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

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

February 22, 2018

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

Lakeland Industry & Community Association (LICA) is pleased to submit the ambient air monitoring monthly report for the LICA Cold Lake South AQM Station in the month of March 2017.

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

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

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

All data collected in March 2017 was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

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

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

Respectfully,

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

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

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

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

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

AMBIENT AIR MONITORING MONTHLY DATA REPORT

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

COLD LAKE CONTINUOUS MONITORING STATION

JOB #: 2833-2017-03-1-C

March 2017

Prepared for:

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
402 - 19 ST NW
CALGARY, ALBERTA
T2N 2J1

Attention: MIKE BISAGA

DATE: **May 10, 2017**

Prepared by: Maram Ghaleb

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

Reviewed by:

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

SUMMARY

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

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

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

Annual Maintenance: A scheduled annual station maintenance was completed between March 6 and March 7 for the following analyzers: SO_2, TRS, THC, and O_3.
Two hours of downtime were recorded each for SO_2 and TRS, and nineteen hours were recorded for O_3 due this maintenance event.

All Parameters: On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

O_3: A repeat span check was triggered on March 6 to address a biased high span drift. One hour of downtime was recorded due to the additional quality check. Annual maintenance was scheduled immediately. Following a shut-down calibration, the sample pump and the zero air pump were rebuilt and the optical cells were cleaned. The analyzer was allowed to stabilize overnight and a successful post-repair calibration was completed on March 7. Sixteen hours of downtime were attributed to the maintenance event.

THC: On March 6, the zero air system was replaced; and the channel was placed in "maintenance mode" for sample manifold cleaning. Three hours of downtime were incurred due to these events.
The analyzer recorded lower than historical concentrations between March 18 and March 19. Twenty two hours of suspect data were invalidated as a result.

NOx/NO/NO_2: The NOx gas concentration 50.7 ppm labelled as “Calculated NOx” on the calibration record is not the actual concentration on the certificate of analysis, which is 50.9 ppm. A sample of affected calculations has been rerun and the error has no significant effect on the calibration. The NOx calibration still meets the AMD calibration criteria.

$PM_{2.5}$: Eighteen hours of data were recorded at concentrations lower than –3 µg/m^3 this month, rendering the data invalid.

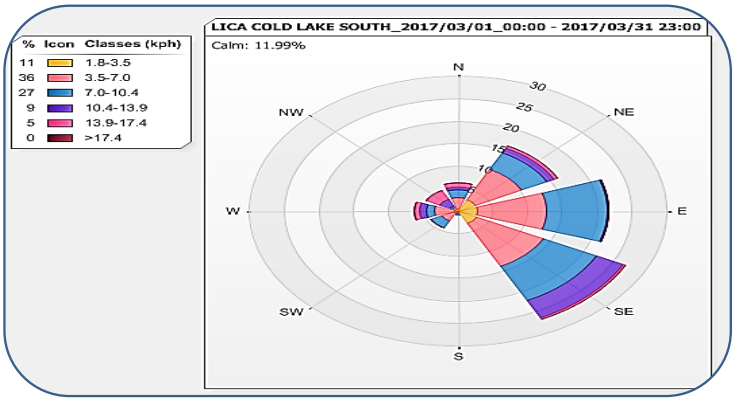
The summary of results is presented on the following pages.

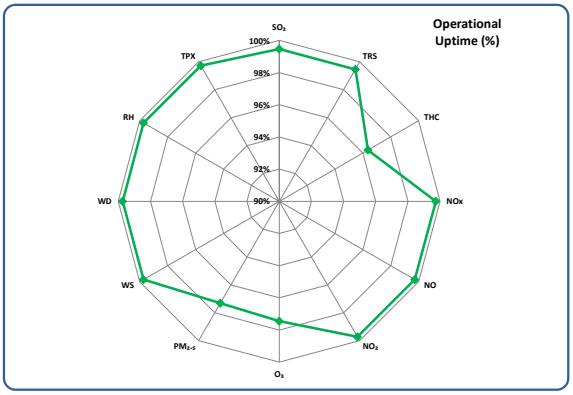
Any deviations or modifications made to the sampling or analytical methods are outlined in Section 1.0, Discussion. On this basis, Maxxam Analytics is issuing this completed report to Lakeland Industry & Community Association, Cold Lake Continuous Monitoring Station.

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.

Lakeland Industry & Community Association - Cold Lake South Site
March 2017 Monthly Report Summary

Pollutants		Monthly Records		1-Hour Records					24-Hour Records			
				Maximum			AAAQO Objective	Exceed. Hours	Maximum		AAAQO Objective	Exceed. Days
Name	Unit	Avg. Conc.	Uptime	Conc.	Date	Hour			Conc.	Date		
SO_2	ppb	0.2	99.5%	1.3	March 15	13	172	0	0.5	March 7	48	0
TRS	ppb	0.3	99.5%	0.5	March 2	8	-	-	0.4	March 2	-	-
THC	ppm	2.12	96.4%	2.64	March 23	6	-	-	2.26	March 14	-	-
NOx	ppb	4.0	99.7%	26.4	March 3	6	-	-	9.5	March 9	-	-
NO	ppb	0.6	99.7%	9.6	March 23	7	-	-	1.7	March 9	-	-
NO_2	ppb	3.4	99.7%	23.7	March 3	6	159	0	7.9	March 9	-	-
O_3	ppb	31.9	97.4%	48.3	March 17	15	82	0	39.8	March 17	-	-
$PM_{2.5}$	µg/m³	3.7	97.3%	21.5	March 12	9	80	0	6.2	March 2	30	0
WS	%	2.3	99.7%	17.3	March 20	1	-	-	12.0	March 19	-	-
WD	degree	89 (E)	99.7%	-	-	-	-	-	-	-	-	-
RH	mm	70	99.7%	100	March 29	6	-	-	91	March 29	-	-
AmbTPX	°C	-6.4	99.7%	11.6	March 31	13	-	-	5.3	March 31	-	-





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

Annual Maintenance: A scheduled annual station maintenance was completed between March 6 and March 7 for the following analyzers: SO2, TRS, THC, and O3.
Two hours of downtime were recorded each for SO2 and TRS, and nineteen hours were recorded for O3 due this maintenance event.
All Parameters: On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.
O3: A repeat span check was triggered on March 6 to address a biased high span drift. One hour of downtime was recorded due to the additional quality check. Annual maintenance was scheduled immediately. Following a shut-down calibration, the sample pump and the zero air pump were rebuilt and the optical cells were cleaned. The analyzer was allowed to stabilize overnight and a successful post-repair calibration was completed on March 7. Sixteen hours of downtime were attributed to the maintenance event.
THC: On March 6, the zero air system was replaced; and the channel was placed in "maintenance mode" for sample manifold cleaning. Three hours of downtime were incurred due to these events.
The analyzer recorded lower than historical concentrations between March 18 and March 19. Twenty two hours of suspect data were invalidated as a result.
PM2.5: Eighteen hours of data were recorded at concentrations lower than –3 µg/m3 this month, rendering the data invalid.

Monthly Continuous Data Summary

Lakeland Industry & Community Association Cold Lake Continuous Monitoring Station						MAXIMUM VALUES							OPERATIONAL TIME (%)
						1-HOUR					24-HOUR		
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
	1-hr	24-hr	1-hr	24-hr									
SO_2 (ppb)	172	48	0	0	0.2	1.3	15	13	2.2	SW	0.5	7	99.5
TRS (ppb)	-	-	-	-	0.3	0.5	2	8	3.2	E	0.4	2	99.5
THC (ppm)	-	-	-	-	2.12	2.64	23	6	0.6	WNW	2.26	14	96.4
NO_2 (ppb)	159	-	0	-	3.4	23.7	3	6	2.6	E	7.9	9	99.7
NO (ppb)	-	-	-	-	0.6	9.6	23	7	1	NE	1.7	9	99.7
NOx (ppb)	-	-	-	-	4.0	26.4	3	6	2.6	E	9.5	9	99.7
O_3 (ppb)	82	-	0	-	31.9	48.3	17	15	7.4	SSW	39.8	17	97.4
$PM_{2.5}$ ($\mu g/m^3$)	80	30	0	0	3.7	21.5	12	9	6.8	ESE	6.2	2	97.3
RELATIVE HUMIDITY (%)	-	-	-	-	70	100	29	6	2.3	ESE	91	29	99.7
AMBIENT TEMPERATURE (°C)	-	-	-	-	-6.4	11.6	31	13	8.5	WSW	5.3	31	99.7
VECTOR WS (kph)	-	-	-	-	2.3	17.3	20	1	-	NNW	12.0	19	99.7
VECTOR WD (sec)	-	-	-	-	89 (E)	-	-	-	-	-	-	-	99.7

Exceedance Summary Report

SO_2 1-Hour Exceedances
Measured concentrations of sulphur dioxide were below the 1-hour AAAQO of 172 ppb.

SO_2 24-Hour Exceedances
Measured concentrations of sulphur dioxide were below the 24-hour AAAQO of 48.0 ppb.

NO_2 1-Hour Exceedances
Measured concentrations of nitrogen dioxide were below the 1-hour AAAQO of 159 ppb.

$PM_{2.5}$ 1-Hour Exceedances
Measured concentrations of fine particulate matter were below the 1-hour AAAQO of 80 µg/m³.

$PM_{2.5}$ 24-Hour Exceedances
Measured concentrations of fine particulate matter were below the 24-hour AAAQO of 30 µg/m³.

O_3 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.

Passive Sampler Summary

	Sulphur Dioxide (ppb)
Mean	0.5
Minimum	0.2
Maximum	1.3

Note: Access papers for stations #12 and #25 were not provided and access to the station #11 was blocked by snow. As a result, data is not available for these stations.

	Hydrogen Sulphide (ppb)
Mean	0.13
Minimum	0.08
Maximum	0.26

Note: Access papers for stations #12 and #25 were not provided and access to the station #11 was blocked by snow. As a result, data is not available for these stations.

	Nitrogen Dioxide (ppb)
Mean	1.0
Minimum	0.4
Maximum	3.0

Note: Access papers for stations #12 were not provided and access to the station #11 was blocked by snow. As a result, data is not available for these stations.

	Ozone (ppb)
Mean	34.1
Minimum	25.9
Maximum	43.4

Note: Access papers for stations #12 were not provided and access to the station #11 was blocked by snow. As a result, data is not available for these stations.

Volatile Organics (VOCs) Data Summary

Sample Collection Date	Maximum Reading (ppb)	Volatile Organic Compound
March 2, 2017	1.6	Acetone
March 8, 2017	2.0	Naphthalene
March 14, 2017	2.75	n-Butane
March 20, 2017	2.7	Acetone
March 26, 2017	3.5	Acetone

Note: NA

Polycyclic Aromatic Hydrocarbons (PAHs) Data Summary

Sample Collection Date	Maximum Reading (µg/puf)	Semi-Volatile Organic
March 2, 2017	0.33	Naphthalene
March 8, 2017	1.12	Naphthalene
March 14, 2017	0.25	Phenanthrene
March 20, 2017	0.14	Naphthalene
March 26, 2017	0.84	Phenanthrene

Note: NA

Partisol Sampler Summary

Sample Collection Date	Concentration (µg/puf)
March 2, 2017	0.110
March 82017	0.037
March 14, 2017	0.123
March 20, 2017	0.033
March 26, 2017	0.126

Note: NA

TABLE OF CONTENTS

Title		Page
SUMMARY		1
MONTHLY DASHBOARD		2
MONTHLY CONTINUOUS DATA SUMMARY REPORT		3
EXCEEDANCE SUMMARY REPORT		4
PASSIVE SAMPLE SUMMARY REPORT		5
VOC SAMPLE SUMMARY REPORT		6
PAH SAMPLE SUMMARY REPORT		7
PARTISOL SAMPLE SUMMARY REPORT		8
TABLE OF CONTENTS		9
1.0 Discussion		11
2.0 Project Personnel		15
3.0 Plant Monthly Required AMD Summary		15
4.0 Calculations and Results		15
5.0 Methods and Procedures		16
Appendix I	Continuous Monitoring Data Results	19
	Sulphur Dioxide	20
	Total Reduced Sulphur	28
	Total Hydrocarbon	36
	Oxides of Nitrogen	44
	Nitric Oxides	52
	Nitrogen Dioxide	59
	Ozone	67
	Particulate Matter 2.5	75
	Wind Speed	80
	Wind Direction	87
	Standard Deviation Wind Direction	90
	Relative Humidity	93
	Ambient Temperature	96

Appendix II	**Non-Continuous Monitoring Data Results**	**99**
	Passive Results	**100**
	VOC Results	**110**
	PAH Results	**125**
	Partisol Results	**136**
Appendix III	**Equipment Calibration Results**	**143**
	Sulphur Dioxide	**144**
	Total Reduced Sulphur	**148**
	Total Hydrocarbon	**152**
	Nitrogen Dioxide	**156**
	Ozone	**160**
	Particulate Matter	**165**
	Wind System	**168**
	VOC Sampler	**170**
	Calibrators	**172**
	Calibration Gases	**175**
Appendix IV	**Analytical Results**	**180**
	Passive Samples	**181**
	VOCs Samples	**188**
	PAHs Samples	**214**
	Partisol Samples	**225**
Appendix V	**Report Certification Form**	**231**
Appendix VI	**Data Validation Certification Form**	**233**

1.0 Discussion

This monthly report consists of continuous monitoring results for the following parameters: Sulphur Dioxide (SO_2), Total Reduced Sulphur (TRS), Total Hydrocarbon (THC), Oxides of Nitrogen (NOx), Nitric Oxides (NO), Nitrogen Dioxide (NO_2), Ozone (O_3), Particulate Matter 2.5 ($PM_{2.5}$), Relative Humidity (RH), Ambient Temperature (AmbTPX), Wind Speed (WS), Wind Direction (WD) and Standard Deviation Wind Direction (STDWD). The non-continuous monitoring data results for Partisol, VOCs, PAHs and Passive samples 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 (December, 2016). The descriptions of the data verification and validation process can be found in Section 5 of this report. Instantaneous data, where applicable, is provided for reference purposes and has not undergone zero correction. The minimum and maximum statistics are highlighted in the data table and are for reference only. The highlighted cells are based on the software's interpretation of the exact position of the minimum or maximum value. The visual presentation of these statistics may not be the obvious choice in a data range due to rounding, truncating or analyzer specifications.

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

SULPHUR DIOXIDE (SO_2)

• Operational time, for the monitoring period was 99.5%, equivalent to four hours of downtime.
• A shut-down calibration was performed on March 6, prior to completing annual maintenance on the analyzer. The sample pump was rebuilt and a leak check was performed. A successful post-repair calibration was completed afterwards. Two hours of downtime were attributed to the maintenance event.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.
• One hour of maximum instantaneous data was invalidated on March 31, at hour 7:00, due to a brief power failure.

TOTAL REDUCED SULPHUR (TRS)

• Operational time, for the monitoring period was 99.5%, equivalent to four hours of downtime.
• A shut-down calibration was performed on March 6, prior to completing annual maintenance on the analyzer. The sample pump was rebuilt, a leak check was performed and the converter tubing was renewed. A successful post-repair calibration was completed afterwards. Two hours of downtime were attributed to the maintenance event.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.
• One hour of maximum instantaneous data was invalidated on March 31, at hour 7:00, due to a brief power failure.

TOTAL HYDROCARBONS (THC)

• Operational time, for the monitoring period was 96.4%, equivalent to twenty-seven hours of downtime.
• On March 6, the zero air system was replaced; and the channel was placed in "maintenance mode" for sample manifold cleaning. Three hours of downtime were incurred due to these events.
• A shut-down calibration was performed on March 7, prior to completing annual maintenance on the analyzer. The hydrogen fuel tubing was renewed and the fuel pressure was adjusted. LICA's Zero Air generator (s/n: 4027) was installed back after it was repaired and Maxxam's Zero Air (s/n: 133) was removed. A successful post-repair calibration was completed afterwards.
• The analyzer recorded lower than historical concentrations between March 18 and March 19. Twenty two hours of suspect data were invalidated as a result.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.
• One hour of maximum instantaneous data was invalidated on March 31, at hour 7:00, due to a brief power failure.

OXIDES OF NITROGEN (NOx), NITRIC OXIDE (NO) and NITROGEN DIOXIDE (NO_2)

• Operational time, for the monitoring period was 99.7%, equivalent to two hours of downtime.
• The routine monthly calibration was performed on March 6.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.
• One hour of maximum instantaneous data was invalidated on March 31, at hour 7:00, due to a brief power failure.
• The NOx gas concentration 50.7 ppm labelled as “Calculated NOx” on the calibration record is not the actual concentration on the certificate of analysis, which is 50.9 ppm. A sample of affected calculations has been rerun and the error has no significant effect on the calibration. The NOx calibration still meets the AMD calibration criteria.

OZONE (O_3)

• Operational time, for the monitoring period was 97.4%, equivalent to nineteen hours of downtime.
• The analyzer spanned close to the upper acceptance limit on March 5. A repeat span check was triggered on March 6 and the result confirmed the drift. Annual maintenance was scheduled immediately. Following a shut-down calibration, the sample pump and the zero air pump were rebuilt and the optical cells were cleaned. The analyzer was allowed to stabilize overnight and a successful post-repair calibration was completed on March 7. As the analyzer passed a shutdown calibration, no data were discarded. Seventeen hours of downtime were attributed to the maintenance event and the repeat span check.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.
• One hour of maximum instantaneous data was invalidated on March 31, at hour 7:00, due to a brief power failure.

PARTICULATE MATTER < 2.5 MICRONS ($PM_{2.5}$)

• Operational time, for the monitoring period was 97.3%, equivalent to twenty hours of downtime.
• Two routine TEOM audits were performed this month. The first was completed on March 7, and the second on March 27.
• Data was corrected in accordance with AMD (2016), Chapter 6, Table 2, *Zero Adjustment Criteria.* Data recorded between 0 and –3 µg/m^3 was corrected to 0 µg/m^3. Data recorded below –3 µg/m^3 was invalidated. Eighteen hours of data were invalidated as the data was below –3 µg/m^3 this month.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

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

• Operational time, for the monitoring period was 99.7%, equivalent to two hours of downtime.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.
• Wind data is reported as vector wind speed and vector wind direction. Wind direction is defined as the direction from which the wind is blowing from and is measured in degrees from true north.

RELATIVE HUMIDITY (RH)

• Operational time, for the monitoring period was 99.7%, equivalent to two hours of downtime.
• A function check was performed on the relative humidity sensor on March 6. The sensor was determined to operate properly.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

AMBIENT TEMPERATURE (AmbTPX)

• Operational time, for the monitoring period was 99.7%, equivalent to two hours of downtime.
• A function check was performed on the temperature sensor on March 6. The sensor was determined to operate properly.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

VOC SAMPLES

• The sampler was programmed to run for 24 hours every 6th day per the NAPS (North American Pollution Surveillance Schedule).
• Samples were collected, as scheduled, on March 2, 8, 14, 20 and 26. Analysis was provided by InnoTech Alberta, results are included in this report.
• The routine quarterly audit for the VOC sampler was completed on March 6.

PAH SAMPLES

• The sampler was programmed to run for 24 hours every 6th day per the NAPS (North American Pollution Surveillance Schedule).
• Samples were collected, as scheduled, on March 2, 8, 14, 20 and 26. Analysis was provided by InnoTech Alberta, results are included in this report.

PARTISOL SAMPLES

• The sampler was programmed to run for 24 hours every 6th day per the NAPS (North American Pollution Surveillance Schedule).
• Samples were collected, as scheduled, on March 2, 8, 14, 20 and 26. Analysis was provided by InnoTech Alberta, results are included in this report.

PASSIVE SAMPLES

• Samples were collected over the months of February and March. Samples were collected at all designated stations, except stations #12 and #25 as access documents were not provided by client. A sample was not collected at station #11 as the access to the station was blocked by snow. Analytical results are included in this report. Passive results are reported in ppb.

2.0 Project Personnel

Mike Bisaga was the contact for Lakeland Industry & Community Association and the Maxxam field technicians were 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-00007: TISCH PUF Sampler Operating, Calibration and Maintenance Procedures
Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
Maxxam AIR SOP-00212: Ambient O_3 Monitoring
Maxxam AIR SOP-00213: Ambient NO/NO_2/NOx 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-00148: Monitoring NO_2 in the Atm. by using All-Season Passive
Maxxam PTC SOP-00149: Monitoring SO_2 in the Atm. by using All-Season Passive
Maxxam PTC SOP-00150: Monitoring H_2S in the Atm. by using All-Season Passive
Maxxam PTC SOP-00151: Mass Determination of Particulate Matter ($PM_{2.5}$ and PM_{10})
Maxxam PTC SOP-00197: Monitoring O_3 in the Atm. by Using Maxxam All-Season Passive

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

Sulphur Dioxide - Thermo 43i UV Fluorescent Analyzer
Total Reduced Sulphur - Thermo 450i UV Fluorescent Analyzer
Total Hydrocarbons - Thermo 51C FID Analyzer
Oxides of Nitrogen - Thermo 42i Chemiluminescent Analyzer
Ozone - Thermo 49i Photometric Analyzer
Particulate Matter ($PM_{2.5}$) - R&P 1405F TEOM Unit
Wind System - Met One Unit
Relative Humidity - Met One Unit
Ambient Temperature - Met One Unit
PAH - TISCH PUF Plus
VOC - XONTECH 910A Gaseous Air Sampler
Datalogger - ESC 8832
Partisol - R&P 2000H Unit

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

Level 0 Preliminary Verification

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

Level 1 Primary Validation

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

Level 2 Final Validation

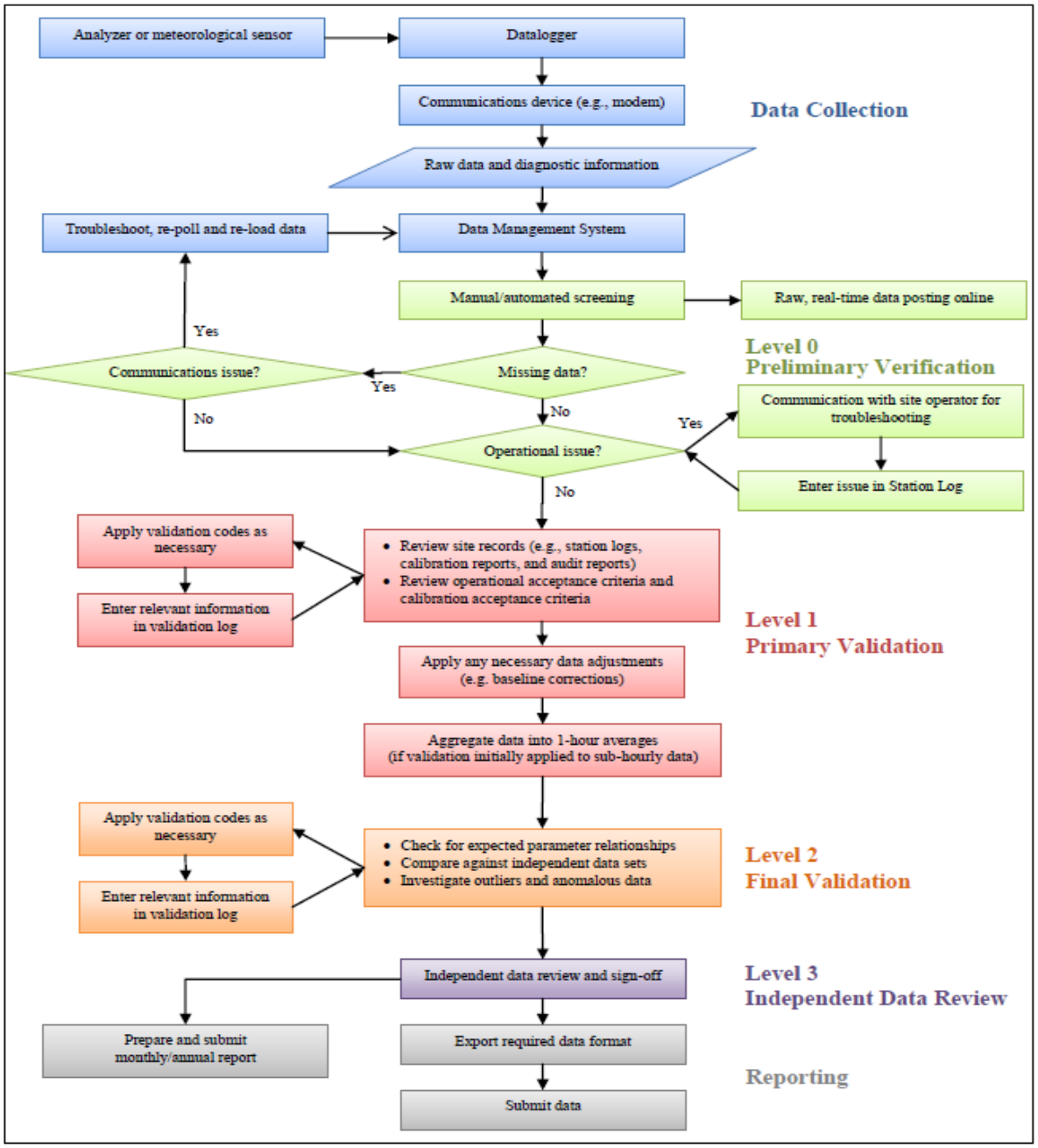
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

Level 3 Independent Data Review

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

Post-Final Validation

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



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

APPENDIX I
CONTINUOUS MONITORING DATA RESULTS

SULPHUR DIOXIDE

SULPHUR DIOXIDE Hourly Averages (SO_2 ppb)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	0.1	**0.0**	0.0	**S**	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	**0.0**	0.1	0.1	24
2	0.1	0.1	**S**	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.3	0.6	0.5	0.7	0.7	0.5	0.4	0.3	0.3	0.1	0.7	0.3	24
3	0.2	**S**	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.2	0.2	0.3	0.3	0.5	0.6	0.4	0.4	0.3	0.2	0.1	0.0	0.1	0.3	0.0	0.0	0.6	0.2	24
4	**S**	0.0	0.1	0.6	0.4	0.0	0.1	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	**S**	0.0	0.6	0.1	24
5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	**S**	0.1	0.0	0.1	0.1	24
6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	**C**	**C**	**C**	**Y**	**Y**	**C**	**C**	**C**	**C**	0.2	0.1	**S**	0.2	0.2	0.1	0.2	0.1	22
7	0.1	0.1	0.2	0.1	0.1	0.2	0.4	0.3	0.4	0.5	0.5	0.6	0.7	0.4	0.5	0.7	0.9	1.0	1.0	0.9	**S**	0.7	0.6	0.4	0.1	1.0	**0.5**	24
8	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	**S**	0.1	0.1	0.1	0.1	0.1	0.3	0.1	24
9	0.1	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.3	0.5	0.4	**S**	0.1	0.1	0.0	0.0	0.0	0.0	0.5	0.1	24
10	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.3	**S**	0.2	0.2	0.2	0.1	0.2	0.2	0.0	0.3	0.2	24
11	0.1	0.1	0.1	0.1	0.1	0.1	0.2	**X**	**X**	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	0.0	0.0	0.0	0.2	0.1	22
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	0.1	0.0	0.3	0.2	0.0	0.3	0.0	24
13	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.3	0.8	1.2	1.1	0.7	0.5	**S**	0.5	0.6	0.7	1.0	0.9	0.5	0.4	0.4	0.4	0.1	1.2	0.5	24
14	0.3	0.2	0.3	0.3	0.3	0.4	0.3	0.4	0.5	0.7	0.5	0.7	1.0	**S**	0.7	0.8	0.8	0.9	0.7	0.6	0.5	0.4	0.3	0.3	0.2	1.0	0.5	24
15	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.3	0.5	**S**	**1.3**	0.9	0.7	0.5	0.3	0.2	0.1	0.2	0.2	0.2	0.2	0.1	**1.3**	0.3	24
16	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	**S**	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.3	0.1	24
17	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.2	**S**	0.2	0.2	0.2	0.4	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.1	0.1	0.0	0.4	0.2	24
18	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	**S**	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.4	0.0	0.4	0.1	24
19	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.1	**S**	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.6	0.0	0.6	0.1	24
20	0.3	0.3	0.5	0.2	0.4	0.5	0.5	**S**	0.9	0.6	0.6	0.4	0.4	0.3	0.3	0.3	0.2	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.9	0.3	24
21	0.0	0.0	0.0	0.0	0.0	0.0	**S**	0.1	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.3	0.1	24
22	0.2	0.3	0.3	0.3	0.2	**S**	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.2	0.2	0.2	0.1	0.0	0.3	0.2	24
23	0.0	0.1	0.0	0.0	**S**	0.1	0.1	0.2	0.4	0.2	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.2	0.3	0.1	0.1	0.0	0.0	0.0	0.4	0.1	24
24	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	0.1	0.0	0.1	0.0	24
25	0.1	0.0	**S**	0.1	0.0	0.1	0.1	0.1	0.1	0.2	1.3	0.9	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	1.3	0.2	24
26	0.0	**S**	0.1	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.5	0.2	0.2	0.2	0.2	0.2	0.0	0.5	0.2	24
27	**S**	0.1	0.1	0.1	0.1	0.1	0.1	0.0	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	0.0	**S**	0.0	0.1	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	**S**	0.0	0.0	0.0	0.0	24
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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
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	**S**	0.0	0.0	0.0	0.0	0.0	0.0	24
31	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.3	0.5	0.2	0.0	0.2	0.0	0.0	**S**	0.0	0.0	0.2	0.1	0.0	0.5	0.1	24
HOURLY MAX	0.3	0.3	0.5	0.6	0.4	0.5	0.5	0.4	0.9	0.8	1.3	1.1	1.0	1.3	0.9	0.8	0.9	1.0	1.0	0.9	0.5	0.7	0.6	0.6				
HOURLY AVG	0.1	0.1	0.1	0.1	0.1	0.1	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	0.1	0.1	0.1	0.2				

STATUS FLAG CODES

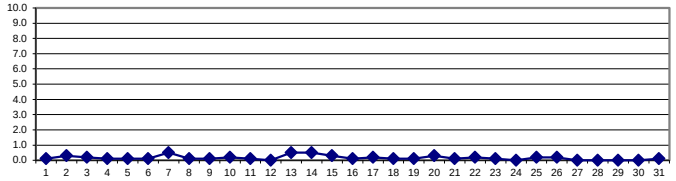
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

OBJECTIVE LIMIT: **ALBERTA ENVIRONMENT:** 1-HR 172 ppb | 24-HR 48 ppb

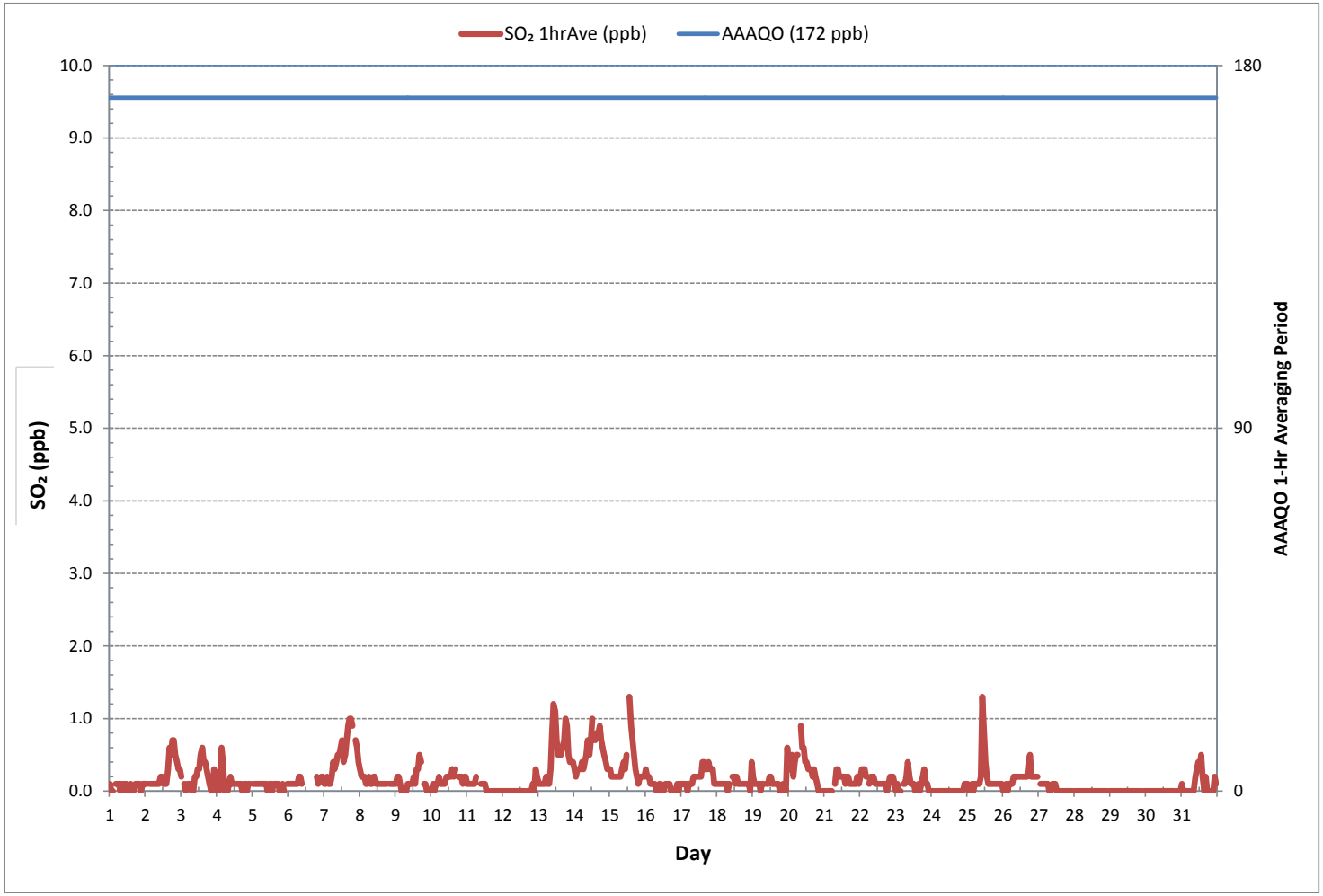
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF 24-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	483					
MINIMUM 1-HR AVERAGE	0.0	ppb	@ HOUR(S)	1	ON DAY(S)	1
MAXIMUM 1-HR AVERAGE:	1.3	ppb	@ HOUR(S)	13	ON DAY(S)	15
MAXIMUM 24-HR AVERAGE:	0.5	ppb			ON DAY(S)	7
					VAR-VARIOUS	
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:		740	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:		99.5	%
STANDARD DEVIATION:	0.2		MONTHLY AVERAGE:		0.2	ppb

24 HR AVERAGES March 2017



SULPHUR DIOXIDE Hourly Averages (SO_2 ppb)



SULPHUR DIOXIDE Instantaneous Maximum (SO_2 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	0.5	0.5	S	0.6	0.6	0.5	0.5	0.6	0.3	0.5	0.5	0.5	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.3	0.6	0.5	24
2	0.5	0.6	S	0.5	0.5	0.4	0.5	0.5	0.6	0.5	0.6	0.7	0.6	0.6	0.6	0.8	1.1	1.1	1.1	1.1	0.9	1.1	0.7	0.9	0.4	1.1	0.7	24
3	0.6	S	0.6	0.6	0.5	0.6	0.6	0.5	0.5	0.6	0.8	0.8	0.8	1.2	1.1	0.9	0.9	0.9	0.6	0.6	0.6	0.8	1.1	0.6	0.5	1.2	0.7	24
4	S	0.6	0.6	1.4	0.9	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	S	0.5	1.4	0.6	24
5	0.6	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.3	0.5	0.3	S	0.5	0.3	0.6	0.5	24
6	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.5	0.5	0.5	C	C	C	Y	Y	C	C	C	C	0.5	0.5	S	0.6	0.5	0.3	0.6	0.5	22
7	0.5	0.5	0.3	0.3	0.3	0.5	0.6	0.6	0.6	0.6	0.6	0.8	0.9	0.6	0.7	0.9	1.1	1.1	1.1	1.4	S	0.8	0.7	0.6	0.3	1.4	0.7	24
8	0.5	0.5	0.3	0.3	0.3	0.3	0.5	0.5	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.5	0.3	S	0.3	0.5	0.3	0.3	0.3	0.5	0.4	24
9	0.3	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.6	0.6	0.4	0.5	0.8	0.9	0.8	S	0.3	0.3	0.3	0.3	0.3	0.3	0.9	0.4	24
10	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.6	0.3	0.4	0.3	0.5	0.3	0.5	0.3	0.3	S	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.6	0.3	24
11	0.3	0.2	0.2	0.3	0.3	0.5	0.3	X	X	0.3	0.5	0.5	0.3	0.2	0.3	0.5	S	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.2	0.5	0.3	22
12	0.5	0.3	0.3	0.3	0.5	0.5	0.3	0.3	0.5	0.5	0.5	0.3	0.2	0.3	0.4	S	0.3	0.5	0.3	0.3	0.5	0.3	0.6	0.6	0.2	0.6	0.4	24
13	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.7	1.2	1.5	1.4	1.1	0.9	S	0.9	0.9	1.1	1.2	1.4	0.7	0.6	0.7	0.6	0.5	1.5	0.8	24
14	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.6	0.9	0.6	0.8	1.1	S	0.9	0.9	0.9	0.9	0.9	0.8	0.6	0.6	0.6	0.5	0.5	1.1	0.7	24
15	0.5	0.3	0.5	0.3	0.5	0.5	0.3	0.5	0.5	0.5	0.6	1.2	S	1.7	1.5	1.1	1.1	0.5	0.5	0.3	0.5	0.5	0.5	0.5	0.3	1.7	0.6	24
16	0.5	0.5	0.5	0.4	0.3	0.4	0.5	0.3	0.3	0.4	0.5	S	0.4	0.3	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.4	24
17	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	S	0.5	0.4	0.5	0.6	0.7	0.6	0.7	0.6	0.5	0.5	0.5	0.4	0.3	0.3	0.7	0.4	24
18	0.3	0.5	0.3	0.3	0.3	0.3	0.5	0.2	0.3	S	0.5	0.5	0.3	0.6	0.3	0.3	0.3	0.5	0.1	0.3	0.3	0.5	0.3	0.9	0.1	0.9	0.4	24
19	0.4	0.2	0.3	0.3	0.3	0.2	0.2	0.3	S	0.3	0.3	0.5	0.3	0.3	0.3	0.4	0.5	0.3	0.3	0.1	0.3	0.3	0.3	1.2	0.1	1.2	0.3	24
20	1.1	0.6	0.9	0.6	0.6	1.1	0.9	S	1.4	0.9	1.1	0.7	0.7	0.6	0.7	0.6	0.6	0.6	0.6	0.5	0.3	0.5	0.5	0.3	0.3	1.4	0.7	24
21	0.3	0.3	0.5	0.5	0.3	0.3	S	0.6	0.9	0.7	0.6	0.5	0.5	0.5	0.4	0.5	0.6	0.5	0.3	0.5	0.5	0.3	0.5	0.3	0.3	0.9	0.5	24
22	0.5	0.5	0.6	0.5	0.5	S	0.3	0.3	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.3	0.3	0.6	0.4	24
23	0.3	0.3	0.2	0.3	S	0.3	0.3	0.6	0.9	0.6	0.3	0.5	0.5	0.5	0.3	0.5	0.5	0.5	0.6	0.7	0.5	0.5	0.5	0.3	0.2	0.9	0.5	24
24	0.3	0.3	0.5	S	0.3	0.3	0.3	0.3	0.3	0.5	0.3	0.3	0.3	0.3	0.5	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.3	0.3	0.2	0.5	0.3	24
25	0.3	0.2	S	0.3	0.2	0.3	0.3	0.3	0.3	0.6	2.3	1.8	0.8	0.5	0.5	0.3	0.4	0.3	0.2	0.3	0.2	0.3	0.3	0.3	0.2	2.3	0.5	24
26	0.3	S	0.3	0.3	0.3	0.3	0.5	0.3	0.3	0.4	0.5	0.3	0.3	0.5	0.5	0.5	0.5	0.6	0.7	0.5	0.3	0.3	0.3	0.3	0.3	0.7	0.4	24
27	S	0.5	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	S	0.2	0.5	0.3	24
28	0.3	0.3	0.3	0.3	0.3	0.3	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	0.3	0.3	0.3	S	0.3	0.2	0.3	0.3	24
29	0.3	0.3	0.3	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	0.3	0.3	0.3	0.5	0.3	S	0.3	0.3	0.2	0.5	0.3	24
30	0.1	0.3	0.3	0.3	0.3	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.1	0.1	0.3	0.3	0.2	S	0.3	0.3	0.3	0.1	0.5	0.3	24
31	0.4	0.3	0.3	0.2	0.3	0.5	0.3	P	0.3	0.6	0.7	0.7	0.9	0.9	1.1	0.5	0.6	0.3	0.3	S	0.3	0.3	0.6	0.5	0.2	1.1	0.5	23
HOURLY MAX	1.1	0.6	0.9	1.4	0.9	1.1	0.9	0.6	1.4	1.2	2.3	1.8	1.1	1.7	1.5	1.1	1.1	1.1	1.2	1.4	0.9	1.1	1.1	1.2				
HOURLY AVG	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.4	0.4	0.5	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

MONTHLY SUMMARY

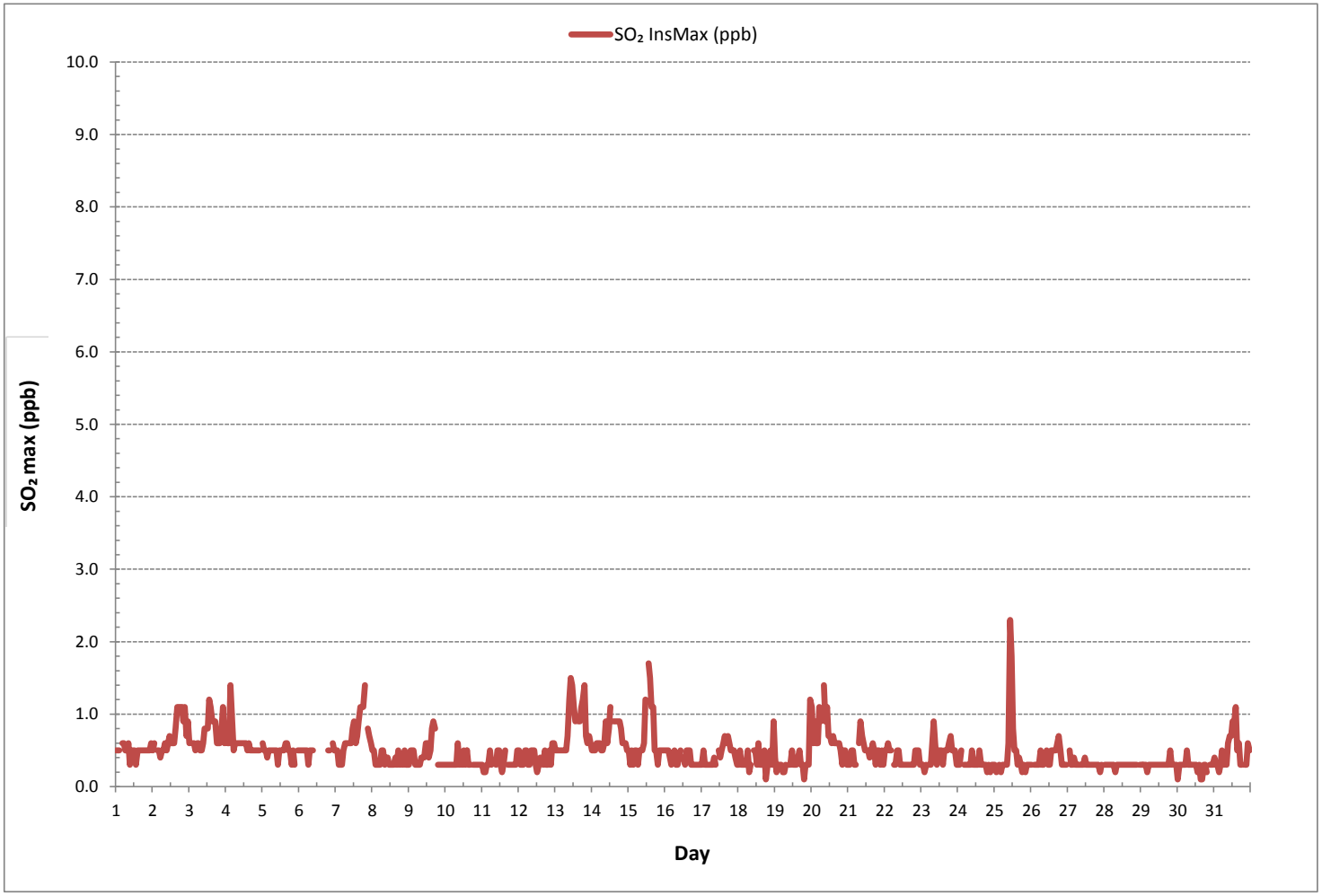
NUMBER OF NON-ZERO READINGS: 699

MAXIMUM INSTANTANEOUS VALUE: 2.3 ppb @ HOUR(S) 10 ON DAY(S) 25

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 739 hrs
MONTHLY CALIBRATION TIME: 7 hrs
STANDARD DEVIATION: 0.2

SULPHUR DIOXIDE Instantaneous Maximum (SO_2 ppb)



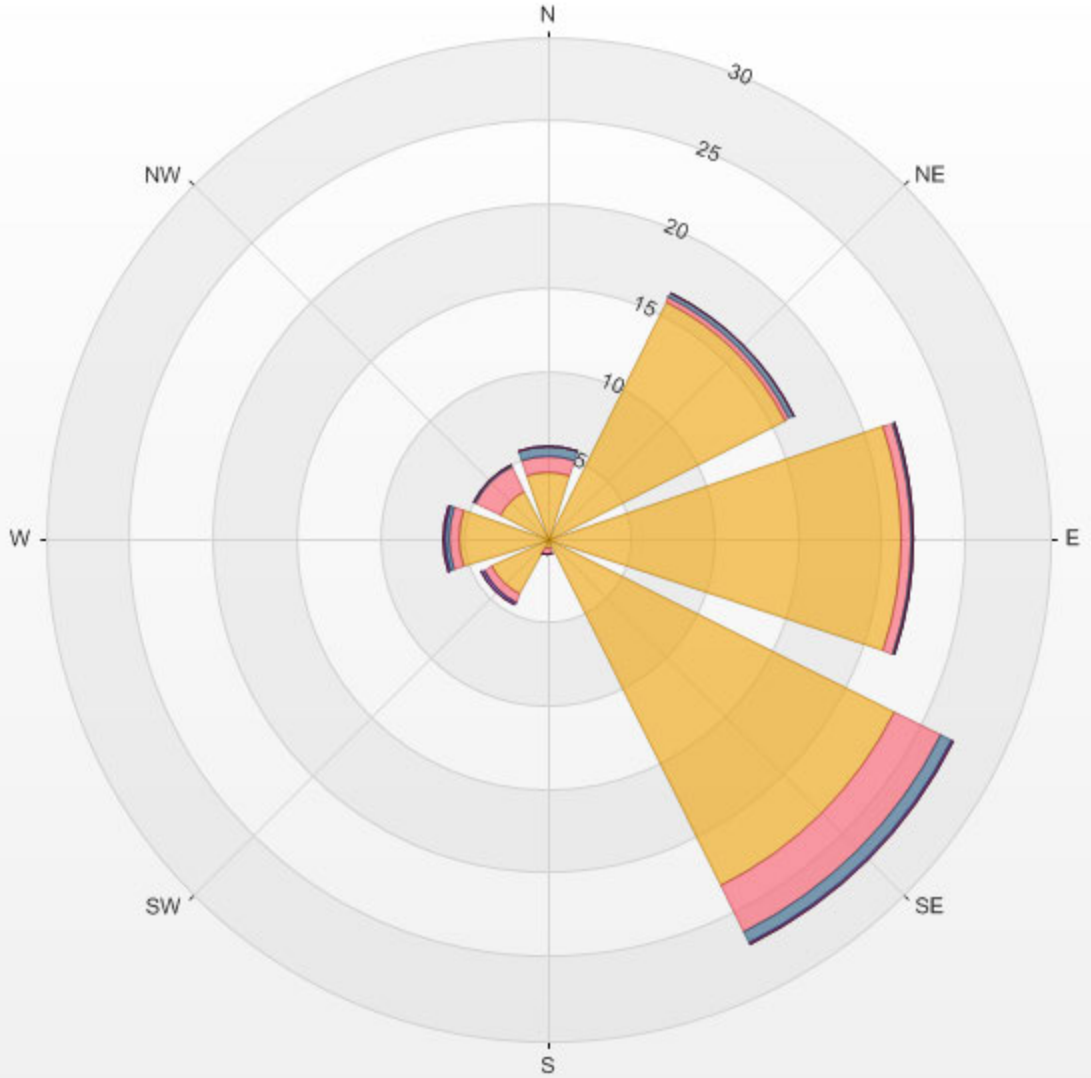
Wind: LICA COLD LAKE SOUTH
Poll.: LICA COLD LAKE SOUTH-SO2[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 12.16% Calm Avg: 0.07 [ppb]

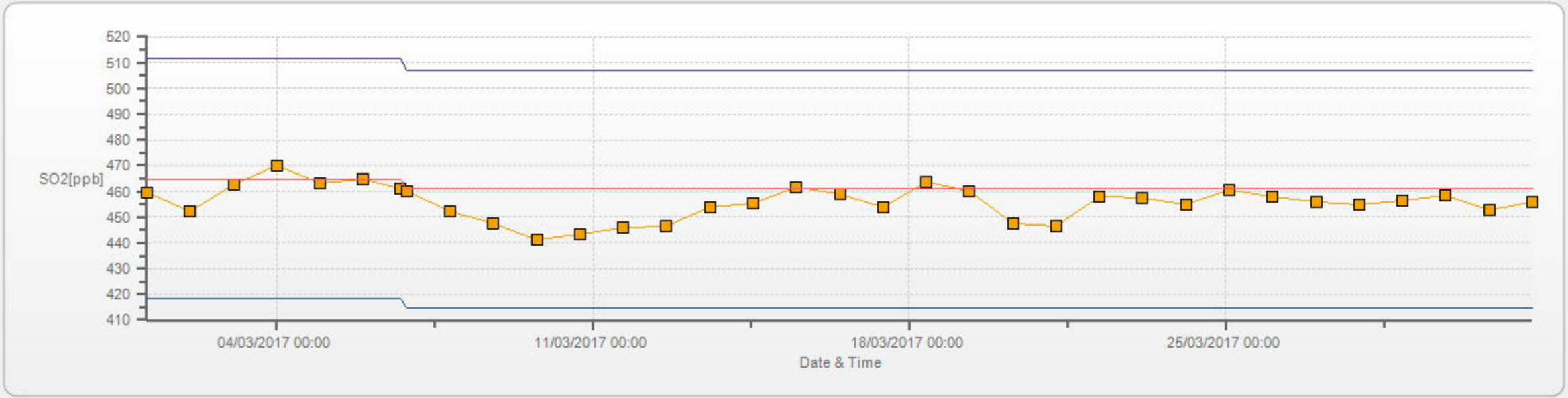
Direction	0.0-0.4	0.4-0.8	0.8-1.1	1.1-1.5	1.5-1.9	>1.9	Total
N	4.0	1.0	0.6	0.0	0.0	0.0	5.6
NE	15.9	0.3	0.3	0.0	0.0	0.0	16.5
E	21.2	0.6	0.1	0.0	0.0	0.0	21.9
SE	23.2	3.2	0.7	0.1	0.0	0.0	27.2
S	0.6	0.4	0.0	0.0	0.0	0.0	1.0
SW	3.7	0.6	0.0	0.1	0.0	0.0	4.4
W	5.3	0.6	0.3	0.1	0.0	0.0	6.3
NW	3.2	1.7	0.1	0.0	0.0	0.0	5.0
Summary	77.0	8.3	2.2	0.4	0.0	0.0	87.8

% Icon Classes (ppb)	77 0.0-0.4	8 0.4-0.8	2 0.8-1.1	0 1.1-1.5	0 1.5-1.9	0 >1.9

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-SO2[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 12.16% Calm Poll Avg: 0.07[ppb]



SO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/03 Type: Span



TOTAL REDUCED SULPHUR

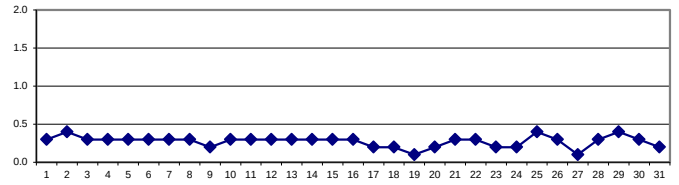
TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)

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

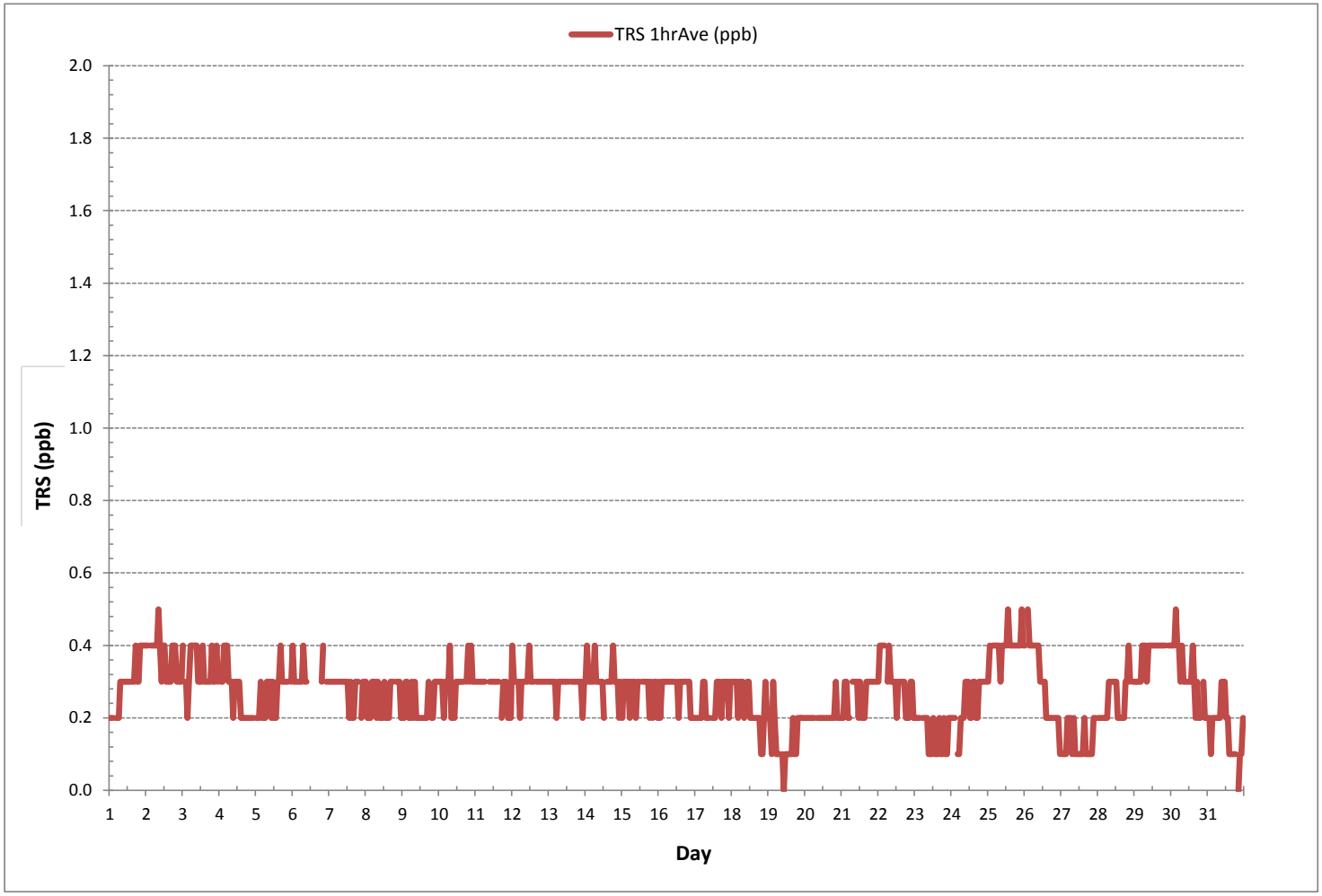
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			698				
MINIMUM 1-HR AVERAGE	0.0	ppb	@ HOUR(S)	10	ON DAY(S)	19	
MAXIMUM 1-HR AVERAGE:	0.5	ppb	@ HOUR(S)	8	ON DAY(S)	2	
MAXIMUM 24-HR AVERAGE:	0.4	ppb			ON DAY(S) VAR-VARIOUS	2	
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:			740	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:			99.5	%
STANDARD DEVIATION:	0.1		MONTHLY AVERAGE:			0.3	ppb

TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)



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	0.9	1.0	S	1.0	0.9	0.9	1.0	0.9	1.0	0.8	0.9	0.9	1.0	0.8	0.9	0.9	0.9	1.0	0.8	0.8	0.9	1.0	0.8	0.7	1.0	0.9	24
2	0.9	0.9	S	0.8	0.9	0.9	1.0	1.3	1.2	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.9	0.9	1.0	1.1	1.0	0.9	0.9	0.9	0.8	1.3	0.9	24
3	0.9	S	1.0	0.9	0.8	0.9	1.0	1.1	1.0	1.0	0.9	1.0	0.9	1.1	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	0.9	0.8	1.1	0.9	24
4	S	0.9	0.9	1.1	1.0	1.0	0.9	0.8	0.9	0.9	0.8	0.9	0.8	1.0	0.8	0.8	1.0	0.9	0.9	1.0	0.9	0.8	1.0	S	0.8	1.1	0.9	24
5	0.9	0.8	0.9	0.9	0.8	0.9	0.9	0.8	0.9	0.8	0.7	1.0	0.8	0.8	0.9	0.9	0.9	0.9	0.8	0.8	0.9	0.8	S	0.8	0.7	1.0	0.9	24
6	1.0	0.9	0.9	1.0	0.9	0.8	0.9	0.9	0.9	0.9	C	C	C	Y	Y	C	C	C	C	0.9	0.8	S	0.8	0.7	0.7	1.0	0.9	22
7	0.7	0.7	0.7	0.9	0.9	0.8	0.9	0.9	0.8	0.8	0.9	0.9	0.9	0.7	0.9	0.9	0.7	1.0	0.9	0.8	S	0.7	0.9	0.9	0.7	1.0	0.8	24
8	1.0	0.7	0.8	0.9	0.8	0.8	0.8	0.7	0.8	1.0	0.8	0.7	0.8	0.8	0.9	0.7	0.8	0.8	0.8	S	0.8	0.8	0.9	0.9	0.7	1.0	0.8	24
9	0.9	0.8	0.9	1.0	0.9	0.8	1.0	0.8	0.9	0.8	0.7	0.8	1.0	0.7	0.8	0.9	0.8	0.9	S	0.7	0.8	0.7	0.9	0.8	0.7	1.0	0.8	24
10	0.8	0.9	0.8	0.7	0.8	0.7	0.8	0.9	0.7	0.6	0.8	0.8	0.8	0.8	0.8	0.7	0.8	S	0.9	1.1	0.8	0.8	0.8	0.7	0.6	1.1	0.8	24
11	0.7	0.7	0.8	0.7	0.8	0.8	0.8	X	X	0.9	0.9	0.7	0.7	0.8	0.6	0.8	S	0.9	0.8	1.0	0.9	0.8	0.9	0.7	0.6	1.0	0.8	22
12	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.9	0.8	0.9	0.9	0.9	0.9	0.7	S	0.7	0.7	0.8	0.9	0.8	0.8	0.8	1.1	0.7	1.1	0.9	24
13	0.7	0.8	0.8	0.8	0.8	0.7	0.9	0.8	0.8	0.8	0.7	0.8	0.7	0.9	S	0.8	0.9	0.9	1.0	0.8	0.8	0.8	0.9	0.9	0.7	1.0	0.8	24
14	0.8	1.0	0.9	0.8	0.8	0.9	1.1	0.8	0.9	0.9	0.9	0.8	0.9	S	0.7	0.9	1.0	0.9	1.0	0.9	0.8	0.9	0.8	0.8	0.7	1.1	0.9	24
15	0.9	0.9	0.9	1.0	0.9	0.9	0.8	0.9	1.0	0.9	0.8	0.8	S	0.8	0.9	0.9	0.8	0.9	0.9	0.9	0.7	0.9	0.8	0.9	0.7	1.0	0.9	24
16	0.9	0.8	0.8	0.8	0.9	0.8	0.9	0.9	0.9	0.9	0.8	S	0.8	0.8	0.8	1.0	0.9	0.8	0.9	0.8	0.9	0.9	0.8	0.8	0.8	1.0	0.9	24
17	0.8	0.8	0.8	0.9	0.8	0.8	1.0	0.8	0.9	0.9	S	1.0	0.8	0.8	0.9	0.9	0.8	0.9	1.0	0.8	0.8	0.9	0.8	0.8	0.8	1.0	0.9	24
18	0.8	0.9	1.1	0.9	0.8	0.9	0.9	0.9	0.7	S	0.8	1.0	0.9	0.8	0.9	0.8	0.9	0.9	0.8	0.8	0.8	0.9	1.3	1.2	0.7	1.3	0.9	24
19	1.0	1.1	0.8	0.9	1.0	0.9	0.9	0.9	S	0.9	0.7	0.8	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.9	0.8	0.8	0.9	0.8	0.7	1.1	0.9	24
20	0.8	0.9	0.9	0.7	0.9	0.7	0.8	S	0.8	0.9	0.7	0.8	0.8	0.8	0.7	1.0	0.8	0.9	1.1	0.7	1.0	0.9	0.8	0.9	0.7	1.1	0.8	24
21	0.8	0.8	0.9	0.9	0.8	0.8	S	0.9	0.9	0.9	0.9	0.8	1.0	0.9	0.7	1.0	0.8	0.9	0.9	0.9	0.9	0.8	0.9	0.8	0.7	1.0	0.9	24
22	0.7	0.9	0.8	1.0	0.9	S	0.9	0.9	0.8	0.9	0.7	0.9	0.9	0.9	0.9	0.8	0.9	1.0	0.9	1.1	0.9	0.9	1.1	1.0	0.7	1.1	0.9	24
23	0.9	0.9	0.9	0.9	S	1.0	0.8	0.9	0.9	0.9	1.0	0.8	0.8	0.8	1.0	0.8	1.0	0.8	0.9	0.9	0.8	0.8	0.8	0.8	0.8	1.0	0.9	24
24	0.9	1.0	0.9	S	0.9	0.7	0.9	0.9	0.9	1.0	0.8	0.9	0.9	1.0	0.8	1.1	0.9	0.9	0.8	0.8	0.7	1.0	0.8	1.0	0.7	1.1	0.9	24
25	0.8	0.9	S	1.0	1.0	0.9	0.9	0.8	1.0	0.9	0.9	0.8	0.8	1.0	1.0	0.8	1.0	1.0	0.9	0.8	0.9	0.9	1.1	0.9	0.8	1.1	0.9	24
26	1.0	S	0.9	1.0	0.9	1.0	0.8	0.9	0.9	1.0	0.9	0.8	0.9	0.9	0.9	0.9	0.8	0.9	0.8	1.1	0.9	0.9	1.0	0.9	0.8	1.1	0.9	24
27	S	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	0.8	0.9	0.7	0.8	0.9	0.9	0.9	0.9	1.0	0.9	0.8	0.7	0.9	0.9	S	0.7	1.0	0.9	24
28	1.0	0.9	1.0	1.0	0.9	1.0	1.2	1.2	1.0	1.0	1.0	0.9	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.0	S	1.1	0.9	1.2	1.0	24
29	1.1	1.1	1.0	1.0	1.0	0.9	0.9	1.0	1.1	1.0	1.0	1.1	1.0	1.0	0.9	0.9	1.0	1.0	1.2	1.0	1.0	S	1.0	1.0	0.9	1.2	1.0	24
30	1.0	1.2	1.0	1.1	1.1	1.1	0.8	0.9	1.1	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	S	1.1	0.9	0.9	0.8	1.2	1.0	24
31	0.7	0.9	0.9	0.9	0.9	1.0	0.9	P	1.2	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.9	0.9	0.8	S	0.9	1.0	0.9	1.1	0.7	1.2	0.9	23
HOURLY MAX	1.1	1.2	1.1	1.1	1.1	1.1	1.2	1.3	1.2	1.0	1.0	1.1	1.1	1.1	1.0	1.1	1.0	1.0	1.2	1.1	1.1	1.1	1.3	1.2				
HOURLY AVG	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9				

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

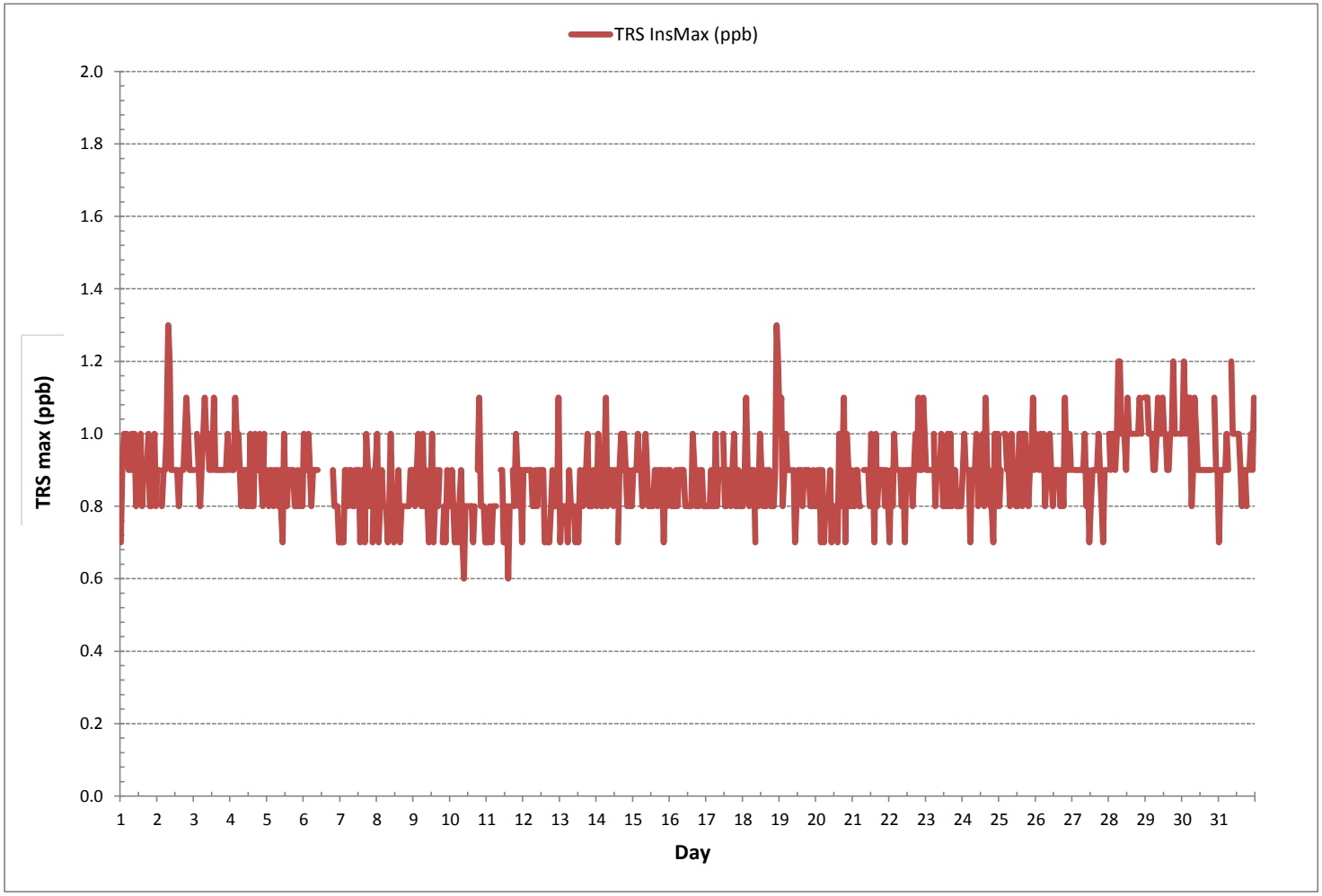
NUMBER OF NON-ZERO READINGS: 699

MAXIMUM INSTANTANEOUS VALUE: 1.3 ppb @ HOUR(S) 7 ON DAY(S) 2

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 739 hrs
MONTHLY CALIBRATION TIME: 7 hrs
STANDARD DEVIATION: 0.1

TOTAL REDUCED SULPHUR Instantaneous Maximum (TRS ppb)



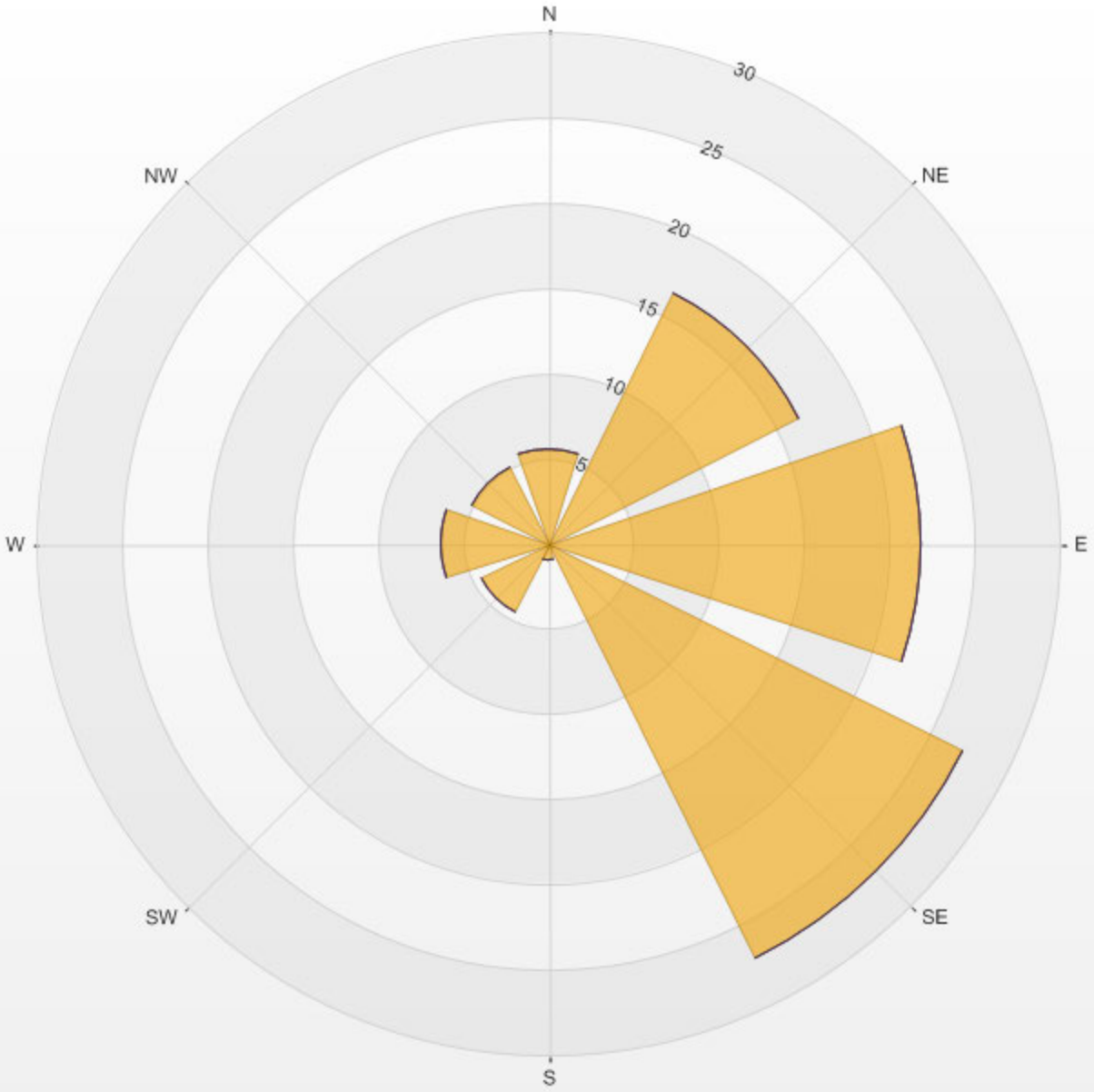
Wind: LICA COLD LAKE SOUTH
Poll.: LICA COLD LAKE SOUTH-TRS[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 12.16% Calm Avg: 0.27 [ppb]

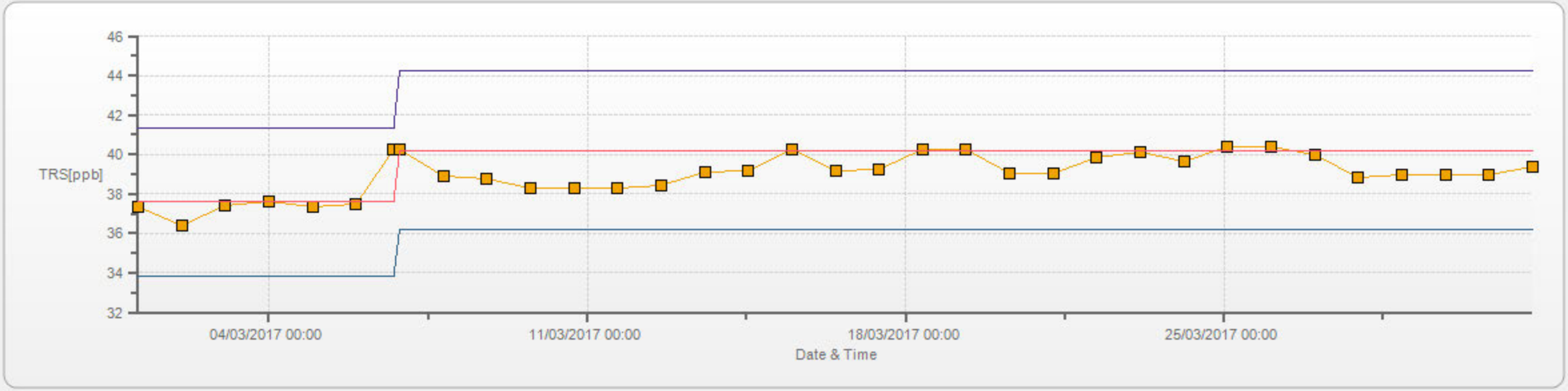
Direction	0.0-0.6	0.6-1.3	1.3-1.9	>1.9	Total
N	5.6	0.0	0.0	0.0	5.6
NE	16.5	0.0	0.0	0.0	16.5
E	21.9	0.0	0.0	0.0	21.9
SE	27.2	0.0	0.0	0.0	27.2
S	1.0	0.0	0.0	0.0	1.0
SW	4.4	0.0	0.0	0.0	4.4
W	6.3	0.0	0.0	0.0	6.3
NW	5.0	0.0	0.0	0.0	5.0
Summary	87.8	0.0	0.0	0.0	87.8

%	Icon	Classes (ppb)	88	0.0-0.6	0	0.6-1.3	0	1.3-1.9	0	>1.9

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-TRS[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 12.16% Calm Poll Avg: 0.27[ppb]



TRS[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/03 Type: Span



TOTAL HYDROCARBON

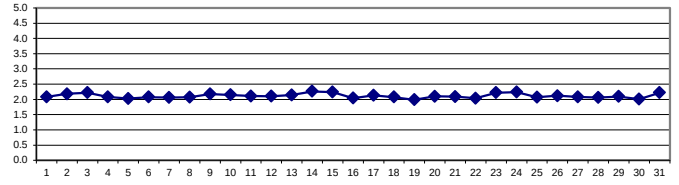
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	2.0	2.1	2.0	S	2.0	2.1	2.1	2.1	2.2	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.2	2.1	24
2	2.1	2.1	S	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.3	2.2	24
3	2.1	S	2.1	2.2	2.2	2.3	2.4	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.3	2.4	2.5	2.4	2.5	2.2	2.1	2.1	2.5	2.2	24
4	S	2.0	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	S	2.0	2.2	2.1	24
5	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.0	S	2.0	2.0	2.2	2.0	24
6	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.2	S1	S1	2.1	2.1	Y	2.1	2.1	2.1	2.1	S	2.0	2.0	2.0	2.2	2.1	21
7	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.1	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.1	2.1	S	2.1	2.1	2.1	2.0	2.2	2.1	24
8	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	S	2.1	2.1	2.0	2.1	2.0	2.1	2.1	24
9	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	S	2.1	2.2	2.3	2.3	2.4	2.1	2.4	2.2	24
10	2.4	2.4	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	S	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.4	2.1	24
11	2.1	2.2	2.2	2.2	2.2	2.2	2.1	X	X	2.1	2.1	2.1	2.1	2.1	2.1	2.1	S	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.2	2.1	22
12	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	S	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.0	2.2	2.1	24
13	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	S	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.3	2.1	24
14	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	S	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.4	**2.3**	24
15	2.1	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.4	2.3	S	2.3	2.4	2.4	2.4	2.3	2.4	2.5	2.5	2.5	2.0	2.0	2.0	2.5	2.2	24
16	2.0	2.0	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.0	2.0	S	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	1.9	2.2	2.0	24
17	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	S	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.0	2.2	2.1	24
18	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	S	X	X	X	X	X	X	X	X	X	X	X	X	X	X	2.1	2.1	2.1	10
19	X	X	X	X	X	X	X	X	S	2.0	2.0	2.0	2.0	2.0	**1.9**	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	**1.9**	2.0	2.0	16
20	2.0	2.0	2.1	2.1	2.1	2.1	2.1	S	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.0	2.2	2.1	24
21	2.3	2.3	2.2	2.1	2.1	2.1	S	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.1	24
22	2.0	2.0	2.0	2.0	2.0	S	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	2.1	2.0	2.2	2.2	2.4	2.0	2.4	2.0	24
23	2.5	2.5	2.4	2.4	S	2.6	**2.6**	2.6	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	**2.6**	2.2	24
24	2.2	2.2	2.2	S	2.3	2.4	2.6	2.5	2.5	2.5	2.5	2.4	2.4	2.3	2.2	2.1	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.6	2.2	24
25	2.0	2.0	S	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.3	2.1	2.0	2.3	2.1	24
26	2.1	S	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.4	2.5	2.2	2.0	2.5	2.1	24
27	S	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.1	S	1.9	2.4	2.1	24
28	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	S	2.0	2.0	2.2	2.1	24
29	2.1	2.1	2.1	2.2	2.3	2.2	2.1	2.2	2.1	2.1	2.2	2.0	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.0	2.0	S	2.0	2.0	2.0	2.3	2.1	24
30	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0	S	2.2	2.3	2.3	1.9	2.3	2.0	24
31	2.3	2.3	2.3	2.4	2.1	2.1	2.3	2.2	2.4	2.5	2.5	2.5	2.5	2.3	2.1	2.0	2.0	2.0	2.1	S	2.1	2.1	2.1	2.0	2.0	2.5	2.2	24
HOURLY MAX	2.47	2.51	2.40	2.43	2.27	2.58	2.64	2.63	2.53	2.49	2.48	2.48	2.48	2.34	2.35	2.39	2.36	2.34	2.38	2.50	2.51	2.51	2.47	2.39				
HOURLY AVG	2.12	2.13	2.13	2.13	2.12	2.15	2.16	2.17	2.17	2.15	2.14	2.12	2.10	2.08	2.06	2.06	2.06	2.05	2.08	2.11	2.13	2.14	2.13	2.12				

STATUS FLAG CODES

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

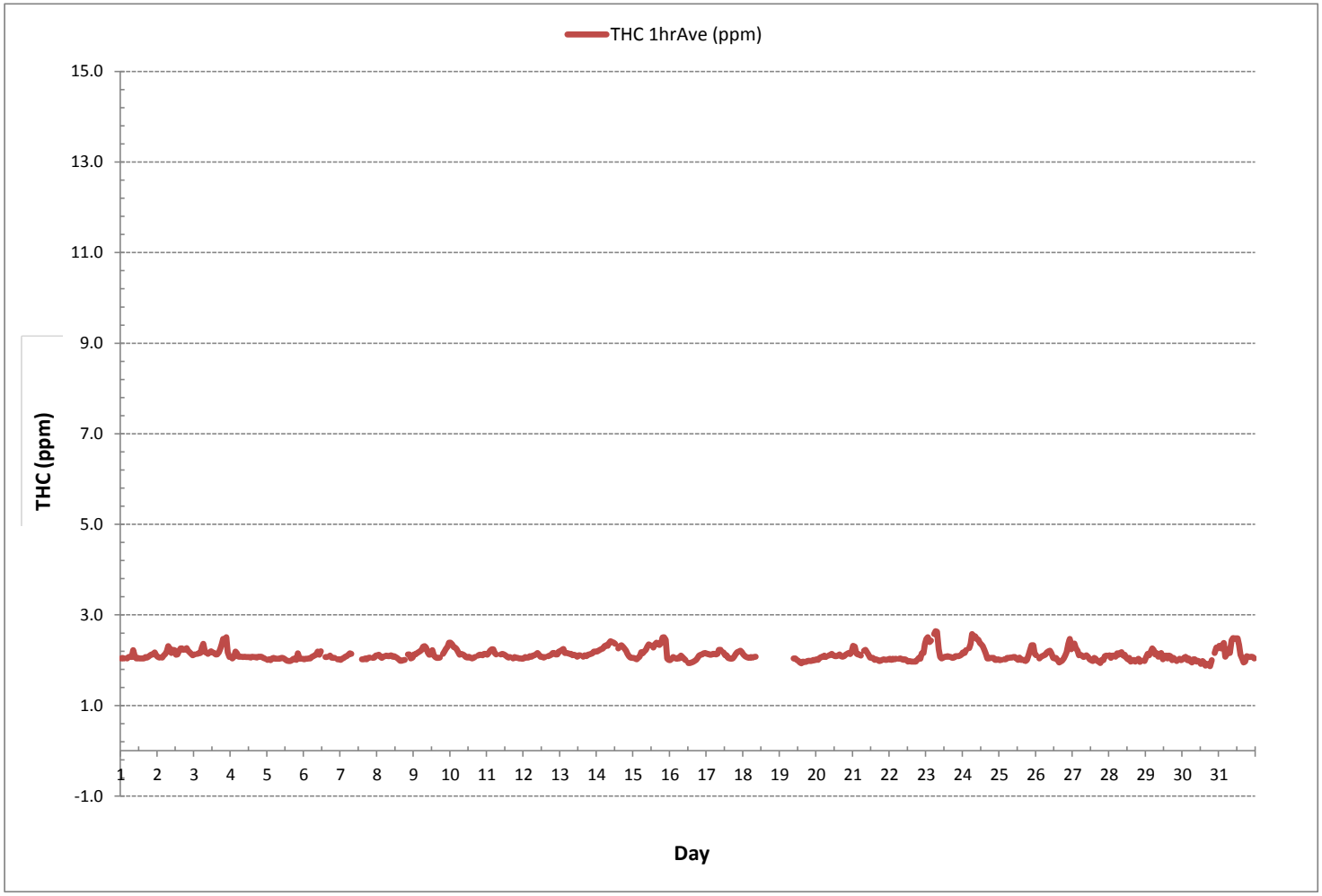
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			678				
MINIMUM 1-HR AVERAGE	1.87	ppm	@ HOUR(S)	14	ON DAY(S)	19	
MAXIMUM 1-HR AVERAGE:	2.64	ppm	@ HOUR(S)	6	ON DAY(S)	23	
MAXIMUM 24-HR AVERAGE:	2.26	ppm			ON DAY(S) VAR-VARIOUS	14	
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:			717	hrs
MONTHLY CALIBRATION TIME:	6	hrs	AMD OPERATION UPTIME:			96.4	%
STANDARD DEVIATION:	0.12		MONTHLY AVERAGE:			2.12	ppm

TOTAL HYDROCARBONS Hourly Averages (THC ppm)



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	2.3	2.4	2.4	S	2.4	2.5	2.7	2.4	3.1	2.7	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.3	3.1	2.5	24
2	2.5	2.5	S	2.5	2.5	2.8	4.0	2.8	2.8	2.5	2.6	2.6	2.5	2.5	2.5	2.6	2.6	2.5	2.5	2.6	2.5	2.6	2.4	2.3	2.3	4.0	2.6	24
3	2.4	S	2.3	2.4	2.4	3.7	5.4	2.4	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.6	2.5	2.8	2.6	2.2	2.2	5.4	2.6	24
4	S	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.6	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	S	2.1	2.6	2.3	24
5	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.5	2.4	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.6	2.2	S	2.2	2.2	2.6	2.3	24
6	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	2.3	2.6	S1	S1	2.8	2.9	X	2.6	2.6	2.2	2.2	S	2.2	2.2	2.2	2.9	2.4	21
7	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	C	C	C	C	C	C	2.1	2.6	2.2	2.2	2.2	2.2	S	2.2	2.2	2.3	2.1	2.6	2.2	24
8	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.4	2.3	3.1	2.3	2.2	2.7	2.3	S	2.6	2.4	2.3	2.4	2.2	3.1	2.4	24
9	5.1	2.4	2.5	2.5	2.5	2.6	2.7	2.8	2.7	2.5	2.5	2.5	3.0	4.5	2.7	2.4	2.4	2.5	S	2.6	2.7	2.7	2.8	2.8	2.4	5.1	2.8	24
10	2.8	2.7	2.7	2.7	2.6	3.4	2.5	3.8	2.7	2.5	2.5	2.4	2.6	3.0	2.4	2.5	2.4	S	2.4	2.5	2.5	2.4	2.5	2.4	2.4	3.8	2.6	24
11	2.5	2.5	2.6	2.6	2.6	2.5	2.7	X	X	2.4	2.4	2.4	2.4	2.3	2.3	2.3	S	3.0	2.3	2.3	2.3	2.3	2.3	2.2	2.2	3.0	2.4	22
12	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	3.0	2.5	2.3	2.5	2.5	2.4	S	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	3.0	2.4	24
13	2.3	2.4	2.4	2.3	2.2	2.7	2.9	2.2	2.3	2.4	2.2	2.1	2.1	2.1	S	2.3	2.3	2.1	2.1	2.2	3.5	2.2	2.2	2.2	2.1	3.5	2.3	24
14	2.2	2.2	2.2	2.4	2.4	2.4	7.7	2.4	2.4	2.5	2.5	2.4	2.4	S	2.3	2.5	2.3	2.3	2.3	2.2	2.1	2.1	2.0	2.0	2.0	7.7	2.5	24
15	2.0	2.0	1.9	2.0	2.0	2.1	2.6	2.2	2.2	2.3	2.4	2.3	S	2.2	2.5	2.4	2.3	2.4	2.3	2.5	2.5	2.8	1.9	1.9	1.9	2.8	2.2	24
16	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.1	2.0	2.0	2.0	S	2.0	1.9	2.0	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.3	1.9	2.3	2.0	24
17	2.2	2.2	2.1	2.1	2.2	2.4	2.2	2.5	2.4	2.3	S	2.3	2.1	2.1	2.2	2.1	2.0	2.0	2.0	2.1	2.3	2.1	2.1	2.1	2.0	2.5	2.2	24
18	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.1	1.9	S	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1.9	2.1	2.0	10
19	X	X	X	X	X	X	X	X	S	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.0	16
20	2.1	2.1	2.1	2.2	2.2	2.2	2.2	S	2.3	2.2	2.3	2.3	2.2	2.3	2.3	2.6	2.3	2.2	2.2	2.5	2.3	2.7	2.3	2.4	2.1	2.7	2.3	24
21	2.5	2.5	2.5	2.3	2.5	2.3	S	2.7	2.4	2.3	2.6	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.7	2.2	24
22	2.0	2.0	2.0	2.0	1.9	S	2.1	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.4	1.9	2.4	2.0	24
23	2.4	2.5	2.4	2.4	S	2.6	2.6	2.6	2.4	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.6	2.2	24
24	2.2	2.2	2.5	S	3.8	2.5	3.1	2.8	2.5	2.5	2.5	2.4	2.3	2.3	2.2	2.1	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	3.8	2.3	24
25	1.9	1.9	S	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.0	2.3	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.2	2.3	2.4	2.4	2.3	1.9	2.4	2.1	24
26	2.2	S	2.1	2.1	2.1	2.1	2.2	2.3	3.0	2.3	2.4	2.1	2.0	2.1	2.0	1.9	2.0	2.0	2.0	2.1	2.4	2.6	2.6	2.4	1.9	3.0	2.2	24
27	S	2.5	2.4	2.3	2.1	2.1	2.1	2.2	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.1	1.9	1.9	1.8	1.9	1.9	2.0	2.0	S	1.8	2.5	2.1	24
28	2.0	1.9	2.0	2.0	2.0	2.6	2.2	2.1	2.1	2.0	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	S	2.0	1.9	2.6	2.0	24
29	2.1	2.1	2.1	2.2	3.6	2.2	2.4	2.1	2.1	2.1	2.3	2.0	2.1	2.4	2.1	2.0	2.0	1.9	2.0	1.9	1.9	S	1.9	1.9	1.9	3.6	2.1	24
30	2.0	2.0	2.0	2.0	2.1	2.0	1.9	2.1	2.5	2.2	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.4	S	2.3	2.6	2.4	1.9	2.6	2.1	24
31	2.4	2.4	2.6	2.6	2.2	2.5	2.4	P	2.5	2.7	2.6	2.5	2.6	2.6	2.3	2.1	2.0	2.0	2.1	S	2.1	2.1	2.1	2.0	2.0	2.7	2.3	23
HOURLY MAX	5.11	2.74	2.68	2.74	3.81	3.69	7.65	3.76	3.13	2.98	2.64	2.59	2.95	4.51	3.08	2.92	2.58	3.04	2.58	2.61	3.45	2.81	2.75	2.81				
HOURLY AVG	2.33	2.23	2.25	2.24	2.33	2.40	2.69	2.37	2.37	2.33	2.31	2.26	2.23	2.30	2.25	2.23	2.17	2.20	2.18	2.23	2.30	2.29	2.25	2.23				

STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS: 677

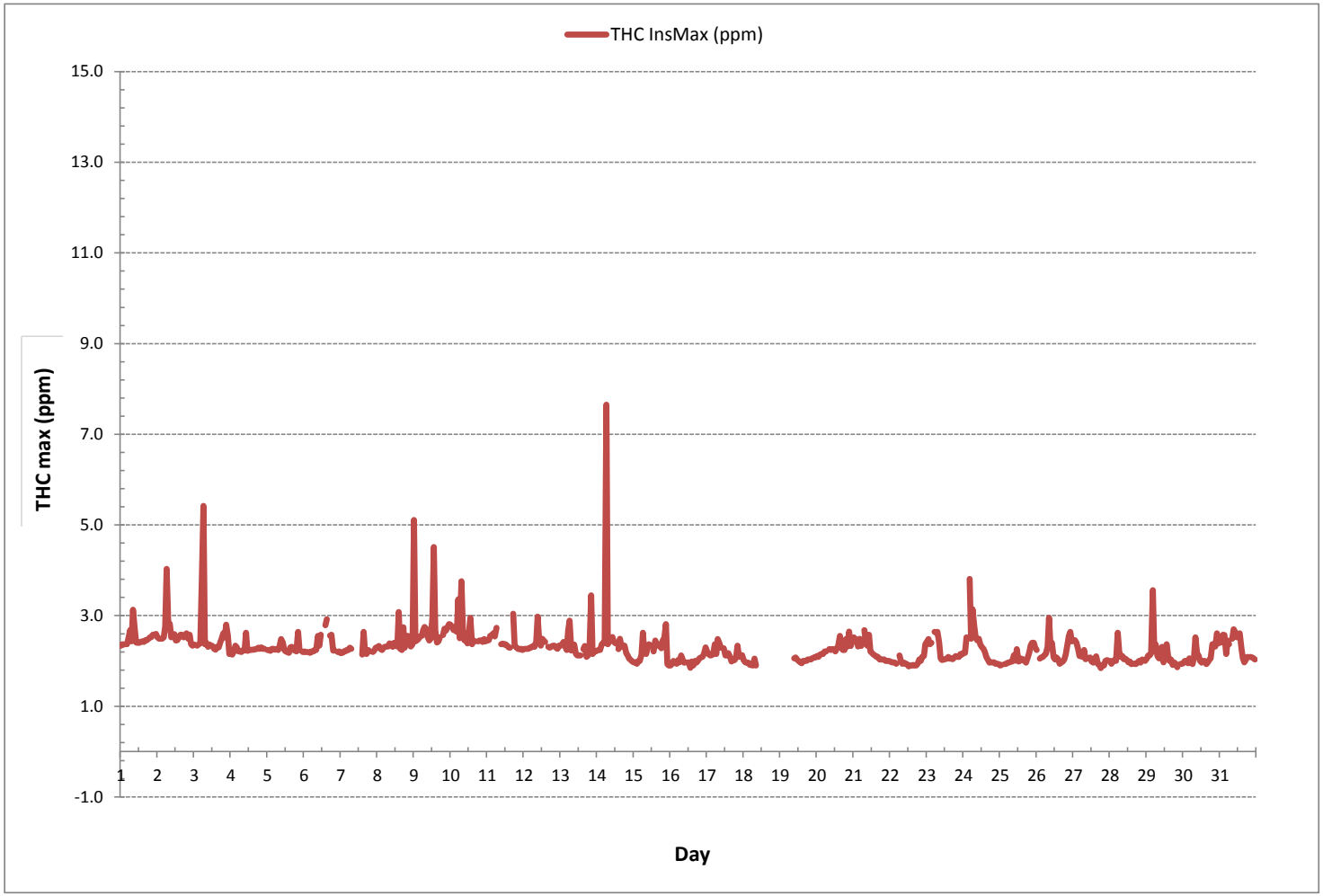
MAXIMUM INSTANTANEOUS VALUE: 7.65 ppm @ HOUR(S) 6 ON DAY(S) 14

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs
MONTHLY CALIBRATION TIME: 6 hrs
STANDARD DEVIATION: 0.39

OPERATIONAL TIME: 716 hrs

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)



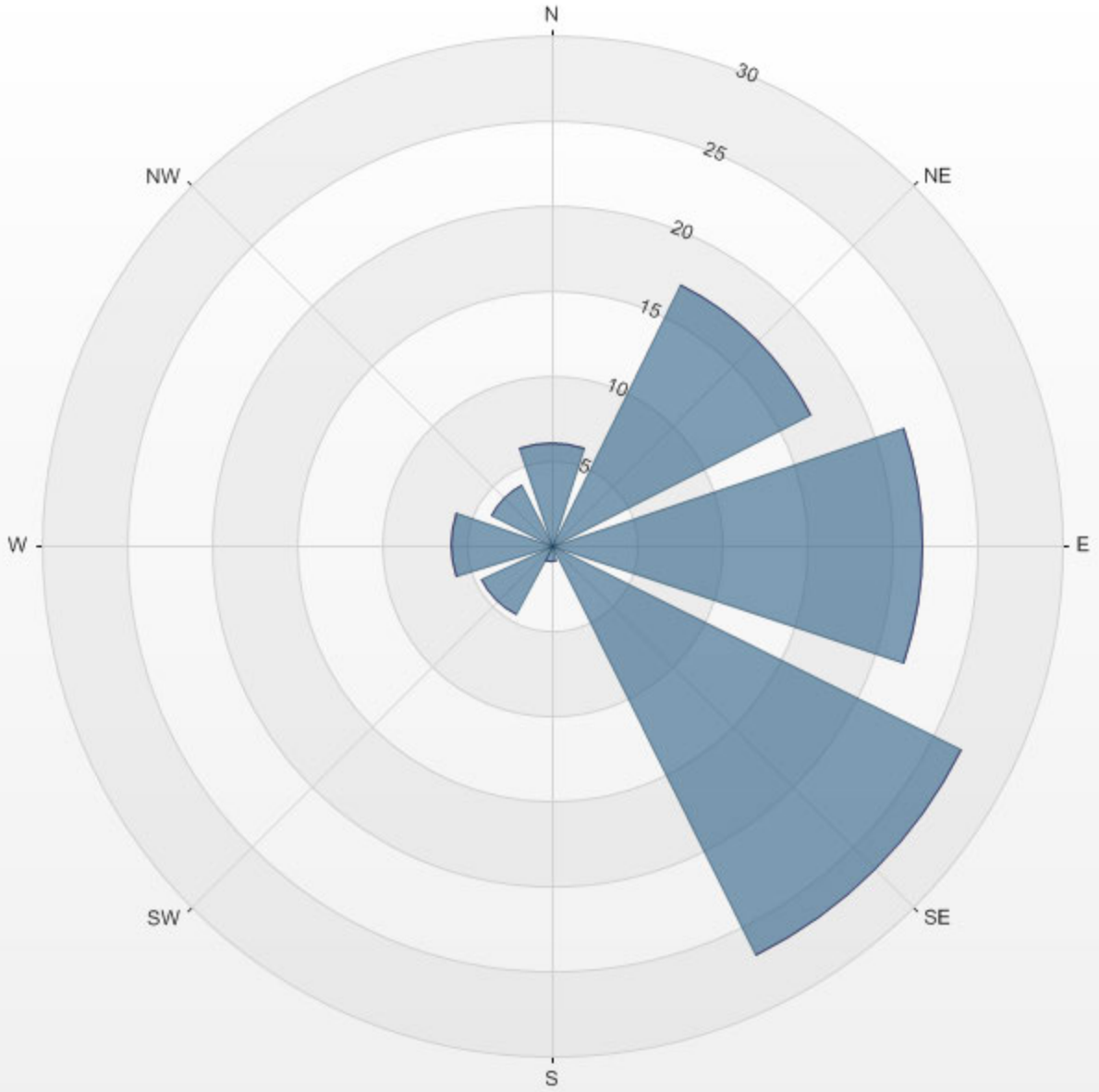
Wind: LICA COLD LAKE SOUTH
Poll.: LICA COLD LAKE SOUTH-THC[ppm]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 12.54% Calm Avg: 2.23 [ppm]

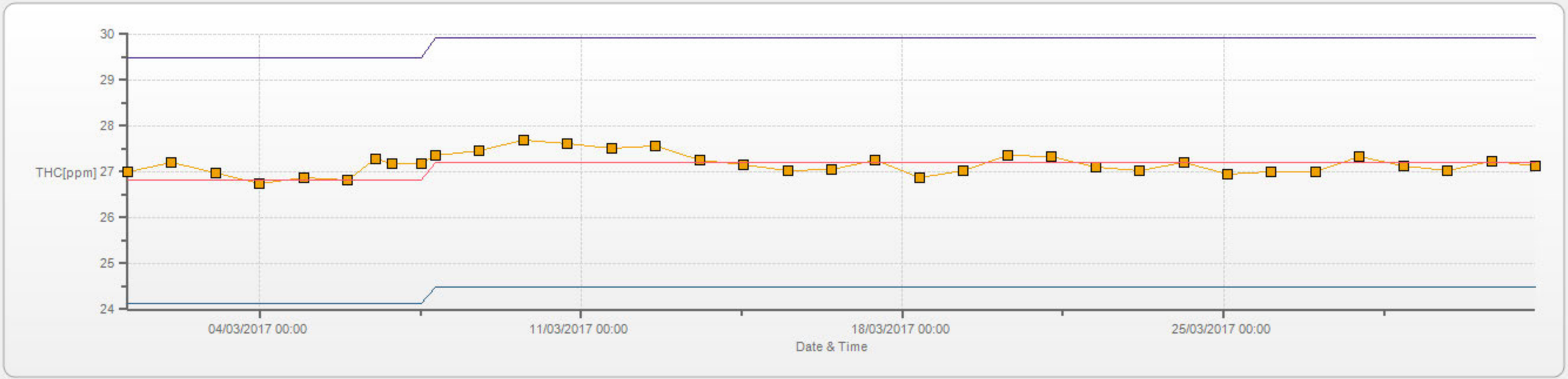
Direction	0.0-0.9	0.9-1.8	1.8-2.7	>2.7	Total
N	0.0	0.0	6.1	0.0	6.1
NE	0.0	0.0	17.1	0.0	17.1
E	0.0	0.0	21.8	0.0	21.8
SE	0.0	0.0	27.0	0.0	27.0
S	0.0	0.0	1.0	0.0	1.0
SW	0.0	0.0	4.6	0.0	4.6
W	0.0	0.0	5.9	0.0	5.9
NW	0.0	0.0	4.0	0.0	4.0
Summary	0.0	0.0	87.5	0.0	87.5

% Icon Classes (ppm)	0 0.0-0.9	0 0.9-1.8	87 1.8-2.7	0 >2.7

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-THC[ppm] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 12.54% Calm Poll Avg: 2.23[ppm]



THC[ppm] Calibration: LICA COLD LAKE SOUTH Monthly: 17/03 Type: Span



OXIDES OF NITROGEN

Maxxam
A Bureau Veritas Group Company

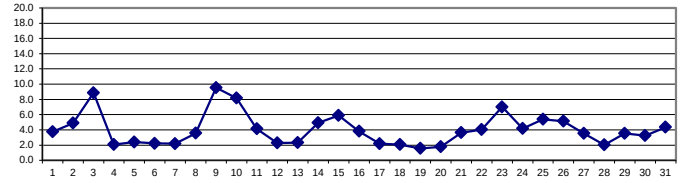
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	2.7	3.3	2.8	S	3.7	4.5	4.1	3.3	4.3	3.1	3.0	2.9	1.4	1.5	1.7	1.8	1.5	2.5	3.3	4.7	8.1	8.7	9.9	3.4	1.4	9.9	3.7	24
2	1.5	1.0	S	1.5	1.9	2.0	5.0	15.4	18.0	4.2	4.6	4.4	3.5	3.5	4.0	5.0	5.1	8.9	8.4	3.6	2.9	2.8	2.6	2.7	1.0	18.0	4.9	24
3	3.8	S	4.9	5.1	10.7	19.2	**26.4**	11.5	18.8	10.9	5.9	4.1	3.1	4.7	3.7	3.5	3.6	4.6	8.9	21.5	12.2	9.5	3.9	3.4	3.1	**26.4**	8.9	24
4	S	3.6	2.5	5.2	3.8	1.9	1.5	1.4	1.4	1.4	1.6	1.4	1.4	1.3	1.7	2.0	2.6	1.7	1.7	1.9	1.7	2.0	1.6	S	1.3	5.2	2.1	24
5	2.0	2.6	1.8	2.2	1.9	2.3	2.6	3.5	2.7	2.6	2.0	1.4	1.4	1.5	1.1	1.5	1.4	1.6	4.3	5.2	4.1	2.7	S	2.6	1.1	5.2	2.4	24
6	1.9	2.1	1.6	1.7	1.4	2.1	2.6	5.0	2.5	2.5	C	C	C	C	C	C	C	2.2	2.0	1.5	2.4	S	2.4	1.6	1.4	5.0	2.2	24
7	1.2	1.5	1.6	1.7	1.5	1.4	1.8	1.9	3.6	2.1	2.2	2.6	2.1	2.0	2.3	2.2	2.5	2.6	2.7	3.0	S	2.7	2.6	2.4	1.2	3.6	2.2	24
8	2.6	4.8	2.5	2.1	2.1	1.4	4.1	2.5	3.2	1.9	1.4	1.9	1.6	1.6	2.6	1.8	2.5	4.7	4.8	S	12.6	8.6	4.1	6.3	1.4	12.6	3.6	24
9	9.4	8.9	7.0	10.4	10.6	7.1	11.6	14.5	19.8	8.0	2.3	1.7	2.8	2.0	3.4	2.8	2.9	8.0	S	10.2	14.5	21.6	19.7	20.2	1.7	21.6	**9.5**	24
10	22.0	25.8	16.8	13.7	17.9	12.0	6.3	9.8	5.2	3.4	4.2	2.0	2.2	2.1	2.9	3.7	3.6	S	5.1	9.2	7.6	4.0	4.8	3.4	2.0	25.8	8.2	24
11	2.4	4.2	9.2	9.6	12.1	7.3	2.2	X	X	1.6	2.5	1.6	1.5	1.4	3.2	2.5	S	3.7	4.8	4.1	3.5	3.3	3.2	3.1	1.4	12.1	4.1	22
12	3.4	2.7	2.8	2.8	4.3	2.9	2.8	2.7	2.5	2.4	2.3	1.7	1.4	1.5	1.2	S	2.7	3.2	1.4	1.7	1.4	1.2	1.2	1.9	1.2	4.3	2.3	24
13	1.9	1.9	1.7	6.4	2.0	1.9	2.1	2.2	1.9	2.2	3.1	1.9	1.6	1.4	S	1.9	1.8	2.0	2.3	2.3	2.5	2.5	2.8	3.2	1.4	6.4	2.3	24
14	2.9	6.0	3.8	5.1	3.3	4.9	5.0	9.4	5.8	3.7	5.2	4.0	5.6	S	6.5	6.2	7.4	8.2	4.4	4.0	3.5	3.0	2.7	2.5	2.5	9.4	4.9	24
15	2.8	2.3	2.2	2.2	2.5	3.9	6.3	5.3	3.9	4.0	3.6	4.4	S	7.8	8.1	8.3	7.9	7.9	12.9	17.2	11.1	7.3	2.0	1.2	1.2	17.2	5.9	24
16	2.0	3.4	5.1	4.6	4.0	11.9	3.8	11.6	5.4	4.8	2.5	S	1.6	1.3	1.0	1.0	1.5	2.6	2.9	3.1	2.6	2.5	4.3	4.0	1.0	11.9	3.8	24
17	3.0	2.6	1.0	**0.8**	2.3	3.4	2.4	2.9	4.2	2.9	S	2.5	1.8	1.9	1.8	1.8	1.7	2.2	2.1	2.1	2.1	1.7	1.7	1.5	**0.8**	4.2	2.2	24
18	1.4	1.5	1.4	1.3	1.8	1.7	2.4	3.1	2.8	S	1.8	1.8	1.4	1.3	1.5	1.8	1.7	2.8	3.7	2.8	3.0	2.3	2.1	2.5	1.3	3.7	2.1	24
19	2.0	2.4	1.5	1.6	1.0	0.9	1.2	1.2	S	1.9	1.7	1.4	1.3	1.2	1.2	1.3	1.8	1.2	1.6	1.3	1.5	2.3	2.5	2.2	0.9	2.5	1.6	24
20	1.1	1.1	1.4	0.8	0.9	0.9	0.9	S	3.9	1.1	1.7	0.9	0.8	0.9	1.1	1.2	1.4	1.5	1.7	2.4	3.2	3.7	4.8	3.3	0.8	4.8	1.8	24
21	9.4	10.0	5.4	4.7	4.3	6.8	S	7.2	4.2	4.3	3.4	2.6	2.1	2.3	2.4	1.8	1.5	1.4	1.4	1.3	1.5	1.8	1.8	1.7	1.3	10.0	3.6	24
22	1.7	1.7	1.6	1.7	3.0	S	3.4	5.5	5.2	4.0	3.9	4.1	3.7	5.3	4.2	3.0	3.0	2.0	1.6	3.2	4.6	7.0	9.0	10.4	1.6	10.4	4.0	24
23	12.1	11.5	9.1	9.9	S	14.3	18.4	22.4	10.1	4.5	2.4	1.8	1.8	1.6	2.3	2.7	2.8	4.3	5.5	8.0	4.8	3.6	4.2	3.0	1.6	22.4	7.0	24
24	4.7	4.0	6.2	S	8.5	6.5	11.5	6.5	4.7	4.3	3.9	3.2	2.5	2.9	3.4	4.3	3.2	2.7	2.3	2.1	2.0	2.0	2.4	2.4	2.0	11.5	4.2	24
25	2.0	2.2	S	2.5	2.7	4.1	2.7	3.0	1.7	2.1	4.6	4.1	3.0	4.3	2.8	2.6	2.6	2.4	3.2	6.1	14.3	23.9	20.1	6.7	1.7	23.9	5.4	24
26	2.6	S	2.3	3.9	6.7	8.5	12.4	9.1	3.0	3.4	3.0	2.5	2.3	2.0	1.5	1.4	1.5	1.6	1.9	3.3	4.6	12.4	20.0	8.0	1.4	20.0	5.1	24
27	S	8.7	13.4	9.0	4.9	4.5	3.5	3.7	2.0	1.6	1.5	1.4	1.5	1.5	1.7	2.8	2.7	2.3	2.2	3.2	3.3	1.3	1.2	S	1.2	13.4	3.5	24
28	1.8	1.8	1.1	0.9	1.3	2.4	2.1	3.1	2.2	1.9	2.2	1.8	1.9	1.8	2.1	1.9	1.8	2.1	2.4	2.5	2.1	2.1	S	3.3	0.9	3.3	2.0	24
29	4.8	2.7	2.6	1.8	5.6	7.9	5.3	4.8	3.4	2.2	2.1	1.9	2.4	4.4	2.9	2.9	3.0	4.1	6.0	3.9	2.3	S	2.0	1.9	1.8	7.9	3.5	24
30	1.9	2.1	2.2	2.0	2.5	2.8	3.5	3.8	2.6	2.5	2.1	2.1	1.9	1.4	1.4	1.8	1.4	2.0	2.7	6.1	S	6.5	12.0	7.1	1.4	12.0	3.2	24
31	13.9	8.0	3.4	10.6	1.6	2.4	5.0	4.5	4.7	5.3	5.8	5.2	4.8	5.4	2.6	1.3	1.7	1.5	2.7	S	2.4	3.1	2.1	2.1	1.3	13.9	4.4	24
HOURLY MAX	22.0	25.8	16.8	13.7	17.9	19.2	26.4	22.4	19.8	10.9	5.9	5.2	5.6	7.8	8.1	8.3	7.9	8.9	12.9	21.5	14.5	23.9	20.1	20.2				
HOURLY AVG	4.3	4.6	4.1	4.3	4.4	5.1	5.4	6.2	5.3	3.4	3.0	2.5	2.2	2.5	2.6	2.6	2.7	3.3	3.7	4.9	4.9	5.4	5.3	4.1				

STATUS FLAG CODES

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

24 HR AVERAGES March 2017

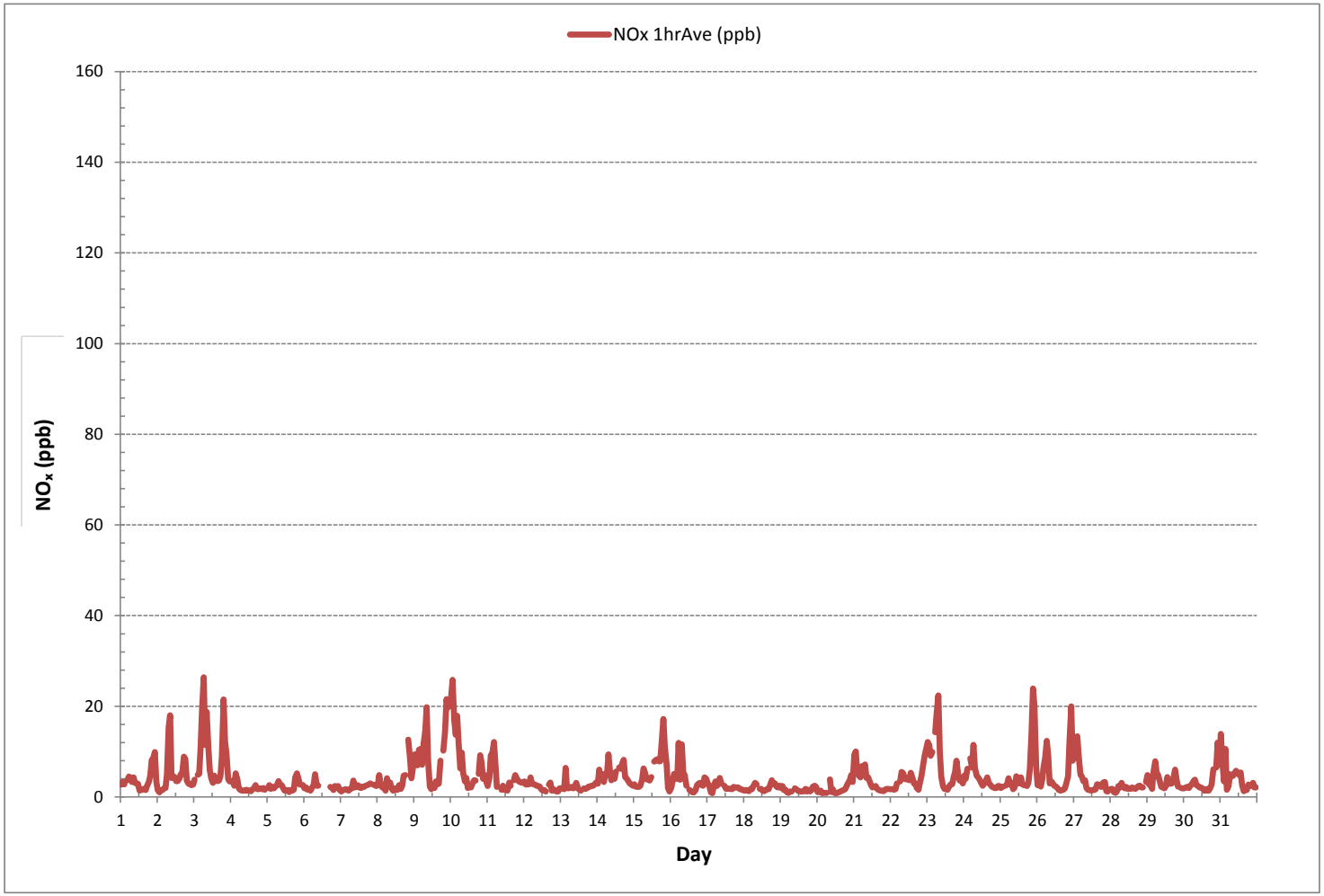


MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			702			
MINIMUM 1-HR AVERAGE	0.8	ppb	@ HOUR(S)	3	ON DAY(S)	17
MAXIMUM 1-HR AVERAGE:	26.4	ppb	@ HOUR(S)	6	ON DAY(S)	3
MAXIMUM 24-HR AVERAGE:	9.5	ppb			ON DAY(S)	9
					VAR-VARIOUS	

IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	742	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	99.7	%
STANDARD DEVIATION:	3.8		MONTHLY AVERAGE:	4.0	ppb

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)



OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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	4.2	5.2	4.5	S	8.6	8.9	7.1	5.9	22.2	9.9	12.0	21.3	5.4	4.2	8.1	6.1	4.2	4.4	6.7	10.8	15.3	13.4	17.5	7.6	4.2	22.2	9.3	24
2	3.2	1.7	S	2.7	3.7	5.0	13.9	24.7	50.0	20.1	23.0	9.7	6.9	7.2	8.1	7.6	7.6	13.6	11.9	5.3	3.6	4.2	3.5	3.5	1.7	50.0	10.5	24
3	8.4	S	7.3	9.4	20.1	43.6	38.3	16.5	45.9	20.3	14.9	6.5	6.1	7.0	13.3	6.9	4.5	6.6	13.4	43.4	26.9	14.6	8.3	11.1	4.5	45.9	17.1	24
4	S	8.2	4.5	6.4	5.5	3.2	2.3	2.7	2.7	2.6	9.8	2.4	2.7	2.4	3.1	9.6	7.2	4.6	4.5	3.7	6.4	4.8	3.0	S	2.3	9.8	4.7	24
5	6.9	7.6	4.6	7.1	3.7	5.4	5.9	8.2	12.4	6.4	4.1	4.2	2.8	9.0	2.4	3.2	2.8	3.2	13.2	8.9	8.1	8.9	S	9.1	2.4	13.2	6.4	24
6	5.4	6.8	3.6	5.5	2.8	5.3	6.1	10.6	3.6	8.3	C	C	C	C	C	C	C	4.2	3.2	2.3	3.0	S	3.0	2.2	2.2	10.6	4.7	24
7	1.7	2.2	1.9	2.0	1.9	2.0	2.2	2.3	13.9	2.6	2.7	6.1	3.2	9.7	6.2	3.2	3.4	3.2	5.9	5.7	S	5.4	4.4	4.1	1.7	13.9	4.2	24
8	4.2	8.2	3.5	3.6	6.7	3.1	6.7	4.5	4.9	4.6	4.3	4.7	4.8	3.6	12.1	5.2	6.8	10.2	8.4	S	20.1	12.1	11.6	12.9	3.1	20.1	7.3	24
9	25.2	14.2	11.1	18.5	16.8	11.3	19.6	19.6	34.1	18.8	8.4	4.0	5.9	3.4	6.4	6.1	4.5	110.5	S	17.7	26.6	36.3	26.6	27.3	3.4	110.5	20.6	24
10	29.7	33.4	20.5	17.9	28.3	25.6	11.2	20.4	7.9	5.9	18.6	5.2	5.4	5.1	6.1	6.2	6.1	S	8.0	14.7	13.5	6.9	7.0	5.5	5.1	33.4	13.4	24
11	4.1	7.5	18.7	18.4	25.6	46.0	4.4	X	X	4.1	6.7	5.3	3.1	4.0	21.5	5.7	S	5.9	8.2	6.6	7.1	4.9	9.5	6.3	3.1	46.0	10.6	22
12	7.3	4.5	4.8	4.4	11.9	4.6	6.4	4.5	6.1	4.4	5.1	3.0	2.7	4.2	2.8	S	6.1	8.3	2.5	2.7	2.3	1.7	1.8	3.0	1.7	11.9	4.6	24
13	2.4	2.7	2.6	37.0	3.2	3.1	3.0	3.3	3.9	3.0	9.5	8.7	5.7	2.1	S	5.3	4.6	3.5	8.0	3.0	3.1	3.5	3.9	5.3	2.1	37.0	5.7	24
14	4.7	13.7	6.3	8.2	6.7	14.9	9.6	14.1	10.3	4.9	15.4	5.1	10.7	S	9.4	8.6	15.8	13.9	7.2	4.9	4.9	4.9	4.2	4.5	4.2	15.8	8.8	24
15	4.5	4.0	3.1	3.2	4.1	7.2	12.5	11.2	6.5	5.7	5.9	5.5	S	9.6	12.3	12.9	13.2	12.7	42.4	29.5	24.4	12.6	3.5	2.2	2.2	42.4	10.8	24
16	5.0	7.1	17.8	9.0	8.4	100.9	6.2	27.0	23.3	8.6	6.1	S	5.4	2.4	4.0	2.2	2.3	8.6	8.2	6.7	7.2	5.1	9.4	12.0	2.2	100.9	12.7	24
17	5.9	4.0	2.6	1.3	5.4	6.8	6.3	4.9	7.1	5.5	S	4.2	2.3	3.7	3.9	4.9	2.1	2.8	3.0	4.6	2.8	2.3	2.3	2.8	1.3	7.1	4.0	24
18	1.9	2.1	2.7	2.2	3.1	2.7	4.2	8.3	8.4	S	3.2	2.8	2.3	1.7	3.2	4.3	2.7	4.9	6.2	4.2	4.4	6.8	3.0	3.9	1.7	8.4	3.9	24
19	3.3	3.3	2.0	1.9	1.9	1.7	3.1	1.9	S	2.6	2.4	1.9	1.9	1.7	2.1	1.8	4.2	2.7	3.1	2.0	2.3	3.9	4.2	2.8	1.7	4.2	2.6	24
20	2.3	1.7	1.8	1.3	1.1	1.3	1.8	S	15.7	1.9	8.6	1.4	1.5	2.4	2.4	6.3	3.5	2.7	3.0	4.1	6.3	14.6	14.7	6.3	1.1	15.7	4.6	24
21	59.8	20.0	15.3	6.7	14.3	11.7	S	19.9	20.4	16.1	13.4	14.9	7.9	15.7	9.8	4.6	2.2	2.7	2.8	2.5	2.4	2.9	2.6	2.7	2.2	59.8	11.8	24
22	3.3	3.3	2.4	3.1	7.5	S	5.1	12.6	73.0	16.6	12.6	15.7	6.4	8.7	7.6	6.8	11.1	3.9	3.4	4.8	8.6	9.6	11.1	12.3	2.4	73.0	10.8	24
23	15.3	13.4	10.8	13.0	S	21.2	39.5	48.6	15.4	17.0	4.5	4.0	4.6	2.2	3.6	4.0	5.0	13.4	8.4	15.9	9.2	5.4	8.1	5.8	2.2	48.6	12.5	24
24	8.3	6.2	22.4	S	32.1	9.7	26.2	11.5	10.5	6.1	5.7	15.9	3.5	5.3	4.4	7.9	5.3	4.6	3.3	4.2	3.2	3.2	3.3	4.0	3.2	32.1	9.0	24
25	5.1	4.7	S	3.6	4.8	8.6	5.7	4.1	3.2	4.1	7.5	5.4	5.0	6.0	7.9	8.3	3.6	2.7	13.5	18.8	29.0	33.6	32.9	14.3	2.7	33.6	10.1	24
26	4.6	S	5.0	10.5	10.3	12.9	24.1	20.7	7.2	7.8	4.5	4.2	5.4	5.7	2.1	2.1	3.6	2.3	2.6	6.9	15.0	24.1	27.3	16.4	2.1	27.3	9.8	24
27	S	16.2	36.3	15.1	9.5	7.3	5.4	6.3	3.5	2.7	2.8	2.4	2.2	2.7	3.2	6.9	6.2	4.2	3.6	7.6	9.0	1.9	1.9	S	1.9	36.3	7.1	24
28	2.9	3.0	2.1	1.5	2.6	6.8	3.2	8.7	3.8	4.4	3.7	3.0	2.7	2.2	4.9	4.9	2.6	2.3	3.1	3.9	2.4	3.5	S	6.4	1.5	8.7	3.7	24
29	10.8	4.2	5.9	2.8	11.1	13.9	12.0	8.2	9.6	3.7	3.3	3.5	4.0	12.6	4.5	3.6	4.4	7.6	11.0	9.2	4.1	S	3.0	4.1	2.8	13.9	6.8	24
30	7.9	4.0	3.6	3.5	4.1	6.3	7.8	8.2	3.7	5.7	4.6	4.6	3.6	3.0	5.1	4.9	3.1	6.9	6.9	12.5	S	15.3	20.9	13.4	3.0	20.9	6.9	24
31	22.4	18.2	5.3	20.1	3.2	8.3	11.9	P	6.3	9.4	7.8	5.8	5.4	6.7	5.4	2.8	2.3	2.1	13.9	S	3.6	9.1	3.6	2.3	2.1	22.4	8.0	23
HOURLY MAX	59.8	33.4	36.3	37.0	32.1	100.9	39.5	48.6	73.0	20.3	23.0	21.3	10.7	15.7	21.5	12.9	15.8	110.5	42.4	43.4	29.0	36.3	32.9	27.3				
HOURLY AVG	9.3	8.0	8.0	8.3	9.0	13.6	10.4	12.1	15.0	7.8	8.0	6.3	4.5	5.3	6.4	5.6	5.2	9.3	8.0	9.2	9.5	9.5	8.8	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: 701

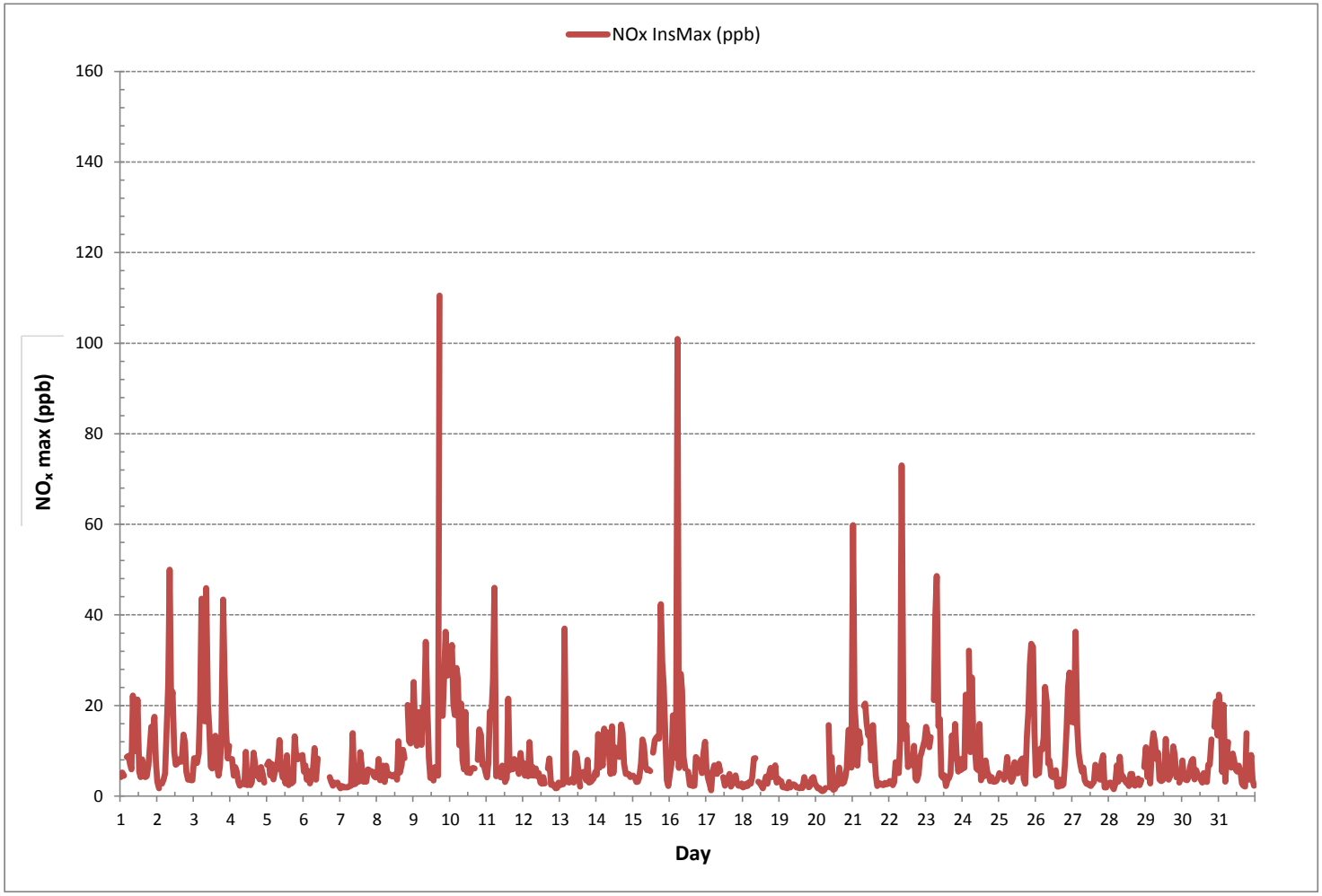
MAXIMUM INSTANTANEOUS VALUE: 110.5 ppb @ HOUR(S) 17 ON DAY(S) 9

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs
MONTHLY CALIBRATION TIME: 7 hrs
STANDARD DEVIATION: 9.7

OPERATIONAL TIME: 741 hrs

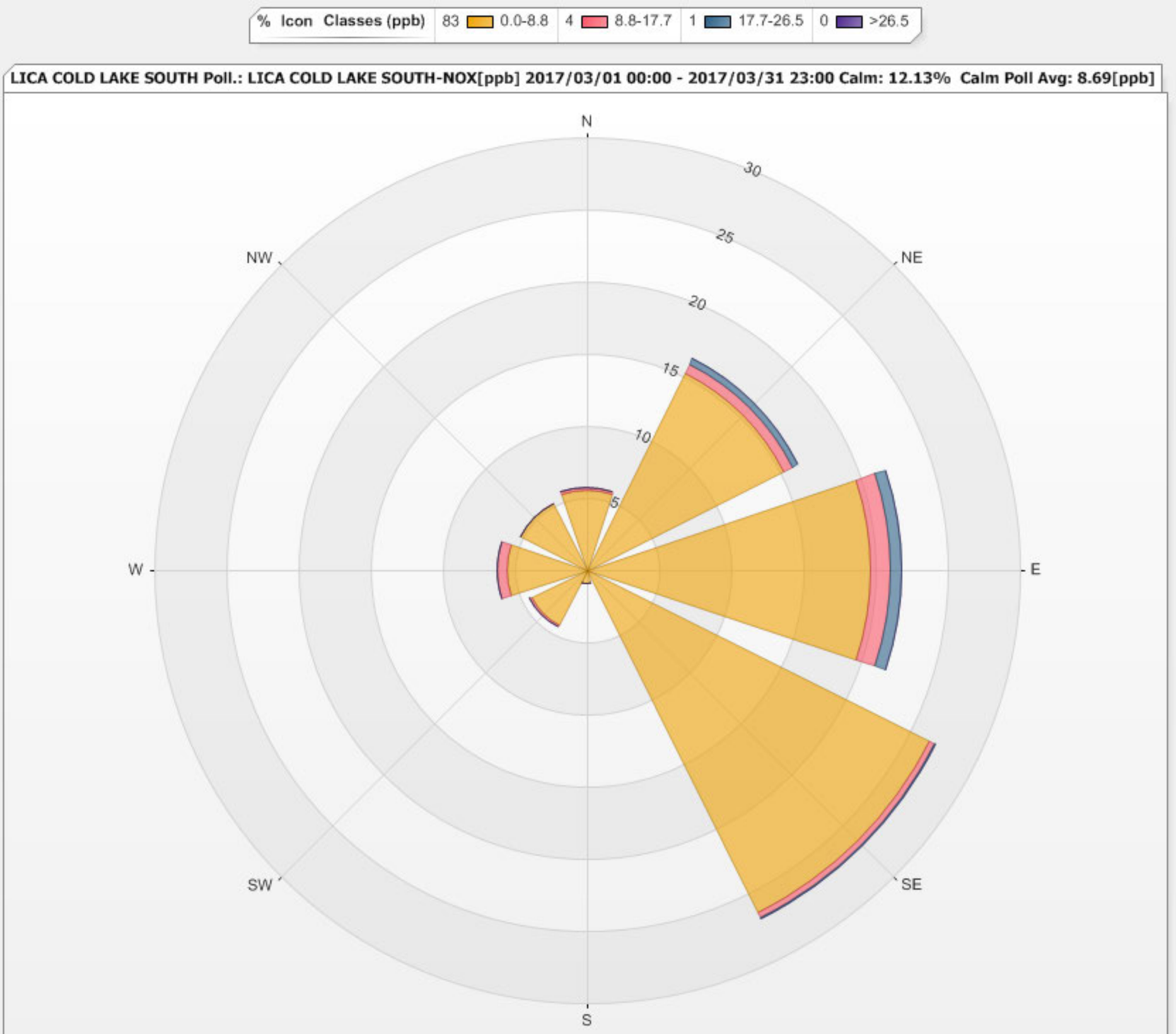
OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)



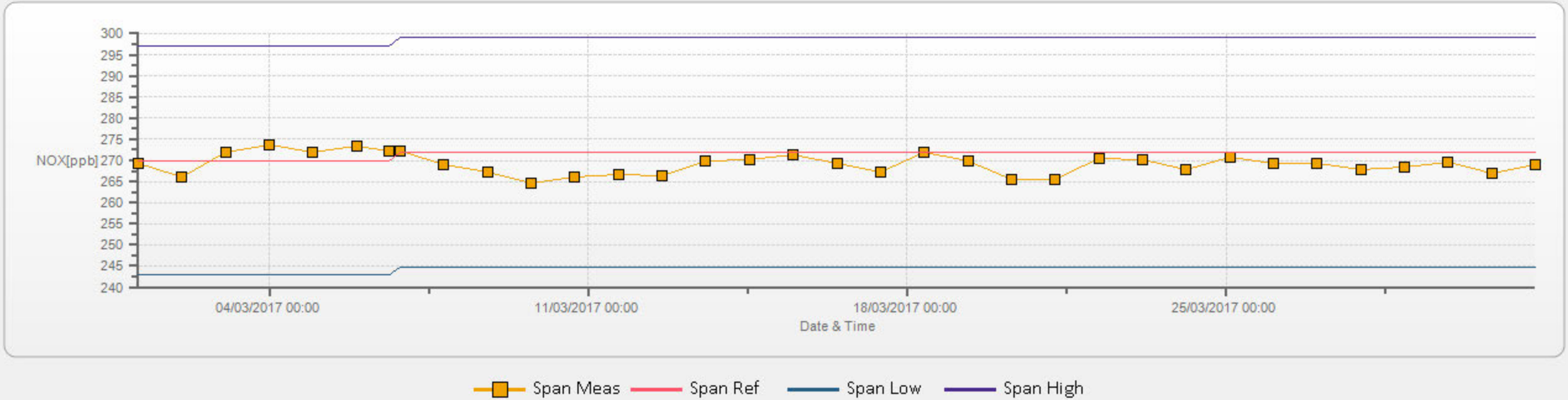
Wind: LICA COLD LAKE SOUTH
Poll.: LICA COLD LAKE SOUTH-NOX[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 12.13% Calm Avg: 8.69 [ppb]

Direction	0.0-8.8	8.8-17.7	17.7-26.5	>26.5	Total
N	5.6	0.1	0.0	0.0	5.7
NE	15.3	0.7	0.4	0.0	16.4
E	19.7	1.4	0.7	0.0	21.8
SE	26.5	0.4	0.1	0.0	27.1
S	1.0	0.0	0.0	0.0	1.0
SW	4.3	0.1	0.0	0.0	4.4
W	5.6	0.7	0.0	0.0	6.3
NW	5.1	0.0	0.0	0.0	5.1
Summary	83.0	3.6	1.3	0.0	87.9


% Icon Classes (ppb)
83 0.0-8.8
4 8.8-17.7
1 17.7-26.5
0 >26.5
LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NOX[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 12.13% Calm Poll Avg: 8.69[ppb]
N
NE
E
SE
S
SW
W
NW
5
10
15
20
25
30

NOX[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/03 Type: Span



NITRIC OXIDES

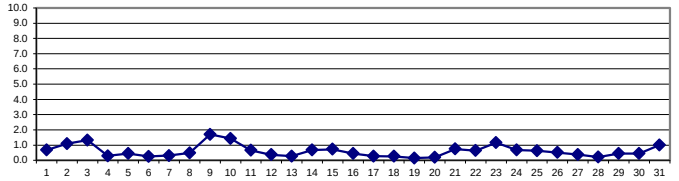
NITRIC OXIDE Hourly Averages (NO ppb)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	0.3	0.4	0.4	S	0.9	1.0	0.9	0.9	2.2	1.2	1.1	1.1	0.4	0.6	0.6	0.5	0.3	0.4	0.3	0.3	0.8	0.3	0.5	0.1	0.1	2.2	0.7	24
2	**0.0**	0.0	S	0.0	0.1	0.0	0.2	2.0	6.8	1.9	1.6	1.9	1.5	1.5	1.6	1.7	1.4	1.3	0.7	0.2	0.1	0.2	0.1	0.2	**0.0**	6.8	1.1	24
3	0.4	S	0.4	0.4	1.0	1.8	2.7	1.2	6.1	4.3	2.5	1.6	1.0	1.6	0.9	0.8	0.6	0.4	0.2	1.4	0.3	0.5	0.1	0.2	0.1	6.1	1.3	24
4	S	0.3	0.3	0.2	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.6	0.7	0.3	0.2	0.3	0.2	0.2	0.1	S	0.1	0.7	0.3	24
5	0.5	0.5	0.3	0.3	0.4	0.6	0.5	0.8	0.7	0.7	0.6	0.4	0.5	0.5	0.3	0.3	0.3	0.2	0.3	0.3	0.5	0.4	S	0.3	0.2	0.8	0.4	24
6	0.2	0.5	0.4	0.2	0.2	0.4	0.4	0.7	0.2	0.5	C	C	C	C	C	C	C	0.2	0.1	0.0	0.0	S	0.0	0.0	0.0	0.7	0.3	24
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.4	0.6	0.9	0.8	0.7	0.8	0.6	0.5	0.3	0.1	0.1	S	0.1	0.1	0.1	0.0	1.0	0.3	24
8	0.1	0.4	0.3	0.4	0.2	0.0	0.3	0.5	1.1	0.7	0.4	0.8	0.7	0.6	1.2	0.6	0.6	0.8	0.0	S	0.3	0.1	0.5	0.6	0.0	1.2	0.5	24
9	1.5	1.0	0.7	1.0	0.2	0.0	0.2	3.1	8.9	4.0	1.4	0.9	1.5	1.0	1.7	1.2	1.0	3.1	S	0.2	1.0	2.1	1.3	2.0	0.0	8.9	**1.7**	24
10	2.1	4.6	1.4	0.9	2.7	3.0	1.3	3.1	2.3	1.7	2.0	1.1	1.2	0.9	1.0	0.8	0.5	S	0.3	0.1	0.7	0.6	0.5	0.2	0.1	4.6	1.4	24
11	0.2	0.3	0.5	0.2	1.1	2.0	0.5	X	X	0.5	1.0	0.6	0.6	0.5	1.7	0.8	S	0.7	0.5	0.4	0.5	0.4	0.5	0.3	0.2	2.0	0.7	22
12	0.4	0.3	0.3	0.3	0.7	0.3	0.3	0.5	0.7	0.7	0.8	0.6	0.4	0.5	0.3	S	0.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.4	24
13	0.0	0.1	0.1	2.2	0.1	0.1	0.1	0.3	0.3	0.4	0.8	0.6	0.3	0.2	S	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.3	24
14	0.0	0.2	0.1	0.2	0.1	0.5	0.3	1.4	1.4	0.9	1.7	1.2	1.7	S	1.6	1.1	1.2	0.8	0.2	0.3	0.2	0.1	0.2	0.1	0.0	1.7	0.7	24
15	0.2	0.1	0.1	0.2	0.1	0.2	0.4	0.8	0.8	1.0	1.0	1.4	S	2.4	2.3	1.6	1.0	0.6	1.0	1.1	0.2	0.1	0.0	0.0	0.0	2.4	0.7	24
16	0.0	0.1	0.3	0.2	0.1	1.8	0.1	2.3	1.2	1.0	0.6	S	0.3	0.2	0.2	0.1	0.2	0.4	0.2	0.2	0.1	0.2	0.1	0.2	0.0	2.3	0.4	24
17	0.3	0.2	0.1	0.1	0.2	0.3	0.2	0.3	0.7	0.7	S	0.6	0.3	0.4	0.3	0.4	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.7	0.3	24
18	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.5	0.6	S	0.4	0.4	0.3	0.2	0.3	0.4	0.3	0.4	0.4	0.2	0.2	0.2	0.1	0.1	0.1	0.6	0.3	24
19	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.1	S	0.4	0.4	0.3	0.3	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.0	0.4	0.1	24
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	1.8	0.2	0.5	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.0	0.1	0.1	0.2	0.1	0.0	1.8	0.2	24
21	1.4	0.4	0.4	0.3	0.3	0.2	S	3.1	1.2	2.4	1.8	1.0	1.5	0.5	1.0	0.3	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.1	3.1	0.7	24
22	0.1	0.2	0.1	0.2	0.5	S	0.3	1.5	0.8	1.9	1.2	1.0	0.8	1.1	1.2	0.9	0.9	0.2	0.1	0.3	0.4	0.3	0.4	0.3	0.1	1.9	0.6	24
23	0.5	0.4	0.2	0.1	S	1.2	3.6	**9.6**	4.0	1.6	0.6	0.4	0.4	0.3	0.5	0.6	0.6	0.8	0.4	0.4	0.1	0.0	0.2	0.1	0.0	**9.6**	1.2	24
24	0.1	0.1	0.6	S	1.1	0.2	2.2	1.4	1.3	1.3	1.1	0.8	0.6	0.8	0.9	1.0	0.6	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.1	2.2	0.7	24
25	0.2	0.3	S	0.2	0.4	0.4	0.1	0.3	0.2	0.4	1.3	1.3	0.8	1.2	0.8	0.5	0.4	0.2	0.1	0.2	0.5	1.8	2.6	0.3	0.1	2.6	0.6	24
26	0.1	S	0.2	0.2	0.3	0.2	1.9	2.2	0.7	1.0	0.9	0.7	0.5	0.4	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.4	1.0	0.3	0.0	2.2	0.5	24
27	S	0.4	1.1	0.4	0.6	0.4	0.4	0.7	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.6	0.6	0.2	0.1	0.2	0.1	0.1	0.1	S	0.1	1.1	0.4	24
28	0.1	0.1	0.1	0.0	0.1	0.2	0.2	0.3	0.3	0.3	0.5	0.4	0.3	0.3	0.5	0.4	0.2	0.1	0.1	0.1	0.0	0.1	S	0.1	0.0	0.5	0.2	24
29	0.2	0.1	0.1	0.1	0.7	0.8	0.4	0.6	0.6	0.4	0.4	0.3	0.4	0.9	0.7	0.7	0.6	0.6	0.7	0.3	0.1	S	0.3	0.2	0.1	0.9	0.4	24
30	0.4	0.4	0.3	0.3	0.4	0.4	0.6	0.6	0.4	0.5	0.5	0.4	0.3	0.3	0.3	0.5	0.3	0.3	0.2	0.3	S	0.5	1.6	0.4	0.2	1.6	0.4	24
31	2.9	1.2	0.1	3.2	0.2	0.4	0.9	1.2	1.6	2.1	2.1	1.7	1.4	1.4	0.4	0.3	0.2	0.2	0.7	S	0.3	0.5	0.1	0.0	0.0	3.2	1.0	24
HOURLY MAX	2.9	4.6	1.4	3.2	2.7	3.0	3.6	9.6	8.9	4.3	2.5	1.9	1.7	2.4	2.3	1.7	1.4	3.1	1.0	1.4	1.0	2.1	2.6	2.0				
HOURLY AVG	0.4	0.4	0.3	0.4	0.4	0.6	0.7	1.4	1.7	1.1	1.0	0.8	0.7	0.7	0.8	0.6	0.5	0.5	0.3	0.3	0.3	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

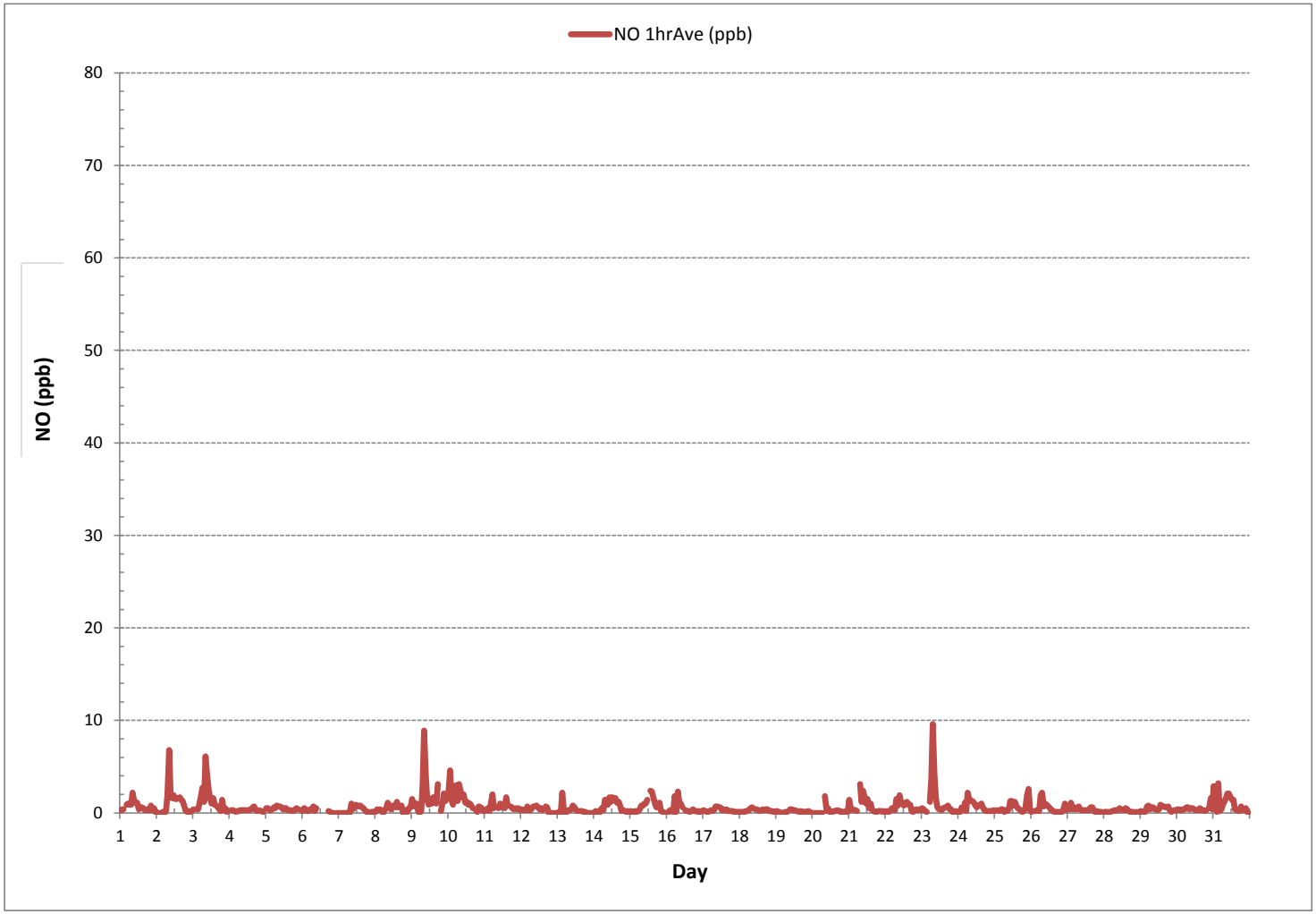
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			650				
MINIMUM 1-HR AVERAGE		0.0	ppb	@ HOUR(S)	0	ON DAY(S)	2
MAXIMUM 1-HR AVERAGE:		9.6	ppb	@ HOUR(S)	7	ON DAY(S)	23
MAXIMUM 24-HR AVERAGE:		1.7	ppb			ON DAY(S)	9
						VAR-VARIOUS	
IZS CALIBRATION TIME:	33	hrs		OPERATIONAL TIME:		742	hrs
MONTHLY CALIBRATION TIME:	7	hrs		AMD OPERATION UPTIME:		99.7	%
STANDARD DEVIATION:	0.9			MONTHLY AVERAGE:		0.6	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	1.2	1.1	2.1	S	3.0	3.0	2.7	2.7	27.9	7.0	5.3	5.1	2.3	2.9	2.3	4.3	1.7	1.6	1.7	2.7	4.4	1.4	2.1	1.1	1.1	27.9	3.9	24
2	0.7	0.5	S	0.7	0.7	0.7	1.4	7.6	25.2	20.8	4.5	6.3	3.4	4.0	3.9	2.7	3.1	3.7	1.8	0.7	0.5	0.9	0.7	0.5	0.5	25.2	4.1	24
3	1.8	S	1.6	1.6	5.7	18.5	7.5	3.4	24.0	8.7	7.3	3.9	2.2	2.6	2.5	1.8	1.3	1.3	1.3	10.6	1.4	1.8	0.8	1.8	0.8	24.0	4.9	24
4	S	1.3	1.3	1.4	0.5	1.2	0.5	1.2	0.9	0.8	1.7	0.8	0.9	1.6	1.2	6.7	3.8	1.7	1.3	1.0	2.7	1.3	0.5	S	0.5	6.7	1.6	24
5	2.7	2.6	1.8	2.1	1.6	2.1	2.7	3.1	3.9	2.9	1.6	2.1	1.6	5.9	0.9	0.9	3.5	0.5	2.3	1.4	3.9	3.4	S	2.3	0.5	5.9	2.4	24
6	1.7	2.0	1.8	2.0	0.8	1.7	1.8	4.4	0.7	2.8	C	C	C	C	C	C	C	1.3	1.1	0.3	0.3	S	0.4	0.3	0.3	4.4	1.5	24
7	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	6.0	0.8	0.9	2.5	1.3	5.1	3.0	1.1	1.1	0.7	0.5	0.7	S	0.8	0.7	0.7	0.2	6.0	1.2	24
8	0.9	1.2	1.1	1.2	0.8	0.8	0.9	1.5	2.7	2.4	1.5	2.8	2.6	1.8	8.4	2.3	2.2	3.0	1.3	S	1.7	1.1	2.7	3.9	0.8	8.4	2.1	24
9	16.1	4.0	2.4	4.9	2.2	0.4	1.3	5.4	16.3	10.7	6.2	2.4	3.1	1.9	3.5	3.3	1.8	49.1	S	1.2	9.7	7.2	4.5	5.7	0.4	49.1	7.1	24
10	6.0	9.3	4.1	2.3	8.1	9.1	3.2	8.6	4.0	2.8	7.0	3.4	4.8	2.3	2.7	2.4	1.7	S	1.4	0.7	3.0	1.8	1.6	1.0	0.7	9.3	4.0	24
11	0.9	1.6	3.9	2.2	5.0	26.6	1.7	X	X	1.6	5.1	2.9	1.8	1.7	18.9	2.2	S	2.1	1.4	1.6	2.3	1.2	1.7	2.7	0.9	26.6	4.2	22
12	2.2	1.0	1.2	1.2	2.9	1.6	1.3	1.4	2.3	1.6	2.5	1.6	1.1	1.6	1.1	S	4.4	3.4	0.4	0.4	0.4	0.3	0.4	0.5	0.3	4.4	1.5	24
13	0.4	0.5	0.5	20.1	0.5	1.6	0.4	0.7	1.7	1.1	2.7	6.2	1.3	1.1	S	1.2	1.4	1.4	1.4	0.5	0.4	0.4	0.5	0.5	0.4	20.1	2.0	24
14	0.7	4.2	0.7	0.9	0.8	4.9	2.2	2.6	2.5	1.6	5.5	1.8	4.0	S	3.0	2.0	5.1	2.1	0.5	0.7	0.7	0.5	1.2	0.9	0.5	5.5	2.1	24
15	1.2	1.1	0.5	0.6	0.6	1.4	1.4	2.2	1.8	1.7	2.5	2.1	S	3.4	3.4	3.0	2.3	1.4	10.9	10.9	1.3	0.9	0.7	0.4	0.4	10.9	2.4	24
16	0.7	1.1	3.1	1.2	0.9	36.5	0.3	8.1	7.6	2.4	2.6	S	2.1	0.7	2.0	0.5	0.5	5.2	1.7	1.1	0.7	1.3	0.7	2.0	0.3	36.5	3.6	24
17	2.0	0.8	0.7	0.3	0.8	1.0	0.7	1.0	1.6	1.7	S	1.6	0.7	2.2	1.4	2.9	0.3	0.4	0.5	2.0	0.4	0.5	0.4	0.5	0.3	2.9	1.1	24
18	0.5	0.4	0.6	0.4	0.9	0.7	0.9	3.7	2.7	S	1.0	1.4	1.2	0.5	1.2	1.6	0.8	1.3	2.1	1.0	0.8	2.0	0.5	0.4	0.4	3.7	1.2	24
19	1.2	0.7	0.7	0.4	0.4	0.4	0.9	0.5	S	0.8	0.8	0.7	0.8	0.6	0.7	0.5	1.4	0.8	0.6	0.7	0.6	0.8	0.8	0.3	0.3	1.4	0.7	24
20	0.3	0.1	0.2	0.2	0.1	0.2	0.1	S	10.3	0.8	4.2	0.5	0.5	0.5	1.1	1.2	1.4	0.7	1.0	0.3	0.7	1.6	1.6	0.7	0.1	10.3	1.2	24
21	31.1	1.4	2.3	1.1	2.1	1.3	S	44.5	8.1	16.8	20.2	8.7	21.9	3.5	4.5	1.7	1.1	0.9	0.3	1.8	1.8	0.7	0.5	0.8	0.3	44.5	7.7	24
22	0.7	0.9	0.5	0.7	2.0	S	1.4	15.3	9.1	20.6	10.7	9.1	2.3	2.6	4.3	3.3	16.2	0.9	0.5	1.2	2.7	1.4	1.8	1.2	0.5	20.6	4.8	24
23	2.5	1.3	1.3	0.7	S	4.5	18.4	27.9	7.9	8.3	1.7	1.7	2.1	0.8	1.2	1.8	2.9	7.7	1.4	4.3	0.9	0.4	1.8	0.8	0.4	27.9	4.4	24
24	0.5	0.4	7.3	S	12.7	1.4	10.4	3.0	4.5	3.0	2.0	3.4	1.3	1.4	1.3	2.9	1.6	0.9	0.6	0.9	0.9	0.8	0.8	0.8	0.4	12.7	2.7	24
25	2.0	1.4	S	0.8	1.7	2.2	0.4	0.8	0.7	1.4	2.2	2.0	1.6	2.2	3.8	2.9	2.1	0.4	1.4	2.2	3.3	7.1	11.2	0.9	0.4	11.2	2.4	24
26	0.9	S	1.1	1.2	1.2	1.2	8.3	6.4	2.0	3.4	2.3	1.8	2.1	2.6	0.7	0.4	1.4	0.3	0.3	0.4	1.3	3.3	4.3	2.1	0.3	8.3	2.1	24
27	S	3.7	15.6	2.6	2.1	1.6	1.2	1.4	1.1	0.9	0.9	0.9	0.7	1.1	1.8	1.6	5.5	0.9	0.7	1.2	0.9	0.4	0.4	S	0.4	15.6	2.1	24
28	0.8	0.7	0.4	0.4	0.7	2.0	2.3	2.5	0.8	0.8	1.7	1.0	0.8	0.6	2.9	4.9	0.7	0.4	0.5	0.7	0.3	0.9	S	0.5	0.3	4.9	1.2	24
29	2.0	0.3	0.9	0.4	6.7	3.4	2.1	3.0	3.8	1.1	1.8	0.8	0.9	3.7	1.8	1.1	1.3	2.3	4.4	2.5	0.8	S	1.1	1.2	0.3	6.7	2.1	24
30	3.1	1.4	1.4	1.6	1.2	2.3	3.1	3.0	1.1	1.8	2.3	1.4	1.0	1.3	1.4	2.3	0.8	2.1	0.9	3.7	S	2.9	6.9	2.7	0.8	6.9	2.2	24
31	8.0	4.2	0.7	8.4	0.8	4.0	4.4	P	2.7	5.2	3.1	2.1	1.7	2.2	1.2	3.9	0.4	0.4	14.4	S	1.3	4.0	0.4	0.3	0.3	14.4	3.4	23
HOURLY MAX	31.1	9.3	15.6	20.1	12.7	36.5	18.4	44.5	27.9	20.8	20.2	9.1	21.9	5.9	18.9	6.7	16.2	49.1	14.4	10.9	9.7	7.2	11.2	5.7				
HOURLY AVG	3.2	1.7	2.1	2.1	2.3	4.6	2.8	5.9	6.3	4.5	3.9	2.8	2.5	2.2	3.0	2.3	2.5	3.3	2.0	2.0	1.7	1.8	1.8	1.3				

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

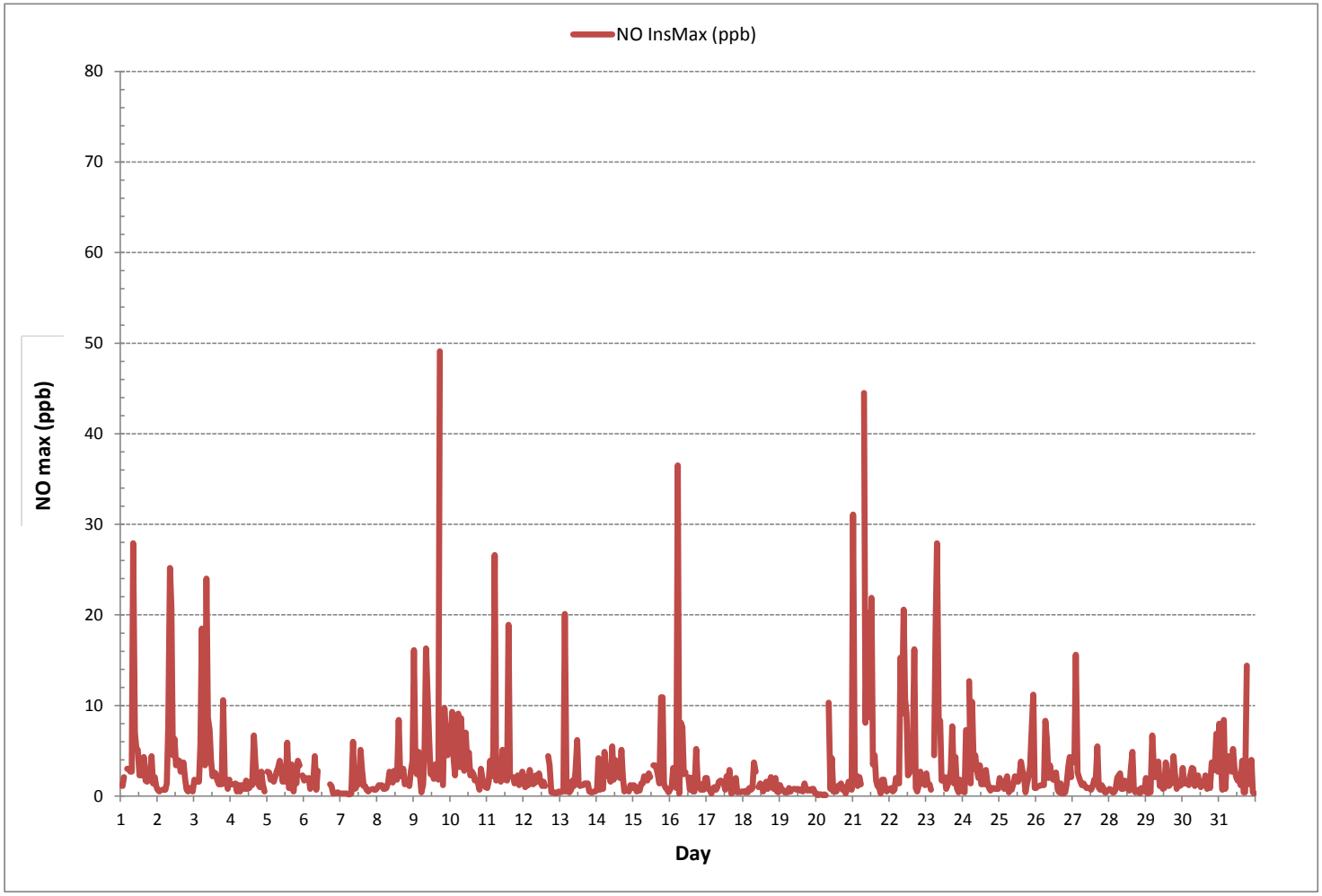
NUMBER OF NON-ZERO READINGS: 701

MAXIMUM INSTANTANEOUS VALUE: 49.1 ppb @ HOUR(S) 17 ON DAY(S) 9

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 741 hrs
MONTHLY CALIBRATION TIME: 7 hrs
STANDARD DEVIATION: 4.7

NITRIC OXIDE Instantaneous Maximum (NO ppb)



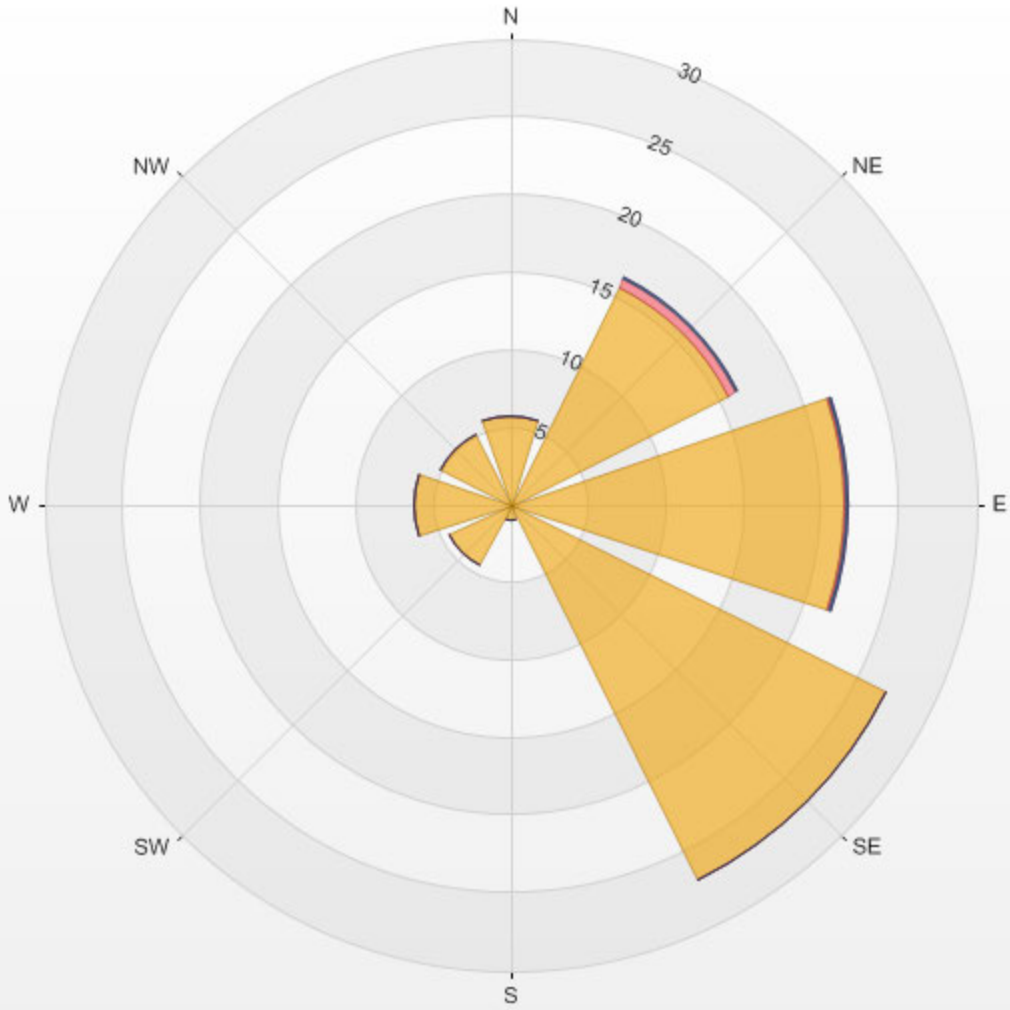
Wind: LICA COLD LAKE SOUTH
Poll.: LICA COLD LAKE SOUTH-NO[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 12.13% Calm Avg: 0.78 [ppb]

Direction	0.0-3.2	3.2-6.5	6.5-9.7	>9.7	Total
N	5.7	0.0	0.0	0.0	5.7
NE	15.7	0.6	0.1	0.0	16.4
E	21.5	0.1	0.1	0.0	21.8
SE	27.1	0.0	0.0	0.0	27.1
S	1.0	0.0	0.0	0.0	1.0
SW	4.4	0.0	0.0	0.0	4.4
W	6.3	0.0	0.0	0.0	6.3
NW	5.1	0.0	0.0	0.0	5.1
Summary	86.9	0.7	0.3	0.0	87.9

% Icon Classes (ppb)	87 0.0-3.2	1 3.2-6.5	0 6.5-9.7	0 >9.7

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 12.13% Calm Poll Avg: 0.78[ppb]



NITROGEN DIOXIDE

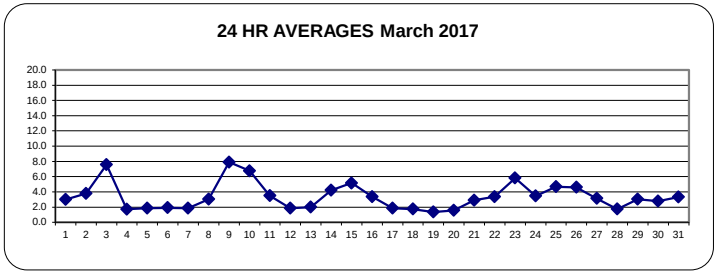
NITROGEN DIOXIDE Hourly Averages (NO_2 ppb)

HR START (MST) / HR END (MST) / DAY	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
1	2.4	2.8	2.3	S	2.8	3.5	3.2	2.4	2.0	1.8	1.8	1.8	0.9	0.8	1.1	1.2	1.0	2.0	2.9	4.3	7.2	8.3	9.4	3.2	0.8	9.4	3.0	24
2	1.5	0.9	S	1.4	1.6	1.9	4.8	13.3	11.2	2.4	3.0	2.4	2.1	2.0	2.5	3.4	3.7	7.6	7.8	3.4	2.7	2.7	2.4	2.5	0.9	13.3	3.8	24
3	3.4	S	4.5	4.7	9.8	17.5	**23.7**	10.4	12.8	6.7	3.5	2.5	2.1	3.1	2.7	2.7	3.1	4.3	8.7	20.1	11.9	9.1	3.8	3.2	2.1	**23.7**	7.6	24
4	S	3.4	2.2	5.0	3.6	1.7	1.3	1.1	1.1	1.1	1.2	1.0	1.0	1.0	1.3	1.3	1.8	1.3	1.4	1.6	1.4	1.7	1.5	S	1.0	5.0	1.7	24
5	1.5	2.0	1.5	1.7	1.5	1.6	2.0	2.6	2.0	1.7	1.3	0.9	0.8	0.9	0.8	1.0	1.0	1.3	4.0	4.9	3.5	2.2	S	2.2	0.8	4.9	1.9	24
6	1.6	1.5	1.2	1.4	1.2	1.6	2.1	4.2	2.2	2.0	C	C	C	C	C	C	C	1.9	1.9	1.5	2.4	S	2.3	1.6	1.2	4.2	1.9	24
7	1.2	1.5	1.6	1.7	1.5	1.4	1.8	1.8	2.5	1.6	1.5	1.6	1.3	1.2	1.5	1.6	2.0	2.3	2.6	2.9	S	2.5	2.5	2.3	1.2	2.9	1.8	24
8	2.5	4.3	2.2	1.7	1.8	1.3	3.8	2.0	2.1	1.1	0.9	1.0	0.9	0.9	1.3	1.2	1.8	3.9	4.8	S	12.3	8.6	3.7	5.8	0.9	12.3	3.0	24
9	7.9	7.9	6.4	9.5	10.5	7.2	11.5	11.4	10.9	4.0	0.9	0.8	1.3	1.1	1.7	1.6	1.9	4.9	S	10.2	13.6	19.5	18.4	18.2	0.8	19.5	**7.9**	24
10	19.9	21.2	15.4	12.9	15.1	9.1	5.0	6.7	2.9	1.7	2.2	0.9	1.0	1.2	1.9	3.0	3.1	S	4.9	9.3	7.0	3.5	4.4	3.1	0.9	21.2	6.8	24
11	2.2	4.0	8.8	9.5	11.0	5.3	1.6	X	X	1.1	1.5	1.0	0.9	0.9	1.5	1.7	S	3.0	4.3	3.7	3.0	2.9	2.7	2.7	0.9	11.0	3.5	22
12	3.0	2.4	2.4	2.5	3.5	2.6	2.4	2.2	1.8	1.6	1.4	1.1	0.9	1.0	0.9	S	2.0	2.6	1.3	1.6	1.3	1.2	1.2	1.8	0.9	3.5	1.9	24
13	1.8	1.7	1.6	4.2	1.9	1.8	1.9	1.9	1.5	1.6	2.2	1.2	1.2	1.1	S	1.7	1.6	1.8	2.2	2.2	2.4	2.5	2.7	3.2	1.1	4.2	2.0	24
14	2.8	5.8	3.7	4.9	3.2	4.4	4.7	8.0	4.4	2.7	3.4	2.8	3.9	S	4.9	5.1	6.2	7.5	4.2	3.7	3.3	2.8	2.4	2.3	2.3	8.0	4.2	24
15	2.6	2.1	2.0	2.0	2.4	3.6	6.0	4.6	3.1	3.0	2.5	3.0	S	5.4	5.8	6.7	7.0	7.3	11.9	16.1	11.0	7.2	2.0	1.2	1.2	16.1	5.2	24
16	1.9	3.3	4.9	4.3	3.9	10.2	3.8	9.4	4.2	3.8	1.9	S	1.3	1.1	0.9	0.9	1.2	2.1	2.7	2.8	2.4	2.3	4.2	3.8	0.9	10.2	3.4	24
17	2.6	2.4	0.9	0.7	2.1	3.1	2.1	2.5	3.5	2.2	S	1.8	1.3	1.4	1.4	1.4	1.4	1.9	1.8	1.8	1.8	1.5	1.5	1.3	0.7	3.5	1.8	24
18	1.2	1.3	1.2	1.1	1.4	1.4	2.1	2.5	2.1	S	1.3	1.3	1.0	1.0	1.1	1.3	1.4	2.4	3.3	2.5	2.8	2.0	1.9	2.4	1.0	3.3	1.7	24
19	1.8	2.3	1.3	1.5	0.9	0.8	1.1	1.0	S	1.5	1.3	1.1	1.0	0.9	1.0	1.1	1.5	1.0	1.4	1.2	1.3	2.1	2.3	2.1	0.8	2.3	1.4	24
20	1.1	1.0	1.3	0.8	0.9	0.9	0.9	S	2.1	0.9	1.2	0.7	0.7	0.8	0.9	1.0	1.1	1.2	1.5	2.4	3.2	3.7	4.7	3.3	0.7	4.7	1.6	24
21	8.1	9.8	5.1	4.5	4.0	6.7	S	4.3	3.0	1.9	1.6	1.6	**0.5**	1.7	1.3	1.5	1.3	1.2	1.3	1.1	1.3	1.6	1.6	1.5	**0.5**	9.8	2.9	24
22	1.5	1.5	1.4	1.4	2.4	S	3.0	4.0	4.4	2.0	2.7	3.1	2.8	4.2	2.9	2.1	2.0	1.7	1.5	2.9	4.2	6.7	8.6	10.1	1.4	10.1	3.4	24
23	11.7	11.2	8.9	9.8	S	13.1	14.7	12.7	6.1	2.8	1.7	1.3	1.3	1.2	1.7	2.0	2.1	3.5	5.1	7.7	4.8	3.5	4.0	2.8	1.2	14.7	5.8	24
24	4.7	3.9	5.5	S	7.4	6.3	9.3	5.2	3.3	2.9	2.7	2.3	1.8	2.0	2.5	3.2	2.6	2.3	2.0	1.8	1.7	1.8	2.1	2.0	1.7	9.3	3.4	24
25	1.7	1.8	S	2.2	2.2	3.6	2.5	2.6	1.4	1.6	3.2	2.7	2.1	3.0	1.9	2.0	2.0	2.1	3.0	5.9	13.7	21.9	17.5	6.5	1.4	21.9	4.7	24
26	2.4	S	2.0	3.6	6.4	8.3	10.5	6.9	2.3	2.3	2.1	1.8	1.7	1.6	1.3	1.2	1.3	1.5	1.8	3.2	4.5	12.1	19.0	7.8	1.2	19.0	4.6	24
27	S	8.4	12.4	8.6	4.3	4.1	3.1	2.9	1.5	1.2	1.1	1.0	1.2	1.2	1.3	2.2	2.1	2.0	2.0	3.0	3.1	1.1	1.1	S	1.0	12.4	3.1	24
28	1.6	1.6	1.0	0.8	1.2	2.2	1.8	2.7	1.8	1.6	1.7	1.4	1.5	1.4	1.5	1.3	1.5	1.9	2.2	2.3	2.0	1.9	S	3.2	0.8	3.2	1.7	24
29	4.6	2.6	2.4	1.6	4.9	7.1	4.9	4.2	2.8	1.7	1.5	1.6	1.9	3.5	2.1	2.2	2.3	3.5	5.3	3.6	2.1	S	1.7	1.6	1.5	7.1	3.0	24
30	1.5	1.7	1.9	1.7	2.1	2.4	3.0	3.2	2.1	2.0	1.6	1.7	1.5	1.1	1.1	1.3	1.1	1.6	2.4	5.8	S	6.0	10.4	6.7	1.1	10.4	2.8	24
31	11.0	6.8	3.2	7.3	1.4	2.0	4.1	3.3	3.0	3.1	3.7	3.5	3.4	4.1	2.1	1.0	1.4	1.2	2.0	S	2.1	2.6	1.9	1.9	1.0	11.0	3.3	24
HOURLY MAX	19.9	21.2	15.4	12.9	15.1	17.5	23.7	13.3	12.8	6.7	3.7	3.5	3.9	5.4	5.8	6.7	7.0	7.6	11.9	20.1	13.7	21.9	19.0	18.2				
HOURLY AVG	3.9	4.2	3.8	3.9	3.9	4.6	4.8	4.8	3.6	2.2	2.0	1.7	1.5	1.8	1.8	2.0	2.2	2.8	3.4	4.6	4.6	5.0	4.9	3.8				

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

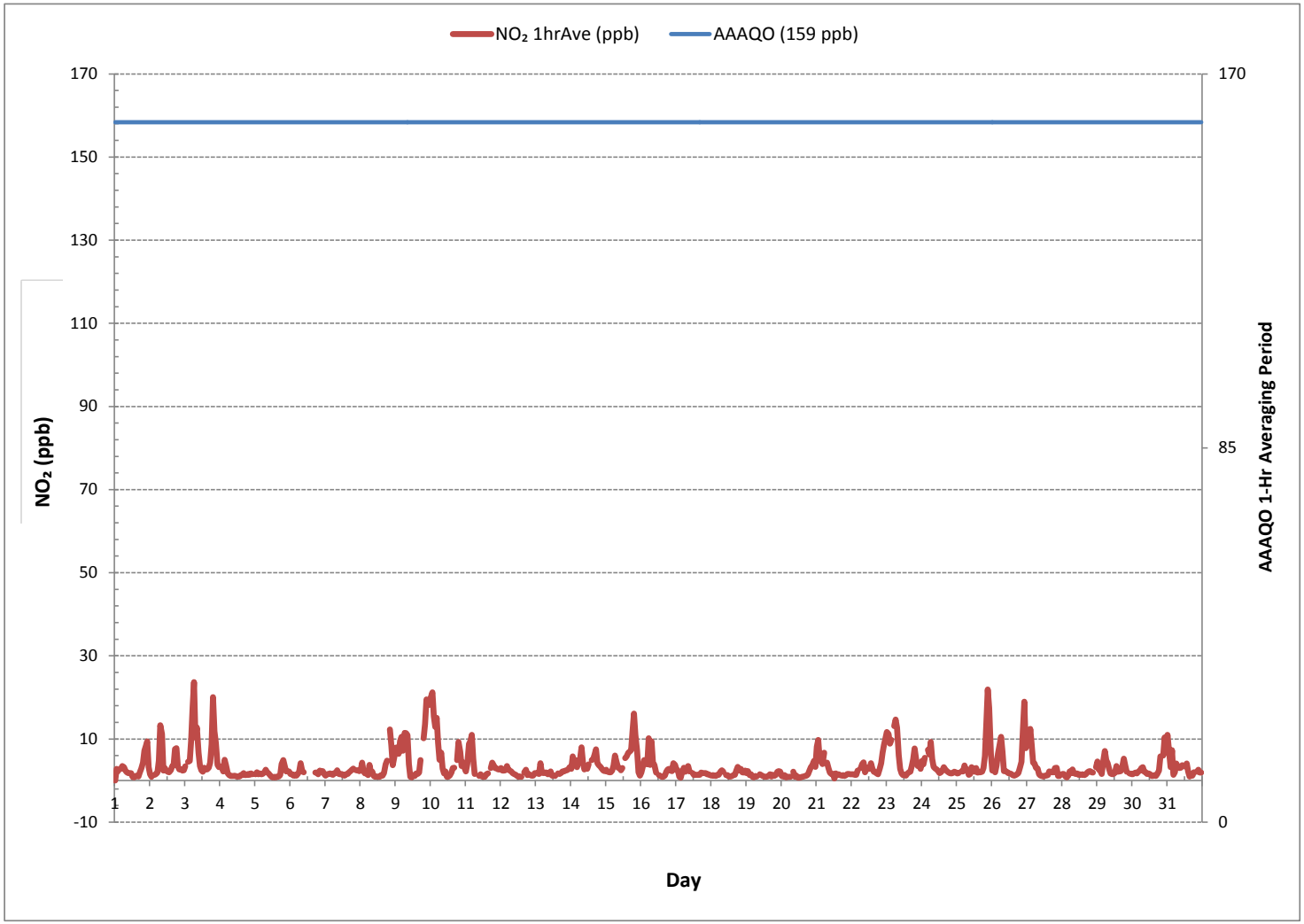
OBJECTIVE LIMIT: **ALBERTA ENVIRONMENT:** 1-HR 159 ppb



MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	702					
MINIMUM 1-HR AVERAGE	0.5	ppb	@ HOUR(S)	12	ON DAY(S)	21
MAXIMUM 1-HR AVERAGE:	23.7	ppb	@ HOUR(S)	6	ON DAY(S)	3
MAXIMUM 24-HR AVERAGE:	7.9	ppb			ON DAY(S) VAR-VARIOUS	9
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:		742	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:		99.7	%
STANDARD DEVIATION:	3.4		MONTHLY AVERAGE:		3.4	ppb

NITROGEN DIOXIDE Hourly Averages (NO_2 ppb)



NITROGEN DIOXIDE Instantaneous Maximum (NO_2 ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	3.4	4.2	3.3	S	5.5	7.0	4.7	4.0	5.9	3.2	7.9	17.6	3.0	3.3	6.4	3.8	2.4	3.0	5.5	8.1	11.0	12.1	15.3	7.2	2.4	17.6	6.4	24
2	2.6	1.3	S	2.2	3.1	4.9	12.6	16.9	24.7	14.1	21.2	5.5	3.6	3.8	5.5	5.1	5.5	10.3	10.5	4.6	3.3	3.4	2.9	3.0	1.3	24.7	7.4	24
3	7.1	S	6.4	7.9	16.8	26.6	30.9	13.8	24.5	12.1	7.5	3.8	4.0	4.4	10.8	5.2	3.6	5.6	12.9	32.6	25.8	12.9	7.9	9.5	3.6	32.6	12.7	24
4	S	6.8	3.7	6.0	5.2	2.2	1.7	1.7	2.1	1.7	8.4	1.7	1.8	1.6	2.0	4.0	3.8	3.7	3.1	2.7	3.6	3.9	2.5	S	1.6	8.4	3.4	24
5	4.2	5.2	2.9	5.1	2.5	3.6	3.6	5.3	8.6	3.6	2.5	2.2	1.4	4.8	1.4	2.2	2.2	2.6	11.0	7.2	5.9	5.7	S	7.1	1.4	11.0	4.4	24
6	3.9	5.0	2.6	3.8	2.3	3.5	4.2	8.4	2.9	5.5	C	C	C	C	C	C	C	3.6	2.9	2.1	2.7	S	2.7	1.9	1.9	8.4	3.6	24
7	1.4	2.0	1.7	1.9	1.8	1.8	2.0	2.1	8.2	1.9	1.7	3.5	1.8	5.1	3.8	2.2	2.2	2.7	5.4	5.0	S	4.8	3.9	3.6	1.4	8.2	3.1	24
8	3.6	7.0	2.9	2.5	6.0	2.5	6.2	3.8	3.2	2.4	2.8	2.2	2.5	1.9	6.6	4.1	5.1	7.6	8.3	S	19.3	12.0	9.1	8.9	1.9	19.3	5.7	24
9	12.3	11.0	8.9	14.2	14.5	11.0	18.4	15.0	17.7	9.1	2.2	2.0	2.7	1.5	3.1	2.9	2.7	63.7	S	17.0	20.1	29.0	23.3	22.7	1.5	63.7	14.1	24
10	23.5	24.2	18.8	16.3	20.3	16.5	8.0	12.5	4.1	3.1	12.2	2.0	2.6	3.3	3.1	4.6	4.4	S	6.8	14.3	12.6	5.6	5.9	4.7	2.0	24.2	10.0	24
11	3.3	6.5	14.8	16.1	20.4	24.2	3.3	X	X	2.5	2.9	2.9	1.4	2.3	6.2	3.6	S	4.4	6.6	5.2	5.5	4.0	7.8	4.4	1.4	24.2	7.1	22
12	5.2	3.6	3.5	3.4	9.4	3.8	5.1	3.3	3.8	2.9	2.7	1.6	1.5	2.5	2.0	S	4.4	5.9	2.1	2.3	2.1	1.4	1.6	2.6	1.4	9.4	3.3	24
13	2.1	2.1	2.0	18.6	2.7	2.4	2.5	2.7	2.2	2.1	6.6	3.0	4.3	1.3	S	4.9	3.5	2.5	6.8	2.6	2.7	3.1	3.3	4.9	1.3	18.6	3.9	24
14	4.4	13.0	5.6	7.6	6.4	10.3	8.8	11.6	8.0	3.5	10.1	3.4	6.8	S	7.0	6.6	11.4	12.4	7.0	4.6	4.4	4.3	3.5	3.6	3.4	13.0	7.1	24
15	3.8	3.1	2.6	2.6	3.5	6.0	11.0	9.9	4.9	3.8	3.8	3.5	S	6.1	8.9	10.0	10.8	12.0	32.9	26.1	23.4	12.0	2.7	1.8	1.8	32.9	8.9	24
16	4.3	6.1	14.6	7.8	7.9	64.7	5.9	19.3	16.1	6.3	3.6	S	3.3	1.7	2.0	1.7	1.7	3.3	6.4	5.8	6.5	3.9	8.7	10.0	1.7	64.7	9.2	24
17	4.7	3.4	2.0	1.0	4.9	5.8	5.9	3.9	5.9	3.8	S	2.7	1.7	2.1	2.3	2.3	1.7	2.5	2.3	3.0	2.3	2.0	1.9	2.3	1.0	5.9	3.1	24
18	1.6	1.7	1.9	1.7	2.3	2.1	3.8	5.6	5.9	S	2.1	1.8	1.3	1.2	2.1	2.9	2.2	3.6	5.2	3.2	4.1	5.0	2.6	3.5	1.2	5.9	2.9	24
19	2.5	2.7	1.7	1.7	1.4	1.3	2.2	1.4	S	1.8	1.7	1.2	1.3	1.3	1.3	1.3	2.9	2.1	2.4	1.7	1.8	3.1	3.5	2.6	1.2	3.5	2.0	24
20	2.1	1.5	1.6	1.2	1.0	1.2	1.5	S	9.6	1.3	5.2	0.9	1.0	1.9	1.9	5.2	2.4	2.1	2.3	3.9	6.3	13.0	13.3	5.6	0.9	13.3	3.7	24
21	28.6	18.5	14.4	5.8	12.6	11.6	S	13.5	12.9	7.7	8.4	6.6	3.2	12.1	5.9	3.1	1.8	1.9	2.4	1.4	1.8	2.2	2.0	2.1	1.4	28.6	7.8	24
22	2.6	2.3	2.0	2.5	5.6	S	4.2	7.6	63.9	6.5	7.0	7.9	4.2	6.6	5.5	4.4	4.3	2.9	2.7	4.4	7.9	8.7	10.3	11.4	2.0	63.9	8.1	24
23	13.6	12.5	10.1	12.5	S	17.0	22.6	20.9	8.5	8.9	2.9	2.4	2.6	1.4	2.5	2.5	3.5	9.7	7.2	12.5	9.1	5.0	7.5	4.9	1.4	22.6	8.7	24
24	8.0	6.0	15.1	S	24.4	8.5	15.7	8.4	5.9	4.2	3.6	13.0	2.3	4.2	3.0	5.0	3.9	3.9	2.9	3.2	2.3	2.7	3.0	3.1	2.3	24.4	6.6	24
25	3.5	3.4	S	3.0	3.2	6.4	5.2	3.5	2.4	3.0	5.4	3.5	3.5	4.0	5.1	5.6	2.5	2.2	12.1	16.5	26.0	27.8	25.8	14.0	2.2	27.8	8.2	24
26	3.8	S	4.0	9.5	9.2	12.5	17.0	14.2	5.2	5.0	3.1	2.6	3.4	3.3	1.5	1.5	2.3	1.9	2.2	6.7	14.4	20.9	23.4	15.6	1.5	23.4	8.0	24
27	S	14.4	20.9	12.5	7.9	5.9	4.2	4.9	2.7	2.0	1.8	1.5	1.5	1.6	2.2	5.5	3.8	3.4	3.1	6.7	8.0	1.4	1.5	S	1.4	20.9	5.3	24
28	2.6	2.3	1.7	1.2	2.0	4.8	2.6	6.5	3.1	3.5	2.1	1.9	2.0	1.6	2.6	2.4	1.8	1.9	2.6	3.1	2.1	2.6	S	6.1	1.2	6.5	2.7	24
29	8.8	3.9	5.0	2.5	8.0	10.5	9.9	6.4	6.0	2.7	2.0	2.7	2.9	9.1	2.9	2.5	3.1	5.4	8.0	8.1	3.4	S	2.2	3.3	2.0	10.5	5.2	24
30	4.7	2.4	2.6	2.3	3.0	3.9	5.0	5.2	3.0	4.2	2.7	3.1	2.7	1.8	3.9	2.9	2.3	4.8	6.5	10.0	S	12.5	15.5	10.9	1.8	15.5	5.0	24
31	14.6	14.0	4.4	12.1	2.3	5.0	7.8	P	3.5	4.3	4.7	3.9	3.6	4.9	4.2	1.7	1.8	1.6	7.2	S	2.6	5.7	3.1	2.1	1.6	14.6	5.2	23
HOURLY MAX	28.6	24.2	20.9	18.6	24.4	64.7	30.9	20.9	63.9	14.1	21.2	17.6	6.8	12.1	10.8	10.0	11.4	63.7	32.9	32.6	26.0	29.0	25.8	22.7				
HOURLY AVG	6.4	6.6	6.3	6.4	7.2	9.6	7.9	8.3	9.5	4.6	5.1	3.8	2.7	3.5	4.0	3.8	3.6	6.4	6.6	7.7	8.3	8.0	7.5	6.3				

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

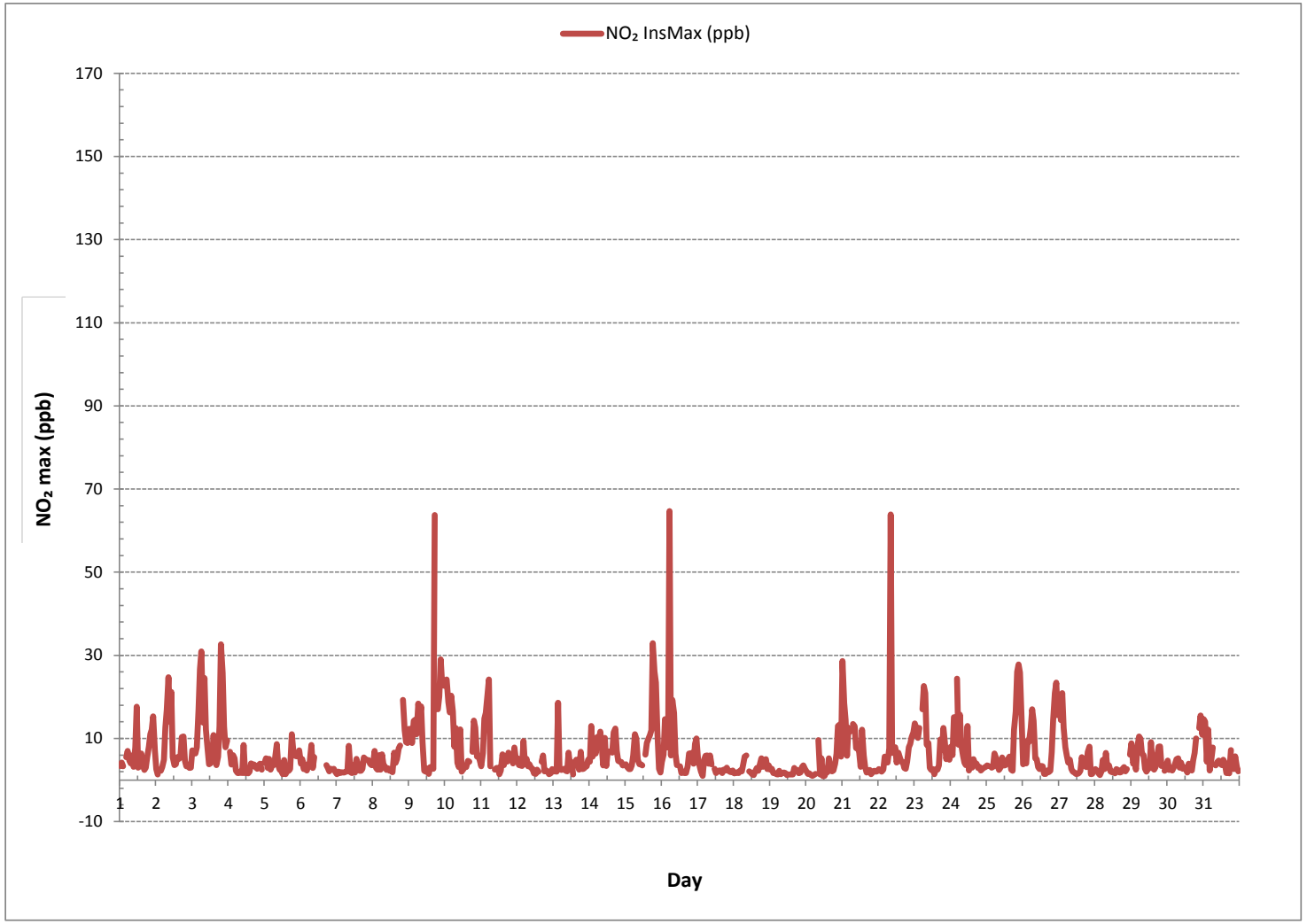
NUMBER OF NON-ZERO READINGS: 701

MAXIMUM INSTANTANEOUS VALUE: 64.7 ppb @ HOUR(S) 17 ON DAY(S) 9

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 741 hrs
MONTHLY CALIBRATION TIME: 7 hrs
STANDARD DEVIATION: 6.7

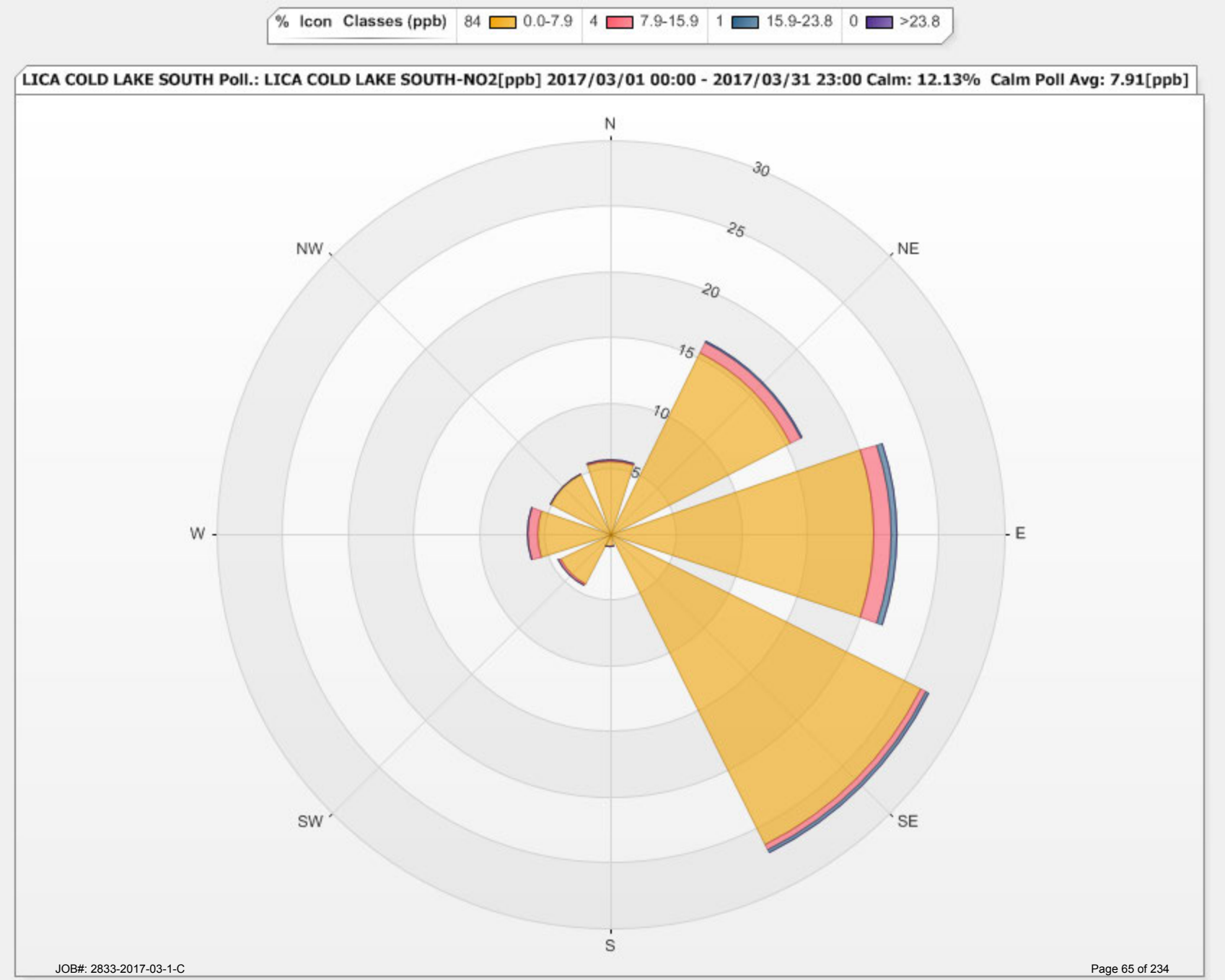
NITROGEN DIOXIDE Instantaneous Maximum (NO_2 ppb)



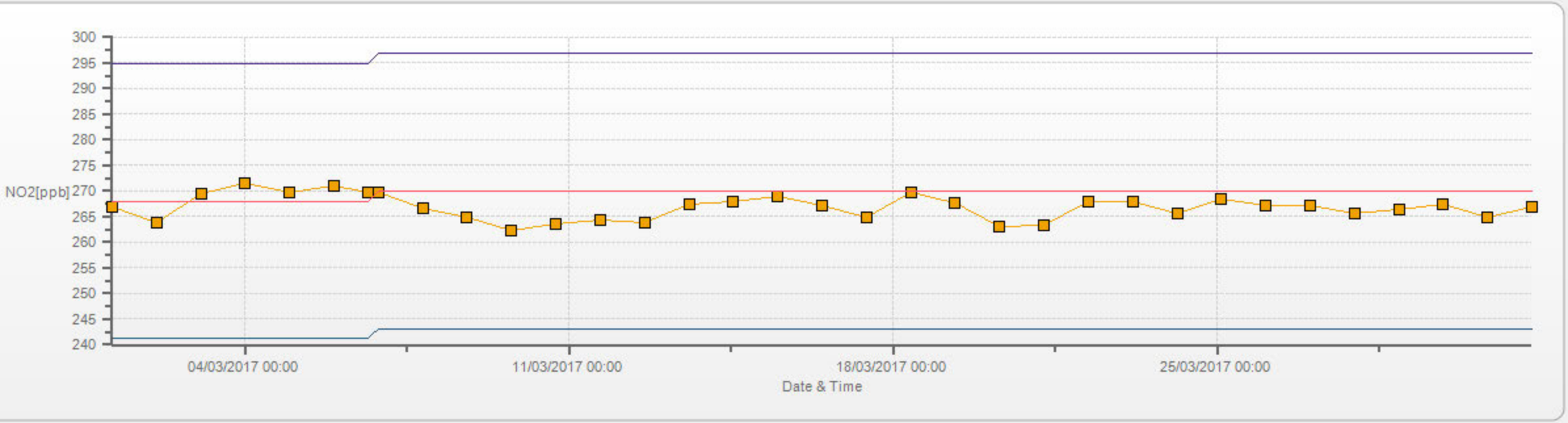
Wind: LICA COLD LAKE SOUTH
Poll.: LICA COLD LAKE SOUTH-NO2[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 12.13% Calm Avg: 7.91 [ppb]

Direction	0.0-7.9	7.9-15.9	15.9-23.8	>23.8	Total
N	5.6	0.1	0.0	0.0	5.7
NE	15.4	0.9	0.1	0.0	16.4
E	20.1	1.3	0.4	0.0	21.8
SE	26.5	0.4	0.1	0.0	27.1
S	1.0	0.0	0.0	0.0	1.0
SW	4.3	0.1	0.0	0.0	4.4
W	5.6	0.7	0.0	0.0	6.3
NW	5.1	0.0	0.0	0.0	5.1
Summary	83.6	3.6	0.7	0.0	87.9


% Icon Classes (ppb)
84 0.0-7.9
4 7.9-15.9
1 15.9-23.8
0 >23.8
LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-NO2[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 12.13% Calm Poll Avg: 7.91[ppb]
N
NE
E
SE
S
SW
W
NW
5
10
15
20
25
30

NO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/03 Type: Span



OZONE

OZONE Hourly Averages (O_3 ppb)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	33.7	32.3	32.4	S	31.7	30.6	29.8	30.2	30.2	31.1	32.3	33.9	35.0	35.4	34.9	35.0	34.1	33.7	32.7	31.3	28.7	26.8	24.4	31.6	24.4	35.4	31.8	24
2	33.3	34.5	S	34.2	32.8	30.6	27.0	15.9	23.7	32.3	31.7	31.8	33.9	34.0	33.0	32.0	31.1	27.9	28.1	31.6	32.8	33.3	33.1	32.5	15.9	34.5	30.9	24
3	31.4	S	30.0	29.7	24.9	17.7	10.3	22.8	20.8	26.1	28.6	29.5	31.5	33.6	38.0	37.5	35.3	31.9	24.3	12.3	13.6	18.9	34.8	36.8	10.3	38.0	27.0	24
4	S	36.4	34.2	25.9	24.9	29.5	32.0	34.7	35.9	36.9	38.0	38.7	39.4	39.6	39.3	39.2	38.8	39.2	39.2	39.0	38.8	38.6	39.1	S	24.9	39.6	36.2	24
5	40.2	39.6	39.6	39.3	39.5	39.2	38.6	37.9	38.3	38.5	38.8	39.1	39.1	38.8	38.7	38.5	38.2	37.7	34.0	33.2	34.3	35.3	S	35.2	33.2	40.2	37.9	24
6	36.0	36.4	36.7	36.2	36.0	35.4	34.8	32.1	S1	33.7	35.2	35.3	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	32.1	36.7	35.3	15
7	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	40.6	40.2	40.2	40.3	39.6	38.0	S	33.5	31.7	30.0	30.0	40.6	37.1	16
8	29.2	27.2	29.5	32.1	32.5	31.4	29.6	32.3	33.3	35.0	36.3	36.7	37.0	37.1	37.3	38.1	37.3	35.3	32.5	S	22.5	25.4	34.6	32.1	22.5	38.1	32.8	24
9	29.1	28.2	29.7	26.4	23.0	22.3	17.7	16.8	20.5	25.9	22.2	21.2	24.2	29.5	28.0	29.5	27.9	26.0	S	16.8	12.8	7.1	5.7	4.7	4.7	29.7	21.5	24
10	2.7	3.5	8.3	10.6	9.9	15.0	17.0	16.1	19.2	20.5	21.5	22.9	25.0	28.7	29.7	28.4	28.0	S	26.8	21.3	25.1	25.3	23.8	25.9	2.7	29.7	19.8	24
11	29.7	28.3	21.6	17.6	16.2	26.2	32.4	X	X	33.0	32.8	33.7	34.2	35.3	35.9	36.5	S	37.1	34.3	33.7	34.7	34.8	35.1	35.8	16.2	37.1	31.4	22
12	35.9	34.2	34.3	34.6	34.6	34.7	34.3	33.7	34.2	37.7	36.3	37.2	38.1	38.7	38.8	S	38.3	40.0	43.4	43.0	42.8	42.3	40.8	39.7	33.7	43.4	37.7	24
13	39.9	40.0	40.0	38.6	38.7	38.2	37.6	37.0	37.3	37.5	37.2	38.5	39.4	39.7	S	41.0	41.5	41.2	40.5	40.0	39.8	39.6	38.8	38.3	37.0	41.5	39.1	24
14	37.5	33.5	35.7	34.9	35.7	34.1	32.6	29.8	34.0	36.5	36.6	38.7	40.0	S	41.8	42.5	42.6	41.4	44.5	44.7	43.6	43.5	42.7	42.0	29.8	44.7	38.6	24
15	41.1	40.4	39.1	37.9	36.0	33.3	30.0	29.8	31.3	31.8	32.7	34.3	S	37.7	37.3	41.3	39.8	38.2	30.3	20.3	20.4	30.3	43.8	45.3	20.3	45.3	34.9	24
16	45.1	44.1	39.7	42.0	39.3	34.8	37.2	24.7	39.1	42.9	44.0	S	45.2	45.2	45.0	44.2	41.4	38.4	38.7	38.3	38.4	37.4	34.3	33.8	24.7	45.2	39.7	24
17	35.9	35.6	36.4	36.2	35.0	33.8	34.4	33.7	33.3	34.5	S	42.1	46.1	47.7	47.8	48.3	47.6	44.6	43.1	41.9	40.6	39.7	39.1	37.8	33.3	48.3	39.8	24
18	36.4	35.9	35.0	34.1	32.9	32.3	31.8	31.1	31.7	S	32.4	32.8	33.0	33.5	33.4	33.0	32.6	31.9	31.9	32.3	32.0	31.5	28.3	28.8	28.3	36.4	32.5	24
19	27.8	27.2	29.3	30.9	36.9	38.5	37.5	37.8	S	37.5	38.9	40.4	41.5	43.7	44.4	44.0	42.6	43.8	41.8	40.6	39.5	38.6	38.7	36.0	27.2	44.4	38.2	24
20	37.4	39.3	39.8	41.1	40.7	40.4	41.3	S	39.7	40.8	41.4	42.7	43.0	43.2	43.7	44.0	44.1	43.7	41.4	35.7	30.4	26.6	25.3	24.5	24.5	44.1	38.7	24
21	20.4	16.6	31.3	31.0	30.3	28.3	S	30.7	32.6	33.9	36.1	39.3	39.8	40.0	39.7	39.9	39.0	38.7	38.5	38.7	38.2	37.3	36.6	36.1	16.6	40.0	34.5	24
22	35.8	35.8	35.8	35.6	34.6	S	33.0	31.5	32.4	31.7	31.4	31.0	30.8	29.5	30.1	30.9	30.3	30.7	30.4	27.9	25.9	22.2	19.6	16.3	16.3	35.8	30.1	24
23	12.7	13.7	15.4	13.2	S	7.8	7.3	11.3	23.2	30.8	32.6	33.7	35.3	36.9	36.4	36.5	36.5	34.4	31.1	27.3	27.1	27.4	27.5	24.2	7.3	36.9	25.3	24
24	20.6	18.8	12.5	S	10.9	10.0	10.9	22.5	26.9	29.3	30.9	32.4	33.0	32.6	32.4	33.5	35.9	36.5	35.2	34.5	34.7	34.8	34.5	34.7	10.0	36.5	27.7	24
25	34.2	33.9	S	32.9	32.8	31.5	30.7	31.3	32.6	31.2	29.4	30.4	32.5	33.9	38.6	40.2	40.7	41.1	36.1	26.6	16.5	7.1	9.7	23.7	7.1	41.1	30.3	24
26	27.8	S	30.2	23.7	18.3	17.5	16.7	20.8	27.0	27.9	29.9	33.3	35.8	41.1	45.6	47.7	47.7	46.9	44.2	36.1	30.3	18.4	11.8	24.1	11.8	47.7	30.6	24
27	S	15.9	14.2	18.2	28.0	27.6	28.2	29.5	32.6	33.6	35.1	37.8	38.6	38.0	38.6	35.5	36.2	37.4	38.7	38.4	35.6	32.3	31.8	S	14.2	38.7	31.9	24
28	30.8	32.9	34.6	33.4	32.0	29.3	28.3	24.8	25.2	26.3	27.0	28.3	28.7	31.0	33.2	34.0	32.8	30.0	27.8	27.2	26.8	26.7	S	18.6	18.6	34.6	29.1	24
29	15.0	11.9	10.6	8.0	6.1	5.8	15.6	18.1	19.7	19.8	21.3	27.5	28.3	27.5	29.8	31.4	31.4	29.4	27.4	26.0	26.1	S	27.2	25.7	5.8	31.4	21.3	24
30	25.2	24.7	25.4	26.3	24.6	25.5	25.7	26.6	27.0	29.2	30.6	32.9	32.6	33.8	34.5	35.1	35.0	33.3	30.0	20.3	S	8.7	4.5	5.9	4.5	35.1	26.0	24
31	2.3	6.5	6.8	4.0	24.2	23.2	14.2	19.9	20.8	22.3	26.2	31.6	37.4	38.9	42.2	44.9	43.2	40.6	37.0	S	36.6	35.7	37.3	36.7	2.3	44.9	27.5	24
HOURLY MAX	45.1	44.1	40.0	42.0	40.7	40.4	41.3	37.9	39.7	42.9	44.0	42.7	46.1	47.7	47.8	48.3	47.7	46.9	44.5	44.7	43.6	43.5	43.8	45.3				
HOURLY AVG	29.5	28.8	28.9	28.9	29.1	27.7	27.5	27.3	29.7	32.0	32.7	34.1	35.7	36.6	37.5	38.0	37.6	36.9	35.3	32.0	31.0	29.6	29.8	29.9				

STATUS FLAG CODES

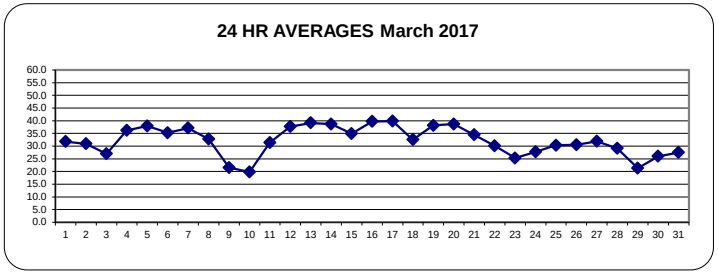
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

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

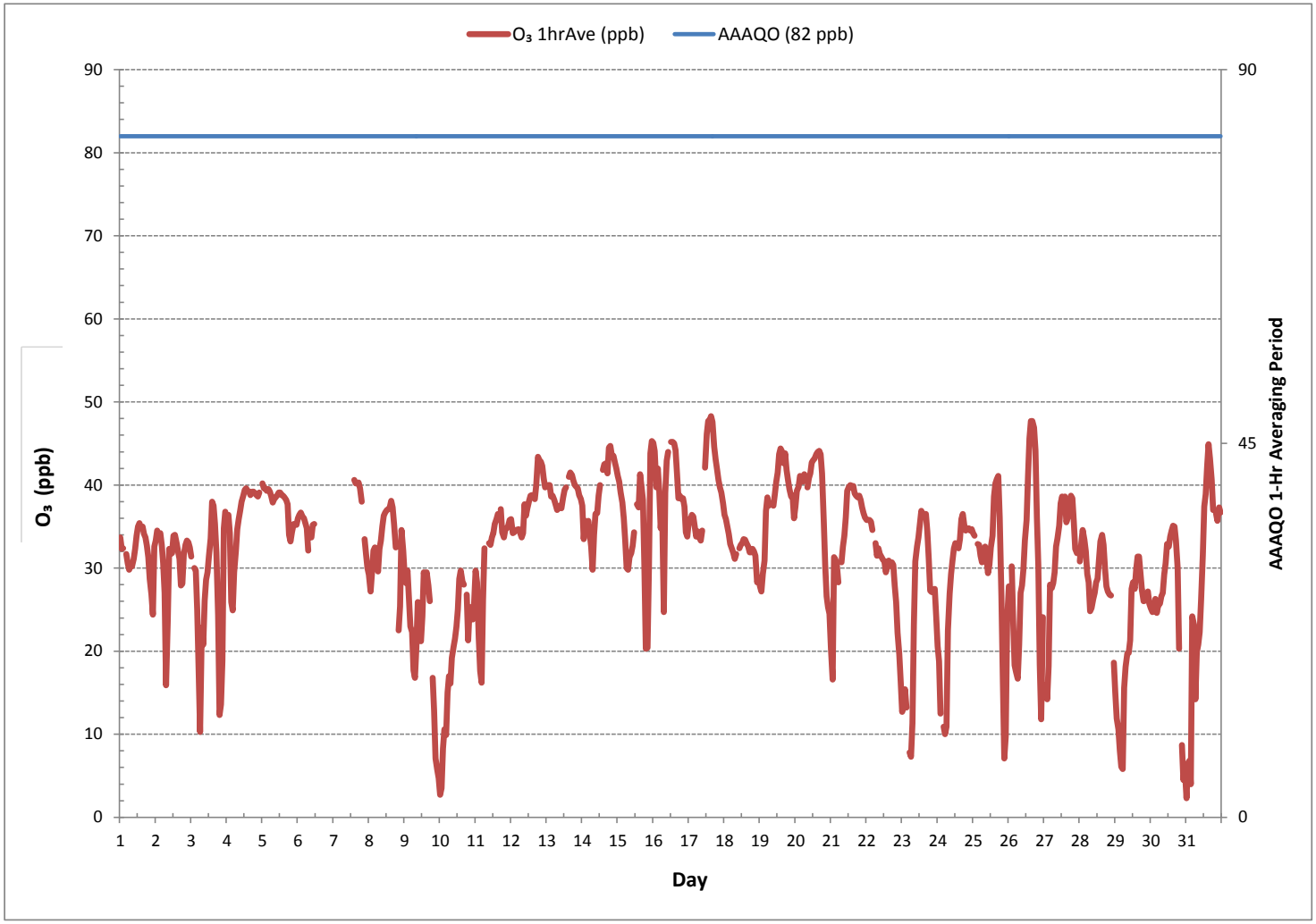
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:			0			
NUMBER OF NON-ZERO READINGS:			683			
MINIMUM 1-HR AVERAGE	2.3	ppb	@ HOUR(S)	0	ON DAY(S)	2.3
MAXIMUM 1-HR AVERAGE:	48.3	ppb	@ HOUR(S)	15	ON DAY(S)	17
MAXIMUM 24-HR AVERAGE:	39.8	ppb			ON DAY(S) VAR-VARIOUS	17

IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	725	hrs
MONTHLY CALIBRATION TIME:	10	hrs	AMD OPERATION UPTIME:	97.4	%
STANDARD DEVIATION:	8.7		MONTHLY AVERAGE:	31.9	ppb



OZONE Hourly Averages (O_3 ppb)



OZONE Instantaneous Maximum (O_3 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	34.5	33.2	33.3	S	32.3	31.5	30.7	31.0	31.4	32.5	33.2	34.8	36.1	36.2	35.4	36.2	34.8	34.5	34.1	32.9	31.4	29.7	28.5	33.5	28.5	36.2	33.1	24
2	34.7	35.0	S	35.1	33.6	32.6	31.8	23.2	32.9	33.2	32.7	33.9	34.2	34.2	33.6	33.0	31.9	30.7	31.2	32.3	33.3	33.5	33.5	32.9	23.2	35.1	32.7	24
3	32.4	S	30.8	30.7	29.4	22.4	20.3	24.8	26.1	29.1	29.4	30.4	32.4	37.6	38.5	38.5	36.8	34.1	30.5	20.5	17.7	26.7	37.9	37.6	17.7	38.5	30.2	24
4	S	37.7	35.7	31.0	27.6	31.3	33.3	35.6	36.5	37.7	38.2	39.4	39.8	40.0	39.5	39.6	39.4	39.8	39.4	39.3	39.3	39.0	40.0	S	27.6	40.0	37.2	24
5	40.7	40.3	40.2	40.0	40.1	40.0	39.3	38.8	39.1	39.0	39.4	39.8	39.3	39.1	39.0	39.0	38.5	38.9	37.3	34.8	35.7	36.2	S	36.4	34.8	40.7	38.7	24
6	37.1	37.1	37.3	37.0	36.4	36.0	35.7	S1	S1	35.5	35.6	35.7	C	C	C	C	C	C	Y	Y	Y	Y	Y	Y	35.5	37.3	36.3	16
7	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	41.1	41.1	40.8	40.5	40.4	38.8	S	35.0	32.2	30.8	30.8	41.1	37.9	16
8	29.9	28.8	31.3	33.3	33.3	32.4	31.2	33.2	34.0	36.2	36.6	37.2	37.3	37.5	38.2	38.5	37.9	37.7	35.4	S	29.7	34.5	35.7	34.2	28.8	38.5	34.5	24
9	30.8	29.7	33.0	29.8	24.8	24.4	21.8	18.7	24.8	26.6	25.0	22.2	28.6	32.4	29.4	31.5	29.4	27.6	S	23.3	16.7	10.4	9.2	7.3	7.3	33.0	24.2	24
10	4.2	6.1	11.6	15.6	14.5	18.0	18.0	19.2	19.7	21.2	23.0	24.9	27.5	29.9	31.0	29.8	28.9	S	28.0	26.2	27.6	27.4	24.6	29.8	4.2	31.0	22.0	24
11	30.1	30.1	25.8	21.1	24.3	29.1	33.8	X	X	33.6	33.2	33.9	34.8	36.1	36.4	37.6	S	38.2	35.9	34.2	35.3	35.4	35.6	36.5	21.1	38.2	32.9	22
12	36.8	34.4	34.8	34.8	35.3	35.0	35.0	34.1	35.3	43.5	37.3	37.6	38.2	39.3	39.0	S	38.8	43.5	44.1	43.5	43.2	42.7	41.4	40.0	34.1	44.1	38.6	24
13	40.1	40.1	40.0	39.8	39.3	38.2	38.2	37.3	37.6	37.6	38.1	39.0	39.6	39.9	S	41.3	41.7	41.7	40.7	40.3	40.2	39.6	39.4	39.0	37.3	41.7	39.5	24
14	38.4	38.0	37.0	36.4	36.4	36.0	33.8	31.2	35.3	36.9	37.6	39.4	41.1	S	42.5	43.0	44.2	46.1	45.8	45.2	44.1	43.9	43.5	42.5	31.2	46.1	39.9	24
15	41.9	40.8	39.8	38.4	37.1	35.3	33.2	31.5	31.7	32.6	34.1	36.7	S	41.3	38.0	44.3	42.8	39.9	36.4	30.4	28.5	42.9	44.9	46.0	28.5	46.0	37.8	24
16	47.0	46.4	43.8	45.4	43.9	42.4	42.1	36.3	44.0	44.6	44.6	S	46.0	45.8	45.4	44.8	43.6	39.3	39.6	39.6	39.3	38.4	37.1	37.6	36.3	47.0	42.5	24
17	37.1	36.2	36.8	36.5	36.5	34.7	35.1	34.7	34.8	35.3	S	44.8	46.9	48.9	48.7	48.9	**49.1**	46.1	43.6	42.4	41.2	40.2	39.6	38.5	34.7	**49.1**	40.7	24
18	37.0	36.1	35.6	34.8	33.5	32.7	32.6	31.9	32.3	S	32.7	35.1	33.3	33.8	33.6	33.3	33.0	32.6	32.9	32.6	32.6	32.4	29.1	29.4	29.1	37.0	33.2	24
19	28.3	28.5	30.4	33.5	38.3	39.9	38.0	38.2	S	39.1	40.3	41.0	43.2	44.6	44.9	44.8	43.6	44.6	43.0	41.2	39.8	39.3	39.4	37.4	28.3	44.9	39.2	24
20	38.2	39.8	40.5	41.7	41.1	41.0	42.1	S	41.4	41.6	42.4	43.5	43.8	44.4	44.4	44.6	44.6	44.4	42.8	39.9	33.0	30.8	28.3	27.0	27.0	44.6	40.1	24
21	24.0	23.0	33.3	32.3	32.3	31.2	S	32.7	33.5	34.7	38.8	40.1	40.5	40.5	40.6	40.6	39.9	39.0	38.9	38.9	38.7	37.7	37.0	36.5	23.0	40.6	35.9	24
22	36.0	36.0	35.9	35.7	35.3	S	33.5	33.0	33.3	32.4	32.0	31.5	31.3	30.8	31.2	31.2	30.7	30.8	30.7	29.4	28.0	24.0	20.5	18.3	18.3	36.0	30.9	24
23	14.4	14.9	15.8	14.9	S	10.6	11.0	18.0	28.0	33.2	32.7	34.5	36.1	37.3	37.4	36.8	36.8	37.0	33.2	30.5	30.1	29.8	29.1	27.9	10.6	37.4	27.4	24
24	23.4	27.1	15.5	S	14.6	12.5	15.3	26.1	28.0	30.5	31.7	33.2	33.3	33.0	33.6	34.8	37.6	37.9	35.4	35.0	35.0	35.0	35.0	35.1	12.5	37.9	29.5	24
25	34.5	34.2	S	33.2	33.5	32.4	31.3	32.3	33.2	32.2	30.2	31.2	34.4	36.4	39.7	41.0	41.2	41.4	40.5	31.4	23.3	12.5	19.6	29.5	12.5	41.4	32.6	24
26	31.5	S	31.2	30.1	20.0	20.5	23.6	27.3	39.9	30.2	31.5	34.8	36.7	44.1	47.2	48.1	48.1	47.7	46.0	42.1	37.1	27.3	23.6	31.9	20.0	48.1	34.8	24
27	S	19.3	16.8	26.7	28.9	28.3	29.1	32.4	33.3	34.1	36.1	38.4	38.8	38.5	39.7	37.0	37.1	38.2	39.8	39.3	37.6	32.7	31.9	S	16.8	39.8	33.4	24
28	31.3	34.2	35.0	34.1	32.4	30.8	29.2	26.1	26.1	28.5	28.2	29.5	29.9	32.7	35.4	35.0	33.8	31.3	28.5	27.6	27.1	27.1	S	23.0	23.0	35.4	30.3	24
29	18.9	15.8	13.1	12.2	10.1	8.5	18.6	19.9	22.3	22.0	24.4	29.4	28.9	28.6	30.8	32.0	32.2	30.6	30.1	27.6	26.7	S	27.9	26.5	8.5	32.2	23.4	24
30	26.2	25.6	26.8	26.8	25.9	27.0	27.3	28.0	28.6	30.2	31.7	35.3	33.9	34.4	35.9	35.7	35.7	35.1	34.1	25.3	S	13.7	8.2	7.9	7.9	35.9	27.8	24
31	5.8	19.9	9.4	20.8	26.0	25.3	22.3	P	21.0	24.9	28.3	35.9	40.7	40.8	45.8	45.8	45.1	41.7	39.3	S	37.1	37.0	37.9	37.6	5.8	45.8	31.3	23
HOURLY MAX	47.0	46.4	43.8	45.4	43.9	42.4	42.1	38.8	44.0	44.6	44.6	44.8	46.9	48.9	48.7	48.9	49.1	47.7	46.0	45.2	44.1	43.9	44.9	46.0				
HOURLY AVG	30.9	31.0	30.4	31.5	30.9	29.7	29.9	29.8	32.0	33.4	33.8	35.3	36.7	37.8	38.5	38.9	38.6	38.3	37.2	34.4	33.2	32.2	31.8	31.8				

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

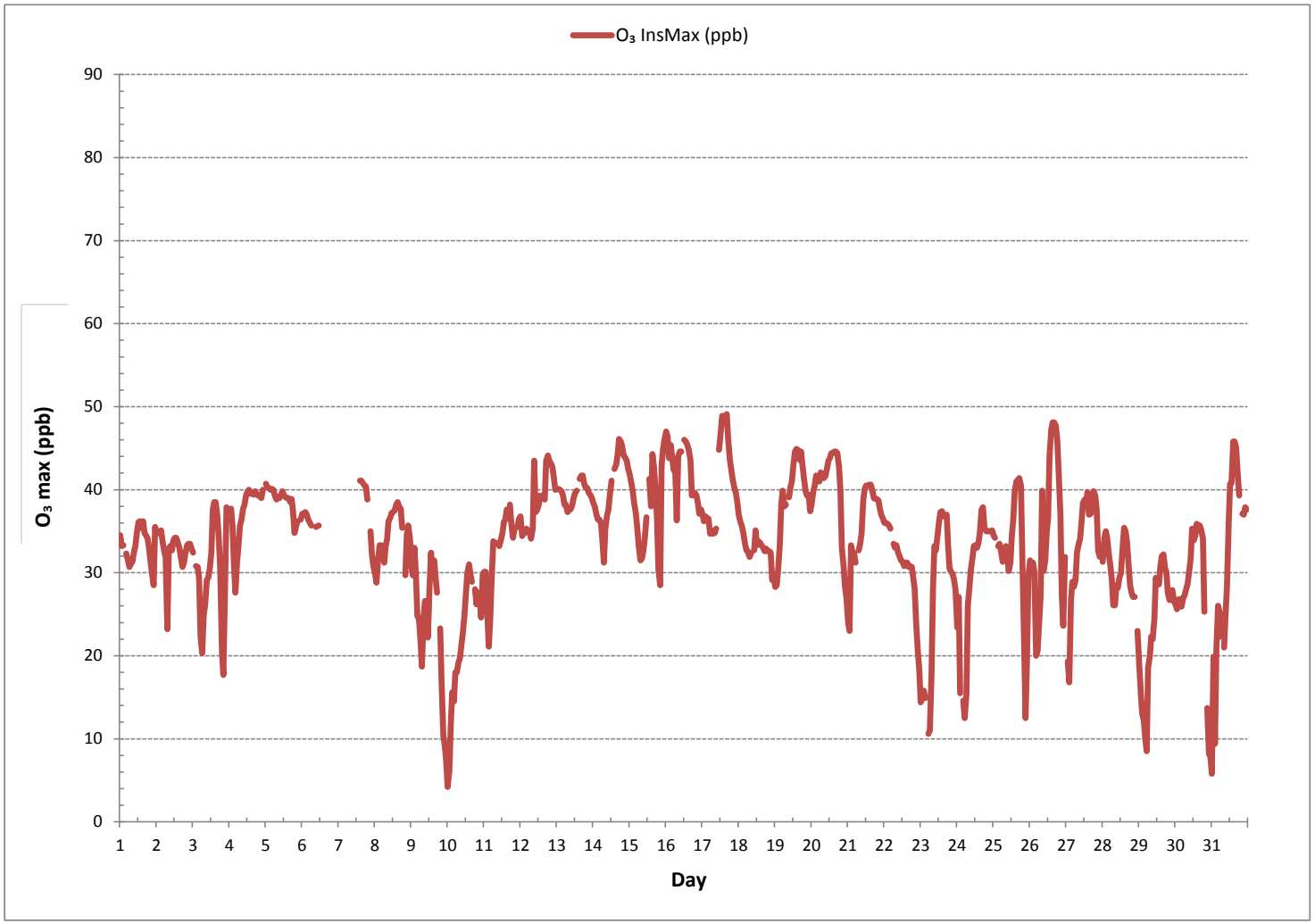
NUMBER OF NON-ZERO READINGS: 681

MAXIMUM INSTANTANEOUS VALUE: 49.1 ppb @ HOUR(S) 16 ON DAY(S) 17

VAR-VARIOUS

IZS CALIBRATION TIME: 32 hrs OPERATIONAL TIME: 725 hrs
MONTHLY CALIBRATION TIME: 12 hrs
STANDARD DEVIATION: 7.7

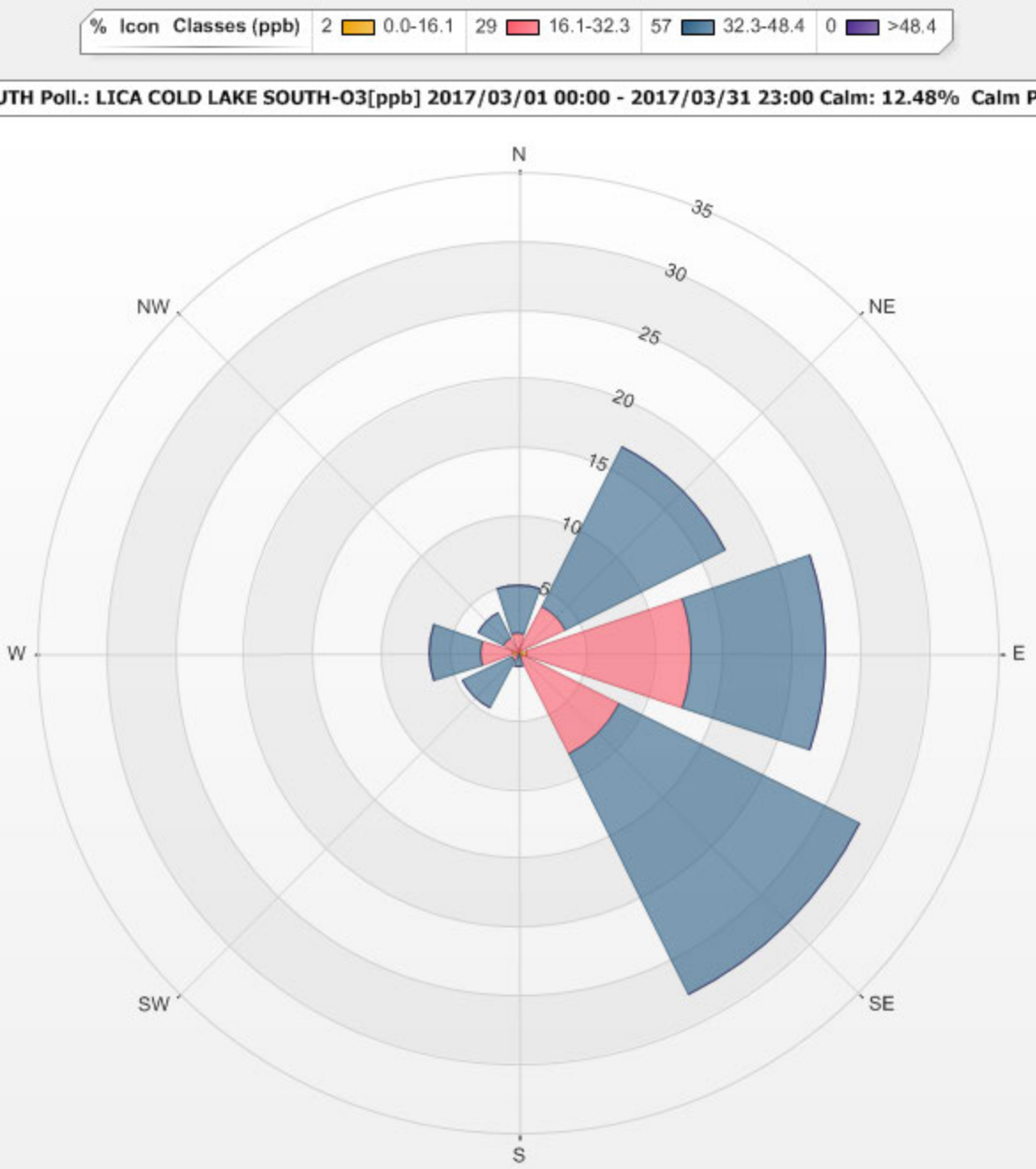
OZONE Instantaneous Maximum (O_3 ppb)



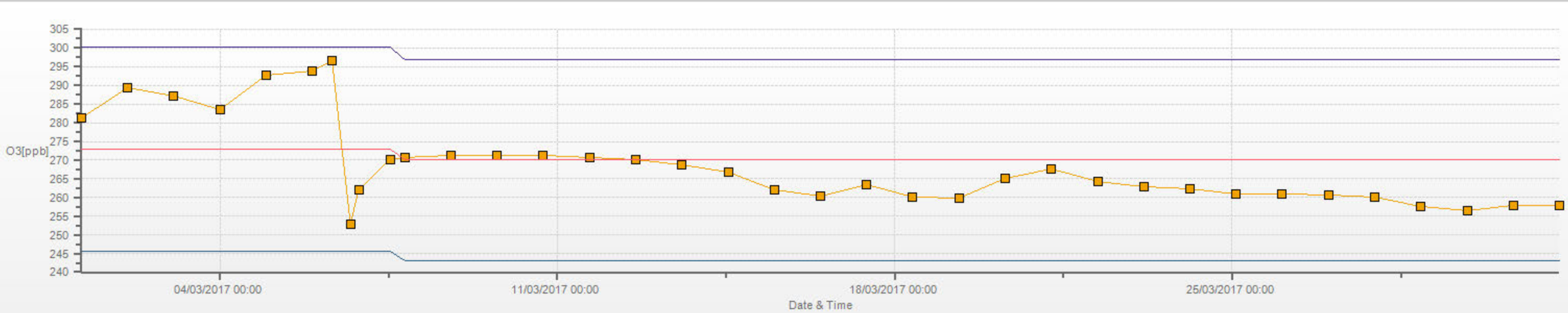
Wind: LICA COLD LAKE SOUTH
Poll.: LICA COLD LAKE SOUTH-O3[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 12.48% Calm Avg: 19.60 [ppb]

Direction	0.0-16.1	16.1-32.3	32.3-48.4	>48.4	Total
N	0.0	1.5	3.5	0.0	5.0
NE	0.3	3.5	13.1	0.0	16.9
E	0.6	12.0	9.8	0.0	22.5
SE	0.4	7.8	19.7	0.0	27.9
S	0.0	0.0	1.0	0.0	1.0
SW	0.0	0.6	4.0	0.0	4.6
W	0.4	2.4	3.7	0.0	6.5
NW	0.0	1.2	2.1	0.0	3.2
Summary	1.8	28.9	56.8	0.0	87.5


% Icon Classes (ppb)
2 0.0-16.1
29 16.1-32.3
57 32.3-48.4
0 >48.4
LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-O3[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 12.48% Calm Poll Avg: 19.60[ppb]
N
NE
E
SE
S
SW
W
NW
5
10
15
20
25
30
35

O3[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 17/03 Type: Span



PARTICULATE MATTER 2.5

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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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**	1.0	2.6	0.0	0.0	4.4	2.4	6.0	5.1	2.4	0.0	1.9	3.5	1.0	0.0	1.1	2.4	0.0	0.0	0.5	1.0	3.4	2.5	1.9	**0.0**	6.0	1.8	24
2	0.0	0.0	1.5	2.1	3.2	0.0	1.2	1.6	8.4	3.6	6.3	5.8	2.5	7.0	6.0	11.8	10.8	13.1	8.1	11.2	2.5	16.0	15.6	9.5	0.0	16.0	**6.2**	24
3	9.0	9.9	4.0	7.5	7.4	10.1	8.8	5.9	9.4	11.8	10.5	9.0	1.6	2.9	0.0	0.0	1.2	5.0	5.7	7.7	10.7	1.0	3.3	0.2	0.0	11.8	5.9	24
4	1.2	0.0	1.7	2.5	5.7	1.0	2.4	0.0	2.5	0.0	1.0	0.2	2.4	0.0	2.2	0.7	**X**	0.0	7.0	3.1	0.5	3.0	4.0	2.3	0.0	7.0	1.9	23
5	3.8	0.1	0.0	0.0	4.1	0.0	0.0	0.3	1.4	1.1	0.0	0.8	1.3	2.3	1.0	0.0	0.0	1.6	0.0	0.5	0.0	3.3	2.3	3.4	0.0	4.1	1.1	24
6	0.0	0.0	1.4	2.1	0.0	0.0	**X**	3.1	1.4	2.9	0.0	2.9	3.0	1.4	**X**	0.0	0.0	6.5	4.9	2.5	1.5	1.5	0.0	1.9	0.0	6.5	1.7	22
7	1.5	1.9	4.0	0.0	2.9	1.3	1.0	2.5	2.8	0.0	**C**	**C**	2.9	0.5	1.9	2.5	0.0	0.0	0.0	1.4	0.0	3.4	6.5	7.5	0.0	7.5	2.0	24
8	6.0	4.0	3.4	2.9	6.5	1.0	3.9	2.5	1.9	1.9	0.4	0.0	0.0	0.4	1.4	0.0	**X**	0.5	1.4	1.0	3.4	6.5	2.9	5.0	0.0	6.5	2.5	23
9	1.9	2.9	5.0	8.4	5.4	1.0	7.5	2.9	3.9	7.9	2.4	3.9	1.0	0.0	5.5	3.4	6.0	1.0	7.5	2.9	4.4	8.9	4.9	6.4	0.0	8.9	4.4	24
10	2.4	1.4	7.5	2.4	3.9	3.4	8.4	6.4	3.4	7.9	1.4	5.5	4.9	2.5	1.4	4.0	7.0	7.0	4.4	3.4	3.4	5.5	0.0	5.5	0.0	8.4	4.3	24
11	4.0	1.9	3.4	2.5	0.5	1.0	1.4	**X**	**X**	2.5	2.5	1.9	3.4	2.9	2.9	1.0	6.0	2.9	4.4	1.9	2.5	3.4	1.4	2.9	0.5	6.0	2.6	22
12	1.4	2.9	1.9	2.9	1.4	2.5	2.5	4.0	3.4	**21.5**	4.0	6.0	4.0	4.0	3.4	9.4	0.0	5.0	0.5	1.4	1.4	4.0	1.0	2.9	0.0	**21.5**	3.8	24
13	1.9	2.5	1.4	4.0	5.5	9.9	4.4	3.4	0.0	2.9	2.5	4.4	1.4	2.9	9.4	12.4	7.5	9.9	4.4	1.9	5.5	6.0	2.5	9.4	0.0	12.4	4.8	24
14	4.0	6.0	5.0	4.0	7.0	3.4	3.4	7.0	6.5	5.9	7.9	5.5	4.0	0.0	3.4	7.9	7.0	12.4	6.5	0.0	3.4	7.0	4.0	1.0	0.0	12.4	5.1	24
15	5.0	4.4	6.5	6.5	9.4	9.0	9.0	7.5	3.4	9.4	4.0	0.0	1.9	1.9	**X**	9.4	9.4	5.5	9.9	3.4	3.4	2.9	0.0	0.0	0.0	9.9	5.3	23
16	1.4	1.9	1.0	1.9	0.0	2.9	0.0	2.9	0.0	1.4	3.4	4.0	0.0	**X**	0.0	**X**	**X**	1.9	0.0	0.0	0.0	0.0	0.0	0.5	0.0	4.0	1.1	21
17	2.9	2.5	4.0	2.9	4.0	2.9	2.9	1.9	6.0	5.5	2.5	1.4	0.0	**X**	**X**	**X**	0.5	5.5	7.9	4.0	2.5	2.9	6.5	1.9	0.0	7.9	3.4	21
18	3.4	4.0	3.4	1.9	2.5	0.0	0.5	2.9	4.4	1.4	5.0	2.9	1.0	0.0	**X**	**X**	**X**	1.9	1.9	1.9	3.4	1.9	0.0	1.4	0.0	5.0	2.2	21
19	**X**	2.9	1.4	2.9	1.4	**X**	0.0	1.9	1.9	2.9	3.4	3.9	6.5	5.0	5.0	1.9	0.0	1.0	0.5	0.0	0.0	0.0	1.9	3.6	0.0	6.5	2.2	22
20	2.5	1.3	0.5	1.0	0.2	1.9	0.0	3.5	1.4	1.9	0.0	6.0	0.0	0.5	4.4	1.1	1.5	5.0	0.4	2.5	2.9	6.9	4.1	2.1	0.0	6.9	2.2	24
21	0.9	1.0	0.0	0.5	0.0	0.6	1.4	4.4	4.7	2.6	0.1	2.1	0.7	5.5	7.3	7.0	0.0	0.0	2.8	3.3	**X**	3.4	0.0	0.0	0.0	7.3	2.1	23
22	0.0	2.3	0.0	1.8	1.6	0.0	0.0	4.6	3.4	1.8	0.0	3.4	1.9	5.0	2.2	7.7	3.4	4.0	0.7	7.0	3.4	5.2	4.7	7.2	0.0	7.7	3.0	24
23	2.2	5.2	5.0	4.4	0.5	6.5	7.7	7.3	7.1	4.2	1.5	4.2	9.9	12.2	6.7	1.4	9.4	3.2	8.6	8.1	7.1	6.7	7.7	6.5	0.5	12.2	6.0	24
24	6.5	3.2	**X**	0.0	2.9	3.3	3.4	6.8	8.1	6.5	13.9	6.3	8.3	12.0	9.8	6.3	6.0	4.3	4.8	3.1	3.6	3.2	0.5	3.2	0.0	13.9	5.5	23
25	1.3	3.7	0.0	1.2	5.6	4.0	0.0	1.1	5.0	6.0	13.0	10.4	11.5	8.9	4.4	6.0	10.7	9.3	4.9	6.4	6.1	7.4	9.0	4.2	0.0	13.0	5.8	24
26	5.5	5.5	4.0	4.0	1.4	1.0	3.5	8.4	17.9	7.0	6.4	1.5	8.4	1.4	5.5	1.4	0.0	0.0	4.0	2.9	4.0	3.9	7.0	5.0	0.0	17.9	4.6	24
27	4.4	2.9	4.4	2.9	3.4	2.5	2.9	1.9	4.0	1.9	3.4	3.4	5.5	1.0	**C**	**C**	2.9	0.0	2.5	2.5	2.9	4.0	1.9	2.9	0.0	5.5	2.9	24
28	4.0	0.0	0.0	0.5	2.5	4.0	5.0	7.0	8.4	7.0	9.4	9.0	9.4	9.4	9.0	3.4	6.0	6.0	6.0	5.0	5.5	6.5	6.0	5.0	0.0	9.4	5.6	24
29	4.4	3.4	4.0	4.0	3.4	7.5	7.0	5.0	7.0	4.4	5.4	5.0	9.4	8.4	12.0	9.4	7.9	8.4	10.9	2.5	2.5	6.5	4.0	2.5	2.5	12.0	6.0	24
30	0.0	2.9	0.0	1.0	2.9	4.0	0.0	2.9	4.0	4.0	1.4	5.5	4.4	4.4	4.0	5.0	3.4	4.4	4.4	5.0	4.4	3.4	5.0	1.4	0.0	5.5	3.2	24
31	1.9	4.4	4.0	3.4	0.0	1.4	6.5	0.0	1.4	7.0	8.4	7.5	4.0	5.0	8.4	2.5	5.0	5.0	5.5	4.0	1.0	3.4	4.4	6.0	0.0	8.4	4.2	24
HOURLY MAX	9.0	9.9	7.5	8.4	9.4	10.1	9.0	8.4	17.9	21.5	13.9	10.4	11.5	12.2	12.0	12.4	10.8	13.1	10.9	11.2	10.7	16.0	15.6	9.5				
HOURLY AVG	2.8	2.8	2.7	2.6	3.1	3.0	3.2	3.9	4.6	4.7	4.0	4.1	3.8	3.7	4.5	4.3	4.2	4.2	4.2	3.3	3.1	4.6	3.7	3.7				

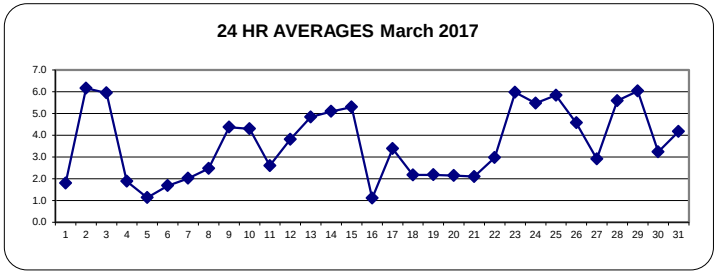
STATUS FLAG CODES

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

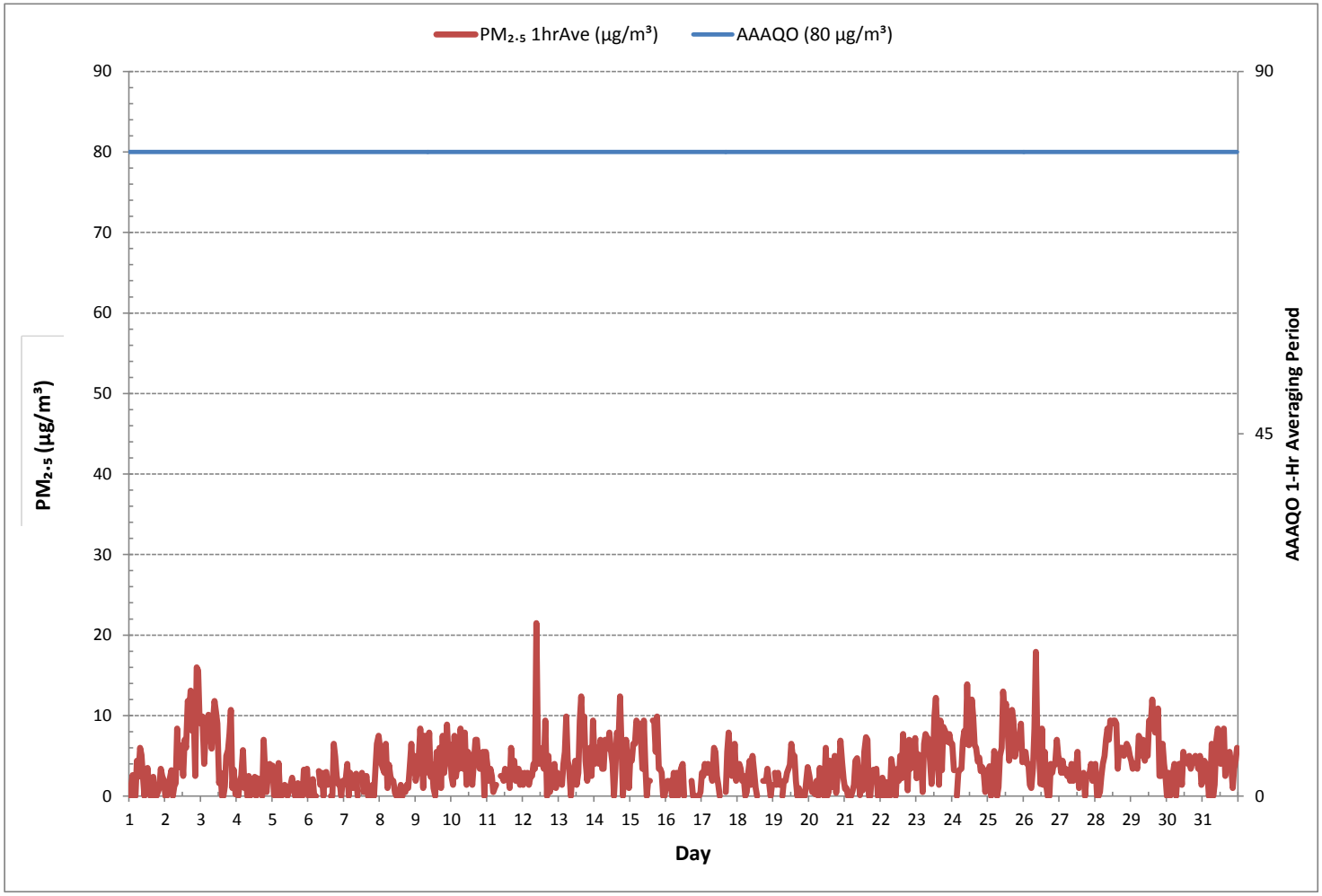
OBJECTIVE LIMIT: **ALBERTA ENVIRONMENT:** 1-HR 80 µg/m³ 24-HR 30 µg/m³

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF 24-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	622					
MINIMUM 1-HR AVERAGE	0.0 µg/m³	@ HOUR(S)	0	ON DAY(S)	1	
MAXIMUM 1-HR AVERAGE:	21.5 µg/m³	@ HOUR(S)	9	ON DAY(S)	12	
MAXIMUM 24-HR AVERAGE:	6.2 µg/m³			ON DAY(S) VAR-VARIOUS	2	
				OPERATIONAL TIME:	724	hrs
MONTHLY CALIBRATION TIME:	4 hrs			AMD OPERATION UPTIME:	97.3	%
STANDARD DEVIATION:	3.1			MONTHLY AVERAGE:	3.7	µg/m³



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



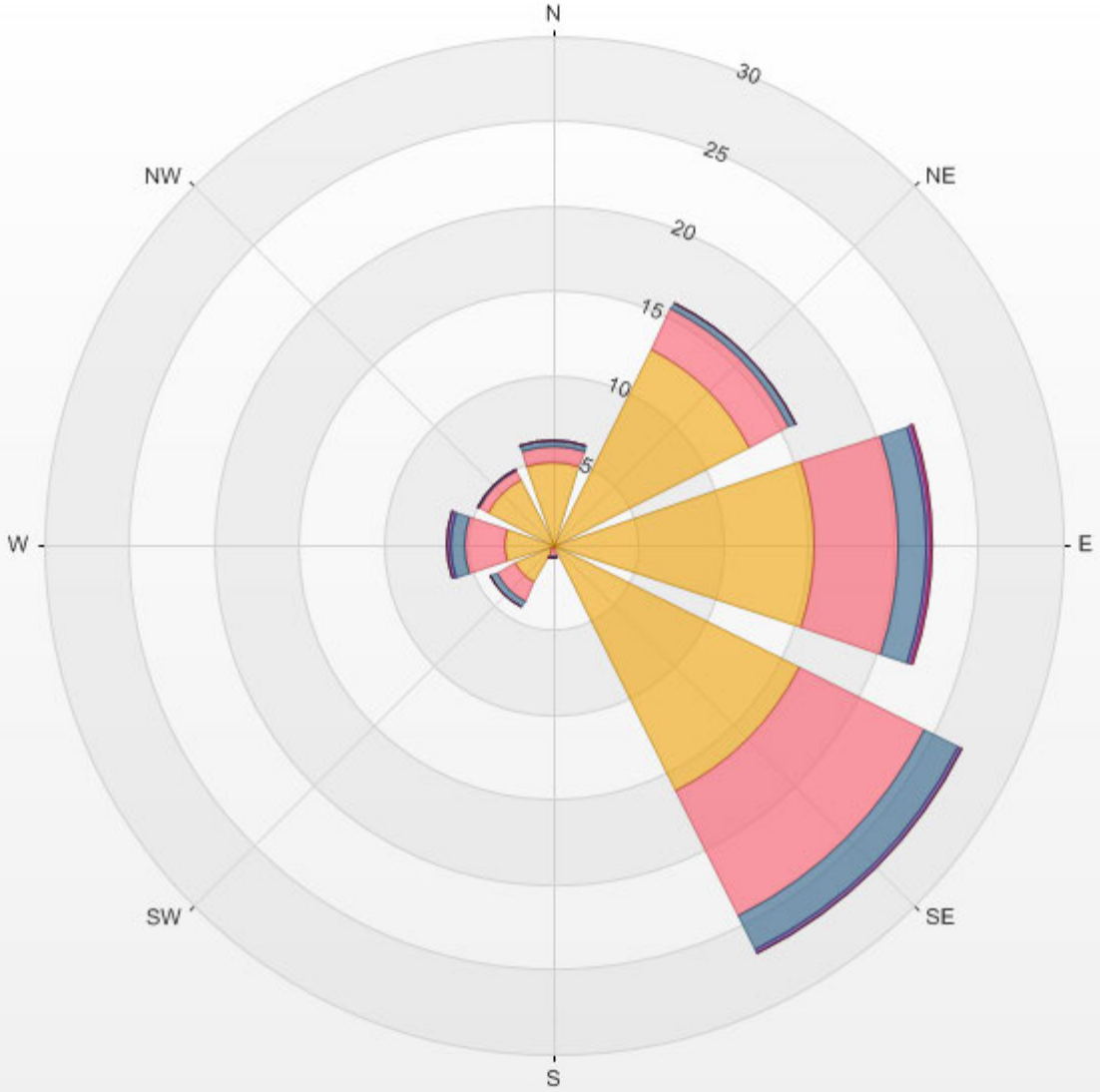
Wind: LICA COLD LAKE SOUTH
Poll.: LICA COLD LAKE SOUTH-PM25[ug/m3(L)]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 12.24% Calm Avg: 4.55 [ppb]

Direction	0.0-4.3	4.3-8.6	8.6-13.0	13.0-17.3	17.3-21.6	>21.6	Total
N	4.9	1.0	0.3	0.0	0.0	0.0	6.1
NE	12.9	2.6	0.4	0.0	0.0	0.0	16.0
E	15.4	4.9	1.7	0.3	0.1	0.0	22.4
SE	16.3	8.2	2.2	0.3	0.0	0.0	27.0
S	0.3	0.4	0.1	0.0	0.0	0.0	0.8
SW	2.5	1.3	0.4	0.0	0.0	0.0	4.2
W	2.9	2.4	0.8	0.1	0.0	0.0	6.3
NW	4.3	0.6	0.1	0.0	0.0	0.0	5.0
Summary	59.5	21.3	6.1	0.7	0.1	0.0	87.8

% Icon Classes (ug/m3(L))	60 0.0-4.3	21 4.3-8.6	6 8.6-13.0	1 13.0-17.3	0 17.3-21.6	0 >21.6

LICA COLD LAKE SOUTH Poll.: LICA COLD LAKE SOUTH-PM25[ug/m3(L)] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 12.24% Calm Poll Avg: 4.55[ug/m3(L)]



WIND SPEED

Maxxam
A Bureau Veritas Group Company

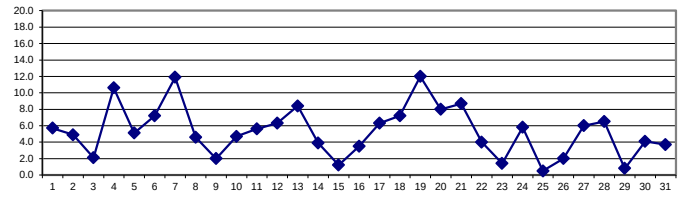
WIND SPEED Hourly Averages (WS kph)

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	8.0	7.9	9.4	8.1	6.4	6.2	6.7	8.2	8.5	8.8	9.2	8.7	8.5	7.1	7.2	8.3	7.4	5.5	3.3	2.4	2.5	1.8	1.4	3.9	1.4	9.4	5.7	24
2	6.3	7.0	7.0	5.0	4.4	2.9	2.7	1.3	3.2	5.1	4.3	4.2	6.4	7.6	4.9	4.8	5.9	4.9	6.6	9.5	11.0	11.8	11.2	10.6	1.3	11.8	4.9	24
3	5.6	4.2	4.3	4.5	3.3	2.1	2.6	2.8	1.8	4.0	4.9	6.1	6.6	6.4	8.0	9.7	7.2	4.4	1.7	1.1	1.1	3.7	8.0	5.8	1.1	9.7	2.1	24
4	4.1	7.0	12.1	11.8	13.9	14.4	13.8	16.4	12.7	13.3	14.8	13.0	11.7	10.4	9.6	10.1	9.7	9.6	9.8	11.9	7.4	6.0	6.0	8.1	4.1	16.4	10.6	24
5	8.5	7.1	6.4	4.8	6.5	8.0	6.7	6.0	4.8	5.7	5.6	6.3	6.9	5.7	7.1	5.8	4.0	3.9	0.8	2.9	3.5	4.9	4.2	2.5	0.8	8.5	5.1	24
6	3.7	6.1	6.2	6.1	7.8	7.6	5.9	2.5	3.3	7.0	9.4	8.9	8.7	9.2	7.8	9.0	10.0	10.0	9.6	11.6	12.8	12.8	11.6	12.5	2.5	12.8	7.2	24
7	15.3	14.6	14.7	13.8	14.2	13.7	15.7	13.9	15.2	14.6	13.7	13.1	14.8	14.0	14.6	12.0	12.0	12.7	8.8	7.2	7.1	6.2	5.4	4.3	4.3	15.7	11.9	24
8	4.3	4.5	6.8	8.4	4.4	3.4	3.8	6.9	8.2	8.3	6.9	9.1	7.8	8.3	8.1	7.9	4.6	2.3	1.9	2.4	0.7	1.8	4.9	2.4	0.7	9.1	4.6	24
9	2.2	2.7	3.3	2.4	1.6	**0.2**	1.2	0.4	1.9	4.5	5.4	5.0	4.2	3.4	3.7	4.7	4.9	3.1	1.0	0.6	0.4	0.9	1.0	0.9	**0.2**	5.4	2.0	24
10	1.0	2.5	2.0	1.4	2.5	4.7	6.6	4.7	6.9	6.6	7.1	9.8	9.1	7.9	7.6	7.2	5.4	3.7	2.3	0.9	3.9	6.5	4.5	2.7	0.9	9.8	4.7	24
11	3.4	2.6	2.1	0.7	5.7	3.9	6.8	**X**	**X**	5.6	5.6	5.7	6.7	7.0	7.2	7.3	7.9	8.7	7.9	8.4	8.4	8.1	7.8	7.1	0.7	8.7	5.6	22
12	6.4	8.1	7.2	7.9	8.1	9.0	8.4	8.0	6.3	6.8	6.0	6.4	5.9	6.0	6.5	7.7	5.2	5.2	4.4	6.7	7.9	8.1	5.9	4.7	4.4	9.0	6.3	24
13	8.2	8.3	7.6	5.9	7.6	9.1	10.0	10.8	10.7	10.9	10.9	13.1	12.3	8.9	9.7	9.1	9.9	8.9	8.1	8.2	6.5	5.1	2.5	1.7	1.7	13.1	8.4	24
14	1.2	1.5	1.4	4.2	5.8	5.0	4.2	5.3	3.2	4.2	5.9	4.9	4.7	4.3	5.3	4.2	3.4	3.9	6.5	6.5	6.5	6.5	6.5	6.0	1.2	6.5	3.9	24
15	5.1	7.2	7.6	6.4	4.7	4.2	3.8	4.9	0.9	3.5	5.2	6.1	4.6	2.2	7.2	5.9	5.4	4.6	0.5	0.7	1.2	3.7	5.2	6.8	0.5	7.6	1.2	24
16	2.6	2.4	1.7	2.6	0.8	2.9	0.3	0.5	1.1	3.3	6.3	7.4	9.2	8.4	7.0	6.5	7.4	5.0	4.3	3.7	4.5	3.4	1.9	3.2	0.3	9.2	3.5	24
17	4.6	4.5	4.9	6.3	3.9	3.8	5.3	4.3	6.2	6.3	7.2	9.3	7.1	8.3	7.4	7.4	5.8	6.9	8.8	8.6	10.8	11.2	11.0	11.5	3.8	11.5	6.3	24
18	12.0	10.8	10.7	10.4	8.9	8.0	6.4	6.9	6.7	8.5	11.3	10.7	12.7	12.4	9.9	8.0	8.1	7.9	7.9	8.4	8.0	3.9	6.1	13.9	3.9	13.9	7.2	24
19	10.7	12.3	15.3	16.1	15.9	14.6	13.8	14.4	13.9	12.9	14.2	15.5	15.0	15.8	12.1	12.7	8.3	12.9	9.1	9.0	8.1	8.2	9.1	10.4	8.1	16.1	**12.0**	24
20	16.3	**17.3**	16.3	15.3	12.4	11.8	14.0	15.5	15.1	13.1	10.7	7.4	8.2	7.9	7.3	7.2	9.3	8.2	5.4	2.3	1.3	0.4	0.7	0.6	0.4	**17.3**	8.0	24
21	0.9	1.2	3.4	2.2	1.8	2.1	2.8	7.2	7.3	9.0	11.1	13.1	13.9	15.4	13.6	12.8	15.9	14.4	12.3	12.8	11.6	8.9	8.2	8.3	0.9	15.9	8.7	24
22	8.1	9.5	10.5	10.5	9.0	8.5	7.9	8.5	8.5	8.3	7.3	7.9	6.4	5.6	5.7	5.6	5.3	4.8	3.5	3.7	4.6	5.9	5.5	4.9	3.5	10.5	4.0	24
23	4.7	5.3	3.4	1.6	2.3	1.2	0.6	1.0	4.8	5.7	5.2	3.8	1.8	5.4	5.1	4.5	4.3	3.5	2.7	1.6	0.8	1.1	2.3	1.0	0.6	5.7	1.4	24
24	0.4	0.6	0.7	0.7	0.8	1.0	0.8	4.6	5.3	6.8	7.5	9.6	8.5	7.7	7.2	6.3	8.3	11.1	10.3	9.6	8.5	10.5	10.0	9.9	0.4	11.1	5.8	24
25	9.7	10.0	7.1	6.0	5.4	3.4	3.3	3.2	4.2	2.6	5.5	5.6	6.3	6.6	6.4	7.3	3.8	2.3	1.0	0.7	0.5	1.3	2.3	3.5	0.5	10.0	0.5	24
26	4.8	5.5	3.8	0.7	1.5	1.9	1.9	1.6	0.4	3.2	3.3	5.3	4.7	2.1	6.7	9.1	6.9	6.1	3.7	1.1	1.1	1.8	2.0	3.1	0.4	9.1	2.0	24
27	3.2	1.4	1.7	2.9	4.9	4.9	7.0	6.4	7.9	8.1	8.4	9.4	8.6	8.4	9.3	6.8	7.2	7.6	7.7	4.0	3.1	9.5	7.0	4.2	1.4	9.5	6.0	24
28	5.3	5.3	7.2	6.5	7.0	5.5	6.1	5.0	7.8	7.0	7.3	8.1	6.8	7.4	6.7	8.9	10.8	6.8	6.2	7.5	9.0	7.3	1.2	1.1	1.1	10.8	6.5	24
29	0.7	1.0	0.9	0.6	0.6	0.7	2.3	2.7	1.7	0.8	2.4	4.6	4.6	4.5	3.7	2.1	3.1	4.2	3.7	4.5	4.8	6.4	5.1	5.3	0.6	6.4	0.8	24
30	5.5	5.7	5.0	6.3	6.2	6.6	5.9	7.5	6.5	7.3	7.0	5.1	5.7	6.4	6.1	4.6	4.8	3.6	2.2	0.4	1.4	0.3	0.8	0.6	0.3	7.5	4.1	24
31	0.6	0.9	0.8	2.3	4.8	4.1	0.5	5.5	4.5	4.1	3.3	2.6	6.2	8.5	7.9	9.6	7.8	6.7	5.4	5.5	8.2	5.2	4.6	6.4	0.5	9.6	3.7	24
HOURLY MAX	16.3	17.3	16.3	16.1	15.9	14.6	15.7	16.4	15.2	14.6	14.8	15.5	15.0	15.8	14.6	12.8	15.9	14.4	12.3	12.8	12.8	12.8	11.6	13.9				
HOURLY AVG	2.2	2.7	2.6	2.3	2.2	2.5	2.5	2.8	2.5	2.8	3.0	3.3	2.7	2.1	2.1	1.4	2.0	1.8	2.1	2.7	2.7	2.8	2.0	1.6				

STATUS FLAG CODES

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

24 HR AVERAGES March 2017

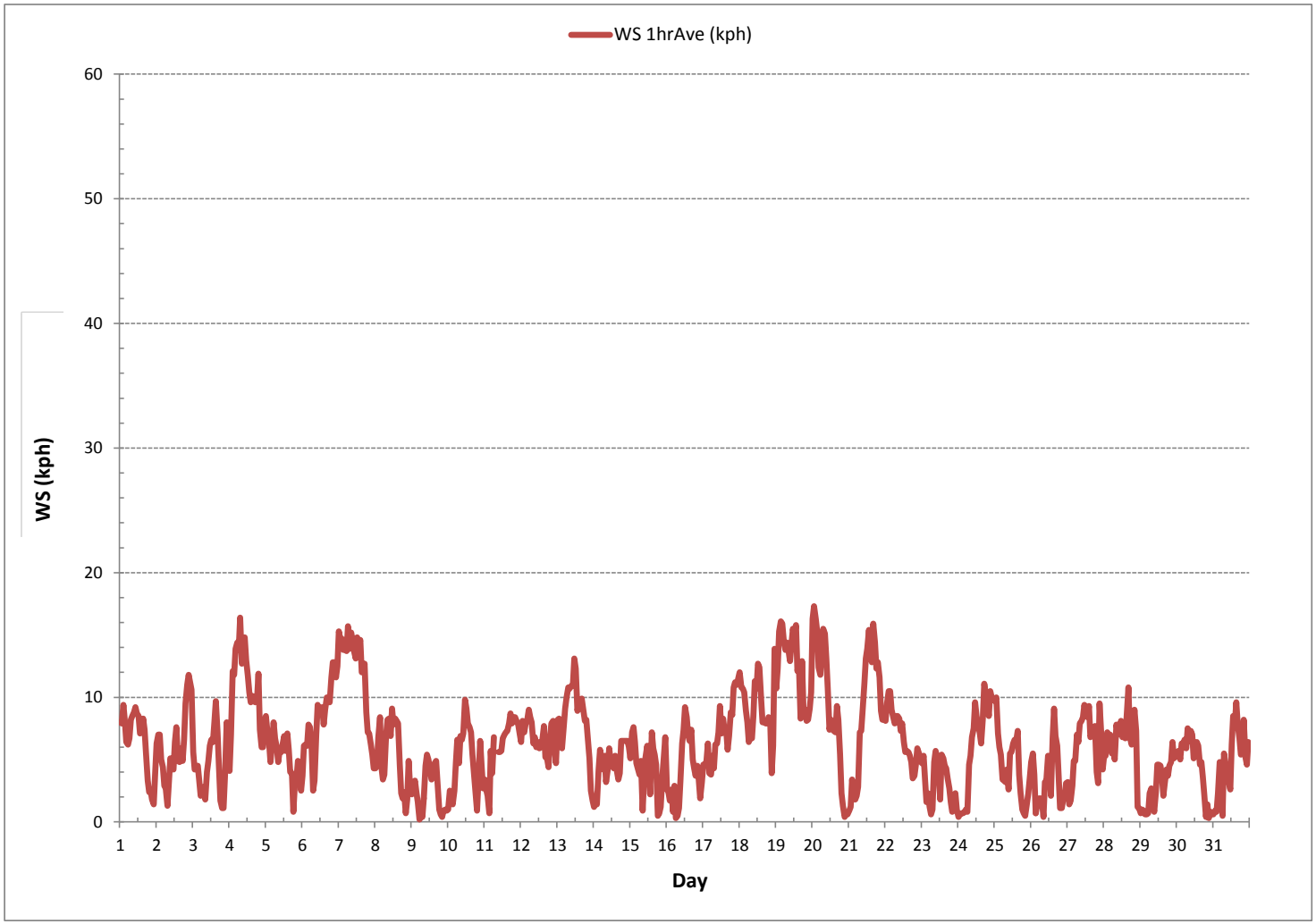


LAST CALIBRATION:	April 1, 2015
DECLINATION :	MAGNETIC DECLINATION 14 DEGREE EAST

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			742				
MINIMUM 1-HR AVERAGE	0.2	kph	@ HOUR(S)	5	ON DAY(S)	9	
MAXIMUM 1-HR AVERAGE:	17.3	kph	@ HOUR(S)	1	ON DAY(S)	20	
MAXIMUM 24-HR AVERAGE:	12.0	kph			ON DAY(S)	19	
					VAR-VARIOUS		
			OPERATIONAL TIME:			742	hrs
MONTHLY CALIBRATION TIME:	0	hrs	AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	3.7		MONTHLY AVERAGE:			2.3	kph

WIND SPEED Hourly Averages (WS kph)



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	13.2	12.3	14.7	12.7	10.4	10.2	10.8	13.4	15.2	14.3	18.2	14.5	15.0	13.7	13.5	12.1	11.9	8.7	6.0	4.6	4.4	3.1	3.9	6.2	3.1	18.2	11.0	24
2	10.8	9.7	11.0	7.4	6.1	5.0	5.5	3.8	7.4	9.2	7.6	8.7	9.1	11.7	7.4	8.4	10.5	9.5	11.6	16.3	16.1	18.9	18.2	14.8	3.8	18.9	10.2	24
3	11.6	5.9	6.6	6.3	5.3	3.4	6.6	7.1	4.6	7.2	7.1	9.5	11.9	14.3	13.4	16.6	15.2	7.9	4.5	3.0	3.9	6.3	12.4	10.1	3.0	16.6	8.4	24
4	7.8	14.5	18.1	17.4	21.2	20.8	20.2	23.7	17.9	19.2	21.1	19.3	18.8	19.2	17.7	18.2	14.4	13.9	16.1	20.6	12.6	10.4	9.0	13.6	7.8	23.7	16.9	24
5	12.2	13.9	10.4	8.0	9.1	11.3	10.7	12.2	8.2	9.9	8.6	9.8	10.9	10.5	10.8	10.7	7.2	7.4	5.5	5.3	6.8	8.0	6.1	6.0	5.3	13.9	9.1	24
6	10.1	10.6	10.7	9.9	11.9	14.3	9.2	5.1	5.6	14.5	14.7	16.5	13.0	13.4	12.6	13.7	16.1	14.2	15.0	17.6	18.7	17.2	15.8	17.8	5.1	18.7	13.3	24
7	22.6	23.6	19.6	22.4	22.1	18.8	22.0	21.7	22.1	20.6	21.2	18.4	22.7	19.7	23.2	19.4	18.3	17.7	16.0	10.3	11.3	10.2	10.2	7.0	7.0	23.6	18.4	24
8	7.3	10.2	12.5	12.8	10.3	5.8	7.3	11.1	13.0	12.7	10.9	13.5	12.4	12.7	13.7	12.3	8.2	6.4	5.3	5.9	3.7	8.1	8.8	4.5	3.7	13.7	9.6	24
9	3.6	4.5	5.1	3.9	3.0	2.0	3.5	2.5	4.4	7.0	9.3	8.4	7.5	7.7	7.6	9.0	8.3	7.3	3.3	2.8	1.9	2.1	3.7	2.8	1.9	9.3	5.1	24
10	3.6	4.6	3.3	2.9	4.7	8.9	11.0	12.1	11.2	11.9	14.0	14.8	17.3	14.2	12.5	12.3	12.4	7.3	4.6	3.1	8.2	9.1	7.3	5.6	2.9	17.3	9.0	24
11	6.1	5.3	3.6	2.6	**42.9**	8.6	12.8	**X**	**X**	10.3	8.7	10.1	11.7	12.5	12.0	11.7	13.9	12.4	12.2	11.8	14.7	13.3	14.6	11.9	2.6	**42.9**	12.0	22
12	10.0	12.8	11.5	12.3	12.1	14.7	13.2	14.5	10.4	10.5	9.9	10.4	10.3	12.0	10.9	14.1	10.8	10.1	7.7	10.1	13.3	14.3	9.4	7.8	7.7	14.7	11.4	24
13	11.6	10.7	10.8	9.3	12.3	13.4	14.3	15.4	16.1	14.8	17.9	21.1	18.9	15.8	15.1	15.9	15.2	15.4	12.3	15.5	11.3	8.5	10.7	8.5	8.5	21.1	13.8	24
14	12.6	6.5	4.2	7.1	12.4	8.8	6.7	7.6	7.5	11.7	10.0	9.8	9.0	7.8	7.4	6.8	6.2	11.6	14.5	11.8	12.1	11.8	9.5	10.9	4.2	14.5	9.3	24
15	9.1	12.1	12.3	9.7	8.6	7.0	6.6	8.0	17.8	8.1	9.1	11.9	8.2	7.5	11.8	10.6	8.0	8.9	3.2	3.3	3.6	7.9	10.1	11.9	3.2	17.8	9.0	24
16	6.1	4.7	4.3	4.9	4.5	5.7	3.7	3.0	3.8	6.8	11.1	13.0	17.9	14.8	13.1	11.3	11.4	8.4	6.9	5.8	7.4	5.7	5.6	6.1	3.0	17.9	7.8	24
17	8.2	7.3	9.9	9.3	9.4	7.1	10.5	7.0	10.9	9.9	10.5	15.7	14.5	20.9	17.6	11.4	13.7	9.9	12.9	12.3	14.7	18.5	15.2	19.0	7.0	20.9	12.3	24
18	17.0	15.1	19.1	17.2	17.5	12.7	12.0	11.8	11.9	16.0	18.9	20.9	19.6	20.7	17.5	15.7	13.3	13.1	12.1	13.1	11.8	10.5	10.7	20.8	10.5	20.9	15.4	24
19	19.7	19.5	22.8	25.4	25.7	29.5	19.8	18.5	21.2	18.9	23.5	22.4	21.7	23.3	22.2	20.7	11.8	22.3	12.7	13.3	11.9	11.5	14.8	16.6	11.5	29.5	19.6	24
20	27.1	25.0	28.7	28.8	20.9	19.9	22.7	21.8	25.2	20.0	21.7	15.7	17.2	13.2	15.1	12.1	16.0	13.0	11.8	5.2	2.9	1.3	1.8	1.8	1.3	28.8	16.2	24
21	2.3	5.6	6.0	3.7	3.6	5.1	5.1	11.6	10.9	15.2	17.6	21.5	24.2	21.3	24.0	18.9	23.4	27.9	19.8	18.8	18.8	16.9	13.1	13.5	2.3	27.9	14.5	24
22	12.8	15.0	18.1	19.7	15.5	13.0	13.4	13.6	13.9	13.1	11.0	12.6	11.3	9.8	9.7	8.6	8.9	7.0	7.3	7.1	7.1	8.9	9.4	7.1	7.0	19.7	11.4	24
23	7.0	8.4	5.8	3.4	3.4	3.6	3.1	5.3	8.4	10.8	8.8	9.8	6.2	10.2	9.9	8.6	7.8	5.9	4.4	4.6	4.4	3.2	4.7	4.7	3.1	10.8	6.4	24
24	2.0	2.2	1.9	2.5	5.3	2.5	4.4	7.6	8.6	12.9	13.6	19.3	18.5	11.4	12.4	10.5	13.7	17.6	16.0	16.4	16.7	17.5	17.5	17.0	1.9	19.3	11.2	24
25	15.4	14.5	12.0	9.7	10.5	7.7	5.0	5.3	7.4	6.6	9.6	10.4	12.2	13.4	10.5	13.2	10.9	6.8	2.8	3.6	2.8	2.7	3.7	6.2	2.7	15.4	8.5	24
26	7.0	7.6	6.0	4.9	6.2	5.1	4.1	4.9	4.0	6.1	7.6	10.5	8.5	12.9	13.8	16.2	11.8	11.0	8.0	2.8	3.2	3.3	3.4	4.4	2.8	16.2	7.2	24
27	5.1	3.7	3.2	5.1	7.4	8.0	9.9	11.7	15.1	14.8	15.9	18.7	15.0	15.2	16.4	12.8	12.2	12.1	12.4	8.0	9.3	15.5	10.3	7.3	3.2	18.7	11.0	24
28	9.4	8.5	12.0	9.8	10.5	9.8	10.2	8.4	11.9	10.3	13.7	14.1	14.1	11.8	12.5	13.9	16.2	12.3	9.1	11.0	12.5	14.0	4.7	4.0	4.0	16.2	11.0	24
29	2.7	3.4	3.3	1.9	1.6	2.6	5.3	4.5	5.0	4.5	5.7	7.7	7.5	7.7	8.0	7.0	7.0	7.3	6.1	7.7	7.2	12.1	10.7	9.5	1.6	12.1	6.1	24
30	10.5	9.8	9.2	10.1	10.2	9.9	11.1	12.9	11.9	11.0	12.4	8.4	9.6	10.3	10.8	12.4	10.2	6.2	5.4	5.3	3.6	2.7	3.6	3.8	2.7	12.9	8.8	24
31	3.1	3.9	2.5	6.6	6.8	7.1	3.9		7.9	7.7	8.2	10.2	14.7	14.1	16.2	20.1	14.8	12.6	11.1	8.2	10.4	7.6	11.8	10.2	2.5	20.1	9.6	23
HOURLY MAX	27.1	25.0	28.7	28.8	42.9	29.5	22.7	23.7	25.2	20.6	23.5	22.4	24.2	23.3	24.0	20.7	23.4	27.9	19.8	20.6	18.8	18.9	18.2	20.8				
HOURLY AVG	9.9	10.0	10.3	9.9	11.3	9.8	9.8	10.6	11.3	11.8	12.8	13.8	13.9	13.7	13.5	13.1	12.2	11.4	9.6	9.2	9.3	9.7	9.4	9.4				

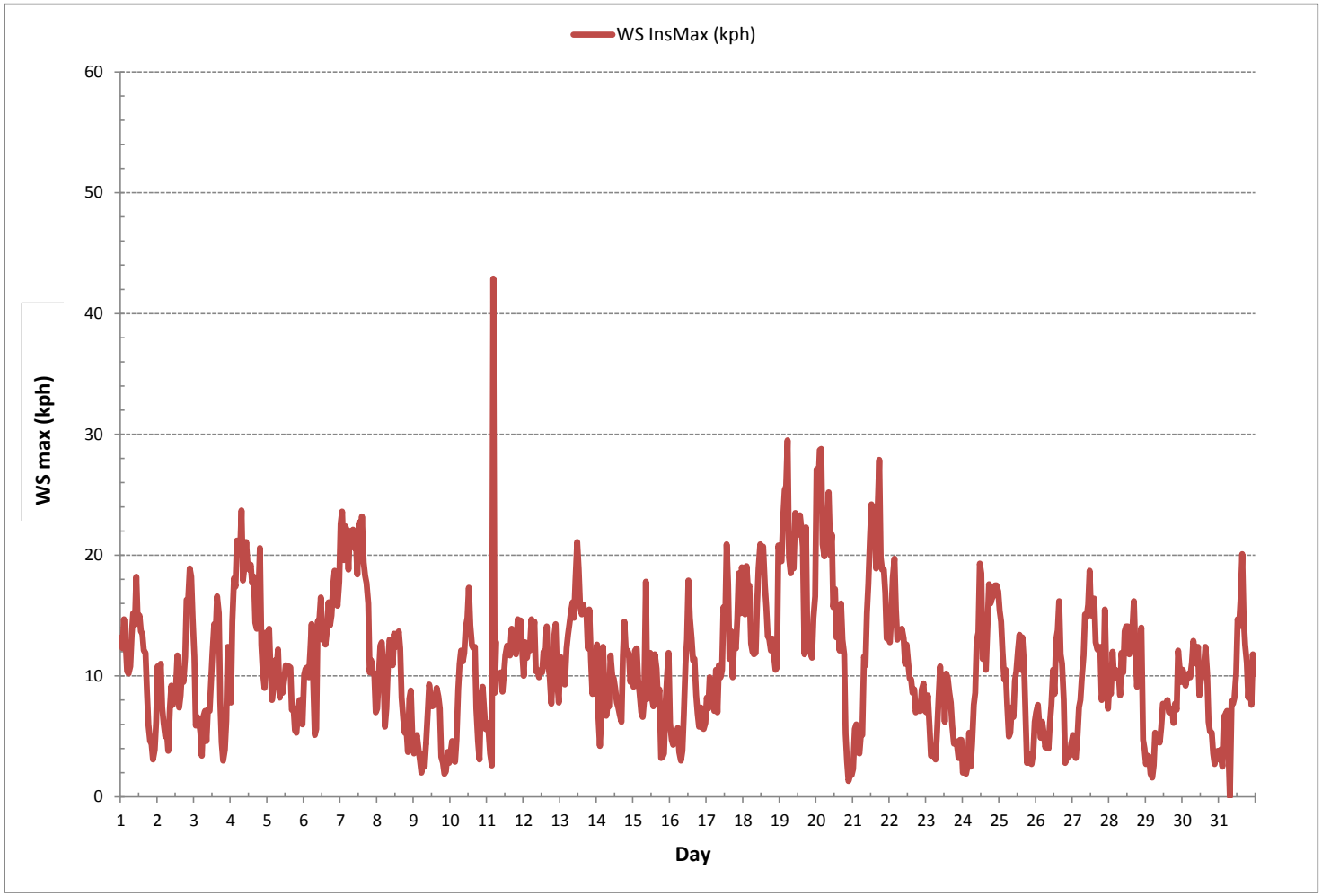
STATUS FLAG CODES

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:	42.9	kph	@ HOUR(S)	4	ON DAY(S)	11
						VAR-VARIOUS
OPERATIONAL TIME:					741	hrs

WIND SPEED Instantaneous Maximum (WS kph)



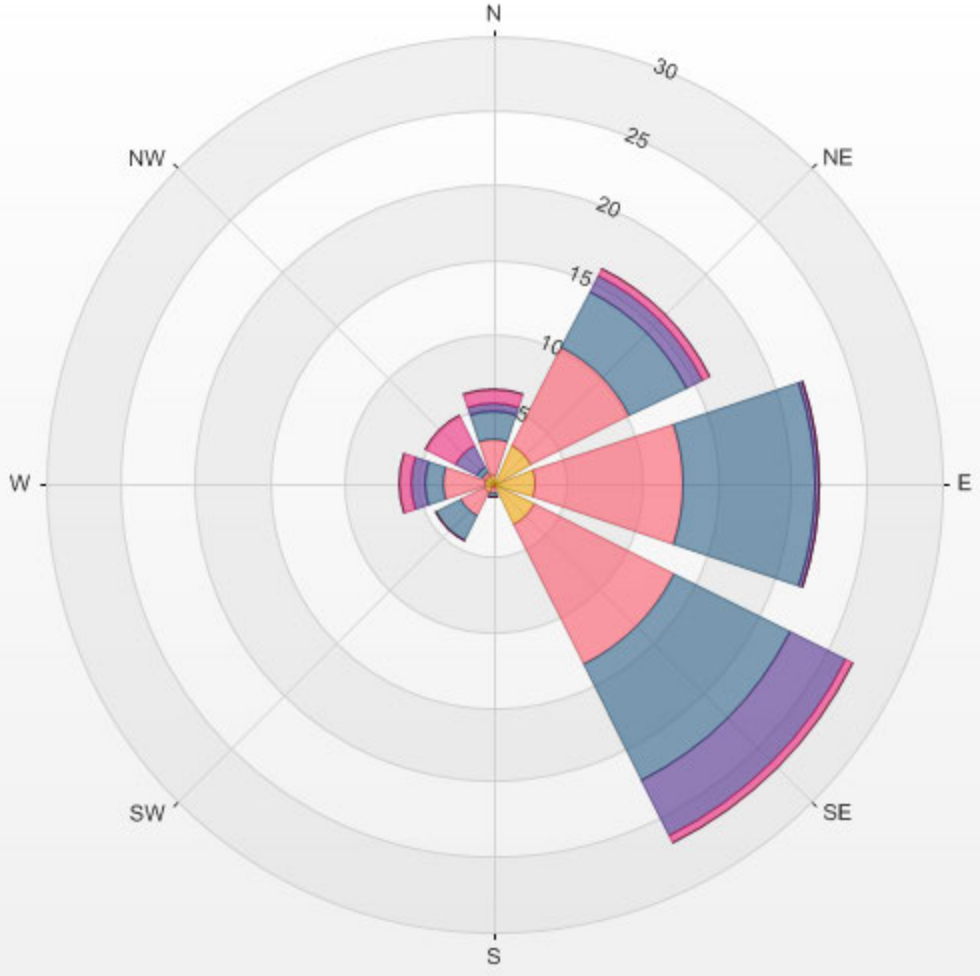
Wind: LICA COLD LAKE SOUTH
Monitor: WSP [kph]
Monthly: 17/03
Type: WindRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 11.99% Calm Avg: 0.00 [kph]

Direction	1.8-3.5	3.5-6.9	6.9-10.4	10.4-13.8	13.8-17.3	>17.3	Total
N	0.5	2.4	1.9	0.5	0.9	0.0	6.3
NE	2.8	7.4	4.2	1.2	0.5	0.0	16.2
E	2.8	9.8	8.9	0.3	0.0	0.0	21.8
SE	3.1	10.4	8.8	4.2	0.5	0.0	27.0
S	0.3	0.4	0.3	0.0	0.0	0.0	0.9
SW	0.7	1.8	1.9	0.0	0.0	0.0	4.3
W	0.5	2.8	1.2	0.9	0.8	0.0	6.3
NW	0.5	0.3	0.4	1.6	2.3	0.0	5.1
Summary	11.3	35.3	27.5	8.8	5.1	0.0	88.0

%	Icon	Classes (kph)										
11		1.8-3.5	35		3.5-6.9	27		6.9-10.4	9		10.4-13.8	5		13.8-17.3	0		>17.3

LICA COLD LAKE SOUTH 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 11.99% Calm Wind Avg Speed: 0.97(kph)



WIND DIRECTION

WIND DIRECTION Hourly Averages (WD)

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

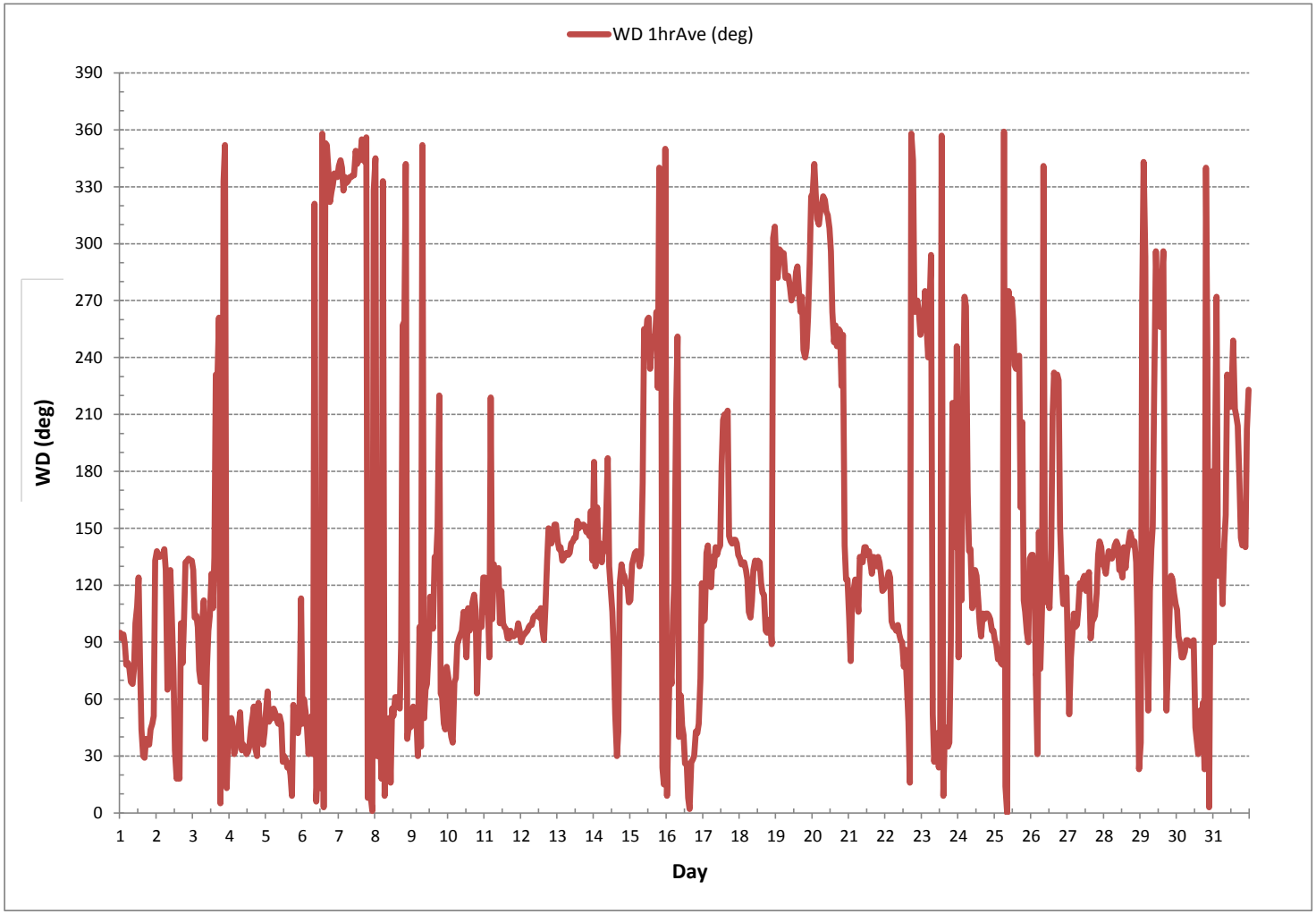
STATUS FLAG CODES

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

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	742	hrs
STANDARD DEVIATION:	90		AMD OPERATION UPTIME:	99.7	%
			MONTHLY AVERAGE:	89 (E)	

WIND DIRECTION Hourly Averages (WD)



STANDARD DEVIATION WIND DIRECTION

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	18	18	18	20	19	20	20	19	19	21	22	23	21	24	23	20	19	21	23	29	22	24	43	19	24
2	12	14	15	13	12	19	24	31	21	22	30	27	19	15	23	21	21	18	18	19	16	17	16	14	24
3	18	18	18	15	15	30	20	17	29	21	19	23	24	21	19	35	25	20	36	41	41	16	16	22	24
4	19	18	20	22	21	20	20	18	20	21	20	20	21	22	20	21	18	20	22	18	21	21	18	20	24
5	19	17	19	20	19	17	18	20	20	20	21	24	22	28	25	26	26	22	56	21	20	21	18	26	24
6	30	20	22	20	21	20	18	23	15	15	20	18	16	17	20	17	19	19	14	12	14	13	14	17	24
7	15	15	15	14	14	14	14	14	13	16	16	21	17	16	16	17	17	15	19	17	15	17	17	15	24
8	20	26	19	19	27	22	27	20	20	19	24	19	21	19	21	19	23	46	23	26	72	32	20	23	24
9	27	28	22	25	42	65	53	77	49	26	24	25	30	47	42	30	25	24	34	43	71	53	60	52	24
10	51	29	26	29	38	22	25	32	24	24	25	21	22	24	22	20	24	24	26	42	24	18	22	28	24
11	24	29	25	42	55	28	21	X	X	25	24	26	25	26	25	23	20	19	18	17	18	20	18	18	22
12	20	18	21	17	18	17	19	18	22	21	25	26	27	28	25	21	25	19	22	21	14	22	27	24	24
13	16	12	14	17	16	16	14	15	15	15	17	20	21	33	25	25	24	24	25	23	23	21	49	60	24
14	69	47	58	17	25	16	22	14	41	32	20	28	22	22	17	19	21	26	18	21	21	22	22	22	24
15	21	17	16	14	17	16	18	16	51	40	24	24	30	62	19	20	18	38	71	62	47	25	21	17	24
16	44	24	49	39	49	15	38	45	33	22	19	22	20	21	22	23	20	19	19	19	18	17	38	26	24
17	16	20	21	17	21	26	36	19	21	14	20	24	41	36	35	39	35	21	15	15	14	14	15	14	24
18	15	17	19	19	22	22	22	19	22	21	20	21	18	19	22	24	24	18	17	16	19	24	17	16	24
19	20	20	19	19	19	20	20	19	21	20	21	22	22	22	23	20	19	21	18	18	19	18	21	13	24
20	17	16	15	15	15	14	15	16	17	18	25	32	31	33	30	29	22	21	17	25	32	34	44	42	24
21	34	59	19	33	33	25	24	15	18	20	17	18	18	17	20	22	16	18	20	17	18	22	23	23	24
22	23	22	21	21	20	20	21	18	20	19	19	18	21	22	21	20	17	15	14	17	17	17	16	15	24
23	13	17	20	35	19	38	56	49	21	24	26	33	61	26	27	25	21	20	19	41	38	25	33	32	24
24	41	65	48	45	41	42	56	18	16	23	22	21	24	23	22	22	21	19	21	22	23	19	19	18	24
25	18	19	20	22	21	20	20	19	20	35	21	26	28	24	28	25	43	52	32	54	51	25	16	18	24
26	16	13	17	58	53	44	42	43	71	31	36	28	33	49	40	25	27	24	18	29	47	21	18	14	24
27	13	31	16	16	20	19	18	22	24	25	23	23	23	22	21	20	19	19	20	22	24	16	15	19	24
28	17	19	16	13	15	17	15	20	19	16	22	22	24	18	26	20	17	26	16	15	14	19	64	51	24
29	66	45	48	60	49	54	27	21	36	53	25	24	25	27	39	43	44	20	16	20	19	22	23	21	24
30	22	20	22	20	20	20	21	19	20	21	21	24	24	23	27	31	28	24	24	43	45	77	40	43	24
31	59	57	55	26	14	15	48	19	35	37	55	59	34	23	35	34	37	37	17	11	12	15	39	25	24

STATUS FLAG CODES

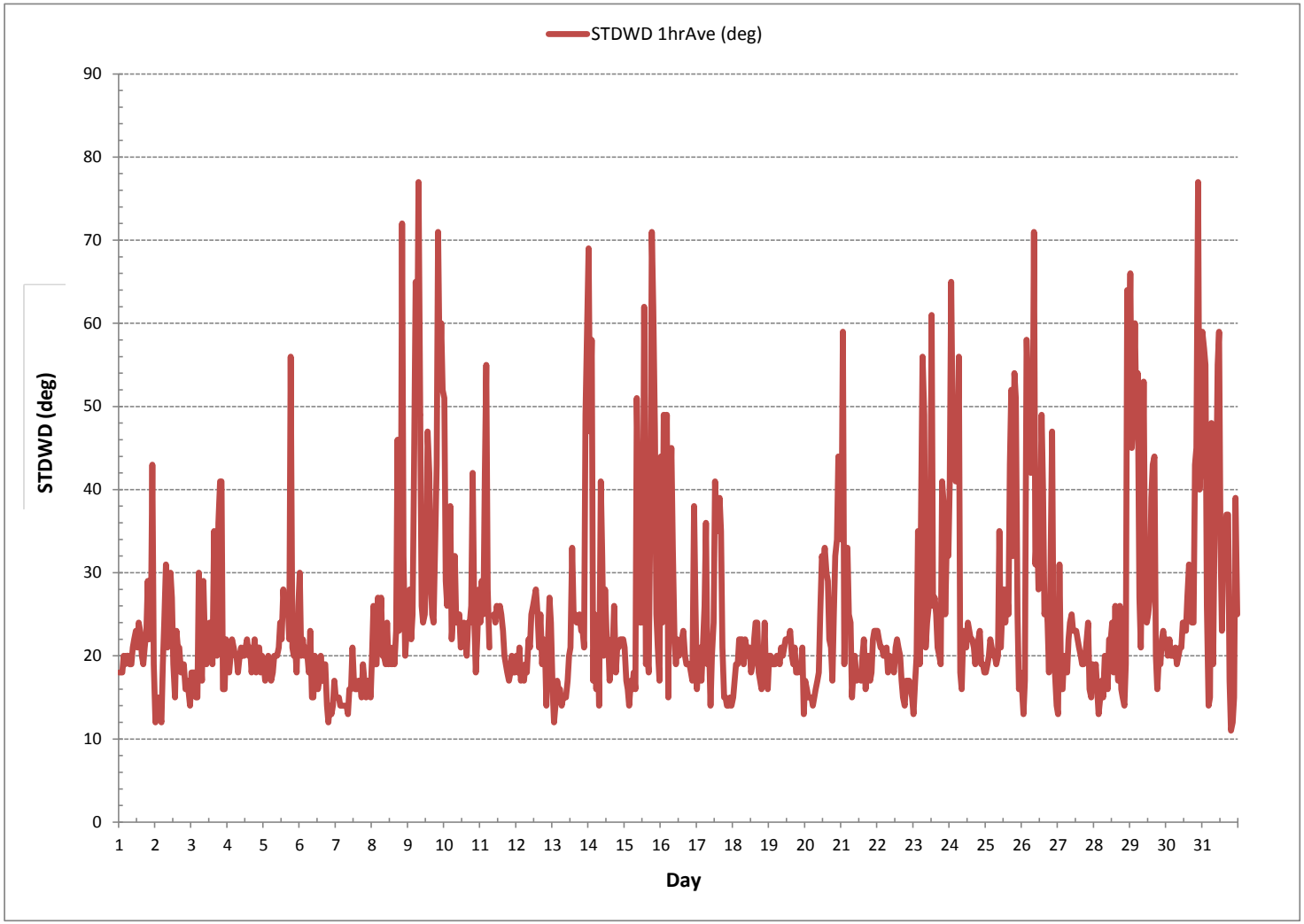
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION: April 1, 2015

CALIBRATION TIME: 0 hrs

OPERATIONAL TIME: 742 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



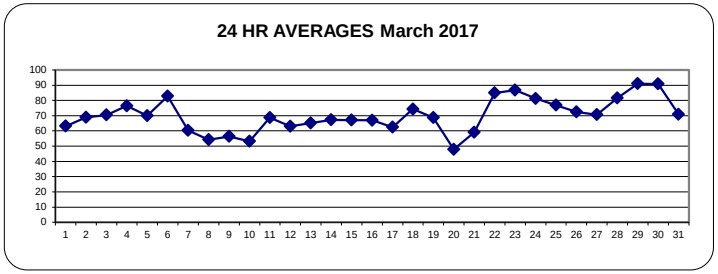
RELATIVE HUMIDITY

RELATIVE HUMIDITY Hourly Averages (RH %)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	66	65	59	59	60	62	63	62	62	62	58	56	55	56	58	58	60	62	66	69	72	74	76	75	55	76	63	24
2	74	75	74	75	77	78	78	76	76	70	65	62	59	58	55	54	54	60	66	69	72	75	76	76	54	78	69	24
3	77	79	82	83	85	87	86	87	84	76	69	64	56	49	41	41	45	53	66	74	79	78	73	77	41	87	70	24
4	83	85	82	80	82	79	76	75	78	80	75	75	74	74	76	75	78	76	72	71	72	72	73	71	71	85	76	24
5	70	69	70	70	71	72	71	72	76	74	71	69	67	64	63	64	63	65	68	72	73	75	77	75	63	77	70	24
6	74	75	76	76	77	75	81	83	84	84	85	86	86	86	87	88	88	87	86	86	85	84	84	83	74	88	83	24
7	83	82	81	80	79	79	78	75	70	65	59	51	42	39	40	40	42	44	48	51	52	54	56	59	39	83	60	24
8	62	62	59	58	59	65	63	59	56	52	45	44	44	45	45	43	45	45	54	61	65	63	51	57	43	65	54	24
9	61	64	63	66	71	72	72	70	66	58	51	45	42	35	34	32	33	34	48	59	65	69	71	71	32	72	56	24
10	71	71	71	70	70	63	58	59	54	47	41	39	37	34	35	38	41	48	50	56	53	52	56	63	34	71	53	24
11	65	70	74	75	75	74	69	**X**	**X**	66	65	63	61	60	62	63	65	68	70	71	72	74	75	76	60	76	69	22
12	77	76	75	75	74	75	74	73	69	63	59	56	52	50	48	48	49	51	54	57	61	63	66	68	48	77	63	24
13	71	73	74	75	74	75	75	73	71	66	60	54	52	49	48	51	53	58	64	67	68	70	71	73	48	75	65	24
14	75	79	80	81	83	84	85	83	71	63	60	53	49	47	53	53	54	57	60	64	69	69	70	73	47	85	67	24
15	74	76	78	81	85	88	90	89	80	73	67	61	53	48	50	53	53	56	63	72	74	58	44	45	44	90	67	24
16	56	66	72	78	85	87	89	90	80	79	78	74	69	62	55	53	53	53	50	54	53	54	60	57	50	90	67	24
17	53	56	55	59	60	63	62	62	63	63	60	55	52	53	51	48	54	62	71	76	78	79	81	82	48	82	62	24
18	83	84	84	84	84	83	83	83	78	71	67	65	62	61	59	58	61	64	68	70	79	80	87	86	58	87	74	24
19	95	96	93	87	77	70	72	68	63	61	57	54	49	45	42	64	69	55	70	78	80	76	68	59	42	96	69	24
20	50	49	50	45	49	50	51	52	51	51	48	44	39	36	33	**29**	31	33	40	49	61	66	69	74	**29**	74	48	24
21	77	79	68	69	72	71	71	67	64	58	51	45	43	43	45	47	50	52	56	54	55	58	60	61	43	79	59	24
22	62	64	70	73	76	77	79	78	78	78	86	91	93	94	94	92	92	94	94	94	95	95	95	94	62	95	85	24
23	94	94	94	94	93	92	92	92	90	89	88	86	83	77	78	77	77	79	82	84	86	87	87	89	77	94	87	24
24	89	89	91	92	90	88	87	92	92	93	93	90	81	74	70	67	67	70	71	70	71	72	75	77	67	93	81	24
25	79	80	82	82	82	82	84	83	79	77	75	70	68	67	62	62	60	61	70	82	88	91	91	91	60	91	77	24
26	90	88	88	89	92	92	92	88	81	78	68	62	56	48	43	43	44	47	54	68	76	84	85	84	43	92	73	24
27	83	88	90	91	88	87	87	83	76	71	64	56	55	55	50	53	52	53	54	58	64	77	80	81	50	91	71	24
28	82	82	82	83	85	86	87	87	87	86	83	80	76	73	67	65	67	73	79	85	90	91	91	92	65	92	82	24
29	95	97	98	98	99	99	**100**	100	100	100	100	90	86	83	77	69	67	71	79	87	92	97	99	100	67	**100**	**91**	24
30	100	100	100	100	100	100	100	100	100	100	100	93	87	85	81	73	68	67	73	83	88	92	94	95	67	100	91	24
31	96	96	95	96	96	96	96	88	82	74	65	57	49	48	46	43	48	54	62	65	64	64	59	60	43	96	71	24
HOURLY MAX	100	100	100	100	100	100	100	100	100	100	100	93	93	94	94	92	92	94	94	94	95	97	99	100				
HOURLY AVG	76	78	78	78	79	79	79	78	75	72	68	64	61	58	56	56	58	60	65	70	73	74	74	75				

STATUS FLAG CODES

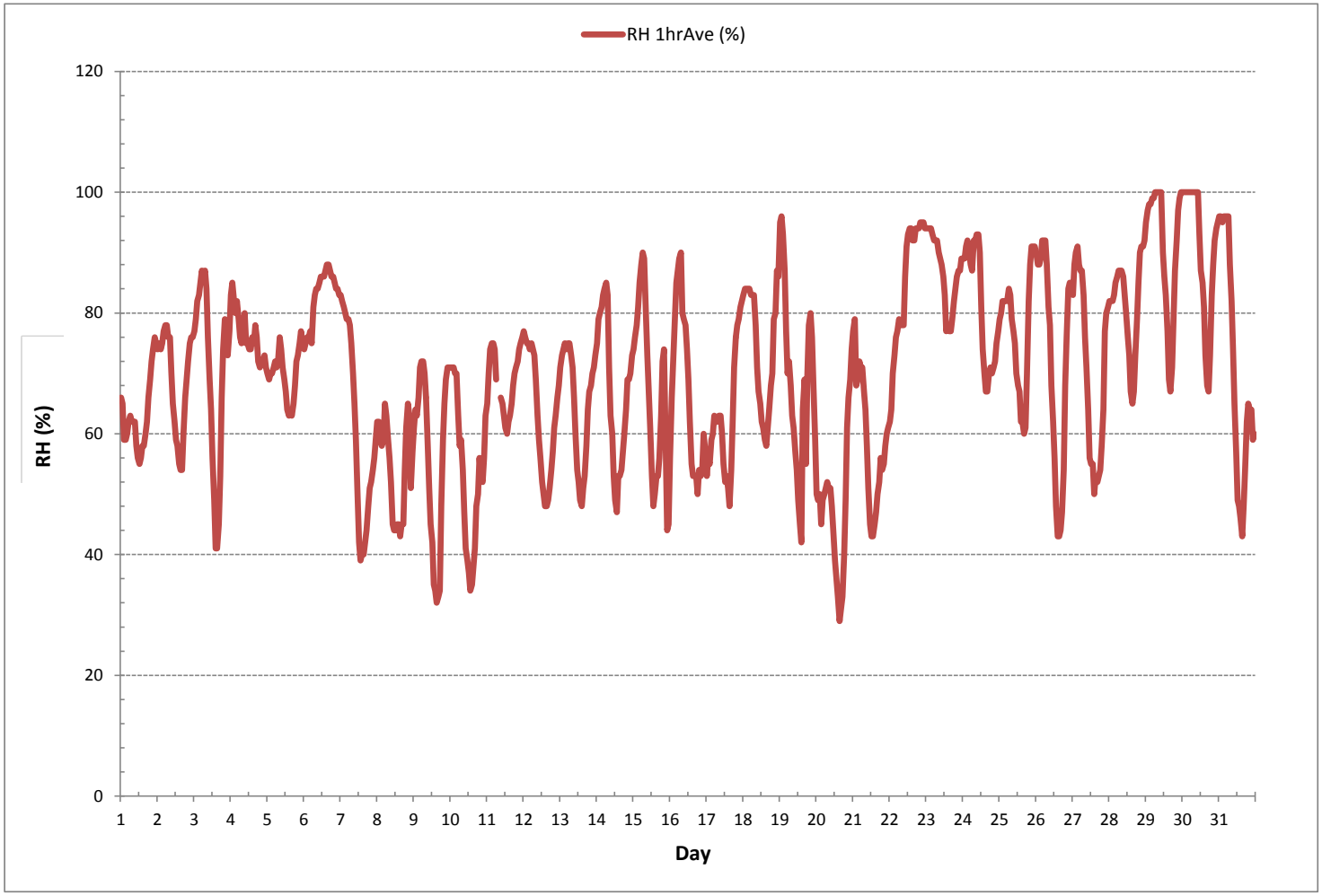
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	29	%	@ HOUR(S)	15	ON DAY(S)	20	
MAXIMUM 1-HR AVERAGE:	100	%	@ HOUR(S)	6	ON DAY(S)	29	
MAXIMUM 24-HR AVERAGE:	91	%			ON DAY(S) VAR-VARIOUS	29	
			OPERATIONAL TIME:			742	hrs
			AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	16		MONTHLY AVERAGE:			70	%

RELATIVE HUMIDITY Hourly Averages (RH %)



AMBIENT TEMPERATURE

Maxxam
A Bureau Veritas Group Company

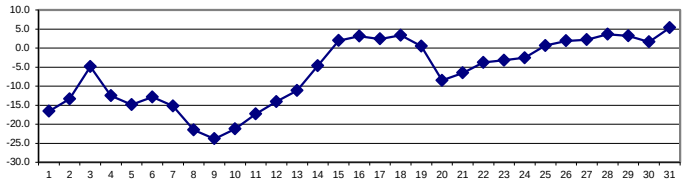
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

HR START (MST) / HR END (MST)	0:00 / 0:59	1:00 / 1:59	2:00 / 2:59	3:00 / 3:59	4:00 / 4:59	5:00 / 5:59	6:00 / 6:59	7:00 / 7:59	8:00 / 8:59	9:00 / 9:59	10:00 / 10:59	11:00 / 11:59	12:00 / 12:59	13:00 / 13:59	14:00 / 14:59	15:00 / 15:59	16:00 / 16:59	17:00 / 17:59	18:00 / 18:59	19:00 / 19:59	20:00 / 20:59	21:00 / 21:59	22:00 / 22:59	23:00 / 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	-16.0	-17.5	-18.0	-18.3	-18.7	-18.8	-18.6	-18.4	-18.0	-17.7	-17.1	-16.1	-15.0	-14.1	-13.5	-13.0	-13.2	-14.2	-15.8	-16.9	-17.5	-17.6	-17.3	-16.9	-18.8	-13.0	-16.6	24
2	-17.1	-17.2	-17.5	-18.3	-19.1	-20.3	-21.0	-22.1	-19.5	-16.9	-14.7	-13.1	-12.8	-11.4	-9.0	-7.8	-6.5	-7.6	-8.1	-7.1	-7.8	-8.5	-8.9	-8.9	-22.1	-6.5	-13.4	24
3	-8.8	-9.8	-10.8	-11.4	-12.0	-12.6	-13.4	-12.4	-11.2	-8.7	-6.0	-2.9	0.1	2.7	5.2	5.2	4.5	2.9	-0.6	-2.8	-4.8	-5.1	-2.3	-2.6	-13.4	5.2	-4.9	24
4	-4.3	-3.7	-2.8	-3.5	-5.6	-8.8	-10.7	-12.6	-14.1	-15.2	-15.5	-15.5	-15.2	-15.5	-15.5	-15.4	-15.4	-15.0	-15.5	-16.1	-16.3	-16.1	-16.2	-16.3	-16.3	-2.8	-12.5	24
5	-16.5	-16.6	-16.8	-16.9	-17.1	-17.3	-17.3	-17.1	-16.7	-16.5	-16.1	-15.2	-14.6	-13.7	-13.1	-12.6	-12.3	-12.2	-12.5	-13.0	-13.6	-13.2	-12.8	-12.7	-17.3	-12.2	-14.9	24
6	-13.0	-13.5	-13.7	-13.9	-14.1	-14.3	-14.6	-14.2	-13.5	-13.0	-12.7	-12.3	-11.9	-11.3	-10.8	-10.4	-10.3	-10.9	-12.0	-12.5	-13.6	-14.0	-14.3	-14.5	-14.6	-10.3	-12.9	24
7	-14.8	-15.2	-15.9	-16.4	-16.5	-16.5	-16.7	-16.6	-16.6	-16.0	-14.9	-13.4	-11.8	-11.1	-10.9	-11.5	-11.7	-12.2	-13.7	-15.4	-17.1	-18.6	-20.2	-21.4	-21.4	-10.9	-15.2	24
8	-22.5	-23.0	-23.4	-24.1	-24.7	-26.3	-26.2	-25.4	-24.9	-24.1	-22.2	-20.9	-19.8	-18.7	-17.7	-16.8	-16.5	-16.6	-18.2	-20.2	-21.2	-21.3	-19.9	-21.6	-26.3	-16.5	-21.5	24
9	-23.0	-24.1	-23.9	-25.1	-27.1	-29.7	**-31.2**	-31.1	-26.5	-24.6	-23.3	-21.6	-19.8	-18.6	-17.7	-17.2	-17.2	-17.4	-20.1	-23.2	-25.3	-27.0	-28.1	-28.8	**-31.2**	-17.2	-23.8	24
10	-29.3	-28.3	-28.1	-28.4	-27.9	-25.4	-24.4	-24.6	-23.3	-21.2	-19.3	-18.7	-17.9	-17.1	-16.4	-16.5	-16.8	-17.1	-17.4	-18.1	-18.0	-18.1	-18.3	-18.6	-29.3	-16.4	-21.2	24
11	-18.9	-19.7	-21.3	-22.8	-22.4	-20.7	-19.9	**X**	**X**	-19.2	-18.2	-17.0	-15.8	-15.0	-14.4	-14.1	-14.1	-14.6	-15.3	-15.5	-15.4	-15.5	-15.5	-15.6	-22.8	-14.1	-17.3	22
12	-15.9	-16.1	-16.4	-16.8	-17.0	-17.3	-17.6	-17.6	-16.9	-15.8	-14.6	-13.3	-12.1	-11.0	-10.5	-9.9	-9.9	-10.1	-11.3	-12.4	-13.3	-13.5	-13.8	-14.4	-17.6	-9.9	-14.1	24
13	-15.1	-15.8	-15.8	-15.7	-15.4	-15.2	-15.1	-14.7	-13.9	-12.4	-10.7	-9.0	-8.1	-6.6	-5.9	-6.5	-6.7	-7.7	-8.9	-9.4	-9.5	-9.6	-9.9	-9.9	-15.8	-5.9	-11.1	24
14	-10.2	-11.7	-11.2	-11.3	-11.7	-11.8	-12.2	-11.6	-8.6	-6.4	-5.4	-2.8	-0.2	1.7	0.3	-0.2	-0.1	0.7	1.7	0.3	-0.3	-0.1	0.1	0.0	-12.2	1.7	-4.6	24
15	-0.4	-0.8	-1.3	-1.9	-2.7	-3.4	-4.0	-3.5	-1.6	0.0	1.7	3.7	6.2	7.9	7.5	6.5	6.4	5.7	4.0	2.3	1.7	3.2	4.8	4.9	-4.0	7.9	2.0	24
16	4.7	3.9	2.9	2.8	2.4	2.1	1.8	1.3	3.6	3.8	3.6	4.2	4.6	5.0	5.5	5.8	5.0	3.9	2.9	2.1	1.7	1.0	-0.1	-0.2	-0.2	5.8	3.1	24
17	-0.2	-0.6	-0.3	-0.7	-0.8	-1.2	-1.4	-1.4	-0.4	0.7	3.1	5.2	6.7	6.9	7.1	7.0	6.0	4.9	3.8	3.2	2.9	2.7	2.3	1.7	-1.4	7.1	2.4	24
18	1.3	0.8	0.6	0.5	0.5	0.7	0.4	0.0	1.1	2.7	3.9	4.8	5.5	6.2	6.9	7.5	7.1	6.4	5.0	4.8	4.1	3.8	2.6	2.9	0.0	7.5	3.3	24
19	1.2	1.7	1.7	1.1	0.7	0.1	-0.6	-0.9	-0.5	0.3	1.1	1.8	2.9	3.6	3.9	1.5	0.7	1.2	0.1	-0.8	-1.5	-1.9	-2.3	-3.2	-3.2	3.9	0.5	24
20	-4.4	-7.7	-8.6	-9.6	-10.4	-10.8	-11.2	-11.2	-10.7	-10.4	-9.4	-8.3	-7.1	-6.2	-5.0	-4.4	-4.6	-4.9	-6.1	-7.8	-9.6	-10.8	-11.8	-12.8	-12.8	-4.4	-8.5	24
21	-13.4	-13.9	-13.0	-13.7	-14.6	-14.5	-14.2	-12.6	-10.7	-8.0	-5.0	-2.9	-1.8	-1.3	-1.0	-0.8	-1.1	-1.6	-1.9	-1.9	-2.0	-2.1	-2.2	-2.3	-14.6	-0.8	-6.5	24
22	-2.3	-2.5	-2.8	-3.1	-3.7	-4.1	-4.5	-4.4	-4.0	-3.7	-4.2	-4.4	-4.2	-4.1	-3.8	-3.6	-3.9	-4.1	-4.1	-4.0	-3.9	-3.7	-3.9	-4.4	-4.5	-2.3	-3.8	24
23	-5.1	-5.3	-4.6	-4.5	-6.1	-6.8	-6.2	-4.2	-3.0	-3.7	-3.9	-3.0	-2.1	-1.1	-1.4	-1.3	-1.4	-1.6	-1.8	-1.8	-1.8	-1.8	-2.1	-2.4	-6.8	-1.1	-3.2	24
24	-2.7	-3.0	-4.9	-7.2	-9.5	-10.8	-10.8	-7.7	-7.1	-6.2	-5.3	-3.7	-1.5	0.6	2.0	3.2	3.5	2.9	2.2	2.0	1.6	1.1	0.4	-0.3	-10.8	3.5	-2.6	24
25	-0.7	-0.9	-1.0	-0.9	-1.0	-0.9	-1.1	-0.8	-0.1	0.8	1.5	2.8	3.4	3.6	4.5	4.6	5.0	4.7	2.8	-0.3	-1.9	-2.8	-3.2	-2.6	-3.2	5.0	0.6	24
26	-2.5	-1.6	-1.6	-2.0	-3.1	-3.6	-3.2	-1.7	0.4	1.0	3.2	4.8	6.4	7.9	8.6	8.7	8.5	8.1	6.3	2.6	0.3	-0.9	-1.2	-0.3	-3.6	8.7	1.9	24
27	0.3	-2.2	-2.8	-2.0	-0.8	-0.9	-1.2	-0.8	0.1	1.1	2.7	4.1	4.7	5.4	6.3	6.1	6.0	5.6	4.9	4.1	3.6	3.3	2.9	2.7	-2.8	6.3	2.2	24
28	2.6	2.2	1.9	1.8	1.7	1.7	1.6	1.9	2.1	2.7	3.3	3.8	4.8	5.8	7.5	8.0	7.7	6.3	5.1	4.1	3.3	3.0	2.7	2.1	1.6	8.0	3.7	24
29	1.9	1.8	1.8	1.8	1.7	1.6	1.5	1.5	1.8	2.4	3.3	4.1	4.3	4.6	5.8	7.6	8.0	6.8	4.6	3.1	2.1	1.8	1.6	1.0	1.0	8.0	3.2	24
30	0.7	0.8	0.6	0.1	0.0	0.0	0.1	0.1	0.4	0.9	1.4	2.2	2.8	3.1	3.6	5.1	6.0	6.3	4.9	2.3	0.5	-0.6	-1.2	-1.8	-1.8	6.3	1.6	24
31	-1.7	-1.2	-1.3	-1.8	-1.0	-1.3	-1.5	0.7	2.6	5.0	7.8	9.9	11.0	**11.6**	11.2	11.1	10.5	10.4	8.8	7.5	7.2	7.0	7.7	7.3	-1.8	**11.6**	**5.3**	24
HOURLY MAX	4.7	3.9	2.9	2.8	2.4	2.1	1.8	1.9	3.6	5.0	7.8	9.9	11.0	11.6	11.2	11.1	10.5	10.4	8.8	7.5	7.2	7.0	7.7	7.3				
HOURLY AVG	-7.9	-8.4	-8.7	-9.1	-9.5	-9.9	-10.1	-9.4	-8.3	-7.7	-6.5	-5.2	-4.1	-3.2	-2.6	-2.4	-2.5	-2.9	-4.1	-5.2	-6.0	-6.3	-6.5	-6.8				

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

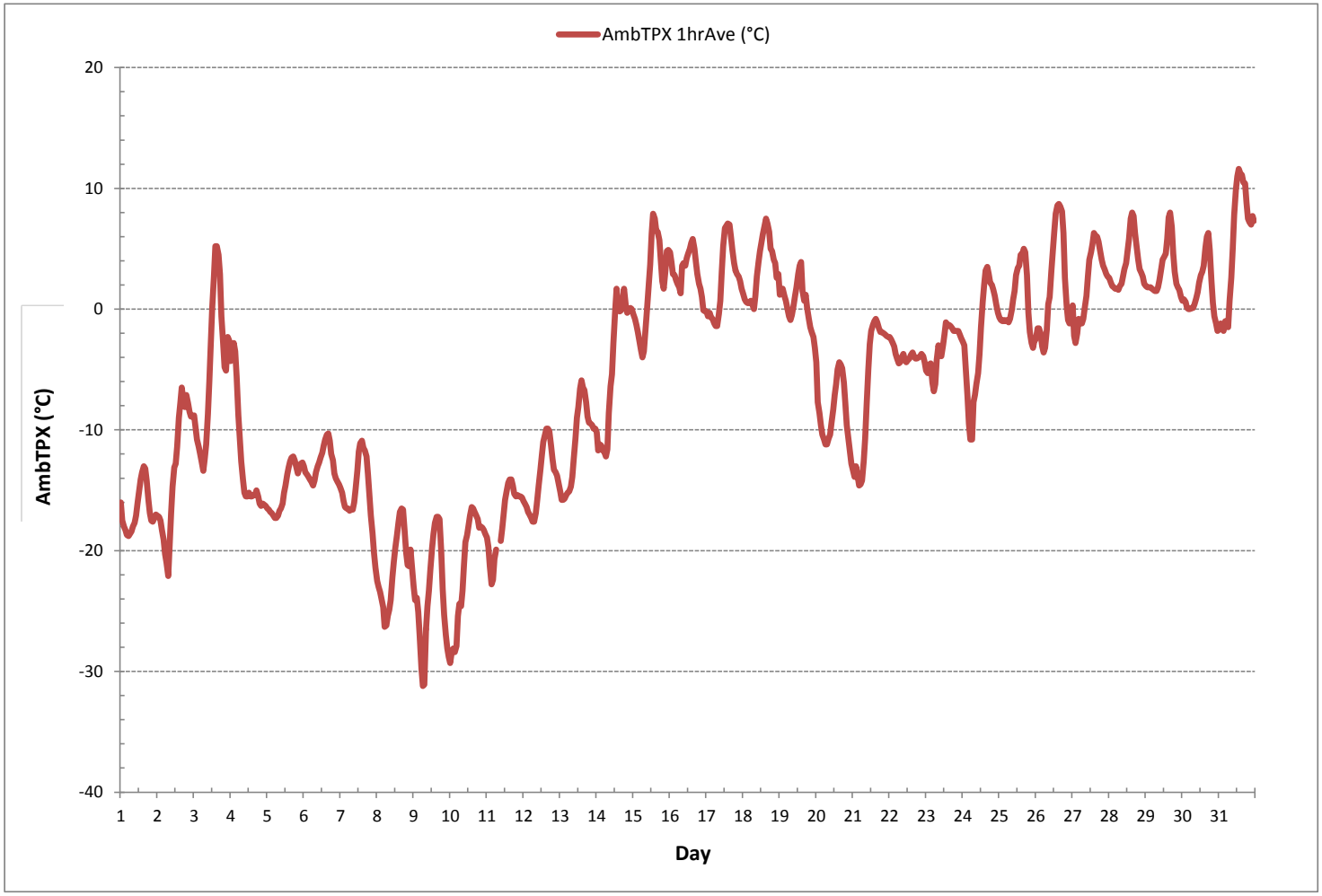
24 HR AVERAGES March 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-31.2	°C	@ HOUR(S)	6	ON DAY(S)	9	
MAXIMUM 1-HR AVERAGE:	11.6	°C	@ HOUR(S)	13	ON DAY(S)	31	
MAXIMUM 24-HR AVERAGE:	5.3	°C			ON DAY(S)	31	
					VAR-VARIOUS		
			OPERATIONAL TIME:			742	hrs
			AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	9.3		MONTHLY AVERAGE:			-6.4	°C

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



APPENDIX II
NON-CONTINUOUS MONITORING DATA RESULTS

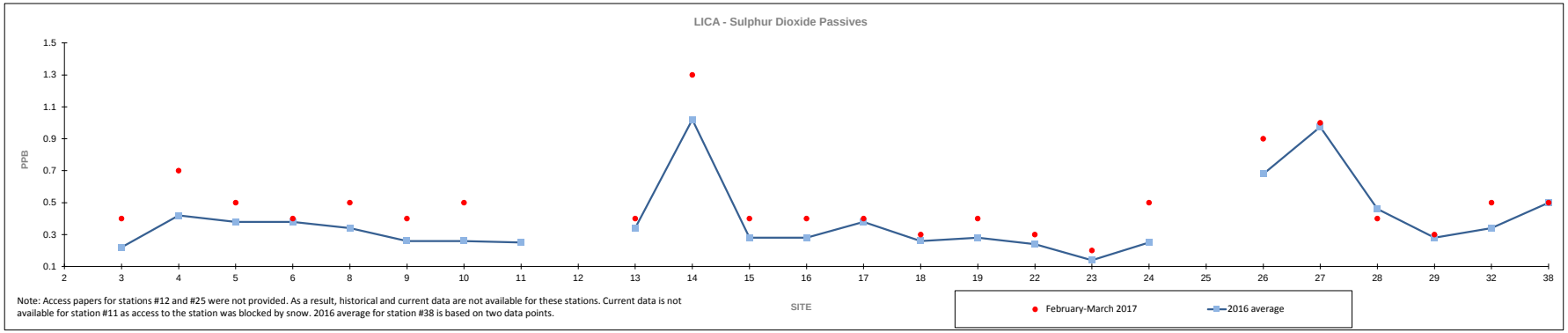
PASSIVE RESULTS

Passive Summary Results for February 2017 - March 2017

Lakeland Industry & Community Association

Sulphur Dioxide
ppb
2016

	2	3	4	5	6	8	9	10	11	12	13	14	15	16	17	18	19	22	23	24	25	26	27	28	29	32	38	February - March 2017 Reading	Site
Mean	NA	0.2	0.4	0.4	0.4	0.3	0.3	0.3	0.3	NA	0.3	1.0	0.3	0.3	0.4	0.3	0.3	0.2	0.1	0.3	NA	0.7	1.0	0.5	0.3	0.3	0.5	0.5	-
Minimum	NA	0.1	0.2	0.3	0.2	0.2	0.2	0.2	0.2	NA	0.2	0.8	0.2	0.2	0.3	0.1	0.1	0.2	0.1	0.2	NA	0.4	0.8	0.3	0.2	0.2	0.3	0.2	#23
Maximum	NA	0.4	0.6	0.5	0.6	0.5	0.3	0.4	0.3	NA	0.5	1.3	0.4	0.5	0.6	0.4	0.6	0.4	0.2	0.4	NA	1.3	1.3	0.6	0.4	0.6	0.7	1.3	#14



Note: Access papers for stations #12 and #25 were not provided. As a result, historical and current data are not available for these stations. Current data is not available for station #11 as access to the station was blocked by snow. 2016 average for station #38 is based on two data points.

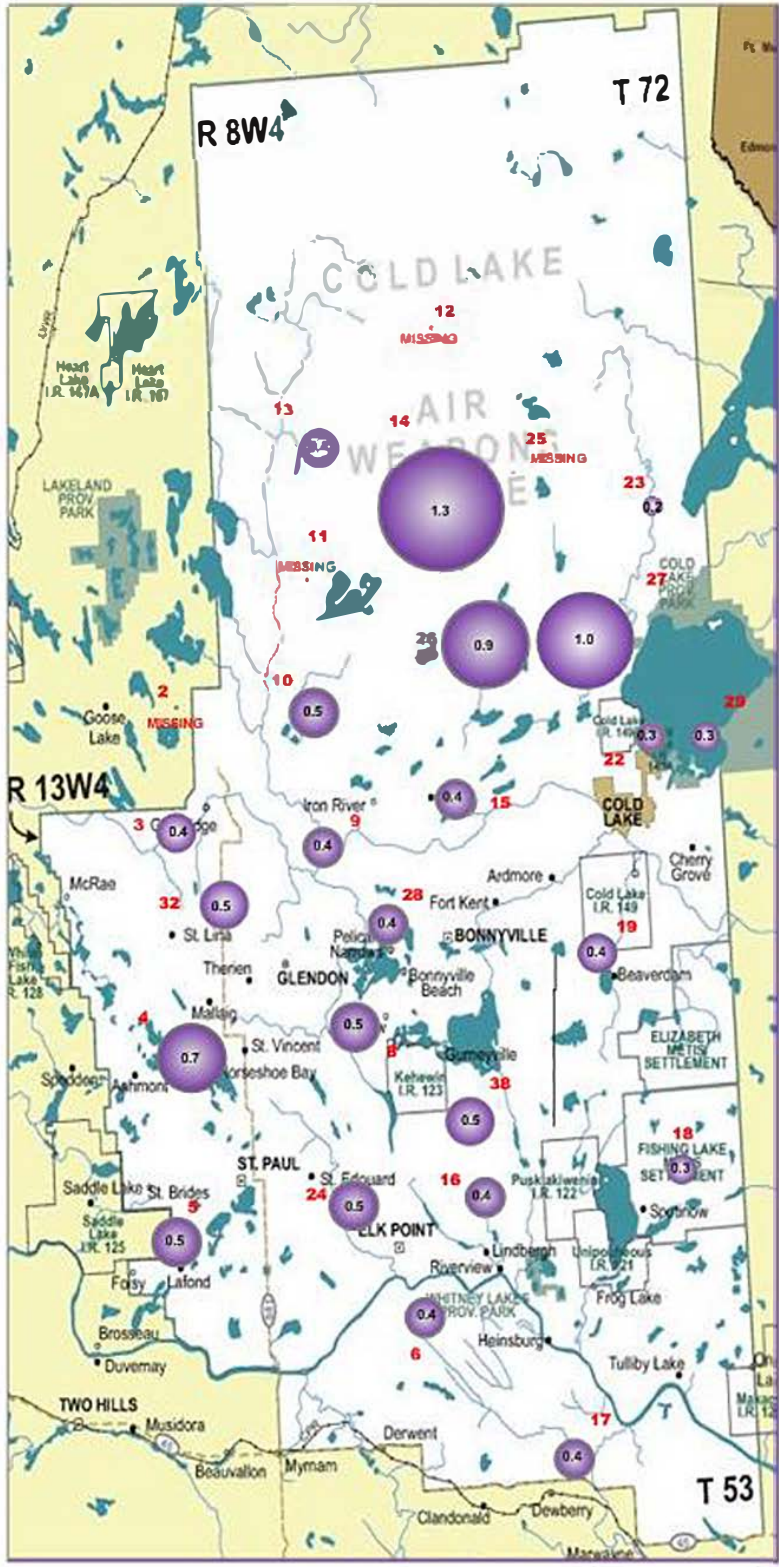
Lakeland Industry & Community Association
SO_2 Passive Bubble Map

FEBRUARY 2017 - MARCH 2017

PASSIVE STATIONS		DUPLICATE
2 – Sand River	MISSING	NA
3 – Therien	0.4 PPB	NA
4 – Flat Lake	0.7 PPB	NA
5 – Lake Eliza	0.5 PPB	NA
6 – Telegraph Creek	0.4 PPB	NA
8 – Muriel-Kehewin	0.5 PPB	NA
9 – Dupre	0.4 PPB	NA
10 – La Corey	0.5 PPB	NA
11 – Wolf Lake	MISSING	NA
12 – Foster Creek	MISSING	NA
13 – Primrose	0.4 PPB	NA
14 – Maskwa	1.3 PPB	NA
15 – Ardmore	0.4 PPB	NA
16 – Frog Lake	0.4 PPB	0.3 PPB
17 – Clear Range	0.4 PPB	0.4 PPB
18 – Fishing Lake	0.3 PPB	0.3 PPB
19 – Beaverdam	0.4 PPB	NA
22 – Cold Lake South	0.3 PPB	NA
23 – Medley-Martineau	0.2 PPB	NA
24 – Fort George	0.5 PPB	NA
25 – Burnt Lake	MISSING	NA
26 – Mahikan	0.9 PPB	NA
27 – Mahkeses	1.0 PPB	NA
28 – Town of Bonnyville	0.4 PPB	NA
29 – Cold Lake South 2	0.3 PPB	NA
32 – St. Lina	0.5 PPB	NA
38 – Bonnyville	0.5 PPB	NA

Summary

Minimum : 0.2 PPB – Medley-Martineau
Maximum: 1.3 PPB – Maskwa
Average: 0.5 PPB *Includes Duplicates



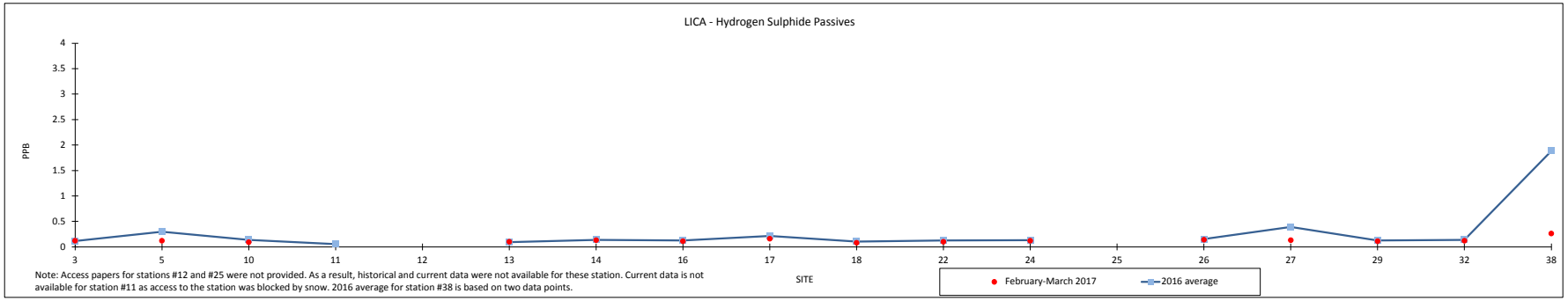
JOB#: 2833-2017-03-1-C
Page 102 of 234

Passive Summary Results for February 2017 - March 2017

Lakeland Industry & Community Association

Hydrogen Sulphide
ppb

	2016																		February - March 2017	
	3	**5**	**10**	**11**	**12**	**13**	**14**	**16**	**17**	**18**	**22**	**24**	**25**	**26**	**27**	**29**	**32**	**38**	**Reading**	**Site**
Mean	0.11	0.30	0.14	0.05	NA	0.09	0.14	0.13	0.22	0.11	0.13	0.13	NA	0.15	0.39	0.13	0.14	1.86	0.13	-
Minimum	0.08	0.13	0.09	0.05	NA	0.08	0.10	0.09	0.14	0.05	0.06	0.09	NA	0.14	0.15	0.08	0.08	0.16	0.08	#18
Maximum	0.17	0.51	0.21	0.06	NA	0.12	0.17	0.16	0.33	0.14	0.20	0.19	NA	0.17	0.67	0.17	0.20	3.61	0.26	#38



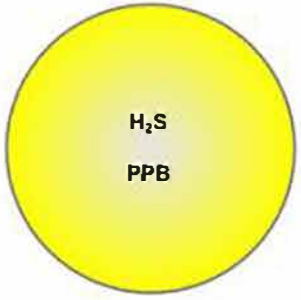
Note: Access papers for stations #12 and #25 were not provided. As a result, historical and current data were not available for these station. Current data is not available for station #11 as access to the station was blocked by snow. 2016 average for station #38 is based on two data points.

Lakeland Industry & Community Association
H_2S Passive Bubble Map

FEBRUARY 2017 - MARCH 2017

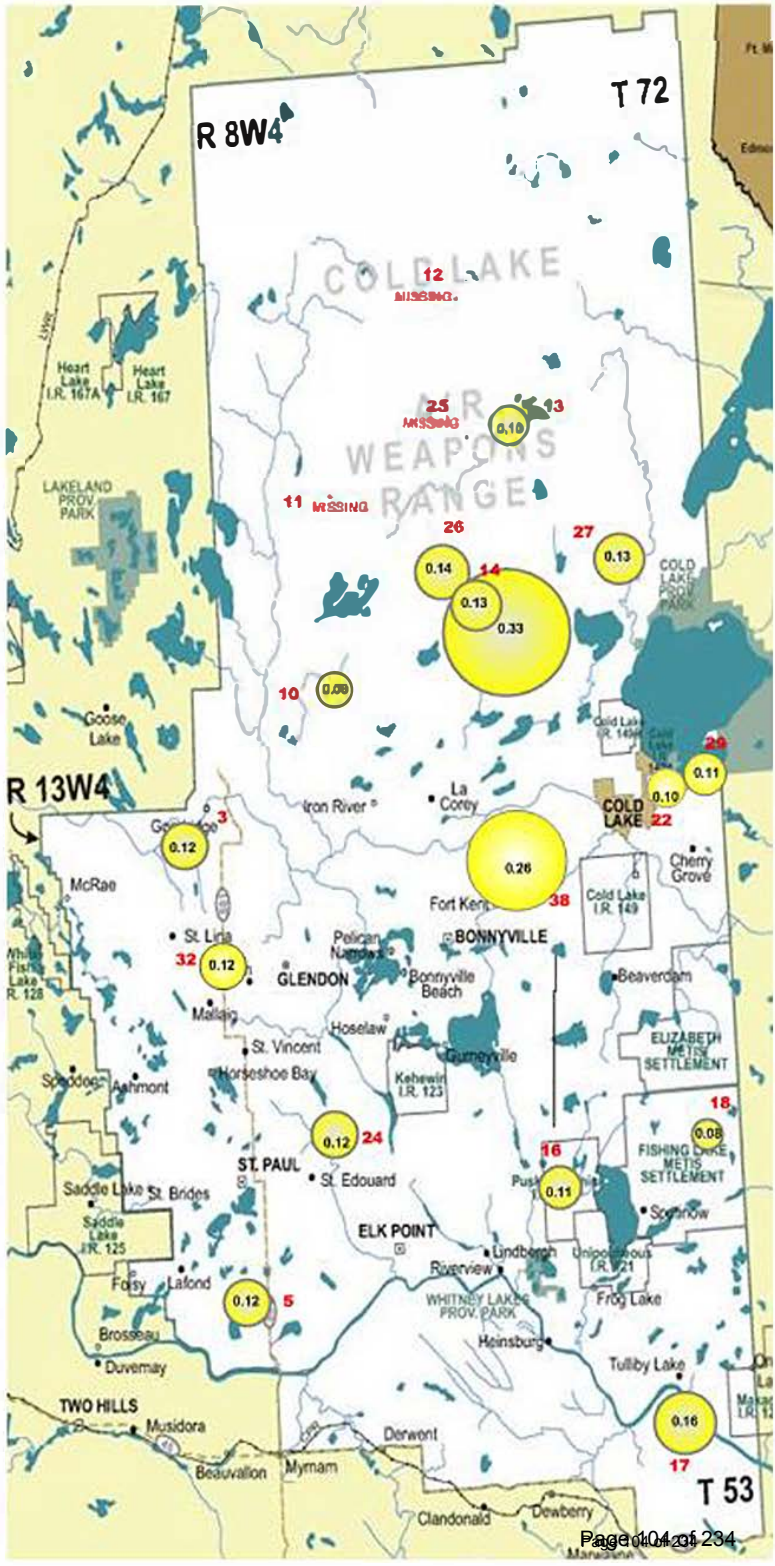
PASSIVE STATIONS

		DUPLICATE
3 – Therien	0.12 PPB	NA
5 – Lake Eliza	0.12 PPB	NA
10 – La Corey	0.09 PPB	NA
11 – Wolf Lake	MISSING	NA
12 – Foster Creek	MISSING	NA
13 – Primrose	0.10 PPB	NA
14 – Maskwa	0.13 PPB	NA
16 – Frog Lake	0.11 PPB	NA
17 – Clear Range	0.16 PPB	NA
18 – Fishing Lake	0.08 PPB	NA
22 – Cold Lake South	0.09 PPB	0.10 PPB
24 – Fort George	0.11 PPB	0.12 PPB
25 – Burnt Lake	MISSING	NA
26 – Mahihkan	0.14 PPB	NA
27 – Mahkeses	0.13 PPB	NA
29 – Cold Lake South 2	0.11 PPB	NA
32 – St. Lina	0.12 PPB	NA
38 – Bonnyville	0.26 PPB	NA



Summary

Minimum : 0.08 PPB – Fishing Lake
Maximum: 0.26 PPB – Bonnyville
Average: 0.13 PPB *Includes Duplicates

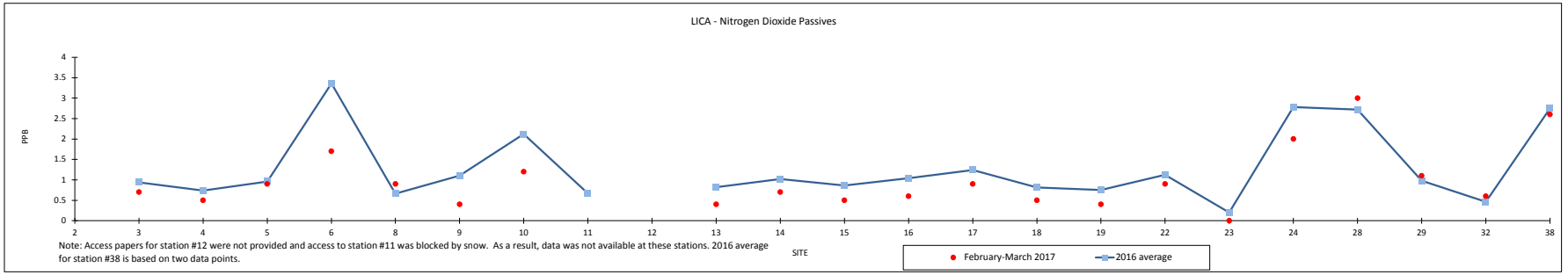


Passive Summary Results for February 2017 - March 2017

Lakeland Industry & Community Association

Nitrogen Dioxide
ppb

	2016																							February - March 2017	
	2	**3**	**4**	**5**	**6**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**22**	**23**	**24**	**28**	**29**	**32**	**38**	**Reading**	**Site**
Mean	NA	0.9	0.7	1.0	3.4	0.7	1.1	2.1	0.7	NA	0.8	1.0	0.9	1.0	1.2	0.8	0.8	1.1	0.2	2.8	2.7	1.0	0.5	2.8	1.0	-
Minimum	NA	0.5	0.3	0.4	2.1	0.3	0.2	1.2	0.3	NA	0.2	0.5	0.3	0.5	0.6	0.4	0.4	0.5	0.1	1.6	1.4	0.4	0.2	1.3	0.4	Various
Maximum	NA	1.8	1.4	2.2	5.0	1.4	2.2	3.7	1.1	NA	2.6	2.6	1.4	2.3	2.1	1.4	1.5	2.4	0.4	4.6	4.9	2.3	1.1	4.2	3.0	#28



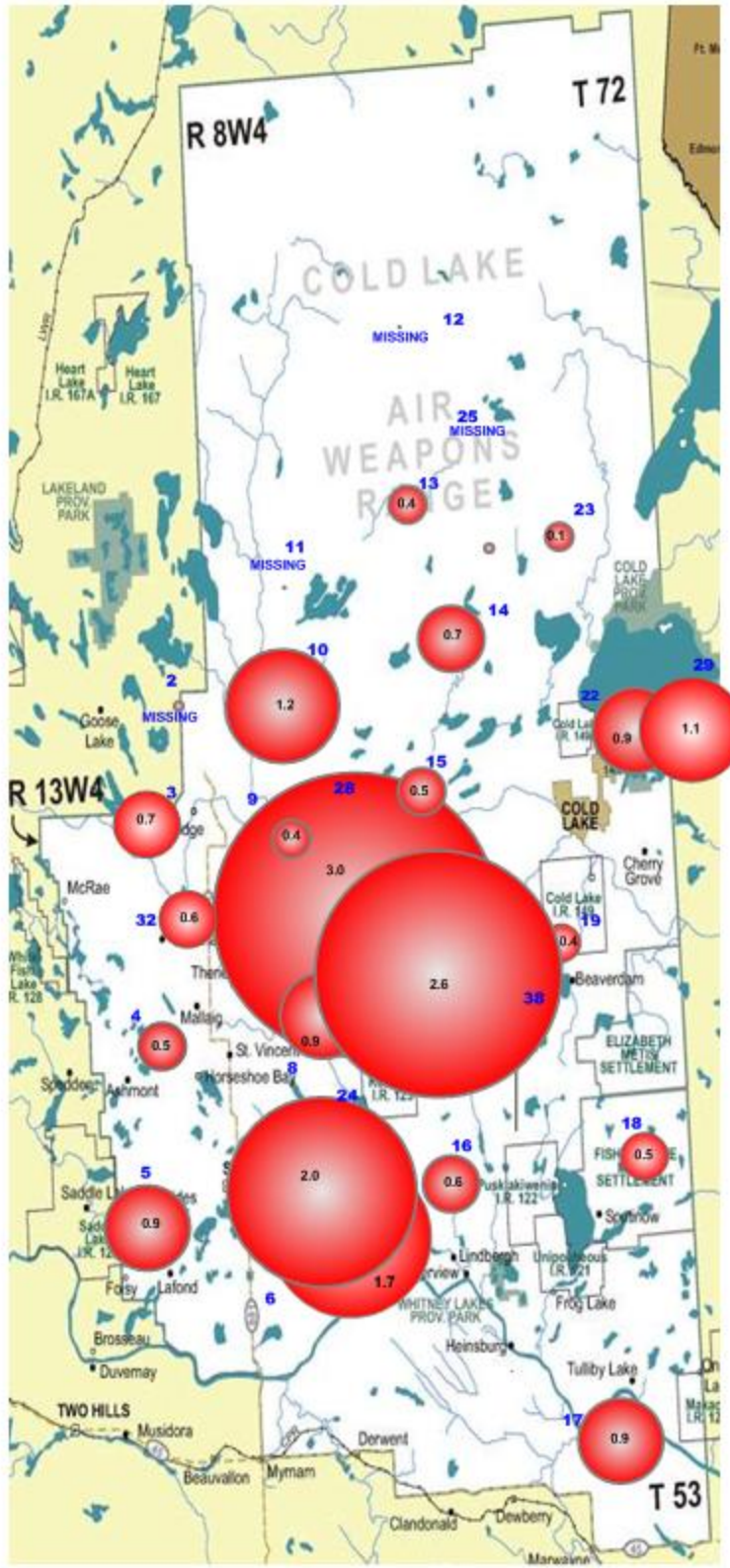
Note: Access papers for station #12 were not provided and access to station #11 was blocked by snow. As a result, data was not available at these stations. 2016 average for station #38 is based on two data points.

Lakeland Industry & Community Association
NO_2 Passive Bubble Map
FEBRUARY 2017 – MARCH 2017

PASSIVE STATIONS		DUPLICATE
2 – Sand River	MISSING	NA
3 – Therien	0.7 PPB	NA
4 – Flat Lake	0.5 PPB	NA
5 – Lake Eliza	0.9 PPB	NA
6 – Telegraph Creek	1.6 PPB	1.8 PPB
8 – Muriel-Kehewin	0.9 PPB	0.8 PPB
9 – Dupre	0.4 PPB	NA
10 – La Corey	1.2 PPB	NA
11 – Wolf Lake	MISSING	NA
12 – Foster Creek	MISSING	NA
13 – Primrose	0.4 PPB	NA
14 – Maskwa	0.7 PPB	NA
15 – Ardmore	0.5 PPB	NA
16 – Frog Lake	0.6 PPB	NA
17 – Clear Range	0.9 PPB	NA
18 – Fishing Lake	0.5 PPB	NA
19 – Beaverdam	0.4 PPB	NA
22 – Cold Lake South	0.9 PPB	NA
23 – Medley-Martineau	<0.1 PPB	NA
24 – Fort George	2.0 PPB	NA
28 – Town of Bonnyville	3.0 PPB	NA
29 – Cold Lake South 2	1.1 PPB	NA
32 – St. Lina	0.6 PPB	NA
38 – Bonnyville	2.6 PPB	NA

Summary

Minimum : 0.4 PPB – Various Stations
Maximum: 3.0 PPB – Town of Bonnyville
Average: 1.0 PPB *Includes Duplicates

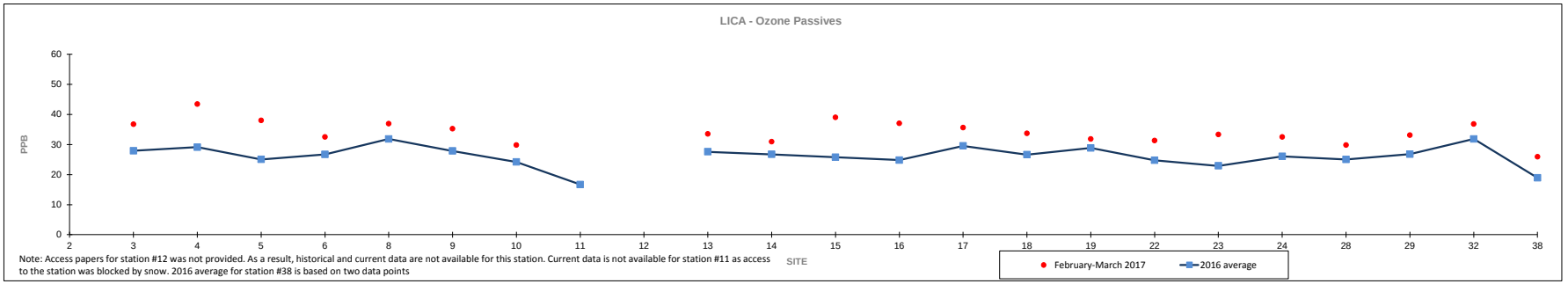


Passive Summary Results for February 2017 - March 2017

Lakeland Industry & Community Association

Ozone ppb

	2	3	4	5	6	8	9	10	11	12	2016 13	14	15	16	17	18	19	22	23	24	28	29	32	38	February - March 2017 Reading	Site
Mean	NA	27.9	29.1	25.0	26.7	31.8	27.8	24.2	16.7	NA	27.6	26.7	25.7	24.8	29.5	26.6	28.8	24.8	22.9	26.0	25.0	26.7	31.8	18.9	34.1	-
Minimum	NA	14.9	17.0	16.0	14.9	19.3	17.7	13.1	11.8	NA	16.5	16.9	14.9	13.0	19.4	15.1	19.0	14.5	12.2	15.9	16.2	16.1	22.9	16.3	25.9	#38
Maximum	NA	41.8	47.4	32.8	47.3	43.8	43.3	38.7	21.5	NA	37.7	40.0	39.3	35.3	49.3	41.4	46.5	32.6	33.2	40.8	34.2	36.7	39.1	21.5	43.4	#4



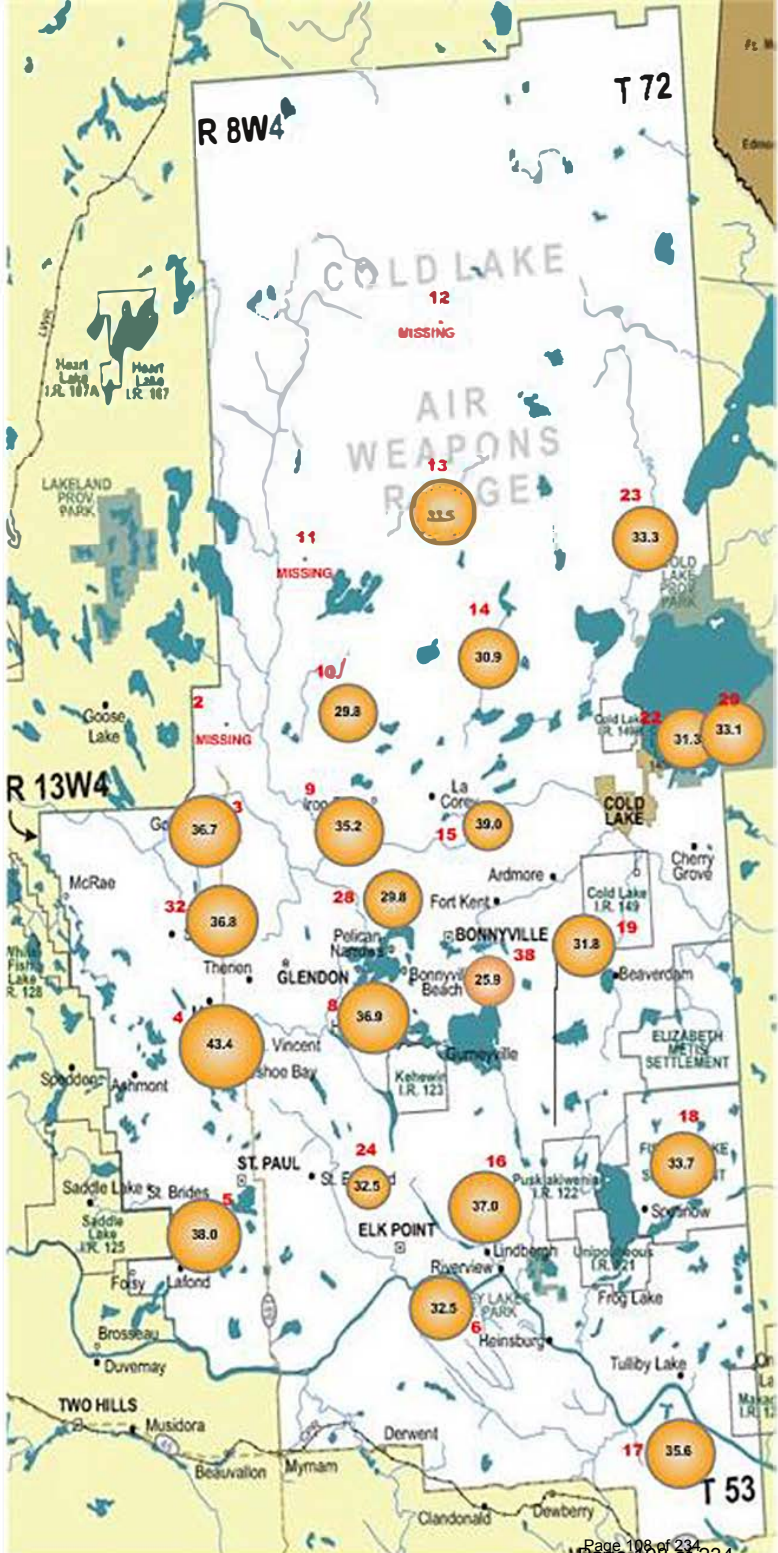
Note: Access papers for station #12 was not provided. As a result, historical and current data are not available for this station. Current data is not available for station #11 as access to the station was blocked by snow. 2016 average for station #38 is based on two data points

Lakeland Industry & Community Association
O_3 Passive Bubble Map

FEBRUARY 2017 – MARCH 2017

PASSIVE STATIONS

		DUPLICATE
2 – Sand River	MISSING	NA
3 – Therien	36.7 PPB	NA
4 – Flat Lake	43.4 PPB	NA
5 – Lake Eliza	38.0 PPB	NA
6 – Telegraph Creek	34.7 PPB	30.3 PPB
8 – Muriel-Kehewin	35.6 PPB	38.1 PPB
9 – Dupre	35.2 PPB	NA
10 – La Corey	29.8 PPB	NA
11 – Wolf Lake	MISSING	NA
12 – Foster Creek	MISSING	NA
13 – Primrose	33.5 PPB	NA
14 – Maskwa	30.9 PPB	NA
15 – Ardmore	39.0 PPB	NA
16 – Frog Lake	37.0 PPB	NA
17 – Clear Range	35.6 PPB	NA
18 – Fishing Lake	33.7 PPB	NA
19 – Beaverdam	31.8 PPB	NA
22 – Cold Lake South	31.3 PPB	NA
23 – Medley-Martineau	33.3 PPB	NA
24 – Fort George	32.5 PPB	NA
28 – Town of Bonnyville	29.8 PPB	NA
29 – Cold Lake South 2	33.1 PPB	NA
32 – St. Lina	36.8 PPB	NA
38 – Bonnyville	25.9 PPB	NA



Summary

Minimum : 25.9 PPB – Bonnyville
Maximum: 43.4 PPB – Flat Lake
Average: 34.1 PPB *Includes Duplicates

JOB#: 2833-2017-03-1-C
Page 108 of 234

VOC RESULTS

Maxxam Analytics

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

Client: LICA
Location: Cold Lake South
Station ID: LICA 01
Sample ID: LICA/VOC/CLS/Mar 02, 2017

Sampler S/N: 6167
Canister ID: (AY) ~~2419~~ 5647
Installation Date/Time (mst): Feb 27, 2017 @ 10:53
Removal Date/Time (mst): Mar 06, 2017 @ 16:32

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
Mar 02, 2017	00:00	00:00 Mar 03, 2017	24.0

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
-27.6	+23.5

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
10.0	6.52	24.0

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

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

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)

Comments: n/a

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Mar 06, 2017

Sample ID: 17030076-001
Customer ID: LICA
Cust Samp ID: LICA/VOC/CLS/Mar 2, 2017
Priority: Normal

RECEIVED
MAR 09 2017

Volatile Organics Data Results

Date: March 2 , 2017
Canister ID: S5647

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	< 0.05
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	0.09
1-Hexene	< 0.02
1-Pentene	0.02
2,2,4-Trimethylpentane	0.07
2,2-Dimethylbutane	0.03
2,3,4-Trimethylpentane	0.03
2,3-Dimethylbutane	0.05
2,3-Dimethylpentane	0.06
2,4-Dimethylpentane	0.04
2-Methylheptane	0.03
2-Methylhexane	0.05
2-Methylpentane	0.2
3-Methylheptane	0.02
3-Methylhexane	0.06
3-Methylpentane	0.07
Acetone	1.6
Acrolein	< 0.3
Benzene	0.22
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	0.03
Chloromethane	0.64
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.03
cis-2-Pentene	< 0.02
Cyclohexane	0.05
Cyclopentane	0.04
Dibromochloromethane	< 0.01
Ethanol	0.8
Ethyl acetate	< 0.4
Ethylbenzene	0.03
Freon-11	0.29
Freon-113	0.13

Volatile Organics Data Results

Date: March 2 , 2017
Canister ID: S5647

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.02
Freon-12	0.61
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.55
Isopentane	0.45
Isoprene	0.01
Isopropyl alcohol	< 0.4
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	0.06
Methylcyclopentane	0.07
Methylene chloride	< 0.3
n-Butane	1.16
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.05
n-Hexane	0.09
n-Nonane	0.01
n-Octane	0.03
n-Pentane	0.3
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	0.02
o-Xylene	0.04
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.13
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
Location: Cold Lake South
Station ID: LICA 01
Sample ID: LICA/VOC/CLS/Mar 08, 2017

Sampler S/N: 6167
Canister ID: H3291
Installation Date/Time (mst): Mar 06, 2017 @ 16:45
Removal Date/Time (mst): Mar 09, 2017 @ 10:39

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
Mar 08, 2017	00:00	00:00 Mar 09, 2017	24.0

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
-28.0	+21.0

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
93	6.10	24.0

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) = -28.0 @ 16:45 Mar 06/17 mst
Final leak check deployment vacuum (in. Hg) = -28.0 @ 08:30 Mar 07/17 mst
Total leak rate = 0.0 psi over 16 hours ~~minutes~~ A.V.
Timer reset to zero prior to sampling? YES (yes/no)
Date of last flow calibration: Mar 06, 2017 (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 leak check completed on March 07, 2017

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Mar 09, 2017

RECEIVED
MAR 13 2017

Sample ID: 17030114-001

Customer ID: LICA

Cust Samp ID: LICA/VOC/CLS/Mar 8, 2017

Priority: Normal

Volatile Organics Data Results

Date: March 8 , 2017
Canister ID: H3297

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	< 0.05
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.02
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	0.03
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.07
1-Hexene	0.02
1-Pentene	0.02
2,2,4-Trimethylpentane	0.05
2,2-Dimethylbutane	0.03
2,3,4-Trimethylpentane	0.03
2,3-Dimethylbutane	0.03
2,3-Dimethylpentane	0.04
2,4-Dimethylpentane	0.03
2-Methylheptane	0.02
2-Methylhexane	0.03
2-Methylpentane	0.09
3-Methylheptane	0.02
3-Methylhexane	0.04
3-Methylpentane	0.05
Acetone	1
Acrolein	< 0.3
Benzene	0.25
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	0.03
Chloromethane	0.67
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	0.03
Dibromochloromethane	< 0.01
Ethanol	< 0.3
Ethyl acetate	< 0.4
Ethylbenzene	0.02
Freon-11	0.3
Freon-113	0.12

Volatile Organics Data Results

Date: March 8 , 2017
Canister ID: H3297

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.02
Freon-12	0.63
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.3
Isopentane	0.23
Isoprene	0.02
Isopropyl alcohol	1.6
Isopropylbenzene	0.02
m,p-Xylene	0.07
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	0.04
Methylcyclopentane	0.04
Methylene chloride	< 0.3
n-Butane	0.66
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.04
n-Hexane	0.06
n-Nonane	0.03
n-Octane	0.03
n-Pentane	0.1
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	2
o-Ethyltoluene	0.02
o-Xylene	0.03
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.13
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

Sample ID: 17030213-001

Customer ID: LICA

Cust Samp ID: LICA/VOC/CLS/Mar 14, 2017

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:	H 2823
Station ID:	LICA 01	Installation Date/Time (mst):	Mar 09, 2017 @ 10:39
Sample ID:	LICA/VOC/CLS/Mar 14, 2017	Removal Date/Time (mst):	Mar 16, 2017 @ 10:55

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
Mar 14, 2017	00:00	00:00 Mar 15, 2017	24.0

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
-27.7	24

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
10.0	6.52	24.0

Deployment/Collection and Maintenance Checklist

Initial leak check deployment vacuum (in. Hg) =	–	@	–	mst	**Leak rate must be 0.0 psi over a minimum of 5 minutes or repair is required**
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: Mar 06, 2017 (due every 3 months)

Last date of sample line & fitting replacement: Nov 09, 2016 (due every 6 months)

Comments:

The leak check completed on Mar 07, 2017

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: [signature] Date: Mar 16, 2017

RECEIVED
MAR 20 2017

Volatile Organics Data Results

Date: March 14 , 2017
Canister ID: H2823

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	< 0.05
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	0.09
1-Hexene	< 0.02
1-Pentene	0.01
2,2,4-Trimethylpentane	0.03
2,2-Dimethylbutane	0.02
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	0.04
2,3-Dimethylpentane	0.04
2,4-Dimethylpentane	0.02
2-Methylheptane	0.02
2-Methylhexane	0.04
2-Methylpentane	0.15
3-Methylheptane	< 0.02
3-Methylhexane	0.05
3-Methylpentane	0.09
Acetone	2.7
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	0.09
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.02
Chloromethane	0.67
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	< 0.02
cis-2-Pentene	< 0.02
Cyclohexane	0.05
Cyclopentane	0.04
Dibromochloromethane	< 0.01
Ethanol	1.1
Ethyl acetate	< 0.4
Ethylbenzene	0.01
Freon-11	0.28
Freon-113	0.09

Volatile Organics Data Results

Date: March 14 , 2017
Canister ID: H2823

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.02
Freon-12	0.7
Hexachloro-1,3-butadiene	< 0.50
Isobutane	1.54
Isopentane	0.75
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	0.6
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.09
Methylcyclopentane	0.1
Methylene chloride	< 0.3
n-Butane	2.75
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.06
n-Hexane	0.17
n-Nonane	0.01
n-Octane	< 0.02
n-Pentane	0.7
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	0.08
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.02
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Maxxam Analytics

Mar 16, 2017 CW

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

Client: ~~LA~~ LICA

Location: COLD LAKE SOUTH

Station ID: LICA 01

Sample ID: LICA/VOC/CLS/MAR 20, 2017

Sampler S/N: 6167

Canister ID: S5627

Installation Date/Time (mst): Mar 16, 2017 @ 11:03

Removal Date/Time (mst): MARCH 24, 2017 @ 11:32

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
MAR 20, 2017	00:00	24:00	24:00

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
-28	23.5

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
10.0	6.52	24.0

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

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

Timer reset to zero prior to sampling? Yes (yes/no)

Date of last flow calibration: MAR 06, 2017 (due every 3 months)

Last date of sample line & fitting replacement: NOV 09, 2016 (due every 6 months)

Comments: Leak check completed Mar 07, 2017

Deployment Technician Signature: Mar 16, 2017.

Collection Technician Signature:

Sample ID: 17030304-001

Customer ID: LICA

Cust Samp ID: LICA/VOC/CLS/Mar 20, 2017

RECEIVED
MAR 30 2017

Volatile Organics Data Results

Date: March 20 , 2017
Canister ID: S5627

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	< 0.05
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	0.05
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	0.01
2-Methylpentane	0.03
3-Methylheptane	< 0.02
3-Methylhexane	0.02
3-Methylpentane	< 0.01
Acetone	2.7
Acrolein	< 0.3
Benzene	0.17
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	0.02
Carbon disulfide	0.11
Carbon tetrachloride	0.1
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.02
Chloromethane	0.87
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	< 0.02
cis-2-Pentene	< 0.02
Cyclohexane	0.03
Cyclopentane	0.01
Dibromochloromethane	< 0.01
Ethanol	< 0.3
Ethyl acetate	< 0.4
Ethylbenzene	< 0.01
Freon-11	0.28
Freon-113	0.11

Volatile Organics Data Results

Date: March 20 , 2017
Canister ID: S5627

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.44
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.24
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	0.02
Methylcyclopentane	< 0.02
Methylene chloride	< 0.3
n-Butane	0.57
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.02
n-Hexane	< 0.01
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.1
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	0.02
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.14
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
Location: COLD LAKE SOUTH
Station ID: LICA 01
Sample ID: LICA/VOC/CLS/MARCH 26, 2017

Sampler S/N: 0167
Canister ID: H3296
Installation Date/Time (mst): MARCH 24, 2017 @ 11:32
Removal Date/Time (mst): Mar 27, 2017 @ 13:14

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
MARCH 26, 2017	00:00	24:00	24:00

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
-29	24.0

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
10	6.52	24

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

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

Timer reset to zero prior to sampling? YES (yes/no)
Date of last flow calibration: MARCH 06, 2017 (due every 3 months)
Last date of sample line & fitting replacement: NOV. 09, 2016 (due every 6 months)

Comments: n/a

Deployment Technician Signature: [signature]

Collection Technician Signature: Alex Yakupov Date: Mar 27, 2017

Sample ID: 17030304-003

Customer ID: LICA
Cust Samp ID: LICA/VOC/CLS/Mar 26, 2017

RECEIVED
MAR 30 2017

Volatile Organics Data Results

Date: March 26 , 2017
Canister ID: H3296

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	< 0.05
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	0.08
1-Hexene	< 0.02
1-Pentene	< 0.01
2,2,4-Trimethylpentane	0.04
2,2-Dimethylbutane	< 0.01
2,3,4-Trimethylpentane	< 0.01
2,3-Dimethylbutane	< 0.02
2,3-Dimethylpentane	0.04
2,4-Dimethylpentane	0.02
2-Methylheptane	0.01
2-Methylhexane	0.03
2-Methylpentane	0.07
3-Methylheptane	< 0.02
3-Methylhexane	0.04
3-Methylpentane	0.03
Acetone	3.5
Acrolein	< 0.3
Benzene	0.16
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	0.03
Carbon disulfide	0.12
Carbon tetrachloride	0.09
Chlorobenzene	< 0.02
Chloroethane	0.03
Chloroform	0.02
Chloromethane	0.82
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	0.01
Dibromochloromethane	< 0.01
Ethanol	1.3
Ethyl acetate	< 0.4
Ethylbenzene	< 0.01
Freon-11	0.23
Freon-113	0.1

Volatile Organics Data Results

Date: March 26 , 2017
Canister ID: H3296

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.39
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.53
Isopentane	0.5
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	0.5
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.04
Methylcyclopentane	0.03
Methylene chloride	< 0.3
n-Butane	1.15
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.04
n-Hexane	< 0.01
n-Nonane	0.01
n-Octane	< 0.02
n-Pentane	0.2
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	0.05
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.17
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.04
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

PAH RESULTS

AIR FCD

Sample ID: 17030076-002

Customer ID: LICA

Cust Samp ID: LICA/PUF/CLS/Mar 2, 2017

Priority: Normal

Tisch PUF PLUS Sample Collection Data Sheet

Client:	LICA	**Puf+ S/N:**	TE-03
Location:	Cold Lake South	**Motor S/N:**	1138/ 100-1020
Station ID:	LICA 01	**Installation Date/Time:**	Feb 27, 2017 / 10:58
Field Sample ID:	LICA/PUF/CLS/Mar 02, 2017	**Removal Date/Time:**	Mar 07, 2017 / 09:12

Sample Data Collection Information

Sample Date:	Mar 02, 2017	**Average Pressure (mmHg)**	719
Start Time (mst):	00:00	**Average Flow (Q_{std})**	229
End Time (mst):	00:00 ~~Feb~~ Mar 03 A.Y. 2017	**Average Tempurature (°C)**	-12.4°
Elapsed Time (Hours):	24.0	**Volume (Vstd m^3)**	330.20

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	(YES)	NO
Average temperature appears correct?	(YES)	NO
Average pressure appears correct?	(YES)	NO
Any error messages? (if yes list below)	YES	(NO)
Sample duration 24 hours?	(YES)	NO

Date of last calibration/audit: Dec 28, 2016

Other observations? n/a

RECEIVED
MAR 09 2017

Deployed By: Alex Yakupov

Collected By: Alex Yakupov Date: Mar 07, 2017

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: March 2 , 2017
PUF S/N: TE03

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.18
2-Methylnaphthalene	0.28
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.14
Acenaphthylene	0.03
Acridine	< 0.01
Anthracene	< 0.01
Benzo(a)anthracene	< 0.01
Benzo(a)pyrene	< 0.01
Benzo(b,j,k)fluoranthene	0.03
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	0.06
Fluorene	0.09
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.33
Perylene	< 0.01
Phenanthrene	0.24
Pyrene	0.04
Retene	0.02

Sample ID: 17030114-002

Customer ID: LICA

Cust Samp ID: LICA/PUF/CLS/Mar 8, 2017

Priority: Normal

TISCH PUF PLUS Sample Collection Data Sheet

Client:	LICA	**Puf+ S/N:**	TE-06
Location:	Cold Lake South	**Motor S/N:**	1138/100-1020
Station ID:	LICA 01	**Installation Date/Time:**	Mar 07, 2017/09:12
Field Sample ID:	LICA/PUF/CLS/Mar 08, 2017	**Removal Date/Time:**	Mar 09, 2017/10:49

Sample Data Collection Information

Sample Date:	Mar 08, 2017	**Average Pressure (mmHg)**	724
Start Time (mst):	00:00	**Average Flow (Q_{std})**	229
End Time (mst):	00:00 Mar 09, 2017	**Average Tempurature (°C)**	-20.3°
Elapsed Time (Hours):	24.0	**Volume (Vstd m^3)**	330.16

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	(YES)	NO
Average temperature appears correct?	(YES)	NO
Average pressure appears correct?	(YES)	NO
Any error messages? (if yes list below)	YES	(NO)
Sample duration 24 hours?	(YES)	NO

Date of last calibration/audit: Dec 28, 2016

Other observations? n/a

Deployed By: Alex Yakupov

Collected By: Alex Yakupov **Date:** Mar 09, 2017

RECEIV
MAR 13 2017

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: March 8 , 2017

PUF S/N: TE-06

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.4
2-Methylnaphthalene	0.62
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.08
Acenaphthylene	0.02
Acridine	< 0.01
Anthracene	0.01
Benzo(a)anthracene	0.01
Benzo(a)pyrene	0.01
Benzo(b,j,k)fluoranthene	0.05
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	0.02
Benzo(ghi)perylene	0.02
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	0.1
Fluorene	0.07
Indeno(1,2,3-cd)pyrene	0.03
Naphthalene	1.12
Perylene	< 0.01
Phenanthrene	0.27
Pyrene	0.03
Retene	0.07

Sample ID: 17030213-002

Customer ID: LICA

Cust Samp ID: LICA/PUF/CLS/Mar 14, 2017

TISCH PUF PLUS Sample Collection Data Sheet

Client:	LICA	Puf+ S/N:	TE-04
Location:	Cold Lake South	Motor S/N:	1138/100-1020
Station ID:	LICA 01	Installation Date/Time:	Mar 09, 2017/10:49
Field Sample ID:	LICA/PUF/CLS/Mar 14, 2017	Removal Date/Time:	Mar 16, 2017 @ 10:52

Sample Data Collection Information

Sample Date:	Mar 14, 2017	Average Pressure (mmHg)	712
Start Time (mst):	00:00	Average Flow (Q_{std})	229
End Time (mst):	00:00 Mar 15, 2017	Average Tempurature (°C)	-3.5
Elapsed Time (Hours):	24.0	Volume (Vstd m^3)	330.17

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	(YES)	NO
Average temperature appears correct?	(YES)	NO
Average pressure appears correct?	(YES)	NO
Any error messages? (if yes list below)	YES	(NO)
Sample duration 24 hours?	(YES)	NO
Date of last calibration/audit:	Dec 28, 2016	
Other observations?		

Deployed By: Alex Yakupov

Collected By: [signature] Date: Mar 16, 2017

RECEIVED
MAR 20 2017

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: March 14 , 2017
PUF S/N: TE-04

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.12
2-Methylnaphthalene	0.15
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.05
Acenaphthylene	0.01
Acridine	< 0.01
Anthracene	0.02
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	0.02
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	0.06
Fluorene	0.08
Indeno(1,2,3-cd)pyrene	0.02
Naphthalene	0.15
Perylene	< 0.01
Phenanthrene	0.25
Pyrene	0.05
Retene	0.03

AIR FC

Sample ID: 17030304-002

Customer ID: LICA

Cust Samp ID: LICA/PUF/CLS/Mar 20, 2017

PUF PLUS Sample Collection Data Sheet

Client:	LICA	**Puf+ S/N:**	A13-02
Location:	COLD LAKE SOUTH	**Motor S/N:**	1138 / 100-1020
Station ID:	LICA 01	**Installation Date/Time:**	Mar 16, 2017 @ 10:52
Field Sample ID:	LICA/PUF/CLS/Mar 20, 2017	**Removal Date/Time:**	MAR 24, 2017 @ 10:54

Sample Data Collection Information

Sample Date:	Mar 20, 2017	**Average Pressure (mmHg)**	722
Start Time (mst):	00:00	**Average Flow (Q_{std})**	229
End Time (mst):	24:00	**Average Tempurature (°C)**	-7.7
Elapsed Time (Hours):	24:00	**Volume (Vstd m^3)**	330.19

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	**YES**	**NO**
Average temperature appears correct?	**YES**	**NO**
Average pressure appears correct?	**YES**	**NO**
Any error messages? (if yes list below)	**YES**	**NO**
Sample duration 24 hours?	**YES**	**NO**

Date of last calibration/audit: Dec 28, 2016

Other observations?

RECEIVED
MAR 30 2017

Deployed By:

Collected By:

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: March 20 , 2017
PUF S/N: A13-02

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.08
2-Methylnaphthalene	0.13
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	< 0.01
Acenaphthylene	< 0.01
Acridine	< 0.01
Anthracene	< 0.01
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	< 0.01
Fluorene	0.02
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.14
Perylene	< 0.01
Phenanthrene	0.03
Pyrene	0.01
Retene	< 0.01

Sample ID: 17030304-004

Customer ID: LICA

Cust Samp ID: LICA/PUF/CLS/Mar 26, 2017

TISCH PUF PLUS Sample Collection Data Sheet

Client:	LICA	**Puf+ S/N:**	TE 05
Location:	COLD LAKE SOUTH	**Motor S/N:**	1138 / 100-1020
Station ID:	LICA 01	**Installation Date/Time:**	MARCH 24, 2017 @ 10:57
Field Sample ID:	LICA/PUF/CLS/Mar 26, 2017	**Removal Date/Time:**	Mar 27, 2017 / 14:09

Sample Data Collection Information

Sample Date:	MARCH 26, 2017	**Average Pressure (mmHg)**	711
Start Time (mst):	00:00	**Average Flow (Q_{std})**	229
End Time (mst):	24:00	**Average Tempurature (°C)**	+3.2°
Elapsed Time (Hours):	24:00	**Volume (Vstd m^3)**	330.20

Sample Recovery Checklist

	(circle one)	
Flow Rate 230 slpm +/- 0.2 slpm ?	(YES)	NO
Average temperature appears correct?	(YES)	NO
Average pressure appears correct?	(YES)	NO
Any error messages? (if yes list below)	YES	(NO)
Sample duration 24 hours?	(YES)	NO

Date of last calibration/audit: DEC. 28, 2016

Other observations? n/a

RECEIVED
MAR 30 2017

Deployed By: [signature]

Collected By: Alex Yakupov

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: March 26 , 2017
PUF S/N: TE05

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.3
2-Methylnaphthalene	0.57
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.04
Acenaphthylene	0.07
Acridine	< 0.01
Anthracene	0.13
Benzo(a)anthracene	0.02
Benzo(a)pyrene	0.02
Benzo(b,j,k)fluoranthene	0.07
Benzo(c)phenanthrene	< 0.01
Benzo(e)pyrene	0.02
Benzo(ghi)perylene	0.02
Chrysene	0.05
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.28
Fluorene	0.25
Indeno(1,2,3-cd)pyrene	0.03
Naphthalene	0.35
Perylene	< 0.01
Phenanthrene	0.84
Pyrene	0.23
Retene	0.12

PARTISOL RESULTS

Sample ID: 17030081-001

Customer ID: LICA

Cust Samp ID: P6072294

Priority: Normal

AIR FCD-01318/2

Partisol Sample Data Sheet

RECEIVED
MAR 09 2017

Date Sampled: Mar 02, 2017

Location: Cold Lake South

Parameter: TSP PM10 PM2.5

Filter #: P607 22 94

Start Time 00:00 Mar 02, 2017

End Time 00:00 Mar 03, 2017

Status OK

Std Vol 26.097

Valid Time 24:00

Total Time 24.0

Comments: Weather Conditions, etc.

n/a

Sample inlet cleaned on Jan 27, 2017

Date of last audit - Jan 27, 2017

Technician Signature: Alex Yakupov

Date: Mar 07, 2017

Time: 09:30

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: 17030112-001

Customer ID: LICA

Cust Samp ID: Flt # P6072293

Priority: Normal

AIR FCD-01318/2

Partisol Sample Data Sheet

RECEIVED
MAR 13 2017

Date Sampled: Mar 08, 2017

Location: Cold Lake South

Parameter: TSP PM10 (PM2.5)

Filter #: P 607 22 93

Start Time 00:00 Mar 08, 2017

End Time 00:00 Mar 09, 2017

Status OK

Std Vol 27.057

Valid Time 24:00

Total Time 24.0

Comments: Weather Conditions, etc.

Sample inlet cleaned on Jan 27, 2017
Date of last audit - Jan 27, 2017

Technician Signature: Alex Yakupov

Date: Mar 09, 2017
Time: 11:15

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

Sample ID: 17030214-001

Customer ID: LICA

Cust Samp ID: P6072292

Priority: Normal

Partisol Sample Data Sheet

Date Sampled: Mar 14, 2017

Location: Cold Lake South

Parameter: TSP PM10 (PM2.5)

Filter #: P607 22 92

Start Time 00:00 Mar 14, 2017

End Time 00:00 Mar 15, 2017

Status OK

Std Vol 25.030

Valid Time 24:00

Total Time 24.0

Comments: Weather Conditions, etc.

-4.9 °C ; 0.938 ATM

Sample inlet cleaned on Jan 27, 2017

Date of last audit - Jan 27, 2017

Technician Signature: Deployed: Alex Yakupov

Date:

Time:

Collected: Mar 16, 2017.

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: 17030306-001

Customer ID: LICA

Cust Samp ID: LICA Flt # P6072291

AIR FCD-01318/2

Partisol Sample Data Sheet

Priority: Normal

RECEIVED
MAR 30 2017

Date Sampled: 20-Mar-2017

Location: COLD LAKE SOUTH

Parameter: ~~TSP~~ ~~PM10~~ PM2.5

Filter #: P6072291

Start Time 00:00

End Time 24:00

Status OK

Std Vol 25.763

Valid Time 24:00

Total Time 24:00

Comments: Weather Conditions, etc.

TEMP -8.7 / .951 ATM

Technician Signature:

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	Note: Beginning & End
6) Enter End D	dd-Aug	Date should be same date

7) "Stop/Run"

Sample ID: 17030306-002

Customer ID: LICA

Cust Samp ID: LICA Flt # P6193008

Priority: Normal

AIR FCD-01318/2

Partisol Sample Data Sheet

Date Sampled: MARCH 26, 2017

Location: COLD LAKE SOUTH

Parameter: ~~TSP~~ ~~PM10~~ PM2.5

Filter #: P6193008

Start Time	00:00
End Time	24:00
Status	OK
Std Vol	24.419
Valid Time	24:00
Total Time	24.0

Comments: Weather Conditions, etc.

n/a

Installed: Mike Espiritu

Technician Signature: Alex Yakupov (collected)

Time: 13:41

Date: Mar 27, 2017

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 Sampler Results

Date	Filter NO.	Concentration (mg)
March 2	P6072294	0.110
March 8	P6072293	0.037
March 14	P6072292	0.123
March 20	P6072291	0.033
March 26	P6193008	0.126

APPENDIX III
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE

Thermo 43i Sulphur Dioxide Analyzer Calibration

Date:	March 6, 2017	**Barometric Pressure:**	0.929 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Cold Lake South	**Weather Conditions:**	Mainly cloudy with snow
Parameter:	Sulphur Dioxide	**Calibration Purpose:**	shut down
Start Time 24 hr. (mst):	10:35	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
End Time 24 hr. (mst):	12:52	**Cal Gas Expiry Date:**	July 18, 2019
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	n/a

Hide

Analyzer:

ID# or Serial Number:	806528242	**Range ppb:**	500
Last Calibration Date:	February 27, 2017	**As Found C.F.:**	0.998
Previous C.F.:	1.001	**New C.F.:**	n/a

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

Standard Calibration Points for Ranges

Point	ppb
High	380
Mid	180
Low	90

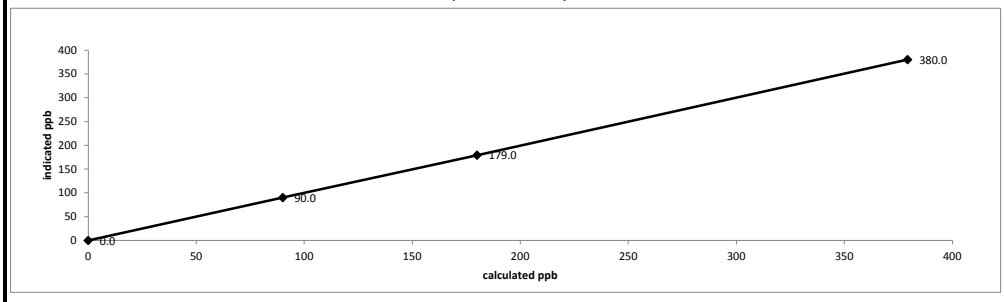
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	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	380.0	0.998
mid	4985	17.80	5003	180.0	179.0	1.006
low	4991	8.90	5000	90.1	90.0	1.001
					Average C.F.=	1.002

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**0.998**	**0.90-1.10**
b (Intercept as % of full scale)=	**0.08%**	**± 3% F.S.**
% change in C.F. from last cal=	**0.28%**	**± 10%**

Thermo 43i Sulphur Dioxide Analyzer Calibration



	As found:	As left:
BKG:	8.0	n/a
COEF:	0.964	n/a
PMT:	-623.5	n/a
FLASH:	774	n/a
INTERNAL:	30.1	n/a
CHAMBER:	45.2	n/a
PERM OVEN GAS:	45.00	n/a
PERM OVEN HEATER:	44.20	n/a
PRESSURE:	674.7	n/a
SAMPLE FLOW:	0.471	n/a
LAMP INTENSITY:	96	n/a
CONVERTER:	n/a	n/a
CONVERTER SET:	n/a	n/a
Expected Value:	465.0	n/a

Comments:

Shutdown calibration completed for annual maintenance.

Thermo 43i Sulphur Dioxide Analyzer Calibration

Date:	March 6, 2017	**Barometric Pressure:**	0.929 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Cold Lake South	**Weather Conditions:**	Mainly cloudy with snow
Parameter:	Sulphur Dioxide	**Calibration Purpose:**	post repair
Start Time 24 hr. (mst):	15:20	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
End Time 24 hr. (mst):	18:36	☑ Hide **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
Last Calibration Date:	n/a	**As Found C.F.:**	n/a
Previous C.F.:	n/a	**New C.F.:**	1.001

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

Standard Calibration Points for Ranges

Point	ppb
High	**380**
Mid	**180**
Low	**90**

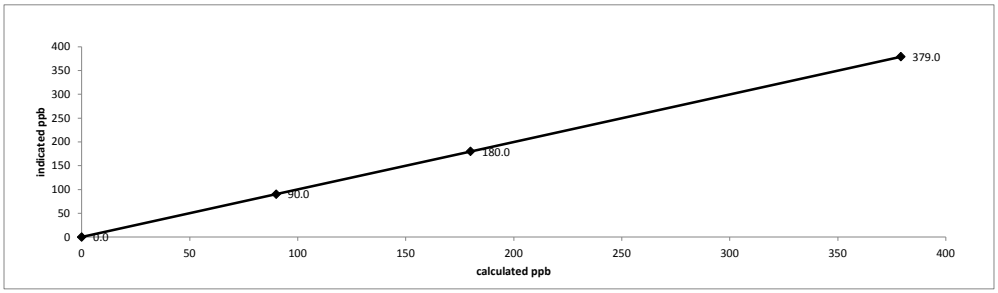
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	**Diluent**	**Cal Gas**	**Total**	**(ppb)**	**(ppb)**	
adjusted zero	5000	0.00	5000	0.0	0.0	n/a
adjusted high	4966	37.50	5004	379.2	379.0	1.001
mid	4986	17.80	5004	180.0	180.0	1.000
low	4991	8.90	5000	90.1	90.0	1.001
calibrator zero	5000	0.00	5000	0.0	0.0	n/a
					Average C.F.=	1.000

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.001**	**.95-1.05**
b (Intercept as % of full scale)=	**0.00%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**± 10%**

Thermo 43i Sulphur Dioxide Analyzer Calibration



	As found:	As left:
BKG:	n/a	8.0
COEF:	n/a	0.957
PMT:	n/a	-623.8
FLASH:	n/a	776
INTERNAL:	n/a	29.8
CHAMBER:	n/a	45.2
PERM OVEN GAS:	n/a	45.00
PERM OVEN HEATER:	n/a	44.20
PRESSURE:	n/a	675.9
SAMPLE FLOW:	n/a	0.471
LAMP INTENSITY:	n/a	96
CONVERTER:	n/a	n/a
CONVERTER SET:	n/a	n/a
Expected Value:	n/a	461.0

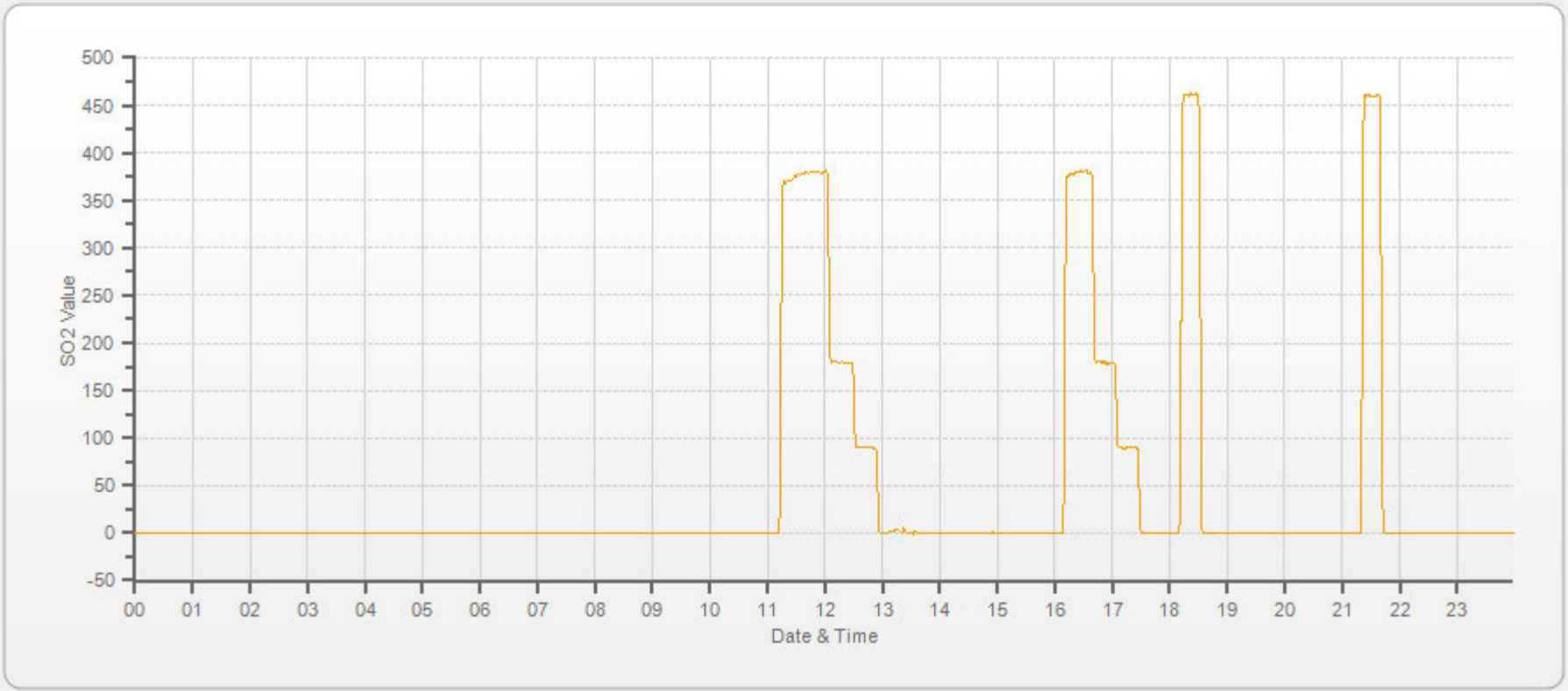
Comments:

The analyzer sample inlet filter was changed.

The analyzer cooling fan filter(s) were cleaned.

Annual maintenance completed. Sample pump rebuilt. Leak check performed. No issues found.

SO2[ppb] Station: LICA COLD LAKE SOUTH Daily: 17.03.06 Type: AVG 1 Min. [1 Min.]



TOTAL REDUCED SULPHUR

Thermo 450i Total Reduced Sulphur Analyzer Calibration

Date:	March 6, 2017	**Barometric Pressure:**	0.929 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Cold Lake South	**Weather Conditions:**	Mainly cloudy with snow
Parameter:	Total Reduced Sulphur	**Calibration Purpose:**	shut down
Start Time 24 hr. (mst):	10:35	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
End Time 24 hr. (mst):	12:40 ☐ Hide	**Cal Gas Expiry Date:**	June 14, 2019
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	CDNova CDN-101 #501

Analyzer:

ID# or Serial Number:	812728560	**Range ppb:**	100
Last Calibration Date:	February 27, 2017	**As Found C.F.:**	0.982
Previous C.F.:	1.000	**New C.F.:**	n/a

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

Standard Calibration Points for Ranges

Point	ppb
High	**78**
Mid	**38**
Low	**19**

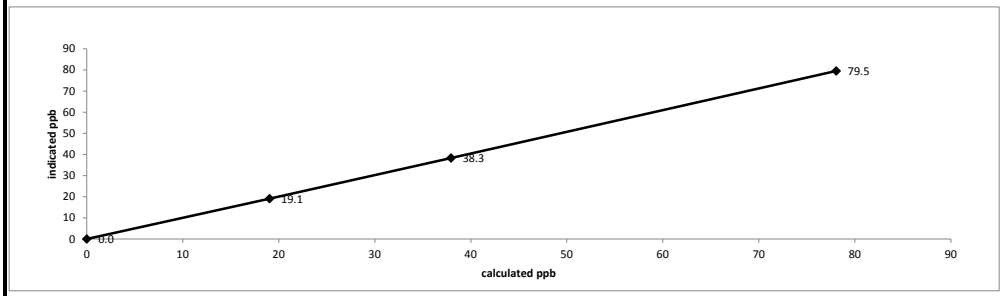
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

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	7443	57.40	7500	78.1	79.5	0.982
mid	7472	27.90	7500	37.9	38.3	0.991
low	7485	14.00	7499	19.0	19.1	0.997
					Average C.F.=	0.990

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**0.981**	**0.90-1.10**
b (Intercept as % of full scale)=	**0.19%**	**± 3% F.S.**
% change in C.F. from last cal=	**1.81%**	**± 10%**

Thermo 450i Total Reduced Sulphur Analyzer Calibration



	As found:		As left:
BKG:	13.8	BKG:	n/a
COEF:	0.937	COEF:	n/a
PMT:	-650.5	PMT:	n/a
FLASH:	741	FLASH:	n/a
INTERNAL:	33.1	INTERNAL:	n/a
CHAMBER:	44.8	CHAMBER:	n/a
CONVERTER TEMP:	825	CONVERTER TEMP:	n/a
CONVERTER SET:	825	CONVERTER SET:	n/a
PERM OVEN GAS:	45.00	PERM OVEN GAS:	n/a
PERM OVEN HTR:	44.37	PERM OVEN HTR:	n/a
PRESSURE:	650.8	PRESSURE:	n/a
SAMPLE FLOW:	0.508	SAMPLE FLOW:	n/a
LAMP INTENSITY:	92	LAMP INTENSITY:	n/a
Expected Value:	37.6	Expected Value:	n/a

Comments:

Shutdown calibration completed for annual maintenance.

Thermo 450i Total Reduced Sulphur Analyzer Calibration

Date:	March 6, 2017	**Barometric Pressure:**	0.929 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Cold Lake South	**Weather Conditions:**	Mainly cloudy with snow
Parameter:	Total Reduced Sulphur	**Calibration Purpose:**	post repair
Start Time 24 hr. (mst):	15:07	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
End Time 24 hr. (mst):	18:36	☐ Hide **Cal Gas Expiry Date:**	June 14, 2019
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	CDNova CDN-101 #501

Analyzer:

ID# or Serial Number:	812728560	**Range ppb:**	100
Last Calibration Date:	n/a	**As Found C.F.:**	n/a
Previous C.F.:	n/a	**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

Standard Calibration Points for Ranges

Point	ppb
High	78
Mid	38
Low	19

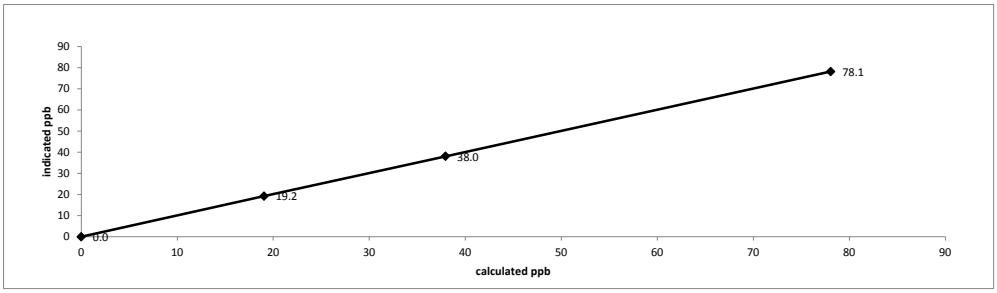
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

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	27.90	7500	37.9	38.0	0.997
low	7485	14.00	7499	19.0	19.2	0.992
calibrator zero	7500	0.00	7500	0.0	0.0	n/a
					Average C.F.=	0.996

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> 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=	**n/a**	**± 10%**

Thermo 450i Total Reduced Sulphur Analyzer Calibration



	As found:		As left:
BKG:	n/a	BKG:	14.1
COEF:	n/a	COEF:	0.932
PMT:	n/a	PMT:	-650.5
FLASH:	n/a	FLASH:	741
INTERNAL:	n/a	INTERNAL:	32.4
CHAMBER:	n/a	CHAMBER:	44.9
CONVERTER TEMP:	n/a	CONVERTER TEMP:	326.2
CONVERTER SET:	n/a	CONVERTER SET:	325.0
PERM OVEN GAS:	n/a	PERM OVEN GAS:	45.00
PERM OVEN HTR:	n/a	PERM OVEN HTR:	44.38
PRESSURE:	n/a	PRESSURE:	627.6
SAMPLE FLOW:	n/a	SAMPLE FLOW:	0.484
LAMP INTENSITY:	n/a	LAMP INTENSITY:	91
Expected Value:	n/a	Expected Value:	40.2

Comments:

The analyzer sample inlet filter was changed.

The analyzer cooling fan filter(s) were cleaned.

Annual maintenance completed. Leaks check performed. Converter tubing renewed and smaller diameter tubing installed. Sample pump rebuilt. Converter chamber cleaned.

TRS[ppb] Station: LICA COLD LAKE SOUTH Daily: 17.03.06 Type: AVG 1 Min. [1 Min.]

TOTAL HYDROCARBON

Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	March 7, 2017	**Barometric Pressure:**	0.936 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Cold Lake South	**Weather Conditions:**	Mainly cloudy with snow
Parameter:	Total Hydrocarbon	**Calibration Purpose:**	shut down
Start/End Time 24 hr. (mst):	8:29 / 10:24	**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:	February 23, 2017	**As Found C.F.:**	1.000
Previous Cal High Point C.F.:	1.000	**New C.F.:**	n/a

Calibrator:

Flow Meter ID's:	n/a	
Make & Model:	API 700	
Serial #:	627	
Cal Gas Cylinder I.D. # :	LL165372	
CH_4/C_3H_8 Cylinder Conc. (ppm):	606.0	212.0
CH_4 as propane/total CH_4 equivilants (ppm):	583.0	1189.0

Standard Calibration Points for a Range of: 50 ppm

Point	Target ppm
High	38
Mid	18
Low	9

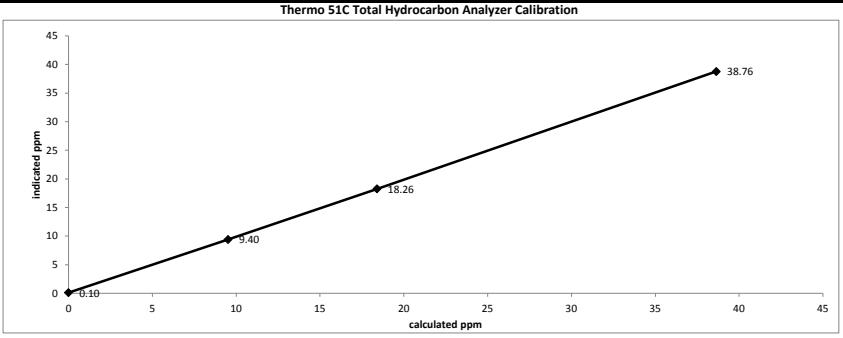
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	**Diluent**	**Cal Gas**	**Total**	**(ppm)**	**(ppm)**	
as found zero	2000	0.00	2000	0.0	0.10	n/a
as found high	1935	65.00	2000	38.64	38.76	1.000
mid	1972	31.00	2003	18.40	18.26	1.013
low	1983	16.00	1999	9.52	9.40	1.023
					Average C.F.=	1.012

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**0.998**	**.95-1.05**
b (Intercept as % of full scale)=	**0.08%**	**± 3% F.S.**
% change in C.F. from last cal=	**0.05%**	**± 10%**

Thermo 51C Total Hydrocarbon Analyzer Calibration



As found:		As left:	
H2 cylinder (psi):	900	H2 cylinder (psi):	n/a
H2 cylinder reg set (psi):	22	H2 cylinder reg set (psi):	n/a
Span Cylinder (psi):	1800	Span Cylinder (psi):	n/a
Span Cylinder Reg Set (psi):	22	Span Cylinder Reg Set (psi):	n/a
Zero Air Gen Pressure:	35	Zero Air Gen Pressure:	n/a
measurement alarms:	None	measurement alarms:	n/a
service alarms:	None	service alarms:	n/a
cnt:	1441	cnt:	n/a
rng:	1	rng:	n/a
try:	3	try:	n/a
flm:	180.4	flm:	n/a
det:	125.6	det:	n/a
Flame:	180	Flame:	n/a
Filter:	125	Filter:	n/a
Base:	125	Base:	n/a
Sample psi:	06.51	Sample psi:	n/a
Internal Air Pressure:	20	Internal Air	n/a
Internal Fuel Pressure:	12	Internal Fuel	n/a
Measured Flow:	n/a	Measured Flow:	n/a
Expected Value:	26.81	Expected Value:	n/a

Comments:

The analyzer sample inlet filter was changed.

The analyzer cooling fan filter(s) were cleaned.

Shutdown calibration completed for annual maintenance.

Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	March 7, 2017	**Barometric Pressure:**	0.936 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Cold Lake South	**Weather Conditions:**	Mainly cloudy with snow
Parameter:	Total Hydrocarbon	**Calibration Purpose:**	post repair
Start/End Time 24 hr. (mst):	10:38 / 13:11	**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:	n/a	**As Found C.F.:**	n/a
Previous Cal High Point C.F.:	n/a	**New C.F.:**	1.000

Calibrator:

Flow Meter ID's:	n/a	
Make & Model:	API 700	
Serial #:	627	
Cal Gas Cylinder I.D. # :	LL165372	
CH_4/C_3H_8 Cylinder Conc. (ppm):	606.0	212.0
CH_4 as propane/total CH_4 equivilants (ppm):	583.0	1189.0

Standard Calibration Points for a Range of: 50 ppm

Point	Target ppm
High	38
Mid	18
Low	9

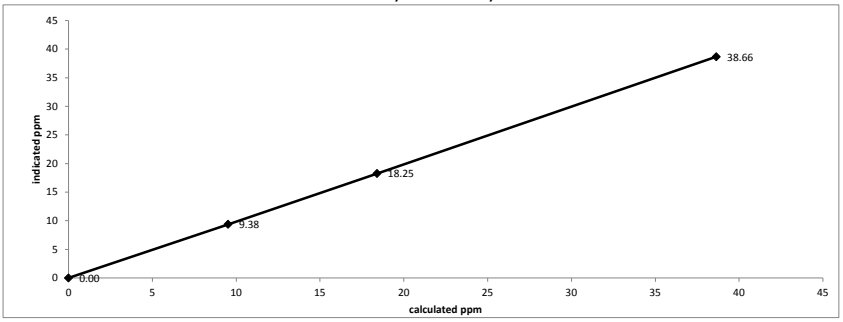
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	**Diluent**	**Cal Gas**	**Total**	**(ppm)**	**(ppm)**	
adjusted zero	2000	0.00	2000	0.0	0.00	n/a
adjusted high	1935	65.00	2000	38.64	38.66	1.000
mid	1972	31.00	2003	18.40	18.25	1.008
low	1983	16.00	1999	9.52	9.38	1.015
calibrator zero	2000	0.00	2000	0.00	0.00	n/a
					Average C.F.=	1.007

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**0.999**	**.95-1.05**
b (Intercept as % of full scale)=	**0.18%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**± 10%**

Thermo 51C Total Hydrocarbon Analyzer Calibration



As found:		As left:	
H2 cylinder (psi):	n/a	H2 cylinder (psi):	900
H2 cylinder reg set (psi):	n/a	H2 cylinder reg set (psi):	22
Span Cylinder (psi):	n/a	Span Cylinder (psi):	1800
Span Cylinder Reg Set (psi):	n/a	Span Cylinder Reg Set (psi):	22
Zero Air Gen Pressure:	n/a	Zero Air Gen Pressure:	35
measurement alarms:	n/a	measurement alarms:	None
service alarms:	n/a	service alarms:	None
cnt:	n/a	cnt:	1461
rng:	n/a	rng:	1
try:	n/a	try:	3
flm:	n/a	flm:	180.8
det:	n/a	det:	125.7
Flame:	n/a	Flame:	180
Filter:	n/a	Filter:	125
Base:	n/a	Base:	125
Sample psi:	n/a	Sample psi:	06.51
Internal Air Pressure:	n/a	Internal Air	20
Internal Fuel Pressure:	n/a	Internal Fuel	13
Measured Flow:	n/a	Measured Flow:	n/a
Expected Value:	n/a	Expected Value:	27.20

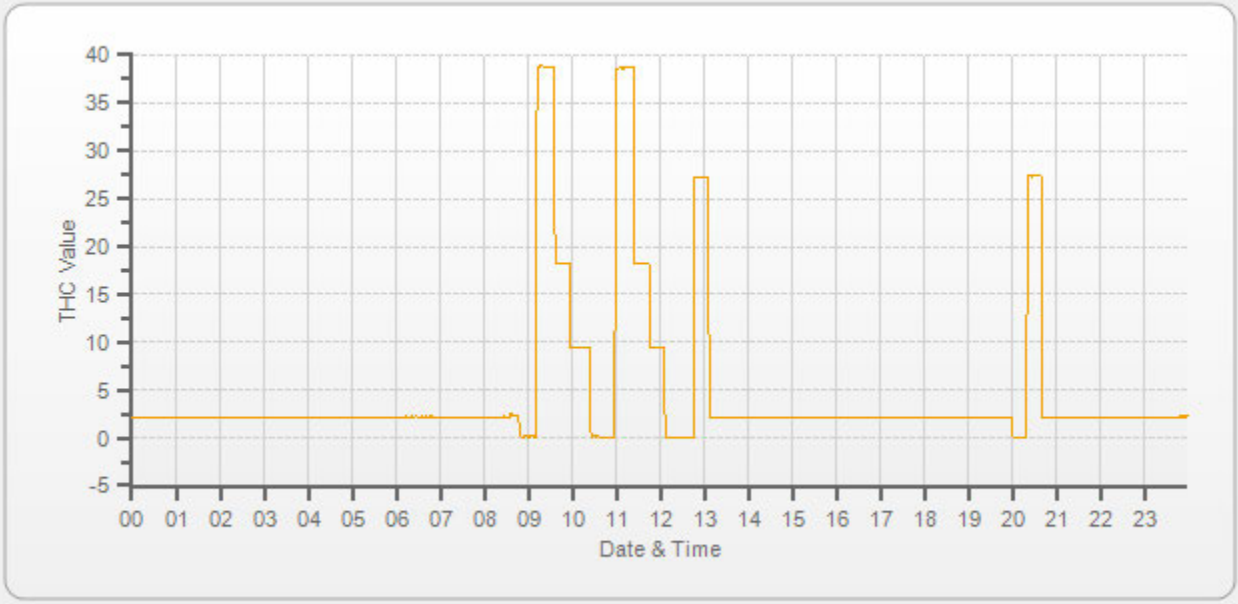
Comments:

The analyzer sample inlet filter was changed.

The analyzer cooling fan filter(s) were cleaned.

The LICA's Zero Air generator s/n 4027 was installed back after repair. Maxxam's Zero Air s/n 133 was left in the station as a temporary back-up zero air generator. H2 fuel tubing was renewed. Fuel pressure adjusted to 13 psi.

THC[ppm] Station: LICA COLD LAKE SOUTH Daily: 2017/03/07 Type: AVG 1 Min. [1 Min.]



NITROGEN DIOXIDE

Thermo 42i NO-NO2-NOx Analyzer Calibration

Date:	March 6, 2017	**Barometric Pressure:**	0.929 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Cold Lake South	**Weather Conditions:**	Mainly cloudy with snow
Start/End Time 24 hr. (mst):	10:35 / 16:03	**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

Analyzer:

ID# or Serial Number:	1505664393
Last Calibration Date:	February 27, 2017
Range ppb:	500

Correction Factors:

	Previous C.F.:	As Found C.F.:	New C.F.:
NO =	1.000	1.000	1.000
NO_2 =	1.000	1.000	1.000
NOx =	1.000	1.000	1.000

Calibrator:

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	50.7

Standard Calibration Points for a Range of: 500 ppb

Point	Target NO (ppb)	Target NO_2 (ppb)	Cc Ozone ?
High	380	250	n/a
Mid	180	145	n/a
Low	90	50	n/a
Extra Point #1	n/a	n/a	n/a
Extra Point #2	n/a	n/a	n/a

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated 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	4965	37.5	5003	380.1	380.1	380.0	380.0	1.000	1.000
adjusted zero	5000	0.00	5000	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4965	37.50	5003	380.1	380.1	380.0	380.0	1.000	1.000
mid	4985	17.80	5003	180.4	180.4	180.0	180.0	1.002	1.002
low	4991	8.90	5000	90.2	90.2	90.0	90.0	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_2	NO drop	NO_2 gain	NO_2 C.F.
Point	**Diluent**	**Cal Gas**	**Total Flow**	**volts or ppb**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**
NOx reference	4965	37.50	5003	0.0	383.0	383.0	0.0	0.0	0.0	
as found high NO2	4965	37.50	5003	235.0	131.0	382.0	252.0	252.0	252.0	1.000
adjusted high NO2	4965	37.50	5003	235.0	131.0	382.0	252.0	252.0	252.0	1.000
gpt mid	4965	37.50	5003	137.0	238.0	383.0	145.0	145.0	145.0	1.000
gpt low	4965	37.50	5003	45.0	333.0	383.0	50.0	50.0	50.0	1.000
									Average NO_2 C.F.=	1.000

Linear Regression/Calibration Results:

	NO	NOx	NO_2	LIMITS
Correlation Coeffecient =	**1.000**	**1.000**	**1.000**	**> or = 0.995**
Slope =	**1.000**	**1.000**	**1.000**	**.95-1.05**
b (Intercept as % of full scale)=	**-0.03%**	**-0.03%**	**0.00%**	**± 3% F.S.**
% change in C.F. from last cal=	**-0.02%**	**-0.02%**	**0.00%**	**± 10%**
NO2 converter effeciency			**1.00**	**0.96 to 1.04**

	As found:		As left:
NO Bkg:	3.7	NO Bkg:	3.7
NOx Bkg:	3.8	NOx Bkg:	3.8
NO Coef:	1.009	NO Coef:	1.009
NO2 Coef:	0.995	NO2 Coef:	0.995
NOx Coef:	0.997	NOx Coef:	0.997
PMT:	-854.7	PMT:	-854.4
Internal:	27.7	Internal:	27.8
Chamber:	50.5	Chamber:	50.3
Cooler:	-2.9	Cooler:	-3.1
NO2 Converter:	323.2	NO2 Converter:	326.0
NO2 Converter Set:	325.0	NO2 Converter Set:	325.0
Pressure:	178.7	Pressure:	178.4
Flow:	0.780	Flow:	0.780
Ozonator Flow:	OK	Ozonator Flow:	OK
Expected Value NO:	1.9	Expected Value NO:	2.0
Expected Value NO2:	268.0	Expected Value NO2:	270.0
Expected Value NOx:	270.0	Expected Value NOx:	272.0

Comments:

The analyzer sample inlet filter was changed.

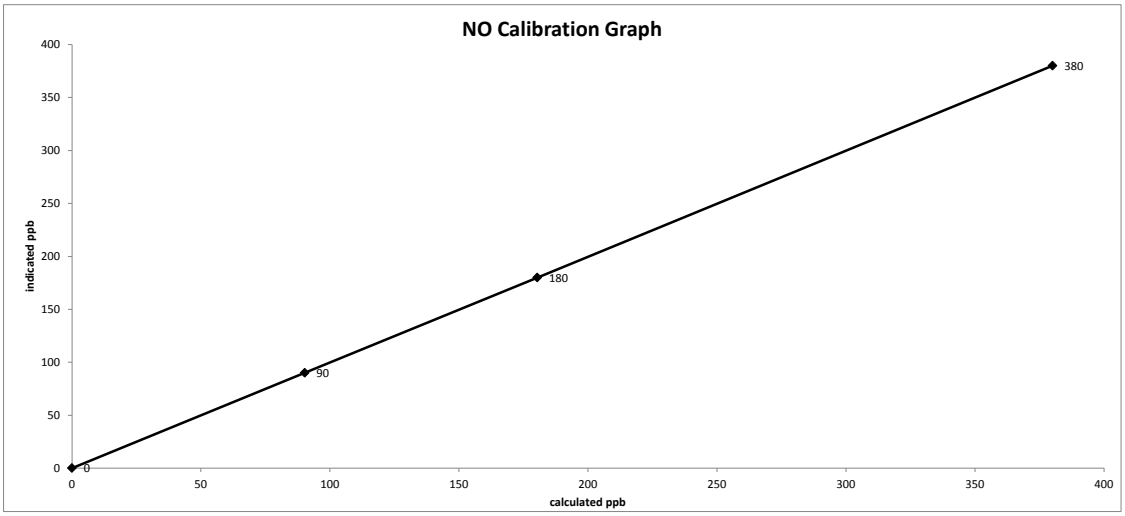
No high point NO2 adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.

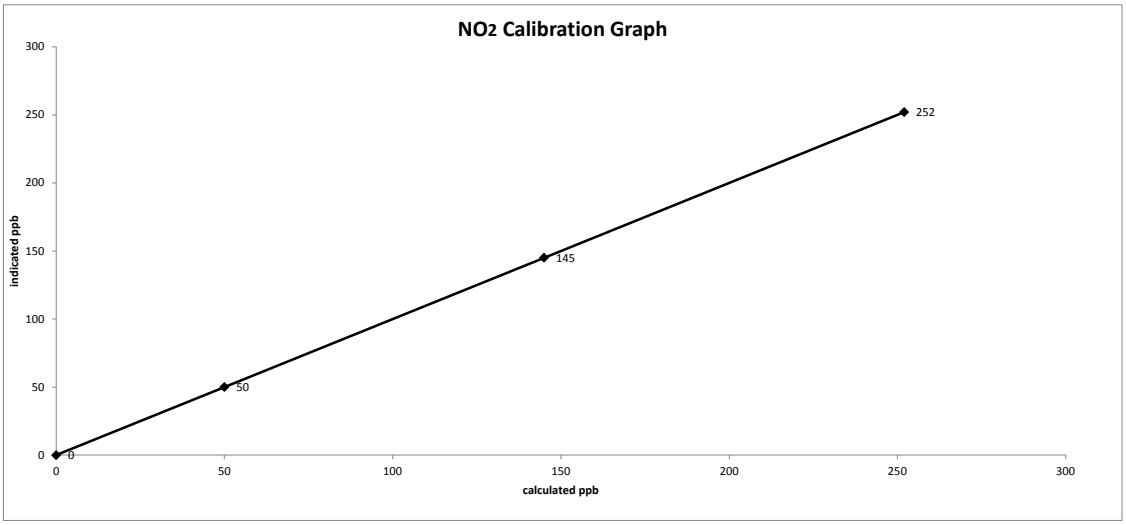
No zero adjustment was required/made. As found zero values were copied to adjusted zero values for linearity calculation purposes.

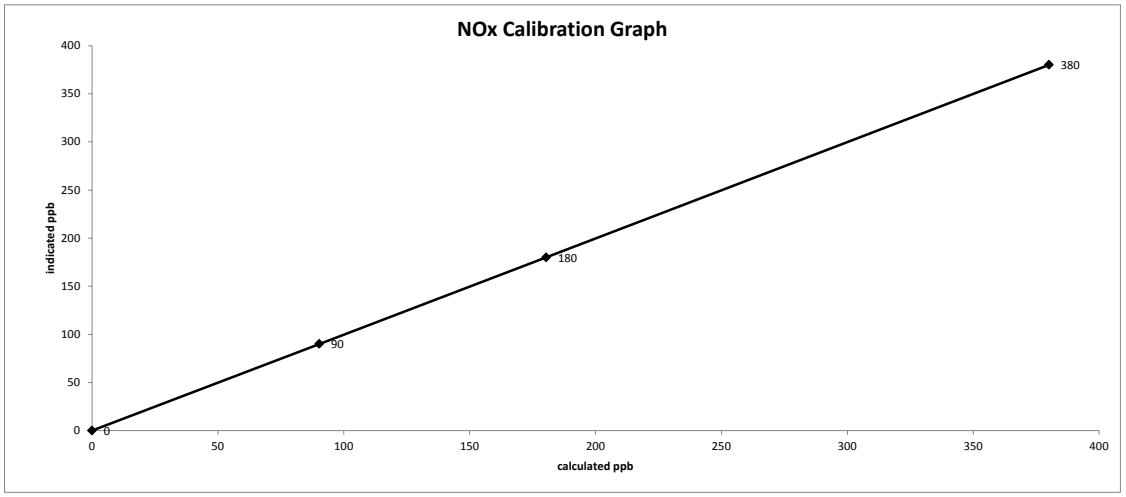
The analyzer cooling fan filter(s) were cleaned.

No High Point NOx/NO adjustment made.

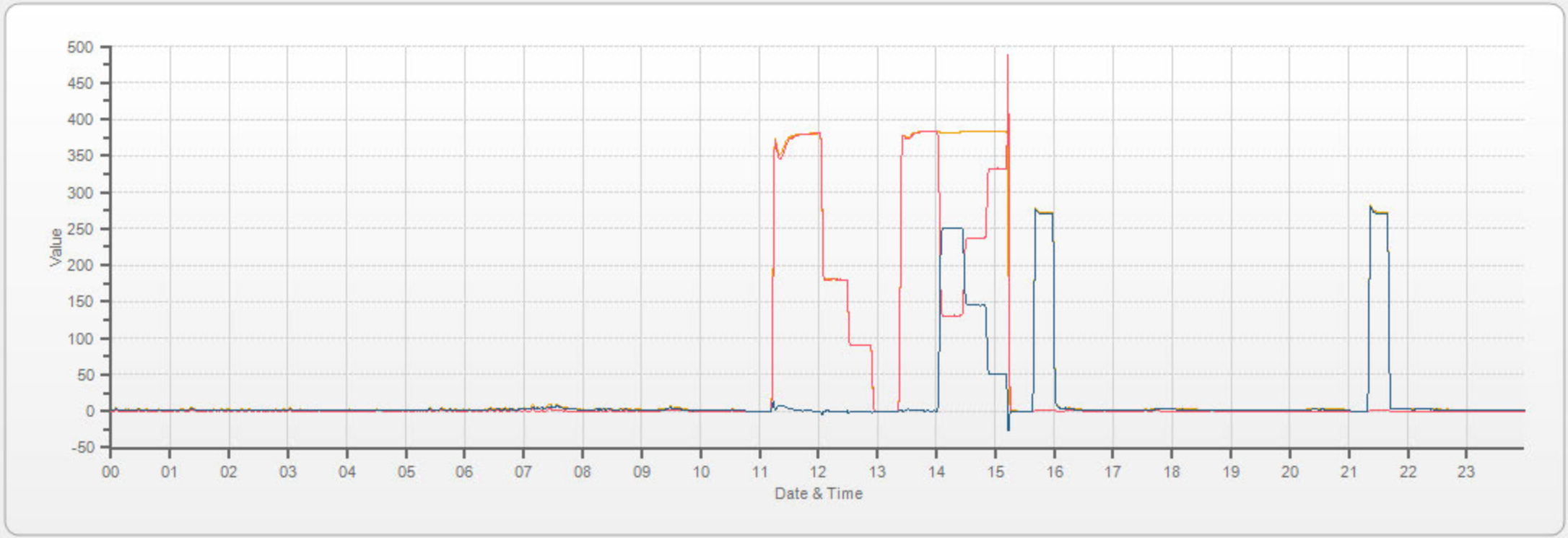
Date:	**March 6, 2017**	**Start/End Time 24 hr. (mst):**	**10:35 / 16:03**
Company/Airshed:	**LICA**	**Calibration Purpose:**	**routine monthly**
Location/Station Name:	**Cold Lake South**	**Calibration Method:**	**Gas Dilution & Gas Phase Titration**







Station: LICA COLD LAKE SOUTH Daily: 17.03.06 Type: AVG 1 Min. [1 Min.]



OZONE

Thermo 49i Ozone Analyzer Calibration

Date:	March 6, 2017	**Barometric Pressure:**	0.929 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Cold Lake South	**Weather Conditions:**	Mainly cloudy with snow
Start/End Time 24 hr. (mst):	12:42 / 14:47	**Calibration Purpose:**	shut down
Ozone Calibration Method:	Varying UV Lamp Power	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
G.P.T. Date:	n/a-done by Varying UV Lamp Power	**Cal Gas Expiry Date:**	n/a

Analyzer:

ID# or Serial Number:	700419951	**Ozone Range ppb:**	500
Last Calibration Date:	February 23, 2017	**As Found C.F.:**	1.000
Previous Cal High Point C.F.:	1.000	**New C.F.:**	n/a

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

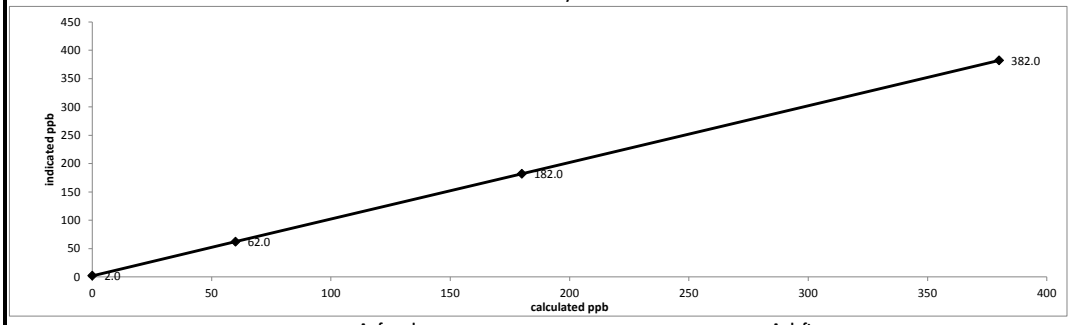
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Conentration:	Indicated Concentration:	Correction Factors:
Point	**Total Flow @ Point Start**	**Total Flow @ Point Finish**	**(ppb)**	**(ppb)**	**(ppb)**	
as found zero	5000	5000	0.0	n/a	2.0	n/a
as found high	5000	5000	380.0	380.0	382.0	1.000
mid	5000	5000	180.0	180.0	182.0	1.000
low	5000	5000	60.0	60.0	62.0	1.000
					Average C.F.=	1.000

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.000**	**0.90-1.10**
b (Intercept as % of full scale)=	**-0.40%**	**± 3% F.S.**
% change in C.F. from last cal=	**0.00%**	**± 10%**

Thermo 49i Ozone Analyzer Calibration

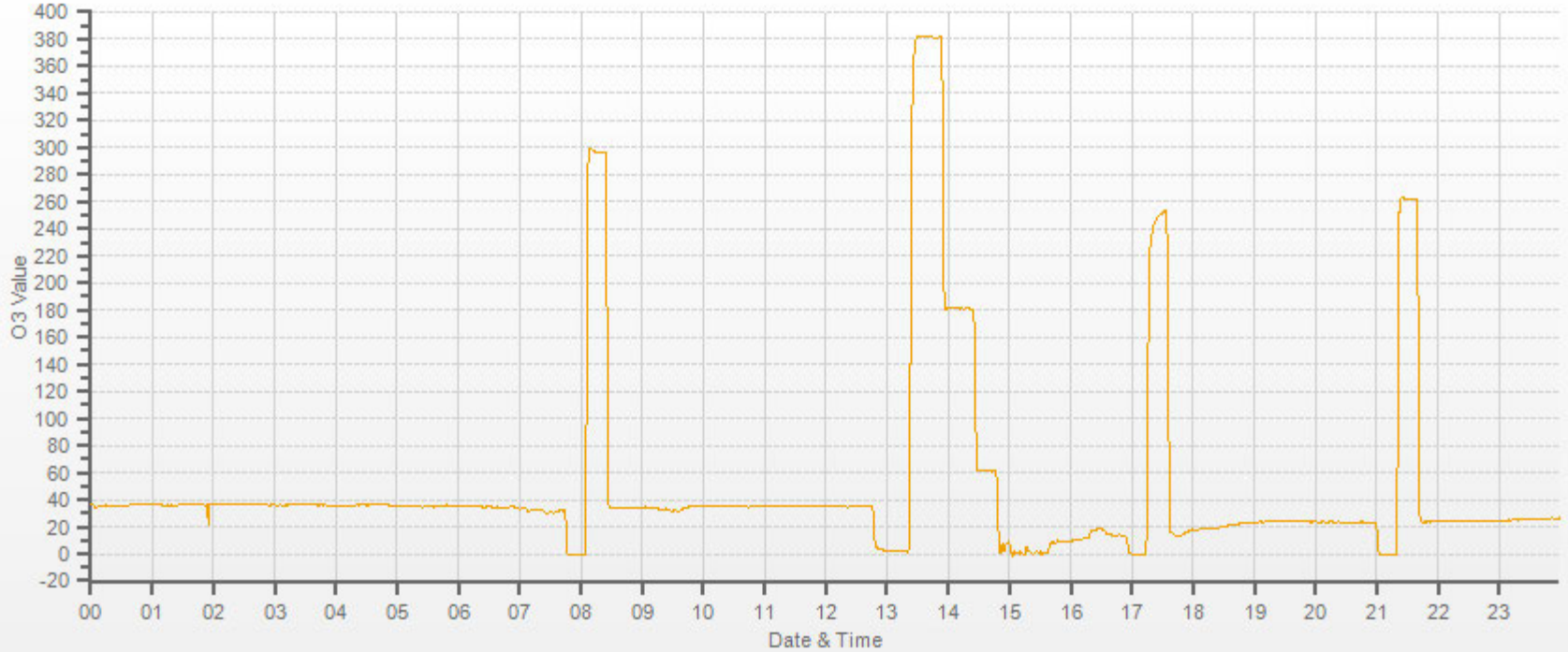


As found:		As left:	
O3 Bkg:	0.1	O3 Bkg:	n/a
O3 Coef:	0.997	O3 Coef:	n/a
Photo Lamp	9.6	Photo Lamp	n/a
O3 Lamp	9.0	O3 Lamp	n/a
Bench:	29.7	Bench:	n/a
Bench Lamp:	53.5	Bench Lamp:	n/a
O3 Lamp:	67.4	O3 Lamp:	n/a
Pressure:	700.5	Pressure:	n/a
Cell A lpm:	0.711	Cell A lpm:	n/a
Cell B lpm:	0.751	Cell B lpm:	n/a
O3 ppb:	1.6	O3 ppb:	n/a
Cell A ppb:	1.1	Cell A ppb:	n/a
Cell B ppb:	-1.3	Cell B ppb:	n/a
Cell A int:	87439	Cell A int:	n/a
Expected Value:	273.0	Expected Value:	n/a

Comments:

Shutdown calibration completed for annual maintenance.

O3[ppb] Station: LICA COLD LAKE SOUTH Daily: 17.03.06 Type: AVG 1 Min. [1 Min.]



Thermo 49i Ozone Analyzer Calibration

Date:	March 7, 2017	**Barometric Pressure:**	0.936 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Cold Lake South	**Weather Conditions:**	Mainly cloudy with snow
Start/End Time 24 hr. (mst):	8:29 / 13:23	**Calibration Purpose:**	post repair
Ozone Calibration Method:	Varying UV Lamp Power	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
G.P.T. Date:	n/a-done by Varying UV Lamp Power	**Cal Gas Expiry Date:**	n/a

Analyzer:

ID# or Serial Number:	700419951	**Ozone Range ppb:**	500
Last Calibration Date:	n/a	**As Found C.F.:**	n/a
Previous Cal High Point C.F.:	n/a	**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

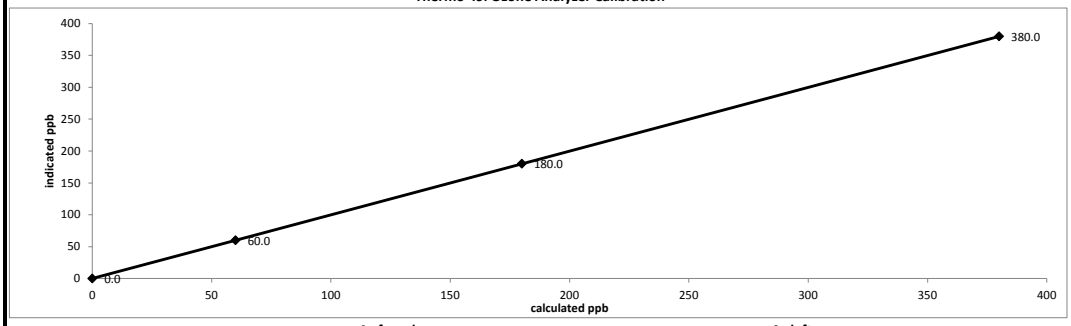
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Conentration:	Indicated Concentration:	Correction Factors:
Point	**Total Flow @ Point Start**	**Total Flow @ Point Finish**	**(ppb)**	**(ppb)**	**(ppb)**	
adjusted zero	5000	5000	0.0	n/a	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	180.0	180.0	181.0	0.994
low	5000	5000	60.0	60.0	61.0	0.984
calibrator zero	5000	5000	0.0	0.0	0.0	n/a
					Average C.F.=	0.993

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.000**	**.95-1.05**
b (Intercept as % of full scale)=	**0.00%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**± 10%**

Thermo 49i Ozone Analyzer Calibration



As found:		As left:	
O3 Bkg:	n/a	O3 Bkg:	0.3
O3 Coef:	n/a	O3 Coef:	1.002
Photo Lamp	n/a	Photo Lamp	9.6
O3 Lamp	n/a	O3 Lamp	9.0
Bench:	n/a	Bench:	29.2
Bench Lamp:	n/a	Bench Lamp:	53.5
O3 Lamp:	n/a	O3 Lamp:	67.4
Pressure:	n/a	Pressure:	707.7
Cell A lpm:	n/a	Cell A lpm:	0.718
Cell B lpm:	n/a	Cell B lpm:	0.757
O3 ppb:	n/a	O3 ppb:	0.1
Cell A ppb:	n/a	Cell A ppb:	3.8
Cell B ppb:	n/a	Cell B ppb:	-3.6
Cell A int:	n/a	Cell A int:	90405
Expected Value:	n/a	Expected Value:	270.0

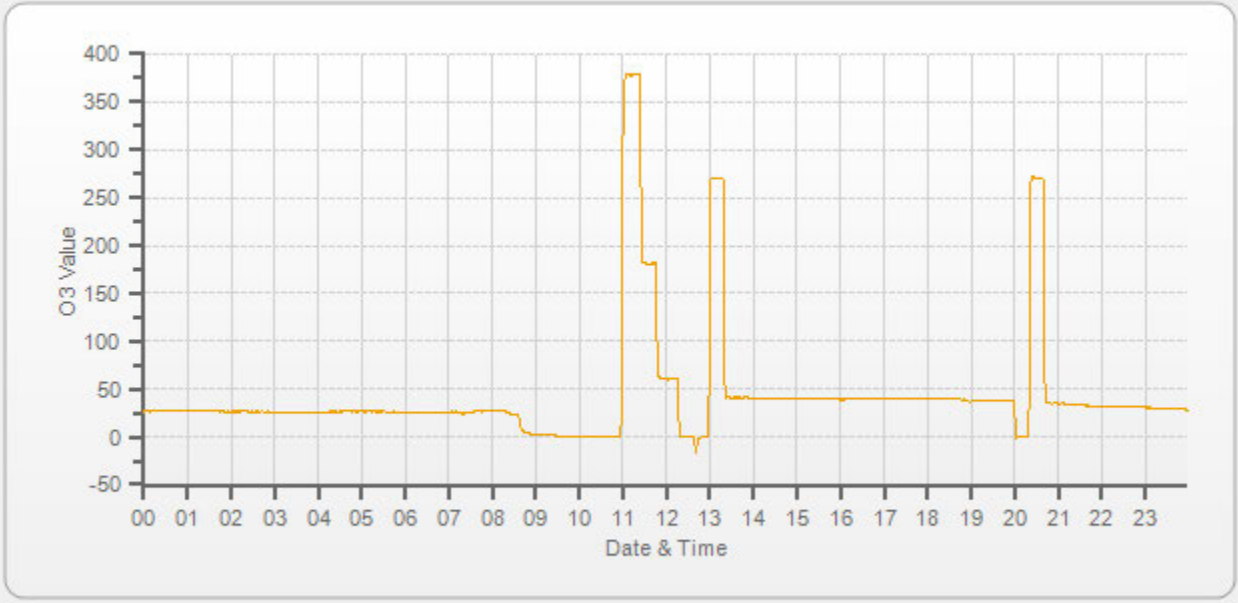
Comments:

The analyzer sample inlet filter was changed.

The analyzer cooling fan filter(s) were cleaned.

Annual maintenance completed. Sample pump and Zero Air pump were rebuilt. Optical cells A and B were cleaned.

O3[ppb] Station: LICA COLD LAKE SOUTH Daily: 2017/03/07 Type: AVG 1 Min. [1 Min.]



PARTICULATE MATTER

R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date:	March 7, 2017	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
Company:	LICA	**Start Time (mst):**	10:16
Station Name/Location:	Cold Lake South	**End Time (mst):**	11:39
Previous Audit Date:	February 21, 2017	**Calibration Purpose:**	Bi-monthly #1
Parameter:	PM 2.5	**Weather Conditions:**	Mainly cloudy with light snow

1400A Information and Status:

ID# or Serial Number:	1405A201620804	**As Found Filter Loading %:**	30.36
Ko Factor:	14578	**As Left Filter Loading %:**	19.82
Ambient Temperature °C:	-14.17	**As Found Noise:**	0.004
Ambient Pressure atm:	0.935	**As Left Noise:**	0.000
Main Flow Reading lpm:	3.00	**Pump Vacuum:**	0.39
Aux Flow Reading lpm:	13.67	**Warnings:**	none

Reference Standards:

	Flow:	**Pressure:**	**Temperature:**
Make:	Dwyer	Fisher Scientific	FLUKE
Model:	475 Mark III	FB 1291	1551A Ex STIK
Serial Number:	#3	ID# 05544	ID# 4295
Calibration Date:	January 1, 2017	December 5, 2016	November 15, 2016

As found leak check:

		Base	**Zero**	**Reference**	**Zero**
PM 2.5 Flow	actual	0.01	0.11	0.01	0.11
	limit	0.15		0.15	
Bypass Flow	actual	0.00	-0.01	0.00	-0.01
	limit	0.60		0.60	

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

		Base	**Zero**	**Reference**	**Zero**
PM 2.5 Flow	actual	0.01	0.11	0.01	0.11
	limit	0.15		0.15	
Bypass Flow	actual	0.00	-0.01	0.00	-0.01
	limit	0.60		0.60	

As found temperature and pressure:

	tolerance +/- 2.0°C		**tolerance +/- 0.01 atm**
1405F temperature °C:	-14.2	**1405F pressure atm:**	0.935
reference temperature °C:	-13.0	**reference pressure:**	0.936
difference °C:	1.1	**difference :**	-0.001

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

	tolerance +/- 2.0°C		**tolerance +/- 0.01 atm**
1405F temperature °C:	-13.0	**1405F pressure atm:**	0.936
reference temperature °C:	-13.0	**reference pressure:**	0.936
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:**	16.56
difference lpm:	0.02	**difference lpm:**	-0.11

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:**	16.56
difference lpm:	0.02	**difference lpm:**	-0.11

K_o Audit:

Last K_o audit date:	February 10, 2017
1405F K_o factor:	14578
Measured K_o factor:	14789.9000
% difference:	1.44

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.

Total and Auxiliary flows were measured and the Main flow was calculated.

R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date:	March 27, 2017	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
Company:	LICA	**Start Time (mst):**	14:01
Station Name/Location:	Cold Lake South	**End Time (mst):**	15:28
Previous Audit Date:	March 7, 2017	**Calibration Purpose:**	Bi-monthly #2
Parameter:	PM 2.5	**Weather Conditions:**	Mix of sun and clouds

1400A Information and Status:

ID# or Serial Number:	1405A201620804	**As Found Filter Loading %:**	31.29
Ko Factor:	14578	**As Left Filter Loading %:**	18.15
Ambient Temperature °C:	8.21	**As Found Noise:**	0.005
Ambient Pressure atm:	0.939	**As Left Noise:**	0.000
Main Flow Reading lpm:	3.00	**Pump Vacuum:**	0.39
Aux Flow Reading lpm:	13.67	**Warnings:**	none

Reference Standards:

	Flow:	**Pressure:**	**Temperature:**
Make:	Dwyer	Fisher Scientific	FLUKE
Model:	475 Mark III	FB 1291	1551A Ex STIK
Serial Number:	#3	ID# 05544	ID# 4295
Calibration Date:	January 1, 2017	December 5, 2016	November 15, 2016

As found leak check:

		Base	**Zero**	**Reference**	**Zero**
PM 2.5 Flow	actual	0.00	0.12	0.00	0.12
	limit	0.15		0.15	
Bypass Flow	actual	0.00	-0.01	0.00	-0.01
	limit	0.60		0.60	

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

		Base	**Zero**	**Reference**	**Zero**
PM 2.5 Flow	actual	0.00	0.12	0.00	0.12
	limit	0.15		0.15	
Bypass Flow	actual	0.00	-0.01	0.00	-0.01
	limit	0.60		0.60	

As found temperature and pressure:

	tolerance +/- 2.0°C		**tolerance +/- 0.01 atm**
1405F temperature °C:	8.2	**1405F pressure atm:**	0.939
reference temperature °C:	7.2	**reference pressure:**	0.935
difference °C:	-1.0	**difference :**	0.004

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

	tolerance +/- 2.0°C		**tolerance +/- 0.01 atm**
1405F temperature °C:	7.2	**1405F pressure atm:**	0.935
reference temperature °C:	7.2	**reference pressure:**	0.935
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:**	16.08
difference lpm:	0.02	**difference lpm:**	-0.59

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:**	16.08
difference lpm:	0.02	**difference lpm:**	-0.59

K_o Audit:

Last K_o audit date:	February 10, 2017
1405F K_o factor:	14578
Measured K_o factor:	14789.9000
% difference:	1.44

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.

Total and auxiliary flows were measured and the main flow was calculated.

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: AJ2 **Inspection Date:** APR 0 3 2015

New Unit [ ] **Repair/Adjust** [X] **Re-Calibration** [X] **As Found** [ ]

Unit Within Tolerance as Found [ ] **Unit Within Tolerance as Left** [X]

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)
30	.084	30.3	.3	3.06	.059	2.96	-.1
60	.165	59.3	-.7	3.07	.059	2.94	-.13
120	.334	120.2	.2	3.08	.059	2.94	-.14
150	.415	149.5	-.5	3.07	.059	2.94	-.13
210	.583	210	0	3.08	.059	2.95	-.12
240	.668	240.3	.3	3.08	.06	2.98	-.1
300	.834	300.4	.4	3.07	.06	3.02	-.04
330	.916	329.8	-.2	3.09	.059	2.97	-.12

Output Type:

0 to 1 volt	X
0 to 2.5 volt	
0 to 5 volt	
RS-232	X
SDI-12	
RS-422	
RS-485	

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)
30	.081	29.3	-.7	11.79	.235	11.76	-.04
60	.165	59.5	-.5	11.85	.237	11.87	.01
120	.331	119.1	-.9	11.85	.236	11.81	-.03
150	.415	149.3	-.7	11.88	.236	11.8	-.08
210	.582	209.5	-.5	11.81	.236	11.79	-.02
240	.666	239.9	-.1	11.88	.235	11.73	-.16
300	.833	299.7	-.3	11.87	.235	11.73	-.13
330	.915	329.6	-.4	11.84	.238	11.9	.06

Test Items:

Array Alignment	✓
Jumper Config	✓
Firmware Config	✓
Zero Calibration	✓
Low Speed Test OK	✓
High Speed Test OK	✓
Sensor Function	✓
Physical Inspection	✓

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:**	March 6, 2017	
Location:	Cold Lake South	**Last Cal. Date:**	December 19, 2016	
Station ID:	LICA 01	**Start Time 24 hr. (mst):**	15:43	
Sampler s/n:	6167	**End Time 24 hr. (mst):**	16:53	
Purpose:	Routine Quarterly	**Performed By/Reviewer:**	Limin Li	Trina Whitsitt

	Pressure Standard:	**Flow Standard:**
Make/Model	Fisher Scientific /FB1291	BUOS DryCal/DC-Lite
S/N or ID#:	ID# 05544	s/n 4425
Certification Date:	December 5, 2016	February 3, 2017

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

$$F = \frac{(P \times V)}{(T \times 60)} = \frac{1.61 \times 6000}{24 \times 60} = 6.71 \text{ cc/min}$$

= 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	0.929	atm
P=	1.60946	(atm)+.68046
V=	6000	cubic centimetres
T=	24	hours

XONTECK QUARTERLY FLOW VERIFICATION/CALIBRATION

FLOW RATE VERIFICATION

Volumetric Flow rate =	n/a	**(cc/min)**		
			As found pot setting =	6.52
Target Flow Rate (cc/min) =	6.71			
				#VALUE!
% Difference =	**#VALUE!**			

FLOW RATE CALIBRATION

Volumetric Flow rate =	n/a	**(cc/min)**		
			Adjusted pot setting =	6.10
Target Flow Rate (cc/min) =	6.71			
				#VALUE!
% Difference =	**#VALUE!**			

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.	March 6, 2017

COMMENTS:

Flow was measured and adjusted for Flow Reading on the sampler from 10.0 to 9.3 and Pot Set Point from 6.52 to 6.10 for the existing conditions of Temperature and Pressure. A VOC canister was installed for 12 hour leak check at 16:45. The canister cheched on March 7, 2017 at 08:30. No leaks detected: the canister keeps the initial vacuum of -28.0 in Hg.

CALIBRATORS

Alberta Government

Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2016-442A

Company Maxxam/SIA **Operator:** Chris

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

Dilution Flow (sccm)

Pt. #1 4892 Pt. #2 4975 Pt. #3 4951

Gas Flow (sccm)

Pt. #1 79.7 Pt. #2 38.8 Pt. #3 19.4

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO_2	NOx	NO	NOx
	0.0	0.0000	0.0000	0.0000	-0.0004	-0.0004	Limit ± 10%	
4972	79.7	0.7855	0.7855	0.7883	0.0004	0.7887	0.4%	0.5%
4936	38.8	0.3822	0.3822	0.3816	0.0005	0.3822	-0.2%	0.1%
4970	19.4	0.1913	0.1913	0.1902	0.0006	0.1913	-0.6%	0.2%
						Absolute Average Percent Difference	0.1%	0.3%

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

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

Flow	O_3 Conc	NO Decrease	NO	NO2	NOX	% Diff. Vs Audit gas	
						NO_2	% Diff. Limit
4972	0	0.0000	0.7867	0.0014	0.7881		
4972	500	0.5127	0.2740	0.5104	0.7849	-0.7%	± 10%
4972	275	0.2863	0.5004	0.2860	0.7865	-0.6%	± 10%
4972	90	0.0940	0.6927	0.0954	0.7880	0.0%	± 10%
					Absolute Average Percent Difference	0%	± 10%

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

NO_2		**LIMITS**
Correlation=	1.0000	**≥ 0.995**
m (Slope)=	0.9924	**0.90-1.10**
b (Intercept % of FS)=	0.1755	**± 3% F.S.**

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

COMMENTS:

Auditor: Shea Beaton Date: January 27, 2017

Operator Signature: Location: McIntyre Center Edmonton

Alberta Government

Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2016-526A

Company Maxxam **Operator:** Mike

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

Dilution Flow (sccm)

Pt. #1 4879 Pt. #2 4932 Pt. #3 4950

Gas Flow (sccm)

Pt. #1 74.5 Pt. #2 36.4 Pt. #3 18.2

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO_2	NOx	NO	NOx
4965	0.0	0.0000	0.0000	0.0001	0.0000	0.0001	Limit ± 10%	
4954	74.5	0.7685	0.7700	0.7915	0.0008	0.7923	3%	3%
4968	36.4	0.3744	0.3751	0.3832	0.0006	0.3838	2%	2%
4968	18.2	0.1872	0.1876	0.1916	0.0002	0.1918	2%	2%
					Absolute Average Percent Difference		3%	2%

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

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

Flow	O_3 Conc	NO Decrease	NO	NO2	NOX	% Diff. Vs Audit gas	
4954	0.000	0.0000	0.7949	0.0005	0.7954	NO_2	% Diff. Limit
4954	0.510	0.5104	0.2845	0.5072	0.7917	-1%	± 10%
4954	0.250	0.2516	0.5433	0.2514	0.7944	0%	± 10%
4954	0.100	0.1085	0.6864	0.1087	0.7951	0%	± 10%
				Absolute Average Percent Difference		0%	± 10%

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

NO_2		**LIMITS**
Correlation=	1.0000	**≥ 0.995**
m (Slope)=	0.9926	**0.90-1.10**
b (Intercept % of FS)=	0.0925	**± 3% F.S.**

AENV Standards Audit Calibrator		**NO_X Analyzer**	
Make/Model	Thermo 146i	Make/Model	Thermo 42i
Serial/AMU Number	1809	Serial/AMU Number	1868
SRM Gas Cylinder No.	CAL018140	Last Calibration Date	March 15, 2017
Cylinder Conc. (ppm)	48.79	Full Scale (ppm)	1.0
		Cylinder Gas Expiry Date	March 28, 2019

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton Date: March 16, 2017

Operator Signature: Location: McIntyre Center Edmonton

CALIBRATION GASES

Alberta Government

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:

Make/Model: R&R MFC 201
Serial Number: AMU 1690
Last Verification Date: October 19, 2016
Gas Type: SO2 Conc. 98.07
Cylinder Number: CA:016625
Expiry Date: January 2019

Flow Measurement Device:

Make/Model: Bios DC2
Serial Number: AMY 1659
Temp.°C: 24.5 C
B.P. 706 mmhg

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

Previous Stated Concentration PPM: 50.6

Percent variance from Stated: 1

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

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [X]

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

Auditor: Al Clark Date: October 19, 2016

Operator Signature: Location: McIntyre Center Edmonton

Alberta Government

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

Previous Stated Concentration PPM: 10.2

Percent variance from Stated: 1

Meets Manufacturer Tolerance. Use manufacturers stated concentration [X] **COMMENTS:**

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [ ]

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

Auditor: Al Clark Date: October 19, 2016

Operator Signature: Al Clark Location: McIntyre Center Edmonton

aemera.org

Calibration Gas Audit

CH4 / C3H8 Cylinder Gas

File No. 2015-092CGA

Company: Maxxam **Operators name:** Chris Wesson

Cylinder #: LL165372 Conc CH4 (PPM) 606/212 Tolerance (%) 0.5 Certified By: Praxair

Reference Calibrator and Gas:

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

Flow Measurement Device:

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

Reference Analyzer:

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

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

	CH4	C3H8
Previous Stated Concentration PPM:	606	212
Percent variance from Stated:	**0.3**	**1.6**

Cylinder gas tolerances based on CH4 only

Meets Manufacturer Tolerance. Use manufacturers stated concentration [X] **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

Alberta Government

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:

Make/Model	Teco 146i
Serial Number	AMU 1809
Last Verification Date	October 19, 2019
Gas Type	NO Conc. 48.79
Cylinder Number	CAL018188
Expiry Date	March 2019

Flow Measurement Device:

Make/Model	Bios DC2
Serial Number	AMU 1659
Temp.°C	24.5 C
B.P.	706 mmhg

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/	Concentration	Cylinder Concentration	
Dilution	Gas	NO	NOX	Dilution Flow	Factor	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:	**50.7**	**50.6**

	NO	NOx
Previous Stated Concentration PPM:	50.7	50.9
Percent variance from Stated:	**0**	**1**

Cylinder gas tolerances based on NO only

Meets Manufacturer Tolerance. Use manufacturers stated concentration [X]

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [ ]

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

COMMENTS: Contains 50.6 ppm SO2.

Auditor: Al Clark Date: October 19, 2016

Operator Signature: Location: McIntyre Center Edmonton

APPENDIX IV
ANALYTICAL RESULTS

PASSIVE SAMPLES

Your Project #: 2017/01/30 - 2017/03/30
Site Location: LICA

Attention:MICHAEL BISAGA

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
PO BOX 8237
5107W- 50TH STREET
BONNYVILLE, AB
CANADA T9N 2J5

Report Date: 2017/04/13
Report #: R2369247
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B724492
Received: 2017/04/04, 11:19

Sample Matrix: Air
Samples Received: 33

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
H2S Passive Analysis (1)	20	2017/04/11	2017/04/13	PTC SOP-00150	Tang.Passive H2S in
NO2 Passive Analysis (1)	5	2017/04/10	2017/04/13	PTC SOP-00148	Passive NO2 in ATM
NO2 Passive Analysis (1)	20	2017/04/11	2017/04/13	PTC SOP-00148	Passive NO2 in ATM
O3 Passive Analysis (1)	25	2017/04/07	2017/04/13	PTC SOP-00197	EPA 300 R2.1
SO2 Passive Analysis (1)	29	2017/04/05	2017/04/13	PTC SOP-00149	Passive SO2 in Air

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) The detection limit is based on a 30 day sampling period.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Levi Manchak, Project Manager
Email: LManchak@maxxam.ca
Phone# (780)468-3536

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B724492
Report Date: 2017/04/13

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2017/01/30 - 2017/03/30
Site Location: LICA
Sampler Initials: AY

RESULTS OF CHEMICAL ANALYSES OF AIR

Maxxam ID		QV2133	QV2134	QV2137	QV2145		QV2151	QV2153		
Sampling Date		2017/01/30 16:47	2017/01/31 11:18	2017/01/31 13:51	2017/01/31 15:11		2017/01/31 11:31	2017/01/31 09:58		
	UNITS	3	4	5	6	QC Batch	8	9	RDL	QC Batch
Passive Monitoring										
Calculated H2S	ppb	0.12		0.12		8601650			0.02	8601650
Calculated NO2	ppb	0.7	0.5	0.9	1.6	8600439	0.9	0.4	0.1	8600786
Calculated O3	ppb	36.7	43.4	38.0	34.7	8598275	35.6	35.2	0.1	8598275
Calculated SO2	ppb	0.4	0.7	0.5	0.4	8596513	0.5	0.4	0.1	8596513
RDL = Reportable Detection Limit										

Maxxam ID		QV2154	QV2155	QV2156	QV2157	QV2161		QV2162		
Sampling Date		2017/01/30 15:37	2017/01/30	2017/01/30	2017/01/30 12:35	2017/01/30 11:34		2017/01/31 08:35		
	UNITS	10	11	12	13	14	QC Batch	15	RDL	QC Batch
Passive Monitoring										
Calculated H2S	ppb	0.09	MISSING	MISSING	0.10	0.13	8601648		0.02	8601648
Calculated NO2	ppb	1.2	MISSING	MISSING	0.4	0.7	8600786	0.5	0.1	8600786
Calculated O3	ppb	29.8	MISSING	MISSING	33.5	30.9	8598275	39.0	0.1	8598820
Calculated SO2	ppb	0.5	MISSING	MISSING	0.4	1.3	8596513	0.4	0.1	8596513
RDL = Reportable Detection Limit										

Maxxam ID		QV2163	QV2164	QV2165	QV2166	QV2167	QV2168	QV2169		
Sampling Date		2017/01/31 18:46	2017/01/31 16:15	2017/01/31 17:46	2017/01/31 19:23	2017/02/01 09:09	2017/01/30 14:26	2017/01/31 14:33		
	UNITS	16	17	18	19	22	23	24	RDL	QC Batch
Passive Monitoring										
Calculated H2S	ppb	0.11	0.16	0.08		0.09		0.11	0.02	8601648
Calculated NO2	ppb	0.6	0.9	0.5	0.4	0.9	<0.1	2.0	0.1	8600786
Calculated O3	ppb	37.0	35.6	33.7	31.8	31.3	33.3	32.5	0.1	8598820
Calculated SO2	ppb	0.4	0.4	0.3	0.4	0.3	0.2	0.5	0.1	8596513
RDL = Reportable Detection Limit										

Maxxam ID		QV2170	QV2171	QV2172	QV2173	QV2174	QV2175	QV2176		
Sampling Date		2017/01/30	2017/01/30 11:56	2017/01/30 13:24	2017/01/31 09:32	2017/02/01 09:16	2017/01/30 17:44	2017/01/30 10:28		
	UNITS	25	26	27	28	29	32	38	RDL	QC Batch
Passive Monitoring										
Calculated H2S	ppb	MISSING	0.14	0.13		0.11	0.12	0.26	0.02	8601648
Calculated NO2	ppb				3.0	1.1	0.6	2.6	0.1	8600786
Calculated O3	ppb				29.8	33.1	36.8	25.9	0.1	8598820
Calculated SO2	ppb	MISSING	0.9	1.0	0.4	0.3	0.5	0.5	0.1	8596518
RDL = Reportable Detection Limit										

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 6744 - 50th Street T6B 3M9 Telephone(780) 378-8500 FAX(780) 378-8699

Maxxam Job #: B724492
Report Date: 2017/04/13

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2017/01/30 - 2017/03/30
Site Location: LICA
Sampler Initials: AY

RESULTS OF CHEMICAL ANALYSES OF AIR

Maxxam ID		QV2179		QV2180	QV2181	QV2182	QV2183	QV2184		
Sampling Date		2017/01/31 15:11		2017/01/31 11:31	2017/01/31 18:46	2017/01/31 16:15	2017/01/31 17:46	2017/02/01 09:09		
	UNITS	6 DUP	QC Batch	8 DUP	16 DUP	17 DUP	18 DUP	22 DUP	RDL	QC Batch
Passive Monitoring										
Calculated H2S	ppb		8601648					0.10	0.02	8601648
Calculated NO2	ppb	1.8	8600439	0.8					0.1	8600786
Calculated O3	ppb	30.3	8598275	38.1					0.1	8598275
Calculated SO2	ppb				0.3	0.4	0.3		0.1	8596518
RDL = Reportable Detection Limit										

Maxxam ID		QV2185		
Sampling Date		2017/01/31 14:33		
	UNITS	24 DUP	RDL	QC Batch
Passive Monitoring				
Calculated H2S	ppb	0.12	0.02	8601648
RDL = Reportable Detection Limit				

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 6744 - 50th Street T6B 3M9 Telephone(780) 378-8500 FAX(780) 378-8699

Maxxam Job #: B724492
Report Date: 2017/04/13

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2017/01/30 - 2017/03/30
Site Location: LICA
Sampler Initials: AY

GENERAL COMMENTS

Sample QV2155 [11] : Site inaccessible for sample retrieval.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 6744 - 50th Street T6B 3M9 Telephone(780) 378-8500 FAX(780) 378-8699

Maxxam Job #: B724492
Report Date: 2017/04/13

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2017/01/30 - 2017/03/30
Site Location: LICA
Sampler Initials: AY

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8596513	OZ	Spiked Blank	Calculated SO2	2017/04/05		99	%	90 - 110
8596513	OZ	Method Blank	Calculated SO2	2017/04/05	<0.1		ppb	
8596518	OZ	Spiked Blank	Calculated SO2	2017/04/05		98	%	90 - 110
8596518	OZ	Method Blank	Calculated SO2	2017/04/05	<0.1		ppb	
8598275	SS6	Spiked Blank	Calculated O3	2017/04/07		104	%	90 - 110
8598275	SS6	Method Blank	Calculated O3	2017/04/07	<0.1		ppb	
8598820	SS6	Spiked Blank	Calculated O3	2017/04/07		101	%	90 - 110
8598820	SS6	Method Blank	Calculated O3	2017/04/07	<0.1		ppb	
8600439	IK2	Spiked Blank	Calculated NO2	2017/04/10		102	%	90 - 110
8600439	IK2	Method Blank	Calculated NO2	2017/04/10	<0.1		ppb	
8600786	IK2	Spiked Blank	Calculated NO2	2017/04/11		101	%	90 - 110
8600786	IK2	Method Blank	Calculated NO2	2017/04/11	<0.1		ppb	
8601648	LCH	Spiked Blank	Calculated H2S	2017/04/11		99	%	90 - 110
8601650	LCH	Spiked Blank	Calculated H2S	2017/04/11		99	%	90 - 110

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 6744 - 50th Street T6B 3M9 Telephone(780) 378-8500 FAX(780) 378-8699

Maxxam Job #: B724492
Report Date: 2017/04/13

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
Client Project #: 2017/01/30 - 2017/03/30
Site Location: LICA
Sampler Initials: AY

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Linda Lin, Supervisor, Centre for Passive Sampling Technology

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation o/a Maxxam Analytics Edmonton: 6744 - 50th Street T6B 3M9 Telephone(780) 378-8500 FAX(780) 378-8699

VOCS SAMPLES

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 2, 2017	S5647	Ambient Air	02-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030076 **REPORT CREATED:** 10-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030076-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030076-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17
17030076-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	15-Mar-17
17030076-001	1,2,4-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17
17030076-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030076-001	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	15-Mar-17
17030076-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030076-001	1,3,5-Trimethylbenzene		0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030076-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030076-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030076-001	1-Butene		0.09	ppbv	0.02	AC-058	15-Mar-17
17030076-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	1-Pentene		0.02	ppbv	0.01	AC-058	15-Mar-17
17030076-001	2,2,4-Trimethylpentane		0.07	ppbv	0.01	AC-058	15-Mar-17
17030076-001	2,2-Dimethylbutane		0.03	ppbv	0.01	AC-058	15-Mar-17
17030076-001	2,3,4-Trimethylpentane		0.03	ppbv	0.01	AC-058	15-Mar-17
17030076-001	2,3-Dimethylbutane		0.05	ppbv	0.02	AC-058	15-Mar-17
17030076-001	2,3-Dimethylpentane		0.06	ppbv	0.02	AC-058	15-Mar-17

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

Date: April-10-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 2, 2017	S5647	Ambient Air	02-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030076 **REPORT CREATED:** 10-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030076-001	2,4-Dimethylpentane		0.04	ppbv	0.01	AC-058	15-Mar-17
17030076-001	2-Methylheptane		0.03	ppbv	0.01	AC-058	15-Mar-17
17030076-001	2-Methylhexane		0.05	ppbv	0.01	AC-058	15-Mar-17
17030076-001	2-Methylpentane		0.20	ppbv	0.01	AC-058	15-Mar-17
17030076-001	3-Methylheptane		0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	3-Methylhexane		0.06	ppbv	0.02	AC-058	15-Mar-17
17030076-001	3-Methylpentane		0.07	ppbv	0.01	AC-058	15-Mar-17
17030076-001	Acetone		1.6	ppbv	0.4	AC-058	15-Mar-17
17030076-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030076-001	Benzene		0.22	ppbv	0.01	AC-058	15-Mar-17
17030076-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030076-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	Bromomethane	I	0.01	ppbv	0.01	AC-058	15-Mar-17
17030076-001	Carbon disulfide	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030076-001	Carbon tetrachloride	I	0.13	ppbv	0.01	AC-058	15-Mar-17
17030076-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	Chloroform	I	0.03	ppbv	0.02	AC-058	15-Mar-17
17030076-001	Chloromethane		0.64	ppbv	0.02	AC-058	15-Mar-17
17030076-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030076-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030076-001	cis-2-Butene		0.03	ppbv	0.02	AC-058	15-Mar-17
17030076-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	Cyclohexane		0.05	ppbv	0.02	AC-058	15-Mar-17

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

Date: April-10-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 2, 2017	S5647	Ambient Air	02-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030076 **REPORT CREATED:** 10-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030076-001	Cyclopentane		0.04	ppbv	0.01	AC-058	15-Mar-17
17030076-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030076-001	Ethanol		0.8	ppbv	0.3	AC-058	15-Mar-17
17030076-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030076-001	Ethylbenzene		0.03	ppbv	0.01	AC-058	15-Mar-17
17030076-001	Freon-11	I	0.29	ppbv	0.02	AC-058	15-Mar-17
17030076-001	Freon-113	I	0.13	ppbv	0.01	AC-058	15-Mar-17
17030076-001	Freon-114	I	0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	Freon-12		0.61	ppbv	0.02	AC-058	15-Mar-17
17030076-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	15-Mar-17
17030076-001	Isobutane		0.55	ppbv	0.02	AC-058	15-Mar-17
17030076-001	Isopentane		0.45	ppbv	0.03	AC-058	15-Mar-17
17030076-001	Isoprene		0.01	ppbv	0.01	AC-058	15-Mar-17
17030076-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030076-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030076-001	m,p-Xylene		0.08	ppbv	0.03	AC-058	15-Mar-17
17030076-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030076-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	15-Mar-17
17030076-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	15-Mar-17
17030076-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030076-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030076-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Mar-17
17030076-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030076-001	Methylcyclohexane		0.06	ppbv	0.01	AC-058	15-Mar-17
17030076-001	Methylcyclopentane		0.07	ppbv	0.02	AC-058	15-Mar-17

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

Date: April-10-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 2, 2017	S5647	Ambient Air	02-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030076 **REPORT CREATED:** 10-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030076-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030076-001	n-Butane		1.16	ppbv	0.03	AC-058	15-Mar-17
17030076-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	15-Mar-17
17030076-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030076-001	n-Heptane		0.05	ppbv	0.01	AC-058	15-Mar-17
17030076-001	n-Hexane		0.09	ppbv	0.01	AC-058	15-Mar-17
17030076-001	n-Octane		0.03	ppbv	0.02	AC-058	15-Mar-17
17030076-001	n-Pentane		0.3	ppbv	0.1	AC-058	15-Mar-17
17030076-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17
17030076-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030076-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030076-001	n-Nonane		0.01	ppbv	0.01	AC-058	15-Mar-17
17030076-001	o-Ethyltoluene	I	0.02	ppbv	0.01	AC-058	15-Mar-17
17030076-001	o-Xylene		0.04	ppbv	0.01	AC-058	15-Mar-17
17030076-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030076-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Mar-17
17030076-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030076-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030076-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030076-001	Toluene		0.13	ppbv	0.01	AC-058	15-Mar-17
17030076-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030076-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030076-001	trans-2-Butene		0.03	ppbv	0.01	AC-058	15-Mar-17
17030076-001	trans-2-Pentene		0.02	ppbv	0.02	AC-058	15-Mar-17
17030076-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17

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

Date: April-10-17 **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

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 2, 2017	S5647	Ambient Air	02-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030076 **REPORT CREATED:** 10-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030076-001	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030076-001	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17

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

Date: April-10-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 8, 2017	H3297	Ambient Air	08-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030114 **REPORT CREATED:** 21-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030114-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030114-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17
17030114-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	15-Mar-17
17030114-001	1,2,4-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17
17030114-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030114-001	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	15-Mar-17
17030114-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030114-001	1,3,5-Trimethylbenzene		0.03	ppbv	0.02	AC-058	15-Mar-17
17030114-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030114-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030114-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030114-001	1-Butene		0.07	ppbv	0.02	AC-058	15-Mar-17
17030114-001	1-Hexene	I	0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	1-Pentene		0.02	ppbv	0.01	AC-058	15-Mar-17
17030114-001	2,2,4-Trimethylpentane		0.05	ppbv	0.01	AC-058	15-Mar-17
17030114-001	2,2-Dimethylbutane		0.03	ppbv	0.01	AC-058	15-Mar-17
17030114-001	2,3,4-Trimethylpentane		0.03	ppbv	0.01	AC-058	15-Mar-17
17030114-001	2,3-Dimethylbutane		0.03	ppbv	0.02	AC-058	15-Mar-17
17030114-001	2,3-Dimethylpentane		0.04	ppbv	0.02	AC-058	15-Mar-17

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

Date: April-21-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 8, 2017	H3297	Ambient Air	08-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030114 **REPORT CREATED:** 21-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030114-001	2,4-Dimethylpentane		0.03	ppbv	0.01	AC-058	15-Mar-17
17030114-001	2-Methylheptane		0.02	ppbv	0.01	AC-058	15-Mar-17
17030114-001	2-Methylhexane		0.03	ppbv	0.01	AC-058	15-Mar-17
17030114-001	2-Methylpentane		0.09	ppbv	0.01	AC-058	15-Mar-17
17030114-001	3-Methylheptane		0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	3-Methylhexane		0.04	ppbv	0.02	AC-058	15-Mar-17
17030114-001	3-Methylpentane		0.05	ppbv	0.01	AC-058	15-Mar-17
17030114-001	Acetone		1.0	ppbv	0.4	AC-058	15-Mar-17
17030114-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030114-001	Benzene		0.25	ppbv	0.01	AC-058	15-Mar-17
17030114-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030114-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	Bromomethane	I	0.01	ppbv	0.01	AC-058	15-Mar-17
17030114-001	Carbon disulfide	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030114-001	Carbon tetrachloride	I	0.13	ppbv	0.01	AC-058	15-Mar-17
17030114-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	Chloroform	I	0.03	ppbv	0.02	AC-058	15-Mar-17
17030114-001	Chloromethane		0.67	ppbv	0.02	AC-058	15-Mar-17
17030114-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030114-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030114-001	cis-2-Butene		0.03	ppbv	0.02	AC-058	15-Mar-17
17030114-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	Cyclohexane		0.04	ppbv	0.02	AC-058	15-Mar-17

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

Date: April-21-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 8, 2017	H3297	Ambient Air	08-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030114 **REPORT CREATED:** 21-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030114-001	Cyclopentane		0.03	ppbv	0.01	AC-058	15-Mar-17
17030114-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030114-001	Ethanol	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030114-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030114-001	Ethylbenzene		0.02	ppbv	0.01	AC-058	15-Mar-17
17030114-001	Freon-11		0.30	ppbv	0.02	AC-058	15-Mar-17
17030114-001	Freon-113	I	0.12	ppbv	0.01	AC-058	15-Mar-17
17030114-001	Freon-114	I	0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	Freon-12		0.63	ppbv	0.02	AC-058	15-Mar-17
17030114-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	15-Mar-17
17030114-001	Isobutane		0.30	ppbv	0.02	AC-058	15-Mar-17
17030114-001	Isopentane		0.23	ppbv	0.03	AC-058	15-Mar-17
17030114-001	Isoprene		0.02	ppbv	0.01	AC-058	15-Mar-17
17030114-001	Isopropyl alcohol		1.6	ppbv	0.4	AC-058	15-Mar-17
17030114-001	Isopropylbenzene		0.02	ppbv	0.01	AC-058	15-Mar-17
17030114-001	m,p-Xylene		0.07	ppbv	0.03	AC-058	15-Mar-17
17030114-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030114-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	15-Mar-17
17030114-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	15-Mar-17
17030114-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030114-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030114-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Mar-17
17030114-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030114-001	Methylcyclohexane		0.04	ppbv	0.01	AC-058	15-Mar-17
17030114-001	Methylcyclopentane		0.04	ppbv	0.02	AC-058	15-Mar-17

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

Date: April-21-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 8, 2017	H3297	Ambient Air	08-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030114 **REPORT CREATED:** 21-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030114-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030114-001	n-Butane		0.66	ppbv	0.03	AC-058	15-Mar-17
17030114-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	15-Mar-17
17030114-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030114-001	n-Heptane		0.04	ppbv	0.01	AC-058	15-Mar-17
17030114-001	n-Hexane		0.06	ppbv	0.01	AC-058	15-Mar-17
17030114-001	n-Octane		0.03	ppbv	0.02	AC-058	15-Mar-17
17030114-001	n-Pentane		0.1	ppbv	0.1	AC-058	15-Mar-17
17030114-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17
17030114-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030114-001	Naphthalene		2.0	ppbv	0.5	AC-058	15-Mar-17
17030114-001	n-Nonane		0.03	ppbv	0.01	AC-058	15-Mar-17
17030114-001	o-Ethyltoluene	I	0.02	ppbv	0.01	AC-058	15-Mar-17
17030114-001	o-Xylene		0.03	ppbv	0.01	AC-058	15-Mar-17
17030114-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030114-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Mar-17
17030114-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030114-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030114-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030114-001	Toluene		0.13	ppbv	0.01	AC-058	15-Mar-17
17030114-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030114-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030114-001	trans-2-Butene		0.03	ppbv	0.01	AC-058	15-Mar-17
17030114-001	trans-2-Pentene		0.02	ppbv	0.02	AC-058	15-Mar-17
17030114-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17

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

Date: April-21-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 8, 2017	H3297	Ambient Air	08-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030114 **REPORT CREATED:** 21-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030114-001	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030114-001	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17

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

Date: April-21-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 14, 2017	H2823	Ambient Air	14-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030213 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030213-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17
17030213-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Mar-17
17030213-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	22-Mar-17
17030213-001	1,2,4-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Mar-17
17030213-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Mar-17
17030213-001	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	22-Mar-17
17030213-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030213-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	22-Mar-17
17030213-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030213-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030213-001	1-Butene		0.09	ppbv	0.02	AC-058	22-Mar-17
17030213-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	1-Pentene		0.01	ppbv	0.01	AC-058	22-Mar-17
17030213-001	2,2,4-Trimethylpentane		0.03	ppbv	0.01	AC-058	22-Mar-17
17030213-001	2,2-Dimethylbutane		0.02	ppbv	0.01	AC-058	22-Mar-17
17030213-001	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030213-001	2,3-Dimethylbutane		0.04	ppbv	0.02	AC-058	22-Mar-17
17030213-001	2,3-Dimethylpentane		0.04	ppbv	0.02	AC-058	22-Mar-17

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

Date: Tuesday, May 02, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 14, 2017	H2823	Ambient Air	14-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030213 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030213-001	2,4-Dimethylpentane		0.02	ppbv	0.01	AC-058	22-Mar-17
17030213-001	2-Methylheptane		0.02	ppbv	0.01	AC-058	22-Mar-17
17030213-001	2-Methylhexane		0.04	ppbv	0.01	AC-058	22-Mar-17
17030213-001	2-Methylpentane		0.15	ppbv	0.01	AC-058	22-Mar-17
17030213-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	3-Methylhexane		0.05	ppbv	0.02	AC-058	22-Mar-17
17030213-001	3-Methylpentane		0.09	ppbv	0.01	AC-058	22-Mar-17
17030213-001	Acetone		2.7	ppbv	0.4	AC-058	22-Mar-17
17030213-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	22-Mar-17
17030213-001	Benzene		0.16	ppbv	0.01	AC-058	22-Mar-17
17030213-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030213-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030213-001	Carbon disulfide	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030213-001	Carbon tetrachloride	I	0.09	ppbv	0.01	AC-058	22-Mar-17
17030213-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	Chloroform	I	0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	Chloromethane		0.67	ppbv	0.02	AC-058	22-Mar-17
17030213-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030213-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17
17030213-001	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	Cyclohexane		0.05	ppbv	0.02	AC-058	22-Mar-17

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

Date: Tuesday, May 02, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 14, 2017	H2823	Ambient Air	14-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030213 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030213-001	Cyclopentane		0.04	ppbv	0.01	AC-058	22-Mar-17
17030213-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030213-001	Ethanol		1.1	ppbv	0.3	AC-058	22-Mar-17
17030213-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030213-001	Ethylbenzene		0.01	ppbv	0.01	AC-058	22-Mar-17
17030213-001	Freon-11	I	0.28	ppbv	0.02	AC-058	22-Mar-17
17030213-001	Freon-113	I	0.09	ppbv	0.01	AC-058	22-Mar-17
17030213-001	Freon-114	I	0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	Freon-12		0.70	ppbv	0.02	AC-058	22-Mar-17
17030213-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	22-Mar-17
17030213-001	Isobutane		1.54	ppbv	0.02	AC-058	22-Mar-17
17030213-001	Isopentane		0.75	ppbv	0.03	AC-058	22-Mar-17
17030213-001	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030213-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030213-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030213-001	m,p-Xylene		0.03	ppbv	0.03	AC-058	22-Mar-17
17030213-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17
17030213-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	22-Mar-17
17030213-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	22-Mar-17
17030213-001	Methyl ethyl ketone		0.6	ppbv	0.3	AC-058	22-Mar-17
17030213-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030213-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	22-Mar-17
17030213-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Mar-17
17030213-001	Methylcyclohexane		0.09	ppbv	0.01	AC-058	22-Mar-17
17030213-001	Methylcyclopentane		0.10	ppbv	0.02	AC-058	22-Mar-17

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

Date: Tuesday, May 02, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 14, 2017	H2823	Ambient Air	14-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030213 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030213-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	22-Mar-17
17030213-001	n-Butane		2.75	ppbv	0.03	AC-058	22-Mar-17
17030213-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	22-Mar-17
17030213-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030213-001	n-Heptane		0.06	ppbv	0.01	AC-058	22-Mar-17
17030213-001	n-Hexane		0.17	ppbv	0.01	AC-058	22-Mar-17
17030213-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	n-Pentane		0.7	ppbv	0.1	AC-058	22-Mar-17
17030213-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Mar-17
17030213-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Mar-17
17030213-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Mar-17
17030213-001	n-Nonane		0.01	ppbv	0.01	AC-058	22-Mar-17
17030213-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030213-001	o-Xylene		0.01	ppbv	0.01	AC-058	22-Mar-17
17030213-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17
17030213-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	22-Mar-17
17030213-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17
17030213-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17
17030213-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030213-001	Toluene		0.08	ppbv	0.01	AC-058	22-Mar-17
17030213-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030213-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17
17030213-001	trans-2-Butene		0.02	ppbv	0.01	AC-058	22-Mar-17
17030213-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030213-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17

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

Date: Tuesday, May 02, 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

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 14, 2017	H2823	Ambient Air	14-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030213 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030213-001	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030213-001	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17

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

Date: Tuesday, May 02, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 20, 2017	S5627	Ambient Air	20-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030304 **REPORT CREATED:** 01-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030304-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030304-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	04-Apr-17
17030304-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	04-Apr-17
17030304-001	1,2,4-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	04-Apr-17
17030304-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030304-001	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	04-Apr-17
17030304-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	04-Apr-17
17030304-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-001	1-Butene		0.05	ppbv	0.02	AC-058	04-Apr-17
17030304-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	2,2,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	2,3-Dimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17

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

Date: Monday, May 01, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 20, 2017	S5627	Ambient Air	20-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030304 **REPORT CREATED:** 01-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030304-001	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	2-Methylhexane		0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	2-Methylpentane		0.03	ppbv	0.01	AC-058	04-Apr-17
17030304-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	3-Methylhexane		0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	3-Methylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	Acetone		2.7	ppbv	0.4	AC-058	04-Apr-17
17030304-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	04-Apr-17
17030304-001	Benzene		0.17	ppbv	0.01	AC-058	04-Apr-17
17030304-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	Bromomethane	I	0.02	ppbv	0.01	AC-058	04-Apr-17
17030304-001	Carbon disulfide	I	0.11	ppbv	0.01	AC-058	04-Apr-17
17030304-001	Carbon tetrachloride	I	0.10	ppbv	0.01	AC-058	04-Apr-17
17030304-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	Chloroform	I	0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	Chloromethane		0.87	ppbv	0.02	AC-058	04-Apr-17
17030304-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030304-001	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	Cyclohexane		0.03	ppbv	0.02	AC-058	04-Apr-17

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

Date: Monday, May 01, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 20, 2017	S5627	Ambient Air	20-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030304 **REPORT CREATED:** 01-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030304-001	Cyclopentane		0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	Ethanol	K, T, U	< 0.3	ppbv	0.3	AC-058	04-Apr-17
17030304-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-001	Ethylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	Freon-11	I	0.28	ppbv	0.02	AC-058	04-Apr-17
17030304-001	Freon-113	I	0.11	ppbv	0.01	AC-058	04-Apr-17
17030304-001	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	Freon-12		0.44	ppbv	0.02	AC-058	04-Apr-17
17030304-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	04-Apr-17
17030304-001	Isobutane		0.24	ppbv	0.02	AC-058	04-Apr-17
17030304-001	Isopentane		0.28	ppbv	0.03	AC-058	04-Apr-17
17030304-001	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	m,p-Xylene	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030304-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030304-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	04-Apr-17
17030304-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	04-Apr-17
17030304-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	04-Apr-17
17030304-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	04-Apr-17
17030304-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030304-001	Methylcyclohexane		0.02	ppbv	0.01	AC-058	04-Apr-17
17030304-001	Methylcyclopentane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17

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

Date: Monday, May 01, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 20, 2017	S5627	Ambient Air	20-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030304 **REPORT CREATED:** 01-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030304-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	04-Apr-17
17030304-001	n-Butane		0.57	ppbv	0.03	AC-058	04-Apr-17
17030304-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	04-Apr-17
17030304-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-001	n-Heptane		0.02	ppbv	0.01	AC-058	04-Apr-17
17030304-001	n-Hexane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	n-Pentane		0.1	ppbv	0.1	AC-058	04-Apr-17
17030304-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	04-Apr-17
17030304-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	04-Apr-17
17030304-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	04-Apr-17
17030304-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	o-Xylene		0.02	ppbv	0.01	AC-058	04-Apr-17
17030304-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030304-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	04-Apr-17
17030304-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030304-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030304-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-001	Toluene		0.14	ppbv	0.01	AC-058	04-Apr-17
17030304-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030304-001	trans-2-Butene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17

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

Date: Monday, May 01, 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

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 20, 2017	S5627	Ambient Air	20-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030304 **REPORT CREATED:** 01-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030304-001	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-001	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17

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

Date: Monday, May 01, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 26, 2017	H3296	Ambient Air	26-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030304 **REPORT CREATED:** 01-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030304-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030304-003	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	04-Apr-17
17030304-003	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	04-Apr-17
17030304-003	1,2,4-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	04-Apr-17
17030304-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030304-003	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	04-Apr-17
17030304-003	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	1,3-Butadiene	I	0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	04-Apr-17
17030304-003	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-003	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-003	1-Butene		0.08	ppbv	0.02	AC-058	04-Apr-17
17030304-003	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	2,2,4-Trimethylpentane		0.04	ppbv	0.01	AC-058	04-Apr-17
17030304-003	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	2,3-Dimethylpentane		0.04	ppbv	0.02	AC-058	04-Apr-17

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

Date: Monday, May 01, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 26, 2017	H3296	Ambient Air	26-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030304 **REPORT CREATED:** 01-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030304-003	2,4-Dimethylpentane		0.02	ppbv	0.01	AC-058	04-Apr-17
17030304-003	2-Methylheptane		0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	2-Methylhexane		0.03	ppbv	0.01	AC-058	04-Apr-17
17030304-003	2-Methylpentane		0.07	ppbv	0.01	AC-058	04-Apr-17
17030304-003	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	3-Methylhexane		0.04	ppbv	0.02	AC-058	04-Apr-17
17030304-003	3-Methylpentane		0.03	ppbv	0.01	AC-058	04-Apr-17
17030304-003	Acetone		3.5	ppbv	0.4	AC-058	04-Apr-17
17030304-003	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	04-Apr-17
17030304-003	Benzene		0.16	ppbv	0.01	AC-058	04-Apr-17
17030304-003	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	Bromomethane	I	0.03	ppbv	0.01	AC-058	04-Apr-17
17030304-003	Carbon disulfide	I	0.12	ppbv	0.01	AC-058	04-Apr-17
17030304-003	Carbon tetrachloride	I	0.09	ppbv	0.01	AC-058	04-Apr-17
17030304-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	Chloroethane	I	0.03	ppbv	0.02	AC-058	04-Apr-17
17030304-003	Chloroform	I	0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	Chloromethane		0.82	ppbv	0.02	AC-058	04-Apr-17
17030304-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030304-003	cis-2-Butene		0.03	ppbv	0.02	AC-058	04-Apr-17
17030304-003	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	Cyclohexane		0.03	ppbv	0.02	AC-058	04-Apr-17

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

Date: Monday, May 01, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 26, 2017	H3296	Ambient Air	26-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030304 **REPORT CREATED:** 01-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030304-003	Cyclopentane		0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	Ethanol		1.3	ppbv	0.3	AC-058	04-Apr-17
17030304-003	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-003	Ethylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	Freon-11	I	0.23	ppbv	0.02	AC-058	04-Apr-17
17030304-003	Freon-113	I	0.10	ppbv	0.01	AC-058	04-Apr-17
17030304-003	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	Freon-12		0.39	ppbv	0.02	AC-058	04-Apr-17
17030304-003	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	04-Apr-17
17030304-003	Isobutane		0.53	ppbv	0.02	AC-058	04-Apr-17
17030304-003	Isopentane		0.50	ppbv	0.03	AC-058	04-Apr-17
17030304-003	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-003	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	m,p-Xylene		0.06	ppbv	0.03	AC-058	04-Apr-17
17030304-003	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030304-003	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	04-Apr-17
17030304-003	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	04-Apr-17
17030304-003	Methyl ethyl ketone		0.5	ppbv	0.3	AC-058	04-Apr-17
17030304-003	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-003	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	04-Apr-17
17030304-003	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030304-003	Methylcyclohexane		0.04	ppbv	0.01	AC-058	04-Apr-17
17030304-003	Methylcyclopentane		0.03	ppbv	0.02	AC-058	04-Apr-17

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

Date: Monday, May 01, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 26, 2017	H3296	Ambient Air	26-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030304 **REPORT CREATED:** 01-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030304-003	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	04-Apr-17
17030304-003	n-Butane		1.15	ppbv	0.03	AC-058	04-Apr-17
17030304-003	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	04-Apr-17
17030304-003	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-003	n-Heptane		0.04	ppbv	0.01	AC-058	04-Apr-17
17030304-003	n-Hexane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	n-Pentane		0.2	ppbv	0.1	AC-058	04-Apr-17
17030304-003	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	04-Apr-17
17030304-003	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	04-Apr-17
17030304-003	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	04-Apr-17
17030304-003	n-Nonane		0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	o-Xylene		0.05	ppbv	0.01	AC-058	04-Apr-17
17030304-003	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030304-003	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	04-Apr-17
17030304-003	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030304-003	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030304-003	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-003	Toluene		0.17	ppbv	0.01	AC-058	04-Apr-17
17030304-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030304-003	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030304-003	trans-2-Butene		0.04	ppbv	0.01	AC-058	04-Apr-17
17030304-003	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030304-003	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17

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

Date: Monday, May 01, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/CLS/Mar 26, 2017	H3296	Ambient Air	26-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030304 **REPORT CREATED:** 01-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030304-003	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030304-003	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17

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

Date: Monday, May 01, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

PAHS SAMPLES

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

RESULTS: Adewunmi Adekanmbi
Lakeland Industry and Community Assn
4000, 19 St NE

Calgary
AB T2E 6P8

INVOICE: Arianna Cook 780 812 2182
PO Box 8237
5107W-50 St
Bonnyville
AB T9N 2J5

CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
LICA/PUF/CLS/Mar 2, 2017	TE03	Air Filter	Normal

DESCRIPTION: Cold Lake South

DATE SAMPLED: 02-Mar-17 0:00 **DATE RECEIVED:** 09-Mar-17

REPORT CREATED: 10-Apr-17 **REPORT NUMBER:** 17030076

VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030076-002	1-Methylnaphthalene		0.18	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	2-Methylnaphthalene		0.28	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Acenaphthene		0.14	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Acenaphthylene		0.03	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Acridine	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Benzo(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Benzo(a)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Benzo(b,j,k)fluoranthene		0.03	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Benzo(e)pyrene		0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Benzo(ghi)perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Chrysene		0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17

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

Date: April-10-17 **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

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/CLS/Mar 2, 2017	TE03	Air Filter	02-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030076 **REPORT CREATED:** 10-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030076-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Fluoranthene		0.06	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Fluorene		0.09	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Naphthalene		0.33	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Phenanthrene		0.24	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Pyrene		0.04	ug/Filter	0.01	NA-017	16-Mar-17
17030076-002	Retene		0.02	ug/Filter	0.01	NA-017	16-Mar-17

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

Date: April-10-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

RESULTS: Adewunmi Adekanmbi
Lakeland Industry and Community Assn
4000, 19 St NE
Calgary
AB T2E 6P8

INVOICE: Arianna Cook 780 812 2182
PO Box 8237
5107W-50 St
Bonnyville
AB T9N 2J5

CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
LICA/PUF/CLS/Mar 8, 2017	TE06	Air Filter	Normal

DESCRIPTION: Cold Lake South

DATE SAMPLED: 08-Mar-17 0:00
DATE RECEIVED: 13-Mar-17
REPORT CREATED: 21-Apr-17
REPORT NUMBER: 17030114
VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030114-002	1-Methylnaphthalene		0.40	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	2-Methylnaphthalene		0.62	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Acenaphthene		0.08	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Acenaphthylene		0.02	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Acridine	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Anthracene		0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Benzo(a)anthracene		0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Benzo(a)pyrene		0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Benzo(b,j,k)fluoranthene		0.05	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Benzo(e)pyrene		0.02	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Benzo(ghi)perylene		0.02	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Chrysene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17

Report certified by: Alberto dos Santos Pereira, Supervisor **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: April-21-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/CLS/Mar 8, 2017	TE06	Air Filter	08-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030114 **REPORT CREATED:** 21-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030114-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Fluoranthene		0.10	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Fluorene		0.07	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Indeno(1,2,3-cd)pyrene		0.03	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Naphthalene		1.12	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Phenanthrene		0.27	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Pyrene		0.03	ug/Filter	0.01	NA-017	22-Mar-17
17030114-002	Retene		0.07	ug/Filter	0.01	NA-017	22-Mar-17

Report certified by: Alberto dos Santos Pereira, Supervisor **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: April-21-17 **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

RESULTS: Adewunmi Adekanmbi
Lakeland Industry and Community Assn
4000, 19 St NE
Calgary
AB T2E 6P8

INVOICE: Arianna Cook 780 812 2182
PO Box 8237
5107W-50 St
Bonnyville
AB T9N 2J5

CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
LICA/PUF/CLS/Mar 14, 2017	TE-04	Air Filter	Normal

DESCRIPTION: Cold Lake South

DATE SAMPLED: 14-Mar-17 0:00
DATE RECEIVED: 20-Mar-17
REPORT CREATED: 02-May-17
REPORT NUMBER: 17030213
VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030213-002	1-Methylnaphthalene		0.12	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	2-Methylnaphthalene		0.15	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Acenaphthene		0.05	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Acenaphthylene		0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Acridine	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Anthracene		0.02	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Benzo(a)anthracene		0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Benzo(a)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Benzo(b,j,k)fluoranthene		0.03	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Benzo(e)pyrene		0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Benzo(ghi)perylene		0.02	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Chrysene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17

Report certified by: Alberto dos Santos Pereira, Supervisor **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: Tuesday, May 02, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/CLS/Mar 14, 2017	TE-04	Air Filter	14-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030213 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030213-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Fluoranthene		0.06	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Fluorene		0.08	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Indeno(1,2,3-cd)pyrene		0.02	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Naphthalene		0.15	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Phenanthrene		0.25	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Pyrene		0.05	ug/Filter	0.01	NA-017	22-Mar-17
17030213-002	Retene		0.03	ug/Filter	0.01	NA-017	22-Mar-17

Report certified by: Alberto dos Santos Pereira, Supervisor **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: Tuesday, May 02, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

RESULTS: Adewunmi Adekanmbi
Lakeland Industry and Community Assn
4000, 19 St NE
Calgary
AB T2E 6P8

INVOICE: Arianna Cook 780 812 2182
PO Box 8237
5107W-50 St
Bonnyville
AB T9N 2J5

CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
LICA/PUF/CLS/Mar 20, 2017	A13-02	Air Filter	Normal

DESCRIPTION: Cold Lake South

DATE SAMPLED: 20-Mar-17 0:00
DATE RECEIVED: 30-Mar-17
REPORT CREATED: 01-May-17
REPORT NUMBER: 17030304
VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030304-002	1-Methylnaphthalene		0.08	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	2-Methylnaphthalene		0.13	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Acenaphthene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Acenaphthylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Acridine	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Benzo(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Benzo(a)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Benzo(b,j,k)fluoranthene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Benzo(e)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Benzo(ghi)perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Chrysene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17

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

Date: Monday, May 01, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/CLS/Mar 20, 2017	A13-02	Air Filter	20-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030304 **REPORT CREATED:** 01-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030304-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Fluoranthene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Fluorene		0.02	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Naphthalene		0.14	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Phenanthrene		0.03	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Pyrene		0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-002	Retene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17

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

Date: Monday, May 01, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/CLS/Mar 26, 2017	TE05	Air Filter	26-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030304 **REPORT CREATED:** 01-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030304-004	1-Methylnaphthalene		0.30	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	2-Methylnaphthalene		0.57	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	3-Methylcholanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Acenaphthene		0.04	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Acenaphthylene		0.07	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Acridine	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Anthracene		0.13	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Benzo(a)anthracene		0.02	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Benzo(a)pyrene		0.02	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Benzo(b,j,k)fluoranthene		0.07	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Benzo(e)pyrene		0.02	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Benzo(ghi)perylene		0.02	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Chrysene		0.05	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Fluoranthene		0.28	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Fluorene		0.25	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Indeno(1,2,3-cd)pyrene		0.03	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Naphthalene		0.35	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Phenanthrene		0.84	ug/Filter	0.01	NA-017	13-Apr-17

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

Date: Monday, May 01, 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

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/CLS/Mar 26, 2017	TE05	Air Filter	26-Mar-17 0:00

DESCRIPTION: Cold Lake South

REPORT NUMBER: 17030304 **REPORT CREATED:** 01-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030304-004	Pyrene		0.23	ug/Filter	0.01	NA-017	13-Apr-17
17030304-004	Retene		0.12	ug/Filter	0.01	NA-017	13-Apr-17

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

Date: Monday, May 01, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

PARTISOL SAMPLES

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

RESULTS: Adewunmi Adekanmbi
Lakeland Industry and Community Assn
4000, 19 St NE
Calgary
AB T2E 6P8

INVOICE: Arianna Cook 780 812 2182
PO Box 8237
5107W-50 St
Bonnyville
AB T9N 2J5

CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
P6072294		Air Filter	Normal

DESCRIPTION: Cold Lake South

DATE SAMPLED: 02-Mar-17 0:00
DATE RECEIVED: 09-Mar-17
REPORT CREATED: 21-Mar-17
REPORT NUMBER: 17030081
VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030081-001	Particulate Weight		0.110	mg	0.004	AC-029	10-Mar-17

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

Date: Tuesday, March 21, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

RESULTS: Adewunmi Adekanmbi
Lakeland Industry and Community Assn
4000, 19 St NE
Calgary
AB T2E 6P8

INVOICE: Arianna Cook 780 812 2182
PO Box 8237
5107W-50 St
Bonnyville
AB T9N 2J5

CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
Flter # P6072293		Air Filter	Normal

DESCRIPTION: Cold Lake South

DATE SAMPLED: 08-Mar-17 0:00
DATE RECEIVED: 13-Mar-17
REPORT CREATED: 02-May-17
REPORT NUMBER: 17030112
VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030112-001	Particulate Weight		0.037	mg	0.004	AC-029	15-Mar-17

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

Date: Tuesday, May 02, 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

RESULTS: Adewunmi Adekanmbi
Lakeland Industry and Community Assn
4000, 19 St NE
Calgary
AB T2E 6P8

INVOICE: Arianna Cook 780 812 2182
PO Box 8237
5107W-50 St
Bonnyville
AB T9N 2J5

CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
P6072292		Air Filter	Normal

DESCRIPTION: Cold Lake South

DATE SAMPLED: 14-Mar-17 0:00
DATE RECEIVED: 20-Mar-17
REPORT CREATED: 18-Apr-17
REPORT NUMBER: 17030214
VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030214-001	Particulate Weight		0.123	mg	0.004	AC-029	22-Mar-17

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

Date: April-18-17 **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

RESULTS: Adewunmi Adekanmbi
Lakeland Industry and Community Assn
4000, 19 St NE

Calgary
AB T2E 6P8

INVOICE: Arianna Cook 780 812 2182
PO Box 8237
5107W-50 St
Bonnyville
AB T9N 2J5

CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
LICA Flt # P6072291		Air Filter	Normal

DESCRIPTION: Cold Lake South P6072291

DATE SAMPLED: 20-Mar-17 0:00
DATE RECEIVED: 30-Mar-17
REPORT CREATED: 13-Apr-17
REPORT NUMBER: 17030306
VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030306-001	Particulate Weight		0.033	mg	0.004	AC-029	31-Mar-17

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

Date: April-13-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA Flt # P6193008		Air Filter	26-Mar-17 0:00

DESCRIPTION: Cold Lake South P6193008

REPORT NUMBER: 17030306 **REPORT CREATED:** 13-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030306-002	Particulate Weight		0.126	mg	0.004	AC-029	31-Mar-17

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

Date: April-13-17

Inquiries: (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

APPENDIX V
REPORT CERTIFICATION FORM

Report Certification Form

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

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

Maram Ghaleb

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

May 10, 2017

Report Issued Date (dd-mm-yyyy)

APPENDIX VI
DATA VALIDATION CERTIFICATION FORM

Validation Certificate Form

Client:	Lakeland Industry & Community Association	**Project #:**	2833-2017-03-1-C
Site:	Cold Lake Continuous Monitoring Station	**Contact:**	Mike Bisaga

Level 0 Preliminary Verification	Maram Ghaleb	**Date**	April 30, 2017
Level 1 Primary Validation	Maram Ghaleb	**Date**	May 1, 2017
Level 2 Final Validation	Maram Ghaleb	**Date**	May 9, 2017
Level 3 Independent Data Review	[signature]	**Date**	May 10, 2017
Post-Final Validation	**NA**	**Date**	**NA**

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

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

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

February 22, 2018

Subject: Monthly Report Submission for the LICA Maskwa station

Lakeland Industry & Community Association (LICA) is pleased to submit the ambient air monitoring monthly report for the LICA Maskwa AQM Station in the month of March 2017.

The air monitoring program consists of continuous air monitoring results for Sulphur Dioxide (SO_2), Hydrogen Sulphide (H_2S), Total Hydrocarbon (THC), Oxides of Nitrogen (NOx), Nitric Oxides (NO), Nitrogen Dioxide (NO_2), Relative Humidity (RH), Barometric Pressure (BP), Precipitation, Ambient Temperature (AmbTPX), Wind Speed (WS), Wind Direction (WD) and Standard Deviation Wind Direction (STDWD).

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

All data collected in March 2017 was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

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

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

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

Respectfully,

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

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

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

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

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

AMBIENT AIR MONITORING MONTHLY DATA REPORT

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

MASKWA CONTINUOUS MONITORING STATION

JOB #: 2833-2017-03-30-C

March 2017

Prepared for:

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
402 - 19 ST NW
CALGARY, ALBERTA
T2N 2J1

Attention: MIKE BISAGA

DATE: **May 9, 2017**

Prepared by:

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

Reviewed by:

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

SUMMARY

In March 2017, 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.

Annual Maintenance: A scheduled annual station maintenance was completed on March 5 for the SO_2 and THC analyzers.

All Parameters: On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

THC: Three hours of downtime were recorded on March 5, due to the annual maintenance event.

SO_2: Two hours of downtime were recorded on March 5, due to the annual maintenance event.

NOx/NO/NO_2: The NOx gas concentration 50.7 ppm labelled as “Calculated NOx” on the calibration record is not the actual concentration on the certificate of analysis, which is 50.9 ppm. A sample of affected calculations has been rerun and the error has no significant effect on the calibration. The NOx calibration still meets the AMD calibration criteria.

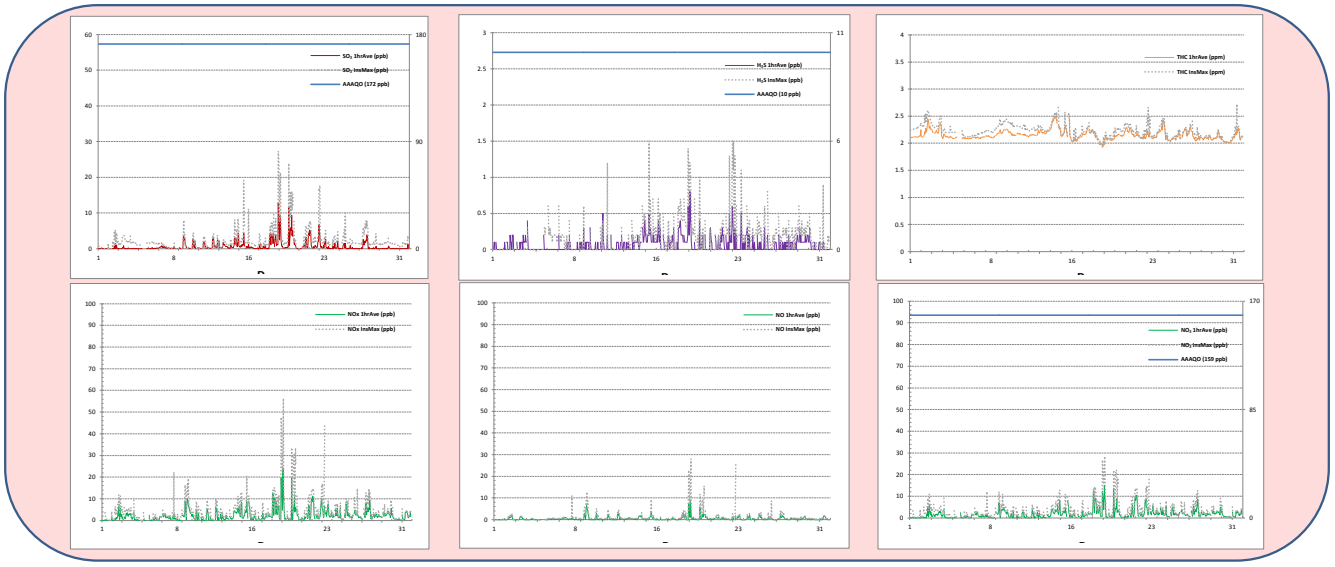
The summary of results is presented on the following pages.

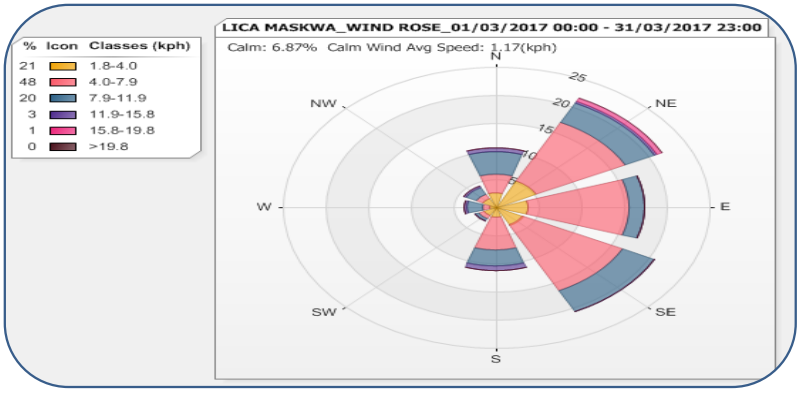
Any deviations or modifications made to the sampling or analytical methods are outlined in Section 1.0, Discussion. On this basis, Maxxam Analytics is issuing this completed report to Lakeland Industry & Community Association, Maskwa Continuous Monitoring Station.

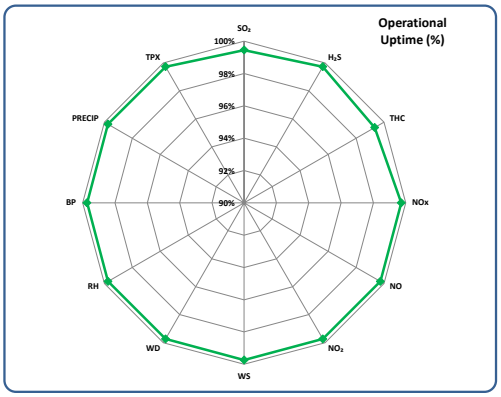
Should you have any questions concerning the results or if we can be of further assistance, please contact us at 403-219-3677 or toll-free at 1-800-386-7247.

Lakeland Industry & Community Association - Maskwa Site
March 2017 Monthly Report Summary

Pollutants		Monthly Records		1-Hour Records					24-Hour Records			
				Maximum			AAAQO Objective	Exceed. Hours	Maximum		AAAQO Objective	Exceed. Days
Name	Unit	Avg. Conc.	Uptime	Conc.	Date	Hour			Conc.	Date		
SO_2	ppb	0.6	99.5%	12.8	March 18	22	172	0	3.0	March 18	48	0
H_2S	ppb	0.1	99.7%	0.8	March 19	2	10	0	0.2	March 15	3	0
THC	ppm	2.15	99.3%	2.55	March 15	17	-	-	2.36	March 14	-	-
NOx	ppb	2.2	99.7%	24.2	March 19	2	-	-	6.3	March 18	-	-
NO	ppb	0.5	99.7%	9.1	March 19	2	-	-	1.5	March 9	-	-
NO_2	ppb	1.7	99.7%	15.1	March 19	2	159	0	5.0	March 18	-	-
WS	kph	2.2	99.7%	19.7	March 4	6	-	-	12.6	March 4	-	-
WD	degree	84 (E)	99.7%	-	-	-	-	-	-	-	-	-
RH	%	67	99.7%	91	March 29	6	-	-	83	March 30	-	-
BP	mbar	941	99.7%	963	March 9	6	-	-	962	March 9	-	-
PRECIP	mm	0.0	99.7%	2.8	March 22	14	-	-	0.8	March 22	-	-
AmbTPX	°C	-6.5	99.7%	14.4	March 15	14	-	-	3.9	March 31	-	-







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

All Parameters: On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

THC: Three hours of downtime were recorded on March 5, due to an annual maintenance event.

SO_2: Two hours of downtime were recorded on March 5, due to an annual maintenance event.

Annual Maintenance: A scheduled annual station maintenance was completed on March 5 for the SO2 and THC analyzers.

Monthly Continuous Data Summary

Lakeland Industry & Community Association Maskwa Continuous Monitoring Station						MAXIMUM VALUES							OPERATIONAL TIME (%)
						1-HOUR					24-HOUR		
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
	1-hr	24-hr	1-hr	24-hr									
SO_2 (ppb)	172	48	0	0	0.6	12.8	18	22	8.5	WNW	3.0	18	99.5
H_2S (ppb)	10	3	0	0	0.1	0.8	19	2	13.9	NW	0.2	15	99.7
THC (ppm)	-	-	-	-	2.15	2.55	15	17	2.9	SW	2.36	14	99.3
NO_2 (ppb)	159	-	0	-	1.7	15.1	19	2	13.9	NW	5.0	18	99.7
NO (ppb)	-	-	-	-	0.5	9.1	19	2	13.9	NW	1.5	9	99.7
NOx (ppb)	-	-	-	-	2.2	24.2	19	2	13.9	NW	6.3	18	99.7
RELATIVE HUMIDITY (%)	-	-	-	-	67	91	29	6	2	SSW	83	30	99.7
BAROMETRIC PRESSURE (millibar)	-	-	-	-	941	963	9	6	0.6	SSE	962	9	99.7
AMBIENT TEMPERATURE (°C)	-	-	-	-	-6.5	14.4	15	14	4.7	NNW	3.9	31	99.7
PRECIPITATION (mm)	-	-	-	-	0.0	2.8	22	14	5	E	0.8	22	99.7
VECTOR WS (kph)	-	-	-	-	2.2	19.7	4	6	-	NNE	12.6	4	99.7
VECTOR WD (sec)	-	-	-	-	84 (E)	-	-	-	-	-	-	-	99.7

Exceedance Summary Report

SO_2 1-Hour Exceedances

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

SO_2 24-Hour Exceedances

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

H_2S 1-Hour Exceedances

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

H_2S 24-Hour Exceedances

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

NO_2 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.

TABLE OF CONTENTS

Title		Page
SUMMARY		1
MONTHLY DASHBOARD		2
MONTHLY CONTINUOUS DATA SUMMARY REPORT		3
EXCEEDANCE SUMMARY REPORT		4
TABLE OF CONTENTS		5
1.0 Discussion		7
2.0 Project Personnel		10
3.0 Plant Monthly Required AMD Summary		10
4.0 Calculations and Results		10
5.0 Methods and Procedures		11
Appendix I	Continuous Monitoring Data Results	14
	Sulphur Dioxide	15
	Hydrogen Sulphide	23
	Total Hydrocarbon	31
	Oxides of Nitrogen	39
	Nitric Oxides	47
	Nitrogen Dioxide	54
	Wind Speed	62
	Wind Direction	69
	Standard Deviation Wind Direction	72
	Relative Humidity	75
	Barometric Pressure	78
	Ambient Temperature	81
	Precipitation	84
Appendix II	Equipment Calibration Results	87
	Sulphur Dioxide	88
	Hydrogen Sulphide	92
	Total Hydrocarbon	95
	Nitrogen Dioxide	99

	Wind System	**103**
	Meteorological System Check	**105**
	Calibrators	**107**
	Calibration Gases	**110**
Appendix III	**Report Certification Form**	**115**
Appendix IV	**Data Validation Certification Form**	**117**

1.0 Discussion

This monthly report consists of continuous monitoring results for the following parameters: Sulphur Dioxide (SO_2), Hydrogen Sulphide (H_2S), Total Hydrocarbon (THC), Oxides of Nitrogen (NOx), Nitric Oxides (NO), Nitrogen Dioxide (NO_2), 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 (December, 2016). The descriptions of the data verification and validation process can be found in Section 5 of this report. Instantaneous data, where applicable, is provided for reference purposes and has not undergone zero correction. The minimum and maximum statistics are highlighted in the data table and are for reference only. The highlighted cells are based on the software's interpretation of the exact position of the minimum or maximum value. The visual presentation of these statistics may not be the obvious choice in a data range due to rounding, truncating or analyzer specifications.

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

SULPHUR DIOXIDE (SO_2)

• Operational time, for the monitoring period was 99.5%, equivalent to four hours of downtime.
• A shut-down calibration was performed on March 5, prior to completing a scheduled annual maintenance on the analyzer. The sample valve was cleaned, the reaction cell was inspected and the high voltage power supply was adjusted. The sample flow rate and pressure were then calibrated. A successful post-repair calibration was completed afterwards. Two hours of downtime were attributed to the maintenance event.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

HYDROGEN SULPHIDE (H_2S)

• Operational time, for the monitoring period was 99.7%, equivalent to two hours of downtime.
• The routine monthly calibration was performed on March 5.
• One hour of maximum instantaneous data on March 5 at hour 16:00, was invalidated due to an anomalous spike.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.
• One hour of maximum instantaneous data was invalidated on March 5 at hour 09:00, due to a brief power interference that occurred during monthly visit activities.

TOTAL HYDROCARBONS (THC)

• Operational time, for the monitoring period was 99.3%, equivalent to five hours of downtime.
• A shut-down calibration was performed on March 5, prior to completing a scheduled annual maintenance on the analyzer. The zero air pressure sensor was adjusted and the pump was rebuilt. A successful post-repair calibration was completed afterwards. Three hours of downtime were attributed to the maintenance event.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

OXIDES OF NITROGEN (NOx), NITRIC OXIDE (NO) and NITROGEN DIOXIDE (NO_2)

• Operational time, for the monitoring period was 99.7%, equivalent to two hours of downtime.
• The routine monthly calibration was performed on March 5.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.
• The NOx gas concentration 50.7 ppm labelled as “Calculated NOx” on the calibration record is not the actual concentration on the certificate of analysis, which is 50.9 ppm. A sample of affected calculations has been rerun and the error has no significant effect on the calibration. The NOx calibration still meets the AMD calibration criteria.

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

- Operational time, for the monitoring period was 99.7%, equivalent to two hours of downtime.
- On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.
- One hour of maximum instantaneous data was invalidated on March 5 at 09:00, due to a brief power interference that occurred during monthly visit activities.
- Wind data is reported as vector wind speed and vector wind direction. Wind direction is defined as the direction from which the wind is blowing from and is measured in degrees from true north.

RELATIVE HUMIDITY (RH)

- Operational time, for the monitoring period was 99.7%, equivalent to two hours of downtime.
- A function check was performed on the relative humidity sensor on March 5. The sensor was determined to operate properly.
- On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

BAROMETRIC PRESSURE (BP)

- Operational time, for the monitoring period was 99.7%, equivalent to two hours of downtime.
- On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

PRECIPITATION (PRECIP)

- Operational time, for the monitoring period was 99.7%, equivalent to two hours of downtime.
- On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

AMBIENT TEMPERATURE (AmbTPX)

- Operational time, for the monitoring period was 99.7%, equivalent to two hours of downtime.
- A function check was performed on the temperature sensor on March 5. The sensor was determined to operate properly.
- On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

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-00209: Ambient Sulphur Monitoring
Maxxam AIR SOP-00213: Ambient NO/NO_2/NOx 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 101A 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

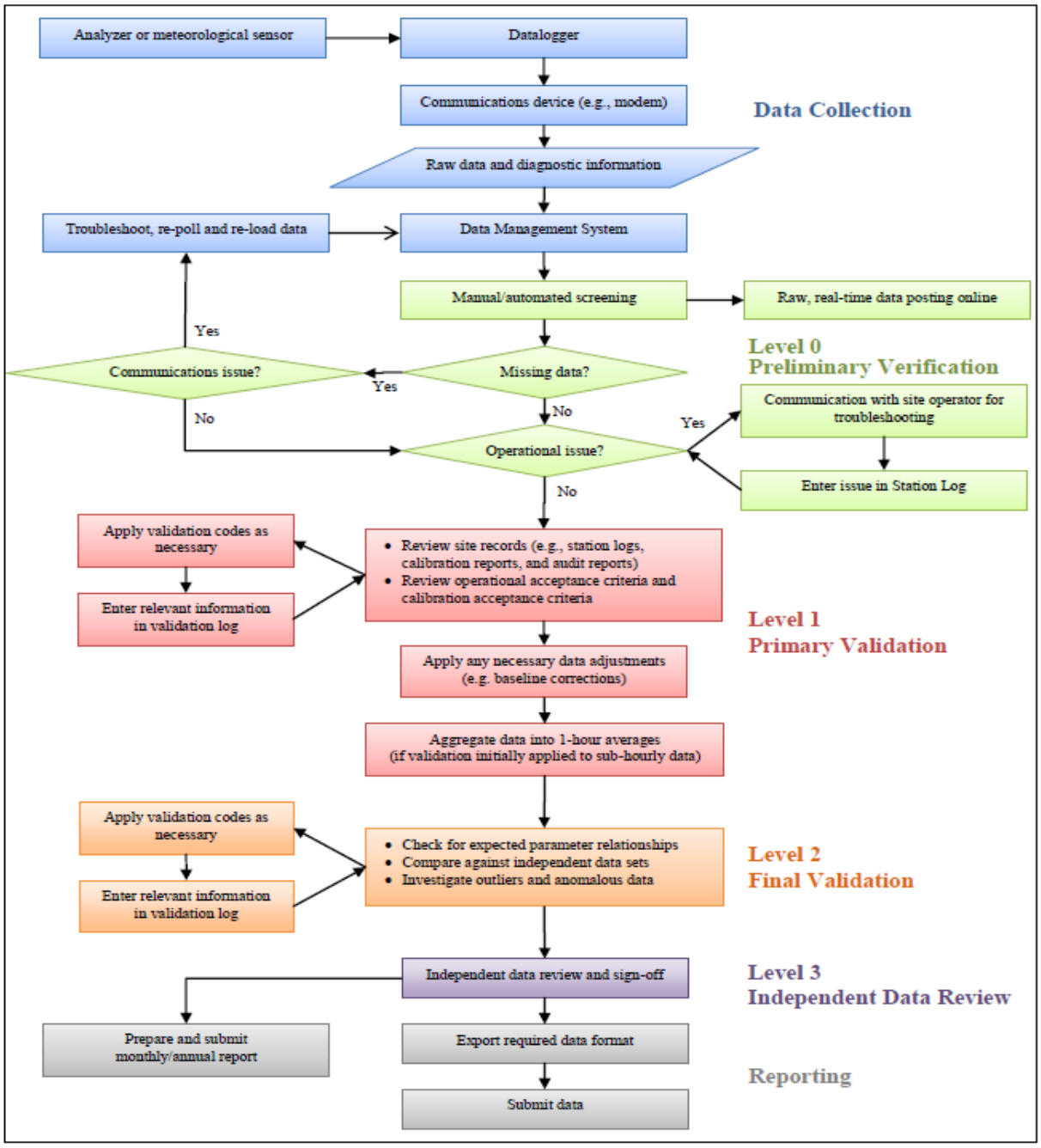
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

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 (December 2016), Chapter 6, Ambient Data Quality; Figure 1 Data Collection and Management Process Flow Chart

APPENDIX I
CONTINUOUS MONITORING DATA RESULTS

SULPHUR DIOXIDE

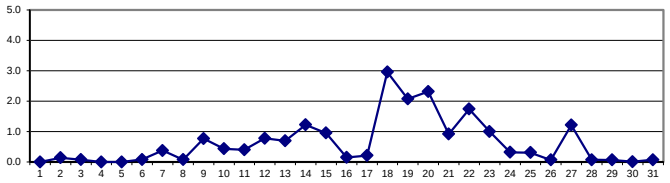
SULPHUR DIOXIDE Hourly Averages (SO_2 ppb)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	**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
2	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1.4	0.0	0.0	0.9	0.4	0.0	0.0	0.0	0.0	1.4	0.1	24
3	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.1	0.4	0.2	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.1	24
4	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
5	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	C	C	C	C	C	Y	Y	C	C	C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22
6	0.0	S	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.0	0.3	0.1	24
7	S	0.3	0.4	0.4	0.4	0.5	0.5	0.8	0.6	0.3	0.6	0.4	0.3	0.4	0.5	0.5	0.2	0.2	0.3	0.2	0.1	0.2	0.2	S	0.1	0.8	0.4	24
8	0.0	0.0	0.2	0.1	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.4	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.4	0.1	24
9	0.0	0.2	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	3.5	3.6	2.5	2.9	1.7	0.9	0.8	0.4	0.3	0.2	S	0.0	0.0	0.0	3.6	0.8	24
10	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.7	2.1	0.5	0.3	1.3	2.0	0.0	0.0	0.0	0.0	S	0.0	0.3	0.0	0.0	2.7	0.4	24
11	0.1	0.2	0.1	0.0	0.0	0.0	0.0	X	X	0.0	0.0	1.6	1.8	1.6	1.5	0.3	0.6	0.0	0.0	S	0.4	0.1	0.0	0.1	0.0	1.8	0.4	22
12	0.2	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.4	2.8	2.2	2.8	1.6	0.4	0.4	0.9	0.5	0.4	S	0.1	1.6	2.4	0.5	0.3	0.0	2.8	0.8	24
13	1.3	2.1	0.2	0.2	0.1	0.1	0.2	0.3	0.3	0.7	1.8	1.7	1.1	1.2	1.0	0.8	0.5	S	0.6	0.6	0.5	0.3	0.2	0.3	0.1	2.1	0.7	24
14	0.1	0.1	0.1	0.1	1.0	0.8	0.6	0.3	0.3	0.4	0.3	0.4	0.9	1.7	2.9	1.2	S	3.0	1.9	0.7	0.5	2.3	4.4	4.1	0.1	4.4	1.2	24
15	0.8	0.5	0.5	0.4	0.6	0.9	0.5	1.2	1.1	0.7	1.1	4.6	3.6	1.1	0.6	S	0.1	0.2	0.5	0.6	0.4	0.2	0.5	1.2	0.1	4.6	1.0	24
16	0.3	0.3	0.2	0.3	0.4	0.5	0.4	0.3	0.3	0.3	0.2	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	0.5	0.2	24
17	0.0	0.8	1.3	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.5	0.6	0.0	S	0.2	0.9	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.3	0.2	24
18	0.0	2.4	3.8	4.0	1.1	3.5	3.2	4.0	3.4	1.4	1.5	4.2	S	0.5	3.0	2.6	3.9	1.3	0.8	1.1	1.2	1.2	**12.8**	7.1	0.0	**12.8**	**3.0**	24
19	5.0	2.4	9.4	6.4	4.4	2.2	0.6	0.6	0.7	0.1	0.1	S	0.2	0.2	0.3	0.4	0.2	0.4	0.4	0.3	0.3	0.5	0.7	11.8	0.1	11.8	2.1	24
20	3.0	0.9	3.7	5.8	5.0	5.1	9.3	3.7	5.1	3.3	S	2.8	1.2	1.5	1.1	0.8	0.5	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	9.3	2.3	24
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	S	0.2	0.8	0.9	0.2	0.3	1.5	3.2	3.1	0.9	0.2	0.4	1.4	3.1	4.3	0.0	4.3	0.9	24
22	3.7	5.2	5.0	4.7	3.0	1.1	0.4	0.2	S	0.1	0.5	0.3	0.2	0.4	0.9	0.6	0.5	0.4	0.4	0.4	1.1	2.0	2.1	6.8	0.1	6.8	1.7	24
23	4.1	3.9	1.7	0.6	0.4	0.6	0.3	S	0.1	0.4	0.8	0.3	1.4	1.2	2.3	2.7	0.6	0.4	0.1	0.3	0.2	0.0	0.6	0.1	0.0	4.1	1.0	24
24	0.0	0.0	0.0	0.0	0.1	0.0	S	0.0	0.7	0.0	0.1	0.7	0.2	1.5	0.3	0.1	0.1	0.1	0.3	0.5	2.2	0.4	0.0	0.1	0.0	2.2	0.3	24
25	0.0	0.1	0.0	0.0	0.0	S	0.0	0.0	0.0	1.0	1.1	1.4	1.4	0.2	1.5	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.3	24
26	0.0	0.1	0.9	0.1	S	0.0	0.0	0.4	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	0.9	0.1	24
27	0.0	0.0	0.0	S	0.0	0.3	0.0	0.0	0.5	2.6	1.9	1.0	1.6	2.2	1.9	1.7	2.5	2.3	3.9	3.7	1.5	0.0	0.0	0.3	0.0	3.9	1.2	24
28	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.1	0.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	24
29	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	0.1	0.0	0.0	0.0	0.0	0.5	0.7	0.3	0.0	0.7	0.1	24
30	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	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.1	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	0.2	1.3	0.0	S	0.2	0.0	1.3	0.1	24
HOURLY MAX	5.0	5.2	9.4	6.4	5.0	5.1	9.3	4.0	5.1	3.3	2.7	4.6	3.6	2.5	3.0	2.7	3.9	3.1	3.9	3.7	2.2	2.4	12.8	11.8				
HOURLY AVG	0.6	0.7	1.0	0.8	0.6	0.5	0.6	0.4	0.5	0.5	0.6	1.0	0.8	0.6	0.8	0.7	0.6	0.4	0.4	0.3	0.4	0.4	0.9	1.3				

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 March 2017

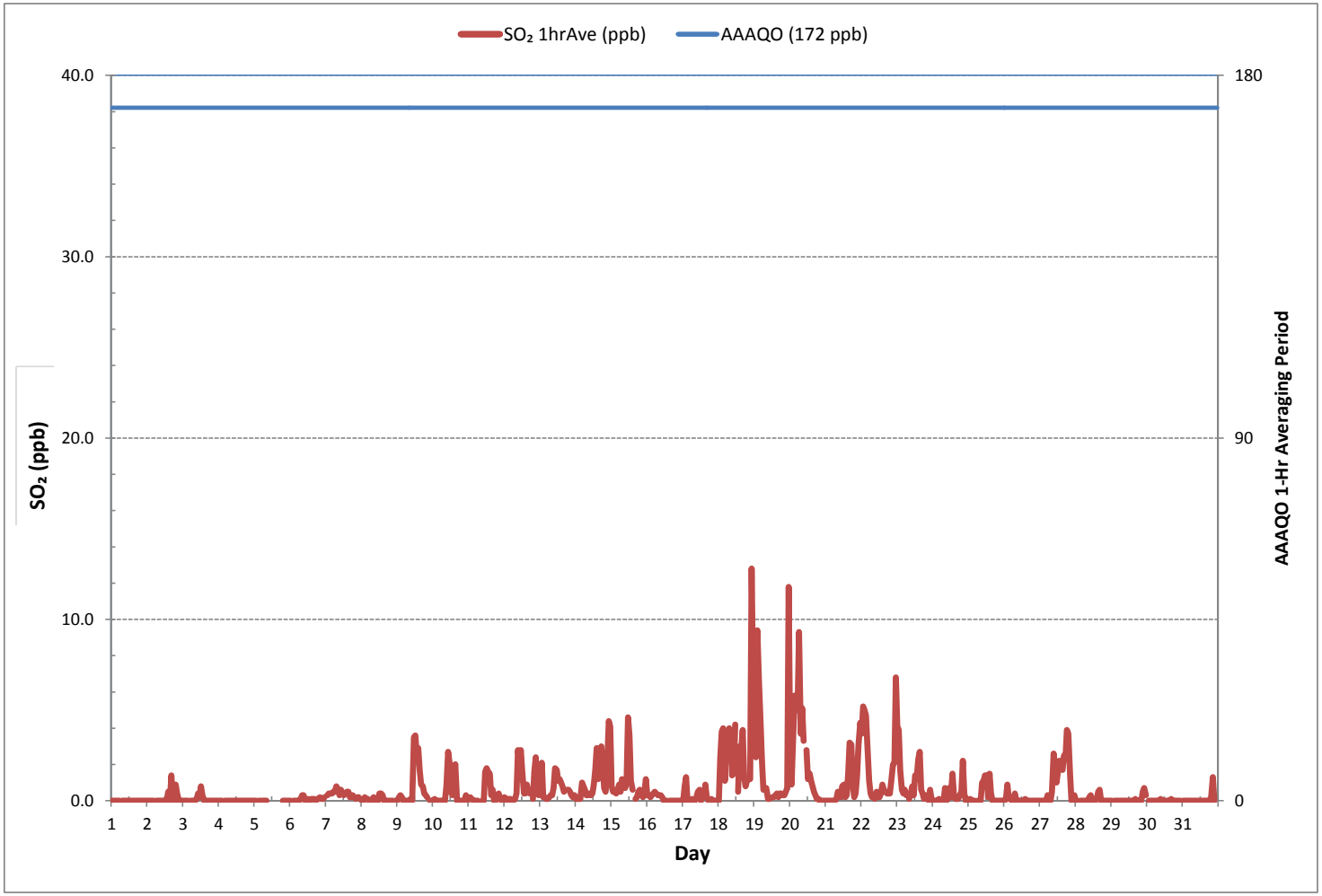


OBJECTIVE LIMIT: **ALBERTA ENVIRONMENT:** 1-HR 172 ppb | 24-HR 48 ppb

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:			0			
NUMBER OF 24-HR EXCEEDANCES:			0			
NUMBER OF NON-ZERO READINGS:			379			
MINIMUM 1-HR AVERAGE	0.0	ppb	@ HOUR(S)	0	ON DAY(S)	1
MAXIMUM 1-HR AVERAGE:	12.8	ppb	@ HOUR(S)	22	ON DAY(S)	18
MAXIMUM 24-HR AVERAGE:	3.0	ppb			ON DAY(S) VAR-VARIOUS	18
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:		740	hrs
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:		99.5	%
STANDARD DEVIATION:	1.3		MONTHLY AVERAGE:		0.6	ppb

SULPHUR DIOXIDE Hourly Averages (SO_2 ppb)



SULPHUR DIOXIDE Instantaneous Maximum (SO_2 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	0.6	0.6	0.6	0.5	0.2	0.3	S	0.3	0.4	0.3	0.2	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	0.6	0.2	24
2	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.3	2.2	0.6	0.9	1.7	4.5	2.6	5.3	1.6	1.2	4.4	4.0	1.7	1.4	2.1	0.0	5.3	1.5	24
3	1.1	1.6	1.3	1.1	S	1.3	1.4	1.4	1.9	3.0	3.3	3.3	3.7	3.7	3.5	2.9	2.4	2.1	2.0	2.2	2.4	2.2	1.9	2.2	1.1	3.7	2.3	24
4	1.8	1.8	2.4	S	3.5	1.6	1.7	2.1	1.6	1.9	1.6	1.9	1.8	1.6	1.5	1.7	1.4	1.6	1.2	1.3	1.0	0.8	1.1	1.1	0.8	3.5	1.7	24
5	1.0	1.0	S	1.0	1.1	1.2	1.2	1.2	1.2	C	C	C	C	C	Y	Y	C	C	C	C	1.6	1.5	1.4	1.5	1.0	1.6	1.2	22
6	1.6	S	1.5	1.5	1.6	1.5	1.5	1.8	1.8	1.8	1.5	1.3	1.4	1.6	1.6	1.4	1.4	1.3	1.5	1.2	1.2	1.2	1.3	1.3	1.2	1.8	1.5	24
7	S	1.4	1.4	1.4	1.3	1.2	1.3	1.6	1.4	1.0	1.4	1.0	0.9	1.0	1.1	1.0	0.7	0.5	0.6	0.4	0.4	0.4	0.3	S	0.3	1.6	1.0	24
8	0.0	0.0	0.2	0.2	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.4	1.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	1.5	0.1	24
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	8.0	3.8	4.4	3.1	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	8.0	1.1	24
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	4.5	4.3	1.2	0.9	2.2	2.5	0.7	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	4.5	0.8	24
11	0.4	0.4	0.0	0.0	0.0	0.0	0.0	X	X	0.0	0.6	2.6	3.5	2.8	3.2	1.5	2.1	0.0	0.0	S	0.7	0.0	0.0	0.0	0.0	3.5	0.8	22
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	3.5	2.8	4.2	2.4	0.3	1.0	1.0	1.0	0.0	S	0.0	3.8	2.2	1.4	0.0	0.0	4.2	1.1	24
13	2.1	2.4	0.2	0.0	0.0	0.2	0.2	0.2	0.5	1.3	2.4	2.5	1.8	1.8	1.9	1.9	1.2	S	1.3	1.3	1.2	1.1	0.8	1.0	0.0	2.5	1.2	24
14	0.9	0.7	0.9	0.9	2.7	2.2	1.8	1.2	1.2	1.3	1.1	1.3	2.9	3.9	8.1	2.6	S	5.2	5.5	1.8	1.6	8.4	7.6	7.4	0.7	8.4	3.1	24
15	2.2	1.8	1.5	1.6	2.0	2.4	1.9	3.0	3.2	2.2	3.0	19.1	11.5	7.1	5.8	S	1.6	1.6	2.0	1.9	1.7	1.4	1.6	11.1	1.4	19.1	4.0	24
16	1.5	1.5	1.5	1.5	1.5	1.4	1.5	1.4	1.3	1.3	1.2	1.0	1.0	1.0	S	0.8	0.8	0.8	0.7	0.4	0.4	0.4	0.4	1.4	0.4	1.5	1.1	24
17	0.9	4.1	4.1	2.2	1.1	0.4	1.3	0.5	0.7	1.0	1.2	1.7	0.5	S	0.9	3.0	1.0	0.7	1.0	1.2	1.0	0.8	0.9	0.9	0.4	4.1	1.4	24
18	1.6	4.3	6.0	6.3	3.4	7.2	5.8	6.6	7.2	3.4	5.5	9.8	S	2.8	7.0	6.4	8.5	3.5	2.7	2.8	2.9	2.8	**27.3**	24.4	1.6	**27.3**	6.9	24
19	15.4	7.5	16.3	21.3	9.5	5.4	2.2	2.1	2.5	1.3	1.2	S	1.4	1.2	1.7	1.4	1.2	1.4	1.6	0.9	0.8	3.9	4.2	23.6	0.8	23.6	5.6	24
20	14.3	5.5	10.8	15.7	8.9	15.5	16.2	10.7	15.3	12.3	S	7.6	2.6	2.7	1.8	2.4	1.6	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	16.2	6.3	24
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	S	0.2	3.2	2.5	0.4	1.1	5.2	6.2	6.4	2.2	0.8	1.2	3.7	6.2	6.8	0.0	6.8	2.0	24
22	6.2	7.8	7.4	7.5	6.4	3.3	1.9	1.6	S	1.7	2.8	1.5	1.6	1.7	3.5	2.2	1.8	1.7	1.9	1.9	3.1	3.7	3.7	16.5	1.5	16.5	4.0	24
23	16.1	17.7	5.0	2.1	2.0	2.5	1.8	S	1.5	2.1	2.2	1.8	3.0	2.7	4.1	5.1	1.9	1.7	1.6	1.6	1.3	1.0	2.1	1.5	1.0	17.7	3.6	24
24	1.0	1.1	0.9	0.9	1.0	0.8	S	0.8	2.6	0.8	2.1	3.2	3.0	3.5	2.0	1.8	1.4	1.4	2.8	2.8	4.8	2.5	1.7	1.7	0.8	4.8	1.9	24
25	1.7	1.7	1.8	1.7	1.6	S	1.6	1.9	1.8	3.7	3.2	4.4	5.7	2.2	10.0	3.4	1.7	1.7	1.6	1.5	1.5	1.6	1.4	1.6	1.4	10.0	2.6	24
26	1.4	2.3	2.7	1.9	S	1.3	1.4	2.4	1.6	1.6	1.4	1.4	1.4	1.4	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.3	2.7	1.6	24
27	1.3	1.4	1.1	S	1.3	1.9	1.3	1.1	4.3	5.9	5.4	3.8	4.9	6.9	7.0	5.5	8.1	5.8	7.8	6.4	5.6	1.3	1.1	1.6	1.1	8.1	3.9	24
28	1.1	1.2	S	1.2	1.0	1.0	1.2	1.2	1.1	1.9	2.0	1.2	1.1	1.4	1.4	4.2	2.7	1.6	1.4	1.3	1.3	1.4	1.4	1.3	1.0	4.2	1.5	24
29	1.3	S	1.2	1.2	1.5	1.3	1.2	1.2	1.3	1.3	1.3	1.7	1.7	1.3	1.5	1.7	1.6	1.6	1.6	1.8	1.6	3.0	3.0	2.4	1.2	3.0	1.6	24
30	S	1.6	1.6	1.6	1.6	1.3	1.4	1.3	1.3	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.1	1.1	1.1	1.0	0.9	0.8	0.9	S	0.8	1.6	1.3	24
31	0.5	0.6	0.6	0.7	0.6	0.6	0.5	1.0	1.6	1.2	1.2	1.2	1.4	1.2	1.5	1.0	1.2	1.3	1.2	2.9	3.6	2.1	S	2.1	0.5	3.6	1.3	24
HOURLY MAX	16.1	17.7	16.3	21.3	9.5	15.5	16.2	10.7	15.3	12.3	5.5	19.1	11.5	7.1	10.0	6.4	8.5	6.4	7.8	6.4	5.6	8.4	27.3	24.4				
HOURLY AVG	2.6	2.4	2.4	2.6	1.9	1.9	1.7	1.6	2.0	2.0	2.0	3.2	2.5	2.2	2.9	2.4	2.1	1.6	1.6	1.5	1.7	1.7	2.6	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

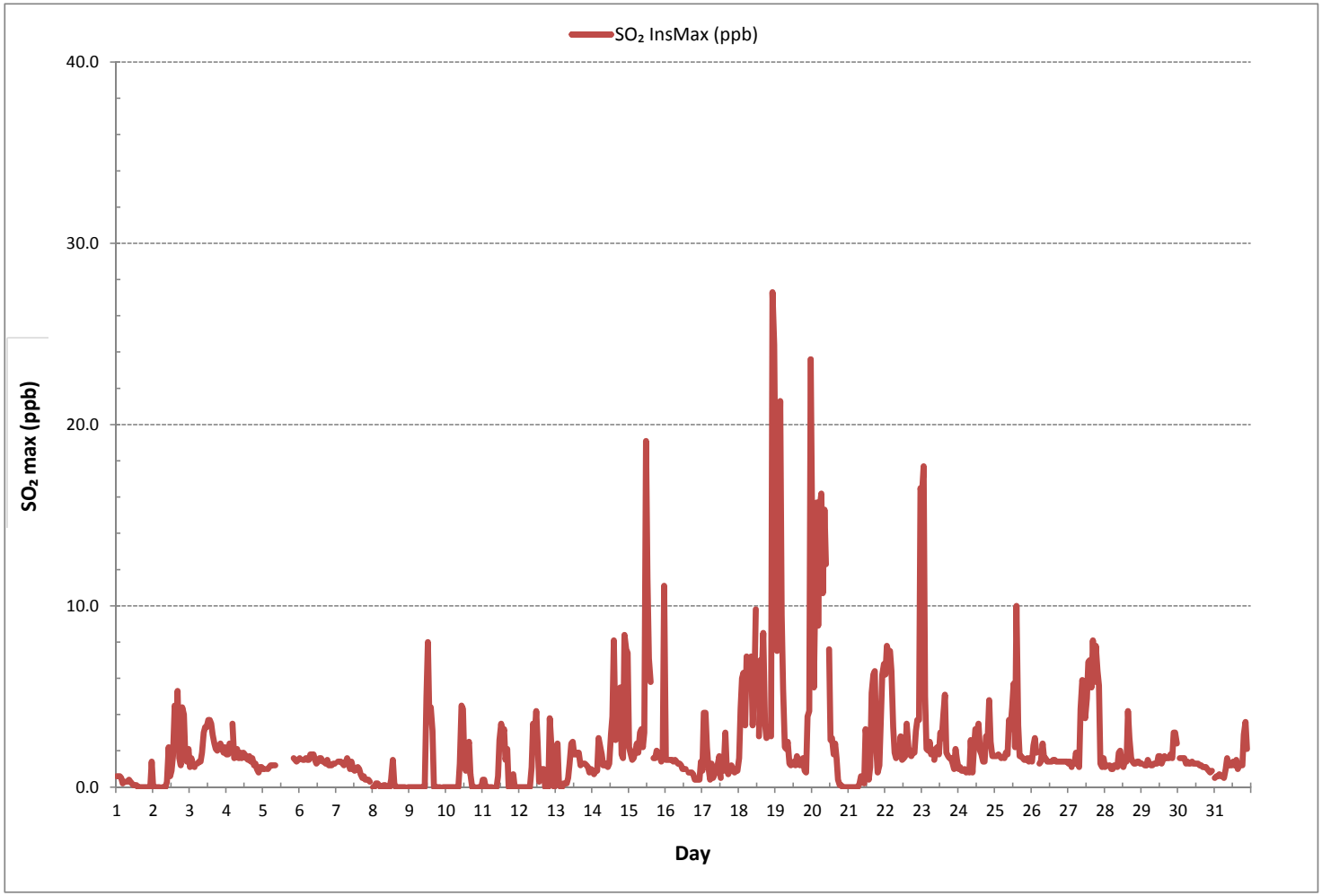
NUMBER OF NON-ZERO READINGS: 597

MAXIMUM INSTANTANEOUS VALUE: 27.3 ppb @ HOUR(S) 22 ON DAY(S) 18

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 740 hrs
MONTHLY CALIBRATION TIME: 9 hrs
STANDARD DEVIATION: 3.1

SULPHUR DIOXIDE Instantaneous Maximum (SO_2 ppb)



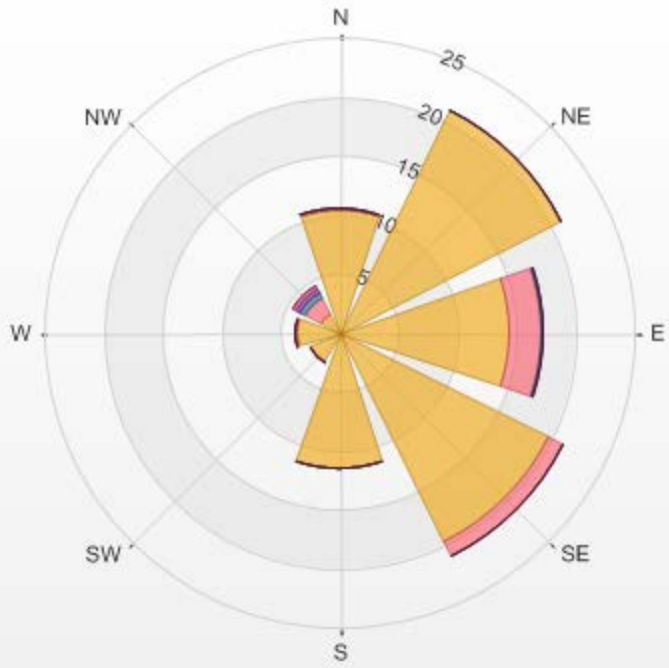
Wind: LICA MASKWA
Poll.: LICA MASKWA-SO2[ppb]
Monthly: 2017/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 7.15% Calm Avg: 0.40 [ppb]

Direction	0.0-2.6	2.6-5.2	5.2-7.7	7.7-10.3	10.3-12.9	>12.9	Total
N	10.4	0.1	0.0	0.0	0.0	0.0	10.6
NE	21.0	0.0	0.0	0.0	0.0	0.0	21.0
E	14.5	2.7	0.1	0.0	0.0	0.0	17.3
SE	19.9	1.3	0.0	0.0	0.0	0.0	21.2
S	11.6	0.0	0.0	0.0	0.0	0.0	11.6
SW	2.7	0.1	0.0	0.0	0.0	0.0	2.9
W	3.6	0.3	0.0	0.0	0.0	0.0	3.9
NW	1.7	1.6	0.6	0.3	0.3	0.0	4.4
Summary	85.4	6.2	0.7	0.3	0.3	0.0	92.9

%	Icon	Classes (ppb)										
	85	0.0-2.6	6	2.6-5.2	1	5.2-7.7	0	7.7-10.3	0	10.3-12.9	0	>12.9

LICA MASKWA Poll.: LICA MASKWA-SO2[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 7.15% Calm Poll Avg: 0.40[ppb]



SO2[ppb] Calibration: LICA MASKWA Monthly: 2017/03 Type: Span

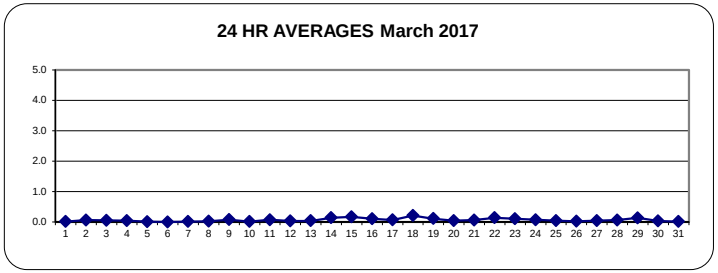
HYDROGEN SULPHIDE

HYDROGEN SULPHIDE Hourly Averages (H_2S ppb)

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

STATUS FLAG CODES

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

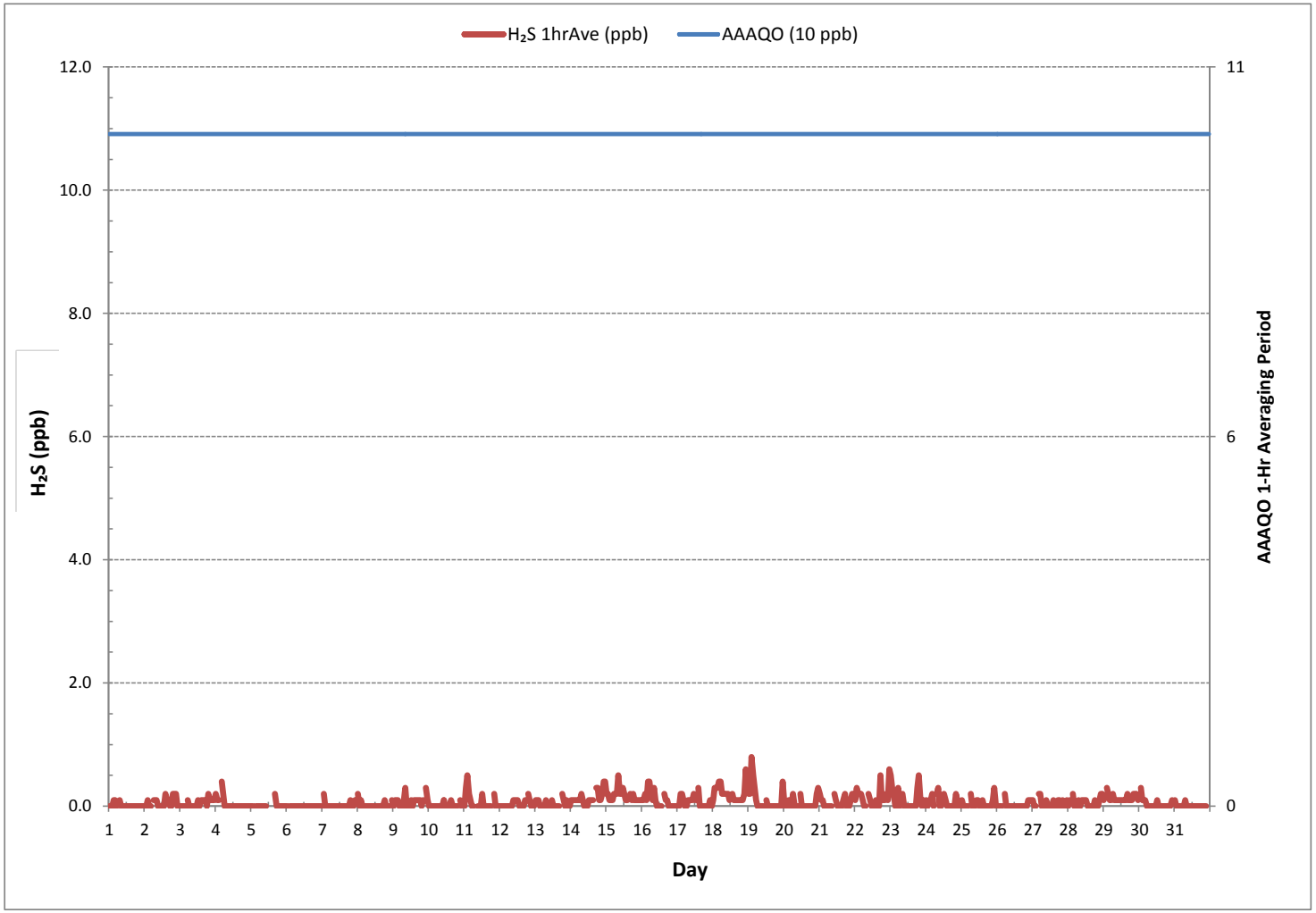


OBJECTIVE LIMIT: **ALBERTA ENVIRONMENT:** 1-HR 10 ppb | 24-HR 3 ppb

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:			0				
NUMBER OF 24-HR EXCEEDANCES:			0				
NUMBER OF NON-ZERO READINGS:			288				
MINIMUM 1-HR AVERAGE	0.0	ppb	@ HOUR(S)	0	ON DAY(S)	1	
MAXIMUM 1-HR AVERAGE:	0.8	ppb	@ HOUR(S)	2	ON DAY(S)	19	
MAXIMUM 24-HR AVERAGE:	0.2	ppb			ON DAY(S) VAR-VARIOUS	15	
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:			742	hrs
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	0.1		MONTHLY AVERAGE:			0.1	ppb

HYDROGEN SULPHIDE Hourly Averages (H_2S ppb)



HYDROGEN SULPHIDE Instantaneous Maximum (H_2S 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	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
2	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24
4	0.0	0.0	0.0	S	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
5	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	P	0.0	C	C	C	C	C	X	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.0	0.3	0.1	22
6	0.3	S	0.6	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.6	0.2	24
7	S	0.6	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	S	0.0	0.6	0.1	24
8	0.4	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	S	0.2	0.0	0.4	0.0	24
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	S	0.3	0.0	0.0	0.6	0.1	24
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.3	0.0	0.0	0.0	0.3	0.0	24
11	0.0	0.2	0.4	0.1	0.0	0.0	0.0	X	X	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	S	0.2	0.0	0.0	0.0	0.0	1.2	0.1	22
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	S	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24
13	0.0	0.0	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	0.1	S	0.4	0.2	0.1	0.2	0.1	0.0	0.0	0.4	0.1	24
14	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.2	0.1	0.2	0.2	0.3	0.3	S	0.6	0.5	0.2	0.2	0.5	0.4	0.5	0.0	0.6	0.3	24
15	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.3	1.5	0.2	0.3	0.7	0.3	0.2	0.2	S	0.7	0.2	0.3	0.3	0.2	0.1	0.2	0.3	0.1	1.5	0.3	24
16	0.2	0.2	0.2	0.2	0.7	0.4	0.3	0.2	0.5	0.2	0.0	0.0	0.0	0.0	S	0.5	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.7	0.2	24
17	0.0	0.1	0.4	0.4	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.1	S	0.5	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.0	0.5	0.1	24
18	0.6	0.6	0.5	0.5	0.6	0.7	0.6	0.4	0.4	0.4	0.4	0.5	S	0.7	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.4	1.4	1.1	0.3	1.4	0.5	24
19	0.6	1.2	1.2	1.2	0.7	0.6	0.2	0.2	0.2	0.3	0.2	S	0.7	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.0	0.2	0.2	1.0	0.0	1.2	0.4	24
20	0.6	0.0	0.0	0.2	0.0	0.2	0.3	0.0	0.2	0.2	S	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.0	0.6	0.1	24
21	0.0	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	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.3	0.2	0.3	0.0	0.3	0.1	24
22	0.3	0.4	0.4	0.4	0.3	0.2	0.2	0.2	S	0.5	0.3	0.3	0.2	0.3	0.3	0.3	0.2	1.3	0.4	0.3	0.3	0.3	0.3	1.3	0.2	1.3	0.4	24
23	1.5	1.1	1.5	0.2	0.2	1.3	0.2	S	0.6	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5	1.1	0.3	0.1	0.2	0.1	0.1	1.5	0.5	24
24	0.2	0.1	0.1	0.1	0.2	0.1	S	0.6	0.4	0.0	0.1	0.2	0.4	0.4	0.2	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.1	0.2	0.0	0.6	0.2	24
25	0.2	0.2	0.2	0.2	0.3	S	0.5	0.2	0.2	0.3	0.4	0.3	0.2	0.2	0.3	0.1	0.1	0.2	0.2	0.2	0.2	0.4	0.6	0.4	0.1	0.6	0.3	24
26	0.1	0.0	0.1	0.2	S	0.8	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.2	0.1	0.2	0.2	0.2	0.0	0.8	0.1	24
27	0.3	0.2	0.2	S	0.5	0.4	0.2	0.1	0.2	0.2	0.1	0.0	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.0	0.5	0.2	24
28	0.0	0.2	S	0.4	0.2	0.0	0.0	0.2	0.2	0.2	0.2	0.3	0.2	0.1	0.0	0.2	0.2	0.0	0.3	0.2	0.2	0.2	0.3	0.3	0.0	0.4	0.2	24
29	0.4	S	0.6	0.3	0.2	0.3	0.3	0.2	0.4	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.4	0.3	0.3	0.2	0.6	0.3	24
30	S	0.5	0.2	0.3	0.2	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.5	0.1	24
31	0.3	0.0	0.1	0.1	0.0	0.0	0.0	0.9	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.2	0.2	S	0.6	0.0	0.9	0.1	24
HOURLY MAX	1.5	1.2	1.5	1.2	0.7	1.3	0.6	0.9	1.5	0.5	0.4	0.7	1.2	0.7	0.5	0.5	0.7	1.3	0.5	1.1	0.3	0.5	1.4	1.3				
HOURLY AVG	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.2	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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS: 399

MAXIMUM INSTANTANEOUS VALUE: 1.5 ppb @ HOUR(S) 8 ON DAY(S) 15

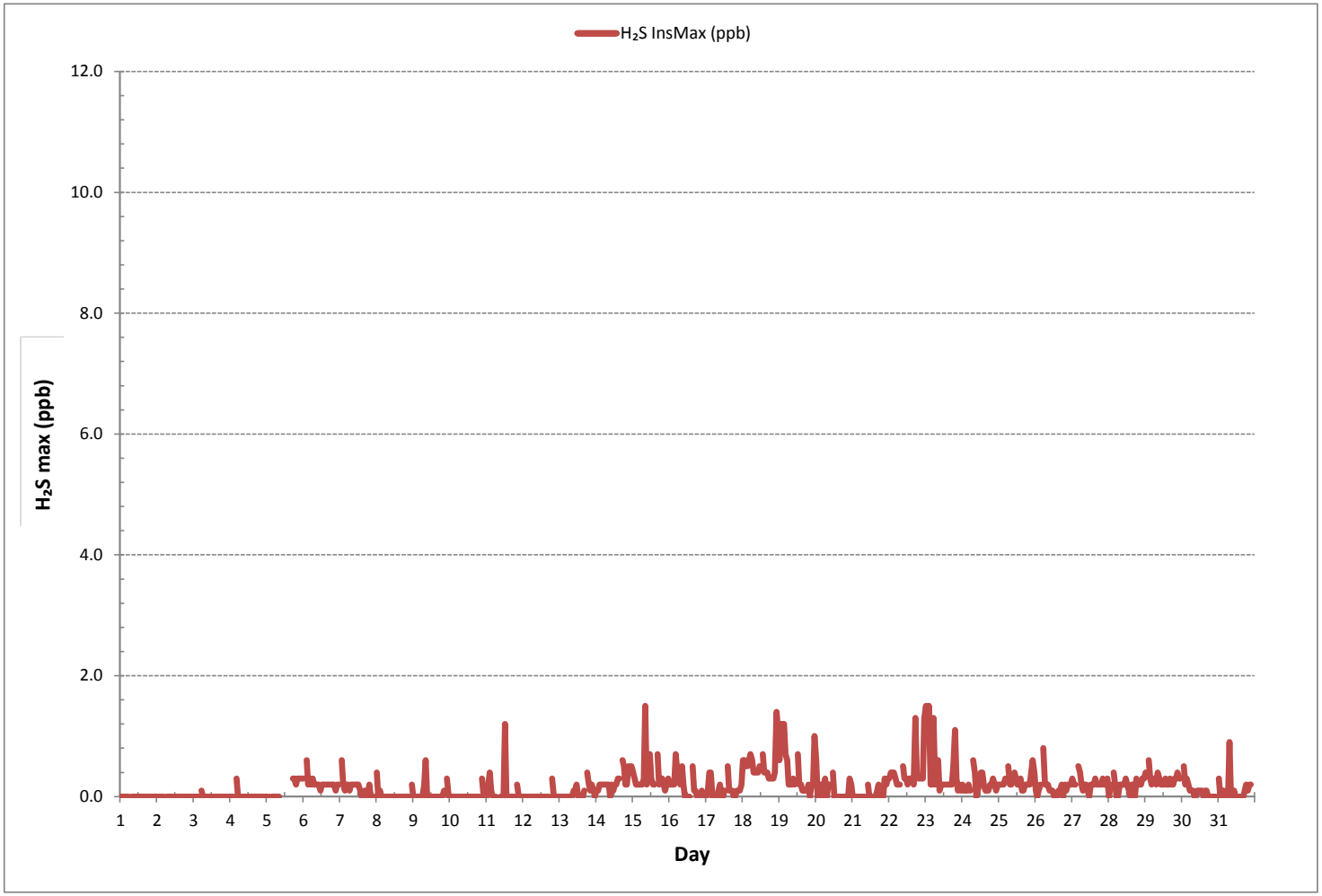
VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 740 hrs

MONTHLY CALIBRATION TIME: 5 hrs

STANDARD DEVIATION: 0.2

HYDROGEN SULPHIDE Instantaneous Maximum (H_2S ppb)



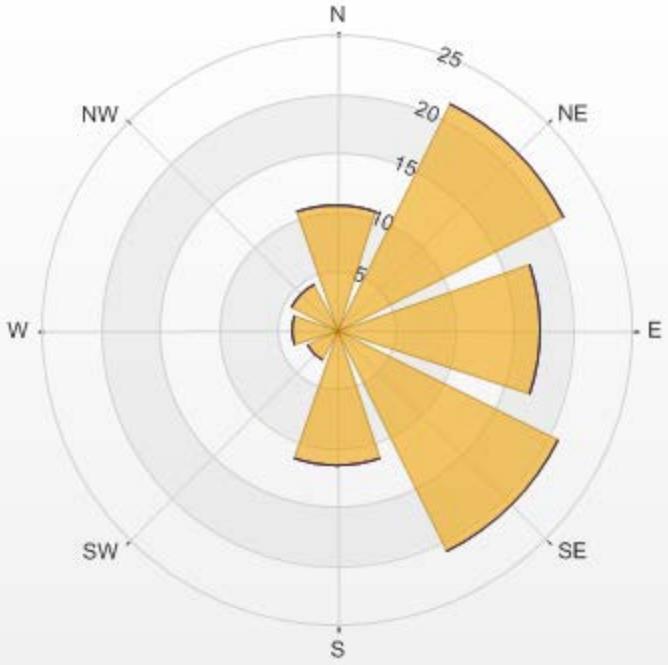
Wind: LICA MASKWA
Poll.: LICA MASKWA-H2S[ppb]
Monthly: 2017/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 7.10% Calm Avg: 0.11 [ppb]

Direction	0.0-0.7	0.7-1.3	1.3-2.0	>2.0	Total
N	10.5	0.0	0.0	0.0	10.5
NE	21.5	0.0	0.0	0.0	21.5
E	17.3	0.0	0.0	0.0	17.3
SE	21.0	0.0	0.0	0.0	21.0
S	11.5	0.0	0.0	0.0	11.5
SW	2.8	0.0	0.0	0.0	2.8
W	3.8	0.0	0.0	0.0	3.8
NW	4.3	0.1	0.0	0.0	4.4
Summary	92.8	0.1	0.0	0.0	92.9

% Icon Classes (ppb)	93 0.0-0.7	0 0.7-1.3	0 1.3-2.0	0 >2.0

LICA MASKWA Poll.: LICA MASKWA-H2S[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 7.10% Calm Poll Avg: 0.11[ppb]



H2S[ppb] Calibration: LICA MASKWA Monthly: 2017/03 Type: Span

TOTAL HYDROCARBON

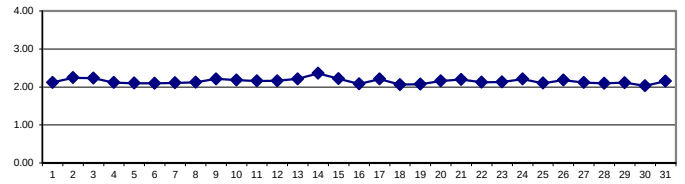
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																											
1	2.11	2.11	2.11	2.10	2.11	2.11	S	2.12	2.12	2.12	2.12	2.12	2.12	2.11	2.11	2.11	2.11	2.12	2.13	2.13	2.13	2.13	2.14	2.13	2.10	2.14	2.12	24
2	2.13	2.13	2.12	2.12	2.11	S	2.13	2.17	2.21	2.18	2.28	2.21	2.21	2.28	2.37	2.44	2.42	2.36	2.28	2.31	2.31	2.27	2.25	2.26	2.11	2.44	2.24	24
3	2.24	2.23	2.20	2.20	S	2.18	2.19	2.19	2.20	2.21	2.24	2.21	2.20	2.19	2.18	2.24	2.32	2.34	2.36	2.37	2.33	2.21	2.13	2.11	2.11	2.37	2.23	24
4	2.09	2.10	2.17	S	2.17	2.13	2.13	2.12	2.12	2.12	2.13	2.12	2.11	2.10	2.11	2.11	2.11	2.13	2.12	2.11	2.11	2.10	2.09	2.09	2.09	2.17	2.12	24
5	2.09	2.09	S	2.09	2.10	2.10	2.11	2.11	2.11	C	C	C	Y	Y	Y	C	C	C	C	2.10	2.08	2.09	2.10	2.11	2.08	2.11	2.10	21
6	2.09	S	2.08	2.08	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.10	2.12	2.12	2.11	2.11	2.11	2.10	2.08	2.12	2.10	24
7	S	2.09	2.11	2.10	2.10	2.11	2.11	2.11	2.10	2.09	2.09	2.10	2.09	2.10	2.11	2.11	2.11	2.11	2.12	2.12	2.11	2.12	2.12	S	2.09	2.12	2.11	24
8	2.13	2.14	2.13	2.13	2.13	2.13	2.14	2.13	2.12	2.12	2.11	2.11	2.11	2.10	2.10	2.10	2.10	2.11	2.12	2.12	2.13	2.14	S	2.15	2.10	2.15	2.12	24
9	2.16	2.17	2.18	2.18	2.18	2.19	2.20	2.21	2.25	2.20	2.18	2.19	2.18	2.19	2.21	2.24	2.25	2.25	2.25	2.25	2.24	S	2.26	2.26	2.16	2.26	2.21	24
10	2.25	2.24	2.21	2.20	2.20	2.21	2.21	2.19	2.18	2.18	2.15	2.17	2.15	2.14	2.15	2.16	2.14	2.14	2.14	2.15	S	2.17	2.18	2.18	2.14	2.25	2.18	24
11	2.18	2.17	2.18	2.17	2.18	2.17	2.16	X	X	2.16	2.16	2.16	2.16	2.15	2.17	2.15	2.16	2.14	2.13	S	2.14	2.13	2.13	2.12	2.12	2.18	2.16	22
12	2.12	2.14	2.15	2.15	2.15	2.16	2.16	2.15	2.16	2.16	2.16	2.16	2.15	2.15	2.15	2.15	2.15	2.15	S	2.15	2.21	2.24	2.20	2.19	2.12	2.24	2.16	24
13	2.20	2.24	2.26	2.26	2.22	2.19	2.19	2.20	2.19	2.20	2.20	2.19	2.17	2.18	2.18	2.19	2.21	S	2.22	2.22	2.23	2.23	2.23	2.25	2.17	2.26	2.21	24
14	2.26	2.27	2.31	2.35	2.38	2.42	2.41	2.43	2.48	2.48	2.46	2.47	2.49	2.45	2.41	2.36	S	2.33	2.30	2.28	2.28	2.25	2.24	2.17	2.17	2.49	**2.36**	24
15	2.13	2.13	2.13	2.14	2.17	2.18	2.18	2.21	2.30	2.27	2.29	2.28	2.23	2.15	2.12	S	2.54	**2.55**	2.43	2.15	2.13	2.09	2.07	2.05	2.05	**2.55**	2.21	24
16	2.04	2.03	2.03	2.04	2.08	2.08	2.05	2.04	2.10	2.04	2.04	2.04	2.06	2.08	S	2.09	2.11	2.12	2.12	2.12	2.12	2.12	2.13	2.17	2.03	2.17	2.08	24
17	2.16	2.17	2.17	2.16	2.16	2.16	2.17	2.17	2.21	2.21	2.27	2.29	2.28	S	2.24	2.19	2.19	2.19	2.19	2.24	2.22	2.24	2.25	2.22	2.16	2.29	2.21	24
18	2.18	2.20	2.21	2.17	2.11	2.13	2.14	2.12	2.09	2.06	2.06	2.07	S	2.02	2.02	1.98	1.98	1.99	1.99	1.97	1.95	**1.94**	2.02	1.97	**1.94**	2.21	2.06	24
19	1.99	2.01	2.11	2.15	2.09	2.07	2.06	2.06	2.08	2.08	2.08	S	2.08	2.06	2.07	2.05	2.06	2.05	2.06	2.07	2.07	2.07	2.09	2.15	1.99	2.15	2.07	24
20	2.13	2.12	2.13	2.14	2.13	2.15	2.16	2.16	2.17	2.16	S	2.14	2.14	2.14	2.13	2.14	2.13	2.14	2.15	2.15	2.17	2.22	2.22	2.25	2.12	2.25	2.16	24
21	2.28	2.29	2.29	2.24	2.21	2.22	2.20	2.20	2.29	S	2.28	2.25	2.19	2.17	2.17	2.16	2.17	2.14	2.12	2.12	2.12	2.13	2.14	2.15	2.12	2.29	2.20	24
22	2.14	2.18	2.15	2.16	2.15	2.12	2.11	2.11	S	2.10	2.11	2.09	2.09	2.08	2.10	2.08	2.08	2.16	2.10	2.09	2.09	2.11	2.14	2.24	2.08	2.24	2.12	24
23	2.18	2.16	2.17	2.11	2.11	2.21	2.17	S	2.10	2.10	2.09	2.09	2.10	2.09	2.11	2.12	2.10	2.11	2.11	2.10	2.11	2.14	2.18	2.20	2.09	2.21	2.13	24
24	2.19	2.20	2.20	2.23	2.24	2.21	S	2.24	2.32	2.24	2.28	2.42	2.41	2.41	2.31	2.25	2.12	2.07	2.09	2.09	2.14	2.07	2.05	2.05	2.05	2.42	2.21	24
25	2.05	2.05	2.06	2.05	2.05	S	2.08	2.08	2.07	2.09	2.09	2.08	2.08	2.08	2.08	2.06	2.14	2.14	2.13	2.11	2.12	2.18	2.20	2.19	2.05	2.20	2.10	24
26	2.13	2.08	2.08	2.10	S	2.12	2.11	2.16	2.20	2.22	2.23	2.25	2.27	2.25	2.25	2.18	2.13	2.16	2.19	2.17	2.17	2.21	2.24	2.28	2.08	2.28	2.18	24
27	2.32	2.23	2.22	S	2.22	2.13	2.13	2.12	2.08	2.09	2.06	2.04	2.06	2.06	2.05	2.09	2.07	2.09	2.13	2.09	2.06	2.09	2.11	2.12	2.04	2.32	2.12	24
28	2.11	2.10	S	2.06	2.06	2.08	2.09	2.09	2.10	2.12	2.12	2.10	2.09	2.09	2.09	2.09	2.07	2.13	2.13	2.14	2.11	2.08	2.07	2.06	2.06	2.14	2.09	24
29	2.05	S	2.07	2.08	2.10	2.09	2.09	2.09	2.09	2.09	2.10	2.11	2.16	2.23	2.24	2.18	2.11	2.10	2.13	2.11	2.07	2.10	2.06	2.07	2.05	2.24	2.11	24
30	S	2.04	2.04	2.03	2.02	2.03	2.03	2.03	2.03	2.03	2.02	2.02	2.02	2.02	2.02	2.01	2.01	2.02	2.04	2.04	2.04	2.07	2.09	S	2.01	2.09	2.03	24
31	2.09	2.12	2.11	2.14	2.19	2.20	2.16	2.23	2.19	2.23	2.23	2.28	2.23	2.14	2.08	2.06	2.09	2.11	2.12	2.11	2.12	2.12	S	2.19	2.06	2.28	2.15	24
HOURLY MAX	2.32	2.29	2.31	2.35	2.38	2.42	2.41	2.43	2.48	2.48	2.46	2.47	2.49	2.45	2.41	2.44	2.54	2.55	2.43	2.37	2.33	2.27	2.26	2.28				
HOURLY AVG	2.15	2.15	2.15	2.14	2.15	2.15	2.14	2.15	2.16	2.15	2.16	2.17	2.16	2.15	2.15	2.14	2.15	2.16	2.16	2.14	2.14	2.14	2.15	2.15				

STATUS FLAG CODES

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

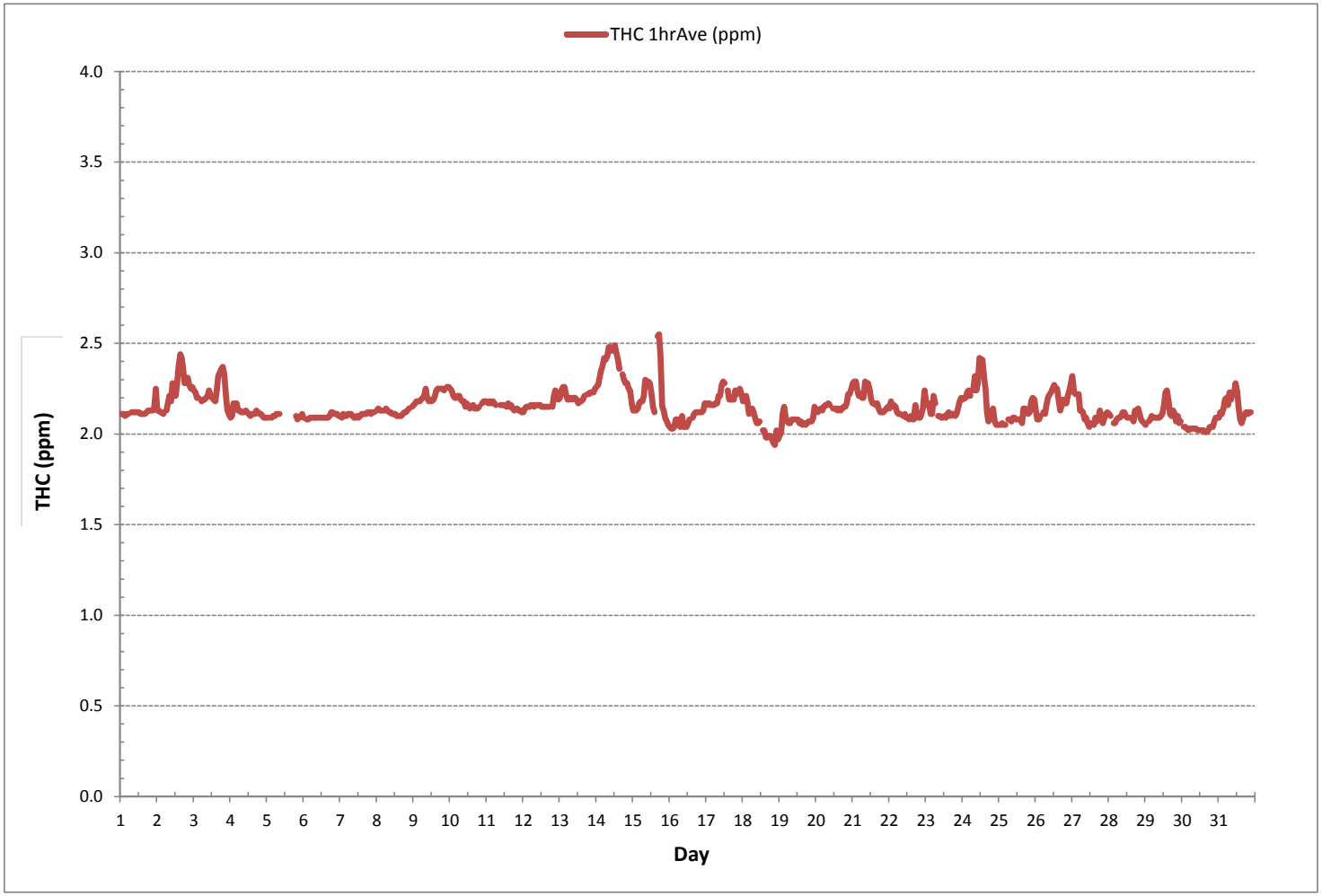
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			699				
MINIMUM 1-HR AVERAGE	1.94	ppm	@ HOUR(S)	21	ON DAY(S)	18	
MAXIMUM 1-HR AVERAGE:	2.55	ppm	@ HOUR(S)	17	ON DAY(S)	15	
MAXIMUM 24-HR AVERAGE:	2.36	ppm			ON DAY(S)	14	
					VAR-VARIOUS		
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:			739	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:			99.3	%
STANDARD DEVIATION:	0.09		MONTHLY AVERAGE:			2.15	ppm

TOTAL HYDROCARBONS Hourly Averages (THC ppm)



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	2.25	2.25	2.25	2.25	2.25	2.26	S	2.26	2.28	2.28	2.28	2.28	2.28	2.28	2.28	2.26	2.29	2.29	2.31	2.31	2.31	2.32	2.32	2.32	2.25	2.32	2.28	24
2	2.32	2.32	2.32	2.32	2.32	S	2.32	2.40	2.53	2.38	2.56	2.47	2.40	2.45	2.60	2.60	2.60	2.53	2.47	2.50	2.47	2.41	2.38	2.38	2.32	2.60	2.44	24
3	2.35	2.35	2.31	2.29	S	2.29	2.29	2.29	2.29	2.31	2.32	2.31	2.29	2.29	2.26	2.38	2.42	2.44	2.44	2.50	2.50	2.35	2.20	2.20	2.20	2.50	2.33	24
4	2.20	2.20	2.28	S	2.26	2.22	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.31	2.22	2.20	2.20	2.20	2.20	2.20	2.20	2.31	2.21	24
5	2.20	2.20	S	2.20	2.20	2.20	2.20	2.20	2.20	C	C	C	Y	Y	Y	C	C	C	C	2.23	2.13	2.13	2.14	2.16	2.13	2.23	2.18	21
6	2.13	S	2.11	2.11	2.10	2.11	2.12	2.12	2.12	2.13	2.13	2.12	2.13	2.12	2.11	2.12	2.13	2.13	2.14	2.14	2.14	2.16	2.15	2.14	2.10	2.16	2.13	24
7	S	2.14	2.15	2.14	2.17	2.17	2.17	2.20	2.17	2.17	2.17	2.17	2.17	2.17	2.18	2.20	2.17	2.20	2.20	2.21	2.20	2.20	2.23	S	2.14	2.23	2.18	24
8	2.23	2.23	2.23	2.23	2.21	2.23	2.23	2.23	2.23	2.23	2.21	2.21	2.21	2.23	2.20	2.20	2.20	2.21	2.23	2.23	2.24	2.25	S	2.28	2.20	2.28	2.23	24
9	2.29	2.31	2.32	2.31	2.32	2.32	2.32	2.44	2.44	2.37	2.32	2.35	2.32	2.34	2.38	2.41	2.38	2.41	2.41	2.41	2.41	S	2.44	2.43	2.29	2.44	2.37	24
10	2.43	2.41	2.38	2.38	2.36	2.37	2.38	2.34	2.34	2.39	2.33	2.38	2.35	2.29	2.32	2.31	2.29	2.29	2.29	2.28	S	2.32	2.32	2.31	2.28	2.43	2.34	24
11	2.32	2.31	2.31	2.31	2.31	2.29	2.26	X	X	2.28	2.28	2.29	2.32	2.36	2.32	2.26	2.32	2.23	2.23	S	2.26	2.23	2.23	2.23	2.23	2.36	2.28	22
12	2.23	2.23	2.25	2.25	2.26	2.26	2.26	2.26	2.29	2.29	2.29	2.29	2.28	2.23	2.27	2.26	2.23	2.25	S	2.26	2.33	2.34	2.29	2.28	2.23	2.34	2.27	24
13	2.29	2.31	2.33	2.32	2.29	2.25	2.24	2.26	2.25	2.25	2.24	2.23	2.20	2.20	2.20	2.23	2.23	S	2.24	2.24	2.26	2.26	2.28	2.29	2.20	2.33	2.26	24
14	2.29	2.32	2.36	2.38	2.44	2.45	2.44	2.51	2.52	2.51	2.57	2.51	2.51	2.48	2.57	2.38	S	2.66	2.60	2.29	2.31	2.32	2.28	2.23	2.23	2.66	2.43	24
15	2.14	2.13	2.13	2.15	2.17	2.17	2.20	2.20	2.58	2.26	2.29	2.33	2.23	2.20	2.10	S	2.54	2.54	2.54	2.18	2.13	2.10	2.08	2.04	2.04	2.58	2.24	24
16	2.04	2.04	2.02	2.05	2.26	2.11	2.10	2.05	2.29	2.07	2.05	2.07	2.08	2.10	S	2.11	2.14	2.13	2.14	2.15	2.14	2.15	2.17	2.31	2.02	2.31	2.12	24
17	2.21	2.20	2.21	2.20	2.20	2.20	2.20	2.20	2.26	2.28	2.32	2.32	2.31	S	2.38	2.21	2.20	2.20	2.20	2.23	2.23	2.24	2.26	2.23	2.20	2.38	2.24	24
18	2.17	2.23	2.23	2.20	2.10	2.18	2.18	2.13	2.10	2.04	2.05	2.08	S	1.98	2.04	1.98	1.98	1.98	1.95	1.95	1.93	1.92	2.12	2.01	1.92	2.23	2.07	24
19	2.07	2.12	2.18	2.20	2.14	2.15	2.07	2.07	2.10	2.07	2.10	S	2.14	2.08	2.15	2.12	2.11	2.08	2.10	2.10	2.13	2.23	2.15	2.26	2.07	2.26	2.13	24
20	2.29	2.19	2.20	2.23	2.24	2.28	2.29	2.26	2.31	2.31	S	2.26	2.23	2.24	2.21	2.21	2.20	2.23	2.23	2.23	2.29	2.34	2.32	2.35	2.19	2.35	2.26	24
21	2.38	2.38	2.38	2.35	2.31	2.31	2.29	2.35	2.38	S	2.35	2.32	2.27	2.21	2.20	2.26	2.23	2.21	2.15	2.15	2.15	2.18	2.20	2.33	2.15	2.38	2.28	24
22	2.18	2.23	2.21	2.20	2.20	2.17	2.13	2.10	S	2.10	2.13	2.07	2.07	2.07	2.17	2.08	2.08	2.26	2.11	2.10	2.17	2.26	2.21	2.44	2.07	2.44	2.16	24
23	2.46	2.35	2.66	2.13	2.13	2.49	2.25	S	2.13	2.12	2.10	2.12	2.13	2.11	2.14	2.15	2.15	2.13	2.14	2.13	2.13	2.17	2.20	2.23	2.10	2.66	2.21	24
24	2.20	2.23	2.24	2.28	2.33	2.29	S	2.35	2.45	2.28	2.44	2.47	2.48	2.46	2.36	2.29	2.17	2.07	2.14	2.13	2.18	2.10	2.04	2.04	2.04	2.48	2.26	24
25	2.04	2.04	2.04	2.04	2.02	S	2.07	2.08	2.07	2.11	2.10	2.10	2.10	2.13	2.10	2.07	2.13	2.13	2.13	2.13	2.14	2.26	2.20	2.26	2.02	2.26	2.11	24
26	2.23	2.08	2.10	2.11	S	2.14	2.14	2.20	2.21	2.23	2.24	2.26	2.29	2.28	2.30	2.23	2.14	2.18	2.23	2.21	2.20	2.26	2.26	2.35	2.08	2.35	2.21	24
27	2.36	2.29	2.27	S	2.41	2.20	2.20	2.20	2.17	2.20	2.12	2.07	2.10	2.12	2.12	2.30	2.15	2.15	2.20	2.17	2.10	2.13	2.13	2.14	2.07	2.41	2.19	24
28	2.14	2.13	S	2.08	2.10	2.10	2.11	2.10	2.14	2.15	2.14	2.14	2.11	2.10	2.10	2.11	2.10	2.15	2.14	2.15	2.14	2.10	2.08	2.07	2.07	2.15	2.12	24
29	2.07	S	2.07	2.10	2.10	2.10	2.10	2.10	2.08	2.08	2.10	2.11	2.20	2.23	2.24	2.20	2.12	2.10	2.13	2.11	2.10	2.13	2.08	2.15	2.07	2.24	2.12	24
30	S	2.04	2.02	2.01	2.01	2.01	2.01	2.01	2.02	2.02	2.02	2.02	2.02	2.02	2.01	2.01	2.01	2.04	2.05	2.07	2.07	2.13	2.13	S	2.01	2.13	2.03	24
31	2.12	2.17	2.13	2.31	2.29	2.26	2.23	**2.72**	2.21	2.26	2.26	2.31	2.29	2.18	2.12	2.07	2.10	2.12	2.13	2.13	2.13	2.13	S	2.20	2.07	**2.72**	2.21	24
HOURLY MAX	2.46	2.41	2.66	2.38	2.44	2.49	2.44	2.72	2.58	2.51	2.57	2.51	2.51	2.48	2.60	2.60	2.60	2.66	2.60	2.50	2.50	2.41	2.44	2.44				
HOURLY AVG	2.23	2.22	2.23	2.21	2.22	2.23	2.21	2.24	2.25	2.22	2.23	2.24	2.23	2.21	2.23	2.21	2.21	2.23	2.22	2.20	2.20	2.21	2.21	2.24				

STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS: 699

MAXIMUM INSTANTANEOUS VALUE: 2.72 ppm @ HOUR(S) 7 ON DAY(S) 31

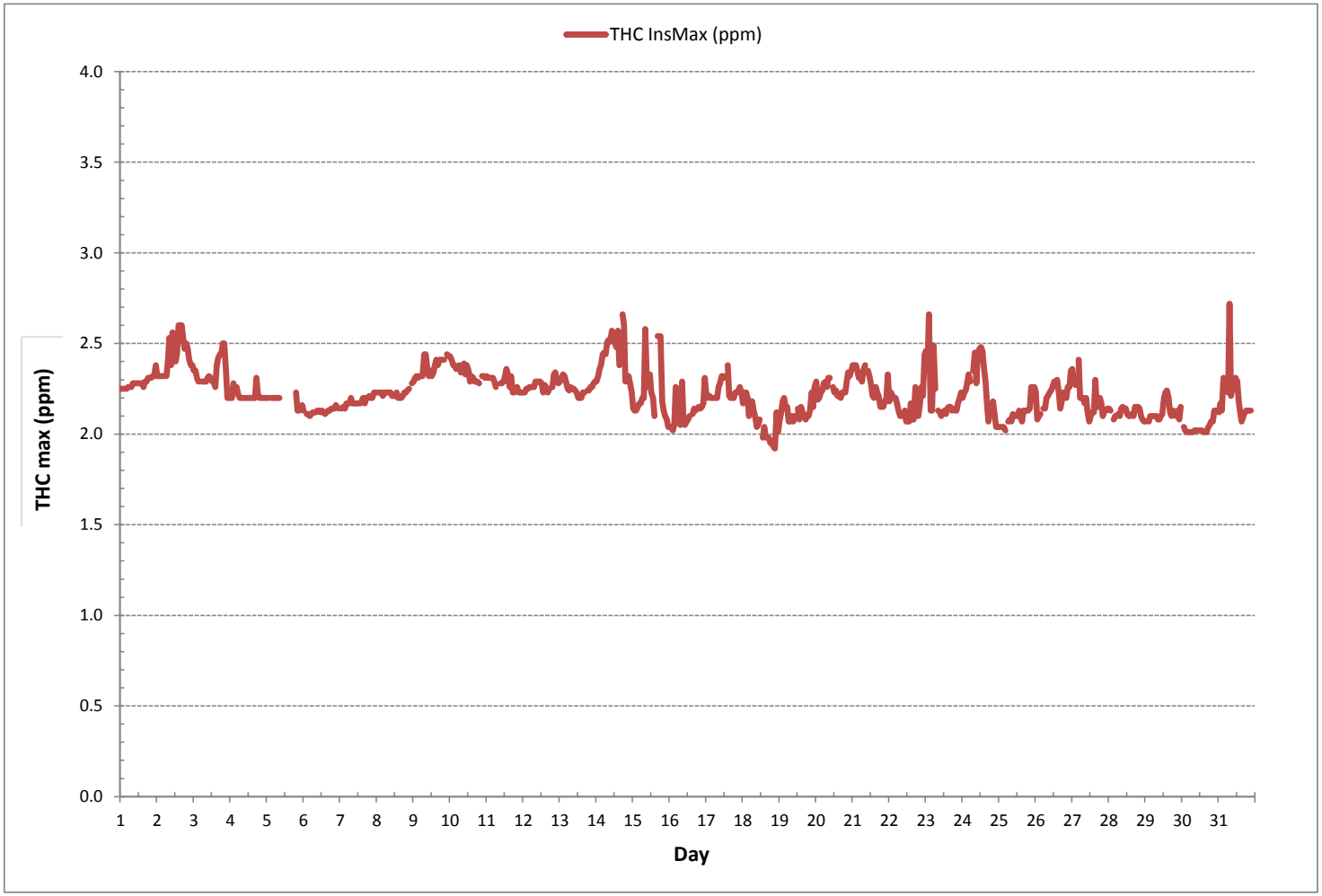
VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 739 hrs

MONTHLY CALIBRATION TIME: 7 hrs

STANDARD DEVIATION: 0.12

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)



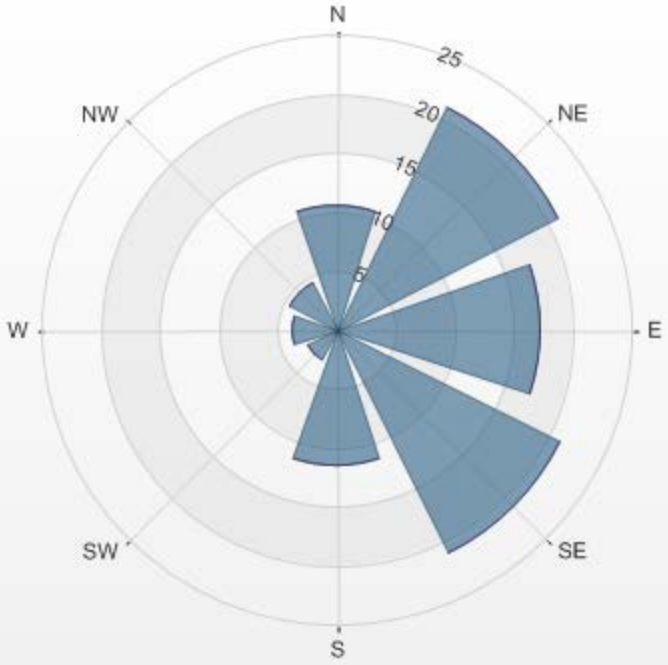
Wind: LICA MASKWA
Poll.: LICA MASKWA-THC[ppm]
Monthly: 2017/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 7.15% Calm Avg: 2.17 [ppm]

Direction	0.0-0.9	0.9-1.7	1.7-2.6	>2.6	Total
N	0.0	0.0	10.6	0.0	10.6
NE	0.0	0.0	21.0	0.0	21.0
E	0.0	0.0	17.3	0.0	17.3
SE	0.0	0.0	21.2	0.0	21.2
S	0.0	0.0	11.6	0.0	11.6
SW	0.0	0.0	2.9	0.0	2.9
W	0.0	0.0	3.9	0.0	3.9
NW	0.0	0.0	4.4	0.0	4.4
Summary	0.0	0.0	92.8	0.0	92.8

%	Icon	Classes (ppm)							
		0	0.0-0.9	0	0.9-1.7	93	1.7-2.6	0	>2.6

LICA MASKWA Poll.: LICA MASKWA-THC[ppm] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 7.15% Calm Poll Avg: 2.17[ppm]



THC[ppm] Calibration: LICA MASKWA Monthly: 2017/03 Type: Span

OXIDES OF NITROGEN

Maxxam
A Bureau Veritas Group Company

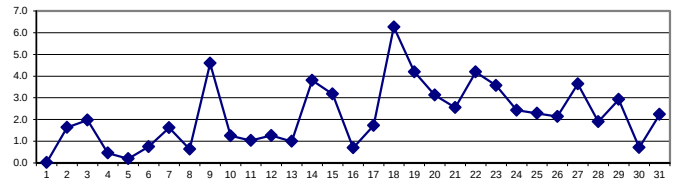
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	**0.0**	0.0	0.0	0.0	0.0	0.0	**S**	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**	0.5	0.0	24
2	0.0	0.0	0.0	0.0	0.0	**S**	0.6	0.9	0.2	0.6	1.4	1.1	1.0	1.5	3.7	2.4	6.4	0.9	0.4	5.8	4.6	1.8	1.6	2.8	0.0	6.4	1.6	24
3	0.8	1.5	0.6	0.4	**S**	1.8	1.0	0.8	0.9	2.2	3.0	2.6	3.5	2.7	1.9	2.3	2.9	3.1	2.8	2.5	3.3	2.5	1.1	1.1	0.4	3.5	2.0	24
4	0.9	0.8	1.6	**S**	4.0	1.2	0.3	0.4	0.1	0.2	0.0	0.2	0.5	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.5	24
5	0.0	0.0	**S**	0.4	0.0	0.0	0.0	0.0	0.0	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	2.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.2	24
6	0.0	**S**	1.0	0.4	0.5	0.4	0.3	1.1	1.4	1.2	0.5	0.1	0.0	0.1	0.2	0.1	0.2	0.3	1.5	1.6	1.6	1.6	1.6	1.5	0.0	1.6	0.7	24
7	**S**	2.8	2.1	1.6	1.8	2.6	2.8	3.0	2.1	1.2	1.5	1.2	1.2	1.6	1.5	1.6	0.7	1.0	1.8	1.7	0.5	0.7	0.8	**S**	0.5	3.0	1.6	24
8	1.7	1.0	1.5	0.6	2.4	0.7	0.6	1.1	0.6	0.0	0.0	0.0	0.8	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	**S**	2.6	0.0	2.6	0.6	24
9	2.3	2.3	2.3	2.1	1.8	1.7	3.3	8.8	8.0	3.1	0.1	6.5	10.2	8.8	8.9	7.3	5.9	5.6	4.9	3.5	3.1	**S**	2.9	2.1	0.1	10.2	4.6	24
10	1.8	2.9	2.7	1.8	1.3	0.6	0.2	0.0	0.0	1.7	4.9	3.7	0.1	0.0	1.7	3.2	0.0	0.0	0.0	0.0	**S**	1.3	0.9	0.0	0.0	4.9	1.3	24
11	0.5	0.6	0.4	0.0	0.2	0.0	0.0	**X**	**X**	0.0	0.0	3.9	5.4	4.5	3.2	0.6	0.9	0.0	0.0	**S**	1.5	0.0	0.0	0.0	0.0	5.4	1.0	22
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9	4.2	5.3	3.8	0.7	0.0	1.5	0.4	0.3	**S**	0.9	2.6	2.8	0.6	0.1	0.0	5.9	1.3	24
13	1.9	2.5	1.0	1.0	0.5	0.0	0.4	0.5	0.5	0.9	2.2	1.3	0.7	0.9	0.8	0.8	0.4	**S**	1.9	1.3	1.1	0.8	0.6	0.9	0.0	2.5	1.0	24
14	0.9	0.9	1.0	1.6	3.5	4.4	4.4	4.1	3.7	3.7	3.4	3.2	4.2	4.6	5.6	3.4	**S**	6.6	4.0	1.8	1.6	4.2	8.4	8.3	0.9	8.4	3.8	24
15	1.2	1.1	1.1	1.1	1.7	2.2	2.2	3.8	4.4	3.7	3.7	8.7	4.6	3.4	1.1	**S**	8.9	7.0	5.5	2.6	1.3	0.3	1.7	1.7	0.3	8.9	3.2	24
16	1.1	0.5	0.5	0.3	1.5	1.9	1.6	1.1	1.9	0.5	0.2	0.1	0.1	0.2	**S**	1.6	0.6	0.6	0.5	0.4	0.1	0.0	0.0	0.7	0.0	1.9	0.7	24
17	0.6	2.2	3.2	0.8	0.8	0.5	0.8	0.9	1.5	2.0	2.5	2.4	1.4	**S**	3.1	2.4	1.8	1.8	2.0	2.2	1.8	1.8	1.8	1.4	0.5	3.2	1.7	24
18	1.2	7.5	12.7	11.7	2.4	8.7	9.7	10.3	8.0	2.8	3.5	8.3	**S**	2.7	6.6	5.4	6.8	2.1	0.6	0.6	0.6	0.6	19.7	11.5	0.6	19.7	**6.3**	24
19	10.2	4.8	**24.2**	14.4	9.2	3.6	0.6	1.0	1.2	0.3	0.2	**S**	2.0	1.1	0.8	0.7	0.3	0.2	0.4	0.1	0.3	0.5	0.7	19.7	0.1	**24.2**	4.2	24
20	6.4	0.5	3.4	5.6	5.1	7.9	11.8	3.8	5.9	5.5	**S**	5.3	2.4	2.4	1.9	1.3	0.4	0.3	0.0	0.0	0.4	0.4	0.4	0.7	0.0	11.8	3.1	24
21	0.9	1.0	0.6	0.1	0.0	0.0	1.5	0.9	1.7	**S**	3.3	2.9	2.6	0.9	1.1	3.2	7.0	6.8	1.9	0.4	1.0	3.4	7.6	9.8	0.0	9.8	2.5	24
22	8.6	11.3	11.0	10.8	6.7	2.4	1.1	0.6	**S**	2.5	2.2	1.1	1.0	1.1	2.2	1.0	0.6	0.8	1.4	1.5	3.4	7.6	7.6	9.9	0.6	11.3	4.2	24
23	5.9	5.4	4.0	1.4	1.4	3.1	6.6	**S**	3.6	2.8	3.5	1.9	4.3	5.0	7.1	7.4	2.6	2.2	1.6	1.6	1.9	1.7	3.3	3.7	1.4	7.4	3.6	24
24	2.1	1.7	1.3	1.6	2.3	1.6	**S**	4.4	5.7	2.1	2.5	4.5	2.5	5.5	1.9	1.7	1.2	1.2	1.8	1.7	5.9	1.5	0.6	0.6	0.6	5.9	2.4	24
25	0.6	0.6	0.6	0.6	0.6	**S**	2.6	1.3	1.3	4.0	7.6	5.7	5.5	2.3	3.5	1.9	2.4	2.4	2.2	1.3	1.2	1.7	1.6	1.1	0.6	7.6	2.3	24
26	1.1	1.5	2.5	2.4	**S**	3.1	3.8	4.8	2.7	2.6	2.5	2.7	2.5	2.7	2.1	1.8	1.2	1.4	1.6	1.6	1.5	1.1	1.2	0.7	0.7	4.8	2.1	24
27	0.6	0.6	0.5	**S**	2.9	3.2	2.1	1.3	2.4	8.1	5.4	2.6	4.0	5.8	4.4	4.0	5.8	5.1	9.2	8.3	3.4	0.8	1.0	2.3	0.5	9.2	3.6	24
28	1.2	0.9	**S**	2.9	1.8	1.4	1.7	2.6	1.9	3.0	3.0	1.8	1.8	1.4	1.6	2.2	2.9	1.7	1.8	1.8	1.6	1.7	1.6	1.5	0.9	3.0	1.9	24
29	1.2	**S**	3.6	2.5	2.1	2.0	3.4	2.8	2.1	2.3	2.4	2.8	3.0	3.6	4.5	4.1	3.2	2.9	3.0	2.5	1.4	3.9	5.6	2.4	1.2	5.6	2.9	24
30	**S**	3.3	1.7	1.2	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.6	0.4	0.2	0.1	0.0	**S**	0.0	3.3	0.7	24
31	2.7	1.1	0.6	0.6	0.6	0.4	0.3	0.7	3.8	3.9	3.8	4.3	4.3	2.8	2.0	1.2	1.7	2.1	1.7	2.4	3.5	1.8	**S**	5.2	0.3	5.2	2.2	24
HOURLY MAX	10.2	11.3	24.2	14.4	9.2	8.7	11.8	10.3	8.0	8.1	7.6	8.7	10.2	8.8	8.9	7.4	8.9	7.0	9.2	8.3	5.9	7.6	19.7	19.7				
HOURLY AVG	1.9	2.0	3.0	2.3	1.9	1.9	2.2	2.1	2.3	2.3	2.3	2.9	2.6	2.3	2.5	2.2	2.3	2.0	1.8	1.6	1.6	1.5	2.5	3.2				

STATUS FLAG CODES

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

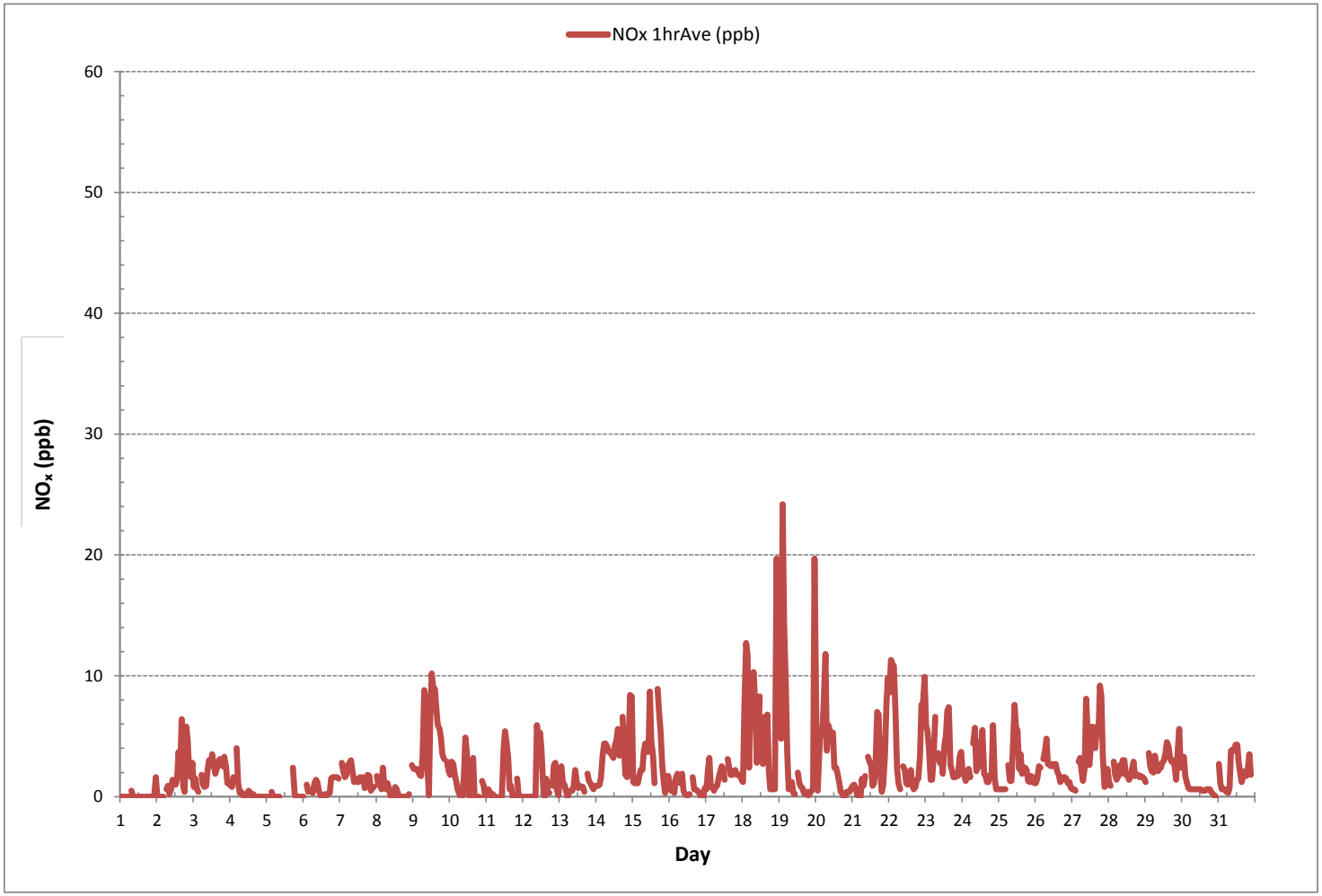
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			605				
MINIMUM 1-HR AVERAGE	0.0	ppb	@ HOUR(S)	0	ON DAY(S)	1	
MAXIMUM 1-HR AVERAGE:	24.2	ppb	@ HOUR(S)	2	ON DAY(S)	19	
MAXIMUM 24-HR AVERAGE:	6.3	ppb			ON DAY(S)	18	
					VAR-VARIOUS		
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:			742	hrs
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	2.7		MONTHLY AVERAGE:			2.2	ppb

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)



OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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	0.6	0.0	0.0	0.1	0.0	0.0	S	3.6	1.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.0	0.6	0.6	0.0	0.0	0.6	0.0	0.0	3.6	0.5	24
2	0.6	1.2	1.2	0.6	0.6	S	3.6	6.5	2.4	2.4	4.7	4.7	3.0	4.7	8.2	7.1	11.8	5.2	3.0	11.2	11.2	4.1	4.1	6.5	0.6	11.8	4.7	24
3	3.6	4.1	3.6	2.4	S	5.9	3.0	3.0	3.0	4.7	5.3	4.7	5.3	4.7	4.1	4.1	5.3	4.7	4.1	4.7	4.7	5.9	2.4	2.4	2.4	5.9	4.2	24
4	2.4	2.4	3.5	S	9.4	2.4	1.8	2.4	1.8	1.8	1.2	1.8	1.8	1.8	1.2	1.8	1.8	1.2	0.6	0.6	0.0	0.0	0.6	0.0	0.0	9.4	1.8	24
5	0.0	0.0	S	3.6	0.6	0.6	1.2	1.2	0.6	C	C	C	C	C	C	C	C	C	0.6	0.1	0.1	0.0	0.1	0.1	0.0	3.6	0.6	24
6	0.0	S	3.0	0.6	1.2	0.6	1.3	3.0	2.4	1.8	1.8	1.2	0.0	1.2	0.6	0.6	0.6	1.2	1.8	1.8	1.8	1.8	1.8	1.8	0.0	3.0	1.4	24
7	S	4.7	2.4	2.4	3.0	3.0	3.6	3.6	3.0	1.8	1.8	1.8	2.4	2.4	1.8	2.4	1.2	1.8	2.4	2.4	1.2	1.2	1.2	S	1.2	4.7	2.3	24
8	3.6	1.8	2.4	1.3	22.3	2.4	3.0	3.0	3.0	0.0	0.0	0.6	1.8	3.0	1.2	0.6	0.6	0.6	0.6	0.6	0.6	1.8	S	4.7	0.0	22.3	2.6	24
9	3.0	3.0	3.0	3.0	2.4	2.4	10.6	16.4	14.7	10.0	1.8	12.4	16.4	17.5	11.2	19.4	7.1	7.1	6.5	5.3	4.1	S	5.3	3.6	1.8	19.4	8.1	24
10	3.6	4.1	4.1	3.0	2.4	1.8	1.2	0.6	0.6	5.3	8.2	8.8	2.4	2.4	4.7	6.5	4.7	0.1	0.0	0.0	S	4.7	3.0	0.6	0.0	8.8	3.2	24
11	3.0	3.0	1.8	0.6	1.3	0.6	0.6	X	X	0.6	3.0	7.1	9.4	7.6	6.4	3.6	4.1	1.8	0.6	S	5.3	0.6	0.6	0.6	0.6	9.4	3.0	22
12	0.6	0.0	0.6	0.0	0.1	0.1	0.0	0.0	4.1	10.0	6.4	9.4	8.2	3.0	2.4	4.1	2.4	2.4	S	3.6	5.9	4.7	3.0	1.2	0.0	10.0	3.1	24
13	3.6	4.1	1.8	1.8	1.2	1.2	1.3	1.8	1.2	2.4	3.6	3.0	1.8	1.8	1.8	1.8	1.8	S	4.7	2.4	2.4	1.8	1.8	1.8	1.2	4.7	2.2	24
14	1.8	1.8	2.4	2.4	5.9	5.9	6.5	7.1	5.9	5.3	5.3	4.7	7.1	7.1	11.2	5.3	S	10.0	10.0	3.0	2.4	12.4	13.0	13.0	1.8	13.0	6.5	24
15	2.4	1.8	1.8	1.8	3.0	3.0	3.5	5.9	6.4	5.3	5.9	20.6	8.8	7.1	3.0	S	11.2	8.2	7.1	3.5	2.4	0.6	2.4	5.9	0.6	20.6	5.3	24
16	1.8	1.3	1.2	1.2	3.0	4.1	4.1	1.2	4.7	1.2	0.6	0.6	0.6	0.6	S	3.5	0.6	0.6	0.6	0.6	0.6	0.0	0.0	2.4	0.0	4.7	1.5	24
17	1.8	8.2	8.2	4.1	2.4	0.6	1.2	1.3	1.8	3.5	3.0	3.5	1.8	S	5.3	3.5	2.4	1.8	3.0	2.4	1.8	1.8	1.8	1.8	0.6	8.2	2.9	24
18	1.8	10.6	14.1	13.5	5.9	15.2	14.6	14.2	12.4	4.7	7.6	12.4	S	4.1	11.2	8.2	11.8	4.7	0.6	0.6	0.6	0.6	47.6	42.2	0.6	47.6	11.3	24
19	25.8	22.9	33.4	56.3	14.2	8.2	1.3	1.8	1.8	1.2	0.6	S	4.1	1.2	1.8	1.8	0.6	1.2	1.2	0.0	0.6	4.1	4.1	33.5	0.0	56.3	9.6	24
20	26.4	3.0	10.6	17.0	30.5	30.5	20.0	8.2	33.4	25.9	S	11.2	4.1	4.7	3.5	3.0	1.2	1.2	0.0	0.6	0.6	0.6	0.6	1.3	0.0	33.4	10.4	24
21	1.2	1.3	1.2	0.6	0.6	0.6	4.7	3.0	2.4	S	5.8	5.9	5.9	1.2	1.8	10.0	11.2	11.8	4.1	0.6	1.8	7.1	11.8	13.5	0.6	13.5	4.7	24
22	13.0	14.1	14.7	14.7	11.2	4.1	1.8	1.2	S	5.9	4.1	1.3	1.3	1.2	5.3	3.5	0.6	1.2	1.8	1.8	7.1	8.8	8.2	16.4	0.6	16.4	6.2	24
23	15.2	17.0	6.4	1.8	1.8	4.7	44.5	S	5.9	4.1	4.1	3.5	5.9	5.9	8.2	9.4	3.5	2.4	2.4	2.4	2.4	1.8	4.7	4.7	1.8	44.5	7.1	24
24	3.0	1.8	1.8	2.4	3.0	3.0	S	7.0	7.7	3.0	4.1	7.1	6.4	7.6	3.0	3.0	1.3	1.3	4.7	3.5	8.2	3.0	0.6	0.6	0.6	8.2	3.8	24
25	0.6	0.6	0.6	0.6	0.6	S	4.7	1.8	1.8	8.2	10.0	7.7	8.2	5.3	9.4	4.1	3.0	2.4	3.0	1.8	1.3	2.4	1.8	1.3	0.6	10.0	3.5	24
26	1.2	2.4	3.0	3.0	S	5.9	10.6	8.2	3.0	3.5	3.0	4.1	3.0	14.6	2.4	2.4	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	14.6	3.6	24
27	0.6	0.6	0.6	S	5.3	4.1	3.5	1.8	8.2	12.9	10.0	4.1	7.1	9.4	11.2	7.1	14.7	10.0	13.5	11.8	10.0	1.2	1.3	3.0	0.6	14.7	6.6	24
28	1.8	1.3	S	5.2	1.8	1.8	1.8	3.5	2.4	3.5	3.5	2.4	1.8	1.8	1.8	4.7	4.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.3	5.2	2.5	24
29	1.8	S	5.3	3.0	2.4	2.4	7.6	3.5	3.0	3.0	3.0	3.5	3.5	4.1	5.3	4.7	4.1	3.0	3.0	3.0	2.4	9.4	9.4	5.9	1.8	9.4	4.2	24
30	S	5.9	2.4	1.3	1.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	1.2	0.6	0.6	0.6	0.6	0.0	S	0.0	5.9	1.0	24
31	5.3	1.8	0.6	0.6	0.6	0.6	0.6	2.4	4.1	4.1	4.1	4.7	4.7	3.5	3.0	1.3	2.4	2.4	1.8	3.5	4.7	3.0	S	7.1	0.6	7.1	2.9	24
HOURLY MAX	26.4	22.9	33.4	56.3	30.5	30.5	44.5	16.4	33.4	25.9	10.0	20.6	16.4	17.5	11.2	19.4	14.7	11.8	13.5	11.8	11.2	12.4	47.6	42.2				
HOURLY AVG	4.5	4.3	4.7	5.1	4.8	4.0	5.6	4.1	4.9	4.7	3.9	5.3	4.4	4.5	4.6	4.4	4.1	3.2	2.9	2.6	2.9	2.9	4.6	6.2				

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: 671

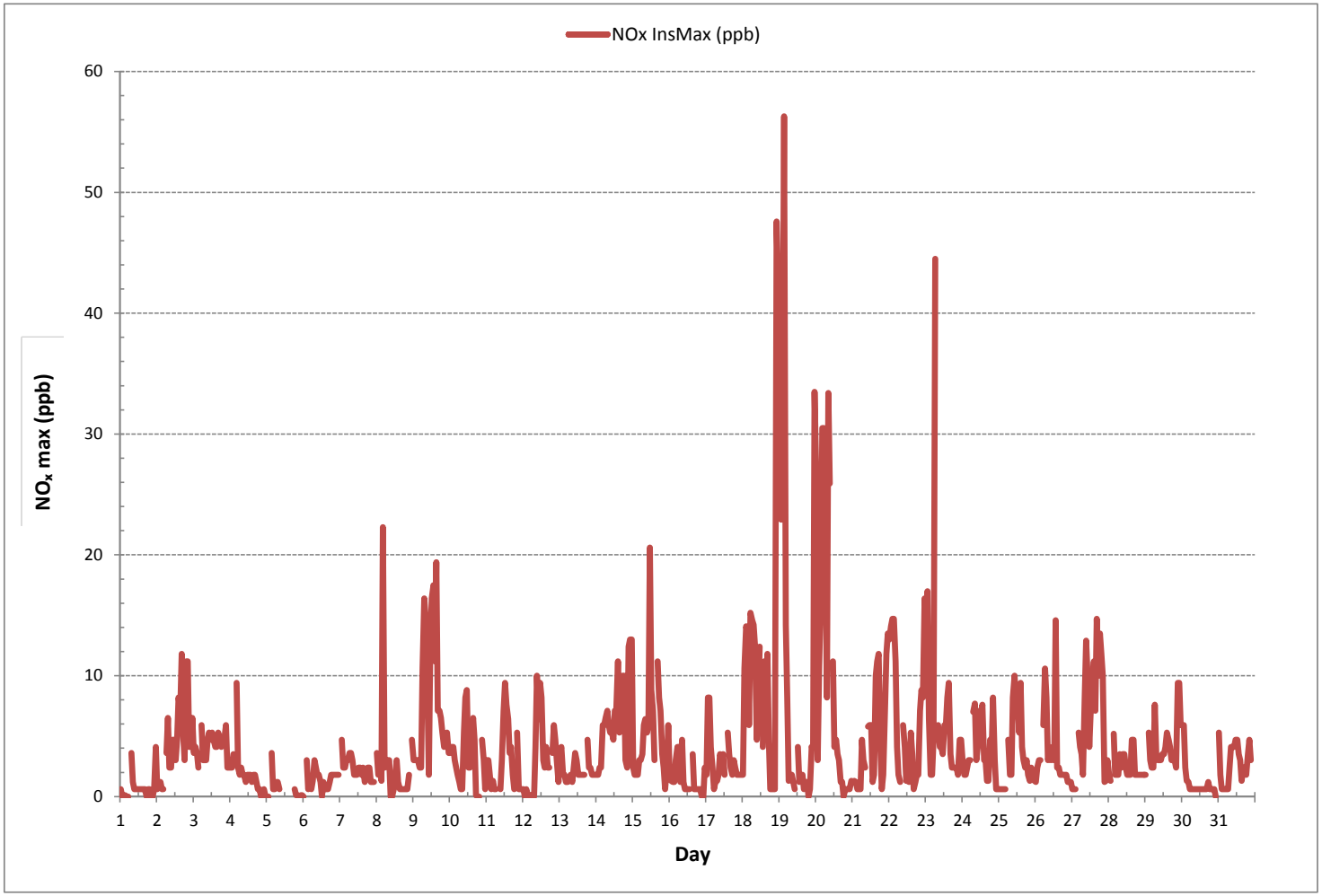
MAXIMUM INSTANTANEOUS VALUE: 56.3 ppb @ HOUR(S) 3 ON DAY(S) 19

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs
MONTHLY CALIBRATION TIME: 9 hrs
STANDARD DEVIATION: 5.7

OPERATIONAL TIME: 742 hrs

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)



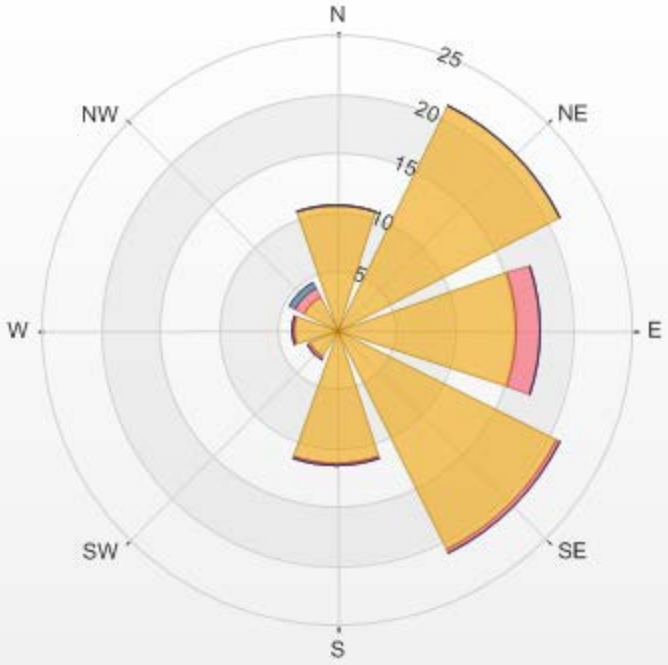
Wind: LICA MASKWA
Poll.: LICA MASKWA-NOX[ppb]
Monthly: 2017/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 7.13% Calm Avg: 2.54 [ppb]

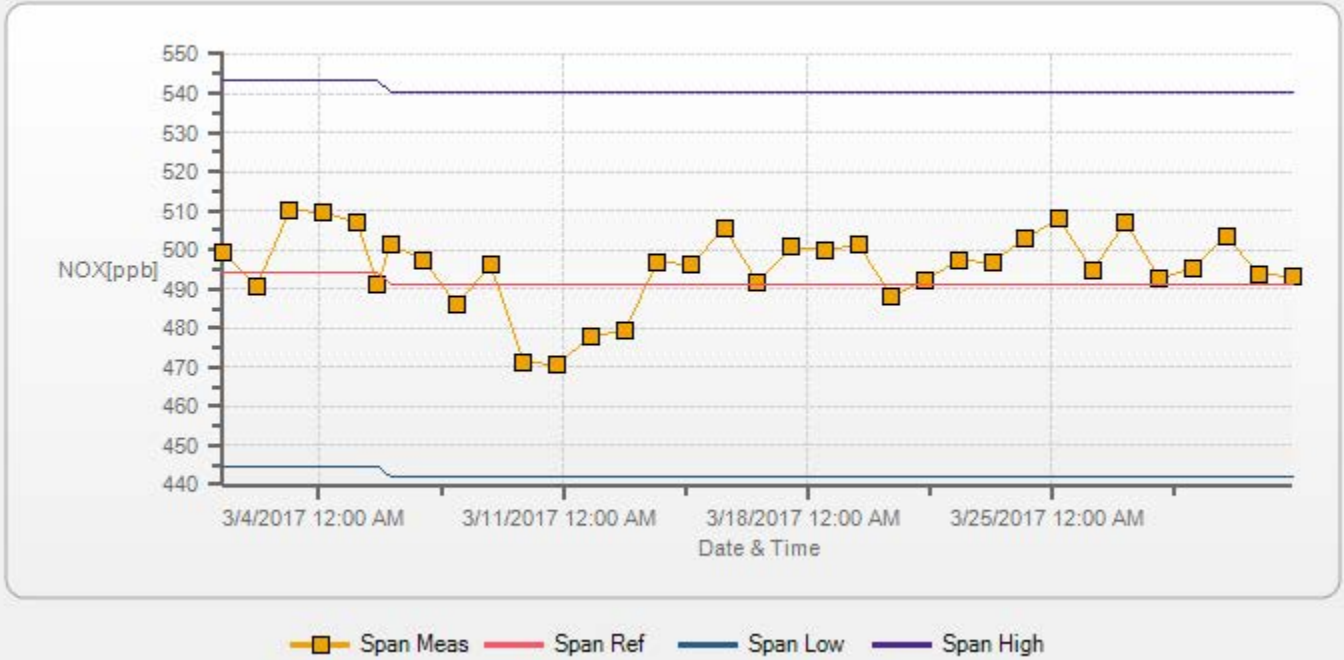
Direction	0.0-8.1	8.1-16.2	16.2-24.3	>24.3	Total
N	10.6	0.0	0.0	0.0	10.6
NE	21.3	0.0	0.0	0.0	21.3
E	15.3	2.0	0.0	0.0	17.3
SE	20.8	0.3	0.0	0.0	21.1
S	11.4	0.1	0.0	0.0	11.6
SW	2.6	0.3	0.0	0.0	2.9
W	3.7	0.1	0.0	0.0	3.9
NW	3.1	0.9	0.4	0.0	4.4
Summary	88.7	3.7	0.4	0.0	92.9

% Icon Classes (ppb)	89	0.0-8.1	4	8.1-16.2	0	16.2-24.3	0	>24.3

LICA MASKWA Poll.: LICA MASKWA-NOX[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 7.13% Calm Poll Avg: 2.54[ppb]



NOX[ppb] Calibration: LICA MASKWA Monthly: 2017/03 Type: Span



NITRIC OXIDES

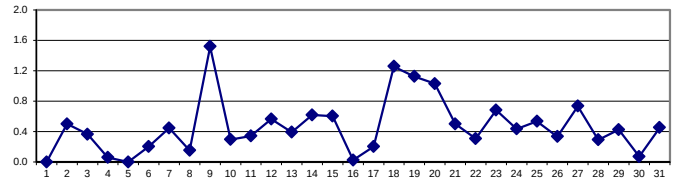
NITRIC OXIDE Hourly Averages (NO ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	**0.0**	0.0	0.0	0.0	0.0	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
2	0.0	0.0	0.0	0.0	0.0	**S**	0.1	0.4	0.2	0.6	1.1	1.1	1.0	1.3	2.0	1.3	1.9	0.1	0.0	0.2	0.2	0.0	0.0	0.0	0.0	2.0	0.5	24
3	0.0	0.0	0.0	0.0	**S**	0.0	0.0	0.0	0.3	0.8	1.3	1.2	1.7	1.0	0.7	0.6	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.4	24
4	0.0	0.0	0.0	**S**	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.6	0.3	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
5	0.0	0.0	**S**	0.0	0.0	0.0	0.0	0.0	0.0	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
6	0.0	**S**	0.1	0.2	0.1	0.2	0.0	0.4	0.6	0.6	0.4	0.1	0.0	0.1	0.2	0.1	0.2	0.3	0.1	0.2	0.2	0.2	0.1	0.3	0.0	0.6	0.2	24
7	**S**	0.3	0.3	0.1	0.4	0.3	0.2	0.5	0.6	0.5	0.7	0.7	0.8	1.0	1.0	0.7	0.4	0.4	0.2	0.4	0.0	0.0	0.3	**S**	0.0	1.0	0.4	24
8	0.2	0.2	0.3	0.2	0.7	0.3	0.3	0.2	0.2	0.0	0.0	0.0	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**S**	0.0	0.0	0.7	0.2	24
9	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.8	3.0	1.7	0.1	4.2	6.4	5.4	5.1	3.6	2.4	1.1	0.0	0.0	0.0	**S**	0.0	0.0	0.0	6.4	**1.5**	24
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.9	2.2	0.1	0.0	0.3	0.3	0.0	0.0	0.0	0.0	**S**	0.0	0.0	0.0	0.0	2.9	0.3	24
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**X**	**X**	0.0	0.0	1.5	2.5	1.8	1.0	0.2	0.2	0.0	0.0	**S**	0.0	0.0	0.0	0.0	0.0	2.5	0.3	22
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	2.0	2.8	2.2	0.7	0.0	1.0	0.4	0.3	**S**	0.3	0.3	0.3	0.2	0.1	0.0	2.8	0.6	24
13	0.2	0.3	0.1	0.3	0.2	0.0	0.4	0.6	0.5	0.6	1.0	0.8	0.6	0.7	0.6	0.6	0.4	**S**	0.2	0.2	0.1	0.1	0.1	0.4	0.0	1.0	0.4	24
14	0.2	0.1	0.2	0.0	0.0	0.2	0.4	0.8	1.2	1.5	1.5	1.2	1.6	1.5	1.8	0.6	**S**	0.4	0.3	0.0	0.0	0.2	0.1	0.4	0.0	1.8	0.6	24
15	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.5	1.1	1.2	1.5	3.8	1.8	1.3	0.5	**S**	1.1	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.6	24
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	**S**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.0	24
17	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.8	0.9	0.6	**S**	0.6	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.2	24
18	0.0	0.1	0.6	0.6	0.0	0.6	0.6	1.4	1.9	0.8	1.2	3.2	**S**	0.5	2.3	1.8	1.8	0.3	0.0	0.0	0.0	0.0	7.4	3.8	0.0	7.4	1.3	24
19	1.8	1.0	**9.1**	4.0	1.3	0.1	0.1	0.4	0.7	0.3	0.2	**S**	0.0	0.4	0.1	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.1	5.9	0.0	**9.1**	1.1	24
20	1.7	0.2	0.7	1.3	1.1	2.2	2.8	1.3	2.4	2.5	**S**	2.0	1.0	1.1	0.9	0.7	0.3	0.3	0.0	0.0	0.2	0.3	0.2	0.5	0.0	2.8	1.0	24
21	0.2	0.1	0.1	0.1	0.0	0.0	0.6	0.6	0.6	**S**	1.2	1.1	1.0	0.5	0.6	1.0	1.2	0.9	0.1	0.0	0.1	0.3	0.4	0.8	0.0	1.2	0.5	24
22	0.5	0.8	0.7	0.9	0.7	0.3	0.0	0.0	**S**	0.3	0.4	0.1	0.1	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.3	1.3	0.0	1.3	0.3	24
23	0.9	0.5	0.3	0.1	0.0	0.0	1.9	**S**	0.6	0.7	1.2	0.7	1.6	1.7	2.2	2.2	0.6	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.7	24
24	0.0	0.0	0.0	0.0	0.0	0.0	**S**	0.6	1.4	0.6	0.8	1.5	0.8	2.1	0.5	0.3	0.0	0.0	0.2	0.2	0.6	0.3	0.1	0.0	0.0	2.1	0.4	24
25	0.0	0.0	0.0	0.0	0.0	**S**	0.1	0.0	0.4	1.1	2.5	2.0	1.9	0.9	1.4	0.6	0.6	0.6	0.1	0.0	0.0	0.0	0.1	0.0	0.0	2.5	0.5	24
26	0.1	0.0	0.0	0.1	**S**	0.0	0.7	1.0	0.6	0.8	0.6	0.8	0.7	0.8	0.6	0.4	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	1.0	0.3	24
27	0.0	0.0	0.0	**S**	0.1	0.0	0.2	0.5	0.6	2.8	1.9	0.9	1.4	1.9	1.4	1.2	1.5	0.8	0.6	0.4	0.2	0.1	0.2	0.2	0.0	2.8	0.7	24
28	0.0	0.1	**S**	0.0	0.0	0.1	0.1	0.5	0.3	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.6	0.3	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.7	0.3	24
29	0.0	**S**	0.1	0.0	0.0	0.0	0.4	0.2	0.2	0.5	0.6	0.6	1.0	1.2	1.4	1.3	0.7	0.5	0.2	0.0	0.0	0.2	0.5	0.2	0.0	1.4	0.4	24
30	**S**	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.1	0.2	0.2	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.1	0.0	**S**	0.0	0.3	0.1	24
31	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.3	1.2	1.7	1.5	1.5	1.3	0.7	0.5	0.2	0.4	0.4	0.3	0.0	0.0	0.0	**S**	0.2	0.0	1.7	0.5	24
HOURLY MAX	1.8	1.0	9.1	4.0	1.3	2.2	2.8	1.8	3.0	2.8	2.9	4.2	6.4	5.4	5.1	3.6	2.4	1.1	0.6	0.4	0.6	0.3	7.4	5.9				
HOURLY AVG	0.2	0.1	0.4	0.3	0.2	0.2	0.3	0.4	0.7	0.8	0.9	1.2	1.1	1.0	0.9	0.7	0.6	0.3	0.1	0.1	0.1	0.1	0.3	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

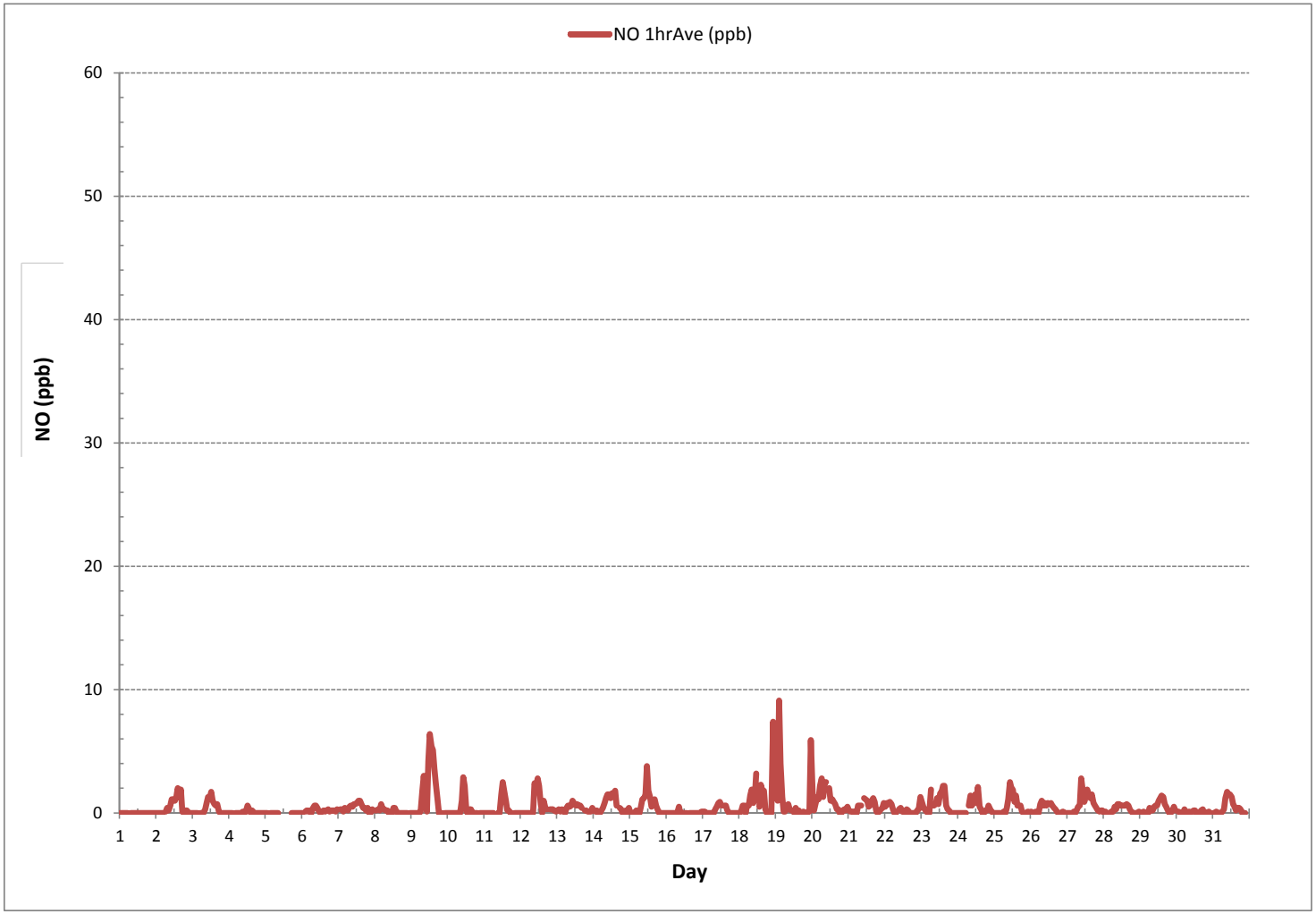
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			408				
MINIMUM 1-HR AVERAGE	0.0	ppb	@ HOUR(S)	0	ON DAY(S)	1	
MAXIMUM 1-HR AVERAGE:	9.1	ppb	@ HOUR(S)	2	ON DAY(S)	19	
MAXIMUM 24-HR AVERAGE:	1.5	ppb			ON DAY(S)	9	
					VAR-VARIOUS		
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:			742	hrs
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	0.9		MONTHLY AVERAGE:			0.5	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	0.0	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	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0	24
2	0.0	0.0	0.0	0.0	0.0	S	0.5	1.7	0.5	1.1	2.3	2.3	1.1	1.7	2.8	2.3	2.8	0.5	0.0	0.5	0.5	0.0	0.0	0.0	0.0	2.8	0.9	24
3	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.5	1.1	1.7	1.7	1.7	1.1	1.1	1.1	1.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.5	24
4	0.0	0.0	0.0	S	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	24
5	0.0	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	C	C	C	C	C	C	C	C	C	0.0	0.5	0.0	0.5	0.5	0.0	0.0	0.5	0.1	24
6	0.0	S	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0	1.1	0.5	24
7	S	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.1	0.5	1.1	1.1	1.1	1.1	1.1	1.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	S	0.5	1.1	0.7	24
8	0.5	0.5	0.5	0.5	11.0	0.5	1.1	0.5	0.5	0.5	0.5	0.5	1.1	1.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	S	0.5	0.5	11.0	1.1	24
9	0.5	0.5	0.5	0.5	0.5	0.5	2.3	5.1	5.7	3.4	1.7	8.1	11.1	12.8	6.3	8.7	3.4	2.3	0.5	0.5	0.5	S	0.5	0.5	0.5	12.8	3.3	24
10	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	3.4	5.1	5.1	1.7	1.1	1.7	1.1	0.5	0.5	0.5	0.5	S	0.5	0.5	0.5	0.5	5.1	1.2	24
11	0.5	0.5	0.5	0.5	0.5	0.5	0.5	X	X	0.5	1.7	3.4	4.6	2.8	2.3	1.1	1.7	0.5	0.5	S	0.5	0.5	0.5	0.5	0.5	4.6	1.2	22
12	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.7	3.4	2.8	4.6	3.9	1.7	1.1	1.7	1.1	0.5	S	0.5	0.5	0.5	0.5	0.5	0.5	4.6	1.3	24
13	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.1	1.1	1.1	1.1	0.5	0.5	0.5	S	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.1	0.6	24
14	0.5	0.5	0.5	0.5	0.0	0.5	0.5	1.7	1.7	1.7	1.7	1.7	2.3	1.7	3.4	1.1	S	0.5	0.5	0.0	0.0	0.5	0.5	0.5	0.0	3.4	1.0	24
15	0.0	0.5	0.0	0.0	0.5	0.0	0.5	1.1	1.7	1.7	2.3	9.3	3.4	2.3	1.1	S	1.7	0.5	0.5	0.0	0.0	0.0	0.0	0.5	0.0	9.3	1.2	24
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.0	0.0	0.5	0.5	0.0	0.5	0.5	0.0	1.1	0.1	24
17	0.5	0.5	0.5	0.5	0.5	0.0	0.0	0.5	0.5	0.5	1.1	1.1	0.5	S	0.5	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.4	24
18	0.0	0.5	0.5	0.5	0.0	1.1	1.1	2.3	3.3	1.1	2.8	4.6	S	0.5	3.9	2.3	3.4	0.5	0.0	0.0	0.0	0.0	22.8	19.2	0.0	22.8	3.1	24
19	7.5	7.5	14.5	**28.0**	3.4	0.5	0.5	1.1	1.1	1.1	0.5	S	0.5	0.5	0.5	0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.5	11.7	0.0	**28.0**	3.6	24
20	8.6	0.5	2.3	3.4	9.3	8.7	5.7	2.8	15.6	10.5	S	3.9	1.7	1.7	1.7	1.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	15.6	3.5	24
21	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.1	S	1.1	2.3	2.3	0.5	0.5	2.3	2.8	1.7	0.5	0.0	0.5	0.5	0.5	1.1	0.0	2.8	0.9	24
22	0.5	1.1	1.1	1.1	1.1	0.5	0.5	0.5	S	0.5	0.5	0.5	0.5	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.5	0.5	0.5	2.8	0.0	2.8	0.6	24
23	2.8	2.3	0.5	0.5	0.0	0.0	26.2	S	0.5	1.1	1.1	1.6	1.7	2.3	2.3	2.8	0.5	0.5	0.5	0.5	0.0	0.0	0.5	0.5	0.0	26.2	2.1	24
24	0.0	0.0	0.0	0.0	0.0	0.5	S	0.5	2.3	1.1	1.7	2.3	2.3	2.8	1.1	0.5	0.0	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.0	2.8	0.8	24
25	0.0	0.0	0.0	0.0	0.0	S	0.5	0.0	0.5	2.3	3.4	2.3	2.8	1.7	3.4	1.1	0.5	0.5	0.5	0.0	0.0	0.5	0.5	0.0	0.0	3.4	0.9	24
26	0.5	0.0	0.0	0.5	S	0.5	3.4	1.7	0.5	1.7	0.5	1.7	1.1	8.6	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.5	0.5	0.0	0.0	8.6	1.0	24
27	0.0	0.0	0.0	S	0.5	0.0	0.5	0.5	2.3	4.5	3.4	1.1	2.3	3.4	3.4	2.3	3.4	1.7	0.5	0.5	0.5	0.5	0.5	0.5	0.0	4.5	1.4	24
28	0.5	0.5	S	0.0	0.0	0.5	0.5	0.5	0.5	1.1	1.1	0.5	0.5	0.5	0.5	1.1	1.1	0.5	0.5	0.0	0.5	0.5	0.5	0.5	0.0	1.1	0.5	24
29	0.5	S	0.5	0.0	0.0	0.5	1.7	0.5	0.5	0.5	0.5	0.5	1.1	1.1	1.7	1.7	1.1	0.5	0.5	0.0	0.5	0.5	0.5	0.5	0.0	1.7	0.7	24
30	S	0.5	0.5	0.0	0.0	0.5	0.5	0.0	0.5	0.0	0.5	0.5	0.5	0.0	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.5	0.0	S	0.0	0.5	0.3	24
31	0.5	0.0	0.5	0.5	0.0	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	0.0	0.0	0.0	S	0.5	0.0	1.7	0.7	24
HOURLY MAX	8.6	7.5	14.5	28.0	11.0	8.7	26.2	5.1	15.6	10.5	5.1	9.3	11.1	12.8	6.3	8.7	3.4	2.3	0.5	0.5	0.5	0.5	22.8	19.2				
HOURLY AVG	0.9	0.6	0.9	1.4	1.0	0.6	1.7	0.9	1.6	1.6	1.5	2.2	1.8	1.9	1.5	1.3	1.1	0.5	0.4	0.3	0.3	0.3	1.1	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: 531

MAXIMUM INSTANTANEOUS VALUE: 28.0 ppb @ HOUR(S) 3 ON DAY(S) 19

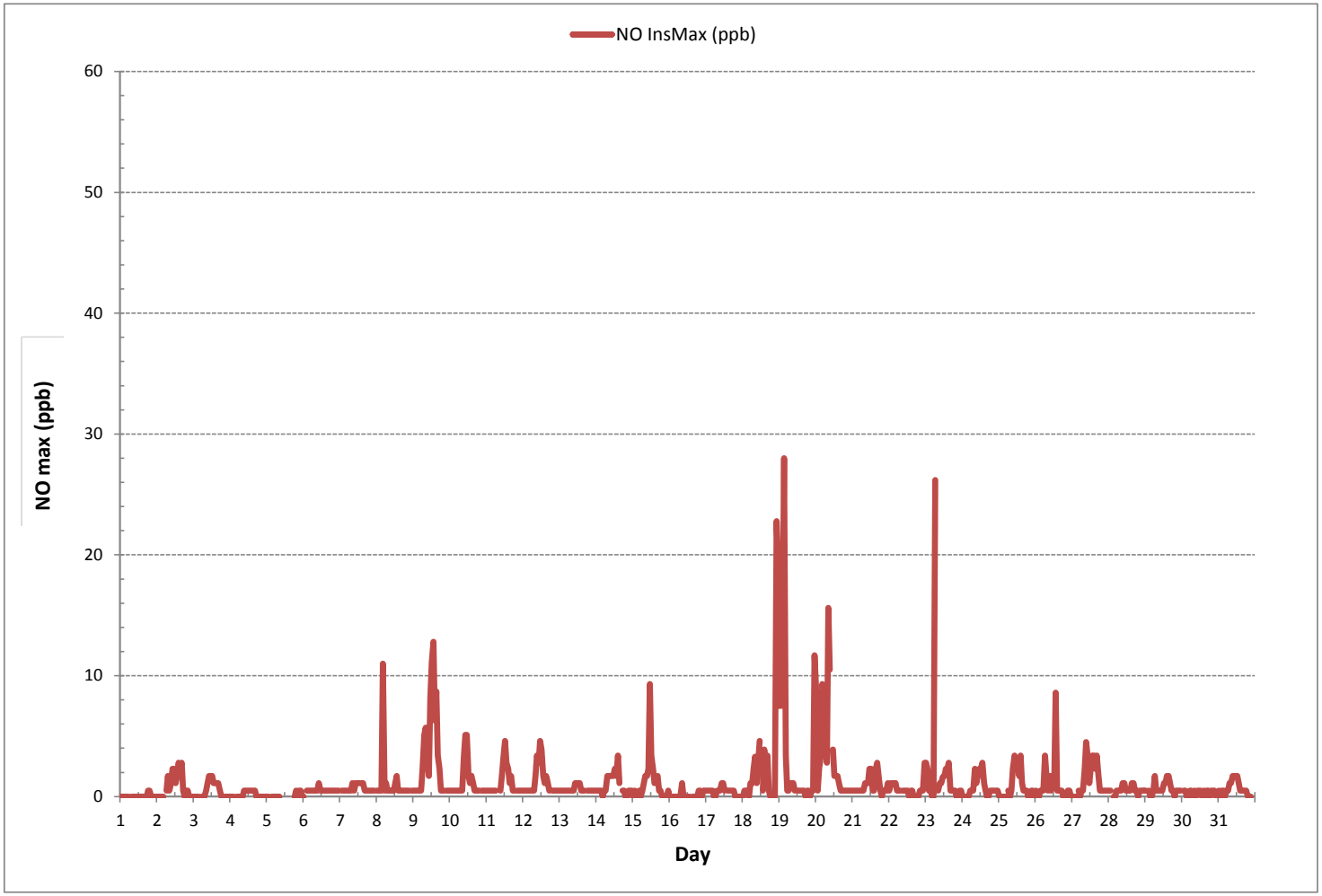
VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 742 hrs

MONTHLY CALIBRATION TIME: 9 hrs

STANDARD DEVIATION: 2.5

NITRIC OXIDE Instantaneous Maximum (NO ppb)



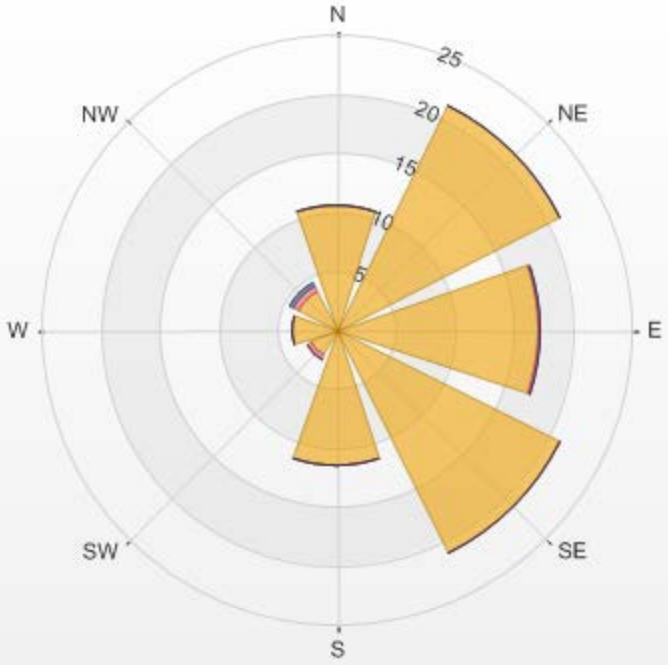
Wind: LICA MASKWA
Poll.: LICA MASKWA-NO[ppb]
Monthly: 2017/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 7.13% Calm Avg: 0.53 [ppb]

Direction	0.0-3.1	3.1-6.1	6.1-9.2	>9.2	Total
N	10.6	0.0	0.0	0.0	10.6
NE	21.3	0.0	0.0	0.0	21.3
E	17.1	0.1	0.0	0.0	17.3
SE	21.1	0.0	0.0	0.0	21.1
S	11.6	0.0	0.0	0.0	11.6
SW	2.4	0.4	0.0	0.0	2.9
W	3.9	0.0	0.0	0.0	3.9
NW	3.6	0.6	0.3	0.0	4.4
Summary	91.5	1.1	0.3	0.0	92.9

% Icon Classes (ppb)	91 0.0-3.1	1 3.1-6.1	0 6.1-9.2	0 >9.2

LICA MASKWA Poll.: LICA MASKWA-NO[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 7.13% Calm Poll Avg: 0.53[ppb]



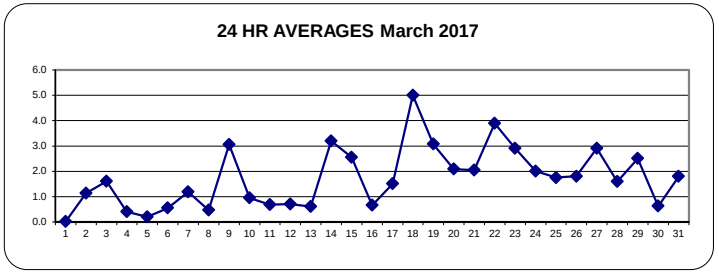
NITROGEN DIOXIDE

NITROGEN DIOXIDE Hourly Averages (NO_2 ppb)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	**0.0**	0.0	0.0	0.0	0.0	0.0	S	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**	0.5	0.0	24
2	0.0	0.0	0.0	0.0	0.0	S	0.5	0.5	0.0	0.0	0.3	0.0	0.0	0.2	1.7	1.1	4.5	0.8	0.4	5.6	4.4	1.7	1.6	2.8	0.0	5.6	1.1	24
3	0.8	1.5	0.6	0.4	S	1.8	1.0	0.8	0.6	1.4	1.7	1.4	1.8	1.7	1.2	1.7	2.3	3.0	2.8	2.5	3.3	2.5	1.1	1.1	0.4	3.3	1.6	24
4	0.9	0.8	1.6	S	4.0	1.2	0.3	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.4	24
5	0.0	0.0	S	0.4	0.0	0.0	0.0	0.0	0.0	C	C	C	C	C	C	C	C	2.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.2	24
6	0.0	S	0.8	0.2	0.4	0.2	0.3	0.7	0.9	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.5	1.4	1.5	1.5	1.2	0.0	1.5	0.6	24
7	S	2.5	1.8	1.5	1.4	2.3	2.6	2.5	1.5	0.7	0.8	0.6	0.4	0.6	0.5	0.9	0.3	0.6	1.5	1.3	0.5	0.7	0.6	S	0.3	2.6	1.2	24
8	1.4	0.8	1.2	0.4	1.7	0.4	0.4	0.8	0.3	0.0	0.0	0.0	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	S	2.6	0.0	2.6	0.5	24
9	2.2	2.3	2.3	2.1	1.7	1.7	3.2	7.0	4.9	1.4	0.0	2.3	3.7	3.5	3.8	3.6	3.5	4.5	4.9	3.5	3.1	S	2.9	2.1	0.0	7.0	3.1	24
10	1.8	2.9	2.7	1.8	1.3	0.6	0.2	0.0	0.0	0.6	2.0	1.5	0.0	0.0	1.3	2.9	0.0	0.0	0.0	0.0	S	1.3	0.9	0.0	0.0	2.9	0.9	24
11	0.5	0.6	0.4	0.0	0.2	0.0	0.0	X	X	0.0	0.0	2.3	2.9	2.7	2.2	0.4	0.7	0.0	0.0	S	1.5	0.0	0.0	0.0	0.0	2.9	0.7	22
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.2	2.5	1.6	0.0	0.0	0.6	0.0	0.0	S	0.7	2.3	2.5	0.4	0.0	0.0	3.5	0.7	24
13	1.8	2.2	0.8	0.6	0.3	0.0	0.0	0.0	0.0	0.3	1.2	0.5	0.2	0.2	0.2	0.2	0.0	S	1.7	1.1	1.0	0.6	0.5	0.6	0.0	2.2	0.6	24
14	0.7	0.9	0.8	1.5	3.5	4.2	4.0	3.3	2.5	2.2	1.9	2.0	2.7	3.1	3.8	2.8	S	6.2	3.6	1.8	1.6	4.1	8.3	7.9	0.7	8.3	3.2	24
15	1.2	1.0	1.1	1.1	1.5	2.1	2.2	3.2	3.2	2.5	2.2	4.9	2.8	2.2	0.6	S	7.8	6.4	5.2	2.6	1.3	0.3	1.7	1.6	0.3	7.8	2.6	24
16	1.1	0.5	0.5	0.3	1.5	1.9	1.6	1.1	1.3	0.5	0.2	0.1	0.1	0.2	S	1.6	0.6	0.6	0.5	0.3	0.1	0.0	0.0	0.6	0.0	1.9	0.7	24
17	0.5	2.0	3.2	0.8	0.8	0.5	0.8	0.9	1.2	1.4	1.6	1.5	0.8	S	2.6	1.8	1.6	1.7	2.0	2.2	1.8	1.8	1.8	1.4	0.5	3.2	1.5	24
18	1.2	7.4	12.1	11.1	2.4	8.2	9.1	8.9	6.0	1.9	2.3	5.2	S	2.1	4.2	3.6	5.1	1.8	0.6	0.6	0.6	0.6	12.3	7.7	0.6	12.3	**5.0**	24
19	8.4	3.8	**15.1**	10.4	7.9	3.5	0.5	0.5	0.6	0.1	0.0	S	1.9	0.7	0.6	0.5	0.3	0.2	0.4	0.1	0.3	0.4	0.7	13.8	0.0	**15.1**	3.1	24
20	4.7	0.3	2.7	4.3	4.0	5.8	8.9	2.5	3.5	3.0	S	3.3	1.3	1.3	1.0	0.5	0.1	0.0	0.0	0.0	0.3	0.1	0.2	0.2	0.0	8.9	2.1	24
21	0.7	0.9	0.5	0.0	0.0	0.0	0.9	0.3	1.1	S	2.1	1.8	1.5	0.4	0.5	2.2	5.8	5.9	1.8	0.4	0.9	3.1	7.2	9.0	0.0	9.0	2.0	24
22	8.1	10.5	10.3	9.9	6.0	2.1	1.1	0.6	S	2.3	1.7	1.1	0.9	1.1	1.9	0.8	0.6	0.8	1.4	1.5	3.3	7.4	7.4	8.7	0.6	10.5	3.9	24
23	5.0	4.9	3.7	1.3	1.4	3.1	4.8	S	3.0	2.1	2.3	1.3	2.7	3.3	4.9	5.3	2.0	2.0	1.4	1.6	1.9	1.7	3.3	3.7	1.3	5.3	2.9	24
24	2.1	1.7	1.3	1.6	2.3	1.6	S	3.8	4.4	1.5	1.7	3.0	1.7	3.5	1.4	1.3	1.2	1.2	1.6	1.6	5.3	1.2	0.5	0.6	0.5	5.3	2.0	24
25	0.6	0.6	0.6	0.6	0.6	S	2.5	1.3	0.9	2.9	5.1	3.7	3.7	1.4	2.1	1.3	1.8	1.8	2.1	1.3	1.2	1.6	1.5	1.1	0.6	5.1	1.8	24
26	1.0	1.5	2.5	2.4	S	3.1	3.0	3.8	2.1	1.8	1.9	1.9	1.9	1.9	1.5	1.4	1.0	1.2	1.6	1.6	1.5	1.1	1.1	0.7	0.7	3.8	1.8	24
27	0.6	0.6	0.5	S	2.7	3.2	1.9	0.8	1.8	5.3	3.5	1.7	2.6	3.9	3.0	2.8	4.3	4.3	8.6	8.0	3.2	0.7	0.7	2.1	0.5	8.6	2.9	24
28	1.2	0.8	S	2.8	1.7	1.3	1.7	2.1	1.5	2.3	2.2	1.2	1.2	0.8	1.0	1.5	2.3	1.3	1.7	1.8	1.6	1.7	1.6	1.4	0.8	2.8	1.6	24
29	1.2	S	3.6	2.5	2.1	2.0	3.0	2.5	1.8	1.8	1.8	2.2	2.1	2.4	3.1	2.8	2.5	2.5	2.8	2.5	1.4	3.7	5.1	2.2	1.2	5.1	2.5	24
30	S	3.2	1.6	1.2	0.6	0.3	0.6	0.6	0.5	0.6	0.5	0.4	0.4	0.5	0.4	0.5	0.4	0.3	0.6	0.4	0.2	0.0	0.0	S	0.0	3.2	0.6	24
31	2.7	1.1	0.4	0.6	0.6	0.4	0.2	0.4	2.6	2.2	2.4	2.8	3.0	2.1	1.6	1.0	1.3	1.7	1.4	2.4	3.5	1.8	S	5.1	0.2	5.1	1.8	24
HOURLY MAX	8.4	10.5	15.1	11.1	7.9	8.2	9.1	8.9	6.0	5.3	5.1	5.2	3.7	3.9	4.9	5.3	7.8	6.4	8.6	8.0	5.3	7.4	12.3	13.8				
HOURLY AVG	1.7	1.9	2.5	2.1	1.7	1.8	1.9	1.7	1.6	1.5	1.4	1.7	1.5	1.4	1.6	1.5	1.7	1.7	1.7	1.6	1.6	1.4	2.2	2.7				

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

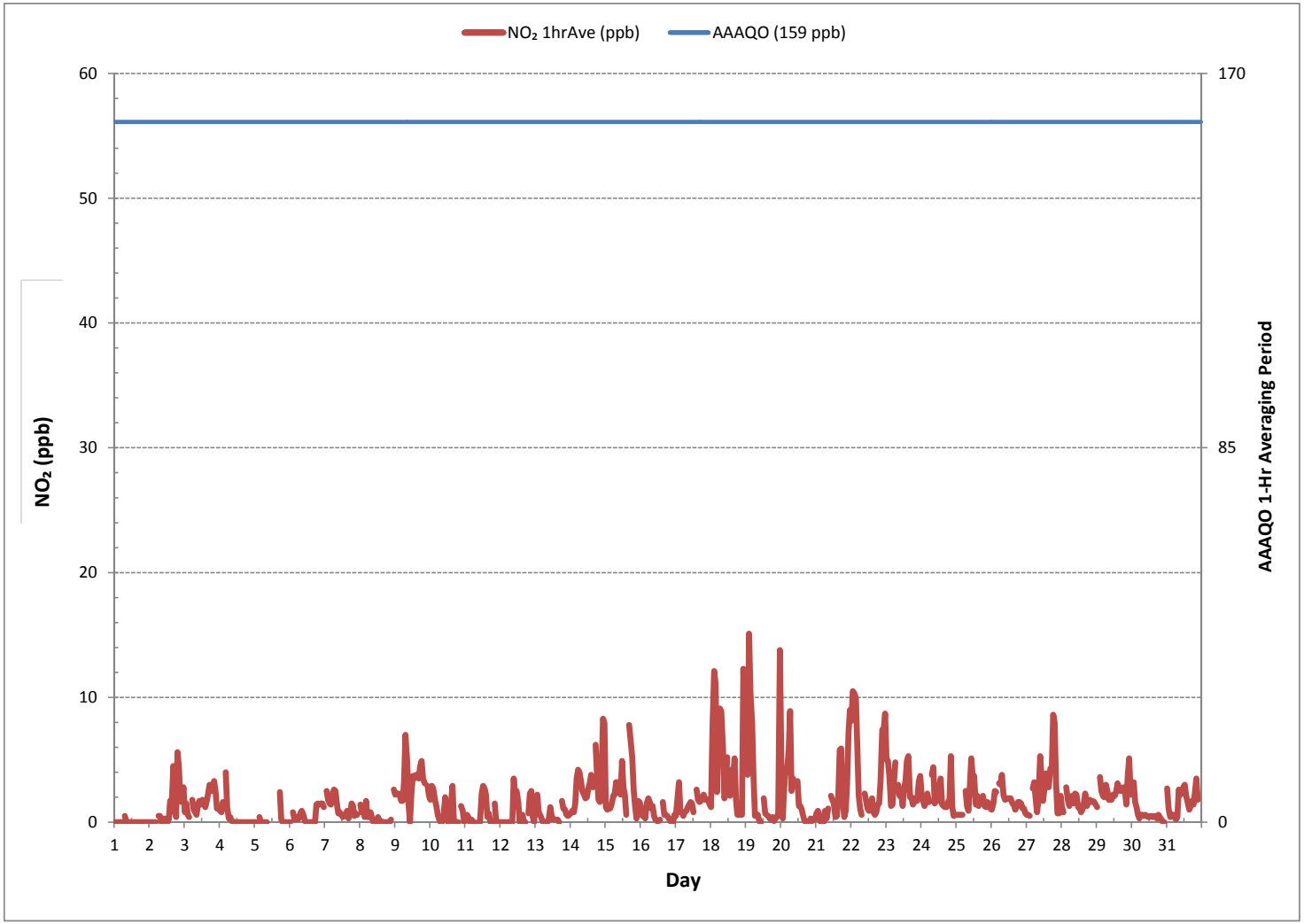


OBJECTIVE LIMIT: **ALBERTA ENVIRONMENT:** 1-HR 159 ppb

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:			0				
NUMBER OF NON-ZERO READINGS:			576				
MINIMUM 1-HR AVERAGE	0.0	ppb	@ HOUR(S)	0	ON DAY(S)	1	
MAXIMUM 1-HR AVERAGE:	15.1	ppb	@ HOUR(S)	2	ON DAY(S)	19	
MAXIMUM 24-HR AVERAGE:	5.0	ppb			ON DAY(S) VAR-VARIOUS	18	
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:			742	hrs
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	2.1		MONTHLY AVERAGE:			1.7	ppb

NITROGEN DIOXIDE Hourly Averages (NO_2 ppb)



NITROGEN DIOXIDE Instantaneous Maximum (NO_2 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	0.3	0.3	0.3	0.3	S	3.3	0.9	0.9	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	3.3	0.5	24
2	0.3	0.9	0.9	0.3	0.9	S	3.3	5.0	2.1	2.1	2.7	2.7	2.1	2.7	5.0	5.0	9.1	4.4	3.3	10.9	10.3	3.8	3.8	6.2	0.3	10.9	3.8	24
3	3.3	4.4	3.8	2.7	S	6.2	3.3	2.7	2.7	3.3	3.8	3.8	3.8	3.8	3.3	3.8	4.4	4.4	4.4	4.9	5.0	5.6	2.7	2.7	2.7	6.2	3.9	24
4	2.1	2.1	3.8	S	9.1	2.7	2.1	2.1	1.5	1.5	0.9	1.5	1.5	1.5	0.9	1.5	1.5	1.5	0.9	0.3	0.3	0.3	0.3	0.3	0.3	9.1	1.7	24
5	0.3	0.3	S	3.3	0.9	0.9	0.9	0.9	0.3	C	C	C	C	C	C	C	C	C	0.9	0.3	0.3	0.3	0.3	0.3	0.3	3.3	0.7	24
6	0.3	S	2.7	0.3	0.9	0.9	0.9	2.7	1.5	1.5	1.5	0.9	0.3	0.9	0.3	0.3	0.3	0.9	2.1	2.1	2.1	1.5	1.5	1.5	0.3	2.7	1.2	24
7	S	4.4	2.1	2.1	2.7	3.3	3.3	3.3	2.1	1.5	0.9	0.9	0.9	0.9	0.9	1.5	0.9	1.5	2.1	2.1	1.5	0.9	0.9	S	0.9	4.4	1.9	24
8	3.3	1.5	2.1	1.5	12.1	2.1	2.1	2.1	2.1	0.0	0.0	0.0	0.9	1.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	1.5	S	4.4	0.0	12.1	1.7	24
9	2.7	2.7	2.7	2.7	2.1	2.1	8.5	12.1	9.1	6.8	0.9	4.4	6.2	6.2	4.4	10.9	4.4	5.0	6.2	4.4	3.9	S	5.0	3.3	0.9	12.1	5.1	24
10	3.3	3.9	3.9	2.7	2.1	1.5	0.9	0.3	0.3	2.1	3.3	3.3	0.9	0.9	3.3	5.6	3.8	0.0	0.0	0.0	S	4.4	2.7	0.3	0.0	5.6	2.2	24
11	2.7	2.7	1.5	0.9	0.9	0.3	0.3	X	X	0.3	1.5	3.8	5.0	4.4	3.8	2.1	2.7	0.9	0.3	S	5.0	0.9	0.3	0.3	0.3	5.0	1.9	22
12	0.3	0.3	0.3	0.0	0.3	0.3	0.3	0.0	2.7	6.2	3.8	5.0	4.4	1.5	1.5	2.7	2.1	1.5	S	3.3	5.6	4.4	2.7	0.9	0.0	6.2	2.2	24
13	3.8	3.8	1.5	1.5	1.5	0.9	0.9	1.5	1.5	2.1	2.7	1.5	1.5	0.9	1.5	1.5	1.5	S	4.4	2.1	2.1	1.5	1.5	1.5	0.9	4.4	1.9	24
14	1.5	2.1	2.1	2.1	5.6	5.6	6.2	5.6	4.4	3.8	3.3	3.3	5.0	5.0	7.9	4.4	S	9.7	9.7	2.7	2.7	12.7	12.7	12.7	1.5	12.7	5.7	24
15	2.7	2.1	1.5	2.1	2.7	3.3	3.3	5.0	5.0	3.8	3.8	10.9	5.6	4.4	2.1	S	9.7	7.9	6.8	3.8	2.7	0.9	2.7	5.6	0.9	10.9	4.3	24
16	1.5	0.9	0.9	0.9	2.7	3.8	3.8	1.5	3.8	0.9	0.3	0.3	0.3	0.3	S	3.3	0.9	0.3	0.3	0.3	0.3	0.3	0.3	2.7	0.3	3.8	1.3	24
17	1.5	8.0	7.9	4.4	2.7	0.9	1.5	0.9	2.1	2.7	2.1	2.1	1.5	S	4.4	2.7	2.1	1.5	2.7	2.7	2.1	2.1	2.1	1.5	0.9	8.0	2.7	24
18	1.5	10.3	13.9	13.3	5.6	14.4	13.9	12.1	9.1	3.3	5.0	7.9	S	3.8	7.3	5.6	7.9	3.8	0.9	0.9	0.9	0.9	26.7	23.2	0.9	26.7	8.4	24
19	18.5	15.6	19.7	28.4	12.1	8.5	0.9	1.5	1.5	0.9	0.3	S	3.8	0.9	1.5	1.5	0.3	0.9	1.5	0.3	0.3	3.8	3.8	22.0	0.3	28.4	6.5	24
20	17.9	2.7	8.5	13.9	22.0	22.0	15.0	6.2	18.5	15.6	S	7.3	2.7	2.7	2.1	2.1	0.9	0.9	0.3	0.3	0.3	0.3	0.3	0.9	0.3	22.0	7.1	24
21	0.9	1.5	0.9	0.9	0.3	0.3	4.4	2.7	1.5	S	4.9	3.8	3.8	0.9	1.5	7.9	9.1	9.7	3.8	0.9	1.5	6.8	10.9	12.7	0.3	12.7	4.0	24
22	12.1	13.3	13.9	13.3	10.3	3.8	2.1	0.9	S	5.6	3.8	1.5	0.9	0.9	5.0	3.3	0.9	0.9	2.1	2.1	6.8	8.5	8.0	13.9	0.9	13.9	5.8	24
23	12.7	15.0	6.2	1.5	2.1	4.4	18.5	S	5.6	3.3	3.3	2.7	3.8	3.8	5.6	6.8	2.7	2.1	2.1	2.1	2.1	2.1	4.4	4.4	1.5	18.5	5.1	24
24	2.7	2.1	2.1	2.1	3.3	3.3	S	6.7	5.6	2.7	3.3	4.4	3.8	5.0	2.1	2.1	1.5	0.9	3.8	3.3	7.9	2.7	0.3	0.3	0.3	7.9	3.1	24
25	0.3	0.3	0.3	0.3	0.3	S	5.0	1.5	1.5	6.2	6.8	5.0	5.0	3.8	6.2	2.7	2.1	2.1	2.7	1.5	1.5	2.1	2.1	1.5	0.3	6.8	2.6	24
26	0.9	2.1	2.7	3.3	S	5.6	7.9	6.2	2.7	2.7	2.1	2.7	2.1	7.3	2.1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0.9	0.9	0.9	7.9	2.7	24
27	0.9	0.9	0.3	S	5.0	3.8	3.3	1.5	6.2	8.5	6.7	3.3	4.4	6.8	7.9	5.0	10.9	7.9	12.7	11.5	9.7	0.9	0.9	2.7	0.3	12.7	5.3	24
28	1.5	0.9	S	5.0	2.1	1.5	2.1	3.3	2.1	2.7	2.7	1.5	1.5	1.5	1.5	3.8	3.8	2.1	2.1	2.1	2.1	2.1	1.5	1.5	0.9	5.0	2.2	24
29	1.5	S	5.0	2.7	2.1	2.1	5.6	3.3	2.7	2.7	2.7	2.7	2.7	2.7	3.3	3.3	3.2	3.2	3.3	3.3	2.1	9.1	8.5	5.6	1.5	9.1	3.6	24
30	S	5.6	2.1	1.5	0.9	0.9	0.9	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.9	0.3	0.3	0.3	0.3	0.3	S	0.3	5.6	0.8	24
31	5.0	1.5	0.9	0.9	0.3	0.3	0.3	1.5	3.3	2.7	2.7	3.3	3.3	2.7	2.1	1.5	2.1	2.1	1.5	3.8	4.4	3.3	S	6.7	0.3	6.7	2.4	24
HOURLY MAX	18.5	15.6	19.7	28.4	22.0	22.0	18.5	12.1	18.5	15.6	6.8	10.9	6.2	7.3	7.9	10.9	10.9	9.7	12.7	11.5	10.3	12.7	26.7	23.2				
HOURLY AVG	3.7	3.9	3.9	4.0	3.9	3.7	4.2	3.3	3.5	3.3	2.6	3.1	2.7	2.7	3.0	3.2	3.1	2.7	2.8	2.5	2.9	2.9	3.7	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

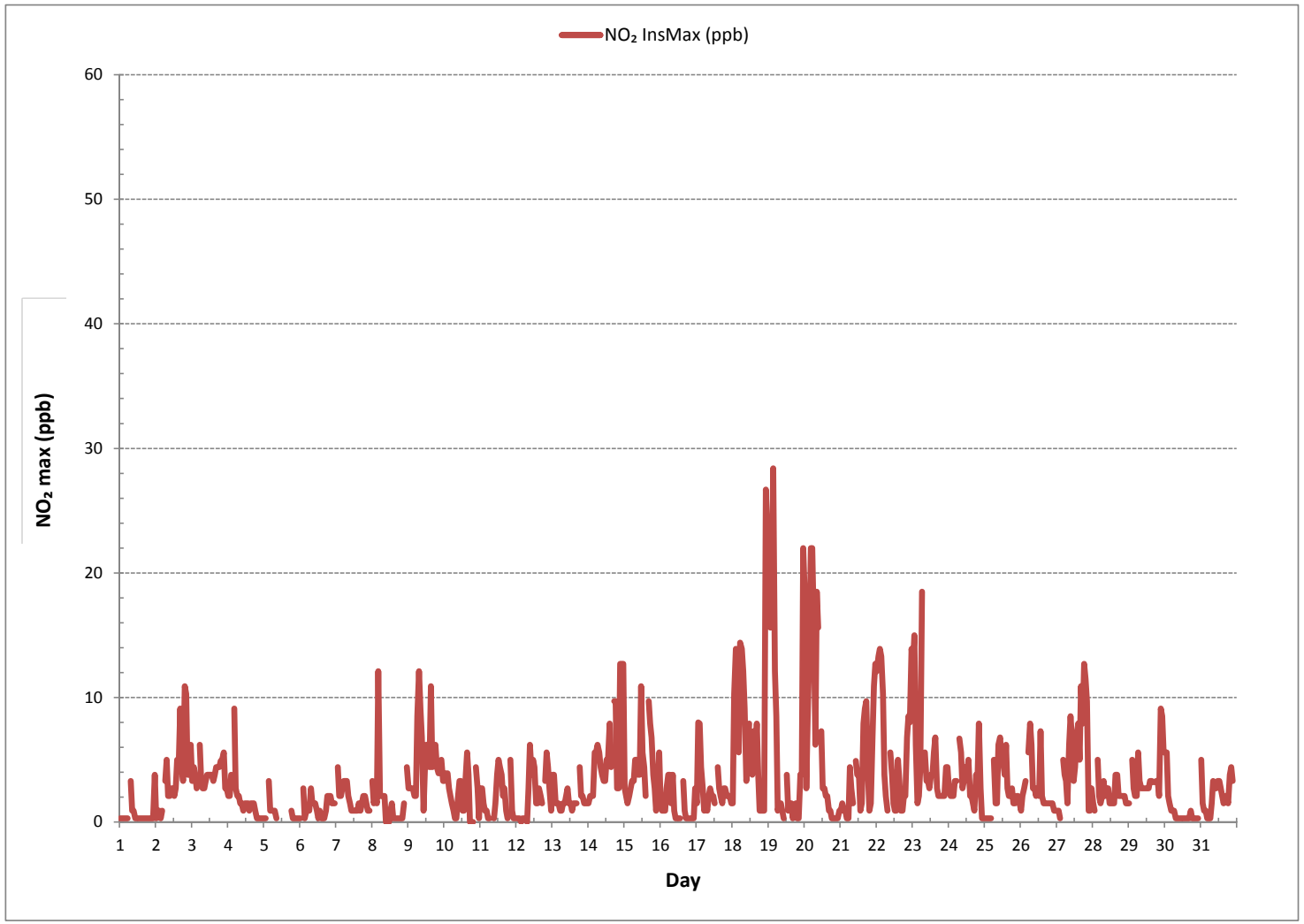
NUMBER OF NON-ZERO READINGS: 692

MAXIMUM INSTANTANEOUS VALUE: 28.4 ppb @ HOUR(S) 3 ON DAY(S) 19

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 742 hrs
MONTHLY CALIBRATION TIME: 9 hrs
STANDARD DEVIATION: 3.8

NITROGEN DIOXIDE Instantaneous Maximum (NO_2 ppb)



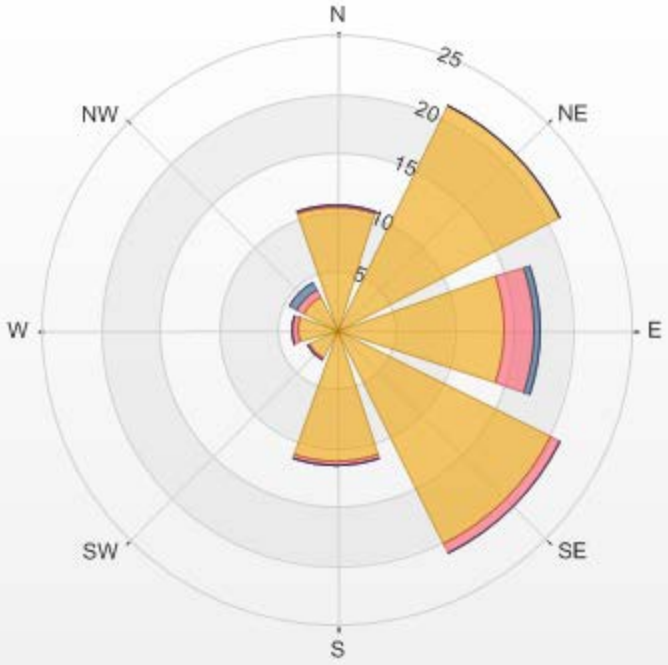
Wind: LICA MASKWA
Poll.: LICA MASKWA-NO2[ppb]
Monthly: 2017/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 7.13% Calm Avg: 2.01 [ppb]

Direction	0.0-5.1	5.1-10.1	10.1-15.2	>15.2	Total
N	10.4	0.1	0.0	0.0	10.6
NE	21.3	0.0	0.0	0.0	21.3
E	14.3	2.4	0.6	0.0	17.3
SE	20.4	0.7	0.0	0.0	21.1
S	11.3	0.3	0.0	0.0	11.6
SW	2.7	0.1	0.0	0.0	2.9
W	3.3	0.6	0.0	0.0	3.9
NW	3.1	0.7	0.6	0.0	4.4
Summary	86.7	5.0	1.1	0.0	92.9

% Icon Classes (ppb)	87	0.0-5.1	5	5.1-10.1	1	10.1-15.2	0	>15.2

LICA MASKWA Poll.: LICA MASKWA-NO2[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 7.13% Calm Poll Avg: 2.01[ppb]



NO2[ppb] Calibration: LICA MASKWA Monthly: 2017/03 Type: Span

WIND SPEED

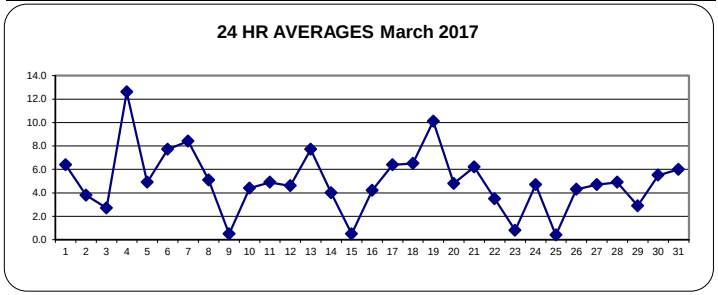
Maxxam
A Bureau Veritas Group Company

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	6.1	6.4	5.1	5.6	7.4	6.3	6.1	8.1	8.5	8.8	9.3	9.4	10.3	9.7	7.9	8.0	6.5	4.8	5.2	3.4	2.7	3.8	4.1	2.2	2.2	10.3	6.4	24
2	2.5	2.8	2.9	2.9	2.4	1.9	1.5	2.6	3.0	4.3	4.1	4.1	4.3	4.5	6.9	7.7	5.4	5.2	5.0	5.6	6.7	7.0	4.1	3.7	1.5	7.7	3.8	24
3	3.8	4.7	5.2	4.7	4.7	5.0	4.7	4.4	1.2	5.5	6.5	5.7	6.3	6.3	5.5	8.8	8.1	3.7	0.3	1.4	4.9	5.9	7.7	7.0	0.3	8.8	2.7	24
4	7.1	8.8	13.5	13.1	17.6	16.5	**19.7**	16.5	15.2	15.8	16.7	14.7	15.1	12.7	12.3	11.6	11.2	12.9	10.7	9.2	7.8	9.3	7.3	8.3	7.1	**19.7**	**12.6**	24
5	6.4	7.8	8.4	5.9	6.3	5.8	4.6	6.5	6.3	4.9	4.0	4.6	5.1	3.4	5.1	4.4	5.1	4.8	5.2	5.1	3.7	2.3	1.8	3.8	1.8	8.4	4.9	24
6	8.1	6.8	6.4	7.4	8.6	9.6	7.7	5.7	5.4	11.0	10.0	9.3	8.4	8.0	7.4	7.3	7.0	7.5	8.5	8.3	8.6	7.9	7.8	7.3	5.4	11.0	7.7	24
7	9.2	9.7	8.7	9.6	8.7	8.8	8.4	7.8	9.5	10.5	9.6	9.4	9.6	9.6	8.4	9.3	9.4	9.6	7.3	7.6	8.5	8.4	4.0	3.3	3.3	10.5	8.4	24
8	4.2	5.7	4.7	8.8	3.4	3.0	3.6	8.3	10.3	6.9	6.0	7.3	2.9	3.3	7.3	6.8	5.9	4.4	3.8	5.2	2.2	4.9	3.8	3.6	2.2	10.3	5.1	24
9	1.5	1.3	1.2	1.3	0.9	0.5	0.6	0.5	2.7	4.8	4.4	1.6	0.7	1.9	3.9	6.3	7.3	5.7	2.8	0.9	1.2	1.1	1.0	1.0	0.5	7.3	0.5	24
10	2.1	3.7	6.3	4.9	4.4	4.4	5.6	6.2	6.0	5.7	8.1	8.6	8.8	8.9	5.2	4.1	3.0	5.4	4.6	3.8	3.1	3.1	2.6	2.5	2.1	8.9	4.4	24
11	3.0	4.0	3.8	3.0	3.4	4.4	5.3	**X**	**X**	5.5	6.6	6.1	6.4	5.7	6.1	7.1	7.3	5.5	4.6	6.1	5.0	4.5	5.1	6.1	3.0	7.3	4.9	22
12	6.2	6.1	5.4	4.7	5.1	5.1	4.7	5.0	4.5	7.7	7.4	7.7	6.9	6.0	5.6	6.1	6.6	5.0	4.5	3.7	6.1	7.9	6.7	6.9	3.7	7.9	4.6	24
13	7.0	7.4	6.1	6.5	6.5	6.4	7.9	7.6	8.7	7.0	9.0	9.6	9.7	10.0	11.2	8.3	8.8	10.5	10.1	8.3	7.5	7.7	6.5	5.3	5.3	11.2	7.7	24
14	3.7	5.4	4.1	4.5	3.7	3.1	3.2	4.4	5.3	6.2	6.5	4.9	5.7	5.7	4.8	4.8	4.8	3.9	5.5	5.2	4.6	5.2	5.6	6.9	3.1	6.9	4.0	24
15	6.0	5.6	5.6	5.6	5.0	3.6	2.3	2.2	1.2	3.4	4.2	3.6	3.2	4.9	4.7	4.3	7.5	2.9	2.1	2.8	3.8	5.2	4.4	3.1	1.2	7.5	0.5	24
16	2.4	2.6	3.2	1.2	1.7	2.8	3.9	1.6	2.4	4.6	7.6	10.3	9.3	6.5	5.2	7.0	6.6	5.7	5.0	4.4	5.7	6.7	4.9	3.2	1.2	10.3	4.2	24
17	4.4	3.8	4.6	4.0	5.3	5.7	4.6	4.1	4.0	5.0	5.8	7.9	11.5	11.9	13.7	11.0	10.1	7.9	6.9	6.8	8.6	8.0	7.8	8.1	3.8	13.7	6.4	24
18	7.9	6.2	6.6	7.8	9.1	8.3	7.5	8.4	9.0	8.9	8.4	9.9	10.8	11.1	10.1	10.5	9.3	7.4	6.1	6.0	8.6	7.8	8.5	8.1	6.0	11.1	6.5	24
19	7.8	10.9	13.9	13.1	12.2	11.1	10.4	10.2	11.6	11.3	8.9	12.2	12.0	10.4	11.2	10.1	12.6	8.8	7.7	9.7	5.6	8.3	7.0	10.3	5.6	13.9	10.1	24
20	8.9	10.7	8.1	9.4	8.3	8.1	9.1	9.4	7.9	7.3	6.5	5.9	4.0	3.5	3.9	2.9	4.6	4.2	2.2	0.8	2.4	3.2	1.1	1.3	0.8	10.7	4.8	24
21	1.2	1.5	2.2	2.7	1.5	2.4	4.2	4.0	5.0	9.2	8.7	9.1	8.2	10.6	11.9	9.6	10.2	10.0	9.2	8.9	9.1	8.5	8.3	8.4	1.2	11.9	6.2	24
22	7.6	6.7	8.0	7.2	8.0	7.2	7.0	7.0	6.3	7.0	6.7	6.0	6.5	4.7	5.0	4.1	2.8	1.3	1.8	2.9	4.5	4.1	3.8	3.7	1.3	8.0	3.5	24
23	3.0	2.6	2.6	2.6	1.5	0.9	1.5	3.9	5.5	4.0	3.3	1.0	2.2	1.2	**0.2**	1.4	3.5	3.0	3.1	3.1	2.9	2.5	2.2	4.3	**0.2**	5.5	0.8	24
24	4.4	2.6	4.1	3.8	3.8	4.0	3.1	5.4	3.3	6.0	7.1	6.5	7.7	6.3	6.7	5.5	6.4	7.1	6.2	6.2	6.1	6.5	6.1	6.3	2.6	7.7	4.7	24
25	6.5	5.8	5.6	5.3	3.6	1.9	1.8	2.7	3.3	2.6	3.5	3.6	3.8	2.8	1.5	3.0	7.7	6.7	5.9	2.6	1.7	2.7	1.4	2.1	1.4	7.7	0.4	24
26	3.7	6.9	4.7	2.0	3.2	3.5	1.6	3.3	6.9	6.4	7.7	7.5	8.5	10.1	9.7	9.2	6.9	8.0	3.8	3.5	0.7	1.7	2.5	2.1	0.7	10.1	4.3	24
27	2.3	2.6	3.5	4.5	3.0	3.8	3.2	4.0	5.3	5.9	7.3	8.3	7.0	7.5	7.1	6.9	8.5	6.4	4.5	5.7	5.4	6.4	6.4	5.0	2.3	8.5	4.7	24
28	5.3	4.8	5.8	4.6	4.0	4.0	4.4	4.6	5.7	5.7	5.7	6.3	6.9	6.2	6.7	4.8	5.5	6.6	4.2	2.3	6.2	6.2	4.0	2.2	2.2	6.9	4.9	24
29	0.7	2.0	1.3	1.3	0.9	2.0	2.0	2.3	3.8	3.6	5.0	3.6	5.7	8.0	8.4	6.2	6.6	5.9	4.7	5.5	4.0	4.7	5.6	5.7	0.7	8.4	2.9	24
30	4.8	5.8	6.5	6.7	8.2	7.2	6.7	6.6	7.8	7.6	8.5	8.3	7.3	7.1	5.6	6.7	6.1	4.3	3.7	0.9	1.0	3.1	4.5	3.5	0.9	8.5	5.5	24
31	3.3	2.5	3.1	2.7	2.6	1.8	2.6	1.7	6.5	7.6	10.1	11.5	11.3	14.1	14.5	14.9	14.7	12.0	4.8	6.6	8.1	7.0	9.5	9.1	1.7	14.9	6.0	24
HOURLY MAX	9.2	10.9	13.9	13.1	17.6	16.5	19.7	16.5	15.2	15.8	16.7	14.7	15.1	14.1	14.5	14.9	14.7	12.9	10.7	9.7	9.1	9.3	9.5	10.3				
HOURLY AVG	2.5	2.6	2.8	2.6	2.7	2.6	2.5	2.8	2.4	2.4	2.7	2.6	2.4	2.4	2.5	2.5	2.7	1.7	1.7	2.2	2.3	2.5	1.9	1.7				

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

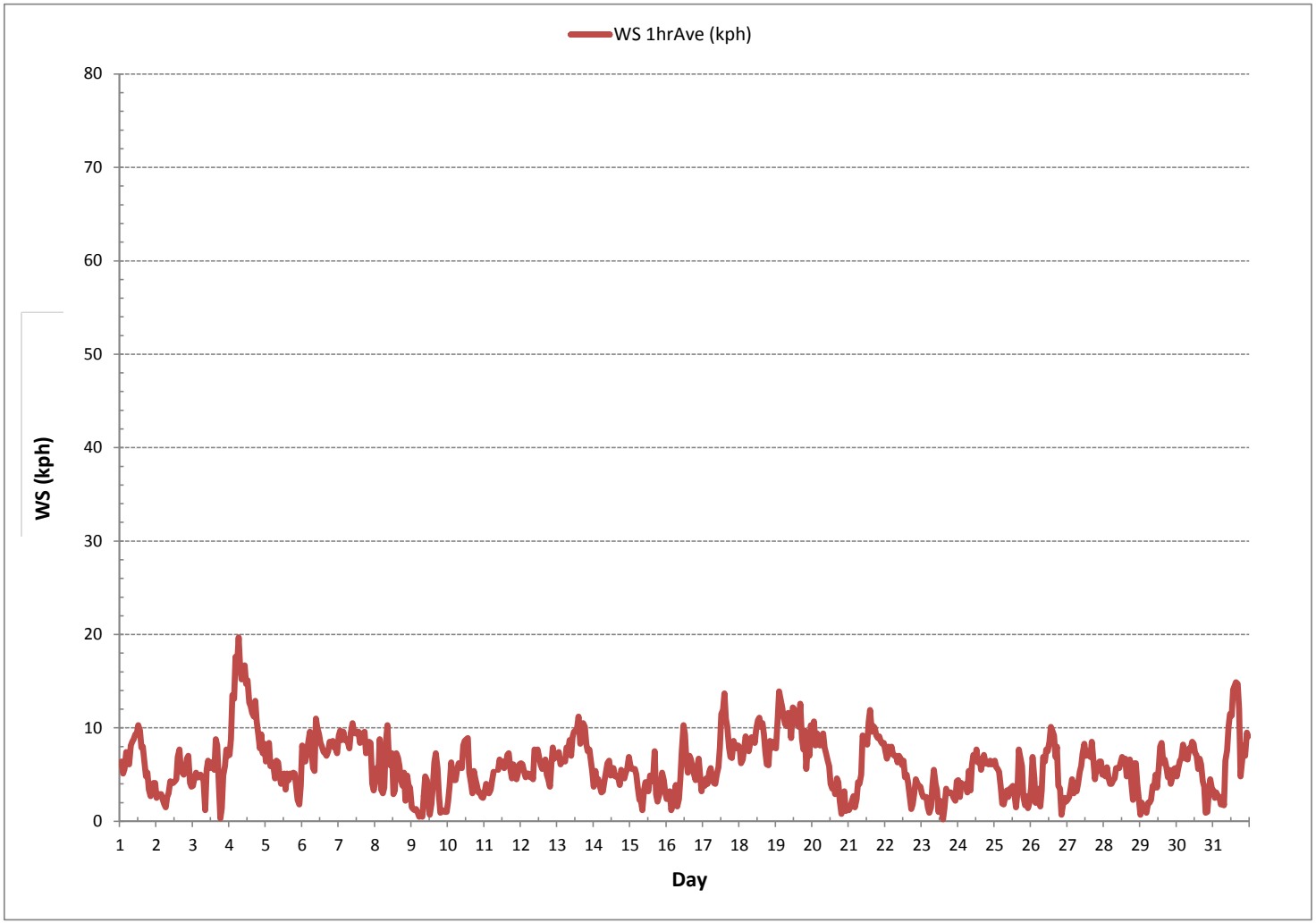


LAST CALIBRATION:	March 30, 2016
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			742				
MINIMUM 1-HR AVERAGE	0.2	kph	@ HOUR(S)	14	ON DAY(S)	23	
MAXIMUM 1-HR AVERAGE:	19.7	kph	@ HOUR(S)	6	ON DAY(S)	4	
MAXIMUM 24-HR AVERAGE:	12.6	kph			ON DAY(S) VAR-VARIOUS	4	
					OPERATIONAL TIME:	742	hrs
MONTHLY CALIBRATION TIME:	0	hrs			AMD OPERATION UPTIME:	99.7	%
STANDARD DEVIATION:	3.0				MONTHLY AVERAGE:	2.2	kph

WIND SPEED Hourly Averages (WS kph)



Maxxam
A Bureau Veritas Group Company

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

Maskwa Continuous Monitoring Station - March 2017

WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	22.6	20.6	18.2	22.8	23.0	22.8	19.9	25.6	24.5	27.6	28.5	28.9	24.7	25.2	21.5	20.1	19.5	19.9	16.9	14.4	30.9	14.9	27.4	14.7	14.4	30.9	22.3	24
2	34.6	16.4	15.5	59.2	15.8	41.7	18.2	17.8	12.9	15.8	16.6	21.4	17.1	20.7	23.8	25.6	18.1	21.0	17.3	23.4	25.3	25.0	15.3	15.1	12.9	59.2	22.2	24
3	15.1	17.3	17.2	16.6	17.9	12.9	16.0	14.0	13.4	14.7	19.5	19.9	18.8	20.1	16.8	24.9	22.1	15.5	9.6	12.5	14.2	19.5	14.6	16.2	9.6	24.9	16.6	24
4	21.2	27.6	30.9	42.5	44.8	39.1	49.1	35.3	33.3	44.3	47.4	40.5	35.1	31.1	30.9	29.2	25.4	28.7	28.2	29.1	23.6	19.7	19.7	20.1	19.7	49.1	32.4	24
5	16.5	18.8	18.8	20.2	21.0	19.6	15.3	13.8	14.4	**P**	14.2	16.8	21.9	17.4	18.2	17.9	16.6	14.2	14.9	14.1	16.0	14.6	16.4	12.5	12.5	21.9	16.7	23
6	16.0	17.1	17.1	16.6	18.4	18.9	18.8	18.2	15.7	27.6	25.9	25.2	23.2	21.2	21.7	25.4	23.2	28.1	26.7	31.8	29.4	23.1	22.8	27.8	15.7	31.8	22.5	24
7	30.2	32.0	35.8	39.5	34.0	37.0	32.4	27.9	30.9	34.2	35.9	46.5	33.3	37.5	32.6	26.9	32.7	26.0	21.8	23.0	24.8	26.7	39.5	33.6	21.8	46.5	32.3	24
8	44.5	14.7	16.2	18.0	72.7	38.0	51.4	20.0	27.7	24.5	19.7	21.4	15.1	17.7	21.2	23.2	19.1	18.0	14.7	17.5	***74.0***	14.9	45.9	32.1	14.7	**74.0**	28.4	24
9	29.4	56.5	34.5	44.4	28.4	28.1	27.7	40.2	28.6	17.3	16.9	54.8	16.4	14.9	14.9	18.0	17.3	17.3	16.8	20.9	15.9	35.1	37.0	28.6	14.9	56.5	27.5	24
10	41.5	24.2	18.6	29.3	36.7	14.3	16.2	15.2	17.6	21.6	27.0	25.9	30.3	29.8	19.3	15.6	14.2	16.5	13.6	14.5	39.1	20.3	14.4	40.2	13.6	41.5	23.2	24
11	16.1	15.0	22.7	19.2	42.7	43.4	16.5	**X**	**X**	18.9	20.4	18.4	23.9	23.4	20.2	22.6	25.4	22.5	16.0	22.0	18.4	18.3	19.5	22.4	15.0	43.4	22.2	22
12	22.2	15.4	16.3	16.3	15.0	15.9	16.4	18.7	20.4	26.5	24.5	26.4	27.1	22.8	21.4	21.4	22.3	17.5	14.5	12.1	18.2	26.3	20.9	21.2	12.1	27.1	20.0	24
13	19.6	21.3	21.5	18.5	22.2	19.1	22.4	23.7	26.0	21.9	26.5	28.5	32.5	28.2	29.1	25.0	25.0	29.2	29.3	25.2	27.2	21.5	22.2	22.1	18.5	32.5	24.5	24
14	16.4	18.4	12.1	14.7	9.1	10.8	10.8	14.7	13.4	13.1	13.3	16.7	17.3	14.8	14.2	19.7	14.4	12.2	16.2	18.4	16.4	24.9	26.0	23.3	9.1	26.0	15.9	24
15	20.2	18.1	23.4	18.4	15.1	10.5	11.4	9.4	28.0	11.2	15.5	13.1	12.6	18.8	15.3	16.1	15.3	12.9	11.3	10.9	18.1	14.0	15.5	19.2	9.4	28.0	15.6	24
16	9.6	10.5	13.1	5.7	9.8	13.3	12.9	9.8	8.5	12.7	24.7	28.9	23.4	21.0	17.1	23.9	18.1	16.0	14.1	11.1	20.6	20.6	15.7	12.7	5.7	28.9	15.6	24
17	13.8	14.0	13.1	14.7	12.2	16.7	16.6	12.4	13.3	15.2	20.5	29.3	34.3	36.1	36.8	29.7	29.1	32.0	18.9	18.6	21.8	20.2	21.3	22.2	12.2	36.8	21.4	24
18	24.1	22.8	25.5	26.1	26.8	26.8	26.3	28.9	28.7	31.1	23.0	30.0	34.9	32.7	35.2	29.9	31.3	21.9	14.2	15.3	27.6	17.8	33.6	30.6	14.2	35.2	26.9	24
19	30.8	37.0	56.0	47.7	46.4	36.3	37.4	41.4	38.2	38.3	44.6	39.4	40.3	37.4	46.2	53.0	42.4	34.6	34.6	51.7	27.6	39.6	28.4	37.9	27.6	56.0	40.3	24
20	41.2	42.7	31.4	41.5	32.6	46.3	44.5	39.1	36.6	29.4	23.0	24.5	26.0	19.7	21.0	17.7	19.3	14.4	12.5	8.8	10.6	10.8	21.8	9.6	8.8	46.3	26.0	24
21	23.7	15.1	13.8	30.7	51.5	67.9	14.7	12.5	22.5	26.0	29.2	27.4	28.9	31.7	36.5	38.5	36.6	35.0	31.0	28.3	33.7	29.8	32.0	28.7	12.5	67.9	30.2	24
22	31.1	25.1	26.9	25.7	29.6	27.0	25.6	27.2	21.1	27.0	21.4	20.3	20.9	17.6	19.0	19.4	11.8	9.3	10.6	12.6	17.4	14.6	13.2	13.9	9.3	31.1	20.3	24
23	14.6	12.0	11.8	12.0	11.4	9.9	10.7	14.2	14.9	13.3	13.1	11.3	11.8	10.2	10.2	14.9	15.4	13.1	12.2	11.6	8.7	7.2	10.5	10.2	7.2	15.4	11.9	24
24	11.8	7.8	11.4	8.1	10.7	14.0	12.0	15.1	16.6	20.4	24.8	27.6	24.7	24.7	23.6	14.8	19.9	30.4	24.9	20.8	21.2	21.7	18.0	18.6	7.8	30.4	18.5	24
25	22.3	17.7	22.5	14.6	11.8	4.6	5.6	10.4	11.0	10.9	11.8	13.1	12.2	10.7	9.6	15.7	16.8	13.3	13.7	9.4	10.9	12.1	12.1	10.9	4.6	22.5	12.7	24
26	14.6	23.6	30.2	10.5	13.1	13.1	10.7	14.9	18.5	16.8	18.8	20.1	27.5	28.4	28.4	22.7	22.3	19.2	12.2	6.9	7.8	10.7	10.9	11.1	6.9	30.2	17.2	24
27	10.9	11.2	11.4	7.4	12.9	17.1	10.7	9.7	18.5	20.8	25.1	22.3	26.7	20.1	26.9	25.1	25.1	18.1	17.3	17.7	15.1	23.8	18.1	14.3	7.4	26.9	17.8	24
28	17.7	14.0	15.3	13.5	12.9	17.3	11.1	12.4	16.6	15.7	17.7	17.9	20.4	18.0	18.1	14.2	14.4	13.5	13.1	14.9	21.2	21.2	13.7	12.2	11.1	21.2	15.7	24
29	4.2	10.3	10.2	4.0	9.9	8.1	7.9	7.3	11.3	10.6	11.2	11.2	17.1	19.8	22.7	18.1	16.7	15.0	9.5	10.5	11.2	14.5	15.6	14.5	4.0	22.7	12.1	24
30	13.9	15.4	22.1	17.1	19.9	24.9	17.6	17.0	23.8	19.3	19.5	17.2	20.9	17.2	15.9	18.8	15.7	13.7	7.9	7.8	3.7	12.6	12.3	12.8	3.7	24.9	16.1	24
31	12.5	11.8	12.7	11.7	12.6	11.6	12.2	10.2	14.8	16.7	26.1	27.2	26.6	35.7	37.1	39.9	36.6	33.1	11.9	25.3	24.8	16.7	20.7	20.0	10.2	39.9	21.2	24
HOURLY MAX	44.5	56.5	56.0	59.2	72.7	67.9	51.4	41.4	38.2	44.3	47.4	54.8	40.3	37.5	46.2	53.0	42.4	35.0	34.6	51.7	74.0	39.6	45.9	40.2				
HOURLY AVG	21.4	20.1	20.8	22.2	23.9	23.5	20.0	19.2	20.7	21.4	22.8	24.9	24.1	23.4	23.4	23.5	22.0	20.4	17.0	18.1	21.8	19.8	21.1	20.3				

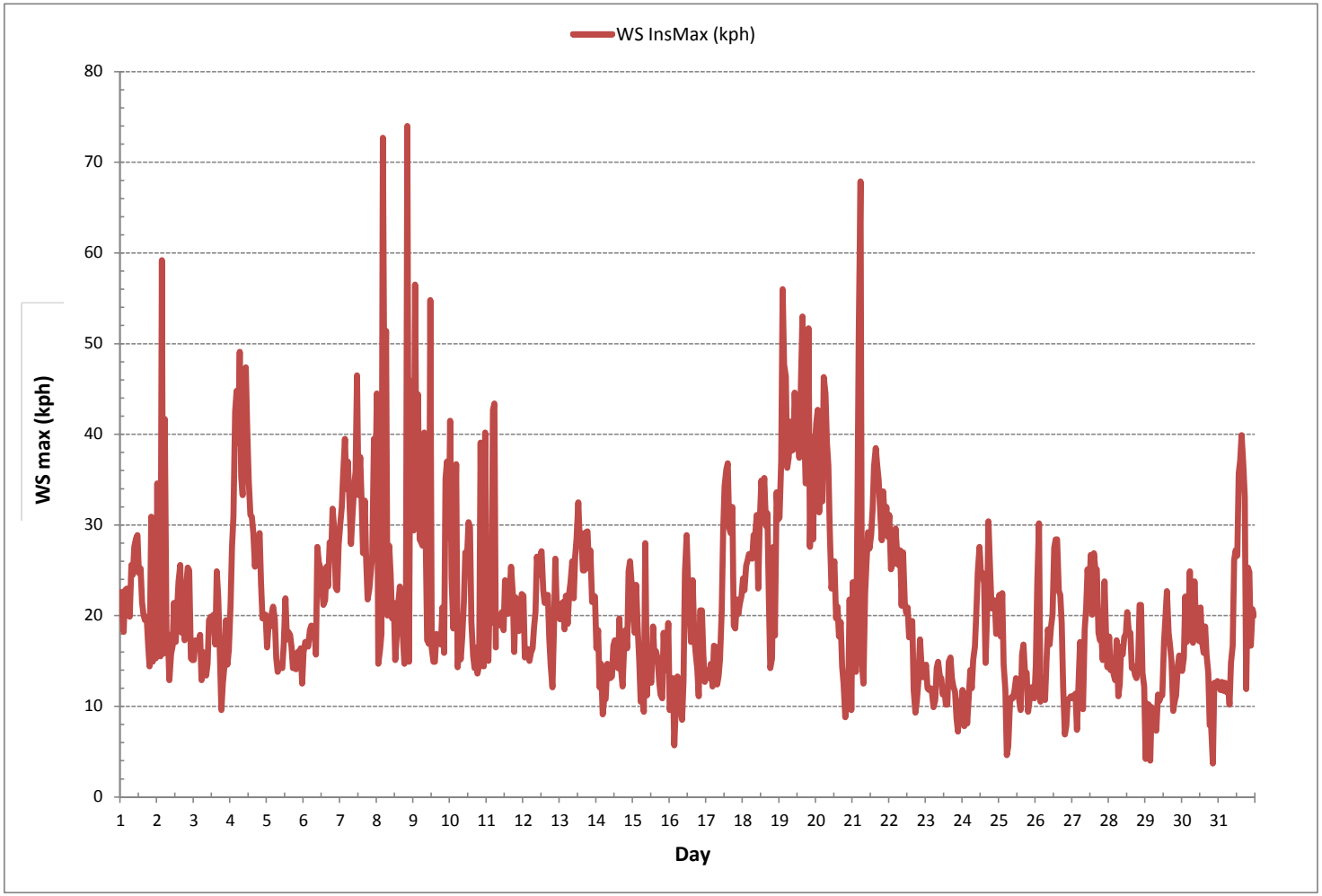
STATUS FLAG CODES

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

MAXIMUM INSTANTANEOUS VALUE:	74.0	kph	@ HOUR(S)	20	ON DAY(S)	8
					VAR-VARIOUS	
OPERATIONAL TIME:					741	hrs

WIND SPEED Instantaneous Maximum (WS kph)



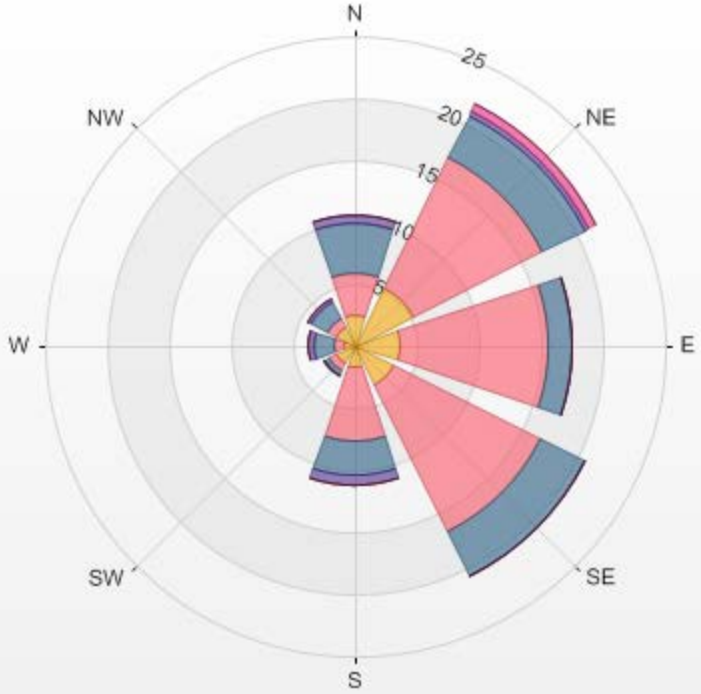
Wind: LICA MASKWA
Monitor: WSP [kph]
Monthly: 2017/03
Type: WindRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 6.87% Calm Avg: 0.00 [kph]

Direction	1.8-4.0	4.0-7.9	7.9-11.9	11.9-15.8	15.8-19.8	>19.8	Total
N	2.6	3.4	3.9	0.7	0.1	0.0	10.6
NE	5.3	11.7	3.8	0.4	0.7	0.0	21.8
E	3.8	11.9	1.9	0.0	0.0	0.0	17.5
SE	3.5	13.2	4.0	0.1	0.0	0.0	20.9
S	1.8	5.9	2.8	0.8	0.0	0.0	11.3
SW	1.6	0.7	0.4	0.1	0.0	0.0	2.8
W	0.8	0.8	1.8	0.4	0.0	0.0	3.8
NW	1.8	0.8	1.4	0.4	0.0	0.0	4.3
Summary	21.0	48.4	19.9	2.9	0.8	0.0	93.1

% Icon Classes (kph)	21	1.8-4.0	48	4.0-7.9	20	7.9-11.9	3	11.9-15.8	1	15.8-19.8	0	>19.8

LICA MASKWA 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 6.87% Calm Wind Avg Speed: 1.17(kph)



WIND DIRECTION

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

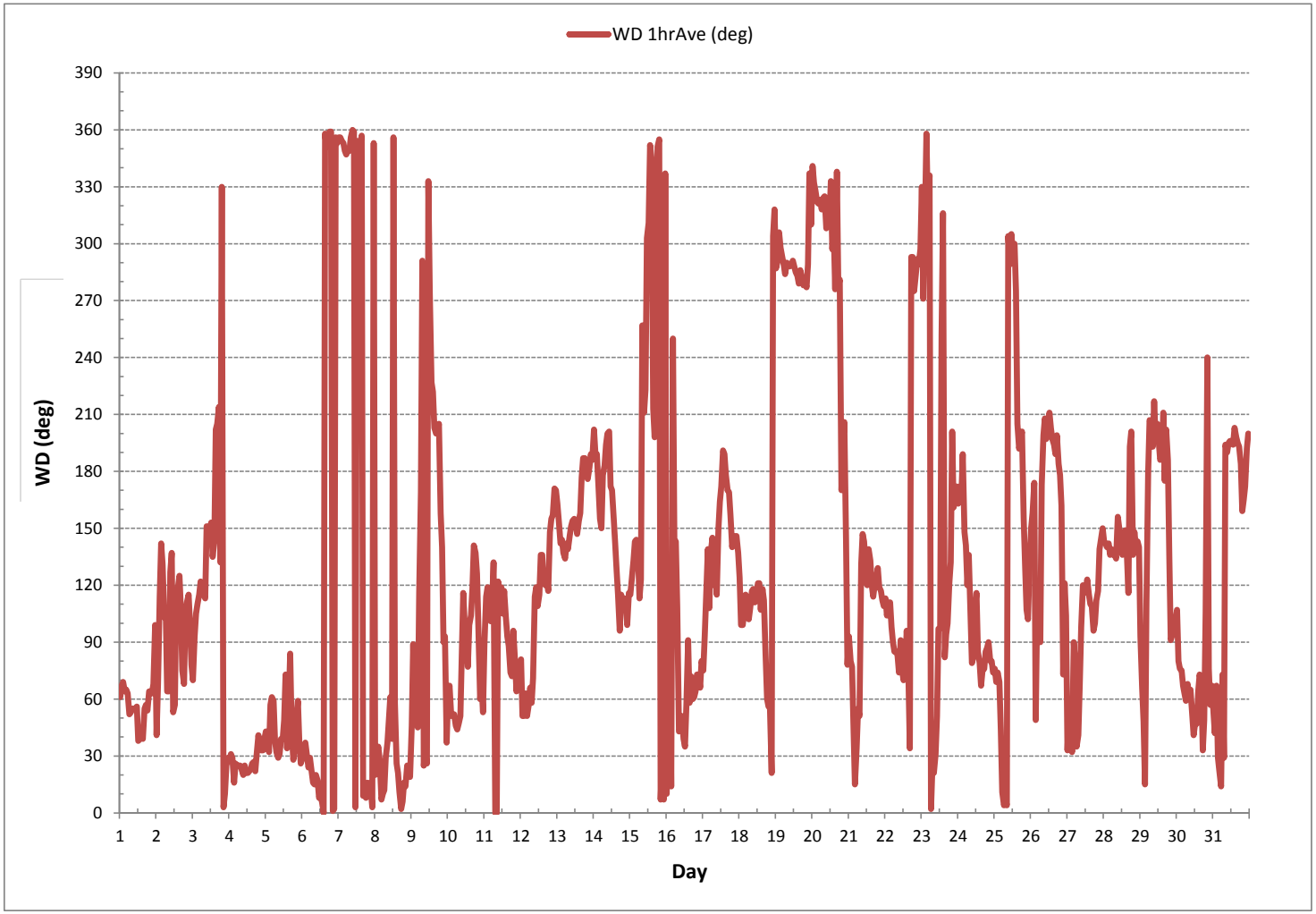
STATUS FLAG CODES

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

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	742	hrs
STANDARD DEVIATION:	92		AMD OPERATION UPTIME:	99.7	%
			MONTHLY AVERAGE:	84 (E)	

WIND DIRECTION Hourly Averages (WD)



STANDARD DEVIATION WIND DIRECTION

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	23	23	22	23	22	25	22	23	24	26	26	26	21	22	26	23	25	22	19	19	17	22	25	29	24
2	19	27	32	26	33	24	30	19	21	29	43	39	45	50	30	27	29	21	19	26	35	31	29	23	24
3	21	21	20	17	17	20	18	17	70	34	30	35	34	33	30	24	20	26	40	60	25	19	12	12	24
4	12	16	13	18	16	15	15	14	16	17	18	17	17	17	16	18	15	17	16	22	18	13	16	17	24
5	20	18	16	26	24	26	26	15	16	21	32	35	36	49	37	38	29	23	15	14	19	23	36	21	24
6	12	17	19	15	15	13	17	19	21	16	20	21	22	24	26	28	33	27	26	27	27	27	27	31	24
7	29	30	34	33	35	33	33	36	30	28	29	31	32	33	33	30	24	25	19	15	19	18	28	30	24
8	18	11	16	12	26	25	29	16	18	33	33	26	64	55	31	29	28	29	24	18	24	13	21	16	24
9	36	31	32	50	64	46	65	55	24	26	40	71	60	63	40	31	22	18	15	33	34	38	42	66	24
10	43	27	21	24	25	22	17	16	19	32	34	31	29	29	34	32	27	20	25	21	23	22	28	18	24
11	26	16	13	21	24	25	32	X	X	31	28	38	35	38	36	31	29	27	23	27	27	24	26	25	22
12	26	22	20	22	18	19	23	21	33	33	35	35	40	41	40	38	29	27	20	22	20	23	25	24	24
13	25	24	25	25	27	27	24	26	24	29	28	29	30	29	27	30	25	23	22	23	26	23	36	38	24
14	35	26	26	27	24	26	26	24	21	21	23	37	34	32	31	33	30	25	23	31	33	32	32	30	24
15	30	25	26	25	23	20	28	33	71	34	30	43	50	41	39	39	17	40	40	34	23	19	29	49	24
16	29	27	37	56	32	24	19	29	38	28	27	23	23	36	37	28	24	22	22	21	20	24	23	35	24
17	23	26	31	41	26	28	34	36	36	30	34	33	29	25	23	26	27	22	22	21	21	22	20	23	24
18	28	31	29	29	30	27	29	28	29	31	30	31	28	29	30	30	28	26	22	19	24	27	31	36	24
19	30	25	35	27	28	27	29	27	26	28	34	30	30	32	33	36	30	29	32	28	27	30	39	34	24
20	32	37	38	39	38	38	36	37	38	38	37	43	56	50	52	51	46	36	40	49	15	11	45	53	24
21	29	36	29	19	49	20	13	16	31	26	31	32	38	28	26	29	31	30	28	28	27	31	30	31	24
22	30	30	28	29	28	30	28	26	29	28	29	27	26	26	29	26	19	45	32	37	30	27	28	29	24
23	30	27	41	38	45	44	46	46	24	31	48	58	52	59	68	52	32	31	24	29	17	38	35	18	24
24	17	21	12	14	18	18	19	28	37	26	27	33	30	34	28	28	25	27	34	28	28	27	24	26	24
25	25	29	25	23	19	18	27	31	28	37	40	37	36	45	66	61	18	16	15	17	40	35	51	52	24
26	30	24	41	44	28	24	40	26	20	23	25	28	29	23	24	25	28	20	18	17	60	30	13	38	24
27	21	18	16	8	28	26	24	16	27	36	31	27	39	29	30	31	27	28	31	27	22	25	25	26	24
28	26	28	24	28	25	25	22	27	29	29	34	33	32	34	29	32	27	19	20	21	25	28	32	41	24
29	63	32	41	53	47	39	52	36	28	39	24	45	42	30	30	39	28	23	19	17	28	30	28	29	24
30	30	29	29	27	27	26	26	26	26	30	24	22	33	37	48	37	34	29	21	51	71	34	22	28	24
31	25	31	24	31	29	58	35	50	27	26	20	20	21	20	22	20	20	21	17	19	22	22	19	17	24

STATUS FLAG CODES

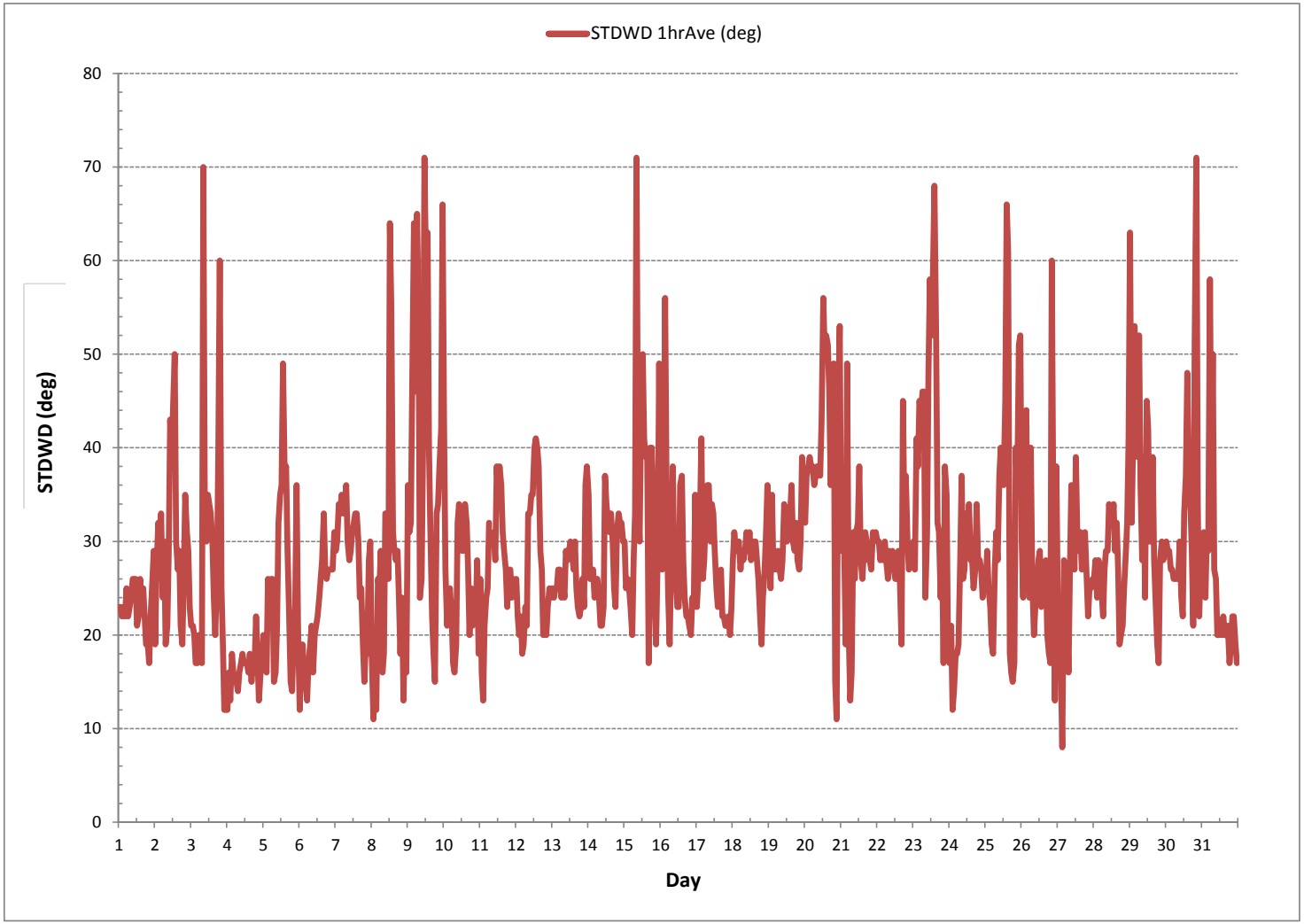
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION: March 30, 2016

CALIBRATION TIME: 0 hrs

OPERATIONAL TIME: 742 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



RELATIVE HUMIDITY

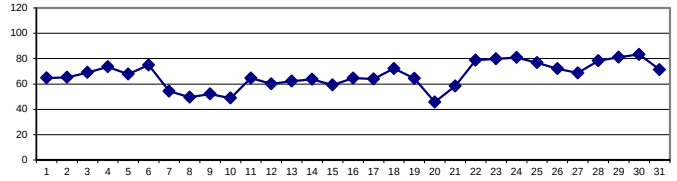
RELATIVE HUMIDITY Hourly Averages (RH %)

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	71	70	70	70	70	70	70	69	66	63	59	56	54	53	51	54	58	62	66	70	71	70	71	71	51	71	65	24
2	71	73	72	72	73	73	73	72	69	64	56	52	48	46	45	48	53	62	69	71	72	75	77	79	45	79	65	24
3	80	81	81	81	82	82	83	83	80	72	63	53	48	44	42	44	49	58	72	78	72	74	75	78	42	83	69	24
4	82	81	78	77	76	72	69	69	72	73	71	72	72	71	**C**	**C**	74	73	72	73	73	73	73	72	69	82	74	24
5	72	71	71	71	71	71	71	71	71	68	64	61	59	57	57	56	61	65	68	70	73	77	76	75	56	77	68	24
6	74	73	73	73	73	72	72	76	77	76	76	76	76	76	76	76	76	77	76	76	75	75	74	74	72	77	75	24
7	74	73	72	70	70	67	65	62	55	50	45	40	37	36	36	38	41	44	50	54	53	54	57	60	36	74	54	24
8	62	62	62	58	61	64	60	55	48	41	38	37	33	35	36	38	39	41	45	48	54	55	56	62	33	64	50	24
9	65	68	67	67	67	65	63	63	61	48	37	29	26	26	26	30	36	41	49	57	62	65	66	65	26	68	52	24
10	64	64	64	63	64	63	61	59	53	43	33	32	28	26	30	33	36	39	44	48	52	55	57	62	26	64	49	24
11	67	71	73	72	71	69	65	**X**	**X**	59	55	54	52	51	56	57	59	64	69	69	70	72	73	74	51	74	65	22
12	74	73	73	73	73	72	72	71	65	57	52	46	42	41	40	41	46	51	59	63	63	62	65	67	40	74	60	24
13	70	71	73	72	72	72	72	71	68	63	59	50	44	40	43	48	51	56	60	64	66	68	69	71	40	73	62	24
14	72	74	76	78	80	81	81	79	69	61	54	45	44	44	41	44	48	53	61	64	67	69	70	71	41	81	64	24
15	73	77	79	81	83	86	87	86	75	69	61	50	38	30	24	32	48	53	55	42	39	40	47	66	24	87	59	24
16	86	80	75	74	78	81	83	84	77	72	68	72	62	52	50	50	50	47	48	49	50	51	55	57	47	86	65	24
17	57	57	57	63	64	66	68	63	60	59	57	57	53	53	53	51	56	67	73	76	79	81	82	83	51	83	64	24
18	84	85	86	85	84	83	82	80	74	67	65	61	57	53	53	55	59	65	69	72	72	73	80	87	53	87	72	24
19	90	90	87	86	80	78	78	71	66	61	54	53	52	49	46	57	49	53	55	56	62	62	58	53	46	90	64	24
20	50	50	51	51	53	54	55	56	54	49	43	35	30	27	23	**22**	23	28	37	47	53	63	70	72	**22**	72	46	24
21	74	75	75	76	76	76	75	68	56	45	43	41	39	38	41	43	50	54	56	58	57	59	61	63	38	76	58	24
22	64	65	67	70	74	76	77	77	73	71	73	80	83	85	85	84	84	84	85	86	87	87	87	87	64	87	79	24
23	86	86	85	85	86	86	86	85	80	77	74	71	68	68	68	70	76	78	81	83	83	84	84	84	68	86	80	24
24	83	83	84	87	87	87	87	86	85	82	78	75	75	72	73	75	77	79	80	80	79	80	82	82	72	87	81	24
25	83	83	84	84	84	84	85	83	78	72	70	67	64	60	56	58	65	67	74	84	88	89	89	89	56	89	77	24
26	89	86	82	84	87	87	87	85	79	72	61	56	53	49	47	49	48	53	62	73	81	85	86	86	47	89	72	24
27	85	88	87	87	88	88	87	84	76	61	54	52	50	51	51	51	53	54	56	59	62	68	77	79	50	88	69	24
28	80	81	81	81	82	83	84	83	82	81	76	73	71	68	67	66	64	72	77	82	83	87	88	88	64	88	78	24
29	88	88	88	88	90	90	**91**	90	89	85	81	77	72	68	64	59	60	64	73	83	87	89	90	90	59	**91**	81	24
30	91	91	91	91	91	91	90	90	90	90	89	87	82	76	65	61	61	65	73	82	87	88	88	89	61	91	**83**	24
31	89	89	89	89	88	88	88	86	80	72	65	58	54	52	51	49	51	59	69	71	68	67	67	70	49	89	71	24
HOURLY MAX	91	91	91	91	91	91	91	90	90	90	89	87	83	85	85	84	84	84	85	86	88	89	90	90				
HOURLY AVG	76	76	76	76	77	77	76	75	71	65	60	57	54	52	50	51	55	59	64	67	69	71	73	74				

STATUS FLAG CODES

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

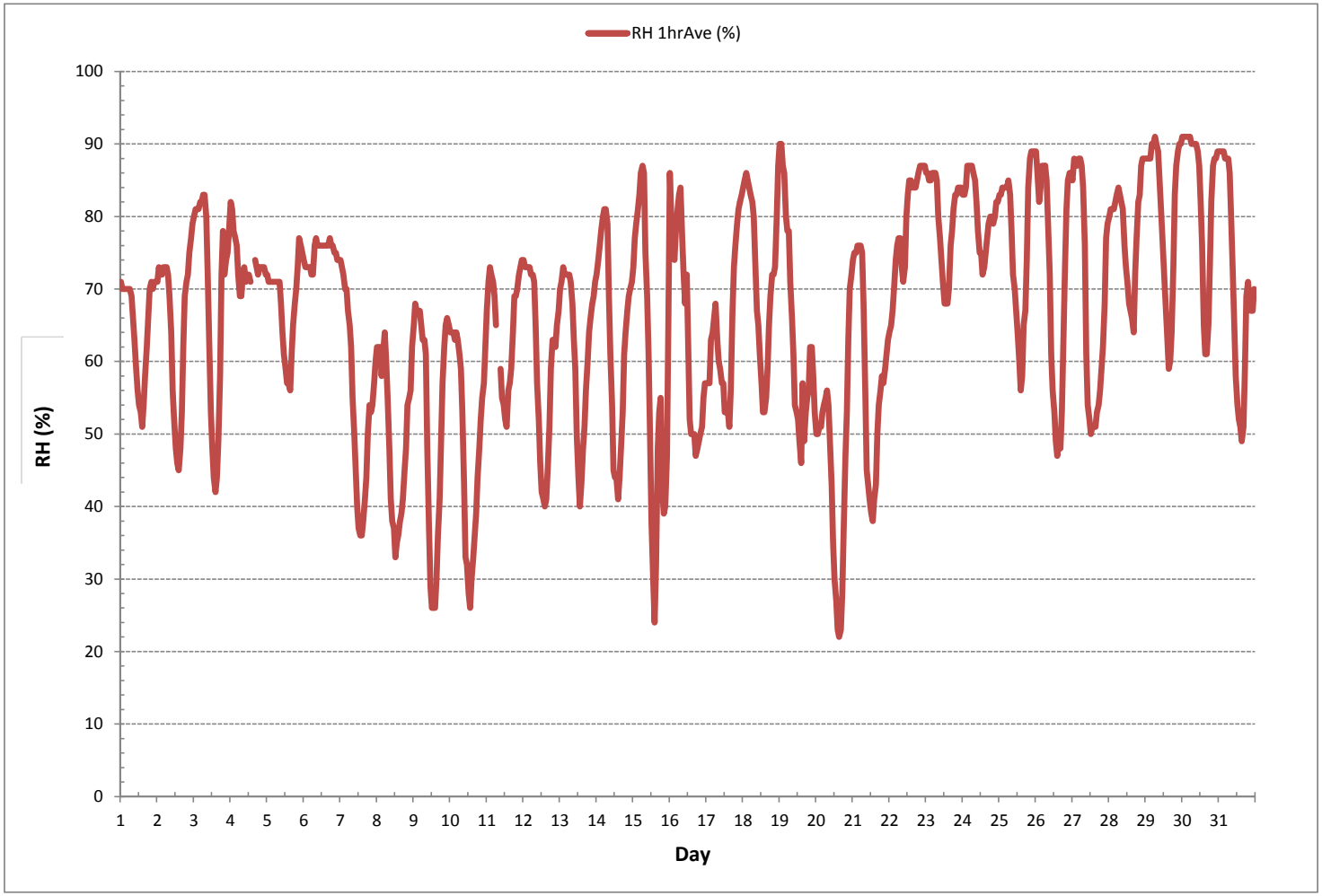
24 HR AVERAGES March 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	22	%	@ HOUR(S)	15	ON DAY(S)	20	
MAXIMUM 1-HR AVERAGE:	91	%	@ HOUR(S)	6	ON DAY(S)	29	
MAXIMUM 24-HR AVERAGE:	83	%			ON DAY(S)	30	
					VAR-VARIOUS		
			OPERATIONAL TIME:			742	hrs
			AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	15		MONTHLY AVERAGE:			67	%

RELATIVE HUMIDITY Hourly Averages (RH %)



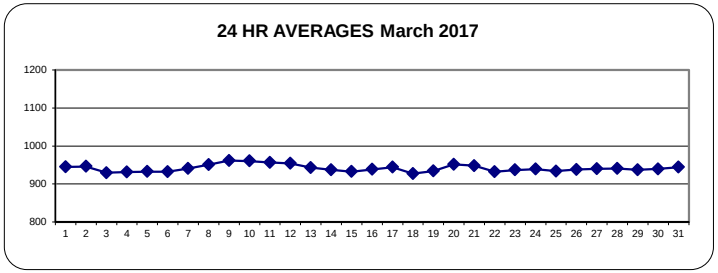
BAROMETRIC PRESSURE

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	939	939	940	940	940	940	941	942	942	943	944	945	945	946	947	947	948	949	950	951	951	951	952	952	939	952	945	24
2	952	952	952	951	951	951	951	951	950	949	949	948	947	946	946	945	944	942	941	940	939	938	937	936	936	952	946	24
3	935	935	934	933	932	932	931	930	930	930	930	930	929	928	928	928	927	927	927	927	927	927	927	927	927	935	930	24
4	927	927	928	929	928	929	930	930	931	931	931	931	932	932	933	933	933	934	935	934	935	935	935	935	927	935	932	24
5	935	935	934	935	934	934	934	934	933	933	933	933	932	932	931	931	931	931	931	932	931	931	931	931	931	935	933	24
6	931	931	931	931	931	931	932	932	932	932	932	932	932	931	932	932	933	933	933	933	933	934	934	934	931	934	932	24
7	934	934	935	935	936	937	937	938	939	939	940	941	942	943	944	944	945	945	946	946	946	946	947	948	934	948	941	24
8	948	948	948	948	949	950	950	950	950	951	951	951	951	950	951	951	951	951	952	953	954	955	955	956	948	956	951	24
9	957	958	959	960	961	962	**963**	963	962	962	962	963	963	962	962	962	962	962	962	963	963	963	963	963	957	**963**	**962**	24
10	963	963	962	962	962	961	961	961	961	960	960	960	959	959	959	959	959	960	960	960	960	960	960	960	959	963	960	24
11	960	960	960	960	960	959	959	**X**	**X**	959	959	958	958	957	956	956	955	955	954	953	953	953	953	953	953	960	957	22
12	953	953	953	953	953	954	954	955	955	956	956	956	957	957	956	956	956	955	955	954	953	953	952	952	952	957	954	24
13	951	950	949	948	948	947	945	945	944	944	943	942	942	941	941	940	939	939	939	939	939	939	939	939	939	951	943	24
14	939	939	938	938	938	939	939	939	939	939	940	940	940	939	939	938	937	936	936	935	935	934	933	932	932	940	938	24
15	932	932	931	931	931	931	930	931	932	932	933	934	934	934	934	934	933	933	933	933	934	934	934	934	930	934	933	24
16	934	934	933	933	934	934	935	935	936	937	937	938	939	939	940	941	941	942	942	943	944	944	944	945	933	945	939	24
17	945	946	946	946	946	947	946	946	946	946	946	946	946	945	945	944	944	943	942	942	941	941	940	939	939	947	944	24
18	938	937	936	935	934	933	932	931	930	930	929	927	927	926	925	924	922	921	920	919	917	**916**	917	918	**916**	938	927	24
19	919	922	924	926	928	930	932	933	934	935	936	937	937	937	938	938	939	939	939	939	940	940	941	942	919	942	934	24
20	944	945	946	947	948	949	950	951	952	953	954	954	954	954	954	954	954	954	953	954	954	954	954	954	944	954	952	24
21	954	954	954	953	953	953	952	952	952	951	951	950	949	948	947	946	945	944	943	943	942	941	941	940	940	954	948	24
22	939	938	937	936	935	935	934	933	933	932	932	931	930	930	930	930	930	930	930	930	930	930	931	931	930	939	932	24
23	932	932	933	933	933	934	934	934	935	936	936	937	937	938	938	939	939	939	940	940	941	941	942	942	932	942	937	24
24	942	942	942	942	942	942	942	942	942	942	941	942	941	940	939	938	937	936	936	936	935	934	934	933	933	942	939	24
25	932	932	932	932	932	932	932	932	933	933	934	934	934	935	935	935	935	935	935	935	935	935	936	936	932	936	934	24
26	936	936	937	937	937	937	937	937	938	938	939	939	939	939	939	939	938	938	938	938	938	938	938	938	936	939	938	24
27	938	938	938	938	938	939	939	939	939	940	940	941	941	941	941	941	942	942	941	942	942	942	942	942	938	942	940	24
28	942	942	942	941	941	941	941	941	941	941	941	941	941	941	940	940	940	940	939	939	939	939	939	939	939	942	941	24
29	939	939	938	938	938	938	938	938	938	938	938	938	938	937	937	937	936	936	935	935	935	935	935	935	935	939	937	24
30	935	935	935	935	935	935	936	936	937	938	938	939	940	940	941	942	943	943	943	944	944	945	945	946	935	946	940	24
31	946	946	947	946	946	947	947	947	947	947	947	947	947	946	945	944	942	942	941	940	939	939	938	937	937	947	944	24
HOURLY MAX	963	963	962	962	962	962	963	963	962	962	962	963	963	962	962	962	962	962	962	963	963	963	963	963				
HOURLY AVG	941	941	941	941	941	941	941	941	941	942	942	942	942	942	942	942	941	941	941	941	941	941	941	941				

STATUS FLAG CODES

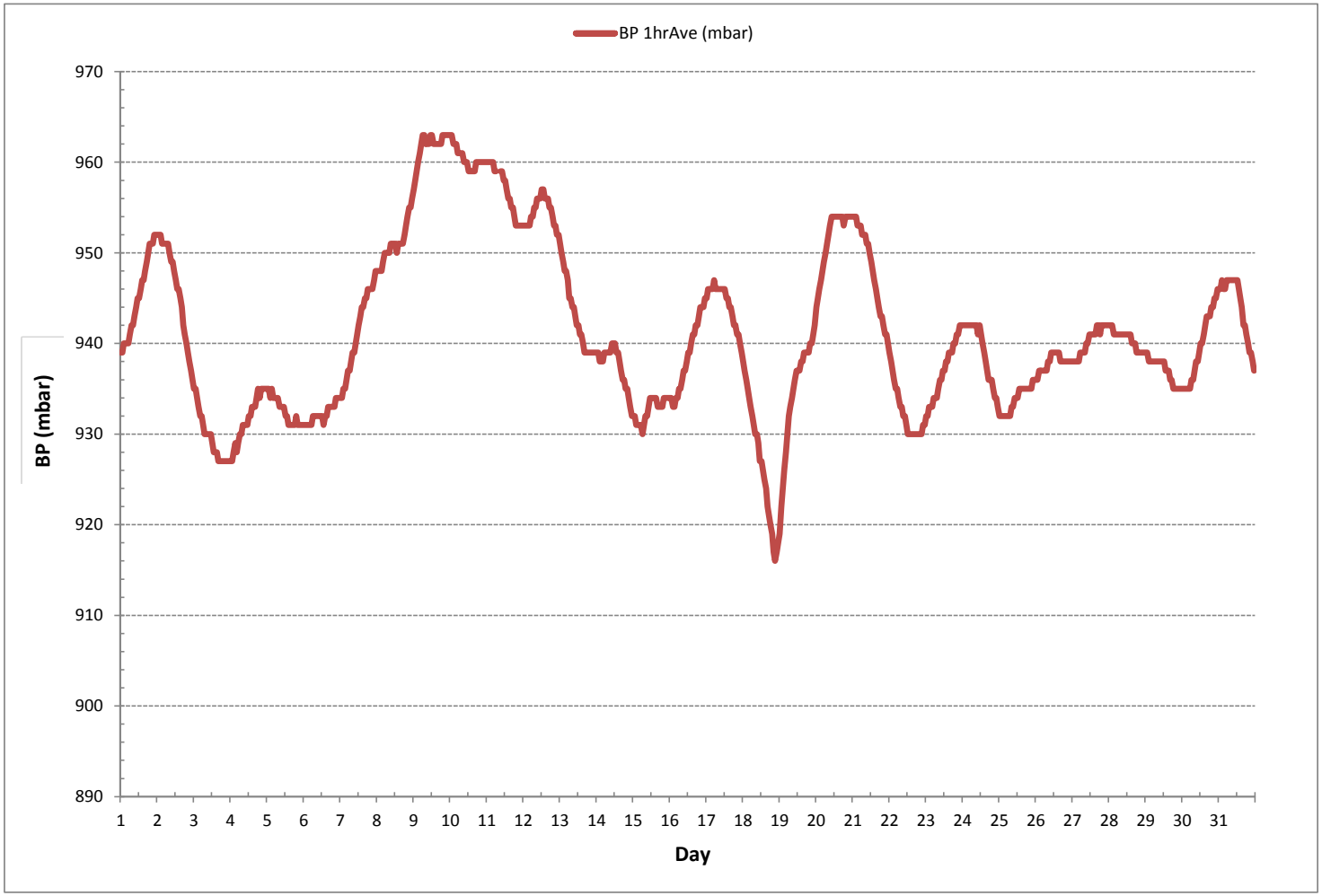
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	916	mbar	@ HOUR(S)	21	ON DAY(S)	18	
MAXIMUM 1-HR AVERAGE:	963	mbar	@ HOUR(S)	6	ON DAY(S)	9	
MAXIMUM 24-HR AVERAGE:	962	mbar			ON DAY(S)	9	
					VAR-VARIOUS		
			OPERATIONAL TIME:			742	hrs
			AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	9		MONTHLY AVERAGE:			941	mbar

BAROMETRIC PRESSURE Hourly Averages (BP mbar)



AMBIENT TEMPERATURE

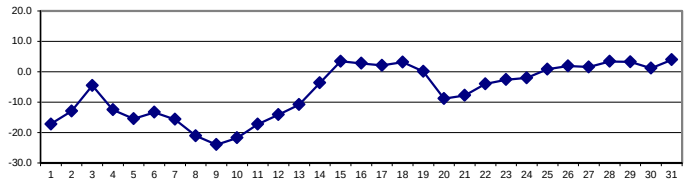
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

HR START (MST) / HR END (MST)	0:00 / 0:59	1:00 / 1:59	2:00 / 2:59	3:00 / 3:59	4:00 / 4:59	5:00 / 5:59	6:00 / 6:59	7:00 / 7:59	8:00 / 8:59	9:00 / 9:59	10:00 / 10:59	11:00 / 11:59	12:00 / 12:59	13:00 / 13:59	14:00 / 14:59	15:00 / 15:59	16:00 / 16:59	17:00 / 17:59	18:00 / 18:59	19:00 / 19:59	20:00 / 20:59	21:00 / 21:59	22:00 / 22:59	23:00 / 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	-19.0	-18.9	-18.7	-18.3	-18.5	-19.0	-19.3	-19.3	-19.0	-18.1	-16.8	-15.5	-14.6	-13.5	-12.4	-12.8	-13.7	-15.4	-17.0	-18.9	-19.4	-18.5	-18.3	-17.7	-19.4	-12.4	-17.2	24
2	-17.4	-17.6	-17.5	-18.1	-18.7	-20.9	-23.2	-23.9	-19.6	-15.1	-11.3	-9.4	-7.2	-5.5	-4.7	-5.2	-6.4	-9.1	-10.6	-9.6	-9.0	-9.3	-9.8	-11.4	-23.9	-4.7	-12.9	24
3	-13.2	-12.7	-11.0	-11.3	-11.6	-11.2	-11.2	-11.1	-9.9	-5.1	-2.3	0.8	2.9	5.0	6.0	5.0	3.1	0.5	-3.5	-5.0	-3.1	-3.2	-2.7	-3.6	-13.2	6.0	-4.5	24
4	-4.0	-2.7	-3.2	-5.2	-7.3	-10.0	-11.8	-13.1	-14.3	-14.7	-14.2	-14.1	-14.4	-14.3	-14.4	-14.2	-14.2	-15.3	-15.9	-16.1	-16.4	-16.8	-16.8	-17.2	-17.2	-2.7	-12.5	24
5	-17.5	-17.9	-18.1	-18.0	-18.1	-18.2	-18.1	-18.1	-17.5	-15.8	-14.5	-12.8	-12.0	-10.4	C	C	-11.7	-12.4	-13.1	-13.6	-14.9	-17.3	-15.4	-14.4	-18.2	-10.4	-15.4	24
6	-14.2	-14.3	-14.3	-14.4	-14.3	-14.1	-13.9	-13.6	-13.0	-12.7	-12.5	-12.2	-11.9	-11.4	-10.9	-10.7	-11.4	-12.6	-13.3	-14.1	-14.5	-14.8	-15.2	-15.4	-15.4	-10.7	-13.3	24
7	-15.9	-16.6	-17.2	-17.3	-17.1	-17.3	-17.5	-17.6	-17.0	-15.3	-13.6	-11.5	-10.4	-10.0	-10.3	-10.8	-11.4	-12.6	-15.1	-17.0	-18.4	-20.1	-21.9	-23.3	-23.3	-10.0	-15.6	24
8	-25.0	-25.1	-25.7	-24.9	-26.3	-27.6	-26.2	-25.3	-23.6	-20.9	-18.7	-17.6	-14.4	-13.8	-14.5	-14.3	-14.5	-16.2	-18.4	-19.9	-21.9	-22.2	-23.1	-25.5	-27.6	-13.8	-21.1	24
9	-27.2	-27.8	-28.8	-30.5	-31.4	-32.6	**-33.4**	-32.8	-26.2	-21.6	-18.2	-14.4	-13.2	-12.7	-12.7	-13.5	-15.8	-18.2	-21.7	-25.0	-27.2	-29.2	-30.0	-31.0	**-33.4**	-12.7	-24.0	24
10	-31.1	-31.3	-29.5	-29.6	-29.8	-29.1	-28.4	-27.7	-24.7	-19.6	-16.0	-15.8	-14.9	-14.4	-14.8	-15.7	-17.1	-17.9	-18.1	-18.6	-19.1	-19.4	-19.3	-19.6	-31.3	-14.4	-21.7	24
11	-20.2	-21.9	-23.2	-23.1	-22.3	-20.8	-19.1	X	X	-17.5	-15.8	-14.5	-13.1	-12.8	-13.6	-13.4	-13.9	-15.2	-16.6	-16.4	-16.2	-16.5	-16.4	-16.2	-23.2	-12.8	-17.2	22
12	-16.4	-17.2	-18.3	-18.6	-18.7	-19.3	-19.6	-19.3	-16.5	-13.7	-11.9	-9.9	-8.6	-7.8	-7.5	-7.5	-9.6	-11.2	-13.8	-15.1	-14.4	-13.8	-14.3	-15.1	-19.6	-7.5	-14.1	24
13	-15.8	-16.2	-16.6	-16.4	-16.0	-15.8	-15.6	-15.0	-13.5	-12.0	-10.5	-7.3	-4.9	-3.1	-3.8	-5.4	-6.2	-7.3	-8.4	-9.3	-9.6	-10.1	-10.1	-10.0	-16.6	-3.1	-10.8	24
14	-10.4	-10.8	-11.0	-11.4	-12.1	-12.4	-12.4	-10.9	-8.0	-5.4	-2.7	0.8	2.4	3.0	4.8	4.5	3.5	1.9	0.5	-0.2	-0.5	-0.5	-0.4	-0.4	-12.4	4.8	-3.7	24
15	-0.7	-1.8	-2.2	-2.6	-3.3	-4.3	-5.5	-4.1	-0.1	1.4	4.4	8.3	12.4	13.8	**14.4**	12.2	7.5	6.3	4.1	5.0	4.6	4.4	4.5	3.9	-5.5	**14.4**	3.4	24
16	2.3	2.6	2.8	2.3	1.1	0.2	1.2	1.4	3.6	4.5	5.1	3.7	5.3	6.1	6.3	5.6	4.8	3.7	2.5	1.6	1.0	0.3	-0.6	-0.9	-0.9	6.3	2.8	24
17	-1.1	-1.0	-1.0	-1.3	-1.4	-1.5	-1.5	-1.0	-0.1	1.1	3.5	6.2	7.6	7.9	7.1	7.4	5.8	3.8	2.5	1.7	1.8	1.5	1.2	0.9	-1.5	7.9	2.1	24
18	0.4	-0.3	-0.8	-0.5	-0.4	-0.1	-0.2	0.0	1.5	3.3	4.2	5.4	7.0	8.4	8.7	8.3	7.0	5.1	3.7	3.0	3.4	3.5	3.1	1.2	-0.8	8.7	3.1	24
19	0.6	0.9	0.8	0.3	-0.6	-1.4	-2.2	-1.9	-0.9	0.3	2.5	3.0	2.6	2.8	3.9	3.0	2.5	1.0	-0.2	-1.1	-2.3	-2.5	-3.7	-4.7	-4.7	3.9	0.1	24
20	-7.2	-9.1	-10.2	-11.2	-11.7	-12.1	-12.6	-12.1	-10.9	-9.5	-7.5	-5.3	-4.0	-3.1	-2.3	-2.2	-2.8	-4.8	-7.3	-10.3	-11.9	-13.8	-14.8	-16.0	-16.0	-2.2	-8.9	24
21	-16.9	-17.9	-18.5	-19.5	-19.6	-19.8	-18.7	-15.2	-9.6	-5.6	-3.4	-1.1	-0.1	0.6	0.1	0.0	-1.3	-2.1	-2.6	-2.8	-2.9	-3.0	-3.1	-3.2	-19.8	0.6	-7.8	24
22	-3.2	-3.5	-3.6	-3.9	-4.5	-5.1	-5.4	-5.1	-4.2	-3.5	-3.3	-3.7	-4.3	-4.1	-4.0	-3.7	-3.6	-3.4	-3.9	-4.0	-4.0	-3.9	-4.2	-4.4	-5.4	-3.2	-4.0	24
23	-4.0	-4.0	-4.0	-4.1	-5.5	-7.0	-6.9	-5.2	-3.5	-2.5	-1.4	-0.5	0.5	0.6	0.8	0.7	-0.4	-1.0	-1.8	-2.4	-2.6	-3.0	-2.8	-2.7	-7.0	0.8	-2.6	24
24	-2.5	-2.6	-3.4	-4.8	-4.6	-5.8	-7.5	-5.8	-4.8	-3.6	-3.0	-1.9	-1.5	0.3	1.1	1.2	1.3	1.0	0.6	0.3	0.2	-0.4	-1.3	-1.7	-7.5	1.3	-2.1	24
25	-2.0	-2.0	-1.9	-1.7	-1.7	-1.6	-1.7	-1.1	0.4	2.3	3.4	4.4	5.4	6.9	8.2	7.4	5.1	4.3	2.0	-1.4	-2.6	-3.3	-4.2	-4.0	-4.2	8.2	0.9	24
26	-2.8	-1.3	-0.5	-1.3	-2.6	-2.4	-2.3	-1.0	0.8	2.9	6.0	7.3	8.2	8.5	8.9	8.6	8.7	7.0	4.3	1.0	-1.1	-2.7	-3.7	-3.9	-3.9	8.9	1.9	24
27	-4.4	-5.0	-5.5	-4.5	-4.0	-2.7	-3.1	-1.9	0.4	3.6	4.7	5.2	6.5	6.5	6.6	6.6	5.7	5.2	4.1	3.3	2.8	2.6	2.4	2.2	-5.5	6.6	1.6	24
28	2.0	1.9	1.6	1.3	1.2	1.1	1.2	1.7	2.1	2.5	4.0	5.0	5.6	6.4	7.0	7.3	7.7	5.7	4.0	2.5	3.2	2.5	2.2	2.1	1.1	7.7	3.4	24
29	1.7	1.8	1.6	1.4	1.4	1.3	1.7	2.0	2.3	3.2	3.7	4.7	5.6	6.6	7.6	8.5	8.2	7.0	4.5	1.7	0.7	0.3	0.7	0.3	0.3	8.5	3.3	24
30	0.1	-0.3	-0.5	-0.6	-0.7	-1.3	-1.3	-1.0	-0.6	-0.1	0.5	1.4	2.5	3.9	6.8	7.7	7.6	6.2	3.5	0.8	-0.6	-1.5	-1.7	-2.7	-2.7	7.7	1.2	24
31	-3.1	-3.6	-3.3	-3.5	-4.4	-4.9	-4.1	-0.3	2.6	5.1	7.4	9.3	10.5	10.7	10.5	10.1	9.3	9.1	6.7	6.3	6.8	6.3	6.0	5.0	-4.9	10.7	**3.9**	24
HOURLY MAX	2.3	2.6	2.8	2.3	1.4	1.3	1.7	2.0	3.6	5.1	7.4	9.3	12.4	13.8	14.4	12.2	9.3	9.1	6.7	6.3	6.8	6.3	6.0	5.0				
HOURLY AVG	-9.3	-9.6	-9.7	-10.0	-10.4	-10.8	-10.9	-9.9	-8.1	-6.5	-4.8	-3.3	-2.1	-1.3	-0.6	-0.8	-2.1	-3.4	-5.1	-6.2	-6.7	-7.2	-7.5	-8.0				

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

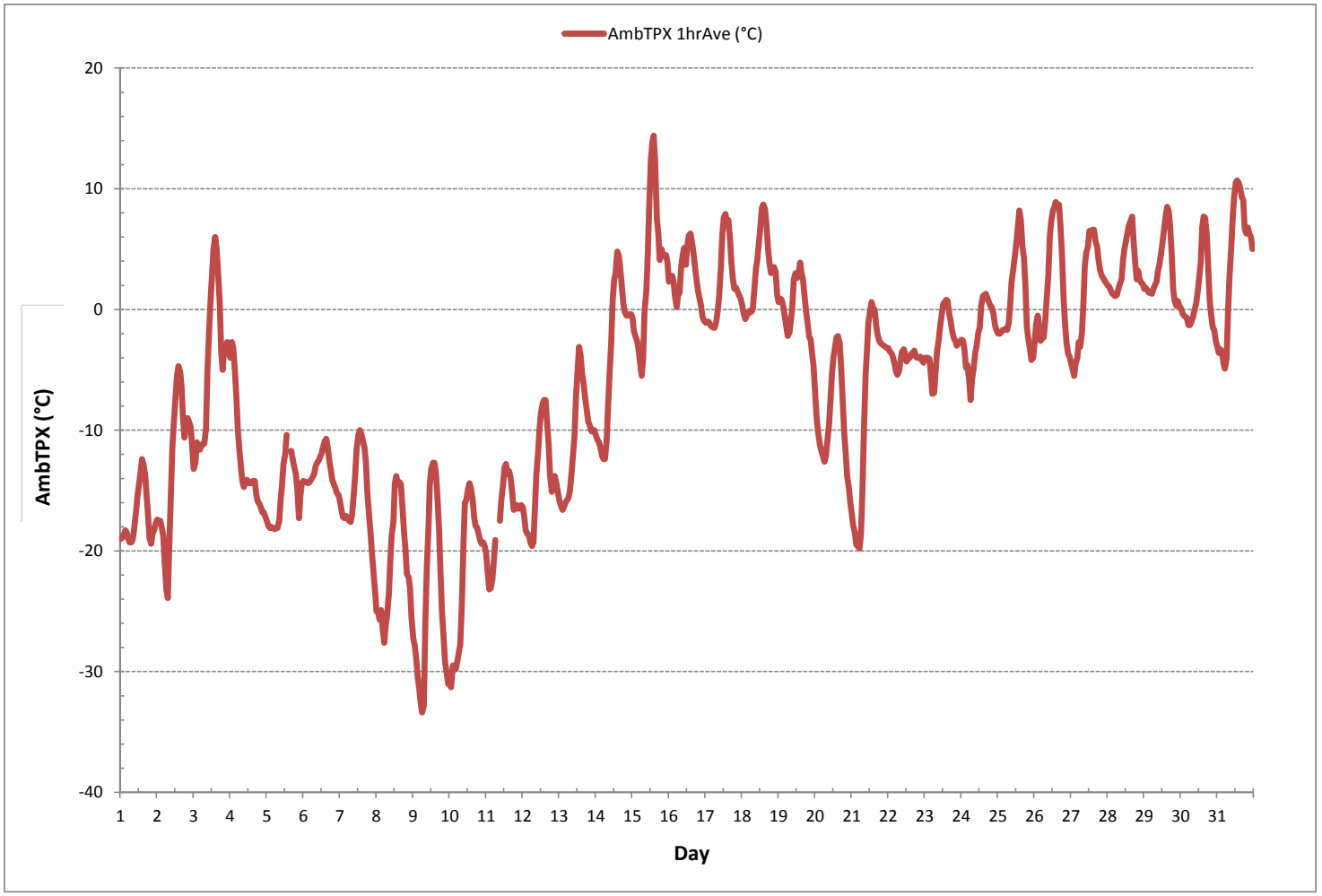
24 HR AVERAGES March 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-33.4	°C	@ HOUR(S)	6	ON DAY(S)	9	
MAXIMUM 1-HR AVERAGE:	14.4	°C	@ HOUR(S)	14	ON DAY(S)	15	
MAXIMUM 24-HR AVERAGE:	3.9	°C			ON DAY(S)	31	
					VAR-VARIOUS		
			OPERATIONAL TIME:			742	hrs
			AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	9.7		MONTHLY AVERAGE:			-6.5	°C

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



PRECIPITATION

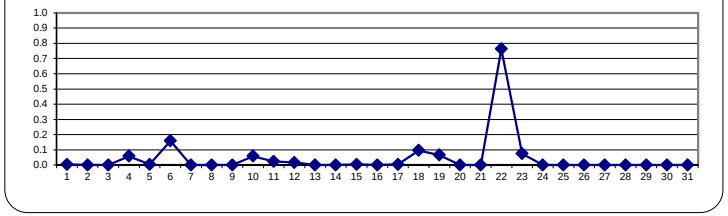
PRECIPITATION Hourly Averages (mm)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.0	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	24
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.1	0.2	0.1	0.0	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	24
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24
6	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.3	0.5	0.6	0.6	0.5	0.3	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	24
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.7	0.1	0.0	0.0	0.0	0.7	0.1	24
11	0.0	0.0	0.0	0.0	0.1	0.0	0.0	X	X	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	22
12	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	24
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	0.1	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	0.0	0.0	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	0.1	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	0.1	0.0	24
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	2.3	0.1	24
19	0.5	0.6	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.1	24
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	1.8	2.3	**2.8**	2.8	1.2	1.5	1.5	0.8	1.1	0.7	0.3	0.2	0.0	**2.8**	**0.8**	24
23	0.8	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	0.1	24
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	24
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
HOURLY MAX	0.8	1.0	0.3	0.2	0.1	0.0	0.0	0.4	0.3	0.5	0.6	1.0	1.8	2.3	2.8	2.8	1.2	1.5	1.5	0.8	1.1	0.7	0.3	2.3				
HOURLY AVG	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.1	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

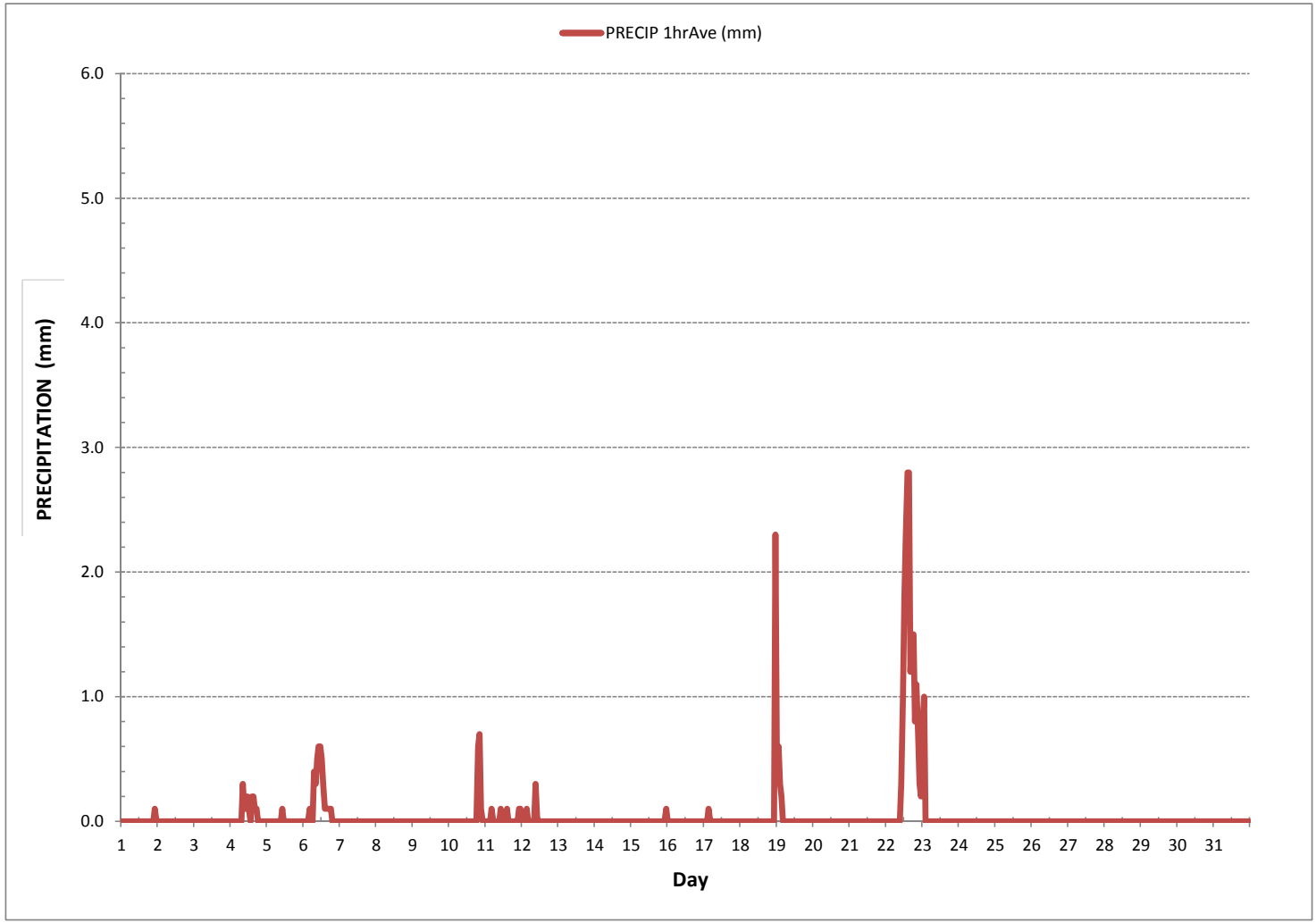
24 HR AVERAGES March 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:		0.0	mm	@ HOUR(S)	0	ON DAY(S)	1
MAXIMUM 1-HR AVERAGE:		2.8	mm	@ HOUR(S)	14	ON DAY(S)	22
MAXIMUM 24-HR AVERAGE:		0.8	mm			ON DAY(S)	22
MONTHLY TOTAL	31.9	mm				VAR-VARIOUS	
				OPERATIONAL TIME:		742	hrs
				AMD OPERATION UPTIME:		99.7	%
STANDARD DEVIATION:		0.2		MONTHLY AVERAGE:		0.0	mm

PRECIPITATION Hourly Averages (mm)



APPENDIX II
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE

API 100E Sulphur Dioxide Analyzer Calibration

Date:	March 5, 2017	**Barometric Pressure:**	0.920 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Maskwa	**Weather Conditions:**	Mainly cloudy with snow
Parameter:	Sulphur Dioxide	**Calibration Purpose:**	shut down
Start Time 24 hr. (mst):	9:22	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
End Time 24 hr. (mst):	13:38	**Cal Gas Expiry Date:**	July 18, 2019
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	n/a

Analyzer:

ID# or Serial Number:	508	**Range ppb:**	1000
Last Calibration Date:	February 14, 2017	**As Found C.F.:**	1.000
Previous C.F.:	1.000	**New C.F.:**	n/a

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

Standard Calibration Points for Ranges

Point	ppb
High	780
Mid	380
Low	190

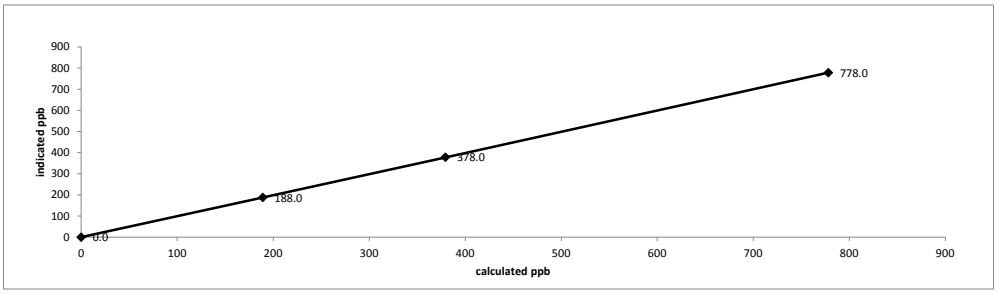
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

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	4923	76.90	5000	778.2	778.0	1.000
mid	4964	37.50	5002	379.4	378.0	1.004
low	4982	18.70	5001	189.2	188.0	1.006
					Average C.F.=	1.003

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.000**	**0.90-1.10**
b (Intercept as % of full scale)=	**0.07%**	**± 3% F.S.**
% change in C.F. from last cal=	**-0.03%**	**± 10%**

API 100E Sulphur Dioxide Analyzer Calibration



	As found:	As left:
SLOPE:	0.980	n/a
OFFSET:	126.3	n/a
HVPS:	479	n/a
RCELL TEMP:	50.0	n/a
BOX TEMP:	30.6	n/a
PMT TEMP:	7.7	n/a
IZS TEMP:	45.0	n/a
PRES:	24.5	n/a
SAMP FL:	616	n/a
NORM PMT:	126.9	n/a
UV LAMP:	2764.7	n/a
LAMP RATIO:	93.0	n/a
STR. LGT	61.9	n/a
DRK PMT:	10.1	n/a
DRK LMP:	-0.6	n/a
Expected Value:	365.0	n/a

Comments:

NOx and SO2 calibrations performed with same gas and calibration equipment. 'SO2 as-found high was extended while obtaining points for Nox.

Shutdown calibration completed for annual maintenance. Clean sample valve, Check reaction cell is clean. Move zero. Check charcoal inside analyzer. HVPS adiusted. Sample flow rate and pressure calibrated.

API 100E Sulphur Dioxide Analyzer Calibration

Date:	March 5, 2017	**Barometric Pressure:**	0.920 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Maskwa	**Weather Conditions:**	Mainly cloudy with snow
Parameter:	Sulphur Dioxide	**Calibration Purpose:**	post repair
Start Time 24 hr. (mst):	16:27	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
End Time 24 hr. (mst):	19:13	**Cal Gas Expiry Date:**	July 18, 2019
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	n/a

Analyzer:

ID# or Serial Number:	508	**Range ppb:**	1000
Last Calibration Date:	n/a	**As Found C.F.:**	n/a
Previous C.F.:	n/a	**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

Standard Calibration Points for Ranges

Point	ppb
High	780
Mid	380
Low	190

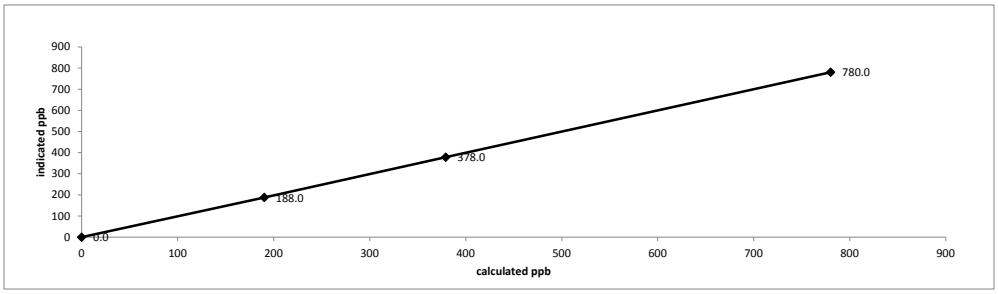
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	**Diluent**	**Cal Gas**	**Total**	**(ppb)**	**(ppb)**	
adjusted zero	5000	0.00	5000	0.0	0.0	n/a
adjusted high	4924	77.10	5001	780.1	780.0	1.000
mid	4965	37.50	5003	379.3	378.0	1.003
low	4982	18.80	5001	190.2	188.0	1.012
calibrator zero	5000	0.00	5000	0.0	0.0	n/a
					Average C.F.=	1.005

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**0.999**	**.95-1.05**
b (Intercept as % of full scale)=	**0.11%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**± 10%**

API 100E Sulphur Dioxide Analyzer Calibration



	As found:	As left:
SLOPE:	n/a	0.973
OFFSET:	n/a	127.2
HVPS:	n/a	483
RCELL TEMP:	n/a	50.0
BOX TEMP:	n/a	31.2
PMT TEMP:	n/a	7.7
IZS TEMP:	n/a	45.0
PRES:	n/a	24.5
SAMP FL:	n/a	579
NORM PMT:	n/a	127.4
UV LAMP:	n/a	2745.9
LAMP RATIO:	n/a	100.3
STR. LGT	n/a	61.9
DRK PMT:	n/a	11.3
DRK LMP:	n/a	-0.5
Expected Value:	n/a	346.0

Comments:

The analyzer sample inlet filter was changed.

Post-repair calibration completed after annual maintenance. Zero Air scrubber repositioned inside. Valves tested for leaks. Factory calibration completed.

SO2[ppb] Station: LICA MASKWA Daily: 2017/03/05 Type: AVG 1 Min. [1 Min.]

HYDROGEN SULPHIDE

API 101A Hydrogen Sulphide Analyzer Calibration

Date:	March 5, 2017	**Barometric Pressure:**	0.920 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Maskwa	**Weather Conditions:**	Mainly cloudy with snow
Parameter:	Hydrogen Sulphide	**Calibration Purpose:**	routine monthly
Start Time 24 hr. (mst):	11:12	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
End Time 24 hr. (mst):	15:58	**Cal Gas Expiry Date:**	June 14, 2019
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	n/a

Analyzer:

ID# or Serial Number:	324	**Range ppb:**	100
Last Calibration Date:	February 15, 2017	**As Found C.F.:**	1.014
Previous C.F.:	0.999	**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

Standard Calibration Points for Ranges

Point	ppb
High	**78**
Mid	**38**
Low	**19**

SO_2 Scrubber Check (10 mins.)

Start/End Time 24 hr.:	12:25 / 12:35
Target Concentration (ppb):	780
Result (ppb):	0
Zero Corrected Result (ppb):	**0**

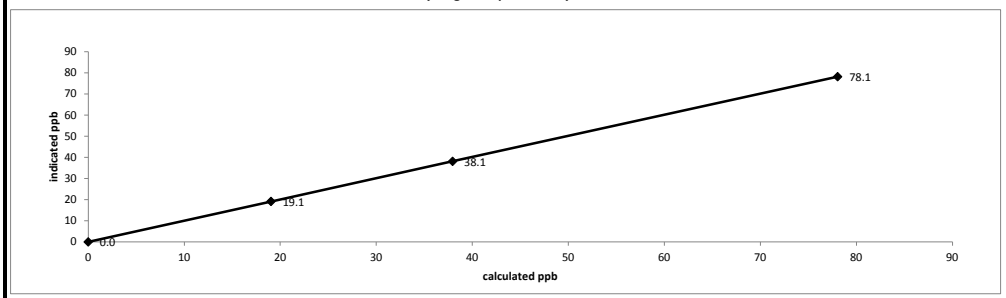
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

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	76.4	1.014
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	38.1	0.996
low	7485	14.00	7499	19.0	19.1	0.997
calibrator zero	7500	0.00	7500	0.0	0.0	n/a
					Average C.F.=	0.998

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.000**	**.95-1.05**
b (Intercept as % of full scale)=	**-0.05%**	**± 3% F.S.**
% change in C.F. from last cal=	**-1.48%**	**± 10%**

API 101A Hydrogen Sulphide Analyzer Calibration

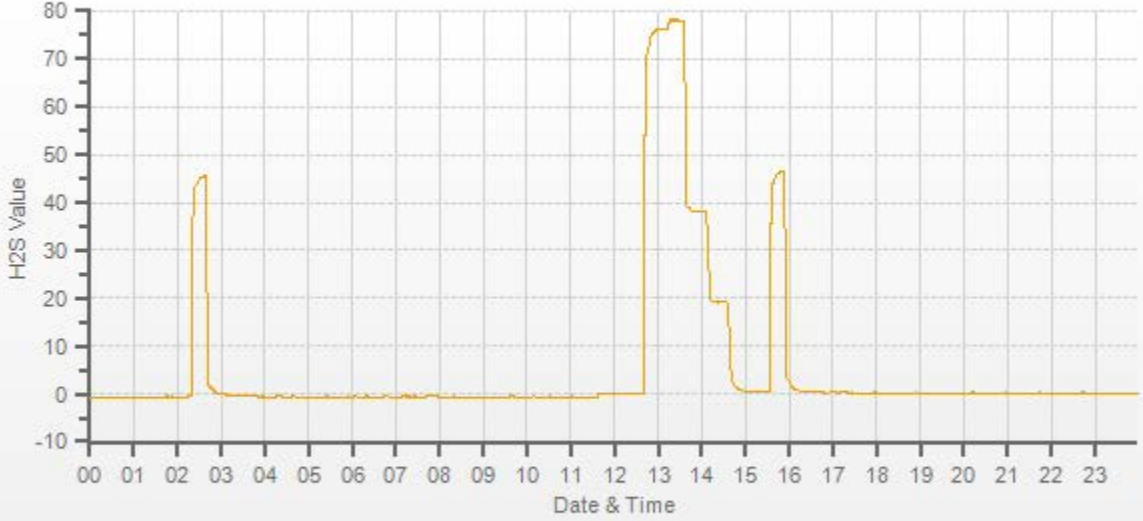


	As found:		**As left:**
SLOPE:	0.944	SLOPE:	0.953
OFFSET:	25.3	OFFSET:	34.0
HVPS:	676	HVPS:	677
DCPS:	2582	DCPS:	2578
RCELL TEMP:	50.1	RCELL TEMP:	50.6
BOX TEMP:	28.7	BOX TEMP:	30.1
PMT TEMP:	6.8	PMT TEMP:	6.8
IZS TEMP:	50.0	IZS TEMP:	50.1
Converter Temp:	324.2	Converter Temp:	324.0
PRES:	23.7	PRES:	23.7
SAMP FL:	566	SAMP FL:	566
UV LAMP:	3558.3	UV LAMP:	3843.5
LAMP RATIO:	109.0	LAMP RATIO:	108.9
STR. LGT	12.0	STR. LGT	11.4
DRK PMT:	51.3	DRK PMT:	36.0
Expected Value:	47.7	Expected Value:	46.6

Comments:

The analyzer sample inlet filter was changed.

H2S[ppb] Station: LICA MASKWA Daily: 2017/03/05 Type: AVG 1 Min. [1 Min.]



TOTAL HYDROCARBON

Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	March 5, 2017	**Barometric Pressure:**	0.920 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Maskwa	**Weather Conditions:**	Mainly cloudy with snow
Parameter:	Total Hydrocarbon	**Calibration Purpose:**	shut down
Start/End Time 24 hr. (mst):	9:22 / 11:14	**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:	February 15, 2017	**As Found C.F.:**	1.003
Previous Cal High Point C.F.:	1.000	**New C.F.:**	n/a

Calibrator:

Flow Meter ID's:	n/a	
Make & Model:	SABIO 2010 D	
Serial #:	11900613	
Cal Gas Cylinder I.D. # :	LL165372	
CH_4/C_3H_8 Cylinder Conc. (ppm):	606.0	212.0
CH_4 as propane/total CH_4 equivilants (ppm):	583.0	1189.0

Standard Calibration Points for a Range of: 50 ppm

Point	Target ppm
High	38
Mid	18
Low	9

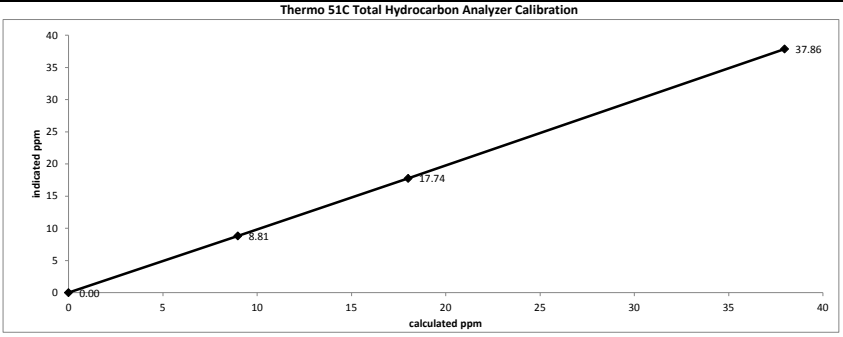
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	**Diluent**	**Cal Gas**	**Total**	**(ppm)**	**(ppm)**	
as found zero	1999	0.00	1999	0.0	0.00	n/a
as found high	1937	63.90	2001	37.97	37.86	1.003
mid	1970	30.30	2000	18.01	17.74	1.015
low	1985	15.10	2000	8.98	8.81	1.019
					Average C.F.=	1.012

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.002**	**.95-1.05**
b (Intercept as % of full scale)=	**0.21%**	**± 3% F.S.**
% change in C.F. from last cal=	**-0.29%**	**± 10%**

Thermo 51C Total Hydrocarbon Analyzer Calibration



As found:		As left:	
H2 cylinder (psi):	800	H2 cylinder (psi):	n/a
H2 cylinder reg set (psi):	22	H2 cylinder reg set (psi):	n/a
Span Cylinder (psi):	700	Span Cylinder (psi):	n/a
Span Cylinder Reg Set (psi):	22	Span Cylinder Reg Set (psi):	n/a
Zero Air Gen Pressure:	38	Zero Air Gen Pressure:	n/a
measurement alarms:	None	measurement alarms:	n/a
service alarms:	None	service alarms:	n/a
cnt:	1079	cnt:	n/a
rng:	1	rng:	n/a
try:	2	try:	n/a
flm:	186.5	flm:	n/a
det:	125.9	det:	n/a
Flame:	186	Flame:	n/a
Filter:	125	Filter:	n/a
Base:	125	Base:	n/a
Sample psi:	07.49	Sample psi:	n/a
Internal Air Pressure:	20	Internal Air	n/a
Internal Fuel Pressure:	12	Internal Fuel	n/a
Measured Flow:	n/a	Measured Flow:	n/a
Expected Value:	26.51	Expected Value:	n/a

Comments:

Shutdown calibration completed for annual maintenance. Pump rebuilt. Zero air pressure controller sensor adjusted.

Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	March 5, 2017	**Barometric Pressure:**	0.920 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Maskwa	**Weather Conditions:**	Mainly cloudy with snow
Parameter:	Total Hydrocarbon	**Calibration Purpose:**	post repair
Start/End Time 24 hr. (mst):	15:19 / 18:33	**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:	n/a	**As Found C.F.:**	n/a
Previous Cal High Point C.F.:	n/a	**New C.F.:**	1.000

Calibrator:

Flow Meter ID's:	n/a	
Make & Model:	SABIO 2010 D	
Serial #:	11900613	
Cal Gas Cylinder I.D. # :	LL165372	
CH_4/C_3H_8 Cylinder Conc. (ppm):	606.0	212.0
CH_4 as propane/total CH_4 equivilants (ppm):	583.0	1189.0

Standard Calibration Points for a Range of: 50 ppm

Point	Target ppm
High	38
Mid	18
Low	9

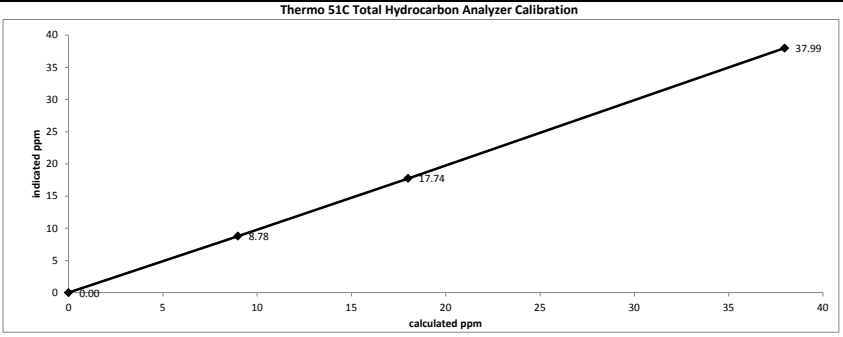
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	**Diluent**	**Cal Gas**	**Total**	**(ppm)**	**(ppm)**	
adjusted zero	1999	0.00	1999	0.0	0.00	n/a
adjusted high	1937	63.90	2001	37.97	37.99	1.000
mid	1971	30.30	2001	18.00	17.74	1.015
low	1985	15.10	2000	8.98	8.78	1.022
calibrator zero	1999	0.00	1999	0.00	0.00	n/a
					Average C.F.=	1.012

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**0.998**	**.95-1.05**
b (Intercept as % of full scale)=	**0.28%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**± 10%**

Thermo 51C Total Hydrocarbon Analyzer Calibration



As found:		As left:	
H2 cylinder (psi):	n/a	H2 cylinder (psi):	800
H2 cylinder reg set (psi):	n/a	H2 cylinder reg set (psi):	22
Span Cylinder (psi):	n/a	Span Cylinder (psi):	700
Span Cylinder Reg Set (psi):	n/a	Span Cylinder Reg Set (psi):	22
Zero Air Gen Pressure:	n/a	Zero Air Gen Pressure:	36
measurement alarms:	n/a	measurement alarms:	None
service alarms:	n/a	service alarms:	None
cnt:	n/a	cnt:	1041
rng:	n/a	rng:	1
try:	n/a	try:	3
flm:	n/a	flm:	184.5
det:	n/a	det:	125.9
Flame:	n/a	Flame:	184
Filter:	n/a	Filter:	125
Base:	n/a	Base:	125
Sample psi:	n/a	Sample psi:	07.51
Internal Air Pressure:	n/a	Internal Air	20
Internal Fuel Pressure:	n/a	Internal Fuel	12
Measured Flow:	n/a	Measured Flow:	n/a
Expected Value:	n/a	Expected Value:	26.80

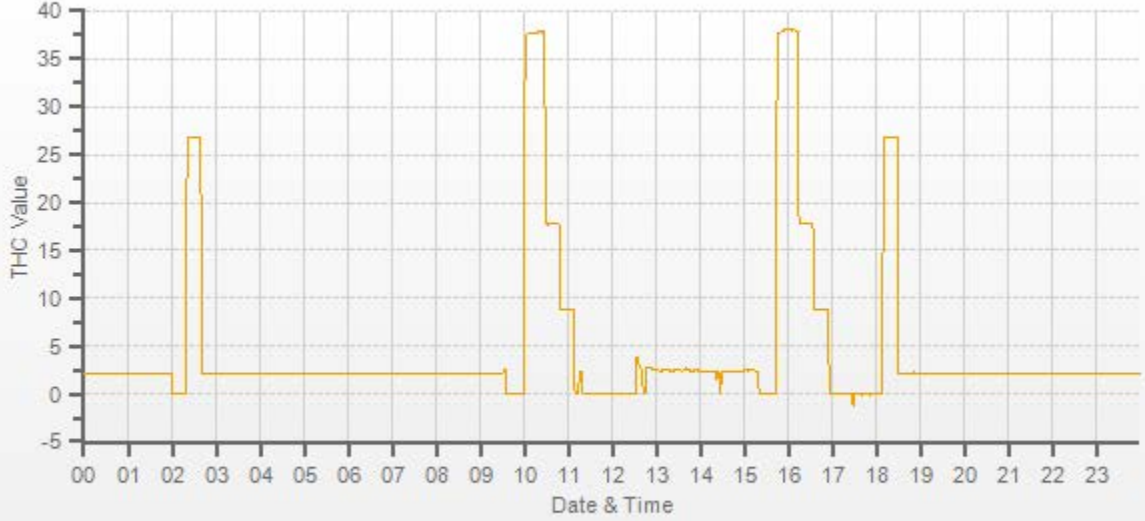
Comments:

The analyzer sample inlet filter was changed.

The analyzer cooling fan filter(s) were cleaned.

Post-repair calibration completed after annual maintenance. Sample pump rebuilt. Sample inlet tubing purged. Zero Air srviced, cut-in/out valves adjusted.

THC[ppm] Station: LICA MASKWA Daily: 2017/03/05 Type: AVG 1 Min. [1 Min.]



NITROGEN DIOXIDE

API 200A NO-NO2-NOx Analyzer Calibration

Date:	March 5, 2017	**Barometric Pressure:**	0.920 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Maskwa	**Weather Conditions:**	Mainly cloudy with snow
Start/End Time 24 hr. (mst):	9:22 / 17:09	**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

Analyzer:

ID# or Serial Number:	1899
Last Calibration Date:	February 14, 2017
Range ppb:	1000

Correction Factors:

	Previous C.F.:	As Found C.F.:	New C.F.:
NO =	0.998	0.992	1.001
NO_2 =	1.000	0.998	0.998
NOx =	0.998	0.993	1.001

Calibrator:

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	50.7

Standard Calibration Points for a Range of: 1000 ppb

Point	Target NO (ppb)	Target NO_2 (ppb)	Cc Ozone ?
High	**780**	**500**	**n/a**
Mid	**380**	**275**	**n/a**
Low	**190**	**100**	**n/a**
Extra Point #1	**n/a**	**n/a**	**n/a**
Extra Point #2	**n/a**	**n/a**	**n/a**

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	**Diluent**	**Cal Gas**	**Total Flow**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**		
as found zero	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	786.0	786.0	0.992	0.993
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	779.0	779.0	1.001	1.001
mid	4964	37.50	5002	380.1	380.1	372.0	372.0	1.022	1.022
low	4980	18.70	4999	189.7	189.7	183.0	183.0	1.036	1.036
calibrator zero	5000	0.00	5000	0	0	0.0	0.0	n/a	n/a
							Average C.F.=	1.020	1.020

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO_2	NO drop	NO_2 gain	NO_2 C.F.
Point	**Diluent**	**Cal Gas**	**Total Flow**	**volts or ppb**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**
NOx reference	4923	76.90	5000	0.0	779.0	780.0	1.0	0.0	1.0	
as found high NO2	4923	76.90	5000	480.0	280.0	781.0	501.0	499.0	500.0	0.998
adjusted high NO2	4923	76.90	5000	480.0	280.0	781.0	501.0	499.0	500.0	0.998
gpt mid	4923	76.90	5000	260.0	504.0	783.0	279.0	275.0	278.0	0.989
gpt low	4923	76.90	5000	90.0	680.0	780.0	100.0	99.0	99.0	1.000
									Average NO_2 C.F.=	0.996

Linear Regression/Calibration Results:

	NO	NOx	NO_2	LIMITS
Correlation Coeffecient =	**1.000**	**1.000**	**1.000**	**> or = 0.995**
Slope =	**0.999**	**0.999**	**0.998**	**.95-1.05**
b (Intercept as % of full scale)=	**-0.42%**	**-0.42%**	**0.09%**	**± 3% F.S.**
% change in C.F. from last cal=	**0.59%**	**0.47%**	**0.20%**	**± 10%**
NO2 converter effeciency			**0.99**	**0.96 to 1.04**

As found:		**As left:**	
NOx SLOPE:	0.913	NOx SLOPE:	0.908
NOx OFFS:	-0.1	NOx OFFS:	0.3
NO SLOPE:	-0.931	NO SLOPE:	0.924
NO OFFS:	-0.7	NO OFFS:	-1.1
SAMP FLW:	549	SAMP FLW:	546
OZONE FL:	78	OZONE FL:	77
NORM PMT:	2.5	NORM PMT:	-1.9
AZERO:	21.1	AZERO:	21.6
HVPS:	686	HVPS:	686
DCPS:	2582	DCPS:	2573
RCELL:	50.7	RCELL:	49.9
BOX TEMP:	28.5	BOX TEMP:	31.4
IZS TEMP:	48.0	IZS TEMP:	48.4
MOLY TEMP:	314.9	MOLY TEMP:	314.0
RCEL:	5.5	RCEL:	5.5
SAMP:	25.7	SAMP:	25.6
Expected Value NO:	4.5	Expected Value NO:	4.5
Expected Value NO2:	490.0	Expected Value NO2:	487.0
Expected Value NOx:	494.0	Expected Value NOx:	491.0

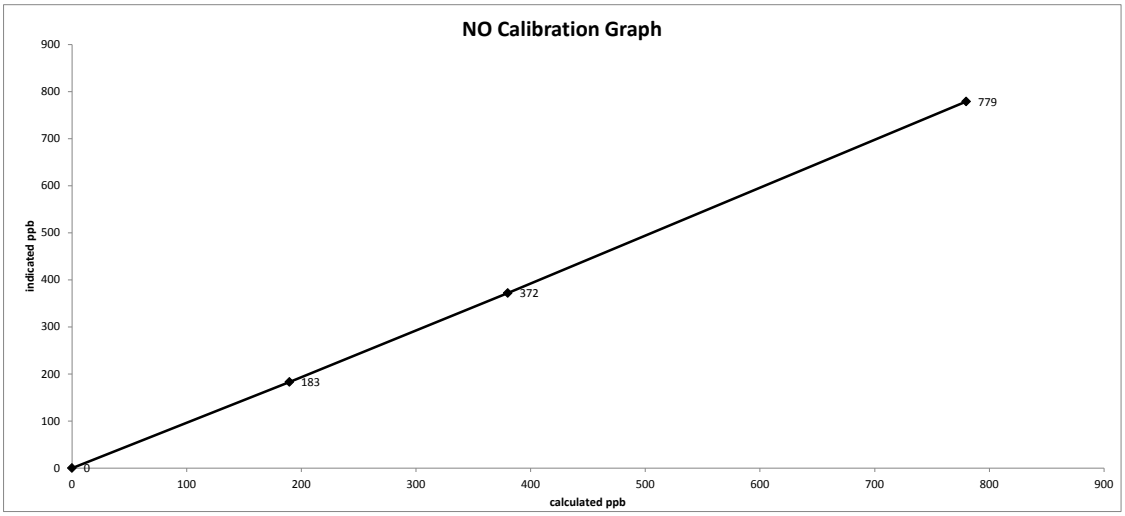
Comments:

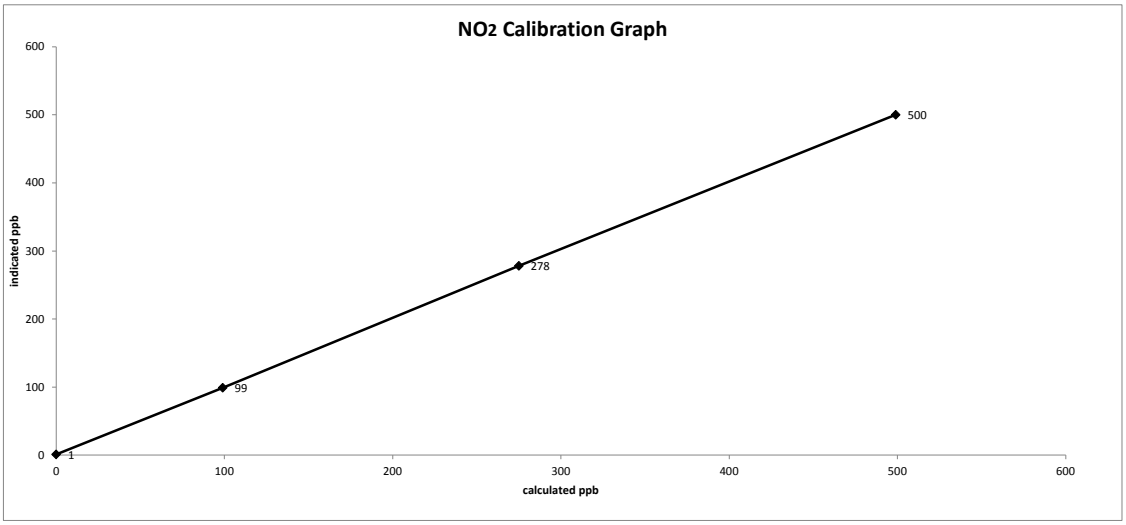
The analyzer sample inlet filter was changed.

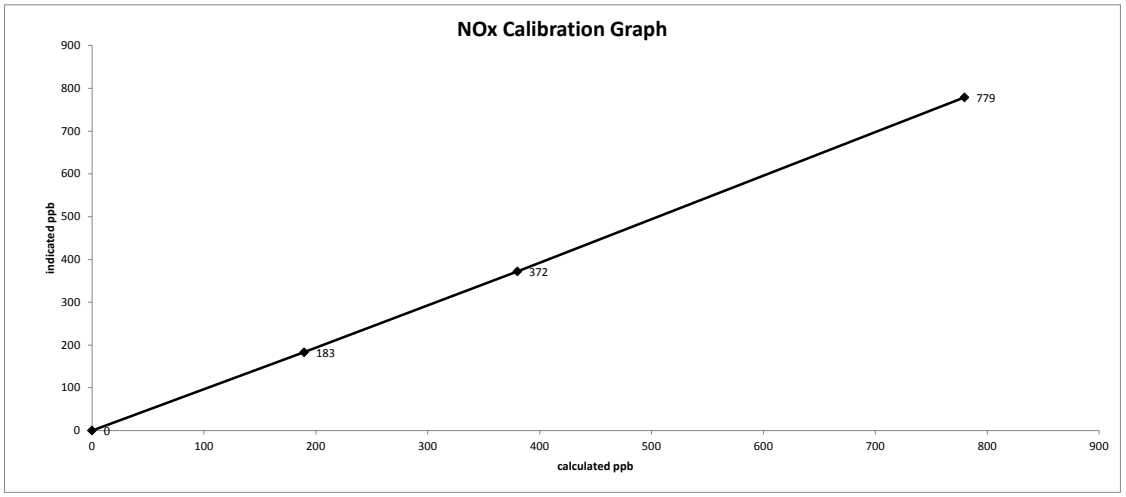
No high point NO2 adjustment was required/made. As found values were copied to adjusted high values for linearity calculation purposes.

At 10:53, after "As Found - High Point" in AUTO mode, the GPT mode with O3=0.0 ppb was tested. No High Point adjustment was made so far. "As Found High" started again at 11:59.

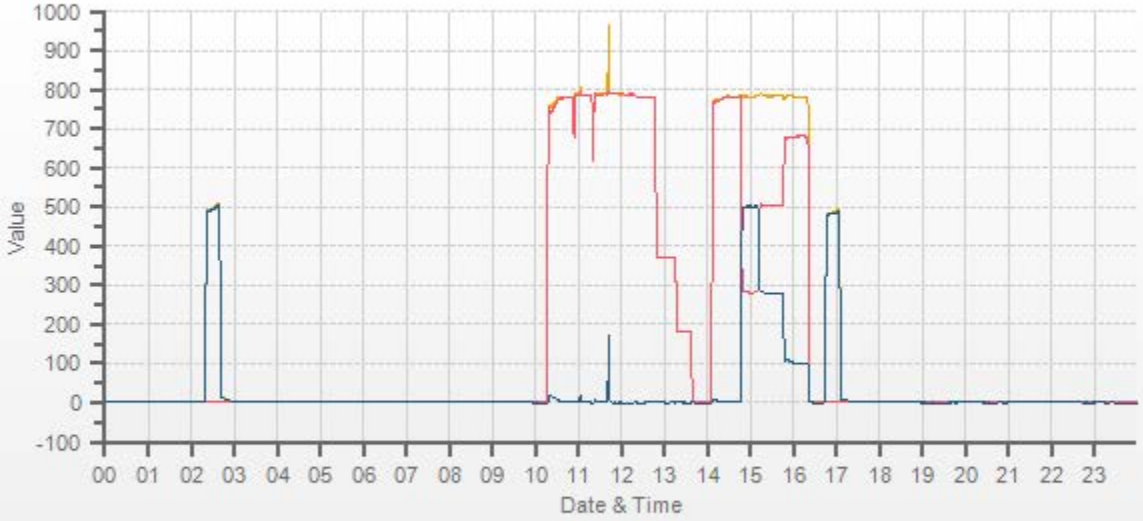
Date:	March 5, 2017	Start/End Time 24 hr. (mst):	9:22 / 17:09
Company/Airshed:	LICA	Calibration Purpose:	routine monthly
Location/Station Name:	Maskwa	Calibration Method:	Gas Dilution & Gas Phase Titration







Station: LICA MASKWA Daily: 2017/03/05 Type: AVG 1 Min. [1 Min.]



WIND SYSTEM

Met One Instruments

Sonic Wind Sensor Certificate of Calibration

Sensor Model No.: 50.5H
Sensor Serial No.: H10703
Sensor Output Swing 0V - 1.0V
Sensor Output Range: 0 - 50.0 MPS
Customer: Maxxam Analytics
Sales Order No.: 115635
Tested per PO: 35-62828
Calibration Date: 03/30/2016
Calibrated by: David Frith DF
QC Inspection Byron Davison

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

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

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

Test Equipment Used for Calibration of Instruments

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

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

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

METEOROLOGICAL SYSTEM CHECK

Calibration complies with ISO/IEC 17025, ANSI/NCSL Z540-1, and 9001

Calibration Certificate No. 1750.01

Cert. No.: 4085-7568459

Traceable® Certificate of Calibration for Digital Hygrometer

Manufactured for and distributed by: Fisher Scientific, 300 Industry Drive, Pittsburgh, PA 15275-1001

Instrument Identification:

Model Numbers: 11-661-7B, 11755843 S/N: 160348895 Manufacturer: Control Company

Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Digital Thermometer	122044330	11/20/16	4000-7226968
Chilled Mirror Hygrometer	31874/H2048MCR	10/12/16	13366

Certificate Information:

Technician: 353 Procedure: CAL-18 Cal Date: 4/08/16 Due Date: 4/08/18

Test Conditions: 26.4°C 37.0 %RH 1021 mBar

Calibration Data: (New Instrument)

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
%RH		N.A.		20.21	20.21	Y	18.71	21.71	0.46	3.3:1
%RH		N.A.		50.59	50.52	Y	49.09	52.09	0.46	3.3:1
%RH		N.A.		75.06	75.10	Y	73.56	76.56	0.46	3.3:1
°C		N.A.		27.490	27.29	Y	27.09	27.89	0.059	>4:1

This Instrument was calibrated using Instruments Traceable to National Institute of Standards and Technology.

A Test Uncertainty Ratio of at least 4:1 is maintained unless otherwise stated and is calculated using the expanded measurement uncertainty. Uncertainty evaluation includes the instrument under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level. In tolerance conditions are based on test results falling within specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the item calibrated. This certificate shall not be reproduced except in full, without written approval of Control Company.

Nominal=Standard's Reading; As Left=Instrument's Reading; In Tol=In Tolerance; Min/Max=Acceptance Range; ±U=Expanded Measurement Uncertainty; TUR=Test Uncertainty Ratio; Accuracy=±(Max-Min)/2; Min = As Left Nominal(Rounded) - Tolerance; Max = As Left Nominal(Rounded) + Tolerance; Date=MM/DD/YY

Nicol Rodriguez, Quality Manager

Aaron Judice, Technical Manager

Maintaining Accuracy:

In our opinion once calibrated your Digital Hygrometer should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Digital Hygrometers change little, if any at all, but can be affected by aging, temperature, shock, and contamination.

Recalibration:

For factory calibration and re-certification traceable to National Institute of Standards and Technology contact Control Company.

CONTROL COMPANY 4455 Rex Road Friendswood, TX 77546 USA
Phone 281 482-1714 Fax 281 482-9448 service@control3.com www.control3.com

CALIBRATORS

Alberta Government

Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2016-442A

Company Maxxam/SIA **Operator:** Chris

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

Dilution Flow (sccm)

Pt. #1 4892 Pt. #2 4975 Pt. #3 4951

Gas Flow (sccm)

Pt. #1 79.7 Pt. #2 38.8 Pt. #3 19.4

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO_2	NOx	NO	NOx
	0.0	0.0000	0.0000	0.0000	-0.0004	-0.0004	Limit ± 10%	
4972	79.7	0.7855	0.7855	0.7883	0.0004	0.7887	0.4%	0.5%
4936	38.8	0.3822	0.3822	0.3816	0.0005	0.3822	-0.2%	0.1%
4970	19.4	0.1913	0.1913	0.1902	0.0006	0.1913	-0.6%	0.2%
						Absolute Average Percent Difference	0.1%	0.3%

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

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

Flow	O_3 Conc	NO Decrease	NO	NO2	NOX	% Diff. Vs Audit gas	
						NO_2	% Diff. Limit
4972	0	0.0000	0.7867	0.0014	0.7881	-0.7%	± 10%
4972	500	0.5127	0.2740	0.5104	0.7849	-0.6%	± 10%
4972	275	0.2863	0.5004	0.2860	0.7865	0.0%	± 10%
4972	90	0.0940	0.6927	0.0954	0.7880	0%	± 10%
					Absolute Average Percent Difference		

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

NO_2		**LIMITS**
Correlation=	1.0000	**≥ 0.995**
m (Slope)=	0.9924	**0.90-1.10**
b (Intercept % of FS)=	0.1755	**± 3% F.S.**

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

COMMENTS:

Auditor: Shea Beaton Date: January 27, 2017

Operator Signature: Location: McIntyre Center Edmonton

Alberta Government

Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2016-526A

Company Maxxam **Operator:** Mike

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

Dilution Flow (sccm)

Pt. #1 4879 Pt. #2 4932 Pt. #3 4950

Gas Flow (sccm)

Pt. #1 74.5 Pt. #2 36.4 Pt. #3 18.2

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO_2	NOx	NO	NOx
4965	0.0	0.0000	0.0000	0.0001	0.0000	0.0001	Limit ± 10%	
4954	74.5	0.7685	0.7700	0.7915	0.0008	0.7923	3%	3%
4968	36.4	0.3744	0.3751	0.3832	0.0006	0.3838	2%	2%
4968	18.2	0.1872	0.1876	0.1916	0.0002	0.1918	2%	2%
					Absolute Average Percent Difference		3%	2%

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

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

Flow	O_3 Conc	NO Decrease	NO	NO2	NOX	% Diff. Vs Audit gas	
4954	0.000	0.0000	0.7949	0.0005	0.7954	NO_2	% Diff. Limit
4954	0.510	0.5104	0.2845	0.5072	0.7917	-1%	± 10%
4954	0.250	0.2516	0.5433	0.2514	0.7944	0%	± 10%
4954	0.100	0.1085	0.6864	0.1087	0.7951	0%	± 10%
				Absolute Average Percent Difference		0%	± 10%

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

NO_2		**LIMITS**
Correlation=	1.0000	**≥ 0.995**
m (Slope)=	0.9926	**0.90-1.10**
b (Intercept % of FS)=	0.0925	**± 3% F.S.**

AENV Standards Audit Calibrator		**NO_X Analyzer**	
Make/Model	Thermo 146i	Make/Model	Thermo 42i
Serial/AMU Number	1809	Serial/AMU Number	1868
SRM Gas Cylinder No.	CAL018140	Last Calibration Date	March 15, 2017
Cylinder Conc. (ppm)	48.79	Full Scale (ppm)	1.0
		Cylinder Gas Expiry Date	March 28, 2019

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton Date: March 16, 2017

Operator Signature: Location: McIntyre Center Edmonton

CALIBRATION GASES

Alberta Government

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:

Make/Model: R&R MFC 201
Serial Number: AMU 1690
Last Verification Date: October 19, 2016
Gas Type: SO2 Conc. 98.07
Cylinder Number: CA:016625
Expiry Date: January 2019

Flow Measurement Device:

Make/Model: Bios DC2
Serial Number: AMY 1659
Temp.°C: 24.5 C
B.P. 706 mmhg

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

Previous Stated Concentration PPM: 50.6

Percent variance from Stated: 1

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

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [X]

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

Auditor: Al Clark Date: October 19, 2016

Operator Signature: Location: McIntyre Center Edmonton

aemera.org

Calibration Gas Audit

CH4 / C3H8 Cylinder Gas

File No. 2015-092CGA

Company: Maxxam **Operators name:** Chris Wesson

Cylinder #: LL165372 Conc CH4 (PPM) 606/212 Tolerance (%) 0.5 Certified By: Praxair

Reference Calibrator and Gas:

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

Flow Measurement Device:

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

Reference Analyzer:

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

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

	CH4	C3H8
Previous Stated Concentration PPM:	606	212
Percent variance from Stated:	**0.3**	**1.6**

Cylinder gas tolerances based on CH4 only

Meets Manufacturer Tolerance. Use manufacturers stated concentration [X] **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

Alberta Government

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

Previous Stated Concentration PPM: 10.2

Percent variance from Stated: 1

Meets Manufacturer Tolerance. Use manufacturers stated concentration [X] **COMMENTS:**

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [ ]

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

Auditor: Al Clark Date: October 19, 2016

Operator Signature: Al Clark Location: McIntyre Center Edmonton

Alberta Government

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:

Make/Model	Teco 146i		
Serial Number	AMU 1809		
Last Verification Date	October 19, 2019		
Gas Type	NO	Conc.	48.79
Cylinder Number	CAL018188		
Expiry Date	March 2019		

Flow Measurement Device:

Make/Model	Bios DC2
Serial Number	AMU 1659
Temp.°C	24.5 C
B.P.	706 mmhg

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/	Concentration	Cylinder Concentration	
Dilution	Gas	NO	NOX	Dilution Flow	Factor	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:	**50.7**	**50.6**

	NO	NOx
Previous Stated Concentration PPM:	50.7	50.9
Percent variance from Stated:	**0**	**1**

Cylinder gas tolerances based on NO only

Meets Manufacturer Tolerance. Use manufacturers stated concentration [X]

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [ ]

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

COMMENTS: Contains 50.6 ppm SO2.

Auditor: Al Clark Date: October 19, 2016

Operator Signature: Location: McIntyre Center Edmonton

APPENDIX III
REPORT CERTIFICATION FORM

Report Certification Form

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

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

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

09-05-2017

Report Issued Date (dd-mm-yyyy)

APPENDIX IV
DATA VALIDATION CERTIFICATION FORM

Validation Certificate Form

Client: Lakeland Industry & Community Association
Project #: 2833-2017-03-30-C
Site: Maskwa Continuous Monitoring Station
Contact: Mike Bisaga

Level 0 Preliminary Verification		**Date**	29-Apr-2017
Level 1 Primary Validation		**Date**	29-Apr-2017
Level 2 Final Validation		**Date**	05-May-2017
Level 3 Independent Data Review		**Date**	09-May-2017
Post-Final Validation	**NA**	**Date**	**NA**

Notes

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

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

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

February 22, 2018

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

Lakeland Industry & Community Association (LICA) is pleased to submit the ambient air monitoring monthly report for the LICA St. Lina AQM Station in the month of March 2017.

The air monitoring program consists of continuous air monitoring results for Sulphur Dioxide (SO_2), Hydrogen Sulphide (H_2S), Total Hydrocarbon (THC), Oxides of Nitrogen (NOx), Nitric Oxides (NO), Nitrogen Dioxide (NO_2), Ozone (O_3), Particulate Matter 2.5 ($PM_{2.5}$), Relative Humidity (RH), Barometric Pressure (BP), Precipitation, Ambient Temperature (AmbTPX), Wind Speed (WS), Wind Direction (WD) and Standard Deviation Wind Direction (STDWD).

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

All data collected in March 2017 was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

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

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

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

Respectfully,

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

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

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

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

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

AMBIENT AIR MONITORING MONTHLY DATA REPORT

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

ST. LINA CONTINUOUS MONITORING STATION

JOB #: 2833-2017-03-31-C

March 2017

Prepared for:

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
402 - 19 ST NW
CALGARY, ALBERTA
T2N 2J1

Attention: MIKE BISAGA

DATE: **May 12, 2017**

Prepared by: Maram Ghaleb

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

Reviewed by:

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

SUMMARY

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

All data collected this month 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.

Annual Maintenance: A scheduled annual maintenance was completed on all gas analyzers between March 1 and March 2. Twenty-two, twenty, one, nineteen and twenty hours of downtime were recorded for SO2, H2S, THC, NO2 and O3 respectively, due this maintenance event.

All parameters: On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

SO_2: A "dark cal" alert was triggered on the analyzer on March 6. The analyzer was reset onsite and no further action was required. Two hours of anomalous data were, however, invalidated at 10:00-11:00 due to this event.

H_2S:
• Seven hours of downtime were recorded between March 6 and March 7 due to the additional quality checks performed to verify the stability of span response after the annual maintenance.
• Eight more hours of downtime were incurred between March 19 and March 23 due to quality check and maintenance performed to address a biased high span response.
• The zero air filter was re-installed on March 28 to address a zero drift. One hour of downtime was recorded due to this event.

NOx/NO/NO_2: Seven hours of downtime were recorded on March 7 due to a repeat calibration, performed for quality assurance and diligence purposes.
NOx calibration concentrations were calculated using a NOx gas concentration of 50.7 rather than 50.9 ppm. This yielded incorrect values for Calculated NOx that were presented on the Analyzer Calibration Form. The calibration concentrations were recalculated using the correct NOx gas value (50.9 ppm) and the outcome was insignificant. The calibration is still deemed AMD complaint.

$PM_{2.5}$: Ten hours of data were recorded at concentrations lower than –3 µg/m3 this month, rendering the data invalid.

WS/WD: One hour of downtime due to maintenance was recorded on March 2 at hour 17:00.

The summary of results is presented on the following pages.

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

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

Monthly Continuous Data Summary

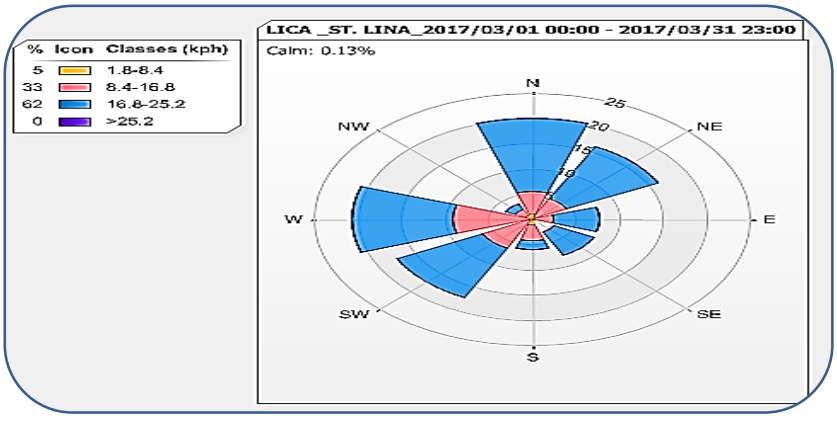
Lakeland Industry & Community Association St. Lina Continuous Monitoring Station						MAXIMUM VALUES							OPERATIONAL TIME (%)
						1-HOUR					24-HOUR		
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
	1-hr	24-hr	1-hr	24-hr									
SO_2 (ppb)	172	48	0	0	0.3	3.5	6	23	19.9	NE	1.0	7	96.5
H_2S (ppb)	10	3	0	0	0.1	0.5	18	20	10.2	NNE	0.3	22	94.9
THC (ppm)	-	-	-	-	2.13	2.74	2	15	17.7	NNE	2.41	2	99.6
NO_2 (ppb)	159	-	0	-	2.0	12.4	10	6	13.5	W	4.7	9	96.2
NO (ppb)	-	-	-	-	0.2	3.2	31	8	22.1	ESE	0.8	31	96.2
NOx (ppb)	-	-	-	-	2.2	12.6	10	6	13.5	W	5.4	9	96.2
O_3 (ppb)	82	-	0	-	34.5	49.6	15	16	20	ENE	45.2	16	97.0
$PM_{2.5}$ ($\mu g/m^3$)	80	30	0	0	4.5	19.5	26	0	15.1	N	13.2	26	98.4
RELATIVE HUMIDITY (%)	-	-	-	-	69	90	28	21	20.5	NNE	87	28	99.7
BAROMETRIC PRESSURE (millibar)	-	-	-	-	927	948	9	13	4.9	NW	945	9	99.7
AMBIENT TEMPERATURE (°C)	-	-	-	-	-7.3	9.9	15	14	9	NNE	3.2	31	99.7
PRECIPITATION (mm)	-	-	-	-	0.1	3.3	22	15	22.2	W	0.6	22	99.7
VECTOR WS (kph)	-	-	-	-	2.8	25.1	16	23	-	W	20.3	29	99.6
VECTOR WD (sec)	-	-	-	-	322 (NW)	-	-	-	-	-	-	-	99.6

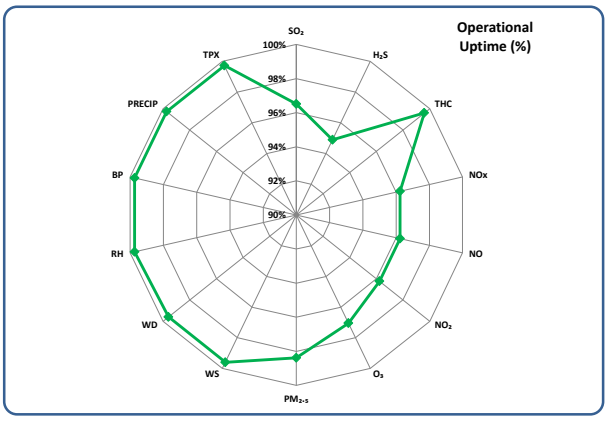
Maxxam

Lakeland Industry & Community Association - St. Lina Site

March 2017 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_2	ppb	0.3	96.5%	3.5	March 6	23	172	0	1.0	March 7	48	0
H_2S	ppb	0.1	94.9%	0.5	March 18	20	10	0	0.3	March 22	3	0
THC	ppm	2.13	99.6%	2.74	March 2	15	-	-	2.41	March 2	-	-
NOx	ppb	2.2	96.2%	12.6	March 10	6	-	-	5.4	March 9	-	-
NO	ppb	0.2	96.2%	3.2	March 31	8	-	-	0.8	March 31	-	-
NO_2	ppb	2.0	96.2%	12.4	March 10	6	159	0	4.7	March 9	-	-
O_3	ppb	34.5	97.0%	49.6	March 15	16	82	0	45.2	March 16	-	-
$PM_{2.5}$	µg/m³	4.5	98.4%	19.5	March 26	0	80	0	13.2	March 26	30	0
WS	kph	2.8	99.6%	25.1	March 16	23	-	-	20.3	March 29	-	-
WD	degree	322 (NW)	99.6%	-	-	-	-	-	-	-	-	-
RH	%	69	99.7%	90	March 28	21	-	-	87	March 28	-	-
BP	mbar	927	99.7%	948	March 9	13	-	-	945	March 9	-	-
PRECIP	mm	0.1	99.7%	3.3	March 22	15	-	-	0.6	March 22	-	-
AmbTPX	°C	-7.3	99.7%	9.9	March 15	14	-	-	3.2	March 31	-	-





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

Annual Maintenance: A scheduled annual maintenance was completed on all gas analyzers between March 1 and March 2. Twenty-two, twenty, one, nineteen and twenty hours of downtime were recorded for SO2, H2S, THC, NO2 and O3 respectively, due this maintenance event.

All parameters: On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

SO_2: A "dark cal" alert was triggered on the analyzer on March 6. The analyzer was reset onsite and no further action was required. Two hours of anomalous data were, however, invalidated at 10:00-11:00 due to this event.

H_2S:

- Seven hours of downtime were recorded between March 6 and March 7 due to the additional quality checks performed to verify the stability of span response after the annual maintenance.
- Eight more hours of downtime were incurred between March 19 and March 23 due to quality check and maintenance performed to address a biased high span response.
- The zero air filter was re-installed on March 28 to address a zero drift. One hour of downtime was recorded due to this event.

NO_2: Seven hours of downtime were recorded on March 7 due to a repeat calibration, performed for quality assurance and diligence purposes.

NOx calibration concentrations were calculated using a NOx gas concentration of 50.7 rather than 50.9 ppm. This yielded incorrect values for Calculated NOx that were presented on the Analyzer Calibration Form. The calibration concentrations were recalculated using the correct NOx gas value (50.9 ppm) and the outcome was insignificant. The calibration is still deemed AMD complaint.

PM2.5: Ten hours of data were recorded at concentrations lower than –3 µg/m3 this month, rendering the data invalid.

WS/WD: One hour of downtime due to maintenance was recorded on March 2 at hour 17:00.

Exceedance Summary Report

SO_2 1-Hour Exceedances
Measured concentrations of sulphur dioxide were below the 1-hour AAAQO of 172 ppb.

SO_2 24-Hour Exceedances
Measured concentrations of sulphur dioxide were below the 24-hour AAAQO of 48.0 ppb.

H_2S 1-Hour Exceedances
Measured concentrations of hydrogen sulphide were below the 1-hour AAAQO of 10 ppb.

H_2S 24-Hour Exceedances
Measured concentrations of hydrogen sulphide were below the 24-hour AAAQO of 3 ppb.

NO_2 1-Hour Exceedances
Measured concentrations of nitrogen dioxide were below the 1-hour AAAQO of 159 ppb.

$PM_{2.5}$ 1-Hour Exceedances
Measured concentrations of fine particulate matter were below the 1-hour AAAQO of 80 µg/m³.

$PM_{2.5}$ 24-Hour Exceedances
Measured concentrations of fine particulate matter were below the 24-hour AAAQO of 30 µg/m³.

O_3 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.

TABLE OF CONTENTS

Title		Page
SUMMARY		1
MONTHLY CONTINUOUS DATA SUMMARY REPORT		2
DASHBOARD		3
EXCEEDANCE SUMMARY REPORT		4
TABLE OF CONTENTS		5
1.0 Discussion		6
2.0 Project Personnel		10
3.0 Plant Monthly Required AMD Summary		10
4.0 Calculations and Results		10
5.0 Methods and Procedures		11
Appendix I	Continuous Monitoring Data Results	14
	Sulphur Dioxide	15
	Hydrogen Sulphide	23
	Total Hydrocarbon	31
	Oxides of Nitrogen	39
	Nitric Oxides	47
	Nitrogen Dioxide	54
	Ozone	62
	Particulate Matter 2.5	70
	Wind Speed	75
	Wind Direction	82
	Standard Deviation Wind Direction	85
	Relative Humidity	88
	Barometric Pressure	91
	Ambient Temperature	94
	Precipitation	97
Appendix II	Equipment Calibration Results	100
	Sulphur Dioxide	101
	Hydrogen Sulphide	106
	Total Hydrocarbon	116
	Nitrogen Dioxide	120
	Ozone	131
	Particulate Matter	136
	Wind System	139
	Calibrators	141
	Calibration Gases	147
Appendix III	Report Certification Form	157
Appendix IV	Data Validation Certification Form	159

1.0 Discussion

This monthly report consists of continuous monitoring results for the following parameters: Sulphur Dioxide (SO_2), Hydrogen Sulphide (H_2S), Total Hydrocarbon (THC), Oxides of Nitrogen (NOx), Nitric Oxides (NO), Nitrogen Dioxide (NO_2), Ozone (O_3), Particulate Matter 2.5 ($PM_{2.5}$), Relative Humidity (RH), Barometric Pressure (BP), Precipitation, Ambient Temperature (AmbTPX), Wind Speed (WS), Wind Direction (WD) and Standard Deviation Wind Direction (STDWD).

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 (December, 2016). The descriptions of the data verification and validation process can be found in Section 5 of this report. Instantaneous data, where applicable, is provided for reference purposes and has not undergone zero correction. The minimum and maximum statistics are highlighted in the data table and are for reference only. The highlighted cells are based on the software's interpretation of the exact position of the minimum or maximum value. The visual presentation of these statistics may not be the obvious choice in a data range due to rounding, truncating or analyzer specifications.

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

SULPHUR DIOXIDE (SO_2)

• Operational time, for the monitoring period, was 96.5% equivalent to twenty-six hours of downtime.
• A shut-down calibration was performed on March 1, prior to completing a scheduled annual maintenance on the analyzer. The sample valve was changed, the reaction cell was inspected and cleaned, and the analogue output was calibrated. A successful post-repair calibration was performed on March 2. Twenty-two hours of downtime were recorded due to this maintenance event.
• The Ozone and SO2 span programs are designed to run concurrently. An additional quality check was recorded on the SO2 channel, on March 2 at 19:00, during the monthly calibration of the Ozone analyzer.
• A "dark cal" alert was triggered on the analyzer on March 6. The analyzer was reset onsite and no further action was required. Two hours of anomalous data were, however, invalidated at 10:00-11:00 due to this event.
• Two maximum instantaneous data points were invalidated on March 7, due to interference from station activities.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

HYDROGEN SULPHIDE (H_2S)

• Operational time, for the monitoring period, was 94.9% equivalent to thirty-eight hours of downtime.
• A shut-down calibration was performed on March 1, prior to completing a scheduled annual maintenance on the analyzer. The reaction cell and sample valve were cleaned, and the analogue output calibrated. A successful post-repair calibration was performed on March 2. Twenty hours of downtime were recorded due to this maintenance event.
• The zero/span system required time to stabilize after the annual maintenance. An additional zero/span check was performed on March 6 to verify the stability of span response. A repeat calibration was completed on March 7, after which the expected span value was updated. Eight hours of downtime was recorded due to the additional quality checks.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.
• The span response exceeded the upper acceptance limit on March 18. A repeat span check was performed on March 19 and the result was within acceptance limits. Maintenance of the zero/span system was conducted on March 23, following a successful shut-down calibration. The valves were purged, the tubings were changed, the zero air scrubber material was renewed and a leak check was completed. A successful post-repair calibration was subsequently performed. As both calibrations met AMD requirements, no data was discarded due to this event. Seven hours of downtime were, however, recorded due to the additional quality checks.
• The zero air filter was re-positioned inside the analyzer on March 28 to address a zero drift, after it had been removed to the outside of the analyzer on March 23. One hour of downtime was recorded due to this event.

TOTAL HYDROCARBONS (THC)

• Operational time, for the monitoring period, was 99.6% equivalent to three hours of downtime.
• A shut-down calibration was performed on March 1, prior to completing a scheduled annual maintenance on the analyzer. The sample pump was rebuilt. A successful post-repair calibration was subsequently completed. One hour of downtime was recorded due to this maintenance event.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

OXIDES OF NITROGEN (NOx), NITRIC OXIDE (NO) and NITROGEN DIOXIDE (NO_2)

• Operational time, for the monitoring period, was 96.2% equivalent to twenty-eight hours of downtime.
• A shut-down calibration was performed on March 1, prior to completing a scheduled annual maintenance on the analyzer. The reaction cell and sample valve were cleaned, and the analogue output calibrated. A successful post-repair calibration was performed on March 2. Nineteen hours of downtime were recorded due to this maintenance event.
• There were concerns about the GPT reference points from the March 2 calibration. A repeat calibration was performed on March 7 for quality assurance and diligence reasons. The calibration met AMD requirements, no issues were identified and no further action was taken. Seven hours of downtime were recorded due this event.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.
• NOx calibration concentrations were calculated using a NOx gas concentration of 50.7 rather than 50.9 ppm. This yielded incorrect values for Calculated NOx that were presented on the Analyzer Calibration Form. The calibration concentrations were recalculated using the correct NOx gas value (50.9 ppm) and the outcome was insignificant. The calibration is still deemed AMD complaint.

OZONE (O_3)

• Operational time, for the monitoring period was 97.0% equivalent to twenty-two hours of downtime.
• A shut-down calibration was performed on March 1, prior to completing a scheduled annual maintenance on the analyzer. The sample pump was rebuilt and absorption cells A and B cleaned. Zero air scrubber container was changed due to a leak. A successful post-repair calibration was performed on March 2. Twenty hours of downtime were recorded due to this maintenance event.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

PARTICULATE MATTER < 2.5 MICRONS ($PM_{2.5}$)

• Operational time, for the monitoring period, was 98.4% equivalent to twelve hours of downtime.
• Two routine TEOM audits were performed this month. The first was completed on March 1, and the second on March 28.
• Data was corrected in accordance with AMD (2016), Chapter 6, Table 2, Zero Adjustment Criteria. Data recorded between 0 and –3 µg/m3 was corrected to 0 µg/m3. Data recorded below –3 µg/m3 was invalidated. Ten hours of data were invalidated as the data was below –3 µg/m3 this month.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

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

• Operational time, for the monitoring period, was 99.6% equivalent to three hours of downtime.
• One hour of downtime due to maintenance was recorded on March 2 at hour 17:00 to check the alignment of the instrument.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

RELATIVE HUMIDITY (RH)

• Operational time, for the monitoring period, was 99.7% equivalent to two hours of downtime.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

BAROMETRIC PRESSURE (BP)

• Operational time, for the monitoring period, was 99.7% equivalent to two hours of downtime.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

2.0 Project Personnel

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

3.0 Plant Monthly Required AMD Summary

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

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

4.0 Calculations and Results

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

5.0 Methods and Procedures

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

Maxxam AIR SOP-00209: Ambient Sulphur Monitoring
Maxxam AIR SOP-00212: Ambient O_3 Monitoring
Maxxam AIR SOP-00213: Ambient NO/NO_2/NOx 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 ($PM_{2.5}$) - 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

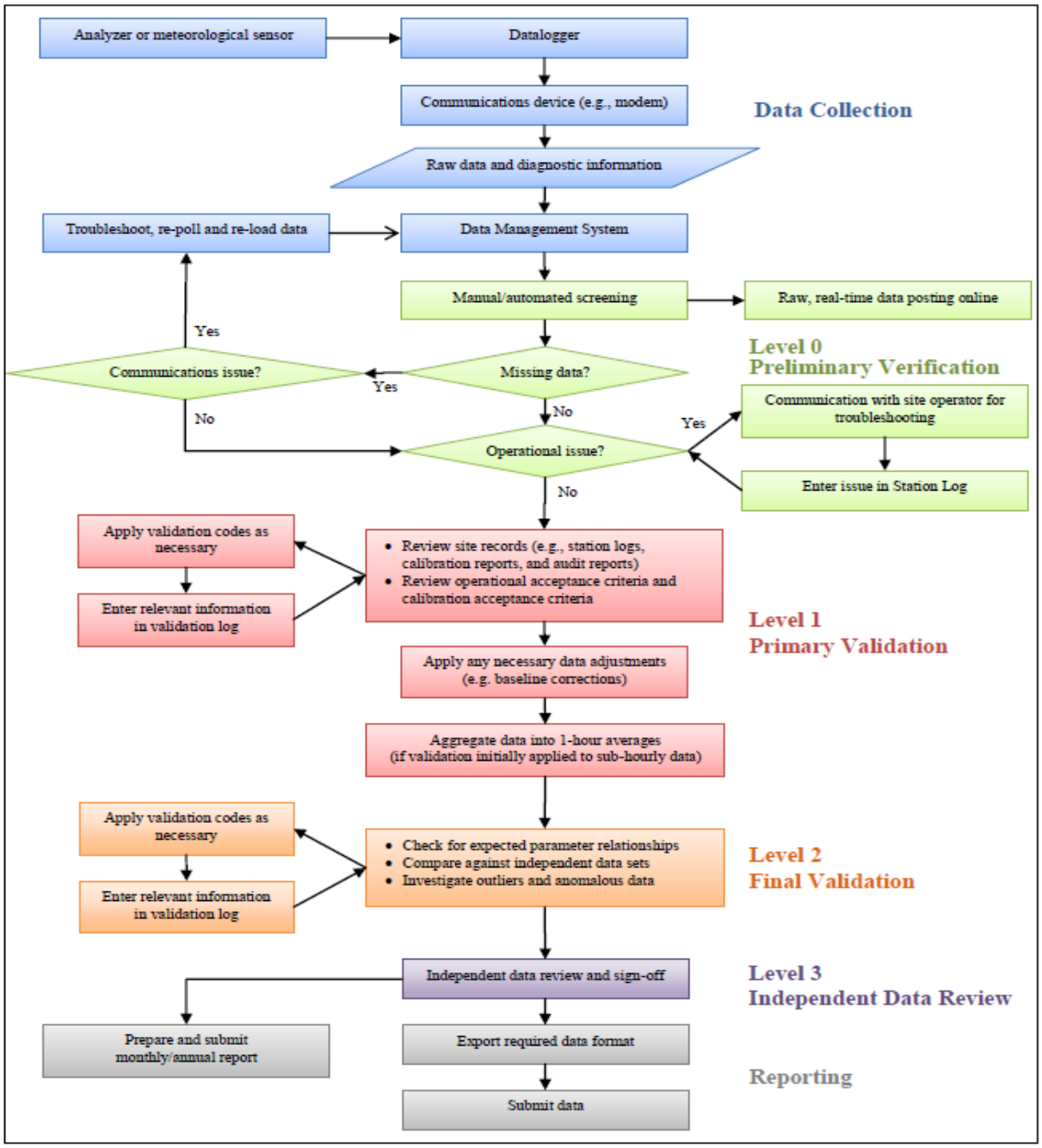
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

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 (December 2016), Chapter 6, Ambient Data Quality; Figure 1 Data Collection and Management Process Flow Chart

APPENDIX I
CONTINUOUS MONITORING DATA RESULTS

SULPHUR DIOXIDE

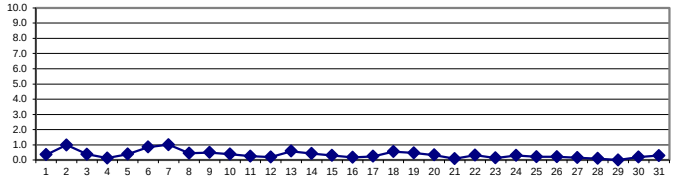
SULPHUR DIOXIDE Hourly Averages (SO_2 ppb)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	0.6	0.5	0.5	0.4	0.3	0.3	S	0.1	0.1	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	0.1	0.6	0.4	13
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	0.9	2.0	1.6	Q	1.0	0.5	0.5	0.4	0.4	2.0	1.0	13
3	0.3	0.3	0.2	0.3	S	0.2	0.3	0.4	0.3	0.4	0.5	0.4	0.4	0.7	0.6	0.4	0.5	0.2	0.7	0.8	0.5	0.2	0.1	**0.0**	**0.0**	0.8	0.4	24
4	0.1	0.0	0.1	S	0.0	0.4	0.8	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.8	0.1	24
5	0.4	0.5	S	0.3	0.4	0.3	0.3	0.2	0.3	0.1	0.2	0.2	0.2	0.3	0.7	0.7	0.5	0.5	0.4	0.3	0.5	0.4	0.4	0.7	0.1	0.7	0.4	24
6	0.8	S	0.7	0.9	0.6	0.4	0.3	0.3	0.2	0.3	X	X	0.5	0.4	0.4	0.3	0.3	0.8	0.8	0.9	1.2	2.0	2.3	**3.5**	0.2	**3.5**	0.9	22
7	S	1.8	2.9	2.7	2.4	1.3	1.8	2.8	2.0	1.0	0.6	0.2	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.3	0.7	1.1	S	0.0	2.9	**1.0**	24
8	0.4	0.4	0.5	0.4	0.3	0.3	0.4	0.4	0.5	0.4	0.4	0.7	0.8	0.7	0.6	0.5	0.4	0.5	0.4	0.3	0.4	0.4	S	0.1	0.1	0.8	0.4	24
9	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.8	1.1	0.7	0.2	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.3	S	0.2	0.3	0.2	1.1	0.5	24
10	0.4	0.3	0.4	0.5	0.5	0.5	0.4	0.4	0.3	0.7	0.7	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.4	0.3	S	0.1	0.2	0.2	0.1	0.7	0.4	24
11	0.2	0.1	0.2	0.3	0.2	0.3	0.3	X	X	0.2	0.2	0.2	0.1	0.0	0.3	0.4	0.4	0.3	0.3	S	0.3	0.3	0.3	0.3	0.0	0.4	0.2	22
12	0.3	0.3	0.4	0.4	0.2	0.3	0.2	0.2	0.3	0.1	0.1	0.1	0.0	0.3	0.4	0.3	0.1	0.0	S	0.1	0.0	0.0	0.2	0.3	0.0	0.4	0.2	24
13	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.6	0.7	0.8	0.9	0.9	1.1	1.1	0.8	0.7	S	0.4	0.6	0.5	0.5	0.4	0.4	0.3	1.1	0.6	24
14	0.3	0.3	0.4	0.5	0.3	0.1	0.2	0.2	0.2	0.1	0.2	0.5	0.2	0.3	0.5	0.6	S	0.6	0.6	0.8	0.6	0.7	0.8	0.7	0.1	0.8	0.4	24
15	0.7	0.7	0.6	0.5	0.6	0.4	0.4	0.4	0.2	0.2	0.4	0.3	0.2	0.2	0.1	S	0.0	0.0	0.1	0.2	0.2	0.3	0.0	0.2	0.0	0.7	0.3	24
16	0.2	0.1	0.3	0.4	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.2	0.1	0.1	S	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.4	0.2	24
17	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.2	0.9	S	1.5	0.9	0.4	0.2	0.3	0.4	0.1	0.0	0.0	0.0	0.0	1.5	0.2	24
18	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.1	0.2	0.2	S	0.5	0.8	0.9	1.0	1.0	1.2	1.2	1.4	1.3	1.3	1.2	0.0	1.4	0.5	24
19	1.0	0.8	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.3	S	0.2	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.2	1.0	0.5	24
20	0.5	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	1.2	S	0.5	0.4	0.5	0.1	0.1	0.2	0.1	0.2	0.3	0.3	0.3	0.2	0.0	0.0	1.2	0.3	24
21	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	S	0.0	0.1	0.2	0.1	0.2	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.1	24
22	0.2	0.2	0.4	0.3	0.5	0.4	0.3	0.4	S	0.2	0.4	0.5	0.4	0.3	0.3	0.3	0.2	0.4	0.3	0.2	0.2	0.3	0.3	0.3	0.2	0.5	0.3	24
23	0.2	0.2	0.1	0.1	0.1	0.1	0.0	S	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.1	24
24	0.1	0.0	0.1	0.1	0.2	0.1	S	0.0	0.1	0.1	0.2	0.2	0.3	0.2	0.3	0.3	0.5	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.0	0.6	0.3	24
25	0.6	0.5	0.5	0.5	0.2	S	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.6	0.2	24
26	0.1	0.0	0.1	0.2	S	0.2	0.3	0.2	0.4	0.3	0.1	0.4	0.4	0.4	0.6	0.6	0.3	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.6	0.2	24
27	0.2	0.1	0.2	S	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.0	0.1	0.1	0.1	0.0	0.2	0.2	24
28	0.2	0.2	S	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.2	0.1	24
29	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
30	S	0.0	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.2	0.2	S	0.0	0.3	0.2	24
31	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.2	0.4	0.9	1.8	1.3	0.3	0.0	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.1	S	0.0	0.0	1.8	0.3	24
HOURLY MAX	1.0	1.8	2.9	2.7	2.4	1.3	1.8	2.8	2.0	1.2	1.8	1.3	0.9	1.1	1.5	0.9	1.0	2.0	1.6	1.2	1.4	2.0	2.3	3.5				
HOURLY AVG	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	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

24 HR AVERAGES March 2017

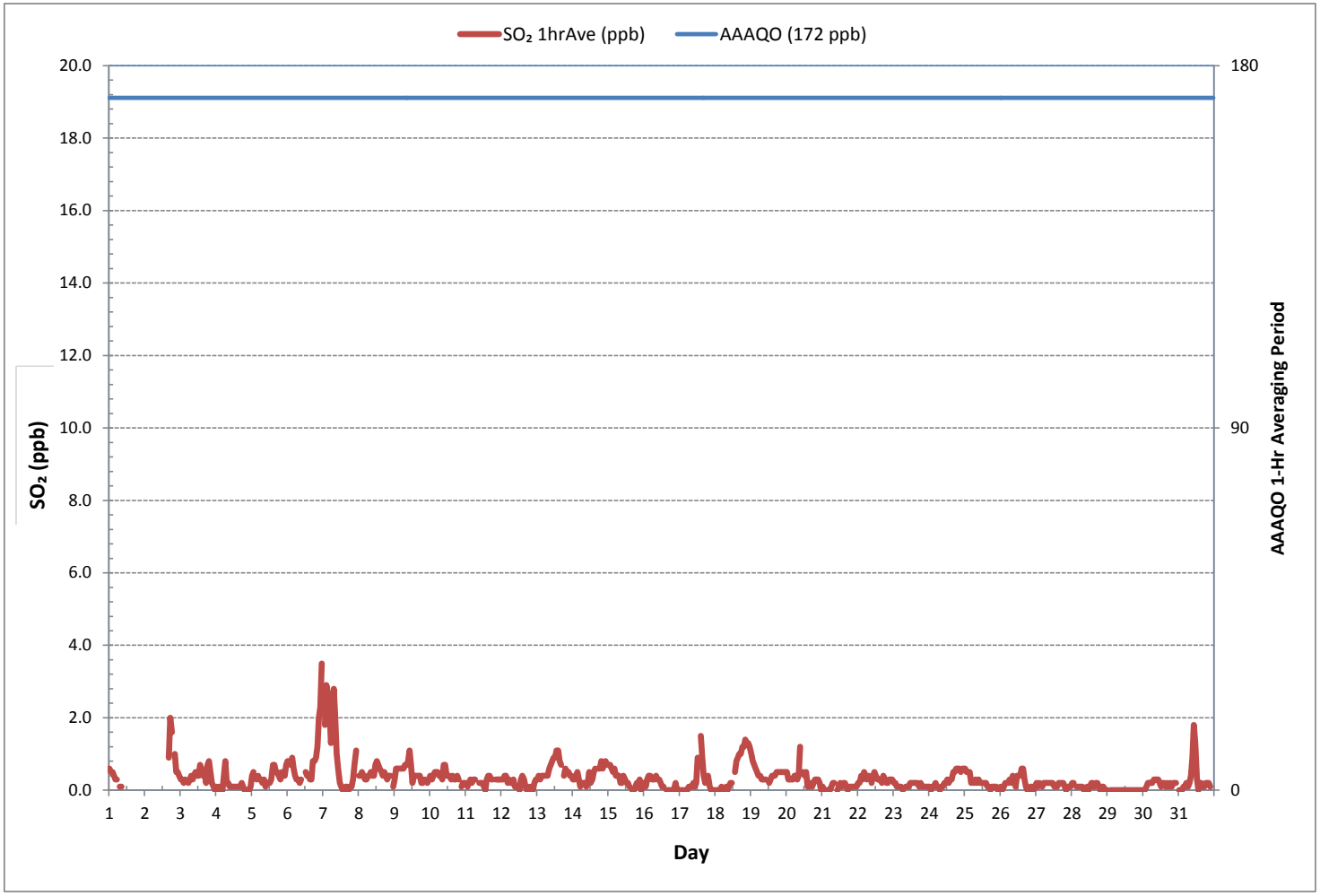


OBJECTIVE LIMIT: **ALBERTA ENVIRONMENT:** 1-HR 172 ppb | 24-HR 48 ppb

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF 24-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	580					
MINIMUM 1-HR AVERAGE	0.0	ppb	@ HOUR(S)	23	ON DAY(S)	3
MAXIMUM 1-HR AVERAGE:	3.5	ppb	@ HOUR(S)	23	ON DAY(S)	6
MAXIMUM 24-HR AVERAGE:	1.0	ppb			ON DAY(S)	7
					VAR-VARIOUS	
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:		718	hrs
MONTHLY CALIBRATION TIME:	9	hrs	AMD OPERATION UPTIME:		96.5	%
STANDARD DEVIATION:	0.4		MONTHLY AVERAGE:		0.3	ppb

SULPHUR DIOXIDE Hourly Averages (SO_2 ppb)



SULPHUR DIOXIDE Instantaneous Maximum (SO_2 ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	4.0	3.8	3.6	3.7	3.6	3.5	S	3.3	3.3	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3.3	4.0	3.6	13
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	4.5	Q	Q	3.9	3.1	3.3	3.1	3.1	4.5	3.6	13
3	2.8	3.0	2.9	2.9	S	3.0	3.1	3.1	3.2	3.3	3.5	3.3	3.3	3.7	3.5	3.5	3.5	3.4	3.7	4.1	3.8	3.2	3.3	3.3	2.8	4.1	3.3	24
4	3.3	3.1	3.3	S	3.1	3.5	3.8	3.4	3.3	3.1	3.2	3.0	2.9	2.8	3.1	2.9	2.8	3.0	2.7	2.5	2.6	2.5	2.8	2.7	2.5	3.8	3.0	24
5	2.9	2.9	S	2.7	2.9	2.9	2.8	2.8	2.8	2.7	2.8	2.7	2.9	3.0	3.3	3.1	3.1	3.1	3.1	2.9	3.2	2.9	3.0	3.3	2.7	3.3	2.9	24
6	3.6	S	3.6	3.7	3.1	3.3	2.8	2.7	2.7	2.7	X	X	3.1	3.1	2.8	2.8	2.8	3.3	3.2	3.3	4.0	4.5	5.2	**5.8**	2.7	**5.8**	3.4	22
7	S	4.7	5.4	5.1	4.8	3.5	4.0	5.1	4.4	3.3	2.8	X	X	1.9	1.7	1.9	1.9	1.7	1.7	1.7	1.9	2.4	2.9	S	1.7	5.4	3.1	22
8	1.8	1.8	2.0	1.9	1.9	1.7	1.6	1.6	1.8	1.8	1.7	1.9	1.9	1.8	1.7	1.6	1.4	1.4	1.3	1.3	1.3	1.5	S	1.0	1.0	2.0	1.6	24
9	1.2	1.3	1.6	1.5	1.3	1.5	1.4	1.4	1.4	1.5	1.7	1.7	0.8	1.0	1.0	1.0	1.2	0.9	0.8	0.9	0.9	S	0.8	0.8	0.8	1.7	1.2	24
10	0.8	0.9	0.9	1.1	1.1	1.1	1.0	1.1	0.8	1.6	1.5	1.0	1.0	1.2	0.8	0.8	0.8	0.8	0.9	0.9	S	0.9	0.8	1.0	0.8	1.6	1.0	24
11	1.0	0.8	0.8	0.9	0.9	1.2	1.2	X	X	1.1	1.2	1.1	1.0	0.9	1.3	1.4	1.5	1.3	1.6	S	1.4	1.4	1.3	1.3	0.8	1.6	1.2	22
12	1.3	1.4	1.5	1.5	1.3	1.4	1.4	1.4	1.4	1.2	1.2	1.2	1.2	1.5	1.5	1.4	1.4	1.3	S	1.5	1.5	1.5	1.7	1.7	1.2	1.7	1.4	24
13	2.0	2.1	1.9	1.9	2.2	2.1	2.3	2.3	2.5	2.8	2.9	2.8	3.1	3.3	3.5	3.1	3.2	S	2.8	2.9	2.9	2.8	2.8	2.8	1.9	3.5	2.7	24
14	2.9	2.9	3.1	3.0	2.7	2.7	2.9	2.7	2.9	2.9	2.9	3.1	2.9	3.0	3.1	3.6	S	3.4	3.3	3.7	3.5	3.5	3.5	3.7	2.7	3.7	3.1	24
15	3.6	3.5	3.4	3.5	3.5	3.4	3.5	3.5	3.3	3.6	3.5	3.4	3.3	3.3	3.3	S	3.1	3.2	3.4	3.3	3.3	3.4	2.9	3.0	2.9	3.6	3.4	24
16	3.2	3.1	3.2	3.2	3.3	3.3	3.2	2.9	3.2	2.9	3.0	3.1	2.7	2.7	S	2.6	2.8	2.9	2.7	2.6	2.6	2.8	2.7	2.4	2.4	3.3	2.9	24
17	2.6	2.5	2.4	2.5	2.3	2.4	2.5	2.5	2.5	2.6	2.4	2.7	3.5	S	4.3	3.5	3.0	2.9	3.3	3.4	2.9	3.0	3.0	3.2	2.3	4.3	2.9	24
18	3.1	3.3	3.2	3.4	3.5	3.6	3.8	3.7	3.7	3.9	4.0	4.2	S	4.3	4.6	4.7	4.8	4.7	4.9	4.8	4.9	4.9	4.7	4.6	3.1	4.9	4.1	24
19	4.4	4.1	3.9	3.9	3.6	3.6	3.6	3.4	3.2	3.2	3.3	S	3.1	3.1	3.1	3.3	3.0	2.9	2.9	2.9	2.9	2.9	2.8	2.8	2.8	4.4	3.3	24
20	2.8	2.5	2.4	2.4	2.3	2.2	2.3	2.1	2.4	3.0	S	2.4	2.3	2.5	2.3	2.3	2.0	1.9	2.2	2.3	2.2	2.3	2.3	2.0	1.9	3.0	2.3	24
21	2.3	2.1	2.2	2.0	2.1	2.1	2.4	2.3	2.6	S	2.5	2.5	2.7	2.6	2.7	2.9	3.0	2.9	2.9	2.9	3.0	3.1	3.1	3.3	2.0	3.3	2.6	24
22	3.3	3.3	3.6	3.6	4.1	3.8	3.9	3.9	S	3.9	4.0	3.9	4.0	3.9	3.8	4.0	4.1	3.9	3.8	3.9	3.7	3.7	3.6	3.7	3.3	4.1	3.8	24
23	3.7	3.9	3.6	3.5	3.7	3.6	3.5	S	3.5	3.6	3.5	3.5	3.5	3.5	3.3	3.5	3.4	3.3	3.4	3.3	3.2	3.2	3.2	3.2	3.2	3.9	3.5	24
24	3.2	2.9	3.0	3.2	3.0	3.1	S	3.0	3.3	3.1	3.3	3.1	3.4	3.2	3.5	3.5	3.8	3.9	4.1	3.8	4.1	3.9	4.1	4.1	2.9	4.1	3.5	24
25	4.0	4.2	3.9	4.1	3.8	S	3.8	4.0	4.1	3.7	4.0	3.8	3.8	4.0	3.7	3.8	3.7	3.7	3.8	3.7	3.7	3.9	3.7	3.7	3.7	4.2	3.9	24
26	3.9	3.8	3.8	3.9	S	3.9	3.9	3.8	4.1	4.1	3.9	4.1	4.1	4.1	4.4	4.3	4.1	3.6	3.8	3.5	3.8	3.5	3.5	3.9	3.5	4.4	3.9	24
27	3.9	3.7	3.7	S	3.8	3.9	3.7	3.9	3.8	3.8	3.7	3.6	3.7	3.6	3.6	3.7	3.6	3.5	3.8	3.5	3.3	3.4	3.3	3.7	3.3	3.9	3.7	24
28	3.6	3.4	S	3.4	3.4	3.5	3.6	3.7	3.5	3.5	3.6	3.7	3.6	4.1	3.9	3.7	3.9	3.9	4.1	3.7	3.8	3.9	3.9	3.9	3.4	4.1	3.7	24
29	4.1	S	3.9	3.8	3.7	3.7	3.9	3.9	3.7	4.1	4.0	3.9	4.1	3.9	4.1	4.1	4.2	4.0	4.2	4.3	4.3	4.2	4.3	4.4	3.7	4.4	4.0	24
30	S	4.2	4.3	4.5	4.3	4.3	4.1	4.4	4.3	4.3	4.0	3.9	3.9	3.8	3.8	3.8	3.8	3.7	3.5	3.5	3.5	3.5	3.2	S	3.2	4.5	3.9	24
31	3.3	3.4	3.2	3.5	3.5	3.6	3.8	3.7	4.1	5.2	5.6	5.2	4.5	3.8	4.1	4.2	4.3	3.8	4.0	4.0	4.1	4.0	S	4.0	3.2	5.6	4.0	24
HOURLY MAX	4.4	4.7	5.4	5.1	4.8	4.3	4.1	5.1	4.4	5.2	5.6	5.2	4.5	4.3	4.6	4.7	4.8	4.7	4.9	4.8	4.9	4.9	5.2	5.8				
HOURLY AVG	3.0	3.0	3.0	3.0	3.0	2.9	3.0	3.1	3.1	3.1	3.1	3.0	3.0	3.0	3.1	3.0	3.0	3.0	3.1	3.0	3.1	3.1	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

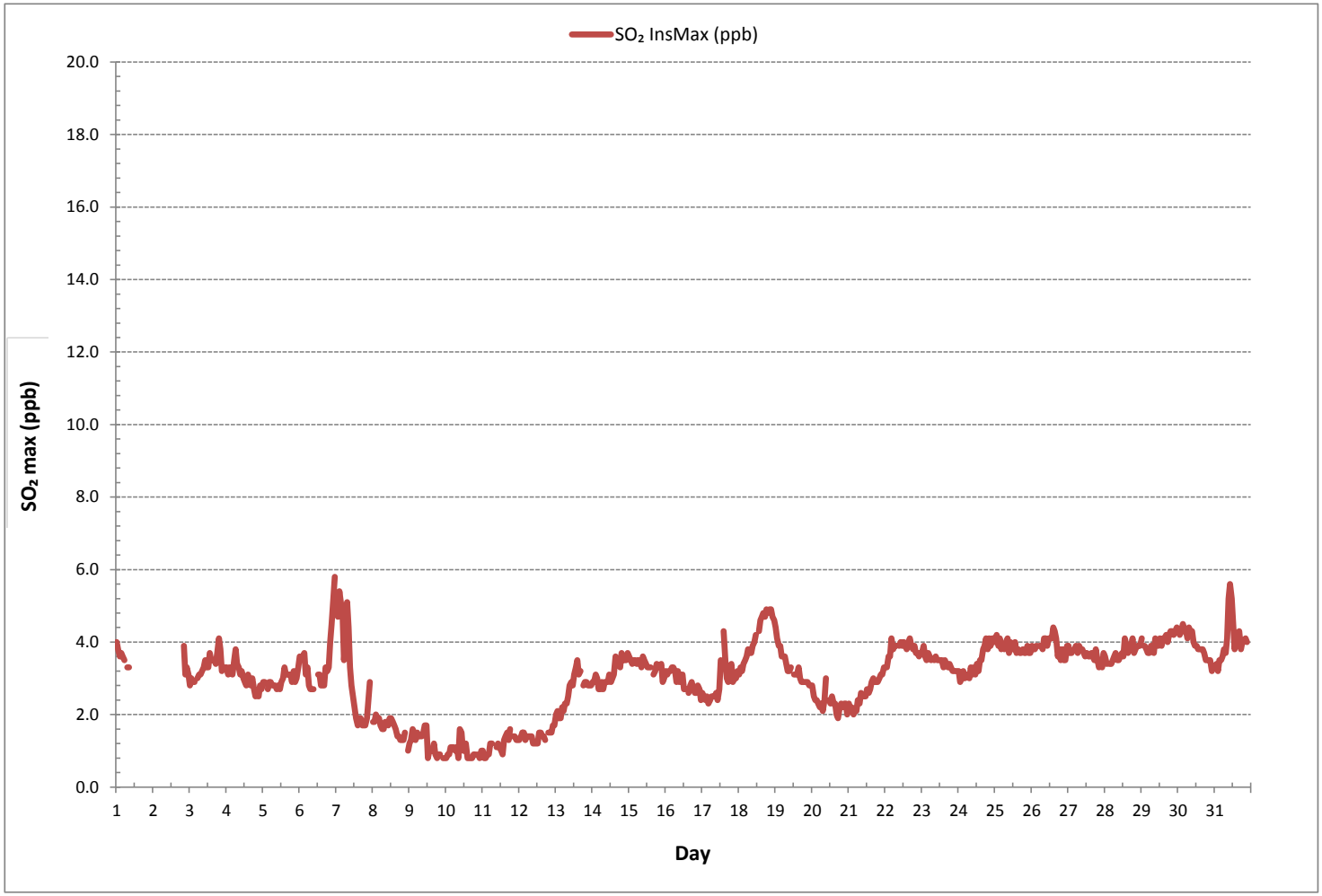
NUMBER OF NON-ZERO READINGS: 672

MAXIMUM INSTANTANEOUS VALUE: 5.8 ppb @ HOUR(S) 23 ON DAY(S) 6

VAR-VARIOUS

IZS CALIBRATION TIME: 32 hrs OPERATIONAL TIME: 716 hrs
MONTHLY CALIBRATION TIME: 10 hrs
STANDARD DEVIATION: 1.0

SULPHUR DIOXIDE Instantaneous Maximum (SO_2 ppb)



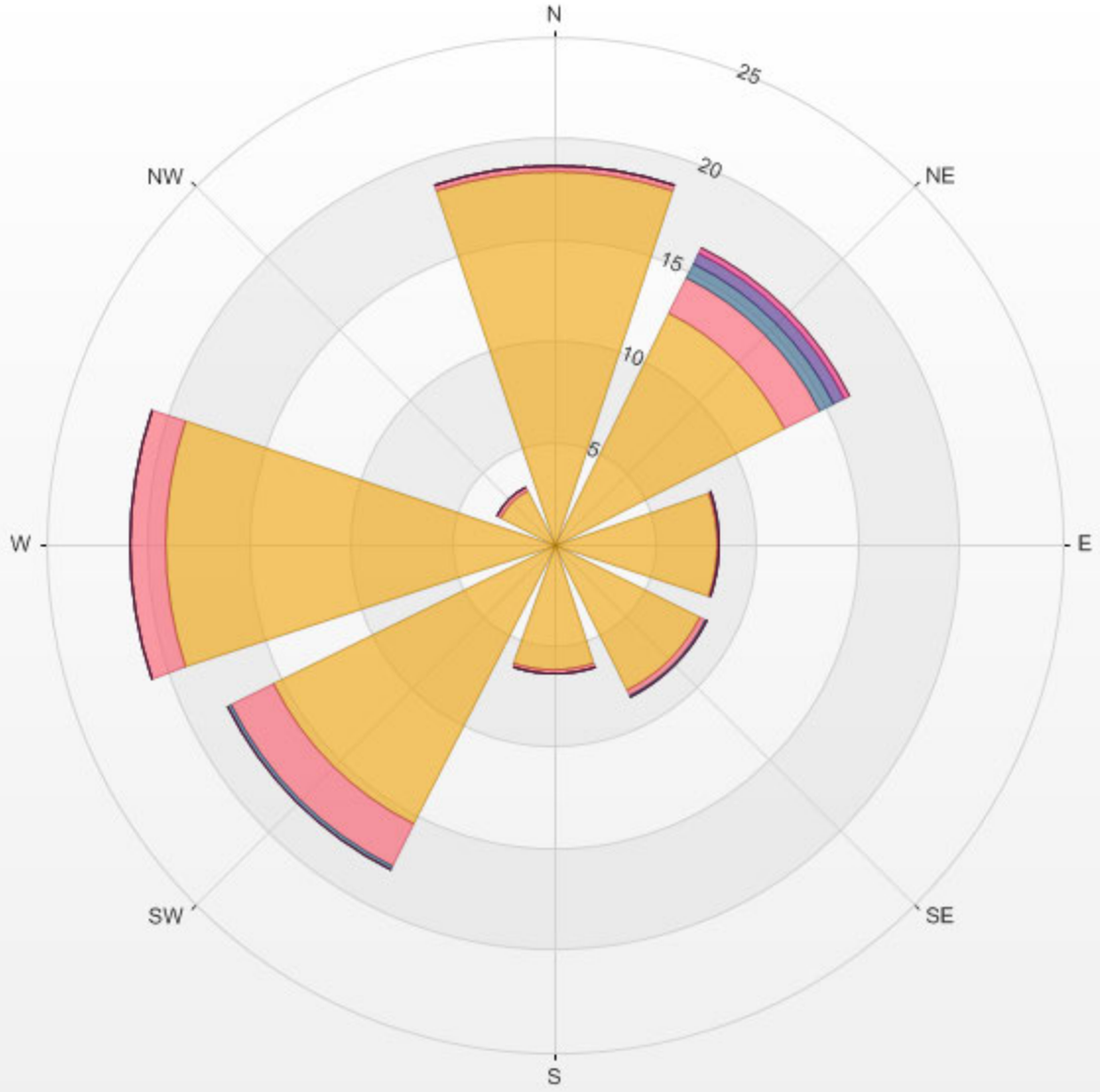
Wind: LICA ST. LINA
Poll.: LICA ST. LINA-SO2[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 0.15% Calm Avg: 0.12 [ppb]

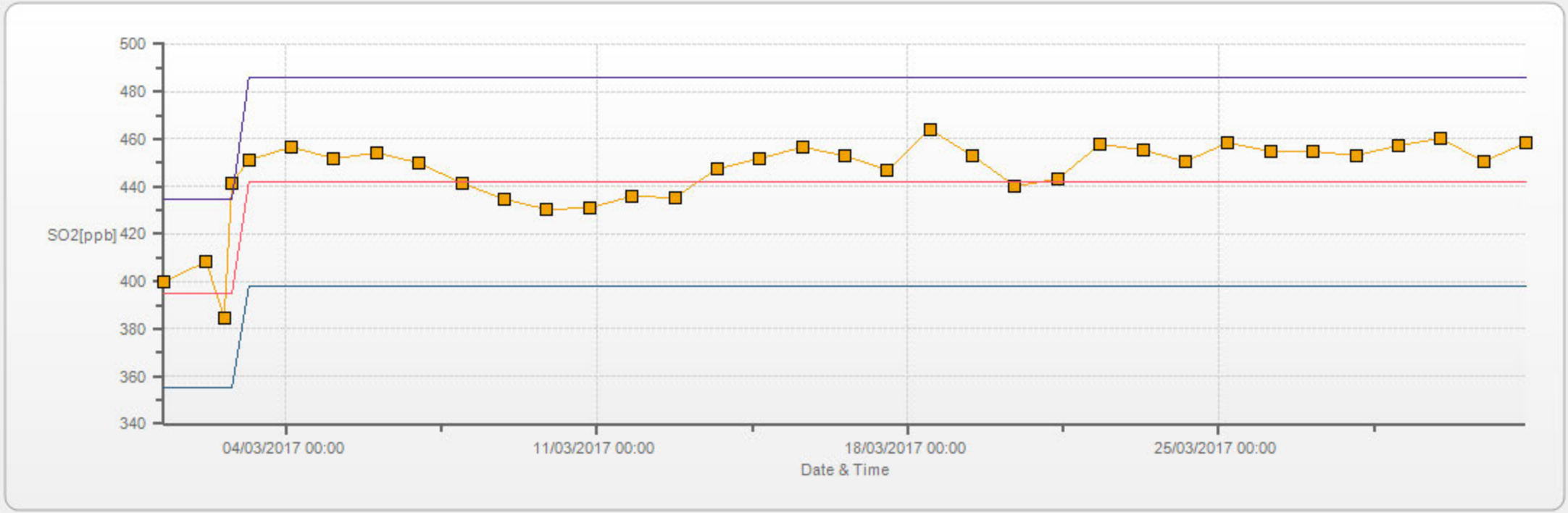
Direction	0.0-0.7	0.7-1.4	1.4-2.2	2.2-2.9	2.9-3.6	>3.6	Total
N	18.4	0.3	0.0	0.0	0.0	0.0	18.7
NE	12.7	1.9	0.7	0.6	0.3	0.0	16.3
E	8.0	0.2	0.0	0.0	0.0	0.0	8.2
SE	8.0	0.3	0.2	0.0	0.0	0.0	8.5
S	6.2	0.2	0.0	0.0	0.0	0.0	6.4
SW	15.4	2.4	0.2	0.0	0.0	0.0	17.9
W	19.1	1.8	0.0	0.0	0.0	0.0	20.9
NW	3.0	0.2	0.0	0.0	0.0	0.0	3.1
Summary	90.8	7.1	1.0	0.6	0.3	0.0	100.0

% Icon	Classes (ppb)											
	91	0.0-0.7	7	0.7-1.4	1	1.4-2.2	1	2.2-2.9	0	2.9-3.6	0	>3.6

LICA ST. LINA Poll.: LICA ST. LINA-SO2[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 0.15% Calm Poll Avg: 0.12[ppb]



SO2[ppb] Calibration: LICA ST. LINA Monthly: 17/03 Type: Span



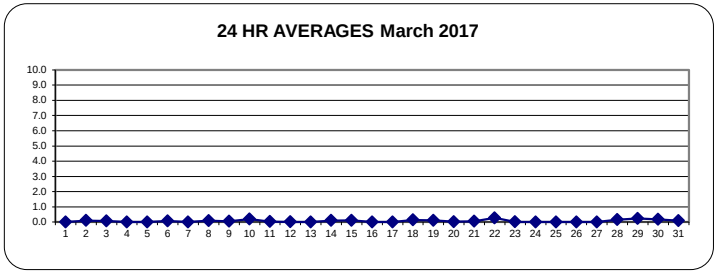
HYDROGEN SULPHIDE

HYDROGEN SULPHIDE Hourly Averages (H_2S ppb)

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

STATUS FLAG CODES

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

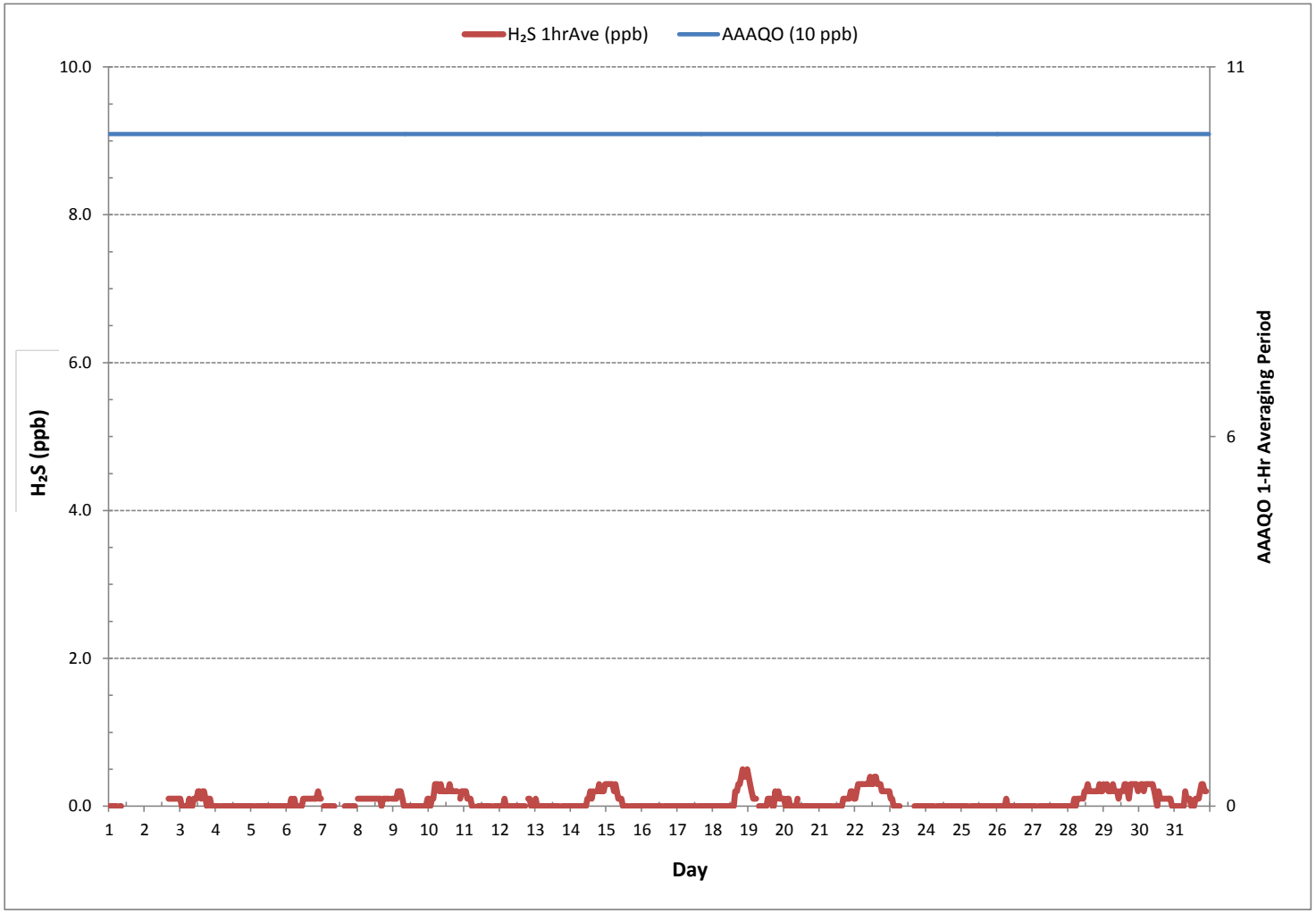


OBJECTIVE LIMIT: **ALBERTA ENVIRONMENT:** 1-HR 10 ppb | 24-HR 3 ppb

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF 24-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	256					
MINIMUM 1-HR AVERAGE	0.0	ppb	@ HOUR(S)	0	ON DAY(S)	1
MAXIMUM 1-HR AVERAGE:	0.5	ppb	@ HOUR(S)	20	ON DAY(S)	18
MAXIMUM 24-HR AVERAGE:	0.3	ppb			ON DAY(S)	22
					VAR-VARIOUS	
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:		706	hrs
MONTHLY CALIBRATION TIME:	11	hrs	AMD OPERATION UPTIME:		94.9	%
STANDARD DEVIATION:	0.1		MONTHLY AVERAGE:		0.1	ppb

HYDROGEN SULPHIDE Hourly Averages (H_2S ppb)



HYDROGEN SULPHIDE Instantaneous Maximum (H_2S ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	1.0	0.9	1.0	1.0	0.9	0.9	S	0.8	0.9	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	0.8	1.0	0.9	13
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	C	C	0.8	0.9	0.8	0.9	0.9	1.0	1.1	0.8	1.1	0.9	15
3	1.0	1.0	1.0	1.2	S	1.2	1.1	1.1	1.2	1.2	1.2	1.2	1.3	1.2	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.0	1.3	1.2	24
4	1.1	1.2	1.1	S	1.2	1.1	1.2	1.1	1.0	1.1	1.1	1.0	0.9	1.0	0.9	0.9	0.8	1.0	0.8	0.7	0.8	0.8	0.7	0.8	0.7	1.2	1.0	24
5	0.8	0.8	S	0.8	0.8	0.9	0.9	0.9	0.8	0.8	0.9	0.8	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	0.8	1.0	0.9	24
6	1.0	S	1.0	1.1	1.0	1.1	0.9	S1	S1	0.9	0.9	1.0	1.0	0.9	0.9	0.8	0.9	1.0	0.9	0.8	0.9	0.9	0.8	0.8	0.8	1.1	0.9	22
7	S	0.7	0.8	0.8	0.7	0.7	0.6	0.6	0.5	C1	C1	C1	C1	C1	C1	0.9	0.7	0.8	0.6	0.7	0.7	0.7	0.6	S	0.5	0.9	0.7	18
8	0.7	0.7	0.6	0.6	0.6	0.7	0.6	0.7	0.6	0.6	0.5	0.5	0.5	1.1	0.5	0.5	0.4	0.4	0.5	0.5	0.4	0.3	S	0.4	0.3	1.1	0.6	24
9	0.4	0.4	0.5	0.4	0.5	0.5	0.3	0.2	0.2	0.1	0.2	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	S	0.0	0.1	0.0	0.5	0.2	24
10	0.1	0.0	0.1	0.1	0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1	S	0.0	0.1	0.1	0.0	0.3	0.1	24
11	0.1	0.3	0.1	0.1	0.2	0.1	0.2	X	X	0.2	0.2	0.2	0.1	0.2	0.3	0.3	0.3	0.3	0.3	S	0.4	0.4	0.4	0.3	0.1	0.4	0.2	22
12	0.4	0.5	0.3	0.4	0.3	0.3	0.2	0.2	0.3	0.2	0.4	0.2	0.2	0.3	0.2	0.3	0.2	0.2	S	0.4	0.5	0.5	0.4	0.4	0.2	0.5	0.3	24
13	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.7	1.4	0.7	0.7	0.8	0.9	0.9	0.8	0.9	0.8	S	1.0	0.9	0.9	0.9	0.9	0.9	0.5	1.4	0.8	24
14	0.9	0.9	1.1	0.9	0.9	1.1	0.8	0.9	0.9	0.9	0.9	1.0	1.1	1.2	1.1	1.2	S	1.1	1.2	1.3	1.2	1.2	1.3	1.2	0.8	1.3	1.1	24
15	1.3	1.5	1.4	1.3	1.3	1.3	1.4	1.3	1.2	1.2	1.2	1.1	1.2	1.2	1.1	S	1.1	1.1	1.1	1.0	1.1	1.0	1.0	1.1	1.0	1.5	1.2	24
16	1.1	1.0	1.0	1.0	1.1	1.2	1.1	1.1	1.0	1.0	1.1	1.0	0.9	0.9	S	0.9	0.8	0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.7	1.2	0.9	24
17	0.7	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.6	0.8	0.6	0.7	0.7	S	0.7	0.7	0.8	0.8	0.8	0.8	1.6	1.0	1.0	1.0	0.5	1.6	0.8	24
18	1.1	1.1	1.1	1.1	1.3	1.3	1.2	1.3	1.4	1.4	1.5	1.5	S	1.6	1.6	1.7	1.8	1.8	1.9	1.9	1.9	1.9	1.8	1.7	1.1	1.9	1.5	24
19	1.7	1.5	1.4	1.2	1.2	1.2	S1	S1	1.0	0.9	0.9	S	0.9	0.9	0.9	1.0	0.7	0.7	0.9	0.7	0.8	0.7	0.6	0.7	0.6	1.7	1.0	22
20	0.7	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.3	S	0.3	0.2	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.1	0.2	0.1	0.7	0.3	24
21	0.3	0.3	0.4	0.2	0.4	0.5	0.5	0.4	0.5	S	0.4	0.5	0.5	0.7	0.6	0.7	0.7	0.8	0.7	0.8	0.8	0.9	1.0	0.9	0.2	1.0	0.6	24
22	0.9	1.0	1.0	1.1	1.1	1.2	1.3	1.2	S	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	0.9	1.3	1.2	24
23	1.1	1.1	1.1	1.2	1.2	1.0	1.0	S	1.0	C1	C1	Y	C1	C1	C1	C1	0.4	0.5	0.6	0.6	0.5	0.6	0.6	0.4	0.4	1.2	0.8	17
24	0.3	0.4	0.4	0.4	0.4	0.5	S	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.3	0.9	0.6	24
25	0.9	0.9	0.8	0.9	0.8	S	0.8	0.8	0.7	0.8	0.8	0.7	0.8	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.9	0.8	24
26	0.7	0.7	0.7	0.7	S	0.8	0.9	0.8	0.7	0.8	0.7	0.8	0.7	0.6	0.6	0.7	0.8	0.8	0.7	0.7	0.8	0.7	0.7	0.7	0.6	0.9	0.7	24
27	0.7	0.7	0.7	S	0.7	0.6	0.7	0.6	0.5	0.9	0.6	0.6	0.5	0.5	0.4	0.5	0.5	0.5	0.7	0.5	0.7	0.6	0.6	0.6	0.4	0.9	0.6	24
28	1.5	0.6	S	0.6	0.6	0.6	0.7	0.7	0.7	Y	0.7	0.7	0.7	1.3	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.6	1.5	0.8	23
29	0.9	S	0.9	1.0	0.9	0.9	0.9	0.8	0.9	0.8	0.8	0.8	0.9	1.0	1.0	1.0	0.9	0.9	1.0	1.0	1.0	1.1	1.0	0.9	0.8	1.1	0.9	24
30	S	1.0	0.9	0.9	0.9	1.0	0.9	1.0	0.9	0.8	0.7	0.8	0.7	0.6	0.6	0.7	0.6	0.6	0.5	0.6	0.6	0.4	0.4	S	0.4	1.0	0.7	24
31	0.4	0.5	0.4	0.4	0.5	0.4	0.3	0.7	0.6	0.6	0.6	0.5	0.5	0.6	0.7	0.7	0.7	0.8	0.8	1.0	0.8	0.7	S	0.9	0.3	1.0	0.6	24
HOURLY MAX	1.7	1.5	1.4	1.3	1.3	1.3	1.4	1.3	1.4	1.4	1.5	1.5	1.3	1.6	1.6	1.7	1.8	1.8	1.9	1.9	1.9	1.9	1.8	1.7				
HOURLY AVG	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.8	0.7	0.8	0.7	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: 648

MAXIMUM INSTANTANEOUS VALUE: 1.9 ppb @ HOUR(S) 18 ON DAY(S) 18

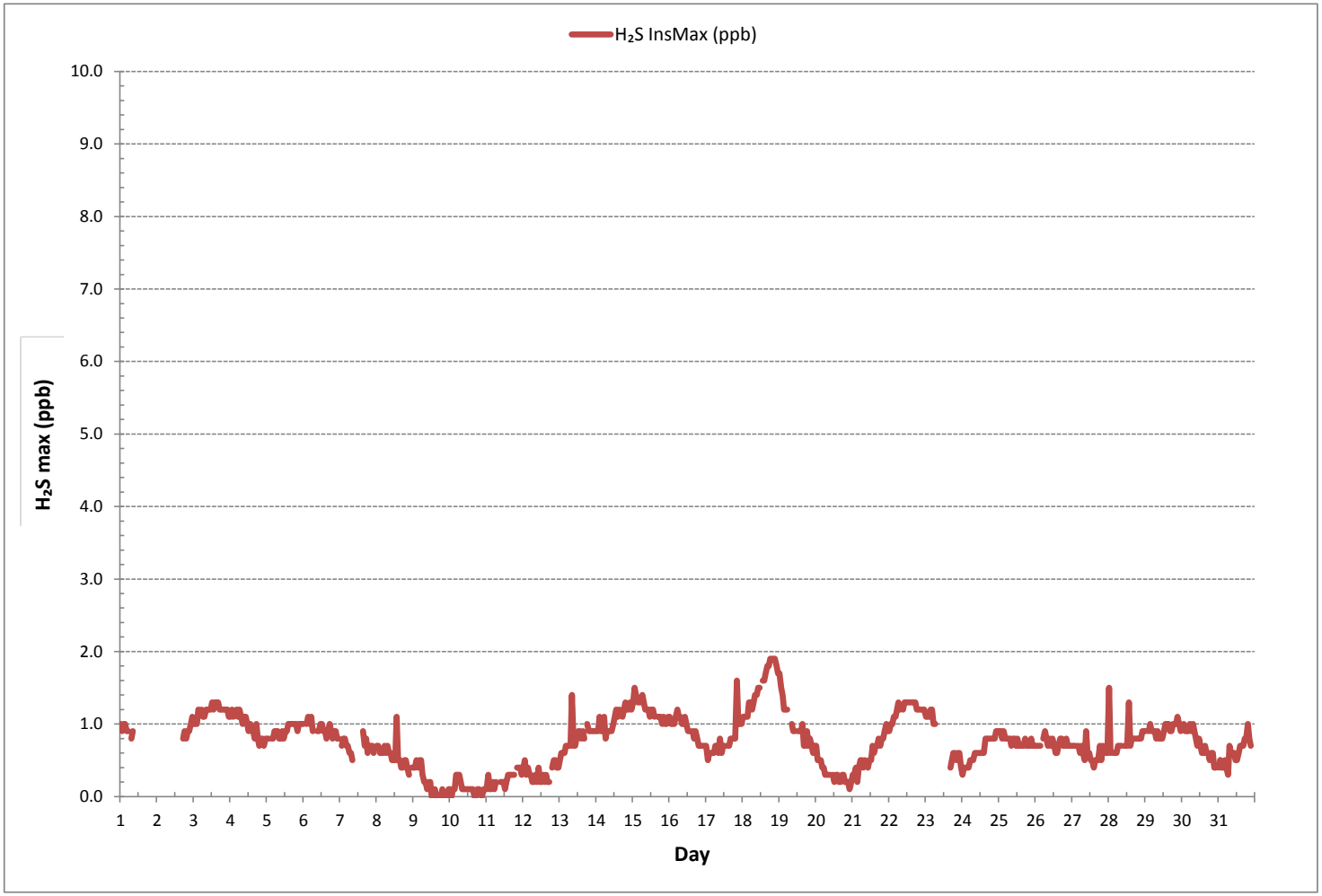
VAR-VARIOUS

IZS CALIBRATION TIME: 32 hrs OPERATIONAL TIME: 704 hrs

MONTHLY CALIBRATION TIME: 12 hrs

STANDARD DEVIATION: 0.4

HYDROGEN SULPHIDE Instantaneous Maximum (H_2S ppb)



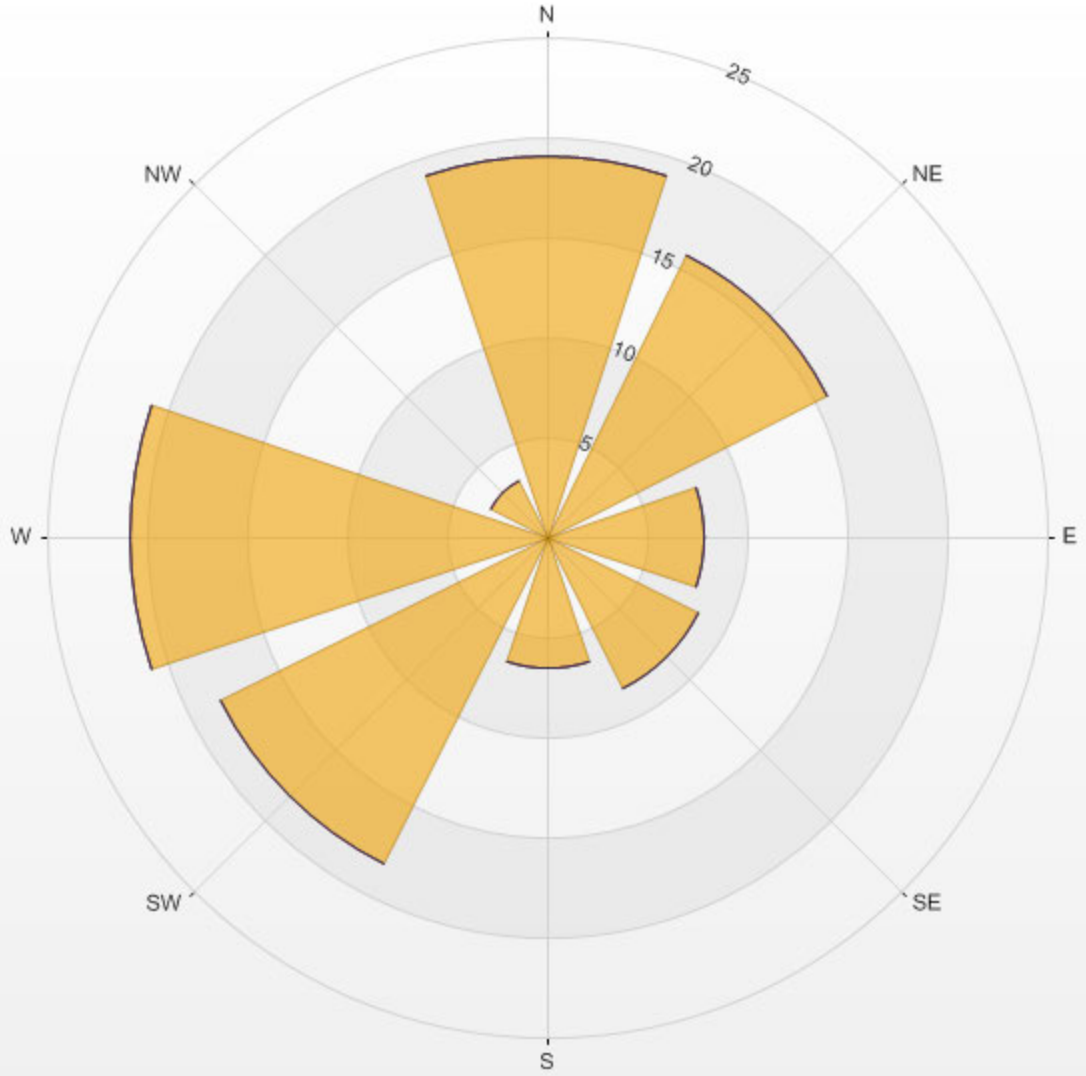
Wind: LICA ST. LINA
Poll.: LICA ST. LINA-H2S[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 0.15% Calm Avg: 0.00 [ppb]

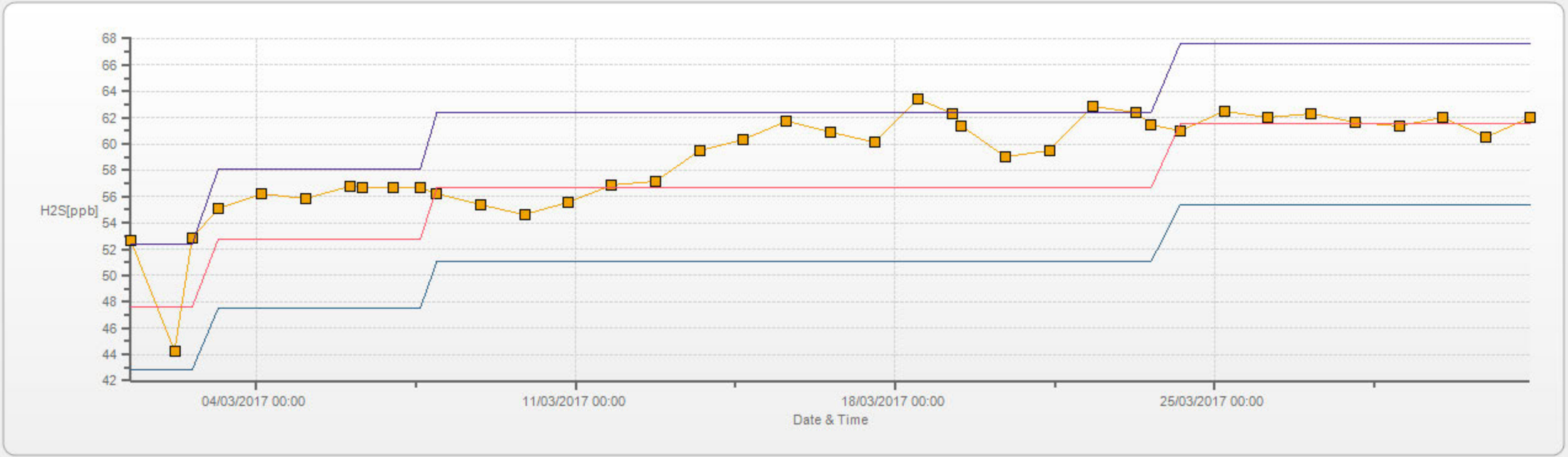
Direction	0.0-0.6	0.6-1.3	1.3-1.9	>1.9	Total
N	19.0	0.0	0.0	0.0	19.0
NE	15.7	0.0	0.0	0.0	15.7
E	7.9	0.0	0.0	0.0	7.9
SE	8.5	0.0	0.0	0.0	8.5
S	6.5	0.0	0.0	0.0	6.5
SW	18.3	0.0	0.0	0.0	18.3
W	20.9	0.0	0.0	0.0	20.9
NW	3.2	0.0	0.0	0.0	3.2
Summary	100.0	0.0	0.0	0.0	100.0

% Icon Classes (ppb)	100 0.0-0.6	0 0.6-1.3	0 1.3-1.9	0 >1.9

LICA ST. LINA Poll.: LICA ST. LINA-H2S[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 0.15% Calm Poll Avg: 0.00[ppb]



H2S[ppb] Calibration: LICA ST. LINA Monthly: 17/03 Type: Span



TOTAL HYDROCARBON

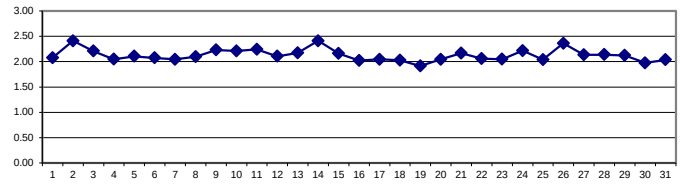
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (MST) / HR END (MST) / DAY	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
1	2.06	2.05	2.05	2.02	2.02	2.03	S	2.05	2.10	2.09	2.13	2.09	C	C	C	C	Y	C	C	C	C	2.15	2.12	2.12	2.02	2.15	2.08	23
2	2.09	2.12	2.14	2.28	2.28	S	2.28	2.48	2.37	2.43	2.40	2.40	2.42	2.59	2.67	**2.74**	2.57	2.45	2.41	2.47	2.56	2.47	2.42	2.38	2.09	**2.74**	**2.41**	24
3	2.32	2.36	2.36	2.33	S	2.36	2.39	2.39	2.38	2.29	2.24	2.25	2.21	2.20	2.13	2.05	2.02	2.22	2.12	2.09	2.07	2.00	1.99	1.98	1.98	2.39	2.21	24
4	1.98	1.98	2.02	S	2.02	2.04	2.06	2.07	2.05	2.06	2.06	2.05	2.06	2.05	2.03	2.03	2.03	2.05	2.05	2.06	2.05	2.04	2.09	2.12	1.98	2.12	2.05	24
5	2.05	2.05	S	2.08	2.05	2.06	2.05	2.07	2.09	2.08	2.08	2.08	2.09	2.11	2.11	2.11	2.12	2.12	2.12	2.13	2.15	2.29	2.21	2.13	2.05	2.29	2.11	24
6	2.11	S	2.33	2.16	2.14	2.12	2.04	2.05	2.04	2.03	2.04	2.03	2.03	2.03	2.03	2.03	2.04	2.07	2.07	2.06	2.04	2.04	2.07	2.07	2.03	2.33	2.07	24
7	S	2.05	2.06	2.05	2.07	2.07	2.07	2.07	2.07	2.10	2.06	2.02	2.02	2.02	2.00	2.00	2.03	2.05	2.04	2.03	2.03	2.03	2.04	S	2.00	2.10	2.04	24
8	2.03	2.05	2.17	2.19	2.16	2.16	2.11	2.26	2.22	2.11	2.10	2.07	2.06	2.06	2.06	2.05	2.00	2.02	2.03	2.05	2.06	2.06	S	2.18	2.00	2.26	2.10	24
9	2.27	2.22	2.23	2.30	2.38	2.37	2.33	2.32	2.24	2.20	2.21	2.16	2.12	2.13	2.12	2.15	2.18	2.17	2.26	2.18	2.15	S	2.30	2.31	2.12	2.38	2.23	24
10	2.29	2.19	2.19	2.27	2.35	2.47	2.58	2.50	2.32	2.23	2.18	2.11	2.09	2.07	2.07	2.07	2.08	2.09	2.10	2.11	S	2.12	2.15	2.19	2.07	2.58	2.21	24
11	2.20	2.24	2.32	2.38	2.38	2.41	2.44	X	X	2.39	2.38	2.37	2.25	2.28	2.22	2.17	2.14	2.10	2.07	S	2.12	2.13	2.06	2.03	2.03	2.44	2.24	22
12	2.02	2.03	2.02	2.03	2.05	2.05	2.07	2.07	2.08	2.09	2.08	2.08	2.13	2.11	2.10	2.16	2.19	2.20	S	2.21	2.16	2.19	2.14	2.14	2.02	2.21	2.10	24
13	2.16	2.15	2.14	2.14	2.15	2.15	2.22	2.34	2.25	2.14	2.15	2.15	2.13	2.14	2.12	2.12	2.14	S	2.17	2.20	2.21	2.17	2.19	2.21	2.12	2.34	2.17	24
14	2.23	2.23	2.24	2.23	2.26	2.30	2.30	2.30	2.31	2.30	2.34	2.39	2.67	2.69	2.72	2.65	S	2.58	2.56	2.55	2.47	2.39	2.35	2.34	2.23	2.72	2.41	24
15	2.30	2.28	2.28	2.27	2.32	2.33	2.35	2.38	2.31	2.29	2.26	2.19	2.08	2.02	2.02	S	1.99	2.01	2.00	2.01	2.00	2.01	1.99	2.01	1.99	2.38	2.16	24
16	2.01	2.00	2.00	2.00	1.99	2.00	2.03	2.04	2.05	2.04	2.01	1.98	1.96	1.98	S	1.97	1.99	2.09	2.05	2.06	2.05	2.04	2.07	2.11	1.96	2.11	2.02	24
17	2.06	2.11	2.07	2.06	2.04	2.05	2.03	2.02	2.01	1.97	1.98	1.98	1.99	S	1.98	2.02	2.03	2.08	2.15	2.11	2.13	2.05	2.04	2.05	1.97	2.15	2.04	24
18	2.13	2.16	2.14	2.13	2.13	2.15	2.12	2.11	2.08	2.08	2.08	2.10	S	2.04	2.02	2.00	1.97	1.92	1.91	**1.85**	1.88	1.90	1.85	1.87	**1.85**	2.16	2.03	24
19	1.86	1.88	1.88	1.89	1.92	1.93	1.95	1.95	1.96	1.96	1.96	S	1.93	1.92	1.93	1.90	1.89	1.90	1.91	1.89	1.90	1.91	1.92	1.94	1.86	1.96	1.92	24
20	1.96	1.98	1.99	2.01	2.01	2.02	2.03	2.03	2.03	2.04	S	2.03	2.05	2.03	2.02	2.02	2.03	2.03	2.05	2.12	2.12	2.11	2.17	2.15	1.96	2.17	2.04	24
21	2.14	2.13	2.11	2.14	2.41	2.67	2.66	2.42	2.24	S	2.16	2.07	2.08	2.07	2.05	2.03	2.03	2.05	2.06	2.05	2.04	2.04	2.06	2.06	2.03	2.67	2.16	24
22	2.06	2.06	2.06	2.06	2.07	2.08	2.09	2.08	S	2.07	2.07	2.06	2.07	2.04	2.01	2.03	2.05	2.05	2.07	2.09	2.07	2.04	2.02	2.01	2.01	2.09	2.06	24
23	2.03	2.02	2.02	2.02	2.02	2.03	2.02	S	2.00	2.01	2.04	2.05	2.04	2.01	1.98	2.01	2.05	2.05	2.11	2.09	2.09	2.12	2.11	2.14	1.98	2.14	2.05	24
24	2.13	2.13	2.14	2.17	2.21	2.16	S	2.24	2.45	2.61	2.70	2.45	2.39	2.33	2.39	2.30	2.18	2.08	2.01	1.99	1.98	1.99	1.97	1.96	1.96	2.70	2.22	24
25	1.97	1.95	1.97	1.98	2.01	S	2.03	2.07	2.09	2.05	2.04	2.06	2.03	2.00	1.98	1.99	2.01	2.02	2.06	2.10	2.17	2.10	2.09	2.14	1.95	2.17	2.04	24
26	2.21	2.18	2.20	2.26	S	2.43	2.52	2.46	2.51	2.57	2.56	2.51	2.33	2.26	2.24	2.33	2.38	2.50	2.52	2.36	2.29	2.27	2.18	2.22	2.18	2.57	2.36	24
27	2.29	2.33	2.33	S	2.23	2.18	2.12	2.09	2.09	2.17	2.18	2.14	2.12	2.08	2.05	2.06	2.09	2.09	2.08	2.08	2.07	2.08	2.09	2.08	2.05	2.33	2.14	24
28	2.10	2.11	S	2.16	2.17	2.20	2.23	2.24	2.23	2.18	2.16	2.17	2.20	2.23	2.16	2.12	2.08	2.06	2.06	2.07	2.06	2.05	2.05	2.05	2.05	2.24	2.14	24
29	2.09	S	2.16	2.16	2.10	2.10	2.08	2.08	2.07	2.07	2.08	2.08	2.11	2.10	2.07	2.04	2.05	2.08	2.12	2.11	2.17	2.17	2.36	2.34	2.04	2.36	2.12	24
30	S	2.09	2.08	2.00	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.93	1.94	1.95	1.97	1.96	1.96	1.99	1.99	2.00	1.96	1.96	1.99	S	1.93	2.09	1.97	24
31	2.03	2.03	2.04	2.05	2.09	2.12	2.17	2.20	2.19	2.16	2.06	2.02	2.01	1.97	1.96	1.96	1.96	1.94	1.92	1.97	1.96	1.98	S	2.01	1.92	2.20	2.03	24
HOURLY MAX	2.32	2.36	2.36	2.38	2.41	2.67	2.66	2.50	2.51	2.61	2.70	2.51	2.67	2.69	2.72	2.74	2.57	2.58	2.56	2.55	2.56	2.47	2.42	2.38				
HOURLY AVG	2.11	2.11	2.13	2.13	2.14	2.17	2.18	2.18	2.16	2.16	2.16	2.14	2.12	2.12	2.11	2.11	2.08	2.11	2.11	2.11	2.10	2.10	2.11	2.12				

STATUS FLAG CODES

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

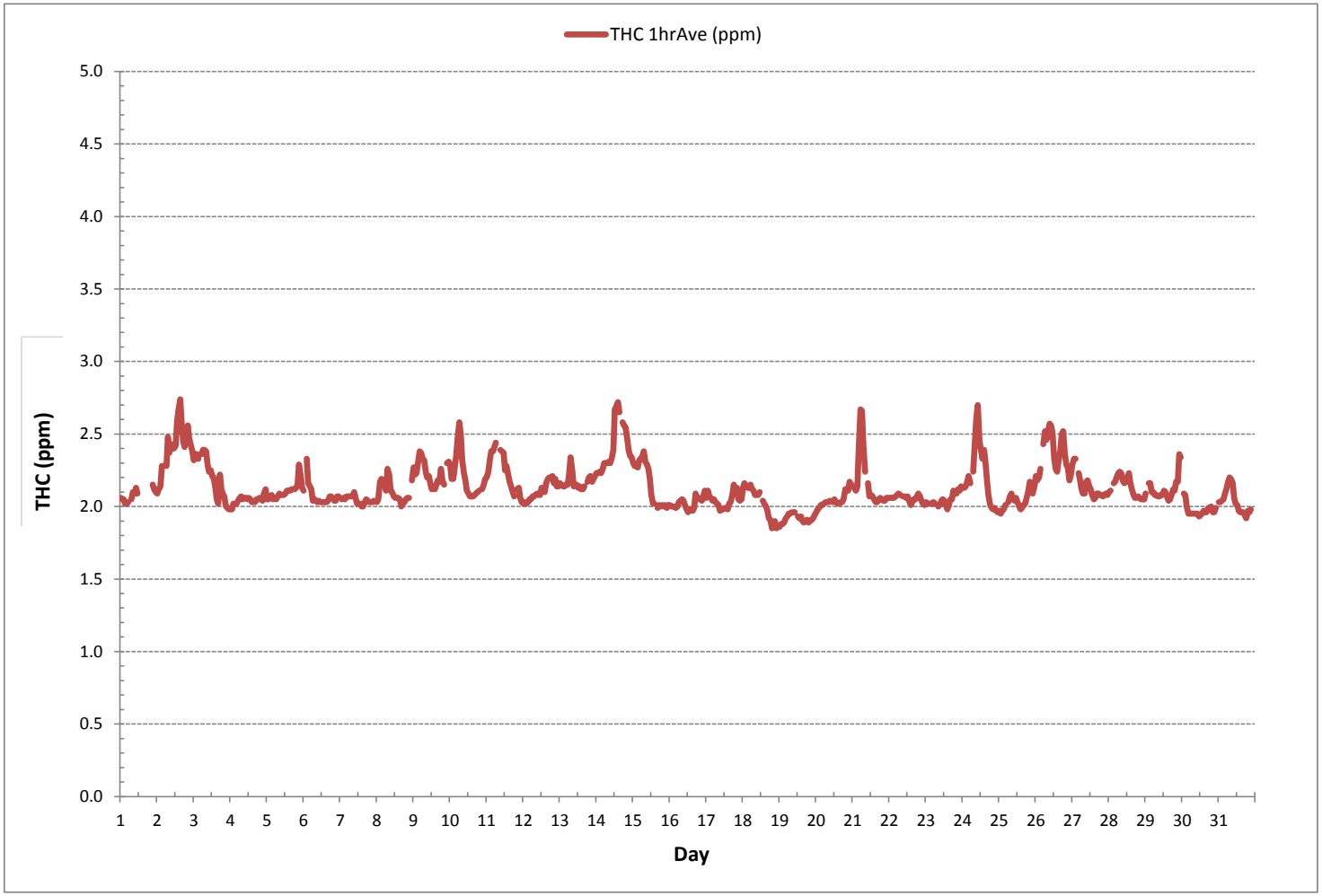
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			700				
MINIMUM 1-HR AVERAGE	1.85	ppm	@ HOUR(S)	19	ON DAY(S)	18	
MAXIMUM 1-HR AVERAGE:	2.74	ppm	@ HOUR(S)	15	ON DAY(S)	2	
MAXIMUM 24-HR AVERAGE:	2.41	ppm			ON DAY(S)	2	
					VAR-VARIOUS		
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:			741	hrs
MONTHLY CALIBRATION TIME:	8	hrs	AMD OPERATION UPTIME:			99.6	%
STANDARD DEVIATION:	0.15		MONTHLY AVERAGE:			2.13	ppm

TOTAL HYDROCARBONS Hourly Averages (THC ppm)



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	2.41	2.41	2.41	2.38	2.38	2.39	S	2.38	2.44	2.51	2.58	C	C	C	C	C	Y	C	C	C	C	2.60	2.51	2.49	2.38	2.60	2.45	23
2	2.17	2.23	2.30	2.61	2.51	S	2.49	2.58	2.45	2.47	2.42	2.39	2.41	2.66	2.64	2.73	2.61	2.39	2.38	2.59	2.50	2.41	2.32	2.26	2.17	2.73	2.46	24
3	2.20	2.22	2.23	2.17	S	2.20	2.25	2.23	2.23	2.17	2.08	2.10	2.08	2.07	1.95	1.89	1.91	2.14	2.11	1.89	1.89	1.82	1.79	1.78	1.78	2.25	2.06	24
4	1.78	1.78	1.85	S	1.82	1.83	1.86	1.88	1.86	1.88	1.89	1.89	1.89	1.88	1.86	1.86	1.86	1.89	1.89	1.91	1.89	1.89	1.95	1.98	1.78	1.98	1.87	24
5	1.92	1.91	S	1.95	1.89	1.91	1.91	1.92	1.94	1.92	1.92	1.92	1.92	1.95	1.94	1.94	1.95	1.94	1.94	1.95	1.97	2.47	2.14	1.94	1.89	2.47	1.96	24
6	1.92	S	2.22	2.08	2.10	2.11	1.85	1.89	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.88	1.91	1.92	1.89	1.89	1.91	1.92	1.94	1.85	2.22	1.93	24
7	S	1.94	1.94	1.94	1.95	1.98	1.98	1.98	1.98	2.16	2.04	1.98	1.98	2.01	1.98	2.04	2.22	2.02	2.02	2.02	2.04	2.04	2.07	S	1.94	2.22	2.01	24
8	2.05	2.11	2.23	2.23	2.22	2.26	2.22	2.35	2.35	2.17	2.16	2.13	2.13	2.11	2.11	2.11	2.08	2.10	2.13	2.14	2.14	2.15	S	2.32	2.05	2.35	2.17	24
9	2.39	2.35	2.35	2.47	2.51	2.51	2.47	2.44	2.39	2.32	2.34	2.33	2.25	2.26	2.26	2.32	2.33	2.35	**2.81**	2.36	2.35	S	2.58	2.63	2.25	**2.81**	2.41	24
10	2.49	2.35	2.38	2.44	2.56	2.66	2.72	2.69	2.53	2.39	2.32	2.25	2.22	2.19	2.18	2.18	2.20	2.22	2.23	2.26	S	2.32	2.32	2.35	2.18	2.72	2.37	24
11	2.36	2.38	2.45	2.54	2.54	2.53	2.53	X	X	2.51	2.49	2.49	2.35	2.35	2.29	2.25	2.23	2.17	2.13	S	2.20	2.20	2.15	2.11	2.11	2.54	2.35	22
12	2.08	2.09	2.10	2.10	2.11	2.13	2.14	2.14	2.15	2.16	2.14	2.17	2.22	2.20	2.18	2.25	2.29	2.29	S	2.29	2.23	2.23	2.19	2.17	2.08	2.29	2.18	24
13	2.18	2.17	2.14	2.11	2.14	2.14	2.32	2.32	2.23	2.10	2.08	2.11	2.05	2.04	2.02	2.02	2.04	S	2.05	2.08	2.10	2.04	2.07	2.09	2.02	2.32	2.11	24
14	2.11	2.11	2.11	2.11	2.14	2.17	2.16	2.17	2.16	2.14	2.25	2.32	2.54	2.54	2.57	2.57	S	2.44	2.39	2.39	2.32	2.22	2.17	2.17	2.11	2.57	2.27	24
15	2.11	2.10	2.10	2.08	2.13	2.14	2.16	2.17	2.14	2.11	2.04	2.01	1.86	1.81	1.78	S	1.78	1.81	1.81	1.79	1.79	1.81	1.78	1.81	1.78	2.17	1.96	24
16	1.83	1.81	1.83	1.81	1.81	1.84	1.88	1.88	1.89	1.89	1.84	1.83	1.83	1.83	S	1.83	1.88	2.04	1.98	1.95	1.95	1.95	2.08	2.08	1.81	2.08	1.89	24
17	2.02	2.11	2.08	2.05	2.01	2.01	2.01	2.01	2.01	1.98	1.98	2.01	2.01	S	1.98	2.01	2.01	2.11	2.14	2.08	2.10	2.04	1.98	1.98	1.98	2.14	2.03	24
18	2.05	2.08	2.04	2.01	2.01	2.01	1.97	1.95	1.92	1.92	1.89	1.89	S	1.85	1.83	1.82	1.81	1.76	1.75	1.69	1.78	1.78	1.72	1.75	1.69	2.08	1.88	24
19	1.76	1.78	1.78	1.79	1.83	1.83	1.85	1.86	1.88	1.89	1.89	S	1.86	1.86	1.88	1.86	1.86	1.88	1.89	1.88	1.89	1.92	1.92	1.97	1.76	1.97	1.86	24
20	2.01	2.04	2.04	2.07	2.08	2.10	2.11	2.11	2.11	2.14	S	2.11	2.13	2.11	2.10	2.11	2.11	2.11	2.11	2.29	2.26	2.29	2.28	2.23	2.01	2.29	2.13	24
21	2.19	2.19	2.16	2.25	2.60	2.76	2.73	2.60	2.32	S	2.25	2.07	2.07	2.07	2.01	1.99	1.98	1.98	1.98	1.97	1.94	1.92	1.94	1.92	1.92	2.76	2.17	24
22	1.92	1.92	1.91	1.89	1.89	1.89	1.91	1.89	S	1.86	1.86	1.86	1.86	1.86	1.83	1.85	1.86	1.88	1.89	1.92	1.89	1.89	1.84	1.85	1.83	1.92	1.88	24
23	1.85	1.85	1.86	1.86	1.86	1.86	1.86	S	1.85	1.91	1.91	1.91	1.91	1.89	1.85	1.95	1.92	1.95	2.08	1.99	2.04	2.04	2.04	2.11	1.85	2.11	1.93	24
24	2.05	2.06	2.08	2.28	2.26	2.14	S	2.35	2.45	2.81	2.78	2.49	2.38	2.29	2.32	2.26	2.11	2.04	1.92	1.91	1.89	1.89	1.86	1.85	1.85	***2.81***	2.19	24
25	1.85	1.83	1.85	1.85	1.92	S	1.89	1.95	1.98	1.94	1.92	1.92	1.92	1.86	1.85	1.88	1.88	1.91	1.95	1.98	2.22	2.04	1.99	2.04	1.83	2.22	1.93	24
26	2.16	2.08	2.11	2.23	S	2.38	2.49	2.38	2.45	2.51	2.52	2.49	2.38	2.20	2.20	2.33	2.38	2.42	2.47	2.36	2.29	2.23	2.19	2.23	2.08	2.52	2.33	24
27	2.26	2.26	2.31	S	2.20	2.13	2.10	2.04	2.04	2.11	2.13	2.08	2.08	2.04	2.01	2.01	2.04	2.04	2.05	2.04	2.04	2.04	2.05	2.05	2.01	2.31	2.09	24
28	2.10	2.08	S	2.16	2.13	2.17	2.18	2.20	2.19	2.14	2.11	2.19	2.17	2.17	2.13	2.05	2.05	2.01	1.98	1.99	1.98	1.99	1.98	1.97	1.97	2.20	2.09	24
29	2.04	S	2.11	2.11	2.11	2.01	1.99	1.99	1.98	1.97	1.98	1.98	2.01	1.99	1.95	1.95	1.95	2.07	2.05	1.98	2.08	2.11	2.41	2.29	1.95	2.41	2.05	24
30	S	1.97	1.97	1.95	1.83	1.86	1.86	1.86	1.94	1.89	1.91	1.86	1.89	1.89	1.92	1.91	1.94	2.01	1.97	1.98	1.95	1.98	2.05	S	1.83	2.05	1.93	24
31	2.05	2.04	2.01	2.04	2.08	2.08	2.14	2.17	2.14	2.14	2.04	1.97	1.95	1.92	1.89	1.88	1.86	1.85	1.83	1.89	1.86	1.86	S	1.89	1.83	2.17	1.98	24
HOURLY MAX	2.49	2.41	2.45	2.61	2.60	2.76	2.73	2.69	2.53	2.81	2.78	2.49	2.54	2.66	2.64	2.73	2.61	2.44	2.81	2.59	2.50	2.60	2.58	2.63				
HOURLY AVG	2.08	2.08	2.10	2.12	2.12	2.14	2.14	2.15	2.13	2.13	2.12	2.09	2.08	2.06	2.05	2.06	2.04	2.06	2.06	2.05	2.05	2.07	2.08	2.08				

STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS: 699

MAXIMUM INSTANTANEOUS VALUE: 2.81 ppm @ HOUR(S) 18 ON DAY(S) 9

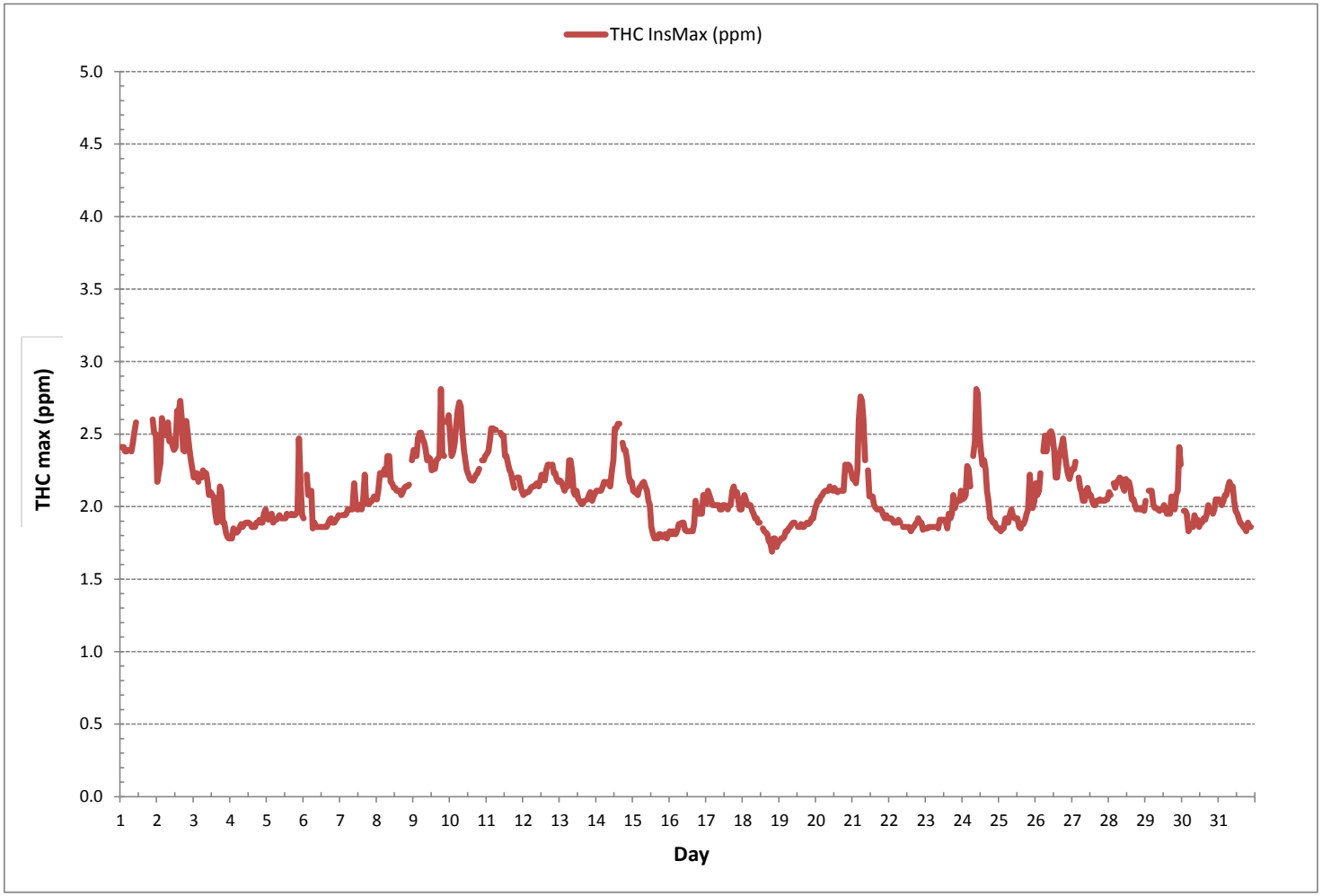
VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 741 hrs

MONTHLY CALIBRATION TIME: 9 hrs

STANDARD DEVIATION: 0.21

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)



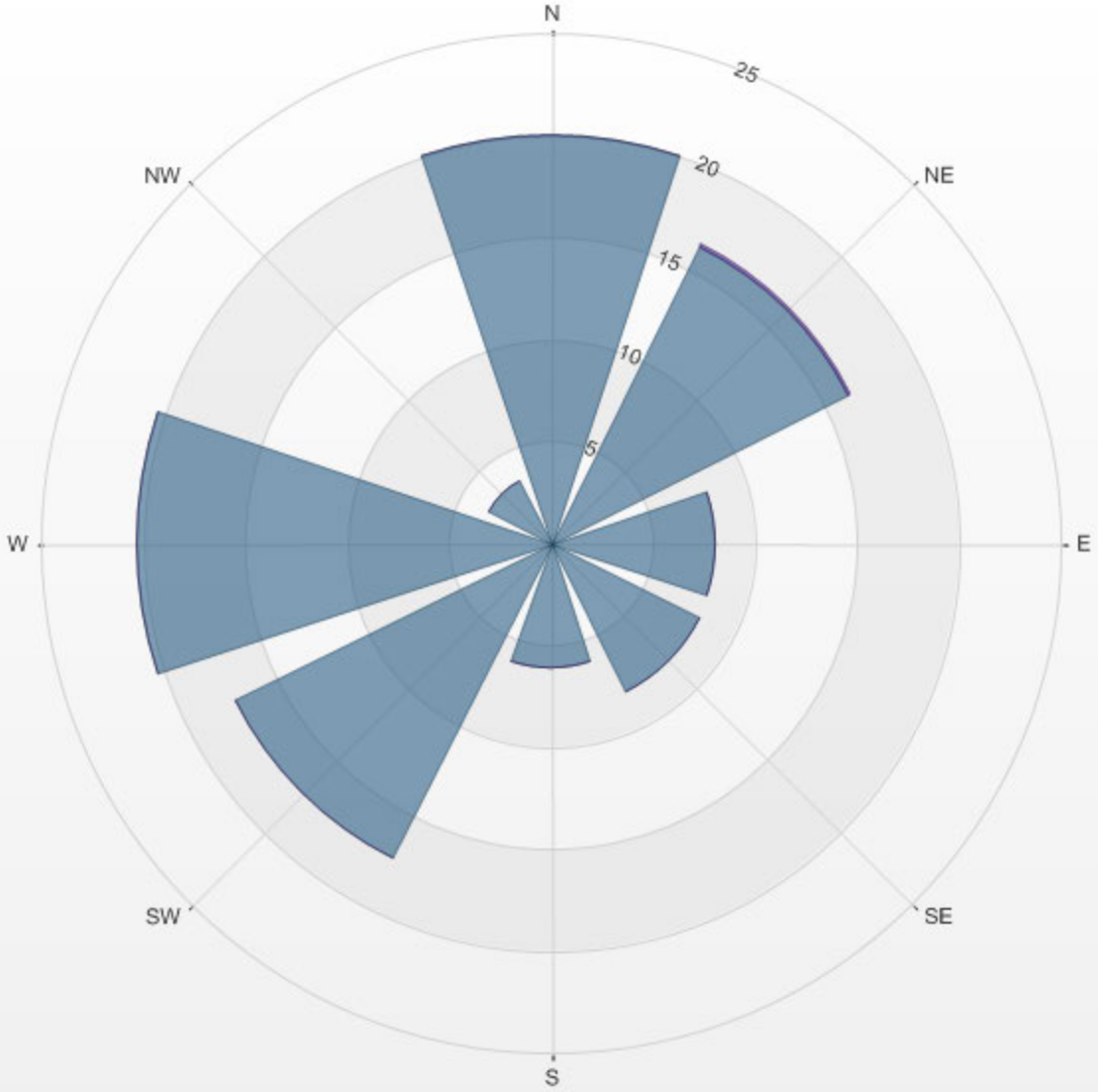
Wind: LICA ST. LINA
Poll.: LICA ST. LINA-THC[ppm]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 0.14% Calm Avg: 2.05 [ppm]

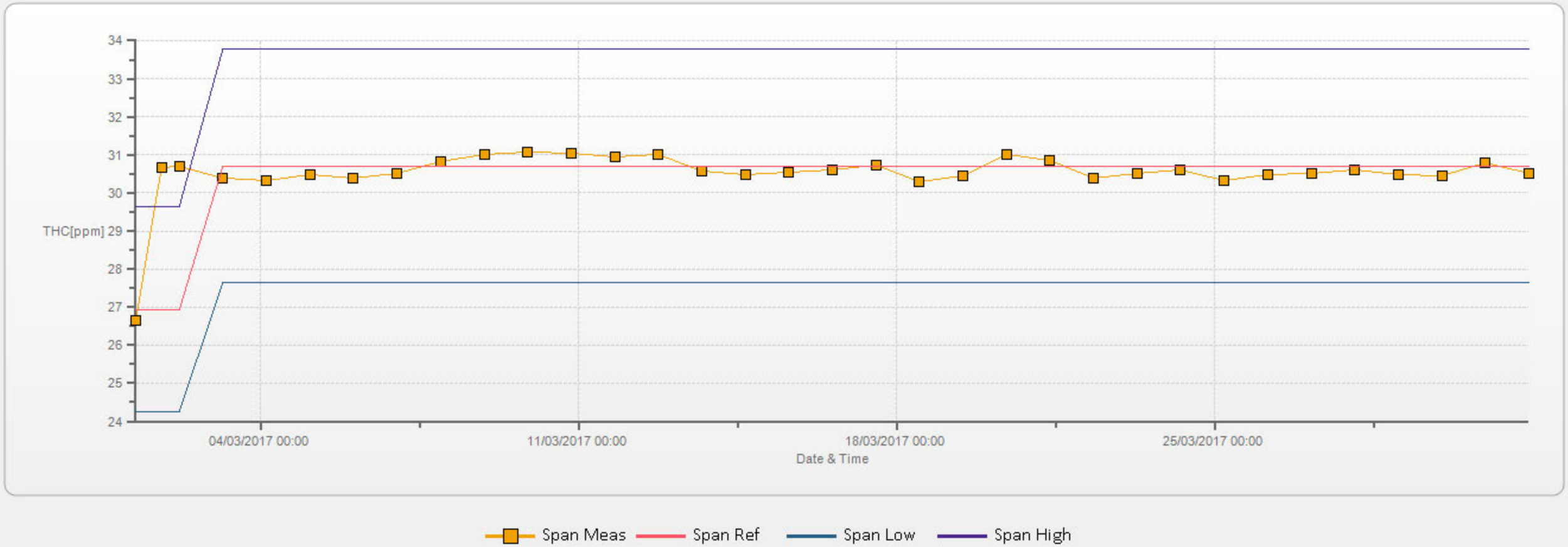
Direction	0.0-0.9	0.9-1.8	1.8-2.7	>2.7	Total
N	0.0	0.0	20.0	0.0	20.0
NE	0.0	0.0	16.3	0.1	16.5
E	0.0	0.0	8.0	0.0	8.0
SE	0.0	0.0	8.2	0.0	8.2
S	0.0	0.0	6.2	0.0	6.2
SW	0.0	0.0	17.3	0.0	17.3
W	0.0	0.0	20.3	0.0	20.3
NW	0.0	0.0	3.4	0.0	3.4
Summary	0.0	0.0	100.0	0.1	100.0

% Icon	Classes (ppm)							
0	0.0-0.9	0	0.9-1.8	100	1.8-2.7	0	>2.7

LICA ST. LINA Poll.: LICA ST. LINA-THC[ppm] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 0.14% Calm Poll Avg: 2.05[ppm]



THC[ppm] Calibration: LICA ST. LINA Monthly: 17/03 Type: Span



OXIDES OF NITROGEN

Maxxam
A Bureau Veritas Group Company

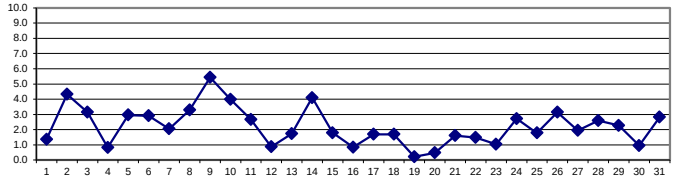
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	2.5	1.8	1.7	1.0	0.9	0.9	S	1.0	1.1	C	C	C	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	0.9	2.5	1.4	16
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	C	C	C	4.5	4.6	4.5	3.7	3.7	4.6	4.3	13
3	3.3	3.4	3.3	3.0	S	3.4	3.4	3.2	3.5	3.4	3.3	3.6	3.8	4.2	3.3	3.1	3.4	4.8	4.5	3.6	2.3	1.0	0.8	0.7	0.7	4.8	3.1	24
4	0.4	0.3	0.6	S	1.0	1.7	2.8	1.7	0.4	0.8	0.7	0.0	0.4	0.2	0.2	0.1	0.4	0.8	0.6	0.6	0.4	0.3	1.6	2.8	0.0	2.8	0.8	24
5	1.5	1.5	S	3.1	2.3	2.3	1.2	1.6	2.8	2.1	1.9	2.3	2.6	3.7	4.1	3.8	4.1	3.9	3.7	3.6	3.9	4.1	4.4	3.5	1.2	4.4	3.0	24
6	3.9	S	11.2	7.2	4.8	4.5	1.4	0.9	0.8	1.7	1.1	1.2	1.1	1.0	1.2	1.1	2.0	3.7	4.1	2.6	2.3	2.2	3.2	3.7	0.8	11.2	2.9	24
7	S	3.1	3.4	3.1	3.0	2.1	2.4	2.7	2.1	1.5	C1	C1	C1	C1	C1	C1	C1	0.8	0.6	1.1	1.3	1.5	2.0	S	0.6	3.4	2.0	17
8	1.2	2.3	5.1	6.1	6.5	5.3	2.4	7.1	6.8	4.2	4.2	3.6	3.6	3.2	2.7	1.9	0.7	0.2	0.8	0.8	0.7	1.1	S	5.0	0.2	7.1	3.3	24
9	7.5	6.2	6.4	8.8	12.2	12.3	11.5	10.9	7.4	5.7	6.0	3.5	1.3	2.0	1.8	2.8	3.2	3.1	3.5	2.1	1.6	S	1.4	3.7	1.3	12.3	5.4	24
10	4.1	2.9	3.9	7.5	11.7	12.1	12.6	10.3	6.4	3.9	3.7	2.6	1.5	0.9	0.5	0.6	0.8	1.3	0.8	0.3	S	1.0	1.0	1.3	0.3	12.6	4.0	24
11	1.4	2.3	3.5	3.8	3.7	4.4	4.5	X	X	3.8	3.8	4.1	2.4	2.7	2.6	2.2	2.0	1.4	1.1	S	2.0	2.0	1.1	1.2	1.1	4.5	2.7	22
12	1.0	0.7	0.6	0.7	0.4	0.7	0.8	0.7	0.6	0.6	0.4	0.5	1.2	1.1	0.8	0.9	1.0	1.1	S	1.9	1.3	1.2	1.0	1.0	0.4	1.9	0.9	24
13	1.3	1.1	1.3	1.2	1.4	1.3	2.3	3.7	2.5	1.6	1.6	1.6	1.9	1.8	1.5	1.6	1.8	S	2.1	1.8	1.9	1.5	1.6	1.6	1.1	3.7	1.7	24
14	1.5	1.7	1.8	1.9	1.9	2.1	2.4	2.4	3.7	3.4	4.2	4.4	7.1	6.9	7.3	6.8	S	6.8	6.2	5.5	5.0	4.3	3.6	3.4	1.5	7.3	4.1	24
15	3.3	3.1	2.6	2.6	2.5	2.5	2.9	3.7	2.9	2.9	3.0	2.5	1.9	1.1	1.1	S	1.0	0.8	0.3	0.2	0.0	0.1	0.1	0.0	0.0	3.7	1.8	24
16	0.2	0.2	1.0	0.2	0.1	0.2	0.4	0.4	0.7	0.8	0.7	0.4	0.5	0.6	S	0.9	0.7	0.9	1.0	1.2	1.4	2.9	2.2	1.8	0.1	2.9	0.8	24
17	1.4	1.1	1.1	1.1	1.2	1.4	1.9	2.0	1.7	1.0	1.3	1.1	1.7	S	2.4	2.3	2.2	2.2	2.9	2.2	2.2	1.6	1.4	1.4	1.0	2.9	1.7	24
18	1.3	1.6	1.5	1.7	2.0	1.8	1.8	2.0	2.1	2.0	2.0	1.9	S	1.8	1.9	1.9	1.6	1.4	1.3	1.1	1.7	2.3	1.1	1.0	1.0	2.3	1.7	24
19	0.7	0.6	0.2	0.0	0.2	0.1	0.2	0.1	0.2	0.4	0.2	S	0.1	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.1	0.2	0.0	0.7	0.2	24
20	0.1	0.2	0.3	0.3	0.3	0.3	0.9	0.7	0.9	0.5	S	0.7	0.6	0.4	0.3	0.3	0.3	0.3	0.3	0.6	0.7	0.4	0.4	1.1	0.1	1.1	0.5	24
21	0.8	0.7	0.6	1.0	3.2	5.5	5.7	3.7	2.3	S	1.9	1.0	1.2	1.3	1.0	0.7	0.5	0.8	0.9	0.8	0.9	0.8	0.8	0.7	0.5	5.7	1.6	24
22	0.6	0.6	0.7	1.1	1.1	1.2	1.2	1.3	S	1.7	1.6	1.6	1.7	1.6	1.4	1.5	2.2	2.0	2.4	2.9	2.3	1.4	0.9	0.9	0.6	2.9	1.5	24
23	0.8	0.6	0.7	0.6	0.6	0.7	0.7	S	0.7	0.8	1.4	1.9	2.0	1.0	0.8	0.9	1.0	0.7	1.2	1.0	1.1	1.6	1.6	1.2	0.6	2.0	1.0	24
24	1.3	1.2	1.1	1.4	1.9	2.2	S	3.1	5.3	6.3	7.9	4.4	3.6	2.7	3.3	3.3	2.7	2.2	2.0	1.8	1.2	1.3	1.1	1.2	1.1	7.9	2.7	24
25	1.6	0.9	1.0	1.0	1.8	S	2.1	2.4	3.5	2.5	1.9	1.7	1.2	1.4	1.4	1.5	1.9	2.0	2.2	2.0	1.5	1.6	1.7	2.1	0.9	3.5	1.8	24
26	2.5	2.2	2.5	2.7	S	3.3	4.3	3.9	4.0	4.4	4.2	3.8	3.3	2.7	2.7	3.3	3.6	3.6	3.5	2.9	2.2	2.0	2.2	2.6	2.0	4.4	3.1	24
27	3.2	3.2	2.6	S	2.5	1.8	1.4	1.4	1.8	2.5	2.8	2.5	2.3	1.9	1.4	1.0	1.5	2.0	1.6	1.5	1.6	1.2	1.5	1.4	1.0	3.2	1.9	24
28	1.5	1.8	S	2.8	2.3	2.2	2.7	3.4	3.1	2.9	2.7	2.4	3.0	4.0	3.7	3.1	2.7	2.6	2.5	2.4	2.4	1.9	1.8	1.8	1.5	4.0	2.6	24
29	2.0	S	1.8	1.6	1.7	1.9	1.7	1.6	2.2	2.1	2.3	1.9	1.8	1.7	2.0	1.7	1.5	1.9	1.9	2.3	2.9	2.8	5.6	5.3	1.5	5.6	2.3	24
30	S	1.9	2.0	1.0	0.5	0.1	0.3	0.6	0.8	0.8	0.7	0.3	0.8	1.1	1.0	1.1	1.0	1.0	1.3	1.3	1.1	1.1	1.1	S	0.1	2.0	1.0	24
31	1.2	1.4	1.4	1.9	2.2	2.8	4.6	6.1	7.2	6.9	4.9	3.7	2.4	2.1	2.7	2.1	1.3	1.4	1.7	1.6	1.6	1.4	S	2.2	1.2	7.2	2.8	24
HOURLY MAX	7.5	6.2	11.2	8.8	12.2	12.3	12.6	10.9	7.4	6.9	7.9	4.4	7.1	6.9	7.3	6.8	4.1	6.8	6.2	5.5	5.0	4.6	5.6	5.3				
HOURLY AVG	1.9	1.7	2.3	2.4	2.6	2.8	2.9	3.0	2.8	2.5	2.6	2.2	2.0	2.0	2.0	1.9	1.7	1.9	2.0	1.8	1.8	1.7	1.8	2.0				

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

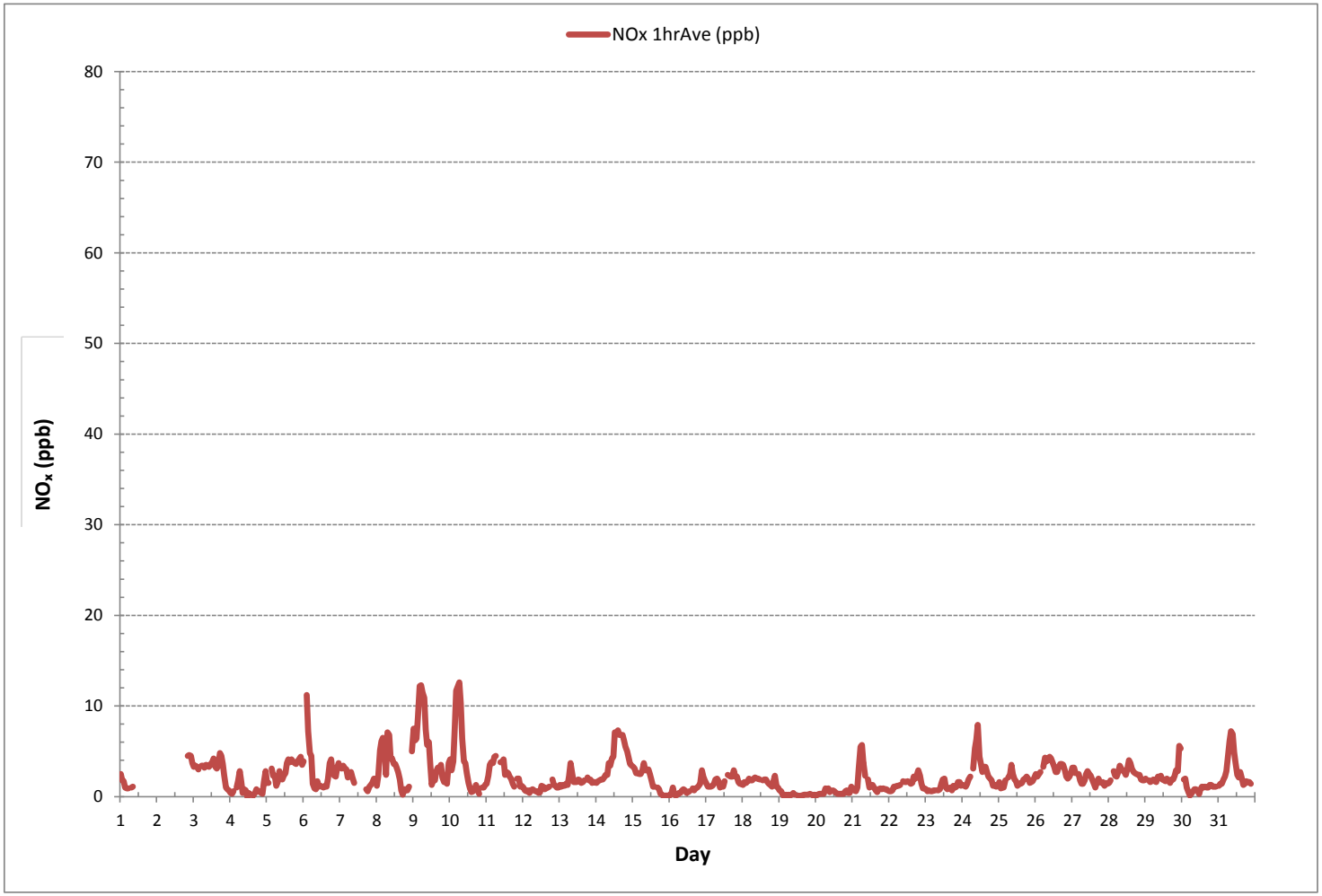
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			663				
MINIMUM 1-HR AVERAGE	0.0	ppb	@ HOUR(S)	11	ON DAY(S)	4	
MAXIMUM 1-HR AVERAGE:	12.6	ppb	@ HOUR(S)	6	ON DAY(S)	10	
MAXIMUM 24-HR AVERAGE:	5.4	ppb			ON DAY(S)	9	
					VAR-VARIOUS		
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:			716	hrs
MONTHLY CALIBRATION TIME:	16	hrs	AMD OPERATION UPTIME:			96.2	%
STANDARD DEVIATION:	1.9		MONTHLY AVERAGE:			2.2	ppb

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)



OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	3.4	2.4	2.6	1.9	1.4	1.6	S	1.5	1.6	C	C	C	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	1.4	3.4	2.1	16
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	C	C	C	6.0	6.3	6.1	5.2	5.2	6.3	5.9	13
3	5.0	5.1	5.2	4.7	S	5.1	5.1	4.7	4.9	5.3	5.3	5.5	5.7	6.8	5.6	4.8	4.9	7.3	7.1	5.2	5.1	2.6	2.3	2.1	2.1	7.3	5.0	24
4	1.8	1.9	2.2	S	2.6	3.3	4.7	3.6	2.4	2.2	2.8	1.5	2.3	1.7	1.7	1.5	1.9	2.2	2.1	2.2	2.2	2.0	4.5	4.5	1.5	4.7	2.5	24
5	3.2	2.9	S	5.3	3.9	4.1	2.7	3.6	4.3	3.7	3.5	3.8	4.1	5.7	5.5	5.1	6.6	5.3	5.0	4.9	5.1	5.7	6.0	4.9	2.7	6.6	4.6	24
6	5.1	S	15.2	13.6	11.0	12.1	2.6	2.1	1.9	6.3	2.3	2.3	2.4	2.4	2.9	2.6	3.6	5.4	5.5	4.5	4.1	3.6	4.8	5.1	1.9	15.2	5.3	24
7	S	4.5	5.0	4.4	5.1	3.6	4.1	4.6	3.8	2.9	C1	C1	C1	C1	C1	C1	C1	3.7	2.4	7.8	3.3	3.4	3.6	S	2.4	7.8	4.1	17
8	2.3	4.1	6.3	7.1	8.7	8.8	5.1	9.1	8.8	5.5	5.1	4.9	4.6	4.0	3.7	3.3	1.7	1.0	3.4	2.6	1.3	2.0	S	7.6	1.0	9.1	4.8	24
9	8.6	8.1	7.6	11.8	14.3	15.3	13.1	11.7	11.0	6.9	6.8	6.8	2.7	2.9	2.6	4.3	4.2	4.0	4.3	3.2	2.4	S	2.9	4.7	2.4	15.3	7.0	24
10	5.4	4.3	5.7	10.9	13.5	13.8	14.0	13.2	9.2	5.6	5.1	3.9	2.8	2.1	1.5	1.7	2.4	2.4	1.9	1.6	S	2.1	2.1	2.6	1.5	14.0	5.6	24
11	2.6	4.0	4.7	5.0	4.7	5.6	5.7	X	X	5.1	5.5	5.4	3.3	3.8	3.4	3.2	3.0	2.6	2.0	S	2.9	3.0	2.5	2.1	2.0	5.7	3.8	22
12	1.9	1.9	1.7	1.6	1.3	1.8	2.0	1.8	1.7	1.9	1.7	1.6	2.7	2.7	2.0	2.1	2.4	2.5	S	3.4	2.6	2.3	2.2	2.2	1.3	3.4	2.1	24
13	2.5	2.2	2.3	2.3	2.5	2.2	5.0	5.0	3.5	2.6	2.6	2.9	2.9	2.9	2.6	2.7	2.8	S	3.0	2.9	2.9	2.5	2.7	2.7	2.2	5.0	2.9	24
14	2.7	2.9	3.0	3.2	3.2	3.8	3.9	4.0	36.6	5.4	5.8	7.1	9.1	8.8	9.2	9.1	S	9.1	8.0	7.7	7.0	6.4	5.3	5.3	2.7	36.6	7.2	24
15	5.1	5.1	4.4	4.2	4.4	4.3	4.8	5.6	5.1	4.8	4.6	4.5	3.9	2.8	2.8	S	3.4	2.6	1.9	2.0	1.7	1.5	1.6	1.7	1.5	5.6	3.6	24
16	1.7	1.6	2.9	1.6	1.6	2.7	3.0	1.9	3.7	3.6	4.0	1.8	2.7	2.8	S	2.2	2.2	2.2	2.3	5.7	3.9	4.5	3.6	3.2	1.6	5.7	2.8	24
17	3.0	2.7	2.4	2.4	2.5	3.0	4.3	3.7	3.6	2.5	4.3	2.6	3.2	S	3.7	3.8	3.5	4.0	4.3	3.8	3.6	3.2	2.7	2.8	2.4	4.3	3.3	24
18	2.7	3.0	3.0	3.2	3.5	3.2	3.2	3.2	3.5	3.4	3.4	3.4	S	3.2	3.1	3.1	3.3	2.8	2.8	2.5	3.9	4.0	2.6	2.3	2.3	4.0	3.1	24
19	2.1	1.9	1.5	1.4	1.7	1.5	1.6	1.5	1.6	1.7	1.6	S	1.5	1.5	1.5	1.7	1.7	2.3	1.7	1.5	1.5	1.6	1.2	1.2	1.2	2.3	1.6	24
20	1.3	1.5	1.4	1.3	1.3	1.4	14.2	2.8	4.3	1.7	S	1.6	1.6	1.6	1.4	1.9	1.5	1.4	1.3	1.8	1.8	1.5	1.5	2.1	1.3	14.2	2.3	24
21	2.0	1.9	1.7	2.2	5.3	7.1	7.4	5.6	3.8	S	3.8	2.4	2.4	2.6	2.7	2.1	1.9	2.1	2.3	2.3	2.3	2.2	2.3	2.3	1.7	7.4	3.1	24
22	2.2	2.3	2.3	2.7	2.6	3.0	2.7	3.0	S	3.2	3.3	3.3	3.1	3.2	3.2	4.1	4.5	4.3	4.1	5.2	3.9	3.4	2.6	2.4	2.2	5.2	3.2	24
23	2.3	2.0	2.2	2.0	2.0	2.2	2.1	S	2.1	2.4	2.9	3.6	4.1	2.9	3.4	3.5	3.6	3.4	2.9	3.0	3.2	24.2	4.8	2.8	2.0	24.2	3.8	24
24	2.8	2.6	2.6	3.1	4.9	5.3	S	6.6	6.7	11.1	11.1	7.0	5.4	4.1	4.6	4.5	4.1	3.7	3.3	3.0	2.6	2.6	2.4	2.8	2.4	11.1	4.6	24
25	2.8	2.0	2.0	2.0	3.5	S	3.9	4.5	4.9	4.3	3.5	3.2	2.8	2.9	3.9	3.2	3.9	3.6	4.5	4.7	3.3	3.3	3.5	4.5	2.0	4.9	3.5	24
26	4.5	4.1	4.5	4.8	S	5.7	6.8	6.4	6.3	7.5	7.5	5.9	15.0	4.9	4.6	5.9	5.9	5.7	5.5	5.1	4.3	4.2	4.3	4.7	4.1	15.0	5.8	24
27	5.3	5.4	4.9	S	5.1	3.7	3.4	3.6	3.7	4.6	4.8	4.7	4.3	4.1	3.3	2.8	3.4	4.1	3.2	3.3	3.3	3.0	3.3	3.0	2.8	5.4	3.9	24
28	3.2	3.5	S	4.8	3.9	3.9	4.3	5.1	4.8	4.4	4.3	4.2	4.9	5.9	5.5	4.7	4.4	4.2	4.3	4.0	4.1	3.7	3.5	3.4	3.2	5.9	4.3	24
29	3.5	S	3.4	3.4	3.4	3.7	3.4	3.5	5.1	4.8	4.5	3.9	3.7	3.5	3.8	4.0	3.5	3.9	3.9	4.3	5.1	5.8	8.1	7.8	3.4	8.1	4.3	24
30	S	4.3	4.1	3.1	2.3	1.8	2.0	2.3	2.6	2.5	2.4	1.9	2.5	2.7	2.4	2.7	2.3	2.4	2.8	2.6	2.4	2.6	2.2	S	1.8	4.3	2.6	24
31	2.4	2.8	3.0	4.0	3.7	4.5	7.6	9.3	9.1	9.1	6.8	5.8	4.7	5.5	5.0	4.9	3.1	3.3	4.1	3.8	5.4	3.3	S	7.8	2.4	9.3	5.2	24
HOURLY MAX	8.6	8.1	15.2	13.6	14.3	15.3	14.2	13.2	36.6	11.1	11.1	7.1	15.0	8.8	9.2	9.1	6.6	9.1	8.0	7.8	7.0	24.2	8.1	7.8				
HOURLY AVG	3.3	3.3	3.9	4.2	4.4	4.8	5.1	4.8	5.7	4.5	4.4	3.9	4.0	3.6	3.5	3.5	3.3	3.6	3.6	3.7	3.5	4.0	3.4	3.7				

STATUS FLAG CODES

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

MONTHLY SUMMARY

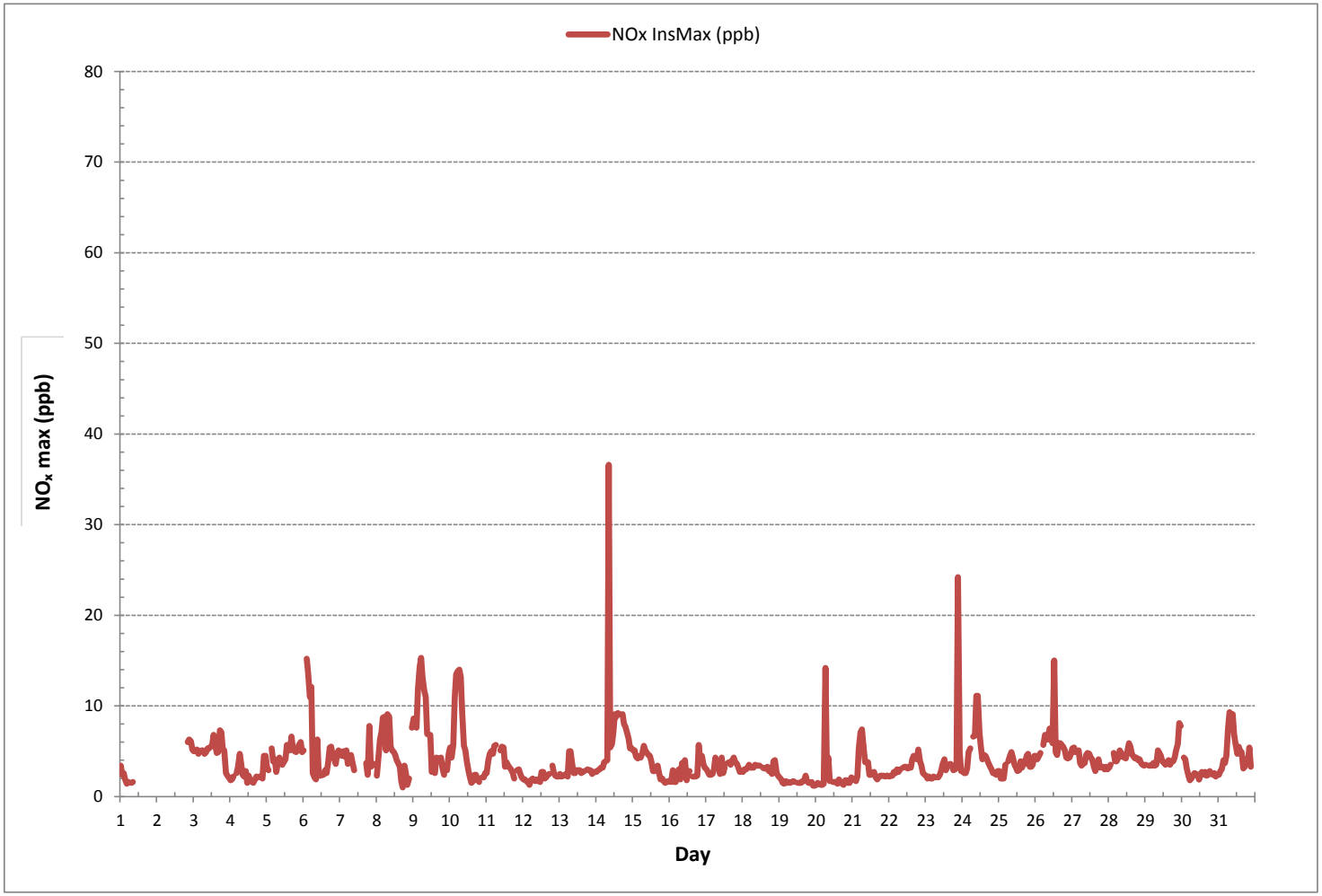
NUMBER OF NON-ZERO READINGS: 668

MAXIMUM INSTANTANEOUS VALUE: 36.6 ppb @ HOUR(S) 8 ON DAY(S) 14

VAR-VARIOUS

IZS CALIBRATION TIME: 32 hrs OPERATIONAL TIME: 716 hrs
MONTHLY CALIBRATION TIME: 16 hrs
STANDARD DEVIATION: 2.7

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)



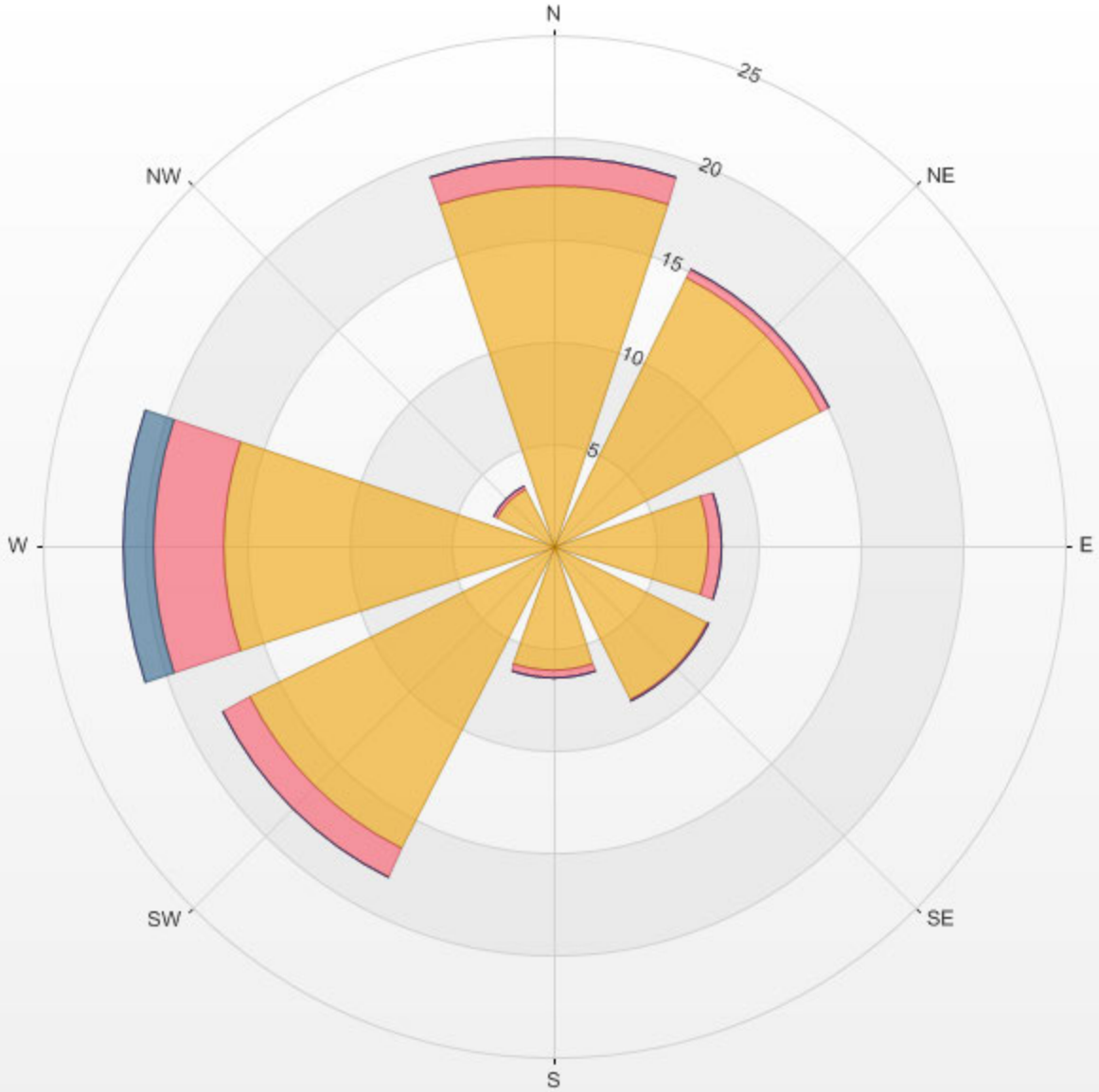
Wind: LICA ST. LINA
Poll.: LICA ST. LINA-NOX[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 0.15% Calm Avg: 0.75 [ppb]

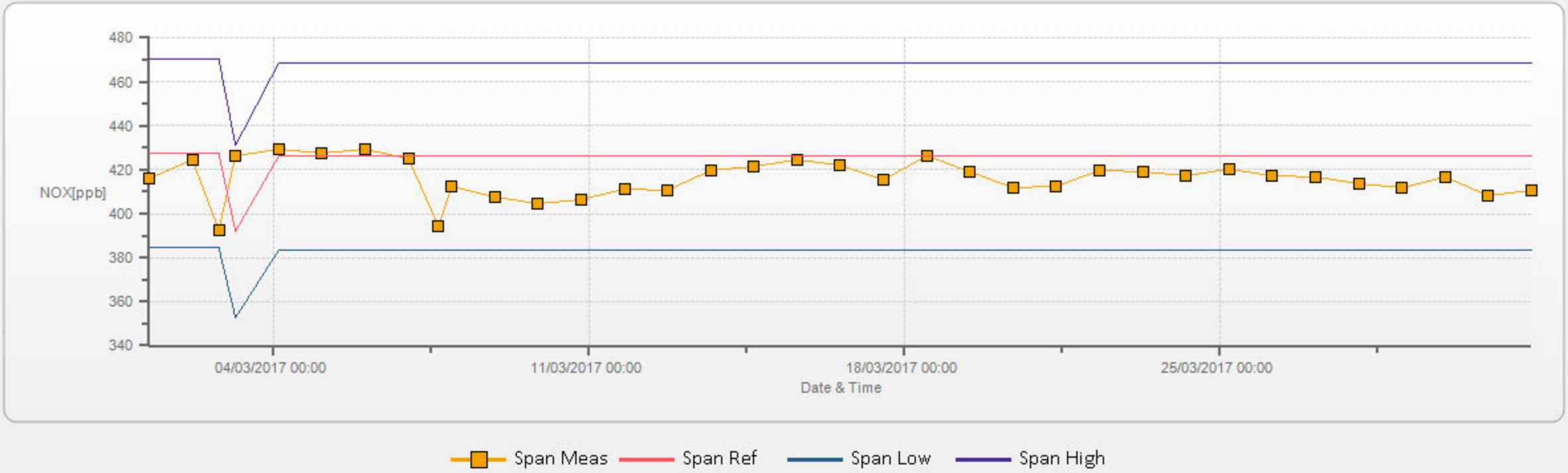
Direction	0.0-4.2	4.2-8.5	8.5-12.7	>12.7	Total
N	17.7	1.4	0.0	0.0	19.0
NE	14.7	0.5	0.0	0.0	15.1
E	7.6	0.6	0.0	0.0	8.2
SE	8.4	0.2	0.0	0.0	8.5
S	6.1	0.3	0.0	0.0	6.4
SW	16.6	1.5	0.0	0.0	18.1
W	16.2	3.4	1.5	0.0	21.1
NW	3.1	0.2	0.0	0.0	3.3
Summary	90.4	7.9	1.5	0.0	100.0

% Icon Classes (ppb)	90 0.0-4.2	8 4.2-8.5	2 8.5-12.7	0 >12.7

LICA ST. LINA Poll.: LICA ST. LINA-NOX[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 0.15% Calm Poll Avg: 0.75[ppb]



NOX[ppb] Calibration: LICA ST. LINA Monthly: 17/03 Type: Span



NITRIC OXIDES

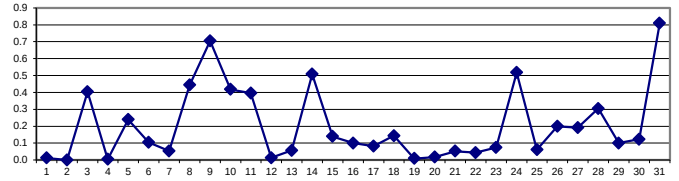
NITRIC OXIDE Hourly Averages (NO ppb)

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

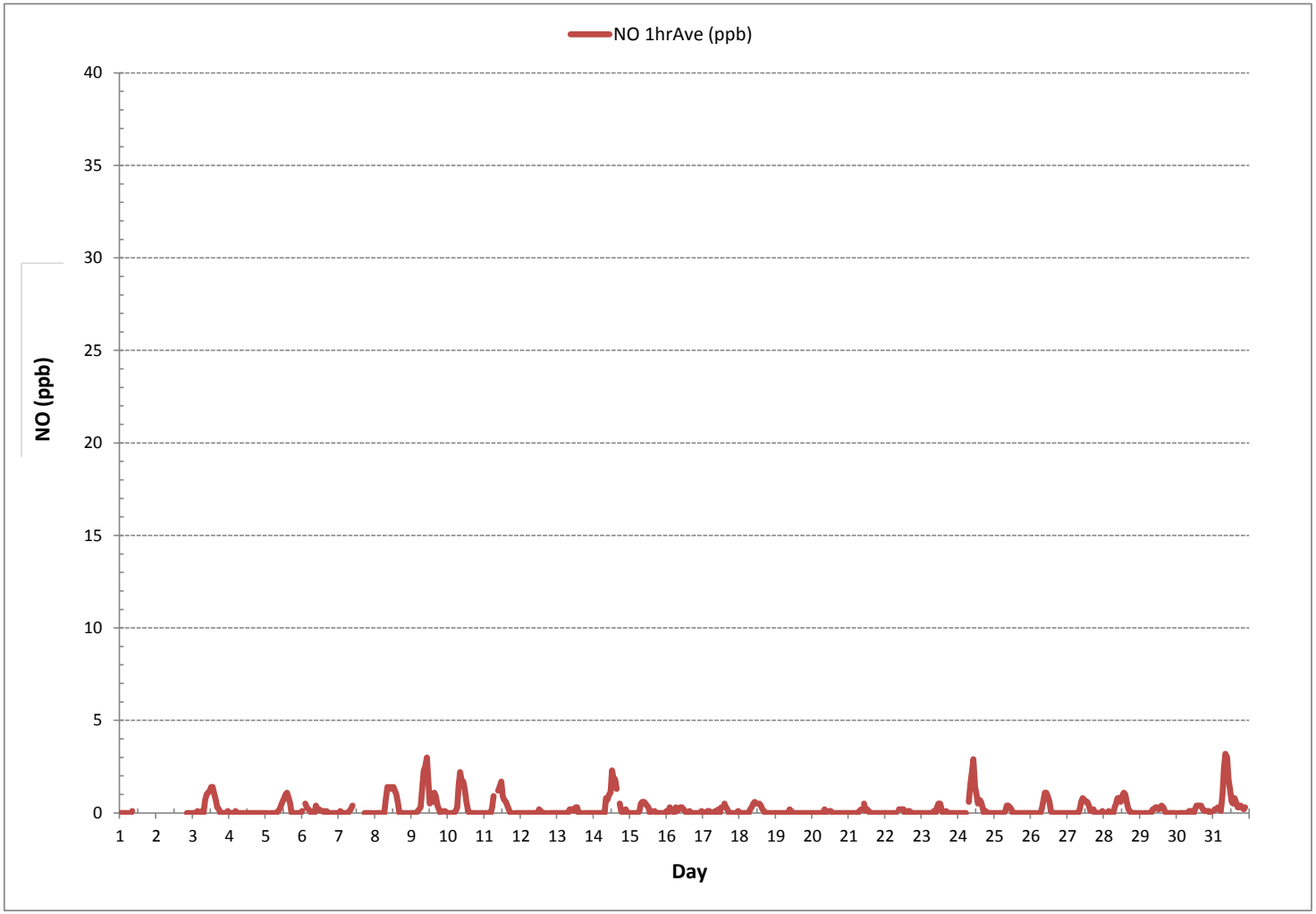
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			257				
MINIMUM 1-HR AVERAGE		0.0	ppb	@ HOUR(S)	0	ON DAY(S)	1
MAXIMUM 1-HR AVERAGE:		3.2	ppb	@ HOUR(S)	8	ON DAY(S)	31
MAXIMUM 24-HR AVERAGE:		0.8	ppb			ON DAY(S)	31
						VAR-VARIOUS	
IZS CALIBRATION TIME:	32	hrs		OPERATIONAL TIME:		716	hrs
MONTHLY CALIBRATION TIME:	16	hrs		AMD OPERATION UPTIME:		96.2	%
STANDARD DEVIATION:	0.5			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	0.9	0.7	0.9	0.8	0.8	0.8	S	1.1	1.3	C	C	C	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	0.7	1.3	0.9	16
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	C	C	C	1.4	1.1	0.7	0.7	0.7	1.4	1.0	13
3	0.6	0.7	0.8	1.1	S	0.9	0.9	1.0	1.8	2.2	2.2	2.5	2.4	2.8	2.4	1.7	1.1	2.1	0.7	0.8	0.9	0.8	1.0	1.1	0.6	2.8	1.4	24
4	1.1	1.0	1.0	S	1.3	1.3	1.3	1.3	1.0	1.3	1.5	1.1	1.5	1.2	1.2	1.1	1.2	1.2	1.3	1.2	1.1	1.2	1.0	1.3	1.0	1.5	1.2	24
5	1.3	1.5	S	1.5	1.4	1.3	1.2	1.3	1.7	1.9	2.3	2.1	2.4	2.7	2.6	2.2	2.2	1.7	1.2	1.4	1.5	1.5	1.5	1.5	1.2	2.7	1.7	24
6	1.6	S	2.0	1.8	1.6	1.8	1.5	1.3	1.5	3.1	1.9	1.7	1.7	1.8	1.7	1.5	1.7	1.8	1.7	1.7	1.9	1.5	1.5	1.5	1.3	3.1	1.7	24
7	S	1.9	1.8	1.8	1.8	1.8	1.9	2.4	2.2	2.3	C1	C1	C1	C1	C1	C1	C1	2.0	0.8	2.5	0.8	0.5	0.7	S	0.5	2.5	1.7	17
8	0.7	0.7	0.7	0.7	0.8	0.7	0.9	2.2	2.2	2.1	2.1	2.4	2.5	2.1	1.8	1.4	0.8	0.7	1.4	1.2	0.7	0.7	S	0.8	0.7	2.5	1.3	24
9	0.7	0.8	0.6	0.7	0.9	0.8	1.1	3.2	3.2	3.5	3.9	4.0	1.5	1.6	1.3	1.9	1.9	1.6	0.9	0.9	0.6	S	1.0	0.7	0.6	4.0	1.6	24
10	0.7	1.0	0.7	0.7	0.8	1.1	1.1	3.0	3.2	2.8	2.9	2.1	1.5	1.1	0.9	0.8	0.8	0.6	0.7	0.7	S	0.9	0.8	0.7	0.6	3.2	1.3	24
11	0.9	0.7	0.8	0.7	1.0	1.6	1.9	X	X	2.3	2.6	2.8	1.8	1.7	1.5	1.5	1.3	0.9	0.7	S	0.9	0.8	0.8	0.8	0.7	2.8	1.3	22
12	0.9	0.7	0.7	0.7	0.5	0.8	0.7	0.7	0.9	1.0	0.9	1.0	1.5	1.2	1.1	0.9	1.1	1.0	S	1.1	0.8	0.7	0.8	0.8	0.5	1.5	0.9	24
13	0.8	0.6	0.6	0.6	0.8	0.6	1.0	0.9	1.3	1.1	1.0	1.0	1.2	1.2	0.9	1.0	0.9	S	0.9	0.8	0.8	0.8	0.8	0.7	0.6	1.3	0.9	24
14	0.7	0.7	0.6	0.7	0.7	0.7	0.8	0.9	17.4	1.7	2.0	2.2	3.2	2.8	2.9	2.2	S	1.4	0.9	0.8	0.7	0.9	0.6	0.6	0.6	17.4	2.0	24
15	0.7	0.8	0.7	0.7	0.7	0.7	0.8	1.2	1.4	1.2	1.2	1.2	1.1	0.7	0.6	S	1.1	0.6	0.5	0.5	0.6	0.7	0.7	0.6	0.5	1.4	0.8	24
16	0.8	0.7	1.0	0.7	0.6	0.8	1.1	0.7	1.2	1.5	1.7	0.9	0.9	0.8	S	0.7	0.8	0.6	0.4	1.1	0.7	0.8	0.8	0.8	0.4	1.7	0.9	24
17	0.6	0.8	0.7	0.8	0.8	0.6	0.7	0.8	1.3	0.9	1.7	0.7	1.3	S	1.5	1.2	1.1	0.7	0.9	0.7	0.7	0.9	0.7	0.8	0.6	1.7	0.9	24
18	0.7	0.7	0.7	1.1	0.8	0.9	0.8	1.0	1.3	1.4	1.5	1.3	S	1.5	1.2	1.2	1.0	0.6	0.7	0.6	0.9	0.7	0.7	0.7	0.6	1.5	1.0	24
19	0.8	0.8	0.7	0.7	0.8	0.8	1.3	0.7	0.9	1.1	0.8	S	0.9	1.0	0.9	0.9	0.8	1.3	1.0	0.7	0.9	1.0	0.7	0.7	0.7	1.3	0.9	24
20	0.7	0.9	0.8	0.8	0.8	0.9	7.9	1.5	2.4	1.2	S	1.2	1.1	1.1	0.8	1.0	1.0	0.7	0.8	0.7	1.0	0.6	0.7	1.0	0.6	7.9	1.3	24
21	0.7	0.7	1.0	1.1	0.9	0.8	0.9	1.3	1.3	S	1.8	1.3	1.3	1.2	1.0	1.0	0.7	0.7	0.8	0.8	1.0	0.7	0.9	0.7	0.7	1.8	1.0	24
22	0.7	0.6	0.7	0.7	0.8	0.7	0.6	1.0	S	1.0	1.2	1.3	1.0	0.9	0.9	1.0	0.9	0.9	0.9	1.2	0.8	0.7	0.8	0.9	0.6	1.3	0.9	24
23	0.7	0.7	0.8	0.9	0.7	0.7	0.9	S	1.0	1.2	1.4	1.6	1.7	1.4	1.7	1.8	1.9	1.4	1.0	0.8	0.8	9.8	1.5	0.7	0.7	9.8	1.5	24
24	0.8	0.8	0.7	0.8	1.4	1.5	S	2.0	2.5	4.5	4.5	2.6	2.1	1.6	1.6	1.3	1.1	1.1	1.0	0.9	0.7	0.9	0.7	0.9	0.7	4.5	1.6	24
25	0.7	0.7	0.9	0.8	0.7	S	1.1	1.2	1.4	1.6	1.3	1.3	1.1	1.0	1.3	0.9	1.0	0.9	0.9	0.7	0.9	1.0	1.1	0.6	0.6	1.6	1.0	24
26	0.9	0.7	0.8	0.9	S	0.9	1.1	1.7	1.7	2.6	2.9	1.9	12.2	1.3	1.0	1.2	1.2	0.9	0.9	1.0	1.1	1.1	1.1	0.7	0.7	12.2	1.7	24
27	1.1	1.0	0.8	S	1.2	1.0	1.1	1.0	1.3	1.8	1.8	1.7	1.6	1.6	1.4	1.1	1.2	1.2	0.9	0.9	0.9	0.8	0.9	0.9	0.8	1.8	1.2	24
28	0.7	0.8	S	1.1	1.0	0.7	0.9	1.5	1.5	1.7	1.8	1.6	2.1	2.2	2.1	1.6	1.3	1.1	1.1	0.8	1.0	0.8	0.7	0.8	0.7	2.2	1.3	24
29	0.8	S	0.9	0.7	0.7	0.9	0.7	1.0	1.7	1.7	1.7	1.5	1.3	1.5	1.5	1.8	1.1	1.2	0.7	1.0	0.9	0.9	0.9	0.8	0.7	1.8	1.1	24
30	S	1.0	0.9	0.9	0.6	0.6	0.9	0.9	0.9	0.9	1.1	1.0	1.2	1.2	1.1	1.3	1.2	1.0	1.1	0.8	0.9	0.9	0.7	S	0.6	1.3	1.0	24
31	0.7	0.9	1.0	1.0	0.9	0.8	2.7	4.3	4.2	4.1	2.5	2.1	1.6	1.4	1.5	1.5	0.9	1.0	0.9	0.7	1.0	0.7	S	1.9	0.7	4.3	1.7	24
HOURLY MAX	1.6	1.9	2.0	1.8	1.8	1.8	7.9	4.3	17.4	4.5	4.5	4.0	12.2	2.8	2.9	2.2	2.2	2.1	1.7	2.5	1.9	9.8	1.5	1.9				
HOURLY AVG	0.8	0.8	0.9	0.9	0.9	0.9	1.4	1.5	2.3	1.9	1.9	1.7	2.0	1.5	1.4	1.3	1.2	1.1	0.9	1.0	0.9	1.2	0.9	0.9				

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

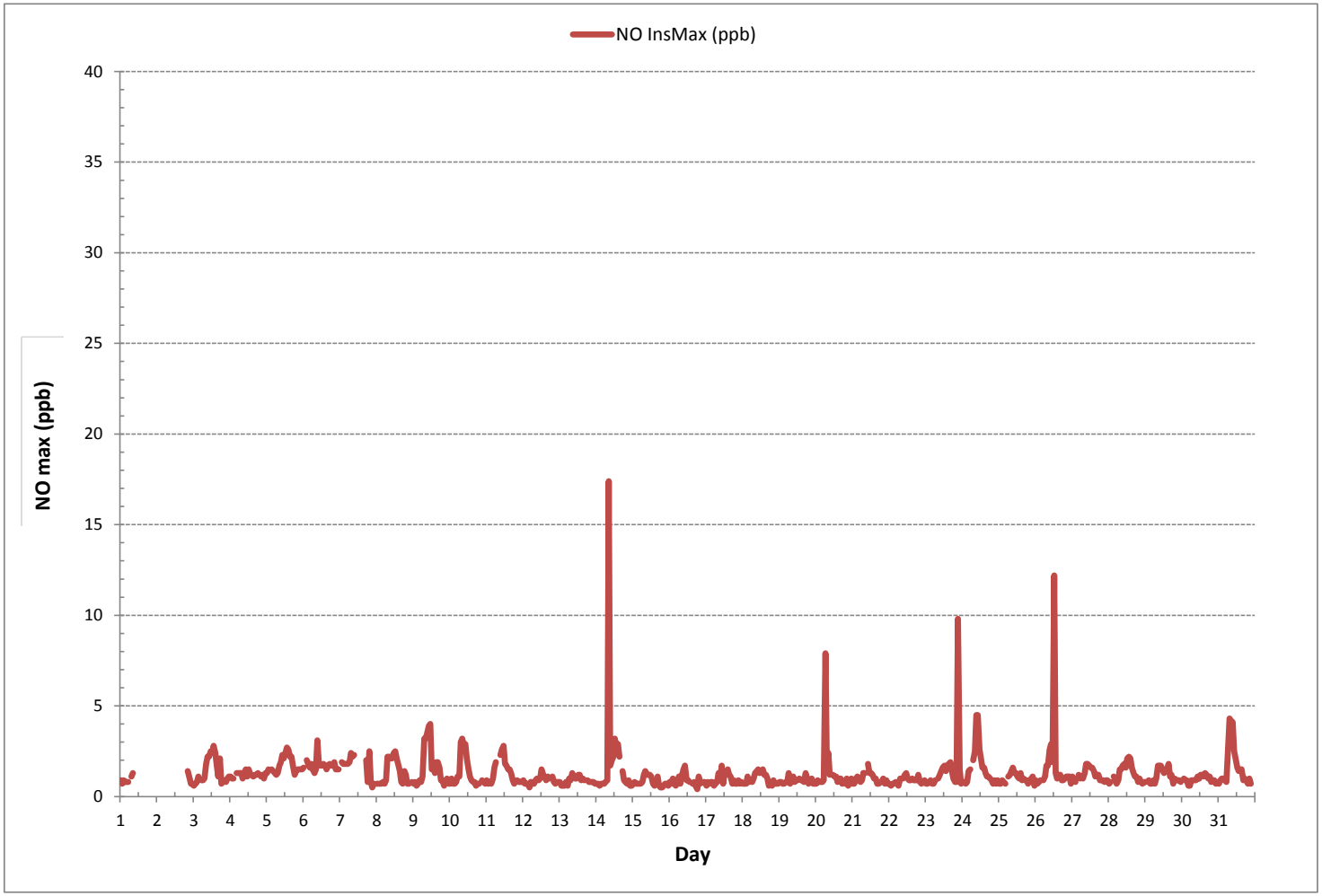
NUMBER OF NON-ZERO READINGS: 668

MAXIMUM INSTANTANEOUS VALUE: 17.4 ppb @ HOUR(S) 8 ON DAY(S) 14

VAR-VARIOUS

IZS CALIBRATION TIME: 32 hrs OPERATIONAL TIME: 716 hrs
MONTHLY CALIBRATION TIME: 16 hrs
STANDARD DEVIATION: 1.1

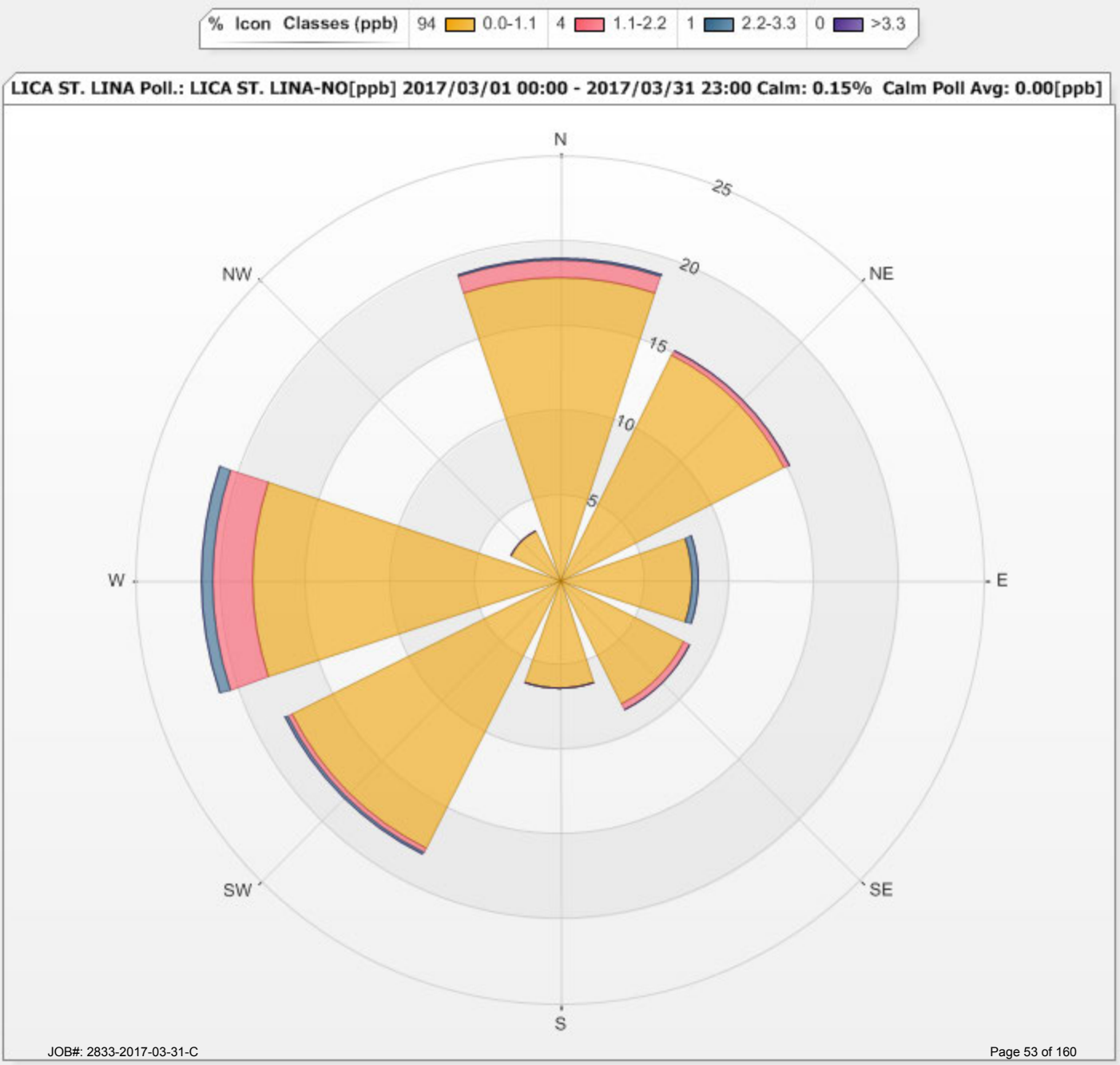
NITRIC OXIDE Instantaneous Maximum (NO ppb)



Wind: LICA ST. LINA
Poll.: LICA ST. LINA-NO[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 0.15% Calm Avg: 0.00 [ppb]

Direction	0.0-1.1	1.1-2.2	2.2-3.3	>3.3	Total
N	17.8	1.1	0.2	0.0	19.0
NE	14.8	0.3	0.0	0.0	15.1
E	7.8	0.0	0.5	0.0	8.2
SE	8.2	0.3	0.0	0.0	8.5
S	6.4	0.0	0.0	0.0	6.4
SW	17.7	0.3	0.2	0.0	18.1
W	18.1	2.4	0.6	0.0	21.1
NW	3.3	0.0	0.0	0.0	3.3
Summary	94.1	4.4	1.4	0.0	100.0


% Icon Classes (ppb)
94 0.0-1.1
4 1.1-2.2
1 2.2-3.3
0 >3.3
LICA ST. LINA Poll.: LICA ST. LINA-NO[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 0.15% Calm Poll Avg: 0.00[ppb]
N
NE
E
SE
S
SW
W
NW
5
10
15
20
25

NITROGEN DIOXIDE

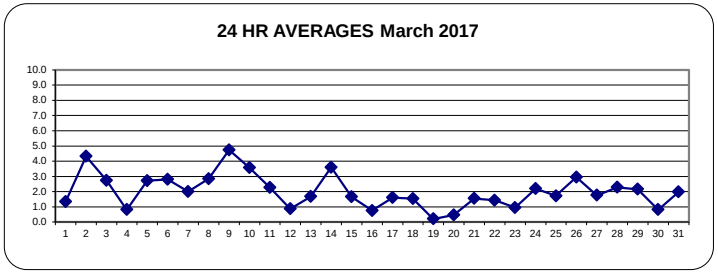
NITROGEN DIOXIDE Hourly Averages (NO_2 ppb)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	2.5	1.8	1.7	1.0	0.9	0.9	S	1.0	0.9	C	C	C	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	0.9	2.5	1.3	16
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	C	C	C	4.5	4.6	4.5	3.7	3.7	4.6	4.3	13
3	3.3	3.4	3.3	2.9	S	3.4	3.3	3.2	2.8	2.5	2.2	2.3	2.4	2.8	2.3	2.4	3.1	4.6	4.5	3.6	2.3	1.0	0.8	0.6	0.6	4.6	2.7	24
4	0.4	0.3	0.6	S	0.9	1.7	2.8	1.7	0.4	0.8	0.7	0.0	0.4	0.2	0.2	0.1	0.4	0.8	0.6	0.6	0.4	0.3	1.6	2.8	0.0	2.8	0.8	24
5	1.5	1.5	S	3.1	2.3	2.3	1.2	1.6	2.7	1.9	1.5	1.7	1.9	2.7	3.0	3.1	3.6	3.8	3.7	3.6	3.9	4.1	4.4	3.5	1.2	4.4	2.7	24
6	3.8	S	10.7	6.9	4.6	4.4	1.4	0.9	0.8	1.3	0.9	1.0	1.0	0.9	1.1	1.1	1.9	3.6	4.1	2.6	2.3	2.2	3.2	3.7	0.8	10.7	2.8	24
7	S	2.9	3.4	3.1	3.0	2.1	2.4	2.7	1.9	1.1	C1	C1	C1	C1	C1	C1	C1	0.8	0.6	1.1	1.3	1.5	2.0	S	0.6	3.4	2.0	17
8	1.2	2.3	5.1	6.1	6.5	5.3	2.4	6.4	5.4	2.9	2.8	2.3	2.2	2.0	1.8	1.4	0.7	0.2	0.8	0.8	0.7	1.1	S	5.0	0.2	6.5	2.8	24
9	7.5	6.2	6.4	8.8	12.1	12.2	11.2	9.5	5.1	3.2	3.0	1.8	0.8	1.2	1.2	1.7	2.3	2.7	3.3	2.0	1.5	S	1.4	3.7	0.8	12.2	4.7	24
10	4.1	2.9	3.9	7.5	11.7	12.0	12.4	8.7	4.2	2.2	2.0	1.3	0.9	0.7	0.5	0.6	0.8	1.3	0.8	0.3	S	1.0	1.0	1.3	0.3	12.4	3.6	24
11	1.4	2.3	3.5	3.8	3.7	4.1	3.6	X	X	2.6	2.4	2.4	1.6	2.0	2.0	1.8	1.8	1.4	1.1	S	2.0	2.0	1.1	1.2	1.1	4.1	2.3	22
12	1.0	0.7	0.6	0.7	0.4	0.7	0.8	0.7	0.6	0.6	0.4	0.5	1.0	1.0	0.8	0.9	1.0	1.1	S	1.9	1.3	1.2	1.0	1.0	0.4	1.9	0.9	24
13	1.3	1.1	1.3	1.2	1.4	1.3	2.3	3.7	2.3	1.3	1.4	1.5	1.6	1.5	1.5	1.5	1.8	S	2.1	1.8	1.9	1.5	1.6	1.6	1.1	3.7	1.7	24
14	1.5	1.7	1.8	1.9	1.9	2.1	2.3	2.4	3.0	2.7	3.1	3.3	4.8	4.9	5.6	5.5	S	6.4	6.1	5.5	5.0	4.1	3.6	3.4	1.5	6.4	3.6	24
15	3.3	3.1	2.6	2.5	2.5	2.5	2.9	3.3	2.3	2.3	2.5	2.1	1.6	1.1	1.0	S	0.9	0.8	0.3	0.2	0.0	0.1	0.1	0.0	0.0	3.3	1.7	24
16	0.1	0.2	0.8	0.2	0.1	0.1	0.1	0.3	0.5	0.5	0.4	0.2	0.4	0.6	S	0.8	0.7	0.9	1.0	1.2	1.4	2.9	2.2	1.7	0.1	2.9	0.8	24
17	1.4	1.1	1.1	1.0	1.2	1.4	1.9	1.9	1.6	1.0	1.1	1.1	1.4	S	2.0	2.0	1.9	2.2	2.8	2.2	2.2	1.6	1.4	1.3	1.0	2.8	1.6	24
18	1.3	1.6	1.5	1.7	2.0	1.8	1.8	1.8	1.8	1.5	1.4	1.3	S	1.3	1.5	1.6	1.6	1.4	1.3	1.1	1.7	2.3	1.1	1.0	1.0	2.3	1.5	24
19	0.7	0.6	0.2	0.0	0.2	0.1	0.2	0.1	0.2	0.3	0.2	S	0.1	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.1	0.2	0.0	0.7	0.2	24
20	0.1	0.2	0.3	0.3	0.3	0.3	0.9	0.7	0.7	0.5	S	0.6	0.6	0.4	0.3	0.3	0.3	0.3	0.3	0.6	0.7	0.4	0.4	1.1	0.1	1.1	0.5	24
21	0.8	0.7	0.6	1.0	3.2	5.5	5.7	3.6	2.1	S	1.4	0.9	1.0	1.2	1.0	0.7	0.5	0.8	0.9	0.8	0.9	0.8	0.8	0.7	0.5	5.7	1.5	24
22	0.6	0.6	0.7	1.1	1.1	1.2	1.2	1.3	S	1.4	1.4	1.4	1.5	1.6	1.4	1.5	2.1	2.0	2.4	2.9	2.3	1.4	0.9	0.9	0.6	2.9	1.4	24
23	0.8	0.6	0.7	0.6	0.6	0.7	0.7	S	0.7	0.8	1.1	1.4	1.5	0.8	0.8	0.8	0.8	0.7	1.2	1.0	1.1	1.6	1.6	1.2	0.6	1.6	0.9	24
24	1.3	1.2	1.1	1.4	1.9	2.1	S	2.5	3.7	4.1	5.0	3.0	2.5	2.2	2.6	2.7	2.4	2.2	1.9	1.8	1.2	1.3	1.1	1.2	1.1	5.0	2.2	24
25	1.6	0.9	1.0	1.0	1.8	S	2.1	2.4	3.1	2.1	1.6	1.5	1.2	1.4	1.4	1.5	1.9	2.0	2.2	2.0	1.5	1.6	1.7	2.1	0.9	3.1	1.7	24
26	2.5	2.2	2.5	2.7	S	3.3	4.3	3.7	3.3	3.3	3.1	3.0	2.8	2.6	2.7	3.3	3.6	3.6	3.5	2.9	2.2	2.0	2.2	2.6	2.0	4.3	3.0	24
27	3.2	3.2	2.6	S	2.5	1.8	1.4	1.4	1.6	1.9	2.1	1.8	1.7	1.4	1.0	1.0	1.4	1.8	1.6	1.5	1.6	1.2	1.5	1.3	1.0	3.2	1.8	24
28	1.5	1.8	S	2.7	2.3	2.2	2.7	3.0	2.6	2.1	1.9	1.7	2.1	2.8	2.7	2.5	2.6	2.5	2.5	2.4	2.4	1.9	1.8	1.8	1.5	3.0	2.3	24
29	2.0	S	1.8	1.6	1.7	1.9	1.7	1.6	2.0	1.9	1.9	1.6	1.5	1.3	1.6	1.4	1.4	1.9	1.9	2.3	2.9	2.8	5.6	5.3	1.3	5.6	2.2	24
30	S	1.9	2.0	1.0	0.5	0.1	0.3	0.6	0.8	0.7	0.6	0.3	0.5	0.6	0.7	0.7	0.6	0.8	1.1	1.2	1.0	0.9	1.0	S	0.1	2.0	0.8	24
31	1.0	1.2	1.2	1.6	2.0	2.7	3.6	3.7	3.9	3.8	3.1	2.4	1.8	1.6	1.8	1.5	0.9	1.1	1.3	1.2	1.4	1.1	S	1.7	0.9	3.9	2.0	24
HOURLY MAX	7.5	6.2	10.7	8.8	12.1	12.2	12.4	9.5	5.4	4.1	5.0	3.3	4.8	4.9	5.6	5.5	3.6	6.4	6.1	5.5	5.0	4.6	5.6	5.3				
HOURLY AVG	1.8	1.7	2.3	2.4	2.6	2.8	2.8	2.7	2.2	1.8	1.8	1.6	1.5	1.5	1.6	1.6	1.5	1.9	1.9	1.8	1.8	1.7	1.8	2.0				

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

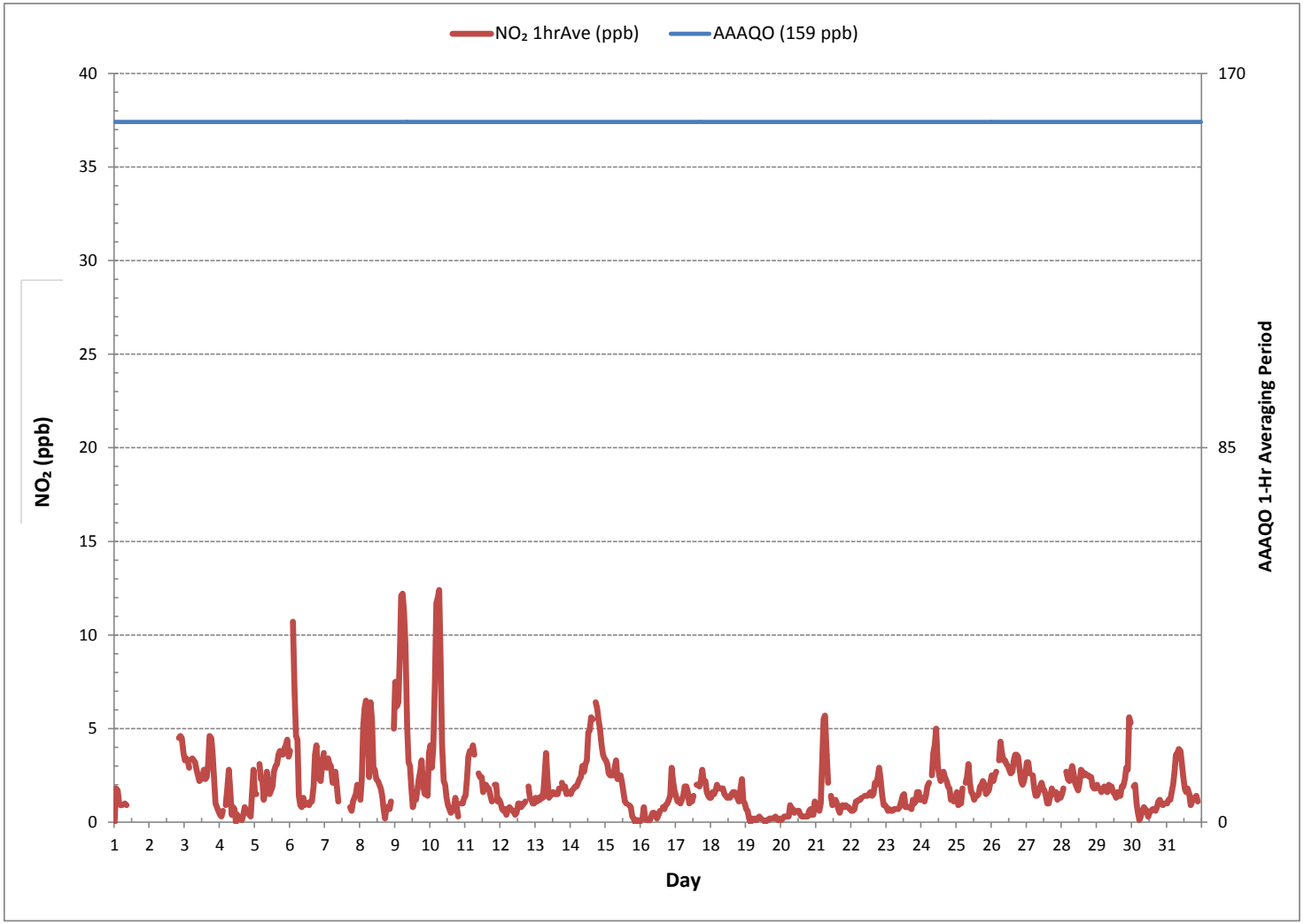
OBJECTIVE LIMIT: **ALBERTA ENVIRONMENT:** 1-HR 159 ppb



MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	663					
MINIMUM 1-HR AVERAGE	0.0	ppb	@ HOUR(S)	11	ON DAY(S)	4
MAXIMUM 1-HR AVERAGE:	12.4	ppb	@ HOUR(S)	6	ON DAY(S)	10
MAXIMUM 24-HR AVERAGE:	4.7	ppb			ON DAY(S) VAR-VARIOUS	9
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:		716	hrs
MONTHLY CALIBRATION TIME:	16	hrs	AMD OPERATION UPTIME:		96.2	%
STANDARD DEVIATION:	1.7		MONTHLY AVERAGE:		2.0	ppb

NITROGEN DIOXIDE Hourly Averages (NO_2 ppb)



Maxxam
A Bureau Veritas Group Company

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

St. Lina Continuous Monitoring Station - March 2017

NITROGEN DIOXIDE Instantaneous Maximum (NO_2 ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	3.4	2.5	2.6	1.7	1.7	1.7	S	1.1	1.2	C	C	C	C	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	1.1	3.4	2.0	16
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	C	C	C	C	5.6	6.0	6.0	5.2	5.2	6.0	5.7	13
3	4.8	4.7	4.9	4.2	S	4.5	4.4	4.3	4.3	3.6	3.5	3.4	3.7	4.6	3.7	3.5	3.7	6.6	6.4	4.7	4.3	2.1	2.0	1.7	1.7	6.6	4.1	24
4	1.4	1.5	2.0	S	1.7	2.7	3.8	3.0	2.0	1.5	1.7	0.8	0.9	0.8	0.8	0.8	1.0	1.3	1.4	1.6	1.7	0.9	3.4	3.4	0.8	3.8	1.7	24
5	2.2	2.1	S	3.9	2.6	2.8	1.7	2.3	3.0	2.2	1.7	2.0	2.1	3.3	3.3	3.2	4.6	4.0	4.1	3.8	4.1	4.5	5.3	3.7	1.7	5.3	3.2	24
6	3.8	S	13.5	12.1	9.7	10.6	1.5	0.9	0.9	3.5	0.9	1.1	1.3	0.9	1.4	1.4	1.9	4.3	4.3	3.3	2.7	2.6	3.8	4.1	0.9	13.5	3.9	24
7	S	3.0	3.6	3.3	3.5	2.3	2.6	2.8	2.4	1.5	C1	C1	C1	C1	C1	C1	C1	1.8	1.9	5.4	3.0	3.3	3.3	S	1.5	5.4	2.9	17
8	2.2	4.5	6.2	6.8	8.8	8.8	5.1	7.6	7.0	4.3	3.4	2.8	2.6	2.5	2.3	2.2	1.4	0.9	2.3	1.9	1.5	1.9	S	7.6	0.9	8.8	4.1	24
9	8.5	7.9	7.7	11.8	13.6	15.0	12.8	10.7	8.1	3.9	3.7	3.4	1.7	1.8	1.8	2.5	3.0	3.4	3.9	2.9	2.4	S	2.8	4.4	1.7	15.0	6.0	24
10	5.2	3.6	5.8	10.6	13.3	13.3	13.4	12.3	6.4	3.2	2.3	1.9	1.7	1.3	1.2	1.3	2.0	2.0	1.8	1.5	S	1.6	2.1	2.0	1.2	13.4	4.8	24
11	2.2	3.3	4.4	4.7	4.5	4.7	4.5	X	X	3.3	3.1	3.0	2.3	2.4	2.2	2.3	2.3	2.0	1.8	S	2.3	2.5	2.2	1.8	1.8	4.7	2.9	22
12	1.5	1.5	1.5	1.5	1.5	1.4	1.5	1.6	1.5	1.5	1.4	1.4	1.7	1.9	1.7	1.8	1.8	2.0	S	2.9	2.0	2.3	2.0	2.0	1.4	2.9	1.7	24
13	2.1	2.1	2.3	2.3	2.3	2.3	4.7	4.9	3.4	2.0	2.2	2.2	2.2	2.2	2.0	2.2	2.4	S	2.5	2.8	2.7	2.6	2.6	2.8	2.0	4.9	2.6	24
14	2.8	2.8	3.1	3.2	3.1	3.6	3.7	3.7	20.5	4.2	4.4	5.3	6.4	6.8	7.5	7.4	S	8.3	7.8	7.3	6.8	5.9	5.3	5.3	2.8	20.5	5.9	24
15	5.1	4.8	4.4	4.1	4.2	4.2	4.8	5.2	4.4	3.9	3.9	3.8	3.0	2.4	2.3	S	2.8	2.1	1.6	1.7	1.4	1.5	1.3	1.5	1.3	5.2	3.2	24
16	1.7	1.7	2.8	1.7	1.5	2.4	2.3	1.7	3.1	2.4	2.6	1.5	1.9	2.4	S	1.5	1.9	2.1	2.1	5.4	3.7	4.1	3.7	3.0	1.5	5.4	2.5	24
17	2.8	2.3	2.3	2.3	2.4	2.9	4.1	3.7	3.2	2.3	2.8	2.2	2.7	S	3.2	3.2	3.1	3.9	4.1	3.7	3.6	3.0	2.6	2.6	2.2	4.1	3.0	24
18	2.6	2.9	2.7	3.0	3.3	3.2	3.0	2.8	2.8	2.6	2.5	2.5	S	2.4	2.4	2.4	2.4	2.4	2.6	2.4	3.6	3.9	2.4	2.2	2.2	3.9	2.7	24
19	2.1	1.8	1.7	1.4	1.4	1.4	1.4	1.5	1.3	1.5	1.4	S	1.2	1.1	1.2	1.4	1.4	2.0	1.3	1.2	1.2	1.5	0.9	0.9	0.9	2.1	1.4	24
20	0.9	1.2	1.2	1.2	1.1	1.2	9.3	1.9	2.3	1.2	S	1.3	1.1	1.1	1.1	1.3	0.9	1.1	1.2	1.5	1.5	1.4	1.4	1.9	0.9	9.3	1.7	24
21	2.0	1.7	1.4	2.3	5.3	7.2	7.2	5.3	3.1	S	2.4	1.7	1.8	2.1	2.0	1.7	1.7	1.9	1.9	2.2	2.2	2.0	2.0	2.0	1.4	7.2	2.7	24
22	2.0	2.1	2.1	2.2	2.5	2.8	2.8	2.8	S	2.7	2.7	2.6	2.5	2.8	2.7	3.5	4.1	3.5	3.7	4.6	3.6	3.2	2.2	2.2	2.0	4.6	2.9	24
23	2.1	2.0	1.9	1.7	1.7	1.9	1.7	S	1.7	1.7	2.2	2.8	2.9	2.2	2.2	2.0	2.4	2.5	2.5	3.0	2.8	16.7	4.1	2.7	1.7	16.7	2.9	24
24	2.7	2.5	2.4	2.9	3.8	4.1	S	5.1	5.1	6.9	7.2	4.9	3.9	3.2	3.9	3.6	3.4	3.4	3.0	2.8	2.5	2.5	2.2	2.4	2.2	7.2	3.7	24
25	2.6	1.8	1.8	1.9	3.3	S	3.1	3.7	4.0	3.3	2.8	2.6	2.3	2.5	3.0	2.7	3.0	3.1	4.4	4.6	3.1	3.1	3.1	4.4	1.8	4.6	3.1	24
26	4.5	3.9	4.4	4.7	S	5.4	6.4	5.3	4.9	5.3	5.2	4.8	7.0	4.2	4.3	5.1	5.2	5.3	5.3	4.8	4.1	3.8	4.0	4.7	3.8	7.0	4.9	24
27	5.1	5.3	4.7	S	4.4	3.4	3.2	2.9	3.0	3.5	3.4	3.3	3.3	3.2	2.6	2.4	3.1	3.4	3.1	3.1	3.1	2.9	3.1	2.9	2.4	5.3	3.4	24
28	3.1	3.4	S	4.1	3.4	3.6	4.1	4.4	3.9	3.3	3.1	3.0	3.3	4.5	4.0	3.7	3.9	3.7	3.9	3.7	3.9	3.6	3.4	3.1	3.0	4.5	3.7	24
29	3.1	S	3.1	3.0	3.2	3.1	3.2	3.0	3.8	3.4	3.2	3.0	2.8	2.8	2.7	2.8	2.8	3.5	3.5	3.9	4.7	5.4	8.3	7.5	2.7	8.3	3.7	24
30	S	3.6	3.7	2.8	2.2	1.9	1.9	1.9	2.0	1.9	1.8	1.4	1.9	1.9	1.9	1.8	1.9	2.3	2.5	2.3	2.1	2.2	2.4	S	1.4	3.7	2.2	24
31	2.2	2.4	2.6	3.6	3.6	4.1	5.4	5.3	5.5	5.7	4.7	4.1	3.6	4.4	3.7	3.5	2.6	2.7	3.7	3.1	4.5	2.7	S	6.4	2.2	6.4	3.9	24
HOURLY MAX	8.5	7.9	13.5	12.1	13.6	15.0	13.4	12.3	20.5	6.9	7.2	5.3	7.0	6.8	7.5	7.4	5.2	8.3	7.8	7.3	6.8	16.7	8.3	7.6				
HOURLY AVG	3.0	3.0	3.6	3.9	4.1	4.4	4.4	4.0	4.1	3.1	3.0	2.7	2.7	2.7	2.6	2.6	2.6	3.1	3.2	3.3	3.1	3.4	3.1	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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS: 668

MAXIMUM INSTANTANEOUS VALUE: 20.5 ppb @ HOUR(S) 8 ON DAY(S) 14

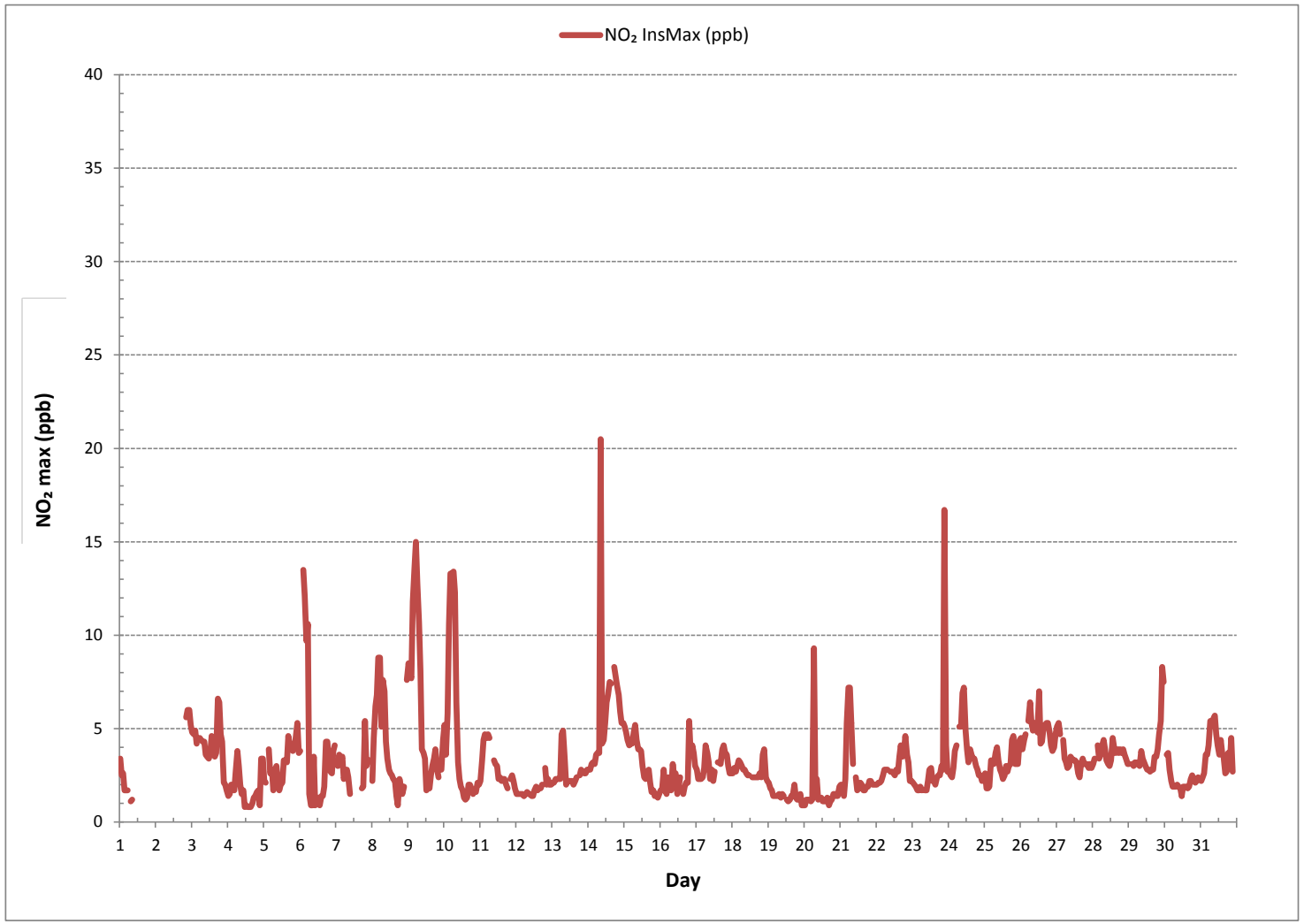
VAR-VARIOUS

IZS CALIBRATION TIME: 32 hrs OPERATIONAL TIME: 716 hrs

MONTHLY CALIBRATION TIME: 16 hrs

STANDARD DEVIATION: 2.2

NITROGEN DIOXIDE Instantaneous Maximum (NO_2 ppb)



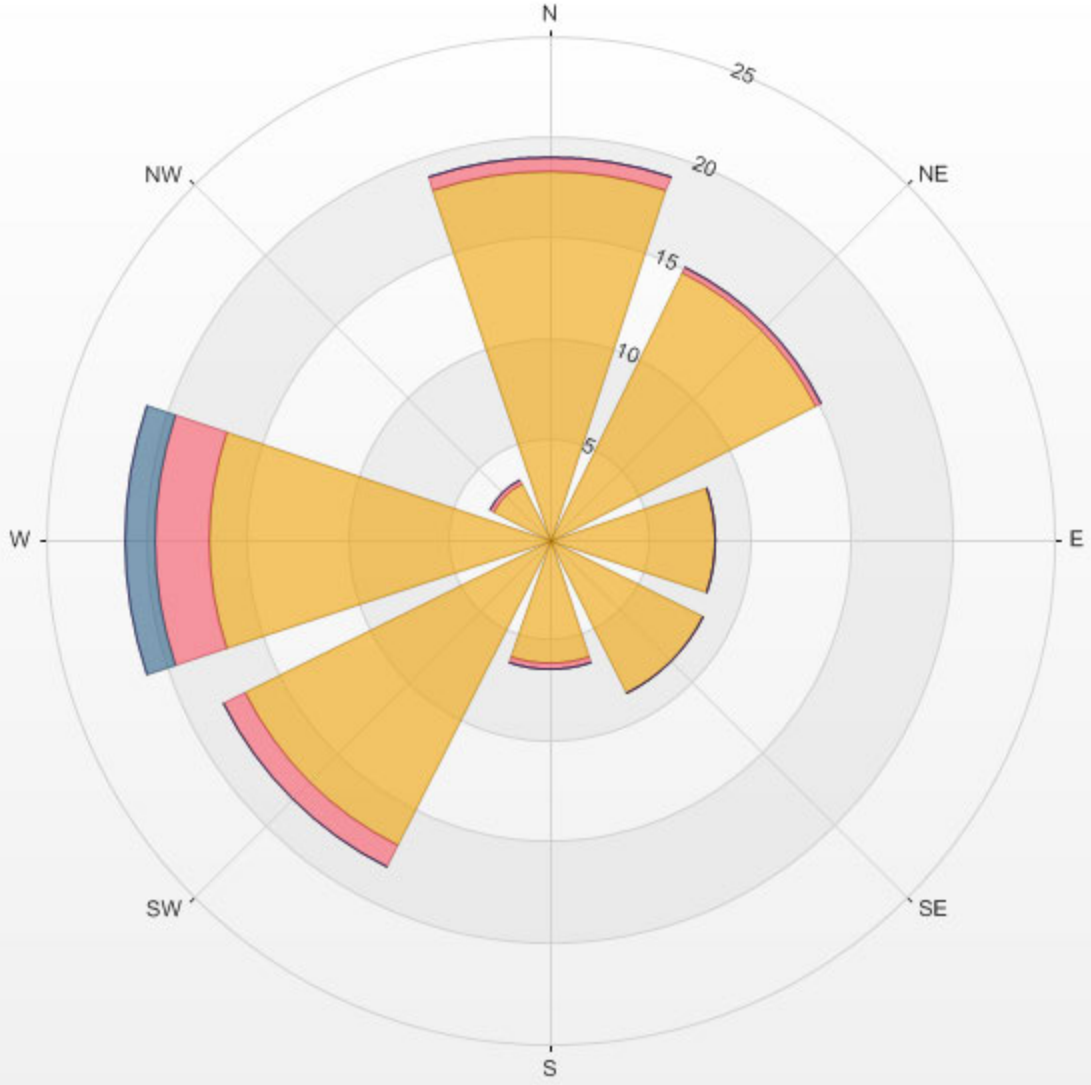
Wind: LICA ST. LINA
Poll.: LICA ST. LINA-NO2[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 0.15% Calm Avg: 0.75 [ppb]

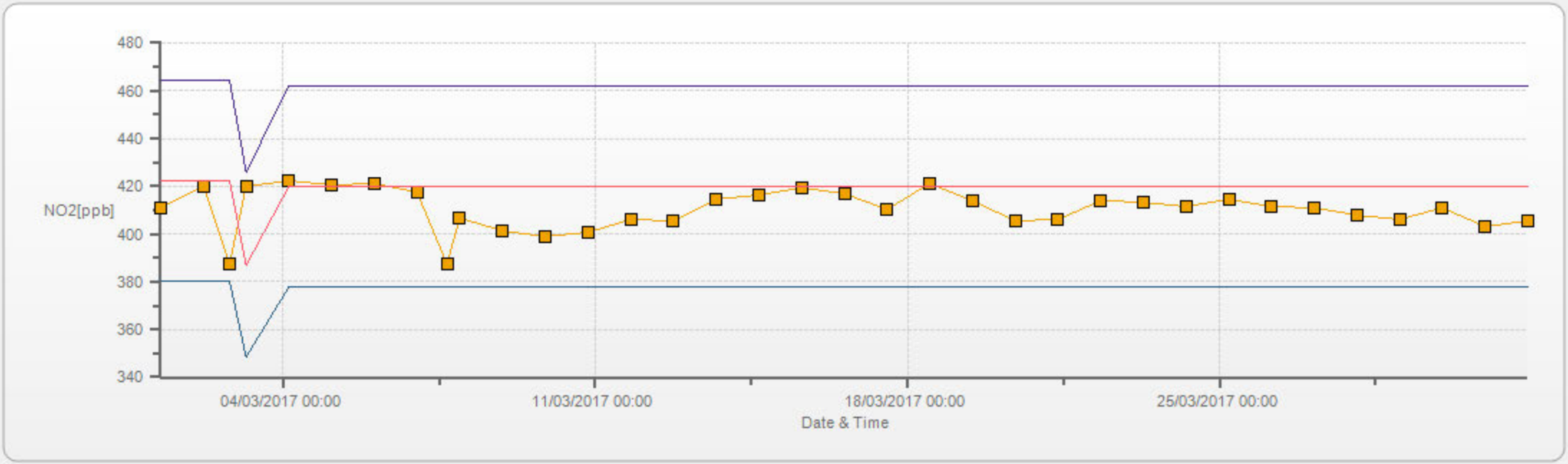
Direction	0.0-4.2	4.2-8.3	8.3-12.5	>12.5	Total
N	18.3	0.8	0.0	0.0	19.0
NE	14.8	0.3	0.0	0.0	15.1
E	8.2	0.0	0.0	0.0	8.2
SE	8.5	0.0	0.0	0.0	8.5
S	6.1	0.3	0.0	0.0	6.4
SW	16.9	1.2	0.0	0.0	18.1
W	16.9	2.7	1.5	0.0	21.1
NW	3.1	0.2	0.0	0.0	3.3
Summary	93.0	5.4	1.5	0.0	100.0

% Icon Classes (ppb)	93 0.0-4.2	5 4.2-8.3	2 8.3-12.5	0 >12.5

LICA ST. LINA Poll.: LICA ST. LINA-NO2[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 0.15% Calm Poll Avg: 0.75[ppb]



NO2[ppb] Calibration: LICA ST. LINA Monthly: 17/03 Type: Span



OZONE

OZONE Hourly Averages (O_3 ppb)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																											
1	28.4	28.4	28.4	29.8	30.2	29.5	S	28.5	27.2	27.1	27.5	28.6	C	C	C	C	C	C	C	Y	Y	Y	Y	Y	27.1	30.2	28.5	19
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	29.2	28.7	29.4	30.6	28.7	30.6	29.5	9
3	31.5	30.7	30.3	30.7	S	28.7	27.6	26.6	26.6	27.9	30.8	31.8	33.7	33.7	34.1	35.4	35.7	32.6	32.9	33.1	37.4	43.3	43.3	43.8	26.6	43.8	33.1	24
4	45.2	44.6	38.0	S	30.4	30.1	27.8	31.4	34.8	36.3	36.6	37.5	38.5	39.7	40.2	40.7	40.6	40.1	39.7	39.6	39.8	39.6	37.5	36.6	27.8	45.2	37.6	24
5	38.5	38.6	S	37.7	38.2	38.4	39.6	39.2	38.2	39.3	39.5	39.5	39.3	38.4	38.0	37.9	37.3	36.9	36.5	36.1	35.8	34.9	34.5	34.6	34.5	39.6	37.7	24
6	34.1	S	25.9	30.7	32.0	32.3	35.5	36.4	36.3	36.7	37.5	37.6	38.3	38.1	38.1	37.7	36.8	33.4	32.8	34.8	35.4	35.1	33.6	32.8	25.9	38.3	34.9	24
7	S	33.2	31.5	31.0	30.2	30.8	29.8	29.0	29.3	30.5	31.1	31.3	32.2	33.3	34.9	35.5	38.5	38.1	37.7	37.3	37.9	38.0	37.6	S	29.0	38.5	33.6	24
8	36.3	32.7	28.9	27.1	25.5	26.6	28.1	24.9	28.9	33.2	35.1	36.6	37.1	37.6	37.7	38.2	39.4	39.6	38.4	38.2	38.2	38.0	S	33.2	24.9	39.6	33.9	24
9	29.6	30.3	29.6	26.6	23.2	22.4	23.0	24.6	28.0	29.6	29.8	31.9	34.8	34.1	34.2	33.7	33.6	33.8	33.9	35.3	35.9	S	36.8	32.7	22.4	36.8	30.8	24
10	31.6	33.4	32.4	26.2	21.0	19.8	18.3	20.8	23.8	26.4	25.9	25.7	25.9	26.5	28.3	28.7	29.0	28.8	28.3	27.8	S	27.3	26.6	26.3	18.3	33.4	26.5	24
11	26.1	25.7	25.0	24.6	24.5	26.1	28.1	X	X	30.1	30.7	31.3	33.7	34.1	34.3	34.8	35.6	36.4	36.5	S	38.4	37.6	37.9	36.1	24.5	38.4	31.8	22
12	35.8	36.1	36.2	36.0	35.6	35.8	35.9	36.0	36.0	36.6	37.5	38.9	40.1	40.4	40.6	41.1	42.0	41.7	S	41.6	43.4	42.8	41.5	40.6	35.6	43.4	38.8	24
13	39.9	40.0	40.4	40.4	40.3	40.2	38.2	35.8	37.3	38.5	38.9	39.5	40.0	40.6	41.9	42.8	42.8	S	42.2	41.7	41.3	41.6	41.8	41.8	35.8	42.8	40.3	24
14	42.0	41.7	41.2	41.0	40.2	39.5	38.7	38.3	37.9	36.1	38.6	39.7	38.0	39.2	39.7	41.6	S	45.5	47.8	45.6	44.0	43.3	42.5	41.4	36.1	47.8	41.0	24
15	39.9	38.6	37.8	37.2	35.8	34.5	32.8	31.4	32.4	32.9	35.4	39.8	45.0	47.8	49.5	S	49.6	48.5	47.5	46.7	47.2	48.3	49.4	48.9	31.4	49.6	41.6	24
16	48.3	48.8	48.0	48.0	46.5	45.0	44.2	43.5	42.5	43.1	44.5	47.0	48.2	49.0	S	49.6	49.4	48.2	46.9	46.0	42.3	37.9	37.1	35.2	35.2	49.6	45.2	24
17	36.9	37.8	38.8	36.7	34.8	33.1	32.1	31.9	35.3	42.8	40.8	40.7	41.2	S	41.6	42.7	42.7	42.2	40.4	39.6	37.9	36.5	37.2	37.7	31.9	42.8	38.3	24
18	36.5	34.6	33.4	32.3	30.2	29.2	28.7	28.6	29.1	29.4	29.8	30.7	S	33.1	33.4	33.6	32.7	31.5	31.1	30.7	29.5	29.0	31.4	31.5	28.6	36.5	31.3	24
19	33.1	32.7	38.2	42.6	38.9	38.3	39.3	39.7	39.7	41.8	43.6	S	46.8	47.8	47.8	47.0	45.7	45.0	43.9	43.3	42.9	43.0	43.7	41.3	32.7	47.8	42.0	24
20	39.3	38.5	40.1	40.5	41.5	41.9	41.0	40.7	40.8	40.9	S	41.3	41.5	42.4	43.8	43.5	43.4	42.9	42.9	41.9	42.1	42.2	41.6	39.1	38.5	43.8	41.5	24
21	37.1	38.6	39.5	37.8	33.7	30.0	29.7	33.3	37.3	S	39.2	41.0	41.0	40.7	41.1	40.9	39.9	38.9	37.6	37.1	36.6	36.3	35.6	35.2	29.7	41.1	37.3	24
22	34.8	34.5	33.9	33.0	32.2	31.6	31.1	30.6	S	29.5	29.2	29.5	29.4	29.4	30.5	30.8	31.5	31.0	29.7	28.1	27.7	29.5	30.3	30.1	27.7	34.8	30.8	24
23	29.5	30.3	30.7	31.1	31.0	31.5	32.3	S	34.1	33.7	32.6	32.5	33.3	35.3	36.8	38.0	38.7	38.2	38.8	36.3	34.9	33.5	32.5	32.2	29.5	38.8	33.8	24
24	31.6	31.1	30.7	31.9	31.1	30.5	S	31.4	30.3	30.0	29.6	33.7	34.8	34.1	33.7	34.3	34.5	36.1	38.0	37.7	36.4	35.6	35.4	34.7	29.6	38.0	33.4	24
25	33.4	34.8	34.9	34.4	32.1	S	31.7	31.3	30.7	32.2	34.7	36.8	38.4	39.5	40.7	40.8	40.3	39.5	39.0	39.3	40.9	39.5	38.2	37.1	30.7	40.9	36.5	24
26	36.6	34.8	34.5	34.5	S	31.4	28.7	29.1	30.1	30.0	31.5	33.3	38.3	42.1	46.1	46.9	45.8	41.3	38.7	38.4	35.7	33.6	34.0	33.3	28.7	46.9	36.0	24
27	30.7	29.2	28.2	S	28.3	29.7	31.3	32.1	32.0	30.4	30.2	31.0	31.8	33.5	35.8	36.7	34.4	31.8	30.5	29.7	29.5	28.9	28.2	27.1	27.1	36.7	30.9	24
28	25.8	25.3	S	26.8	26.4	24.5	22.4	20.8	20.8	21.6	21.8	21.4	21.0	20.7	22.3	24.4	25.5	25.7	24.3	22.0	23.0	23.0	23.1	23.7	20.7	26.8	23.3	24
29	22.1	S	21.9	23.0	23.3	22.9	23.5	24.7	24.7	26.0	26.6	26.8	25.8	26.5	27.7	28.3	30.6	32.7	31.1	31.8	30.2	27.3	22.1	19.5	19.5	32.7	26.0	24
30	S	22.6	21.9	22.9	24.7	23.7	24.5	25.3	25.4	26.1	26.9	27.5	28.6	27.8	28.4	29.6	30.8	31.3	30.7	28.1	33.0	31.4	30.2	S	21.9	33.0	27.3	24
31	26.1	24.1	22.6	20.8	17.8	15.8	13.6	13.4	16.9	22.1	32.8	35.9	38.4	39.8	32.3	30.7	33.9	36.0	36.3	36.7	36.8	35.1	S	31.7	13.4	39.8	28.2	24
HOURLY MAX	48.3	48.8	48.0	48.0	46.5	45.0	44.2	43.5	42.5	43.1	44.5	47.0	48.2	49.0	49.5	49.6	49.6	48.5	47.8	46.7	47.2	48.3	49.4	48.9				
HOURLY AVG	34.3	34.0	33.0	32.7	31.4	30.8	30.6	30.7	31.7	32.4	33.4	34.4	36.3	36.6	36.9	37.4	37.9	37.4	36.9	36.6	36.7	35.9	35.5	34.6				

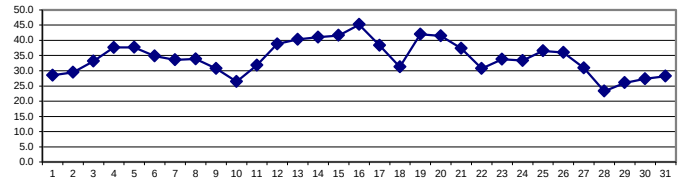
STATUS FLAG CODES

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

OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 82 ppb

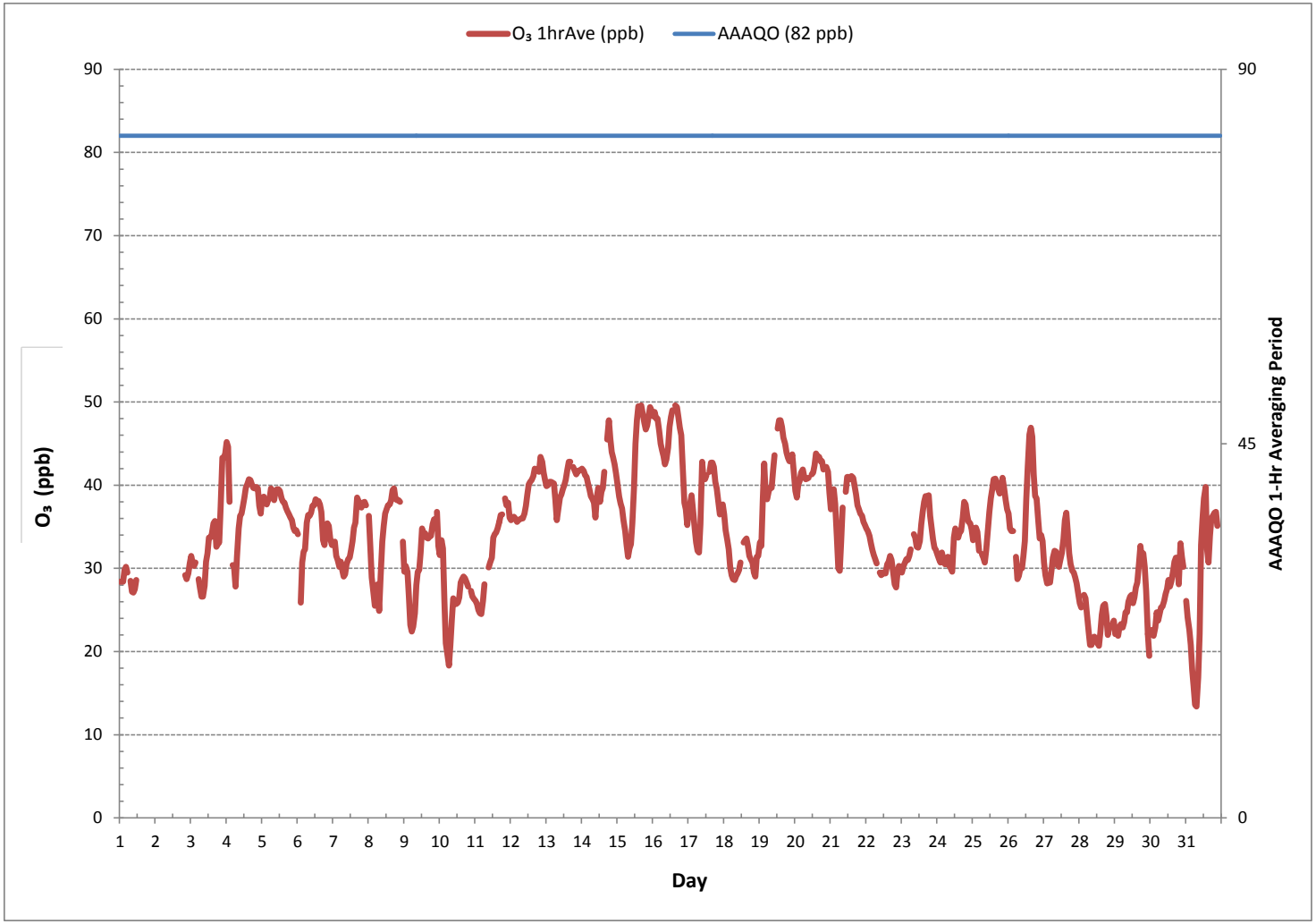
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	678					
MINIMUM 1-HR AVERAGE	13.4	ppb	@ HOUR(S)	7	ON DAY(S)	31
MAXIMUM 1-HR AVERAGE:	49.6	ppb	@ HOUR(S)	16	ON DAY(S)	15
MAXIMUM 24-HR AVERAGE:	45.2	ppb			ON DAY(S)	16
					VAR-VARIOUS	
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:		722	hrs
MONTHLY CALIBRATION TIME:	12	hrs	AMD OPERATION UPTIME:		97.0	%
STANDARD DEVIATION:	6.6		MONTHLY AVERAGE:		34.5	ppb

OZONE Hourly Averages (O_3 ppb)



OZONE Instantaneous Maximum (O_3 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	29.1	29.0	30.5	30.5	29.7	S	28.9	28.1	27.4	27.8	29.4	C	C	C	C	C	C	C	Y	Y	Y	Y	Y	27.4	30.5	29.0	19
2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	C	31.3	30.6	31.5	32.9	30.6	32.9	31.6	9
3	33.2	32.9	32.4	32.5	S	30.8	29.8	28.5	28.8	30.9	33.9	34.0	36.2	36.1	36.1	37.9	38.1	36.5	34.8	35.0	43.2	46.0	46.0	45.8	28.5	46.0	35.6	24
4	49.2	47.5	45.1	S	32.5	32.5	30.6	33.9	37.5	38.4	38.8	39.6	41.0	41.7	42.3	42.6	42.5	41.9	41.5	41.5	41.7	41.4	40.9	38.9	30.6	49.2	40.2	24
5	40.5	40.3	S	40.2	41.8	41.0	41.4	41.3	40.3	41.3	41.4	41.4	41.3	40.6	39.9	39.8	39.4	38.9	38.4	38.0	37.8	37.5	40.1	37.3	37.3	41.8	40.0	24
6	36.2	S	31.9	35.1	35.4	37.6	38.8	39.6	38.2	39.0	39.2	39.6	40.6	40.1	40.3	39.7	38.8	37.6	35.6	36.9	37.2	36.9	36.6	35.1	31.9	40.6	37.7	24
7	S	35.4	33.6	33.4	32.5	32.7	31.9	31.5	31.5	32.5	33.0	33.4	34.2	35.8	36.8	39.4	40.7	40.5	39.8	39.6	40.2	40.5	41.5	S	31.5	41.5	35.9	24
8	38.3	36.6	31.7	30.0	27.7	30.8	30.8	28.0	33.1	36.1	38.0	38.4	39.2	39.4	39.4	40.3	41.4	41.5	40.8	40.1	39.9	39.8	S	36.3	27.7	41.5	36.4	24
9	32.6	32.4	31.8	30.1	25.7	25.9	25.4	27.4	31.3	31.7	31.5	35.8	37.3	36.5	36.1	35.8	36.0	36.0	36.6	37.2	38.0	S	39.7	36.0	25.4	39.7	33.3	24
10	34.7	35.6	35.4	31.4	24.1	22.6	21.3	23.9	26.4	29.2	28.6	27.4	27.9	28.5	30.0	30.8	30.8	30.6	30.5	29.4	S	29.2	28.5	28.1	21.3	35.6	28.9	24
11	28.0	27.9	26.9	26.2	26.2	28.5	30.9	X	X	32.3	32.9	34.7	35.6	36.1	36.1	36.6	37.7	38.1	38.4	S	40.2	39.4	40.1	38.4	26.2	40.2	33.9	22
12	37.6	37.9	38.0	37.9	37.2	37.6	37.6	37.7	37.9	38.5	39.8	41.5	41.9	42.5	42.5	43.6	44.0	43.4	S	44.2	45.4	45.1	43.8	42.6	37.2	45.4	40.8	24
13	41.8	41.9	42.0	42.0	42.2	42.1	41.5	38.4	39.7	40.2	40.9	41.5	41.9	42.7	44.0	44.7	44.6	S	44.2	43.7	43.2	43.5	43.5	43.7	38.4	44.7	42.3	24
14	43.8	43.6	43.2	43.0	42.3	41.7	40.9	40.1	40.1	40.5	40.5	42.2	40.7	41.1	41.9	44.6	S	49.8	50.2	48.1	46.4	45.2	44.7	43.5	40.1	50.2	43.4	24
15	42.6	40.8	39.7	39.4	38.1	36.8	35.3	33.5	34.6	36.0	38.7	45.0	48.6	50.3	51.7	S	52.0	50.9	49.5	48.6	49.9	51.2	51.5	51.1	33.5	52.0	44.2	24
16	50.3	51.3	50.7	51.1	48.5	47.9	46.5	45.8	44.7	45.4	48.4	49.1	50.6	51.2	S	51.7	51.5	50.7	48.7	48.6	46.7	40.3	39.9	39.7	39.7	51.7	47.8	24
17	40.3	41.0	43.0	40.7	37.2	36.1	35.2	35.6	43.5	45.7	43.5	43.0	43.2	S	44.2	45.0	44.7	44.6	42.3	41.7	40.5	38.6	39.0	39.8	35.2	45.7	41.2	24
18	39.1	37.0	35.3	34.4	32.9	31.1	30.7	30.5	31.2	31.2	31.8	33.1	S	35.0	35.4	35.4	35.2	33.8	33.1	32.9	32.2	32.2	33.5	33.6	30.5	39.1	33.5	24
19	35.8	38.5	43.1	44.7	42.8	41.1	41.4	41.7	42.0	44.7	46.0	S	48.9	49.8	50.3	49.0	48.3	47.2	46.1	45.2	44.9	45.0	45.6	44.4	35.8	50.3	44.6	24
20	42.0	41.4	42.3	42.2	43.7	43.7	43.2	42.5	42.7	42.7	S	43.2	43.5	45.8	45.6	45.5	45.2	44.9	45.0	44.2	44.2	44.2	44.0	42.2	41.4	45.8	43.6	24
21	39.7	40.9	41.8	40.2	37.7	32.7	32.5	37.2	40.3	S	42.6	43.0	43.0	43.1	43.0	43.2	41.9	41.0	40.0	38.9	38.5	38.3	37.5	37.0	32.5	43.2	39.7	24
22	36.6	36.3	35.8	35.1	34.2	33.5	33.1	32.5	S	31.4	31.1	31.4	31.2	31.5	33.1	33.0	34.7	33.2	31.9	30.6	29.7	32.1	32.1	32.1	29.7	36.6	32.9	24
23	32.2	32.4	33.1	33.4	33.4	34.2	34.6	S	36.2	36.3	34.8	34.6	35.6	37.6	39.3	40.2	40.8	40.2	40.7	40.2	37.0	36.1	34.8	34.4	32.2	40.8	36.2	24
24	33.5	33.4	32.7	35.1	35.1	32.9	S	34.0	32.4	32.7	32.5	36.7	37.0	36.3	35.8	36.5	36.7	39.0	40.0	39.9	38.6	37.5	37.2	37.0	32.4	40.0	35.8	24
25	36.1	36.9	36.8	36.6	35.1	S	33.6	33.8	33.0	34.8	37.3	40.0	40.6	41.9	42.7	43.0	42.6	41.7	41.3	42.2	43.0	42.6	40.1	40.0	33.0	43.0	38.9	24
26	38.5	38.0	37.6	37.1	S	34.6	31.5	31.4	32.4	32.7	34.4	37.0	43.7	46.3	51.5	50.5	51.7	45.2	41.4	40.5	39.2	35.3	36.1	35.8	31.4	51.7	39.2	24
27	33.8	31.0	30.8	S	31.1	31.8	34.2	34.2	34.2	33.1	32.9	32.9	33.9	37.0	38.1	38.9	37.8	33.9	32.5	31.7	31.7	30.8	30.4	29.3	29.3	38.9	33.3	24
28	27.7	27.3	S	28.9	28.8	27.1	25.0	23.1	22.9	23.4	24.6	23.1	23.0	22.7	25.4	26.9	27.6	27.6	27.2	24.3	25.4	25.2	25.2	26.0	22.7	28.9	25.6	24
29	24.6	S	25.2	25.6	26.4	26.1	26.4	27.4	27.0	28.5	28.9	29.6	28.4	29.3	30.8	30.5	36.9	35.2	33.6	34.0	34.0	29.5	27.0	22.5	22.5	36.9	29.0	24
30	S	24.7	24.1	25.6	26.8	26.0	26.8	27.7	27.6	28.8	29.1	29.8	30.6	30.4	30.6	32.5	33.1	33.2	32.7	32.4	37.9	35.4	34.2	S	24.1	37.9	30.0	24
31	28.5	26.6	25.1	23.9	21.3	18.1	16.8	16.0	20.7	29.6	38.8	38.4	43.2	43.2	39.3	33.2	37.2	38.0	38.4	38.9	39.0	37.6	S	34.4	16.0	43.2	31.6	24
HOURLY MAX	50.3	51.3	50.7	51.1	48.5	47.9	46.5	45.8	44.7	45.7	48.4	49.1	50.6	51.2	51.7	51.7	52.0	50.9	50.2	48.6	49.9	51.2	51.5	51.1				
HOURLY AVG	36.6	36.4	35.6	35.2	34.0	33.4	33.1	33.1	34.2	35.0	35.9	36.9	38.7	39.0	39.4	39.7	40.4	39.8	39.1	38.9	39.2	38.2	38.0	37.1				

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

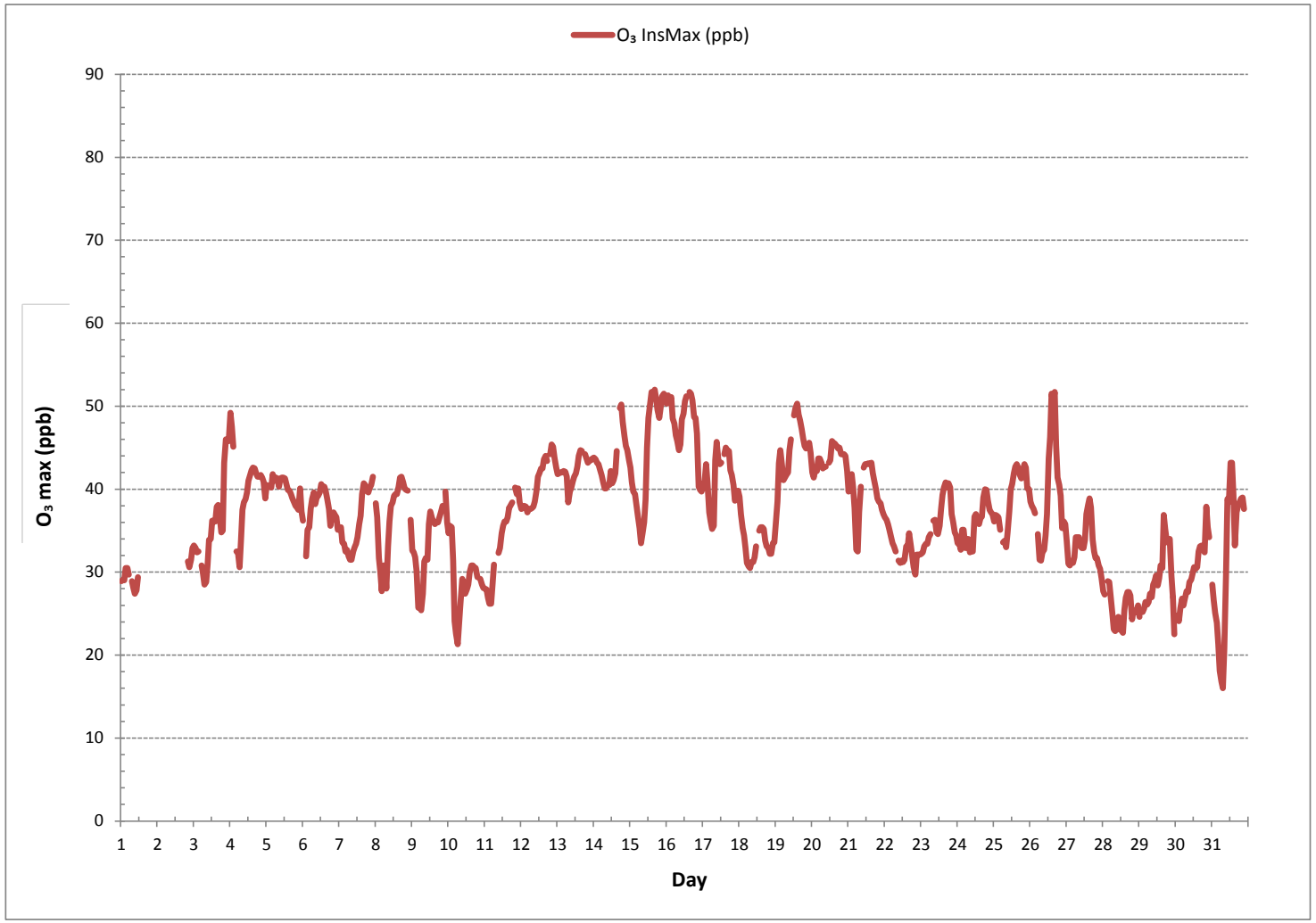
NUMBER OF NON-ZERO READINGS: 678

MAXIMUM INSTANTANEOUS VALUE: 52.0 ppb @ HOUR(S) 16 ON DAY(S) 15

VAR-VARIOUS

IZS CALIBRATION TIME: 32 hrs OPERATIONAL TIME: 722 hrs
MONTHLY CALIBRATION TIME: 12 hrs
STANDARD DEVIATION: 6.6

OZONE Instantaneous Maximum (O_3 ppb)



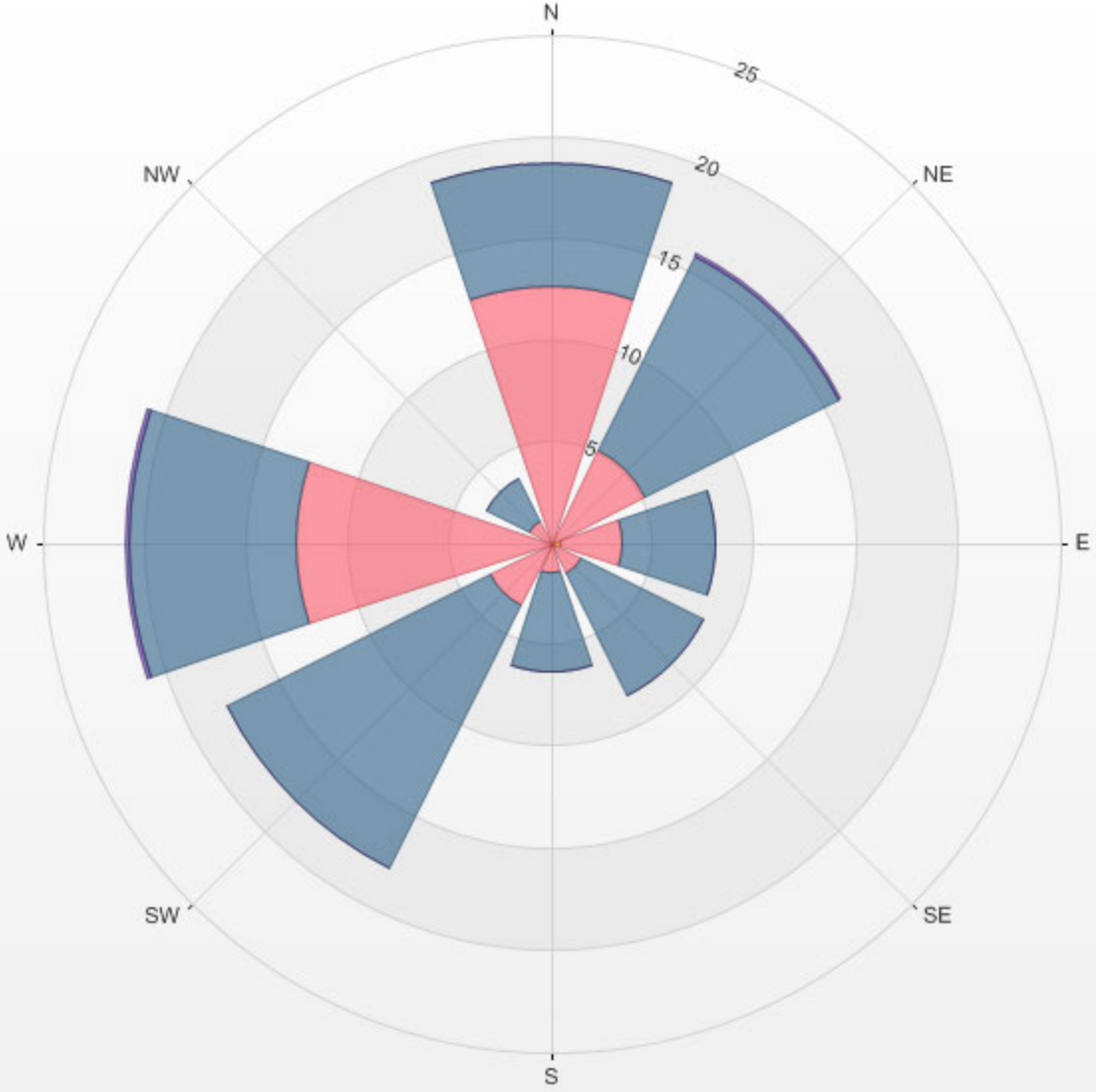
Wind: LICA ST. LINA
Poll.: LICA ST. LINA-O3[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 0.15% Calm Avg: 38.22 [ppb]

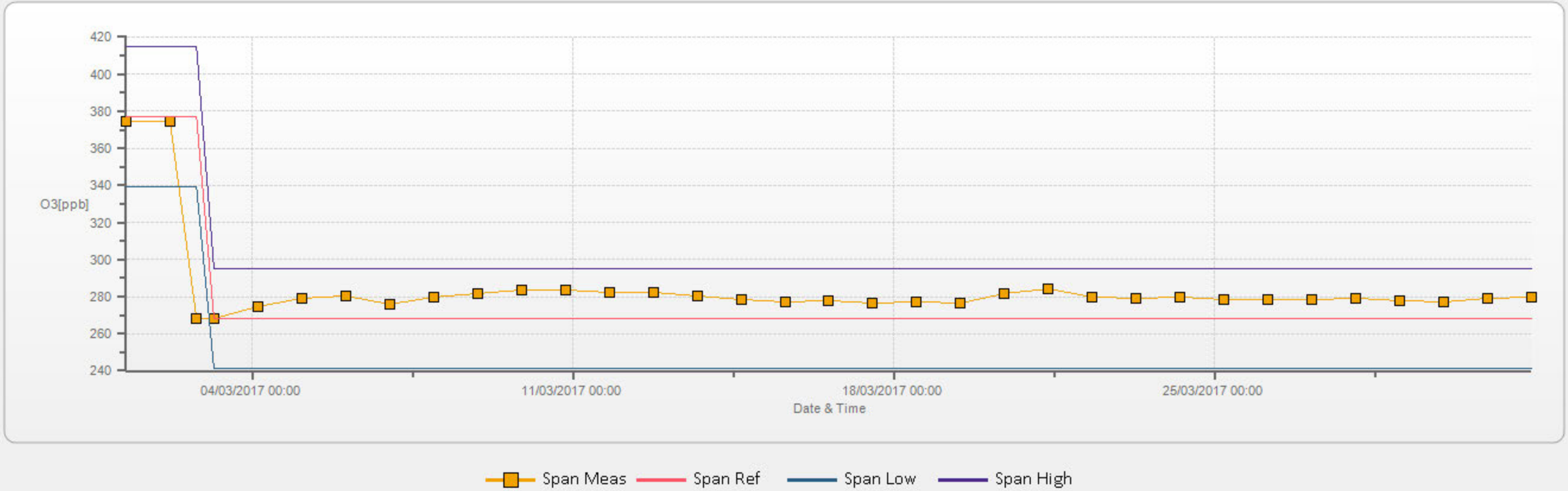
Direction	0.0-16.5	16.5-33.1	33.1-49.6	>49.6	Total
N	0.0	12.7	6.1	0.0	18.7
NE	0.0	5.2	10.6	0.2	15.9
E	0.4	3.1	4.6	0.0	8.1
SE	0.0	1.6	6.8	0.0	8.4
S	0.0	1.5	4.9	0.0	6.3
SW	0.0	3.4	14.5	0.0	17.8
W	0.0	12.5	8.3	0.2	21.0
NW	0.0	1.2	2.4	0.0	3.5
Summary	0.4	41.1	58.0	0.3	100.0

% Icon	Classes (ppb)							
	0	0.0-16.5	41	16.5-33.1	58	33.1-49.6	0	>49.6

LICA ST. LINA Poll.: LICA ST. LINA-O3[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 0.15% Calm Poll Avg: 38.22[ppb]



O3[ppb] Calibration: LICA ST. LINA Monthly: 17/03 Type: Span



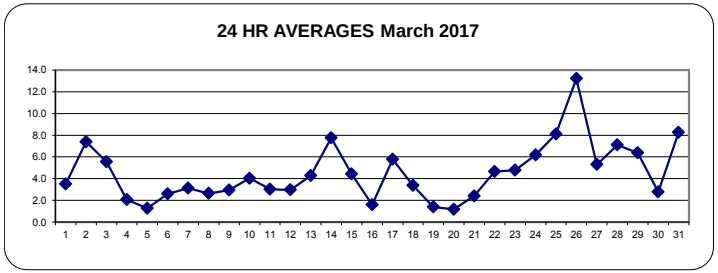
PARTICULATE MATTER 2.5

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

HR START (MST) / HR END (MST) / DAY	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
1	X	X	6.4	11.9	1.4	7.5	5.4	0.9	1.9	10.4	3.0	C	C	C	0.0	0.0	0.0	0.0	1.4	0.0	2.9	4.0	5.9	3.4	0.0	11.9	3.5	22
2	3.9	0.4	1.9	3.4	4.4	2.9	4.4	2.4	5.4	4.4	10.9	7.9	7.9	9.9	9.4	15.5	11.9	15.5	12.4	12.4	7.5	9.9	9.4	3.4	0.4	15.5	7.4	24
3	6.4	10.9	5.9	7.5	5.4	6.4	4.4	5.4	5.9	8.4	6.9	5.4	4.4	4.4	9.9	X	0.0	7.5	9.5	0.9	6.4	1.9	0.9	2.9	0.0	10.9	5.5	23
4	2.9	0.9	0.0	7.5	0.0	0.4	3.4	1.4	2.4	3.4	4.0	6.4	5.9	0.9	0.0	X	0.0	0.0	0.0	0.0	0.4	1.9	0.9	5.0	0.0	7.5	2.1	23
5	0.0	0.0	0.0	3.4	1.9	0.9	1.4	1.4	2.4	0.0	0.9	1.4	0.0	1.4	0.0	0.0	1.9	1.9	2.4	0.9	0.0	0.4	1.9	5.9	0.0	5.9	1.3	24
6	1.9	1.9	0.4	0.9	1.4	0.9	3.9	6.4	6.4	X	3.4	1.4	3.4	6.9	4.4	0.9	0.0	0.0	0.9	4.0	1.9	0.0	3.5	5.0	0.0	6.9	2.6	23
7	1.9	3.5	4.0	2.4	5.9	2.4	4.4	7.5	0.0	2.4	2.4	8.4	3.9	3.9	0.0	0.0	0.0	1.4	1.9	5.4	0.0	2.9	6.9	3.4	0.0	8.4	3.1	24
8	3.4	3.9	4.9	2.4	1.9	5.9	0.9	0.9	3.4	3.5	2.4	5.0	1.4	0.0	0.0	2.4	0.4	0.0	1.4	0.0	3.4	5.4	5.4	5.0	0.0	5.9	2.6	24
9	1.4	1.4	5.9	3.4	2.0	4.4	6.4	5.0	5.4	1.0	5.4	5.5	3.4	6.3	1.0	2.0	0.0	0.0	0.4	1.4	0.4	4.4	0.0	4.4	0.0	6.4	3.0	24
10	3.4	2.5	4.0	3.4	10.4	2.4	0.0	8.4	2.4	9.1	5.5	2.9	2.9	4.4	2.4	3.9	0.9	5.0	2.4	4.4	5.9	4.0	2.9	3.4	0.0	10.4	4.0	24
11	7.9	0.9	0.0	6.4	1.9	3.9	3.5	X	X	4.4	3.4	0.9	0.0	2.9	1.9	4.4	4.0	5.9	3.9	2.4	3.9	1.4	2.9	0.0	0.0	7.9	3.0	22
12	0.0	2.9	0.4	2.4	2.9	3.9	1.9	2.4	3.4	2.5	3.4	2.9	6.4	6.4	4.0	5.9	1.9	3.5	2.9	3.4	2.9	0.0	1.4	3.4	0.0	6.4	3.0	24
13	0.0	0.0	6.9	3.9	11.5	2.4	0.0	5.4	3.9	4.4	4.5	1.3	9.0	2.8	3.5	2.9	3.5	9.5	6.9	2.4	4.5	2.4	4.4	6.5	0.0	11.5	4.3	24
14	0.4	5.4	8.4	5.9	4.6	6.4	8.9	8.0	5.9	2.4	2.4	11.3	10.5	8.5	8.9	8.0	8.8	11.4	10.4	10.4	12.8	12.1	8.3	6.0	0.4	12.8	7.8	24
15	2.3	5.9	7.3	8.5	4.9	3.9	9.1	5.3	11.6	9.0	13.6	5.9	2.5	4.4	2.5	0.4	0.0	1.4	2.9	0.0	2.1	0.0	1.2	1.6	0.0	13.6	4.4	24
16	0.0	0.9	3.0	0.0	0.0	0.0	0.4	0.0	0.4	0.8	1.7	0.0	0.5	0.8	1.1	2.4	3.8	1.5	1.9	2.8	3.3	5.0	4.4	3.5	0.0	5.0	1.6	24
17	1.9	3.8	5.3	2.3	4.7	5.4	7.9	6.3	5.9	1.5	6.6	0.1	7.9	4.3	5.4	9.5	13.1	9.1	9.2	5.1	6.3	8.2	3.3	5.3	0.1	13.1	5.8	24
18	4.6	2.4	4.8	4.3	3.8	2.6	0.0	6.4	0.0	3.9	5.3	7.6	0.0	4.9	7.9	2.8	4.6	1.6	0.0	0.0	1.9	1.4	6.8	3.6	0.0	7.9	3.4	24
19	0.0	1.2	1.0	3.7	0.3	3.2	2.6	0.6	4.2	0.0	0.8	0.3	X	0.0	3.3	0.0	X	0.0	4.7	0.0	0.0	2.9	0.0	1.9	0.0	4.7	1.4	22
20	7.3	0.0	0.4	0.0	1.1	2.1	0.0	2.4	1.1	0.0	1.3	0.0	0.4	3.8	0.0	X	0.0	X	0.0	0.0	0.4	1.4	1.4	2.7	0.0	7.3	1.2	22
21	5.2	0.7	5.4	0.4	0.9	0.2	5.2	1.0	0.0	2.7	4.4	2.7	3.2	4.4	4.9	2.9	0.4	2.0	0.2	3.2	3.1	1.4	2.1	1.2	0.0	5.4	2.4	24
22	0.9	4.7	5.0	5.8	4.9	5.0	6.7	4.0	4.2	5.4	3.4	5.4	5.4	5.2	7.2	1.4	7.8	1.6	3.7	4.4	2.2	5.9	3.7	7.7	0.9	7.8	4.7	24
23	3.5	6.4	5.2	6.4	3.7	6.6	0.0	7.1	0.0	0.4	3.2	9.7	2.9	6.2	5.0	0.2	6.0	5.2	7.4	5.7	4.1	5.7	4.2	9.6	0.0	9.7	4.8	24
24	10.8	7.9	2.9	2.8	0.9	3.6	4.2	6.1	6.2	5.4	4.1	5.1	7.1	8.1	3.6	11.7	7.6	7.9	2.3	6.4	7.3	9.4	10.8	6.3	0.9	11.7	6.2	24
25	4.6	9.9	7.2	0.0	9.1	0.1	5.5	0.3	9.5	5.4	8.6	6.7	9.0	5.7	8.3	6.2	12.3	12.1	13.4	12.5	11.4	15.1	10.3	11.6	0.0	15.1	8.1	24
26	**19.5**	9.0	15.3	10.7	13.1	13.1	12.9	14.9	14.5	13.6	14.9	16.6	17.9	15.9	15.9	14.3	15.4	14.9	10.9	9.9	9.9	11.7	5.6	6.7	5.6	**19.5**	**13.2**	24
27	7.1	5.7	0.0	2.3	1.1	8.6	4.0	2.9	12.9	3.7	2.5	5.4	6.4	14.5	7.9	7.3	6.9	4.5	2.7	2.0	4.6	2.4	3.9	7.7	0.0	14.5	5.3	24
28	4.4	7.9	6.9	8.0	10.4	4.0	4.3	6.2	3.4	6.9	C	C	7.9	9.9	8.4	9.0	9.0	9.9	10.9	11.9	5.0	4.4	5.0	2.4	2.4	11.9	7.1	24
29	9.0	1.9	3.4	2.9	4.4	0.9	5.9	5.0	3.4	5.4	8.4	9.0	5.9	2.4	8.4	3.9	6.9	1.9	5.0	11.4	13.4	12.4	12.9	9.0	0.9	13.4	6.4	24
30	7.5	7.5	4.9	2.4	0.0	1.4	X	0.0	0.0	0.0	0.0	1.4	2.9	0.0	2.9	4.4	0.0	3.9	1.4	3.4	5.9	4.0	5.0	4.9	0.0	7.5	2.8	23
31	5.0	2.4	1.9	2.4	3.4	11.9	12.9	9.9	16.4	11.9	12.4	7.5	11.9	5.4	9.0	7.9	5.9	5.9	8.4	12.9	10.4	5.9	3.9	12.9	1.9	16.4	8.3	24
HOURLY MAX	19.5	10.9	15.3	11.9	13.1	13.1	12.9	14.9	16.4	13.6	14.9	16.6	17.9	15.9	15.9	15.5	15.4	15.5	13.4	12.9	13.4	15.1	12.9	12.9				
HOURLY AVG	4.2	3.8	4.2	4.1	3.9	4.0	4.4	4.5	4.8	4.4	5.0	5.0	5.2	5.2	4.7	4.7	4.4	4.8	4.6	4.5	4.7	4.8	4.5	5.0				

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

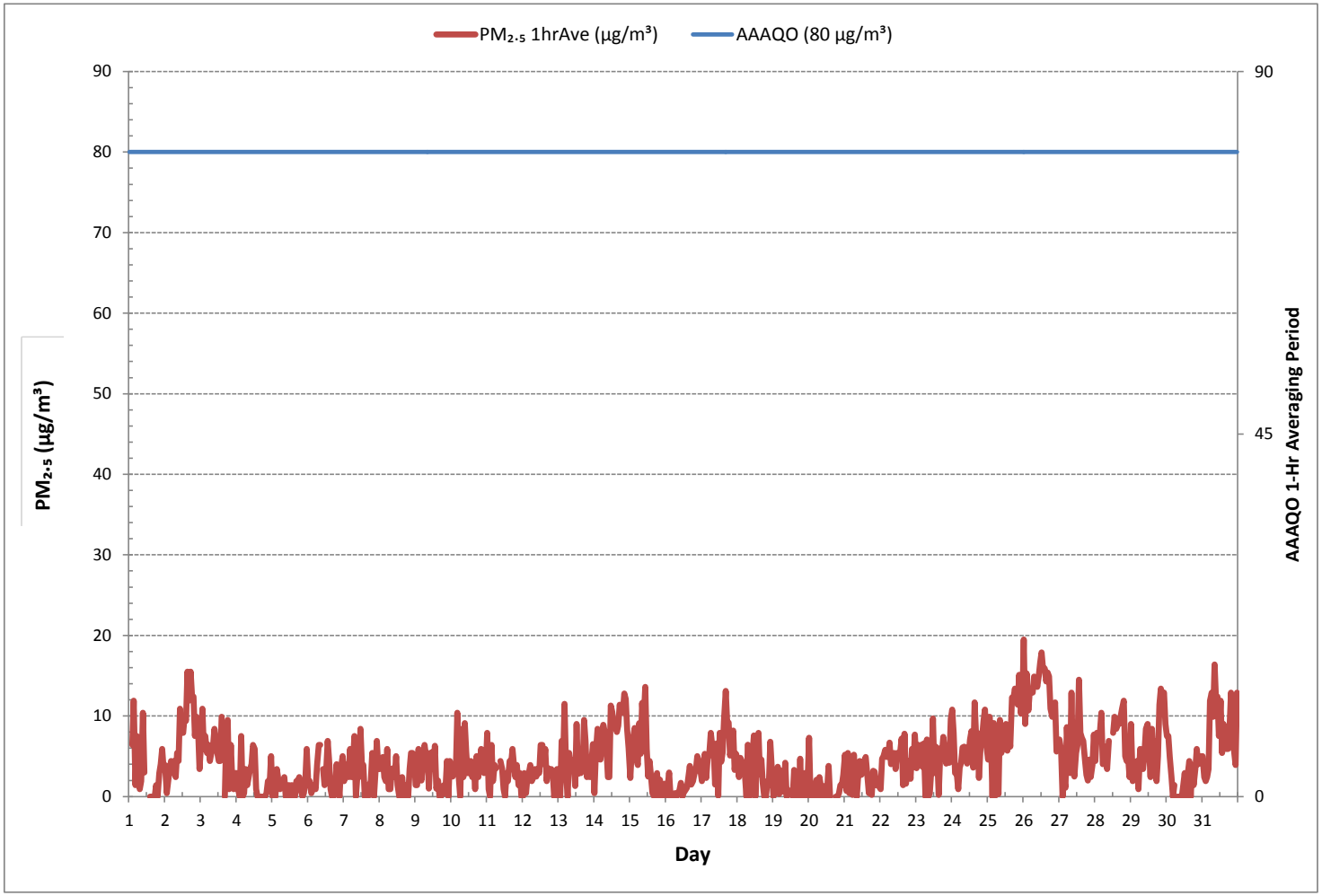


OBJECTIVE LIMIT: **ALBERTA ENVIRONMENT:** 1-HR 80 µg/m³ 24-HR 30 µg/m³

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0						
NUMBER OF 24-HR EXCEEDANCES:	0						
NUMBER OF NON-ZERO READINGS:	639						
MINIMUM 1-HR AVERAGE	0.0	µg/m³	@ HOUR(S)	14	ON DAY(S)	1	
MAXIMUM 1-HR AVERAGE:	19.5	µg/m³	@ HOUR(S)	0	ON DAY(S)	26	
MAXIMUM 24-HR AVERAGE:	13.2	µg/m³			ON DAY(S) VAR-VARIOUS	26	
OPERATIONAL TIME:						732	hrs
MONTHLY CALIBRATION TIME:	5	hrs			AMD OPERATION UPTIME:	98.4	%
STANDARD DEVIATION:	3.8				MONTHLY AVERAGE:	4.5	µg/m³

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



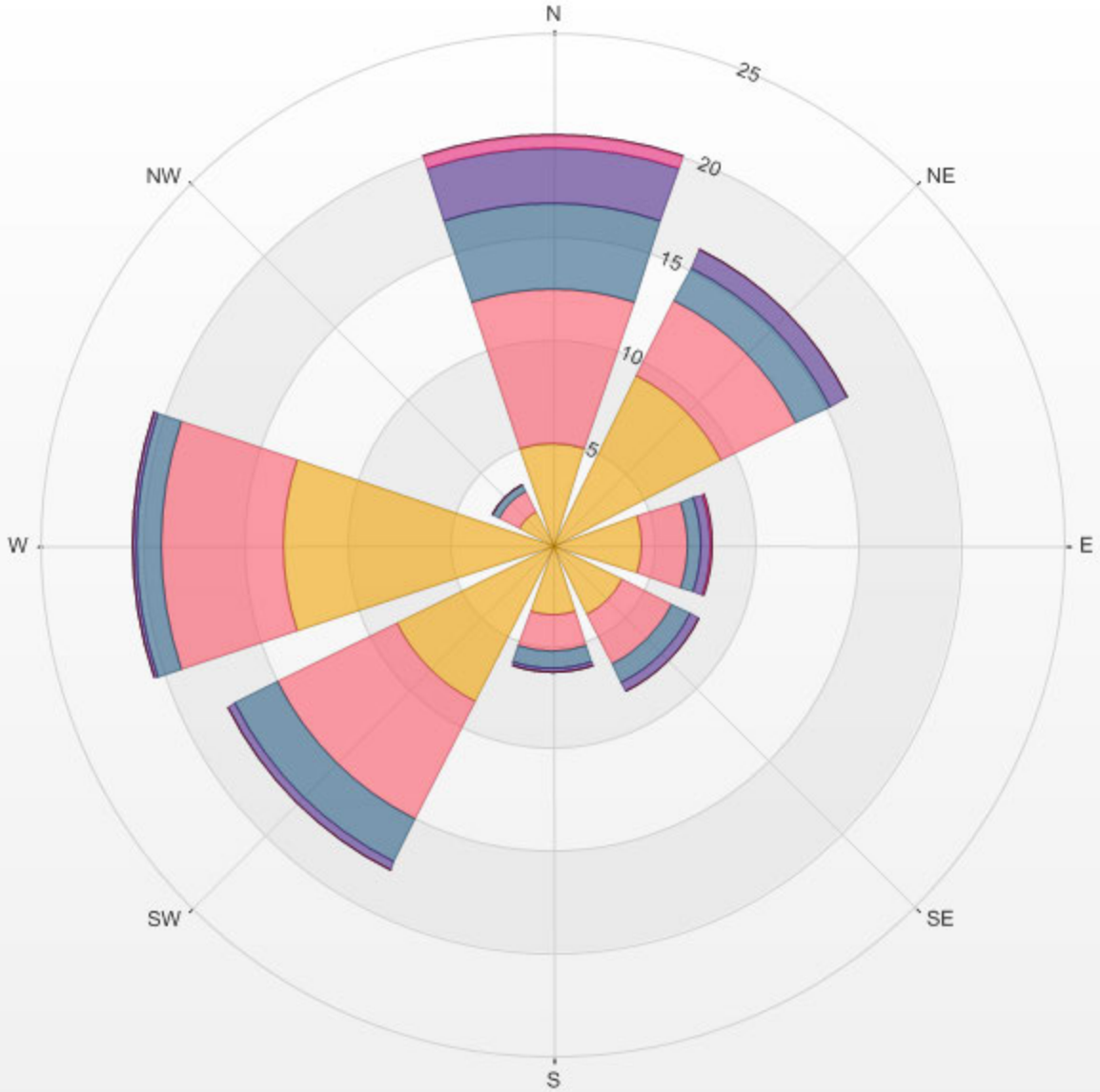
Wind: LICA ST. LINA
Poll.: LICA ST. LINA-PM25[ug/m3(L)]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 0.14% Calm Avg: 5.21 [ug/m3]

Direction	0.0-3.9	3.9-7.8	7.8-11.8	11.8-15.7	15.7-19.6	>19.6	Total
N	5.0	7.6	4.1	2.8	0.7	0.0	20.1
NE	9.2	4.1	1.8	1.0	0.0	0.0	16.1
E	4.4	2.2	0.7	0.4	0.1	0.0	7.9
SE	3.9	2.6	1.1	0.4	0.0	0.0	8.0
S	3.4	1.8	0.8	0.1	0.0	0.0	6.2
SW	8.5	6.5	2.3	0.4	0.0	0.0	17.8
W	13.2	5.9	1.2	0.1	0.0	0.0	20.5
NW	1.8	1.1	0.4	0.0	0.0	0.0	3.3
Summary	49.5	31.8	12.5	5.2	0.8	0.0	100.0

% Icon Classes (ug/m3(L))	49	0.0-3.9	32	3.9-7.8	13	7.8-11.8	5	11.8-15.7	1	15.7-19.6	0	>19.6

LICA ST. LINA Poll.: LICA ST. LINA-PM25[ug/m3(L)] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 0.14% Calm Poll Avg: 5.21[ug/m3(L)]



WIND SPEED

Maxxam
A Bureau Veritas Group Company

WIND SPEED Hourly Averages (WS kph)

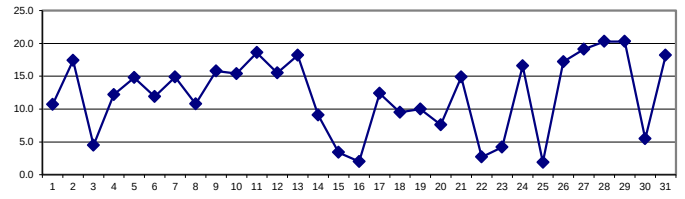
HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	9.8	10.3	10.3	10.4	11.6	11.2	8.9	6.5	8.9	7.3	8.4	8.5	14.3	15.4	18.5	18.2	20.5	21.4	17.1	18.9	21.3	14.5	18.8	19.5	6.5	21.4	10.7	24
2	10.5	24.4	17.9	13.2	12.9	17.4	19.2	20.0	19.3	19.2	20.2	19.4	20.0	18.5	18.9	17.7	20.2	Y	22.1	22.7	21.9	18.4	12.1	10.8	10.5	24.4	17.4	23
3	9.0	7.9	8.0	6.3	8.4	6.4	6.5	7.7	8.6	11.7	11.4	15.2	15.2	12.8	14.8	18.1	20.9	9.8	12.7	12.7	11.2	11.4	11.8	13.6	6.3	20.9	4.5	24
4	13.8	15.3	12.5	7.9	8.3	10.6	12.0	11.8	14.6	13.0	10.1	9.1	8.1	8.7	10.2	11.9	12.7	14.4	14.6	14.3	14.1	17.2	19.3	20.2	7.9	20.2	12.2	24
5	21.5	20.5	21.3	19.2	21.8	21.1	23.6	22.3	21.0	20.5	10.5	11.1	17.8	19.1	17.0	20.1	6.0	20.2	20.2	22.0	9.2	11.8	15.1	11.7	6.0	23.6	14.8	24
6	18.5	19.1	18.9	19.1	19.4	15.7	20.8	20.4	17.7	16.2	16.5	13.8	18.3	19.2	18.6	17.7	17.4	20.2	20.2	20.6	21.3	20.7	19.7	19.9	13.8	21.3	11.9	24
7	19.4	20.0	20.7	19.1	19.5	20.9	20.0	18.8	20.1	21.9	19.2	18.4	18.4	18.8	18.7	18.2	18.2	12.1	9.3	10.0	15.6	14.1	15.6	20.2	9.3	21.9	14.9	24
8	18.1	17.5	20.3	18.3	19.5	17.5	17.5	16.9	17.7	16.2	16.3	18.5	17.5	19.7	8.1	6.9	9.7	14.5	20.0	19.6	19.3	11.2	19.8	17.0	6.9	20.3	10.8	24
9	16.4	15.7	18.1	17.6	19.1	18.1	17.9	17.4	16.8	21.1	23.5	4.9	4.8	4.9	15.6	20.7	21.5	20.3	20.2	20.5	18.8	17.4	18.7	18.3	4.8	23.5	15.8	24
10	17.8	16.3	15.6	15.2	14.7	14.2	13.5	13.6	14.5	14.6	14.7	14.4	14.4	14.2	11.9	12.8	14.5	16.4	17.2	16.9	18.3	20.6	20.8	19.7	11.9	20.8	15.4	24
11	19.1	18.8	20.1	22.6	21.8	19.8	18.9	X	X	18.7	18.4	17.9	15.4	14.6	15.5	15.6	17.1	18.1	18.1	19.2	22.8	22.9	19.0	17.4	14.6	22.9	18.6	22
12	15.9	15.5	15.4	14.3	13.0	14.8	17.0	15.0	14.1	12.4	15.5	15.8	14.7	17.6	15.1	17.8	17.9	17.5	19.3	17.7	18.8	19.7	20.4	19.8	12.4	20.4	15.5	24
13	19.9	20.1	19.6	20.0	18.9	19.0	17.4	18.3	18.6	18.7	19.1	19.3	18.2	18.9	20.2	19.8	21.3	19.8	19.1	19.6	18.3	14.3	15.9	13.8	13.8	21.3	18.2	24
14	18.5	19.1	21.0	21.4	20.9	20.2	17.8	17.2	15.4	19.8	8.0	21.1	17.9	19.1	15.9	15.0	14.9	15.8	16.1	16.5	15.4	17.0	16.9	19.2	8.0	21.4	9.1	24
15	19.7	20.8	21.0	21.4	21.1	17.1	11.4	16.9	20.5	19.7	17.9	20.1	12.4	10.3	9.0	10.8	20.0	20.1	21.1	19.6	22.2	15.1	17.9	20.4	9.0	22.2	3.4	24
16	21.0	21.2	19.0	10.7	21.5	23.2	21.6	20.8	22.4	23.9	22.0	20.5	9.3	5.0	14.6	16.3	20.3	21.5	20.4	15.5	13.9	4.8	14.5	**25.1**	4.8	**25.1**	2.0	24
17	22.2	22.4	22.2	14.0	17.9	19.7	5.2	5.8	9.3	11.3	15.5	15.3	19.5	18.7	21.5	19.6	21.1	21.0	21.0	19.7	18.0	19.3	18.7	17.5	5.2	22.4	12.4	24
18	19.7	18.5	16.8	15.0	15.4	15.0	15.1	16.0	14.1	13.4	13.0	12.5	11.8	11.6	11.9	12.8	13.6	13.0	13.3	14.4	10.2	15.1	15.7	10.9	10.2	19.7	9.5	24
19	9.0	14.9	14.6	11.9	8.9	9.7	10.9	12.0	11.1	8.2	7.8	7.5	5.9	4.2	5.1	17.0	18.3	14.2	12.3	12.2	12.4	12.7	13.1	15.4	4.2	18.3	10.0	24
20	15.0	16.5	20.7	19.3	17.8	15.4	15.7	17.1	17.3	17.6	16.9	16.1	15.5	14.7	17.3	18.0	18.5	14.8	23.4	20.7	20.6	21.0	20.6	20.4	14.7	23.4	7.6	24
21	18.0	21.3	20.1	19.3	17.3	18.2	17.4	20.0	18.8	19.1	20.0	13.9	15.8	12.3	9.3	10.2	14.2	14.4	15.1	12.1	10.6	10.1	9.6	10.0	9.3	21.3	14.9	24
22	11.0	11.0	10.0	9.8	10.0	11.2	10.0	10.5	10.4	13.3	14.1	16.2	17.0	18.7	20.6	22.2	7.0	22.7	23.1	21.6	19.6	19.2	19.8	20.3	7.0	23.1	2.7	24
23	21.3	23.9	22.8	16.1	6.2	18.4	23.9	24.2	21.7	19.5	22.2	5.4	23.6	23.2	6.2	24.3	20.5	**1.2**	17.0	18.9	17.4	19.3	19.3	17.2	**1.2**	24.3	4.2	24
24	18.9	19.1	20.6	20.4	15.8	18.4	20.2	17.3	18.9	19.7	20.3	21.2	21.0	22.5	22.5	23.5	17.4	22.9	24.6	24.4	21.2	12.6	13.3	19.7	12.6	24.6	16.6	24
25	22.5	23.8	23.1	19.9	19.2	19.8	20.3	22.0	6.1	6.8	20.2	9.5	21.1	20.8	20.5	18.1	17.3	18.4	20.7	19.7	20.1	18.3	16.3	15.0	6.1	23.8	1.9	24
26	15.1	16.3	19.8	15.7	17.3	17.7	16.9	20.1	18.4	17.5	18.5	19.8	16.5	16.8	17.8	20.4	18.1	18.3	17.1	16.4	17.9	18.6	15.9	20.2	15.1	20.4	17.2	24
27	20.5	20.1	20.6	22.9	21.6	18.4	18.8	21.3	20.7	19.8	20.8	19.8	20.4	17.7	17.8	18.7	17.7	15.7	16.8	16.0	16.4	17.5	20.1	21.8	15.7	22.9	19.1	24
28	20.4	22.9	22.2	20.4	20.0	19.6	20.0	18.7	19.4	20.0	19.4	20.1	19.1	21.2	20.8	21.4	20.9	21.5	18.6	20.0	20.5	20.5	21.2	20.3	18.6	22.9	20.3	24
29	21.2	22.1	23.0	24.1	24.7	24.5	23.5	22.6	21.5	20.8	22.7	21.3	20.7	20.8	20.8	21.4	22.8	22.7	5.5	19.2	22.2	10.2	21.4	20.7	5.5	24.7	**20.3**	24
30	17.2	11.0	17.7	19.6	10.5	12.9	8.6	8.4	11.0	15.0	16.5	17.0	15.5	20.7	21.3	23.8	22.7	7.2	9.7	22.1	21.6	13.1	13.1	19.6	7.2	23.8	5.5	24
31	21.9	20.8	21.4	21.8	21.1	22.1	21.7	22.3	22.1	22.4	20.2	20.7	22.0	20.2	22.3	18.0	16.2	12.4	8.8	10.9	22.4	22.9	22.7	22.8	8.8	***22.9***	18.2	24
HOURLY MAX	22.5	24.4	23.1	24.1	24.7	24.5	23.9	24.2	22.4	23.9	23.5	21.3	23.6	23.2	22.5	24.3	22.8	22.9	24.6	24.4	22.8	22.9	22.7	25.1				
HOURLY AVG	2.6	3.5	3.4	1.7	2.0	2.4	2.4	2.3	3.0	2.6	3.1	3.9	3.3	3.7	4.0	3.5	3.5	2.1	2.2	2.5	3.9	2.5	3.2	2.3				

STATUS FLAG CODES

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

LAST CALIBRATION:	September 12, 2016
DECLINATION :	MAGNETIC DECLINATION 14 DEGREE EAST

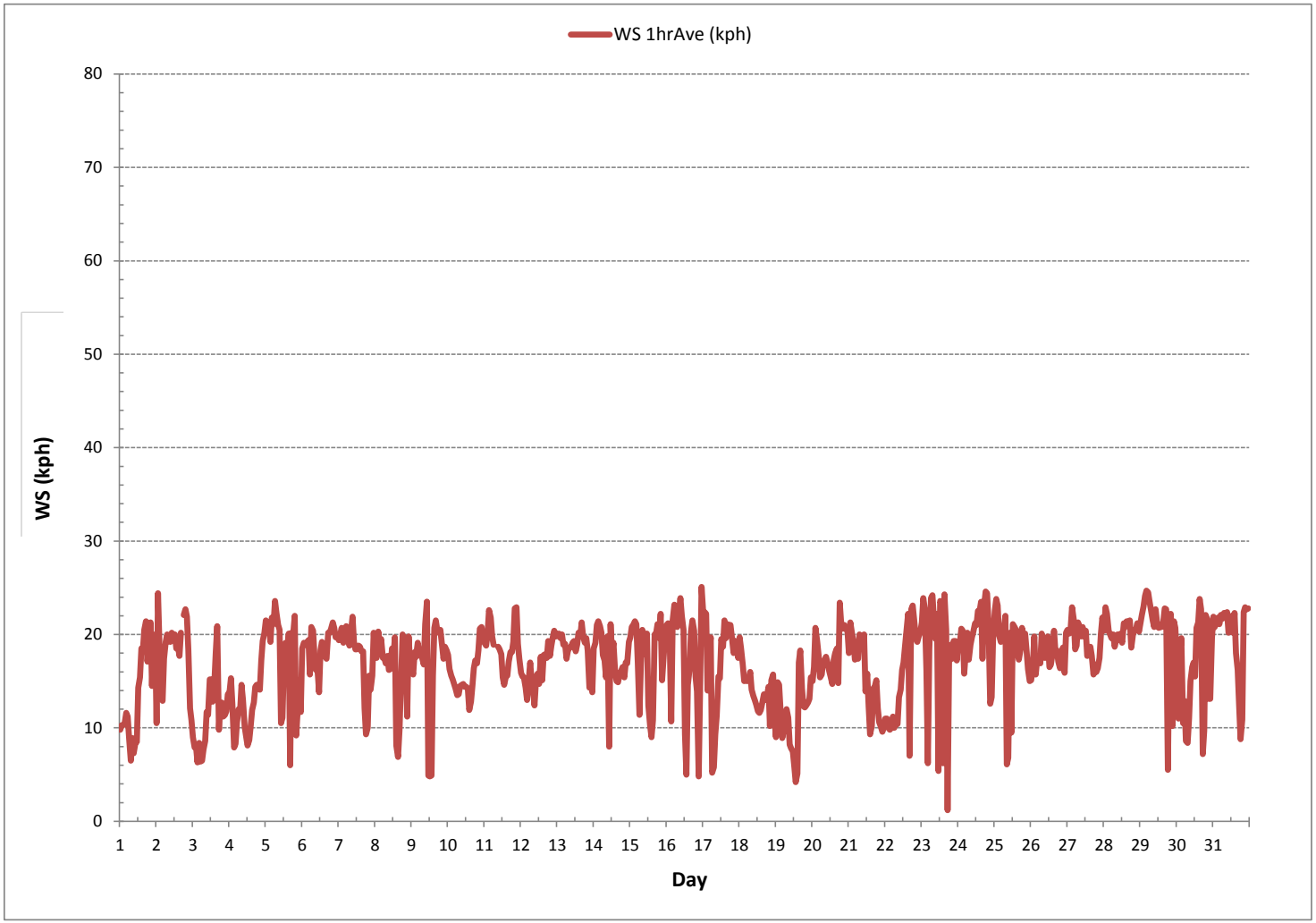
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			741				
MINIMUM 1-HR AVERAGE	1.2	kph	@ HOUR(S)	17	ON DAY(S)	23	
MAXIMUM 1-HR AVERAGE:	25.1	kph	@ HOUR(S)	23	ON DAY(S)	16	
MAXIMUM 24-HR AVERAGE:	20.3	kph			ON DAY(S) VAR-VARIOUS	29	
					OPERATIONAL TIME:	741	hrs
MONTHLY CALIBRATION TIME:	0	hrs			AMD OPERATION UPTIME:	99.6	%
STANDARD DEVIATION:	4.4				MONTHLY AVERAGE:	2.8	kph

WIND SPEED Hourly Averages (WS kph)



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	23.5	25.5	25.0	25.7	27.0	25.9	23.2	35.0	26.3	36.0	27.0	26.8	33.4	30.7	33.1	31.2	34.4	35.1	42.6	31.5	32.1	48.2	44.7	33.1	23.2	48.2	31.5	24
2	33.8	31.2	23.9	24.8	19.6	24.3	27.8	30.7	27.8	32.3	31.9	33.0	35.1	33.5	31.5	29.7	29.6	Y	Y	33.8	36.8	30.2	25.8	25.0	19.6	36.8	29.6	22
3	24.3	20.6	22.0	18.8	19.9	21.4	19.0	21.8	23.2	28.5	27.2	29.0	27.0	27.0	29.0	29.2	29.9	30.3	25.7	25.4	24.8	25.7	24.4	22.2	18.8	30.3	24.8	24
4	23.3	24.0	24.6	25.6	26.3	37.5	37.2	35.5	39.8	40.0	30.8	32.0	25.1	25.8	29.4	28.4	28.5	28.9	27.3	29.5	29.1	26.9	27.6	29.1	23.3	40.0	29.7	24
5	31.8	33.1	32.1	32.8	32.1	32.2	32.1	53.3	30.8	32.0	32.4	33.1	33.3	32.0	32.5	35.7	58.6	**72.2**	31.1	31.7	44.3	41.3	42.7	33.8	30.8	**72.2**	37.4	24
6	29.8	28.2	27.8	27.1	28.0	31.3	30.6	33.2	40.7	38.7	41.8	40.3	37.0	41.6	40.1	37.9	40.7	34.9	36.3	40.1	40.2	40.6	33.9	34.3	27.1	41.8	35.6	24
7	34.6	38.9	43.1	40.0	36.6	41.1	38.1	35.0	36.7	40.0	36.3	34.0	35.9	37.1	37.7	34.9	34.2	34.8	31.1	29.6	30.8	31.8	30.8	29.6	29.6	43.1	35.5	24
8	29.3	28.0	33.8	31.9	33.6	24.4	27.3	29.2	31.8	31.9	28.2	31.9	30.8	36.1	29.8	29.6	30.0	31.5	33.7	32.4	27.1	28.1	24.0	25.3	24.0	36.1	30.0	24
9	27.8	23.6	27.1	24.7	23.1	23.1	23.1	22.0	30.4	35.8	43.8	34.5	34.8	34.8	32.2	37.5	33.5	33.7	25.8	24.7	22.2	24.7	24.0	26.7	22.0	43.8	28.9	24
10	29.3	29.7	29.7	27.9	28.4	29.7	24.6	29.0	28.0	31.9	28.0	31.3	28.0	30.0	24.5	29.0	27.8	30.0	30.8	30.6	31.5	32.4	32.3	31.9	24.5	32.4	29.4	24
11	30.6	31.7	33.4	37.8	35.4	35.4	29.1	**X**	**X**	28.8	35.5	33.7	30.9	29.8	30.2	30.2	31.3	30.9	30.2	31.9	35.2	35.6	32.8	30.4	28.8	37.8	32.3	22
12	29.6	29.3	32.0	30.2	29.1	28.5	29.9	28.0	31.9	27.8	31.1	32.6	29.8	34.6	30.5	34.8	28.9	27.8	30.5	29.5	33.1	34.6	36.4	37.7	27.8	37.7	31.2	24
13	35.0	36.1	34.3	32.9	29.5	31.5	31.3	30.1	32.0	38.0	33.5	32.2	31.1	37.0	36.4	38.7	38.0	38.3	35.7	30.7	31.4	33.7	37.9	35.3	29.5	38.7	34.2	24
14	42.1	36.4	34.9	35.3	35.5	34.2	32.2	32.0	28.7	30.3	32.3	32.5	28.1	31.2	28.8	25.3	24.6	25.7	25.0	25.6	26.3	29.2	26.6	29.0	24.6	42.1	30.5	24
15	34.6	30.3	27.9	28.1	31.0	34.4	32.6	32.1	32.1	29.5	28.7	30.2	33.0	34.5	33.9	30.7	30.0	29.0	33.0	37.5	37.6	33.4	32.7	27.0	27.0	37.6	31.8	24
16	28.8	26.5	26.8	31.0	27.7	33.8	27.2	29.2	30.4	35.0	30.2	31.1	30.8	30.6	26.9	27.0	28.1	27.2	27.4	26.8	27.7	27.7	38.6	34.9	26.5	38.6	29.6	24
17	31.4	27.9	31.2	28.8	29.6	29.9	28.7	28.7	33.1	35.1	37.5	29.9	32.1	36.8	42.2	38.4	37.1	29.2	29.4	29.6	28.3	30.5	32.8	27.2	27.2	42.2	31.9	24
18	38.9	34.9	27.7	27.2	28.1	25.2	25.5	27.2	24.8	26.6	26.1	28.2	29.7	27.1	26.2	26.9	24.5	23.1	24.4	24.6	34.1	33.6	39.1	32.2	23.1	39.1	28.6	24
19	39.0	65.3	50.8	46.3	33.8	40.5	27.4	27.0	28.1	28.3	28.1	28.8	28.3	42.6	44.5	31.8	32.0	29.2	26.5	23.9	26.6	26.6	27.0	29.8	23.9	65.3	33.8	24
20	36.6	44.7	43.6	32.9	31.6	29.1	29.8	30.9	31.1	37.5	32.3	28.5	31.1	34.3	32.3	30.6	30.3	32.1	39.9	29.6	25.4	24.8	24.7	27.6	24.7	44.7	32.1	24
21	30.5	30.0	26.1	27.4	27.1	29.5	26.9	32.0	31.8	33.9	39.5	30.5	36.6	40.3	30.1	37.2	41.4	38.3	40.3	32.7	27.6	25.3	22.6	23.9	22.6	41.4	31.7	24
22	25.3	23.1	28.1	23.5	23.0	26.5	23.2	25.0	26.1	26.3	27.7	28.3	27.9	29.8	29.6	36.8	28.5	34.8	33.3	32.7	31.0	28.7	32.9	34.1	23.0	36.8	28.6	24
23	32.9	36.2	34.7	29.2	37.4	36.6	39.4	34.5	33.8	31.1	33.1	37.5	36.3	35.7	32.3	34.6	31.8	35.3	30.2	26.0	25.3	24.5	33.5	24.5	24.5	39.4	32.8	24
24	24.0	24.5	23.3	32.1	24.9	32.1	30.5	27.4	28.5	29.9	32.1	38.7	40.7	44.1	45.0	47.5	43.1	46.4	51.6	45.0	45.2	42.4	41.3	36.3	23.3	51.6	36.5	24
25	33.4	36.2	35.1	26.9	24.4	27.1	35.0	34.7	31.6	29.5	30.2	30.9	29.1	29.8	29.6	27.5	27.9	27.9	27.7	24.4	25.8	27.1	22.7	21.0	21.0	36.2	29.0	24
26	22.9	31.3	28.4	23.8	25.5	26.6	35.5	26.6	26.6	28.9	28.9	27.3	27.0	28.5	28.9	30.5	27.5	28.7	25.6	25.1	25.5	25.8	26.8	27.8	22.9	35.5	27.5	24
27	27.3	27.5	27.9	30.7	35.3	38.0	33.8	29.2	29.4	29.0	40.2	31.7	32.7	31.5	31.0	33.4	32.1	28.2	27.2	26.2	26.6	27.9	30.0	29.3	26.2	40.2	30.7	24
28	28.6	29.0	28.2	27.9	27.3	28.8	28.4	28.1	27.3	28.3	28.9	28.8	28.6	30.4	29.5	31.2	29.0	28.6	28.8	28.3	29.7	29.2	28.4	30.3	27.3	31.2	28.8	24
29	29.5	29.6	30.4	28.8	30.8	30.8	29.0	28.8	29.5	28.8	29.7	29.0	29.3	29.9	28.0	29.7	29.1	29.5	29.7	28.8	28.3	28.9	28.2	30.6	28.0	30.8	29.4	24
30	39.8	34.9	37.6	38.4	40.4	26.6	27.0	19.8	24.2	27.2	27.7	27.7	28.6	29.7	29.9	31.0	31.0	31.6	35.1	28.8	33.0	32.1	27.2	26.9	19.8	40.4	30.7	24
31	26.0	23.8	25.9	25.9	25.5	25.5	26.2	26.8	27.6	28.9	29.5	37.9	41.6	42.2	39.4	37.8	39.6	31.3	28.2	30.3	31.0	30.2	31.5	30.0	23.8	42.2	30.9	24
HOURLY MAX	42.1	65.3	50.8	46.3	40.4	41.1	39.4	53.3	40.7	40.0	43.8	40.3	41.6	44.1	45.0	47.5	58.6	72.2	51.6	45.0	45.2	48.2	44.7	37.7				
HOURLY AVG	30.8	31.4	30.9	29.8	29.3	30.4	29.4	30.1	30.1	31.8	31.9	31.7	31.7	33.5	32.4	32.7	32.7	32.8	31.5	29.9	30.8	31.0	31.1	29.6				

STATUS FLAG CODES

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

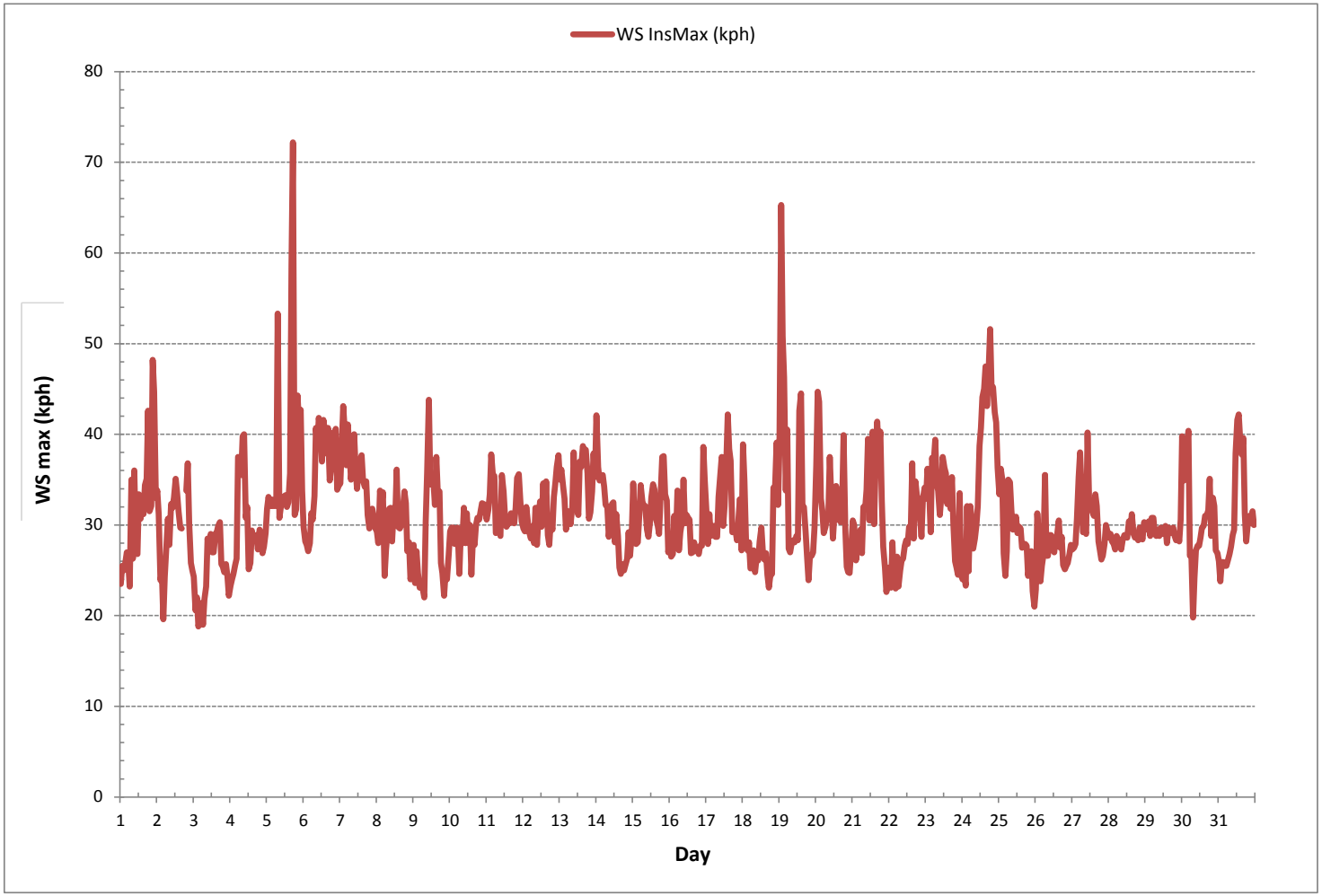
MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE: 72.2 kph @ HOUR(S) 17 ON DAY(S) 5

VAR-VARIOUS

OPERATIONAL TIME: 740 hrs

WIND SPEED Instantaneous Maximum (WS kph)



Wind: LICA ST. LINA
Monitor: WSP [kph]
Monthly: 17/03
Type: WindRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

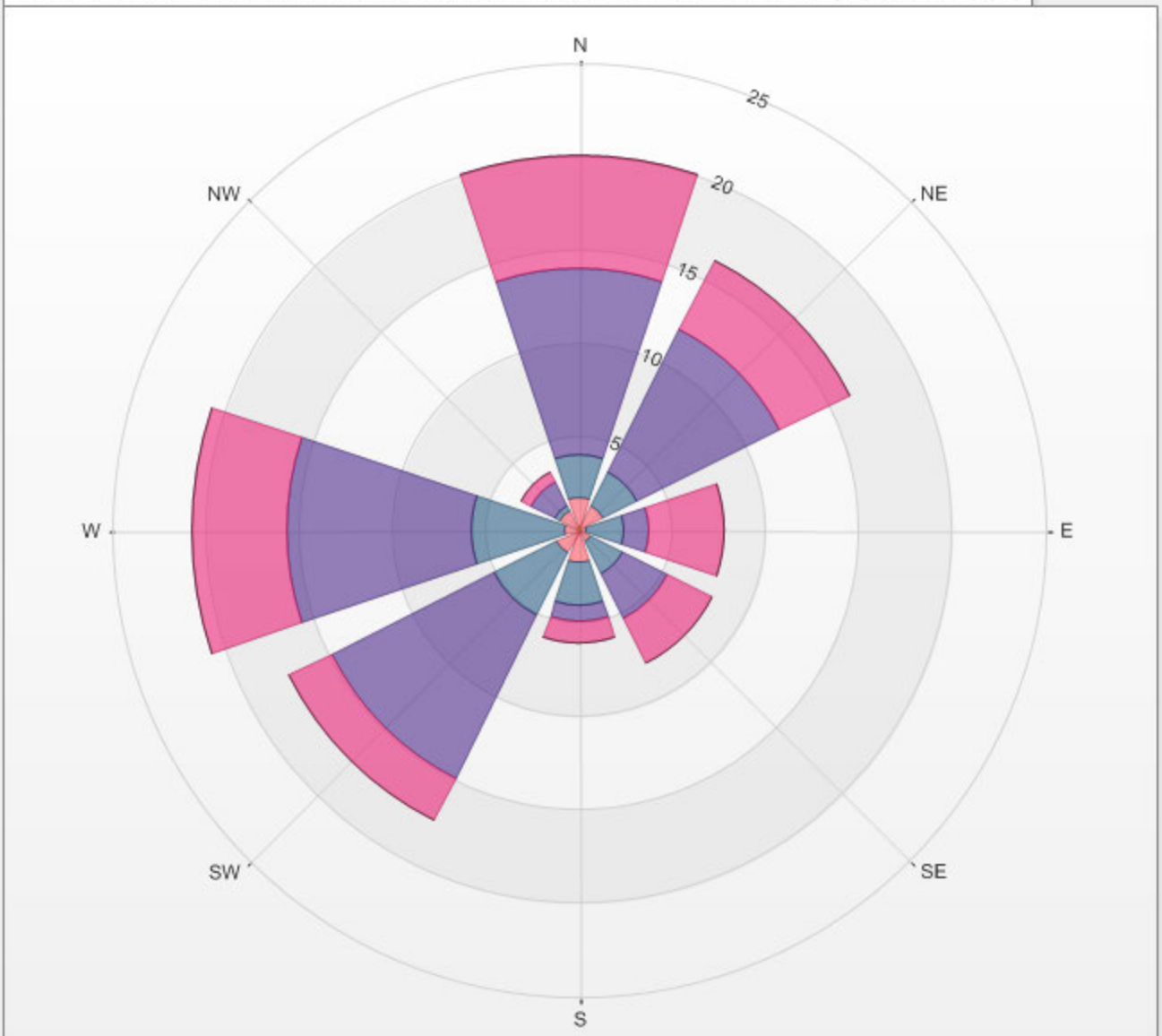
Calm: 0.13%

Calm Avg: 0.00 [kph]

Direction	1.8-5.0	5.0-10.1	10.1-15.1	15.1-20.2	20.2-25.2	>25.2	Total
N	0.3	1.5	2.3	10.0	6.1	0.0	20.1
NE	0.1	1.4	2.0	8.5	4.2	0.0	16.2
E	0.0	0.4	2.0	1.4	4.1	0.0	7.8
SE	0.0	0.7	1.9	2.7	2.7	0.0	8.0
S	0.1	1.6	2.3	0.8	1.2	0.0	6.1
SW	0.0	1.4	3.8	9.7	2.6	0.0	17.4
W	0.0	0.8	5.0	9.9	5.1	0.0	20.8
NW	0.1	1.1	0.3	1.5	0.5	0.0	3.5
Summary	0.7	8.8	19.6	44.4	26.4	0.0	100.0

%	Icon	Classes (kph)	1	1.8-5.0	9	5.0-10.1	20	10.1-15.1	44	15.1-20.2	26	20.2-25.2	0	>25.2

LICA ST. LINA 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 0.13% Calm Wind Avg Speed: 1.20(kph)



WIND DIRECTION

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

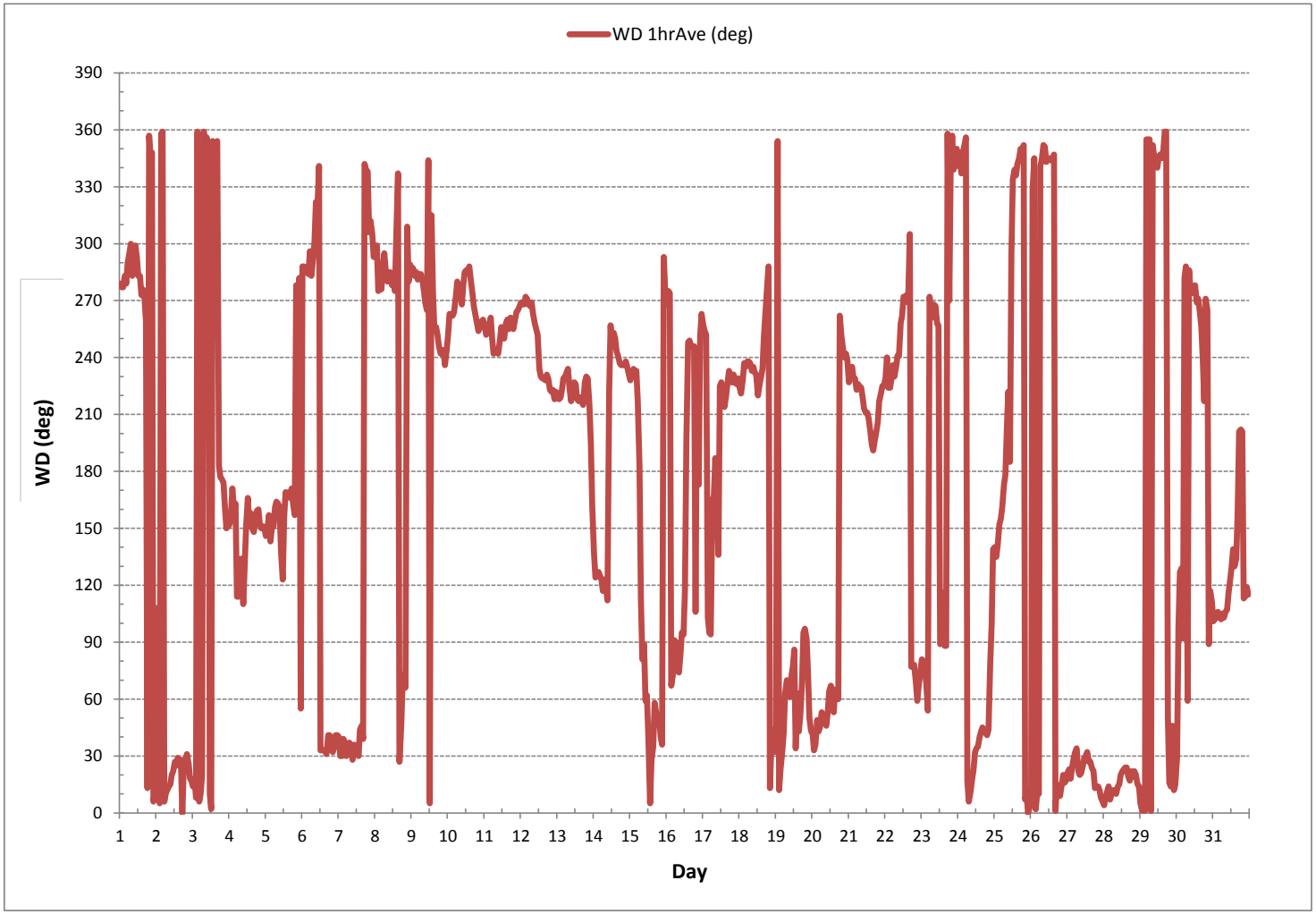
STATUS FLAG CODES

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 14 DEGREE EAST

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	741	hrs
STANDARD DEVIATION:	111		AMD OPERATION UPTIME:	99.6	%
			MONTHLY AVERAGE:	322 (NW)	

WIND DIRECTION Hourly Averages (WD)



STANDARD DEVIATION WIND DIRECTION

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	28	26	26	25	20	21	34	49	42	49	41	40	20	14	10	11	7	22	22	2	2	50	24	37	24
2	64	7	3	4	4	3	4	7	9	32	25	27	35	25	13	15	11	Y	29	22	16	11	17	19	23
3	24	25	21	36	23	34	30	28	22	17	17	13	16	21	16	12	10	46	16	15	20	19	17	12	24
4	11	10	24	43	38	33	28	30	27	26	28	34	36	33	28	18	18	12	9	10	13	11	10	12	24
5	22	29	17	43	23	28	16	7	8	29	71	64	35	21	42	31	73	12	5	8	41	41	47	62	24
6	31	10	9	12	22	47	13	16	38	51	51	55	39	36	37	41	43	20	23	23	27	21	14	14	24
7	15	16	17	18	19	18	18	17	16	16	18	17	19	19	22	21	33	58	69	54	48	53	42	9	24
8	11	12	7	5	4	9	11	11	10	12	12	10	12	20	70	74	67	47	5	5	5	41	4	9	24
9	8	9	6	5	4	5	5	4	6	9	13	62	80	77	51	8	6	9	4	5	3	5	4	5	24
10	5	4	9	9	10	9	7	9	10	14	12	14	14	17	18	18	12	9	8	8	6	4	3	4	24
11	4	6	5	12	15	8	13	X	X	15	23	11	15	16	13	13	10	8	8	6	6	5	7	8	22
12	11	12	13	15	19	13	8	11	19	26	15	14	18	20	17	20	14	13	20	15	20	22	26	20	24
13	22	28	28	22	15	16	16	16	26	32	21	20	16	21	24	22	20	30	25	21	33	52	51	53	24
14	37	34	28	24	26	17	37	43	46	25	60	7	10	7	11	12	12	11	10	11	13	11	11	13	24
15	12	16	18	18	23	45	51	21	9	8	12	21	60	71	75	66	28	11	18	16	19	52	41	8	24
16	3	5	18	28	4	3	2	3	6	15	4	13	54	44	13	10	17	15	30	48	57	69	59	20	24
17	4	13	20	42	44	35	66	72	64	68	49	41	33	35	32	34	22	15	16	14	13	14	14	13	24
18	19	15	13	15	15	13	13	13	17	18	19	23	26	27	25	20	16	14	12	11	48	25	31	34	24
19	44	41	34	36	46	38	29	24	30	46	50	52	51	72	43	20	16	18	13	13	16	23	25	21	24
20	22	27	22	16	17	19	17	15	17	19	28	21	22	28	30	21	20	51	9	4	6	3	4	23	24
21	39	21	9	9	10	11	11	16	15	20	21	25	23	31	38	38	28	27	25	27	28	28	30	26	24
22	24	23	29	30	27	23	30	28	30	20	19	13	10	9	6	27	48	18	4	6	9	29	22	25	24
23	6	6	14	47	63	45	19	7	7	9	12	47	18	8	54	13	6	22	22	5	6	5	5	7	24
24	4	10	3	4	7	13	29	9	14	26	18	21	30	25	29	31	52	32	21	25	40	55	65	42	24
25	26	19	17	6	5	5	3	5	53	43	12	48	22	13	7	10	14	8	4	3	3	5	7	4	24
26	7	39	6	12	8	9	29	4	13	10	9	6	10	10	13	10	11	10	8	6	6	7	11	8	24
27	7	7	8	17	29	45	45	28	24	19	22	30	15	16	17	14	14	15	10	11	13	10	11	13	24
28	7	9	7	8	7	8	6	8	9	11	16	14	15	21	25	20	15	22	43	36	11	10	19	35	24
29	9	7	8	8	8	8	8	10	9	7	10	9	8	13	6	7	7	11	36	38	12	64	5	30	24
30	50	71	50	44	34	23	41	40	29	13	10	11	14	7	8	7	13	45	57	2	34	63	50	36	24
31	3	2	13	4	3	2	21	15	14	13	30	32	27	40	23	45	56	62	63	52	24	13	26	20	24

STATUS FLAG CODES

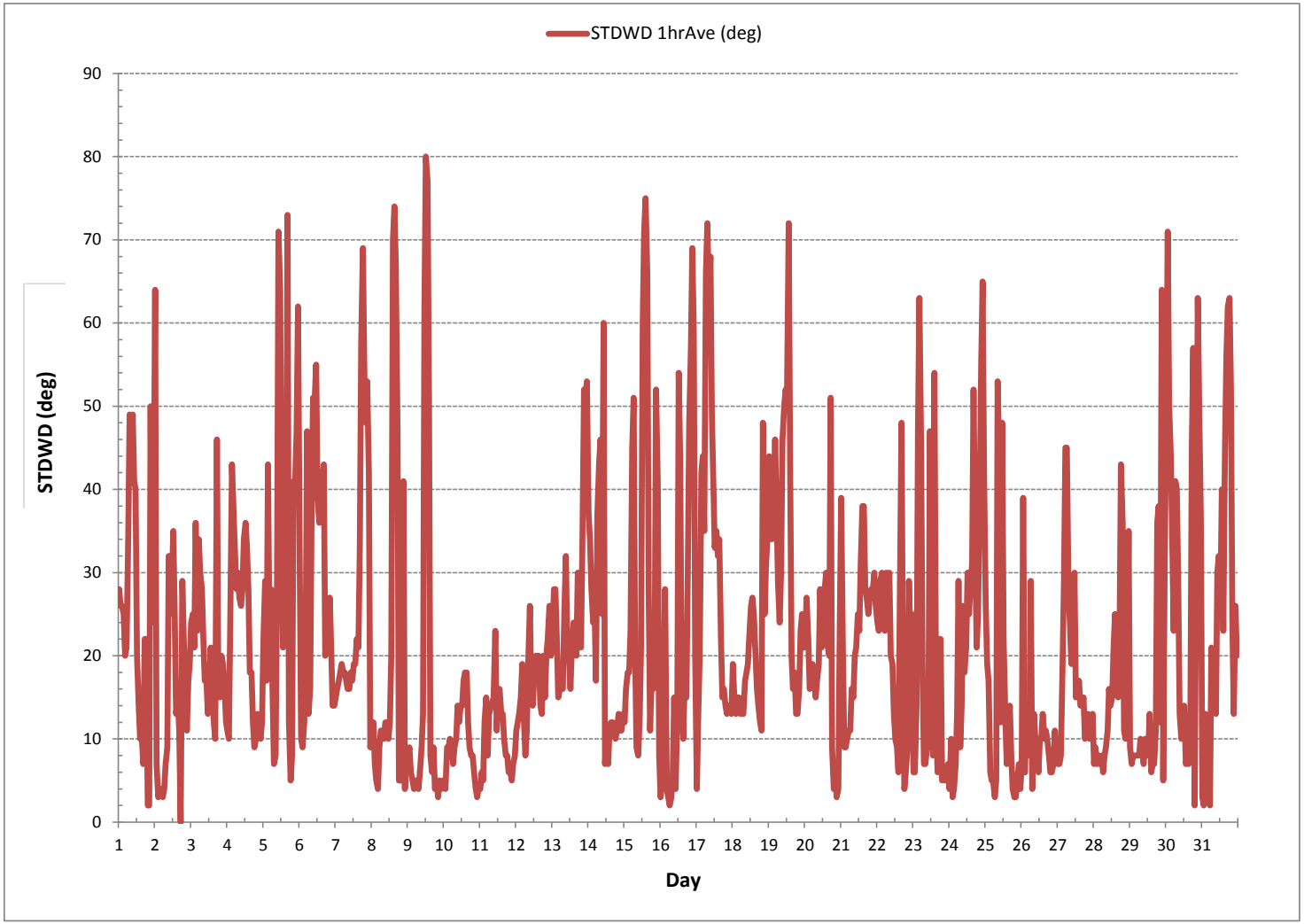
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION: September 12, 2016

CALIBRATION TIME: 0 hrs

OPERATIONAL TIME: 741 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



RELATIVE HUMIDITY

Maxxam
A Bureau Veritas Group Company

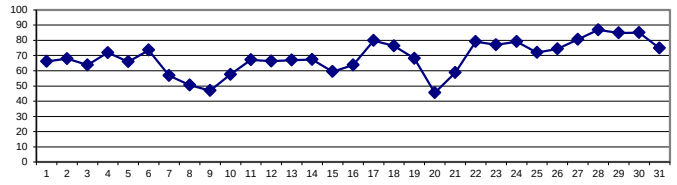
RELATIVE HUMIDITY Hourly Averages (RH %)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	74	76	75	73	71	69	67	65	64	63	62	59	59	60	59	58	57	64	69	69	69	70	66	69	57	76	66	24
2	75	75	74	74	74	75	74	73	69	63	59	55	54	54	56	57	63	68	70	73	74	75	73	73	54	75	68	24
3	73	75	77	78	80	81	82	82	75	64	56	50	45	45	45	44	45	52	59	60	64	66	66	69	44	82	64	24
4	71	73	74	73	74	72	73	74	77	75	74	73	72	71	70	68	67	68	71	72	71	70	71	72	67	77	72	24
5	71	71	72	71	72	72	72	72	70	65	60	57	56	54	55	56	58	61	66	69	71	71	70	70	54	72	66	24
6	71	72	73	73	73	74	76	76	75	73	74	73	71	71	72	73	75	76	76	76	75	72	73	72	71	76	74	24
7	72	72	72	71	70	69	68	66	65	62	56	53	48	45	41	41	39	42	47	50	51	54	55	56	39	72	57	24
8	53	54	58	61	61	60	59	57	52	46	42	39	37	35	35	35	39	52	58	61	60	55	54	52	35	61	51	24
9	54	55	56	58	60	62	64	60	50	43	37	33	31	31	31	36	36	40	46	50	49	47	46	52	31	64	47	24
10	54	55	51	56	58	60	62	60	52	45	42	37	38	37	54	62	66	68	69	70	71	71	72	72	37	72	58	24
11	72	71	71	71	71	70	69	**X**	**X**	62	58	54	53	56	59	63	67	70	73	73	74	74	74	74	53	74	67	22
12	74	74	74	74	74	74	74	73	71	68	66	63	60	53	51	52	56	60	64	66	67	68	67	69	51	74	66	24
13	70	71	71	72	73	74	74	73	68	61	56	57	52	53	55	58	62	64	69	72	74	76	76	76	52	76	67	24
14	75	75	75	74	76	76	77	72	68	54	48	46	50	50	55	59	63	68	72	74	76	77	79	80	46	80	67	24
15	81	83	84	85	86	86	86	84	77	64	58	48	40	36	31	32	31	36	39	38	39	47	64	72	31	86	59	24
16	74	73	70	68	69	72	74	49	45	29	29	**26**	34	43	63	64	66	72	78	82	86	88	88	89	**26**	89	64	24
17	89	89	89	89	89	89	89	89	88	83	80	71	66	65	63	65	67	73	77	78	81	83	83	81	63	89	80	24
18	80	81	82	82	84	85	85	83	80	76	74	69	66	64	63	65	68	71	73	75	76	78	85	87	63	87	76	24
19	87	88	88	84	79	75	76	67	59	54	51	44	39	35	42	60	80	83	81	78	80	72	66	67	35	88	68	24
20	63	57	55	55	53	52	54	50	45	41	38	37	36	34	32	31	30	31	42	49	50	50	51	56	30	63	46	24
21	59	55	54	57	61	65	67	64	56	50	49	48	51	53	54	57	57	59	62	63	65	66	68	69	48	69	59	24
22	70	70	71	72	73	73	75	75	75	75	78	81	82	83	83	83	83	84	85	86	86	86	86	86	70	86	79	24
23	86	86	86	86	86	86	86	85	79	74	73	69	65	63	61	53	66	68	77	78	81	83	85	86	53	86	77	24
24	85	83	83	83	81	81	82	80	79	79	80	80	80	79	78	75	73	74	75	76	76	77	80	80	73	85	79	24
25	81	80	81	82	84	84	83	81	74	68	64	58	52	52	53	55	59	66	73	78	78	80	81	83	52	84	72	24
26	84	85	87	86	87	87	87	87	78	70	65	61	62	59	56	54	56	62	70	77	81	82	80	80	54	87	74	24
27	83	85	87	86	85	85	84	81	79	78	78	76	76	75	72	72	76	78	80	82	83	85	85	85	72	87	81	24
28	87	87	86	86	88	89	89	89	89	88	88	86	84	83	83	83	83	84	85	88	89	**90**	90	90	83	**90**	**87**	24
29	90	90	90	90	90	90	90	90	90	90	90	89	87	79	72	69	71	71	78	82	84	87	88	89	69	90	85	24
30	89	89	89	89	89	89	89	89	89	89	88	88	87	84	80	74	73	75	78	84	85	82	86	88	73	89	85	24
31	88	89	89	89	89	89	89	86	77	70	63	58	57	58	66	70	68	68	71	72	70	72	73	74	57	89	75	24
HOURLY MAX	90	90	90	90	90	90	90	90	90	90	90	89	87	84	83	83	83	84	85	88	89	90	90	90				
HOURLY AVG	75	75	76	76	76	76	77	74	71	65	62	59	58	57	58	59	61	65	69	71	72	73	74	75				

STATUS FLAG CODES

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

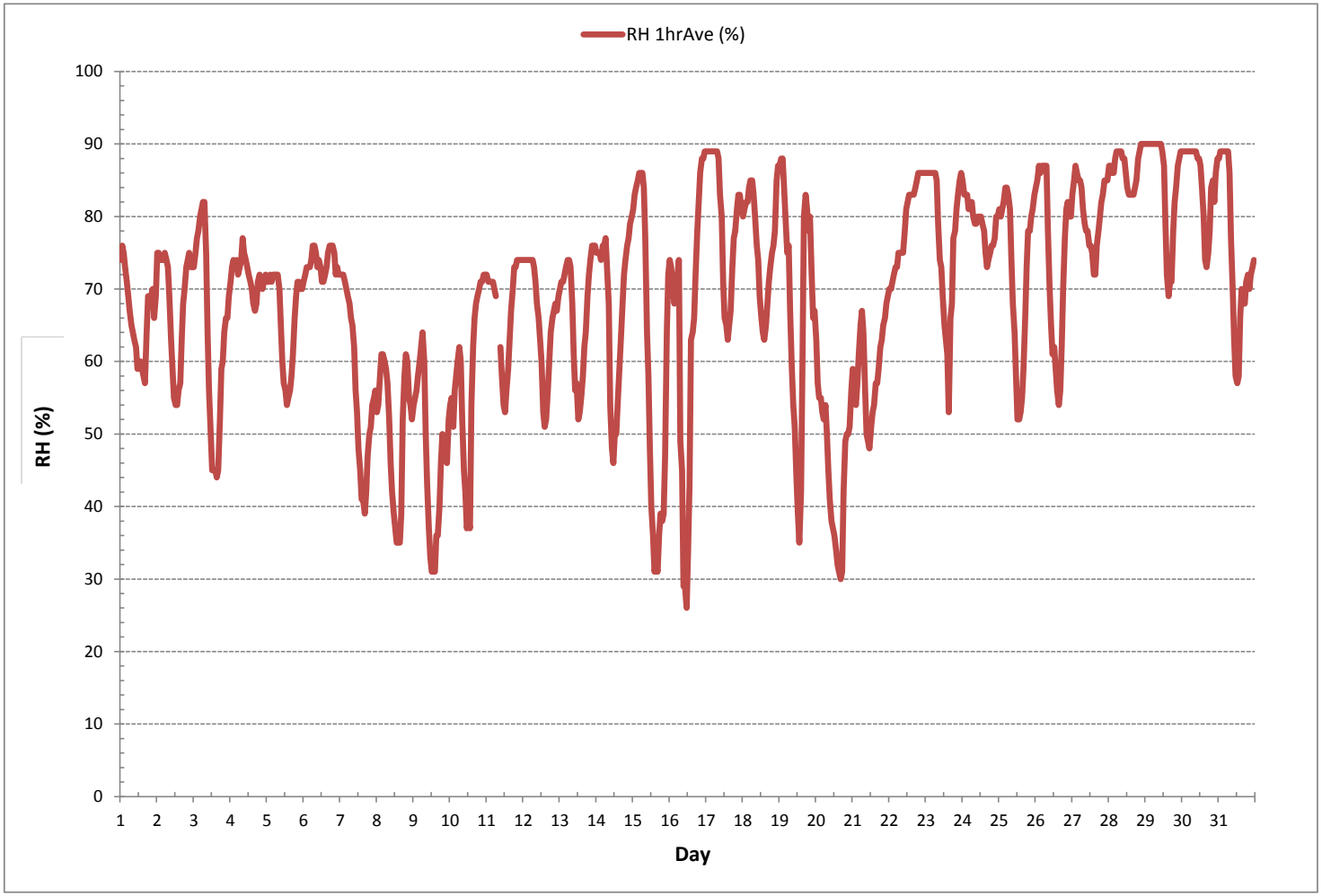
24 HR AVERAGES March 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	26	%	@ HOUR(S)	11	ON DAY(S)	16	
MAXIMUM 1-HR AVERAGE:	90	%	@ HOUR(S)	21	ON DAY(S)	28	
MAXIMUM 24-HR AVERAGE:	87	%			ON DAY(S) VAR-VARIOUS	28	
			OPERATIONAL TIME:			742	hrs
			AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	14		MONTHLY AVERAGE:			69	%

RELATIVE HUMIDITY Hourly Averages (RH %)



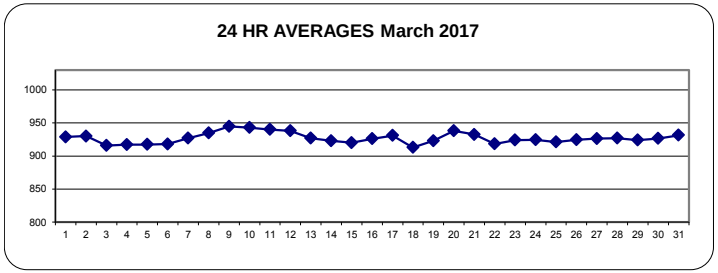
BAROMETRIC PRESSURE

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	922	922	922	922	922	923	923	924	925	926	927	928	929	931	931	932	933	934	934	935	935	935	936	936	922	936	929	24
2	936	935	935	935	935	934	934	934	933	933	933	932	931	931	930	929	928	927	925	924	923	922	921	921	921	936	930	24
3	920	920	919	918	917	917	916	915	915	915	915	915	915	915	915	915	915	916	915	914	914	915	914	914	914	920	916	24
4	914	914	915	914	914	914	914	916	916	916	916	917	918	918	918	918	919	919	919	920	920	920	920	919	914	920	917	24
5	919	919	918	919	918	918	918	918	918	918	918	918	917	917	917	917	917	917	916	916	916	916	916	916	916	919	917	24
6	916	916	916	916	916	916	917	917	917	918	918	918	918	918	918	919	919	919	919	920	920	920	920	920	916	920	918	24
7	920	921	921	922	922	923	924	924	925	926	927	927	928	929	930	931	931	931	931	931	930	931	931	931	920	931	927	24
8	931	931	931	931	932	932	932	933	933	934	935	935	935	936	936	936	936	936	937	937	938	938	939	939	931	939	935	24
9	939	940	941	941	942	943	944	944	945	946	946	947	947	**948**	947	947	947	946	946	946	945	945	945	945	939	**948**	**945**	24
10	944	944	943	943	943	942	942	942	942	942	942	943	943	943	943	943	943	943	943	943	943	943	943	943	942	944	943	24
11	943	943	943	943	942	942	942	**X**	**X**	942	942	942	942	941	940	940	939	938	937	937	936	936	936	936	936	943	940	22
12	936	936	936	936	937	937	937	938	938	939	940	940	941	941	940	941	940	940	939	938	937	937	936	935	935	941	938	24
13	934	933	932	931	931	930	929	928	927	928	927	927	926	926	926	925	924	924	924	924	924	924	923	923	923	934	927	24
14	924	924	924	923	923	924	924	924	924	925	925	926	926	925	924	923	923	922	921	921	920	920	918	918	918	926	923	24
15	918	917	917	917	917	916	916	917	918	920	921	922	922	923	923	923	923	922	922	922	921	922	922	922	916	923	920	24
16	922	921	921	922	921	922	922	922	923	924	925	926	927	928	928	928	929	929	930	930	931	931	931	932	921	932	926	24
17	932	932	933	933	933	933	933	933	933	933	933	932	932	932	932	931	930	930	929	928	927	927	926	925	925	933	931	24
18	924	922	921	920	919	918	917	917	916	915	914	914	913	912	911	910	909	907	906	905	**904**	905	906	908	**904**	924	913	24
19	910	912	915	916	918	919	920	921	923	924	924	925	926	926	926	926	927	927	927	927	928	928	929	930	910	930	923	24
20	931	932	933	934	935	935	936	937	938	939	940	940	941	941	941	941	941	941	940	940	940	939	939	939	931	941	938	24
21	939	939	938	938	937	937	936	935	935	936	935	934	934	933	931	930	929	928	928	927	926	926	925	924	924	939	933	24
22	923	922	921	920	920	920	919	918	918	918	917	917	917	916	916	917	917	917	917	917	918	918	918	919	916	923	918	24
23	919	920	920	920	920	921	921	921	922	922	923	924	925	925	926	926	927	927	927	928	927	928	928	928	919	928	924	24
24	928	928	928	927	927	927	927	926	926	926	926	926	926	925	924	923	923	922	921	921	921	920	919	919	919	928	924	24
25	918	918	918	918	918	919	919	920	920	921	922	922	923	923	923	924	924	924	923	922	922	922	923	923	918	924	921	24
26	923	923	923	923	923	923	923	924	924	925	925	926	926	926	927	927	927	926	926	925	924	924	924	924	923	927	925	24
27	924	924	924	924	924	924	924	924	925	926	926	926	927	927	927	928	928	928	928	928	928	928	928	928	924	928	926	24
28	928	928	928	928	928	927	927	927	927	928	928	928	928	927	927	927	926	926	926	926	926	926	926	926	926	928	927	24
29	926	925	925	925	925	925	925	925	925	925	925	925	925	925	925	924	924	924	923	922	922	921	921	921	921	926	924	24
30	921	921	921	921	921	921	922	923	923	924	925	926	927	928	929	930	931	931	932	931	931	932	932	933	921	933	927	24
31	933	933	933	933	933	933	933	933	934	934	935	935	934	934	933	932	930	929	929	927	927	926	926	925	925	935	931	24
HOURLY MAX	944	944	943	943	943	943	944	944	945	946	946	947	947	948	947	947	947	946	946	946	945	945	945	945				
HOURLY AVG	926	926	926	926	926	926	926	926	926	927	928	928	928	928	928	928	928	927	927	927	927	927	926	927				

STATUS FLAG CODES

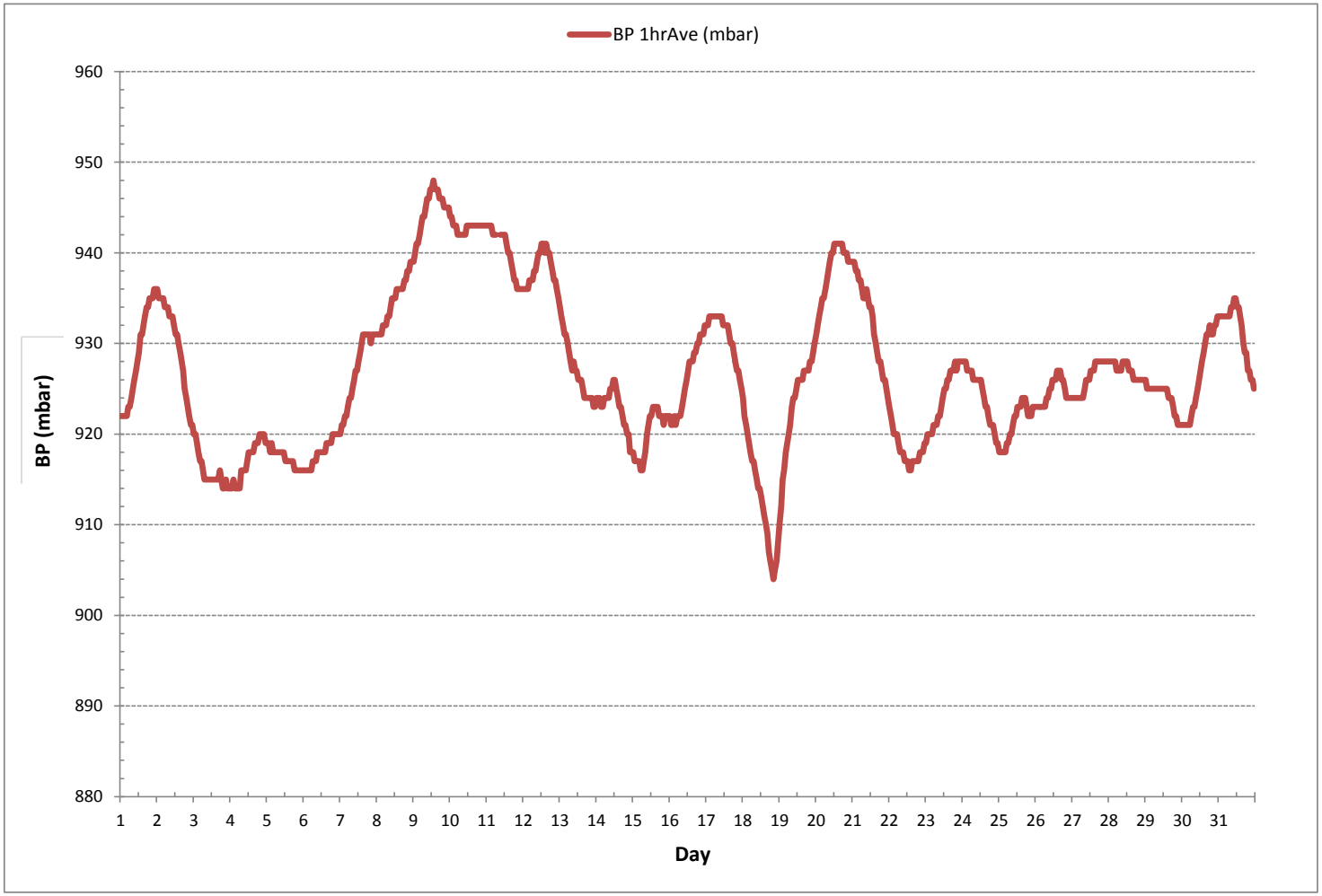
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	904	mbar	@ HOUR(S)	20	ON DAY(S)	18	
MAXIMUM 1-HR AVERAGE:	948	mbar	@ HOUR(S)	13	ON DAY(S)	9	
MAXIMUM 24-HR AVERAGE:	945	mbar			ON DAY(S)	9	
					VAR-VARIOUS		
			OPERATIONAL TIME:			742	hrs
			AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	8		MONTHLY AVERAGE:			927	mbar

BAROMETRIC PRESSURE Hourly Averages (BP mbar)



AMBIENT TEMPERATURE

Maxxam
A Bureau Veritas Group Company

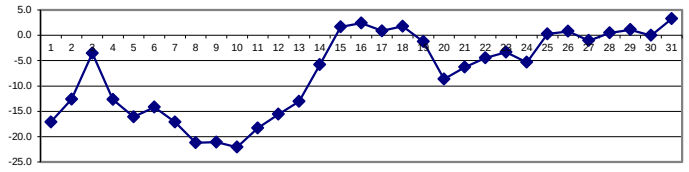
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																											
1	-16.4	-17.4	-18.0	-19.1	-19.8	-20.5	-20.7	-20.4	-19.5	-18.5	-16.7	-15.3	-13.9	-13.9	-13.7	-13.2	-13.4	-16.3	-17.4	-17.5	-17.2	-17.5	-16.9	-17.7	-20.7	-13.2	-17.1	24
2	-19.6	-20.1	-19.8	-19.7	-20.1	-19.6	-20.2	-20.3	-15.9	-12.8	-11.7	-10.0	-8.9	-7.5	-6.9	-6.7	-7.0	-7.9	-8.3	-8.4	-8.0	-8.3	-7.7	-7.6	-20.3	-6.7	-12.6	24
3	-7.6	-7.9	-8.5	-8.6	-9.1	-9.7	-10.2	-10.4	-8.6	-5.3	-2.6	0.2	2.2	2.9	3.9	5.0	5.1	1.9	-1.7	-2.5	-2.9	-3.0	-3.5	-4.1	-10.4	5.1	-3.5	24
4	-4.4	-4.3	-4.4	-5.9	-7.4	-8.5	-10.4	-12.3	-13.9	-14.5	-14.5	-14.2	-14.4	-14.4	-13.6	-13.6	-14.1	-15.3	-17.0	-17.5	-17.4	-17.5	-17.6	-17.6	-17.6	-4.3	-12.7	24
5	-17.9	-18.2	-18.4	-18.7	-18.9	-19.1	-19.2	-19.1	-18.5	-16.9	-14.8	-13.8	-13.2	-12.6	-12.5	-12.7	-13.2	-14.0	-15.2	-16.1	-16.4	-16.3	-15.6	-15.1	-19.2	-12.5	-16.1	24
6	-15.0	-15.1	-15.2	-15.3	-15.3	-15.1	-15.2	-15.1	-14.6	-13.9	-13.5	-12.6	-11.2	-11.3	-11.6	-12.0	-12.5	-13.2	-13.9	-14.5	-14.9	-15.7	-16.9	-16.9	-16.9	-11.2	-14.2	24
7	-17.1	-17.7	-18.3	-19.0	-19.7	-20.3	-20.3	-20.2	-19.8	-18.8	-16.8	-15.7	-14.3	-13.1	-11.2	-11.4	-11.7	-13.4	-15.7	-17.1	-18.2	-19.3	-20.3	-21.4	-21.4	-11.2	-17.1	24
8	-22.1	-23.1	-24.5	-25.6	-26.2	-25.8	-25.5	-25.2	-24.2	-22.8	-21.5	-19.6	-18.3	-16.3	-15.2	-14.9	-15.2	-17.4	-19.3	-20.3	-20.9	-21.3	-21.6	-22.1	-26.2	-14.9	-21.2	24
9	-23.6	-24.4	-24.8	-25.4	-25.9	-26.7	-27.4	-26.1	-22.7	-19.8	-17.5	-15.6	-14.6	-14.0	-14.1	-16.0	-16.6	-18.9	-21.5	-22.1	-21.9	-21.9	-22.1	-22.7	-27.4	-14.0	-21.1	24
10	-23.3	-25.0	-25.5	-26.4	-26.9	-27.0	**-28.3**	-28.1	-25.3	-21.6	-19.9	-17.1	-16.5	-15.8	-18.2	-19.0	-19.8	-20.1	-20.3	-20.4	-20.6	-20.9	-21.6	-21.9	**-28.3**	-15.8	-22.1	24
11	-22.5	-22.0	-21.8	-21.7	-21.8	-21.3	-20.1	X	X	-18.0	-16.7	-15.5	-14.8	-15.5	-15.5	-15.6	-16.1	-16.8	-17.3	-17.6	-17.9	-17.8	-17.7	-18.1	-22.5	-14.8	-18.3	22
12	-18.1	-17.9	-17.9	-18.2	-18.4	-18.6	-19.1	-19.0	-17.4	-15.5	-13.6	-12.0	-11.3	-11.1	-11.9	-12.1	-13.3	-14.3	-15.4	-15.7	-15.8	-15.7	-15.7	-16.1	-19.1	-11.1	-15.6	24
13	-16.6	-16.8	-17.3	-17.4	-17.0	-16.7	-16.7	-16.4	-14.2	-12.4	-11.0	-10.9	-9.0	-8.8	-9.0	-9.2	-9.8	-10.2	-11.6	-12.3	-12.6	-12.7	-12.5	-12.0	-17.4	-8.8	-13.0	24
14	-11.2	-11.1	-11.1	-11.3	-12.1	-12.5	-13.0	-12.0	-10.6	-5.9	-2.7	-0.6	-2.2	-1.1	-1.9	-2.3	-2.4	-2.6	-2.5	-2.1	-1.9	-1.6	-2.3	-2.9	-13.0	-0.6	-5.8	24
15	-3.3	-4.1	-4.7	-5.0	-5.4	-5.4	-5.7	-5.3	-2.7	1.1	3.4	7.0	8.9	9.2	**9.9**	8.7	7.6	5.8	3.9	3.3	3.6	3.6	2.7	1.8	-5.7	**9.9**	1.6	24
16	1.4	1.5	1.7	1.6	0.7	-0.1	-0.8	0.2	1.2	7.2	8.1	8.9	7.7	6.3	4.2	3.7	3.3	2.5	1.3	0.6	-0.3	-0.8	-1.0	-1.1	-1.1	8.9	2.4	24
17	-1.2	-1.3	-1.1	-1.2	-1.3	-1.4	-1.6	-1.1	-0.2	0.4	0.4	2.8	3.8	4.2	4.5	4.1	3.8	2.4	1.3	1.0	0.7	0.7	0.7	0.4	-1.6	4.5	0.9	24
18	0.2	-0.4	-0.7	-0.6	-1.0	-1.1	-1.0	-0.6	0.0	1.3	1.8	3.4	4.6	5.2	5.6	5.2	4.6	3.9	3.3	2.7	2.2	1.9	1.0	0.6	-1.1	5.6	1.8	24
19	0.5	-0.9	-1.8	-2.2	-2.5	-3.1	-3.6	-2.1	-0.5	0.7	2.0	3.2	3.4	3.3	2.6	0.1	-1.9	-2.9	-3.1	-3.4	-3.7	-4.0	-4.6	-5.7	-5.7	3.4	-1.3	24
20	-7.1	-8.5	-10.6	-11.6	-12.3	-12.9	-13.3	-11.8	-10.1	-9.0	-7.3	-6.5	-5.5	-4.9	-4.3	-3.7	-3.9	-4.9	-7.9	-9.4	-10.1	-10.3	-10.5	-11.1	-13.3	-3.7	-8.6	24
21	-11.3	-11.0	-11.0	-11.2	-11.6	-12.0	-12.1	-10.6	-7.7	-5.3	-3.6	-2.8	-2.8	-2.7	-3.0	-3.3	-3.2	-3.4	-3.5	-3.5	-3.7	-3.9	-4.0	-4.1	-12.1	-2.7	-6.3	24
22	-3.9	-3.9	-3.9	-4.0	-4.2	-4.4	-4.5	-4.4	-4.2	-4.1	-3.9	-3.9	-4.1	-4.3	-4.1	-4.2	-4.6	-4.8	-5.0	-5.1	-5.5	-5.3	-5.5	-5.2	-5.5	-3.9	-4.5	24
23	-5.2	-5.3	-5.4	-5.6	-5.6	-5.9	-6.0	-5.2	-3.5	-2.7	-2.5	-1.4	-0.6	0.2	0.9	3.6	-0.3	-0.9	-3.2	-3.6	-4.5	-5.2	-5.8	-6.5	-6.5	3.6	-3.3	24
24	-7.3	-8.9	-10.0	-9.3	-11.2	-11.9	-11.2	-11.2	-10.2	-8.9	-7.2	-5.3	-4.0	-2.8	-1.8	-0.5	0.3	0.1	-0.4	-0.6	-0.6	-1.2	-2.1	-2.2	-11.9	0.3	-5.4	24
25	-2.8	-2.9	-3.2	-3.7	-4.1	-3.9	-3.7	-2.9	-0.8	1.0	2.6	4.3	6.3	6.5	6.1	5.6	4.8	2.8	0.9	-0.5	-1.0	-1.2	-1.6	-2.1	-4.1	6.5	0.3	24
26	-2.4	-3.4	-3.3	-2.8	-3.4	-4.1	-4.6	-3.8	-0.7	1.4	2.9	4.4	4.9	5.9	6.4	7.0	6.2	4.4	2.1	0.6	0.1	0.3	0.5	-0.2	-4.6	7.0	0.8	24
27	-1.0	-1.5	-1.7	-2.7	-3.0	-3.5	-3.8	-3.2	-2.5	-1.7	-1.2	-0.4	-0.3	0.2	1.0	1.1	0.7	0.3	-0.1	-0.3	-0.3	-0.4	-0.4	-0.4	-3.8	1.1	-1.0	24
28	-0.4	-0.3	-0.3	-0.5	-1.0	-1.4	-1.6	-1.5	-0.8	0.1	0.8	1.1	1.6	1.7	1.8	1.7	2.0	2.0	1.6	1.3	1.0	0.9	0.5	0.3	-1.6	2.0	0.4	24
29	0.3	0.3	0.3	0.1	0.1	0.0	-0.1	0.0	0.1	0.4	1.0	1.5	1.9	2.9	3.9	4.5	3.9	3.9	2.2	1.2	0.7	-0.4	-0.4	-2.1	-2.1	4.5	1.1	24
30	-2.2	-1.8	-1.8	-1.7	-1.8	-1.6	-1.6	-1.5	-1.3	-0.8	-0.2	0.4	1.1	1.9	2.1	3.1	3.4	2.6	1.7	-0.1	0.0	0.5	-0.6	-0.8	-2.2	3.4	0.0	24
31	-1.3	-1.4	-1.7	-1.9	-2.3	-2.5	-2.4	-0.7	2.1	4.8	6.8	7.8	8.2	8.1	7.0	6.0	6.3	6.9	6.2	5.5	5.1	4.1	3.7	3.2	-2.5	8.2	**3.2**	24
HOURLY MAX	1.4	1.5	1.7	1.6	0.7	0.0	-0.1	0.2	2.1	7.2	8.1	8.9	8.9	9.2	9.9	8.7	7.6	6.9	6.2	5.5	5.1	4.1	3.7	3.2				
HOURLY AVG	-9.1	-9.5	-9.8	-10.1	-10.6	-10.9	-11.1	-10.3	-8.9	-7.4	-6.1	-4.8	-4.0	-3.6	-3.5	-3.6	-4.1	-5.1	-6.3	-6.9	-7.2	-7.4	-7.7	-8.1				

STATUS FLAG CODES

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

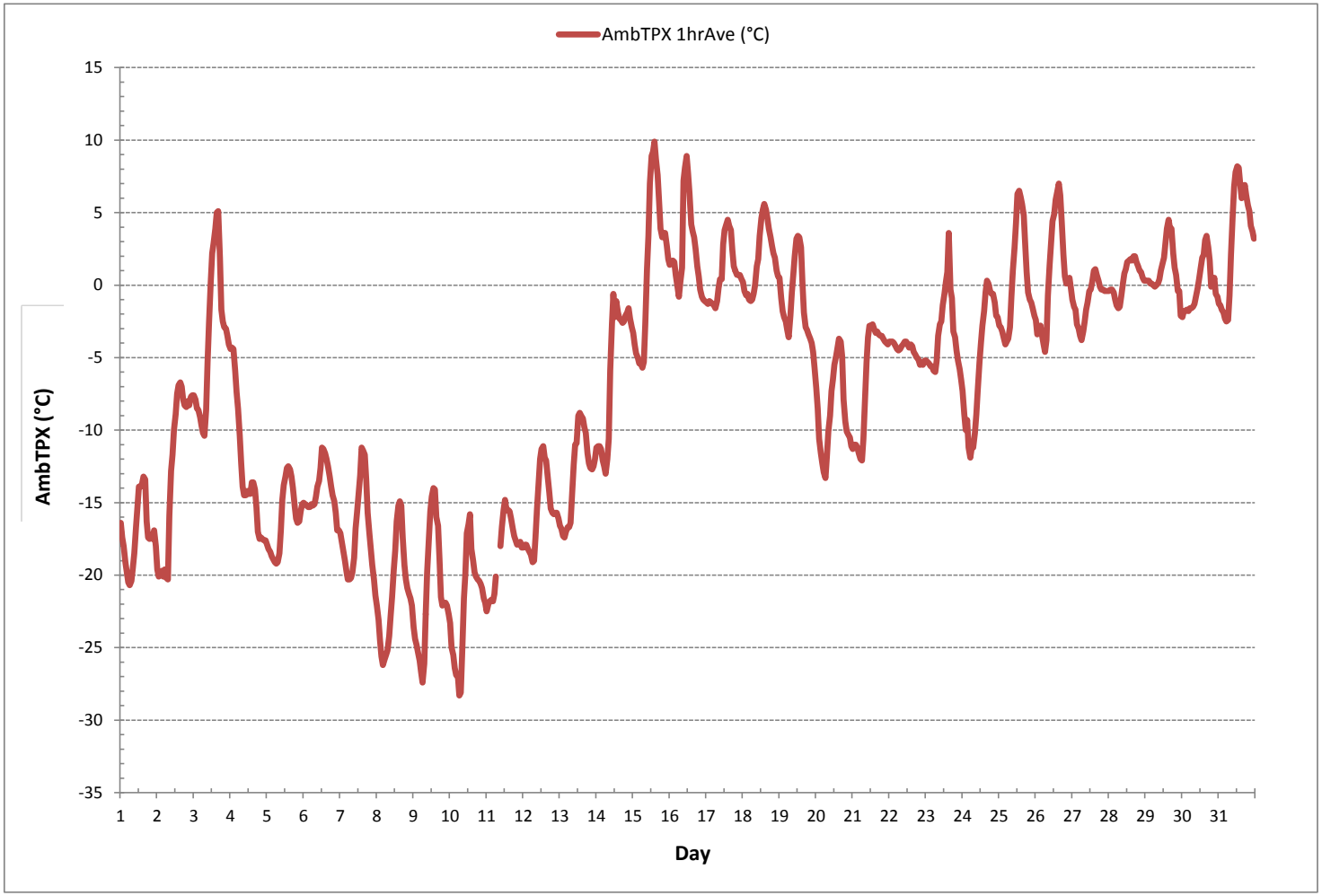
24 HR AVERAGES March 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-28.3	°C	@ HOUR(S)	6	ON DAY(S)	10	
MAXIMUM 1-HR AVERAGE:	9.9	°C	@ HOUR(S)	14	ON DAY(S)	15	
MAXIMUM 24-HR AVERAGE:	3.2	°C			ON DAY(S)	31	
					VAR-VARIOUS		
			OPERATIONAL TIME:			742	hrs
			AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	8.8		MONTHLY AVERAGE:			-7.3	°C

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



PRECIPITATION

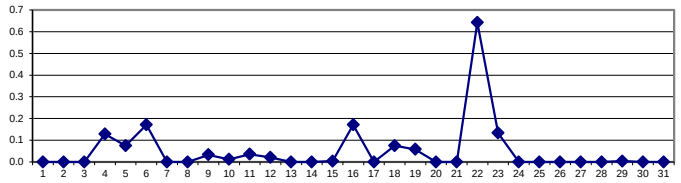
PRECIPITATION Hourly Averages (mm)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	24
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	0.3	0.5	0.6	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.1	24
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.1	24
6	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.6	0.6	0.4	0.5	0.4	0.0	0.3	0.1	0.1	0.2	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.6	0.2	24
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	24
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	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	24
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**X**	**X**	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.0	0.2	0.0	22
12	0.0	0.1	0.2	0.0	0.1	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	0.2	0.0	24
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	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	0.1	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	0.0	0.0	0.0	0.0	0.2	0.5	0.8	2.4	0.2	0.0	0.0	2.4	0.2	24
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	1.8	0.0	0.0	0.0	1.8	0.1	24
19	0.6	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	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.6	0.1	24
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	1.4	2.6	2.5	**3.3**	2.1	1.7	0.5	0.1	0.0	0.0	0.1	0.1	0.0	**3.3**	**0.6**	24
23	0.1	0.1	0.3	0.2	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.1	24
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
26	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	24
29	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	24
30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
HOURLY MAX	0.6	0.2	0.3	0.2	2.5	0.1	0.6	0.6	1.0	0.4	0.5	0.9	1.8	2.6	2.5	3.3	2.1	1.7	0.5	0.2	0.5	0.8	2.4	0.2				
HOURLY AVG	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	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

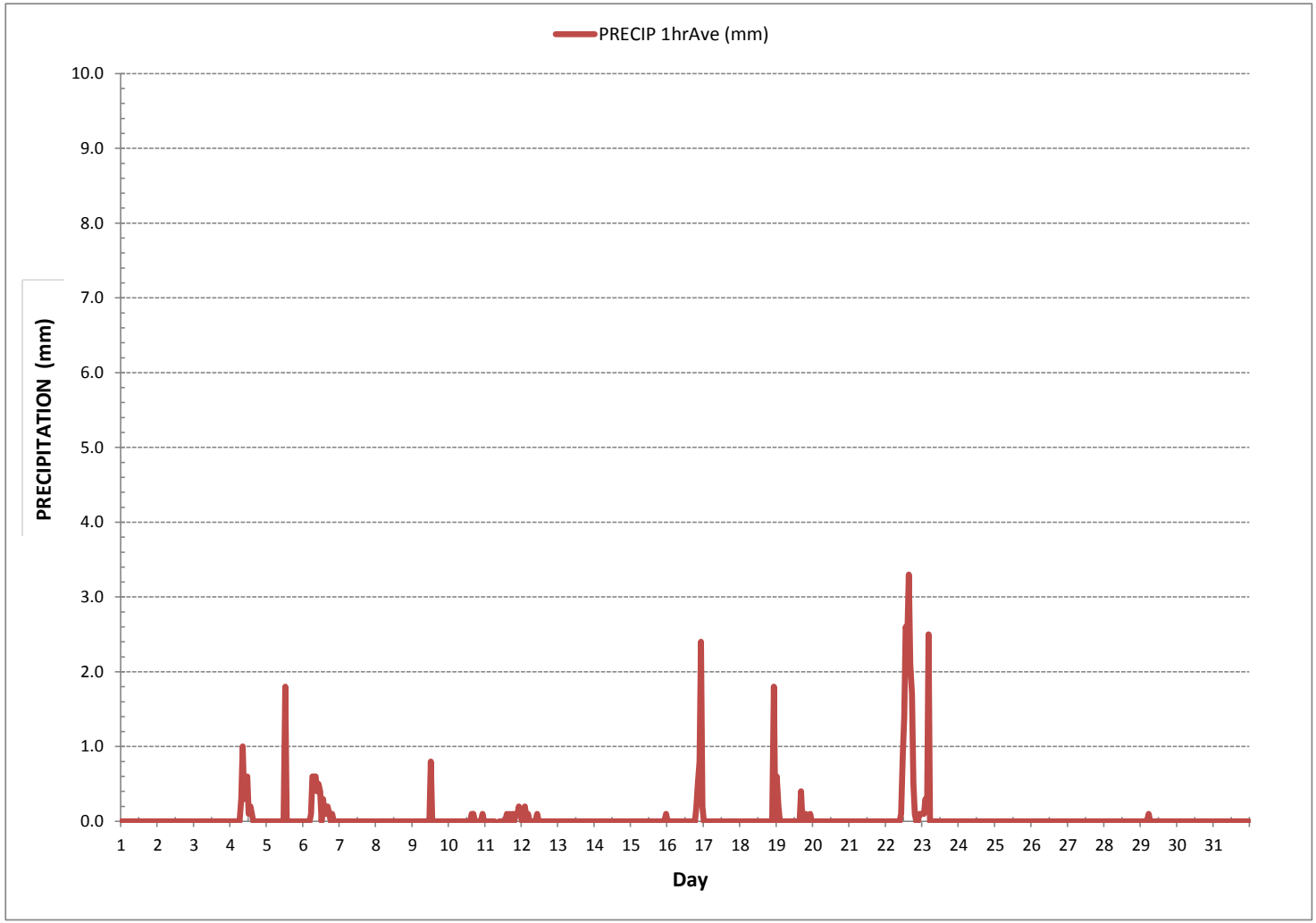
24 HR AVERAGES March 2017



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:		0.0	mm	@ HOUR(S)	0	ON DAY(S)	1
MAXIMUM 1-HR AVERAGE:		3.3	mm	@ HOUR(S)	15	ON DAY(S)	22
MAXIMUM 24-HR AVERAGE:		0.6	mm			ON DAY(S)	22
MONTHLY TOTAL	37.5	mm				VAR-VARIOUS	
				OPERATIONAL TIME:		742	hrs
				AMD OPERATION UPTIME:		99.7	%
STANDARD DEVIATION:		0.3		MONTHLY AVERAGE:		0.1	mm

PRECIPITATION Hourly Averages (mm)



APPENDIX II
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE

API 100E Sulphur Dioxide Analyzer Calibration

Date:	March 1, 2017	**Barometric Pressure:**	27.6 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	19
Location/Station Name:	St. Lina	**Weather Conditions:**	Mainly sunny
Parameter:	Sulphur Dioxide	**Calibration Purpose:**	shut down
Start Time 24 hr. (mst):	9:40	**Performed By/Reviewer:**	Limin Li / Trina Whitsitt
End Time 24 hr. (mst):	12:15	**Cal Gas Expiry Date:**	December 25, 2018
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	n/a

Analyzer:

ID# or Serial Number:	468	**Range ppb:**	1000	Station SO2 Analyzer Range?
Last Calibration Date:	February 2, 2017	**As Found C.F.:**	0.995	1000 ppb
Previous C.F.:	1.000	**New C.F.:**	n/a	

Calibrator:

Flow Meter ID's:	n/a
Make & Model:	Sabio 2010
Serial #:	17200415
Cal Gas Cylinder I.D. # :	BLM002756T
Cal Gas Conc. (ppm):	49.9

Standard Calibration Points for Ranges

Point	ppb
High	780
Mid	380
Low	190

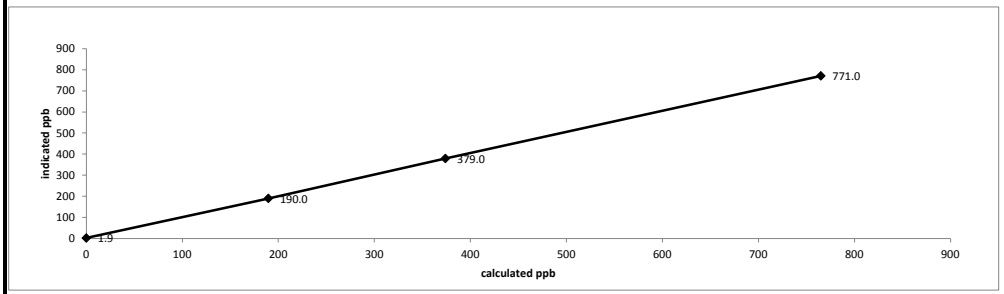
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	**Diluent**	**Cal Gas**	**Total**	**(ppb)**	**(ppb)**	
as found zero	5028	0.00	5028	0.0	1.9	n/a
as found high	4952	77.10	5029	765.0	771.0	0.995
mid	4991	37.70	5029	374.1	379.0	0.992
low	5008	19.10	5027	189.6	190.0	1.008
					Average C.F.=	0.998

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**0.993**	**0.90-1.10**
b (Intercept as % of full scale)=	**-0.11%**	**± 3% F.S.**
% change in C.F. from last cal=	**0.53%**	**± 10%**

API 100E Sulphur Dioxide Analyzer Calibration

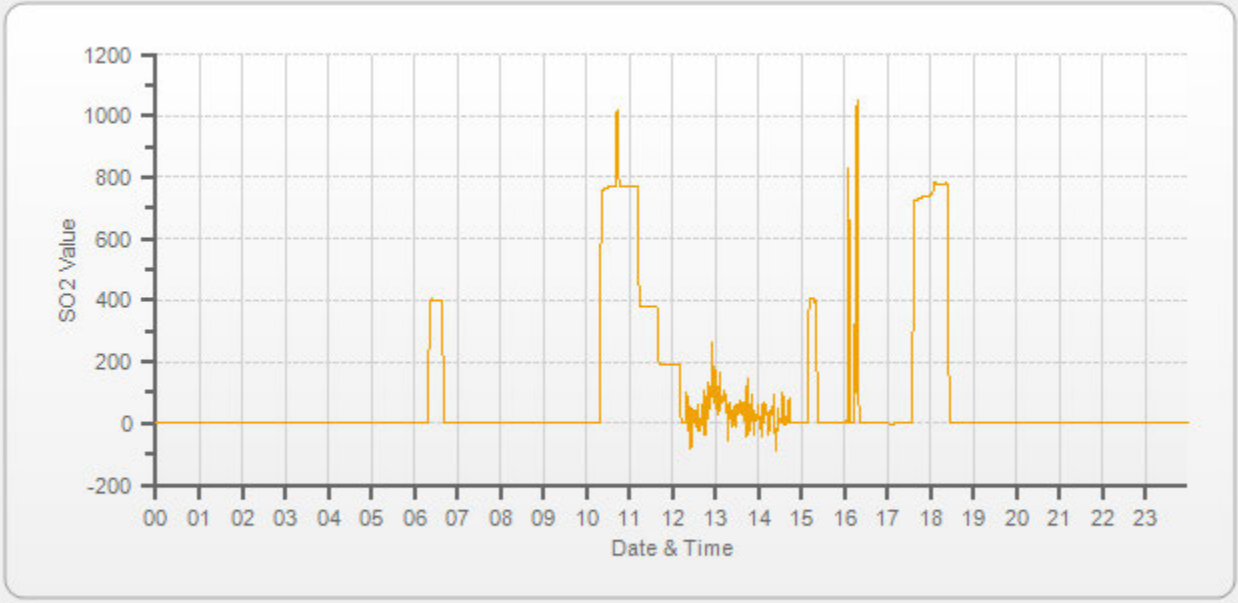


	As found:	As left:
SLOPE:	0.987	n/a
OFFSET:	117.8	n/a
HVPS:	651	n/a
RCELL TEMP:	50	n/a
BOX TEMP:	29.3	n/a
PMT TEMP:	7.9	n/a
IZS TEMP:	50	n/a
PRES:	23.8	n/a
SAMP FL:	614	n/a
NORM PMT:	121	n/a
UV LAMP:	3154	n/a
LAMP RATIO:	96.7	n/a
STR. LGT	58.1	n/a
DRK PMT:	5.1	n/a
DRK LMP:	6.7	n/a
Expected Value:	395.0	n/a

Comments:

As found high point was repeated due to operator error. After shut-down calibration, the reaction cell was cleaned. The sinter filter and o-rings were changed. The sample valve (flow rate lower than zero check. Dirty inside) was changed. The analogue output was calibrated. The sample pump was rebuilt. Valves were tested for leaks. ZERO Air scrubber was repositioned inside. Factory calibration completed.

SO2[ppb] Station: LICA ST. LINA Daily: 2017/03/01 Type: AVG 1 Min. [1 Min.]



API 100E Sulphur Dioxide Analyzer Calibration

Date:	March 2, 2017	**Barometric Pressure:**	27.78 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	St. Lina	**Weather Conditions:**	Mainly sunny
Parameter:	Sulphur Dioxide	**Calibration Purpose:**	post repair
Start Time 24 hr. (mst):	10:59	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
End Time 24 hr. (mst):	15:35	**Cal Gas Expiry Date:**	July 18, 2019
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	n/a

Analyzer:

ID# or Serial Number:	468	**Range ppb:**	1000	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.:**	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

Standard Calibration Points for Ranges

Point	ppb
High	780
Mid	380
Low	190

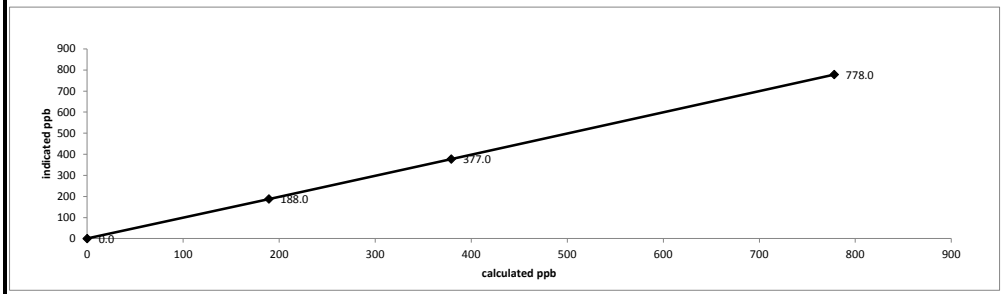
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	**Diluent**	**Cal Gas**	**Total**	**(ppb)**	**(ppb)**	
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	4965	37.50	5003	379.3	377.0	1.006
low	4980	18.70	4999	189.3	188.0	1.007
calibrator zero	5000	0.00	5000	0.0	0.0	n/a
					Average C.F.=	1.004

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.000**	**.95-1.05**
b (Intercept as % of full scale)=	**0.10%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**± 10%**

API 100E Sulphur Dioxide Analyzer Calibration



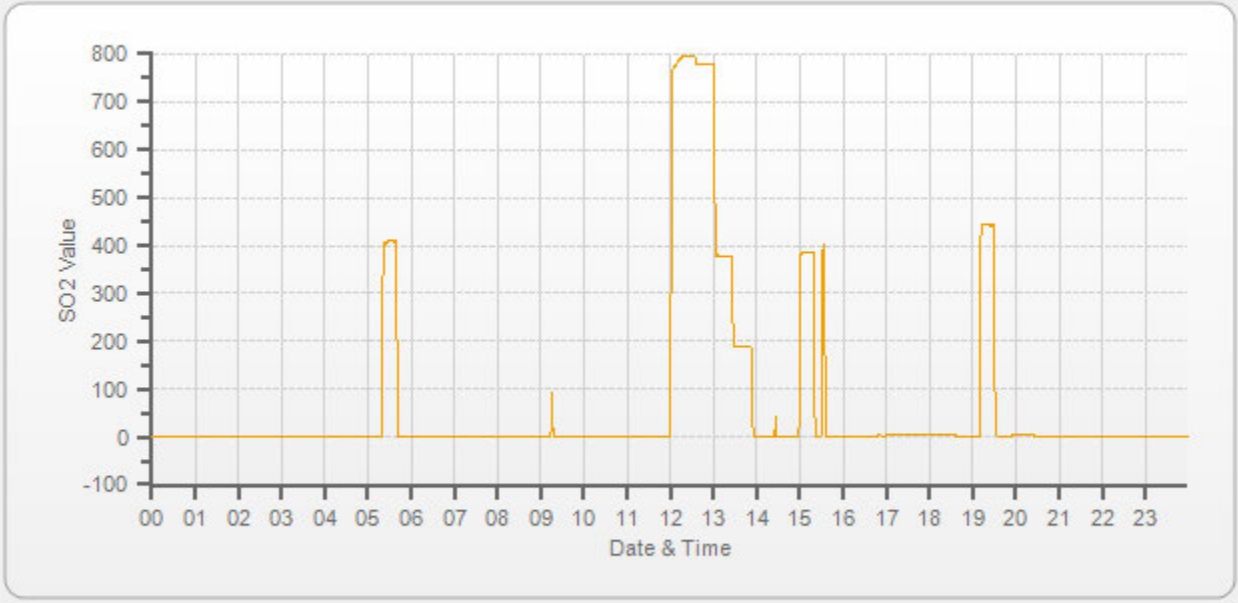
As found:		As left:	
SLOPE:	n/a	SLOPE:	1.010
OFFSET:	n/a	OFFSET:	116.4
HVPS:	n/a	HVPS:	651
RCELL TEMP:	n/a	RCELL TEMP:	50.0
BOX TEMP:	n/a	BOX TEMP:	29.1
PMT TEMP:	n/a	PMT TEMP:	7.8
IZS TEMP:	n/a	IZS TEMP:	53.0
PRES:	n/a	PRES:	24.3
SAMP FL:	n/a	SAMP FL:	599
NORM PMT:	n/a	NORM PMT:	116.7
UV LAMP:	n/a	UV LAMP:	3151.5
LAMP RATIO:	n/a	LAMP RATIO:	100.1
STR. LGT	n/a	STR. LGT	58.8
DRK PMT:	n/a	DRK PMT:	5.6
DRK LMP:	n/a	DRK LMP:	6.8
Expected Value:	n/a	Expected Value:	442.0

Comments:

The analyzer sample inlet filter was changed.

Sample pump was rebuilt. Reaction cell cleaned. Output voltage calibrated. Manifold rebuilt. Valves tested for leaks. New Sample valve installed. ZERO Air scrubber was repositioned inside. Factory calibration completed.

SO2[ppb] Station: LICA ST. LINA Daily: 2017/03/02 Type: AVG 1 Min. [1 Min.]



HYDROGEN SULPHIDE

API 101E Hydrogen Sulphide Analyzer Calibration

Date:	March 1, 2017	**Barometric Pressure:**	27.60 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	19
Location/Station Name:	St. Lina	**Weather Conditions:**	Mainly sunny
Parameter:	Hydrogen Sulphide	**Calibration Purpose:**	shut down
Start Time 24 hr. (mst):	9:20	**Performed By/Reviewer:**	Limin Li / Trina Whitsitt
End Time 24 hr. (mst):	12:15	**Cal Gas Expiry Date:**	January 6, 2018
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	Internal

Analyzer:

ID# or Serial Number:	509	**Range ppb:**	100
Last Calibration Date:	February 22, 2017	**As Found C.F.:**	1.031
Previous C.F.:	0.999	**New C.F.:**	n/a

Calibrator:

Flow Meter ID's:	n/a
Make & Model:	Environics 2000
Serial #:	1991
Cal Gas Cylinder I.D. # :	BLM002508
Cal Gas Conc. (ppm):	10.2

Standard Calibration Points for Ranges

Point	ppb
High	78
Mid	38
Low	19

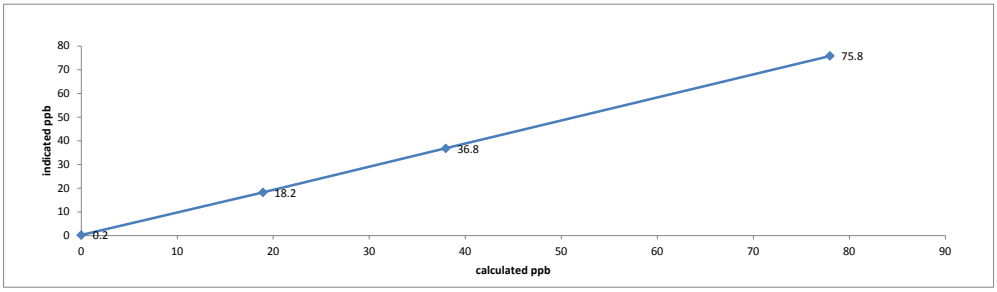
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

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	0.2	n/a
as found high	7443	57.34	7500	78.0	75.8	1.031
mid	7473	27.92	7501	38.0	36.8	1.037
low	7488	13.92	7502	18.9	18.2	1.052
					Average C.F.=	1.040

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.030**	**0.90-1.10**
b (Intercept as % of full scale)=	**-0.02%**	**± 3% F.S.**
% change in C.F. from last cal=	**-3.25%**	**± 10%**

API 101E Hydrogen Sulphide Analyzer Calibration

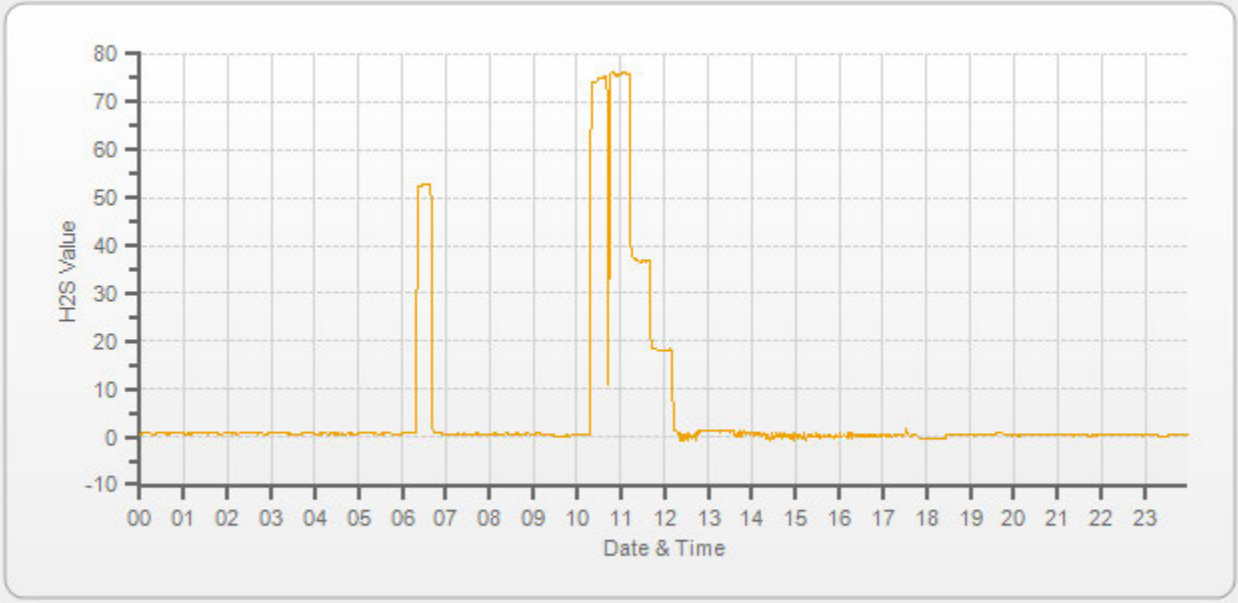


	As found:		As left:
SLOPE:	0.924	SLOPE:	n/a
OFFSET:	52.9	OFFSET:	n/a
HVPS:	675	HVPS:	n/a
RCELL TEMP:	50	RCELL TEMP:	n/a
BOX TEMP:	29.1	BOX TEMP:	n/a
PMT TEMP:	8.0	PMT TEMP:	n/a
IZS TEMP:	48	IZS TEMP:	n/a
Converter Temp:	314	Converter Temp:	n/a
PRES:	20.4	PRES:	n/a
SAMP FL:	559	SAMP FL:	n/a
UV LAMP:	3452	UV LAMP:	n/a
LAMP RATIO:	92.4	LAMP RATIO:	n/a
STR. LGT	24.5	STR. LGT	n/a
DRK PMT:	0.3	DRK PMT:	n/a
DRK LMP:	0.5	DRK LMP:	n/a
Expected Value:	47.6	Expected Value:	n/a

Comments:

As found high point repeated due to operator error. After shut-down calibration, the reaction cell was cleaned. The sinter filter and o-rings were changed. The sample valve was cleaned. The analogue output was calibrated. The valves were tested for leaks. The sample pump was rebuilt. Factory calibration completed. Zero Air scrubber was repositioned inside.

H2S[ppb] Station: LICA ST. LINA Daily: 2017/03/01 Type: AVG 1 Min. [1 Min.]



API 101E Hydrogen Sulphide Analyzer Calibration

Date:	March 2, 2017	**Barometric Pressure:**	27.78 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	20
Location/Station Name:	St. Lina	**Weather Conditions:**	Mainly sunny
Parameter:	Hydrogen Sulphide	**Calibration Purpose:**	post repair
Start Time 24 hr. (mst):	12:00	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
End Time 24 hr. (mst):	15:00	**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	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:	SABIO 2010 D
Serial #:	11900613
Cal Gas Cylinder I.D. # :	EY0000654
Cal Gas Conc. (ppm):	10.2

Standard Calibration Points for Ranges

Point	ppb
High	78
Mid	38
Low	19

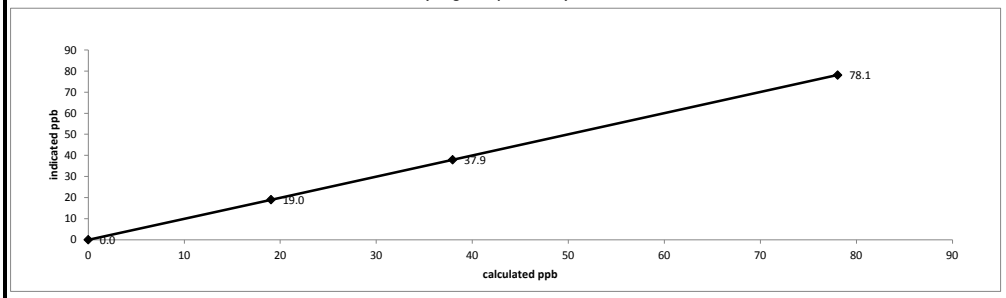
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

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	7471	27.90	7499	37.9	37.9	1.001
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.=	1.001

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**0.999**	**.95-1.05**
b (Intercept as % of full scale)=	**0.03%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**± 10%**

API 101E Hydrogen Sulphide Analyzer Calibration



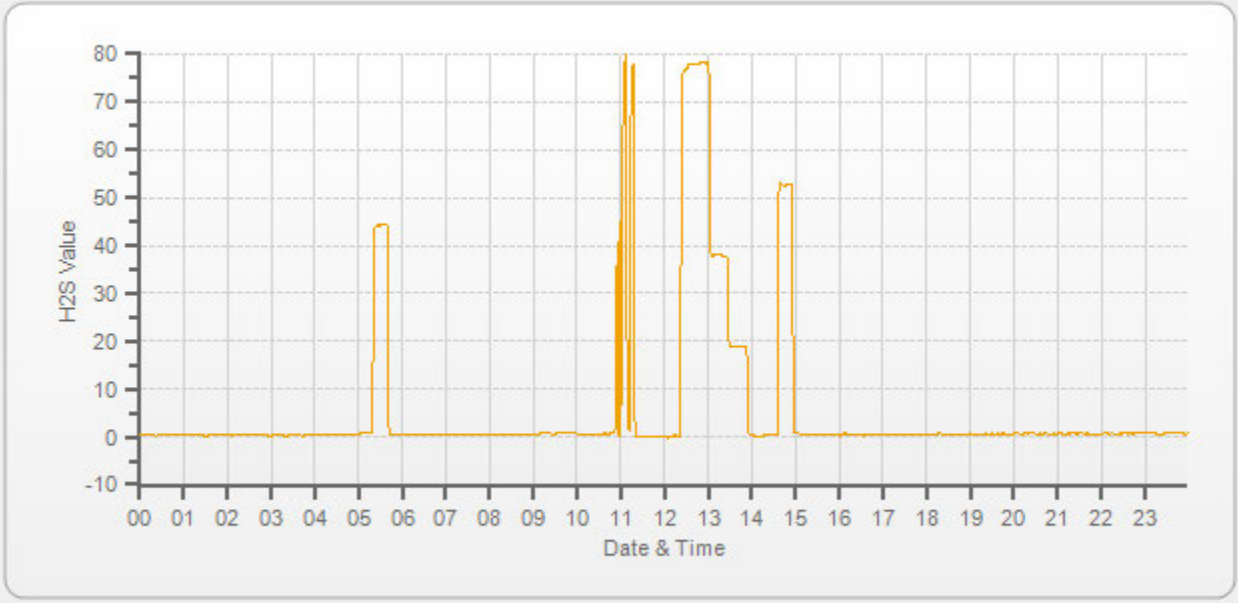
As found:		As left:	
SLOPE:	n/a	SLOPE:	1.030
OFFSET:	n/a	OFFSET:	53.0
HVPS:	n/a	HVPS:	679
RCELL TEMP:	n/a	RCELL TEMP:	50.0
BOX TEMP:	n/a	BOX TEMP:	29.4
PMT TEMP:	n/a	PMT TEMP:	8.0
IZS TEMP:	n/a	IZS TEMP:	48.0
Converter Temp:	n/a	Converter Temp:	315.4
PRES:	n/a	PRES:	20.7
SAMP FL:	n/a	SAMP FL:	536
UV LAMP:	n/a	UV LAMP:	3077.7
LAMP RATIO:	n/a	LAMP RATIO:	100.9
STR. LGT	n/a	STR. LGT	27.3
DRK PMT:	n/a	DRK PMT:	0.6
DRK LMP:	n/a	DRK LMP:	0.3
Expected Value:	n/a	Expected Value:	52.8

Comments:

The analyzer sample inlet filter was changed.

Valves tested for leaks. Sample pump was rebuilt. Reaction cell cleaned. Manifold rebuilt. Output voltage calibrated. Factory calibration completed. Zero Air scrubber was repositioned inside.

H2S[ppb] Station: LICA ST. LINA Daily: 2017/03/02 Type: AVG 1 Min. [1 Min.]



API 101E Hydrogen Sulphide Analyzer Calibration

Date:	March 7, 2017	**Barometric Pressure:**	27.60 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	21
Location/Station Name:	St. Lina	**Weather Conditions:**	Mainly sunny
Parameter:	Hydrogen Sulphide	**Calibration Purpose:**	repeat
Start Time 24 hr. (mst):	9:38	**Performed By/Reviewer:**	Limin Li / Trina Whitsitt
End Time 24 hr. (mst):	15:00	**Cal Gas Expiry Date:**	January 6, 2018
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	Internal

Analyzer:

ID# or Serial Number:	509	**Range ppb:**	100
Last Calibration Date:	March 2, 2017	**As Found C.F.:**	1.043
Previous C.F.:	0.999	**New C.F.:**	1.000

Calibrator:

Flow Meter ID's:	n/a
Make & Model:	Environics 2000
Serial #:	1991
Cal Gas Cylinder I.D. # :	BLM002508
Cal Gas Conc. (ppm):	10.2

Standard Calibration Points for Ranges

Point	ppb
High	78
Mid	38
Low	19

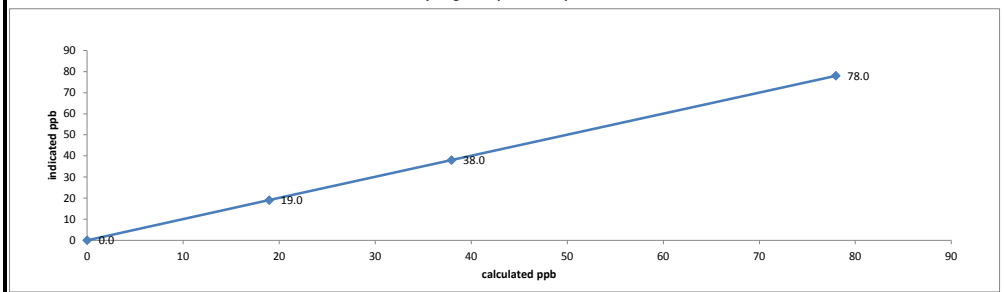
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	**Diluent**	**Cal Gas**	**Total**	**(ppb)**	**(ppb)**	
as found zero	7504	0.00	7504	0.0	-0.3	n/a
as found high	7448	57.38	7505	78.0	74.5	1.043
adjusted zero	7504	0.00	7504	0.0	0.0	n/a
adjusted high	7448	57.38	7505	78.0	78.0	1.000
mid	7477	27.93	7505	38.0	38.0	0.999
low	7491	13.95	7505	19.0	19.0	0.998
calibrator zero	7504	0.00	7504	0.0	0.2	n/a
					Average C.F.=	0.999

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.000**	**.95-1.05**
b (Intercept as % of full scale)=	**-0.02%**	**± 3% F.S.**
% change in C.F. from last cal=	**-4.36%**	**± 10%**

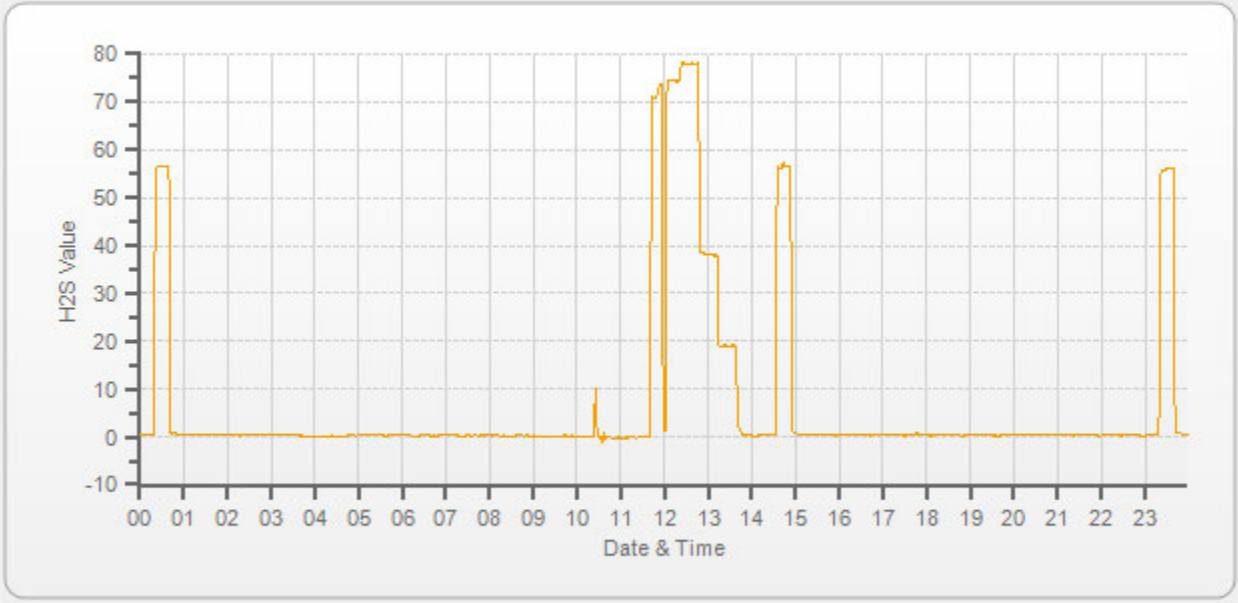
API 101E Hydrogen Sulphide Analyzer Calibration



	As found:		As left:
SLOPE:	1.03	SLOPE:	1.066
OFFSET:	53	OFFSET:	51.2
HVPS:	679	HVPS:	679
RCELL TEMP:	50	RCELL TEMP:	50
BOX TEMP:	30	BOX TEMP:	30
PMT TEMP:	8.0	PMT TEMP:	8
IZS TEMP:	48	IZS TEMP:	48
Converter Temp:	314	Converter Temp:	314
PRES:	20.6	PRES:	20.6
SAMP FL:	535	SAMP FL:	535
UV LAMP:	3092	UV LAMP:	3092
LAMP RATIO:	101.1	LAMP RATIO:	101.1
STR. LGT	27.3	STR. LGT	27.3
DRK PMT:	0.5	DRK PMT:	0.5
DRK LMP:	0.3	DRK LMP:	0.3
Expected Value:	52.8	Expected Value:	56.7

Comments:

H2S[ppb] Station: LICA ST. LINA Daily: 2017/03/07 Type: AVG 1 Min. [1 Min.]



API 101E Hydrogen Sulphide Analyzer Calibration

Date:	March 23, 2017	**Barometric Pressure:**	27.37 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	21
Location/Station Name:	St. Lina, Ab	**Weather Conditions:**	A few clouds
Parameter:	Hydrogen Sulphide	**Calibration Purpose:**	shut down
Start Time 24 hr. (mst):	9:40	**Performed By/Reviewer:**	Michael Espiritu / Trina Whitsitt
End Time 24 hr. (mst):	10:56	**Cal Gas Expiry Date:**	July 15, 2017
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	n/a

Analyzer:

ID# or Serial Number:	509	**Range ppb:**	100
Last Calibration Date:	March 7, 2017	**As Found C.F.:**	0.983
Previous C.F.:	1.000	**New C.F.:**	n/a

Calibrator:

Flow Meter ID's:	n/a
Make & Model:	Sabio 2010
Serial #:	042531101(0911)
Cal Gas Cylinder I.D. # :	LL74267
Cal Gas Conc. (ppm):	9.88

Standard Calibration Points for Ranges

Point	ppb
High	78
Mid	38
Low	19

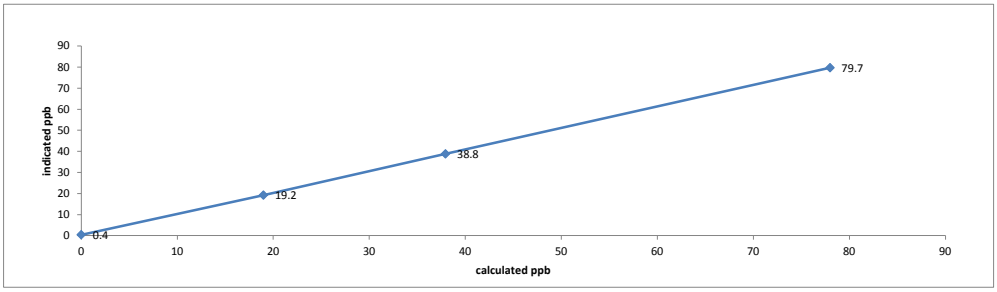
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	**Diluent**	**Cal Gas**	**Total**	**(ppb)**	**(ppb)**	
as found zero	7499	0.00	7499	0.0	0.4	n/a
as found high	7441	59.20	7500	78.0	79.7	0.983
mid	7471	28.80	7500	37.9	38.8	0.988
low	7484	14.40	7498	19.0	19.2	1.009
					Average C.F.=	0.994

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**0.981**	**0.90-1.10**
b (Intercept as % of full scale)=	**-0.16%**	**± 3% F.S.**
% change in C.F. from last cal=	**1.66%**	**± 10%**

API 101E Hydrogen Sulphide Analyzer Calibration



	As found:	As left:
SLOPE:	1.066	n/a
OFFSET:	51.2	n/a
HVPS:	679	n/a
RCELL TEMP:	50	n/a
BOX TEMP:	30.1	n/a
PMT TEMP:	8	n/a
IZS TEMP:	48	n/a
Converter Temp:	314	n/a
PRES:	21.6	n/a
SAMP FL:	535	n/a
UV LAMP:	3150	n/a
LAMP RATIO:	103	n/a
STR. LGT	27.3	n/a
DRK PMT:	0.4	n/a
DRK LMP:	0.3	n/a
Expected Value:	56.7	n/a

Comments:

Shutdown calibration before checking the IZS system.

API 101E Hydrogen Sulphide Analyzer Calibration

Date:	March 23, 2017	**Barometric Pressure:**	27.37 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	21
Location/Station Name:	St. Lina, Ab	**Weather Conditions:**	A few clouds
Parameter:	Hydrogen Sulphide	**Calibration Purpose:**	post repair
Start Time 24 hr. (mst):	12:50	**Performed By/Reviewer:**	Michael Espiritu / Trina Whitsitt
End Time 24 hr. (mst):	15:25	**Cal Gas Expiry Date:**	July 15, 2017
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	n/a

Analyzer:

ID# or Serial Number:	509	**Range ppb:**	100
Last Calibration Date:	March 7, 2017	**As Found C.F.:**	n/a
Previous C.F.:	n/a	**New C.F.:**	0.997

Calibrator:

Flow Meter ID's:	n/a
Make & Model:	Sabio 2010
Serial #:	042531101(0911)
Cal Gas Cylinder I.D. # :	LL74267
Cal Gas Conc. (ppm):	9.88

Standard Calibration Points for Ranges

Point	ppb
High	78
Mid	38
Low	19

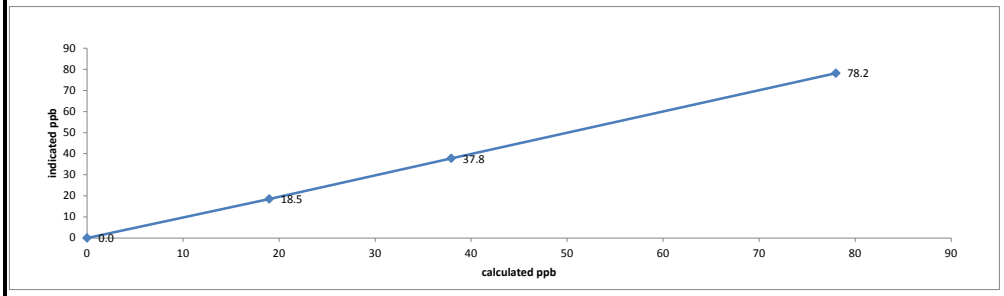
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	**Diluent**	**Cal Gas**	**Total**	**(ppb)**	**(ppb)**	
adjusted zero	7499	0.00	7499	0.0	0.0	n/a
adjusted high	7441	59.20	7500	78.0	78.2	0.997
mid	7471	28.80	7500	37.9	37.8	1.004
low	7484	14.40	7498	19.0	18.5	1.026
calibrator zero	7499	0.00	7499	0.0	0.1	n/a
					Average C.F.=	1.009

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**0.995**	**.95-1.05**
b (Intercept as % of full scale)=	**0.26%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**± 10%**

API 101E Hydrogen Sulphide Analyzer Calibration

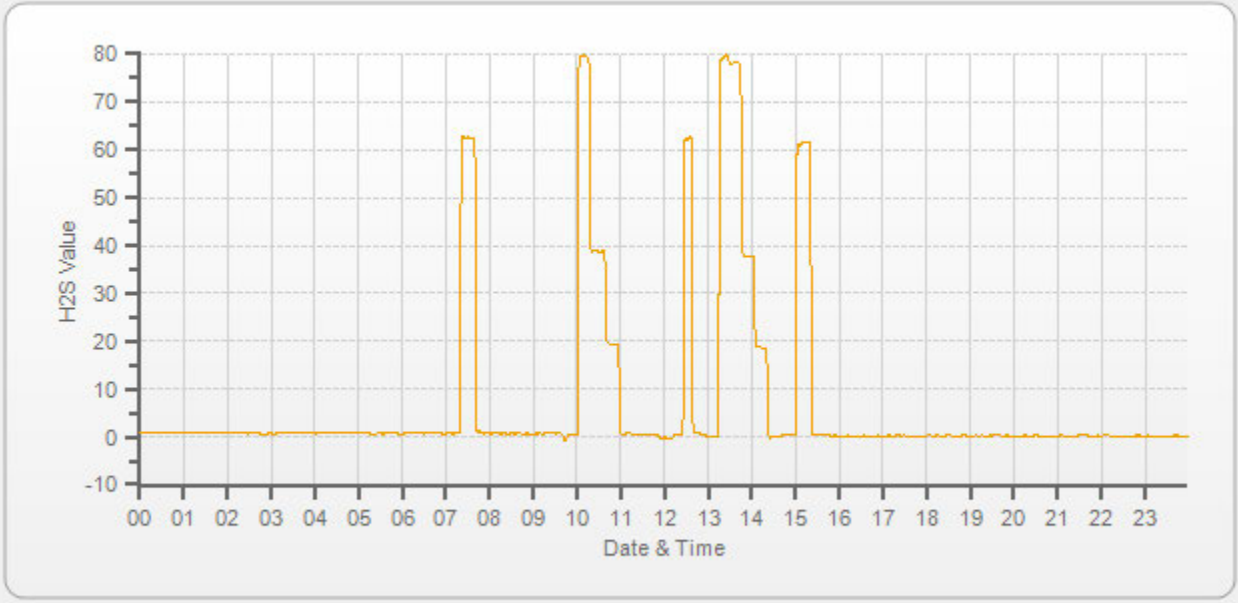


	As found:	As left:
SLOPE:	1.066	1.047
OFFSET:	51.2	51.8
HVPS:	679	679
RCELL TEMP:	50	50
BOX TEMP:	30.1	30.9
PMT TEMP:	8	8
IZS TEMP:	48	48
Converter Temp:	314	314
PRES:	21.6	20.5
SAMP FL:	535	535
UV LAMP:	3150	3151
LAMP RATIO:	103	103
STR. LGT	27.3	27.1
DRK PMT:	0.4	0.4
DRK LMP:	0.3	0.4
Expected Value:	56.7	61.5

Comments:

Replaced a few IZS tubings, purged valves and restored original zero scrubber setup.

H2S[ppb] Station: LICA ST. LINA Daily: 2017/03/23 Type: AVG 1 Min. [1 Min.]



TOTAL HYDROCARBON

Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	March 1, 2017	**Barometric Pressure:**	27.61 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	21
Location/Station Name:	St. Lina	**Weather Conditions:**	Mainly sunny
Parameter:	Total Hydrocarbon	**Calibration Purpose:**	shut down
Start/End Time 24 hr. (mst):	12:22/15:00	**Performed By/Reviewer:**	Limin Li / Trina Whitsitt
Calibration Method:	Gas Dilution	**Cal Gas Expiry Date:**	July 7, 2022

Analyzer:

ID# or Serial Number:	51CLT-77021-384	**Range ppm:**	50
Last Calibration Date:	February 3, 2017	**As Found C.F.:**	1.003
Previous Cal High Point C.F.:	1.000	**New C.F.:**	n/a

Calibrator:

Flow Meter ID's:	n/a	
Make & Model:	Environics 2000	
Serial #:	1991	
Cal Gas Cylinder I.D. # :	LL83638	
CH_4/C_3H_8 Cylinder Conc. (ppm):	582.0	203.0
CH_4 as propane/total CH_4 equivilants (ppm):	558.3	1140.3

Standard Calibration Points for a Range of: 50 ppm

Point	Target ppm
High	38
Mid	18
Low	9

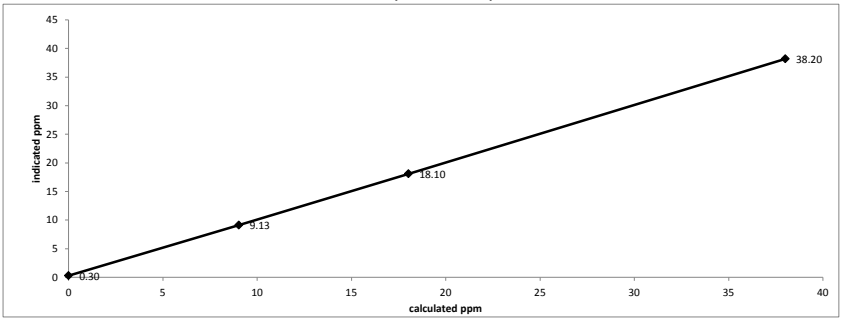
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	**Diluent**	**Cal Gas**	**Total**	**(ppm)**	**(ppm)**	
as found zero	2005	0.00	2005	0.0	0.30	n/a
as found high	2005	69.12	2074	38.00	38.20	1.003
mid	2005	32.20	2037	18.02	18.10	1.013
low	2005	16.00	2021	9.03	9.13	1.022
					Average C.F.=	1.013

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.001**	**.95-1.05**
b (Intercept as % of full scale)=	**-0.39%**	**± 3% F.S.**
% change in C.F. from last cal=	**-0.27%**	**± 10%**

Thermo 51C Total Hydrocarbon Analyzer Calibration



As found:		As left:	
H2 cylinder (psi):	1800	H2 cylinder (psi):	n/a
H2 cylinder reg set (psi):	24	H2 cylinder reg set (psi):	n/a
Span Cylinder (psi):	1900	Span Cylinder (psi):	n/a
Span Cylinder Reg Set (psi):	20	Span Cylinder Reg Set (psi):	n/a
Zero Air Gen Pressure:	46	Zero Air Gen Pressure:	n/a
measurement alarms:	None	measurement alarms:	n/a
service alarms:	None	service alarms:	n/a
cnt:	3292	cnt:	n/a
rng:	1	rng:	n/a
try:	0	try:	n/a
flm:	194.5	flm:	n/a
det:	125.5	det:	n/a
Flame:	194	Flame:	n/a
Filter:	125	Filter:	n/a
Base:	125	Base:	n/a
Sample psi:	6.9	Sample psi:	n/a
Internal Air Pressure:	20	Internal Air	n/a
Internal Fuel Pressure:	12	Internal Fuel	n/a
Measured Flow:	0.8988	Measured Flow:	n/a
Expected Value:	26.94	Expected Value:	n/a

Comments:

After shut-down calibration, the pump was rebuilt.

Thermo 51C Total Hydrocarbon Analyzer Calibration

Date:	March 1, 2017	**Barometric Pressure:**	27.61 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	21
Location/Station Name:	St. Lina	**Weather Conditions:**	Mainly sunny
Parameter:	Total Hydrocarbon	**Calibration Purpose:**	post repair
Start/End Time 24 hr. (mst):	17:20 / 20:20	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
Calibration Method:	Gas Dilution	**Cal Gas Expiry Date:**	July 7, 2022

Analyzer:

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

Calibrator:

Flow Meter ID's:	n/a	
Make & Model:	API 700	
Serial #:	627	
Cal Gas Cylinder I.D. # :	LL83638	
CH_4/C_3H_8 Cylinder Conc. (ppm):	582.0	203.0
CH_4 as propane/total CH_4 equivilants (ppm):	558.3	1140.3

Standard Calibration Points for a Range of: 50 ppm

Point	Target ppm
High	38
Mid	18
Low	9

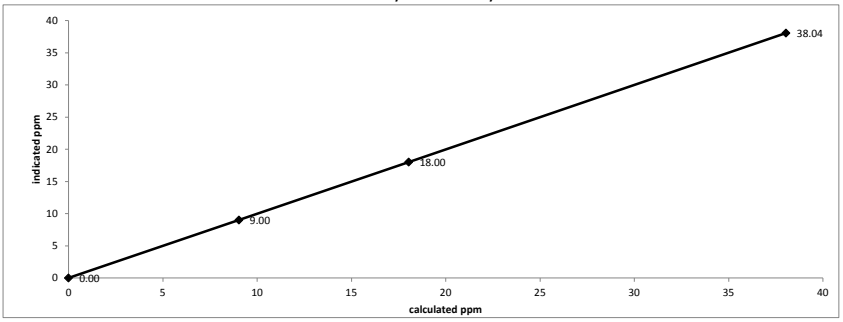
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors:
Point	**Diluent**	**Cal Gas**	**Total**	**(ppm)**	**(ppm)**	
adjusted zero	2005	0.00	2005	0.0	0.00	n/a
adjusted high	2002	69.10	2071	38.04	38.04	1.000
mid	2003	32.20	2035	18.04	18.00	1.002
low	2003	16.00	2019	9.04	9.00	1.004
calibrator zero	2005	0.00	2005	0.00	0.00	n/a
					Average C.F.=	1.002

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.000**	**.95-1.05**
b (Intercept as % of full scale)=	**0.04%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**± 10%**

Thermo 51C Total Hydrocarbon Analyzer Calibration



As found:		As left:	
H2 cylinder (psi):	n/a	H2 cylinder (psi):	1800
H2 cylinder reg set (psi):	n/a	H2 cylinder reg set (psi):	24
Span Cylinder (psi):	n/a	Span Cylinder (psi):	1900
Span Cylinder Reg Set (psi):	n/a	Span Cylinder Reg Set (psi):	20
Zero Air Gen Pressure:	n/a	Zero Air Gen Pressure:	46
measurement alarms:	n/a	measurement alarms:	None
service alarms:	n/a	service alarms:	None
cnt:	n/a	cnt:	1954
rng:	n/a	rng:	1
try:	n/a	try:	1
flm:	n/a	flm:	193.3
det:	n/a	det:	125.7
Flame:	n/a	Flame:	193
Filter:	n/a	Filter:	125
Base:	n/a	Base:	125
Sample psi:	n/a	Sample psi:	06.91
Internal Air Pressure:	n/a	Internal Air	20
Internal Fuel Pressure:	n/a	Internal Fuel	13
Measured Flow:	n/a	Measured Flow:	n/a
Expected Value:	n/a	Expected Value:	30.70

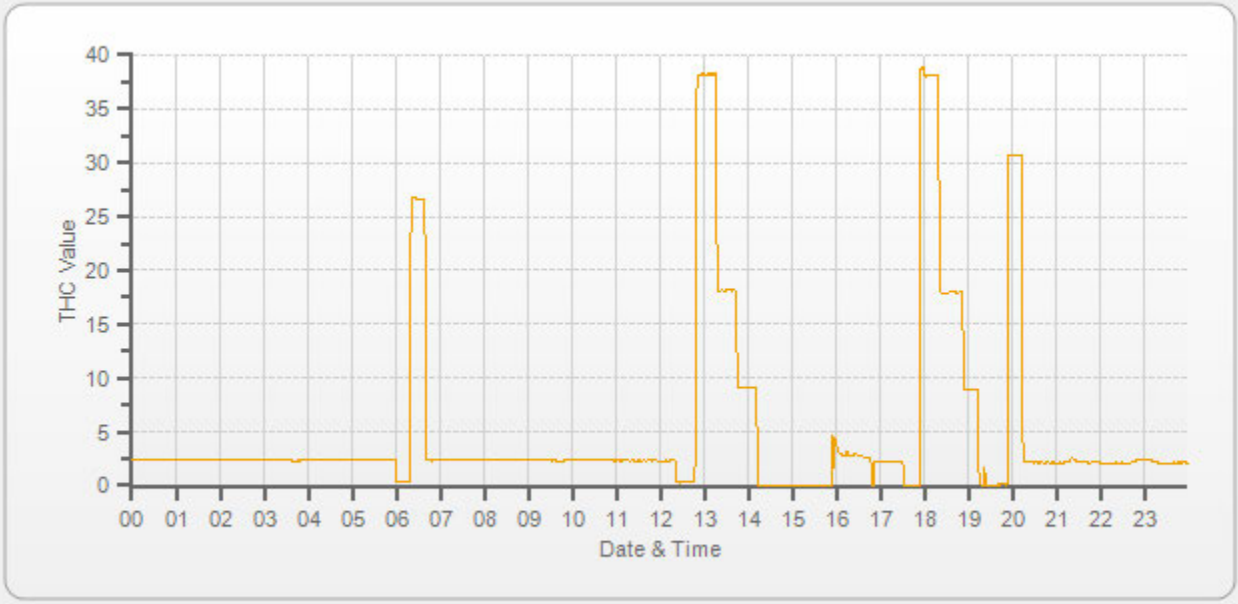
Comments:

The analyzer sample inlet filter was changed.

A new span gas cylinder was installed.
The analyzer cooling fan filter(s) were cleaned.

Sample pump was rebuilt.

THC[ppm] Station: LICA ST. LINA Daily: 2017/03/01 Type: AVG 1 Min. [1 Min.]



NITROGEN DIOXIDE

API 200E NO-NO2-NOx Analyzer Calibration

Date:	March 1, 2017	**Barometric Pressure:**	27.6 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	19
Location/Station Name:	St. Lina	**Weather Conditions:**	Mainly sunny
Start/End Time 24 hr. (mst):	9:40 / 15:00	**Calibration Purpose:**	shut down
G.P.T. to be used for Ozone?	Yes with 1000 ppb NOx full scale	**Performed By/Reviewer:**	Limin Li / Trina Whitsitt
Calibration Method:	Gas Dilution & Varying UV Lamp Power	**Cal Gas Expiry Date:**	December 25, 2018

Analyzer:

ID# or Serial Number:	594
Last Calibration Date:	February 2, 2017
Range ppb:	1000

Correction Factors:

	Previous C.F.:	As Found C.F.:	New C.F.:
NO =	1.000	1.012	n/a
NO_2 =	1.012	1.014	n/a
NOx =	1.000	1.009	n/a

Calibrator:

Flow Meter ID's:	n/a	
Make & Model:	Sabio 2010	
Serial #:	17200415	
Cal Gas Cylinder I.D. # :	BLM002756T	
NO/NOx Gas Conc. (ppm):	50.7	50.7

Standard Calibration Points for a Range of: 1000 ppb

Point	Target NO (ppb)	Target NO_2 (ppb)	Cc Ozone ?
High	610	375	<--high ozone
Mid	380	190	<--mid ozone
Low	190	70	<--low ozone
Extra Point #1	n/a	n/a	n/a
Extra Point #2	n/a	n/a	n/a

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	**Diluent**	**Cal Gas**	**Total Flow**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**		
as found zero	5028	0.0	5028	0	0	0.1	0.5	n/a	n/a
as found high	4951	77.1	5028	777.4	777.4	768.0	771.0	1.012	1.009
mid	4991	37.70	5029	380.1	380.1	377.0	377.0	1.008	1.010
low	5008	19.10	5027	192.6	192.6	190.0	190.0	1.014	1.017
							Average C.F.=	1.012	1.012

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO_2	NO drop	NO_2 gain	NO_2 C.F.
Point	**Diluent**	**Cal Gas**	**Total Flow**	**volts or ppb**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**
NOx reference	4951	77.10	5028	0.0	768.0	769.0	1.0	0.1	1.0	
as found high NO2	4951	77.10	5028	510.0	268.0	758.0	494.0	500.0	493.0	1.014
gpt mid	4951	77.10	5028	275.0	500.0	762.0	261.0	268.0	260.0	1.031
gpt low	4951	77.10	5028	100.0	673.0	768.0	95.0	95.0	94.0	1.011
									Average NO_2 C.F.=	1.019

Linear Regression/Calibration Results:

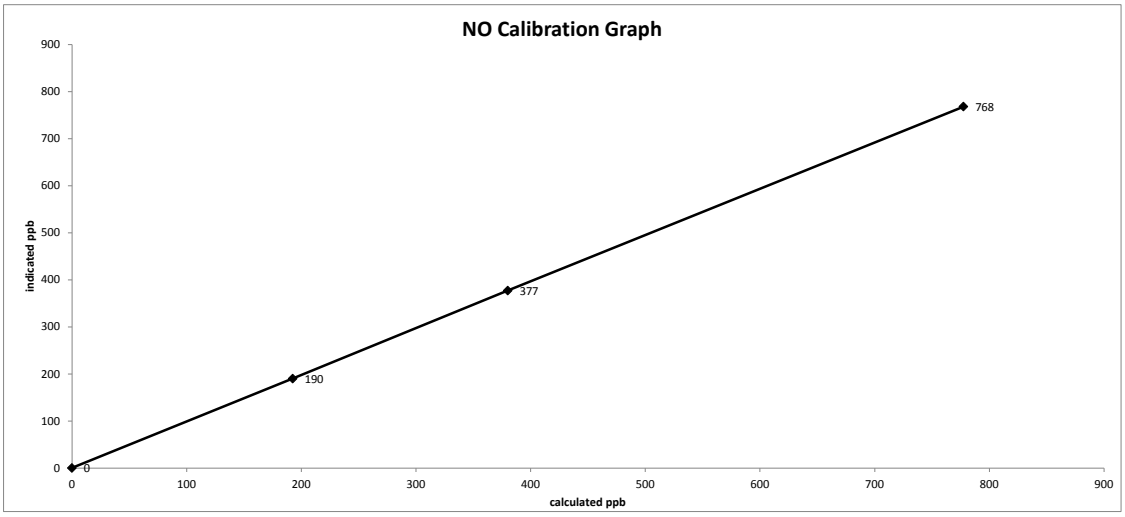
	NO	NOx	NO_2	LIMITS
Correlation Coeffecient =	**1.000**	**1.000**	**1.000**	**> or = 0.995**
Slope =	**1.012**	**1.008**	**1.017**	**0.90-1.10**
b (Intercept as % of full scale)=	**0.03%**	**-0.01%**	**-0.01%**	**± 3% F.S.**
% change in C.F. from last cal=	**-1.24%**	**-0.22%**	**-0.90%**	**± 10%**
NO2 converter effeciency			**0.99**	**0.96 to 1.04**

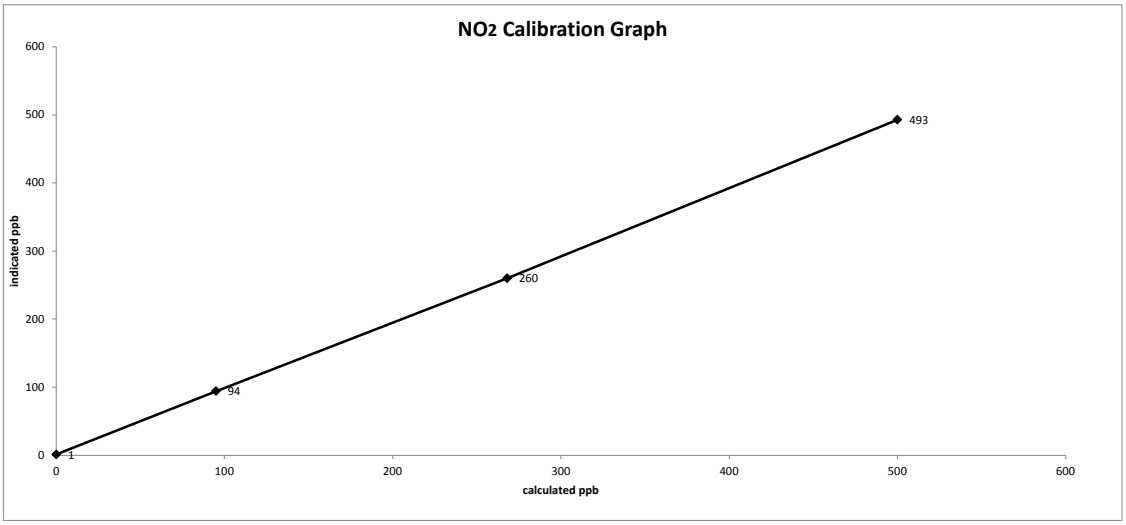
As found:		As left:	
NOx SLOPE:	0.998	NOx SLOPE:	n/a
NOx OFFS:	2.2	NOx OFFS:	n/a
NO SLOPE:	1.008	NO SLOPE:	n/a
NO OFFS:	0.3	NO OFFS:	n/a
SAMP FLW:	483	SAMP FLW:	n/a
OZONE FL:	78	OZONE FL:	n/a
PMT:	19.1	PMT:	n/a
NORM PMT:	1	NORM PMT:	n/a
AZERO:	15.9	AZERO:	n/a
HVPS:	767	HVPS:	n/a
RCELL TEMP:	50	RCELL TEMP:	n/a
BOX TEMP:	29.8	BOX TEMP:	n/a
PMT TEMP:	6.7	PMT TEMP:	n/a
IZS TEMP:	40	IZS TEMP:	n/a
MOLY TEMP:	315.2	MOLY TEMP:	n/a
RCEL:	5.1	RCEL:	n/a
SAMP:	26.2	SAMP:	n/a
Expected Value NO:	422.4	Expected Value NO:	n/a
Expected Value NO2:	6.0	Expected Value NO2:	n/a
Expected Value NOx:	427.5	Expected Value NOx:	n/a

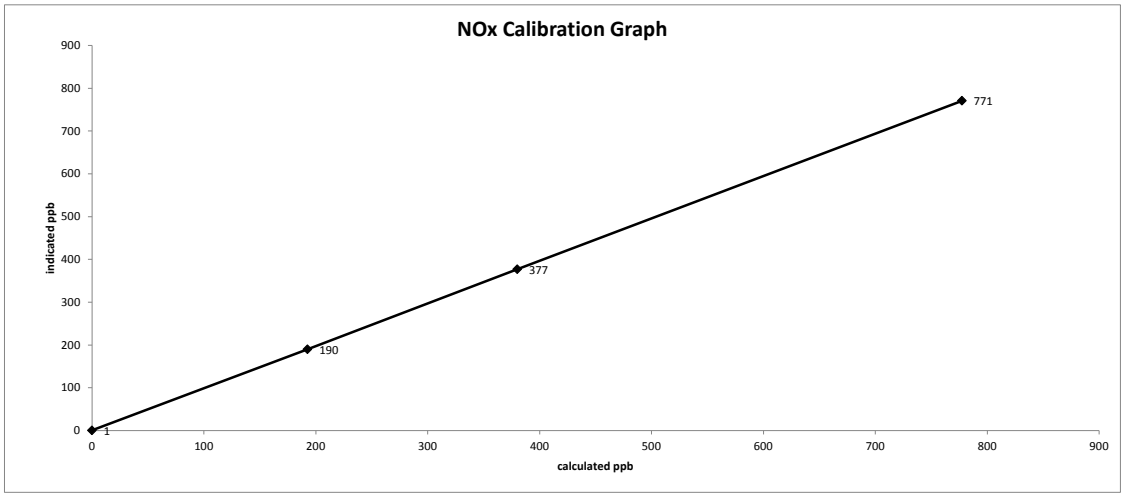
Comments:

As found high point repeated due to operator error. GPT low point starts at 14:40. After shut-down calibration, the reaction cell was cleaned. The sinter filter and o-rings were changed. The sample valve was cleaned. The NO/NO2 valve (leak) was changed. The O3 O-ring was changed. Output voltage calibrated.

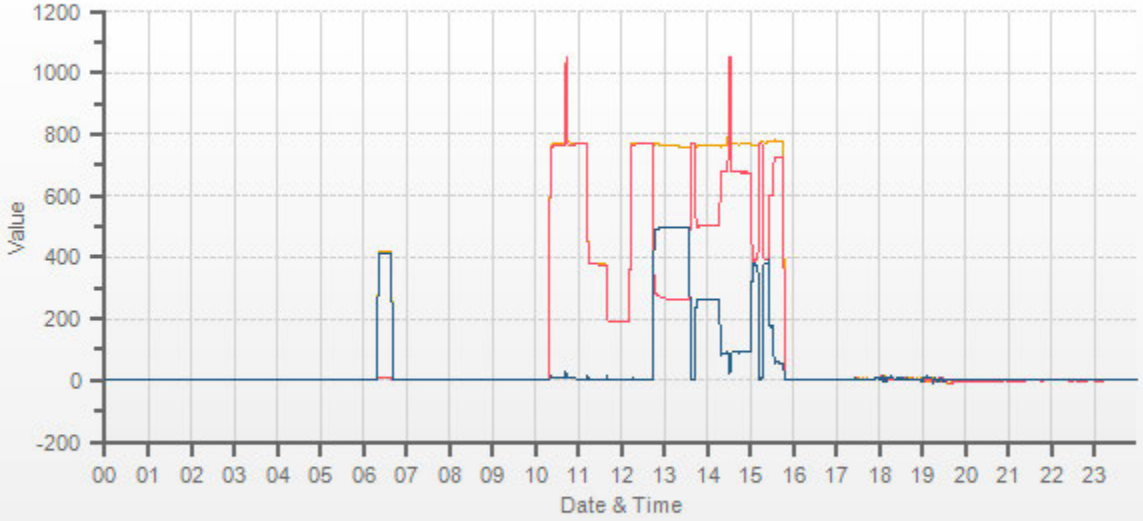
Date:	**March 1, 2017**	**Start/End Time 24 hr. (mst):**	**9:40 / 15:00**
Company/Airshed:	**LICA**	**Calibration Purpose:**	**shut down**
Location/Station Name:	**St. Lina**	**Calibration Method:**	**Gas Dilution & Varying UV Lamp Power**







Station: LICA ST. LINA Daily: 2017/03/01 Type: AVG 1 Min. [1 Min.]



API 200E NO-NO2-NOx Analyzer Calibration

Date:	March 2, 2017	**Barometric Pressure:**	27.78 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	20
Location/Station Name:	St. Lina	**Weather Conditions:**	Mainly sunny
Start/End Time 24 hr. (mst):	10:59 / 19:50	**Calibration Purpose:**	post repair
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

Analyzer:

ID# or Serial Number:	594
Last Calibration Date:	n/a
Range ppb:	1000

Correction Factors:

	Previous C.F.:	As Found C.F.:	New C.F.:
NO =	n/a	n/a	1.000
NO_2 =	n/a	n/a	1.010
NOx =	n/a	n/a	1.000

Calibrator:

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	50.7

Standard Calibration Points for a Range of: 1000 ppb

Point	Target NO (ppb)	Target NO_2 (ppb)	Cc Ozone ?
High	**780**	**500**	**n/a**
Mid	**380**	**275**	**n/a**
Low	**190**	**100**	**n/a**
Extra Point #1	**n/a**	**n/a**	**n/a**
Extra Point #2	**n/a**	**n/a**	**n/a**

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	**Diluent**	**Cal Gas**	**Total Flow**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**		
adjusted zero	5000	0.0	5000	0	0	0.0	0.0	n/a	n/a
adjusted high	4924	76.9	5001	779.6	779.6	780.0	780.0	1.000	1.000
mid	4965	37.50	5003	380.1	380.1	379.0	379.0	1.003	1.003
low	4980	18.70	4999	189.7	189.7	189.0	189.0	1.004	1.004
calibrator zero	5000	0.00	5000	0.0	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_2	NO drop	NO_2 gain	NO_2 C.F.
Point	**Diluent**	**Cal Gas**	**Total Flow**	**volts or ppb**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**
NOx reference	4924	76.90	5001	0.0	783.0	781.0	-2.0	0.0	-2.0	
adjusted high NO2	4924	76.90	5001	500.0	271.0	776.0	505.0	512.0	507.0	1.010
gpt mid	4924	76.90	5001	275.0	500.0	776.0	276.0	283.0	278.0	1.018
gpt low	4924	76.90	5001	105.0	676.0	778.0	102.0	107.0	104.0	1.029
								Average NO_2 C.F.=		1.019

Linear Regression/Calibration Results:

	NO	NOx	NO_2	LIMITS
Correlation Coeffecient =	**1.000**	**1.000**	**1.000**	**> or = 0.995**
Slope =	**0.999**	**0.999**	**1.006**	**.95-1.05**
b (Intercept as % of full scale)=	**-0.06%**	**-0.06%**	**-0.24%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**n/a**	**n/a**	**± 10%**
NO2 converter effeciency			**0.96**	**0.96 to 1.04**

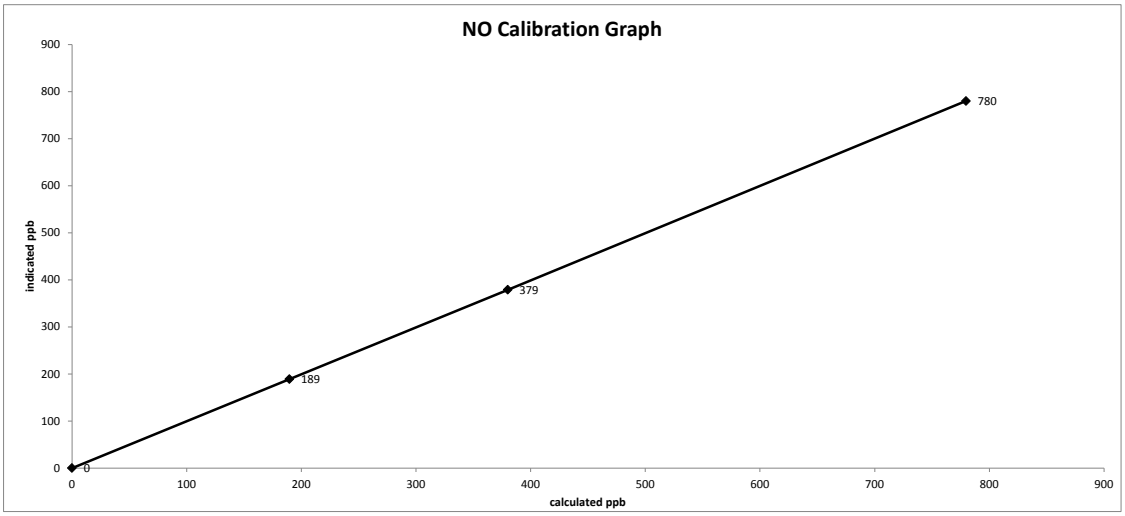
As found:		As left:	
NOx SLOPE:	n/a	NOx SLOPE:	0.967
NOx OFFS:	n/a	NOx OFFS:	-1.6
NO SLOPE:	n/a	NO SLOPE:	0.964
NO OFFS:	n/a	NO OFFS:	-2.7
SAMP FLW:	n/a	SAMP FLW:	485
OZONE FL:	n/a	OZONE FL:	78
PMT:	n/a	PMT:	20.0
NORM PMT:	n/a	NORM PMT:	-2.3
AZERO:	n/a	AZERO:	21.1
HVPS:	n/a	HVPS:	767
RCELL TEMP:	n/a	RCELL TEMP:	50.0
BOX TEMP:	n/a	BOX TEMP:	29.7
PMT TEMP:	n/a	PMT TEMP:	6.6
IZS TEMP:	n/a	IZS TEMP:	40.0
MOLY TEMP:	n/a	MOLY TEMP:	316.3
RCEL:	n/a	RCEL:	5.2
SAMP:	n/a	SAMP:	26.2
Expected Value NO:	n/a	Expected Value NO:	7.1
Expected Value NO2:	n/a	Expected Value NO2:	420.0
Expected Value NOx:	n/a	Expected Value NOx:	426.0

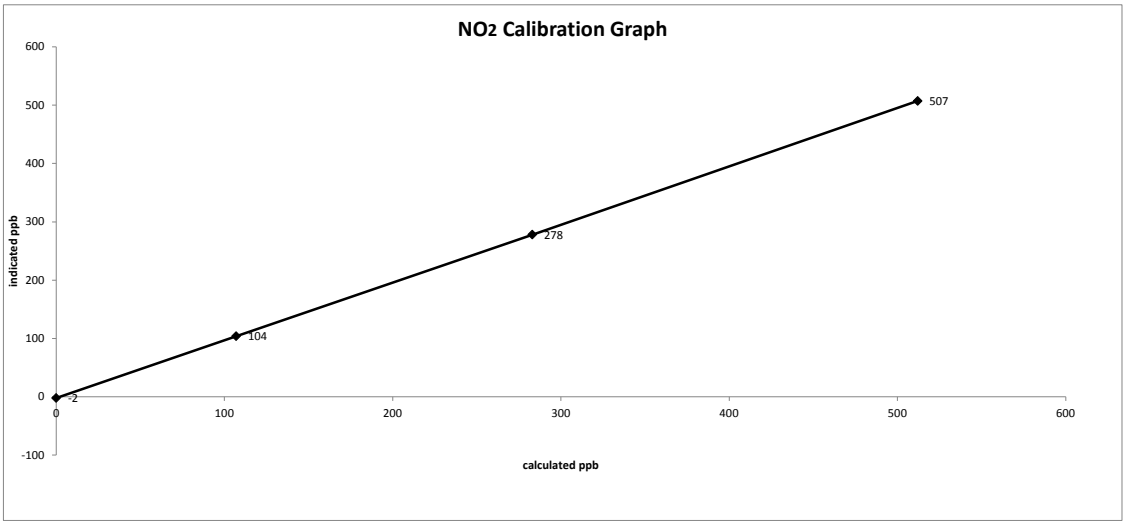
Comments:

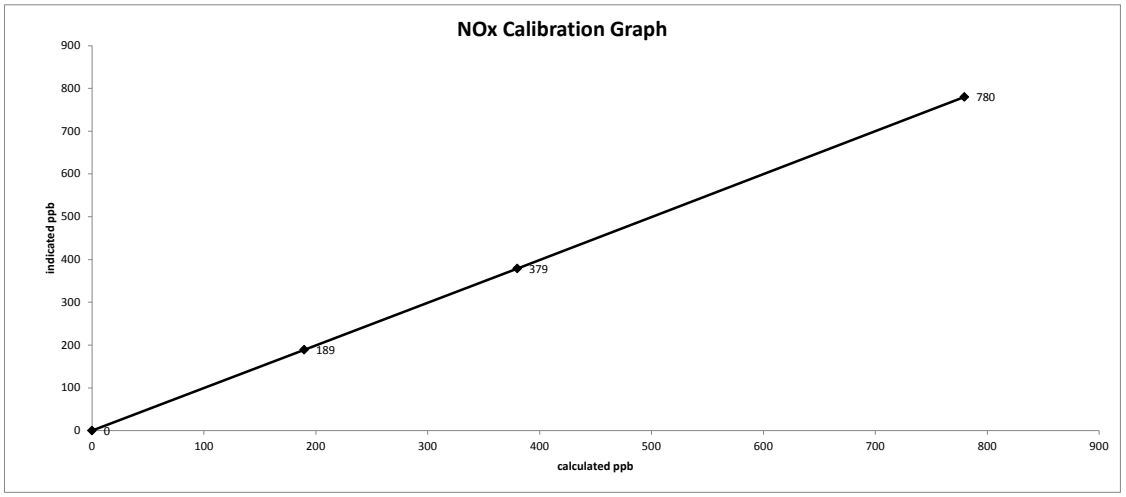
The analyzer sample inlet filter was changed.

Reaction cell cleaned. Valves rebuilt and checked for leaks. Factory calibration completed. Output voltage calibrated.

Date:	March 2, 2017	Start/End Time 24 hr. (mst):	10:59 / 19:50
Company/Airshed:	LICA	Calibration Purpose:	post repair
Location/Station Name:	St. Lina	Calibration Method:	Gas Dilution & Gas Phase Titration







API 200E NO-NO2-NOx Analyzer Calibration

Date:	March 2, 2017	**Barometric Pressure:**	27.78 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	20
Location/Station Name:	St. Lina	**Weather Conditions:**	Mainly sunny
Start/End Time 24 hr. (mst):	10:59 / 19:50	**Calibration Purpose:**	post repair
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

Analyzer:

ID# or Serial Number:	594
Last Calibration Date:	n/a
Range ppb:	1000

Correction Factors:

	Previous C.F.:	As Found C.F.:	New C.F.:
NO =	n/a	n/a	1.000
NO_2 =	n/a	n/a	1.004
NOx =	n/a	n/a	1.000

Calibrator:

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	50.7

Standard Calibration Points for a Range of: 1000 ppb

Point	Target NO (ppb)	Target NO_2 (ppb)	Cc Ozone ?
High	**780**	**500**	**n/a**
Mid	**380**	**275**	**n/a**
Low	**190**	**100**	**n/a**
Extra Point #1	**n/a**	**n/a**	**n/a**
Extra Point #2	**n/a**	**n/a**	**n/a**

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO_2	NO drop	NO_2 gain	NO_2 C.F.
Point	**Diluent**	**Cal Gas**	**Total Flow**	**volts or ppb**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**
NOx reference	4924	76.90	5001	0.0	783.0	778.0	-5.0	0.0	-5.0	
adjusted high NO2	4924	76.90	5001	500.0	270.0	776.0	506.0	513.0	511.0	1.004
gpt mid	4924	76.90	5001	275.0	501.0	776.0	276.0	282.0	281.0	1.004
gpt low	4924	76.90	5001	105.0	677.0	777.0	101.0	106.0	106.0	1.000
									Average NO_2 C.F.=	1.002

Linear Regression/Calibration Results:

	NO	NOx	NO_2	LIMITS
Correlation Coeffecient =	**1.000**	**1.000**	**1.000**	**> or = 0.995**
Slope =	**0.999**	**0.999**	**0.997**	**.95-1.05**
b (Intercept as % of full scale)=	**-0.06%**	**-0.06%**	**-0.27%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**n/a**	**n/a**	**± 10%**
NO2 converter effeciency			**0.96**	**0.96 to 1.04**

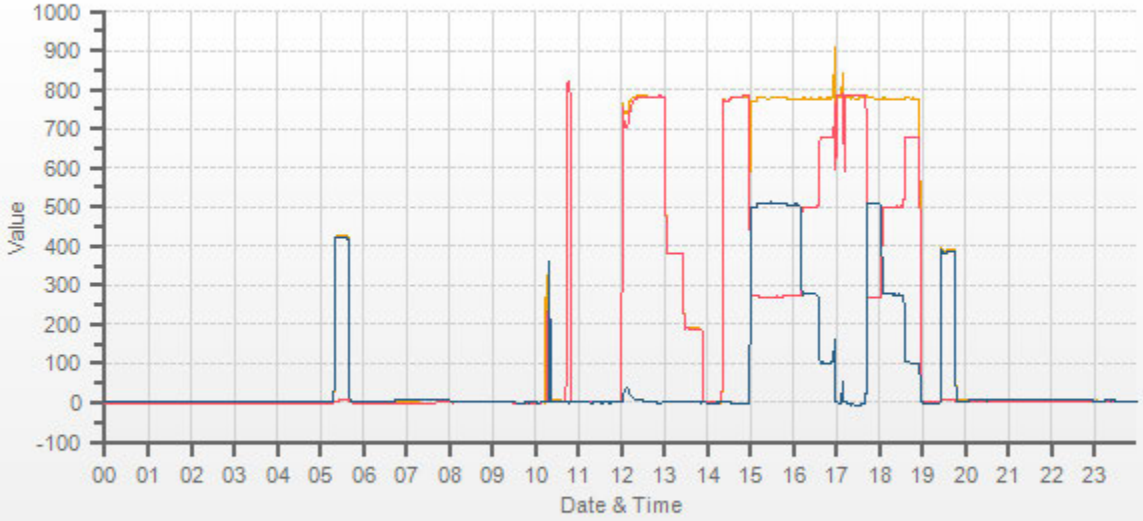
As found:		As left:	
NOx SLOPE:	n/a	NOx SLOPE:	0.967
NOx OFFS:	n/a	NOx OFFS:	-1.6
NO SLOPE:	n/a	NO SLOPE:	0.964
NO OFFS:	n/a	NO OFFS:	-2.7
SAMP FLW:	n/a	SAMP FLW:	485
OZONE FL:	n/a	OZONE FL:	78
PMT:	n/a	PMT:	20.0
NORM PMT:	n/a	NORM PMT:	-2.3
AZERO:	n/a	AZERO:	21.1
HVPS:	n/a	HVPS:	767
RCELL TEMP:	n/a	RCELL TEMP:	50.0
BOX TEMP:	n/a	BOX TEMP:	29.7
PMT TEMP:	n/a	PMT TEMP:	6.6
IZS TEMP:	n/a	IZS TEMP:	40.0
MOLY TEMP:	n/a	MOLY TEMP:	316.3
RCEL:	n/a	RCEL:	5.2
SAMP:	n/a	SAMP:	26.2
Expected Value NO:	n/a	Expected Value NO:	6.1
Expected Value NO2:	n/a	Expected Value NO2:	387.0
Expected Value NOx:	n/a	Expected Value NOx:	392.0

Comments:

The analyzer sample inlet filter was changed.

GPT calibration repeated with reference point in GPT mode.

Station: LICA ST. LINA Daily: 2017/03/02 Type: AVG 1 Min. [1 Min.]



API 200E NO-NO2-NOx Analyzer Calibration

Date:	March 7, 2017	**Barometric Pressure:**	27.6 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	21
Location/Station Name:	St. Lina	**Weather Conditions:**	Mainly sunny
Start/End Time 24 hr. (mst):	10:00 / 16:50	**Calibration Purpose:**	repeat
G.P.T. to be used for Ozone?	No	**Performed By/Reviewer:**	Limin Li / Trina Whitsitt
Calibration Method:	Gas Dilution & Gas Phase Titration	**Cal Gas Expiry Date:**	December 25, 2018

Analyzer:

ID# or Serial Number:	594
Last Calibration Date:	March 2, 2017
Range ppb:	1000

Correction Factors:

	Previous C.F.:	As Found C.F.:	New C.F.:
NO =	1.000	1.001	1.000
NO_2 =	1.010	0.988	1.002
NOx =	1.000	0.999	1.000

Calibrator:

Flow Meter ID's:	n/a	
Make & Model:	Sabio 2010	
Serial #:	17200415	
Cal Gas Cylinder I.D. # :	BLM002756T	
NO/NOx Gas Conc. (ppm):	50.7	50.7

Standard Calibration Points for a Range of: 1000 ppb

Point	Target NO (ppb)	Target NO_2 (ppb)	Cc Ozone ?
High	780	500	n/a
Mid	380	275	n/a
Low	190	100	n/a
Extra Point #1	n/a	n/a	n/a
Extra Point #2	n/a	n/a	n/a

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	**Diluent**	**Cal Gas**	**Total Flow**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**		
as found zero	5028	0.0	5028	0	0	1.4	1.0	n/a	n/a
as found high	4951	77.1	5028	777.4	777.4	778.0	779.0	1.001	0.999
adjusted zero	5028	0.00	5028	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4951	77.10	5028	777.4	777.4	777.4	777.4	1.000	1.000
mid	4991	37.70	5029	380.1	380.1	380.0	380.0	1.000	1.000
low	5009	19.00	5028	191.6	191.6	192.0	192.0	0.998	0.998
calibrator zero	1	0.00		0	0	0.3	0.3	n/a	n/a
							Average C.F.=	0.999	0.999

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO_2	NO drop	NO_2 gain	NO_2 C.F.
Point	**Diluent**	**Cal Gas**	**Total Flow**	**volts or ppb**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**
NOx reference	4951	77.10	5028	0.0	777.0	775.0	-2.0	0.0	-2.0	
as found high NO2	4951	77.10	5028	500.0	276.0	780.0	505.0	501.0	507.0	0.988
adjusted high NO2	4951	77.10	5028	500.0	276.0	774.0	498.0	501.0	500.0	1.002
gpt mid	4951	77.10	5028	275.0	507.0	774.0	268.0	270.0	270.0	1.000
gpt low	4951	77.10	5028	100.0	684.0	774.0	91.0	93.0	93.0	1.000
								Average NO_2 C.F.=		1.001

Linear Regression/Calibration Results:

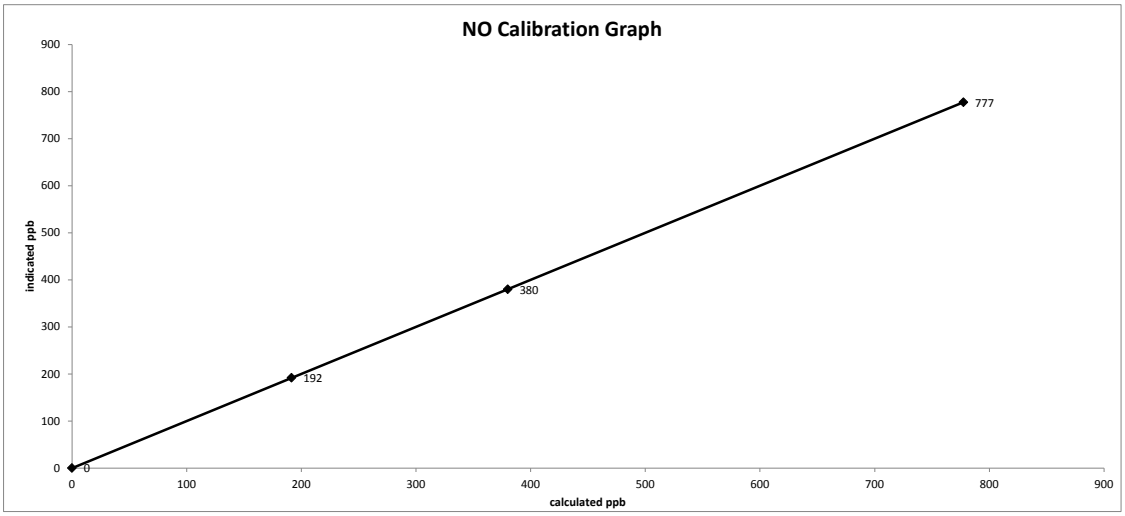
	NO	NOx	NO_2	LIMITS
Correlation Coeffecient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.000	1.000	0.999	.95-1.05
b (Intercept as % of full scale)=	0.01%	0.01%	-0.10%	± 3% F.S.
% change in C.F. from last cal=	-0.11%	0.07%	2.16%	± 10%
NO2 converter effeciency			0.97	0.96 to 1.04

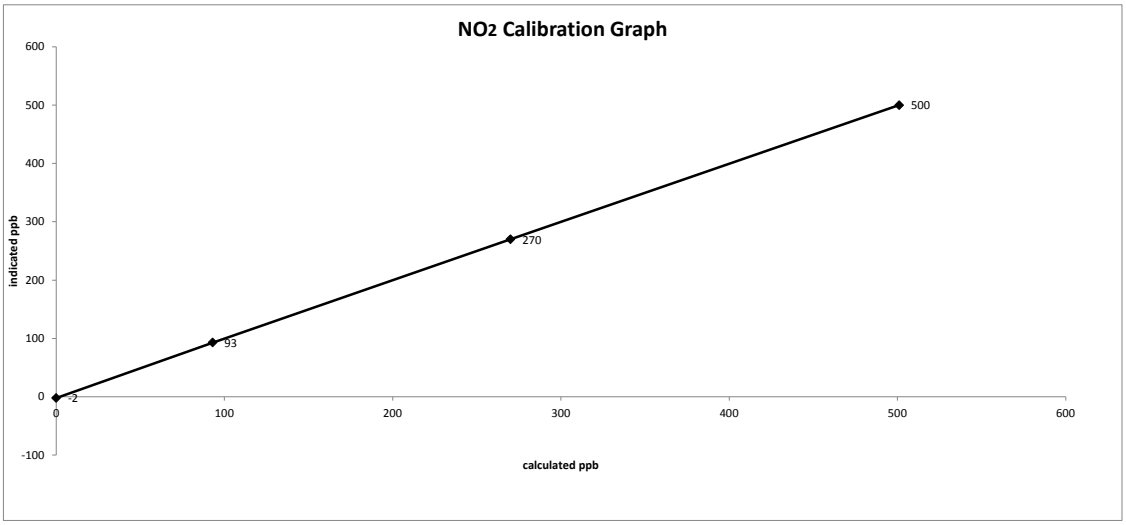
As found:		As left:	
NOx SLOPE:	0.967	NOx SLOPE:	0.965
NOx OFFS:	-1.6	NOx OFFS:	0.2
NO SLOPE:	0.964	NO SLOPE:	0.962
NO OFFS:	-2.7	NO OFFS:	-0.3
SAMP FLW:	483	SAMP FLW:	480
OZONE FL:	78	OZONE FL:	78
PMT:	1430	PMT:	18.3
NORM PMT:	1640	NORM PMT:	2.1
AZERO:	17	AZERO:	18
HVPS:	767	HVPS:	767
RCELL TEMP:	50	RCELL TEMP:	50
BOX TEMP:	29.8	BOX TEMP:	31.9
PMT TEMP:	6.7	PMT TEMP:	6.7
IZS TEMP:	40	IZS TEMP:	40.3
MOLY TEMP:	315.2	MOLY TEMP:	314
RCEL:	5.1	RCEL:	5.3
SAMP:	26.6	SAMP:	25.8
Expected Value NO:	420.0	Expected Value NO:	420.0
Expected Value NO2:	7.1	Expected Value NO2:	7.1
Expected Value NOx:	426.0	Expected Value NOx:	426.0

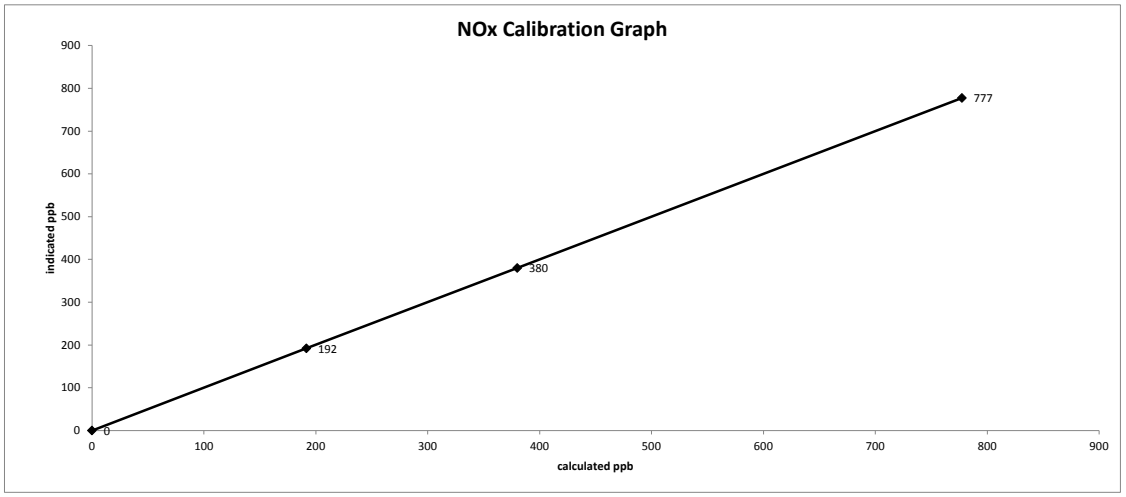
Comments:

Before the calibration, the GPT high point was checked for 40 minutes and NO2 was found to be stable. NO2 converter is deemed okay. Repeat calibration complete. The analyzer does not require replacing.

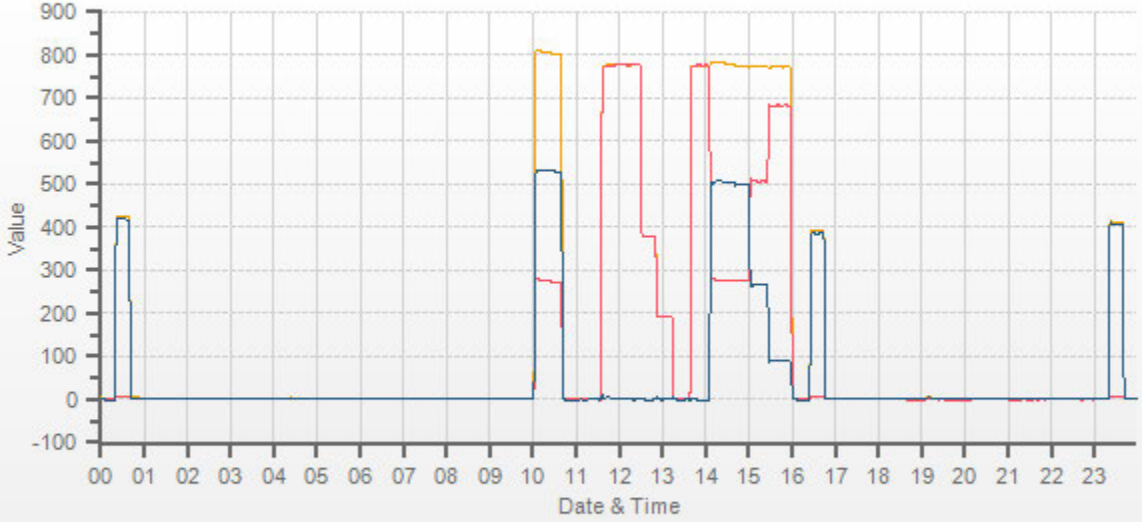
Date:	March 7, 2017	Start/End Time 24 hr. (mst):	10:00 / 16:50
Company/Airshed:	LICA	Calibration Purpose:	repeat
Location/Station Name:	St. Lina	Calibration Method:	Gas Dilution & Gas Phase Titration







Station: LICA ST. LINA Daily: 2017/03/07 Type: AVG 1 Min. [1 Min.]



OZONE

Thermo 49i Ozone Analyzer Calibration

Date:	March 1, 2017	**Barometric Pressure:**	27.61 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	21
Location/Station Name:	St. Lina	**Weather Conditions:**	Mainly sunny
Start/End Time 24 hr. (mst):	15:50 / 18:26	**Calibration Purpose:**	shut down
Ozone Calibration Method:	Direct G.P.T.	**Performed By/Reviewer:**	Limin Li / Trina Whitsitt
G.P.T. Date:	March 1, 2017	**Cal Gas Expiry Date:**	n/a

Analyzer:

ID# or Serial Number:	1002240371	**Ozone Range ppb:**	500
Last Calibration Date:	February 3, 2017	**As Found C.F.:**	1.024
Previous Cal High Point C.F.:	1.000	**New C.F.:**	n/a

Calibrator:

Flow Meter ID's:	n/a
Make & Model:	SABIO 2010
Serial #:	17200415
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

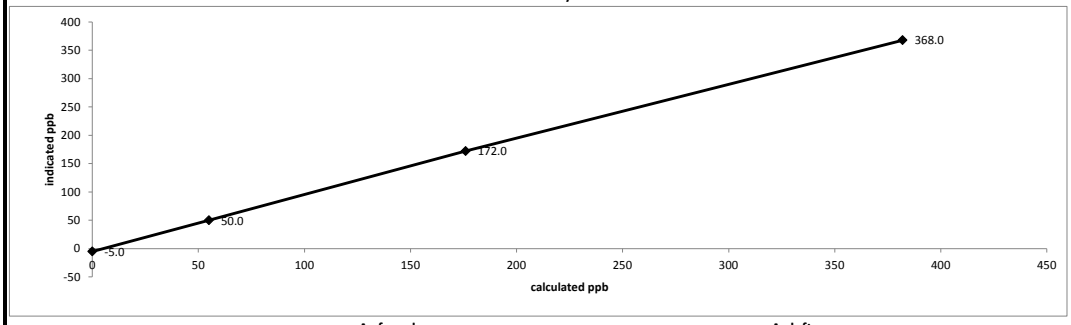
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Conentration:	Indicated Concentration:	Correction Factors:
Point	**Total Flow @ Point Start**	**Total Flow @ Point Finish**	**(ppb)**	**(ppb)**	**(ppb)**	
as found zero	5000	5000	0.0	n/a	-5.0	n/a
as found high	5000	5000	382.0	382.0	368.0	1.024
mid	5000	5000	176.0	176.0	172.0	0.994
low	5000	5000	55.0	55.0	50.0	1.000
					Average C.F.=	1.006

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.024**	**0.90-1.10**
b (Intercept as % of full scale)=	**0.70%**	**± 3% F.S.**
% change in C.F. from last cal=	**-2.41%**	**± 10%**

Thermo 49i Ozone Analyzer Calibration

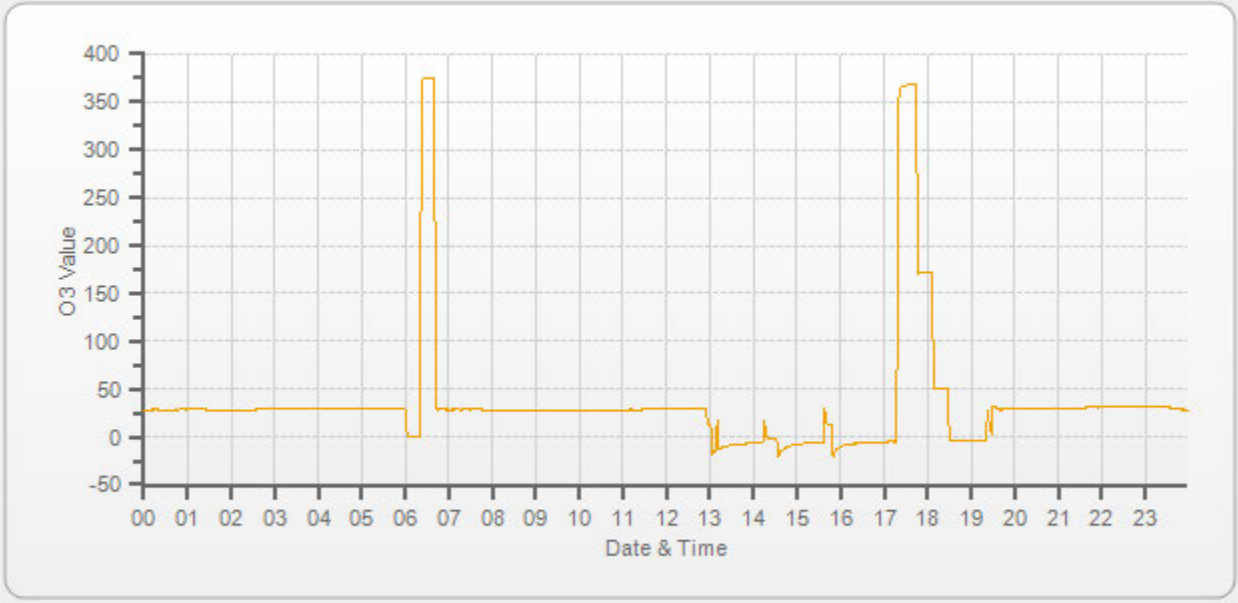


As found:		As left:	
O3 Bkg:	3.8	O3 Bkg:	n/a
O3 Coef:	0.937	O3 Coef:	n/a
Photo Lamp	9.4	Photo Lamp	n/a
O3 Lamp	7.8	O3 Lamp	n/a
Bench:	26.9	Bench:	n/a
Bench Lamp:	53.6	Bench Lamp:	n/a
O3 Lamp:	67.8	O3 Lamp:	n/a
Pressure:	680	Pressure:	n/a
Cell A lpm:	0.726	Cell A lpm:	n/a
Cell B lpm:	0.720	Cell B lpm:	n/a
O3 ppb:	28.9	O3 ppb:	n/a
Cell A ppb:	30.0	Cell A ppb:	n/a
Cell B ppb:	27	Cell B ppb:	n/a
Cell A int:	55429	Cell A int:	n/a
Expected Value:	377.0	Expected Value:	n/a

Comments:

Cell B Int:70378; Shut-down calibration completed to rebuild a sample pump and clean a reaction cell. Leak check pass. Change charcoal container to address leaks.

O3[ppb] Station: LICA ST. LINA Daily: 2017/03/01 Type: AVG 1 Min. [1 Min.]



Thermo 49i Ozone Analyzer Calibration

Date:	March 2, 2017	**Barometric Pressure:**	27.78 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	20
Location/Station Name:	St. Lina	**Weather Conditions:**	Mainly sunny
Start/End Time 24 hr. (mst):	15:43 / 19:35	**Calibration Purpose:**	post repair
Ozone Calibration Method:	Varying UV Lamp Power	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
G.P.T. Date:	n/a-done by Varying UV Lamp Power	**Cal Gas Expiry Date:**	n/a

Analyzer:

ID# or Serial Number:	1002240371	**Ozone Range ppb:**	500
Last Calibration Date:	n/a	**As Found C.F.:**	n/a
Previous Cal High Point C.F.:	n/a	**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

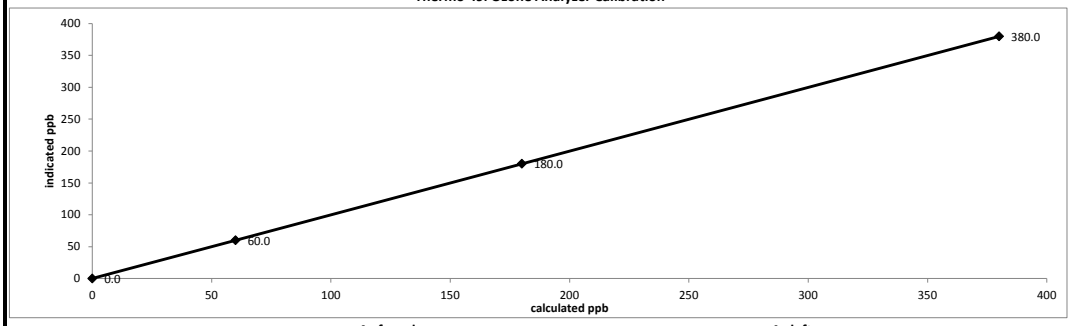
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Conentration:	Indicated Concentration:	Correction Factors:
Point	**Total Flow @ Point Start**	**Total Flow @ Point Finish**	**(ppb)**	**(ppb)**	**(ppb)**	
adjusted zero	5000	5000	0.0	n/a	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	180.0	180.0	181.0	0.994
low	5000	5000	60.0	60.0	61.0	0.984
calibrator zero	5000	5000	0.0	0.0	1.0	n/a
					Average C.F.=	0.993

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.000**	**.95-1.05**
b (Intercept as % of full scale)=	**0.00%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**± 10%**

Thermo 49i Ozone Analyzer Calibration



As found:		As left:	
O3 Bkg:	n/a	O3 Bkg:	-1.5
O3 Coef:	n/a	O3 Coef:	0.978
Photo Lamp	n/a	Photo Lamp	10.7
O3 Lamp	n/a	O3 Lamp	8.2
Bench:	n/a	Bench:	27.0
Bench Lamp:	n/a	Bench Lamp:	53.6
O3 Lamp:	n/a	O3 Lamp:	67.7
Pressure:	n/a	Pressure:	680.0
Cell A lpm:	n/a	Cell A lpm:	0.730
Cell B lpm:	n/a	Cell B lpm:	0.764
O3 ppb:	n/a	O3 ppb:	1.5
Cell A ppb:	n/a	Cell A ppb:	1.5
Cell B ppb:	n/a	Cell B ppb:	0.2
Cell A int:	n/a	Cell A int:	86877
Expected Value:	n/a	Expected Value:	268.0

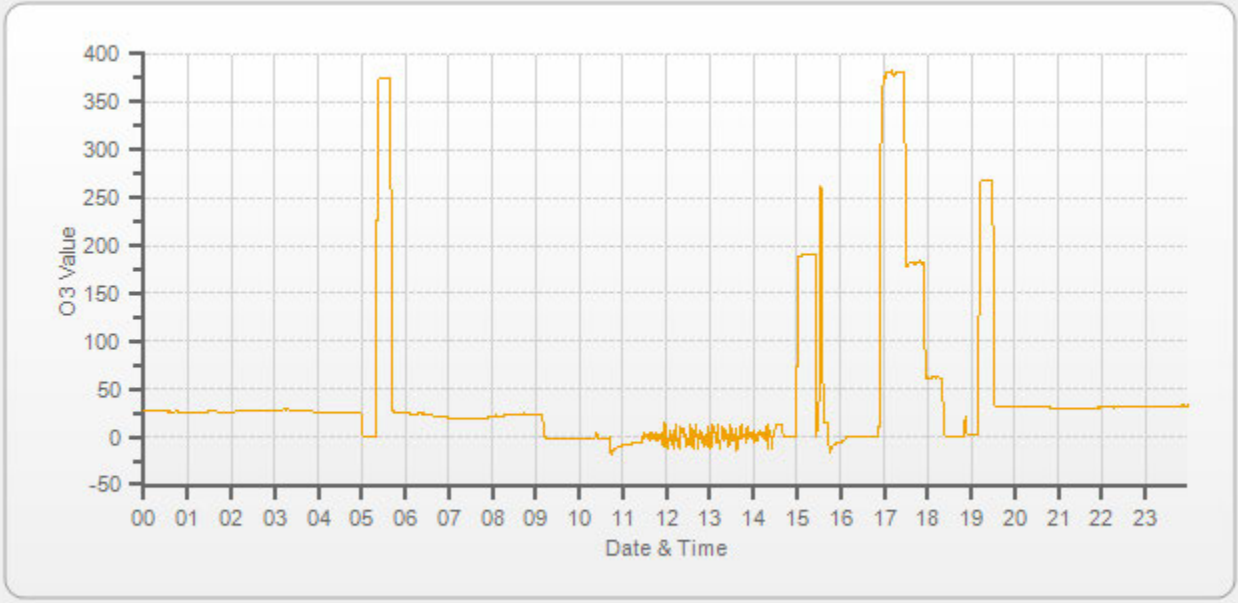
Comments:

The analyzer sample inlet filter was changed.

The analyzer cooling fan filter(s) were cleaned.

A sample pump was rebuilt, and absorption cells A and B cleaned. Zero Air scrubber container was changed due to leak.

O3[ppb] Station: LICA ST. LINA Daily: 2017/03/02 Type: AVG 1 Min. [1 Min.]



PARTICULATE MATTER

R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date:	March 1, 2017	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
Company:	LICA	**Start Time (mst):**	11:05
Station Name/Location:	St. Lina	**End Time (mst):**	13:49
Previous Audit Date:	February 3, 2017	**Calibration Purpose:**	Bi-monthly #1
Parameter:	PM 2.5	**Weather Conditions:**	Mainly sunny

1400A Information and Status:

ID# or Serial Number:	1405A208301003	**As Found Filter Loading %:**	35.94
Ko Factor:	13125	**As Left Filter Loading %:**	17.77
Ambient Temperature °C:	0.919	**As Found Noise:**	0.004
Ambient Pressure atm:	-15.88	**As Left Noise:**	0.000
Main Flow Reading lpm:	3.00	**Pump Vacuum:**	0.32
Aux Flow Reading lpm:	13.67	**Warnings:**	None

Reference Standards:

	Flow:	**Pressure:**	**Temperature:**
Make:	Dwyer	Fisher	FLUKE
Model:	475 Mark III	FB1291	1551A Ex STIK
Serial Number:	#3	#05544	4295
Calibration Date:	January 1, 2017	December 5, 2016	November 15, 2016

As found leak check:

		Base	**Zero**	**Reference**	**Zero**
PM 2.5 Flow	actual	0.00	0.03	0.00	0.03
	limit	0.15		0.15	
Bypass Flow	actual	0.01	-0.68	0.01	-0.68
	limit	0.60		0.60	

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

		Base	**Zero**	**Reference**	**Zero**
PM 2.5 Flow	actual	0.00	0.03	0.00	0.03
	limit	0.15		0.15	
Bypass Flow	actual	0.01	-0.68	0.01	-0.68
	limit	0.60		0.60	

As found temperature and pressure:

	tolerance +/- 2.0°C		**tolerance +/- 0.01 atm**
1405F temperature °C:	-15.9	**1405F pressure atm:**	0.919
reference temperature °C:	-16.0	**reference pressure:**	0.915
difference °C:	-0.1	**difference :**	0.004

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

	tolerance +/- 2.0°C		**tolerance +/- 0.01 atm**
1405F temperature °C:	-16.0	**1405F pressure atm:**	0.915
reference temperature °C:	-16.0	**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:	3.02	**reference total/aux flow lpm:**	16.23
difference lpm:	0.02	**difference lpm:**	-0.44

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:**	16.23
difference lpm:	0.02	**difference lpm:**	-0.44

K_o Audit:

Last K_o audit date:	February 3, 2017
1405F K_o factor:	13125
Measured K_o factor:	13126.5000
% difference:	0.01

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.

R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date:	March 28, 2017	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
Company:	LICA	**Start Time (mst):**	9:58
Station Name/Location:	St. Lina	**End Time (mst):**	11:04
Previous Audit Date:	March 1, 2017	**Calibration Purpose:**	Bi-monthly #2
Parameter:	PM 2.5	**Weather Conditions:**	Fog

1400A Information and Status:

ID# or Serial Number:	1405A208301003	**As Found Filter Loading %:**	22.67
Ko Factor:	13125	**As Left Filter Loading %:**	21.44
Ambient Temperature °C:	1.11	**As Found Noise:**	0.003
Ambient Pressure atm:	0.912	**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:	Dwyer	Fisher	FLUKE
Model:	475 Mark III	FB1291	1551A Ex STIK
Serial Number:	#3	#05544	4295
Calibration Date:	January 1, 2017	December 5, 2016	November 15, 2016

As found leak check:

		Base	**Zero**	**Reference**	**Zero**
PM 2.5 Flow	actual	0.00	0.03	0.00	0.03
	limit	0.15		0.15	
Bypass Flow	actual	0.00	-0.72	0.00	-0.72
	limit	0.60		0.60	

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

		Base	**Zero**	**Reference**	**Zero**
PM 2.5 Flow	actual	0.00	0.03	0.00	0.03
	limit	0.15		0.15	
Bypass Flow	actual	0.00	-0.72	0.00	-0.72
	limit	0.60		0.60	

As found temperature and pressure:

	tolerance +/- 2.0°C		**tolerance +/- 0.01 atm**
1405F temperature °C:	1.1	**1405F pressure atm:**	0.912
reference temperature °C:	1.3	**reference pressure:**	0.916
difference °C:	0.2	**difference :**	-0.004

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

	tolerance +/- 2.0°C		**tolerance +/- 0.01 atm**
1405F temperature °C:	1.3	**1405F pressure atm:**	0.916
reference temperature °C:	1.3	**reference pressure:**	0.916
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:	2.94	**reference total/aux flow lpm:**	16.05
difference lpm:	-0.06	**difference lpm:**	-0.62

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:	2.94	**reference total/aux flow lpm:**	16.05
difference lpm:	-0.06	**difference lpm:**	-0.62

K_o Audit:

Last K_o audit date:	February 3, 2017
1405F K_o factor:	13125
Measured K_o factor:	13126.5000
% difference:	0.01

Comments:

The TEOM intake head and associated sharp cut components were cleaned.

The 47 mm FDMS filter was changed.

WIND SYSTEM

Met One Instruments

Sonic Wind Sensor Certificate of Calibration

Sensor Model No.: 50.5H
Sensor Serial No.: H12635
Sensor Output Swing 0V - 1.0V
Sensor Output Range: 0 - 50.0 MPS
Customer: Maxxam Analytics
Sales Order No.: 117998
Tested per PO: 35-64914
Calibration Date: 09/12/2016
Calibrated by: David Frith DF

QC Inspection Byron Davis

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

As Found Test Date: N/A As Left Test Date 09/12/2016

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

Test Equipment Used for Calibration of Instruments

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

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

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

CALIBRATORS

aemera.org

Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2016-076A

Company Maxxam **Operator:** Christopher Wesson

Calibrator:		**Flow Measurement Device:**	
Make/Model	Sabio 2010	Make/Model	N/A
Serial Number	17200415	Serial Number	N/A
Last Verification Date	May 2015	Temperature (°C)	N/A
NO Cylinder S/N	LL42475	Barometric Pressure	N/A
NO/NOX Concentration	48.5/48.5		

Dilution Flow (sccm)

Pt. #1 5000 Pt. #2 5000 Pt. #3 5000

Gas Flow (sccm)

Pt. #1 80 Pt. #2 40 Pt. #3 20

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO_2	NOx	NO	NOx
5029	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5030	80.6	0.777	0.777	0.805	-0.005	0.800	4%	3%
5025	39.4	0.380	0.380	0.394	-0.002	0.392	4%	3%
5028	19.8	0.191	0.191	0.198	-0.001	0.197	4%	3%
						Absolute Average Percent Difference	3.65%	3.09%

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

NO		**LIMITS**	**NOx**	
Correlation=	1.0000	**≥ 0.990**	Correlation=	1.0000
m (Slope)=	1.0360	**0.90-1.10**	m (Slope)=	1.0295
b (Intercept % of FS)=	0.0110	**± 3% F.S.**	b (Intercept % of FS)=	0.0293

Flow	O_3 Conc	NO Decrease	NO	NO2	NOX	% Diff. Vs Audit gas	
5030	Lamp C.	0.000	0.804	-0.004	0.800	NO_2	% Diff. Limit
5030	1.388	0.495	0.309	0.491	0.800	0%	± 10%
5030	0.745	0.241	0.563	0.239	0.802	1%	± 10%
5030	0.367	0.091	0.713	0.089	0.801	2%	± 10%
					Absolute Average Percent Difference	1%	± 10%

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

NO_2		**LIMITS**
Correlation=	1.0000	**≥ 0.995**
m (Slope)=	0.9988	**0.90-1.10**
b (Intercept % of FS)=	-0.2760	**± 3% F.S.**

AENV Standards **Audit Calibrator**		**NO_X Analyzer**	
Make/Model	Teco 146i	Make/Model	Teco 42i
Serial/AMU Number	AMU 1809	Serial/AMU Number	AMU 1868
		Last Calibration Date	May 18, 2016
		Full Scale (ppm)	1.0

COMMENTS: Contains 50.3 ppm SO2. Flows not measured as per Chapter 7, Section 5 of AMD.

Auditor: Al Clark Date: May 18, 2016

Operator Signature: Location: McIntyre Center Edmonton

Alberta Government

Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2016-442A

Company Maxxam/SIA **Operator:** Chris

Calibrator:			
Make/Model	API 700		
Serial Number	627		
Last Verification Date	February 3, 2016		
NO Cylinder S/N	EY0000597		
NO [PPM]	49.0	NOx [PPM]	49.0
Expiry Date	December 8, 2019		

Flow Measurement Device:	
Make/Model	Definer 530
Serial Number	H-148944, L-152019
Temperature (°C)	23.5
Barometric Pressure	707.1 mmHg

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

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO_2	NOx	NO	NOx
	0.0	0.0000	0.0000	0.0000	-0.0004	-0.0004	Limit ± 10%	
4972	79.7	0.7855	0.7855	0.7883	0.0004	0.7887	0.4%	0.5%
4936	38.8	0.3822	0.3822	0.3816	0.0005	0.3822	-0.2%	0.1%
4970	19.4	0.1913	0.1913	0.1902	0.0006	0.1913	-0.6%	0.2%
						Absolute Average Percent Difference	0.1%	0.3%

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

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

Flow	O_3 Conc	NO Decrease	NO	NO2	NOX	% Diff. Vs Audit gas	
						NO_2	% Diff. Limit
4972	0	0.0000	0.7867	0.0014	0.7881		
4972	500	0.5127	0.2740	0.5104	0.7849	-0.7%	± 10%
4972	275	0.2863	0.5004	0.2860	0.7865	-0.6%	± 10%
4972	90	0.0940	0.6927	0.0954	0.7880	0.0%	± 10%
					Absolute Average Percent Difference	0%	± 10%

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

NO_2		**LIMITS**
Correlation=	1.0000	**≥ 0.995**
m (Slope)=	0.9924	**0.90-1.10**
b (Intercept % of FS)=	0.1755	**± 3% F.S.**

AENV Standards	
Audit Calibrator	
Make/Model	Thermo 146i
Serial/AMU Number	AMU1809
SRM Gas Cylinder No.	CAL018140
Cylinder Conc. (ppm)	48.79

NO_X Analyzer	
Make/Model	Thermo 42i
Serial/AMU Number	AMU 1868
Last Calibration Date	January 25, 2017
Full Scale (ppm)	1.0
Cylinder Gas Expiry Date	March 25, 2019

COMMENTS:

Auditor: Shea Beaton Date: January 27, 2017

Operator Signature: Location: McIntyre Center Edmonton

Alberta Government

Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2016-527A

Company Maxxam **Operator:** Mike

Calibrator:				**Flow Measurement Device:**	
Make/Model	Environics 2000			Make/Model	Bios Defender 530
Serial Number	1991			Serial Number	Hi148944 Lo 152019
Last Verification Date	March 31, 2016			Temperature (°C)	24.5
NO Cylinder S/N	EY0000597			Barometric Pressure	699
NO [PPM]	49.0	NOx [PPM]	49.0		
Expiry Date	December 8, 2019				

Dilution Flow (sccm)

Pt. #1 4902 Pt. #2 4935 Pt. #3 4957

Gas Flow (sccm)

Pt. #1 79.3 Pt. #2 38.7 Pt. #3 19.4

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO_2	NOx	NO	NOx
4976	0.0	0.0000	0.0000	0.0001	0.0000	0.0001	Limit ± 10%	
4981	79.3	0.7801	0.7801	0.7898	0.0000	0.7898	1%	1%
4972	38.7	0.3814	0.3814	0.3841	0.0002	0.3843	1%	1%
4976	19.4	0.1910	0.1910	0.1913	0.0003	0.1916	0%	0%
					Absolute Average Percent Difference		1%	1%

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

NO		**LIMITS**	**NOx**	
Correlation=	1.0000	**≥ 0.990**	Correlation=	1.0000
m (Slope)=	1.0130	**0.90-1.10**	m (Slope)=	1.0129
b (Intercept % of FS)=	-0.1190	**± 3% F.S.**	b (Intercept % of FS)=	-0.1029

Flow	O_3 Conc	NO Decrease	NO	NO2	NOX	% Diff. Vs Audit gas	
						NO_2	% Diff. Limit
4981	0.000	0.0000	0.7925	-0.0001	0.7924	-1%	± 10%
4981	0.400	0.5347	0.2578	0.5279	0.7857	0%	± 10%
4981	0.200	0.2490	0.5435	0.2478	0.7913	1%	± 10%
4981	0.090	0.1090	0.6835	0.1095	0.7927	0%	± 10%
				Absolute Average Percent Difference		0%	± 10%

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

NO_2		**LIMITS**
Correlation=	1.0000	**≥ 0.995**
m (Slope)=	0.9864	**0.90-1.10**
b (Intercept % of FS)=	0.1136	**± 3% F.S.**

AENV Standards		**NO_X Analyzer**	
Audit Calibrator		Make/Model	Thermo 42i
Make/Model	Thermo 146i	Serial/AMU Number	1868
Serial/AMU Number	1809	Last Calibration Date	March 15, 2017
SRM Gas Cylinder No.	CAL018140	Full Scale (ppm)	1.0
Cylinder Conc. (ppm)	48.79	Cylinder Gas Expiry Date	March 28, 2019

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton Date: March 16, 2017

Operator Signature: Location: McIntyre Center Edmonton

Alberta Government

Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2016-526A

Company Maxxam **Operator:** Mike

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

Dilution Flow (sccm)

Pt. #1 4879 Pt. #2 4932 Pt. #3 4950

Gas Flow (sccm)

Pt. #1 74.5 Pt. #2 36.4 Pt. #3 18.2

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO_2	NOx	NO	NOx
4965	0.0	0.0000	0.0000	0.0001	0.0000	0.0001	Limit ± 10%	
4954	74.5	0.7685	0.7700	0.7915	0.0008	0.7923	3%	3%
4968	36.4	0.3744	0.3751	0.3832	0.0006	0.3838	2%	2%
4968	18.2	0.1872	0.1876	0.1916	0.0002	0.1918	2%	2%
					Absolute Average Percent Difference		3%	2%

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

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

Flow	O_3 Conc	NO Decrease	NO	NO2	NOX	% Diff. Vs Audit gas	
4954	0.000	0.0000	0.7949	0.0005	0.7954	NO_2	% Diff. Limit
4954	0.510	0.5104	0.2845	0.5072	0.7917	-1%	± 10%
4954	0.250	0.2516	0.5433	0.2514	0.7944	0%	± 10%
4954	0.100	0.1085	0.6864	0.1087	0.7951	0%	± 10%
				Absolute Average Percent Difference		0%	± 10%

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

NO_2		**LIMITS**
Correlation=	1.0000	**≥ 0.995**
m (Slope)=	0.9926	**0.90-1.10**
b (Intercept % of FS)=	0.0925	**± 3% F.S.**

AENV Standards Audit Calibrator		**NO_X Analyzer**	
Make/Model	Thermo 146i	Make/Model	Thermo 42i
Serial/AMU Number	1809	Serial/AMU Number	1868
SRM Gas Cylinder No.	CAL018140	Last Calibration Date	March 15, 2017
Cylinder Conc. (ppm)	48.79	Full Scale (ppm)	1.0
		Cylinder Gas Expiry Date	March 28, 2019

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton Date: March 16, 2017

Operator Signature: Location: McIntyre Center Edmonton

aemera.org

Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2016-094A

Company Maxxam **Operator:** Christopher Wesson

Calibrator:		**Flow Measurement Device:**	
Make/Model	Sabio 2010	Make/Model	N/A
Serial Number	042531101(0911)	Serial Number	N/A
Last Verification Date	December 2014	Temperature (°C)	N/A
NO Cylinder S/N	LI42475	Barometric Pressure	N/A
NO/NOX Concentration			

Dilution Flow (sccm)

Pt. #1 5000 Pt. #2 5000 Pt. #3 5000

Gas Flow (sccm)

Pt. #1 80 Pt. #2 40 Pt. #3 20

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO_2	NOx	NO	NOx
5001	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
4999	80.4	0.780	0.780	0.802	-0.003	0.799	3%	2%
5000	39.2	0.380	0.380	0.391	-0.001	0.390	3%	3%
4999	19.6	0.190	0.190	0.195	-0.001	0.194	3%	2%
						Absolute Average Percent Difference	3%	2%

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

NO		**LIMITS**	**NOx**	
Correlation=	1.0000	**≥ 0.990**	Correlation=	1.0000
m (Slope)=	1.0284	**0.90-1.10**	m (Slope)=	1.0247
b (Intercept % of FS)=	-0.0085	**± 3% F.S.**	b (Intercept % of FS)=	-0.0097

Flow	O_3 Conc	NO Decrease	NO	NO2	NOX	% Diff. Vs Audit gas	
4999	0.000	0.000	0.802	-0.001	0.801	NO_2	% Diff. Limit
4999		#VALUE!	Not completed O3 gen system issue.			#VALUE!	± 10%
4999		0.802				-100%	± 10%
4999		0.802				-100%	± 10%
					Absolute Average Percent Difference	#VALUE!	± 10%

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

NO_2		**LIMITS**
Correlation=	#VALUE!	**≥ 0.995**
m (Slope)=	#VALUE!	**0.90-1.10**
b (Intercept % of FS)=	#VALUE!	**± 3% F.S.**

AENV Standards Audit Calibrator		**NO_X Analyzer**	
Make/Model	Teco 146i	Make/Model	Teco 42i
Serial/AMU Number	AMU 1809	Serial/AMU Number	AMU 1868
		Last Calibration Date	January 19, 2016
		Full Scale (ppm)	1.0

COMMENTS: 50.3 ppm of SO2 in cylinder.

Auditor: Al Clark Date: January 19, 2016

Operator Signature: Location: McIntyre Center Edmonton

CALIBRATION GASES

Form No. F-GAS-002
Version No. 1.1

Alberta Government

Calibration Gas Audit

Single Component Cylinder Gas

File No. 2015-342CGA

Company: Maxxam **Operator's Name:** Limin Li

Cylinder #: BLM002756T Concentration PPM: 49.9 Tolerance(%) 2 Certified By: Air Liquide

Reference Calibrator and Gas:

Make/Model: R&R MFC 201
Serial Number: AMU 1690
Last Verification Date: March 31, 2015
Gas Type: SO2 Conc. 98.57
Cylinder Number: CAL016720

Flow Measurement Device:

Make/Model: Bios DC2
Serial Number: AMU 1659
Temp.°C: 22.5 C
B.P. 690 mmhg

Reference Analyzer:

Make/Model: Teco 43C Serial/AMU Number: 1623
Instrument Settings: Zero: 7.9 Span: 1.028 Range: 1.0
Last Calibration: Date: Mar 31/15 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated	Gas Flow/	Concentration	Cylinder
Dilution	Gas	Concentration (PPM)	Dilution Flow	Factor	Concentration
5000	0.0	0.000			
4976	82.6	0.821	0.01660	60.242	49.5
4993	41.0	0.410	0.00821	121.780	49.9
4977	20.2	0.202	0.00406	246.386	49.8
				Average Cylinder Concentration:	**49.7**

Previous Stated Concentration PPM: 49.9

Percent variance from Stated: **0.4**

Meets Manufacturer Tolerance. Use manufacturers stated concentration [X] **COMMENTS:**

<=5% Outside Manufacturer Tolerance. Use manufacturers concentration [ ]

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

Auditor: Al Clark Date: March 31, 2015

Operator Signature: Location: McIntyre Center Edmonton

Alberta Government

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:

Make/Model: R&R MFC 201
Serial Number: AMU 1690
Last Verification Date: October 19, 2016
Gas Type: SO2 Conc. 98.07
Cylinder Number: CA:016625
Expiry Date: January 2019

Flow Measurement Device:

Make/Model: Bios DC2
Serial Number: AMY 1659
Temp.°C: 24.5 C
B.P. 706 mmhg

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

Previous Stated Concentration PPM: 50.6

Percent variance from Stated: 1

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

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [X]

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

Auditor: Al Clark Date: October 19, 2016

Operator Signature: Location: McIntyre Center Edmonton

Alberta Government

Calibration Gas Audit

Single Component Cylinder Gas

File No. 2015-338CGA

Company: Maxxam **Operator's Name:** Limin Li

Cylinder #: BLM002508 Concentration PPM: 10.2 Tolerance(%) 2 Certified By: Air Liquide

Reference Calibrator and Gas:

Make/Model: R&R MFC 201
Serial Number: AMU1690
Last Verification Date: March 31, 2015
Gas Type: H2S Conc. 20.43
Cylinder Number: CAL015106

Flow Measurement Device:

Make/Model: Bios DC2
Serial Number: AMU 1659
Temp.°C: 23.0 C
B.P. 689 mmhg

Reference Analyzer:

Make/Model: Teco 450i Serial/AMU Number: 1980
Instrument Settings: Zero: 14.5 Span: 1.035 Range: 0.1
Last Calibration: Date: Mar 31/15 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated	Gas Flow/	Concentration	Cylinder
Dilution	Gas	Concentration (PPM)	Dilution Flow	Factor	Concentration
5000	0.0	0.0000			
5080	38.2	0.0725	0.00752	132.984	9.6
5078	17.9	0.0340	0.00353	283.687	9.6
5066	9.1	0.0170	0.00180	556.703	9.5
				Average Cylinder Concentration:	**9.6**

Previous Stated Concentration PPM: 10.2

Percent variance from Stated: **6.0**

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

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [X]

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

Auditor: Al Clark Date: March 31, 2015

Operator Signature: Al Clark Location: McIntyre Center Edmonton

Alberta Government

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

Previous Stated Concentration PPM: 10.2

Percent variance from Stated: 1

Meets Manufacturer Tolerance. Use manufacturers stated concentration [X] **COMMENTS:**

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [ ]

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

Auditor: Al Clark Date: October 19, 2016

Operator Signature: Al Clark Location: McIntyre Center Edmonton

Alberta Government

Calibration Gas Audit

Single Component Cylinder Gas

File No. 2014-250CGA

Company: Maxxam **Operator's Name:** Limin Li

Cylinder #: LL74267 Concentration PPM: 9.88 Tolerance(%) 2 Certified By: Air Liquide

Reference Calibrator and Gas:

Make/Model: R&R MFC 201
Serial Number: AMU 1690
Last Verification Date: December 15, 2014
Gas Type: H2S Conc. 20.43
Cylinder Number: CAL015106

Flow Measurement Device:

Make/Model: Bios DC2
Serial Number: AMU 1659
Temp.°C: 23.0 C
B.P. 702 mmhg

Reference Analyzer:

Make/Model: Teco 45C Serial/AMU Number: 1624
Instrument Settings: Zero: 6.4 Span: 1.160 Range: 0.1
Last Calibration: Date: Dec15/14 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated	Gas Flow/	Concentration	Cylinder
Dilution	Gas	Concentration (PPM)	Dilution Flow	Factor	Concentration
5000	0.0	0.0000			
5099	38.5	0.0731	0.00755	132.442	9.68
5092	18.0	0.0342	0.00353	282.889	9.67
5066	9.2	0.0173	0.00182	550.652	9.53
				Average Cylinder Concentration:	**9.63**

Previous Stated Concentration PPM: 9.88

Percent variance from Stated: **2.6**

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

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [X]

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

Auditor: Al Clark Date: December 16, 2014

Operator Signature: Location: McIntyre Center Edmonton

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22014

DocNumber: 000068924

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

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

Praxair Order Number: 21137117
Customer P. O. Number: 35-55963
Customer Reference Number:

Fill Date: 7/1/2014
Part Number: NI ME600P2E-AQ
Lot Number: 109418203
Cylinder Style & Outlet: AQ CGA 350
Cylinder Pressure & Volume: 2200 psig 78 cu. ft.

Certified Concentration:

Expiration Date: 7/7/2022			NIST Traceable Analytical Uncertainty:
Cylinder Number: LL83638			
582	ppm	METHANE	± 1.5 %
203	ppm	PROPANE	± 0.9 %
	Balance	NITROGEN	

Certifcation Information: *Certification Date:* 7/7/2014 *Term:* 96 Months *Expiration Date:* 7/7/2022

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

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

1. Component: METHANE

Requested Concentration: 600 ppm
Certified Concentration: 582 ppm
Instrument Used: MKS Multigas 2031 FTIR
Analytical Method: Fourier Transform Infrared
Last Multipoint Calibration: 6/24/2014

First Analysis Data:						Date: 7/7/2014
Z: 0	R: 249.5	C: 589.4	Conc: 581.21			
R: 249.5	Z: 0	C: 589	Conc: 580.82			
Z: 0	C: 592	R: 249.4	Conc: 583.77			
UOM: ppm		Mean Test Assay: 581.93 ppm				

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC139480
Ref. Std. Conc: 246 ppm
Ref. Std. Traceable to SRM # : 2751
SRM Sample # : 212-09-AL
SRM Cylinder # : SX-20000

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

2. Component: PROPANE

Requested Concentration: 200 ppm
Certified Concentration: 203 ppm
Instrument Used: MKS Multigas 2031 FTIR
Analytical Method: Fourier Transform Infrared
Last Multipoint Calibration: 6/24/2014

First Analysis Data:						Date: 7/7/2014
Z: 0	R: 273.6	C: 208.4	Conc: 202.43			
R: 273.7	Z: 0	C: 208.6	Conc: 202.63			
Z: 0	C: 208.5	R: 273.6	Conc: 202.53			
UOM: ppm		Mean Test Assay: 202.53 ppm				

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC 163442
Ref. Std. Conc: 265.8 ppm
Ref. Std. Traceable to SRM # : vs 2644a
SRM Sample # : 101-C-45
SRM Cylinder # : XF003829B

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

Analyzed by: Jack Fu

Certified by: Ying Yu

Alberta Government

Calibration Gas Audit

NO Cylinder Gas

File No. 2015-343CGA

Company: Maxxam **Operators name:** Limin Li

Cylinder #: BLM002756T Conc (PPM) 50.7/50.7 Tolerance (%) 2 Certified By: Air Liquide

Reference Calibrator and Gas:

Make/Model	Teco 146i		
Serial Number	AMU 1809		
Last Verification Date	March 31, 2015		
Gas Type	NO	Conc.	48.79
Cylinder Number	CAL018024		

Flow Measurement Device:

Make/Model	Bios DC2
Serial Number	AMU 1659
Temp.°C	22.5 C
B.P.	690 mmhg

Reference Analyzer:

Make/Model	Teco 42i			Serial/AMU Number:	1868
Instrument Settings	Zero: 4.2		Span: 1.008	Range:	1.0
Last Calibration:	Date: Mar 31/15		C.F. 1.000	Done By:	Al Clark

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/	Concentration	Cylinder Concentration	
Dilution	Gas	NO	NOX	Dilution Flow	Factor	NO	NOX
5000	0.0	0.000	0.000				
4976	82.6	0.842	0.822	0.01660	60.242	50.7	49.5
4993	41.0	0.420	0.410	0.00821	121.780	51.1	49.9
4977	20.2	0.208	0.205	0.00406	246.386	51.2	50.5
					Average Cylinder Concentration:	**51.0**	**50.0**

	NO	NOx
Previous Stated Concentration PPM:	50.7	50.7
Percent variance from Stated:	**0.7**	**1.4**

Cylinder gas tolerances based on NO only

Meets Manufacturer Tolerance. Use manufacturers stated concentration [X]

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [ ]

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

COMMENTS: Contains 49.9 ppm SO2 in cylinder

Auditor: Al Clark Date: March 31, 2015

Operator Signature: Location: McIntyre Center Edmonton

Alberta Government

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:

Make/Model	Teco 146i		
Serial Number	AMU 1809		
Last Verification Date	October 19, 2019		
Gas Type	NO	Conc.	48.79
Cylinder Number	CAL018188		
Expiry Date	March 2019		

Flow Measurement Device:

Make/Model	Bios DC2
Serial Number	AMU 1659
Temp.°C	24.5 C
B.P.	706 mmhg

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/	Concentration	Cylinder Concentration	
Dilution	Gas	NO	NOX	Dilution Flow	Factor	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:	**50.7**	**50.6**

	NO	NOx
Previous Stated Concentration PPM:	50.7	50.9
Percent variance from Stated:	**0**	**1**

Cylinder gas tolerances based on NO only

Meets Manufacturer Tolerance. Use manufacturers stated concentration [X]

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [ ]

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

COMMENTS: Contains 50.6 ppm SO2.

Auditor: Al Clark Date: October 19, 2016

Operator Signature: Location: McIntyre Center Edmonton

Alberta Government

Calibration Gas Audit

NO Cylinder Gas

File No. 2015-343CGA

Company: Maxxam **Operators name:** Limin Li

Cylinder #: BLM002756T Conc (PPM) 50.7/50.7 Tolerance (%) 2 Certified By: Air Liquide

Reference Calibrator and Gas:

Make/Model	Teco 146i		
Serial Number	AMU 1809		
Last Verification Date	March 31, 2015		
Gas Type	NO	Conc.	48.79
Cylinder Number	CAL018024		

Flow Measurement Device:

Make/Model	Bios DC2
Serial Number	AMU 1659
Temp.°C	22.5 C
B.P.	690 mmhg

Reference Analyzer:

Make/Model	Teco 42i			Serial/AMU Number:	1868
Instrument Settings	Zero: 4.2		Span: 1.008	Range:	1.0
Last Calibration:	Date: Mar 31/15		C.F. 1.000	Done By:	Al Clark

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/	Concentration	Cylinder Concentration	
Dilution	Gas	NO	NOX	Dilution Flow	Factor	NO	NOX
5000	0.0	0.000	0.000				
4976	82.6	0.842	0.822	0.01660	60.242	50.7	49.5
4993	41.0	0.420	0.410	0.00821	121.780	51.1	49.9
4977	20.2	0.208	0.205	0.00406	246.386	51.2	50.5
					Average Cylinder Concentration:	**51.0**	**50.0**

	NO	NOx
Previous Stated Concentration PPM:	50.7	50.7
Percent variance from Stated:	**0.7**	**1.4**

Cylinder gas tolerances based on NO only

Meets Manufacturer Tolerance. Use manufacturers stated concentration [X]

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [ ]

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

COMMENTS: Contains 49.9 ppm SO2 in cylinder

Auditor: Al Clark Date: March 31, 2015

Operator Signature: Location: McIntyre Center Edmonton

APPENDIX III
REPORT CERTIFICATION FORM

Report Certification Form

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

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

Maram Ghaleb

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

May 12, 2017

Report Issued Date (dd-mm-yyyy)

APPENDIX IV
DATA VALIDATION CERTIFICATION FORM

Validation Certificate Form

Client:	Lakeland Industry & Community Association	**Project #:**	2833-2017-03-31-C
Site:	St. Lina Continuous Monitoring Station	**Contact:**	Mike Bisaga

Level 0 Preliminary Verification	Maram Ghaleb	**Date**	April 30, 2017
Level 1 Primary Validation	Maram Ghaleb	**Date**	May 2, 2017
Level 2 Final Validation	Maram Ghaleb	**Date**	May 11, 2017
Level 3 Independent Data Review		**Date**	May 12, 2017
Post-Final Validation	**NA**	**Date**	**NA**

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

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

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

February 22, 2018

Subject: Monthly Report Submission for the LICA Portable (Bonnyville) station

Lakeland Industry & Community Association (LICA) is pleased to submit the ambient air monitoring monthly report for the LICA Portable (Bonnyville) AQM Station in the month of March 2017.

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

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

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

All data collected in March 2017 was compliant with the requirements outlined in the Air Monitoring Directive (Alberta Environment and Parks, 2016), with the exception of H_2S.

Non-Conformance: One instance of 1-hour exceedance for H2S was recorded at 10.5 ppb on March 24 at hour 07. AE Reference #: 324242.

As the LICA Environmental Program Manager and Data & Reporting Specialist, we certify that we have reviewed and verified this report and that the information is complete, accurate and representative of the monitoring results, reporting timeframe and the specified analysis, summarization and reporting requirements. We also certify all air data that are required by the AMD to be electronically submitted to AEP and Alberta's Ambient Air Quality Data Warehouse have been submitted by the time of this report submission, with the exception of electronic submission for the results of intermittent samples and VOC canister samples. The results for both intermittent samples and VOC canister samples is scheduled to be submitted by the end of March 2018.

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

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

Respectfully,

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

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

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

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

AMBIENT AIR MONITORING MONTHLY DATA REPORT

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

BONNYVILLE CONTINUOUS MONITORING STATION

JOB #: 2833-2017-03-35-C

March 2017

Prepared for:

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

Attention: MIKE BISAGA

DATE: **May 15, 2017**

Prepared by: Maram Ghaleb

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

Reviewed by:

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

SUMMARY

In March 2017, 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 the Lakeland Industry & Community Association.

All data collected this month, with the exception of H_2S on March 24 at hours 06:00-07:00, was compliant with the requirements outlined in the AMD, 2016.

Non-Conformance: One instance of 1-hour exceedance was recorded for H_2S this month at 10.5 ppb on March 24 at hour 07:00. Alberta Environment and Sustainable Resource Development (ESRD) Reference #: 324242.

Annual Maintenance: A scheduled annual station maintenance was completed between March 3 and March 4 on the following analyzers: SO_2, H_2S and O_3 .
Twenty-one, twenty-four and one hours of downtime were recorded for SO_2, H_2S and O_3 respectively, due this maintenance event.

All Parameters: On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

$PM_{2.5}$: Thirty-two hours of data were recorded at concentrations lower than –3 µg/m^3 this month, rendering the data invalid.

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

The summary of results is presented on the following pages.

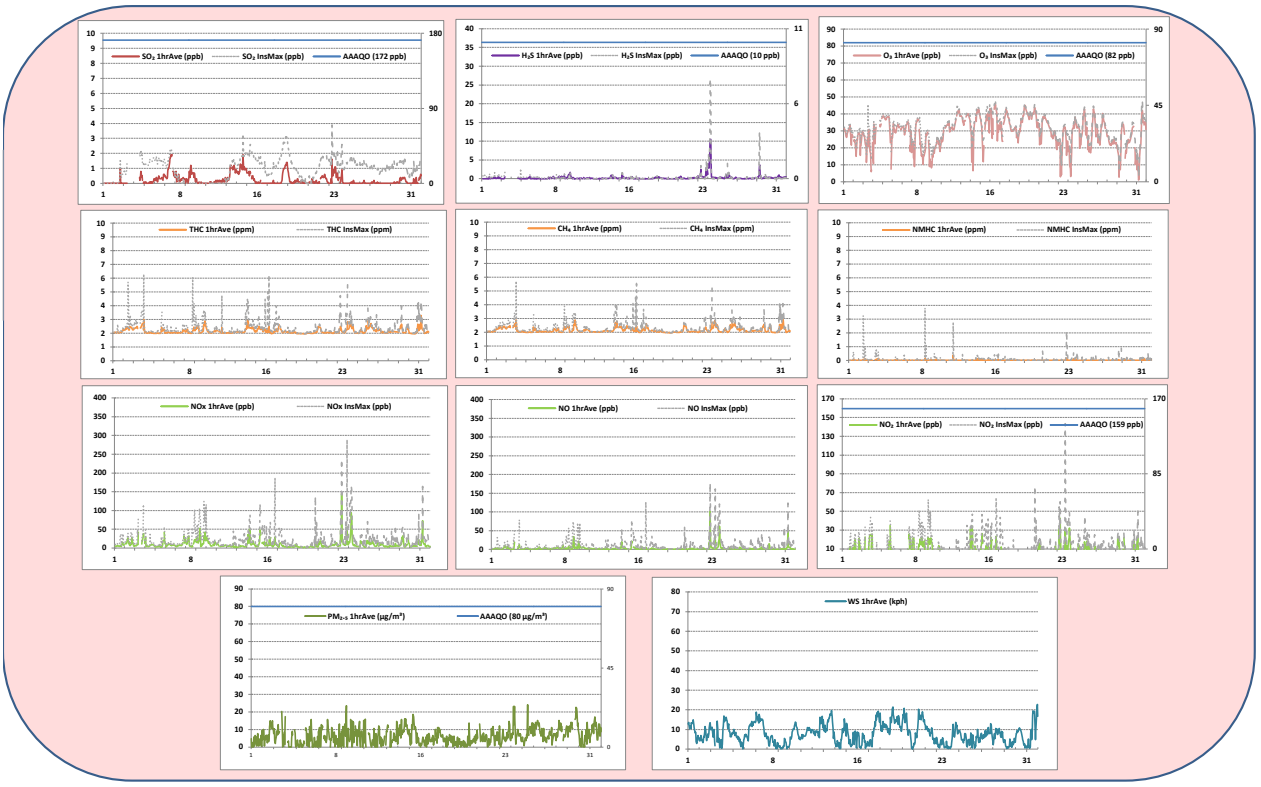
Any deviations or modifications made to the sampling or analytical methods are outlined in Section 1.0, Discussion. On this basis, Maxxam Analytics is issuing this completed report to Lakeland Industry & Community Association, Bonnyville Continuous Monitoring Station.

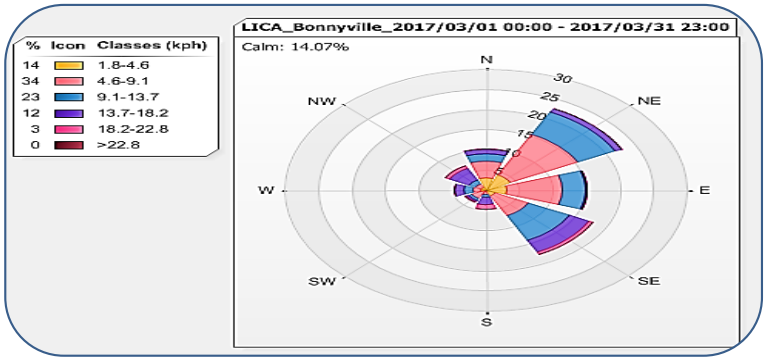
Should you have any questions concerning the results or if we can be of further assistance, please contact us at 403-219-3678 or toll-free at 1-800-386-7247.

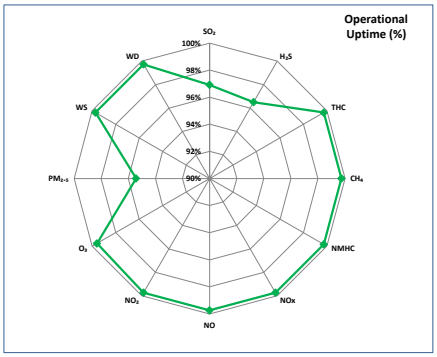
Lakeland Industry & Community Association - Bonnyville Site

March 2017 Monthly Report Summary

Pollutants		Monthly Records		1-Hour Records					24-Hour Records			
				Maximum			AAAQO Objective	Exceed. Hours	Maximum		AAAQO Objective	Exceed. Days
Name	Unit	Avg. Conc.	Uptime	Conc.	Date	Hour			Conc.	Date		
SO_2	ppb	0.2	96.9%	1.9	March 7	14	172	0	1.0	March 14	48	0
H_2S	ppb	0.3	96.5%	10.5	March 24	7	10	1	2.2	March 24	3	0
THC	ppm	2.15	99.7%	3.28	March 31	5	-	-	2.41	March 3	-	-
CH_4	ppm	2.15	99.7%	3.17	March 31	5	-	-	2.39	March 3	-	-
NMHC	ppm	0.01	99.7%	0.38	March 11	16	-	-	0.03	March 14	-	-
NOx	ppb	9.9	99.7%	144.5	March 23	7	-	-	21.9	March 23	-	-
NO	ppb	2.9	99.7%	101.6	March 23	7	-	-	10.2	March 23	-	-
NO_2	ppb	7.0	99.7%	42.9	March 23	7	159	0	12.8	March 3	-	-
O_3	ppb	29.0	99.6%	45.6	March 16	13	82	0	38.6	March 19	-	-
$PM_{2.5}$	µg/m^3	6.3	95.4%	24.1	March 25	11	80	0	13.2	March 29	30	0
WS	kph	2.5	99.7%	22.7	March 31	22	-	-	14.0	March 19	-	-
WD	degree	80 (E)	99.7%	-	-	-	-	-	-	-	-	-







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, with the exception of H2S on March 24 at hours 06:00-07:00, was compliant with the requirements outlined in the AMD, 2016.
- The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above 90%.

Operational Issues

Non-Conformance: One instance of 1-hour exceedance was recorded for H2S this month at 10.5 ppb on March 24 at hour 07:00. Alberta Environment and Sustainable Resource Development (ESRD) Reference #: 324242.

Annual Maintenance: A scheduled annual station maintenance was completed between March 3 and March 4 on the following analyzers: SO2, H2S and O3. Twenty-one, twenty-four and one hours of downtime were recorded for SO2, H2S and O3 respectively, due this maintenance event.

All Parameters: On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

$PM_{2.5}$: Thirty-two hours of data were recorded at concentrations lower than –3 µg/m^3 this month, rendering the data invalid.

Monthly Continuous Data Summary

Lakeland Industry & Community Association Bonnyville Continuous Monitoring Station						MAXIMUM VALUES							OPERATIONAL TIME (%)
						1-HOUR					24-HOUR		
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
	1-hr	24-hr	1-hr	24-hr									
SO_2 (ppb)	172	48	0	0	0.2	1.9	7	14	15.2	NW	1.0	14	96.9
H_2S (ppb)	10	3	1	0	0.3	10.5	24	7	1.2	ENE	2.2	24	96.5
THC (ppm)	-	-	-	-	2.15	3.28	31	5	1.2	N	2.41	3	99.7
CH_4 (ppm)	-	-	-	-	2.15	3.17	31	5	1.2	N	2.39	3	99.7
NMHC (ppm)	-	-	-	-	0.01	0.38	11	16	9.5	ENE	0.03	14	99.7
NO_2 (ppb)	159	-	0	-	7.0	42.9	23	7	1.2	N	12.8	3	99.7
NO (ppb)	-	-	-	-	2.9	101.6	23	7	1.2	N	10.2	23	99.7
NOx (ppb)	-	-	-	-	9.9	144.5	23	7	1.2	N	21.9	23	99.7
O_3 (ppb)	82	-	0	-	29.0	45.6	16	13	5.6	NE	38.6	19	99.6
$PM_{2.5}$ ($\mu g/m^3$)	80	30	0	0	6.3	24.1	25	11	4.6	WSW	13.2	29	95.4
VECTOR WS (kph)	-	-	-	-	2.5	22.7	31	22	-	SSW	14.0	19	99.7
VECTOR WD (sec)	-	-	-	-	80 (E)	-	-	-	-	-	-	-	99.7

Exceedance Summary Report

SO_2 1-Hour Exceedances

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

SO_2 24-Hour Exceedances

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

H_2S 1-Hour Exceedances

DATE	TIME (MST)	READING (ppb)	WS (kph)	WD (deg)	ESRD Reference #
March 24	7	10.5	1.2	ENE	324242

H_2S 24-Hour Exceedances

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

NO_2 1-Hour Exceedances

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

$PM_{2.5}$ 1-Hour Exceedances

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

$PM_{2.5}$ 24-Hour Exceedances

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

O_3 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
March 2, 2017	2.37	n-Butane
March 8, 2017	1.4	Acetone
March 14, 2017	4.63	n-Butane
March 20, 2017	1.4	Acetone
March 26, 2017	3.2	Acetone

Note: NA

Polycyclic Aromatic Hydrocarbons (PAHs) Data Summary

Sample Collection Date	Maximum Reading (µg/puf)	Semi-Volatile Organic
March 2, 2017	0.56	2-Methylnaphthalene
March 8, 2017	3.89	Naphthalene
March 14, 2017	0.31	Phenanthrene
March 20, 2017	0.45	Naphthalene
March 26, 2017	0.16	Phenanthrene

Note: NA

Volatile Organics (VOCs) Data Summary - NMHC Canister System

Sample Collection Date	Maximum Reading (ppb)	Volatile Organic Compound
March 3, 2017	6.24	n-Butane
March 8, 2017	2.6	Ethanol
March 11, 2017	43.8	n-Butane
March 19, 2017	4.44	n-Butane
March 28, 2017	6.3	Acetone

Note: NA

TABLE OF CONTENTS

Title		Page
SUMMARY		1
MONTHLY DASHBOARD		2
MONTHLY CONTINUOUS DATA SUMMARY REPORT		3
EXCEEDANCE SUMMARY REPORT		4
VOC SAMPLE SUMMARY REPORT		5
PAH SAMPLE SUMMARY REPORT		6
NMHC CANISTER SAMPLE SUMMARY REPORT		7
TABLE OF CONTENTS		8
1.0 Discussion		10
2.0 Project Personnel		13
3.0 Plant Monthly Required AMD Summary		13
4.0 Calculations and Results		13
5.0 Methods and Procedures		14
Appendix I	Continuous Monitoring Data Results	17
	Sulphur Dioxide	18
	Hydrogen Sulphide	26
	Total Hydrocarbon	34
	Methane	42
	Non-Methane Hydrocarbon	50
	Oxides of Nitrogen	58
	Nitric Oxides	66
	Nitrogen Dioxide	73
	Ozone	81
	Particulate Matter 2.5	89
	Wind Speed	94
	Wind Direction	101
	Standard Deviation Wind Direction	104

Appendix II	Non-Continuous Monitoring Data Results	107
	VOC Results	108
	PAH Results	124
	NMHC Canister Results	135
Appendix III	Equipment Calibration Results	151
	Sulphur Dioxide	152
	Hydrogen Sulphide	157
	Total Hydrocarbon	162
	Nitrogen Dioxide	166
	Ozone	170
	Particulate Matter	174
	Wind System	177
	Calibrators	180
	Calibration Gases	185
Appendix IV	Analytical Results	191
	VOCs Samples	192
	PAHs Samples	218
	NMHC Canister Samples	229
Appendix V	Report Certification Form	255
Appendix VI	Data Validation Certification Form	257

1.0 Discussion

This monthly report consists of continuous monitoring results for the following parameters: Sulphur Dioxide (SO_2), Hydrogen Sulphide (H_2S), Total Hydrocarbon (THC), Methane (CH_4), Non-Methane Hydrocarbon (NMHC), Oxides of Nitrogen (NOx), Nitric Oxides (NO), Nitrogen Dioxide (NO_2), Ozone (O_3), Particulate Matter 2.5 ($PM_{2.5}$), Wind Speed (WS), Wind Direction (WD) and Standard Deviation Wind Direction (STDWD). The non-continuous monitoring data results for VOCs, PAHs and NMHC canister 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 (December, 2016). The descriptions of the data verification and validation process can be found in Section 5 of this report. Instantaneous data, where applicable, is provided for reference purposes and has not undergone zero correction. The minimum and maximum statistics are highlighted in the data table and are for reference only. The highlighted cells are based on the software's interpretation of the exact position of the minimum or maximum value. The visual presentation of these statistics may not be the obvious choice in a data range due to rounding, truncating or analyzer specifications.

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

SULPHUR DIOXIDE (SO_2)

• Operational time, for the monitoring period, was 96.9%, equivalent to twenty-three hours of downtime.
• A shut-down calibration was performed on March 3, prior to completing a scheduled annual maintenance on the analyzer. A new UV lamp was installed and the sample pump was rebuilt. A successful post-repair calibration was completed on March 4. Twenty-one hours of downtime were recorded due to this maintenance event.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

HYDROGEN SULPHIDE (H_2S)

• Operational time, for the monitoring period, was 96.5%, equivalent to twenty-six hours of downtime.
• A shut-down calibration was performed on March 3, prior to completing a scheduled annual maintenance on the analyzer. The reaction cell and sample valve were cleaned. The sinter filter was changed. A successful post-repair calibration was completed on March 4. Twenty-four hours of downtime were recorded due to this maintenance event.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

TOTAL HYDROCARBONS (THC), METHANE (CH_4) and NON-METHANE HYDROCARBONS (NMHC)

• Operational time, for the monitoring period, was 99.7%, equivalent to two hours of downtime.
• The routine monthly calibration was performed on March 3. The channel was placed in "maintenance" mode for few minutes on March 4, while the sample manifold was being cleaned. The maximum instantaneous data point at hour 10:00 was invalidated as a result.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

OXIDES OF NITROGEN (NOx), NITRIC OXIDE (NO) and NITROGEN DIOXIDE (NO_2)

• Operational time, for the monitoring period, was 99.7%, equivalent to two hours of downtime.
• The routine monthly calibration was performed on March 3. The channel was placed in "maintenance" mode for few minutes on March 4, while the sample manifold was being cleaned. The maximum instantaneous data point at hour 10:00 was invalidated as a result.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

OZONE (O_3)

• Operational time, for the monitoring period, was 99.6%, equivalent to three hours of downtime.
• A shut-down calibration was performed on March 4, prior to completing a scheduled annual maintenance on the analyzer. The UV lamp was changed, a factory calibration was completed, a ZERO Air scrubber was re-positioned inside the analyzer and the sample pump was rebuilt. A successful post-repair calibration was subsequently completed. One hour of downtime was recorded due to this maintenance event.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.

PARTICULATE MATTER < 2.5 MICRONS ($PM_{2.5}$)

• Operational time, for the monitoring period, was 95.4%, equivalent to thirty-four hours of downtime.
• Two routine TEOM audits were performed this month. The first was completed on March 3, and the second on March 28.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.
• Data was corrected in accordance with AMD (2016), Chapter 6, Table 2, Zero Adjustment Criteria. Data recorded between 0 and –3 µg/m3 was corrected to 0 µg/m3. Data recorded below –3 µg/m3 was invalidated. Thirty-two hours of data were invalidated as the data was below –3 µg/m3 this month.

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

• Operational time, for the monitoring period, was 99.7%, equivalent to two hours of downtime.
• The wind system was calibrated on March 3.
• On March 11, the datalogger time was automatically synchronized to daylight savings time. This was immediately manually reverted to Mountain Standard Time (MST) as per AMD's requirement. However, two hours (7:00 and 8:00) of data were lost in the process.
• 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.

VOC SAMPLES

• The sampler was programmed to run for 24 hours every 6th day per the NAPS (North American Pollution Surveillance Schedule).
• Samples were collected, as scheduled, on March 2, 8, 14, 20 and 26. Analysis was provided by InnoTech Alberta, results are included in this report.

PAH SAMPLES

• The sampler was programmed to run for 24 hours every 6th day per the NAPS (North American Pollution Surveillance Schedule).
• Samples were collected, as scheduled, on March 2, 8, 14, 20 and 26. Analysis was provided by InnoTech Alberta, results are included in this report.

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.
Five canister events were recorded this month. The date, time and initial 5-min average concentration measurements are as follows:
• March 3 at 19:20 - 0.44 ppm
• March 8 at 19:05 - 0.48 ppm
• March 11 at 16:35 - 1.49 ppm
• March 19 at 06:50 - 0.36 ppm
• March 28 at 15:55 - 0.34 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. Analysis was provided by InnoTech Alberta, results are included in this report.

2.0 Project Personnel

Mike Bisaga was the contact for Lakeland Industry & Community Association and the Maxxam field technician(s) was/were Alexander Yakupov and Limin Li.

3.0 Plant Monthly Required AMD Summary

All data collected this month, with the exception of H2S on March 24 at hours 06:00-07:00, was compliant with the requirements outlined in the AMD, 2016.

Non-Conformance: One instance of 1-hour exceedance was recorded for H2S this month at 10.5 ppb on March 24 at hour 07:00. Alberta Environment and Sustainable Resource Development (ESRD) Reference #: 324242.

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_3 Monitoring
Maxxam AIR SOP-00213: Ambient $NO/NO_2/NOx$ Monitoring
Maxxam AIR SOP-00215: TEOM Operation
Maxxam AIR SOP-00225: The Collection of VOCs in Ambient Air Using Canister and Xontech
Maxxam AIR SOP-00007: TISCH PUF Sampler Operating, Calibration and Maintenance Procedures

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 ($PM_{2.5}$) - R&P 1405F TEOM Unit
Wind System - RM Young Unit
Datalogger - ESC 8832
VOC - XONTECH 910A Gaseous Air Sampler
PAH - TISCH PUF Plus

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

Level 0 Preliminary Verification

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

Level 1 Primary Validation

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

Level 2 Final Validation

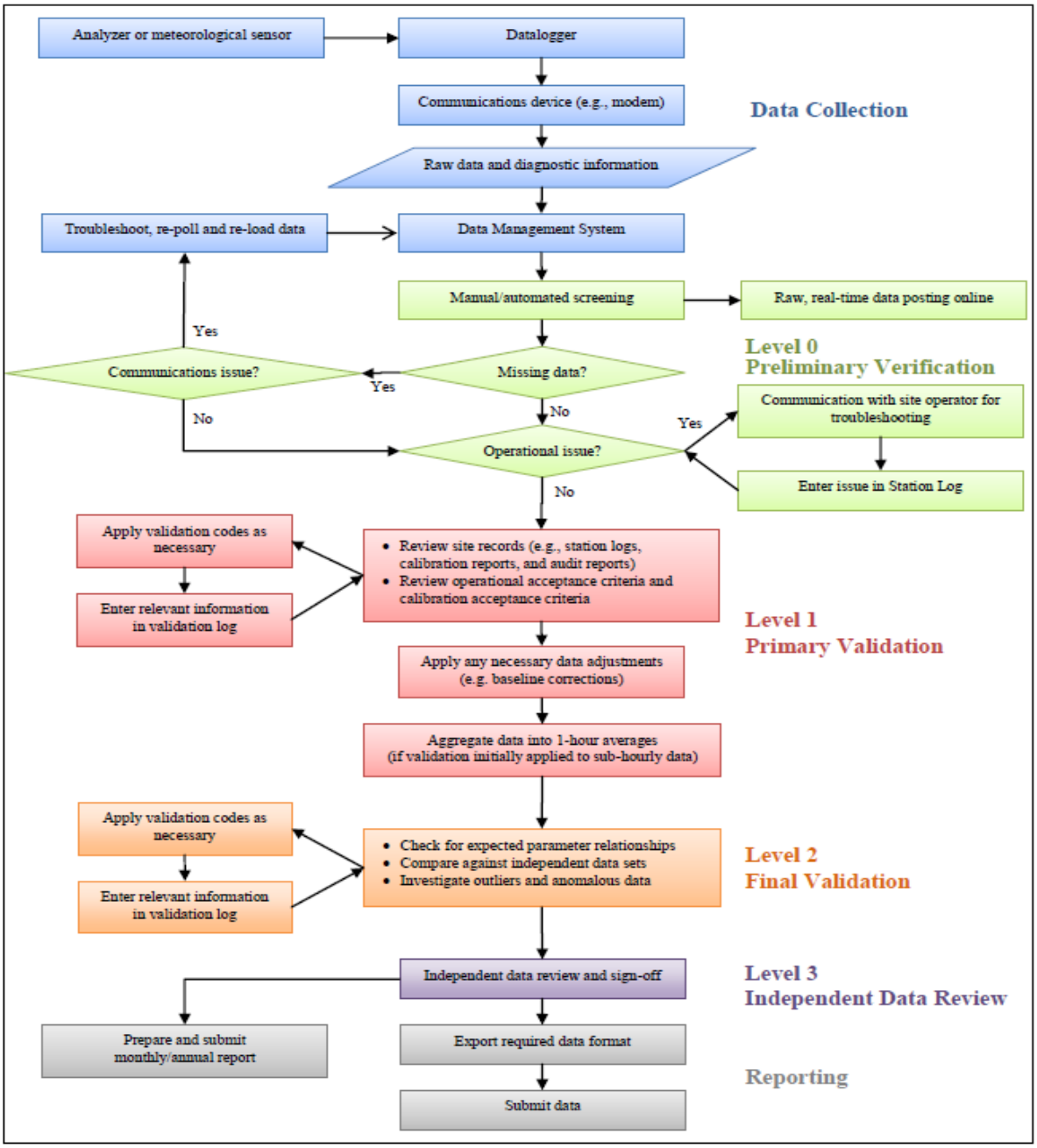
The purpose of Level 2 validation is to verify that there are no inconsistencies among related data, or among regional data measured at nearby sites.

Level 3 Independent Data Review

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

Post-Final Validation

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



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

APPENDIX I
CONTINUOUS MONITORING DATA RESULTS

SULPHUR DIOXIDE

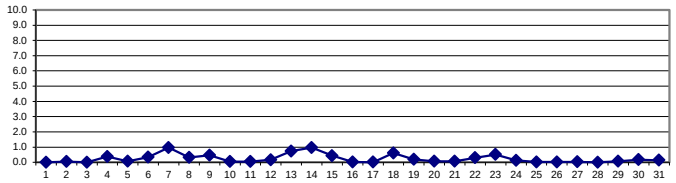
SULPHUR DIOXIDE Hourly Averages (SO_2 ppb)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	**0.0**	**S**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	0.0	0.0	24
2	**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	1.0	0.0	0.0	0.0	0.0	0.0	0.0	**S**	0.0	1.0	0.0	24
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**C**	**C**	**C**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	0.0	0.0	0.0	12
4	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**C**	**C**	**C**	**C**	0.4	0.2	0.5	0.8	0.7	0.4	0.5	0.2	**S**	0.0	0.1	0.0	0.8	0.4	15
5	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.0	**S**	0.1	0.2	0.3	0.0	0.3	0.1	24
6	0.3	0.2	0.2	0.2	0.4	0.4	0.2	0.1	0.2	0.4	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	**S**	0.2	0.6	0.6	0.6	0.1	0.6	0.3	24
7	0.5	0.5	0.4	0.4	0.4	0.3	0.4	0.8	1.0	1.0	1.1	1.4	1.7	1.7	**1.9**	1.8	1.8	1.9	**S**	0.8	0.8	0.5	0.5	0.5	0.3	**1.9**	1.0	24
8	0.4	0.5	0.8	0.4	0.1	0.3	0.2	0.2	0.6	0.4	0.1	0.1	0.2	0.2	0.3	0.3	0.2	**S**	0.3	0.4	0.3	0.3	0.3	0.3	0.1	0.8	0.3	24
9	0.1	0.0	0.1	0.3	0.0	0.0	0.0	0.1	0.4	0.8	0.8	0.4	1.0	1.2	0.9	0.6	**S**	0.7	0.7	0.7	0.4	0.7	0.6	0.2	0.0	1.2	0.5	24
10	0.1	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	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	24
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**X**	**X**	0.1	0.1	0.0	0.1	0.0	**S**	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.0	0.2	0.0	22
12	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	**S**	0.0	0.1	0.3	0.2	0.2	0.1	0.1	0.2	0.4	0.2	0.0	0.4	0.2	24
13	0.2	0.1	0.3	0.4	0.3	0.2	0.3	0.4	0.6	1.1	1.2	1.2	**S**	1.0	1.1	0.9	1.0	1.1	1.2	1.0	0.9	0.7	0.8	0.9	0.1	1.2	0.7	24
14	0.8	0.7	0.7	0.8	0.6	0.6	0.7	0.8	1.2	1.3	1.1	**S**	1.2	0.9	1.3	1.9	1.0	0.9	1.1	0.9	0.9	1.0	1.0	0.9	0.6	1.9	**1.0**	24
15	0.7	0.7	0.7	0.7	0.7	0.8	0.5	0.8	0.7	0.7	**S**	0.3	0.5	0.5	0.5	0.3	0.2	0.3	0.2	0.1	0.0	0.0	0.1	0.0	0.0	0.8	0.4	24
16	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	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	0.0	0.2	0.0	24
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**S**	0.0	0.0	0.0	0.0	0.1	0.2	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
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**S**	0.0	0.1	0.2	0.5	0.7	0.9	1.0	1.0	1.0	1.1	1.2	1.2	1.3	1.4	1.4	1.1	0.0	1.4	0.6	24
19	0.9	0.7	0.5	0.3	0.1	0.1	**S**	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.2	0.1	0.2	0.1	0.1	0.2	0.3	0.3	0.0	0.9	0.2	24
20	0.1	0.1	0.1	0.1	0.1	**S**	0.0	0.2	0.2	0.2	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	24
21	0.0	0.0	0.1	0.1	**S**	0.0	0.0	0.0	0.3	0.3	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.1	24
22	0.1	0.0	0.1	**S**	0.3	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.6	0.4	0.4	0.3	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.6	0.3	24
23	0.0	0.0	**S**	0.0	0.0	0.3	0.0	1.6	0.6	0.5	0.9	0.7	0.7	0.9	1.1	1.1	0.8	0.4	0.4	0.5	0.7	0.2	0.2	0.3	0.0	1.6	0.5	24
24	0.4	**S**	0.0	0.1	0.4	0.4	0.9	0.6	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	0.9	0.1	24
25	**S**	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	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	**S**	0.0	0.2	0.0	24
26	0.0	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	0.0	0.0	0.0	**S**	0.0	0.0	0.2	0.0	24
27	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	**S**	0.0	0.0	0.0	0.2	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	**S**	0.0	0.0	0.0	0.0	0.0	0.0	24
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	**S**	0.0	0.2	0.3	0.4	0.0	0.4	0.1	24
30	0.2	0.2	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.3	0.2	0.1	0.1	0.1	0.0	0.0	0.0	**S**	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	24
31	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	**S**	0.2	0.4	0.3	0.4	0.6	0.5	0.0	0.6	0.1	24
HOURLY MAX	0.9	0.7	0.8	0.8	0.7	0.8	0.9	1.6	1.2	1.3	1.2	1.4	1.7	1.7	1.9	1.9	1.8	1.9	1.2	1.2	1.3	1.4	1.4	1.1				
HOURLY AVG	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.3	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 March 2017

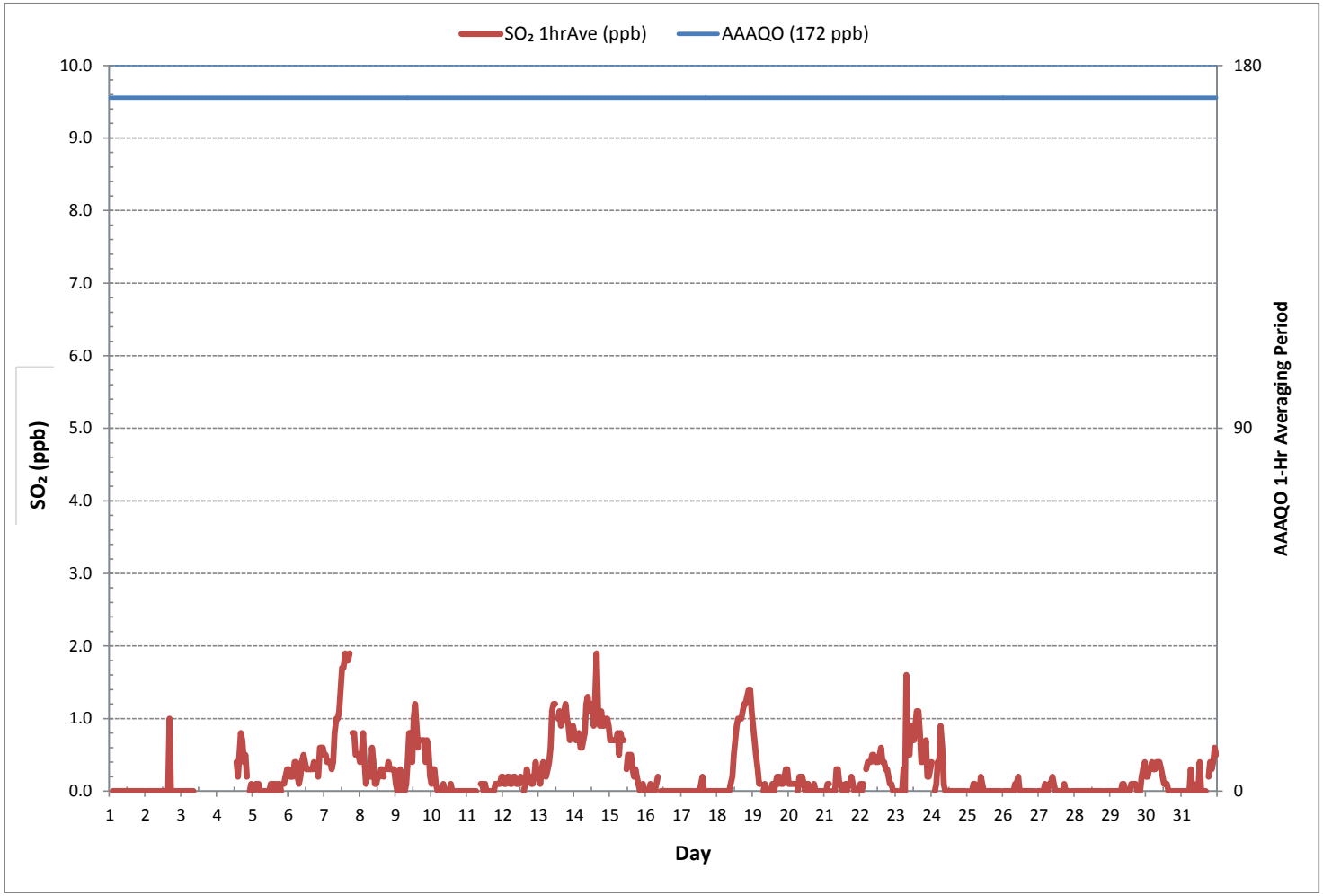


OBJECTIVE LIMIT: **ALBERTA ENVIRONMENT:** 1-HR 172 ppb | 24-HR 48 ppb

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:			0			
NUMBER OF 24-HR EXCEEDANCES:			0			
NUMBER OF NON-ZERO READINGS:			362			
MINIMUM 1-HR AVERAGE	0.0	ppb	@ HOUR(S)	0	ON DAY(S)	1
MAXIMUM 1-HR AVERAGE:	1.9	ppb	@ HOUR(S)	14	ON DAY(S)	7
MAXIMUM 24-HR AVERAGE:	1.0	ppb			ON DAY(S) VAR-VARIOUS	14
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:		721	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:		96.9	%
STANDARD DEVIATION:	0.4		MONTHLY AVERAGE:		0.2	ppb

SULPHUR DIOXIDE Hourly Averages (SO_2 ppb)



SULPHUR DIOXIDE Instantaneous Maximum (SO_2 ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	0.0	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
2	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	1.0	1.6	0.4	0.4	0.5	0.6	0.6	0.6	S	0.0	1.6	0.3	24
3	0.8	0.8	0.9	0.6	0.6	0.6	0.8	0.9	1.5	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	0.6	1.5	0.8	12
4	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	2.0	1.8	2.0	2.2	2.1	1.8	1.9	1.3	S	1.3	1.4	1.3	2.2	1.8	15
5	1.2	1.2	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.4	1.6	1.5	1.5	1.5	1.5	1.5	1.4	S	1.7	1.7	1.7	1.2	1.7	1.4	24
6	1.7	1.5	1.5	1.5	1.8	1.7	1.4	1.3	1.5	1.7	1.7	1.5	1.5	1.6	1.5	1.5	1.4	1.5	1.4	S	1.2	1.6	1.6	1.6	1.2	1.8	1.5	24
7	1.5	1.3	1.2	1.2	1.1	1.0	1.2	1.3	1.6	1.5	1.7	2.0	2.2	2.1	2.2	2.1	2.2	2.3	S	1.0	1.1	0.8	0.8	0.7	0.7	2.3	1.5	24
8	0.4	0.6	0.8	0.7	0.3	0.4	0.2	0.2	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.8	0.2	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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
10	0.0	0.0	0.0	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
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	X	X	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	22
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	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.3	0.0	24
13	0.2	0.1	0.2	0.3	0.2	0.1	0.5	0.6	1.0	1.3	1.5	1.5	S	1.5	1.5	1.3	1.4	1.6	1.5	1.5	1.2	1.2	1.3	1.3	0.1	1.6	1.0	24
14	1.3	1.2	1.2	1.2	1.3	1.3	1.4	1.4	1.7	1.8	1.7	S	1.8	1.8	2.0	3.3	1.9	1.8	1.9	1.8	1.8	1.9	2.1	2.0	1.2	3.3	1.7	24
15	1.9	1.9	1.9	2.1	2.1	2.1	1.8	2.5	2.6	2.3	S	2.0	2.1	2.1	2.1	2.0	1.7	1.8	1.8	1.7	1.7	1.5	1.6	1.6	1.5	2.6	2.0	24
16	1.5	1.5	1.5	1.8	1.7	1.5	1.3	1.6	1.8	S	1.4	1.3	1.3	1.2	1.2	1.2	1.0	1.0	1.5	0.7	0.6	0.7	0.7	0.4	0.4	1.8	1.2	24
17	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.7	S	0.6	0.7	0.7	0.9	1.0	1.4	1.0	1.2	1.3	1.2	1.2	1.2	1.1	1.1	1.2	0.4	1.4	0.9	24
18	1.2	1.2	1.6	1.6	1.7	1.5	1.7	S	1.8	1.9	2.0	2.3	2.3	2.7	2.9	2.7	2.7	2.9	3.0	3.1	2.9	3.1	3.0	2.9	1.2	3.1	2.3	24
19	2.5	2.3	2.2	2.1	1.7	1.5	S	1.4	1.6	1.3	1.3	1.3	1.2	1.2	1.0	1.0	1.1	1.0	1.0	0.9	0.9	0.7	0.8	0.8	0.7	2.5	1.3	24
20	0.6	0.4	0.4	0.5	0.3	S	0.1	0.5	0.4	0.5	0.0	0.0	0.1	0.2	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	24
21	0.0	0.0	0.5	0.1	S	0.0	0.0	0.2	0.4	0.5	0.4	0.3	0.4	0.5	0.6	0.7	0.6	0.7	0.7	0.8	0.9	0.9	0.9	1.0	0.0	1.0	0.5	24
22	1.1	1.1	1.3	S	1.5	1.6	1.7	1.5	1.7	1.8	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.6	1.6	1.5	1.6	1.5	1.1	1.9	1.6	24
23	1.6	1.4	S	1.2	1.3	1.8	1.2	3.9	2.9	1.9	2.1	1.8	1.8	2.1	2.1	2.0	1.7	1.3	1.2	1.2	2.3	0.9	0.9	0.7	0.7	3.9	1.7	24
24	1.2	S	1.3	1.2	1.5	2.2	2.6	2.3	1.0	1.0	1.0	0.9	1.0	1.2	1.2	1.2	1.2	1.4	1.3	1.4	1.5	1.5	1.5	1.6	0.9	2.6	1.4	24
25	S	1.5	1.7	1.7	1.9	1.6	1.5	1.6	1.7	1.8	1.6	1.5	1.2	1.5	1.3	1.4	1.2	1.3	1.3	1.2	1.2	1.2	1.3	S	1.2	1.9	1.5	24
26	1.4	1.2	1.4	1.3	1.2	1.3	1.2	1.3	1.5	1.6	1.4	1.2	1.2	1.1	1.3	1.3	1.2	1.1	1.1	1.1	1.1	1.2	S	1.0	1.0	1.6	1.2	24
27	1.1	1.0	0.9	1.2	1.1	1.0	0.9	1.2	1.2	1.1	1.2	1.0	1.0	1.0	1.0	1.0	0.9	0.9	1.0	1.0	0.7	S	0.6	0.7	0.6	1.2	1.0	24
28	0.8	0.8	1.0	0.8	0.8	1.0	0.9	0.8	0.8	1.0	1.0	0.9	0.9	0.8	1.1	1.0	1.3	1.2	1.0	1.1	S	0.9	1.0	1.2	0.8	1.3	1.0	24
29	1.1	1.0	1.0	1.1	1.2	1.4	1.0	1.4	1.5	1.2	1.3	1.2	1.2	1.3	1.3	1.2	1.4	1.5	1.4	S	1.4	1.4	1.5	1.5	1.0	1.5	1.3	24
30	1.5	1.4	1.4	1.5	1.3	1.5	1.3	1.5	1.3	1.6	1.3	1.1	1.0	1.0	0.9	0.8	0.6	0.7	S	0.5	0.4	0.6	0.6	0.4	0.4	1.6	1.1	24
31	0.6	0.7	0.5	0.6	0.4	0.9	1.5	0.9	1.1	0.8	0.8	0.9	1.3	1.2	0.8	1.0	0.9	S	1.2	1.2	1.2	1.5	1.7	1.5	0.4	1.7	1.0	24
HOURLY MAX	2.5	2.3	2.2	2.1	2.1	2.2	2.6	3.9	2.9	2.3	2.1	2.3	2.3	2.7	2.9	3.3	2.7	2.9	3.0	3.1	2.9	3.1	3.0	2.9				
HOURLY AVG	0.9	0.9	0.9	0.9	0.9	1.0	0.9	1.1	1.2	1.0	1.0	0.9	1.0	1.1	1.1	1.2	1.1	1.1	1.0	1.0	1.0	1.0	1.0	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

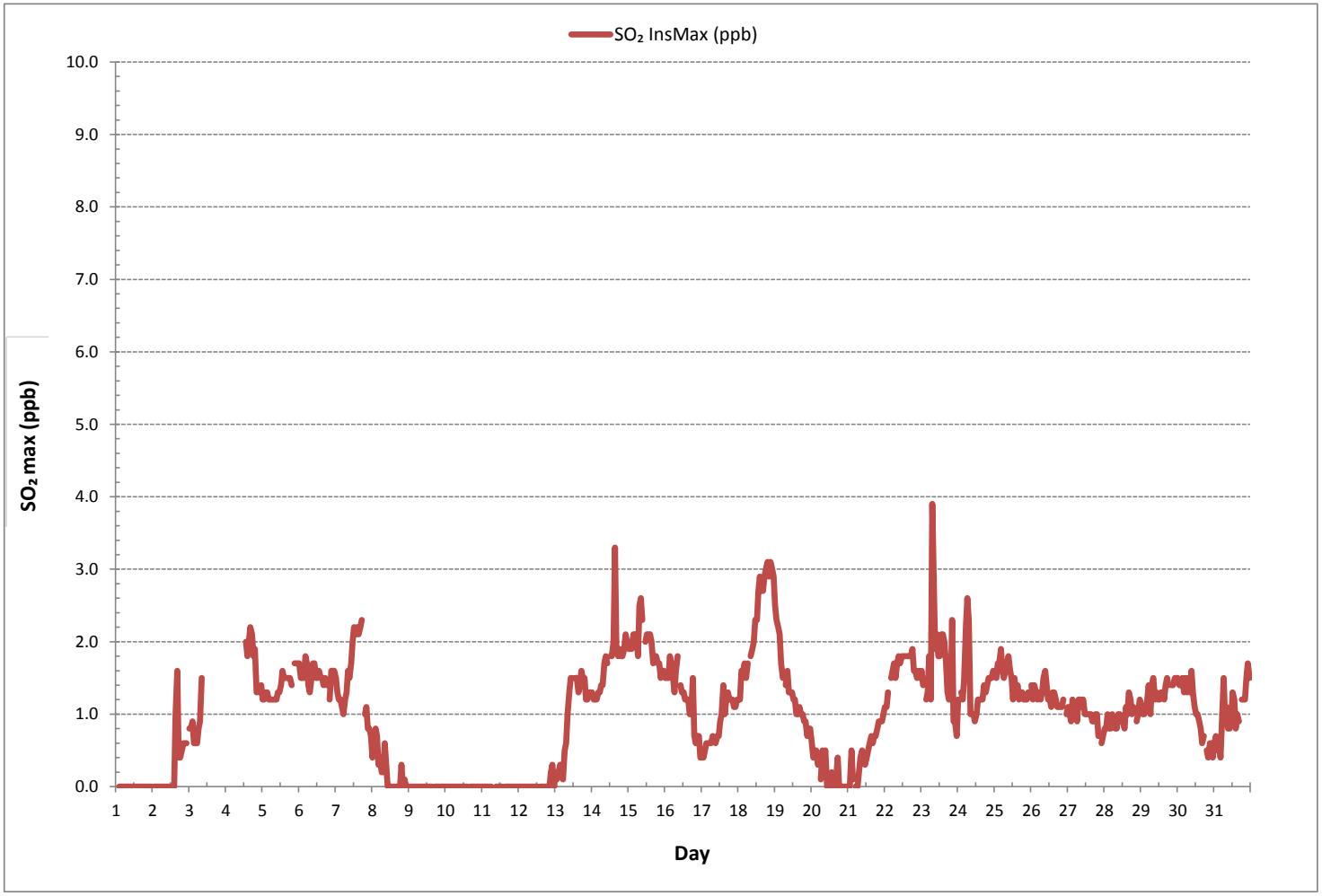
NUMBER OF NON-ZERO READINGS: 532

MAXIMUM INSTANTANEOUS VALUE: 3.9 ppb @ HOUR(S) 7 ON DAY(S) 23

VAR-VARIOUS

IZS CALIBRATION TIME: 32 hrs OPERATIONAL TIME: 721 hrs
MONTHLY CALIBRATION TIME: 7 hrs
STANDARD DEVIATION: 0.7

SULPHUR DIOXIDE Instantaneous Maximum (SO_2 ppb)



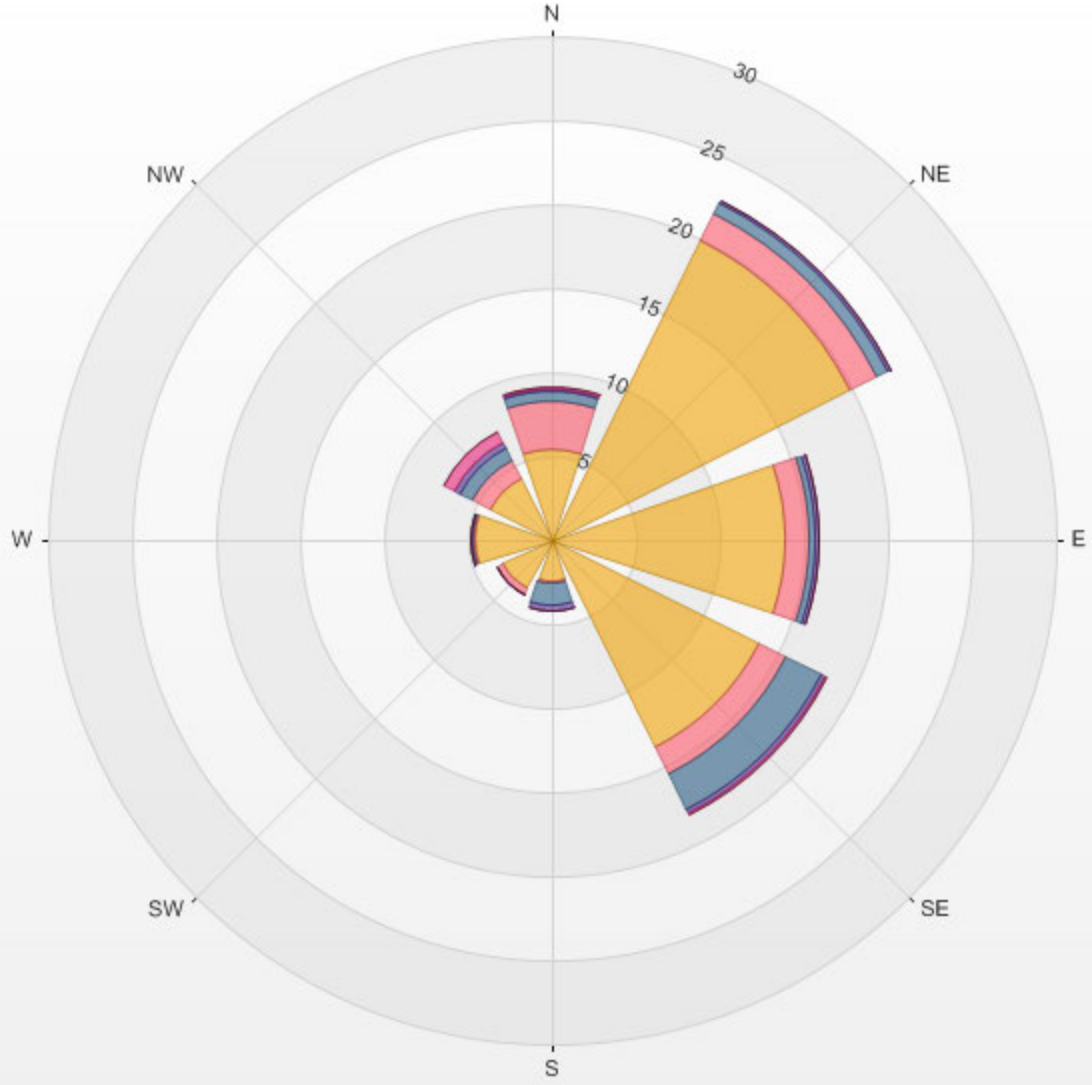
Wind: LICA Bonnyville
Poll.: LICA Bonnyville-SO2[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 14.08% Calm Avg: 0.23 [ppb]

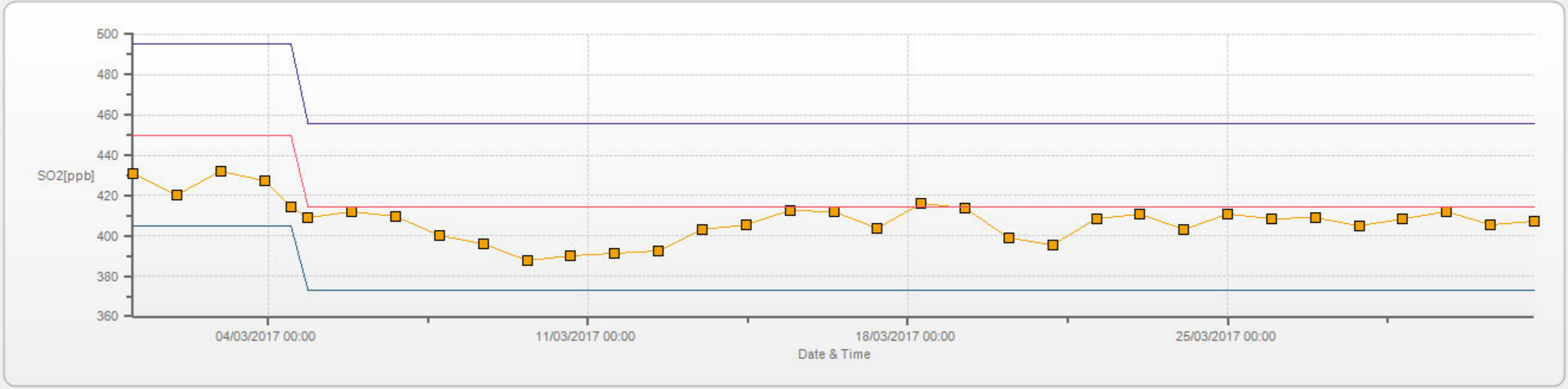
Direction	0.0-0.4	0.4-0.8	0.8-1.2	1.2-1.6	1.6-2.0	>2.0	Total
N	5.4	2.8	0.6	0.2	0.2	0.0	9.1
NE	19.9	1.8	0.7	0.2	0.0	0.0	22.6
E	13.9	1.5	0.3	0.3	0.0	0.0	16.0
SE	13.8	1.8	2.5	0.2	0.2	0.0	18.3
S	2.5	0.2	1.3	0.3	0.0	0.0	4.3
SW	3.2	0.4	0.0	0.0	0.0	0.0	3.7
W	4.6	0.2	0.2	0.0	0.0	0.0	4.9
NW	4.1	1.2	0.9	0.3	0.7	0.0	7.2
Summary	67.5	9.7	6.5	1.3	1.0	0.0	86.0

% Icon	Classes (ppb)										
67	0.0-0.4	10	0.4-0.8	6	0.8-1.2	1	1.2-1.6	1	1.6-2.0	0	>2.0

LICA Bonnyville Poll.: LICA Bonnyville-SO2[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 14.08% Calm Poll Avg: 0.23[ppb]



SO2[ppb] Calibration: LICA Bonnyville Monthly: 17/03 Type: Span



HYDROGEN SULPHIDE

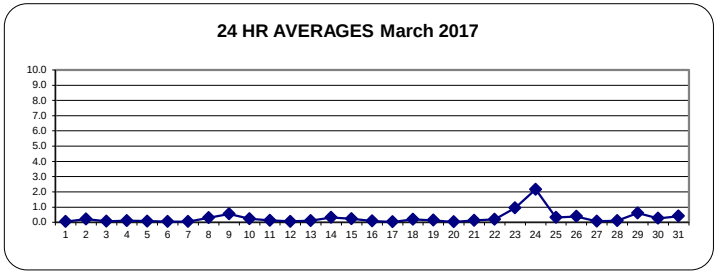
Maxxam
A Bureau Veritas Group Company

HYDROGEN SULPHIDE Hourly Averages (H_2S ppb)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	**0.0**	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.5	0.1	0.0	0.0	0.2	**0.0**	0.5	0.0	24
2	S	0.1	0.1	0.2	0.1	0.3	0.2	0.4	0.3	0.1	0.2	0.1	0.1	0.2	0.3	0.3	0.1	0.5	0.3	0.3	0.1	0.1	0.2	S	0.1	0.5	0.2	24
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	0.0	0.5	0.1	12
4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	C	0.1	0.3	0.2	0.1	0.0	S	0.0	0.0	0.0	0.3	0.1	12
5	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	0.1	0.2	0.3	0.3	S	0.6	0.2	0.0	0.0	0.6	0.1	24
6	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	S	0.1	0.0	0.0	0.0	0.0	0.2	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	0.1	S	0.3	0.3	0.0	0.0	0.3	0.0	0.3	0.0	24
8	0.2	0.2	0.1	0.1	0.3	0.4	0.6	0.6	0.2	0.0	0.2	0.2	0.1	0.1	0.1	0.2	0.2	S	0.4	0.4	0.5	0.7	0.5	0.5	0.0	0.7	0.3	24
9	0.5	0.5	0.4	0.7	0.4	0.4	0.5	0.5	0.6	0.8	0.7	0.0	0.1	0.3	0.2	0.3	S	0.0	0.4	0.9	1.0	1.2	1.0	1.3	0.0	1.3	0.6	24
10	1.7	0.9	0.4	0.4	0.3	0.0	0.2	0.3	0.2	0.0	0.1	0.0	0.0	0.0	0.0	S	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.2	0.0	1.7	0.2	24
11	0.0	0.1	0.1	0.2	0.2	0.0	0.0	X	X	0.3	0.1	0.0	0.0	0.1	S	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.0	0.3	0.1	22
12	0.2	0.0	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	S	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.1	24
13	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.2	0.1	0.1	0.1	0.1	S	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.0	0.2	0.1	24
14	0.2	0.2	0.3	0.4	0.9	0.6	0.8	1.0	0.1	0.1	0.2	S	0.3	0.4	0.3	0.2	0.3	0.2	0.1	0.1	0.0	0.1	0.2	0.2	0.0	1.0	0.3	24
15	0.2	0.2	0.1	0.0	0.1	0.1	0.5	1.2	0.5	0.6	S	0.4	0.2	0.1	0.1	0.1	0.2	0.3	0.1	0.1	0.0	0.1	0.2	0.0	0.0	1.2	0.2	24
16	0.0	0.1	0.1	0.1	0.2	0.3	0.1	0.3	0.5	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.1	0.0	0.0	0.1	0.0	0.5	0.1	24
17	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	S	0.1	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	0.2	0.0	24
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	S	0.0	0.0	0.1	0.1	0.2	0.1	0.2	0.3	0.4	0.4	0.3	0.4	0.6	0.6	0.4	0.5	0.0	0.6	0.2	24
19	0.4	0.3	0.4	0.2	0.2	0.2	S	0.2	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.4	0.1	24
20	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	0.1	0.0	0.2	0.2	0.0	0.1	0.1	0.0	0.2	0.0	24
21	0.0	0.2	0.4	0.2	S	0.4	0.7	0.3	0.0	0.0	0.1	0.0	0.0	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.7	0.1	24
22	0.1	0.0	0.0	S	0.2	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.3	0.2	0.1	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.5	0.6	0.0	0.6	0.2	24
23	0.8	0.4	S	0.5	0.6	1.0	1.2	2.5	1.0	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.4	1.0	2.9	0.9	1.9	2.4	0.3	2.9	0.9	24
24	1.2	S	3.8	2.8	4.7	8.1	10.4	**10.5**	3.6	0.5	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	**10.5**	**2.2**	24
25	S	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.1	0.2	0.1	0.0	0.2	0.4	0.4	0.9	0.4	0.9	S	0.0	0.9	0.3	24
26	1.0	0.3	0.4	0.9	1.0	0.9	0.6	0.4	0.5	0.5	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.1	0.2	0.2	0.4	0.3	S	0.1	0.0	1.0	0.4	24
27	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	S	0.0	0.2	0.0	0.2	0.1	24
28	0.3	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.1	0.0	0.2	0.1	0.1	0.0	0.2	0.2	S	0.2	0.3	0.1	0.0	0.3	0.1	24
29	0.1	0.1	0.5	0.3	0.3	0.6	3.3	3.7	1.1	0.7	0.2	0.1	0.0	0.1	0.1	0.2	0.3	0.1	0.4	S	0.6	0.6	0.3	0.4	0.0	3.7	0.6	24
30	0.2	0.2	0.2	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	S	0.2	0.3	0.3	0.2	0.2	0.2	0.4	0.3	24
31	0.2	0.3	0.2	0.7	0.6	0.6	1.0	0.4	0.5	0.4	0.3	0.4	0.3	0.2	0.3	0.2	0.3	S	0.4	0.3	0.3	0.5	0.4	0.5	0.2	1.0	0.4	24
HOURLY MAX	1.7	0.9	3.8	2.8	4.7	8.1	10.4	10.5	3.6	0.8	0.7	0.5	0.5	0.5	0.4	0.4	0.4	0.5	0.4	1.0	2.9	1.2	1.9	2.4				
HOURLY AVG	0.3	0.2	0.3	0.3	0.4	0.5	0.7	0.9	0.4	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	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

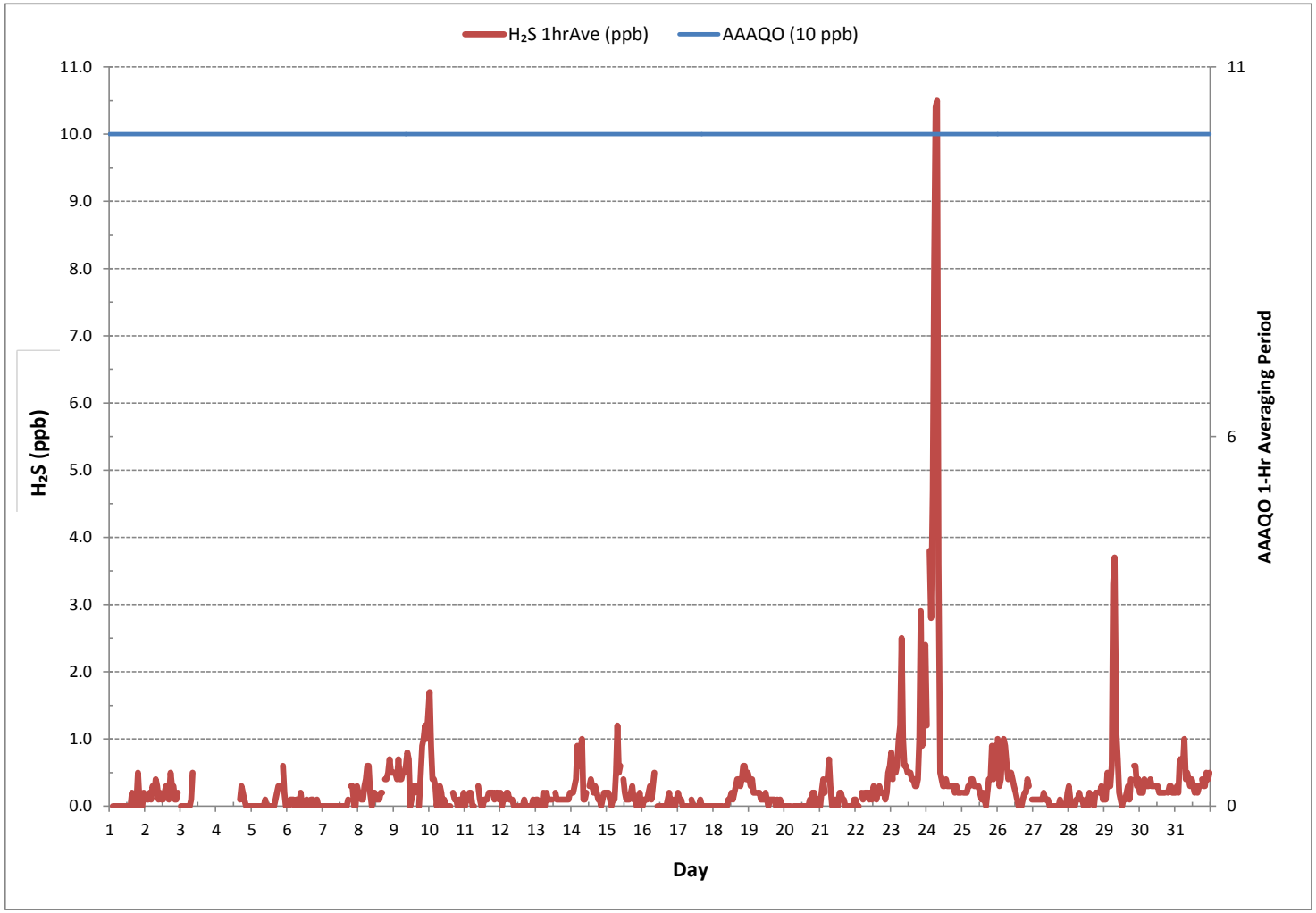


OBJECTIVE LIMIT: **ALBERTA ENVIRONMENT:** 1-HR 10 ppb | 24-HR 3 ppb

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:			1				
NUMBER OF 24-HR EXCEEDANCES:			0				
NUMBER OF NON-ZERO READINGS:			470				
MINIMUM 1-HR AVERAGE	0.0	ppb	@ HOUR(S)	0	ON DAY(S)	1	
MAXIMUM 1-HR AVERAGE:	10.5	ppb	@ HOUR(S)	7	ON DAY(S)	24	
MAXIMUM 24-HR AVERAGE:	2.2	ppb			ON DAY(S) VAR-VARIOUS	24	
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:			718	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:			96.5	%
STANDARD DEVIATION:	0.8		MONTHLY AVERAGE:			0.3	ppb

HYDROGEN SULPHIDE Hourly Averages (H_2S ppb)



HYDROGEN SULPHIDE Instantaneous Maximum (H_2S 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	**0.8**	**S**	0.8	0.8	0.6	0.6	0.5	0.9	0.6	0.5	0.6	0.6	0.4	0.6	0.5	0.6	0.4	0.5	0.4	1.2	0.6	0.3	0.2	0.4	0.2	1.2	0.6	24
2	**S**	0.3	0.3	0.4	0.3	0.7	0.6	1.6	0.7	0.5	0.5	0.5	0.6	0.6	0.7	0.9	0.8	1.1	0.9	0.9	0.7	0.6	0.7	**S**	0.3	1.6	0.7	24
3	0.6	0.8	0.7	0.8	0.8	0.7	0.7	0.9	1.7	**C**	**C**	**C**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	0.6	1.7	0.9	12
4	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**C**	**C**	**C**	**C**	0.3	0.6	0.4	0.4	0.4	**S**	0.3	2.6	0.3	2.6	0.7	12
5	0.3	0.1	0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.6	0.6	0.7	**S**	1.0	0.9	0.4	0.1	1.0	0.4	24
6	0.4	0.3	0.5	0.4	0.6	0.4	0.4	0.4	0.4	0.6	0.3	0.3	0.3	0.5	0.3	0.2	0.5	0.3	0.3	**S**	0.3	0.2	0.1	0.0	0.0	0.6	0.3	24
7	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.0	0.1	0.2	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.1	**S**	0.5	0.4	0.0	0.0	0.2	0.0	0.5	0.1	24
8	0.2	0.1	0.2	0.1	0.1	0.3	0.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	**S**	0.1	0.1	0.6	0.8	0.1	0.1	0.0	1.1	0.2	24
9	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.2	0.5	0.6	1.6	0.0	0.0	0.0	0.0	0.0	**S**	0.0	0.0	0.7	0.6	1.2	1.1	0.8	0.0	1.6	0.3	24
10	1.9	1.4	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	**S**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.1	24
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**X**	**X**	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	22
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	**S**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
13	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**	0.0	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	0.3	0.4	0.2	0.4	1.0	1.0	0.9	1.2	0.2	0.0	0.1	**S**	0.3	0.2	0.2	0.1	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	1.2	0.3	24
15	0.2	0.1	0.0	0.0	0.1	0.2	0.5	2.2	1.1	0.8	**S**	0.3	0.1	0.3	0.3	0.2	0.2	0.4	0.1	0.2	0.0	0.0	0.3	0.0	0.0	2.2	0.3	24
16	0.0	0.1	0.1	0.0	0.4	1.0	0.1	0.5	0.6	**S**	0.2	0.0	0.4	0.0	0.0	0.0	0.0	0.4	1.0	0.0	0.0	0.0	0.0	0.5	0.0	1.0	0.2	24
17	0.1	0.1	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	0.1	0.0	0.0	0.1	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	0.2	0.1	0.2	**S**	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.4	0.4	0.5	0.4	0.4	0.8	0.6	0.4	0.4	0.0	0.8	0.3	24
19	0.3	0.2	0.3	0.3	0.1	0.2	**S**	0.0	0.1	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	0.3	0.1	24
20	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	0.4	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.0	24
21	0.0	0.0	0.0	0.0	**S**	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	0.1	0.0	0.2	0.0	24
22	0.0	0.0	0.1	**S**	0.2	0.1	0.1	0.3	0.1	0.0	0.2	0.1	0.3	0.1	0.1	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.7	0.0	0.7	0.2	24
23	1.2	0.4	**S**	0.5	0.5	1.6	1.8	3.5	2.0	0.6	0.5	0.2	0.4	0.2	0.0	0.2	0.0	0.1	0.0	1.5	4.6	2.1	2.6	4.4	0.0	4.6	1.3	24
24	2.2	**S**	6.4	4.3	7.1	9.4	**26.6**	23.8	6.3	0.2	0.2	0.0	0.1	0.2	0.0	0.1	0.0	0.2	0.1	0.1	0.1	0.0	0.0	0.1	0.0	**26.6**	3.8	24
25	**S**	0.0	0.1	0.1	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.3	0.3	0.5	1.4	0.8	1.0	**S**	0.0	1.4	0.3	24
26	4.1	0.2	0.3	1.7	1.0	1.3	0.9	0.3	0.5	0.5	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.5	0.3	**S**	0.0	0.0	4.1	0.5	24
27	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	**S**	0.0	0.5	0.0	0.5	0.0	24
28	0.5	0.3	0.0	0.0	0.0	0.1	0.0	0.2	0.1	0.2	0.0	0.1	0.2	0.0	0.3	0.1	0.1	0.0	0.1	0.2	**S**	0.2	0.3	0.2	0.0	0.5	0.1	24
29	0.2	0.1	0.6	0.4	0.2	0.8	12.5	12.5	2.0	1.2	0.3	0.1	0.0	0.0	0.1	0.1	0.5	0.1	0.4	**S**	1.1	1.0	0.3	0.3	0.0	12.5	1.5	24
30	0.2	0.1	0.2	0.1	0.1	0.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	**S**	0.0	0.2	0.0	0.0	0.0	0.0	0.3	0.1	24
31	0.0	0.0	0.0	0.5	0.3	0.3	1.1	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	**S**	0.2	0.1	0.2	0.3	0.2	0.3	0.0	1.1	0.2	24
HOURLY MAX	4.1	1.4	6.4	4.3	7.1	9.4	26.6	23.8	6.3	1.2	1.6	0.6	0.6	0.6	1.1	0.9	0.8	1.1	1.0	1.5	4.6	2.1	2.6	4.4				
HOURLY AVG	0.5	0.2	0.4	0.4	0.5	0.7	1.7	1.8	0.6	0.3	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.3	0.5	0.3	0.3	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

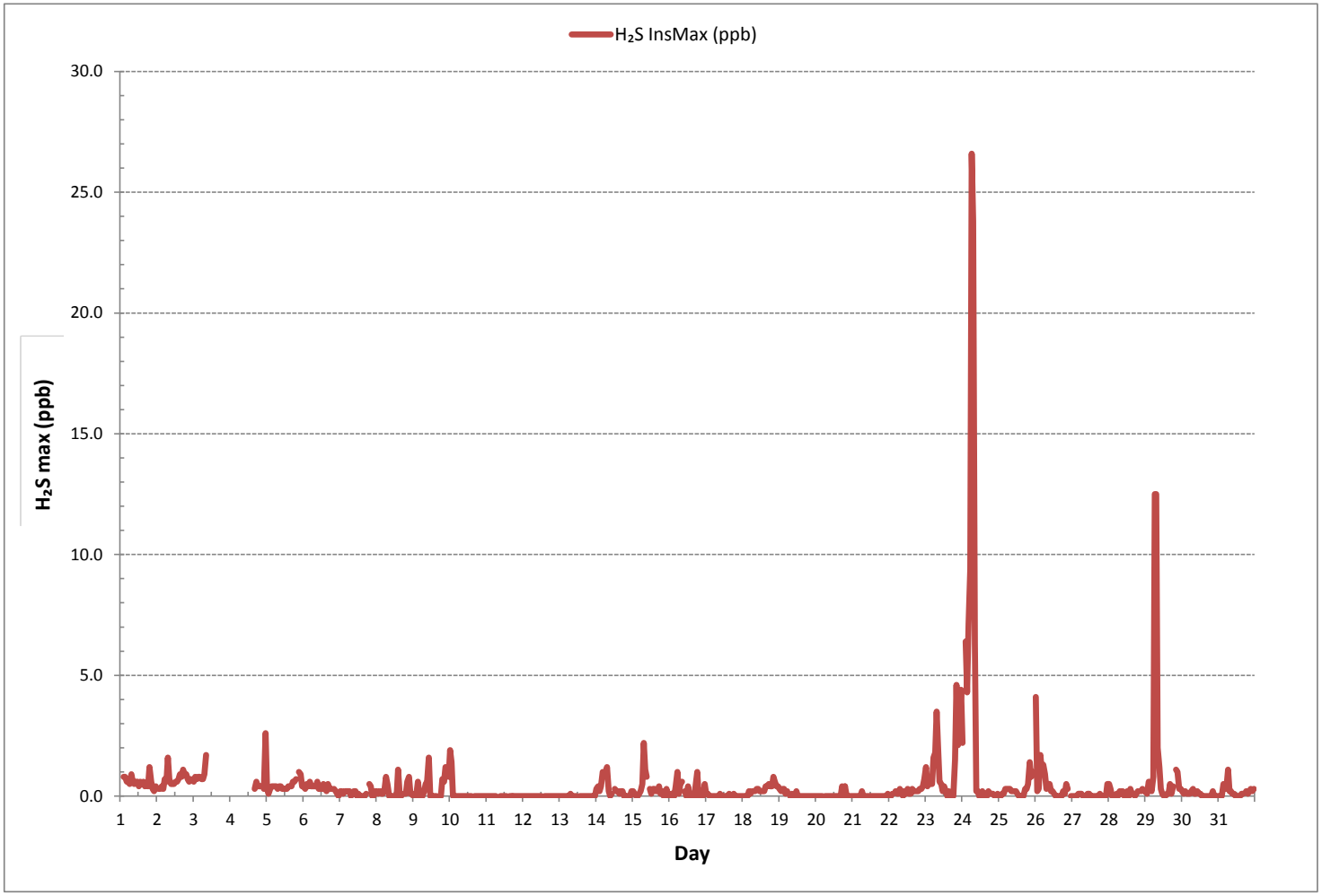
NUMBER OF NON-ZERO READINGS: 399

MAXIMUM INSTANTANEOUS VALUE: 26.6 ppb @ HOUR(S) 6 ON DAY(S) 24

VAR-VARIOUS

IZS CALIBRATION TIME: 32 hrs OPERATIONAL TIME: 718 hrs
MONTHLY CALIBRATION TIME: 7 hrs
STANDARD DEVIATION: 1.7

HYDROGEN SULPHIDE Instantaneous Maximum (H_2S ppb)



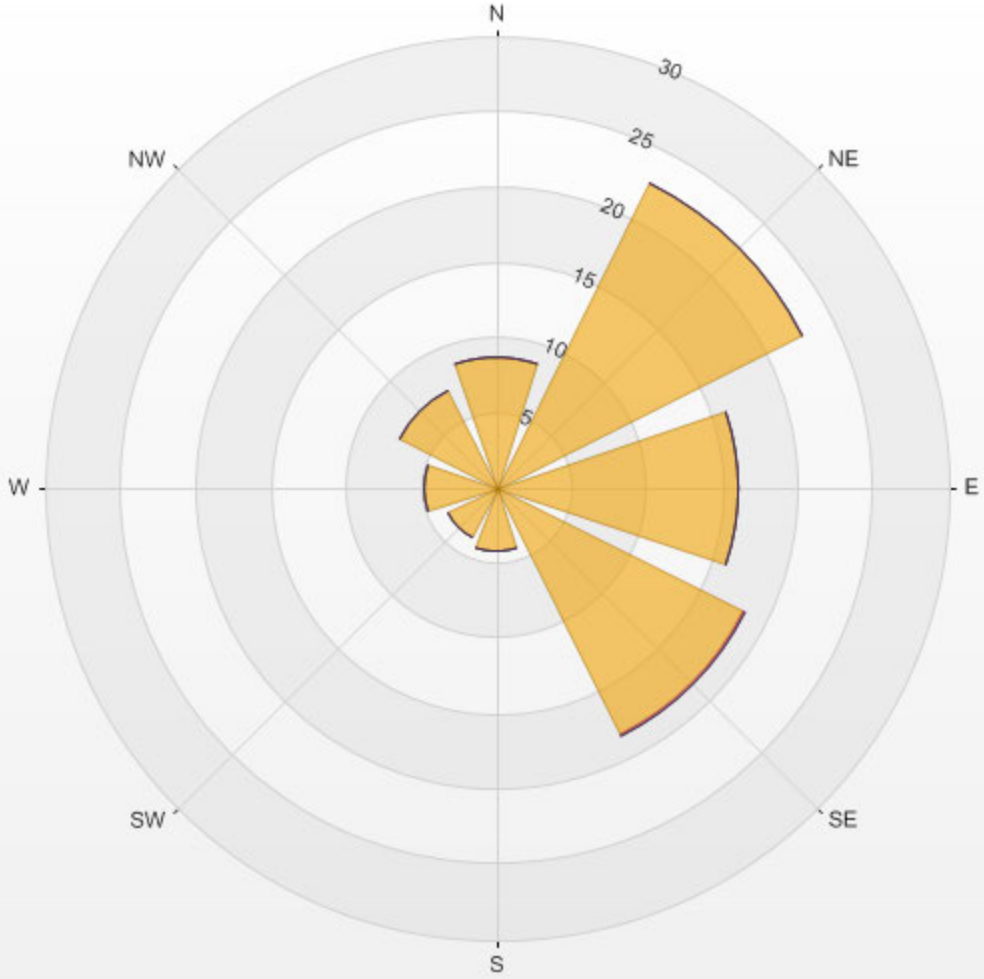
Wind: LICA Bonnyville
Poll.: LICA Bonnyville-H2S[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 14.14% Calm Avg: 0.98 [ppb]

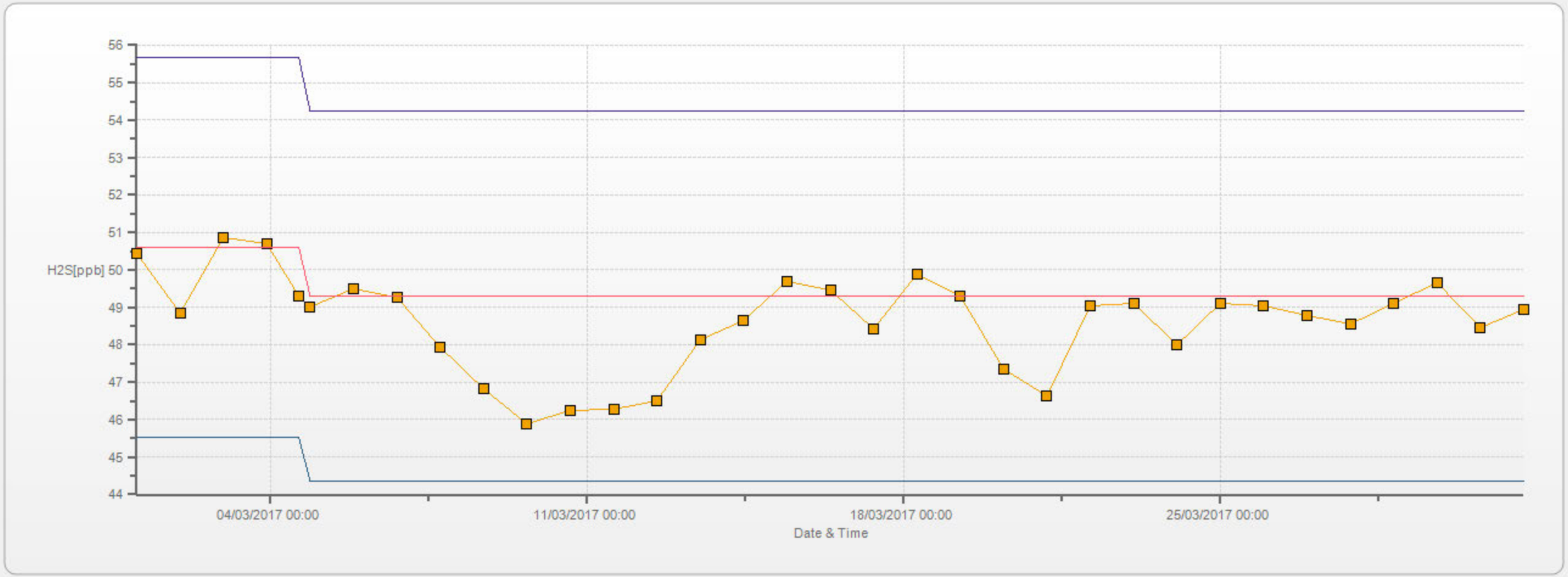
Direction	0.0-3.5	3.5-7.1	7.1-10.6	>10.6	Total
N	8.7	0.0	0.0	0.0	8.7
NE	22.7	0.0	0.0	0.0	22.7
E	16.1	0.0	0.0	0.0	16.1
SE	18.3	0.2	0.0	0.0	18.4
S	4.3	0.0	0.0	0.0	4.3
SW	3.7	0.0	0.0	0.0	3.7
W	4.9	0.0	0.0	0.0	4.9
NW	7.2	0.0	0.0	0.0	7.2
Summary	85.7	0.2	0.0	0.0	85.9

% Icon Classes (ppb)	86 0.0-3.5	0 3.5-7.1	0 7.1-10.6	0 >10.6

LICA Bonnyville Poll.: LICA Bonnyville-H2S[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 14.14% Calm Poll Avg: 0.98[ppb]



H2S[ppb] Calibration: LICA Bonnyville Monthly: 17/03 Type: Span



TOTAL HYDROCARBON

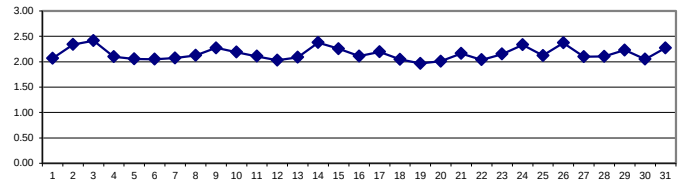
TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	2.08	S	2.06	2.06	2.04	2.05	2.07	2.05	2.04	2.03	2.06	2.09	2.03	2.03	2.03	2.04	2.03	2.05	2.08	2.11	2.07	2.07	2.15	2.26	2.03	2.26	2.07	24
2	S	2.27	2.22	2.24	2.23	2.31	2.27	2.38	2.43	2.46	2.39	2.34	2.28	2.22	2.23	2.48	2.48	2.43	2.40	2.43	2.39	2.33	2.25	S	2.22	2.48	2.34	24
3	2.23	2.31	2.34	2.34	2.38	2.41	2.41	2.37	2.49	2.48	2.33	C	C	C	C	C	2.37	2.38	2.49	2.53	2.67	2.70	S	2.23	2.23	2.70	**2.41**	24
4	3.02	2.66	2.04	2.07	2.10	2.07	2.01	2.00	2.00	2.00	2.00	2.01	2.05	2.07	2.04	2.04	2.03	2.04	2.05	2.01	2.03	S	2.00	1.99	1.99	3.02	2.10	24
5	1.99	1.99	1.99	1.99	1.99	1.99	1.99	2.00	2.01	2.00	2.00	1.99	1.99	2.00	1.99	1.99	2.00	2.08	2.42	2.15	S	2.16	2.31	2.26	1.99	2.42	2.06	24
6	2.27	2.12	2.00	2.02	2.04	2.01	2.01	2.02	2.06	2.10	2.05	2.05	2.05	2.03	2.03	2.03	2.05	2.03	2.04	S	2.04	2.03	2.02	2.03	2.00	2.27	2.05	24
7	2.06	2.08	2.05	2.02	2.04	2.04	2.01	2.04	2.06	2.04	2.04	2.03	2.02	2.02	2.03	2.03	2.03	2.04	S	2.08	2.25	2.18	2.19	2.25	2.01	2.25	2.07	24
8	2.20	2.17	2.07	2.08	2.13	2.20	2.28	2.29	2.12	2.01	2.01	2.01	2.01	2.00	1.99	2.00	1.99	S	2.00	2.17	2.20	2.20	2.44	2.30	1.99	2.44	2.12	24
9	2.24	2.18	2.27	2.43	2.31	2.41	2.39	2.42	2.34	2.50	2.26	2.01	2.01	2.02	2.04	2.04	S	2.06	2.15	2.29	2.14	2.58	2.64	2.55	2.01	2.64	2.27	24
10	2.90	2.77	2.50	2.43	2.33	2.22	2.14	2.11	2.09	2.08	2.06	2.03	2.01	2.01	2.01	S	2.03	2.03	2.03	2.07	2.09	2.10	2.16	2.18	2.01	2.90	2.19	24
11	2.10	2.13	2.14	2.22	2.20	2.20	2.18	X	X	2.13	2.13	2.13	2.08	2.03	S	2.01	2.40	2.06	2.00	2.01	2.02	2.03	2.03	2.03	2.00	2.40	2.11	22
12	2.02	2.02	2.01	2.02	2.01	2.01	2.02	2.03	2.03	2.02	2.00	2.01	2.00	S	2.01	2.04	2.01	2.02	2.05	2.06	2.05	2.08	2.07	2.06	2.00	2.08	2.03	24
13	2.09	2.11	2.11	2.11	2.11	2.13	2.10	2.09	2.07	2.08	2.09	2.08	S	2.06	2.06	2.07	2.08	2.06	2.04	2.06	2.08	2.08	2.11	2.16	2.04	2.16	2.09	24
14	2.32	2.28	2.31	2.79	2.45	2.37	2.93	2.44	2.38	2.37	2.38	S	2.38	2.42	2.45	2.32	2.40	2.46	2.34	2.37	2.18	2.16	2.08	2.15	2.08	2.93	2.38	24
15	2.19	2.09	2.13	2.17	2.30	2.34	2.31	2.49	2.44	2.32	S	2.27	2.33	2.36	2.28	2.26	2.22	2.10	2.21	2.24	2.17	2.20	2.30	2.15	2.09	2.49	2.26	24
16	2.05	2.15	2.09	2.05	2.22	2.37	2.05	2.49	2.11	S	2.10	2.02	1.97	1.97	1.98	1.99	1.99	2.00	2.13	2.11	2.17	2.09	2.21	2.25	1.97	2.49	2.11	24
17	2.31	2.17	2.16	2.09	2.21	2.26	2.52	2.61	S	2.30	2.30	2.32	2.20	2.13	2.08	2.04	2.04	2.07	2.08	2.10	2.14	2.12	2.13	2.12	2.04	2.61	2.20	24
18	2.08	2.06	2.08	2.11	2.10	2.09	2.05	S	2.00	2.02	2.03	2.02	2.01	2.01	2.01	2.02	2.05	2.08	2.09	2.05	2.02	2.07	2.06	1.99	1.99	2.11	2.05	24
19	1.99	1.97	2.00	1.99	1.97	1.96	S	1.98	1.97	1.97	1.97	1.96	1.96	**1.95**	1.95	1.97	1.95	1.95	1.95	1.95	1.95	1.96	1.96	1.97	**1.95**	2.00	1.97	24
20	1.98	2.01	2.01	2.00	2.01	S	2.00	2.02	2.01	1.99	1.99	1.98	1.98	1.98	1.98	1.99	2.00	2.02	2.02	2.06	2.03	2.08	2.05	2.05	1.98	2.08	2.01	24
21	2.08	2.19	2.31	2.49	S	2.44	2.44	2.43	2.40	2.29	2.12	2.09	2.06	2.02	2.06	2.05	2.04	2.02	2.00	2.02	2.04	2.05	2.04	2.06	2.00	2.49	2.16	24
22	2.06	2.04	2.05	S	2.03	2.04	2.05	2.05	2.04	2.02	2.02	2.02	2.01	1.99	1.99	2.00	2.04	2.11	2.08	2.02	2.04	2.06	2.06	2.06	1.99	2.11	2.04	24
23	2.05	2.02	S	2.03	2.03	2.30	2.22	2.47	2.49	2.28	2.16	2.11	2.11	2.05	2.05	2.05	2.03	2.01	2.06	2.09	2.18	2.21	2.21	2.27	2.01	2.49	2.15	24
24	2.84	S	2.29	2.34	2.46	2.67	2.86	2.88	2.48	2.57	2.34	2.40	2.53	2.44	2.26	2.13	2.09	2.03	2.02	2.01	2.01	2.04	2.02	2.00	2.00	2.88	2.34	24
25	S	1.98	1.99	2.00	2.02	2.08	2.18	2.27	2.23	2.11	2.11	2.13	2.07	1.99	2.00	2.02	2.03	2.05	2.09	2.16	2.55	2.26	2.37	S	1.98	2.55	2.12	24
26	2.89	2.32	2.43	2.50	2.47	2.51	2.63	2.70	2.52	2.40	2.41	2.37	2.31	2.27	2.18	2.19	2.23	2.23	2.18	2.09	2.25	2.30	S	2.16	2.09	2.89	2.37	24
27	2.18	2.23	2.26	2.22	2.28	2.23	2.17	2.06	2.02	2.04	2.13	2.10	2.09	2.02	2.03	2.03	2.03	2.01	2.00	2.01	2.00	S	2.04	2.11	2.00	2.28	2.10	24
28	2.17	2.15	2.13	2.06	2.08	2.09	2.12	2.10	2.09	2.11	2.12	2.10	2.11	2.11	2.12	2.12	2.09	2.11	2.07	2.09	S	2.11	2.08	2.08	2.06	2.17	2.10	24
29	2.07	2.08	2.22	2.34	2.35	2.51	2.41	2.65	2.50	2.25	2.05	2.03	2.02	2.02	2.04	2.05	2.04	2.06	2.13	S	2.27	2.32	2.55	2.31	2.02	2.65	2.23	24
30	2.14	2.00	2.00	1.98	1.98	1.98	1.98	1.97	1.97	1.96	1.96	1.97	1.97	1.98	1.97	1.98	1.97	1.98	S	2.30	2.05	2.66	2.18	2.26	1.96	2.66	2.05	24
31	2.20	2.64	2.33	2.29	2.43	**3.28**	3.07	2.34	2.28	2.23	2.21	2.26	2.15	1.99	1.98	2.03	2.04	S	2.08	2.04	2.10	2.14	2.09	2.07	1.98	**3.28**	2.27	24
HOURLY MAX	3.02	2.77	2.50	2.79	2.47	3.28	3.07	2.88	2.52	2.57	2.41	2.40	2.53	2.44	2.45	2.48	2.48	2.46	2.49	2.53	2.67	2.70	2.64	2.55				
HOURLY AVG	2.23	2.18	2.15	2.18	2.18	2.25	2.26	2.27	2.20	2.17	2.13	2.10	2.10	2.08	2.06	2.07	2.09	2.09	2.11	2.13	2.14	2.19	2.17	2.15				

STATUS FLAG CODES

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

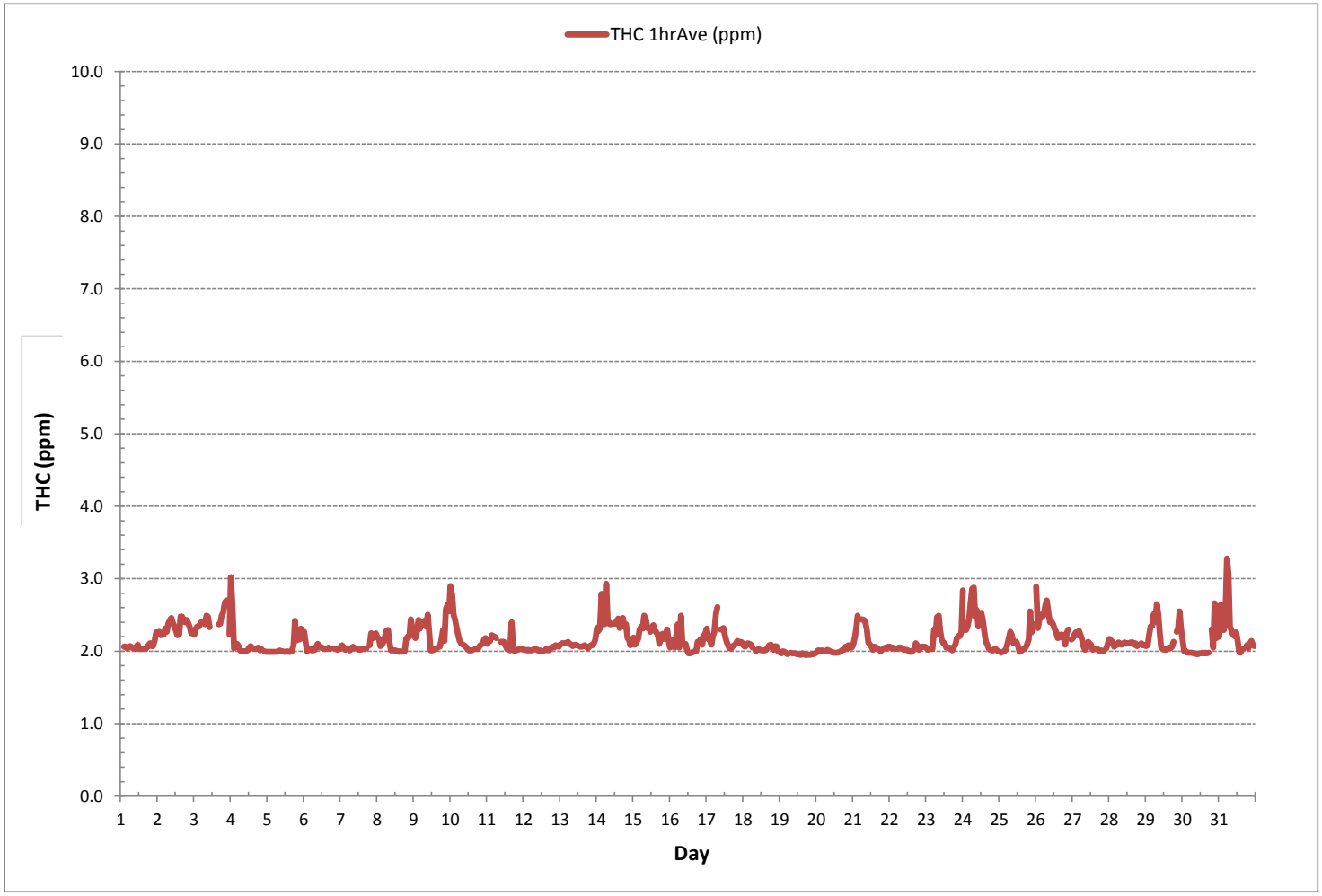
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			704				
MINIMUM 1-HR AVERAGE		1.95	ppm	@ HOUR(S)	13	ON DAY(S)	19
MAXIMUM 1-HR AVERAGE:		3.28	ppm	@ HOUR(S)	5	ON DAY(S)	31
MAXIMUM 24-HR AVERAGE:		2.41	ppm			ON DAY(S)	3
						VAR-VARIOUS	
IZS CALIBRATION TIME:	33	hrs		OPERATIONAL TIME:		742	hrs
MONTHLY CALIBRATION TIME:	5	hrs		AMD OPERATION UPTIME:		99.7	%
STANDARD DEVIATION:	0.19			MONTHLY AVERAGE:		2.15	ppm

TOTAL HYDROCARBONS Hourly Averages (THC ppm)



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	2.10	S	2.07	2.08	2.06	2.06	2.09	2.07	2.08	2.06	2.50	2.63	2.06	2.06	2.06	2.10	2.05	2.13	2.12	2.25	2.10	2.11	2.20	2.51	2.05	2.63	2.15	24
2	S	2.31	2.28	2.38	2.38	2.48	2.36	2.54	2.64	2.70	2.45	5.72	4.81	2.26	2.28	3.04	3.30	2.57	2.55	2.67	2.64	2.68	2.53	S	2.26	5.72	2.80	24
3	2.36	2.50	2.79	2.59	2.67	2.95	3.01	2.64	2.85	2.82	2.51	C	C	C	C	C	2.73	3.08	3.36	3.54	3.66	3.12	S	2.34	2.34	3.66	2.86	24
4	6.29	3.08	2.13	2.18	2.17	2.16	2.04	2.03	2.07	2.06	Y	2.09	2.18	2.19	2.17	2.14	2.14	2.15	2.20	2.05	2.15	S	2.09	2.04	2.03	6.29	2.35	23
5	2.01	2.03	2.03	2.02	2.02	2.03	2.02	2.07	2.18	2.04	2.20	2.12	2.05	2.06	2.04	2.03	2.18	2.44	3.16	3.53	S	2.34	2.74	2.44	2.01	3.53	2.25	24
6	2.42	2.34	2.06	2.10	2.23	2.20	2.10	2.59	2.23	2.29	2.15	2.17	2.14	2.11	2.10	2.13	2.54	2.09	2.13	S	2.16	2.11	2.09	2.19	2.06	2.59	2.20	24
7	2.16	2.25	2.10	2.10	2.38	2.10	2.06	2.09	2.09	2.16	2.12	2.10	2.07	2.07	2.09	2.12	2.11	2.16	S	2.28	2.68	2.54	2.43	2.54	2.06	2.68	2.21	24
8	2.66	2.32	2.22	2.18	2.50	2.59	2.49	2.43	2.25	2.04	2.04	2.07	2.10	2.04	2.09	2.08	2.10	S	2.06	6.06	2.82	3.27	4.16	2.67	2.04	6.06	2.58	24
9	2.43	2.23	2.42	3.32	2.42	2.52	2.52	2.59	2.41	2.75	2.60	2.06	2.07	2.03	2.11	2.20	S	2.22	3.36	2.96	2.73	3.66	3.50	3.58	2.03	3.66	2.64	24
10	3.05	3.52	2.86	2.61	2.62	2.32	2.19	2.12	2.12	2.29	2.12	2.05	2.13	2.03	2.03	S	2.06	2.09	2.07	2.10	2.16	2.20	2.19	2.38	2.03	3.52	2.32	24
11	2.15	2.16	2.20	2.55	2.27	2.37	2.27	X	X	2.23	2.27	2.21	2.13	2.10	S	2.03	4.76	2.96	2.02	2.07	2.08	2.06	2.08	2.05	2.02	4.76	2.33	22
12	2.04	2.05	2.06	2.04	2.03	2.03	2.05	2.05	2.05	2.15	2.17	2.06	2.04	S	2.04	2.44	2.02	2.04	2.07	2.07	2.08	2.29	2.08	2.08	2.02	2.44	2.09	24
13	2.10	2.13	2.13	2.12	2.36	2.16	2.23	2.28	2.18	2.08	2.16	2.09	S	2.08	2.07	2.09	2.17	2.09	2.05	2.07	2.09	2.11	2.16	2.37	2.05	2.37	2.15	24
14	3.51	2.58	2.61	4.46	4.46	3.61	4.32	2.85	2.66	2.51	2.60	S	2.66	2.53	2.72	2.49	2.67	2.91	2.58	2.67	2.32	2.43	2.17	2.47	2.17	4.46	2.90	24
15	2.63	2.35	2.23	2.36	2.74	2.90	3.19	3.29	2.74	2.45	S	2.36	2.42	2.56	2.35	2.33	2.45	2.14	2.51	2.33	2.37	2.35	4.49	2.44	2.14	4.49	2.61	24
16	2.21	2.34	2.31	2.31	4.98	4.55	2.38	6.20	2.59	S	2.21	2.21	2.03	2.22	2.12	2.10	2.04	2.19	2.68	2.30	2.87	2.19	2.90	2.87	2.03	6.20	2.73	24
17	3.96	2.63	2.70	2.22	2.40	2.50	3.35	3.17	S	2.51	2.42	2.44	2.29	2.15	2.16	2.15	2.06	2.14	2.10	2.13	2.15	2.22	2.14	2.13	2.06	3.96	2.44	24
18	2.10	2.11	2.18	2.43	2.23	2.34	2.13	S	2.06	2.23	2.17	2.13	2.05	2.10	2.14	2.12	2.31	2.18	2.23	2.10	2.12	2.40	2.12	2.06	2.05	2.43	2.18	24
19	2.01	1.99	2.02	2.00	1.98	1.98	S	1.99	1.98	1.98	1.98	1.98	1.97	1.97	1.96	2.03	2.04	1.96	1.96	1.96	1.96	1.97	1.98	1.98	1.96	2.04	1.98	24
20	2.05	2.32	2.06	2.06	2.06	S	2.02	2.07	2.05	2.10	2.05	2.01	2.01	1.99	1.99	2.00	2.23	2.10	2.14	2.15	2.66	2.25	2.09	2.12	1.99	2.66	2.11	24
21	2.13	2.46	2.51	2.70	S	2.57	2.65	2.60	2.45	2.56	2.15	2.13	2.18	2.10	2.16	2.17	2.13	2.18	2.07	2.13	2.14	2.29	2.15	2.20	2.07	2.70	2.30	24
22	2.17	2.13	2.14	S	2.15	2.14	2.15	2.16	2.13	2.10	2.17	2.15	2.03	2.01	2.03	2.11	2.17	2.23	2.48	2.05	2.08	2.08	2.07	2.09	2.01	2.48	2.13	24
23	2.13	2.04	S	2.08	2.14	3.39	2.91	4.73	3.69	2.82	2.30	2.16	2.20	2.10	2.12	2.13	2.14	2.03	2.35	2.16	3.47	2.64	3.38	3.39	2.03	4.73	2.63	24
24	5.88	S	2.83	2.81	2.66	3.37	3.72	3.43	2.62	3.35	2.42	2.53	2.65	2.55	2.37	2.24	2.14	2.07	2.12	2.11	2.04	2.26	2.07	2.05	2.04	5.88	2.71	24
25	S	2.00	2.01	2.03	2.15	2.28	2.38	2.51	2.47	2.25	2.14	2.19	2.13	2.00	2.01	2.03	2.05	2.21	2.33	2.51	3.00	2.89	2.88	S	2.00	3.00	2.29	24
26	3.82	2.48	2.91	2.70	3.24	3.04	3.19	3.06	2.82	2.48	2.64	2.60	2.34	2.30	2.41	2.21	2.26	2.68	2.63	2.23	3.33	2.42	S	2.30	2.21	3.82	2.70	24
27	2.27	2.49	2.40	2.29	2.38	2.38	2.29	2.10	2.08	2.14	2.18	2.17	2.14	2.17	2.24	2.07	2.05	2.02	2.02	2.03	2.04	S	2.09	2.19	2.02	2.49	2.18	24
28	2.37	2.43	2.30	2.13	2.41	2.32	2.13	2.16	2.10	2.22	2.24	2.13	2.16	2.14	2.24	2.86	2.17	2.26	2.25	2.16	S	2.97	2.25	2.28	2.10	2.97	2.29	24
29	2.12	2.13	2.41	2.74	2.73	2.74	2.86	3.99	2.95	2.41	2.14	2.27	2.03	2.03	2.08	2.20	2.10	2.15	2.45	S	2.62	2.43	2.92	2.55	2.03	3.99	2.48	24
30	2.36	2.02	2.03	2.01	2.00	2.01	2.00	2.00	2.01	2.01	1.98	2.02	1.99	2.00	2.04	2.05	2.02	2.13	S	3.23	2.10	4.43	3.07	4.30	1.98	4.43	2.34	24
31	2.95	3.43	3.64	2.62	2.96	4.36	4.10	3.27	2.32	2.27	2.23	2.36	2.32	2.02	2.03	2.61	2.06	S	2.61	2.15	2.26	2.15	2.12	2.12	2.02	4.36	2.65	24
HOURLY MAX	6.29	3.52	3.64	4.46	4.98	4.55	4.32	6.20	3.69	3.35	2.64	5.72	4.81	2.56	2.72	3.04	4.76	3.08	3.36	6.06	3.66	4.43	4.49	4.30				
HOURLY AVG	2.70	2.37	2.35	2.41	2.53	2.62	2.57	2.73	2.37	2.34	2.25	2.32	2.25	2.14	2.15	2.22	2.31	2.26	2.37	2.48	2.44	2.51	2.52	2.44				

STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS: 703

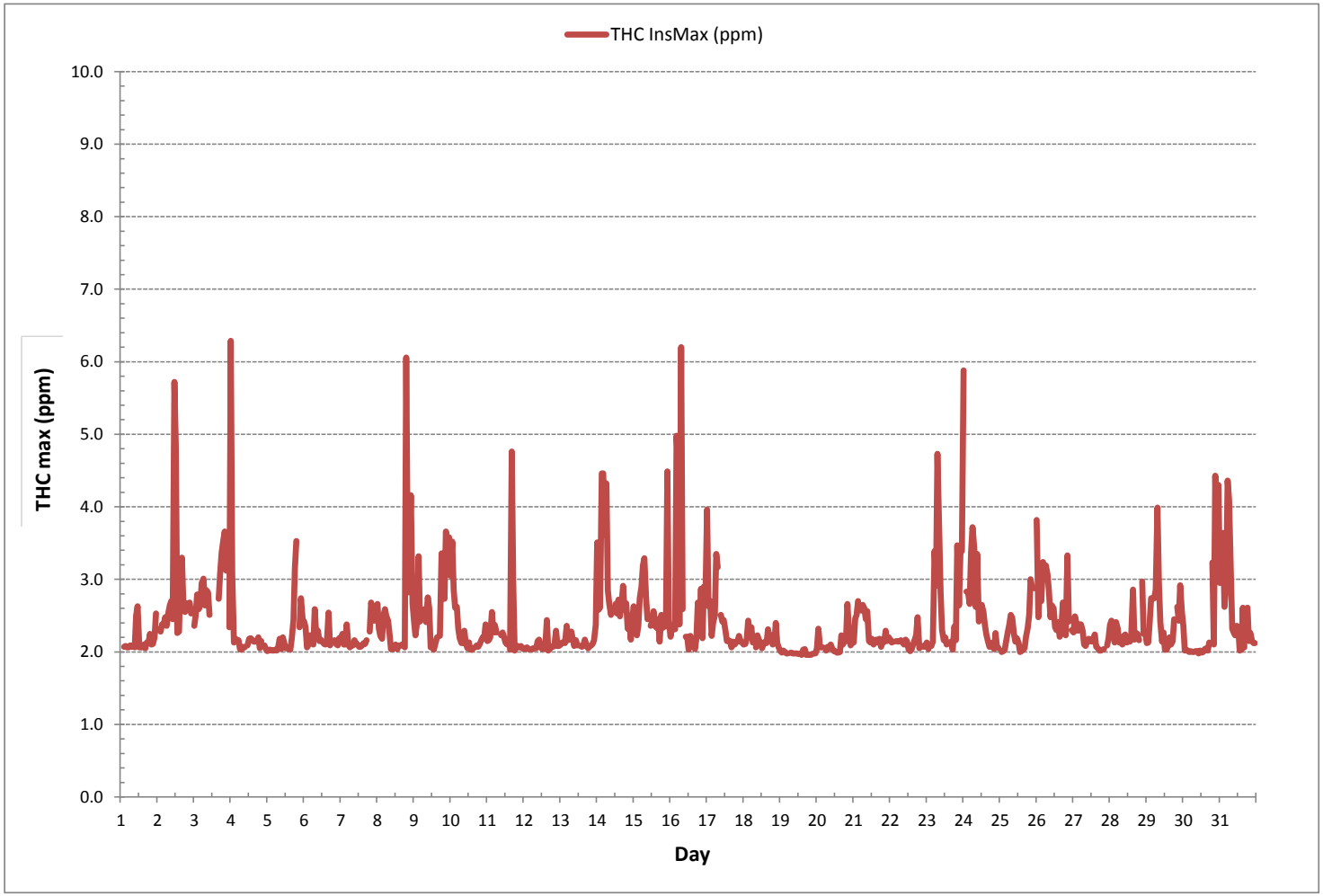
MAXIMUM INSTANTANEOUS VALUE: 6.29 ppm @ HOUR(S) 0 ON DAY(S) 4

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs
MONTHLY CALIBRATION TIME: 5 hrs
STANDARD DEVIATION: 0.57

OPERATIONAL TIME: 741 hrs

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)



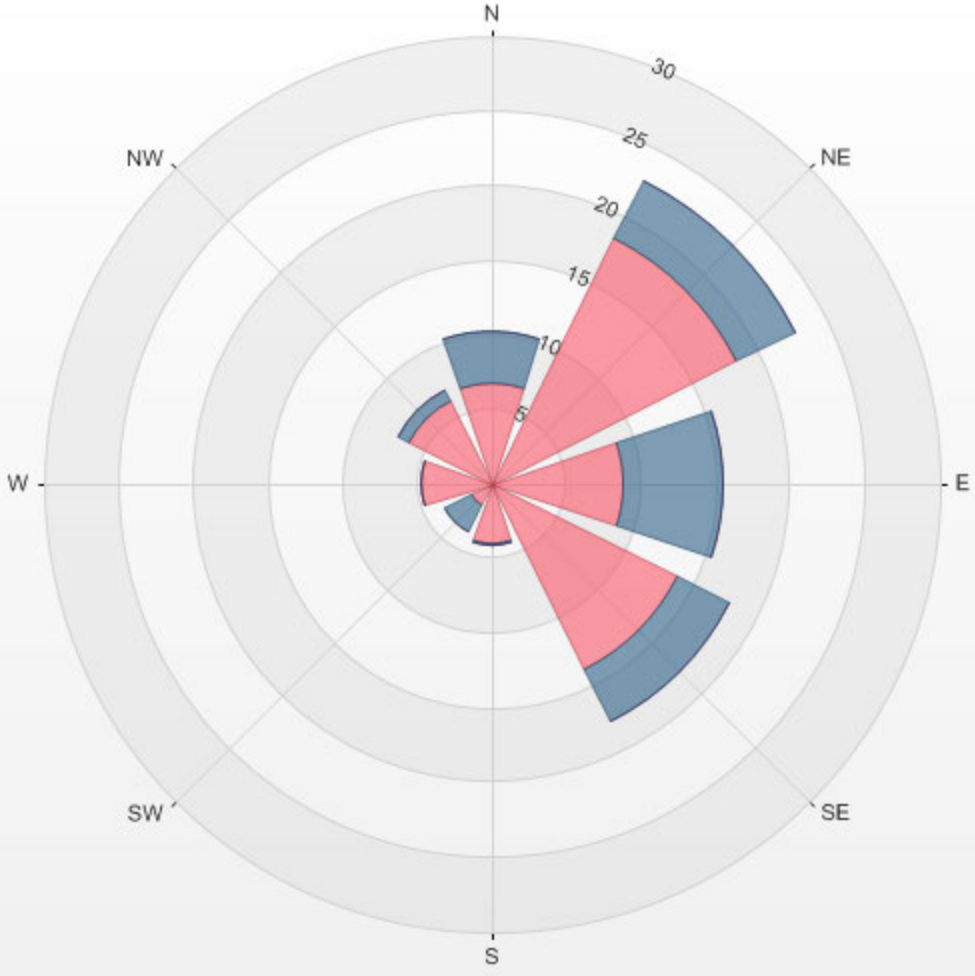
Wind: LICA Bonnyville
Poll.: LICA Bonnyville-THC55[ppm]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 14.37% Calm Avg: 2.32 [ppm]

Direction	0.0-1.1	1.1-2.2	2.2-3.3	>3.3	Total
N	0.0	6.8	3.4	0.0	10.2
NE	0.0	18.4	4.4	0.0	22.8
E	0.0	8.8	6.7	0.0	15.5
SE	0.0	13.9	3.8	0.0	17.8
S	0.0	4.0	0.1	0.0	4.1
SW	0.0	1.6	2.0	0.0	3.6
W	0.0	4.7	0.0	0.0	4.7
NW	0.0	6.3	0.7	0.0	7.0
Summary	0.0	64.4	21.2	0.0	85.6

%	Icon	Classes (ppm)	0	0.0-1.1	64	1.1-2.2	21	2.2-3.3	0	>3.3

LICA Bonnyville Poll.: LICA Bonnyville-THC55[ppm] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 14.37% Calm Poll Avg: 2.32[ppm]



THC55[ppm] Calibration: LICA Bonnyville Monthly: 17/03 Type: Span

METHANE

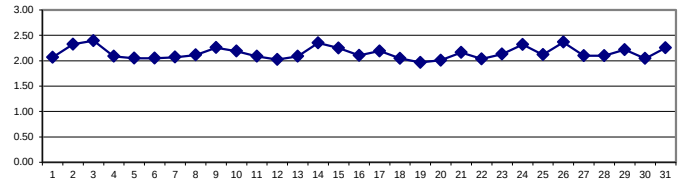
METHANE Hourly Averages (CH_4 ppm)

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	2.08	S	2.06	2.06	2.04	2.05	2.07	2.05	2.04	2.03	2.03	2.03	2.03	2.03	2.03	2.04	2.03	2.05	2.08	2.11	2.07	2.07	2.15	2.26	2.03	2.26	2.06	24
2	S	2.27	2.21	2.24	2.23	2.31	2.27	2.38	2.43	2.46	2.39	2.29	2.24	2.22	2.23	2.38	2.37	2.43	2.40	2.43	2.38	2.32	2.25	S	2.21	2.46	2.32	24
3	2.23	2.31	2.34	2.34	2.38	2.41	2.40	2.37	2.48	2.47	2.33	C	C	C	C	C	2.32	2.35	2.46	2.45	2.58	2.62	S	2.22	2.22	2.62	**2.39**	24
4	2.88	2.56	2.04	2.07	2.10	2.07	2.01	2.00	2.00	2.00	2.00	2.00	2.03	2.07	2.04	2.04	2.03	2.04	2.05	2.01	2.03	S	2.00	1.99	1.99	2.88	2.09	24
5	1.99	1.99	1.99	1.99	1.99	1.99	1.99	2.00	2.01	2.00	2.00	1.99	1.99	2.00	1.99	1.99	2.00	2.08	2.38	2.12	S	2.15	2.30	2.26	1.99	2.38	2.05	24
6	2.27	2.12	2.00	2.02	2.04	2.01	2.01	2.02	2.06	2.10	2.05	2.05	2.05	2.03	2.03	2.03	2.04	2.03	2.04	S	2.04	2.03	2.02	2.03	2.00	2.27	2.05	24
7	2.06	2.08	2.05	2.02	2.04	2.04	2.01	2.04	2.06	2.04	2.04	2.03	2.02	2.02	2.03	2.03	2.03	2.04	S	2.08	2.25	2.18	2.19	2.24	2.01	2.25	2.07	24
8	2.20	2.17	2.07	2.08	2.13	2.19	2.28	2.29	2.12	2.01	2.01	2.01	2.01	2.00	1.99	2.00	1.99	S	2.00	2.04	2.19	2.16	2.41	2.29	1.99	2.41	2.11	24
9	2.24	2.18	2.27	2.40	2.31	2.41	2.39	2.42	2.34	2.42	2.24	2.01	2.01	2.02	2.03	2.04	S	2.06	2.11	2.27	2.14	2.51	2.59	2.52	2.01	2.59	2.26	24
10	2.89	2.76	2.50	2.43	2.33	2.22	2.14	2.11	2.09	2.07	2.06	2.03	2.01	2.01	2.01	S	2.03	2.03	2.03	2.07	2.09	2.10	2.16	2.18	2.01	2.89	2.19	24
11	2.10	2.13	2.14	2.21	2.20	2.20	2.18	X	X	2.13	2.13	2.12	2.08	2.03	S	2.01	2.01	2.01	2.00	2.01	2.02	2.03	2.03	2.03	2.00	2.21	2.09	22
12	2.02	2.02	2.01	2.02	2.01	2.01	2.02	2.03	2.03	2.02	2.00	2.01	2.00	S	2.01	2.01	2.01	2.02	2.05	2.06	2.05	2.07	2.07	2.06	2.00	2.07	2.03	24
13	2.09	2.11	2.11	2.11	2.11	2.13	2.10	2.09	2.07	2.08	2.09	2.08	S	2.06	2.06	2.07	2.08	2.06	2.04	2.06	2.08	2.08	2.11	2.16	2.04	2.16	2.09	24
14	2.29	2.27	2.29	2.68	2.41	2.34	2.79	2.39	2.38	2.36	2.34	S	2.36	2.41	2.43	2.32	2.38	2.42	2.30	2.31	2.17	2.15	2.08	2.15	2.08	2.79	2.35	24
15	2.19	2.09	2.13	2.17	2.29	2.32	2.30	2.46	2.40	2.32	S	2.27	2.32	2.36	2.28	2.26	2.22	2.10	2.20	2.24	2.17	2.20	2.27	2.14	2.09	2.46	2.25	24
16	2.05	2.15	2.09	2.05	2.20	2.33	2.05	2.44	2.09	S	2.10	2.02	1.97	1.97	1.97	1.99	1.99	2.00	2.13	2.10	2.17	2.09	2.21	2.25	1.97	2.44	2.10	24
17	2.28	2.17	2.15	2.09	2.21	2.26	2.50	2.61	S	2.30	2.30	2.32	2.20	2.13	2.08	2.04	2.04	2.07	2.08	2.10	2.14	2.12	2.13	2.11	2.04	2.61	2.19	24
18	2.08	2.06	2.08	2.11	2.10	2.08	2.05	S	2.00	2.02	2.03	2.02	2.01	2.01	2.01	2.02	2.04	2.08	2.09	2.05	2.02	2.07	2.06	1.99	1.99	2.11	2.05	24
19	1.99	1.97	2.00	1.99	1.97	1.96	S	1.98	1.97	1.97	1.97	1.96	1.96	**1.95**	1.95	1.97	1.95	1.95	1.95	1.95	1.95	1.96	1.96	1.97	**1.95**	2.00	1.97	24
20	1.98	2.01	2.01	2.00	2.01	S	2.00	2.02	2.01	1.99	1.99	1.98	1.98	1.98	1.98	1.99	1.99	2.01	2.02	2.06	2.01	2.08	2.05	2.05	1.98	2.08	2.01	24
21	2.08	2.19	2.31	2.49	S	2.44	2.44	2.43	2.40	2.29	2.12	2.09	2.06	2.02	2.06	2.05	2.04	2.02	2.00	2.02	2.04	2.05	2.04	2.06	2.00	2.49	2.16	24
22	2.06	2.04	2.05	S	2.03	2.04	2.04	2.05	2.04	2.02	2.02	2.02	2.01	1.99	1.99	1.99	2.04	2.11	2.08	2.02	2.04	2.06	2.06	2.06	1.99	2.11	2.04	24
23	2.05	2.02	S	2.03	2.03	2.26	2.21	2.31	2.38	2.27	2.16	2.11	2.11	2.05	2.05	2.05	2.03	2.01	2.05	2.08	2.16	2.20	2.20	2.25	2.01	2.38	2.13	24
24	2.73	S	2.28	2.32	2.45	2.61	2.77	2.84	2.48	2.56	2.34	2.40	2.53	2.44	2.26	2.13	2.09	2.02	2.02	2.01	2.01	2.03	2.02	2.00	2.00	2.84	2.32	24
25	S	1.98	1.99	2.00	2.02	2.08	2.18	2.26	2.23	2.11	2.11	2.13	2.07	1.99	1.99	2.02	2.03	2.05	2.09	2.16	2.53	2.25	2.37	S	1.98	2.53	2.12	24
26	2.85	2.32	2.42	2.50	2.46	2.50	2.61	2.69	2.52	2.39	2.40	2.37	2.31	2.27	2.18	2.19	2.23	2.23	2.18	2.08	2.24	2.29	S	2.16	2.08	2.85	2.36	24
27	2.18	2.23	2.26	2.22	2.28	2.23	2.17	2.06	2.02	2.04	2.13	2.10	2.09	2.02	2.02	2.03	2.03	2.01	2.00	2.01	2.00	S	2.04	2.11	2.00	2.28	2.10	24
28	2.17	2.15	2.13	2.06	2.08	2.09	2.12	2.10	2.09	2.11	2.12	2.10	2.11	2.11	2.11	2.08	2.09	2.10	2.07	2.09	S	2.09	2.08	2.08	2.06	2.17	2.10	24
29	2.07	2.08	2.22	2.33	2.34	2.48	2.40	2.57	2.45	2.24	2.05	2.02	2.02	2.02	2.04	2.04	2.04	2.05	2.12	S	2.25	2.31	2.54	2.31	2.02	2.57	2.22	24
30	2.14	2.00	2.00	1.98	1.98	1.98	1.98	1.97	1.97	1.96	1.96	1.97	1.97	1.98	1.97	1.98	1.97	1.98	S	2.27	2.05	2.56	2.16	2.24	1.96	2.56	2.04	24
31	2.19	2.56	2.31	2.27	2.41	**3.17**	2.96	2.34	2.28	2.22	2.21	2.26	2.15	1.99	1.98	2.01	2.04	S	2.07	2.04	2.08	2.14	2.09	2.07	1.98	**3.17**	2.25	24
HOURLY MAX	2.89	2.76	2.50	2.68	2.46	3.17	2.96	2.84	2.52	2.56	2.40	2.40	2.53	2.44	2.43	2.38	2.38	2.43	2.46	2.45	2.58	2.62	2.59	2.52				
HOURLY AVG	2.22	2.17	2.15	2.18	2.17	2.24	2.25	2.25	2.19	2.17	2.12	2.10	2.09	2.08	2.06	2.06	2.07	2.08	2.11	2.11	2.14	2.17	2.16	2.15				

STATUS FLAG CODES

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

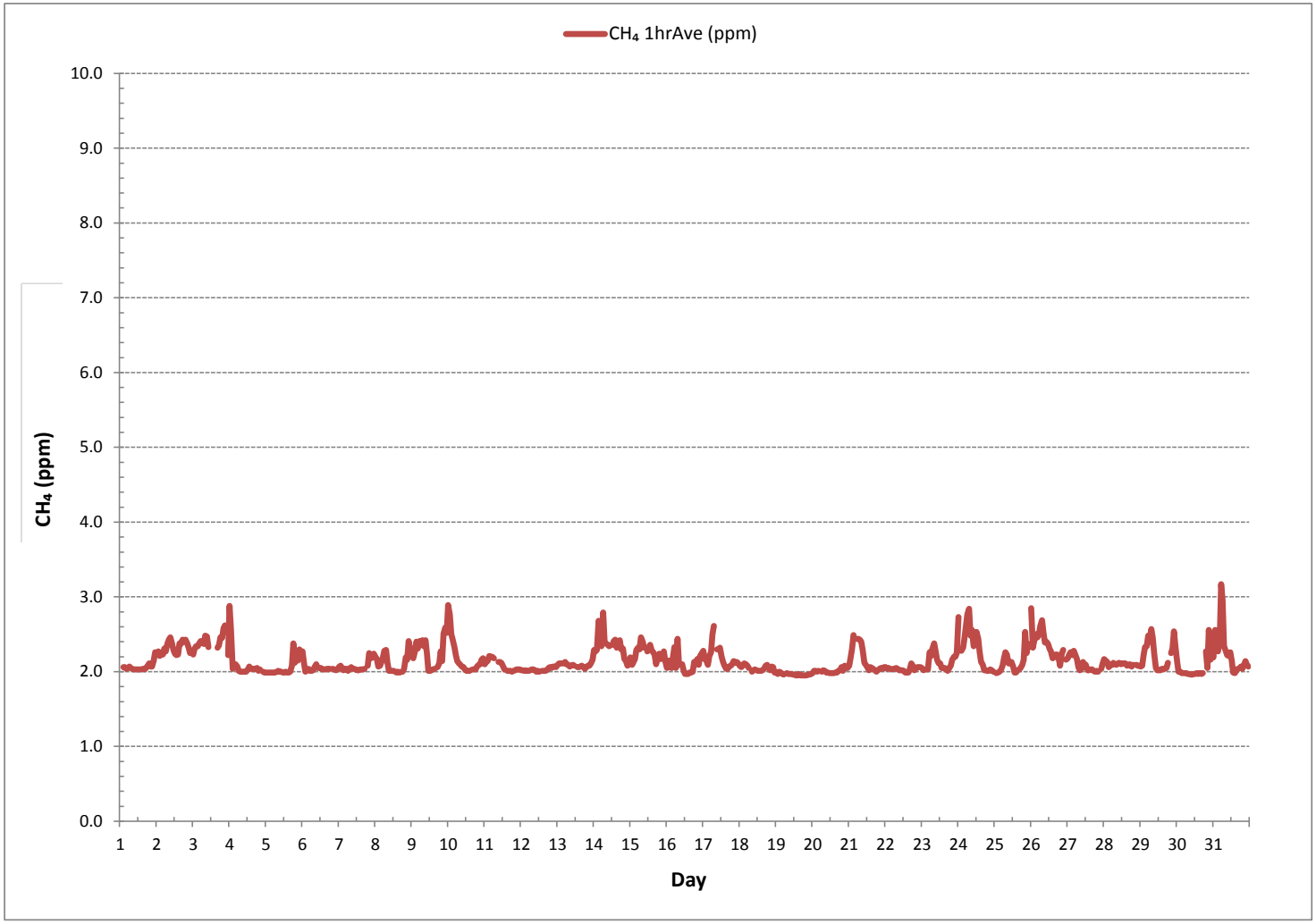
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			704				
MINIMUM 1-HR AVERAGE		1.95	ppm	@ HOUR(S)	13	ON DAY(S)	19
MAXIMUM 1-HR AVERAGE:		3.17	ppm	@ HOUR(S)	5	ON DAY(S)	31
MAXIMUM 24-HR AVERAGE:		2.39	ppm			ON DAY(S)	3
						VAR-VARIOUS	
IZS CALIBRATION TIME:	33	hrs		OPERATIONAL TIME:		742	hrs
MONTHLY CALIBRATION TIME:	5	hrs		AMD OPERATION UPTIME:		99.7	%
STANDARD DEVIATION:	0.18			MONTHLY AVERAGE:		2.15	ppm

METHANE Hourly Averages (CH_4 ppm)



METHANE MAX Instantaneous Maximum (CH_4 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	S	2.07	2.08	2.06	2.06	2.10	2.07	2.09	2.06	2.05	2.05	2.06	2.06	2.06	2.11	2.06	2.13	2.12	2.26	2.11	2.12	2.20	2.51	2.05	2.51	2.11	24
2	S	2.31	2.28	2.39	2.38	2.47	2.37	2.54	2.64	2.71	2.45	2.50	2.49	2.27	2.28	2.76	2.71	2.53	2.50	2.58	2.55	2.58	2.52	S	2.27	2.76	2.49	24
3	2.36	2.49	2.70	2.59	2.61	2.87	2.85	2.60	2.78	2.73	2.51	C	C	C	C	C	2.44	2.55	3.12	3.07	3.39	2.93	S	2.27	2.27	3.39	2.71	24
4	5.71	2.94	2.14	2.18	2.17	2.16	2.04	2.03	2.07	2.06	Y	2.04	2.15	2.20	2.17	2.15	2.15	2.16	2.16	2.05	2.16	S	2.10	2.05	2.03	5.71	2.32	23
5	2.01	2.04	2.03	2.02	2.02	2.03	2.02	2.07	2.19	2.04	2.20	2.13	2.05	2.06	2.04	2.03	2.18	2.40	3.02	3.34	S	2.34	2.66	2.44	2.01	3.34	2.23	24
6	2.42	2.34	2.06	2.11	2.22	2.20	2.10	2.54	2.23	2.29	2.16	2.17	2.15	2.11	2.10	2.14	2.14	2.10	2.14	S	2.17	2.12	2.10	2.19	2.06	2.54	2.19	24
7	2.17	2.25	2.11	2.11	2.35	2.10	2.06	2.10	2.10	2.16	2.12	2.11	2.08	2.08	2.10	2.12	2.12	2.17	S	2.28	2.63	2.54	2.43	2.48	2.06	2.63	2.21	24
8	2.60	2.32	2.19	2.19	2.44	2.52	2.44	2.43	2.26	2.04	2.04	2.08	2.10	2.04	2.10	2.08	2.01	S	2.02	2.29	2.74	2.43	3.89	2.60	2.01	3.89	2.34	24
9	2.44	2.24	2.42	3.17	2.43	2.53	2.52	2.59	2.37	2.56	2.47	2.06	2.07	2.03	2.09	2.21	S	2.22	3.21	2.85	2.64	3.37	3.33	3.38	2.03	3.38	2.57	24
10	3.05	3.41	2.87	2.58	2.62	2.32	2.19	2.13	2.12	2.10	2.13	2.06	2.13	2.03	2.03	S	2.06	2.10	2.08	2.10	2.16	2.21	2.19	2.39	2.03	3.41	2.31	24
11	2.15	2.16	2.21	2.49	2.27	2.37	2.27	X	X	2.24	2.27	2.22	2.14	2.11	S	2.03	2.05	2.03	2.02	2.07	2.08	2.06	2.08	2.05	2.02	2.49	2.16	22
12	2.04	2.05	2.06	2.04	2.03	2.03	2.06	2.05	2.06	2.16	2.18	2.06	2.04	S	2.04	2.04	2.02	2.04	2.07	2.08	2.08	2.13	2.09	2.08	2.02	2.18	2.07	24
13	2.11	2.13	2.13	2.13	2.36	2.16	2.23	2.28	2.18	2.09	2.17	2.09	S	2.08	2.07	2.10	2.12	2.09	2.05	2.07	2.10	2.12	2.17	2.32	2.05	2.36	2.15	24
14	3.32	2.52	2.52	4.10	4.10	3.37	4.00	2.73	2.57	2.45	2.36	S	2.60	2.48	2.61	2.49	2.57	2.81	2.51	2.58	2.32	2.37	2.18	2.40	2.18	4.10	2.78	24
15	2.56	2.30	2.25	2.36	2.66	2.81	3.04	3.17	2.64	2.45	S	2.32	2.42	2.55	2.32	2.28	2.45	2.14	2.44	2.31	2.35	2.36	4.09	2.39	2.14	4.09	2.55	24
16	2.22	2.35	2.31	2.31	4.61	4.22	2.33	5.68	2.42	S	2.22	2.22	2.03	2.20	2.10	2.10	2.04	2.20	2.62	2.24	2.77	2.19	2.79	2.79	2.03	5.68	2.65	24
17	3.67	2.56	2.61	2.22	2.41	2.50	3.21	3.06	S	2.51	2.43	2.44	2.30	2.16	2.09	2.07	2.06	2.09	2.10	2.14	2.16	2.15	2.15	2.14	2.06	3.67	2.40	24
18	2.10	2.11	2.18	2.38	2.24	2.32	2.14	S	2.06	2.23	2.18	2.14	2.05	2.11	2.15	2.13	2.23	2.18	2.24	2.11	2.13	2.35	2.13	2.06	2.05	2.38	2.17	24
19	2.01	1.99	2.02	2.01	1.98	1.97	S	1.98	1.98	1.98	1.98	1.98	1.97	1.96	1.96	2.04	2.04	1.96	1.95	1.95	1.96	1.96	1.98	1.98	1.95	2.04	1.98	24
20	2.05	2.27	2.06	2.06	2.06	S	2.02	2.07	2.05	2.10	2.06	2.01	2.01	1.99	1.99	2.00	2.02	2.11	2.15	2.15	2.04	2.17	2.09	2.13	1.99	2.27	2.07	24
21	2.14	2.46	2.51	2.71	S	2.57	2.63	2.60	2.45	2.52	2.16	2.13	2.18	2.10	2.16	2.18	2.14	2.18	2.08	2.13	2.15	2.29	2.16	2.20	2.08	2.71	2.30	24
22	2.18	2.13	2.15	S	2.15	2.15	2.16	2.17	2.14	2.10	2.18	2.16	2.03	2.01	2.03	2.06	2.17	2.24	2.42	2.05	2.08	2.08	2.07	2.10	2.01	2.42	2.13	24
23	2.10	2.04	S	2.08	2.15	3.15	2.83	2.88	3.12	2.39	2.30	2.17	2.21	2.11	2.13	2.14	2.10	2.03	2.28	2.16	3.28	2.57	3.24	3.21	2.03	3.28	2.46	24
24	5.35	S	2.72	2.70	2.61	3.17	3.44	3.30	2.62	2.77	2.42	2.53	2.65	2.55	2.37	2.25	2.15	2.08	2.13	2.12	2.04	2.06	2.07	2.06	2.04	5.35	2.62	24
25	S	2.01	2.02	2.03	2.15	2.28	2.33	2.46	2.45	2.26	2.15	2.20	2.14	2.00	2.01	2.03	2.06	2.21	2.29	2.52	2.90	2.81	2.79	S	2.00	2.90	2.28	24
26	3.60	2.48	2.83	2.66	3.10	2.95	2.84	3.06	2.82	2.48	2.54	2.51	2.34	2.30	2.41	2.21	2.26	2.69	2.64	2.23	3.10	2.34	S	2.30	2.21	3.60	2.64	24
27	2.27	2.47	2.41	2.29	2.38	2.38	2.29	2.11	2.08	2.14	2.18	2.18	2.14	2.17	2.04	2.07	2.05	2.03	2.02	2.03	2.04	S	2.10	2.20	2.02	2.47	2.18	24
28	2.37	2.39	2.30	2.14	2.37	2.33	2.13	2.16	2.11	2.16	2.19	2.14	2.16	2.15	2.19	2.12	2.12	2.19	2.10	2.17	S	2.18	2.25	2.28	2.10	2.39	2.20	24
29	2.13	2.14	2.34	2.63	2.64	2.65	2.79	3.67	2.82	2.35	2.15	2.05	2.03	2.03	2.08	2.09	2.10	2.15	2.36	S	2.55	2.39	2.83	2.54	2.03	3.67	2.41	24
30	2.36	2.02	2.03	2.01	2.00	2.01	2.00	1.99	2.01	2.02	1.98	2.01	1.99	2.00	2.04	2.05	2.02	2.14	S	3.08	2.10	4.06	2.89	4.03	1.98	4.06	2.30	24
31	2.84	3.24	3.46	2.54	2.87	4.08	3.86	3.15	2.32	2.27	2.24	2.36	2.32	2.02	2.04	2.06	2.06	S	2.53	2.07	2.13	2.15	2.12	2.12	2.02	4.08	2.56	24
HOURLY MAX	5.71	3.41	3.46	4.10	4.61	4.22	4.00	5.68	3.12	2.77	2.54	2.53	2.65	2.55	2.61	2.76	2.71	2.81	3.21	3.34	3.39	4.06	4.09	4.03				
HOURLY AVG	2.64	2.35	2.33	2.38	2.48	2.56	2.51	2.61	2.34	2.28	2.22	2.18	2.17	2.14	2.13	2.14	2.16	2.21	2.32	2.31	2.38	2.39	2.47	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

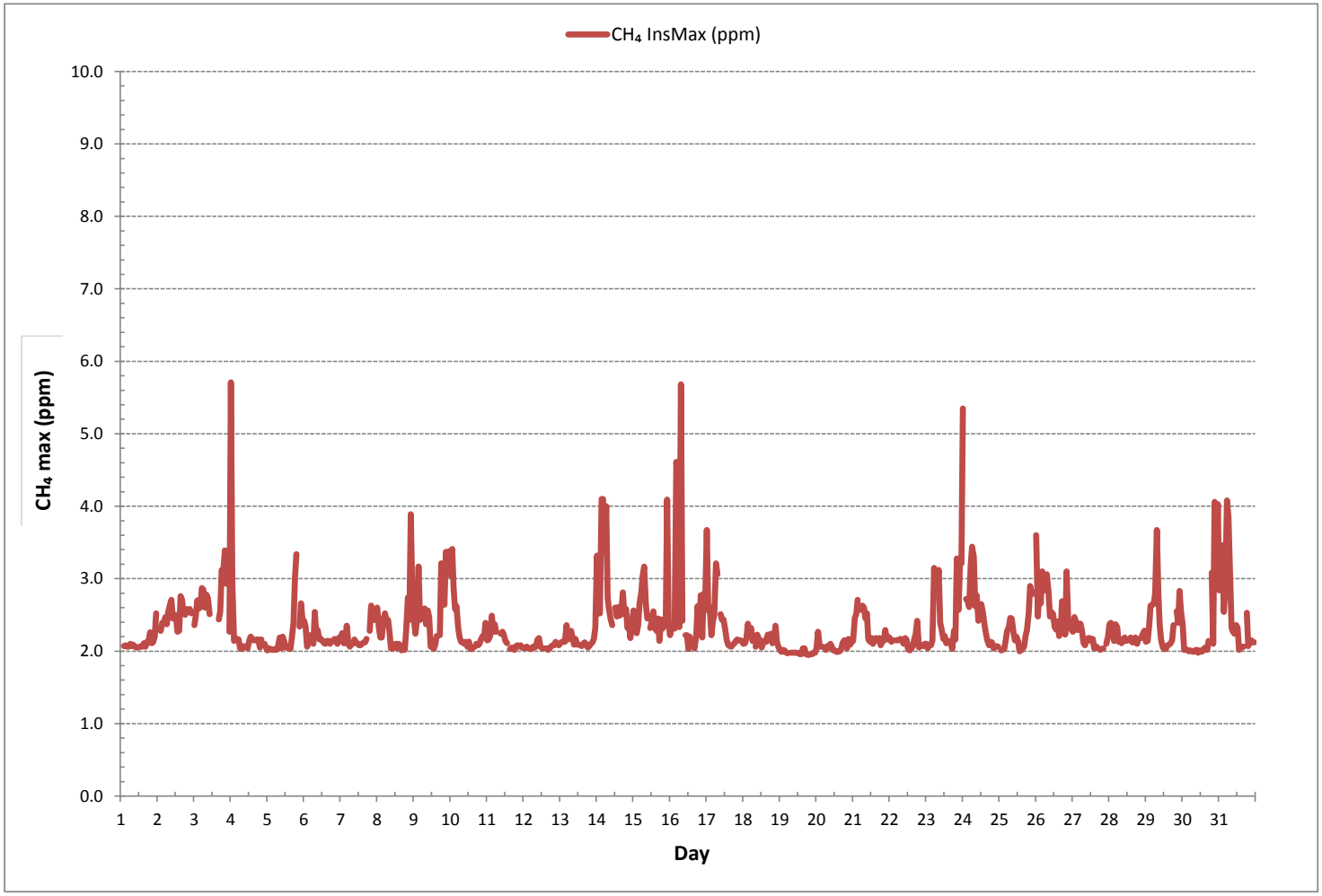
NUMBER OF NON-ZERO READINGS: 703

MAXIMUM INSTANTANEOUS VALUE: 5.71 ppm @ HOUR(S) 0 ON DAY(S) 4

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 741 hrs
MONTHLY CALIBRATION TIME: 5 hrs
STANDARD DEVIATION: 0.44

METHANE MAX Instantaneous Maximum (CH_4 ppm)



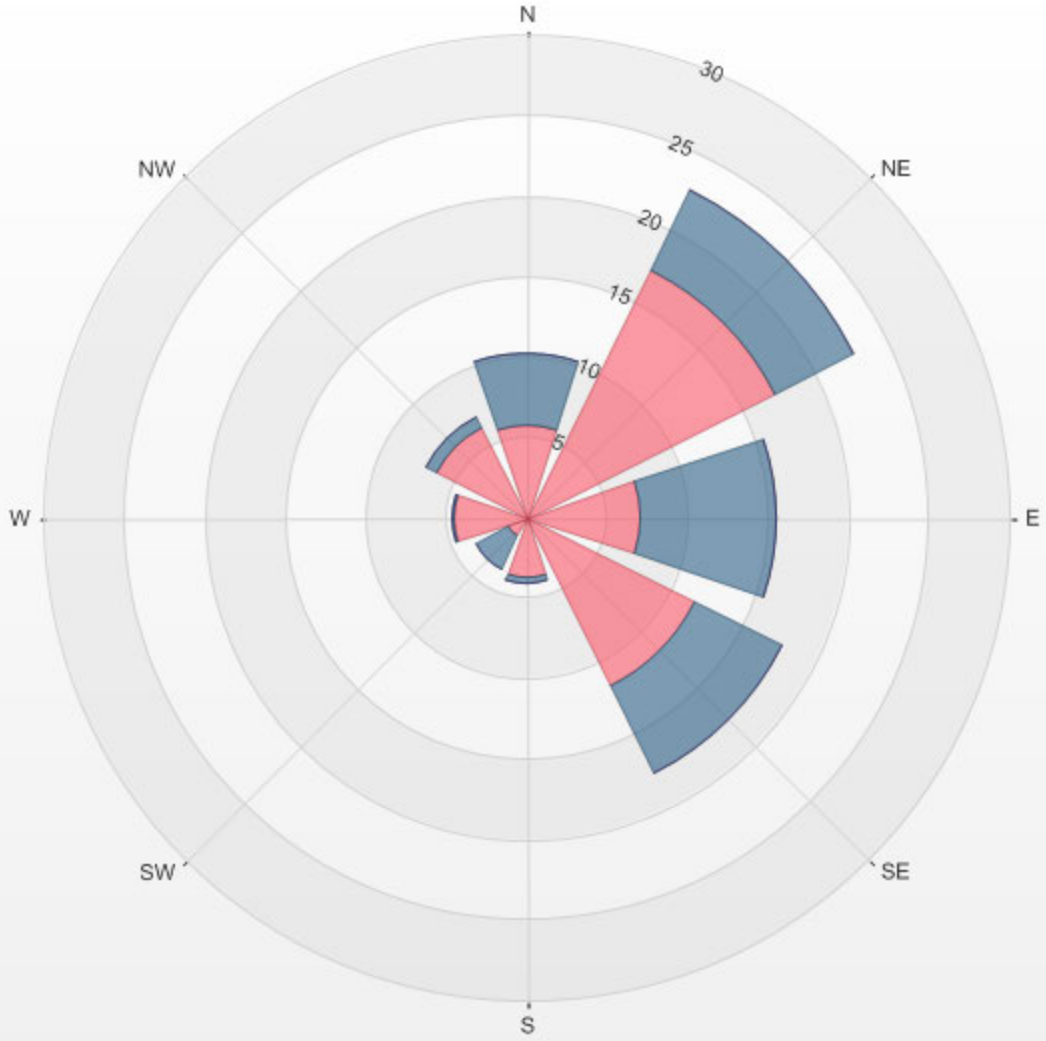
Wind: LICA Bonnyville
Poll.: LICA Bonnyville-CH4[ppm]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 14.37% Calm Avg: 2.29 [ppm]

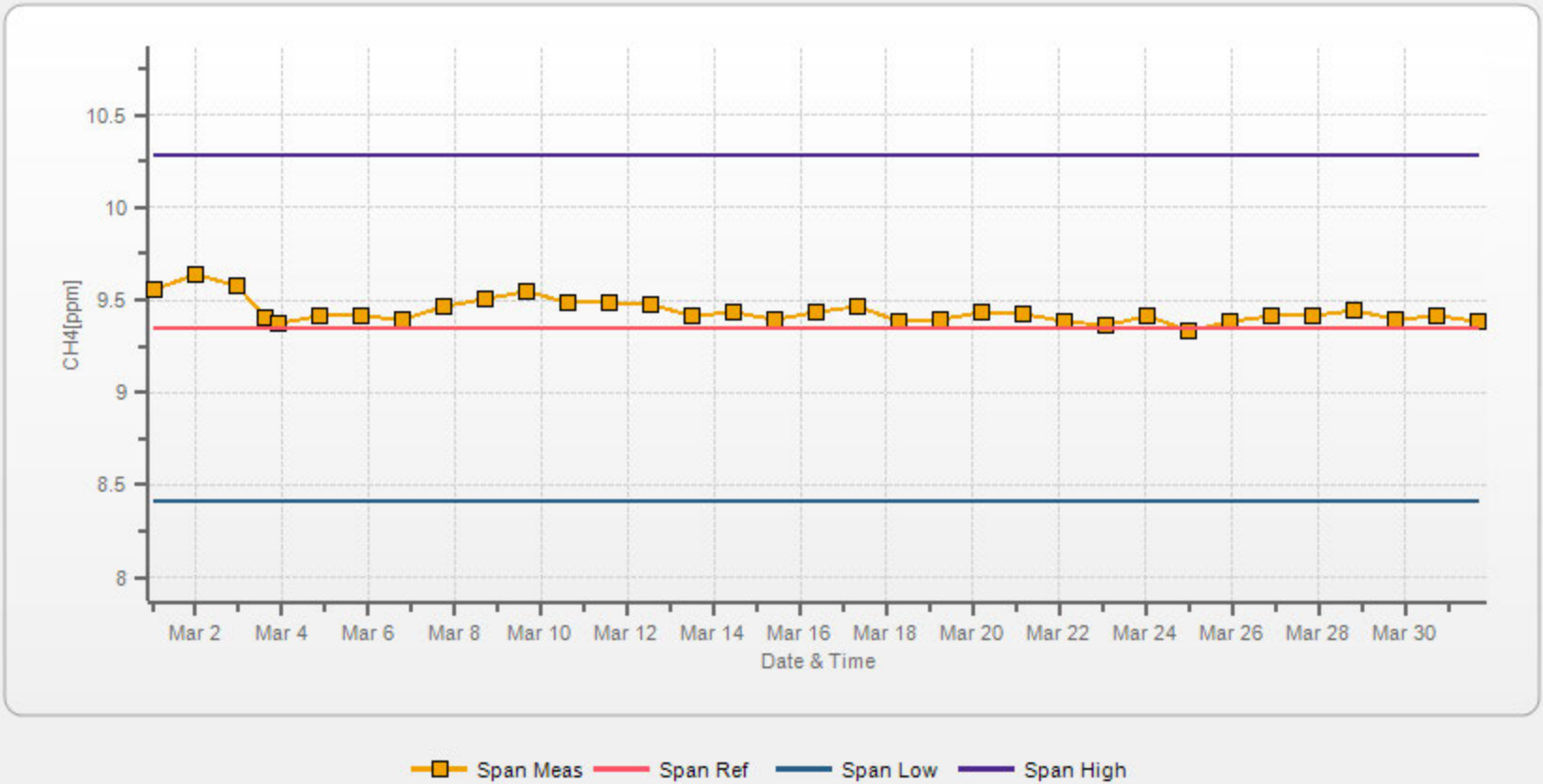
Direction	0.0-1.1	1.1-2.1	2.1-3.2	>3.2	Total
N	0.0	5.8	4.4	0.0	10.2
NE	0.0	17.2	5.6	0.0	22.8
E	0.0	7.1	8.4	0.0	15.5
SE	0.0	11.7	6.1	0.0	17.8
S	0.0	3.7	0.4	0.0	4.1
SW	0.0	1.3	2.3	0.0	3.6
W	0.0	4.6	0.1	0.0	4.7
NW	0.0	6.3	0.7	0.0	7.0
Summary	0.0	57.6	28.0	0.0	85.6

% Icon Classes (ppm)	0 0.0-1.1	58 1.1-2.1	28 2.1-3.2	0 >3.2

LICA Bonnyville Poll.: LICA Bonnyville-CH4[ppm] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 14.37% Calm Poll Avg: 2.29[ppm]



CH4[ppm] Calibration: LICA Bonnyville Monthly: 17/03 Type: Span



NON-METHANE HYDROCARBON

Maxxam
A Bureau Veritas Group Company

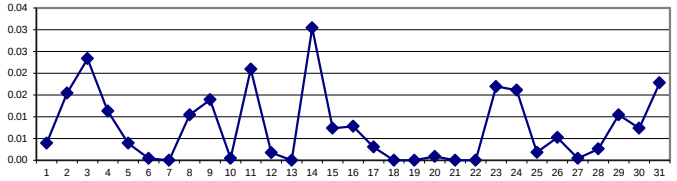
NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

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**	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	0.06	0.00	24
2	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.00	0.00	0.10	0.11	0.00	0.00	0.00	0.02	0.01	0.00	S	0.00	0.11	0.02	24
3	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.00	C	C	C	C	C	0.05	0.04	0.03	0.08	0.09	0.08	S	0.01	0.00	0.09	0.02	24
4	0.14	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.14	0.01	24
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.03	S	0.01	0.01	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	0.00	0.00	0.01	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
8	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.13	0.01	0.04	0.04	0.01	0.00	0.13	0.01	24
9	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.07	0.02	0.00	0.00	0.00	0.00	0.00	S	0.00	0.04	0.02	0.00	0.07	0.05	0.03	0.00	0.07	0.01	24
10	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	X	X	0.00	0.00	0.00	0.00	0.00	S	0.00	**0.38**	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.38**	0.02	22
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.01	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	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
14	0.02	0.02	0.02	0.11	0.04	0.03	0.13	0.05	0.01	0.01	0.04	S	0.02	0.01	0.02	0.01	0.02	0.04	0.03	0.06	0.01	0.00	0.00	0.00	0.00	0.13	**0.03**	24
15	0.01	0.00	0.00	0.00	0.01	0.02	0.01	0.02	0.03	0.00	S	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.01	0.00	0.03	0.01	24
16	0.00	0.00	0.00	0.00	0.02	0.04	0.00	0.06	0.02	S	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.06	0.01	24
17	0.03	0.00	0.01	0.00	0.00	0.00	0.02	0.00	S	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	24
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
19	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
20	0.00	0.00	0.00	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	0.02	0.00	0.00	0.00	0.00	0.02	0.00	24
21	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
22	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
23	0.00	0.00	S	0.00	0.00	0.04	0.01	0.16	0.11	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.01	0.02	0.00	0.16	0.02	24
24	0.11	S	0.01	0.02	0.01	0.06	0.09	0.04	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	0.02	0.00	0.00	0.00	0.11	0.02	24
25	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	0.02	0.01	0.01	S	0.00	0.02	0.00	24
26	0.04	0.00	0.01	0.00	0.01	0.01	0.02	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	S	0.00	0.00	0.04	0.01	24
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.01	0.00	24
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	S	0.02	0.00	0.00	0.00	0.04	0.00	24
29	0.00	0.00	0.00	0.01	0.01	0.03	0.01	0.07	0.05	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	S	0.02	0.01	0.01	0.00	0.00	0.07	0.01	24
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.03	0.00	0.10	0.02	0.02	0.00	0.10	0.01	24
31	0.00	0.08	0.02	0.02	0.02	0.11	0.11	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	S	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.11	0.02	24
HOURLY MAX	0.14	0.10	0.02	0.11	0.04	0.11	0.13	0.16	0.11	0.07	0.04	0.06	0.04	0.01	0.02	0.10	0.38	0.06	0.04	0.13	0.09	0.10	0.05	0.03				
HOURLY AVG	0.01	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.02	0.00	0.01	0.01	0.01	0.01	0.01	0.00				

STATUS FLAG CODES

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

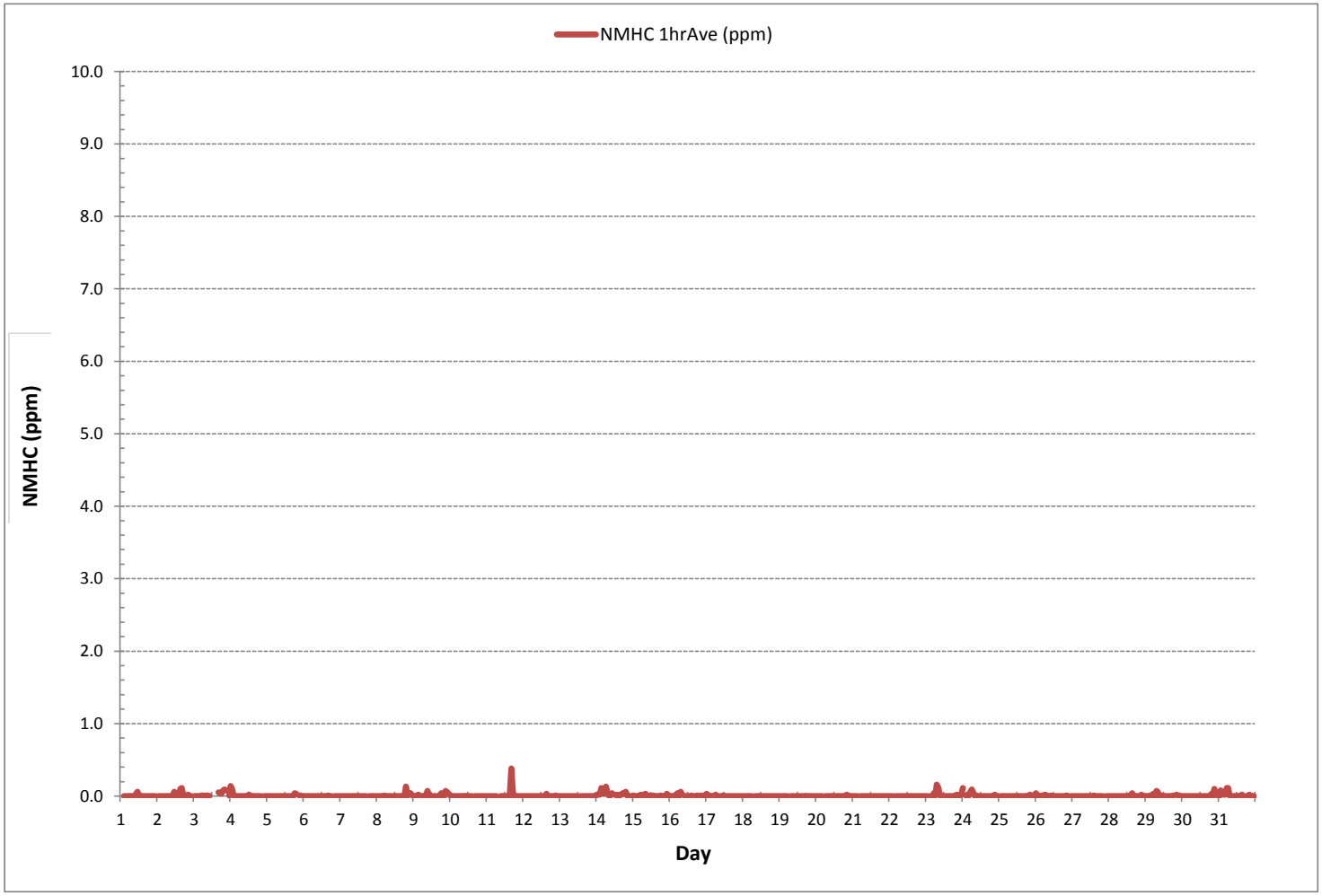
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			146				
MINIMUM 1-HR AVERAGE		0.00	ppm	@ HOUR(S)	0	ON DAY(S)	1
MAXIMUM 1-HR AVERAGE:		0.38	ppm	@ HOUR(S)	16	ON DAY(S)	11
MAXIMUM 24-HR AVERAGE:		0.03	ppm			ON DAY(S)	14
						VAR-VARIOUS	
IZS CALIBRATION TIME:	33	hrs		OPERATIONAL TIME:		742	hrs
MONTHLY CALIBRATION TIME:	5	hrs		AMD OPERATION UPTIME:		99.7	%
STANDARD DEVIATION:	0.02			MONTHLY AVERAGE:		0.01	ppm

NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)



NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.05	24
2	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.23	2.32	0.00	0.00	0.67	0.95	0.10	0.05	0.09	0.12	0.11	0.00	S	0.00	3.23	0.35	24
3	0.00	0.04	0.10	0.00	0.07	0.09	0.17	0.05	0.12	0.10	0.00	C	C	C	C	C	0.29	0.53	0.24	0.84	0.29	0.45	S	0.08	0.00	0.84	0.19	24
4	0.60	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Y	0.10	0.17	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	S	0.00	0.00	0.00	0.60	0.05	23
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.14	0.32	S	0.10	0.12	0.00	0.00	0.32	0.03	24
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.47	0.02	24
7	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.06	0.00	0.00	0.11	0.00	0.11	0.01	24
8	0.06	0.00	0.03	0.00	0.06	0.08	0.11	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	S	0.05	**3.80**	0.15	1.08	0.26	0.09	0.00	**3.80**	0.26	24
9	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.07	0.22	0.14	0.00	0.00	0.00	0.07	0.00	S	0.00	0.50	0.12	0.09	0.28	0.19	0.20	0.00	0.50	0.09	24
10	0.11	0.13	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.02	24
11	0.00	0.00	0.00	0.05	0.00	0.00	0.00	X	X	0.00	0.00	0.00	0.00	0.00	S	0.00	2.75	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.75	0.18	22
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.45	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.45	0.03	24
13	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	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.06	0.00	24
14	0.18	0.11	0.09	0.35	0.35	0.24	0.36	0.13	0.10	0.11	0.25	S	0.11	0.12	0.11	0.13	0.12	0.21	0.10	0.16	0.08	0.08	0.05	0.08	0.05	0.36	0.16	24
15	0.07	0.05	0.00	0.00	0.10	0.11	0.15	0.13	0.23	0.04	S	0.11	0.05	0.13	0.06	0.10	0.15	0.00	0.08	0.05	0.06	0.06	0.40	0.07	0.00	0.40	0.10	24
16	0.00	0.00	0.00	0.00	0.37	0.34	0.05	0.53	0.18	S	0.00	0.00	0.00	0.04	0.13	0.06	0.00	0.00	0.10	0.07	0.12	0.00	0.12	0.09	0.00	0.53	0.10	24
17	0.29	0.07	0.09	0.00	0.00	0.04	0.14	0.11	S	0.00	0.00	0.17	0.00	0.00	0.11	0.11	0.00	0.07	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.29	0.06	24
18	0.00	0.00	0.00	0.06	0.00	0.05	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.09	0.01	24
19	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
20	0.00	0.05	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	0.22	0.07	0.00	0.00	0.67	0.22	0.00	0.00	0.00	0.67	0.05	24
21	0.00	0.00	0.00	0.00	S	0.10	0.04	0.00	0.00	0.04	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.01	24
22	0.00	0.00	0.00	S	0.00	0.00	0.08	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.11	0.01	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.01	24
23	0.07	0.00	S	0.00	0.00	0.25	0.11	2.11	0.89	0.57	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.08	0.10	0.20	0.09	0.15	0.18	0.00	2.11	0.21	24
24	0.54	S	0.12	0.13	0.09	0.21	0.27	0.16	0.04	0.60	0.03	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.60	0.11	24
25	S	0.00	0.00	0.00	0.00	0.05	0.08	0.09	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.34	0.33	0.10	S	0.00	0.34	0.05	24
26	0.22	0.05	0.09	0.07	0.14	0.11	0.38	0.09	0.07	0.00	0.10	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.24	0.14	S	0.00	0.00	0.38	0.08	24
27	0.00	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	0.21	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.21	0.01	24
28	0.05	0.05	0.08	0.00	0.04	0.19	0.00	0.00	0.00	0.11	0.10	0.00	0.00	0.00	0.13	0.79	0.10	0.14	0.16	0.06	S	0.88	0.00	0.00	0.00	0.88	0.13	24
29	0.05	0.00	0.12	0.12	0.10	0.12	0.09	0.32	0.20	0.09	0.00	0.22	0.00	0.00	0.00	0.16	0.00	0.00	0.10	S	0.15	0.10	0.10	0.00	0.00	0.32	0.09	24
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	S	0.16	0.00	0.37	0.18	0.27	0.00	0.37	0.04	24
31	0.11	0.21	0.17	0.11	0.17	0.29	0.24	0.13	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.61	0.00	S	0.08	0.09	0.16	0.00	0.00	0.00	0.00	0.61	0.11	24
HOURLY MAX	0.60	0.22	0.17	0.35	0.37	0.34	0.38	2.11	0.89	0.60	0.47	3.23	2.32	0.13	0.21	0.79	2.75	0.94	0.50	3.80	0.67	1.08	0.40	0.27				
HOURLY AVG	0.08	0.04	0.03	0.04	0.05	0.08	0.08	0.14	0.07	0.07	0.04	0.16	0.09	0.01	0.03	0.11	0.18	0.07	0.06	0.20	0.09	0.17	0.06	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

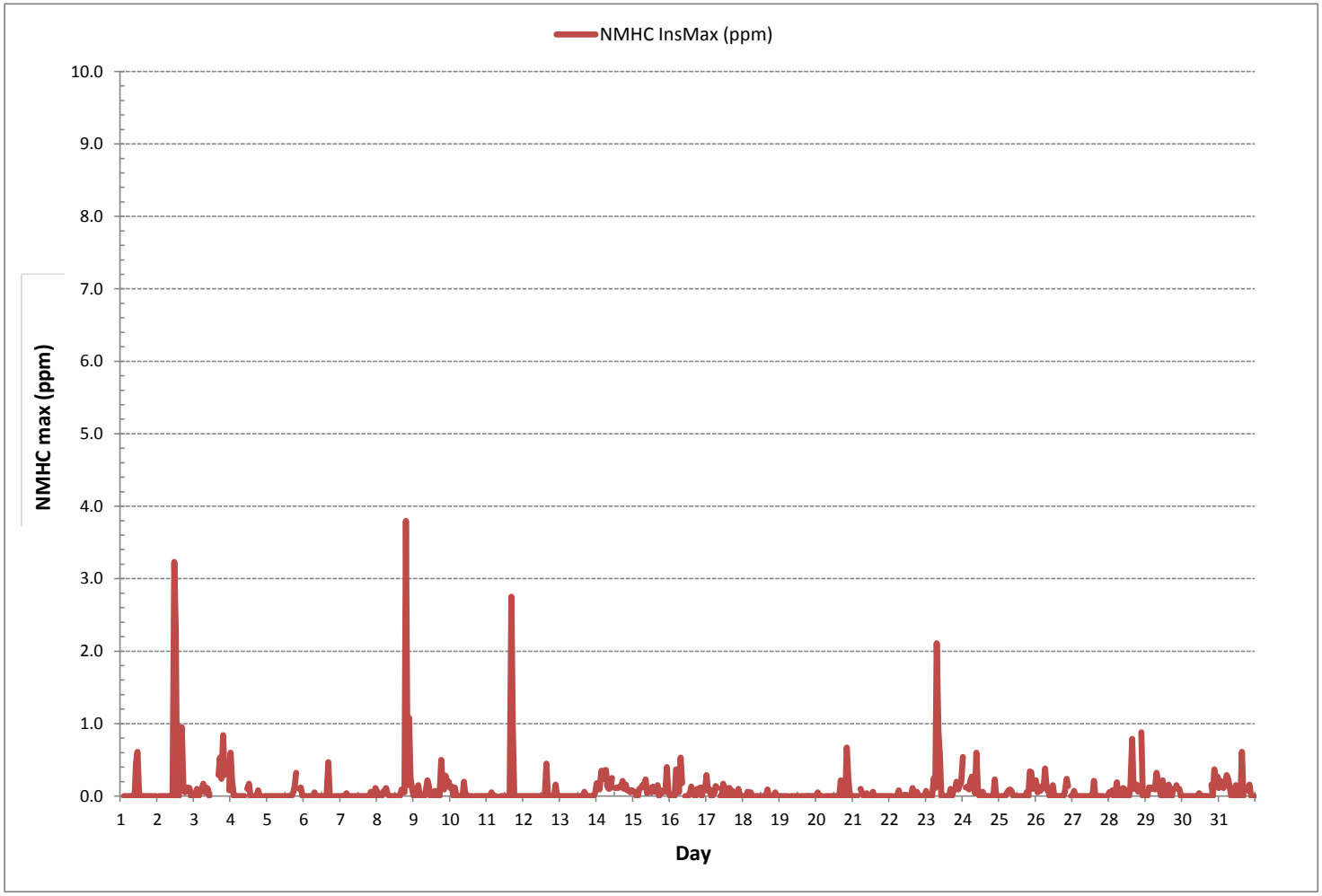
NUMBER OF NON-ZERO READINGS: 257

MAXIMUM INSTANTANEOUS VALUE: 3.80 ppm @ HOUR(S) 19 ON DAY(S) 8

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 741 hrs
MONTHLY CALIBRATION TIME: 5 hrs
STANDARD DEVIATION: 0.28

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)



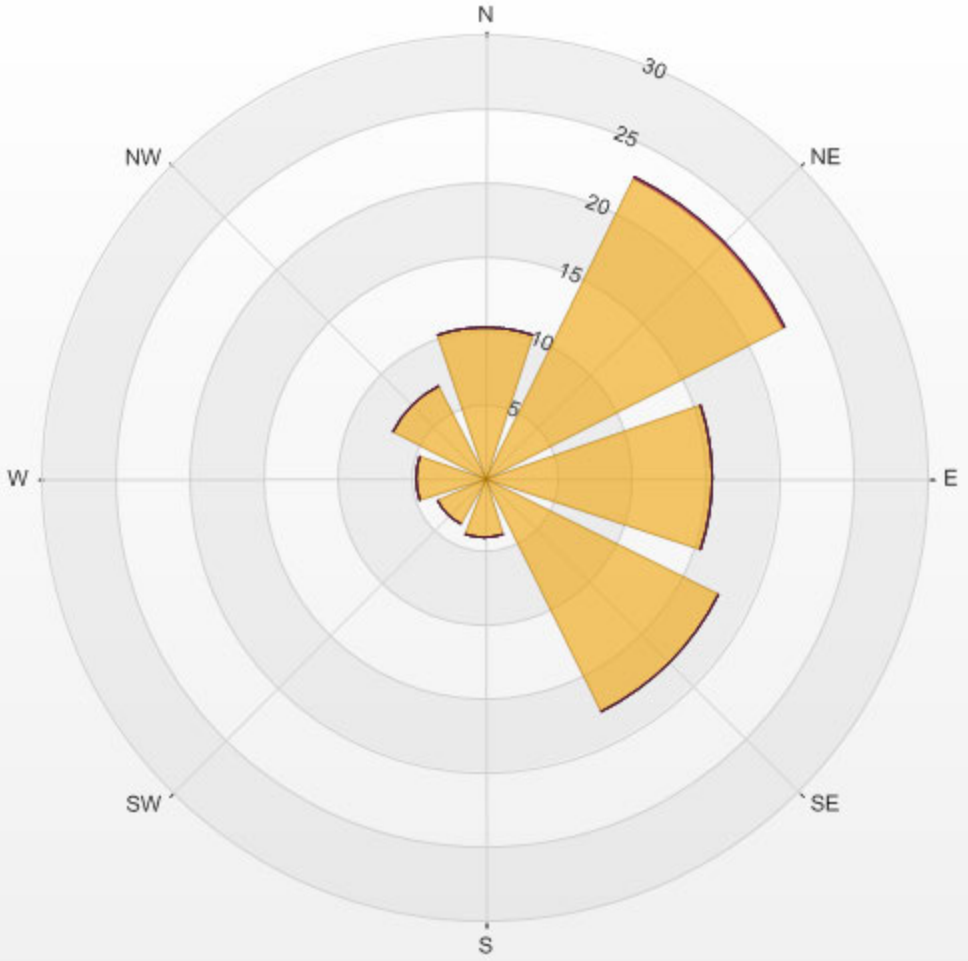
Wind: LICA Bonnyville
Poll.: LICA Bonnyville-NMHC[ppm]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 14.37% Calm Avg: 0.02 [ppm]

Direction	0.0-0.4	0.4-0.8	0.8-1.1	1.1-1.5	1.5-1.9	>1.9	Total
N	10.2	0.0	0.0	0.0	0.0	0.0	10.2
NE	22.6	0.1	0.0	0.0	0.0	0.0	22.8
E	15.5	0.0	0.0	0.0	0.0	0.0	15.5
SE	17.8	0.0	0.0	0.0	0.0	0.0	17.8
S	4.1	0.0	0.0	0.0	0.0	0.0	4.1
SW	3.6	0.0	0.0	0.0	0.0	0.0	3.6
W	4.7	0.0	0.0	0.0	0.0	0.0	4.7
NW	7.0	0.0	0.0	0.0	0.0	0.0	7.0
Summary	85.5	0.1	0.0	0.0	0.0	0.0	85.6

% Icon Classes (ppm)	85 0.0-0.4	0 0.4-0.8	0 0.8-1.1	0 1.1-1.5	0 1.5-1.9	0 >1.9

LICA Bonnyville Poll.: LICA Bonnyville-NMHC[ppm] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 14.37% Calm Poll Avg: 0.02[ppm]



NMHC[ppm] Calibration: LICA Bonnyville Monthly: 17/03 Type: Span

OXIDES OF NITROGEN

Maxxam
A Bureau Veritas Group Company

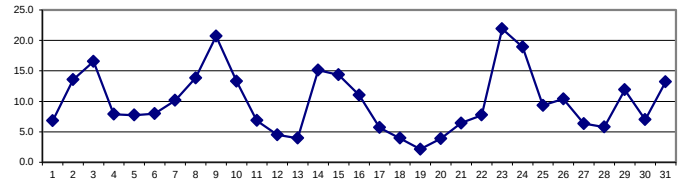
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	4.5	S	5.3	4.4	4.4	4.8	6.0	7.0	6.7	5.3	4.9	4.6	4.7	5.8	7.1	6.3	4.0	7.2	13.2	15.3	11.8	7.7	7.4	8.1	4.0	15.3	6.8	24
2	S	11.2	12.3	11.4	11.1	16.0	19.5	26.5	24.4	12.7	15.8	8.7	6.6	6.6	7.7	14.0	10.7	28.3	16.1	15.9	11.6	7.1	3.9	S	3.9	28.3	13.6	24
3	5.6	6.0	6.1	5.2	7.6	8.7	10.6	9.3	42.1	C	C	C	C	C	C	C	10.9	21.2	20.3	28.6	37.8	32.6	S	12.2	5.2	42.1	16.6	24
4	23.4	28.8	3.7	4.0	5.7	7.1	4.4	3.6	3.6	3.9	4.7	5.5	6.8	8.2	7.8	8.5	9.4	8.5	9.0	9.1	7.6	S	4.5	3.7	3.6	28.8	7.9	24
5	2.8	3.6	3.0	3.1	3.1	3.5	3.5	4.6	3.4	6.0	4.4	3.4	2.8	2.4	3.6	2.1	3.0	7.8	16.0	21.2	S	41.9	21.8	11.2	2.1	41.9	7.7	24
6	12.3	7.4	2.9	4.5	7.4	8.0	9.6	8.8	11.3	10.8	10.8	8.5	8.0	8.9	6.2	6.2	8.7	7.8	6.8	S	8.5	7.0	6.6	6.4	2.9	12.3	8.0	24
7	5.0	4.1	4.2	3.9	4.4	6.2	7.3	6.2	6.6	8.8	7.4	7.1	7.2	6.3	6.3	8.7	9.5	13.7	S	25.7	31.9	13.2	14.9	25.1	3.9	31.9	10.2	24
8	15.2	14.4	10.0	11.1	19.0	22.2	31.1	32.1	13.8	5.3	4.5	5.6	5.5	3.0	2.9	6.8	3.9	S	10.9	14.9	21.2	21.6	19.8	23.8	2.9	32.1	13.9	24
9	16.4	14.7	15.5	31.2	15.1	13.1	16.4	18.8	34.9	52.7	37.0	3.8	6.5	7.1	6.4	11.1	S	10.7	12.2	32.8	20.5	42.2	37.8	19.0	3.8	52.7	20.7	24
10	25.5	29.5	21.6	23.2	20.3	13.3	11.9	15.9	13.5	10.0	8.0	5.8	5.9	5.3	5.6	S	9.5	8.9	6.1	9.0	15.1	16.9	13.1	11.5	5.3	29.5	13.3	24
11	8.2	10.0	10.6	11.5	10.9	8.3	5.4	X	X	3.9	4.0	4.8	4.4	4.3	S	4.6	5.0	6.8	6.5	5.4	6.6	8.2	8.2	6.3	3.9	11.5	6.9	22
12	5.8	4.8	5.1	4.7	6.3	5.8	6.2	6.2	7.1	3.9	3.7	3.9	2.5	S	4.4	4.6	12.3	1.9	2.7	1.5	1.9	5.1	2.0	1.5	1.5	12.3	4.5	24
13	1.9	2.0	2.1	2.1	3.2	4.5	4.7	7.3	3.1	3.6	5.2	4.5	S	5.8	5.5	5.3	4.7	2.8	3.1	3.1	2.8	4.1	4.6	5.2	1.9	7.3	4.0	24
14	9.9	11.1	14.2	36.0	18.3	13.3	49.5	50.9	16.8	9.1	8.1	S	9.9	11.9	18.9	13.2	10.3	10.7	8.9	9.1	3.7	4.8	3.8	5.1	3.7	50.9	15.1	24
15	5.8	3.7	4.0	5.1	8.0	13.9	18.7	48.0	37.2	35.7	S	13.3	12.9	14.8	14.9	10.3	10.0	16.5	10.5	5.8	7.1	10.5	15.4	8.0	3.7	48.0	14.4	24
16	5.8	6.2	6.1	7.6	13.8	23.2	7.0	25.3	27.4	S	8.2	5.8	5.9	3.2	4.8	6.0	7.5	11.7	29.3	12.8	12.2	7.8	9.6	6.0	3.2	29.3	11.0	24
17	8.2	3.4	5.1	2.1	6.1	11.4	13.6	12.6	S	10.2	6.8	6.0	5.4	3.7	6.7	4.1	3.9	3.1	3.3	3.8	3.6	2.6	2.3	2.9	2.1	13.6	5.7	24
18	2.8	2.3	2.7	3.1	3.1	3.4	2.1	S	3.5	3.5	2.7	3.0	4.2	2.9	3.4	3.3	3.3	7.7	6.0	6.1	4.7	9.6	4.6	2.9	2.1	9.6	4.0	24
19	2.8	2.2	2.5	2.5	2.2	2.0	S	3.7	2.7	2.6	2.5	1.9	1.5	1.3	1.5	2.6	2.6	1.8	1.2	1.2	1.5	1.4	2.9	2.2	1.2	3.7	2.1	24
20	2.2	2.4	2.2	1.8	3.2	S	6.7	5.0	3.7	4.8	3.2	3.0	2.4	1.7	2.6	2.9	2.9	8.0	5.6	4.9	10.5	3.5	2.8	3.2	1.7	10.5	3.9	24
21	3.5	8.0	18.0	10.7	S	13.4	19.0	12.4	5.2	5.6	3.1	5.3	3.2	5.5	6.5	4.4	4.3	3.5	3.0	2.6	3.2	2.8	2.3	2.7	2.3	19.0	6.4	24
22	3.6	3.8	3.9	S	5.3	5.5	6.8	10.4	6.4	7.7	9.3	9.8	8.4	6.5	7.1	9.6	9.5	11.2	9.3	14.2	13.2	5.2	4.5	6.9	3.6	14.2	7.7	24
23	5.3	6.4	S	5.9	5.5	48.9	16.4	144.5	53.6	26.4	16.9	9.4	9.8	8.7	8.2	9.4	7.2	9.0	10.8	18.5	55.6	10.9	9.2	7.7	5.3	144.5	21.9	24
24	16.8	S	13.9	20.2	39.1	49.7	94.3	75.0	29.8	13.9	8.3	7.6	8.2	5.8	8.6	7.6	6.0	5.0	4.9	4.1	3.9	4.6	4.3	3.4	3.4	94.3	18.9	24
25	S	3.4	3.1	3.8	19.1	13.7	16.9	16.4	9.9	8.9	6.6	6.5	4.5	1.7	2.8	3.1	2.3	6.0	12.2	19.7	18.0	12.1	14.7	S	1.7	19.7	9.3	24
26	20.1	8.7	15.1	13.5	9.8	13.0	15.6	19.4	16.2	11.1	12.0	10.2	6.5	5.1	4.7	4.2	4.3	4.7	6.7	6.9	15.5	11.8	S	4.4	4.2	20.1	10.4	24
27	7.5	9.6	11.5	7.3	8.4	10.2	9.6	11.1	9.6	7.0	5.1	5.0	4.6	3.1	4.2	3.5	5.9	3.5	3.9	3.4	2.4	S	4.1	5.2	2.4	11.5	6.3	24
28	6.4	6.8	5.6	3.6	4.3	4.6	4.3	5.7	3.7	4.5	6.6	6.3	5.6	4.4	12.2	5.9	5.6	5.8	7.2	5.4	S	7.7	4.7	6.2	3.6	12.2	5.8	24
29	6.0	6.2	7.5	8.8	10.8	28.8	17.1	24.8	32.7	21.8	4.5	2.9	2.9	2.9	4.4	5.8	8.7	8.1	10.2	S	25.6	13.2	11.9	8.1	2.9	32.7	11.9	24
30	5.2	3.1	3.0	2.8	3.5	4.6	5.8	8.0	6.1	4.8	6.6	6.7	6.1	5.0	6.7	5.1	5.7	5.0	S	16.7	10.2	21.6	11.1	7.3	2.8	21.6	7.0	24
31	6.8	16.1	7.5	17.3	21.9	44.2	73.2	16.2	11.9	10.4	10.1	12.0	7.9	3.8	6.0	4.4	3.3	S	7.4	7.1	4.5	3.9	3.5	4.8	3.3	73.2	13.2	24
HOURLY MAX	25.5	29.5	21.6	36.0	39.1	49.7	94.3	144.5	53.6	52.7	37.0	13.3	12.9	14.8	18.9	14.0	12.3	28.3	29.3	32.8	55.6	42.2	37.8	25.1				
HOURLY AVG	8.5	8.3	7.6	9.1	10.0	14.2	17.1	21.9	15.4	10.9	8.0	6.2	5.9	5.4	6.5	6.3	6.5	8.5	9.1	11.2	12.9	11.8	8.8	7.6				

STATUS FLAG CODES

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

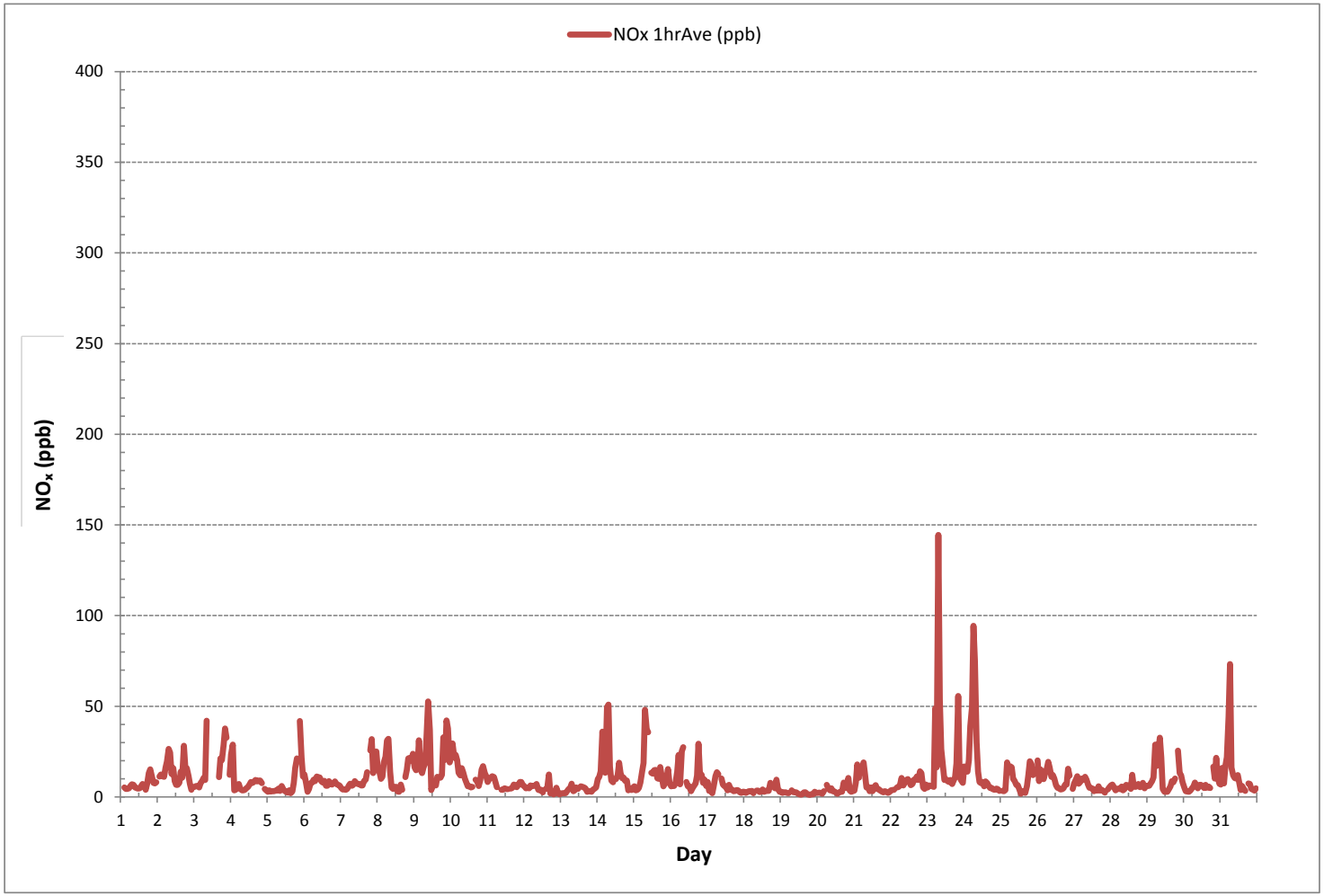
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			702				
MINIMUM 1-HR AVERAGE	1.2	ppb	@ HOUR(S)	18	ON DAY(S)	19	
MAXIMUM 1-HR AVERAGE:	144.5	ppb	@ HOUR(S)	7	ON DAY(S)	23	
MAXIMUM 24-HR AVERAGE:	21.9	ppb			ON DAY(S)	23	
					VAR-VARIOUS		
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:			742	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	10.9		MONTHLY AVERAGE:			9.9	ppb

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)



OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	8.0	S	9.6	7.6	8.3	8.8	11.5	11.6	10.9	9.8	8.9	9.6	10.7	24.5	36.2	36.9	7.6	15.2	20.1	27.4	38.2	11.8	11.6	13.5	7.6	38.2	15.6	24
2	S	15.7	17.2	16.7	16.5	23.8	29.2	38.7	38.6	21.6	24.1	14.9	11.9	10.6	13.0	40.7	38.1	40.1	23.4	29.4	25.3	20.4	8.2	S	8.2	40.7	23.6	24
3	11.6	9.7	9.9	8.8	11.9	12.7	47.5	32.7	82.3	C	C	C	C	C	C	C	17.9	28.7	30.6	45.1	115.3	83.6	S	19.6	8.8	115.3	35.5	24
4	45.6	48.1	11.3	8.2	7.9	9.3	6.4	5.9	8.4	7.7	Y	8.3	36.4	16.1	17.0	13.0	13.6	11.7	12.0	13.7	13.2	S	7.2	8.8	5.9	48.1	15.0	23
5	4.5	6.4	5.0	4.7	4.6	6.4	5.9	7.5	6.3	11.4	9.2	7.4	4.6	5.0	29.7	5.1	19.4	15.5	26.5	28.9	S	53.0	49.7	14.8	4.5	53.0	14.4	24
6	16.5	13.2	6.0	7.6	14.3	13.4	14.6	12.8	15.3	14.9	15.1	12.1	9.9	18.1	8.0	8.6	11.1	9.9	9.2	S	12.1	9.2	8.6	9.7	6.0	18.1	11.7	24
7	8.2	7.2	5.8	5.7	6.9	11.8	10.9	10.5	9.2	11.5	9.6	8.9	9.6	9.6	9.0	12.1	14.3	20.5	S	34.6	44.8	18.0	20.4	30.9	5.7	44.8	14.3	24
8	29.2	18.6	13.7	15.3	32.6	41.8	52.9	45.8	21.8	9.8	9.2	9.8	8.8	5.7	17.8	54.0	32.9	S	40.8	47.4	87.1	102.9	41.0	47.0	5.7	102.9	34.2	24
9	29.2	19.6	30.2	62.9	19.2	21.0	68.8	72.3	105.2	89.4	74.6	42.0	21.6	24.9	19.7	36.0	S	22.5	46.3	123.7	70.6	90.6	107.7	43.2	19.2	123.7	54.0	24
10	116.1	51.4	29.6	34.2	31.9	19.1	29.2	24.7	16.8	12.7	13.4	14.7	9.6	8.5	8.8	S	17.7	12.3	9.1	11.2	21.8	20.3	18.1	14.3	8.5	116.1	23.7	24
11	11.0	13.1	13.0	15.5	14.0	10.8	27.8	X	X	23.0	6.6	7.4	6.8	9.2	S	7.4	6.6	9.7	8.3	9.4	10.7	11.2	10.8	8.9	6.6	27.8	11.5	22
12	7.4	6.3	6.6	6.8	10.4	7.6	8.5	9.8	9.8	7.7	5.9	5.6	4.5	S	7.1	13.9	44.6	32.3	27.0	3.8	28.4	36.3	16.0	2.5	2.5	44.6	13.4	24
13	2.7	3.0	3.3	3.9	6.0	5.8	23.1	15.6	18.7	23.0	17.1	15.2	S	17.7	26.3	14.9	8.3	15.5	43.8	15.1	8.4	5.8	26.1	8.2	2.7	43.8	14.2	24
14	26.1	19.4	24.5	46.1	42.2	36.1	79.9	87.9	40.3	12.3	27.6	S	14.9	15.7	23.2	38.7	35.8	29.5	39.8	36.7	5.6	7.1	6.1	8.2	5.6	87.9	30.6	24
15	8.2	8.2	5.6	6.9	11.8	35.8	36.8	117.5	94.0	84.7	S	53.1	36.7	61.2	58.9	39.6	42.4	60.9	20.5	8.9	14.7	16.7	58.3	18.0	5.6	117.5	39.1	24
16	10.5	11.7	8.5	9.7	29.0	53.2	24.0	69.4	51.5	S	13.4	8.9	19.3	4.4	21.9	9.6	10.1	33.6	187.1	56.5	18.8	10.4	12.5	9.4	4.4	187.1	29.7	24
17	13.6	6.5	6.6	5.4	52.4	41.9	45.5	34.4	S	51.5	18.6	7.7	17.3	7.5	20.8	11.3	23.5	11.4	21.2	6.0	14.7	4.4	2.8	4.5	2.8	52.4	18.7	24
18	15.9	3.1	3.6	3.7	3.9	9.4	2.5	S	4.5	16.0	3.1	5.0	26.7	14.0	5.6	5.2	5.7	10.1	7.0	7.5	11.1	11.8	5.8	4.3	2.5	26.7	8.1	24
19	4.0	2.7	2.9	3.4	2.9	3.1	S	4.7	3.1	2.9	3.4	2.1	2.1	1.9	2.8	4.0	3.9	3.0	1.7	1.7	1.8	1.9	5.5	3.1	1.7	5.5	3.0	24
20	3.7	3.9	4.9	3.5	6.7	S	10.1	7.8	7.0	21.6	4.6	5.3	4.2	4.8	3.9	25.0	4.1	137.0	9.6	39.0	71.2	23.5	4.6	5.5	3.5	137.0	17.9	24
21	5.0	23.1	21.4	14.1	S	27.6	22.2	42.7	14.8	14.1	15.6	23.4	11.7	29.3	33.8	8.1	6.1	18.0	4.8	7.0	4.2	3.9	2.8	3.4	2.8	42.7	15.5	24
22	4.4	4.7	4.5	S	6.3	7.8	8.1	37.0	8.6	25.9	13.3	12.8	10.8	8.8	13.5	18.2	13.0	13.7	14.3	18.4	19.0	6.8	6.0	10.1	4.4	37.0	12.4	24
23	13.4	11.7	S	11.5	26.0	95.8	33.6	236.2	140.4	33.6	25.6	14.8	14.2	10.7	10.2	30.4	10.3	71.0	20.1	87.7	**289.0**	16.2	23.4	26.1	10.2	**289.0**	54.4	24
24	67.2	S	118.8	67.9	103.6	137.9	165.6	150.9	52.7	46.9	43.4	22.3	13.5	26.7	31.3	31.9	8.2	8.7	18.3	5.6	6.2	8.5	5.6	5.3	5.3	165.6	49.9	24
25	S	4.9	3.9	5.8	34.0	21.7	28.1	35.4	17.8	12.8	8.4	22.8	12.9	3.1	16.9	22.8	4.2	34.9	30.7	29.9	70.1	40.1	27.5	S	3.1	70.1	22.2	24
26	26.5	15.0	31.4	27.0	12.7	19.2	34.7	31.9	36.5	14.6	16.2	36.3	31.3	17.1	8.2	20.0	6.6	19.2	13.2	31.5	35.3	15.0	S	7.5	6.6	36.5	22.0	24
27	10.9	13.2	15.2	10.0	12.6	16.7	12.4	15.3	13.0	12.2	27.3	33.2	23.5	16.9	20.5	21.4	20.2	24.8	30.6	6.8	5.2	S	18.1	6.7	5.2	33.2	16.8	24
28	9.2	8.6	6.7	5.4	6.5	45.6	14.2	32.2	27.4	6.8	26.9	18.7	23.1	15.5	60.2	22.4	17.7	9.7	34.2	9.1	S	14.9	7.8	9.3	5.4	60.2	18.8	24
29	8.2	9.2	9.8	13.0	19.3	40.2	51.1	54.9	58.8	46.1	32.7	4.4	4.8	11.3	6.1	8.4	26.4	11.4	20.4	S	36.6	16.9	16.5	11.7	4.4	58.8	22.5	24
30	8.9	4.7	4.1	3.9	6.6	6.4	9.2	18.0	9.6	6.3	11.8	10.2	9.7	8.8	16.7	7.2	37.1	7.4	S	23.9	26.7	90.7	21.4	11.7	3.9	90.7	15.7	24
31	11.2	26.1	20.8	26.5	40.0	60.6	164.1	52.9	24.9	29.0	27.3	35.8	20.5	15.7	31.1	23.0	20.1	S	35.1	30.2	11.5	9.4	8.6	11.3	8.6	164.1	32.0	24
HOURLY MAX	116.1	51.4	118.8	67.9	103.6	137.9	165.6	236.2	140.4	89.4	74.6	53.1	36.7	61.2	60.2	54.0	44.6	137.0	187.1	123.7	289.0	102.9	107.7	47.0				
HOURLY AVG	18.5	13.4	15.1	15.4	20.0	28.4	35.9	45.4	32.7	23.4	18.3	16.3	14.9	14.6	19.9	20.3	17.6	25.5	27.8	27.5	38.5	26.3	19.3	13.0				

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

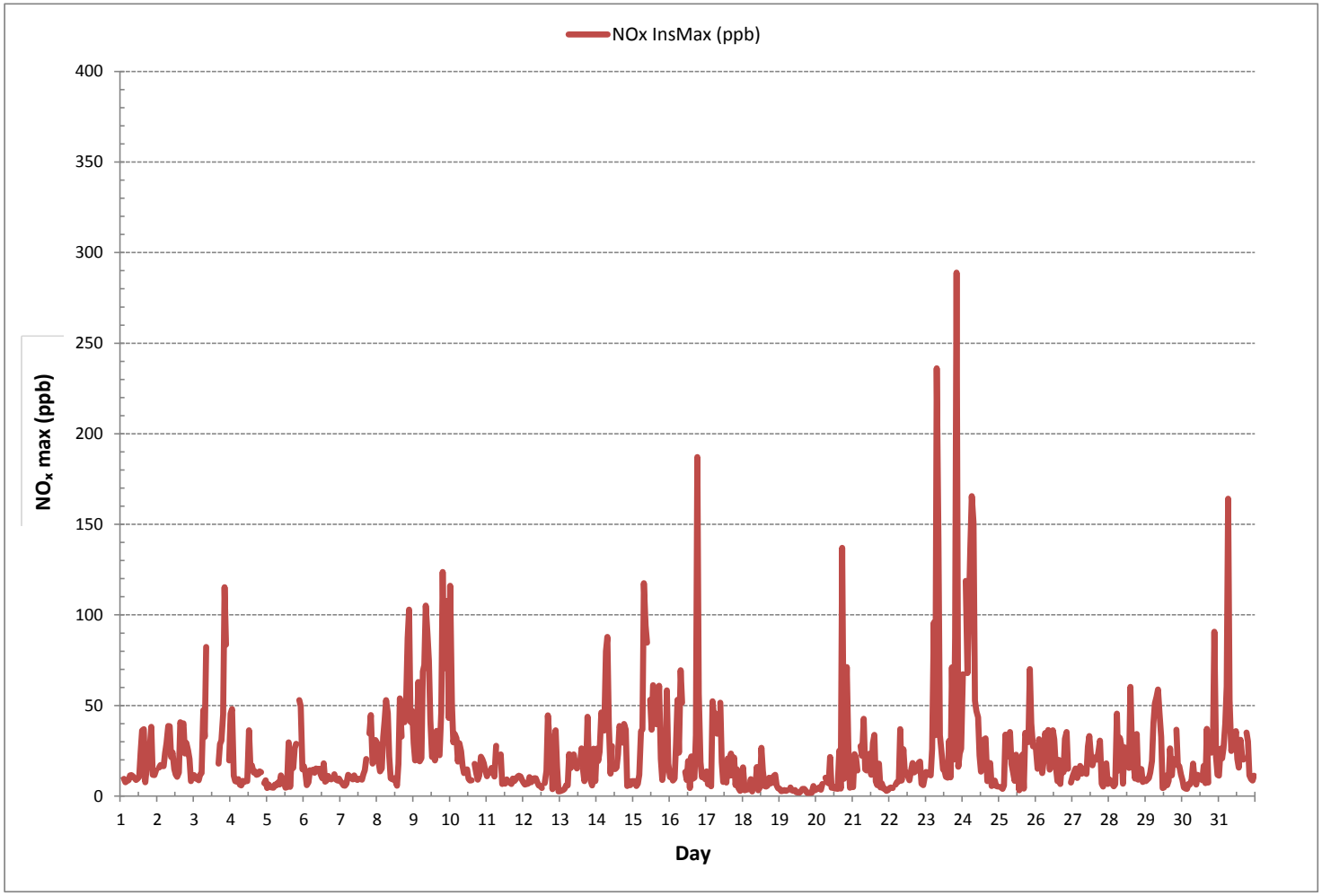
NUMBER OF NON-ZERO READINGS: 701

MAXIMUM INSTANTANEOUS VALUE: 289.0 ppb @ HOUR(S) 20 ON DAY(S) 23

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 741 hrs
MONTHLY CALIBRATION TIME: 7 hrs
STANDARD DEVIATION: 27.2

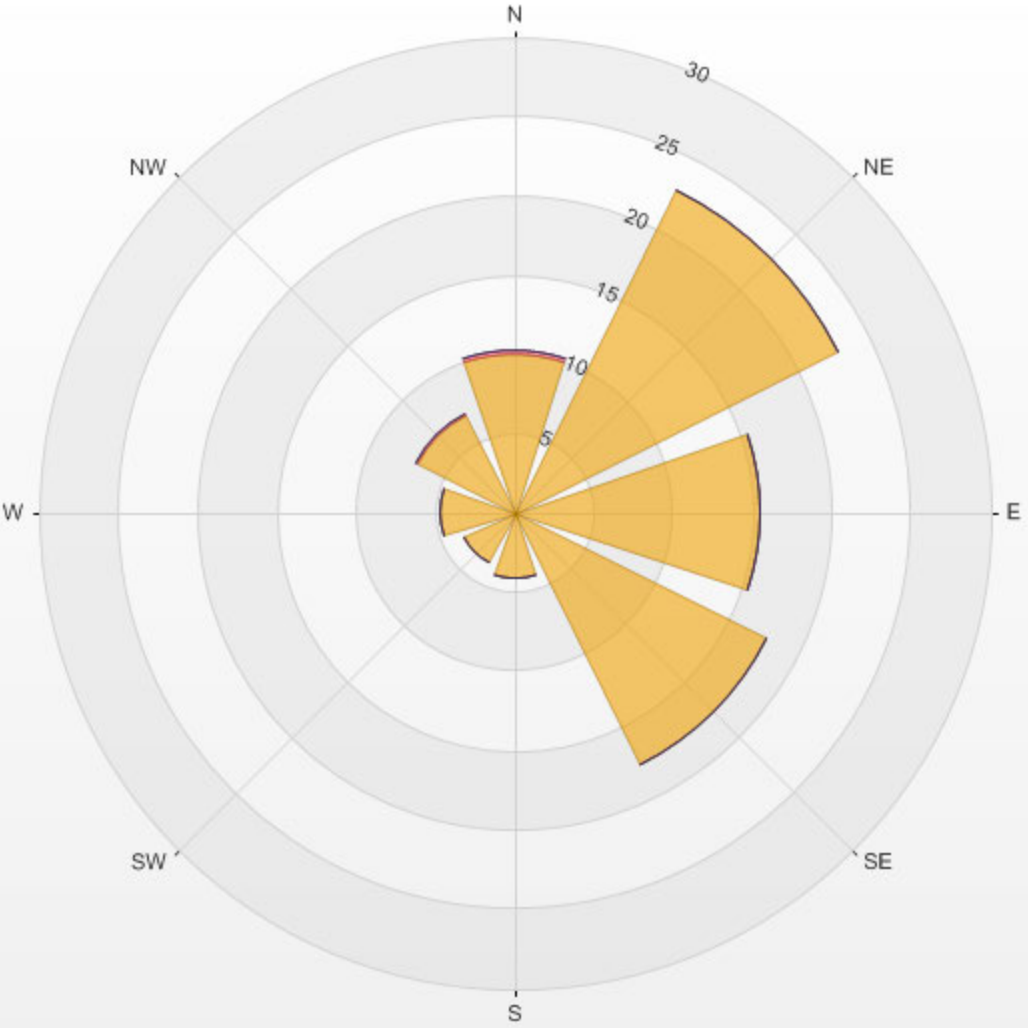
OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)



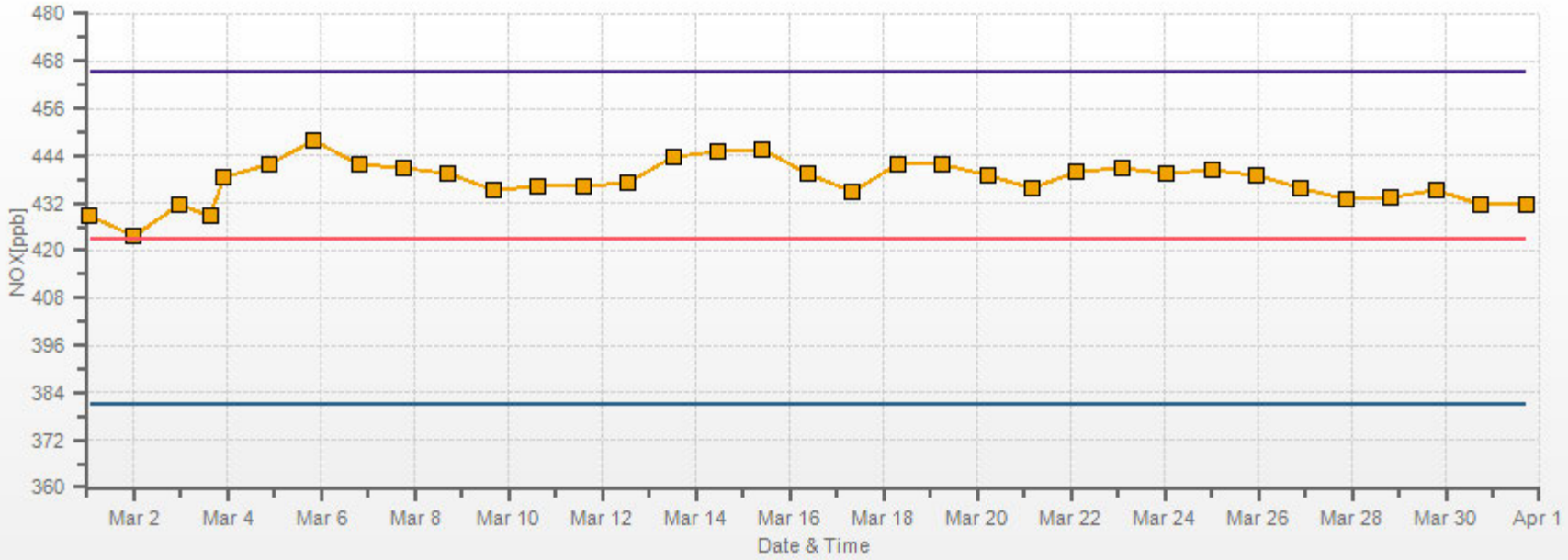
Wind: LICA Bonnyville
Poll.: LICA Bonnyville-NOX[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 14.25% Calm Avg: 20.54 [ppb]

Direction	0.0-48.2	48.2-96.4	96.4-144.6	>144.6	Total
N	10.0	0.3	0.0	0.0	10.3
NE	22.8	0.0	0.0	0.0	22.8
E	15.5	0.0	0.0	0.0	15.5
SE	17.8	0.0	0.0	0.0	17.8
S	4.1	0.0	0.0	0.0	4.1
SW	3.6	0.0	0.0	0.0	3.6
W	4.7	0.0	0.0	0.0	4.7
NW	6.8	0.1	0.0	0.0	7.0
Summary	85.3	0.4	0.0	0.0	85.8


% Icon Classes (ppb)
85 0.0-48.2
0 48.2-96.4
0 96.4-144.6
0 >144.6
LICA Bonnyville Poll.: LICA Bonnyville-NOX[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 14.25% Calm Poll Avg: 20.54[ppb]
N
NE
E
SE
S
SW
W
NW
30
25
20
15
10
5

NOX[ppb] Calibration: LICA Bonnyville Monthly: 17/03 Type: Span



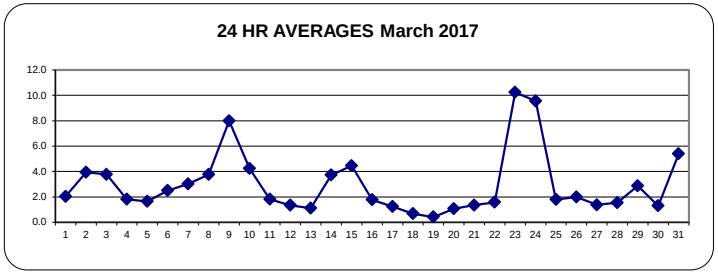
NITRIC OXIDES

NITRIC OXIDE Hourly Averages (NO ppb)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	1.0	S	1.1	0.9	1.0	1.4	1.3	2.4	2.7	2.6	2.6	2.8	2.8	3.2	3.8	2.8	1.4	1.5	1.9	3.0	2.9	1.5	1.0	1.2	0.9	3.8	2.0	24
2	S	1.4	1.7	1.8	2.2	2.5	3.4	6.7	10.0	6.4	8.5	5.0	3.8	3.5	3.6	6.4	3.5	7.2	2.5	2.6	2.7	1.1	0.3	S	0.3	10.0	3.9	24
3	0.2	0.5	0.5	0.3	0.4	0.5	1.5	1.8	19.6	C	C	C	C	C	C	C	2.0	4.2	2.9	4.8	12.5	7.9	S	0.8	0.2	19.6	3.8	24
4	2.3	3.0	0.0	0.4	0.6	1.1	1.1	1.0	1.3	1.5	2.2	2.3	3.3	3.3	3.3	3.2	3.5	2.3	1.3	1.6	1.4	S	0.8	0.9	0.0	3.5	1.8	24
5	0.5	0.7	0.6	0.4	0.6	0.6	0.6	0.8	1.0	2.2	2.0	1.8	1.4	1.3	1.6	1.0	0.9	2.2	2.3	2.9	S	6.9	3.9	1.7	0.4	6.9	1.6	24
6	2.1	0.7	0.4	1.1	1.7	1.2	1.7	2.2	3.4	4.2	4.6	3.9	3.9	4.9	2.9	2.8	3.4	2.7	1.8	S	2.1	1.8	1.8	2.1	0.4	4.9	2.5	24
7	1.4	1.2	1.4	1.3	1.3	2.0	2.0	2.0	2.6	4.1	3.8	3.8	4.0	3.2	3.0	4.1	4.0	4.3	S	5.0	5.7	2.5	2.3	4.5	1.2	5.7	3.0	24
8	2.8	3.0	2.1	1.6	2.2	4.3	9.3	10.8	5.2	2.3	2.2	2.9	2.9	1.5	1.8	3.7	1.7	S	2.4	3.1	5.9	8.3	3.5	3.1	1.5	10.8	3.8	24
9	0.8	0.0	0.9	8.8	0.2	0.3	3.2	6.7	20.9	34.0	23.8	2.7	4.4	4.1	3.8	6.4	S	3.3	1.8	10.6	4.5	21.7	16.9	4.1	0.0	34.0	8.0	24
10	8.1	7.8	4.7	5.2	4.3	3.2	3.7	6.7	7.1	6.1	5.4	3.9	4.2	3.5	2.3	S	2.7	2.7	1.9	2.2	3.1	3.4	2.6	2.5	1.9	8.1	4.2	24
11	1.8	2.4	2.4	2.0	2.2	2.1	2.0	X	X	1.9	1.9	2.5	2.3	2.2	S	1.4	1.4	1.6	1.3	1.2	1.3	1.4	1.5	1.3	1.2	2.5	1.8	22
12	1.2	1.0	1.0	0.7	1.2	1.2	1.2	1.7	2.5	1.7	1.9	1.9	1.1	S	1.5	1.8	5.6	0.7	0.8	0.1	0.3	1.9	0.0	0.0	0.0	5.6	1.3	24
13	0.0	0.0	0.0	0.0	0.4	0.7	0.9	2.7	1.2	1.8	2.8	2.8	S	2.5	2.8	2.6	1.7	0.9	0.6	0.5	0.0	0.2	0.3	0.3	0.0	2.8	1.1	24
14	0.7	1.1	0.3	4.8	2.3	2.4	15.0	20.7	6.0	3.7	3.4	S	3.5	3.9	5.8	3.9	2.6	2.0	1.1	1.5	0.0	0.4	0.1	0.3	0.0	20.7	3.7	24
15	0.0	0.0	0.2	0.2	0.7	1.7	2.4	21.7	17.6	19.7	S	6.0	5.4	5.9	6.1	3.6	2.5	3.1	1.2	0.8	1.2	0.4	1.8	0.4	0.0	21.7	4.5	24
16	0.4	0.4	0.8	0.5	1.0	1.2	0.4	5.4	7.8	S	2.7	1.6	1.8	0.9	1.4	1.4	1.3	1.9	6.0	1.2	0.7	0.6	1.0	0.3	0.3	7.8	1.8	24
17	0.7	0.1	0.2	0.1	0.4	1.5	1.7	2.7	S	4.1	2.7	2.5	2.1	1.3	2.7	1.4	1.2	0.4	0.7	0.7	0.6	0.3	0.2	0.3	0.1	4.1	1.2	24
18	0.3	0.1	0.2	0.1	0.3	0.3	0.0	S	0.7	0.9	0.6	0.9	1.4	1.0	1.1	1.1	0.8	1.2	1.0	0.9	0.6	1.5	0.4	0.2	0.0	1.5	0.7	24
19	0.3	0.2	0.5	0.4	0.3	0.3	S	0.9	0.7	0.9	0.8	0.6	0.4	0.3	0.4	0.7	0.5	0.2	0.1	0.3	0.3	0.1	0.3	0.1	0.1	0.9	0.4	24
20	0.3	0.5	0.8	0.7	1.0	S	1.5	1.5	1.6	2.2	1.4	1.3	0.8	0.5	0.9	0.9	0.7	2.8	0.5	1.0	3.2	0.4	0.0	0.0	0.0	3.2	1.1	24
21	0.0	0.5	1.6	0.9	S	2.1	3.2	3.7	1.4	2.4	1.3	2.1	1.1	2.4	3.0	1.3	1.3	0.9	0.5	0.3	0.7	0.3	0.0	0.1	0.0	3.7	1.4	24
22	0.4	0.4	0.4	S	0.7	0.7	1.1	3.0	1.5	2.2	2.6	3.0	2.4	2.1	2.9	3.7	2.6	2.5	1.5	1.1	1.0	0.2	0.0	0.2	0.0	3.7	1.6	24
23	0.2	0.4	S	0.2	0.3	17.4	2.6	101.6	31.3	14.5	9.0	4.5	4.6	3.8	3.1	3.6	2.3	3.2	1.1	4.0	25.8	0.6	0.7	0.7	0.2	101.6	10.2	24
24	3.3	S	5.5	6.6	19.0	28.0	62.2	49.7	14.7	5.7	3.3	3.3	3.7	2.2	3.6	2.4	1.7	1.4	0.9	0.6	0.6	0.5	0.5	0.4	0.4	62.2	9.6	24
25	S	0.5	0.3	0.5	3.8	2.0	3.9	4.6	3.2	3.1	2.6	2.6	1.6	0.3	0.7	0.7	0.2	1.2	1.0	2.2	2.2	1.7	0.6	S	0.2	4.6	1.8	24
26	1.8	0.6	1.4	0.3	0.3	1.4	2.5	5.0	6.0	4.4	4.9	4.0	2.2	1.3	1.0	1.3	0.8	0.7	1.1	1.3	2.3	1.1	S	0.2	0.2	6.0	2.0	24
27	0.6	0.7	0.8	0.9	0.8	1.3	1.1	2.8	3.0	2.6	2.1	2.5	1.7	1.0	1.8	1.1	2.1	1.0	1.2	1.2	0.2	S	0.8	0.4	0.2	3.0	1.4	24
28	0.2	0.5	0.2	0.2	0.3	0.9	0.4	1.8	1.3	1.8	3.1	3.1	2.3	1.8	6.3	2.6	1.8	1.6	2.4	0.9	S	1.5	0.3	0.3	0.2	6.3	1.5	24
29	0.3	0.4	0.7	0.7	0.9	7.2	3.7	10.6	15.5	9.4	1.0	0.6	0.6	0.7	1.0	1.5	2.8	1.4	1.0	S	3.5	1.1	0.8	0.5	0.3	15.5	2.9	24
30	0.6	0.3	0.4	0.3	0.6	0.6	1.2	2.2	1.5	1.3	2.1	2.2	1.8	0.9	1.8	1.3	1.7	0.9	S	2.0	1.9	3.6	0.2	0.4	0.2	3.6	1.3	24
31	0.3	2.1	0.4	3.2	6.0	22.3	49.1	7.3	5.7	5.1	4.6	5.7	2.9	0.9	1.7	1.3	0.5	S	1.9	1.8	0.9	0.4	0.0	0.0	0.0	49.1	5.4	24
HOURLY MAX	8.1	7.8	5.5	8.8	19.0	28.0	62.2	101.6	31.3	34.0	23.8	6.0	5.4	5.9	6.3	6.4	5.6	7.2	6.0	10.6	25.8	21.7	16.9	4.5				
HOURLY AVG	1.1	1.1	1.1	1.5	1.9	3.7	6.1	10.0	6.8	5.3	3.8	2.9	2.6	2.2	2.6	2.4	2.0	2.1	1.5	2.0	3.0	2.5	1.5	0.9				

STATUS FLAG CODES

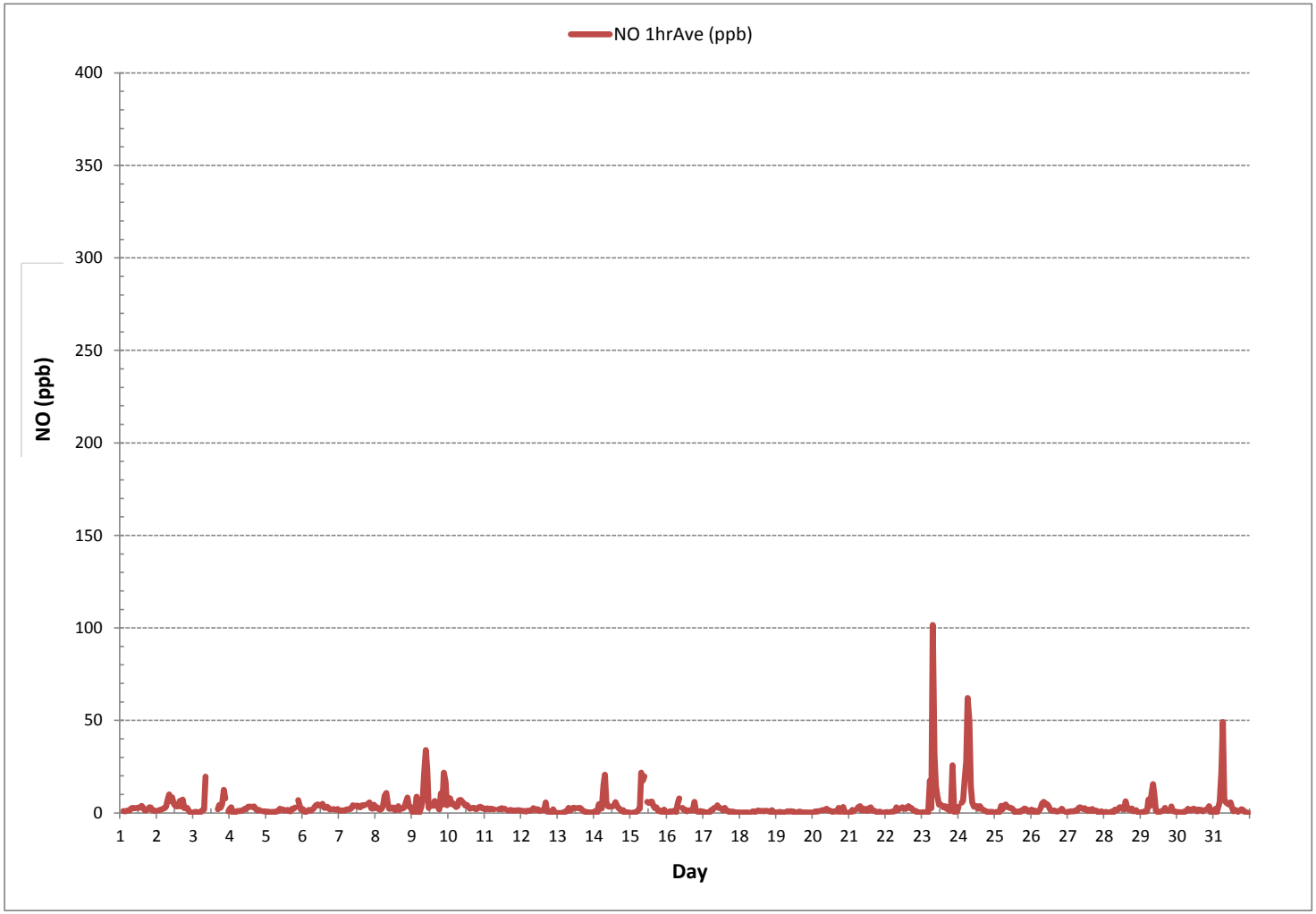
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			682				
MINIMUM 1-HR AVERAGE	0.0	ppb	@ HOUR(S)	2	ON DAY(S)	4	
MAXIMUM 1-HR AVERAGE:	101.6	ppb	@ HOUR(S)	7	ON DAY(S)	23	
MAXIMUM 24-HR AVERAGE:	10.2	ppb			ON DAY(S)	23	
					VAR-VARIOUS		
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:			742	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	6.3		MONTHLY AVERAGE:			2.9	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	2.6	S	2.8	2.4	2.9	3.1	3.0	4.8	4.8	4.8	4.8	6.0	6.3	13.3	31.3	31.3	3.1	4.3	5.0	8.1	11.3	3.3	2.8	3.0	2.4	31.3	7.2	24
2	S	3.4	3.7	4.1	4.3	5.9	7.0	12.9	18.4	10.7	13.1	7.8	6.6	5.6	6.0	21.8	11.1	12.3	5.4	12.8	8.8	5.0	1.8	S	1.8	21.8	8.6	24
3	3.0	2.1	2.3	2.3	2.7	2.7	26.8	21.4	50.7	C	C	C	C	C	C	C	6.5	7.9	7.5	13.6	78.4	43.4	S	3.6	2.1	78.4	17.2	24
4	8.4	9.8	1.1	2.2	2.1	2.6	2.7	2.4	3.7	3.5	Y	4.2	22.3	8.7	7.3	5.9	5.6	5.3	3.7	3.6	3.7	S	2.0	3.4	1.1	22.3	5.2	23
5	1.6	2.0	1.9	1.3	1.7	1.6	1.6	2.2	2.9	4.8	4.4	4.5	2.8	2.6	4.4	7.8	12.5	5.6	6.4	5.7	S	13.8	11.5	4.3	1.3	13.8	4.7	24
6	4.1	2.4	1.7	3.1	3.3	2.7	2.7	4.0	5.6	6.2	7.3	5.9	5.4	11.9	4.2	4.6	4.9	4.0	3.0	S	3.4	3.2	3.1	4.1	1.7	11.9	4.4	24
7	3.3	3.3	2.6	2.8	2.9	5.1	4.0	4.7	4.8	6.2	5.4	5.2	6.0	5.3	4.9	6.8	11.7	8.0	S	8.4	10.8	5.2	4.0	8.6	2.6	11.7	5.7	24
8	6.8	5.3	4.1	4.1	5.2	12.2	21.5	17.1	8.6	5.3	4.9	6.0	5.0	3.3	20.8	37.7	15.7	S	19.0	25.6	36.5	56.2	10.3	10.5	3.3	56.2	14.9	24
9	4.2	0.9	5.6	25.8	1.3	2.6	40.8	45.2	74.5	60.4	52.0	25.0	18.3	13.3	9.4	24.0	S	11.1	19.3	70.6	33.6	54.1	62.5	14.6	0.9	74.5	29.1	24
10	69.6	30.7	8.5	8.8	7.9	5.2	15.5	11.5	9.6	8.1	9.0	5.6	6.6	6.0	3.7	S	14.1	4.2	3.4	3.9	5.6	5.6	4.3	3.8	3.4	69.6	10.9	24
11	3.9	3.9	3.9	3.5	4.1	3.7	14.9	X	X	12.3	3.6	4.6	4.2	5.3	S	3.2	2.6	2.9	2.8	3.1	3.7	3.2	2.9	2.8	2.6	14.9	4.5	22
12	2.4	2.3	2.3	2.0	3.1	2.8	2.7	3.7	3.9	4.2	4.3	3.5	2.5	S	3.4	6.7	25.5	25.3	15.0	1.5	11.5	25.1	12.6	0.9	0.9	25.5	7.3	24
13	0.8	0.8	0.8	1.2	4.8	2.8	13.7	7.5	12.3	14.8	9.9	8.9	S	12.5	15.9	10.5	3.9	14.4	13.1	7.3	6.0	1.5	8.8	1.4	0.8	15.9	7.5	24
14	10.7	3.1	1.9	9.8	11.4	20.0	39.3	54.7	15.2	5.6	16.1	S	6.0	5.9	7.8	22.0	17.8	16.1	14.2	19.4	0.9	1.7	1.3	1.3	0.9	54.7	13.1	24
15	1.1	1.2	1.1	1.1	2.9	23.2	9.9	77.2	58.8	55.4	S	45.4	21.7	35.1	28.5	23.3	24.7	26.3	2.2	2.1	4.2	1.5	17.8	1.4	1.1	77.2	20.3	24
16	1.7	1.2	1.7	1.5	5.0	23.3	4.6	35.2	26.1	S	5.8	3.0	10.1	1.5	10.2	3.1	2.0	6.3	127.3	17.7	2.2	1.9	2.2	1.2	1.2	127.3	12.8	24
17	3.9	0.5	0.9	0.8	8.6	23.0	22.1	13.1	S	34.9	11.8	3.9	9.4	3.6	12.6	4.5	13.1	5.9	15.4	2.1	9.3	1.6	1.0	1.0	0.5	34.9	8.8	24
18	4.7	1.1	1.0	0.9	1.0	6.8	1.0	S	1.7	8.6	1.2	1.8	10.5	6.3	2.9	2.8	6.1	2.2	2.6	2.0	3.2	3.7	1.2	0.9	0.9	10.5	3.2	24
19	0.7	1.1	1.3	1.2	0.9	1.0	S	1.7	1.3	1.5	1.6	1.3	1.4	0.9	1.2	1.8	1.6	0.9	0.9	1.3	1.1	0.9	1.5	1.1	0.7	1.8	1.2	24
20	1.4	1.9	2.4	2.3	3.5	S	3.2	3.1	3.3	10.6	2.8	3.3	2.3	2.6	2.7	11.1	1.7	60.7	1.8	26.2	30.2	12.7	0.8	0.6	0.6	60.7	8.3	24
21	0.8	3.2	3.6	2.5	S	6.8	5.4	24.6	6.6	6.9	6.8	12.8	9.8	17.9	18.8	3.2	3.7	9.3	2.3	4.0	2.3	1.6	1.1	1.3	0.8	24.6	6.8	24
22	1.9	1.7	1.6	S	2.3	2.4	2.7	16.0	3.3	17.8	5.2	5.1	4.1	3.7	7.4	9.0	4.6	4.3	4.0	3.3	2.3	1.6	1.2	1.5	1.2	17.8	4.7	24
23	2.1	1.8	S	1.5	5.1	49.3	11.1	176.5	99.6	20.2	15.0	7.6	6.8	5.5	4.8	18.9	4.8	60.7	3.3	57.6	161.6	2.7	15.5	11.5	1.5	176.5	32.3	24
24	28.9	S	86.1	36.1	62.1	94.2	121.5	114.6	48.1	30.4	27.7	12.5	6.8	16.1	24.5	16.7	3.6	3.9	11.9	2.4	2.2	1.7	1.6	1.3	1.3	121.5	32.8	24
25	S	1.4	1.2	1.7	8.8	4.3	8.4	10.7	6.7	5.2	4.5	8.9	5.3	1.9	9.6	8.1	1.5	15.8	5.3	6.5	28.3	21.2	3.1	S	1.2	28.3	7.7	24
26	3.7	2.1	4.6	2.8	3.0	3.0	10.0	11.5	22.7	7.2	7.4	22.0	26.5	8.1	3.0	10.2	2.2	10.1	5.4	11.2	11.7	2.9	S	1.3	1.3	26.5	8.4	24
27	2.4	2.2	1.9	2.3	2.3	3.1	2.5	6.4	4.7	4.8	19.8	32.5	7.7	11.1	15.7	11.1	11.4	7.4	13.1	3.7	2.0	S	7.5	2.2	1.9	32.5	7.7	24
28	1.5	1.7	1.2	1.7	1.9	36.1	10.3	14.8	21.0	3.8	19.6	9.5	15.6	11.9	43.6	22.0	12.5	4.6	17.0	3.3	S	5.1	2.3	1.1	1.1	43.6	11.4	24
29	1.4	1.5	1.8	2.9	2.7	15.7	26.6	30.1	33.2	29.4	15.8	1.7	1.8	6.2	2.1	3.2	12.5	2.8	4.7	S	13.9	3.1	3.3	2.0	1.4	33.2	9.5	24
30	2.0	1.4	1.5	1.5	1.8	1.6	2.6	13.3	3.1	2.4	4.4	4.1	3.9	2.7	7.2	2.9	18.6	2.3	S	5.4	20.1	63.3	1.5	1.5	1.4	63.3	7.4	24
31	2.6	7.1	3.8	5.6	19.1	37.1	123.7	39.8	13.9	25.5	13.5	26.6	11.0	8.2	11.5	13.1	10.1	S	19.6	24.1	6.9	3.9	0.8	0.9	0.8	123.7	18.6	24
HOURLY MAX	69.6	30.7	86.1	36.1	62.1	94.2	123.7	176.5	99.6	60.4	52.0	45.4	26.5	35.1	43.6	37.7	25.5	60.7	127.3	70.6	161.6	63.3	62.5	14.6				
HOURLY AVG	6.3	3.5	5.3	4.7	6.3	13.5	18.7	26.9	19.6	14.2	10.6	10.0	8.5	8.2	11.2	12.0	9.0	11.9	12.2	12.3	17.8	12.1	6.6	3.2				

STATUS FLAG CODES

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

MONTHLY SUMMARY

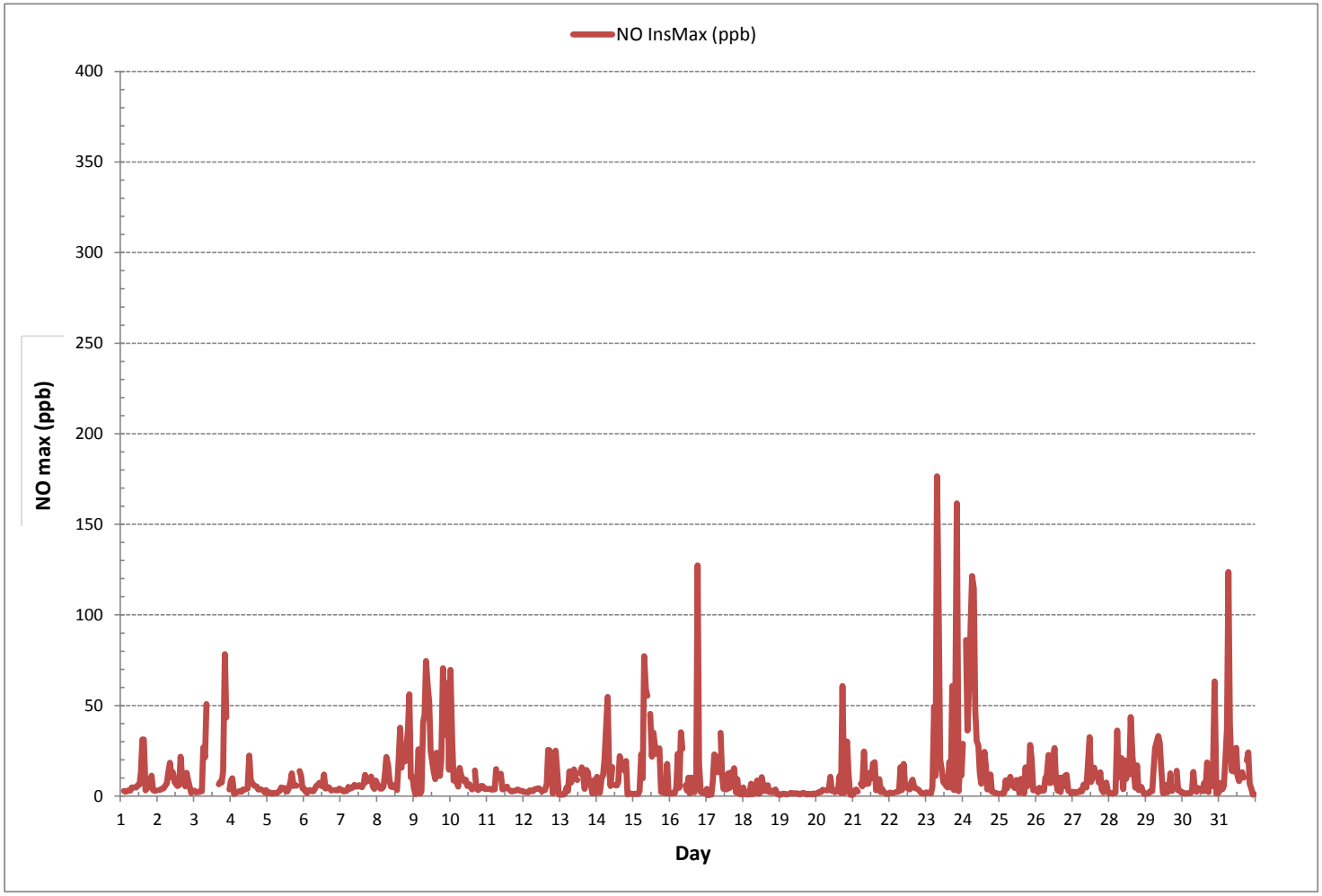
NUMBER OF NON-ZERO READINGS: 701

MAXIMUM INSTANTANEOUS VALUE: 176.5 ppb @ HOUR(S) 7 ON DAY(S) 23

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 741 hrs
MONTHLY CALIBRATION TIME: 7 hrs
STANDARD DEVIATION: 18.0

NITRIC OXIDE Instantaneous Maximum (NO ppb)



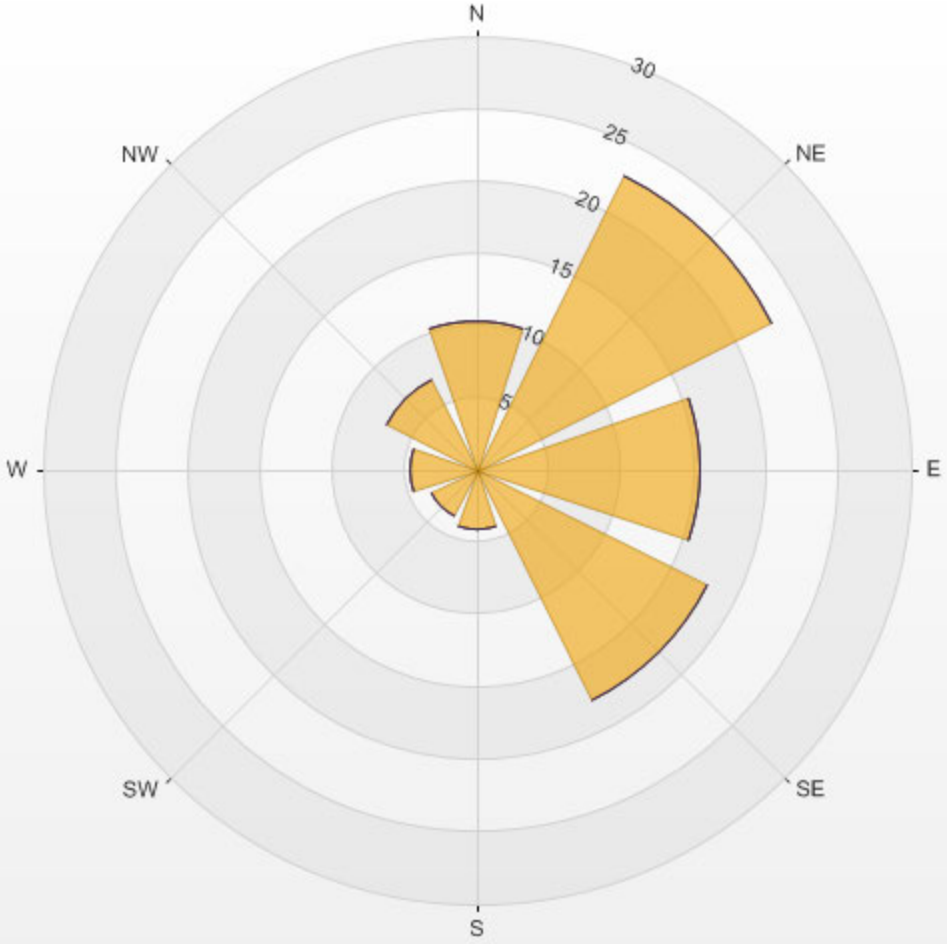
Wind: LICA Bonnyville
Poll.: LICA Bonnyville-NO[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 14.25% Calm Avg: 7.63 [ppb]

Direction	0.0-33.9	33.9-67.8	67.8-101.7	>101.7	Total
N	10.3	0.0	0.0	0.0	10.3
NE	22.8	0.0	0.0	0.0	22.8
E	15.5	0.0	0.0	0.0	15.5
SE	17.8	0.0	0.0	0.0	17.8
S	4.1	0.0	0.0	0.0	4.1
SW	3.6	0.0	0.0	0.0	3.6
W	4.7	0.0	0.0	0.0	4.7
NW	7.0	0.0	0.0	0.0	7.0
Summary	85.8	0.0	0.0	0.0	85.8

% Icon	Classes (ppb)	86	0.0-33.9	0	33.9-67.8	0	67.8-101.7	0	>101.7

LICA Bonnyville Poll.: LICA Bonnyville-NO[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 14.25% Calm Poll Avg: 7.63[ppb]



NITROGEN DIOXIDE

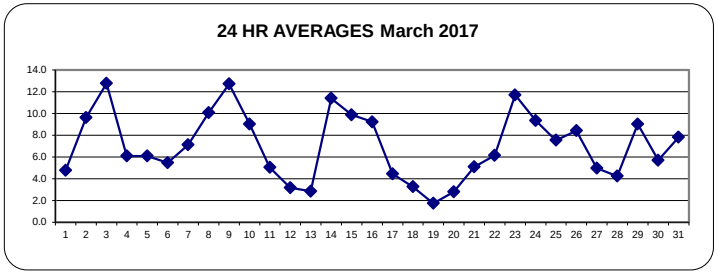
NITROGEN DIOXIDE Hourly Averages (NO_2 ppb)

HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																												
1	3.5	S	4.1	3.5	3.4	3.5	4.7	4.6	3.9	2.7	2.3	1.8	2.0	2.6	3.2	3.4	2.6	5.7	11.3	12.3	8.9	6.3	6.5	6.9	1.8	12.3	4.8	24
2	S	9.8	10.6	9.7	9.0	13.6	16.2	19.9	14.4	6.3	7.3	3.7	2.8	3.1	4.1	7.6	7.1	21.1	13.6	13.3	8.9	5.9	3.6	S	2.8	21.1	9.6	24
3	5.4	5.5	5.6	4.9	7.1	8.2	9.1	7.5	22.5	C	C	C	C	C	C	C	8.9	17.0	17.4	23.8	25.3	24.7	S	11.4	4.9	25.3	**12.8**	24
4	21.1	25.8	3.7	3.6	5.1	6.0	3.3	2.7	2.3	2.4	2.6	3.2	3.5	4.8	4.5	5.3	5.9	6.2	7.7	7.5	6.2	S	3.8	2.8	2.3	25.8	6.1	24
5	2.3	2.9	2.3	2.7	2.6	2.9	2.9	3.8	2.4	3.8	2.4	1.6	1.4	1.2	2.1	1.2	2.1	5.6	13.7	18.2	S	35.0	17.9	9.4	1.2	35.0	6.1	24
6	10.2	6.7	2.5	3.4	5.7	6.8	7.9	6.6	8.0	6.6	6.1	4.7	4.1	4.0	3.3	3.4	5.3	5.1	5.0	S	6.4	5.2	4.8	4.3	2.5	10.2	5.5	24
7	3.6	2.9	2.8	2.5	3.1	4.1	5.3	4.2	4.0	4.7	3.6	3.3	3.2	3.1	3.3	4.5	5.5	9.4	S	20.8	26.2	10.6	12.6	20.6	2.5	26.2	7.1	24
8	12.4	11.4	7.9	9.5	16.8	17.9	21.9	21.3	8.5	2.9	2.3	2.7	2.6	1.5	1.2	3.1	2.1	S	8.5	11.8	15.2	13.2	16.3	20.7	1.2	21.9	10.1	24
9	15.6	14.7	14.6	22.5	14.9	12.8	13.2	12.2	14.0	18.6	13.2	1.1	2.2	3.0	2.6	4.8	S	7.4	10.4	22.2	16.0	20.5	20.9	14.9	1.1	22.5	12.7	24
10	17.4	21.7	16.8	18.0	16.0	10.1	8.2	9.2	6.4	3.8	2.6	1.9	1.8	1.8	3.3	S	6.7	6.2	4.2	6.7	12.0	13.5	10.4	9.0	1.8	21.7	9.0	24
11	6.3	7.5	8.2	9.5	8.8	6.1	3.4	X	X	2.0	2.1	2.3	2.1	2.2	S	3.1	3.6	5.3	5.2	4.2	5.3	6.9	6.7	5.0	2.0	9.5	5.0	22
12	4.6	3.8	4.1	3.9	5.1	4.6	5.0	4.5	4.6	2.2	1.8	1.9	1.5	S	2.9	2.9	6.7	1.3	1.9	1.4	1.6	3.2	2.0	1.5	1.3	6.7	3.2	24
13	1.9	2.0	2.1	2.1	2.8	3.8	3.7	4.6	1.9	1.9	2.4	1.8	S	3.3	2.7	2.7	3.0	1.9	2.4	2.5	2.8	3.9	4.3	5.0	1.8	5.0	2.8	24
14	9.2	10.1	13.9	31.2	16.0	11.0	34.5	30.2	10.7	5.4	4.6	S	6.4	8.0	13.1	9.3	7.7	8.7	7.7	7.6	3.7	4.4	3.7	4.8	3.7	34.5	11.4	24
15	5.8	3.7	3.8	4.9	7.3	12.2	16.3	26.3	19.6	16.0	S	7.3	7.5	8.8	8.8	6.7	7.5	13.4	9.3	4.9	5.9	10.1	13.5	7.6	3.7	26.3	9.9	24
16	5.5	5.8	5.3	7.0	12.8	22.0	6.6	19.8	19.6	S	5.6	4.2	4.1	2.3	3.3	4.6	6.3	9.8	23.3	11.6	11.4	7.1	8.6	5.6	2.3	23.3	9.2	24
17	7.6	3.3	4.9	2.0	5.7	10.0	11.9	9.9	S	6.1	4.1	3.5	3.3	2.4	4.0	2.8	2.7	2.7	2.6	3.1	3.0	2.3	2.1	2.5	2.0	11.9	4.5	24
18	2.5	2.2	2.6	3.0	2.9	3.0	2.1	S	2.8	2.6	2.1	2.2	2.7	1.9	2.2	2.2	2.6	6.5	5.1	5.2	4.1	8.0	4.2	2.6	1.9	8.0	3.3	24
19	2.6	2.0	2.1	2.1	1.9	1.8	S	2.8	1.9	1.7	1.6	1.3	1.1	1.1	1.1	1.9	2.1	1.7	1.1	**1.0**	1.3	1.3	2.6	2.2	**1.0**	2.8	1.8	24
20	1.9	1.8	1.4	1.0	2.2	S	5.3	3.5	2.1	2.6	1.7	1.6	1.6	1.2	1.7	2.0	2.2	5.2	5.2	3.9	7.3	3.0	2.8	3.2	1.0	7.3	2.8	24
21	3.5	7.6	16.4	9.8	S	11.3	15.9	8.7	3.8	3.2	1.8	3.2	2.1	3.1	3.5	3.2	3.0	2.6	2.5	2.2	2.5	2.5	2.3	2.6	1.8	16.4	5.1	24
22	3.2	3.4	3.5	S	4.6	4.8	5.7	7.4	4.9	5.5	6.7	6.8	6.0	4.4	4.2	5.8	6.8	8.8	7.7	13.1	12.2	5.0	4.5	6.6	3.2	13.1	6.2	24
23	5.1	6.1	S	5.7	5.2	31.5	13.8	**42.9**	22.3	11.9	7.9	4.9	5.2	4.9	5.1	5.8	4.9	5.8	9.7	14.5	29.8	10.3	8.6	7.1	4.9	**42.9**	11.7	24
24	13.5	S	8.4	13.7	20.1	21.7	32.1	25.3	15.1	8.2	5.1	4.2	4.5	3.5	5.0	5.2	4.3	3.6	4.0	3.5	3.3	4.0	3.8	3.0	3.0	32.1	9.4	24
25	S	2.9	2.9	3.3	15.3	11.7	12.9	11.8	6.7	5.8	4.0	3.9	2.9	1.4	2.1	2.4	2.1	4.8	11.2	17.5	15.8	10.4	14.1	S	1.4	17.5	7.5	24
26	18.3	8.1	13.7	13.2	9.5	11.6	13.1	14.4	10.1	6.7	7.1	6.2	4.3	3.8	3.7	2.9	3.5	3.9	5.6	5.6	13.2	10.7	S	4.2	2.9	18.3	8.4	24
27	6.9	8.9	10.7	6.5	7.5	8.9	8.5	8.3	6.6	4.3	3.1	2.5	2.9	2.2	2.4	2.4	3.7	2.6	2.7	2.3	2.2	S	3.4	4.8	2.2	10.7	5.0	24
28	6.2	6.3	5.4	3.5	4.0	3.7	3.9	3.9	2.4	2.8	3.6	3.2	3.3	2.6	5.9	3.3	3.8	4.2	4.8	4.5	S	6.2	4.4	5.9	2.4	6.3	4.3	24
29	5.7	5.8	6.9	8.1	9.9	21.6	13.4	14.2	17.2	12.3	3.5	2.3	2.3	2.2	3.4	4.2	5.9	6.7	9.2	S	22.1	12.1	11.0	7.6	2.2	22.1	9.0	24
30	4.6	2.8	2.6	2.5	2.9	4.0	4.6	5.8	4.6	3.5	4.5	4.5	4.3	4.0	4.9	3.8	4.1	4.1	S	14.7	8.3	18.1	11.0	7.0	2.5	18.1	5.7	24
31	6.4	14.0	7.2	14.1	16.0	21.8	24.1	8.9	6.2	5.3	5.5	6.3	5.0	2.9	4.3	3.0	2.8	S	5.5	5.3	3.7	3.5	3.5	4.8	2.8	24.1	7.8	24
HOURLY MAX	21.1	25.8	16.8	31.2	20.1	31.5	34.5	42.9	22.5	18.6	13.2	7.3	7.5	8.8	13.1	9.3	8.9	21.1	23.3	23.8	29.8	35.0	20.9	20.7				
HOURLY AVG	7.3	7.2	6.6	7.6	8.1	10.4	11.0	11.9	8.6	5.6	4.2	3.4	3.3	3.1	3.9	3.9	4.5	6.5	7.5	9.1	9.8	9.2	7.4	6.7				

STATUS FLAG CODES

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

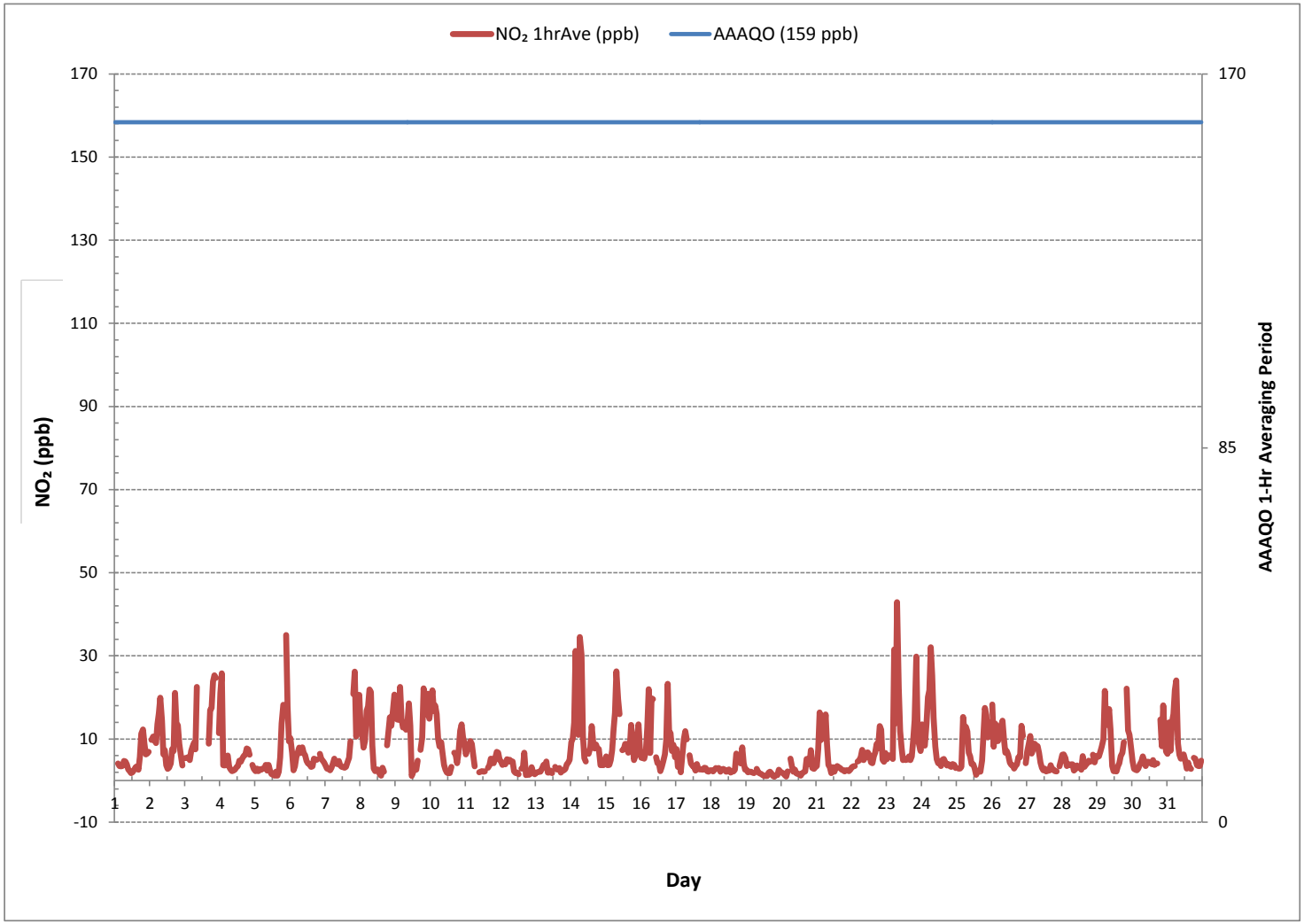
OBJECTIVE LIMIT: **ALBERTA ENVIRONMENT:** 1-HR 159 ppb



MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	702					
MINIMUM 1-HR AVERAGE	1.0 ppb	@ HOUR(S)	19	ON DAY(S)	19	
MAXIMUM 1-HR AVERAGE:	42.9 ppb	@ HOUR(S)	7	ON DAY(S)	23	
MAXIMUM 24-HR AVERAGE:	12.8 ppb			ON DAY(S)	3	
				VAR-VARIOUS		
IZS CALIBRATION TIME:	33 hrs	OPERATIONAL TIME:			742	hrs
MONTHLY CALIBRATION TIME:	7 hrs	AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	6.0	MONTHLY AVERAGE:			7.0	ppb

NITROGEN DIOXIDE Hourly Averages (NO_2 ppb)



NITROGEN DIOXIDE Instantaneous Maximum (NO_2 ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	6.3	S	7.0	5.9	5.8	6.4	9.3	7.8	6.7	5.5	5.0	4.4	4.9	11.4	9.1	6.9	5.4	11.9	16.9	22.7	26.9	9.3	9.4	11.0	4.4	26.9	9.4	24
2	S	13.4	14.1	14.3	13.1	18.6	22.5	26.3	20.2	11.5	11.2	7.4	5.6	5.7	7.5	20.8	27.9	28.0	18.6	20.8	16.8	16.5	7.0	S	5.6	28.0	15.8	24
3	8.8	8.0	8.4	7.3	9.9	10.7	21.6	19.2	34.7	C	C	C	C	C	C	C	13.9	20.9	25.0	32.1	36.9	43.6	S	17.7	7.3	43.6	19.9	24
4	37.4	38.3	10.7	6.8	7.0	7.8	4.6	4.4	5.1	4.8	Y	5.2	17.2	8.0	9.8	7.6	9.3	8.9	9.4	10.3	10.0	S	5.7	5.9	4.4	38.3	10.6	23
5	3.3	5.2	3.7	4.1	3.6	5.3	5.0	6.1	3.9	7.0	5.4	3.3	2.5	2.7	25.5	2.4	9.7	10.4	20.2	24.3	S	39.7	38.2	12.8	2.4	39.7	10.6	24
6	12.8	11.2	4.6	5.0	11.7	11.7	12.3	9.6	10.2	9.0	8.0	6.6	5.2	6.7	4.4	4.5	6.6	6.3	6.8	S	8.9	6.8	6.0	6.3	4.4	12.8	7.9	24
7	5.5	4.5	3.9	3.5	4.7	7.8	7.4	6.8	4.9	6.2	5.0	4.2	4.4	4.8	4.5	5.7	7.8	13.2	S	27.9	34.3	13.4	16.9	24.5	3.5	34.3	9.6	24
8	22.4	14.1	9.8	11.7	27.6	30.5	32.0	28.8	13.3	5.0	4.7	4.5	4.0	2.7	3.5	16.6	18.4	S	24.1	29.6	51.0	51.0	32.6	37.8	2.7	51.0	20.7	24
9	25.9	19.0	25.1	39.6	18.6	19.2	34.8	33.2	32.5	33.0	31.3	19.2	10.2	18.9	13.9	19.6	S	11.3	28.4	62.6	38.3	39.9	50.0	29.0	10.2	62.6	28.4	24
10	49.9	30.2	22.1	25.7	24.2	14.5	14.1	13.6	8.5	5.2	4.9	9.7	3.6	3.1	5.4	S	8.8	8.8	6.4	8.5	17.2	15.2	14.2	11.1	3.1	49.9	14.1	24
11	8.0	9.8	9.9	12.6	11.0	8.2	14.7	X	X	11.3	3.6	3.4	3.1	4.6	S	4.6	4.4	7.9	6.4	6.9	7.4	9.2	8.2	6.6	3.1	14.7	7.7	22
12	5.8	4.7	5.0	5.3	7.8	5.4	6.6	6.6	6.6	3.9	2.8	2.9	2.5	S	4.4	7.6	21.4	10.0	13.3	3.2	18.6	20.7	6.1	2.2	2.2	21.4	7.5	24
13	2.5	2.8	3.1	3.0	4.9	5.0	10.7	8.4	8.8	9.6	8.2	10.0	S	9.9	11.7	10.4	5.0	3.5	35.0	10.1	5.6	5.5	20.2	7.7	2.5	35.0	8.8	24
14	16.2	16.8	22.8	36.8	36.0	19.9	42.5	47.0	25.5	7.3	11.7	S	9.6	10.1	15.9	25.2	19.8	16.0	26.0	21.6	5.1	6.1	5.5	7.2	5.1	47.0	19.6	24
15	7.4	7.3	5.2	6.3	9.5	18.7	27.1	46.7	35.8	29.9	S	19.3	18.0	31.5	30.8	27.8	23.7	39.0	18.8	7.6	10.9	16.1	41.7	16.6	5.2	46.7	21.6	24
16	9.8	11.4	7.3	8.8	25.5	34.8	19.4	38.2	31.8	S	8.1	6.1	13.2	3.3	12.7	7.0	8.5	27.5	64.1	42.3	16.8	9.8	10.8	8.7	3.3	64.1	18.5	24
17	12.1	6.8	6.8	4.8	43.6	20.7	25.6	21.6	S	29.8	9.1	4.9	9.6	4.4	11.0	8.0	11.1	9.9	9.7	4.7	5.6	3.6	2.5	4.1	2.5	43.6	11.7	24
18	11.7	2.6	3.2	3.3	3.5	6.7	2.3	S	3.3	7.8	2.5	3.5	19.5	8.4	3.0	3.3	4.0	8.5	5.7	6.6	7.9	10.1	4.9	3.8	2.3	19.5	5.9	24
19	3.7	2.1	2.2	2.7	2.5	2.5	S	3.5	2.1	2.1	2.3	1.3	1.3	1.4	1.9	2.9	3.0	2.8	1.3	1.2	1.5	1.7	4.7	2.7	1.2	4.7	2.3	24
20	2.9	2.7	2.9	1.7	3.7	S	7.6	5.2	4.5	11.9	2.7	3.0	2.5	2.7	2.3	14.0	3.1	76.7	8.7	16.3	40.7	12.7	4.6	5.4	1.7	76.7	10.4	24
21	4.6	21.5	18.4	12.3	S	20.8	18.5	22.0	8.6	11.8	11.1	15.3	5.4	15.6	15.8	5.3	3.6	8.9	2.8	3.5	2.9	3.1	2.5	2.7	2.5	22.0	10.3	24
22	3.7	3.9	3.7	S	4.8	6.5	6.6	22.5	6.1	11.9	8.6	8.2	7.1	5.8	7.0	9.6	8.9	10.1	10.5	17.1	17.8	6.0	5.2	8.9	3.7	22.5	8.7	24
23	11.7	10.6	S	10.6	20.8	54.8	22.6	60.1	41.4	14.4	10.9	7.2	7.6	5.5	5.6	13.3	6.0	21.0	18.0	39.5	**143.5**	15.2	16.1	14.6	5.5	**143.5**	24.8	24
24	38.8	S	38.4	33.5	41.6	44.5	48.8	39.9	20.7	18.7	17.1	14.0	7.1	10.4	11.6	18.6	5.4	5.6	6.3	4.4	4.4	7.4	5.1	4.4	4.4	48.8	19.4	24
25	S	4.0	3.3	4.3	25.7	17.8	19.9	24.8	11.3	8.1	5.2	14.8	7.7	1.7	10.8	14.7	3.3	21.7	25.6	23.7	44.7	20.2	24.5	S	1.7	44.7	15.4	24
26	23.5	13.3	27.0	24.5	12.0	17.6	24.9	23.3	15.9	8.2	9.0	15.9	9.6	13.7	5.4	10.3	4.9	10.0	10.3	23.7	25.0	12.9	S	6.4	4.9	27.0	15.1	24
27	8.9	12.2	14.3	8.6	10.7	14.4	10.5	10.3	8.7	7.7	16.3	8.8	15.8	9.7	14.7	15.6	12.2	18.7	18.4	4.1	3.9	S	10.7	6.1	3.9	18.7	11.4	24
28	8.1	7.2	6.2	4.5	5.2	10.8	9.6	17.5	13.7	3.6	11.1	9.8	12.4	6.3	22.6	9.2	8.3	5.8	18.7	6.7	S	10.3	6.0	8.6	3.6	22.6	9.7	24
29	7.2	8.2	8.5	10.5	16.9	24.9	28.0	25.0	26.1	19.8	17.0	3.3	3.6	8.2	4.6	5.9	17.4	9.0	16.0	S	26.9	14.8	13.8	10.9	3.3	28.0	14.2	24
30	7.8	3.9	3.3	3.3	5.2	5.5	6.8	7.7	7.2	4.7	7.6	6.6	6.8	6.4	9.8	5.0	19.7	6.0	S	19.8	15.3	31.5	20.4	10.9	3.3	31.5	9.6	24
31	10.3	19.2	17.1	21.2	21.3	26.5	50.2	20.8	14.6	15.5	16.0	16.2	10.6	12.6	22.2	13.6	18.1	S	15.7	11.7	7.6	6.1	8.3	10.9	6.1	50.2	16.8	24
HOURLY MAX	49.9	38.3	38.4	39.6	43.6	54.8	50.2	60.1	41.4	33.0	31.3	19.3	19.5	31.5	30.8	27.8	27.9	76.7	64.1	62.6	143.5	51.0	50.0	37.8				
HOURLY AVG	13.0	10.9	10.6	11.4	14.6	16.6	18.9	20.9	14.9	11.2	9.2	8.2	8.0	8.1	10.6	10.9	10.7	15.1	16.8	17.7	22.5	15.8	13.9	10.5				

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

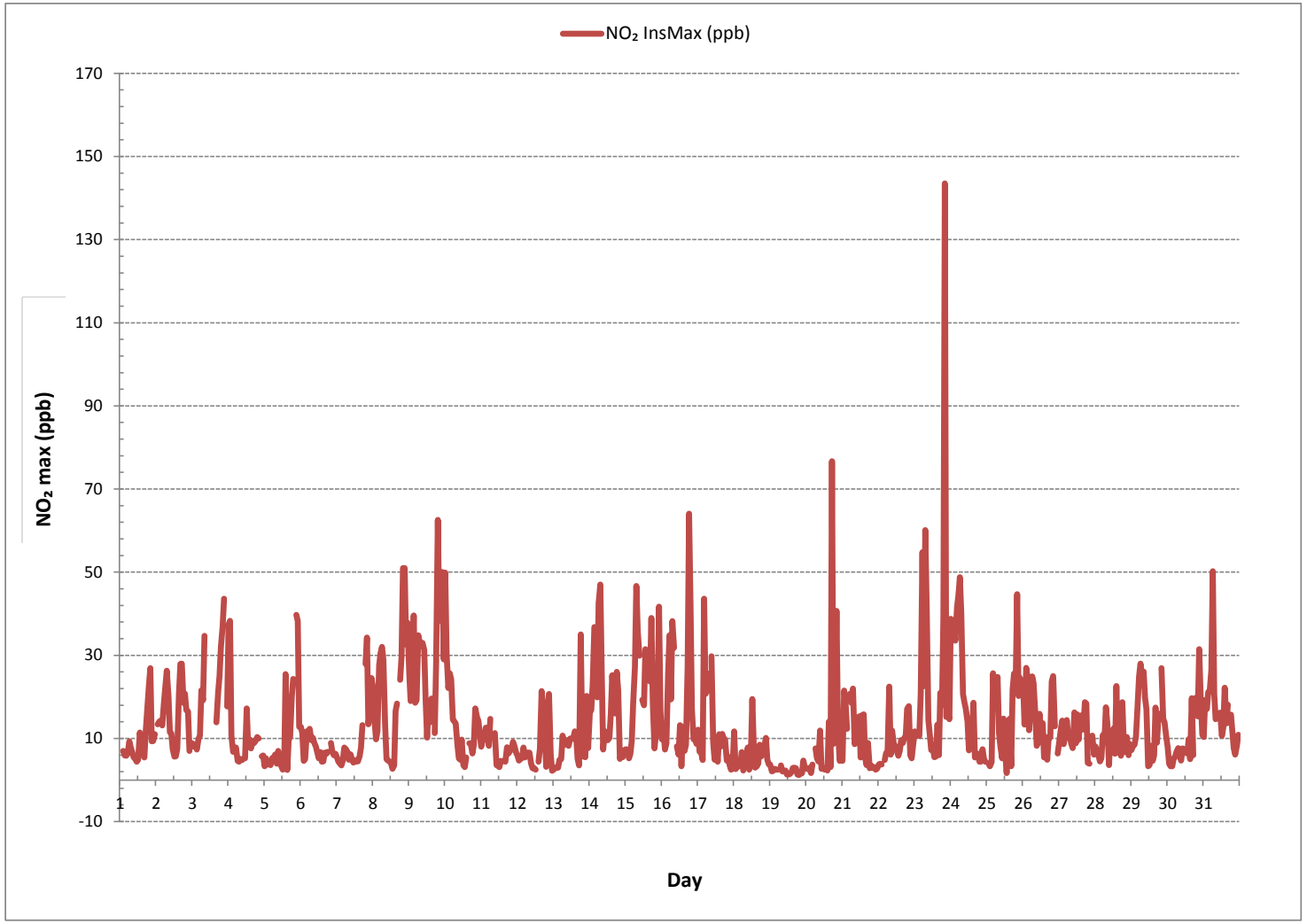
NUMBER OF NON-ZERO READINGS: 701

MAXIMUM INSTANTANEOUS VALUE: 143.5 ppb @ HOUR(S) 20 ON DAY(S) 23

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 741 hrs
MONTHLY CALIBRATION TIME: 7 hrs
STANDARD DEVIATION: 12.1

NITROGEN DIOXIDE Instantaneous Maximum (NO_2 ppb)



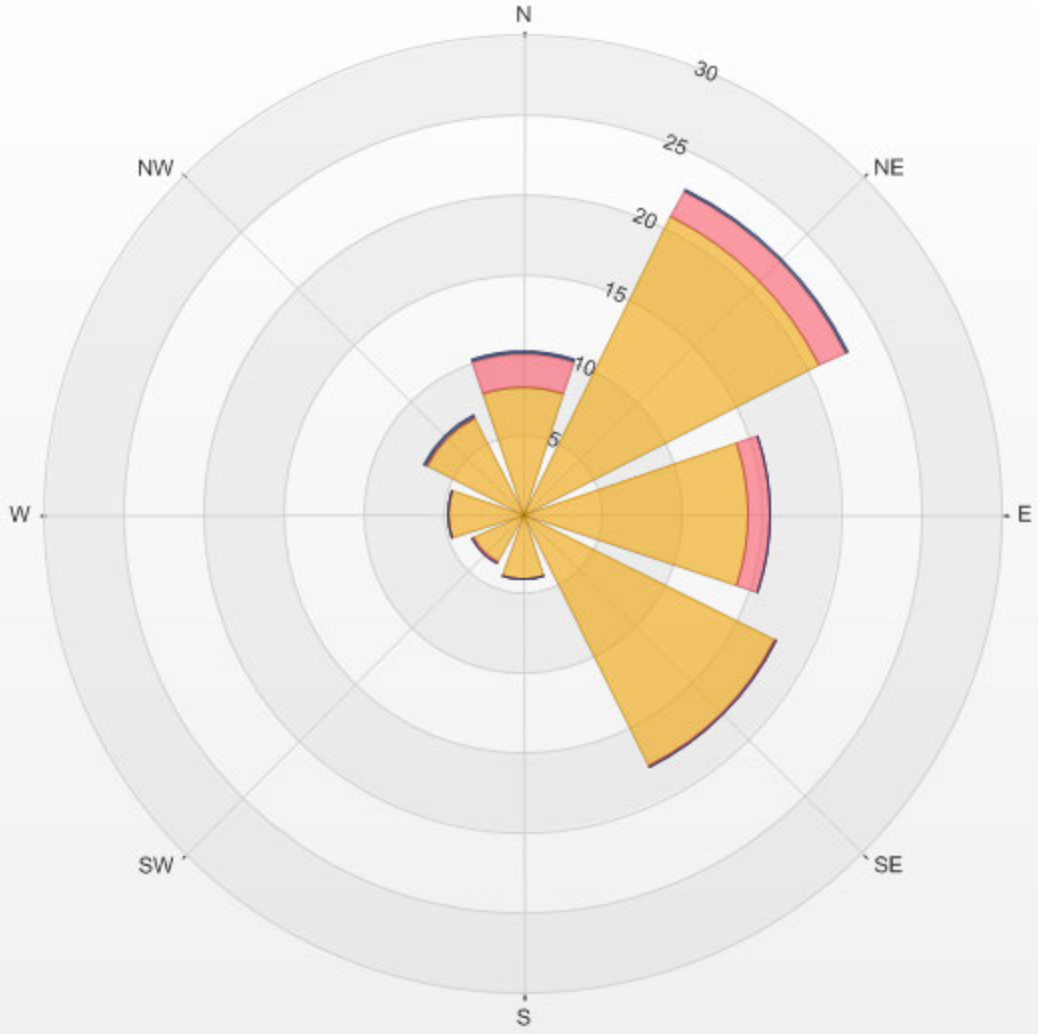
Wind: LICA Bonnyville
Poll.: LICA Bonnyville-NO2[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 14.25% Calm Avg: 12.91 [ppb]

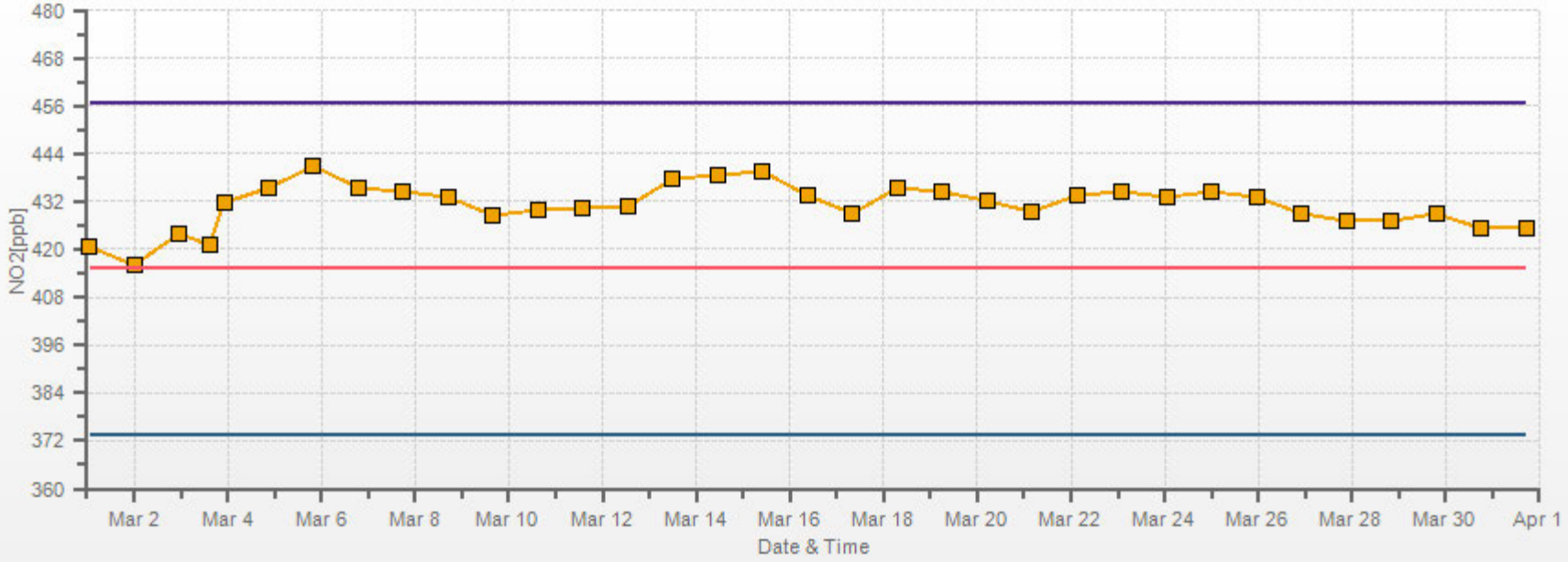
Direction	0.0-14.3	14.3-28.7	28.7-43.0	>43.0	Total
N	8.0	2.1	0.1	0.0	10.3
NE	20.8	1.9	0.1	0.0	22.8
E	14.1	1.4	0.0	0.0	15.5
SE	17.7	0.1	0.0	0.0	17.8
S	4.1	0.0	0.0	0.0	4.1
SW	3.4	0.1	0.0	0.0	3.6
W	4.7	0.0	0.0	0.0	4.7
NW	6.7	0.1	0.1	0.0	7.0
Summary	79.5	5.8	0.4	0.0	85.7

% Icon Classes (ppb)	79 0.0-14.3	6 14.3-28.7	0 28.7-43.0	0 >43.0

LICA Bonnyville Poll.: LICA Bonnyville-NO2[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 14.25% Calm Poll Avg: 12.91[ppb]



NO2[ppb] Calibration: LICA Bonnyville Monthly: 17/03 Type: Span



OZONE

OZONE Hourly Averages (O_3 ppb)

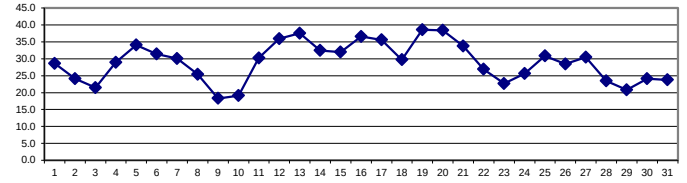
HR START (MST) / HR END (MST)	0:00 0:59	1:00 1:59	2:00 2:59	3:00 3:59	4:00 4:59	5:00 5:59	6:00 6:59	7:00 7:59	8:00 8:59	9:00 9:59	10:00 10:59	11:00 11:59	12:00 12:59	13:00 13:59	14:00 14:59	15:00 15:59	16:00 16:59	17:00 17:59	18:00 18:59	19:00 19:59	20:00 20:59	21:00 21:59	22:00 22:59	23:00 23:59	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
DAY																											
1	29.4	S	31.4	30.5	29.5	28.7	26.8	26.1	26.4	28.1	29.0	29.8	30.6	31.1	31.5	32.7	33.2	29.5	24.6	21.6	26.6	27.9	27.0	26.2	21.6	33.2	28.6	24
2	S	24.5	23.7	24.6	24.3	20.0	17.7	15.0	19.3	25.0	24.6	27.3	28.7	29.0	28.9	28.3	27.6	15.5	21.6	21.6	25.4	27.5	29.5	S	15.0	29.5	24.1	24
3	29.2	28.0	27.1	27.0	24.5	23.0	21.8	22.0	11.3	15.4	23.5	25.8	20.7	30.5	30.8	29.6	22.8	18.0	16.7	9.8	5.9	6.8	S	23.1	5.9	30.8	21.4	24
4	14.6	10.7	34.0	30.2	23.8	22.4	27.6	29.9	32.2	C	C	C	Y	C	C	C	C	33.7	32.4	32.8	34.0	S	37.2	37.9	10.7	37.9	28.9	23
5	38.5	38.4	38.8	38.1	37.9	37.4	37.0	36.4	37.4	36.6	37.6	38.2	38.3	38.4	38.1	38.4	37.5	34.3	26.8	22.8	S	7.4	21.6	26.8	7.4	38.8	34.0	24
6	25.8	29.3	34.2	34.1	31.5	30.7	29.4	30.0	28.7	30.3	31.0	32.3	33.0	33.1	33.9	33.5	31.7	32.4	32.4	S	31.1	30.6	30.9	31.6	25.8	34.2	31.4	24
7	32.3	32.4	32.2	32.5	31.1	29.6	27.7	29.6	31.1	31.5	33.1	33.9	34.3	35.2	35.3	34.4	33.2	29.7	S	21.4	17.7	30.2	26.0	17.3	17.3	35.3	30.1	24
8	22.5	21.4	23.2	21.7	14.2	12.9	9.0	13.3	24.9	32.1	34.5	35.0	35.5	36.6	37.2	36.1	36.6	S	30.8	28.2	22.0	22.8	18.7	15.2	9.0	37.2	25.4	24
9	16.2	16.2	15.0	10.3	14.4	15.7	15.3	16.8	17.6	18.7	24.2	28.3	27.3	28.3	29.1	29.3	S	24.4	18.8	9.0	13.4	10.7	10.4	11.5	9.0	29.3	18.3	24
10	8.1	9.8	15.6	14.4	14.7	18.6	17.5	16.8	18.9	19.8	20.6	21.5	21.9	23.9	26.0	S	23.6	22.3	24.4	22.9	18.7	17.7	20.3	22.3	8.1	26.0	19.1	24
11	26.0	24.3	23.5	23.8	24.7	27.5	30.4	X	X	31.7	31.5	32.2	32.6	33.2	S	33.8	33.8	33.3	35.6	34.8	32.0	29.3	29.8	31.2	23.5	35.6	30.2	22
12	31.7	32.0	31.9	32.4	31.0	31.0	30.4	30.9	31.2	33.4	34.2	35.1	36.9	S	38.7	41.0	40.9	41.8	40.7	41.8	41.9	39.5	38.5	39.2	30.4	41.9	35.9	24
13	38.8	38.7	38.5	38.0	36.9	35.2	35.0	33.3	35.5	36.1	35.8	36.2	S	38.2	38.9	39.3	39.4	40.0	40.0	39.5	38.8	37.9	36.9	35.5	33.3	40.0	37.5	24
14	31.1	30.1	25.8	11.6	23.0	26.6	6.5	12.3	29.7	33.3	35.2	S	37.4	38.0	35.5	39.8	42.0	42.1	42.7	41.1	42.6	40.8	40.1	38.3	6.5	42.7	32.4	24
15	37.0	37.0	35.0	32.4	29.1	23.9	19.4	11.7	17.6	21.2	S	30.9	33.4	34.3	37.0	39.6	39.4	36.2	38.0	40.5	39.0	33.5	28.8	39.5	11.7	40.5	31.9	24
16	43.2	42.2	43.1	41.8	33.9	25.5	37.3	27.9	27.9	S	42.7	44.5	44.0	**45.6**	43.6	42.5	40.9	34.3	24.0	29.3	29.1	33.4	31.6	32.8	24.0	**45.6**	36.6	24
17	30.8	35.0	34.2	35.4	31.5	26.0	23.9	23.9	S	33.9	35.4	36.1	37.7	38.5	40.1	43.0	41.7	42.0	40.9	39.3	38.2	37.9	37.6	35.7	23.9	43.0	35.6	24
18	34.2	33.5	32.2	30.8	30.6	29.6	30.1	S	29.9	30.1	30.3	30.6	31.2	31.8	32.3	31.8	30.8	25.9	27.3	26.2	27.2	22.8	26.3	28.4	22.8	34.2	29.7	24
19	28.7	31.0	29.7	33.4	37.0	37.3	S	34.9	37.2	38.9	38.9	41.6	43.6	44.7	45.0	43.2	42.7	42.2	41.1	40.8	40.1	38.9	38.4	37.9	28.7	45.0	**38.6**	24
20	36.6	37.0	38.6	40.7	39.5	S	36.9	38.0	40.1	39.7	39.8	40.5	41.7	43.9	43.5	41.5	40.4	39.1	36.9	33.8	31.7	35.0	34.1	34.1	31.7	43.9	38.4	24
21	33.0	30.0	21.7	26.9	S	26.8	22.4	30.6	35.3	36.1	38.4	37.2	37.9	38.6	37.6	38.2	37.3	37.0	36.2	35.7	35.0	34.7	34.8	34.1	21.7	38.6	33.7	24
22	33.3	32.4	31.5	S	30.6	29.6	28.2	26.5	27.6	26.5	25.3	25.5	27.5	29.8	29.9	28.5	27.1	24.8	25.6	19.7	19.0	24.3	23.7	21.4	19.0	33.3	26.9	24
23	22.7	22.6	S	23.2	22.3	2.9	14.5	3.9	11.4	17.5	24.1	29.3	30.6	31.7	32.2	31.6	32.4	31.4	26.8	23.8	15.5	23.8	24.0	23.6	2.9	32.4	22.7	24
24	17.8	S	20.7	14.5	9.3	7.8	3.1	7.8	17.6	26.5	29.8	31.4	31.6	33.5	32.4	31.6	34.1	38.0	36.2	35.1	34.1	32.6	31.5	32.3	3.1	38.0	25.6	24
25	S	32.8	31.8	31.2	19.7	23.3	21.4	22.0	26.2	26.4	28.5	30.7	34.1	38.7	39.7	41.4	42.9	40.4	33.6	27.7	27.6	32.1	25.8	S	19.7	42.9	30.8	24
26	18.9	26.9	19.6	17.6	20.3	19.3	17.8	17.1	19.6	23.6	26.3	31.3	36.4	40.0	43.0	41.7	40.4	38.9	35.7	33.5	26.5	27.6	S	32.2	17.1	43.0	28.4	24
27	28.5	25.5	22.8	26.0	25.2	23.1	21.5	25.7	29.2	31.3	32.5	33.7	36.7	40.3	37.4	36.2	35.6	35.2	32.8	31.4	31.5	S	29.5	27.8	21.5	40.3	30.4	24
28	26.6	26.6	27.0	26.6	24.1	22.5	21.8	22.1	22.5	21.4	22.2	23.0	23.6	23.2	22.2	24.6	24.9	24.1	22.5	22.6	S	22.3	23.1	20.7	20.7	27.0	23.5	24
29	19.8	19.7	18.0	16.2	14.6	2.7	8.2	7.1	7.2	13.2	28.0	31.0	32.0	33.6	33.6	34.1	33.3	31.7	27.9	S	13.9	18.5	16.8	17.2	2.7	34.1	20.8	24
30	20.0	23.7	22.6	23.7	24.9	23.5	23.1	23.4	24.6	25.3	26.2	27.0	28.3	31.1	32.0	32.2	32.7	32.6	S	20.1	19.1	10.2	12.2	15.6	10.2	32.7	24.1	24
31	15.3	7.1	13.0	8.4	5.6	**0.9**	1.8	14.3	16.8	20.0	21.9	26.6	33.0	41.7	42.0	39.5	34.7	S	33.4	34.9	35.3	35.1	34.1	30.8	**0.9**	42.0	23.7	24
HOURLY MAX	43.2	42.2	43.1	41.8	39.5	37.4	37.3	38.0	40.1	39.7	42.7	44.5	44.0	45.6	45.0	43.2	42.9	42.2	42.7	41.8	42.6	40.8	40.1	39.5				
HOURLY AVG	27.3	27.5	27.9	26.6	25.3	22.8	22.1	22.4	25.3	27.7	30.5	31.9	33.1	35.1	35.4	35.8	35.0	32.8	31.3	29.0	28.0	27.3	28.2	28.3				

STATUS FLAG CODES

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

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

24 HR AVERAGES March 2017

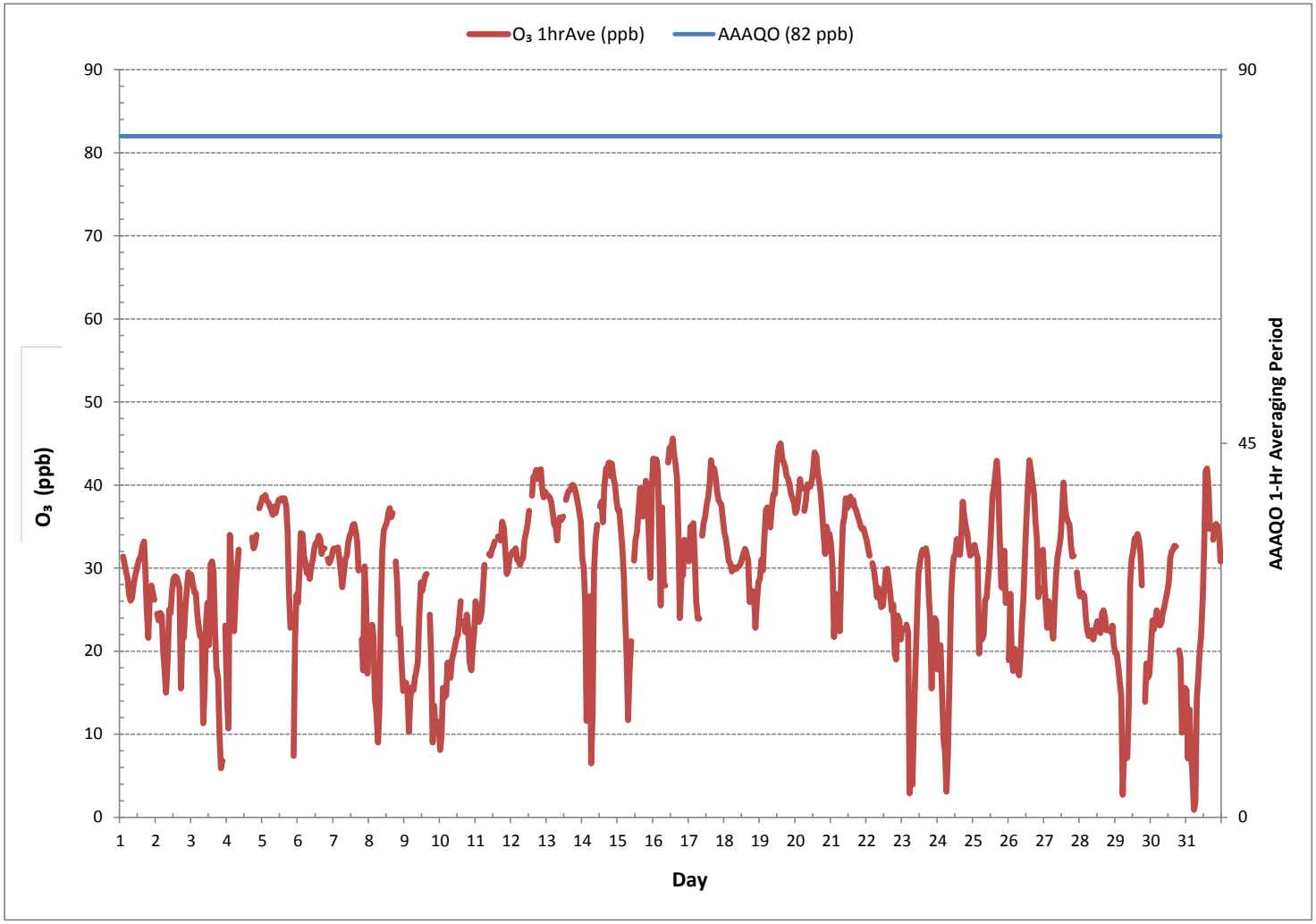


MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	701					
MINIMUM 1-HR AVERAGE	0.9	ppb	@ HOUR(S)	5	ON DAY(S)	31
MAXIMUM 1-HR AVERAGE:	45.6	ppb	@ HOUR(S)	13	ON DAY(S)	16
MAXIMUM 24-HR AVERAGE:	38.6	ppb			ON DAY(S)	19
					VAR-VARIOUS	

IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	741	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	99.6	%
STANDARD DEVIATION:	8.7		MONTHLY AVERAGE:	29.0	ppb

OZONE Hourly Averages (O_3 ppb)



OZONE Instantaneous Maximum (O_3 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	31.5	S	32.2	31.6	30.3	30.3	29.0	28.0	28.7	29.1	30.2	30.9	32.0	33.4	33.5	34.4	34.3	32.9	28.7	31.5	29.0	29.7	29.3	28.2	28.0	34.4	30.8	24
2	S	26.3	25.6	26.4	26.4	22.5	22.1	19.4	22.9	26.3	26.6	28.7	29.5	30.1	30.2	31.9	31.7	22.5	26.4	26.1	28.0	29.5	30.4	S	19.4	31.9	26.8	24
3	30.3	28.7	28.0	28.2	26.6	24.8	24.0	23.4	15.4	18.6	25.4	28.2	45.6	32.5	32.8	31.7	30.9	22.3	22.1	16.5	13.2	15.4	S	26.4	13.2	45.6	25.7	24
4	24.8	30.0	35.3	33.7	25.3	26.7	29.8	33.1	33.8	C	C	C	Y	C	C	C	C	36.2	34.9	35.4	37.2	S	38.4	39.3	24.8	39.3	32.9	23
5	39.4	40.0	39.7	39.3	38.7	38.6	38.3	38.0	38.7	38.6	39.1	39.1	39.0	39.3	39.3	39.3	39.0	37.4	32.9	29.2	S	17.7	28.0	29.0	17.7	40.0	36.4	24
6	28.1	34.0	35.6	36.2	34.9	33.5	32.4	33.1	33.2	32.1	32.6	33.8	34.4	35.0	35.0	34.7	33.8	34.0	34.1	S	32.8	31.7	32.1	32.6	28.1	36.2	33.5	24
7	33.1	33.1	32.9	33.4	32.9	32.3	29.1	32.6	32.9	33.4	34.3	34.9	35.7	36.5	36.6	35.7	35.3	33.1	S	26.6	29.7	33.5	28.5	21.4	21.4	36.6	32.5	24
8	26.0	23.1	24.5	24.1	22.8	21.3	18.5	21.1	30.6	33.8	36.1	36.2	36.9	37.2	38.0	37.6	37.4	S	35.1	38.6	33.8	30.6	29.0	26.1	18.5	38.6	30.4	24
9	20.1	22.3	22.3	15.7	17.5	17.3	17.1	20.5	21.3	21.3	30.1	30.0	29.7	29.1	30.3	31.8	S	28.4	25.6	20.7	19.2	22.2	20.8	18.5	15.7	31.8	23.1	24
10	15.2	16.2	19.8	20.5	17.0	21.0	19.1	19.7	20.8	20.5	21.9	22.1	23.2	25.2	27.5	S	25.8	24.6	25.7	24.6	23.7	21.0	22.5	25.7	15.2	27.5	21.9	24
11	27.7	26.7	24.9	26.1	27.6	29.1	32.0	X	X	33.1	32.7	32.9	33.5	34.6	S	35.0	34.8	35.7	37.1	36.8	33.7	31.7	31.5	32.3	24.9	37.1	31.9	22
12	32.8	33.4	33.4	34.0	32.8	32.2	31.7	32.5	32.5	34.9	35.0	36.6	38.1	S	40.0	44.4	44.2	43.3	41.9	42.6	42.9	42.2	39.3	39.9	31.7	44.4	37.4	24
13	39.3	39.3	39.2	38.8	38.6	36.6	36.5	36.1	36.5	37.1	37.0	37.2	S	39.5	40.3	40.5	40.5	40.7	40.8	40.5	39.8	39.6	38.7	39.0	36.1	40.8	38.8	24
14	35.1	35.3	29.1	19.4	30.6	30.6	28.5	24.3	33.5	35.1	36.6	S	39.3	39.6	39.0	43.2	43.5	44.1	44.7	43.8	43.5	42.6	41.2	40.2	19.4	44.7	36.6	24
15	38.7	38.4	36.5	34.6	31.6	27.9	26.1	23.7	23.4	26.0	S	34.0	35.9	37.2	40.2	42.6	43.9	44.8	41.9	42.3	42.0	37.4	35.4	45.5	23.4	45.5	36.1	24
16	45.6	45.2	45.0	43.8	41.6	39.9	42.7	40.6	40.2	S	45.0	46.2	45.3	47.0	45.3	44.7	44.0	43.2	33.8	34.4	35.7	35.9	34.5	36.3	33.8	47.0	41.6	24
17	36.8	37.3	36.9	36.9	33.4	32.8	27.0	26.7	S	37.4	38.6	39.2	39.1	40.8	42.3	44.3	43.4	42.6	42.2	40.2	39.0	38.8	38.3	37.4	26.7	44.3	37.9	24
18	35.4	34.3	33.5	32.3	31.7	30.9	30.6	S	30.7	30.7	30.9	31.5	32.5	32.9	33.2	33.1	32.5	29.2	28.8	27.7	28.8	26.4	28.1	29.5	26.4	35.4	31.1	24
19	30.9	31.8	32.0	35.3	39.0	38.4	S	36.8	38.0	39.9	41.6	42.9	44.7	45.8	46.1	45.1	43.9	42.8	42.2	41.7	40.8	40.3	39.8	39.4	30.9	46.1	40.0	24
20	37.5	39.0	39.5	42.1	41.2	S	38.8	40.2	41.1	41.2	41.0	42.0	43.2	45.3	45.5	43.0	42.0	41.6	41.4	36.3	36.2	36.6	36.2	37.1	36.2	45.5	40.3	24
21	35.6	35.4	25.6	29.8	S	31.2	27.6	35.4	36.6	38.3	39.6	38.8	39.1	39.7	39.9	39.6	38.6	38.6	37.2	36.8	35.7	35.9	35.9	35.1	25.6	39.9	35.9	24
22	34.4	33.8	32.9	S	31.7	31.2	29.9	28.7	29.0	28.8	27.5	27.5	30.4	31.0	31.5	31.3	29.1	26.9	27.9	24.0	25.7	25.8	24.5	23.8	23.8	34.4	29.0	24
23	26.7	26.7	S	25.4	24.6	13.8	21.9	8.7	16.5	20.4	27.0	31.7	32.0	32.8	33.4	33.4	33.8	33.5	32.5	30.7	26.7	28.5	27.5	28.1	8.7	33.8	26.8	24
24	25.3	S	26.7	26.4	20.5	16.0	10.6	24.0	28.1	30.4	31.8	32.6	33.3	34.4	35.3	33.8	37.5	39.3	38.3	36.8	35.1	34.4	32.6	33.5	10.6	39.3	30.3	24
25	S	33.8	32.8	32.6	30.1	27.0	25.2	24.5	28.1	30.5	30.1	34.6	37.8	39.7	41.2	42.7	44.1	43.8	41.2	33.7	35.9	36.8	31.7	S	24.5	44.1	34.5	24
26	24.5	28.8	26.9	21.3	22.5	22.2	20.7	19.9	22.0	29.0	29.1	35.4	39.3	42.0	44.6	43.6	42.0	41.1	39.4	36.2	33.8	29.6	S	33.7	19.9	44.6	31.6	24
27	31.4	29.1	25.6	27.5	27.5	26.9	23.7	28.8	31.2	33.7	33.8	35.7	40.0	41.6	40.2	37.8	37.6	37.6	35.7	33.1	33.2	S	30.6	30.0	23.7	41.6	32.7	24
28	28.1	27.8	28.0	28.5	25.7	24.1	23.3	23.5	23.7	22.9	23.7	24.4	24.8	23.8	23.8	26.4	26.4	26.3	24.9	25.4	S	24.3	25.5	23.1	22.9	28.5	25.1	24
29	21.5	21.5	20.1	18.2	18.8	7.5	14.3	14.8	12.3	23.3	30.6	32.2	33.7	34.7	35.1	35.6	35.4	34.5	32.9	S	22.1	22.5	18.9	19.7	7.5	35.6	24.4	24
30	24.1	24.4	23.8	25.8	26.3	25.4	25.8	25.7	26.3	26.7	28.2	29.2	31.2	33.5	35.1	34.4	34.4	34.4	S	25.8	25.1	20.8	18.1	18.9	18.1	35.1	27.1	24
31	18.5	12.7	18.6	11.5	11.4	2.7	4.8	17.1	19.2	21.7	25.3	29.3	38.8	**48.0**	47.1	42.3	37.2	S	37.4	37.8	36.9	36.5	36.3	34.3	2.7	**48.0**	27.2	24
HOURLY MAX	45.6	45.2	45.0	43.8	41.6	39.9	42.7	40.6	41.1	41.2	45.0	46.2	45.6	48.0	47.1	45.1	44.2	44.8	44.7	43.8	43.5	42.6	41.2	45.5				
HOURLY AVG	30.3	30.6	30.2	29.3	28.7	26.5	26.0	26.9	28.5	30.2	32.5	33.7	35.8	36.6	37.3	37.7	37.1	35.7	34.7	33.0	32.4	31.0	31.2	31.2				

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

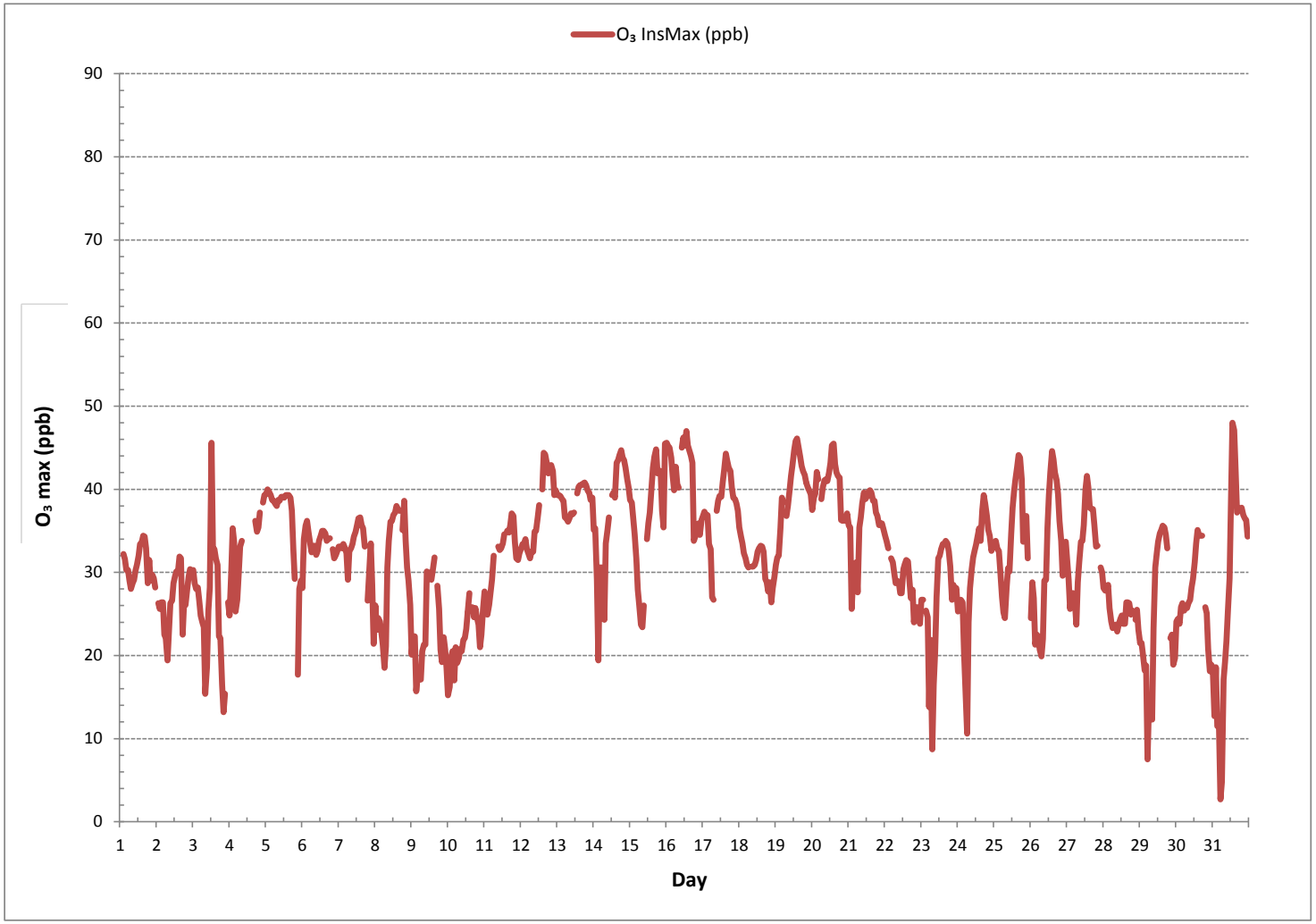
NUMBER OF NON-ZERO READINGS: 701

MAXIMUM INSTANTANEOUS VALUE: 48.0 ppb @ HOUR(S) 13 ON DAY(S) 31

VAR-VARIOUS

IZS CALIBRATION TIME: 33 hrs OPERATIONAL TIME: 741 hrs
MONTHLY CALIBRATION TIME: 7 hrs
STANDARD DEVIATION: 7.6

OZONE Instantaneous Maximum (O_3 ppb)



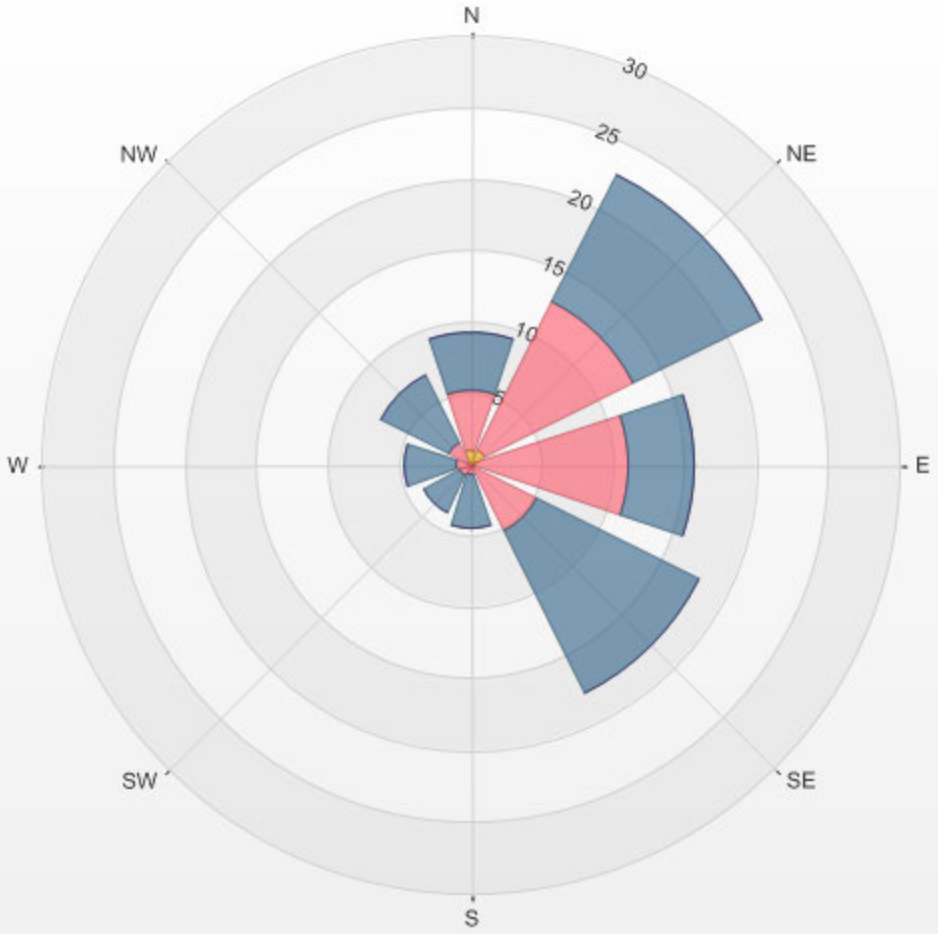
Wind: LICA Bonnyville
Poll.: LICA Bonnyville-O3[ppb]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 14.47% Calm Avg: 20.59 [ppb]

Direction	0.0-15.2	15.2-30.5	30.5-45.7	>45.7	Total
N	1.0	4.3	4.0	0.0	9.3
NE	1.2	11.6	10.0	0.0	22.8
E	0.3	10.7	4.6	0.0	15.6
SE	0.0	5.2	12.8	0.0	17.9
S	0.0	0.7	3.7	0.0	4.4
SW	0.0	0.9	2.9	0.0	3.7
W	0.0	1.0	3.7	0.0	4.7
NW	0.1	1.6	5.3	0.0	7.0
Summary	2.6	36.0	47.0	0.0	85.5

%	Icon	Classes (ppb)							
	3	0.0-15.2	36	15.2-30.5	47	30.5-45.7	0	>45.7

LICA Bonnyville Poll.: LICA Bonnyville-O3[ppb] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 14.47% Calm Poll Avg: 20.59[ppb]



O3[ppb] Calibration: LICA Bonnyville Monthly: 17/03 Type: Span

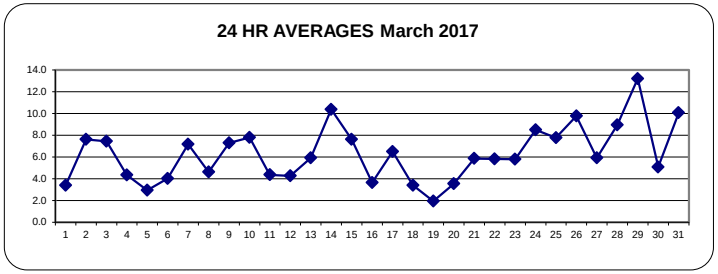
PARTICULATE MATTER 2.5

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

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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	**0.0**	0.0	1.1	2.7	0.0	5.8	1.0	6.5	5.5	5.6	2.6	0.6	5.9	7.7	1.8	0.5	4.5	X	1.2	3.9	6.7	0.3	9.5	**0.0**	9.5	3.4	23
2	4.2	4.4	10.1	4.7	0.5	3.4	4.2	6.4	6.8	6.1	2.4	3.4	7.0	3.1	6.7	11.4	14.9	12.1	13.4	10.4	11.8	14.9	11.4	9.4	0.5	14.9	7.6	24
3	7.7	10.3	3.4	2.0	4.1	5.8	9.1	9.2	6.9	12.7	7.7	8.4	8.7	C	C	C	C	20.3	8.6	0.0	7.1	X	8.4	1.3	0.0	20.3	7.5	23
4	17.4	X	X	X	10.0	X	2.8	3.5	0.0	0.0	0.0	0.0	0.0	0.0	5.2	9.0	6.9	X	X	X	9.8	7.9	1.6	0.0	0.0	17.4	4.4	17
5	X	0.3	4.1	2.6	1.1	0.0	0.1	0.0	4.0	2.8	2.0	0.0	1.4	0.0	X	0.8	3.4	2.1	X	9.5	10.9	9.6	0.7	6.7	0.0	10.9	3.0	21
6	7.7	5.7	0.5	0.0	11.6	4.0	3.5	15.6	9.3	6.5	0.0	1.3	0.0	0.2	5.5	3.6	0.1	0.1	3.2	3.1	0.0	6.0	0.0	9.0	0.0	15.6	4.0	24
7	5.1	11.1	0.0	X	0.2	12.8	9.6	12.1	11.1	X	6.2	4.6	6.6	3.6	5.7	2.5	4.1	4.7	15.7	13.1	9.1	8.6	4.2	X	0.0	15.7	7.2	21
8	0.0	4.7	4.1	11.1	10.1	5.6	7.2	2.6	8.6	6.6	0.1	5.6	6.6	3.1	1.6	4.7	0.0	0.0	3.6	13.1	0.1	7.7	4.1	0.0	0.0	13.1	4.6	24
9	9.1	1.1	5.6	11.7	0.0	6.6	11.2	13.1	6.2	13.1	23.6	1.1	0.0	2.6	10.6	8.7	3.7	3.1	X	15.6	4.1	15.2	0.0	1.6	0.0	23.6	7.3	23
10	14.6	14.1	2.6	8.7	X	12.1	6.2	X	10.1	0.7	7.7	9.6	6.1	11.1	14.5	3.8	0.0	5.8	9.1	8.9	6.6	0.0	3.9	15.1	0.0	15.1	7.8	22
11	6.5	2.3	15.9	2.3	0.0	X	7.2	X	X	8.1	7.2	7.7	5.1	2.6	1.1	0.0	0.0	4.1	X	1.1	4.7	10.6	0.7	0.0	0.0	15.9	4.4	20
12	0.0	7.7	4.7	0.0	0.0	6.1	8.6	12.1	11.1	3.6	1.6	5.6	0.1	3.6	4.6	3.1	0.7	1.6	2.6	6.2	X	X	1.1	9.1	0.0	12.1	4.3	22
13	8.6	11.6	12.6	11.1	X	0.0	X	0.0	9.1	0.0	3.1	2.6	4.1	3.6	4.6	8.1	7.2	3.6	5.6	3.1	4.7	14.6	10.6	1.6	0.0	14.6	5.9	22
14	9.1	10.6	6.6	12.6	12.6	6.6	5.1	15.6	7.2	7.7	8.6	9.6	8.6	12.1	16.1	13.1	16.1	11.7	12.7	12.6	8.6	8.1	7.2	10.1	5.1	16.1	10.4	24
15	6.1	5.6	1.1	7.7	2.1	12.6	10.1	15.6	18.6	17.1	14.1	10.1	11.6	11.1	8.6	2.2	8.1	5.6	2.6	5.1	2.6	0.7	1.6	2.2	0.7	18.6	7.6	24
16	0.0	X	1.1	2.2	4.7	5.6	3.1	4.1	0.7	0.7	2.6	5.6	0.0	6.2	7.2	1.6	4.7	7.7	7.7	5.1	3.1	3.1	4.1	3.1	0.0	7.7	3.7	23
17	5.1	5.6	6.6	1.1	2.2	4.7	3.6	10.1	7.2	7.7	5.6	2.2	11.1	5.1	11.1	8.6	10.1	10.1	6.6	6.2	5.6	6.2	7.2	6.6	1.1	11.1	6.5	24
18	3.1	3.1	3.1	5.1	4.1	2.6	0.1	6.2	0.0	2.2	1.1	5.1	3.6	7.2	X	6.6	3.1	2.6	6.2	3.1	1.6	0.1	2.2	6.2	0.0	7.2	3.4	23
19	0.7	2.2	1.1	3.1	2.6	0.0	5.6	0.0	1.6	2.2	4.7	1.6	1.6	0.0	3.1	1.6	2.2	0.7	3.1	3.6	0.1	3.1	0.0	2.1	0.0	5.6	1.9	24
20	0.7	1.1	0.0	0.7	6.2	1.1	2.6	13.7	4.1	0.6	1.6	3.6	2.1	3.6	2.6	3.6	4.7	3.1	6.1	6.2	2.2	7.2	X	4.1	0.0	13.7	3.5	23
21	9.6	5.1	X	9.1	X	13.1	10.1	3.1	3.6	4.6	5.1	7.2	3.1	8.1	6.6	6.2	4.7	3.1	4.6	7.2	6.6	4.6	0.0	3.6	0.0	13.1	5.9	22
22	2.6	4.7	1.1	4.1	2.6	3.6	10.6	7.7	6.6	8.1	11.6	7.2	5.6	0.7	5.6	6.6	3.6	4.6	8.6	8.6	3.6	8.1	1.6	12.1	0.7	12.1	5.8	24
23	8.1	0.7	0.0	1.1	2.2	3.6	8.1	10.1	4.7	5.6	4.1	4.1	3.1	5.6	4.1	8.2	7.2	5.1	9.1	9.1	14.6	12.6	4.7	3.6	0.0	14.6	5.8	24
24	6.6	7.7	5.1	8.1	7.2	23.1	12.7	23.1	15.2	10.1	1.6	5.1	6.2	7.2	10.1	8.2	7.7	6.2	6.6	7.7	7.2	4.1	3.1	4.1	1.6	23.1	8.5	24
25	5.6	4.1	3.1	2.6	0.7	3.6	5.1	5.1	3.6	7.2	5.1	**24.1**	8.2	6.6	9.6	10.6	11.7	9.6	9.6	7.7	13.7	9.1	13.7	6.2	0.7	**24.1**	7.8	24
26	12.7	8.7	6.6	11.6	14.1	10.6	12.1	12.6	15.2	13.7	13.7	12.1	13.7	9.1	7.7	7.7	6.2	10.6	7.2	6.6	3.1	10.6	4.7	3.7	3.1	15.2	9.8	24
27	5.6	3.6	3.1	2.6	5.1	5.1	6.2	5.6	4.6	8.1	9.1	8.2	7.2	6.6	11.1	1.1	4.1	4.7	7.2	7.7	6.6	6.6	7.7	4.7	1.1	11.1	5.9	24
28	3.7	8.2	5.6	6.2	10.1	11.1	15.2	10.6	9.6	13.7	12.7	8.7	11.7	C	C	3.6	7.2	6.2	5.6	6.2	7.2	10.6	12.1	11.2	3.6	15.2	9.0	24
29	8.7	5.6	11.6	11.2	9.6	12.1	8.6	14.1	11.7	14.1	10.6	10.6	X	15.6	X	X	15.6	16.6	22.6	22.1	20.2	12.1	13.7	10.1	5.6	22.6	**13.2**	21
30	7.7	6.6	0.7	4.7	4.1	0.0	9.1	6.6	3.1	0.0	0.1	1.1	0.0	6.6	3.7	9.6	8.7	1.6	14.1	4.7	8.7	7.7	10.1	2.6	0.0	14.1	5.1	24
31	5.1	6.6	7.2	8.6	12.6	11.1	13.1	7.7	12.6	14.6	17.1	12.1	12.1	14.1	7.2	4.1	4.1	6.6	13.1	13.1	12.7	6.2	11.1	8.7	4.1	17.1	10.1	24
HOURLY MAX	17.4	14.1	15.9	12.6	14.1	23.1	15.2	23.1	18.6	17.1	23.6	24.1	13.7	15.6	16.1	13.1	16.1	20.3	22.6	22.1	20.2	15.2	13.7	15.1				
HOURLY AVG	6.2	5.6	4.4	5.4	5.1	6.4	7.2	8.5	7.3	6.8	6.3	6.2	5.2	5.7	7.0	5.5	5.7	5.9	8.3	7.6	6.7	7.7	5.1	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

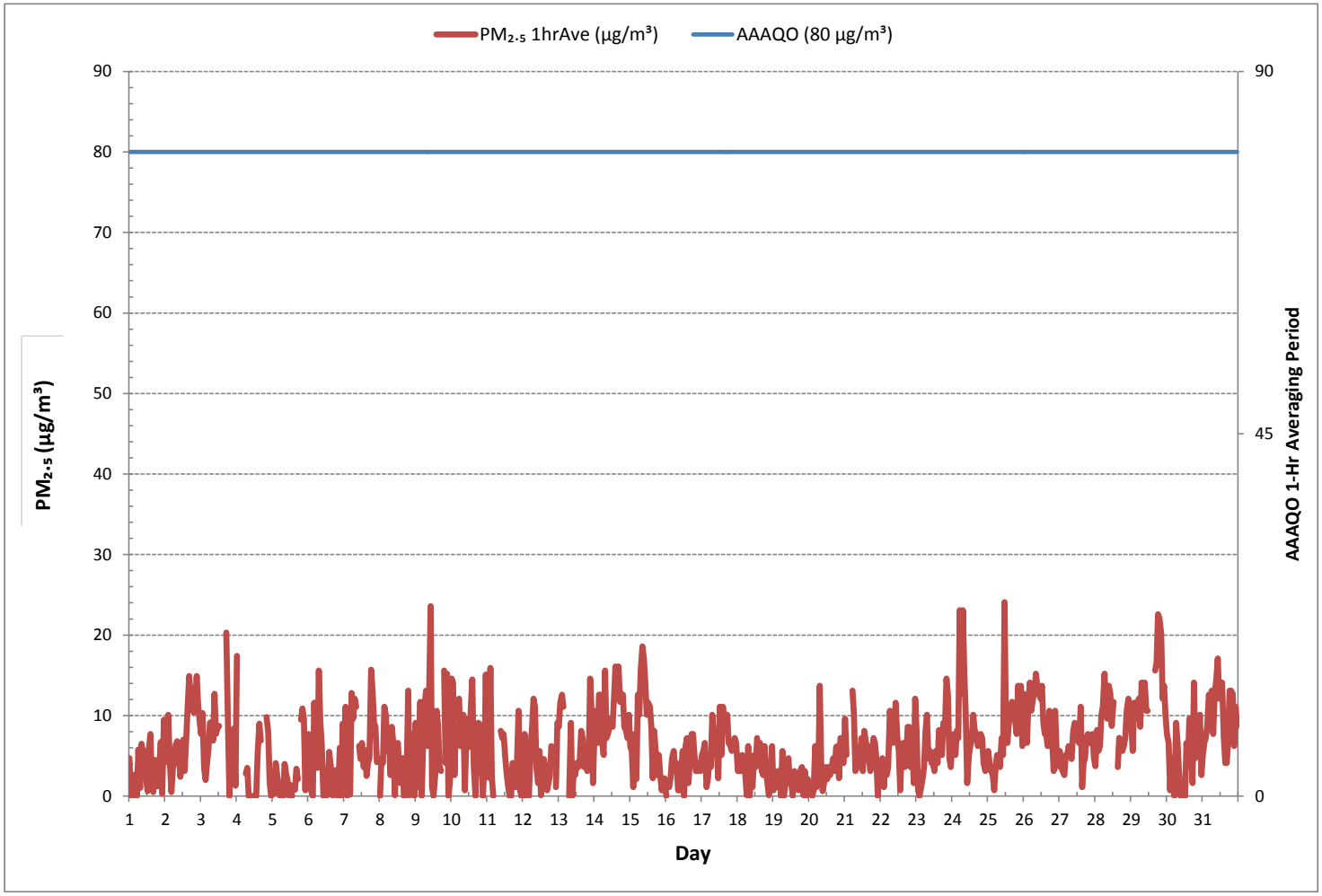


OBJECTIVE LIMIT: **ALBERTA ENVIRONMENT:** 1-HR 80 µg/m³ 24-HR 30 µg/m³

MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0						
NUMBER OF 24-HR EXCEEDANCES:	0						
NUMBER OF NON-ZERO READINGS:	651						
MINIMUM 1-HR AVERAGE	0.0	µg/m³	@ HOUR(S)	1	ON DAY(S)	1	
MAXIMUM 1-HR AVERAGE:	24.1	µg/m³	@ HOUR(S)	11	ON DAY(S)	25	
MAXIMUM 24-HR AVERAGE:	13.2	µg/m³			ON DAY(S)	29	
					VAR-VARIOUS		
			OPERATIONAL TIME:			710	hrs
MONTHLY CALIBRATION TIME:	6	hrs	AMD OPERATION UPTIME:			95.4	%
STANDARD DEVIATION:	4.6		MONTHLY AVERAGE:			6.3	µg/m³

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



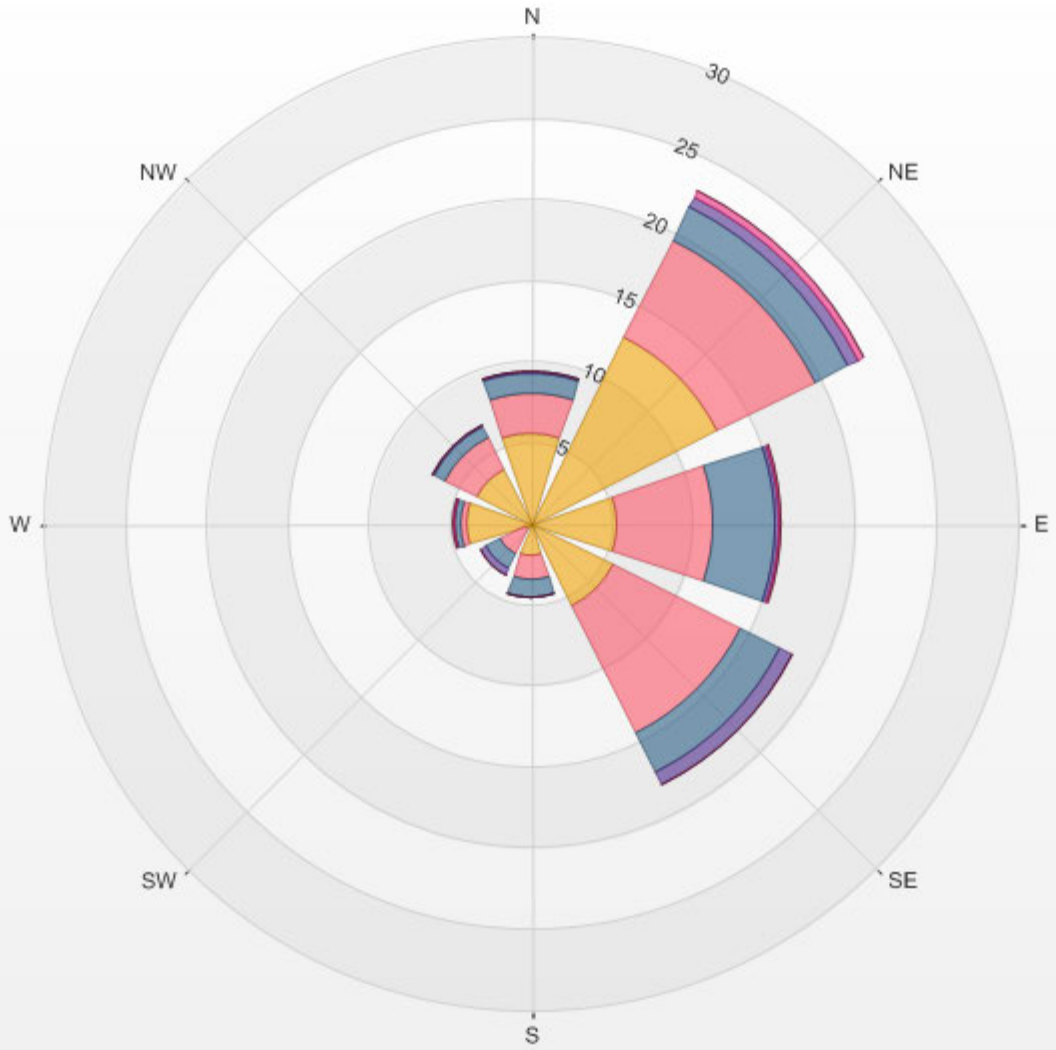
Wind: LICA Bonnyville
Poll.: LICA Bonnyville-PM25[ug/m3(L)]
Monthly: 17/03
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 14.41% Calm Avg: 8.46 [ug/m3(L)]

Direction	0.0-4.8	4.8-9.7	9.7-14.5	14.5-19.4	19.4-24.2	>24.2	Total
N	5.6	2.6	1.1	0.1	0.0	0.0	9.4
NE	12.8	6.7	2.3	0.7	0.4	0.0	23.0
E	5.3	6.0	3.7	0.3	0.1	0.0	15.4
SE	5.7	8.7	2.7	0.9	0.0	0.0	18.0
S	2.0	1.4	1.1	0.0	0.0	0.0	4.6
SW	0.4	1.7	1.0	0.4	0.0	0.0	3.6
W	4.0	0.4	0.3	0.0	0.1	0.0	4.9
NW	3.7	2.3	0.7	0.1	0.0	0.0	6.8
Summary	39.5	29.8	13.0	2.6	0.7	0.0	85.6

% Icon Classes (ug/m3(L))	40	0.0-4.8	30	4.8-9.7	13	9.7-14.5	3	14.5-19.4	1	19.4-24.2	0	>24.2

LICA Bonnyville Poll.: LICA Bonnyville-PM25[ug/m3(L)] 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 14.41% Calm Poll Avg: 8.46[ug/m3(L)]



WIND SPEED

Maxxam
A Bureau Veritas Group Company

WIND SPEED Hourly Averages (WS kph)

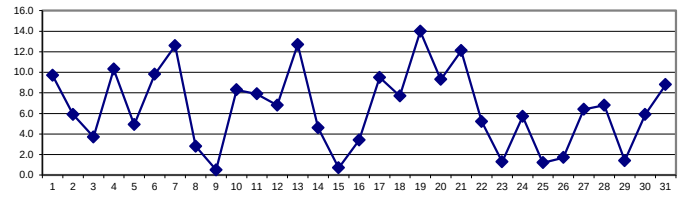
HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	12.8	13.7	12.2	10.4	11.5	11.8	10.4	13.5	12.9	12.9	14.0	14.9	12.5	10.9	9.2	8.2	8.5	3.9	2.9	3.3	6.3	7.0	5.5	5.6	2.9	14.9	9.7	24
2	4.3	4.1	4.7	6.9	6.2	4.4	4.9	3.3	3.4	6.5	6.1	8.7	11.5	9.8	7.3	4.4	6.7	6.2	7.7	6.0	7.9	10.8	13.2	13.5	3.3	13.5	5.9	24
3	9.8	10.2	10.1	11.2	8.0	6.2	8.1	10.1	3.9	1.7	C	C	C	3.7	14.3	9.7	3.5	4.9	5.5	0.6	1.3	3.7	4.9	0.5	0.5	14.3	3.7	24
4	1.7	2.2	10.4	11.6	16.9	14.0	16.1	14.5	15.3	16.2	14.6	14.4	10.6	11.6	12.8	9.0	9.0	8.1	6.3	6.9	6.3	8.3	7.8	8.4	1.7	16.9	10.3	24
5	8.3	10.1	8.5	7.0	7.6	8.5	7.0	5.8	6.2	6.6	5.0	6.2	6.0	3.9	5.1	2.9	1.3	3.7	2.6	3.1	0.1	1.4	4.8	5.2	0.1	10.1	4.9	24
6	7.2	6.3	7.6	7.5	7.2	6.1	5.8	4.9	4.2	10.9	11.9	11.7	12.6	12.1	12.8	14.1	11.5	13.4	12.2	13.7	13.9	14.1	13.8	13.5	4.2	14.1	9.8	24
7	14.3	18.9	16.2	16.6	14.6	14.5	13.3	17.7	16.2	14.1	14.7	15.5	14.8	14.9	15.2	14.4	12.3	10.3	7.9	6.5	7.1	8.2	7.3	5.3	5.3	18.9	12.6	24
8	5.6	6.5	5.6	2.2	1.6	1.5	3.9	5.4	6.7	6.6	6.9	6.6	3.6	3.8	3.2	1.5	4.9	4.0	0.7	0.2	1.3	0.3	3.4	2.8	0.2	6.9	2.8	24
9	1.4	1.5	0.9	1.8	0.8	0.1	0.7	0.3	0.2	0.4	1.5	1.2	1.9	5.5	4.9	4.0	3.4	2.0	0.1	0.7	1.2	1.1	1.0	1.6	0.1	5.5	0.5	24
10	2.7	6.1	5.9	5.1	6.6	8.7	9.0	10.2	10.4	10.0	11.6	12.9	13.8	13.4	11.5	11.0	10.3	7.7	7.2	6.3	5.2	6.0	4.8	4.8	2.7	13.8	8.3	24
11	6.0	5.9	7.5	5.3	6.6	7.2	6.5	X	X	6.6	7.2	8.1	9.3	10.1	11.1	10.0	9.5	11.0	10.7	9.5	10.1	8.3	9.8	9.9	5.3	11.1	7.9	22
12	9.9	9.9	8.6	7.8	8.3	9.3	6.9	8.2	9.2	9.1	9.3	8.4	8.9	6.6	8.7	5.8	16.3	14.3	12.9	15.0	14.3	16.8	10.8	14.9	5.8	16.8	6.8	24
13	13.6	9.3	10.0	12.1	8.6	10.4	9.9	9.4	13.3	14.9	13.9	15.8	15.8	17.4	18.0	17.2	18.4	19.6	16.8	14.0	10.2	5.4	8.8	6.7	5.4	19.6	12.7	24
14	3.1	2.8	1.2	2.0	2.3	4.3	3.4	1.2	3.0	3.4	0.2	2.2	0.3	5.0	4.8	7.8	10.3	8.4	10.6	9.4	15.5	12.1	10.5	7.1	0.2	15.5	4.6	24
15	6.6	13.1	11.3	9.7	7.5	6.7	2.7	3.2	4.8	1.9	1.2	1.6	2.3	2.2	6.9	8.5	6.2	2.4	7.4	9.2	8.8	3.8	0.6	5.6	0.6	13.1	0.7	24
16	8.7	6.9	8.4	6.7	1.0	0.7	1.2	0.4	1.5	2.0	5.6	8.1	6.5	5.6	6.9	3.5	4.1	0.4	2.6	2.7	1.5	3.9	3.3	2.8	0.4	8.7	3.4	24
17	1.5	1.5	4.5	4.6	4.8	1.5	1.4	1.2	8.9	6.6	8.0	10.7	10.5	14.0	11.8	17.4	15.0	18.2	18.7	16.6	19.4	18.3	15.0	13.8	1.2	19.4	9.5	24
18	18.4	12.8	9.2	11.6	9.1	9.7	14.2	11.1	12.9	12.0	11.5	10.8	12.7	11.1	12.0	10.6	9.3	8.4	10.6	9.9	7.4	9.3	16.3	13.5	7.4	18.4	7.7	24
19	13.7	18.0	20.6	21.5	17.2	16.9	14.7	13.1	14.1	15.0	14.0	14.9	16.5	15.2	12.7	17.0	15.6	12.5	11.1	11.3	11.5	9.0	9.7	13.4	9.0	21.5	**14.0**	24
20	15.0	17.7	16.9	20.8	15.5	13.5	15.1	16.7	18.3	12.7	10.5	7.1	7.1	9.6	9.7	9.5	8.4	6.5	3.3	0.4	0.8	**0.0**	1.2	1.2	**0.0**	20.8	9.3	24
21	3.0	2.4	3.3	8.3	6.8	7.2	5.8	9.4	10.2	15.1	20.3	15.3	17.6	17.1	15.9	14.9	16.8	18.0	19.0	16.7	14.2	13.9	14.9	12.8	2.4	20.3	12.1	24
22	12.2	10.1	10.8	11.7	11.2	9.7	9.1	10.4	9.9	7.9	6.7	8.3	8.2	10.2	10.8	8.4	5.2	4.9	5.5	2.7	3.6	5.5	4.0	2.7	2.7	12.2	5.2	24
23	6.0	4.1	3.2	1.3	1.0	2.4	0.6	1.2	3.1	4.5	4.8	2.2	4.9	5.8	3.8	3.3	0.8	0.7	0.7	1.2	1.1	4.0	0.5	0.8	0.5	6.0	1.3	24
24	1.5	0.3	0.6	0.9	1.1	0.3	1.3	1.2	3.1	5.8	8.8	12.6	8.1	6.4	6.1	7.0	11.2	13.7	11.4	12.3	9.2	7.8	9.4	8.8	0.3	13.7	5.7	24
25	9.2	9.5	8.4	8.1	6.0	4.7	4.9	4.8	4.9	3.2	5.0	4.6	8.0	7.9	7.6	5.2	1.7	1.0	2.4	4.8	4.5	5.0	1.9	3.7	1.0	9.5	1.2	24
26	3.1	8.2	2.6	1.3	0.6	7.2	3.0	3.9	1.6	0.4	2.0	1.4	6.4	5.9	6.3	10.1	6.0	4.2	3.3	5.6	3.6	6.4	7.3	8.1	0.4	10.1	1.7	24
27	7.4	5.1	6.1	7.1	5.6	7.5	5.9	9.4	6.8	6.4	8.6	9.3	7.2	10.5	11.1	8.6	7.9	8.3	8.0	13.0	12.1	9.2	6.1	5.0	5.0	13.0	6.4	24
28	2.2	3.3	5.4	7.9	5.3	7.8	10.5	8.6	10.3	7.7	7.4	9.0	9.5	10.6	8.2	8.0	6.7	6.0	9.1	6.6	8.8	5.9	3.8	3.4	2.2	10.6	6.8	24
29	4.0	4.8	2.5	1.6	1.1	0.2	0.9	1.2	0.6	0.6	1.4	2.5	5.2	1.4	3.3	1.8	0.9	3.9	2.1	2.6	2.9	5.4	4.8	3.6	0.2	5.4	1.4	24
30	5.5	7.9	7.9	9.4	9.3	8.8	9.8	10.0	10.8	9.8	10.1	9.5	8.4	7.6	6.0	4.8	3.9	2.6	1.9	2.7	0.6	1.8	1.6	0.6	0.6	10.8	5.9	24
31	0.6	1.8	0.7	5.1	1.4	1.2	0.5	1.3	8.2	10.0	4.9	9.1	16.9	19.5	18.5	19.0	19.4	14.4	4.9	9.4	15.6	19.8	**22.7**	16.7	0.5	**22.7**	8.8	24
HOURLY MAX	18.4	18.9	20.6	21.5	17.2	16.9	16.1	17.7	18.3	16.2	20.3	15.8	17.6	19.5	18.5	19.0	19.4	19.6	19.0	16.7	19.4	19.8	22.7	16.7				
HOURLY AVG	2.8	3.6	3.9	3.7	3.5	3.5	3.0	3.4	2.5	2.9	3.1	2.6	1.8	1.3	1.8	1.9	2.6	2.6	2.8	3.3	3.3	3.2	2.2	2.1				

STATUS FLAG CODES

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

LAST CALIBRATION:	March 3, 2017
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

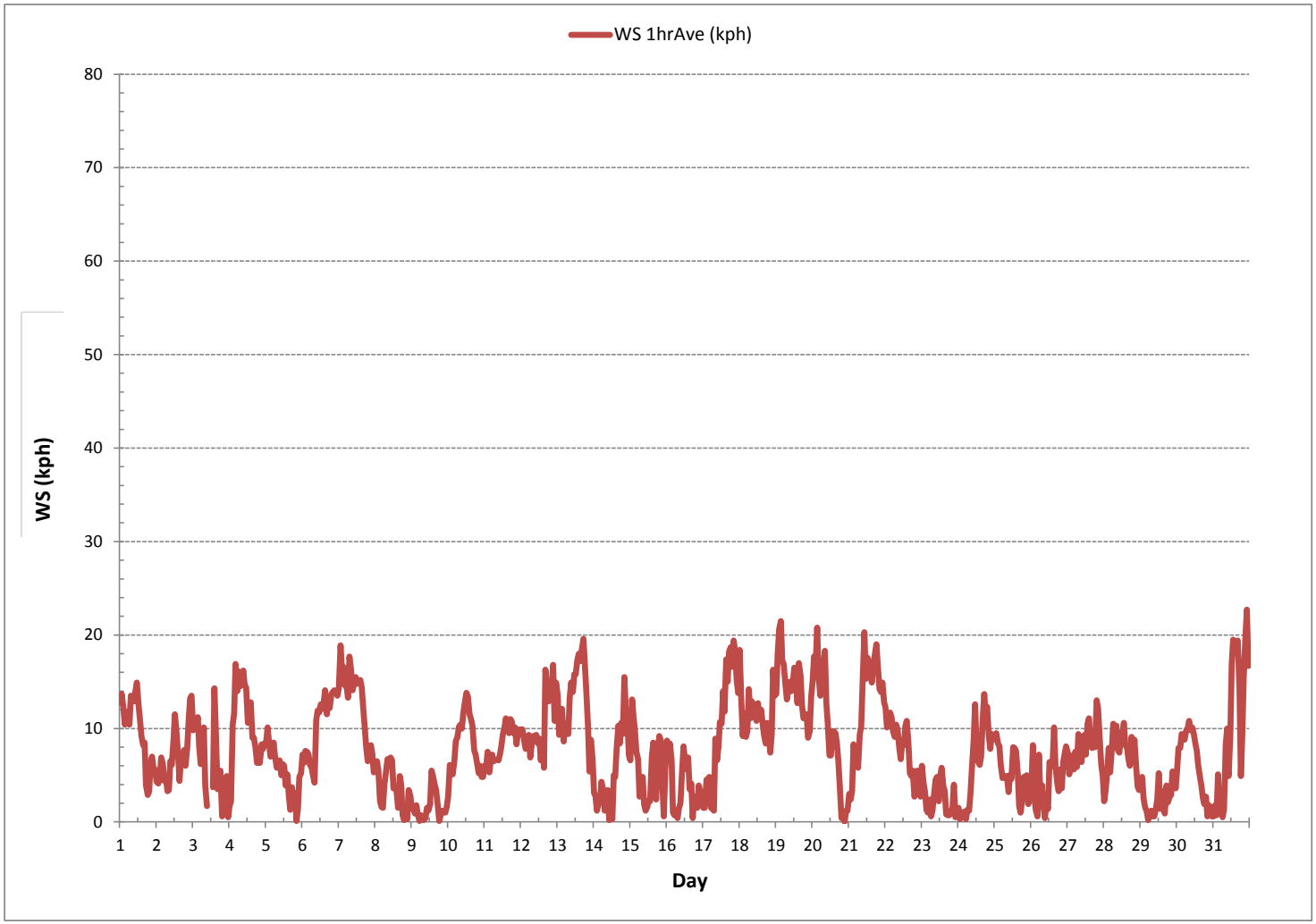
24 HR AVERAGES March 2017



MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:			738				
MINIMUM 1-HR AVERAGE	0.0	kph	@ HOUR(S)	21	ON DAY(S)	20	
MAXIMUM 1-HR AVERAGE:	22.7	kph	@ HOUR(S)	22	ON DAY(S)	31	
MAXIMUM 24-HR AVERAGE:	14.0	kph			ON DAY(S)	19	
					VAR-VARIOUS		
			OPERATIONAL TIME:			742	hrs
MONTHLY CALIBRATION TIME:	3	hrs	AMD OPERATION UPTIME:			99.7	%
STANDARD DEVIATION:	4.9		MONTHLY AVERAGE:			2.5	kph

WIND SPEED Hourly Averages (WS kph)



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	26.8	28.0	27.0	22.2	21.1	24.9	24.8	28.4	31.0	27.5	30.3	27.4	27.2	23.6	20.7	18.9	18.1	11.7	7.4	14.0	13.7	15.9	12.3	12.0	7.4	31.0	21.5	24
2	10.0	10.0	10.5	13.6	12.8	10.2	10.7	8.2	11.7	13.2	14.0	17.7	19.9	19.2	17.5	15.3	16.5	13.7	16.4	16.1	18.4	21.1	27.3	27.4	8.2	27.4	15.5	24
3	21.2	19.9	17.5	19.6	15.6	11.9	16.3	19.0	8.7	7.7	C	C	C	C	26.3	22.8	10.7	10.7	14.0	5.3	5.3	8.3	10.7	6.4	5.3	26.3	13.9	24
4	5.9	9.8	27.6	31.3	35.8	31.5	40.2	32.9	36.8	40.2	32.4	34.5	24.8	23.7	32.0	21.4	22.9	17.4	16.8	20.0	17.7	19.9	17.5	20.1	5.9	40.2	25.5	24
5	18.8	25.0	20.7	15.3	16.5	20.6	16.8	11.3	12.5	13.4	11.4	16.2	13.5	11.7	12.3	8.2	7.9	6.8	7.0	7.6	6.0	6.6	10.3	13.5	6.0	25.0	12.9	24
6	15.9	16.5	16.5	16.3	18.7	16.1	19.1	12.2	12.1	22.6	24.1	26.1	26.3	25.4	28.1	36.0	23.5	28.4	31.1	33.2	33.1	33.7	32.6	28.8	12.1	36.0	24.0	24
7	29.5	37.8	33.4	34.3	42.7	30.2	26.9	40.0	32.9	32.1	30.8	33.1	32.1	29.7	32.3	30.4	25.9	19.2	19.0	12.1	15.3	17.8	14.7	10.8	10.8	42.7	27.6	24
8	14.6	13.9	13.8	9.0	6.1	5.4	10.9	12.9	14.2	13.5	16.0	15.1	11.1	11.5	9.8	8.5	8.8	9.3	4.7	2.1	4.8	5.4	9.2	7.0	2.1	16.0	9.9	24
9	4.6	4.9	3.6	6.5	6.5	1.4	4.5	3.9	2.4	2.5	5.7	6.3	8.3	9.4	10.2	11.0	9.3	6.8	1.6	6.0	7.7	6.8	5.6	5.9	1.4	11.0	5.9	24
10	6.7	14.3	13.9	13.6	14.1	18.3	18.8	18.0	17.9	21.4	23.5	27.5	29.8	29.1	23.2	23.7	21.8	21.8	18.8	14.0	11.7	11.9	11.8	11.7	6.7	29.8	18.2	24
11	12.7	11.6	14.1	12.3	12.4	13.2	14.2	X	X	12.4	13.5	18.5	17.0	20.5	21.2	18.5	22.6	22.1	23.2	23.1	20.1	18.0	22.4	19.4	11.6	23.2	17.4	22
12	21.2	20.9	23.1	16.3	18.5	18.4	16.0	17.4	18.4	21.3	19.1	17.5	17.3	13.8	18.7	22.0	23.0	23.5	22.4	25.8	29.3	30.9	19.1	28.2	13.8	30.9	20.9	24
13	25.4	17.9	21.8	23.4	17.1	18.8	20.8	18.5	31.7	28.5	24.7	26.4	26.5	29.6	27.5	27.3	31.5	32.4	29.5	27.8	19.5	15.5	19.9	21.7	15.5	32.4	24.3	24
14	18.5	20.6	8.3	7.2	7.9	12.1	8.8	7.4	9.0	9.8	5.1	8.1	8.4	11.2	14.2	17.8	20.9	17.7	22.3	19.5	30.9	29.0	22.3	16.6	5.1	30.9	14.7	24
15	18.5	27.3	21.2	17.5	14.1	11.7	9.3	8.8	24.6	6.5	10.2	6.5	9.1	9.5	12.0	12.8	12.6	11.3	15.9	17.0	19.4	14.3	6.9	20.5	6.5	27.3	14.1	24
16	18.6	16.2	16.0	17.7	6.4	7.3	8.6	4.2	6.6	5.9	13.2	18.0	16.1	14.2	22.0	9.1	9.8	3.6	8.8	10.4	7.0	9.8	8.0	11.8	3.6	22.0	11.2	24
17	7.7	6.6	10.4	9.8	10.1	6.5	7.1	6.7	20.9	19.7	16.3	19.2	19.6	23.6	23.7	27.3	27.6	30.7	33.9	33.4	34.3	34.8	31.6	31.6	6.5	34.8	20.5	24
18	33.4	29.1	22.7	24.7	21.9	23.5	28.6	24.4	26.2	22.4	22.5	22.7	25.0	21.6	21.8	22.3	22.8	21.0	23.5	25.4	19.7	23.5	43.0	38.9	19.7	43.0	25.4	24
19	36.4	42.6	**54.4**	49.9	43.3	41.4	40.7	30.9	33.0	36.7	37.1	36.2	40.8	37.2	42.0	46.1	33.6	31.8	23.3	24.3	26.0	21.1	28.5	29.9	21.1	**54.4**	36.1	24
20	37.7	45.5	45.7	45.3	36.7	32.8	34.0	36.2	42.5	28.3	22.7	19.8	21.5	25.6	26.9	22.2	18.4	19.8	10.4	5.1	4.3	6.3	3.9	6.1	3.9	45.7	24.9	24
21	7.6	9.1	11.4	16.6	13.2	14.1	16.7	18.4	19.5	37.3	39.5	33.3	34.2	34.4	33.6	30.4	34.7	36.3	39.1	36.4	33.0	30.7	32.4	30.9	7.6	39.5	26.8	24
22	26.1	23.3	25.2	22.0	22.3	22.5	21.4	21.4	20.6	20.0	16.4	20.6	19.0	22.3	20.9	18.7	11.5	9.6	10.6	7.9	11.8	11.3	9.3	13.8	7.9	26.1	17.9	24
23	12.7	11.4	8.2	5.7	6.0	6.6	4.6	4.5	6.7	13.6	11.9	10.0	10.7	16.8	11.3	9.3	12.1	4.8	5.4	6.3	7.2	9.1	5.7	6.4	4.5	16.8	8.6	24
24	9.0	6.1	3.0	3.0	4.3	4.7	5.8	9.8	10.5	14.9	18.7	26.5	22.3	13.5	19.0	19.6	27.1	31.4	25.4	27.1	21.4	19.4	20.6	19.0	3.0	31.4	15.9	24
25	22.6	21.2	19.4	19.1	12.6	10.2	9.6	10.0	10.6	8.2	10.1	16.9	15.1	15.2	13.1	11.5	7.8	7.6	7.5	10.2	13.4	11.2	8.7	11.0	7.5	22.6	12.6	24
26	12.1	14.7	12.1	6.7	7.3	15.6	10.9	12.5	6.6	6.1	7.5	10.7	13.9	13.3	15.2	17.2	10.7	11.1	11.4	11.4	8.2	11.7	18.2	19.5	6.1	19.5	11.9	24
27	13.7	11.3	13.1	16.2	13.7	15.6	16.1	18.9	15.4	14.8	17.5	16.4	16.7	18.7	17.8	20.3	16.6	18.3	15.7	31.1	29.6	18.8	14.1	10.8	10.8	31.1	17.1	24
28	7.5	7.7	13.7	15.3	12.3	17.4	21.1	16.3	19.3	16.8	14.3	17.5	18.4	18.3	16.1	16.8	13.3	13.0	19.5	15.8	20.4	14.3	15.3	8.3	7.5	21.1	15.4	24
29	8.5	9.7	7.2	6.4	6.7	2.4	2.7	3.9	5.6	5.1	9.0	9.7	12.9	11.0	13.0	9.3	5.9	7.7	6.8	8.5	8.6	11.3	10.7	9.9	2.4	13.0	8.0	24
30	14.8	16.5	21.6	23.5	21.1	19.2	22.1	25.2	23.9	20.8	23.1	22.6	18.2	17.1	16.8	12.1	11.9	9.9	6.3	8.3	6.4	5.4	5.6	4.7	4.7	25.2	15.7	24
31	3.8	6.0	5.7	12.2	7.9	5.4	6.2	7.4	15.3	15.1	10.2	19.4	26.6	32.1	28.0	30.1	31.5	24.4	14.9	18.1	23.9	36.2	34.9	30.4	3.8	36.2	18.6	24
HOURLY MAX	37.7	45.5	54.4	49.9	43.3	41.4	40.7	40.0	42.5	40.2	39.5	36.2	40.8	37.2	42.0	46.1	34.7	36.3	39.1	36.4	34.3	36.2	43.0	38.9				
HOURLY AVG	16.9	17.9	18.2	17.8	16.3	15.8	16.6	16.3	18.2	18.0	18.4	20.0	20.1	20.1	20.9	19.9	18.4	17.2	16.5	16.9	17.0	17.1	17.2	17.2				

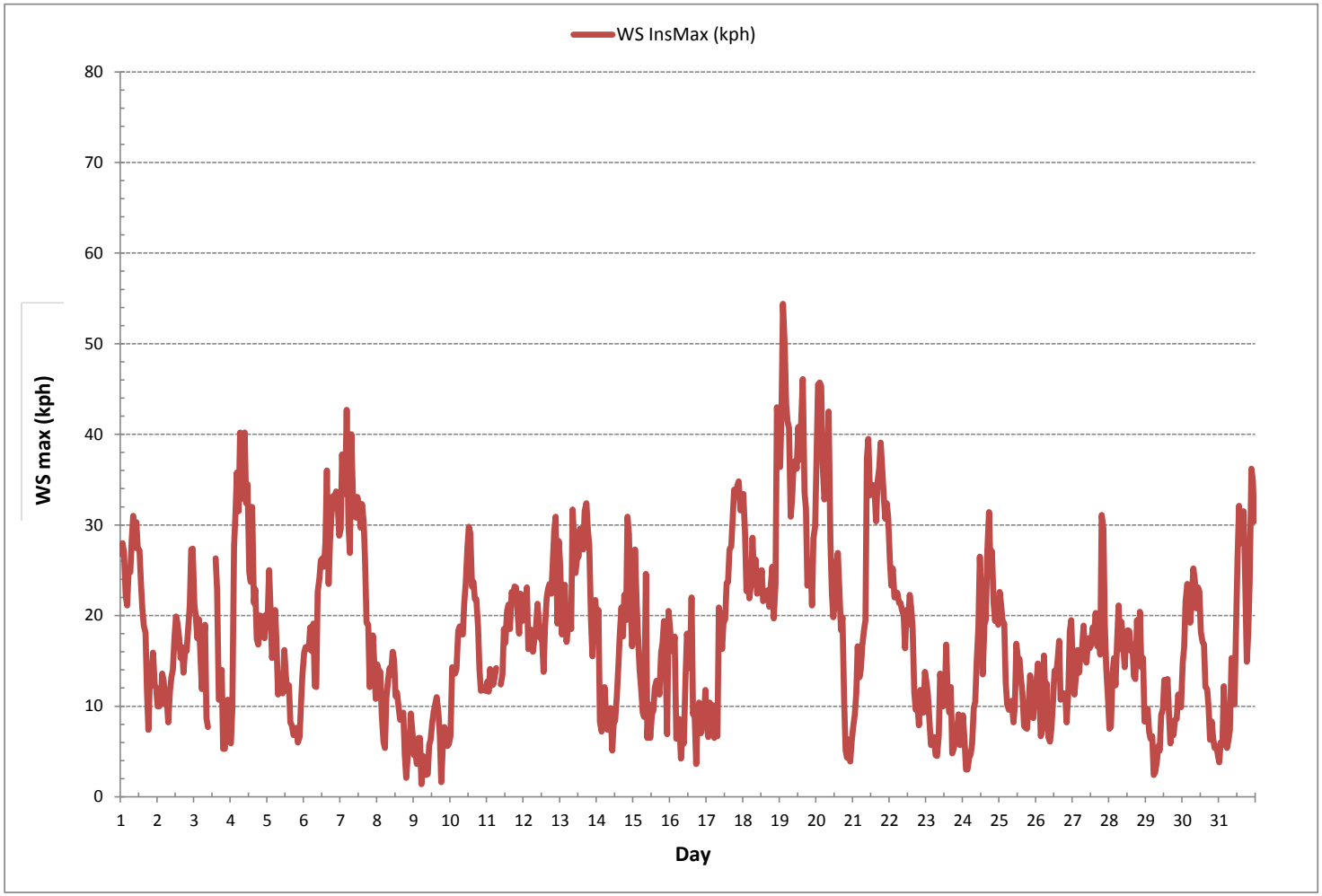
STATUS FLAG CODES

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

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	54.4	kph	@ HOUR(S)	2	ON DAY(S)	19
				VAR-VARIOUS		
OPERATIONAL TIME:					742	hrs

WIND SPEED Instantaneous Maximum (WS kph)



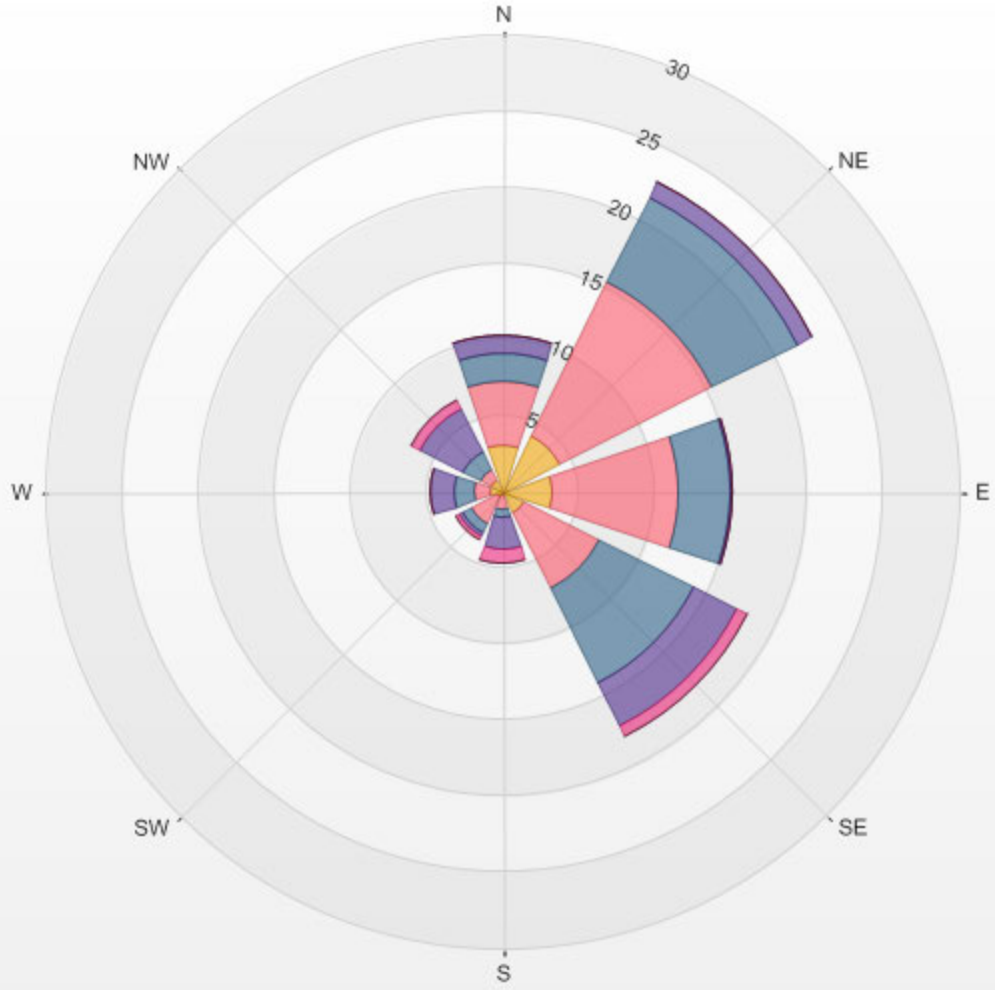
Wind: LICA Bonnyville
Monitor: WSP [kph]
Monthly: 17/03
Type: WindRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 14.07% Calm Avg: 0.00 [kph]

Direction	1.8-4.6	4.6-9.1	9.1-13.7	13.7-18.2	18.2-22.8	>22.8	Total
N	3.1	4.2	1.9	1.1	0.0	0.0	10.3
NE	4.2	11.2	6.2	1.1	0.0	0.0	22.7
E	3.3	8.3	3.5	0.1	0.0	0.0	15.2
SE	1.6	5.4	7.0	3.1	0.8	0.0	18.0
S	0.3	1.0	0.5	2.0	1.0	0.0	4.7
SW	0.4	1.9	0.7	0.3	0.3	0.0	3.5
W	0.8	1.1	1.4	1.5	0.0	0.0	4.7
NW	0.8	0.8	1.4	3.1	0.7	0.0	6.8
Summary	14.5	33.8	22.6	12.3	2.7	0.0	85.9

% Icon Classes (kph)	14 1.8-4.6	34 4.6-9.1	23 9.1-13.7	12 13.7-18.2	3 18.2-22.8	0 >22.8

LICA Bonnyville 2017/03/01 00:00 - 2017/03/31 23:00 Calm: 14.07% Calm Wind Avg Speed: 0.99(kph)



WIND DIRECTION

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

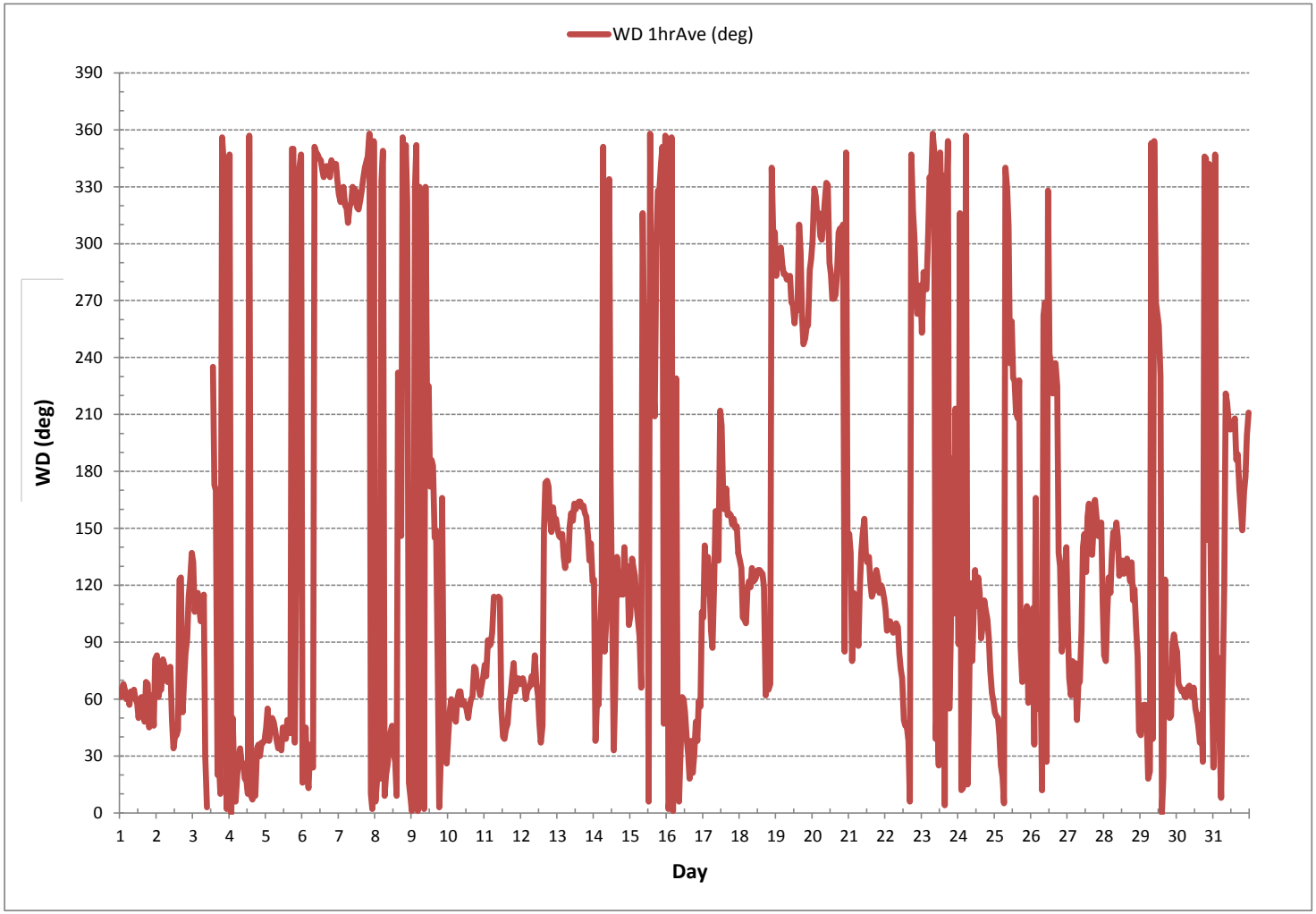
STATUS FLAG CODES

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

LAST CALIBRATION:	March 3, 2017
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	3	hrs	OPERATIONAL TIME:	742	hrs
STANDARD DEVIATION:	106		AMD OPERATION UPTIME:	99.7	%
			MONTHLY AVERAGE:	80 (E)	

WIND DIRECTION Hourly Averages (WD)



STANDARD DEVIATION WIND DIRECTION

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	RDGS.
DAY																									
1	16	16	17	18	16	17	18	16	17	18	18	16	17	19	20	20	18	28	28	17	18	19	16	19	24
2	27	22	21	15	19	24	20	24	28	18	17	16	13	17	19	34	21	15	17	22	23	12	13	14	24
3	15	14	13	10	14	15	13	17	14	16	C	C	C	39	13	18	30	15	16	11	6	6	12	57	24
4	12	12	18	19	17	19	20	19	18	20	20	18	18	15	17	16	17	17	17	17	15	17	16	17	24
5	15	18	17	14	17	16	14	16	15	16	22	19	21	24	17	17	18	11	9	14	40	12	10	11	24
6	15	16	17	16	15	17	15	14	13	14	15	14	14	14	15	15	14	15	14	15	16	15	15	15	24
7	15	13	14	15	15	14	13	12	14	16	16	16	16	16	15	15	14	13	12	8	11	14	12	10	24
8	12	14	16	14	14	22	11	15	16	15	19	21	24	25	19	30	21	36	39	13	9	43	12	7	24
9	11	6	8	11	15	8	10	19	15	17	45	51	69	14	31	54	32	29	9	11	59	40	11	10	24
10	13	15	18	15	13	13	16	14	14	15	16	17	17	16	16	16	16	19	20	18	17	15	18	17	24
11	17	16	13	16	15	14	19	X	X	16	22	20	15	15	14	15	17	16	16	20	17	16	16	15	22
12	15	18	18	17	16	16	17	18	16	20	18	18	16	18	14	24	7	6	6	10	13	10	11	10	24
13	11	12	13	13	15	13	14	15	15	14	13	9	10	10	10	10	11	10	11	10	13	21	17	32	24
14	34	23	29	23	29	18	16	26	28	34	59	55	70	15	22	16	14	15	13	14	15	13	17	20	24
15	20	15	14	13	13	14	24	15	33	39	68	60	26	35	42	10	21	17	13	14	15	17	35	15	24
16	13	13	14	12	19	37	35	29	13	16	19	18	17	17	16	15	12	7	10	12	14	16	15	28	24
17	22	29	21	21	21	24	20	39	21	22	18	12	16	9	12	8	11	10	10	11	10	12	13	15	24
18	11	14	19	14	18	18	13	17	13	15	14	15	14	14	13	15	18	16	16	18	23	13	15	18	24
19	18	19	18	16	18	18	18	19	19	19	21	20	19	18	22	17	16	17	15	15	15	14	17	16	24
20	16	17	15	15	15	15	14	15	16	18	19	30	28	25	26	25	23	22	16	16	28	71	39	61	24
21	46	42	24	13	15	17	22	17	16	13	12	15	14	15	16	18	15	14	13	14	15	15	15	16	24
22	15	18	16	15	15	18	15	15	17	18	20	19	16	16	14	16	13	12	13	23	25	19	21	25	24
23	17	25	25	29	18	29	27	11	14	14	20	38	20	20	18	19	58	31	18	33	45	17	54	35	24
24	24	20	14	8	24	25	8	17	31	24	18	14	22	21	26	23	17	15	16	16	20	19	16	16	24
25	17	17	17	16	14	13	10	12	17	22	19	24	24	16	13	25	55	51	19	18	18	21	18	21	24
26	17	12	18	35	19	17	27	22	38	47	25	63	20	35	36	9	19	37	33	14	20	12	13	20	24
27	14	14	13	16	19	15	15	16	19	21	16	16	23	12	9	16	15	13	12	11	14	14	19	17	24
28	22	20	16	13	19	16	13	16	13	16	18	16	15	13	16	15	18	20	14	17	16	19	17	15	24
29	12	12	16	15	17	3	15	10	36	37	48	44	27	73	24	47	49	17	17	11	14	16	19	18	24
30	22	18	18	17	17	18	18	17	17	18	17	19	17	17	21	23	21	18	13	12	68	11	35	23	24
31	37	17	46	18	17	7	14	48	45	7	25	11	8	9	7	11	8	7	22	11	6	6	7	11	24

STATUS FLAG CODES

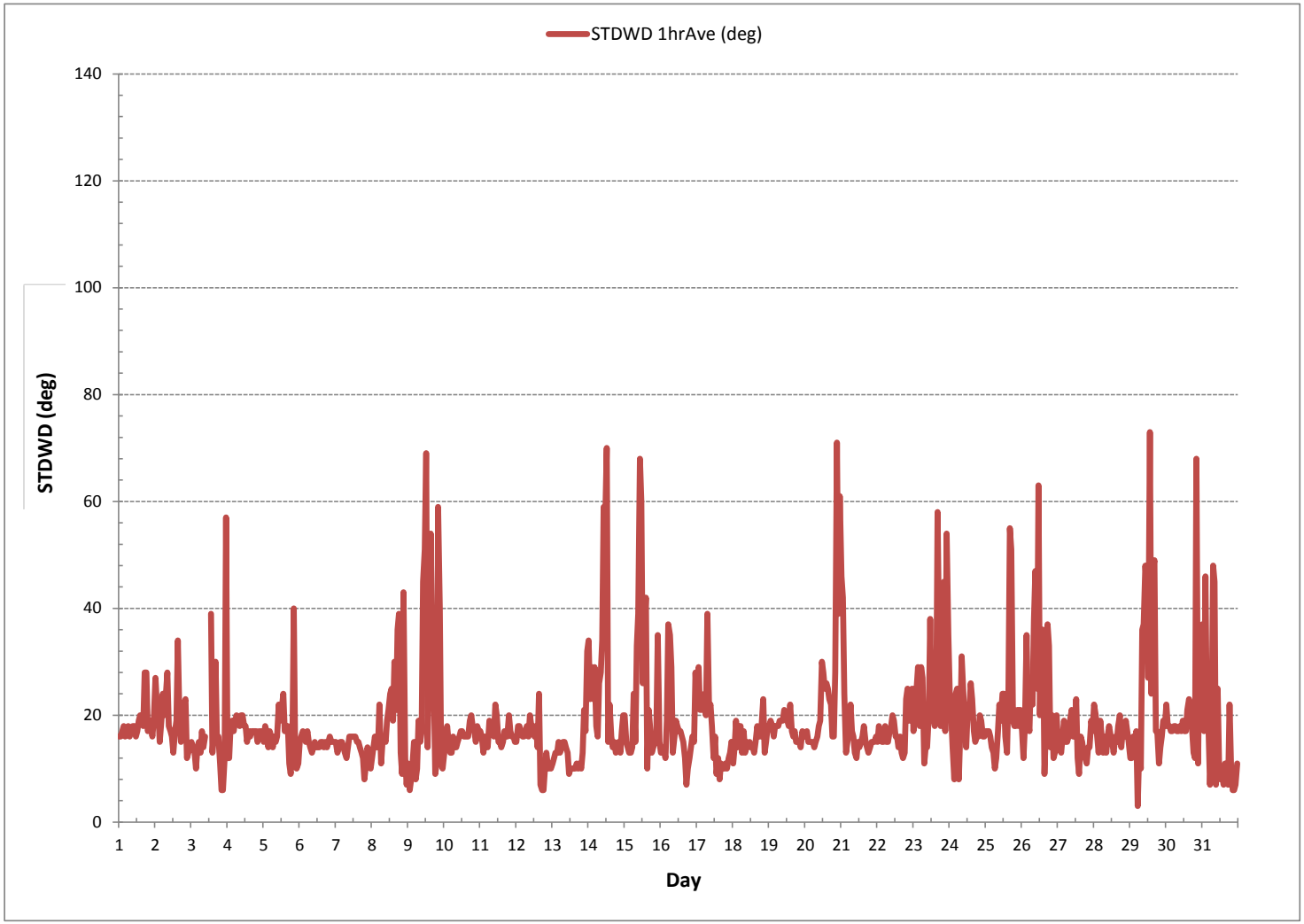
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION: March 3, 2017

CALIBRATION TIME: 0 hrs

OPERATIONAL TIME: 742 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
Location: Bonnyville - AER
Station ID: LICA 37
Sample ID: LICA/VOC/Bonnyville/Mar 02, 2017

Sampler S/N: 6200
Canister ID: 14995
Installation Date/Time (mst): Feb 27, 2017 @ 12:48
Removal Date/Time (mst): Mar 07, 2017 @ 14:49

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
Mar 02, 2017	00:00	00:00 Mar 03, 2017	24.0

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
-27.6	+18.1

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
10.0	4.94	27.5

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

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

Timer reset to zero prior to sampling? YES (yes/no)
Date of last flow calibration: Jan 27, 2017 (due every 3 months)
Last date of sample line & fitting replacement: Sep 28, 2016 (due every 6 months)

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

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Mar 07, 2017

Sample ID: 17030077-001

Customer ID: LICA

Cust Samp ID: LICA/VOC/Bonnyville/Mar 2, 2017

RECEIVED
MAR 09 2017

Volatile Organics Data Results

Date: March 2 , 2017
Canister ID: 14995

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	0.07
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.02
1,2-Dichloropropane	0.01
1,3,5-Trimethylbenzene	0.04
1,3-Butadiene	0.02
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.11
1-Hexene	0.02
1-Pentene	0.02
2,2,4-Trimethylpentane	0.15
2,2-Dimethylbutane	0.04
2,3,4-Trimethylpentane	0.05
2,3-Dimethylbutane	0.11
2,3-Dimethylpentane	0.15
2,4-Dimethylpentane	0.07
2-Methylheptane	0.06
2-Methylhexane	0.09
2-Methylpentane	0.32
3-Methylheptane	0.04
3-Methylhexane	0.12
3-Methylpentane	0.17
Acetone	1.7
Acrolein	< 0.3
Benzene	0.27
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	0.03
Chloromethane	0.64
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.03
cis-2-Pentene	< 0.02
Cyclohexane	0.23
Cyclopentane	0.11
Dibromochloromethane	< 0.01
Ethanol	2.6
Ethyl acetate	< 0.4
Ethylbenzene	0.07
Freon-11	0.29
Freon-113	0.12

Volatile Organics Data Results

Date: March 2 , 2017
Canister ID: 14995

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.02
Freon-12	0.61
Hexachloro-1,3-butadiene	< 0.50
Isobutane	1.01
Isopentane	0.99
Isoprene	< 0.01
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	0.25
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	0.29
Methylcyclopentane	0.27
Methylene chloride	< 0.3
n-Butane	2.37
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.14
n-Hexane	0.23
n-Nonane	0.06
n-Octane	0.6
n-Pentane	< 0.05
n-Propylbenzene	< 0.5
n-Undecane	< 0.5
Naphthalene	0.03
o-Ethyltoluene	0.02
o-Xylene	0.08
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	0.05
Tetrahydrofuran	< 0.4
Toluene	0.33
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.03
trans-2-Pentene	0.03
Trichloroethylene	< 0.04
Vinyl acetate	< 0.04
Vinyl chloride	< 0.02

Sample ID: 17030116-001

Customer ID: LICA

Cust Samp ID: LICA/VOC/Bonnyville/Mar 08, 2017

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:**	1831
Station ID:	LICA 37	**Installation Date/Time (mst):**	Mar 07, 2017 @ 14:49
Sample ID:	LICA/VOC/Bonnyville/Mar 08, 2017	**Removal Date/Time (mst):**	Mar 09, 2017 @ 14:29

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
Mar 08, 2017	00:00	00:00 Mar 09, 2017	24.0

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
-27.0	+18.5

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
10.0	4.94	27.5

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

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

Timer reset to zero prior to sampling? YES (yes/no)

Date of last flow calibration: Jan 27, 2017 (due every 3 months)

Last date of sample line & fitting replacement: Sep 28, 2016 (due every 6 months)

Comments: The canister is not equipped with a pressure gauge

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: Alex Yakupov Date: Mar 09, 2017

RECEIVED
MAR 13 2017

Volatile Organics Data Results

Date: March 8 , 2017
Canister ID: 1831

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	0.1
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.02
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	0.05
1,3-Butadiene	0.03
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.14
1-Hexene	0.03
1-Pentene	0.04
2,2,4-Trimethylpentane	0.14
2,2-Dimethylbutane	0.05
2,3,4-Trimethylpentane	0.06
2,3-Dimethylbutane	0.08
2,3-Dimethylpentane	0.12
2,4-Dimethylpentane	0.06
2-Methylheptane	0.06
2-Methylhexane	0.08
2-Methylpentane	0.21
3-Methylheptane	0.05
3-Methylhexane	0.1
3-Methylpentane	0.16
Acetone	1.4
Acrolein	< 0.3
Benzene	0.3
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	0.01
Carbon disulfide	0.08
Carbon tetrachloride	0.13
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.03
Chloromethane	0.66
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.05
cis-2-Pentene	0.03
Cyclohexane	0.14
Cyclopentane	0.08
Dibromochloromethane	< 0.01
Ethanol	1.3
Ethyl acetate	< 0.4
Ethylbenzene	0.08
Freon-11	0.3
Freon-113	0.13

Volatile Organics Data Results

Date: March 8 , 2017
Canister ID: 1831

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.02
Freon-12	0.63
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.59
Isopentane	0.61
Isoprene	0.03
Isopropyl alcohol	< 0.4
Isopropylbenzene	0.02
m,p-Xylene	0.27
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	0.15
Methylcyclopentane	0.28
Methylene chloride	< 0.3
n-Butane	1.19
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.11
n-Hexane	0.4
n-Nonane	0.05
n-Octane	0.07
n-Pentane	0.3
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	0.04
o-Xylene	0.1
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	0.05
Tetrachloroethylene	0.05
Tetrahydrofuran	< 0.4
Toluene	0.31
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.06
trans-2-Pentene	0.05
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Sample ID: 17030212-001

Customer ID: LICA

Cust Samp ID: LICA/VOC/Bonnyville/Mar 14, 2017

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:	2665
Station ID:	LICA 37	Installation Date/Time (mst):	Mar 09, 2017 @ 14:29
Sample ID:	LICA/VOC/Bonnyville/Mar 14, 2017	Removal Date/Time (mst):	MAR16, 2017 @ 11:35

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
Mar 14, 2017	00:00	00:00 Mar 15, 2017	24.0

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
-27.7	20

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
10.0	4.94	27.5

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

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

Timer reset to zero prior to sampling? YES (yes/no)

Date of last flow calibration: Jan 27, 2017 (due every 3 months)

Last date of sample line & fitting replacement: Sep 28, 2016 (due every 6 months)

Comments:

Deployment Technician Signature: Alex Yakupov

Collection Technician Signature: [signature] Date: Mar 16, 2017.

RECEIVED
MAR 20 2017

Volatile Organics Data Results

Date: March 14 , 2017
Canister ID: 2665

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	< 0.05
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	0.14
1-Hexene	< 0.02
1-Pentene	0.02
2,2,4-Trimethylpentane	0.05
2,2-Dimethylbutane	0.03
2,3,4-Trimethylpentane	0.02
2,3-Dimethylbutane	0.07
2,3-Dimethylpentane	0.07
2,4-Dimethylpentane	0.03
2-Methylheptane	0.03
2-Methylhexane	0.07
2-Methylpentane	0.25
3-Methylheptane	0.02
3-Methylhexane	0.09
3-Methylpentane	0.16
Acetone	2.7
Acrolein	< 0.3
Benzene	0.2
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	< 0.01
Carbon tetrachloride	0.1
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	0.02
Chloromethane	0.63
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	0.07
Dibromochloromethane	< 0.01
Ethanol	1.8
Ethyl acetate	< 0.4
Ethylbenzene	0.03
Freon-11	0.29
Freon-113	0.09

Volatile Organics Data Results

Date: March 14 , 2017
Canister ID: 2665

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.02
Freon-12	0.63
Hexachloro-1,3-butadiene	< 0.50
Isobutane	2.37
Isopentane	1.26
Isoprene	< 0.01
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	0.09
m-Diethylbenzene	< 0.04
m-Ethyltoluene	< 0.08
Methyl butyl ketone	< 0.50
Methyl ethyl ketone	0.6
Methyl isobutyl ketone	< 0.4
Methyl methacrylate	< 0.07
Methyl tert butyl ether	< 0.03
Methylcyclohexane	0.16
Methylcyclopentane	0.19
Methylene chloride	< 0.3
n-Butane	4.63
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.12
n-Hexane	0.34
n-Nonane	0.02
n-Octane	0.04
n-Pentane	1.1
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	0.01
o-Xylene	0.04
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	0.04
Tetrahydrofuran	< 0.4
Toluene	0.14
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
Location: Bonnyville - AER
Station ID: LICA 37
Sample ID: LICA/VOC/Bonnyville/Mar 20, 2017

Sampler S/N: 6200
Canister ID: 2471
Installation Date/Time (mst): MAR 16, 2017 @ 11:40
Removal Date/Time (mst): MAR 24, 2017 @ 08:25

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
MAR 20, 2017	00:00	24:00	24:00

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
-29	18

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
10.0	4.94	27.5

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

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

Timer reset to zero prior to sampling? YES. (yes/no)
Date of last flow calibration: JAN 27, 2017 (due every 3 months)
Last date of sample line & fitting replacement: SEP 28, 2016 (due every 6 months)

Comments:

Deployment Technician Signature:

Collection Technician Signature:

Sample ID: 17030303-001

Customer ID: LICA

Cust Samp ID: LICA/VOC/Bonnyville/Mar 20, 2017

RECEIVED
MAR 30 2017

Volatile Organics Data Results

Date: March 20 , 2017
Canister ID: 2417

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	< 0.05
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	0.02
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	0.05
3-Methylheptane	< 0.02
3-Methylhexane	0.02
3-Methylpentane	0.01
Acetone	1.4
Acrolein	< 0.3
Benzene	0.14
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	0.01
Carbon disulfide	0.12
Carbon tetrachloride	0.08
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	< 0.02
Chloromethane	0.63
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	< 0.02
cis-2-Pentene	< 0.02
Cyclohexane	0.03
Cyclopentane	0.01
Dibromochloromethane	< 0.01
Ethanol	0.4
Ethyl acetate	< 0.4
Ethylbenzene	< 0.01
Freon-11	0.23
Freon-113	0.09

Volatile Organics Data Results

Date: March 20 , 2017
Canister ID: 2417

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.38
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.29
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	0.04
Methylcyclopentane	0.02
Methylene chloride	< 0.3
n-Butane	0.97
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.03
n-Hexane	< 0.01
n-Nonane	< 0.01
n-Octane	< 0.02
n-Pentane	0.2
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	< 0.01
o-Xylene	0.02
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	0.02
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Sample ID: 17030303-003

Customer ID: LICA

Cust Samp ID: LICA/VOC/Bonnyville/Mar 26, 2017

Maxxam Analytics

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

Client: LICA

Location: Bonnyville - AER

Station ID: LICA 37

Sample ID: LICA/VOC/Bonnyville/Mar 26, 2017

Sampler S/N: ~~6600~~ME 6200

Canister ID: S5600

Installation Date/Time (mst): MAR 24, 2017 @ 08:32

Removal Date/Time (mst): Mar 27, 2017 @ 11:39

Date and Time Information

Sample Date:	Start Time (mst)	End Time (mst)	Elapsed Time (hours)
MARCH 26, 2017	00:00	24:00	24

Canister Pressure/Vacuum	
Initial Vacuum (in. Hg)	Final Pressure (psi)
-28	+19.2

Flow Settings		
Flow Reading (sccm)	Pot Set Point	Pump Set (psi)
10	4.94	27.5

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

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

Timer reset to zero prior to sampling? YES (yes/no)

Date of last flow calibration: JANUARY 27, 2017 (due every 3 months)

Last date of sample line & fitting replacement: SEPTEMBER 28, 2016 (due every 6 months)

Comments: n/a

Deployment Technician Signature:

Collection Technician Signature: Alex Yakupov Date: Mar 27, 2017

RECEIVED MAR 30 2017

Volatile Organics Data Results

Date: March 26 , 2017
Canister ID: 2471

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	0.05
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	0.06
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	0.06
2,3-Dimethylpentane	0.11
2,4-Dimethylpentane	0.04
2-Methylheptane	0.11
2-Methylhexane	0.26
2-Methylpentane	0.23
3-Methylheptane	0.06
3-Methylhexane	0.27
3-Methylpentane	0.14
Acetone	3.2
Acrolein	< 0.3
Benzene	0.3
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	0.09
Carbon tetrachloride	0.07
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	< 0.02
Chloromethane	0.65
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.04
cis-2-Butene	0.02
cis-2-Pentene	< 0.02
Cyclohexane	0.26
Cyclopentane	0.1
Dibromochloromethane	< 0.01
Ethanol	1.3
Ethyl acetate	< 0.4
Ethylbenzene	0.1
Freon-11	0.22
Freon-113	0.08

Volatile Organics Data Results

Date: March 26 , 2017
Canister ID: 2471

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.36
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.99
Isopentane	0.92
Isoprene	< 0.01
Isopropyl alcohol	< 0.4
Isopropylbenzene	< 0.01
m,p-Xylene	0.39
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	0.54
Methylcyclopentane	0.31
Methylene chloride	0.3
n-Butane	2.53
n-Decane	< 0.06
n-Dodecane	< 0.4
n-Heptane	0.43
n-Hexane	0.36
n-Nonane	0.08
n-Octane	0.16
n-Pentane	0.7
n-Propylbenzene	< 0.05
n-Undecane	< 0.5
Naphthalene	< 0.5
o-Ethyltoluene	0.01
o-Xylene	0.19
p-Diethylbenzene	< 0.04
p-Ethyltoluene	< 0.07
Styrene	< 0.04
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	0.8
trans-1,2-Dichloroethylene	0.08
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.02
trans-2-Pentene	< 0.02
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

PAH RESULTS

Sample ID: 17030077-002

Customer ID: LICA

Cust Samp ID: LICA/PUF/Bonnyville/Mar 2, 2017

TISCH PUF PLUS Sample Collection Data Sheet

Client:	LICA	**Puf+ S/N:**	TE-02
Location:	Bonnyville - AER	**Motor S/N:**	1139/100-1015
Station ID:	LICA 37	**Installation Date/Time:**	Feb 27, 2017/12:56
Field Sample ID:	LICA/PUF/Bonnyville/Mar02, 2017	**Removal Date/Time:**	Mar 07, 2017/14:59

Sample Data Collection Information

Sample Date:	Mar 02, 2017	**Average Pressure (mmHg)**	708
Start Time (mst):	00:00	**Average Flow (Q_{std})**	229
End Time (mst):	00:00 Mar 03, 2017	**Average Tempurature (°C)**	-11.7°
Elapsed Time (Hours):	24.0	**Volume (Vstd m^3)**	330.15

Sample Recovery Checklist

	(circle one)	
Flow Rate 230 slpm +/- 0.2 slpm ?	(YES)	NO
Average temperature appears correct?	(YES)	NO
Average pressure appears correct?	(YES)	NO
Any error messages? (if yes list below)	YES	(NO)
Sample duration 24 hours?	(YES)	NO

Date of last calibration/audit: Jan 27, 2017

Other observations? n/a

RECEIVED
MAR 09 2017

Deployed By: Alex Yakupov

Collected By: Alex Yakupov **Date:** Mar 07, 2017

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: March 2 , 2017
PUF S/N: TE02

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.44
2-Methylnaphthalene	0.56
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.15
Acenaphthylene	0.04
Acridine	< 0.01
Anthracene	0.01
Benzo(a)anthracene	< 0.01
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	0.02
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.09
Fluorene	0.13
Indeno(1,2,3-cd)pyrene	0.01
Naphthalene	0.33
Perylene	< 0.01
Phenanthrene	0.31
Pyrene	0.06
Retene	0.05

Sample ID: 17030116-002

Customer ID: LICA

Cust Samp ID: LICA/PUF/Bonnyville/Mar 08, 2017

RECEIVED
MAR 13 2017

TISCH PUF PLUS Sample Collection Data Sheet

Client:	LICA	Puf+ S/N:	9801
Location:	Bonnyville - AER	Motor S/N:	1139/100-1015
Station ID:	LICA 37	Installation Date/Time:	Mar 07, 2017/14:59
Field Sample ID:	LICA/PUF/Bonnyville/Mar08,2017	Removal Date/Time:	Mar 09, 2017/14:33

Sample Data Collection Information

Sample Date:	Mar 08, 2017	Average Pressure (mmHg)	714
Start Time (mst):	00:00	Average Flow (Q_{std})	229
End Time (mst):	Mar 09, 2017/00:00	Average Tempurature (°C)	-21.5°
Elapsed Time (Hours):	24.0	Volume (Vstd m^3)	330.17

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	(YES)	NO
Average temperature appears correct?	(YES)	NO
Average pressure appears correct?	(YES)	NO
Any error messages? (if yes list below)	YES	(NO)
Sample duration 24 hours?	(YES)	NO
Date of last calibration/audit:	Jan 27, 2017	
Other observations?	n/a	

Deployed By: Alex Yakupov

Collected By: Alex Yakupov Date: Mar 09, 2017

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: March 8 , 2017
PUF S/N: 9801

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	1.21
2-Methylnaphthalene	2.07
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.34
Acenaphthylene	0.12
Acridine	< 0.01
Anthracene	0.01
Benzo(a)anthracene	0.02
Benzo(a)pyrene	0.01
Benzo(b,j,k)fluoranthene	0.06
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	0.06
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.09
Fluorene	0.12
Indeno(1,2,3-cd)pyrene	0.03
Naphthalene	3.89
Perylene	< 0.01
Phenanthrene	0.36
Pyrene	0.06
Retene	0.08

Sample ID: 17030212-002

Customer ID: LICA

Cust Samp ID: LICA/PUF/Bonnyville/Mar 14, 2017

TISCH PUF PLUS Sample Collection Data Sheet

Client:	LICA	**Puf+ S/N:**	P13-01
Location:	Bonnyville - AER	**Motor S/N:**	1139 / 100-1015
Station ID:	LICA 37	**Installation Date/Time:**	Mar 09, 2017 / 14:33
Field Sample ID:	LICA/PUF/Bonnyville/Mar 14, 2017 (24)	**Removal Date/Time:**	MAR 16, 2017 @ 11:50

Sample Data Collection Information

Sample Date:	Mar 14, 2017	**Average Pressure (mmHg)**	701
Start Time (mst):	00:00	**Average Flow (Q_{std})**	229
End Time (mst):	00:00 Mar 15, 2017	**Average Tempurature (°C)**	-4.7
Elapsed Time (Hours):	24.0	**Volume (Vstd m^3)**	330.18

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	(YES)	~~NO~~
Average temperature appears correct?	(YES)	~~NO~~
Average pressure appears correct?	(YES)	~~NO~~
Any error messages? (if yes list below)	~~YES~~	(NO)
Sample duration 24 hours?	(YES)	~~NO~~

Date of last calibration/audit: Jan 27, 2017

Other observations?

Deployed By: Alex Yakupov

Collected By: [signature] **Date:** Mar 16, 2017

RECEIVED
MAR 20 2017

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: March 14 , 2017
PUF S/N: P13-01

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.11
2-Methylnaphthalene	0.12
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.07
Acenaphthylene	0.06
Acridine	< 0.01
Anthracene	0.02
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	< 0.01
Dibenzo(a,h)pyrene	< 0.01
Dibenzo(a,i)pyrene	< 0.01
Dibenzo(a,l)pyrene	< 0.01
Dibenzo(ah)anthracene	< 0.01
Fluoranthene	0.1
Fluorene	0.1
Indeno(1,2,3-cd)pyrene	0.02
Naphthalene	0.11
Perylene	< 0.01
Phenanthrene	0.31
Pyrene	0.08
Retene	0.04

Sample ID: 17030303-002

Customer ID: LICA

Cust Samp ID: LICA/PUF/Bonnyville/Mar 20, 2017

ISCH PUF PLUS Sample Collection Data Sheet

Client:	LICA	**Puf+ S/N:**	TE09
Location:	Bonnyville - AER	**Motor S/N:**	1139/1000-1015
Station ID:	LICA 37	**Installation Date/Time:**	MAR 16, 2017 @ 11:52
Field Sample ID:	LICA/PUF/Bonnyville/MAR 20, 2017	**Removal Date/Time:**	MAR 24, 2017 @

Sample Data Collection Information

Sample Date:	MAR 20, 2017	**Average Pressure (mmHg)**	706
Start Time (mst):	00:00	**Average Flow (Q_{std})**	229
End Time (mst):	24:00	**Average Tempurature (°C)**	-7.8
Elapsed Time (Hours):	24:00	**Volume (Vstd m^3)**	330.18

Sample Recovery Checklist

(circle one)

Flow Rate 230 slpm +/- 0.2 slpm ?	**YES**	**NO**
Average temperature appears correct?	**YES**	**NO**
Average pressure appears correct?	**YES**	**NO**
Any error messages? (if yes list below)	**YES**	**NO**
Sample duration 24 hours?	**YES**	**NO**

Date of last calibration/audit: JAN 27, 2017

Other observations?

Deployed By:

Collected By:

RECEIVED
MAR 30 2017

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: March 20 , 2017
PUF S/N: TE-09

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.21
2-Methylnaphthalene	0.4
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.03
Acenaphthylene	0.01
Acridine	< 0.01
Anthracene	< 0.01
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	0.02
Fluorene	0.03
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.45
Perylene	< 0.01
Phenanthrene	0.07
Pyrene	0.02
Retene	0.01

Sample ID: 17030303-004

Customer ID: LICA

Cust Samp ID: LICA/PUF/Bonnyville/Mar 26, 2017

TISCH PUF PLUS Sample Collection Data Sheet

Client:	LICA	**Puf+ S/N:**	TE ~~09~~ 10 01
Location:	Bonnyville - AER	**Motor S/N:**	1139 / 100-1015
Station ID:	LICA 37	**Installation Date/Time:**	MARCH 24, 2017
Field Sample ID:	LICA / PUF / Bonnyville / Mar 26, 2017	**Removal Date/Time:**	Mar 27, 2017 / 11:39

Sample Data Collection Information

Sample Date:	MARCH 26, 2017	**Average Pressure (mmHg)**	700
Start Time (mst):	00:00	**Average Flow (Q_{std})**	229 ~~330.20~~ A.V.
End Time (mst):	24:00	**Average Tempurature (°C)**	+ 1.6 °
Elapsed Time (Hours):	24:00	**Volume (Vstd m^3)**	330.20

Sample Recovery Checklist

	(circle one)	
Flow Rate 230 slpm +/- 0.2 slpm ?	(YES)	NO
Average temperature appears correct?	(YES)	NO
Average pressure appears correct?	(YES)	NO
Any error messages? (if yes list below)	YES	(NO)
Sample duration 24 hours?	(YES)	NO
Date of last calibration/audit:	JANUARY 27, 2017	
Other observations?	n/a	

RECEIVED
MAR 30 2017

Deployed By: [signature]

Collected By: Alex Yakupov **Date:** Mar 27, 2017

Polycyclic Aromatic Hydrocarbons (PAHs) Data Results

Date: March 26 , 2017
PUF S/N: TE01

PARAMETERS	CONCENTRATION (µg/puf)
1-Methylnaphthalene	0.08
2-Methylnaphthalene	0.14
3-Methylcholanthrene	< 0.01
7,12-Dimethylbenz(a)anthracene	< 0.01
Acenaphthene	0.02
Acenaphthylene	0.01
Acridine	< 0.01
Anthracene	< 0.01
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	0.05
Fluorene	0.07
Indeno(1,2,3-cd)pyrene	< 0.01
Naphthalene	0.12
Perylene	< 0.01
Phenanthrene	0.16
Pyrene	0.04
Retene	0.06

NMHC CANISTER RESULTS

Sample ID: 17030077-004

Customer ID: LICA

Cust Samp ID: LICA/NMHC VOC/Bonnyville/Mar 3, 2017

AIR FCD-01320/2

RECEIVED
MAR 09 2017

Maxxam

VOC Sample Collection Data Sheet

Client: LICA
Location: Bonnyville - AER
Station ID: LICA 37
Field Sample ID: LICA/NMHC/VOC/Bonnyville/Mar 03, 2017

Sampler S/N: n/a
Canister ID: H 3286
Canister Installation Date/Time: Mar 03, 2017 / 16:05
Canister Removal Date/Time: Mar 04, 2017 / 15:19

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
Mar 03, 2017	19:25	n/a	n/a

Flow Settings		
Meter Reading (sccm)	Pot Set Pt.	Pump Pressure Setting (psig)
n/a	n/a	n/a

Canister Information	
Initial Canister Vacuum (inHg)	Final Canister Vacuum (inHg)
-27.0	-2.0

Canister valve open prior to sampling?: (YES) / NO

Canister valve closed prior to disconnection?: (YES) / NO

Comments: NMHC canister

Technician Signiture: Alex Yakupov **Date:** Mar 04, 2017

Volatile Organics Data Results (NMHC Canister System)

Date: March 3 , 2017
Canister ID: H3286

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	0.11
1,2,4-Trichlorobenzene	< 1.1
1,2,4-Trimethylbenzene	0.37
1,2-Dibromoethane	< 0.03
1,2-Dichlorobenzene	< 0.04
1,2-Dichloroethane	0.03
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	0.14
1,3-Butadiene	0.17
1,3-Dichlorobenzene	< 0.4
1,4-Dichlorobenzene	< 0.5
1,4-Dioxane	< 0.5
1-Butene	0.52
1-Hexene	0.09
1-Pentene	0.11
2,2,4-Trimethylpentane	0.57
2,2-Dimethylbutane	0.22
2,3,4-Trimethylpentane	0.15
2,3-Dimethylbutane	0.36
2,3-Dimethylpentane	0.43
2,4-Dimethylpentane	0.2
2-Methylheptane	0.19
2-Methylhexane	0.42
2-Methylpentane	1.16
3-Methylheptane	0.16
3-Methylhexane	0.48
3-Methylpentane	0.65
Acetone	4.0
Acrolein	< 0.4
Benzene	0.69
Benzyl chloride	< 0.5
Bromodichloromethane	< 0.03
Bromoform	< 0.03
Bromomethane	< 0.01
Carbon disulfide	0.3
Carbon tetrachloride	0.14
Chlorobenzene	< 0.03
Chloroethane	< 0.03
Chloroform	0.04
Chloromethane	0.72
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.05
cis-2-Butene	0.18
cis-2-Pentene	0.1
Cyclohexane	0.48
Cyclopentane	0.29
Dibromochloromethane	< 0.01
Ethanol	10.1
Ethyl acetate	< 0.5
Ethylbenzene	0.26
Freon-11	0.31
Freon-113	0.15

Volatile Organics Data Results (NMHC Canister System)

Date: March 3 , 2017
Canister ID: H3286

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.03
Freon-12	0.59
Hexachloro-1,3-butadiene	< 0.68
Isobutane	3.02
Isopentane	3.59
Isoprene	0.1
Isopropyl alcohol	< 0.5
Isopropylbenzene	0.03
m,p-Xylene	0.97
m-Diethylbenzene	< 0.05
m-Ethyltoluene	0.24
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	0.58
Methylcyclopentane	0.79
Methylene chloride	< 0.4
n-Butane	6.24
n-Decane	< 0.08
n-Dodecane	< 0.5
n-Heptane	0.44
n-Hexane	0.71
n-Nonane	0.17
n-Octane	1.7
n-Pentane	0.07
n-Propylbenzene	< 0.7
n-Undecane	1.7
Naphthalene	0.1
o-Ethyltoluene	0.1
o-Xylene	0.34
p-Diethylbenzene	0.1
p-Ethyltoluene	0.15
Styrene	0.08
Tetrachloroethylene	0.3
Tetrahydrofuran	< 0.5
Toluene	1.06
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.05
trans-2-Butene	0.21
trans-2-Pentene	0.21
Trichloroethylene	< 0.05
Vinyl acetate	< 0.5
Vinyl chloride	< 0.03

Sample ID: 17030116-003

Customer ID: LICA

Cust Samp ID: LICA/NMHC/Bonnyville/Mar 08, 2017

AIR FCD-01320/2

Maxxam

VOC Sample Collection Data Sheet

Client: LICA
Location: Bonnyville - AER
Station ID: LICA 37
Field Sample ID: LICA/NMHC VOC/Bonnyville/Mar of 2017

Sampler S/N: n/a
Canister ID: 1061
Canister Installation Date/Time: Mar 04, 2017 / 15:19
Canister Removal Date/Time: Mar 09, 2017 / ~~0~~ 13:41 A.V.

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
Mar 08, 2017	19:05	n/a	n/a

Flow Settings		
Meter Reading (sccm)	Pot Set Pt.	Pump Pressure Setting (psig)
n/a	n/a	n/a

Canister Information	
Initial Canister Vacuum (inHg)	Final Canister Vacuum (inHg)
-27.7	n/a - no pressure gauge (A.Y)

Canister valve open prior to sampling?: (YES) / NO

Canister valve closed prior to disconnection?: YES / NO

Comments: (NMHC canister)
The canister is not equipped with a pressure gauge.

Technician Signiture: Alex Yampov **Date:** Mar 09, 2017

RECEIVED
MAR 13 2017

Volatile Organics Data Results (NMHC Canister System)

Date: March 8 , 2017
Canister ID: 1061

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	0.11
1,2,4-Trichlorobenzene	< 0.8
1,2,4-Trimethylbenzene	0.36
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.03
1,2-Dichloroethane	0.03
1,2-Dichloropropane	0.01
1,3,5-Trimethylbenzene	0.13
1,3-Butadiene	0.1
1,3-Dichlorobenzene	< 0.3
1,4-Dichlorobenzene	< 0.4
1,4-Dioxane	< 0.4
1-Butene	0.47
1-Hexene	0.09
1-Pentene	0.09
2,2,4-Trimethylpentane	0.75
2,2-Dimethylbutane	0.06
2,3,4-Trimethylpentane	0.31
2,3-Dimethylbutane	0.18
2,3-Dimethylpentane	0.58
2,4-Dimethylpentane	0.25
2-Methylheptane	0.21
2-Methylhexane	0.44
2-Methylpentane	0.56
3-Methylheptane	0.2
3-Methylhexane	0.52
3-Methylpentane	0.34
Acetone	1.9
Acrolein	< 0.3
Benzene	0.57
Benzyl chloride	< 0.4
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	0.01
Carbon disulfide	< 0.01
Carbon tetrachloride	0.12
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	0.14
cis-2-Pentene	0.09
Cyclohexane	0.17
Cyclopentane	0.1
Dibromochloromethane	< 0.01
Ethanol	2.6
Ethyl acetate	< 0.4
Ethylbenzene	0.31
Freon-11	0.29
Freon-113	0.13

Volatile Organics Data Results (NMHC Canister System)

Date: March 8 , 2017
Canister ID: 1061

PARAMETERS	CONCENTRATION (PPB)
Freon-114	0.02
Freon-12	0.52
Hexachloro-1,3-butadiene	< 0.50
Isobutane	0.83
Isopentane	1.1
Isoprene	0.09
Isopropyl alcohol	< 0.4
Isopropylbenzene	0.04
m,p-Xylene	1.11
m-Diethylbenzene	< 0.04
m-Ethyltoluene	0.25
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	0.3
Methylcyclopentane	0.41
Methylene chloride	< 0.3
n-Butane	2.18
n-Decane	0.09
n-Dodecane	< 0.4
n-Heptane	0.47
n-Hexane	0.37
n-Nonane	0.1
n-Octane	0.22
n-Pentane	0.5
n-Propylbenzene	0.08
n-Undecane	< 0.5
Naphthalene	1.5
o-Ethyltoluene	0.1
o-Xylene	0.4
p-Diethylbenzene	0.08
p-Ethyltoluene	0.12
Styrene	0.06
Tetrachloroethylene	< 0.04
Tetrahydrofuran	< 0.4
Toluene	1.29
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.04
trans-2-Butene	0.13
trans-2-Pentene	0.15
Trichloroethylene	< 0.04
Vinyl acetate	< 0.4
Vinyl chloride	< 0.02

Sample ID: 17030212-003

Customer ID: LICA

Cust Samp ID: LICA/NMHC VOC/Bonnyville/Mar 14, 2017

Maxxam

VOC Sample Collection Data Sheet

Client: LICA
Location: Bonnyville - AER
Station ID: LICA 37
Field Sample ID: LICA/NMHC VOC/Bonnyville/MAR 11, 2017

Sampler S/N: n/a
Canister ID: 17121
Canister Installation Date/Time: Mar 09, 2017 / 13:41
Canister Removal Date/Time: Mar 16, 2017 @ 12:21

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
Mar 11, 2017	16:35	n/a	n/a

Flow Settings		
Meter Reading (sccm)	Pot Set Pt.	Pump Pressure Setting (psig)
n/a	n/a	n/a

Canister Information	
Initial Canister Vacuum (inHg)	Final Canister Vacuum (inHg)
-27.7	0

Canister valve open prior to sampling?: YES / NO

Canister valve closed prior to disconnection?: YES / NO

Comments: NMHC canister
5mm NMHC conc = 1.49ppm.

Technician Signature: Alex Yakupov (Installation) Date: Mar 16, 2017 (of removal)

Volatile Organics Data Results (NMHC Canister System)

Date: March 11 , 2017
Canister ID: 17121

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	< 0.05
1,2,3-Trimethylbenzene	< 0.06
1,2,4-Trichlorobenzene	< 1.0
1,2,4-Trimethylbenzene	< 0.06
1,2-Dibromoethane	< 0.02
1,2-Dichlorobenzene	< 0.04
1,2-Dichloroethane	0.02
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	0.04
1,3-Butadiene	< 0.02
1,3-Dichlorobenzene	< 0.4
1,4-Dichlorobenzene	< 0.5
1,4-Dioxane	< 0.5
1-Butene	2.38
1-Hexene	0.1
1-Pentene	0.29
2,2,4-Trimethylpentane	0.28
2,2-Dimethylbutane	0.03
2,3,4-Trimethylpentane	0.06
2,3-Dimethylbutane	0.33
2,3-Dimethylpentane	0.37
2,4-Dimethylpentane	0.2
2-Methylheptane	0.02
2-Methylhexane	0.12
2-Methylpentane	0.73
3-Methylheptane	< 0.02
3-Methylhexane	0.13
3-Methylpentane	0.43
Acetone	2.9
Acrolein	< 0.4
Benzene	1.45
Benzyl chloride	< 0.5
Bromodichloromethane	< 0.02
Bromoform	< 0.02
Bromomethane	< 0.01
Carbon disulfide	< 0.01
Carbon tetrachloride	0.1
Chlorobenzene	< 0.02
Chloroethane	< 0.02
Chloroform	< 0.02
Chloromethane	0.65
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.05
cis-2-Butene	1.64
cis-2-Pentene	0.3
Cyclohexane	0.05
Cyclopentane	0.09
Dibromochloromethane	< 0.01
Ethanol	5.7
Ethyl acetate	< 0.5
Ethylbenzene	0.04
Freon-11	0.29
Freon-113	0.09

Volatile Organics Data Results (NMHC Canister System)

Date: March 11 , 2017
Canister ID: 17121

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.02
Freon-12	0.63
Hexachloro-1,3-butadiene	< 0.62
Isobutane	18.9
Isopentane	9.79
Isoprene	0.01
Isopropyl alcohol	< 0.5
Isopropylbenzene	< 0.01
m,p-Xylene	0.12
m-Diethylbenzene	< 0.05
m-Ethyltoluene	< 0.10
Methyl butyl ketone	< 0.62
Methyl ethyl ketone	0.4
Methyl isobutyl ketone	< 0.5
Methyl methacrylate	< 0.09
Methyl tert butyl ether	< 0.04
Methylcyclohexane	0.06
Methylcyclopentane	0.32
Methylene chloride	< 0.4
n-Butane	43.8
n-Decane	< 0.08
n-Dodecane	< 0.5
n-Heptane	0.09
n-Hexane	0.22
n-Nonane	0.02
n-Octane	0.03
n-Pentane	1.5
n-Propylbenzene	< 0.06
n-Undecane	< 0.6
Naphthalene	< 0.6
o-Ethyltoluene	0.02
o-Xylene	0.05
p-Diethylbenzene	< 0.05
p-Ethyltoluene	< 0.09
Styrene	< 0.05
Tetrachloroethylene	< 0.05
Tetrahydrofuran	< 0.5
Toluene	0.38
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.05
trans-2-Butene	1.96
trans-2-Pentene	0.54
Trichloroethylene	< 0.05
Vinyl acetate	0.8
Vinyl chloride	< 0.02

Sample ID: 17030303-005

AIR FCD-01320/2

Customer ID: LICA

Cust Samp ID: LICA/NMHC VOC/Bonnyville/Mar 19, 2017

Maxxam

RECEIVED
MAR 30 2017

VOC Sample Collection Data Sheet

Client: LICA
Location: Bonnyville - AER
Station ID: LICA 37
Field Sample ID: LICA/NMHC VOC/Bonnyville/March 19, 2017

Sampler S/N: n/a
Canister ID: 1684
Canister Installation Date/Time: 16-Mar-2017 @ 11:28 MST
Canister Removal Date/Time: 24 MARCH 2017 @ 0758 MST

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
MARCH 19, 2017	06:55	n/a	n/a

Flow Settings		
Meter Reading (sccm)	Pot Set Pt.	Pump Pressure Setting (psig)
n/a	n/a	n/a

Canister Information	
Initial Canister Vacuum (inHg)	Final Canister Vacuum (inHg)
-28	0

Canister valve open prior to sampling?: (YES) / NO

Canister valve closed prior to disconnection?: (YES) / NO

Comments: NMHC canister

Technician Signature: Installed: [signature] Date: Mar 16, 2017

Removed: [signature] Date: March 24, 2017

Volatile Organics Data Results (NMHC Canister System)

Date: March 19 , 2017
Canister ID: 1684

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	< 0.07
1,2,4-Trichlorobenzene	< 1.1
1,2,4-Trimethylbenzene	< 0.07
1,2-Dibromoethane	< 0.03
1,2-Dichlorobenzene	< 0.04
1,2-Dichloroethane	< 0.01
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	< 0.03
1,3-Butadiene	< 0.03
1,3-Dichlorobenzene	< 0.4
1,4-Dichlorobenzene	< 0.6
1,4-Dioxane	< 0.6
1-Butene	0.1
1-Hexene	< 0.03
1-Pentene	< 0.01
2,2,4-Trimethylpentane	0.02
2,2-Dimethylbutane	< 0.01
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	0.03
2-Methylpentane	0.08
3-Methylheptane	< 0.03
3-Methylhexane	0.03
3-Methylpentane	0.03
Acetone	1.6
Acrolein	< 0.4
Benzene	0.13
Benzyl chloride	< 0.6
Bromodichloromethane	< 0.03
Bromoform	< 0.03
Bromomethane	< 0.01
Carbon disulfide	0.04
Carbon tetrachloride	0.07
Chlorobenzene	< 0.03
Chloroethane	< 0.03
Chloroform	< 0.03
Chloromethane	0.6
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.06
cis-2-Butene	< 0.03
cis-2-Pentene	< 0.03
Cyclohexane	< 0.03
Cyclopentane	0.01
Dibromochloromethane	< 0.01
Ethanol	0.9
Ethyl acetate	< 0.6
Ethylbenzene	< 0.01
Freon-11	0.22
Freon-113	0.09

Volatile Organics Data Results (NMHC Canister System)

Date: March 19 , 2017
Canister ID: 1684

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.03
Freon-12	0.37
Hexachloro-1,3-butadiene	< 0.70
Isobutane	0.56
Isopentane	0.63
Isoprene	< 0.01
Isopropyl alcohol	< 0.6
Isopropylbenzene	< 0.01
m,p-Xylene	< 0.04
m-Diethylbenzene	< 0.06
m-Ethyltoluene	< 0.11
Methyl butyl ketone	< 0.70
Methyl ethyl ketone	< 0.4
Methyl isobutyl ketone	< 0.6
Methyl methacrylate	< 0.10
Methyl tert butyl ether	< 0.04
Methylcyclohexane	0.03
Methylcyclopentane	< 0.03
Methylene chloride	< 0.4
n-Butane	4.44
n-Decane	< 0.08
n-Dodecane	< 0.6
n-Heptane	0.03
n-Hexane	< 0.01
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	0.03
p-Diethylbenzene	< 0.06
p-Ethyltoluene	< 0.10
Styrene	< 0.06
Tetrachloroethylene	< 0.06
Tetrahydrofuran	< 0.6
Toluene	0.05
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.06
trans-2-Butene	0.04
trans-2-Pentene	< 0.03
Trichloroethylene	< 0.06
Vinyl acetate	< 0.6
Vinyl chloride	< 0.03

Sample ID: 17040067-003

Customer ID: LICA

Cust Samp ID: LICA/NMHC/Bonnyville/April 04, 2017

AIR FCD-01320/2

RECEIVED
APR 06 2017

Maxxam

VOC Sample Collection Data Sheet

Client: LICA
Location: Bonnyville AER
Station ID: LICA 37
Field Sample ID: LICA/NMHC/Bonnyville/~~Apr 04,~~ Mar 28, 2017 modified

Sampler S/N: n/a
Canister ID: K17
Canister Installation Date/Time: 24 MARCH 2017 @ 08:05 MST
Canister Removal Date/Time: Apr 05, 2017 / 12:44

Date and Time Information			
Sample Date	Start Time (MST)	End Time (MST)	Elapsed Time (Hours)
Apr 04, 2017	18:10	n/a	n/a

Flow Settings		
Meter Reading (sccm)	Pot Set Pt.	Pump Pressure Setting (psig)
n/a	n/a	n/a

Canister Information	
Initial Canister Vacuum (inHg)	Final Canister Vacuum (inHg)
-28	0.0

Canister valve open prior to sampling?: (YES) / NO

Canister valve closed prior to disconnection?: (YES) / NO

Comments: (NMHC canister)

Technician Signiture: Installed: [signature] Date: 24 MARCH 2017

Removed Alex Yakupov Date: Apr 05, 2017

Volatile Organics Data Results (NMHC Canister System)

Date: March 28 , 2017
Canister ID: 1517

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	0.09
1,2,4-Trichlorobenzene	< 1.1
1,2,4-Trimethylbenzene	0.24
1,2-Dibromoethane	< 0.03
1,2-Dichlorobenzene	< 0.04
1,2-Dichloroethane	0.03
1,2-Dichloropropane	< 0.01
1,3,5-Trimethylbenzene	0.11
1,3-Butadiene	0.04
1,3-Dichlorobenzene	< 0.4
1,4-Dichlorobenzene	< 0.5
1,4-Dioxane	< 0.5
1-Butene	0.48
1-Hexene	0.03
1-Pentene	0.03
2,2,4-Trimethylpentane	0.07
2,2-Dimethylbutane	0.04
2,3,4-Trimethylpentane	0.05
2,3-Dimethylbutane	0.13
2,3-Dimethylpentane	0.15
2,4-Dimethylpentane	0.08
2-Methylheptane	0.23
2-Methylhexane	0.26
2-Methylpentane	0.71
3-Methylheptane	0.18
3-Methylhexane	0.32
3-Methylpentane	0.40
Acetone	6.3
Acrolein	< 0.4
Benzene	0.53
Benzyl chloride	< 0.5
Bromodichloromethane	< 0.03
Bromoform	< 0.03
Bromomethane	0.02
Carbon disulfide	0.26
Carbon tetrachloride	0.14
Chlorobenzene	< 0.03
Chloroethane	0.04
Chloroform	0.03
Chloromethane	0.68
cis-1,2-Dichloroethene	< 0.01
cis-1,3-Dichloropropene	< 0.05
cis-2-Butene	0.05
cis-2-Pentene	< 0.03
Cyclohexane	0.70
Cyclopentane	0.11
Dibromochloromethane	< 0.01
Ethanol	2.0
Ethyl acetate	< 0.5
Ethylbenzene	0.12
Freon-11	0.31
Freon-113	0.14

Volatile Organics Data Results (NMHC Canister System)

Date: March 28 , 2017
Canister ID: 1517

PARAMETERS	CONCENTRATION (PPB)
Freon-114	< 0.03
Freon-12	0.51
Hexachloro-1,3-butadiene	< 0.68
Isobutane	1.06
Isopentane	1.34
Isoprene	0.02
Isopropyl alcohol	< 0.5
Isopropylbenzene	0.03
m,p-Xylene	0.70
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	1.17
Methylcyclopentane	0.46
Methylene chloride	< 0.4
n-Butane	2.73
n-Decane	0.19
n-Dodecane	< 0.5
n-Heptane	0.40
n-Hexane	0.58
n-Nonane	0.30
n-Octane	0.33
n-Pentane	1.2
n-Propylbenzene	< 0.07
n-Undecane	< 0.7
Naphthalene	< 0.7
o-Ethyltoluene	0.05
o-Xylene	0.24
p-Diethylbenzene	0.06
p-Ethyltoluene	< 0.09
Styrene	< 0.05
Tetrachloroethylene	0.06
Tetrahydrofuran	< 0.5
Toluene	0.98
trans-1,2-Dichloroethylene	< 0.01
trans-1,3-Dichloropropylene	< 0.05
trans-2-Butene	0.04
trans-2-Pentene	0.03
Trichloroethylene	0.07
Vinyl acetate	< 0.5
Vinyl chloride	< 0.03

APPENDIX III
EQUIPMENT CALIBRATION RESULTS

SULPHUR DIOXIDE

API 100E Sulphur Dioxide Analyzer Calibration

Date:	March 3, 2017	**Barometric Pressure:**	27.73 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	21
Location/Station Name:	Bonnyville - AER	**Weather Conditions:**	Mainly sunny
Parameter:	Sulphur Dioxide	**Calibration Purpose:**	shut down
Start Time 24 hr. (mst):	9:10	**Performed By/Reviewer:**	Limin Li / Trina Whitsitt
End Time 24 hr. (mst):	11:40	**Cal Gas Expiry Date:**	December 25, 2018
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	n/a

Analyzer:

ID# or Serial Number:	467	**Range ppb:**	1000
Last Calibration Date:	February 17, 2017	**As Found C.F.:**	1.012
Previous C.F.:	1.000	**New C.F.:**	n/a

Calibrator:

Flow Meter ID's:	n/a
Make & Model:	Sabio 2010
Serial #:	17200415
Cal Gas Cylinder I.D. # :	BLM002756T
Cal Gas Conc. (ppm):	49.9

Standard Calibration Points for Ranges

Point	ppb
High	780
Mid	380
Low	190

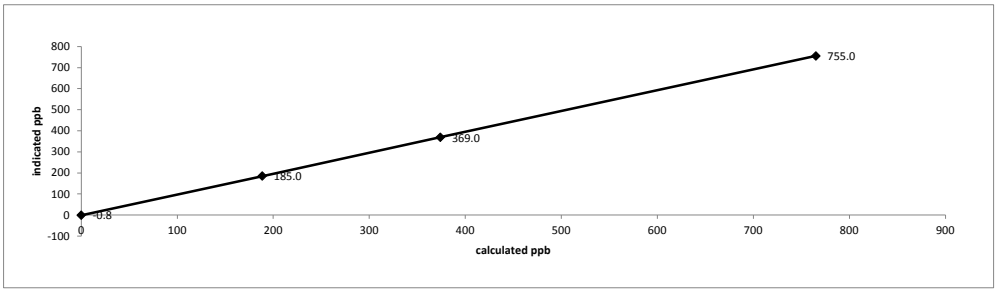
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	**Diluent**	**Cal Gas**	**Total**	**(ppb)**	**(ppb)**	
as found zero	5028	0.00	5028	0.0	-0.8	n/a
as found high	4951	77.10	5028	765.2	755.0	1.012
mid	4991	37.70	5029	374.1	369.0	1.012
low	5009	19.00	5028	188.6	185.0	1.015
					Average C.F.=	1.013

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.012**	**0.90-1.10**
b (Intercept as % of full scale)=	**0.09%**	**± 3% F.S.**
% change in C.F. from last cal=	**-1.24%**	**± 10%**

API 100E Sulphur Dioxide Analyzer Calibration

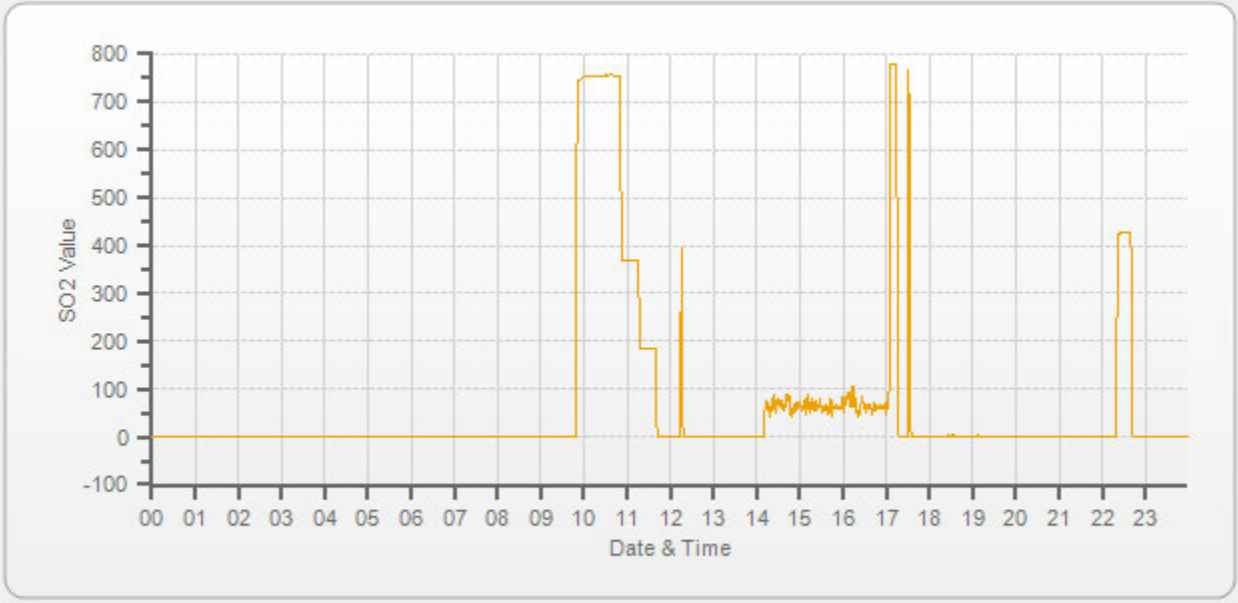


As found:		As left:	
SLOPE:	0.952	SLOPE:	n/a
OFFSET:	130.6	OFFSET:	n/a
HVPS:	524	HVPS:	n/a
RCELL TEMP:	50.0	RCELL TEMP:	n/a
BOX TEMP:	32.2	BOX TEMP:	n/a
PMT TEMP:	8.1	PMT TEMP:	n/a
IZS TEMP:	50.0	IZS TEMP:	n/a
PRES:	25.1	PRES:	n/a
SAMP FL:	536	SAMP FL:	n/a
NORM PMT:	125	NORM PMT:	n/a
UV LAMP:	2699	UV LAMP:	n/a
LAMP RATIO:	97.1	LAMP RATIO:	n/a
STR. LGT	62.2	STR. LGT	n/a
DRK PMT:	15.8	DRK PMT:	n/a
DRK LMP:	2.7	DRK LMP:	n/a
Expected Value:	450.0	Expected Value:	n/a

Comments:

After the shutdown calibration, the UV lamp was changed. A factory calibration was completed. A ZERO Air scrubber was re-positioned inside. Sample pump rebuilt.

SO2[ppb] Station: LICA Bonnyville Daily: 2017/03/03 Type: AVG 1 Min. [1 Min.]



API 100E Sulphur Dioxide Analyzer Calibration

Date:	March 4, 2017	**Barometric Pressure:**	0.921 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Bonnyville - AER	**Weather Conditions:**	Mainly cloudy with snow
Parameter:	Sulphur Dioxide	**Calibration Purpose:**	post repair
Start Time 24 hr. (mst):	9:17	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
End Time 24 hr. (mst):	12:48	**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
Last Calibration Date:	n/a	**As Found C.F.:**	n/a
Previous C.F.:	n/a	**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

Standard Calibration Points for Ranges

Point	ppb
High	780
Mid	380
Low	190

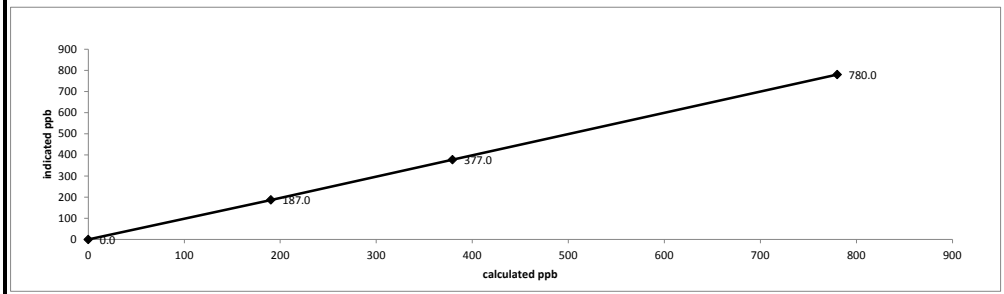
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	**Diluent**	**Cal Gas**	**Total**	**(ppb)**	**(ppb)**	
adjusted zero	5000	0.00	5000	0.0	0.0	n/a
adjusted high	4924	77.10	5001	780.1	780.0	1.000
mid	4964	37.50	5002	379.4	377.0	1.006
low	4979	18.80	4998	190.3	187.0	1.018
calibrator zero	5000	0.00	5000	0.0	0.0	n/a
					Average C.F.=	1.008

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**0.999**	**.95-1.05**
b (Intercept as % of full scale)=	**0.18%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**± 10%**

API 100E Sulphur Dioxide Analyzer Calibration



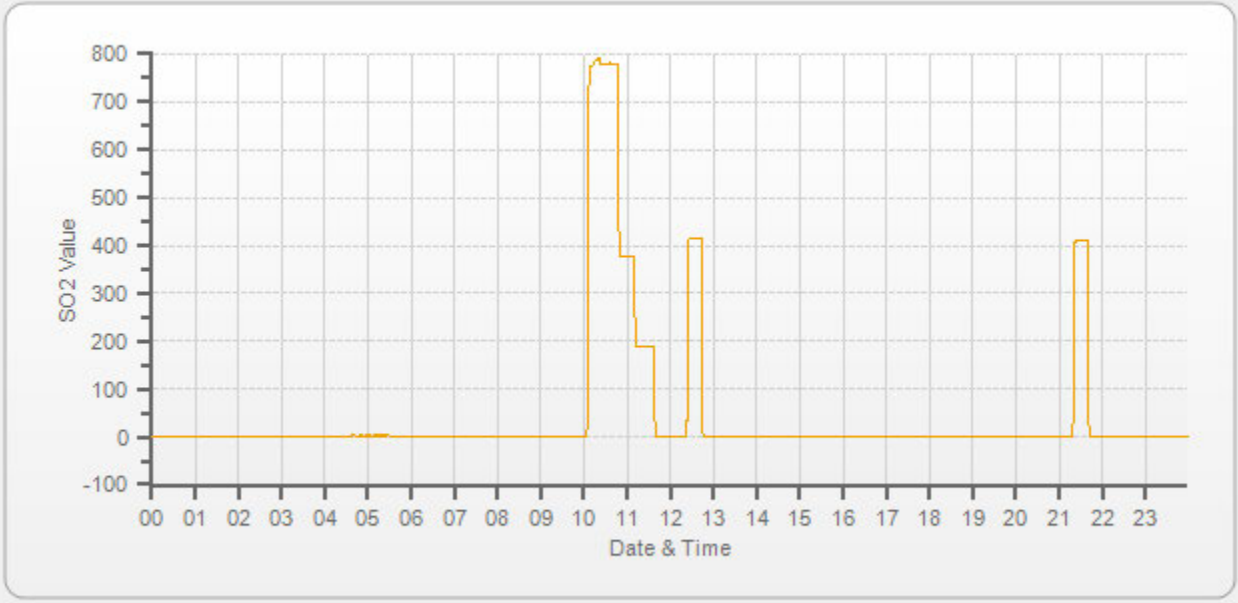
	As found:	As left:
SLOPE:	n/a	1.047
OFFSET:	n/a	117.3
HVPS:	n/a	488
RCELL TEMP:	n/a	50.0
BOX TEMP:	n/a	71.7
PMT TEMP:	n/a	8.1
IZS TEMP:	n/a	50.0
PRES:	n/a	25.2
SAMP FL:	n/a	560
NORM PMT:	n/a	117.0
UV LAMP:	n/a	4316.7
LAMP RATIO:	n/a	99.6
STR. LGT	n/a	61.4
DRK PMT:	n/a	15.5
DRK LMP:	n/a	3.3
Expected Value:	n/a	414.5

Comments:

The analyzer sample inlet filter was changed.

A new UV lamp was installed. A factory calibration was completed. A ZERO Air scrubber was re-positioned inside. Sample pump rebuilt.

SO2[ppb] Station: LICA Bonnyville Daily: 2017/03/04 Type: AVG 1 Min. [1 Min.]



HYDROGEN SULPHIDE

API 101E Hydrogen Sulphide Analyzer Calibration

Date:	March 3, 2017	**Barometric Pressure:**	27.73 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	21
Location/Station Name:	Bonnyville - AER	**Weather Conditions:**	Mainly sunny
Parameter:	Hydrogen Sulphide	**Calibration Purpose:**	shut down
Start Time 24 hr. (mst):	9:10	**Performed By/Reviewer:**	Limin Li / Trina Whitsitt
End Time 24 hr. (mst):	11:20	**Cal Gas Expiry Date:**	January 6, 2018
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	n/a

Analyzer:

ID# or Serial Number:	510	**Range ppb:**	100
Last Calibration Date:	February 8, 2017	**As Found C.F.:**	1.019
Previous C.F.:	0.998	**New C.F.:**	n/a

Calibrator:

Flow Meter ID's:	n/a
Make & Model:	Environica 2000
Serial #:	1991
Cal Gas Cylinder I.D. # :	BLM002508
Cal Gas Conc. (ppm):	10.2

Standard Calibration Points for Ranges

Point	ppb
High	78
Mid	38
Low	19

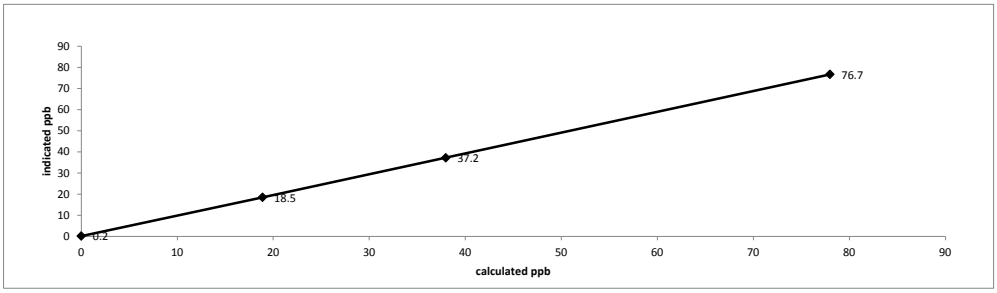
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration:	Indicated Concentration:	Correction Factors (C.F.):
Point	**Diluent**	**Cal Gas**	**Total**	**(ppb)**	**(ppb)**	
as found zero	7507	0.00	7507	0.0	0.2	n/a
as found high	7443	57.34	7500	78.0	76.7	1.019
mid	7473	27.92	7501	38.0	37.2	1.026
low	7502	13.92	7516	18.9	18.5	1.033
					Average C.F.=	1.026

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.019**	**0.90-1.10**
b (Intercept as % of full scale)=	**-0.05%**	**± 3% F.S.**
% change in C.F. from last cal=	**-2.14%**	**± 10%**

API 101E Hydrogen Sulphide Analyzer Calibration

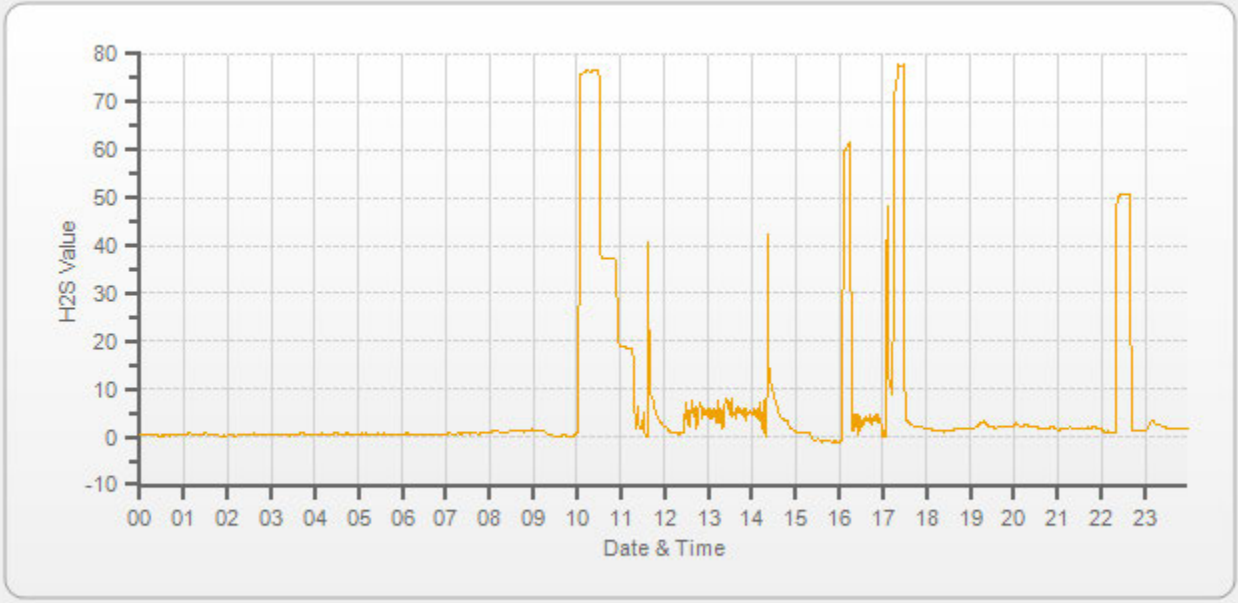


	As found:		As left:
SLOPE:	0.951	SLOPE:	n/a
OFFSET:	30.8	OFFSET:	n/a
HVPS:	530	HVPS:	n/a
RCELL TEMP:	50.0	RCELL TEMP:	n/a
BOX TEMP:	35.1	BOX TEMP:	n/a
PMT TEMP:	8.4	PMT TEMP:	n/a
IZS TEMP:	45.0	IZS TEMP:	n/a
Converter Temp:	314.4	Converter Temp:	n/a
PRES:	20.5	PRES:	n/a
SAMP FL:	535	SAMP FL:	n/a
UV LAMP:	3426	UV LAMP:	n/a
LAMP RATIO:	90.3	LAMP RATIO:	n/a
STR. LGT	14.6	STR. LGT	n/a
DRK PMT:	35.0	DRK PMT:	n/a
DRK LMP:	-1.9	DRK LMP:	n/a
Expected Value:	50.6	Expected Value:	n/a

Comments:

Pump:-19inHg. After the shutdown calibration, the reaction cell and sample valve were cleaned. The sinter filter was changed.

H2S[ppb] Station: LICA Bonnyville Daily: 2017/03/03 Type: AVG 1 Min. [1 Min.]



API 101E Hydrogen Sulphide Analyzer Calibration

Date:	March 4, 2017	**Barometric Pressure:**	0.921 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Bonnyville - AER	**Weather Conditions:**	Mainly cloudy with snow
Parameter:	Hydrogen Sulphide	**Calibration Purpose:**	post repair
Start Time 24 hr. (mst):	12:07	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
End Time 24 hr. (mst):	15:45	**Cal Gas Expiry Date:**	June 14, 2019
Calibration Method:	Gas Dilution	**Converter Model & s/n (if applicable):**	n/a

Analyzer:

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

Standard Calibration Points for Ranges

Point	ppb
High	78
Mid	38
Low	19

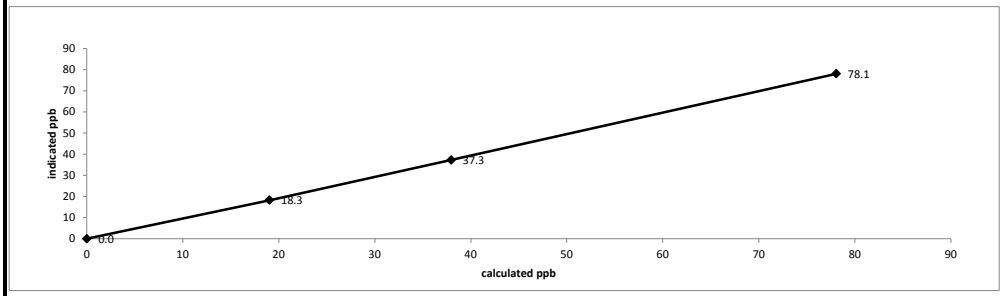
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

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	7471	27.90	7499	37.9	37.3	1.017
low	7490	14.00	7504	19.0	18.3	1.040
calibrator zero	7500	0.00	7500	0.0	0.0	n/a
					Average C.F.=	1.019

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**0.997**	**.95-1.05**
b (Intercept as % of full scale)=	**0.44%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**± 10%**

API 101E Hydrogen Sulphide Analyzer Calibration



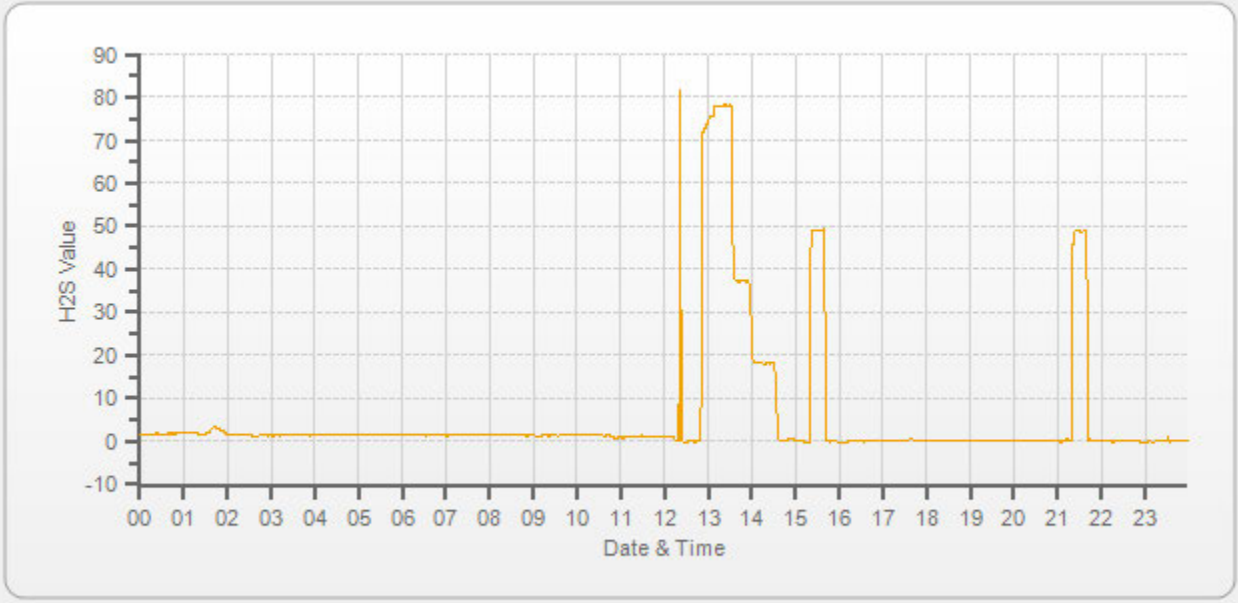
	As found:	As left:
SLOPE:	n/a	1.039
OFFSET:	n/a	30.7
HVPS:	n/a	530
RCELL TEMP:	n/a	50.0
BOX TEMP:	n/a	35.0
PMT TEMP:	n/a	8.4
IZS TEMP:	n/a	45.0
Converter Temp:	n/a	314.5
PRES:	n/a	20.7
SAMP FL:	n/a	535
UV LAMP:	n/a	3354.4
LAMP RATIO:	n/a	100.0
STR. LGT	n/a	16.0
DRK PMT:	n/a	35.7
DRK LMP:	n/a	-1.8
Expected Value:	n/a	49.3

Comments:

The analyzer sample inlet filter was changed.

Post-repair calibration completed after annual maintenance.

H2S[ppb] Station: LICA Bonnyville Daily: 2017/03/04 Type: AVG 1 Min. [1 Min.]



TOTAL HYDROCARBON

Thermo 55i Methane/Non-Methane Analyzer Calibration

Date:	March 3, 2017	**Barometric Pressure:**	27.74 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	21
Location/Station Name:	Bonnyville - AER	**Weather Conditions:**	Mainly sunny
Parameter:	CH_4 / NMHC / THC	**Calibration Purpose:**	routine monthly
Start/End Time 24 hr. (mst):	11:30 / 15:45	**Performed By/Reviewer:**	Limin Li / Trina Whitsitt
Calibration Method:	Gas Dilution	**Cal Gas Expiry Date:**	December 25, 2023

Analyzer:

ID# or Serial Number:	1236656107
Measured Flow:	1.15 lpm
Last Calibration Date:	February 9, 2017
Range ppm:	20 CH4/20 NMHC/40 THC

Correction Factors:

	Previous C.F.:	As Found C.F.:	New C.F.:
CH_4 =	1.001	0.988	1.000
NMHC =	1.000	0.989	1.000
THC =	1.000	0.989	1.000

Calibrator:

Flow Meter ID's:	n/a		
Make & Model:	Environics 2000		
Serial #:	1991		
Cal Gas Cylinder I.D. # :	LL165372		
CH4 Cylinder Conc.=	606.0	212.0	**=C_3H_8 Cylinder Conc.**
CH_4 as C_3H_8=	583.0	1189.0	**=total CH_4 equivilant**

Standard Calibration Points for Analyzer Range of 20/20/40 ppm

Point	CH4	NMHC	THC
High	**13.00**	**13.00**	**26.00**
Mid	**7.00**	**7.00**	**14.00**
Low	**3.00**	**3.00**	**6.00**

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

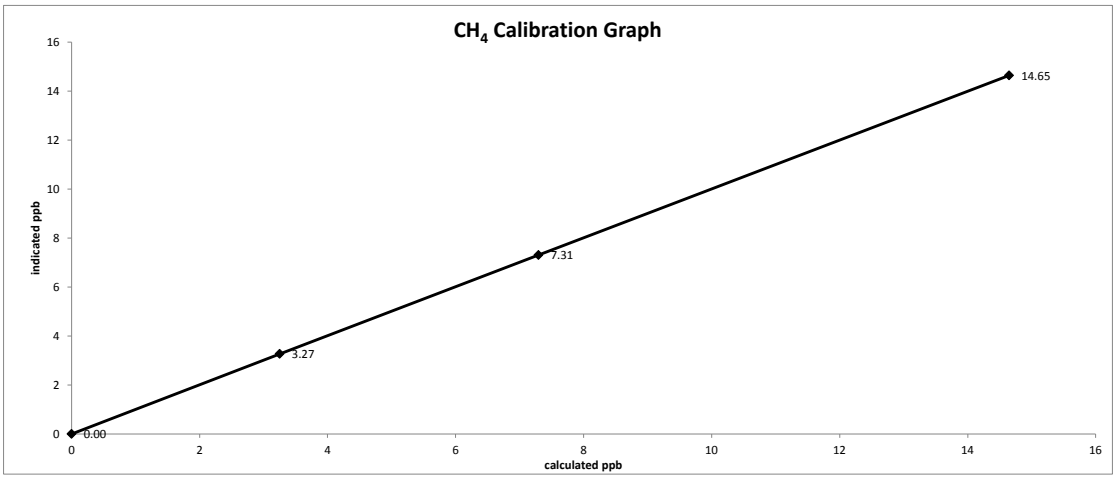
Calibrator Flow Rates (cc/min)				Calculated CH_4 (ppm)	Calculated NMHC (ppm)	Calculated THC (ppm)	Indicated CH_4 (ppm)	Indicated NMHC (ppm)	Indicated THC (ppm)	Correction Factors:		
Point	**Diluent**	**Cal Gas**	**Total Flow**							**CH_4**	**NMHC**	**THC**
as found zero	2503	0.00	2503	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
as found high	2503	62.00	2565	14.65	14.09	28.74	14.82	14.25	29.07	0.988	0.989	0.989
adjusted zero	2503	0.00	2503	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
adjusted high	2503	62.00	2565	14.65	14.09	28.74	14.65	14.09	28.74	1.000	1.000	1.000
mid	2503	30.50	2534	7.30	7.02	14.31	7.31	7.02	14.33	0.998	1.000	0.999
low	2503	13.50	2517	3.25	3.13	6.38	3.27	3.16	6.43	0.994	0.990	0.992
calibrator zero	2503	0.00	2503	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
									Average C.F.=	0.997	0.997	0.997

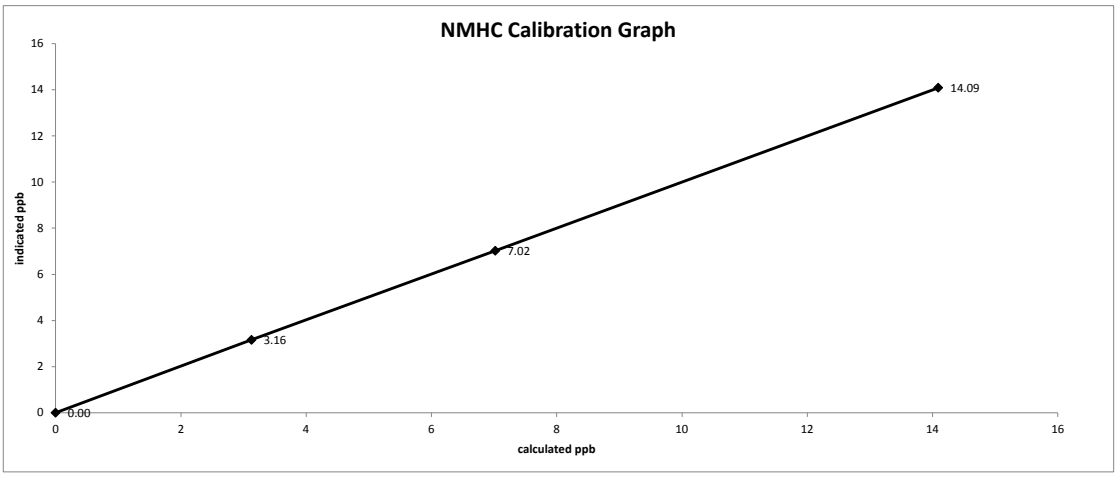
Linear Regression/Calibration Results:

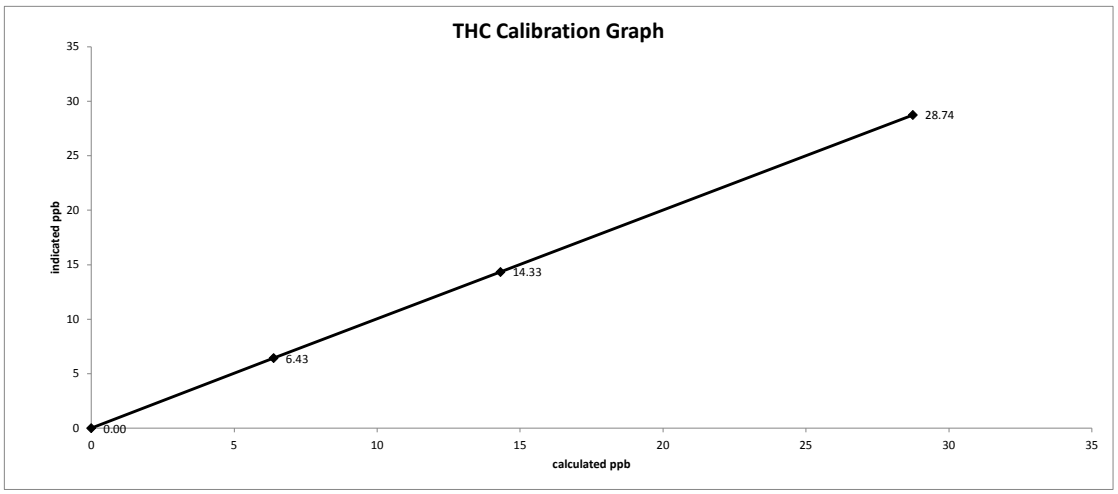
	CH_4	NMHC	THC	LIMITS
Correlation Coeffecient =	**1.000**	**1.000**	**1.000**	**> or = 0.995**
Slope =	**1.000**	**0.999**	**0.999**	**.95-1.05**
b (Intercept as % of full scale)=	**0.05%**	**0.07%**	**0.06%**	**± 3% F.S.**
% change in C.F. from last cal=	**1.26%**	**1.11%**	**1.14%**	**± 10%**

		As found:				**As left:**
Interface Board Voltages:	Bias Supply:	-292.8		Calibration History cnt'd:	NM Peak Area:	86981
Temperatures:	Detector Oven:	175.0		Crucial Settings:	Methane Start:	8
	Filter:	175.0			Methane End:	16
	Column Oven:	75.2			Backflush:	18
	Internal:	31.9			NMHV Start:	24.5
Cylinder Pressures/reg.:	Carrier:	1400	50		NMHC End:	56
	Fuel:	1450	55	Run History>1:	Date:	03MAR17
	Span Gas:	1050	22		Time:	09:28
	Zero Air Generator:	55			CH_4 PK HT:	3450
Internal Pressures:	Carrier:	31.1			CH_4 RT:	13.2
	Fuel:	40.3			CH_4 Baseline:	2451
	Air:	32.1			CH_4 LOD:	52
FID Status:	Status:	LIT			CH_4 SD:	17
	Counts:	28049			CH_4 CONC:	2.57
	Flame:	370.1			NM PK HT:	20
	Det Base:	175			NM Peak Area:	338
Flame and Power Stats:	Last Power On:	August 3, 2016			NM CONC:	0.05
	Flameouts:	3			NM Base Start:	2372
	Det Oven at Start:	169.0			NM Base End:	2388
	Col Oven at Start:	74.5			NM LOD:	12
Calibration History:	Time:	09FEB17 12:09			NM Start IDX:	30
	Type:	SPAN			NM End IDX:	64
	Status:	GOOD			NM Max Slope:	1.6e+00
	Check/Adjust:	ADJUST			NM Min Slope:	-1.4e+00
	CH_4 Span Conc:	13.62			NM PT Count:	28
	CH_4 SP Ratio:	0.000744		Expected Values:	Previous CH4:	9.01
	CH_4 RT:	13.2			Previous NMHC	13.93
	CH_4 PK IDX:	26			Previous THC:	22.97
	CH_4 PK HT:	18312			New CH4:	9.34
	NM Span Conc:	13.11			New NMHC	13.77
	NM SP Ratio:	0.000151			New THC:	23.13

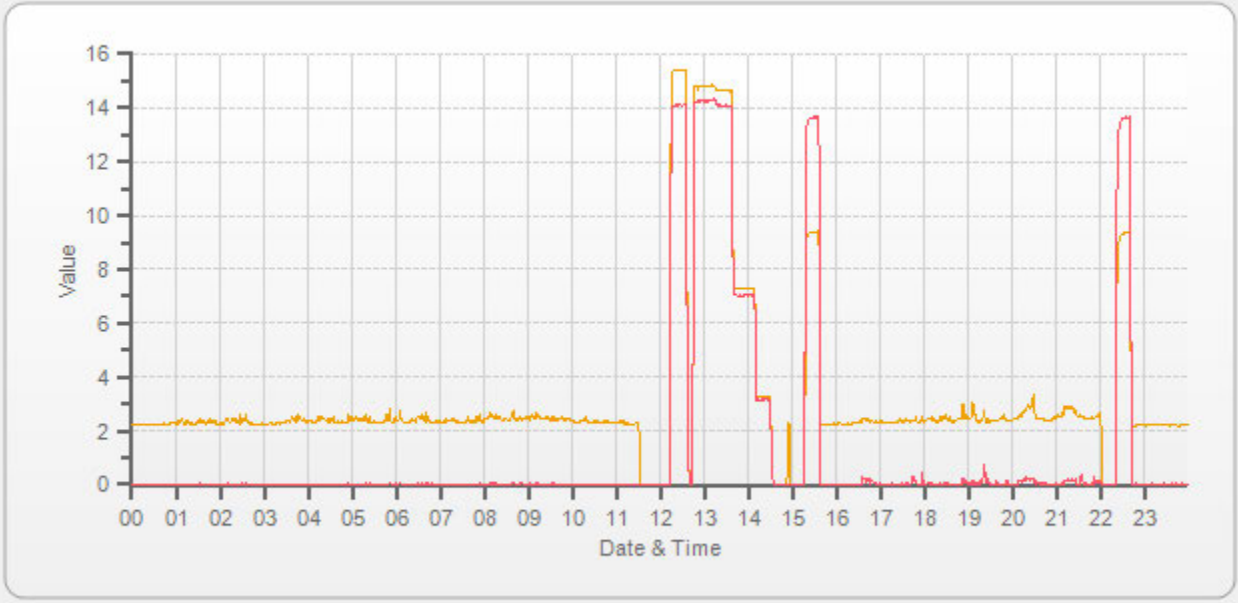
Date:	**March 3, 2017**	**Start/End Time 24 hr. (mst):**	**11:30 / 15:45**
Company/Airshed:	**LICA**	**Calibration Purpose:**	**routine monthly**
Location/Station Name:	**Bonnyville - AER**	**Calibration Method:**	**Gas Dilution**







Station: LICA Bonnyville Daily: 2017/03/03 Type: AVG 1 Min. [1 Min.]



NITROGEN DIOXIDE

API 200E NO-NO2-NOx Analyzer Calibration

Date:	March 3, 2017	**Barometric Pressure:**	27.74 inHg
Company/Airshed:	LICA	**Station Temperature °C:**	21
Location/Station Name:	Bonnyville - AER	**Weather Conditions:**	Mainly sunny
Start/End Time 24 hr. (mst):	09:10 / 15:30	**Calibration Purpose:**	routine monthly
G.P.T. to be used for Ozone?	Yes with 1000 ppb NOx full scale	**Performed By/Reviewer:**	Limin Li / Trina Whitsitt
Calibration Method:	Gas Dilution & Gas Phase Titration	**Cal Gas Expiry Date:**	December 25, 2018

Analyzer:

ID# or Serial Number:	593
Last Calibration Date:	February 24, 2017
Range ppb:	1000

Correction Factors:

	Previous C.F.:	As Found C.F.:	New C.F.:
NO =	1.001	1.032	1.000
NO_2 =	1.000	0.994	1.002
NOx =	1.001	1.031	1.000

Calibrator:

Flow Meter ID's:	n/a	
Make & Model:	Sabio 2010	
Serial #:	17200415	
Cal Gas Cylinder I.D. # :	BLM002756T	
NO/NOx Gas Conc. (ppm):	50.7	50.7

Standard Calibration Points for a Range of: 1000 ppb

Point	Target NO (ppb)	Target NO_2 (ppb)	Cc Ozone ?
High	610	375	<--high ozone
Mid	380	190	<--mid ozone
Low	190	70	<--low ozone
Extra Point #1	n/a	n/a	n/a
Extra Point #2	n/a	n/a	n/a

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

Calibrator Flow Rates (cc/min)				Calculated NO	Calculated NOx	Indicated NO	Indicated NOx	NO C.F.	NOx C.F.
Point	**Diluent**	**Cal Gas**	**Total Flow**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**		
as found zero	5028	0.0	5028	0	0	0.4	0.6	n/a	n/a
as found high	4951	77.1	5028	777.4	777.4	754.0	755.0	1.032	1.031
adjusted zero	5028	0.00	5028	0.0	0.0	0.1	-0.2	n/a	n/a
adjusted high	4951	77.10	5028	777.4	777.4	777.4	777.4	1.000	1.000
mid	4991	37.70	5029	380.1	380.1	380.0	380.0	1.001	1.000
low	5009	19.00	5028	191.6	191.6	191.0	191.0	1.004	1.002
calibrator zero	5028	0.00	5028	0	0	0.2	-0.6	n/a	n/a
							Average C.F.=	1.001	1.001

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO_2	NO drop	NO_2 gain	NO_2 C.F.
Point	**Diluent**	**Cal Gas**	**Total Flow**	**volts or ppb**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**	**(ppb)**
NOx reference	4953	77.10	5030	0.0	779.0	779.0	0.0	0.1	0.0	
as found high NO2	4953	77.10	5030	510.0	266.0	782.0	516.0	513.0	516.0	0.994
adjusted high NO2	4953	77.10	5030	510.0	266.0	778.0	512.0	513.0	512.0	1.002
gpt mid	4953	77.10	5030	275.0	508.0	779.0	271.0	271.0	271.0	1.000
gpt low	4953	77.10	5030	100.0	684.0	778.0	94.0	95.0	94.0	1.011
								Average NO_2 C.F.=		1.004

Linear Regression/Calibration Results:

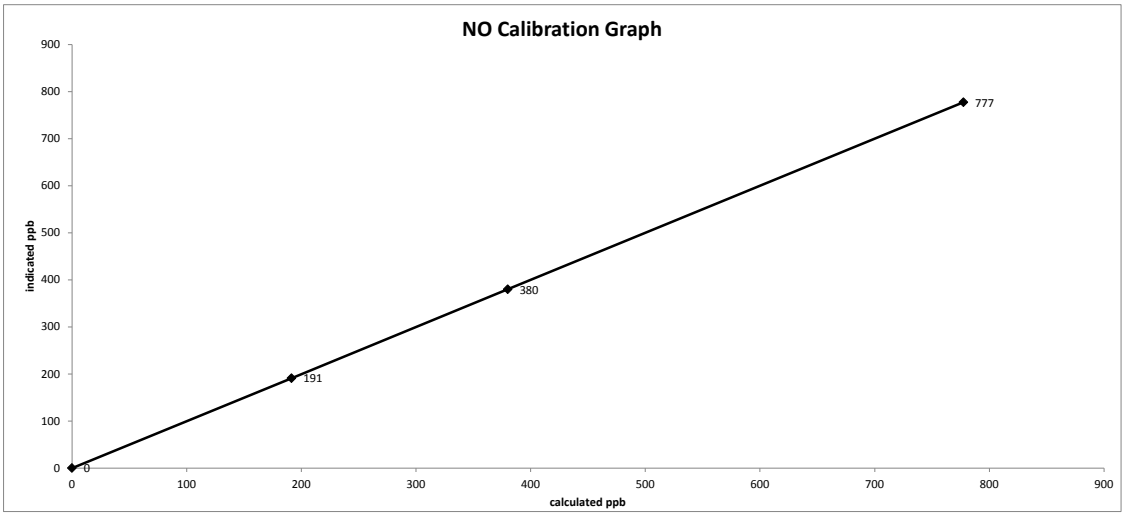
	NO	NOx	NO_2	LIMITS
Correlation Coeffecient =	**1.000**	**1.000**	**1.000**	**> or = 0.995**
Slope =	**1.000**	**1.000**	**1.001**	**.95-1.05**
b (Intercept as % of full scale)=	**-0.02%**	**-0.04%**	**-0.03%**	**± 3% F.S.**
% change in C.F. from last cal=	**-3.06%**	**-2.95%**	**0.58%**	**± 10%**
NO2 converter effeciency			**1.00**	**0.96 to 1.04**

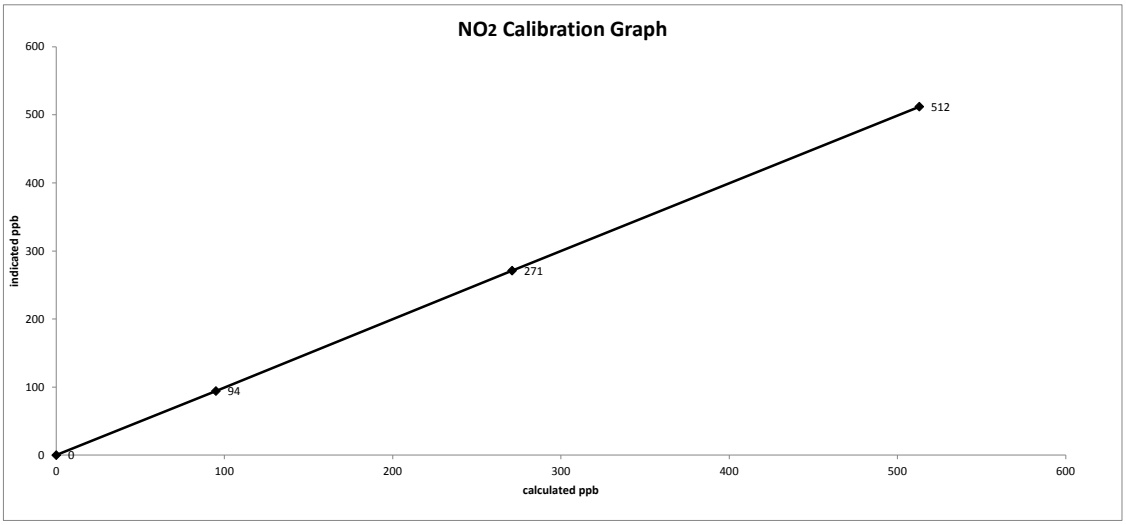
As found:		**As left:**	
NOx SLOPE:	0.853	NOx SLOPE:	0.881
NOx OFFS:	-0.9	NOx OFFS:	0.5
NO SLOPE:	0.856	NO SLOPE:	0.882
NO OFFS:	-2.1	NO OFFS:	-1.6
SAMP FLW:	472	SAMP FLW:	467
OZONE FL:	76	OZONE FL:	76
PMT:	91.1	PMT:	17.6
NORM PMT:	53.6	NORM PMT:	6.3
AZERO:	9.5	AZERO:	10.6
HVPS:	670	HVPS:	670
RCELL TEMP:	50	RCELL TEMP:	50.0
BOX TEMP:	31.2	BOX TEMP:	32.1
PMT TEMP:	6.7	PMT TEMP:	6.7
IZS TEMP:	45.2	IZS TEMP:	45.1
MOLY TEMP:	315.8	MOLY TEMP:	316
RCEL:	5.3	RCEL:	5.3
SAMP:	26.6	SAMP:	26.6
Expected Value NO:	8.6	Expected Value NO:	7.9
Expected Value NO2:	415.0	Expected Value NO2:	421.0
Expected Value NOx:	423.0	Expected Value NOx:	428.7

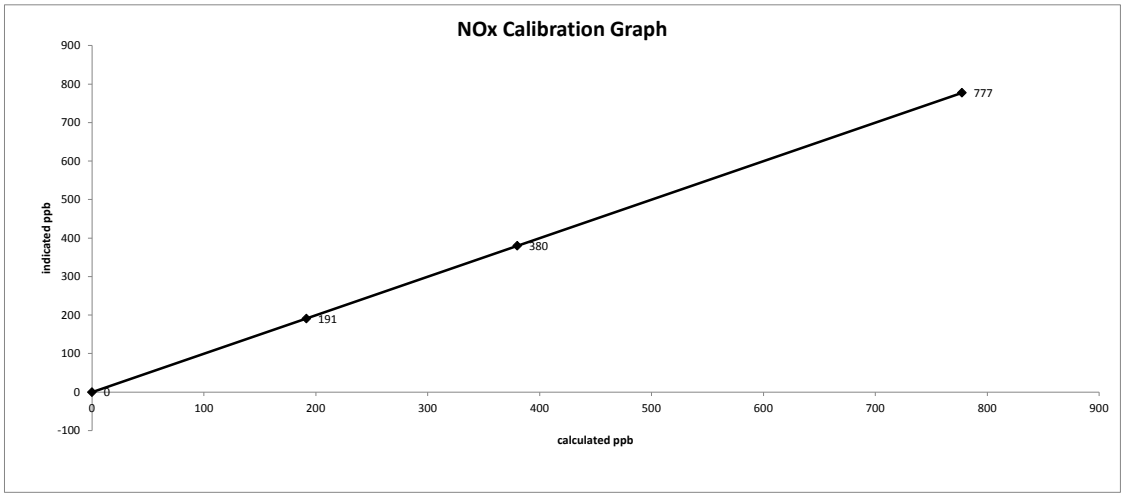
Comments:

The analyzer sample inlet filter was changed.

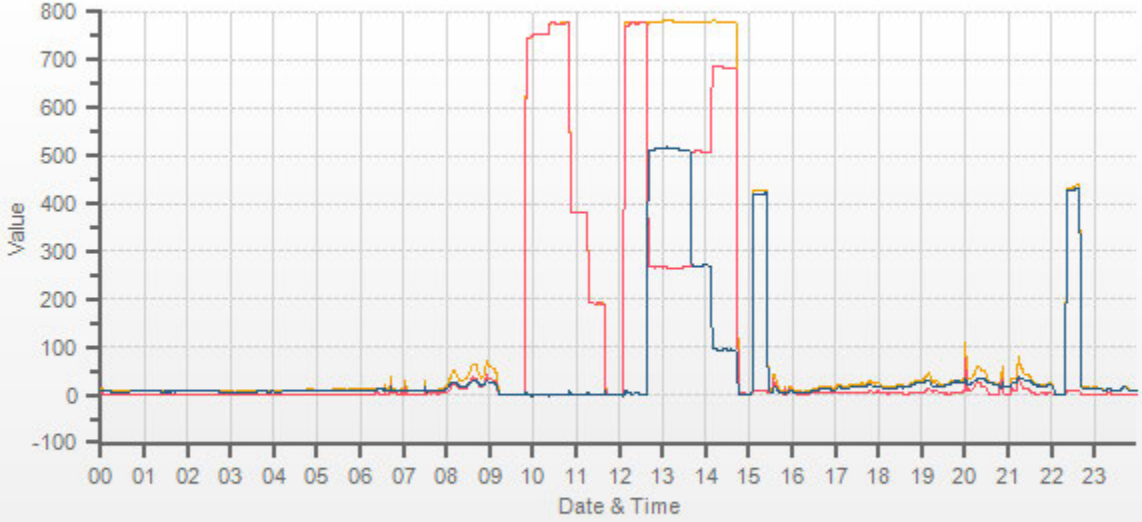
Date:	March 3, 2017	Start/End Time 24 hr. (mst):	09:10 / 15:30
Company/Airshed:	LICA	Calibration Purpose:	routine monthly
Location/Station Name:	Bonnyville - AER	Calibration Method:	Gas Dilution & Gas Phase Titration







Station: LICA Bonnyville Daily: 2017/03/03 Type: AVG 1 Min. [1 Min.]



OZONE

Thermo 49i Ozone Analyzer Calibration

Date:	March 4, 2017	**Barometric Pressure:**	0.921 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Bonnyville	**Weather Conditions:**	Mainly cloudy with snow
Start/End Time 24 hr. (mst):	9:17 / 11:12	**Calibration Purpose:**	shut down
Ozone Calibration Method:	Varying UV Lamp Power	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
G.P.T. Date:	n/a-done by Varying UV Lamp Power	**Cal Gas Expiry Date:**	n/a

Analyzer:

ID# or Serial Number:	1002240372	**Ozone Range ppb:**	500
Last Calibration Date:	February 9, 2017	**As Found C.F.:**	0.999
Previous Cal High Point C.F.:	1.000	**New C.F.:**	n/a

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

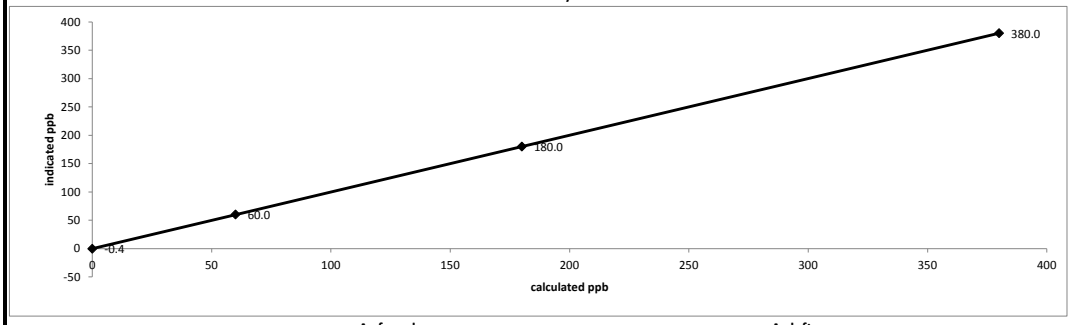
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Conentration:	Indicated Concentration:	Correction Factors:
Point	**Total Flow @ Point Start**	**Total Flow @ Point Finish**	**(ppb)**	**(ppb)**	**(ppb)**	
as found zero	5000	5000	0.0	n/a	-0.4	n/a
as found high	5000	5000	380.0	380.0	380.0	0.999
mid	5000	5000	180.0	180.0	180.0	0.998
low	5000	5000	60.0	60.0	60.0	0.993
					Average C.F.=	0.997

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**0.999**	**0.90-1.10**
b (Intercept as % of full scale)=	**0.04%**	**± 3% F.S.**
% change in C.F. from last cal=	**0.11%**	**± 10%**

Thermo 49i Ozone Analyzer Calibration



As found:		As left:	
O3 Bkg:	-0.1	O3 Bkg:	n/a
O3 Coef:	0.984	O3 Coef:	n/a
Photo Lamp	14.2	Photo Lamp	n/a
O3 Lamp	5.8	O3 Lamp	n/a
Bench:	28.9	Bench:	n/a
Bench Lamp:	54.0	Bench Lamp:	n/a
O3 Lamp:	68.1	O3 Lamp:	n/a
Pressure:	695.9	Pressure:	n/a
Cell A lpm:	0.734	Cell A lpm:	n/a
Cell B lpm:	0.746	Cell B lpm:	n/a
O3 ppb:	-0.2	O3 ppb:	n/a
Cell A ppb:	1.8	Cell A ppb:	n/a
Cell B ppb:	-2.1	Cell B ppb:	n/a
Cell A int:	79343	Cell A int:	n/a
Expected Value:	303.0	Expected Value:	n/a

Comments:

Shutdown calibration completed to perform annual maintenance. No ZERO adjustment made. No High Point adjustment made.

Thermo 49i Ozone Analyzer Calibration

Date:	March 4, 2017	**Barometric Pressure:**	0.921 atm
Company/Airshed:	LICA	**Station Temperature °C:**	22
Location/Station Name:	Bonnyville	**Weather Conditions:**	Mainly cloudy with snow
Start/End Time 24 hr. (mst):	12:45 / 16:43	**Calibration Purpose:**	post repair
Ozone Calibration Method:	Varying UV Lamp Power	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
G.P.T. Date:	n/a-done by Varying UV Lamp Power	**Cal Gas Expiry Date:**	n/a

Analyzer:

ID# or Serial Number:	1002240372	**Ozone Range ppb:**	500
Last Calibration Date:	n/a	**As Found C.F.:**	n/a
Previous Cal High Point C.F.:	n/a	**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

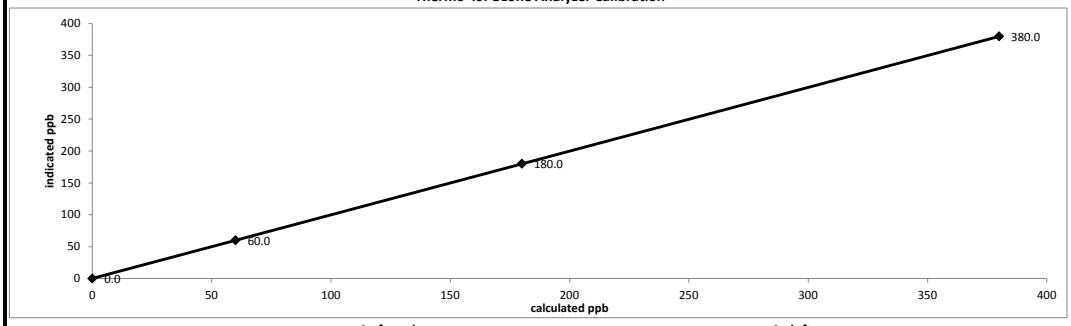
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Conentration:	Indicated Concentration:	Correction Factors:
Point	**Total Flow @ Point Start**	**Total Flow @ Point Finish**	**(ppb)**	**(ppb)**	**(ppb)**	
adjusted zero	5000	5000	0.0	n/a	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	180.0	180.0	181.0	0.994
low	5000	5000	60.0	60.0	61.0	0.984
calibrator zero	5000	5000	0.0	0.0	0.0	n/a
					Average C.F.=	0.993

Linear Regression/Calibration Results:

		LIMITS
Correlation Coeffecient =	**1.000**	**> or = 0.995**
Slope =	**1.000**	**.95-1.05**
b (Intercept as % of full scale)=	**0.00%**	**± 3% F.S.**
% change in C.F. from last cal=	**n/a**	**± 10%**

Thermo 49i Ozone Analyzer Calibration



As found:		As left:	
O3 Bkg:	n/a	O3 Bkg:	-0.2
O3 Coef:	n/a	O3 Coef:	1.000
Photo Lamp	n/a	Photo Lamp	14.2
O3 Lamp	n/a	O3 Lamp	5.8
Bench:	n/a	Bench:	27.7
Bench Lamp:	n/a	Bench Lamp:	54.0
O3 Lamp:	n/a	O3 Lamp:	68.1
Pressure:	n/a	Pressure:	700.0
Cell A lpm:	n/a	Cell A lpm:	0.754
Cell B lpm:	n/a	Cell B lpm:	0.766
O3 ppb:	n/a	O3 ppb:	0.0
Cell A ppb:	n/a	Cell A ppb:	1.9
Cell B ppb:	n/a	Cell B ppb:	-1.9
Cell A int:	n/a	Cell A int:	82069
Expected Value:	n/a	Expected Value:	282.0

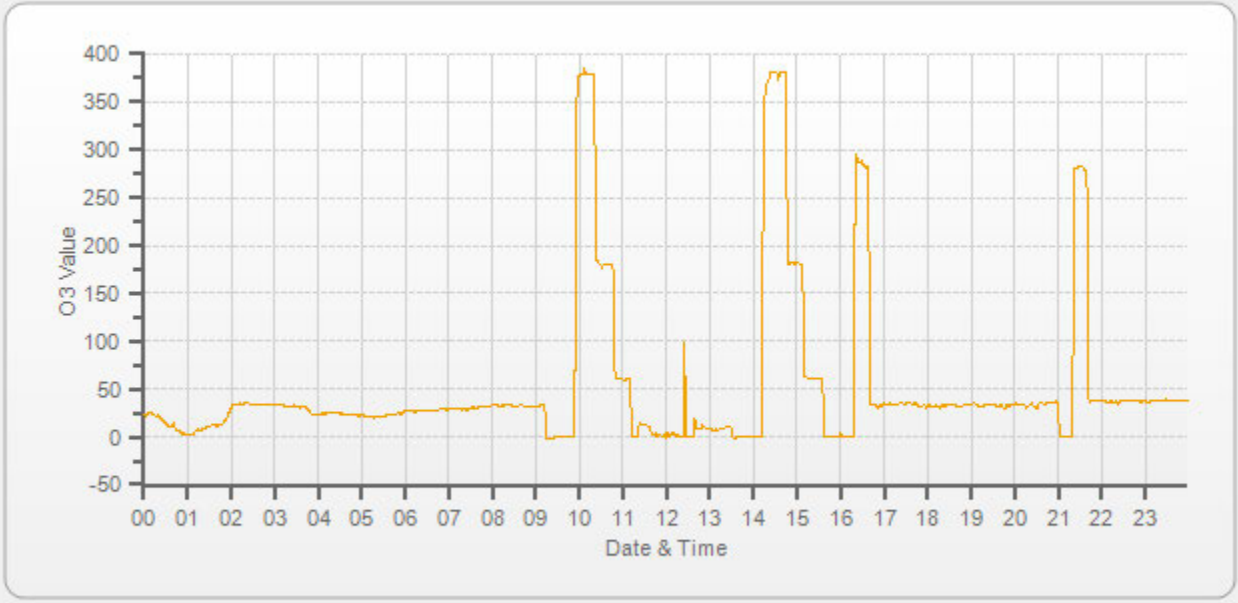
Comments:

The analyzer sample inlet filter was changed.

The analyzer cooling fan filter(s) were cleaned.

Post-repair calibration completed after annual maintenance. The Optical Cell A and B was cleaned and the sample pump was rebuilt.

O3[ppb] Station: LICA Bonnyville Daily: 2017/03/04 Type: AVG 1 Min. [1 Min.]



PARTICULATE MATTER

R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date:	March 3, 2017	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
Company:	LICA	**Start Time (mst):**	13:55
Station Name/Location:	Bonnyville - AER	**End Time (mst):**	16:21
Previous Audit Date:	February 21, 2017	**Calibration Purpose:**	Bi-monthly #1
Parameter:	PM 2.5	**Weather Conditions:**	Mainly sunny

1400A Information and Status:

ID# or Serial Number:	1405A207691003	**As Found Filter Loading %:**	27.36
Ko Factor:	15635	**As Left Filter Loading %:**	16.95
Ambient Temperature °C:	3.74	**As Found Noise:**	0.004
Ambient Pressure atm:	0.919	**As Left Noise:**	0.000
Main Flow Reading lpm:	3.00	**Pump Vacuum:**	0.30
Aux Flow Reading lpm:	13.67	**Warnings:**	None

Reference Standards:

	Flow:	**Pressure:**	**Temperature:**
Make:	Dwyer	Fisher	FLUKE
Model:	475 Mark III	FB1291	1551A Ex STIK
Serial Number:	#3	#05544	2329070
Calibration Date:	January 1, 2017	December 5, 2016	November 15, 2016

As found leak check:

		Base	**Zero**	**Reference**	**Zero**
PM 2.5 Flow	actual	0.00	0.07	0.00	0.07
	limit	0.15		0.15	
Bypass Flow	actual	0.00	-0.31	0.00	-0.31
	limit	0.60		0.60	

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

		Base	**Zero**	**Reference**	**Zero**
PM 2.5 Flow	actual	0.00	0.07	0.00	0.07
	limit	0.15		0.15	
Bypass Flow	actual	0.00	-0.31	0.00	-0.31
	limit	0.60		0.60	

As found temperature and pressure:

	tolerance +/- 2.0°C		**tolerance +/- 0.01 atm**
1405F temperature °C:	3.7	**1405F pressure atm:**	0.919
reference temperature °C:	3.5	**reference pressure:**	0.919
difference °C:	-0.3	**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:	3.5	**1405F pressure atm:**	0.919
reference temperature °C:	3.5	**reference pressure:**	0.919
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:	2.99	**reference total/aux flow lpm:**	16.23
difference lpm:	-0.01	**difference lpm:**	-0.44

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:	2.99	**reference total/aux flow lpm:**	16.23
difference lpm:	-0.01	**difference lpm:**	-0.44

K_o Audit:

Last K_o audit date:	February 6, 2017
1405F K_o factor:	15635
Measured K_o factor:	15808.3000
% difference:	1.11

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.

The total and by-pass flows were measured and the main flow was calculated.

R & P 1405F TEOM PM 2.5 Analyzer Calibration

Date:	March 28, 2017	**Performed By/Reviewer:**	Alex Yakupov / Trina Whitsitt
Company:	LICA	**Start Time (mst):**	13:39
Station Name/Location:	Bonnyville - AER	**End Time (mst):**	14:29
Previous Audit Date:	March 3, 2017	**Calibration Purpose:**	Bi-monthly #2
Parameter:	PM 2.5	**Weather Conditions:**	Fog

1400A Information and Status:

ID# or Serial Number:	1405A207691003	**As Found Filter Loading %:**	25.93
Ko Factor:	15635	**As Left Filter Loading %:**	26.11
Ambient Temperature °C:	5.08	**As Found Noise:**	0.004
Ambient Pressure atm:	0.930	**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:

	Flow:	**Pressure:**	**Temperature:**
Make:	Dwyer	Fisher	FLUKE
Model:	475 Mark III	FB1291	1551A Ex STIK
Serial Number:	#3	#05544	4295
Calibration Date:	January 1, 2017	December 5, 2016	November 15, 2016

As found leak check:

		Base	**Zero**	**Reference**	**Zero**
PM 2.5 Flow	actual	0.00	0.07	0.00	0.07
	limit	0.15		0.15	
Bypass Flow	actual	0.00	-0.31	0.00	-0.31
	limit	0.60		0.60	

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

		Base	**Zero**	**Reference**	**Zero**
PM 2.5 Flow	actual	0.00	0.07	0.00	0.07
	limit	0.15		0.15	
Bypass Flow	actual	0.00	-0.31	0.00	-0.31
	limit	0.60		0.60	

As found temperature and pressure:

	tolerance +/- 2.0°C		**tolerance +/- 0.01 atm**
1405F temperature °C:	5.1	**1405F pressure atm:**	0.930
reference temperature °C:	6.7	**reference pressure:**	0.932
difference °C:	1.7	**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:	6.7	**1405F pressure atm:**	0.932
reference temperature °C:	6.7	**reference pressure:**	0.932
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:	2.96	**reference total/aux flow lpm:**	16.09
difference lpm:	-0.04	**difference lpm:**	-0.58

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:	2.96	**reference total/aux flow lpm:**	16.09
difference lpm:	-0.04	**difference lpm:**	-0.58

K_o Audit:

Last K_o audit date:	February 6, 2017
1405F K_o factor:	15635
Measured K_o factor:	15808.3000
% difference:	1.11

Comments:

The TEOM intake head and associated sharp cut components were cleaned.

The 47 mm FDMS filter was changed.

The total and by-pass flows were measured and the main flow was calculated.

WIND SYSTEM

Meteorological Sensor Audit

Station Information

Company:	LICA	Performed By:	Limin Li
Location:	Bonnyville (in Calgary shop)	Reason:	Annual maintenance
Audit Date:	26-Jan-16	Start Time (mst):	11:00
Previous Audit Date:	NA	End Time (mst):	15:00

Wind Speed

Sensor make:	R. M. Young	Sensor height:	n/a
Sensor model:	5103VK	Serial Number:	56589
Calibrator:	Young 18802	Variable speed motor:	CA 03309
Voltage range:	0-1	Output signal range:	200KPH

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:	R. M. Young	Sensor height:	n/a
Sensor model:	5103VK	Serial Number:	56589
Calibrator:	Young 18802	Variable speed motor:	CA 03309
Voltage range:	0-1	Output signal range:	0-360DEG

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

Meteorological Sensor Audit/Calibration

Location Information

Company:	LICA	**Performed By:**	Alex Yakupov
Audit Location:	Bonnyville - AER	**Reviewed By:**	Trina Whitsitt
Audit Date:	March 3, 2017	**Start /EndTime (mst):**	10:11 / 13:14

Wind Sensor Information

Sensor ID Data:		**Sensor Outputs:**	
Sensor Make:	R.M. Young	**Velocity Voltage Output Range:**	0-1
Sensor Model:	5103 VK	**Velocity Unit Output Range:**	0-200
Serial #:	56589	**Direction Voltage Output Range:**	0-1
Previous Cal/Audit Date:	January 26, 2016	**Direction Unit Output Range:**	0-360

Wind Calibrator Information

Calibrator Make/ Model:	RM Young / Model 18802	**Serial #:**	CA 03309
Maxxam Unit ID #:	13-3357	**Certification Date:**	October 6, 2016

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

RPM	Wind Speed Generated kph	Clockwise Wind Speed kph	Counter Clockwise Wind Speed kph	Correction Factor
0	0	0.0	0.0	-
1000	17.6	17.7	17.6	0.998
2000	35.3	35.3	35.3	0.999
3000	52.9	53.0	53.0	0.999
4000	70.6	70.6	70.7	0.999
5000	88.2	88.3	88.4	0.998
6000	105.8	106.0	106.0	0.998
7000	123.5	123.6	123.7	0.999
8000	141.1	141.3	141.4	0.998
9000	158.8	159.0	159.1	0.998
10000	176.4	176.7	176.7	0.998
		The audit meets AMD requirements.	**Average Correction Factor=**	**0.998**

Wind Direction Audit Data **+/- 5° of the absolute average degrees difference for all points is the limit**

Generated Wind Direction 0-360 (Up)	Generated Wind Direction 360-0 (Down)	Indicated Wind Direction 0-360 (Up)	Indicated Wind Direction 360-0 (Down)	Degrees Difference 0-360 (Up)	Degrees Difference 360-0 (Down)	Average Absolute Degrees Difference
0	355	0	354	0.2	1.3	0.8
30	330	30	329	-0.4	0.9	0.6
60	300	60	300	-0.4	0.3	0.4
90	270	91	271	-0.8	-0.6	0.7
120	240	120	240	0.3	0.4	0.4
150	210	149	210	0.7	-0.3	0.5
180	180	180	181	0.5	-0.9	0.7
210	150	209	150	1.1	-0.2	0.6
240	120	239	121	1.4	-0.5	1.0
270	90	269	90	1.5	-0.2	0.9
300	60	296	60	3.6	0.0	1.8
330	30	325	30	4.7	0.0	2.4
355	0	352	0	3.2	0.2	1.7
The audit meets AMD requirements.			**Average Absolute Degrees Difference=**			**1.0**

Comments:

CALIBRATORS

aemera.org

Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2016-076A

Company Maxxam **Operator:** Christopher Wesson

Calibrator:		**Flow Measurement Device:**	
Make/Model	Sabio 2010	Make/Model	N/A
Serial Number	17200415	Serial Number	N/A
Last Verification Date	May 2015	Temperature (°C)	N/A
NO Cylinder S/N	LL42475	Barometric Pressure	N/A
NO/NOX Concentration	48.5/48.5		

Dilution Flow (sccm)

Pt. #1 5000 Pt. #2 5000 Pt. #3 5000

Gas Flow (sccm)

Pt. #1 80 Pt. #2 40 Pt. #3 20

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO_2	NOx	NO	NOx
5029	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
5030	80.6	0.777	0.777	0.805	-0.005	0.800	4%	3%
5025	39.4	0.380	0.380	0.394	-0.002	0.392	4%	3%
5028	19.8	0.191	0.191	0.198	-0.001	0.197	4%	3%
						Absolute Average Percent Difference	3.65%	3.09%

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

NO		**LIMITS**	**NOx**	
Correlation=	1.0000	**≥ 0.990**	Correlation=	1.0000
m (Slope)=	1.0360	**0.90-1.10**	m (Slope)=	1.0295
b (Intercept % of FS)=	0.0110	**± 3% F.S.**	b (Intercept % of FS)=	0.0293

Flow	O_3 Conc	NO Decrease	NO	NO2	NOX	% Diff. Vs Audit gas	
5030	Lamp C.	0.000	0.804	-0.004	0.800	NO_2	% Diff. Limit
5030	1.388	0.495	0.309	0.491	0.800	0%	± 10%
5030	0.745	0.241	0.563	0.239	0.802	1%	± 10%
5030	0.367	0.091	0.713	0.089	0.801	2%	± 10%
					Absolute Average Percent Difference	1%	± 10%

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

NO_2		**LIMITS**
Correlation=	1.0000	**≥ 0.995**
m (Slope)=	0.9988	**0.90-1.10**
b (Intercept % of FS)=	-0.2760	**± 3% F.S.**

AENV Standards **Audit Calibrator**		**NO_X Analyzer**	
Make/Model	Teco 146i	Make/Model	Teco 42i
Serial/AMU Number	AMU 1809	Serial/AMU Number	AMU 1868
		Last Calibration Date	May 18, 2016
		Full Scale (ppm)	1.0

COMMENTS: Contains 50.3 ppm SO2. Flows not measured as per Chapter 7, Section 5 of AMD.

Auditor: Al Clark Date: May 18, 2016

Operator Signature: Location: McIntyre Center Edmonton

Alberta Government

Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2016-442A

Company Maxxam/SIA **Operator:** Chris

Calibrator:			
Make/Model	API 700		
Serial Number	627		
Last Verification Date	February 3, 2016		
NO Cylinder S/N	EY0000597		
NO [PPM]	49.0	NOx [PPM]	49.0
Expiry Date	December 8, 2019		

Flow Measurement Device:	
Make/Model	Definer 530
Serial Number	H-148944, L-152019
Temperature (°C)	23.5
Barometric Pressure	707.1 mmHg

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

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO_2	NOx	NO	NOx
	0.0	0.0000	0.0000	0.0000	-0.0004	-0.0004	Limit ± 10%	
4972	79.7	0.7855	0.7855	0.7883	0.0004	0.7887	0.4%	0.5%
4936	38.8	0.3822	0.3822	0.3816	0.0005	0.3822	-0.2%	0.1%
4970	19.4	0.1913	0.1913	0.1902	0.0006	0.1913	-0.6%	0.2%
						Absolute Average Percent Difference	0.1%	0.3%

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

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

Flow	O_3 Conc	NO Decrease	NO	NO2	NOX	% Diff. Vs Audit gas	
4972	0	0.0000	0.7867	0.0014	0.7881	NO_2	% Diff. Limit
4972	500	0.5127	0.2740	0.5104	0.7849	-0.7%	± 10%
4972	275	0.2863	0.5004	0.2860	0.7865	-0.6%	± 10%
4972	90	0.0940	0.6927	0.0954	0.7880	0.0%	± 10%
					Absolute Average Percent Difference	0%	± 10%

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

NO_2		**LIMITS**
Correlation=	1.0000	**≥ 0.995**
m (Slope)=	0.9924	**0.90-1.10**
b (Intercept % of FS)=	0.1755	**± 3% F.S.**

AENV Standards **Audit Calibrator**	
Make/Model	Thermo 146i
Serial/AMU Number	AMU1809
SRM Gas Cylinder No.	CAL018140
Cylinder Conc. (ppm)	48.79

NO_X Analyzer	
Make/Model	Thermo 42i
Serial/AMU Number	AMU 1868
Last Calibration Date	January 25, 2017
Full Scale (ppm)	1.0
Cylinder Gas Expiry Date	March 25, 2019

COMMENTS:

Auditor: Shea Beaton Date: January 27, 2017

Operator Signature: Location: McIntyre Center Edmonton

Alberta Government

Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2016-527A

Company Maxxam **Operator:** Mike

Calibrator:				**Flow Measurement Device:**	
Make/Model	Environics 2000			Make/Model	Bios Defender 530
Serial Number	1991			Serial Number	Hi148944 Lo 152019
Last Verification Date	March 31, 2016			Temperature (°C)	24.5
NO Cylinder S/N	EY0000597			Barometric Pressure	699
NO [PPM]	49.0	NOx [PPM]	49.0		
Expiry Date	December 8, 2019				

Dilution Flow (sccm)

Pt. #1 4902 Pt. #2 4935 Pt. #3 4957

Gas Flow (sccm)

Pt. #1 79.3 Pt. #2 38.7 Pt. #3 19.4

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO_2	NOx	NO	NOx
4976	0.0	0.0000	0.0000	0.0001	0.0000	0.0001	Limit ± 10%	
4981	79.3	0.7801	0.7801	0.7898	0.0000	0.7898	1%	1%
4972	38.7	0.3814	0.3814	0.3841	0.0002	0.3843	1%	1%
4976	19.4	0.1910	0.1910	0.1913	0.0003	0.1916	0%	0%
					Absolute Average Percent Difference		1%	1%

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

NO		**LIMITS**	**NOx**	
Correlation=	1.0000	**≥ 0.990**	Correlation=	1.0000
m (Slope)=	1.0130	**0.90-1.10**	m (Slope)=	1.0129
b (Intercept % of FS)=	-0.1190	**± 3% F.S.**	b (Intercept % of FS)=	-0.1029

Flow	O_3 Conc	NO Decrease	NO	NO2	NOX	% Diff. Vs Audit gas	
4981	0.000	0.0000	0.7925	-0.0001	0.7924	NO_2	% Diff. Limit
4981	0.400	0.5347	0.2578	0.5279	0.7857	-1%	± 10%
4981	0.200	0.2490	0.5435	0.2478	0.7913	0%	± 10%
4981	0.090	0.1090	0.6835	0.1095	0.7927	1%	± 10%
				Absolute Average Percent Difference		0%	± 10%

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

NO_2		**LIMITS**
Correlation=	1.0000	**≥ 0.995**
m (Slope)=	0.9864	**0.90-1.10**
b (Intercept % of FS)=	0.1136	**± 3% F.S.**

AENV Standards		**NO_X Analyzer**	
Audit Calibrator		Make/Model	Thermo 42i
Make/Model	Thermo 146i	Serial/AMU Number	1868
Serial/AMU Number	1809	Last Calibration Date	March 15, 2017
SRM Gas Cylinder No.	CAL018140	Full Scale (ppm)	1.0
Cylinder Conc. (ppm)	48.79	Cylinder Gas Expiry Date	March 28, 2019

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton Date: March 16, 2017

Operator Signature: Location: McIntyre Center Edmonton

Alberta Government

Calibrator Performance Audit

Oxides Of Nitrogen

File No. 2016-526A

Company Maxxam **Operator:** Mike

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

Dilution Flow (sccm)

Pt. #1 4879 Pt. #2 4932 Pt. #3 4950

Gas Flow (sccm)

Pt. #1 74.5 Pt. #2 36.4 Pt. #3 18.2

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO_2	NOx	NO	NOx
4965	0.0	0.0000	0.0000	0.0001	0.0000	0.0001	Limit ± 10%	
4954	74.5	0.7685	0.7700	0.7915	0.0008	0.7923	3%	3%
4968	36.4	0.3744	0.3751	0.3832	0.0006	0.3838	2%	2%
4968	18.2	0.1872	0.1876	0.1916	0.0002	0.1918	2%	2%
					Absolute Average Percent Difference		3%	2%

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

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

Flow	O_3 Conc	NO Decrease	NO	NO2	NOX	% Diff. Vs Audit gas	
						NO_2	% Diff. Limit
4954	0.000	0.0000	0.7949	0.0005	0.7954		
4954	0.510	0.5104	0.2845	0.5072	0.7917	-1%	± 10%
4954	0.250	0.2516	0.5433	0.2514	0.7944	0%	± 10%
4954	0.100	0.1085	0.6864	0.1087	0.7951	0%	± 10%
				Absolute Average Percent Difference		0%	± 10%

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

NO_2		**LIMITS**
Correlation=	1.0000	**≥ 0.995**
m (Slope)=	0.9926	**0.90-1.10**
b (Intercept % of FS)=	0.0925	**± 3% F.S.**

AENV Standards Audit Calibrator		**NO_X Analyzer**	
Make/Model	Thermo 146i	Make/Model	Thermo 42i
Serial/AMU Number	1809	Serial/AMU Number	1868
SRM Gas Cylinder No.	CAL018140	Last Calibration Date	March 15, 2017
Cylinder Conc. (ppm)	48.79	Full Scale (ppm)	1.0
		Cylinder Gas Expiry Date	March 28, 2019

COMMENTS: Gas has ~50ppm SO2

Auditor: Shea Beaton Date: March 16, 2017

Operator Signature: Location: McIntyre Center Edmonton

CALIBRATION GASES

Alberta Government

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:

Make/Model: R&R MFC 201
Serial Number: AMU 1690
Last Verification Date: October 19, 2016
Gas Type: SO2 Conc. 98.07
Cylinder Number: CA:016625
Expiry Date: January 2019

Flow Measurement Device:

Make/Model: Bios DC2
Serial Number: AMY 1659
Temp.°C: 24.5 C
B.P. 706 mmhg

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

Previous Stated Concentration PPM: 50.6

Percent variance from Stated: 1

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

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [X]

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

Auditor: Al Clark Date: October 19, 2016

Operator Signature: Location: McIntyre Center Edmonton

Alberta Government

Calibration Gas Audit

Single Component Cylinder Gas

File No. 2015-338CGA

Company: Maxxam **Operator's Name:** Limin Li

Cylinder #: BLM002508 Concentration PPM: 10.2 Tolerance(%) 2 Certified By: Air Liquide

Reference Calibrator and Gas:

Make/Model: R&R MFC 201
Serial Number: AMU1690
Last Verification Date: March 31, 2015
Gas Type: H2S Conc. 20.43
Cylinder Number: CAL015106

Flow Measurement Device:

Make/Model: Bios DC2
Serial Number: AMU 1659
Temp.°C: 23.0 C
B.P. 689 mmhg

Reference Analyzer:

Make/Model: Teco 450i Serial/AMU Number: 1980
Instrument Settings: Zero: 14.5 Span: 1.035 Range: 0.1
Last Calibration: Date: Mar 31/15 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated	Gas Flow/	Concentration	Cylinder
Dilution	Gas	Concentration (PPM)	Dilution Flow	Factor	Concentration
5000	0.0	0.0000			
5080	38.2	0.0725	0.00752	132.984	9.6
5078	17.9	0.0340	0.00353	283.687	9.6
5066	9.1	0.0170	0.00180	556.703	9.5
				Average Cylinder Concentration:	**9.6**

Previous Stated Concentration PPM: 10.2

Percent variance from Stated: **6.0**

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

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [X]

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

Auditor: Al Clark Date: March 31, 2015

Operator Signature: Al Clark Location: McIntyre Center Edmonton

Alberta Government

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

Previous Stated Concentration PPM: 10.2

Percent variance from Stated: 1

Meets Manufacturer Tolerance. Use manufacturers stated concentration [X] **COMMENTS:**

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [ ]

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

Auditor: Al Clark Date: October 19, 2016

Operator Signature: Al Clark Location: McIntyre Center Edmonton

Form No. F-GAS-003
Version No 1.1

Alberta Government

Calibration Gas Audit

NO Cylinder Gas

File No. 2015-343CGA

Company: Maxxam **Operators name:** Limin Li

Cylinder #: BLM002756T Conc (PPM) 50.7/50.7 Tolerance (%) 2 Certified By: Air Liquide

Reference Calibrator and Gas:

Make/Model	Teco 146i		
Serial Number	AMU 1809		
Last Verification Date	March 31, 2015		
Gas Type	NO	Conc.	48.79
Cylinder Number	CAL018024		

Flow Measurement Device:

Make/Model	Bios DC2
Serial Number	AMU 1659
Temp.°C	22.5 C
B.P.	690 mmhg

Reference Analyzer:

Make/Model	Teco 42i			Serial/AMU Number:	1868
Instrument Settings	Zero: 4.2		Span: 1.008	Range:	1.0
Last Calibration:	Date: Mar 31/15		C.F. 1.000	Done By:	Al Clark

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/	Concentration	Cylinder Concentration	
Dilution	Gas	NO	NOX	Dilution Flow	Factor	NO	NOX
5000	0.0	0.000	0.000				
4976	82.6	0.842	0.822	0.01660	60.242	50.7	49.5
4993	41.0	0.420	0.410	0.00821	121.780	51.1	49.9
4977	20.2	0.208	0.205	0.00406	246.386	51.2	50.5
					Average Cylinder Concentration:	**51.0**	**50.0**

	NO	NOx
Previous Stated Concentration PPM:	50.7	50.7
Percent variance from Stated:	**0.7**	**1.4**

Cylinder gas tolerances based on NO only

Meets Manufacturer Tolerance. Use manufacturers stated concentration [X]

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration [ ]

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

COMMENTS: Contains 49.9 ppm SO2 in cylinder

Auditor: Al Clark Date: March 31, 2015

Operator Signature: Location: McIntyre Center Edmonton

aemera.org

Calibration Gas Audit

CH4 / C3H8 Cylinder Gas

File No. 2015-092CGA

Company: Maxxam **Operators name:** Chris Wesson

Cylinder #: LL165372 Conc CH4 (PPM) 606/212 Tolerance (%) 0.5 Certified By: Praxair

Reference Calibrator and Gas:

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

Flow Measurement Device:

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

Reference Analyzer:

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

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

	CH4	C3H8
Previous Stated Concentration PPM:	606	212
Percent variance from Stated:	**0.3**	**1.6**

Cylinder gas tolerances based on CH4 only

Meets Manufacturer Tolerance. Use manufacturers stated concentration [X] **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

APPENDIX IV
ANALYTICAL RESULTS

VOCS SAMPLES

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/Mar 2, 2017	14995	Ambient Air	02-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030077 **REPORT CREATED:** 13-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030077-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030077-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030077-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030077-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030077-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030077-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17
17030077-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	15-Mar-17
17030077-001	1,2,4-Trimethylbenzene		0.07	ppbv	0.05	AC-058	15-Mar-17
17030077-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030077-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030077-001	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	15-Mar-17
17030077-001	1,2-Dichloropropane	I	0.01	ppbv	0.01	AC-058	15-Mar-17
17030077-001	1,3,5-Trimethylbenzene		0.04	ppbv	0.02	AC-058	15-Mar-17
17030077-001	1,3-Butadiene	I	0.02	ppbv	0.02	AC-058	15-Mar-17
17030077-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030077-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030077-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030077-001	1-Butene		0.11	ppbv	0.02	AC-058	15-Mar-17
17030077-001	1-Hexene	I	0.02	ppbv	0.02	AC-058	15-Mar-17
17030077-001	1-Pentene		0.02	ppbv	0.01	AC-058	15-Mar-17
17030077-001	2,2,4-Trimethylpentane		0.15	ppbv	0.01	AC-058	15-Mar-17
17030077-001	2,2-Dimethylbutane		0.04	ppbv	0.01	AC-058	15-Mar-17
17030077-001	2,3,4-Trimethylpentane		0.05	ppbv	0.01	AC-058	15-Mar-17
17030077-001	2,3-Dimethylbutane		0.11	ppbv	0.02	AC-058	15-Mar-17
17030077-001	2,3-Dimethylpentane		0.15	ppbv	0.02	AC-058	15-Mar-17

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

Date: April-13-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/Mar 2, 2017	14995	Ambient Air	02-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030077 **REPORT CREATED:** 13-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030077-001	2,4-Dimethylpentane		0.07	ppbv	0.01	AC-058	15-Mar-17
17030077-001	2-Methylheptane		0.06	ppbv	0.01	AC-058	15-Mar-17
17030077-001	2-Methylhexane		0.09	ppbv	0.01	AC-058	15-Mar-17
17030077-001	2-Methylpentane		0.32	ppbv	0.01	AC-058	15-Mar-17
17030077-001	3-Methylheptane		0.04	ppbv	0.02	AC-058	15-Mar-17
17030077-001	3-Methylhexane		0.12	ppbv	0.02	AC-058	15-Mar-17
17030077-001	3-Methylpentane		0.17	ppbv	0.01	AC-058	15-Mar-17
17030077-001	Acetone		1.7	ppbv	0.4	AC-058	15-Mar-17
17030077-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030077-001	Benzene		0.27	ppbv	0.01	AC-058	15-Mar-17
17030077-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030077-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030077-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030077-001	Bromomethane	I	0.01	ppbv	0.01	AC-058	15-Mar-17
17030077-001	Carbon disulfide	I	0.01	ppbv	0.01	AC-058	15-Mar-17
17030077-001	Carbon tetrachloride	I	0.13	ppbv	0.01	AC-058	15-Mar-17
17030077-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030077-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030077-001	Chloroform	I	0.03	ppbv	0.02	AC-058	15-Mar-17
17030077-001	Chloromethane		0.64	ppbv	0.02	AC-058	15-Mar-17
17030077-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030077-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030077-001	cis-2-Butene		0.03	ppbv	0.02	AC-058	15-Mar-17
17030077-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030077-001	Cyclohexane		0.23	ppbv	0.02	AC-058	15-Mar-17

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

Date: April-13-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/Mar 2, 2017	14995	Ambient Air	02-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030077 **REPORT CREATED:** 13-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030077-001	Cyclopentane		0.11	ppbv	0.01	AC-058	15-Mar-17
17030077-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030077-001	Ethanol		2.6	ppbv	0.3	AC-058	15-Mar-17
17030077-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030077-001	Ethylbenzene		0.07	ppbv	0.01	AC-058	15-Mar-17
17030077-001	Freon-11	I	0.29	ppbv	0.02	AC-058	15-Mar-17
17030077-001	Freon-113	I	0.12	ppbv	0.01	AC-058	15-Mar-17
17030077-001	Freon-114	I	0.02	ppbv	0.02	AC-058	15-Mar-17
17030077-001	Freon-12		0.61	ppbv	0.02	AC-058	15-Mar-17
17030077-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	15-Mar-17
17030077-001	Isobutane		1.01	ppbv	0.02	AC-058	15-Mar-17
17030077-001	Isopentane		0.99	ppbv	0.03	AC-058	15-Mar-17
17030077-001	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030077-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030077-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030077-001	m,p-Xylene		0.25	ppbv	0.03	AC-058	15-Mar-17
17030077-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030077-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	15-Mar-17
17030077-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	15-Mar-17
17030077-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030077-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030077-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Mar-17
17030077-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030077-001	Methylcyclohexane		0.29	ppbv	0.01	AC-058	15-Mar-17
17030077-001	Methylcyclopentane		0.27	ppbv	0.02	AC-058	15-Mar-17

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

Date: April-13-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/VOC/Bonnyville/Mar 2, 2017	14995	Ambient Air	02-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030077 **REPORT CREATED:** 13-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030077-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030077-001	n-Butane		2.37	ppbv	0.03	AC-058	15-Mar-17
17030077-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	15-Mar-17
17030077-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030077-001	n-Heptane		0.14	ppbv	0.01	AC-058	15-Mar-17
17030077-001	n-Hexane		0.23	ppbv	0.01	AC-058	15-Mar-17
17030077-001	n-Octane		0.06	ppbv	0.02	AC-058	15-Mar-17
17030077-001	n-Pentane		0.6	ppbv	0.1	AC-058	15-Mar-17
17030077-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17
17030077-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030077-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030077-001	n-Nonane		0.03	ppbv	0.01	AC-058	15-Mar-17
17030077-001	o-Ethyltoluene	I	0.02	ppbv	0.01	AC-058	15-Mar-17
17030077-001	o-Xylene		0.08	ppbv	0.01	AC-058	15-Mar-17
17030077-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030077-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Mar-17
17030077-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030077-001	Tetrachloroethylene	I	0.05	ppbv	0.04	AC-058	15-Mar-17
17030077-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030077-001	Toluene		0.33	ppbv	0.01	AC-058	15-Mar-17
17030077-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030077-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030077-001	trans-2-Butene		0.03	ppbv	0.01	AC-058	15-Mar-17
17030077-001	trans-2-Pentene		0.03	ppbv	0.02	AC-058	15-Mar-17
17030077-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17

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

Date: April-13-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
LICA/VOC/Bonnyville/Mar 2, 2017	14995	Ambient Air	02-Mar-17	0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030077 **REPORT CREATED:** 13-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030077-001	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030077-001	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17

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

Date: April-13-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
ICA/VOC/Bonnyville/Mar 08, 201	1831	Ambient Air	08-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030116 **REPORT CREATED:** 11-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030116-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030116-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17
17030116-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	15-Mar-17
17030116-001	1,2,4-Trimethylbenzene		0.10	ppbv	0.05	AC-058	15-Mar-17
17030116-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030116-001	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	15-Mar-17
17030116-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030116-001	1,3,5-Trimethylbenzene		0.05	ppbv	0.02	AC-058	15-Mar-17
17030116-001	1,3-Butadiene	I	0.03	ppbv	0.02	AC-058	15-Mar-17
17030116-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030116-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-001	1-Butene		0.14	ppbv	0.02	AC-058	15-Mar-17
17030116-001	1-Hexene	I	0.03	ppbv	0.02	AC-058	15-Mar-17
17030116-001	1-Pentene		0.04	ppbv	0.01	AC-058	15-Mar-17
17030116-001	2,2,4-Trimethylpentane		0.14	ppbv	0.01	AC-058	15-Mar-17
17030116-001	2,2-Dimethylbutane		0.05	ppbv	0.01	AC-058	15-Mar-17
17030116-001	2,3,4-Trimethylpentane		0.06	ppbv	0.01	AC-058	15-Mar-17
17030116-001	2,3-Dimethylbutane		0.08	ppbv	0.02	AC-058	15-Mar-17
17030116-001	2,3-Dimethylpentane		0.12	ppbv	0.02	AC-058	15-Mar-17

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

Date: May-11-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
ICA/VOC/Bonnyville/Mar 08, 201	1831	Ambient Air	08-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030116 **REPORT CREATED:** 11-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030116-001	2,4-Dimethylpentane		0.06	ppbv	0.01	AC-058	15-Mar-17
17030116-001	2-Methylheptane		0.06	ppbv	0.01	AC-058	15-Mar-17
17030116-001	2-Methylhexane		0.08	ppbv	0.01	AC-058	15-Mar-17
17030116-001	2-Methylpentane		0.21	ppbv	0.01	AC-058	15-Mar-17
17030116-001	3-Methylheptane		0.05	ppbv	0.02	AC-058	15-Mar-17
17030116-001	3-Methylhexane		0.10	ppbv	0.02	AC-058	15-Mar-17
17030116-001	3-Methylpentane		0.16	ppbv	0.01	AC-058	15-Mar-17
17030116-001	Acetone		1.4	ppbv	0.4	AC-058	15-Mar-17
17030116-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030116-001	Benzene		0.30	ppbv	0.01	AC-058	15-Mar-17
17030116-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-001	Bromomethane	I	0.01	ppbv	0.01	AC-058	15-Mar-17
17030116-001	Carbon disulfide	I	0.08	ppbv	0.01	AC-058	15-Mar-17
17030116-001	Carbon tetrachloride	I	0.13	ppbv	0.01	AC-058	15-Mar-17
17030116-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-001	Chloroform	I	0.03	ppbv	0.02	AC-058	15-Mar-17
17030116-001	Chloromethane		0.66	ppbv	0.02	AC-058	15-Mar-17
17030116-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030116-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030116-001	cis-2-Butene		0.05	ppbv	0.02	AC-058	15-Mar-17
17030116-001	cis-2-Pentene		0.03	ppbv	0.02	AC-058	15-Mar-17
17030116-001	Cyclohexane		0.14	ppbv	0.02	AC-058	15-Mar-17

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

Date: May-11-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
ICA/VOC/Bonnyville/Mar 08, 201	1831	Ambient Air	08-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030116 **REPORT CREATED:** 11-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030116-001	Cyclopentane		0.08	ppbv	0.01	AC-058	15-Mar-17
17030116-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030116-001	Ethanol		1.3	ppbv	0.3	AC-058	15-Mar-17
17030116-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-001	Ethylbenzene		0.08	ppbv	0.01	AC-058	15-Mar-17
17030116-001	Freon-11		0.30	ppbv	0.02	AC-058	15-Mar-17
17030116-001	Freon-113	I	0.13	ppbv	0.01	AC-058	15-Mar-17
17030116-001	Freon-114	I	0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-001	Freon-12		0.63	ppbv	0.02	AC-058	15-Mar-17
17030116-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	15-Mar-17
17030116-001	Isobutane		0.59	ppbv	0.02	AC-058	15-Mar-17
17030116-001	Isopentane		0.61	ppbv	0.03	AC-058	15-Mar-17
17030116-001	Isoprene		0.03	ppbv	0.01	AC-058	15-Mar-17
17030116-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-001	Isopropylbenzene		0.02	ppbv	0.01	AC-058	15-Mar-17
17030116-001	m,p-Xylene		0.27	ppbv	0.03	AC-058	15-Mar-17
17030116-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030116-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	15-Mar-17
17030116-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	15-Mar-17
17030116-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030116-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Mar-17
17030116-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030116-001	Methylcyclohexane		0.15	ppbv	0.01	AC-058	15-Mar-17
17030116-001	Methylcyclopentane		0.28	ppbv	0.02	AC-058	15-Mar-17

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

Date: May-11-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
ICA/VOC/Bonnyville/Mar 08, 201	1831	Ambient Air	08-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030116 **REPORT CREATED:** 11-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030116-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030116-001	n-Butane		1.19	ppbv	0.03	AC-058	15-Mar-17
17030116-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	15-Mar-17
17030116-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-001	n-Heptane		0.11	ppbv	0.01	AC-058	15-Mar-17
17030116-001	n-Hexane		0.40	ppbv	0.01	AC-058	15-Mar-17
17030116-001	n-Octane		0.07	ppbv	0.02	AC-058	15-Mar-17
17030116-001	n-Pentane		0.3	ppbv	0.1	AC-058	15-Mar-17
17030116-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17
17030116-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030116-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030116-001	n-Nonane		0.05	ppbv	0.01	AC-058	15-Mar-17
17030116-001	o-Ethyltoluene	I	0.04	ppbv	0.01	AC-058	15-Mar-17
17030116-001	o-Xylene		0.10	ppbv	0.01	AC-058	15-Mar-17
17030116-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030116-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Mar-17
17030116-001	Styrene	I	0.05	ppbv	0.04	AC-058	15-Mar-17
17030116-001	Tetrachloroethylene	I	0.05	ppbv	0.04	AC-058	15-Mar-17
17030116-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-001	Toluene		0.31	ppbv	0.01	AC-058	15-Mar-17
17030116-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030116-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030116-001	trans-2-Butene		0.06	ppbv	0.01	AC-058	15-Mar-17
17030116-001	trans-2-Pentene		0.05	ppbv	0.02	AC-058	15-Mar-17
17030116-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17

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

Date: May-11-17 **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

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
ICA/VOC/Bonnyville/Mar 08, 201	1831	Ambient Air	08-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030116 **REPORT CREATED:** 11-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030116-001	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-001	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17

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

Date: May-11-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 14, 201	2665	Ambient Air	14-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030212 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030212-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17
17030212-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Mar-17
17030212-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	22-Mar-17
17030212-001	1,2,4-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Mar-17
17030212-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Mar-17
17030212-001	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	22-Mar-17
17030212-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030212-001	1,3,5-Trimethylbenzene		0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	22-Mar-17
17030212-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030212-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030212-001	1-Butene		0.14	ppbv	0.02	AC-058	22-Mar-17
17030212-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	1-Pentene		0.02	ppbv	0.01	AC-058	22-Mar-17
17030212-001	2,2,4-Trimethylpentane		0.05	ppbv	0.01	AC-058	22-Mar-17
17030212-001	2,2-Dimethylbutane		0.03	ppbv	0.01	AC-058	22-Mar-17
17030212-001	2,3,4-Trimethylpentane		0.02	ppbv	0.01	AC-058	22-Mar-17
17030212-001	2,3-Dimethylbutane		0.07	ppbv	0.02	AC-058	22-Mar-17
17030212-001	2,3-Dimethylpentane		0.07	ppbv	0.02	AC-058	22-Mar-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 14, 201	2665	Ambient Air	14-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030212 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030212-001	2,4-Dimethylpentane		0.03	ppbv	0.01	AC-058	22-Mar-17
17030212-001	2-Methylheptane		0.03	ppbv	0.01	AC-058	22-Mar-17
17030212-001	2-Methylhexane		0.07	ppbv	0.01	AC-058	22-Mar-17
17030212-001	2-Methylpentane		0.25	ppbv	0.01	AC-058	22-Mar-17
17030212-001	3-Methylheptane		0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	3-Methylhexane		0.09	ppbv	0.02	AC-058	22-Mar-17
17030212-001	3-Methylpentane		0.16	ppbv	0.01	AC-058	22-Mar-17
17030212-001	Acetone		2.7	ppbv	0.4	AC-058	22-Mar-17
17030212-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	22-Mar-17
17030212-001	Benzene		0.20	ppbv	0.01	AC-058	22-Mar-17
17030212-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030212-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030212-001	Carbon disulfide	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030212-001	Carbon tetrachloride	I	0.10	ppbv	0.01	AC-058	22-Mar-17
17030212-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	Chloroform	I	0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	Chloromethane		0.63	ppbv	0.02	AC-058	22-Mar-17
17030212-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030212-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17
17030212-001	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	Cyclohexane		0.11	ppbv	0.02	AC-058	22-Mar-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 14, 201	2665	Ambient Air	14-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030212 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030212-001	Cyclopentane		0.07	ppbv	0.01	AC-058	22-Mar-17
17030212-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030212-001	Ethanol		1.8	ppbv	0.3	AC-058	22-Mar-17
17030212-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030212-001	Ethylbenzene		0.03	ppbv	0.01	AC-058	22-Mar-17
17030212-001	Freon-11	I	0.29	ppbv	0.02	AC-058	22-Mar-17
17030212-001	Freon-113	I	0.09	ppbv	0.01	AC-058	22-Mar-17
17030212-001	Freon-114	I	0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	Freon-12		0.63	ppbv	0.02	AC-058	22-Mar-17
17030212-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	22-Mar-17
17030212-001	Isobutane		2.37	ppbv	0.02	AC-058	22-Mar-17
17030212-001	Isopentane		1.26	ppbv	0.03	AC-058	22-Mar-17
17030212-001	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030212-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030212-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030212-001	m,p-Xylene		0.09	ppbv	0.03	AC-058	22-Mar-17
17030212-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17
17030212-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	22-Mar-17
17030212-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	22-Mar-17
17030212-001	Methyl ethyl ketone		0.6	ppbv	0.3	AC-058	22-Mar-17
17030212-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030212-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	22-Mar-17
17030212-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	22-Mar-17
17030212-001	Methylcyclohexane		0.16	ppbv	0.01	AC-058	22-Mar-17
17030212-001	Methylcyclopentane		0.19	ppbv	0.02	AC-058	22-Mar-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 14, 201	2665	Ambient Air	14-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030212 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030212-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	22-Mar-17
17030212-001	n-Butane		4.63	ppbv	0.03	AC-058	22-Mar-17
17030212-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	22-Mar-17
17030212-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030212-001	n-Heptane		0.12	ppbv	0.01	AC-058	22-Mar-17
17030212-001	n-Hexane		0.34	ppbv	0.01	AC-058	22-Mar-17
17030212-001	n-Octane		0.04	ppbv	0.02	AC-058	22-Mar-17
17030212-001	n-Pentane		1.1	ppbv	0.1	AC-058	22-Mar-17
17030212-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	22-Mar-17
17030212-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Mar-17
17030212-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	22-Mar-17
17030212-001	n-Nonane		0.02	ppbv	0.01	AC-058	22-Mar-17
17030212-001	o-Ethyltoluene	I	0.01	ppbv	0.01	AC-058	22-Mar-17
17030212-001	o-Xylene		0.04	ppbv	0.01	AC-058	22-Mar-17
17030212-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17
17030212-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	22-Mar-17
17030212-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17
17030212-001	Tetrachloroethylene	I	0.04	ppbv	0.04	AC-058	22-Mar-17
17030212-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030212-001	Toluene		0.14	ppbv	0.01	AC-058	22-Mar-17
17030212-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	22-Mar-17
17030212-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17
17030212-001	trans-2-Butene		0.03	ppbv	0.01	AC-058	22-Mar-17
17030212-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17
17030212-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	22-Mar-17

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

Date: May-02-17 **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

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 14, 201	2665	Ambient Air	14-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030212 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030212-001	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	22-Mar-17
17030212-001	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	22-Mar-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 20, 201	2471	Ambient Air	20-Mar-17 0:00

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-001	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-001	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	04-Apr-17
17030303-001	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	04-Apr-17
17030303-001	1,2,4-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	04-Apr-17
17030303-001	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-001	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	04-Apr-17
17030303-001	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	04-Apr-17
17030303-001	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-001	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-001	1-Butene		0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	2,2,4-Trimethylpentane		0.02	ppbv	0.01	AC-058	04-Apr-17
17030303-001	2,2-Dimethylbutane		0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	2,3-Dimethylbutane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	2,3-Dimethylpentane		0.02	ppbv	0.02	AC-058	04-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 20, 201	2471	Ambient Air	20-Mar-17 0:00

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-001	2,4-Dimethylpentane		0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	2-Methylhexane		0.02	ppbv	0.01	AC-058	04-Apr-17
17030303-001	2-Methylpentane		0.05	ppbv	0.01	AC-058	04-Apr-17
17030303-001	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	3-Methylhexane		0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	3-Methylpentane		0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	Acetone		1.4	ppbv	0.4	AC-058	04-Apr-17
17030303-001	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	04-Apr-17
17030303-001	Benzene		0.14	ppbv	0.01	AC-058	04-Apr-17
17030303-001	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-001	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	Bromomethane	I	0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	Carbon disulfide	I	0.12	ppbv	0.01	AC-058	04-Apr-17
17030303-001	Carbon tetrachloride	I	0.08	ppbv	0.01	AC-058	04-Apr-17
17030303-001	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	Chloroform	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	Chloromethane		0.63	ppbv	0.02	AC-058	04-Apr-17
17030303-001	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-001	cis-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	Cyclohexane		0.03	ppbv	0.02	AC-058	04-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 20, 201	2471	Ambient Air	20-Mar-17 0:00

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-001	Cyclopentane		0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	Ethanol		0.4	ppbv	0.3	AC-058	04-Apr-17
17030303-001	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-001	Ethylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	Freon-11	I	0.23	ppbv	0.02	AC-058	04-Apr-17
17030303-001	Freon-113	I	0.09	ppbv	0.01	AC-058	04-Apr-17
17030303-001	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	Freon-12		0.38	ppbv	0.02	AC-058	04-Apr-17
17030303-001	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	04-Apr-17
17030303-001	Isobutane		0.29	ppbv	0.02	AC-058	04-Apr-17
17030303-001	Isopentane		0.32	ppbv	0.03	AC-058	04-Apr-17
17030303-001	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-001	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	m,p-Xylene	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-001	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-001	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	04-Apr-17
17030303-001	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	04-Apr-17
17030303-001	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	04-Apr-17
17030303-001	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-001	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	04-Apr-17
17030303-001	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-001	Methylcyclohexane		0.04	ppbv	0.01	AC-058	04-Apr-17
17030303-001	Methylcyclopentane		0.02	ppbv	0.02	AC-058	04-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 20, 201	2471	Ambient Air	20-Mar-17 0:00

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-001	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	04-Apr-17
17030303-001	n-Butane		0.97	ppbv	0.03	AC-058	04-Apr-17
17030303-001	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	04-Apr-17
17030303-001	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-001	n-Heptane		0.03	ppbv	0.01	AC-058	04-Apr-17
17030303-001	n-Hexane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	n-Octane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	n-Pentane		0.2	ppbv	0.1	AC-058	04-Apr-17
17030303-001	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	04-Apr-17
17030303-001	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	04-Apr-17
17030303-001	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	04-Apr-17
17030303-001	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	o-Xylene		0.02	ppbv	0.01	AC-058	04-Apr-17
17030303-001	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-001	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	04-Apr-17
17030303-001	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-001	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-001	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-001	Toluene		0.07	ppbv	0.01	AC-058	04-Apr-17
17030303-001	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-001	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-001	trans-2-Butene		0.02	ppbv	0.01	AC-058	04-Apr-17
17030303-001	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-001	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17

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

Date: May-02-17 **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

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 20, 201	2471	Ambient Air	20-Mar-17 0:00

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-001	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-001	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 26, 201	S5600	Ambient Air	26-Mar-17 0:00

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-003	1,2,3-Trimethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	04-Apr-17
17030303-003	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	04-Apr-17
17030303-003	1,2,4-Trimethylbenzene		0.05	ppbv	0.05	AC-058	04-Apr-17
17030303-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-003	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	04-Apr-17
17030303-003	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-003	1,3,5-Trimethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	04-Apr-17
17030303-003	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-003	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-003	1-Butene		0.06	ppbv	0.02	AC-058	04-Apr-17
17030303-003	1-Hexene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-003	2,2,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-003	2,2-Dimethylbutane		0.02	ppbv	0.01	AC-058	04-Apr-17
17030303-003	2,3,4-Trimethylpentane		0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-003	2,3-Dimethylbutane		0.06	ppbv	0.02	AC-058	04-Apr-17
17030303-003	2,3-Dimethylpentane		0.11	ppbv	0.02	AC-058	04-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 26, 201	S5600	Ambient Air	26-Mar-17 0:00

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-003	2,4-Dimethylpentane		0.04	ppbv	0.01	AC-058	04-Apr-17
17030303-003	2-Methylheptane		0.11	ppbv	0.01	AC-058	04-Apr-17
17030303-003	2-Methylhexane		0.26	ppbv	0.01	AC-058	04-Apr-17
17030303-003	2-Methylpentane		0.23	ppbv	0.01	AC-058	04-Apr-17
17030303-003	3-Methylheptane		0.06	ppbv	0.02	AC-058	04-Apr-17
17030303-003	3-Methylhexane		0.27	ppbv	0.02	AC-058	04-Apr-17
17030303-003	3-Methylpentane		0.14	ppbv	0.01	AC-058	04-Apr-17
17030303-003	Acetone		3.2	ppbv	0.4	AC-058	04-Apr-17
17030303-003	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	04-Apr-17
17030303-003	Benzene		0.30	ppbv	0.01	AC-058	04-Apr-17
17030303-003	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-003	Carbon disulfide	I	0.09	ppbv	0.01	AC-058	04-Apr-17
17030303-003	Carbon tetrachloride	I	0.07	ppbv	0.01	AC-058	04-Apr-17
17030303-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	Chloroform	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	Chloromethane		0.65	ppbv	0.02	AC-058	04-Apr-17
17030303-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-003	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-003	cis-2-Butene		0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	cis-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	Cyclohexane		0.26	ppbv	0.02	AC-058	04-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 26, 201	S5600	Ambient Air	26-Mar-17 0:00

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-003	Cyclopentane		0.10	ppbv	0.01	AC-058	04-Apr-17
17030303-003	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-003	Ethanol		1.3	ppbv	0.3	AC-058	04-Apr-17
17030303-003	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-003	Ethylbenzene		0.10	ppbv	0.01	AC-058	04-Apr-17
17030303-003	Freon-11	I	0.22	ppbv	0.02	AC-058	04-Apr-17
17030303-003	Freon-113	I	0.08	ppbv	0.01	AC-058	04-Apr-17
17030303-003	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	Freon-12		0.36	ppbv	0.02	AC-058	04-Apr-17
17030303-003	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	04-Apr-17
17030303-003	Isobutane		0.99	ppbv	0.02	AC-058	04-Apr-17
17030303-003	Isopentane		0.92	ppbv	0.03	AC-058	04-Apr-17
17030303-003	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-003	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-003	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-003	m,p-Xylene		0.39	ppbv	0.03	AC-058	04-Apr-17
17030303-003	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-003	m-Ethyltoluene	K, T, U	< 0.08	ppbv	0.08	AC-058	04-Apr-17
17030303-003	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	04-Apr-17
17030303-003	Methyl ethyl ketone		0.3	ppbv	0.3	AC-058	04-Apr-17
17030303-003	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-003	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	04-Apr-17
17030303-003	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-003	Methylcyclohexane		0.54	ppbv	0.01	AC-058	04-Apr-17
17030303-003	Methylcyclopentane		0.31	ppbv	0.02	AC-058	04-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 26, 201	S5600	Ambient Air	26-Mar-17 0:00

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-003	Methylene chloride		0.3	ppbv	0.3	AC-058	04-Apr-17
17030303-003	n-Butane		2.53	ppbv	0.03	AC-058	04-Apr-17
17030303-003	n-Decane	K, T, U	< 0.06	ppbv	0.06	AC-058	04-Apr-17
17030303-003	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-003	n-Heptane		0.43	ppbv	0.01	AC-058	04-Apr-17
17030303-003	n-Hexane		0.36	ppbv	0.01	AC-058	04-Apr-17
17030303-003	n-Octane		0.16	ppbv	0.02	AC-058	04-Apr-17
17030303-003	n-Pentane		0.7	ppbv	0.1	AC-058	04-Apr-17
17030303-003	n-Propylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	04-Apr-17
17030303-003	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	04-Apr-17
17030303-003	Naphthalene	K, T, U	< 0.5	ppbv	0.5	AC-058	04-Apr-17
17030303-003	n-Nonane		0.08	ppbv	0.01	AC-058	04-Apr-17
17030303-003	o-Ethyltoluene	I	0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-003	o-Xylene		0.19	ppbv	0.01	AC-058	04-Apr-17
17030303-003	p-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-003	p-Ethyltoluene	K, T, U	< 0.07	ppbv	0.07	AC-058	04-Apr-17
17030303-003	Styrene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-003	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-003	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-003	Toluene		0.80	ppbv	0.01	AC-058	04-Apr-17
17030303-003	trans-1,2-Dichloroethylene	I	0.08	ppbv	0.01	AC-058	04-Apr-17
17030303-003	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-003	trans-2-Butene		0.02	ppbv	0.01	AC-058	04-Apr-17
17030303-003	trans-2-Pentene	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17
17030303-003	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17

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

Date: May-02-17 **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

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/VOC/Bonnyville/Mar 26, 201	S5600	Ambient Air	26-Mar-17 0:00

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-003	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-003	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	04-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

PAHS SAMPLES

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/Bonnyville/Mar 2, 2017	TE02	Air Filter	02-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030077 **REPORT CREATED:** 13-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030077-002	1-Methylnaphthalene		0.44	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	2-Methylnaphthalene		0.56	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Acenaphthene		0.15	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Acenaphthylene		0.04	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Acridine	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Anthracene		0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Benzo(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Benzo(a)pyrene		0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Benzo(b,j,k)fluoranthene		0.04	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Benzo(e)pyrene		0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Benzo(ghi)perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Chrysene		0.02	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Fluoranthene		0.09	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Fluorene		0.13	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Indeno(1,2,3-cd)pyrene		0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Naphthalene		0.33	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Phenanthrene		0.31	ug/Filter	0.01	NA-017	16-Mar-17

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

Date: April-13-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/Bonnyville/Mar 2, 2017	TE02	Air Filter	02-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030077 **REPORT CREATED:** 13-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030077-002	Pyrene		0.06	ug/Filter	0.01	NA-017	16-Mar-17
17030077-002	Retene		0.05	ug/Filter	0.01	NA-017	16-Mar-17

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

Date: April-13-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/Bonnyville/Mar 08, 2017	9801	Air Filter	08-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030116 **REPORT CREATED:** 11-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030116-002	1-Methylnaphthalene		1.21	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	2-Methylnaphthalene		2.07	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Acenaphthene		0.34	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Acenaphthylene		0.12	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Acridine	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Anthracene		0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Benzo(a)anthracene		0.02	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Benzo(a)pyrene		0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Benzo(b,j,k)fluoranthene		0.06	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Benzo(e)pyrene		0.02	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Benzo(ghi)perylene		0.03	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Chrysene		0.04	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Dibenzo(a,i)pyrene		0.06	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Fluoranthene		0.09	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Fluorene		0.12	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Indeno(1,2,3-cd)pyrene		0.03	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Naphthalene		3.89	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Phenanthrene		0.36	ug/Filter	0.01	NA-017	22-Mar-17

Report certified by: Alberto dos Santos Pereira, Supervisor **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: May-11-17 **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

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
LICA/PUF/Bonnyville/Mar 08, 2017	9801	Air Filter	08-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030116 **REPORT CREATED:** 11-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030116-002	Pyrene		0.06	ug/Filter	0.01	NA-017	22-Mar-17
17030116-002	Retene		0.08	ug/Filter	0.01	NA-017	22-Mar-17

Report certified by: Alberto dos Santos Pereira, Supervisor **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: May-11-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
ICA/PUF/Bonnyville/Mar 14, 2017	P13-01	Air Filter	14-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030212 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030212-002	1-Methylnaphthalene		0.11	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	2-Methylnaphthalene		0.12	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Acenaphthene		0.07	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Acenaphthylene		0.06	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Acridine	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Anthracene		0.02	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Benzo(a)anthracene		0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Benzo(a)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Benzo(b,j,k)fluoranthene		0.03	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Benzo(e)pyrene		0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Benzo(ghi)perylene		0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Chrysene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Fluoranthene		0.10	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Fluorene		0.10	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Indeno(1,2,3-cd)pyrene		0.02	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Naphthalene		0.11	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Phenanthrene		0.31	ug/Filter	0.01	NA-017	22-Mar-17

Report certified by: Alberto dos Santos Pereira, Supervisor **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: May-02-17 **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

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
ICA/PUF/Bonnyville/Mar 14, 2017	P13-01	Air Filter	14-Mar-17 0:00

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030212 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030212-002	Pyrene		0.08	ug/Filter	0.01	NA-017	22-Mar-17
17030212-002	Retene		0.04	ug/Filter	0.01	NA-017	22-Mar-17

Report certified by: Alberto dos Santos Pereira, Supervisor **On behalf of:** PJ Pretorius, Manager, Analysis and Testing Services

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
ICA/PUF/Bonnyville/Mar 20, 2017	TE09	Air Filter	20-Mar-17 0:00

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-002	1-Methylnaphthalene		0.21	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	2-Methylnaphthalene		0.40	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	3-Methylcholanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Acenaphthene		0.03	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Acenaphthylene		0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Acridine	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Benzo(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Benzo(a)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Benzo(b,j,k)fluoranthene		0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Benzo(e)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Benzo(ghi)perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Chrysene		0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Fluoranthene		0.02	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Fluorene		0.03	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Naphthalene		0.45	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Phenanthrene		0.07	ug/Filter	0.01	NA-017	13-Apr-17

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

Date: May-02-17 **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

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
ICA/PUF/Bonnyville/Mar 20, 2017	TE09	Air Filter	20-Mar-17 0:00

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-002	Pyrene		0.02	ug/Filter	0.01	NA-017	13-Apr-17
17030303-002	Retene		0.01	ug/Filter	0.01	NA-017	13-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
.ICA/PUF/Bonnyville/Mar 26, 2017	TE01	Air Filter	26-Mar-17 0:00

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-004	1-Methylnaphthalene		0.08	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	2-Methylnaphthalene		0.14	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	3-Methylcholanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	7,12-Dimethylbenz(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Acenaphthene		0.02	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Acenaphthylene		0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Acridine	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Benzo(a)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Benzo(a)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Benzo(b,j,k)fluoranthene		0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Benzo(c)phenanthrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Benzo(e)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Benzo(ghi)perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Chrysene		0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Dibenzo(a,h)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Dibenzo(a,i)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Dibenzo(a,l)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Dibenzo(ah)anthracene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Fluoranthene		0.05	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Fluorene		0.07	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Indeno(1,2,3-cd)pyrene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Naphthalene		0.12	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Perylene	K, T, U	< 0.01	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Phenanthrene		0.16	ug/Filter	0.01	NA-017	13-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
ICA/PUF/Bonnyville/Mar 26, 2017	TE01	Air Filter	26-Mar-17 0:00

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-004	Pyrene		0.04	ug/Filter	0.01	NA-017	13-Apr-17
17030303-004	Retene		0.06	ug/Filter	0.01	NA-017	13-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

NMHC CANISTER SAMPLES

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\/NMHC VOC/Bonnyville/Mar 3, 2	H3286	Ambient Air	03-Mar-17 19:25

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030077 **REPORT CREATED:** 13-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030077-004	1,1,1-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030077-004	1,1,2,2-Tetrachloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030077-004	1,1,2-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030077-004	1,1-Dichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030077-004	1,1-Dichloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17
17030077-004	1,2,3-Trimethylbenzene	I	0.11	ppbv	0.07	AC-058	15-Mar-17
17030077-004	1,2,4-Trichlorobenzene	K, T, U	< 1.1	ppbv	1.1	AC-058	15-Mar-17
17030077-004	1,2,4-Trimethylbenzene		0.37	ppbv	0.07	AC-058	15-Mar-17
17030077-004	1,2-Dibromoethane	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030077-004	1,2-Dichlorobenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030077-004	1,2-Dichloroethane	I	0.03	ppbv	0.01	AC-058	15-Mar-17
17030077-004	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030077-004	1,3,5-Trimethylbenzene		0.14	ppbv	0.03	AC-058	15-Mar-17
17030077-004	1,3-Butadiene	I	0.17	ppbv	0.03	AC-058	15-Mar-17
17030077-004	1,3-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030077-004	1,4-Dichlorobenzene	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030077-004	1,4-Dioxane	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030077-004	1-Butene		0.52	ppbv	0.03	AC-058	15-Mar-17
17030077-004	1-Hexene	I	0.09	ppbv	0.03	AC-058	15-Mar-17
17030077-004	1-Pentene		0.11	ppbv	0.01	AC-058	15-Mar-17
17030077-004	2,2,4-Trimethylpentane		0.57	ppbv	0.01	AC-058	15-Mar-17
17030077-004	2,2-Dimethylbutane		0.22	ppbv	0.01	AC-058	15-Mar-17
17030077-004	2,3,4-Trimethylpentane		0.15	ppbv	0.01	AC-058	15-Mar-17
17030077-004	2,3-Dimethylbutane		0.36	ppbv	0.03	AC-058	15-Mar-17
17030077-004	2,3-Dimethylpentane		0.43	ppbv	0.03	AC-058	15-Mar-17

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

Date: April-13-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\/NMHC VOC/Bonnyville/Mar 3, 2	H3286	Ambient Air	03-Mar-17 19:25

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030077 **REPORT CREATED:** 13-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030077-004	2,4-Dimethylpentane		0.20	ppbv	0.01	AC-058	15-Mar-17
17030077-004	2-Methylheptane		0.19	ppbv	0.01	AC-058	15-Mar-17
17030077-004	2-Methylhexane		0.42	ppbv	0.01	AC-058	15-Mar-17
17030077-004	2-Methylpentane		1.16	ppbv	0.01	AC-058	15-Mar-17
17030077-004	3-Methylheptane		0.16	ppbv	0.03	AC-058	15-Mar-17
17030077-004	3-Methylhexane		0.48	ppbv	0.03	AC-058	15-Mar-17
17030077-004	3-Methylpentane		0.65	ppbv	0.01	AC-058	15-Mar-17
17030077-004	Acetone		4.0	ppbv	0.5	AC-058	15-Mar-17
17030077-004	Acrolein	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030077-004	Benzene		0.69	ppbv	0.01	AC-058	15-Mar-17
17030077-004	Benzyl chloride	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030077-004	Bromodichloromethane	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030077-004	Bromoform	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030077-004	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030077-004	Carbon disulfide	I	0.30	ppbv	0.01	AC-058	15-Mar-17
17030077-004	Carbon tetrachloride	I	0.14	ppbv	0.01	AC-058	15-Mar-17
17030077-004	Chlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030077-004	Chloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030077-004	Chloroform	I	0.04	ppbv	0.03	AC-058	15-Mar-17
17030077-004	Chloromethane		0.72	ppbv	0.03	AC-058	15-Mar-17
17030077-004	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030077-004	cis-1,3-Dichloropropene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17
17030077-004	cis-2-Butene		0.18	ppbv	0.03	AC-058	15-Mar-17
17030077-004	cis-2-Pentene		0.10	ppbv	0.03	AC-058	15-Mar-17
17030077-004	Cyclohexane		0.48	ppbv	0.03	AC-058	15-Mar-17

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

Date: April-13-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\/NMHC VOC/Bonnyville/Mar 3, 2	H3286	Ambient Air	03-Mar-17 19:25

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030077 **REPORT CREATED:** 13-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030077-004	Cyclopentane		0.29	ppbv	0.01	AC-058	15-Mar-17
17030077-004	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030077-004	Ethanol		10.1	ppbv	0.4	AC-058	15-Mar-17
17030077-004	Ethyl acetate	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030077-004	Ethylbenzene		0.26	ppbv	0.01	AC-058	15-Mar-17
17030077-004	Freon-11	I	0.31	ppbv	0.03	AC-058	15-Mar-17
17030077-004	Freon-113	I	0.15	ppbv	0.01	AC-058	15-Mar-17
17030077-004	Freon-114	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030077-004	Freon-12		0.59	ppbv	0.03	AC-058	15-Mar-17
17030077-004	Hexachloro-1,3-butadiene	K, T, U	< 0.68	ppbv	0.68	AC-058	15-Mar-17
17030077-004	Isobutane		3.02	ppbv	0.03	AC-058	15-Mar-17
17030077-004	Isopentane		3.59	ppbv	0.04	AC-058	15-Mar-17
17030077-004	Isoprene		0.10	ppbv	0.01	AC-058	15-Mar-17
17030077-004	Isopropyl alcohol	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030077-004	Isopropylbenzene		0.03	ppbv	0.01	AC-058	15-Mar-17
17030077-004	m,p-Xylene		0.97	ppbv	0.04	AC-058	15-Mar-17
17030077-004	m-Diethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17
17030077-004	m-Ethyltoluene	I	0.24	ppbv	0.11	AC-058	15-Mar-17
17030077-004	Methyl butyl ketone	K, T, U	< 0.68	ppbv	0.68	AC-058	15-Mar-17
17030077-004	Methyl ethyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030077-004	Methyl isobutyl ketone	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030077-004	Methyl methacrylate	K, T, U	< 0.09	ppbv	0.09	AC-058	15-Mar-17
17030077-004	Methyl tert butyl ether	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030077-004	Methylcyclohexane		0.58	ppbv	0.01	AC-058	15-Mar-17
17030077-004	Methylcyclopentane		0.79	ppbv	0.03	AC-058	15-Mar-17

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

Date: April-13-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\/NMHC VOC/Bonnyville/Mar 3, 2	H3286	Ambient Air	03-Mar-17 19:25

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030077 **REPORT CREATED:** 13-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030077-004	Methylene chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030077-004	n-Butane		6.24	ppbv	0.04	AC-058	15-Mar-17
17030077-004	n-Decane	K, T, U	< 0.08	ppbv	0.08	AC-058	15-Mar-17
17030077-004	n-Dodecane	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030077-004	n-Heptane		0.44	ppbv	0.01	AC-058	15-Mar-17
17030077-004	n-Hexane		0.71	ppbv	0.01	AC-058	15-Mar-17
17030077-004	n-Octane		0.17	ppbv	0.03	AC-058	15-Mar-17
17030077-004	n-Pentane		1.7	ppbv	0.1	AC-058	15-Mar-17
17030077-004	n-Propylbenzene		0.07	ppbv	0.07	AC-058	15-Mar-17
17030077-004	n-Undecane	K, T, U	< 0.7	ppbv	0.7	AC-058	15-Mar-17
17030077-004	Naphthalene		1.7	ppbv	0.7	AC-058	15-Mar-17
17030077-004	n-Nonane		0.10	ppbv	0.01	AC-058	15-Mar-17
17030077-004	o-Ethyltoluene	I	0.10	ppbv	0.01	AC-058	15-Mar-17
17030077-004	o-Xylene		0.34	ppbv	0.01	AC-058	15-Mar-17
17030077-004	p-Diethylbenzene	I	0.10	ppbv	0.05	AC-058	15-Mar-17
17030077-004	p-Ethyltoluene	I	0.15	ppbv	0.09	AC-058	15-Mar-17
17030077-004	Styrene	I	0.08	ppbv	0.05	AC-058	15-Mar-17
17030077-004	Tetrachloroethylene	I	0.30	ppbv	0.05	AC-058	15-Mar-17
17030077-004	Tetrahydrofuran	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030077-004	Toluene		1.06	ppbv	0.01	AC-058	15-Mar-17
17030077-004	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030077-004	trans-1,3-Dichloropropylene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17
17030077-004	trans-2-Butene		0.21	ppbv	0.01	AC-058	15-Mar-17
17030077-004	trans-2-Pentene		0.21	ppbv	0.03	AC-058	15-Mar-17
17030077-004	Trichloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Mar-17

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

Date: April-13-17 **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

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
\/NMHC VOC/Bonnyville/Mar 3, 2	H3286	Ambient Air	03-Mar-17 19:25

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030077 **REPORT CREATED:** 13-Apr-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030077-004	Vinyl acetate	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030077-004	Vinyl chloride	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17

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

Date: April-13-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

RESULTS: Adewunmi Adekanmbi
Lakeland Industry and Community Assn
4000, 19 St NE
Calgary
AB T2E 6P8

INVOICE: Arianna Cook 780 812 2182
PO Box 8237
5107W-50 St
Bonnyville
AB T9N 2J5

CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
CA/NMHC/Bonnyville/Mar 08, 20		Ambient Air	Normal

DESCRIPTION: Bonnyville - AER

DATE SAMPLED: 08-Mar-17 19:05
DATE RECEIVED: 13-Mar-17
REPORT CREATED: 11-May-17
REPORT NUMBER: 17030116
VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030116-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-003	1,1-Dichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030116-003	1,2,3-Trimethylbenzene	I	0.11	ppbv	0.05	AC-058	15-Mar-17
17030116-003	1,2,4-Trichlorobenzene	K, T, U	< 0.8	ppbv	0.8	AC-058	15-Mar-17
17030116-003	1,2,4-Trimethylbenzene		0.36	ppbv	0.05	AC-058	15-Mar-17
17030116-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-003	1,2-Dichlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030116-003	1,2-Dichloroethane	I	0.03	ppbv	0.01	AC-058	15-Mar-17
17030116-003	1,2-Dichloropropane	I	0.01	ppbv	0.01	AC-058	15-Mar-17
17030116-003	1,3,5-Trimethylbenzene		0.13	ppbv	0.02	AC-058	15-Mar-17
17030116-003	1,3-Butadiene	I	0.10	ppbv	0.02	AC-058	15-Mar-17
17030116-003	1,3-Dichlorobenzene	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030116-003	1,4-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-003	1,4-Dioxane	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-003	1-Butene		0.47	ppbv	0.02	AC-058	15-Mar-17

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

Date: May-11-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
CA/NMHC/Bonnyville/Mar 08, 201		Ambient Air	08-Mar-17 19:05

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030116 **REPORT CREATED:** 11-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030116-003	1-Hexene	I	0.09	ppbv	0.02	AC-058	15-Mar-17
17030116-003	1-Pentene		0.09	ppbv	0.01	AC-058	15-Mar-17
17030116-003	2,2,4-Trimethylpentane		0.75	ppbv	0.01	AC-058	15-Mar-17
17030116-003	2,2-Dimethylbutane		0.06	ppbv	0.01	AC-058	15-Mar-17
17030116-003	2,3,4-Trimethylpentane		0.31	ppbv	0.01	AC-058	15-Mar-17
17030116-003	2,3-Dimethylbutane		0.18	ppbv	0.02	AC-058	15-Mar-17
17030116-003	2,3-Dimethylpentane		0.58	ppbv	0.02	AC-058	15-Mar-17
17030116-003	2,4-Dimethylpentane		0.25	ppbv	0.01	AC-058	15-Mar-17
17030116-003	2-Methylheptane		0.21	ppbv	0.01	AC-058	15-Mar-17
17030116-003	2-Methylhexane		0.44	ppbv	0.01	AC-058	15-Mar-17
17030116-003	2-Methylpentane		0.56	ppbv	0.01	AC-058	15-Mar-17
17030116-003	3-Methylheptane		0.20	ppbv	0.02	AC-058	15-Mar-17
17030116-003	3-Methylhexane		0.52	ppbv	0.02	AC-058	15-Mar-17
17030116-003	3-Methylpentane		0.34	ppbv	0.01	AC-058	15-Mar-17
17030116-003	Acetone		1.9	ppbv	0.4	AC-058	15-Mar-17
17030116-003	Acrolein	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030116-003	Benzene		0.57	ppbv	0.01	AC-058	15-Mar-17
17030116-003	Benzyl chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-003	Bromomethane	I	0.01	ppbv	0.01	AC-058	15-Mar-17
17030116-003	Carbon disulfide	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030116-003	Carbon tetrachloride	I	0.12	ppbv	0.01	AC-058	15-Mar-17
17030116-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-003	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17

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

Date: May-11-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
CA/NMHC/Bonnyville/Mar 08, 201		Ambient Air	08-Mar-17 19:05

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030116 **REPORT CREATED:** 11-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030116-003	Chloroform	I	0.04	ppbv	0.02	AC-058	15-Mar-17
17030116-003	Chloromethane		0.72	ppbv	0.02	AC-058	15-Mar-17
17030116-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030116-003	cis-1,3-Dichloropropene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030116-003	cis-2-Butene		0.14	ppbv	0.02	AC-058	15-Mar-17
17030116-003	cis-2-Pentene		0.09	ppbv	0.02	AC-058	15-Mar-17
17030116-003	Cyclohexane		0.17	ppbv	0.02	AC-058	15-Mar-17
17030116-003	Cyclopentane		0.10	ppbv	0.01	AC-058	15-Mar-17
17030116-003	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030116-003	Ethanol		2.6	ppbv	0.3	AC-058	15-Mar-17
17030116-003	Ethyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-003	Ethylbenzene		0.31	ppbv	0.01	AC-058	15-Mar-17
17030116-003	Freon-11	I	0.29	ppbv	0.02	AC-058	15-Mar-17
17030116-003	Freon-113	I	0.13	ppbv	0.01	AC-058	15-Mar-17
17030116-003	Freon-114	I	0.02	ppbv	0.02	AC-058	15-Mar-17
17030116-003	Freon-12		0.52	ppbv	0.02	AC-058	15-Mar-17
17030116-003	Hexachloro-1,3-butadiene	K, T, U	< 0.50	ppbv	0.50	AC-058	15-Mar-17
17030116-003	Isobutane		0.83	ppbv	0.02	AC-058	15-Mar-17
17030116-003	Isopentane		1.10	ppbv	0.03	AC-058	15-Mar-17
17030116-003	Isoprene		0.09	ppbv	0.01	AC-058	15-Mar-17
17030116-003	Isopropyl alcohol	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-003	Isopropylbenzene		0.04	ppbv	0.01	AC-058	15-Mar-17
17030116-003	m,p-Xylene		1.11	ppbv	0.03	AC-058	15-Mar-17
17030116-003	m-Diethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030116-003	m-Ethyltoluene	I	0.25	ppbv	0.08	AC-058	15-Mar-17

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

Date: May-11-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
CA/NMHC/Bonnyville/Mar 08, 201		Ambient Air	08-Mar-17 19:05

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030116 **REPORT CREATED:** 11-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030116-003	Methyl butyl ketone	K, T, U	< 0.50	ppbv	0.50	AC-058	15-Mar-17
17030116-003	Methyl ethyl ketone	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030116-003	Methyl isobutyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-003	Methyl methacrylate	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Mar-17
17030116-003	Methyl tert butyl ether	K, T, U	< 0.03	ppbv	0.03	AC-058	15-Mar-17
17030116-003	Methylcyclohexane		0.30	ppbv	0.01	AC-058	15-Mar-17
17030116-003	Methylcyclopentane		0.41	ppbv	0.02	AC-058	15-Mar-17
17030116-003	Methylene chloride	K, T, U	< 0.3	ppbv	0.3	AC-058	15-Mar-17
17030116-003	n-Butane		2.18	ppbv	0.03	AC-058	15-Mar-17
17030116-003	n-Decane		0.09	ppbv	0.06	AC-058	15-Mar-17
17030116-003	n-Dodecane	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-003	n-Heptane		0.47	ppbv	0.01	AC-058	15-Mar-17
17030116-003	n-Hexane		0.37	ppbv	0.01	AC-058	15-Mar-17
17030116-003	n-Octane		0.22	ppbv	0.02	AC-058	15-Mar-17
17030116-003	n-Pentane		0.5	ppbv	0.1	AC-058	15-Mar-17
17030116-003	n-Propylbenzene		0.08	ppbv	0.05	AC-058	15-Mar-17
17030116-003	n-Undecane	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Mar-17
17030116-003	Naphthalene		1.5	ppbv	0.5	AC-058	15-Mar-17
17030116-003	n-Nonane		0.10	ppbv	0.01	AC-058	15-Mar-17
17030116-003	o-Ethyltoluene	I	0.10	ppbv	0.01	AC-058	15-Mar-17
17030116-003	o-Xylene		0.40	ppbv	0.01	AC-058	15-Mar-17
17030116-003	p-Diethylbenzene	I	0.08	ppbv	0.04	AC-058	15-Mar-17
17030116-003	p-Ethyltoluene	I	0.12	ppbv	0.07	AC-058	15-Mar-17
17030116-003	Styrene	I	0.06	ppbv	0.04	AC-058	15-Mar-17
17030116-003	Tetrachloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17

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

Date: May-11-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
CA/NMHC/Bonnyville/Mar 08, 201		Ambient Air	08-Mar-17 19:05

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030116 **REPORT CREATED:** 11-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030116-003	Tetrahydrofuran	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-003	Toluene		1.29	ppbv	0.01	AC-058	15-Mar-17
17030116-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	15-Mar-17
17030116-003	trans-1,3-Dichloropropylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030116-003	trans-2-Butene		0.13	ppbv	0.01	AC-058	15-Mar-17
17030116-003	trans-2-Pentene		0.15	ppbv	0.02	AC-058	15-Mar-17
17030116-003	Trichloroethylene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Mar-17
17030116-003	Vinyl acetate	K, T, U	< 0.4	ppbv	0.4	AC-058	15-Mar-17
17030116-003	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Mar-17

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

Date: May-11-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

RESULTS: Adewunmi Adekanmbi
Lakeland Industry and Community Assn
4000, 19 St NE
Calgary
AB T2E 6P8

INVOICE: Arianna Cook 780 812 2182
PO Box 8237
5107W-50 St
Bonnyville
AB T9N 2J5

CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
/NMHC VOC/Bonnyville/Mar 14,	17121	Ambient Air	Normal

DESCRIPTION: Bonnyville - AER

DATE SAMPLED: 11-Mar-17 16:35
DATE RECEIVED: 20-Mar-17
REPORT CREATED: 02-May-17
REPORT NUMBER: 17030212
VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030212-003	1,1,1-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	23-Mar-17
17030212-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	23-Mar-17
17030212-003	1,1,2-Trichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	23-Mar-17
17030212-003	1,1-Dichloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	23-Mar-17
17030212-003	1,1-Dichloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	23-Mar-17
17030212-003	1,2,3-Trimethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	23-Mar-17
17030212-003	1,2,4-Trichlorobenzene	K, T, U	< 1.0	ppbv	1.0	AC-058	23-Mar-17
17030212-003	1,2,4-Trimethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	23-Mar-17
17030212-003	1,2-Dibromoethane	K, T, U	< 0.02	ppbv	0.02	AC-058	23-Mar-17
17030212-003	1,2-Dichlorobenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	23-Mar-17
17030212-003	1,2-Dichloroethane	I	0.02	ppbv	0.01	AC-058	23-Mar-17
17030212-003	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	23-Mar-17
17030212-003	1,3,5-Trimethylbenzene		0.04	ppbv	0.02	AC-058	23-Mar-17
17030212-003	1,3-Butadiene	K, T, U	< 0.02	ppbv	0.02	AC-058	23-Mar-17
17030212-003	1,3-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	23-Mar-17
17030212-003	1,4-Dichlorobenzene	K, T, U	< 0.5	ppbv	0.5	AC-058	23-Mar-17
17030212-003	1,4-Dioxane	K, T, U	< 0.5	ppbv	0.5	AC-058	23-Mar-17
17030212-003	1-Butene		2.38	ppbv	0.02	AC-058	23-Mar-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC VOC/Bonnyville/Mar 14, 2	17121	Ambient Air	11-Mar-17 16:35

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030212 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030212-003	1-Hexene	I	0.10	ppbv	0.02	AC-058	23-Mar-17
17030212-003	1-Pentene		0.29	ppbv	0.01	AC-058	23-Mar-17
17030212-003	2,2,4-Trimethylpentane		0.28	ppbv	0.01	AC-058	23-Mar-17
17030212-003	2,2-Dimethylbutane		0.03	ppbv	0.01	AC-058	23-Mar-17
17030212-003	2,3,4-Trimethylpentane		0.06	ppbv	0.01	AC-058	23-Mar-17
17030212-003	2,3-Dimethylbutane		0.33	ppbv	0.02	AC-058	23-Mar-17
17030212-003	2,3-Dimethylpentane		0.37	ppbv	0.02	AC-058	23-Mar-17
17030212-003	2,4-Dimethylpentane		0.20	ppbv	0.01	AC-058	23-Mar-17
17030212-003	2-Methylheptane		0.02	ppbv	0.01	AC-058	23-Mar-17
17030212-003	2-Methylhexane		0.12	ppbv	0.01	AC-058	23-Mar-17
17030212-003	2-Methylpentane		0.73	ppbv	0.01	AC-058	23-Mar-17
17030212-003	3-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	23-Mar-17
17030212-003	3-Methylhexane		0.13	ppbv	0.02	AC-058	23-Mar-17
17030212-003	3-Methylpentane		0.43	ppbv	0.01	AC-058	23-Mar-17
17030212-003	Acetone		2.9	ppbv	0.5	AC-058	23-Mar-17
17030212-003	Acrolein	K, T, U	< 0.4	ppbv	0.4	AC-058	23-Mar-17
17030212-003	Benzene		1.45	ppbv	0.01	AC-058	23-Mar-17
17030212-003	Benzyl chloride	K, T, U	< 0.5	ppbv	0.5	AC-058	23-Mar-17
17030212-003	Bromodichloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	23-Mar-17
17030212-003	Bromoform	K, T, U	< 0.02	ppbv	0.02	AC-058	23-Mar-17
17030212-003	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	23-Mar-17
17030212-003	Carbon disulfide	K, T, U	< 0.01	ppbv	0.01	AC-058	23-Mar-17
17030212-003	Carbon tetrachloride	I	0.10	ppbv	0.01	AC-058	23-Mar-17
17030212-003	Chlorobenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	23-Mar-17
17030212-003	Chloroethane	K, T, U	< 0.02	ppbv	0.02	AC-058	23-Mar-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
/NMHC VOC/Bonnyville/Mar 14, 2	17121	Ambient Air	11-Mar-17	16:35

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030212 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030212-003	Chloroform	K, T, U	< 0.02	ppbv	0.02	AC-058	23-Mar-17
17030212-003	Chloromethane		0.65	ppbv	0.02	AC-058	23-Mar-17
17030212-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	23-Mar-17
17030212-003	cis-1,3-Dichloropropene	K, T, U	< 0.05	ppbv	0.05	AC-058	23-Mar-17
17030212-003	cis-2-Butene		1.64	ppbv	0.02	AC-058	23-Mar-17
17030212-003	cis-2-Pentene		0.30	ppbv	0.02	AC-058	23-Mar-17
17030212-003	Cyclohexane		0.05	ppbv	0.02	AC-058	23-Mar-17
17030212-003	Cyclopentane		0.09	ppbv	0.01	AC-058	23-Mar-17
17030212-003	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	23-Mar-17
17030212-003	Ethanol		5.7	ppbv	0.4	AC-058	23-Mar-17
17030212-003	Ethyl acetate	K, T, U	< 0.5	ppbv	0.5	AC-058	23-Mar-17
17030212-003	Ethylbenzene		0.04	ppbv	0.01	AC-058	23-Mar-17
17030212-003	Freon-11	I	0.29	ppbv	0.02	AC-058	23-Mar-17
17030212-003	Freon-113	I	0.09	ppbv	0.01	AC-058	23-Mar-17
17030212-003	Freon-114	K, T, U	< 0.02	ppbv	0.02	AC-058	23-Mar-17
17030212-003	Freon-12		0.63	ppbv	0.02	AC-058	23-Mar-17
17030212-003	Hexachloro-1,3-butadiene	K, T, U	< 0.62	ppbv	0.62	AC-058	23-Mar-17
17030212-003	Isobutane		18.9	ppbv	0.02	AC-058	23-Mar-17
17030212-003	Isopentane		9.79	ppbv	0.04	AC-058	23-Mar-17
17030212-003	Isoprene		0.01	ppbv	0.01	AC-058	23-Mar-17
17030212-003	Isopropyl alcohol	K, T, U	< 0.5	ppbv	0.5	AC-058	23-Mar-17
17030212-003	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	23-Mar-17
17030212-003	m,p-Xylene		0.12	ppbv	0.04	AC-058	23-Mar-17
17030212-003	m-Diethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	23-Mar-17
17030212-003	m-Ethyltoluene	K, T, U	< 0.10	ppbv	0.10	AC-058	23-Mar-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC VOC/Bonnyville/Mar 14, 2	17121	Ambient Air	11-Mar-17 16:35

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030212 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030212-003	Methyl butyl ketone	K, T, U	< 0.62	ppbv	0.62	AC-058	23-Mar-17
17030212-003	Methyl ethyl ketone		0.4	ppbv	0.4	AC-058	23-Mar-17
17030212-003	Methyl isobutyl ketone	K, T, U	< 0.5	ppbv	0.5	AC-058	23-Mar-17
17030212-003	Methyl methacrylate	K, T, U	< 0.09	ppbv	0.09	AC-058	23-Mar-17
17030212-003	Methyl tert butyl ether	K, T, U	< 0.04	ppbv	0.04	AC-058	23-Mar-17
17030212-003	Methylcyclohexane		0.06	ppbv	0.01	AC-058	23-Mar-17
17030212-003	Methylcyclopentane		0.32	ppbv	0.02	AC-058	23-Mar-17
17030212-003	Methylene chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	23-Mar-17
17030212-003	n-Butane		43.8	ppbv	0.11	AC-058	23-Mar-17
17030212-003	n-Decane	K, T, U	< 0.08	ppbv	0.08	AC-058	23-Mar-17
17030212-003	n-Dodecane	K, T, U	< 0.5	ppbv	0.5	AC-058	23-Mar-17
17030212-003	n-Heptane		0.09	ppbv	0.01	AC-058	23-Mar-17
17030212-003	n-Hexane		0.22	ppbv	0.01	AC-058	23-Mar-17
17030212-003	n-Octane		0.03	ppbv	0.02	AC-058	23-Mar-17
17030212-003	n-Pentane		1.5	ppbv	0.1	AC-058	23-Mar-17
17030212-003	n-Propylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	23-Mar-17
17030212-003	n-Undecane	K, T, U	< 0.6	ppbv	0.6	AC-058	23-Mar-17
17030212-003	Naphthalene	K, T, U	< 0.6	ppbv	0.6	AC-058	23-Mar-17
17030212-003	n-Nonane		0.02	ppbv	0.01	AC-058	23-Mar-17
17030212-003	o-Ethyltoluene	I	0.02	ppbv	0.01	AC-058	23-Mar-17
17030212-003	o-Xylene		0.05	ppbv	0.01	AC-058	23-Mar-17
17030212-003	p-Diethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	23-Mar-17
17030212-003	p-Ethyltoluene	K, T, U	< 0.09	ppbv	0.09	AC-058	23-Mar-17
17030212-003	Styrene	K, T, U	< 0.05	ppbv	0.05	AC-058	23-Mar-17
17030212-003	Tetrachloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	23-Mar-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED	
/NMHC VOC/Bonnyville/Mar 14, 2	17121	Ambient Air	11-Mar-17	16:35

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17030212 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030212-003	Tetrahydrofuran	K, T, U	< 0.5	ppbv	0.5	AC-058	23-Mar-17
17030212-003	Toluene		0.38	ppbv	0.01	AC-058	23-Mar-17
17030212-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	23-Mar-17
17030212-003	trans-1,3-Dichloropropylene	K, T, U	< 0.05	ppbv	0.05	AC-058	23-Mar-17
17030212-003	trans-2-Butene		1.96	ppbv	0.01	AC-058	23-Mar-17
17030212-003	trans-2-Pentene		0.54	ppbv	0.02	AC-058	23-Mar-17
17030212-003	Trichloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	23-Mar-17
17030212-003	Vinyl acetate		0.8	ppbv	0.5	AC-058	23-Mar-17
17030212-003	Vinyl chloride	K, T, U	< 0.02	ppbv	0.02	AC-058	23-Mar-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

RESULTS: Adewunmi Adekanmbi
Lakeland Industry and Community Assn
4000, 19 St NE
Calgary
AB T2E 6P8

INVOICE: Arianna Cook 780 812 2182
PO Box 8237
5107W-50 St
Bonnyville
AB T9N 2J5

CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
/NMHC VOC/Bonnyville/Mar 19,	1684	Ambient Air	Normal

DESCRIPTION: Bonnyville- AER

DATE SAMPLED: 19-Mar-17 6:55
DATE RECEIVED: 30-Mar-17
REPORT CREATED: 02-May-17
REPORT NUMBER: 17030303
VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-005	1,1,1-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	1,1,2,2-Tetrachloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	1,1,2-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	1,1-Dichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	1,1-Dichloroethylene	K, T, U	< 0.06	ppbv	0.06	AC-058	04-Apr-17
17030303-005	1,2,3-Trimethylbenzene	K, T, U	< 0.07	ppbv	0.07	AC-058	04-Apr-17
17030303-005	1,2,4-Trichlorobenzene	K, T, U	< 1.1	ppbv	1.1	AC-058	04-Apr-17
17030303-005	1,2,4-Trimethylbenzene	K, T, U	< 0.07	ppbv	0.07	AC-058	04-Apr-17
17030303-005	1,2-Dibromoethane	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	1,2-Dichlorobenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-005	1,2-Dichloroethane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	1,3,5-Trimethylbenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	1,3-Butadiene	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	1,3-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-005	1,4-Dichlorobenzene	K, T, U	< 0.6	ppbv	0.6	AC-058	04-Apr-17
17030303-005	1,4-Dioxane	K, T, U	< 0.6	ppbv	0.6	AC-058	04-Apr-17
17030303-005	1-Butene		0.10	ppbv	0.03	AC-058	04-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC VOC/Bonnyville/Mar 19, 2	1684	Ambient Air	19-Mar-17 6:55

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-005	1-Hexene	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	1-Pentene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	2,2,4-Trimethylpentane		0.02	ppbv	0.01	AC-058	04-Apr-17
17030303-005	2,2-Dimethylbutane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	2,3,4-Trimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	2,3-Dimethylbutane	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	2,3-Dimethylpentane	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	2,4-Dimethylpentane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	2-Methylheptane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	2-Methylhexane		0.03	ppbv	0.01	AC-058	04-Apr-17
17030303-005	2-Methylpentane		0.08	ppbv	0.01	AC-058	04-Apr-17
17030303-005	3-Methylheptane	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	3-Methylhexane		0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	3-Methylpentane		0.03	ppbv	0.01	AC-058	04-Apr-17
17030303-005	Acetone		1.6	ppbv	0.6	AC-058	04-Apr-17
17030303-005	Acrolein	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-005	Benzene		0.13	ppbv	0.01	AC-058	04-Apr-17
17030303-005	Benzyl chloride	K, T, U	< 0.6	ppbv	0.6	AC-058	04-Apr-17
17030303-005	Bromodichloromethane	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	Bromoform	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	Bromomethane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	Carbon disulfide	I	0.04	ppbv	0.01	AC-058	04-Apr-17
17030303-005	Carbon tetrachloride	I	0.07	ppbv	0.01	AC-058	04-Apr-17
17030303-005	Chlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	Chloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC VOC/Bonnyville/Mar 19, 2	1684	Ambient Air	19-Mar-17 6:55

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-005	Chloroform	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	Chloromethane		0.60	ppbv	0.03	AC-058	04-Apr-17
17030303-005	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	cis-1,3-Dichloropropene	K, T, U	< 0.06	ppbv	0.06	AC-058	04-Apr-17
17030303-005	cis-2-Butene	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	cis-2-Pentene	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	Cyclohexane	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	Cyclopentane		0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	Ethanol		0.9	ppbv	0.4	AC-058	04-Apr-17
17030303-005	Ethyl acetate	K, T, U	< 0.6	ppbv	0.6	AC-058	04-Apr-17
17030303-005	Ethylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	Freon-11	I	0.22	ppbv	0.03	AC-058	04-Apr-17
17030303-005	Freon-113	I	0.09	ppbv	0.01	AC-058	04-Apr-17
17030303-005	Freon-114	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	Freon-12	I	0.37	ppbv	0.03	AC-058	04-Apr-17
17030303-005	Hexachloro-1,3-butadiene	K, T, U	< 0.70	ppbv	0.70	AC-058	04-Apr-17
17030303-005	Isobutane		0.56	ppbv	0.03	AC-058	04-Apr-17
17030303-005	Isopentane		0.63	ppbv	0.04	AC-058	04-Apr-17
17030303-005	Isoprene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	Isopropyl alcohol	K, T, U	< 0.6	ppbv	0.6	AC-058	04-Apr-17
17030303-005	Isopropylbenzene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	m,p-Xylene	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-005	m-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	04-Apr-17
17030303-005	m-Ethyltoluene	K, T, U	< 0.11	ppbv	0.11	AC-058	04-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC VOC/Bonnyville/Mar 19, 2	1684	Ambient Air	19-Mar-17 6:55

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-005	Methyl butyl ketone	K, T, U	< 0.70	ppbv	0.70	AC-058	04-Apr-17
17030303-005	Methyl ethyl ketone	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-005	Methyl isobutyl ketone	K, T, U	< 0.6	ppbv	0.6	AC-058	04-Apr-17
17030303-005	Methyl methacrylate	K, T, U	< 0.10	ppbv	0.10	AC-058	04-Apr-17
17030303-005	Methyl tert butyl ether	K, T, U	< 0.04	ppbv	0.04	AC-058	04-Apr-17
17030303-005	Methylcyclohexane		0.03	ppbv	0.01	AC-058	04-Apr-17
17030303-005	Methylcyclopentane	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	Methylene chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	04-Apr-17
17030303-005	n-Butane		4.44	ppbv	0.04	AC-058	04-Apr-17
17030303-005	n-Decane	K, T, U	< 0.08	ppbv	0.08	AC-058	04-Apr-17
17030303-005	n-Dodecane	K, T, U	< 0.6	ppbv	0.6	AC-058	04-Apr-17
17030303-005	n-Heptane		0.03	ppbv	0.01	AC-058	04-Apr-17
17030303-005	n-Hexane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	n-Octane	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	n-Pentane		0.2	ppbv	0.1	AC-058	04-Apr-17
17030303-005	n-Propylbenzene	K, T, U	< 0.07	ppbv	0.07	AC-058	04-Apr-17
17030303-005	n-Undecane	K, T, U	< 0.7	ppbv	0.7	AC-058	04-Apr-17
17030303-005	Naphthalene	K, T, U	< 0.7	ppbv	0.7	AC-058	04-Apr-17
17030303-005	n-Nonane	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	o-Ethyltoluene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	o-Xylene		0.03	ppbv	0.01	AC-058	04-Apr-17
17030303-005	p-Diethylbenzene	K, T, U	< 0.06	ppbv	0.06	AC-058	04-Apr-17
17030303-005	p-Ethyltoluene	K, T, U	< 0.10	ppbv	0.10	AC-058	04-Apr-17
17030303-005	Styrene	K, T, U	< 0.06	ppbv	0.06	AC-058	04-Apr-17
17030303-005	Tetrachloroethylene	K, T, U	< 0.06	ppbv	0.06	AC-058	04-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
/NMHC VOC/Bonnyville/Mar 19, 2	1684	Ambient Air	19-Mar-17 6:55

DESCRIPTION: Bonnyville- AER

REPORT NUMBER: 17030303 **REPORT CREATED:** 02-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17030303-005	Tetrahydrofuran	K, T, U	< 0.6	ppbv	0.6	AC-058	04-Apr-17
17030303-005	Toluene		0.05	ppbv	0.01	AC-058	04-Apr-17
17030303-005	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	04-Apr-17
17030303-005	trans-1,3-Dichloropropylene	K, T, U	< 0.06	ppbv	0.06	AC-058	04-Apr-17
17030303-005	trans-2-Butene		0.04	ppbv	0.01	AC-058	04-Apr-17
17030303-005	trans-2-Pentene	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17
17030303-005	Trichloroethylene	K, T, U	< 0.06	ppbv	0.06	AC-058	04-Apr-17
17030303-005	Vinyl acetate	K, T, U	< 0.6	ppbv	0.6	AC-058	04-Apr-17
17030303-005	Vinyl chloride	K, T, U	< 0.03	ppbv	0.03	AC-058	04-Apr-17

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

Date: May-02-17 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

RESULTS: Adewunmi Adekanmbi
Lakeland Industry and Community Assn
4000, 19 St NE
Calgary
AB T2E 6P8

INVOICE: Arianna Cook 780 812 2182
PO Box 8237
5107W-50 St
Bonnyville
AB T9N 2J5

CLIENT SAMPLE ID	CANISTER ID	Matrix	Priority
A/NMHC/Bonnyville/March 28, 2(	1517	Ambient Air	Normal

DESCRIPTION: Bonnyville - AER

DATE SAMPLED: 28-Mar-17 18:10

DATE RECEIVED: 06-Apr-17

REPORT CREATED: 03-May-17

REPORT NUMBER: 17040067

VERSION: Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17040067-003	1,1,1-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Apr-17
17040067-003	1,1,2,2-Tetrachloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Apr-17
17040067-003	1,1,2-Trichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Apr-17
17040067-003	1,1-Dichloroethane	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Apr-17
17040067-003	1,1-Dichloroethylene	K, T, U	< 0.05	ppbv	0.05	AC-058	14-Apr-17
17040067-003	1,2,3-Trimethylbenzene	I	0.09	ppbv	0.07	AC-058	14-Apr-17
17040067-003	1,2,4-Trichlorobenzene	K, T, U	< 1.1	ppbv	1.1	AC-058	14-Apr-17
17040067-003	1,2,4-Trimethylbenzene		0.24	ppbv	0.07	AC-058	14-Apr-17
17040067-003	1,2-Dibromoethane	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Apr-17
17040067-003	1,2-Dichlorobenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	14-Apr-17
17040067-003	1,2-Dichloroethane	I	0.03	ppbv	0.01	AC-058	14-Apr-17
17040067-003	1,2-Dichloropropane	K, T, U	< 0.01	ppbv	0.01	AC-058	14-Apr-17
17040067-003	1,3,5-Trimethylbenzene		0.11	ppbv	0.03	AC-058	14-Apr-17
17040067-003	1,3-Butadiene	I	0.04	ppbv	0.03	AC-058	14-Apr-17
17040067-003	1,3-Dichlorobenzene	K, T, U	< 0.4	ppbv	0.4	AC-058	14-Apr-17
17040067-003	1,4-Dichlorobenzene	K, T, U	< 0.5	ppbv	0.5	AC-058	14-Apr-17
17040067-003	1,4-Dioxane	K, T, U	< 0.5	ppbv	0.5	AC-058	14-Apr-17
17040067-003	1-Butene		0.48	ppbv	0.03	AC-058	14-Apr-17

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

Date: Wednesday, May 03, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
A/NMHC/Bonnyville/March 28, 2(	1517	Ambient Air	28-Mar-17 18:10

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17040067 **REPORT CREATED:** 03-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17040067-003	1-Hexene	I	0.03	ppbv	0.03	AC-058	14-Apr-17
17040067-003	1-Pentene		0.03	ppbv	0.01	AC-058	14-Apr-17
17040067-003	2,2,4-Trimethylpentane		0.07	ppbv	0.01	AC-058	14-Apr-17
17040067-003	2,2-Dimethylbutane		0.04	ppbv	0.01	AC-058	14-Apr-17
17040067-003	2,3,4-Trimethylpentane		0.05	ppbv	0.01	AC-058	14-Apr-17
17040067-003	2,3-Dimethylbutane		0.13	ppbv	0.03	AC-058	14-Apr-17
17040067-003	2,3-Dimethylpentane		0.15	ppbv	0.03	AC-058	14-Apr-17
17040067-003	2,4-Dimethylpentane		0.08	ppbv	0.01	AC-058	14-Apr-17
17040067-003	2-Methylheptane		0.23	ppbv	0.01	AC-058	14-Apr-17
17040067-003	2-Methylhexane		0.26	ppbv	0.01	AC-058	14-Apr-17
17040067-003	2-Methylpentane		0.71	ppbv	0.01	AC-058	14-Apr-17
17040067-003	3-Methylheptane		0.18	ppbv	0.03	AC-058	14-Apr-17
17040067-003	3-Methylhexane		0.32	ppbv	0.03	AC-058	14-Apr-17
17040067-003	3-Methylpentane		0.40	ppbv	0.01	AC-058	14-Apr-17
17040067-003	Acetone		6.3	ppbv	0.5	AC-058	14-Apr-17
17040067-003	Acrolein	K, T, U	< 0.4	ppbv	0.4	AC-058	14-Apr-17
17040067-003	Benzene		0.53	ppbv	0.01	AC-058	14-Apr-17
17040067-003	Benzyl chloride	K, T, U	< 0.5	ppbv	0.5	AC-058	14-Apr-17
17040067-003	Bromodichloromethane	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Apr-17
17040067-003	Bromoform	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Apr-17
17040067-003	Bromomethane	I	0.02	ppbv	0.01	AC-058	14-Apr-17
17040067-003	Carbon disulfide	I	0.26	ppbv	0.01	AC-058	14-Apr-17
17040067-003	Carbon tetrachloride	I	0.14	ppbv	0.01	AC-058	14-Apr-17
17040067-003	Chlorobenzene	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Apr-17
17040067-003	Chloroethane	I	0.04	ppbv	0.03	AC-058	14-Apr-17

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

Date: Wednesday, May 03, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
A/NMHC/Bonnyville/March 28, 2(	1517	Ambient Air	28-Mar-17 18:10

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17040067 **REPORT CREATED:** 03-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17040067-003	Chloroform	I	0.03	ppbv	0.03	AC-058	14-Apr-17
17040067-003	Chloromethane		0.68	ppbv	0.03	AC-058	14-Apr-17
17040067-003	cis-1,2-Dichloroethene	K, T, U	< 0.01	ppbv	0.01	AC-058	14-Apr-17
17040067-003	cis-1,3-Dichloropropene	K, T, U	< 0.05	ppbv	0.05	AC-058	14-Apr-17
17040067-003	cis-2-Butene		0.05	ppbv	0.03	AC-058	14-Apr-17
17040067-003	cis-2-Pentene	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Apr-17
17040067-003	Cyclohexane		0.70	ppbv	0.03	AC-058	14-Apr-17
17040067-003	Cyclopentane		0.11	ppbv	0.01	AC-058	14-Apr-17
17040067-003	Dibromochloromethane	K, T, U	< 0.01	ppbv	0.01	AC-058	14-Apr-17
17040067-003	Ethanol		2.0	ppbv	0.4	AC-058	14-Apr-17
17040067-003	Ethyl acetate	K, T, U	< 0.5	ppbv	0.5	AC-058	14-Apr-17
17040067-003	Ethylbenzene		0.12	ppbv	0.01	AC-058	14-Apr-17
17040067-003	Freon-11	I	0.31	ppbv	0.03	AC-058	14-Apr-17
17040067-003	Freon-113	I	0.14	ppbv	0.01	AC-058	14-Apr-17
17040067-003	Freon-114	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Apr-17
17040067-003	Freon-12		0.51	ppbv	0.03	AC-058	14-Apr-17
17040067-003	Hexachloro-1,3-butadiene	K, T, U	< 0.68	ppbv	0.68	AC-058	14-Apr-17
17040067-003	Isobutane		1.06	ppbv	0.03	AC-058	14-Apr-17
17040067-003	Isopentane		1.34	ppbv	0.04	AC-058	14-Apr-17
17040067-003	Isoprene		0.02	ppbv	0.01	AC-058	14-Apr-17
17040067-003	Isopropyl alcohol	K, T, U	< 0.5	ppbv	0.5	AC-058	14-Apr-17
17040067-003	Isopropylbenzene		0.03	ppbv	0.01	AC-058	14-Apr-17
17040067-003	m,p-Xylene		0.70	ppbv	0.04	AC-058	14-Apr-17
17040067-003	m-Diethylbenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	14-Apr-17
17040067-003	m-Ethyltoluene	K, T, U	< 0.11	ppbv	0.11	AC-058	14-Apr-17

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

Date: Wednesday, May 03, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
A/NMHC/Bonnyville/March 28, 2(	1517	Ambient Air	28-Mar-17 18:10

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17040067 **REPORT CREATED:** 03-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17040067-003	Methyl butyl ketone	K, T, U	< 0.68	ppbv	0.68	AC-058	14-Apr-17
17040067-003	Methyl ethyl ketone		0.4	ppbv	0.4	AC-058	14-Apr-17
17040067-003	Methyl isobutyl ketone	K, T, U	< 0.5	ppbv	0.5	AC-058	14-Apr-17
17040067-003	Methyl methacrylate	K, T, U	< 0.09	ppbv	0.09	AC-058	14-Apr-17
17040067-003	Methyl tert butyl ether	K, T, U	< 0.04	ppbv	0.04	AC-058	14-Apr-17
17040067-003	Methylcyclohexane		1.17	ppbv	0.01	AC-058	14-Apr-17
17040067-003	Methylcyclopentane		0.46	ppbv	0.03	AC-058	14-Apr-17
17040067-003	Methylene chloride	K, T, U	< 0.4	ppbv	0.4	AC-058	14-Apr-17
17040067-003	n-Butane		2.73	ppbv	0.04	AC-058	14-Apr-17
17040067-003	n-Decane		0.19	ppbv	0.08	AC-058	14-Apr-17
17040067-003	n-Dodecane	K, T, U	< 0.5	ppbv	0.5	AC-058	14-Apr-17
17040067-003	n-Heptane		0.40	ppbv	0.01	AC-058	14-Apr-17
17040067-003	n-Hexane		0.58	ppbv	0.01	AC-058	14-Apr-17
17040067-003	n-Octane		0.33	ppbv	0.03	AC-058	14-Apr-17
17040067-003	n-Pentane		1.2	ppbv	0.1	AC-058	14-Apr-17
17040067-003	n-Propylbenzene	K, T, U	< 0.07	ppbv	0.07	AC-058	14-Apr-17
17040067-003	n-Undecane	K, T, U	< 0.7	ppbv	0.7	AC-058	14-Apr-17
17040067-003	Naphthalene	K, T, U	< 0.7	ppbv	0.7	AC-058	14-Apr-17
17040067-003	n-Nonane		0.30	ppbv	0.01	AC-058	14-Apr-17
17040067-003	o-Ethyltoluene	I	0.05	ppbv	0.01	AC-058	14-Apr-17
17040067-003	o-Xylene		0.24	ppbv	0.01	AC-058	14-Apr-17
17040067-003	p-Diethylbenzene	I	0.06	ppbv	0.05	AC-058	14-Apr-17
17040067-003	p-Ethyltoluene	K, T, U	< 0.09	ppbv	0.09	AC-058	14-Apr-17
17040067-003	Styrene	K, T, U	< 0.05	ppbv	0.05	AC-058	14-Apr-17
17040067-003	Tetrachloroethylene	I	0.06	ppbv	0.05	AC-058	14-Apr-17

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

Date: Wednesday, May 03, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

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

ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

CLIENT SAMPLE ID	CANISTER ID	Matrix	DATE SAMPLED
A/NMHC/Bonnyville/March 28, 2(	1517	Ambient Air	28-Mar-17 18:10

DESCRIPTION: Bonnyville - AER

REPORT NUMBER: 17040067 **REPORT CREATED:** 03-May-17 **VERSION:** Version 01

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
17040067-003	Tetrahydrofuran	K, T, U	< 0.5	ppbv	0.5	AC-058	14-Apr-17
17040067-003	Toluene		0.98	ppbv	0.01	AC-058	14-Apr-17
17040067-003	trans-1,2-Dichloroethylene	K, T, U	< 0.01	ppbv	0.01	AC-058	14-Apr-17
17040067-003	trans-1,3-Dichloropropylene	K, T, U	< 0.05	ppbv	0.05	AC-058	14-Apr-17
17040067-003	trans-2-Butene		0.04	ppbv	0.01	AC-058	14-Apr-17
17040067-003	trans-2-Pentene		0.03	ppbv	0.03	AC-058	14-Apr-17
17040067-003	Trichloroethylene	I	0.07	ppbv	0.05	AC-058	14-Apr-17
17040067-003	Vinyl acetate	K, T, U	< 0.5	ppbv	0.5	AC-058	14-Apr-17
17040067-003	Vinyl chloride	K, T, U	< 0.03	ppbv	0.03	AC-058	14-Apr-17

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

Date: Wednesday, May 03, 2017 **Inquiries:** (780) 632 8455 **E-mail:** EAS.Results@innotechalberta.ca

APPENDIX V
REPORT CERTIFICATION FORM

Report Certification Form

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

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

Maram Ghaleb

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

May 12, 2017

Report Issued Date (dd-mm-yyyy)

APPENDIX VI
DATA VALIDATION CERTIFICATION FORM

Validation Certificate Form

Client:	Lakeland Industry & Community Association	**Project #:**	2833-2017-03-35-C
Site:	Bonnyville Continuous Monitoring Station	**Contact:**	Mike Bisaga

Level 0 Preliminary Verification	Maram Ghaleb	**Date**	April 30, 2017
Level 1 Primary Validation	Maram Ghaleb	**Date**	May 5, 2017
Level 2 Final Validation	Maram Ghaleb	**Date**	May 9, 2017
Level 3 Independent Data Review		**Date**	May 12, 2017
Post-Final Validation	**NA**	**Date**	**NA**

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