	LICA/PUF/Bonnyville/Dec 20, 2016	Removal Date/Time:	Dec 22, 2016 / 14:01
Sample Data Collection Information			
Sample Date:	Dec 20, 2016	Average Pressure (mmHg)	695
Start Time (mst):	00:00	Average Flow (Q <sub>std</sub> )	229
End Time (mst):	00:00 Dec 21, 2016	Average Temperature (°C)	-6.6
Elapsed Time (Hours):	24.0	Volume (V <sub>std</sub> m <sup>3</sup> )	330.20
Sample Recovery Checklist			
(circle one)			
Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Average temperature appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Average pressure appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Any error messages? (if yes list below)	<input type="radio"/> YES	<input checked="" type="radio"/> NO	
Sample duration 24 hours?	<input checked="" type="radio"/> YES	<input type="radio"/> NO	
Date of last calibration/audit:	Oct 07, 2016		
Other observations?	n/a		
<div style="border: 2px solid blue; padding: 5px; display: inline-block; transform: rotate(-2deg);"> <p style="margin: 0;">RECEIVED</p> <p style="margin: 0; color: red;">DEC 23 2016</p> </div>			
<p><b>Sample ID:</b> 16120222-004</p> <p><b>Customer ID:</b> LICA</p> <p><b>Cust Samp ID:</b> LICA/PUF/Bonnyville/Dec 20, 2016</p>			
Deployed By:	Alex Yakupov		
Collected By:	Alex Yakupov		Date: Dec 22, 2016

## Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

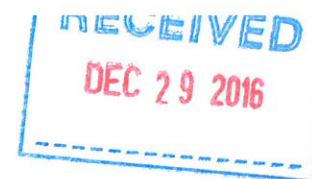
Date: December 20, 2016  
PUF S/N: TE-04

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.38
2-Methylnaphthalene	0.66
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.07
Acenaphthylene	0.08
Acridine	< 0.01
Anthracene	0.04
Benzo(a)anthracene	0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	< 0.01
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	< 0.01
Benzo(ghi)perylene	0.01
Chrysene	< 0.01
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.07
Fluorene	0.12
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.46
Perylene	< 0.01
Phenanthrene	0.3
Pyrene	0.05
Retene	0.06

Sample ID: 16120231-002

Customer ID: LICA

Cust Samp ID: LICA/PUF/Bonnyville/Dec 26, 2016



TISCH PUF PLUS Sample Collection Data Sheet

Client:	<u>LICA</u>	Puf+ S/N:	<u>TE-02</u>
Location:	<u>Bonnyville - AER</u>	Motor S/N:	<u>1139/100-1015</u>
Station ID:	<u>LICA 37</u>	Installation Date/Time:	<u>Dec 22, 2016/14:01</u>
Field Sample ID:	<u>LICA/PUF/Bonnyville/Dec 26, 2016</u>	Removal Date/Time:	<u>Dec 27, 2016/12:41</u>

Sample Data Collection Information

Sample Date:	<u>Dec 26, 2016</u>	Average Pressure (mmHg)	<u>704</u>
Start Time (mst):	<u>00:00</u>	Average Flow (Q <sub>std</sub> )	<u>229</u>
End Time (mst):	<u>00:00 Dec 27, 2016</u>	Average Temperature (°C)	<u>-19.8°</u>
Elapsed Time (Hours):	<u>24.0</u>	Volume (V <sub>std</sub> m <sup>3</sup> )	<u>330.17</u>

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average temperature appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Average pressure appears correct?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Any error messages? (if yes list below)	YES	<input checked="" type="radio"/> NO
Sample duration 24 hours?	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Date of last calibration/audit:	<u>Oct 07, 2016</u>	
Other observations?	<u>na</u>	

Deployed By: Alex Yakupov

Collected By: Alex Yakupov Date Dec 27, 2016

## Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: December 26, 2016  
PUF S/N: TE-02

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.59
2-Methylnaphthalene	0.98
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.09
Acenaphthylene	0.20
Acridine	< 0.01
Anthracene	0.06
Benzo(a)anthracene	0.03
Benzo(a)pyrene	0.02
Benzo(b,j,k)fluoranthene	0.02
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	0.02
Benzo(ghi)perylene	0.03
Chrysene	0.04
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	0.05
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.11
Fluorene	0.17
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	1.15
Perylene	< 0.01
Phenanthrene	0.51
Pyrene	0.08
Retene	0.15

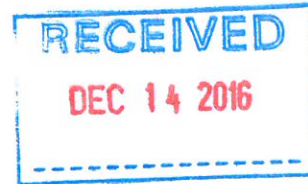
***NMHC CANISTER RESULTS***

Sample ID: 16120122-005

AIR FCD-01320/2

Customer ID: LICA  
Cust Samp ID: LICA/NMHC  
VOC/Bonnyville/ Dec 8,  
2016

# Maxxam



## VOC Sample Collection Data Sheet

Client: LICA Sampler S/N: n/a  
 Location: Bonnyville - AER Canister ID: 1136  
 Station ID: LICA 37 Canister Installation Date/Time: Dec 01, 2016 / 10:30  
 Field Sample ID: LICA/NMHC VOC/Bonnyville/ Canister Removal Date/Time: Dec 12, 2016 / 15:54  
Dec 7, 2016

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
<u>Dec 7, 2016</u>	<u>06:35</u>	<u>n/a</u>	<u>n/a</u>

Flow Settings		
Meter Reading (sccm)	Pot Set Pt.	Pump Pressure Setting (psig)
<u>n/a</u>	<u>n/a</u>	<u>n/a</u>

Canister Information	
Initial Canister Vacuum (in Hg)	Final Canister Vacuum (in Hg)
<u>-27.9</u>	<u>-9.0</u>

Canister valve open prior to sampling?: YES / NO

Canister valve closed prior to disconnection?: YES / NO

**Comments:**

NMHC sampling canister  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Technician Signature: \_\_\_\_\_

Alex Yakupov

Date: Dec 12, 2016



## Volatile Organics Data Results (NMHC Canister System)

Date: December 7, 2016  
Canister ID: 1136

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.03
1,1,2,2-Tetrachloroethane	< 0.03
1,1,2-Trichloroethane	< 0.03
1,1-Dichloroethane	< 0.03
1,1-Dichloroethylene	< 0.06
1,2,3-Trimethylbenzene	< 0.08
1,2,4-Trichlorobenzene	< 1.2
1,2,4-Trimethylbenzene	< 0.05
1,2-Dibromoethane	< 0.03
1,2-Dichlorobenzene	< 0.05
1,2-Dichloroethane	0.04
1,2-Dichloropropane	0.03
1,3,5-Trimethylbenzene	< 0.03
1,3-Butadiene	0.1
1,3-Dichlorobenzene	< 0.5
1,4-Dichlorobenzene	< 0.6
1,4-Dioxane	< 0.6
1-Butene	0.66
1-Hexene	0.07
1-Pentene	0.08
2,2,4-Trimethylpentane	0.11
2,2-Dimethylbutane	0.03
2,3,4-Trimethylpentane	0.05
2,3-Dimethylbutane	0.1
2,3-Dimethylpentane	0.23
2,4-Dimethylpentane	0.07
2-Methylheptane	0.06
2-Methylhexane	0.22
2-Methylpentane	0.41
3-Methylheptane	0.04
3-Methylhexane	0.17
3-Methylpentane	0.24
Acetone	1.8
Acrolein	< 0.5
Benzene	0.34
Benzyl chloride	< 0.6
Bromodichloromethane	< 0.03
Bromoform	< 0.03
Bromomethane	< 0.02
Carbon disulfide	0.67
Carbon tetrachloride	0.17
Chlorobenzene	< 0.03
Chloroethane	< 0.03
Chloroform	0.04
Chloromethane	0.67
cis-1,2-Dichloroethene	< 0.02
cis-1,3-Dichloropropene	< 0.06
cis-2-Butene	0.12
cis-2-Pentene	0.07
Cyclohexane	0.11
Cyclopentane	0.05
Dibromochloromethane	< 0.02
Ethanol	3
Ethyl acetate	< 0.6
Ethylbenzene	0.06
Freon-11	0.45
Freon-113	< 0.02



## Volatile Organics Data Results (NMHC Canister System)

Date: December 7, 2016  
Canister ID: 1136

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.03
Freon-12	1
Hexachloro-1,3-butadiene	< 0.76
Isobutane	1.02
Isopentane	1.42
Isoprene	0.03
Isopropyl alcohol	< 0.6
Isopropylbenzene	< 0.02
m,p-Xylene	0.21
m-Diethylbenzene	< 0.06
m-Ethyltoluene	< 0.12
Methyl butyl ketone	< 0.76
Methyl ethyl ketone	< 0.5
Methyl isobutyl ketone	< 0.6
Methyl methacrylate	< 0.11
Methyl tert butyl ether	< 0.05
Methylcyclohexane	0.23
Methylcyclopentane	0.31
Methylene chloride	< 0.5
n-Butane	2.93
n-Decane	< 0.09
n-Dodecane	< 0.6
n-Heptane	0.15
n-Hexane	0.22
n-Nonane	0.02
n-Octane	0.05
n-Pentane	0.5
n-Propylbenzene	< 0.08
n-Undecane	< 0.8
Naphthalene	< 0.8
o-Ethyltoluene	0.02
o-Xylene	0.09
p-Diethylbenzene	< 0.06
p-Ethyltoluene	< 0.11
Styrene	< 0.06
Tetrachloroethylene	< 0.06
Tetrahydrofuran	< 0.6
Toluene	0.48
trans-1,2-Dichloroethylene	< 0.02
trans-1,3-Dichloropropylene	< 0.06
trans-2-Butene	0.22
trans-2-Pentene	0.12
Trichloroethylene	< 0.06
Vinyl acetate	< 0.6
Vinyl chloride	< 0.03

Sample ID: 16120203-005

AIR FCD-01320/2

Customer ID: LICA  
Cust Samp ID: LICA/NMHC  
VOC/Bonnyville/Dec 17,  
2016

# Maxxam



## VOC Sample Collection Data Sheet

Client: LICA Sampler S/N: n/a  
 Location: Bonnyville - AER Canister ID: 2452  
 Station ID: LICA 37 Canister Installation Date/Time: Dec 18, 2016 / 15:54  
 Field Sample ID: LICA/NMHC VOC/Bonnyville/ Canister Removal Date/Time: Dec 19, 2016 / 18:32  
Dec 17, 2016

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
<u>Dec 17, 2016</u>	<u>10:10</u>	<u>n/a</u>	<u>n/a</u>

Flow Settings		
Meter Reading (scm)	Pot Set Pt.	Pump Pressure Setting (psig)
<u>n/a</u>	<u>n/a</u>	<u>n/a</u>

Canister Information	
Initial Canister Vacuum (in Hg)	Final Canister Vacuum (in Hg)
<u>-27.2</u>	<u>n/a</u>

*no pressure gauge*

Canister valve open prior to sampling?: YES / NO

Canister valve closed prior to disconnection?: YES / NO

**Comments:**

NMHC sampling canister

*The canister is not equipped with a pressure gauge*

Technician Signature:

Alex Yakupov

Date:

Dec 19, 2016

## Volatile Organics Data Results (NMHC Canister System)

Date: December 17, 2016  
Canister ID: 2452

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	0.04
1,1,2,2-Tetrachloroethane	< 0.03
1,1,2-Trichloroethane	< 0.03
1,1-Dichloroethane	< 0.03
1,1-Dichloroethylene	< 0.06
1,2,3-Trimethylbenzene	< 0.08
1,2,4-Trichlorobenzene	< 1.2
1,2,4-Trimethylbenzene	0.61
1,2-Dibromoethane	< 0.03
1,2-Dichlorobenzene	< 0.05
1,2-Dichloroethane	0.08
1,2-Dichloropropane	0.05
1,3,5-Trimethylbenzene	0.04
1,3-Butadiene	0.09
1,3-Dichlorobenzene	< 0.5
1,4-Dichlorobenzene	< 0.6
1,4-Dioxane	< 0.6
1-Butene	0.34
1-Hexene	< 0.03
1-Pentene	0.05
2,2,4-Trimethylpentane	0.05
2,2-Dimethylbutane	0.07
2,3,4-Trimethylpentane	0.04
2,3-Dimethylbutane	< 0.03
2,3-Dimethylpentane	0.08
2,4-Dimethylpentane	0.04
2-Methylheptane	0.03
2-Methylhexane	0.08
2-Methylpentane	0.15
3-Methylheptane	0.03
3-Methylhexane	0.08
3-Methylpentane	0.1
Acetone	1.8
Acrolein	< 0.5
Benzene	0.32
Benzyl chloride	< 0.6
Bromodichloromethane	0.03
Bromoform	< 0.03
Bromomethane	< 0.02
Carbon disulfide	0.21
Carbon tetrachloride	0.18
Chlorobenzene	< 0.03
Chloroethane	< 0.03
Chloroform	0.08
Chloromethane	0.73
cis-1,2-Dichloroethene	0.03
cis-1,3-Dichloropropene	< 0.06
cis-2-Butene	0.11
cis-2-Pentene	< 0.03
Cyclohexane	0.19
Cyclopentane	0.1
Dibromochloromethane	0.05
Ethanol	2.8
Ethyl acetate	< 0.6
Ethylbenzene	0.06
Freon-11	0.46
Freon-113	0.09

## Volatile Organics Data Results (NMHC Canister System)

Date: December 17, 2016  
Canister ID: 2452

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.06
Freon-12	0.95
Hexachloro-1,3-butadiene	< 0.76
Isobutane	2.04
Isopentane	0.82
Isoprene	0.02
Isopropyl alcohol	< 0.6
Isopropylbenzene	0.02
m,p-Xylene	0.11
m-Diethylbenzene	< 0.06
m-Ethyltoluene	< 0.12
Methyl butyl ketone	< 0.76
Methyl ethyl ketone	< 0.5
Methyl isobutyl ketone	< 0.6
Methyl methacrylate	< 0.11
Methyl tert butyl ether	< 0.05
Methylcyclohexane	0.25
Methylcyclopentane	0.19
Methylene chloride	< 0.5
n-Butane	3.04
n-Decane	< 0.09
n-Dodecane	< 0.6
n-Heptane	0.09
n-Hexane	0.15
n-Nonane	0.04
n-Octane	0.04
n-Pentane	0.4
n-Propylbenzene	< 0.08
n-Undecane	< 0.8
Naphthalene	< 0.8
o-Ethyltoluene	0.03
o-Xylene	0.06
p-Diethylbenzene	< 0.06
p-Ethyltoluene	< 0.11
Styrene	< 0.06
Tetrachloroethylene	0.18
Tetrahydrofuran	< 0.6
Toluene	0.19
trans-1,2-Dichloroethylene	0.03
trans-1,3-Dichloropropylene	< 0.06
trans-2-Butene	0.15
trans-2-Pentene	0.04
Trichloroethylene	< 0.06
Vinyl acetate	< 0.6
Vinyl chloride	0.05

Sample ID: 17010017-004

Customer ID: LICA

Cust Samp ID: LICA/NMHCVOC/Bonnyville /Dec 31, 2016



# Maxxam

## VOC Sample Collection Data Sheet

Client: LICA  
Location: Bonnyville - AER  
Station ID: LICA 37  
Field Sample ID: LICA/NMHC VOC/Bonnyville/  
Dec 31, 2016

Sampler S/N: n/a  
Canister ID: 14392  
Canister Installation Date/Time: December 19, 2016 / 18:34  
Canister Removal Date/Time: January 04, 2017 / 11:49

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
<u>Dec 31, 2016</u>	<u>05:40</u>	<u>n/a</u>	<u>n/a</u>

Flow Settings		
Meter Reading (sccm)	Pot Set Pt.	Pump Pressure Setting (psig)
<u>n/a</u>	<u>n/a</u>	<u>n/a</u>

Canister Information	
Initial Canister Vacuum (inHg)	Final Canister Vacuum (inHg)
<u>-27.0</u>	<u>n/a</u>

*the canister is not equipped with a pressure gauge.*

Canister valve open prior to sampling?: YES / NO

Canister valve closed prior to disconnection?: YES / NO

Comments:

NMHC canister

Technician Signature: Alex Yakupov

Date: Jan 04, 2017

## Volatile Organics Data Results (NMHC Canister System)

Date: December 31, 2016  
Canister ID: 14992

PARAMETERS	CONCENTRATION (PPB)
1,1,1-Trichloroethane	< 0.03
1,1,2,2-Tetrachloroethane	< 0.03
1,1,2-Trichloroethane	< 0.03
1,1-Dichloroethane	< 0.03
1,1-Dichloroethylene	< 0.05
1,2,3-Trimethylbenzene	< 0.07
1,2,4-Trichlorobenzene	< 1.1
1,2,4-Trimethylbenzene	< 0.04
1,2-Dibromoethane	< 0.03
1,2-Dichlorobenzene	< 0.04
1,2-Dichloroethane	0.04
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.03
1,3-Butadiene	< 0.03
1,3-Dichlorobenzene	< 0.4
1,4-Dichlorobenzene	< 0.5
1,4-Dioxane	< 0.5
1-Butene	0.13
1-Hexene	< 0.03
1-Pentene	< 0.01
2,2,4-Trimethylpentane	0.02
2,2-Dimethylbutane	0.01
2,3,4-Trimethylpentane	0.02
2,3-Dimethylbutane	< 0.03
2,3-Dimethylpentane	< 0.03
2,4-Dimethylpentane	< 0.01
2-Methylheptane	< 0.01
2-Methylhexane	0.04
2-Methylpentane	0.07
3-Methylheptane	< 0.03
3-Methylhexane	0.03
3-Methylpentane	0.06
Acetone	2.4
Acrolein	< 0.4
Benzene	0.12
Benzyl chloride	< 0.5
Bromodichloromethane	< 0.03
Bromoform	< 0.03
Bromomethane	< 0.01
Carbon disulfide	< 0.01
Carbon tetrachloride	0.17
Chlorobenzene	< 0.03
Chloroethane	< 0.03
Chloroform	0.04
Chloromethane	0.9
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.05
cis-2-Butene	0.05
cis-2-Pentene	< 0.03
Cyclohexane	0.03
Cyclopentane	0.03
Dibromochloromethane	0.03
Ethanol	1.3
Ethyl acetate	< 0.5
Ethylbenzene	0.01
Freon-11	0.47
Freon-113	0.07

## Volatile Organics Data Results (NMHC Canister System)

Date: December 31, 2016  
Canister ID: 14992

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.03
Freon-12	1.04
Hexachloro-1,3-butadiene	< 0.68
Isobutane	0.67
Isopentane	0.46
Isoprene	< 0.01
Isopropyl alcohol	< 0.5
Isopropylbenzene	< 0.01
m,p-Xylene	< 0.04
m-Diethylbenzene	< 0.05
m-Ethyltoluene	< 0.11
Methyl butyl ketone	< 0.68
Methyl ethyl ketone	< 0.4
Methyl isobutyl ketone	< 0.5
Methyl methacrylate	< 0.09
Methyl tert butyl ether	< 0.04
Methylcyclohexane	0.07
Methylcyclopentane	0.08
Methylene chloride	0.7
n-Butane	1.3
n-Decane	< 0.08
n-Dodecane	< 0.5
n-Heptane	0.04
n-Hexane	1.04
n-Nonane	< 0.01
n-Octane	< 0.03
n-Pentane	0.2
n-Propylbenzene	< 0.07
n-Undecane	< 0.7
Naphthalene	< 0.7
o-Ethyltoluene	< 0.01
o-Xylene	< 0.01
p-Diethylbenzene	< 0.05
p-Ethyltoluene	< 0.09
Styrene	< 0.05
Tetrachloroethylene	< 0.05
Tetrahydrofuran	< 0.5
Toluene	0.06
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.05
trans-2-Butene	0.04
trans-2-Pentene	< 0.03
Trichloroethylene	< 0.05
Vinyl acetate	< 0.5
Vinyl chloride	< 0.03

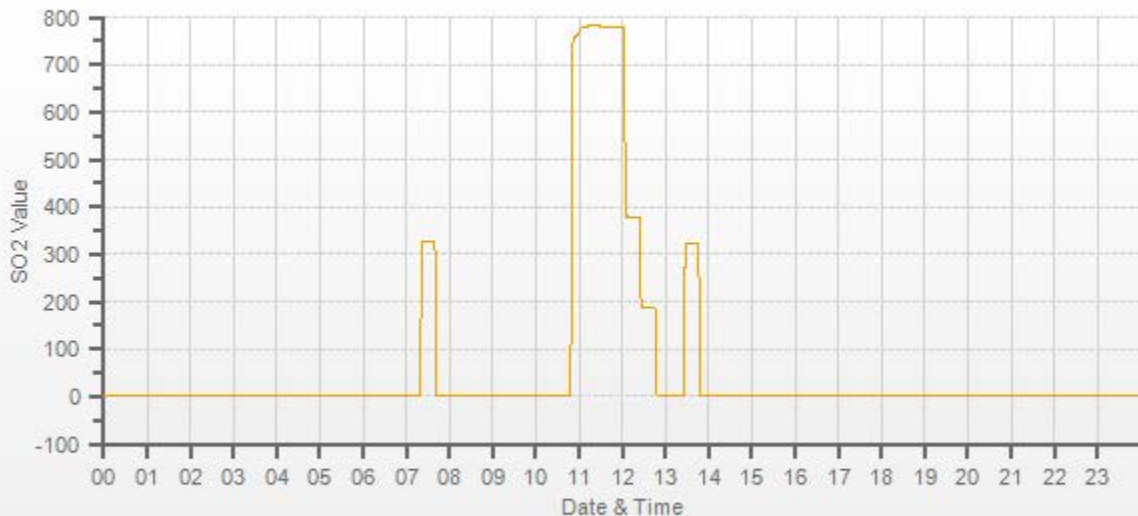
***APPENDIX III***  
***EQUIPMENT CALIBRATION RESULTS***



***SULPHUR DIOXIDE***



SO2[ppb] Station: LICA Bonnyville Daily: 2016/12/16 Type: AVG 1 Min. [1 Min.]



— SO2[ppb]



## API 100E Sulphur Dioxide Analyzer Calibration

Date: December 23, 2016	Barometric Pressure: 0.934 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Bonnyville - AER	Weather Conditions: A few clouds
Parameter: Sulphur Dioxide	Calibration Purpose: repeat
Start Time 24 hr. (mst): 10:45	Performed By/Reviewer: Alex Yakupov   Trina Whitsitt
End Time 24 hr. (mst): 14:36	Cal Gas Expiry Date: July 18, 2019
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer:		
ID# or Serial Number: 467	Range ppb: 1000	Station SO2 Analyzer Range? ppb
Last Calibration Date: December 16, 2016	As Found C.F.: 0.995	
Previous C.F.: 1.000	New C.F.: 1.000	

Calibrator: Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. #: LL104222 Cal Gas Conc. (ppm): 50.6	<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								

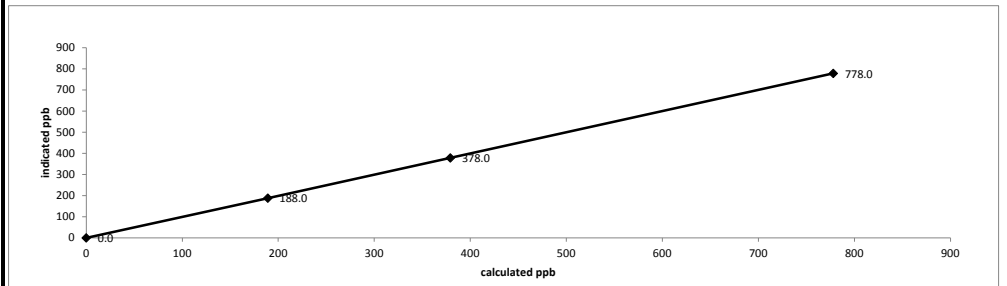
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	5000	0.00	5000	0.0	0.0	n/a
as found high	4924	76.90	5001	778.1	782.0	0.995
adjusted zero	5000	0.00	5000	0.0	0.0	n/a
adjusted high	4924	76.90	5001	778.1	778.0	1.000
mid	4966	37.50	5004	379.2	378.0	1.003
low	4981	18.70	5000	189.3	188.0	1.007
calibrator zero	5000	0.00	5000	0.0	0.0	n/a
Average C.F.=						1.003

Linear Regression/Calibration Results:

Correlation Coefficient = 1.000	LIMITS > or = 0.995
Slope = 1.000	.95-1.05
b (Intercept as % of full scale) = 0.07%	± 3% F.S.
% change in C.F. from last cal = 0.50%	± 10%

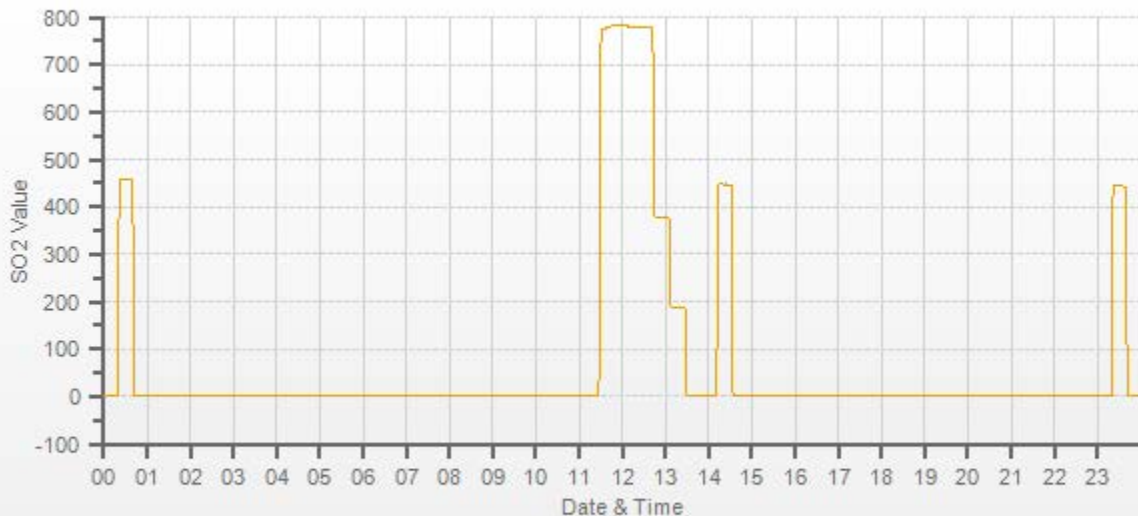
API 100E Sulphur Dioxide Analyzer Calibration



<b>As found:</b> SLOPE: 0.974 OFFSET: 124.0 HVPS: 524 RCELL TEMP: 50.0 BOX TEMP: 32.9 PMT TEMP: 8.1 IZS TEMP: 45.0 PRES: 25.5 SAMP FL: 532 NORM PMT: 124.9 UV LAMP: 2736.7 LAMP RATIO: 98.4 STR. LGT: 60.4 DRK PMT: 16.4 DRK LMP: 2.7 Expected Value: 321.0	<b>As left:</b> SLOPE: 0.968 OFFSET: 125.2 HVPS: 524 RCELL TEMP: 50.0 BOX TEMP: 32.7 PMT TEMP: 8.1 IZS TEMP: 50.0 PRES: 25.5 SAMP FL: 533 NORM PMT: 124.2 UV LAMP: 2737.6 LAMP RATIO: 98.3 STR. LGT: 60.6 DRK PMT: 16.0 DRK LMP: 2.7 Expected Value: 447.0
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**Comments:**

Oven temperature was adjusted from 45 to 50 degrees. The repeat calibration completed to correct the EV. The EV will be corrected after the first scheduled ZS check.



— SO2[ppb]

***HYDROGEN SULPHIDE***



## API 101E Hydrogen Sulphide Analyzer Calibration

Date: December 16, 2016	Barometric Pressure: 0.940 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Bonnyville - AER	Weather Conditions: A few clouds
Parameter: Hydrogen Sulphide	Calibration Purpose: routine monthly
Start Time 24 hr. (mst): 10:11	Performed By/Reviewer: Alex Yakupov Trina Whittitt
End Time 24 hr. (mst): 13:38	Cal Gas Expiry Date: June 14, 2019
Calibration Method: Gas Dilution	Converter Model & s/n (if applicable): n/a

Analyzer: ID# or Serial Number: 510	Range ppb: 100	Station SO <sub>2</sub> Analyzer Range?
Last Calibration Date: November 17, 2016	As Found C.F.: 0.983	1000 ppb
Previous C.F.: 1.000	New C.F.: 0.998	

Calibrator: Flow Meter ID's: n/a Make & Model: SABIO 2010 D Serial #: 11900613 Cal Gas Cylinder I.D. #: EY0000654 Cal Gas Conc. (ppm): 10.2	<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>SO<sub>2</sub> Scrubber Check (10 mins.)</b> Start/End Time 24 hr.: 10:42/10:52 Target Concentration (ppb): 780 Result (ppb): 0 Zero Corrected Result (ppb): 0 <b>**warning-initial zero must be done for corrected result, corrected result must not be greater than 2 ppb**</b>
Point	ppb									
High	78									
Mid	38									
Low	19									

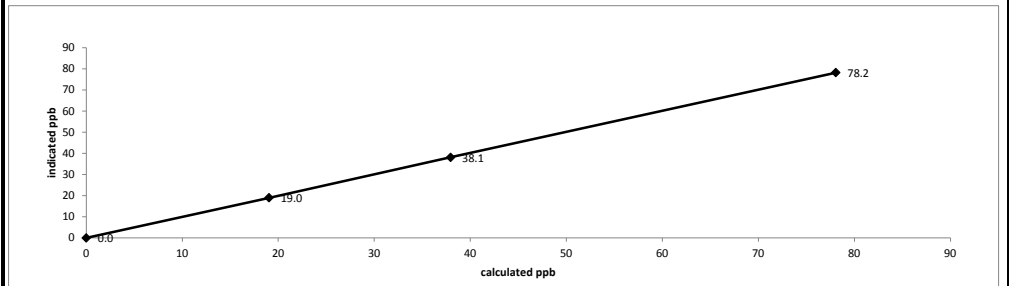
**ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015**

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total	(ppb)	(ppb)	
as found zero	7500	0.00	7500	0.0	0.0	n/a
as found high	7442	57.40	7499	78.1	79.4	0.983
adjusted zero	7500	0.00	7500	0.0	0.0	n/a
adjusted high	7442	57.40	7499	78.1	78.2	0.998
mid	7471	27.90	7499	37.9	38.1	0.996
low	7486	14.00	7500	19.0	19.0	1.002
calibrator zero	7500	0.00	7500	0.0	0.0	n/a
Average C.F. =						0.999

**Linear Regression/Calibration Results:**

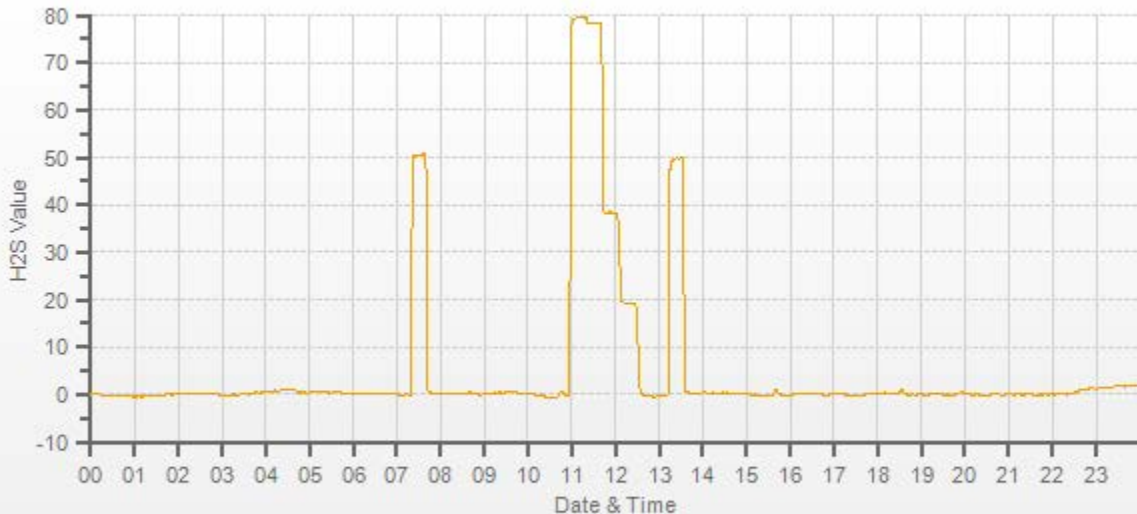
Correlation Coefficient = 1.000	LIMITS > or = 0.995
Slope = 0.998	.95-1.05
b (Intercept as % of full scale) = 0.01%	± 3% F.S.
% change in C.F. from last cal = 1.67%	± 10%

API 101E Hydrogen Sulphide Analyzer Calibration



<b>As found:</b> SLOPE: 0.971 OFFSET: 31.3 HVPS: 530 RCELL TEMP: 50.0 BOX TEMP: 36.9 PMT TEMP: 8.4 IZS TEMP: 45.0 Converter Temp: 315.2 PRES: 21.2 SAMP FL: 548 UV LAMP: 3523.7 LAMP RATIO: 92.9 STR. LGT: 15.2 DRK PMT: 37.5 DRK LMP: -1.8 Expected Value: 50.8	<b>As left:</b> SLOPE: 0.957 OFFSET: 31.3 HVPS: 530 RCELL TEMP: 50.0 BOX TEMP: 37.3 PMT TEMP: 8.4 IZS TEMP: 45.0 Converter Temp: 315.0 PRES: 21.2 SAMP FL: 548 UV LAMP: 3525.3 LAMP RATIO: 92.9 STR. LGT: 15.0 DRK PMT: 37.3 DRK LMP: -1.9 Expected Value: 49.9
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**Comments:**  
 The analyzer sample inlet filter was changed.  
 No zero adjustment was required/made. As found zero value copied to adjusted zero value for linearity calculation purposes.



— H2S[ppb]



***TOTAL HYDROCARBON***



# Thermo 55i Methane/Non-Methane Analyzer Calibration

Date:	December 15, 2016	Barometric Pressure:	0.938 atm
Company/Airshed:	LICA	Station Temperature °C:	22
Location/Station Name:	Bonnyville - AER	Weather Conditions:	Mix of sun and clouds
Parameter:	CH <sub>4</sub> / NMHC / THC	Calibration Purpose:	routine monthly
Start/End Time 24 hr. (mst):	13:25 / 16:40	Performed By/Reviewer:	Alex Yakupov / Trina Whitsitt
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	November 25, 2023

Analyzer:		Correction Factors:			
ID# or Serial Number:	1236656107	Previous C.F.:	As Found C.F.:	New C.F.:	
Measured Flow:	1.158	CH <sub>4</sub> =	1.000	1.008	1.000
Last Calibration Date:	November 18, 2016	NMHC =	1.000	1.000	1.000
Range ppm:	20 CH <sub>4</sub> /20 NMHC/40 THC	THC =	0.999	1.003	1.000

Calibrator:		Standard Calibration Points for Analyzer Range of 20/20/40 ppm			
Flow Meter ID's:	n/a	Point	CH <sub>4</sub>	NMHC	THC
Make & Model:	API 700	High	13.00	13.00	26.00
Serial #:	627	Mid	7.00	7.00	14.00
Cal Gas Cylinder I.D. #:	LL165372	Low	3.00	3.00	6.00
CH <sub>4</sub> Cylinder Conc. =	606.0	212.0	=C <sub>3</sub> H <sub>8</sub> Cylinder Conc.		
CH <sub>4</sub> as C <sub>3</sub> H <sub>8</sub> =	583.0	1189.0	=total CH <sub>4</sub> equivalent		

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

Point	Calibrator Flow Rates (cc/min)			Calculated CH <sub>4</sub> (ppm)	Calculated NMHC (ppm)	Calculated THC (ppm)	Indicated CH <sub>4</sub> (ppm)	Indicated NMHC (ppm)	Indicated THC (ppm)	Correction Factors:		
	Diluent	Cal Gas	Total Flow							CH <sub>4</sub>	NMHC	THC
as found zero	2000	0.00	2000	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
as found high	2000	46.00	2046	13.62	13.11	26.73	13.52	13.11	26.65	1.008	1.000	1.003
adjusted zero	2000	0.00	2000	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
adjusted high	2000	46.00	2046	13.62	13.11	26.73	13.62	13.11	26.74	1.000	1.000	1.000
mid	2000	24.00	2024	7.19	6.91	14.10	7.20	6.91	14.11	0.998	1.000	0.999
low	2000	11.00	2011	3.31	3.19	6.50	3.33	3.19	6.50	0.995	1.000	1.001
calibrator zero	2000	0.00	2000	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
Average C.F.=										0.998	1.000	1.000

### Linear Regression/Calibration Results:

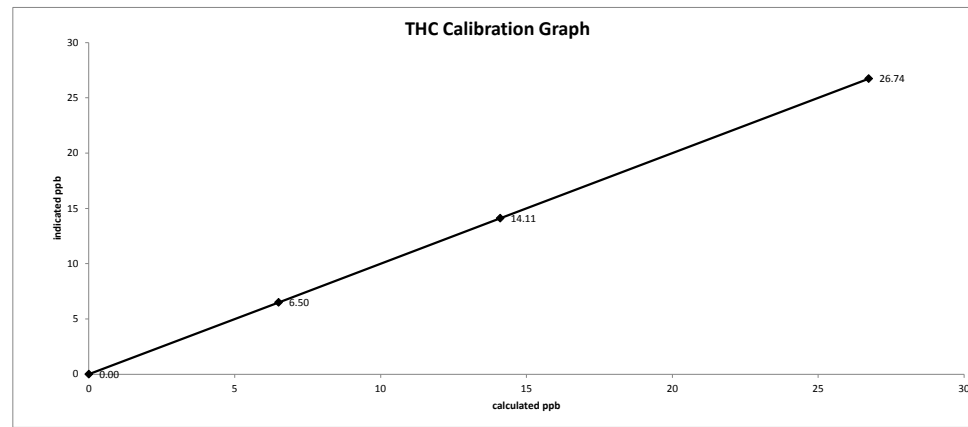
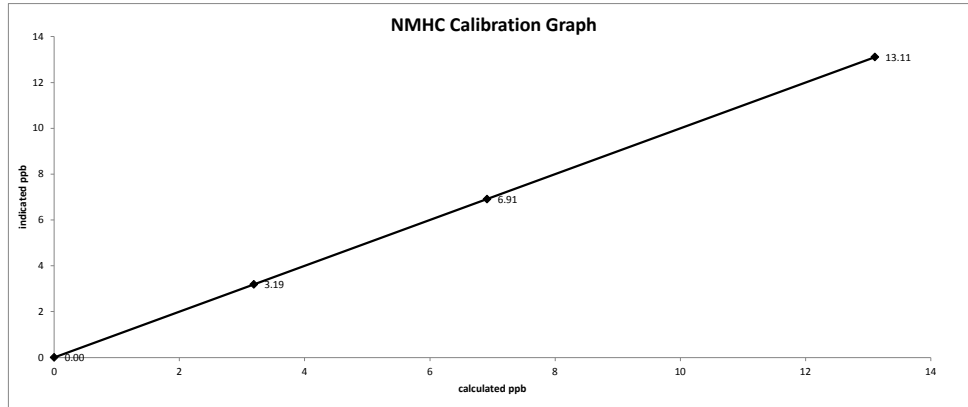
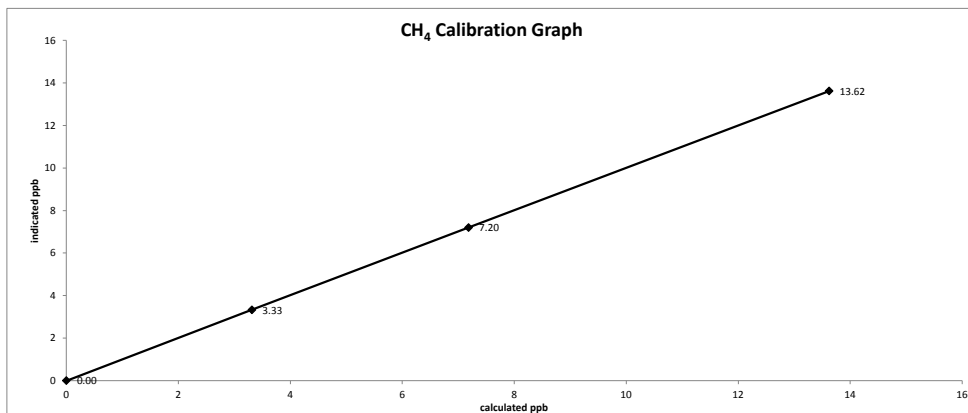
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.999	1.000	1.000	.95-1.05
b (Intercept as % of full scale) =	0.05%	0.00%	0.00%	± 3% F.S.
% change in C.F. from last cal =	-0.77%	0.02%	-0.41%	± 10%

Interface Board Voltages:	Bias Supply:	-292.8	Calibration History cnt'd:	NM Peak Area:	88089
Temperatures:	Detector Oven:	175.0	Crucial Settings:	Methane Start:	n/a
	Filter:	175.0		Methane End:	n/a
	Column Oven:	75.0		Backflush:	n/a
	Internal:	32.1		NMHV Start:	n/a
Cylinder Pressures/reg.:	Carrier:	2200 / 50	Run History>1:	NMHC End:	n/a
	Fuel:	400 / 60	Date:	Dec 15, 2016	
	Span Gas:	400 / 22	Time:	13:41	
	Zero Air Generator:	47	CH <sub>4</sub> PK HT:	0	
Internal Pressures:	Carrier:	31.1	CH <sub>4</sub> RT:	8.0	
	Fuel:	40.3	CH <sub>4</sub> Baseline:	2283	
	Air:	32.4	CH <sub>4</sub> LOD:	58	
FID Status:	Status:	LIT	CH <sub>4</sub> SD:	19	
	Counts:	26716	CH <sub>4</sub> CONC:	0.00	
	Flame:	378.6	NM PK HT:	0	
	Det Base:	175.0	NM Peak Area:	0	
Flame and Power Stats:	Last Power On:	August 3, 2016	NM CONC:	0.00	
	Flameouts:	2	NM Base Start:	2264	
	Det Oven at Start:	169.0	NM Base End:	2282	
	Col Oven at Start:	74.5	NM LOD:	14	
Calibration History:	Time:	Nov 18, 2016 / 10:30	NM Start IDX:	30	
	Type:	SPAN	NM End IDX:	81	
	Status:	GOOD	NM Max Slope:	7.6e-01	
	Check/Adjust:	ADJUST	NM Min Slope:	-3.4e-01	
	CH <sub>4</sub> Span Conc:	13.62	NM PT Count:	0	
	CH <sub>4</sub> SP Ratio:	0.000071	Expected Values:	Previous CH <sub>4</sub> :	9.55
	CH <sub>4</sub> RT:	12.4		Previous NMHC:	11.19
	CH <sub>4</sub> PK IDX:	22		Previous THC:	20.76
	CH <sub>4</sub> PK HT:	19182		New CH <sub>4</sub> :	9.62
	NM Span Conc:	13.11		New NMHC:	11.20
	NM SP Ratio:	0.000149		New THC:	20.83

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

Date: December 15, 2016  
Company/Airshed: LICA  
Location/Station Name: Bonnyville - AER

Start/End Time 24 hr. (mst): 13:25 / 16:40  
Calibration Purpose: routine monthly  
Calibration Method: Gas Dilution





CH4[ppm] NMHC[ppm]

***NITROGEN DIOXIDE***



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

Date: December 16, 2016	Barometric Pressure: 0.940 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Bonnyville - AER	Weather Conditions: A few clouds
Start/End Time 24 hr. (mst): 10:11 / 15:34	Calibration Purpose: routine monthly
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Alex Yakupov   Trina Whitsitt
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: July 18, 2019

<b>Analyzer:</b> ID# or Serial Number: 593 Last Calibration Date: November 17, 2016 Range ppb: 1000	<b>Correction Factors:</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>NO =</td> <td>1.000</td> <td>0.992</td> <td>1.000</td> </tr> <tr> <td>NO<sub>2</sub> =</td> <td>1.026</td> <td>1.016</td> <td>1.016</td> </tr> <tr> <td>NOx =</td> <td>1.000</td> <td>0.989</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	0.992	1.000	NO <sub>2</sub> =	1.026	1.016	1.016	NOx =	1.000	0.989	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	0.992	1.000														
NO <sub>2</sub> =	1.026	1.016	1.016														
NOx =	1.000	0.989	1.000														

<b>Calibrator:</b> Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. #: LL104222 NO/NOx Gas Conc. (ppm): 50.7   50.9	<b>Standard Calibration Points for a Range of: 1000 ppb</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO<sub>2</sub> (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> <td>500</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>275</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>190</td> <td>100</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO <sub>2</sub> (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO <sub>2</sub> (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	5000	0.0	5000	0	0	0.0	0.0	n/a	n/a
as found high	4924	76.9	5001	779.6	779.6	786.0	788.0	0.992	0.989
adjusted zero	5000	0.00	5000	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4924	76.90	5001	779.6	779.6	780.0	780.0	1.000	1.000
mid	4966	37.50	5004	380.0	380.0	379.0	379.0	1.003	1.003
low	4981	18.70	5000	189.6	189.6	188.0	188.0	1.009	1.009
calibrator zero	5000	0.00	5000	0	0	0.0	0.0	n/a	n/a
Average C.F.=								1.004	1.004

**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	4924	76.90	5001	0.0	779.0	779.0	0.0	0.0	0.0	
as found high NO2	4800	76.90	4877	495.0	265.0	771.0	506.0	514.0	506.0	1.016
adjusted high NO2	4800	76.90	4877	495.0	265.0	771.0	506.0	514.0	506.0	1.016
gpt mid	4800	76.90	4877	270.0	495.0	769.0	274.0	284.0	274.0	1.036
gpt low	4800	76.90	4877	105.0	673.0	778.0	105.0	106.0	105.0	1.010
Average NO <sub>2</sub> C.F.=									1.021	

**Linear Regression/Calibration Results:**

	NO	NOx	NO <sub>2</sub>	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.999	0.999	1.018	.95-1.05
b (Intercept as % of full scale)=	-0.09%	-0.09%	-0.06%	± 3% F.S.
% change in C.F. from last cal=	0.81%	1.06%	0.99%	± 10%
NO <sub>2</sub> converter efficiency			1.02	0.96 to 1.04

As found:	As left:
NOx SLOPE: 1.091	NOx SLOPE: 1.077
NOx OFFS: 0.5	NOx OFFS: 0.5
NO SLOPE: 1.095	NO SLOPE: 1.079
NO OFFS: -0.8	NO OFFS: -0.8
SAMP FLW: 481	SAMP FLW: 481
OZONE FL: 63	OZONE FL: 63
PMT: 9.8	PMT: 6.4
NORM PMT: -0.4	NORM PMT: -1.9
AZERO: 9.0	AZERO: 9.3
HVPS: 658	HVPS: 658
RCELL TEMP: 50.0	RCELL TEMP: 50.0
BOX TEMP: 31.5	BOX TEMP: 32.7
PMT TEMP: 6.7	PMT TEMP: 6.7
IZS TEMP: 40.2	IZS TEMP: 40.1
MOLY TEMP: 315.4	MOLY TEMP: 315.6
RCEL: 5.4	RCEL: 5.4
SAMP: 27.4	SAMP: 27.2
Expected Value NO: 5.00	Expected Value NO: 3.90
Expected Value NO <sub>2</sub> : 301.40	Expected Value NO <sub>2</sub> : 286.00
Expected Value NOx: 306.20	Expected Value NOx: 290.00

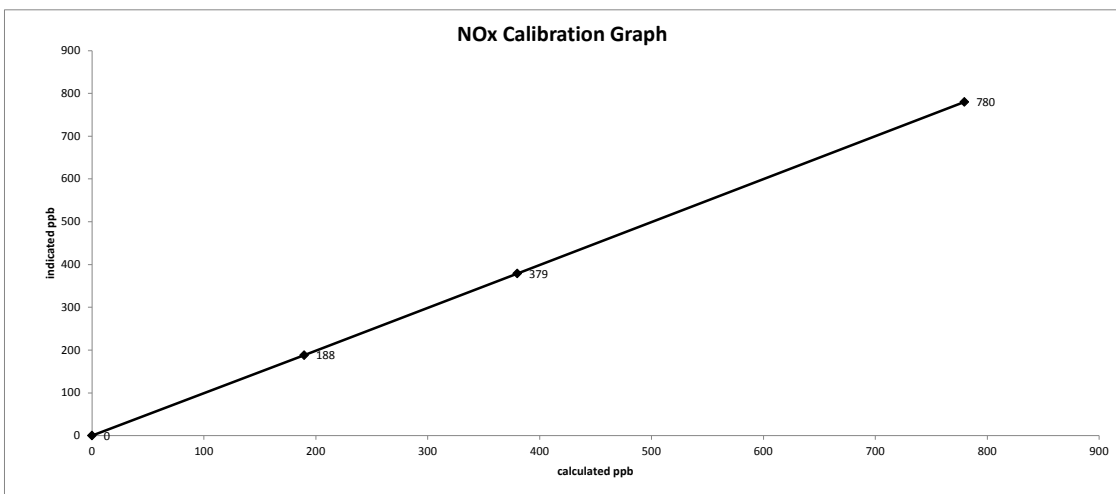
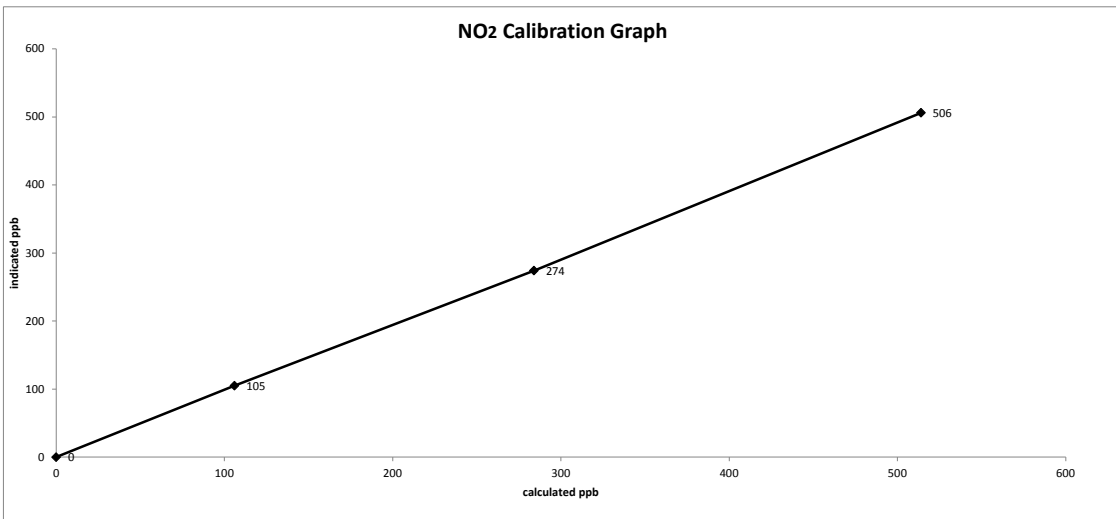
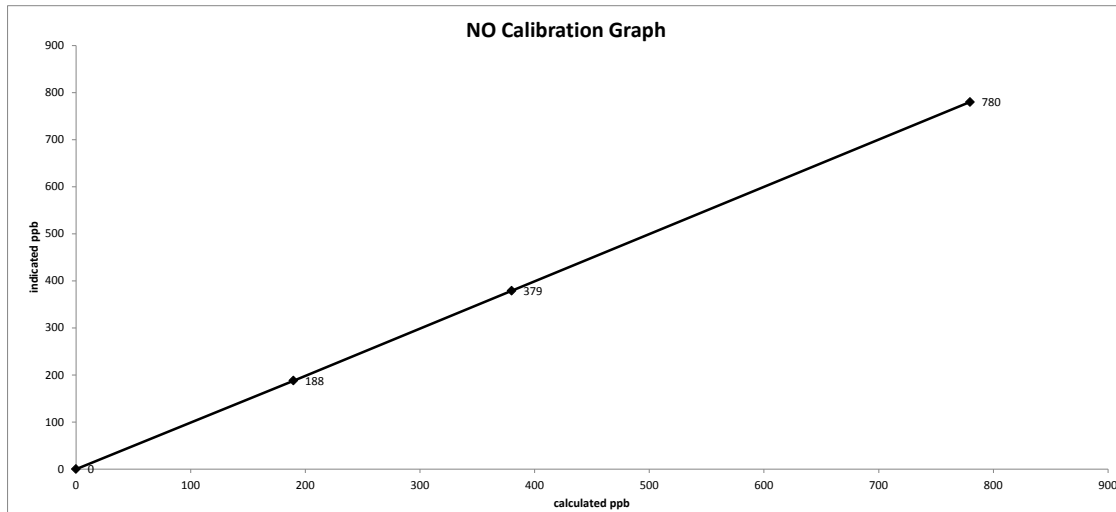
**Comments:**

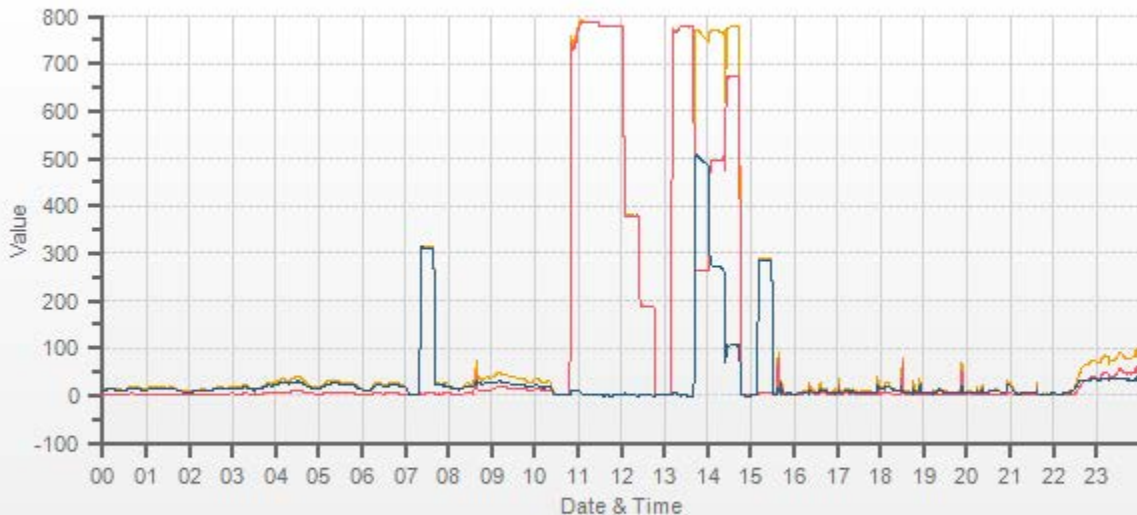
The analyzer sample inlet filter was changed. No high point NO2 adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.

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

Date: December 16, 2016  
Company/Airshed: LICA  
Location/Station Name: Bonnyville - AER

Start/End Time 24 hr. (mst): 10:11 / 15:34  
Calibration Purpose: routine monthly  
Calibration Method: Gas Dilution & Gas Phase Titration





— NOX[ppb] — NO[ppb] — NO2[ppb]





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

Date: December 23, 2016	Barometric Pressure: 0.934 atm
Company/Airshed: LICA	Station Temperature °C: 22
Location/Station Name: Bonnyville - AER	Weather Conditions: A few clouds
Start/End Time 24 hr. (mst): 10:45/16:27	Calibration Purpose: repeat
G.P.T. to be used for Ozone? No	Performed By/Reviewer: Alex Yakupov   Trina Whitsitt
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: July 18, 2019

<b>Analyzer:</b> ID# or Serial Number: 593 Last Calibration Date: December 16, 2016 Range ppb: 1000	<b>Correction Factors:</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>NO =</td> <td>1.000</td> <td>1.018</td> <td>1.001</td> </tr> <tr> <td>NO<sub>2</sub> =</td> <td>1.016</td> <td>1.030</td> <td>1.030</td> </tr> <tr> <td>NOx =</td> <td>1.000</td> <td>1.014</td> <td>1.001</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	1.018	1.001	NO <sub>2</sub> =	1.016	1.030	1.030	NOx =	1.000	1.014	1.001
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	1.018	1.001														
NO <sub>2</sub> =	1.016	1.030	1.030														
NOx =	1.000	1.014	1.001														

<b>Calibrator:</b> Flow Meter ID's: n/a Make & Model: API 700 Serial #: 627 Cal Gas Cylinder I.D. #: LL104222 NO/NOx Gas Conc. (ppm): 50.7   50.9	<b>Standard Calibration Points for a Range of: 1000 ppb</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO<sub>2</sub> (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> <td>500</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>275</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>190</td> <td>100</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO <sub>2</sub> (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO <sub>2</sub> (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	Diluent	Cal Gas	Total Flow	(ppb)	(ppb)	(ppb)	(ppb)		
as found zero	5000	0.0	5000	0	0	0.0	0.0	n/a	n/a
as found high	4924	76.9	5001	779.6	779.6	766.0	769.0	1.018	1.014
adjusted zero	5000	0.00	5000	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4924	76.90	5001	779.6	779.6	779.0	779.0	1.001	1.001
mid	4966	37.50	5004	380.0	380.0	378.0	378.0	1.005	1.005
low	4981	18.70	5000	189.6	189.6	188.0	188.0	1.009	1.009
calibrator zero	5000	0.00	5000	0	0	0.0	0.0	n/a	n/a
Average C.F.=								1.005	1.005

**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	4924	76.90	5001	0.0	780.0	780.0	0.0	0.0	0.0	
as found high NO <sub>2</sub>	4800	76.90	4877	495.0	265.0	766.0	500.0	515.0	500.0	1.030
adjusted high NO <sub>2</sub>	4800	76.90	4877	495.0	265.0	766.0	500.0	515.0	500.0	1.030
gpt mid	4800	76.90	4877	270.0	497.0	771.0	274.0	283.0	274.0	1.033
gpt low	4800	76.90	4877	100.0	679.0	779.0	100.0	101.0	100.0	1.010
Average NO <sub>2</sub> C.F.=										1.024

**Linear Regression/Calibration Results:**

	NO	NOx	NO <sub>2</sub>	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.000	1.000	1.032	.95-1.05
b (Intercept as % of full scale)=	-0.09%	-0.09%	0.07%	± 3% F.S.
% change in C.F. from last cal=	-1.78%	-1.38%	-1.38%	± 10%
NO <sub>2</sub> converter efficiency			1.02	0.96 to 1.04

As found:	As left:
NOx SLOPE: 1.077	NOx SLOPE: 1.092
NOx OFFS: 0.5	NOx OFFS: 0.5
NO SLOPE: 1.079	NO SLOPE: 1.093
NO OFFS: -0.8	NO OFFS: -0.8
SAMP FLW: 478	SAMP FLW: 478
OZONE FL: 63	OZONE FL: 63
PMT: 7.6	PMT: 6.7
NORM PMT: 2.6	NORM PMT: 0.4
AZERO: 8.8	AZERO: 8.7
HVPS: 658	HVPS: 658
RCELL TEMP: 50.0	RCELL TEMP: 50.0
BOX TEMP: 31.6	BOX TEMP: 31.5
PMT TEMP: 6.7	PMT TEMP: 6.7
IZS TEMP: 40.1	IZS TEMP: 45.0
MOLY TEMP: 315.7	MOLY TEMP: 315.0
RCEL: 5.3	RCEL: 5.3
SAMP: 27.0	SAMP: 27.0
Expected Value NO: 3.9	Expected Value NO: 6.0
Expected Value NO <sub>2</sub> : 286.0	Expected Value NO <sub>2</sub> : 425.0
Expected Value NOx: 290.0	Expected Value NOx: 431.0

**Comments:**

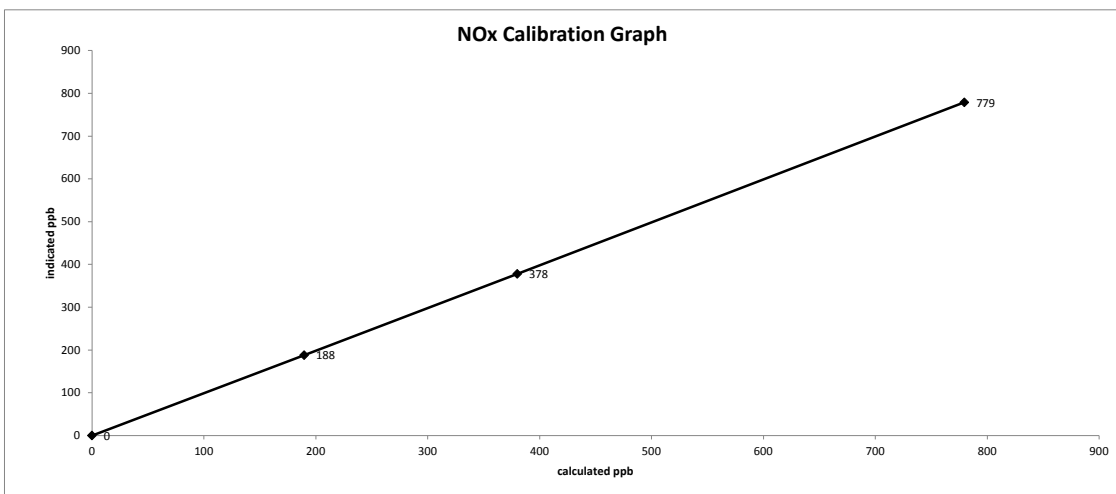
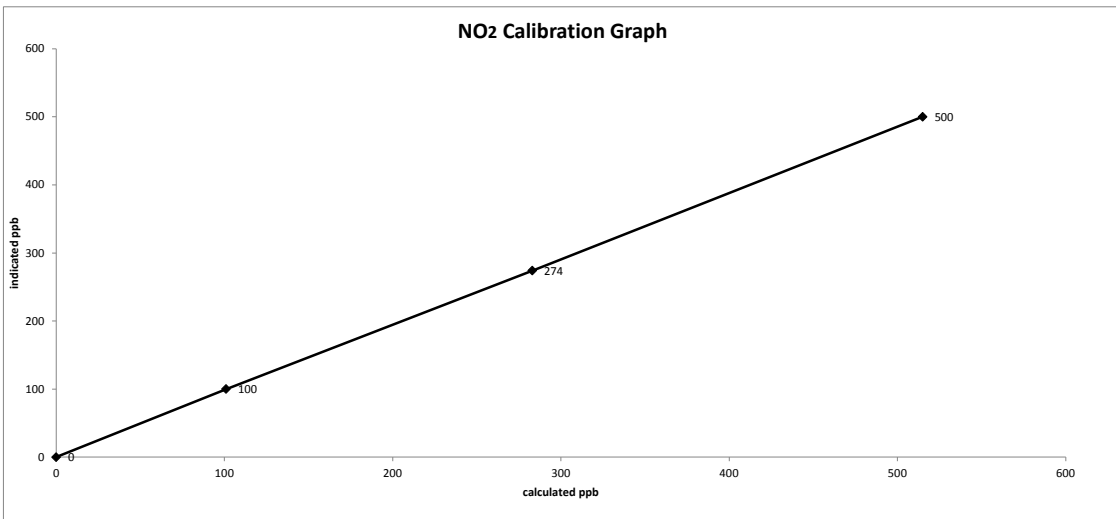
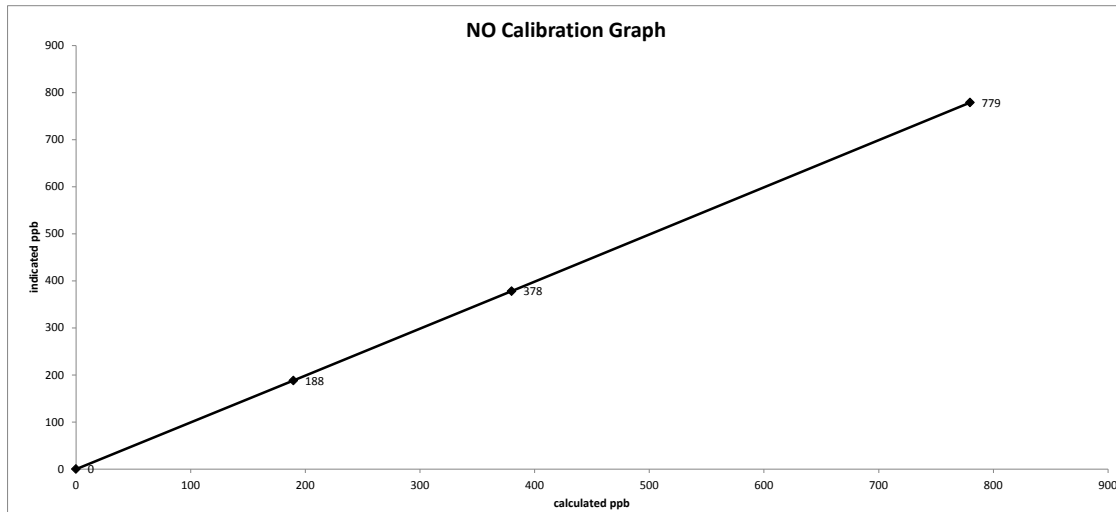
No high point NO<sub>2</sub> adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.

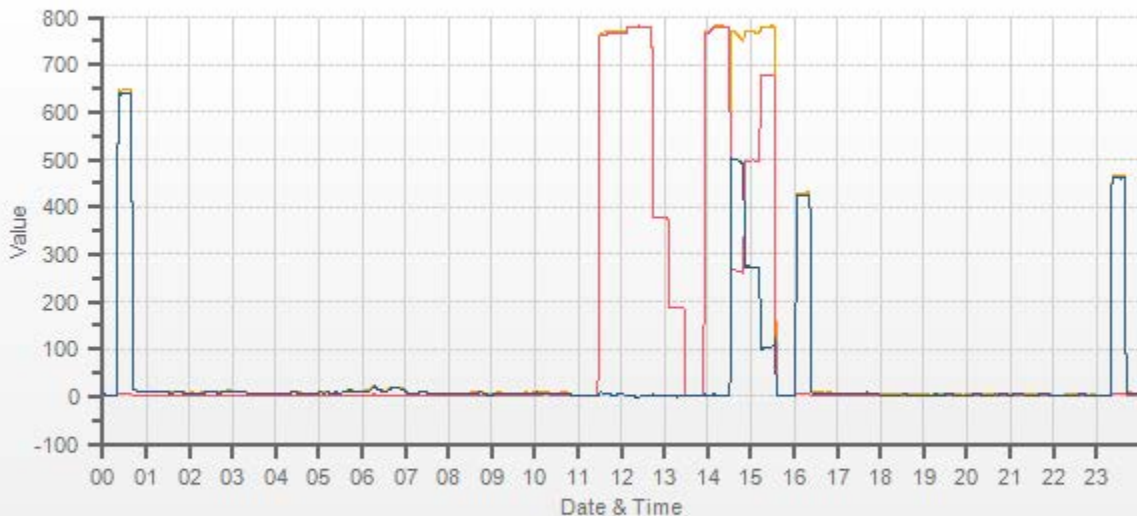
No zero adjustment was required/made. As found zero values were copied to adjusted zero values for linearity calculation purposes.

Oven temperature adjusted from 40 to 45 degrees. The repeat calibration completed to correct the EV. The EV will be adjusted after the first scheduled ZS check.

Date: December 23, 2016  
Company/Airshed: LICA  
Location/Station Name: Bonnyville - AER

Start/End Time 24 hr. (mst): 10:45/ 16:27  
Calibration Purpose: repeat  
Calibration Method: Gas Dilution & Gas Phase Titration





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

## ***OZONE***

# Maxxam Thermo 49i Ozone Analyzer Calibration

A Bureau Veritas Group Company

Date: December 15, 2016  
 Company/Airshed: LICA  
 Location/Station Name: Bonnyville - AER  
 Start/End Time 24 hr. (mst): 13:25 / 16:31  
 Ozone Calibration Method: Varying UV Lamp Power  
 G.P.T. Date: n/a-done by Varying UV Lamp Power

Barometric Pressure: 0.938 atm  
 Station Temperature °C: 22  
 Weather Conditions: Mix of sun and clouds  
 Calibration Purpose: routine monthly  
 Performed By/Reviewer: Alex Yakupov / Trina Whitsitt  
 Cal Gas Expiry Date: n/a

Analyzer:  
 ID# or Serial Number: 1002240372  
 Last Calibration Date: November 18, 2016  
 Previous Cal High Point C.F.: 1.000

Ozone Range ppb: 500  
 As Found C.F.: 1.000  
 New C.F.: 1.000

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

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

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

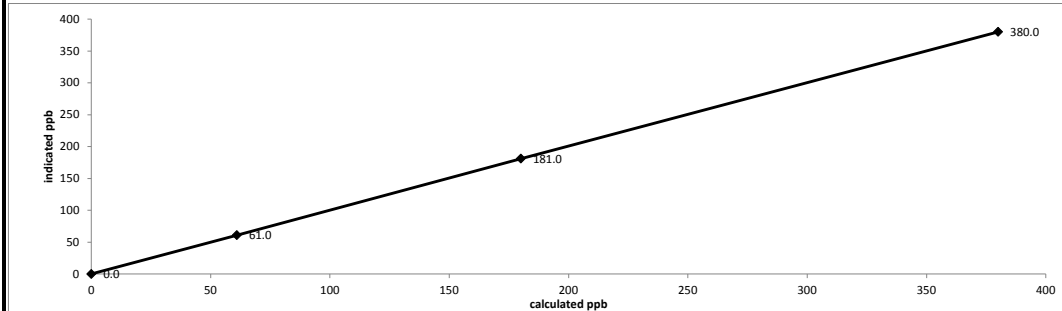
Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5000	5000	0.0	n/a	0.0	n/a
as found high	5000	5000	380.0	380.0	380.0	1.000
adjusted zero	5000	5000	0.0	0.0	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	180.0	180.0	181.0	0.994
low	5000	5000	61.0	61.0	61.0	1.000
calibrator zero	5000	5000	0.0	n/a	0.0	n/a
Average C.F. =						0.998

Linear Regression/Calibration Results:

Correlation Coefficient = 1.000  
 Slope = 1.000  
 b (Intercept as % of full scale) = -0.04%  
 % change in C.F. from last cal = 0.00%

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

Thermo 49i Ozone Analyzer Calibration



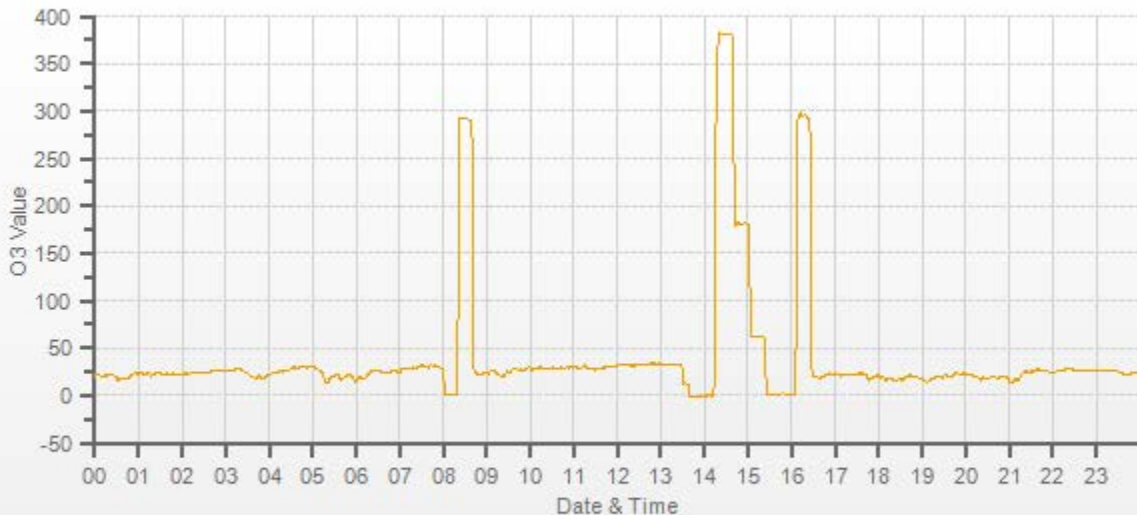
**As found:**  
 O3 Bkg: -0.1  
 O3 Coef: 0.990  
 Photo Lamp: 14.2  
 O3 Lamp: 5.8  
 Bench: 28.9  
 Bench Lamp: 54.1  
 O3 Lamp: 68.1  
 Pressure: 706.6  
 Cell A lpm: 0.749  
 Cell B lpm: 0.760  
 O3 ppb: 0.1  
 Cell A ppb: 0.1  
 Cell B ppb: -2.0  
 Cell A int: 82053  
 Expected Value: 279.0

**As left:**  
 O3 Bkg: -0.1  
 O3 Coef: 0.990  
 Photo Lamp: 14.2  
 O3 Lamp: 5.8  
 Bench: 31.2  
 Bench Lamp: 54.1  
 O3 Lamp: 68.1  
 Pressure: 707.5  
 Cell A lpm: 0.750  
 Cell B lpm: 0.760  
 O3 ppb: 0.5  
 Cell A ppb: 0.5  
 Cell B ppb: 0.5  
 Cell A int: 81977  
 Expected Value: 293.0

Comments:

The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned.

No High Point adjustment was made. No ZERO adjustment made.



— O3[ppb]

***PARTICULATE MATTER***



# R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: December 15, 2016  
 Company: LICA  
 Station Name/Location: Bonnyville - AER  
 Previous Audit Date: November 24, 2016  
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whitsitt  
 Start Time (mst): 16:05  
 End Time (mst): 16:55  
 Calibration Purpose: Bi-monthly #1  
 Weather Conditions: Mix of sun and clouds

### 1400A Information and Status:

ID# or Serial Number: 1405A207691003 As Found Filter Loading %: 31.08  
 Ko Factor: 15635 As Left Filter Loading %: 30.41  
 Ambient Temperature °C: -18.87 As Found Noise: 0.004  
 Ambient Pressure atm: 0.941 As Left Noise: 0.000  
 Main Flow Reading lpm: 3.00 Pump Vacuum: 0.37  
 Aux Flow Reading lpm: 13.67 Warnings: None

### Reference Standards:

Make:	Flow:	Pressure:	Temperature:
<u>Dwyer</u>	<u>BRUNTON</u>	<u>FLUKE</u>	
<u>Model: 475 Mark III</u>	<u>BIO</u>	<u>1551A Ex STIK</u>	
<u>Serial Number: #2</u>	<u>BPO 14</u>	<u>4295</u>	
<u>Calibration Date: January 15, 2016</u>	<u>July 7, 2016</u>	<u>November 15, 2016</u>	

### As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.09	0.00	0.09
	limit	0.15	<del>0.15</del>	0.15	<del>0.15</del>
Bypass Flow	actual	0.00	-0.39	0.00	-0.39
	limit	0.60	<del>0.60</del>	0.60	<del>0.60</del>

### As left leak check (same as above if as found passes):

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.09	0.00	0.09
	limit	0.15	<del>0.15</del>	0.15	<del>0.15</del>
Bypass Flow	actual	0.00	-0.39	0.00	-0.39
	limit	0.60	<del>0.60</del>	0.60	<del>0.60</del>

### As found temperature and pressure:

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: <u>-18.9</u>	1405F pressure atm: <u>0.941</u>
reference temperature °C: <u>-19.4</u>	reference pressure: <u>0.942</u>
difference °C: <u>-0.5</u>	difference: <u>-0.001</u>

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

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: <u>-19.4</u>	1405F pressure atm: <u>0.942</u>
reference temperature °C: <u>-19.4</u>	reference pressure: <u>0.942</u>
difference °C: <u>0.0</u>	difference: <u>0.000</u>

### As found flows:

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: <u>3.00</u>	1400A total/aux flow lpm: <u>16.67</u>
reference main flow lpm: <u>2.98</u>	reference total/aux flow lpm: <u>16.97</u>
difference lpm: <u>-0.02</u>	difference lpm: <u>0.30</u>

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

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: <u>3.00</u>	1400A total/aux flow lpm: <u>16.67</u>
reference main flow lpm: <u>2.98</u>	reference total/aux flow lpm: <u>16.97</u>
difference lpm: <u>-0.02</u>	difference lpm: <u>0.30</u>

### K<sub>o</sub> Audit:

Last K<sub>o</sub> audit date: November 24, 2016  
 1405F K<sub>o</sub> factor: 15635  
 Measured K<sub>o</sub> factor: 15790.8000  
 % difference: 1.00

### Comments:

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





# R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date: December 22, 2016  
 Company: LICA  
 Station Name/Location: Bonnyville - AER  
 Previous Audit Date: December 15, 2016  
 Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Trina Whitsitt  
 Start Time (mst): 12:35  
 End Time (mst): 13:26  
 Calibration Purpose: Bi-monthly #2  
 Weather Conditions: Mix of sun and clouds

### 1400A Information and Status:

ID# or Serial Number: 1405A207691003 As Found Filter Loading %: 32.27  
 Ko Factor: 15635 As Left Filter Loading %: 18.58  
 Ambient Temperature °C: 1.96 As Found Noise: 0.003  
 Ambient Pressure atm: 0.921 As Left Noise: 0.000  
 Main Flow Reading lpm: 3.00 Pump Vacuum: 0.31  
 Aux Flow Reading lpm: 13.67 Warnings: None

### Reference Standards:

Make:	Flow:	Pressure:	Temperature:
<u>Dwyer</u>	<u>BRUNTON</u>	<u>FLUKE</u>	
<u>Model: 475 Mark III</u>	<u>BIO</u>	<u>1551A Ex STIK</u>	
<u>Serial Number: #2</u>	<u>BPO 14</u>	<u>4295</u>	
<u>Calibration Date: January 15, 2016</u>	<u>July 7, 2016</u>	<u>November 15, 2016</u>	

### As found leak check:

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.08	0.00	0.08
	limit	0.15	<del>0.15</del>	0.15	<del>0.15</del>
Bypass Flow	actual	0.00	-0.39	0.00	-0.39
	limit	0.60	<del>0.60</del>	0.60	<del>0.60</del>

### As left leak check (same as above if as found passes):

		Base	Zero	Reference	Zero
PM 2.5 Flow	actual	0.00	0.08	0.00	0.08
	limit	0.15	<del>0.15</del>	0.15	<del>0.15</del>
Bypass Flow	actual	0.00	-0.39	0.00	-0.39
	limit	0.60	<del>0.60</del>	0.60	<del>0.60</del>

### As found temperature and pressure:

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: <u>2.0</u>	1405F pressure atm: <u>0.921</u>
reference temperature °C: <u>2.2</u>	reference pressure: <u>0.921</u>
difference °C: <u>0.3</u>	difference: <u>0.000</u>

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

tolerance +/- 2.0°C	tolerance +/- 0.01 atm
1405F temperature °C: <u>2.2</u>	1405F pressure atm: <u>0.921</u>
reference temperature °C: <u>2.2</u>	reference pressure: <u>0.921</u>
difference °C: <u>0.0</u>	difference: <u>0.000</u>

### As found flows:

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: <u>3.00</u>	1400A total/aux flow lpm: <u>13.67</u>
reference main flow lpm: <u>2.97</u>	reference total/aux flow lpm: <u>13.97</u>
difference lpm: <u>-0.03</u>	difference lpm: <u>0.30</u>

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

main flow tolerance 3.00 lpm +/- 0.20 lpm	total/aux flow tolerance 16.67/13.67 lpm +/- 1.00 lpm +/- 7%
1405F main flow lpm: <u>3.00</u>	1400A total/aux flow lpm: <u>13.67</u>
reference main flow lpm: <u>3.00</u>	reference total/aux flow lpm: <u>13.67</u>
difference lpm: <u>0.00</u>	difference lpm: <u>0.00</u>

### K<sub>o</sub> Audit:

Last K<sub>o</sub> audit date: November 24, 2016  
 1405F K<sub>o</sub> factor: 15635  
 Measured K<sub>o</sub> factor: 15790.8000  
 % difference: 1.00

### Comments:

The TEOM sample filter was changed. The TEOM intake head and associated sharp cut components were cleaned.  
 The bypass (auxillary) flow filter was changed. The TEOM sample pump was replaced.  
 A new sample pump was installed and the flows were calibrated.

## ***WIND SYSTEM***



# Meteorological Sensor Audit

## Station Information

Company:	<u>LICA</u>	Performed By:	<u>Limin Li</u>
Location:	<u>Bonnyville (in Calgary shop)</u>	Reason:	<u>Annual maintenance</u>
Audit Date:	<u>26-Jan-16</u>	Start Time (mst):	<u>11:00</u>
Previous Audit Date:	<u>NA</u>	End Time (mst):	<u>15:00</u>

## Wind Speed

Sensor make:	<u>R. M. Young</u>	Sensor height:	<u>n/a</u>
Sensor model:	<u>5103VK</u>	Serial Number:	<u>56589</u>
Calibrator:	<u>Young 18802</u>	Variable speed motor:	<u>CA 03309</u>
Voltage range:	<u>0-1</u>	Output signal range:	<u>200KPH</u>

## Wind Speed Audit Data

RPM	Wind Speed Actual	Indicated WS - CW	Indicated WS-CCW	Correction Factor
0	0.0	0.032	0.032	-
1000	17.6	17.66	17.64	1.00
2000	35.28	35.3	35.29	1.00
3000	52.92	52.99	52.99	1.00
4000	70.56	70.66	70.65	1.00
5000	88.2	88.35	88.33	1.00
6000	105.84	106	106	1.00
7000	123.48	123.7	123.7	1.00
8000	141.12	141.4	141.3	1.00
9000	158.76	159.1	159.1	1.00
10000	176.4	176.7	176.7	1.00
Average Correction Factor:				1.00

## Wind Direction

Sensor make:	<u>R. M. Young</u>	Sensor height:	<u>n/a</u>
Sensor model:	<u>5103VK</u>	Serial Number:	<u>56589</u>
Calibrator:	<u>Young 18802</u>	Variable speed motor:	<u>CA 03309</u>
Voltage range:	<u>0-1</u>	Output signal range:	<u>0-360DEG</u>

## Wind Direction Audit Data

Wind Direction	Indicated	Correction Factor
0	0.5	NA
45	44.9	1.00
90	92.0	0.98
135	136.5	0.99
180	180.6	1.00
225	224.4	1.00
270	270.3	1.00
315	312.2	1.01
359	355.0	1.01
Average Correction Factor:		1.00

Remarks: Annual maintenance. Changed 05163PG, 05124VG bearings. 05131D, 05133B & 05135D

Audit Performed by: Limin Li

## ***CALIBRATORS***



# Calibrator Performance Audit

## Oxides Of Nitrogen

File No. 2015-119

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>API 700</u>	Make/Model	<u>NA</u>
Serial Number	<u>627</u>	Serial Number	<u>NA</u>
Last Verification Date	<u>April 1 2015</u>	Temperature (°C)	<u>NA</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>NA</u>
NO/NOx Concentration	<u>50.3/50.3</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>
		Pt. #3	<u>5000</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>
		Pt. #3	<u>18.9</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO <sub>2</sub>	NOx	NO	NOx
5007	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5003	77.5	0.779	0.779	0.787	-0.001	0.786	1%	1%
5004	37.8	0.380	0.380	0.383	0.000	0.383	1%	1%
5001	18.9	0.190	0.190	0.191	0.000	0.191	1%	1%
Absolute Average Percent Difference							1%	1%

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

<u>NO</u>	<u>LIMITS</u>	<u>NOx</u>	
Correlation=	1.0000	≥ 0.990	Correlation= 1.0000
m (Slope)=	1.0106	0.90-1.10	m (Slope)= 1.0092
b (Intercept % of FS)=	-0.0566	± 3% F.S.	b (Intercept % of FS)= -0.0368

Flow	O <sub>2</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOX	% Diff. Vs Audit gas	
5003	0	0.000	0.787	0.001	0.788	NO <sub>2</sub>	% Diff. Limit
5003	0.5	0.493	0.294	0.498	0.792	1%	± 10%
5003	0.25	0.256	0.531	0.262	0.792	2%	± 10%
5003	0.1	0.108	0.679	0.110	0.789	1%	± 10%
Absolute Average Percent Difference						1.2%	± 10%

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

<u>NO<sub>x</sub></u>	<u>LIMITS</u>	
Correlation=	1.0000	≥ 0.995
m (Slope)=	1.0089	0.90-1.10
b (Intercept % of FS)=	0.1591	± 3% F.S.

AENV Standards Audit Calibrator	NO <sub>x</sub> Analyzer
Make/Model <u>Thermo 146i</u>	Make/Model <u>Thermo 42i</u>
Serial/AMU Number <u>1809</u>	Serial/AMU Number <u>1868</u>
	Last Calibration Date <u>February 1, 2016</u>
	Full Scale (ppm) <u>1</u>

COMMENTS: Flows not manually measured - calibration system audited as it is currently being operated.

Auditor: Shea Beaton  
Operator Signature: [Signature]

Date: February 3, 2016  
Location: McIntyre Center Edmonton



# Calibrator Performance Audit

## Oxides Of Nitrogen

File No. 2015-165

Company Maxxam Operator: Chris Wesson

Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>None</u>
Serial Number	<u>11900613</u>	Serial Number	<u>None</u>
Last Verification Date	<u>April 1, 2015</u>	Temperature (°C)	<u>23.5</u>
NO Cylinder S/N	<u>LL119317</u>	Barometric Pressure	<u>706 mmHg</u>
NO/NOx Concentration	<u>50.3ppm/50.3ppm</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5001</u>	Pt. #2	<u>5000</u>
		Pt. #3	<u>5000</u>
Gas Flow (sccm)			
Pt. #1	<u>77.5</u>	Pt. #2	<u>37.8</u>
		Pt. #3	<u>18.9</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO <sub>2</sub>	NOx	NO	NOx
4999	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5001	77.5	0.779	0.779	0.775	0.000	0.775	-1%	-1%
5000	37.8	0.380	0.380	0.376	0.001	0.377	-1%	-1%
5000	18.9	0.190	0.190	0.188	0.001	0.189	-1%	-1%
Absolute Average Percent Difference							1%	1%

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

NO	LIMITS	NOx
Correlation= 1.0000	≥ 0.990	Correlation= 1.0000
m (Slope)= 0.9950	0.90-1.10	m (Slope)= 0.9946
b (Intercept % of FS)= -0.0773	± 3% F.S.	b (Intercept % of FS)= -0.0167

Flow	O <sub>3</sub> Conc	NO Decrease	NO	NO <sub>2</sub>	NOx	% Diff. Vs Audit gas	
5001	0	0.000	0.772	0.000	0.772	NO <sub>2</sub>	% Diff. Limit
5001	0.51	0.507	0.265	0.506	0.772	0%	± 10%
5001	0.25	0.252	0.520	0.254	0.773	1%	± 10%
5001	0.1	0.110	0.662	0.109	0.772	-1%	± 10%
Absolute Average Percent Difference						0.1%	± 10%

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

NO <sub>2</sub>	LIMITS
Correlation= 1.0000	≥ 0.995
m (Slope)= 0.9992	0.90-1.10
b (Intercept % of FS)= 0.0171	± 3% F.S.

AENV Standards Audit Calibrator	NO <sub>x</sub> Analyzer
Make/Model <u>Thermo 146i</u>	Make/Model <u>Thermo 42i</u>
Serial/AMU Number <u>1809</u>	Serial/AMU Number <u>1868</u>
	Last Calibration Date <u>March 28, 2016</u>
	Full Scale (ppm) <u>1</u>

COMMENTS: NO Cyl has 49.9ppb SO<sub>2</sub> - Flows Not Manually Measured

Auditor: Shea Beaton  
Operator Signature: [Signature]

Date: March 31, 2016  
Location: McIntyre Center Edmonton

## ***CALIBRATION GASES***



# Calibration Gas Audit

## Single Component Cylinder Gas

File No. 2016-335CGA

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

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

**Expiry Date:** July 2019

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

**Reference Analyzer:**

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

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

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

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.000	<del>0.0000</del>	<del>0.0000</del>	<del>0.000</del>
4935	82.0	0.830	0.01662	60.183	50.0
4968	40.8	0.412	0.00821	121.765	50.2
4955	20.2	0.203	0.00408	245.297	49.8
<b>Average Cylinder Concentration:</b>					<b>50.0</b>

**Previous Stated Concentration PPM:** 50.6

**Percent variance from Stated:** 1

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

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

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

**Auditor:** Al Clark

**Operator Signature:** *Al Clark*

**Date:** October 19, 2016

**Location:** McIntyre Center Edmonton







# Calibration Gas Audit

## CH4 / C3H8 Cylinder Gas

File No. 2015-092CGA

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

**Reference Calibrator and Gas:**

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

**Flow Measurement Device:**

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

**Reference Analyzer:**

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

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

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

**Cylinder gas tolerances based on CH4 only**

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

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



# Calibration Gas Audit

## NO Cylinder Gas

File No. 2016-336CGA

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

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

Expiry Date: July 2019

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

**Reference Analyzer:**

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

Instrument Settings    Zero: 4.4      Span: 1.080      Range: 1.0

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

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

***VOCS SAMPLES***

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
LICA/VOC/Bonnyville/Dec 2, 2016	S5623	Ambient Air	02-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120042	<b>REPORT CREATED:</b>	03-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120042-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	08-Dec-16
16120042-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	08-Dec-16
16120042-001	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-001	1,2-Dichloroethane	I	0.03	ppbv	0.01	AC-058	08-Dec-16
16120042-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16120042-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-001	1-Butene	I	0.03	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	2,2,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	2,2-Dimethylbutane	I	0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	2,3-Dimethylpentane	I	0.02	ppbv	0.02	AC-058	08-Dec-16

**Report certified by:** Graham Knox, Team Lead

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

**Date:** January-03-17

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
LICA/VOC/Bonnyville/Dec 2, 2016	S5623	Ambient Air	02-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120042	<b>REPORT CREATED:</b>	03-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120042-001	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	2-Methylheptane	I	0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	2-Methylhexane	I	0.04	ppbv	0.01	AC-058	08-Dec-16
16120042-001	2-Methylpentane	I	0.08	ppbv	0.01	AC-058	08-Dec-16
16120042-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	3-Methylhexane	I	0.03	ppbv	0.02	AC-058	08-Dec-16
16120042-001	3-Methylpentane	I	0.05	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Acetone		2.6	ppbv	0.4	AC-058	08-Dec-16
16120042-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16120042-001	Benzene		0.44	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Carbon disulfide	I	0.22	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Carbon tetrachloride	I	0.13	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Chloroform	I	0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Chloromethane		0.50	ppbv	0.02	AC-058	08-Dec-16
16120042-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-001	cis-2-Butene	I	0.04	ppbv	0.02	AC-058	08-Dec-16
16120042-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Cyclohexane	I	0.04	ppbv	0.02	AC-058	08-Dec-16

**Report certified by:** Graham Knox, Team Lead

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

**Date:** January-03-17

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
LICA/VOC/Bonnyville/Dec 2, 2016	S5623	Ambient Air	02-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120042	<b>REPORT CREATED:</b>	03-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120042-001	Cyclopentane	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Ethanol		0.6	ppbv	0.3	AC-058	08-Dec-16
16120042-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-001	Ethylbenzene	I	0.02	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Freon-11		0.35	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Freon-113	I	0.06	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Freon-12		0.73	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	08-Dec-16
16120042-001	Isobutane		0.73	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Isopentane		0.46	ppbv	0.03	AC-058	08-Dec-16
16120042-001	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Isopropyl alcohol		2.1	ppbv	0.4	AC-058	08-Dec-16
16120042-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	m,p-Xylene	I	0.08	ppbv	0.03	AC-058	08-Dec-16
16120042-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	08-Dec-16
16120042-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	08-Dec-16
16120042-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16120042-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	08-Dec-16
16120042-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	08-Dec-16
16120042-001	Methylcyclohexane	I	0.05	ppbv	0.01	AC-058	08-Dec-16
16120042-001	Methylcyclopentane	I	0.05	ppbv	0.02	AC-058	08-Dec-16

<b>Report certified by:</b>	Graham Knox, Team Lead	<b>On behalf of:</b>	PJ Pretorius, Manager, Analysis and Testing Services
<b>Date:</b>	January-03-17	<b>Inquiries:</b>	(780) 632 8455
		<b>E-mail:</b>	EAS.Results@innotechalberta.ca



<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
LICA/VOC/Bonnyville/Dec 2, 2016	S5623	Ambient Air	02-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120042	<b>REPORT CREATED:</b>	03-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120042-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	08-Dec-16
16120042-001	n-Butane		1.15	ppbv	0.03	AC-058	08-Dec-16
16120042-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	08-Dec-16
16120042-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-001	n-Heptane	I	0.04	ppbv	0.01	AC-058	08-Dec-16
16120042-001	n-Hexane	I	0.10	ppbv	0.01	AC-058	08-Dec-16
16120042-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	n-Pentane		0.3	ppbv	0.1	AC-058	08-Dec-16
16120042-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	08-Dec-16
16120042-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	08-Dec-16
16120042-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	08-Dec-16
16120042-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	o-Xylene	I	0.03	ppbv	0.01	AC-058	08-Dec-16
16120042-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	08-Dec-16
16120042-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	08-Dec-16
16120042-001	Toluene	I	0.27	ppbv	0.01	AC-058	08-Dec-16
16120042-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16
16120042-001	trans-2-Butene	K, T, U	< 0.01	ppbv	0.01	AC-058	08-Dec-16
16120042-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	08-Dec-16
16120042-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	08-Dec-16

**Report certified by:** Graham Knox, Team Lead

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

**Date:** January-03-17

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca



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 Vegreville, Alberta  
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**ENVIRONMENTAL ANALYTICAL SERVICES**

TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/Bonnyville/Dec 2, 2016	S5623	Ambient Air	02-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120042	<b>REPORT CREATED:</b>	03-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120042-001	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	08-Dec-16
16120042-001	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	08-Dec-16

<b>Report certified by:</b> Graham Knox, Team Lead	<b>On behalf of:</b> PJ Pretorius, Manager, Analysis and Testing Services
<b>Date:</b> January-03-17	<b>Inquiries:</b> (780) 632 8455 <b>E-mail:</b> EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
LICA/VOC/Bonnyville/ Dec 8, 2016	S5643	Ambient Air	08-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16
16120122-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	17-Dec-16
16120122-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	17-Dec-16
16120122-001	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-001	1,2-Dichloroethane	I	0.04	ppbv	0.01	AC-058	17-Dec-16
16120122-001	1,2-Dichloropropane	I	0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	17-Dec-16
16120122-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-001	1-Butene	I	0.16	ppbv	0.02	AC-058	17-Dec-16
16120122-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	2,2,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	2,2-Dimethylbutane	I	0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	2,3-Dimethylpentane	I	0.03	ppbv	0.02	AC-058	17-Dec-16

**Report certified by:** Krista Gegolick, Account Coordinator

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

**Date:** Friday, January 13, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
LICA/VOC/Bonnyville/ Dec 8, 2016	S5643	Ambient Air	08-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-001	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	2-Methylheptane	I	0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	2-Methylhexane	I	0.04	ppbv	0.01	AC-058	17-Dec-16
16120122-001	2-Methylpentane	I	0.09	ppbv	0.01	AC-058	17-Dec-16
16120122-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	3-Methylhexane	I	0.04	ppbv	0.02	AC-058	17-Dec-16
16120122-001	3-Methylpentane	I	0.05	ppbv	0.01	AC-058	17-Dec-16
16120122-001	Acetone		1.2	ppbv	0.4	AC-058	17-Dec-16
16120122-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	17-Dec-16
16120122-001	Benzene		0.64	ppbv	0.01	AC-058	17-Dec-16
16120122-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	Carbon disulfide	I	0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	Carbon tetrachloride	I	0.17	ppbv	0.01	AC-058	17-Dec-16
16120122-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	Chloroethane	I	0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	Chloroform	I	0.04	ppbv	0.02	AC-058	17-Dec-16
16120122-001	Chloromethane		0.70	ppbv	0.02	AC-058	17-Dec-16
16120122-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16
16120122-001	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	Cyclohexane	I	0.11	ppbv	0.02	AC-058	17-Dec-16

**Report certified by:** Krista Gegolick, Account Coordinator

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

**Date:** Friday, January 13, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
LICA/VOC/Bonnyville/ Dec 8, 2016	S5643	Ambient Air	08-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-001	Cyclopentane	I	0.02	ppbv	0.01	AC-058	17-Dec-16
16120122-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	Ethanol		0.4	ppbv	0.3	AC-058	17-Dec-16
16120122-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-001	Ethylbenzene	I	0.03	ppbv	0.01	AC-058	17-Dec-16
16120122-001	Freon-11		0.46	ppbv	0.02	AC-058	17-Dec-16
16120122-001	Freon-113	I	0.04	ppbv	0.01	AC-058	17-Dec-16
16120122-001	Freon-114	I	0.03	ppbv	0.02	AC-058	17-Dec-16
16120122-001	Freon-12		0.97	ppbv	0.02	AC-058	17-Dec-16
16120122-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	17-Dec-16
16120122-001	Isobutane		0.49	ppbv	0.02	AC-058	17-Dec-16
16120122-001	Isopentane	I	0.27	ppbv	0.03	AC-058	17-Dec-16
16120122-001	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	m,p-Xylene	I	0.17	ppbv	0.03	AC-058	17-Dec-16
16120122-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16
16120122-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	17-Dec-16
16120122-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	17-Dec-16
16120122-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	17-Dec-16
16120122-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	17-Dec-16
16120122-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-001	Methylcyclohexane	I	0.16	ppbv	0.01	AC-058	17-Dec-16
16120122-001	Methylcyclopentane	I	0.09	ppbv	0.02	AC-058	17-Dec-16

**Report certified by:** Krista Gegolick, Account Coordinator

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

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<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
LICA/VOC/Bonnyville/ Dec 8, 2016	S5643	Ambient Air	08-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	17-Dec-16
16120122-001	n-Butane		0.76	ppbv	0.03	AC-058	17-Dec-16
16120122-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	17-Dec-16
16120122-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-001	n-Heptane	I	0.06	ppbv	0.01	AC-058	17-Dec-16
16120122-001	n-Hexane	I	0.11	ppbv	0.01	AC-058	17-Dec-16
16120122-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	n-Pentane	I	0.2	ppbv	0.1	AC-058	17-Dec-16
16120122-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	17-Dec-16
16120122-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	17-Dec-16
16120122-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	17-Dec-16
16120122-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	o-Xylene	I	0.08	ppbv	0.01	AC-058	17-Dec-16
16120122-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16
16120122-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	17-Dec-16
16120122-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16
16120122-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16
16120122-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	17-Dec-16
16120122-001	Toluene		0.86	ppbv	0.01	AC-058	17-Dec-16
16120122-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16
16120122-001	trans-2-Butene	K, T, U	< 0.01	ppbv	0.01	AC-058	17-Dec-16
16120122-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	17-Dec-16

**Report certified by:** Krista Gegolick, Account Coordinator

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

**Date:** Friday, January 13, 2017

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# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/VOC/Bonnyville/ Dec 8, 2016	S5643	Ambient Air	08-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120122-001	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	17-Dec-16
16120122-001	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	17-Dec-16

**Report certified by:** Krista Gegolick, Account Coordinator

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

**Date:** Friday, January 13, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>RESULTS:</b> Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE  Calgary AB T2E 6P8	<b>CLIENT SAMPLE ID</b> ICA/Bonnyville/VOC/Dec 14, 2016	<b>CANISTER ID</b> 14717	<b>Matrix</b> Ambient Air	<b>Priority</b> Normal
	<b>DESCRIPTION:</b> Bonnyville - AER			
<b>INVOICE:</b> Arianna Cook PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5	<b>DATE SAMPLED:</b> 14-Dec-16	0:00	<b>DATE RECEIVED:</b> 21-Dec-16	
	<b>REPORT CREATED:</b> 19-Jan-17		<b>REPORT NUMBER:</b> 16120203	
			<b>VERSION:</b> Version 01	

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17
16120203-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	03-Jan-17
16120203-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	03-Jan-17
16120203-001	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	03-Jan-17
16120203-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	03-Jan-17
16120203-001	1,2-Dichloroethane	I	0.03	ppbv	0.01	AC-058	03-Jan-17
16120203-001	1,2-Dichloropropane	I	0.02	ppbv	0.01	AC-058	03-Jan-17
16120203-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	03-Jan-17
16120203-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-001	1-Butene	I	0.06	ppbv	0.02	AC-058	03-Jan-17

**Report certified by:** Krista Gegolick, Account Coordinator

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

**Date:** Thursday, January 19, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca



<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
.ICA/Bonnyville/VOC/Dec 14, 2016	14717	Ambient Air	14-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	2,2,4-Trimethylpentane	I	0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	2,3-Dimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	2-Methylhexane	I	0.02	ppbv	0.01	AC-058	03-Jan-17
16120203-001	2-Methylpentane	I	0.04	ppbv	0.01	AC-058	03-Jan-17
16120203-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	3-Methylhexane	I	0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	3-Methylpentane	I	0.03	ppbv	0.01	AC-058	03-Jan-17
16120203-001	Acetone		1.5	ppbv	0.4	AC-058	03-Jan-17
16120203-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	03-Jan-17
16120203-001	Benzene	I	0.16	ppbv	0.01	AC-058	03-Jan-17
16120203-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	Carbon disulfide	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	Carbon tetrachloride	I	0.15	ppbv	0.01	AC-058	03-Jan-17
16120203-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17

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.ICA/Bonnyville/VOC/Dec 14, 2016	14717	Ambient Air	14-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-001	Chloroform	I	0.04	ppbv	0.02	AC-058	03-Jan-17
16120203-001	Chloromethane		0.77	ppbv	0.02	AC-058	03-Jan-17
16120203-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17
16120203-001	cis-2-Butene	I	0.04	ppbv	0.02	AC-058	03-Jan-17
16120203-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	Cyclohexane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	Cyclopentane	I	0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	Dibromochloromethane	I	0.02	ppbv	0.01	AC-058	03-Jan-17
16120203-001	Ethanol		1.0	ppbv	0.3	AC-058	03-Jan-17
16120203-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-001	Ethylbenzene	I	0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	Freon-11		0.44	ppbv	0.02	AC-058	03-Jan-17
16120203-001	Freon-113	I	0.08	ppbv	0.01	AC-058	03-Jan-17
16120203-001	Freon-114	I	0.03	ppbv	0.02	AC-058	03-Jan-17
16120203-001	Freon-12		0.94	ppbv	0.02	AC-058	03-Jan-17
16120203-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	03-Jan-17
16120203-001	Isobutane		0.65	ppbv	0.02	AC-058	03-Jan-17
16120203-001	Isopentane	I	0.28	ppbv	0.03	AC-058	03-Jan-17
16120203-001	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	m,p-Xylene	K, T, U	< 0.03	ppbv	0.03	AC-058	03-Jan-17
16120203-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17
16120203-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	03-Jan-17

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.ICA/Bonnyville/VOC/Dec 14, 2016	14717	Ambient Air	14-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	03-Jan-17
16120203-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	03-Jan-17
16120203-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	03-Jan-17
16120203-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	03-Jan-17
16120203-001	Methylcyclohexane	I	0.03	ppbv	0.01	AC-058	03-Jan-17
16120203-001	Methylcyclopentane	I	0.03	ppbv	0.02	AC-058	03-Jan-17
16120203-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	03-Jan-17
16120203-001	n-Butane		1.09	ppbv	0.03	AC-058	03-Jan-17
16120203-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	03-Jan-17
16120203-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-001	n-Heptane	I	0.03	ppbv	0.01	AC-058	03-Jan-17
16120203-001	n-Hexane	I	0.05	ppbv	0.01	AC-058	03-Jan-17
16120203-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	n-Pentane	I	0.2	ppbv	0.1	AC-058	03-Jan-17
16120203-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	03-Jan-17
16120203-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	03-Jan-17
16120203-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	03-Jan-17
16120203-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	o-Xylene	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17
16120203-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	03-Jan-17
16120203-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17
16120203-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17

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.ICA/Bonnyville/VOC/Dec 14, 2016	14717	Ambient Air	14-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17
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Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-001	Toluene	I	0.07	ppbv	0.01	AC-058	03-Jan-17
16120203-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	03-Jan-17
16120203-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17
16120203-001	trans-2-Butene	I	0.03	ppbv	0.01	AC-058	03-Jan-17
16120203-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17
16120203-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	03-Jan-17
16120203-001	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	03-Jan-17
16120203-001	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	03-Jan-17

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<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
.ICA/VOC/Bonnyville/Dec 20, 2016	15007	Ambient Air	20-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120222	<b>REPORT CREATED:</b>	23-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120222-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17
16120222-003	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	05-Jan-17
16120222-003	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	05-Jan-17
16120222-003	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120222-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120222-003	1,2-Dichloroethane	I	0.05	ppbv	0.01	AC-058	05-Jan-17
16120222-003	1,2-Dichloropropane	I	0.03	ppbv	0.01	AC-058	05-Jan-17
16120222-003	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	05-Jan-17
16120222-003	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-003	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-003	1-Butene	I	0.06	ppbv	0.02	AC-058	05-Jan-17
16120222-003	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	2,2,4-Trimethylpentane	I	0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	2,3-Dimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Monday, January 23, 2017

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<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
.ICA/VOC/Bonnyville/Dec 20, 2016	15007	Ambient Air	20-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120222	<b>REPORT CREATED:</b>	23-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120222-003	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	2-Methylhexane	I	0.03	ppbv	0.01	AC-058	05-Jan-17
16120222-003	2-Methylpentane	I	0.09	ppbv	0.01	AC-058	05-Jan-17
16120222-003	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	3-Methylhexane	I	0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	3-Methylpentane	I	0.20	ppbv	0.01	AC-058	05-Jan-17
16120222-003	Acetone		1.3	ppbv	0.4	AC-058	05-Jan-17
16120222-003	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	05-Jan-17
16120222-003	Benzene	I	0.11	ppbv	0.01	AC-058	05-Jan-17
16120222-003	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	Carbon disulfide	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	Carbon tetrachloride	I	0.15	ppbv	0.01	AC-058	05-Jan-17
16120222-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	Chloroform	I	0.14	ppbv	0.02	AC-058	05-Jan-17
16120222-003	Chloromethane		0.73	ppbv	0.02	AC-058	05-Jan-17
16120222-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17
16120222-003	cis-2-Butene	I	0.03	ppbv	0.02	AC-058	05-Jan-17
16120222-003	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	Cyclohexane	I	0.04	ppbv	0.02	AC-058	05-Jan-17

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.ICA/VOC/Bonnyville/Dec 20, 2016	15007	Ambient Air	20-Dec-16	0:00
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<b>REPORT NUMBER:</b>	16120222	<b>REPORT CREATED:</b>	23-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120222-003	Cyclopentane	I	0.02	ppbv	0.01	AC-058	05-Jan-17
16120222-003	Dibromochloromethane	I	0.02	ppbv	0.01	AC-058	05-Jan-17
16120222-003	Ethanol		2.6	ppbv	0.3	AC-058	05-Jan-17
16120222-003	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-003	Ethylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	Freon-11		0.43	ppbv	0.02	AC-058	05-Jan-17
16120222-003	Freon-113	I	0.08	ppbv	0.01	AC-058	05-Jan-17
16120222-003	Freon-114	I	0.03	ppbv	0.02	AC-058	05-Jan-17
16120222-003	Freon-12		0.92	ppbv	0.02	AC-058	05-Jan-17
16120222-003	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	05-Jan-17
16120222-003	Isobutane		0.92	ppbv	0.02	AC-058	05-Jan-17
16120222-003	Isopentane		0.45	ppbv	0.03	AC-058	05-Jan-17
16120222-003	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	Isopropyl alcohol		0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-003	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	m,p-Xylene	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120222-003	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17
16120222-003	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	05-Jan-17
16120222-003	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	05-Jan-17
16120222-003	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	05-Jan-17
16120222-003	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-003	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	05-Jan-17
16120222-003	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120222-003	Methylcyclohexane	I	0.03	ppbv	0.01	AC-058	05-Jan-17
16120222-003	Methylcyclopentane	I	0.27	ppbv	0.02	AC-058	05-Jan-17

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Monday, January 23, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca



<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
.ICA/VOC/Bonnyville/Dec 20, 2016	15007	Ambient Air	20-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120222	<b>REPORT CREATED:</b>	23-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120222-003	Methylene chloride		7.9	ppbv	0.3	AC-058	05-Jan-17
16120222-003	n-Butane		1.74	ppbv	0.03	AC-058	05-Jan-17
16120222-003	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	05-Jan-17
16120222-003	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-003	n-Heptane	I	0.03	ppbv	0.01	AC-058	05-Jan-17
16120222-003	n-Hexane		1.17	ppbv	0.01	AC-058	05-Jan-17
16120222-003	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	n-Pentane		0.5	ppbv	0.1	AC-058	05-Jan-17
16120222-003	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	05-Jan-17
16120222-003	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	05-Jan-17
16120222-003	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	05-Jan-17
16120222-003	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	o-Xylene	I	0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17
16120222-003	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	05-Jan-17
16120222-003	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17
16120222-003	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17
16120222-003	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	05-Jan-17
16120222-003	Toluene	I	0.06	ppbv	0.01	AC-058	05-Jan-17
16120222-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	05-Jan-17
16120222-003	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17
16120222-003	trans-2-Butene	I	0.05	ppbv	0.01	AC-058	05-Jan-17
16120222-003	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120222-003	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	05-Jan-17

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

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**ENVIRONMENTAL ANALYTICAL SERVICES**

TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
.ICA/VOC/Bonnyville/Dec 20, 2016	15007	Ambient Air	20-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120222	<b>REPORT CREATED:</b>	23-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120222-003	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	05-Jan-17
16120222-003	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	05-Jan-17

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<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
.ICA/VOC/Bonnyville/Dec 26, 2016	2489	Ambient Air	26-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120231	<b>REPORT CREATED:</b>	18-Jan-17	<b>REPORT REVISED:</b> 23-Jan-17
			<b>VERSION:</b>	Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120231-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17
16120231-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	09-Jan-17
16120231-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	09-Jan-17
16120231-001	1,2,4-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	09-Jan-17
16120231-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	09-Jan-17
16120231-001	1,2-Dichloroethane	I	0.04	ppbv	0.01	AC-058	09-Jan-17
16120231-001	1,2-Dichloropropane	I	0.02	ppbv	0.01	AC-058	09-Jan-17
16120231-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-001	1,3-Butadiene	I	0.04	ppbv	0.02	AC-058	09-Jan-17
16120231-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	09-Jan-17
16120231-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-001	1-Butene	I	0.14	ppbv	0.02	AC-058	09-Jan-17
16120231-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-001	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-001	2,2,4-Trimethylpentane	I	0.03	ppbv	0.01	AC-058	09-Jan-17
16120231-001	2,2-Dimethylbutane	I	0.03	ppbv	0.01	AC-058	09-Jan-17
16120231-001	2,3,4-Trimethylpentane	I	0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-001	2,3-Dimethylbutane	I	0.06	ppbv	0.02	AC-058	09-Jan-17
16120231-001	2,3-Dimethylpentane	I	0.06	ppbv	0.02	AC-058	09-Jan-17

**Report certified by:** Graham Knox, Team Lead

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

**Date:** January-23-17

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<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
.ICA/VOC/Bonnyville/Dec 26, 2016	2489	Ambient Air	26-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120231	<b>REPORT CREATED:</b>	18-Jan-17	<b>REPORT REVISED:</b> 23-Jan-17
			<b>VERSION:</b>	Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120231-001	2,4-Dimethylpentane	I	0.02	ppbv	0.01	AC-058	09-Jan-17
16120231-001	2-Methylheptane	I	0.03	ppbv	0.01	AC-058	09-Jan-17
16120231-001	2-Methylhexane	I	0.06	ppbv	0.01	AC-058	09-Jan-17
16120231-001	2-Methylpentane	I	0.17	ppbv	0.01	AC-058	09-Jan-17
16120231-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-001	3-Methylhexane	I	0.06	ppbv	0.02	AC-058	09-Jan-17
16120231-001	3-Methylpentane	I	0.10	ppbv	0.01	AC-058	09-Jan-17
16120231-001	Acetone		1.7	ppbv	0.4	AC-058	09-Jan-17
16120231-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	09-Jan-17
16120231-001	Benzene	I	0.25	ppbv	0.01	AC-058	09-Jan-17
16120231-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-001	Carbon disulfide	I	0.02	ppbv	0.01	AC-058	09-Jan-17
16120231-001	Carbon tetrachloride	I	0.13	ppbv	0.01	AC-058	09-Jan-17
16120231-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-001	Chloroform	I	0.04	ppbv	0.02	AC-058	09-Jan-17
16120231-001	Chloromethane		0.89	ppbv	0.02	AC-058	09-Jan-17
16120231-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17
16120231-001	cis-2-Butene	I	0.05	ppbv	0.02	AC-058	09-Jan-17
16120231-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-001	Cyclohexane	I	0.11	ppbv	0.02	AC-058	09-Jan-17

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<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
.ICA/VOC/Bonnyville/Dec 26, 2016	2489	Ambient Air	26-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120231	<b>REPORT CREATED:</b>	18-Jan-17	<b>REPORT REVISED:</b> 23-Jan-17
			<b>VERSION:</b>	Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120231-001	Cyclopentane	I	0.05	ppbv	0.01	AC-058	09-Jan-17
16120231-001	Dibromochloromethane	I	0.02	ppbv	0.01	AC-058	09-Jan-17
16120231-001	Ethanol		2.7	ppbv	0.3	AC-058	09-Jan-17
16120231-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-001	Ethylbenzene	I	0.02	ppbv	0.01	AC-058	09-Jan-17
16120231-001	Freon-11		0.39	ppbv	0.02	AC-058	09-Jan-17
16120231-001	Freon-113	I	0.07	ppbv	0.01	AC-058	09-Jan-17
16120231-001	Freon-114	I	0.03	ppbv	0.02	AC-058	09-Jan-17
16120231-001	Freon-12		0.92	ppbv	0.02	AC-058	09-Jan-17
16120231-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	09-Jan-17
16120231-001	Isobutane		1.48	ppbv	0.02	AC-058	09-Jan-17
16120231-001	Isopentane		0.95	ppbv	0.03	AC-058	09-Jan-17
16120231-001	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-001	m,p-Xylene	I	0.06	ppbv	0.03	AC-058	09-Jan-17
16120231-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17
16120231-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	09-Jan-17
16120231-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	09-Jan-17
16120231-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	09-Jan-17
16120231-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	09-Jan-17
16120231-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	09-Jan-17
16120231-001	Methylcyclohexane	I	0.18	ppbv	0.01	AC-058	09-Jan-17
16120231-001	Methylcyclopentane	I	0.13	ppbv	0.02	AC-058	09-Jan-17

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.ICA/VOC/Bonnyville/Dec 26, 2016	2489	Ambient Air	26-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120231	<b>REPORT CREATED:</b>	18-Jan-17	<b>REPORT REVISED:</b> 23-Jan-17
			<b>VERSION:</b>	Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120231-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	09-Jan-17
16120231-001	n-Butane		3.21	ppbv	0.03	AC-058	09-Jan-17
16120231-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	09-Jan-17
16120231-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-001	n-Heptane	I	0.08	ppbv	0.01	AC-058	09-Jan-17
16120231-001	n-Hexane	I	0.20	ppbv	0.01	AC-058	09-Jan-17
16120231-001	n-Octane	I	0.03	ppbv	0.02	AC-058	09-Jan-17
16120231-001	n-Pentane		0.6	ppbv	0.1	AC-058	09-Jan-17
16120231-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	09-Jan-17
16120231-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	09-Jan-17
16120231-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	09-Jan-17
16120231-001	n-Nonane	I	0.02	ppbv	0.01	AC-058	09-Jan-17
16120231-001	o-Ethyltoluene	I	0.03	ppbv	0.01	AC-058	09-Jan-17
16120231-001	o-Xylene	I	0.03	ppbv	0.01	AC-058	09-Jan-17
16120231-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17
16120231-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	09-Jan-17
16120231-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17
16120231-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17
16120231-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	09-Jan-17
16120231-001	Toluene	I	0.15	ppbv	0.01	AC-058	09-Jan-17
16120231-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	09-Jan-17
16120231-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17
16120231-001	trans-2-Butene	I	0.07	ppbv	0.01	AC-058	09-Jan-17
16120231-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	09-Jan-17
16120231-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	09-Jan-17

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**ENVIRONMENTAL ANALYTICAL SERVICES**

TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
.ICA/VOC/Bonnyville/Dec 26, 2016	2489	Ambient Air	26-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120231	<b>REPORT CREATED:</b>	18-Jan-17	<b>REPORT REVISED:</b> 23-Jan-17
				<b>VERSION:</b> Version 02

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120231-001	Vinyl acetate	K, T, U	< 0.4 ppbv	0.4	AC-058	09-Jan-17
16120231-001	Vinyl chloride	K, T, U	< 0.02 ppbv	0.02	AC-058	09-Jan-17

**Report certified by:** Graham Knox, Team Lead

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

**Date:** January-23-17

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***PAHS SAMPLES***

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/PUF/Bonnyville/Dec 2, 2016	TE03	Air Filter	02-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120042	<b>REPORT CREATED:</b>	03-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120042-002	1-Methylnaphthalene		0.14	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	2-Methylnaphthalene		0.21	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Acenaphthene		0.09	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Acenaphthylene		0.06	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Acridine	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Benzo(a)anthracene		0.04	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Benzo(a)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Benzo(b,j,k)fluoranthene		0.05	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Benzo(e)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Benzo(ghi)perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Chrysene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Fluoranthene		0.05	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Fluorene		0.08	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Naphthalene		0.11	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Perylene	K, T, U	< 0.01	ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Phenanthrene		0.17	ug/puf	0.01	NA-017	11-Dec-16

**Report certified by:** Rebecca Holgate, Account Coordinator

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

**Date:** January-03-17

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca





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# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/PUF/Bonnyville/Dec 2, 2016	TE03	Air Filter	02-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120042	<b>REPORT CREATED:</b>	03-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120042-002	Pyrene		0.06 ug/puf	0.01	NA-017	11-Dec-16
16120042-002	Retene		0.02 ug/puf	0.01	NA-017	11-Dec-16

**Report certified by:** Rebecca Holgate, Account Coordinator

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

**Date:** January-03-17

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/PUF/Bonnyville/ Dec 8, 2016	TE09	Air Filter	08-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-002	1-Methylnaphthalene		0.36	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	2-Methylnaphthalene		0.74	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Acenaphthene		0.08	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Acenaphthylene		0.06	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Acridine	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Anthracene		0.04	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Benzo(a)anthracene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Benzo(a)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Benzo(b,j,k)fluoranthene		0.03	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Benzo(c)phenanthrene		0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Benzo(e)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Benzo(ghi)perylene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Chrysene		0.02	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Dibenzo(a,i)pyrene		0.02	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Fluoranthene		0.07	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Fluorene		0.10	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Naphthalene		0.87	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Perylene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Phenanthrene		0.29	ug/PUF	0.01	NA-017	24-Dec-16

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Friday, January 13, 2017

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# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/PUF/Bonnyville/ Dec 8, 2016	TE09	Air Filter	08-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120122-002	Pyrene		0.04 ug/PUF	0.01	NA-017	24-Dec-16
16120122-002	Retene		0.15 ug/PUF	0.01	NA-017	24-Dec-16

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Friday, January 13, 2017

**Inquiries:** (780) 632 8455

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<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
LICA/PUF/Bonnyville/Dec 14, 2016	A13-02	Air Filter	14-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-002	1-Methylnaphthalene		0.73	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	2-Methylnaphthalene		1.20	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Acenaphthene		0.15	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Acenaphthylene		0.18	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Acridine	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Anthracene		0.10	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Benzo(a)anthracene		0.03	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Benzo(a)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Benzo(b,j,k)fluoranthene		0.08	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Benzo(c)phenanthrene		0.02	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Benzo(e)pyrene		0.02	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Benzo(ghi)perylene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Chrysene		0.07	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Dibenzo(a,i)pyrene		0.02	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Fluoranthene		0.21	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Fluorene		0.34	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Naphthalene		1.87	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Perylene		0.01	ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Phenanthrene		0.85	ug/PUF	0.01	NA-017	24-Dec-16

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Thursday, January 19, 2017

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# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/PUF/Bonnyville/Dec 14, 2016	A13-02	Air Filter	14-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120203-002	Pyrene		0.14 ug/PUF	0.01	NA-017	24-Dec-16
16120203-002	Retene		1.51 ug/PUF	0.01	NA-017	24-Dec-16

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Thursday, January 19, 2017

**Inquiries:** (780) 632 8455

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<b>RESULTS:</b>	Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE		<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>Priority</b>
	Calgary AB	T2E 6P8	ICA/PUF/Bonnyville/Dec 20, 2016	TE04	Air Filter	Normal
<b>INVOICE:</b>	Arianna Cook PO Box 8237 5107W-50 St Bonnyville AB		780 812 2182		<b>DESCRIPTION:</b>	
					Bonnyville - AER	
			<b>DATE SAMPLED:</b>	20-Dec-16 0:00	<b>DATE RECEIVED:</b>	23-Dec-16
			<b>REPORT CREATED:</b>	23-Jan-17	<b>REPORT NUMBER:</b>	16120222
					<b>VERSION:</b>	Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120222-004	1-Methylnaphthalene		0.38	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	2-Methylnaphthalene		0.66	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	3-Methylcholanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Acenaphthene		0.07	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Acenaphthylene		0.08	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Acridine	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Anthracene		0.04	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Benzo(a)anthracene		0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Benzo(a)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Benzo(e)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Benzo(ghi)perylene		0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Chrysene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Monday, January 23, 2017

**Inquiries:** (780) 632 8455

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# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
LICA/PUF/Bonnyville/Dec 20, 2016	TE04	Air Filter	20-Dec-16 0:00
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120222	<b>REPORT CREATED:</b>	23-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120222-004	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Fluoranthene		0.07	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Fluorene		0.12	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Naphthalene		0.46	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Phenanthrene		0.30	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Pyrene		0.05	ug/Filter	0.01	NA-017	17-Jan-17
16120222-004	Retene		0.06	ug/Filter	0.01	NA-017	17-Jan-17

**Report certified by:** Graham Knox, Team Lead

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

**Date:** Monday, January 23, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>RESULTS:</b> Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE  Calgary AB T2E 6P8	<b>CLIENT SAMPLE ID</b> ICA/PUF/Bonnyville/Dec 26, 2016	<b>CANISTER ID</b> TE-02	<b>Matrix</b> Air Filter	<b>Priority</b> Normal
	<b>DESCRIPTION:</b> Bonnyville - AER			
<b>INVOICE:</b> Arianna Cook PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5	<b>DATE SAMPLED:</b> 26-Dec-16	0:00	<b>DATE RECEIVED:</b> 29-Dec-16	
	<b>REPORT CREATED:</b> 18-Jan-17		<b>REPORT NUMBER:</b> 16120231	
	<b>REPORT REVISED:</b> 23-Jan-17		<b>VERSION:</b> Version 02	

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120231-002	1-Methylnaphthalene		0.59	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	2-Methylnaphthalene		0.98	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Acenaphthene		0.09	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Acenaphthylene		0.20	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Acridine	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Anthracene		0.06	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Benzo(a)anthracene		0.03	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Benzo(a)pyrene		0.02	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Benzo(b,j,k)fluoranthene		0.02	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Benzo(e)pyrene		0.02	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Benzo(ghi)perylene		0.03	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Chrysene		0.04	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Dibenzo(a,i)pyrene		0.05	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17

**Report certified by:** Graham Knox, Team Lead

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

**Date:** January-23-17

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca



<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
LICA/PUF/Bonnyville/Dec 26, 2016	TE-02	Air Filter	26-Dec-16	0:00
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120231	<b>REPORT CREATED:</b>	18-Jan-17	<b>REPORT REVISED:</b> 23-Jan-17
			<b>VERSION:</b>	Version 02

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120231-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Fluoranthene		0.11	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Fluorene		0.17	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Naphthalene		1.15	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Phenanthrene		0.51	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Pyrene		0.08	ug/Filter	0.01	NA-017	17-Jan-17
16120231-002	Retene		0.15	ug/Filter	0.01	NA-017	17-Jan-17

**Report certified by:** Graham Knox, Team Lead

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

**Date:** January-23-17

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***NMHC CANISTER SAMPLES***



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# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<b>RESULTS:</b> Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE  Calgary AB T2E 6P8	<b>CLIENT SAMPLE ID</b> /NMHC VOC/Bonnyville/ Dec 7, 2	<b>CANISTER ID</b> 1136	<b>Matrix</b> Ambient Air	<b>Priority</b> Normal
	<b>DESCRIPTION:</b> Bonnyville - AER			
<b>INVOICE:</b> Arianna Cook PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5	780 812 2182	<b>DATE SAMPLED:</b> 07-Dec-16 6:35	<b>DATE RECEIVED:</b> 14-Dec-16	
		<b>REPORT CREATED:</b> 13-Jan-17	<b>REPORT NUMBER:</b> 16120122	
			<b>VERSION:</b> Version 01	

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-005	1,1,1-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-005	1,1,2,2-Tetrachloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-005	1,1,2-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-005	1,1-Dichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-005	1,1-Dichloroethylene	K, T, U	< 0.06	ppbv	0.06	AC-058	17-Dec-16
16120122-005	1,2,3-Trimethylbenzene	K, T, U	< 0.08	ppbv	0.08	AC-058	17-Dec-16
16120122-005	1,2,4-Trichlorobenzene	K, T, U	< 1.2	ppbv	1.2	AC-058	17-Dec-16
16120122-005	1,2,4-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	17-Dec-16
16120122-005	1,2-Dibromoethane	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-005	1,2-Dichlorobenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	17-Dec-16
16120122-005	1,2-Dichloroethane	I	0.04	ppbv	0.02	AC-058	17-Dec-16
16120122-005	1,2-Dichloropropane	I	0.03	ppbv	0.02	AC-058	17-Dec-16
16120122-005	1,3,5-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-005	1,3-Butadiene	I	0.10	ppbv	0.03	AC-058	17-Dec-16
16120122-005	1,3-Dichlorobenzene	K, T, U	< 0.5	ppbv	0.5	AC-058	17-Dec-16
16120122-005	1,4-Dichlorobenzene	K, T, U	< 0.6	ppbv	0.6	AC-058	17-Dec-16
16120122-005	1,4-Dioxane	K, T, U	< 0.6	ppbv	0.6	AC-058	17-Dec-16
16120122-005	1-Butene		0.66	ppbv	0.03	AC-058	17-Dec-16

**Report certified by:** Krista Gegolick, Account Coordinator

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

**Date:** Friday, January 13, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
√NMHC VOC/Bonnyville/ Dec 7, 2	1136	Ambient Air	07-Dec-16 6:35
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-005	1-Hexene	I	0.07	ppbv	0.03	AC-058	17-Dec-16
16120122-005	1-Pentene	I	0.08	ppbv	0.02	AC-058	17-Dec-16
16120122-005	2,2,4-Trimethylpentane	I	0.11	ppbv	0.02	AC-058	17-Dec-16
16120122-005	2,2-Dimethylbutane	I	0.03	ppbv	0.02	AC-058	17-Dec-16
16120122-005	2,3,4-Trimethylpentane	I	0.05	ppbv	0.02	AC-058	17-Dec-16
16120122-005	2,3-Dimethylbutane	I	0.10	ppbv	0.03	AC-058	17-Dec-16
16120122-005	2,3-Dimethylpentane	I	0.23	ppbv	0.03	AC-058	17-Dec-16
16120122-005	2,4-Dimethylpentane	I	0.07	ppbv	0.02	AC-058	17-Dec-16
16120122-005	2-Methylheptane	I	0.06	ppbv	0.02	AC-058	17-Dec-16
16120122-005	2-Methylhexane	I	0.22	ppbv	0.02	AC-058	17-Dec-16
16120122-005	2-Methylpentane	I	0.41	ppbv	0.02	AC-058	17-Dec-16
16120122-005	3-Methylheptane	I	0.04	ppbv	0.03	AC-058	17-Dec-16
16120122-005	3-Methylhexane	I	0.17	ppbv	0.03	AC-058	17-Dec-16
16120122-005	3-Methylpentane	I	0.24	ppbv	0.02	AC-058	17-Dec-16
16120122-005	Acetone		1.8	ppbv	0.6	AC-058	17-Dec-16
16120122-005	Acrolein	K, T, U	< 0.5	ppbv	0.5	AC-058	17-Dec-16
16120122-005	Benzene	I	0.34	ppbv	0.02	AC-058	17-Dec-16
16120122-005	Benzyl chloride	K, T, U	< 0.6	ppbv	0.6	AC-058	17-Dec-16
16120122-005	Bromodichloromethane	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-005	Bromoform	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-005	Bromomethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-005	Carbon disulfide		0.67	ppbv	0.02	AC-058	17-Dec-16
16120122-005	Carbon tetrachloride	I	0.17	ppbv	0.02	AC-058	17-Dec-16
16120122-005	Chlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-005	Chloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16

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<b>REPORT NUMBER:</b>	16120122	<b>REPORT CREATED:</b>	13-Jan-17
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Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-005	Chloroform	I	0.04	ppbv	0.03	AC-058	17-Dec-16
16120122-005	Chloromethane		0.67	ppbv	0.03	AC-058	17-Dec-16
16120122-005	cis-1,2-Dichloroethene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-005	cis-1,3-Dichloropropene	K, T, U	< 0.06	ppbv	0.06	AC-058	17-Dec-16
16120122-005	cis-2-Butene	I	0.12	ppbv	0.03	AC-058	17-Dec-16
16120122-005	cis-2-Pentene	I	0.07	ppbv	0.03	AC-058	17-Dec-16
16120122-005	Cyclohexane	I	0.11	ppbv	0.03	AC-058	17-Dec-16
16120122-005	Cyclopentane	I	0.05	ppbv	0.02	AC-058	17-Dec-16
16120122-005	Dibromochloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-005	Ethanol		3.0	ppbv	0.5	AC-058	17-Dec-16
16120122-005	Ethyl acetate	K, T, U	< 0.6	ppbv	0.6	AC-058	17-Dec-16
16120122-005	Ethylbenzene	I	0.06	ppbv	0.02	AC-058	17-Dec-16
16120122-005	Freon-11		0.45	ppbv	0.03	AC-058	17-Dec-16
16120122-005	Freon-113	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-005	Freon-114	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16
16120122-005	Freon-12		1.00	ppbv	0.03	AC-058	17-Dec-16
16120122-005	Hexachloro-1,3-butadiene	K, T, U	< 0.76	ppbv	0.76	AC-058	17-Dec-16
16120122-005	Isobutane		1.02	ppbv	0.03	AC-058	17-Dec-16
16120122-005	Isopentane		1.42	ppbv	0.05	AC-058	17-Dec-16
16120122-005	Isoprene	I	0.03	ppbv	0.02	AC-058	17-Dec-16
16120122-005	Isopropyl alcohol	K, T, U	< 0.6	ppbv	0.6	AC-058	17-Dec-16
16120122-005	Isopropylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-005	m,p-Xylene	I	0.21	ppbv	0.05	AC-058	17-Dec-16
16120122-005	m-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	17-Dec-16
16120122-005	m-Ethyltoluene	K, T, U	< 0.12	ppbv	0.12	AC-058	17-Dec-16

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Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-005	Methyl butyl ketone	K, T, U	< 0.76	ppbv	0.76	AC-058	17-Dec-16
16120122-005	Methyl ethyl ketone	K, T, U	< 0.5	ppbv	0.5	AC-058	17-Dec-16
16120122-005	Methyl isobutyl ketone	K, T, U	< 0.6	ppbv	0.6	AC-058	17-Dec-16
16120122-005	Methyl methacrylate	K, T, U	< 0.11	ppbv	0.11	AC-058	17-Dec-16
16120122-005	Methyl tert butyl ether	K, T, U	< 0.05	ppbv	0.05	AC-058	17-Dec-16
16120122-005	Methylcyclohexane	I	0.23	ppbv	0.02	AC-058	17-Dec-16
16120122-005	Methylcyclopentane	I	0.31	ppbv	0.03	AC-058	17-Dec-16
16120122-005	Methylene chloride	K, T, U	< 0.5	ppbv	0.5	AC-058	17-Dec-16
16120122-005	n-Butane		2.93	ppbv	0.05	AC-058	17-Dec-16
16120122-005	n-Decane	K, T, U	< 0.09	ppbv	0.09	AC-058	17-Dec-16
16120122-005	n-Dodecane	K, T, U	< 0.6	ppbv	0.6	AC-058	17-Dec-16
16120122-005	n-Heptane	I	0.15	ppbv	0.02	AC-058	17-Dec-16
16120122-005	n-Hexane	I	0.22	ppbv	0.02	AC-058	17-Dec-16
16120122-005	n-Octane	I	0.05	ppbv	0.03	AC-058	17-Dec-16
16120122-005	n-Pentane		0.5	ppbv	0.2	AC-058	17-Dec-16
16120122-005	n-Propylbenzene	K, T, U	< 0.08	ppbv	0.08	AC-058	17-Dec-16
16120122-005	n-Undecane	K, T, U	< 0.8	ppbv	0.8	AC-058	17-Dec-16
16120122-005	Naphthalene	K, T, U	< 0.8	ppbv	0.8	AC-058	17-Dec-16
16120122-005	n-Nonane	I	0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-005	o-Ethyltoluene	I	0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-005	o-Xylene	I	0.09	ppbv	0.02	AC-058	17-Dec-16
16120122-005	p-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	17-Dec-16
16120122-005	p-Ethyltoluene	K, T, U	< 0.11	ppbv	0.11	AC-058	17-Dec-16
16120122-005	Styrene	K, T, U	< 0.06	ppbv	0.06	AC-058	17-Dec-16
16120122-005	Tetrachloroethylene	K, T, U	< 0.06	ppbv	0.06	AC-058	17-Dec-16

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Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120122-005	Tetrahydrofuran	K, T, U	< 0.6	ppbv	0.6	AC-058	17-Dec-16
16120122-005	Toluene		0.48	ppbv	0.02	AC-058	17-Dec-16
16120122-005	trans-1,2-Dichloroethylene	K, T, U	< 0.02	ppbv	0.02	AC-058	17-Dec-16
16120122-005	trans-1,3-Dichloropropylene	K, T, U	< 0.06	ppbv	0.06	AC-058	17-Dec-16
16120122-005	trans-2-Butene	I	0.22	ppbv	0.02	AC-058	17-Dec-16
16120122-005	trans-2-Pentene	I	0.12	ppbv	0.03	AC-058	17-Dec-16
16120122-005	Trichloroethylene	K, T, U	< 0.06	ppbv	0.06	AC-058	17-Dec-16
16120122-005	Vinyl acetate	K, T, U	< 0.6	ppbv	0.6	AC-058	17-Dec-16
16120122-005	Vinyl chloride	K, T, U	< 0.03	ppbv	0.03	AC-058	17-Dec-16

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<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
,/NMHC VOC/Bonnyville/Dec 17, 2	2452	Ambient Air	17-Dec-16	10:10
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-005	1,1,1-Trichloroethane	I	0.04	ppbv	0.03	AC-058	05-Jan-17
16120203-005	1,1,2,2-Tetrachloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120203-005	1,1,2-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120203-005	1,1-Dichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120203-005	1,1-Dichloroethylene	K, T, U	< 0.06	ppbv	0.06	AC-058	05-Jan-17
16120203-005	1,2,3-Trimethylbenzene	K, T, U	< 0.08	ppbv	0.08	AC-058	05-Jan-17
16120203-005	1,2,4-Trichlorobenzene	K, T, U	< 1.2	ppbv	1.2	AC-058	05-Jan-17
16120203-005	1,2,4-Trimethylbenzene		0.61	ppbv	0.05	AC-058	05-Jan-17
16120203-005	1,2-Dibromoethane	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120203-005	1,2-Dichlorobenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	05-Jan-17
16120203-005	1,2-Dichloroethane	I	0.08	ppbv	0.02	AC-058	05-Jan-17
16120203-005	1,2-Dichloropropane	I	0.05	ppbv	0.02	AC-058	05-Jan-17
16120203-005	1,3,5-Trimethylbenzene	I	0.04	ppbv	0.03	AC-058	05-Jan-17
16120203-005	1,3-Butadiene	I	0.09	ppbv	0.03	AC-058	05-Jan-17
16120203-005	1,3-Dichlorobenzene	K, T, U	< 0.5	ppbv	0.5	AC-058	05-Jan-17
16120203-005	1,4-Dichlorobenzene	K, T, U	< 0.6	ppbv	0.6	AC-058	05-Jan-17
16120203-005	1,4-Dioxane	K, T, U	< 0.6	ppbv	0.6	AC-058	05-Jan-17
16120203-005	1-Butene	I	0.34	ppbv	0.03	AC-058	05-Jan-17
16120203-005	1-Hexene	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120203-005	1-Pentene	I	0.05	ppbv	0.02	AC-058	05-Jan-17
16120203-005	2,2,4-Trimethylpentane	I	0.05	ppbv	0.02	AC-058	05-Jan-17
16120203-005	2,2-Dimethylbutane	I	0.07	ppbv	0.02	AC-058	05-Jan-17
16120203-005	2,3,4-Trimethylpentane	I	0.04	ppbv	0.02	AC-058	05-Jan-17
16120203-005	2,3-Dimethylbutane	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120203-005	2,3-Dimethylpentane	I	0.08	ppbv	0.03	AC-058	05-Jan-17

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,/NMHC VOC/Bonnyville/Dec 17, 2	2452	Ambient Air	17-Dec-16 10:10
<b>DESCRIPTION:</b>	Bonnyville - AER		
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Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-005	2,4-Dimethylpentane	I	0.04	ppbv	0.02	AC-058	05-Jan-17
16120203-005	2-Methylheptane	I	0.03	ppbv	0.02	AC-058	05-Jan-17
16120203-005	2-Methylhexane	I	0.08	ppbv	0.02	AC-058	05-Jan-17
16120203-005	2-Methylpentane	I	0.15	ppbv	0.02	AC-058	05-Jan-17
16120203-005	3-Methylheptane	I	0.03	ppbv	0.03	AC-058	05-Jan-17
16120203-005	3-Methylhexane	I	0.08	ppbv	0.03	AC-058	05-Jan-17
16120203-005	3-Methylpentane	I	0.10	ppbv	0.02	AC-058	05-Jan-17
16120203-005	Acetone		1.8	ppbv	0.6	AC-058	05-Jan-17
16120203-005	Acrolein	K, T, U	< 0.5	ppbv	0.5	AC-058	05-Jan-17
16120203-005	Benzene	I	0.32	ppbv	0.02	AC-058	05-Jan-17
16120203-005	Benzyl chloride	K, T, U	< 0.6	ppbv	0.6	AC-058	05-Jan-17
16120203-005	Bromodichloromethane		0.03	ppbv	0.03	AC-058	05-Jan-17
16120203-005	Bromoform	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120203-005	Bromomethane	K, T, U	< 0.02	ppbv	0.02	AC-058	05-Jan-17
16120203-005	Carbon disulfide	I	0.21	ppbv	0.02	AC-058	05-Jan-17
16120203-005	Carbon tetrachloride	I	0.18	ppbv	0.02	AC-058	05-Jan-17
16120203-005	Chlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120203-005	Chloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120203-005	Chloroform	I	0.08	ppbv	0.03	AC-058	05-Jan-17
16120203-005	Chloromethane		0.73	ppbv	0.03	AC-058	05-Jan-17
16120203-005	cis-1,2-Dichloroethene	I	0.03	ppbv	0.02	AC-058	05-Jan-17
16120203-005	cis-1,3-Dichloropropene	K, T, U	< 0.06	ppbv	0.06	AC-058	05-Jan-17
16120203-005	cis-2-Butene	I	0.11	ppbv	0.03	AC-058	05-Jan-17
16120203-005	cis-2-Pentene	K, T, U	< 0.03	ppbv	0.03	AC-058	05-Jan-17
16120203-005	Cyclohexane	I	0.19	ppbv	0.03	AC-058	05-Jan-17

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Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-005	Cyclopentane	I	0.10	ppbv	0.02	AC-058	05-Jan-17
16120203-005	Dibromochloromethane	I	0.05	ppbv	0.02	AC-058	05-Jan-17
16120203-005	Ethanol		2.8	ppbv	0.5	AC-058	05-Jan-17
16120203-005	Ethyl acetate	K, T, U	< 0.6	ppbv	0.6	AC-058	05-Jan-17
16120203-005	Ethylbenzene	I	0.06	ppbv	0.02	AC-058	05-Jan-17
16120203-005	Freon-11		0.46	ppbv	0.03	AC-058	05-Jan-17
16120203-005	Freon-113	I	0.09	ppbv	0.02	AC-058	05-Jan-17
16120203-005	Freon-114	I	0.06	ppbv	0.03	AC-058	05-Jan-17
16120203-005	Freon-12		0.95	ppbv	0.03	AC-058	05-Jan-17
16120203-005	Hexachloro-1,3-butadiene	K, T, U	< 0.76	ppbv	0.76	AC-058	05-Jan-17
16120203-005	Isobutane		2.04	ppbv	0.03	AC-058	05-Jan-17
16120203-005	Isopentane		0.82	ppbv	0.05	AC-058	05-Jan-17
16120203-005	Isoprene	I	0.02	ppbv	0.02	AC-058	05-Jan-17
16120203-005	Isopropyl alcohol	K, T, U	< 0.6	ppbv	0.6	AC-058	05-Jan-17
16120203-005	Isopropylbenzene	I	0.02	ppbv	0.02	AC-058	05-Jan-17
16120203-005	m,p-Xylene	I	0.11	ppbv	0.05	AC-058	05-Jan-17
16120203-005	m-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	05-Jan-17
16120203-005	m-Ethyltoluene	K, T, U	< 0.12	ppbv	0.12	AC-058	05-Jan-17
16120203-005	Methyl butyl ketone	K, T, U	< 0.76	ppbv	0.76	AC-058	05-Jan-17
16120203-005	Methyl ethyl ketone	K, T, U	< 0.5	ppbv	0.5	AC-058	05-Jan-17
16120203-005	Methyl isobutyl ketone	K, T, U	< 0.6	ppbv	0.6	AC-058	05-Jan-17
16120203-005	Methyl methacrylate	K, T, U	< 0.11	ppbv	0.11	AC-058	05-Jan-17
16120203-005	Methyl tert butyl ether	K, T, U	< 0.05	ppbv	0.05	AC-058	05-Jan-17
16120203-005	Methylcyclohexane	I	0.25	ppbv	0.02	AC-058	05-Jan-17
16120203-005	Methylcyclopentane	I	0.19	ppbv	0.03	AC-058	05-Jan-17

**Report certified by:** Krista Gegolick, Account Coordinator

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

**Date:** Thursday, January 19, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
,/NMHC VOC/Bonnyville/Dec 17, 2	2452	Ambient Air	17-Dec-16	10:10
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16120203-005	Methylene chloride	K, T, U	< 0.5	ppbv	0.5	AC-058	05-Jan-17
16120203-005	n-Butane		3.04	ppbv	0.05	AC-058	05-Jan-17
16120203-005	n-Decane	K, T, U	< 0.09	ppbv	0.09	AC-058	05-Jan-17
16120203-005	n-Dodecane	K, T, U	< 0.6	ppbv	0.6	AC-058	05-Jan-17
16120203-005	n-Heptane	I	0.09	ppbv	0.02	AC-058	05-Jan-17
16120203-005	n-Hexane	I	0.15	ppbv	0.02	AC-058	05-Jan-17
16120203-005	n-Octane	I	0.04	ppbv	0.03	AC-058	05-Jan-17
16120203-005	n-Pentane	I	0.4	ppbv	0.2	AC-058	05-Jan-17
16120203-005	n-Propylbenzene	K, T, U	< 0.08	ppbv	0.08	AC-058	05-Jan-17
16120203-005	n-Undecane	K, T, U	< 0.8	ppbv	0.8	AC-058	05-Jan-17
16120203-005	Naphthalene	K, T, U	< 0.8	ppbv	0.8	AC-058	05-Jan-17
16120203-005	n-Nonane	I	0.04	ppbv	0.02	AC-058	05-Jan-17
16120203-005	o-Ethyltoluene	I	0.03	ppbv	0.02	AC-058	05-Jan-17
16120203-005	o-Xylene	I	0.06	ppbv	0.02	AC-058	05-Jan-17
16120203-005	p-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	05-Jan-17
16120203-005	p-Ethyltoluene	K, T, U	< 0.11	ppbv	0.11	AC-058	05-Jan-17
16120203-005	Styrene	K, T, U	< 0.06	ppbv	0.06	AC-058	05-Jan-17
16120203-005	Tetrachloroethylene	I	0.18	ppbv	0.06	AC-058	05-Jan-17
16120203-005	Tetrahydrofuran	K, T, U	< 0.6	ppbv	0.6	AC-058	05-Jan-17
16120203-005	Toluene	I	0.19	ppbv	0.02	AC-058	05-Jan-17
16120203-005	trans-1,2-Dichloroethylene	I	0.03	ppbv	0.02	AC-058	05-Jan-17
16120203-005	trans-1,3-Dichloropropylene	K, T, U	< 0.06	ppbv	0.06	AC-058	05-Jan-17
16120203-005	trans-2-Butene	I	0.15	ppbv	0.02	AC-058	05-Jan-17
16120203-005	trans-2-Pentene	I	0.04	ppbv	0.03	AC-058	05-Jan-17
16120203-005	Trichloroethylene	K, T, U	< 0.06	ppbv	0.06	AC-058	05-Jan-17

**Report certified by:** Krista Gegolick, Account Coordinator

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

**Date:** Thursday, January 19, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca



PO Bag 4000  
 Vegreville, Alberta  
 Canada T9C 1T4  
 (780) 632-8211

# ENVIRONMENTAL ANALYTICAL SERVICES

## TEST REPORT

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>	
,/NMHC VOC/Bonnyville/Dec 17, 2	2452	Ambient Air	17-Dec-16	10:10
<b>DESCRIPTION:</b>	Bonnyville - AER			
<b>REPORT NUMBER:</b>	16120203	<b>REPORT CREATED:</b>	19-Jan-17	<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
16120203-005	Vinyl acetate	K, T, U	< 0.6 ppbv	0.6	AC-058	05-Jan-17
16120203-005	Vinyl chloride	I	0.05 ppbv	0.03	AC-058	05-Jan-17

**Report certified by:** Krista Gegolick, Account Coordinator

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

**Date:** Thursday, January 19, 2017

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>RESULTS:</b> Adewunmi Adekanmbi Lakeland Industry and Community Assn 4000, 19 St NE  Calgary AB T2E 6P8	<b>CLIENT SAMPLE ID</b> /NMHC VOC/Bonnyville/Dec 31, 2016	<b>CANISTER ID</b> 14992	<b>Matrix</b> Ambient Air	<b>Priority</b> Normal
	<b>DESCRIPTION:</b> Bonnyville - AER			
<b>INVOICE:</b> Arianna Cook PO Box 8237 5107W-50 St Bonnyville AB T9N 2J5	<b>DATE SAMPLED:</b> 31-Dec-16	5:40	<b>DATE RECEIVED:</b> 05-Jan-17	
	<b>REPORT CREATED:</b> 25-Jan-17		<b>REPORT NUMBER:</b> 17010017	
	780 812 2182		<b>VERSION:</b> Version 01	

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17010017-004	1,1,1-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	1,1,2,2-Tetrachloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	1,1,2-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	1,1-Dichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	1,1-Dichloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	10-Jan-17
17010017-004	1,2,3-Trimethylbenzene	K, T, U	< 0.07	ppbv	0.07	AC-058	10-Jan-17
17010017-004	1,2,4-Trichlorobenzene	K, T, U	< 1.1	ppbv	1.1	AC-058	10-Jan-17
17010017-004	1,2,4-Trimethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	10-Jan-17
17010017-004	1,2-Dibromoethane	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	1,2-Dichlorobenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	10-Jan-17
17010017-004	1,2-Dichloroethane	I	0.04	ppbv	0.01	AC-058	10-Jan-17
17010017-004	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	10-Jan-17
17010017-004	1,3,5-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	1,3-Butadiene	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	1,3-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	10-Jan-17
17010017-004	1,4-Dichlorobenzene	K, T, U	< 0.5	ppbv	0.5	AC-058	10-Jan-17
17010017-004	1,4-Dioxane	K, T, U	< 0.5	ppbv	0.5	AC-058	10-Jan-17
17010017-004	1-Butene	I	0.13	ppbv	0.03	AC-058	10-Jan-17

**Report certified by:** Rebecca Holgate, Account Coordinator

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

**Date:** January-25-17

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
/NMHC VOC/Bonnyville/Dec 31, 2	14992	Ambient Air	31-Dec-16 5:40
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	17010017	<b>REPORT CREATED:</b>	25-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17010017-004	1-Hexene	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	10-Jan-17
17010017-004	2,2,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	10-Jan-17
17010017-004	2,2-Dimethylbutane	I	0.01	ppbv	0.01	AC-058	10-Jan-17
17010017-004	2,3,4-Trimethylpentane	I	0.02	ppbv	0.01	AC-058	10-Jan-17
17010017-004	2,3-Dimethylbutane	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	2,3-Dimethylpentane	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	10-Jan-17
17010017-004	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	10-Jan-17
17010017-004	2-Methylhexane	I	0.04	ppbv	0.01	AC-058	10-Jan-17
17010017-004	2-Methylpentane	I	0.07	ppbv	0.01	AC-058	10-Jan-17
17010017-004	3-Methylheptane	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	3-Methylhexane	I	0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	3-Methylpentane	I	0.06	ppbv	0.01	AC-058	10-Jan-17
17010017-004	Acetone		2.4	ppbv	0.5	AC-058	10-Jan-17
17010017-004	Acrolein	K, T, U	< 0.4	ppbv	0.4	AC-058	10-Jan-17
17010017-004	Benzene	I	0.12	ppbv	0.01	AC-058	10-Jan-17
17010017-004	Benzyl chloride	K, T, U	< 0.5	ppbv	0.5	AC-058	10-Jan-17
17010017-004	Bromodichloromethane	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	Bromoform	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	10-Jan-17
17010017-004	Carbon disulfide	K, T, U	< 0.01	ppbv	0.01	AC-058	10-Jan-17
17010017-004	Carbon tetrachloride	I	0.17	ppbv	0.01	AC-058	10-Jan-17
17010017-004	Chlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	Chloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17

**Report certified by:** Rebecca Holgate, Account Coordinator

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

**Date:** January-25-17

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<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
./NMHC VOC/Bonnyville/Dec 31, 2	14992	Ambient Air	31-Dec-16 5:40
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	17010017	<b>REPORT CREATED:</b>	25-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17010017-004	Chloroform	I	0.04	ppbv	0.03	AC-058	10-Jan-17
17010017-004	Chloromethane		0.90	ppbv	0.03	AC-058	10-Jan-17
17010017-004	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	10-Jan-17
17010017-004	cis-1,3-Dichloropropene	K, T, U	< 0.05	ppbv	0.05	AC-058	10-Jan-17
17010017-004	cis-2-Butene	I	0.05	ppbv	0.03	AC-058	10-Jan-17
17010017-004	cis-2-Pentene	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	Cyclohexane	I	0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	Cyclopentane	I	0.03	ppbv	0.01	AC-058	10-Jan-17
17010017-004	Dibromochloromethane	I	0.03	ppbv	0.01	AC-058	10-Jan-17
17010017-004	Ethanol		1.3	ppbv	0.4	AC-058	10-Jan-17
17010017-004	Ethyl acetate	K, T, U	< 0.5	ppbv	0.5	AC-058	10-Jan-17
17010017-004	Ethylbenzene	I	0.01	ppbv	0.01	AC-058	10-Jan-17
17010017-004	Freon-11		0.47	ppbv	0.03	AC-058	10-Jan-17
17010017-004	Freon-113	I	0.07	ppbv	0.01	AC-058	10-Jan-17
17010017-004	Freon-114	I	0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	Freon-12		1.04	ppbv	0.03	AC-058	10-Jan-17
17010017-004	Hexachloro-1,3-butadiene	K, T, U	< 0.68	ppbv	0.68	AC-058	10-Jan-17
17010017-004	Isobutane		0.67	ppbv	0.03	AC-058	10-Jan-17
17010017-004	Isopentane		0.46	ppbv	0.04	AC-058	10-Jan-17
17010017-004	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	10-Jan-17
17010017-004	Isopropyl alcohol	K, T, U	< 0.5	ppbv	0.5	AC-058	10-Jan-17
17010017-004	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	10-Jan-17
17010017-004	m,p-Xylene	K, T, U	< 0.04	ppbv	0.04	AC-058	10-Jan-17
17010017-004	m-Diethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	10-Jan-17
17010017-004	m-Ethyltoluene	K, T, U	< 0.11	ppbv	0.11	AC-058	10-Jan-17

**Report certified by:** Rebecca Holgate, Account Coordinator

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

**Date:** January-25-17

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<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
./NMHC VOC/Bonnyville/Dec 31, 2	14992	Ambient Air	31-Dec-16 5:40
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	17010017	<b>REPORT CREATED:</b>	25-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17010017-004	Methyl butyl ketone	K, T, U	< 0.68	ppbv	0.68	AC-058	10-Jan-17
17010017-004	Methyl ethyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	10-Jan-17
17010017-004	Methyl isobutyl ketone	K, T, U	< 0.5	ppbv	0.5	AC-058	10-Jan-17
17010017-004	Methyl methacrylate	K, T, U	< 0.09	ppbv	0.09	AC-058	10-Jan-17
17010017-004	Methyl tert butyl ether	K, T, U	< 0.04	ppbv	0.04	AC-058	10-Jan-17
17010017-004	Methylcyclohexane	I	0.07	ppbv	0.01	AC-058	10-Jan-17
17010017-004	Methylcyclopentane	I	0.08	ppbv	0.03	AC-058	10-Jan-17
17010017-004	Methylene chloride		0.7	ppbv	0.4	AC-058	10-Jan-17
17010017-004	n-Butane		1.30	ppbv	0.04	AC-058	10-Jan-17
17010017-004	n-Decane	K, T, U	< 0.08	ppbv	0.08	AC-058	10-Jan-17
17010017-004	n-Dodecane	K, T, U	< 0.5	ppbv	0.5	AC-058	10-Jan-17
17010017-004	n-Heptane	I	0.04	ppbv	0.01	AC-058	10-Jan-17
17010017-004	n-Hexane		1.04	ppbv	0.01	AC-058	10-Jan-17
17010017-004	n-Octane	K, T, U	< 0.03	ppbv	0.03	AC-058	10-Jan-17
17010017-004	n-Pentane	I	0.2	ppbv	0.1	AC-058	10-Jan-17
17010017-004	n-Propylbenzene	K, T, U	< 0.07	ppbv	0.07	AC-058	10-Jan-17
17010017-004	n-Undecane	K, T, U	< 0.7	ppbv	0.7	AC-058	10-Jan-17
17010017-004	Naphthalene	K, T, U	< 0.7	ppbv	0.7	AC-058	10-Jan-17
17010017-004	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	10-Jan-17
17010017-004	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	10-Jan-17
17010017-004	o-Xylene	K, T, U	< 0.01	ppbv	0.01	AC-058	10-Jan-17
17010017-004	p-Diethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	10-Jan-17
17010017-004	p-Ethyltoluene	K, T, U	< 0.09	ppbv	0.09	AC-058	10-Jan-17
17010017-004	Styrene	K, T, U	< 0.05	ppbv	0.05	AC-058	10-Jan-17
17010017-004	Tetrachloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	10-Jan-17

**Report certified by:** Rebecca Holgate, Account Coordinator

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

**Date:** January-25-17

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca



<b>CLIENT SAMPLE ID</b>	<b>CANISTER ID</b>	<b>Matrix</b>	<b>DATE SAMPLED</b>
,/NMHC VOC/Bonnyville/Dec 31, 2	14992	Ambient Air	31-Dec-16 5:40
<b>DESCRIPTION:</b>	Bonnyville - AER		
<b>REPORT NUMBER:</b>	17010017	<b>REPORT CREATED:</b>	25-Jan-17
			<b>VERSION:</b> Version 01

Lab ID	Parameter	Qualifier	Result Units	RDL	Method	Analysis Date
17010017-004	Tetrahydrofuran	K, T, U	< 0.5 ppbv	0.5	AC-058	10-Jan-17
17010017-004	Toluene	I	0.06 ppbv	0.01	AC-058	10-Jan-17
17010017-004	trans-1,2-Dichloroethylene	K, T, U	< 0.01 ppbv	0.01	AC-058	10-Jan-17
17010017-004	trans-1,3-Dichloropropylene	K, T, U	< 0.05 ppbv	0.05	AC-058	10-Jan-17
17010017-004	trans-2-Butene	I	0.04 ppbv	0.01	AC-058	10-Jan-17
17010017-004	trans-2-Pentene	K, T, U	< 0.03 ppbv	0.03	AC-058	10-Jan-17
17010017-004	Trichloroethylene	K, T, U	< 0.05 ppbv	0.05	AC-058	10-Jan-17
17010017-004	Vinyl acetate	K, T, U	< 0.5 ppbv	0.5	AC-058	10-Jan-17
17010017-004	Vinyl chloride	K, T, U	< 0.03 ppbv	0.03	AC-058	10-Jan-17

**Report certified by:** Rebecca Holgate, Account Coordinator

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

**Date:** January-25-17

**Inquiries:** (780) 632 8455

**E-mail:** EAS.Results@innotechalberta.ca

***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	Bonnyville 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>
Kim Wilson	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.

*Kim Wilson*

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

27-Jan-17

\_\_\_\_\_  
 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>2833-2016-12-35-C</u>
<b>Site:</b> <u>Bonnyville Continuous Monitoring Station</u>	<b>Contact:</b> <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u>Kim Wilson</u>	Date <u>27-Jan-17</u>
Level 1 Primary Validation	<u>Kim Wilson</u>	Date <u>27-Jan-17</u>
Level 2 Final Validation	<u>Kim Wilson</u>	Date <u>27-Jan-17</u>
Level 3 Independent Data Review	<u>CRS/lnh</u>	Date <u>27-Jan-17</u>
Post-Final Validation	<u>NA</u>	Date <u>NA</u>

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