



Lakeland Industry & Community Association

MAY 2019

Monthly Ambient Air Quality Monitoring Report

LICA-201905

Operation and Maintenance:

Maxxam Analytics

Data Validation and Report:

Maxxam Analytics

July 2, 2019

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July 2, 2019

Alberta Environment and Parks (AEP)

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9820 106 Street

Edmonton, AB, T5K 2J6

Emailed to: Air.Reporting@gov.ab.ca

RE: LICA – May 2019 Monthly Ambient Air Quality Monitoring Report

Enclosed is the May 2019 Monthly Ambient Air Quality Monitoring Report for the continuous ambient air quality monitoring stations of the Lakeland Industry & Community Association (LICA) regional air quality monitoring network.

The representative of the Person Responsible for this monitoring program is

LICA Airshed

Michael Bisaga, Technical Program Manager

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This report has been prepared by Maxxam Analytics, and has been reviewed and submitted by Michael Bisaga & Lily Lin of the LICA Airshed.

NETWORK STATION SUMMARY

Listing of Continuous Monitoring Stations and Integrated Sampling Stations

Station Name		Cold Lake South	Maskwa	St. Lina	Bonnyville East
Station ID		1174	1248	1250	1608
Coordinates		54.41402, -110.23316	54.604935, -110.452637	54.215961, -111.503304	54.252747, -110.690611
Continuous Monitoring Parameter	SO2	√	√	√	√
	TRS	√			
	H2S		√	√	√
	THC	√	√	√	√
	CH4	√	√	√	√
	NMHC	√	√	√	√
	NOX	√	√	√	√
	NO	√	√	√	√
	NO2	√	√	√	√
	O3	√		√	√
	PM2.5	√		√	√
	TPX	√	√	√	
	RH	√	√	√	
	BP		√	√	
	PRECIPTATION		√	√	
	WS	√	√	√	√
	WD	√	√	√	√
STDWD	√	√	√	√	
Integrated Sampling	VOCs	√			√
	PAHs	√			√
	Partisol	√			
	Passive	√			
	NMHC Canister				√

List of Contractors who performed the air monitoring activities

Sampling Program	Monitoring Activities Conducted By	Sample Analysis Conducted By	Data/Report Prepared By	Electronic Submission Conducted By
Continuous Monitoring Station	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics
Intermittent (VOCs/PAHs)	Maxxam Analytics	InnoTech Alberta Inc	InnoTech Alberta Inc	Maxxam Analytics
Partisol	Maxxam Analytics	InnoTech Alberta Inc	InnoTech Alberta Inc	Maxxam Analytics
Passive	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics	Maxxam Analytics
NMHC Canister	Maxxam Analytics	InnoTech Alberta Inc	InnoTech Alberta Inc	Not Applicable

Monitoring Notes during the Month of May 2019

Cold Lake South:

- Measured parameters were below Alberta Ambient Air Quality Objectives (AAAQOs) where applicable, with an exception of PM_{2.5}. AEP Ref #: 353872.
- All data collected this month were compliant with the requirements outlined in the AMD 2016.
- All parameters met the 90% operational uptime requirement, with an exception of NO_x/NO/NO₂ (76.3%). AEP Ref #: 354247.
- **AEP Audit:** A station audit was conducted by Alberta Environment and Parks (AEP) on May 8.
- **NO_x/NO/NO₂:** An AEP audit was performed on May 8. The analyzer failed the initial audit attempt due to a compressed O-ring. The audit was successfully completed following a replacement of the sample filter holder. Based on AEP's recommendation, data was invalidated back to the last valid monthly calibration, which occurred on April 24. 176 hours of downtime were recorded in May due to this event.
- **PM_{2.5}:** One 24-hour exceedance was recorded on May 28, at concentration of 30 µg/m³.
- **THC/CH₄/NMHC:** The Maxxam-supplied Thermo 55i analyzer, s/n: 1236656188, was removed following a successful shut-down calibration on May 13, and a LICA-owned Thermo 55i, s/n: 1236656107, was installed. The analyzer was allowed time to stabilize overnight and a successful installation calibration was completed on May 14. Nineteen hours of downtime were recorded due to the analyzer replacement event.
- The VOCs, PAHs and Partisol samples were processed for analysis by InnoTech and the results will be provided in the 2019, Q2 Integrated Report.
- The passive samples were processed for analysis by Maxxam Analytics and the results will be provided in the 2019, Q2 Integrated Report.

Maskwa:

- Measured parameters were below Alberta Ambient Air Quality Objectives (AAAQOs) where applicable.
- All data collected this month were compliant with the requirements outlined in the AMD 2016.
- All parameters met the 90% operational uptime requirement.
- **AEP Audit:** A station audit was conducted by Alberta Environment and Parks (AEP) on May 9.
- **THC/CH4/NMHC:** The analyzer failed the scheduled and repeat span checks on May 25 as the span gas depleted. The span gas bottle was replaced on May 27 and a successful zero-span check was completed afterwards. Two hours of downtime were recorded due to this event.

St. Lina Station:

- Measured parameters were below Alberta Ambient Air Quality Objectives (AAAQOs) where applicable, with an exception of PM2.5. AEP Ref #: 354046.
- All parameters met the 90% operational uptime requirement.
- **AEP Audit:** A station audit was conducted by Alberta Environment and Parks (AEP) on May 6.
- **PM2.5:** One 1-hour exceedance was recorded on May 30 at hour 14, at concentration of 88 µg/m³.
- **NOx/NO/NO2:** One hour of downtime was recorded on May 26 due to an additional quality check performed to assess a biased low drift in span response.
- **H2S:** Two hours of downtime were recorded this month due to additional quality checks performed to assess biased high drifts in zero and span response.

Bonnyville East Station:

- All data collected this month were compliant with the requirements outlined in the AMD 2016.
- All parameters met the 90% operational uptime requirement.
- Measured parameters were below Alberta Ambient Air Quality Objectives (AAAQOs) where applicable, with exceptions of H2S. Sixty 1-hr and ten 24-hr exceedances were recorded this month.

Date	Time	Avg. Period	Reading (ppb)	AEP Reference #
02-May	21:00	1-hr	32	352764
02-May	22:00	1-hr	29	352764
02-May	23:00	1-hr	14	352764
02-May	-	24-hr	4	352764
05-May	19:00	1-hr	12	352848
05-May	20:00	1-hr	25	352848
05-May	21:00	1-hr	20	352848
06-May	4:00	1-hr	16	352849

06-May	5:00	1-hr	11	352849
06-May	6:00	1-hr	11	352849
07-May	23:00	1-hr	15	352942
08-May	0:00	1-hr	23	352943
08-May	2:00	1-hr	16	352943
08-May	22:00	1-hr	14	352943
08-May	23:00	1-hr	18	352943
08-May	-	24-hr	4	352848
09-May	0:00	1-hr	52	352978
09-May	2:00	1-hr	42	352978
09-May	-	24-hr	5	352849
11-May	19:00	1-hr	89	353093
11-May	20:00	1-hr	34	353093
11-May	-	24-hr	6	352942
14-May	7:00	1-hr	12	353257
16-May	21:00	1-hr	35	353346
16-May	22:00	1-hr	25	353346
16-May	-	24-hr	4	352943
17-May	0:00	1-hr	13	353347
17-May	17:00	1-hr	11	353347
17-May	18:00	1-hr	14	353347
17-May	19:00	1-hr	23	353347
17-May	20:00	1-hr	41	353347
17-May	21:00	1-hr	42	353347
17-May	22:00	1-hr	73	353347
17-May	23:00	1-hr	18	353347
17-May	-	24-hr	15	352978
18-May	2:00	1-hr	28	353398
18-May	5:00	1-hr	24	353398
18-May	6:00	1-hr	16	353398
18-May	21:00	1-hr	29	353398
18-May	22:00	1-hr	36	353398
18-May	23:00	1-hr	24	353398
18-May	-	24-hr	9	353093
19-May	0:00	1-hr	41	353413
19-May	1:00	1-hr	53	353413
19-May	2:00	1-hr	76	353413
19-May	3:00	1-hr	35	353413
19-May	4:00	1-hr	11	353413
19-May	5:00	1-hr	11	353413
19-May	-	24-hr	11	353257

20-May	2:00	1-hr	11	353432
20-May	18:00	1-hr	13	353432
20-May	19:00	1-hr	23	353432
20-May	20:00	1-hr	55	353432
20-May	21:00	1-hr	67	353432
20-May	22:00	1-hr	62	353432
20-May	23:00	1-hr	75	353432
20-May	-	24-hr	15	353346
21-May	0:00	1-hr	33	353470
21-May	1:00	1-hr	16	353470
21-May	2:00	1-hr	14	353470
21-May	3:00	1-hr	28	353470
21-May	19:00	1-hr	15	353470
21-May	21:00	1-hr	24	353470
21-May	22:00	1-hr	30	353470
21-May	23:00	1-hr	23	353470
21-May	-	24-hr	11	353347
22-May	2:00	1-hr	25	353521
23-May	0:00	1-hr	18	353557
31-May	0:00	1-hr	12	354045
31-May	1:00	1-hr	13	354045

- **AEP Audit:** A station audit was conducted by Alberta Environment and Parks (AEP) on May 7.
- **H2S:** One hour of downtime was recorded this month, due to an additional quality check performed to assess a biased high drift in span response.
- **H2S:** One hour of downtime was recorded on May 6 due to an additional quality check, performed to assess a biased high drift in span response.
- **NO_x/NO/NO₂:** Thirteen hours of downtime were recorded across the month due to additional quality checks and corrective actions performed to address drifts in span response.
- **NMHC Canister System:** Three canister events were recorded this month: on May 24 at 21:55, at initial concentration of 0.47 ppm, on May 30 at 22:50, at initial concentration of 0.56 ppm, and on May 31 at 09:50, at initial concentration of 1.00 ppm. The samples were processed for analysis by InnoTech and the results will be provided in the 2019, Q2 Integrated Sampling Report.

Revisions to Alberta's Ambient Air Quality Data Warehouse

No revisions to historical data previously submitted to the Alberta's Ambient Air Quality Data Warehouse were made this month.

Deviations from Authorized Monitoring Methods

At the Maskwa station, nearby trees exceed the height allowed under section 2.3 of the wind speed and wind direction siting criteria in Chapter 3 of the AMD. This non-conformance was documented in the updated station site documents. Further actions are being considered including siting the wind sensor so that it meets AMD Chapter 3 siting requirements, or obtaining written authorization from “The Director” to deviate from AMD Siting requirements.

At the Cold Lake South station, the height of the existing wind sensor tower is shorter than the AMD requirements listed in section 2.3 of the wind speed and wind direction siting criteria in Chapter 3 of the AMD. This non-conformance was documented in the updated station site documents. Further actions are being considered including siting the wind sensor so that it meets AMD Chapter 3 siting requirements, or obtaining written authorization from “The Director” to deviate from AMD Siting requirements.

Certification

As the LICA Environmental Program Manager and Data & Reporting Specialist, 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 verify 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, Partisol samples and passive samples. Electronic submission for the intermittent sample, Partisol sample and passive sample results will be performed during the preparation of the 2019 Q2 integrated sampling report.

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

Respectfully,



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MAY 1 - 31, 2019

MONTHLY AMBIENT AIR QUALITY MONITORING REPORT

AEP Ambient Station ID: 1174

Project #: 2833-2019-05-23-C

LICA-201905

Prepared for:

Lakeland Industry & Community Association

Mike Bisaga

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Monitoring Station

**Cold Lake South Continuous Monitoring
Station**

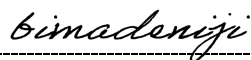
Date of Report Issuance: June 28, 2019

Report Preparation By:

Bim Adeniji, M.Sc.

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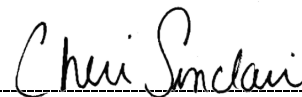
Project Manager, Customer Service, Air Services

Reviewed By:

Cheri Sinclair, B.Sc.

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Supervisor, Customer Service, Air Services



#1 - 2080 39 Avenue NE, Calgary AB, T2E 6P7

Lakeland Industry & Community Association

5107 50 St.
Bonnyville, Alberta T9N 2J7

Attention: Mike Bisaga

Date: June 28, 2019

Subject: MONTHLY AMBIENT AIR QUALITY MONITORING REPORT for MAY 1 - 31, 2019

In May 2019, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the Cold Lake South Continuous Monitoring Station near Cold Lake, Alberta. The monitoring program provides measurements of ambient air pollutants and meteorological data to satisfy the reporting requirements of the Alberta airshed.

Network Parameters for Continuous Monitoring:

This monthly report, where applicable, was prepared in accordance with Chapter 9 of the Air Monitoring Directive (AMD, 2016). The report summarizes the continuous monitoring results for pollutant and meteorological parameters and presents the hourly statistics, graphs and rose charts for the month. Calibration records are provided in a separate PDF document in order to comply with AMD requirements Chapter 9, 13.1.7, RC 13-R. The station is equipped with analyzers to measure SO₂, TRS, THC, CH₄, NMHC, NO_x, NO, NO₂, PM_{2.5} and O₃. The meteorological sensors and equipment capture data for WS, WD, RH, AmbTPX and STDWD.

Exceedance & Performance Reporting:

Non-Conformance: The operational time of 76.3% for NO_x/NO/NO₂ did not meet the equipment uptime specifications as per AMD, Chapter 9, 14.0, RC 14-C. This contravention was reported to AEP under reference number: **354247**. For all the remaining parameters, the data capture rates for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above the 90% requirement, as per the Alberta Air Monitoring Directive (AMD, Chapter 6, DQ 4-C, 2016).

Comparisons of the measured ambient air concentrations to the corresponding AAAQOs were done in accordance with Appendix A, Alberta Ambient Air Quality Objective Calculation Guidelines (AMD, Chapter 9, Appendix A, 2016). For PM_{2.5}, there was a concentration recorded in excess of the Alberta Ambient Air Quality Objectives and Guidelines (AAAQO, January 2019). One 24-hour exceedance was recorded and reported to AEP under reference number: **353872**.

For all the remaining parameters, there were no ambient concentrations in excess of the AAAQOs.

Monthly Monitoring Overview:

In relation to the previous month, there were no changes made to the scope or management of the ambient air monitoring program.

The evaluation of data collected in the month of May did not reveal any errors or omissions that would require resubmission of air data to AEP's airdata warehouse.

AEP Audit: A station audit was conducted by Alberta Environment and Parks (AEP) on May 8. The Audit report can be found on page 84.

THC/CH₄/NMHC: Following a successful shut-down calibration on May 13, Maxxam's Thermo 55i analyzer (s/n: 1236656188) was removed and a LICA-owned Thermo 55i (s/n: 1236656107) was installed. The analyzer was allowed time to stabilize overnight and a successful installation calibration was completed on May 14. Nineteen hours of downtime were recorded due to the analyzer replacement event.

NO_x/NO/NO₂: During an AEP audit on May 8, the analyzer failed the initial audit attempt due to a compressed internal O-ring in the Stainless steel sample inlet filter holder. The audit was successfully completed once the stainless steel unit was replaced with an inert teflon Thermo style filter holder. Based on AEP's recommendation and Maxxam's internal review, data was invalidated back to the last valid monthly calibration, which occurred on April 24. 176 hours of downtime were recorded in May, due to this event.

Should you have any questions concerning the results or if we can be of further assistance, please contact your Maxxam representative indicated below.

Reviewed by:



Cheri Sinclair, B.Sc.

Supervisor, Customer Service, Air Services

403-819-9139

I certify that I 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. Certification of submitted information is specific to the contents of this report and is not intended to represent the onus of the Person Responsible, as outlined in Chapter 9, RC 12-E.

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List of Acronyms

AAAQO	Alberta Ambient Air Quality Objectives and Guidelines Summary
AEP	Alberta Environment and Parks
AMBTPX	Ambient Temperature
AMD	Air Monitoring Directive
CH₄	Methane
DAS	Data acquisition system
hr	Hour
hrs	Hours
IZS	Internal zero-span
kph	Kilometers per hour
NO	Nitric Oxide
NO₂	Nitrogen dioxide
NO_x	Total oxides of nitrogen
O₃	Ozone
NMHC	Non-Methane Hydrocarbon
PM_{2.5}	Particulate matter less than or equal to 2.5 microns in diameter
ppb	Parts per billion
ppm	Parts per million
QA	Quality Assurance
QC	Quality Control
RH	Relative Humidity
SHARP	Synchronized Hybrid Ambient Real-time Particulate Monitor
SOP	Standard Operating Procedure
SO₂	Sulphur Dioxide
STDWD	Standard Deviation Wind Direction
THC	Total hydrocarbons
TRS	Total Reduced Sulphur
µg/m³	Microgram per cubic meter
WS	Wind Speed
WD	Wind Direction
°C	Degrees Celsius

AAAQO Exceedance Summary Report

SO₂ 1-Hour Exceedances

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

SO₂ 24-Hour Exceedances

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

NO₂ 1-Hour Exceedances

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

PM_{2.5} 1-Hour Exceedances

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

PM_{2.5} 24-Hour Exceedances

DATE	READING (µg/m ³)	WS (kph)	WD (deg)	AEP Reference #
May 28	30	5.4	W	353872

O₃ 1-Hour Exceedances

Measured concentrations of ozone were below the 1-hour AAAQO of 76 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

MONTHLY CONTINUOUS DATA SUMMARY

Lakeland Industry & Community Association						MAXIMUM VALUES							OPERATIONAL TIME (%)
Cold Lake South Continuous Monitoring Station						1-HOUR					24-HOUR		
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
	1-hr	24-hr	1-hr	24-hr									
SO ₂ (ppb)	172	48	0	0	0	2	12	2	5.5	SE	0	1	100.0
TRS (ppb)	-	-	-	-	0	1	10	6	14.1	NNW	1	23	100.0
THC (ppm)	-	-	-	-	2.04	2.61	23	7	3.6	WSW	2.17	27	97.4
CH ₄ (ppm)	-	-	-	-	2.04	2.61	23	7	3.6	WSW	2.17	27	97.4
NMHC (ppm)	-	-	-	-	0.00	0.01	18	12	11.3	SE	0.00	1	97.4
NO ₂ (ppb)	159	-	0	-	2	11	9	6	1.4	S	3	9	76.3
NO (ppb)	-	-	-	-	0	16	9	5	0.9	ENE	2	9	76.3
NO _x (ppb)	-	-	-	-	2	26	9	5	0.9	ENE	4	9	76.3
O ₃ (ppb)	76	-	0	-	35.6	72.6	29	12	13.4	WSW	45.0	12	100.0
PM _{2.5} (µg/m ³)	80	29	0	1	6	44	28	14	12.5	WNW	30	28	100.0
RELATIVE HUMIDITY (%)	-	-	-	-	52	100	2	2	3.3	W	75	24	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	10.2	31.4	29	16	10.0	W	21.4	29	100.0
VECTOR WS (kph)	-	-	-	-	0.9	24.3	3	15	-	NW	11.3	10	100.0
VECTOR WD (sec)	-	-	-	-	39 (NE)	-	-	-	-	-	-	-	100.0

OPERATIONAL SUMMARY

Parameter	Equipment	Method & Procedure	Operational Notes
SULPHUR DIOXIDE (SO ₂)	Thermo 43i TLE Pulsed Fluorescence Analyzer	Maxxam AIR SOP-00209: Ambient Sulphur Monitoring	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by AEP on May 8. The Audit report can be found on page 84. The routine monthly calibration was performed on May 14, between the hours of 09:00 and 13:00.
TOTAL REDUCED SULPHUR (TRS)	Thermo 450i UV Fluorescence Analyzer	Maxxam AIR SOP-00209: Ambient Sulphur Monitoring	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by AEP on May 8. The Audit report can be found on page 84. The routine monthly calibration was performed on May 14, between the hours of 11:00 and 14:00.
TOTAL HYDROCARBONS (THC), METHANE (CH ₄) & NON-METHANE HYDROCARBONS (NMHC)	Thermo 55i FID Analyzer	Maxxam AIR SOP-00001: Methane, Non-Methane Hydrocarbon Analyzer Monitoring	<ul style="list-style-type: none"> Operational time for the monitoring period was 97.4%, equivalent to 19 hours of downtime. A station audit was conducted by AEP on May 8. The Audit report can be found on page 84. Following a successful shut-down calibration on May 13, Maxxam's Thermo 55i analyzer (s/n: 1236656188) was removed and a LICA-owned Thermo 55i (s/n: 1236656107), which was removed in March for maintenance was installed. The analyzer was allowed time to stabilize overnight and a successful installation calibration was completed on May 14. Nineteen hours of downtime were recorded due to the analyzer replacement event. The analyzer exhibited poor sample injections on May 8, as demonstrated by sporadic minute data recorded at a concentration lower than 1.80 ppm. Impacted CH₄ minute concentration, along with the corresponding THC and NMHC values, were excluded; and the respective hourly averages were re-calculated. The following hour was re-averaged: May 8, hour 5:00.
OXIDES OF NITROGEN (NO _x), NITRIC OXIDE (NO) & NITROGEN DIOXIDE (NO ₂)	Thermo 42i Chemiluminescent Analyzer	Maxxam AIR SOP-00213: Ambient NO/NO ₂ /NO _x Monitoring	<ul style="list-style-type: none"> Operational time for the monitoring period was 76.3%, equivalent to 176 hours of downtime. Equipment uptime did not meet AMD's 90% requirement this month. A station audit was conducted by AEP on May 8. During the audit, it was discovered that the Stainless steel sample inlet filter holder had a faulty O-ring, causing the analyzer to fail low. Initially, the filter holder was bypassed to perform a successful response check directly from the sample manifold. Subsequently, the Stainless steel unit was replaced with an inert teflon Thermo style filter holder and the audit was completed successfully. Based on AEP's recommendation and Maxxam's internal review, data was invalidated back to the last valid monthly calibration, which occurred on April 24. 176 hours of downtime were recorded in May, due to this event. The routine monthly calibration was performed on May 14, between the hours of 09:00 and 14:00.
OZONE (O ₃)	Thermo 49i Photometric Analyzer	Maxxam AIR SOP-00212: Ambient O ₃ Monitoring	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by AEP on May 8. The Audit report can be found on page 84. The routine monthly calibration was performed on May 13, between the hours of 12:00 and 16:00.

OPERATIONAL SUMMARY

Parameter	Equipment	Method & Procedure	Operational Notes
PARTICULATE MATTER < 2.5 MICRONS (PM _{2.5})	Thermo SHARP 5030 Unit	Maxxam AIR SOP-00014: Measurement of Particulate Concentration Using the THERMO SHARP	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by AEP on May 8. The Audit report can be found on page 84. The routine monthly check was performed on May 24, at hour 18:00.
WIND SPEED (WS), WIND DIRECTION (WD) & STANDARD DEVIATION WIND DIRECTION (STDWD)	Met One Unit	Maxxam AIR SOP-00013: RM Young Wind Monitor Calibration	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by AEP on May 8. The Audit report can be found on page 84. One instance of maximum instantaneous data was invalidated on May 7, at hour 6:00, as the spike in wind speed was deemed anomalous. Minute data review did not support the validity of the elevated measurement. Wind data is reported as vector wind speed and vector wind direction. Wind direction is defined as the direction from which the wind is blowing and is measured in degrees from true north.
RELATIVE HUMIDITY (RH)	Rotronic Hygroclip Unit	Operations Manual	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by AEP on May 8. The Audit report can be found on page 84.
AMBIENT TEMPERATURE (AmbTPX)	Rotronic Hygroclip Unit	Operations Manual	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by AEP on May 8. The Audit report can be found on page 84.
Datalogger	Envista Ultimate Unit	Operations Manual	<ul style="list-style-type: none"> There were no performance issues identified.

SUMMARY TABLES, GRAPHS AND ROSES

SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)

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

STATUS FLAG CODES

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

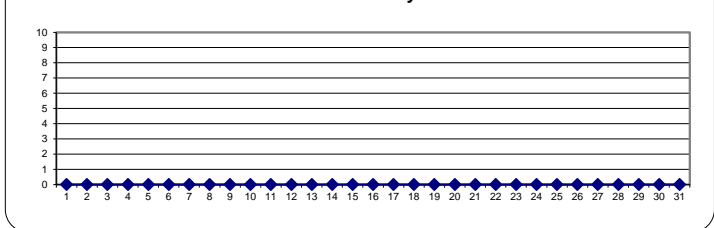
OBJECTIVE LIMIT:

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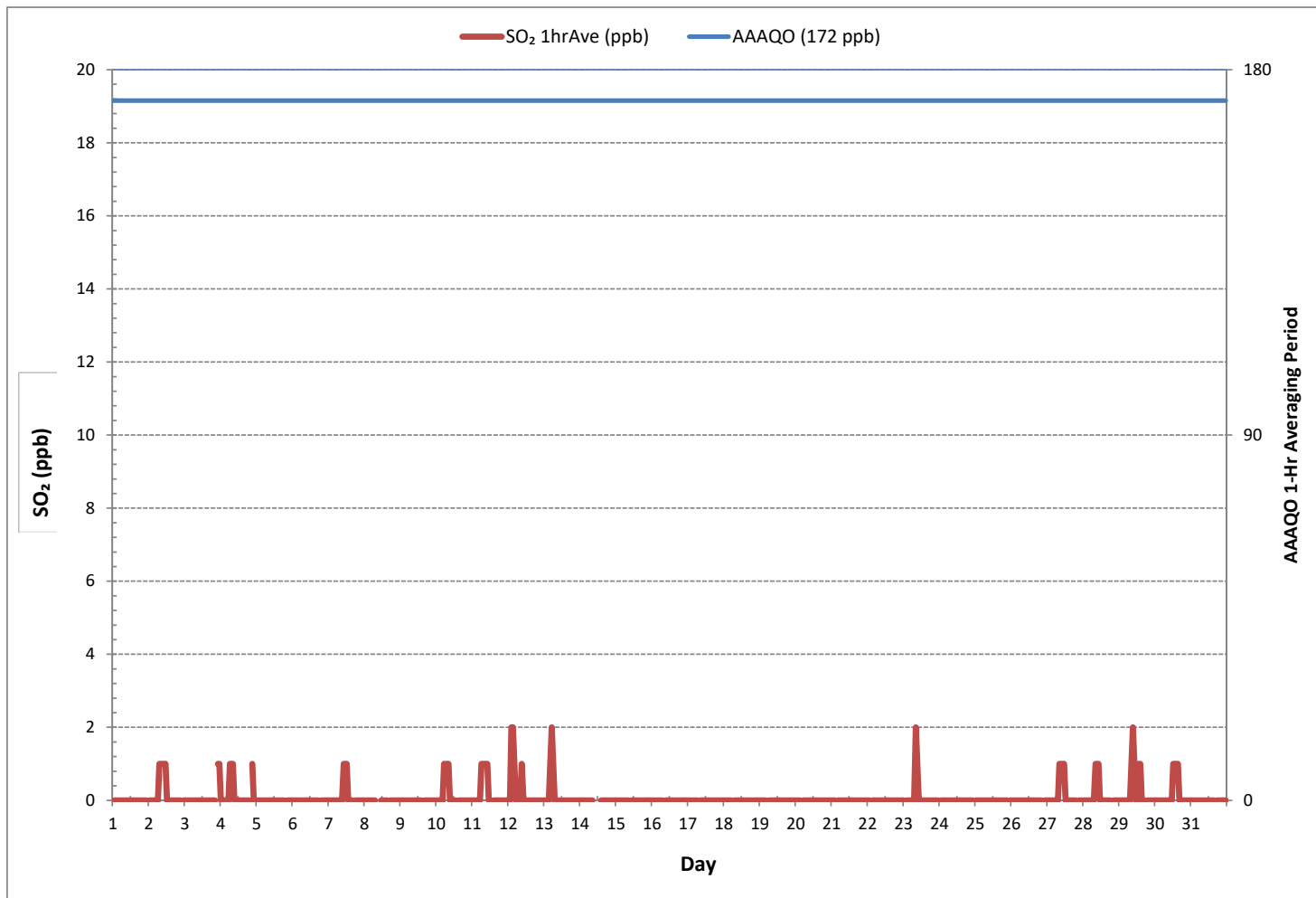
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	48		
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR 1 ON DAY 1		
MAXIMUM 1-HR AVERAGE:	2 ppb @ HOUR 2 ON DAY 12		
MAXIMUM 24-HR AVERAGE:	0 ppb ON DAY 1		
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	744 hrs
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	0	MONTHLY AVERAGE:	0 ppb

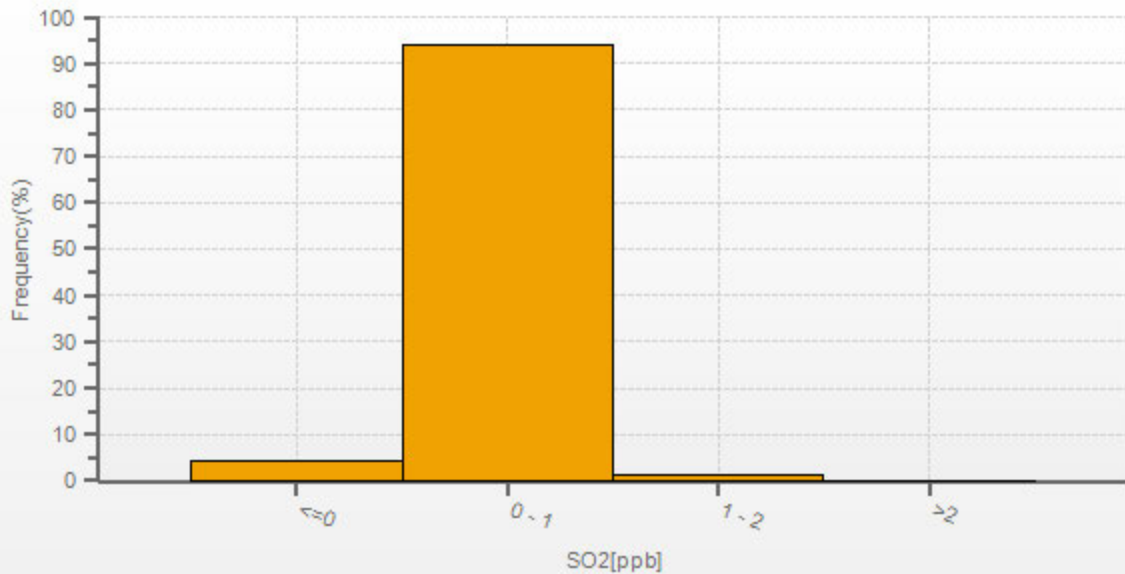
24 HR AVERAGES May 2019



SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)

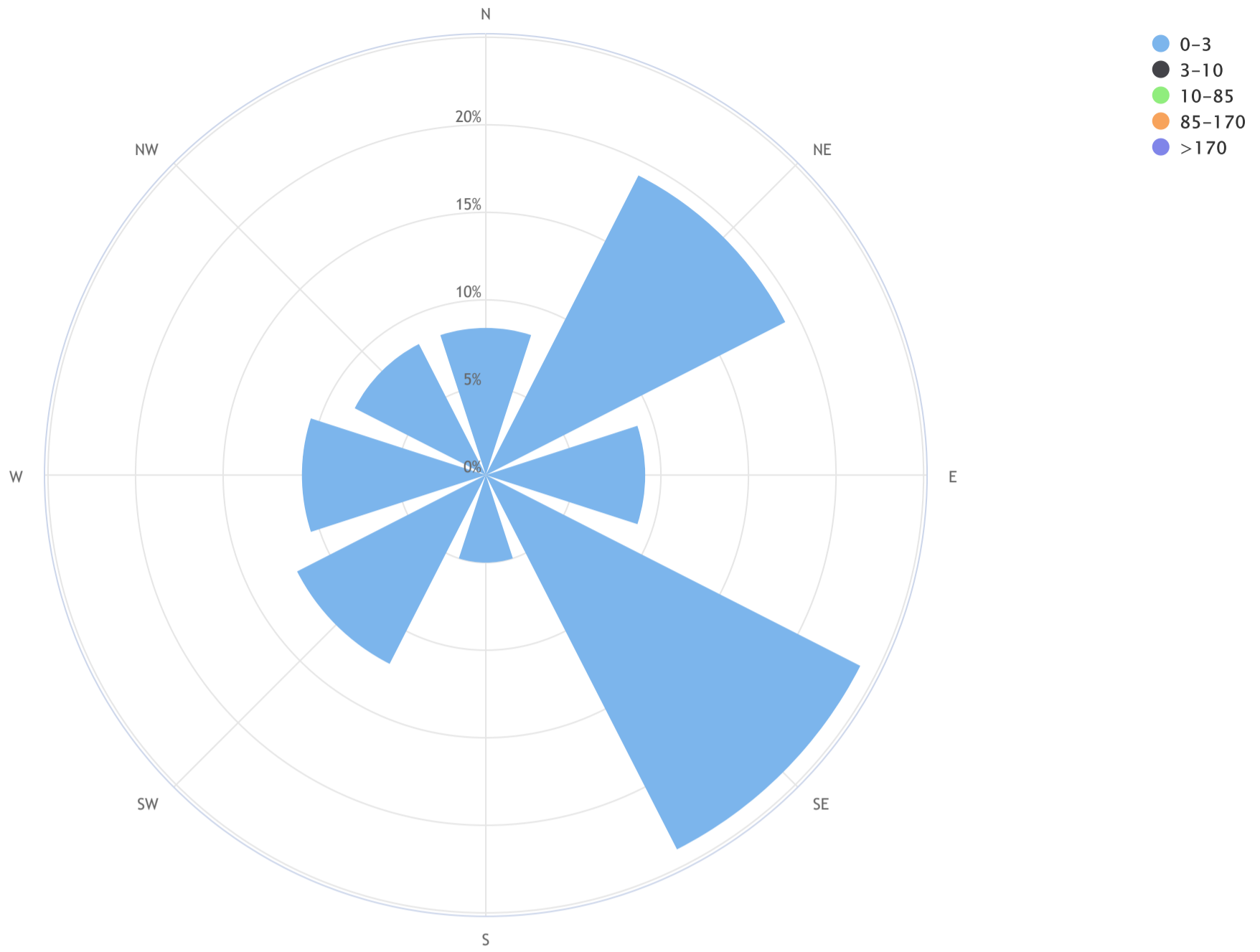


SO2[ppb] Histogram: LICA COLD LAKE SOUTH Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Cold Lake South Continuous Monitoring Station_SO₂ (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.1, CALM % = 3.4%



Direction	0-3	3-10	10-85	85-170	>170	TOTAL
N	8.4	0.0	0.0	0.0	0.0	8.4
NE	19.2	0.0	0.0	0.0	0.0	19.2
E	9.1	0.0	0.0	0.0	0.0	9.1
SE	24.0	0.0	0.0	0.0	0.0	24.0
S	5.0	0.0	0.0	0.0	0.0	5.0
SW	12.1	0.0	0.0	0.0	0.0	12.1
W	10.5	0.0	0.0	0.0	0.0	10.5
NW	8.4	0.0	0.0	0.0	0.0	8.4
Summary	96.6	0.0	0.0	0.0	0.0	96.6
CALM	3.4	0.0	0.0	0.0	0.0	3.4

TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)

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

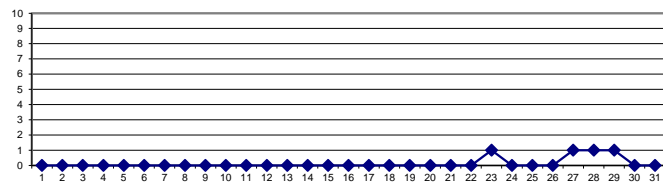
STATUS FLAG CODES

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

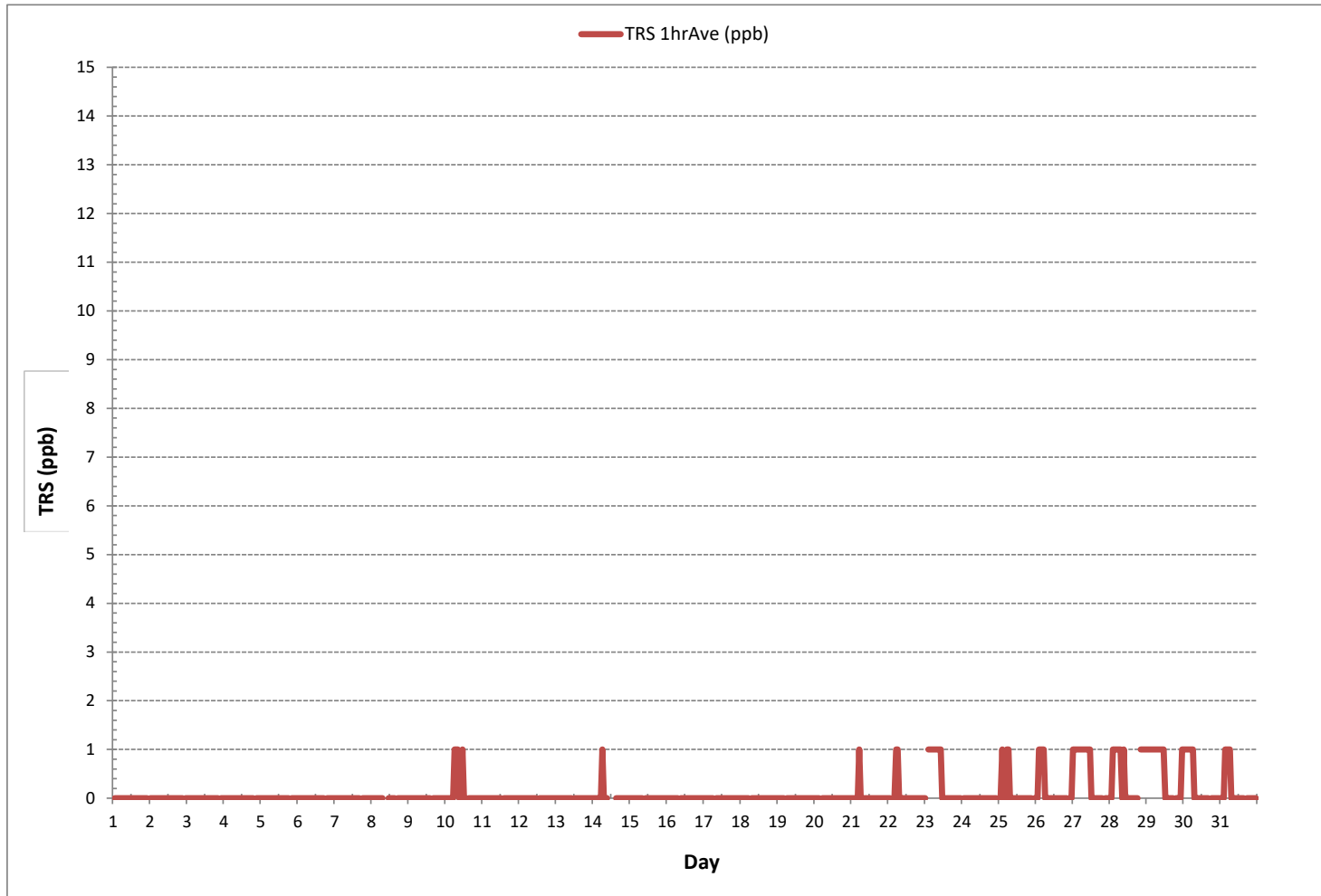
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	71			
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	1	ON DAY 1
MAXIMUM 1-HR AVERAGE:	1	ppb @ HOUR	6	ON DAY 10
MAXIMUM 24-HR AVERAGE:	1	ppb		ON DAY 23
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	744
MONTHLY CALIBRATION TIME:	4	hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	0		MONTHLY AVERAGE:	0
				ppb

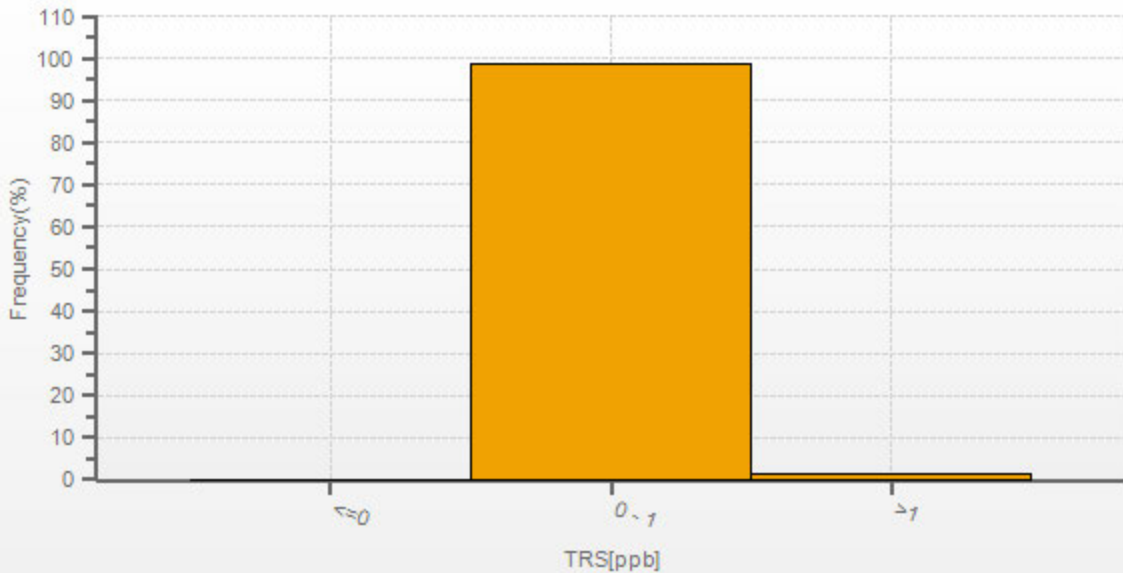
24 HR AVERAGES May 2019



TOTAL REDUCED SULPHUR Hourly Averages (TRS ppb)

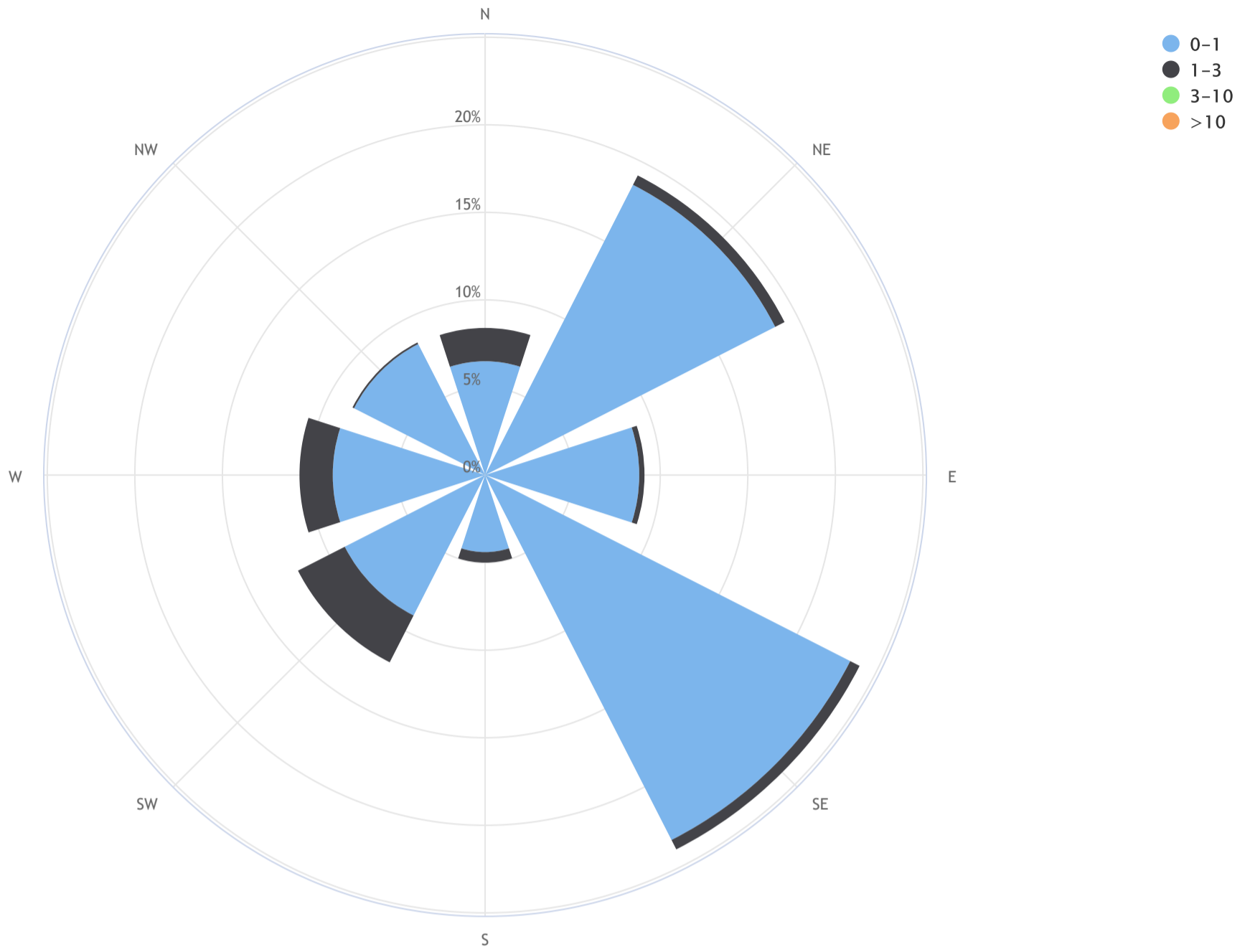


TRS[ppb] Histogram: LICA COLD LAKE SOUTH Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Cold Lake South Continuous Monitoring Station_TRS (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.4, CALM % = 3.4%



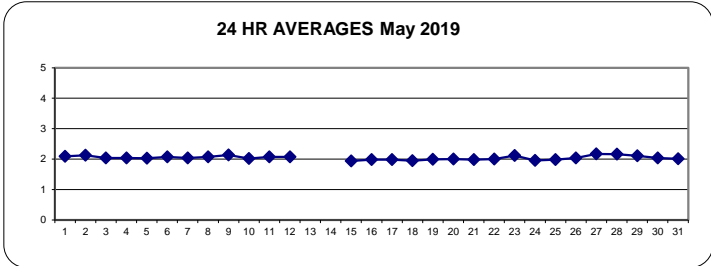
Direction	0-1	1-3	3-10	>10	TOTAL
N	6.5	1.9	0.0	0.0	8.4
NE	18.6	0.6	0.0	0.0	19.2
E	8.8	0.3	0.0	0.0	9.1
SE	23.4	0.6	0.0	0.0	24.0
S	4.4	0.6	0.0	0.0	5.0
SW	9.0	3.0	0.0	0.0	11.9
W	8.7	1.9	0.0	0.0	10.5
NW	8.4	0.1	0.0	0.0	8.5
Summary	87.8	8.8	0.0	0.0	96.6
CALM	2.1	1.3	0.0	0.0	3.4

TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	S	2.05	2.05	2.05	2.05	2.05	2.05	2.06	2.08	2.09	2.12	2.11	2.12	2.15	2.10	2.11	2.09	2.10	2.08	2.08	2.08	2.10	2.12	S	2.05	2.15	2.09	24	
2	2.14	2.19	2.26	2.34	2.37	2.40	2.42	2.15	2.09	2.08	2.07	2.05	2.05	2.05	2.04	2.04	2.04	2.04	2.03	2.04	2.05	2.05	S	2.06	2.03	2.42	2.13	24	
3	2.05	2.04	2.05	2.05	2.06	2.06	2.07	2.07	2.04	2.04	2.03	2.04	2.04	2.03	2.03	2.03	2.03	2.04	2.03	2.04	2.04	S	2.05	2.05	2.03	2.07	2.04	24	
4	2.05	2.05	2.06	2.05	2.06	2.05	2.05	2.04	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	S	2.04	2.04	2.03	2.03	2.06	2.04	24
5	2.04	2.05	2.04	2.06	2.07	2.12	2.09	2.03	2.02	2.02	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.02	2.02	S	2.04	2.02	2.02	2.02	2.01	2.12	2.03	24	
6	2.03	2.04	2.07	2.11	2.13	2.07	2.05	2.06	2.06	2.06	2.10	2.11	2.10	2.10	2.05	2.04	2.04	2.05	S	2.06	2.06	2.07	2.07	2.07	2.03	2.13	2.07	24	
7	2.07	2.06	2.06	2.06	2.05	2.05	2.05	2.04	2.04	2.03	2.03	2.03	2.03	2.04	2.03	2.04	2.04	2.04	S	2.04	2.04	2.06	2.04	2.05	2.04	2.03	2.07	2.04	24
8	2.07	2.06	2.06	2.05	2.07	2.08	Q	Q	2.07	2.07	2.06	2.06	2.04	2.05	2.06	S	2.05	2.05	2.07	2.08	2.10	2.16	2.10	2.04	2.17	2.07	2.04	24	
9	2.16	2.19	2.21	2.28	2.40	2.45	2.38	2.17	2.13	2.09	2.08	2.10	2.09	2.06	2.06	S	2.06	2.04	2.04	2.04	2.05	2.05	2.06	2.05	2.04	2.45	2.14	24	
10	2.09	2.13	2.16	2.22	2.19	1.99	1.99	1.98	1.98	1.98	1.98	1.97	1.97	1.97	S	1.98	1.99	1.99	1.99	2.00	1.99	1.99	2.00	2.01	1.97	2.22	2.02	24	
11	2.07	2.09	2.12	2.13	2.14	2.29	2.30	2.11	2.04	2.02	2.00	2.02	S	2.03	2.01	2.00	2.00	2.00	2.00	2.00	2.05	2.04	2.04	2.14	2.00	2.30	2.07	24	
12	2.12	2.18	2.20	2.23	2.21	2.18	2.19	2.19	2.15	1.99	1.98	1.98	S	1.96	1.96	1.97	1.97	1.97	1.96	1.96	1.99	2.01	2.08	2.09	1.96	2.23	2.07	24	
13	2.17	2.31	2.32	2.34	2.11	2.04	2.03	2.00	2.00	1.99	1.98	S	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1.98	2.34	-	14	
14	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	1.98	1.97	1.97	1.96	1.96	1.95	1.96	1.96	1.97	1.96	1.98	1.99	1.95	1.99	-	15	
15	1.97	1.96	1.93	1.93	1.92	1.93	1.93	1.93	1.93	S	1.92	1.93	1.93	1.93	1.93	1.92	1.92	1.92	1.93	1.93	1.95	1.97	1.98	1.99	1.92	1.99	1.94	24	
16	2.01	2.01	2.03	2.06	2.02	1.99	1.97	1.97	S	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.97	1.98	1.99	1.99	2.00	1.96	2.06	1.98	24	
17	2.04	2.08	2.12	2.10	2.06	1.99	1.99	S	1.97	1.96	1.95	1.94	1.95	1.95	1.94	1.94	1.94	1.94	1.94	1.94	1.96	1.97	1.97	1.96	1.94	2.12	1.98	24	
18	1.96	1.96	1.97	1.98	1.98	1.98	S	1.97	1.96	1.96	1.94	1.94	1.94	1.93	1.92	1.92	1.91	1.92	1.93	1.95	1.99	1.99	2.00	1.91	2.00	1.95	24		
19	2.01	2.03	2.02	2.03	2.07	S	2.03	2.01	1.99	1.96	1.95	1.94	1.95	1.95	1.95	1.95	1.95	1.94	1.95	1.98	2.02	1.98	2.03	2.09	1.94	2.09	1.99	24	
20	2.09	2.08	2.16	2.15	S	2.06	2.05	2.05	2.01	1.98	1.94	1.95	1.96	1.94	1.93	1.93	1.93	1.94	1.94	1.94	1.95	2.00	1.98	1.99	1.93	2.16	2.00	24	
21	1.99	1.99	2.00	S	2.17	2.11	1.98	1.99	1.97	1.95	1.92	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.92	1.96	1.98	2.14	2.21	1.91	2.21	1.98	24	
22	2.10	2.07	S	2.09	2.12	2.16	2.10	2.00	1.98	1.94	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.93	1.96	1.99	1.99	2.05	2.06	1.92	2.16	2.00	24	
23	2.18	S	2.33	2.34	2.38	2.44	2.50	2.61	2.27	2.05	2.00	1.95	1.98	1.99	2.01	2.01	1.99	1.98	1.99	2.00	1.99	1.97	1.95	1.95	1.95	2.61	2.12	24	
24	S	1.95	1.95	1.96	1.96	1.95	1.95	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.95	1.95	1.94	1.94	1.94	1.94	1.98	2.02	2.10	S	1.94	2.10	1.96	24	
25	2.07	2.18	2.11	1.97	2.00	2.02	1.96	1.96	1.95	1.94	1.94	1.94	1.94	1.94	1.94	1.95	1.94	1.94	1.94	1.96	1.97	1.97	S	2.06	1.94	2.18	1.98	24	
26	2.14	2.14	2.17	2.22	2.27	2.24	1.99	1.95	1.96	1.95	1.95	1.95	1.95	1.95	1.95	1.94	1.95	1.95	1.95	1.95	1.98	S	2.17	2.28	1.94	2.28	2.04	24	
27	2.32	2.32	2.39	2.36	2.33	2.32	2.47	2.43	2.42	2.12	2.02	2.00	1.99	1.96	1.95	1.95	1.95	1.94	1.96	2.02	S	2.24	2.17	2.35	1.94	2.47	2.17	24	
28	2.45	2.49	2.44	2.52	2.48	2.50	2.28	2.17	2.10	2.08	2.05	1.97	1.94	1.94	1.94	1.93	1.93	1.94	1.94	S	2.02	2.13	2.24	2.24	1.93	2.52	2.16	24	
29	2.37	2.40	2.46	2.31	2.22	2.29	2.20	2.07	2.01	1.96	1.96	1.94	1.93	1.92	1.92	1.92	1.91	1.91	S	1.94	2.04	2.35	2.22	2.32	1.91	2.46	2.11	24	
30	2.54	2.61	2.44	2.37	2.24	1.96	1.96	1.95	1.94	1.95	1.93	1.91	1.91	1.92	1.92	1.92	1.92	S	1.93	1.93	1.93	1.93	1.94	1.96	1.91	2.61	2.04	24	
31	1.99	2.09	2.09	2.05	2.10	2.11	2.07	2.03	1.95	1.93	1.93	1.93	1.93	1.92	1.93	1.93	S	1.94	1.94	1.95	1.98	2.03	2.12	2.20	1.92	2.20	2.01	24	
HOURLY MAX	2.54	2.61	2.46	2.52	2.48	2.50	2.50	2.61	2.42	2.12	2.12	2.11	2.12	2.15	2.10	2.11	2.09	2.10	2.08	2.08	2.08	2.35	2.24	2.35					
HOURLY AVG	2.12	2.13	2.15	2.15	2.15	2.13	2.11	2.07	2.04	2.00	1.99	1.98	1.98	1.98	1.98	1.97	1.97	1.97	1.98	1.99	2.00	2.04	2.06	2.08					

STATUS FLAG CODES

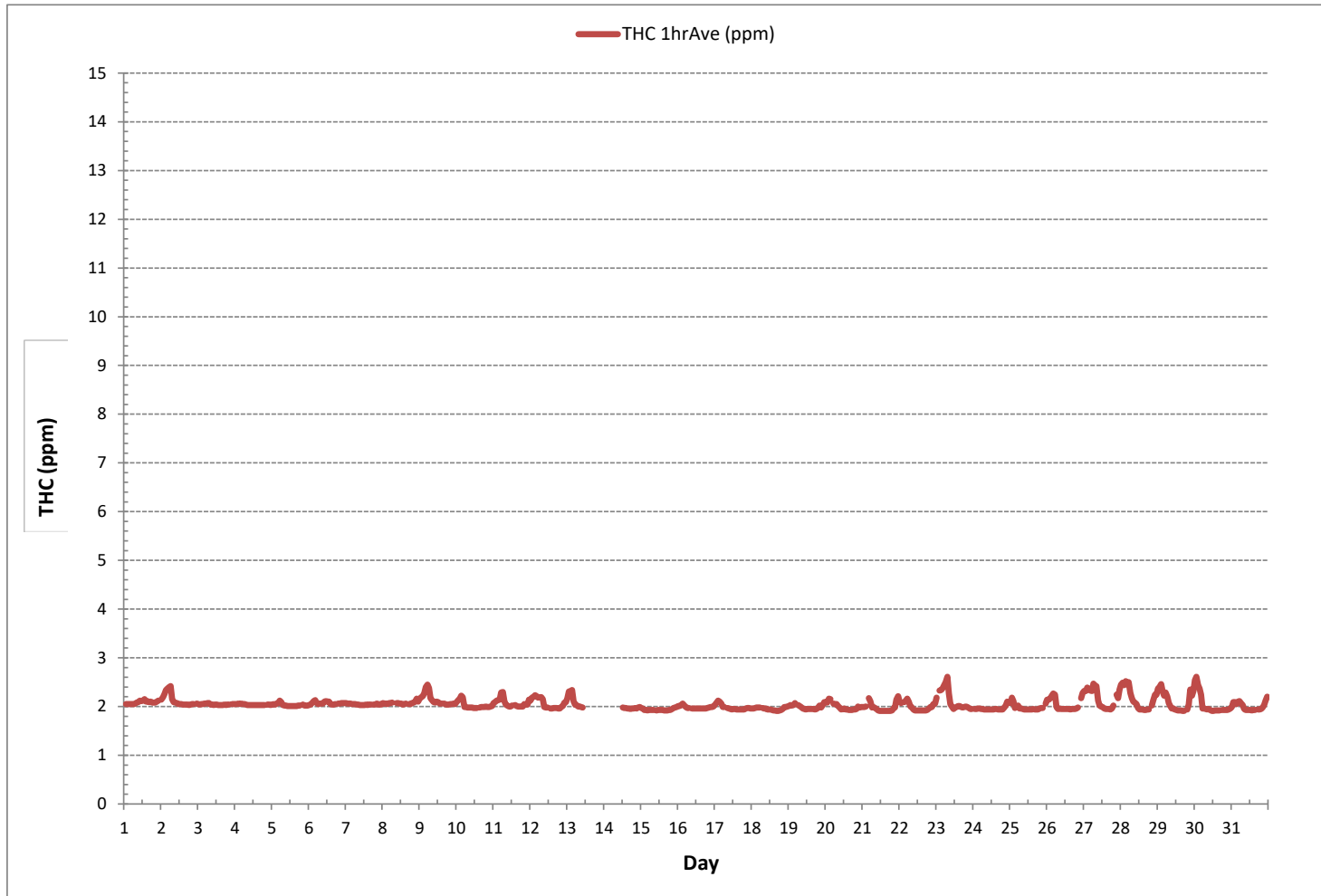
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE



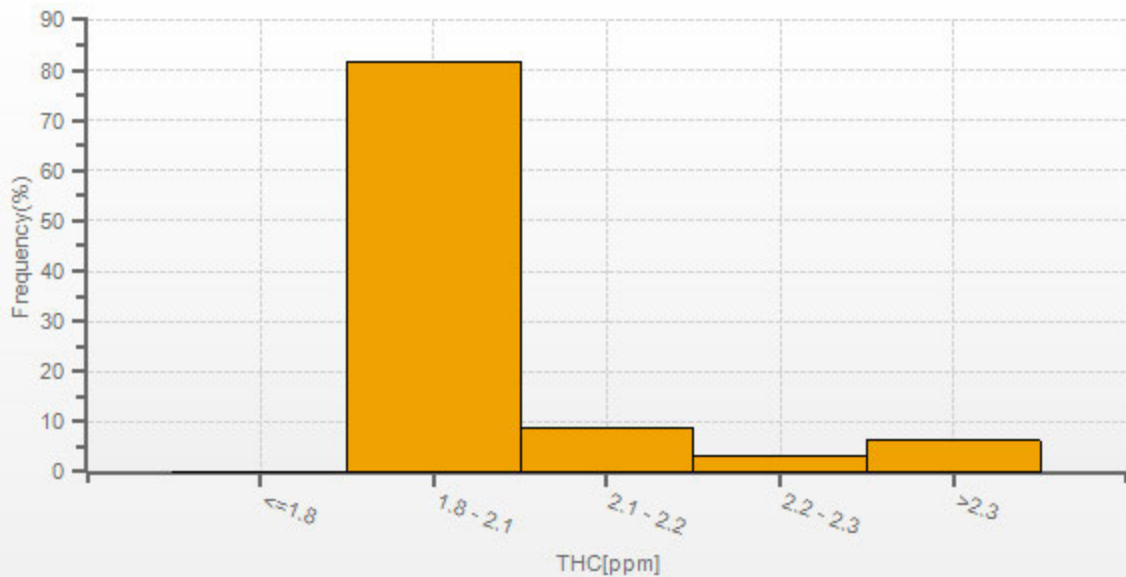
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	686			
MINIMUM 1-HR AVERAGE:	1.91 ppm	@ HOUR	16	ON DAY 18
MAXIMUM 1-HR AVERAGE:	2.61 ppm	@ HOUR	7	ON DAY 23
MAXIMUM 24-HR AVERAGE:	2.17 ppm			ON DAY 27
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	725 hrs	
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	97.4 %	
STANDARD DEVIATION:	0.12	MONTHLY AVERAGE:	2.04 ppm	

TOTAL HYDROCARBONS Hourly Averages (THC ppm)

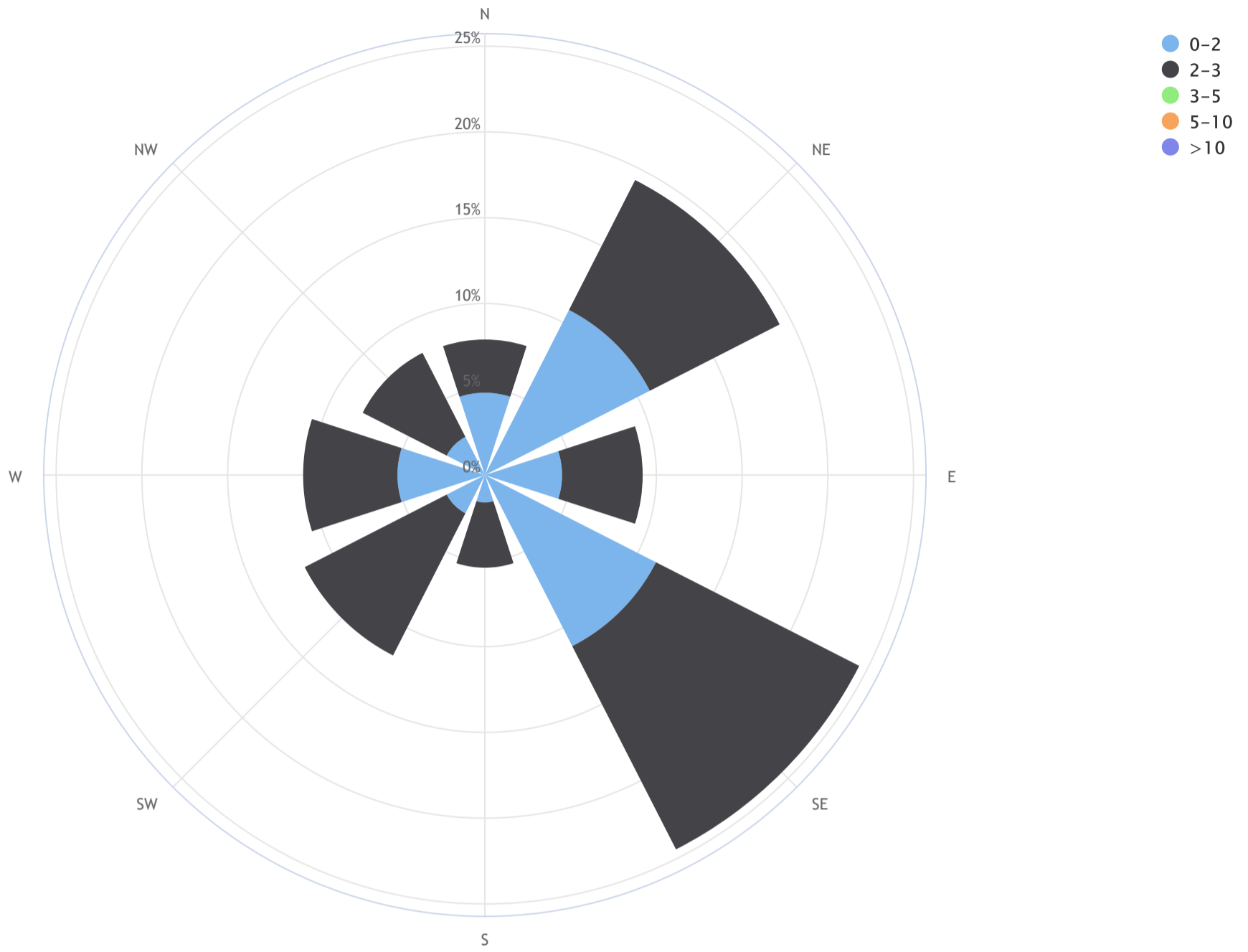


THC[ppm] Histogram: LICA COLD LAKE SOUTH Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Cold Lake South Continuous Monitoring Station_THC (ppm)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 2.2, CALM % = 3.4%



Direction	0-2	2-3	3-5	5-10	>10	TOTAL
N	4.8	3.1	0.0	0.0	0.0	7.9
NE	10.8	8.5	0.0	0.0	0.0	19.2
E	4.5	4.7	0.0	0.0	0.0	9.2
SE	11.2	13.3	0.0	0.0	0.0	24.5
S	1.6	3.8	0.0	0.0	0.0	5.4
SW	2.5	9.3	0.0	0.0	0.0	11.8
W	5.1	5.5	0.0	0.0	0.0	10.6
NW	2.5	5.5	0.0	0.0	0.0	8.0
Summary	43.0	53.6	0.0	0.0	0.0	96.6
CALM	0.3	3.1	0.0	0.0	0.0	3.4

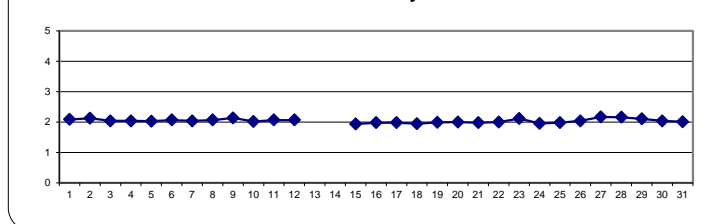
METHANE Hourly Averages (CH₄ ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.			
DAY																														
1	S	2.05	2.05	2.05	2.05	2.05	2.05	2.06	2.08	2.09	2.12	2.11	2.12	2.15	2.10	2.11	2.09	2.10	2.08	2.08	2.08	2.10	2.12	S	2.05	2.15	2.09	24		
2		2.14	2.19	2.26	2.34	2.37	2.40	2.42	2.15	2.09	2.08	2.07	2.05	2.05	2.05	2.04	2.04	2.04	2.04	2.03	2.04	2.05	2.05	S	2.06	2.03	2.42	2.13	24	
3		2.05	2.04	2.05	2.05	2.06	2.06	2.07	2.07	2.04	2.04	2.03	2.04	2.04	2.03	2.03	2.03	2.04	2.03	2.04	2.04	2.04	S	2.05	2.05	2.03	2.07	2.04	24	
4		2.05	2.05	2.06	2.05	2.06	2.05	2.05	2.04	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	S	2.04	2.04	2.03	2.03	2.06	2.04	24
5		2.04	2.05	2.04	2.06	2.07	2.12	2.09	2.03	2.02	2.02	2.01	2.01	2.01	2.01	2.01	2.01	2.02	2.02	S	2.04	2.02	2.02	2.02	2.02	2.01	2.12	2.03	24	
6		2.03	2.04	2.07	2.11	2.13	2.07	2.05	2.06	2.06	2.06	2.10	2.11	2.10	2.10	2.05	2.04	2.04	2.05	S	2.06	2.06	2.07	2.07	2.07	2.03	2.13	2.07	24	
7		2.07	2.06	2.06	2.06	2.05	2.05	2.05	2.04	2.04	2.03	2.03	2.03	2.03	2.04	2.03	2.04	2.03	S	2.04	2.04	2.06	2.04	2.05	2.04	2.03	2.07	2.04	24	
8		2.07	2.06	2.06	2.05	2.07	2.07	2.08	Q	Q	2.07	2.07	2.06	2.06	2.04	2.05	2.06	S	2.05	2.05	2.07	2.08	2.10	2.16	2.10	2.04	2.17	2.07	24	
9		2.16	2.19	2.21	2.28	2.40	2.45	2.38	2.17	2.13	2.09	2.08	2.10	2.09	2.06	2.06	S	2.06	2.04	2.04	2.04	2.05	2.05	2.06	2.05	2.04	2.45	2.14	24	
10		2.09	2.13	2.16	2.22	2.19	1.99	1.99	1.98	1.98	1.98	1.98	1.97	1.97	S	1.98	1.99	1.99	1.99	2.00	1.99	1.99	2.00	2.01	1.97	2.22	2.02	24		
11		2.07	2.09	2.12	2.13	2.14	2.29	2.30	2.11	2.04	2.02	2.00	2.02	S	2.03	2.01	2.00	2.00	2.00	2.00	2.05	2.04	2.04	2.14	2.00	2.30	2.07	24		
12		2.12	2.18	2.20	2.23	2.21	2.18	2.19	2.19	2.15	1.99	1.98	1.98	S	1.96	1.96	1.97	1.97	1.97	1.96	1.96	1.99	2.01	2.08	2.09	1.96	2.23	2.07	24	
13		2.17	2.31	2.32	2.34	2.11	2.04	2.03	2.00	2.00	1.99	1.98	S	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1.98	2.34	-	14	
14	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1.98	2.34	-	15		
15		1.97	1.96	1.93	1.93	1.92	1.93	1.93	1.93	1.93	S	1.92	1.93	1.93	1.93	1.93	1.92	1.92	1.92	1.93	1.93	1.95	1.97	1.98	1.99	1.92	1.99	1.94	24	
16		2.01	2.01	2.03	2.06	2.02	1.99	1.97	1.97	S	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.97	1.98	1.99	1.99	2.00	1.96	2.06	1.98	24	
17		2.04	2.08	2.12	2.10	2.06	1.99	1.99	S	1.97	1.96	1.96	1.95	1.94	1.95	1.94	1.94	1.94	1.94	1.94	1.94	1.96	1.97	1.97	1.96	1.94	2.12	1.98	24	
18		1.96	1.96	1.97	1.98	1.98	1.98	S	1.97	1.96	1.96	1.94	1.94	1.94	1.93	1.92	1.92	1.91	1.92	1.93	1.95	1.99	1.99	2.00	1.91	2.00	1.95	24		
19		2.01	2.03	2.02	2.03	2.07	S	2.03	2.01	1.99	1.96	1.95	1.94	1.95	1.95	1.95	1.95	1.94	1.95	1.98	2.02	1.98	2.03	2.09	1.94	2.09	1.99	24		
20		2.09	2.08	2.16	2.15	S	2.06	2.05	2.05	2.01	1.98	1.94	1.95	1.96	1.94	1.93	1.93	1.93	1.94	1.94	1.95	2.00	1.98	1.99	1.93	2.16	2.00	24		
21		1.99	1.99	2.00	S	2.17	2.11	1.98	1.99	1.97	1.95	1.92	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.92	1.96	1.98	2.14	2.21	1.91	2.21	1.98	24	
22		2.10	2.07	S	2.09	2.12	2.16	2.10	2.00	1.98	1.94	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.93	1.96	1.99	1.99	2.05	2.06	1.92	2.16	2.00	24	
23		2.18	S	2.33	2.34	2.38	2.44	2.50	2.61	2.27	2.05	2.00	1.95	1.98	1.99	2.01	2.01	1.99	1.98	1.99	2.00	1.99	1.97	1.95	1.95	1.95	2.61	2.12	24	
24	S	1.95	1.95	1.96	1.96	1.95	1.95	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.95	1.95	1.94	1.94	1.94	1.94	1.98	2.02	2.10	S	1.94	2.10	1.96	24	
25		2.07	2.18	2.11	1.97	2.00	2.02	1.96	1.96	1.95	1.94	1.94	1.94	1.94	1.94	1.95	1.94	1.94	1.94	1.96	1.97	1.97	S	2.06	1.94	2.18	1.98	24		
26		2.14	2.14	2.17	2.22	2.27	2.24	1.99	1.95	1.96	1.95	1.95	1.95	1.95	1.95	1.94	1.95	1.95	1.95	1.95	1.96	1.98	S	2.17	2.28	1.94	2.28	2.04	24	
27		2.32	2.32	2.39	2.36	2.33	2.32	2.47	2.43	2.42	2.12	2.02	2.00	1.99	1.96	1.95	1.95	1.95	1.94	1.96	2.02	S	2.24	2.17	2.35	1.94	2.47	2.17	24	
28		2.45	2.49	2.44	2.52	2.48	2.50	2.28	2.17	2.10	2.08	2.05	1.97	1.94	1.94	1.94	1.93	1.93	1.94	1.94	S	2.02	2.13	2.24	2.24	1.93	2.52	2.16	24	
29		2.37	2.40	2.46	2.31	2.22	2.29	2.20	2.07	2.01	1.96	1.96	1.94	1.93	1.92	1.92	1.92	1.91	1.91	S	1.94	2.04	2.35	2.22	2.32	1.91	2.46	2.11	24	
30		2.54	2.61	2.44	2.37	2.24	1.96	1.96	1.95	1.94	1.95	1.93	1.91	1.91	1.92	1.92	1.92	1.92	S	1.93	1.93	1.93	1.93	1.94	1.96	1.91	2.61	2.04	24	
31		1.99	2.09	2.09	2.05	2.10	2.11	2.07	2.03	1.95	1.93	1.93	1.93	1.93	1.92	1.93	S	1.94	1.94	1.95	1.98	2.03	2.12	2.20	1.92	2.20	2.01	24		
HOURLY MAX	2.54	2.61	2.46	2.52	2.48	2.50	2.50	2.61	2.42	2.12	2.12	2.11	2.12	2.15	2.10	2.11	2.09	2.10	2.08	2.08	2.08	2.35	2.24	2.35						
HOURLY AVG	2.12	2.13	2.15	2.15	2.15	2.13	2.11	2.07	2.04	2.00	1.99	1.98	1.98	1.98	1.98	1.97	1.97	1.97	1.98	1.99	2.00	2.04	2.06	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

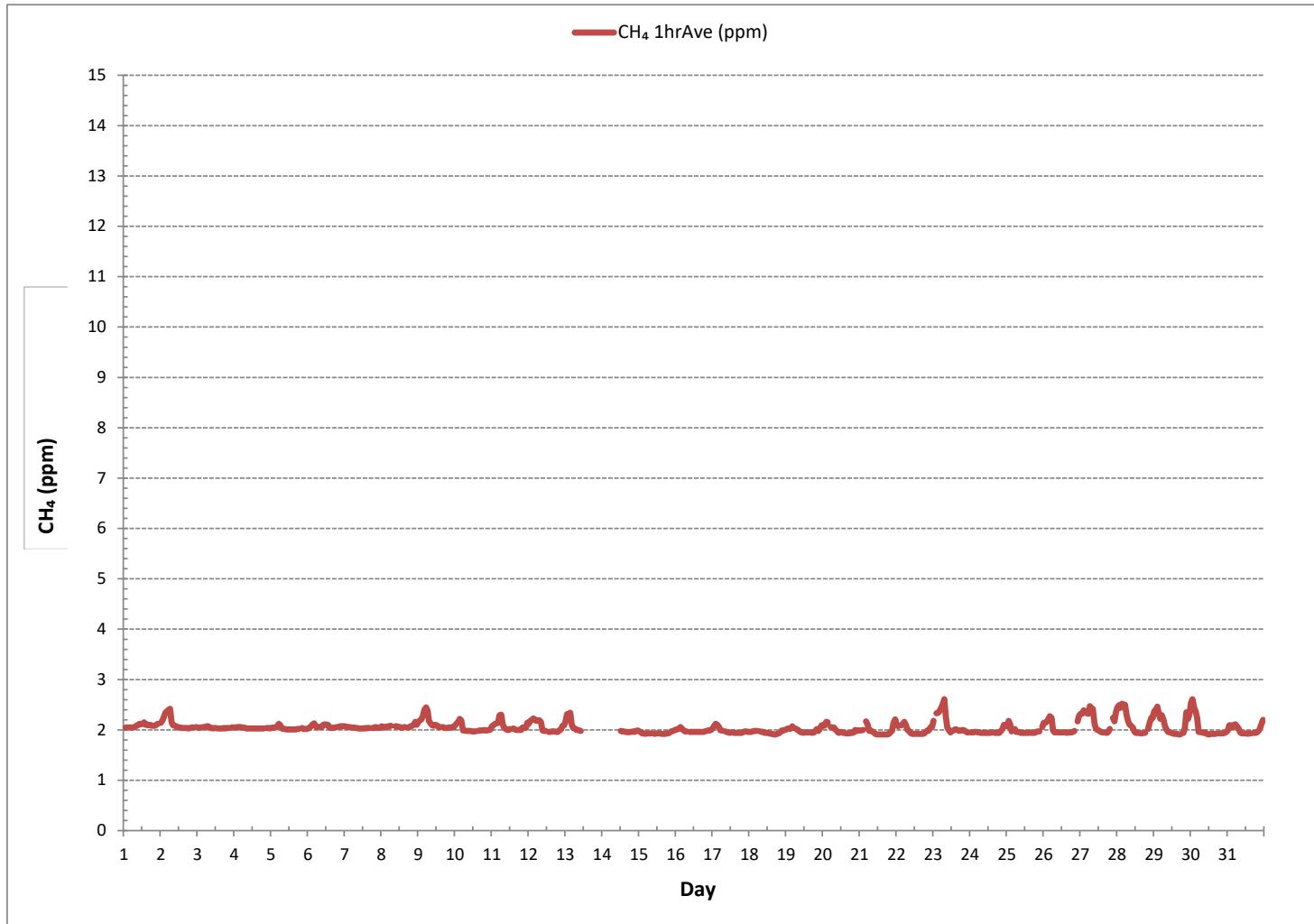
24 HR AVERAGES May 2019



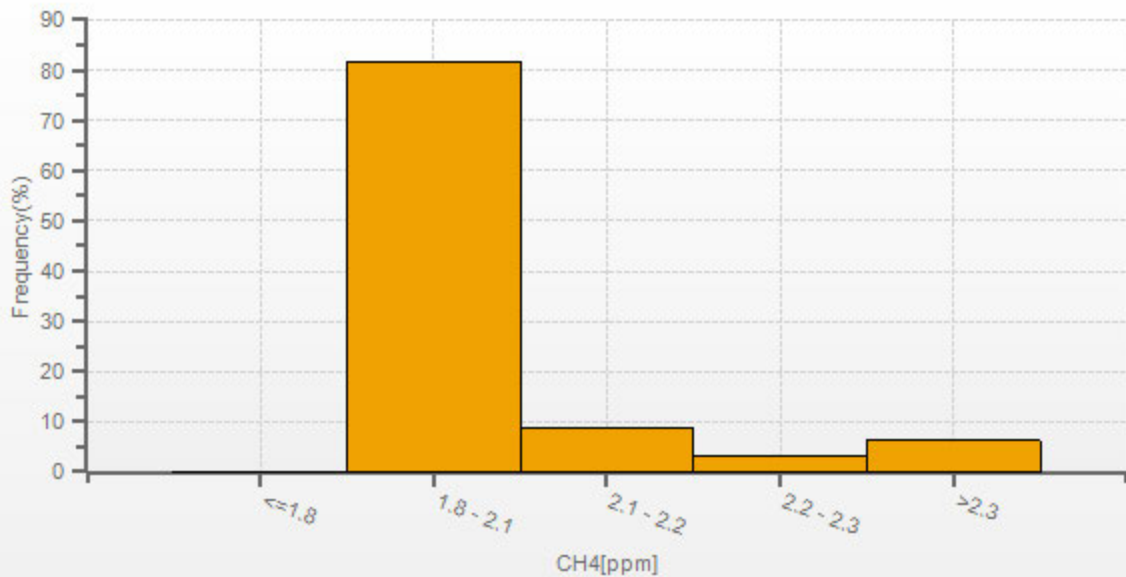
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	686				
MINIMUM 1-HR AVERAGE:	1.91	ppm @ HOUR	16	ON DAY	18
MAXIMUM 1-HR AVERAGE:	2.61	ppm @ HOUR	7	ON DAY	23
MAXIMUM 24-HR AVERAGE:	2.17	ppm		ON DAY	27
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	725	hrs
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:	97.4	%
STANDARD DEVIATION:	0.12		MONTHLY AVERAGE:	2.04	ppm

METHANE Hourly Averages (CH₄ ppm)

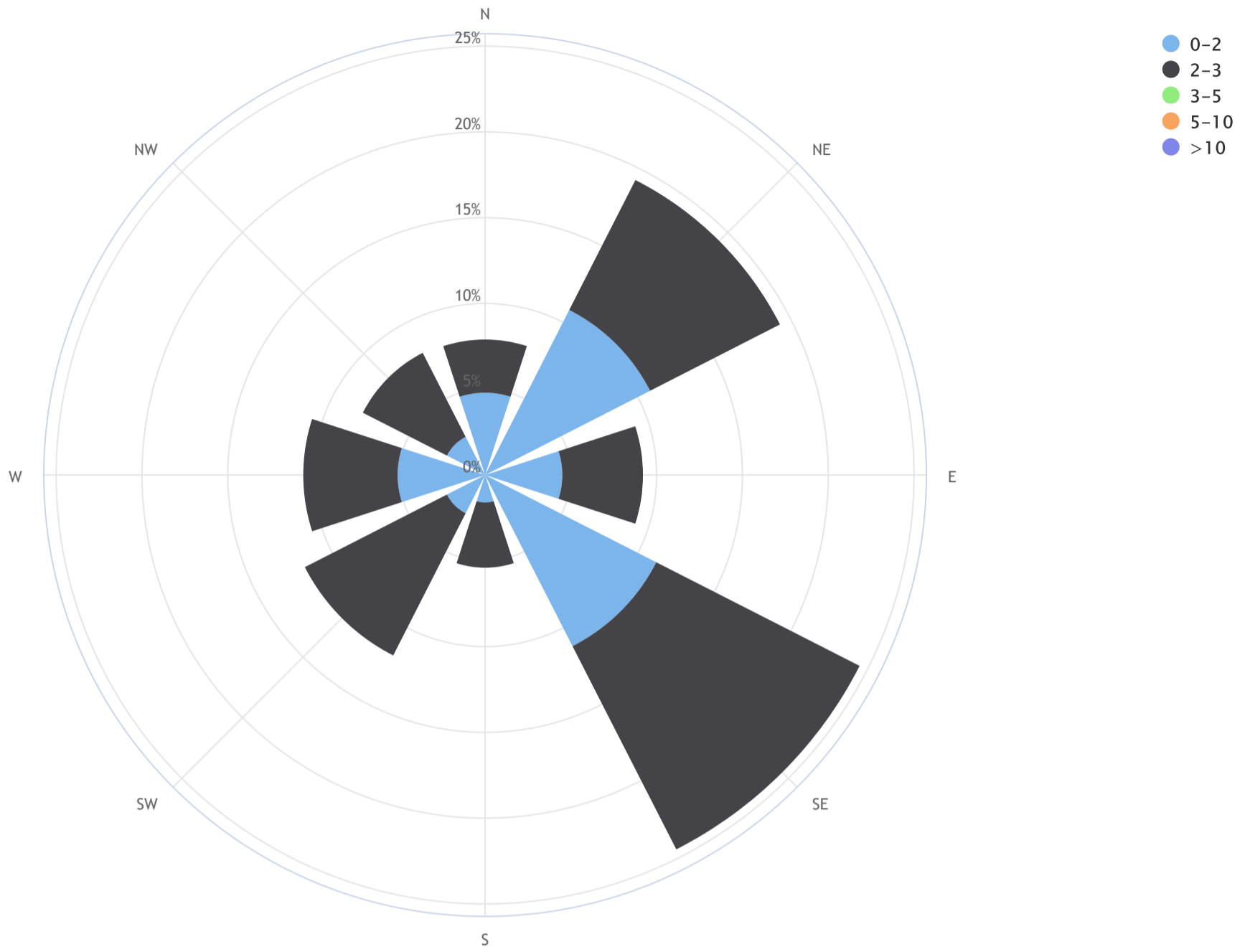


CH4[ppm] Histogram: LICA COLD LAKE SOUTH Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Cold Lake South Continuous Monitoring Station_CH₄ (ppm)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 2.2, CALM % = 3.4%



Direction	0-2	2-3	3-5	5-10	>10	TOTAL
N	4.8	3.1	0.0	0.0	0.0	7.9
NE	10.8	8.5	0.0	0.0	0.0	19.2
E	4.5	4.7	0.0	0.0	0.0	9.2
SE	11.2	13.3	0.0	0.0	0.0	24.5
S	1.6	3.8	0.0	0.0	0.0	5.4
SW	2.5	9.3	0.0	0.0	0.0	11.8
W	5.1	5.5	0.0	0.0	0.0	10.6
NW	2.5	5.5	0.0	0.0	0.0	8.0
Summary	43.0	53.6	0.0	0.0	0.0	96.6
CALM	0.3	3.1	0.0	0.0	0.0	3.4



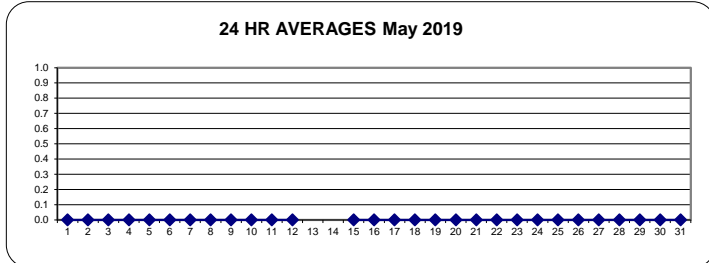
NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

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	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	S	0.00	0.00	0.00	0.00	24																					
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	24																						
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	24																							
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	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	0.00	S	0.00	0.00	0.00	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	0.00	0.00	S	0.00	0.00	0.00	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	S	0.00	0.00	0.00	0.00	24																											
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Q	Q	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	24																												
9	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	24																														
10	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	24																															
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	24																																
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	24																																	
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	0.00	0.00	-	14																							
14	Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	15																							
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24																								
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24																								
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24																								
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24																								
19	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																								
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	0.00	0.00	0.00	0.00	0.00	24																								
21	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	24																								
22	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																								
23	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																								
24	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	S	0.00	0.00	0.00	24																								
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	24																								
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	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	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	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	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	24																										
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	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	S	0.00	0.00	0.00	0.00	24																														
31	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	24																														
HOURLY MAX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24																							
HOURLY AVG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24																								

STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	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 May 2019



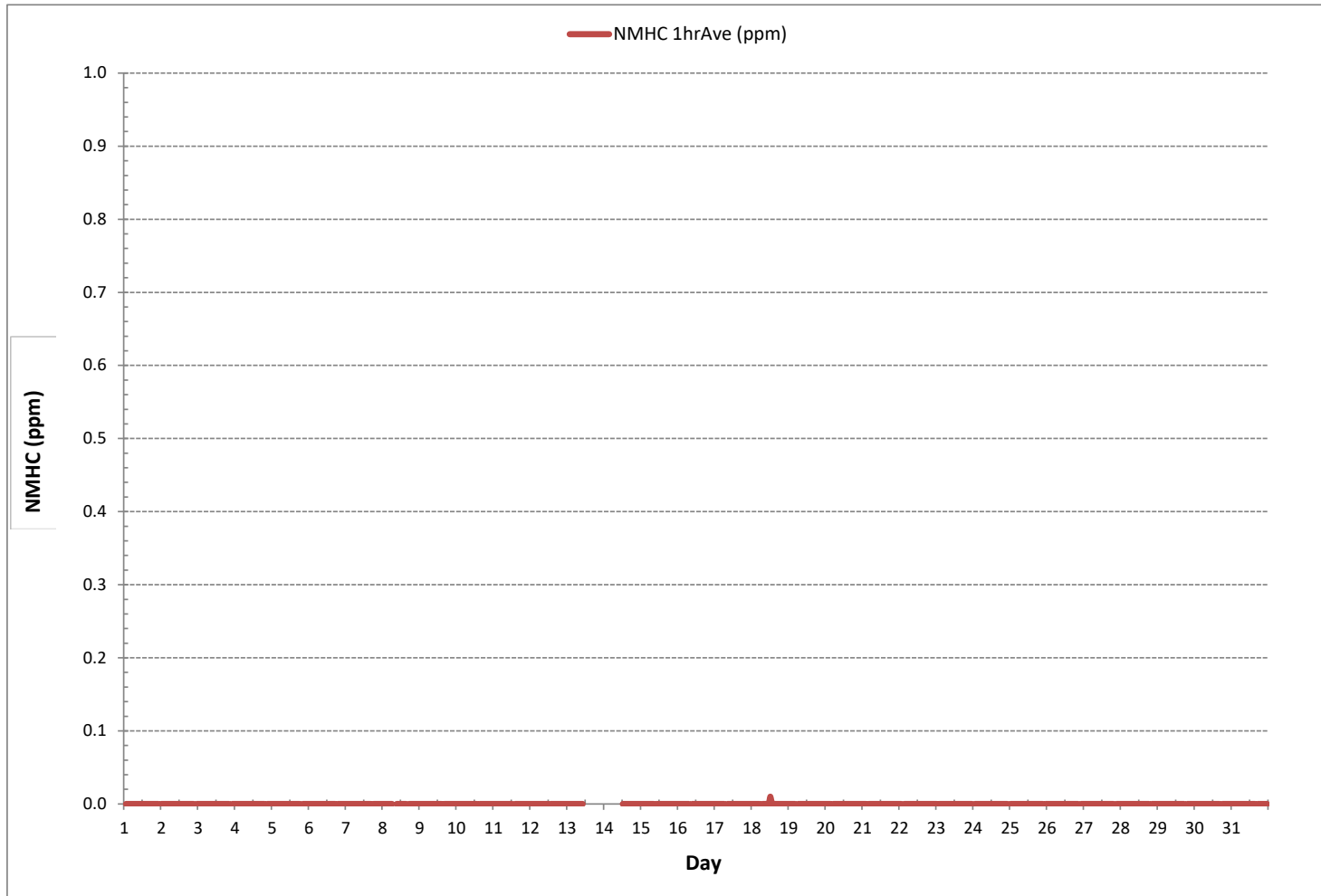
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	1			
MINIMUM 1-HR AVERAGE:	0.00	ppm @ HOUR	1	ON DAY 1
MAXIMUM 1-HR AVERAGE:	0.01	ppm @ HOUR	12	ON DAY 18
MAXIMUM 24-HR AVERAGE:	0.00	ppm		ON DAY 1
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	725 hrs
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:	97.4 %
STANDARD DEVIATION:	0.00		MONTHLY AVERAGE:	0.00 ppm

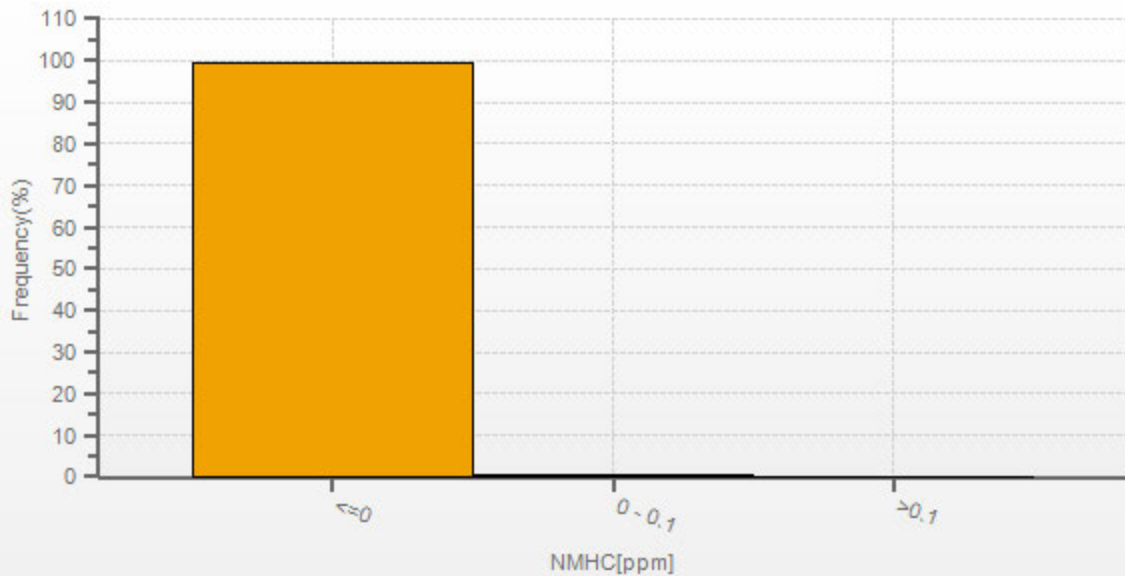


LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - May 2019

NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

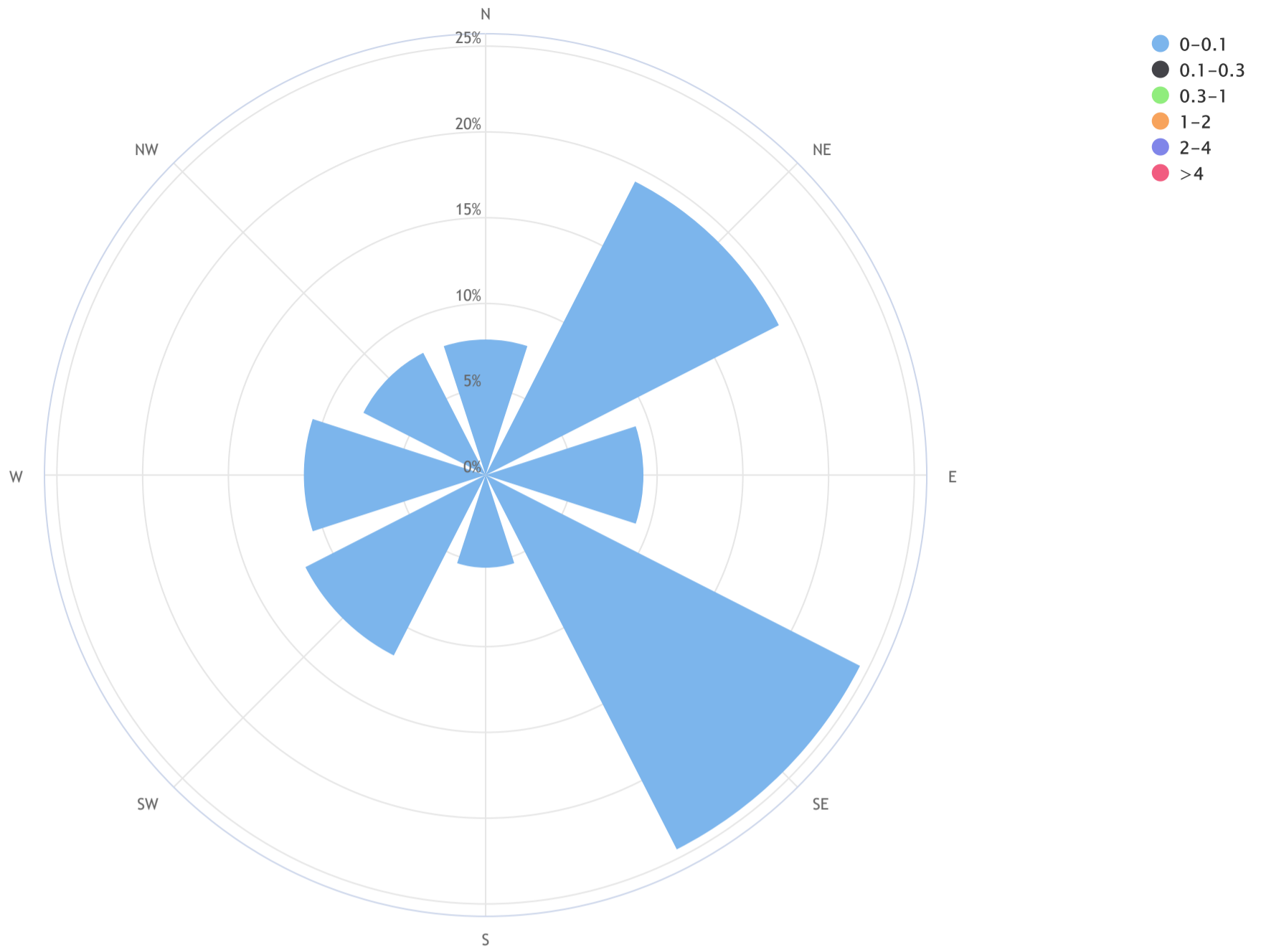


NMHC[ppm] Histogram: LICA COLD LAKE SOUTH Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Cold Lake South Continuous Monitoring Station_NMHC (ppm)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.0, CALM % = 3.4%



Direction	0-0.1	0.1-0.3	0.3-1	1-2	2-4	>4	TOTAL
N	7.9	0.0	0.0	0.0	0.0	0.0	7.9
NE	19.2	0.0	0.0	0.0	0.0	0.0	19.2
E	9.2	0.0	0.0	0.0	0.0	0.0	9.2
SE	24.5	0.0	0.0	0.0	0.0	0.0	24.5
S	5.4	0.0	0.0	0.0	0.0	0.0	5.4
SW	11.8	0.0	0.0	0.0	0.0	0.0	11.8
W	10.6	0.0	0.0	0.0	0.0	0.0	10.6
NW	8.0	0.0	0.0	0.0	0.0	0.0	8.0
Summary	96.6	0.0	0.0	0.0	0.0	0.0	96.6
CALM	3.4	0.0	0.0	0.0	0.0	0.0	3.4



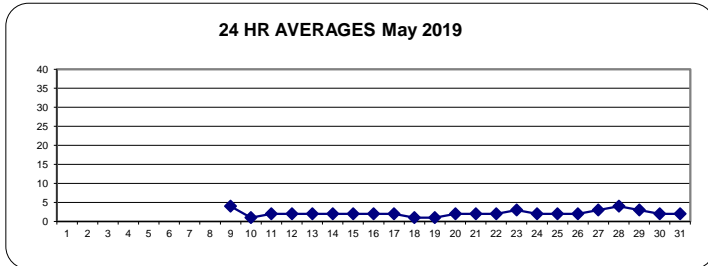
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

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

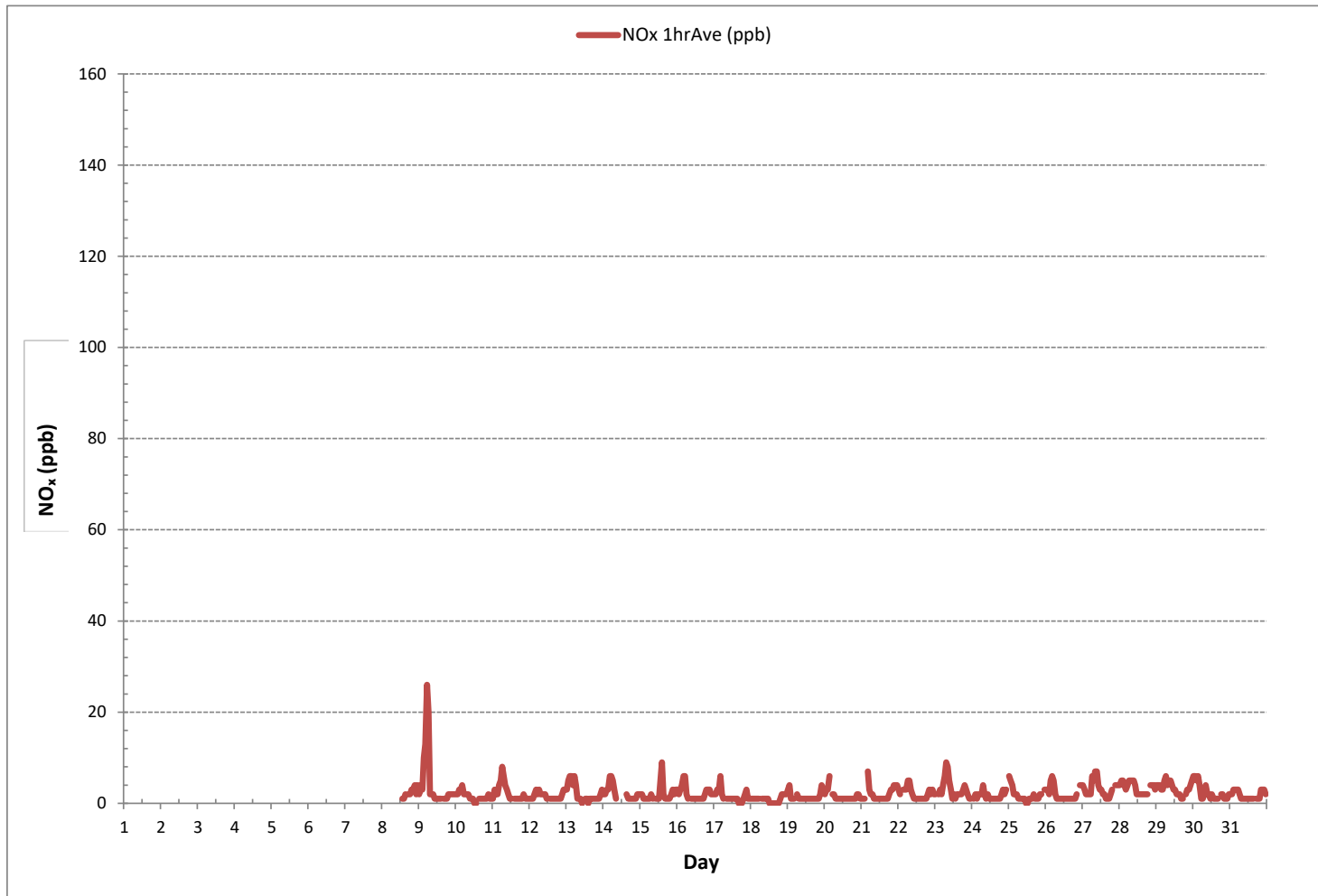
24 HR AVERAGES May 2019



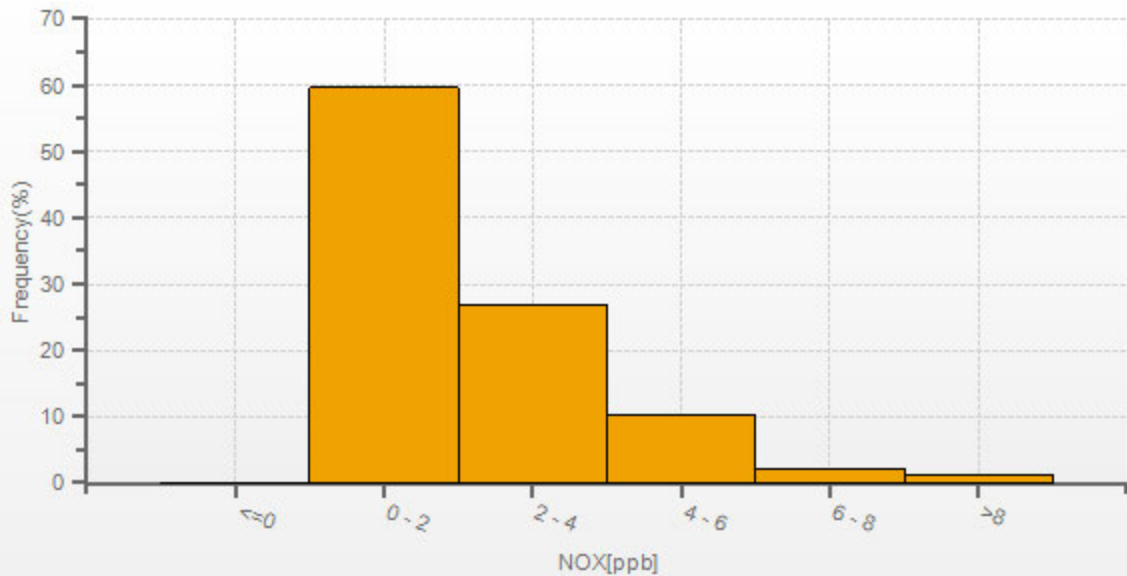
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	517			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	12	ON DAY 10
MAXIMUM 1-HR AVERAGE:	26 ppb	@ HOUR	5	ON DAY 9
MAXIMUM 24-HR AVERAGE:	4 ppb			ON DAY 9
IZS CALIBRATION TIME:	24 hrs	OPERATIONAL TIME:	568 hrs	
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	76.3 %	
STANDARD DEVIATION:	2	MONTHLY AVERAGE:	2 ppb	

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

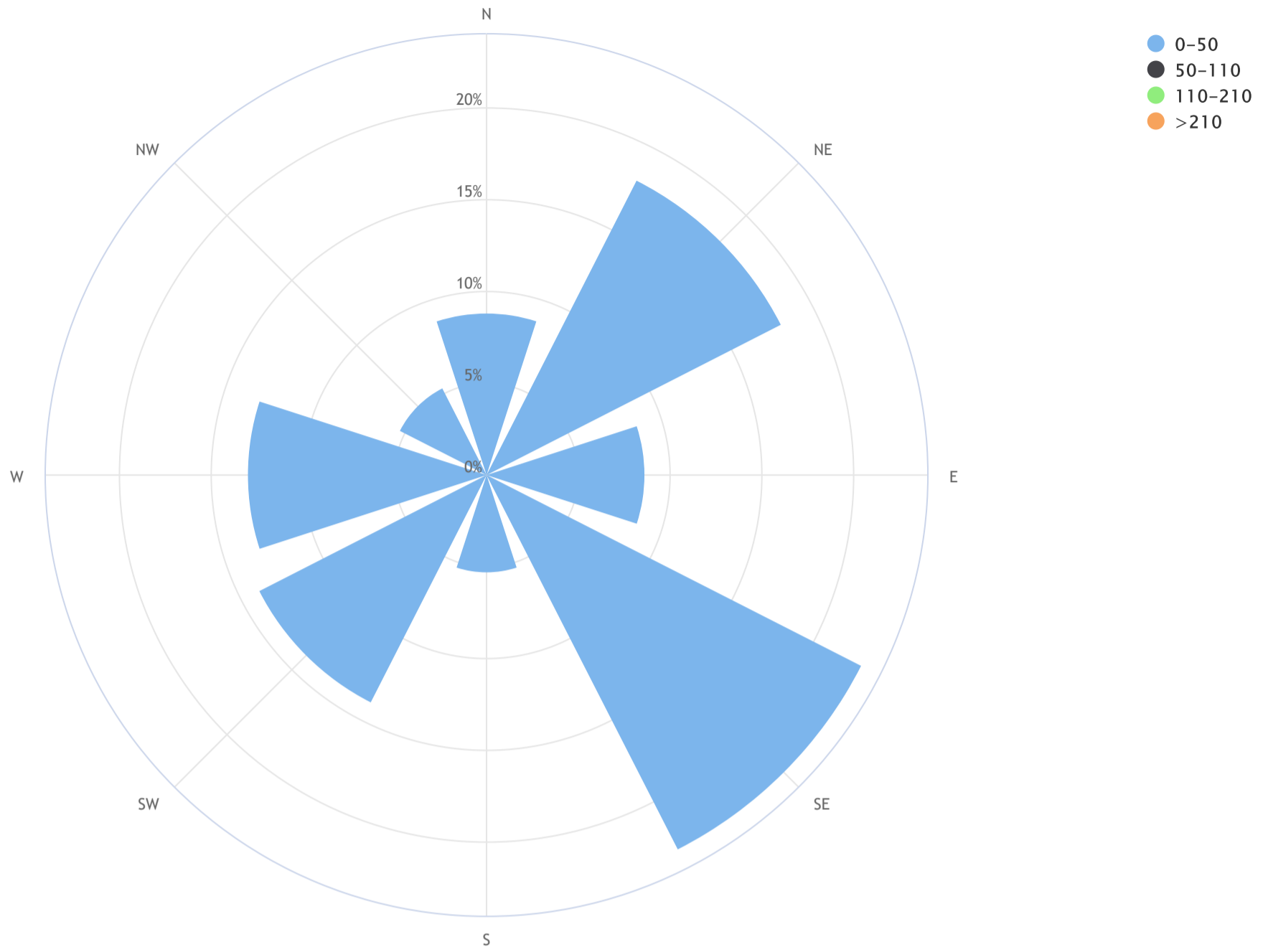


NOX[ppb] Histogram: LICA COLD LAKE SOUTH Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Cold Lake South Continuous Monitoring Station_NO_x (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 3.1, CALM % = 4.3%



Direction	0-50	50-110	110-210	>210	TOTAL
N	8.8	0.0	0.0	0.0	8.8
NE	18.0	0.0	0.0	0.0	18.0
E	8.6	0.0	0.0	0.0	8.6
SE	22.9	0.0	0.0	0.0	22.9
S	5.3	0.0	0.0	0.0	5.3
SW	13.9	0.0	0.0	0.0	13.9
W	13.0	0.0	0.0	0.0	13.0
NW	5.3	0.0	0.0	0.0	5.3
Summary	95.7	0.0	0.0	0.0	95.7
CALM	4.3	0.0	0.0	0.0	4.3

NITRIC OXIDE Hourly Averages (NO ppb)

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

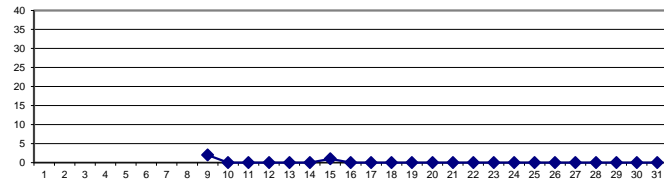
STATUS FLAG CODES

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

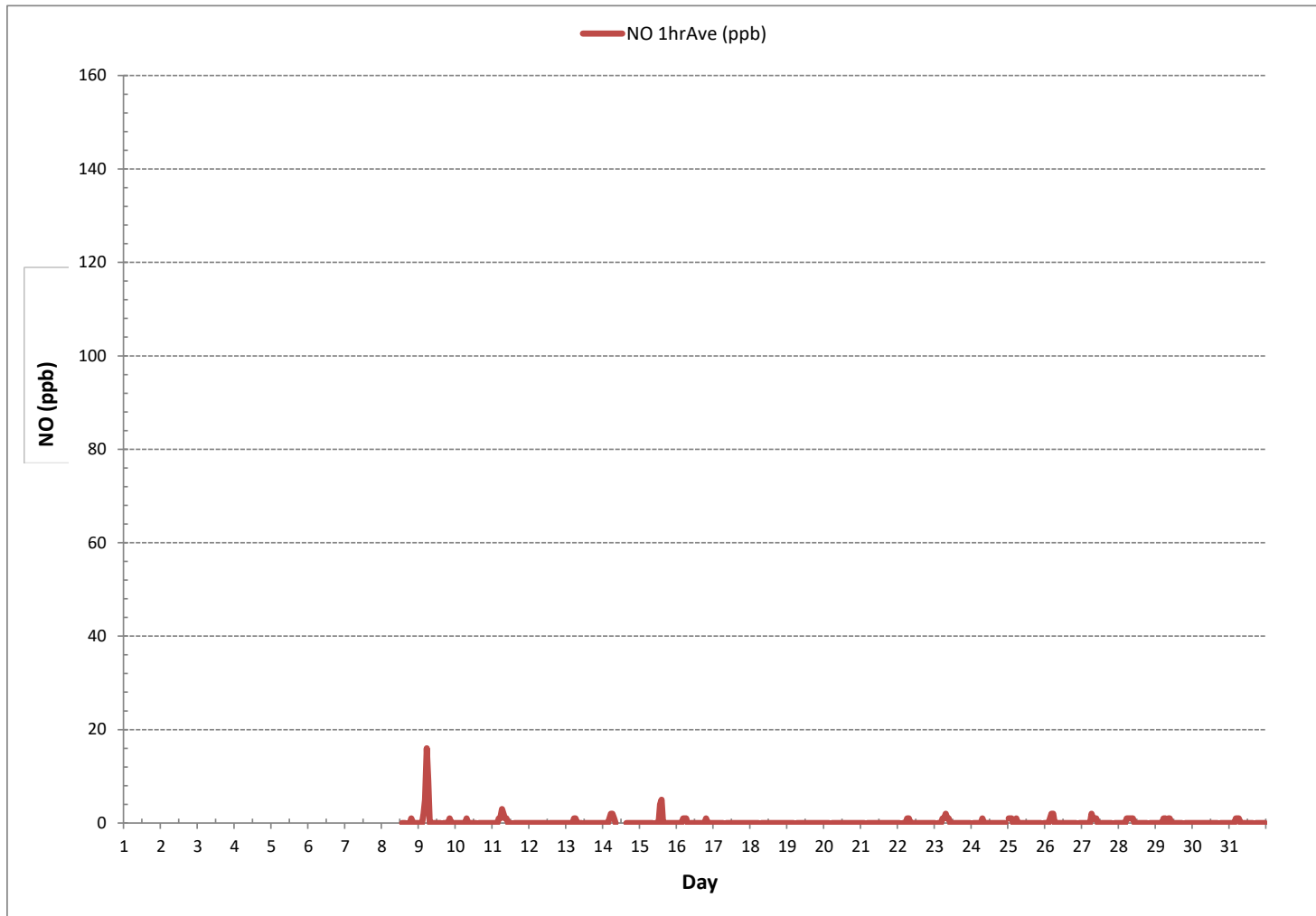
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	56			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	13	ON DAY 8
MAXIMUM 1-HR AVERAGE:	16 ppb	@ HOUR	5	ON DAY 9
MAXIMUM 24-HR AVERAGE:	2 ppb			ON DAY 9
IZS CALIBRATION TIME:	24 hrs	OPERATIONAL TIME:	568 hrs	
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	76.3 %	
STANDARD DEVIATION:	1	MONTHLY AVERAGE:	0 ppb	

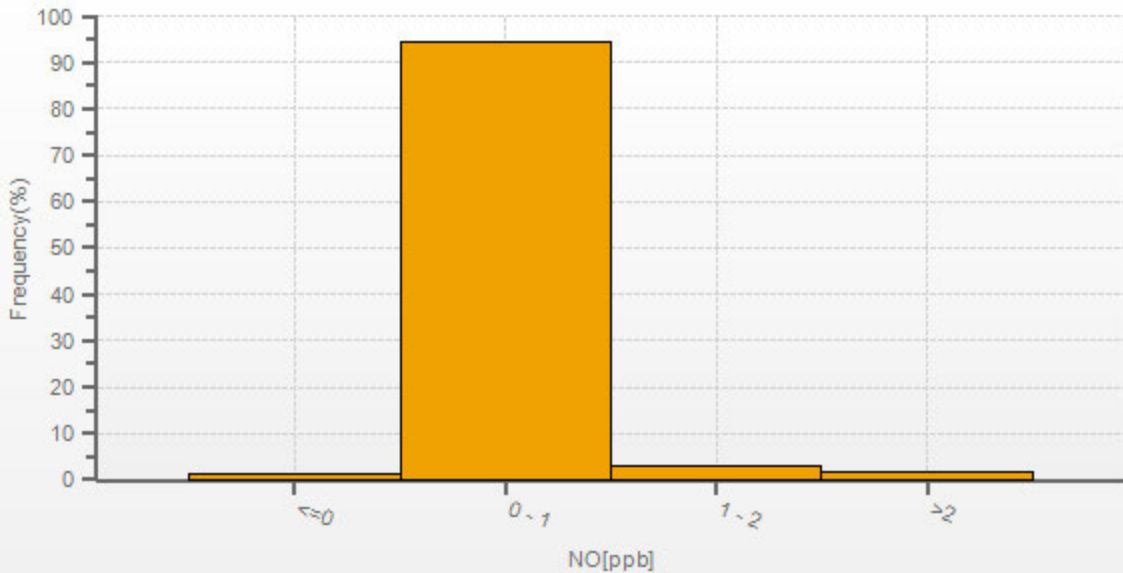
24 HR AVERAGES May 2019



NITRIC OXIDE Hourly Averages (NO ppb)

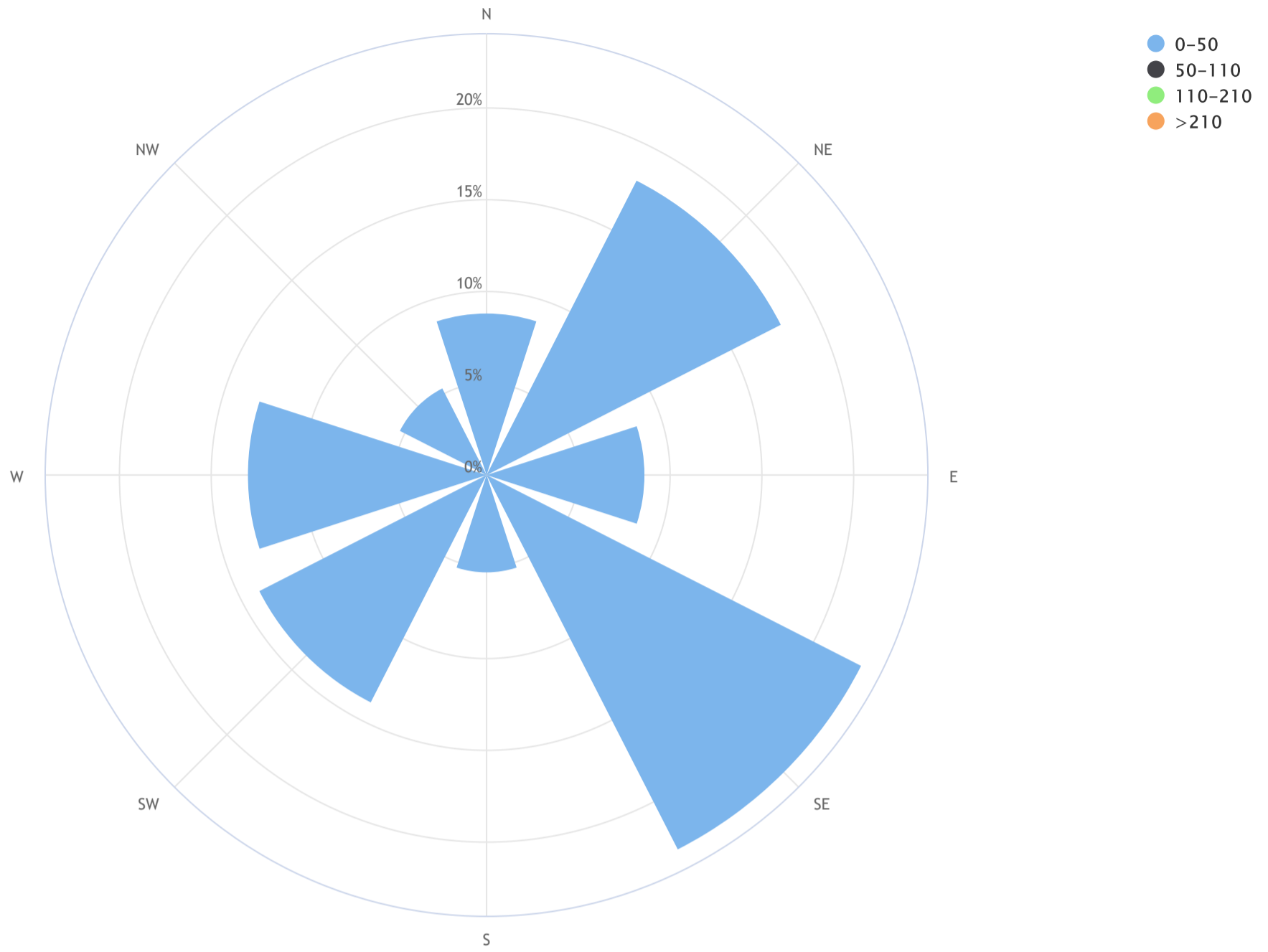


NO[ppb] Histogram: LICA COLD LAKE SOUTH Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Cold Lake South Continuous Monitoring Station_NO (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.4, CALM % = 4.3%



Direction	0-50	50-110	110-210	>210	TOTAL
N	8.8	0.0	0.0	0.0	8.8
NE	18.0	0.0	0.0	0.0	18.0
E	8.6	0.0	0.0	0.0	8.6
SE	22.9	0.0	0.0	0.0	22.9
S	5.3	0.0	0.0	0.0	5.3
SW	13.9	0.0	0.0	0.0	13.9
W	13.0	0.0	0.0	0.0	13.0
NW	5.3	0.0	0.0	0.0	5.3
Summary	95.7	0.0	0.0	0.0	95.7
CALM	4.3	0.0	0.0	0.0	4.3



NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)

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

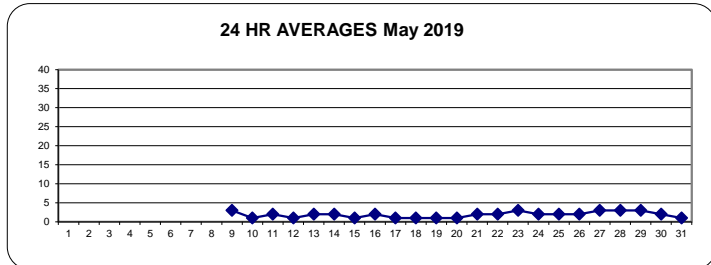
STATUS FLAG CODES

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

OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

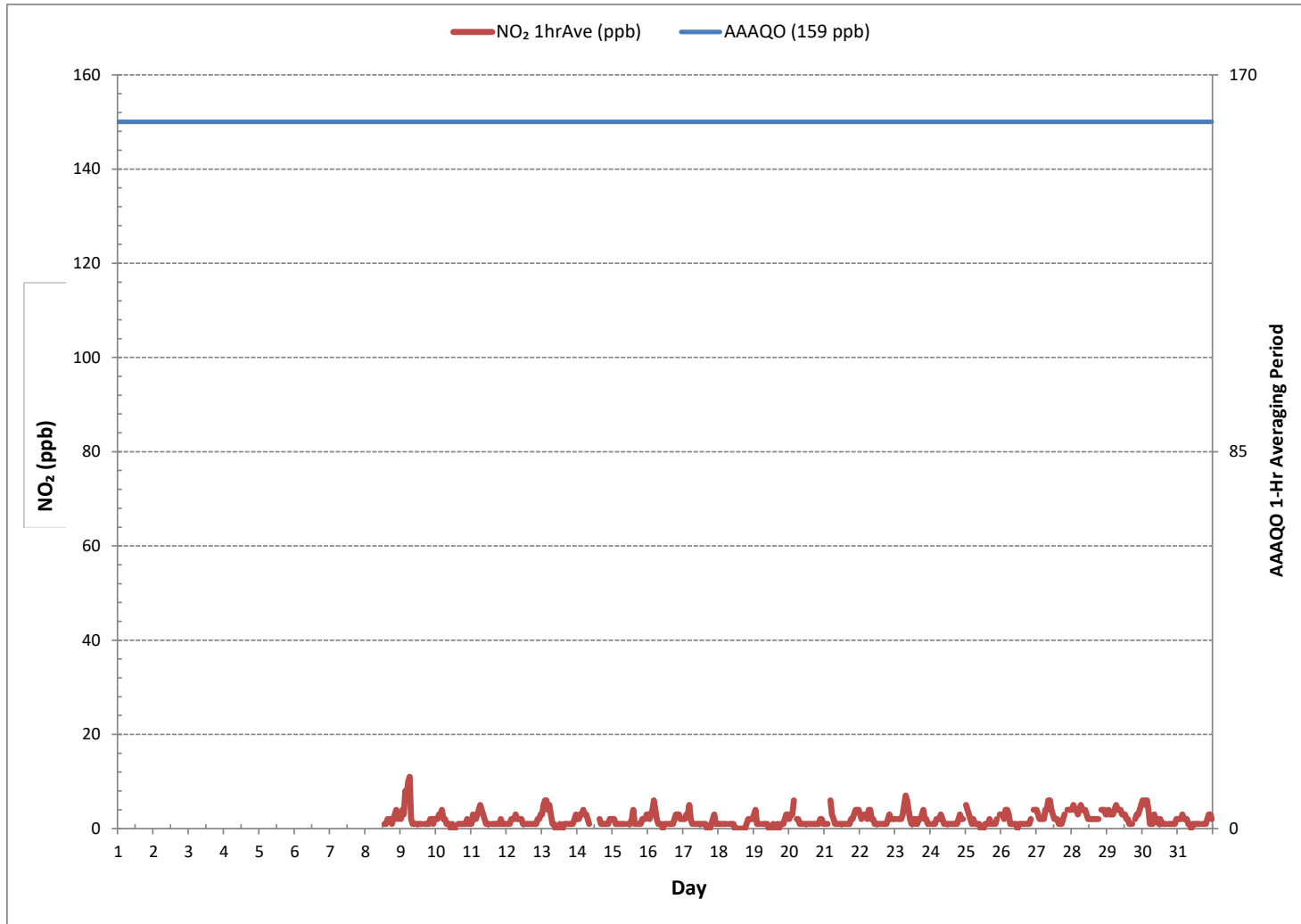
24 HR AVERAGES May 2019



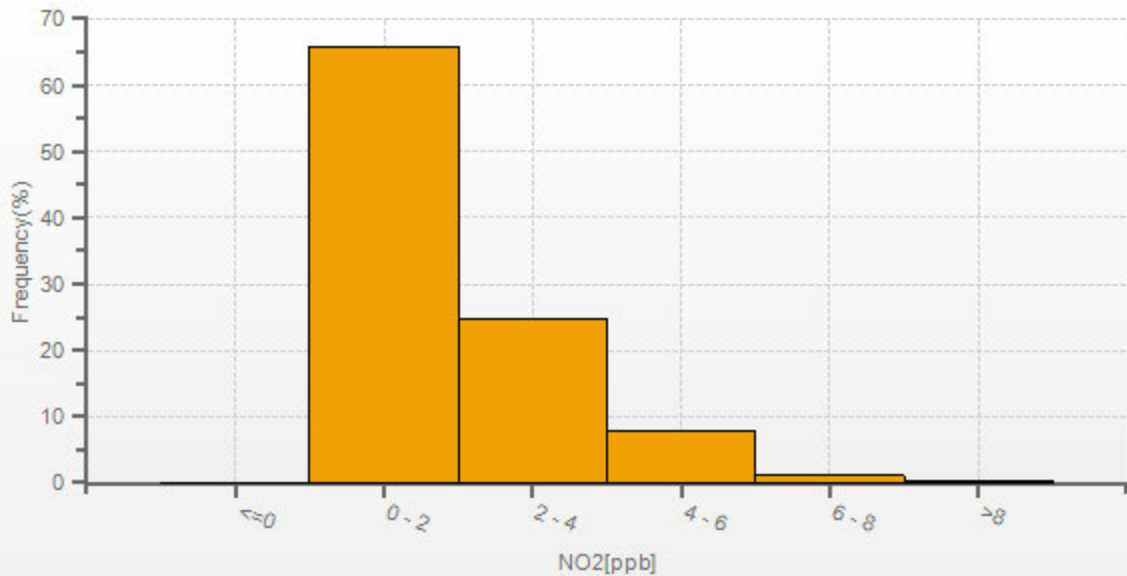
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0					
NUMBER OF NON-ZERO READINGS:	503					
MINIMUM 1-HR AVERAGE:	0	ppb	@ HOUR	10	ON DAY	10
MAXIMUM 1-HR AVERAGE:	11	ppb	@ HOUR	6	ON DAY	9
MAXIMUM 24-HR AVERAGE:	3	ppb			ON DAY	9
IZS CALIBRATION TIME:	24	hrs	OPERATIONAL TIME:	568	hrs	
MONTHLY CALIBRATION TIME:	6	hrs	AMD OPERATION UPTIME:	76.3	%	
STANDARD DEVIATION:	1		MONTHLY AVERAGE:	2	ppb	

NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)

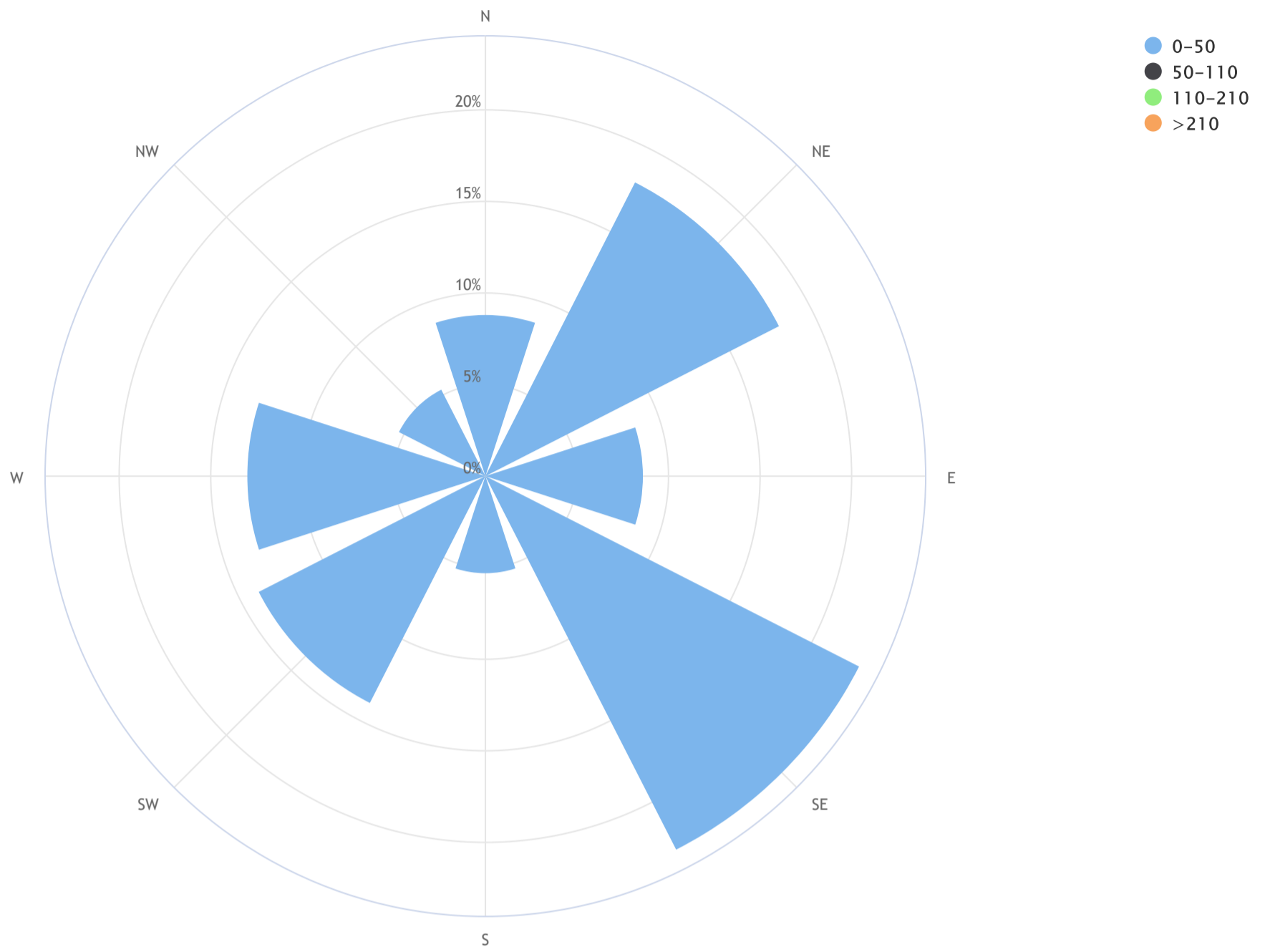


NO2[ppb] Histogram: LICA COLD LAKE SOUTH Monthly: 19/05 1 Hr.



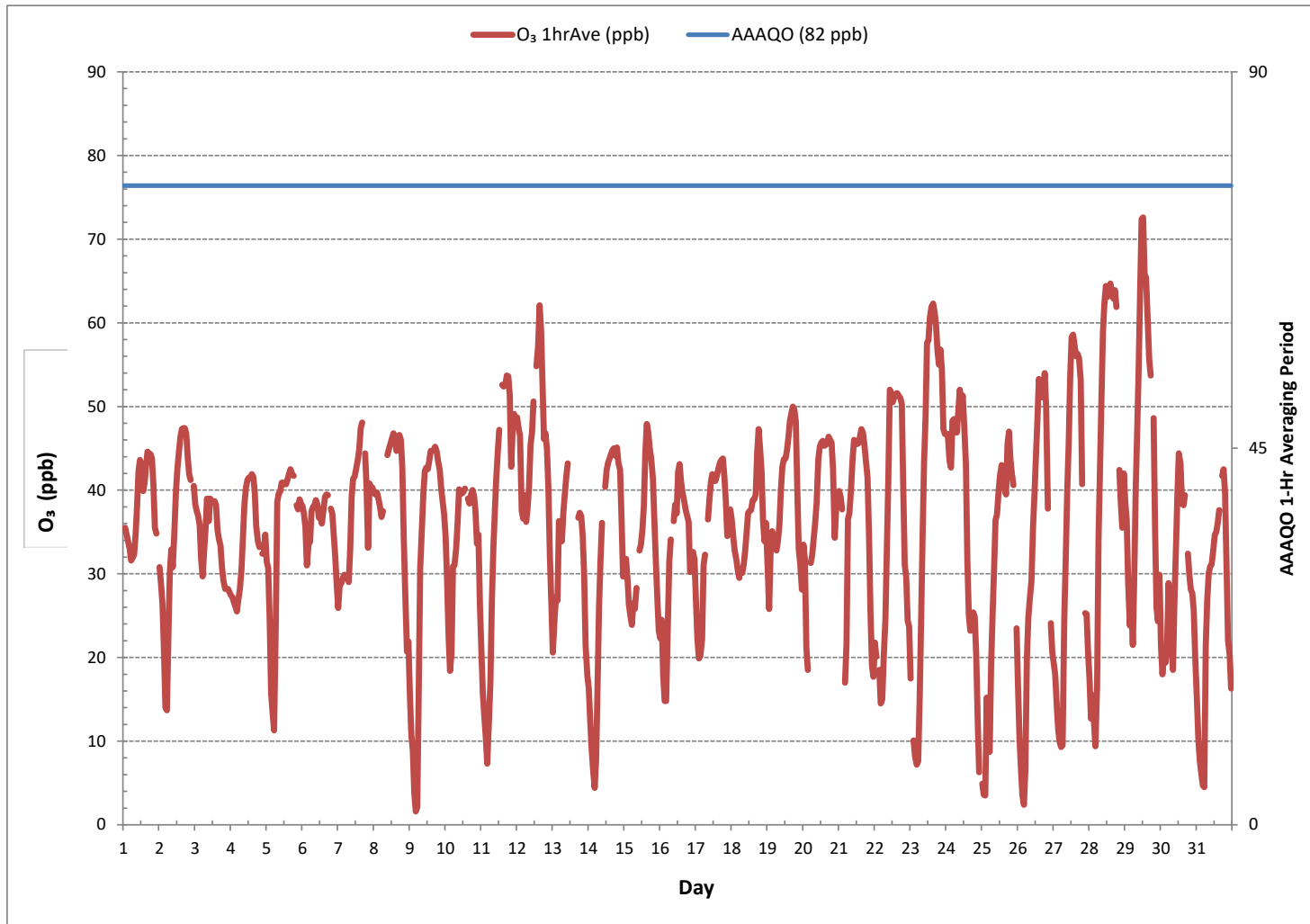
Lakeland Industry & Community Association_Cold Lake South Continuous Monitoring Station_NO₂ (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 2.6, CALM % = 4.3%

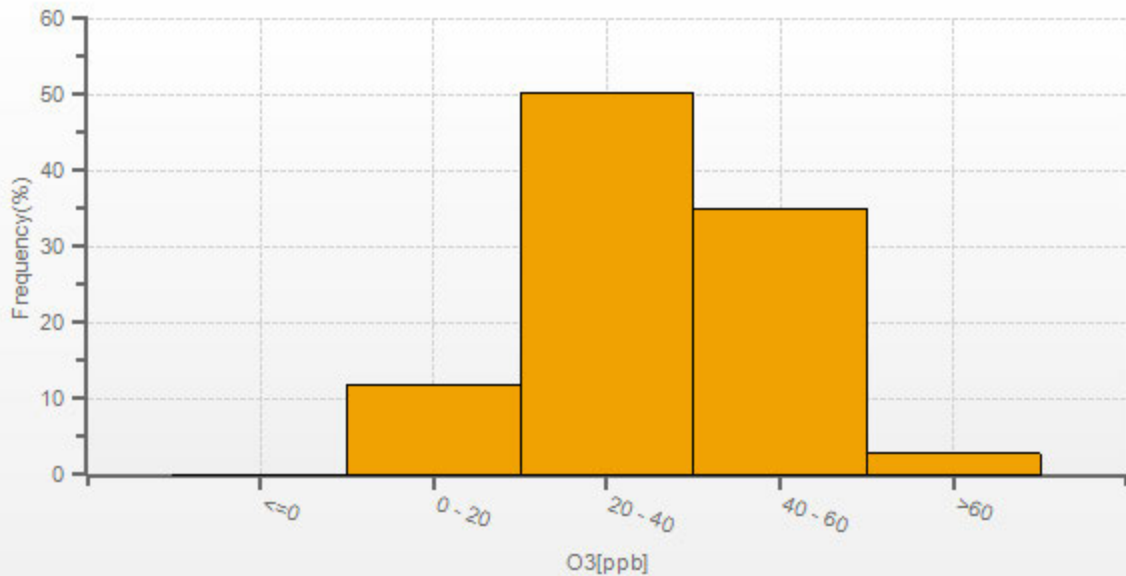


Direction	0-50	50-110	110-210	>210	TOTAL
N	8.8	0.0	0.0	0.0	8.8
NE	18.0	0.0	0.0	0.0	18.0
E	8.6	0.0	0.0	0.0	8.6
SE	22.9	0.0	0.0	0.0	22.9
S	5.3	0.0	0.0	0.0	5.3
SW	13.9	0.0	0.0	0.0	13.9
W	13.0	0.0	0.0	0.0	13.0
NW	5.3	0.0	0.0	0.0	5.3
Summary	95.7	0.0	0.0	0.0	95.7
CALM	4.3	0.0	0.0	0.0	4.3

OZONE Hourly Averages (O₃ ppb)

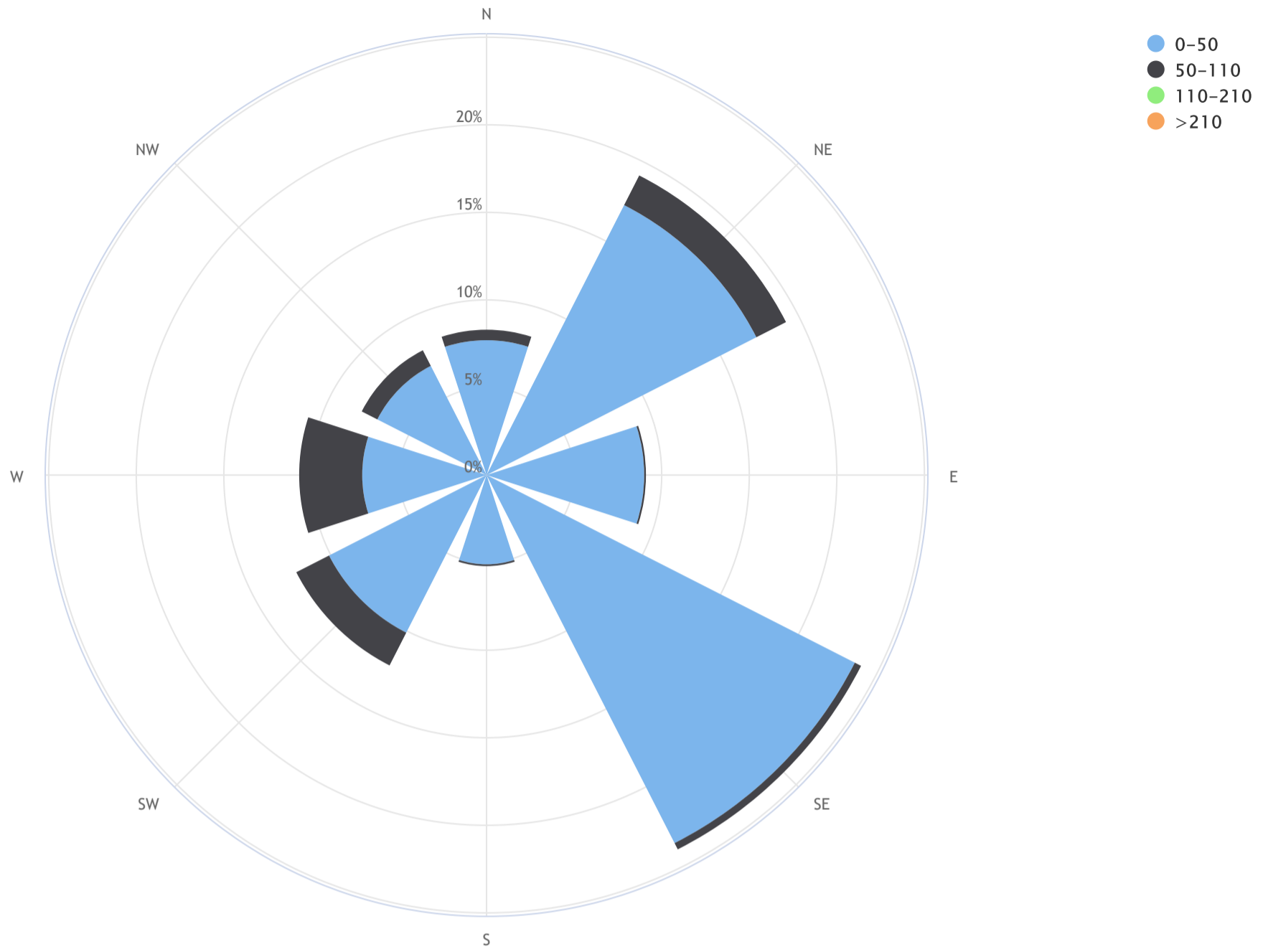


O3[ppb] Histogram: LICA COLD LAKE SOUTH Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Cold Lake South Continuous Monitoring Station_O₃ (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 15.8, CALM % = 3.4%



Direction	0-50	50-110	110-210	>210	TOTAL
N	7.7	0.6	0.0	0.0	8.2
NE	17.3	1.9	0.0	0.0	19.2
E	9.0	0.1	0.0	0.0	9.1
SE	23.6	0.4	0.0	0.0	24.0
S	5.1	0.1	0.0	0.0	5.3
SW	10.1	2.1	0.0	0.0	12.2
W	7.1	3.6	0.0	0.0	10.7
NW	7.0	1.0	0.0	0.0	8.0
Summary	86.8	9.8	0.0	0.0	96.6
CALM	3.4	0.0	0.0	0.0	3.4

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	2	2	2	2	2	2	2	2	2	2	2	3	3	3	2	3	3	4	5	5	3	5	6	4	2	6	3	24	
2	5	7	8	11	9	7	5	3	2	2	2	1	1	1	1	1	2	3	3	2	2	2	4	1	11	4	24		
3	3	3	3	3	3	4	4	3	2	1	2	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	4	2	24
4	1	1	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	2	2	2	3	4	3	2	1	4	1	24	
5	3	1	1	1	1	2	1	0	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	0	3	1	24	
6	2	2	2	2	3	3	3	3	3	2	3	4	4	6	8	6	5	5	5	4	3	3	4	7	2	8	4	24	
7	6	2	2	1	1	2	2	3	3	3	4	4	4	3	3	3	4	4	3	3	4	4	3	2	1	6	3	24	
8	2	2	3	3	3	3	3	3	3	3	4	4	Q	Q	3	3	4	4	4	5	7	8	7	9	2	9	4	24	
9	8	8	9	12	12	13	12	5	4	4	3	3	2	2	2	2	2	2	3	3	3	3	3	4	2	13	5	24	
10	4	4	4	4	4	2	3	3	4	3	2	2	2	2	2	1	2	2	3	2	3	2	2	3	1	4	3	24	
11	2	2	2	1	2	2	2	2	3	3	3	2	2	2	3	2	3	3	4	4	12	6	7	7	1	12	3	24	
12	7	7	6	6	6	6	6	6	5	4	4	4	4	7	6	4	4	3	3	4	4	4	5	7	3	7	5	24	
13	8	9	9	9	10	6	3	2	2	2	2	2	1	1	0	0	1	1	1	1	1	1	1	2	0	10	3	24	
14	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	4	1	4	2	24	
15	5	6	6	5	4	4	3	3	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	1	1	6	3	24	
16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	2	2	2	2	0	2	1	24		
17	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	4	6	4	3	1	6	2	24	
18	2	2	2	3	3	3	3	3	3	3	2	2	1	1	1	1	1	1	1	1	3	5	8	9	1	9	3	24	
19	6	6	5	6	6	6	4	4	3	2	1	1	1	2	2	2	2	2	3	2	2	5	6	6	1	6	4	24	
20	3	3	4	6	6	5	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	5	6	6	2	6	3	24	
21	7	7	8	7	8	7	7	6	4	4	3	3	3	2	3	2	3	3	4	5	7	11	10	11	2	11	6	24	
22	12	12	13	14	14	12	12	11	9	8	6	4	3	4	4	4	4	5	5	8	10	12	15	3	15	9	24		
23	17	20	20	20	20	20	19	14	11	14	15	5	5	5	6	6	6	6	7	8	9	9	10	12	5	20	12	24	
24	12	11	11	12	10	10	9	9	8	7	7	7	8	9	13	11	10	10	C	9	10	11	13	16	7	16	10	24	
25	15	11	9	6	5	6	5	4	3	2	2	2	2	2	3	5	5	4	3	5	7	8	11	12	2	15	6	24	
26	13	15	15	16	15	12	6	5	5	4	3	4	10	17	24	14	5	2	2	2	3	4	6	2	24	8	24		
27	7	7	8	8	9	11	12	14	16	18	17	17	17	16	16	16	17	18	18	19	22	24	25	27	7	27	16	24	
28	29	29	30	30	29	29	21	17	13	11	16	25	33	43	44	39	38	39	38	37	39	38	36	28	11	44	30	24	
29	23	21	19	17	17	17	16	13	11	14	16	22	22	18	17	17	16	16	16	18	21	29	28	32	11	32	19	24	
30	33	34	33	32	37	37	18	13	10	44	39	15	10	8	5	3	5	6	13	12	8	6	4	4	3	44	18	24	
31	4	4	4	4	5	5	4	4	4	4	4	4	3	3	4	4	5	5	7	8	10	11	10	11	3	11	6	24	
HOURLY MAX	33	34	33	32	37	37	21	17	16	44	39	25	33	43	44	39	38	39	38	37	39	38	36	32					
HOURLY AVG	8	8	8	8	8	8	6	5	5	6	6	5	5	6	6	5	5	5	5	6	7	8	8	8					

STATUS FLAG CODES

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

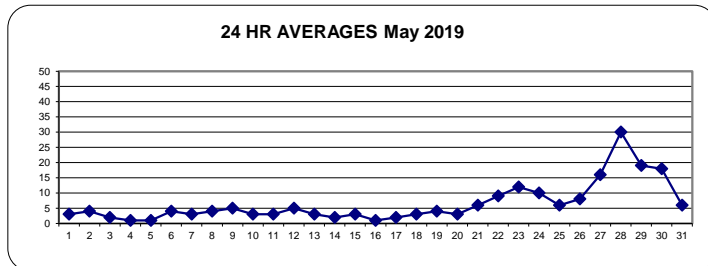
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	80 µg/m ³	24-HR	29 µg/m ³
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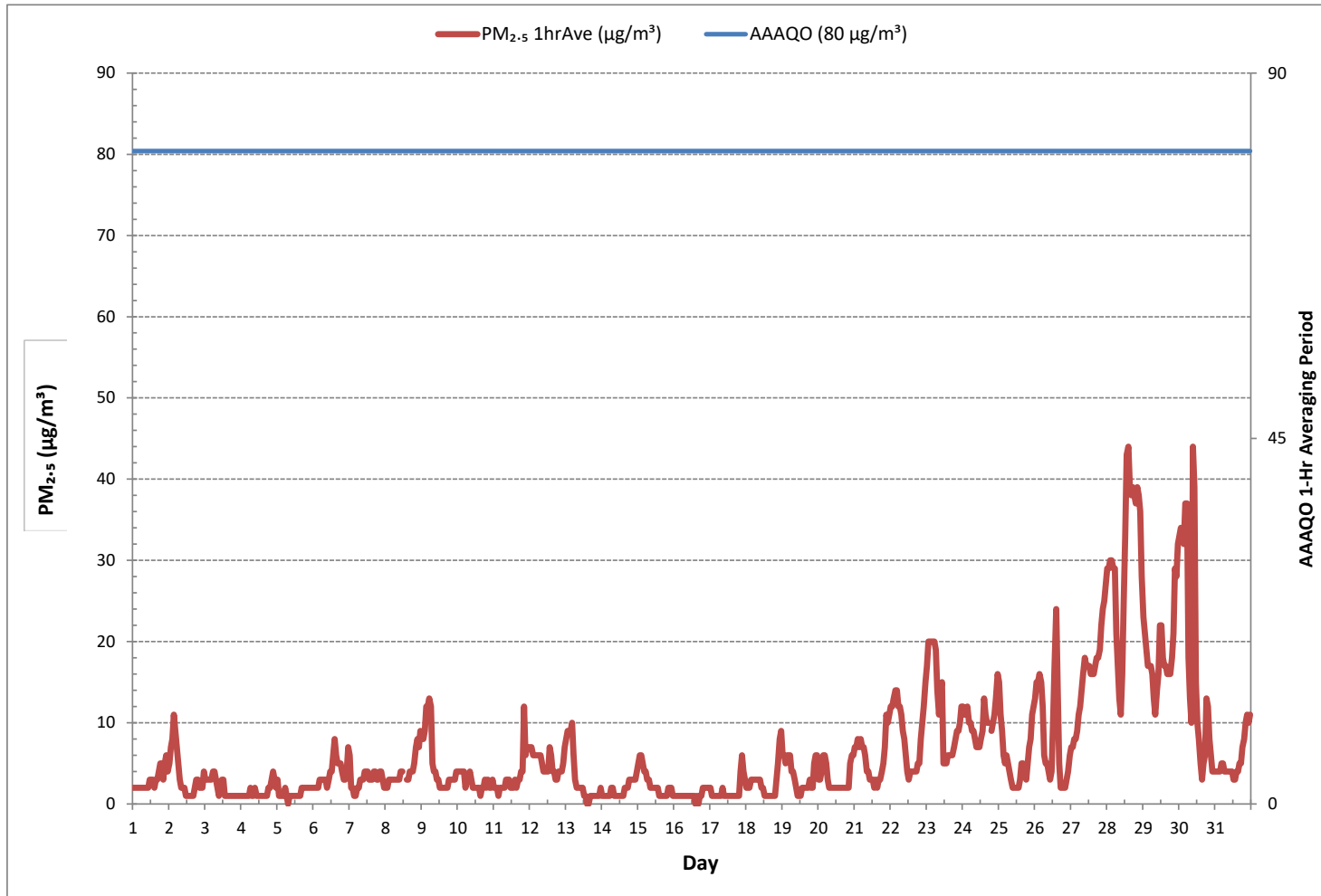
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	1				
NUMBER OF NON-ZERO READINGS:	736				
MINIMUM 1-HR AVERAGE:	0 µg/m ³	@ HOUR	7	ON DAY	5
MAXIMUM 1-HR AVERAGE:	44 µg/m ³	@ HOUR	14	ON DAY	28
MAXIMUM 24-HR AVERAGE:	30 µg/m ³			ON DAY	28
MONTHLY CALIBRATION TIME:	1	hrs	OPERATIONAL TIME:	744	hrs
STANDARD DEVIATION:	8		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	6	µg/m ³

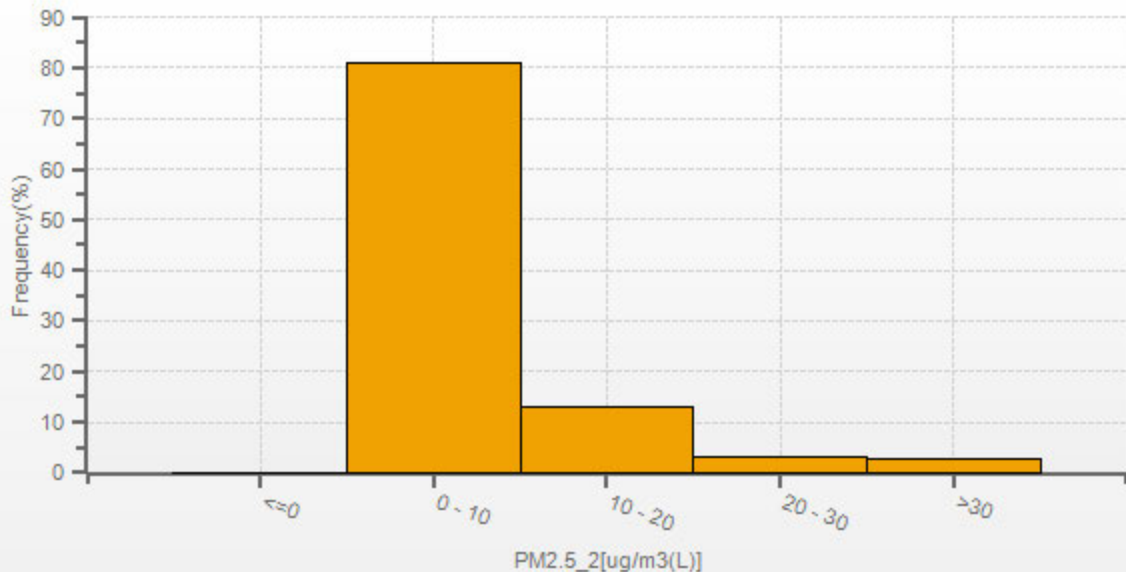
24 HR AVERAGES May 2019



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

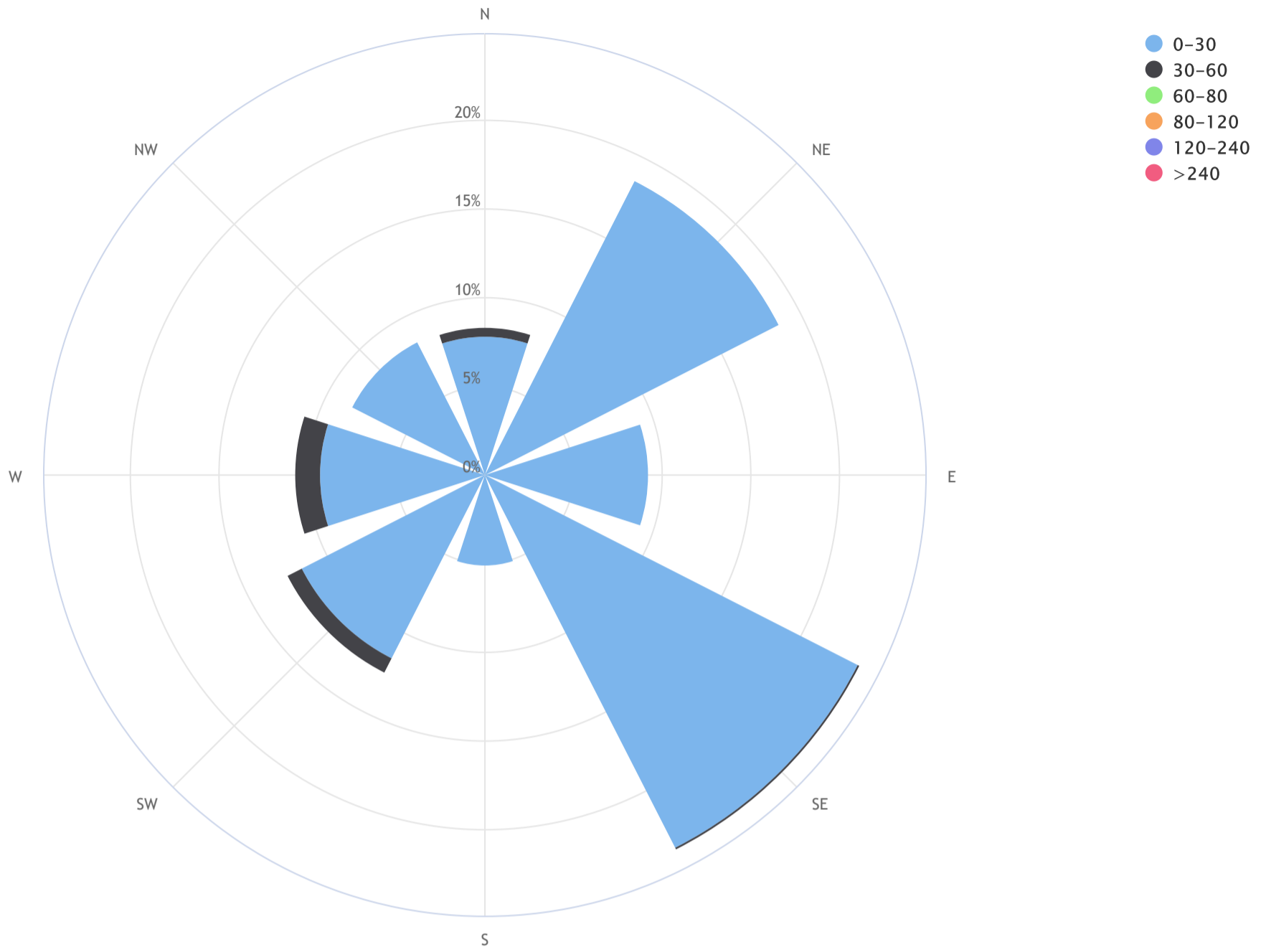


PM2.5_2[ug/m3(L)] Histogram: LICA COLD LAKE SOUTH Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Cold Lake South Continuous Monitoring Station_PM2.5 (µg/m³)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 9.0, CALM % = 3.4%



Direction	0-30	30-60	60-80	80-120	120-240	>240	TOTAL
N	7.8	0.5	0.0	0.0	0.0	0.0	8.4
NE	18.6	0.0	0.0	0.0	0.0	0.0	18.6
E	9.2	0.0	0.0	0.0	0.0	0.0	9.2
SE	23.6	0.1	0.0	0.0	0.0	0.0	23.8
S	5.1	0.0	0.0	0.0	0.0	0.0	5.1
SW	11.6	0.9	0.0	0.0	0.0	0.0	12.6
W	9.3	1.4	0.0	0.0	0.0	0.0	10.7
NW	8.4	0.0	0.0	0.0	0.0	0.0	8.4
Summary	93.7	3.0	0.0	0.0	0.0	0.0	96.6
CALM	3.4	0.0	0.0	0.0	0.0	0.0	3.4

WIND SPEED Hourly Averages (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	4.1	6.9	7.6	7.7	7.9	5.5	7.7	9.2	8.2	6.9	10.7	9.4	9.0	6.1	10.9	11.0	7.9	5.5	5.5	7.3	4.5	3.6	3.4	3.4	3.4	11.0	6.3	24
DAY 2	2.1	3.4	3.3	1.6	0.3	1.2	2.4	5.2	5.2	9.5	8.3	5.1	6.3	2.4	6.4	6.0	6.9	7.7	5.5	4.1	4.0	3.0	6.4	7.5	0.3	9.5	3.1	24
DAY 3	8.8	10.4	8.3	7.6	2.6	3.3	4.7	8.2	18.6	19.5	21.5	19.4	21.8	22.5	23.8	24.3	24.1	22.1	20.2	14.0	7.6	8.6	7.5	5.3	2.6	24.3	10.9	24
DAY 4	5.6	5.0	7.0	6.6	4.7	6.8	11.0	11.6	13.3	14.8	15.8	16.0	14.6	14.7	13.8	15.8	15.4	14.4	9.6	5.2	5.3	6.7	5.9	5.2	4.7	16.0	9.4	24
DAY 5	3.2	2.6	1.9	0.8	0.6	1.1	2.3	2.7	1.5	1.4	3.7	6.1	6.6	8.1	5.8	9.3	8.1	6.8	6.3	6.1	5.8	6.7	8.5	7.0	0.6	9.3	3.6	24
DAY 6	7.6	5.9	3.3	0.9	3.0	5.3	6.6	7.2	8.9	6.2	4.3	4.4	2.9	2.7	5.3	4.3	2.5	2.5	3.1	10.0	8.0	5.2	3.2	2.9	0.9	10.0	2.4	24
DAY 7	4.5	6.0	5.9	6.7	5.4	13.5	13.4	3.8	4.5	8.5	10.2	7.2	7.7	6.8	7.1	7.3	7.5	7.6	5.2	3.2	2.1	7.0	6.4	6.1	2.1	13.5	4.9	24
DAY 8	4.7	6.6	6.8	5.3	7.1	6.3	6.7	5.8	8.0	6.7	6.5	5.4	6.3	2.3	6.3	12.2	6.6	5.2	6.0	3.3	0.5	0.8	0.2	1.2	0.2	12.2	3.6	24
DAY 9	1.1	0.5	0.4	0.8	0.2	0.9	1.4	4.1	4.6	6.1	8.1	7.3	8.3	8.1	8.6	7.2	7.5	6.9	5.8	9.6	6.4	1.6	2.8	2.5	0.2	9.6	3.7	24
DAY 10	1.7	2.8	1.5	3.4	3.8	10.8	14.1	16.7	17.9	20.1	18.5	19.4	21.0	21.0	21.6	17.7	20.8	17.4	16.1	13.8	6.2	2.7	4.2	0.3	0.3	21.6	11.3	24
DAY 11	2.4	2.8	0.8	0.9	1.0	3.6	2.4	2.0	1.2	2.6	4.4	5.7	3.5	4.8	5.7	6.3	6.1	9.8	5.4	3.1	3.4	6.5	8.6	7.8	0.8	9.8	2.6	24
DAY 12	8.2	5.8	5.5	0.2	2.4	5.9	2.8	3.4	7.6	13.7	12.0	13.0	17.0	18.5	19.3	18.7	17.8	17.8	19.0	13.5	5.8	2.0	2.4	2.3	0.2	19.3	6.2	24
DAY 13	2.5	5.1	4.3	3.7	7.5	8.2	13.8	14.3	15.0	15.6	18.5	22.4	22.9	17.4	18.4	14.8	13.1	12.9	13.0	9.6	6.1	3.1	1.3	0.8	0.8	22.9	9.6	24
DAY 14	0.7	0.4	0.2	0.4	0.7	0.8	0.5	2.2	3.6	2.2	5.0	4.1	4.2	4.9	4.1	4.2	0.4	6.1	4.9	1.6	3.5	3.6	0.8	0.3	0.2	6.1	1.9	24
DAY 15	2.0	5.4	6.0	4.2	6.4	8.7	10.6	9.8	11.2	9.8	11.7	13.1	10.4	7.1	10.4	10.9	9.4	8.2	8.1	5.6	3.2	2.3	1.3	2.6	1.3	13.1	7.3	24
DAY 16	2.9	1.8	1.1	1.2	1.4	3.5	5.4	6.5	6.7	6.2	4.3	8.7	7.7	4.8	6.8	8.0	7.6	7.0	5.4	5.0	1.2	3.6	4.3	3.5	1.1	8.7	3.7	24
DAY 17	2.3	2.3	2.4	2.7	3.3	5.5	7.1	8.2	10.8	13.2	14.3	13.9	13.4	11.6	11.4	11.7	11.3	10.4	10.0	6.5	4.1	3.8	9.9	9.4	2.3	14.3	8.0	24
DAY 18	6.2	6.4	5.9	6.3	5.6	6.5	9.3	10.1	9.1	10.0	9.7	12.0	11.3	10.2	10.7	10.6	9.6	11.9	12.2	9.9	4.2	4.0	3.1	3.7	3.1	12.2	8.2	24
DAY 19	2.5	2.3	4.0	6.2	6.0	8.2	9.3	8.2	8.7	8.8	10.8	10.1	10.1	11.3	11.9	11.1	10.5	9.8	7.9	6.9	2.5	1.2	1.3	2.5	1.2	11.9	7.1	24
DAY 20	3.7	3.4	1.6	2.8	5.0	7.5	6.3	8.1	8.2	8.3	9.6	10.3	12.0	11.2	11.7	12.3	12.5	11.3	9.6	8.0	4.2	2.8	4.6	4.9	1.6	12.5	7.4	24
DAY 21	5.6	5.4	5.3	3.3	0.8	0.4	7.7	7.2	6.4	7.9	10.1	10.9	9.8	10.0	8.9	6.9	5.9	9.2	5.8	4.0	0.5	0.4	0.8	1.0	0.4	10.9	4.8	24
DAY 22	0.1	0.3	0.8	1.2	0.8	1.0	1.1	1.0	1.9	2.0	3.6	4.6	5.3	7.4	7.4	5.4	5.1	2.5	1.8	1.2	0.7	0.7	0.5	0.3	0.1	7.4	1.5	24
DAY 23	0.9	0.3	0.5	0.8	0.5	0.6	1.4	3.6	2.7	4.2	1.4	3.4	5.5	4.0	6.0	4.7	1.3	6.2	3.4	5.6	5.5	8.3	7.1	8.2	0.3	8.3	1.2	24
DAY 24	7.8	5.9	7.8	9.0	8.4	6.1	7.2	7.4	11.6	13.9	12.9	11.1	13.9	14.1	11.6	12.2	13.6	10.9	10.8	5.9	1.7	0.6	0.7	0.9	0.6	14.1	8.4	24
DAY 25	1.3	1.7	2.4	2.5	0.1	0.6	0.7	1.6	2.6	4.8	3.1	1.7	1.8	2.9	6.0	9.8	2.3	4.3	6.5	4.4	3.6	2.3	1.1	0.8	0.1	9.8	0.7	24
DAY 26	0.2	0.4	0.1	0.7	0.2	1.0	3.8	3.7	2.8	3.8	2.9	2.3	1.1	3.0	4.9	1.9	3.5	4.4	4.4	2.6	1.7	1.0	0.1	0.6	0.1	4.9	0.6	24
DAY 27	0.4	0.3	0.1	0.7	0.5	0.2	0.4	3.0	6.5	5.6	6.5	7.5	10.5	9.9	9.3	8.2	6.7	5.9	3.2	2.1	2.7	2.3	1.0	0.4	0.1	10.5	3.5	24
DAY 28	0.7	0.4	0.7	0.9	0.7	3.2	5.3	5.5	6.0	8.1	9.8	10.6	10.1	11.0	12.5	10.1	9.4	9.3	6.4	4.0	2.9	2.7	2.6	3.8	0.4	12.5	5.4	24
DAY 29	3.2	1.7	2.3	0.8	0.7	0.3	3.2	5.2	7.0	10.2	13.2	13.2	13.4	13.0	13.3	13.2	10.0	9.7	7.5	4.7	3.4	2.4	3.3	4.4	0.3	13.4	6.1	24
DAY 30	3.2	2.8	3.2	2.9	3.3	8.4	5.8	4.6	1.1	7.2	9.3	10.4	8.8	13.2	15.3	16.5	16.2	12.2	9.8	6.8	4.0	4.9	4.5	0.3	0.3	16.5	6.1	24
DAY 31	0.4	0.6	0.5	0.3	0.3	0.3	4.7	5.1	3.3	2.5	3.4	4.1	1.2	3.8	4.1	2.4	3.2	3.9	3.9	3.0	2.4	0.5	0.8	0.3	0.3	5.1	1.7	24
HOURLY MAX	8.8	10.4	8.3	9.0	8.4	13.5	14.1	16.7	18.6	20.1	21.5	22.4	22.9	22.5	23.8	24.3	24.1	22.1	20.2	14.0	8.0	8.6	9.9	9.4				

STATUS FLAG CODES

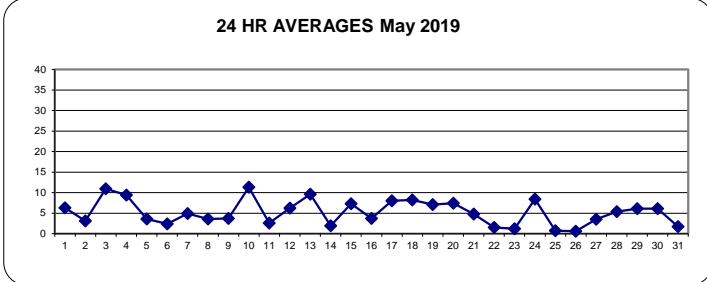
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

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

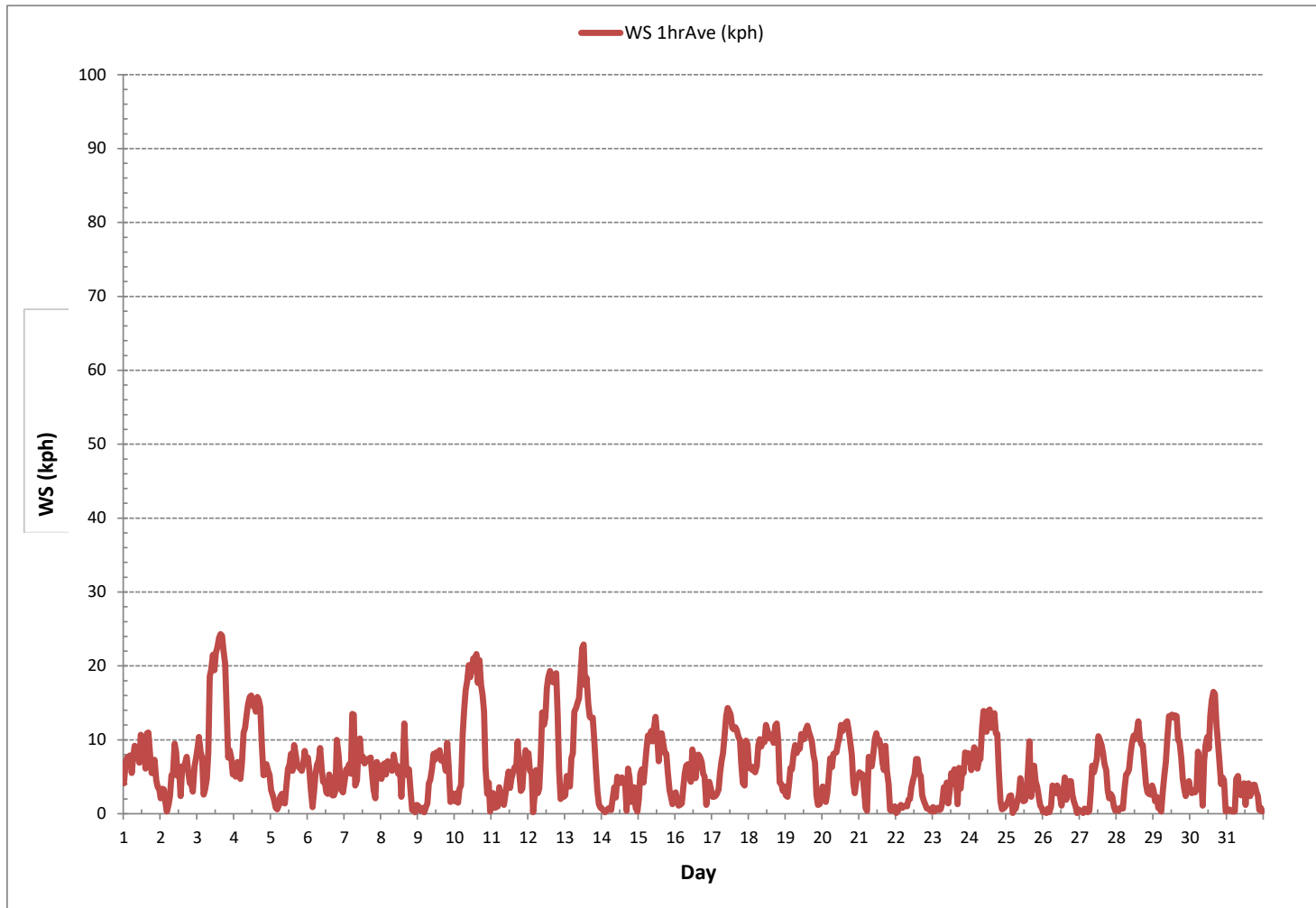
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	744			
MINIMUM 1-HR AVERAGE	0.1 kph @ HOUR	0	ON DAY	22
MAXIMUM 1-HR AVERAGE:	24.3 kph @ HOUR	15	ON DAY	3
MAXIMUM 24-HR AVERAGE:	11.3 kph		ON DAY	10
MONTHLY CALIBRATION TIME:	0 hrs	OPERATIONAL TIME:	744 hrs	
STANDARD DEVIATION:	4.8	AMD OPERATION UPTIME:	100.0 %	
		MONTHLY AVERAGE:	0.9 kph	

24 HR AVERAGES May 2019

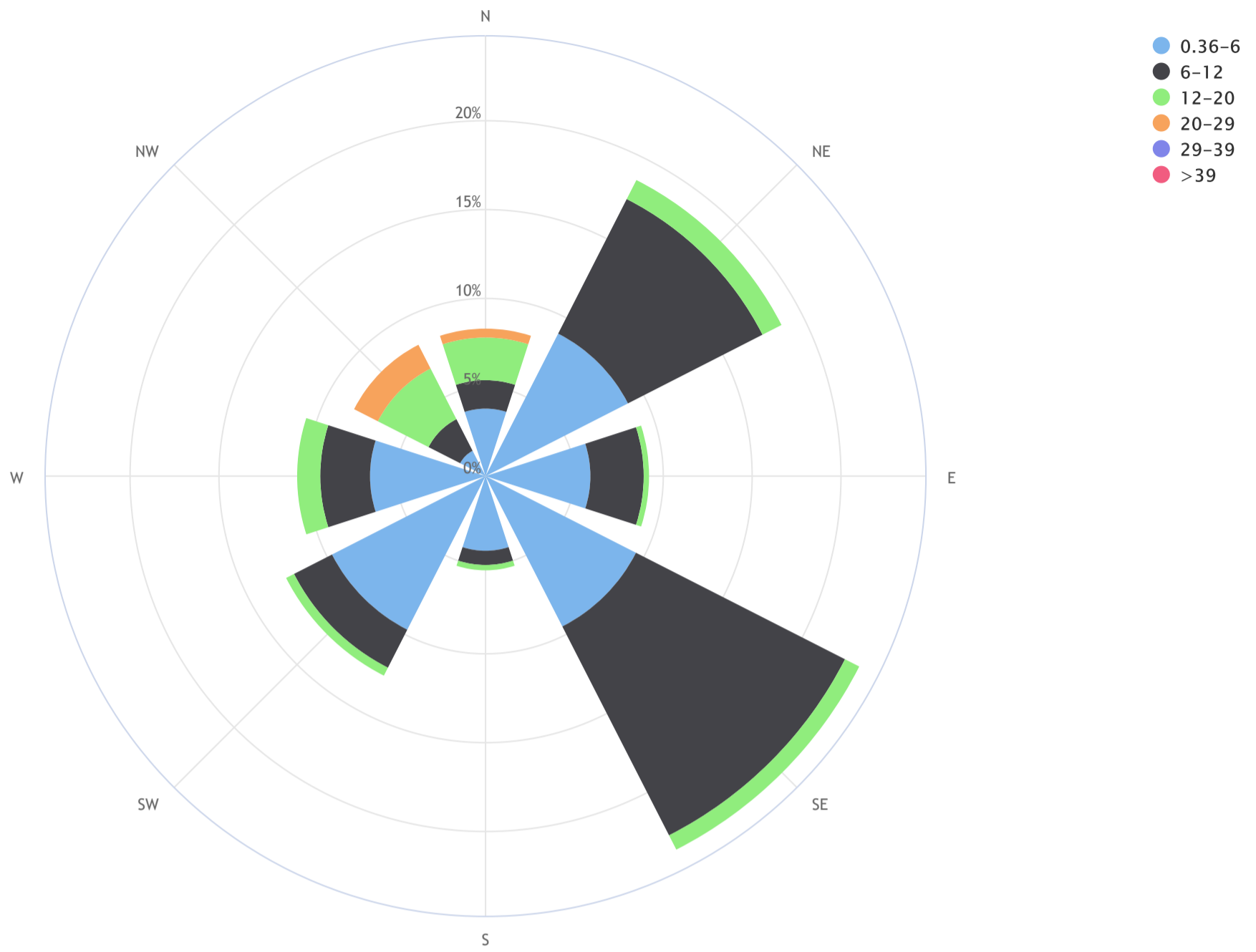


WIND SPEED Hourly Averages (WS kph)



Lakeland Industry & Community Association_Cold Lake South Continuous Monitoring Station_19/05

Wind Rose_Wind Frequency (Blowing From)_CALM Avg = 0.2_CALM % = 3.4%



Direction	0.36-6	6-12	12-20	20-29	29-39	>39	TOTAL
N	3.8	1.6	2.4	0.5	0.0	0.0	8.3
NE	9.0	8.5	1.2	0.0	0.0	0.0	18.7
E	5.9	3.0	0.3	0.0	0.0	0.0	9.1
SE	9.5	13.2	0.9	0.0	0.0	0.0	23.7
S	4.2	0.8	0.3	0.0	0.0	0.0	5.3
SW	9.7	2.4	0.5	0.0	0.0	0.0	12.6
W	6.5	2.8	1.3	0.0	0.0	0.0	10.6
NW	1.6	2.0	3.2	1.5	0.0	0.0	8.3
Summary	50.1	34.3	10.2	2.0	0.0	0.0	96.7
CALM	3.4	0.0	0.0	0.0	0.0	0.0	3.4



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - May 2019

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

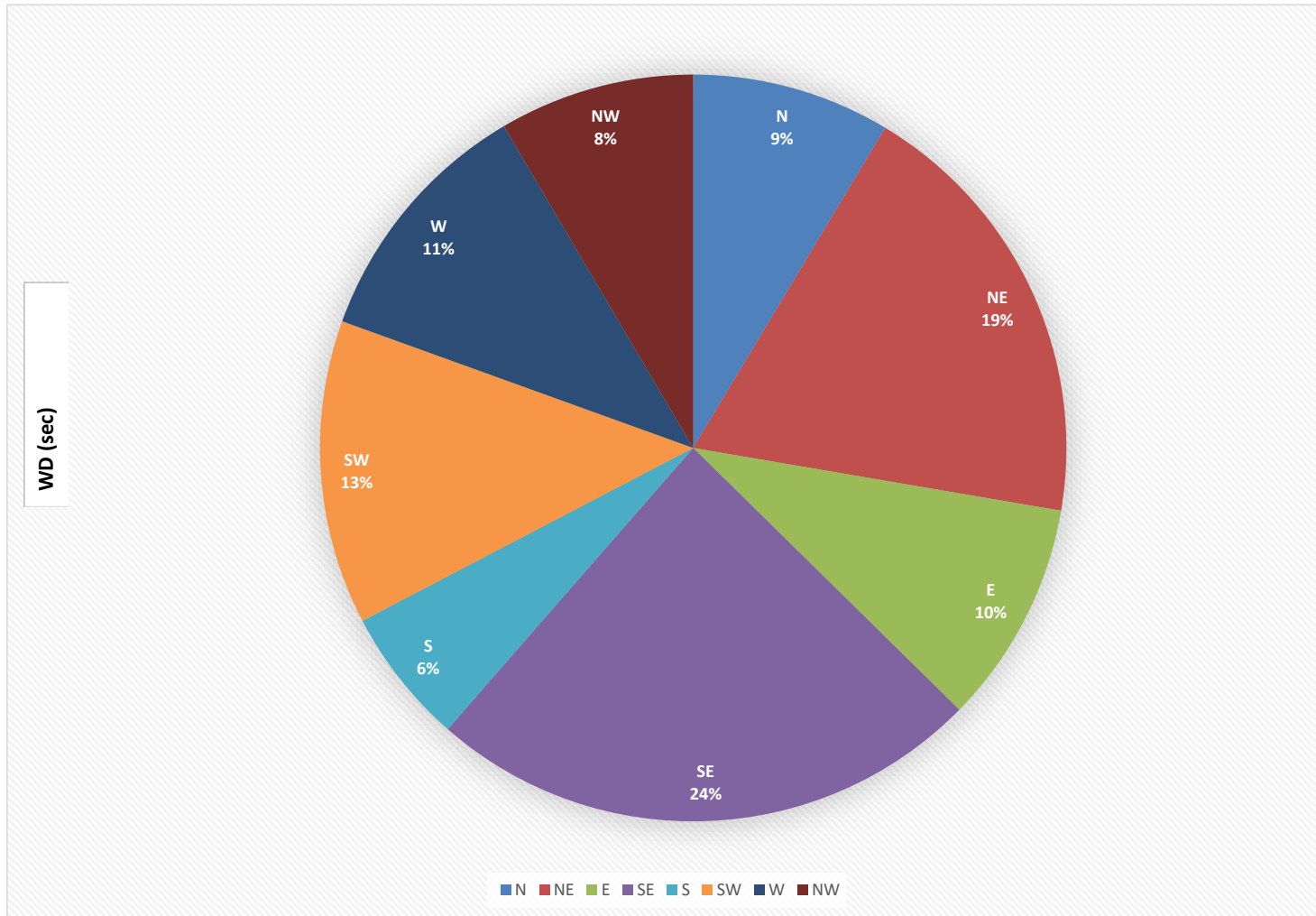
STATUS FLAG CODES

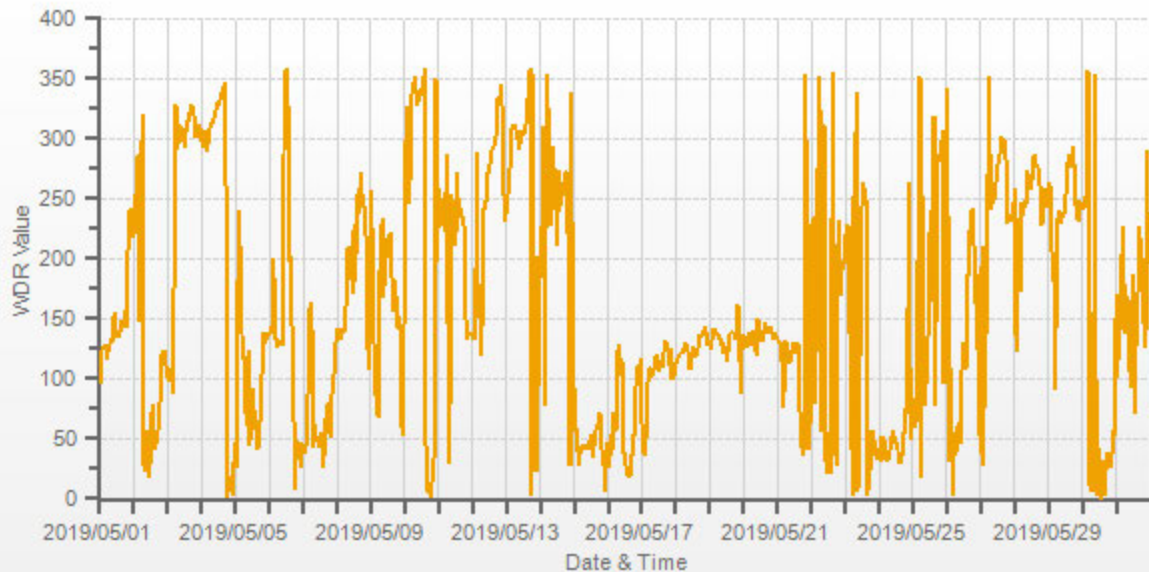
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

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

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	744	hrs
STANDARD DEVIATION:	99		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	39 (NE)	

WIND DIRECTION Hourly Averages (WD)







LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - May 2019

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59		
DAY																										
1	13	11	9	10	9	11	10	14	14	17	28	12	10	8	27	20	10	12	22	11	14	16	19	20	24	
2	42	14	26	36	71	36	43	26	33	13	18	38	28	59	35	31	22	12	12	12	15	19	10	10	24	
3	13	8	8	14	38	16	19	11	7	12	9	14	14	12	12	9	11	10	8	7	13	10	11	15	24	
4	12	10	5	6	16	14	9	10	15	18	18	17	16	17	17	14	14	15	19	8	6	6	10	11	24	
5	9	20	34	37	45	44	24	41	63	64	44	37	35	26	35	20	13	19	16	26	5	5	4	5	24	
6	4	5	18	55	29	8	9	10	8	15	50	40	51	63	22	31	49	47	21	13	9	7	15	12	24	
7	11	11	14	14	58	10	23	34	27	15	15	27	27	32	31	25	22	15	14	35	42	9	9	12	24	
8	8	19	9	16	5	6	16	34	31	31	42	36	28	60	42	12	22	33	16	10	63	51	69	53	24	
9	46	63	64	50	62	34	47	25	24	33	22	25	21	25	20	31	18	31	26	5	8	62	56	51	24	
10	48	48	57	11	32	9	8	14	14	12	13	14	10	19	18	17	13	8	11	7	10	37	11	73	24	
11	28	14	34	47	51	7	27	41	67	57	42	33	60	43	38	36	29	14	21	21	8	4	3	3	24	
12	4	7	15	76	29	29	39	27	23	11	22	15	17	12	15	17	16	11	9	7	8	34	13	19	24	
13	13	6	11	11	4	6	5	15	14	15	12	13	13	19	15	20	20	16	13	9	19	13	32	48	24	
14	53	63	74	54	39	57	58	38	36	59	43	54	52	46	44	36	73	26	26	63	39	44	68	72	24	
15	24	10	8	10	6	6	6	7	7	8	7	11	18	21	14	15	16	14	18	15	20	24	21	24	24	
16	13	40	44	21	24	16	19	23	23	28	45	17	28	42	28	25	28	12	8	14	38	8	8	9	24	
17	30	13	10	21	12	12	10	11	14	15	17	20	16	20	21	18	18	17	13	10	14	16	5	6	24	
18	8	9	7	7	8	10	8	13	14	22	20	19	15	22	19	20	22	8	6	7	9	6	10	7	24	
19	8	8	7	6	4	7	7	14	14	22	16	21	23	21	18	13	15	17	15	5	31	27	11	14	24	
20	5	7	24	7	7	5	12	11	18	23	32	21	12	21	12	15	12	11	9	5	6	7	3	3	24	
21	3	4	3	10	54	66	9	17	25	29	19	22	21	19	27	32	34	10	11	10	48	49	24	43	24	
22	77	68	62	31	39	34	39	41	31	45	38	40	41	29	32	33	25	34	46	44	42	43	55	65	24	
23	45	65	54	20	61	63	36	24	39	38	69	49	38	39	27	27	71	13	30	11	18	10	14	10	24	
24	13	22	7	7	9	12	14	10	15	8	7	13	11	11	10	10	11	11	7	10	45	50	50	43	24	
25	31	23	14	25	74	64	63	57	42	34	56	68	67	49	43	19	51	39	18	21	23	39	45	48	24	
26	73	62	73	46	70	49	21	22	43	41	56	62	70	55	43	64	40	34	17	21	14	32	76	47	24	
27	53	69	78	38	58	72	49	23	14	13	14	20	18	14	22	24	23	17	18	15	7	8	21	53	24	
28	57	69	45	44	45	10	5	14	14	15	17	17	17	21	17	20	16	14	13	6	10	11	14	8	24	
29	11	19	12	40	36	69	14	10	11	11	10	11	16	23	16	17	17	12	12	9	9	15	9	5	24	
30	5	9	16	38	42	9	9	21	60	15	21	19	23	15	15	13	12	22	8	12	9	10	9	70	24	
31	60	48	59	68	64	50	13	23	49	58	50	43	69	53	42	58	42	28	21	28	14	42	31	60	24	

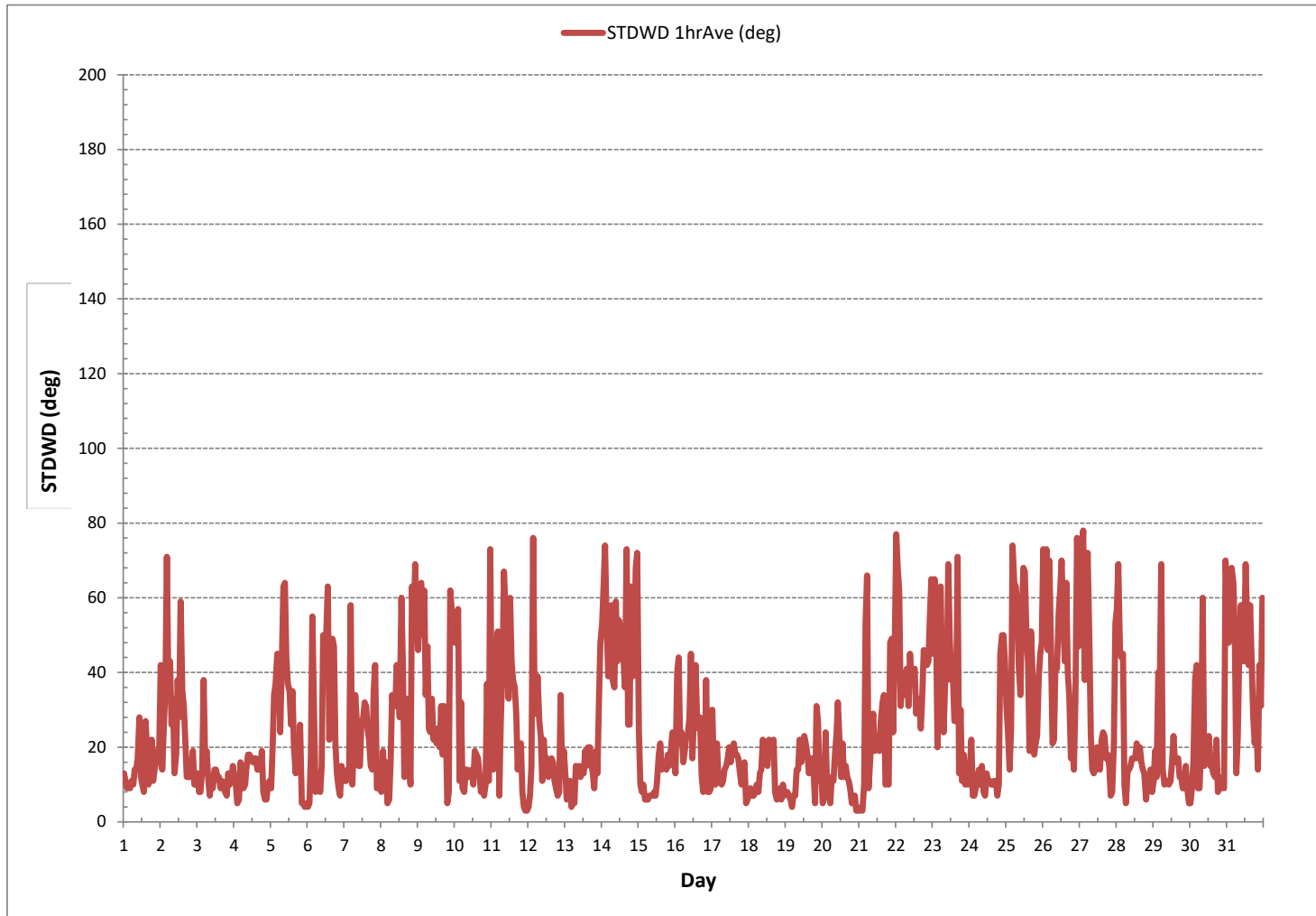
STATUS FLAG CODES

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

LAST CALIBRATION: November 9, 2017

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 744 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)





VECTOR WIND SPEED Hourly Averages (kph) & WIND DIRECTION Hourly Averages in Sector

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	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.	
21 WS	5.6	5.4	5.3	3.3	0.8	0.4	7.7	7.2	6.4	7.9	10.1	10.9	9.8	10.0	8.9	6.9	5.9	9.2	5.8	4.0	0.5	0.4	0.8	1.0	0.4	10.9	4.8	24
WD	SE	SE	SE	ESE	ENE	E	SE	ESE	ESE	ESE	ESE	SE	ESE	ESE	SE	ENE	NE	NE	NE	NE	N	ENE	NE	ENE	-	-	-	24
22 WS	0.1	0.3	0.8	1.2	0.8	1.0	1.1	1.0	1.9	2.0	3.6	4.6	5.3	7.4	7.4	5.4	5.1	2.5	1.8	1.2	0.7	0.7	0.5	0.3	0.1	7.4	1.5	24
WD	SW	SW	SW	E	SW	WNW	N	ENE	WNW	NW	NE	NNE	NNE	NE	NNE	N	NE	ESE	NNE	SW	S	SSE	SSW	S	-	-	-	24
23 WS	0.9	0.3	0.5	0.8	0.5	0.6	1.4	3.6	2.7	4.2	1.4	3.4	5.5	4.0	6.0	4.7	1.3	6.2	3.4	5.6	5.5	8.3	7.1	8.2	0.3	8.3	1.2	24
WD	SW	SSW	SW	SE	SSW	N	WSW	WSW	NNW	N	NE	SW	WSW	W	WSW	WSW	N	NNE	NNE	NE	NE	NE	NE	NE	-	-	-	24
24 WS	7.8	5.9	7.8	9.0	8.4	6.1	7.2	7.4	11.6	13.9	12.9	11.1	13.9	14.1	11.6	12.2	13.6	10.9	10.8	5.9	1.7	0.6	0.7	0.9	0.6	14.1	8.4	24
WD	NE	NNE	NE	NE	NE	NNE	NNE	NE	NE	NE	ENE	NE	NE	NNE	NNE	NE	NE	ENE	ENE	ENE	W	E	NE	NE	-	-	-	24
25 WS	1.3	1.7	2.4	2.5	0.1	0.6	0.7	1.6	2.6	4.8	3.1	1.7	1.8	2.9	6.0	9.8	2.3	4.3	6.5	4.4	3.6	2.3	1.1	0.8	0.1	9.8	0.7	24
WD	E	ENE	ENE	E	WNW	N	NNE	WSW	ENE	E	ESE	SE	SW	SSE	NW	NW	ENE	WNW	W	WNW	WNW	NW	E	S	-	-	-	24
26 WS	0.2	0.4	0.1	0.7	0.2	1.0	3.8	3.7	2.8	3.8	2.9	2.3	1.1	3.0	4.9	1.9	3.5	4.4	4.4	2.6	1.7	1.0	0.1	0.6	0.1	4.9	0.6	24
WD	NNW	SSW	NNE	ESE	N	NE	NE	NE	ENE	NE	NE	SE	SE	ESE	ESE	S	SW	WSW	WSW	SSE	S	SE	ENE	ENE	-	-	-	24
27 WS	0.4	0.3	0.1	0.7	0.5	0.2	0.4	3.0	6.5	5.6	6.5	7.5	10.5	9.9	9.3	8.2	6.7	5.9	3.2	2.1	2.7	2.3	1.0	0.4	0.1	10.5	3.5	24
WD	NE	SSW	NNE	S	SE	WSW	N	WSW	WSW	WSW	WSW	W	W	WNW	WNW	WNW	WNW	WNW	W	SW	SW	SW	SW	SW	-	-	-	24
28 WS	0.7	0.4	0.7	0.9	0.7	3.2	5.3	5.5	6.0	8.1	9.8	10.6	10.1	11.0	12.5	10.1	9.4	9.3	6.4	4.0	2.9	2.7	2.6	3.8	0.4	12.5	5.4	24
WD	WSW	SE	ESE	SW	S	WSW	SW	WSW	WSW	W	W	W	WSW	W	WNW	W	W	W	W	SW	SW	WSW	WSW	WSW	-	-	-	24
29 WS	3.2	1.7	2.3	0.8	0.7	0.3	3.2	5.2	7.0	10.2	13.2	13.2	13.4	13.0	13.3	13.2	10.0	9.7	7.5	4.7	3.4	2.4	3.3	4.4	0.3	13.4	6.1	24
WD	WSW	W	SW	S	SSW	E	SW	SW	WSW	SW	WSW	WSW	W	WNW	WNW	W	WNW	W	WSW	SW	SW	WSW	WSW	WSW	-	-	-	24
30 WS	3.2	2.8	3.2	2.9	3.3	8.4	5.8	4.6	1.1	7.2	9.3	10.4	8.8	13.2	15.3	16.5	16.2	12.2	9.8	6.8	4.0	4.9	4.5	0.3	0.3	16.5	6.1	24
WD	WSW	WSW	WSW	WSW	N	NNE	N	N	E	N	N	N	NE	N	N	NNE	N	NNE	NE	NE	NNE	NE	ENE	NE	-	-	-	24
WS HOURLY MAX	8.8	10.4	8.3	9.0	8.4	13.5	14.1	16.7	18.6	20.1	21.5	22.4	22.9	22.5	23.8	24.3	24.1	22.1	20.2	14.0	8.0	8.6	9.9	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

LAST CALIBRATION:	November 9, 2017
DECLINATION :	MAGNETIC DECLINATION 16 DEGREE EAST

MONTHLY SUMMARY

WIND SPEED			
MINIMUM 1-HR AVERAGE	0.1	kph @ HOUR(S)	0 ON DAY(S) 22
MAXIMUM 1-HR AVERAGE:	24.3	kph @ HOUR(S)	15 ON DAY(S) 3
MAXIMUM 24-HR AVERAGE:	11.3	kph	ON DAY(S) 10
			VAR-VARIOUS
		MONTHLY AVERAGE:	0.9 kph
WIND DIRECTION			
		MONTHLY AVERAGE:	39 (NE)
HOURS IN SERVICE	744	hrs	
HOURS OF DATA	744	hrs	
HOURS OF CALIBRATION	0	hrs	STANDARD DEVIATION: 4.8
HOURS OF MISSING DATA	0	hrs	AMD OPERATION UPTIME: 100.0 %

@ HOUR(S)

24 HOUR AVERAGES FOR May 2016



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
 Cold Lake South Continuous Monitoring Station - May 2019

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

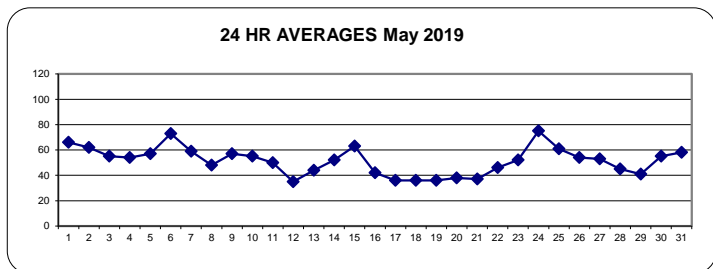
STATUS FLAG CODES

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

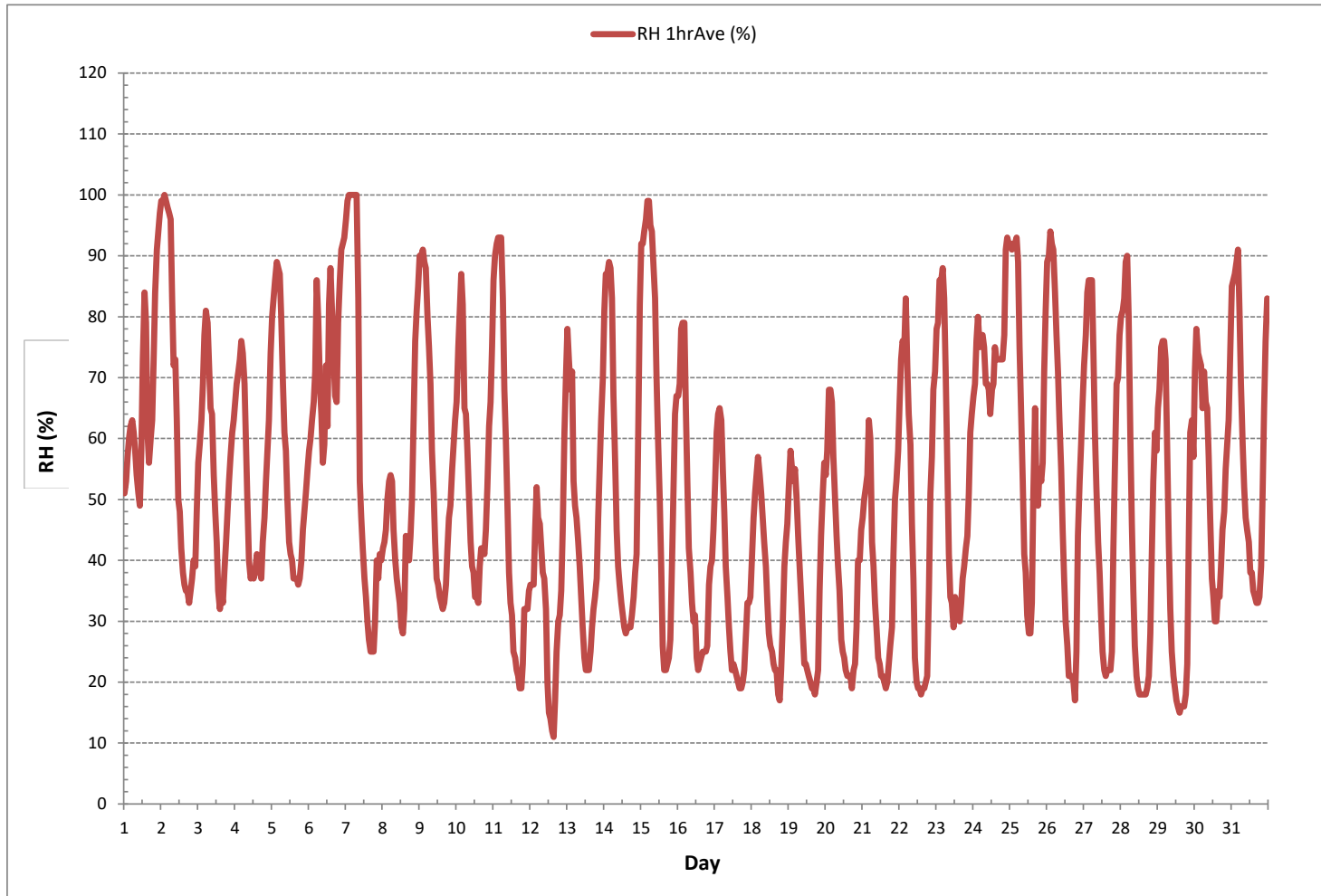
MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	11	%	@ HOUR	15	ON DAY	12
MAXIMUM 1-HR AVERAGE:	100	%	@ HOUR	2	ON DAY	2
MAXIMUM 24-HR AVERAGE:	75	%			ON DAY	24
OPERATIONAL TIME:						744 hrs
AMSD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	23					
MONTHLY AVERAGE:						52 %

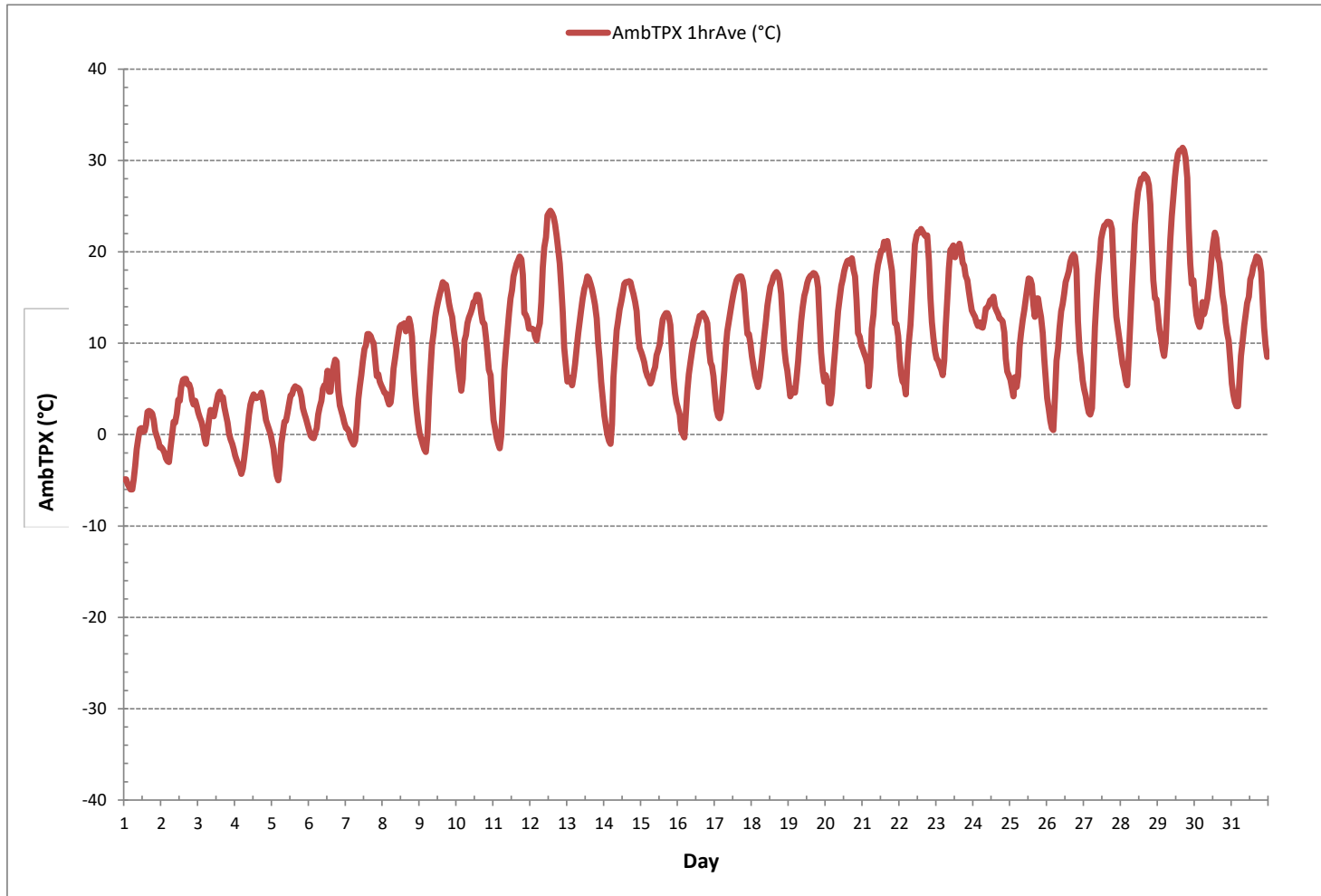
24 HR AVERAGES May 2019



RELATIVE HUMIDITY Hourly Averages (RH %)



AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - May 2019

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)

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

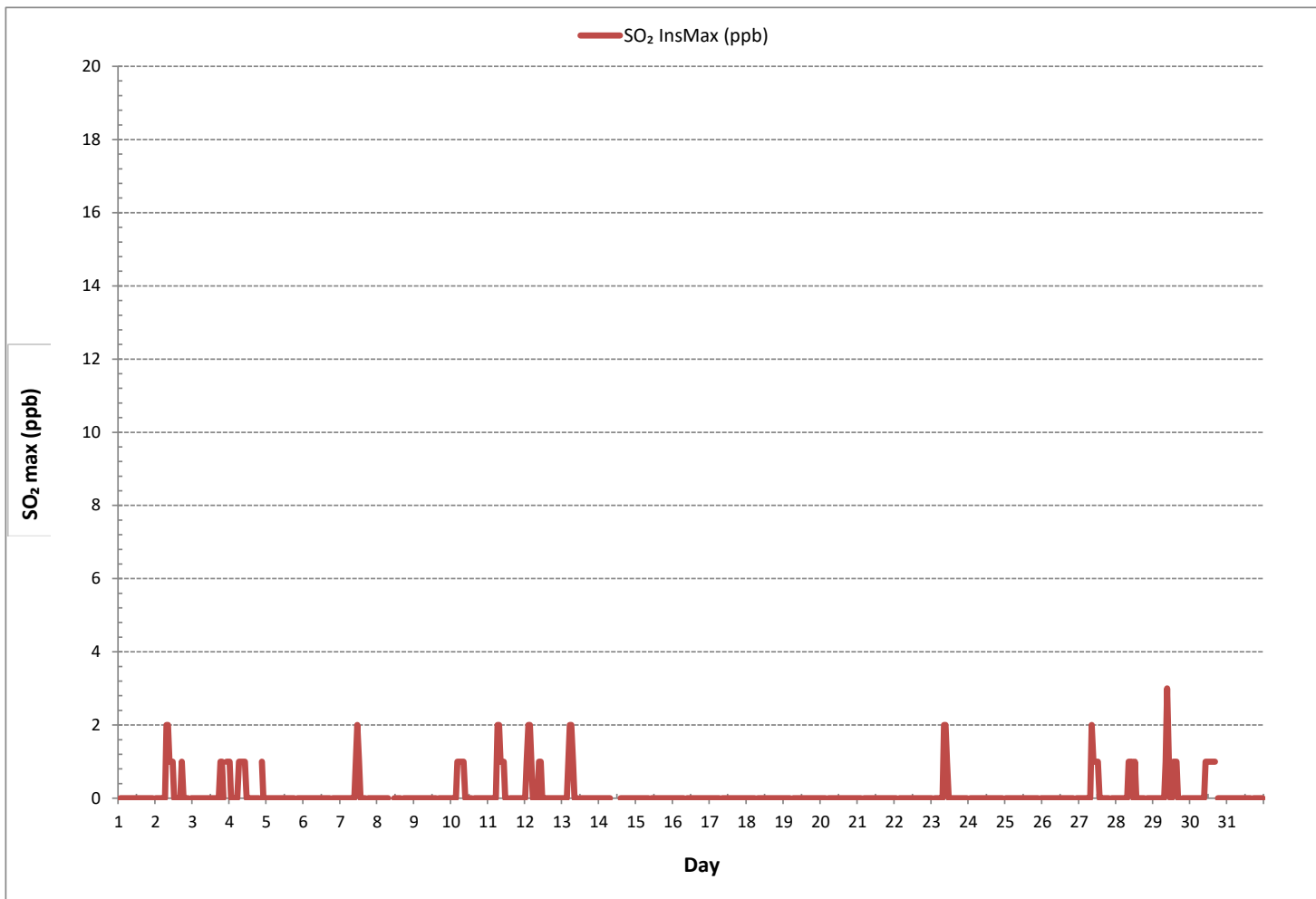
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	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:	65
MAXIMUM INSTANTANEOUS VALUE:	3 ppb @ HOUR 9 ON DAY 29
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	0

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - May 2019

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

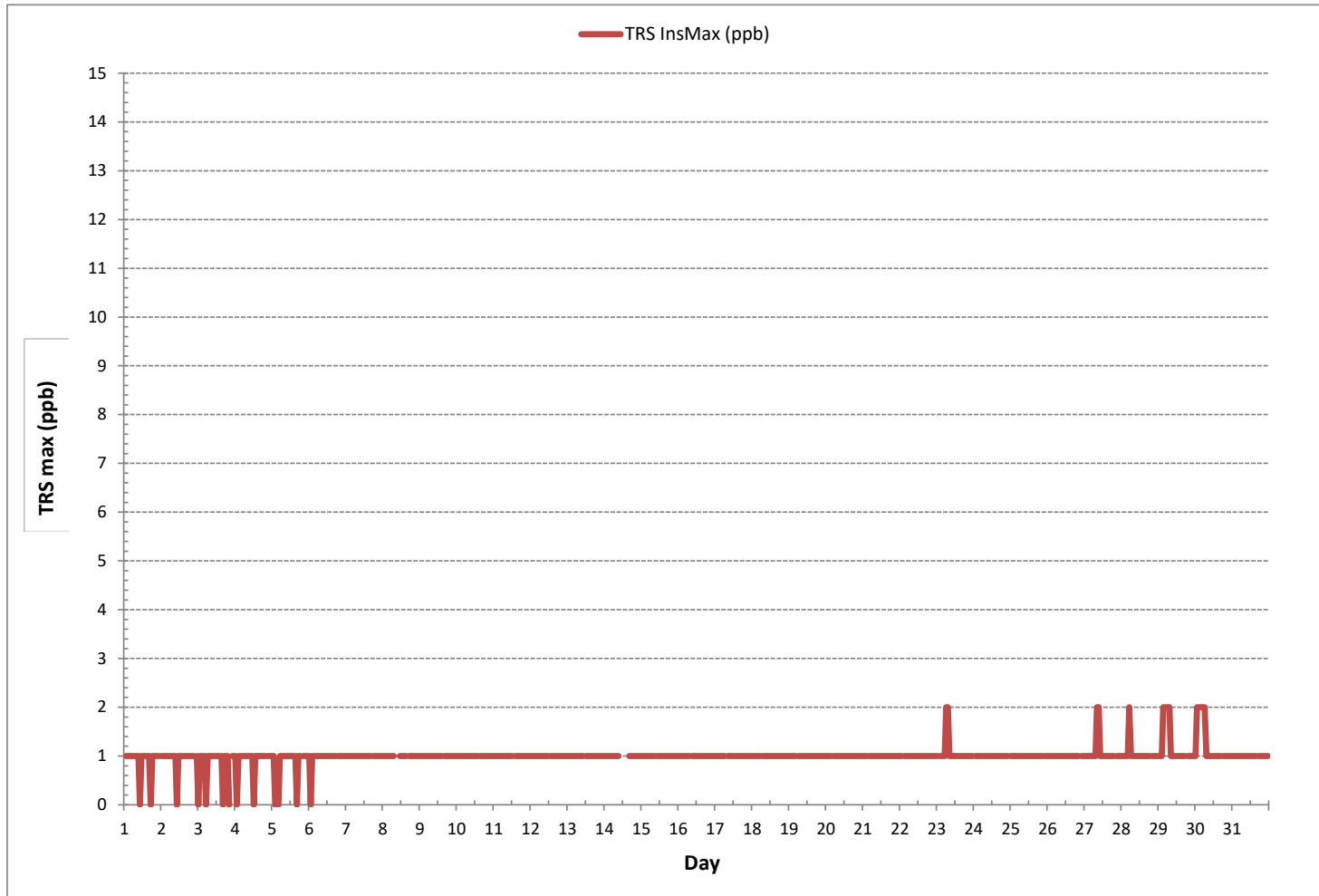
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	689
MAXIMUM INSTANTANEOUS VALUE:	2 ppb @ HOUR 6 ON DAY 23
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	0

TOTAL REDUCED SULPHUR Instantaneous Maximum (TRS ppb)



TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

	HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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		S	2.08	2.07	2.07	2.06	2.08	2.07	2.08	2.10	2.13	2.14	2.13	2.14	2.19	2.13	2.13	2.12	2.12	2.11	2.12	2.11	2.13	2.16	S	2.06	2.19	2.11	24	
2		2.17	2.24	2.32	2.38	2.40	2.46	2.54	2.30	2.12	2.10	2.09	2.08	2.07	2.06	2.06	2.06	2.06	2.06	2.06	2.07	2.08	2.12	S	2.08	2.06	2.54	2.17	24	
3		2.07	2.07	2.06	2.08	2.09	2.08	2.10	2.14	2.07	2.06	2.05	2.06	2.08	2.05	2.05	2.06	2.06	2.06	2.06	2.05	2.07	S	2.08	2.08	2.05	2.14	2.07	24	
4		2.07	2.08	2.09	2.07	2.09	2.08	2.07	2.06	2.09	2.05	2.07	2.05	2.04	2.06	2.05	2.05	2.04	2.05	2.05	2.05	S	2.06	2.07	2.05	2.04	2.09	2.06	24	
5		2.08	2.10	2.08	2.16	2.09	2.20	2.15	2.05	2.04	2.04	2.04	2.03	2.04	2.04	2.03	2.04	2.04	2.05	2.04	S	2.11	2.06	2.06	2.04	2.03	2.20	2.07	24	
6		2.05	2.07	2.16	2.20	2.24	2.10	2.08	2.08	2.08	2.09	2.13	2.13	2.12	2.12	2.08	2.07	2.06	2.07	S	2.08	2.08	2.10	2.09	2.09	2.05	2.24	2.10	24	
7		2.10	2.08	2.07	2.07	2.07	2.08	2.07	2.07	2.06	2.06	2.06	2.06	2.06	2.05	2.05	2.06	2.06	S	2.06	2.07	2.09	2.06	2.07	2.07	2.05	2.10	2.07	24	
8		2.12	2.08	2.08	2.07	2.10	2.12	2.12	Q	Q	2.09	2.08	2.09	2.13	2.08	2.07	2.08	S	2.07	2.08	2.12	2.15	2.15	2.29	2.17	2.07	2.29	2.11	24	
9		2.23	2.24	2.25	2.33	2.46	2.55	2.56	2.19	2.15	2.14	2.11	2.14	2.14	2.09	2.08	S	2.08	2.07	2.07	2.06	2.10	2.09	2.15	2.08	2.06	2.56	2.19	24	
10		2.14	2.22	2.29	2.32	2.32	2.10	2.02	2.00	2.01	2.00	2.01	1.99	2.01	2.01	S	2.01	2.02	2.01	2.03	2.03	2.01	2.05	2.02	2.04	1.99	2.32	2.07	24	
11		2.13	2.15	2.17	2.19	2.19	2.36	2.41	2.23	2.11	2.05	2.04	2.05	2.04	S	2.05	2.04	2.02	2.02	2.03	2.03	2.12	2.08	2.08	2.23	2.02	2.41	2.12	24	
12		2.20	2.32	2.31	2.32	2.37	2.23	2.22	2.27	2.20	2.11	2.01	2.03	S	2.06	1.98	2.00	2.00	2.00	2.00	1.99	2.03	2.06	2.19	2.20	1.98	2.37	2.13	24	
13		2.29	2.35	2.39	2.39	2.24	2.11	2.10	2.02	2.05	2.02	2.01	S	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	2.01	2.39	-	14
14		Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	2.01	1.98	2.01	2.06	1.96	1.96	1.97	1.98	1.98	1.98	2.03	2.02	1.96	2.06	-	15	
15		2.01	1.96	1.96	1.94	1.95	1.93	1.94	1.94	1.94	S	1.93	1.94	1.94	2.06	2.00	1.95	1.93	1.94	1.96	1.94	2.00	2.00	2.06	2.03	1.93	2.06	1.97	24	
16		2.12	2.06	2.12	2.14	2.06	2.02	1.98	1.98	S	1.98	1.97	1.97	1.96	1.96	1.96	1.97	1.96	1.96	1.97	1.98	2.01	2.01	2.00	2.03	1.96	2.14	2.01	24	
17		2.12	2.13	2.18	2.16	2.14	2.03	2.01	S	1.99	1.97	1.97	1.95	1.96	1.96	1.95	1.95	1.95	1.95	1.95	1.96	1.97	1.99	1.98	1.97	1.95	2.18	2.01	24	
18		1.97	1.97	2.00	1.99	1.99	1.99	S	1.98	1.97	1.97	1.95	1.94	2.36	1.94	1.95	1.93	1.94	1.95	1.93	1.94	1.99	2.02	2.02	2.01	1.93	2.36	1.99	24	
19		2.06	2.06	2.18	2.07	2.11	S	2.05	2.02	2.01	1.98	1.95	1.95	1.96	1.96	1.95	1.95	1.95	1.95	1.97	2.02	2.17	2.00	2.09	2.10	1.95	2.18	2.02	24	
20		2.14	2.12	2.30	2.27	S	2.08	2.06	2.07	2.04	2.00	1.96	1.96	1.96	1.96	1.95	1.94	1.94	1.94	1.96	1.95	1.98	2.03	2.01	2.01	1.94	2.30	2.03	24	
21		2.01	2.00	2.01	S	2.34	2.20	2.04	2.00	1.98	1.96	1.94	1.94	1.92	1.94	1.92	1.94	1.91	1.94	1.94	1.93	2.03	2.07	2.35	2.35	1.91	2.35	2.03	24	
22		2.27	2.27	S	2.16	2.20	2.19	2.17	2.07	2.02	1.99	1.93	1.94	1.92	1.94	1.93	1.93	1.93	1.93	1.94	2.00	2.10	2.04	2.08	2.11	2.15	1.92	2.27	2.05	24
23		2.32	S	2.42	2.40	2.45	2.49	2.55	2.68	2.49	2.16	2.03	1.97	1.99	2.00	2.04	2.02	2.01	1.99	2.01	2.02	2.02	1.98	1.96	1.96	1.96	2.68	2.17	24	
24		S	1.96	1.97	1.98	1.99	1.96	1.96	1.95	1.95	1.95	1.95	1.94	1.94	1.94	1.96	1.96	1.95	1.99	1.95	1.95	2.05	2.07	2.33	S	1.94	2.33	1.98	24	
25		2.26	2.41	2.37	2.05	2.06	2.10	1.98	1.98	1.97	1.95	1.95	1.95	1.94	1.96	1.96	1.97	1.95	1.95	1.95	1.96	1.98	2.00	S	2.10	1.94	2.41	2.03	24	
26		2.35	2.24	2.25	2.35	2.48	2.44	2.09	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.95	1.95	1.95	1.96	1.96	2.03	2.07	S	2.30	2.39	1.95	2.48	2.11	24	
27		2.49	2.41	2.57	2.45	2.49	2.48	2.55	2.45	2.53	2.27	2.04	2.02	2.03	1.97	1.96	1.97	1.96	1.95	1.98	2.25	S	2.37	2.35	2.46	1.95	2.57	2.26	24	
28		2.67	2.64	2.50	2.67	2.54	2.67	2.39	2.25	2.15	2.11	2.10	2.01	1.95	1.96	1.94	1.95	1.95	1.95	1.96	S	2.10	2.30	2.50	2.48	1.94	2.67	2.25	24	
29		2.54	2.50	2.63	2.43	2.35	2.38	2.31	2.11	2.05	1.99	1.99	1.96	1.95	1.93	1.93	1.93	1.93	1.92	S	1.99	2.37	2.61	2.39	2.39	1.92	2.63	2.20	24	
30		2.66	2.79	2.76	2.47	2.43	1.97	1.97	1.96	1.95	1.95	1.96	1.92	1.93	1.93	1.93	1.93	1.93	S	1.93	1.94	1.94	1.94	1.95	2.01	1.92	2.79	2.09	24	
31		2.26	2.25	2.26	2.18	2.19	2.21	2.18	2.07	1.99	1.94	1.94	1.94	1.93	1.93	1.94	1.94	S	1.95	1.96	1.96	2.02	2.11	2.18	2.29	1.93	2.29	2.07	24	
HOURLY MAX		2.67	2.79	2.76	2.67	2.54	2.67	2.56	2.68	2.53	2.27	2.14	2.14	2.36	2.19	2.13	2.13	2.12	2.12	2.11	2.25	2.37	2.61	2.50	2.48					
HOURLY AVG		2.21	2.20	2.24	2.22	2.22	2.20	2.16	2.11	2.07	2.04	2.01	2.00	2.02	2.00	1.99	1.99	1.99	1.99	2.00	2.02	2.06	2.09	2.14	2.14					

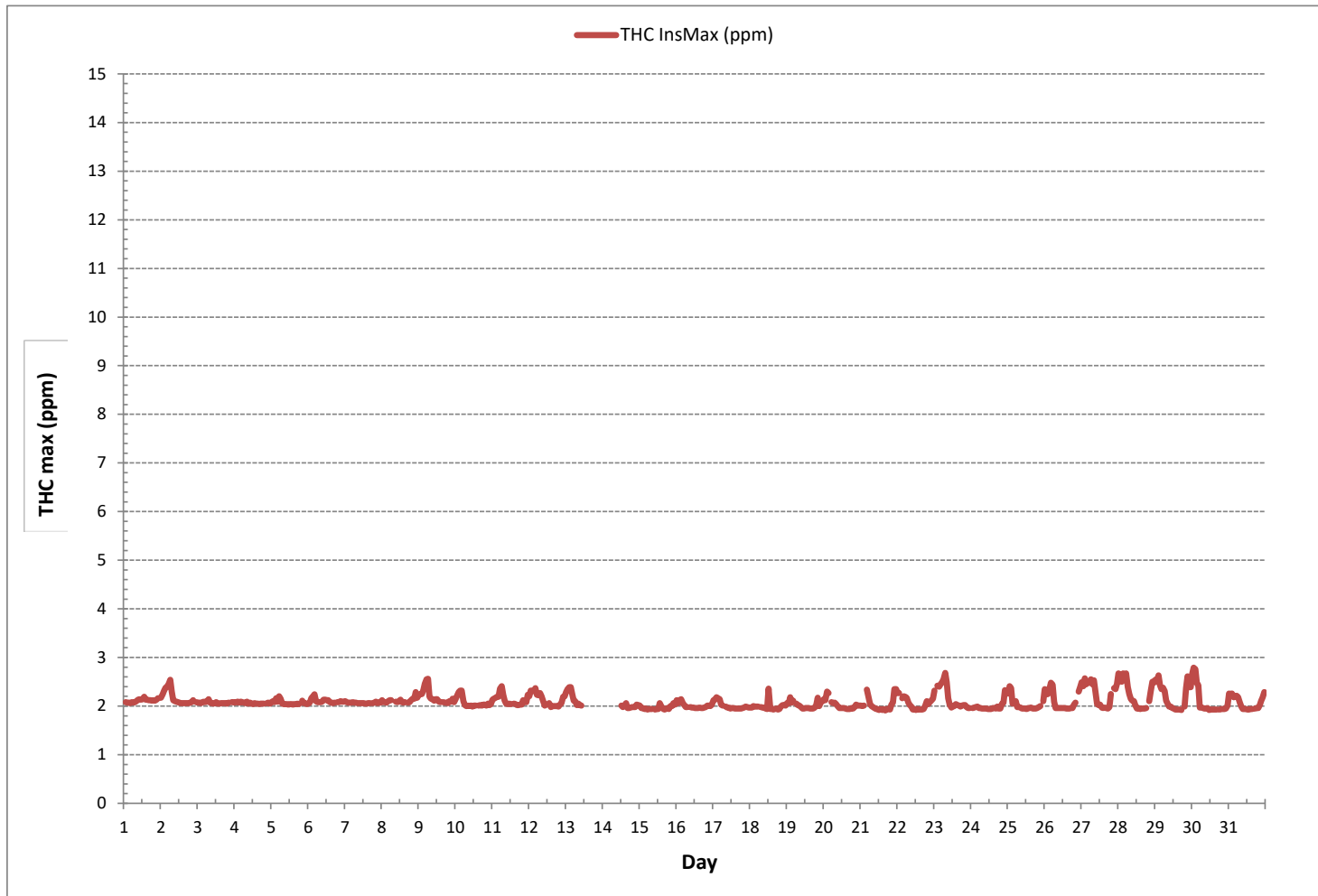
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	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:	686					
MAXIMUM INSTANTANEOUS VALUE:	2.79	ppm	@ HOUR	1	ON DAY	30
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	725	hrs	
MONTHLY CALIBRATION TIME:	5	hrs				
STANDARD DEVIATION:	0.16					

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - May 2019

METHANE MAX Instantaneous Maximum (CH₄ ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.			
DAY 1	S	2.08	2.07	2.07	2.06	2.08	2.07	2.08	2.10	2.13	2.14	2.13	2.14	2.19	2.13	2.13	2.12	2.12	2.11	2.12	2.11	2.13	2.16	S	2.06	2.19	2.11	24		
2		2.17	2.24	2.32	2.38	2.40	2.46	2.54	2.30	2.12	2.10	2.09	2.08	2.07	2.06	2.06	2.06	2.06	2.06	2.06	2.07	2.08	2.12	S	2.08	2.06	2.54	2.17	24	
3		2.07	2.07	2.06	2.08	2.09	2.08	2.10	2.14	2.07	2.06	2.05	2.06	2.08	2.05	2.05	2.06	2.06	2.06	2.06	2.05	2.07	S	2.08	2.08	2.05	2.14	2.07	24	
4		2.07	2.08	2.09	2.07	2.09	2.08	2.07	2.06	2.09	2.05	2.07	2.05	2.04	2.06	2.05	2.05	2.04	2.05	2.05	2.05	S	2.06	2.07	2.05	2.04	2.09	2.06	24	
5		2.08	2.10	2.08	2.16	2.09	2.20	2.15	2.05	2.04	2.04	2.03	2.04	2.04	2.03	2.04	2.04	2.05	2.04	S	2.11	2.06	2.06	2.04	2.03	2.20	2.07	24		
6		2.05	2.07	2.16	2.20	2.24	2.10	2.08	2.08	2.08	2.09	2.13	2.12	2.12	2.08	2.07	2.06	2.07	S	2.08	2.08	2.10	2.09	2.09	2.05	2.24	2.10	24		
7		2.10	2.08	2.07	2.07	2.07	2.08	2.07	2.07	2.06	2.06	2.06	2.06	2.05	2.05	2.06	2.06	S	2.06	2.07	2.09	2.06	2.07	2.07	2.05	2.10	2.07	24		
8		2.12	2.08	2.08	2.07	2.10	2.12	2.12	Q	Q	2.09	2.08	2.09	2.13	2.08	2.07	2.08	S	2.07	2.08	2.12	2.15	2.15	2.29	2.17	2.07	2.29	2.11	24	
9		2.23	2.24	2.25	2.33	2.46	2.55	2.56	2.19	2.15	2.14	2.11	2.14	2.14	2.09	2.08	S	2.08	2.07	2.07	2.06	2.10	2.09	2.15	2.08	2.06	2.56	2.19	24	
10		2.14	2.22	2.29	2.32	2.32	2.10	2.02	2.00	2.01	2.00	2.01	1.99	2.01	2.01	S	2.01	2.02	2.01	2.03	2.03	2.01	2.05	2.02	2.04	1.99	2.32	2.07	24	
11		2.13	2.15	2.17	2.19	2.19	2.36	2.41	2.23	2.11	2.05	2.04	2.05	2.04	S	2.05	2.04	2.02	2.02	2.03	2.03	2.12	2.08	2.08	2.23	2.02	2.41	2.12	24	
12		2.20	2.32	2.31	2.32	2.37	2.23	2.22	2.27	2.20	2.11	2.02	2.03	S	2.06	1.98	2.00	2.00	2.00	2.00	1.99	2.03	2.06	2.19	2.20	1.98	2.37	2.13	24	
13		2.29	2.35	2.39	2.39	2.24	2.11	2.10	2.02	2.05	2.02	2.01	S	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	2.01	2.39	-	14	
14		Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	2.01	1.98	2.01	2.06	1.96	1.96	1.97	1.98	1.98	1.98	2.03	2.02	1.96	2.06	-	15	
15		2.01	1.96	1.96	1.94	1.95	1.93	1.94	1.94	1.94	S	1.93	1.94	1.94	2.06	2.00	1.95	1.93	1.94	1.96	1.94	2.00	2.00	2.06	2.03	1.93	2.06	1.97	24	
16		2.12	2.06	2.12	2.14	2.06	2.02	1.98	1.98	S	1.98	1.97	1.97	1.96	1.96	1.96	1.97	1.96	1.96	1.97	1.98	2.01	2.01	2.00	2.03	1.96	2.14	2.01	24	
17		2.12	2.13	2.18	2.16	2.14	2.03	2.01	S	1.99	1.97	1.97	1.95	1.96	1.96	1.95	1.95	1.95	1.95	1.95	1.96	1.97	1.99	1.98	1.97	1.95	2.18	2.01	24	
18		1.97	1.97	2.00	1.99	1.99	1.99	S	1.98	1.97	1.97	1.95	1.94	1.94	1.94	1.95	1.93	1.94	1.95	1.93	1.94	1.99	2.02	2.02	2.01	1.93	2.02	1.97	24	
19		2.06	2.06	2.18	2.07	2.11	S	2.05	2.02	2.01	1.98	1.95	1.95	1.96	1.96	1.96	1.95	1.95	1.95	1.97	2.02	2.17	2.00	2.09	2.10	1.95	2.18	2.02	24	
20		2.14	2.12	2.30	2.27	S	2.08	2.06	2.07	2.04	2.00	1.96	1.96	1.96	1.96	1.95	1.94	1.94	1.94	1.96	1.95	1.98	2.03	2.01	2.01	1.94	2.30	2.03	24	
21		2.01	2.00	2.01	S	2.34	2.20	2.04	2.00	1.98	1.96	1.94	1.94	1.92	1.94	1.92	1.94	1.91	1.94	1.94	1.93	2.03	2.07	2.35	2.35	1.91	2.35	2.03	24	
22		2.27	2.27	S	2.16	2.20	2.19	2.17	2.07	2.02	1.99	1.93	1.94	1.92	1.94	1.93	1.93	1.93	1.94	2.00	2.10	2.04	2.08	2.11	2.15	1.92	2.27	2.05	24	
23		2.32	S	2.42	2.40	2.45	2.49	2.55	2.68	2.49	2.16	2.03	1.97	1.99	2.00	2.04	2.02	2.01	1.99	2.01	2.02	2.02	1.98	1.96	1.96	1.96	2.68	2.17	24	
24		S	1.96	1.97	1.98	1.99	1.96	1.96	1.95	1.95	1.95	1.95	1.94	1.94	1.94	1.96	1.96	1.95	1.95	1.95	1.95	2.05	2.07	2.33	S	1.94	2.33	1.98	24	
25		2.26	2.41	2.37	2.05	2.06	2.10	1.98	1.98	1.97	1.95	1.95	1.95	1.94	1.96	1.96	1.97	1.95	1.95	1.95	1.96	1.98	2.00	S	2.10	1.94	2.41	2.03	24	
26		2.35	2.24	2.25	2.35	2.48	2.44	2.09	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.95	1.95	1.95	1.96	1.96	2.03	2.07	S	2.30	2.39	1.95	2.48	2.11	24	
27		2.49	2.41	2.57	2.45	2.49	2.48	2.55	2.45	2.53	2.27	2.04	2.02	2.03	1.97	1.96	1.97	1.96	1.95	1.98	2.25	S	2.37	2.35	2.46	1.95	2.57	2.26	24	
28		2.67	2.64	2.50	2.67	2.54	2.67	2.39	2.25	2.15	2.11	2.10	2.01	1.95	1.96	1.94	1.95	1.95	1.95	1.95	1.96	S	2.10	2.30	2.50	2.48	1.94	2.67	2.25	24
29		2.54	2.50	2.63	2.43	2.35	2.38	2.31	2.11	2.05	1.99	1.99	1.96	1.95	1.93	1.93	1.93	1.93	1.93	1.93	1.92	S	1.99	2.37	2.61	2.39	1.92	2.63	2.20	24
30		2.66	2.79	2.76	2.47	2.43	1.97	1.97	1.96	1.95	1.95	1.96	1.92	1.93	1.93	1.93	1.93	1.93	S	1.93	1.94	1.94	1.94	1.95	2.01	1.92	2.79	2.09	24	
31		2.26	2.25	2.26	2.18	2.19	2.21	2.18	2.07	1.99	1.94	1.94	1.93	1.93	1.94	1.94	S	1.95	1.96	1.96	2.02	2.11	2.18	2.29	1.93	2.29	2.07	24		
HOURLY MAX		2.67	2.79	2.76	2.67	2.54	2.67	2.56	2.68	2.53	2.27	2.14	2.14	2.14	2.19	2.13	2.12	2.12	2.11	2.25	2.37	2.61	2.50	2.48						
HOURLY AVG		2.21	2.20	2.24	2.22	2.22	2.20	2.16	2.11	2.07	2.04	2.01	2.00	2.00	2.00	2.00	1.99	1.99	1.99	2.00	2.02	2.06	2.09	2.14	2.14					

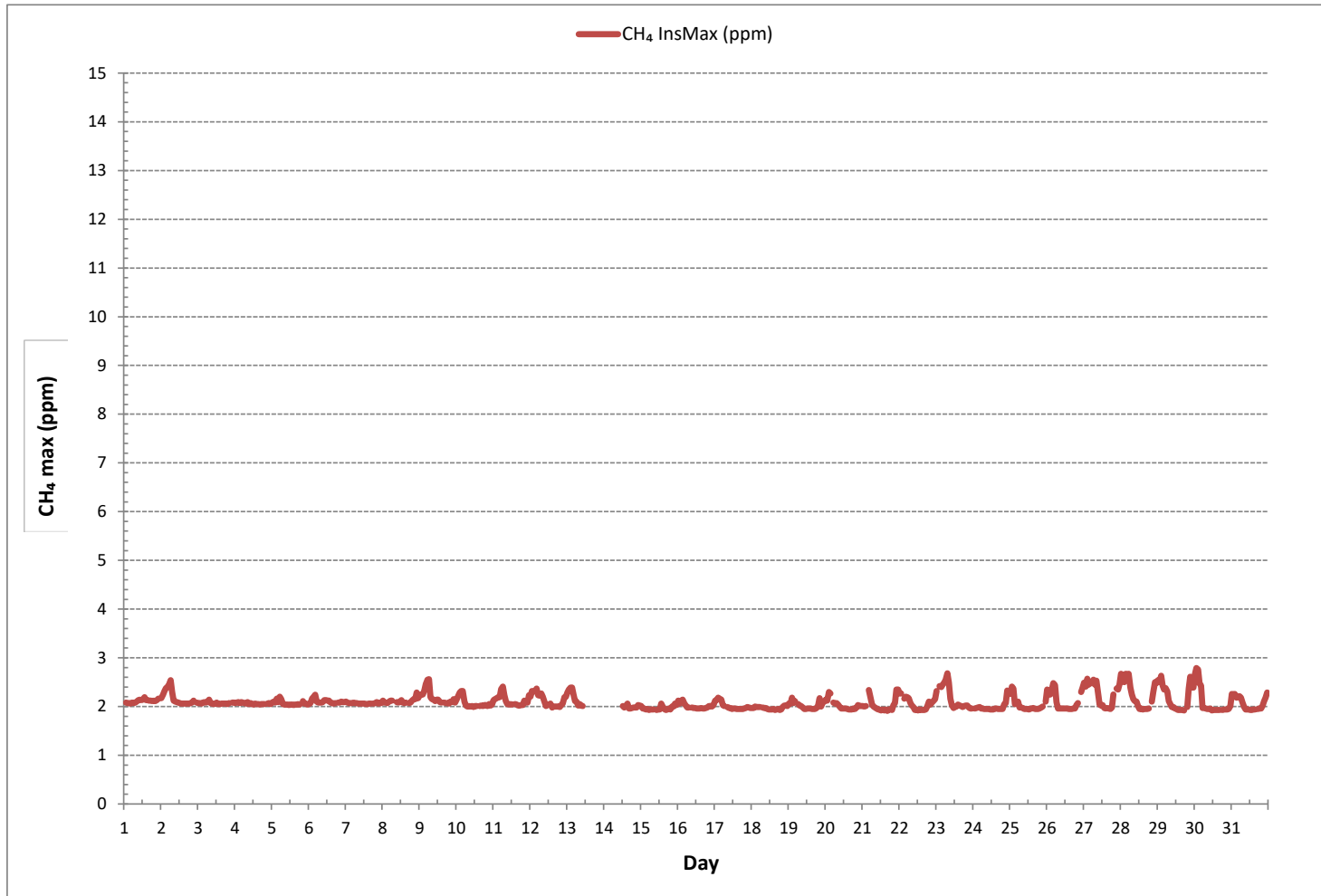
STATUS FLAG CODES

C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	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:	686
MAXIMUM INSTANTANEOUS VALUE:	2.79 ppm @ HOUR 1 ON DAY 30
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	725 hrs
STANDARD DEVIATION:	0.16

METHANE MAX Instantaneous Maximum (CH₄ ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - May 2019

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)

DAY	HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.	
	HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
1	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	24	
2		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	24	
3		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	24	
4		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	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	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	S	0.00	0.00	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	0.00	0.00	0.00	Q	Q	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	24	
9		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	0.00	0.00	0.00	24	
10		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	0.00	0.00	0.00	0.00	24	
11		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	
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	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	
13		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	C	C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	0.00	0.00	-	14	
14		Y	Y	Y	Y	Y	Y	Y	Y	Y	C	C	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	15
15		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
16		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
17		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	
18		0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.02	24	
19		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	0.00	24	
20		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	
21		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	
22		0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
23		0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
24		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	0.06	0.00	0.00	0.00	0.00	0.00	S	0.00	0.06	0.00	24	
25		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	24	
26		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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.05	0.00	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	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	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	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
29		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
31		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	0.00	0.00	0.00	24	
HOURLY MAX		0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
HOURLY AVG		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			

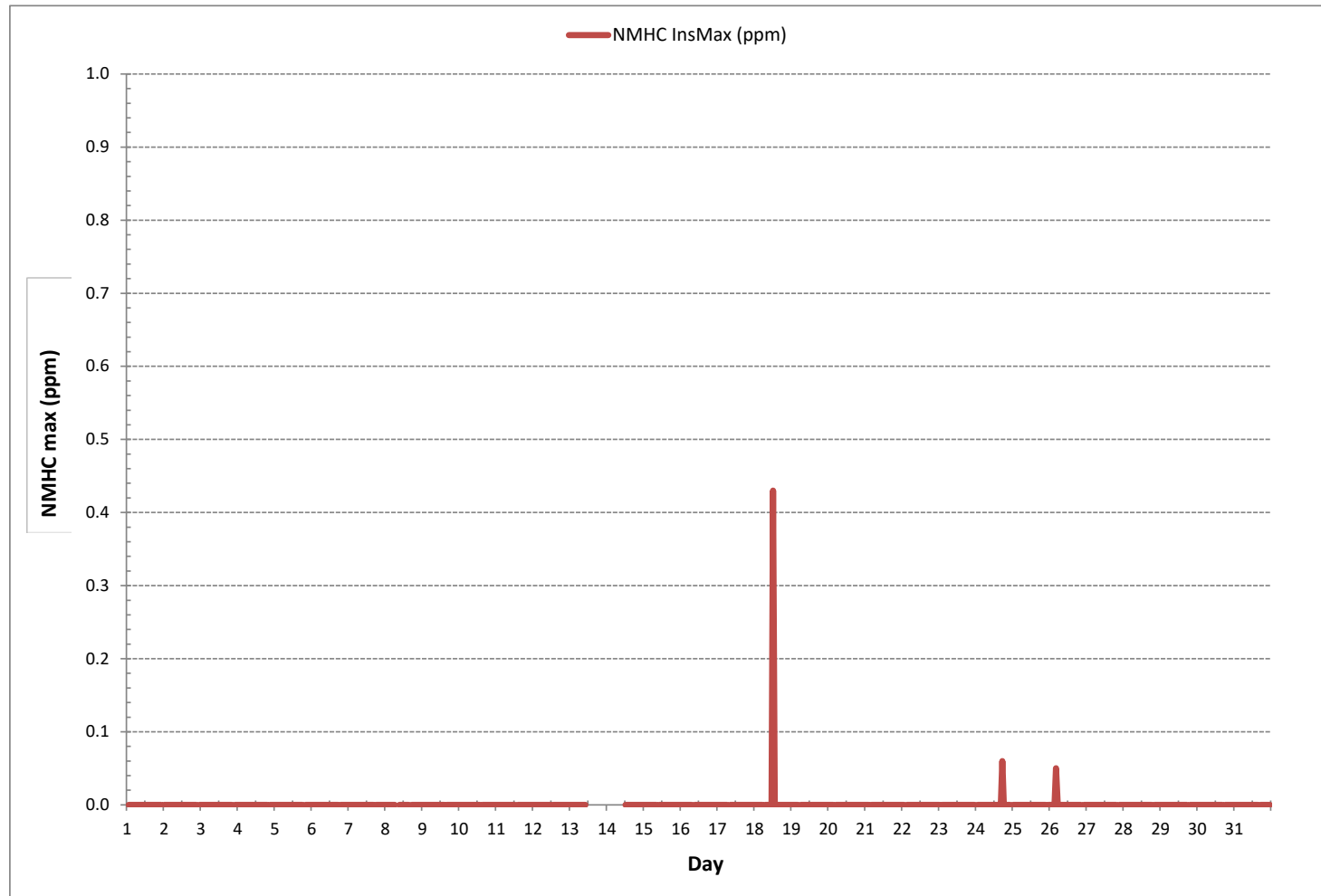
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	3		
MAXIMUM INSTANTANEOUS VALUE:	0.43 ppm	@ HOUR	12 ON DAY 18
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	725 hrs
MONTHLY CALIBRATION TIME:	5 hrs		
STANDARD DEVIATION:	0.02		

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - May 2019

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	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0	
2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
8	X	X	X	X	X	X	X	X	Q	Q	Q	Q	Q	1	5	4	S	2	2	36	5	8	5	8	1	36	-	-	16	
9	5	12	5	15	27	43	43	3	2	2	4	3	3	1	1	S	3	1	3	4	20	7	3	6	1	43	9	24		
10	3	6	5	4	5	3	2	4	2	1	1	2	1	1	S	1	2	1	1	2	1	3	2	3	1	6	2	24		
11	3	6	5	6	9	7	9	8	7	3	3	1	1	S	1	1	1	1	3	5	6	2	1	8	1	9	4	24		
12	1	1	2	3	7	2	7	3	3	2	2	S	1	1	1	1	1	1	1	1	1	6	4	5	1	7	3	24		
13	4	6	7	7	5	10	12	1	2	1	1	S	1	1	1	1	6	2	2	2	1	2	3	4	1	12	4	24		
14	4	8	5	8	9	22	7	7	C	C	C	C	C	C	C	2	1	2	1	2	2	2	3	1	22	-	-	24		
15	4	4	3	3	4	3	3	3	2	S	2	4	2	66	84	32	3	2	2	3	4	4	3	10	2	84	11	24		
16	7	4	6	7	13	20	10	4	S	6	2	1	2	4	3	2	1	3	3	18	9	19	2	3	1	20	6	24		
17	4	4	9	5	10	6	4	S	9	2	3	1	2	2	1	3	1	1	2	5	5	8	2	1	1	10	4	24		
18	1	1	2	3	2	3	S	2	1	1	2	1	1	1	1	1	1	1	1	1	4	6	5	7	1	7	2	24		
19	5	6	4	2	2	S	2	6	1	1	1	1	1	2	1	1	5	1	1	1	3	15	12	5	1	15	3	24		
20	3	6	7	12	S	2	2	2	1	2	2	1	1	1	1	1	1	1	1	1	2	13	4	2	1	13	3	24		
21	1	1	1	S	14	6	3	3	3	3	2	2	2	2	1	2	3	3	5	4	4	5	7	7	1	14	4	24		
22	7	3	S	5	5	4	7	11	4	3	3	2	1	2	2	3	3	2	4	4	7	6	5	4	1	11	4	24		
23	4	S	4	5	6	8	10	12	11	8	4	4	3	2	2	2	9	3	5	6	8	3	3	2	2	12	5	24		
24	S	2	3	3	6	4	3	19	2	3	9	4	2	4	2	4	2	5	3	8	5	5	S	2	2	19	5	24		
25	9	8	9	8	3	5	2	5	2	1	7	1	1	1	1	1	5	2	1	2	2	4	S	5	1	9	4	24		
26	4	4	5	10	8	10	7	2	2	3	1	1	1	7	5	2	1	1	1	3	5	S	18	6	1	18	5	24		
27	6	5	3	4	4	3	12	6	9	11	7	4	3	3	2	3	2	2	4	5	S	6	6	7	2	12	5	24		
28	7	7	7	7	5	7	6	7	7	6	6	3	2	4	6	2	2	2	2	S	6	7	7	5	2	7	5	24		
29	5	5	6	4	5	9	5	6	7	5	4	6	3	2	3	2	2	2	S	3	4	7	7	6	2	9	5	24		
30	7	8	6	7	7	4	5	3	14	3	5	2	2	2	2	2	2	S	2	2	3	4	2	4	2	14	4	24		
31	3	4	5	5	6	7	15	2	1	1	2	3	1	2	2	2	S	2	2	2	11	6	5	5	1	15	4	24		
HOURLY MAX	9	12	9	15	27	43	43	19	14	11	9	4	6	66	84	32	9	3	5	36	20	19	18	10						
HOURLY AVG	4	5	5	6	7	9	8	5	4	3	3	2	2	5	6	3	3	2	2	5	5	6	5	5						

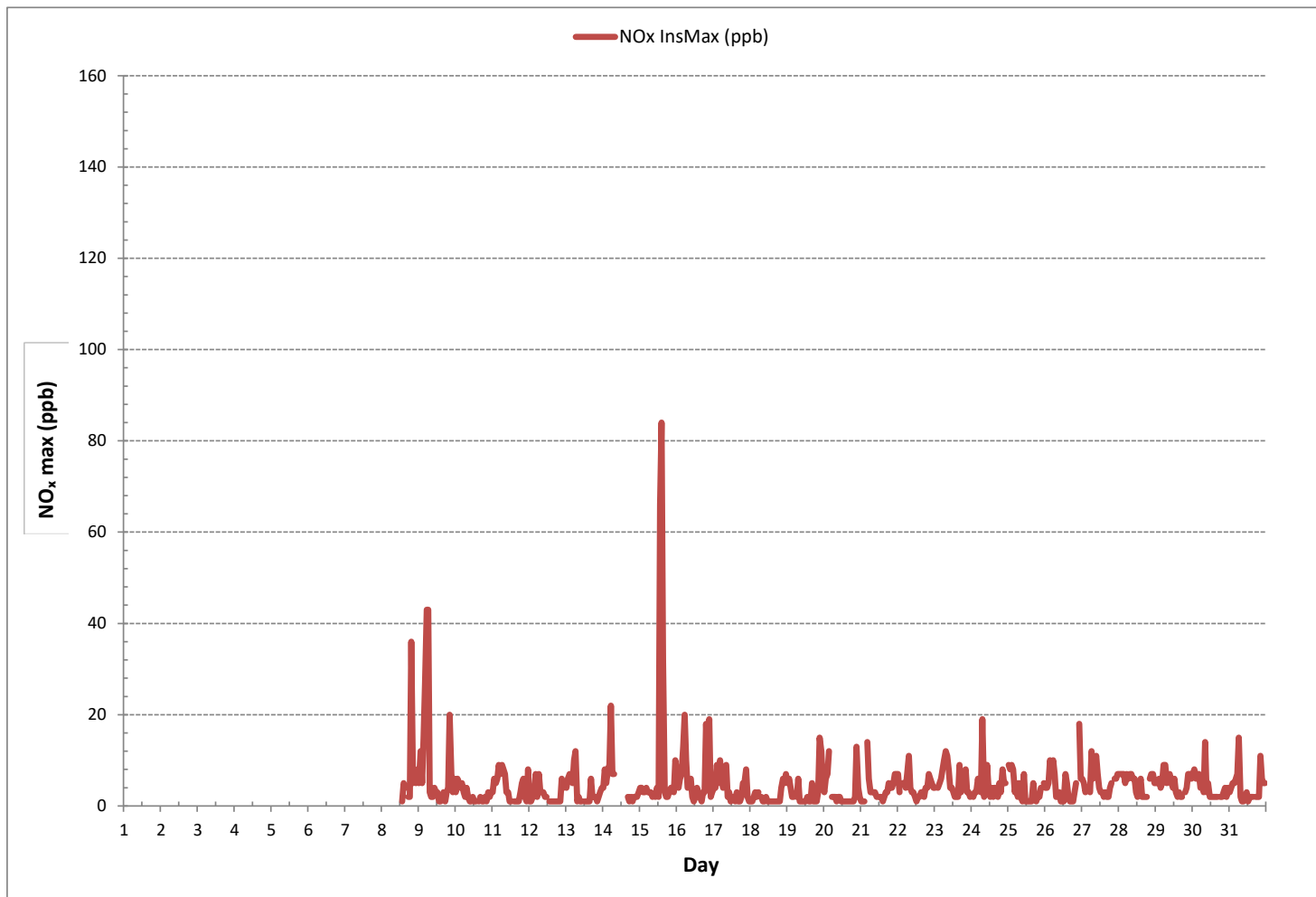
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	531
MAXIMUM INSTANTANEOUS VALUE:	84 ppb @ HOUR 14 ON DAY 15
IZS CALIBRATION TIME:	24 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	6
OPERATIONAL TIME:	568 hrs

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - May 2019

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	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0																					
2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0																					
3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0																					
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0																					
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0																					
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0																					
7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0																					
8	X	X	X	X	X	X	X	X	Q	Q	Q	Q	Q	Q	X	1	1	S	0	0	20	0	2	0	1	0	20	-	16																					
9	1	6	2	4	17	28	26	1	0	0	1	1	1	0	0	S	1	0	0	2	13	1	0	2	0	28	5	24																						
10	0	1	0	0	1	0	1	1	1	0	0	0	0	0	S	0	1	0	0	0	0	0	0	0	0	1	0	24																						
11	0	2	1	3	3	2	3	2	1	1	0	0	S	0	0	1	0	1	3	2	0	0	2	0	0	3	1	24																						
12	0	0	0	0	0	0	2	0	1	1	1	0	S	0	0	0	0	0	0	0	0	0	0	0	0	2	0	24																						
13	0	1	0	0	0	2	2	0	0	0	0	S	0	0	0	3	1	0	0	0	0	0	0	0	0	3	1	24																						
14	2	3	1	2	2	14	3	2	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	14	-	24																						
15	1	1	1	1	1	1	1	1	1	S	1	2	1	51	47	10	1	0	0	0	0	0	0	3	0	51	5	24																						
16	1	0	1	1	3	9	2	1	S	4	2	0	1	1	2	1	0	0	0	9	1	6	0	0	0	9	2	24																						
17	1	0	2	0	1	2	1	S	5	1	2	1	1	1	1	1	0	0	3	1	0	1	0	0	0	5	1	24																						
18	0	0	0	1	1	1	S	1	0	0	2	0	0	0	1	0	0	0	0	0	0	1	0	1	0	2	0	24																						
19	1	0	0	0	0	S	0	3	0	0	0	0	1	0	0	2	0	0	0	0	0	5	3	0	0	5	1	24																						
20	0	1	1	1	S	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	6	0	0	0	6	1	24																						
21	0	0	0	S	2	1	0	1	1	1	0	1	0	0	1	0	1	0	2	0	0	0	0	1	0	2	1	24																						
22	1	0	S	0	1	1	1	4	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	4	1	24																						
23	0	S	1	1	1	3	2	3	2	2	0	0	0	0	0	5	0	1	1	4	1	1	1	1	0	5	1	24																						
24	S	0	1	1	1	2	1	7	0	0	3	1	0	1	1	3	2	0	2	0	2	1	1	S	0	7	1	24																						
25	3	3	4	4	1	3	1	3	1	0	9	0	0	0	0	2	0	0	0	0	0	0	S	0	0	9	1	24																						
26	0	1	2	5	4	5	3	1	1	1	0	0	0	2	2	0	0	0	0	0	0	S	4	0	0	5	1	24																						
27	0	0	0	0	1	0	4	1	2	2	1	0	0	0	0	0	0	0	0	0	S	0	0	0	0	4	1	24																						
28	0	0	0	0	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	S	0	0	0	0	0	1	0	24																						
29	0	0	0	0	0	1	2	1	1	1	1	0	1	0	0	2	0	0	S	0	0	1	1	0	0	2	1	24																						
30	0	0	0	0	0	2	2	0	6	0	1	0	0	0	1	1	0	S	0	0	1	1	0	0	0	6	1	24																						
31	0	1	1	1	3	3	8	0	0	0	1	0	1	0	1	S	0	0	0	0	5	0	0	0	0	0	8	1	24																					
HOURLY MAX	3	6	4	5	17	28	26	7	6	4	9	2	1	51	47	10	5	1	3	20	13	6	4	3																										
HOURLY AVG	1	1	1	1	2	4	3	2	1	1	1	0	0	3	3	1	1	0	0	2	1	1	0	0																										

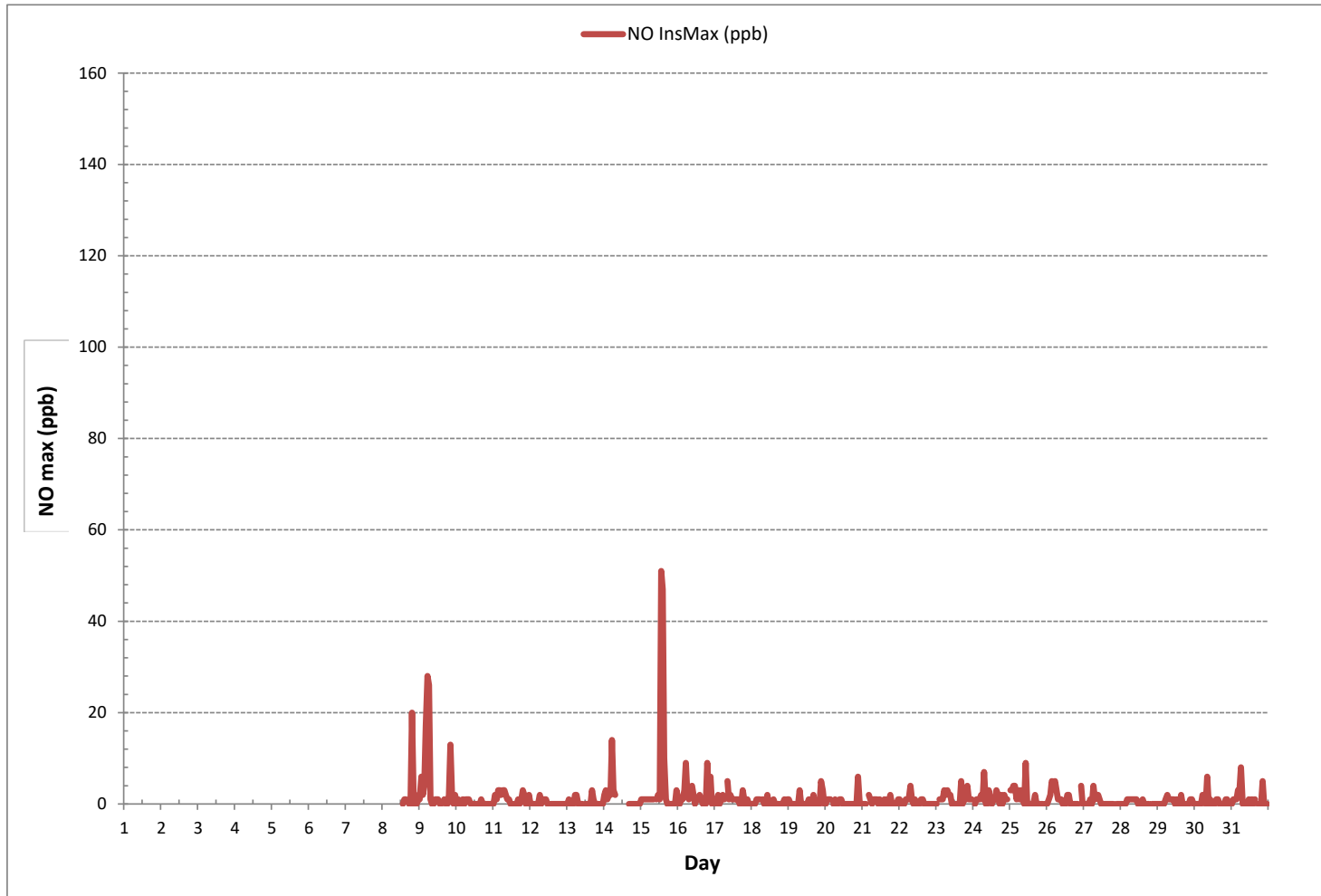
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	244
MAXIMUM INSTANTANEOUS VALUE:	51 ppb @ HOUR 13 ON DAY 15
IZS CALIBRATION TIME:	24 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	4
OPERATIONAL TIME:	568 hrs

NITRIC OXIDE Instantaneous Maximum (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - May 2019

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
7	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	0
8	X	X	X	X	X	X	X	X	Q	Q	Q	Q	Q	1	4	3	S	2	2	17	5	6	5	7	1	17	-	16	
9	4	8	5	11	12	17	17	2	1	2	2	2	2	1	1	S	2	1	2	2	9	6	3	5	1	17	5	24	
10	3	5	4	3	5	3	2	3	2	1	1	1	0	0	S	1	1	1	1	1	1	1	3	1	3	0	5	2	24
11	3	4	5	3	7	4	5	5	4	2	2	1	1	S	1	1	1	1	1	2	4	4	2	1	6	1	7	3	24
12	1	1	2	3	7	2	5	2	2	2	2	1	S	1	1	1	1	1	1	1	1	6	4	5	1	7	2	24	
13	3	5	7	7	5	9	9	1	1	1	0	S	1	1	1	1	4	2	1	1	1	2	3	4	0	9	3	24	
14	4	5	5	7	7	8	4	4	C	C	C	C	C	C	C	C	2	1	2	1	2	2	2	3	1	8	-	24	
15	3	3	2	2	3	2	2	2	1	S	2	2	2	15	40	23	1	2	2	3	4	4	3	7	1	40	6	24	
16	5	4	6	6	12	12	8	3	S	2	1	1	1	3	2	2	1	2	2	10	8	13	2	3	1	13	5	24	
17	4	4	8	5	8	4	3	S	5	1	2	1	1	2	1	3	1	1	1	4	5	7	2	1	1	8	3	24	
18	1	1	1	2	2	2	S	2	1	1	1	1	1	1	1	1	1	1	1	1	4	6	5	7	1	7	2	24	
19	4	6	4	1	2	S	2	3	1	1	1	1	1	2	1	1	3	1	1	1	3	10	9	5	1	10	3	24	
20	3	5	6	11	S	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	9	3	2	1	11	3	24	
21	1	1	1	S	13	5	3	2	2	2	2	2	1	1	1	2	2	2	3	4	4	5	6	6	1	13	3	24	
22	6	3	S	4	5	4	6	7	3	3	2	1	1	1	2	2	2	1	3	4	6	6	5	4	1	7	3	24	
23	4	S	3	4	4	4	7	9	9	7	3	3	2	2	2	2	4	3	5	5	5	2	2	2	2	9	4	24	
24	S	2	2	2	5	3	2	13	2	3	6	3	1	3	2	1	2	1	4	2	5	4	4	S	1	13	3	24	
25	6	5	5	4	3	3	2	3	1	1	2	1	1	1	1	3	2	1	2	2	4	S	5	1	6	3	24		
26	4	4	3	6	6	6	4	2	1	2	1	1	1	5	4	2	1	1	3	5	S	14	6	1	14	4	24		
27	6	5	3	4	4	3	8	5	8	9	6	4	3	3	2	3	2	2	3	5	S	6	6	6	2	9	5	24	
28	6	6	6	7	4	6	6	6	6	5	5	3	2	3	5	2	2	2	2	S	6	7	7	5	2	7	5	24	
29	5	5	6	4	4	8	8	4	6	6	4	4	5	2	2	3	2	1	S	3	4	7	6	6	1	8	5	24	
30	7	7	6	7	7	3	3	8	3	4	2	2	2	2	1	2	1	S	2	2	2	3	2	3	1	8	4	24	
31	3	4	3	4	4	4	8	1	1	1	1	2	1	1	2	1	S	2	2	2	7	6	5	5	1	8	3	24	
HOURLY MAX	7	8	8	11	13	17	17	13	9	9	6	4	5	15	40	23	4	3	5	17	9	13	14	7					
HOURLY AVG	4	4	4	5	6	5	5	4	3	3	2	2	1	2	4	3	2	1	2	3	4	5	4	5					

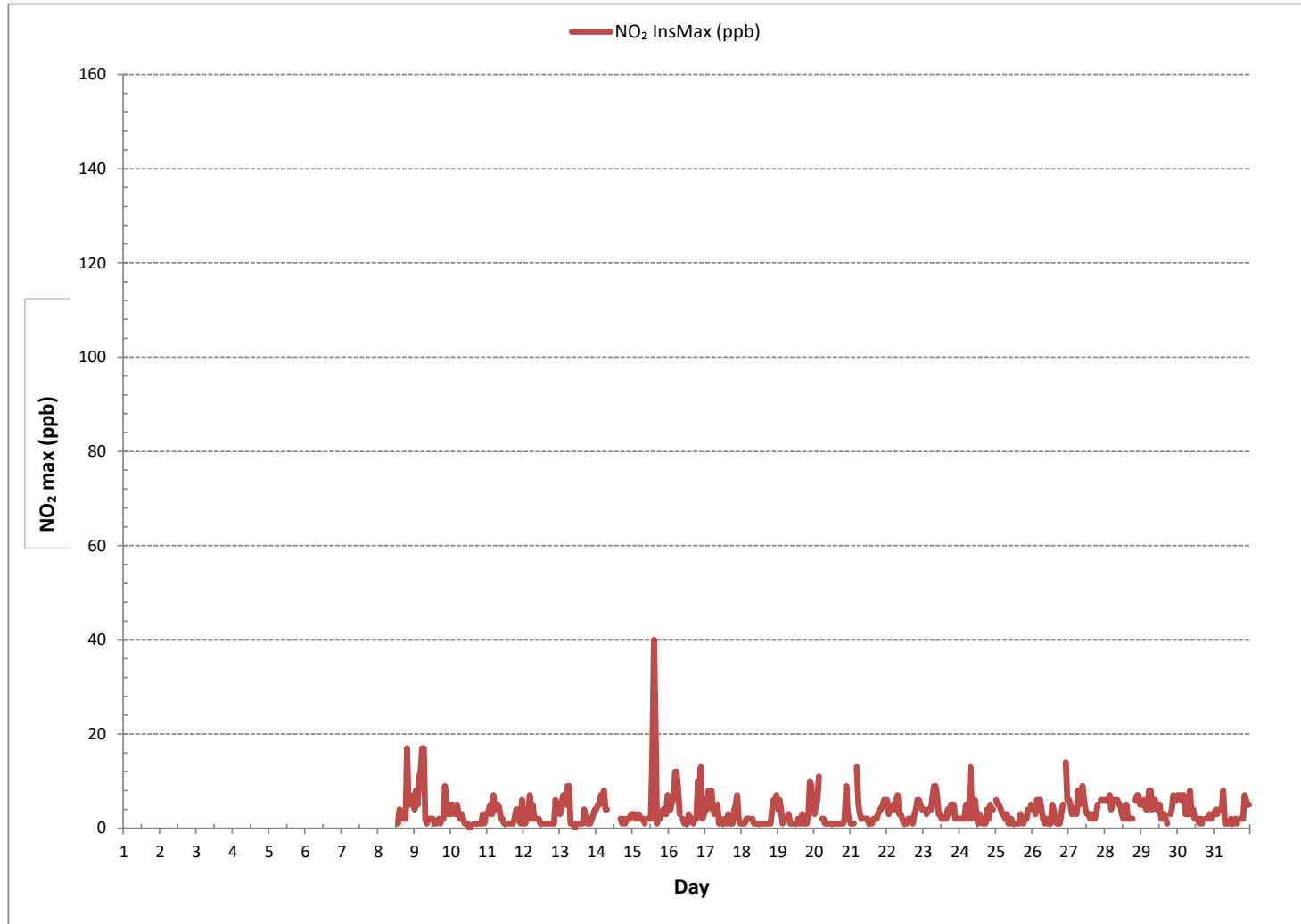
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	528
MAXIMUM INSTANTANEOUS VALUE:	40 ppb @ HOUR 14 ON DAY 15
	VAR-VARIOUS
IZS CALIBRATION TIME:	24 hrs
MONTHLY CALIBRATION TIME:	8 hrs
STANDARD DEVIATION:	3
OPERATIONAL TIME:	568 hrs

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Cold Lake South Continuous Monitoring Station - May 2019

OZONE Instantaneous Maximum (O₃ ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.			
DAY 1	S	36.5	35.3	34.4	33.9	33.4	33.1	33.2	36.3	41.0	43.7	44.2	44.3	41.6	42.2	44.5	46.0	45.0	45.4	44.7	44.0	38.8	38.5	S	33.1	46.0	40.0	24		
2		33.1	30.9	28.6	24.1	17.4	21.0	27.3	32.3	36.8	32.1	38.3	41.2	44.1	45.4	46.9	47.7	48.0	51.8	48.0	46.3	43.4	43.5	S	43.2	17.4	51.8	37.9	24	
3		39.1	37.9	37.3	36.6	35.0	32.1	35.0	36.8	40.8	38.5	39.5	39.4	39.3	39.0	39.3	36.3	34.8	34.3	31.6	29.9	28.8	S	29.1	28.6	28.6	40.8	35.6	24	
4		28.2	27.7	27.0	26.7	26.1	28.0	29.5	32.8	37.5	40.3	41.4	42.3	42.2	42.1	42.7	42.0	41.9	37.6	34.6	33.9	S	33.3	33.2	36.3	26.1	42.7	35.1	24	
5		35.5	34.0	29.6	19.8	17.1	16.9	38.9	39.8	40.9	40.4	41.6	41.4	41.3	41.3	41.8	43.0	43.0	42.7	42.8	S	39.2	38.9	39.4	38.8	16.9	43.0	36.9	24	
6		38.4	38.0	37.3	34.5	36.9	36.0	40.2	39.2	39.7	39.9	40.3	37.4	38.3	38.1	39.2	41.5	41.0	41.2	S	39.2	38.3	36.8	32.9	31.5	31.5	41.5	38.1	24	
7		29.1	29.7	30.2	30.6	31.0	30.9	30.7	29.9	37.7	41.2	42.4	42.2	43.7	44.3	45.4	48.3	49.1	S	46.0	42.9	39.9	41.5	41.4	41.1	29.1	49.1	38.7	24	
8		40.9	40.6	40.4	40.0	38.8	37.6	39.2	Q	Q	44.8	45.4	46.3	47.0	47.3	47.4	45.8	S	47.1	46.8	45.9	38.7	32.7	26.2	28.3	26.2	47.4	41.3	24	
9		19.8	15.3	11.2	7.2	3.4	3.2	30.2	34.1	36.8	41.3	43.4	43.1	43.0	44.1	45.5	S	45.2	46.1	45.7	44.0	43.0	43.0	41.6	39.7	3.2	46.1	33.5	24	
10		39.0	33.8	31.9	23.1	27.5	31.4	31.9	34.5	39.1	40.5	40.3	40.3	40.5	41.4	S	40.5	39.2	40.4	40.6	40.4	38.7	36.5	35.5	33.8	23.1	41.4	36.6	24	
11		25.5	18.5	16.3	15.3	9.2	15.8	19.4	30.1	35.7	40.2	43.9	46.1	48.5	S	54.2	53.3	53.2	54.5	54.4	54.3	48.3	49.4	49.4	48.9	9.2	54.5	38.4	24	
12		49.2	48.2	47.4	45.3	41.2	40.4	38.9	39.2	44.1	46.6	49.7	51.1	S	56.5	59.9	63.9	62.9	55.3	49.5	47.7	46.1	44.5	37.7	29.9	29.9	63.9	47.6	24	
13		24.1	28.4	29.1	33.2	37.4	37.4	35.9	38.7	40.7	42.8	44.7	S	C	C	C	C	C	C	37.2	37.7	37.4	37.4	32.0	27.3	21.4	21.4	44.7	34.6	24
14		22.0	15.7	11.9	11.0	6.1	12.0	23.1	29.1	34.2	38.3	S	41.5	43.4	44.3	44.6	45.5	45.8	45.4	46.5	44.6	45.3	40.2	34.7	6.1	46.1	35.5	35.9	24	
15		35.9	34.5	30.3	29.2	25.6	26.1	27.6	26.8	29.9	S	33.8	34.1	36.3	43.5	49.1	48.9	48.2	45.7	44.6	42.9	39.3	33.1	31.7	28.7	25.6	49.1	33.9	24	
16		25.7	27.8	24.7	19.6	18.4	29.3	33.9	34.9	S	37.7	40.6	38.4	48.7	46.0	42.5	40.4	39.5	38.5	37.9	37.9	36.6	33.2	33.9	32.4	18.4	48.7	34.7	24	
17		31.5	24.5	24.9	23.8	27.6	32.1	34.9	S	37.5	40.8	43.3	43.4	42.2	41.8	42.3	43.5	44.9	44.7	44.7	43.4	40.4	38.2	37.5	38.1	23.8	44.9	37.7	24	
18		37.2	35.3	33.7	32.6	30.9	30.2	S	30.8	32.3	33.5	36.5	38.1	38.2	38.1	39.5	39.5	40.5	47.4	49.0	45.5	45.7	39.5	38.0	38.9	30.2	49.0	37.9	24	
19		35.6	33.5	35.4	35.8	34.2	S	33.6	34.9	37.7	41.7	43.6	44.5	44.7	45.8	47.6	49.9	50.2	50.8	50.3	49.8	46.0	40.3	34.6	32.8	32.8	50.8	41.4	24	
20		36.0	34.9	29.7	28.7	S	31.9	33.8	35.6	37.9	41.7	45.0	45.7	46.3	46.6	45.9	46.7	46.6	47.1	46.6	46.4	44.8	39.2	40.8	40.8	28.7	47.1	40.8	24	
21		41.2	39.8	38.7	S	25.7	32.8	37.1	38.6	41.6	47.6	46.8	46.1	46.2	46.4	47.4	48.4	47.9	47.0	44.7	43.5	38.7	30.6	24.7	19.4	19.4	48.4	40.0	24	
22		26.1	26.2	S	21.2	17.4	20.0	23.2	27.9	36.9	48.7	53.4	53.3	51.5	52.6	52.7	52.3	52.7	52.6	52.2	51.4	38.0	33.5	28.7	27.6	17.4	53.4	39.1	24	
23		22.2	S	13.9	10.3	10.2	12.1	21.1	31.2	37.2	50.5	58.9	59.1	60.8	61.6	63.2	62.9	63.5	60.5	59.5	56.3	58.2	57.9	48.3	47.1	10.2	63.5	44.6	24	
24		S	48.0	46.2	47.7	49.4	50.4	48.1	48.5	53.1	53.5	51.8	52.0	50.7	44.3	40.8	29.3	24.9	25.4	26.2	25.8	24.1	17.6	10.8	S	10.8	53.5	39.5	24	
25		6.3	5.3	4.3	20.5	15.5	14.5	21.0	28.4	34.0	40.5	39.8	40.5	43.4	44.2	44.4	42.7	43.0	47.3	47.9	45.5	44.1	43.0	S	30.5	4.3	47.9	32.5	24	
26		24.3	13.8	7.7	4.3	3.3	13.9	22.4	25.8	28.7	32.9	38.2	42.0	46.5	51.3	56.0	54.4	52.2	54.6	55.6	55.1	S	28.6	25.2	3.3	56.0	33.9	24		
27		25.2	21.3	19.6	15.1	15.9	12.4	16.4	30.1	36.5	44.2	49.7	57.5	59.4	59.8	58.7	56.9	57.6	56.9	55.3	50.7	S	30.5	28.6	25.0	12.4	59.8	38.4	24	
28		20.4	16.6	18.7	18.8	12.4	28.0	36.4	47.9	54.9	62.6	64.3	65.7	64.9	65.1	65.7	64.9	64.2	65.4	64.1	S	48.3	43.9	44.4	49.5	12.4	65.7	47.3	24	
29		45.4	40.9	35.1	27.6	30.8	25.1	40.8	43.1	51.4	59.5	66.8	74.7	75.5	70.8	67.0	67.4	56.8	S	51.6	44.2	32.0	30.1	33.2	25.1	75.5	48.9	24		
30		26.4	26.2	24.9	23.5	31.7	31.5	24.8	23.2	22.8	29.2	37.5	43.2	47.0	46.9	39.7	38.9	41.2	S	33.1	31.4	28.8	28.2	26.7	23.9	22.8	47.0	31.8	24	
31		18.8	13.1	10.4	8.0	7.2	7.4	27.6	29.2	31.8	31.7	31.8	33.8	35.9	35.6	37.0	39.5	S	42.5	43.6	42.3	36.7	27.4	24.1	20.9	7.2	43.6	27.7	24	
HOURLY MAX		49.2	48.2	47.4	47.7	49.4	50.4	48.1	48.5	54.9	62.6	66.8	74.7	75.5	70.8	67.0	67.4	64.2	65.4	64.1	56.3	58.2	57.9	49.4	49.5					
HOURLY AVG		30.4	29.2	27.1	25.0	23.9	25.8	31.2	34.0	38.1	42.1	44.5	45.6	46.7	47.1	47.9	47.5	47.3	46.9	45.6	43.9	40.9	37.4	33.9	33.5					

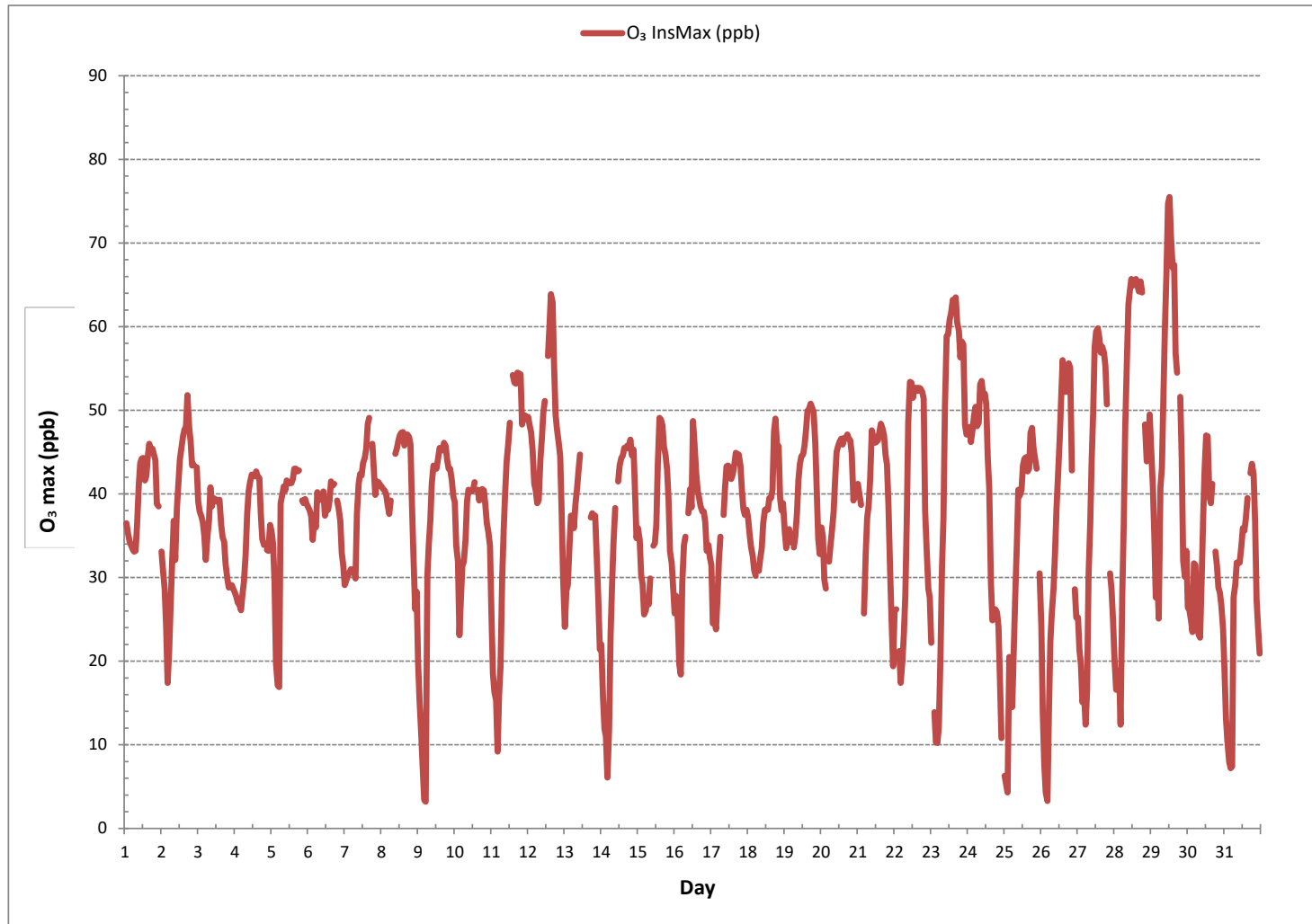
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	704
MAXIMUM INSTANTANEOUS VALUE:	75.5 ppb @ HOUR 12 ON DAY 29
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	11.9

OZONE Instantaneous Maximum (O₃ ppb)





WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY 1	19.9	18.9	26.2	24.0	25.9	18.2	22.4	26.2	21.8	24.6	27.6	29.6	24.5	23.2	26.2	31.3	28.3	26.6	27.9	22.3	24.5	14.7	9.6	11.4	9.6	31.3	23.1	24	
2	9.1	9.6	9.7	6.9	2.8	6.8	12.1	14.7	18.4	22.0	23.5	26.2	19.1	17.4	22.5	23.1	21.8	18.9	15.4	12.7	11.5	9.6	24.0	25.4	2.8	26.2	16.0	24	
3	33.2	38.6	35.0	25.9	15.2	9.9	11.5	23.7	45.7	54.7	48.4	62.3	85.4	58.6	61.5	59.7	71.3	59.8	53.2	40.7	22.4	27.0	29.1	20.8	9.9	85.4	41.4	24	
4	16.4	14.9	17.1	16.9	14.9	21.0	26.6	27.9	34.2	44.9	44.9	46.2	51.5	53.2	43.7	44.7	46.2	43.7	35.3	26.2	21.0	24.5	25.4	22.3	14.9	53.2	31.8	24	
5	15.4	10.4	6.7	2.8	4.5	4.2	12.7	11.8	12.5	13.5	20.6	23.5	28.1	31.5	22.7	25.9	21.8	17.9	17.1	19.6	13.5	17.9	20.6	15.4	2.8	31.5	16.3	24	
6	17.4	15.5	8.9	6.3	13.1	13.9	22.0	19.8	24.2	20.1	33.2	14.9	14.5	25.7	20.1	16.2	16.2	15.9	9.5	30.3	24.2	18.6	10.3	9.5	6.3	33.2	17.5	24	
7	15.5	16.7	17.9	22.4	26.2	22.7	X	21.4	15.4	22.0	31.0	24.2	35.4	24.5	26.7	26.9	23.5	21.4	16.8	13.2	14.5	23.3	20.8	19.0	13.2	35.4	21.8	23	
8	14.3	23.7	17.6	14.9	15.4	15.7	17.1	26.9	29.2	27.4	34.7	26.5	21.8	20.1	33.0	44.2	22.7	17.6	18.6	13.0	3.8	5.2	2.8	7.4	2.8	44.2	19.7	24	
9	10.1	3.7	4.1	3.9	1.7	3.3	13.7	16.9	15.4	27.6	27.9	29.3	30.8	36.4	31.3	33.4	28.6	29.6	22.0	25.3	22.0	24.8	53.7	12.5	1.7	53.7	21.2	24	
10	10.8	21.3	7.1	9.0	18.4	34.8	44.2	51.3	49.8	59.6	57.6	55.7	73.7	64.2	76.9	66.9	73.0	54.8	54.5	41.0	35.7	16.2	14.5	6.0	6.0	76.9	41.5	24	
11	5.5	6.4	2.8	5.4	5.8	9.8	8.4	8.1	12.0	20.1	20.3	22.5	23.2	27.4	25.2	39.1	32.0	29.4	23.2	8.6	10.1	15.4	20.8	16.9	2.8	39.1	16.6	24	
12	17.6	14.7	16.7	6.9	12.0	23.7	10.6	14.9	54.6	43.2	41.0	48.0	65.9	72.7	55.6	61.2	51.3	48.7	57.6	32.0	16.2	10.2	6.2	5.9	5.9	72.7	32.8	24	
13	11.8	11.5	12.3	14.7	16.7	20.3	40.5	36.1	55.4	60.5	58.6	65.2	76.4	58.3	58.1	53.2	44.1	35.7	43.9	36.1	20.8	12.3	5.9	4.0	4.0	76.4	35.5	24	
14	4.5	2.8	3.3	2.5	3.0	4.9	4.7	10.6	18.4	17.0	22.7	25.4	26.6	23.2	19.1	28.3	10.8	22.2	17.4	17.2	18.6	20.1	9.7	7.3	2.5	28.3	14.2	24	
15	8.4	15.7	17.9	12.0	18.8	31.8	31.5	28.3	30.3	28.9	31.3	33.0	32.8	23.0	28.1	28.5	25.9	26.4	23.7	17.9	11.0	9.6	5.8	10.3	5.8	33.0	22.1	24	
16	8.1	8.8	5.7	4.8	4.5	10.1	17.1	19.1	18.9	22.0	19.3	24.7	24.1	19.1	23.3	24.2	21.1	22.3	13.5	11.3	6.7	12.0	15.4	10.8	4.5	24.7	15.3	24	
17	7.7	6.2	6.9	9.0	12.3	17.1	23.0	26.9	34.8	47.1	52.8	43.8	52.5	49.6	41.0	39.6	36.9	34.0	33.7	22.2	13.5	14.7	30.3	31.8	6.2	52.8	28.6	24	
18	22.2	21.1	20.3	20.5	18.6	22.1	26.7	27.4	26.6	34.0	30.5	47.6	39.1	42.2	35.3	36.6	31.1	36.4	30.3	24.0	12.7	13.7	9.6	10.5	9.6	47.6	26.6	24	
19	7.1	9.3	13.1	13.6	13.8	20.3	20.3	21.8	23.0	39.8	34.2	33.2	47.4	38.8	53.7	31.6	32.0	30.3	20.8	19.3	9.2	4.0	4.3	8.4	4.0	53.7	22.9	24	
20	8.6	7.6	5.9	9.6	11.3	18.1	22.0	20.3	24.4	40.8	34.5	34.4	40.6	45.4	34.8	40.3	37.1	35.2	30.1	21.5	11.8	7.1	9.5	12.0	5.9	45.4	23.5	24	
21	14.0	11.9	12.3	10.8	4.5	13.5	21.3	21.8	22.0	28.7	37.7	47.7	34.2	35.7	37.1	25.4	21.5	26.6	19.1	12.3	3.2	1.7	2.3	3.8	1.7	47.7	19.5	24	
22	4.5	3.1	15.2	5.9	2.8	4.9	4.5	5.3	7.1	12.1	18.1	28.1	24.7	25.4	27.8	23.2	15.8	10.8	8.6	4.9	3.7	3.3	3.0	2.1	2.1	28.1	11.0	24	
23	3.7	3.3	3.0	2.8	3.6	5.9	7.6	12.1	13.5	18.8	19.8	22.1	31.0	22.5	24.0	18.4	18.9	17.1	11.4	15.2	16.7	25.3	22.5	22.2	2.8	31.0	15.1	24	
24	26.6	18.4	23.7	24.9	23.5	19.6	21.3	23.1	40.8	34.5	33.2	30.5	34.9	36.6	47.4	53.7	51.0	32.0	27.9	20.1	11.0	3.2	4.0	4.1	3.2	53.7	26.9	24	
25	5.4	6.4	6.2	14.9	2.8	5.9	5.8	9.8	11.3	18.6	19.3	20.0	20.3	19.8	28.1	36.1	13.2	19.8	19.6	17.6	13.8	9.1	10.4	5.2	2.8	36.1	14.1	24	
26	3.5	3.0	2.3	3.2	2.9	6.8	11.5	10.6	15.7	17.6	17.6	17.9	16.9	21.4	21.6	19.6	17.9	18.8	13.7	15.2	7.6	5.4	4.9	3.0	2.3	21.6	11.6	24	
27	2.8	4.2	4.2	2.8	3.0	2.8	3.7	17.1	17.9	21.0	23.7	28.1	35.4	41.0	38.6	31.2	24.4	22.7	10.3	5.4	6.5	5.4	3.5	3.7	2.8	41.0	15.0	24	
28	4.7	4.0	2.5	3.0	3.5	10.1	15.7	16.4	29.1	31.2	34.9	43.7	44.4	42.2	38.7	45.1	34.2	36.7	23.4	15.4	11.5	9.8	11.0	11.3	2.5	45.1	21.8	24	
29	9.6	7.9	8.4	4.7	2.6	3.1	13.7	15.9	28.1	31.2	45.1	45.1	44.6	49.2	44.1	44.9	39.5	32.2	25.6	12.7	8.0	6.7	11.0	14.2	2.6	49.2	22.8	24	
30	9.1	9.8	14.2	13.7	23.7	39.1	18.1	19.6	12.0	18.4	35.9	41.8	27.4	46.6	51.5	56.1	57.3	52.7	31.1	20.5	14.2	17.9	17.4	5.9	5.9	57.3	27.2	24	
31	3.2	3.3	2.9	3.0	3.2	2.3	15.0	23.2	20.4	17.1	17.4	18.1	17.9	23.0	22.5	19.1	21.1	14.9	14.0	9.5	8.0	4.3	2.5	3.7	2.3	23.2	12.1	24	
HOURLY MAX	33.2	38.6	35.0	25.9	26.2	39.1	44.2	51.3	55.4	60.5	58.6	65.2	85.4	72.7	76.9	66.9	73.0	59.8	57.6	41.0	35.7	27.0	53.7	31.8					

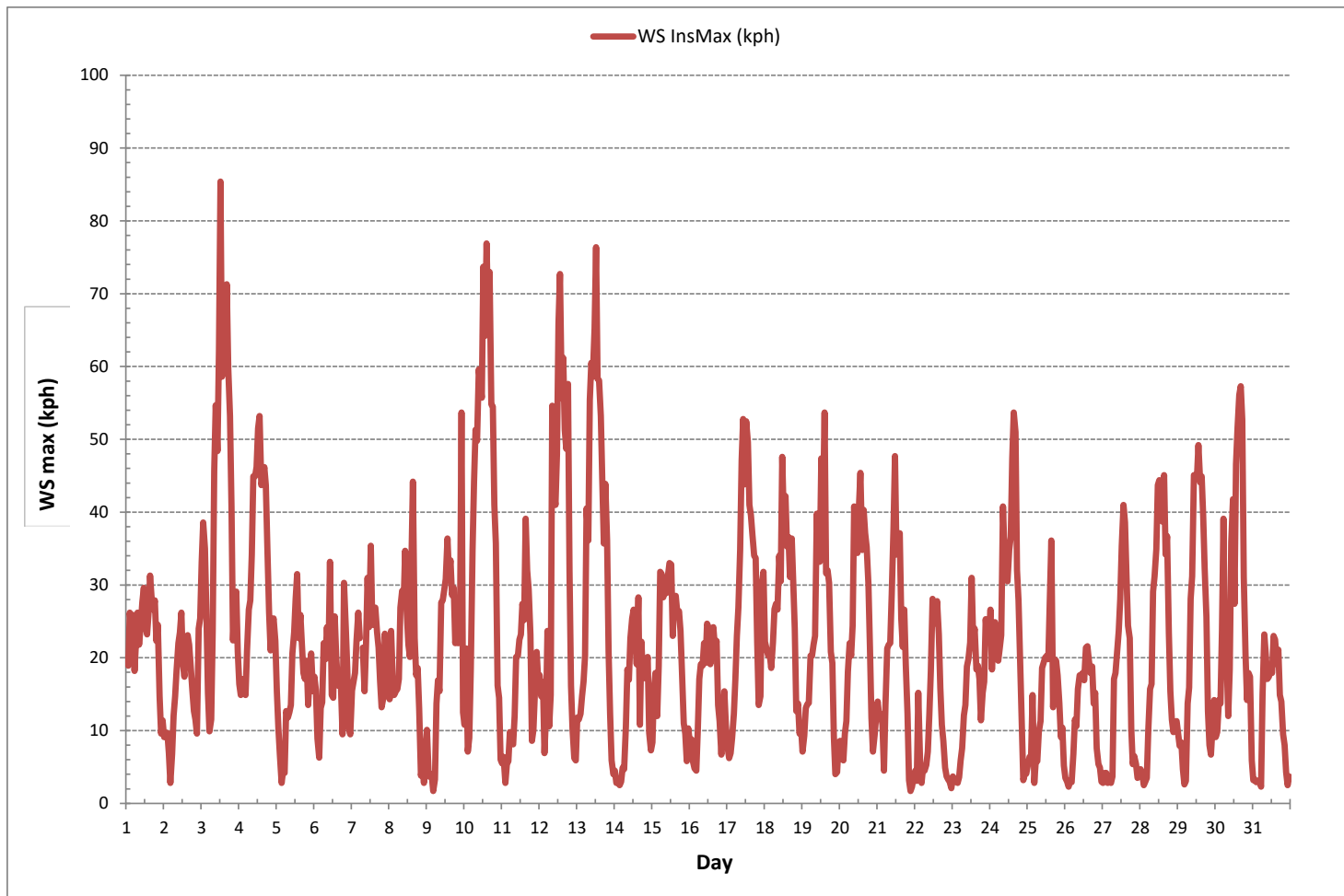
STATUS FLAG CODES

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

MAXIMUM INSTANTANEOUS VALUE:	85.4 kph	@ HOUR	12	ON DAY	3
OPERATIONAL TIME:	743 hrs				

WIND SPEED Instantaneous Maximum (WS kph)



AEP AUDIT REPORT

May 16th, 2019

File Numbers: 2019 – 062A / 082A

Michael Bisaga Manager, Environmental Programs
Lakeland Industry and Community Association
PO Box 8237
Bonnyville, Alberta
T9N 2J5

Mr. Bisaga:

Subject: Ambient Air Monitoring Station Audit Results for the Lica Network

Alberta Environment and Parks Ambient Air Monitoring Audit team conducted an audit of the Lakeland Industry and Community Association (Lica) ambient air monitoring stations May 6th to 9th, 2019.

All pollutant gas analyzers met AMD criteria. However the Oxides of Nitrogen analyzer at Cold Lake South initially was failing 24% low. When doing cursory checks it was discovered the stainless steel sample inlet filter holder had a compressed internal oring. When bypassed and eventually replaced with an inert Teflon Thermo style filter holder, the analyzer passed the audit. The S.S. sample inlet filter was removed from service and retained by AEP. Please review the attached picture.

It would appear the compressed oring likely occurred during the April 24th monthly calibration when a new inlet particulate filter was installed. From the review of the calibration documents on site there was no significant as found change in calculated analyzer response before or during the calibration.

Data from April 24th 2019 to May 8th 2019 needs to be flagged as invalid due to the initial 24% low response found in accordance with AMD Chapter 8 Section 4.1, Aud 4-E (a)(b). An uptime contravention must be reported for the months of April and May 2019.

AEP suggests that the current inventory of sample inlet filter holders in use at the Cold Lake South station be updated to the newer Teflon Thermo style inlet filter holders in place throughout the rest of the Lica network.

Review of the calibration documents shows that the SO₂ and NO_x analyzer were calibrated and adjusted at the lower end of the high point (60-80% of the analyzer fullscale) calibration range in the month of April 2019. This may account for the responses being lower than anticipated for audit responses. Maxxam indicated the same cylinder of gas is used at all locations. Cold Lake South SO₂ and NO_x analyzers did not see a similar audit response as they were calibrated at a higher calculated response based on analyzer range. AEP recommends that the SO₂ and NO_x

analyzers be calibrated at a higher calculated high point response (closer to the 80% value) to ensure all the error possible is removed from the analyzers.

The Thermo 5030i series PM2.5 samplers at St Lina and Bonnyville East were not audited this cycle.

All meteorological equipment met AMD criteria with the exception of the Relative Humidity sensor at St Lina. It was reading 23% high compared to our audit standard.

All site and network documentation that were reviewed on line, showed that they require updating as elements in both documents are missing or incorrect. Please review the attached audit findings.

AEP was asked to review a proposed new Maskwa location approximately 2000m west of the current location. Initial assessment indicates it is a suitable location for an ambient air monitoring station based on siting criteria. However please note the proposed location puts it closer to a major emission source, the Imperial Oil Resources Maskwa facility. This facility may cause an increase in concentration levels of some or all of the pollutants being measured at the current location.

Upon receiving notification of this performance audit Lica was asked to provide the date of the most recent quality system audit as required by AMD Chapter 5 QS 4-A and QS 4-B(b). Lica has indicated June 2017 was the last 3rd party audit of the QAP.

Please address the issues noted above and provide a written response to the Audit Team by June 21st, 2019. If you have any questions or comments, please contact the undersigned at 780-427-7888.

Yours truly,



Al Clark
Monitoring Systems Auditor

Attachments:

- Lica Analyzer Audit Sheets
- Lica Audit Summary
- SS inlet sample picture

CC: Shea Beaton – AEP
Marty Collins – AEP
Bob Myrick – AEP
Max Mazur – AEP
Wally Qiu – AER
Lily Lin – Lica
air.reporting@gov.ab.ca

STATION AUDIT

File No. 2019 - 072A - 079A

Date: May 8, 2019

Performed by: Al Clark

Station

Name: Cold Lake South

Location: Cold Lake

Facility/Zone: Lica

Operator: Maxxam

Temp. 21.6 C

Barometric Press. 724 mmHg

Location

Latitude N 54° 24' 50.7"

Longitude W 110° 13' 58.4"

Elevation 527m

Status of Site Documentation On Line Incomplete

Status of Network Documentation On Line Incomplete

Status of QAP Audited June 2017

Manifold Material Glass

Manifold Condition Good

Meteorological

	Observed	Audit Value
Wind Speed Direction	<u>10.3 kph / 131 deg</u>	<u>5-10 kph / SSE</u>
Station Temperature	<u>17.9 C</u>	<u>18.1 C</u>
Relative Humidity	<u>23.9%</u>	<u>23.7 %</u>
Ambient Temperature	<u>11.9 C</u>	<u>12.5 C</u>
Solar Radiation	<u>N/A</u>	<u>N/A</u>
Precipitation	<u>N/A</u>	<u>N/A</u>

Remarks:

SO₂ ANALYZER AUDIT

File No. 2019 - 072A

Date: May 8, 2019

Performed by: Al Clark

Station

Name: Cold Lake South

Location: Cold Lake

Facility/Zone: Lica

Operator: Maxxam

Temp. 21.8 C

Barometric Press. 724 mmHg

Monitor

Make/Model: Teco 43i TLE Serial No: 1180260018

Inlet flow (sccm): 454 Full Scale Range ppm: 0.5

Last cal. Date: Apr 24/19 Old Correction Factor: 1.0210

Zero/Bkg 1.96

Span Coef 1.019

Calibrator

Calibration Method: GAS DILUTION Make/Model: Sabio 2010

Cylinder #: FF23250 AMU #: 2092

CGA Date: April 2019 SO₂ Concentration PPM: 49.5

Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Concentration (ppm)	% Difference	
Air	Gas	Total			vs Audit Gas	Limits
4966	0.0	4966	0.0000	0.0000		
4940	39.2	4979	0.3897	0.3956	2%	± 10%
4951	20.1	4971	0.2002	0.2024	1%	± 10%
4984	10.5	4994	0.1041	0.1046	1%	± 10%
Absolute Average Percent Difference					1%	

Linear Regression Analysis:

$y=mx+b$ (where x =calculated concentration, y =indicated concentration)

Correlation Coeff.= 1.0000

m (Slope)= 1.0157

b (Intercept as % of full scale)= -0.1128

LIMITS

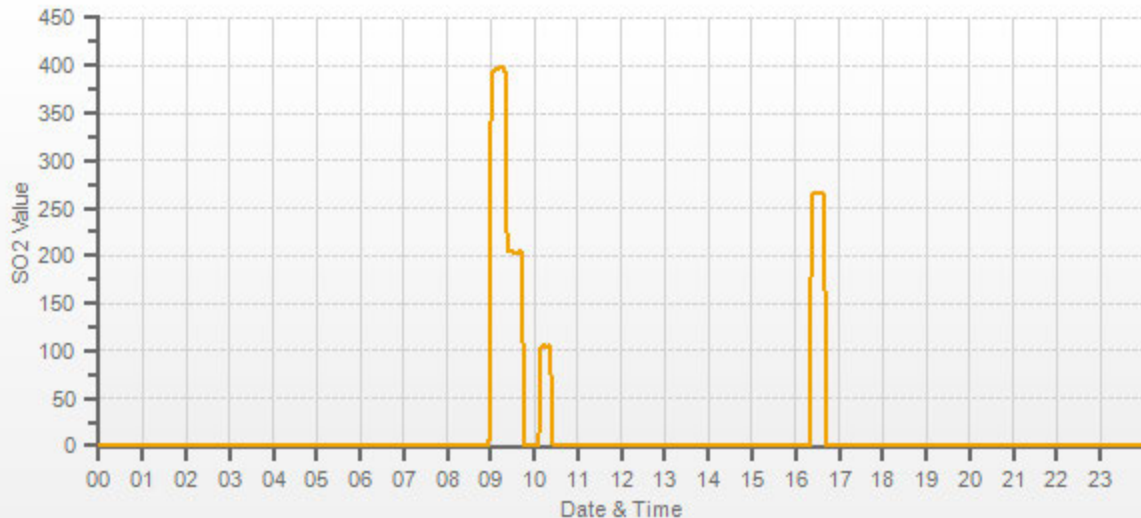
≥ **0.995**

0.90-1.10

± **3% F.S.**

Remarks:

SO2[ppb]



TRS ANALYZER AUDIT

File No. 2019 - 073A

Date: May 8, 2019

Performed by: AI Clark

Station

Name: Cold Lake South

Location: Cold Lake

Facility/Zone: Lica

Operator: Maxxam

Temp. 21.8 C

Barometric Press. 724 mmHg

Monitor

Make/Model: Teco 450i Serial No: 0812728560

Inlet flow (sccm): 495 Full Scale Range ppm: 0.1

Last cal. Date: Apr 24/19 Old Correction Factor: 0.9990

Zero/Bkg 15.7

Span Coef 0.910

Calibrator

Calibration Method: GAS DILUTION Make/Model: Sabio 2010

Cylinder #: EX0011882 AMU #: 2092

CGA Date: May 2019 H₂S Concentration PPM: 10.8

Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Concentration (ppm)	% Difference	
Air	Gas	Total			vs Audit Gas	Limits
4966	0.0	4966	0.0000	0.0001		
4942	37.0	4979	0.0803	0.0775	-4%	± 10%
4951	20.1	4971	0.0437	0.0421	-4%	± 10%
4984	9.9	4994	0.0214	0.0209	-3%	± 10%
Absolute Average Percent Difference					3%	

Linear Regression Analysis:

$y=mx+b$ (where x =calculated concentration, y =indicated concentration)

Correlation Coeff.= 1.0000

m (Slope)= 0.9635

b (Intercept as % of full scale)= 0.1416

LIMITS

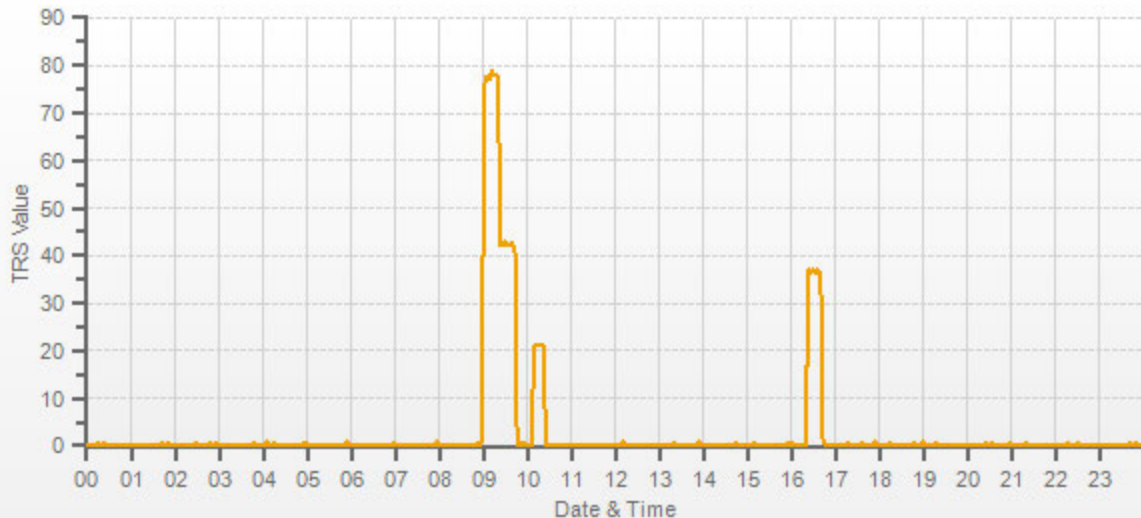
≥ **0.995**

0.90-1.10

± **3% F.S.**

Remarks:

— TRS[ppb]



Non Methane Analyzer Audit

File No. 2019 - 074A

Date: May 8, 2019

Performed by: Al Clark

Station:

Name: Cold Lake South Location: Cold Lake Operator: Maxxam
 Facility/Zone: Lica Temp. 21.6 C BP: 724 mmHg

Monitor:

Make/Model: Teco 55i Serial No. 1236656188
 Inlet flow (scm): N/A CH₄ Range ppm: 20
 Last cal. Date: Apr 24/19 Non CH₄ Range ppm: 20
 Old Correction Factor: CH₄: 0.989 THC Range ppm: 40
 Non CH₄: 1.002
 THC: 0.994

Calibration Method:

Gas Dilution

Calibrator:

Make/Model Sabio 2010 AMU# 2270
 HC cylinder # EA0004003 CH₄ conc. (ppm) 1010 CH₄ Equiv (C3H8 only) (ppm) 872
 CGA Date April 2019 C₃H₈ conc. (ppm) 317 Total CH₄ Equiv. (ppm) 1882

Calibrator Flows			Calc. Conc.			Indicated Concentration			% Difference vs Audit Gas		
			CH ₄ (ppm)	Non CH ₄ (ppm)	THC (ppm)	CH ₄ (ppm)	Non CH ₄ (ppm)	THC (ppm)	Limit ± 10%		
Air	Gas	Total							CH ₄	Non CH ₄	THC
5045	0.0	5045	0.00	0.00	0.00	0.00	0.00	0.00	4%	0%	3%
4963	80.3	5043	16.08	13.88	29.96	16.80	13.93	30.74	4%	0%	3%
5027	40.0	5067	7.97	6.88	14.85	8.40	6.90	15.30	5%	0%	3%
5046	20.1	5066	4.01	3.46	7.47	4.18	3.37	7.55	4%	-3%	1%
Absolute Average Percent Difference									5%	1%	2%

Linear Regression Analysis:

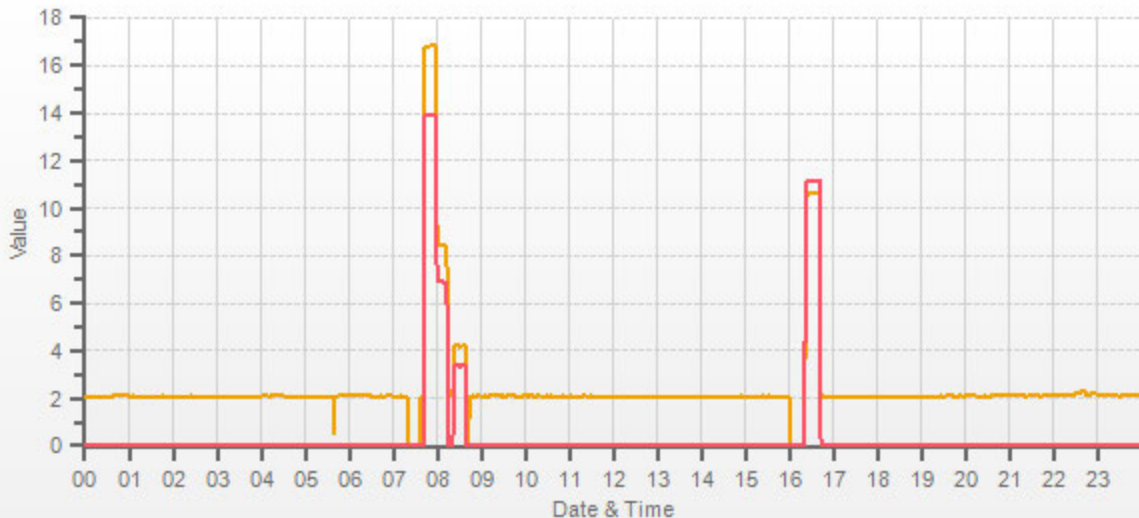
y=mx+b (where x=calculated concentration, y=indicated concentration)

	<u>CH₄</u>	<u>Non CH₄</u>	<u>THC</u>	<u>LIMITS</u>
Correlation Coeff.=	<u>1.0000</u>	<u>1.0000</u>	<u>1.0000</u>	≥ 0.995
m (Slope)=	<u>1.0452</u>	<u>1.0060</u>	<u>1.0274</u>	0.90-1.10
b (Intercept as % of FS)=	<u>0.0597</u>	<u>-0.2078</u>	<u>-0.0791</u>	± 3% F.S.

Remarks:



CH4[ppm] NMHC[ppm]



NO-NOx-NO2 Analyzer Audit

File No. 2019 - 075A

Date: May 8, 2019 Performed by: Al Clark

Station:

Name: Cold Lake South Location: Cold Lake Operator: Maxxam
Facility/Zone: Lica Temp. 22.7 C BP: 722 mmHg

Monitor:

Make/Model: Teco 42i Serial No. 1505664393
Inlet flow (scm): 716 Range ppm: 0.5
Last cal. Date: Apr 24/19 Old CF: NO: 1.017
NOx: 1.018
NO2: 1.000
NO Bkg 7.0
NOx Bkg 7.2
NO Coef 0.852
NOx Coef 1.002
NO2 Coef 0.999

Calibration Method: Gas Dilution / GPT

Calibrator: Make/Model: Sabio 2010 AMU# 2270
NO cylinder # FF23222 NO conc. ppm 50.8 NOx conc. ppm 51.4
CGA Date April 2019

Calibrator Flows			Calc. Conc.		Indicated Concentration		% Difference vs Audit Gas	
Air	Gas	Total	NO (ppm)	NOx (ppm)	NO (ppm)	NOx (ppm)	NO	NOx
5051	0.0	5051	0.0000	0.0000	0.0001	0.0001	Limit ± 10%	
5020	40.2	5060	0.4036	0.4084	0.4096	0.4193	1%	3%
5040	19.9	5060	0.1998	0.2021	0.2047	0.2082	2%	3%
5054	10.0	5064	0.1003	0.1015	0.1012	0.1033	1%	2%
Absolute Average Percent Difference							2%	2%

Linear Regression Analysis:

y=mx+b (where x=calculated concentration, y=indicated concentration)

	NO	NOx	NO ₂	LIMITS
Correlation Coeff.=	<u>1.0000</u>	<u>1.0000</u>	<u>1.0000</u>	≥ 0.995
m (Slope)=	<u>1.0157</u>	<u>1.0275</u>	<u>0.9986</u>	0.90-1.10
b (Intercept as % of full scale)=	<u>0.0418</u>	<u>-0.0358</u>	<u>-0.0477</u>	± 3% F.S.

O ₃ Setting	Flow Rate	Indicated Conc. (ppm)			NO Decrease	NO ₂ Increase	% Difference vs Audit Gas	
		NO	NOx	NO ₂				
0.000	5060	0.4145	0.4197	0.0051	0.3193	0.3185	0%	%Dif Limit
0.850	5060	0.0952	0.4189	0.3236	0.3193	0.3185	0%	± 10%
0.600	5060	0.1999	0.4194	0.2194	0.2146	0.2143	0%	± 10%
0.360	5060	0.3088	0.4192	0.1103	0.1057	0.1052	0%	± 10%
Absolute Average Percent Difference							0%	

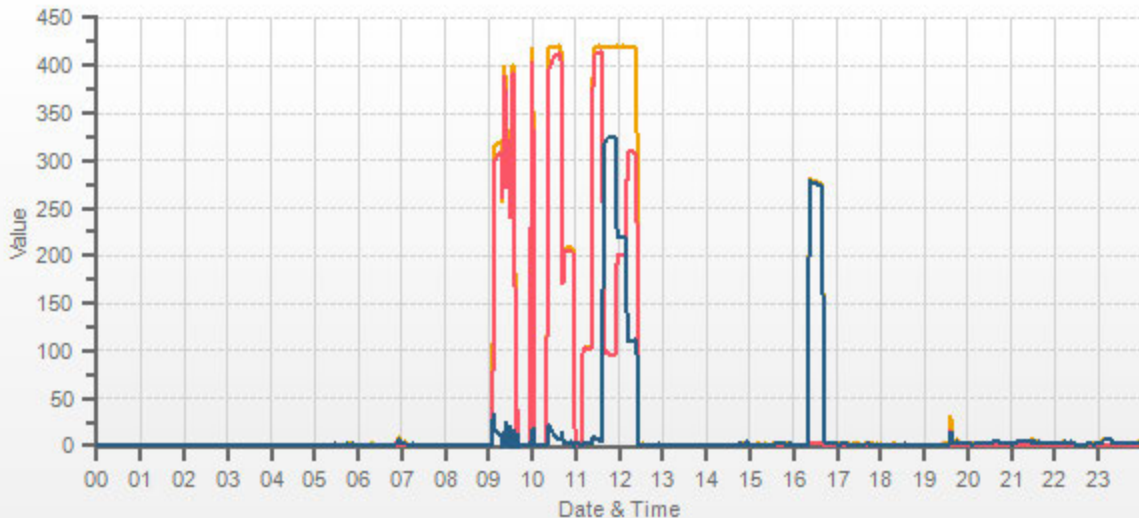
Converter Efficiency

Average Converter Efficiency 99.7%

Remarks: Inlet filter replaced. Had a faulty oring caused >450 scfm leak. A new Teflon holder installed. Initial response 24% low. Appears to be since last monthly cal. Power blip at start of mid pt 1040 MST.



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



O₃ ANALYZER AUDIT

File No. 2019 - 076A

Date: May 8, 2019

Performed by: Al Clark

Station

Name: Cold Lake South

Location: Cold Lake

Facility/Zone: Lica

Operator: Maxxam

Temp. 21.6 C

Barometric Press. 724 mmHg

Monitor

Make/Model: Teco 49i Serial No: 0700419951

Inlet flow (sccm): 710 / 752 Full Scale Range ppm: 0.5

Last cal. Date: Apr 24/19 Old Correction Factor: 1.0000

Zero/Bkg 0.0

Span Coeff. 1.036

Calibrator

Calibration Method: Photometer

Make/Model: Teco 49i PS AMU #: 1808

NO cylinder #: N/A NO concentration ppm: N/A

Ozone Setting PPB/Current	Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Conc. (ppm)	% Difference	
	Air	Gas	Total			vs Audit Gas	Limits
0.0000	0	X	0	0.0000	0.0010		
0.4000	0	X	0	0.4000	0.4053	1%	± 10%
0.2000	0	X	0	0.2000	0.2030	1%	± 10%
0.1000	0	X	0	0.1000	0.1017	1%	± 10%
Absolute Average Percent Difference						1%	

Linear Regression Analysis:

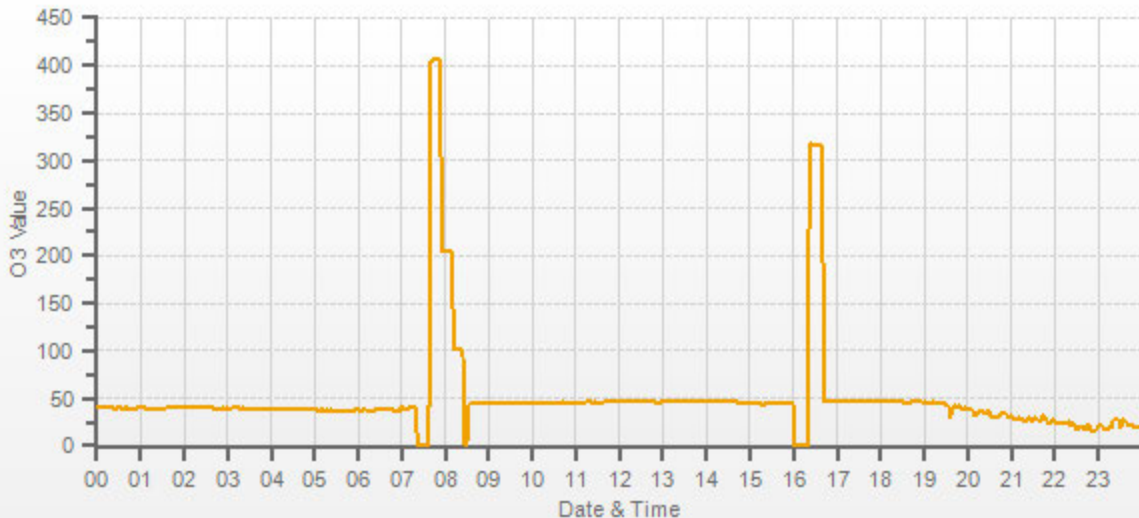
$y=mx+b$ (where x =calculated concentration, y =indicated concentration)

Correlation Coeff.= 1.0000
m (Slope)= 1.0110
b (Intercept as % of full scale)= 0.1640

LIMITS
≥ **0.995**
0.90-1.10
± **3% F.S.**

Remarks:

O3[ppb]



SHARP 5030 ANALYZER AUDIT

File No. 2019 - 077A

Date: May 8, 2019

Performed by: Al Clark

Station

Name: Cold Lake South Location: Cold Lake
Facility/Zone: Lica Operator: Maxxam

Monitor

Make/Model: Sharp 5030 Serial No: CM2209

Flow Audit Transfer Standard

Make/Model DeltaCal Cell s/n 1002
Serial # AMU 1858

Foil Kit

Foil Set No. CM1608 Certificate Date November 2017

Sample Flow

Set Pt.(LPH)	<u>1000</u>	Converted to LPM	<u>16.7</u>	Limit(+/-10%)	
Indicated	<u>1000</u>		<u>16.7</u>		<u>0.2%</u>
Conv Meas Flow	<u>1002</u>		<u>16.7</u>	Measured	<u>16.7</u>

Leak Check

Starting value	<u>1002</u>	Lph	Flow	<u>16.7</u>	(LPM)
Leak Check	<u>990</u>	Lph	Flow	<u>16.5</u>	(LPM)
Adapter			Flow	<u>-1.2%</u>	(LPM+/- 5.0% or 0.8lpm)

Sensors

	Sharp	Audit	Difference	Tolerance
T1 - Amb Tmp°C	<u>11</u>	<u>12.5</u>	<u>1.5</u>	(+/- 4°C)
Amb Press(hPa)	<u>957</u>	<u>965</u>	<u>8</u>	(+/-13.33hPa)

Background Zero

	Analog	Neph(µg/m³)	Limit	Conc
With Hepa	<u>160</u>	<u>0.2</u>	(<+/- 2 µg/m³)	<u>0.3</u>

Mass Foil Audit (Sensitivity)

	Old Factor	New Factor	Difference	Limit
Span Value	<u>7082</u>	<u>7020</u>	<u>-1%</u>	(+/- 5%)

R&P 2000D Partsiol Audit

File #: 2019 - 078A

Date: May 8, 2019

Performed by: Al clark

Location: Cold Lake

Temperature: 11.9 C

Barometric Pressure: 718 mmHg

Sampler

Make/Model 2000iD
Last Calibration Date: Not reviewed

Serial # 200D1W20244

Audit Transfer Standard

Make/Model DeltaCal
Serial # 1002

AMU # 1852

Ambient temperature

Current Reading 11.9 °C
Actual Reading 12.3 °C

Difference -0.4 <2°C

Ambient pressure

Current Reading 718 mmHg
Actual Reading 720 mmHg

Difference -2.0 ± 10mmHg

Filters temperature

Current Reading 13.4 °C
Actual Reading 13.2 °C

Difference 0.2 <2°C

Leak check

Pass with: 10.0 < 128 mmHg

or

Fail with: > 128 mmHg

Audit Flows

Coarse Set Pt	Current Rdg.	Actual Rdg.	% err.	Limits
<u>1.67</u>	<u>1.68</u>	<u>1.65</u>	<u>-1.82</u>	± 4%

Fine Set Pt	Current Rdg.	Actual Rdg.	% err.	Limits
<u>15.00</u>	<u>15.02</u>	<u>15.14</u>	<u>0.79</u>	± 4%

Other Inspections

	Condition
Rubber Seals in Hub and Satellite	<u>All OK</u>
PM Inlet Condition	<u>OK</u>
Large Inline Filter	<u>OK</u>
Air Screens Located Under Rain Hoods	<u>OK</u>

Comments:

Station Performance Audit Summary

Company: Lica

Facility Name: Cold Lake

Approval No.: N/A

Site Name: Cold Lake south

Region: North Saskatchewan

District: Cold Lake

Parameters audited:

H ₂ S		SO ₂	X	NO _x	X	NH ₃		O ₃	X
CO		CH ₄	X	NonCH ₄	X	THC	X	TRS	X
PM _{2.5}	X	PM ₁₀		TSP		BTEX		Wind Speed	X
Wind Dir	X	Amb. Temp	X	Stn. Temp	X	RH	X	Solar Radiation	
Rainfall		Precip		VWS		Other			
All parameters monitored as per approval: Yes <u> </u> No <u> </u> N/A <u> </u>									

GENERAL

	YES	NO	N/A
Has the location remained unchanged from previous audit?	X		
Is site secure?	X		
Are station operating conditions adequate?	X		

DATA ACQUISITION

Are strip charts in use?		X	
Is a telemetry system for data acquisition in use?	X		

SYSTEM COMPONENTS

Is a glass sampling manifold installed?	X		
Is sampling manifold clean?	X		
Is a manifold trap in place?	X		
Are spare manifold ports capped	X		
Is manifold oriented so it is not exactly horizontal?	X		
Are manifold ports situated to prevent water entering monitors?	X		
Is manifold pump properly installed and operative?	X		
Do sample lines extend at least 3/4" into manifold?	X		
Are monitor sampling lines connected to manifold?	X		
Are sampling lines clean?	X		
Are monitors properly mounted and secure?	X		
Are monitors properly exhausted from room or scrubbed?	X		
Are zero and span systems operational?	X		

WIND EQUIPMENT

Is wind sensor properly oriented?	X		
Does wind equipment appear to be functioning properly?	X		
Date of last calibration.	Date: <u> November 2017 </u>		

COMMENTS:

AUDITOR: Al Clark

DATE: May 8, 2019



Station Site Documents Audit Checklist

Station	
Name: <u> Cold Lake South </u>	Location: <u> Cold Lake </u>
Facility/Zone: <u> Lica </u>	Operator: <u> Maxxam </u>

<p>Required Elements of AMD Chapter 3 SS 4-B Do the Site Documents Contain the Following:</p> <p>(a) Name of Owner/ Approval Holder</p> <p>(b) Name of Operating Agency</p> <p>(c) Contact Information</p> <p>(d) Date the Site or Station was Established</p> <p>(e) Date the information was last updated</p> <p>(f) Location including Latitude and Longitude</p> <p>(g) Four Colour Photos Looking N, E, S, W From Manifold Inlet</p> <p>(h) Additional Photos/Sketches of AMD Standard Site Non-Conformance</p> <p>(i) List of Instruments Located at the Site</p> <p>(j) Site Description Including the following:</p> <p style="padding-left: 20px;">(i) Land Use By Sector</p> <p style="padding-left: 20px;">(ii) Site Elevation</p> <p style="padding-left: 20px;">(iii) Greatest Angle of Elevation & Direction to Nearby Buildings</p> <p style="padding-left: 20px;">(iv) Average Building height in the area</p> <p style="padding-left: 20px;">(v) Distance to Nearest Trees</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Meets AMD</th> <th rowspan="2">NA</th> <th colspan="2">Current</th> </tr> <tr> <th>YES</th> <th>NO</th> <th>YES</th> <th>NO</th> </tr> </thead> <tbody> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td></td><td></td><td>X</td><td></td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr style="background-color: #cccccc;"><td colspan="5"></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td></td><td>X</td><td></td><td></td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td></td><td>X</td><td></td><td></td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> </tbody> </table>	Meets AMD		NA	Current		YES	NO	YES	NO	X			X		X			X		X			X		X			X		X			X		X			X		X			X				X			X			X							X			X			X				X			X			X				X			X	
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<p>Required Elements of AMD Chapter 3 SS 4-D Do the Station Site Documents Contain the Following:</p> <p>(a) Recent Area Map Covering Approximately 1Km²</p> <p>(b) Plan View Sketch</p> <p>(d) Colour Photos Showing Sample Manifold/Inlet</p> <p>(e) Colour Photo of the Station</p> <p>(f) Additional Photos/Sketches of AMD Standard Station Non-Conformance</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Meets AMD</th> <th rowspan="2">NA</th> <th colspan="2">Current</th> </tr> <tr> <th>YES</th> <th>NO</th> <th>YES</th> <th>NO</th> </tr> </thead> <tbody> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td></td><td></td><td>X</td><td></td><td></td></tr> </tbody> </table>	Meets AMD		NA	Current		YES	NO	YES	NO	X			X		X			X		X			X		X			X				X		
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COMMENTS: List Aemera as owner should AEP now. Missing site elevation and average building height in area. Exterior picture does not show manifold intake clearly.

AUDITOR: Al Clark DATE: May 15, 2019



Network Site Documents Audit Checklist

Network	
Name: <u> Cold Lake South </u>	Location: <u> Cold Lake </u>
Facility/Zone: <u> Lica </u>	Operator: <u> Maxxam </u>

<p>Required Elements of AMD Chapter 3 SS 4-C Do the Network Site Documents Contain the Following:</p> <p>(a) A Recent Area Map Showing the Following:</p> <ul style="list-style-type: none"> (i) Station Locations <li style="background-color: yellow;">(ii) Roadways <li style="background-color: yellow;">(iii) Railway Lines <li style="background-color: yellow;">(iv) Airports (v) Lakes (vi) Rivers (vii) Human Settlements (viii) Locations of Identified Industrial & Non-Industrial Pollutant Sources (ix) Other Significant Landmarks <p>(b) A windrose for each Continuous Ambient Air Monitoring Station</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Meets AMD</th> <th rowspan="2">NA</th> <th colspan="2">Current</th> </tr> <tr> <th>YES</th> <th>NO</th> <th>YES</th> <th>NO</th> </tr> </thead> <tbody> <tr style="background-color: #cccccc;"> <td colspan="5" style="height: 15px;"></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </tbody> </table>	Meets AMD		NA	Current		YES	NO	YES	NO						X			X			X					X					X				X			X		X			X		X			X				X			X			X	
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COMMENTS: Missing elements of the network map.

AUDITOR: Al Clark DATE: May 15, 2019



Audit Summary

Form No. F-AA-018

Version 1.2

Page 3 of 4

Facility / Zone	Lica
Total # of parameters that passed	21
Total # of parameters audited in the network	21
Date(s) of the audit	May 6-9, 2019
Issue Date of Audit Summary	May 16, 2019

Station Name	Cold Lake South
Auditor	Al Clark
Audit Date	May 8, 2019

Critical	Pass	Fail
H ₂ S		
SO ₂	X	
TRS	X	
NO / NO ₂ / NO _x	*X	
O ₃	X	
HC	X	
Sharp PM _{2.5}	X	
Wind Speed / Wind Direction	X	
Wind head Orientation	X	
Manifold Fan	X	
Partisol PM _{2.5}	X	
Zero/Span Systems Operational	X	

Inspection Items	OK	Need for Improvement
Sample pump venting/scrubbing	X	
Heating / Air Conditioning	X	
Manifold	X	
Sample Lines	X	
Sharp PM _{2.5}	X	
Partisol PM _{2.5}	X	
Safety	X	
Site Conditions	X	

Non-critical	OK	Opportunity for Improvement
RH	X	
Station Temperature	X	
Ambient Temperature	X	
Barometric Pressure		
Tipping bucket		
Station Condition	X	
Station Documentation		X Needs review / or missing

Not monitored or audited at this location

* Initial response was 24% low



1.0 Quality Control Activities

Quality control procedures are established to govern the performance of the monitoring equipment and to protect operational uptime. Data collected during QC/QA activities are assigned a data validation code to comply with the requirements outlined in Chapter 6, 4.1.1, DQ 4-A (AMD, 2016). Calibrations are deemed successful only if the AMD calibration acceptance limits are met (Chapter 7, 9.0, AMD 2016).

A daily zero-span test procedure is performed for each gaseous parameter by challenging the analyzer with a zero-air source and span gas. Daily review of the data ensures the zero and span check are within the required acceptance limits and do not deviate more than $\pm 10\%$ from the expected value. The total zero-span cycle is complete within an hour with the zero phase commencing at the beginning of the scheduled hour. This QC activity is conducted in accordance with Chapter 7, 4.0, Cal 4-A (AMD, 2016).

The allowable time for a zero-span check is one hour per calendar day. The time allotted for the zero-span check does not contribute to downtime and is identified with a data validation code of "S". If any additional zero-span response checks are performed, the time accrued during the QC activity is considered downtime and is identified with a data validation code of "S1". The initiation of an additional zero-span check may be warranted during the investigation of operational issues or suspect data.

Each month, a scheduled multipoint calibration is performed on each gas analyzer. Prior to any adjustments, an as-found response test is completed to obtain the zero reading of the analyzer and the response to the highest span concentration. The zero and high point test gases are then re-introduced into the analyzer to establish the zero and high set-points. Once these adjustments are satisfactory, a mid-point and a low-point test concentration is introduced. Additional multi-point calibrations are required if any of the conditions, outlined in Chapter 7, 2.1, Cal 2G (AMD, 2016) exist.

The time allotted for the first multi-point calibration is not considered downtime and is identified with a data validation code of "C". If any additional as-found response checks or multipoint calibrations are performed, the time accrued during the QC activity is considered downtime and is identified with a data validation code of "C1".

A mechanical wind system undergoes annual calibration, as a minimum, while an ultrasonic wind system is factory calibrated every two years (Chapter 6, 6.0, Cal 6-A, AMD 2016). Supplementary to this, a visual inspection of the equipment is performed during each scheduled monthly site visit.

The time allotted for the wind system calibration is not considered downtime and is identified with a data validation code of "C". If function checks or additional calibrations are performed, the time accrued during the QC activity is not considered downtime and is identified with a data validation code of "Q" and "C", respectively. If QC activity goes beyond 10% of the monthly operating time, the time exceeding 10% is considered downtime and is assigned a data validation code of "C1". Data identified with a data validation code of "Q" is in accordance with Chapter 6, 4.1.3 (AMD, 2016) which states QA/QC activities are not included when calculating data completeness.

High volume samplers are calibrated every three months, as a minimum, in accordance with Chapter 7, 7.0, Cal 7-B (AMD, 2016).

Where passive sampling is in practice, quality control samples will be deployed in accordance with Chapter 4, 3.0, 3.1.3. Method blanks, replicate samples and spiked blanks are exposed and handled in the same manner as each passive sample. To comply with the data submission requirements in Chapter 9, 3.1, the replicate and corresponding passive sample concentrations are reportable data values and have not been averaged.

As recommended in Chapter 6, 4.2 (AMD 2016), daily data review is conducted to verify data and avoid significant data losses. Automated flags, originating from the data-logger, and data anomalies are reviewed and may prompt the need to dispatch a technician for investigation and/or corrective action. Additionally, there are several automated alarm scenarios that serve to screen raw data, alert technicians and elicit investigation or corrective action.

Comparisons of the measured ambient concentrations to the corresponding AAAQO are assessed using the significant figures protocol in Chapter 9, 3.1.2. If the measurement is near the set objective, raw data may undergo necessary data adjustments to confirm a true exceedance. Should an exceedance occur, Maxxam will formally notify the client; however, the reporting protocol to AEP is defined by the client and may not involve Maxxam. Exceedance events are acknowledged in the report, based on the information available at the time.

2.0 Data Verification and Validation

The data validation procedures, outlined in Chapter 6, 4.0, AMD 2016, are used to accept, reject and qualify data. The data verification and validation process, and the current Data Collection and Management Process Flow Chart have been compiled from sections 4.2 to 4.6 (AMD, 2016) and are shown below.

Baseline adjustments are applied by interpolation between two valid zero checks, as determined by the Data Acquisition System. In the event that zero check results are not reliable, data may be adjusted by applying a constant offset to data collected between two adjacent zero checks. Both adjustment approaches are deemed acceptable by the AMD.

Table 1 (Chapter 6) outlines the quantitative parameter relationships to be considered and dictates that data adjustments are applied equally for NO/NO₂/NO_x and CH₄/NMHC/THC parameters. Below zero adjustments are applied to 1-hour averages, in accordance with Table 2 (Chapter 6), and are done after baseline corrections.

Instantaneous data, where provided, 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.

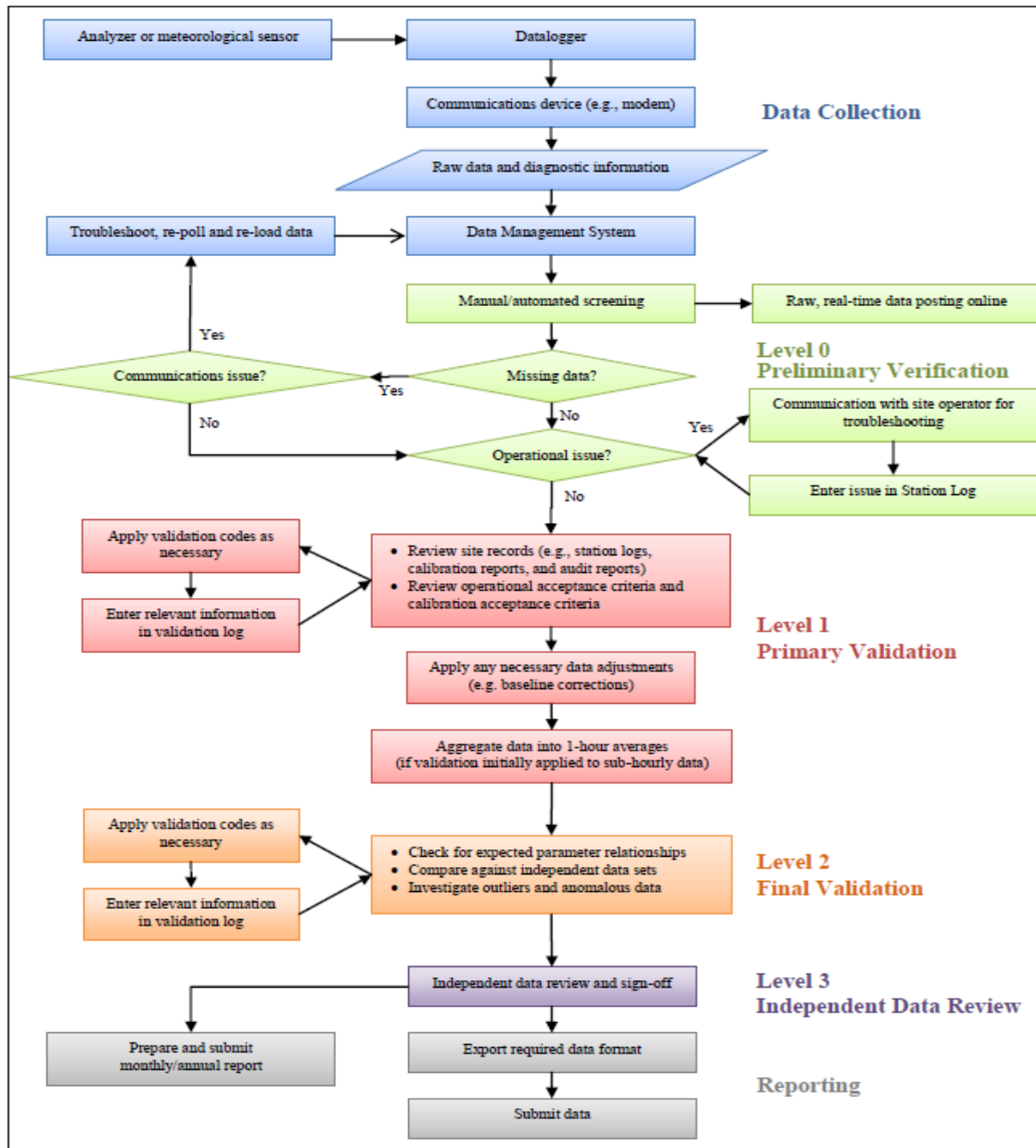
All calculations and reporting of results follow the methods described in the AMD, 2016.

There were no deviations from the prescribed methods.

AMD Data Verification and Validation Process

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

<p>Level 0 Preliminary Verification</p>	<p>Level 0 data are raw data obtained directly from the data acquisition system (DAS). At this level, data undergoes a certain amount of manual or automated screening and flagging. Screening checks include: a) identification of periods of missing data; b) verification of time stamps against reference time; c) verification that instrument diagnostics/data-logger 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.</p>
<p>Level 1 Primary Validation</p>	<p>Primary validation involves more thorough evaluation and documentation of issues identified during data screening, along with appropriate application of data validation codes. Level 1 activities 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.</p>
<p>Level 2 Final Validation</p>	<p>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. At this level of review, some general knowledge of pollutant and meteorological behavior can be used to determine if data is suspect.</p>
<p>Level 3 Independent Data Review</p>	<p>Level 3 validation involves a final cursory review of validated data, and is completed by an individual independent of both field operations and primary data validation. At this level, a final independent QA review/endorsement is performed before data is submitted to Alberta Environment and Parks.</p>
<p>Post-Final Validation</p>	<p>The Post-Final Validation step serves to re-evaluate validated data for errors or omissions discovered and/or suspected after the initial monthly data submittal. This level of validation is performed on an annual basis, when annual reporting is required or requested.</p>



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



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2019-05-23-C</u>
Site: <u>Cold Lake South Continuous Monitoring Station</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u><i>bimadeniji</i></u>	Date <u>26-Jun-2019</u>
Level 1 Primary Validation	<u><i>bimadeniji</i></u>	Date <u>26-Jun-2019</u>
Level 2 Final Validation	<u><i>bimadeniji</i></u>	Date <u>27-Jun-2019</u>
Level 3 Independent Data Review	<u><i>Cheri Smclair</i></u>	Date <u>28-Jun-2019</u>
Post-Final Validation	<u>NA</u>	Date <u>NA</u>

Notes

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

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MAY 1 - 31, 2019

MONTHLY AMBIENT AIR QUALITY MONITORING REPORT

AEP Ambient Station ID: 1248

Project #: 2833-2019-05-24-C

LICA-201905

Prepared for:

Lakeland Industry & Community Association

Mike Bisaga

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Monitoring Station

Maskwa Continuous Monitoring Station

Date of Report Issuance: June 21, 2019

Report Preparation By:

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Project Manager, Customer Service, Air Services

Reviewed By:

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Project Team Lead, Customer Service, Air Services



#1 - 2080 39 Avenue NE, Calgary AB, T2E 6P7

Lakeland Industry & Community Association

5107 50 St.
Bonnyville, Alberta T9N 2J7

Attention: Mike Bisaga

Date: June 21, 2019

Subject: MONTHLY AMBIENT AIR QUALITY MONITORING REPORT for MAY 1 - 31, 2019

In May 2019, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the Maskwa Continuous Monitoring Station near Cold Lake, Alberta. The monitoring program provides measurements of ambient air pollutants and meteorological data to satisfy the reporting requirements of the Alberta airshed.

Network Parameters for Continuous Monitoring:

This monthly report, where applicable, was prepared in accordance with Chapter 9 of the Air Monitoring Directive (AMD, 2016). The report summarizes the continuous monitoring results for pollutant and meteorological parameters and presents the hourly statistics, graphs and rose charts for the month. Calibration records are provided in a separate PDF document in order to comply with AMD requirements Chapter 9, 13.1.7, RC 13-R. The station is equipped with analyzers to measure SO₂, H₂S, THC, CH₄, NMHC, NO_x, NO and NO₂. The meteorological sensors and equipment capture data for WS, WD, RH, BP, PRECIP, AmbTPX and STDWD.

Exceedance & Performance Reporting:

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above the 90% requirement, as per the AMD, Chapter 6, DQ 4-C, 2016.

All measured ambient air concentrations were below the Alberta Ambient Air Quality Objectives and Guidelines (AAAQO, January 2019). Comparisons of these concentrations to the corresponding AAAQOs were done in accordance with Chapter 9, 15.3.2, RC 15-P. Accordingly, the averaging specifications and data completeness criteria, as defined in the Alberta Ambient Air Quality Objective Calculation Guidelines, were applied (Chapter 9, Appendix A, AMD 2016).

Specific to the content and purpose of this report, there were no instances where the requirements of the AMD (2016) were contravened.

Monthly Monitoring Overview:

In relation to the previous month, there were no changes made to the scope or management of the ambient air monitoring program.

The evaluation of data collected in the month of May did not reveal any errors or omissions that would require resubmission of air data to AEP's airdata warehouse.

AEP Audit: A station audit was conducted by Alberta Environment and Parks (AEP) on May 9. The Audit report can be found on page 78.

THC/CH₄/NMHC: The analyzer failed the scheduled and repeat zero-span checks on May 25, as the span gas was depleted. The span gas bottle was replaced on May 27 and a successful zero-span check was completed afterwards. Two hours of downtime were recorded due to this event.

Should you have any questions concerning the results or if we can be of further assistance, please contact your Maxxam representative indicated below.

Reviewed by:



Wunmi Adekanmbi, M.Sc., EPT, PMP
Project Team Lead, Customer Service, Air Services
403-219-3661

I certify that I 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. Certification of submitted information is specific to the contents of this report and is not intended to represent the onus of the Person Responsible, as outlined in Chapter 9, RC 12-E.

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List of Acronyms

AAAQO	Alberta Ambient Air Quality Objectives and Guidelines Summary
AEP	Alberta Environment and Parks
AMBTPX	Ambient Temperature
AMD	Air Monitoring Directive
BP	Barometric Pressure
CH₄	Methane
DAS	Data acquisition system
hr	Hour
hrs	Hours
H₂S	Hydrogen Sulphide
IZS	Internal zero-span
kph	Kilometers per hour
NO	Nitric Oxide
NO₂	Nitrogen dioxide
NO_x	Total oxides of nitrogen
NMHC	Non-Methane Hydrocarbon
Precip	Precipitation
ppb	Parts per billion
ppm	Parts per million
QA	Quality Assurance
QC	Quality Control
RH	Relative Humidity
SOP	Standard Operating Procedure
SO₂	Sulphur Dioxide
STDWD	Standard Deviation Wind Direction
THC	Total hydrocarbons
WS	Wind Speed
WD	Wind Direction
°C	Degrees Celsius

AAAQO Exceedance Summary Report

SO₂ 1-Hour Exceedances

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

SO₂ 24-Hour Exceedances

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

H₂S 1-Hour Exceedances

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

H₂S 24-Hour Exceedances

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

NO₂ 1-Hour Exceedances

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

In accordance with EPEA and the Substance Release Regulation

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

MONTHLY CONTINUOUS DATA SUMMARY

Lakeland Industry & Community Association Maskwa Continuous Monitoring Station						MAXIMUM VALUES							OPERATIONAL TIME (%)
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	1-HOUR					24-HOUR		
	1-hr	24-hr	1-hr	24-hr		READING	DAY	HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
SO ₂ (ppb)	172	48	0	0	1	14	13	6	8.2	NW	3	13	100.0
H ₂ S (ppb)	10	3	0	0	0	1	2	5	2.0	W	0	1	100.0
THC (ppm)	-	-	-	-	2.06	2.58	23	6	0.2	NW	2.18	23	99.7
CH ₄ (ppm)	-	-	-	-	2.06	2.58	23	6	0.2	NW	2.18	23	99.7
NMHC (ppm)	-	-	-	-	0.00	0.30	3	10	12.3	WNW	0.02	3	99.7
NO ₂ (ppb)	159	-	0	-	2	24	13	3	5.6	WNW	6	13	100.0
NO (ppb)	-	-	-	-	0	15	2	6	2.1	N	2	2	100.0
NO _x (ppb)	-	-	-	-	3	33	13	3	5.6	WNW	8	13	100.0
RELATIVE HUMIDITY (%)	-	-	-	-	55	100	1	18	2.2	NE	93	24	100.0
BAROMETRIC PRESSURE (millibar)	-	-	-	-	938	949	8	7	8.5	S	947	8	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	9.5	31.0	29	16	6.5	W	21.9	29	100.0
PRECIPITATION (mm)	-	-	-	-	12.7	2.1	6	14	3.3	ENE	4.9	6	100.0
VECTOR WS (kph)	-	-	-	-	0.7	18.2	10	15	-	NNE	8.3	10	100.0
VECTOR WD (sec)	-	-	-	-	70 (ENE)	-	-	-	-	-	-	-	100.0

* Precipitation: data represents the total (sum) for the indicated time frame

OPERATIONAL SUMMARY

Parameter	Equipment	Method & Procedure	Operational Notes
SULPHUR DIOXIDE (SO ₂)	Thermo 43i TLE Pulsed Fluorescence Analyzer	Maxxam AIR SOP-00209: Ambient Sulphur Monitoring	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 9. The Audit report can be found on page 78. The routine monthly calibration was performed on May 10, between the hours of 10:00 and 14:00.
HYDROGEN SULPHIDE (H ₂ S)	Thermo 450i UV Fluorescence Analyzer	Maxxam AIR SOP-00209: Ambient Sulphur Monitoring	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 9. The Audit report can be found on page 78. The routine monthly calibration was performed on May 10, between the hours of 10:00 and 14:00.
TOTAL HYDROCARBONS (THC), METHANE (CH ₄) & NON-METHANE HYDROCARBONS (NMHC)	Thermo 55i FID Analyzer	Maxxam AIR SOP-00001: Methane, Non-Methane Hydrocarbon Analyzer Monitoring	<ul style="list-style-type: none"> Operational time for the monitoring period was 99.7 %, equivalent to 2 hours of downtime. A station audit was conducted by Alberta Environment and Parks (AEP) on May 9, between the hours of 09:00 and 10:00. The Audit report can be found on page 78. The routine monthly calibration was also performed on May 9, between the hours of 13:00 and 16:00, following AEP audit. The analyzer failed the daily zero-span check scheduled for hour 19:00 on May 25. The results of repeat and subsequent scheduled span checks drifted further outside the lower acceptance limit, confirming span gas depletion. This prompted a site visit on May 27 where the span gas bottle was replaced and a successful zero-span check was completed afterwards, as a quality check. Two hours of downtime were recorded due to this event.
OXIDES OF NITROGEN (NO _x), NITRIC OXIDE (NO) & NITROGEN DIOXIDE (NO ₂)	Thermo 42i Chemiluminescent Analyzer	Maxxam AIR SOP-00213: Ambient NO/NO ₂ /NO _x Monitoring	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 9. The Audit report can be found on page 78. The routine monthly calibration was performed on May 10, between the hours of 10:00 and 15:00.
WIND SPEED (WS), WIND DIRECTION (WD) & STANDARD DEVIATION WIND DIRECTION (STDWD)	RM Young Unit	Maxxam AIR SOP-00013: RM Young Wind Monitor Calibration	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 9. The Audit report can be found on page 78. 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)	Rotronic Hygroclip Unit	Operations Manual	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 9. The Audit report can be found on page 78.
BAROMETRIC PRESSURE (BP)	Met One Unit	Operations Manual	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 9. The Audit report can be found on page 78.

OPERATIONAL SUMMARY

Parameter	Equipment	Method & Procedure	Operational Notes
PRECIPITATION (PRECIP)	Met One Unit	Maxxam AIR SOP-00242: Precipitation Collector Installation/Maintenance	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 9. The Audit report can be found on page 78. The quarterly precipitation sensor audit was performed on May 28, between 16:50 and 16:52. The result was satisfactory.
AMBIENT TEMPERATURE (AmbTPX)	Rotronic Hygroclip Unit	Operations Manual	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 9. The Audit report can be found on page 78.
Datalogger	Envidas Ultimate Unit	Operations Manual	<ul style="list-style-type: none"> There were no performance issues identified.

SUMMARY TABLES, GRAPHS AND ROSES

SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)

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

STATUS FLAG CODES

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

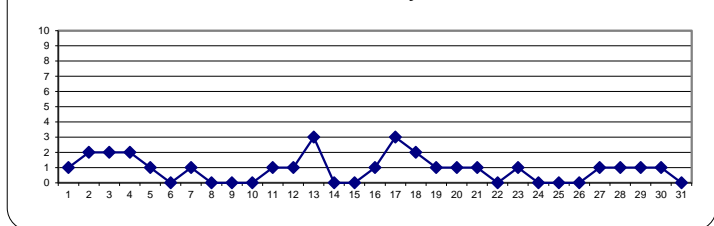
OBJECTIVE LIMIT:

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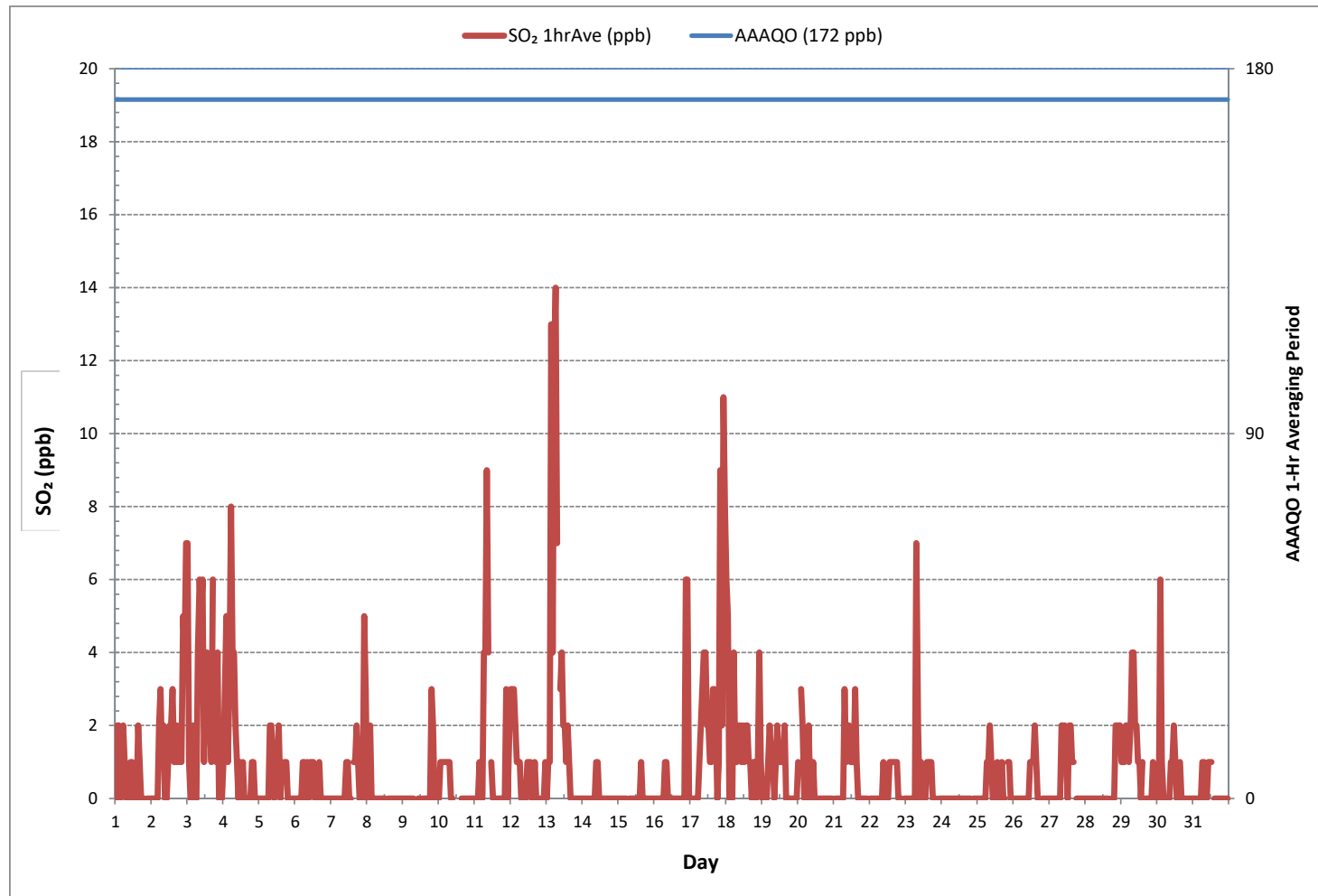
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	259		
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0 ON DAY	1
MAXIMUM 1-HR AVERAGE:	14 ppb @ HOUR	6 ON DAY	13
MAXIMUM 24-HR AVERAGE:	3 ppb	ON DAY	13
IZS CALIBRATION TIME:	31 hrs	OPERATIONAL TIME:	744 hrs
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	2	MONTHLY AVERAGE:	1 ppb

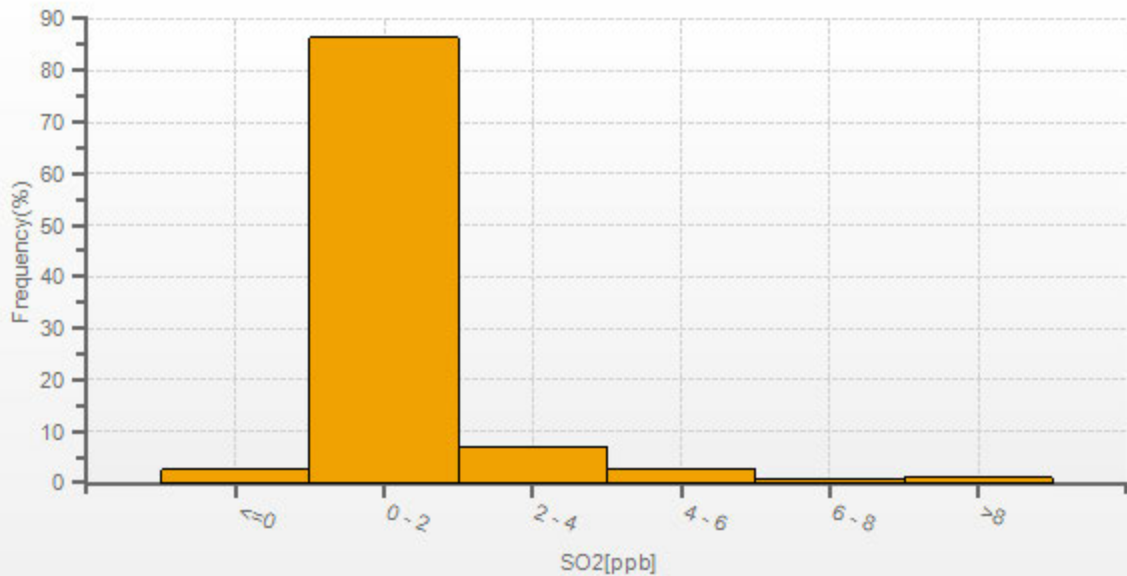
24 HR AVERAGES May 2019



SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)

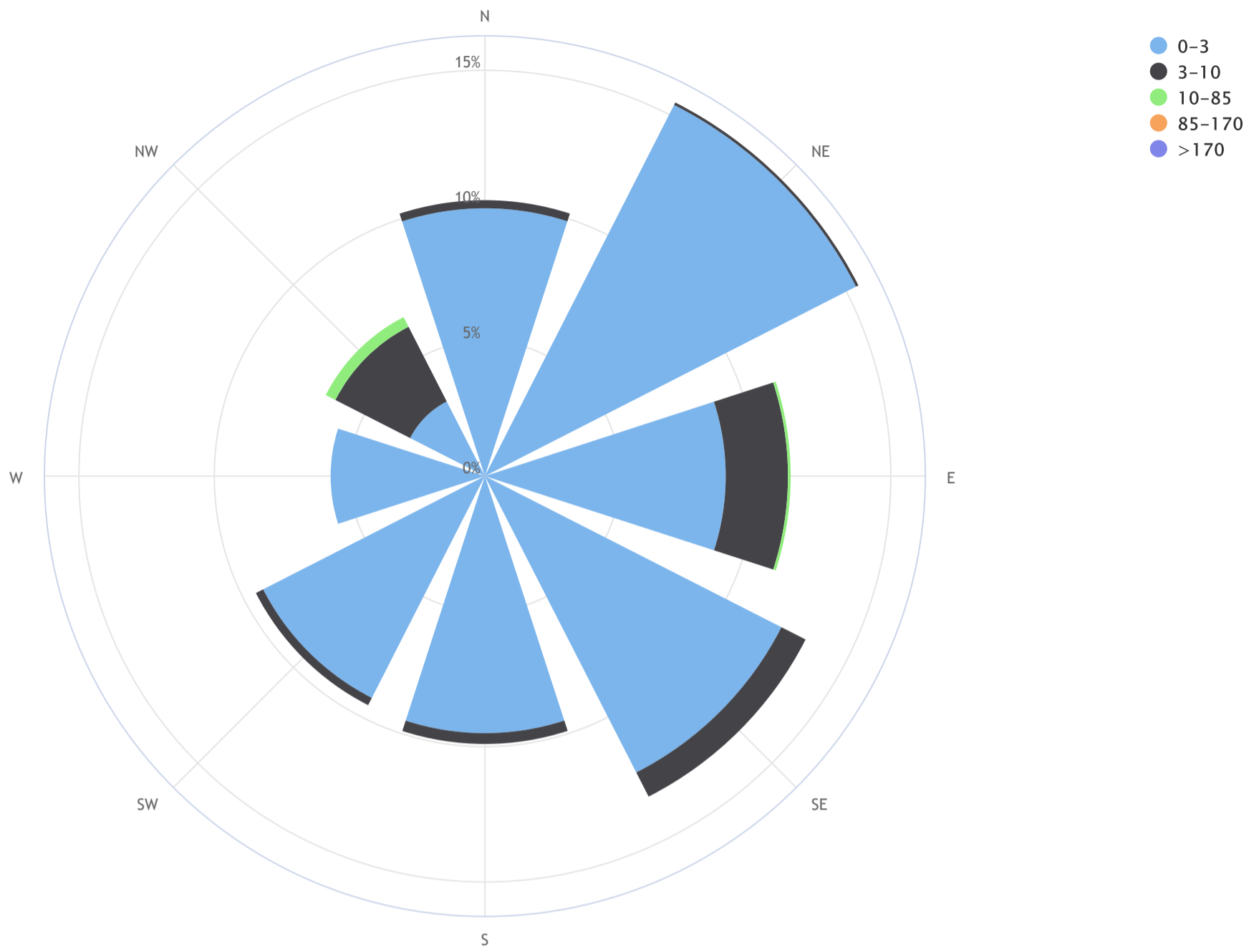


SO2[ppb] Histogram: LICA MASKWA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Maskwa Continuous Monitoring Station_SO₂ (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.2, CALM % = 17.8%



Direction	0-3	3-10	10-85	85-170	>170	TOTAL
N	9.9	0.3	0.0	0.0	0.0	10.2
NE	15.4	0.1	0.0	0.0	0.0	15.6
E	8.9	2.3	0.1	0.0	0.0	11.3
SE	12.3	1.0	0.0	0.0	0.0	13.3
S	9.5	0.4	0.0	0.0	0.0	9.9
SW	9.2	0.3	0.0	0.0	0.0	9.5
W	5.7	0.0	0.0	0.0	0.0	5.7
NW	3.1	3.1	0.4	0.0	0.0	6.7
Summary	74.1	7.5	0.6	0.0	0.0	82.2
CALM	17.6	0.3	0.0	0.0	0.0	17.8

HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)

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

STATUS FLAG CODES

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

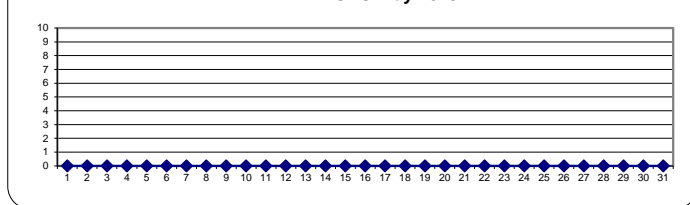
OBJECTIVE LIMIT:

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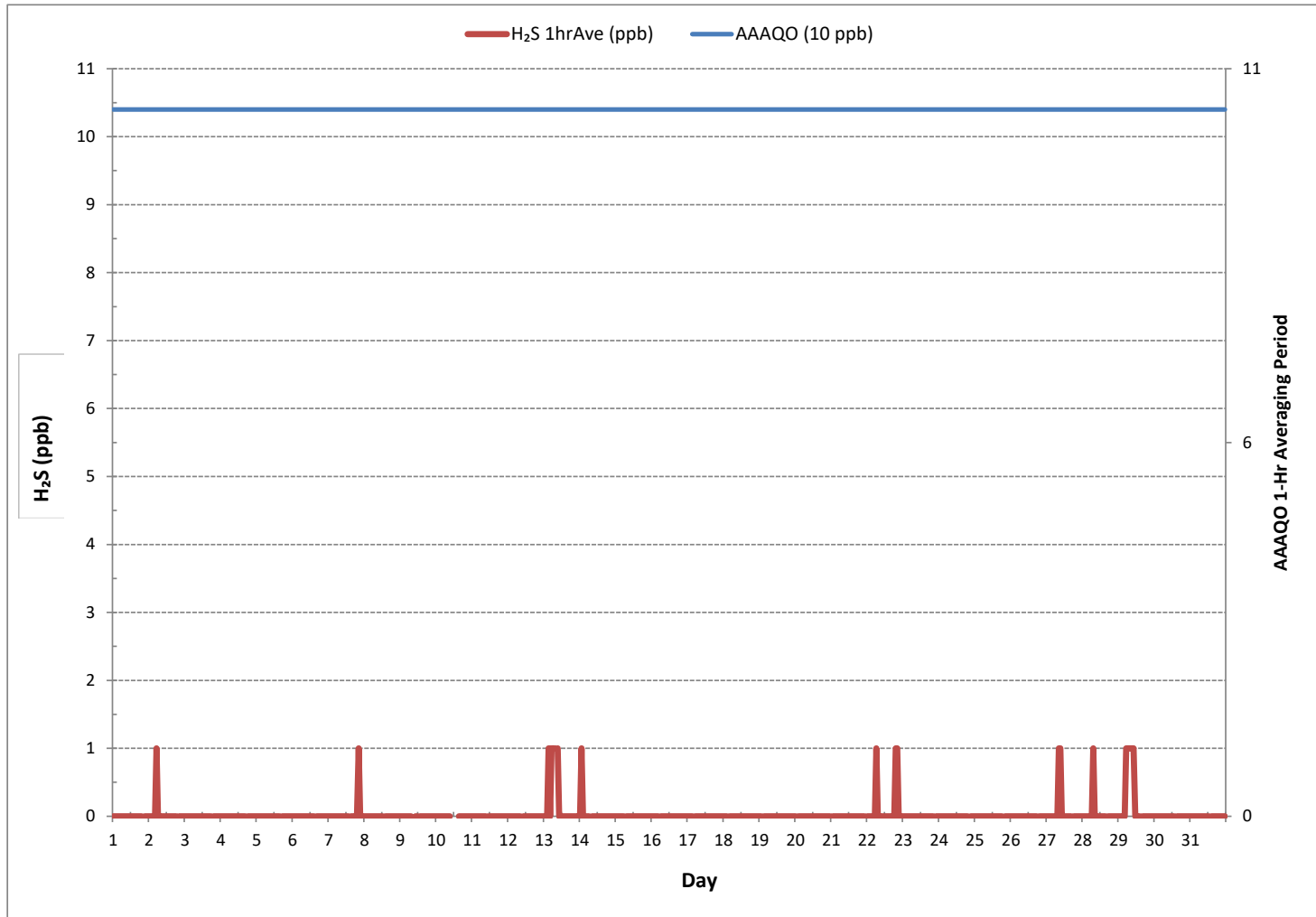
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF 24-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	20				
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0	ON DAY	1	
MAXIMUM 1-HR AVERAGE:	1 ppb @ HOUR	5	ON DAY	2	
MAXIMUM 24-HR AVERAGE:	0 ppb		ON DAY	1	
IZS CALIBRATION TIME:	31	hrs	OPERATIONAL TIME:	744	hrs
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	0		MONTHLY AVERAGE:	0	ppb

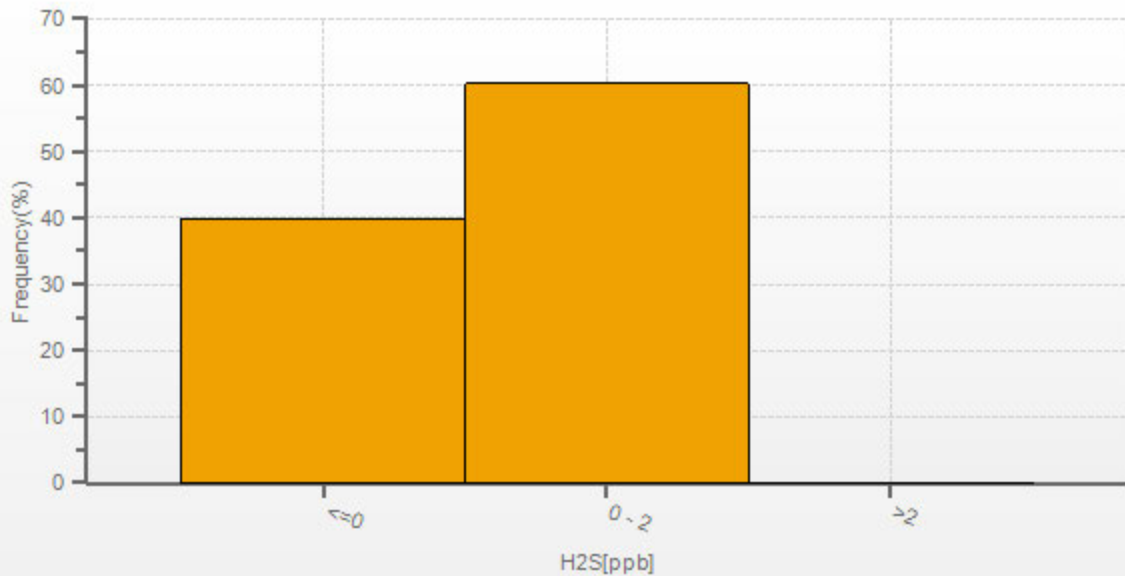
24 HR AVERAGES May 2019



HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)

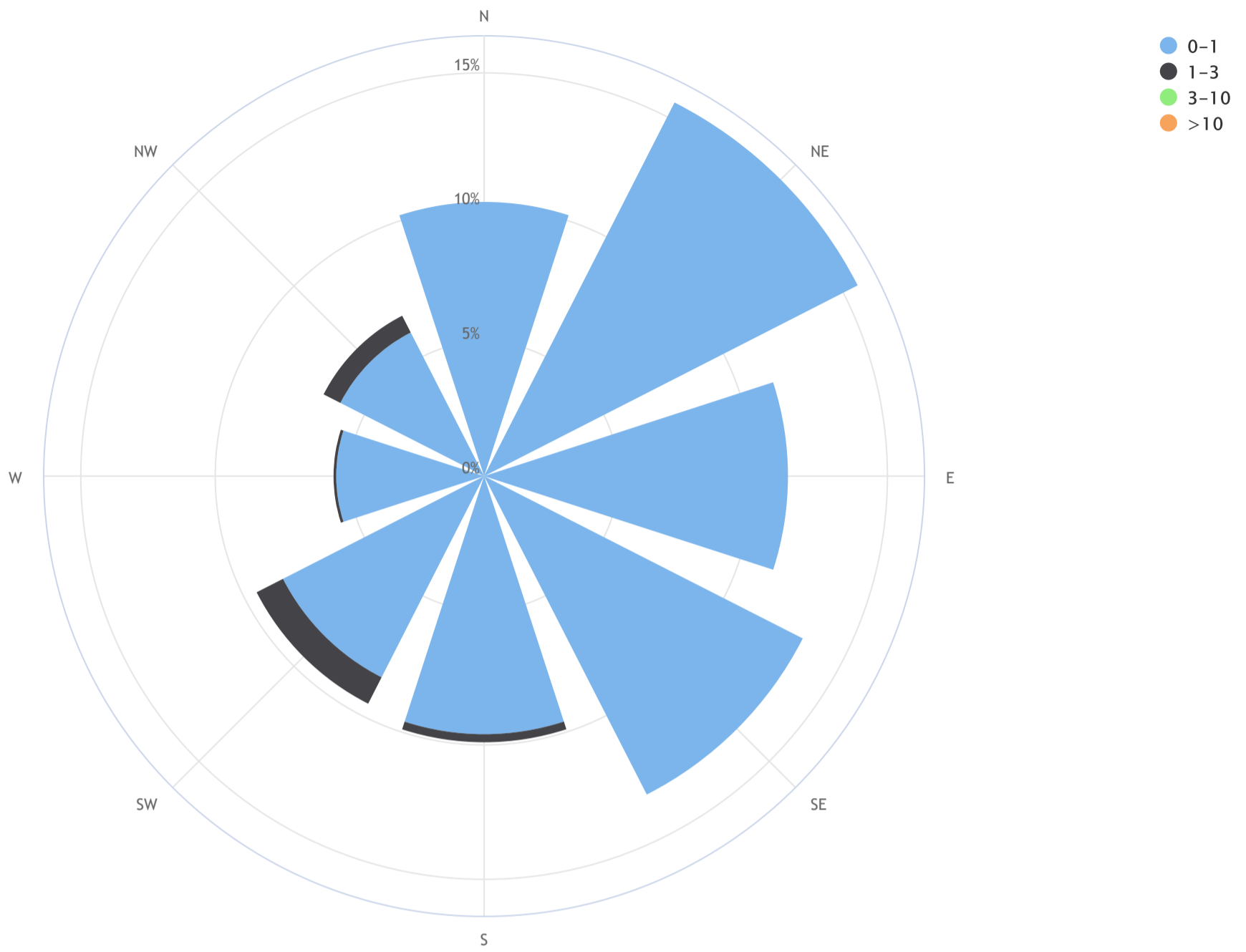


H2S[ppb] Histogram: LICA MASKWA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Maskwa Continuous Monitoring Station_H2S (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.0, CALM % = 17.8%



Direction	0-1	1-3	3-10	>10	TOTAL
N	10.2	0.0	0.0	0.0	10.2
NE	15.6	0.0	0.0	0.0	15.6
E	11.3	0.0	0.0	0.0	11.3
SE	13.3	0.0	0.0	0.0	13.3
S	9.6	0.3	0.0	0.0	9.9
SW	8.4	1.1	0.0	0.0	9.5
W	5.5	0.1	0.0	0.0	5.7
NW	6.0	0.7	0.0	0.0	6.7
Summary	79.9	2.3	0.0	0.0	82.1
CALM	17.3	0.6	0.0	0.0	17.9



TOTAL HYDROCARBONS Hourly Averages (THC ppm)

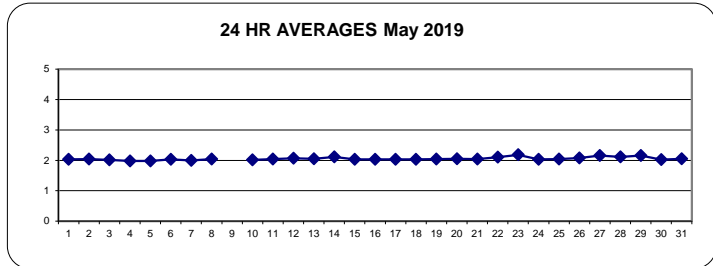
HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.			
DAY																														
1	2.00	2.01	2.01	2.01	2.01	2.01	2.00	2.01	2.04	2.04	2.03	2.04	2.05	2.06	2.06	2.05	2.05	2.05	2.05	2.05	2.05	S	2.05	2.06	2.06	2.00	2.06	2.03	24	
2	2.06	2.08	2.13	2.15	2.12	2.17	2.17	2.06	2.06	2.02	1.99	1.98	1.99	1.99	2.00	1.98	1.98	1.98	1.99	S	2.00	2.01	1.98	2.00	1.98	2.17	2.04	24		
3	2.01	1.98	1.98	1.97	1.99	1.99	2.00	2.01	1.99	2.00	2.39	2.07	1.99	2.01	2.00	2.00	1.99	2.01	S	1.99	1.99	1.98	1.98	1.97	1.97	2.39	2.01	24		
4	1.98	1.99	2.00	1.98	1.99	1.99	1.98	1.97	1.97	1.96	1.96	1.97	1.98	1.98	1.98	1.97	1.98	S	1.99	1.98	1.98	1.99	1.98	1.97	1.96	2.00	1.98	24		
5	1.97	1.97	2.00	2.00	2.00	2.02	2.00	1.98	1.97	1.96	1.96	1.96	1.97	1.99	1.98	1.98	S	1.99	1.99	1.98	1.98	1.98	1.98	1.99	1.96	2.02	1.98	24		
6	1.99	1.99	2.02	2.06	2.09	2.07	2.03	2.04	2.01	2.01	2.04	2.05	2.04	2.04	2.06	S	2.01	2.02	2.02	2.04	2.04	2.04	2.02	2.03	1.99	2.09	2.03	24		
7	2.02	2.02	2.02	2.03	2.03	2.03	2.01	2.01	1.99	1.99	2.00	2.00	2.00	1.99	S	1.99	1.99	2.00	1.99	1.99	2.02	1.98	2.01	1.99	1.98	2.03	2.00	24		
8	1.97	1.98	2.00	1.99	2.00	2.01	2.04	2.02	2.02	2.03	2.03	2.03	2.02	S	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.04	2.06	2.29	1.97	2.29	2.00	24		
9	2.41	2.47	2.40	2.49	2.44	2.44	2.33	2.20	2.18	Q	Q	2.04	S	C	C	C	C	2.03	2.03	2.05	2.07	2.07	2.06	2.07	2.03	2.49	-	24		
10	2.14	2.12	2.14	2.02	2.00	1.99	1.99	1.99	1.99	1.98	S	1.99	1.99	1.98	1.98	1.99	1.99	1.99	1.99	1.99	2.00	2.00	2.01	2.00	1.98	2.14	2.01	24		
11	2.04	2.08	2.05	2.06	2.07	2.08	2.09	2.02	2.03	2.03	S	2.02	2.03	2.05	2.05	2.03	2.02	2.01	2.00	2.01	2.03	2.06	2.06	2.08	2.00	2.09	2.04	24		
12	2.12	2.16	2.16	2.16	2.18	2.20	2.22	2.18	2.11	S	2.02	1.99	2.00	1.98	2.00	1.99	2.04	1.99	1.99	1.99	2.00	2.01	2.02	2.07	1.98	2.22	2.07	24		
13	2.11	2.07	2.05	2.15	2.05	2.22	2.09	2.07	S	2.05	2.05	2.02	2.02	2.03	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.03	2.04	2.04	2.05	2.02	2.22	2.05	24	
14	2.07	2.13	2.18	2.26	2.27	2.54	2.28	S	2.04	2.04	2.06	2.06	2.06	2.10	2.08	2.05	2.04	2.03	2.03	2.06	2.05	2.05	2.06	2.06	2.03	2.54	2.11	24		
15	2.06	2.05	2.05	2.06	2.04	2.04	S	2.03	2.02	2.01	2.01	2.02	2.02	2.02	2.02	2.01	2.01	2.02	2.02	2.03	2.02	2.05	2.04	2.04	2.01	2.06	2.03	24		
16	2.04	2.03	2.03	2.04	2.05	S	2.01	2.01	2.01	2.01	2.01	2.01	2.02	2.02	2.02	2.01	2.01	2.01	2.02	2.02	2.02	2.05	2.08	2.03	2.01	2.08	2.03	24		
17	2.06	2.08	2.06	2.05	S	2.08	2.03	2.02	2.03	2.04	2.03	2.02	2.02	2.01	2.01	2.02	2.01	2.01	2.01	2.02	2.01	2.06	2.01	2.07	2.02	2.01	2.08	2.03	24	
18	2.02	2.03	2.02	S	2.02	2.03	2.01	2.01	2.03	2.02	2.03	2.02	2.02	2.01	2.02	2.01	2.02	2.01	2.01	2.02	2.03	2.04	2.07	2.08	2.01	2.08	2.03	24		
19	2.06	2.06	S	2.07	2.07	2.07	2.05	2.05	2.05	2.04	2.03	2.02	2.01	2.02	2.02	2.01	2.01	2.00	2.00	2.01	2.02	2.04	2.11	2.11	2.00	2.11	2.04	24		
20	2.08	S	2.06	2.12	2.11	2.10	2.11	2.05	2.04	2.03	2.03	2.02	2.03	2.04	2.02	2.02	2.02	2.01	2.02	2.01	2.02	2.04	2.04	2.03	2.03	2.01	2.12	2.05	24	
21	S	2.06	2.09	2.08	2.08	2.09	2.08	2.06	2.05	2.03	2.02	2.02	2.01	2.00	2.00	1.99	2.00	2.00	2.00	2.00	2.02	2.05	2.08	S	1.99	2.09	2.04	24		
22	2.06	2.06	2.09	2.15	2.36	2.32	2.23	2.12	2.08	2.02	2.01	2.01	2.00	2.00	2.01	2.01	2.01	2.01	2.02	2.19	2.19	2.13	S	2.32	2.00	2.36	2.10	24		
23	2.38	2.35	2.35	2.51	2.42	2.48	2.58	2.29	2.10	2.05	2.03	2.04	2.05	2.06	2.07	2.06	2.06	2.06	2.06	2.06	2.05	2.04	S	2.04	2.04	2.03	2.58	2.18	24	
24	2.05	2.04	2.04	2.04	2.04	2.03	2.03	2.03	2.03	2.02	2.03	2.04	2.03	2.03	2.04	2.04	2.03	2.02	2.02	2.02	2.02	S	2.05	2.05	2.04	2.02	2.05	2.03	24	
25	2.06	2.04	2.06	2.03	2.05	2.10	2.09	2.03	2.02	2.02	2.03	2.03	2.04	2.03	2.04	2.03	2.02	2.02	2.04	S	2.04	2.07	S1	2.09	2.02	2.10	2.04	23		
26	2.06	2.09	2.09	2.25	2.36	2.26	2.13	2.03	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.01	2.02	2.01	S	2.03	2.06	2.05	2.10	2.18	2.01	2.36	2.08	24		
27	2.19	2.25	2.29	2.24	2.25	2.29	2.28	2.23	2.23	2.33	S1	2.21	2.08	2.03	2.03	2.02	2.02	S	2.03	2.04	2.08	2.10	2.14	2.11	2.02	2.33	2.16	23		
28	2.10	2.14	2.19	2.27	2.29	2.21	2.22	2.26	2.13	2.04	2.03	2.03	2.03	2.02	2.02	2.01	S	2.01	2.02	2.02	2.07	2.13	2.17	2.20	2.01	2.29	2.11	24		
29	2.20	2.36	2.40	2.42	2.49	2.40	2.34	2.26	2.25	2.13	2.08	2.05	2.01	2.00	2.00	S	1.97	1.97	1.97	1.98	2.02	2.07	2.12	2.08	1.97	2.49	2.16	24		
30	2.05	2.07	2.12	2.05	2.04	2.04	2.03	2.02	2.03	2.03	2.01	2.00	1.99	1.97	S	1.98	1.99	1.99	1.99	1.99	2.00	1.98	2.00	2.01	1.97	2.12	2.02	24		
31	2.01	2.02	2.03	2.02	2.10	2.33	2.09	1.98	2.02	2.01	2.02	2.00	2.00	S	2.02	2.02	2.02	2.02	2.04	2.05	2.07	2.06	2.09	2.17	1.98	2.33	2.05	24		
HOURLY MAX	2.41	2.47	2.40	2.51	2.49	2.54	2.58	2.29	2.25	2.33	2.39	2.21	2.08	2.10	2.08	2.06	2.06	2.06	2.06	2.19	2.19	2.13	2.29	2.32						
HOURLY AVG	2.08	2.09	2.10	2.12	2.13	2.15	2.12	2.07	2.05	2.03	2.03	2.03	2.02	2.02	2.02	2.01	2.01	2.01	2.01	2.02	2.03	2.04	2.06	2.07						

STATUS FLAG CODES

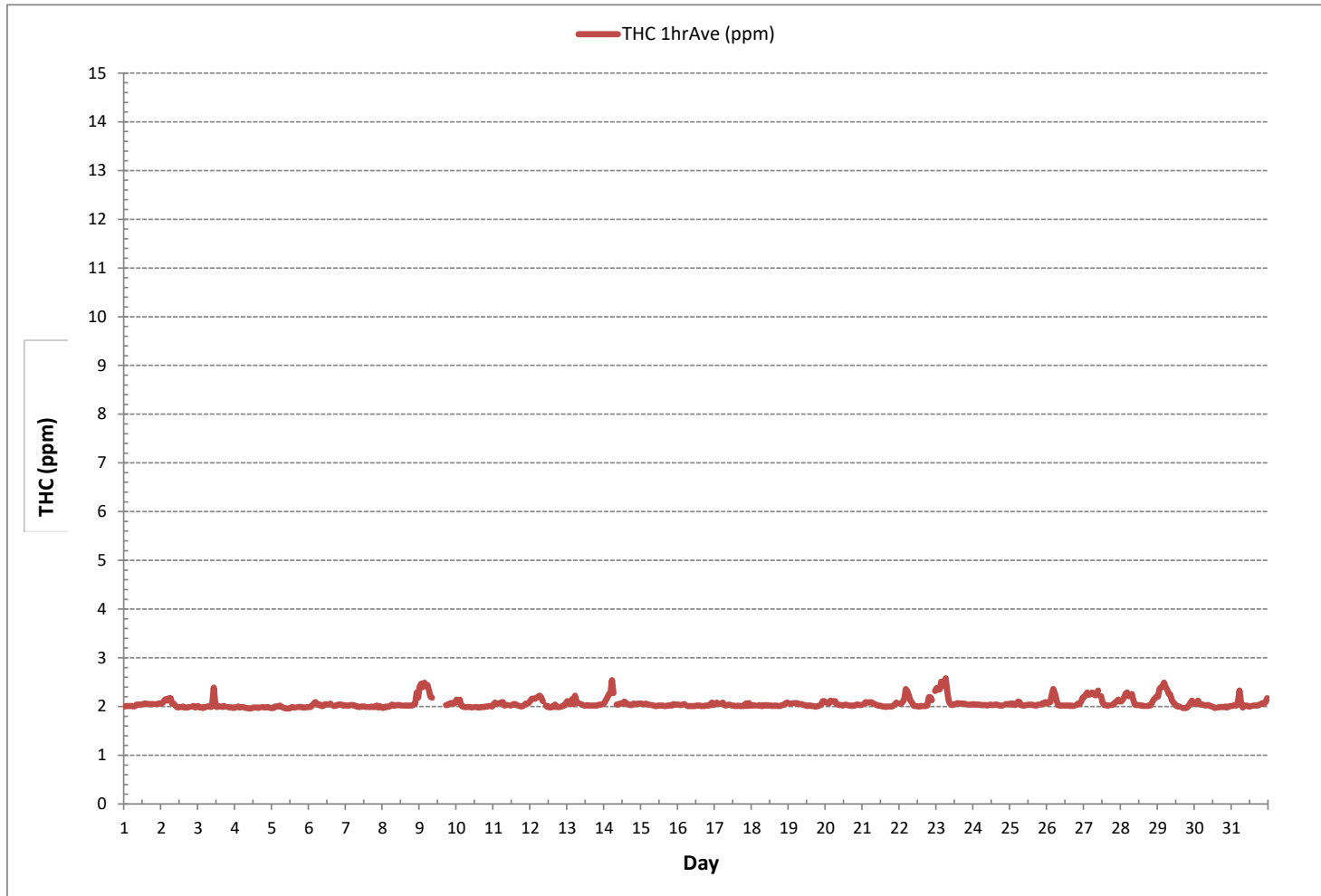
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

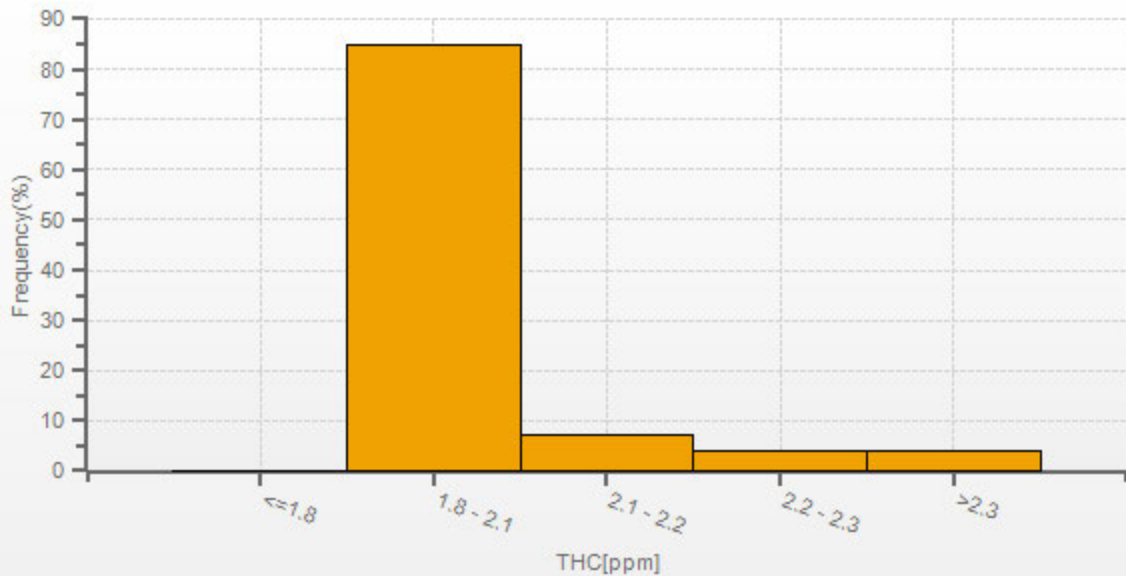
NUMBER OF NON-ZERO READINGS:	704				
MINIMUM 1-HR AVERAGE:	1.96 ppm	@ HOUR	9	ON DAY	4
MAXIMUM 1-HR AVERAGE:	2.58 ppm	@ HOUR	6	ON DAY	23
MAXIMUM 24-HR AVERAGE:	2.18 ppm			ON DAY	23
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	742 hrs		
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	99.7 %		
STANDARD DEVIATION:	0.09	MONTHLY AVERAGE:	2.06 ppm		



TOTAL HYDROCARBONS Hourly Averages (THC ppm)

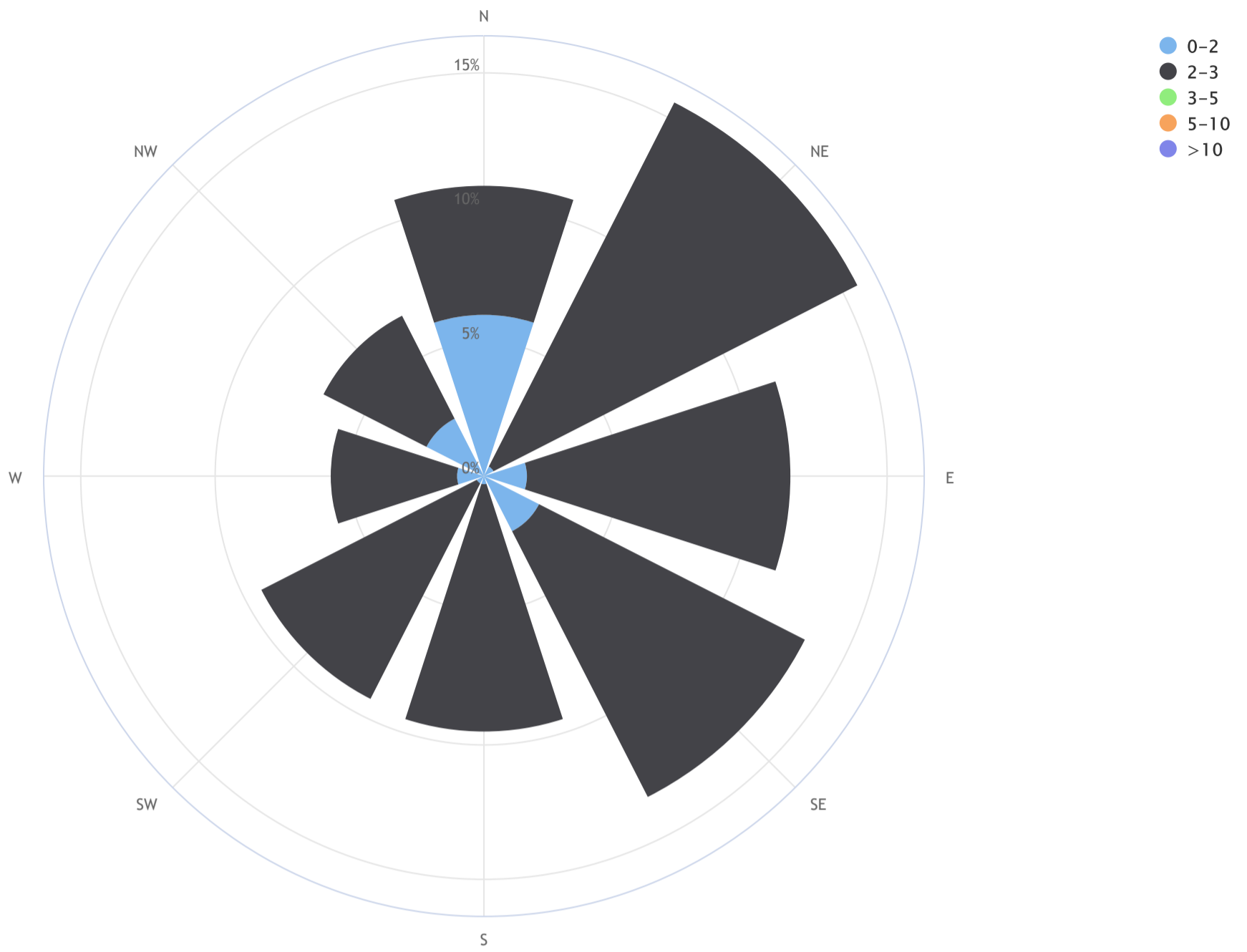


THC[ppm] Histogram: LICA MASKWA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Maskwa Continuous Monitoring Station_THC (ppm)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 2.1, CALM % = 17.8%



Direction	0-2	2-3	3-5	5-10	>10	TOTAL
N	6.0	4.8	0.0	0.0	0.0	10.8
NE	0.4	15.2	0.0	0.0	0.0	15.6
E	1.6	9.8	0.0	0.0	0.0	11.4
SE	2.3	11.1	0.0	0.0	0.0	13.4
S	0.3	9.2	0.0	0.0	0.0	9.5
SW	0.3	9.0	0.0	0.0	0.0	9.2
W	1.0	4.7	0.0	0.0	0.0	5.7
NW	2.4	4.3	0.0	0.0	0.0	6.7
Summary	14.2	68.0	0.0	0.0	0.0	82.2
CALM	1.3	16.5	0.0	0.0	0.0	17.8

METHANE Hourly Averages (CH₄ ppm)

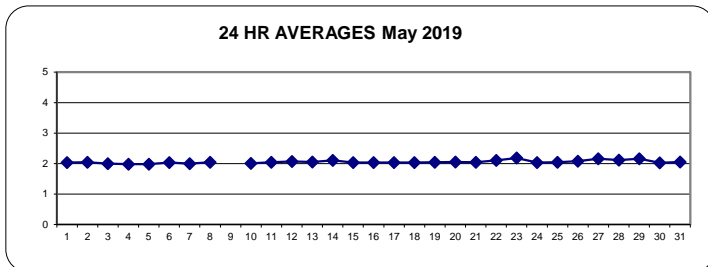
HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59						
DAY																														
1	2.00	2.01	2.01	2.01	2.01	2.01	2.00	2.01	2.04	2.04	2.03	2.04	2.05	2.06	2.06	2.05	2.05	2.05	2.05	2.05	2.05	S	2.05	2.06	2.06	2.00	2.06	2.03	24	
2	2.06	2.08	2.13	2.15	2.12	2.14	2.14	2.06	2.06	2.02	1.99	1.98	1.99	1.99	2.00	1.98	1.98	1.98	1.99	S	2.00	2.01	1.98	2.00	1.98	2.15	2.04	24		
3	2.01	1.98	1.98	1.97	1.99	1.99	2.00	2.01	1.99	1.99	2.09	2.01	1.99	2.01	2.00	2.00	1.99	2.01	S	1.99	1.99	1.98	1.98	1.97	1.97	2.09	2.00	24		
4	1.98	1.99	2.00	1.98	1.99	1.99	1.98	1.97	1.97	1.96	1.96	1.97	1.98	1.98	1.98	1.97	1.98	S	1.99	1.98	1.98	1.99	1.98	1.97	1.96	2.00	1.98	24		
5	1.97	1.97	2.00	2.00	2.00	2.02	2.00	1.98	1.97	1.96	1.96	1.96	1.97	1.99	1.98	1.98	S	1.99	1.99	1.99	1.98	1.98	1.98	1.99	1.96	2.02	1.98	24		
6	1.99	1.99	2.02	2.06	2.09	2.07	2.03	2.04	2.01	2.01	2.04	2.05	2.04	2.04	2.06	S	2.01	2.02	2.02	2.04	2.04	2.04	2.02	2.03	1.99	2.09	2.03	24		
7	2.02	2.02	2.02	2.03	2.03	2.03	2.01	2.01	1.99	1.99	2.00	2.00	2.00	1.99	S	1.99	1.99	2.00	1.99	2.00	1.99	2.02	1.98	2.01	1.99	1.98	2.03	2.00	24	
8	1.97	1.98	2.00	1.99	2.00	2.01	2.04	2.02	2.02	2.03	2.03	2.03	2.02	S	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.04	2.06	2.29	2.18	1.97	2.29	2.00	24	
9	2.41	2.47	2.40	2.49	2.44	2.44	2.33	2.20	2.18	Q	Q	2.04	S	C	C	C	C	C	2.03	2.03	2.05	2.07	2.07	2.06	2.07	2.03	2.49	-	24	
10	2.14	2.12	2.14	2.02	2.00	1.99	1.99	1.99	1.99	1.98	S	1.99	1.99	1.98	1.98	1.99	1.99	1.99	1.99	1.99	2.00	2.00	2.01	2.01	2.00	1.98	2.14	2.01	24	
11	2.04	2.08	2.05	2.06	2.07	2.08	2.09	2.02	2.03	2.03	S	2.02	2.03	2.05	2.05	2.03	2.02	2.01	2.00	2.01	2.03	2.06	2.06	2.08	2.00	2.09	2.04	24		
12	2.12	2.16	2.16	2.16	2.18	2.20	2.22	2.18	2.11	S	2.02	1.99	2.00	1.98	2.00	1.99	2.03	1.99	1.99	1.99	2.00	2.01	2.02	2.07	1.98	2.22	2.07	24		
13	2.11	2.07	2.05	2.08	2.05	2.11	2.09	2.07	S	2.04	2.03	2.02	2.02	2.03	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.03	2.04	2.04	2.05	2.02	2.11	2.05	24	
14	2.07	2.13	2.18	2.25	2.26	2.32	2.28	S	2.04	2.04	2.06	2.06	2.06	2.10	2.08	2.05	2.04	2.03	2.02	2.03	2.06	2.05	2.06	2.06	2.03	2.32	2.10	24		
15	2.06	2.05	2.05	2.06	2.04	2.04	S	2.03	2.02	2.01	2.01	2.02	2.02	2.02	2.02	2.01	2.01	2.02	2.02	2.03	2.02	2.05	2.04	2.04	2.01	2.06	2.03	24		
16	2.04	2.03	2.03	2.04	2.05	S	2.01	2.01	2.01	2.01	2.01	2.01	2.02	2.02	2.02	2.01	2.01	2.01	2.02	2.02	2.02	2.02	2.05	2.08	2.03	2.01	2.08	2.03	24	
17	2.06	2.08	2.06	2.05	S	2.08	2.03	2.02	2.03	2.04	2.03	2.02	2.02	2.01	2.01	2.02	2.01	2.01	2.01	2.02	2.01	2.06	2.01	2.07	2.02	2.01	2.08	2.03	24	
18	2.02	2.03	2.02	S	2.02	2.03	2.01	2.01	2.03	2.02	2.03	2.02	2.02	2.01	2.02	2.01	2.02	2.01	2.01	2.02	2.03	2.04	2.07	2.08	2.01	2.08	2.03	24		
19	2.06	2.06	S	2.07	2.07	2.07	2.05	2.05	2.05	2.04	2.03	2.02	2.01	2.02	2.02	2.01	2.01	2.00	2.00	2.01	2.02	2.04	2.11	2.11	2.00	2.11	2.04	24		
20	2.08	S	2.06	2.12	2.11	2.10	2.11	2.05	2.04	2.03	2.03	2.02	2.03	2.04	2.03	2.02	2.02	2.01	2.02	2.01	2.02	2.04	2.04	2.03	2.03	2.01	2.12	2.05	24	
21	S	2.06	2.09	2.08	2.08	2.09	2.08	2.06	2.05	2.03	2.02	2.02	2.01	2.00	2.00	1.99	2.00	2.00	2.00	2.00	2.02	2.05	2.08	S	1.99	2.09	2.04	24		
22	2.06	2.06	2.09	2.15	2.36	2.32	2.23	2.12	2.08	2.02	2.01	2.01	2.00	2.00	2.01	2.01	2.01	2.01	2.01	2.02	2.19	2.19	2.13	S	2.32	2.00	2.36	2.10	24	
23	2.38	2.35	2.35	2.51	2.42	2.48	2.58	2.29	2.10	2.05	2.03	2.04	2.05	2.06	2.07	2.06	2.06	2.06	2.06	2.06	2.05	2.04	S	2.04	2.04	2.03	2.58	2.18	24	
24	2.05	2.04	2.04	2.04	2.04	2.03	2.03	2.03	2.03	2.02	2.03	2.04	2.03	2.03	2.04	2.04	2.03	2.02	2.02	2.02	2.02	2.02	S	2.05	2.05	2.04	2.02	2.05	2.03	24
25	2.06	2.04	2.06	2.03	2.05	2.10	2.09	2.03	2.02	2.02	2.03	2.03	2.04	2.03	2.04	2.03	2.02	2.02	2.04	S	2.04	2.07	S1	2.09	2.02	2.10	2.04	23		
26	2.06	2.09	2.09	2.23	2.28	2.23	2.13	2.03	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.01	2.02	2.01	S	2.03	2.06	2.05	2.10	2.18	2.01	2.28	2.08	24		
27	2.19	2.25	2.29	2.24	2.25	2.29	2.28	2.23	2.23	S1	2.21	2.08	2.03	2.03	2.02	2.02	S	2.03	2.04	2.08	2.10	2.14	2.11	2.02	2.33	2.16	23			
28	2.10	2.14	2.19	2.27	2.29	2.21	2.22	2.26	2.13	2.04	2.03	2.03	2.03	2.02	2.02	2.01	S	2.01	2.02	2.02	2.07	2.13	2.17	2.20	2.01	2.29	2.11	24		
29	2.20	2.36	2.40	2.42	2.49	2.40	2.34	2.26	2.25	2.13	2.08	2.05	2.01	2.00	2.00	S	1.97	1.97	1.98	2.02	2.07	2.12	2.08	1.97	2.49	2.16	24			
30	2.05	2.07	2.10	2.05	2.04	2.04	2.03	2.02	2.03	2.03	2.01	2.00	1.99	1.97	S	1.98	1.99	1.99	1.99	1.99	2.00	1.98	2.00	2.01	1.97	2.10	2.02	24		
31	2.01	2.02	2.03	2.02	2.07	2.21	2.09	1.98	2.02	2.01	2.02	2.00	2.00	S	2.02	2.02	2.02	2.02	2.04	2.05	2.07	2.06	2.09	2.17	1.98	2.21	2.05	24		
HOURLY MAX	2.41	2.47	2.40	2.51	2.49	2.48	2.58	2.29	2.25	2.33	2.09	2.21	2.08	2.10	2.08	2.06	2.06	2.06	2.06	2.06	2.19	2.19	2.13	2.29	2.32					
HOURLY AVG	2.08	2.09	2.10	2.12	2.13	2.14	2.12	2.07	2.05	2.03	2.02	2.02	2.02	2.02	2.02	2.01	2.01	2.01	2.01	2.02	2.03	2.04	2.06	2.07						

STATUS FLAG CODES

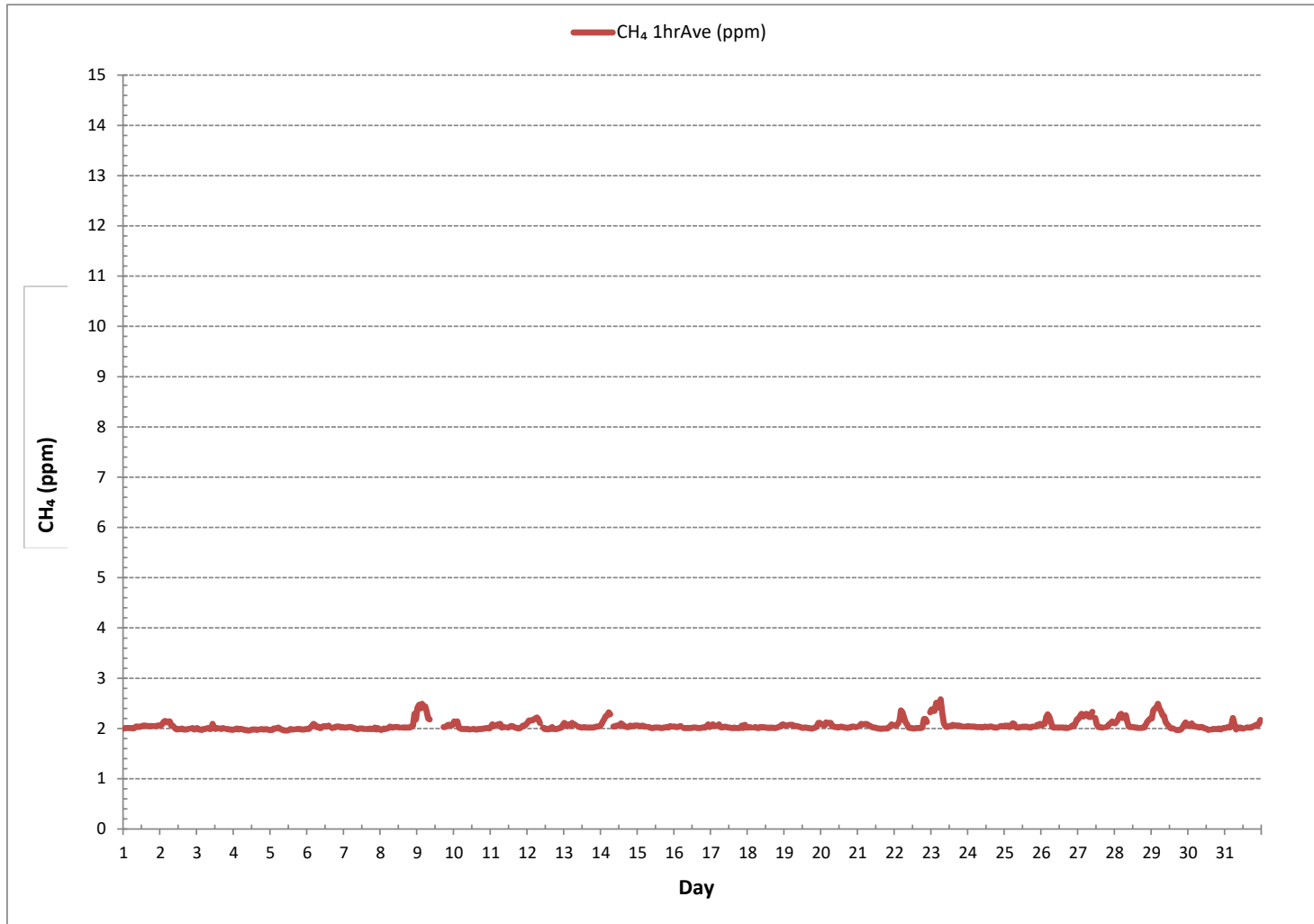
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

MONTHLY SUMMARY

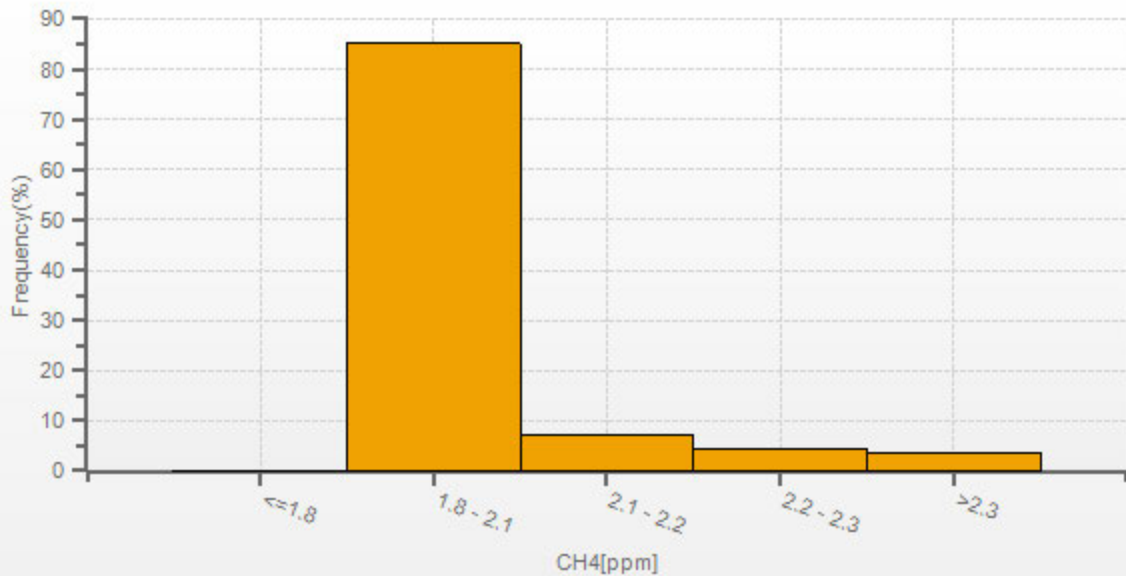
NUMBER OF NON-ZERO READINGS:	704			
MINIMUM 1-HR AVERAGE:	1.96	ppm	@ HOUR	9 ON DAY 4
MAXIMUM 1-HR AVERAGE:	2.58	ppm	@ HOUR	6 ON DAY 23
MAXIMUM 24-HR AVERAGE:	2.18	ppm		ON DAY 23
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	742 hrs
MONTHLY CALIBRATION TIME:	4	hrs	AMD OPERATION UPTIME:	99.7 %
STANDARD DEVIATION:	0.09		MONTHLY AVERAGE:	2.06 ppm



METHANE Hourly Averages (CH₄ ppm)

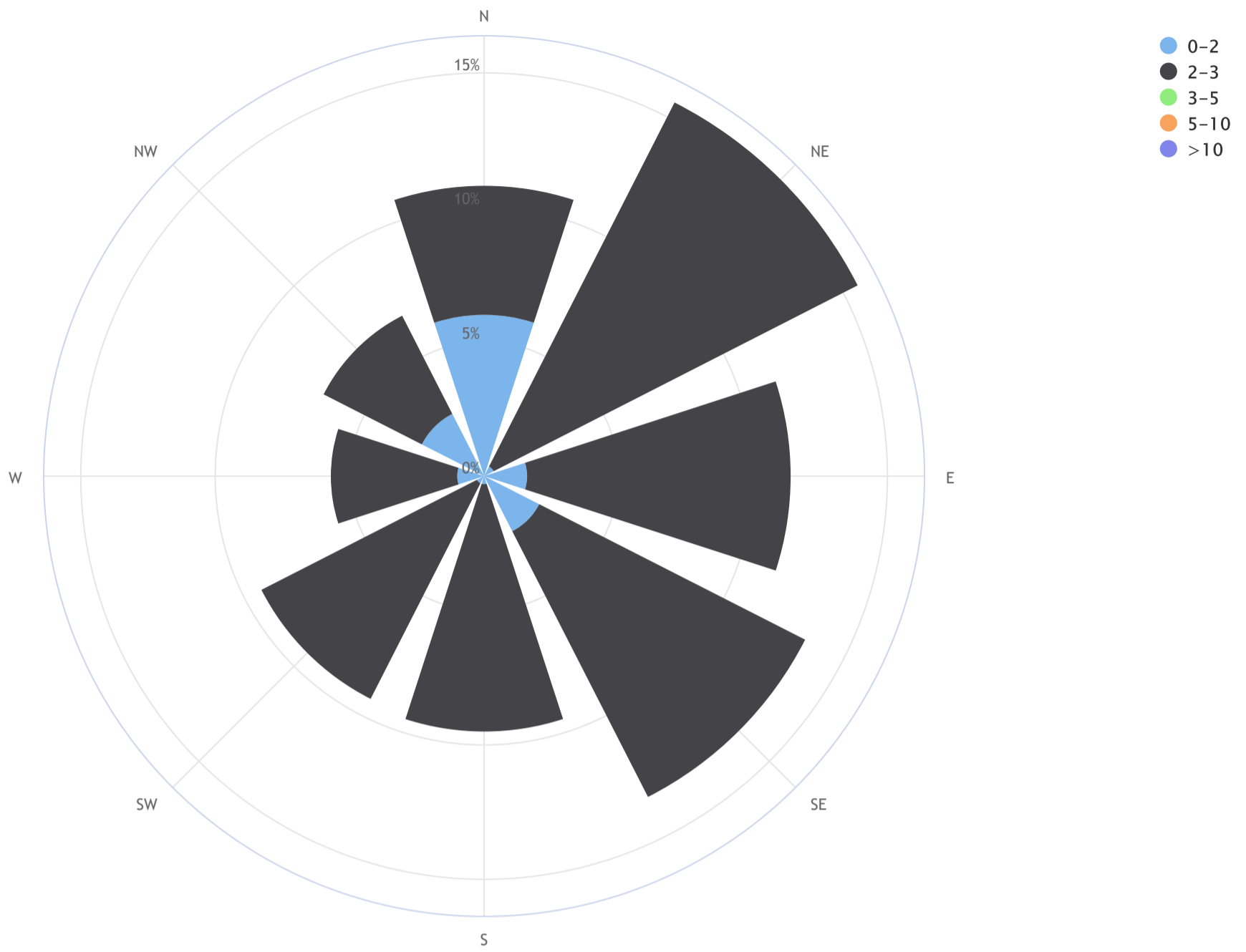


CH4[ppm] Histogram: LICA MASKWA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Maskwa Continuous Monitoring Station_CH4 (ppm)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 2.1, CALM % = 17.8%



Direction	0-2	2-3	3-5	5-10	>10	TOTAL
N	6.0	4.8	0.0	0.0	0.0	10.8
NE	0.4	15.2	0.0	0.0	0.0	15.6
E	1.6	9.8	0.0	0.0	0.0	11.4
SE	2.3	11.1	0.0	0.0	0.0	13.4
S	0.3	9.2	0.0	0.0	0.0	9.5
SW	0.3	9.0	0.0	0.0	0.0	9.2
W	1.0	4.7	0.0	0.0	0.0	5.7
NW	2.6	4.1	0.0	0.0	0.0	6.7
Summary	14.3	67.9	0.0	0.0	0.0	82.2
CALM	1.3	16.5	0.0	0.0	0.0	17.8



NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.			
DAY																														
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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
2	0.00	0.00	0.00	0.00	0.00	0.03	0.03	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	0.03	0.00	24
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.30	0.05	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	0.30	0.02	24
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	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	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
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	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	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	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
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	24
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Q	Q	0.00	S	C	C	C	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	24
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
13	0.00	0.00	0.00	0.07	0.00	0.11	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	0.11	0.01	24
14	0.00	0.00	0.00	0.02	0.01	0.22	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.01	24
15	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	0.00	0.00	24
16	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	0.00	0.00	24
17	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	0.00	0.00	24
18	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	0.00	0.00	24
19	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
20	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
21	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	24
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	24
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	24
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	24
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	S1	0.00	0.00	0.00	0.00	0.00	0.00	23
26	0.00	0.00	0.00	0.02	0.08	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	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.01	24
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S1	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	23
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	24
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	24
30	0.00	0.00	0.02	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	0.02	0.00	24
31	0.00	0.00	0.00	0.00	0.02	0.12	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	0.12	0.01	24
HOURLY MAX	0.00	0.00	0.02	0.07	0.08	0.22	0.03	0.00	0.00	0.01	0.30	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
HOURLY AVG	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				

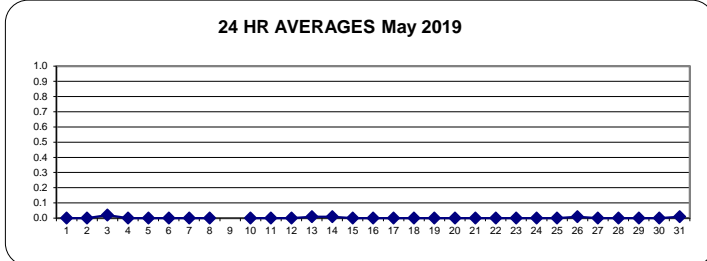
STATUS FLAG CODES

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

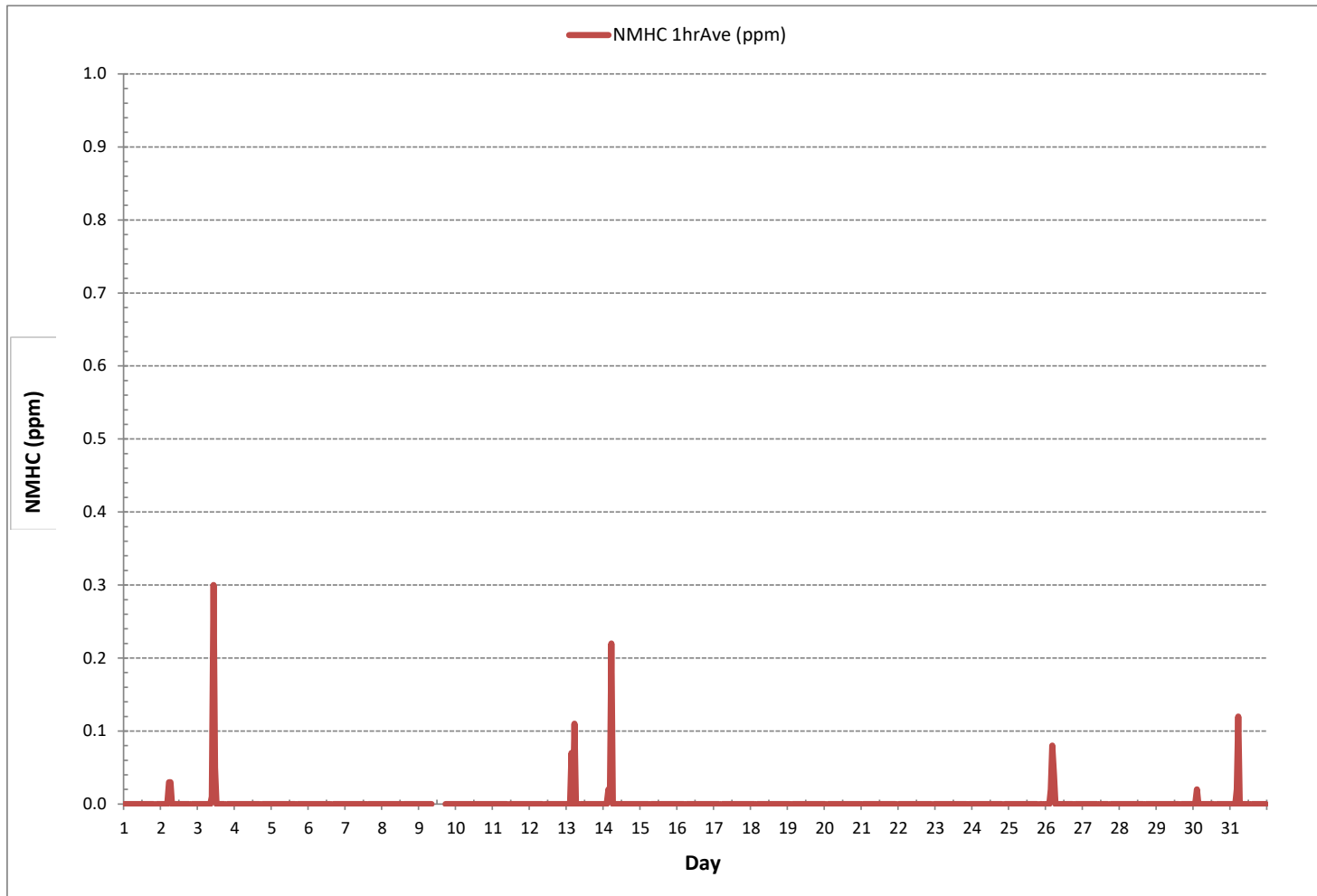
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	16			
MINIMUM 1-HR AVERAGE:	0.00	ppm @ HOUR	0	ON DAY 1
MAXIMUM 1-HR AVERAGE:	0.30	ppm @ HOUR	10	ON DAY 3
MAXIMUM 24-HR AVERAGE:	0.02	ppm		ON DAY 3
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	742 hrs
MONTHLY CALIBRATION TIME:	4	hrs	AMD OPERATION UPTIME:	99.7 %
STANDARD DEVIATION:	0.02		MONTHLY AVERAGE:	0.00 ppm

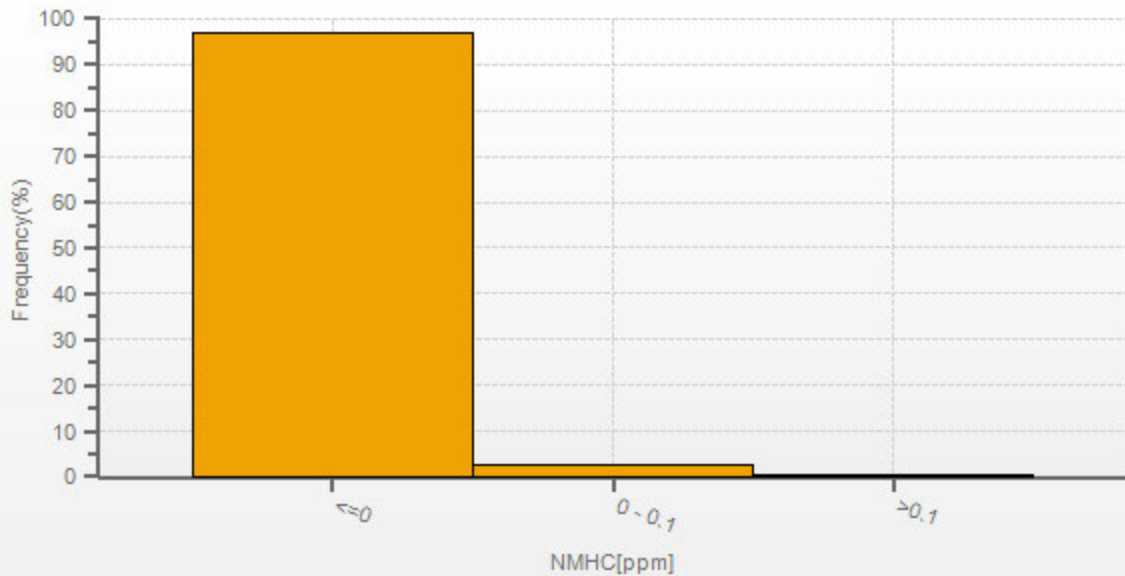
24 HR AVERAGES May 2019



NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

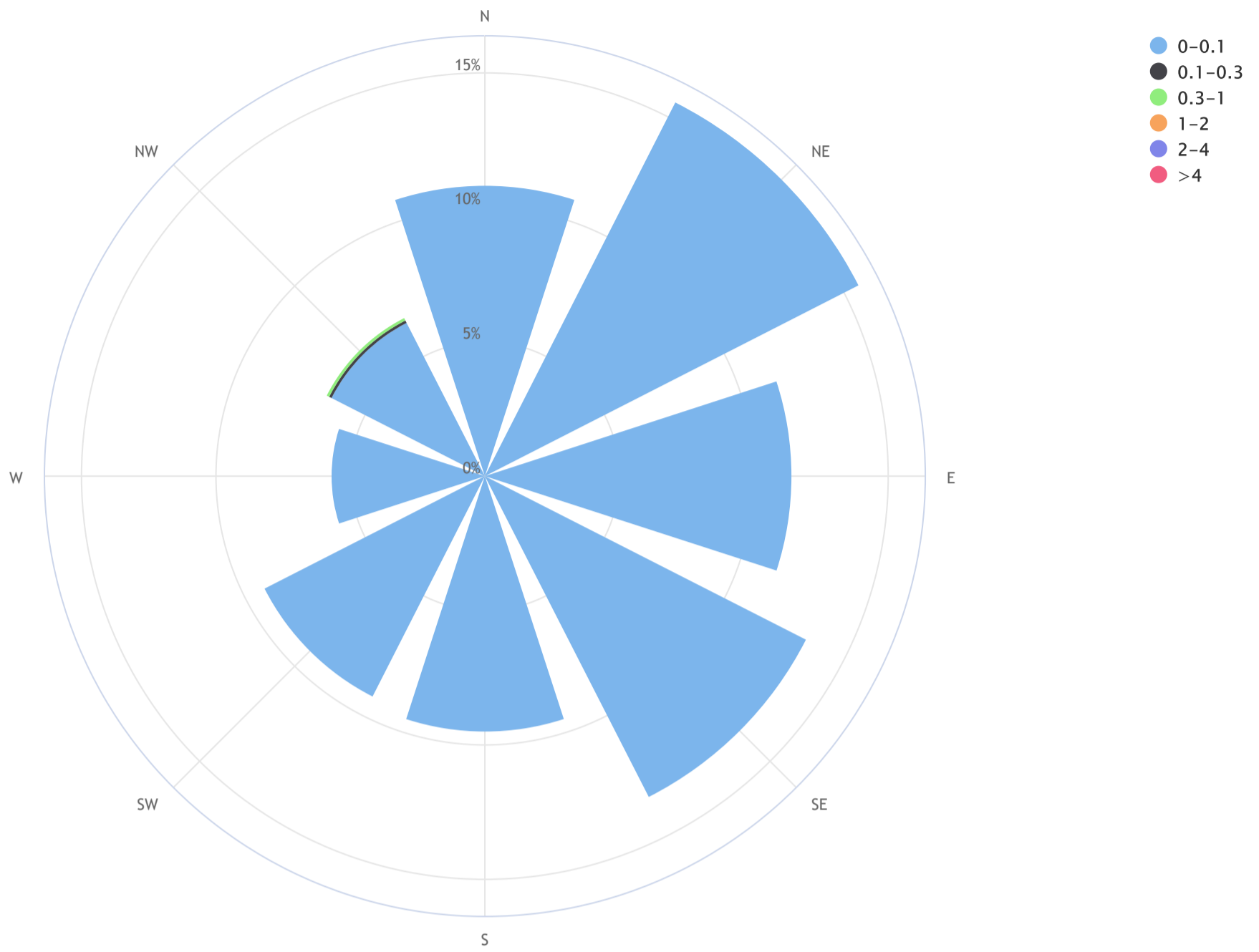


NMHC[ppm] Histogram: LICA MASKWA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Maskwa Continuous Monitoring Station_NMHC (ppm)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.0, CALM % = 17.8%



Direction	0-0.1	0.1-0.3	0.3-1	1-2	2-4	>4	TOTAL
N	10.8	0.0	0.0	0.0	0.0	0.0	10.8
NE	15.6	0.0	0.0	0.0	0.0	0.0	15.6
E	11.4	0.0	0.0	0.0	0.0	0.0	11.4
SE	13.4	0.0	0.0	0.0	0.0	0.0	13.4
S	9.5	0.0	0.0	0.0	0.0	0.0	9.5
SW	9.2	0.0	0.0	0.0	0.0	0.0	9.2
W	5.7	0.0	0.0	0.0	0.0	0.0	5.7
NW	6.4	0.1	0.1	0.0	0.0	0.0	6.7
Summary	82.0	0.1	0.1	0.0	0.0	0.0	82.2
CALM	17.5	0.3	0.0	0.0	0.0	0.0	17.8



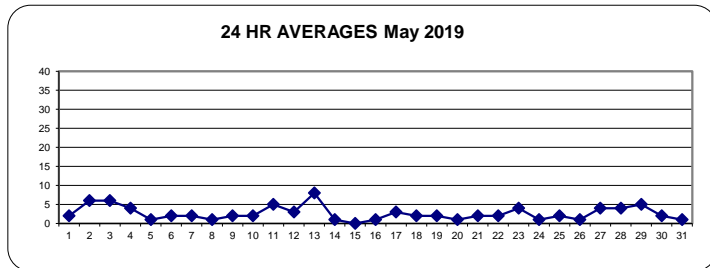
OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

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	2	4	1	3	3	3	1	2	2	2	2	1	2	2	5	3	2	2	2	S	2	2	2	0	5	2	24	
2	1	2	9	2	3	25	27	5	10	2	1	2	5	4	9	2	1	3	3	S	10	7	6	8	1	27	6	24	
3	9	1	0	1	4	2	1	14	12	11	13	3	8	9	5	5	2	15	S	3	12	1	0	1	0	15	6	24	
4	2	8	13	2	8	25	10	9	4	2	1	2	1	2	1	1	1	S	1	2	2	2	2	1	1	25	4	24	
5	1	1	1	1	1	1	0	4	4	1	0	2	1	3	1	2	S	2	2	2	2	1	1	1	0	4	1	24	
6	1	2	2	1	2	2	2	2	3	1	3	3	3	1	1	S	3	2	3	1	1	1	1	0	0	3	2	24	
7	0	0	0	0	0	0	0	0	1	1	2	1	3	1	S	2	2	3	2	1	1	0	8	5	0	8	2	24	
8	1	2	2	1	1	1	2	2	1	1	1	1	S	2	1	2	1	2	1	1	1	1	1	2	1	2	1	24	
9	3	3	2	1	1	2	5	4	Q	Q	Q	2	S	2	1	1	1	1	1	4	3	1	2	2	1	5	2	24	
10	3	6	7	4	2	1	2	1	1	1	C	C	C	C	C	C	1	1	1	1	1	1	0	1	0	7	2	24	
11	2	7	3	9	7	6	15	9	21	12	S	3	1	1	1	1	1	1	1	1	1	3	1	2	1	21	5	24	
12	4	4	4	4	3	4	3	3	3	S	2	4	4	2	1	1	3	1	1	1	1	1	2	2	7	1	7	3	24
13	9	5	5	33	10	27	31	17	S	7	8	6	5	3	4	2	1	0	1	1	1	1	1	1	0	33	8	24	
14	1	1	1	1	1	4	4	S	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	4	1	24
15	1	1	1	1	0	0	S	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	24
16	0	0	0	0	0	S	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	6	8	0	0	8	1	24	
17	0	0	0	0	S	0	2	3	4	5	5	2	3	2	2	3	2	1	1	1	12	3	14	8	0	14	3	24	
18	6	4	2	S	2	6	2	2	4	4	2	2	2	3	3	2	1	0	1	2	0	1	3	1	0	6	2	24	
19	1	1	S	1	2	3	2	2	1	2	3	2	2	2	2	1	1	0	0	2	1	1	1	2	0	3	2	24	
20	3	S	4	3	1	1	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	24
21	S	1	1	1	1	1	1	5	2	5	3	3	2	2	3	1	1	1	0	1	2	1	2	S	0	5	2	24	
22	1	1	2	2	2	4	1	1	2	1	1	1	1	2	2	2	2	2	2	2	1	1	S	3	1	4	2	24	
23	3	3	3	2	3	5	5	23	6	2	2	2	1	2	3	6	3	4	2	1	1	S	2	1	1	23	4	24	
24	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	2	1	1	1	2	1	24	
25	0	0	0	0	0	1	2	2	2	1	1	1	1	3	3	2	3	1	1	S	4	5	2	1	0	5	2	24	
26	1	1	1	1	1	1	0	0	0	0	0	2	2	2	3	1	1	1	S	1	1	1	1	1	0	3	1	24	
27	2	3	4	4	4	5	7	7	7	9	7	5	2	6	4	2	3	S	2	3	3	2	2	2	2	9	4	24	
28	3	2	2	2	2	17	11	6	4	2	1	2	2	3	2	S	2	2	2	2	4	5	6	7	1	17	4	24	
29	5	7	8	9	9	8	10	10	9	7	5	4	2	1	3	S	1	1	1	2	2	2	4	2	1	10	5	24	
30	1	2	20	2	1	1	1	1	2	3	2	3	2	1	S	1	1	1	1	1	1	1	1	1	1	20	2	24	
31	1	1	1	1	1	1	2	1	1	1	3	2	2	S	1	1	1	1	1	2	2	2	3	2	1	3	1	24	
HOURLY MAX	9	8	20	33	10	27	31	23	21	12	13	6	8	9	9	6	3	15	3	4	12	7	14	8					
HOURLY AVG	2	2	3	3	3	5	5	5	4	3	3	2	2	2	2	2	2	2	1	1	3	2	3	2					

STATUS FLAG CODES

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

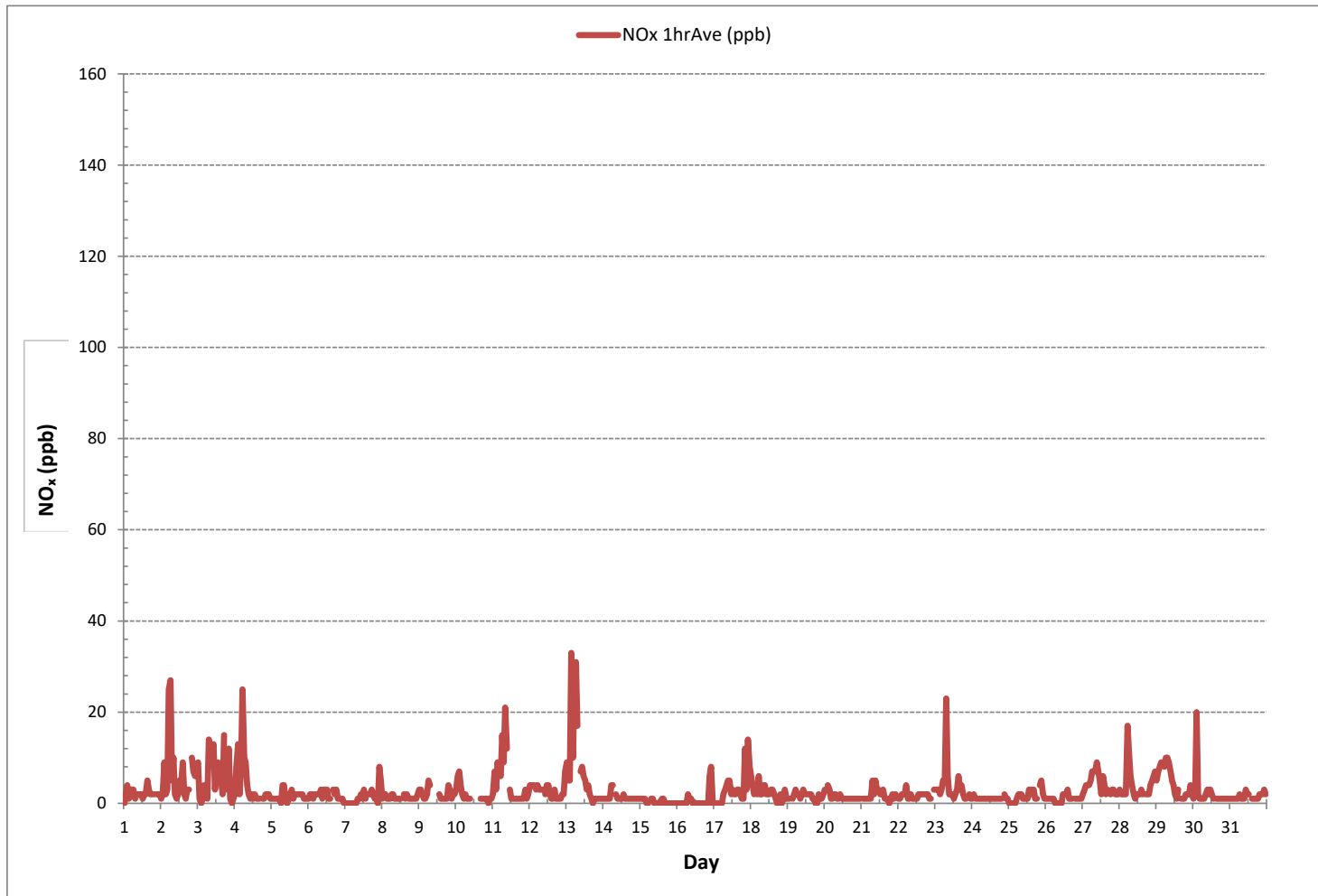
24 HR AVERAGES May 2019



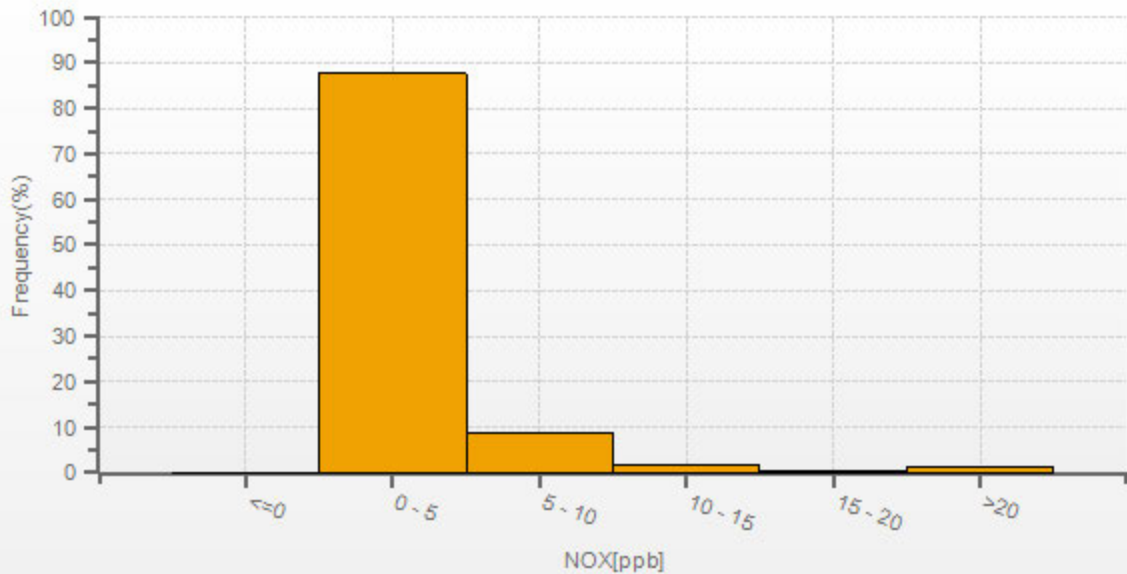
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	634			
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	0	ON DAY 1
MAXIMUM 1-HR AVERAGE:	33	ppb @ HOUR	3	ON DAY 13
MAXIMUM 24-HR AVERAGE:	8	ppb		ON DAY 13
IZS CALIBRATION TIME:	31	hrs	OPERATIONAL TIME:	744 hrs
MONTHLY CALIBRATION TIME:	6	hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	4		MONTHLY AVERAGE:	3 ppb

OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

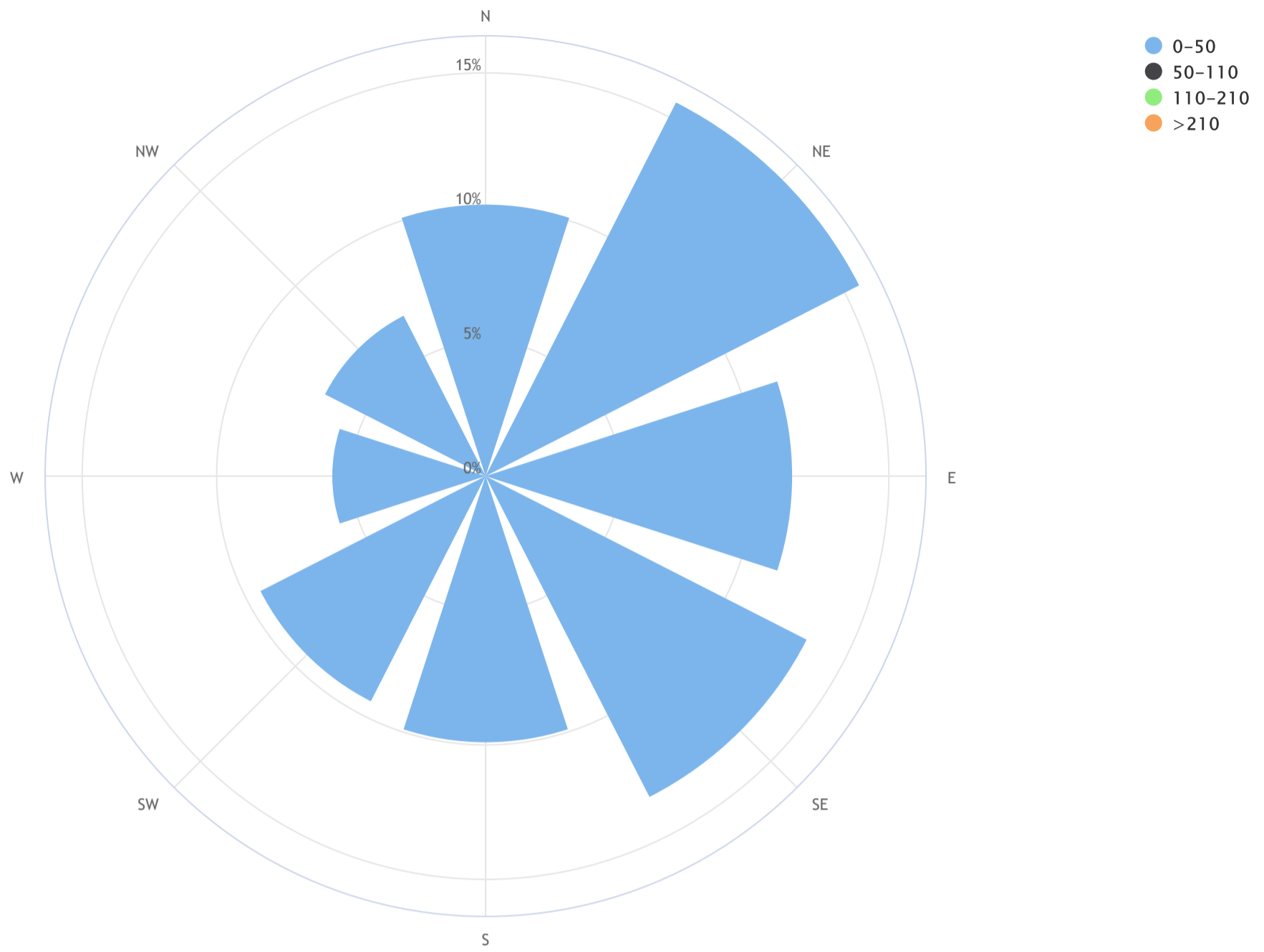


NOX[ppb] Histogram: LICA MASKWA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Maskwa Continuous Monitoring Station_NO_x (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 2.5, CALM % = 17.9%



Direction	0-50	50-110	110-210	>210	TOTAL
N	10.1	0.0	0.0	0.0	10.1
NE	15.6	0.0	0.0	0.0	15.6
E	11.4	0.0	0.0	0.0	11.4
SE	13.4	0.0	0.0	0.0	13.4
S	9.9	0.0	0.0	0.0	9.9
SW	9.4	0.0	0.0	0.0	9.4
W	5.7	0.0	0.0	0.0	5.7
NW	6.7	0.0	0.0	0.0	6.7
Summary	82.1	0.0	0.0	0.0	82.1
CALM	17.9	0.0	0.0	0.0	17.9

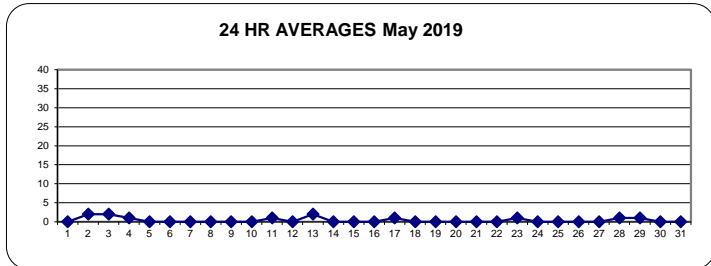
NITRIC OXIDE Hourly Averages (NO ppb)

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

STATUS FLAG CODES

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

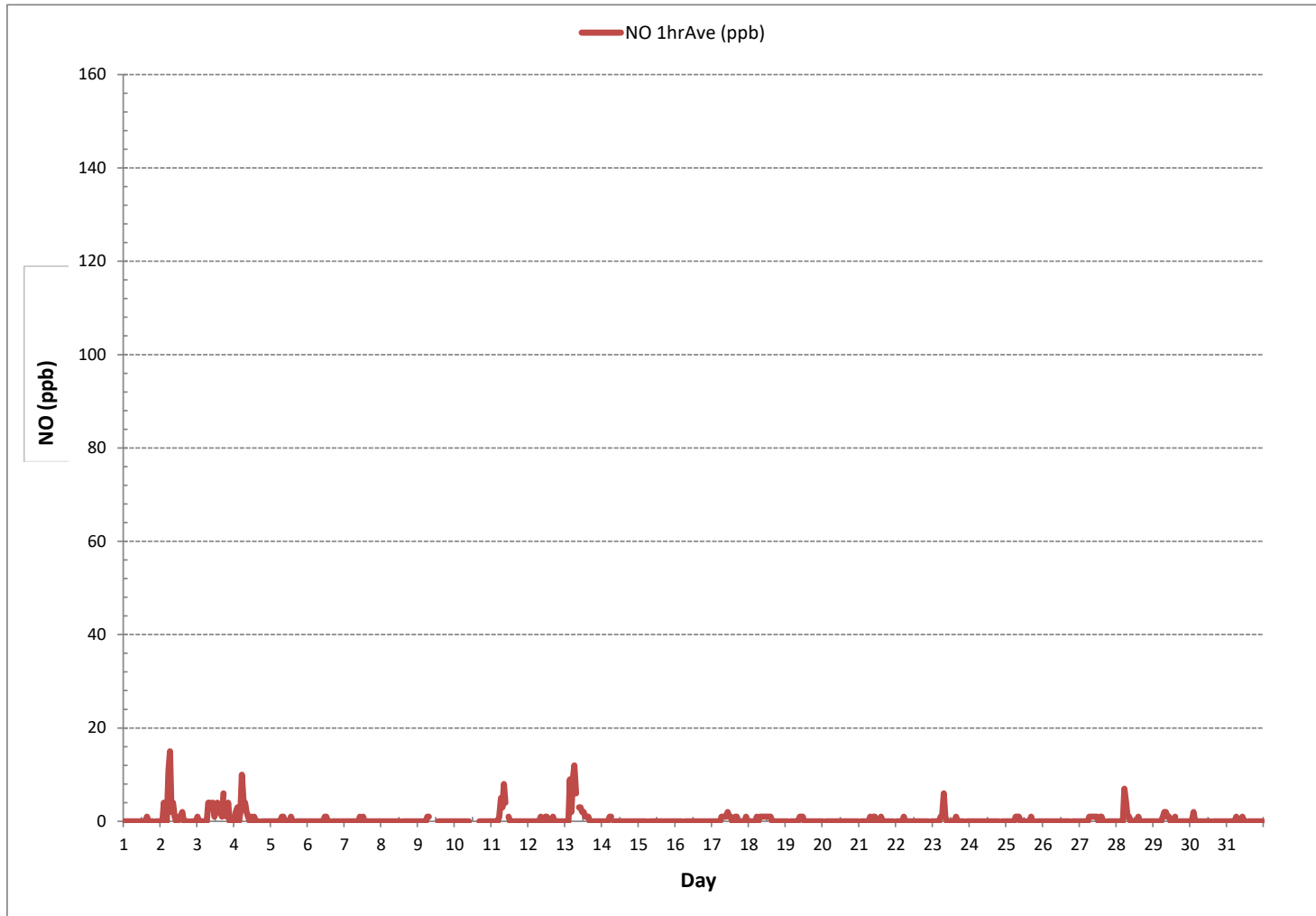
24 HR AVERAGES May 2019



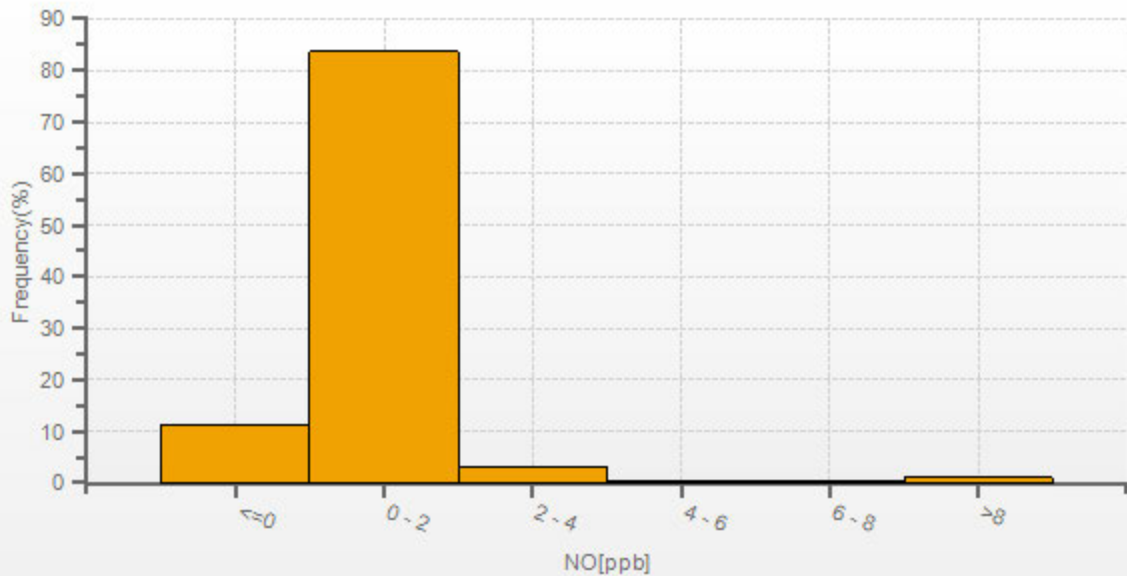
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	126				
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	0	ON DAY	1
MAXIMUM 1-HR AVERAGE:	15	ppb @ HOUR	6	ON DAY	2
MAXIMUM 24-HR AVERAGE:	2	ppb		ON DAY	2
IZS CALIBRATION TIME:	31	hrs	OPERATIONAL TIME:	744	hrs
MONTHLY CALIBRATION TIME:	6	hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	1		MONTHLY AVERAGE:	0	ppb

NITRIC OXIDE Hourly Averages (NO ppb)

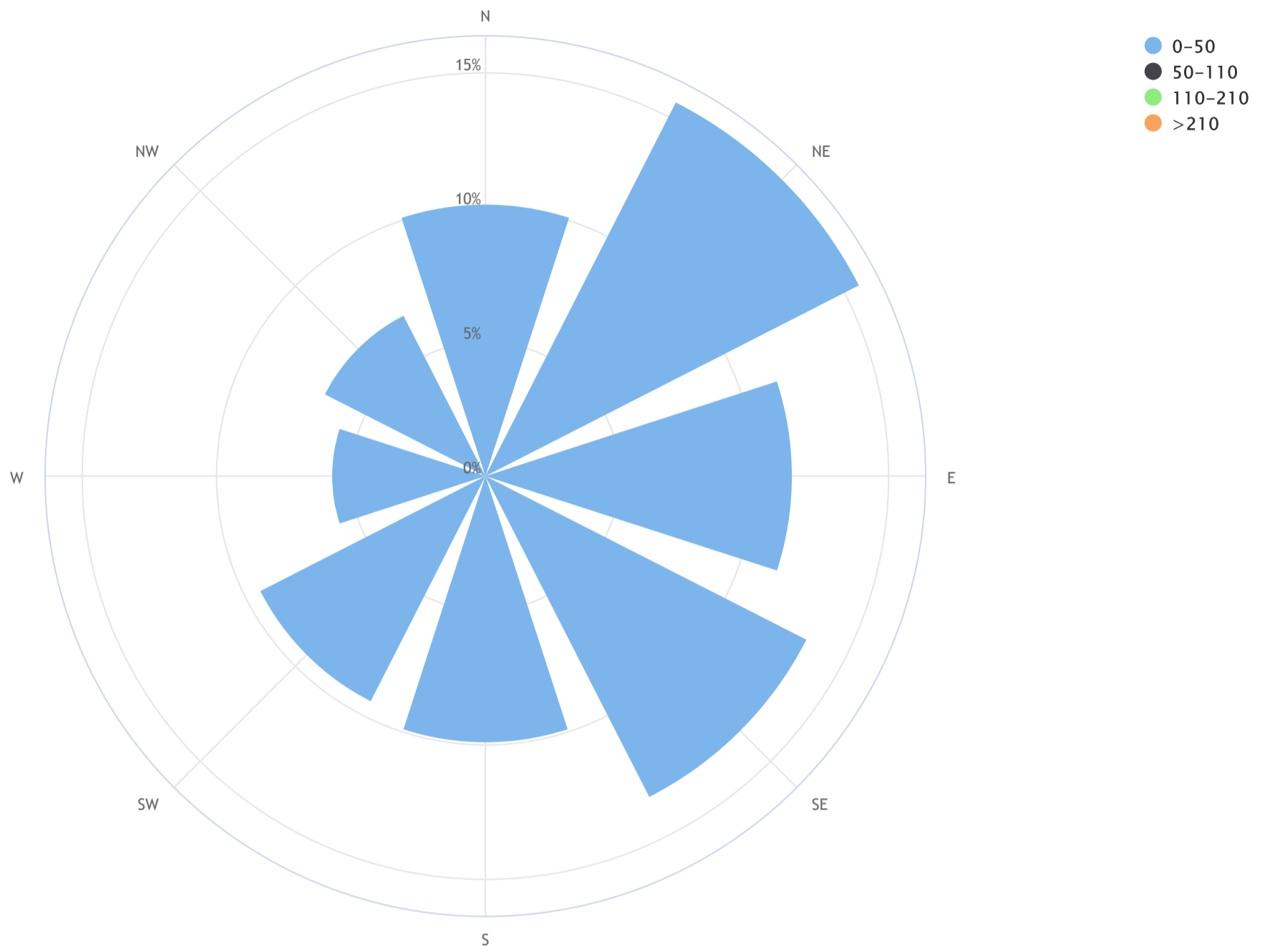


NO[ppb] Histogram: LICAMASKWA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Maskwa Continuous Monitoring Station_NO (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.3, CALM % = 17.9%



Direction	0-50	50-110	110-210	>210	TOTAL
N	10.1	0.0	0.0	0.0	10.1
NE	15.6	0.0	0.0	0.0	15.6
E	11.4	0.0	0.0	0.0	11.4
SE	13.4	0.0	0.0	0.0	13.4
S	9.9	0.0	0.0	0.0	9.9
SW	9.4	0.0	0.0	0.0	9.4
W	5.7	0.0	0.0	0.0	5.7
NW	6.7	0.0	0.0	0.0	6.7
Summary	82.1	0.0	0.0	0.0	82.1
CALM	17.9	0.0	0.0	0.0	17.9

NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)

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

STATUS FLAG CODES

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

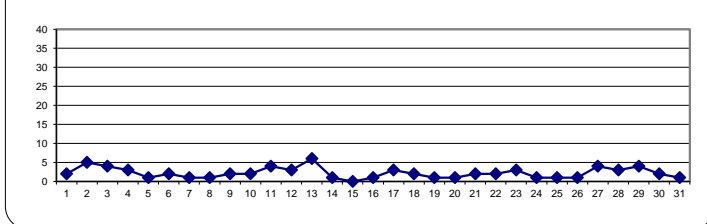
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

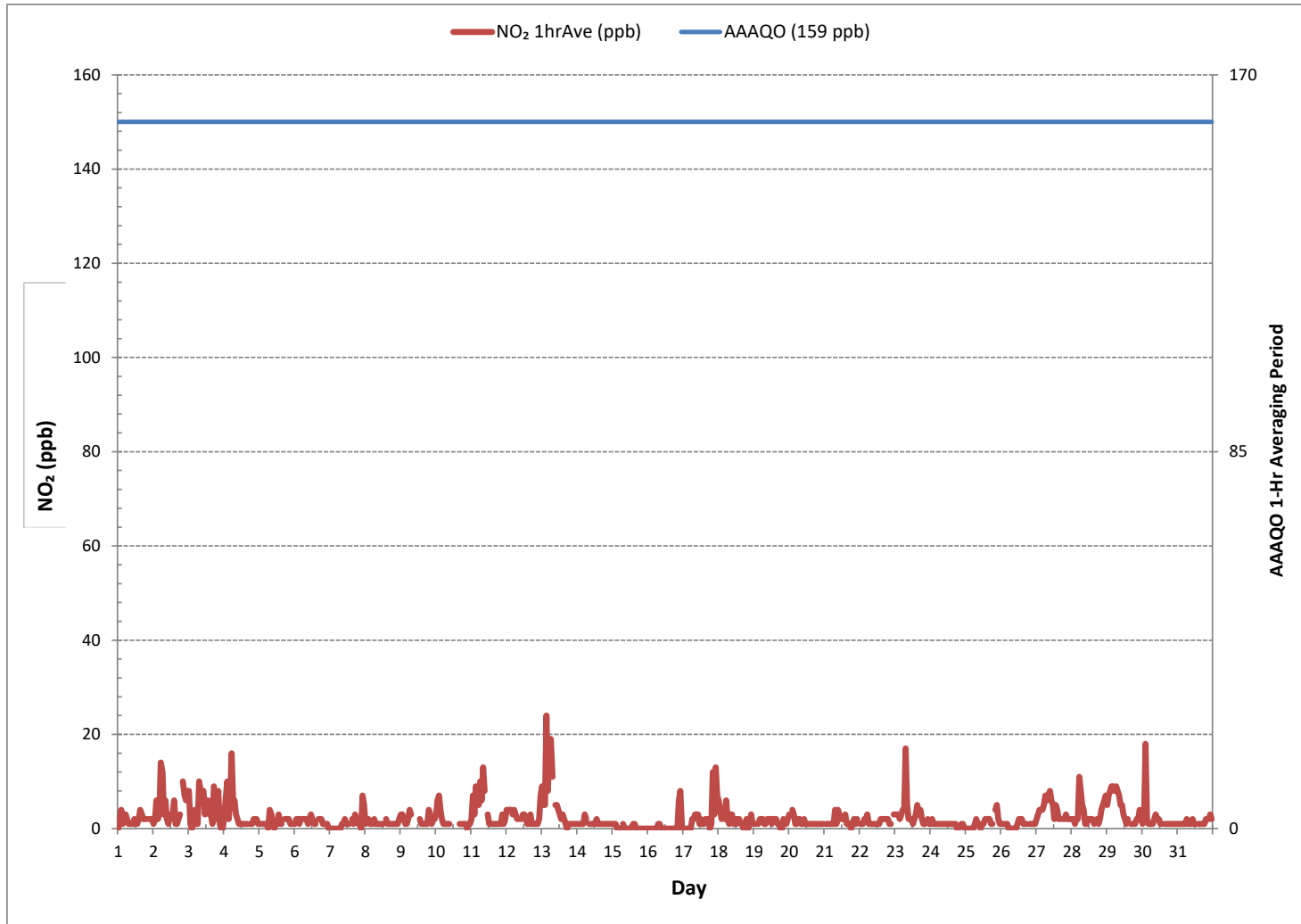
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	623			
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	0	ON DAY 1
MAXIMUM 1-HR AVERAGE:	24	ppb @ HOUR	3	ON DAY 13
MAXIMUM 24-HR AVERAGE:	6	ppb		ON DAY 13
IZS CALIBRATION TIME:	31	hrs	OPERATIONAL TIME:	744 hrs
MONTHLY CALIBRATION TIME:	6	hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	3		MONTHLY AVERAGE:	2 ppb

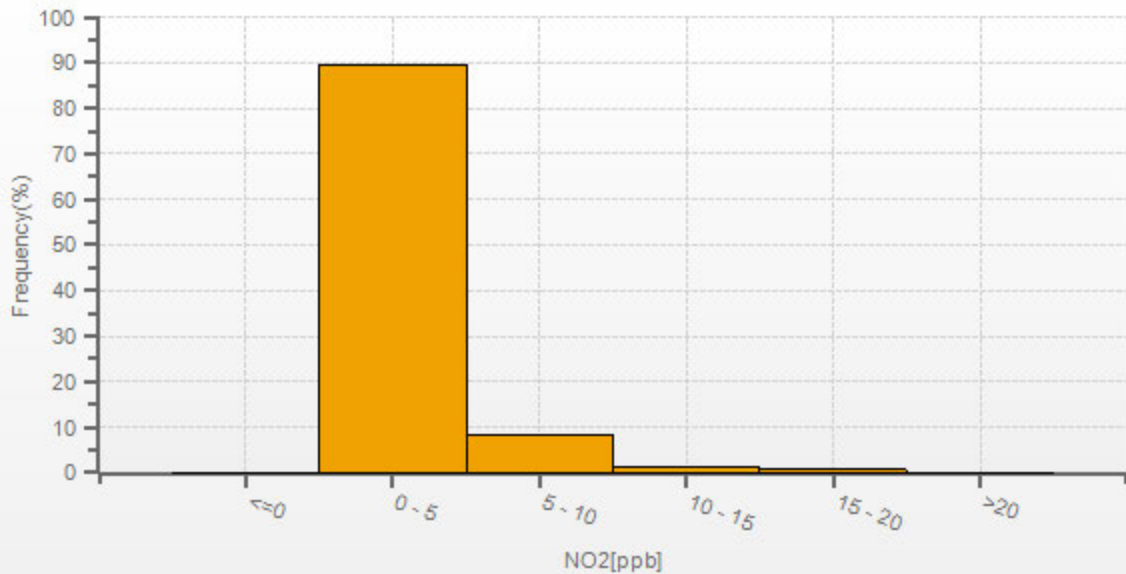
24 HR AVERAGES May 2019



NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)

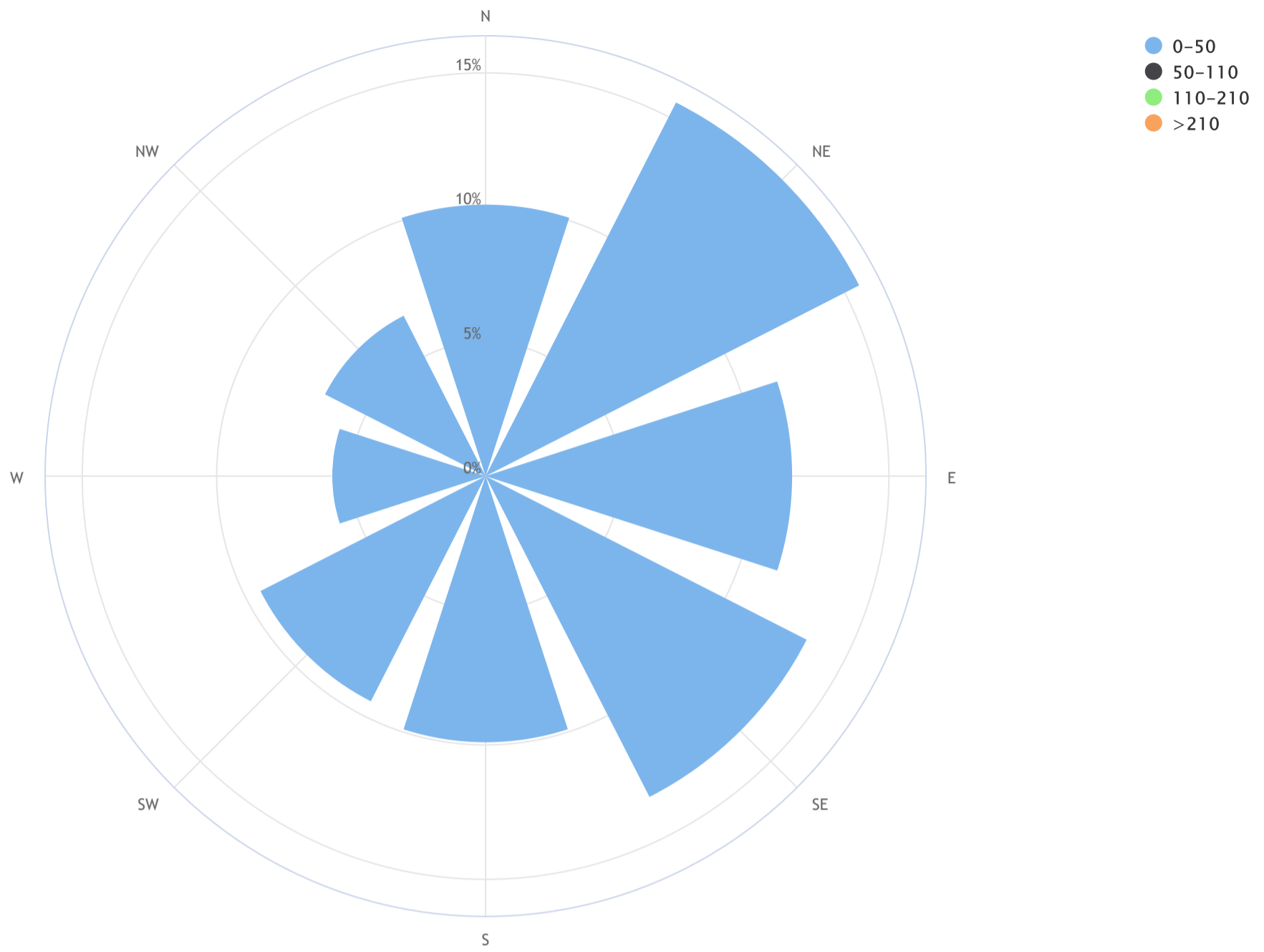


NO2[ppb] Histogram: LICA MASKWA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Maskwa Continuous Monitoring Station_NO₂ (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 2.2, CALM % = 17.9%



Direction	0-50	50-110	110-210	>210	TOTAL
N	10.1	0.0	0.0	0.0	10.1
NE	15.6	0.0	0.0	0.0	15.6
E	11.4	0.0	0.0	0.0	11.4
SE	13.4	0.0	0.0	0.0	13.4
S	9.9	0.0	0.0	0.0	9.9
SW	9.4	0.0	0.0	0.0	9.4
W	5.7	0.0	0.0	0.0	5.7
NW	6.7	0.0	0.0	0.0	6.7
Summary	82.1	0.0	0.0	0.0	82.1
CALM	17.9	0.0	0.0	0.0	17.9



WIND SPEED Hourly Averages (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	3.7	4.0	4.4	4.5	3.5	2.2	4.7	6.1	5.3	5.3	4.9	6.8	7.8	7.1	6.8	5.6	6.2	4.6	2.2	1.2	1.4	1.1	0.2	0.9	0.2	7.8	3.4	24	
2	0.3	0.6	0.3	1.0	1.5	2.0	2.1	3.2	2.6	5.0	2.8	2.9	1.8	3.0	3.1	2.7	1.5	3.0	3.6	3.5	3.3	3.5	5.7	6.0	0.3	6.0	0.9	24	
3	8.9	7.8	6.6	5.4	1.4	0.6	2.2	8.6	10.1	10.8	12.3	13.2	13.4	13.5	11.9	12.6	11.9	10.2	9.2	7.9	7.1	6.4	5.4	5.2	0.6	13.5	6.2	24	
4	5.7	5.0	4.4	5.0	6.3	6.0	6.9	6.7	8.1	9.0	9.0	8.3	8.0	7.7	8.7	7.9	8.9	7.0	9.2	6.6	3.7	2.2	2.9	6.3	2.2	9.2	6.2	24	
5	2.6	0.0	0.7	0.8	0.2	1.4	3.5	1.3	1.2	3.1	2.8	1.4	3.5	2.6	6.7	5.7	2.8	3.3	2.0	4.3	3.6	3.2	4.9	4.8	0.0	6.7	1.9	24	
6	2.6	1.0	0.4	1.5	0.4	3.2	4.9	4.7	4.2	1.4	3.7	4.9	5.9	8.0	3.3	4.2	3.8	3.8	7.9	5.6	4.0	3.7	2.6	3.6	0.4	8.0	2.6	24	
7	5.0	6.3	3.6	3.3	3.1	3.6	3.9	3.3	3.8	5.1	2.1	4.6	5.9	7.7	7.4	5.4	7.6	4.3	4.3	2.2	1.2	3.0	3.9	3.3	1.2	7.7	3.5	24	
8	4.6	6.8	5.1	3.4	2.5	1.8	6.3	8.5	11.7	9.2	8.2	7.4	7.6	3.0	4.4	7.5	4.6	4.3	3.0	2.3	2.2	0.8	1.4	0.8	0.8	11.7	4.4	24	
9	0.9	1.4	0.9	0.7	0.6	1.3	3.8	6.7	5.8	8.0	9.6	9.5	10.4	11.5	10.8	11.1	9.2	6.1	5.7	7.3	6.4	3.5	4.7	3.7	0.6	11.5	5.3	24	
10	1.6	1.7	2.5	3.1	7.2	6.5	8.9	11.0	12.0	9.5	10.4	11.0	11.9	11.9	12.8	18.2	17.3	15.2	9.9	10.1	8.1	6.3	1.3	0.8	0.8	18.2	8.3	24	
11	1.4	1.6	1.6	1.0	0.6	2.7	1.1	1.7	1.8	2.5	3.6	3.2	5.3	5.8	4.4	7.2	8.3	6.5	7.0	4.6	4.6	6.8	6.9	6.2	0.6	8.3	2.6	24	
12	6.8	5.5	2.0	2.3	7.5	1.8	4.5	7.3	7.6	6.3	6.4	9.6	11.0	9.9	11.0	10.9	10.2	9.4	8.3	5.2	4.0	0.6	1.1	1.4	0.6	11.0	3.4	24	
13	1.8	2.9	4.8	5.6	4.0	6.3	8.2	8.2	10.8	10.0	9.0	9.6	9.2	10.8	7.8	8.5	8.0	8.4	7.9	7.3	4.5	0.7	0.7	0.4	0.4	10.8	5.7	24	
14	0.2	0.2	0.2	1.4	0.8	0.2	1.0	5.0	4.1	3.5	2.1	3.4	3.1	3.3	1.4	4.9	2.9	2.5	2.3	3.5	4.7	4.4	2.6	1.3	0.2	5.0	0.7	24	
15	1.8	2.2	3.6	4.3	6.0	7.7	7.4	12.4	12.5	12.6	13.1	9.6	5.3	5.6	5.2	5.8	6.3	5.4	7.1	7.5	3.4	3.6	3.9	4.8	1.8	13.1	6.2	24	
16	3.8	4.4	2.7	1.8	2.0	3.0	5.1	4.4	4.5	5.0	4.6	3.3	5.9	6.3	6.1	6.0	6.5	5.2	3.7	4.2	2.4	3.0	2.3	2.3	1.8	6.5	3.7	24	
17	2.3	3.7	4.4	4.1	4.0	4.1	4.8	6.3	8.5	10.4	10.8	9.7	11.2	10.0	9.1	9.5	9.0	8.1	7.6	5.5	4.4	4.7	6.5	7.0	2.3	11.2	6.4	24	
18	6.6	6.2	6.2	4.5	3.7	3.5	5.1	6.7	5.3	5.7	6.6	8.6	7.2	8.7	9.9	7.0	9.0	9.6	7.6	5.2	4.1	4.7	5.1	4.3	3.5	9.9	6.0	24	
19	4.6	4.5	5.5	6.4	6.9	6.3	5.5	6.2	6.6	7.5	9.2	8.2	7.3	8.4	8.4	8.0	6.8	7.0	6.0	4.3	2.9	3.3	2.2	3.2	2.2	9.2	5.7	24	
20	5.1	5.3	5.3	2.2	2.2	3.5	2.6	3.8	8.2	6.7	6.0	7.0	7.0	8.1	7.1	6.1	7.6	7.8	7.6	5.2	3.9	4.5	5.4	5.2	2.2	8.2	5.0	24	
21	4.6	4.6	2.8	3.9	3.4	3.8	4.1	4.4	5.4	5.0	6.8	6.9	6.7	7.5	6.2	6.2	3.8	6.0	5.3	2.3	0.9	1.3	0.3	1.1	0.3	7.5	3.5	24	
22	0.6	0.2	0.7	0.9	0.6	0.4	0.7	0.7	0.4	3.8	3.4	2.3	3.0	0.8	3.9	1.5	0.8	1.3	2.4	2.8	2.1	1.4	0.7	0.8	0.2	3.9	0.6	24	
23	1.2	1.4	0.0	0.2	0.5	0.6	0.2	2.3	3.7	3.7	2.1	4.0	3.9	5.4	3.4	2.3	3.0	1.5	1.3	5.8	4.9	5.4	4.8	4.5	0.0	5.8	1.2	24	
24	6.7	4.3	4.2	3.4	3.9	3.5	5.3	6.6	5.9	6.0	4.4	6.9	6.7	8.5	8.6	7.9	9.0	7.0	6.0	3.0	1.4	0.3	1.0	1.9	0.3	9.0	5.0	24	
25	2.2	2.4	1.6	0.3	0.2	0.1	0.2	2.7	3.3	3.7	3.1	3.9	3.0	1.1	2.8	2.6	4.2	3.6	3.3	3.5	1.3	0.8	0.3	1.3	0.1	4.2	1.0	24	
26	0.3	0.5	0.5	0.4	0.1	1.5	4.4	6.6	5.3	7.0	4.3	2.4	3.8	2.2	2.1	3.9	6.4	5.2	6.6	3.7	3.5	4.1	4.3	2.4	0.1	7.0	1.0	24	
27	5.2	6.8	6.9	5.4	3.9	4.8	4.6	4.6	5.0	3.8	5.2	4.7	5.0	5.5	5.1	3.7	3.8	3.6	2.2	3.2	3.6	3.3	2.9	1.8	1.8	6.9	3.7	24	
28	1.5	2.2	1.4	2.4	2.0	1.2	0.8	1.2	3.1	4.7	6.6	6.9	6.9	6.8	5.4	6.0	5.8	4.4	4.4	3.3	4.3	4.6	4.8	3.5	0.8	6.9	3.5	24	
29	4.1	5.8	4.8	5.3	5.8	7.3	6.6	6.1	6.4	8.3	7.3	7.4	6.9	6.9	8.0	6.9	6.5	5.3	3.7	1.9	3.6	3.5	1.0	1.5	1.0	8.3	4.8	24	
30	1.7	2.0	4.6	5.0	7.4	8.7	8.9	7.4	5.8	5.3	9.6	9.3	8.7	11.0	11.9	15.0	14.1	12.0	9.2	8.7	4.3	0.3	2.0	0.4	0.3	15.0	6.7	24	
31	0.0	0.3	0.8	0.3	0.6	1.3	2.2	4.9	4.6	2.2	3.3	3.2	1.7	3.9	5.4	6.7	5.0	8.5	7.0	3.6	1.9	0.8	0.1	0.8	0.0	8.5	2.7	24	
HOURLY MAX	8.9	7.8	6.9	6.4	7.5	8.7	8.9	12.4	12.5	12.6	13.1	13.2	13.4	13.5	12.8	18.2	17.3	15.2	9.9	10.1	8.1	6.8	6.9	7.0					

STATUS FLAG CODES

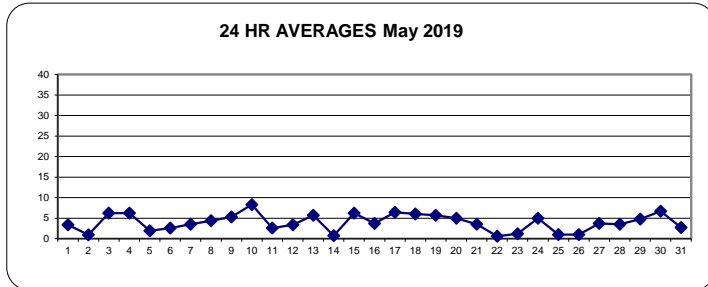
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	September 17, 2018
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

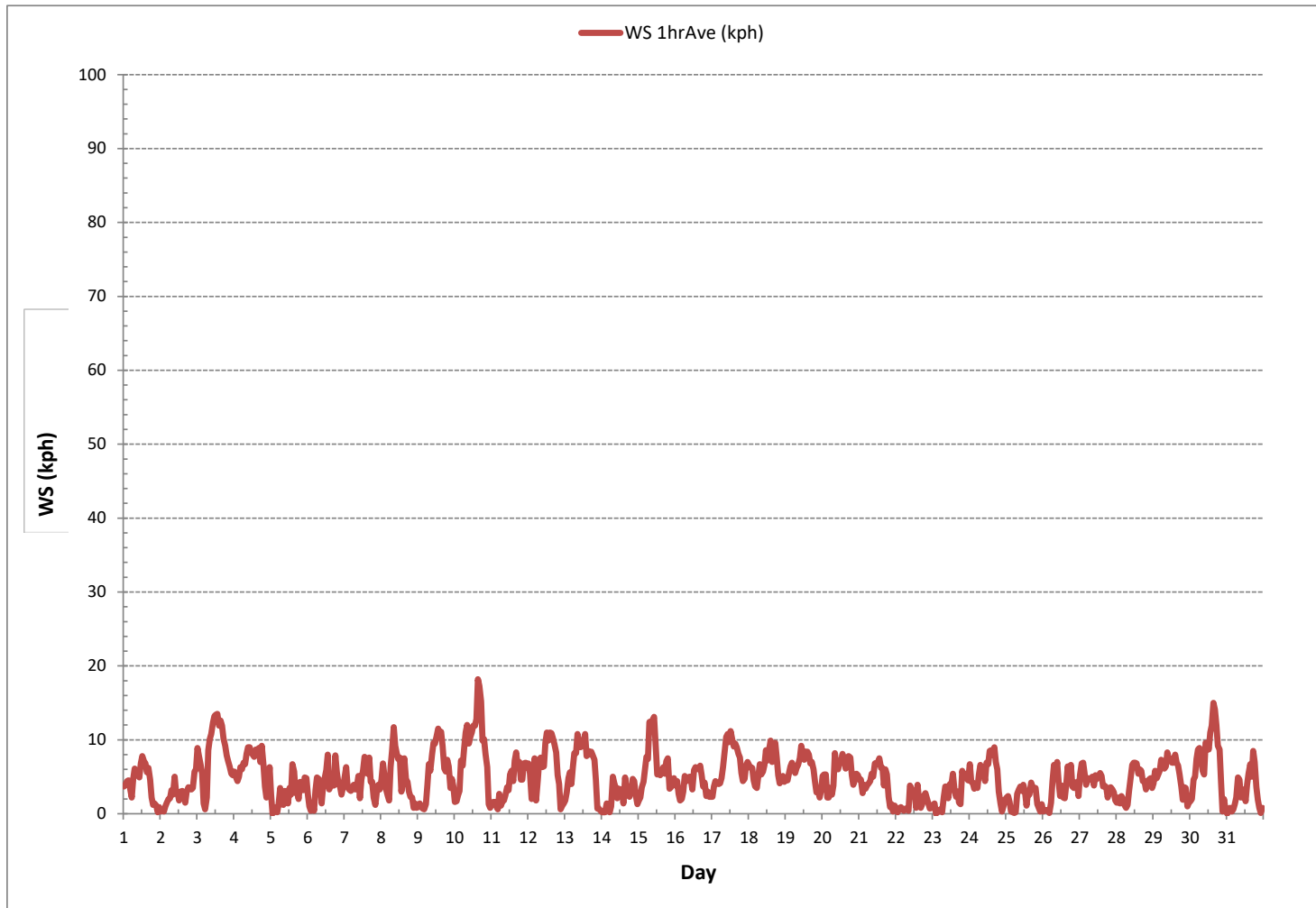
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	741
MINIMUM 1-HR AVERAGE	0.0 kph @ HOUR 1 ON DAY 5
MAXIMUM 1-HR AVERAGE:	18.2 kph @ HOUR 15 ON DAY 10
MAXIMUM 24-HR AVERAGE:	8.3 kph ON DAY 10
MONTHLY CALIBRATION TIME:	0 hrs OPERATIONAL TIME: 744 hrs
STANDARD DEVIATION:	3.1 AMD OPERATION UPTIME: 100.0 %
	MONTHLY AVERAGE: 0.7 kph

24 HR AVERAGES May 2019

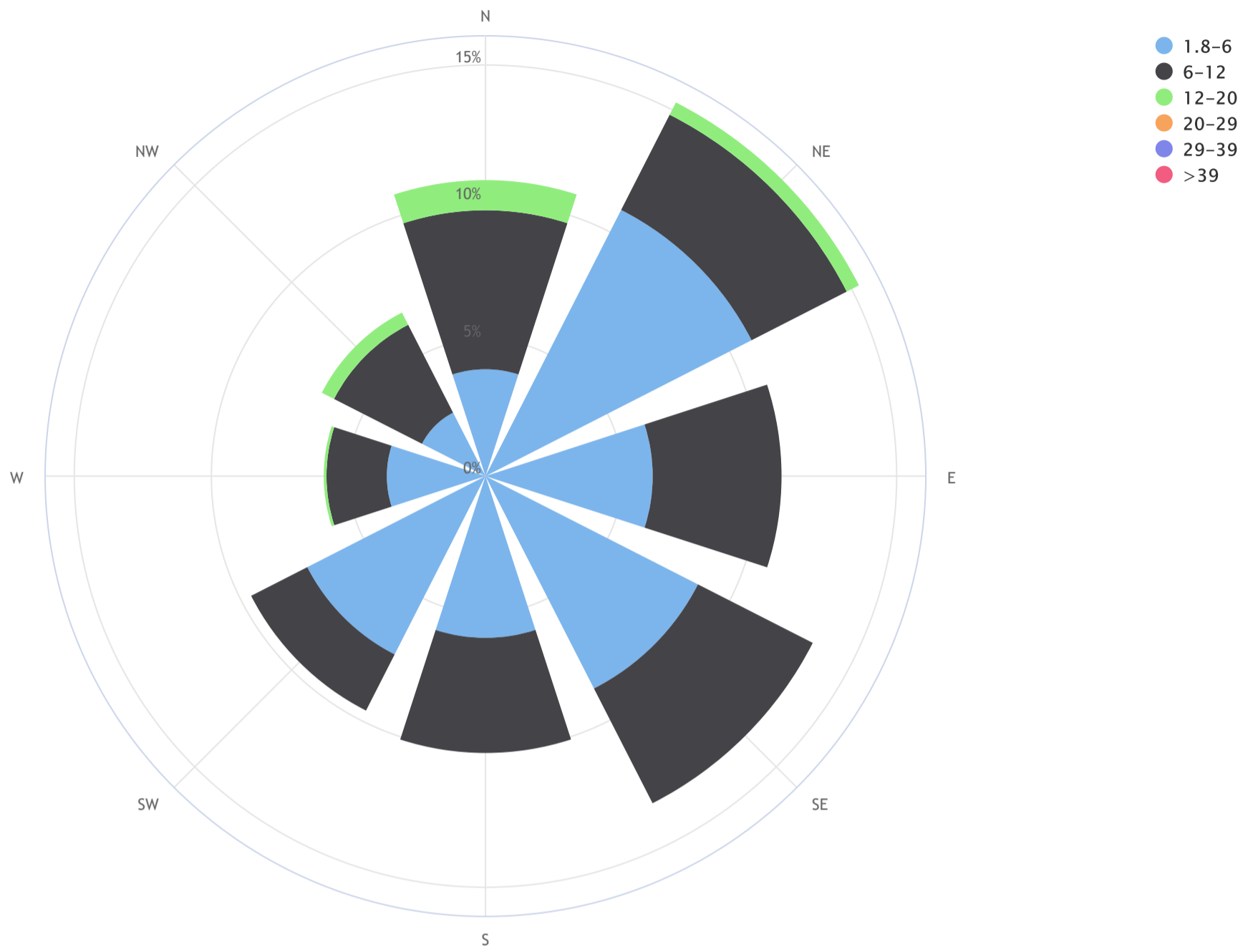


WIND SPEED Hourly Averages (WS kph)



Lakeland Industry & Community Association_Maskwa Continuous Monitoring Station_19/05

Wind Rose_Wind Frequency (Blowing From)_CALM Avg = 0.9_CALM % = 17.5%



Direction	1.8-6	6-12	12-20	20-29	29-39	>39	TOTAL
N	3.9	5.8	1.1	0.0	0.0	0.0	10.8
NE	10.9	3.9	0.5	0.0	0.0	0.0	15.3
E	6.1	4.7	0.0	0.0	0.0	0.0	10.8
SE	8.7	4.7	0.0	0.0	0.0	0.0	13.4
S	5.9	4.2	0.0	0.0	0.0	0.0	10.1
SW	7.3	2.3	0.0	0.0	0.0	0.0	9.5
W	3.6	2.2	0.1	0.0	0.0	0.0	5.9
NW	2.6	3.6	0.5	0.0	0.0	0.0	6.7
Summary	48.9	31.3	2.3	0.0	0.0	0.0	82.5
CALM	17.5	0.0	0.0	0.0	0.0	0.0	17.5



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

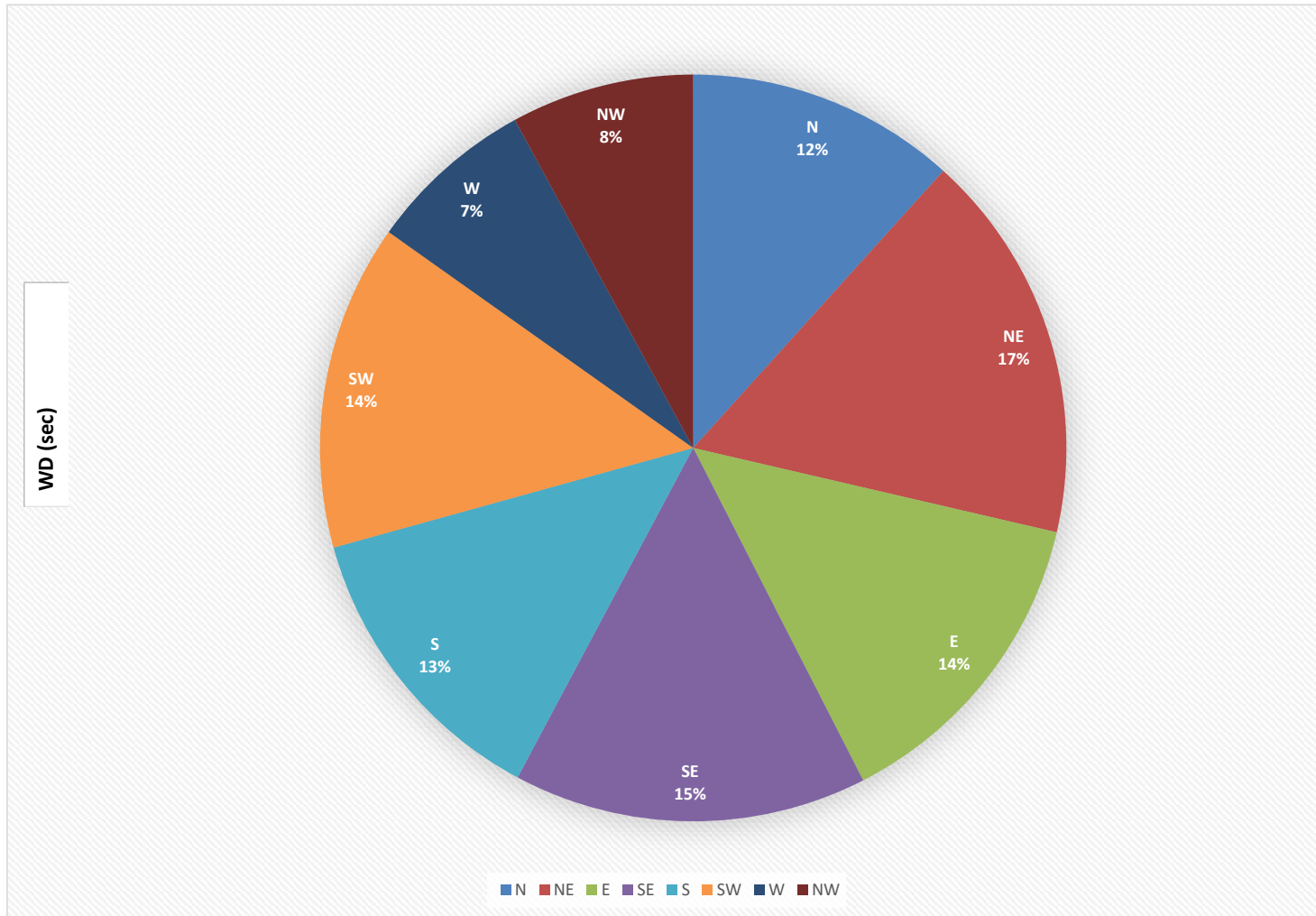
STATUS FLAG CODES

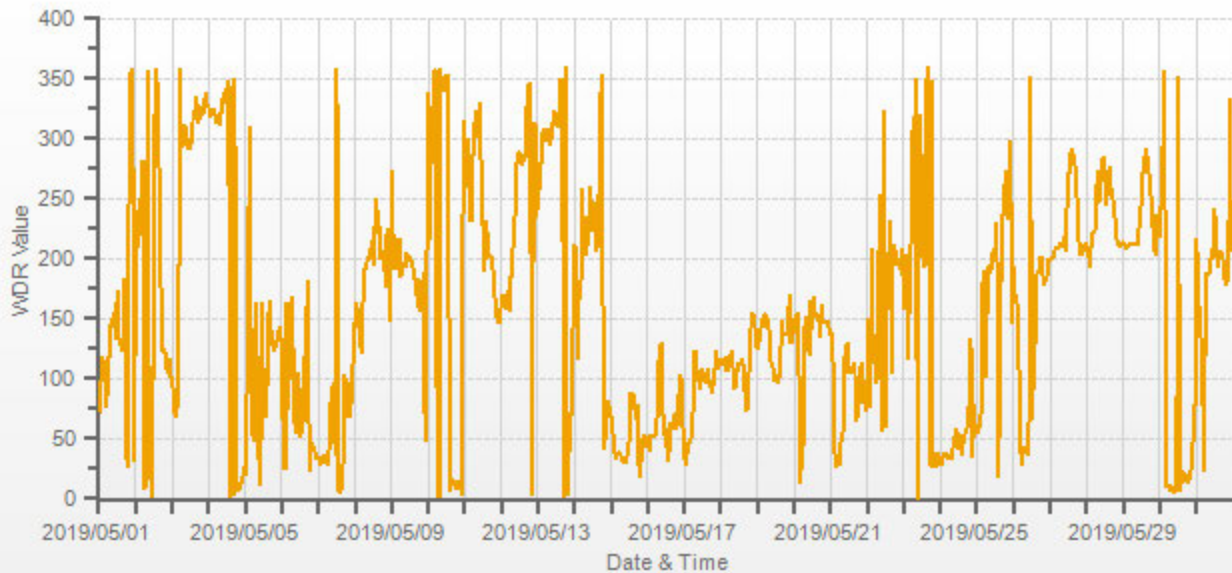
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	September 17, 2018
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	744	hrs
STANDARD DEVIATION:	99		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	70 (ENE)	

WIND DIRECTION Hourly Averages (WD)







LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - May 2019

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59		
DAY																										
1	22	18	12	17	23	30	16	21	29	31	36	28	22	19	14	23	17	24	29	32	32	45	62	17	24	
2	61	51	35	29	9	13	28	25	40	13	40	46	55	49	46	56	52	40	14	14	27	18	13	15	24	
3	8	17	13	18	57	32	28	12	11	13	10	9	11	13	15	16	14	14	14	14	12	12	12	15	24	
4	15	17	19	14	12	11	12	18	20	18	22	20	20	22	15	14	13	25	12	10	11	8	19	4	24	
5	9	78	52	22	51	33	28	59	63	40	36	66	47	54	24	28	37	39	53	12	9	12	11	10	24	
6	17	35	54	32	68	18	24	20	23	49	17	19	31	21	52	19	29	38	13	19	11	18	13	10	24	
7	11	5	17	17	10	12	11	18	31	28	58	46	37	21	24	31	27	26	25	16	14	12	14	19	24	
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9	24	31	52	39	37	42	13	11	17	17	15	16	13	13	12	16	12	15	18	7	30	34	42	18	24	
10	49	49	36	17	12	11	11	13	17	13	17	20	16	14	13	8	8	8	12	6	5	6	21	31	24	
11	20	24	30	43	55	11	33	32	45	42	46	52	28	28	40	27	17	21	13	13	4	5	5	9	24	
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14	30	54	62	26	47	61	31	21	31	47	58	42	51	41	65	25	41	45	49	14	25	16	32	42	24	
15	15	27	12	9	8	8	9	6	6	6	8	19	33	30	34	30	32	21	18	6	25	15	11	7	24	
16	7	12	13	21	25	17	31	32	39	43	47	36	32	29	32	25	21	18	13	15	13	29	12	24		
17	12	4	6	6	7	8	21	17	13	19	15	24	18	20	23	17	18	18	14	10	11	6	8	7	24	
18	6	8	6	6	8	18	15	24	33	27	30	26	30	23	19	27	22	14	12	15	12	5	7	8	24	
19	5	7	9	7	8	12	12	18	22	22	23	28	29	29	25	19	34	27	12	13	27	6	16	6	24	
20	6	5	6	43	25	17	45	27	17	28	32	31	31	26	26	35	25	16	19	13	6	5	7	6	24	
21	7	8	43	7	6	7	17	24	24	24	24	22	30	29	27	29	43	26	19	17	10	38	22	23	24	
22	32	46	27	50	18	33	29	35	72	42	28	42	49	69	31	49	53	31	13	10	17	39	29	17	24	
23	25	12	65	5	30	56	53	24	26	27	53	41	41	23	30	45	26	54	55	8	15	11	18	16	24	
24	6	20	21	22	21	23	9	7	10	16	15	13	12	14	10	11	16	16	15	15	24	24	34	17	24	
25	17	18	27	52	56	71	76	23	34	40	49	43	46	63	53	56	22	22	21	21	44	32	60	27	24	
26	44	37	42	37	43	11	13	12	22	19	43	50	46	61	57	40	18	27	10	9	6	4	5	21	24	
27	5	5	3	5	6	6	7	9	9	20	14	24	29	25	20	31	23	23	18	5	6	6	5	9	24	
28	11	9	18	14	13	14	33	38	22	20	18	16	20	19	28	31	19	22	21	12	5	4	6	7	24	
29	5	7	4	5	6	4	8	8	11	9	16	18	24	25	21	18	17	20	18	23	8	7	26	18	24	
30	16	21	17	19	9	7	7	10	13	17	12	26	22	19	18	7	6	6	8	6	9	28	20	41	24	
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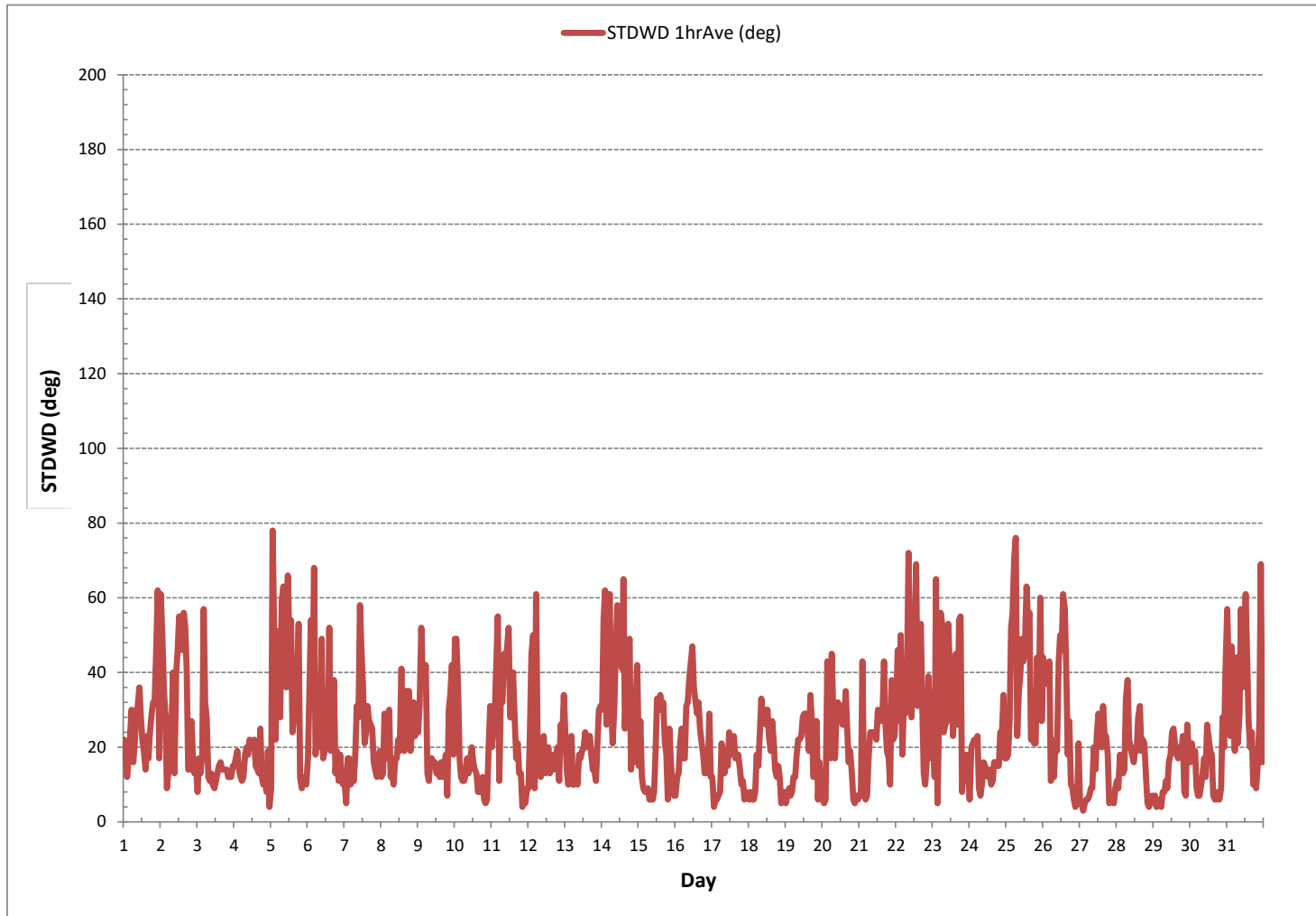
STATUS FLAG CODES

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

LAST CALIBRATION: September 17, 2018

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 744 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)



VECTOR WIND SPEED Hourly Averages (kph) & WIND DIRECTION Hourly Averages in Sector

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	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	WS	3.7	4.0	4.4	4.5	3.5	2.2	4.7	6.1	5.3	5.3	4.9	6.8	7.8	7.1	6.8	5.6	6.2	4.6	2.2	1.2	1.4	1.1	0.2	0.9	0.2	7.8	3.4	24
	WD	ENE	E	ESE	ESE	ESE	ENE	ESE	ESE	SSE	SE	SSE	SE	S	SE	SE	ESE	ESE	S	NE	NNE	N	N	N	NNE	-	-	-	24
2	WS	0.3	0.6	0.3	1.0	1.5	2.0	2.1	3.2	2.6	5.0	2.8	2.9	1.8	3.0	3.1	2.7	1.5	3.0	3.6	3.5	3.3	3.5	5.7	6.0	0.3	6.0	0.9	24
	WD	S	SSW	WSW	SW	W	W	N	NNE	N	NNE	NNE	N	SW	N	NNW	W	W	SE	ESE	SE	ESE	ESE	ESE	E	-	-	-	24
3	WS	8.9	7.8	6.6	5.4	1.4	0.6	2.2	8.6	10.1	10.8	12.3	13.4	13.5	11.9	12.6	11.9	10.2	9.2	7.9	7.1	6.4	5.4	5.2	0.6	13.5	6.2	24	
	WD	E	E	ENE	ENE	ENE	N	WNW	WNW	NW	NW	WNW	WNW	WNW	NW	NW	NNW	NW	NW	NW	NW	NNW	NNW	NW	NW	-	-	-	24
4	WS	5.7	5.0	4.4	5.0	6.3	6.0	6.9	6.7	8.1	9.0	9.0	8.3	8.0	7.7	8.7	7.9	8.9	7.0	9.2	6.6	3.7	2.2	2.9	6.3	2.2	9.2	6.2	24
	WD	NW	NW	NW	NW	NW	NW	NW	NW	NW	NNW	NNW	NNW	NNW	N	NNW	N	N	NNE	N	N	NNE	NNE	NNE	NNE	-	-	-	24
5	WS	2.6	0.0	0.7	0.8	0.2	1.4	3.5	1.3	1.2	3.1	2.8	1.4	3.5	2.6	6.7	5.7	2.8	3.3	2.0	4.3	3.6	3.2	4.9	4.8	0.0	6.7	1.9	24
	WD	NNE	ENE	SSW	NW	ENE	NE	NE	SSE	E	NNE	NNE	SSE	ENE	ENE	E	SE	SSE	SE	SE	ESE	SE	SE	SE	SE	-	-	-	24
6	WS	2.6	1.0	0.4	1.5	0.4	3.2	4.9	4.7	4.2	1.4	3.7	4.9	5.9	8.0	3.3	4.2	3.8	3.8	7.9	5.6	4.0	3.7	2.6	3.6	0.4	8.0	2.6	24
	WD	ESE	NE	NNE	SSE	ENE	ESE	SSE	SE	ENE	NE	ESE	E	NE	NE	ENE	ESE	SE	S	NNE	NE	NE	NE	NNE	NNE	-	-	-	24
7	WS	5.0	6.3	3.6	3.3	3.1	3.6	3.9	3.3	3.8	5.1	2.1	4.6	5.9	7.7	7.4	5.4	7.6	4.3	4.3	2.2	1.2	3.0	3.9	3.3	1.2	7.7	3.5	24
	WD	NE	NNE	NE	NE	NNE	NE	NNE	NE	ENE	E	E	NE	N	N	N	N	NNE	ESE	E	E	ENE	ENE	E	ESE	-	-	-	24
8	WS	4.6	6.8	5.1	3.4	2.5	1.8	6.3	8.5	11.7	9.2	8.2	7.4	7.6	3.0	4.4	7.5	4.6	4.3	3.0	2.3	2.2	0.8	1.4	0.8	0.8	11.7	4.4	24
	WD	SSE	SSE	SE	SE	ESE	SSE	S	S	SSW	SSW	SSW	SSW	SSW	SW	WSW	SW	SW	SSW	SSW	SSW	S	SW	S	SSE	-	-	-	24
9	WS	0.9	1.4	0.9	0.7	0.6	1.3	3.8	6.7	5.8	8.0	9.6	9.5	10.4	11.5	10.8	11.1	9.2	6.1	5.7	7.3	6.4	3.5	4.7	3.7	0.6	11.5	5.3	24
	WD	W	SSW	S	S	SSW	SW	S	SSW	SSW	S	SSW	SSW	SSW	S	S	SSE	S	SSE	SSE	SSE	S	S	NE	S	-	-	-	24
10	WS	1.6	1.7	2.5	3.1	7.2	6.5	8.9	11.0	12.0	9.5	10.4	11.0	11.9	12.8	18.2	17.3	15.2	9.9	10.1	8.1	6.3	1.3	0.8	0.8	18.2	8.3	24	
	WD	NNW	SW	WNW	NW	N	N	N	N	NNW	NNW	NNW	N	N	N	NNE	NNE	NNE	N	NNE	NNE	NNE	N	NW	NW	-	-	-	24
11	WS	1.4	1.6	1.6	1.0	0.6	2.7	1.1	1.7	1.8	2.5	3.6	3.2	5.3	5.8	4.4	7.2	8.3	6.5	7.0	4.6	4.6	6.8	6.9	6.2	0.6	8.3	2.6	24
	WD	W	WNW	WNW	WSW	SW	W	WNW	NW	NW	NNW	NNW	WSW	SW	S	SW	SSW	SSW	SSW	S	S	SSE	SSE	SE	SE	-	-	-	24
12	WS	6.8	5.5	2.0	2.3	7.5	1.8	4.5	7.3	7.6	6.3	6.4	9.6	11.0	9.9	11.0	10.9	10.2	9.4	8.3	5.2	4.0	0.6	1.1	1.4	0.6	11.0	3.4	24
	WD	SSE	SSE	SSE	SSE	S	SSE	S	SSW	SSW	SW	W	WNW	WNW	W	WNW	W	WNW	NNW	NNW	NNW	N	W	NW	SW	-	-	-	24
13	WS	1.8	2.9	4.8	5.6	4.0	6.3	8.2	8.2	10.8	10.0	9.0	9.6	9.2	10.8	7.8	8.5	8.0	8.4	7.9	7.3	4.5	0.7	0.7	0.4	0.4	10.8	5.7	24
	WD	WSW	WSW	W	WNW	NW	WNW	NW	WNW	WNW	NNW	NNW	NW	NW	NW	NW	N	NNW	N	N	N	NNE	ENE	ENE	SSE	-	-	-	24
14	WS	0.2	0.2	0.2	1.4	0.8	0.2	1.0	5.0	4.1	3.5	2.1	3.4	3.1	3.3	1.4	4.9	2.9	2.5	2.3	3.5	4.7	4.4	2.6	1.3	0.2	5.0	0.7	24
	WD	SSW	SSW	ESE	S	SSE	WSW	SSW	SSW	SSW	SW	WSW	WSW	SSW	SSW	SSW	WSW	NNW	N	NE	NE	ENE	E	ENE	-	-	-	-	24
15	WS	1.8	2.2	3.6	4.3	6.0	7.7	7.4	12.4	12.5	12.6	13.1	9.6	5.3	5.6	5.2	5.8	6.3	5.4	7.1	7.5	3.4	3.6	3.9	4.8	1.8	13.1	6.2	24
	WD	ENE	NE	NE	NNE	NE	NE	NE	NNE	NNE	NNE	NE	NE	E	E	E	ENE	ENE	NNE	NNE	NE	NE	NE	NE	NE	-	-	-	24
16	WS	3.8	4.4	2.7	1.8	2.0	3.0	5.1	4.4	4.5	5.0	4.6	3.3	5.9	6.3	6.1	6.0	6.5	5.2	3.7	4.2	2.4	3.0	2.3	2.3	1.8	6.5	3.7	24
	WD	NE	NE	NE	NE	NE	NE	ENE	ESE	SE	ENE	NE	ENE	NNE	NE	ENE	ENE	ENE	ENE	ENE	ENE	ENE	ESE	E	ENE	-	-	-	24
17	WS	2.3	3.7	4.4	4.1	4.0	4.1	4.8	6.3	8.5	10.4	10.8	9.7	11.2	10.0	9.1	9.5	9.0	8.1	7.6	5.5	4.4	4.7	6.5	7.0	2.3	11.2	6.4	24
	WD	NE	NNE	NE	NE	NE	NE	E	ESE	ESE	ESE	E	E	ESE	E	E	ESE	E	E	E	E	ESE	ESE	ESE	ESE	-	-	-	24
18	WS	6.6	6.2	6.2	4.5	3.7	3.5	5.1	6.7	5.3	5.7	6.6	8.6	7.2	8.7	9.9	7.0	9.0	7.6	5.2	4.1	4.7	5.1	4.3	3.5	9.9	6.0	24	
	WD	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	E	E	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	-	-	-	24
19	WS	4.6	4.5	5.5	6.4	6.9	6.3	5.5	6.2	6.6	7.5	9.2	8.2	7.3	8.4	8.4	8.0	6.8	7.0	6.0	4.3	2.9	3.3	2.2	3.2	2.2	9.2	5.7	24
	WD	SE	SE	SE	SE	SSE	SSE	SE	SSE	SE	ESE	ESE	E	ESE	E	E	ESE	SE	SE	SE	SE	SE	SE	SE	SE	-	-	-	24
20	WS	5.1	5.3	5.3	2.2	2.2	3.5	2.6	3.8	8.2	6.7	6.0	7.0	8.1	7.1	6.1	7.6	7.8	7.6	5.2	3.9	4.5	5.4	5.2	5.2	2.2	8.2	5.0	24
	WD	SSE	SSE	SSE	SE	NNE	NNE	NE	SE	SSE	SE	ESE	SSE	SE	SSE	SSE	SSE	SSE	SSE	SE	SSE	SE	SE	SE	SE	-	-	-	24



VECTOR WIND SPEED Hourly Averages (kph) & WIND DIRECTION Hourly Averages in Sector

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	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																														
21	WS	4.6	4.6	2.8	3.9	3.4	3.8	4.1	4.4	5.4	5.0	6.8	6.9	6.7	7.5	6.2	6.2	3.8	6.0	5.3	2.3	0.9	1.3	0.3	1.1	0.3	7.5	3.5	24	
	WD	SE	SE	E	NNE	NE	NNE	NNE	NE	NE	ESE	SE	ESE	ESE	ESE	ESE	ESE	ENE	ENE	E	ESE	E	E	ENE	-	-	-	24		
22	WS	0.6	0.2	0.7	0.9	0.6	0.4	0.7	0.7	0.4	3.8	3.4	2.3	3.0	0.8	3.9	1.5	0.8	1.3	2.4	2.8	2.1	1.4	0.7	0.8	0.2	3.9	0.6	24	
	WD	ESE	SSE	ENE	SSW	ESE	ESE	E	ESE	WSW	ESE	NE	NW	ENE	SSW	S	SW	ESE	SSW	SSW	SSW	SSW	S	SSW	-	-	-	24		
23	WS	1.2	1.4	0.0	0.2	0.5	0.6	0.2	2.3	3.7	3.7	2.1	4.0	3.9	5.4	3.4	2.3	3.0	1.5	1.3	5.8	4.9	5.4	4.8	4.5	0.0	5.8	1.2	24	
	WD	SSE	SSW	S	ESE	SSW	SW	NW	WNW	N	N	NW	WSW	SSW	S	WNW	NNW	N	NNE	NNW	NNE	NE	NNE	NE	NNE	-	-	-	24	
24	WS	6.7	4.3	4.2	3.4	3.9	3.5	5.3	6.6	5.9	6.0	4.4	6.9	6.7	8.5	8.6	7.9	9.0	7.0	6.0	3.0	1.4	0.3	1.0	1.9	0.3	9.0	5.0	24	
	WD	NNE	NNE	NE	NE	NE	NE	NE	NE	NE	ENE	NE	NE	NE	NE	NE	NE	NE	ENE	E	SE	NE	ENE	NE	-	-	-	24		
25	WS	2.2	2.4	1.6	0.3	0.2	0.1	0.2	2.7	3.3	3.7	3.1	3.9	3.0	1.1	2.8	2.6	4.2	3.6	3.3	3.5	1.3	0.8	0.3	1.3	0.1	4.2	1.0	24	
	WD	NE	NE	ENE	ENE	S	SSE	E	S	SSW	S	SSW	SSW	SSW	SSW	NNE	E	SSW	SW	WSW	W	W	SW	WNW	SE	-	-	-	24	
26	WS	0.3	0.5	0.5	0.4	0.1	1.5	4.4	6.6	5.3	7.0	4.3	2.4	3.8	2.2	2.1	3.9	6.4	5.2	6.6	3.7	3.5	4.1	4.3	2.4	0.1	7.0	1.0	24	
	WD	S	SSE	SSE	SE	E	NNE	NE	NE	NE	NE	N	ENE	E	ESE	S	S	S	SSW	S	S	S	S	SSW	-	-	-	24		
27	WS	5.2	6.8	6.9	5.4	3.9	4.8	4.6	4.6	5.0	3.8	5.2	4.7	5.0	5.5	5.1	3.7	3.8	3.6	2.2	3.2	3.6	3.3	2.9	1.8	1.8	6.9	3.7	24	
	WD	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	24
28	WS	1.5	2.2	1.4	2.4	2.0	1.2	0.8	1.2	3.1	4.7	6.6	6.9	6.9	6.8	5.4	6.0	5.8	4.4	4.4	3.3	4.3	4.6	4.8	3.5	0.8	6.9	3.5	24	
	WD	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	24
29	WS	4.1	5.8	4.8	5.3	5.8	7.3	6.6	6.1	6.4	8.3	7.3	7.4	6.9	6.9	8.0	6.9	6.5	5.3	3.7	1.9	3.6	3.5	1.0	1.5	1.0	8.3	4.8	24	
	WD	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	24
30	WS	1.7	2.0	4.6	5.0	7.4	8.7	8.9	7.4	5.8	5.3	9.6	9.3	8.7	11.0	11.9	15.0	14.1	12.0	9.2	8.7	4.3	0.3	2.0	0.4	0.3	15.0	6.7	24	
	WD	SW	WSW	WNW	N	N	NNE	NNE	N	N	N	NNE	N	N	N	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NNE	NE	ENE	-	-	-	24
WS HOURLY MAX		8.9	7.8	6.9	6.4	7.5	8.7	8.9	12.4	12.5	12.6	13.1	13.2	13.4	13.5	12.8	18.2	17.3	15.2	9.9	10.1	8.1	6.8	6.9	7.0					

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

LAST CALIBRATION:	September 17, 2018
DECLINATION :	MAGNETIC DECLINATION 16 DEGREE EAST

MONTHLY SUMMARY

WIND SPEED					
MINIMUM 1-HR AVERAGE	0.0	kph	@ HOUR(S)	1 ON DAY(S)	5
MAXIMUM 1-HR AVERAGE:	18.2	kph	@ HOUR(S)	15 ON DAY(S)	10
MAXIMUM 24-HR AVERAGE:	8.3	kph		ON DAY(S)	10
				VAR-VARIOUS	
				MONTHLY AVERAGE:	0.7 kph
WIND DIRECTION					
				MONTHLY AVERAGE:	70 (ENE)
HOURS IN SERVICE	744	hrs			
HOURS OF DATA	720	hrs			
HOURS OF CALIBRATION	0	hrs		STANDARD DEVIATION:	3.1
HOURS OF MISSING DATA	0	hrs		AMD OPERATION UPTIME:	100.0 %



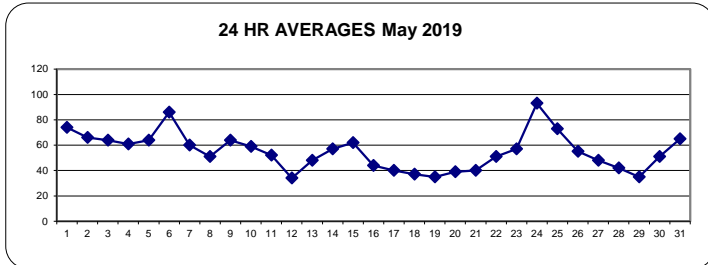
RELATIVE HUMIDITY Hourly Averages (RH %)

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

STATUS FLAG CODES

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

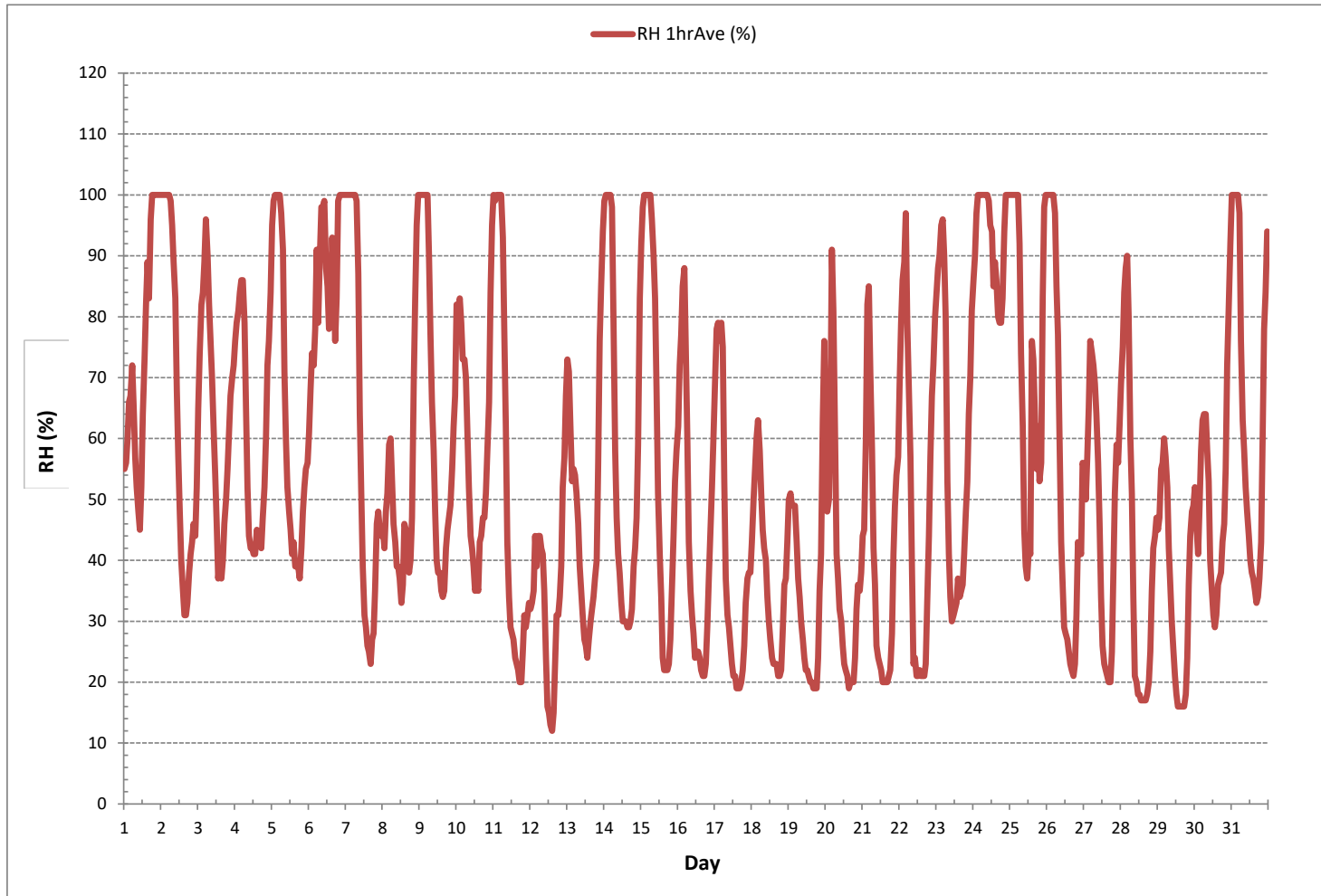
24 HR AVERAGES May 2019



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	12	%	@ HOUR	14	ON DAY	12
MAXIMUM 1-HR AVERAGE:	100	%	@ HOUR	18	ON DAY	1
MAXIMUM 24-HR AVERAGE:	93	%			ON DAY	24
OPERATIONAL TIME:						744 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	26					MONTHLY AVERAGE: 55 %

RELATIVE HUMIDITY Hourly Averages (RH %)





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	940	940	940	939	939	938	938	938	938	937	937	936	935	935	934	933	933	933	932	932	933	932	932	932	932	932	940	936	24
2	932	932	932	932	932	932	933	933	934	934	934	934	934	934	934	933	933	933	933	933	933	932	932	931	931	931	934	933	24
3	931	930	930	930	929	930	930	930	931	931	932	932	932	932	933	934	934	935	935	936	936	936	936	936	936	929	936	933	24
4	936	936	936	936	936	937	937	938	938	938	938	938	938	938	938	939	939	939	940	940	940	940	940	940	940	936	940	938	24
5	940	940	940	941	941	941	942	942	943	943	942	942	942	942	941	942	942	941	941	941	941	941	941	941	941	940	943	941	24
6	941	941	941	941	941	941	941	941	941	941	941	941	940	940	940	940	940	940	940	940	940	940	940	940	940	940	941	940	24
7	941	941	941	941	941	942	942	943	944	945	945	945	945	945	945	945	945	945	945	945	945	946	946	947	947	941	947	944	24
8	947	947	947	947	947	947	948	949	949	949	949	948	948	948	948	948	948	947	947	947	946	946	946	945	945	949	947	24	
9	945	945	945	944	944	944	943	944	943	943	942	941	940	939	938	936	936	935	934	933	932	932	932	931	931	931	945	939	24
10	931	931	931	931	932	932	933	934	934	935	935	935	935	935	935	936	936	937	937	937	937	937	937	937	937	931	937	934	24
11	937	937	937	937	937	937	937	938	938	937	937	936	935	935	935	934	933	932	932	931	930	930	929	928	928	928	938	935	24
12	928	928	927	927	926	926	926	926	926	926	926	926	926	926	926	926	926	927	928	928	929	929	929	929	926	926	929	927	24
13	929	930	930	931	931	932	933	933	934	934	934	934	934	934	935	935	935	936	936	936	937	937	937	937	937	929	937	934	24
14	937	937	937	938	938	938	939	940	940	940	940	939	939	938	938	937	937	936	936	935	935	935	934	934	934	940	940	937	24
15	934	934	933	933	933	933	934	934	935	935	936	936	937	937	938	938	939	939	939	939	939	940	940	941	933	941	937	24	
16	942	941	941	942	942	942	943	943	944	944	944	943	943	943	942	942	941	941	940	940	940	940	940	940	940	940	944	942	24
17	940	939	939	939	939	940	940	941	942	942	942	942	941	941	941	941	941	941	941	940	940	940	941	941	939	942	941	24	
18	942	942	942	943	943	944	945	945	946	946	946	946	946	945	945	945	945	945	945	945	944	944	944	944	942	946	944	24	
19	944	944	944	945	945	945	946	946	947	947	946	946	946	945	945	944	944	944	943	943	942	942	942	942	942	942	947	944	24
20	941	942	942	942	941	942	943	943	943	943	943	942	942	941	941	941	940	940	940	939	939	938	938	938	938	938	943	941	24
21	938	939	939	938	938	939	940	941	941	941	942	942	942	942	942	941	941	941	941	941	941	941	941	941	938	942	941	24	
22	941	941	941	941	941	942	943	943	943	944	943	943	942	942	942	941	941	941	941	940	940	940	940	940	940	944	942	24	
23	939	939	939	939	939	939	939	940	940	940	940	939	939	939	938	938	937	937	936	936	936	936	935	935	935	940	938	24	
24	935	934	934	934	933	934	934	934	934	933	934	934	934	934	934	934	934	934	934	935	935	935	935	935	933	935	934	24	
25	935	935	935	936	936	936	937	938	939	939	939	939	939	939	939	940	940	940	940	940	940	940	941	935	941	939	24		
26	941	941	941	942	942	943	943	944	945	945	945	945	945	944	944	944	943	943	942	942	941	940	940	940	940	940	945	943	24
27	939	939	939	939	938	938	939	939	939	939	939	939	939	938	938	937	937	937	937	936	936	936	936	936	936	936	939	938	24
28	935	935	935	935	935	935	936	937	937	937	937	937	936	936	936	935	935	934	934	934	933	933	933	933	933	933	937	935	24
29	933	933	933	933	932	932	933	933	933	933	932	932	931	931	931	930	930	930	930	930	929	929	929	929	929	929	933	931	24
30	929	929	929	931	932	933	934	935	936	937	937	937	938	938	939	940	940	941	941	941	942	942	942	942	929	942	937	24	
31	942	943	943	943	943	943	944	944	944	944	944	944	943	943	942	941	941	941	940	940	939	939	939	939	939	944	942	24	
HOURLY MAX	947	947	947	947	947	947	948	949	949	949	949	949	948	948	948	948	948	947	947	947	946	946	946	947					
HOURLY AVG	938	938	938	938	938	938	939	939	939	939	939	939	939	939	939	938	938	938	938	938	938	938	938	938					

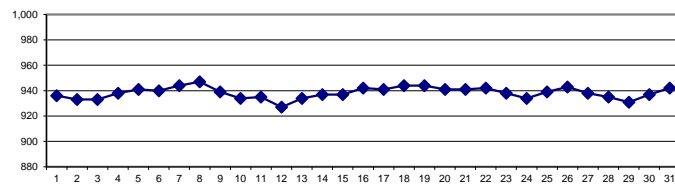
STATUS FLAG CODES

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

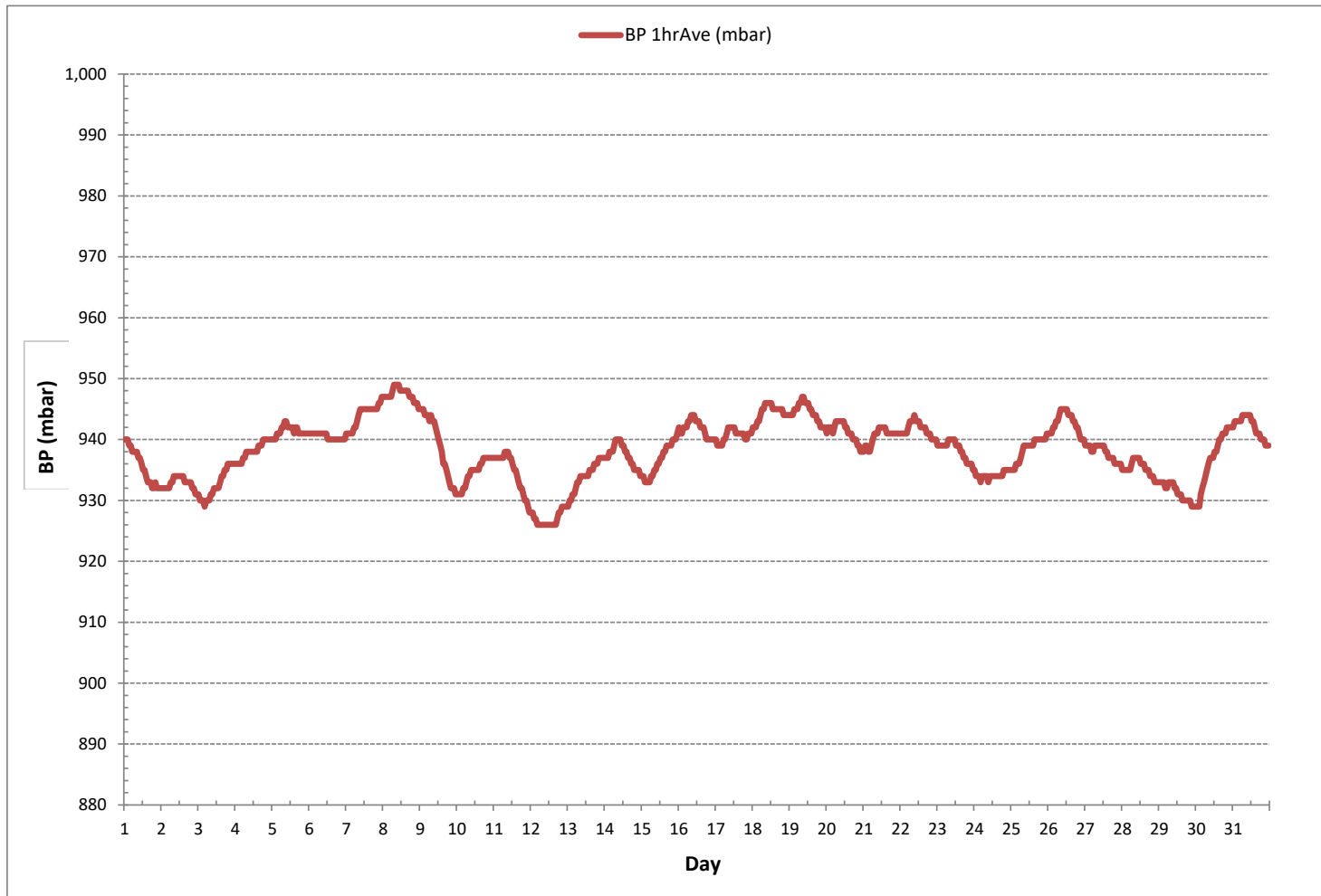
MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	926 mbar	@ HOUR	4	ON DAY	12
MAXIMUM 1-HR AVERAGE:	949 mbar	@ HOUR	7	ON DAY	8
MAXIMUM 24-HR AVERAGE:	947 mbar			ON DAY	8
OPERATIONAL TIME:					744 hrs
AMD OPERATION UPTIME:					100.0 %
STANDARD DEVIATION:	5			MONTHLY AVERAGE:	938 mbar

24 HR AVERAGES May 2019



BAROMETRIC PRESSURE Hourly Averages (BP mbar)





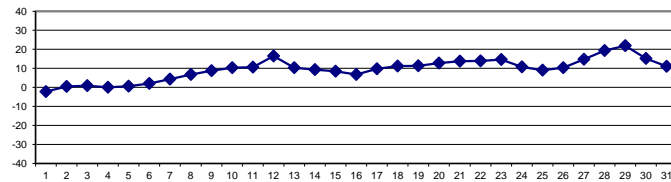
AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	-5.5	-5.6	-5.8	-6.2	-6.5	-6.8	-5.4	-3.7	-2.3	-1.0	0.1	0.7	0.5	1.1	1.0	1.0	1.3	-0.3	-0.6	-0.8	-1.0	-1.3	-3.0	-4.0	-6.8	1.3	-2.2	24	
2	-3.7	-3.7	-4.7	-5.8	-6.3	-6.0	-4.4	-2.8	-0.9	-0.2	1.2	2.0	3.2	5.0	5.4	6.3	5.9	5.6	5.0	3.6	2.3	1.5	2.3	2.0	-6.3	6.3	0.5	24	
3	1.5	0.8	0.2	-0.3	-0.7	-1.3	0.1	1.5	1.4	0.8	1.3	2.3	2.9	4.0	3.5	3.8	2.9	1.8	1.5	0.3	-0.4	-1.2	-1.9	-2.2	-2.2	4.0	0.9	24	
4	-2.7	-3.0	-3.6	-4.2	-4.5	-4.4	-3.5	-1.5	0.2	1.7	2.7	3.2	3.4	3.5	3.2	3.6	3.7	3.8	2.8	2.0	0.4	-1.1	-1.7	-1.9	-4.5	3.8	0.1	24	
5	-3.2	-4.2	-4.8	-4.4	-5.4	-4.7	-2.7	-1.7	0.6	1.2	1.7	2.5	3.5	4.1	4.1	5.0	4.8	4.8	5.1	3.5	1.3	0.8	0.8	0.9	-5.4	5.1	0.6	24	
6	-0.2	-1.4	-1.9	-1.4	-1.2	-0.4	2.0	1.6	1.3	1.6	2.1	3.9	4.8	5.8	5.2	5.6	6.7	7.3	5.4	2.9	1.9	0.8	-0.1	-0.7	-1.9	7.3	2.1	24	
7	-0.6	-1.2	-1.7	-2.5	-2.8	-2.8	-1.4	0.8	3.6	5.9	7.2	8.3	9.7	10.0	10.8	10.7	10.8	9.7	8.8	6.3	3.3	2.9	3.9	4.0	-2.8	10.8	4.3	24	
8	4.0	4.3	3.6	2.8	1.6	1.8	4.3	6.2	7.4	9.0	10.3	11.3	11.3	10.7	10.7	11.0	11.6	11.8	11.3	9.4	5.2	2.9	1.0	-0.2	-0.2	11.8	6.8	24	
9	-0.4	-1.3	-1.8	-2.3	-2.5	-0.9	3.4	6.0	8.3	10.2	11.8	13.0	13.5	14.5	15.7	16.4	16.4	15.4	15.0	14.1	13.6	12.5	11.2	9.9	-2.5	16.4	8.8	24	
10	7.3	7.6	7.3	8.4	9.5	9.7	10.7	11.6	11.9	13.0	13.6	13.9	14.5	14.8	14.6	13.6	12.3	11.0	10.7	9.7	8.3	6.8	3.8	2.2	2.2	14.8	10.3	24	
11	0.8	1.0	0.6	-0.3	-1.5	0.2	3.1	6.5	9.2	11.7	13.7	15.0	16.2	17.1	18.1	18.6	18.8	19.0	18.6	16.3	13.3	13.6	12.8	11.9	-1.5	19.0	10.6	24	
12	12.6	12.2	12.0	10.6	11.6	11.3	12.3	14.7	17.4	19.7	22.3	23.8	23.6	23.9	23.6	23.0	22.8	20.7	18.7	16.9	14.7	10.7	9.8	7.8	7.8	7.8	23.9	16.5	24
13	6.6	6.4	6.5	7.2	5.9	6.7	8.4	10.4	12.0	13.2	14.4	15.5	16.2	16.4	15.7	15.3	14.9	14.2	12.7	11.0	7.9	4.5	2.9	1.3	1.3	16.4	10.3	24	
14	0.2	-0.9	-1.6	-1.9	-1.9	0.3	5.4	9.0	10.6	11.6	12.7	14.3	15.4	15.5	15.5	15.9	16.0	15.8	15.2	13.7	12.2	11.6	10.3	8.5	-1.9	16.0	9.3	24	
15	7.5	6.7	6.2	5.7	5.5	5.3	5.5	6.2	6.6	7.0	8.2	10.4	10.8	11.7	12.8	13.9	13.8	13.9	12.9	11.4	8.0	6.3	4.5	3.6	3.6	13.9	8.5	24	
16	2.5	0.7	-0.5	-1.8	-2.1	0.4	3.0	6.0	7.8	8.8	9.3	10.5	11.4	12.2	12.6	13.2	12.9	12.6	11.8	10.8	8.0	6.0	4.1	2.7	-2.1	13.2	6.8	24	
17	1.0	0.0	-0.2	0.0	-0.4	1.5	5.9	9.3	11.1	11.8	12.8	14.1	14.8	15.7	16.5	16.9	16.7	16.6	15.5	13.8	11.5	9.9	9.3	8.6	-0.4	16.9	9.7	24	
18	7.4	6.3	5.7	4.8	4.1	5.8	7.8	9.4	10.8	11.8	13.8	14.7	15.7	16.6	17.2	17.4	17.0	16.4	15.7	14.5	11.7	9.2	8.8	6.9	4.1	17.4	11.2	24	
19	5.3	5.1	5.4	5.4	5.4	6.9	8.9	10.7	12.7	13.8	14.7	15.5	16.2	16.8	17.4	17.8	17.9	17.6	16.9	15.0	11.0	9.0	5.0	2.6	2.6	17.9	11.4	24	
20	5.4	7.4	7.2	4.2	0.7	3.6	8.0	11.9	13.5	15.0	15.9	17.1	18.0	18.5	19.3	19.6	19.0	19.2	18.1	16.4	13.2	11.6	11.5	10.9	0.7	19.6	12.7	24	
21	9.5	9.2	6.7	2.9	2.1	4.7	9.0	13.0	14.9	17.5	18.5	19.1	20.2	20.5	19.9	20.6	20.8	20.0	19.5	17.4	13.5	11.1	10.6	9.6	2.1	20.8	13.8	24	
22	7.4	5.7	4.5	4.0	3.2	7.2	10.4	14.1	18.1	20.6	19.4	20.6	20.8	21.0	21.3	21.0	21.0	21.0	18.8	16.1	12.1	9.9	8.7	7.6	3.2	21.3	13.9	24	
23	7.5	7.5	6.9	6.1	5.9	7.3	11.6	15.6	17.6	19.2	19.7	19.7	19.5	19.3	18.7	19.6	19.1	19.1	18.0	16.6	15.4	14.0	13.2	12.2	5.9	19.7	14.6	24	
24	11.6	11.2	10.4	9.8	9.7	9.6	9.9	10.1	10.1	11.1	12.1	12.8	12.6	13.7	12.4	12.5	13.0	13.4	12.8	11.7	9.6	7.0	5.7	5.0	5.0	13.7	10.7	24	
25	3.3	2.4	2.0	1.0	1.0	3.3	7.5	10.0	11.8	13.1	14.5	15.4	14.7	15.2	12.1	11.3	13.5	14.4	13.3	12.1	10.6	6.5	4.2	2.7	1.0	15.4	9.0	24	
26	1.4	0.3	-0.7	-1.4	-1.6	1.4	5.4	8.8	11.5	12.7	13.4	14.9	16.0	16.9	17.9	18.4	18.8	18.8	18.2	16.1	11.5	10.7	10.7	7.8	-1.6	18.8	10.3	24	
27	8.1	10.0	9.0	8.2	7.0	7.6	8.5	9.8	11.5	13.8	17.3	20.2	21.6	22.0	22.6	22.7	22.8	22.5	21.2	18.1	14.6	12.3	12.3	10.9	7.0	22.8	14.8	24	
28	9.5	8.3	6.9	6.1	6.1	8.7	13.4	17.0	20.8	23.8	24.6	25.9	26.9	27.6	28.2	28.1	28.2	27.8	26.9	24.6	20.9	18.7	17.5	16.3	6.1	28.2	19.3	24	
29	16.1	15.8	13.9	13.2	12.6	13.0	14.3	16.7	19.6	22.7	25.5	28.1	29.5	30.4	30.5	30.8	31.0	30.5	29.6	26.7	22.2	19.0	17.7	16.7	12.6	31.0	21.9	24	
30	14.9	15.3	17.1	17.0	16.3	15.0	14.4	14.6	15.0	15.4	18.2	20.2	21.0	21.2	20.1	18.5	17.1	16.0	14.9	13.4	11.0	7.7	6.1	4.6	4.6	21.2	15.2	24	
31	3.1	2.1	1.6	1.0	0.8	3.1	7.7	9.8	11.2	12.9	13.7	15.1	16.3	17.1	17.9	18.6	19.1	18.9	18.4	16.9	13.0	9.6	8.2	6.9	0.8	19.1	11.0	24	
HOURLY MAX	16.1	15.8	17.1	17.0	16.3	15.0	14.4	17.0	20.8	23.8	25.5	28.1	29.5	30.4	30.5	30.8	31.0	30.5	29.6	26.7	22.2	19.0	17.7	16.7					
HOURLY AVG	4.5	4.0	3.4	2.8	2.3	3.5	5.9	8.1	9.8	11.3	12.5	13.7	14.3	14.9	15.0	15.2	15.2	14.8	14.0	12.3	9.7	7.9	6.8	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

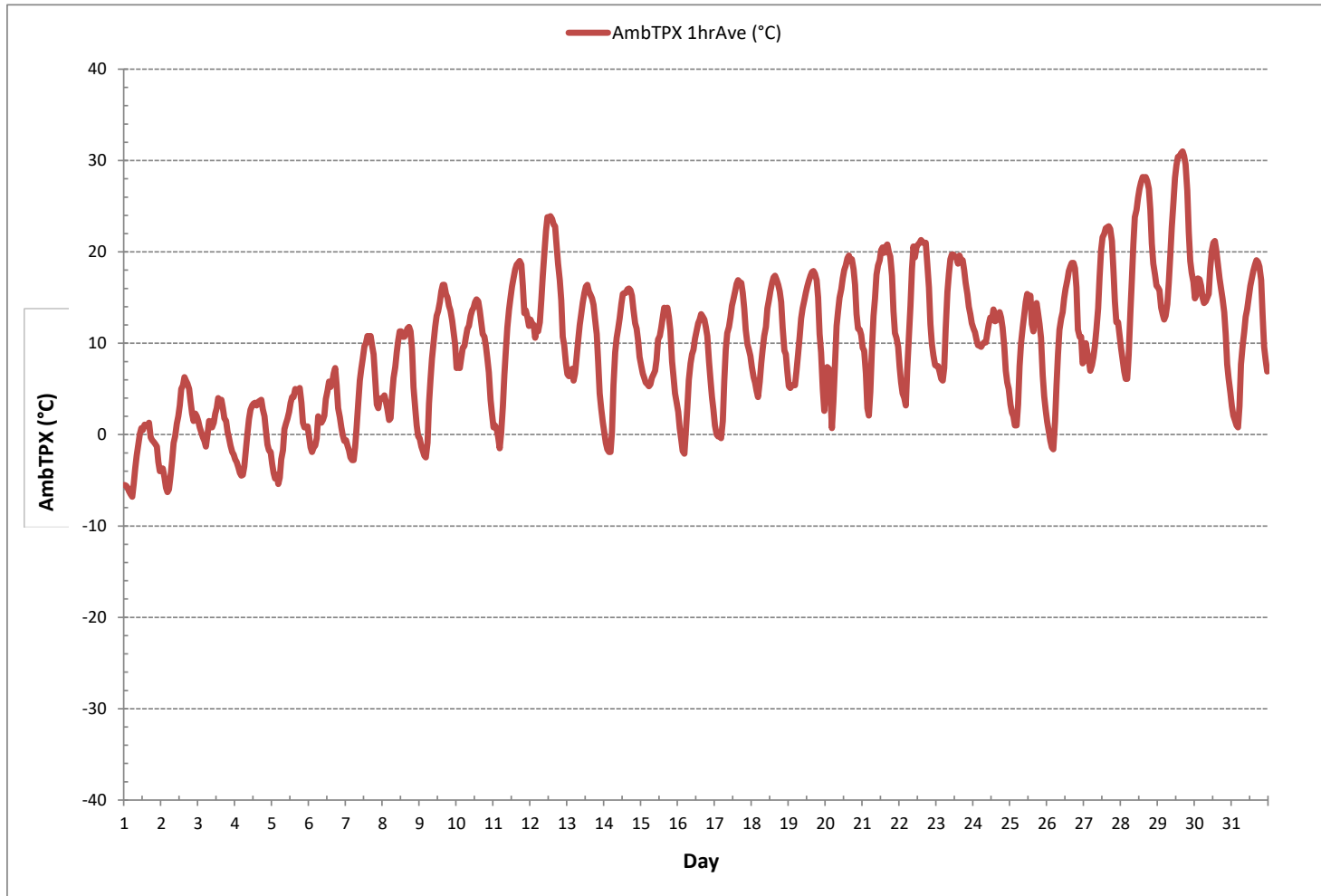
24 HR AVERAGES May 2019



MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	-6.8 °C	@ HOUR	5	ON DAY	1
MAXIMUM 1-HR AVERAGE:	31.0 °C	@ HOUR	16	ON DAY	29
MAXIMUM 24-HR AVERAGE:	21.9 °C			ON DAY	29
OPERATIONAL TIME:				744 hrs	
AMD OPERATION UPTIME:				100.0 %	
STANDARD DEVIATION:	7.7			MONTHLY AVERAGE:	9.5 °C

AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



PRECIPITATION Hourly TOTALS (mm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.				
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	SUM					
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	0.2	0.1	0.0	0.8	0.0	0.4	1.2	0.0	0.0	0.0	0.0	1.2	2.7	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.0	0.0	0.0	2.1	0.1	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.1	4.9	24				
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.1	0.0	0.0	0.1	0.1	24				
15	0.2	0.5	0.3	0.4	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.0	24				
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				
24	0.0	0.2	1.1	0.0	0.1	0.0	0.1	0.1	0.7	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.6	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	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4	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	0.2	0.5	1.1	0.4	0.5	0.1	0.1	0.1	0.7	0.2	0.3	0.0	0.1	0.1	2.1	0.1	0.0	0.8	0.0	2.0	1.2	0.0	0.0	0.1	0.0	0.0	0.0	24				
HOURLY SUM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24				

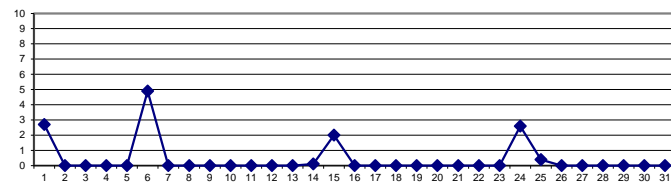
STATUS FLAG CODES

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

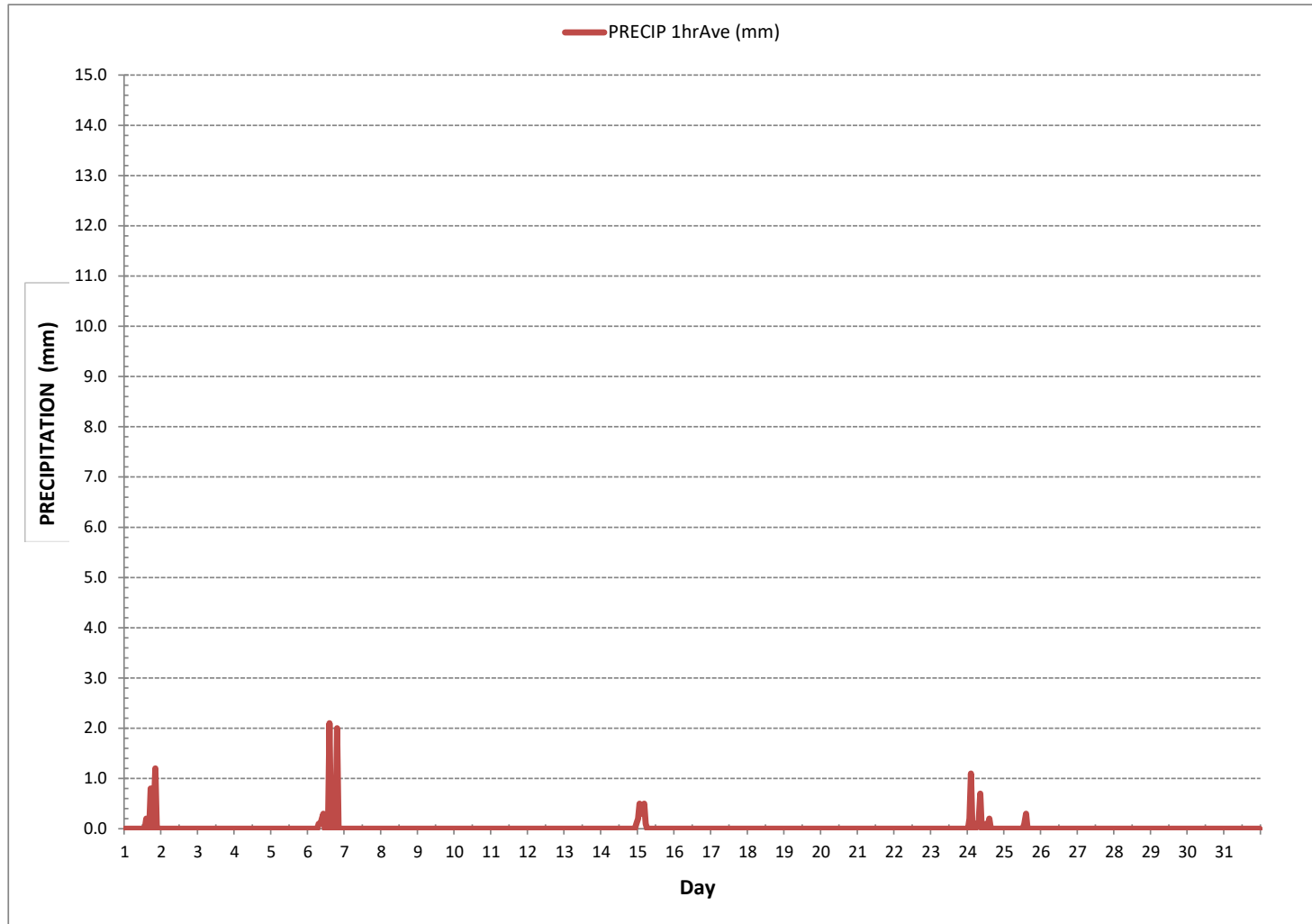
MONTHLY SUMMARY

MINIMUM 1-HR TOTAL:	0.0	mm	@ HOUR	0	ON DAY	1
MAXIMUM 1-HR TOTAL:	2.1	mm	@ HOUR	14	ON DAY	6
MAXIMUM 24-HR TOTAL:	4.9	mm			ON DAY	6
OPERATIONAL TIME:						744 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	0.1					MONTHLY TOTAL: 12.7 mm

24 HR TOTALS May 2019



PRECIPITATION Hourly TOTALS (mm)





SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)

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

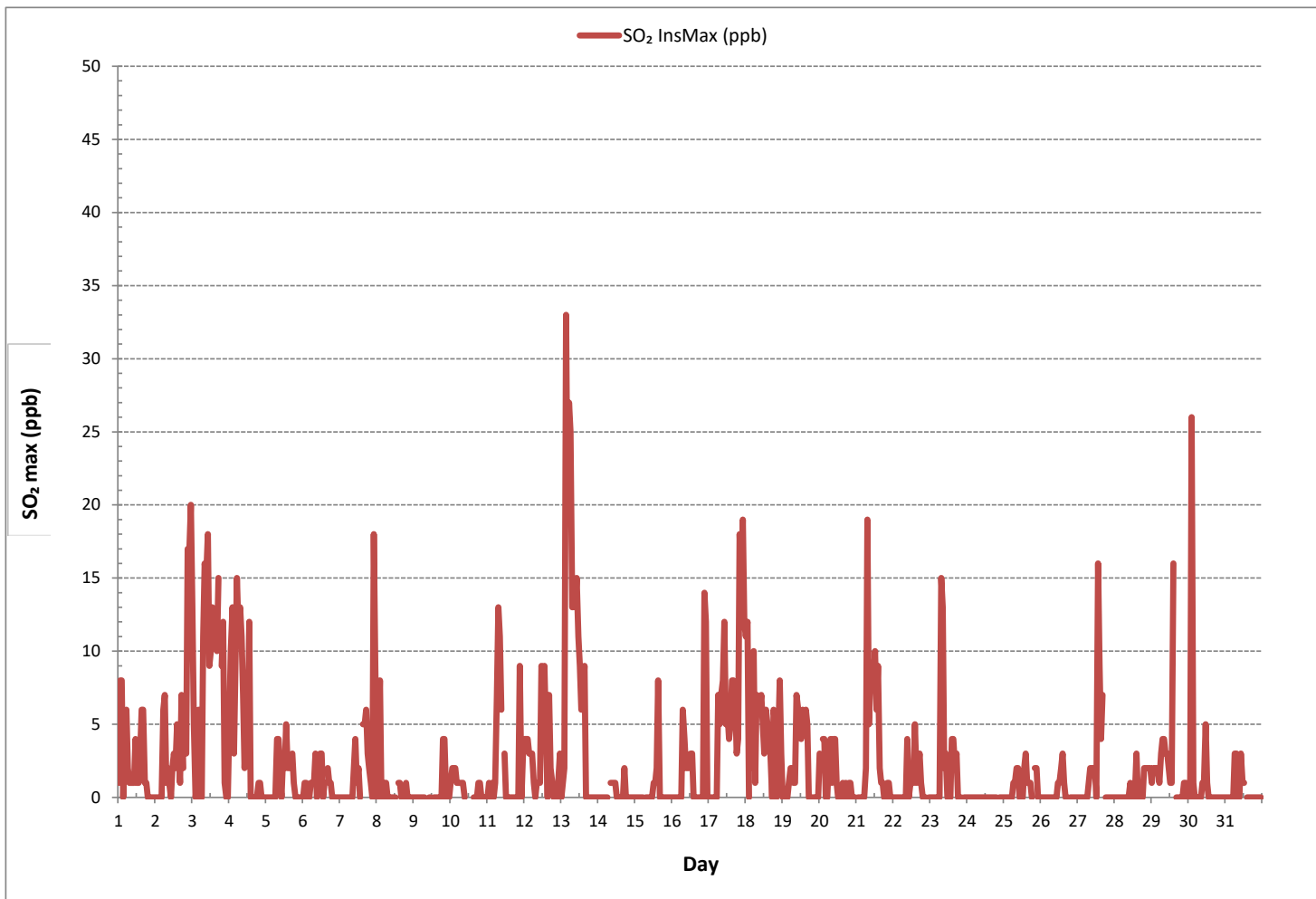
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	339
MAXIMUM INSTANTANEOUS VALUE:	33 ppb @ HOUR 3 ON DAY 13
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	4
OPERATIONAL TIME:	744 hrs

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)





HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)

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

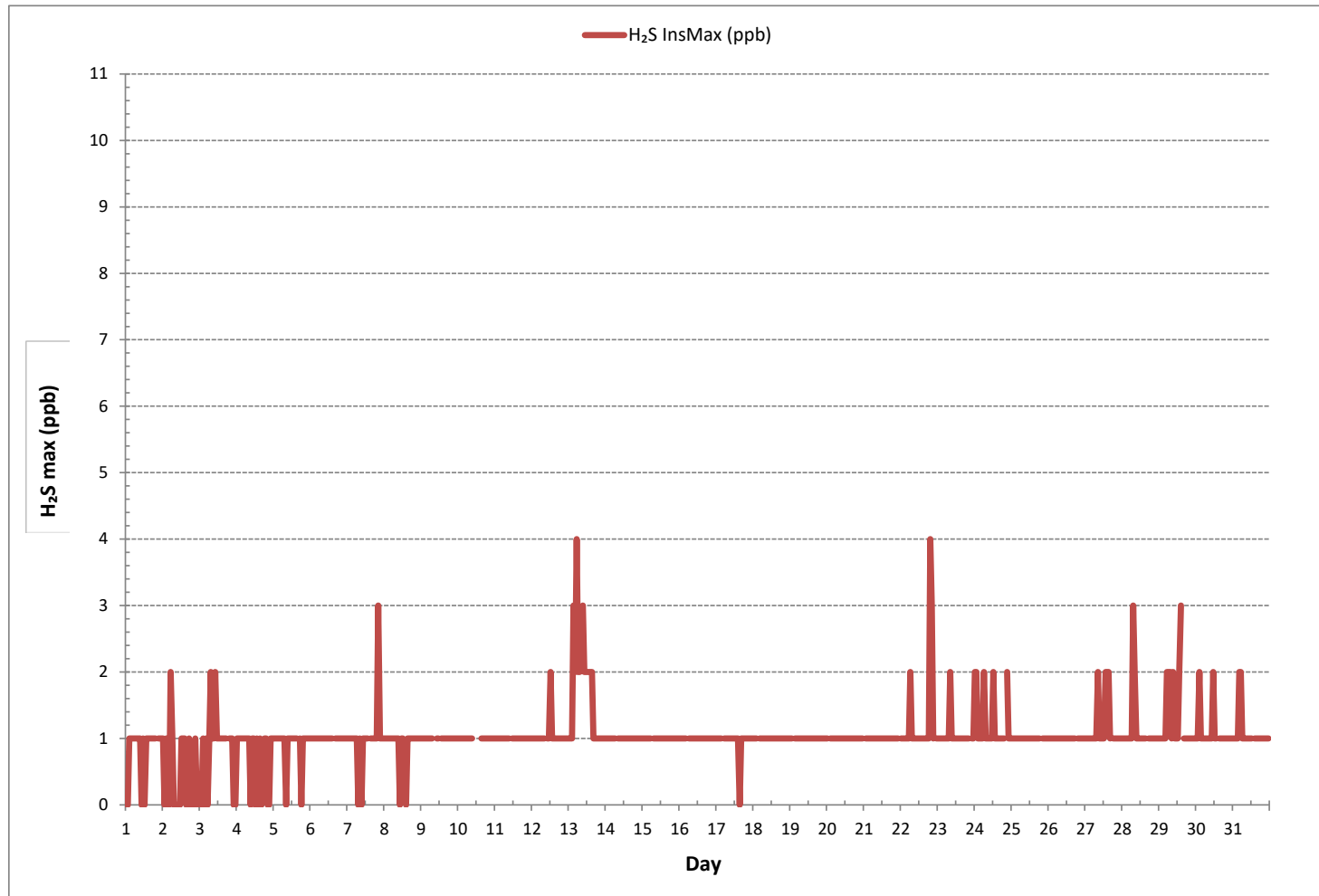
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	669
MAXIMUM INSTANTANEOUS VALUE:	4 ppb @ HOUR 5 ON DAY 13
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	0

HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)





TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY MIN.	DAILY MAX.	24-HR AVG.	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59					
DAY 1	2.02	2.02	2.02	2.02	2.02	2.04	2.02	2.05	2.06	2.05	2.06	2.07	2.07	2.09	2.08	2.08	2.09	2.07	2.07	2.07	S	2.08	2.08	2.08	2.02	2.09	2.06	24	
2	2.08	2.12	2.17	2.23	2.17	2.54	2.45	2.08	2.08	2.05	2.02	2.00	2.00	2.01	2.02	2.00	1.99	2.01	2.01	S	2.02	2.08	2.01	2.04	1.99	1.99	2.54	2.09	24
3	2.07	2.01	1.99	1.99	2.02	2.00	2.04	2.06	2.04	2.35	5.18	3.38	2.03	2.04	2.05	2.02	2.01	2.04	S	2.01	2.02	2.00	2.00	1.99	1.99	5.18	2.23	24	
4	2.00	2.02	2.03	2.00	2.00	2.01	2.01	1.99	1.99	1.98	1.98	1.98	1.99	2.00	2.00	2.00	2.00	S	2.01	2.01	2.00	2.00	2.00	1.99	1.98	2.03	2.00	24	
5	1.98	1.99	2.14	2.01	2.02	2.05	2.08	2.01	2.00	1.99	1.98	1.99	1.99	2.01	2.00	2.00	S	2.00	2.00	2.00	2.00	2.00	2.01	2.00	1.98	2.14	2.01	24	
6	2.00	2.02	2.05	2.13	2.12	2.11	2.07	2.07	2.06	2.06	2.06	2.07	2.07	2.06	2.08	S	2.04	2.04	2.04	2.06	2.06	2.07	2.05	2.05	2.00	2.13	2.06	24	
7	2.04	2.04	2.03	2.05	2.04	2.04	2.04	2.03	2.01	2.01	2.02	2.02	2.01	2.01	S	2.01	2.01	2.06	2.02	2.04	2.09	2.00	2.08	2.04	2.00	2.09	2.03	24	
8	1.99	2.01	2.02	2.01	2.01	2.04	2.08	2.04	2.04	2.05	2.05	2.06	2.05	S	2.04	2.04	2.03	2.04	2.03	2.03	2.11	2.19	2.58	2.34	1.99	2.58	2.08	24	
9	2.81	2.66	2.51	2.65	2.52	2.50	2.43	2.25	2.22	Q	Q	2.07	S	C	C	C	C	2.05	2.05	2.09	2.09	2.11	2.12	2.14	2.05	2.81	-	24	
10	2.20	2.16	2.29	2.06	2.03	2.01	2.01	2.01	2.01	2.00	S	2.01	2.01	2.01	2.01	2.00	2.01	2.01	2.02	2.02	2.03	2.03	2.02	2.00	2.29	2.04	24		
11	2.09	2.12	2.09	2.10	2.12	2.13	2.13	2.04	2.07	2.06	S	2.05	2.05	2.07	2.09	2.05	2.04	2.03	2.03	2.04	2.05	2.09	2.08	2.10	2.03	2.13	2.07	24	
12	2.16	2.18	2.18	2.20	2.22	2.31	2.25	2.24	2.18	S	2.08	2.06	2.05	2.13	2.04	2.02	2.65	2.01	2.00	2.01	2.02	2.04	2.05	2.11	2.00	2.65	2.14	24	
13	2.32	2.11	2.08	2.50	2.23	2.67	2.36	2.21	S	2.21	2.10	2.06	2.04	2.08	2.08	2.11	2.04	2.03	2.04	2.05	2.05	2.07	2.05	2.09	2.03	2.67	2.15	24	
14	2.13	2.17	2.26	2.47	3.01	3.52	2.37	S	2.06	2.05	2.08	2.08	2.09	2.14	2.13	2.07	2.06	2.05	2.06	2.09	2.09	2.06	2.10	2.12	2.05	3.52	2.23	24	
15	2.10	2.10	2.08	2.08	2.06	2.06	S	2.05	2.03	2.04	2.03	2.04	2.04	2.04	2.04	2.02	2.03	2.04	2.04	2.04	2.04	2.08	2.06	2.07	2.02	2.10	2.05	24	
16	2.08	2.06	2.07	2.06	2.09	S	2.04	2.04	2.05	2.03	2.04	2.04	2.05	2.05	2.03	2.03	2.03	2.03	2.04	2.04	2.04	2.04	2.12	2.14	2.06	2.03	2.14	2.05	24
17	2.11	2.11	2.08	2.08	S	2.11	2.09	2.05	2.08	2.09	2.07	2.05	2.06	2.03	2.03	2.04	2.06	2.04	2.02	2.03	2.12	2.05	2.15	2.05	2.02	2.15	2.07	24	
18	2.05	2.05	2.04	S	2.04	2.07	2.03	2.09	2.07	2.05	2.07	2.04	2.05	2.09	2.04	2.04	2.04	2.03	2.04	2.05	2.05	2.07	2.09	2.10	2.03	2.10	2.05	24	
19	2.08	2.08	S	2.09	2.10	2.10	2.07	2.07	2.07	2.07	2.07	2.05	2.04	2.04	2.04	2.03	2.02	2.03	2.02	2.03	2.02	2.05	2.07	2.17	2.13	2.02	2.17	2.07	24
20	2.12	S	2.09	2.26	2.26	2.15	2.16	2.07	2.07	2.05	2.05	2.04	2.05	2.06	2.05	2.04	2.04	2.03	2.04	2.04	2.06	2.06	2.07	2.05	2.03	2.26	2.08	24	
21	S	2.08	2.17	2.11	2.10	2.12	2.09	2.16	2.08	2.07	2.04	2.06	2.07	2.03	2.04	2.02	2.02	2.02	2.02	2.02	2.06	2.08	2.13	S	2.02	2.17	2.07	24	
22	2.12	2.09	2.12	2.22	2.58	2.57	2.30	2.18	2.11	2.07	2.03	2.03	2.02	2.03	2.03	2.03	2.04	2.10	2.05	2.75	2.56	2.25	S	2.42	2.02	2.75	2.20	24	
23	2.43	2.45	2.54	2.72	2.55	2.63	2.72	2.39	2.19	2.07	2.06	2.06	2.09	2.08	2.12	2.09	2.08	2.08	2.09	2.09	2.06	S	2.07	2.07	2.06	2.72	2.25	24	
24	2.07	2.05	2.06	2.06	2.07	2.05	2.06	2.06	2.05	2.04	2.05	2.06	2.06	2.05	2.06	2.06	2.05	2.05	2.04	2.05	S	2.07	2.09	2.10	2.04	2.10	2.06	24	
25	2.09	2.08	2.10	2.06	2.08	2.18	2.18	2.05	2.04	2.04	2.04	2.05	2.07	2.05	2.07	2.07	2.04	2.04	2.06	S	2.08	2.11	S1	2.16	2.04	2.18	2.08	23	
26	2.10	2.14	2.18	2.50	2.59	2.55	2.22	2.07	2.05	2.05	2.05	2.04	2.04	2.04	2.06	2.03	2.04	2.04	S	2.08	2.12	2.08	2.14	2.31	2.03	2.59	2.15	24	
27	2.24	2.28	2.32	2.27	2.29	2.33	2.33	2.25	2.27	2.37	S1	S1	2.16	2.07	2.07	2.05	2.04	S	2.06	2.07	2.11	2.14	2.21	2.16	2.04	2.37	2.19	22	
28	2.17	2.30	2.31	2.48	2.50	2.34	2.25	2.34	2.25	2.06	2.04	2.07	2.05	2.05	2.04	2.05	S	2.03	2.05	2.05	2.13	2.16	2.19	2.24	2.03	2.50	2.18	24	
29	2.26	2.47	2.45	2.49	2.51	2.49	2.38	2.29	2.29	2.22	2.10	2.09	2.04	2.06	2.17	S	2.03	1.99	2.01	2.00	2.09	2.12	2.28	2.15	1.99	2.51	2.22	24	
30	2.09	2.12	2.52	2.09	2.06	2.06	2.05	2.05	2.05	2.06	2.04	2.02	2.03	1.99	S	2.00	2.03	2.02	2.03	2.03	2.02	2.01	2.06	2.03	1.99	2.52	2.06	24	
31	2.03	2.06	2.06	2.06	2.42	2.60	2.24	2.01	2.07	2.04	2.04	2.03	2.04	S	2.04	2.05	2.07	2.07	2.10	2.11	2.09	2.15	2.25	2.01	2.60	2.12	24		
HOURLY MAX	2.81	2.66	2.54	2.72	3.01	3.52	2.72	2.39	2.29	2.37	5.18	3.38	2.16	2.14	2.17	2.11	2.65	2.10	2.09	2.75	2.56	2.25	2.58	2.42					
HOURLY AVG	2.13	2.14	2.17	2.20	2.23	2.28	2.19	2.11	2.09	2.08	2.16	2.09	2.05	2.05	2.06	2.04	2.06	2.04	2.04	2.07	2.08	2.08	2.11	2.12					

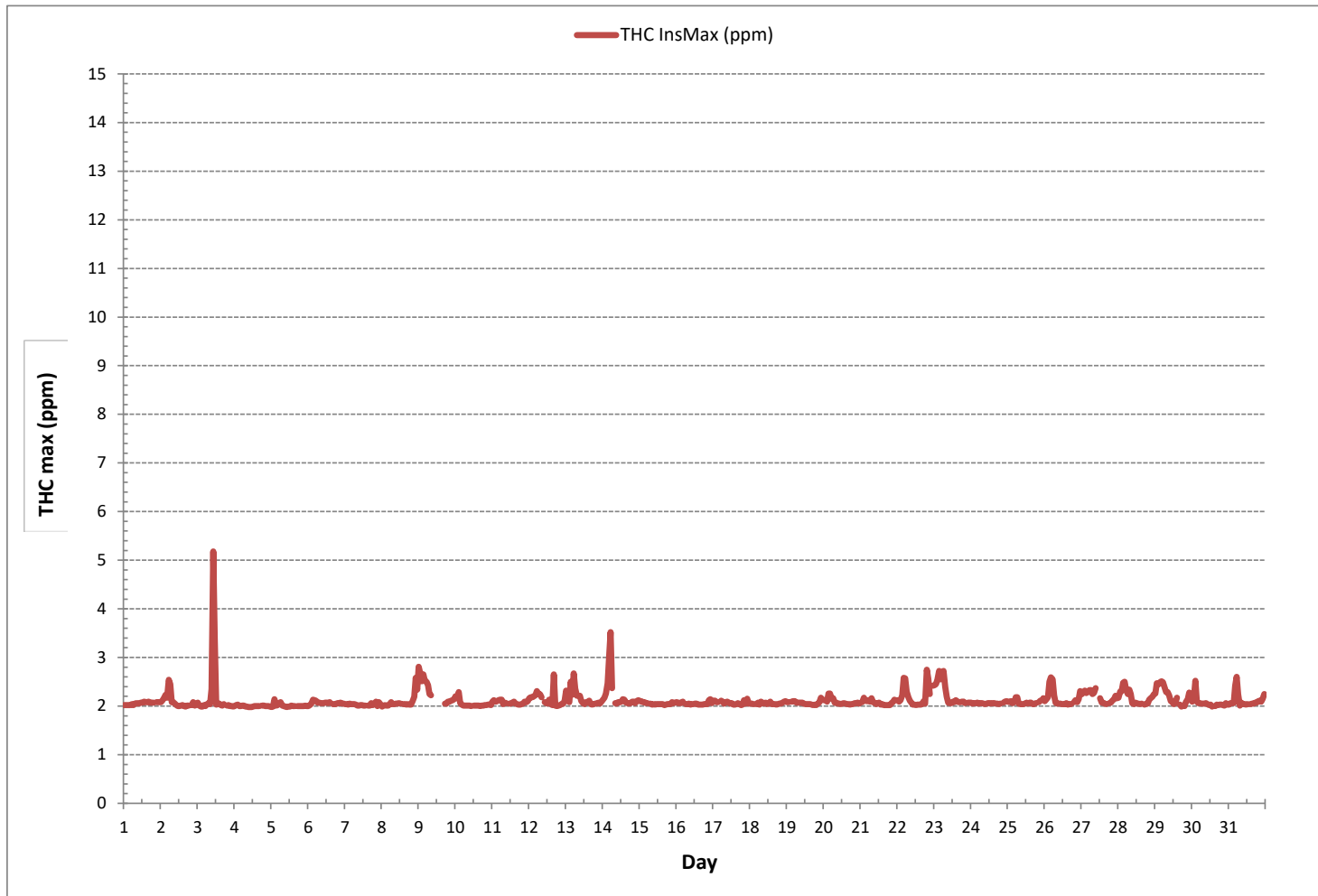
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	703
MAXIMUM INSTANTANEOUS VALUE:	5.18 ppm @ HOUR 10 ON DAY 3
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	4 hrs
OPERATIONAL TIME:	741 hrs
STANDARD DEVIATION:	0.19

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - May 2019

METHANE MAX Instantaneous Maximum (CH₄ 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	2.02	2.02	2.02	2.02	2.02	2.04	2.02	2.05	2.06	2.05	2.06	2.07	2.07	2.09	2.08	2.08	2.09	2.07	2.07	2.07	S	2.08	2.08	2.08	2.02	2.09	2.06	24	
2	2.08	2.12	2.17	2.23	2.17	2.31	2.28	2.08	2.08	2.05	2.02	2.00	2.00	2.01	2.02	2.00	1.99	2.01	2.01	S	2.02	2.08	2.01	2.04	1.99	2.31	2.08	24	
3	2.07	2.01	1.99	1.99	2.02	2.00	2.04	2.06	2.04	2.07	2.77	2.35	2.03	2.04	2.05	2.02	2.01	2.04	S	2.01	2.02	2.00	2.00	1.99	1.99	2.77	2.07	24	
4	2.00	2.02	2.03	2.00	2.00	2.01	2.01	1.99	1.99	1.98	1.98	1.98	1.99	2.00	2.00	2.00	2.00	S	2.01	2.01	2.00	2.00	2.00	1.99	1.98	2.03	2.00	24	
5	1.98	1.99	2.14	2.01	2.02	2.05	2.08	2.01	2.00	1.99	1.98	1.99	1.99	2.01	2.00	2.00	S	2.00	2.00	2.00	2.00	2.00	2.01	2.00	1.98	2.14	2.01	24	
6	2.00	2.02	2.05	2.13	2.12	2.11	2.07	2.07	2.06	2.06	2.06	2.07	2.07	2.06	2.08	S	2.04	2.04	2.04	2.06	2.06	2.07	2.05	2.05	2.00	2.13	2.06	24	
7	2.04	2.04	2.03	2.05	2.04	2.04	2.04	2.03	2.01	2.01	2.02	2.02	2.01	2.01	S	2.01	2.01	2.06	2.02	2.04	2.09	2.00	2.08	2.04	2.00	2.09	2.03	24	
8	1.99	2.01	2.02	2.01	2.01	2.04	2.08	2.04	2.04	2.05	2.05	2.06	2.05	S	2.04	2.04	2.03	2.04	2.03	2.03	2.11	2.19	2.58	2.34	1.99	2.58	2.08	24	
9	2.81	2.66	2.51	2.65	2.52	2.50	2.43	2.25	2.22	Q	Q	2.07	S	C	C	C	C	2.05	2.05	2.09	2.09	2.11	2.12	2.14	2.05	2.81	-	24	
10	2.20	2.16	2.29	2.06	2.03	2.01	2.01	2.01	2.01	2.01	2.00	S	2.01	2.01	2.01	2.01	2.00	2.01	2.01	2.02	2.02	2.03	2.03	2.02	2.00	2.29	2.04	24	
11	2.09	2.12	2.09	2.10	2.12	2.13	2.13	2.04	2.07	2.06	S	2.05	2.05	2.07	2.09	2.05	2.04	2.03	2.03	2.04	2.05	2.09	2.08	2.10	2.03	2.13	2.07	24	
12	2.16	2.18	2.18	2.20	2.22	2.31	2.25	2.24	2.18	S	2.08	2.06	2.05	2.04	2.04	2.02	2.53	2.01	2.00	2.01	2.02	2.04	2.05	2.11	2.00	2.53	2.13	24	
13	2.32	2.11	2.08	2.19	2.16	2.18	2.36	2.19	S	2.12	2.10	2.06	2.04	2.08	2.08	2.11	2.04	2.03	2.04	2.05	2.05	2.07	2.05	2.09	2.03	2.36	2.11	24	
14	2.13	2.17	2.26	2.32	2.34	2.35	2.37	S	2.06	2.05	2.08	2.08	2.09	2.14	2.13	2.07	2.06	2.05	2.06	2.09	2.09	2.06	2.10	2.12	2.05	2.37	2.14	24	
15	2.10	2.10	2.08	2.08	2.06	2.06	S	2.05	2.03	2.04	2.03	2.04	2.04	2.04	2.04	2.02	2.03	2.04	2.03	2.04	2.04	2.08	2.06	2.07	2.02	2.10	2.05	24	
16	2.08	2.06	2.07	2.06	2.09	S	2.04	2.04	2.05	2.03	2.04	2.04	2.05	2.05	2.03	2.03	2.03	2.03	2.04	2.04	2.04	2.12	2.14	2.06	2.03	2.14	2.05	24	
17	2.11	2.11	2.08	2.08	S	2.11	2.09	2.05	2.08	2.09	2.07	2.05	2.06	2.03	2.03	2.04	2.06	2.04	2.02	2.03	2.12	2.05	2.15	2.05	2.02	2.15	2.07	24	
18	2.05	2.05	2.04	S	2.04	2.07	2.03	2.09	2.07	2.05	2.07	2.04	2.05	2.09	2.04	2.04	2.04	2.03	2.04	2.03	2.05	2.05	2.07	2.09	2.10	2.03	2.10	2.05	24
19	2.08	2.08	S	2.09	2.10	2.10	2.07	2.07	2.07	2.07	2.07	2.05	2.04	2.04	2.04	2.04	2.03	2.02	2.03	2.02	2.05	2.07	2.17	2.13	2.02	2.17	2.07	24	
20	2.12	S	2.09	2.26	2.26	2.15	2.16	2.07	2.07	2.05	2.05	2.04	2.05	2.06	2.05	2.04	2.04	2.03	2.04	2.04	2.06	2.06	2.07	2.05	2.03	2.26	2.08	24	
21	S	2.08	2.17	2.11	2.10	2.12	2.09	2.16	2.08	2.07	2.04	2.06	2.07	2.03	2.04	2.02	2.02	2.02	2.02	2.02	2.06	2.08	2.13	S	2.02	2.17	2.07	24	
22	2.12	2.09	2.12	2.22	2.58	2.57	2.30	2.18	2.11	2.07	2.03	2.03	2.02	2.03	2.03	2.03	2.04	2.10	2.05	2.75	2.56	2.25	S	2.42	2.02	2.75	2.20	24	
23	2.43	2.45	2.54	2.72	2.55	2.63	2.72	2.39	2.19	2.07	2.06	2.06	2.09	2.08	2.12	2.09	2.08	2.08	2.09	2.09	2.06	S	2.07	2.07	2.06	2.72	2.25	24	
24	2.07	2.05	2.06	2.06	2.07	2.05	2.06	2.06	2.05	2.04	2.05	2.06	2.06	2.05	2.06	2.06	2.05	2.04	2.05	S	2.07	2.09	2.10	2.04	2.10	2.06	24		
25	2.09	2.08	2.10	2.06	2.08	2.18	2.18	2.05	2.04	2.04	2.04	2.05	2.07	2.05	2.07	2.07	2.04	2.04	2.06	S	2.08	2.11	S1	2.16	2.04	2.18	2.08	23	
26	2.10	2.14	2.18	2.33	2.41	2.38	2.22	2.07	2.05	2.05	2.04	2.04	2.04	2.04	2.06	2.03	2.04	2.04	S	2.08	2.12	2.08	2.14	2.31	2.03	2.41	2.13	24	
27	2.24	2.28	2.32	2.27	2.29	2.33	2.33	2.25	2.27	2.37	S1	S1	2.16	2.07	2.07	2.05	2.04	S	2.06	2.07	2.11	2.14	2.21	2.16	2.04	2.37	2.19	22	
28	2.17	2.30	2.31	2.48	2.50	2.34	2.25	2.34	2.25	2.06	2.04	2.07	2.05	2.05	2.04	2.05	S	2.03	2.05	2.05	2.13	2.16	2.19	2.24	2.03	2.50	2.18	24	
29	2.26	2.47	2.45	2.49	2.51	2.49	2.38	2.29	2.29	2.22	2.10	2.09	2.04	2.06	2.08	S	2.03	1.99	2.01	2.00	2.09	2.12	2.28	2.15	1.99	2.51	2.21	24	
30	2.09	2.12	2.22	2.09	2.06	2.06	2.05	2.05	2.06	2.04	2.02	2.03	2.03	1.99	S	2.00	2.03	2.02	2.03	2.03	2.02	2.01	2.06	2.03	1.99	2.22	2.05	24	
31	2.03	2.06	2.06	2.06	2.23	2.35	2.24	2.01	2.07	2.04	2.04	2.03	2.04	S	2.04	2.05	2.05	2.07	2.07	2.10	2.11	2.09	2.15	2.25	2.01	2.35	2.10	24	
HOURLY MAX	2.81	2.66	2.54	2.72	2.58	2.63	2.72	2.39	2.29	2.37	2.77	2.35	2.16	2.14	2.13	2.11	2.53	2.10	2.09	2.75	2.56	2.25	2.58	2.42					
HOURLY AVG	2.13	2.14	2.16	2.18	2.19	2.20	2.18	2.11	2.09	2.07	2.06	2.06	2.05	2.05	2.05	2.04	2.05	2.04	2.04	2.07	2.08	2.08	2.11	2.12					

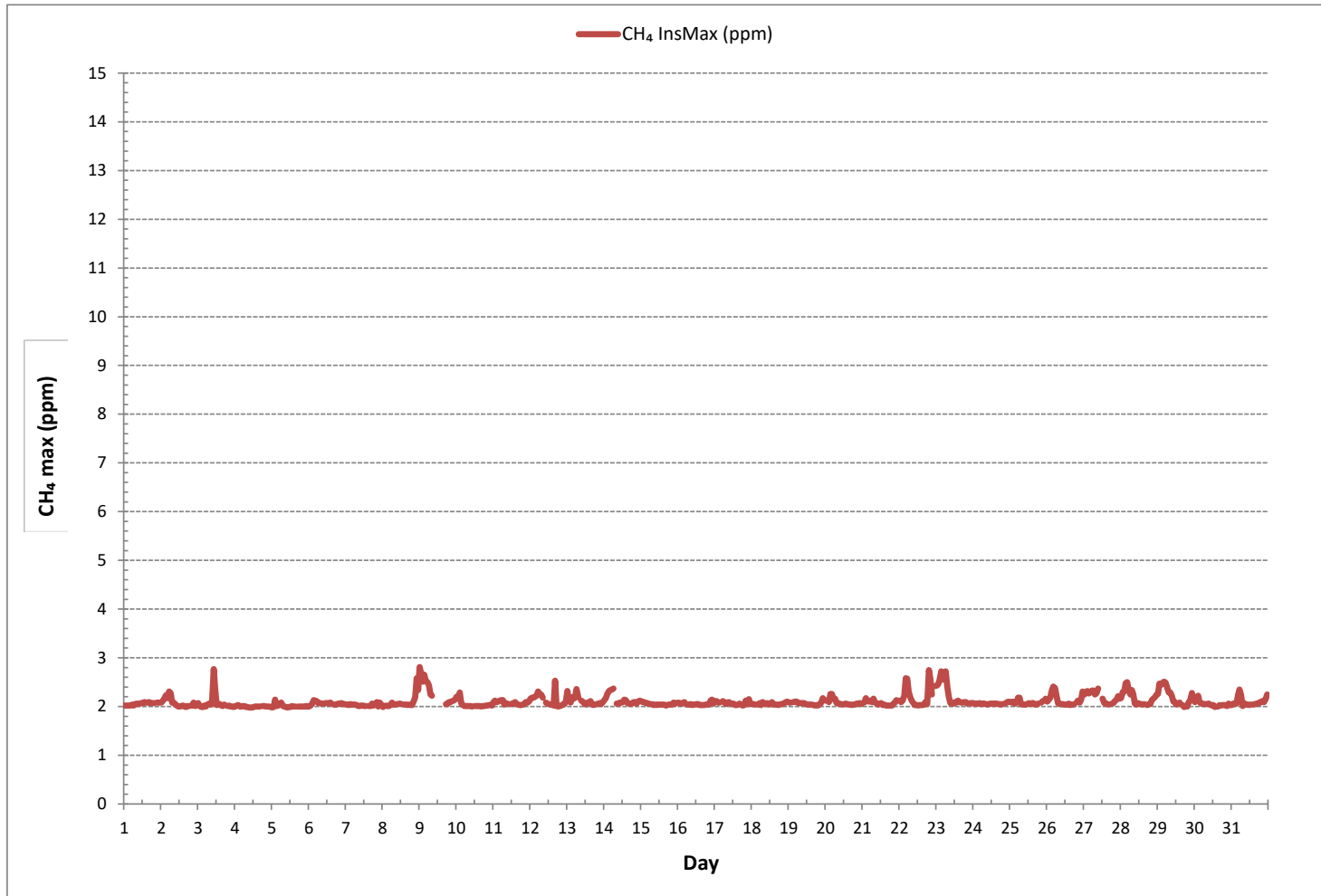
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	703
MAXIMUM INSTANTANEOUS VALUE:	2.81 ppm @ HOUR 0 ON DAY 9
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	4 hrs
STANDARD DEVIATION:	0.13
OPERATIONAL TIME:	741 hrs

METHANE MAX Instantaneous Maximum (CH₄ 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	24	
2	0.00	0.00	0.00	0.00	0.00	0.23	0.17	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	0.23	0.02	24
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	2.41	1.03	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	2.41	0.16	24
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	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	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
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	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
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	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	24
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Q	Q	0.00	S	C	C	C	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	24
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
12	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	0.10	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.01	24
13	0.00	0.00	0.00	0.31	0.08	0.49	0.00	0.09	S	0.09	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	0.49	0.05	24
14	0.00	0.00	0.00	0.15	0.69	1.22	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.22	0.09	24
15	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	0.00	24
16	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	0.00	0.00	24
17	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	0.00	24
18	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	0.00	24
19	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
20	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
21	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	24
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	24
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	24
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	24
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	S1	0.00	0.00	0.00	0.00	23
26	0.00	0.00	0.00	0.17	0.19	0.17	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	S	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.02	24
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S1	S1	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	22
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	24
30	0.00	0.00	0.30	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	0.30	0.01	24
31	0.00	0.00	0.00	0.00	0.19	0.25	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	0.25	0.02	24
HOURLY MAX	0.00	0.00	0.30	0.31	0.69	1.22	0.17	0.09	0.00	0.28	2.41	1.03	0.00	0.10	0.09	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
HOURLY AVG	0.00	0.00	0.01	0.02	0.04	0.08	0.01	0.00	0.00	0.01	0.09	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	0.00	0.00	0.00	

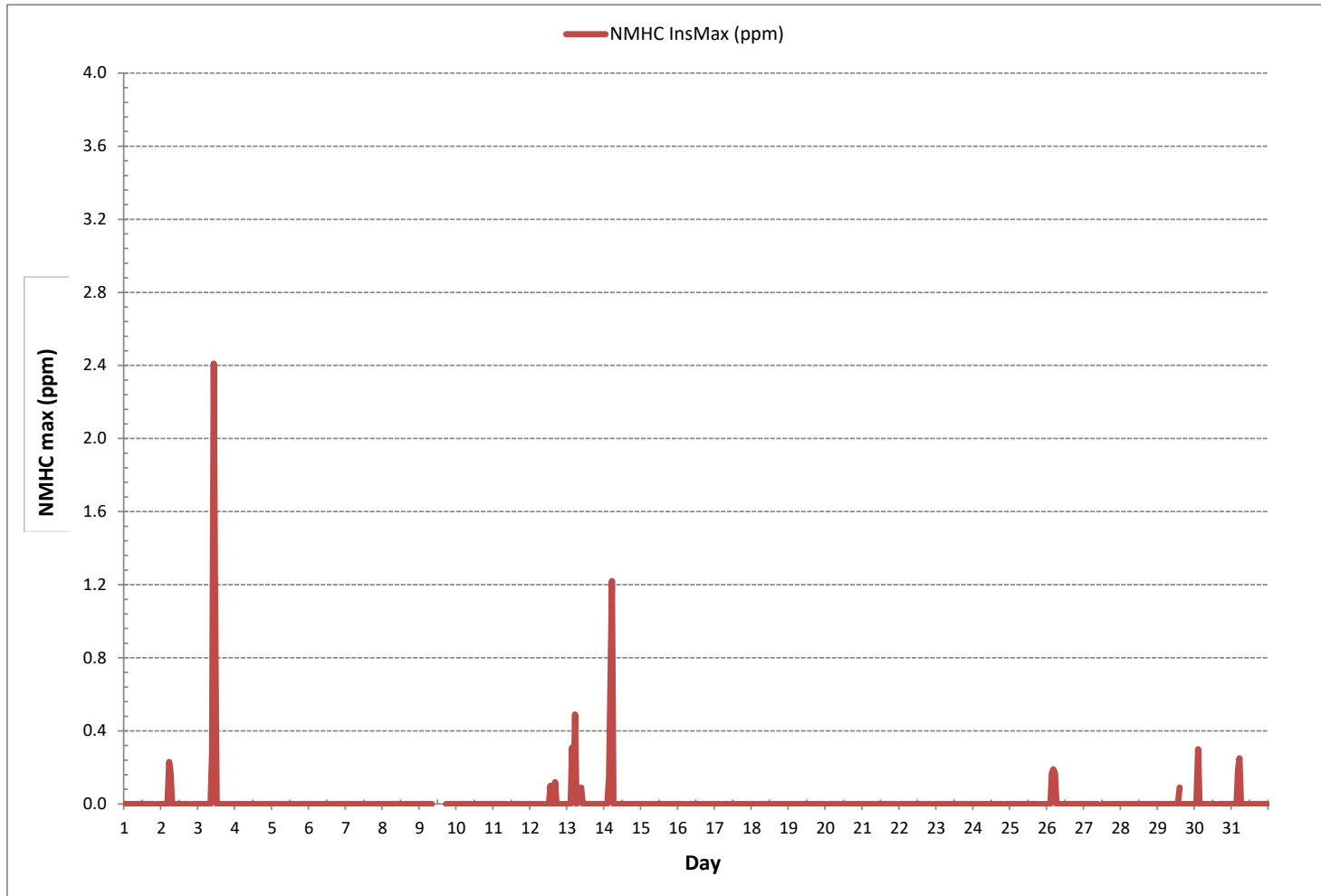
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	22
MAXIMUM INSTANTANEOUS VALUE:	2.41 ppm @ HOUR 10 ON DAY 3
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	4 hrs
STANDARD DEVIATION:	0.12
OPERATIONAL TIME:	741 hrs

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - May 2019

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	1	8	8	2	6	7	4	3	2	2	2	7	2	3	4	12	10	3	3	2	S	2	2	2	1	12	4	24	
2	1	2	43	5	15	69	70	9	14	4	1	9	8	6	14	7	5	12	5	S	11	18	18	25	1	70	16	24	
3	19	5	0	2	11	21	4	35	34	32	38	22	22	31	24	29	30	40	S	25	36	4	0	8	0	40	20	24	
4	19	34	35	11	27	44	35	30	27	19	8	14	11	29	1	1	1	S	1	2	2	2	2	1	1	44	16	24	
5	1	1	2	1	1	1	0	7	6	5	0	4	3	6	4	3	S	5	2	4	4	1	1	1	0	7	3	24	
6	1	3	3	2	10	3	3	2	11	1	4	6	7	2	3	S	7	2	5	1	1	1	1	1	1	11	3	24	
7	0	0	0	0	0	0	0	0	2	4	7	1	38	7	S	16	15	9	5	2	2	0	20	13	0	38	6	24	
8	1	5	7	1	1	2	2	7	1	1	4	3	1	S	3	3	11	2	1	1	1	2	1	6	1	11	3	24	
9	5	5	3	1	2	3	5	6	Q	Q	Q	Q	S	5	2	1	2	1	2	6	6	3	3	3	1	6	3	24	
10	6	12	12	7	6	2	2	2	1	10	C	C	C	C	C	C	C	1	1	2	1	1	1	1	1	12	-	24	
11	6	9	6	12	9	15	23	29	30	19	S	8	2	2	2	1	1	1	1	1	1	9	1	3	1	30	8	24	
12	5	5	5	5	5	9	4	5	4	S	6	22	18	19	9	1	18	4	2	2	2	3	4	13	1	22	7	24	
13	26	7	13	79	49	61	59	33	S	36	35	23	18	13	16	21	1	1	1	1	1	1	2	1	1	79	22	24	
14	1	1	1	1	12	13	5	S	12	2	2	2	2	3	2	2	2	5	1	1	1	1	1	2	1	13	3	24	
15	1	1	1	1	0	0	S	1	1	0	1	1	1	2	3	10	0	0	0	1	2	0	0	0	0	0	10	1	24
16	0	0	0	0	0	S	1	7	6	3	3	2	3	3	1	0	0	0	0	0	0	16	16	0	0	16	3	24	
17	0	0	0	0	S	1	10	6	12	10	14	6	11	6	6	9	13	9	2	5	23	16	28	15	0	28	9	24	
18	16	12	3	S	4	13	3	11	10	12	11	8	5	9	9	6	6	0	9	8	1	3	5	3	0	16	7	24	
19	1	1	S	2	2	3	2	2	3	10	9	8	6	9	8	6	7	1	1	0	8	3	1	6	0	10	4	24	
20	4	S	5	5	1	1	3	4	1	6	7	1	7	1	1	1	1	1	1	2	2	1	1	1	1	7	3	24	
21	S	1	2	2	1	1	4	20	8	14	12	10	12	8	10	4	2	3	0	1	3	3	2	S	0	20	6	24	
22	2	1	2	2	2	28	1	1	3	4	1	3	2	2	6	4	3	3	3	2	2	1	S	3	1	28	3	24	
23	3	4	3	2	4	8	13	31	29	6	7	15	2	17	17	11	5	8	2	2	1	S	3	2	1	31	8	24	
24	3	3	2	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	S	2	1	1	1	5	1	24	
25	0	0	0	0	0	1	3	4	4	7	1	2	2	8	10	8	11	2	1	S	9	10	4	2	0	11	4	24	
26	2	2	1	1	1	1	0	0	0	2	3	4	4	5	2	1	1	S	2	2	1	2	1	2	1	0	5	2	24
27	3	3	4	4	4	6	14	19	14	23	9	8	4	32	22	10	14	S	3	5	5	2	3	3	2	32	9	24	
28	10	2	2	2	4	83	58	9	8	3	2	11	5	5	29	3	S	8	2	4	5	7	7	8	2	83	12	24	
29	11	11	10	10	10	10	29	21	10	16	9	10	3	4	32	S	2	1	1	9	4	6	8	3	1	32	10	24	
30	2	2	53	3	1	1	8	2	2	5	3	11	2	1	S	2	1	1	1	3	1	1	1	1	1	53	5	24	
31	1	1	1	1	1	1	5	4	1	4	8	6	3	S	4	3	2	2	2	2	3	3	4	2	1	8	3	24	
HOURLY MAX	26	34	53	79	49	83	70	35	34	36	38	23	38	32	32	29	30	40	9	25	36	18	28	25					
HOURLY AVG	5	5	8	6	6	14	12	10	9	9	7	8	7	9	9	6	6	4	2	3	5	4	5	4					

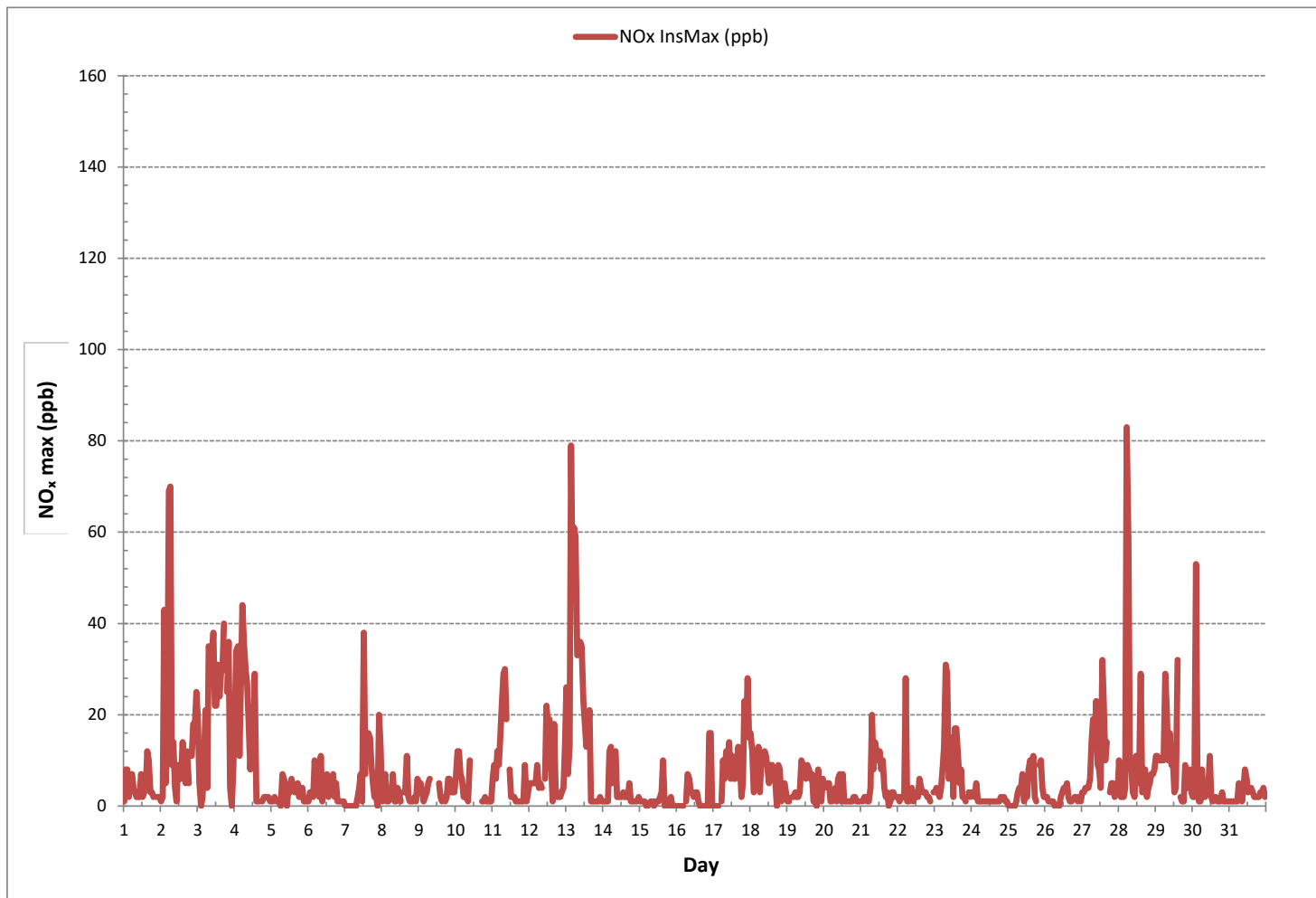
STATUS FLAG CODES

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:	652
MAXIMUM INSTANTANEOUS VALUE:	83 ppb @ HOUR 5 ON DAY 28
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	7 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	10

OXIDES OF NITROGEN Instantaneous Maximum (NO_x 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	1	1	1	1	0	2	1	1	0	3	1	0	0	0	S	0	0	0	0	0	3	1	24
2	0	0	23	0	5	42	41	3	6	1	0	2	2	2	4	2	1	3	0	S	0	0	1	2	0	42	6	24	
3	2	0	0	0	0	6	1	14	13	11	17	8	9	14	11	15	15	20	S	8	15	1	0	5	0	20	8	24	
4	7	14	12	3	10	20	17	14	13	8	3	6	3	11	0	0	0	S	0	0	0	0	0	0	0	20	6	24	
5	0	0	0	0	0	0	0	1	2	1	0	1	1	2	1	1	S	0	0	0	0	0	0	0	0	2	0	24	
6	0	0	0	0	4	0	0	0	1	0	1	1	2	0	0	S	2	0	0	0	0	0	0	0	0	4	1	24	
7	0	0	0	0	0	0	0	0	1	1	2	0	29	6	S	3	3	1	0	0	0	0	0	0	0	29	2	24	
8	0	0	0	0	0	0	0	3	0	0	2	1	0	S	0	1	3	0	0	0	0	0	0	0	0	3	0	24	
9	0	0	0	0	0	1	1	1	Q	Q	Q	Q	S	1	0	0	1	0	0	0	0	0	0	0	0	1	0	24	
10	0	0	2	0	0	0	1	0	5	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	5	-	24	
11	0	0	0	0	0	4	8	12	13	7	S	2	0	1	0	0	0	0	0	0	0	0	0	0	0	13	2	24	
12	0	0	0	0	0	2	0	1	1	S	2	7	5	5	2	0	4	1	0	0	0	0	0	0	0	7	1	24	
13	2	0	1	35	14	26	31	14	S	18	16	10	8	5	7	8	0	0	0	0	0	0	0	0	0	35	8	24	
14	0	0	0	0	7	8	2	S	6	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	8	1	24	
15	0	0	0	0	0	0	S	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	3	0	24	
16	0	0	0	0	0	S	0	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	24	
17	0	0	0	0	0	S	0	3	2	4	4	6	2	4	2	2	3	4	2	0	0	1	1	3	1	6	2	24	
18	1	1	0	S	0	2	1	4	3	5	4	3	2	3	3	2	2	0	1	1	0	0	0	0	0	5	2	24	
19	0	0	S	0	0	0	0	1	1	3	2	2	3	2	1	2	0	0	0	0	0	0	0	0	0	3	1	24	
20	0	S	0	0	0	0	1	1	0	2	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3	0	24	
21	S	0	0	0	0	0	1	7	2	4	3	2	3	1	2	1	0	0	0	0	0	0	0	0	S	7	1	24	
22	0	0	0	0	0	14	0	0	1	1	0	1	0	0	1	1	0	0	0	0	0	0	S	0	0	14	1	24	
23	0	0	0	0	1	3	6	11	9	1	1	5	0	5	4	3	0	1	0	0	0	S	0	0	0	11	2	24	
24	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	1	0	24	
25	0	0	0	0	0	1	1	2	2	3	0	1	0	1	1	2	4	0	0	S	0	0	0	0	0	4	1	24	
26	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	S	0	0	0	0	0	0	1	0	24	
27	0	0	0	0	0	0	3	9	4	7	1	1	1	7	4	1	5	S	0	0	0	0	0	0	0	9	2	24	
28	0	0	0	0	0	55	35	1	1	0	0	4	1	2	19	1	S	2	0	0	0	0	0	0	0	55	5	24	
29	1	1	0	0	0	1	11	7	2	4	2	2	0	1	12	S	0	0	0	2	0	0	0	0	0	12	2	24	
30	0	0	17	0	0	0	4	0	0	1	0	3	0	0	S	0	0	0	0	0	0	0	0	0	0	17	1	24	
31	0	0	0	0	0	0	1	1	0	1	3	3	1	S	2	0	0	0	0	0	0	0	0	0	0	0	3	1	24
HOURLY MAX	7	14	23	35	14	55	41	14	13	18	17	10	29	14	19	15	15	20	1	8	15	1	3	5					
HOURLY AVG	0	1	2	1	1	6	6	4	3	3	2	2	3	3	3	2	2	1	0	0	1	0	0	0					

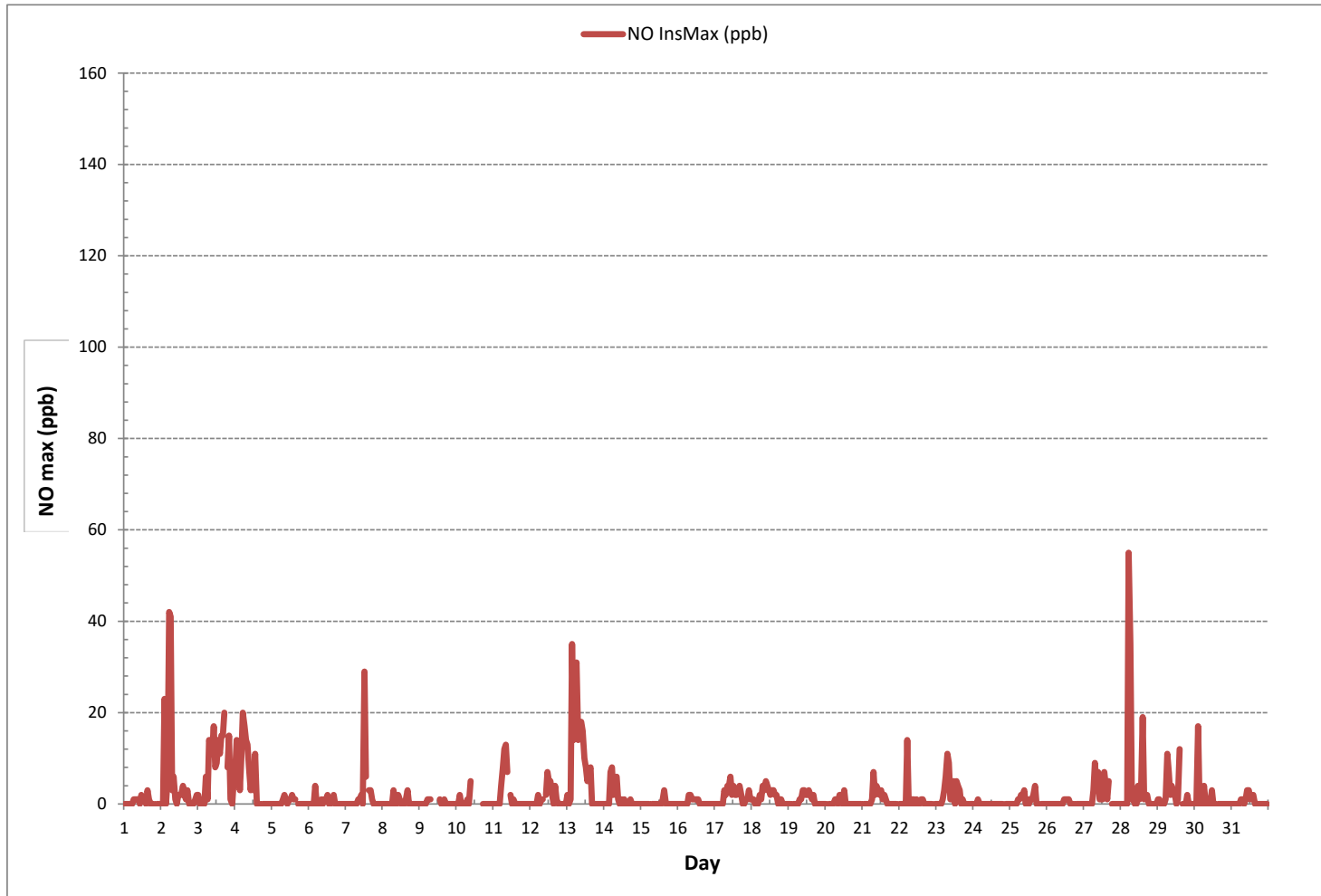
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	274
MAXIMUM INSTANTANEOUS VALUE:	55 ppb @ HOUR 5 ON DAY 28
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	5
OPERATIONAL TIME:	744 hrs

NITRIC OXIDE Instantaneous Maximum (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Maskwa Continuous Monitoring Station - May 2019

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY 1	1	8	8	2	6	6	4	2	2	2	2	5	2	2	3	9	9	3	3	2	S	2	2	2	1	9	4	24	
2	2	2	23	5	10	28	29	6	9	3	1	7	6	5	10	5	4	9	5	S	12	18	18	22	1	29	10	24	
3	18	5	0	2	11	15	3	21	21	20	21	14	13	17	14	15	15	20	S	17	21	3	0	4	0	21	13	24	
4	13	20	23	8	17	25	19	17	14	11	5	8	8	19	1	1	1	S	1	2	2	2	2	2	1	25	10	24	
5	1	1	2	1	1	1	1	6	4	3	0	3	2	5	3	3	S	4	2	4	4	2	1	1	0	6	2	24	
6	1	3	3	2	7	3	3	2	9	1	3	5	5	1	3	S	5	2	4	1	1	1	1	1	1	9	3	24	
7	0	0	0	0	0	0	0	0	2	3	5	1	8	2	S	13	12	8	5	3	2	0	19	13	0	19	4	24	
8	1	5	7	1	1	2	2	4	1	1	2	2	1	S	2	3	8	1	1	2	1	2	1	6	1	8	3	24	
9	5	5	3	1	2	3	4	4	Q	Q	Q	Q	S	4	2	1	2	1	2	6	6	3	3	3	1	6	3	24	
10	6	12	11	7	6	2	2	2	1	6	C	C	C	C	C	C	C	1	1	2	1	1	1	1	1	12	-	24	
11	6	9	6	12	9	11	15	17	17	12	S	6	2	1	2	1	1	1	1	1	1	9	1	3	1	17	6	24	
12	5	5	5	5	5	7	4	4	3	S	4	15	13	14	7	1	13	3	2	2	2	3	4	13	1	15	6	24	
13	24	7	12	44	36	36	28	19	S	18	19	13	11	8	11	14	1	1	1	1	1	1	2	1	1	44	13	24	
14	1	1	1	1	5	6	3	S	7	2	1	2	1	2	2	1	2	4	1	1	1	1	1	2	1	7	2	24	
15	1	1	1	1	0	0	S	1	0	0	1	1	1	1	3	7	0	0	0	1	2	0	0	0	0	0	7	1	24
16	0	0	0	0	0	S	1	5	4	2	2	2	2	2	1	0	0	0	0	0	0	15	16	0	0	16	2	24	
17	0	0	0	0	S	1	7	5	8	7	9	4	7	4	6	10	7	2	4	23	16	24	14	0	24	7	24		
18	15	12	3	S	4	11	3	7	6	7	6	5	4	6	6	4	4	0	8	7	1	3	5	3	0	15	6	24	
19	1	1	S	2	2	3	2	2	2	7	6	6	4	6	6	4	5	1	1	1	8	3	1	6	1	8	3	24	
20	4	S	5	5	1	1	2	3	1	5	5	1	5	1	1	1	1	1	2	2	1	1	1	1	1	5	2	24	
21	S	1	2	2	1	1	4	13	6	10	9	7	9	6	8	3	2	3	1	1	3	3	2	S	1	13	4	24	
22	1	1	2	2	2	14	1	1	2	3	1	2	2	2	5	3	2	3	3	2	1	1	S	3	1	14	3	24	
23	3	4	3	2	4	7	7	21	21	5	6	10	2	13	13	8	5	7	2	2	1	S	3	2	1	21	6	24	
24	3	2	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	S	2	1	1	1	4	1	24	
25	0	0	0	0	0	1	2	3	3	3	1	1	2	7	9	6	7	2	1	S	9	10	4	2	0	10	3	24	
26	2	2	1	1	1	1	0	0	0	1	3	3	3	4	2	1	1	S	2	2	1	2	1	2	1	0	4	2	24
27	3	3	4	4	4	6	11	11	10	16	7	7	3	25	18	9	12	S	3	5	5	2	3	3	2	25	8	24	
28	9	2	2	2	4	33	31	7	7	2	2	7	4	4	10	2	S	6	2	4	5	7	7	8	2	33	7	24	
29	10	10	10	10	10	9	18	15	8	12	7	8	2	2	22	S	2	1	1	7	3	6	8	3	1	22	8	24	
30	1	2	36	3	1	1	3	2	2	4	3	8	2	1	S	2	1	1	1	2	1	1	1	1	1	36	4	24	
31	1	1	1	1	1	1	4	3	1	2	5	4	2	S	2	2	2	2	2	2	3	3	4	2	1	5	2	24	
HOURLY MAX	24	20	36	44	36	36	31	21	21	20	21	15	13	25	22	15	15	20	8	17	23	18	24	22					
HOURLY AVG	5	4	6	4	5	8	7	7	6	6	5	5	4	6	6	5	5	3	2	3	4	4	5	4					

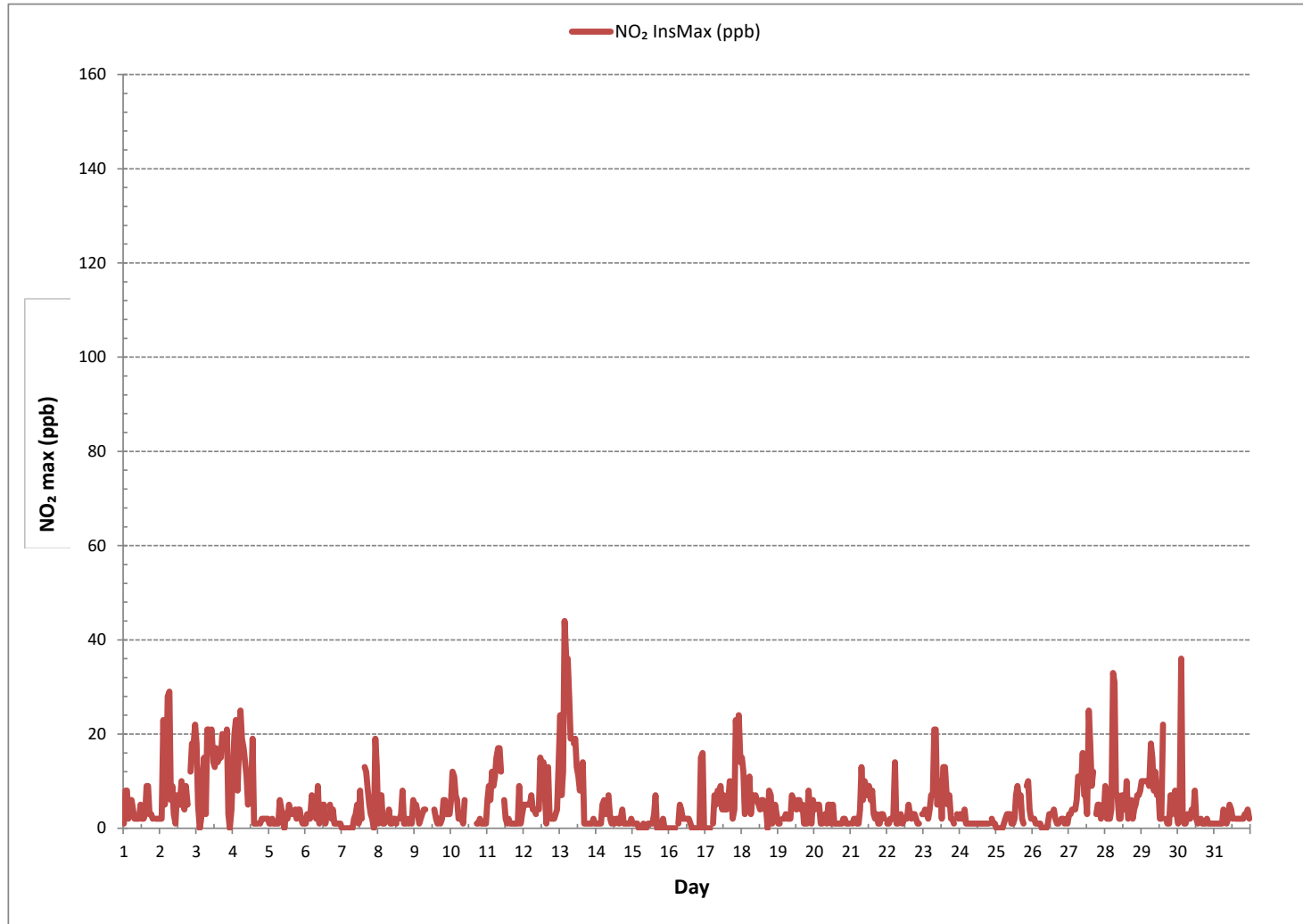
STATUS FLAG CODES

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:	654
MAXIMUM INSTANTANEOUS VALUE:	44 ppb @ HOUR 3 ON DAY 13
	VAR-VARIOUS
IZS CALIBRATION TIME:	31 hrs
MONTHLY CALIBRATION TIME:	7 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	6

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)





WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	7.7	7.8	8.6	7.6	8.3	4.4	7.5	8.5	8.1	9.3	10.3	15.4	11.8	12.5	11.0	8.9	11.0	7.2	3.7	2.1	3.1	3.4	1.7	2.0	1.7	15.4	7.6	24
2	1.6	1.4	1.5	1.8	2.6	3.6	3.9	5.0	6.4	7.8	6.5	6.8	8.8	7.5	7.1	5.4	6.7	7.0	4.8	5.6	6.8	9.2	9.8	1.4	9.8	5.6	24	
3	14.6	13.6	11.2	9.6	5.0	1.8	8.3	15.7	20.3	19.4	20.2	19.6	25.9	24.5	23.6	24.4	24.4	18.9	15.9	14.9	13.2	16.5	11.8	12.5	1.8	25.9	16.1	24
4	10.8	11.3	9.6	12.4	9.9	12.0	11.0	10.6	15.2	16.3	16.0	15.6	13.9	14.9	13.9	14.3	12.5	14.1	13.2	9.6	5.6	4.0	5.9	6.7	4.0	16.3	11.6	24
5	4.1	1.6	2.3	2.1	1.4	2.8	5.4	3.6	5.2	6.5	5.8	7.7	7.8	6.9	11.4	11.2	6.6	6.7	5.8	7.7	5.3	4.7	8.3	9.1	1.4	11.4	5.8	24
6	5.2	2.0	2.0	3.1	3.5	4.7	8.1	10.1	6.3	3.9	4.9	7.2	9.8	10.5	8.4	6.6	7.3	7.9	12.6	9.7	5.2	5.0	3.2	5.9	2.0	12.6	6.4	24
7	7.3	6.1	4.1	4.9	4.9	4.3	4.0	4.3	7.6	7.7	8.7	10.1	11.5	10.8	12.8	12.3	12.4	7.4	6.7	4.0	2.8	5.0	6.4	5.6	2.8	12.8	7.2	24
8	7.8	10.4	9.9	6.2	5.2	3.1	9.1	14.3	14.4	12.2	12.0	13.7	12.7	8.5	9.0	8.7	8.0	6.4	3.8	2.4	1.9	1.9	1.4	1.4	14.4	8.1	24	
9	1.2	2.8	2.0	1.9	2.6	2.8	6.7	7.8	7.6	10.0	11.3	13.6	13.5	13.4	13.7	18.3	12.5	10.3	8.8	12.3	11.7	6.5	15.4	5.9	1.2	18.3	8.9	24
10	6.7	4.2	5.9	6.6	12.0	14.4	16.1	20.9	21.0	17.9	17.9	19.8	20.9	21.1	19.3	26.3	27.5	23.1	17.1	12.8	12.0	9.2	3.3	2.0	2.0	27.5	14.9	24
11	2.9	4.0	3.6	2.6	2.4	3.8	2.7	3.7	6.3	7.0	8.4	9.8	10.6	11.2	10.4	13.1	11.8	10.0	10.0	6.6	5.7	9.8	9.6	9.0	2.4	13.1	7.3	24
12	10.7	13.0	6.0	5.9	9.7	6.4	8.6	11.1	12.7	10.1	12.9	17.2	19.5	19.6	22.8	18.3	23.1	17.8	16.4	11.8	8.4	2.4	4.3	2.5	2.4	23.1	12.1	24
13	3.3	5.7	7.0	10.6	7.3	12.7	13.9	16.1	17.3	17.8	17.9	19.2	17.3	20.7	17.2	16.9	16.2	14.5	12.6	12.8	7.5	1.6	2.4	1.5	1.5	20.7	12.1	24
14	1.0	1.9	1.2	2.7	2.1	1.6	4.6	7.6	7.1	9.4	8.5	9.1	9.5	9.3	8.5	12.5	9.3	7.3	6.0	5.5	8.3	10.5	4.4	2.8	1.0	12.5	6.3	24
15	3.1	3.9	4.2	5.6	9.0	10.2	10.6	15.8	17.4	15.2	17.3	13.7	10.2	9.3	11.7	9.5	11.0	10.0	10.1	8.4	8.2	5.7	5.4	5.2	3.1	17.4	9.6	24
16	5.0	4.2	3.4	2.4	2.6	5.4	7.5	7.8	8.6	9.6	9.9	10.1	10.9	13.6	12.0	11.4	10.7	8.1	6.7	7.5	5.4	5.6	4.1	3.1	2.4	13.6	7.3	24
17	3.1	2.9	4.7	4.4	5.1	5.3	10.1	10.2	15.8	17.3	16.0	18.8	18.0	15.9	16.4	17.1	15.4	14.5	13.3	11.1	6.6	6.6	10.4	12.9	2.9	18.8	11.3	24
18	9.8	8.5	8.9	7.3	5.9	7.2	8.9	10.9	9.8	9.5	12.0	15.7	16.5	15.5	15.9	15.3	14.5	15.9	12.8	8.8	6.2	6.0	6.3	7.9	5.9	16.5	10.7	24
19	5.7	5.7	9.0	8.9	9.9	10.9	9.4	10.6	10.4	14.3	14.8	15.9	15.8	16.9	15.1	13.7	13.7	12.9	10.7	8.2	3.3	4.2	2.5	4.0	2.5	16.9	10.3	24
20	7.3	6.8	7.5	6.3	3.2	3.4	5.5	9.5	14.3	13.4	13.6	14.4	15.9	13.5	13.9	11.6	14.4	13.7	13.1	13.0	5.0	6.5	6.2	7.9	3.2	15.9	10.0	24
21	6.4	8.7	7.3	3.5	3.5	4.0	4.2	6.8	8.1	10.7	13.8	13.2	13.1	18.0	12.7	12.4	12.2	11.2	9.0	5.2	2.3	2.6	1.5	2.1	1.5	18.0	8.0	24
22	2.3	1.1	3.0	3.7	1.6	1.7	1.8	2.0	4.8	9.4	6.8	6.0	10.5	6.2	6.5	5.1	3.0	3.5	2.5	2.6	2.6	2.2	2.2	2.4	1.1	10.5	3.9	24
23	1.8	2.0	0.0	1.0	1.3	2.7	2.1	6.3	7.6	9.1	6.3	8.4	10.4	8.7	9.2	5.8	5.2	6.0	4.5	6.7	6.0	7.7	6.3	6.4	0.0	10.4	5.5	24
24	8.9	9.4	7.5	5.4	7.7	5.3	7.3	7.8	7.3	8.9	6.1	9.8	10.1	12.9	13.2	13.0	12.8	10.8	10.5	7.3	7.5	1.2	3.5	3.4	1.2	13.2	8.2	24
25	4.3	3.3	3.0	2.7	1.3	1.3	3.1	5.2	5.7	8.0	7.6	9.4	10.3	7.5	13.9	10.9	7.4	8.1	10.2	10.9	7.1	2.8	2.8	2.1	1.3	13.9	6.2	24
26	1.5	1.3	1.7	1.5	0.8	2.5	5.9	7.6	8.3	9.1	9.3	6.0	10.0	7.5	10.0	8.7	9.9	8.0	8.5	6.6	3.5	5.0	4.6	3.7	0.8	10.0	5.9	24
27	5.7	7.2	7.2	6.1	4.4	6.3	6.1	6.2	6.4	5.9	7.0	11.3	11.3	11.8	11.6	9.3	10.5	8.8	5.1	4.0	3.3	3.4	2.8	2.6	2.6	11.8	6.8	24
28	2.3	2.5	2.7	2.9	2.7	2.5	2.5	3.0	9.7	11.8	13.0	14.3	15.8	15.3	11.8	14.5	11.9	10.7	10.4	6.2	4.5	5.5	4.9	4.4	2.3	15.8	7.7	24
29	5.8	6.8	5.9	5.4	6.5	8.5	8.4	8.0	9.6	13.0	12.2	14.1	13.8	18.8	16.0	14.9	14.8	15.5	10.4	9.2	3.9	3.3	4.8	3.6	3.3	18.8	9.7	24
30	3.1	5.9	11.1	11.0	12.4	11.7	13.8	11.9	10.7	9.0	16.1	17.7	16.8	18.0	20.3	17.1	19.2	17.0	12.1	12.8	7.8	2.5	2.8	2.1	2.1	20.3	11.8	24
31	0.9	1.1	1.4	1.2	1.4	2.0	6.9	7.1	7.3	8.1	6.8	8.9	7.2	10.1	10.7	10.3	8.6	10.3	9.3	5.6	3.3	2.1	1.6	1.6	0.9	10.7	5.6	24
HOURLY MAX	14.6	13.6	11.2	12.4	12.4	14.4	16.1	20.9	21.0	19.4	20.2	19.8	25.9	24.5	23.6	26.3	27.5	23.1	17.1	14.9	13.2	16.5	15.4	12.9				

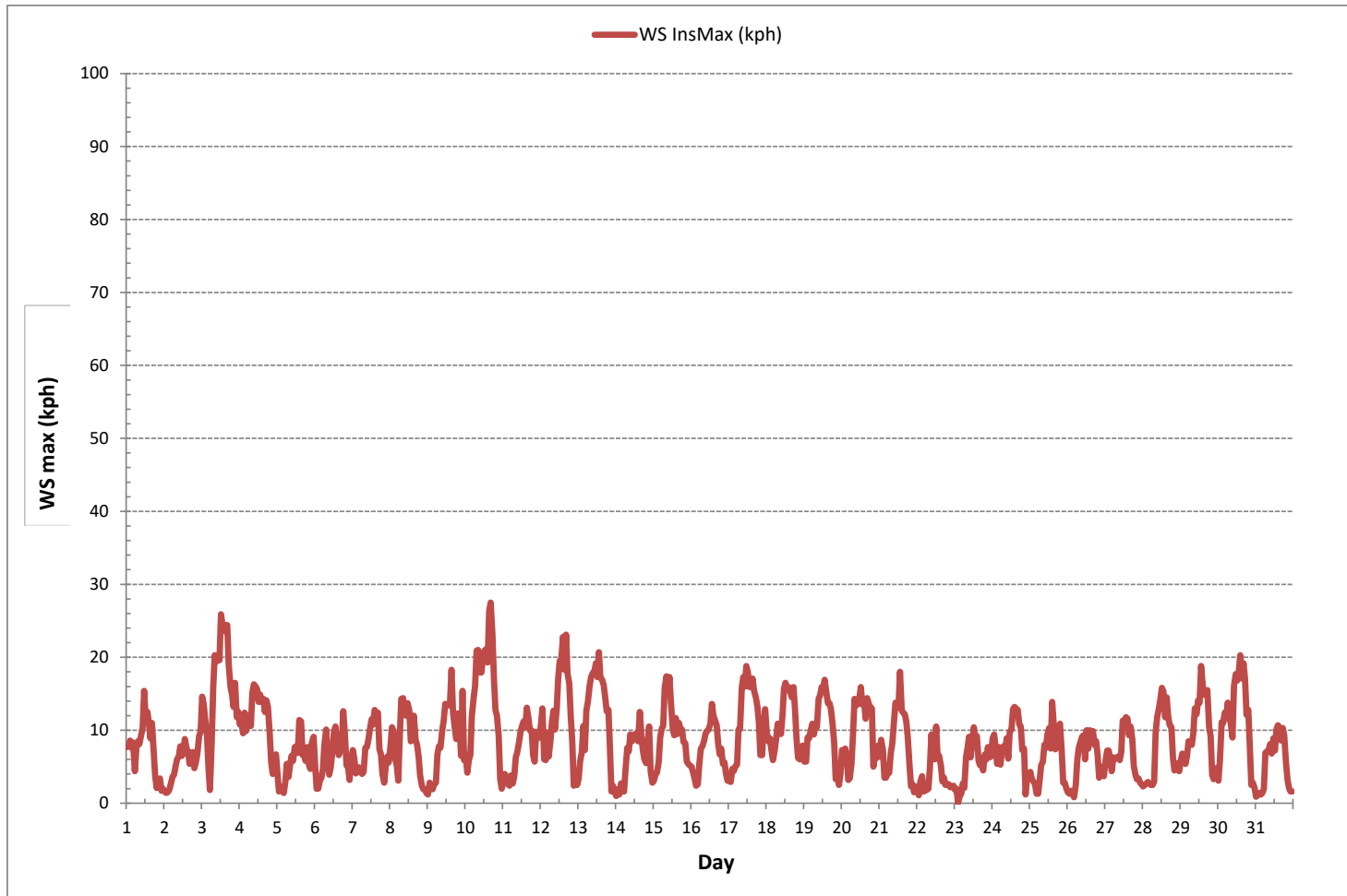
STATUS FLAG CODES

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

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	27.5	kph	@ HOUR	16	ON DAY	10	
OPERATIONAL TIME:						744	hrs

WIND SPEED Instantaneous Maximum (WS kph)



AEP AUDIT REPORT

May 16th, 2019

File Numbers: 2019 – 062A / 082A

Michael Bisaga Manager, Environmental Programs
Lakeland Industry and Community Association
PO Box 8237
Bonnyville, Alberta
T9N 2J5

Mr. Bisaga:

Subject: Ambient Air Monitoring Station Audit Results for the Lica Network

Alberta Environment and Parks Ambient Air Monitoring Audit team conducted an audit of the Lakeland Industry and Community Association (Lica) ambient air monitoring stations May 6th to 9th, 2019.

All pollutant gas analyzers met AMD criteria. However the Oxides of Nitrogen analyzer at Cold Lake South initially was failing 24% low. When doing cursory checks it was discovered the stainless steel sample inlet filter holder had a compressed internal oring. When bypassed and eventually replaced with an inert Teflon Thermo style filter holder, the analyzer passed the audit. The S.S. sample inlet filter was removed from service and retained by AEP. Please review the attached picture.

It would appear the compressed oring likely occurred during the April 24th monthly calibration when a new inlet particulate filter was installed. From the review of the calibration documents on site there was no significant as found change in calculated analyzer response before or during the calibration.

Data from April 24th 2019 to May 8th 2019 needs to be flagged as invalid due to the initial 24% low response found in accordance with AMD Chapter 8 Section 4.1, Aud 4-E (a)(b). An uptime contravention must be reported for the months of April and May 2019.

AEP suggests that the current inventory of sample inlet filter holders in use at the Cold Lake South station be updated to the newer Teflon Thermo style inlet filter holders in place throughout the rest of the Lica network.

Review of the calibration documents shows that the SO₂ and NO_x analyzer were calibrated and adjusted at the lower end of the high point (60-80% of the analyzer fullscale) calibration range in the month of April 2019. This may account for the responses being lower than anticipated for audit responses. Maxxam indicated the same cylinder of gas is used at all locations. Cold Lake South SO₂ and NO_x analyzers did not see a similar audit response as they were calibrated at a higher calculated response based on analyzer range. AEP recommends that the SO₂ and NO_x

analyzers be calibrated at a higher calculated high point response (closer to the 80% value) to ensure all the error possible is removed from the analyzers.

The Thermo 5030i series PM2.5 samplers at St Lina and Bonnyville East were not audited this cycle.

All meteorological equipment met AMD criteria with the exception of the Relative Humidity sensor at St Lina. It was reading 23% high compared to our audit standard.

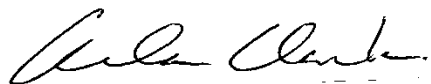
All site and network documentation that were reviewed on line, showed that they require updating as elements in both documents are missing or incorrect. Please review the attached audit findings.

AEP was asked to review a proposed new Maskwa location approximately 2000m west of the current location. Initial assessment indicates it is a suitable location for an ambient air monitoring station based on siting criteria. However please note the proposed location puts it closer to a major emission source, the Imperial Oil Resources Maskwa facility. This facility may cause an increase in concentration levels of some or all of the pollutants being measured at the current location.

Upon receiving notification of this performance audit Lica was asked to provide the date of the most recent quality system audit as required by AMD Chapter 5 QS 4-A and QS 4-B(b). Lica has indicated June 2017 was the last 3rd party audit of the QAP.

Please address the issues noted above and provide a written response to the Audit Team by June 21st, 2019. If you have any questions or comments, please contact the undersigned at 780-427-7888.

Yours truly,



Al Clark
Monitoring Systems Auditor

Attachments:

- Lica Analyzer Audit Sheets
- Lica Audit Summary
- SS inlet sample picture

CC: Shea Beaton – AEP
Marty Collins – AEP
Bob Myrick – AEP
Max Mazur – AEP
Wally Qiu – AER
Lily Lin – Lica
air.reporting@gov.ab.ca

STATION AUDIT

File No. 2019 - 079A - 082A

Date: May 9, 2019

Performed by: AI Clark

Station

Name: Maskwa

Location: IOL Maskwa

Facility/Zone: Lica

Operator: Maxxam

Temp. 20.1 C

Barometric Press. 712 mmHg

Location

Latitude N 54° 36' 18.4"

Longitude W 110° 27' 09.7"

Elevation 614 m

Status of Site Documentation On line Incomplete

Status of Network Documentation On line Incomplete

Status of QAP Audited June 2017

Manifold Material Glass

Manifold Condition Good

Meteorological

	Observed	Audit Value
Wind Speed Direction	<u>12.5 kph / 215 deg</u>	<u>10-15 kph / SW</u>
Station Temperature	<u>23.0 C</u>	<u>22.6 C</u>
Relative Humidity	<u>39.5%</u>	<u>38.3%</u>
Ambient Temperature	<u>13.1 C</u>	<u>13.9 C</u>
BP	<u>942.5 mb</u>	<u>947.9 mb</u>
Precipitation	<u>1.0 mil</u>	<u>10 tips</u>

Remarks:

SO₂ ANALYZER AUDIT

File No. 2019 - 079A

Date: May 9, 2019

Performed by: Al Clark

Station

Name: Maskwa

Location: IOL Maskwa

Facility/Zone: Lica

Operator: Maxxam

Temp. 20.1 C

Barometric Press. 712 mmHg

Monitor

Make/Model: Teco 43i TLE Serial No: 1180930031

Inlet flow (sccm): 459 Full Scale Range ppm: 1.0

Last cal. Date: Apr 17/19 Old Correction Factor: 0.9990

Zero/Bkg 2.20

Span Coef 0.911 Audited June 2017

Calibrator

Calibration Method: GAS DILUTION Make/Model: Sabio 2010

Cylinder #: FF23250 AMU #: 2092

CGA Date: April 2019 SO₂ Concentration PPM: 49.5

Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Concentration (ppm)	% Difference	
Air	Gas	Total			vs Audit Gas	Limits
4953	0.0	4953	0.0000	0.0004		
4890	78.2	4968	0.7792	0.7409	-5%	± 10%
4930	39.4	4969	0.3925	0.3731	-5%	± 10%
4978	20.1	4998	0.1991	0.1890	-5%	± 10%
Absolute Average Percent Difference					5%	

Linear Regression Analysis:

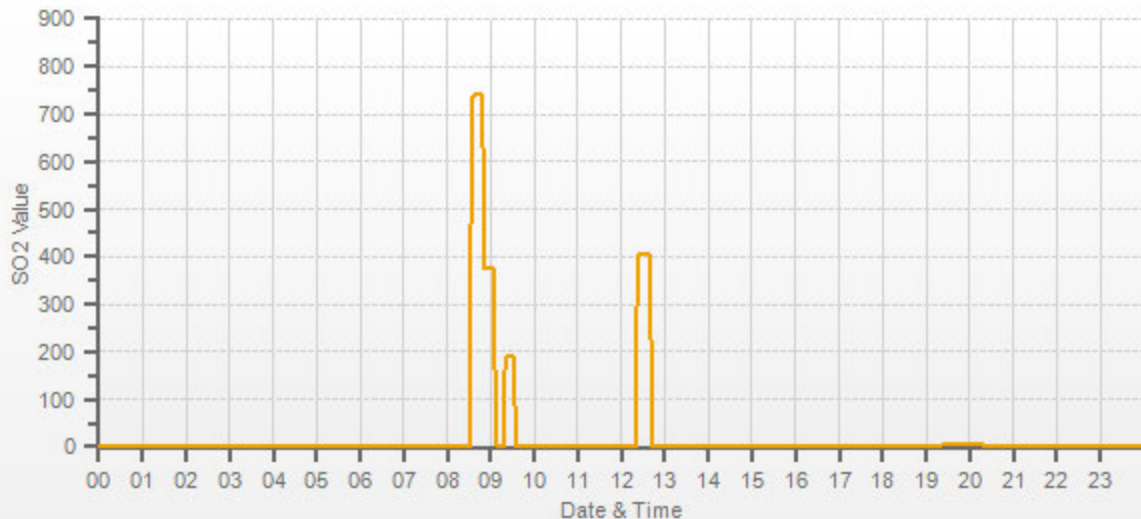
$y=mx+b$ (where x =calculated concentration, y =indicated concentration)

Correlation Coeff.= 1.0000
m (Slope)= 0.9506
b (Intercept as % of full scale)= 0.0102

LIMITS
≥ **0.995**
0.90-1.10
± **3% F.S.**

Remarks:

SO2[ppb]



H₂S ANALYZER AUDIT

File No. 2019 - 080A

Date: May 9, 2019

Performed by: AI Clark

Station

Name: Maskwa

Location: IOL Maskwa

Facility/Zone: Lica

Operator: Maxxam

Temp. 20.1 C

Barometric Press. 712 mmHg

Monitor

Make/Model: Teco 450i Serial No: CM17360005

Inlet flow (sccm): 947 Full Scale Range ppm: 0.1

Last cal. Date: Apr 17/19 Old Correction Factor: 1.0040

Zero/Bkg 20.1

Span Coef 0.803 Audited June 2017

Calibrator

Calibration Method: GAS DILUTION Make/Model: Sabio 2010

Cylinder #: EX0011882 AMU #: 2092

CGA Date: May 2019 H₂S Concentration PPM: 10.8

Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Concentration (ppm)	% Difference	
Air	Gas	Total			vs Audit Gas	Limits
4953	0.0	4953	0.0000	-0.0001		
4930	37.6	4968	0.0817	0.0815	0%	± 10%
4949	20.4	4969	0.0443	0.0440	-1%	± 10%
4988	10.2	4998	0.0220	0.0221	1%	± 10%
Absolute Average Percent Difference					0%	

Linear Regression Analysis:

$y=mx+b$ (where x =calculated concentration, y =indicated concentration)

Correlation Coeff.= 1.0000

m (Slope)= 0.9972

b (Intercept as % of full scale)= -0.0496

LIMITS

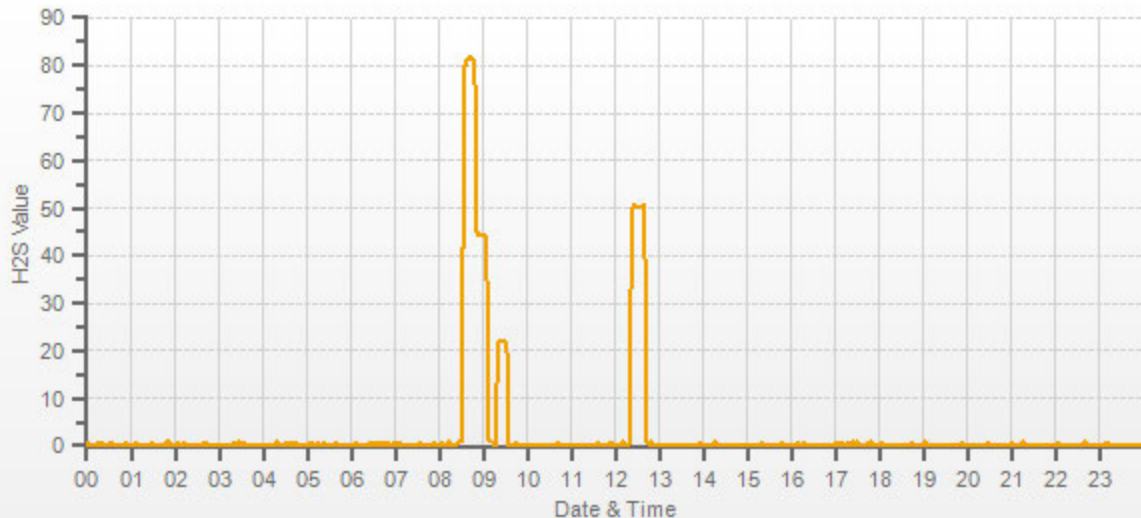
≥ **0.995**

0.90-1.10

± **3% F.S.**

Remarks:

H2S[ppb]



Non Methane Analyzer Audit

File No. 2019 - 081A

Date: May 9, 2019

Performed by: Al Clark

Station:

Name: Maskwa Location: IOL Maskwa Operator: Maxxam
Facility/Zone: Lica Temp. 21.1 C BP: 711 mmHg

Monitor:

Make/Model: Teco 55i Serial No. 1180930026
Inlet flow (scm): N/A CH₄ Range ppm: 20
Last cal. Date: Apr 17/19 Non CH₄ Range ppm: 20
THC Range ppm: 40

Old Correction Factor: CH₄: 1.001
Non CH₄: 1.001
THC: 1.001

Calibration Method:

Gas Dilution

Calibrator:

Make/Model Sabio 2010 AMU# 2092

HC cylinder # EA0004003 CH₄ conc. (ppm) 1010 CH₄ Equiv (C3H8 only) (ppm) 872
CGA Date April 2019 C₃H₈ conc. (ppm) 317 Total CH₄ Equiv. (ppm) 1882

Calibrator Flows			Calc. Conc.			Indicated Concentration			% Difference vs Audit Gas		
			CH ₄ (ppm)	Non CH ₄ (ppm)	THC (ppm)	CH ₄ (ppm)	Non CH ₄ (ppm)	THC (ppm)	Limit ± 10%		
Air	Gas	Total							CH ₄	Non CH ₄	THC
4998	0.0	4998	0.00	0.00	0.00	0.00	0.00	0.00	2%	0%	1%
4895	77.7	4973	15.78	13.62	29.40	16.11	13.68	29.79	2%	0%	1%
4922	39.2	4961	7.98	6.89	14.87	8.20	6.93	15.00	3%	1%	1%
4971	19.9	4991	4.03	3.48	7.50	4.16	3.53	7.69	3%	2%	2%
Absolute Average Percent Difference									3%	1%	2%

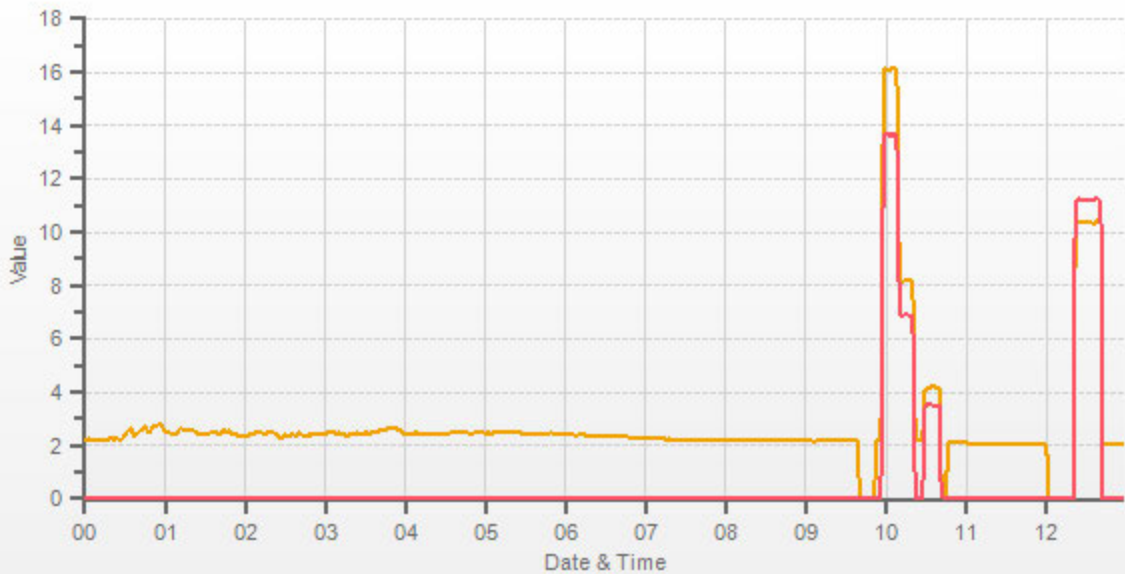
Linear Regression Analysis:

y=mx+b (where x=calculated concentration, y=indicated concentration)

	CH₄	Non CH₄	THC	LIMITS
Correlation Coeff.=	<u>1.0000</u>	<u>1.0000</u>	<u>1.0000</u>	≥ 0.995
m (Slope)=	<u>1.0202</u>	<u>1.0035</u>	<u>1.0119</u>	0.90-1.10
b (Intercept as % of FS)=	<u>0.1496</u>	<u>0.0894</u>	<u>0.0554</u>	± 3% F.S.

Remarks:





NO-NOx-NO2 Analyzer Audit

File No. 2019 - 082A

Date: May 9, 2019 Performed by: Al Clark

Station:

Name: Maskwa Location: IOL Maskwa Operator: Maxxam
Facility/Zone: Lica Temp. 22.7 C BP: 716 mmHg

Monitor:

Make/Model: Teco 42i Serial No. 1180930028
Inlet flow (scm): 541 Range ppm: 1.0
Last cal. Date: Apr 17/19 Old CF: NO: 0.994
NOx: 0.992
NO2: 0.995

NO Bkg 2.6
NOx Bkg 2.7
NO Coef 0.930
NOx Coef 1.001
NO2 Coef 1.000

Calibration Method: Gas Dilution / GPT

Calibrator: Make/Model: Sabio 2010 AMU# 2270
NO cylinder # FF23222 NO conc. ppm 50.8 NOx conc. ppm 51.4
CGA Date April 2019

Calibrator Flows			Calc. Conc.		Indicated Concentration		% Difference vs Audit Gas	
Air	Gas	Total	NO (ppm)	NOx (ppm)	NO (ppm)	NOx (ppm)	NO	NOx
5055	0.0	5055	0.0000	0.0000	-0.0001	-0.0001	Limit ± 10%	
4989	80.7	5070	0.8086	0.8181	0.7783	0.7843	-4%	-4%
5039	40.2	5079	0.4021	0.4068	0.3869	0.3906	-4%	-4%
5071	20.1	5091	0.2006	0.2029	0.1914	0.1938	-5%	-4%
Absolute Average Percent Difference							4%	4%

Linear Regression Analysis:

y=mx+b (where x=calculated concentration, y=indicated concentration)

	NO	NOx	NO ₂	LIMITS
Correlation Coeff.=	<u>1.0000</u>	<u>1.0000</u>	<u>1.0000</u>	≥ 0.995
m (Slope)=	<u>0.9633</u>	<u>0.9591</u>	<u>0.9963</u>	0.90-1.10
b (Intercept as % of full scale)=	<u>-0.0744</u>	<u>-0.0235</u>	<u>0.1547</u>	± 3% F.S.

O ₃ Setting	Flow Rate	Indicated Conc. (ppm)			NO Decrease	NO ₂ Increase	% Difference vs Audit Gas	
		NO	NOx	NO ₂				
0.000	5070	0.7741	0.7787	0.0046	0.4708	0.4706	0%	± 10%
1.300	5070	0.3033	0.7785	0.4752	0.4708	0.4706	0%	± 10%
0.600	5070	0.5779	0.7794	0.2016	0.1962	0.1970	0%	± 10%
0.360	5070	0.6775	0.7800	0.1024	0.0966	0.0978	1%	± 10%
Absolute Average Percent Difference							1%	

Converter Efficiency

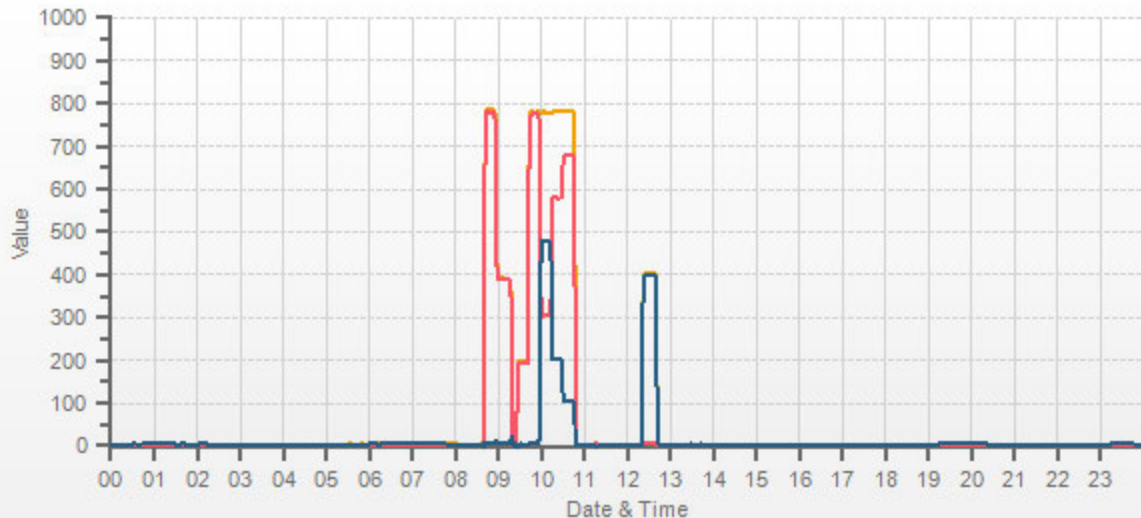
Average Converter Efficiency 100.5%

Remarks:



Station: LICA MASKWA Daily: 19/05/09 Type: AVG 1 Min. [1 Min.]

— NOX[ppb] — NO[ppb] — NO2[ppb]



Station Performance Audit Summary

Company: Lica

Facility Name: IOL Maskwa

Approval No.: N/A

Site Name: Maskwa

Region: North Saskatchewan

District: Cold Lake

Parameters audited:

H ₂ S	X	SO ₂	X	NO _x	X	NH ₃		O ₃	
CO		CH ₄	X	NonCH ₄	X	THC	X	TRS	
PM _{2.5}		PM ₁₀		TSP		BTEX		Wind Speed	
Wind Dir	X	Amb. Temp	X	Stn.Temp	X	RH	X	Solar Radiation	
Rainfall		Precip		VWS		BP	X		
All parameters monitored as per approval: Yes _____ No _____ N/A _____									

GENERAL

Audited June 2017

YES NO N/A

Has the location remained unchanged from previous audit?

X		
X		
X		

Is site secure?

Are station operating conditions adequate?

DATA ACQUISITION

Are strip charts in use?

	X	
X		

Is a telemetry system for data acquisition in use?

SYSTEM COMPONENTS

Is a glass sampling manifold installed?

Is sampling manifold clean?

Is a manifold trap in place?

Are spare manifold ports capped

Is manifold oriented so it is not exactly horizontal?

Are manifold ports situated to prevent water entering monitors?

Is manifold pump properly installed and operative?

Do sample lines extend at least 3/4" into manifold?

Are monitor sampling lines connected to manifold?

Are sampling lines clean?

Are monitors properly mounted and secure?

Are monitors properly exhausted from room or scrubbed?

Are zero and span systems operational?

X		
X		
X		
X		
X		
X		
X		
X		
X		
X		
X		
X		
X		
X		

WIND EQUIPMENT

Is wind sensor properly oriented?

Does wind equipment appear to be functioning properly?

Date of last calibration.

Date: September 2018

X		
X		

COMMENTS:

AUDITOR: Al Clark

DATE: May 9, 2019



Station Site Documents Audit Checklist

Station	
Name: <u>Maskwa</u>	Location: <u>IOL Maskwa</u>
Facility/Zone: <u>Lica</u>	Operator: <u>Maxxam</u>

Required Elements of AMD Chapter 3 SS 4-B																																																																																
Do the Site Documents Contain the Following:																																																																																
(a) Name of Owner/ Approval Holder	<table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th colspan="2">Meets AMD</th><th rowspan="2">NA</th><th colspan="2">Current</th></tr><tr><th>YES</th><th>NO</th><th>YES</th><th>NO</th></tr></thead><tbody><tr><td style="text-align: center;">X</td><td></td><td></td><td style="text-align: center;">X</td><td></td></tr><tr><td style="text-align: center;">X</td><td></td><td></td><td style="text-align: center;">X</td><td></td></tr><tr><td style="text-align: center;">X</td><td></td><td></td><td style="text-align: center;">X</td><td></td></tr><tr><td style="text-align: center;">X</td><td></td><td></td><td style="text-align: center;">X</td><td></td></tr><tr><td style="text-align: center;">X</td><td></td><td></td><td style="text-align: center;">X</td><td></td></tr><tr><td style="text-align: center;">X</td><td></td><td></td><td style="text-align: center;">X</td><td></td></tr><tr><td></td><td></td><td style="text-align: center;">X</td><td></td><td></td></tr><tr><td style="text-align: center;">X</td><td></td><td></td><td style="text-align: center;">X</td><td></td></tr><tr><td colspan="5" style="background-color: #cccccc;"></td></tr><tr><td style="text-align: center;">X</td><td></td><td></td><td style="text-align: center;">X</td><td></td></tr><tr><td></td><td style="text-align: center;">X</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td style="text-align: center;">X</td><td></td><td></td></tr><tr><td></td><td></td><td style="text-align: center;">X</td><td></td><td></td></tr><tr><td style="text-align: center;">X</td><td></td><td></td><td style="text-align: center;">X</td><td></td></tr></tbody></table>	Meets AMD		NA	Current		YES	NO	YES	NO	X			X		X			X		X			X		X			X		X			X		X			X				X			X			X							X			X			X						X					X			X			X	
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(c) Contact Information																																																																																
(d) Date the Site or Station was Established																																																																																
(e) Date the information was last updated																																																																																
(f) Location including Latitude and Longitude																																																																																
(g) Four Colour Photos Looking N, E, S, W From Manifold Inlet																																																																																
(h) Additional Photos/Sketches of AMD Standard Site Non-Conformance																																																																																
(i) List of Instruments Located at the Site																																																																																
(j) Site Description Including the following:																																																																																
(i) Land Use By Sector																																																																																
(ii) Site Elevation																																																																																
(iii) Greatest Angle of Elevation & Direction to Nearby Buildings																																																																																
(iv) Average Building height in the area																																																																																
(v) Distance to Nearest Trees																																																																																

Required Elements of AMD Chapter 3 SS 4-D																																			
Do the Station Site Documents Contain the Following:																																			
(a) Recent Area Map Covering Approximately 1Km ²	<table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th colspan="2">Meets AMD</th><th rowspan="2">NA</th><th colspan="2">Current</th></tr><tr><th>YES</th><th>NO</th><th>YES</th><th>NO</th></tr></thead><tbody><tr><td style="text-align: center;">X</td><td></td><td></td><td style="text-align: center;">X</td><td></td></tr><tr style="background-color: #ffff00;"><td style="text-align: center;">X</td><td></td><td></td><td style="text-align: center;">X</td><td></td></tr><tr style="background-color: #ffff00;"><td style="text-align: center;">X</td><td></td><td></td><td style="text-align: center;">X</td><td></td></tr><tr><td style="text-align: center;">X</td><td></td><td></td><td style="text-align: center;">X</td><td></td></tr><tr><td></td><td></td><td style="text-align: center;">X</td><td></td><td></td></tr></tbody></table>	Meets AMD		NA	Current		YES	NO	YES	NO	X			X		X			X		X			X		X			X				X		
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YES	NO		YES	NO																															
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		X																																	
(b) Plan View Sketch																																			
(d) Colour Photos Showing Sample Manifold/Inlet																																			
(e) Colour Photo of the Station																																			
(f) Additional Photos/Sketches of AMD Standard Station Non-Conformance																																			

COMMENTS: Missing site elevation. Shows tree elevation not building. Exterior manifold obscured by the railing on the roof of the station.

AUDITOR: Al Clark DATE: May 15, 2019



Audit Summary

Form No. F-AA-018

Version 1.2

Page 4 of 4

Facility / Zone	Lica		
Total # of parameters that passed	21		
Total # of parameters audited in the network	21		
Date(s) of the audit	May 6-9, 2019		
Issue Date of Audit Summary	May 16, 2019		
Station Name	Maskwa		
Auditor	Al Clark		
Audit Date	May 9, 2019		
Critical	Pass	Fail	
H ₂ S	X		
SO ₂	X		
TRS			
NO / NO ₂ / NO _x	X		
O ₃			
HC	X		
Sharp PM _{2.5}			
Wind Speed / Wind Direction	X		
Wind head Orientation	X		
Manifold Fan	X		
Partisol PM _{2.5}			
Zero/Span Systems Operational	X		
Inspection Items	OK	Need for Improvement	
Sample pump venting/scrubbing	X		
Heating / Air Conditioning	X		
Manifold	X		
Sample Lines	X		
Sharp PM _{2.5}			
Partisol PM _{2.5}			
Safety	X		
Site Conditions	X		
Non-critical	OK	Opportunity for Improvement	
RH	X		
Station Temperature	X		
Ambient Temperature	X		
Barometric Pressure	X		
Tipping bucket	X		
Station Condition	X		
Station Documentation		X	Needs review / or missing

Not monitored or audited at this location

* Initial response was 24% low



1.0 Quality Control Activities

Quality control procedures are established to govern the performance of the monitoring equipment and to protect operational uptime. Data collected during QC/QA activities are assigned a data validation code to comply with the requirements outlined in Chapter 6, 4.1.1, DQ 4-A (AMD, 2016). Calibrations are deemed successful only if the AMD calibration acceptance limits are met (Chapter 7, 9.0, AMD 2016).

A daily zero-span test procedure is performed for each gaseous parameter by challenging the analyzer with a zero-air source and span gas. Daily review of the data ensures the zero and span check are within the required acceptance limits and do not deviate more than $\pm 10\%$ from the expected value. The total zero-span cycle is complete within an hour with the zero phase commencing at the beginning of the scheduled hour. This QC activity is conducted in accordance with Chapter 7, 4.0, Cal 4-A (AMD, 2016).

The allowable time for a zero-span check is one hour per calendar day. The time allotted for the zero-span check does not contribute to downtime and is identified with a data validation code of "S". If any additional zero-span response checks are performed, the time accrued during the QC activity is considered downtime and is identified with a data validation code of "S1". The initiation of an additional zero-span check may be warranted during the investigation of operational issues or suspect data.

Each month, a scheduled multipoint calibration is performed on each gas analyzer. Prior to any adjustments, an as-found response test is completed to obtain the zero reading of the analyzer and the response to the highest span concentration. The zero and high point test gases are then re-introduced into the analyzer to establish the zero and high set-points. Once these adjustments are satisfactory, a mid-point and a low-point test concentration is introduced. Additional multi-point calibrations are required if any of the conditions, outlined in Chapter 7, 2.1, Cal 2G (AMD, 2016) exist.

The time allotted for the first multi-point calibration is not considered downtime and is identified with a data validation code of "C". If any additional as-found response checks or multipoint calibrations are performed, the time accrued during the QC activity is considered downtime and is identified with a data validation code of "C1".

A mechanical wind system undergoes annual calibration, as a minimum, while an ultrasonic wind system is factory calibrated every two years (Chapter 6, 6.0, Cal 6-A, AMD 2016). Supplementary to this, a visual inspection of the equipment is performed during each scheduled monthly site visit.

The time allotted for the wind system calibration is not considered downtime and is identified with a data validation code of "C". If function checks or additional calibrations are performed, the time accrued during the QC activity is not considered downtime and is identified with a data validation code of "Q" and "C", respectively. If QC activity goes beyond 10% of the monthly operating time, the time exceeding 10% is considered downtime and is assigned a data validation code of "C1". Data identified with a data validation code of "Q" is in accordance with Chapter 6, 4.1.3 (AMD, 2016) which states QA/QC activities are not included when calculating data completeness.

High volume samplers are calibrated every three months, as a minimum, in accordance with Chapter 7, 7.0, Cal 7-B (AMD, 2016).

Where passive sampling is in practice, quality control samples will be deployed in accordance with Chapter 4, 3.0, 3.1.3. Method blanks, replicate samples and spiked blanks are exposed and handled in the same manner as each passive sample. To comply with the data submission requirements in Chapter 9, 3.1, the replicate and corresponding passive sample concentrations are reportable data values and have not been averaged.

As recommended in Chapter 6, 4.2 (AMD 2016), daily data review is conducted to verify data and avoid significant data losses. Automated flags, originating from the data-logger, and data anomalies are reviewed and may prompt the need to dispatch a technician for investigation and/or corrective action. Additionally, there are several automated alarm scenarios that serve to screen raw data, alert technicians and elicit investigation or corrective action.

Comparisons of the measured ambient concentrations to the corresponding AAAQO are assessed using the significant figures protocol in Chapter 9, 3.1.2. If the measurement is near the set objective, raw data may undergo necessary data adjustments to confirm a true exceedance. Should an exceedance occur, Maxxam will formally notify the client; however, the reporting protocol to AEP is defined by the client and may not involve Maxxam. Exceedance events are acknowledged in the report, based on the information available at the time.

2.0 Data Verification and Validation

The data validation procedures, outlined in Chapter 6, 4.0, AMD 2016, are used to accept, reject and qualify data. The data verification and validation process, and the current Data Collection and Management Process Flow Chart have been compiled from sections 4.2 to 4.6 (AMD, 2016) and are shown below.

Baseline adjustments are applied by interpolation between two valid zero checks, as determined by the Data Acquisition System. In the event that zero check results are not reliable, data may be adjusted by applying a constant offset to data collected between two adjacent zero checks. Both adjustment approaches are deemed acceptable by the AMD.

Table 1 (Chapter 6) outlines the quantitative parameter relationships to be considered and dictates that data adjustments are applied equally for NO/NO₂/NO_x and CH₄/NMHC/THC parameters. Below zero adjustments are applied to 1-hour averages, in accordance with Table 2 (Chapter 6), and are done after baseline corrections.

Instantaneous data, where provided, 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.

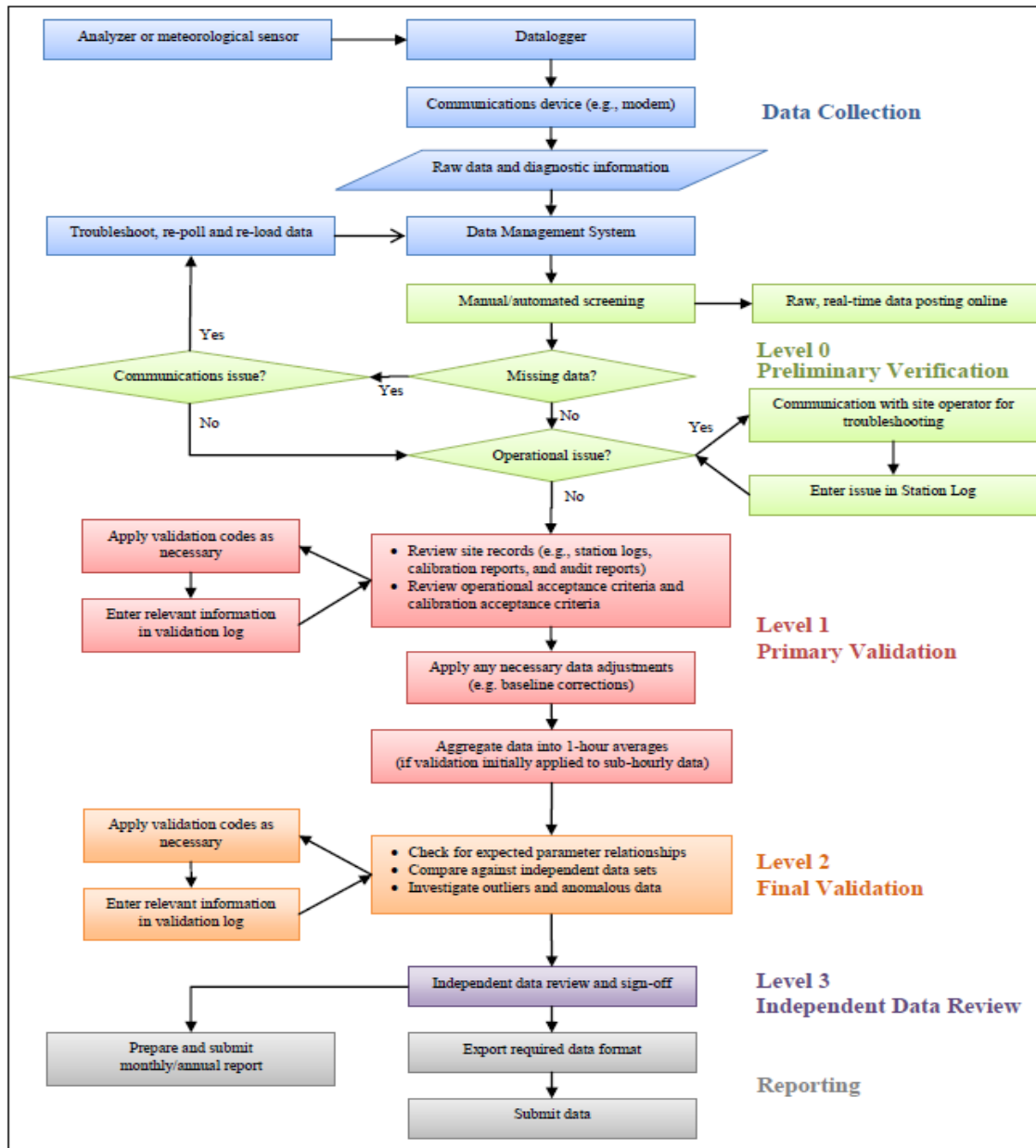
All calculations and reporting of results follow the methods described in the AMD, 2016.

There were no deviations from the prescribed methods.

AMD Data Verification and Validation Process

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). At this level, data undergoes a certain amount of manual or automated screening and flagging. Screening checks include: a) identification of periods of missing data; b) verification of time stamps against reference time; c) verification that instrument diagnostics/data-logger 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	Primary validation involves more thorough evaluation and documentation of issues identified during data screening, along with appropriate application of data validation codes. Level 1 activities 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. At this level of review, some general knowledge of pollutant and meteorological behavior can be used to determine if data is suspect.
Level 3 Independent Data Review	Level 3 validation involves a final cursory review of validated data, and is completed by an individual independent of both field operations and primary data validation. At this level, a final independent QA review/endorsement is performed before data is submitted to Alberta Environment and Parks.
Post-Final Validation	The Post-Final Validation step serves to re-evaluate validated data for errors or omissions discovered and/or suspected after the initial monthly data submittal. This level of validation is performed on an annual basis, when annual reporting is required or requested.



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

Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2019-05-24-C</u>
Site: <u>Maskwa Continuous Monitoring Station</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u><i>bimadeniji</i></u>	Date <u>06-June-2019</u>
Level 1 Primary Validation	<u><i>bimadeniji</i></u>	Date <u>07-June-2019</u>
Level 2 Final Validation	<u><i>bimadeniji</i></u>	Date <u>10-June-2019</u>
Level 3 Independent Data Review	<u><i>CSA dmkg</i></u>	Date <u>17-June-2019</u>
Post-Final Validation	<u>NA</u>	Date <u>NA</u>

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

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MAY 1 - 31, 2019

MONTHLY AMBIENT AIR QUALITY MONITORING REPORT

AEP Ambient Station ID: 1250

Project #: 2833-2019-05-25-C

LICA-201905

Prepared for:

Lakeland Industry & Community Association

Mike Bisaga

5107 50 St.

Bonnyville, Alberta T9N 2J7

monitoring@lica.ca

780-266-7068

Monitoring Station

St. Lina Continuous Monitoring Station

Date of Report Issuance: June 24, 2019

Report Preparation By:

Bim Adeniji, M.Sc.

403-219-3677

aadeniji@maxxam.ca



Project Manager, Customer Service, Air Services

Reviewed By:

Wunmi Adekanmbi, M.Sc., EPT, PMP

403-219-3661

aadekanmbi@maxxam.ca



Project Team Lead, Customer Service, Air Services



#1 - 2080 39 Avenue NE, Calgary AB, T2E 6P7

Lakeland Industry & Community Association

5107 50 St.
Bonnyville, Alberta T9N 2J7

Attention: Mike Bisaga

Date: June 24, 2019

Subject: MONTHLY AMBIENT AIR QUALITY MONITORING REPORT for MAY 1 - 31, 2019

In May 2019, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the St. Lina Continuous Monitoring Station near St. Lina, Alberta. The monitoring program provides measurements of ambient air pollutants and meteorological data to satisfy the reporting requirements of the Alberta airshed.

Network Parameters for Continuous Monitoring:

This monthly report, where applicable, was prepared in accordance with Chapter 9 of the Air Monitoring Directive (AMD, 2016). The report summarizes the continuous monitoring results for pollutant and meteorological parameters and presents the hourly statistics, graphs and rose charts for the month. Calibration records are provided in a separate PDF document in order to comply with AMD requirements Chapter 9, 13.1.7, RC 13-R. The station is equipped with analyzers to measure SO₂, H₂S, THC, CH₄, NMHC, NO_x, NO, NO₂, PM_{2.5} and O₃. The meteorological sensors and equipment capture data for WS, WD, RH, BP, PRECIP, AmbTPX and STDWD.

Exceedance & Performance Reporting:

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above the 90% requirement, as per the AMD, Chapter 6, DQ 4-C, 2016.

Non-Conformance: Comparisons of the measured ambient air concentrations to the corresponding AAAQOs were done in accordance with Appendix A, Alberta Ambient Air Quality Objective Calculation Guidelines (AMD, Chapter 9, Appendix A, 2016). For PM_{2.5}, there was a concentration recorded in excess of the Alberta Ambient Air Quality Objectives and Guidelines (AAAQO, January 2019). One 1-hour exceedance was recorded and reported to AEP under reference number: **354046**.

For all the remaining parameters, there were no ambient concentrations in excess of the AAAQOs.

Monthly Monitoring Overview:

In relation to the previous month, there were no changes made to the scope or management of the ambient air monitoring program.

The evaluation of data collected in the month of May did not reveal any errors or omissions that would require resubmission of air data to AEP's airdata warehouse.

AEP Audit: A station audit was conducted by Alberta Environment and Parks (AEP) on May 6. The Audit report can be found on page 89.

H₂S: Two hours of downtime were recorded this month, due to additional quality checks performed to assess biased high drifts in zero and span response.

NO_x/NO/NO₂: One hour of downtime was recorded on May 26, due to an additional quality check performed to assess a biased low drift in span response.

Should you have any questions concerning the results or if we can be of further assistance, please contact your Maxxam representative indicated below.

Reviewed by:



Wunmi Adekanmbi, M.Sc., EPT, PMP
Project Team Lead, Customer Service, Air Services
403-219-3661

I certify that I 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. Certification of submitted information is specific to the contents of this report and is not intended to represent the onus of the Person Responsible, as outlined in Chapter 9, RC 12-E.

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List of Acronyms

AAAQO	Alberta Ambient Air Quality Objectives and Guidelines Summary
AEP	Alberta Environment and Parks
AMBTPX	Ambient Temperature
AMD	Air Monitoring Directive
BP	Barometric Pressure
CH₄	Methane
DAS	Data acquisition system
hr	Hour
hrs	Hours
H₂S	Hydrogen Sulphide
IZS	Internal zero-span
kph	Kilometers per hour
NO	Nitric Oxide
NO₂	Nitrogen dioxide
NOx	Total oxides of nitrogen
O₃	Ozone
NMHC	Non-Methane Hydrocarbon
PM_{2.5}	Particulate matter less than or equal to 2.5 microns in diameter
Precip	Precipitation
ppb	Parts per billion
ppm	Parts per million
QA	Quality Assurance
QC	Quality Control
RH	Relative Humidity
SHARP	Synchronized Hybrid Ambient Real-time Particulate Monitor
SOP	Standard Operating Procedure
SO₂	Sulphur Dioxide
STDWD	Standard Deviation Wind Direction
THC	Total hydrocarbons
WS	Wind Speed
WD	Wind Direction
°C	Degrees Celsius

AAAQO Exceedance Summary Report

SO₂ 1-Hour Exceedances

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

SO₂ 24-Hour Exceedances

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

H₂S 1-Hour Exceedances

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

H₂S 24-Hour Exceedances

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

NO₂ 1-Hour Exceedances

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

PM_{2.5} 1-Hour Exceedances

DATE	TIME (MST)	READING (µg/m ³)	WS (kph)	WD (deg)	AEP Reference #
May 30	14:00	88	12.9	NNW	354046

PM_{2.5} 24-Hour Exceedances

Measured concentrations of fine particulate matter were below the 24-hour AAAQO of 29 µg/m³.

O₃ 1-Hour Exceedances

Measured concentrations of ozone were below the 1-hour AAAQO of 76 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

MONTHLY CONTINUOUS DATA SUMMARY

Lakeland Industry & Community Association						MAXIMUM VALUES							OPERATIONAL TIME (%)
St. Lina Continuous Monitoring Station						1-HOUR				24-HOUR			
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
	1-hr	24-hr	1-hr	24-hr									
SO ₂ (ppb)	172	48	0	0	0	2	26	7	4.3	NE	1	27	100.0
H ₂ S (ppb)	10	3	0	0	0	2	27	5	8.1	SSW	1	27	99.7
THC (ppm)	-	-	-	-	1.96	2.20	25	5	5.2	E	2.00	19	100.0
CH ₄ (ppm)	-	-	-	-	1.96	2.20	25	5	5.2	E	2.00	19	100.0
NMHC (ppm)	-	-	-	-	0.00	0.10	28	14	9.3	W	0.00	1	100.0
NO ₂ (ppb)	159	-	0	-	1	6	27	8	9.4	WSW	3	27	99.9
NO (ppb)	-	-	-	-	0	2	27	8	9.4	WSW	0	1	99.9
NO _x (ppb)	-	-	-	-	2	8	27	8	9.4	WSW	3	24	99.9
O ₃ (ppb)	76	-	0	-	41.5	72.8	28	17	9.4	W	59.8	28	100.0
PM _{2.5} (µg/m ³)	80	29	1	0	8	88	30	14	12.9	NNW	29	30	100.0
RELATIVE HUMIDITY (%)	-	-	-	-	49	100	2	3	6.9	WSW	77	24	100.0
BAROMETRIC PRESSURE (millibar)	-	-	-	-	931	941	8	11	4.3	ENE	939	8	100.0
AMBIENT TEMPERATURE (°C)	-	-	-	-	10.8	30.3	29	15	11.2	WNW	22.3	29	100.0
PRECIPITATION (mm)	-	-	-	-	66.2	13.3	28	3	9.1	W	13.3	28	100.0
VECTOR WS (kph)	-	-	-	-	1.2	28.3	10	14	-	NNW	14.9	10	100.0
VECTOR WD (sec)	-	-	-	-	120 (ESE)	-	-	-	-	-	-	-	100.0

* Precipitation: data represents the total (sum) for the indicated time frame

OPERATIONAL SUMMARY

Parameter	Equipment	Method & Procedure	Operational Notes
SULPHUR DIOXIDE (SO ₂)	Thermo 43i TLE Pulsed Fluorescence Analyzer	Maxxam AIR SOP-00209: Ambient Sulphur Monitoring	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 6. The Audit report can be found on page 89. The routine monthly calibration was performed on May 23, between the hours of 10:00 and 14:00.
HYDROGEN SULPHIDE (H ₂ S)	Thermo 450i UV Fluorescence Analyzer	Maxxam AIR SOP-00209: Ambient Sulphur Monitoring	<ul style="list-style-type: none"> Operational time for the monitoring period was 99.7%, equivalent to 2 hours of downtime. A station audit was conducted by Alberta Environment and Parks (AEP) on May 6. The Audit report can be found on page 89. The analyzer began to exhibit biased high drifts in zero and span response on May 9. The result of an additional zero-span check performed at hour 06:00 on May 10, and subsequent scheduled checks, exhibited similar response. This prompted a site visit on May 16, where the routine monthly calibration was successfully completed between hours 11:00 - 15:00. The expected span value was updated following the post-calibration zero-span check. As the monthly calibration results met AMD requirements, no data was discarded due to the drifts. One hour of downtime was, however, recorded due to the additional quality check. The daily zero-span results began to drift towards the upper acceptance limit again on May 25. A repeat zero-span check performed shortly afterwards showed a similar trend. Subsequent zero-span checks demonstrated improved response. As a proactive measure, the permeation tube was replaced on May 27, during a scheduled site visit and was allowed time to stabilize. However, span response did not stabilize within 72 hours of replacing the perm tube. The reference span value was therefore not updated until after a multi-point calibration was performed on June 4. As the June 4 calibration met AMD requirements, demonstrating optimum analyzer performance, no data was discarded due to the instability in span response. One hour of downtime was, however, incurred due to the additional quality check on May 25.
TOTAL HYDROCARBONS (THC), METHANE (CH ₄) & NON-METHANE HYDROCARBONS (NMHC)	Thermo 55i FID Analyzer	Maxxam AIR SOP-00001: Methane, Non-Methane Hydrocarbon Analyzer Monitoring	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 6. The Audit report can be found on page 89. The routine monthly calibration was performed on May 16, between the hours of 11:00 and 15:00. The span gas cylinder was replaced during this site visit.

OPERATIONAL SUMMARY

Parameter	Equipment	Method & Procedure	Operational Notes
OXIDES OF NITROGEN (NO _x), NITRIC OXIDE (NO) & NITROGEN DIOXIDE (NO ₂)	Thermo 42i Chemiluminescent Analyzer	Maxxam AIR SOP-00213: Ambient NO/NO ₂ /NO _x Monitoring	<ul style="list-style-type: none"> Operational time for the monitoring period was 99.9%, equivalent to 1 hour of downtime. A station audit was conducted by Alberta Environment and Parks (AEP) on May 6. The Audit report can be found on page 89. The analyzer exhibited a sudden drift outside the lower acceptance limit on May 23. This prompted an immediate site visit where the routine monthly calibration was completed successfully between hours 10:00 – 16:00. The permeation tube was replaced during this site visit and allowed time to stabilize. An additional zero-span check was triggered on May 26, at hour 7:00 to assess span response following the permeation tube replacement. The span reference value was subsequently updated after the scheduled zero-span check on May 27. As the monthly calibration result met AMD requirements, no data was discarded due to the span drift. One hour of downtime was, however, recorded due to the additional quality check.
OZONE (O ₃)	Thermo 49i Photometric Analyzer	Maxxam AIR SOP-00212: Ambient O ₃ Monitoring	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 6. The Audit report can be found on page 89. The routine monthly calibration was performed on May 23, between the hours of 10:00 and 14:00.
PARTICULATE MATTER < 2.5 MICRONS (PM _{2.5})	Thermo SHARP 5030i Unit	Maxxam AIR SOP-00014: Measurement of Particulate Concentration Using the THERMO SHARP	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. The routine quarterly calibration was performed on May 27, between the hours of 14:00 and 15:00. One 1-hour exceedance was recorded on May 30, hour 14:00, at a concentration of 88µg/m³ and was reported to AEP under reference number: 354046.
WIND SPEED (WS), WIND DIRECTION (WD) & STANDARD DEVIATION WIND DIRECTION (STDWD)	Met One Unit	Maxxam AIR SOP-00013: RM Young Wind Monitor Calibration	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. The resident wind system, Met One (s/n: H12635) was removed on May 3. A new LICA-owned model, RM Young (s/n: WM161466), was audited onsite and installed on the same day. A station audit was conducted by Alberta Environment and Parks (AEP) on May 6. The Audit report can be found on page 89. Wind data is reported as vector wind speed and vector wind direction. Wind direction is defined as the direction from which the wind is blowing and is measured in degrees from true north.
RELATIVE HUMIDITY (RH)	Rotronic Hygroclip Unit	Operations Manual	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 6. The Audit report can be found on page 89.

OPERATIONAL SUMMARY

Parameter	Equipment	Method & Procedure	Operational Notes
BAROMETRIC PRESSURE (BP)	Met One Unit	Operations Manual	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 6. The Audit report can be found on page 89.
PRECIPITATION (PRECIP)	Met One Unit	Maxxam AIR SOP-00242: Precipitation Collector Installation/Maintenance	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 6. The Audit report can be found on page 89. The quarterly precipitation sensor audit was performed on May 27, between 16:26 and 16:30. The result was satisfactory.
AMBIENT TEMPERATURE (AmbTPX)	Rotronic Hygroclip Unit	Operations Manual	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 6. The Audit report can be found on page 89.
Datalogger	Envista Ultimate Unit	Operations Manual	<ul style="list-style-type: none"> There were no performance issues identified.

SUMMARY TABLES, GRAPHS AND ROSES



SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)

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

STATUS FLAG CODES

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

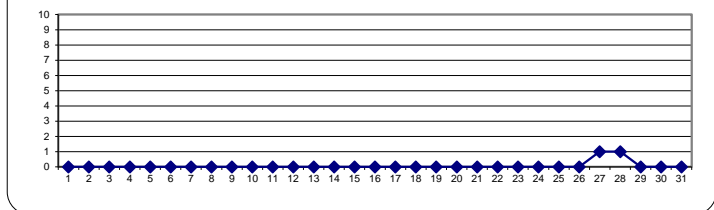
OBJECTIVE LIMIT:

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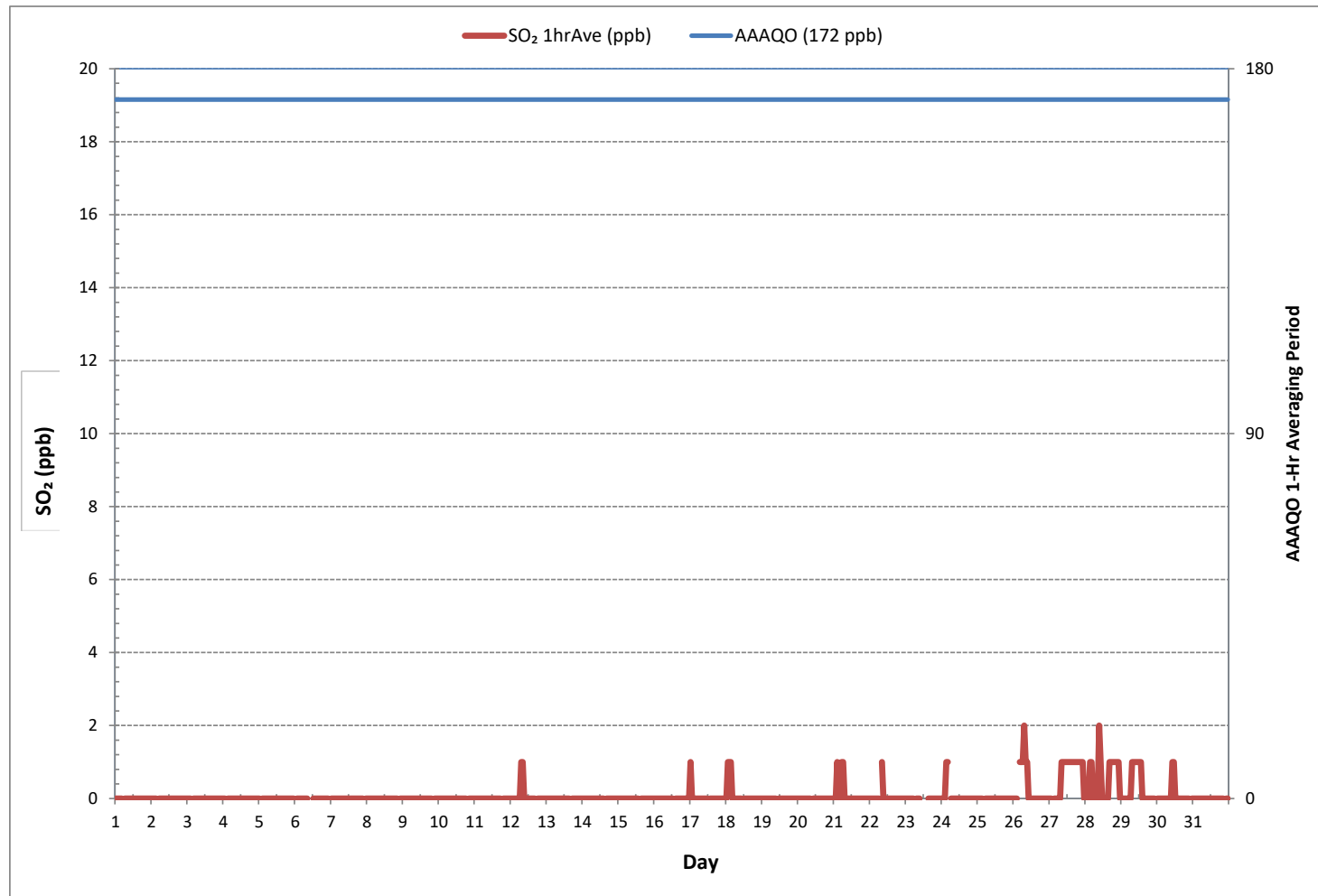
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	53		
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0 ON DAY	1
MAXIMUM 1-HR AVERAGE:	2 ppb @ HOUR	7 ON DAY	26
MAXIMUM 24-HR AVERAGE:	1 ppb	ON DAY	27
IZS CALIBRATION TIME:	33 hrs	OPERATIONAL TIME:	744 hrs
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	0	MONTHLY AVERAGE:	0 ppb

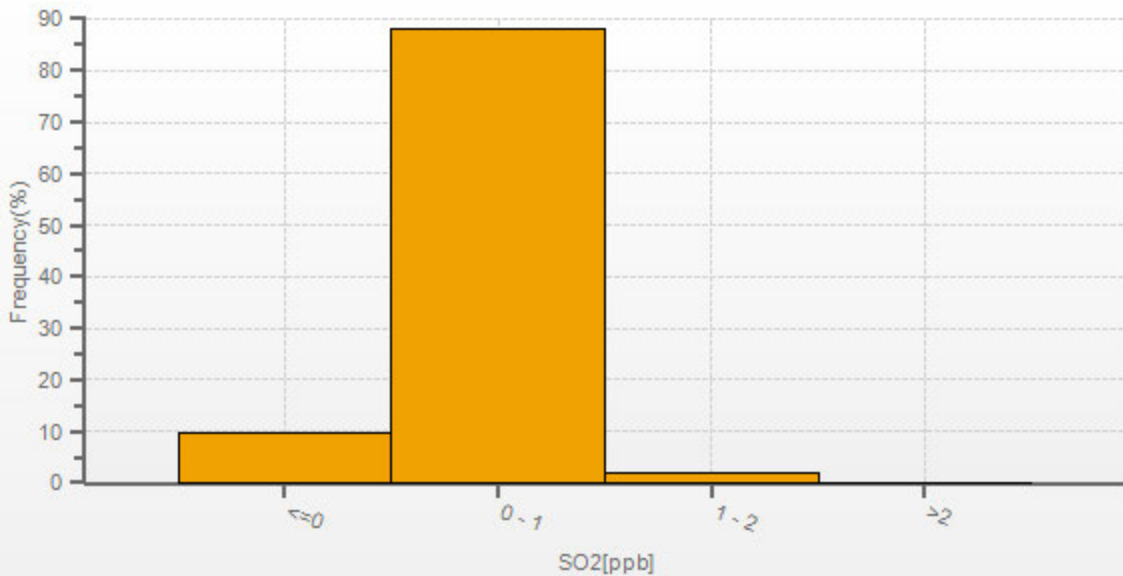
24 HR AVERAGES May 2019



SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)

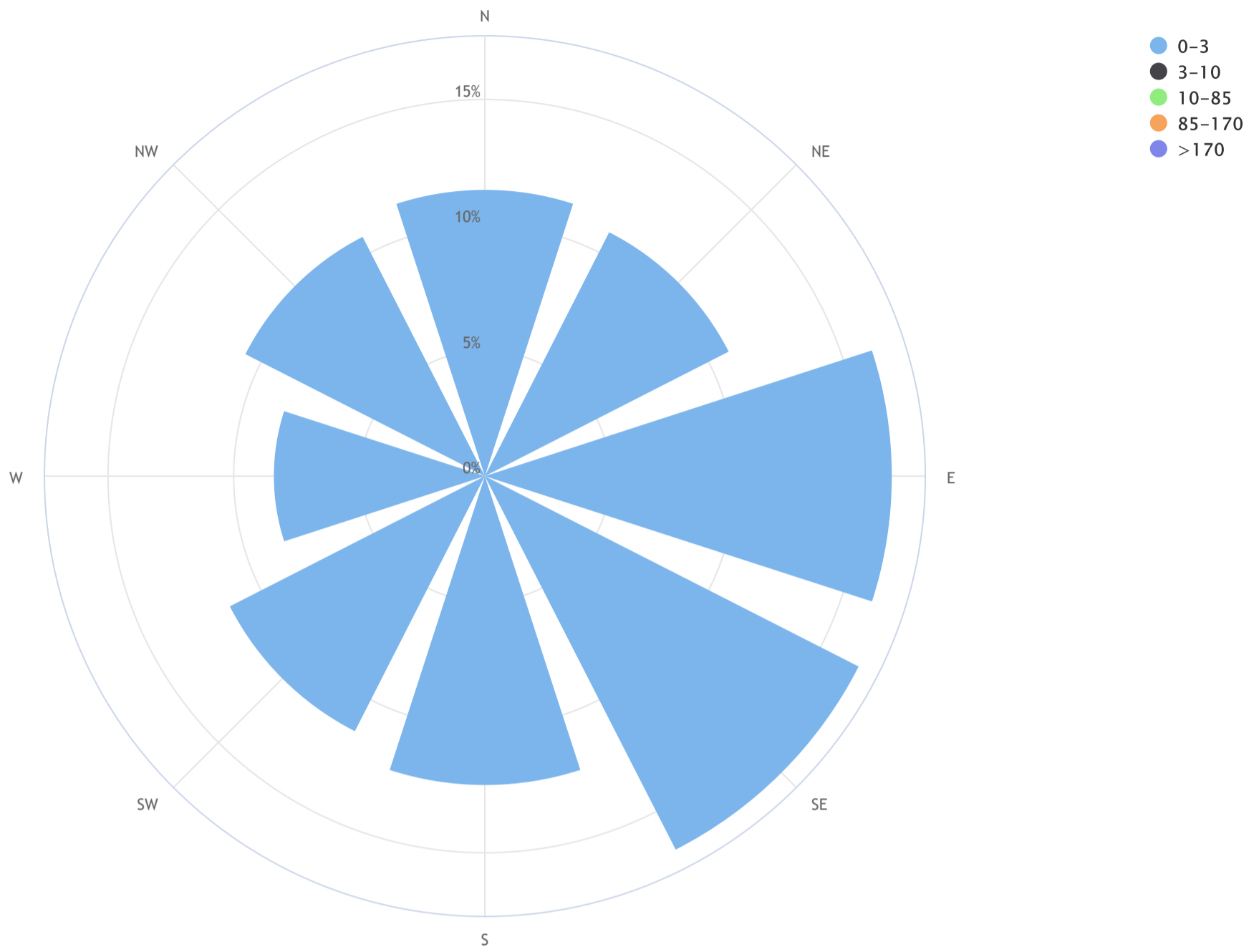


SO2[ppb] Histogram: LICA ST. LINA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_St. Lina Continuous Monitoring Station_SO₂ (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.0, CALM % = 1.9%



Direction	0-3	3-10	10-85	85-170	>170	TOTAL
N	11.4	0.0	0.0	0.0	0.0	11.4
NE	10.9	0.0	0.0	0.0	0.0	10.9
E	16.2	0.0	0.0	0.0	0.0	16.2
SE	16.7	0.0	0.0	0.0	0.0	16.7
S	12.3	0.0	0.0	0.0	0.0	12.3
SW	11.4	0.0	0.0	0.0	0.0	11.4
W	8.4	0.0	0.0	0.0	0.0	8.4
NW	10.7	0.0	0.0	0.0	0.0	10.7
Summary	98.1	0.0	0.0	0.0	0.0	98.1
CALM	1.9	0.0	0.0	0.0	0.0	1.9

HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)

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

STATUS FLAG CODES

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

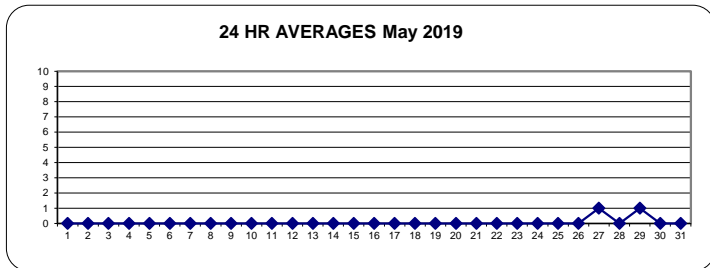
OBJECTIVE LIMIT:

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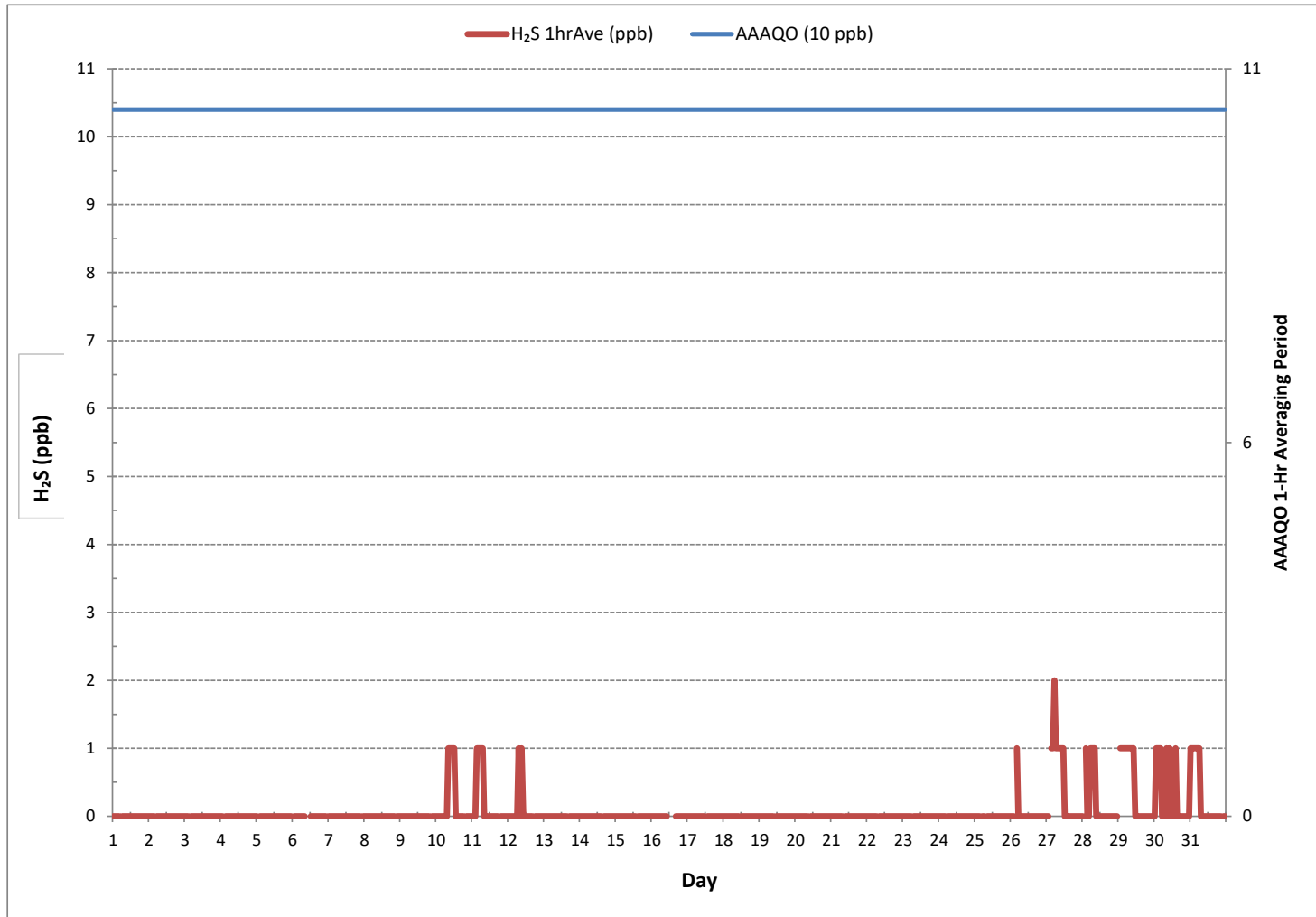
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	51		
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0 ON DAY	1
MAXIMUM 1-HR AVERAGE:	2 ppb @ HOUR	5 ON DAY	27
MAXIMUM 24-HR AVERAGE:	1 ppb	ON DAY	27
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	742 hrs
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	99.7 %
STANDARD DEVIATION:	0	MONTHLY AVERAGE:	0 ppb

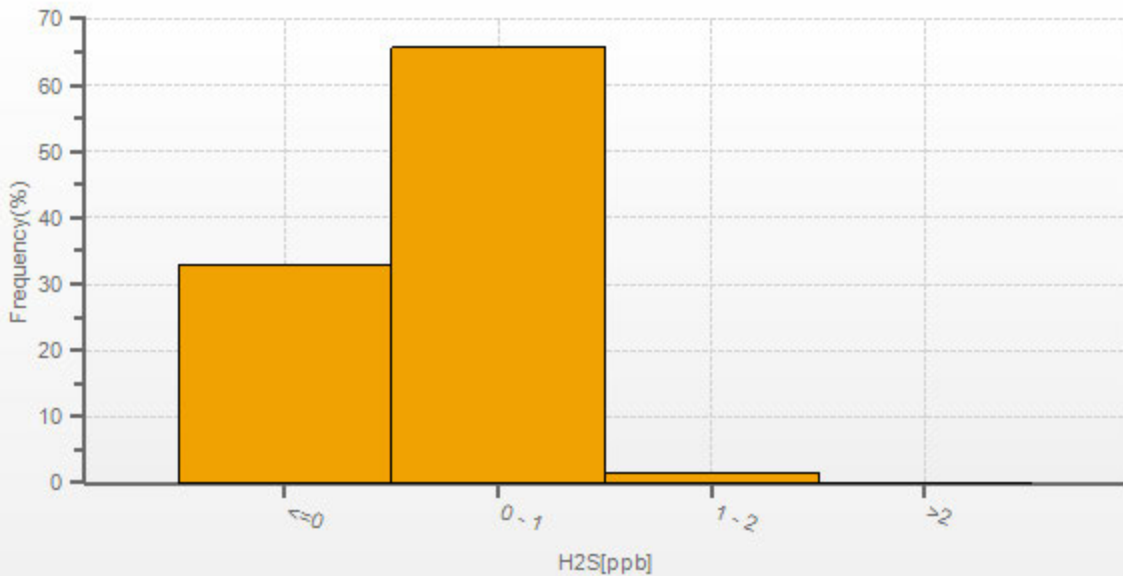
24 HR AVERAGES May 2019



HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)

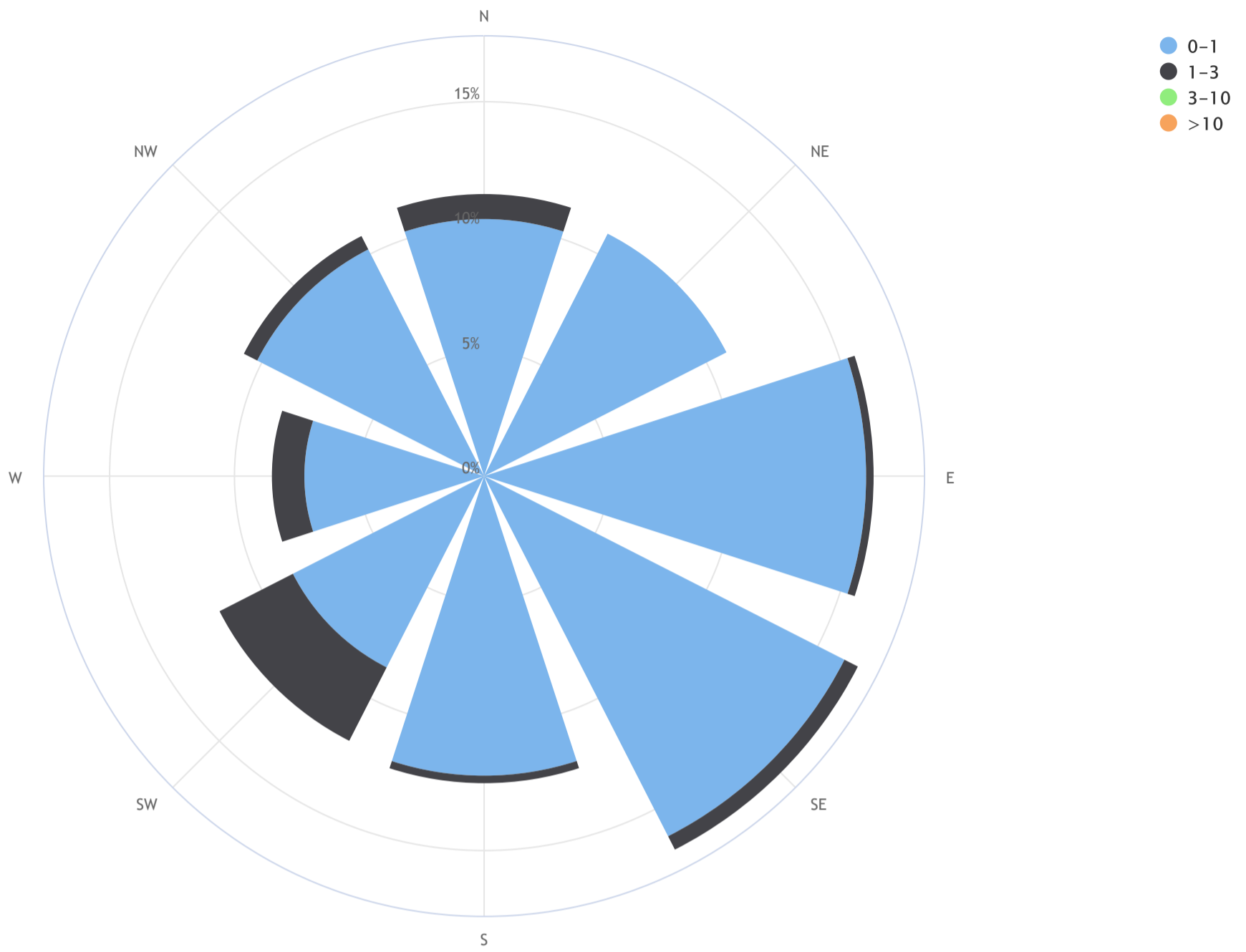


H2S[ppb] Histogram: LICA ST. LINA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_St. Lina Continuous Monitoring Station_H2S (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.0, CALM % = 2.0%



Direction	0-1	1-3	3-10	>10	TOTAL
N	10.3	1.0	0.0	0.0	11.3
NE	10.9	0.0	0.0	0.0	10.9
E	15.3	0.3	0.0	0.0	15.6
SE	16.2	0.6	0.0	0.0	16.8
S	12.0	0.3	0.0	0.0	12.3
SW	8.6	3.3	0.0	0.0	11.9
W	7.2	1.3	0.0	0.0	8.5
NW	10.2	0.6	0.0	0.0	10.7
Summary	90.7	7.3	0.0	0.0	98.0
CALM	2.0	0.0	0.0	0.0	2.0

TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	2.02	2.03	2.01	2.01	2.02	S	2.04	1.99	1.96	1.95	1.94	1.95	1.95	1.94	1.94	1.93	1.94	1.93	1.92	1.93	1.94	1.94	1.94	1.93	1.92	2.04	1.96	24	
2	1.93	1.93	1.93	1.93	S	1.93	1.93	1.94	1.94	1.93	1.93	1.93	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.93	1.94	1.94	1.92	1.94	1.93	24	
3	1.96	1.99	1.99	S	1.96	1.93	1.94	1.93	1.93	1.93	1.93	1.94	1.94	1.94	1.94	1.94	1.94	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.99	1.94	24	
4	1.94	1.94	S	1.94	1.95	1.95	1.95	1.95	1.95	1.94	1.94	1.94	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.94	1.97	1.99	1.97	1.93	1.99	1.94	24	
5	2.02	S	1.98	1.99	2.02	2.05	1.99	1.97	1.97	1.95	1.95	1.95	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.95	1.96	1.96	1.99	1.94	2.05	1.97	24	
6	S	2.02	2.03	2.03	1.99	1.98	1.98	1.98	1.98	1.99	1.97	Q	Q	Q	1.95	1.94	1.94	1.94	1.95	1.96	1.97	2.00	2.01	S	1.94	2.03	1.98	24	
7	2.03	2.05	2.02	2.05	2.06	2.07	2.06	2.08	2.07	2.00	1.95	1.94	1.94	1.94	1.94	1.93	1.92	1.93	1.94	1.93	1.94	1.95	S	1.96	1.92	2.08	1.99	24	
8	1.98	2.00	1.99	1.95	1.97	2.01	2.01	1.99	1.99	1.97	1.97	1.95	1.95	1.95	1.95	1.96	1.95	1.95	1.94	1.95	1.96	S	1.99	1.97	1.94	2.01	1.97	24	
9	2.01	2.04	2.06	2.07	2.08	2.08	2.12	2.09	2.03	2.00	1.96	1.95	1.93	1.91	1.90	1.90	1.91	1.91	1.91	1.91	1.91	S	1.93	1.91	1.90	1.90	2.12	1.98	24
10	1.91	1.91	1.91	1.91	1.90	1.90	1.89	1.89	1.90	1.89	1.90	1.89	1.89	1.90	1.90	1.89	1.90	1.90	1.90	S	1.91	1.96	1.97	1.98	1.89	1.98	1.91	24	
11	1.98	1.97	1.97	1.97	1.98	1.99	1.97	1.96	1.94	1.93	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.90	S	1.92	1.93	1.94	1.96	1.96	1.90	1.99	1.94	24	
12	1.95	1.96	1.99	1.96	1.94	1.91	1.89	1.89	1.90	1.89	1.89	1.89	1.88	1.88	1.89	1.89	1.89	S	1.88	1.88	1.88	1.89	1.90	1.89	1.88	1.99	1.90	24	
13	1.89	1.90	1.92	1.92	1.94	1.94	1.94	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.89	S	1.89	1.90	1.90	1.90	1.91	1.92	1.94	1.98	1.89	1.98	1.91	24	
14	2.02	2.04	1.99	1.98	1.97	2.00	1.99	1.97	1.96	1.92	1.92	1.91	1.90	1.90	1.90	S	1.91	1.91	1.91	1.92	1.93	1.95	1.94	1.95	1.90	2.04	1.95	24	
15	1.95	1.95	1.96	1.95	1.97	1.95	1.95	1.94	1.94	1.92	1.91	1.92	1.91	1.92	S	1.90	1.89	1.90	1.90	1.89	1.90	1.94	2.00	1.98	1.89	2.00	1.93	24	
16	2.03	2.00	1.97	1.97	1.97	1.99	1.97	1.96	1.93	1.93	1.93	C	C	C	C	C	1.92	1.91	1.91	1.91	1.92	1.94	1.96	1.99	1.91	2.03	1.95	24	
17	1.99	1.98	2.00	2.00	2.02	2.00	2.00	1.99	1.96	1.95	1.94	1.95	S	1.93	1.92	1.92	1.92	1.92	1.93	1.93	1.93	1.94	1.96	2.01	1.92	2.02	1.96	24	
18	2.03	2.05	2.08	2.12	2.06	2.07	2.04	2.01	1.99	1.96	1.94	S	1.93	1.93	1.93	1.92	1.92	1.92	1.93	1.93	1.94	1.95	1.98	2.00	1.92	2.12	1.98	24	
19	2.02	2.03	2.05	2.05	2.08	2.15	2.16	2.10	2.00	1.98	S	1.97	1.96	1.95	1.95	1.94	1.94	1.94	1.94	1.94	1.94	1.95	1.97	1.97	1.94	2.16	2.00	24	
20	2.00	2.04	2.09	2.09	2.09	2.08	2.07	2.05	2.01	S	1.95	1.93	1.92	1.92	1.92	1.91	1.91	1.91	1.91	1.91	1.91	1.92	1.94	1.97	1.99	1.91	2.09	1.98	24
21	2.03	2.05	2.06	2.13	2.18	2.15	2.11	2.06	S	1.94	1.92	1.92	1.93	1.92	1.91	1.92	1.92	1.91	1.91	1.91	1.91	1.95	1.98	1.99	1.99	1.91	2.18	1.99	24
22	1.99	1.99	1.96	1.92	1.92	1.92	1.92	S	1.94	1.93	1.92	1.92	1.92	1.92	1.91	1.92	1.92	1.92	1.91	1.93	1.92	1.99	1.96	1.97	2.00	1.91	2.00	1.94	24
23	2.00	2.00	2.00	2.01	1.99	2.00	S	2.05	2.01	1.98	1.94	1.93	1.93	1.92	1.92	1.92	1.92	1.92	1.93	1.94	1.94	2.00	1.99	2.00	1.95	1.92	2.05	1.97	24
24	1.96	1.96	1.97	1.97	2.02	S	2.06	2.00	1.96	1.96	1.96	1.99	1.94	1.92	1.92	1.91	1.91	1.93	1.94	1.95	1.94	1.97	1.98	1.99	1.91	2.06	1.96	24	
25	1.98	1.98	2.07	2.18	S	2.20	2.07	2.02	1.96	1.94	1.92	1.91	1.91	1.90	1.90	1.91	1.91	1.91	1.91	1.91	1.92	1.92	1.92	1.93	1.90	2.20	1.96	24	
26	1.95	1.95	2.03	S	2.07	2.09	2.05	2.01	2.00	1.97	1.95	1.95	1.94	1.94	1.94	1.93	1.93	1.92	1.92	1.92	1.93	1.95	1.98	2.04	1.92	2.09	1.97	24	
27	2.05	2.02	S	2.04	2.06	2.10	2.11	2.10	2.04	2.00	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.93	1.92	1.92	1.93	1.94	1.95	1.97	1.92	2.11	1.99	24	
28	2.02	S	2.10	2.00	1.94	2.20	2.17	2.05	2.02	1.97	1.94	1.93	1.93	1.93	1.92	1.92	1.92	1.92	1.93	1.94	1.95	1.97	1.97	1.92	2.20	1.99	24		
29	S	1.99	1.99	1.99	2.00	2.02	2.03	2.03	2.00	1.97	1.95	1.93	1.91	1.91	1.90	1.89	1.89	1.89	1.90	1.90	1.92	1.94	1.95	S	1.89	2.03	1.95	24	
30	1.94	1.96	2.00	2.00	2.01	1.97	1.98	1.97	1.95	1.94	1.94	1.93	1.92	1.93	1.94	1.91	1.91	1.91	1.91	1.90	1.91	1.94	1.94	S	1.99	1.90	2.01	1.95	24
31	2.03	2.07	2.02	1.98	1.98	1.98	2.00	1.98	1.94	1.93	1.93	1.92	1.92	1.94	1.94	1.93	1.93	1.93	1.94	1.99	1.97	S	1.99	2.03	1.92	2.07	1.97	24	
HOURLY MAX	2.05	2.07	2.10	2.18	2.18	2.20	2.17	2.10	2.07	2.00	1.97	1.99	1.96	1.95	2.02	1.96	1.95	1.95	1.95	1.99	2.00	2.00	2.01	2.04					
HOURLY AVG	1.99	1.99	2.00	2.00	2.00	2.02	2.01	2.00	1.97	1.95	1.93	1.93	1.92	1.92	1.93	1.92	1.92	1.92	1.92	1.92	1.94	1.95	1.96	1.97					

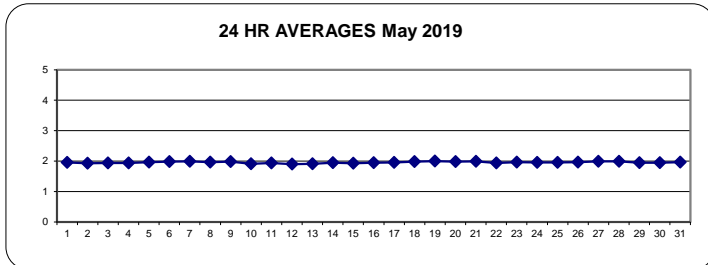
STATUS FLAG CODES

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

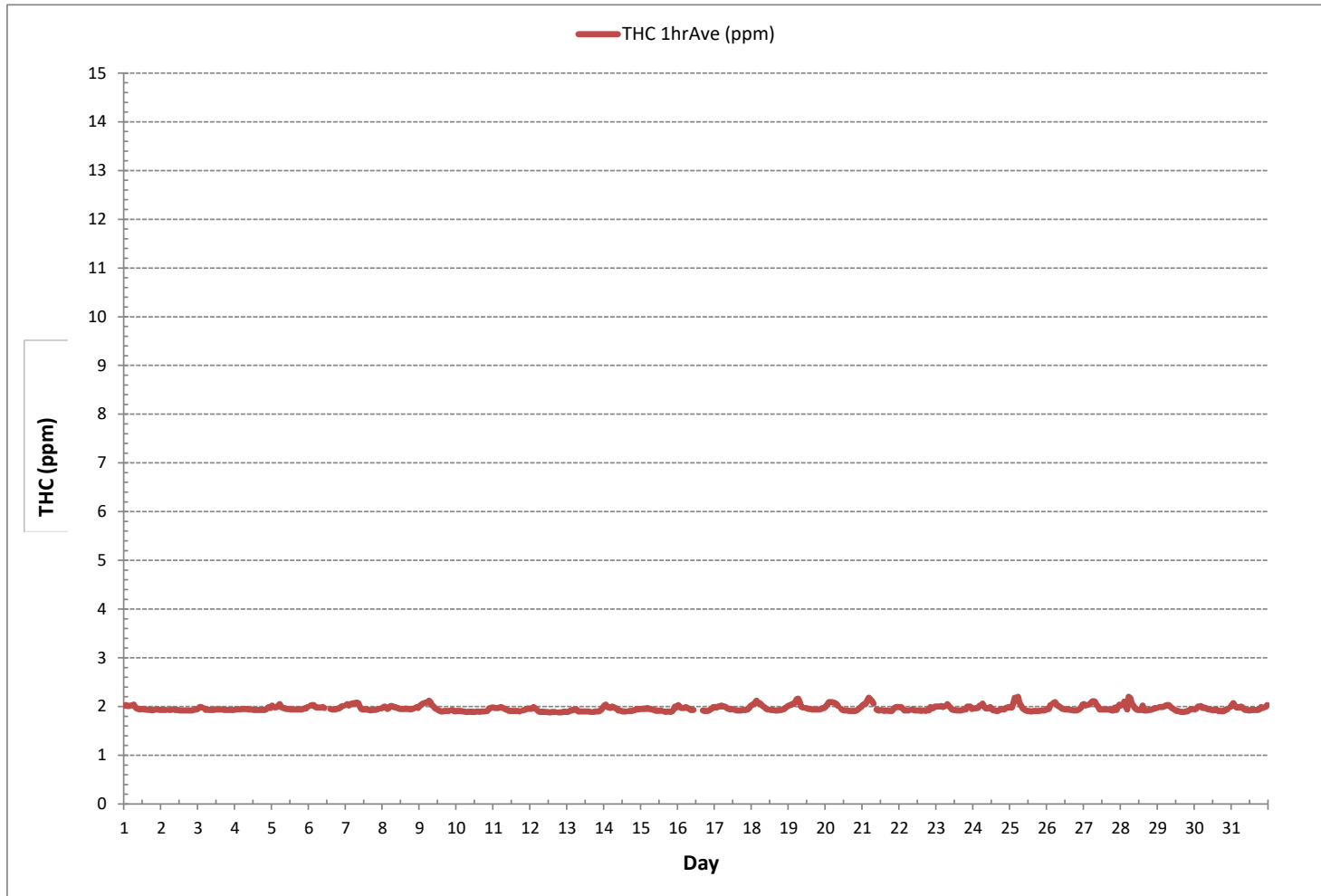
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	704			
MINIMUM 1-HR AVERAGE:	1.88 ppm	@ HOUR	12	ON DAY 12
MAXIMUM 1-HR AVERAGE:	2.20 ppm	@ HOUR	5	ON DAY 25
MAXIMUM 24-HR AVERAGE:	2.00 ppm			ON DAY 19
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	744 hrs	
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	0.05	MONTHLY AVERAGE:	1.96 ppm	

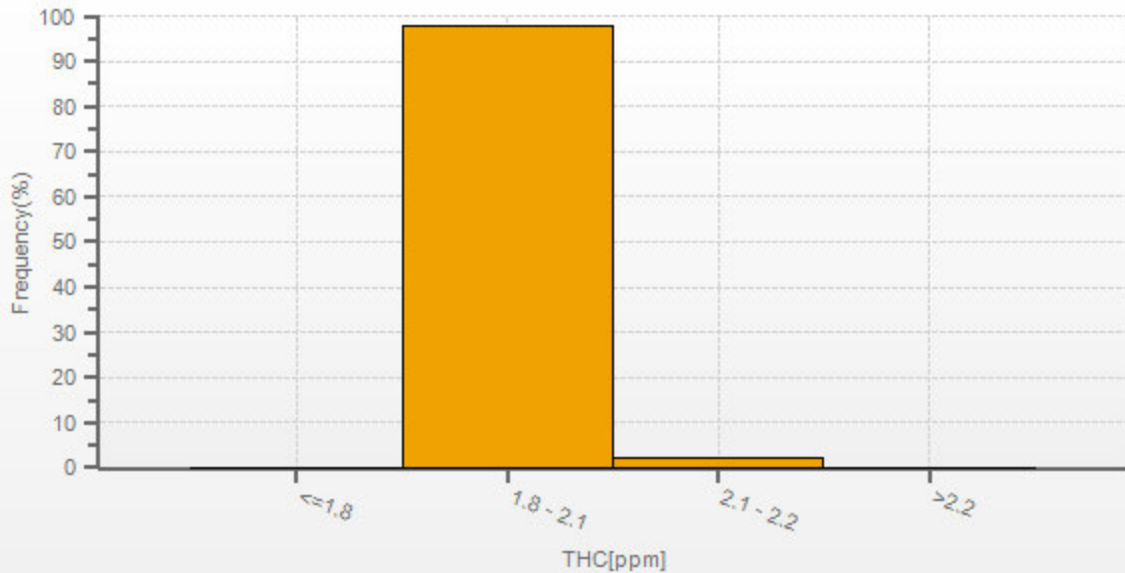
24 HR AVERAGES May 2019



TOTAL HYDROCARBONS Hourly Averages (THC ppm)

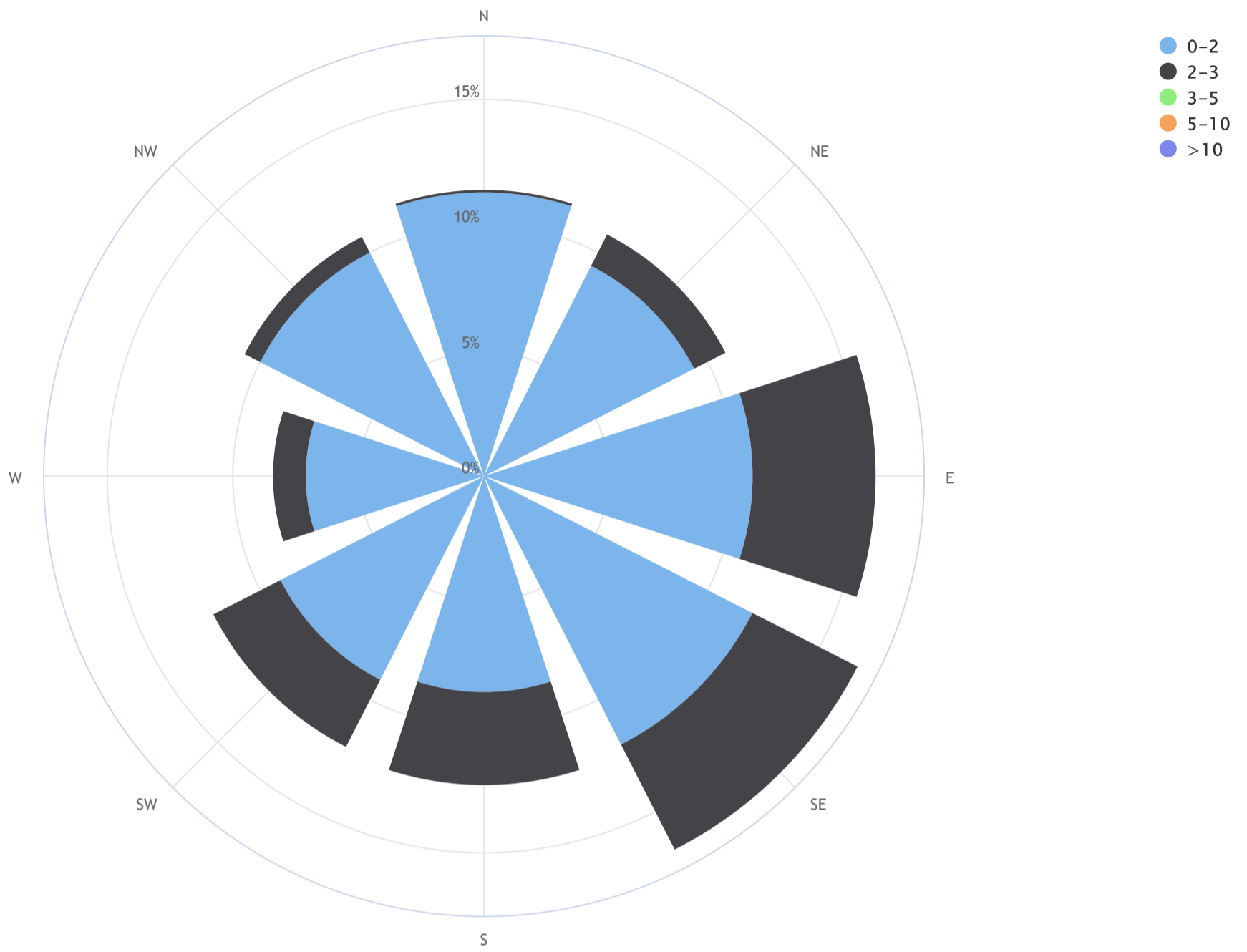


THC[ppm] Histogram: LICA ST. LINA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_St. Lina Continuous Monitoring Station_THC (ppm)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 2.0, CALM % = 1.9%



Direction	0-2	2-3	3-5	5-10	>10	TOTAL
N	11.3	0.1	0.0	0.0	0.0	11.4
NE	9.4	1.4	0.0	0.0	0.0	10.9
E	10.7	4.9	0.0	0.0	0.0	15.6
SE	12.0	4.7	0.0	0.0	0.0	16.7
S	8.6	3.7	0.0	0.0	0.0	12.3
SW	9.1	3.0	0.0	0.0	0.0	12.1
W	7.1	1.3	0.0	0.0	0.0	8.4
NW	10.0	0.7	0.0	0.0	0.0	10.7
Summary	78.3	19.9	0.0	0.0	0.0	98.1
CALM	1.6	0.3	0.0	0.0	0.0	1.9



METHANE Hourly Averages (CH₄ 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	2.02	2.03	2.01	2.01	2.02	S	2.04	1.99	1.96	1.95	1.94	1.95	1.95	1.94	1.94	1.93	1.94	1.93	1.92	1.93	1.94	1.94	1.94	1.93	1.92	2.04	1.96	24		
2	1.93	1.93	1.93	1.93	S	1.93	1.93	1.94	1.94	1.93	1.93	1.93	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.93	1.94	1.94	1.92	1.94	1.93	24		
3	1.96	1.99	1.99	S	1.96	1.93	1.94	1.93	1.93	1.93	1.93	1.94	1.94	1.94	1.94	1.94	1.94	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.99	1.94	24		
4	1.94	1.94	S	1.94	1.95	1.95	1.95	1.95	1.95	1.94	1.94	1.94	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.94	1.97	1.99	1.97	1.93	1.99	1.94	24		
5	2.02	S	1.98	1.99	2.02	2.05	1.99	1.97	1.97	1.95	1.95	1.95	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.95	1.96	1.96	1.99	1.94	2.05	1.97	24		
6	S	2.02	2.03	2.03	1.99	1.98	1.98	1.98	1.98	1.99	1.97	Q	Q	Q	1.95	1.94	1.94	1.94	1.95	1.96	1.97	2.00	2.01	S	1.94	2.03	1.98	24		
7	2.03	2.05	2.02	2.05	2.06	2.07	2.06	2.08	2.07	2.00	1.95	1.94	1.94	1.94	1.94	1.93	1.92	1.93	1.94	1.93	1.94	1.95	S	1.96	1.92	2.08	1.99	24		
8	1.98	2.00	1.99	1.95	1.97	2.01	2.01	1.99	1.99	1.97	1.97	1.95	1.95	1.95	1.95	1.96	1.95	1.95	1.94	1.95	1.96	S	1.99	1.97	1.94	2.01	1.97	24		
9	2.01	2.04	2.06	2.07	2.08	2.08	2.12	2.09	2.03	2.00	1.96	1.95	1.93	1.91	1.90	1.90	1.91	1.91	1.91	1.91	S	1.93	1.91	1.90	1.90	2.12	1.98	24		
10	1.91	1.91	1.91	1.91	1.90	1.90	1.89	1.89	1.90	1.89	1.90	1.89	1.89	1.90	1.90	1.89	1.90	1.90	1.90	S	1.91	1.96	1.97	1.98	1.89	1.98	1.91	24		
11	1.98	1.97	1.97	1.97	1.98	1.99	1.97	1.96	1.94	1.93	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.90	S	1.92	1.93	1.94	1.96	1.96	1.90	1.99	1.94	24	
12	1.95	1.96	1.99	1.96	1.94	1.91	1.89	1.89	1.90	1.89	1.89	1.89	1.88	1.88	1.89	1.89	1.89	S	1.88	1.88	1.88	1.89	1.90	1.89	1.88	1.99	1.90	24		
13	1.89	1.90	1.92	1.92	1.94	1.94	1.94	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.89	S	1.89	1.90	1.90	1.90	1.91	1.92	1.94	1.96	1.99	1.91	2.03	1.95	24	
14	2.02	2.04	1.99	1.98	1.97	2.00	1.99	1.97	1.96	1.92	1.92	1.91	1.90	1.90	1.90	S	1.91	1.91	1.91	1.92	1.93	1.95	1.94	1.95	1.90	2.04	1.95	24		
15	1.95	1.95	1.96	1.95	1.97	1.95	1.95	1.94	1.94	1.92	1.91	1.92	1.91	1.92	S	1.90	1.89	1.90	1.90	1.89	1.90	1.94	2.00	1.98	1.89	2.00	1.93	24		
16	2.03	2.00	1.97	1.97	1.97	1.99	1.97	1.96	1.93	1.93	C	C	C	C	C	1.92	1.91	1.91	1.91	1.91	1.92	1.94	1.96	1.99	1.91	2.02	1.95	24		
17	1.99	1.98	2.00	2.00	2.02	2.00	2.00	1.99	1.96	1.95	1.94	1.95	S	1.93	1.92	1.92	1.92	1.92	1.93	1.93	1.93	1.94	1.96	2.01	1.92	2.03	1.96	24		
18	2.03	2.05	2.08	2.12	2.06	2.07	2.04	2.01	1.99	1.96	1.94	S	1.93	1.93	1.93	1.92	1.92	1.92	1.93	1.93	1.94	1.95	1.98	2.00	1.92	2.12	1.98	24		
19	2.02	2.03	2.05	2.05	2.08	2.15	2.16	2.10	2.00	1.98	S	1.97	1.96	1.95	1.95	1.94	1.94	1.94	1.94	1.94	1.94	1.95	1.97	1.97	1.94	2.16	2.00	24		
20	2.00	2.04	2.09	2.09	2.08	2.07	2.05	2.01	S	1.95	1.93	1.92	1.92	1.92	1.92	1.91	1.91	1.91	1.91	1.91	1.91	1.92	1.94	1.97	1.99	1.91	2.09	1.98	24	
21	2.03	2.05	2.06	2.13	2.18	2.15	2.11	2.06	S	1.94	1.92	1.92	1.93	1.92	1.91	1.92	1.92	1.91	1.91	1.91	1.91	1.95	1.98	1.99	1.99	1.91	2.18	1.99	24	
22	1.99	1.99	1.96	1.92	1.92	1.92	1.92	S	1.94	1.93	1.92	1.92	1.92	1.92	1.91	1.92	1.92	1.92	1.91	1.92	1.93	1.92	1.99	1.96	1.97	2.00	1.91	2.00	1.94	24
23	2.00	2.00	2.00	2.01	1.99	2.00	S	2.05	2.01	1.98	1.94	1.93	1.93	1.92	1.92	1.92	1.92	1.92	1.93	1.94	1.94	2.00	1.99	2.00	1.95	1.92	2.05	1.97	24	
24	1.96	1.96	1.97	1.97	2.02	S	2.06	2.00	1.96	1.96	1.96	1.99	1.94	1.92	1.92	1.91	1.91	1.93	1.94	1.95	1.94	1.97	1.98	1.99	1.91	2.06	1.96	24		
25	1.98	1.98	2.07	2.18	S	2.20	2.07	2.02	1.96	1.94	1.92	1.91	1.91	1.90	1.90	1.91	1.91	1.91	1.91	1.91	1.92	1.92	1.92	1.93	1.90	2.20	1.96	24		
26	1.95	1.95	2.03	S	2.07	2.09	2.05	2.01	2.00	1.97	1.95	1.95	1.94	1.94	1.94	1.93	1.93	1.92	1.91	1.92	1.93	1.95	1.98	2.04	1.91	2.09	1.97	24		
27	2.05	2.02	S	2.04	2.06	2.10	2.11	2.10	2.04	2.00	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.93	1.92	1.92	1.92	1.93	1.94	1.95	1.97	2.11	1.99	24		
28	2.02	S	2.10	2.00	1.94	2.20	2.17	2.05	2.02	1.97	1.94	1.93	1.93	1.93	1.92	1.92	1.92	1.92	1.93	1.94	1.95	1.97	1.97	1.97	1.92	2.20	1.98	24		
29	S	1.99	1.99	1.99	2.00	2.02	2.03	2.03	2.00	1.97	1.95	1.93	1.91	1.91	1.90	1.89	1.89	1.89	1.90	1.90	1.92	1.94	1.95	S	1.89	2.03	1.95	24		
30	1.94	1.96	2.00	2.00	2.01	1.97	1.98	1.97	1.95	1.94	1.94	1.93	1.92	1.93	1.94	1.91	1.91	1.91	1.90	1.91	1.94	1.94	S	1.99	1.90	2.01	1.95	24		
31	2.03	2.07	2.02	1.98	1.98	1.98	2.00	1.98	1.94	1.93	1.93	1.92	1.92	1.94	1.93	1.93	1.93	1.93	1.94	1.99	1.97	S	1.99	2.03	1.92	2.07	1.97	24		
HOURLY MAX	2.05	2.07	2.10	2.18	2.18	2.20	2.17	2.10	2.07	2.00	1.97	1.99	1.96	1.95	1.95	1.96	1.95	1.95	1.95	1.99	2.00	2.00	2.01	2.04						
HOURLY AVG	1.99	1.99	2.00	2.00	2.00	2.02	2.01	2.00	1.97	1.95	1.93	1.93	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.92	1.94	1.95	1.96	1.97					

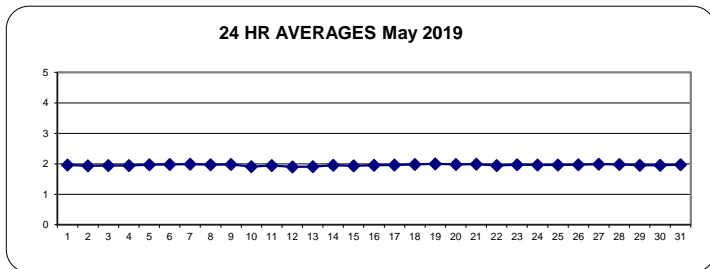
STATUS FLAG CODES

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

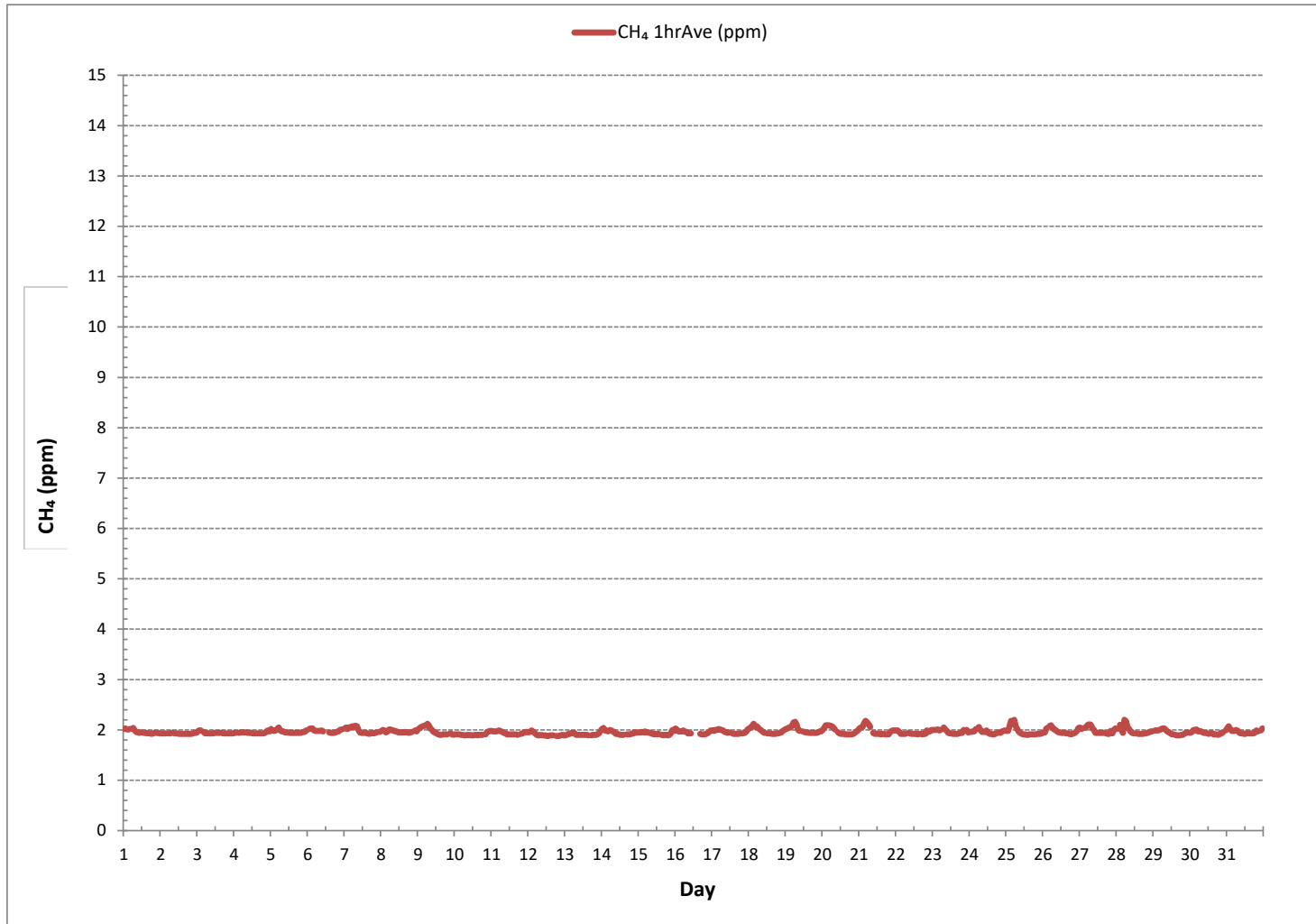
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	704			
MINIMUM 1-HR AVERAGE:	1.88 ppm	@ HOUR	12	ON DAY 12
MAXIMUM 1-HR AVERAGE:	2.20 ppm	@ HOUR	5	ON DAY 25
MAXIMUM 24-HR AVERAGE:	2.00 ppm			ON DAY 19
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	744	hrs
MONTHLY CALIBRATION TIME:	5 hrs	AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	0.05	MONTHLY AVERAGE:	1.96	ppm

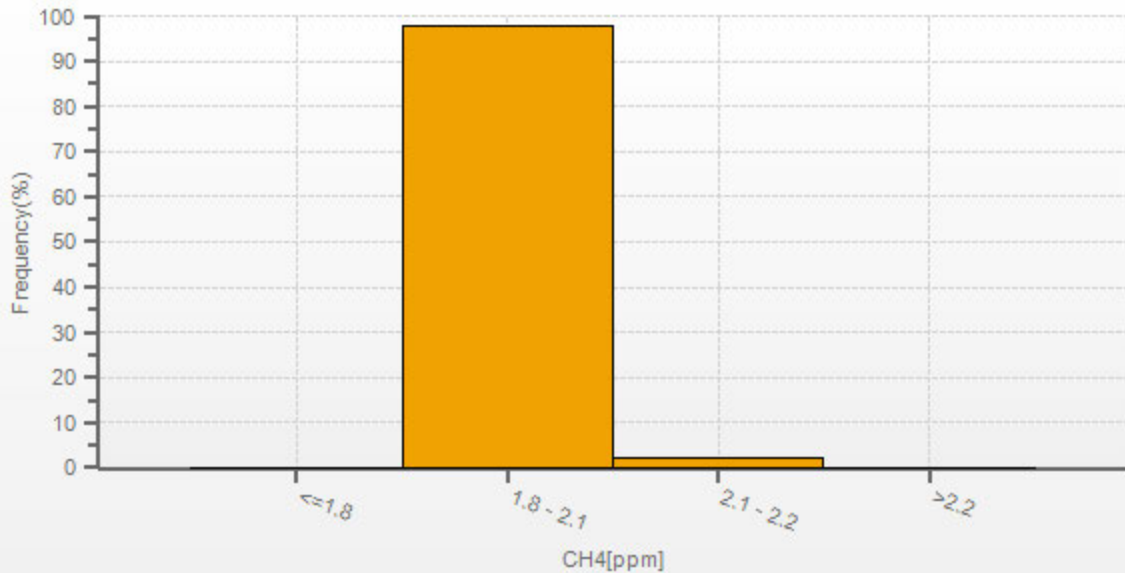
24 HR AVERAGES May 2019



METHANE Hourly Averages (CH₄ ppm)

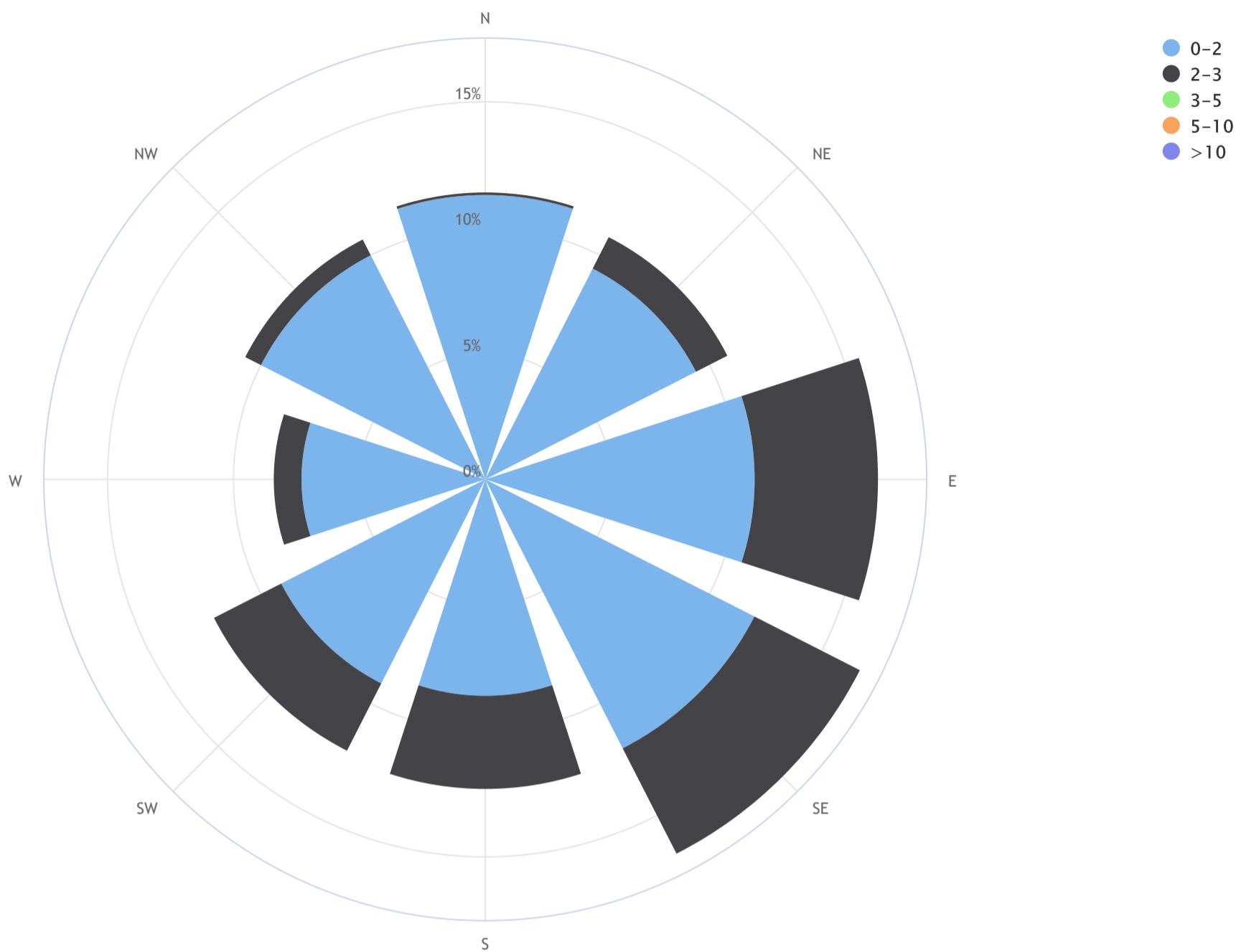


CH4[ppm] Histogram: LICA ST. LINA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_St. Lina Continuous Monitoring Station_CH4 (ppm)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 2.0, CALM % = 1.9%



Direction	0-2	2-3	3-5	5-10	>10	TOTAL
N	11.3	0.1	0.0	0.0	0.0	11.4
NE	9.4	1.4	0.0	0.0	0.0	10.9
E	10.7	4.9	0.0	0.0	0.0	15.6
SE	12.0	4.7	0.0	0.0	0.0	16.7
S	8.6	3.7	0.0	0.0	0.0	12.3
SW	9.1	3.0	0.0	0.0	0.0	12.1
W	7.3	1.1	0.0	0.0	0.0	8.4
NW	10.0	0.7	0.0	0.0	0.0	10.7
Summary	78.4	19.7	0.0	0.0	0.0	98.1
CALM	1.6	0.3	0.0	0.0	0.0	1.9



NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY																												
1	0.00	0.00	0.00	0.00	0.00	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
2	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	0.00
3	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	0.00
4	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
6	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Q	Q	Q	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
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	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	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
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	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
14	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	0.00	0.00	0.00	0.00
15	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	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	C	C	C	C	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	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	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	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	0.00
23	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	0.00
24	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	0.00	0.00
25	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	0.00
26	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	0.00
27	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00
29	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00
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	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00
HOURLY MAX	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	0.10	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
HOURLY AVG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

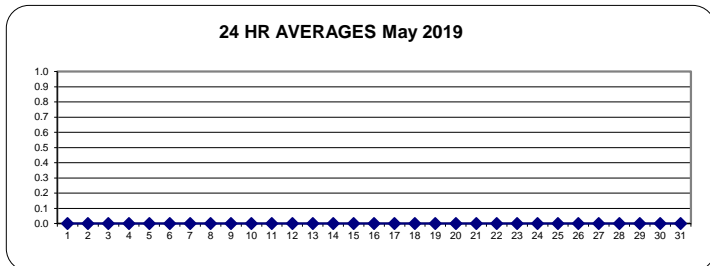
STATUS FLAG CODES

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

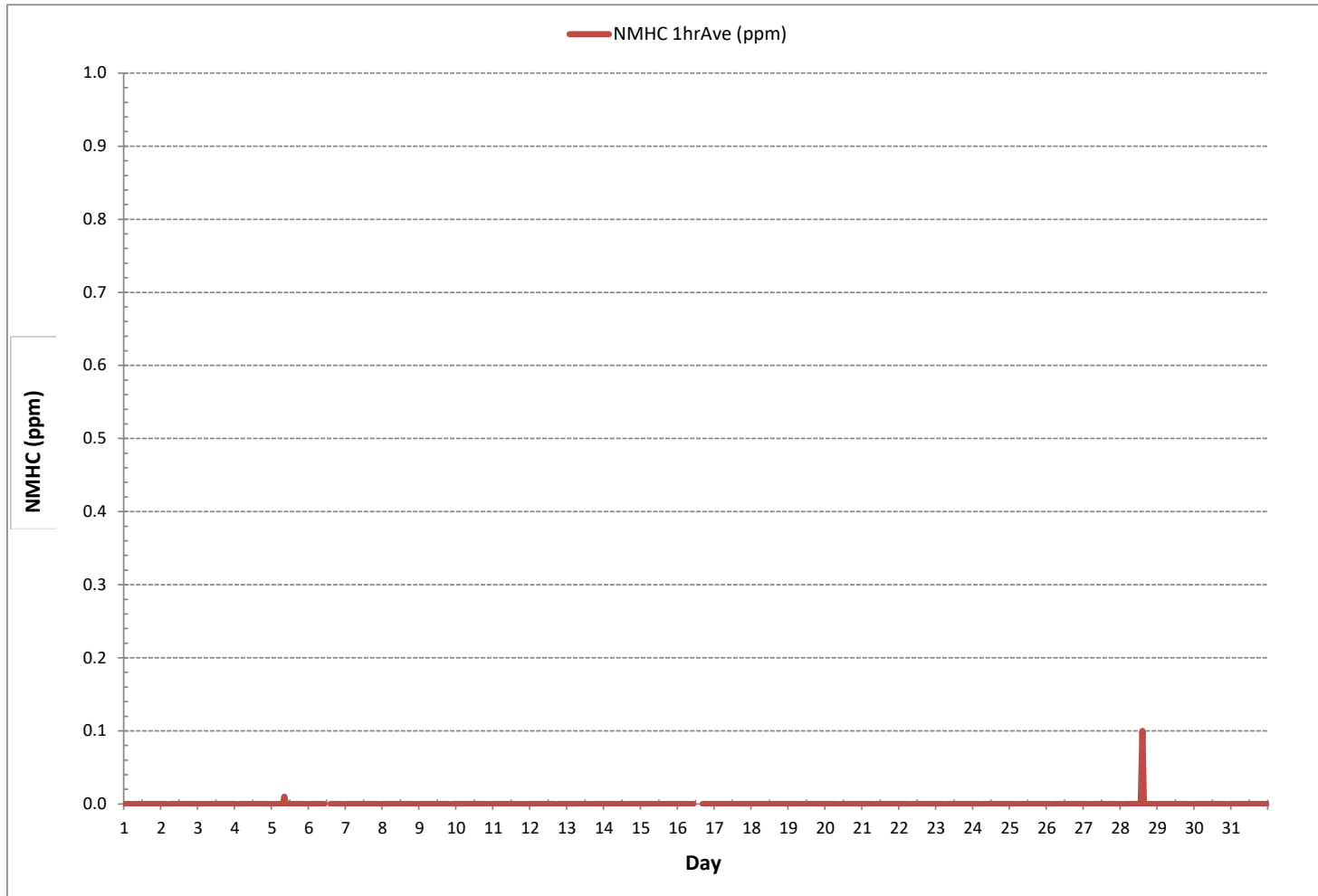
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	2					
MINIMUM 1-HR AVERAGE:	0.00	ppm	@ HOUR	0	ON DAY	1
MAXIMUM 1-HR AVERAGE:	0.10	ppm	@ HOUR	14	ON DAY	28
MAXIMUM 24-HR AVERAGE:	0.00	ppm			ON DAY	1
IZS CALIBRATION TIME:	32	hrs		OPERATIONAL TIME:	744	hrs
MONTHLY CALIBRATION TIME:	5	hrs		AMD OPERATION UPTIME:	100.0	%
STANDARD DEVIATION:	0.00			MONTHLY AVERAGE:	0.00	ppm

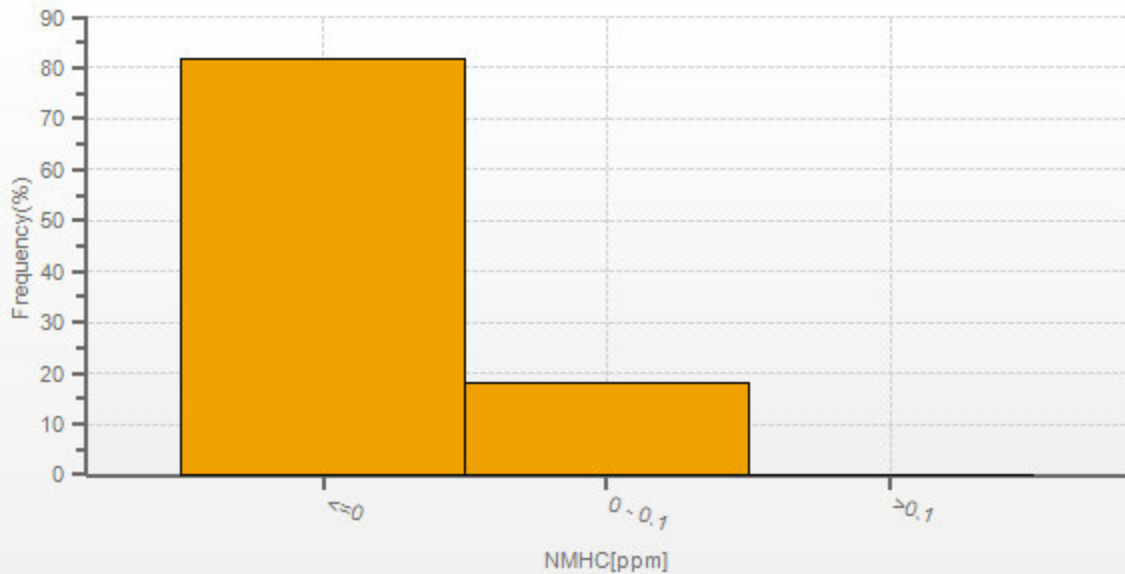
24 HR AVERAGES May 2019



NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

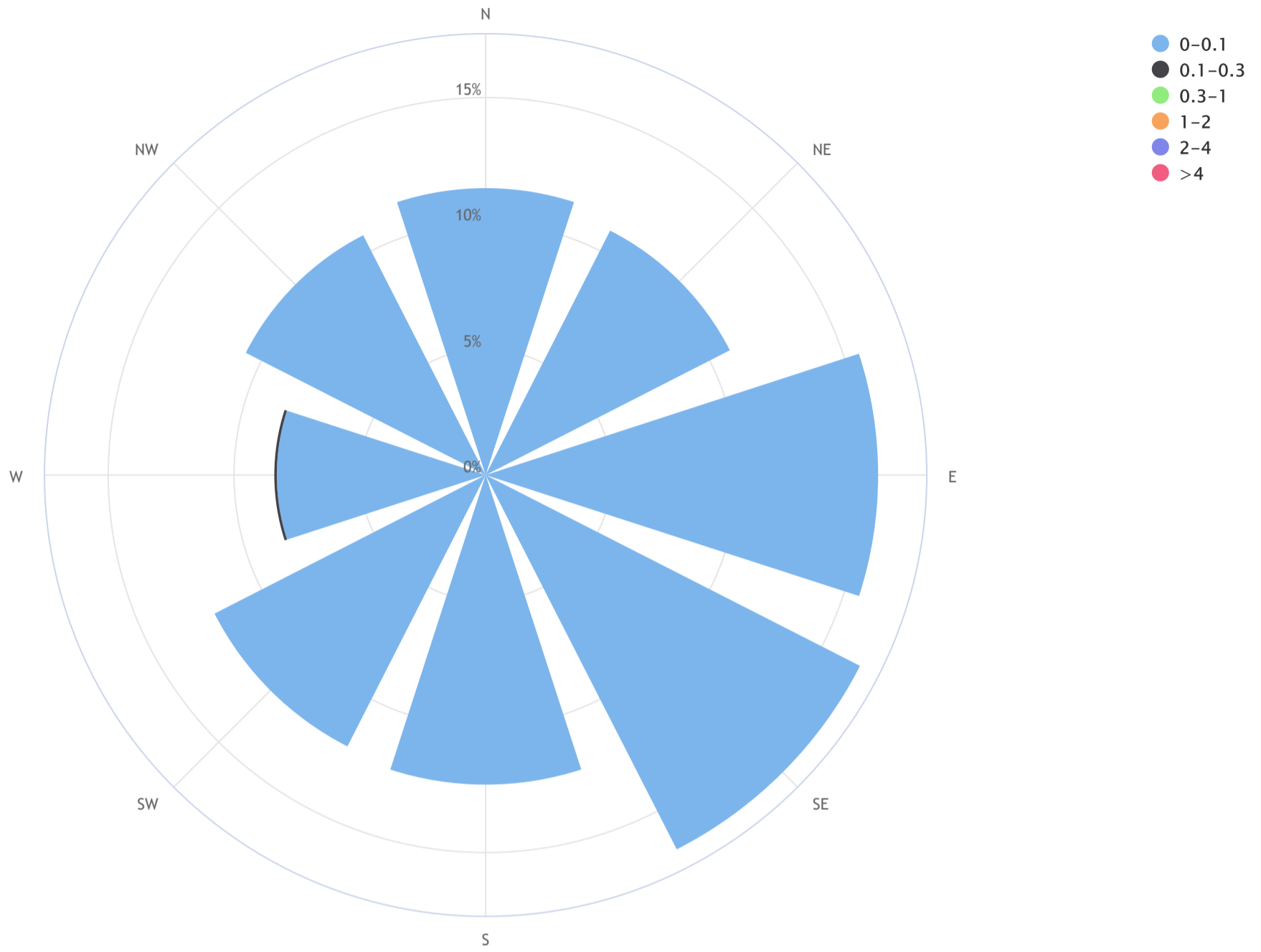


NMHC[ppm] Histogram: LICA ST. LINA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_St. Lina Continuous Monitoring Station_NMHC (ppm)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.0, CALM % = 1.9%



Direction	0-0.1	0.1-0.3	0.3-1	1-2	2-4	>4	TOTAL
N	11.4	0.0	0.0	0.0	0.0	0.0	11.4
NE	10.9	0.0	0.0	0.0	0.0	0.0	10.9
E	15.6	0.0	0.0	0.0	0.0	0.0	15.6
SE	16.7	0.0	0.0	0.0	0.0	0.0	16.7
S	12.3	0.0	0.0	0.0	0.0	0.0	12.3
SW	12.1	0.0	0.0	0.0	0.0	0.0	12.1
W	8.3	0.1	0.0	0.0	0.0	0.0	8.4
NW	10.7	0.0	0.0	0.0	0.0	0.0	10.7
Summary	98.0	0.1	0.0	0.0	0.0	0.0	98.1
CALM	1.9	0.0	0.0	0.0	0.0	0.0	1.9



OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

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

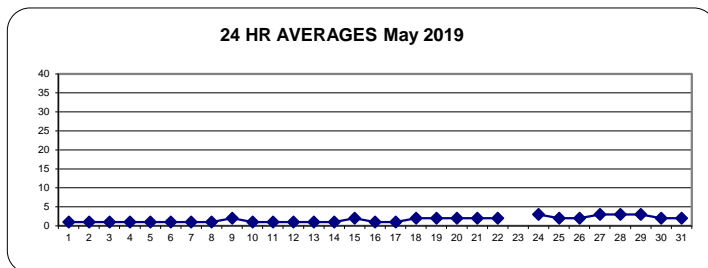
STATUS FLAG CODES

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

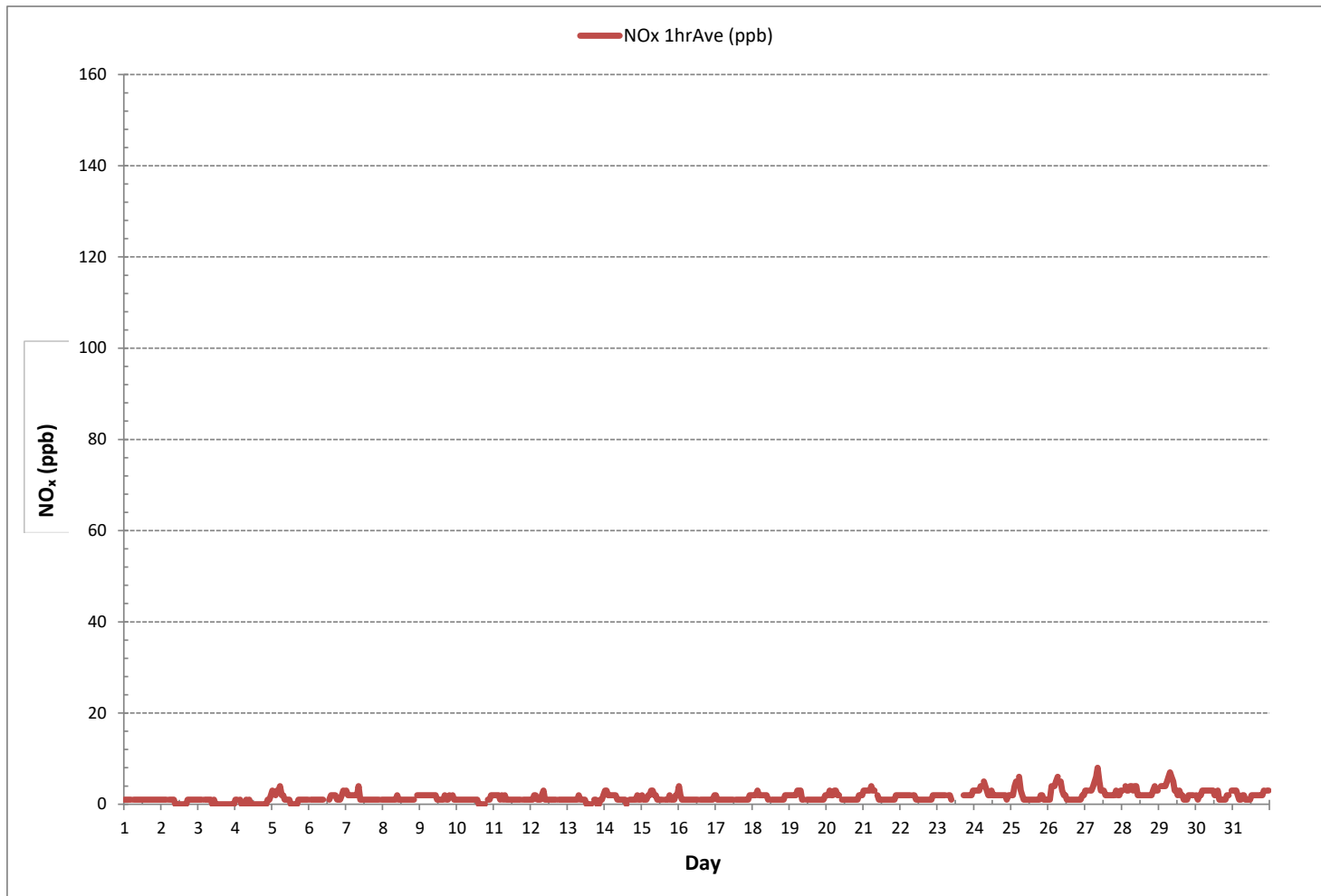
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	646			
MINIMUM 1-HR AVERAGE:	0 ppb	@ HOUR	9	ON DAY 2
MAXIMUM 1-HR AVERAGE:	8 ppb	@ HOUR	8	ON DAY 27
MAXIMUM 24-HR AVERAGE:	3 ppb			ON DAY 24
IZS CALIBRATION TIME:	33 hrs	OPERATIONAL TIME:	743 hrs	
MONTHLY CALIBRATION TIME:	7 hrs	AMD OPERATION UPTIME:	99.9 %	
STANDARD DEVIATION:	1	MONTHLY AVERAGE:	2 ppb	

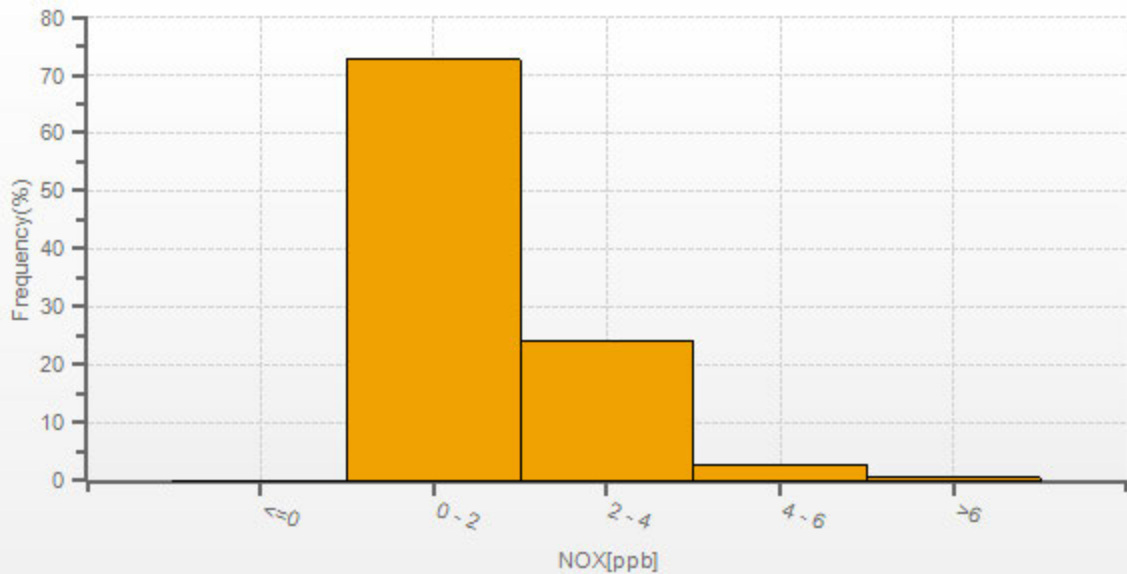
24 HR AVERAGES May 2019



OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

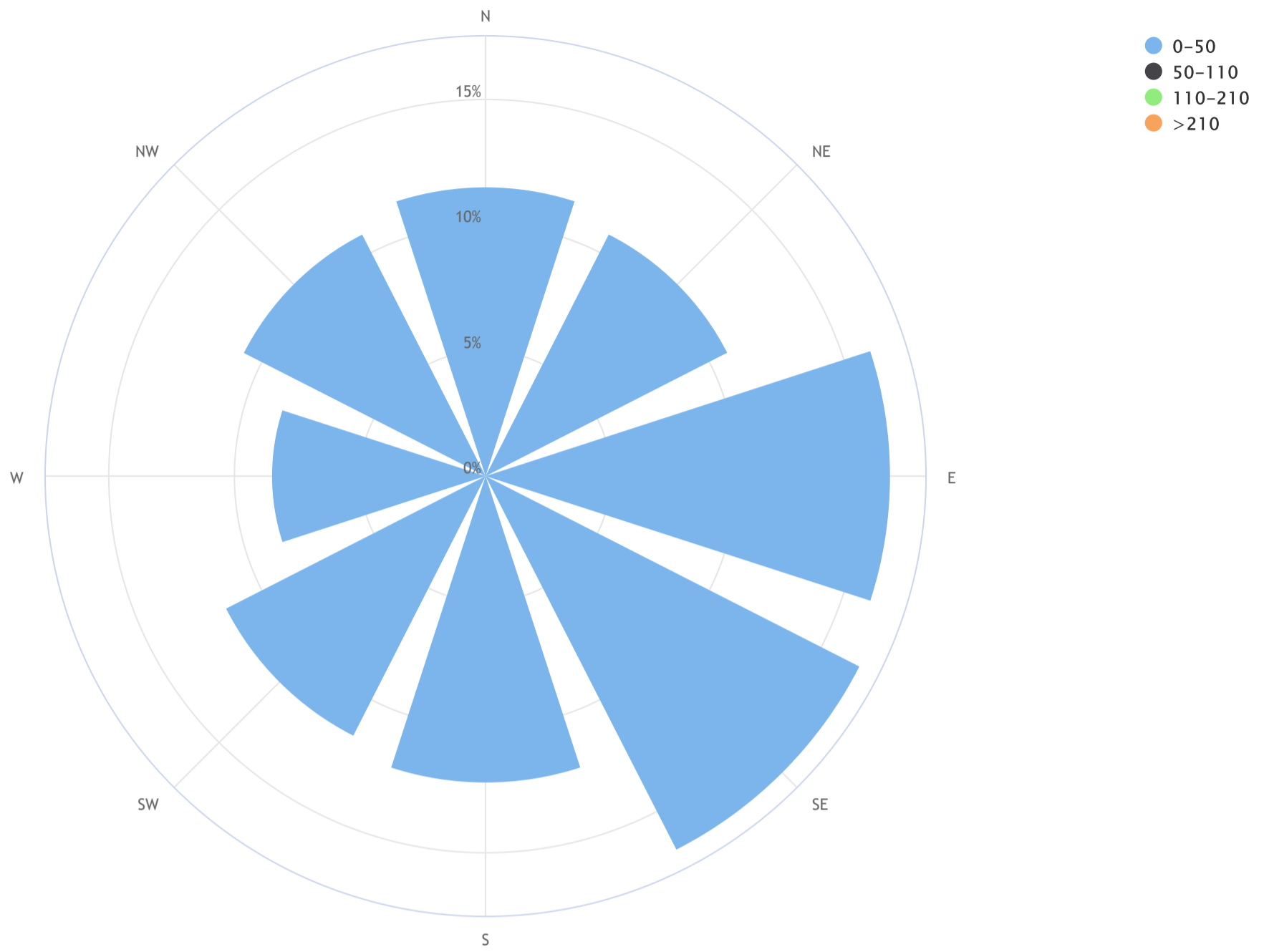


NOX[ppb] Histogram: LICA ST. LINA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_St. Lina Continuous Monitoring Station_NO_x (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 1.3, CALM % = 1.9%



Direction	0-50	50-110	110-210	>210	TOTAL
N	11.5	0.0	0.0	0.0	11.5
NE	10.8	0.0	0.0	0.0	10.8
E	16.1	0.0	0.0	0.0	16.1
SE	16.7	0.0	0.0	0.0	16.7
S	12.2	0.0	0.0	0.0	12.2
SW	11.6	0.0	0.0	0.0	11.6
W	8.5	0.0	0.0	0.0	8.5
NW	10.8	0.0	0.0	0.0	10.8
Summary	98.1	0.0	0.0	0.0	98.1
CALM	1.9	0.0	0.0	0.0	1.9

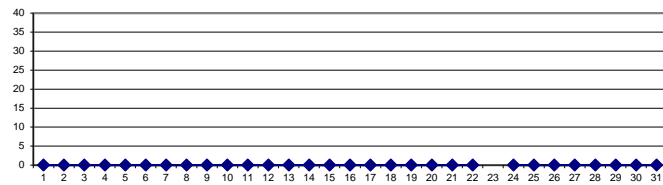
NITRIC OXIDE Hourly Averages (NO ppb)

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

STATUS FLAG CODES

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

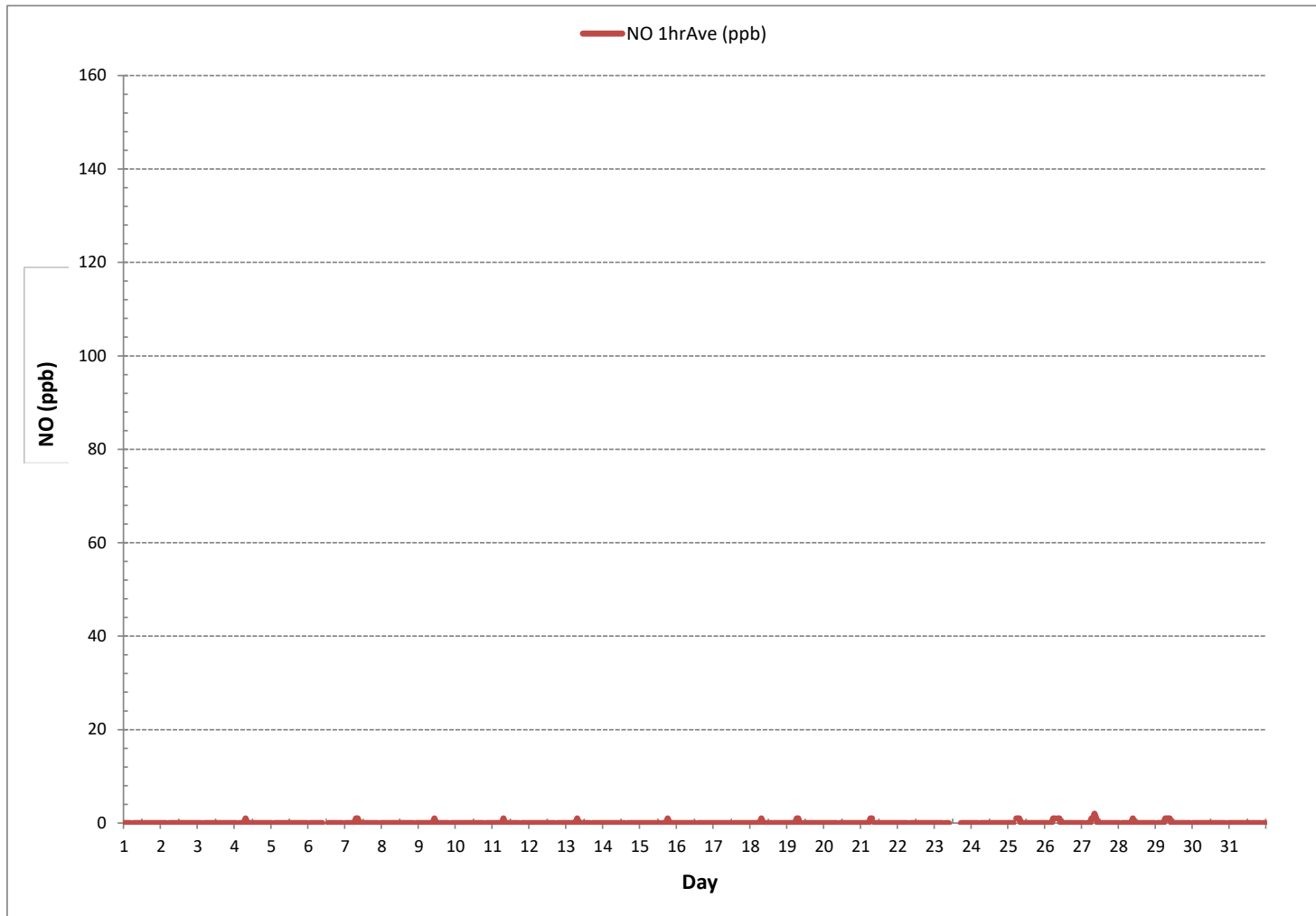
24 HR AVERAGES May 2019



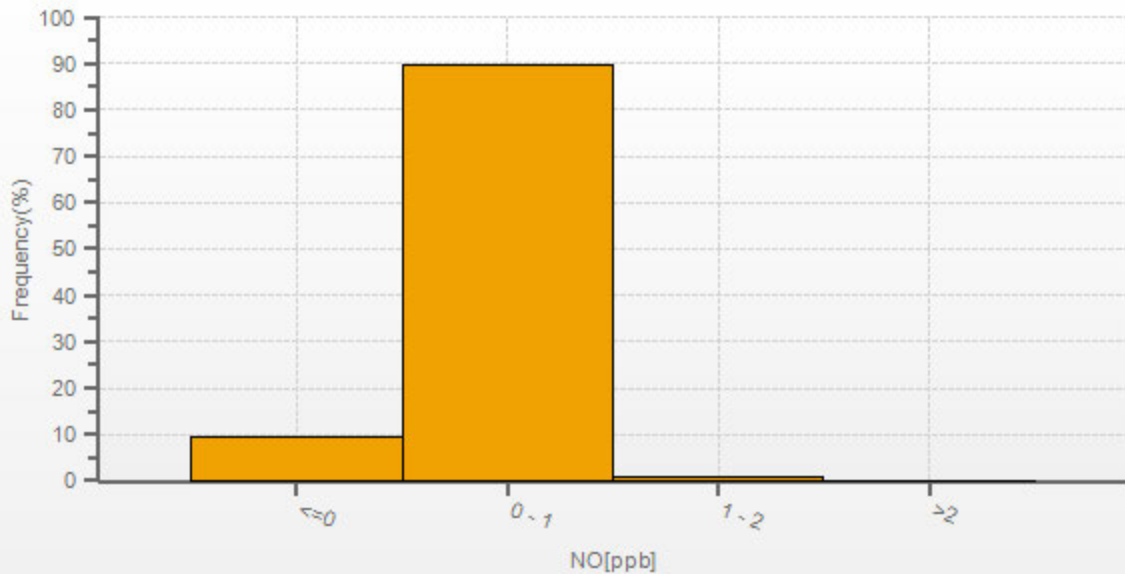
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	28			
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	0	ON DAY 1
MAXIMUM 1-HR AVERAGE:	2	ppb @ HOUR	8	ON DAY 27
MAXIMUM 24-HR AVERAGE:	0	ppb		ON DAY 1
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	743 hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	99.9 %
STANDARD DEVIATION:	0		MONTHLY AVERAGE:	0 ppb

NITRIC OXIDE Hourly Averages (NO ppb)

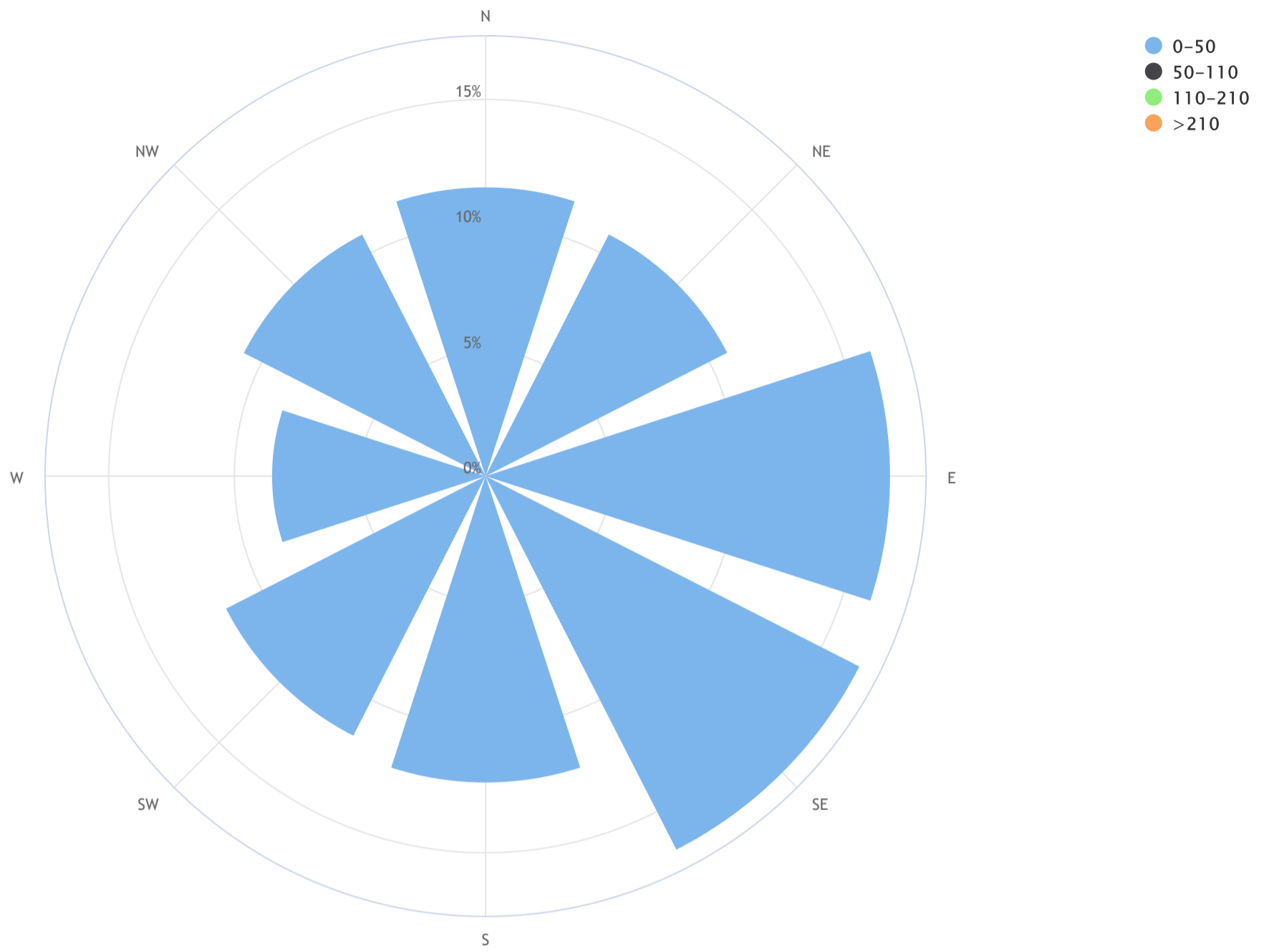


NO[ppb] Histogram: LICA ST. LINA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_St. Lina Continuous Monitoring Station_NO (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.0, CALM % = 1.9%



Direction	0-50	50-110	110-210	>210	TOTAL
N	11.5	0.0	0.0	0.0	11.5
NE	10.8	0.0	0.0	0.0	10.8
E	16.1	0.0	0.0	0.0	16.1
SE	16.7	0.0	0.0	0.0	16.7
S	12.2	0.0	0.0	0.0	12.2
SW	11.6	0.0	0.0	0.0	11.6
W	8.5	0.0	0.0	0.0	8.5
NW	10.8	0.0	0.0	0.0	10.8
Summary	98.1	0.0	0.0	0.0	98.1
CALM	1.9	0.0	0.0	0.0	1.9

NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)

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

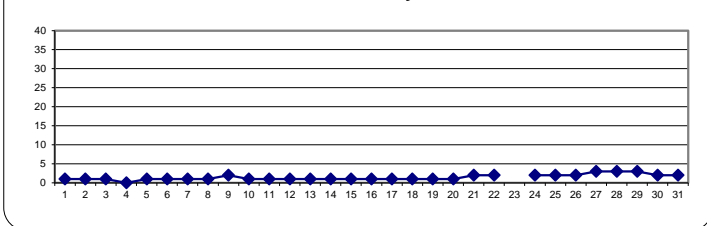
STATUS FLAG CODES

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

OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

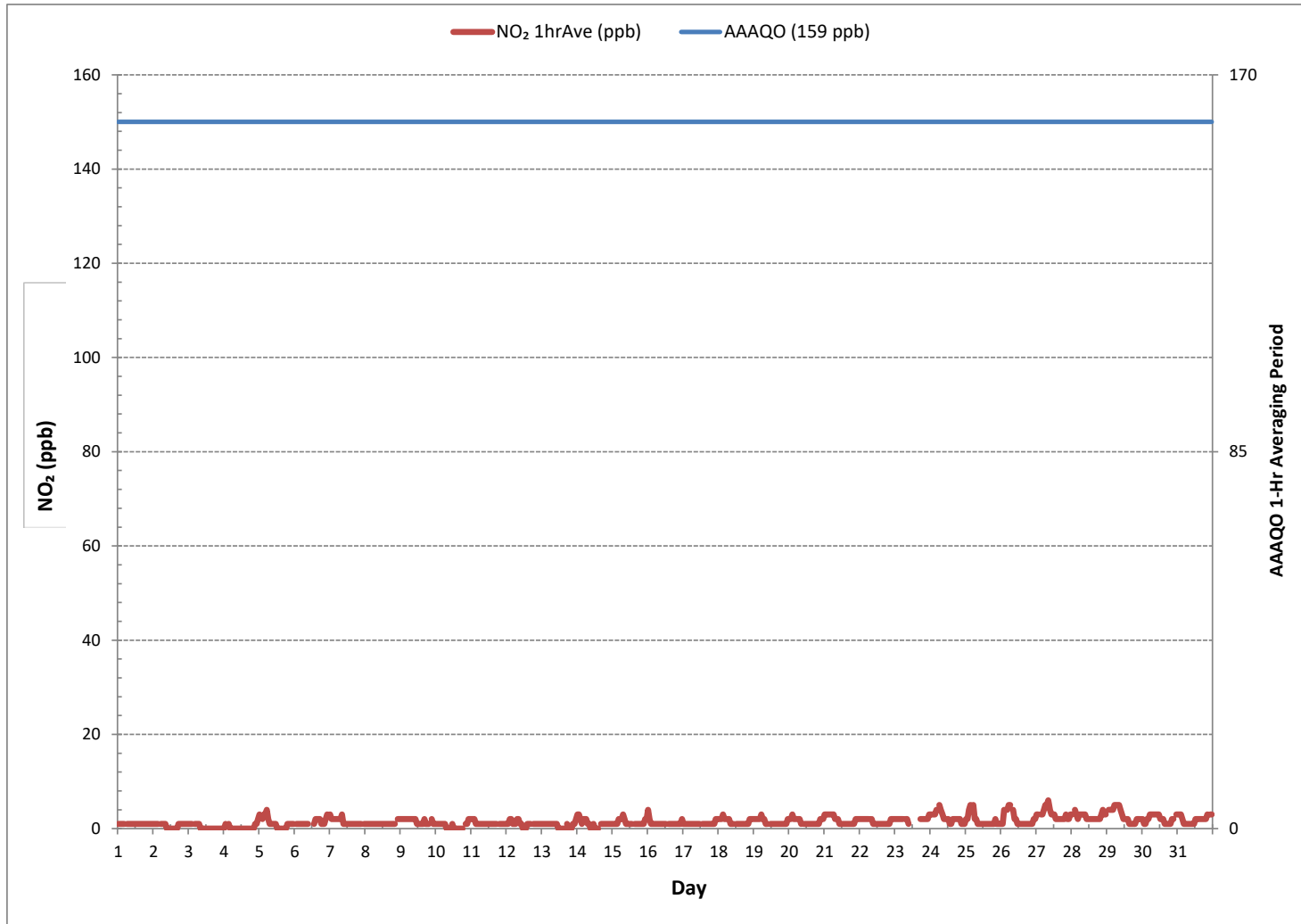
24 HR AVERAGES May 2019



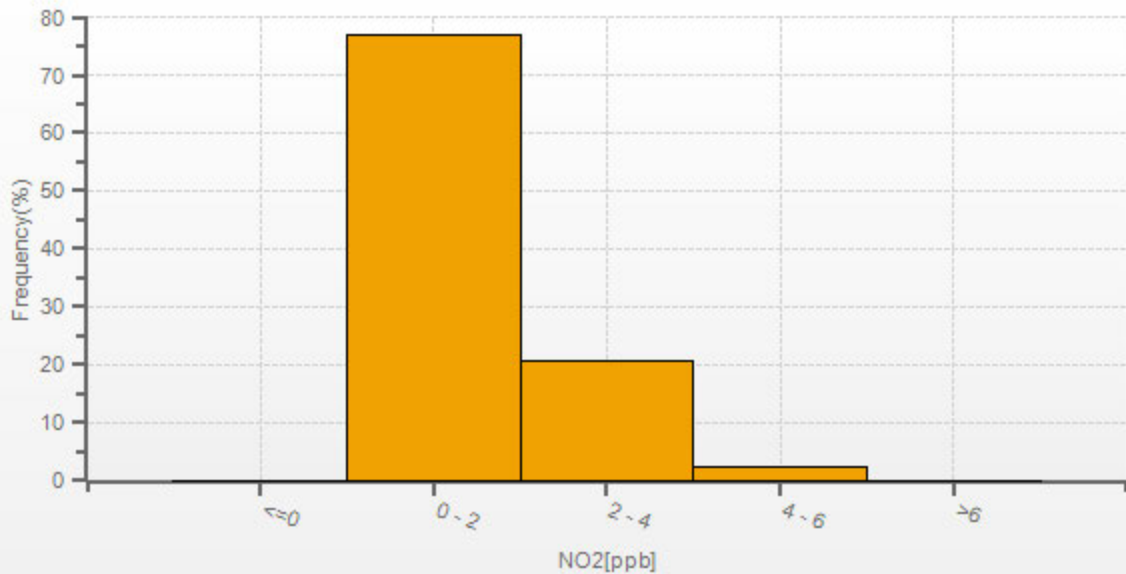
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0				
NUMBER OF NON-ZERO READINGS:	624				
MINIMUM 1-HR AVERAGE:	0	ppb	@ HOUR	9 ON DAY	2
MAXIMUM 1-HR AVERAGE:	6	ppb	@ HOUR	8 ON DAY	27
MAXIMUM 24-HR AVERAGE:	3	ppb		ON DAY	27
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	743	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	99.9	%
STANDARD DEVIATION:	1		MONTHLY AVERAGE:	1	ppb

NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)

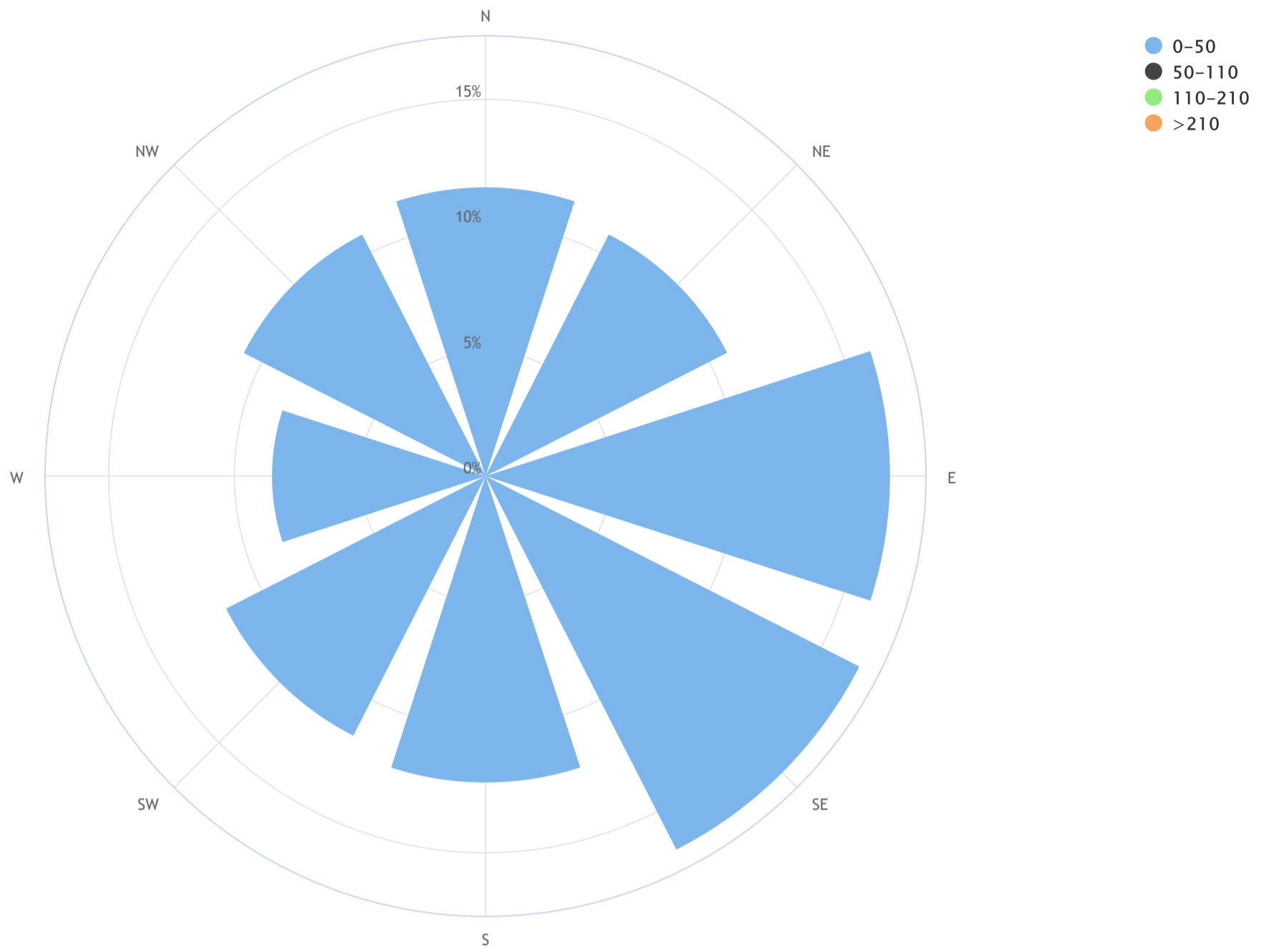


NO2[ppb] Histogram: LICA ST. LINA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_St. Lina Continuous Monitoring Station_NO₂ (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 1.3, CALM % = 1.9%



Direction	0-50	50-110	110-210	>210	TOTAL
N	11.5	0.0	0.0	0.0	11.5
NE	10.8	0.0	0.0	0.0	10.8
E	16.1	0.0	0.0	0.0	16.1
SE	16.7	0.0	0.0	0.0	16.7
S	12.2	0.0	0.0	0.0	12.2
SW	11.6	0.0	0.0	0.0	11.6
W	8.5	0.0	0.0	0.0	8.5
NW	10.8	0.0	0.0	0.0	10.8
Summary	98.1	0.0	0.0	0.0	98.1
CALM	1.9	0.0	0.0	0.0	1.9

OZONE Hourly Averages (O₃ ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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	36.6	34.2	33.6	34.2	33.7	S	31.7	38.7	43.3	44.8	44.2	42.7	43.7	45.0	44.9	44.9	46.5	47.2	46.0	45.5	44.9	45.3	45.0	43.5	31.7	47.2	41.7	24
2	43.0	41.2	42.0	39.8	S	38.7	38.0	38.0	39.7	44.8	45.2	46.3	46.8	47.4	47.4	47.5	47.7	47.7	47.4	48.0	47.5	46.6	46.0	44.8	38.0	48.0	44.4	24
3	42.4	37.8	39.7	S	41.5	42.5	40.8	37.9	35.6	36.7	38.1	37.7	37.9	37.8	38.6	39.8	39.7	42.7	39.0	32.5	30.9	30.4	29.3	28.7	28.7	42.7	37.3	24
4	28.1	27.7	S	28.6	28.7	29.2	30.2	31.2	32.2	34.4	38.2	39.9	41.5	42.4	42.7	42.6	42.5	43.2	43.2	41.3	39.5	35.6	33.3	32.5	27.7	43.2	36.0	24
5	30.4	S	31.4	30.5	28.9	28.1	33.8	35.1	37.3	37.7	39.2	40.3	40.9	41.4	41.6	42.0	42.1	42.1	41.7	41.5	40.3	38.1	38.3	37.7	28.1	42.1	37.4	24
6	S	36.9	36.0	35.3	35.5	35.1	34.9	35.0	34.1	34.8	36.2	Q	Q	37.3	38.3	38.4	40.6	40.3	39.3	39.4	37.9	33.3	31.8	S	31.8	40.6	36.5	24
7	28.9	28.3	29.1	27.5	25.6	23.2	20.7	21.5	27.8	37.5	40.8	41.6	42.7	43.8	44.5	44.9	44.3	44.2	43.2	41.8	41.4	39.8	S	41.3	20.7	44.9	35.8	24
8	39.7	40.1	39.4	41.2	42.0	40.7	38.6	38.6	37.7	39.4	40.6	42.8	41.7	42.7	41.9	42.7	43.7	44.6	44.4	44.6	43.7	S	43.1	42.0	37.7	44.6	41.6	24
9	40.7	38.7	36.8	34.6	33.3	33.0	30.0	31.2	37.1	40.0	42.3	43.2	44.5	46.5	48.0	49.3	49.0	47.6	46.1	43.7	S	40.8	41.5	39.1	30.0	49.3	40.7	24
10	37.7	35.4	34.1	32.2	31.7	32.7	33.5	35.6	38.5	40.9	41.1	41.5	41.4	42.2	44.4	45.0	42.3	41.9	42.9	S	38.1	34.9	33.8	33.7	31.7	45.0	38.1	24
11	33.3	34.3	34.3	33.2	31.2	30.8	31.4	33.3	37.5	40.0	44.8	46.7	48.6	51.0	50.8	52.7	54.3	56.3	S	57.4	55.5	52.6	49.7	48.3	30.8	57.4	43.8	24
12	45.8	44.0	40.8	40.8	40.4	40.3	39.9	37.8	39.6	45.0	52.7	54.0	54.2	57.6	62.2	59.8	59.9	S	52.0	50.5	49.1	49.8	50.7	51.1	37.8	62.2	48.6	24
13	50.4	48.5	46.8	46.5	44.9	42.6	39.8	40.3	41.5	41.3	42.5	44.4	45.7	47.1	46.4	44.9	S	42.0	37.2	38.2	38.7	37.4	36.0	32.4	32.4	50.4	42.4	24
14	30.8	29.6	30.6	31.4	31.4	30.1	27.2	30.4	32.7	35.7	37.3	38.7	40.1	40.8	41.4	S	42.5	40.9	40.8	41.7	40.9	41.3	40.9	37.9	27.2	42.5	36.3	24
15	35.5	35.2	34.0	33.8	30.5	28.6	26.1	25.4	25.9	28.4	32.2	33.3	34.1	34.5	S	39.8	42.3	44.9	44.5	45.1	45.0	39.8	33.0	35.5	25.4	45.1	35.1	24
16	32.5	30.1	30.0	29.6	29.4	27.7	28.9	29.7	33.2	34.4	36.1	38.5	39.7	S	41.9	42.2	41.5	41.8	41.8	41.2	38.3	35.2	35.3	34.4	27.7	42.2	35.4	24
17	34.6	33.1	32.1	31.3	30.7	31.2	30.2	32.8	36.4	38.0	40.7	42.8	S	44.5	46.3	47.4	47.8	47.8	47.4	46.8	45.2	43.2	41.1	39.5	30.2	47.8	39.6	24
18	37.8	36.4	35.0	31.5	30.0	29.1	28.5	29.1	32.3	35.1	39.1	S	42.3	42.4	42.7	43.0	43.4	45.3	48.3	46.9	42.4	40.4	39.0	39.1	28.5	48.3	38.2	24
19	38.5	37.4	36.0	34.8	32.6	30.3	30.2	32.4	38.8	41.3	S	44.4	46.0	47.2	48.1	49.1	50.0	48.5	46.8	46.0	44.5	43.1	42.4	42.0	30.2	50.0	41.3	24
20	40.7	38.4	34.9	33.7	32.8	31.8	32.4	35.5	39.0	S	42.9	44.4	45.3	46.1	46.7	46.2	46.4	47.2	46.4	46.1	43.8	39.9	40.2	40.5	31.8	47.2	40.9	24
21	38.7	37.0	36.0	33.9	31.3	30.1	30.4	32.2	S	49.5	50.2	49.6	50.6	50.9	50.1	50.4	50.8	50.8	50.6	48.2	45.6	43.2	43.3	41.6	30.1	50.9	43.3	24
22	39.8	41.6	40.8	43.3	45.6	44.7	43.8	S	40.6	46.0	53.2	57.8	57.8	58.3	56.5	55.5	55.3	55.5	54.9	56.1	51.9	54.0	52.5	50.5	39.8	58.3	50.3	24
23	49.4	47.8	45.8	44.8	46.2	47.2	S	35.6	39.7	43.7	C	C	C	C	C	60.9	60.1	58.1	55.2	50.2	48.9	48.9	47.5	35.6	60.9	48.8	24	
24	46.6	43.4	41.7	43.5	39.5	S	36.9	40.3	45.4	49.1	49.6	45.7	50.1	54.0	52.6	46.7	47.0	38.0	33.3	29.2	27.1	24.6	23.1	22.3	22.3	54.0	40.4	24
25	20.6	18.9	15.1	13.5	S	12.7	15.5	18.7	24.8	30.7	36.1	39.9	42.6	43.4	38.1	37.4	40.9	43.6	45.4	42.4	41.5	46.4	51.0	47.7	12.7	51.0	33.3	24
26	39.6	38.5	34.6	S	29.5	29.7	31.3	30.4	32.5	40.5	46.4	50.4	54.5	55.5	56.6	57.2	57.1	56.8	55.1	52.8	54.3	52.4	48.9	44.4	29.5	57.2	45.6	24
27	40.5	42.6	S	39.9	39.6	35.2	28.3	27.9	33.3	45.2	58.1	63.1	65.0	66.6	65.5	64.5	64.5	62.4	62.8	65.9	63.9	65.2	59.9	53.3	27.9	66.6	52.8	24
28	54.8	S	47.7	58.5	62.8	36.9	34.8	43.0	46.0	57.3	63.2	63.4	62.5	64.2	65.6	66.8	69.8	72.8	72.8	71.4	70.9	66.0	63.6	59.8	34.8	72.8	59.8	24
29	S	52.0	49.1	45.9	43.0	37.2	32.5	34.3	42.2	53.5	64.7	70.7	70.3	69.6	62.6	59.6	58.2	58.6	59.3	54.8	51.7	52.7	49.5	S	32.5	70.7	53.3	24
30	46.6	46.4	44.3	39.8	34.1	29.4	28.9	29.4	28.8	29.9	31.7	35.6	37.6	35.8	36.6	34.7	33.8	33.2	34.6	32.5	34.2	31.3	S	28.1	28.1	46.6	34.7	24
31	25.5	23.4	23.1	24.4	25.1	23.4	22.5	24.9	28.5	30.4	33.1	35.4	38.8	40.6	43.0	44.6	47.0	47.5	46.2	42.8	38.0	S	39.5	34.0	22.5	47.5	34.0	24
HOURLY MAX	54.8	52.0	49.1	58.5	62.8	47.2	43.8	43.0	46.0	57.3	64.7	70.7	70.3	69.6	65.6	66.8	69.8	72.8	72.8	71.4	70.9	66.0	63.6	59.8				
HOURLY AVG	38.3	37.2	36.4	35.8	35.6	32.8	31.7	32.9	36.1	40.2	43.5	45.5	46.7	47.5	47.8	48.0	48.4	47.8	47.0	46.2	44.5	43.2	42.4	40.5				

STATUS FLAG CODES

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

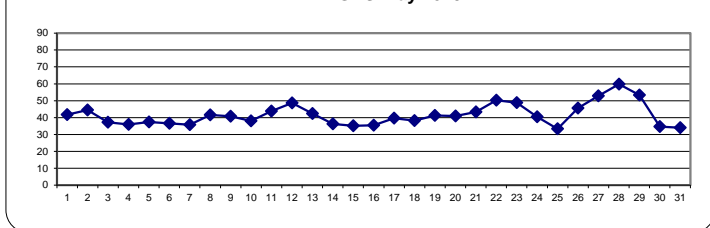
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 76 ppb

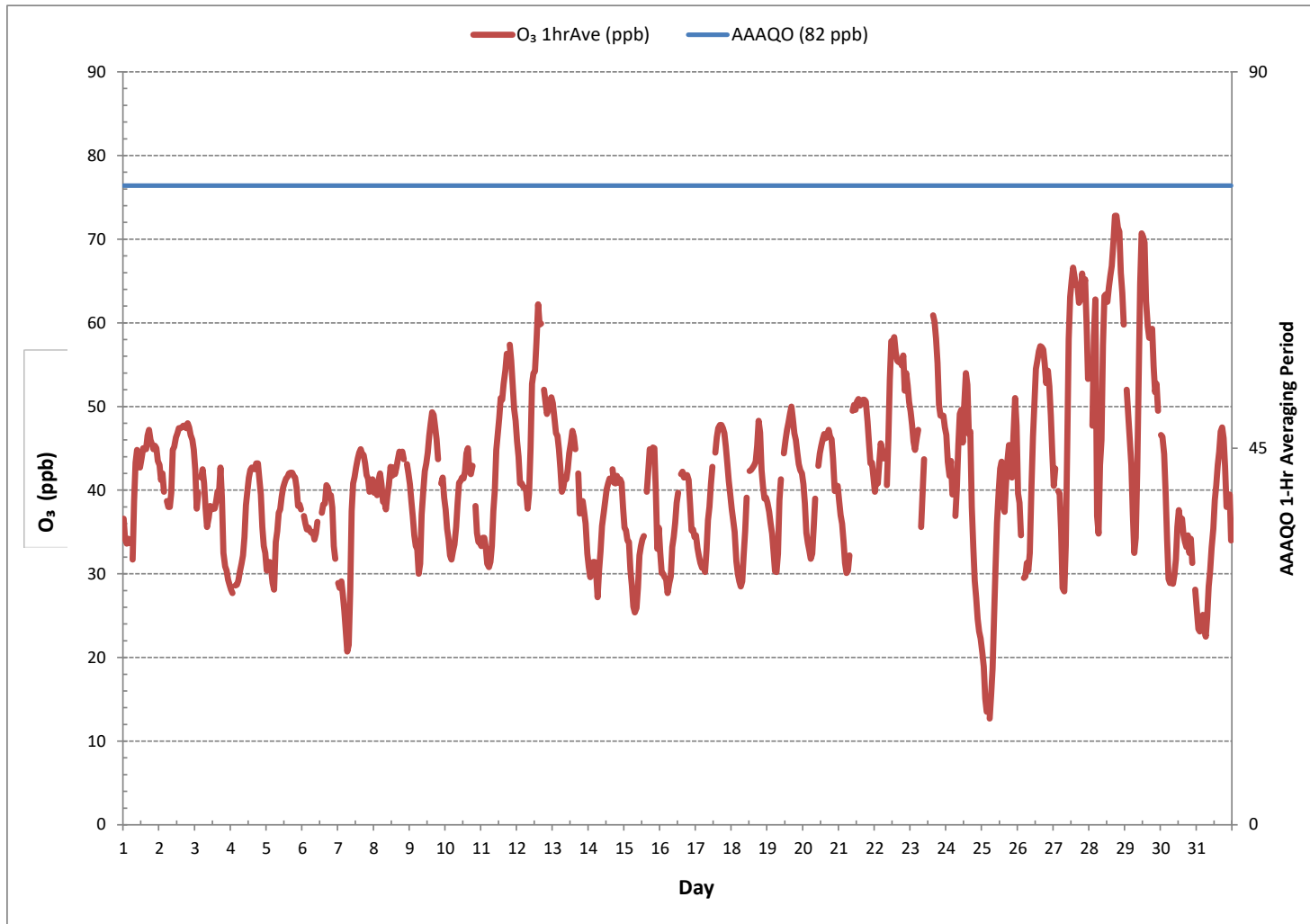
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	704			
MINIMUM 1-HR AVERAGE:	12.7	ppb	@ HOUR	5 ON DAY 25
MAXIMUM 1-HR AVERAGE:	72.8	ppb	@ HOUR	17 ON DAY 28
MAXIMUM 24-HR AVERAGE:	59.8	ppb		ON DAY 28
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	744 hrs
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	9.6		MONTHLY AVERAGE:	41.5 ppb

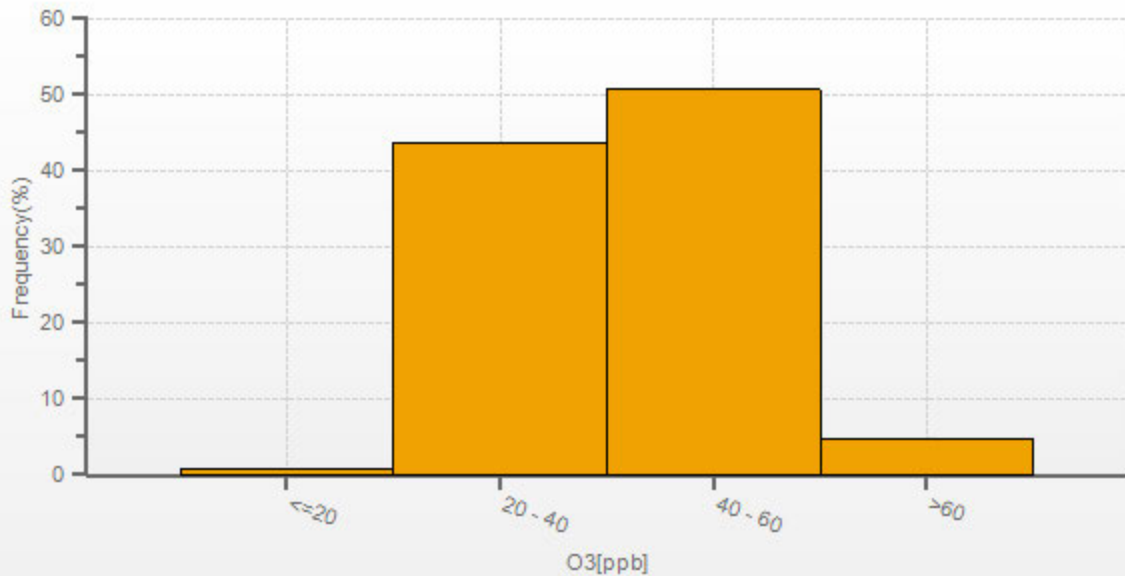
24 HR AVERAGES May 2019



OZONE Hourly Averages (O₃ ppb)

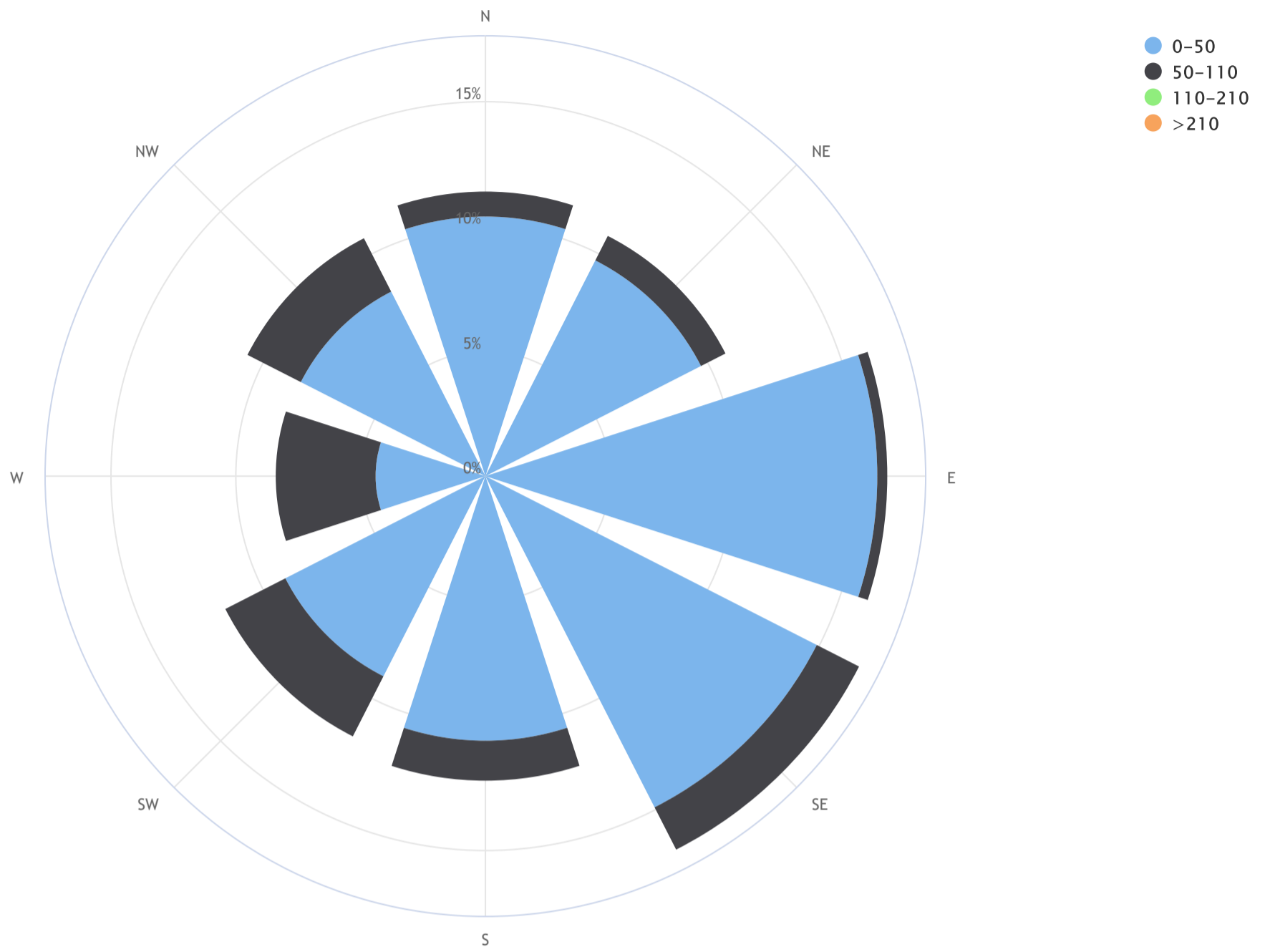


O3[ppb] Histogram: LICA ST. LINA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_St. Lina Continuous Monitoring Station_O₃ (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 42.5, CALM % = 1.9%



Direction	0-50	50-110	110-210	>210	TOTAL
N	10.4	1.0	0.0	0.0	11.4
NE	9.7	1.1	0.0	0.0	10.9
E	15.7	0.4	0.0	0.0	16.1
SE	14.9	1.9	0.0	0.0	16.7
S	10.6	1.6	0.0	0.0	12.1
SW	9.0	2.7	0.0	0.0	11.7
W	4.4	4.0	0.0	0.0	8.4
NW	8.3	2.4	0.0	0.0	10.7
Summary	83.0	15.1	0.0	0.0	98.1
CALM	1.4	0.4	0.0	0.0	1.9

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	3	3	3	3	3	3	3	3	3	4	5	5	6	7	7	8	3	4	4	6	6	6	5	3	3	8	4	24	
2	3	3	3	4	3	3	4	6	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	6	3	24
3	3	3	4	4	3	4	4	2	1	1	2	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	4	2	24
4	2	2	2	2	2	2	2	2	2	3	3	2	2	2	2	2	2	2	1	1	1	1	1	2	1	3	2	24	
5	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	3	4	3	2	2	2	1	1	1	1	4	2	24
6	1	2	2	2	2	2	2	4	4	6	10	13	13	12	12	9	8	7	7	7	7	8	7	7	1	13	6	24	
7	8	9	3	2	3	3	2	3	6	5	3	4	4	4	3	3	3	3	5	4	4	4	4	4	2	9	4	24	
8	4	3	3	3	3	3	4	4	4	5	5	5	5	5	5	5	6	6	7	6	6	6	7	7	3	7	5	24	
9	8	7	7	8	8	8	8	8	7	7	5	4	4	3	3	3	3	3	3	3	3	4	4	4	3	8	5	24	
10	3	2	2	2	2	2	2	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	2	2	1	3	2	24	
11	2	1	1	2	2	3	2	2	2	2	2	2	2	3	3	3	4	4	5	5	5	5	5	5	1	5	3	24	
12	4	4	4	5	5	5	5	6	6	6	7	6	6	6	6	10	6	6	6	5	5	5	4	5	4	10	6	24	
13	5	5	6	11	10	9	7	3	4	3	3	2	3	3	3	3	2	2	1	1	1	2	2	2	1	11	4	24	
14	2	2	2	2	2	2	2	2	2	1	2	2	2	3	3	3	4	4	4	4	4	5	5	5	1	5	3	24	
15	4	4	4	4	4	4	5	4	4	4	4	4	5	5	4	4	3	3	2	2	2	3	4	3	2	5	4	24	
16	2	2	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	24	
17	2	2	2	2	2	2	2	2	2	2	3	4	3	2	3	6	5	5	6	9	8	6	7	6	2	9	4	24	
18	6	6	5	7	6	7	6	6	9	9	7	6	5	4	3	3	2	2	3	2	3	3	4	3	2	9	5	24	
19	3	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4	5	5	4	4	4	4	4	4	3	5	4	24	
20	3	3	3	3	3	3	5	5	5	3	3	3	3	3	4	4	4	4	5	4	4	5	6	5	3	6	4	24	
21	5	5	5	6	7	8	8	9	7	7	7	7	7	7	6	6	7	6	6	7	9	9	9	9	5	9	7	24	
22	10	11	9	6	5	6	5	7	7	7	8	10	9	9	8	8	8	7	7	7	8	9	10	11	5	11	8	24	
23	11	11	12	14	13	12	11	14	13	12	10	9	10	10	11	11	11	11	10	9	10	10	11	9	9	14	11	24	
24	9	10	11	12	13	13	13	11	10	9	9	12	9	8	10	18	20	21	20	15	13	12	12	12	8	21	13	24	
25	13	15	18	17	15	14	9	13	10	10	8	7	8	8	6	7	10	7	8	9	7	7	7	6	6	18	10	24	
26	8	9	10	8	9	8	6	6	6	5	5	6	5	5	5	4	4	3	4	4	4	4	6	3	3	10	6	24	
27	10	15	20	21	24	25	26	26	26	24	20	21	22	20	C	C	18	19	18	18	19	18	19	21	10	26	20	24	
28	20	21	24	19	17	26	22	15	13	13	27	36	38	37	36	33	35	35	32	30	29	24	21	21	13	38	26	24	
29	22	3	5	7	8	8	9	9	9	13	17	19	17	18	18	17	17	17	19	18	17	16	18	18	3	22	14	24	
30	17	17	20	28	35	36	31	43	56	66	45	42	35	77	88	14	2	2	2	3	10	11	11	8	2	88	29	24	
31	6	5	6	5	4	5	5	6	5	7	9	10	34	27	33	38	41	42	44	40	24	25	27	19	4	44	20	24	
HOURLY MAX	22	21	24	28	35	36	31	43	56	66	45	42	38	77	88	38	41	42	44	40	29	25	27	21					
HOURLY AVG	7	6	7	7	7	8	7	7	8	8	8	8	9	10	10	8	8	8	8	7	7	7	7	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

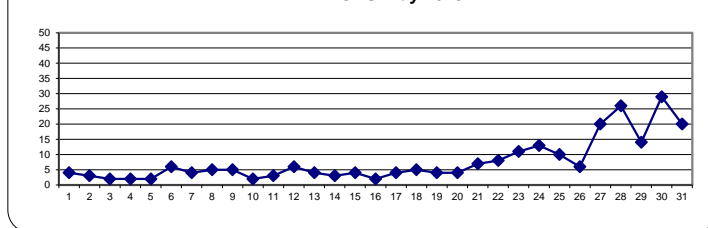
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	80	µg/m ³	24-HR	29	µg/m ³
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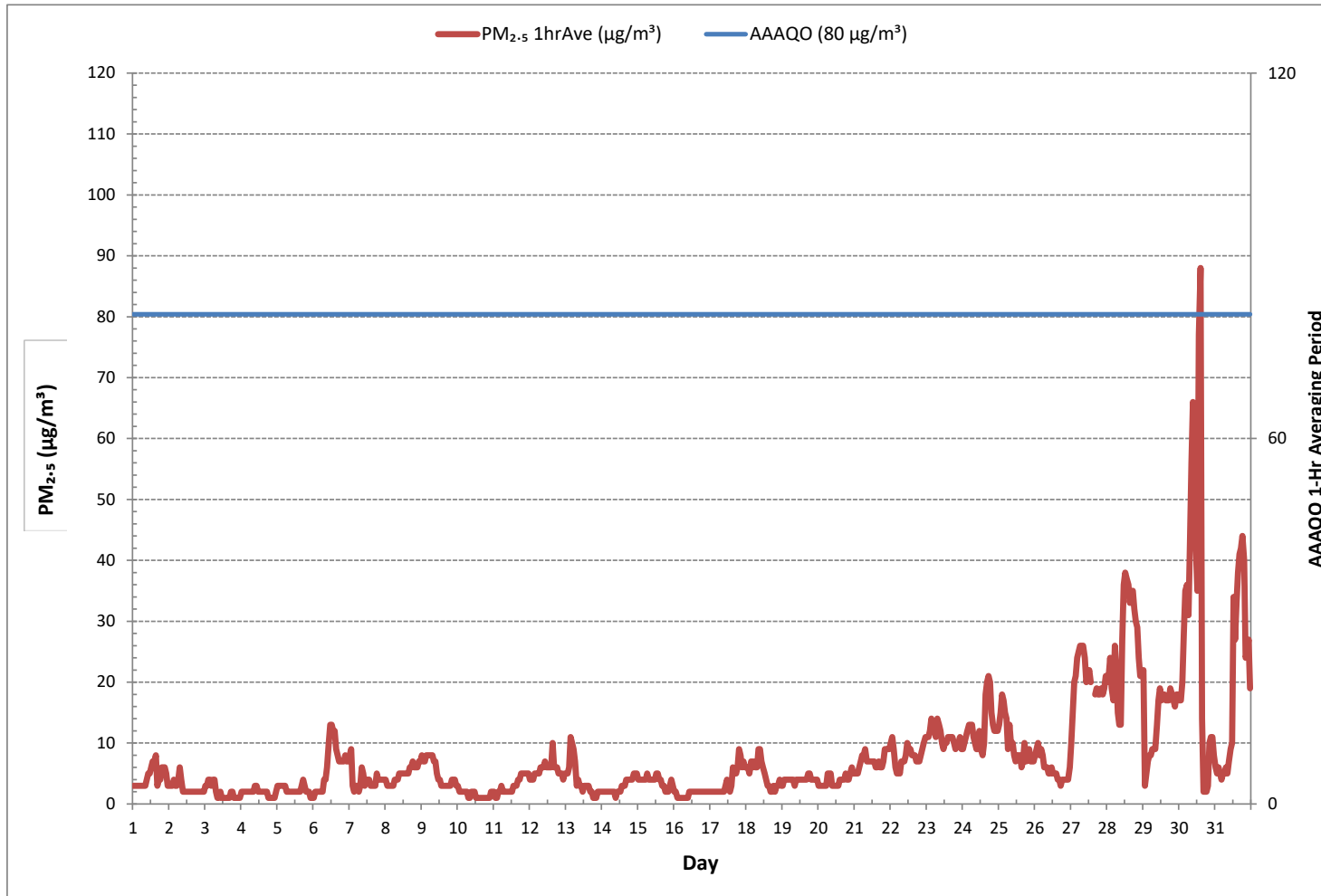
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	1			
NUMBER OF 24-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	742			
MINIMUM 1-HR AVERAGE:	1 µg/m ³ @ HOUR	8	ON DAY	3
MAXIMUM 1-HR AVERAGE:	88 µg/m ³ @ HOUR	14	ON DAY	30
MAXIMUM 24-HR AVERAGE:	29 µg/m ³		ON DAY	30
MONTHLY CALIBRATION TIME:	2 hrs	OPERATIONAL TIME:	744 hrs	
STANDARD DEVIATION:	9	AMD OPERATION UPTIME:	100.0 %	
		MONTHLY AVERAGE:	8 µg/m ³	

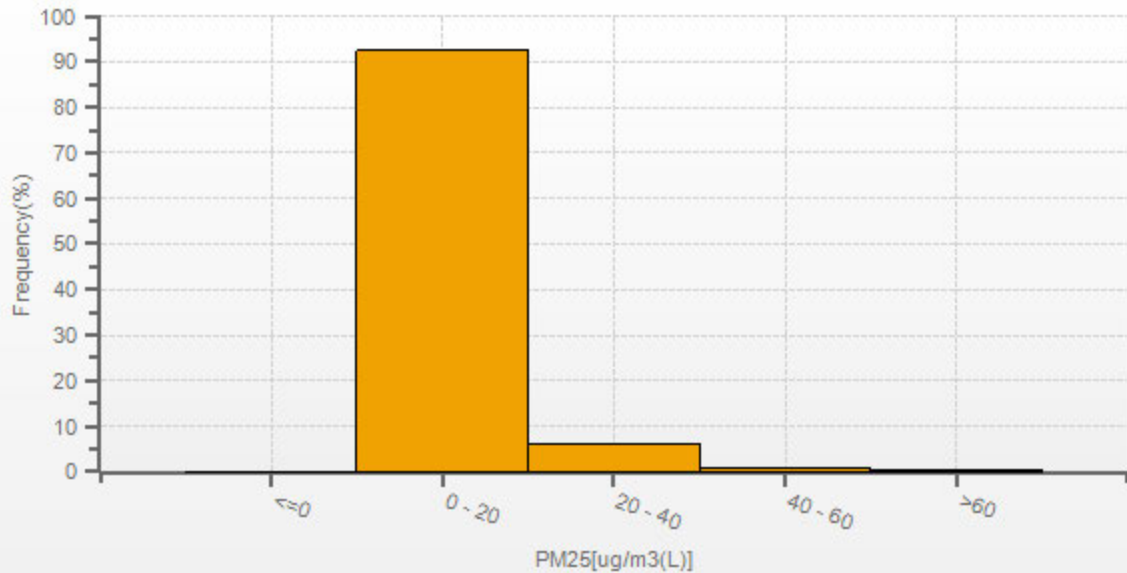
24 HR AVERAGES May 2019



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

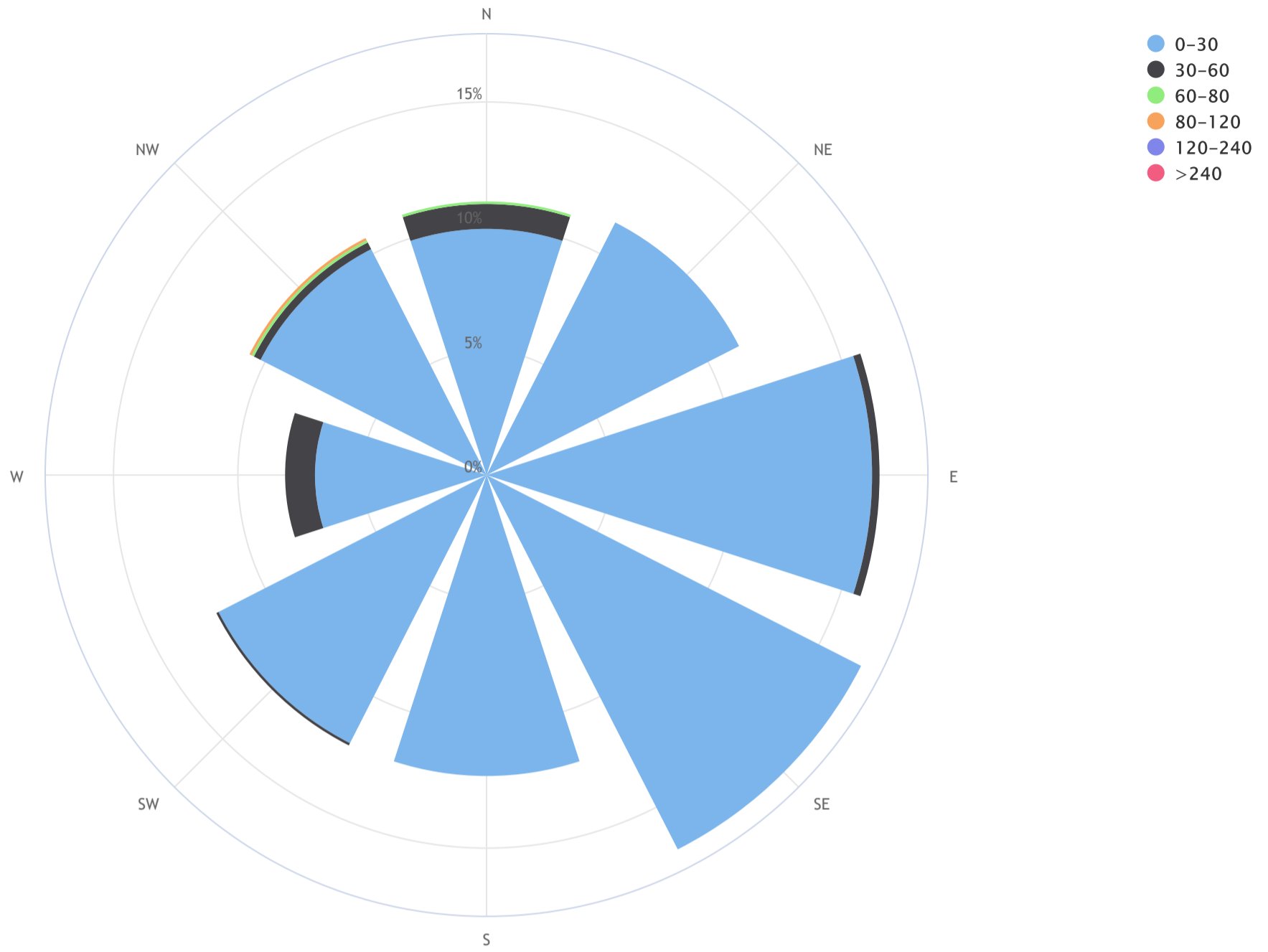


PM25[ug/m3(L)] Histogram: LICA ST. LINA Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_St. Lina Continuous Monitoring Station_PM_{2.5} (µg/m³)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 14.5, CALM % = 1.9%



Direction	0-30	30-60	60-80	80-120	120-240	>240	TOTAL
N	9.9	1.0	0.1	0.0	0.0	0.0	11.0
NE	11.4	0.0	0.0	0.0	0.0	0.0	11.4
E	15.5	0.3	0.0	0.0	0.0	0.0	15.7
SE	16.9	0.0	0.0	0.0	0.0	0.0	16.9
S	12.1	0.0	0.0	0.0	0.0	0.0	12.1
SW	12.1	0.1	0.0	0.0	0.0	0.0	12.2
W	6.9	1.2	0.0	0.0	0.0	0.0	8.1
NW	10.2	0.3	0.1	0.1	0.0	0.0	10.7
Summary	94.9	2.9	0.3	0.1	0.0	0.0	98.1
CALM	1.5	0.4	0.0	0.0	0.0	0.0	1.9



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	8.1	8.8	8.7	8.4	6.7	5.6	3.5	4.9	7.4	10.0	11.4	11.1	12.0	13.1	13.1	10.4	14.3	10.6	6.8	5.7	5.4	2.4	4.2	6.3	2.4	14.3	2.4	24
2	6.5	6.3	4.4	6.9	7.2	7.0	6.6	6.7	7.1	7.3	4.6	3.7	3.9	6.7	9.3	9.4	6.2	6.0	6.0	6.2	9.2	8.2	7.8	6.5	3.7	9.4	2.9	24
3	2.6	5.3	2.9	8.1	9.3	13.6	19.5	19.8	21.3	20.7	19.6	20.1	C	C	C	C	22.5	23.2	22.5	18.1	14.3	11.5	12.2	12.5	2.6	23.2	13.8	24
4	10.5	10.1	9.0	10.0	10.9	9.6	11.1	12.9	14.0	14.2	16.4	16.5	14.8	14.9	14.0	13.8	14.5	14.7	13.2	12.3	8.4	8.2	7.5	8.4	7.5	16.5	10.3	24
5	8.4	8.7	6.7	6.6	8.5	6.8	8.0	8.8	6.0	3.4	3.1	4.2	0.4	5.7	6.0	3.3	4.8	6.5	10.3	12.7	11.8	11.8	13.9	13.7	0.4	13.9	6.4	24
6	13.3	12.5	11.0	13.0	12.2	11.6	14.5	14.3	14.4	15.7	13.3	8.8	6.7	0.4	8.1	8.4	4.3	11.0	5.5	3.9	4.9	12.6	11.6	12.1	0.4	15.7	4.5	24
7	11.0	8.8	11.0	8.9	5.9	1.0	1.0	6.8	7.1	9.4	6.0	3.9	3.9	4.7	6.5	4.2	6.7	8.7	4.4	5.1	4.6	6.2	1.8	9.4	1.0	11.0	3.9	24
8	13.7	14.5	14.9	13.9	12.6	13.1	14.1	15.6	15.5	14.3	5.8	4.3	10.4	11.7	15.0	15.7	12.0	8.3	5.1	2.6	3.8	7.2	6.6	9.7	2.6	15.7	7.8	24
9	9.7	10.4	10.2	10.2	10.4	10.4	8.5	10.1	14.3	14.8	17.0	16.5	17.1	16.2	18.1	19.3	13.1	11.4	7.8	9.2	10.5	9.5	9.7	9.7	7.8	19.3	10.1	24
10	9.8	9.8	7.6	11.2	13.1	14.0	16.0	19.3	18.3	22.0	24.4	24.5	24.1	23.7	28.3	24.7	22.8	19.7	18.3	12.8	7.6	9.4	10.7	10.4	7.6	28.3	14.9	24
11	7.4	1.8	5.0	7.3	8.2	8.7	5.4	7.3	9.0	6.7	6.3	7.2	6.2	9.5	7.0	8.6	6.6	5.7	6.6	5.7	9.0	11.0	12.2	13.9	1.8	13.9	6.4	24
12	12.6	13.3	8.4	11.6	10.5	11.4	13.2	17.9	15.9	18.2	19.1	19.8	22.2	21.8	22.2	22.9	22.9	20.9	18.9	15.1	11.6	7.6	8.1	8.3	7.6	22.9	12.1	24
13	9.8	11.6	11.2	10.4	10.6	10.0	10.5	16.2	17.0	15.3	15.8	17.3	16.5	20.2	18.3	18.7	18.0	17.7	17.1	13.7	8.8	8.7	9.5	8.8	8.7	20.2	12.6	24
14	5.6	6.1	5.9	5.2	2.3	2.9	2.3	2.5	3.1	4.1	5.1	7.7	4.0	3.6	2.6	5.3	7.8	7.7	7.0	9.6	7.6	10.7	9.0	9.1	2.3	10.7	3.0	24
15	12.8	15.1	15.1	17.8	17.3	17.1	16.3	16.5	15.8	15.9	17.2	14.1	10.9	9.0	9.9	7.7	3.7	4.0	8.3	8.9	6.5	7.0	10.5	11.8	3.7	17.8	10.0	24
16	12.4	14.5	13.4	13.8	11.6	10.2	10.6	10.8	12.5	10.8	9.7	8.6	7.4	8.0	8.5	10.1	12.0	13.7	12.0	13.2	11.7	11.5	11.6	12.4	7.4	14.5	10.8	24
17	12.3	12.7	12.2	11.6	11.9	11.4	10.3	13.6	20.6	20.1	18.8	19.3	17.6	19.1	18.4	17.7	16.7	16.7	16.5	14.6	11.6	13.3	13.3	15.2	10.3	20.6	14.6	24
18	15.2	14.9	15.1	12.1	16.4	12.0	10.2	11.0	10.8	13.0	16.7	17.2	18.9	16.5	17.4	17.5	16.9	18.3	14.6	12.2	12.4	13.6	13.2	13.5	10.2	18.9	14.4	24
19	11.7	12.4	12.3	10.9	9.9	7.9	9.0	10.5	13.5	14.7	16.7	17.3	16.9	16.4	16.8	14.1	15.1	13.8	13.8	13.5	12.2	13.8	14.7	13.2	7.9	17.3	13.2	24
20	12.8	12.5	12.0	10.8	11.7	11.4	11.1	12.3	13.0	16.2	17.4	15.0	14.1	17.5	14.6	17.6	14.6	14.2	12.6	12.6	11.2	11.2	12.1	14.2	10.8	17.6	13.1	24
21	15.1	16.1	14.8	11.3	10.0	7.3	8.4	8.0	12.2	15.5	17.6	18.2	15.8	15.0	13.5	12.3	11.2	10.0	9.8	6.1	7.7	8.7	7.9	8.1	6.1	18.2	11.2	24
22	5.8	7.5	8.3	9.5	10.7	11.0	8.0	6.6	4.7	5.1	4.3	3.6	2.6	0.2	4.2	5.1	3.8	2.0	0.4	1.7	6.3	8.0	8.2	7.6	0.2	11.0	1.0	24
23	6.4	6.3	7.3	7.1	5.5	3.6	2.7	2.3	2.0	1.1	1.4	4.5	8.2	3.3	4.5	5.6	5.5	8.7	8.2	6.8	7.6	12.8	11.5	12.5	1.1	12.8	1.1	24
24	11.8	10.0	13.4	14.4	13.9	12.6	12.3	11.4	12.0	13.4	12.9	10.9	10.9	10.2	17.6	14.7	12.5	12.0	10.6	8.3	10.4	10.1	8.5	5.4	5.4	17.6	11.3	24
25	6.1	6.4	6.0	6.6	6.9	5.2	5.8	2.7	3.9	4.4	5.0	4.3	1.1	11.6	7.5	4.4	8.8	11.3	11.1	8.1	8.1	11.1	7.1	7.9	1.1	11.6	1.9	24
26	6.0	7.1	7.7	7.0	4.1	2.8	4.1	4.3	6.0	6.9	4.4	2.4	5.1	4.5	3.0	2.5	4.3	2.8	4.5	5.5	8.2	9.4	9.8	8.7	2.4	9.8	1.8	24
27	7.3	8.0	8.9	7.9	9.1	8.1	7.2	8.2	9.4	11.8	17.3	14.3	11.9	11.9	9.4	5.7	3.9	2.8	1.8	2.1	5.7	5.5	7.6	7.2	1.8	17.3	6.8	24
28	7.6	7.3	8.3	9.1	9.8	6.1	7.2	8.8	9.6	11.6	13.2	11.2	12.2	11.1	9.3	10.5	11.3	9.4	6.5	5.3	8.0	9.8	8.7	5.3	13.2	8.7	24	
29	10.1	11.7	9.3	10.8	10.4	8.1	7.6	8.3	10.2	12.9	17.4	17.5	19.0	17.1	13.0	11.2	9.2	9.7	7.0	7.6	10.3	10.5	9.9	10.1	7.0	19.0	10.2	24
30	10.2	11.4	11.6	10.9	10.8	12.6	13.5	12.5	10.4	10.7	9.5	10.5	11.6	13.8	12.9	14.7	14.5	14.2	13.1	9.6	8.6	9.0	8.6	7.5	7.5	14.7	9.6	24
31	8.7	7.0	8.5	9.4	9.1	8.3	6.4	8.1	7.1	3.8	3.4	1.3	5.3	4.0	4.2	1.6	0.6	1.2	3.6	6.1	8.6	10.9	10.3	9.4	0.6	10.9	4.2	24
HOURLY MAX	15.2	16.1	15.1	17.8	17.3	17.1	19.5	19.8	21.3	22.0	24.4	24.5	24.1	23.7	28.3	24.7	22.9	23.2	22.5	18.1	14.3	13.8	14.7	15.2				

STATUS FLAG CODES

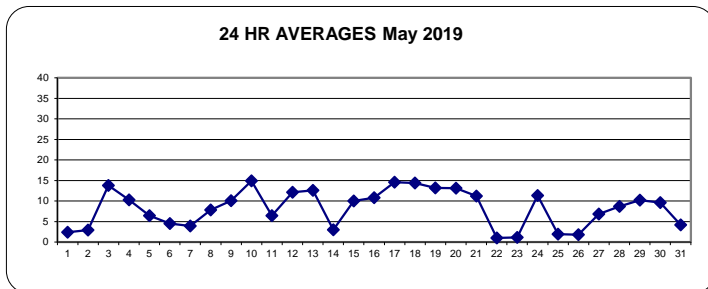
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	May 03, 2019
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

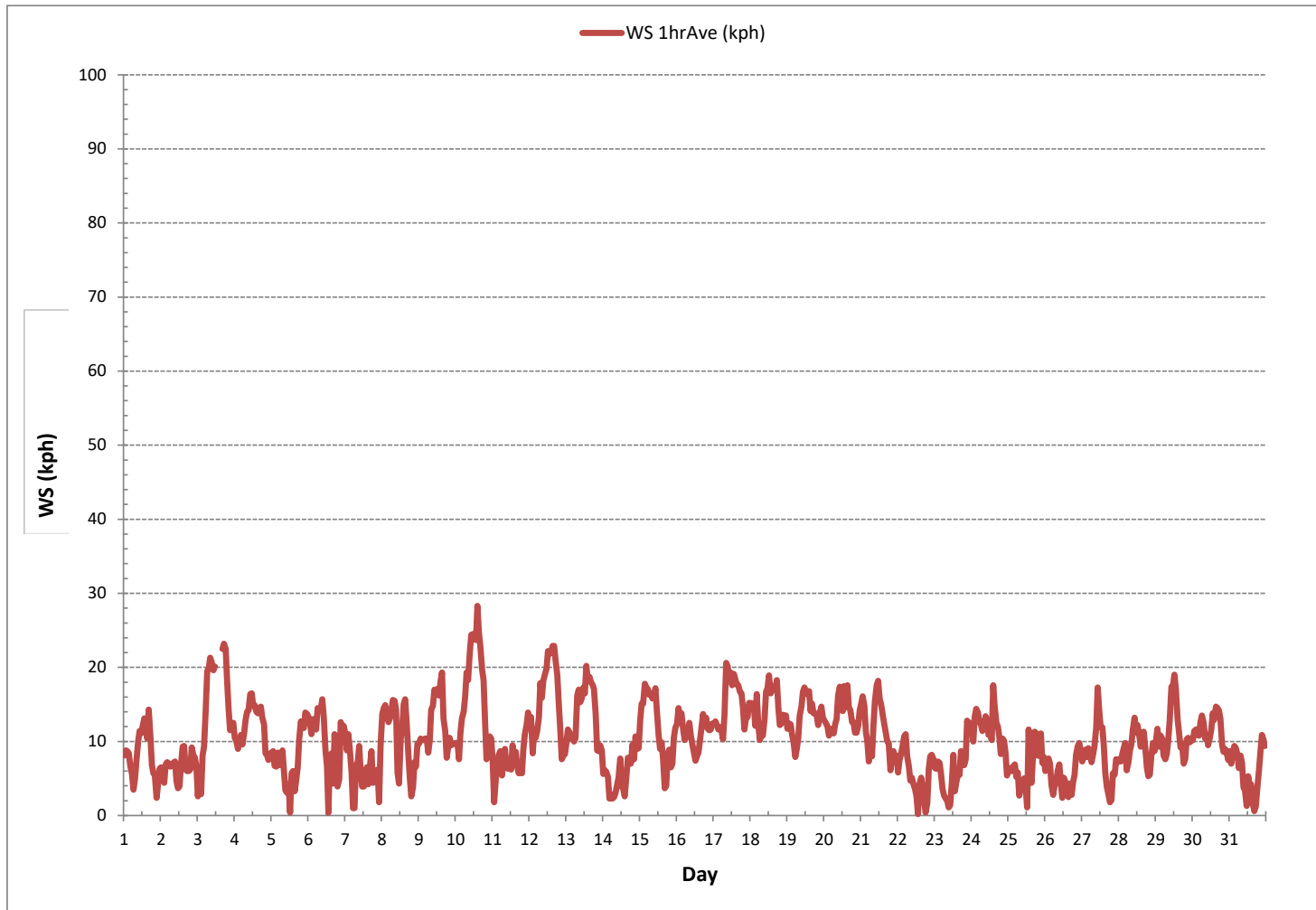
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	740
MINIMUM 1-HR AVERAGE	0.2 kph @ HOUR 13 ON DAY 22
MAXIMUM 1-HR AVERAGE:	28.3 kph @ HOUR 14 ON DAY 10
MAXIMUM 24-HR AVERAGE:	14.9 kph ON DAY 10
MONTHLY CALIBRATION TIME:	4 hrs
OPERATIONAL TIME:	744 hrs
AMT OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	4.8
MONTHLY AVERAGE:	1.2 kph

24 HR AVERAGES May 2019

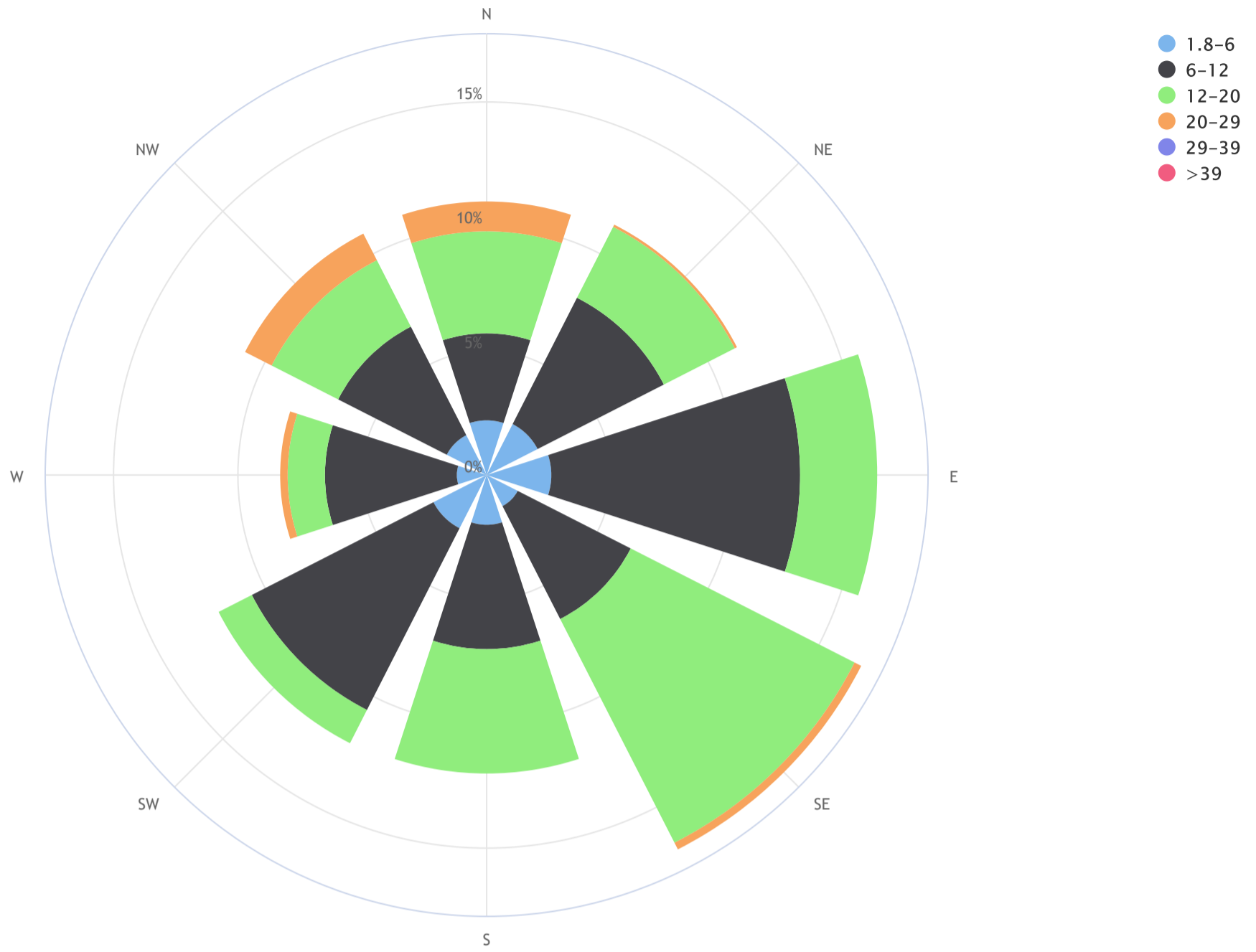


WIND SPEED Hourly Averages (WS kph)



Lakeland Industry & Community Association_St. Lina Continuous Monitoring Station_19/05

Wind Rose_Wind Frequency (Blowing From)_CALM Avg = 1.0_CALM % = 1.9%



Direction	1.8-6	6-12	12-20	20-29	29-39	>39	TOTAL
N	2.2	3.5	4.1	1.2	0.0	0.0	10.9
NE	2.3	5.7	3.2	0.1	0.0	0.0	11.4
E	2.6	10.0	3.1	0.0	0.0	0.0	15.7
SE	1.4	5.1	10.1	0.3	0.0	0.0	16.9
S	2.0	5.0	5.0	0.0	0.0	0.0	12.0
SW	2.4	8.2	1.5	0.0	0.0	0.0	12.2
W	1.2	5.3	1.5	0.3	0.0	0.0	8.3
NW	1.8	4.9	3.0	1.2	0.0	0.0	10.8
Summary	15.8	47.7	31.5	3.1	0.0	0.0	98.1
CALM	1.9	0.0	0.0	0.0	0.0	0.0	1.9



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - May 2019

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

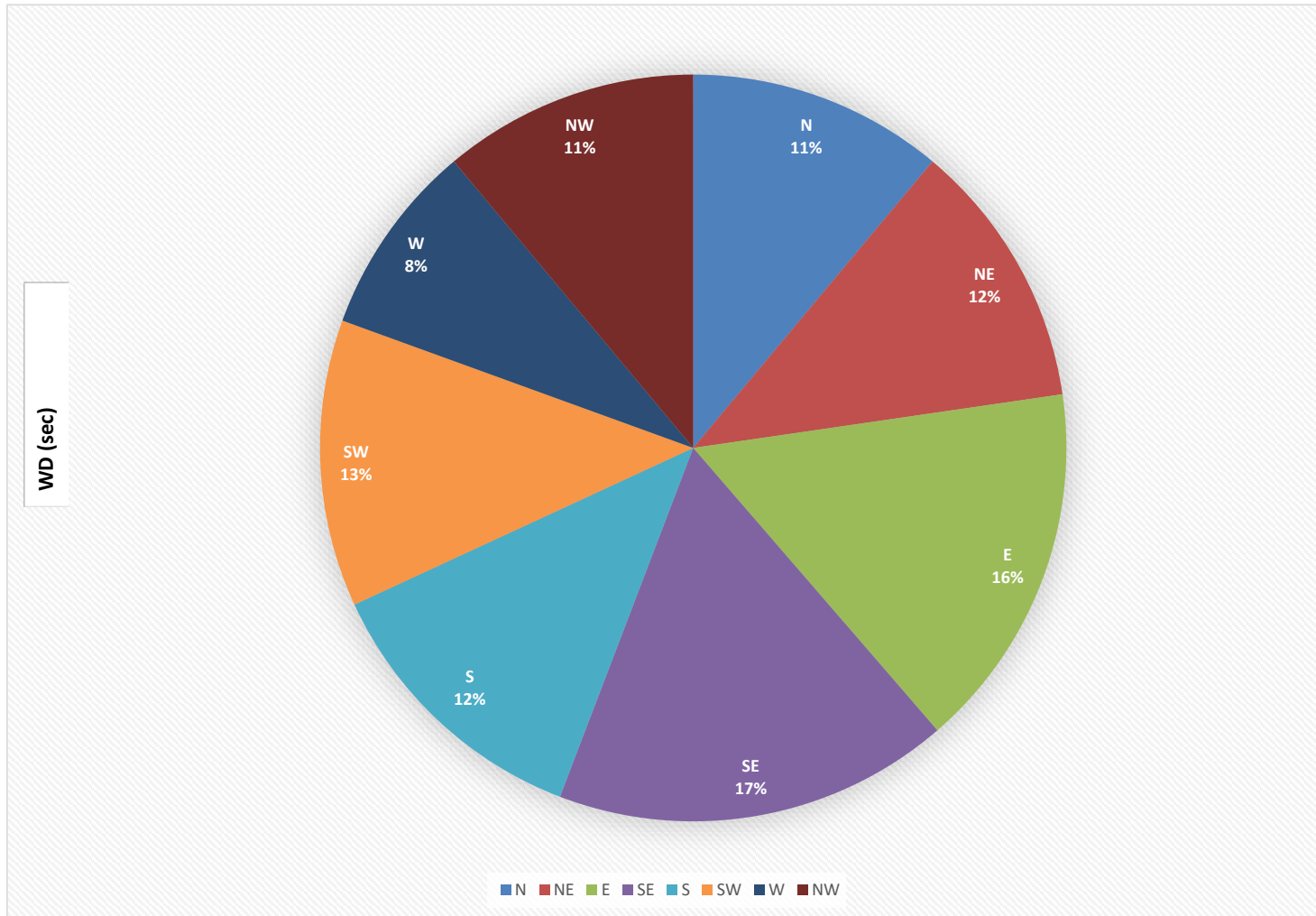
STATUS FLAG CODES

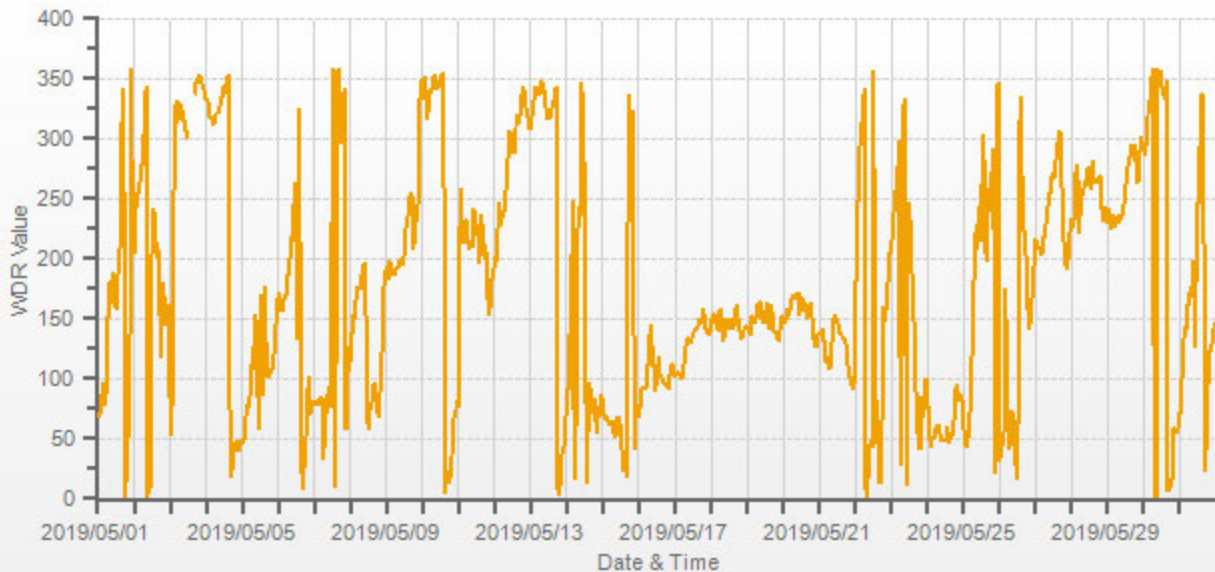
C	- MONTHLY CALIBRATION	Q	- QUALITY ASSURANCE
C1	- REPEAT CALIBRATION	R	- RECOVERY
Y	- MAINTENANCE	X	- MACHINE MALFUNCTION
S	- DAILY ZERO/SPAN CHECK	G	- OUT FOR REPAIR
S1	- REPEAT ZERO/SPAN CHECK	P	- POWER FAILURE

LAST CALIBRATION:	May 03, 2019
DECLINATION :	MAGNETIC DECLINATION 19 DEGREE EAST

MONTHLY CALIBRATION TIME:	4 hrs	OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	99	AMD OPERATION UPTIME:	100.0 %
		MONTHLY AVERAGE:	120 (ESE)

WIND DIRECTION Hourly Averages (WD)







LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - May 2019

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59		
DAY																										
1	10	6	10	3	8	15	39	16	20	16	15	14	13	16	13	36	12	11	11	11	12	39	27	27	24	
2	9	14	27	8	12	20	17	17	22	30	39	57	54	39	30	27	45	30	24	31	18	6	11	8	24	
3	55	14	56	12	14	11	5	7	7	8	10	9	C	C	C	C	11	9	9	6	6	7	5	5	24	
4	6	5	5	5	5	10	10	12	11	12	13	18	17	21	21	18	12	15	10	8	4	4	4	6	24	
5	3	2	9	7	5	10	9	13	32	46	54	40	77	28	32	40	29	24	10	4	3	6	7	8	24	
6	9	11	8	8	14	8	7	8	11	11	16	31	23	78	43	13	34	7	10	13	9	8	5	5	24	
7	3	4	5	9	10	44	64	15	10	15	37	55	50	45	35	54	23	36	49	17	22	21	62	11	24	
8	14	10	11	9	16	9	6	5	8	7	34	46	21	11	11	10	12	16	25	29	18	11	17	15	24	
9	9	3	9	7	6	3	7	7	7	13	12	17	12	17	12	15	17	14	11	27	10	10	24	10	24	
10	5	13	26	7	5	7	7	7	12	10	11	10	12	10	11	15	7	9	10	10	5	13	5	5	24	
11	5	60	15	7	12	6	7	11	17	23	31	31	35	30	31	32	24	27	18	16	8	7	4	8	24	
12	9	9	24	17	9	4	6	6	9	10	13	18	17	16	16	10	8	12	10	6	7	8	8	3	24	
13	3	6	6	5	4	4	5	8	10	12	16	17	19	16	16	15	18	17	7	6	10	3	2	6	24	
14	30	10	13	11	42	33	16	20	38	39	43	22	51	39	54	26	16	16	16	9	9	11	5	7	24	
15	5	5	3	3	4	4	4	5	5	6	7	11	12	21	17	17	41	29	13	8	22	26	7	4	24	
16	6	4	4	4	5	7	8	14	13	16	21	23	31	30	22	22	16	12	8	6	4	7	4	2	24	
17	3	3	3	4	3	3	8	13	10	10	12	15	18	12	21	11	8	9	11	5	3	3	5	4	24	
18	5	3	3	5	6	8	13	15	15	12	12	15	13	19	15	14	15	11	10	4	4	3	3	3	24	
19	3	3	4	6	5	10	8	14	13	14	16	19	18	14	20	17	14	18	9	5	5	4	4	3	24	
20	4	4	4	3	4	6	7	9	12	14	16	18	18	15	21	16	20	16	7	6	7	5	4	4	24	
21	3	4	4	7	3	7	8	13	12	11	16	14	19	19	13	17	17	11	14	6	4	11	4	8	24	
22	46	26	13	8	3	7	10	8	10	18	37	47	57	79	22	28	22	19	26	15	17	8	5	5	24	
23	4	12	8	13	35	42	48	44	51	65	58	35	23	54	34	33	26	10	10	13	21	4	7	10	24	
24	10	15	5	3	4	5	7	7	8	10	12	14	18	17	11	10	10	9	10	6	6	4	6	10	24	
25	6	8	5	7	11	23	20	27	24	33	36	45	72	26	43	18	18	14	11	8	18	14	14	19	24	
26	10	4	3	24	30	38	10	15	13	20	40	59	34	46	55	49	28	39	33	14	2	6	4	11	24	
27	7	10	3	4	3	5	7	7	11	7	10	16	17	19	21	37	30	35	12	6	6	9	7	5	24	
28	5	7	14	7	10	14	7	6	9	10	12	17	15	20	24	19	14	16	15	14	15	5	2	18	24	
29	8	3	10	7	2	5	7	4	8	7	9	15	14	14	19	17	18	14	10	6	3	17	4	4	24	
30	3	5	8	15	8	5	5	6	9	6	9	15	16	11	14	12	14	12	10	5	11	4	3	5	24	
31	5	7	10	4	6	5	10	10	18	28	47	69	26	47	31	63	69	52	17	14	5	3	6	10	24	

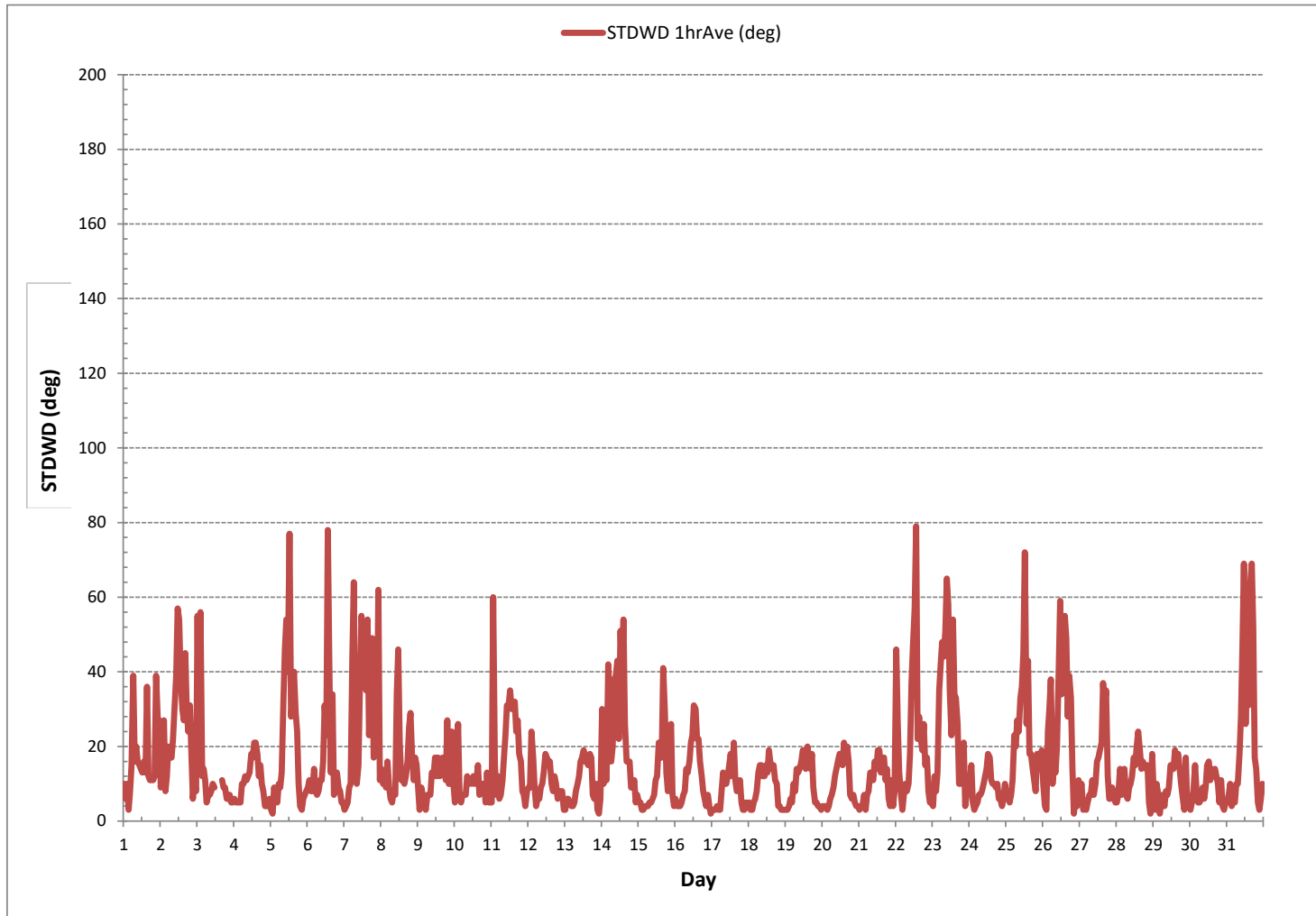
STATUS FLAG CODES

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

LAST CALIBRATION: May 03, 2019

CALIBRATION TIME: 4 hrs OPERATIONAL TIME: 744 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)





VECTOR WIND SPEED Hourly Averages (kph) & WIND DIRECTION Hourly Averages in Sector

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	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	WS	8.1	8.8	8.7	8.4	6.7	5.6	3.5	4.9	7.4	10.0	11.4	11.1	12.0	13.1	13.1	10.4	14.3	10.6	6.8	5.7	5.4	2.4	4.2	6.3	2.4	14.3	2.4	24
	WD	ENE	ENE	ENE	E	E	ENE	ESE	S	S	SSE	S	SSE	SSE	S	SSW	SW	NW	NNW	N	NNE	NE	ENE	N	SW	-	-	-	24
2	WS	6.5	6.3	4.4	6.9	7.2	7.0	6.6	6.7	7.1	7.3	4.6	3.7	3.9	6.7	9.3	9.4	6.2	6.0	6.0	6.2	9.2	8.2	7.8	6.5	3.7	9.4	2.9	24
	WD	SSW	WSW	WSW	WSW	W	W	WNW	NW	NNW	N	NNE	N	SW	WSW	SW	SSW	SSW	SSE	ESE	S	SSE	SE	SE	SSE	-	-	-	24
3	WS	2.6	5.3	2.9	8.1	9.3	13.6	19.5	19.8	21.3	20.7	19.6	20.1	C	C	C	C	22.5	23.2	22.5	18.1	14.3	11.5	12.2	12.5	2.6	23.2	13.8	24
	WD	ENE	NE	SSW	NW	NNW	NW	NNW	NW	NW	NW	WNW	C	C	C	C	NNW	NNW	NNW	N	N	NNW	NNW	NNW	-	-	-	24	
4	WS	10.5	10.1	9.0	10.0	10.9	9.6	11.1	12.9	14.0	14.2	16.4	16.5	14.8	14.9	14.0	13.8	14.5	14.7	13.2	12.3	8.4	8.2	7.5	8.4	7.5	16.5	10.3	24
	WD	NNW	NNW	NW	NW	NW	NW	NW	NW	NW	NNW	NNW	NNW	NNW	N	N	NNE	NNE	NE	NE	NE	NE	NE	NE	NE	-	-	-	24
5	WS	8.4	8.7	6.7	6.6	8.5	6.8	8.0	8.8	6.0	3.4	3.1	4.2	0.4	5.7	6.0	3.3	4.8	6.5	10.3	12.7	11.8	11.8	13.9	13.7	0.4	13.9	6.4	24
	WD	NE	NE	ENE	ENE	E	ESE	ESE	SE	SSE	ESE	ENE	SSE	E	E	S	ESE	E	E	ESE	ESE	SE	SSE	SSE	-	-	-	24	
6	WS	13.3	12.5	11.0	13.0	12.2	11.6	14.5	14.3	14.4	15.7	13.3	8.8	6.7	0.4	8.1	8.4	4.3	11.0	5.5	3.9	4.9	12.6	11.6	12.1	0.4	15.7	4.5	24
	WD	S	SSE	SSE	SSE	SSE	SSE	S	S	SSW	SW	W	SSW	SE	NW	ENE	N	NNE	NE	ENE	E	ENE	E	E	-	-	-	24	
7	WS	11.0	8.8	11.0	8.9	5.9	1.0	5.8	7.1	9.4	6.0	3.9	3.9	4.7	6.5	4.2	6.7	8.7	4.4	5.1	4.6	6.2	1.8	9.4	1.0	1.0	11.0	3.9	24
	WD	ENE	ENE	E	E	ENE	E	NNE	ENE	ENE	E	E	ENE	NW	N	N	NW	N	WNW	NW	NNW	NNW	ENE	SE	ESE	-	-	-	24
8	WS	13.7	14.5	14.9	13.9	12.6	13.1	14.1	15.6	15.5	14.3	5.8	4.3	10.4	11.7	15.0	15.7	12.0	8.3	5.1	2.6	3.8	7.2	6.6	9.7	2.6	15.7	7.8	24
	WD	ESE	SE	SSE	SSE	S	S	S	S	SSW	S	ENE	ENE	ENE	E	E	E	ENE	ENE	ESE	ESE	S	S	-	-	-	-	-	24
9	WS	9.7	10.4	10.2	10.2	10.4	10.4	8.5	10.1	14.3	14.8	17.0	16.5	17.1	16.2	18.1	19.3	13.1	11.4	7.8	9.2	10.5	9.5	9.7	9.7	7.8	19.3	10.1	24
	WD	S	S	SSW	SSW	S	S	S	SSW	SSW	SSW	SSW	SSW	SSW	SW	SW	WSW	WSW	WSW	SSW	SW	SW	WSW	NNW	NNW	-	-	-	24
10	WS	9.8	9.8	7.6	11.2	13.1	14.0	16.0	19.3	18.3	22.0	24.4	24.5	24.1	23.7	28.3	24.7	22.8	19.7	18.3	12.8	7.6	9.4	10.7	10.4	7.6	28.3	14.9	24
	WD	NNW	N	NNW	NW	NW	NNW	NNW	N	N	NNW	NNW	NNW	NNW	N	NNW	N	NNE	NNE	NNE	NNE	NE	ENE	ENE	E	-	-	-	24
11	WS	7.4	1.8	5.0	7.3	8.2	8.7	5.4	7.3	9.0	6.7	6.3	7.2	6.2	9.5	7.0	8.6	6.6	5.7	6.6	5.7	9.0	11.0	12.2	13.9	1.8	13.9	6.4	24
	WD	ENE	WSW	SW	SSW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SSW	SW	SW	SSW	SW	SSW	SSW	S	SSE	SSE	S	S	-	-	-	24
12	WS	12.6	13.3	8.4	11.6	10.5	11.4	13.2	17.9	15.9	18.2	19.1	19.8	22.2	21.8	22.2	22.9	22.9	20.9	18.9	15.1	11.6	7.6	8.1	8.3	7.6	22.9	12.1	24
	WD	SSW	SSW	SW	WSW	SW	WSW	WSW	W	WNW	NW	WNW	WNW	WNW	NW	NW	NW	NW	NW	NNW	NNW	NNW	NW	NW	NW	-	-	-	24
13	WS	9.8	11.6	11.2	10.4	10.6	10.0	10.5	16.2	17.0	15.3	15.8	17.3	16.5	20.2	18.3	18.7	18.0	17.7	17.1	13.7	8.8	8.7	9.5	8.8	8.7	20.2	12.6	24
	WD	NW	NW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NW	NW	NW	NW	NW	NW	NNW	NNW	N	N	NNE	NE	NE	NE	NE	-	-	-	24
14	WS	5.6	6.1	5.9	5.2	2.3	2.9	2.3	2.5	3.1	4.1	5.1	7.7	4.0	3.6	2.6	5.3	7.8	7.7	7.0	9.6	7.6	10.7	9.0	9.1	2.3	10.7	3.0	24
	WD	E	E	SE	S	WSW	NNE	NE	SSW	WSW	SW	NNW	WSW	W	NNE	NE	E	E	ENE	E	ENE	NE	ENE	ENE	E	-	-	-	24
15	WS	12.8	15.1	15.1	17.8	17.3	17.1	16.3	16.5	15.8	15.9	17.2	14.1	10.9	9.0	9.9	7.7	3.7	4.0	8.3	8.9	6.5	7.0	10.5	11.8	3.7	17.8	10.0	24
	WD	ENE	ENE	ENE	ENE	ENE	ENE	NE	NE	NE	ENE	ENE	ENE	ENE	NNE	NNE	NNE	NNE	NNW	W	W	NW	NE	ENE	ENE	-	-	-	24
16	WS	12.4	14.5	13.4	13.8	11.6	10.2	10.6	10.8	12.5	10.8	9.7	8.6	7.4	8.0	8.5	10.1	12.0	13.7	12.0	13.2	11.7	11.5	11.6	12.4	7.4	14.5	10.8	24
	WD	ENE	E	E	E	E	ESE	SE	ESE	ESE	E	ESE	ESE	E	E	E	E	E	E	E	E	ESE	ESE	ESE	ESE	-	-	-	24
17	WS	12.3	12.7	12.2	11.6	11.9	11.4	10.3	13.6	20.6	20.1	18.8	19.3	17.6	19.1	18.4	17.7	17.6	16.7	16.5	14.6	11.6	13.3	13.3	15.2	10.3	20.6	14.6	24
	WD	E	ESE	ESE	ESE	E	E	ESE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SSE	SE	SSE	SSE	SE	SE	SE	-	-	-	24
18	WS	15.2	14.9	15.1	12.1	16.4	12.0	10.2	11.0	10.8	13.0	16.7	17.2	18.9	16.5	17.4	17.5	16.9	18.3	14.6	12.2	12.4	13.6	13.2	13.5	10.2	18.9	14.4	24
	WD	SE	SSE	SSE	SE	SE	SSE	SSE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SSE	SSE	SE	SE	SE	SE	SE	-	-	-	24
19	WS	11.7	12.4	12.3	10.9	9.9	7.9	9.0	10.5	13.5	14.7	16.7	17.3	16.9	16.4	16.8	14.1	15.1	13.8	13.8	13.5	12.2	13.8	14.7	13.2	7.9	17.3	13.2	24
	WD	SE	SE	SE	SSE	SSE	SE	SSE	SSE	SSE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	-	-	-	24
20	WS	12.8	12.5	12.0	10.8	11.7	11.4	11.1	12.3	13.0	16.2	17.4	15.0	14.1	17.5	14.6	17.6	14.6	14.2	12.6	12.6	11.2	11.2	12.1	14.2	10.8	17.6	13.1	24
	WD	SSE	SE	SSE	SSE	SSE	SSE	SSE	SSE	SSE	S	SSE	SSE	SSE	SSE	SSE	SSE	SSE	SSE	SSE	SSE	SE	SE	SE	SE	-	-	-	24



VECTOR WIND SPEED Hourly Averages (kph) & WIND DIRECTION Hourly Averages in Sector

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	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																													
21	WS	15.1	16.1	14.8	11.3	10.0	7.3	8.4	8.0	12.2	15.5	17.6	18.2	15.0	13.5	12.3	11.2	10.0	9.8	6.1	7.7	8.7	7.9	8.1	6.1	18.2	11.2	24	
	WD	SE	SE	SE	SE	ESE	ESE	ESE	ESE	SE	SSE	SSE	SSE	SE	SE	SE	SE	SE	SE	ESE	ESE	E	E	E	-	-	-	24	
22	WS	5.8	7.5	8.3	9.5	10.7	11.0	8.0	6.6	4.7	5.1	4.3	3.6	2.6	0.2	4.2	5.1	3.8	2.0	0.4	1.7	6.3	8.0	8.2	7.6	0.2	11.0	1.0	24
	WD	SSE	SW	WSW	WNW	WNW	NNW	NNW	N	N	NE	NE	NE	N	ESE	ENE	NE	NNE	NNE	E	SSE	SE	S	S	SSW	-	-	-	24
23	WS	6.4	6.3	7.3	7.1	5.5	3.6	2.7	2.3	2.0	1.1	1.4	4.5	8.2	3.3	4.5	5.6	5.5	8.7	8.2	6.8	7.6	12.8	11.5	12.5	1.1	12.8	1.1	24
	WD	SSW	SW	WSW	WSW	W	WNW	NNE	WSW	NW	NNW	NNE	SW	WSW	SSW	S	SSE	E	ENE	NE	NE	E	ENE	ENE	E	-	-	-	24
24	WS	11.8	10.0	13.4	14.4	13.9	12.6	12.3	11.4	12.0	13.4	12.9	10.9	10.9	10.2	17.6	14.7	12.5	12.0	10.6	8.3	10.4	10.1	8.5	5.4	5.4	17.6	11.3	24
	WD	E	ENE	NE	NE	NE	NE	ENE	ENE	NE	NE	NE	NE	NE	ENE	NE	NE	NE	NE	ENE	E	E	E	E	E	-	-	-	24
25	WS	6.1	6.4	6.0	6.6	6.9	5.2	5.8	2.7	3.9	4.4	5.0	4.3	1.1	11.6	7.5	4.4	8.8	11.3	11.1	8.1	8.1	11.1	7.1	7.9	1.1	11.6	1.9	24
	WD	ENE	NE	NE	NE	ENE	E	SE	S	SW	SSW	WSW	SSW	WSW	WNW	W	SSW	SW	WSW	WSW	W	WNW	NNE	NNW	NNW	-	-	-	24
26	WS	6.0	7.1	7.7	7.0	4.1	2.8	4.1	4.3	6.0	6.9	4.4	2.4	5.1	4.5	3.0	2.5	4.3	2.8	4.5	5.5	8.2	9.4	9.8	8.7	2.4	9.8	1.8	24
	WD	NNE	NE	NE	NE	S	ENE	NE	NE	ENE	ENE	NNE	NNE	WNW	NNW	WSW	SW	SSW	SSW	SE	SE	SSE	S	SSW	-	-	-	24	
27	WS	7.3	8.0	8.9	7.9	9.1	8.1	7.2	8.2	9.4	11.8	17.3	14.3	11.9	11.9	9.4	5.7	3.9	2.8	1.8	2.1	5.7	5.5	7.6	7.2	1.8	17.3	6.8	24
	WD	SW	SSW	SSW	SSW	SSW	SSW	SW	SW	WSW	WSW	WSW	W	W	W	WNW	WNW	NW	WNW	SW	SSW	SSW	S	SSW	SW	-	-	-	24
28	WS	7.6	7.3	8.3	9.1	9.8	6.1	7.2	8.8	9.6	11.6	13.2	11.2	12.2	11.1	9.3	10.5	11.3	9.4	6.5	5.3	5.5	8.0	9.8	8.7	5.3	13.2	8.7	24
	WD	SW	SW	WSW	W	W	SW	WSW	WSW	WSW	W	W	W	WSW	W	W	W	W	W	W	W	WSW	SW	WSW	SW	-	-	-	24
29	WS	10.1	11.7	9.3	10.8	10.4	8.1	7.6	8.3	10.2	12.9	17.4	17.5	19.0	17.1	13.0	11.2	9.2	9.7	7.0	7.6	10.3	10.5	9.9	10.1	7.0	19.0	10.2	24
	WD	SW	WSW	SW	SW	SW	SW	SW	SW	SW	WSW	WSW	W	W	WNW	WNW	WNW	WNW	WNW	W	W	W	W	WNW	WNW	-	-	-	24
30	WS	10.2	11.4	11.6	10.9	10.8	12.6	13.5	12.5	10.4	10.7	9.5	10.5	11.6	13.8	12.9	14.7	14.5	14.2	13.1	9.6	8.6	9.0	8.6	7.5	7.5	14.7	9.6	24
	WD	WNW	WNW	WNW	NW	NNW	N	N	NNE	N	N	N	N	NNW	NNW	NNW	NNW	N	NNE	N	NNE	ENE	ENE	NE	ENE	-	-	-	24
WS HOURLY MAX		15.2	16.1	15.1	17.8	17.3	17.1	19.5	19.8	21.3	22.0	24.4	24.5	24.1	23.7	28.3	24.7	22.9	23.2	22.5	18.1	14.3	13.8	14.7	15.2				

STATUS FLAG CODES

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

LAST CALIBRATION:	May 03, 2019
DECLINATION :	MAGNETIC DECLINATION 16 DEGREE EAST

MONTHLY SUMMARY			
WIND SPEED			
MINIMUM 1-HR AVERAGE	0.2 kph	@ HOUR(S)	13 ON DAY(S)
MAXIMUM 1-HR AVERAGE:	28.3 kph	@ HOUR(S)	14 ON DAY(S)
MAXIMUM 24-HR AVERAGE:	14.9 kph		ON DAY(S)
			VAR-VARIOUS
		MONTHLY AVERAGE:	1.2 kph
WIND DIRECTION			
		MONTHLY AVERAGE:	120 (ESE)
HOURS IN SERVICE	744 hrs		
HOURS OF DATA	744 hrs		
HOURS OF CALIBRATION	4 hrs	STANDARD DEVIATION:	4.8
HOURS OF MISSING DATA	0 hrs	AMD OPERATION UPTIME:	100.0 %



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

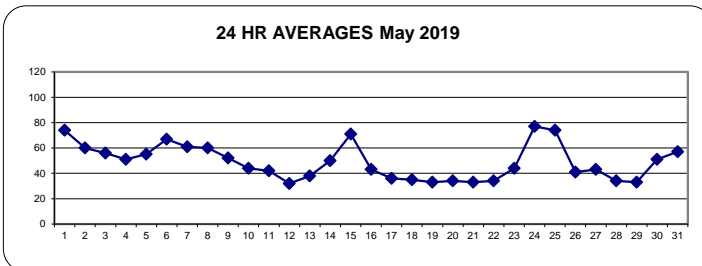
STATUS FLAG CODES

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

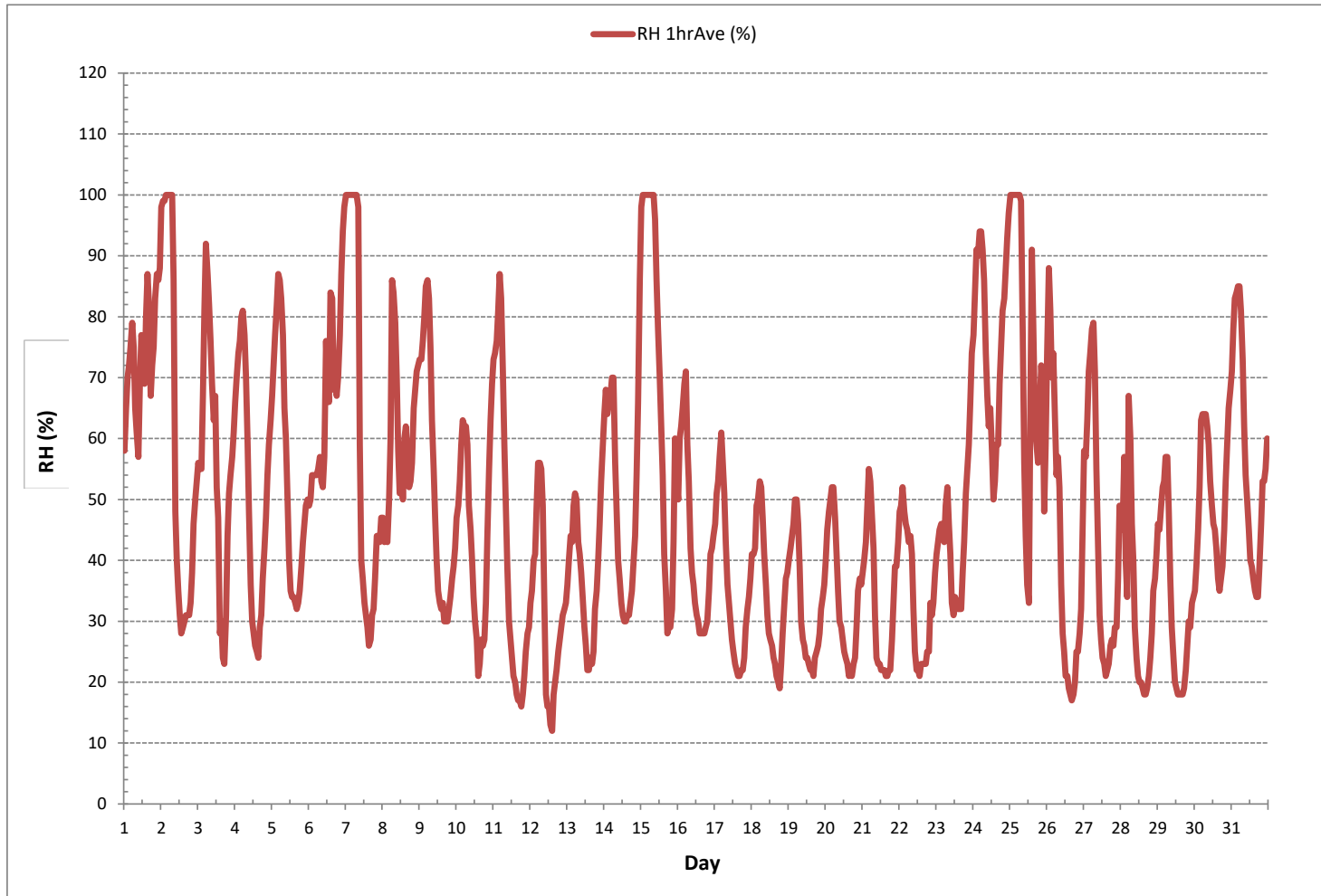
MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	12	%	@ HOUR	14	ON DAY	12
MAXIMUM 1-HR AVERAGE:	100	%	@ HOUR	3	ON DAY	2
MAXIMUM 24-HR AVERAGE:	77	%			ON DAY	24
OPERATIONAL TIME:						744 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	22					MONTHLY AVERAGE: 49 %

24 HR AVERAGES May 2019



RELATIVE HUMIDITY Hourly Averages (RH %)





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	930	929	929	929	928	928	928	928	928	927	927	926	926	925	925	924	924	925	925	924	924	923	923	924	923	923	923	930	926	24
2	923	923	923	923	923	923	924	924	925	926	926	926	926	926	926	925	924	924	924	924	923	922	922	922	922	922	922	926	924	24
3	921	921	921	921	921	922	922	923	923	924	924	925	925	926	926	927	927	928	928	928	928	928	928	928	928	928	921	928	925	24
4	928	928	927	928	928	928	929	929	930	930	930	930	931	931	931	931	931	932	931	932	931	931	931	931	931	927	932	930	24	
5	931	931	931	931	931	932	932	933	934	934	934	934	934	933	933	933	933	933	932	932	932	932	932	932	932	931	934	932	24	
6	932	932	932	931	931	931	931	931	932	932	932	932	932	932	932	932	932	932	932	932	931	931	931	931	931	931	931	932	932	24
7	931	931	932	932	932	932	933	934	935	936	937	937	938	938	938	938	938	938	937	938	938	938	938	938	938	931	938	936	24	
8	938	938	938	939	939	939	939	939	939	940	940	941	941	941	940	940	940	940	941	941	940	939	939	938	938	938	941	939	24	
9	937	937	937	936	936	935	935	935	935	935	934	933	933	932	931	929	929	928	927	926	926	925	925	925	925	925	937	932	24	
10	925	925	925	925	926	926	927	928	928	928	929	929	929	929	929	930	930	930	930	930	930	930	930	929	929	925	930	928	24	
11	929	929	929	929	929	929	929	930	930	930	930	930	930	929	929	928	927	927	926	925	924	923	922	921	921	921	930	928	24	
12	921	920	920	920	919	920	920	920	920	920	921	921	921	921	921	922	922	922	922	923	923	923	923	923	923	919	923	921	24	
13	923	924	924	924	925	925	926	927	927	928	928	928	929	929	929	929	929	930	930	930	929	929	929	929	929	923	930	927	24	
14	929	930	930	930	930	931	931	932	932	932	933	933	932	932	931	930	930	929	928	928	928	927	926	926	926	926	930	930	24	
15	925	924	924	924	924	924	925	925	926	927	928	929	929	930	931	931	932	933	932	933	932	932	932	932	932	924	933	928	24	
16	933	933	933	933	933	933	934	934	935	935	935	935	935	935	935	934	934	933	933	933	932	931	931	931	931	931	935	934	24	
17	931	930	930	930	930	930	931	932	932	933	933	933	933	933	933	933	933	933	933	933	933	933	933	933	933	930	933	932	24	
18	933	933	933	933	934	934	935	936	936	937	937	938	938	938	938	938	938	938	938	937	937	936	936	936	933	938	936	24		
19	936	935	935	935	935	936	936	937	938	938	938	938	938	938	938	937	937	937	936	936	935	935	934	934	934	934	938	936	24	
20	934	934	933	933	933	933	934	934	935	935	935	935	935	934	934	934	934	933	932	932	931	930	930	930	930	930	935	933	24	
21	930	930	930	930	930	930	931	932	933	933	934	934	934	935	935	935	935	935	935	935	935	934	934	934	930	935	933	24		
22	934	934	934	934	935	935	936	936	937	937	937	937	937	937	937	936	936	936	935	935	934	934	934	934	934	934	937	936	24	
23	934	934	933	933	933	933	933	934	934	934	934	934	933	933	933	932	931	930	929	929	929	928	927	927	927	927	934	932	24	
24	927	926	926	926	926	925	926	926	927	927	927	928	928	928	927	927	927	927	927	927	927	927	927	927	925	928	927	24		
25	927	927	927	928	928	929	929	930	931	932	933	933	933	933	932	933	934	935	935	934	934	934	934	934	927	935	932	24		
26	934	934	934	934	934	935	935	937	938	938	938	939	939	938	938	938	938	937	937	935	934	934	933	933	933	939	936	24		
27	933	932	932	931	931	931	931	932	933	933	934	934	933	933	933	932	932	932	931	931	931	930	930	930	930	930	934	932	24	
28	929	929	929	929	929	929	930	931	931	932	932	932	932	932	932	931	931	931	931	931	930	928	928	928	928	928	932	930	24	
29	927	927	927	926	926	926	926	927	927	928	928	928	928	928	927	927	927	927	926	926	925	925	925	925	925	925	928	927	24	
30	924	924	924	925	926	927	928	929	930	930	931	932	933	933	934	934	935	935	935	935	935	935	935	935	924	935	931	24		
31	935	935	935	935	935	935	936	936	936	937	937	937	937	937	937	936	936	936	935	934	933	933	932	932	932	932	937	935	24	
HOURLY MAX	938	938	938	939	939	939	939	939	939	940	940	941	941	941	940	940	940	940	941	941	940	939	939	938	938					
HOURLY AVG	930	930	930	930	930	930	930	931	932	932	932	932	932	932	932	932	932	932	932	931	931	930	930	930						

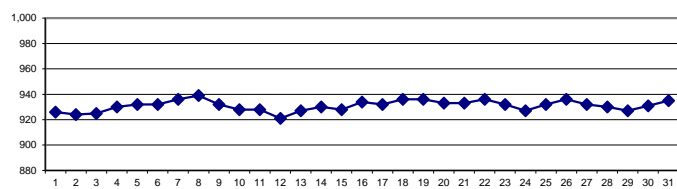
STATUS FLAG CODES

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

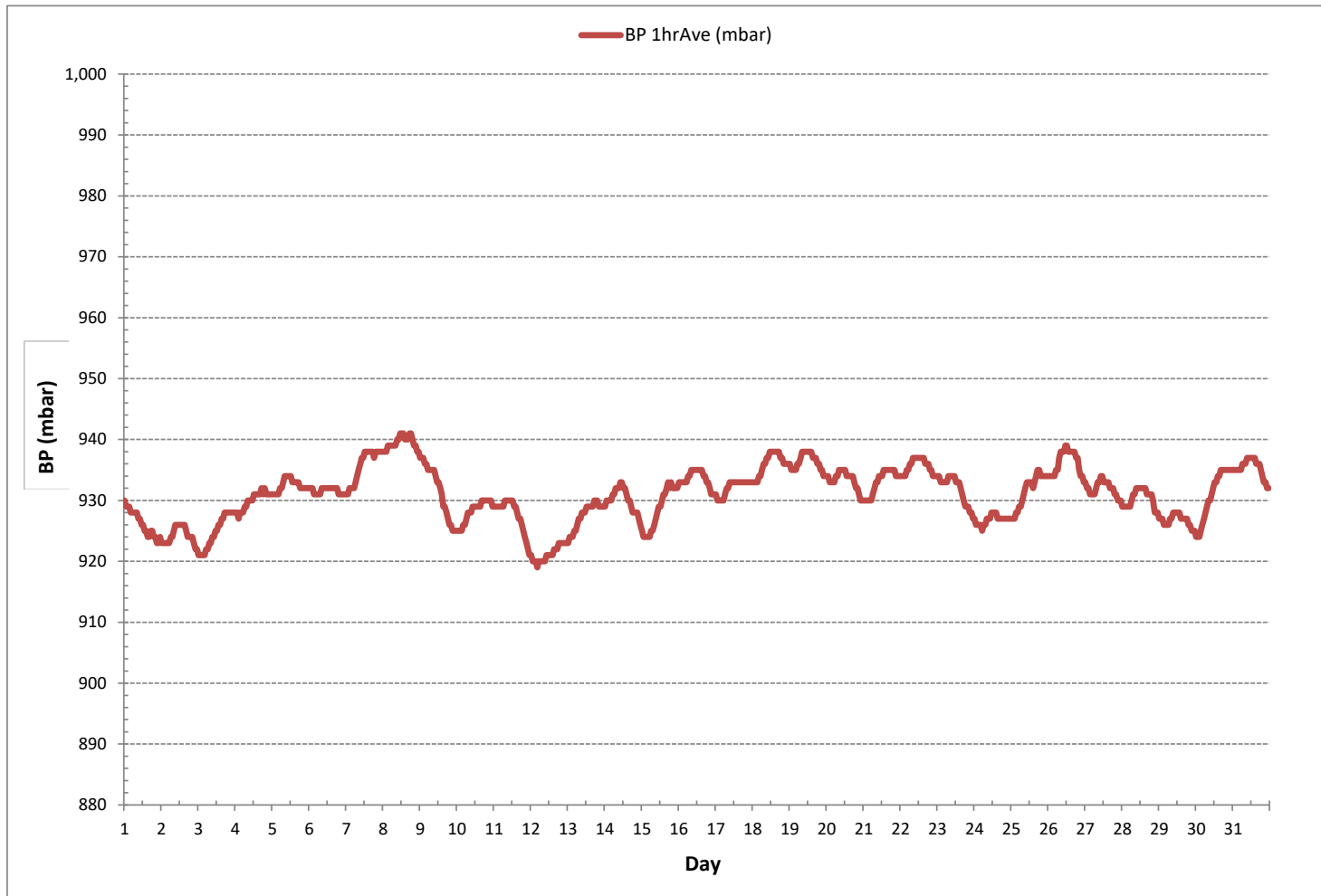
MONTHLY SUMMARY

MINIMUM 1-HR AVERAGE:	919	mbar	@ HOUR	4	ON DAY	12
MAXIMUM 1-HR AVERAGE:	941	mbar	@ HOUR	11	ON DAY	8
MAXIMUM 24-HR AVERAGE:	939	mbar			ON DAY	8
OPERATIONAL TIME:						744 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	5				MONTHLY AVERAGE:	931 mbar

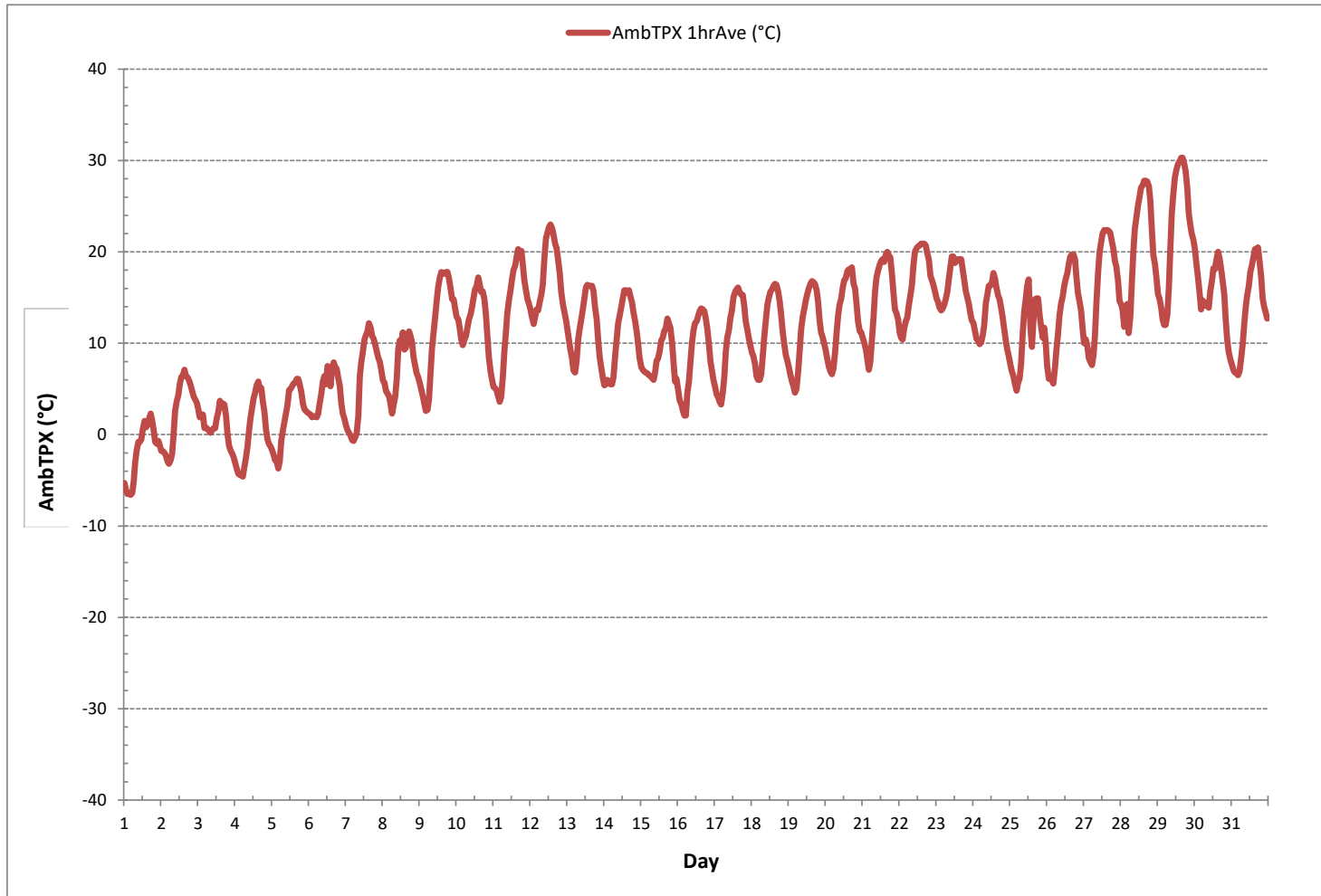
24 HR AVERAGES May 2019



BAROMETRIC PRESSURE Hourly Averages (BP mbar)



AMBIENT TEMPERATURE Hourly Averages (AmbTPX °C)



PRECIPITATION Hourly TOTALS (mm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.				
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	SUM					
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	0.2	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	0.2	0.2	24
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	24
4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	24
5	0.0	0.0	10.2	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	10.2	10.2	24
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.8	0.0	0.8	1.2	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	1.2	2.9	24
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
8	0.0	0.0	0.0	0.0	0.0	0.4	1.0	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	1.0	1.5	24
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	1.5	0.0	0.0	0.0	0.0	1.5	1.5	24
15	1.2	2.1	0.9	0.4	0.1	0.1	0.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	5.6	24
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
19	0.0	0.0	0.0	0.0	10.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.4	10.4	24
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
25	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	2.7	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	2.7	5.2	24
26	0.0	10.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	10.5	24
27	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
28	0.0	0.0	0.0	13.3	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	13.3	13.3	24
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	4.6	24
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24
HOURLY MAX	1.2	10.5	10.2	13.3	10.4	0.4	1.0	0.4	0.4	0.1	0.0	0.8	0.1	2.7	2.2	0.1	0.0	4.6	0.0	0.0	0.0	0.2	0.0	1.5								
HOURLY SUM	0.0	0.4	0.4	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0								

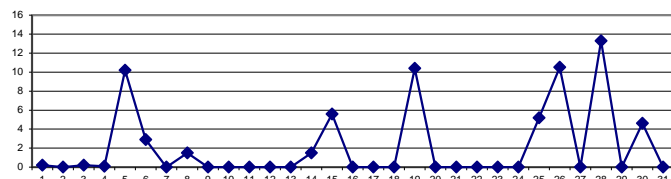
STATUS FLAG CODES

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

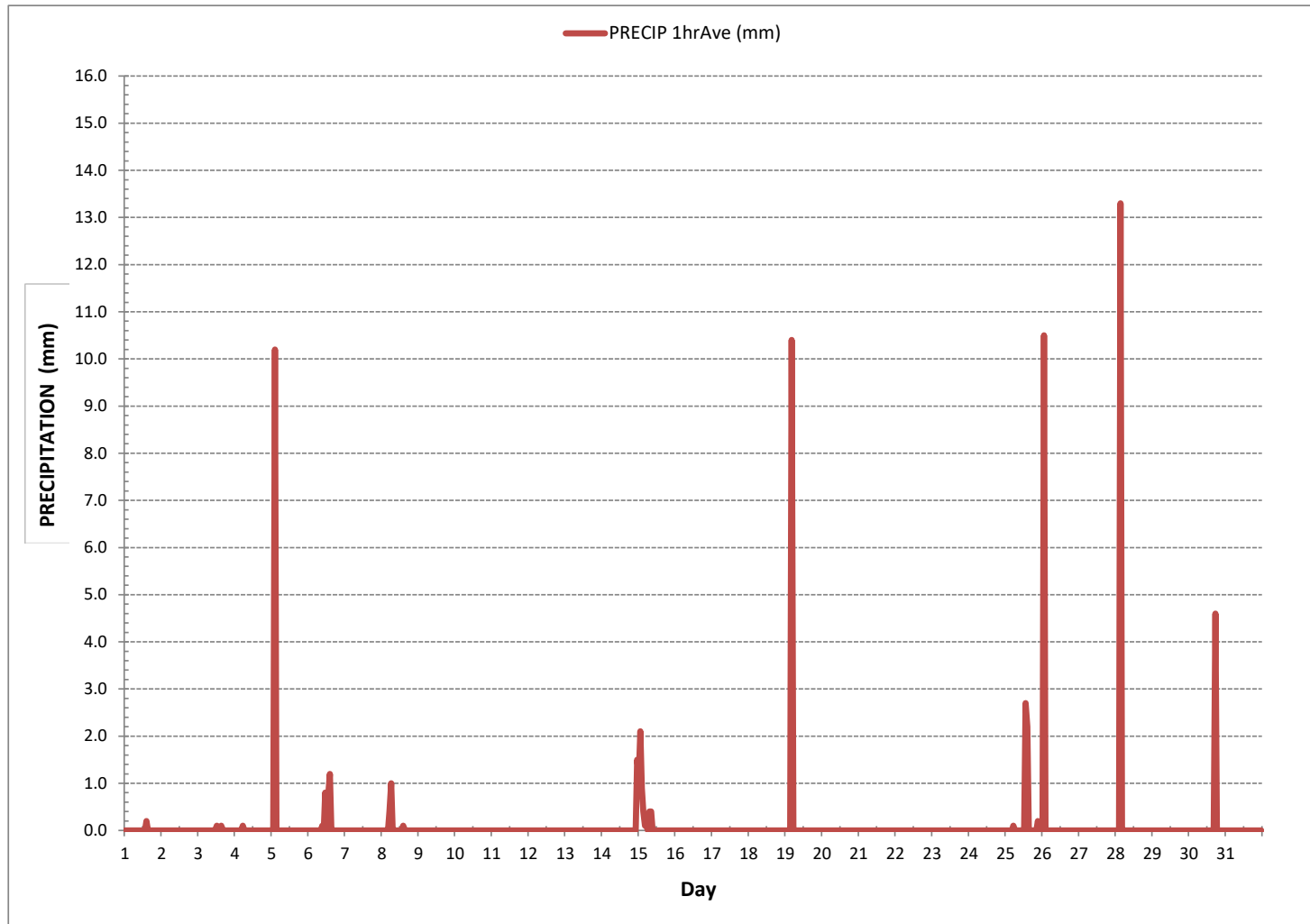
MONTHLY SUMMARY

MINIMUM 1-HR TOTAL:	0.0	mm	@ HOUR	0	ON DAY	1
MAXIMUM 1-HR TOTAL:	13.3	mm	@ HOUR	3	ON DAY	28
MAXIMUM 24-HR TOTAL:	13.3	mm			ON DAY	28
OPERATIONAL TIME:						744 hrs
AMD OPERATION UPTIME:						100.0 %
STANDARD DEVIATION:	0.9				MONTHLY TOTAL:	66.2 mm

24 HR TOTALS May 2019



PRECIPITATION Hourly TOTALS (mm)





SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)

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

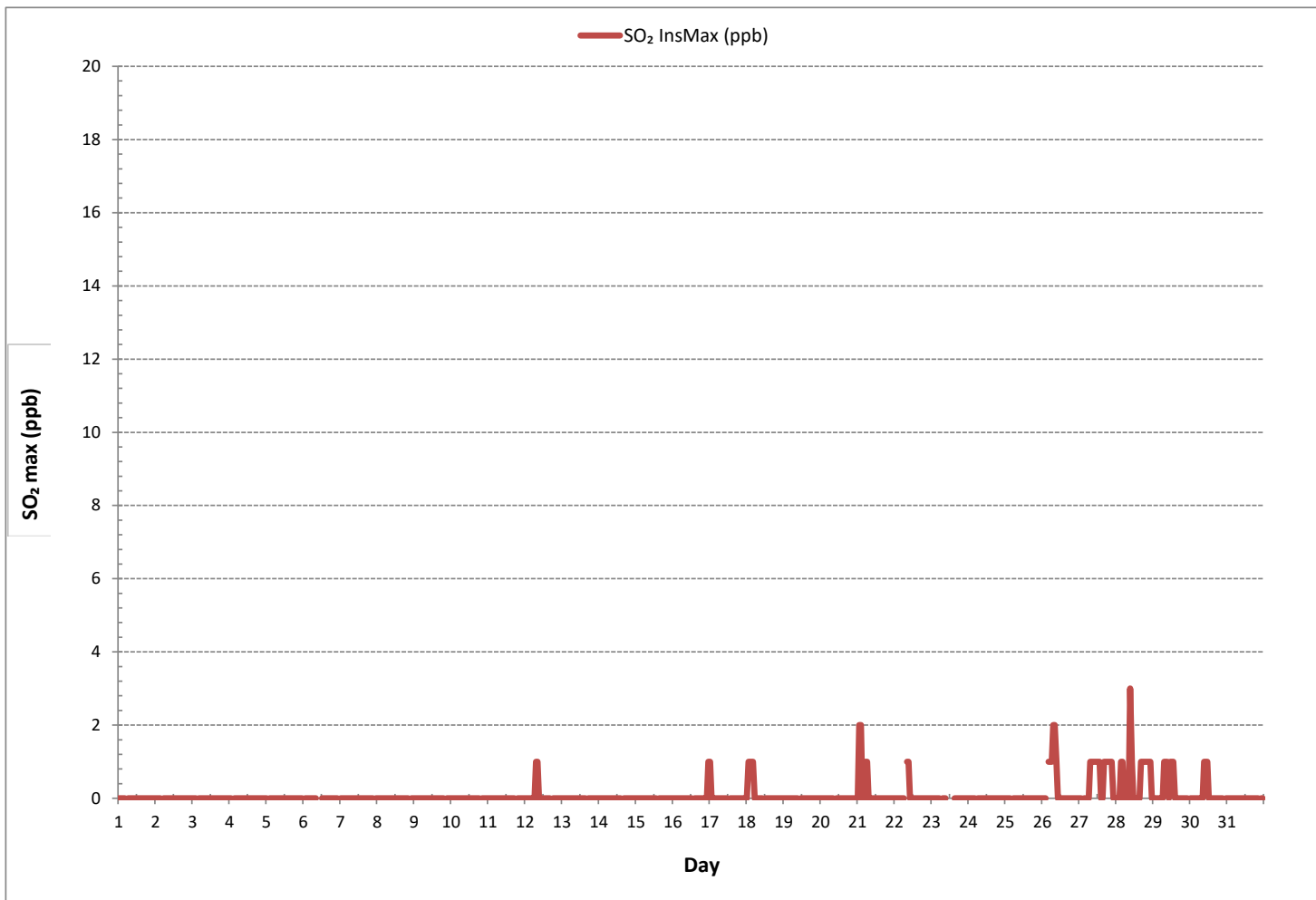
STATUS FLAG CODES

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:	53
MAXIMUM INSTANTANEOUS VALUE:	3 ppb @ HOUR 9 ON DAY 28
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	0

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - May 2019

HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)

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

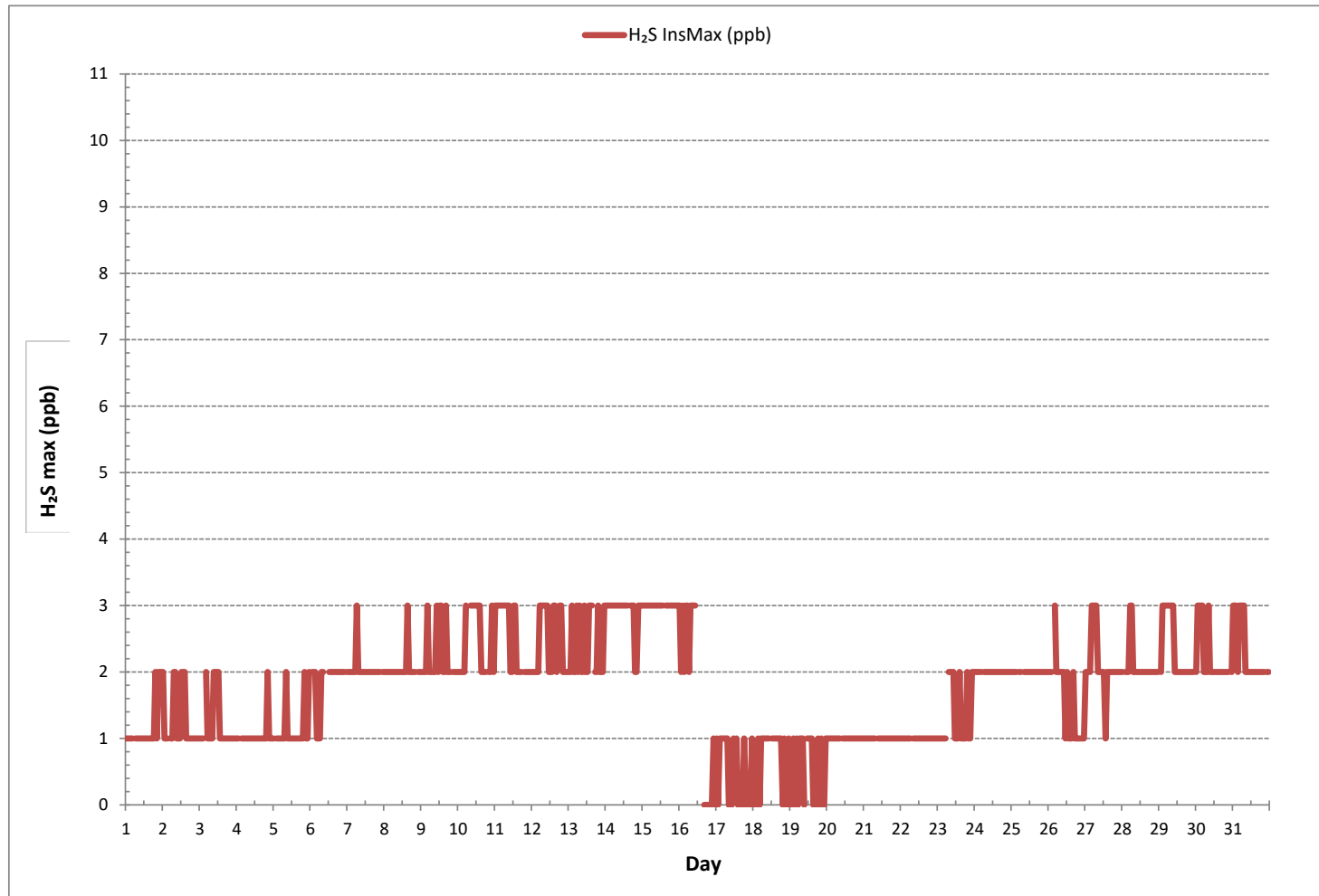
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	664
MAXIMUM INSTANTANEOUS VALUE:	3 ppb @ HOUR 6 ON DAY 7
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	741 hrs
STANDARD DEVIATION:	1

HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)





TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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	2.04	2.05	2.04	2.02	2.04	S	2.07	2.03	1.98	1.97	1.96	1.96	1.97	1.96	1.95	1.96	1.96	1.96	1.94	1.96	1.97	1.97	1.95	1.95	1.94	2.07	1.98	24	
2	1.94	1.96	1.97	1.95	S	1.95	1.95	1.95	1.97	1.94	1.95	1.94	1.95	1.95	1.93	1.95	1.93	1.95	1.94	1.95	1.94	1.95	1.97	1.97	1.93	1.97	1.95	24	
3	1.99	2.00	2.02	S	1.99	1.95	1.96	1.95	1.96	1.95	1.94	1.96	1.95	2.06	1.95	1.95	1.95	1.95	1.93	1.95	1.96	1.95	1.95	1.95	1.93	2.06	1.96	24	
4	1.96	1.95	S	1.95	1.96	1.96	1.96	1.96	1.96	1.96	1.95	1.96	1.95	1.96	1.95	1.95	1.96	1.94	1.96	1.95	1.97	2.09	2.03	2.00	1.94	2.09	1.97	24	
5	2.04	S	1.99	2.02	2.04	2.06	2.04	1.99	2.33	1.99	1.96	1.97	1.97	1.96	1.97	1.95	1.97	1.95	1.96	1.99	2.04	1.98	1.98	2.01	1.95	2.33	2.01	24	
6	S	2.05	2.04	2.06	2.01	2.01	2.00	2.01	1.99	2.01	2.00	Q	Q	Q	1.97	1.99	1.96	1.95	1.97	1.99	2.03	2.04	2.03	S	1.95	2.06	2.00	24	
7	2.07	2.11	2.04	2.09	2.10	2.09	2.09	2.12	2.13	2.04	1.97	1.95	1.97	1.95	1.98	1.96	1.93	1.95	1.95	1.97	1.96	1.98	S	1.99	1.93	2.13	2.02	24	
8	2.00	2.02	2.01	1.99	2.00	2.02	2.04	2.00	2.02	1.99	1.98	1.99	1.96	1.99	1.96	2.00	1.97	1.98	1.95	1.98	2.02	S	2.04	2.00	1.95	2.04	2.00	24	
9	2.04	2.06	2.07	2.08	2.11	2.11	2.16	2.13	2.07	2.02	1.97	1.97	1.95	1.95	1.92	1.99	1.94	1.95	1.92	1.93	S	1.95	1.94	1.92	1.92	2.16	2.01	24	
10	1.94	1.92	1.95	1.92	1.95	1.93	1.90	1.92	1.91	1.92	1.91	1.90	1.91	1.93	1.93	1.91	1.94	1.91	1.93	S	1.95	2.02	2.01	2.02	1.90	2.02	1.94	24	
11	2.02	1.99	1.98	1.99	2.02	2.02	2.00	2.00	1.95	1.96	1.92	1.94	1.94	1.92	1.94	1.93	1.94	1.92	S	1.94	1.96	1.99	1.98	1.99	1.92	2.02	1.97	24	
12	1.96	1.99	2.03	1.99	1.97	1.95	1.92	1.91	1.92	1.90	1.91	1.90	1.89	1.90	1.90	1.89	1.91	S	1.92	1.91	1.89	1.92	1.91	1.92	1.89	2.03	1.93	24	
13	1.90	1.94	1.94	1.95	1.96	1.95	1.96	1.92	1.94	1.91	1.93	1.91	1.94	1.91	1.93	1.93	S	1.92	1.91	1.93	1.92	1.94	1.96	2.02	1.90	2.02	1.94	24	
14	2.05	2.07	2.04	2.00	2.01	2.09	2.02	1.99	1.99	1.94	1.95	1.95	1.91	1.93	1.92	S	1.92	1.94	1.94	1.97	1.98	1.98	1.99	1.99	1.91	2.09	1.98	24	
15	1.97	1.98	1.99	1.97	1.99	1.96	1.97	1.96	1.97	1.94	1.92	1.92	1.92	1.94	S	1.93	1.91	1.93	1.93	1.91	1.93	1.99	2.05	2.03	1.91	2.05	1.96	24	
16	2.05	2.03	1.99	2.01	2.01	2.03	2.00	1.98	1.94	1.95	1.95	C	C	C	C	C	1.94	1.93	1.94	1.94	1.96	2.00	2.01	2.03	1.93	2.05	1.98	24	
17	2.02	2.04	2.04	2.06	2.11	2.05	2.02	2.01	1.97	1.97	1.96	1.96	S	1.95	1.95	1.93	1.95	1.93	1.95	1.94	1.95	1.95	1.99	2.04	1.93	2.11	1.99	24	
18	2.07	2.07	2.09	2.15	2.11	2.09	2.07	2.03	2.01	1.99	1.97	S	1.96	1.94	1.94	1.94	1.95	1.96	1.94	1.96	1.96	1.97	1.99	2.01	1.94	2.15	2.01	24	
19	2.04	2.04	2.07	2.08	2.12	2.19	2.19	2.16	2.03	2.01	S	1.99	2.00	1.98	1.96	1.98	1.95	1.97	1.95	1.97	1.96	1.98	1.98	1.99	1.95	2.19	2.02	24	
20	2.02	2.07	2.11	2.11	2.10	2.09	2.09	2.07	2.06	S	1.98	1.96	1.93	1.94	1.94	1.92	1.92	1.94	1.92	1.94	1.92	1.94	1.95	2.01	2.01	1.92	2.11	2.00	24
21	2.11	2.06	2.10	2.18	2.21	2.18	2.14	2.09	S	1.97	1.93	1.96	1.94	1.96	1.93	1.95	1.95	1.93	1.94	1.93	2.00	2.07	2.05	2.03	1.93	2.21	2.02	24	
22	2.05	2.01	2.00	1.95	1.93	1.96	1.94	S	1.95	1.95	1.95	1.95	1.94	1.94	1.95	1.93	1.93	1.92	2.01	1.97	2.23	1.98	2.00	2.03	1.92	2.23	1.98	24	
23	2.01	2.04	2.02	2.03	2.04	2.42	S	2.18	2.06	2.05	1.97	1.94	1.95	1.93	1.94	1.94	1.94	1.94	1.94	1.97	2.16	2.21	2.12	2.17	2.05	1.93	2.42	2.05	24
24	2.04	2.02	2.01	2.01	2.10	S	2.08	2.09	1.99	1.97	2.00	2.04	2.00	1.94	1.95	1.94	1.94	1.95	1.96	1.97	1.97	2.23	2.12	2.09	1.94	2.23	2.02	24	
25	1.99	2.00	2.17	2.33	S	2.30	2.12	2.05	1.99	1.97	1.94	1.92	1.94	1.93	1.92	1.95	1.92	1.94	1.92	1.94	1.93	1.96	1.95	1.97	1.92	2.33	2.00	24	
26	1.97	1.97	2.08	S	2.10	2.11	2.09	2.03	2.02	2.02	1.97	1.99	1.95	1.97	1.95	1.97	1.94	1.95	1.93	1.94	1.96	1.98	2.02	2.07	1.93	2.11	2.00	24	
27	2.07	2.04	S	2.06	2.09	2.14	2.13	2.15	2.07	2.04	1.96	1.96	1.95	1.95	1.95	1.95	1.96	1.95	1.95	1.93	2.12	1.95	2.15	2.11	1.93	2.15	2.03	24	
28	2.05	S	2.13	2.10	1.98	2.31	2.25	2.11	2.04	2.00	1.97	1.95	1.95	1.95	2.56	1.93	1.94	1.94	1.96	1.95	1.95	1.97	1.99	2.02	1.93	2.56	2.04	24	
29	S	2.03	2.00	2.02	2.02	2.05	2.06	2.06	2.01	2.00	1.97	1.96	1.94	1.92	1.92	1.91	1.91	1.91	1.92	1.93	1.94	2.31	1.97	S	1.91	2.31	1.99	24	
30	1.96	2.00	2.02	2.03	2.03	2.12	2.05	2.05	1.97	1.96	1.97	1.95	1.96	1.96	1.98	1.94	1.92	1.95	1.96	1.95	1.96	1.96	S	2.01	1.92	2.12	1.98	24	
31	2.07	2.10	2.07	2.00	2.00	2.01	2.04	2.00	1.98	1.95	1.96	1.95	1.94	1.97	1.94	1.97	2.01	1.96	1.98	2.06	1.99	S	2.03	2.06	1.94	2.10	2.00	24	
HOURLY MAX	2.11	2.11	2.17	2.33	2.21	2.42	2.25	2.18	2.33	2.05	2.00	2.04	2.00	2.06	2.56	2.00	2.01	1.98	2.01	2.16	2.23	2.31	2.17	2.11					
HOURLY AVG	2.02	2.02	2.03	2.04	2.04	2.07	2.04	2.03	2.01	1.97	1.96	1.95	1.95	1.95	1.96	1.95	1.94	1.94	1.95	1.96	1.99	2.00	2.01	2.01					

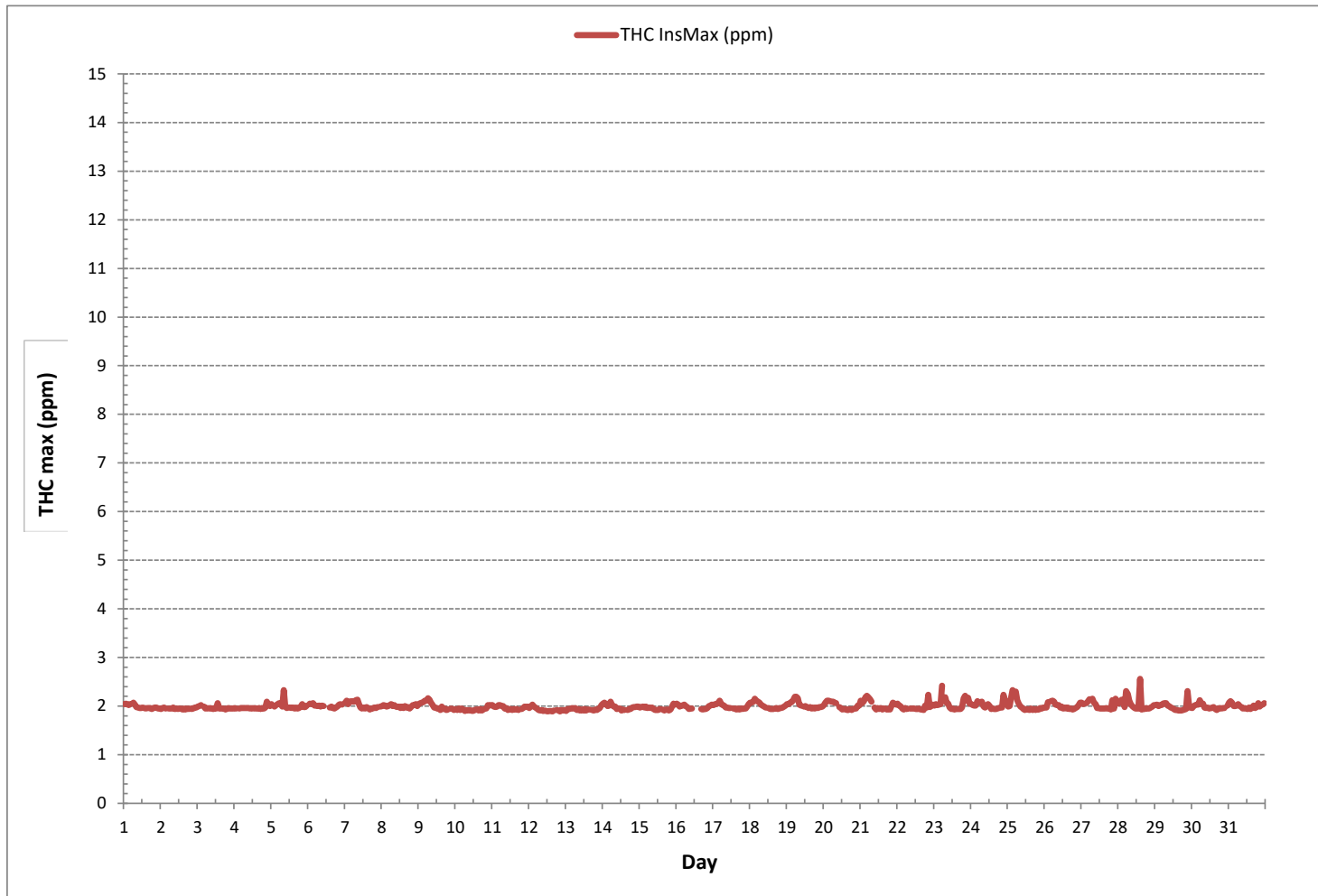
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	704
MAXIMUM INSTANTANEOUS VALUE:	2.56 ppm @ HOUR 14 ON DAY 28
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	0.07

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - May 2019

METHANE MAX Instantaneous Maximum (CH₄ 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	2.04	2.05	2.04	2.02	2.04	S	2.07	2.03	1.98	1.97	1.96	1.96	1.97	1.95	1.95	1.96	1.96	1.96	1.94	1.96	1.97	1.97	1.95	1.95	1.94	2.07	1.98	24	
2	1.94	1.96	1.97	1.95	S	1.95	1.95	1.95	1.97	1.94	1.95	1.94	1.95	1.95	1.93	1.95	1.93	1.95	1.94	1.95	1.94	1.95	1.97	1.97	1.93	1.97	1.95	24	
3	1.99	2.00	2.02	S	1.99	1.95	1.96	1.95	1.96	1.95	1.94	1.96	1.95	2.06	1.95	1.95	1.95	1.95	1.93	1.95	1.96	1.95	1.95	1.95	1.93	2.06	1.96	24	
4	1.96	1.95	S	1.95	1.96	1.96	1.96	1.96	1.96	1.96	1.95	1.96	1.95	1.96	1.94	1.95	1.96	1.94	1.96	1.95	1.97	2.09	2.03	2.00	1.94	2.09	1.97	24	
5	2.04	S	1.99	2.02	2.04	2.06	2.04	1.99	2.00	1.99	1.96	1.97	1.97	1.96	1.97	1.95	1.97	1.95	1.96	1.99	2.04	1.98	1.98	2.01	1.95	2.06	1.99	24	
6	S	2.05	2.04	2.06	2.01	2.01	2.00	2.01	1.99	2.01	2.00	Q	Q	Q	1.97	1.99	1.96	1.95	1.97	1.99	2.03	2.04	2.03	S	1.95	2.06	2.00	24	
7	2.07	2.06	2.04	2.09	2.10	2.09	2.09	2.12	2.13	2.04	1.97	1.95	1.97	1.95	1.98	1.96	1.93	1.95	1.95	1.97	1.96	1.98	S	1.99	1.93	2.13	2.01	24	
8	2.00	2.02	2.01	1.97	2.00	2.02	2.04	2.00	2.02	1.99	1.98	1.99	1.96	1.99	1.96	2.00	1.97	1.98	1.95	1.98	2.02	S	2.04	2.00	1.95	2.04	1.99	24	
9	2.04	2.06	2.07	2.08	2.11	2.11	2.16	2.13	2.07	2.02	1.97	1.97	1.95	1.95	1.92	1.99	1.94	1.95	1.92	1.93	S	1.95	1.94	1.92	1.92	2.16	2.01	24	
10	1.94	1.92	1.95	1.92	1.95	1.93	1.90	1.92	1.91	1.92	1.91	1.90	1.91	1.93	1.93	1.91	1.94	1.91	1.93	S	1.95	2.02	2.01	2.02	1.90	2.02	1.94	24	
11	2.02	1.99	1.98	1.99	2.02	2.02	2.00	2.00	1.95	1.96	1.92	1.94	1.94	1.92	1.94	1.93	1.94	1.92	S	1.92	1.94	1.96	1.99	1.98	1.99	1.92	2.02	1.97	24
12	1.96	1.99	2.03	1.99	1.97	1.95	1.92	1.91	1.92	1.90	1.91	1.90	1.89	1.90	1.90	1.89	1.91	S	1.92	1.91	1.89	1.92	1.91	1.92	1.89	2.03	1.93	24	
13	1.90	1.93	1.94	1.95	1.96	1.95	1.96	1.92	1.94	1.91	1.93	1.91	1.94	1.91	1.93	1.93	S	1.92	1.91	1.93	1.92	1.94	1.96	2.02	1.90	2.02	1.94	24	
14	2.05	2.07	2.04	2.00	2.01	2.09	2.02	1.99	1.99	1.94	1.95	1.95	1.91	1.93	1.92	S	1.92	1.94	1.94	1.97	1.98	1.98	1.99	1.99	1.91	2.09	1.98	24	
15	1.97	1.98	1.99	1.97	1.99	1.96	1.97	1.96	1.97	1.94	1.92	1.93	1.92	1.94	S	1.93	1.91	1.93	1.93	1.91	1.93	1.99	2.05	2.03	1.91	2.05	1.96	24	
16	2.05	2.03	1.99	2.01	2.01	2.03	2.00	1.98	1.94	1.95	1.95	C	C	C	C	C	1.94	1.93	1.94	1.94	1.96	2.00	2.01	2.03	1.93	2.05	1.98	24	
17	2.02	2.04	2.04	2.06	2.11	2.05	2.02	2.01	1.97	1.97	1.96	1.96	S	1.95	1.95	1.93	1.95	1.93	1.95	1.94	1.95	1.95	1.99	2.04	1.93	2.11	1.99	24	
18	2.07	2.07	2.09	2.15	2.11	2.09	2.07	2.03	2.01	1.99	1.97	S	1.96	1.94	1.94	1.94	1.95	1.96	1.94	1.96	1.96	1.97	1.99	2.01	1.94	2.15	2.01	24	
19	2.04	2.04	2.07	2.08	2.12	2.19	2.19	2.16	2.03	2.01	S	1.99	2.00	1.98	1.96	1.98	1.95	1.97	1.95	1.97	1.96	1.98	1.98	1.99	1.95	2.19	2.02	24	
20	2.02	2.07	2.11	2.11	2.10	2.09	2.09	2.07	2.06	S	1.98	1.96	1.93	1.94	1.94	1.92	1.92	1.94	1.92	1.94	1.95	1.95	2.01	2.01	1.92	2.11	2.00	24	
21	2.11	2.06	2.10	2.18	2.21	2.18	2.14	2.09	S	1.97	1.93	1.96	1.94	1.96	1.93	1.95	1.95	1.93	1.94	1.93	2.00	2.07	2.05	2.03	1.93	2.21	2.02	24	
22	2.05	2.01	2.00	1.95	1.93	1.96	1.93	S	1.95	1.95	1.95	1.95	1.94	1.94	1.95	1.93	1.93	1.92	2.01	1.97	2.23	1.98	2.00	2.03	1.92	2.23	1.98	24	
23	2.01	2.04	2.02	2.03	2.04	2.42	S	2.18	2.06	2.05	1.97	1.94	1.95	1.93	1.94	1.94	1.94	1.94	1.94	1.97	2.16	2.21	2.12	2.17	2.05	1.93	2.42	2.05	24
24	2.04	2.02	2.01	2.01	2.10	S	2.08	2.09	1.99	1.97	2.00	2.04	2.00	1.94	1.95	1.94	1.94	1.95	1.96	1.97	1.97	2.23	2.12	2.09	1.94	2.23	2.02	24	
25	1.99	2.00	2.17	2.33	S	2.30	2.12	2.05	1.99	1.97	1.94	1.92	1.94	1.93	1.92	1.95	1.92	1.94	1.92	1.94	1.93	1.96	1.95	1.97	1.92	2.33	2.00	24	
26	1.97	1.97	2.08	S	2.10	2.11	2.09	2.03	2.02	2.02	1.97	1.99	1.95	1.97	1.95	1.97	1.94	1.95	1.93	1.94	1.96	1.98	2.02	2.07	1.93	2.11	2.00	24	
27	2.07	2.04	S	2.05	2.09	2.14	2.13	2.15	2.07	2.04	1.96	1.96	1.95	1.95	1.95	1.95	1.96	1.95	1.95	1.93	2.12	1.95	2.15	2.11	1.93	2.15	2.03	24	
28	2.05	S	2.13	2.10	1.98	2.31	2.25	2.11	2.04	2.00	1.97	1.95	1.95	1.95	1.94	1.93	1.94	1.94	1.96	1.95	1.95	1.97	1.99	2.02	1.93	2.31	2.02	24	
29	S	2.03	2.00	2.02	2.02	2.05	2.06	2.06	2.01	1.98	1.97	1.96	1.94	1.92	1.92	1.91	1.91	1.91	1.92	1.93	1.94	2.31	1.97	S	1.91	2.31	1.99	24	
30	1.96	2.00	2.02	2.03	2.03	2.12	2.05	2.05	1.97	1.96	1.97	1.95	1.96	1.96	1.98	1.94	1.92	1.95	1.96	1.95	1.96	1.96	S	2.01	1.92	2.12	1.98	24	
31	2.07	2.10	2.07	2.00	2.00	2.01	2.04	2.00	1.98	1.95	1.96	1.95	1.94	1.97	1.94	1.97	2.01	1.96	1.98	2.06	1.99	S	2.03	2.06	1.94	2.10	2.00	24	
HOURLY MAX	2.11	2.10	2.17	2.33	2.21	2.42	2.25	2.18	2.13	2.05	2.00	2.04	2.00	2.06	1.98	2.00	2.01	1.98	2.01	2.16	2.23	2.31	2.17	2.11					
HOURLY AVG	2.02	2.02	2.03	2.04	2.04	2.07	2.04	2.03	2.00	1.97	1.96	1.95	1.95	1.95	1.94	1.95	1.94	1.94	1.95	1.96	1.99	2.00	2.01	2.01					

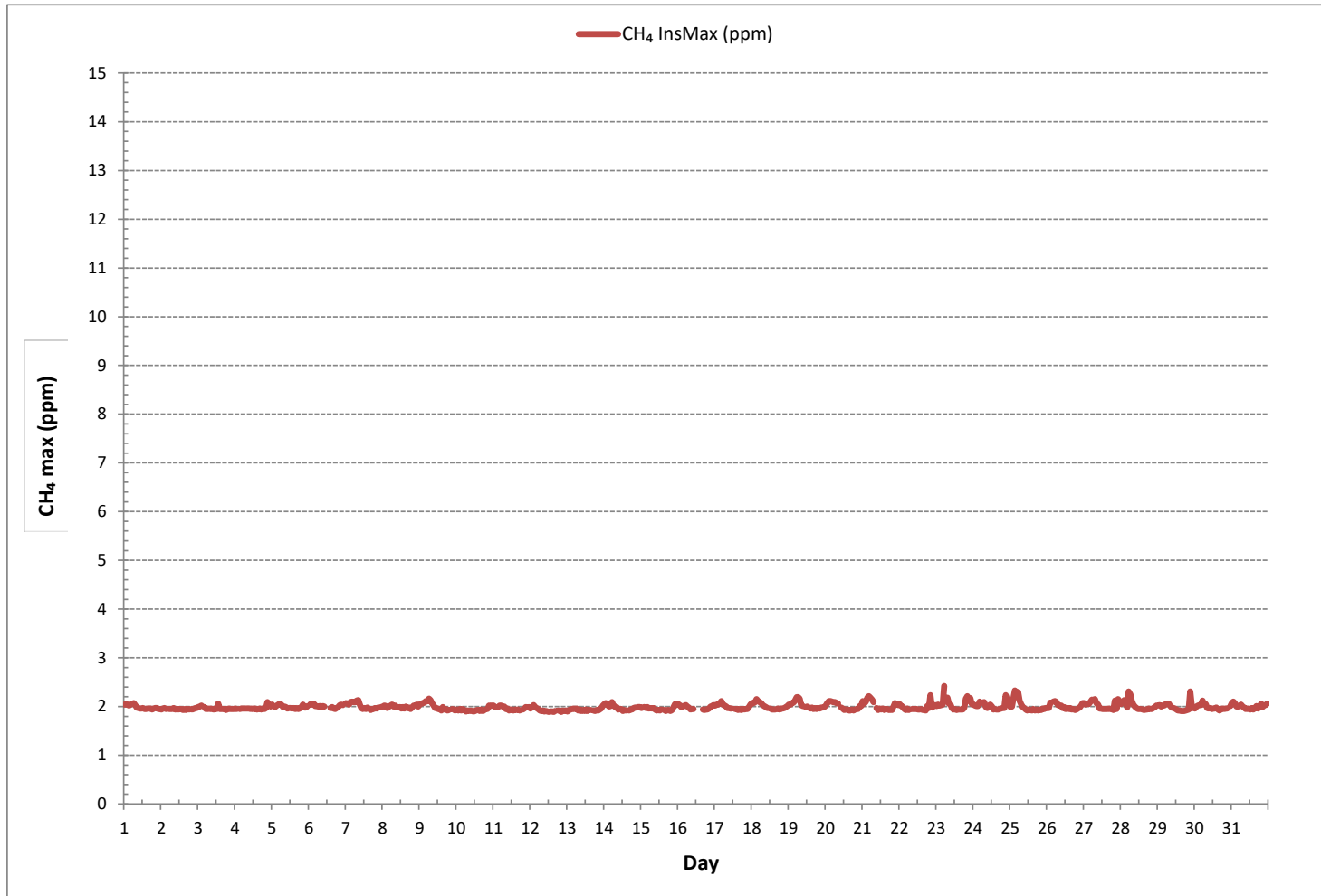
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	704
MAXIMUM INSTANTANEOUS VALUE:	2.42 ppm @ HOUR 5 ON DAY 23
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	0.07

METHANE MAX Instantaneous Maximum (CH₄ ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - May 2019

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY 1	0.00	0.00	0.00	0.00	0.00	S	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	0.01	0.00	0.00	0.00	0.00	0.02	0.00	24
2	0.00	0.00	0.00	0.00	S	0.00	0.00	0.01	0.00	0.01	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	0.00	0.00	0.02	0.00	24
3	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	0.01	0.00	24
4	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02	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	24
5	0.00	S	0.00	0.04	0.00	0.00	0.01	0.00	0.38	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	0.38	0.02	24
6	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Q	Q	Q	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	24
7	0.00	0.06	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.06	0.00	24
8	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	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.04	0.00	24	
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	S	0.00	0.00	0.00	0.00	0.01	0.00	24
10	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	0.00	0.00	0.00	0.00	0.00	S	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.00	S	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	24	
12	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	24	
13	0.00	0.04	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	S	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	24	
14	0.00	0.00	0.00	0.02	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	0.01	0.00	0.02	0.00	24	
15	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	0.00	0.00	0.00	0.00	24
16	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	C	C	C	C	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24	
17	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	24	
18	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	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24	
19	0.00	0.00	0.00	0.00	0.00	0.00	0.01	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	0.01	0.00	24	
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	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	0.01	0.00	24	
21	0.00	0.00	0.00	0.01	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	0.01	0.00	24	
22	0.00	0.00	0.00	0.00	0.00	0.00	0.01	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24	
23	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	0.01	0.00	0.00	0.01	0.00	24	
24	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	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	24	
25	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	
26	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	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24	
27	0.00	0.01	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.03	0.00	0.03	0.00	24	
28	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	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62	0.03	24	
29	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01	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	0.03	0.00	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	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	S	0.00	0.00	0.01	0.00	24	
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	24	
HOURLY MAX	0.00	0.06	0.00	0.04	0.01	0.00	0.01	0.01	0.38	0.03	0.01	0.00	0.02	0.02	0.62	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.03				
HOURLY AVG	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	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	0.00	0.00				

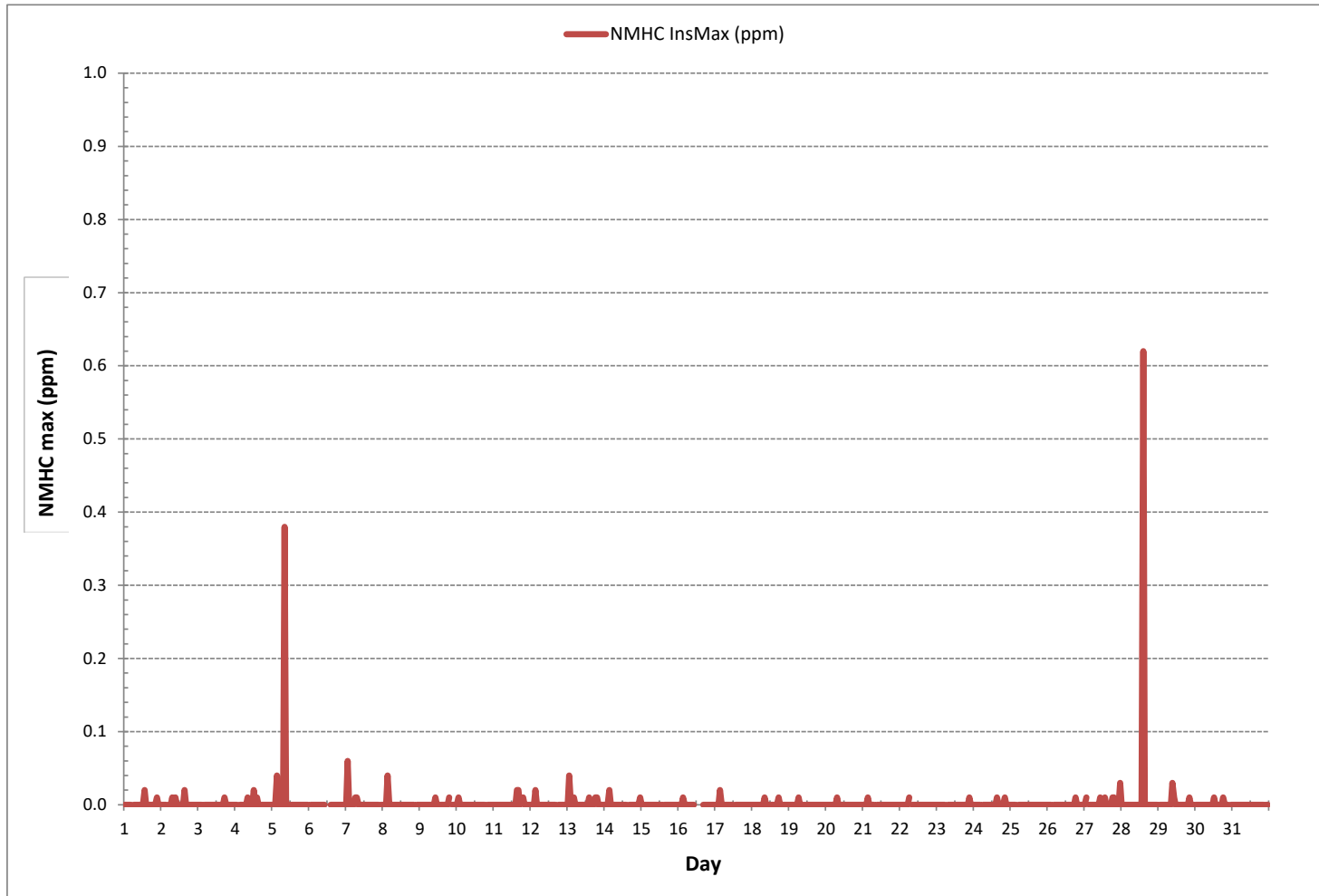
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	54
MAXIMUM INSTANTANEOUS VALUE:	0.62 ppm @ HOUR 14 ON DAY 28
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	0.03

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - May 2019

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	1	1	1	1	1	S	1	2	1	1	1	2	1	1	2	4	4	1	1	1	1	1	1	1	1	1	4	2	24
2	4	1	1	1	S	3	3	1	1	1	1	0	1	0	1	1	0	4	2	1	1	1	1	1	0	4	1	24	
3	1	1	3	S	1	1	1	1	4	0	4	1	0	1	1	4	4	4	1	5	1	0	0	1	0	5	2	24	
4	5	1	S	1	2	1	0	20	2	6	0	1	1	0	0	1	1	0	0	0	1	1	2	2	0	20	2	24	
5	4	S	3	3	4	4	4	2	2	1	1	4	1	0	1	0	0	1	1	1	1	1	1	1	0	4	2	24	
6	S	1	1	1	1	1	1	2	3	1	Q	Q	Q	Q	3	2	3	2	1	1	2	3	3	S	1	3	2	24	
7	3	3	2	2	2	2	2	3	5	2	1	1	1	1	6	2	6	1	3	1	1	1	S	1	1	6	2	24	
8	1	1	1	1	1	1	1	1	6	7	3	1	1	1	1	1	1	1	1	1	1	S	2	2	1	7	2	24	
9	2	2	2	2	3	2	3	2	5	2	30	2	2	1	4	3	12	2	2	8	S	11	2	1	1	30	4	24	
10	1	1	3	3	1	1	5	1	12	2	3	4	9	7	0	3	0	0	1	S	1	2	2	2	0	12	3	24	
11	2	2	2	2	2	2	8	2	2	2	1	1	1	1	5	2	1	2	S	1	2	2	2	1	1	8	2	24	
12	3	5	6	2	1	1	2	4	4	2	1	1	1	2	0	2	1	S	3	2	3	2	1	1	0	6	2	24	
13	1	1	1	1	1	2	4	33	8	13	18	4	1	1	2	1	S	3	1	1	1	1	2	3	1	33	4	24	
14	3	3	3	2	3	3	2	3	3	1	5	5	9	1	0	S	1	1	1	1	1	2	1	2	0	9	2	24	
15	2	2	2	1	2	3	4	2	2	2	1	1	1	1	S	1	1	2	45	3	5	2	3	3	1	45	4	24	
16	4	3	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	2	1	4	1	24	
17	2	1	1	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	1	1	2	2	2	1	2	1	24	
18	2	2	2	3	3	2	2	2	2	2	1	S	1	1	1	1	1	1	1	1	1	2	2	2	1	3	2	24	
19	2	2	2	2	3	3	3	3	2	1	S	1	1	1	1	1	1	1	1	1	2	2	1	2	1	3	2	24	
20	2	2	3	3	3	3	3	2	2	S	1	1	1	1	1	1	1	1	1	1	1	2	2	3	1	3	2	24	
21	3	3	3	3	4	4	3	3	S	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	4	2	24	
22	3	2	2	2	2	2	7	S	3	2	1	2	1	1	1	1	2	1	1	1	2	3	3	2	1	7	2	24	
23	2	2	2	2	2	S	5	4	2	C	C	C	C	C	C	C	2	3	2	2	3	3	3	2	5	-	24		
24	3	4	4	4	5	S	6	5	3	3	3	4	2	2	2	2	2	2	2	2	2	2	2	1	6	3	24		
25	2	3	5	7	S	9	4	3	2	4	4	4	1	6	5	3	6	1	1	2	5	2	1	5	1	9	4	24	
26	1	1	5	S	6	6	6	S1	7	5	3	2	2	2	8	9	3	2	1	1	2	2	2	1	9	3	23		
27	3	3	S	4	3	5	18	20	36	6	13	13	3	5	5	4	4	2	3	3	2	3	7	2	36	7	24		
28	4	S	4	3	3	10	11	4	6	16	6	21	3	2	9	11	14	6	5	4	17	16	8	4	2	21	8	24	
29	S	4	4	4	4	8	11	20	14	9	4	12	5	9	11	3	3	2	2	3	3	3	8	S	2	20	7	24	
30	2	2	2	2	3	3	3	4	3	3	4	4	3	6	3	2	1	1	1	1	2	2	S	3	1	6	3	24	
31	4	4	3	3	2	2	2	2	2	2	2	1	7	4	3	2	4	2	2	3	3	S	3	3	1	7	3	24	
HOURLY MAX	5	5	6	7	6	10	18	33	36	16	30	21	9	9	11	11	14	6	45	8	17	16	8	7					
HOURLY AVG	2	2	3	2	2	3	4	6	5	3	4	3	2	2	3	2	3	2	3	2	2	3	2	2					

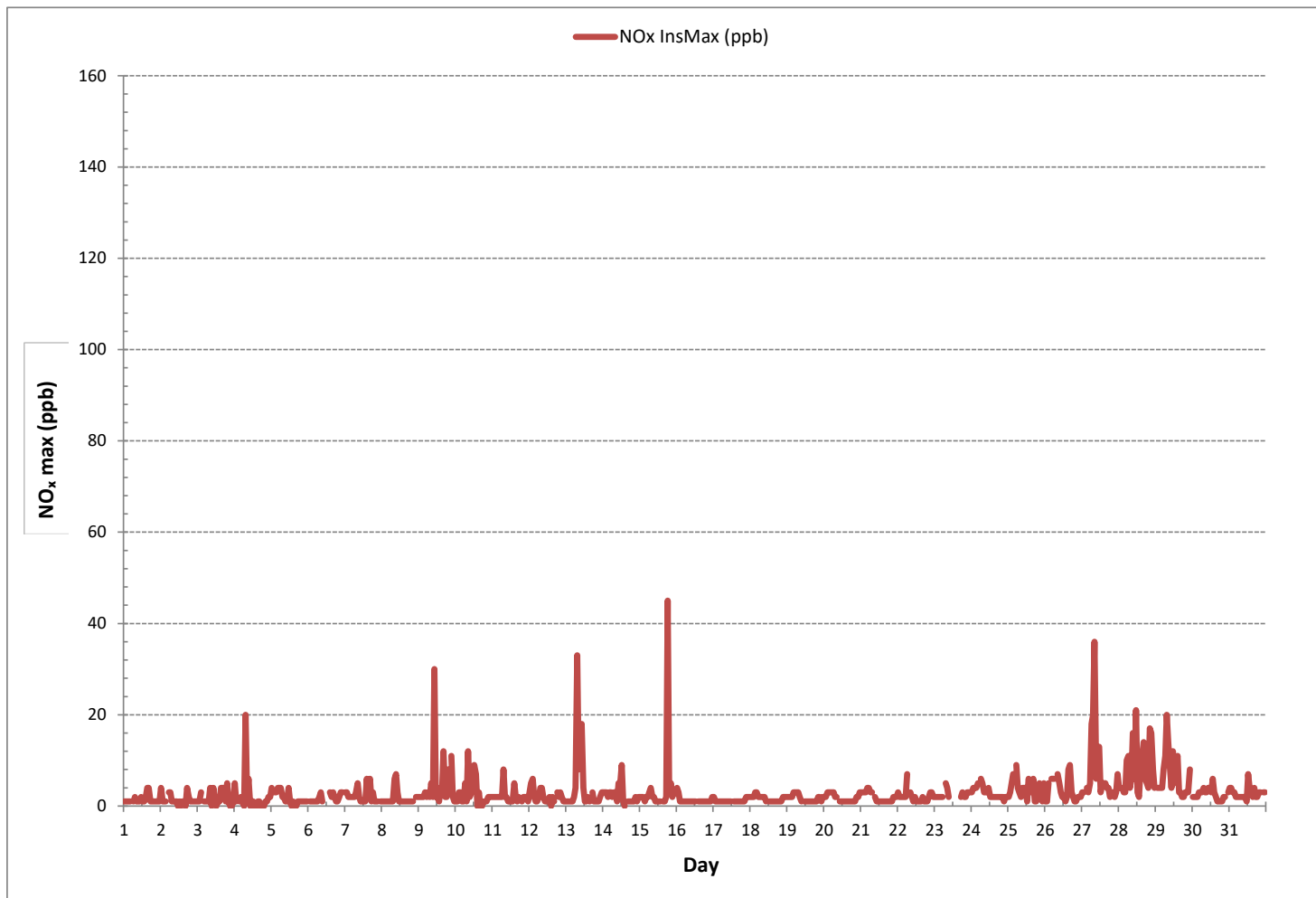
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	677
MAXIMUM INSTANTANEOUS VALUE:	45 ppb @ HOUR 18 ON DAY 15
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	7 hrs
OPERATIONAL TIME:	743 hrs
STANDARD DEVIATION:	4

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

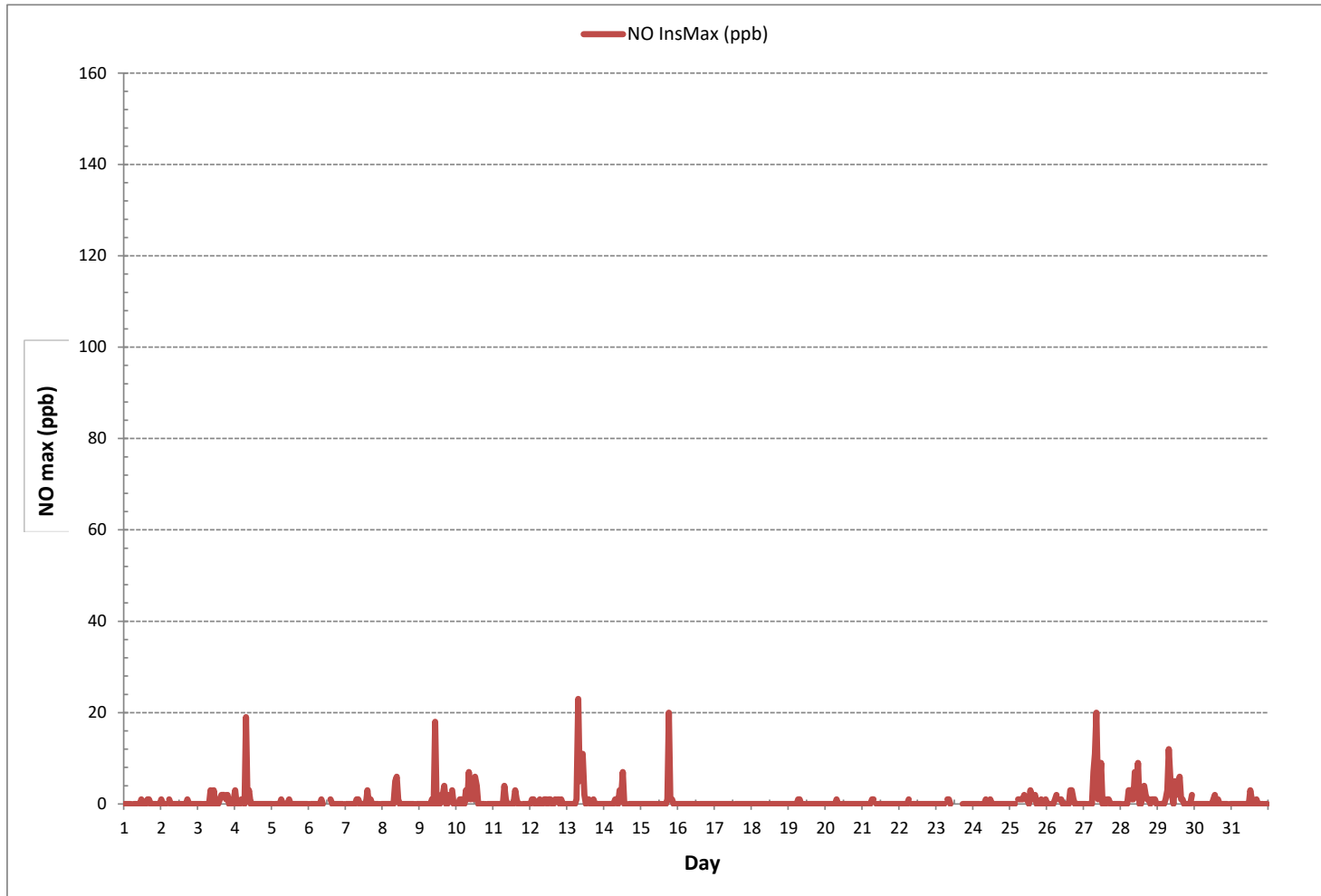
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	153
MAXIMUM INSTANTANEOUS VALUE:	23 ppb @ HOUR 7 ON DAY 13
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	2
OPERATIONAL TIME:	743 hrs

NITRIC OXIDE Instantaneous Maximum (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - May 2019

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)

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

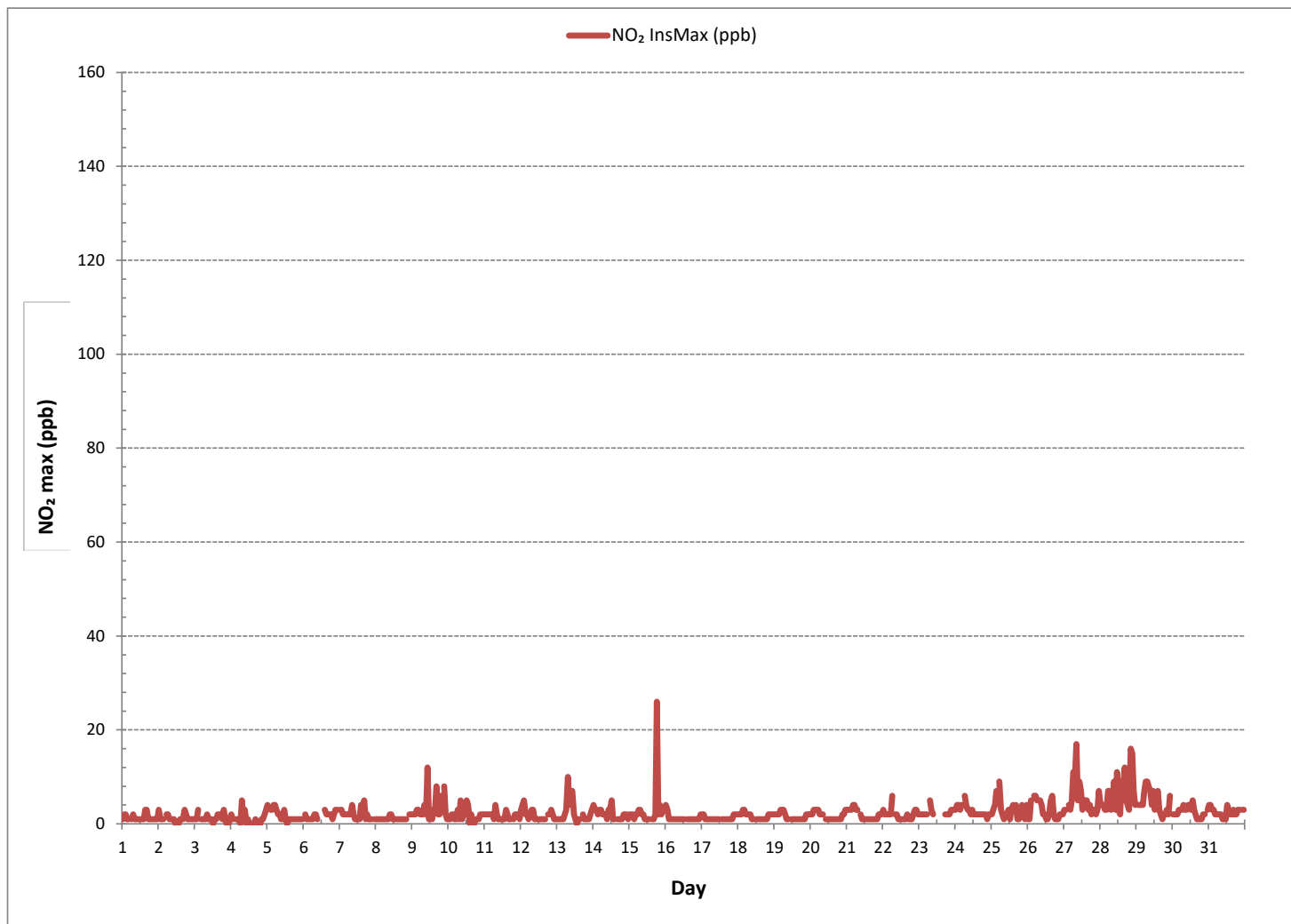
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	679
MAXIMUM INSTANTANEOUS VALUE:	26 ppb @ HOUR 18 ON DAY 15
	VAR-VARIOUS
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	7 hrs
OPERATIONAL TIME:	743 hrs
STANDARD DEVIATION:	2

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - May 2019

OZONE Instantaneous Maximum (O₃ ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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	38.7	36.9	35.2	35.4	35.2	S	36.1	43.0	44.9	46.9	46.1	45.1	45.5	46.7	46.6	46.9	49.1	49.1	48.3	47.1	46.5	46.8	47.4	46.5	35.2	49.1	43.9	24
2	45.2	43.8	43.8	42.7	S	40.9	39.7	39.6	42.9	47.0	46.8	49.3	49.3	48.8	48.7	48.7	49.2	49.1	49.0	49.7	49.2	48.6	47.7	46.2	39.6	49.7	46.3	24
3	45.3	40.1	42.7	S	43.4	44.9	42.9	40.5	37.5	39.3	39.5	38.9	39.3	39.1	40.8	42.2	42.3	44.6	43.1	36.4	32.1	31.6	30.7	29.8	29.8	45.3	39.4	24
4	29.5	28.8	S	29.8	30.1	30.5	32.1	32.6	34.0	37.3	40.0	42.6	43.4	43.9	44.1	43.9	43.8	44.9	44.8	43.5	41.3	38.5	34.6	34.9	28.8	44.9	37.8	24
5	32.1	S	32.9	32.9	30.3	29.7	37.3	37.1	39.5	39.3	41.2	42.1	42.3	43.0	42.8	43.4	43.3	43.6	43.3	43.0	41.9	40.8	39.6	39.1	29.7	43.6	39.1	24
6	S	38.3	37.3	36.6	36.7	36.5	36.3	36.4	35.8	36.8	38.2	Q	Q	Q	41.3	41.1	42.9	42.6	41.4	40.8	41.0	38.6	33.7	S	33.7	42.9	38.5	24
7	30.7	30.3	31.1	31.1	28.3	26.8	23.2	26.0	37.2	41.0	42.5	43.3	44.4	45.5	46.3	46.5	45.7	46.0	45.5	44.5	43.4	42.9	S	43.7	23.2	46.5	38.5	24
8	42.2	42.2	41.3	42.8	43.6	42.7	40.8	40.0	39.4	41.7	43.4	44.5	44.0	44.3	44.2	45.0	45.6	46.1	46.5	46.1	45.2	S	45.5	44.4	39.4	46.5	43.5	24
9	42.1	40.5	38.1	36.1	35.5	34.4	32.3	35.0	40.4	43.7	44.1	44.6	46.2	49.0	49.9	51.4	51.4	49.6	47.7	47.0	S	42.2	44.5	40.5	32.3	51.4	42.9	24
10	39.6	37.9	35.4	34.4	33.0	34.2	35.7	37.6	40.4	42.6	43.3	43.4	43.1	44.3	46.6	47.3	43.8	43.2	44.4	S	40.3	38.6	35.5	35.2	33.0	47.3	40.0	24
11	35.5	35.5	35.4	35.2	33.3	33.1	35.0	36.0	40.0	43.2	47.8	48.8	51.1	53.5	52.7	55.3	57.4	58.9	S	59.5	57.8	55.0	51.5	50.0	33.1	59.5	46.1	24
12	47.9	46.7	43.6	42.4	42.8	42.0	42.5	41.6	43.6	50.5	55.4	55.7	57.3	62.0	63.9	64.6	63.7	S	53.6	53.3	50.7	51.7	52.1	52.4	41.6	64.6	51.3	24
13	52.0	51.0	48.3	48.0	47.3	45.2	41.9	42.4	52.9	43.2	44.3	46.6	48.4	49.4	48.7	47.6	S	45.7	39.2	39.8	40.1	39.0	37.6	35.1	35.1	52.9	44.9	24
14	32.5	31.3	32.3	32.5	32.8	32.2	31.1	32.5	36.1	37.4	39.6	40.6	41.9	42.9	43.3	S	44.7	42.8	44.0	43.6	42.6	43.9	43.3	41.3	31.1	44.7	38.5	24
15	37.7	37.1	35.9	35.7	32.7	30.7	29.7	27.7	28.0	31.9	35.0	36.0	36.0	36.4	S	43.1	44.7	47.1	46.6	46.7	46.9	45.2	35.8	38.0	27.7	47.1	37.6	24
16	35.9	31.3	31.3	30.8	30.9	29.7	31.7	32.4	34.8	36.9	38.1	40.5	41.7	S	43.7	44.1	43.2	43.3	43.5	43.4	40.9	37.9	37.0	36.1	29.7	44.1	37.3	24
17	36.2	34.9	33.9	32.7	31.9	32.5	31.9	37.3	38.0	40.2	43.3	44.6	S	46.2	47.9	49.4	49.5	49.2	49.2	48.7	47.2	44.9	42.9	40.7	31.9	49.5	41.4	24
18	39.7	38.1	36.4	35.1	31.6	30.5	29.7	31.6	35.5	37.0	42.5	S	44.1	43.9	44.3	44.9	45.0	48.7	50.1	49.4	45.5	42.3	40.4	40.3	29.7	50.1	40.3	24
19	39.8	38.7	37.9	36.3	34.7	32.2	32.0	37.5	40.8	43.7	S	45.8	47.8	48.9	50.1	50.8	51.6	50.8	48.8	47.4	46.5	44.3	43.6	43.4	32.0	51.6	43.2	24
20	42.0	41.0	37.1	34.8	34.5	32.9	34.8	38.8	41.9	S	44.6	46.6	47.3	47.7	48.0	47.6	47.8	48.7	48.7	47.6	46.4	42.4	41.8	41.7	32.9	48.7	42.8	24
21	40.5	38.8	37.6	35.9	33.5	31.6	32.0	39.3	S	52.3	52.5	51.3	52.2	52.5	51.9	52.3	53.6	52.4	52.6	51.2	48.1	46.1	45.3	43.7	31.6	53.6	45.5	24
22	42.3	43.4	42.8	46.5	47.1	47.2	46.1	S	42.7	51.3	59.6	60.3	59.7	60.4	59.3	57.9	57.6	57.9	57.4	58.1	57.7	55.6	54.0	52.7	42.3	60.4	52.9	24
23	52.5	50.0	48.5	48.0	53.2	51.8	S	41.9	43.4	50.3	C	C	C	C	C	62.4	62.2	61.3	58.9	53.0	50.6	50.8	51.8	50.8	41.9	62.4	52.3	24
24	50.9	45.0	43.6	45.3	43.2	S	39.7	43.1	47.7	52.3	52.6	51.8	53.6	55.8	55.4	49.0	49.9	42.7	36.4	30.9	29.6	26.2	23.9	23.7	23.7	55.8	43.1	24
25	21.8	20.1	17.6	14.6	S	17.0	16.9	22.9	27.5	34.7	40.3	41.3	46.2	47.1	41.3	44.1	43.9	47.2	47.0	45.6	43.0	49.7	52.0	51.3	14.6	52.0	36.2	24
26	44.2	40.3	38.8	S	34.3	34.3	32.9	32.2	37.2	44.2	49.0	53.2	57.4	57.0	58.2	58.9	59.2	58.8	56.9	55.1	55.2	54.5	50.6	47.4	32.2	59.2	48.2	24
27	42.3	45.2	S	41.0	41.0	39.4	32.4	30.4	39.8	53.4	62.9	65.2	68.0	68.3	66.9	66.2	66.7	65.2	66.6	66.8	65.5	66.7	66.2	55.7	30.4	68.3	55.7	24
28	56.8	S	50.3	63.6	65.4	56.9	40.3	45.6	51.8	64.3	64.7	65.3	64.6	66.9	67.3	69.0	73.7	74.7	76.1	74.9	74.1	68.5	65.2	63.6	40.3	76.1	63.6	24
29	S	53.1	50.9	47.3	45.4	42.0	34.8	37.8	46.9	59.4	70.9	73.2	73.8	74.0	66.4	62.5	59.6	60.7	60.6	57.8	52.9	54.5	51.9	S	34.8	74.0	56.2	24
30	47.4	49.0	46.3	42.6	37.5	32.0	30.4	30.4	29.9	30.7	34.4	38.2	38.9	37.4	37.6	37.1	36.0	36.0	36.8	34.8	36.5	32.6	S	29.2	29.2	49.0	36.6	24
31	27.0	24.3	24.3	25.6	25.8	25.4	24.5	27.3	30.1	33.2	34.5	36.9	41.3	42.8	44.7	46.8	49.1	49.7	48.0	46.8	41.0	S	40.7	37.1	24.3	49.7	35.9	24
HOURLY MAX	56.8	53.1	50.9	63.6	65.4	56.9	46.1	45.6	52.9	64.3	70.9	73.2	73.8	74.0	67.3	69.0	73.7	74.7	76.1	74.9	74.1	68.5	66.2	63.6				
HOURLY AVG	40.4	39.1	38.3	37.8	37.8	35.8	34.2	35.9	39.4	43.5	46.1	47.7	48.9	49.9	49.8	50.3	50.5	50.0	49.2	48.4	46.7	45.5	44.4	42.6				

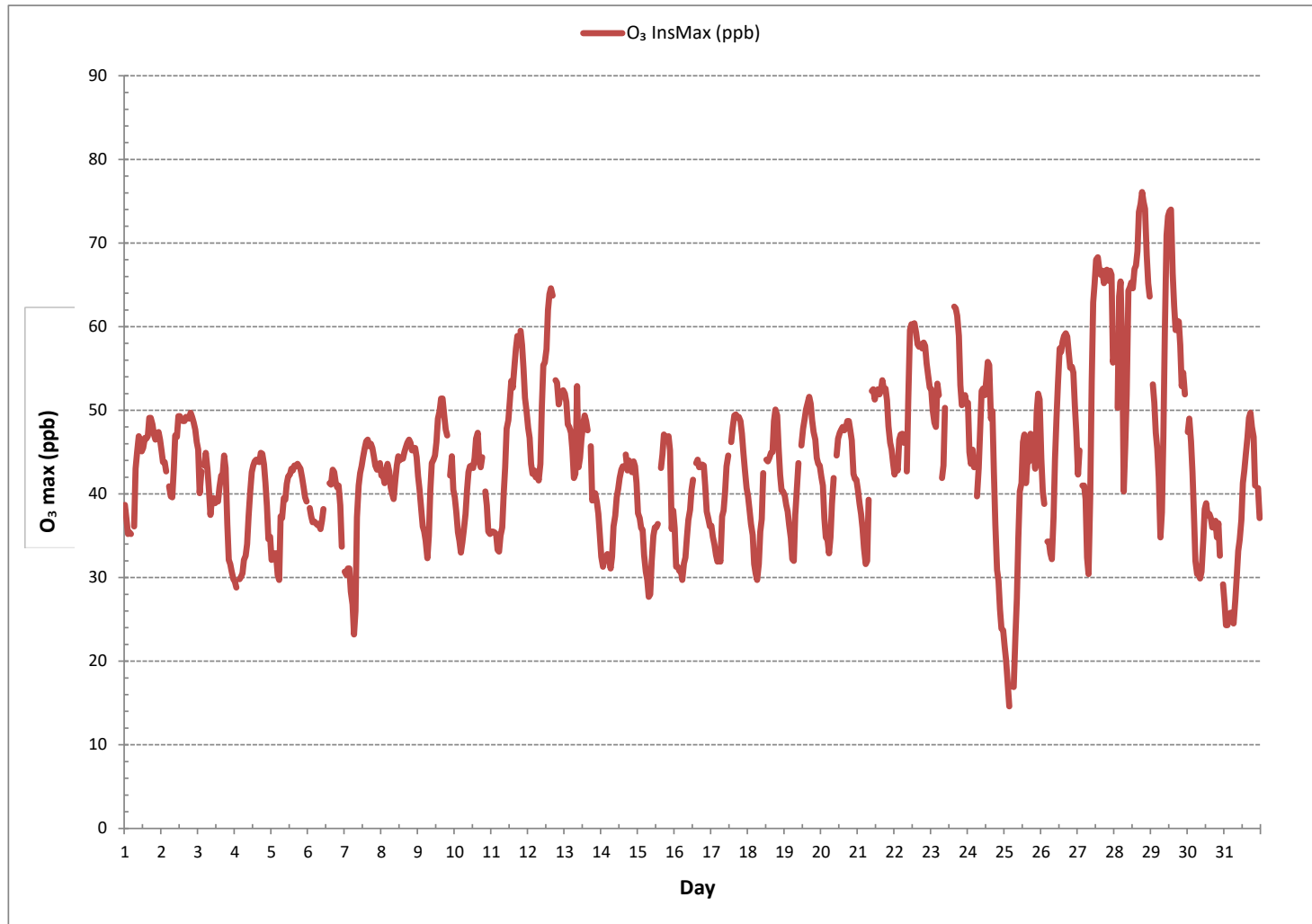
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	703
MAXIMUM INSTANTANEOUS VALUE:	76.1 ppb @ HOUR 18 ON DAY 28
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	5 hrs
STANDARD DEVIATION:	9.8
OPERATIONAL TIME:	744 hrs

OZONE Instantaneous Maximum (O₃ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
St. Lina Continuous Monitoring Station - May 2019

WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.	
DAY 1	17.4	15.2	20.2	17.6	15.6	14.3	12.7	14.7	20.6	25.2	27.6	25.4	28.7	35.5	33.6	28.5	36.4	27.2	19.7	13.0	11.4	9.9	12.9	16.2	9.9	36.4	20.8	24
2	13.2	9.9	13.4	11.6	14.2	14.5	15.4	15.1	20.2	21.9	20.6	22.4	20.8	27.8	24.8	28.1	23.7	18.4	18.0	31.8	29.4	22.4	14.3	14.4	9.9	31.8	19.4	24
3	9.2	10.3	12.1	29.4	25.2	35.5	46.7	41.0	49.7	48.2	46.5	C	C	C	C	C	50.2	47.0	48.8	39.0	29.0	23.9	22.3	24.0	9.2	50.2	33.6	24
4	21.3	17.5	15.8	18.8	18.9	16.1	22.2	22.7	27.4	27.7	31.8	37.6	33.7	32.9	30.6	34.2	31.6	32.4	30.6	26.2	14.2	12.6	10.1	13.7	10.1	37.6	24.2	24
5	12.3	13.2	8.9	7.8	9.5	9.8	13.9	15.2	15.6	12.5	15.7	15.0	13.4	15.1	14.9	13.6	13.4	15.9	20.4	24.4	20.7	21.3	25.4	27.5	7.8	27.5	15.7	24
6	28.2	26.1	19.0	24.3	23.1	22.1	23.7	28.8	25.6	27.1	22.7	27.2	14.2	15.0	44.6	15.9	20.4	24.0	11.9	6.5	8.2	24.1	19.7	19.9	6.5	44.6	21.8	24
7	17.7	14.0	17.6	15.9	12.0	5.3	8.1	15.3	15.3	17.1	16.9	17.9	18.4	18.2	18.2	19.5	18.8	23.1	17.1	12.8	9.6	14.3	13.2	17.9	5.3	23.1	15.6	24
8	24.0	29.8	28.9	28.7	28.0	26.7	28.8	25.7	25.7	21.6	14.9	13.4	21.2	23.9	27.0	25.9	25.1	16.4	13.9	5.6	5.3	9.1	9.4	12.1	5.3	29.8	20.5	24
9	12.4	13.3	12.8	13.8	13.0	14.8	15.8	18.9	27.6	29.7	30.9	34.9	31.4	29.6	35.4	33.2	27.0	23.3	14.7	28.5	17.3	15.6	26.9	16.8	12.4	35.4	22.4	24
10	17.0	19.1	15.7	20.2	23.0	26.4	33.2	36.7	38.6	46.9	53.4	51.2	51.7	51.0	64.0	52.6	46.0	45.6	37.8	30.0	15.9	15.3	17.4	15.5	15.3	64.0	34.3	24
11	15.9	5.7	6.3	8.8	10.7	11.1	10.2	14.0	18.1	15.7	19.7	23.3	21.0	23.0	18.2	21.3	21.6	16.5	15.9	10.3	15.5	17.7	20.4	24.9	5.7	24.9	16.1	24
12	22.5	22.2	14.4	17.5	21.8	18.8	30.5	28.9	25.1	35.8	40.8	41.5	49.5	45.7	51.5	41.8	46.9	48.5	39.6	32.5	26.0	11.5	13.2	13.1	11.5	51.5	30.8	24
13	16.7	19.0	18.2	17.8	16.3	15.2	23.9	35.2	31.8	34.6	33.3	35.7	42.1	41.2	39.5	35.7	42.4	38.8	35.0	31.2	19.4	13.9	15.2	14.2	13.9	42.4	27.8	24
14	9.2	8.3	8.0	7.0	4.4	5.3	4.2	6.5	9.0	16.7	17.2	20.6	23.9	14.4	14.1	13.6	16.2	14.5	20.1	18.2	19.4	25.0	21.1	18.9	4.2	25.0	14.0	24
15	24.8	29.2	28.2	32.7	34.6	35.3	30.3	31.7	34.5	32.8	32.5	31.0	22.1	22.2	23.1	17.7	12.5	12.8	15.8	15.4	10.9	13.5	20.6	21.5	10.9	35.3	24.4	24
16	24.6	26.4	24.3	23.3	20.6	17.8	23.7	19.8	23.0	23.4	24.9	23.3	20.8	20.9	22.8	26.2	25.7	28.2	28.9	27.3	23.5	20.0	18.6	19.3	17.8	28.9	23.2	24
17	19.8	20.7	18.9	17.2	17.0	19.7	19.9	35.4	38.4	37.5	36.7	39.7	40.2	45.5	39.6	41.2	36.4	32.2	31.2	30.7	20.4	21.2	22.4	26.3	17.0	45.5	29.5	24
18	26.7	27.4	27.6	24.8	31.5	24.8	24.3	26.7	24.7	28.2	33.4	35.2	39.6	35.7	38.0	36.5	33.8	36.3	27.0	24.0	19.6	24.5	27.4	23.8	19.6	39.6	29.2	24
19	19.3	21.4	22.7	20.7	19.6	16.4	19.7	22.8	25.9	33.4	36.7	44.6	36.5	33.2	36.3	30.4	31.2	31.6	27.7	24.7	21.0	24.1	26.2	22.3	16.4	44.6	27.0	24
20	20.9	21.4	20.7	19.4	22.0	22.1	21.4	23.9	27.0	32.7	40.0	32.6	34.5	34.3	36.4	38.0	35.7	32.1	32.0	24.5	21.5	19.9	19.6	25.6	19.4	40.0	27.4	24
21	27.2	29.8	26.4	23.0	17.9	15.1	16.5	23.2	28.2	32.8	40.4	39.9	35.9	36.6	32.6	35.4	25.0	23.7	22.0	14.1	9.5	14.5	11.2	12.6	9.5	40.4	24.7	24
22	19.9	10.5	9.7	15.3	18.4	19.1	15.1	13.1	9.2	14.1	13.9	15.2	14.7	12.9	12.8	13.0	10.7	7.3	2.1	3.6	8.0	9.1	9.1	9.3	2.1	19.9	11.9	24
23	8.7	9.4	12.1	9.4	10.9	11.4	9.3	14.2	10.2	12.8	10.1	20.9	23.7	16.2	16.0	19.6	16.4	20.6	21.9	17.8	19.7	25.8	25.7	34.3	8.7	34.3	16.6	24
24	28.6	23.4	28.4	29.4	26.7	24.6	26.5	24.0	30.8	30.3	30.0	24.4	25.7	26.9	42.5	34.0	31.5	26.7	27.3	20.1	23.2	20.0	16.7	11.4	11.4	42.5	26.4	24
25	7.8	8.9	9.1	10.3	12.0	11.5	12.7	7.2	13.3	16.0	17.2	20.2	18.5	34.3	21.4	8.6	21.8	21.5	17.8	12.3	17.2	27.6	12.3	12.4	7.2	34.3	15.5	24
26	13.9	12.5	14.2	11.6	8.3	6.2	8.5	10.5	18.5	17.0	18.4	16.6	16.2	15.7	14.5	13.3	13.3	13.3	10.6	9.6	10.4	12.2	13.3	13.3	6.2	18.5	12.9	24
27	10.7	14.5	14.1	11.6	12.5	12.0	14.0	16.3	18.2	20.6	28.4	28.8	27.7	27.5	22.2	16.8	12.9	7.9	3.4	5.3	6.4	6.7	9.0	8.3	3.4	28.8	14.8	24
28	9.4	11.9	12.4	14.0	14.1	10.0	10.3	12.7	17.0	23.1	22.5	24.0	24.9	27.5	26.2	25.3	24.6	19.3	16.2	9.2	12.7	13.1	13.4	16.0	9.2	27.5	17.1	24
29	16.3	18.4	16.4	18.8	15.7	14.5	13.3	18.5	21.5	28.3	34.8	33.3	33.4	32.2	32.2	29.5	22.2	21.0	14.4	11.4	15.8	19.0	16.5	14.9	11.4	34.8	21.3	24
30	14.5	18.7	21.6	21.9	21.6	27.4	29.9	32.3	23.7	27.7	22.2	26.8	30.0	33.5	30.9	33.0	32.8	33.9	30.3	20.3	19.7	17.5	16.5	12.5	12.5	33.9	25.0	24
31	13.4	13.6	13.6	14.7	13.6	13.7	13.5	18.0	16.9	12.6	14.5	14.7	16.3	17.3	14.9	13.3	7.1	6.5	7.0	12.7	14.1	16.7	16.4	16.0	6.5	18.0	13.8	24
HOURLY MAX	28.6	29.8	28.9	32.7	34.6	35.5	46.7	41.0	49.7	48.2	53.4	51.2	51.7	51.0	64.0	52.6	50.2	48.5	48.8	39.0	29.4	27.6	27.4	34.3				

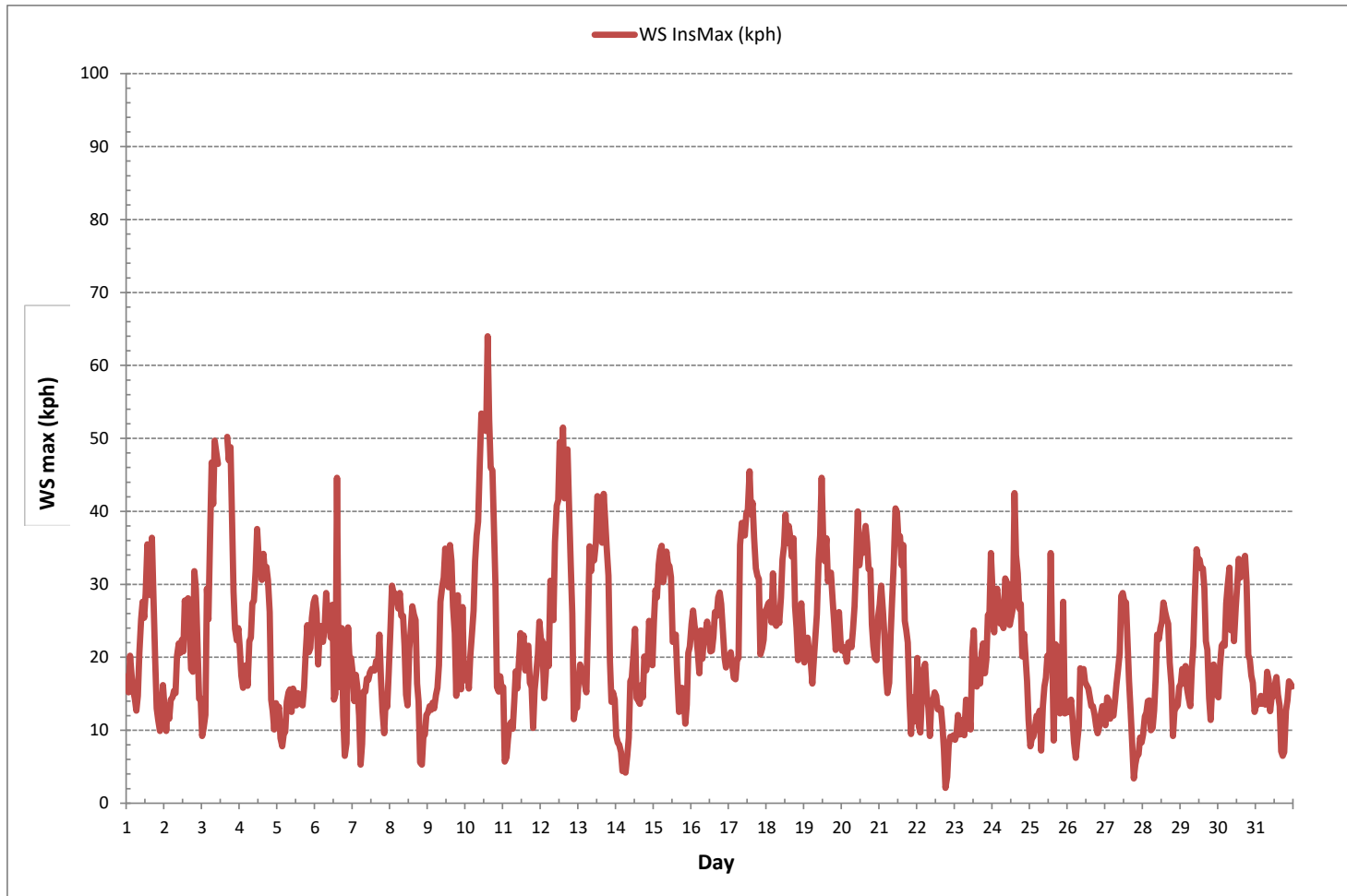
STATUS FLAG CODES

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:	64.0	kph	@ HOUR	14	ON DAY	10
OPERATIONAL TIME:					744	hrs

WIND SPEED Instantaneous Maximum (WS kph)



AEP AUDIT REPORT

May 16th, 2019

File Numbers: 2019 – 062A / 082A

Michael Bisaga Manager, Environmental Programs
Lakeland Industry and Community Association
PO Box 8237
Bonnyville, Alberta
T9N 2J5

Mr. Bisaga:

Subject: Ambient Air Monitoring Station Audit Results for the Lica Network

Alberta Environment and Parks Ambient Air Monitoring Audit team conducted an audit of the Lakeland Industry and Community Association (Lica) ambient air monitoring stations May 6th to 9th, 2019.

All pollutant gas analyzers met AMD criteria. However the Oxides of Nitrogen analyzer at Cold Lake South initially was failing 24% low. When doing cursory checks it was discovered the stainless steel sample inlet filter holder had a compressed internal oring. When bypassed and eventually replaced with an inert Teflon Thermo style filter holder, the analyzer passed the audit. The S.S. sample inlet filter was removed from service and retained by AEP. Please review the attached picture.

It would appear the compressed oring likely occurred during the April 24th monthly calibration when a new inlet particulate filter was installed. From the review of the calibration documents on site there was no significant as found change in calculated analyzer response before or during the calibration.

Data from April 24th 2019 to May 8th 2019 needs to be flagged as invalid due to the initial 24% low response found in accordance with AMD Chapter 8 Section 4.1, Aud 4-E (a)(b). An uptime contravention must be reported for the months of April and May 2019.

AEP suggests that the current inventory of sample inlet filter holders is use at the Cold Lake South station be updated to the newer Teflon Thermo style inlet file holders in place throughout the rest of the Lica network.

Review of the calibration documents shows that the SO₂ and NO_x analyzer were calibrated and adjusted at the lower end of the high point (60-80% of the analyzer fullscale) calibration range in the month of April 2019. This may account for the responses being lower than anticipated for audit responses. Maxxam indicated the same cylinder of gas is used at all locations. Cold Lake South SO₂ and NO_x analyzers did not see a similar audit response as they were calibrated at a higher calculated response based on analyzer range. AEP recommends that the SO₂ and NO_x

analyzers be calibrated at a higher calculated high point response (closer to the 80% value) to ensure all the error possible is removed from the analyzers.

The Thermo 5030i series PM2.5 samplers at St Lina and Bonnyville East were not audited this cycle.

All meteorological equipment met AMD criteria with the exception of the Relative Humidity sensor at St Lina. It was reading 23% high compared to our audit standard.

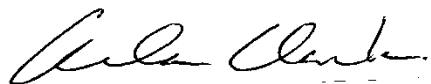
All site and network documentation that were reviewed on line, showed that they require updating as elements in both documents are missing or incorrect. Please review the attached audit findings.

AEP was asked to review a proposed new Maskwa location approximately 2000m west of the current location. Initial assessment indicates it is a suitable location for an ambient air monitoring station based on siting criteria. However please note the proposed location puts it closer to a major emission source, the Imperial Oil Resources Maskwa facility. This facility may cause an increase in concentration levels of some or all of the pollutants being measured at the current location.

Upon receiving notification of this performance audit Lica was asked to provide the date of the most recent quality system audit as required by AMD Chapter 5 QS 4-A and QS 4-B(b). Lica has indicated June 2017 was the last 3rd party audit of the QAP.

Please address the issues noted above and provide a written response to the Audit Team by June 21st, 2019. If you have any questions or comments, please contact the undersigned at 780-427-7888.

Yours truly,



Al Clark
Monitoring Systems Auditor

Attachments:

- Lica Analyzer Audit Sheets
- Lica Audit Summary
- SS inlet sample picture

CC: Shea Beaton – AEP
Marty Collins – AEP
Bob Myrick – AEP
Max Mazur – AEP
Wally Qiu – AER
Lily Lin – Lica
air.reporting@gov.ab.ca

STATION AUDIT

File No. 2019 - 062A - 066A

Date: May 6, 2019

Performed by: Al Clark

Station

Name: St Lina

Location: St Lina

Facility/Zone: Lica

Operator: Maxxam

Temp. 20.3 C

Barometric Press. 704 mmHg

Location

Latitude N 54° 12' 59.2"

Longitude W 111° 30' 09.1"

Elevation 676m

Status of Site Documentation On Line Incomplete

Status of Network Documentation On Line Incomplete

Status of QAP Audited June 2017

Manifold Material Glass

Manifold Condition Good

Meteorological

	Observed	Audit Value
Wind Speed Direction	<u>6.2 kph / 13.5 deg</u>	<u>5-10 kph / N</u>
Station Temperature	<u>22.2 C</u>	<u>21.8 C</u>
Relative Humidity	<u>80.0%</u>	<u>65.2%</u>
Ambient Temperature	<u>6.7 C</u>	<u>6.9 C</u>
Solar Radiation	<u>699 mmHg</u>	<u>702 mmHg</u>
Precipitation	<u>1.0 mil</u>	<u>10 tips</u>

Remarks:

SO₂ ANALYZER AUDIT

File No. 2019 - 062A

Date: May 6, 2019

Performed by: Al Clark

Station

Name: St Lina

Location: St Lina

Facility/Zone: Lica

Operator: Maxxam

Temp. 20.3 C

Barometric Press. 704 mmHg

Monitor

Make/Model: Teco 43i TLE Serial No: 1180930030

Inlet flow (sccm): 437 Full Scale Range ppm: 1.0

Last cal. Date: Apr 12/19 Old Correction Factor: 1.0030

Zero/Bkg 3.9

Span Coef 1.042

Calibrator

Calibration Method: GAS DILUTION Make/Model: Sabio 2010

Cylinder #: FF23250 AMU #: 2092

CGA Date: April 2019 SO₂ Concentration PPM: 49.5

Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Concentration (ppm)	% Difference	
Air	Gas	Total			vs Audit Gas	Limits
4945	0.0	4945	0.0000	-0.0001		
4882	77.9	4960	0.7774	0.7252	-7%	± 10%
4918	39.0	4957	0.3894	0.3638	-7%	± 10%
4954	20.0	4974	0.1990	0.1822	-8%	± 10%
Absolute Average Percent Difference					7%	

Linear Regression Analysis:

$y=mx+b$ (where x =calculated concentration, y =indicated concentration)

Correlation Coeff.= 1.0000

m (Slope)= 0.9345

b (Intercept as % of full scale)= -0.1335

LIMITS

≥ **0.995**

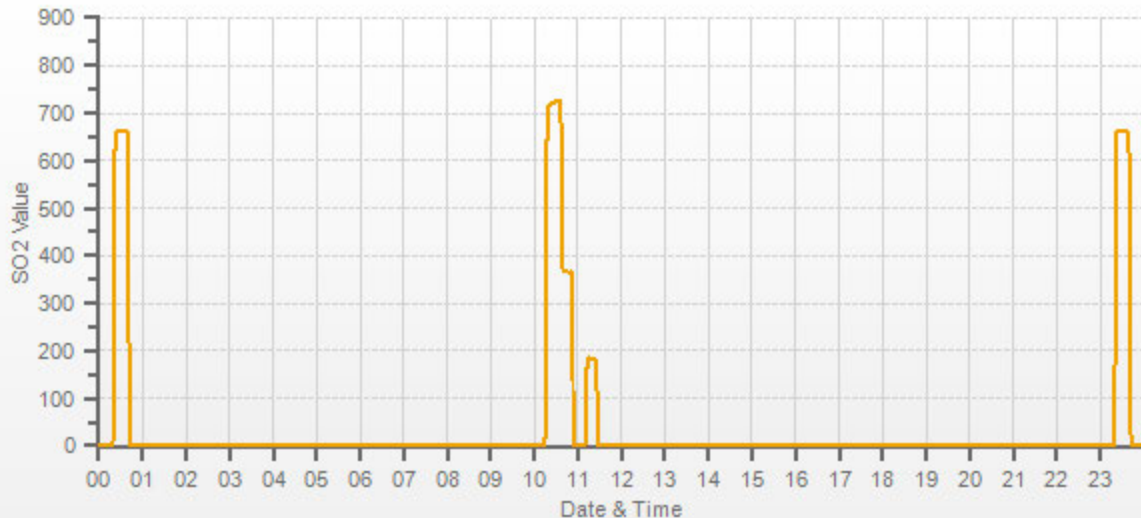
0.90-1.10

± **3% F.S.**

Remarks:

Calibration documentation shows analyzer calibrated at a lower value than the audit values.

— SO2[ppb]



H₂S ANALYZER AUDIT

File No. 2019 - 063A

Date: May 6, 2019

Performed by: Al Clark

Station

Name: St Lina

Location: St Lina

Facility/Zone: Lica

Operator: Maxxam

Temp. 20.3 C

Barometric Press. 704 mmHg

Monitor

Make/Model: Teco 450i Serial No: CM18010058

Inlet flow (sccm): 822 Full Scale Range ppm: 0.1

Last cal. Date: Apr 12/19 Old Correction Factor: 1.0130

Zero/Bkg 35.8

Span Coef 0.834

Calibrator

Calibration Method: GAS DILUTION Make/Model: Sabio 2010

Cylinder #: EX0011882 AMU #: 2092

CGA Date: May 2019 H₂S Concentration PPM: 10.8

Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Concentration (ppm)	% Difference	
Air	Gas	Total			vs Audit Gas	Limits
4945	0.0	4945	0.0000	0.0011		
4923	37.2	4960	0.0810	0.0810	-1%	± 10%
4937	20.1	4957	0.0438	0.0444	-1%	± 10%
4964	10.0	4974	0.0217	0.0222	-3%	± 10%
Absolute Average Percent Difference					2%	

Linear Regression Analysis:

$y=mx+b$ (where x =calculated concentration, y =indicated concentration)

Correlation Coeff.= 1.0000

m (Slope)= 0.9879

b (Intercept as % of full scale)= 0.9901

LIMITS

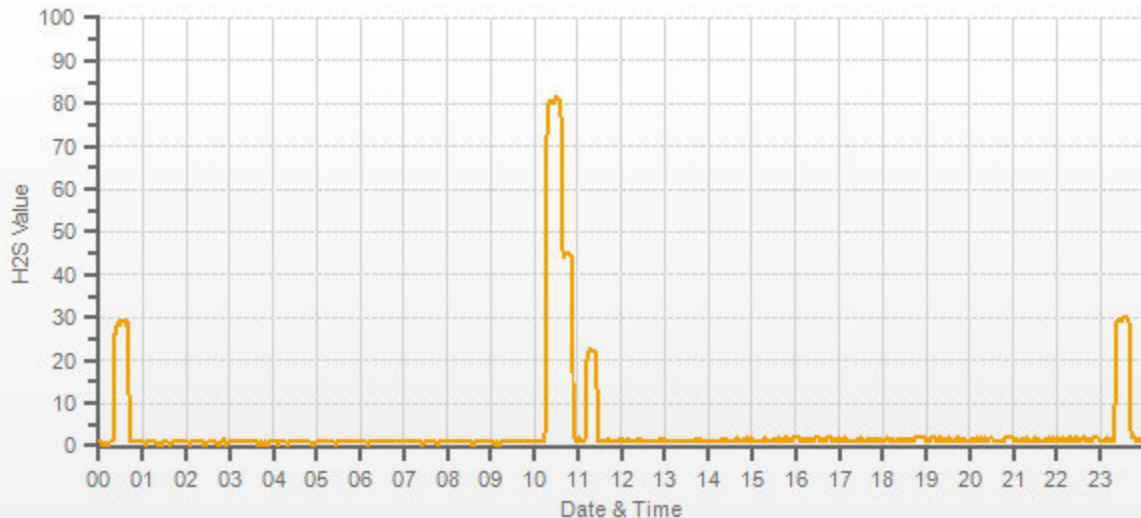
≥ **0.995**

0.90-1.10

± **3% F.S.**

Remarks:

H2S[ppb]



Non Methane Analyzer Audit

File No. 2019 - 064A

Date: May 6, 2019

Performed by: Al Clark

Station:

Name: St Lina Location: St Lina Operator: Maxxam
Facility/Zone: Lica Temp. 22.5 C BP: 702 mmHg

Monitor:

Make/Model: Teco 55i Serial No. 1180930025
Inlet flow (scm): N/A CH₄ Range ppm: 20
Last cal. Date: Apr 12/19 Non CH₄ Range ppm: 20
Old Correction Factor: CH₄: 0.996 THC Range ppm: 40
Non CH₄: 0.980
THC: 0.989

Calibration Method:

Gas Dilution

Calibrator:

Make/Model Sabio 2010 AMU# 2092

HC cylinder # EA0004003 CH₄ conc. (ppm) 1010 CH₄ Equiv (C3H8 only) (ppm) 872
CGA Date April 2019 C₃H₈ conc. (ppm) 317 Total CH₄ Equiv. (ppm) 1882

Calibrator Flows			Calc. Conc.			Indicated Concentration			% Difference vs Audit Gas		
			CH ₄ (ppm)	Non CH ₄ (ppm)	THC (ppm)	CH ₄ (ppm)	Non CH ₄ (ppm)	THC (ppm)	Limit ± 10%		
Air	Gas	Total							CH ₄	Non CH ₄	THC
4960	0.0	4960	0.00	0.00	0.00	0.00	0.00	0.00	1%	0%	0%
4884	77.2	4961	15.72	13.57	29.28	15.87	13.52	29.39	1%	0%	0%
4930	39.1	4969	7.95	6.86	14.81	7.99	6.88	14.87	1%	0%	0%
4962	19.9	4982	4.03	3.48	7.52	4.06	3.57	7.63	1%	3%	2%
Absolute Average Percent Difference									1%	1%	1%

Linear Regression Analysis:

y=mx+b (where x=calculated concentration, y=indicated concentration)

	CH₄	Non CH₄	THC	LIMITS
Correlation Coeff.=	<u>1.0000</u>	<u>1.0000</u>	<u>1.0000</u>	≥ 0.995
m (Slope)=	<u>1.0098</u>	<u>0.9945</u>	<u>1.0027</u>	0.90-1.10
b (Intercept as % of FS)=	<u>-0.0615</u>	<u>0.2414</u>	<u>0.0900</u>	± 3% F.S.

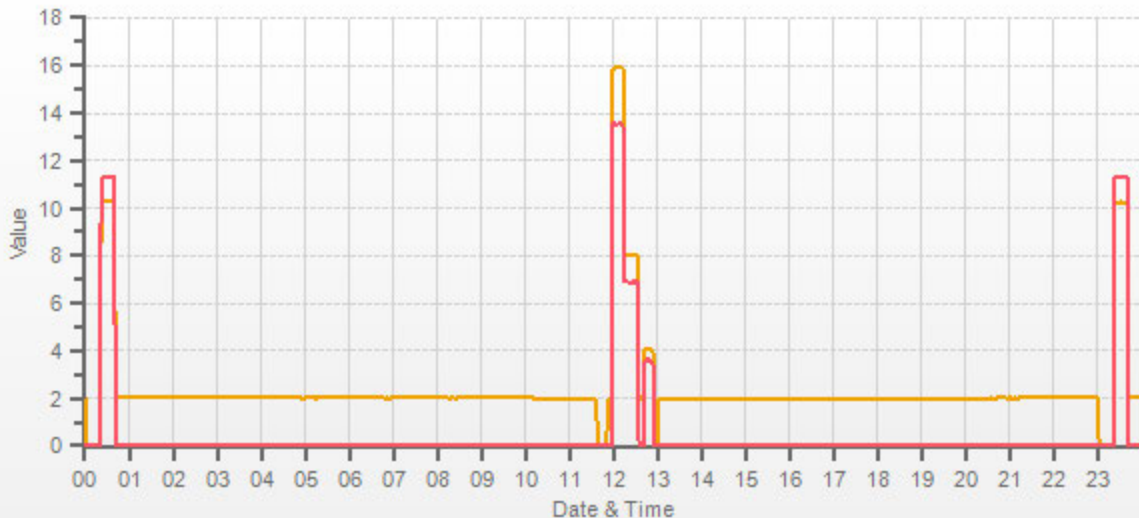
Remarks:

Calibration form indicates Bonnyville East not St. Lina.



Station: LICA ST. LINA Daily: 19/05/06 Type: AVG 1 Min. [1 Min.]

CH4[ppm] NMHC[ppm]



NO-NOx-NO2 Analyzer Audit

File No. 2019 - 065A

Date: May 6, 2019 Performed by: Al Clark

Station:

Name: St Lina Location: St Lina Operator: Maxxam
Facility/Zone: Lica Temp. 21.1 C BP: 702 mmHg

Monitor:

Make/Model: Teco 42i Serial No. 1180930029
Inlet flow (scm): 521 Range ppm: 1.0
Last cal. Date: Apr 8/19 Old CF: NO: 0.998
NOx: 0.996
NO2: 1.005
NO Bkg 5.4
NOx Bkg 5.6
NO Coef 1.167
NOx Coef 1.004
NO2 Coef 0.999

Calibration Method: Gas Dilution / GPT

Calibrator: Make/Model: Sabio 2010 AMU# 2270
NO cylinder # FF23222 NO conc. ppm 50.8 NOx conc. ppm 51.4
CGA Date April 2019

Calibrator Flows			Calc. Conc.		Indicated Concentration		% Difference vs Audit Gas	
Air	Gas	Total	NO (ppm)	NOx (ppm)	NO (ppm)	NOx (ppm)	NO	NOx
5045	0.0	5045	0.0000	0.0000	0.0000	0.0000	Limit ± 10%	
4964	80.4	5044	0.8097	0.8193	0.7701	0.7809	-5%	-5%
5011	40.1	5051	0.4033	0.4081	0.3836	0.3890	-5%	-5%
5043	20.1	5063	0.2017	0.2041	0.1890	0.1928	-6%	-6%
Absolute Average Percent Difference							5%	5%

Linear Regression Analysis:

y=mx+b (where x=calculated concentration, y=indicated concentration)

	NO	NOx	NO ₂	LIMITS
Correlation Coeff.=	<u>1.0000</u>	<u>1.0000</u>	<u>1.0000</u>	≥ 0.995
m (Slope)=	<u>0.9522</u>	<u>0.9538</u>	<u>0.9993</u>	0.90-1.10
b (Intercept as % of full scale)=	<u>-0.1113</u>	<u>-0.0665</u>	<u>0.1062</u>	± 3% F.S.

O ₃ Setting	Flow Rate	Indicated Conc. (ppm)			NO Decrease	NO ₂ Increase	% Difference vs Audit Gas	
		NO	NOx	NO ₂				
0.000	5044	0.7726	0.7794	0.0068	0.0000	0.0000	0.0000	%Dif Limit
1.300	5044	0.3209	0.7802	0.4593	0.4517	0.4525	0%	± 10%
0.600	5044	0.5830	0.7802	0.1972	0.1896	0.1904	0%	± 10%
0.360	5044	0.6785	0.7804	0.1020	0.0941	0.0952	1%	± 10%
Absolute Average Percent Difference							1%	

Converter Efficiency

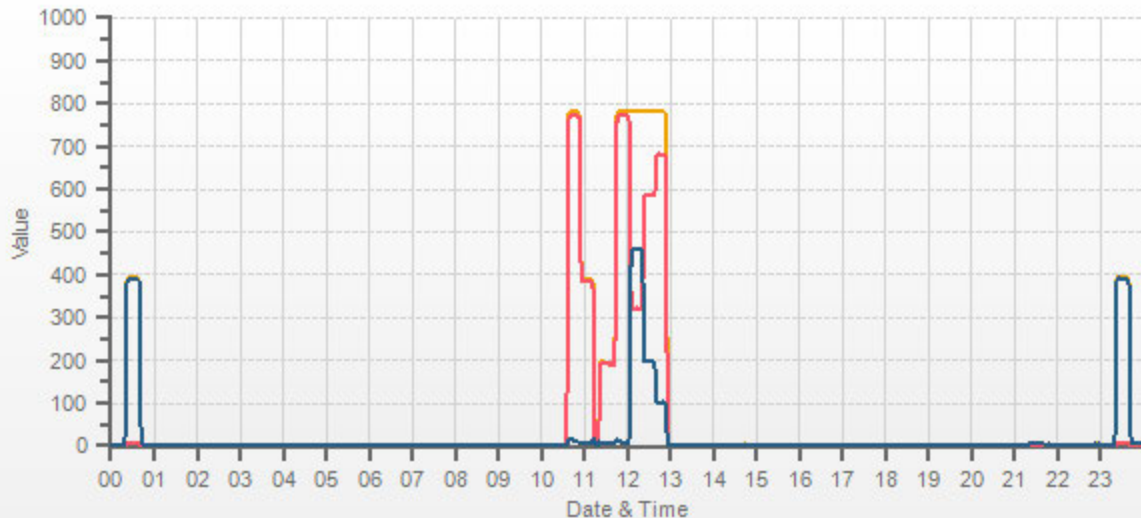
Average Converter Efficiency 100.6%

Remarks: Calibration form indicates Bonnyville East not St. Lina.
Calibration document shows the analyzer was calibrated at lower values than audit.



Station: LICA ST. LINA Daily: 19/05/06 Type: AVG 1 Min. [1 Min.]

— NOX[ppb] — NO[ppb] — NO2[ppb]



O₃ ANALYZER AUDIT

File No. 2019 - 066A

Date: May 6, 2019

Performed by: Al Clark

Station

Name: St Lina

Location: St Lina

Facility/Zone: Lica

Operator: Maxxam

Temp. 20.3 C

Barometric Press. 704 mmHg

Monitor

Make/Model: Teco 49i Serial No: 1002240371

Inlet flow (sccm): 727 / 767 Full Scale Range ppm: 0.5

Last cal. Date: Apr 12/19 Old Correction Factor: 1.0030

Zero/Bkg -0.8

Span Coeff. 0.992

Calibrator

Calibration Method: Photometer

Make/Model: Teco 49i PS AMU #: 1808

NO cylinder #: N/A NO concentration ppm: N/A

Ozone Setting PPB/Current	Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Conc. (ppm)	% Difference	
	Air	Gas	Total			vs Audit Gas	Limits
0.0000	0	X	0	0.0000	0.0037		
0.4000	0	X	0	0.4000	0.4059	1%	± 10%
0.2000	0	X	0	0.2000	0.2043	0%	± 10%
0.1000	0	X	0	0.1000	0.1037	0%	± 10%
Absolute Average Percent Difference						0%	

Linear Regression Analysis:

$y=mx+b$ (where x =calculated concentration, y =indicated concentration)

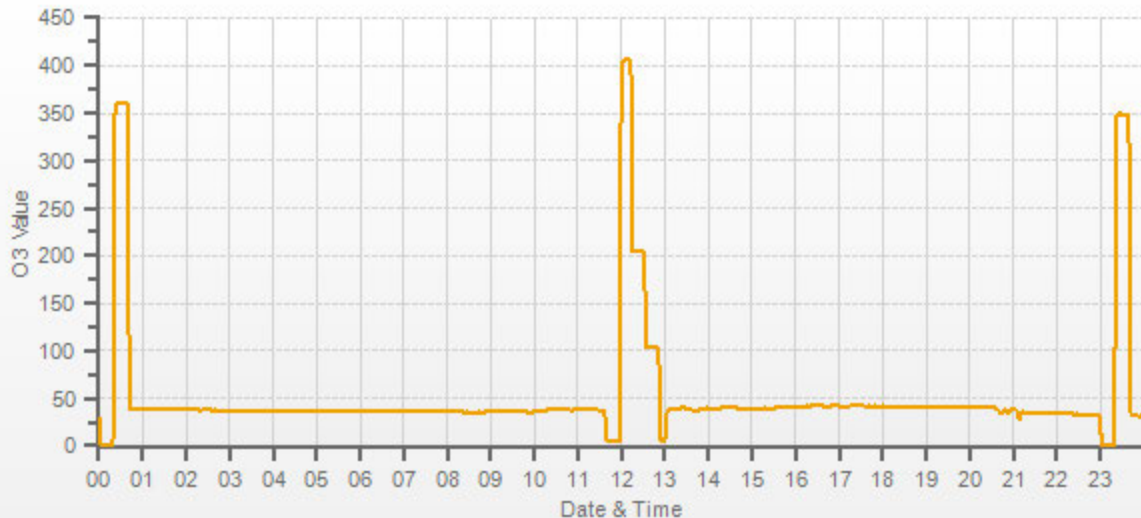
Correlation Coeff.= 1.0000
m (Slope)= 1.0058
b (Intercept as % of full scale)= 0.6760

LIMITS
≥ 0.995
0.90-1.10
± 3% F.S.

Remarks:

Calibration form indicates Bonnyville East not St. Lina.

O3[ppb]



Station Performance Audit Summary

Company: Lica Facility Name: St Lina

Approval No.: N/A Site Name: St Lina

Region: North Saskatchewan District: Cold Lake

Parameters audited:

H ₂ S	X	SO ₂	X	NO _x	X	NH ₃	X	O ₃	X
CO		CH ₄	X	NonCH ₄	X	THC	X	TRS	
PM _{2.5}		PM ₁₀		TSP		BTEX		Wind Speed	
Wind Dir	X	Amb. Temp	X	Stn.Temp	X	RH	X	Solar Radiation	
Rainfall		Precip	X	VWS		BP	X		
All parameters monitored as per approval: Yes _____ No _____ N/A _____									

GENERAL

	YES	NO	N/A
Has the location remained unchanged from previous audit?	X		
Is site secure?	X		
Are station operating conditions adequate?	X		

DATA ACQUISITION

Are strip charts in use?		X	
Is a telemetry system for data acquisition in use?	X		

SYSTEM COMPONENTS

Is a glass sampling manifold installed?	X		
Is sampling manifold clean?	X		
Is a manifold trap in place?	X		
Are spare manifold ports capped	X		
Is manifold oriented so it is not exactly horizontal?	X		
Are manifold ports situated to prevent water entering monitors?	X		
Is manifold pump properly installed and operative?	X		
Do sample lines extend at least 3/4" into manifold?	X		
Are monitor sampling lines connected to manifold?	X		
Are sampling lines clean?	X		
Are monitors properly mounted and secure?	X		
Are monitors properly exhausted from room or scrubbed?	X		
Are zero and span systems operational?	X		

WIND EQUIPMENT

Is wind sensor properly oriented?	X		
Does wind equipment appear to be functioning properly?	X		
Date of last calibration.	Date:	May 2019	

COMMENTS:

AUDITOR: Al Clark DATE: May 6, 2019



Station Site Documents Audit Checklist

Station	
Name: <u> St Lina </u>	Location: <u> St Lina </u>
Facility/Zone: <u> Lica </u>	Operator: <u> Maxxam </u>

Required Elements of AMD Chapter 3 SS 4-B

Do the Site Documents Contain the Following:

- (a) Name of Owner/ Approval Holder
- (b) Name of Operating Agency
- (c) Contact Information
- (d) Date the Site or Station was Established
- (e) Date the information was last updated
- (f) Location including Latitude and Longitude
- (g) Four Colour Photos Looking N, E, S, W From Manifold Inlet
- (h) Additional Photos/Sketches of AMD Standard Site Non-Conformance
- (i) List of Instruments Located at the Site
- (j) Site Description Including the following:
 - (i) Land Use By Sector
 - (ii) Site Elevation
 - (iii) Greatest Angle of Elevation & Direction to Nearby Buildings
 - (iv) Average Building height in the area
 - (v) Distance to Nearest Trees

Meets AMD		NA	Current	
YES	NO		YES	NO
X			X	
X			X	
X			X	
X			X	
X			X	
X			X	
X			X	
		X		
X			X	
X			X	
	X			
	X			
	X			
X			X	

Required Elements of AMD Chapter 3 SS 4-D

Do the Station Site Documents Contain the Following:

- (a) Recent Area Map Covering Approximately 1Km²
- (b) Plan View Sketch - Lablled a Schematic.
- (d) Colour Photos Showing Sample Manifold/Inlet
- (e) Colour Photo of the Station
- (f) Additional Photos/Sketches of AMD Standard Station Non-Conformance

Meets AMD		NA	Current	
YES	NO		YES	NO
X			X	
X			X	
X			X	
X			X	
		X		

COMMENTS: Does not include site elevation or the communication tower building height and distance north of station. Station picture doesn't show PM2.5 inlet. Roadway labelled as side street should be secondary highway. Compressor pad ~250 m east of station not 20m.
Page Satellite image labelled CLS not St Lina. Missing all sector quadrant descriptions.

AUDITOR: Al Clark DATE: May 15, 2019



Network Site Documents Audit Checklist

Network	
Name: <u> St Lina </u>	Location: <u> St Lina </u>
Facility/Zone: <u> Lica </u>	Operator: <u> Maxxam </u>

<p>Required Elements of AMD Chapter 3 SS 4-C Do the Network Site Documents Contain the Following:</p> <p>(a) A Recent Area Map Showing the Following:</p> <ul style="list-style-type: none"> (i) Station Locations <li style="background-color: yellow;">(ii) Roadways <li style="background-color: yellow;">(iii) Railway Lines <li style="background-color: yellow;">(iv) Airports (v) Lakes (vi) Rivers (vii) Human Settlements (viii) Locations of Identified Industrial & Non-Industrial Pollutant Sources (ix) Other Significant Landmarks <p>(b) A windrose for each Continuous Ambient Air Monitoring Station</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Meets AMD</th> <th rowspan="2">NA</th> <th colspan="2">Current</th> </tr> <tr> <th>YES</th> <th>NO</th> <th>YES</th> <th>NO</th> </tr> </thead> <tbody> <tr style="background-color: #cccccc;"> <td colspan="5" style="height: 15px;"></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </tbody> </table>	Meets AMD		NA	Current		YES	NO	YES	NO						X			X			X					X					X				X			X		X			X		X			X				X			X			X	
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COMMENTS: Missing elements of the network map.

AUDITOR: Al Clark DATE: May 15, 2019



Audit Summary

Form No. F-AA-018

Version 1.2

Page 1 of 4

Facility / Zone	Lica
Total # of parameters that passed	21
Total # of parameters audited in the network	21
Date(s) of the audit	May 6-9, 2019
Issue Date of Audit Summary	May 16, 2019

Station Name	St. Lina
Auditor	Al Clark
Audit Date	May 6, 2019

Critical	Pass		Fail
H ₂ S	X		
SO ₂	X		
TRS			
NO / NO ₂ / NO _x	X		
O ₃	X		
HC	X		
Sharp PM _{2.5}			
Wind Speed / Wind Direction	X		
Wind head Orientation	X		
Manifold Fan	X		
Partisol PM _{2.5}			
Zero/Span Systems Operational	X		

Inspection Items	OK		Need for Improvement
Sample pump venting/scrubbing	X		
Heating / Air Conditioning	X		
Manifold	X		
Sample Lines	X		
Sharp PM _{2.5}			
Partisol PM _{2.5}			
Safety	X		
Site Conditions	X		

Non-critical	OK		Opportunity for Improvement
RH		X	+/- 15%
Station Temperature	X		
Ambient Temperature	X		
Barometric Pressure	X		
Tipping bucket	X		
Station Condition	X		
Station Documentation		X	Needs review / or missing

Not monitored or audited at this location

* Initial response was 24% low



1.0 Quality Control Activities

Quality control procedures are established to govern the performance of the monitoring equipment and to protect operational uptime. Data collected during QC/QA activities are assigned a data validation code to comply with the requirements outlined in Chapter 6, 4.1.1, DQ 4-A (AMD, 2016). Calibrations are deemed successful only if the AMD calibration acceptance limits are met (Chapter 7, 9.0, AMD 2016).

A daily zero-span test procedure is performed for each gaseous parameter by challenging the analyzer with a zero-air source and span gas. Daily review of the data ensures the zero and span check are within the required acceptance limits and do not deviate more than $\pm 10\%$ from the expected value. The total zero-span cycle is complete within an hour with the zero phase commencing at the beginning of the scheduled hour. This QC activity is conducted in accordance with Chapter 7, 4.0, Cal 4-A (AMD, 2016).

The allowable time for a zero-span check is one hour per calendar day. The time allotted for the zero-span check does not contribute to downtime and is identified with a data validation code of "S". If any additional zero-span response checks are performed, the time accrued during the QC activity is considered downtime and is identified with a data validation code of "S1". The initiation of an additional zero-span check may be warranted during the investigation of operational issues or suspect data.

Each month, a scheduled multipoint calibration is performed on each gas analyzer. Prior to any adjustments, an as-found response test is completed to obtain the zero reading of the analyzer and the response to the highest span concentration. The zero and high point test gases are then re-introduced into the analyzer to establish the zero and high set-points. Once these adjustments are satisfactory, a mid-point and a low-point test concentration is introduced. Additional multi-point calibrations are required if any of the conditions, outlined in Chapter 7, 2.1, Cal 2G (AMD, 2016) exist.

The time allotted for the first multi-point calibration is not considered downtime and is identified with a data validation code of "C". If any additional as-found response checks or multipoint calibrations are performed, the time accrued during the QC activity is considered downtime and is identified with a data validation code of "C1".

A mechanical wind system undergoes annual calibration, as a minimum, while an ultrasonic wind system is factory calibrated every two years (Chapter 6, 6.0, Cal 6-A, AMD 2016). Supplementary to this, a visual inspection of the equipment is performed during each scheduled monthly site visit.

The time allotted for the wind system calibration is not considered downtime and is identified with a data validation code of "C". If function checks or additional calibrations are performed, the time accrued during the QC activity is not considered downtime and is identified with a data validation code of "Q" and "C", respectively. If QC activity goes beyond 10% of the monthly operating time, the time exceeding 10% is considered downtime and is assigned a data validation code of "C1". Data identified with a data validation code of "Q" is in accordance with Chapter 6, 4.1.3 (AMD, 2016) which states QA/QC activities are not included when calculating data completeness.

High volume samplers are calibrated every three months, as a minimum, in accordance with Chapter 7, 7.0, Cal 7-B (AMD, 2016).

Where passive sampling is in practice, quality control samples will be deployed in accordance with Chapter 4, 3.0, 3.1.3. Method blanks, replicate samples and spiked blanks are exposed and handled in the same manner as each passive sample. To comply with the data submission requirements in Chapter 9, 3.1, the replicate and corresponding passive sample concentrations are reportable data values and have not been averaged.

As recommended in Chapter 6, 4.2 (AMD 2016), daily data review is conducted to verify data and avoid significant data losses. Automated flags, originating from the data-logger, and data anomalies are reviewed and may prompt the need to dispatch a technician for investigation and/or corrective action. Additionally, there are several automated alarm scenarios that serve to screen raw data, alert technicians and elicit investigation or corrective action.

Comparisons of the measured ambient concentrations to the corresponding AAAQO are assessed using the significant figures protocol in Chapter 9, 3.1.2. If the measurement is near the set objective, raw data may undergo necessary data adjustments to confirm a true exceedance. Should an exceedance occur, Maxxam will formally notify the client; however, the reporting protocol to AEP is defined by the client and may not involve Maxxam. Exceedance events are acknowledged in the report, based on the information available at the time.

2.0 Data Verification and Validation

The data validation procedures, outlined in Chapter 6, 4.0, AMD 2016, are used to accept, reject and qualify data. The data verification and validation process, and the current Data Collection and Management Process Flow Chart have been compiled from sections 4.2 to 4.6 (AMD, 2016) and are shown below.

Baseline adjustments are applied by interpolation between two valid zero checks, as determined by the Data Acquisition System. In the event that zero check results are not reliable, data may be adjusted by applying a constant offset to data collected between two adjacent zero checks. Both adjustment approaches are deemed acceptable by the AMD.

Table 1 (Chapter 6) outlines the quantitative parameter relationships to be considered and dictates that data adjustments are applied equally for NO/NO₂/NO_x and CH₄/NMHC/THC parameters. Below zero adjustments are applied to 1-hour averages, in accordance with Table 2 (Chapter 6), and are done after baseline corrections.

Instantaneous data, where provided, 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.

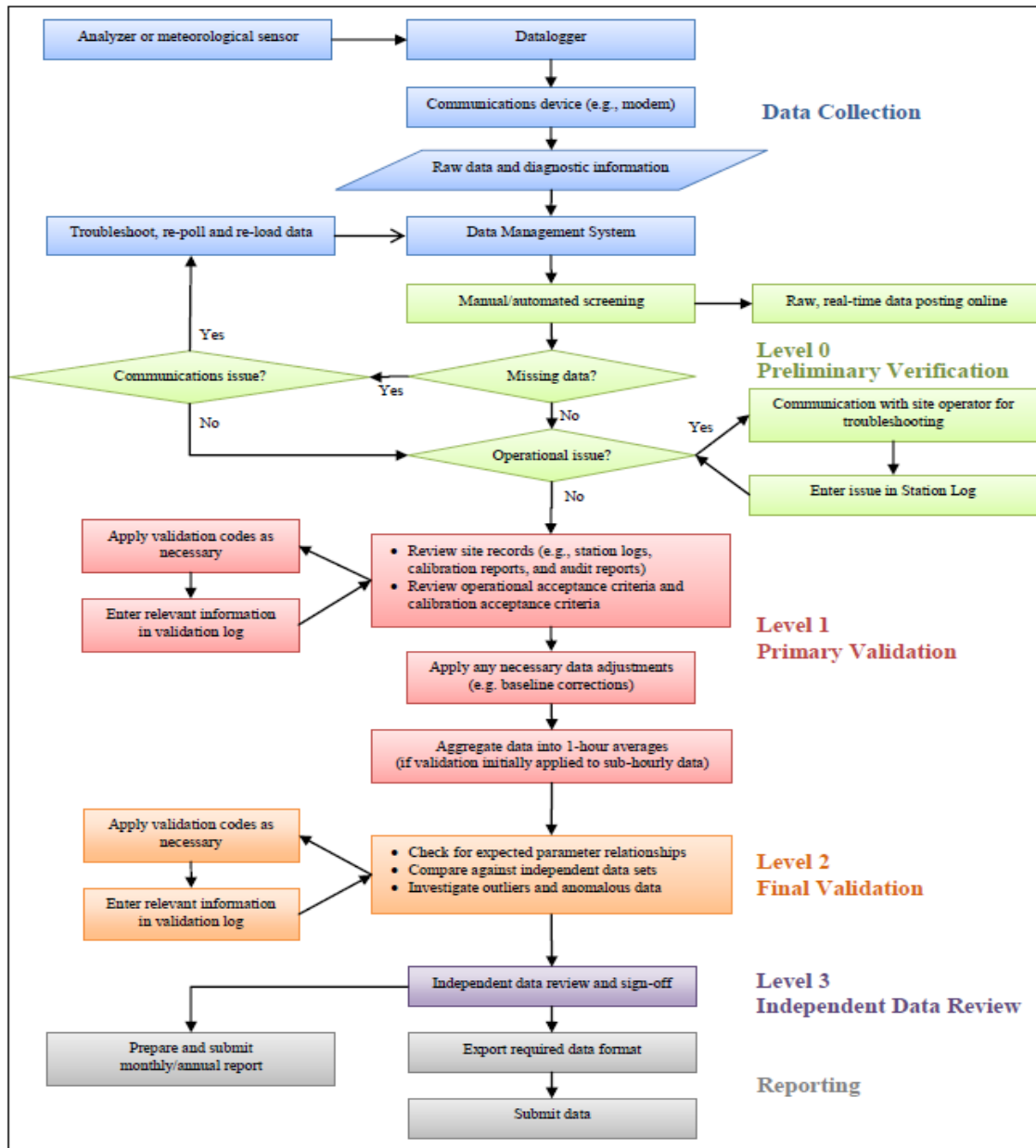
All calculations and reporting of results follow the methods described in the AMD, 2016.

There were no deviations from the prescribed methods.

AMD Data Verification and Validation Process

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). At this level, data undergoes a certain amount of manual or automated screening and flagging. Screening checks include: a) identification of periods of missing data; b) verification of time stamps against reference time; c) verification that instrument diagnostics/data-logger 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	Primary validation involves more thorough evaluation and documentation of issues identified during data screening, along with appropriate application of data validation codes. Level 1 activities 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. At this level of review, some general knowledge of pollutant and meteorological behavior can be used to determine if data is suspect.
Level 3 Independent Data Review	Level 3 validation involves a final cursory review of validated data, and is completed by an individual independent of both field operations and primary data validation. At this level, a final independent QA review/endorsement is performed before data is submitted to Alberta Environment and Parks.
Post-Final Validation	The Post-Final Validation step serves to re-evaluate validated data for errors or omissions discovered and/or suspected after the initial monthly data submittal. This level of validation is performed on an annual basis, when annual reporting is required or requested.



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



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u>	Project #: <u>2833-2019-05-25-C</u>
Site: <u>St. Lina Continuous Monitoring Station</u>	Contact: <u>Mike Bisaga</u>

Level 0 Preliminary Verification	<u><i>bimadeniji</i></u>	Date <u>11- Jun- 2019</u>
Level 1 Primary Validation	<u><i>bimadeniji</i></u>	Date <u>12- Jun- 2019</u>
Level 2 Final Validation	<u><i>bimadeniji</i></u>	Date <u>13- Jun- 2019</u>
Level 3 Independent Data Review	<u><i>crashmha</i></u>	Date <u>17- Jun- 2019</u>
Post-Final Validation	<u>NA</u>	Date <u>NA</u>

Notes

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

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MAY 1 - 31, 2019

MONTHLY AMBIENT AIR QUALITY MONITORING REPORT

AEP Ambient Station ID: 1608

Project #: 2833-2019-05-68-C

LICA-201905

Prepared for:

Lakeland Industry & Community Association

Mike Bisaga

5107 50 St.

Bonnyville, Alberta T9N 2J5

monitoring@lica.ca

780-266-7068

Monitoring Station

**Bonnyville East Site Continuous Monitoring
Station**

Date of Report Issuance: June 25, 2019

Report Preparation By:

Bim Adeniji, M.Sc.

403-219-3677

aadeniji@maxxam.ca



Project Manager, Customer Service, Air Services

Reviewed By:

Wunmi Adekanmbi, M.Sc., EPT, PMP

403-219-3661

aadekanmbi@maxxam.ca



Project Team Lead, Customer Service, Air Services



#1 - 2080 39 Avenue NE, Calgary AB, T2E 6P7

Lakeland Industry & Community Association

5107 50 St.
Bonnyville, Alberta T9N 2J7

Attention: Mike Bisaga

Date: June 25, 2019

Subject: MONTHLY AMBIENT AIR QUALITY MONITORING REPORT for MAY 1 - 31, 2019

In May 2019, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the Bonnyville East Continuous Monitoring Station near Bonnyville, Alberta. The monitoring program provides measurements of ambient air pollutants and meteorological data to satisfy the reporting requirements of the Alberta airshed.

Network Parameters for Continuous Monitoring:

This monthly report, where applicable, was prepared in accordance with Chapter 9 of the Air Monitoring Directive (AMD, 2016). The report summarizes the continuous monitoring results for pollutant and meteorological parameters and presents the hourly statistics, graphs and rose charts for the month. Calibration records are provided in a separate PDF document in order to comply with AMD requirements Chapter 9, 13.1.7, RC 13-R. The station is equipped with analyzers to measure SO₂, H₂S, THC, CH₄, NMHC, NO_x, NO, NO₂, PM_{2.5} and O₃. The meteorological sensors and equipment capture data for WS, WD and STDWD.

Exceedance & Performance Reporting:

The operational time for all continuous ambient air analyzers, meteorological systems and data acquisition systems were above the 90% requirement, as per the AMD, Chapter 6, DQ 4-C, 2016.

Non- Conformance: Comparisons of the measured ambient air concentrations to the corresponding AAAQOs were done in accordance with Appendix A, Alberta Ambient Air Quality Objective Calculation Guidelines (AMD, Chapter 9, Appendix A, 2016). For H₂S, there were concentrations recorded in excess of the Alberta Ambient Air Quality Objectives and Guidelines (AAAQO, January 2019). Sixty 1-hr and ten 24-hr exceedances were recorded for H₂S this month. Details of the exceedance are recorded in Appendix I. For all the remaining parameters, there were no ambient concentrations in excess of the AAAQOs.

Monthly Monitoring Overview:

In relation to the previous month, there were no changes made to the scope or management of the ambient air monitoring program.

The evaluation of data collected in the month of May did not reveal any errors or omissions that would require resubmission of air data to AEP's airdata warehouse.

AEP Audit: A station audit was conducted by Alberta Environment and Parks (AEP) on May 7. The Audit report can be found on page 80.

H₂S: One hour of downtime was recorded this month, due to an additional quality check performed to assess a biased high drift in span response.

NO_x/NO/NO₂: Thirteen hours of downtime were recorded across the month due to additional quality checks and corrective actions performed to address drifts in span response.

Canister System: Three canister events were recorded this month. The samples were processed for analysis by InnoTech and the results will be provided in the 2019, Q2 Integrated Report.

Should you have any questions concerning the results or if we can be of further assistance, please contact your Maxxam representative indicated below.

Reviewed by:



Wunmi Adekanmbi, M.Sc., EPT, PMP
Project Team Lead, Customer Service, Air Services
403-219-3661

I certify that I 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. Certification of submitted information is specific to the contents of this report and is not intended to represent the onus of the Person Responsible, as outlined in Chapter 9, RC 12-E.

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List of Acronyms

AAAQO	Alberta Ambient Air Quality Objectives and Guidelines Summary
AEP	Alberta Environment and Parks
AMD	Air Monitoring Directive
CH₄	Methane
DAS	Data acquisition system
hr	Hour
hrs	Hours
H₂S	Hydrogen Sulphide
IZS	Internal zero-span
kph	Kilometers per hour
NO	Nitric Oxide
NO₂	Nitrogen dioxide
NO_x	Total oxides of nitrogen
O₃	Ozone
NMHC	Non-Methane Hydrocarbon
PM_{2.5}	Particulate matter less than or equal to 2.5 microns in diameter
ppb	Parts per billion
ppm	Parts per million
QA	Quality Assurance
QC	Quality Control
SHARP	Synchronized Hybrid Ambient Real-time Particulate Monitor
SOP	Standard Operating Procedure
SO₂	Sulphur Dioxide
STDWD	Standard Deviation Wind Direction
THC	Total hydrocarbons
µg/m³	Microgram per cubic meter
WS	Wind Speed
WD	Wind Direction
°C	Degrees Celsius

AAAQO Exceedance Summary Report

SO₂ 1-Hour Exceedances

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

SO₂ 24-Hour Exceedances

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

H₂S 1-Hour Exceedances

Sixty 1-hour exceedances were recorded this month. Details of the exceedance are recorded in Appendix I.

H₂S 24-Hour Exceedances

Ten 24-hour exceedances were recorded this month. Details of the exceedance are recorded in Appendix I.

NO₂ 1-Hour Exceedances

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

PM_{2.5} 1-Hour Exceedances

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

PM_{2.5} 24-Hour Exceedances

Measured concentrations of fine particulate matter were below the 24-hour AAAQO of 29 µg/m³.

O₃ 1-Hour Exceedances

Measured concentrations of ozone were below the 1-hour AAAQO of 76 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

MONTHLY CONTINUOUS DATA SUMMARY

Lakeland Industry & Community Association						MAXIMUM VALUES							OPERATIONAL TIME (%)
Bonnyville East Continuous Monitoring Station						1-HOUR				24-HOUR			
PARAMETER	OBJECTIVES		EXCEEDANCES		MONTHLY AVERAGE	READING	DAY	HOUR	WIND SPEED (kph)	WIND DIRECTION (sector)	READING	DAY	
	1-hr	24-hr	1-hr	24-hr									
SO ₂ (ppb)	172	48	0	0	0	2	12	0	21.5	SSE	0	1	100.0
H ₂ S (ppb)	10	3	60	10	3	89	11	19	8.1	SE	15	17	99.9
THC (ppm)	-	-	-	-	2.03	2.50	31	4	2.2	ENE	2.15	31	100.0
CH ₄ (ppm)	-	-	-	-	2.03	2.49	26	4	0.8	NW	2.14	22	100.0
NMHC (ppm)	-	-	-	-	0.00	0.15	31	4	2.2	ENE	0.02	31	100.0
NO ₂ (ppb)	159	-	0	-	2	12	22	8	1.7	WNW	4	22	98.3
NO (ppb)	-	-	-	-	1	163	30	11	16.4	N	10	30	98.3
NO _x (ppb)	-	-	-	-	3	172	30	11	16.4	N	14	30	98.3
O ₃ (ppb)	76	-	0	-	38.5	72.3	29	11	17.2	WSW	55.1	28	100.0
PM _{2.5} (µg/m ³)	80	29	0	0	8	43	23	1	0.8	S	25	28	100.0
VECTOR WS (kph)	-	-	-	-	1.1	39.5	3	15	-	NW	18.4	24	100.0
VECTOR WD (sec)	-	-	-	-	90 (E)	-	-	-	-	-	-	-	100.0

OPERATIONAL SUMMARY

Parameter	Equipment	Method & Procedure	Operational Notes
SULPHUR DIOXIDE (SO ₂)	Thermo 43i TLE Pulsed Fluorescence Analyzer	Maxxam AIR SOP-00209: Ambient Sulphur Monitoring	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 7. The Audit report can be found on page 80. The routine monthly calibration was performed on May 17, between the hours of 09:00 and 14:00.
HYDROGEN SULPHIDE (H ₂ S)	Thermo 450i UV Fluorescence Analyzer	Maxxam AIR SOP-00209: Ambient Sulphur Monitoring	<ul style="list-style-type: none"> Operational time for the monitoring period was 99.9%, equivalent to 1 hour of downtime. A station audit was conducted by Alberta Environment and Parks (AEP) on May 7. The Audit report can be found on page 80. The routine monthly calibration was performed on May 17, between the hours of 09:00 and 14:00. The analyzer began to span towards the upper acceptance limit towards the end of the month. An additional zero-span check was performed to assess span response on May 29, exhibiting similar response. Following a successful multi-point calibration on June 6, the reference span value was updated, correcting the span drift. As all the zero-span checks were within acceptance limits and the June 6 calibration results met AMD requirements, no data was discarded due to the drift in span response. One hour of downtime was, however, incurred due to the additional quality check. There were sixty 1-hr and ten 24-hr exceedances recorded this month. Details of the exceedance are recorded in Appendix I.
TOTAL HYDROCARBONS (THC), METHANE (CH ₄) & NON-METHANE HYDROCARBONS (NMHC)	Thermo 55i FID Analyzer	Maxxam AIR SOP-00001: Methane, Non-Methane Hydrocarbon Analyzer Monitoring Maxxam AIR SOP-00225: The Collection of VOCs in Ambient Air Using Canisters and Xontech	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 7. The Audit report can be found on page 80. The routine monthly calibration was performed on May 22, between the hours of 10:00 and 13:00. The canister sampler is programmed to draw in a whole air sample when the 5-minute average concentration of NMHC is above 0.30 ppm. A representative sample of ambient air is collected over a one-hour period when the canister event is triggered. Three canister events were recorded this month. The date, time and initial 5-min average concentration measurements are as follows: May 24, at 21:55 – 0.47 ppm May 30, at 22:50 – 0.56 ppm May 31, at 09:55 – 0.47 ppm

OPERATIONAL SUMMARY

Parameter	Equipment	Method & Procedure	Operational Notes
OXIDES OF NITROGEN (NO _x), NITRIC OXIDE (NO) & NITROGEN DIOXIDE (NO ₂)	Thermo 42i Chemiluminescent Analyzer	Maxxam AIR SOP-00213: Ambient NO/NO ₂ /NO _x Monitoring	<ul style="list-style-type: none"> Operational time for the monitoring period was 98.3%, equivalent to 13 hours of downtime. A station audit was conducted by Alberta Environment and Parks (AEP) on May 7. The Audit report can be found on page 80. The instability in span response that began in the April monitoring period continued into the May monitoring period. Following a successful routine monthly calibration, conducted on May 17, between hours 9:00 – 15:00, the reference span value was updated, and the instability issue was resolved. The cause of the instability in span response could not be determined. As the monthly calibration met AMD requirements, demonstrating that analyzer performance was not impacted, no data was discarded due to this event. On May 24, the analyzer exhibited a sudden drift outside the upper acceptance limit. The result of a repeat span check triggered immediately afterwards was within limits. This instability in span response prompted an immediate site visit, where an as-found response check was successfully completed. The permeation tube was replaced during this site visit and allowed time to stabilize. An additional zero-span check was triggered on May 26, at hour 07:00 to assess span response following the permeation tube replacement. However, span response did not stabilize within 72 hours of replacing the perm tube, prompting another site visit. A repeat calibration was completed on May 28 and the reference span value was adjusted following the zero-span check on May 29. As the as-found response check and calibration results met AMD requirements, no data was discarded due to the span drift. Thirteen hours of downtime were, however, recorded due to the additional quality checks.
OZONE (O ₃)	Thermo 49i Photometric Analyzer	Maxxam AIR SOP-00212: Ambient O ₃ Monitoring	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 7. The Audit report can be found on page 80. The routine monthly calibration was performed on May 22, between the hours of 10:00 and 14:00.
PARTICULATE MATTER < 2.5 MICRONS (PM _{2.5})	Thermo SHARP 5030i Unit	Maxxam AIR SOP-00014: Measurement of Particulate Concentration Using the THERMO SHARP	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. The routine monthly check was performed on May 22, at hour 13:00.
WIND SPEED (WS), WIND DIRECTION (WD) & STANDARD DEVIATION WIND DIRECTION (STDWD)	Met One Unit	Maxxam AIR SOP-00013: RM Young Wind Monitor Calibration	<ul style="list-style-type: none"> Operational time was 100% and there were no performance issues identified. A station audit was conducted by Alberta Environment and Parks (AEP) on May 7. The Audit report can be found on page 80. Wind data is reported as vector wind speed and vector wind direction. Wind direction is defined as the direction from which the wind is blowing and is measured in degrees from true north.
Datalogger	Envista Ultimate Unit	Operation Manual	<ul style="list-style-type: none"> There were no performance issues identified.

SUMMARY TABLES, GRAPHS AND ROSES

SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)

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

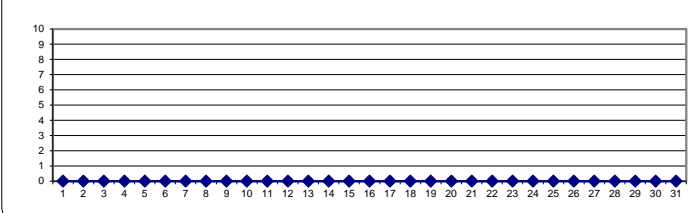
STATUS FLAG CODES

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

OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT:	1-HR	172	ppb	24-HR	48	ppb
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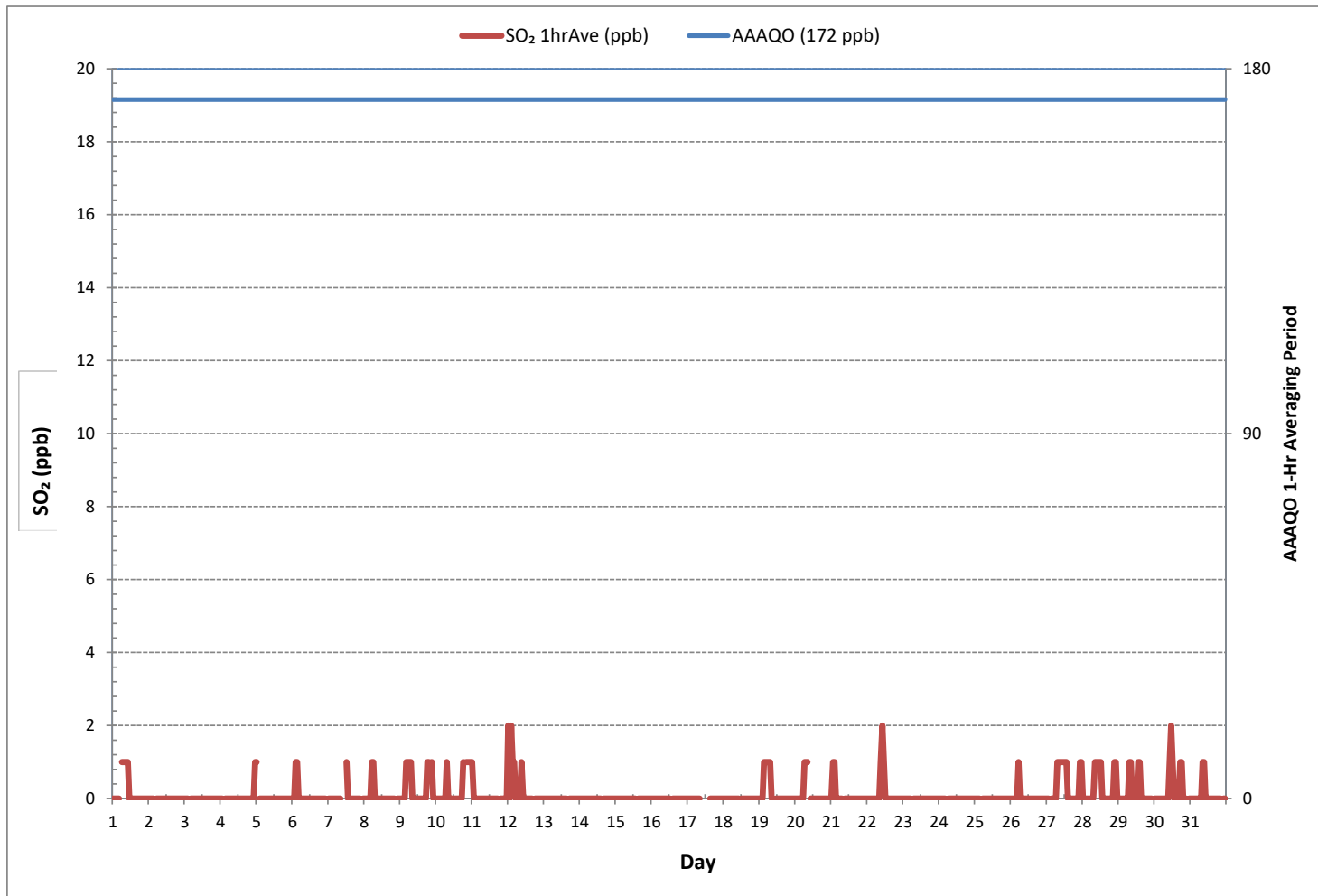
24 HR AVERAGES May 2019



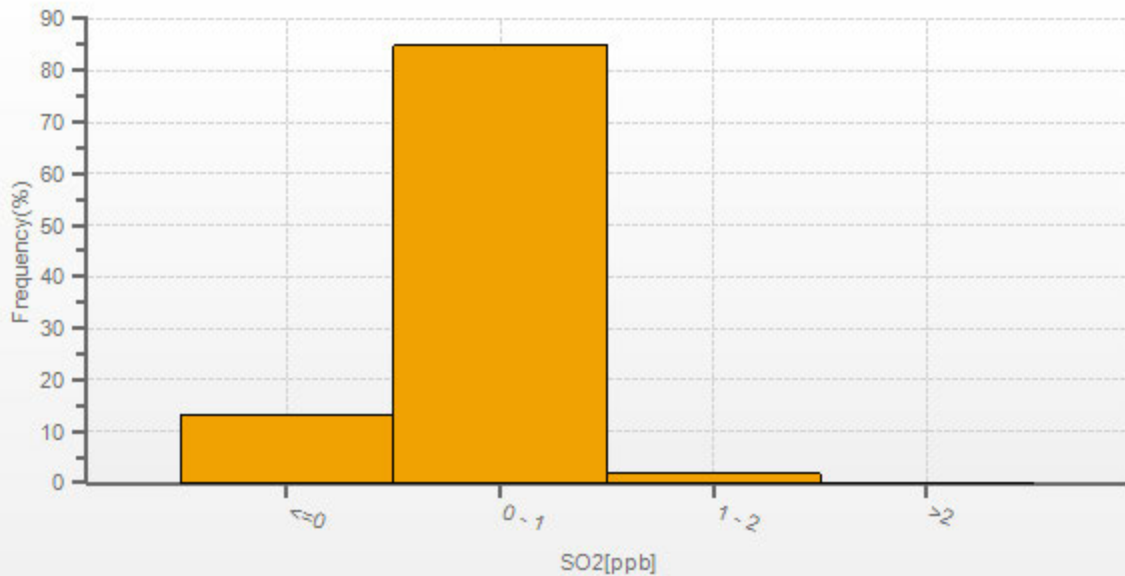
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0
NUMBER OF 24-HR EXCEEDANCES:	0
NUMBER OF NON-ZERO READINGS:	72
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR ON DAY 1
MAXIMUM 1-HR AVERAGE:	2 ppb @ HOUR ON DAY 12
MAXIMUM 24-HR AVERAGE:	0 ppb ON DAY 1
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	744 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	0
MONTHLY AVERAGE:	0 ppb

SULPHUR DIOXIDE Hourly Averages (SO₂ ppb)

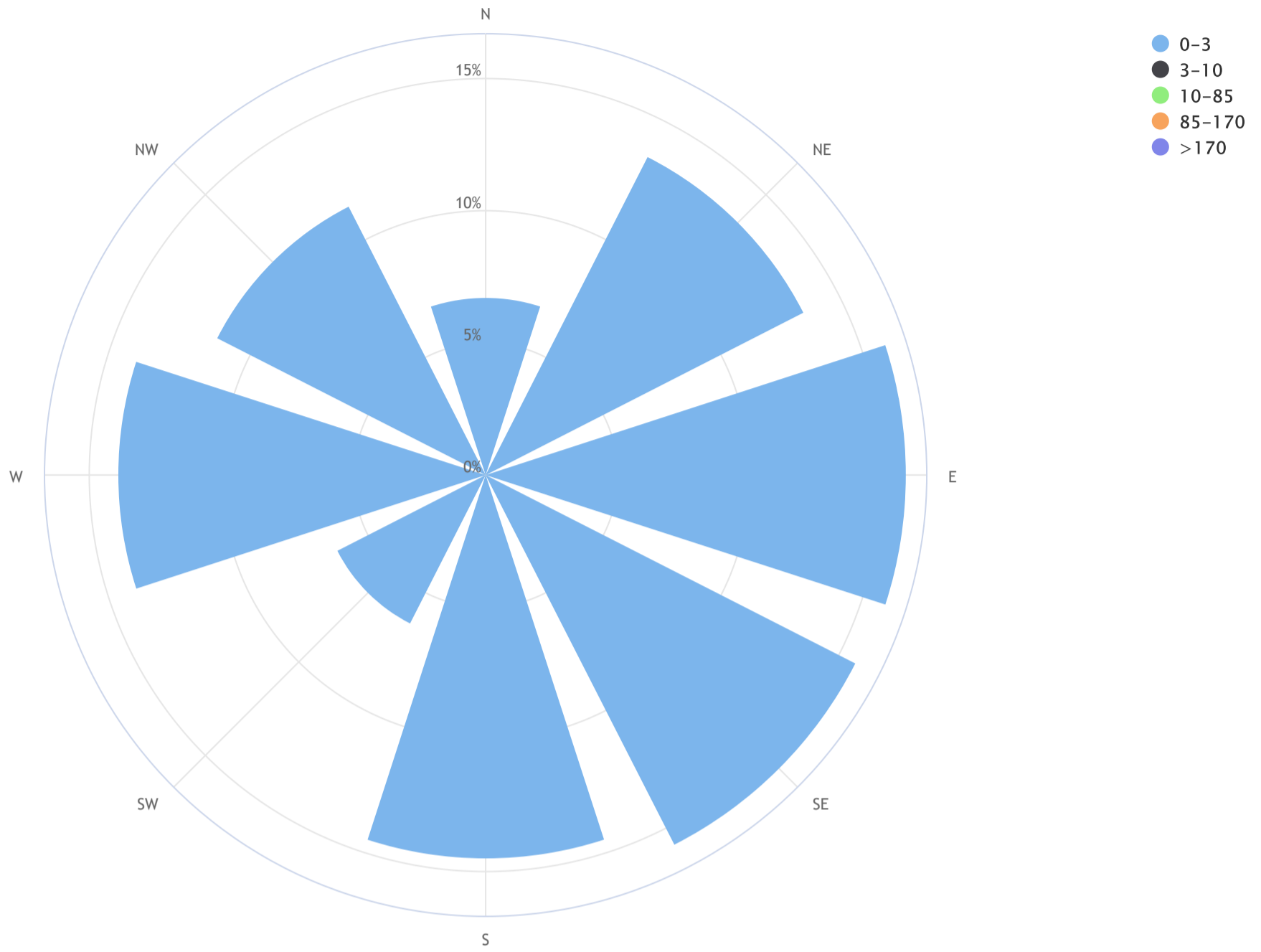


SO₂[ppb] Histogram: LICA Bonnyville East Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Bonnyville East Continuous Monitoring Station_SO₂ (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.0, CALM % = 2.1%



Direction	0-3	3-10	10-85	85-170	>170	TOTAL
N	6.7	0.0	0.0	0.0	0.0	6.7
NE	13.5	0.0	0.0	0.0	0.0	13.5
E	15.9	0.0	0.0	0.0	0.0	15.9
SE	15.7	0.0	0.0	0.0	0.0	15.7
S	14.5	0.0	0.0	0.0	0.0	14.5
SW	6.3	0.0	0.0	0.0	0.0	6.3
W	13.9	0.0	0.0	0.0	0.0	13.9
NW	11.4	0.0	0.0	0.0	0.0	11.4
Summary	97.9	0.0	0.0	0.0	0.0	97.9
CALM	2.1	0.0	0.0	0.0	0.0	2.1

HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	0	0	0	0	6	S	6	0	1	1	1	2	2	0	1	3	0	1	1	0	0	0	0	0	0	0	6	1	24
2	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	32	29	14	0	32	4	24
3	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	1	0	24
4	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
5	0	S	1	0	0	0	6	0	0	0	1	0	0	0	0	0	0	0	0	0	12	25	20	9	2	0	25	3	
6	S	0	4	6	16	11	11	0	0	0	0	0	0	0	3	1	0	2	7	0	0	0	0	S	0	16	3	24	
7	0	0	0	0	0	0	0	0	0	0	Q	Q	Q	0	1	1	0	1	0	0	0	0	S	15	0	15	1	24	
8	23	10	16	8	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	3	S	14	18	0	23	4	24	
9	52	0	42	2	5	8	0	0	0	0	0	0	0	0	0	0	1	6	0	0	S	0	2	8	0	52	5	24	
10	1	2	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	2	0	24	
11	0	1	1	0	1	1	1	1	1	1	0	0	0	0	0	1	0	0	S	89	34	4	2	1	0	89	6	24	
12	0	0	0	0	3	4	6	7	0	1	0	0	0	0	0	0	0	S	0	0	0	0	1	1	0	7	1	24	
13	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	1	2	0	2	0	24	
14	5	0	1	1	1	1	9	12	1	0	0	0	0	0	0	S	0	0	0	0	0	7	9	1	0	12	2	24	
15	1	1	1	1	1	1	1	0	0	0	0	0	0	0	S	1	0	0	0	0	0	0	0	1	0	1	0	24	
16	1	1	3	9	1	1	1	1	0	0	0	0	0	S	0	0	0	0	0	0	9	35	25	4	0	35	4	24	
17	13	4	1	1	6	1	1	1	5	C	C	C	C	C	C	7	10	11	14	23	41	42	73	18	1	73	15	24	
18	0	0	28	6	1	24	16	10	6	2	2	S	3	1	2	2	0	1	4	0	5	29	36	24	0	36	9	24	
19	41	53	76	35	11	11	2	4	4	3	S	2	2	2	2	1	1	1	0	0	0	0	8	0	76	11	24		
20	1	0	11	0	0	1	2	4	3	S	1	5	6	5	2	5	3	7	13	23	55	67	62	75	0	75	15	24	
21	33	16	14	28	7	8	3	1	S	7	6	9	7	4	1	1	3	0	0	15	4	24	30	23	0	33	11	24	
22	10	7	25	4	1	2	1	S	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	2	24	
23	18	0	0	9	7	6	S	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	18	2	24	
24	0	0	1	1	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0	24	
25	2	4	1	1	S	1	9	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	1	24	
26	0	1	3	S	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	24	
27	0	2	S	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	24	
28	4	S	2	6	3	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	6	1	24	
29	S	1	1	2	2	1	1	S1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	S	0	2	1	23	
30	1	1	1	1	1	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	S	2	0	2	1	24	
31	12	13	4	5	4	10	3	2	1	1	0	0	0	0	0	0	0	0	0	2	0	S	5	3	0	13	3	24	
HOURLY MAX	52	53	76	35	16	24	16	12	6	7	6	9	7	5	3	7	10	11	14	89	55	67	73	75					
HOURLY AVG	8	4	8	4	3	3	3	2	1	1	0	1	1	0	0	1	1	1	1	5	6	9	10	8					

STATUS FLAG CODES

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

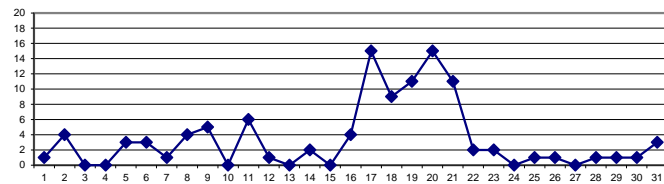
OBJECTIVE LIMIT:

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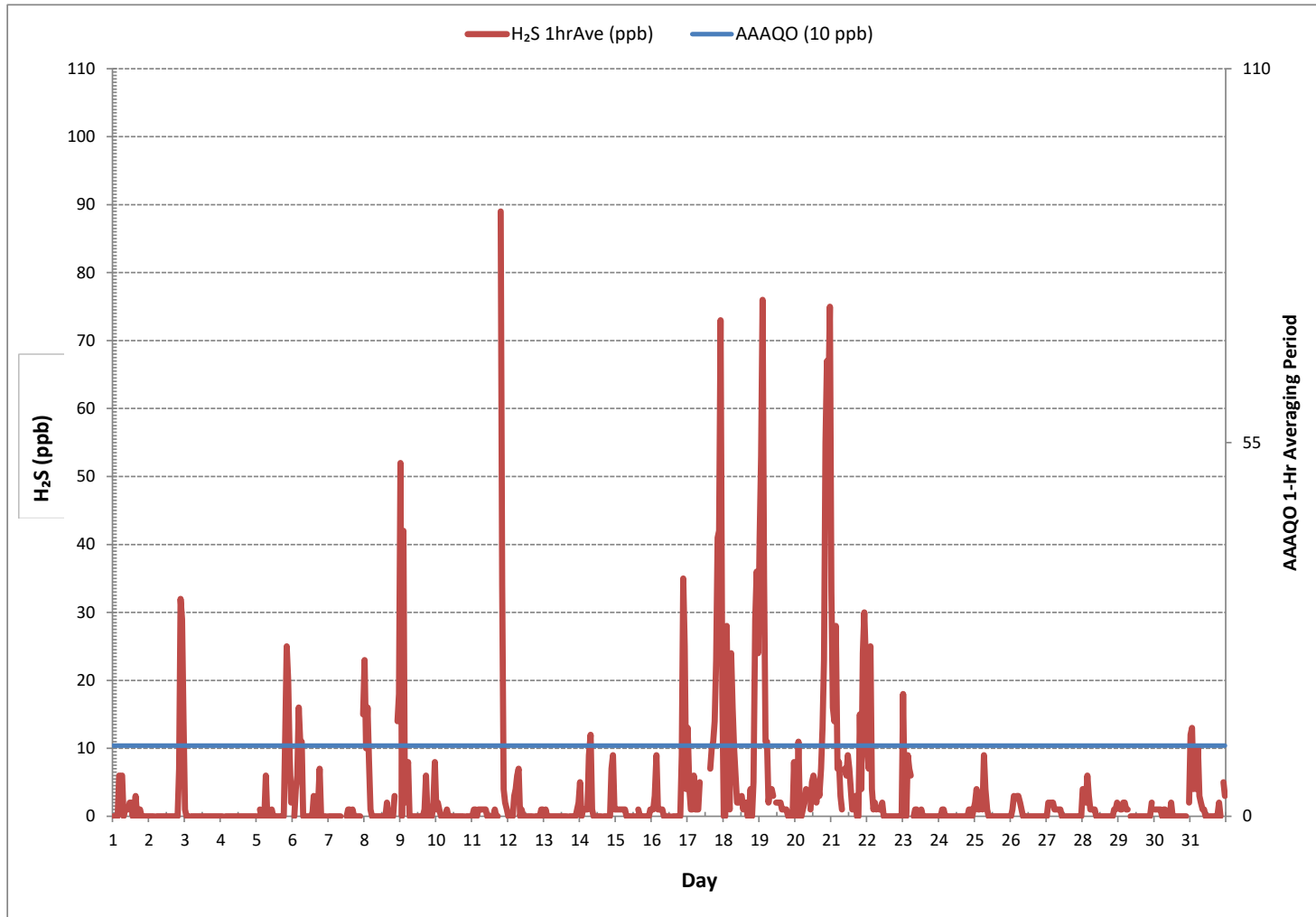
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	60			
NUMBER OF 24-HR EXCEEDANCES:	10			
NUMBER OF NON-ZERO READINGS:	296			
MINIMUM 1-HR AVERAGE:	0 ppb @ HOUR	0	ON DAY	1
MAXIMUM 1-HR AVERAGE:	89 ppb @ HOUR	19	ON DAY	11
MAXIMUM 24-HR AVERAGE:	15 ppb		ON DAY	17
IZS CALIBRATION TIME:	32 hrs	OPERATIONAL TIME:	743 hrs	
MONTHLY CALIBRATION TIME:	6 hrs	AMD OPERATION UPTIME:	99.9 %	
STANDARD DEVIATION:	10	MONTHLY AVERAGE:	3 ppb	

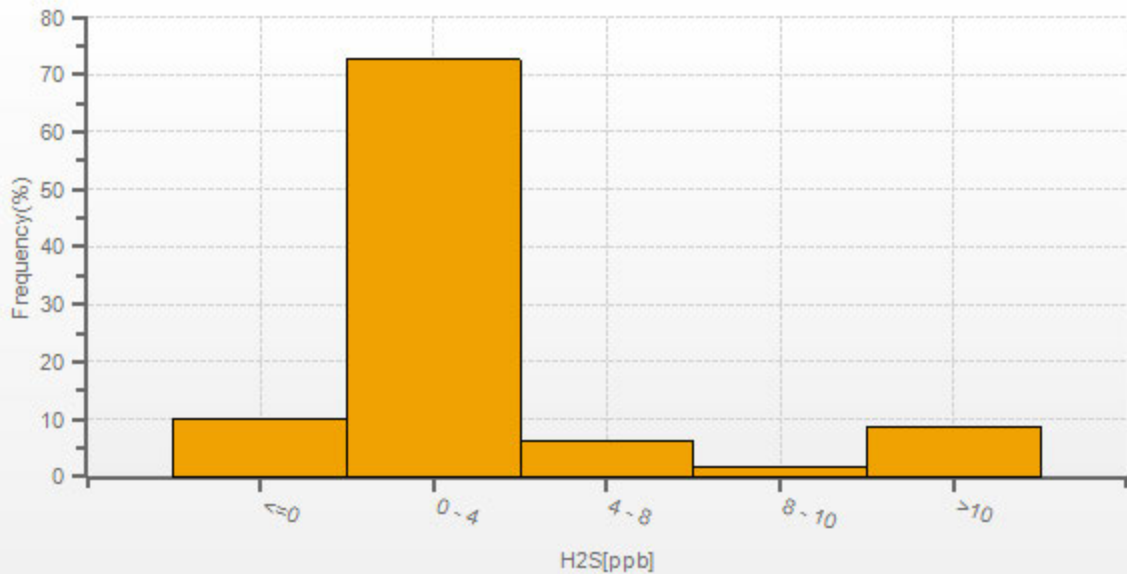
24 HR AVERAGES May 2019



HYDROGEN SULPHIDE Hourly Averages (H₂S ppb)

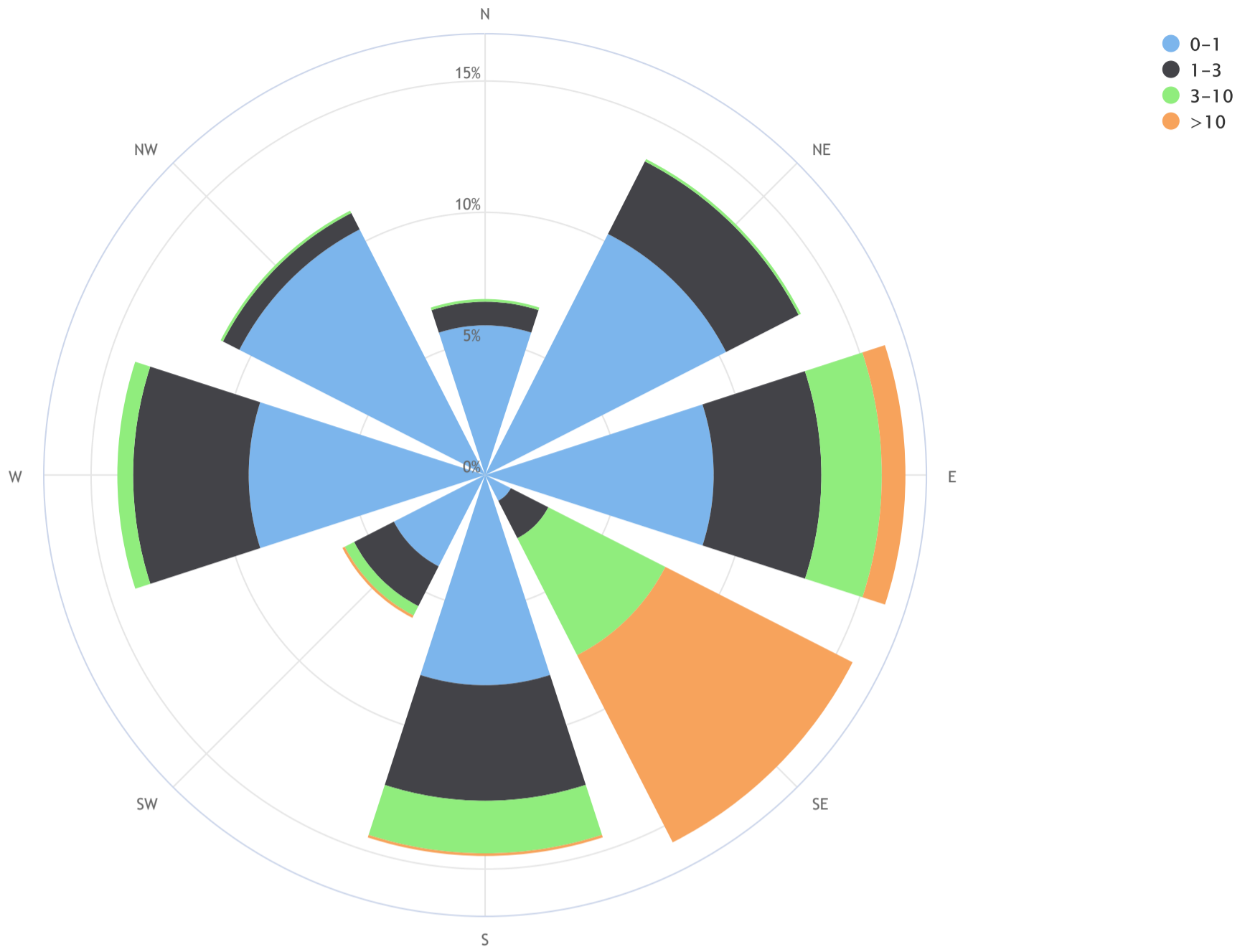


H2S[ppb] Histogram: LICA Bonnyville East Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Bonnyville East Continuous Monitoring Station_H₂S (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 2.8, CALM % = 2.1%



Direction	0-1	1-3	3-10	>10	TOTAL
N	5.7	0.9	0.1	0.0	6.7
NE	10.3	3.1	0.1	0.0	13.5
E	8.7	4.1	2.3	0.9	16.0
SE	1.1	1.6	5.0	8.0	15.7
S	8.0	4.4	2.0	0.1	14.5
SW	3.9	1.7	0.4	0.1	6.1
W	9.0	4.4	0.6	0.0	14.0
NW	10.5	0.7	0.1	0.0	11.4
Summary	57.1	20.9	10.7	9.1	97.9
CALM	0.7	0.6	0.7	0.1	2.1



TOTAL HYDROCARBONS Hourly Averages (THC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.		
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.			
DAY																														
1	2.00	2.02	2.03	2.05	2.05	S	2.11	2.14	2.09	2.07	2.02	1.99	1.97	1.96	1.97	1.98	1.97	1.97	1.95	1.97	1.99	1.98	2.01	2.07	1.95	2.14	2.02	24		
2	2.04	2.04	2.03	2.01	S	2.03	2.03	2.04	2.15	2.04	1.97	1.97	1.97	1.95	1.95	1.95	1.95	1.95	1.96	1.97	2.02	2.01	1.99	1.99	1.95	2.15	2.00	24		
3	2.01	2.02	2.01	S	2.01	1.98	2.00	2.01	1.95	1.94	1.94	1.94	1.94	1.94	1.93	1.94	1.94	1.94	1.94	1.94	1.96	1.97	1.99	2.01	1.93	2.02	1.97	24		
4	1.99	2.01	S	1.97	2.00	2.03	1.96	1.96	1.96	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.96	1.96	2.01	2.04	2.09	1.95	2.09	1.98	24		
5	2.06	S	2.15	2.13	2.13	2.16	2.22	2.09	1.97	1.96	1.96	1.95	1.94	1.94	1.94	1.94	1.95	1.95	1.95	1.97	1.97	1.99	1.98	1.97	1.94	2.22	2.01	24		
6	S	1.99	2.03	2.09	2.17	2.16	2.12	2.08	2.02	2.04	2.00	1.97	1.97	1.97	1.95	1.95	1.95	1.96	1.96	1.96	1.98	2.02	2.03	S	1.95	2.17	2.02	24		
7	2.04	2.10	2.08	2.05	2.05	2.04	2.01	2.01	2.01	1.99	1.97	Q	Q	1.96	1.96	1.95	1.96	1.96	1.96	1.96	1.99	2.04	S	1.98	1.95	2.10	2.00	24		
8	1.99	1.98	1.98	1.98	2.00	2.02	2.00	2.00	2.01	2.01	2.01	1.99	1.98	1.99	1.98	1.98	1.99	1.99	1.98	1.99	2.02	S	2.11	2.16	1.98	2.16	2.01	24		
9	2.21	2.10	2.35	2.21	2.21	2.25	2.20	2.17	2.09	2.06	2.04	2.03	2.01	1.98	1.96	1.95	1.94	1.95	1.94	1.94	S	1.99	2.03	2.04	1.94	2.35	2.07	24		
10	2.06	2.09	2.16	2.14	2.04	1.95	1.93	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.91	1.91	1.91	1.90	1.91	S	1.94	1.95	1.99	1.97	1.90	2.16	1.96	24		
11	2.06	2.03	2.06	2.06	2.05	2.12	2.15	2.15	2.05	1.99	1.95	1.93	1.92	1.92	1.92	1.92	1.91	1.91	S	2.19	2.15	2.05	2.06	2.05	1.91	2.19	2.03	24		
12	2.14	2.15	2.19	2.13	2.14	2.07	2.09	2.00	1.94	1.89	1.89	1.88	1.88	1.88	1.88	1.89	1.89	S	1.90	1.91	1.94	1.94	1.98	1.97	1.88	2.19	1.98	24		
13	1.98	2.00	1.98	2.04	2.09	2.03	1.96	1.91	1.90	1.90	1.90	1.90	1.90	1.90	1.90	S	1.91	1.91	1.91	1.93	1.95	1.98	2.03	1.90	2.09	1.95	24			
14	2.12	2.08	2.12	2.07	2.12	2.19	2.28	2.11	1.99	1.95	1.93	1.93	1.93	1.93	1.92	S	1.93	1.95	1.95	1.94	1.95	2.00	2.00	1.92	2.28	2.02	24			
15	2.01	2.01	1.97	1.98	1.95	1.94	1.93	1.92	1.92	1.92	1.92	1.92	1.93	1.93	S	1.93	1.92	1.92	1.92	1.93	1.97	1.96	1.97	2.07	1.92	2.07	1.95	24		
16	2.10	2.10	2.11	2.17	2.18	2.14	2.04	1.97	1.96	1.94	1.94	1.95	1.95	S	1.94	1.93	1.93	1.94	1.94	1.94	1.94	1.95	2.03	2.01	2.08	2.11	1.93	2.18	2.02	24
17	2.01	2.04	2.06	2.05	2.10	2.08	2.09	2.01	1.96	1.93	1.94	1.93	S	1.93	1.92	1.92	1.92	1.92	1.93	1.93	1.95	2.02	2.09	2.18	2.05	1.92	2.18	2.00	24	
18	2.10	2.09	2.15	2.16	2.21	2.03	1.96	1.95	1.95	1.95	1.95	S	1.94	1.93	1.92	1.92	1.92	1.92	1.92	1.93	1.92	1.95	2.13	2.04	2.06	1.92	2.21	2.00	24	
19	2.15	2.19	2.27	2.19	2.17	2.10	2.05	2.00	1.97	1.94	S	1.94	1.94	1.95	1.95	1.94	1.93	1.94	1.94	1.94	1.94	1.95	1.96	2.03	2.26	1.93	2.27	2.03	24	
20	2.11	2.14	2.17	2.27	2.25	2.22	2.05	2.01	1.98	S	1.95	1.96	1.97	1.95	1.94	1.94	1.93	1.93	1.94	1.96	2.08	2.21	2.25	2.27	1.93	2.27	2.06	24		
21	2.24	2.17	2.16	2.20	2.15	2.17	2.09	2.08	S	1.96	1.96	1.95	1.95	1.95	1.94	1.94	1.94	1.97	1.98	2.10	2.06	2.29	2.31	2.36	1.94	2.36	2.08	24		
22	2.40	2.36	2.31	2.19	2.11	2.18	2.14	S	2.21	2.11	C	C	C	C	2.01	2.01	2.01	2.02	2.01	2.02	2.10	2.12	2.23	2.15	2.01	2.40	2.14	24		
23	2.32	2.18	2.20	2.29	2.37	2.33	S	2.20	2.27	2.28	2.17	2.04	2.05	2.03	2.02	2.01	2.02	2.03	2.07	2.07	2.09	2.05	2.02	2.01	2.37	2.14	24			
24	2.02	2.03	2.02	2.05	2.03	S	2.03	2.06	2.03	2.02	2.04	2.02	2.02	2.02	2.02	2.02	2.03	2.02	2.02	2.02	2.06	2.12	2.26	2.15	2.02	2.26	2.05	24		
25	2.13	2.19	2.25	2.24	S	2.24	2.19	2.14	2.13	2.08	2.02	2.02	2.01	2.00	2.02	2.02	2.00	2.00	1.99	2.01	2.02	2.02	2.03	2.07	1.99	2.25	2.08	24		
26	2.12	2.17	2.27	S	2.49	2.39	2.22	2.18	2.20	2.09	2.04	2.03	2.02	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.04	2.12	2.13	2.11	2.01	2.49	2.12	24		
27	2.15	2.26	S	2.30	2.28	2.23	2.25	2.20	2.13	2.07	2.04	2.01	2.01	2.01	2.00	2.00	1.99	1.99	2.01	2.01	2.04	2.08	2.06	2.13	1.99	2.30	2.10	24		
28	2.21	S	2.24	2.16	2.19	2.19	2.15	2.15	2.09	2.05	2.01	2.01	2.00	1.99	1.99	1.98	1.99	2.00	2.00	2.02	2.04	2.05	2.13	2.11	1.98	2.24	2.08	24		
29	S	2.06	2.05	2.07	2.06	2.07	2.07	2.07	2.06	2.04	2.01	2.01	1.99	1.99	1.99	1.98	1.98	1.98	1.98	2.01	2.00	2.06	2.12	S	1.98	2.12	2.03	24		
30	2.10	2.08	2.06	2.09	2.14	2.06	2.03	2.04	2.05	2.04	2.02	2.00	1.99	1.99	1.98	1.99	1.99	2.00	2.00	2.02	2.04	2.03	S	2.13	1.98	2.14	2.04	24		
31	2.27	2.28	2.29	2.33	2.50	2.38	2.30	2.10	2.02	2.16	2.06	2.01	2.01	2.01	2.00	2.01	2.01	2.01	2.01	2.06	2.13	2.12	S	2.22	2.16	2.00	2.50	2.15	24	
HOURLY MAX	2.40	2.36	2.35	2.33	2.50	2.39	2.30	2.20	2.27	2.28	2.17	2.04	2.05	2.03	2.02	2.02	2.03	2.03	2.07	2.19	2.15	2.29	2.31	2.36						
HOURLY AVG	2.11	2.10	2.13	2.13	2.15	2.13	2.09	2.06	2.03	2.01	1.98	1.97	1.97	1.96	1.96	1.96	1.96	1.96	1.97	1.99	2.01	2.04	2.08	2.09						

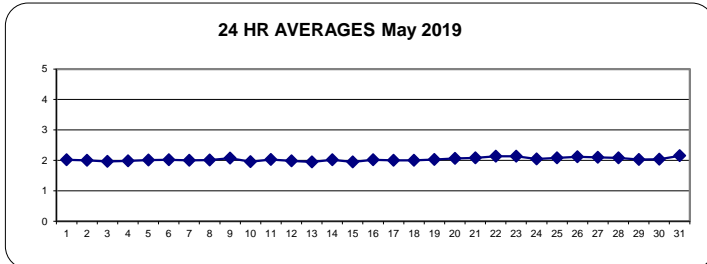
STATUS FLAG CODES

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

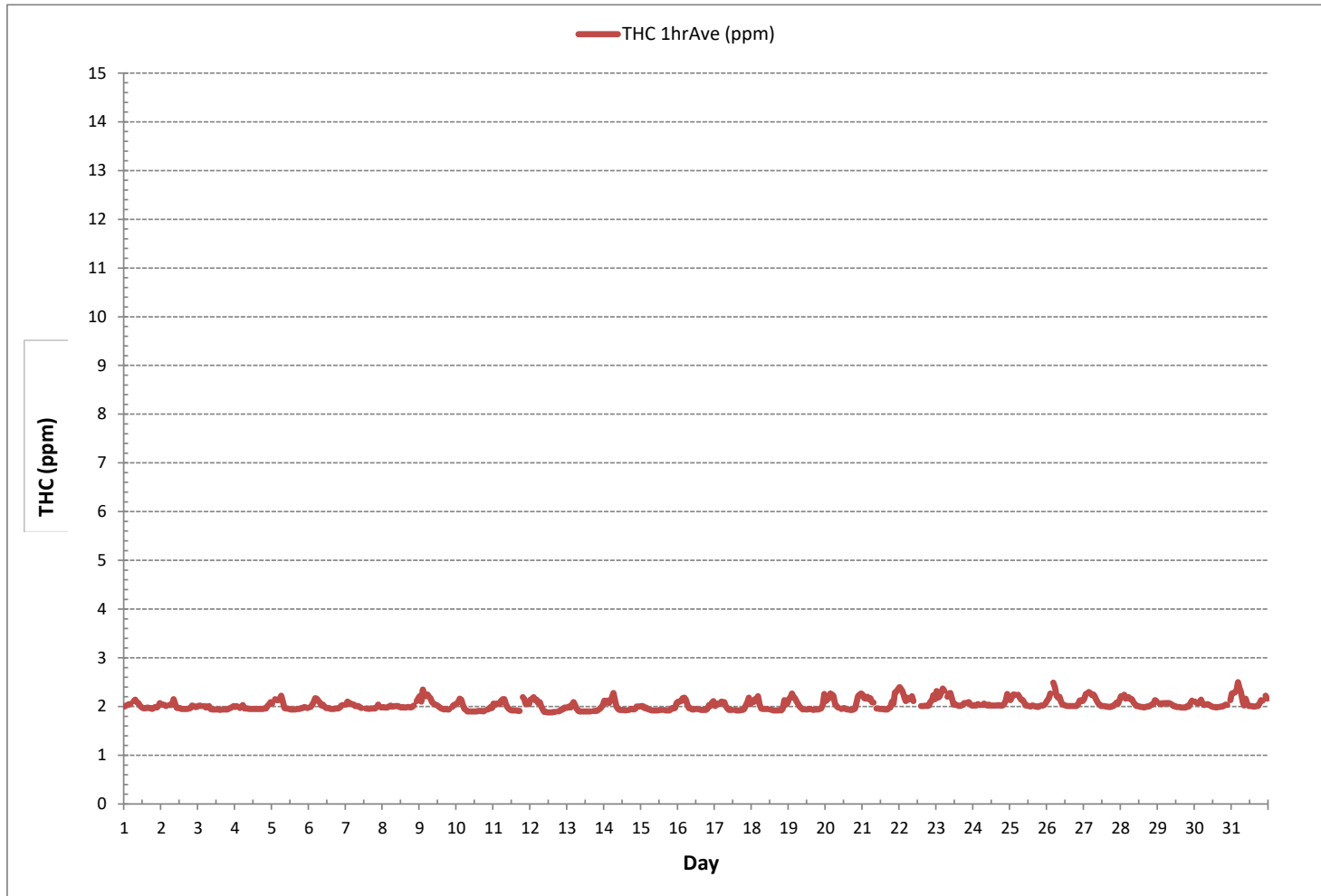
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	705			
MINIMUM 1-HR AVERAGE:	1.88 ppm	@ HOUR	11	ON DAY 12
MAXIMUM 1-HR AVERAGE:	2.50 ppm	@ HOUR	4	ON DAY 31
MAXIMUM 24-HR AVERAGE:	2.15 ppm			ON DAY 31
IZS CALIBRATION TIME:	33 hrs	OPERATIONAL TIME:	744 hrs	
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	100.0 %	
STANDARD DEVIATION:	0.10	MONTHLY AVERAGE:	2.03 ppm	

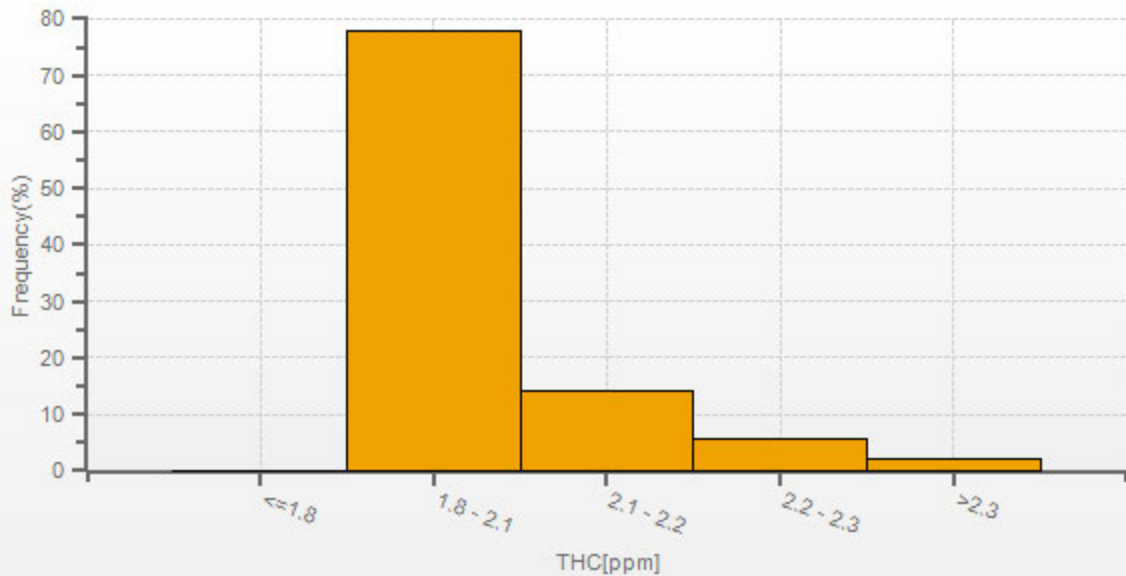
24 HR AVERAGES May 2019



TOTAL HYDROCARBONS Hourly Averages (THC ppm)

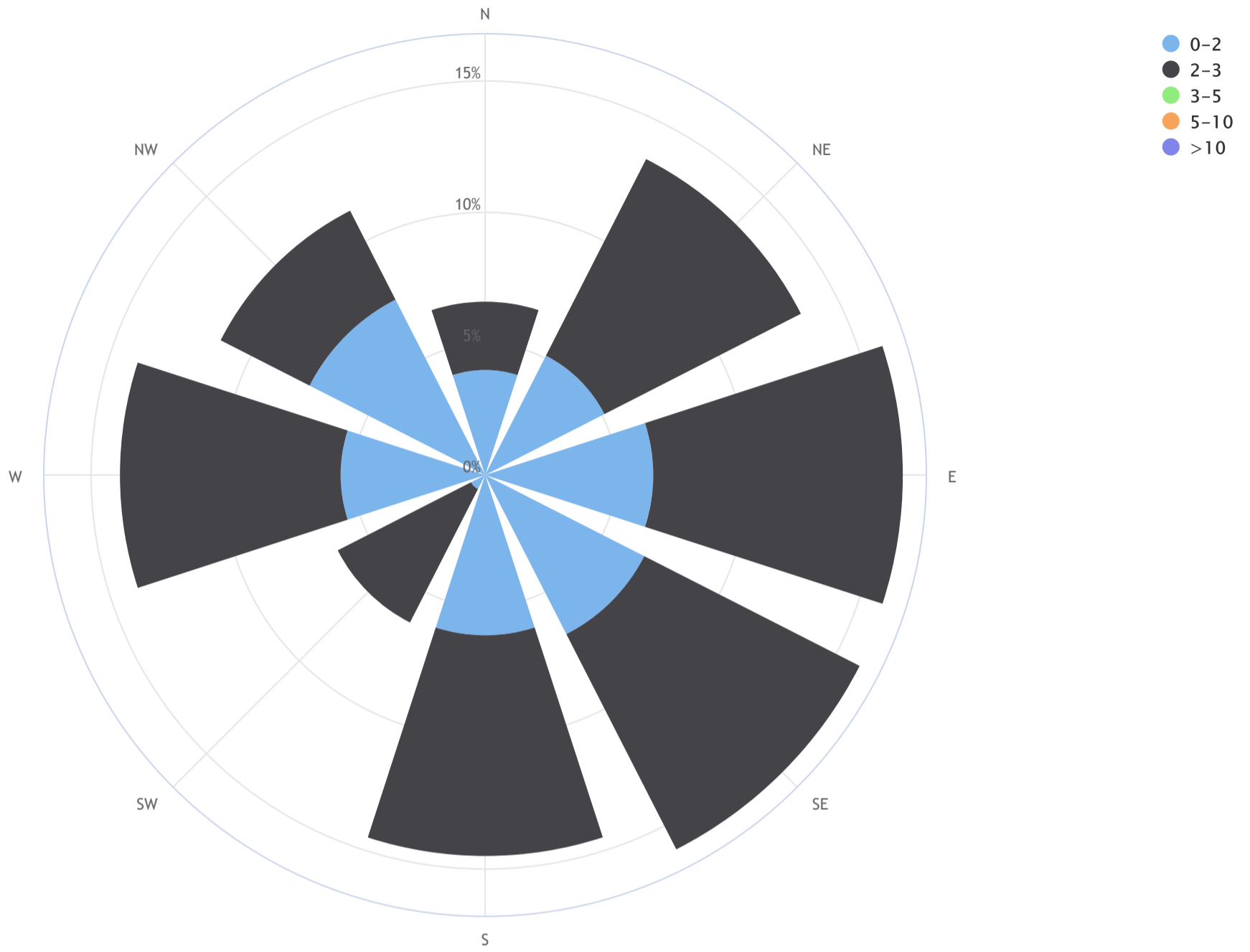


THC[ppm] Histogram: LICA Bonnyville East Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Bonnyville East Continuous Monitoring Station_THC (ppm)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 2.2, CALM % = 2.1%



Direction	0-2	2-3	3-5	5-10	>10	TOTAL
N	4.0	2.6	0.0	0.0	0.0	6.5
NE	5.1	8.4	0.0	0.0	0.0	13.5
E	6.4	9.5	0.0	0.0	0.0	15.9
SE	6.8	9.2	0.0	0.0	0.0	16.0
S	6.1	8.4	0.0	0.0	0.0	14.5
SW	0.6	5.7	0.0	0.0	0.0	6.2
W	5.5	8.4	0.0	0.0	0.0	13.9
NW	7.5	3.8	0.0	0.0	0.0	11.4
Summary	42.0	55.9	0.0	0.0	0.0	97.9
CALM	0.1	2.0	0.0	0.0	0.0	2.1



METHANE Hourly Averages (CH₄ 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	2.00	2.02	2.03	2.05	2.05	S	2.11	2.14	2.09	2.07	2.02	1.99	1.97	1.96	1.97	1.98	1.97	1.97	1.95	1.97	1.99	1.98	2.01	2.07	1.95	2.14	2.02	24		
2	2.04	2.04	2.03	2.01	S	2.03	2.03	2.04	2.15	2.04	1.97	1.97	1.97	1.95	1.95	1.95	1.95	1.96	1.97	2.02	2.01	1.99	1.99	1.95	2.15	2.00	24			
3	2.01	2.02	2.01	S	2.01	1.98	2.00	2.01	1.95	1.94	1.94	1.94	1.94	1.94	1.93	1.94	1.94	1.94	1.94	1.94	1.96	1.97	1.99	2.01	1.93	2.02	1.97	24		
4	1.99	2.01	S	1.97	2.00	2.03	1.96	1.96	1.96	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.96	1.96	2.01	2.04	2.09	1.95	2.09	1.98	24		
5	2.06	S	2.15	2.13	2.13	2.16	2.22	2.09	1.97	1.96	1.96	1.95	1.94	1.94	1.94	1.94	1.95	1.95	1.95	1.97	1.97	1.99	1.98	1.97	1.94	2.22	2.01	24		
6	S	1.99	2.03	2.09	2.17	2.16	2.12	2.08	2.02	2.04	2.00	1.97	1.97	1.97	1.95	1.95	1.95	1.96	1.96	1.96	1.98	2.02	2.03	S	1.95	2.17	2.02	24		
7	2.04	2.10	2.08	2.05	2.05	2.04	2.01	2.01	2.01	1.99	1.97	Q	Q	1.96	1.96	1.95	1.96	1.96	1.96	1.96	1.99	2.04	S	1.98	1.95	2.10	2.00	24		
8	1.99	1.98	1.98	1.98	2.00	2.02	2.00	2.00	2.01	2.01	2.01	1.99	1.98	1.99	1.98	1.98	1.99	1.99	1.98	1.99	2.02	S	2.11	2.16	1.98	2.16	2.01	24		
9	2.21	2.10	2.35	2.21	2.21	2.25	2.20	2.17	2.09	2.06	2.04	2.03	2.01	1.98	1.96	1.95	1.94	1.95	1.94	1.94	S	1.99	2.03	2.04	1.94	2.35	2.07	24		
10	2.06	2.09	2.16	2.14	2.04	1.95	1.93	1.90	1.90	1.90	1.90	1.90	1.90	1.90	1.91	1.91	1.91	1.90	1.91	S	1.94	1.95	1.99	1.97	1.90	2.16	1.96	24		
11	2.06	2.03	2.06	2.06	2.05	2.12	2.15	2.15	2.05	1.99	1.95	1.93	1.92	1.92	1.92	1.92	1.91	1.91	S	2.19	2.15	2.05	2.06	2.05	1.91	2.19	2.03	24		
12	2.14	2.15	2.19	2.13	2.14	2.07	2.09	2.00	1.94	1.89	1.89	1.88	1.88	1.88	1.88	1.89	1.89	S	1.90	1.91	1.94	1.94	1.98	1.97	1.88	2.19	1.98	24		
13	1.98	2.00	1.98	2.04	2.09	2.03	1.96	1.91	1.90	1.90	1.90	1.90	1.90	1.90	1.90	S	1.91	1.91	1.91	1.93	1.95	1.98	2.03	1.90	2.09	1.95	24			
14	2.12	2.08	2.12	2.07	2.12	2.19	2.28	2.11	1.99	1.95	1.93	1.93	1.93	1.93	1.92	S	1.93	1.95	1.95	1.94	1.95	2.00	2.00	1.92	2.28	2.02	24			
15	2.01	2.01	1.97	1.98	1.95	1.94	1.93	1.92	1.92	1.92	1.92	1.92	1.93	1.93	S	1.93	1.92	1.92	1.92	1.93	1.97	1.96	1.97	2.07	1.92	2.07	1.95	24		
16	2.10	2.10	2.11	2.16	2.18	2.14	2.04	1.97	1.96	1.94	1.94	1.95	1.95	S	1.94	1.93	1.93	1.94	1.94	1.94	1.94	1.95	2.03	2.01	2.08	2.11	1.93	2.18	2.02	24
17	2.01	2.04	2.06	2.05	2.10	2.08	2.09	2.01	1.96	1.93	1.94	1.93	S	1.93	1.92	1.92	1.92	1.92	1.93	1.93	1.95	2.02	2.09	2.18	2.05	1.92	2.18	2.00	24	
18	2.10	2.09	2.15	2.16	2.21	2.03	1.96	1.95	1.95	1.95	1.95	S	1.94	1.93	1.92	1.92	1.92	1.92	1.93	1.92	1.95	2.13	2.04	2.06	1.92	2.21	2.00	24		
19	2.15	2.19	2.27	2.19	2.17	2.10	2.05	2.00	1.97	1.94	S	1.94	1.94	1.95	1.95	1.94	1.93	1.94	1.94	1.94	1.95	1.96	2.03	2.26	1.93	2.27	2.03	24		
20	2.11	2.14	2.17	2.27	2.25	2.22	2.05	2.01	1.98	S	1.95	1.96	1.97	1.95	1.94	1.94	1.93	1.93	1.94	1.96	2.08	2.21	2.25	2.27	1.93	2.27	2.06	24		
21	2.24	2.17	2.16	2.20	2.15	2.17	2.09	2.08	S	1.96	1.96	1.95	1.95	1.95	1.94	1.94	1.94	1.97	1.98	2.10	2.06	2.29	2.31	2.36	1.94	2.36	2.08	24		
22	2.40	2.36	2.31	2.19	2.11	2.18	2.14	S	2.21	2.11	C	C	C	C	2.01	2.01	2.01	2.02	2.01	2.02	2.10	2.12	2.23	2.15	2.01	2.40	2.14	24		
23	2.32	2.18	2.20	2.29	2.37	2.33	S	2.20	2.27	2.28	2.17	2.04	2.05	2.03	2.02	2.01	2.02	2.03	2.07	2.07	2.07	2.09	2.05	2.02	2.01	2.37	2.14	24		
24	2.02	2.03	2.02	2.05	2.03	S	2.03	2.06	2.03	2.02	2.04	2.02	2.02	2.02	2.02	2.02	2.03	2.02	2.02	2.02	2.06	2.08	2.11	2.09	2.02	2.11	2.04	24		
25	2.13	2.19	2.22	2.23	S	2.24	2.19	2.14	2.13	2.08	2.02	2.02	2.01	2.00	2.02	2.02	2.00	2.00	1.99	2.01	2.02	2.02	2.03	2.07	1.99	2.24	2.08	24		
26	2.12	2.17	2.27	S	2.49	2.39	2.22	2.18	2.20	2.09	2.04	2.03	2.02	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.04	2.12	2.13	2.11	2.01	2.49	2.12	24		
27	2.15	2.26	S	2.30	2.28	2.23	2.25	2.20	2.13	2.07	2.04	2.01	2.01	2.01	2.00	2.00	1.99	1.99	2.01	2.01	2.04	2.08	2.06	2.13	1.99	2.30	2.10	24		
28	2.21	S	2.24	2.16	2.19	2.19	2.15	2.15	2.09	2.05	2.01	2.01	2.00	1.99	1.99	1.98	1.98	1.99	2.00	2.02	2.04	2.05	2.13	2.11	1.98	2.24	2.08	24		
29	S	2.06	2.05	2.07	2.06	2.07	2.07	2.07	2.06	2.04	2.01	2.01	1.99	1.99	1.99	1.98	1.98	1.98	1.98	2.01	2.00	2.06	2.12	S	1.98	2.12	2.03	24		
30	2.10	2.08	2.06	2.09	2.14	2.06	2.03	2.04	2.05	2.04	2.02	2.00	1.99	1.99	1.98	1.99	1.99	2.00	2.00	2.02	2.04	2.03	S	2.11	1.98	2.14	2.04	24		
31	2.27	2.28	2.29	2.27	2.36	2.38	2.30	2.10	2.02	2.06	2.03	2.01	2.01	2.01	2.00	2.00	2.01	2.01	2.06	2.13	2.12	S	2.22	2.16	2.00	2.38	2.13	24		
HOURLY MAX	2.40	2.36	2.35	2.30	2.49	2.39	2.30	2.20	2.27	2.28	2.17	2.04	2.05	2.03	2.02	2.02	2.03	2.03	2.07	2.19	2.15	2.29	2.31	2.36						
HOURLY AVG	2.11	2.10	2.13	2.12	2.14	2.13	2.09	2.06	2.03	2.01	1.98	1.97	1.97	1.96	1.96	1.96	1.96	1.96	1.97	1.99	2.01	2.04	2.07	2.08						

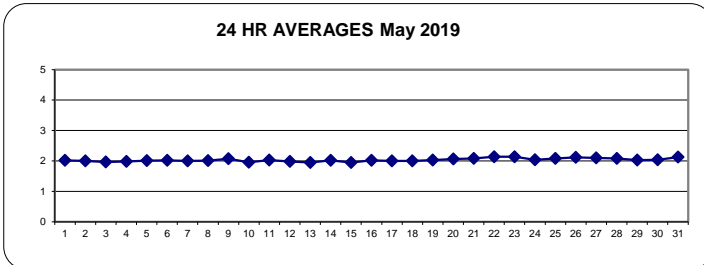
STATUS FLAG CODES

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

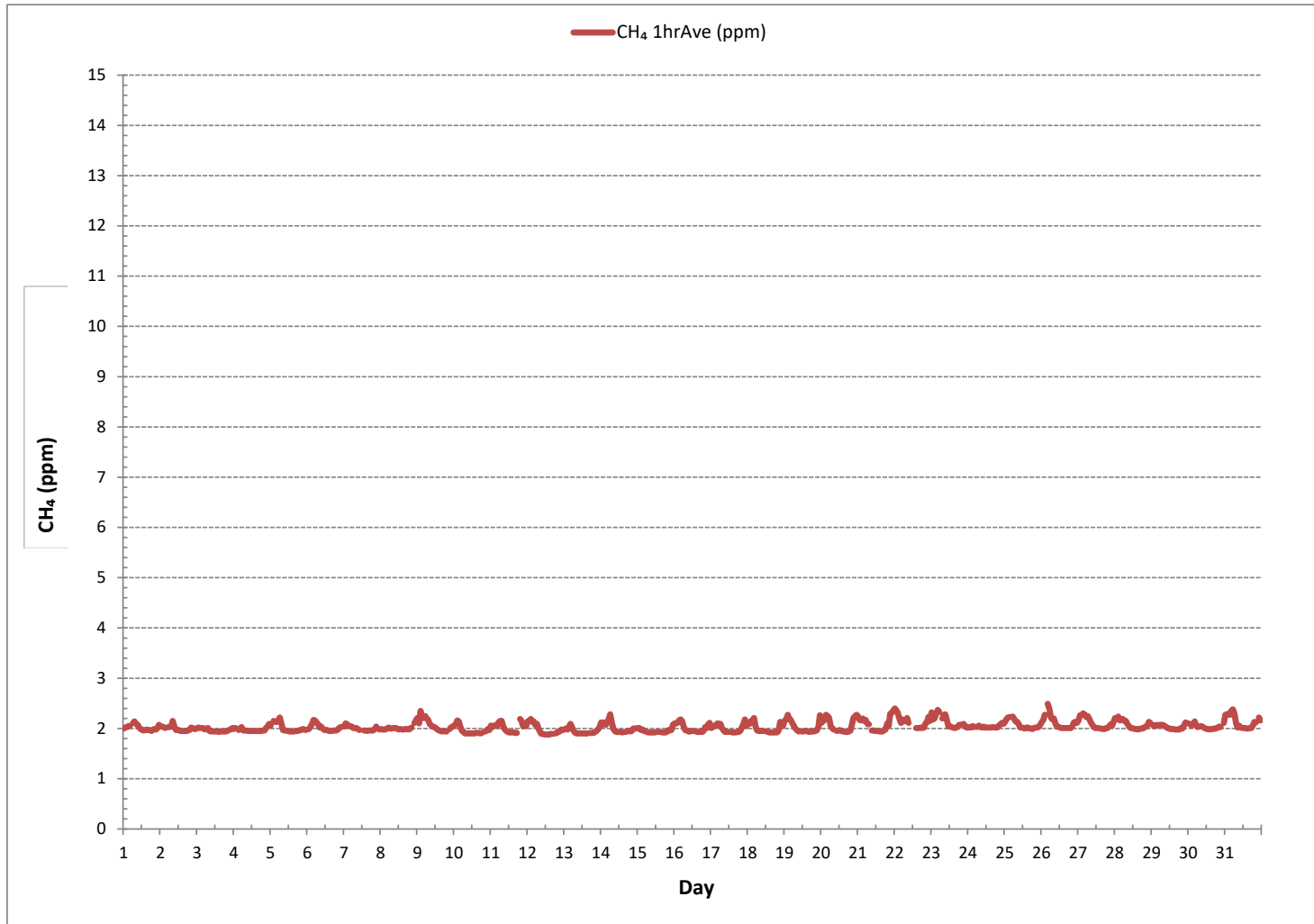
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	705
MINIMUM 1-HR AVERAGE:	1.88 ppm @ HOUR 11 ON DAY 12
MAXIMUM 1-HR AVERAGE:	2.49 ppm @ HOUR 4 ON DAY 26
MAXIMUM 24-HR AVERAGE:	2.14 ppm ON DAY 22
IZS CALIBRATION TIME:	33 hrs OPERATIONAL TIME: 744 hrs
MONTHLY CALIBRATION TIME:	4 hrs AMD OPERATION UPTIME: 100.0 %
STANDARD DEVIATION:	0.10 MONTHLY AVERAGE: 2.03 ppm

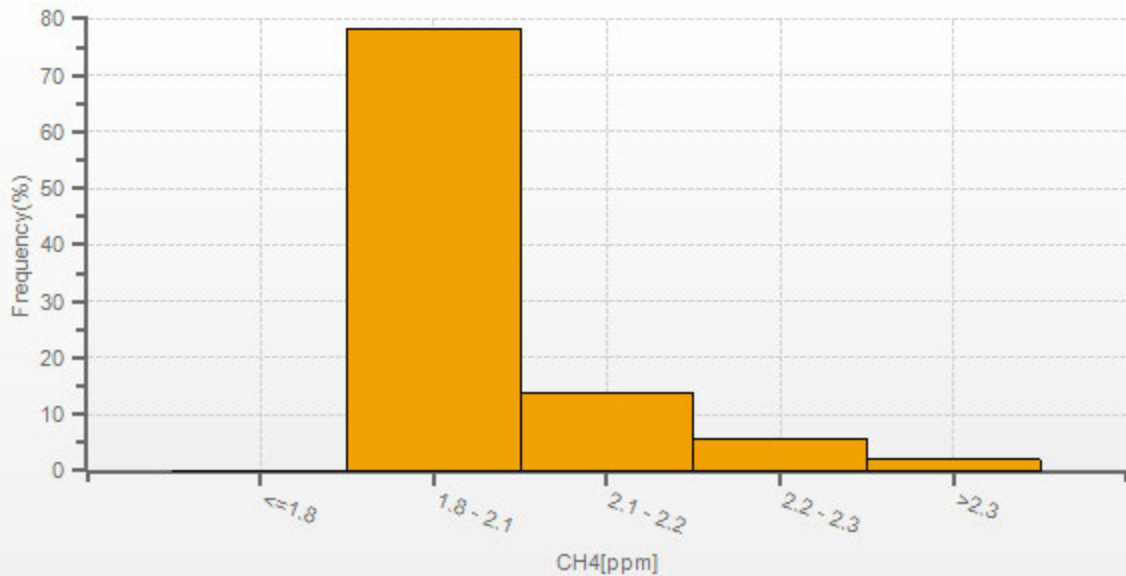
24 HR AVERAGES May 2019



METHANE Hourly Averages (CH₄ ppm)

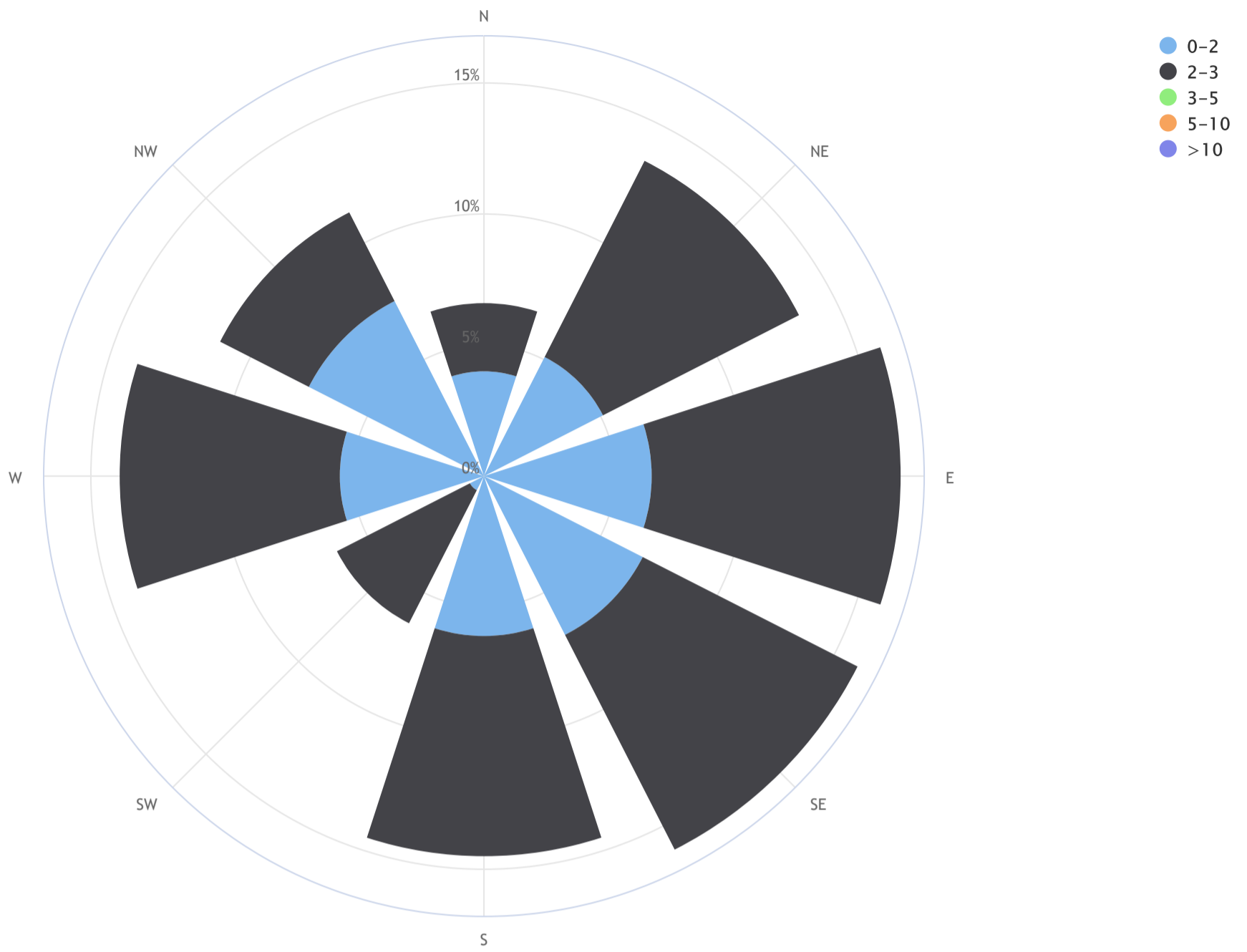


CH4[ppm] Histogram: LICA Bonnyville East Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Bonnyville East Continuous Monitoring Station_CH4 (ppm)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 2.2, CALM % = 2.1%



Direction	0-2	2-3	3-5	5-10	>10	TOTAL
N	4.0	2.6	0.0	0.0	0.0	6.5
NE	5.1	8.4	0.0	0.0	0.0	13.5
E	6.4	9.5	0.0	0.0	0.0	15.9
SE	6.8	9.2	0.0	0.0	0.0	16.0
S	6.1	8.4	0.0	0.0	0.0	14.5
SW	0.6	5.7	0.0	0.0	0.0	6.2
W	5.5	8.4	0.0	0.0	0.0	13.9
NW	7.5	3.8	0.0	0.0	0.0	11.4
Summary	42.0	55.9	0.0	0.0	0.0	97.9
CALM	0.1	2.0	0.0	0.0	0.0	2.1



NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	0.00	0.00	0.00	0.00	0.00	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
2	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	0.00	24
3	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	0.00	24
4	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
5	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
6	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	24
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Q	Q	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	24
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	24
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	24
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	24
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	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	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	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	24
14	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	0.00	0.00	0.00	0.00	24
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	24
16	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	24
17	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	0.00	0.00	0.00	0.00	0.00	24
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
22	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	C	C	C	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
23	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	0.00	24
24	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	0.04	0.14	0.06	0.00	0.14	0.01	24	
25	0.00	0.00	0.03	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	0.03	0.00	24	
26	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	0.00	24
27	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
28	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24
29	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	24
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	0.00	0.00	0.00	0.00	0.00	S	0.02	0.00	0.02	0.00	24
31	0.00	0.00	0.00	0.06	0.15	0.00	0.00	0.00	0.00	0.11	0.03	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	0.15	0.02	24
HOURLY MAX	0.00	0.00	0.03	0.06	0.15	0.00	0.00	0.00	0.00	0.11	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.14	0.06					
HOURLY AVG	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					

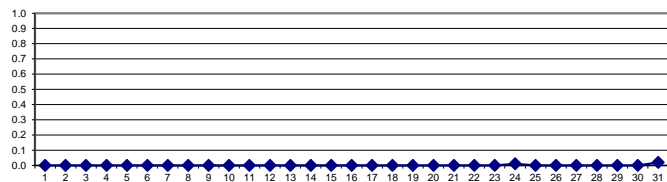
STATUS FLAG CODES

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

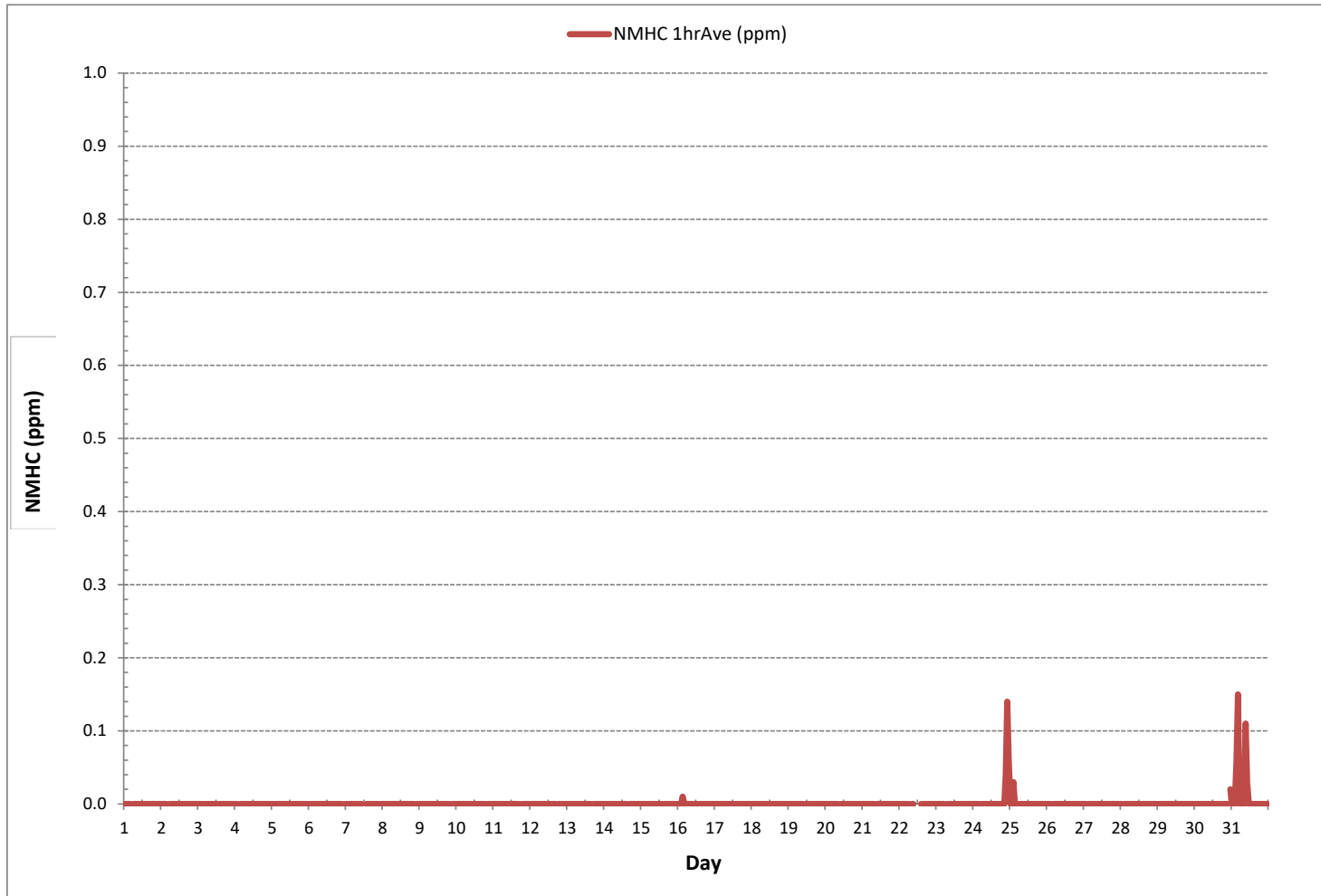
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	10				
MINIMUM 1-HR AVERAGE:	0.00 ppm @ HOUR	0	ON DAY	1	
MAXIMUM 1-HR AVERAGE:	0.15 ppm @ HOUR	4	ON DAY	31	
MAXIMUM 24-HR AVERAGE:	0.02 ppm		ON DAY	31	
IZS CALIBRATION TIME:	33 hrs	OPERATIONAL TIME:	744 hrs		
MONTHLY CALIBRATION TIME:	4 hrs	AMD OPERATION UPTIME:	100.0 %		
STANDARD DEVIATION:	0.01	MONTHLY AVERAGE:	0.00 ppm		

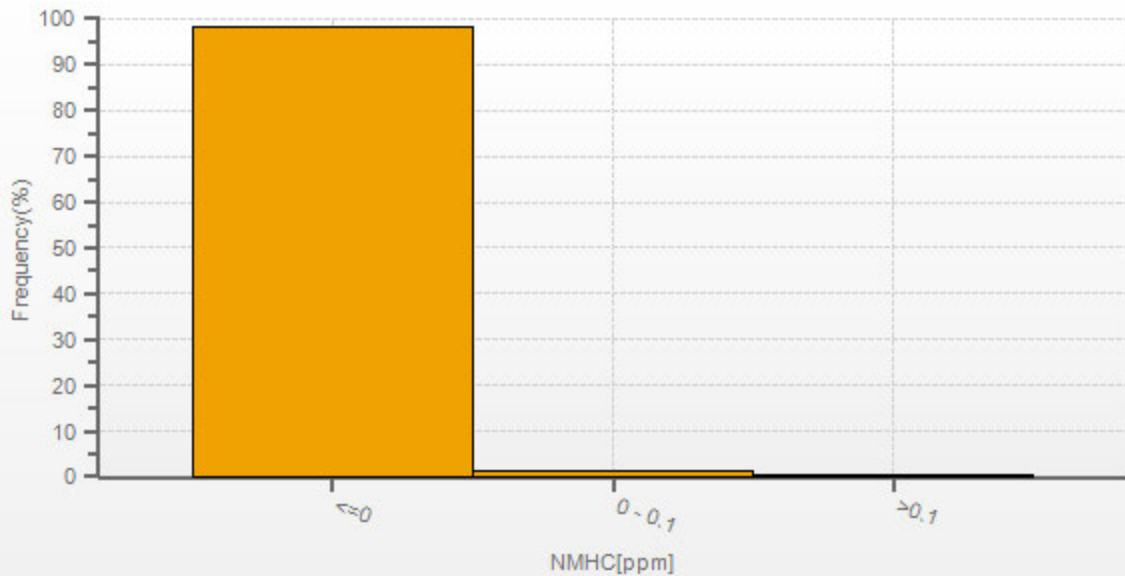
24 HR AVERAGES May 2019



NON-METHANE HYDROCARBONS Hourly Averages (NMHC ppm)

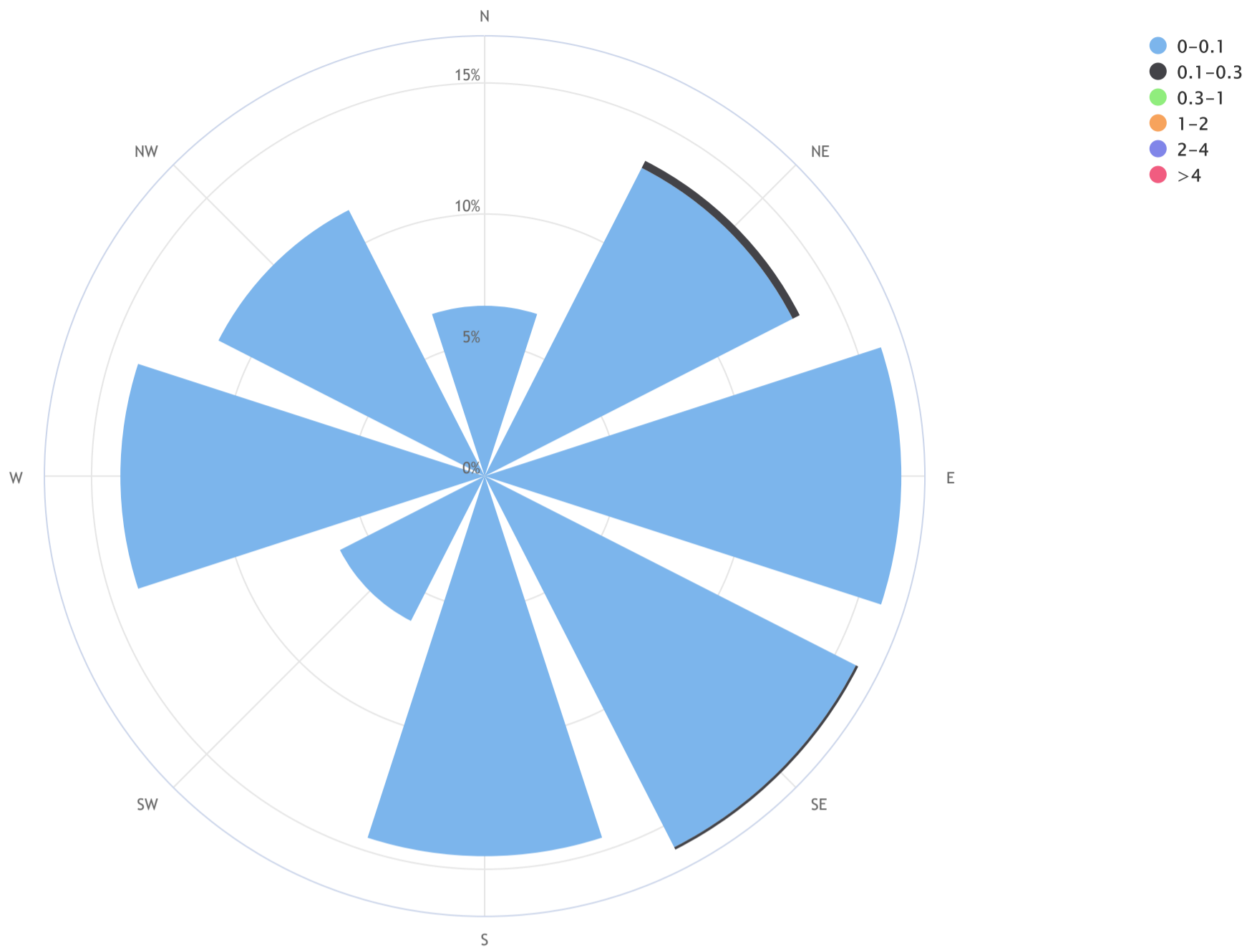


NMHC[ppm] Histogram: LICA Bonnyville East Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Bonnyville East Continuous Monitoring Station_NMHC (ppm)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.0, CALM % = 2.1%



Direction	0-0.1	0.1-0.3	0.3-1	1-2	2-4	>4	TOTAL
N	6.5	0.0	0.0	0.0	0.0	0.0	6.5
NE	13.2	0.3	0.0	0.0	0.0	0.0	13.5
E	15.9	0.0	0.0	0.0	0.0	0.0	15.9
SE	15.9	0.1	0.0	0.0	0.0	0.0	16.0
S	14.5	0.0	0.0	0.0	0.0	0.0	14.5
SW	6.2	0.0	0.0	0.0	0.0	0.0	6.2
W	13.9	0.0	0.0	0.0	0.0	0.0	13.9
NW	11.4	0.0	0.0	0.0	0.0	0.0	11.4
Summary	97.5	0.4	0.0	0.0	0.0	0.0	97.9
CALM	2.1	0.0	0.0	0.0	0.0	0.0	2.1



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	1	2	1	1	2	S	3	4	3	2	2	2	1	1	2	2	2	2	2	3	5	4	6	6	1	6	2	24	
2	2	1	2	3	S	7	9	5	6	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	9	2	24
3	2	2	2	S	2	2	3	4	1	1	1	1	1	1	0	0	0	0	0	1	2	3	3	4	0	4	2	24	
4	3	3	S	3	5	4	1	1	1	1	0	0	0	0	0	0	1	0	0	1	1	3	5	7	0	7	2	24	
5	4	S	9	7	6	10	8	3	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	0	10	2	24	
6	S	2	2	2	3	2	2	2	2	2	1	1	1	2	2	2	2	2	2	2	3	2	2	S	1	3	2	24	
7	2	3	2	9	2	2	2	2	Q	Q	Q	Q	1	1	3	1	2	1	1	1	1	2	S	1	1	9	2	24	
8	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	S	3	1	3	1	24	
9	2	2	3	4	4	4	4	4	2	2	2	2	1	1	1	1	1	1	1	2	2	S	2	3	3	1	4	2	24
10	3	4	4	5	5	3	5	1	1	1	1	0	0	0	0	1	1	1	2	S	3	4	4	3	0	5	2	24	
11	10	5	5	3	2	3	7	8	5	3	1	1	1	1	1	1	1	1	S	2	2	2	2	2	1	10	3	24	
12	3	3	4	3	3	3	3	2	2	2	1	1	1	1	1	1	1	S	1	1	1	2	2	3	2	1	4	2	24
13	2	2	3	5	7	6	3	1	1	1	1	1	1	1	1	S	1	1	1	1	2	4	3	3	1	7	2	24	
14	3	2	3	3	9	13	10	5	4	1	1	1	1	1	S	2	1	2	2	1	2	1	2	1	2	1	13	3	24
15	2	2	2	2	1	1	1	1	1	1	1	1	1	S	1	1	1	1	1	1	2	2	2	2	1	2	1	24	
16	2	2	2	7	6	12	43	19	1	1	26	1	S	1	18	1	1	1	5	3	1	1	3	1	43	7	24		
17	1	2	2	2	2	27	2	3	0	C	C	C	C	C	C	C	1	0	1	1	1	1	1	1	0	27	-	24	
18	3	2	3	4	5	2	1	1	1	1	1	S	1	1	1	1	1	1	1	1	1	2	2	2	1	5	2	24	
19	2	2	2	3	3	3	2	2	1	1	S	1	1	1	1	1	1	1	1	1	1	4	10	4	1	10	2	24	
20	3	3	2	3	4	4	2	2	1	S	2	1	1	1	1	1	1	1	1	1	1	5	11	2	1	11	2	24	
21	2	2	2	2	13	7	3	2	S	1	1	1	1	1	2	1	1	1	1	2	3	5	5	4	1	13	3	24	
22	7	5	3	5	4	6	4	S	15	13	10	3	1	1	1	1	1	1	1	2	6	11	6	5	1	15	5	24	
23	4	11	5	7	30	7	S	6	7	6	4	2	2	1	1	1	1	4	3	2	3	3	2	2	1	30	5	24	
24	2	3	2	2	14	S	S1	S1	2	1	1	1	C1	C1	1	1	1	2	3	1	1	3	4	3	1	14	3	20	
25	3	4	5	4	S	4	3	2	2	1	0	1	1	0	1	2	1	1	1	1	2	2	3	3	0	5	2	24	
26	4	6	8	S	13	10	6	S1	3	1	1	1	1	1	1	1	1	1	1	1	4	4	4	5	1	13	3	23	
27	5	4	S	5	5	5	5	6	6	5	4	3	2	2	2	2	2	2	2	8	8	6	5	8	2	8	4	24	
28	6	S	6	4	5	6	4	C1	C1	C1	C1	C1	C1	C1	C1	2	2	2	2	5	7	6	4	4	2	7	-	16	
29	S	4	4	4	5	5	5	5	4	4	3	3	2	2	2	2	1	1	2	3	8	8	4	S	1	8	4	24	
30	4	3	3	3	5	5	48	3	3	3	36	172	2	1	1	1	2	3	2	2	2	4	S	4	1	172	14	24	
31	5	3	5	4	11	5	3	2	2	2	2	1	1	1	1	2	2	2	2	3	6	S	5	4	1	11	3	24	
HOURLY MAX	10	11	9	9	30	27	48	19	15	13	36	172	2	2	3	18	2	4	3	8	8	11	11	8					
HOURLY AVG	3	3	3	4	6	6	7	4	3	2	4	8	1	1	1	2	1	1	1	2	3	3	4	3					

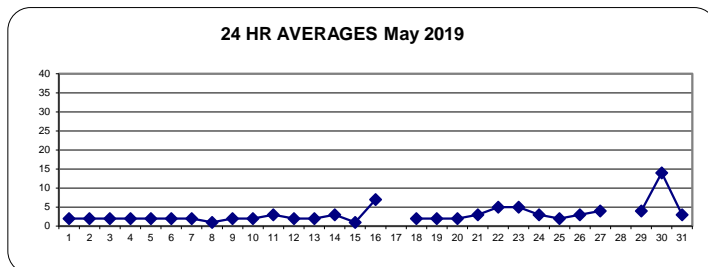
STATUS FLAG CODES

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

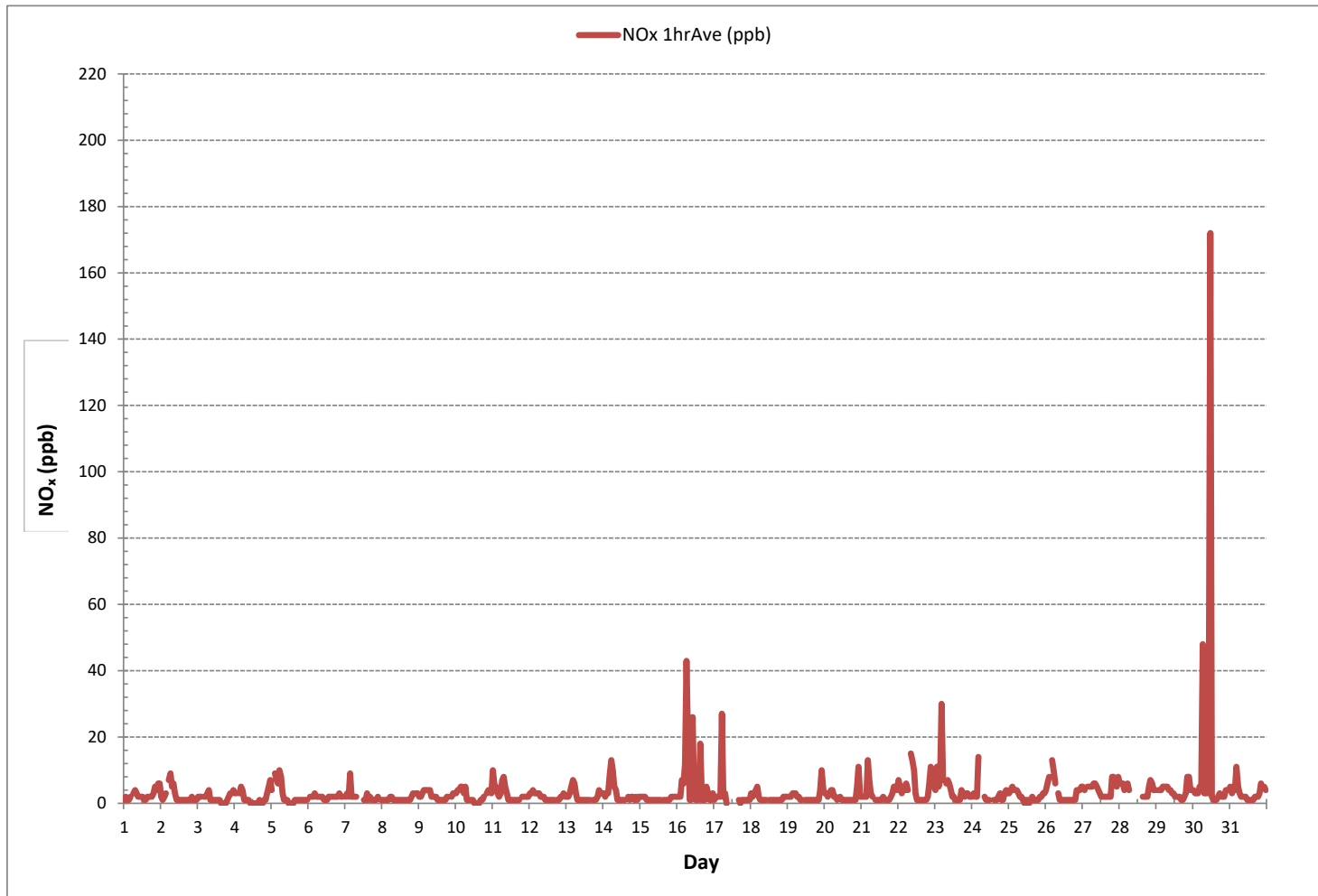
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	664			
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	15	ON DAY 3
MAXIMUM 1-HR AVERAGE:	172	ppb @ HOUR	11	ON DAY 30
MAXIMUM 24-HR AVERAGE:	14	ppb		ON DAY 30
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	731 hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	98.3 %
STANDARD DEVIATION:	8		MONTHLY AVERAGE:	3 ppb

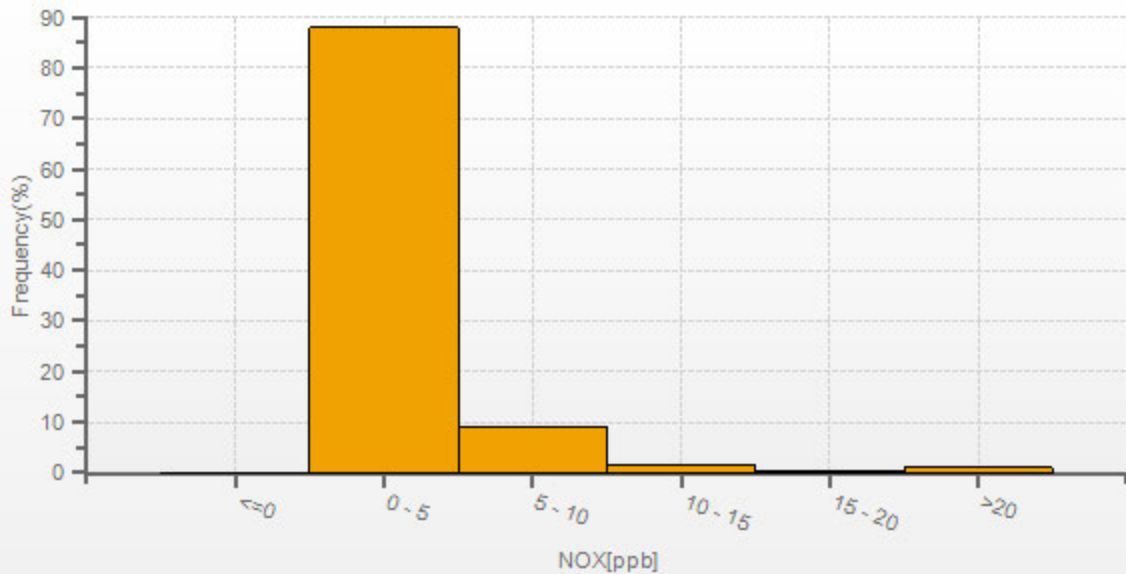
24 HR AVERAGES May 2019



OXIDES OF NITROGEN Hourly Averages (NO_x ppb)

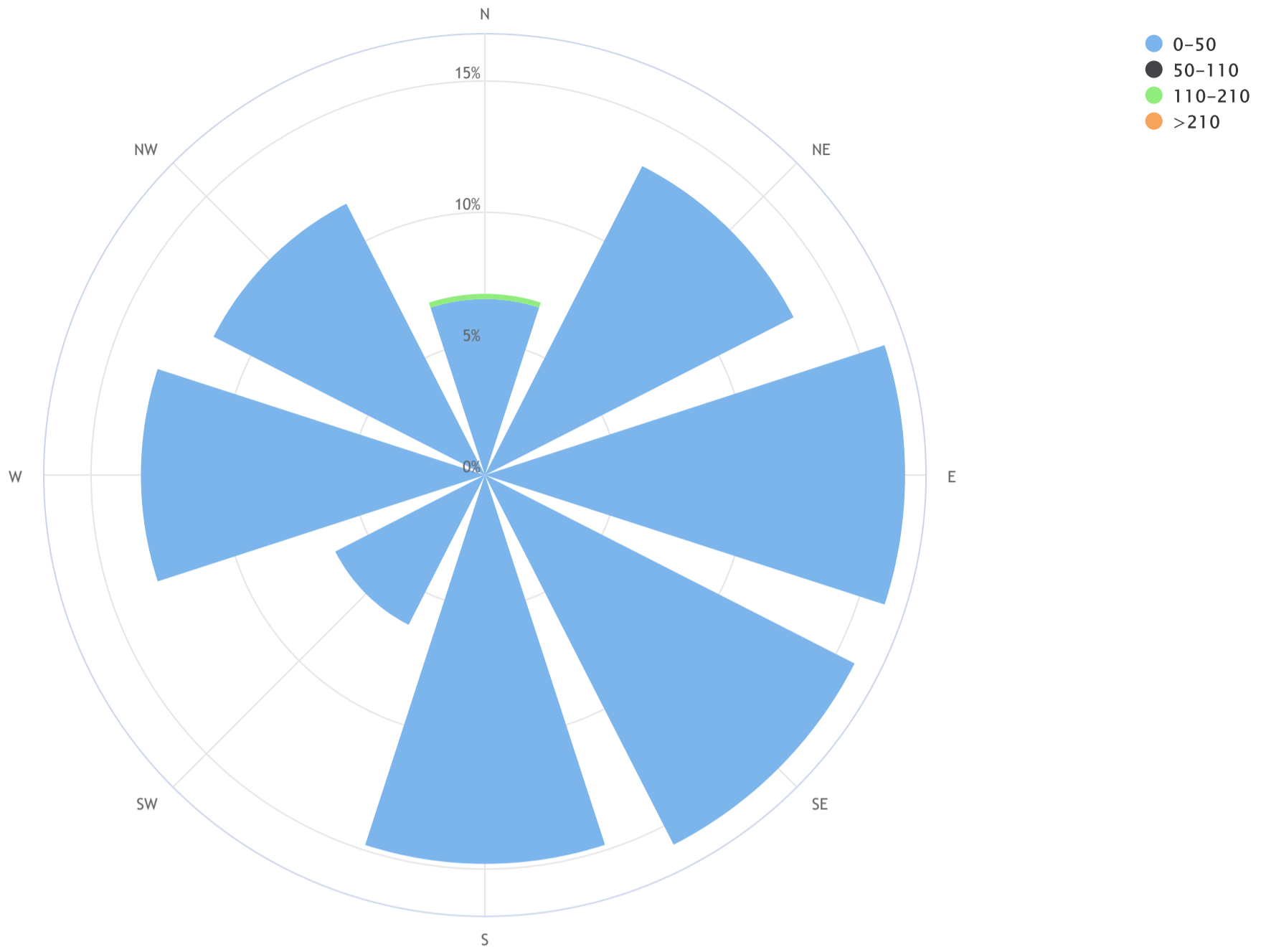


NOX[ppb] Histogram: LICA Bonnyville East Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Bonnyville East Continuous Monitoring Station_NO_x (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 5.8, CALM % = 2.2%



Direction	0-50	50-110	110-210	>210	TOTAL
N	6.7	0.0	0.2	0.0	6.8
NE	13.2	0.0	0.0	0.0	13.2
E	16.0	0.0	0.0	0.0	16.0
SE	15.8	0.0	0.0	0.0	15.8
S	14.8	0.0	0.0	0.0	14.8
SW	6.4	0.0	0.0	0.0	6.4
W	13.1	0.0	0.0	0.0	13.1
NW	11.6	0.0	0.0	0.0	11.6
Summary	97.7	0.0	0.2	0.0	97.8
CALM	2.2	0.0	0.0	0.0	2.2

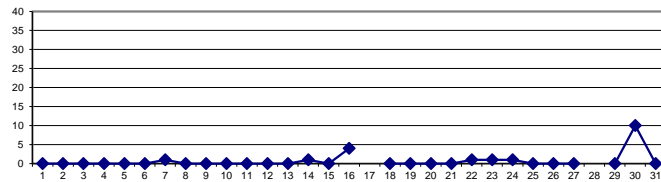
NITRIC OXIDE Hourly Averages (NO ppb)

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	S	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
2	0	0	0	0	S	0	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
3	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
4	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	
5	0	S	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	24	
6	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	24	
7	0	0	0	7	0	0	0	0	Q	Q	Q	Q	0	0	1	0	1	0	0	0	0	0	0	S	0	0	7	24	
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	24	
9	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	1	24	
10	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	2	24	
11	0	0	0	0	0	0	2	2	2	1	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	2	24	
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	24	
13	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	1	0	0	0	1	24	
14	0	0	0	0	1	3	3	2	1	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	3	24	
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	24	
16	0	0	0	2	1	6	32	13	0	0	18	1	0	S	0	18	0	0	0	3	1	0	0	0	0	0	32	24	
17	0	0	0	0	0	16	0	2	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	16	-	24
18	0	0	0	1	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	1	24	
19	0	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	2	24	
20	0	0	0	0	0	0	0	0	0	0	S	0	0	0	1	0	0	0	0	0	0	1	2	0	0	0	2	24	
21	0	0	0	0	5	2	1	0	S	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	24	
22	0	0	0	0	0	1	0	S	3	3	3	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	24	
23	0	4	0	1	18	1	S	1	1	1	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	18	24	
24	0	0	0	0	7	S	S1	S1	0	0	0	0	C1	C1	0	0	0	1	2	0	0	0	0	0	0	0	7	20	
25	0	0	0	0	S	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
26	0	0	0	0	S	2	2	2	S1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	23
27	0	0	0	S	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24
28	0	S	0	0	0	0	1	C1	C1	C1	C1	C1	C1	C1	C1	0	0	0	0	0	0	0	0	0	0	0	1	-	16
29	S	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	1	0	24
30	0	0	0	0	0	0	39	0	0	0	0	33	163	0	0	0	0	1	1	0	0	0	0	S	0	0	163	10	24
31	0	0	0	0	3	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	S	0	0	0	3	0	24
HOURLY MAX	0	4	0	7	18	16	39	13	3	3	33	163	0	0	1	18	1	2	2	3	1	2	2	0	0	0	0	0	
HOURLY AVG	0	0	0	0	1	1	3	1	1	0	2	6	0	0	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

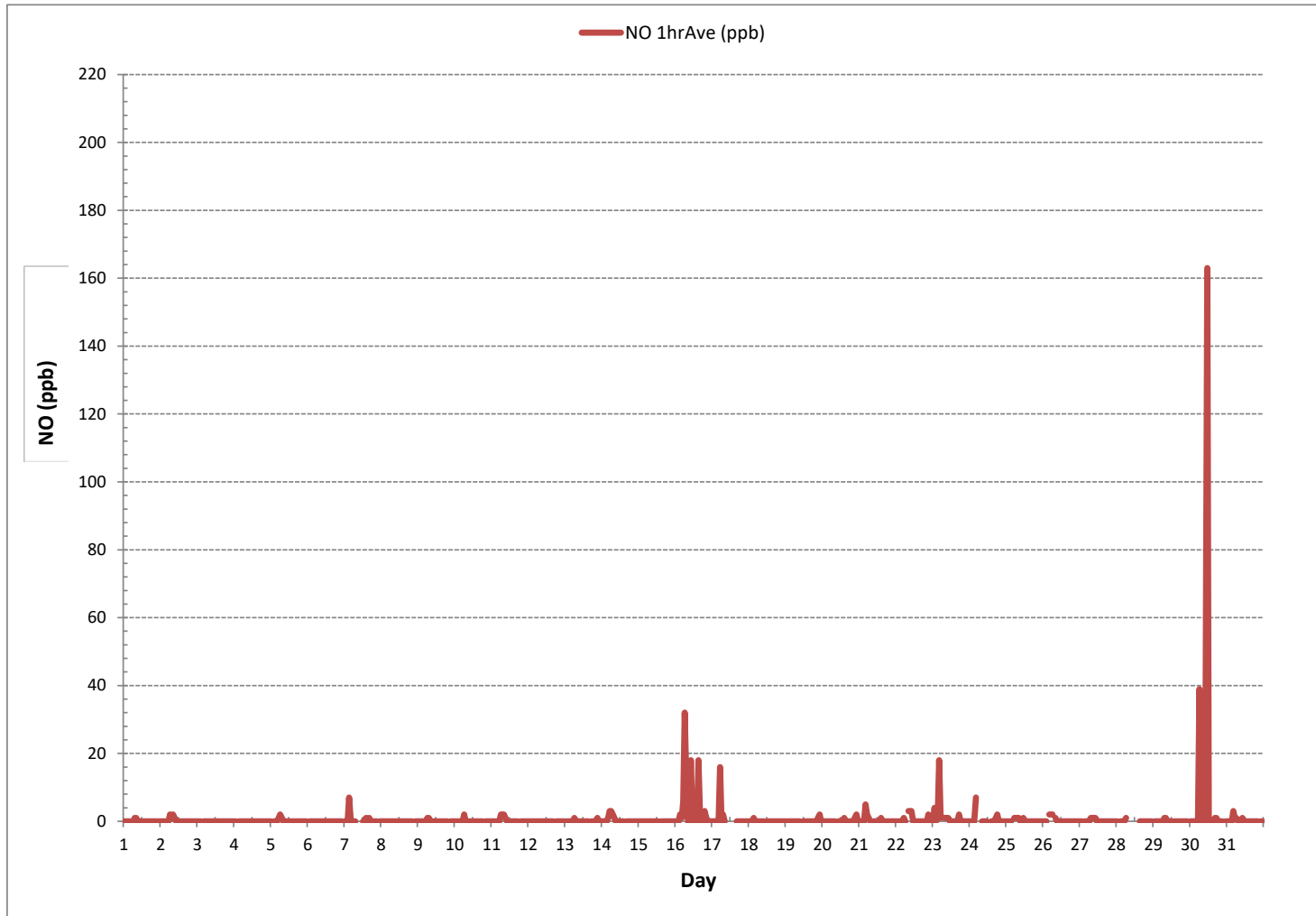
24 HR AVERAGES May 2019



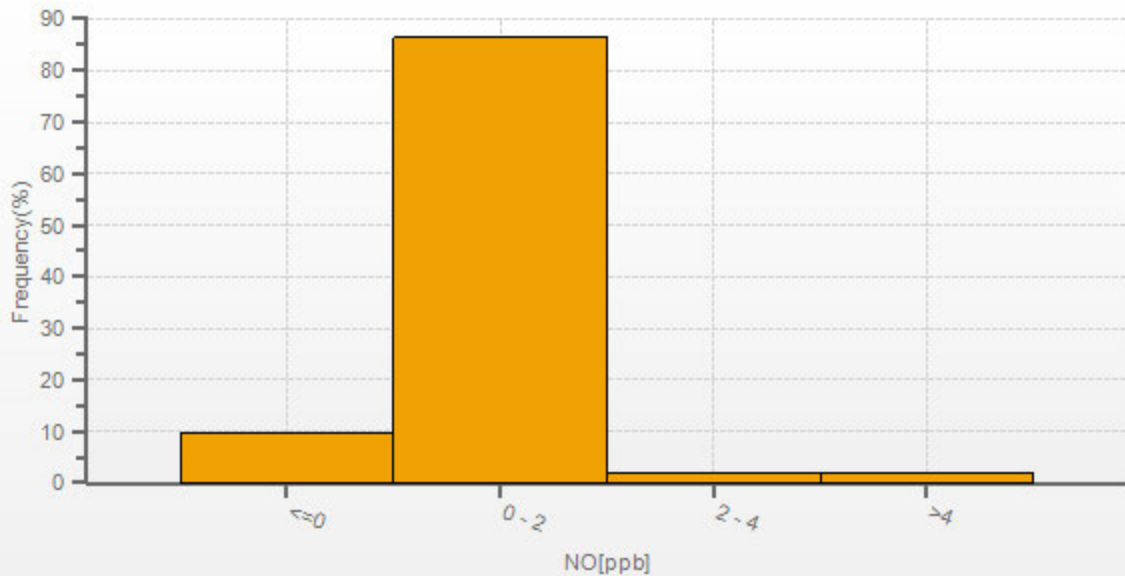
MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	90				
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	0	ON DAY 1	
MAXIMUM 1-HR AVERAGE:	163	ppb @ HOUR	11	ON DAY 30	
MAXIMUM 24-HR AVERAGE:	10	ppb		ON DAY 31	
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	731	hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	98.3	%
STANDARD DEVIATION:	7		MONTHLY AVERAGE:	1	ppb

NITRIC OXIDE Hourly Averages (NO ppb)

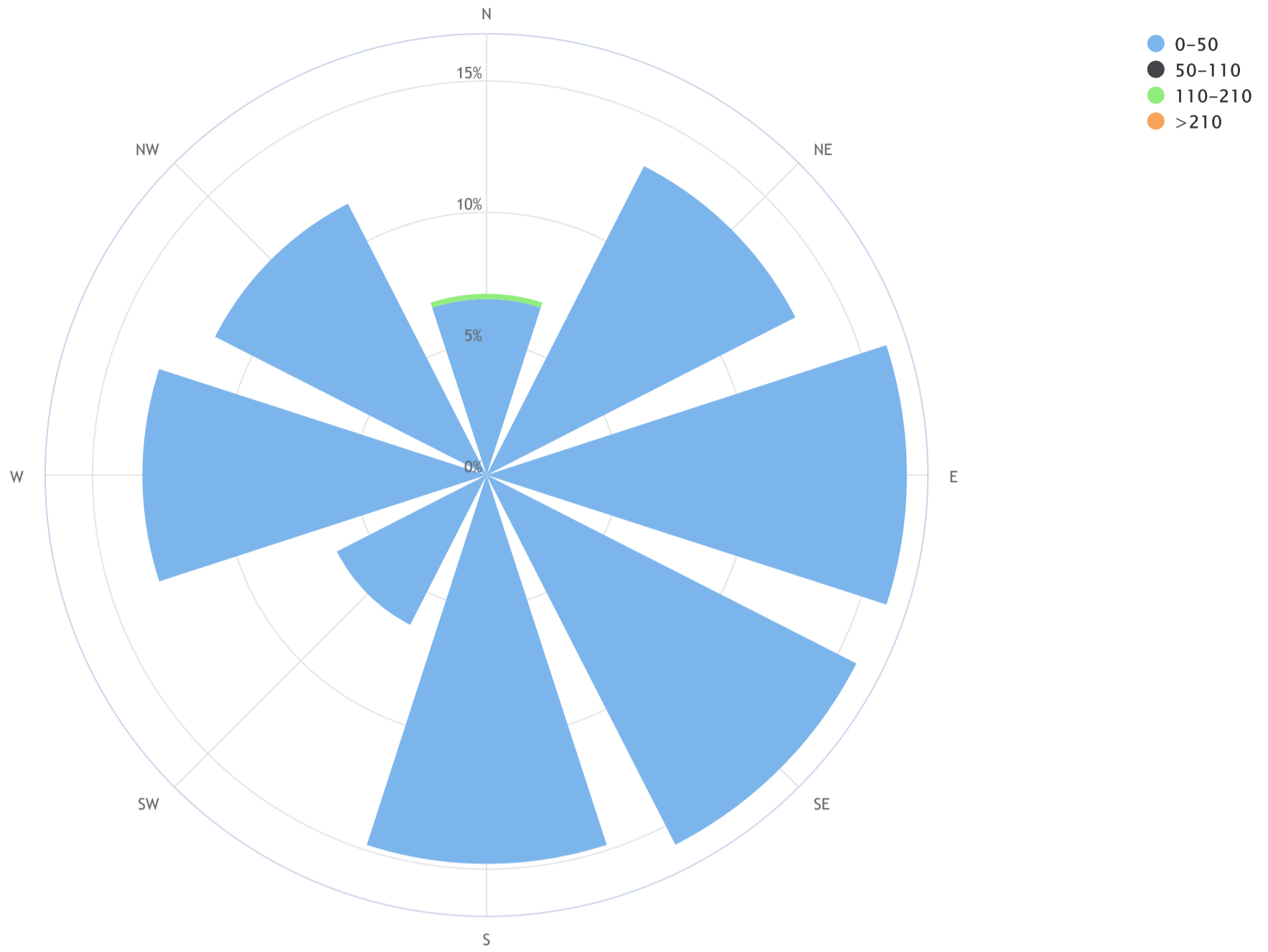


NO[ppb] Histogram: LICA Bonnyville East Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Bonnyville East Continuous Monitoring Station_NO (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 0.8, CALM % = 2.2%



Direction	0-50	50-110	110-210	>210	TOTAL
N	6.7	0.0	0.2	0.0	6.8
NE	13.2	0.0	0.0	0.0	13.2
E	16.0	0.0	0.0	0.0	16.0
SE	15.8	0.0	0.0	0.0	15.8
S	14.8	0.0	0.0	0.0	14.8
SW	6.4	0.0	0.0	0.0	6.4
W	13.1	0.0	0.0	0.0	13.1
NW	11.6	0.0	0.0	0.0	11.6
Summary	97.7	0.0	0.2	0.0	97.8
CALM	2.2	0.0	0.0	0.0	2.2

NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)

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

STATUS FLAG CODES

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

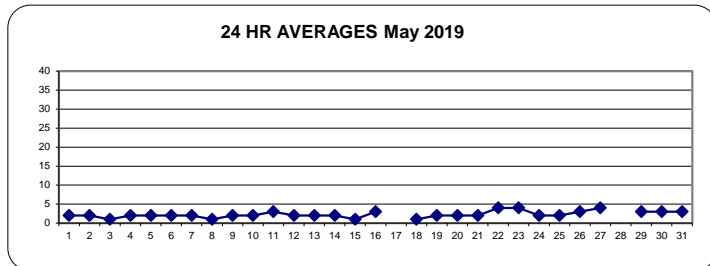
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 159 ppb

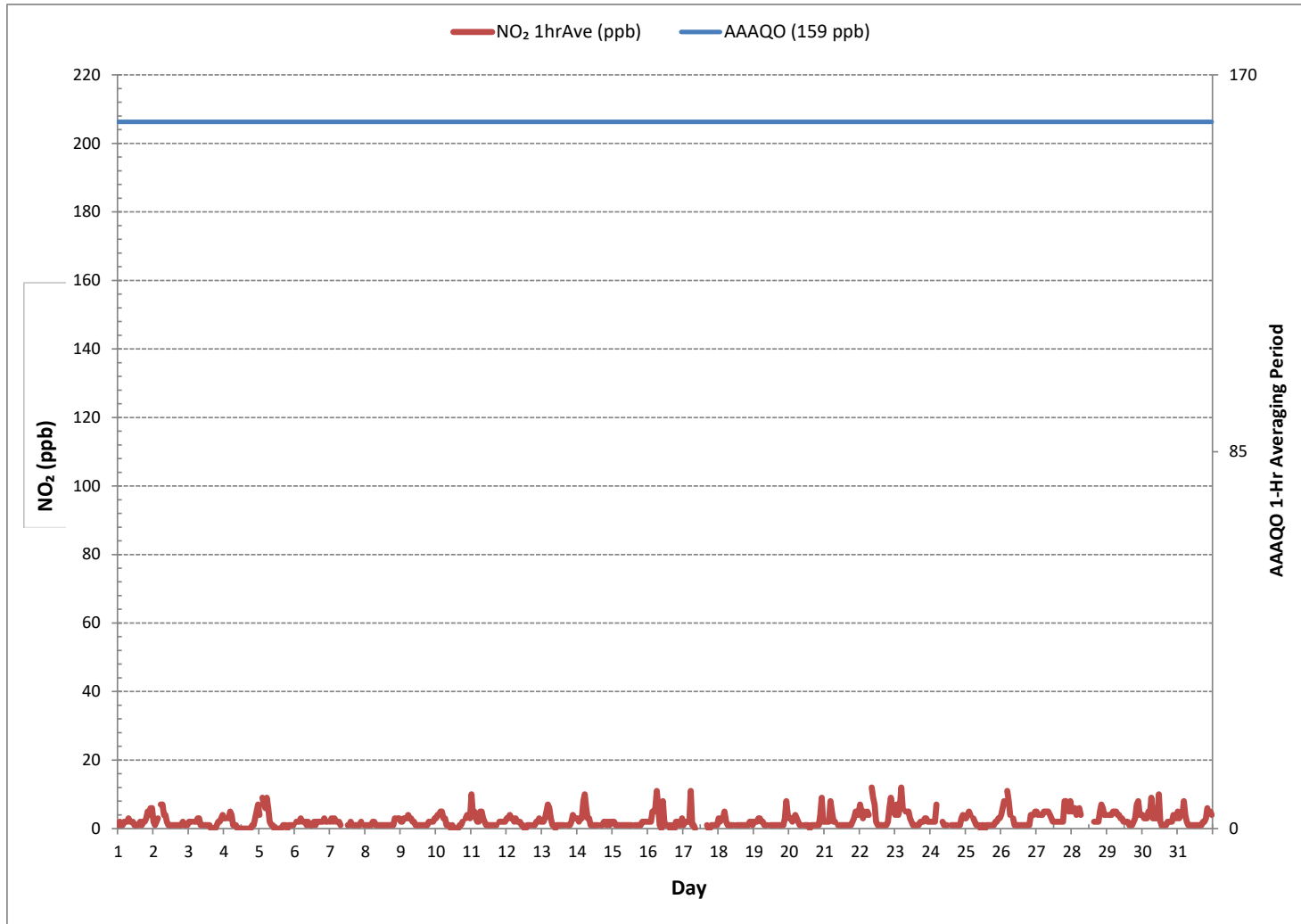
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	649			
MINIMUM 1-HR AVERAGE:	0	ppb @ HOUR	15	ON DAY 3
MAXIMUM 1-HR AVERAGE:	12	ppb @ HOUR	8	ON DAY 22
MAXIMUM 24-HR AVERAGE:	4	ppb		ON DAY 22
IZS CALIBRATION TIME:	32	hrs	OPERATIONAL TIME:	731 hrs
MONTHLY CALIBRATION TIME:	7	hrs	AMD OPERATION UPTIME:	98.3 %
STANDARD DEVIATION:	2		MONTHLY AVERAGE:	2 ppb

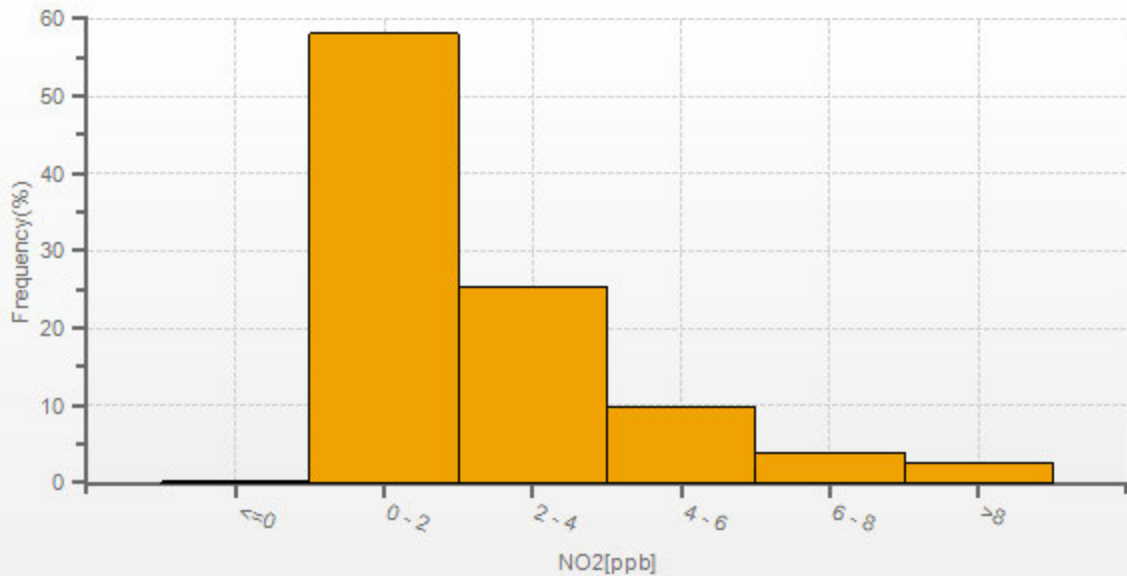
24 HR AVERAGES May 2019



NITROGEN DIOXIDE Hourly Averages (NO₂ ppb)

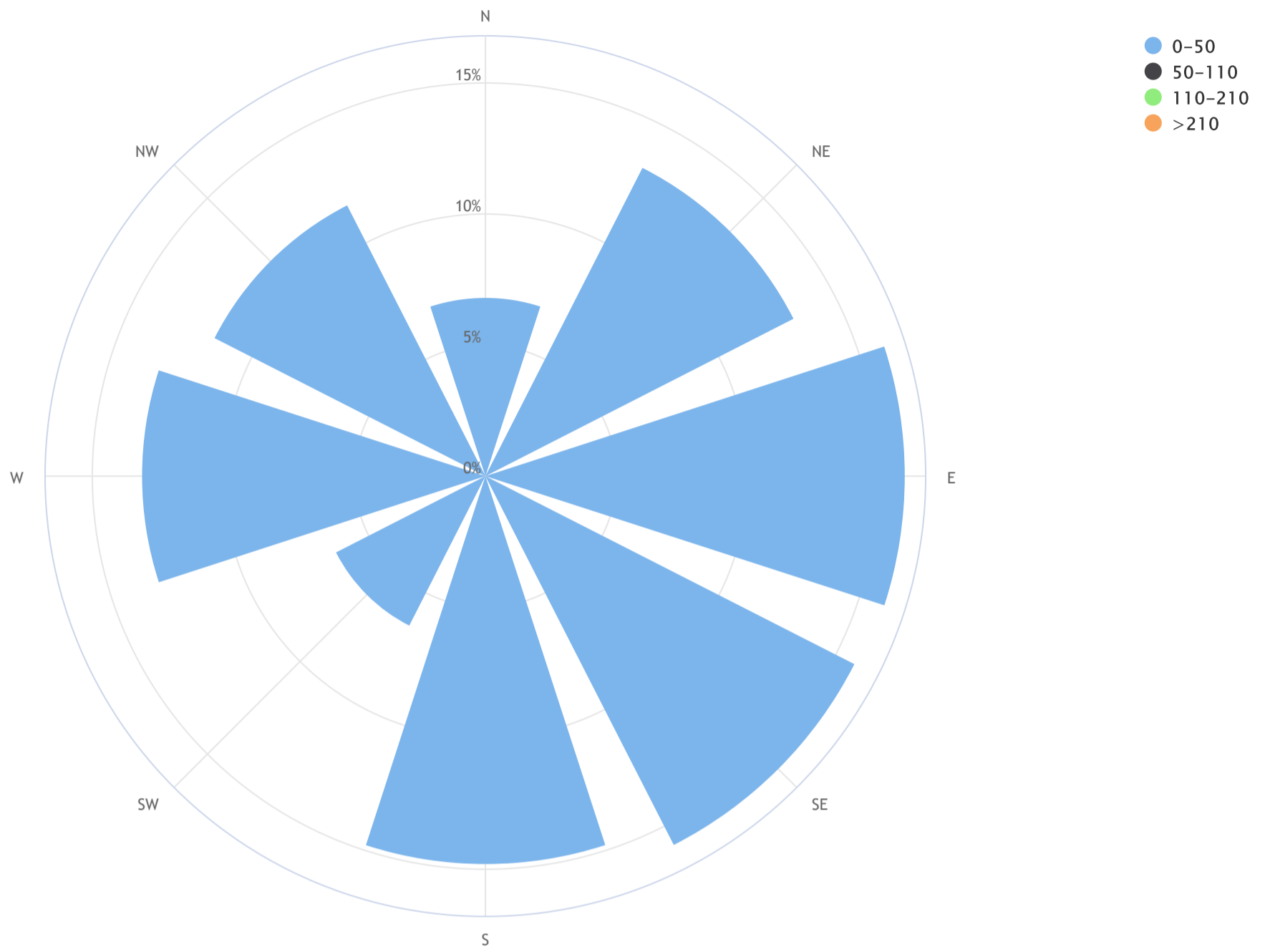


NO2[ppb] Histogram: LICA Bonnyville East Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Bonnyville East Continuous Monitoring Station_NO₂ (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 5.0, CALM % = 2.2%



Direction	0-50	50-110	110-210	>210	TOTAL
N	6.8	0.0	0.0	0.0	6.8
NE	13.2	0.0	0.0	0.0	13.2
E	16.0	0.0	0.0	0.0	16.0
SE	15.8	0.0	0.0	0.0	15.8
S	14.8	0.0	0.0	0.0	14.8
SW	6.4	0.0	0.0	0.0	6.4
W	13.1	0.0	0.0	0.0	13.1
NW	11.6	0.0	0.0	0.0	11.6
Summary	97.8	0.0	0.0	0.0	97.8
CALM	2.2	0.0	0.0	0.0	2.2



OZONE Hourly Averages (O₃ ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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	38.7	38.0	37.9	36.3	34.3	S	34.1	36.4	39.2	40.5	42.9	43.0	41.9	41.4	43.2	43.3	42.3	41.8	42.0	37.9	36.5	36.7	34.5	32.9	32.9	32.9	43.3	38.9	24
2	31.5	33.0	34.4	31.5	S	27.1	27.5	32.9	33.5	41.0	44.0	45.2	46.4	47.8	48.4	48.4	48.2	48.0	47.2	45.7	44.5	44.2	44.7	45.1	27.1	48.4	40.9	24	
3	44.6	41.5	37.5	S	30.6	29.1	30.9	33.1	37.1	36.7	37.4	38.2	37.8	36.8	37.5	36.9	39.0	38.0	33.3	31.2	27.9	26.4	25.5	24.0	24.0	44.6	34.4	24	
4	23.3	22.9	S	24.1	23.1	25.1	29.3	31.3	33.3	37.4	39.6	40.8	41.4	41.8	41.0	40.7	41.3	40.5	38.3	34.3	29.7	26.3	24.3	22.0	22.0	41.8	32.7	24	
5	26.3	S	18.7	21.8	22.4	22.0	24.6	33.6	40.6	40.6	40.1	40.4	41.1	41.8	42.3	42.7	43.2	43.6	41.5	39.7	38.6	37.9	38.1	37.9	18.7	43.6	35.6	24	
6	S	37.9	35.9	33.9	32.9	33.7	34.7	35.1	36.5	34.5	38.0	39.9	39.6	34.9	38.7	39.1	39.6	39.4	38.7	38.5	31.2	32.6	32.7	S	31.2	39.9	36.3	24	
7	27.2	26.1	24.6	24.0	24.2	24.4	23.9	26.9	Q	Q	37.0	40.7	42.0	42.3	43.0	43.7	44.2	44.4	44.2	45.6	41.2	37.8	S	41.5	23.9	45.6	35.7	24	
8	40.7	40.2	41.7	41.3	39.6	38.5	39.7	41.1	42.0	42.8	43.8	44.7	45.4	43.9	41.7	44.1	45.6	45.6	45.1	41.1	38.7	S	29.2	24.5	24.5	45.6	40.9	24	
9	26.8	30.8	26.1	29.3	29.9	27.9	28.6	30.4	34.5	37.8	40.0	41.0	43.3	43.9	44.2	44.9	45.1	43.8	43.8	42.1	S	39.0	36.1	32.0	26.1	45.1	36.6	24	
10	29.5	22.6	22.1	21.3	22.6	24.5	26.1	32.9	36.5	39.0	39.1	40.1	40.0	41.2	41.2	41.7	39.2	38.8	37.1	S	31.2	29.5	29.5	28.9	21.3	41.7	32.8	24	
11	23.0	23.2	22.9	24.1	23.6	19.5	21.7	27.6	32.3	36.3	39.9	43.4	46.9	48.4	49.6	49.9	53.6	53.6	S	44.8	42.0	40.9	42.5	46.1	19.5	53.6	37.2	24	
12	44.0	43.6	39.7	37.3	34.5	35.9	34.4	39.0	40.6	41.5	45.8	48.5	51.3	52.5	56.1	62.3	58.1	S	50.6	46.9	42.4	41.5	39.9	40.8	34.4	62.3	44.7	24	
13	38.9	37.9	38.0	36.4	33.2	34.4	36.9	38.6	40.3	40.8	42.4	44.7	45.5	47.7	47.0	45.5	S	39.5	35.6	34.6	31.5	28.7	28.3	26.5	26.5	47.7	38.0	24	
14	25.1	27.2	23.2	22.1	14.2	15.7	19.8	24.6	29.9	34.9	37.3	39.1	40.6	41.2	41.9	S	43.1	45.0	42.9	43.1	44.0	41.2	41.9	37.9	14.2	45.0	33.7	24	
15	37.6	31.1	31.4	29.1	27.1	25.6	25.5	27.8	29.3	31.6	33.5	34.5	33.8	35.2	S	39.1	41.4	44.4	46.5	44.3	37.4	35.5	34.8	29.9	25.5	46.5	34.2	24	
16	27.2	26.0	26.5	23.9	21.6	21.9	27.7	30.5	32.5	34.4	34.6	38.8	39.5	S	41.7	41.1	42.9	41.7	40.4	38.9	36.3	36.3	34.7	33.1	21.6	42.9	33.6	24	
17	34.4	33.2	31.7	30.3	25.4	23.2	29.3	31.5	35.4	37.4	38.0	39.3	S	43.6	44.2	45.3	46.1	45.8	46.2	44.5	40.4	37.6	36.2	35.5	23.2	46.2	37.2	24	
18	33.8	32.8	30.0	30.6	28.1	29.9	30.5	31.8	33.9	36.8	38.4	S	39.8	40.1	41.6	42.1	42.5	45.1	45.7	45.3	42.5	39.2	40.3	38.1	28.1	45.7	37.4	24	
19	35.2	33.4	30.6	31.4	30.5	31.5	33.0	35.5	40.0	42.1	S	44.1	44.8	46.4	48.4	50.0	50.3	48.2	46.9	44.3	41.9	38.6	32.5	34.9	30.5	50.3	39.8	24	
20	34.7	34.0	32.7	29.1	28.0	27.3	32.6	35.5	40.0	S	44.0	44.5	45.3	45.1	44.6	44.8	45.6	46.3	45.7	44.3	40.5	36.5	29.9	35.1	27.3	46.3	38.5	24	
21	36.3	36.0	34.4	33.3	27.1	27.9	34.2	36.2	S	48.6	47.3	46.3	46.1	46.7	46.8	47.4	48.6	46.3	46.6	41.2	36.9	34.4	36.3	31.5	27.1	48.6	39.8	24	
22	25.4	27.5	30.8	29.0	29.6	25.5	28.5	S	21.1	30.8	C	C	C	C	C	54.4	53.0	52.0	51.2	48.9	40.4	31.1	31.4	34.0	21.1	54.4	35.8	24	
23	33.1	26.3	25.4	20.7	21.9	24.3	S	34.2	36.5	39.6	50.4	58.2	58.9	61.2	61.9	61.5	60.7	56.3	53.0	54.3	48.3	51.3	50.3	45.6	20.7	61.9	44.9	24	
24	45.2	47.1	46.1	42.4	42.4	S	46.9	48.5	51.9	52.8	51.2	52.1	52.1	48.2	46.4	40.1	30.2	27.7	29.3	27.2	23.0	22.0	16.6	16.5	16.5	52.8	39.4	24	
25	17.1	14.0	11.2	11.0	S	12.7	17.5	22.5	26.7	34.1	38.9	41.9	43.9	45.6	42.7	44.8	47.5	46.8	46.5	41.7	41.1	41.2	37.4	34.4	11.0	47.5	33.1	24	
26	29.5	25.0	20.8	S	12.4	16.8	22.5	28.9	33.3	39.1	42.5	45.5	47.7	50.0	51.2	53.7	55.2	56.1	54.9	51.9	41.5	40.2	37.8	42.1	12.4	56.1	39.1	24	
27	45.3	42.8	S	40.6	39.8	38.0	35.9	38.0	39.6	45.1	52.5	61.2	62.7	63.1	62.0	60.6	60.5	58.1	54.2	44.6	47.0	48.5	50.4	44.9	35.9	63.1	49.4	24	
28	45.3	S	45.9	45.9	44.7	42.5	42.4	44.6	49.5	58.0	64.7	63.4	61.7	61.1	62.2	63.1	64.7	64.8	63.1	54.8	54.7	59.9	58.0	52.8	42.4	64.8	55.1	24	
29	S	50.2	48.4	45.6	44.6	43.4	43.5	45.3	49.3	56.3	68.6	72.3	70.8	67.1	68.9	60.7	55.5	54.2	53.8	47.8	43.3	42.2	40.4	S	40.4	72.3	53.3	24	
30	37.7	37.3	38.6	37.8	31.7	24.5	20.5	22.6	23.9	28.2	33.5	33.1	46.7	40.8	37.9	35.7	36.0	39.4	40.0	32.4	28.4	24.5	S	22.7	20.5	46.7	32.8	24	
31	20.4	21.9	18.5	16.8	13.0	16.4	21.2	25.3	27.9	30.0	31.0	34.3	35.4	36.9	40.9	44.2	44.3	44.5	44.4	39.0	31.6	S	30.7	27.2	13.0	44.5	30.3	24	
HOURLY MAX	45.3	50.2	48.4	45.9	44.7	43.4	46.9	48.5	51.9	58.0	68.6	72.3	70.8	67.1	68.9	63.1	64.7	64.8	63.1	54.8	54.7	59.9	58.0	52.8					
HOURLY AVG	33.0	32.5	31.2	30.4	28.7	27.2	30.1	33.4	36.1	39.6	42.6	44.8	45.9	46.1	46.8	47.1	46.9	46.0	45.0	42.4	38.5	37.3	36.0	34.4					

STATUS FLAG CODES

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

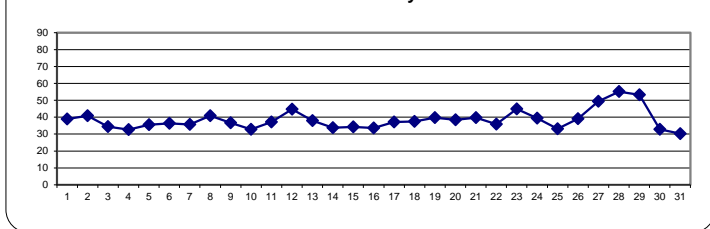
OBJECTIVE LIMIT:

ALBERTA ENVIRONMENT: 1-HR 76 ppb

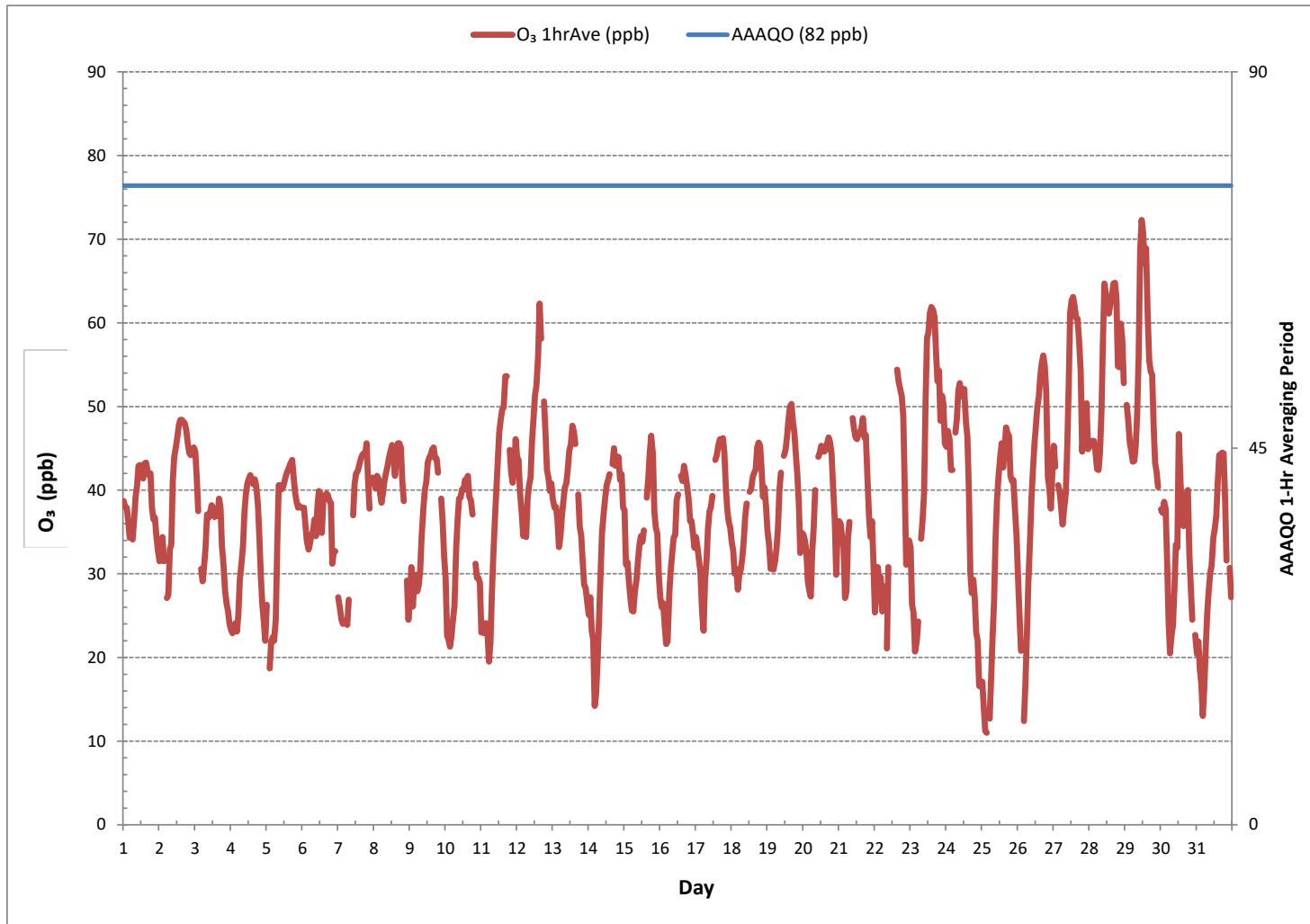
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0			
NUMBER OF NON-ZERO READINGS:	704			
MINIMUM 1-HR AVERAGE:	11.0	ppb	@ HOUR	3 ON DAY 25
MAXIMUM 1-HR AVERAGE:	72.3	ppb	@ HOUR	11 ON DAY 29
MAXIMUM 24-HR AVERAGE:	55.1	ppb		ON DAY 28
IZS CALIBRATION TIME:	33	hrs	OPERATIONAL TIME:	744 hrs
MONTHLY CALIBRATION TIME:	5	hrs	AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	10.2		MONTHLY AVERAGE:	38.5 ppb

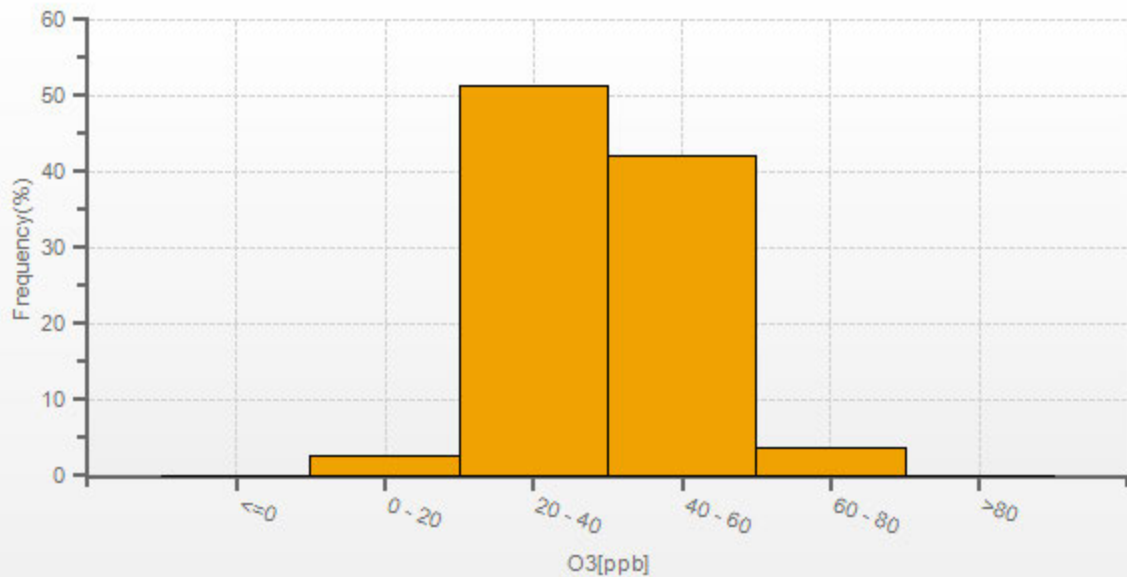
24 HR AVERAGES May 2019



OZONE Hourly Averages (O₃ ppb)

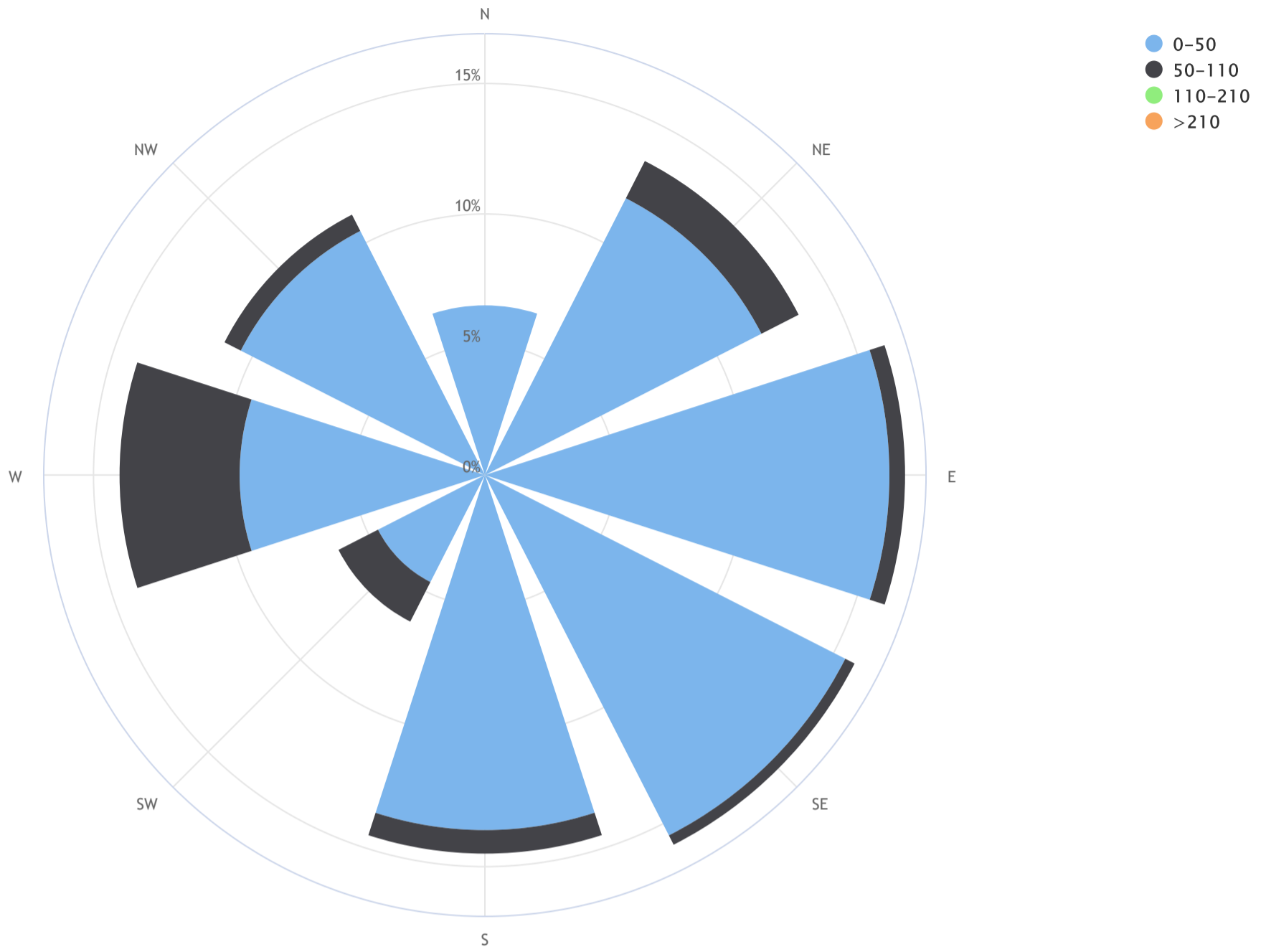


O3[ppb] Histogram: LICA Bonnyville East Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Bonnyville East Continuous Monitoring Station_O₃ (ppb)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 28.7, CALM % = 2.1%



Direction	0-50	50-110	110-210	>210	TOTAL
N	6.5	0.0	0.0	0.0	6.5
NE	11.9	1.6	0.0	0.0	13.5
E	15.5	0.6	0.0	0.0	16.1
SE	15.5	0.4	0.0	0.0	15.9
S	13.6	0.9	0.0	0.0	14.5
SW	4.6	1.7	0.0	0.0	6.3
W	9.4	4.6	0.0	0.0	13.9
NW	10.5	0.7	0.0	0.0	11.2
Summary	87.5	10.4	0.0	0.0	97.9
CALM	2.0	0.1	0.0	0.0	2.1

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	3	3	3	3	3	3	4	4	4	4	5	6	4	4	5	8	6	7	4	4	5	4	5	7	3	8	5	24	
2	5	4	5	5	4	5	5	5	5	3	2	2	2	2	2	2	2	2	5	2	3	3	3	3	2	5	3	24	
3	3	3	4	4	3	4	4	3	1	1	2	3	2	2	1	1	2	1	1	1	1	1	2	1	2	1	4	2	24
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6	2	2	3	3	8	5	6	4	8	5	9	11	11	11	9	9	8	8	8	7	6	4	4	5	2	11	6	24	
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19	4	4	3	3	4	4	7	7	6	10	6	3	3	4	4	4	5	3	4	5	4	16	9	3	3	16	5	24	
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21	3	5	4	4	7	14	8	7	10	29	14	5	10	8	13	11	17	21	17	23	18	9	7	7	3	29	11	24	
22	8	8	8	7	7	9	8	13	13	24	21	9	9	C	7	13	10	13	10	6	7	31	7	8	6	31	11	24	
23	9	43	11	13	10	9	8	12	12	8	7	5	5	6	6	7	9	34	13	11	10	7	7	6	5	43	11	24	
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25	13	15	16	15	21	11	11	10	15	7	4	4	4	5	9	5	6	5	5	7	8	8	9	10	4	21	9	24	
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27	6	8	9	11	15	17	18	21	22	23	22	21	21	20	21	22	20	21	22	23	23	22	22	22	6	23	19	24	
28	23	23	27	21	21	19	18	16	14	14	22	26	29	31	35	37	35	33	32	32	31	22	18	16	14	37	25	24	
29	15	16	17	17	17	16	15	13	11	16	26	26	25	23	23	22	21	21	22	23	25	25	25	28	11	28	20	24	
30	23	21	20	25	38	28	13	13	18	41	41	26	21	32	10	4	3	9	12	13	15	14	11	11	3	41	19	24	
31	7	9	7	7	8	11	6	7	9	5	8	9	8	8	14	27	26	31	19	23	35	29	28	20	5	35	15	24	
HOURLY MAX	23	43	27	25	38	28	18	21	22	41	41	26	29	32	35	37	35	34	32	32	35	31	28	28					
HOURLY AVG	6	7	7	7	8	8	7	7	7	8	9	7	7	7	7	8	8	9	9	9	9	10	7	7					

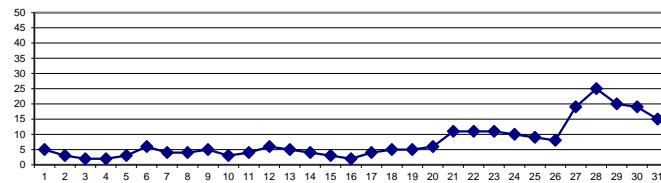
STATUS FLAG CODES

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/m ³	24-HR	29 µg/m ³
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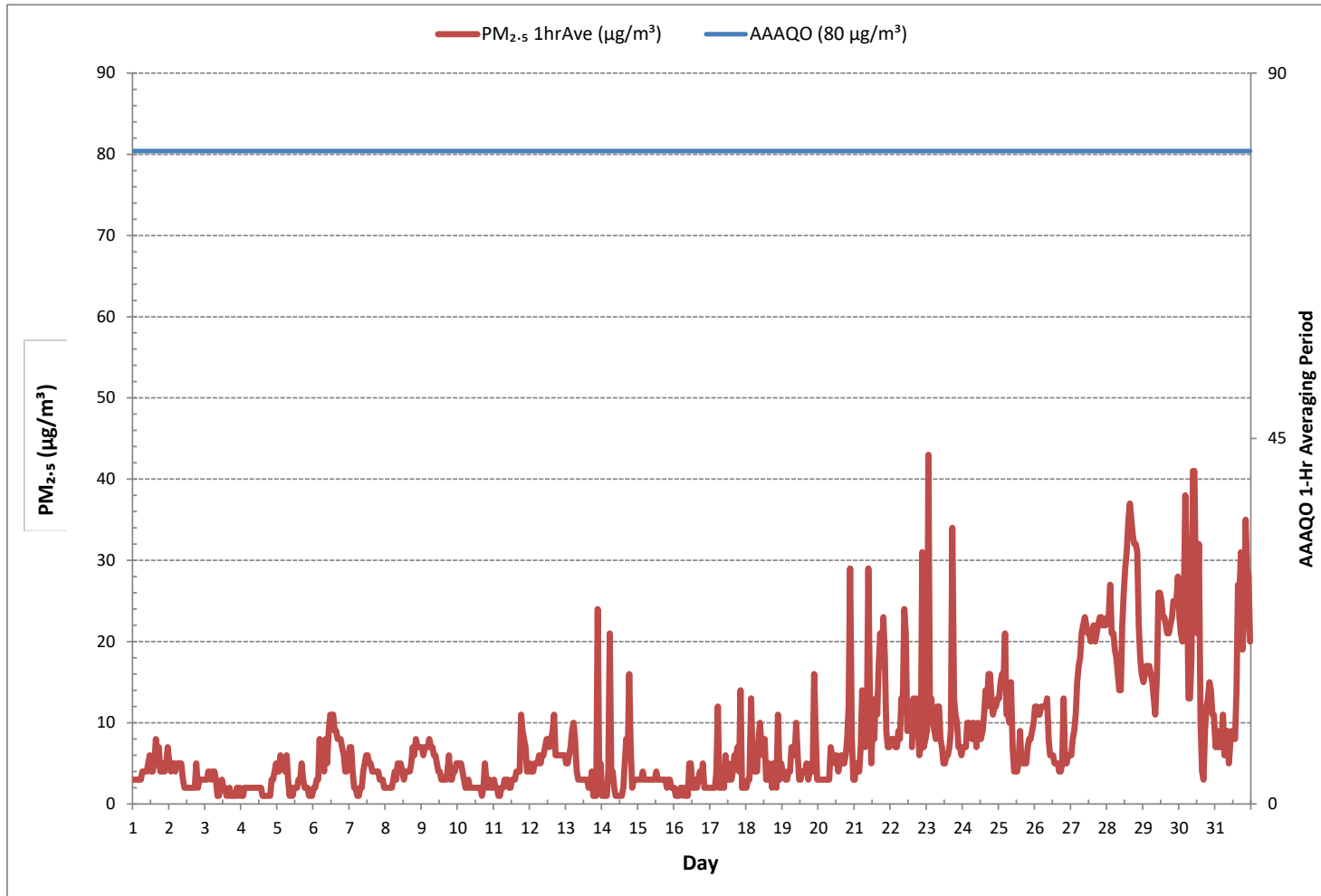
24 HR AVERAGES May 2019



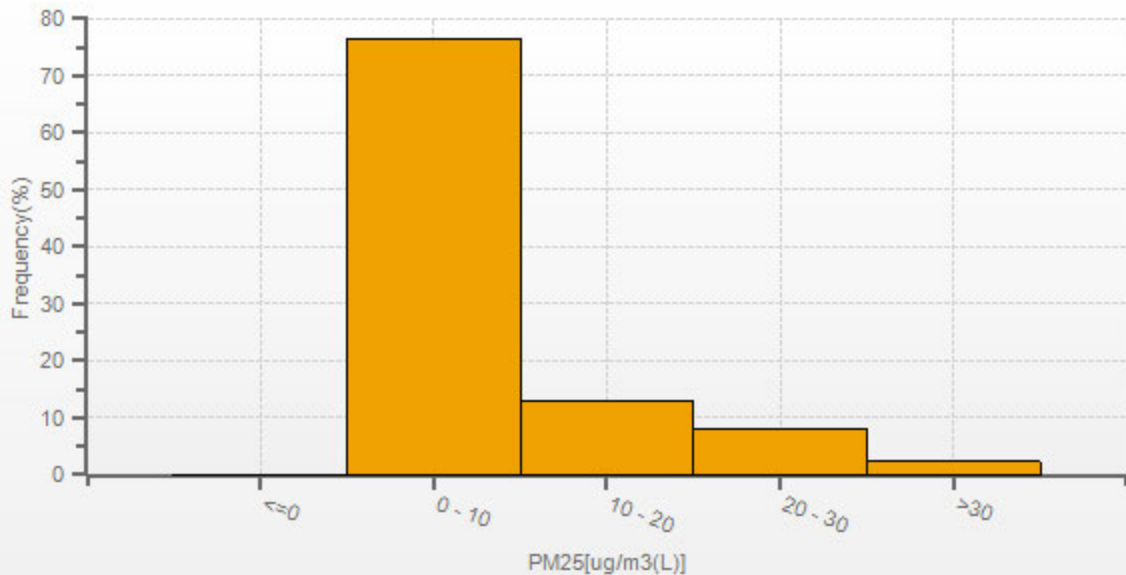
MONTHLY SUMMARY

NUMBER OF 1-HR EXCEEDANCES:	0		
NUMBER OF 24-HR EXCEEDANCES:	0		
NUMBER OF NON-ZERO READINGS:	743		
MINIMUM 1-HR AVERAGE:	1 µg/m ³ @ HOUR	8 ON DAY	3
MAXIMUM 1-HR AVERAGE:	43 µg/m ³ @ HOUR	1 ON DAY	23
MAXIMUM 24-HR AVERAGE:	25 µg/m ³	ON DAY	28
MONTHLY CALIBRATION TIME:	1 hrs	OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	7	AMD OPERATION UPTIME:	100.0 %
		MONTHLY AVERAGE:	8 µg/m ³

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

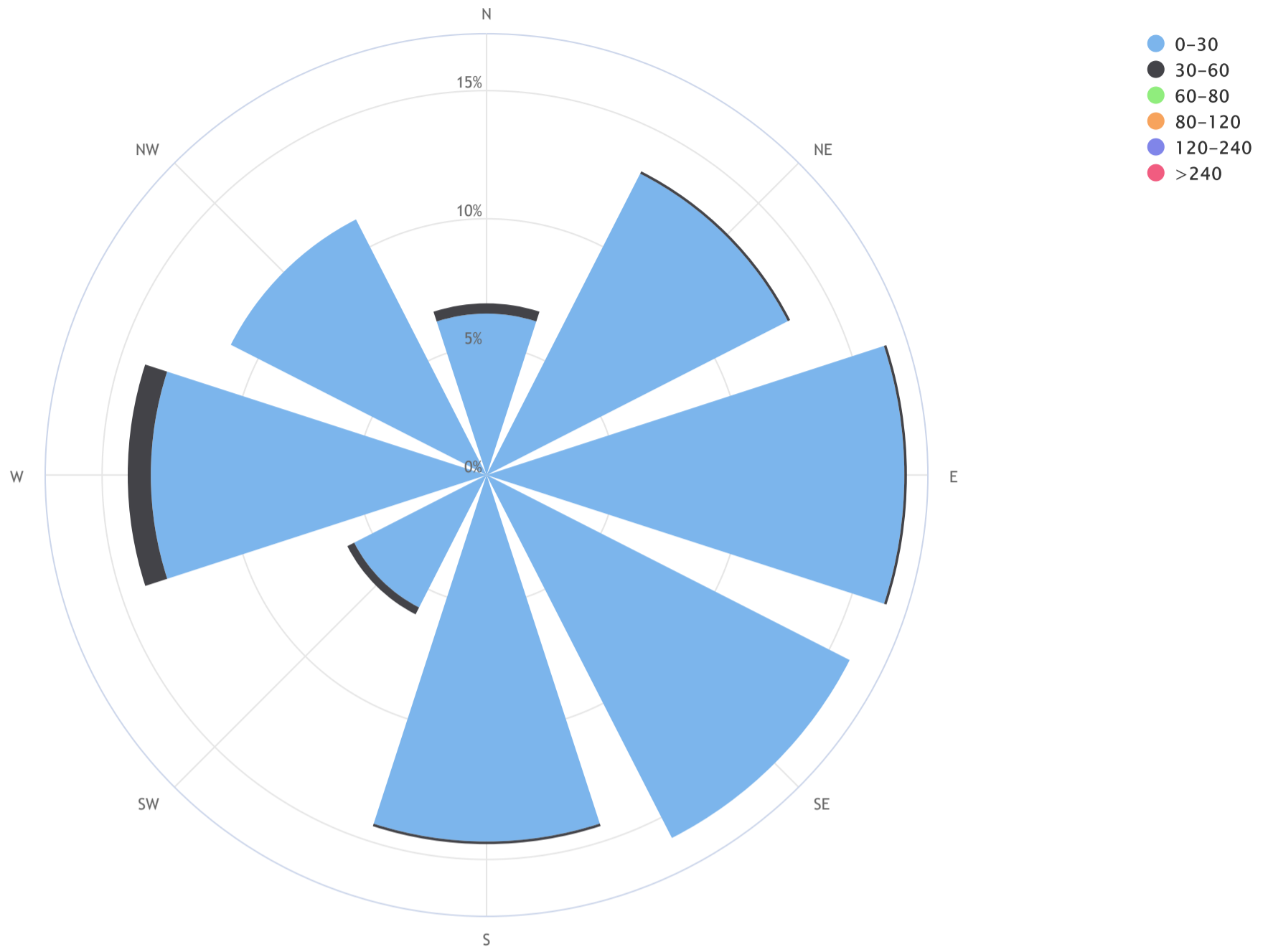


PM25[ug/m3(L)] Histogram: LICA Bonnyville East Monthly: 19/05 1 Hr.



Lakeland Industry & Community Association_Bonnyville East Continuous Monitoring Station_PM2.5 (µg/m³)_19/05

Pollutant Rose_Wind Frequency (Blowing From)_ CALM Avg = 13.5, CALM % = 2.0%



Direction	0-30	30-60	60-80	80-120	120-240	>240	TOTAL
N	6.3	0.4	0.0	0.0	0.0	0.0	6.7
NE	13.2	0.1	0.0	0.0	0.0	0.0	13.3
E	16.3	0.1	0.0	0.0	0.0	0.0	16.4
SE	15.9	0.0	0.0	0.0	0.0	0.0	15.9
S	14.3	0.1	0.0	0.0	0.0	0.0	14.4
SW	5.8	0.3	0.0	0.0	0.0	0.0	6.1
W	13.1	0.9	0.0	0.0	0.0	0.0	14.0
NW	11.2	0.0	0.0	0.0	0.0	0.0	11.2
Summary	96.0	2.0	0.0	0.0	0.0	0.0	98.0
CALM	1.8	0.3	0.0	0.0	0.0	0.0	2.0



WIND SPEED Hourly Averages (WS kph)

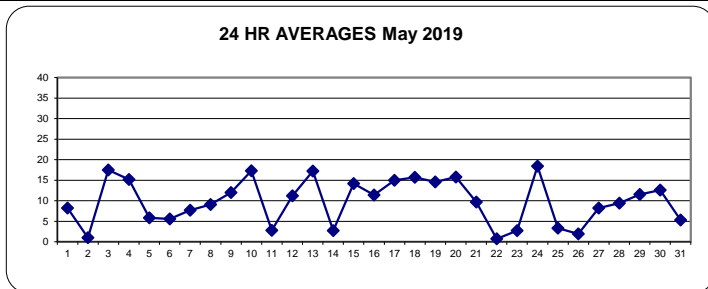
HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	19.2	17.0	17.1	17.4	11.5	10.8	10.4	9.4	10.2	11.8	15.8	18.6	16.7	17.2	17.9	17.9	14.1	19.6	11.3	8.2	6.1	6.4	4.9	2.8	2.8	19.6	8.2	24	
2	6.4	6.0	7.3	5.8	3.4	2.9	6.0	9.4	8.5	8.8	8.3	5.2	4.4	5.8	4.3	4.7	4.0	7.1	11.5	18.2	14.8	13.0	14.6	11.7	2.9	18.2	1.0	24	
3	16.5	17.0	19.6	13.3	9.1	9.1	11.8	17.0	30.6	32.8	32.7	33.3	31.4	25.9	35.4	39.5	37.0	34.8	33.1	22.2	14.9	12.7	13.9	12.5	9.1	39.5	17.5	24	
4	11.4	12.7	13.4	13.7	13.9	14.0	16.9	17.9	16.5	22.5	24.0	21.6	21.1	22.5	24.2	24.3	21.5	23.1	21.6	15.5	11.4	9.2	6.4	8.2	6.4	24.3	15.2	24	
5	7.6	3.9	3.3	2.7	2.5	2.5	4.2	7.2	6.1	6.4	5.4	7.7	7.6	6.4	4.2	6.5	7.0	5.6	16.3	14.3	14.1	12.1	14.2	16.0	2.5	16.3	5.8	24	
6	19.2	16.7	12.1	11.5	10.8	12.9	14.7	14.4	13.5	15.7	18.1	19.1	13.3	12.9	6.4	1.9	9.0	2.9	3.4	2.6	14.4	14.5	12.1	10.8	1.9	19.2	5.6	24	
7	6.8	8.0	9.4	6.2	7.4	5.9	8.2	5.2	4.7	5.2	7.5	6.6	5.5	7.4	4.4	8.9	4.8	5.7	15.4	16.6	14.1	11.4	18.9	16.0	4.4	18.9	7.7	24	
8	19.0	12.3	14.7	13.1	15.2	22.3	19.5	22.3	21.7	18.7	13.3	11.7	6.6	12.8	11.1	7.3	6.9	3.7	4.8	6.2	1.8	4.3	3.3	2.8	1.8	22.3	9.1	24	
9	2.7	1.8	5.1	4.5	4.2	5.2	11.1	12.7	10.5	17.9	19.2	19.7	19.7	16.8	17.4	16.9	11.2	16.5	17.4	18.5	23.8	18.1	5.8	3.3	1.8	23.8	12.0	24	
10	1.6	8.4	12.0	11.8	12.9	13.6	11.0	21.7	25.3	24.4	27.8	29.8	32.2	34.2	34.7	37.2	33.4	29.7	26.4	15.5	12.4	7.7	6.5	7.6	1.6	37.2	17.3	24	
11	8.0	6.8	6.2	7.4	8.0	4.6	2.3	2.8	4.4	3.3	5.8	6.0	5.2	5.5	2.9	3.9	6.9	6.3	7.7	8.1	8.2	12.4	15.3	20.1	2.3	20.1	2.8	24	
12	21.5	22.8	21.1	7.5	13.4	7.2	6.2	11.4	21.5	18.2	16.4	21.7	25.3	25.4	27.0	29.8	30.8	28.9	26.8	21.0	13.5	10.5	8.3	8.4	6.2	30.8	11.2	24	
13	10.4	10.5	11.4	11.9	11.7	9.7	15.4	24.9	28.6	24.1	23.3	31.3	31.2	37.8	34.0	26.9	26.6	21.7	23.2	17.5	11.8	7.9	7.9	4.0	4.0	37.8	17.2	24	
14	3.6	1.9	0.5	4.3	2.4	2.5	1.9	2.4	3.7	6.2	7.4	8.2	9.0	5.3	4.7	2.1	5.6	9.9	10.7	15.5	17.0	11.5	13.5	10.9	0.5	17.0	2.7	24	
15	10.5	14.2	16.3	19.9	19.3	18.6	21.2	22.9	23.4	26.4	25.5	22.3	17.6	12.0	3.9	1.3	3.9	7.1	10.7	10.8	12.4	12.9	13.0	14.2	1.3	26.4	14.2	24	
16	14.2	13.3	8.1	4.9	9.5	10.4	12.4	13.0	13.4	12.4	13.0	9.8	8.3	9.4	8.1	9.6	11.8	18.4	20.1	19.7	14.4	12.8	10.9	14.4	4.9	20.1	11.4	24	
17	14.8	15.2	14.9	16.0	6.6	11.3	13.3	14.6	19.2	20.4	20.3	22.1	21.2	20.0	21.8	21.7	21.4	19.9	19.6	15.2	11.4	10.0	11.2	11.8	6.6	22.1	15.0	24	
18	15.6	16.6	12.7	11.6	13.4	17.9	20.8	16.8	15.6	20.0	16.1	17.5	19.1	19.2	18.3	19.1	21.6	21.9	21.4	19.6	14.6	12.4	12.6	12.9	11.6	21.9	15.7	24	
19	10.3	9.0	9.8	12.5	13.6	16.6	17.7	14.7	17.0	16.3	14.7	17.2	15.0	17.8	20.6	19.3	19.1	17.5	16.7	12.8	10.6	9.7	12.6	13.8	9.0	20.6	14.6	24	
20	12.5	11.4	12.5	13.8	14.5	12.3	16.3	17.3	17.2	15.2	17.7	19.3	18.7	20.0	21.9	21.1	22.5	22.6	21.5	15.4	10.9	8.3	9.8	10.6	8.3	22.6	15.8	24	
21	11.1	13.8	11.7	10.0	2.1	5.9	8.8	7.3	12.4	17.9	20.1	17.7	18.3	15.3	13.6	12.6	9.6	11.1	9.8	7.7	6.1	6.3	4.6	3.3	2.1	20.1	9.7	24	
22	1.5	1.6	2.1	4.6	1.8	1.9	4.1	2.0	1.7	1.9	5.2	5.2	4.0	6.5	6.1	2.8	4.8	2.6	1.6	4.5	5.9	1.5	2.7	4.9	1.5	6.5	0.7	24	
23	2.6	0.8	1.8	1.0	2.7	3.6	4.6	1.9	4.8	3.2	3.9	9.2	6.8	9.8	6.3	4.5	6.2	9.1	12.1	13.5	10.6	11.9	13.6	14.8	0.8	14.8	2.7	24	
24	18.4	17.4	16.6	16.5	13.1	15.8	17.9	20.3	24.5	25.0	21.6	22.1	22.0	22.5	25.3	23.2	23.4	24.4	25.1	20.8	12.6	8.6	6.5	6.8	6.5	25.3	18.4	24	
25	6.0	0.4	7.7	9.2	7.9	6.1	6.8	4.5	4.5	5.6	5.6	3.2	7.3	5.3	13.0	20.7	1.2	9.1	8.7	8.9	12.1	6.2	5.0	8.3	0.4	20.7	3.3	24	
26	5.8	4.3	3.8	2.6	0.8	3.5	4.3	3.5	5.9	8.9	5.3	6.0	7.2	4.9	3.1	3.3	5.2	4.1	4.1	4.1	7.9	11.6	11.2	8.0	0.8	11.6	1.9	24	
27	6.5	5.2	7.2	6.5	4.1	5.3	5.7	10.4	10.2	10.8	13.2	17.0	15.5	12.7	11.2	12.7	11.9	10.3	6.9	5.0	6.5	6.3	6.3	5.7	4.1	17.0	8.2	24	
28	3.6	5.2	4.5	7.8	3.7	5.5	5.8	9.0	10.9	13.7	15.5	14.4	14.8	14.7	14.5	14.7	15.0	12.6	9.4	5.3	10.1	10.5	7.6	6.9	3.6	15.5	9.4	24	
29	7.5	8.2	7.1	7.7	8.6	7.9	10.1	12.0	13.7	16.0	18.2	17.2	17.7	18.9	17.6	17.3	15.5	14.3	12.3	7.5	6.5	6.7	10.7	10.6	6.5	18.9	11.5	24	
30	11.5	11.4	12.7	12.8	10.8	13.9	13.5	11.9	10.2	17.8	18.9	16.4	19.2	23.5	24.9	25.2	22.9	26.2	24.5	18.5	13.9	9.5	9.4	10.0	9.4	26.2	12.6	24	
31	7.0	7.7	3.3	1.1	2.2	6.5	8.1	7.7	6.7	5.5	5.4	6.5	6.4	5.8	4.8	1.4	7.9	5.9	10.1	7.9	9.3	11.1	11.1	7.0	1.1	11.1	5.3	24	
HOURLY MAX	21.5	22.8	21.1	19.9	19.3	22.3	21.2	24.9	30.6	32.8	32.7	33.3	32.2	37.8	35.4	39.5	37.0	34.8	33.1	22.2	23.8	18.1	18.9	20.1					

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:	October 24, 2018
DECLINATION :	MAGNETIC DECLINATION 13 DEGREE EAST

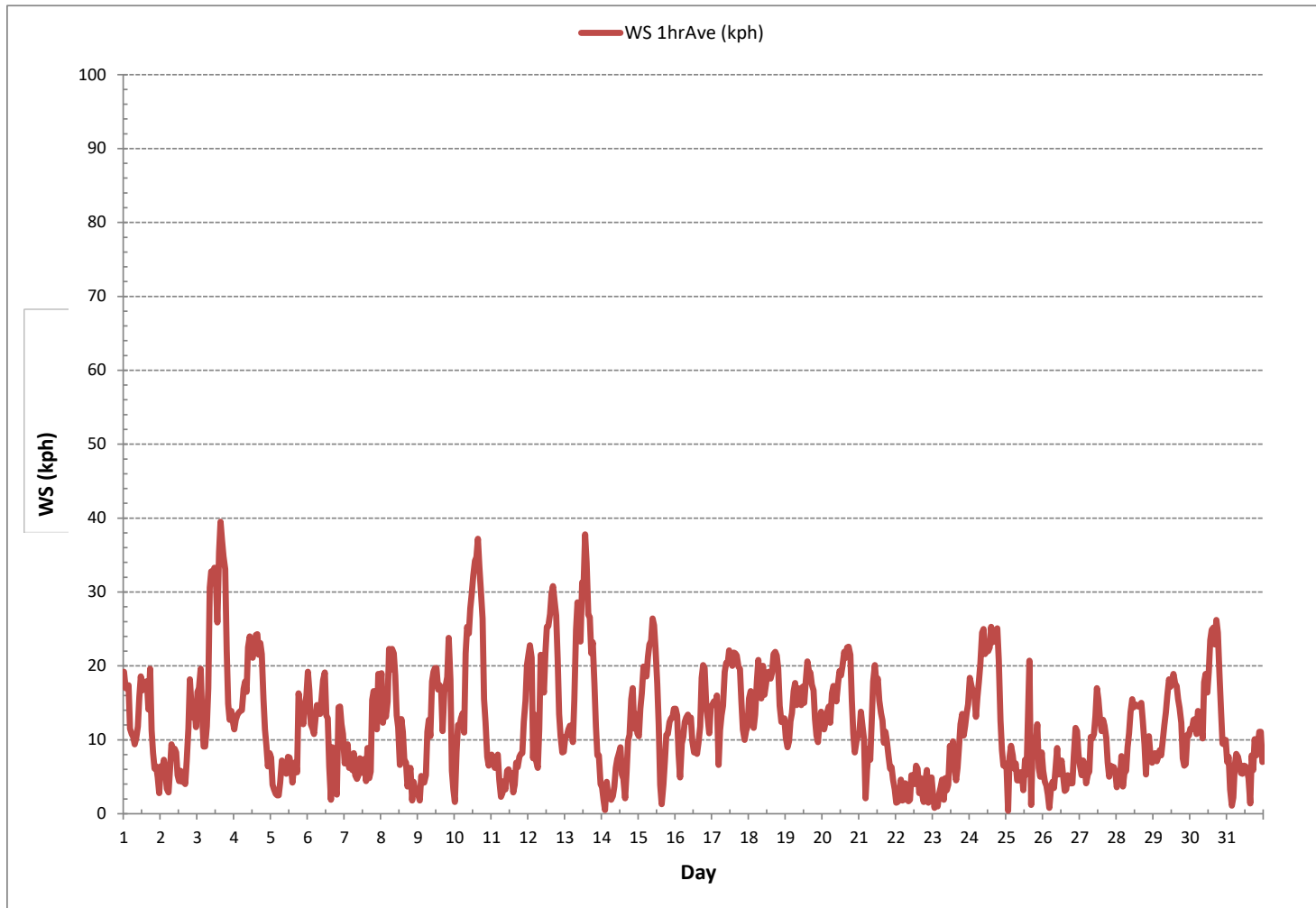
24 HR AVERAGES May 2019



MONTHLY SUMMARY

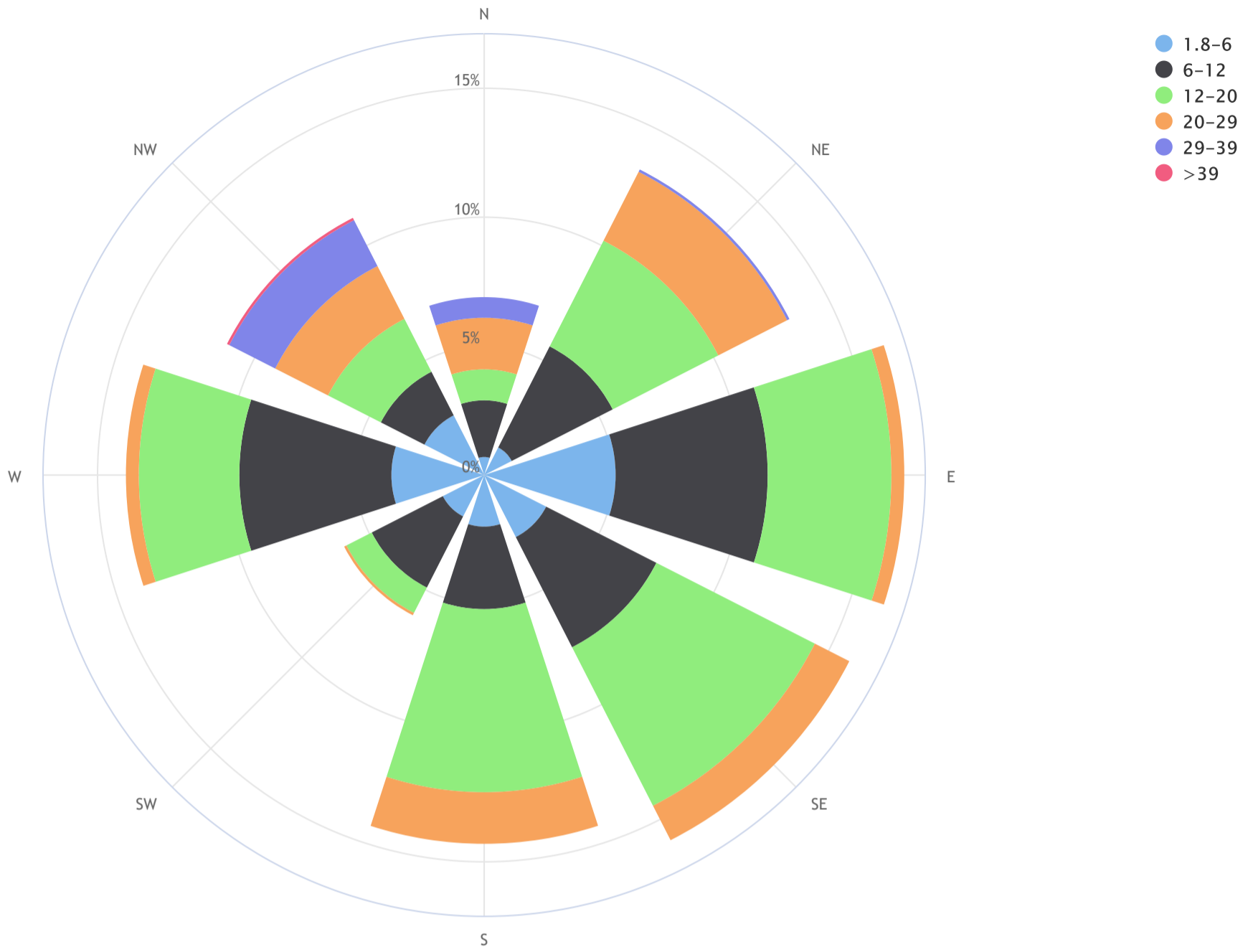
NUMBER OF NON-ZERO READINGS:	744
MINIMUM 1-HR AVERAGE	0.4 kph @ HOUR 1 ON DAY 25
MAXIMUM 1-HR AVERAGE:	39.5 kph @ HOUR 15 ON DAY 3
MAXIMUM 24-HR AVERAGE:	18.4 kph ON DAY 24
MONTHLY CALIBRATION TIME:	0 hrs
OPERATIONAL TIME:	744 hrs
AMD OPERATION UPTIME:	100.0 %
STANDARD DEVIATION:	7.4
MONTHLY AVERAGE:	1.1 kph

WIND SPEED Hourly Averages (WS kph)



Lakeland Industry & Community Association_Bonnyville East Continuous Monitoring Station_19/05

Wind Rose_Wind Frequency (Blowing From)_CALM Avg = 1.2_CALM % = 2.0%



Direction	1.8-6	6-12	12-20	20-29	29-39	>39	TOTAL
N	0.7	2.2	1.2	2.0	0.8	0.0	6.9
NE	1.2	4.4	4.6	3.0	0.1	0.0	13.3
E	5.1	5.9	4.8	0.5	0.0	0.0	16.4
SE	2.7	4.8	6.9	1.5	0.0	0.0	15.9
S	2.0	3.2	7.1	2.0	0.0	0.0	14.4
SW	1.8	3.1	1.1	0.1	0.0	0.0	6.1
W	3.6	5.9	3.9	0.5	0.0	0.0	14.0
NW	2.6	1.9	2.3	2.3	2.0	0.1	11.1
Summary	19.6	31.5	31.9	12.0	3.0	0.1	98.0
CALM	2.0	0.0	0.0	0.0	0.0	0.0	2.0



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - May 2019

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

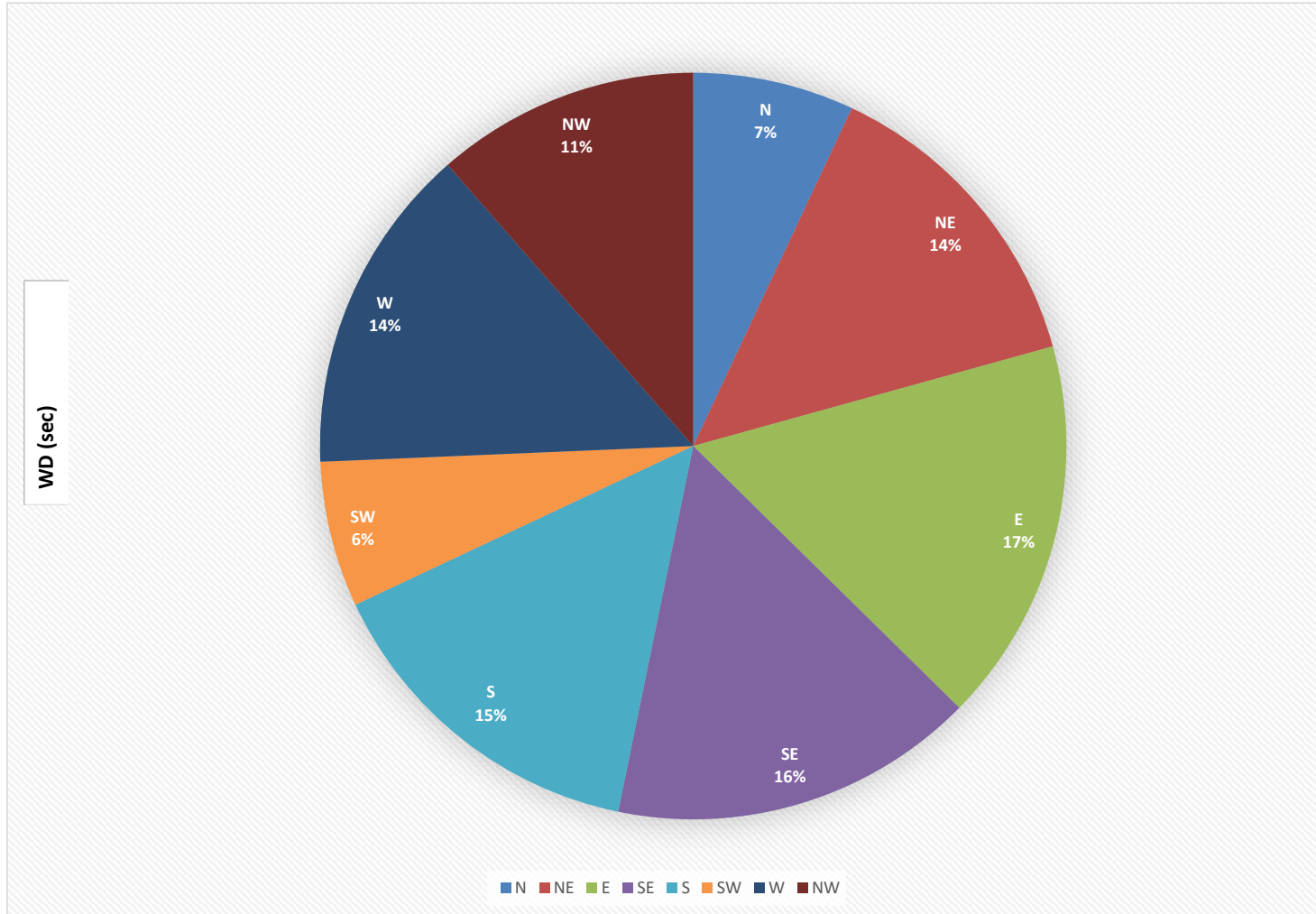
STATUS FLAG CODES

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

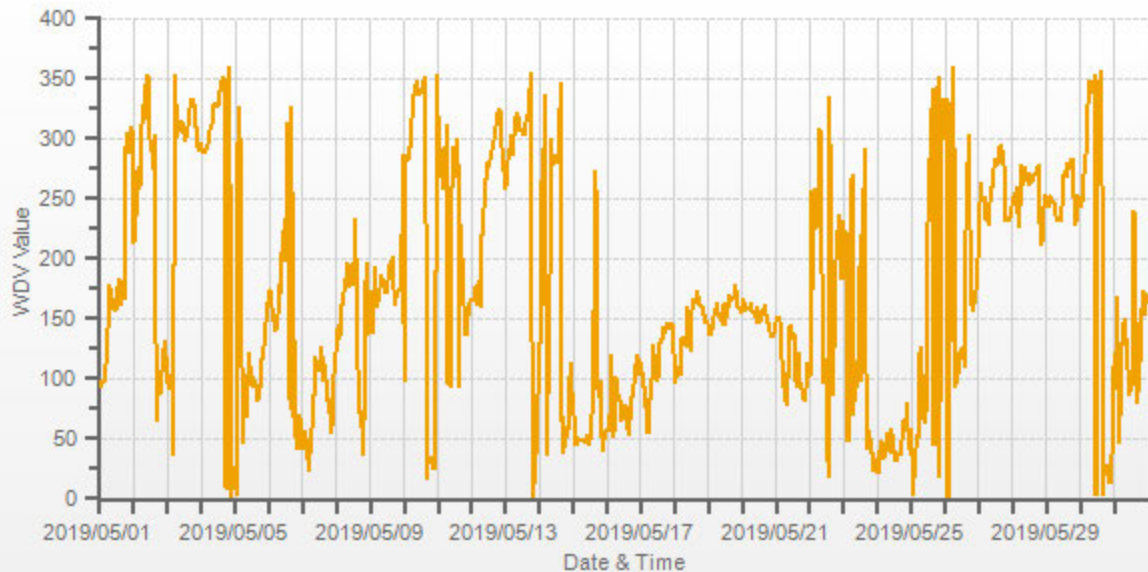
LAST CALIBRATION:	October 24, 2018
DECLINATION :	MAGNETIC DECLINATION 13 DEGREE EAST

MONTHLY CALIBRATION TIME:	0	hrs	OPERATIONAL TIME:	744	hrs
STANDARD DEVIATION:	98		AMD OPERATION UPTIME:	100.0	%
			MONTHLY AVERAGE:	90 (E)	

WIND DIRECTION Hourly Averages (WD)



WDV[degwdr] Station: LICA Bonnyville East Monthly: 19/05 Type: AVG 1 Hr. [1 Hr.]





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - May 2019

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59		
DAY																										
1	6	6	6	5	6	6	6	10	9	8	8	7	7	7	9	8	6	6	8	5	3	3	2	1	24	
2	6	5	5	4	7	7	8	8	10	13	14	17	18	18	19	14	13	6	6	5	5	5	5	5	24	
3	5	5	5	7	6	6	6	8	7	7	7	7	8	8	7	7	7	7	7	6	5	6	6	5	24	
4	4	5	5	5	5	7	7	7	8	8	8	9	9	9	9	9	10	9	10	9	10	11	5	6	24	
5	5	5	7	8	4	4	8	9	11	10	13	10	11	11	13	10	9	10	5	5	5	5	6	6	24	
6	6	6	6	6	6	6	7	7	8	9	10	9	10	8	9	9	9	10	6	2	5	6	6	4	24	
7	5	6	6	7	6	7	7	11	11	12	9	36	39	29	50	13	35	14	12	15	8	15	9	7	24	
8	3	15	10	20	7	6	9	9	7	12	13	14	51	14	16	22	12	33	20	11	63	19	23	31	24	
9	30	31	13	15	14	10	5	9	12	9	11	9	13	18	18	16	33	9	3	2	2	6	31	66	24	
10	62	21	17	14	11	6	9	8	9	10	11	11	11	9	9	11	9	10	5	8	6	11	12	25	24	
11	9	10	14	14	10	17	22	37	12	47	26	24	32	26	41	53	28	28	19	4	6	4	3	4	24	
12	3	2	4	16	6	45	42	17	8	9	9	8	11	12	12	10	10	9	6	8	6	9	15	13	24	
13	6	8	2	5	7	4	7	4	8	10	11	9	11	6	9	18	8	14	7	6	7	10	11	48	24	
14	42	31	64	30	19	12	35	38	31	17	22	26	18	40	40	63	27	25	12	18	16	31	6	18	24	
15	20	4	3	3	4	3	4	4	4	5	7	10	15	12	50	70	40	30	8	9	8	7	12	5	24	
16	4	4	25	19	7	9	10	11	9	17	10	14	12	19	19	25	11	12	9	7	9	4	9	3	24	
17	9	8	7	5	30	13	5	9	19	16	17	13	14	18	16	13	9	10	7	4	3	6	5	25	24	
18	10	4	11	8	6	7	5	9	12	11	28	14	16	14	15	14	10	8	8	4	2	2	2	3	24	
19	3	3	3	5	2	3	6	10	11	21	25	19	26	16	13	13	11	12	10	5	5	2	3	1	24	
20	4	3	4	2	2	3	5	8	9	17	18	15	19	19	11	11	7	15	9	5	5	9	4	6	24	
21	2	1	1	4	33	32	9	19	14	16	21	13	19	22	21	27	25	9	10	17	37	17	19	22	24	
22	51	62	52	24	27	7	19	18	22	45	9	9	53	37	31	48	19	12	11	14	7	30	35	24	24	
23	40	27	21	31	27	46	19	55	24	41	29	30	22	29	29	24	26	8	6	8	14	10	10	8	24	
24	5	13	3	3	5	3	9	6	7	7	7	8	8	7	8	7	7	6	6	7	6	6	5	6	24	
25	6	8	6	4	5	6	7	11	12	12	13	19	15	14	9	9	14	11	11	6	8	7	14	4	24	
26	3	5	7	4	4	5	10	12	10	8	13	13	10	13	16	20	13	15	10	4	1	2	2	5	24	
27	7	7	3	5	8	7	12	12	14	13	10	10	10	10	10	9	9	10	8	5	6	4	6	6	24	
28	6	7	5	6	4	10	11	12	9	10	9	12	11	12	11	11	9	9	9	5	4	8	10	9	24	
29	14	12	13	13	11	17	16	15	14	14	14	14	11	11	11	10	10	9	9	6	7	7	6	6	24	
30	7	8	9	7	6	6	8	7	9	9	10	12	11	8	9	12	10	7	7	6	5	7	5	5	24	
31	7	7	6	8	5	5	7	10	11	12	12	13	11	14	16	15	8	8	6	3	1	2	3	10	24	

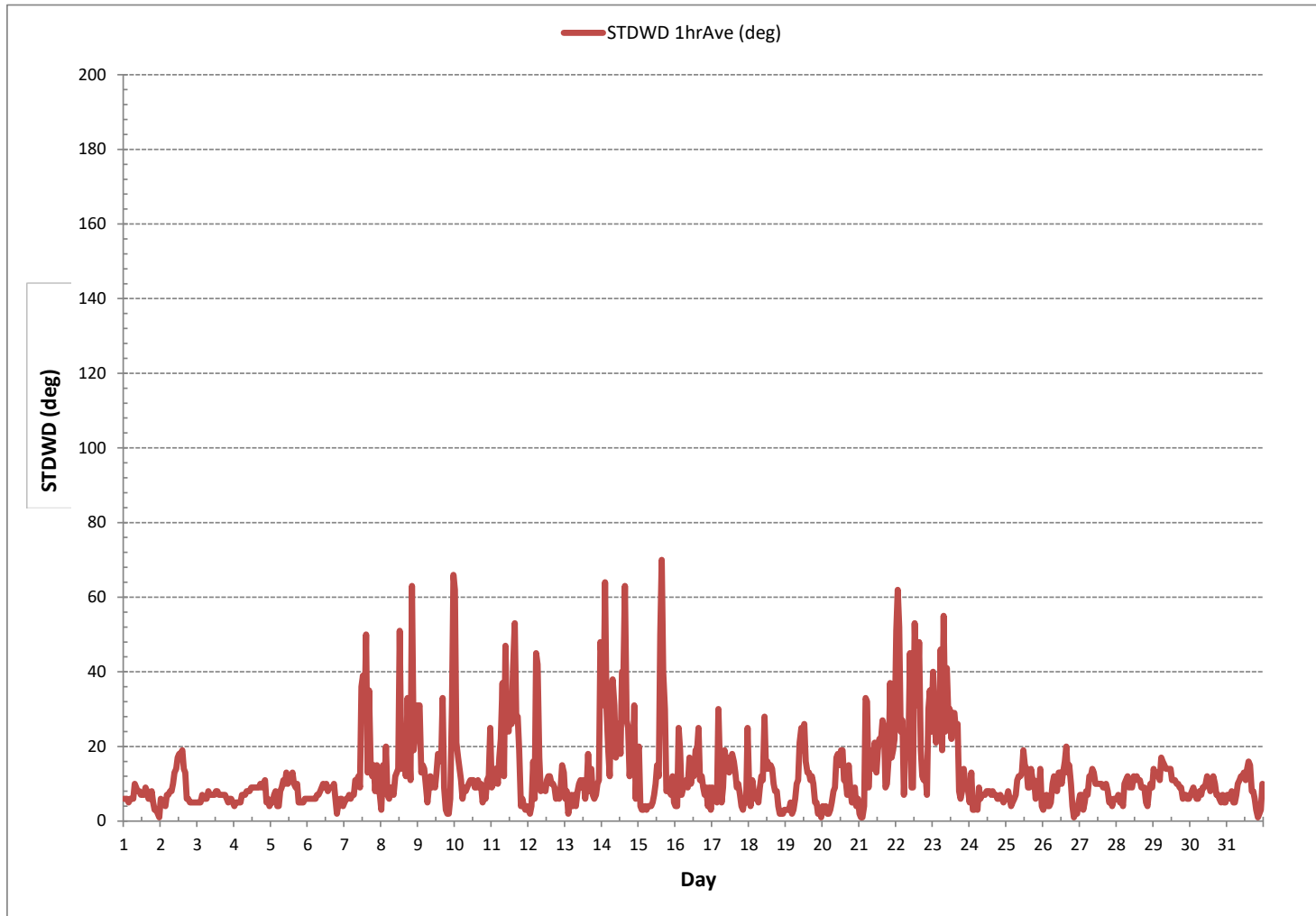
STATUS FLAG CODES

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

LAST CALIBRATION: October 24, 2018

CALIBRATION TIME: 0 hrs OPERATIONAL TIME: 744 hrs

STANDARD DEVIATION WIND DIRECTION Hourly Averages (STDWD deg)





VECTOR WIND SPEED Hourly Averages (kph) & WIND DIRECTION Hourly Averages in Sector

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	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	WS	19.2	17.0	17.1	17.4	11.5	10.8	10.4	9.4	10.2	11.8	15.8	18.6	16.7	17.2	17.9	17.9	14.1	19.6	11.3	8.2	6.1	6.4	4.9	2.8	2.8	19.6	8.2	24	
	WD	E	E	E	E	ESE	ESE	SSE	S	SSE	SSE	SSE	SSE	S	SSE	SSE	S	SSE	WNW	WNW	WNW	WNW	WNW	NW	NW	-	-	-	24	
2	WS	6.4	6.0	7.3	5.8	3.4	2.9	6.0	9.4	8.5	8.8	8.3	5.2	4.4	5.8	4.3	4.7	4.0	7.1	11.5	18.2	14.8	13.0	14.6	11.7	2.9	18.2	1.0	24	
	WD	SSW	SW	WSW	W	WSW	W	NNW	NW	NNW	N	N	WNW	WNW	WNW	W	WNW	ENE	E	E	E	ESE	ESE	SE	ESE	-	-	-	24	
3	WS	16.5	17.0	19.6	13.3	9.1	9.1	11.8	17.0	30.6	32.8	32.7	33.3	31.4	25.9	35.4	39.5	37.0	34.8	33.1	22.2	14.9	12.7	13.9	12.5	9.1	39.5	17.5	24	
	WD	E	E	E	ESE	NE	N	NW	WNW	NW	NW	NW	NW	WNW	WNW	WNW	NW	NW	NNW	NNW	NNW	NW	WNW	WNW	WNW	-	-	-	24	
4	WS	11.4	12.7	13.4	13.7	13.9	14.0	16.9	17.9	16.5	22.5	24.0	21.6	21.1	22.5	24.2	24.3	21.5	23.1	21.6	15.5	11.4	9.2	6.4	8.2	6.4	24.3	15.2	24	
	WD	WNW	WNW	WNW	WNW	WNW	WNW	NW	NW	NW	NNW	NNW	NW	NNW	NNW	NNW	N	N	N	N	N	N	N	N	N	NNE	-	-	-	24
5	WS	7.6	3.9	3.3	2.7	2.5	2.5	4.2	7.2	6.1	6.4	5.4	7.7	7.6	6.4	4.2	6.5	7.0	5.6	16.3	14.3	14.1	12.1	14.2	16.0	2.5	16.3	5.8	24	
	WD	NNE	N	NW	W	WNW	NE	E	ENE	ENE	ESE	ESE	E	E	E	E	E	E	E	E	ESE	ESE	SE	SSE	SSE	-	-	-	24	
6	WS	19.2	16.7	12.1	11.5	10.8	12.9	14.7	14.4	13.5	15.7	18.1	19.1	13.3	12.9	6.4	1.9	9.0	2.9	3.4	2.6	14.4	14.5	12.1	10.8	1.9	19.2	5.6	24	
	WD	S	S	SSE	SSE	SE	SE	SE	S	SSW	SW	SSW	SW	NW	ESE	ENE	NW	ENE	SE	NE	NE	ENE	ENE	NE	NE	-	-	-	24	
7	WS	6.8	8.0	9.4	6.2	7.4	5.9	8.2	5.2	4.7	5.2	7.5	6.6	5.5	7.4	4.4	8.9	4.8	5.7	15.4	16.6	14.1	11.4	18.9	16.0	4.4	18.9	7.7	24	
	WD	NE	NE	NE	NE	NNE	NE	NE	E	E	ESE	ESE	ESE	ESE	SE	ESE	E	ESE	E	E	ENE	NE	ENE	E	ESE	-	-	-	24	
8	WS	19.0	12.3	14.7	13.1	15.2	22.3	19.5	22.3	21.7	18.7	13.3	11.7	6.6	12.8	11.1	7.3	6.9	3.7	4.8	6.2	1.8	4.3	3.3	2.8	1.8	22.3	9.1	24	
	WD	ESE	SE	SE	SE	SSE	S	S	SSW	S	S	S	S	SW	S	ESE	ENE	ENE	ENE	NE	ESE	SE	SE	SE	SE	-	-	-	24	
9	WS	2.7	1.8	5.1	4.5	4.2	5.2	11.1	12.7	10.5	17.9	19.2	19.7	19.7	16.8	17.4	16.9	11.2	16.5	17.4	18.5	23.8	18.1	5.8	3.3	1.8	23.8	12.0	24	
	WD	SE	S	SE	S	S	SSE	S	S	S	S	S	S	S	S	SSW	SSW	SSW	SSE	SSE	S	S	S	S	WNW	-	-	-	24	
10	WS	1.6	8.4	12.0	11.8	12.9	13.6	11.0	21.7	25.3	24.4	27.8	29.8	32.2	34.2	34.7	37.2	33.4	29.7	26.4	15.5	12.4	7.7	6.5	7.6	1.6	37.2	17.3	24	
	WD	E	WNW	W	W	WNW	NW	NW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	NNW	N	NNE	NNE	NE	NNE	NNE	NNE	NNE	N	-	-	-	24	
11	WS	8.0	6.8	6.2	7.4	8.0	4.6	2.3	2.8	4.4	3.3	5.8	6.0	5.2	5.5	2.9	3.9	6.9	6.3	7.7	8.1	8.2	12.4	15.3	20.1	2.3	20.1	2.8	24	
	WD	NW	WNW	WNW	WSW	WSW	W	NW	E	E	E	WNW	WNW	W	WNW	WNW	E	SW	SSW	S	SE	SE	SSE	SSE	SSE	-	-	-	24	
12	WS	21.5	22.8	21.1	7.5	13.4	7.2	6.2	11.4	21.5	18.2	16.4	21.7	25.3	25.4	27.0	29.8	30.8	28.9	26.8	21.0	13.5	10.5	8.3	8.4	6.2	30.8	11.2	24	
	WD	SSE	SSE	SSE	S	SSE	S	SSE	SW	SW	WSW	W	W	W	WNW	WNW	WNW	WNW	NW	NW	NW	NW	WNW	WNW	W	-	-	-	24	
13	WS	10.4	10.5	11.4	11.9	11.7	9.7	15.4	24.9	28.6	24.1	23.3	31.3	31.2	37.8	34.0	26.9	26.6	21.7	23.2	17.5	11.8	7.9	7.9	4.0	4.0	37.8	17.2	24	
	WD	WSW	W	WNW	WNW	WNW	WNW	WNW	NW	NW	NW	NW	NW	WNW	WNW	NW	NW	NW	NNW	N	N	NNE	NNE	NE	E	-	-	-	24	
14	WS	3.6	1.9	0.5	4.3	2.4	2.5	1.9	2.4	3.7	6.2	7.4	8.2	9.0	5.3	4.7	2.1	5.6	9.9	10.7	15.5	17.0	11.5	13.5	10.9	0.5	17.0	2.7	24	
	WD	E	SSW	WNW	W	NNW	NE	E	E	WNW	W	WNW	WNW	W	WNW	NNW	NE	ENE	NE	ENE	NE	E	ESE	E	-	-	-	-	24	
15	WS	10.5	14.2	16.3	19.9	19.3	18.6	21.2	22.9	23.4	26.4	25.5	22.3	17.6	12.0	3.9	1.3	3.9	7.1	10.7	10.8	12.4	12.9	13.0	14.2	1.3	26.4	14.2	24	
	WD	E	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	ENE	E	SSW	W	E	E	E	ENE	NE	NE	ENE	-	-	-	24	
16	WS	14.2	13.3	8.1	4.9	9.5	10.4	12.4	13.0	13.4	12.4	13.0	9.8	8.3	9.4	8.1	9.6	11.8	18.4	20.1	19.7	14.4	12.8	10.9	14.4	4.9	20.1	11.4	24	
	WD	ENE	NE	ENE	ESE	NE	ENE	E	E	E	ENE	ENE	ENE	ENE	ENE	NE	ENE	ENE	E	E	ESE	ESE	ESE	ESE	ESE	-	-	-	24	
17	WS	14.8	15.2	14.9	16.0	6.6	11.3	13.3	14.6	19.2	20.4	20.3	22.1	21.2	20.0	21.8	21.7	21.4	19.9	19.6	15.2	11.4	10.0	11.2	11.8	6.6	22.1	15.0	24	
	WD	ESE	ESE	E	E	ENE	NE	E	E	ESE	SE	ESE	E	E	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	-	-	-	24	
18	WS	15.6	16.6	12.7	11.6	13.4	17.9	20.8	16.8	15.6	20.0	16.1	17.5	19.1	19.2	18.3	19.1	21.6	21.9	21.4	19.6	14.6	12.4	12.6	12.9	11.6	21.9	15.7	24	
	WD	E	E	ESE	ESE	ESE	SE	SE	SE	SE	SSE	SSE	ESE	SSE	SSE	SSE	S	SSE	SSE	SSE	SSE	SSE	SSE	SSE	SSE	-	-	-	24	
19	WS	10.3	9.0	9.8	12.5	13.6	16.6	17.7	14.7	17.0	16.3	14.7	17.2	15.0	17.8	20.6	19.3	19.1	17.5	16.7	12.8	10.6	9.7	12.6	13.8	9.0	20.6	14.6	24	
	WD	SE	SE	SE	SE	SSE	SSE	SSE	SSE	SSE	SSE	SE	SSE	SE	SSE	SSE	SSE	SSE	SSE	SSE	S	SSE	SSE	SSE	SSE	-	-	-	24	
20	WS	12.5	11.4	12.5	13.8	14.5	12.3	16.3	17.3	17.2	15.2	17.7	19.3	18.7	20.0	21.9	21.1	22.5	22.6	21.5	15.4	10.9	8.3	9.8	10.6	8.3	22.6	15.8	24	
	WD	SSE	SSE	SSE	SSE	SSE	SSE	SSE	SSE	SSE	SSE	SSE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	-	-	-	24	



VECTOR WIND SPEED Hourly Averages (kph) & WIND DIRECTION Hourly Averages in Sector

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	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.		
21	WS	11.1	13.8	11.7	10.0	2.1	5.9	8.8	7.3	12.4	17.9	20.1	17.7	18.3	15.3	13.6	12.6	9.6	11.1	9.8	7.7	6.1	6.3	4.6	3.3	2.1	20.1	9.7	24
	WD	SE	SSE	SSE	SE	ESE	E	ESE	E	ENE	SE	SE	SE	SE	E	E	ESE	E	E	E	E	E	ESE	E	-	-	-	24	
22	WS	1.5	1.6	2.1	4.6	1.8	1.9	4.1	2.0	1.7	1.9	5.2	5.2	4.0	6.5	6.1	2.8	4.8	2.6	1.6	4.5	5.9	1.5	2.7	4.9	1.5	6.5	0.7	24
	WD	ESE	WSW	S	SW	WSW	SW	W	NW	WNW	E	ESE	ESE	E	NNE	NNW	ESE	E	SE	S	SW	SSW	SW	S	SSW	-	-	-	24
23	WS	2.6	0.8	1.8	1.0	2.7	3.6	4.6	1.9	4.8	3.2	3.9	9.2	6.8	9.8	6.3	4.5	6.2	9.1	12.1	13.5	10.6	11.9	13.6	14.8	0.8	14.8	2.7	24
	WD	SW	S	S	NE	SSW	WSW	W	ENE	ESE	ESE	E	S	E	SW	WSW	WNW	NE	NE	ENE	NE	NE	NNE	NNE	NE	-	-	-	24
24	WS	18.4	17.4	16.6	16.5	13.1	15.8	17.9	20.3	24.5	25.0	21.6	22.1	22.0	22.5	25.3	23.2	23.4	24.4	25.1	20.8	12.6	8.6	6.5	6.8	6.5	25.3	18.4	24
	WD	NNE	NNE	NE	NE	NE	NE	NE	NE	NE	ENE	NE	NE	NNE	NNE	NE	NE	NE	ENE	ENE	NE	E	NE	NE	NE	-	-	-	24
25	WS	6.0	0.4	7.7	9.2	7.9	6.1	6.8	4.5	4.5	5.6	5.6	3.2	7.3	5.3	13.0	20.7	1.2	9.1	8.7	8.9	12.1	6.2	5.0	8.3	0.4	20.7	3.3	24
	WD	ENE	N	NNE	NE	NE	NE	ESE	SE	E	ENE	E	ENE	W	WSW	WNW	NNW	NE	W	W	N	NNE	WSW	NNW	WNW	-	-	-	24
26	WS	5.8	4.3	3.8	2.6	0.8	3.5	4.3	3.5	5.9	8.9	5.3	6.0	7.2	4.9	3.1	3.3	5.2	4.1	4.1	4.1	7.9	11.6	11.2	8.0	0.8	11.6	1.9	24
	WD	NW	NNW	N	NNE	NW	NNW	N	E	E	ESE	ESE	SE	SE	ESE	W	W	WNW	SSE	SSE	SSE	S	SSW	-	-	-	-	-	24
27	WS	6.5	5.2	7.2	6.5	4.1	5.3	5.7	10.4	10.2	10.8	13.2	17.0	15.5	12.7	11.2	12.7	11.9	10.3	6.9	5.0	6.5	6.3	6.3	5.7	4.1	17.0	8.2	24
	WD	SSW	W	WSW	WSW	WSW	SW	SW	SW	WSW	WSW	W	W	WNW	W	W	WNW	WNW	WNW	W	SW	SW	SW	SW	WSW	-	-	-	24
28	WS	3.6	5.2	4.5	7.8	3.7	5.5	5.8	9.0	10.9	13.7	15.5	14.4	14.8	14.7	14.5	14.7	15.0	12.6	9.4	5.3	10.1	10.5	7.6	6.9	3.6	15.5	9.4	24
	WD	WSW	WSW	WSW	WSW	SW	WSW	W	W	W	W	W	W	W	W	W	W	W	W	W	SW	SSW	SW	WSW	WSW	-	-	-	24
29	WS	7.5	8.2	7.1	7.7	8.6	7.9	10.1	12.0	13.7	16.0	18.2	17.2	17.7	18.9	17.6	17.3	15.5	14.3	12.3	7.5	6.5	6.7	10.7	10.6	6.5	18.9	11.5	24
	WD	WSW	WSW	WSW	WSW	WSW	WSW	WSW	SW	SW	SW	SW	WSW	W	W	W	W	W	W	W	SW	SW	WSW	WSW	WSW	-	-	-	24
30	WS	11.5	11.4	12.7	12.8	10.8	13.9	13.5	11.9	10.2	17.8	18.9	16.4	19.2	23.5	24.9	25.2	22.9	26.2	24.5	18.5	13.9	9.5	9.4	10.0	9.4	26.2	12.6	24
	WD	WSW	WSW	W	W	WNW	NW	NNW	NNW	NNW	NNW	N	N	NNW	NNW	NNW	N	N	NNE	NNE	NNE	NNE	NNE	NNE	ENE	-	-	-	24
WS HOURLY MAX		21.5	22.8	21.1	19.9	19.3	22.3	21.2	24.9	30.6	32.8	32.7	33.3	32.2	37.8	35.4	39.5	37.0	34.8	33.1	22.2	23.8	18.1	18.9	20.1				

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:	October 24, 2018
DECLINATION :	MAGNETIC DECLINATION 16 DEGREE EAST

MONTHLY SUMMARY

WIND SPEED	
MINIMUM 1-HR AVERAGE	0.4 kph @ HOUR(S) 1 ON DAY(S) 25
MAXIMUM 1-HR AVERAGE:	39.5 kph @ HOUR(S) 15 ON DAY(S) 3
MAXIMUM 24-HR AVERAGE:	18.4 kph ON DAY(S) 24
VAR-VARIOUS	
MONTHLY AVERAGE:	1.1 kph
WIND DIRECTION	
MONTHLY AVERAGE:	90 (E)
HOURS IN SERVICE	744 hrs
HOURS OF DATA	744 hrs
HOURS OF CALIBRATION	0 hrs
HOURS OF MISSING DATA	0 hrs
STANDARD DEVIATION:	7.4
AMD OPERATION UPTIME:	100.0 %



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - May 2019

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)

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

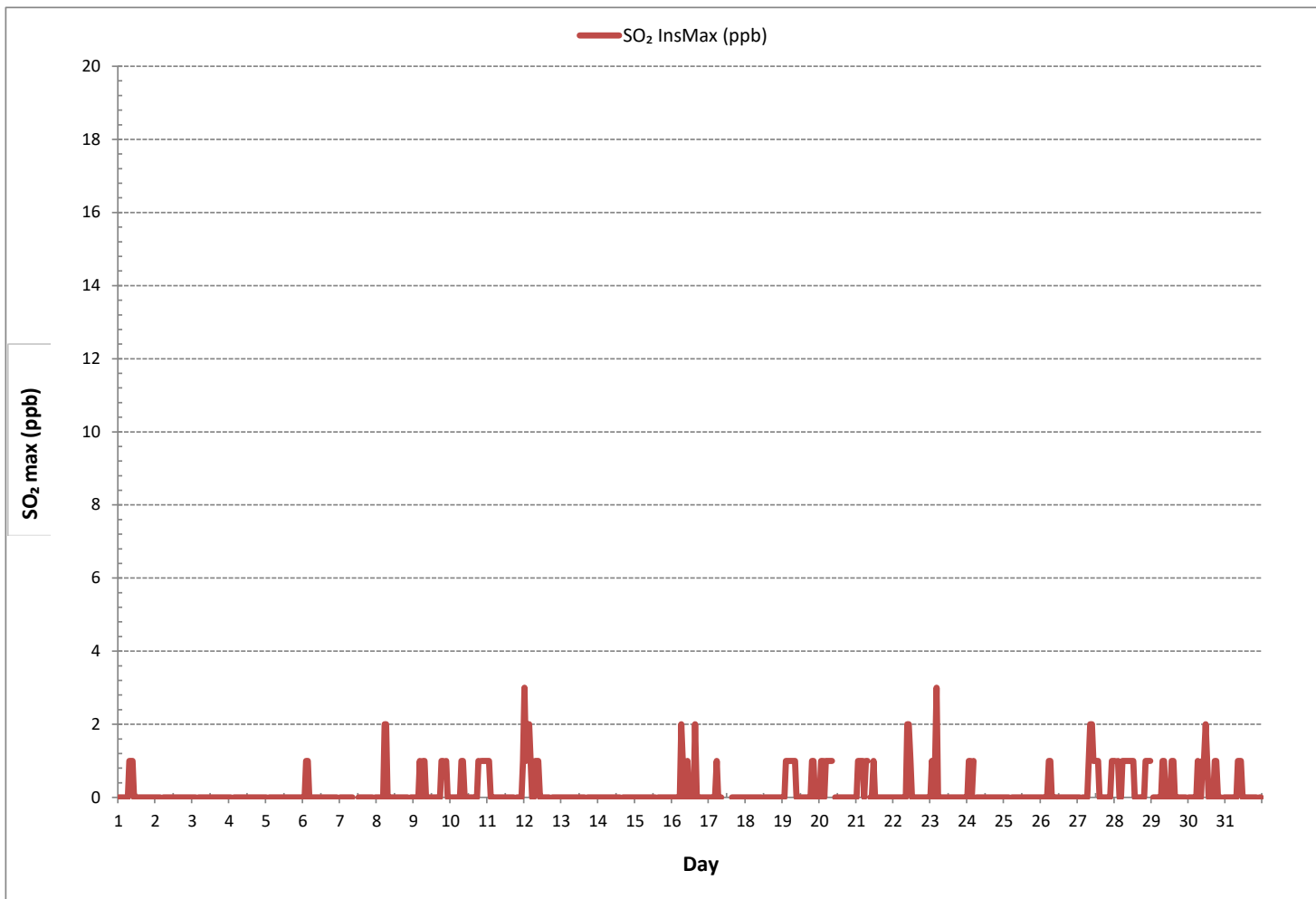
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	107
MAXIMUM INSTANTANEOUS VALUE:	3 ppb @ HOUR 0 ON DAY 12
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	0

SULPHUR DIOXIDE Instantaneous Maximum (SO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - May 2019

HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY																													
1	1	1	1	1	7	S	8	1	2	2	2	4	3	1	3	4	1	2	1	1	1	1	1	1	1	1	8	2	24
2	1	1	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	9	34	31	16	1	34	5	24
3	2	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	24
4	1	1	S	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
5	1	S	1	1	1	1	7	1	1	1	2	1	1	1	1	1	1	1	1	14	27	22	11	4	1	27	5	24	
6	S	1	5	8	18	13	13	2	1	1	1	1	1	1	5	2	2	3	9	2	2	2	1	S	1	18	4	24	
7	2	2	2	2	2	2	2	1	2	Q	Q	Q	4	4	8	5	13	2	3	2	2	2	S	30	1	30	5	24	
8	32	33	27	25	8	2	2	2	2	3	3	3	3	2	4	10	3	2	3	2	28	S	141	120	2	141	20	24	
9	124	3	172	50	37	54	2	2	3	2	2	2	3	2	2	3	18	36	2	2	S	2	35	67	2	172	27	24	
10	5	5	3	2	2	2	3	3	3	3	2	2	3	2	3	2	2	2	2	S	2	2	3	2	2	5	3	24	
11	2	3	3	2	3	3	3	14	4	3	2	2	2	2	2	3	3	3	S	191	175	23	9	5	2	191	20	24	
12	4	5	2	2	16	23	30	41	2	3	2	2	2	2	2	2	2	2	S	2	2	2	3	3	2	41	7	24	
13	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	3	S	2	2	2	2	3	3	22	2	22	3	24	
14	37	4	5	5	4	5	25	22	6	2	2	2	2	2	S	2	4	3	4	3	35	33	8	2	37	10	24		
15	6	4	4	4	3	3	3	3	3	3	3	3	3	3	S	4	3	3	2	2	3	3	3	3	2	6	3	24	
16	3	3	40	33	3	4	6	7	3	3	4	2	2	S	2	6	2	2	2	2	51	52	65	42	2	65	15	24	
17	34	31	7	3	32	5	3	4	23	C	C	C	C	C	C	16	18	24	28	38	62	128	173	51	3	173	38	24	
18	6	4	79	21	12	35	30	24	17	16	16	S	25	9	7	13	2	13	25	5	15	48	52	41	2	79	22	24	
19	71	97	99	65	32	21	10	11	15	14	S	17	11	10	10	15	15	10	9	1	1	0	2	17	0	99	24	24	
20	6	2	31	1	1	2	14	12	15	S	6	12	19	24	10	16	13	21	26	38	127	191	178	112	1	191	38	24	
21	55	29	38	65	20	26	17	3	S	16	18	19	21	16	5	10	19	9	11	92	29	124	206	73	3	206	40	24	
22	43	22	212	10	5	5	3	S	2	2	8	2	1	1	1	2	1	1	1	1	1	8	1	1	1	212	14	24	
23	194	1	1	37	34	25	S	1	3	6	1	8	9	1	1	1	1	1	2	2	3	1	2	2	1	194	15	24	
24	2	2	3	3	2	S	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	3	1	24	
25	3	5	2	2	S	2	10	5	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	2	24	
26	1	2	4	S	4	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	1	24	
27	1	3	S	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	24	
28	6	S	3	7	4	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	1	7	2	24	
29	S	2	2	3	3	2	S1	S1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	S	1	4	1	22	
30	2	2	2	2	2	2	2	2	1	1	2	3	1	1	1	1	1	1	1	1	1	1	S	3	1	3	2	24	
31	14	15	5	7	5	12	4	3	2	2	1	1	1	1	1	1	1	1	1	3	1	S	7	5	1	15	4	24	
HOURLY MAX	194	97	212	65	37	54	30	41	23	16	18	19	25	24	10	16	19	36	28	191	175	191	206	120					
HOURLY AVG	23	10	26	13	9	9	7	6	4	3	3	3	4	3	3	4	4	5	5	14	19	24	34	22					

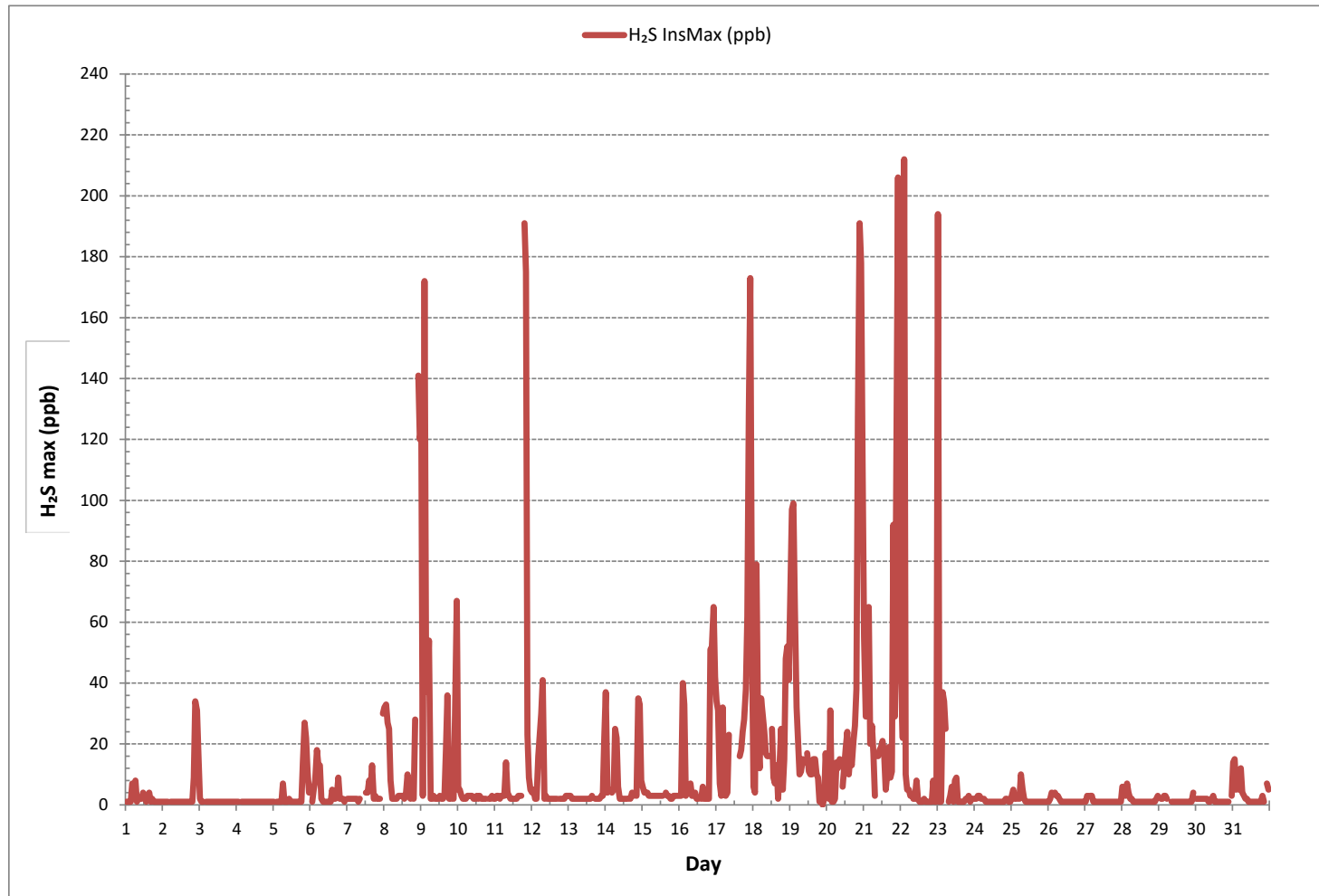
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	700
MAXIMUM INSTANTANEOUS VALUE:	212 ppb @ HOUR 2 ON DAY 22
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	6 hrs
OPERATIONAL TIME:	742 hrs
STANDARD DEVIATION:	27

HYDROGEN SULPHIDE Instantaneous Maximum (H₂S ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - May 2019

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	2.00	2.03	2.04	2.06	2.06	S	2.12	2.14	2.10	2.08	2.03	1.99	1.98	1.97	1.97	1.98	1.97	1.98	1.96	1.97	2.00	1.99	2.01	2.08	1.96	2.14	2.02	24	
2	2.05	2.05	2.04	2.01	S	2.03	2.03	2.04	2.16	2.04	1.97	1.97	1.97	1.96	1.95	1.95	1.95	1.95	1.96	1.97	2.03	2.01	1.99	1.99	1.95	2.16	2.00	24	
3	2.02	2.02	2.02	S	2.01	1.99	2.00	2.01	1.96	1.95	1.94	1.95	1.95	1.94	1.94	1.94	1.94	1.94	1.95	1.95	1.96	1.97	1.99	2.01	1.94	2.02	1.97	24	
4	1.99	2.01	S	1.98	2.01	2.03	1.97	1.96	1.96	1.96	1.95	1.95	1.96	1.96	1.95	1.95	1.95	1.95	1.95	1.95	1.96	1.96	2.02	2.04	2.09	1.95	2.09	1.98	24
5	2.07	S	2.16	2.14	2.13	2.16	2.23	2.09	1.98	1.96	1.96	1.95	1.95	1.95	1.94	1.94	1.95	1.95	1.95	1.97	1.97	1.99	1.98	1.98	1.94	2.23	2.01	24	
6	S	1.99	2.04	2.10	2.17	2.16	2.13	2.08	2.02	2.04	2.00	1.97	1.97	1.96	1.95	1.95	1.96	1.97	1.96	1.99	2.02	2.03	S	1.95	2.17	2.02	24		
7	2.04	2.11	2.08	2.05	2.05	2.04	2.02	2.01	2.00	1.98	Q	Q	1.97	1.97	1.97	1.98	1.98	1.98	1.98	1.99	2.03	2.24	S	2.03	1.97	2.24	2.02	24	
8	2.01	2.01	2.01	2.00	2.06	2.04	2.01	2.03	2.04	2.03	2.03	2.02	2.00	2.00	2.00	2.01	2.01	2.01	2.00	2.01	2.40	S	2.41	2.43	2.00	2.43	2.07	24	
9	2.67	2.19	3.11	2.75	2.55	2.54	2.22	2.21	2.12	2.10	2.06	2.07	2.02	2.01	1.97	1.96	2.11	2.05	1.95	1.96	S	2.01	2.17	2.12	1.95	3.11	2.21	24	
10	2.10	2.18	2.24	2.23	2.08	2.01	1.95	1.93	1.91	1.92	1.91	1.91	1.92	1.92	1.92	1.93	1.93	1.92	1.93	S	1.96	2.00	2.02	2.05	1.91	2.24	1.99	24	
11	2.10	2.08	2.08	2.09	2.07	2.16	2.25	2.22	2.13	2.03	1.98	1.95	1.94	1.93	1.93	1.93	1.92	1.92	S	2.55	2.92	2.25	2.16	2.12	1.92	2.92	2.12	24	
12	2.20	2.20	2.22	2.16	2.23	2.16	2.17	2.22	1.99	1.91	1.90	1.90	1.90	1.90	1.90	1.91	1.91	S	1.91	1.92	1.97	1.97	2.05	2.00	1.90	2.23	2.02	24	
13	2.01	2.03	2.02	2.07	2.14	2.08	2.00	1.94	1.93	1.92	1.91	1.92	1.92	1.91	1.91	1.92	S	1.93	1.93	1.94	1.98	1.99	2.02	2.20	1.91	2.20	1.98	24	
14	2.27	2.20	2.32	2.20	2.18	2.34	2.35	2.23	2.04	1.98	1.95	1.95	1.95	1.95	1.94	S	1.96	1.97	1.98	2.01	1.96	2.13	2.09	2.07	1.94	2.35	2.09	24	
15	2.06	2.05	2.02	2.02	1.99	1.97	1.95	1.95	1.93	1.95	1.93	1.95	1.95	1.94	S	1.94	1.95	1.94	1.94	1.95	2.03	2.01	2.03	2.20	1.93	2.20	1.98	24	
16	2.22	2.20	2.17	2.48	2.27	2.27	2.17	2.02	1.98	1.96	1.95	1.98	1.97	S	1.95	1.95	1.95	1.95	1.95	1.98	2.22	2.06	2.21	2.21	1.95	2.48	2.09	24	
17	2.09	2.08	2.11	2.10	2.26	2.11	2.12	2.07	2.00	1.97	1.96	1.95	S	1.94	1.95	1.95	1.95	1.96	1.96	1.99	2.15	2.46	2.35	2.16	1.94	2.46	2.07	24	
18	2.17	2.14	2.24	2.26	2.26	2.18	2.00	1.98	1.97	1.97	S	1.96	1.95	1.93	1.94	1.94	1.95	1.98	1.95	2.01	2.26	2.16	2.14	1.93	2.26	2.06	24		
19	2.26	2.36	2.38	2.31	2.28	2.16	2.14	2.03	2.01	1.97	S	1.97	1.97	1.97	1.97	1.99	1.96	1.97	1.98	1.95	1.99	1.98	2.18	2.36	1.95	2.38	2.09	24	
20	2.18	2.17	2.28	2.32	2.29	2.26	2.22	2.05	2.01	S	1.98	1.99	2.01	1.99	1.96	1.96	1.97	1.96	1.98	1.99	2.28	2.50	2.73	2.42	1.96	2.73	2.15	24	
21	2.38	2.27	2.31	2.43	2.22	2.27	2.11	2.12	S	1.99	1.99	1.98	1.98	1.99	1.96	1.97	1.99	2.01	2.04	2.28	2.21	2.58	2.77	2.53	1.96	2.77	2.19	24	
22	2.57	2.70	2.71	2.87	2.18	2.31	2.19	S	2.26	2.19	C	C	C	2.02	2.04	2.03	2.06	2.08	2.40	2.23	2.23	4.13	2.45	2.02	4.13	2.40	24		
23	3.44	2.26	2.38	2.55	2.94	2.75	S	2.26	2.34	2.31	2.31	2.09	2.09	2.05	2.04	2.03	2.05	2.07	2.15	2.12	2.13	2.11	2.08	2.04	2.03	3.44	2.29	24	
24	2.06	2.05	2.05	2.08	2.05	S	2.07	2.06	2.03	2.03	2.04	2.03	2.02	2.03	2.02	2.02	2.03	2.02	2.02	2.02	2.07	2.14	2.29	2.17	2.02	2.29	2.06	24	
25	2.13	2.20	2.27	2.25	S	2.25	2.20	2.15	2.13	2.08	2.03	2.02	2.01	2.01	2.02	2.02	2.01	2.00	2.00	2.01	2.02	2.02	2.04	2.07	2.00	2.27	2.08	24	
26	2.13	2.18	2.27	S	2.51	2.40	2.23	2.18	2.20	2.09	2.04	2.03	2.02	2.02	2.01	2.01	2.01	2.01	2.02	2.02	2.05	2.12	2.14	2.11	2.01	2.51	2.12	24	
27	2.15	2.27	S	2.31	2.29	2.24	2.25	2.20	2.14	2.08	2.04	2.02	2.01	2.01	2.00	2.00	2.00	2.01	2.01	2.02	2.05	2.09	2.07	2.14	2.00	2.31	2.10	24	
28	2.23	S	2.25	2.16	2.20	2.20	2.16	2.15	2.09	2.06	2.01	2.01	2.00	1.99	1.99	1.99	2.00	2.00	2.01	2.03	2.04	2.05	2.13	2.12	1.99	2.25	2.08	24	
29	S	2.06	2.05	2.07	2.07	2.07	2.08	2.07	2.06	2.04	2.01	2.01	2.00	1.99	1.99	1.98	1.98	1.98	1.98	2.02	2.01	2.07	2.12	S	1.98	2.12	2.03	24	
30	2.10	2.08	2.06	2.10	2.14	2.07	2.03	2.04	2.05	2.04	2.02	2.00	2.00	1.99	1.99	1.99	1.99	2.00	2.01	2.02	2.04	2.04	S	2.14	1.99	2.14	2.04	24	
31	2.29	2.29	2.30	2.35	2.55	2.40	2.31	2.11	2.03	2.17	2.11	2.01	2.02	2.02	2.00	2.01	2.02	2.02	2.07	2.14	2.12	S	2.24	2.16	2.00	2.55	2.16	24	
HOURLY MAX	3.44	2.70	3.11	2.87	2.94	2.75	2.35	2.26	2.34	2.31	2.31	2.09	2.09	2.05	2.04	2.04	2.11	2.07	2.15	2.55	2.92	2.58	4.13	2.53					
HOURLY AVG	2.21	2.15	2.21	2.22	2.22	2.19	2.12	2.09	2.05	2.03	2.00	1.98	1.98	1.97	1.97	1.98	1.98	1.99	2.04	2.09	2.11	2.23	2.16						

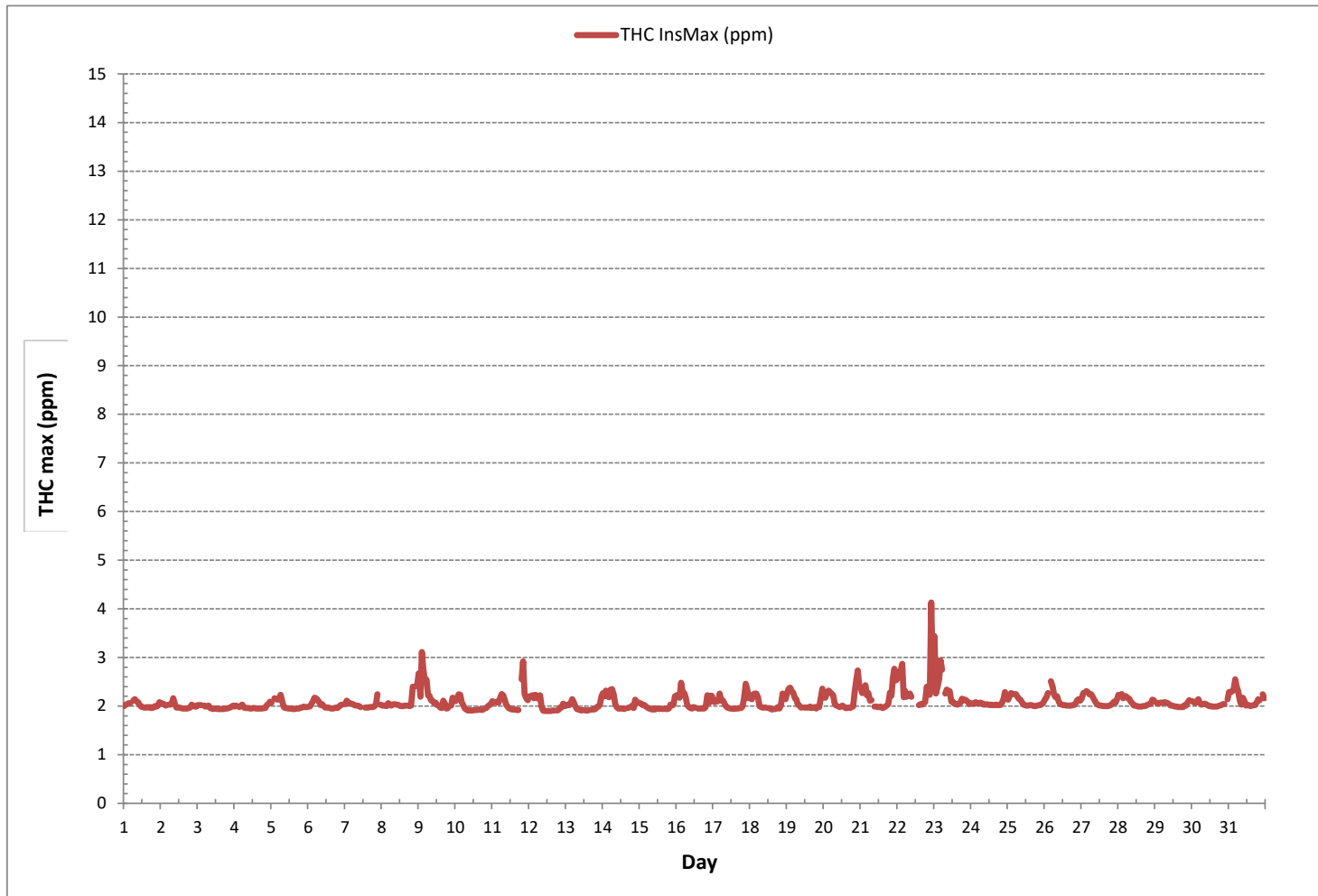
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	705
MAXIMUM INSTANTANEOUS VALUE:	4.13 ppm @ HOUR 22 ON DAY 22
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	4 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	0.18

TOTAL HYDROCARBONS Instantaneous Maximum (THC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - May 2019

METHANE MAX Instantaneous Maximum (CH₄ 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	2.00	2.03	2.04	2.06	2.06	S	2.12	2.14	2.10	2.08	2.03	1.99	1.98	1.97	1.97	1.98	1.97	1.98	1.96	1.97	2.00	1.99	2.01	2.08	1.96	2.14	2.02	24	
2	2.05	2.05	2.04	2.01	S	2.03	2.03	2.04	2.17	2.04	1.97	1.97	1.97	1.96	1.95	1.95	1.95	1.95	1.96	1.97	2.03	2.01	1.99	1.99	1.95	2.17	2.00	24	
3	2.02	2.02	2.02	S	2.01	1.99	2.00	2.01	1.95	1.95	1.94	1.95	1.95	1.94	1.94	1.94	1.94	1.94	1.95	1.95	1.96	1.97	1.99	2.01	1.94	2.02	1.97	24	
4	1.99	2.01	S	1.98	2.01	2.03	1.97	1.96	1.96	1.96	1.95	1.95	1.96	1.96	1.95	1.95	1.95	1.95	1.95	1.96	1.96	2.02	2.04	2.09	1.95	2.09	1.98	24	
5	2.07	S	2.16	2.14	2.13	2.16	2.23	2.09	1.98	1.96	1.96	1.95	1.95	1.95	1.94	1.94	1.95	1.95	1.95	1.97	1.97	1.99	1.98	1.98	1.94	2.23	2.01	24	
6	S	1.99	2.04	2.10	2.17	2.16	2.13	2.08	2.02	2.04	2.00	1.97	1.97	1.97	1.96	1.95	1.95	1.96	1.97	1.96	1.99	2.02	2.03	S	1.95	2.17	2.02	24	
7	2.04	2.11	2.08	2.05	2.05	2.04	2.02	2.01	2.01	2.00	1.98	Q	Q	1.97	1.97	1.97	1.98	1.98	1.98	1.99	2.03	2.22	S	2.03	1.97	2.22	2.02	24	
8	2.01	2.01	2.01	2.00	2.06	2.04	2.01	2.03	2.04	2.03	2.03	2.02	2.00	2.00	2.00	2.01	2.01	2.01	2.00	2.01	2.40	S	2.41	2.43	2.00	2.43	2.07	24	
9	2.67	2.19	3.11	2.75	2.55	2.54	2.22	2.21	2.12	2.10	2.06	2.07	2.02	2.01	1.97	1.96	2.11	2.05	1.95	1.96	S	2.01	2.17	2.12	1.95	3.11	2.21	24	
10	2.10	2.18	2.24	2.23	2.08	2.01	1.95	1.93	1.91	1.92	1.91	1.91	1.92	1.92	1.92	1.93	1.93	1.92	1.93	S	1.96	2.00	2.02	2.05	1.91	2.24	1.99	24	
11	2.10	2.08	2.08	2.09	2.07	2.16	2.25	2.22	2.13	2.03	1.98	1.95	1.94	1.93	1.93	1.93	1.92	1.92	S	2.55	2.92	2.25	2.16	2.12	1.92	2.92	2.12	24	
12	2.20	2.20	2.22	2.16	2.23	2.16	2.17	2.22	1.99	1.91	1.90	1.90	1.90	1.90	1.91	1.91	S	1.91	1.91	1.92	1.92	1.97	2.05	2.00	1.90	2.23	2.02	24	
13	2.01	2.03	2.02	2.07	2.14	2.08	2.00	1.94	1.93	1.92	1.91	1.92	1.92	1.91	1.91	1.92	S	1.93	1.93	1.94	1.98	1.99	2.02	2.20	1.91	2.20	1.98	24	
14	2.27	2.20	2.32	2.20	2.18	2.34	2.35	2.23	2.04	1.98	1.95	1.95	1.95	1.95	1.94	S	1.96	1.97	1.98	2.01	1.96	2.13	2.09	2.07	1.94	2.35	2.09	24	
15	2.06	2.05	2.02	2.02	1.99	1.97	1.95	1.95	1.93	1.95	1.93	1.95	1.95	1.94	S	1.94	1.95	1.94	1.94	1.95	2.03	2.01	2.03	2.20	1.93	2.20	1.98	24	
16	2.22	2.20	2.17	2.43	2.27	2.27	2.17	2.02	1.98	1.96	1.95	1.98	1.97	S	1.95	1.95	1.95	1.96	1.95	1.98	2.22	2.06	2.21	2.21	1.95	2.43	2.09	24	
17	2.09	2.08	2.11	2.10	2.26	2.11	2.12	2.07	2.00	1.97	1.96	1.95	S	1.94	1.95	1.95	1.95	1.96	1.96	1.99	2.15	2.46	2.35	2.16	1.94	2.46	2.07	24	
18	2.17	2.14	2.24	2.26	2.26	2.18	2.00	1.98	1.97	1.97	1.97	S	1.96	1.95	1.93	1.94	1.94	1.95	1.98	1.95	2.01	2.26	2.16	2.14	1.93	2.26	2.06	24	
19	2.26	2.36	2.38	2.31	2.28	2.16	2.14	2.03	2.01	1.97	S	1.97	1.97	1.97	1.97	1.99	1.96	1.97	1.98	1.95	1.99	1.98	2.18	2.36	1.95	2.38	2.09	24	
20	2.18	2.17	2.28	2.32	2.29	2.26	2.22	2.05	2.01	S	1.98	1.99	2.01	1.99	1.96	1.96	1.97	1.96	1.98	1.99	2.28	2.50	2.73	2.42	1.96	2.73	2.15	24	
21	2.38	2.27	2.31	2.43	2.22	2.27	2.11	2.12	S	1.99	1.99	1.98	1.98	1.99	1.96	1.97	1.99	2.01	2.04	2.28	2.21	2.58	2.77	2.53	1.96	2.77	2.19	24	
22	2.57	2.70	2.71	2.87	2.18	2.31	2.19	S	2.26	2.19	C	C	C	C	2.02	2.04	2.03	2.06	2.08	2.40	2.23	2.23	3.85	2.45	2.02	3.85	2.39	24	
23	3.44	2.26	2.38	2.55	2.94	2.75	S	2.26	2.34	2.31	2.31	2.09	2.09	2.05	2.04	2.03	2.05	2.07	2.15	2.12	2.13	2.11	2.08	2.04	2.03	3.44	2.29	24	
24	2.06	2.05	2.05	2.08	2.05	S	2.07	2.06	2.03	2.03	2.04	2.03	2.02	2.02	2.02	2.02	2.03	2.02	2.02	2.02	2.02	2.07	2.09	2.12	2.09	2.02	2.12	2.05	24
25	2.13	2.20	2.23	2.24	S	2.25	2.20	2.15	2.13	2.08	2.03	2.02	2.01	2.00	2.02	2.02	2.01	2.00	2.00	2.01	2.02	2.02	2.04	2.07	2.00	2.25	2.08	24	
26	2.13	2.18	2.27	S	2.51	2.40	2.23	2.18	2.20	2.09	2.04	2.03	2.02	2.02	2.01	2.01	2.01	2.01	2.02	2.02	2.05	2.12	2.14	2.11	2.01	2.51	2.12	24	
27	2.15	2.27	S	2.31	2.29	2.24	2.25	2.21	2.14	2.08	2.04	2.02	2.01	2.01	2.00	2.00	2.00	2.00	2.01	2.02	2.05	2.09	2.07	2.14	2.00	2.31	2.10	24	
28	2.23	S	2.25	2.16	2.20	2.20	2.16	2.15	2.09	2.06	2.01	2.01	2.00	1.99	1.99	1.99	2.00	2.00	2.00	2.03	2.04	2.05	2.13	2.12	1.99	2.25	2.08	24	
29	S	2.06	2.05	2.07	2.07	2.07	2.08	2.07	2.06	2.04	2.01	2.01	2.00	1.99	1.99	1.98	1.98	1.98	1.98	2.02	2.01	2.07	2.12	S	1.98	2.12	2.03	24	
30	2.10	2.08	2.06	2.10	2.14	2.07	2.03	2.04	2.05	2.04	2.02	2.00	2.00	1.99	1.99	1.99	1.99	2.00	2.01	2.02	2.04	2.04	S	2.12	1.99	2.14	2.04	24	
31	2.29	2.29	2.30	2.28	2.36	2.40	2.31	2.11	2.03	2.06	2.04	2.01	2.02	2.02	2.00	2.01	2.02	2.02	2.07	2.14	2.12	S	2.24	2.16	2.00	2.40	2.14	24	
HOURLY MAX	3.44	2.70	3.11	2.87	2.94	2.75	2.35	2.26	2.34	2.31	2.31	2.09	2.09	2.05	2.04	2.11	2.07	2.15	2.55	2.92	2.58	3.85	2.53						
HOURLY AVG	2.21	2.15	2.21	2.22	2.21	2.19	2.12	2.09	2.05	2.02	2.00	1.98	1.98	1.97	1.97	1.97	1.98	1.99	2.04	2.09	2.11	2.21	2.15						

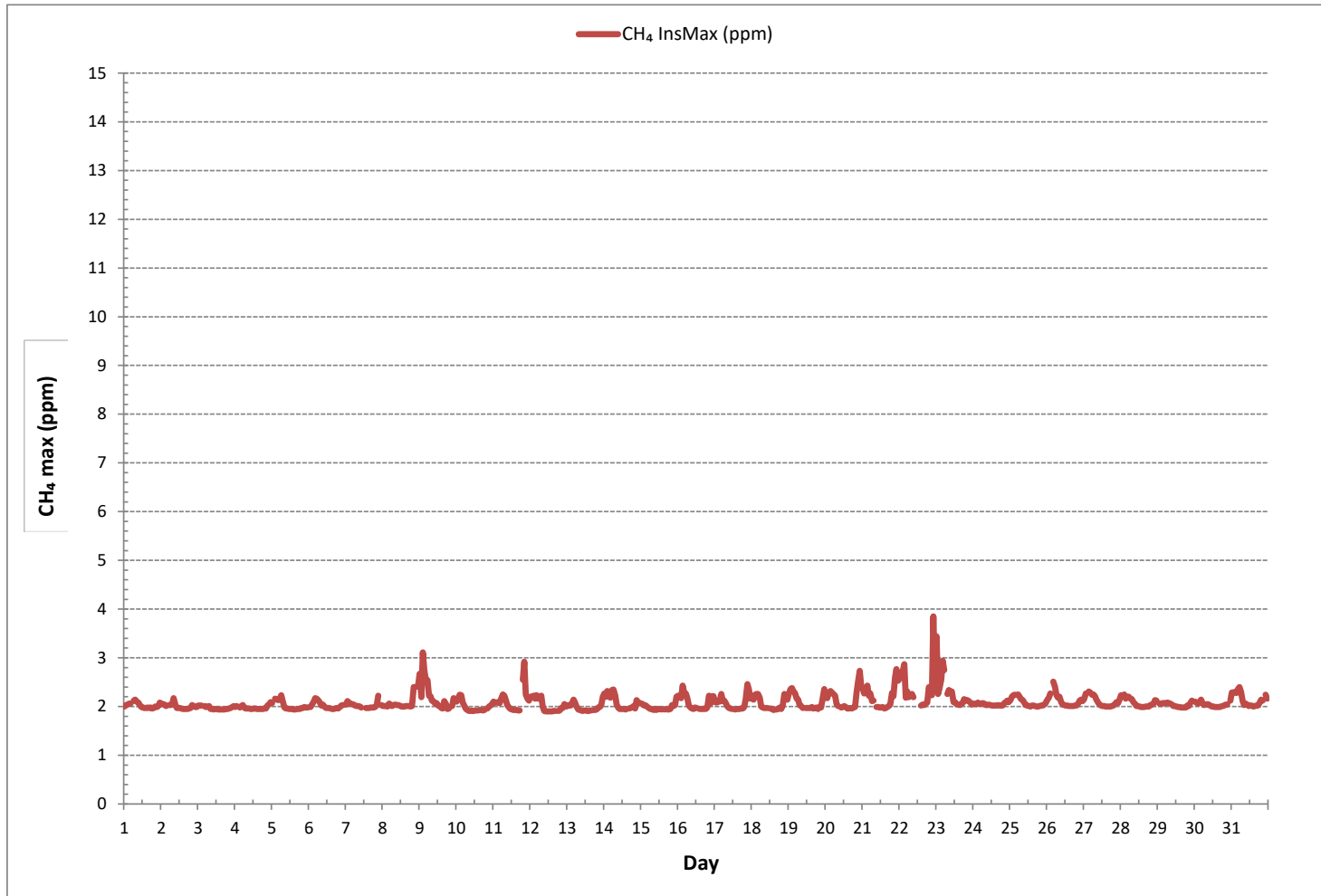
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	705
MAXIMUM INSTANTANEOUS VALUE:	3.85 ppm @ HOUR 22 ON DAY 22
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	4 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	0.18

METHANE MAX Instantaneous Maximum (CH₄ ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - May 2019

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY 1	0.00	0.00	0.00	0.00	0.00	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	24	
2	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	
3	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	
4	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
5	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
6	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	24
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Q	Q	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	24	
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	24	
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	24	
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	24	
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	
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	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	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	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	24	
14	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	0.00	0.00	0.00	24	
15	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	0.00	0.00	0.00	24	
16	0.00	0.00	0.00	0.31	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	0.31	0.01	24	
17	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	
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	C	C	C	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.27	0.01	24
23	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	
24	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	0.05	0.17	0.07	0.00	0.17	0.01	24
25	0.00	0.00	0.04	0.01	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	24	
26	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	
27	0.00	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
28	0.00	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24	
29	S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	S	0.00	0.00	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	0.00	0.00	0.00	0.00	0.00	S	0.02	0.00	0.02	0.00	24
31	0.00	0.00	0.00	0.07	0.19	0.01	0.00	0.00	0.00	0.11	0.07	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	0.19	0.02	24
HOURLY MAX	0.00	0.00	0.04	0.31	0.19	0.01	0.00	0.00	0.00	0.11	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.27	0.07				
HOURLY AVG	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00				

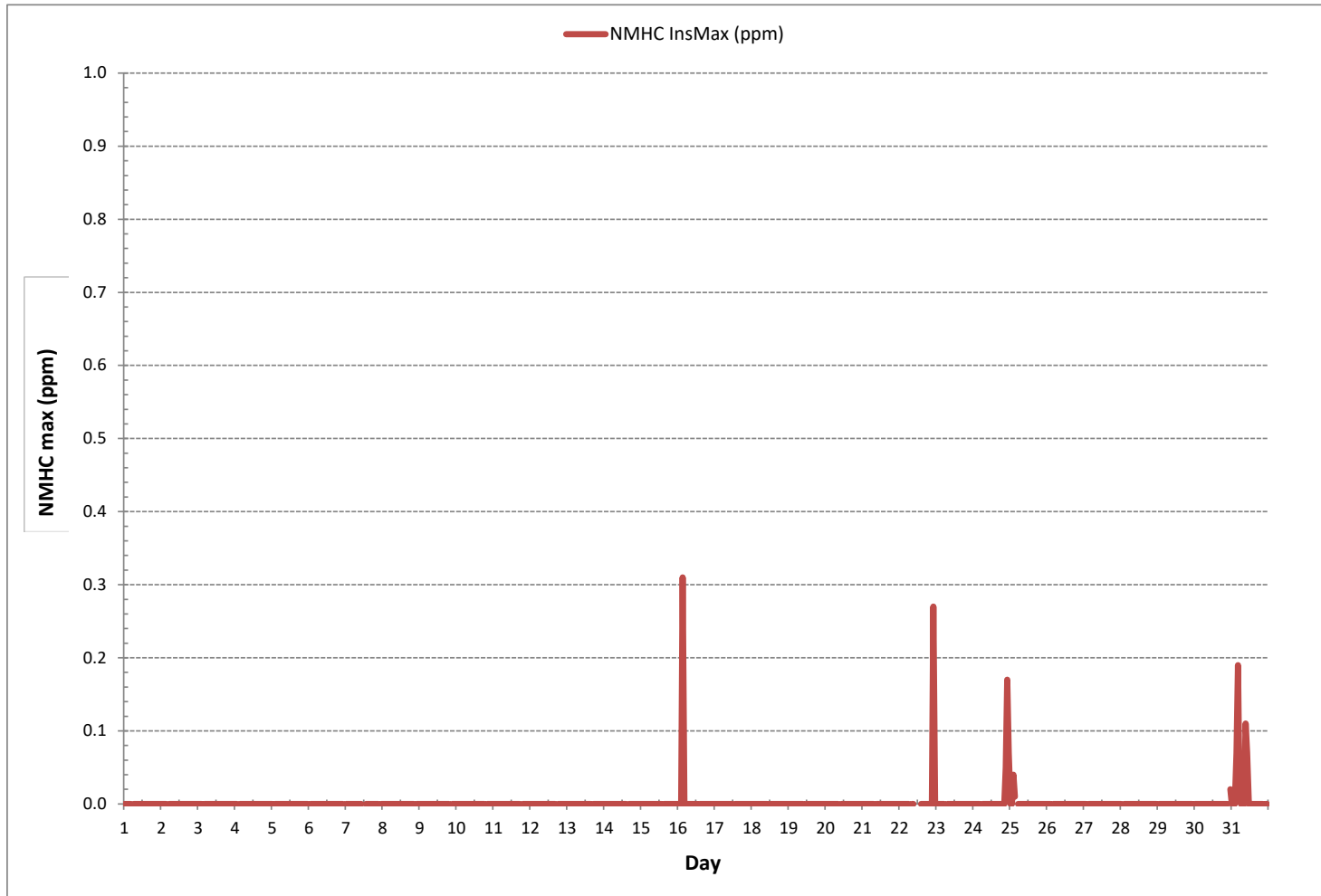
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	13
MAXIMUM INSTANTANEOUS VALUE:	0.31 ppm @ HOUR 3 ON DAY 16
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	4 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	0.02

NON-METHANE HYDROCARBONS Instantaneous Maximum (NMHC ppm)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - May 2019

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	1	2	1	1	2	S	3	3	3	2	2	2	2	1	1	2	1	2	2	3	5	4	6	6	1	6	2	24	
2	2	1	2	3	S	8	9	5	6	3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	9	2	24
3	2	2	2	S	2	2	3	4	1	1	1	1	1	1	1	0	0	0	0	1	2	2	3	4	0	4	1	24	
4	3	3	S	3	5	4	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	3	5	7	0	7	2	24	
5	4	S	9	7	6	10	8	3	1	1	0	0	0	0	0	0	1	0	1	0	0	1	1	1	0	10	2	24	
6	S	1	2	2	3	2	2	2	2	2	1	1	1	2	2	2	2	2	3	2	3	2	2	S	1	3	2	24	
7	2	3	2	12	2	2	2	2	Q	Q	Q	Q	2	2	32	1	18	6	2	1	2	3	S	1	1	32	5	24	
8	1	1	1	1	2	2	3	2	6	2	3	1	2	1	2	2	1	1	5	3	4	S	5	4	1	6	2	24	
9	3	3	5	5	8	9	5	4	2	2	4	2	1	1	1	1	1	1	4	3	S	4	3	3	1	9	3	24	
10	3	10	6	6	7	5	37	2	2	1	1	6	1	0	1	1	1	2	5	S	4	4	4	8	0	37	5	24	
11	13	10	9	5	3	5	11	9	7	12	1	1	1	1	1	1	1	1	S	8	4	3	3	3	1	13	5	24	
12	4	3	4	4	3	3	4	4	2	2	2	1	1	1	1	1	1	S	1	1	2	3	4	4	1	4	2	24	
13	2	2	4	7	8	8	5	1	1	1	1	1	1	1	1	1	1	S	1	1	1	2	32	8	7	1	32	4	24
14	5	3	5	8	22	31	17	7	35	1	1	1	1	1	1	S	18	1	5	6	1	4	2	3	1	35	8	24	
15	2	3	2	2	2	2	1	4	1	3	3	1	2	1	S	2	1	5	2	1	4	4	3	3	1	5	2	24	
16	3	2	3	52	23	47	408	205	3	18	189	16	6	S	12	457	1	2	2	75	28	1	2	5	1	457	68	24	
17	2	3	3	3	4	339	6	49	2	C	C	C	C	C	C	C	2	1	6	2	1	2	2	3	1	339	-	24	
18	5	4	5	18	7	5	1	1	6	4	3	S	3	4	22	6	3	1	1	2	1	19	2	2	1	22	5	24	
19	2	2	3	3	3	3	3	2	2	7	S	1	1	1	1	1	1	1	1	1	3	37	38	5	1	38	5	24	
20	3	3	3	4	4	4	3	2	4	S	7	4	7	1	16	1	1	1	1	1	3	59	52	3	1	59	8	24	
21	3	3	3	3	77	40	8	3	S	2	2	1	1	1	22	4	2	7	5	6	5	6	10	7	1	77	10	24	
22	12	10	5	10	6	10	5	S	22	16	14	6	2	3	5	2	2	2	1	5	11	57	15	10	1	57	10	24	
23	10	111	10	226	540	12	S	10	7	8	7	2	2	2	2	2	38	5	3	6	4	2	3	2	540	44	24		
24	3	3	3	4	164	S	S1	S1	2	2	2	2	C1	C1	2	1	1	3	5	1	2	3	4	4	1	164	11	20	
25	3	5	5	4	S	5	3	3	2	1	1	2	2	1	1	2	1	1	1	2	3	2	3	3	1	5	2	24	
26	4	6	8	S	14	11	6	S1	S1	2	1	1	1	1	1	1	1	1	1	2	4	5	4	5	1	14	4	22	
27	5	4	S	5	5	6	6	6	6	5	4	3	3	2	2	2	2	2	3	9	8	7	6	8	2	9	5	24	
28	6	S	7	4	6	7	5	C1	C1	C1	C1	C1	C1	C1	C1	2	2	2	2	6	7	6	4	4	2	7	-	16	
29	S	4	4	5	5	5	5	5	4	4	3	3	2	2	2	2	1	2	2	3	8	8	4	S	1	8	4	24	
30	4	3	3	3	5	5	57	3	3	3	46	201	2	1	1	1	3	4	3	2	2	4	S	4	1	201	16	24	
31	5	3	5	4	12	5	3	2	2	2	2	1	1	1	1	1	2	2	2	3	7	S	5	4	1	12	3	24	
HOURLY MAX	13	111	10	226	540	339	408	205	35	18	189	201	7	4	32	457	18	38	6	75	28	59	52	10					
HOURLY AVG	4	7	4	14	33	21	22	13	5	4	11	10	2	1	5	17	2	3	2	5	5	10	7	4					

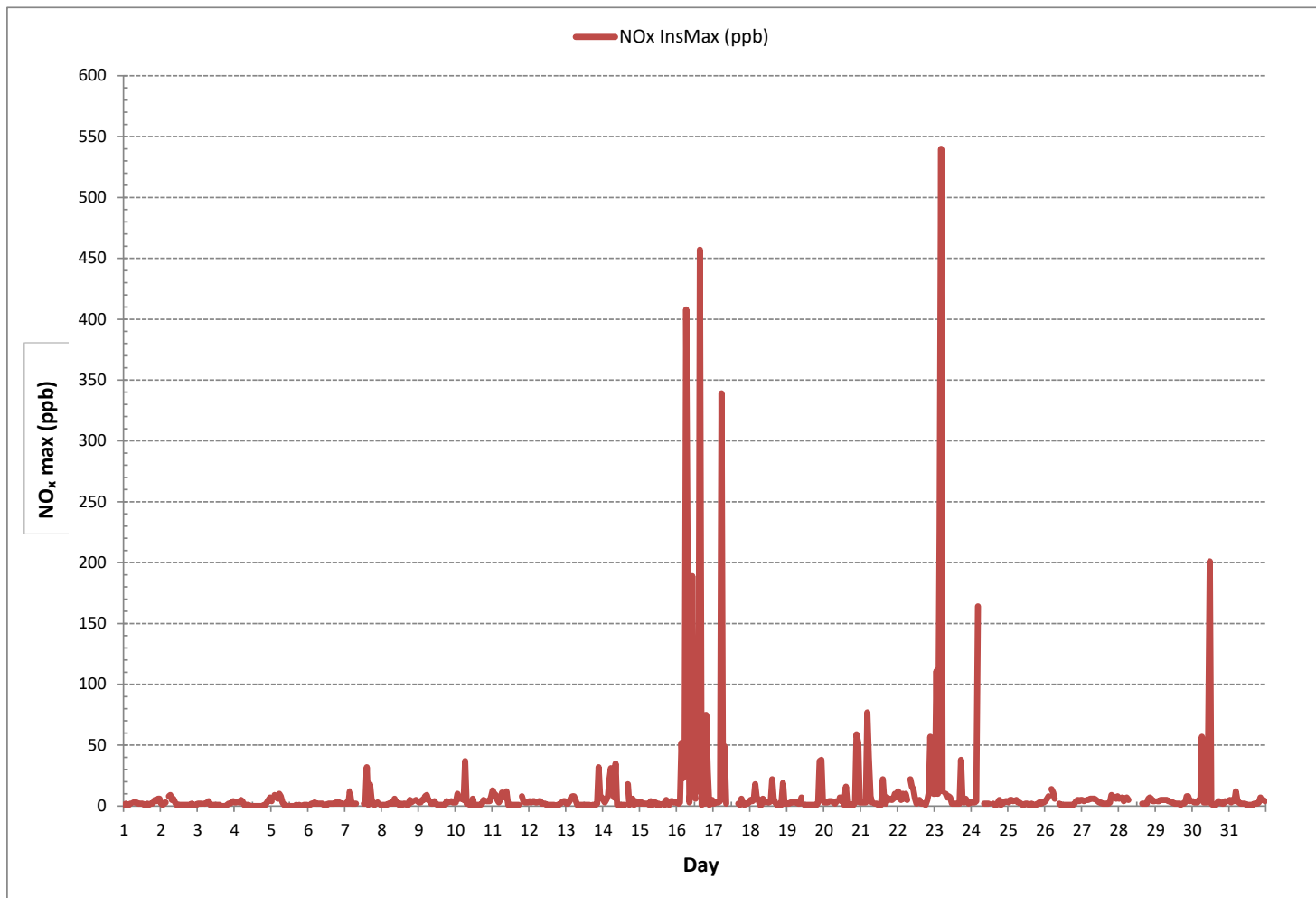
STATUS FLAG CODES

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:	664
MAXIMUM INSTANTANEOUS VALUE:	540 ppb @ HOUR 4 ON DAY 23
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	7 hrs
OPERATIONAL TIME:	730 hrs
STANDARD DEVIATION:	38

OXIDES OF NITROGEN Instantaneous Maximum (NO_x ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - May 2019

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	S	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24	
2	0	0	0	0	S	0	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	24
3	0	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
4	0	0	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24
5	0	S	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	24	
6	S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	S	0	1	0	24	
7	0	0	0	9	0	0	0	0	Q	Q	Q	Q	1	0	20	0	15	2	0	0	0	0	0	S	0	0	20	3	24	
8	0	0	0	0	0	0	0	1	2	0	1	0	0	0	0	0	0	0	1	0	0	S	0	0	0	0	2	0	24	
9	0	0	0	0	1	2	1	1	0	0	2	0	0	0	0	0	0	0	1	0	S	0	0	0	0	0	2	0	24	
10	0	0	0	0	0	0	20	0	0	0	4	0	0	0	0	0	0	0	1	S	0	0	0	0	0	0	20	1	24	
11	0	0	0	0	0	1	3	3	2	7	0	0	0	0	0	0	0	0	S	1	0	0	0	0	0	0	7	1	24	
12	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0	0	1	0	24	
13	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	S	0	0	0	0	15	2	0	0	15	1	24		
14	0	0	0	0	7	14	7	2	6	0	0	0	0	0	0	S	5	0	1	0	0	0	0	0	0	14	2	24		
15	0	0	0	0	0	0	0	2	0	1	1	0	0	0	S	0	0	2	1	0	0	0	0	0	0	0	2	1	24	
16	0	0	0	37	10	35	293	191	2	12	164	4	2	S	6	458	0	1	1	50	19	0	0	0	0	458	56	24		
17	0	0	0	0	0	238	7	39	1	C	C	C	C	C	C	C	1	0	7	0	0	0	0	0	0	238	-	24		
18	0	0	0	9	0	0	0	0	4	2	1	S	1	9	4	8	4	0	0	0	0	9	0	0	0	9	2	24		
19	0	0	0	0	0	1	1	1	1	1	3	S	0	0	0	0	0	0	0	0	0	14	12	0	0	14	2	24		
20	0	0	0	0	0	1	1	1	2	S	2	2	3	0	34	0	0	0	0	0	0	28	17	0	0	34	4	24		
21	0	0	0	0	54	28	3	1	S	0	1	0	0	0	26	2	1	2	5	1	0	0	0	0	0	54	6	24		
22	0	1	1	0	1	2	1	S	5	4	5	1	0	1	1	0	0	0	0	0	33	1	0	0	0	33	3	24		
23	0	70	2	152	459	2	S	2	1	2	1	0	0	0	0	0	0	41	0	0	0	0	0	0	0	459	32	24		
24	0	1	1	0	71	S	S1	S1	0	0	0	0	C1	C1	0	0	0	1	3	0	0	0	0	0	0	71	4	20		
25	0	0	0	0	S	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24		
26	0	0	0	S	2	2	2	S1	S1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	22		
27	0	0	S	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	24		
28	0	S	0	0	0	1	1	C1	C1	C1	C1	C1	C1	C1	C1	0	0	0	0	0	0	0	0	0	0	1	-	16		
29	S	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	1	0	24	
30	0	0	0	0	0	0	47	0	0	0	44	190	0	0	0	0	2	1	0	0	0	0	0	S	0	190	13	24		
31	0	0	0	0	3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	S	0	0	0	3	1	24		
HOURLY MAX	0	70	2	152	459	238	293	191	6	12	164	190	3	9	34	458	15	41	7	50	19	33	17	0						
HOURLY AVG	0	2	0	7	21	11	14	9	1	1	8	7	0	0	3	16	1	2	1	2	1	3	1	0						

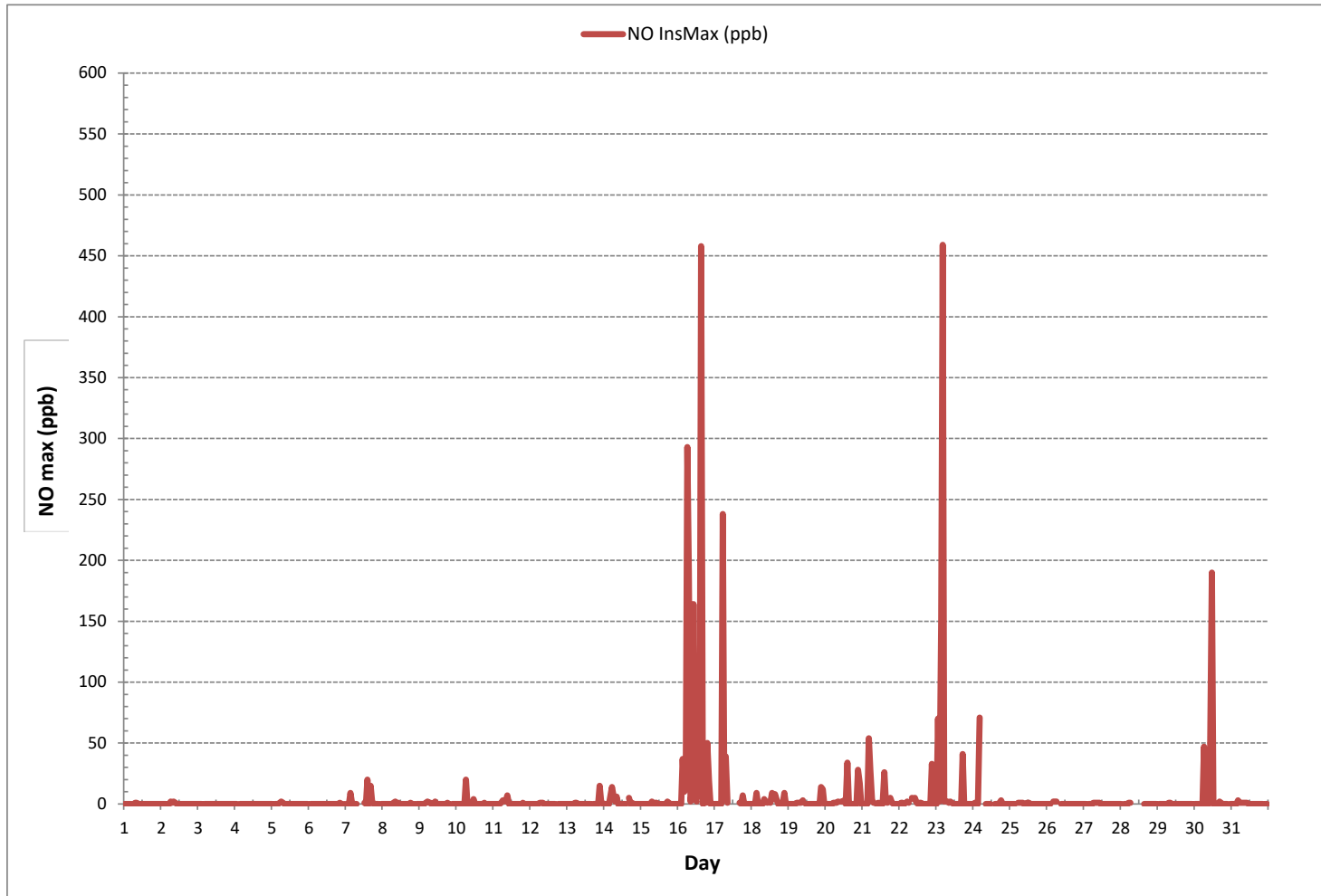
STATUS FLAG CODES

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:	171
MAXIMUM INSTANTANEOUS VALUE:	459 ppb @ HOUR 4 ON DAY 23
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	7 hrs
STANDARD DEVIATION:	32
OPERATIONAL TIME:	730 hrs

NITRIC OXIDE Instantaneous Maximum (NO ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - May 2019

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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	S	2	3	2	2	1	1	1	1	1	2	1	2	2	3	5	4	6	6	1	6	2	24	
2	3	1	2	3	S	7	7	4	4	2	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	7	2	24	
3	2	2	2	S	2	2	3	3	1	1	1	1	1	1	1	0	0	0	0	1	2	2	3	4	0	4	1	24	
4	3	3	S	3	5	4	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	3	5	7	0	7	2	24	
5	4	S	9	7	6	9	6	2	1	1	0	0	0	0	0	0	1	1	1	0	0	1	1	1	0	9	2	24	
6	S	1	2	2	3	2	2	2	2	2	1	1	1	2	1	2	2	2	2	2	3	2	2	S	1	3	2	24	
7	2	3	2	4	2	2	2	1	Q	Q	Q	Q	1	1	14	1	4	4	2	1	2	3	S	1	1	14	3	24	
8	1	1	1	1	2	2	3	1	3	1	2	1	1	1	1	2	1	1	1	4	3	4	S	5	4	1	5	2	24
9	3	3	5	4	7	7	4	3	2	2	2	2	1	1	1	1	1	1	1	3	3	S	4	3	4	1	7	3	24
10	3	10	6	6	7	5	17	2	1	1	1	2	1	0	1	1	1	1	4	S	4	4	4	4	8	0	17	4	24
11	13	10	9	5	3	4	8	7	4	5	1	1	1	1	1	1	1	1	S	7	4	3	3	3	1	13	4	24	
12	4	3	4	4	3	3	3	3	2	2	1	1	1	1	1	1	1	S	1	1	2	3	4	4	1	4	2	24	
13	2	2	4	7	7	8	4	1	1	1	1	1	1	1	1	1	S	1	1	1	2	17	6	7	1	17	3	24	
14	5	3	5	8	15	18	10	5	29	1	1	1	1	1	1	S	13	1	5	5	1	4	2	3	1	29	6	24	
15	2	3	2	2	2	1	1	2	1	2	2	1	1	1	S	1	1	3	2	1	4	4	3	3	1	4	2	24	
16	3	2	3	18	14	16	193	54	1	10	63	12	4	S	9	45	1	1	1	26	9	1	2	5	1	193	21	24	
17	2	3	3	3	4	110	2	15	1	C	C	C	C	C	C	C	2	1	2	2	1	2	2	3	1	110	-	24	
18	5	4	5	9	7	4	1	1	3	2	2	S	2	1	18	3	1	1	2	1	2	1	10	2	2	1	18	4	24
19	2	2	2	3	3	3	3	2	1	4	S	1	1	1	1	1	1	1	1	1	3	22	29	5	1	29	4	24	
20	3	3	3	4	4	4	3	2	3	S	5	2	3	1	4	1	1	1	1	1	2	32	36	2	1	36	5	24	
21	3	3	3	3	47	13	5	2	S	2	2	1	1	1	3	3	1	5	4	5	5	6	10	7	1	47	6	24	
22	12	10	4	10	6	8	5	S	17	12	10	5	2	2	4	1	1	2	1	4	10	25	15	10	1	25	8	24	
23	10	42	9	77	159	11	S	8	6	6	6	2	2	2	2	2	23	5	3	6	4	2	2	2	2	159	17	24	
24	2	3	3	3	103	S	S1	S1	2	1	2	1	C1	C1	1	1	1	2	2	1	2	3	4	3	1	103	7	20	
25	3	5	5	4	S	3	2	2	1	1	1	1	1	1	1	2	1	1	1	2	2	2	3	3	1	5	2	24	
26	4	6	8	S	12	8	4	S1	S1	1	1	1	1	1	1	1	1	1	1	1	4	4	4	5	1	12	3	22	
27	5	4	S	5	5	5	5	5	5	4	3	3	2	2	2	2	2	2	3	8	8	7	6	8	2	8	4	24	
28	6	S	7	4	5	6	4	C1	C1	C1	C1	C1	C1	C1	C1	2	2	2	2	5	7	6	4	4	2	7	-	16	
29	S	4	4	4	5	5	5	4	4	3	3	3	2	2	2	2	1	1	2	3	8	8	4	S	1	8	4	24	
30	4	3	3	3	5	5	16	3	3	3	7	23	2	1	1	1	1	3	2	2	2	4	S	4	1	23	4	24	
31	5	3	5	4	9	4	2	1	1	2	2	1	1	1	1	1	2	2	3	6	S	5	4	1	9	3	24		
HOURLY MAX	13	42	9	77	159	110	193	54	29	12	63	23	4	2	18	45	13	23	5	26	10	32	36	10					
HOURLY AVG	4	5	4	7	16	10	11	5	4	3	5	3	1	1	3	3	2	2	2	3	4	7	6	4					

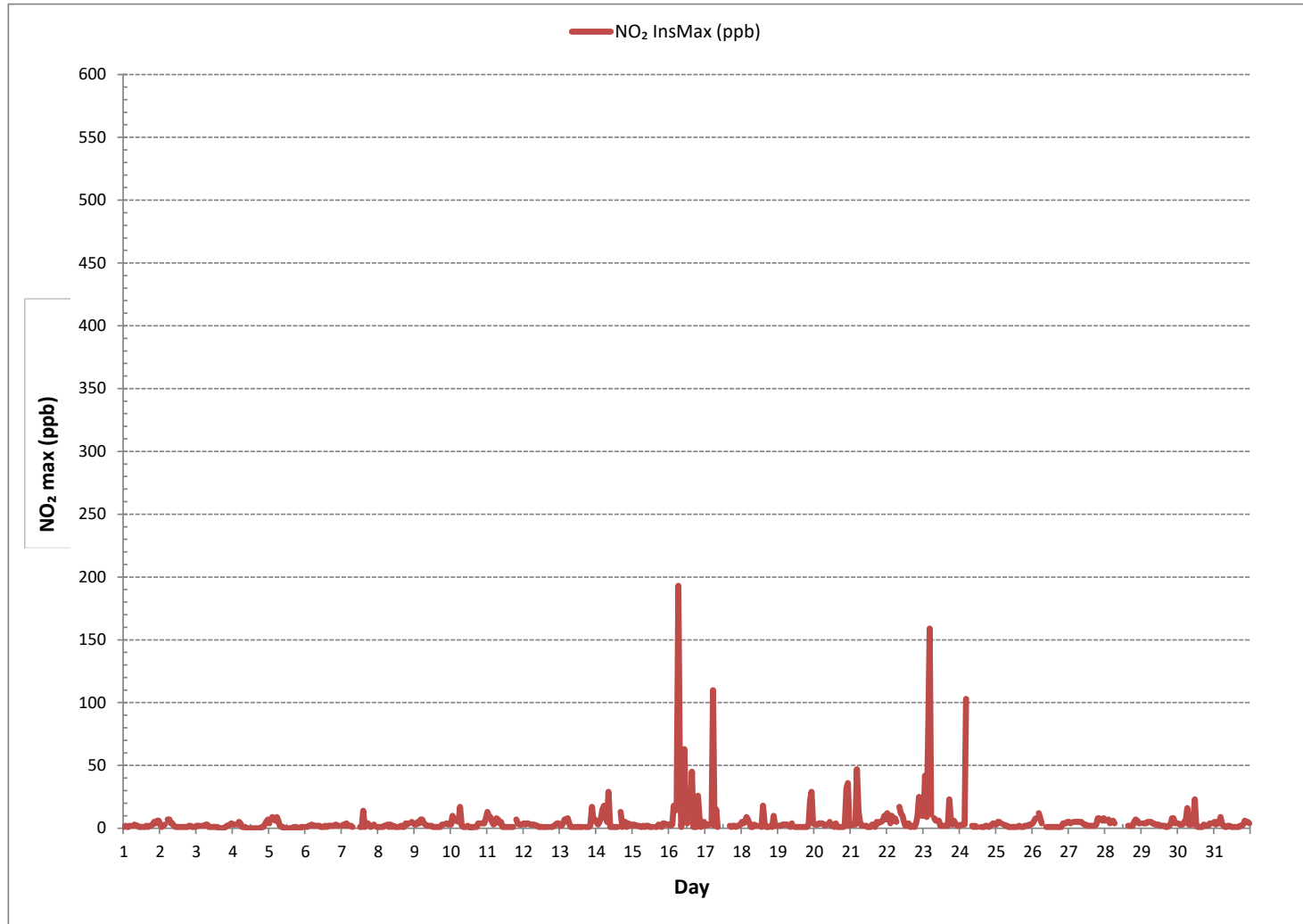
STATUS FLAG CODES

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:	664
MAXIMUM INSTANTANEOUS VALUE:	193 ppb @ HOUR 6 ON DAY 16
	VAR-VARIOUS
IZS CALIBRATION TIME:	32 hrs
MONTHLY CALIBRATION TIME:	7 hrs
OPERATIONAL TIME:	730 hrs
STANDARD DEVIATION:	13

NITROGEN DIOXIDE Instantaneous Maximum (NO₂ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - May 2019

OZONE Instantaneous Maximum (O₃ ppb)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	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	38.8	38.1	38.1	36.4	34.5	S	34.3	36.7	39.4	40.8	43.1	43.3	42.0	41.6	43.4	43.5	42.5	42.1	42.2	38.2	36.6	36.9	34.7	33.0	33.0	43.5	39.1	24
2	31.8	33.2	34.5	31.7	S	27.5	27.8	33.0	33.8	41.2	44.1	45.2	46.4	47.8	48.4	48.4	48.3	48.2	47.3	45.8	44.7	44.3	44.8	45.1	27.5	48.4	41.0	24
3	44.6	41.6	37.6	S	30.7	29.3	31.0	33.2	37.1	36.7	37.5	38.3	37.9	36.9	37.7	36.9	39.0	38.1	33.4	31.3	28.0	26.5	25.5	24.0	24.0	44.6	34.5	24
4	23.4	23.0	S	24.2	23.1	25.1	29.3	31.3	33.3	37.4	39.7	40.8	41.4	41.8	41.0	40.7	41.3	40.5	38.2	34.3	29.7	26.2	24.3	21.9	21.9	41.8	32.7	24
5	26.3	S	18.7	21.8	22.4	22.0	24.6	33.6	40.6	40.5	40.0	40.3	41.0	41.7	42.3	42.7	43.2	43.6	41.4	39.7	38.5	37.8	38.0	37.9	18.7	43.6	35.6	24
6	S	37.8	35.8	33.8	32.8	33.5	34.6	35.0	36.4	34.4	38.0	39.8	39.6	34.9	38.7	39.2	39.5	39.3	38.8	38.6	31.3	32.6	32.8	S	31.3	39.8	36.2	24
7	27.1	26.0	24.6	24.3	24.2	24.3	23.8	26.8	Q	Q	37.0	41.9	42.6	42.9	44.0	44.2	45.1	45.3	46.2	46.7	44.7	39.3	S	42.0	23.8	46.7	36.3	24
8	41.5	41.7	42.8	42.7	40.5	39.3	43.3	41.7	43.5	43.3	44.3	45.4	46.0	45.7	43.7	45.7	46.0	46.0	46.1	45.3	41.7	S	36.5	36.9	36.5	46.1	43.0	24
9	31.3	35.1	32.6	32.1	32.3	30.2	30.3	33.1	36.2	39.5	40.9	43.0	44.6	44.5	45.0	46.3	47.5	45.4	45.3	43.2	S	39.9	39.1	35.3	30.2	47.5	38.8	24
10	30.9	30.2	26.6	22.9	24.4	27.1	30.5	34.4	38.3	39.7	40.1	41.2	41.4	42.2	42.3	43.1	40.4	40.3	38.4	S	33.2	30.3	30.8	30.5	22.9	43.1	34.7	24
11	25.6	26.6	25.3	25.6	26.6	21.8	25.5	30.4	34.3	40.0	42.2	45.8	47.9	49.4	51.6	51.9	55.2	54.8	S	50.4	46.5	43.1	46.5	47.2	21.8	55.2	39.7	24
12	45.6	45.5	41.5	39.2	37.3	38.9	38.0	43.4	42.4	44.2	48.1	50.9	52.4	53.8	60.7	67.1	60.3	S	55.2	49.8	44.8	43.9	43.5	43.6	37.3	67.1	47.4	24
13	41.3	40.0	39.9	37.8	34.3	37.0	38.7	40.2	41.0	41.7	44.0	45.9	47.8	48.7	48.4	47.9	S	43.7	38.7	36.3	33.4	31.2	29.5	28.3	28.3	48.7	39.8	24
14	29.1	29.4	27.5	28.2	20.4	19.6	21.5	27.2	32.9	36.5	38.4	40.1	41.7	42.0	42.7	S	45.3	45.9	46.1	46.9	46.9	43.4	42.9	41.1	19.6	46.9	36.3	24
15	39.3	33.6	32.4	30.8	29.3	26.5	27.2	28.7	31.1	33.6	35.7	35.4	34.9	35.9	S	40.2	43.2	47.0	47.0	46.1	43.2	37.2	37.0	32.7	26.5	47.0	36.0	24
16	28.0	27.6	30.5	27.5	24.0	29.0	30.1	33.1	33.7	35.3	38.3	40.7	40.9	S	42.6	42.9	44.3	42.4	41.2	41.1	38.5	37.4	37.6	35.2	24.0	44.3	35.7	24
17	35.1	35.2	32.8	31.8	30.4	28.1	30.1	34.9	37.3	38.2	39.1	40.5	S	45.1	45.4	46.3	48.3	46.8	47.8	46.8	43.1	40.1	37.6	36.3	28.1	48.3	39.0	24
18	35.8	34.0	33.4	33.0	30.1	30.9	31.3	33.3	36.0	37.5	39.6	S	40.5	41.2	42.6	43.0	43.4	46.7	47.0	46.4	45.5	40.5	41.0	40.4	30.1	47.0	38.8	24
19	36.3	35.4	33.0	33.3	31.6	32.1	35.0	37.5	42.2	42.7	S	45.1	45.7	47.4	50.3	51.5	51.2	49.0	47.6	46.5	43.0	41.8	39.5	36.0	31.6	51.5	41.5	24
20	35.9	34.9	35.0	30.5	28.9	28.9	34.5	37.7	42.8	S	44.9	45.4	45.9	45.7	45.4	45.5	46.5	46.8	46.4	46.1	43.7	41.1	37.3	36.8	28.9	46.8	40.3	24
21	37.6	36.7	35.9	34.1	34.4	33.6	35.6	37.9	S	50.6	49.1	47.1	47.3	47.7	47.8	48.6	49.9	49.0	48.7	46.7	40.3	39.2	39.4	41.0	33.6	50.6	42.5	24
22	41.1	36.0	37.5	37.6	33.7	33.0	30.5	S	24.6	37.4	C	C	C	C	C	55.7	54.3	53.3	53.8	53.6	45.9	45.5	41.6	44.7	24.6	55.7	42.2	24
23	43.7	36.0	31.8	29.8	30.5	30.9	S	35.4	37.6	40.8	59.6	60.0	60.9	62.1	62.7	62.7	62.5	61.2	56.2	56.9	52.1	56.2	55.0	47.3	29.8	62.7	49.2	24
24	46.9	48.7	47.2	44.8	45.4	S	49.2	48.6	51.9	52.9	51.2	52.2	52.2	48.4	46.4	40.2	30.2	27.8	29.4	27.2	23.0	22.1	16.6	16.5	16.5	52.9	40.0	24
25	17.2	14.1	11.2	10.9	S	12.7	17.7	22.6	26.6	34.1	38.9	42.0	43.9	45.6	42.8	44.9	47.5	46.7	46.5	41.7	41.1	41.2	37.5	34.5	10.9	47.5	33.1	24
26	29.4	25.1	20.8	S	12.5	17.0	22.4	28.9	33.2	39.0	42.4	45.4	47.7	49.9	51.1	53.6	55.1	56.0	54.9	51.9	41.6	40.2	37.8	42.1	12.5	56.0	39.0	24
27	45.2	42.7	S	40.4	39.8	37.9	35.7	37.9	39.5	45.0	52.4	61.2	62.6	63.1	62.0	60.5	60.5	58.0	54.2	44.9	47.2	48.5	50.6	45.2	35.7	63.1	49.4	24
28	45.7	S	46.1	45.9	45.0	42.7	42.5	44.6	49.4	58.0	64.6	63.4	61.7	61.0	62.3	63.0	64.7	64.8	63.1	55.0	54.8	59.8	58.0	52.8	42.5	64.8	55.2	24
29	S	50.1	48.3	45.5	44.5	43.3	43.4	45.2	49.2	56.3	68.5	72.2	70.8	67.0	68.9	60.7	55.4	54.0	53.7	47.7	43.3	42.2	40.3	S	40.3	72.2	53.2	24
30	37.5	37.1	38.3	37.6	31.5	24.3	20.8	22.3	23.7	28.0	33.6	34.1	46.5	40.6	37.6	35.4	35.8	39.1	39.7	32.1	28.0	24.1	S	22.4	20.8	46.5	32.6	24
31	20.2	21.8	18.4	16.8	12.9	16.2	21.0	25.2	27.8	30.1	31.0	34.1	35.3	36.8	40.9	44.1	44.3	44.5	44.4	39.1	31.7	S	30.8	27.2	12.9	44.5	30.2	24
HOURLY MAX	46.9	50.1	48.3	45.9	45.4	43.3	49.2	48.6	51.9	58.0	68.5	72.2	70.8	67.0	68.9	67.1	64.7	64.8	63.1	56.9	54.8	59.8	58.0	52.8				
HOURLY AVG	34.9	34.4	33.0	32.1	30.6	29.1	31.3	34.5	37.1	40.5	43.7	45.5	46.5	46.6	47.5	47.9	47.7	46.9	46.0	43.9	40.2	39.1	38.2	36.5				

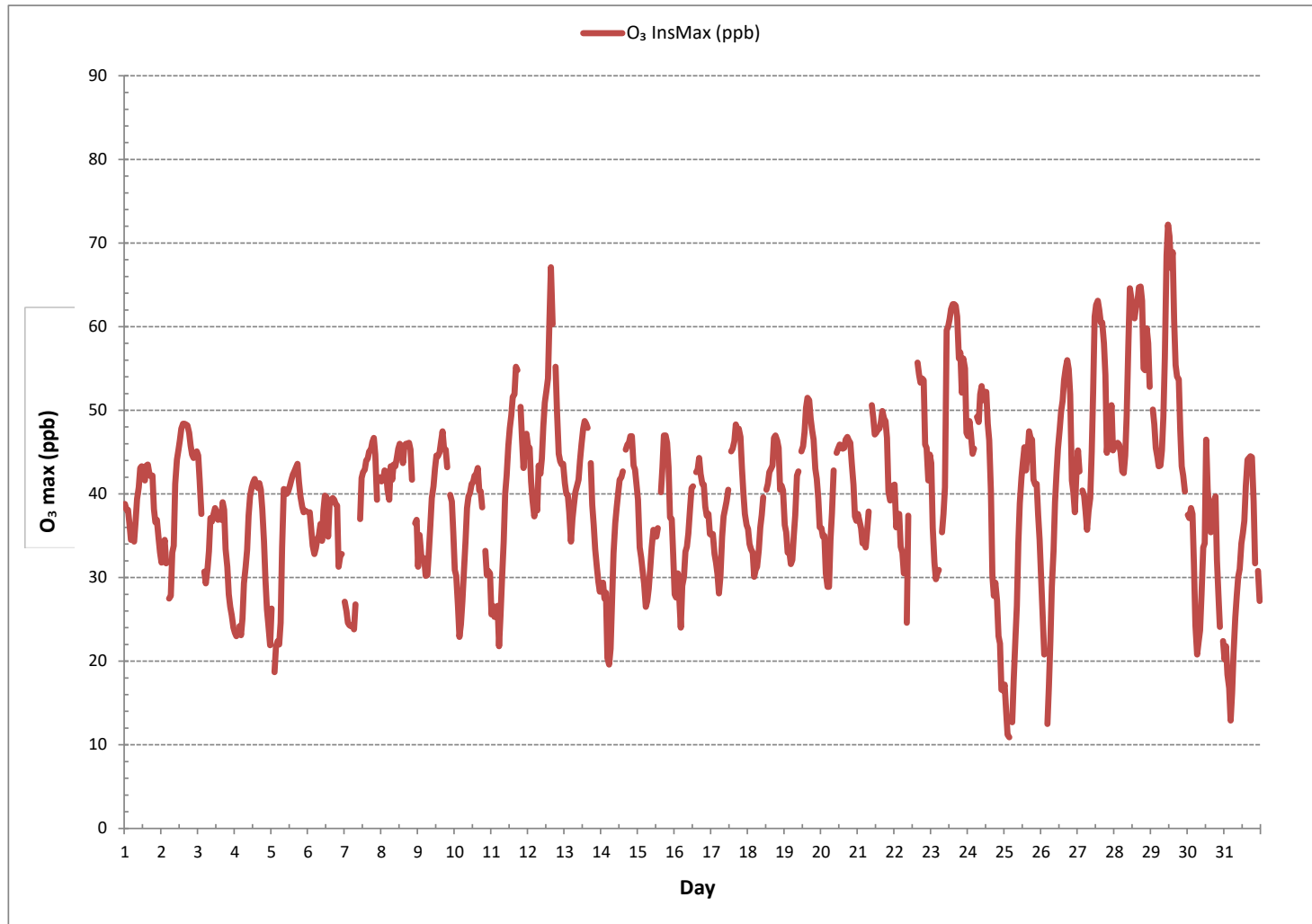
STATUS FLAG CODES

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

MONTHLY SUMMARY

NUMBER OF NON-ZERO READINGS:	704
MAXIMUM INSTANTANEOUS VALUE:	72.2 ppb @ HOUR 11 ON DAY 29
IZS CALIBRATION TIME:	33 hrs
MONTHLY CALIBRATION TIME:	5 hrs
OPERATIONAL TIME:	744 hrs
STANDARD DEVIATION:	10.0

OZONE Instantaneous Maximum (O₃ ppb)





LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
Bonnyville East Continuous Monitoring Station - May 2019

WIND SPEED Instantaneous Maximum (WS kph)

HR START (MST)	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	DAILY	DAILY	24-HR	RDGS.	
HR END (MST)	0:59	1:59	2:59	3:59	4:59	5:59	6:59	7:59	8:59	9:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59	18:59	19:59	20:59	21:59	22:59	23:59	MIN.	MAX.	AVG.		
DAY 1	20.9	18.3	18.2	18.6	12.6	11.8	11.7	11.4	12.7	14.5	18.7	21.6	19.5	20.0	21.0	21.8	16.0	21.7	16.0	8.9	6.4	6.9	5.0	3.0	3.0	21.8	14.9	24	
2	7.2	7.0	7.8	7.1	4.3	3.8	7.0	10.7	10.6	11.9	11.7	10.0	9.0	9.2	7.6	8.0	7.3	8.0	12.5	19.2	16.3	13.8	16.0	13.2	3.8	19.2	10.0	24	
3	17.3	18.0	20.8	14.7	11.1	9.8	13.0	20.2	35.3	37.4	37.5	39.0	37.7	31.0	42.8	45.6	43.4	40.0	37.7	25.0	16.5	14.0	15.7	13.6	9.8	45.6	26.6	24	
4	12.1	13.8	14.9	14.7	15.3	16.2	19.4	20.3	19.7	26.8	28.6	26.3	26.2	26.6	28.0	27.6	25.5	27.3	24.9	17.6	12.3	9.8	7.0	8.5	7.0	28.6	19.6	24	
5	8.4	4.7	4.4	3.6	3.2	3.0	6.3	8.5	7.7	7.8	7.6	9.6	9.5	9.6	8.7	8.0	8.5	7.1	17.2	15.3	15.1	13.4	15.8	18.0	3.0	18.0	9.2	24	
6	21.5	18.6	13.4	12.8	12.0	14.8	17.0	16.8	15.6	19.3	22.9	22.8	21.1	15.5	7.9	5.4	12.6	5.2	4.0	3.5	16.0	15.8	13.3	11.2	3.5	22.9	14.1	24	
7	7.4	8.6	10.3	7.3	8.1	6.7	9.5	6.8	6.2	6.6	9.2	13.8	16.1	16.0	12.6	14.9	12.2	13.9	28.0	25.7	19.8	16.6	39.8	25.9	6.2	39.8	14.2	24	
8	24.9	21.9	23.3	20.6	22.8	33.4	30.5	34.1	30.4	27.6	23.7	21.1	28.8	23.8	21.7	13.2	11.8	10.2	10.1	8.4	8.6	8.1	6.8	5.1	5.1	34.1	19.6	24	
9	6.4	5.3	7.8	7.2	6.4	7.8	20.2	17.3	16.7	27.5	25.7	29.9	32.5	30.5	31.4	33.7	36.7	28.4	25.4	29.6	29.6	37.3	17.6	25.5	5.3	37.3	22.4	24	
10	11.0	14.4	17.4	17.4	20.7	19.9	18.8	35.9	35.6	34.8	44.9	42.9	52.5	48.0	53.9	63.6	52.8	45.8	35.9	26.0	16.1	11.7	13.3	14.0	11.0	63.6	31.1	24	
11	10.1	9.0	8.8	9.2	10.7	8.2	6.0	7.4	8.3	9.4	11.8	12.7	14.4	15.2	13.3	16.2	22.2	15.7	13.4	10.2	9.6	15.5	20.4	28.5	6.0	28.5	12.8	24	
12	31.4	31.9	32.0	16.4	18.8	20.5	14.4	34.7	35.2	30.8	24.6	34.5	45.3	38.8	41.9	50.6	47.4	44.7	45.5	36.8	17.6	14.4	10.6	10.7	10.6	50.6	30.4	24	
13	12.3	13.8	13.1	14.7	17.0	14.7	29.3	37.2	39.3	36.8	36.4	47.1	53.7	53.3	47.1	47.7	39.4	41.5	34.4	30.5	20.5	11.8	10.2	8.6	8.6	53.7	29.6	24	
14	9.0	4.4	4.2	7.8	5.0	4.7	4.8	6.8	9.6	12.1	16.9	19.6	20.3	19.2	16.9	13.4	16.7	23.6	15.3	32.1	27.8	19.9	18.7	19.5	4.2	32.1	14.5	24	
15	19.2	19.7	22.6	30.4	25.9	27.7	30.8	31.5	35.7	37.0	34.0	31.3	27.9	22.8	16.2	10.7	17.6	15.2	14.3	15.0	15.9	18.9	18.6	10.7	37.0	23.1	24		
16	18.0	17.4	15.5	10.7	13.6	17.6	18.0	20.4	18.2	21.4	18.4	18.3	17.3	18.3	17.7	20.0	19.8	28.0	26.0	25.0	19.8	17.2	17.6	18.0	10.7	28.0	18.8	24	
17	19.9	19.4	18.6	20.4	14.3	17.2	16.8	25.6	33.8	35.4	45.1	35.7	36.3	35.2	35.2	40.1	35.7	29.7	29.0	24.8	17.0	11.7	16.6	18.3	11.7	45.1	26.3	24	
18	21.0	20.3	18.6	15.2	17.0	25.1	27.2	23.5	26.3	30.7	30.7	30.9	35.8	36.1	32.3	32.9	33.5	33.9	30.2	27.0	19.6	16.0	16.9	18.5	15.2	36.1	25.8	24	
19	13.6	14.2	13.2	16.3	19.5	24.3	25.9	22.3	31.4	29.9	31.6	30.5	33.3	33.7	34.5	31.7	28.7	28.2	26.8	20.1	14.4	10.5	14.0	17.2	10.5	34.5	23.6	24	
20	15.4	16.6	18.3	15.4	15.8	15.6	25.8	25.3	25.8	30.4	31.2	37.1	34.8	36.1	34.8	35.3	33.8	36.4	30.0	23.1	19.0	10.2	13.8	17.2	10.2	37.1	24.9	24	
21	13.4	16.1	14.3	12.7	6.5	13.2	12.9	11.9	18.8	33.9	33.3	32.8	34.6	28.4	26.7	24.0	22.6	17.2	15.2	12.1	13.6	9.5	10.1	4.8	4.8	34.6	18.3	24	
22	4.2	16.3	6.8	7.5	6.2	6.2	6.6	4.1	4.4	7.2	8.2	9.7	16.5	20.4	16.3	9.7	8.2	4.2	3.1	8.1	8.3	4.1	8.1	7.0	3.1	20.4	8.4	24	
23	5.6	2.6	3.3	3.0	6.5	9.9	8.7	6.5	7.7	7.8	9.0	25.2	13.3	23.7	17.7	11.9	18.6	14.2	23.4	21.8	15.7	33.9	24.4	22.1	2.6	33.9	14.0	24	
24	27.0	25.8	23.9	24.6	20.6	21.7	26.6	22.8	28.1	28.5	24.7	25.8	25.8	25.8	29.0	27.1	26.9	27.8	28.2	23.3	14.3	10.8	6.9	7.8	6.9	29.0	23.1	24	
25	6.9	1.9	8.4	9.4	8.3	6.5	7.8	5.8	6.5	7.5	7.3	6.9	10.3	8.9	20.7	24.7	8.0	11.5	11.4	11.0	14.3	9.7	7.5	8.8	1.9	24.7	9.6	24	
26	6.1	4.8	4.3	3.1	3.5	4.0	5.3	5.4	7.3	10.6	7.7	8.0	9.0	6.8	5.7	6.8	7.4	6.3	5.8	4.3	7.5	11.2	11.1	8.9	3.1	11.2	6.7	24	
27	7.4	6.0	7.4	7.0	4.8	6.4	7.7	13.9	14.0	14.4	16.2	21.1	19.2	16.0	14.3	15.9	14.5	12.6	8.2	5.5	7.0	6.5	6.9	6.2	4.8	21.1	10.8	24	
28	4.3	5.8	5.2	8.5	4.2	6.8	7.9	12.1	12.9	16.6	18.7	18.7	18.9	19.2	18.4	18.8	18.4	15.6	11.3	6.0	10.5	12.4	10.3	8.1	4.2	19.2	12.1	24	
29	10.8	10.7	9.6	10.5	11.1	12.0	15.4	16.9	19.3	22.1	25.5	25.1	22.6	23.9	22.3	21.7	19.8	17.7	15.0	8.8	7.3	7.8	11.8	11.2	7.3	25.5	15.8	24	
30	12.5	13.3	15.3	14.8	11.6	16.6	15.6	13.7	11.9	20.9	22.1	20.4	23.8	27.8	29.3	30.3	27.7	30.7	27.8	21.1	15.0	10.5	10.0	11.4	10.0	30.7	18.9	24	
31	8.0	8.6	4.2	2.4	3.8	7.0	9.2	9.4	8.7	7.7	7.8	8.5	8.2	7.9	7.8	7.1	9.3	7.1	11.1	8.4	9.1	10.8	11.5	8.1	2.4	11.5	8.0	24	
HOURLY MAX	31.4	31.9	32.0	30.4	25.9	33.4	30.8	37.2	39.3	37.4	45.1	47.1	53.7	53.3	53.9	63.6	52.8	45.8	45.5	36.8	29.6	37.3	39.8	28.5					

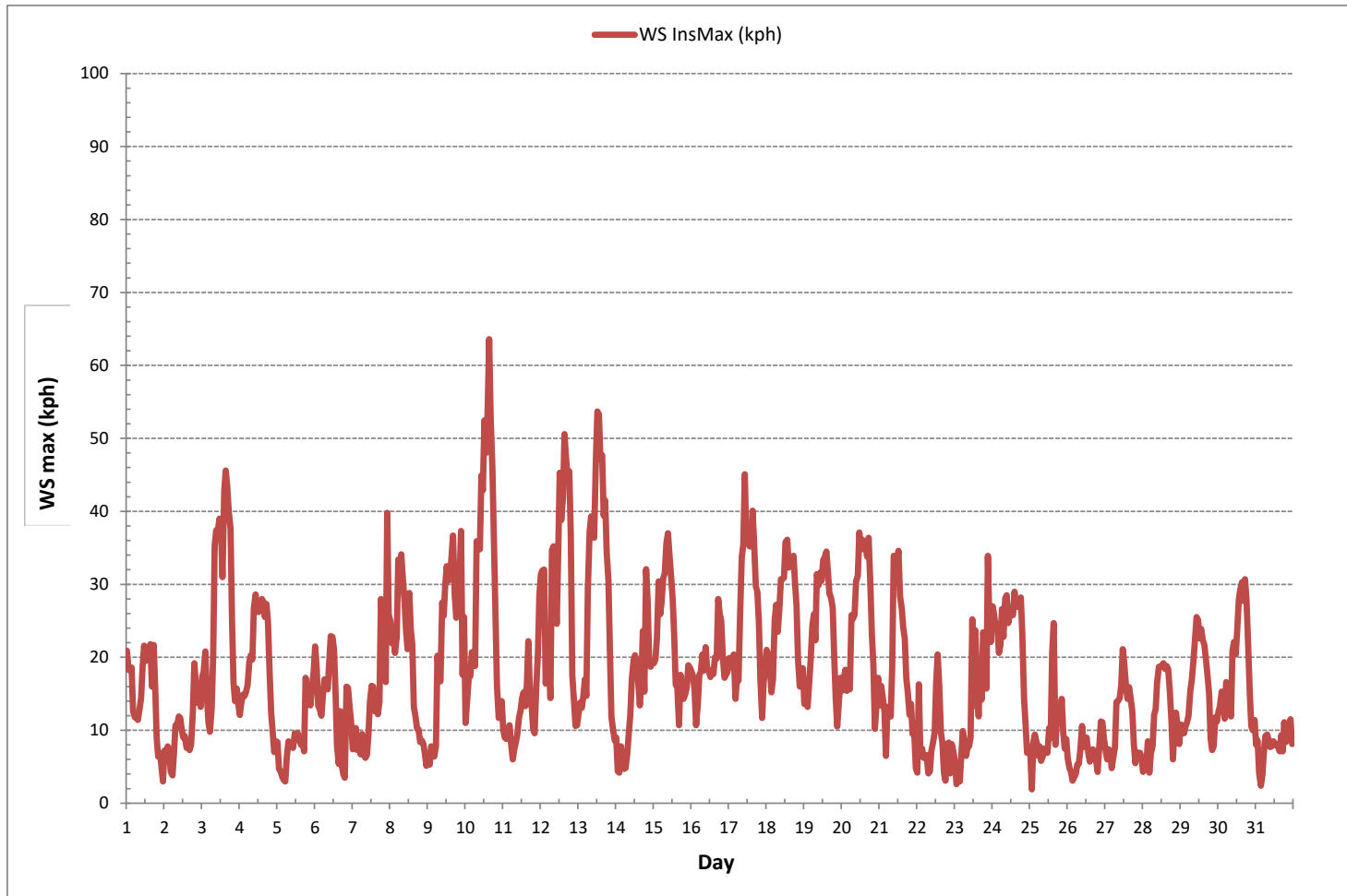
STATUS FLAG CODES

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

MONTHLY SUMMARY

MAXIMUM INSTANTANEOUS VALUE:	63.6	kph	@ HOUR	15	ON DAY	10	
OPERATIONAL TIME:						744	hrs

WIND SPEED Instantaneous Maximum (WS kph)



AEP AUDIT REPORT

May 16th, 2019

File Numbers: 2019 – 062A / 082A

Michael Bisaga Manager, Environmental Programs
Lakeland Industry and Community Association
PO Box 8237
Bonnyville, Alberta
T9N 2J5

Mr. Bisaga:

Subject: Ambient Air Monitoring Station Audit Results for the Lica Network

Alberta Environment and Parks Ambient Air Monitoring Audit team conducted an audit of the Lakeland Industry and Community Association (Lica) ambient air monitoring stations May 6th to 9th, 2019.

All pollutant gas analyzers met AMD criteria. However the Oxides of Nitrogen analyzer at Cold Lake South initially was failing 24% low. When doing cursory checks it was discovered the stainless steel sample inlet filter holder had a compressed internal oring. When bypassed and eventually replaced with an inert Teflon Thermo style filter holder, the analyzer passed the audit. The S.S. sample inlet filter was removed from service and retained by AEP. Please review the attached picture.

It would appear the compressed oring likely occurred during the April 24th monthly calibration when a new inlet particulate filter was installed. From the review of the calibration documents on site there was no significant as found change in calculated analyzer response before or during the calibration.

Data from April 24th 2019 to May 8th 2019 needs to be flagged as invalid due to the initial 24% low response found in accordance with AMD Chapter 8 Section 4.1, Aud 4-E (a)(b). An uptime contravention must be reported for the months of April and May 2019.

AEP suggests that the current inventory of sample inlet filter holders in use at the Cold Lake South station be updated to the newer Teflon Thermo style inlet filter holders in place throughout the rest of the Lica network.

Review of the calibration documents shows that the SO₂ and NO_x analyzer were calibrated and adjusted at the lower end of the high point (60-80% of the analyzer fullscale) calibration range in the month of April 2019. This may account for the responses being lower than anticipated for audit responses. Maxxam indicated the same cylinder of gas is used at all locations. Cold Lake South SO₂ and NO_x analyzers did not see a similar audit response as they were calibrated at a higher calculated response based on analyzer range. AEP recommends that the SO₂ and NO_x

analyzers be calibrated at a higher calculated high point response (closer to the 80% value) to ensure all the error possible is removed from the analyzers.

The Thermo 5030i series PM2.5 samplers at St Lina and Bonnyville East were not audited this cycle.

All meteorological equipment met AMD criteria with the exception of the Relative Humidity sensor at St Lina. It was reading 23% high compared to our audit standard.

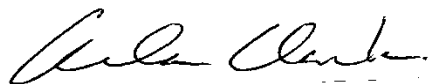
All site and network documentation that were reviewed on line, showed that they require updating as elements in both documents are missing or incorrect. Please review the attached audit findings.

AEP was asked to review a proposed new Maskwa location approximately 2000m west of the current location. Initial assessment indicates it is a suitable location for an ambient air monitoring station based on siting criteria. However please note the proposed location puts it closer to a major emission source, the Imperial Oil Resources Maskwa facility. This facility may cause an increase in concentration levels of some or all of the pollutants being measured at the current location.

Upon receiving notification of this performance audit Lica was asked to provide the date of the most recent quality system audit as required by AMD Chapter 5 QS 4-A and QS 4-B(b). Lica has indicated June 2017 was the last 3rd party audit of the QAP.

Please address the issues noted above and provide a written response to the Audit Team by June 21st, 2019. If you have any questions or comments, please contact the undersigned at 780-427-7888.

Yours truly,



Al Clark
Monitoring Systems Auditor

Attachments:

- Lica Analyzer Audit Sheets
- Lica Audit Summary
- SS inlet sample picture

CC: Shea Beaton – AEP
Marty Collins – AEP
Bob Myrick – AEP
Max Mazur – AEP
Wally Qiu – AER
Lily Lin – Lica
air.reporting@gov.ab.ca

Audit Summary

Form No. F-AA-018

Version 1.2

Page 2 of 4

Facility / Zone	Lica		
Total # of parameters that passed	21		
Total # of parameters audited in the network	21		
Date(s) of the audit	May 6-9, 2019		
Issue Date of Audit Summary	May 16, 2019		
Station Name	Bonnyville East		
Auditor	Al Clark		
Audit Date	May 7, 2019		
Critical	Pass	Fail	
H ₂ S	X		
SO ₂	X		
TRS			
NO / NO ₂ / NO _x	X		
O ₃	X		
HC	X		
Sharp PM _{2.5}			
Wind Speed / Wind Direction	X		
Wind head Orientation	X		
Manifold Fan	X		
Partisol PM _{2.5}			
Zero/Span Systems Operational	X		
Inspection Items	OK	Need for Improvement	
Sample pump venting/scrubbing	X		
Heating / Air Conditioning	X		
Manifold	X		
Sample Lines	X		
Sharp PM _{2.5}			
Partisol PM _{2.5}			
Safety	X		
Site Conditions	X		
Non-critical	OK	Opportunity for Improvement	
RH	X		
Station Temperature	X		
Ambient Temperature	X		
Barometric Pressure			
Tipping bucket			
Station Condition	X		
Station Documentation		X	Needs review / or missing

Not monitored or audited at this location

* Initial response was 24% low

STATION AUDIT

File No. 2019 - 067A - 071A

Date: May 7, 2019

Performed by: Al Clark

Station

Name: Bonnyville East

Location: Bonnyville

Facility/Zone: Lica

Operator: Maxxam

Temp. 22.7 C

Barometric Press. 716 mmHg

Location

Latitude N 54° 15' 09.9"

Longitude W 110° 41' 26.6"

Elevation 550m

Status of Site Documentation On Line - incomplete

Status of Network Documentation On Line - incomplete

Status of QAP Audited June 2017

Manifold Material Glass

Manifold Condition Good

Meteorological

	Observed	Audit Value
Wind Speed Direction	<u>11.1 kph / 92 deg</u>	<u>10-15 kph / E</u>
Station Temperature	<u>22.2 C</u>	<u>21.4 C</u>
Relative Humidity	<u>N/A</u>	<u>N/A</u>
Ambient Temperature	<u>N/A</u>	<u>N/A</u>
Solar Radiation	<u>N/A</u>	<u>N/A</u>
Precipitation	<u>N/A</u>	<u>N/A</u>

Remarks:

SO₂ ANALYZER AUDIT

File No. 2019 - 067A

Date: May 7, 2019

Performed by: Al Clark

Station

Name: Bonnyville East

Location: Bonnyville

Facility/Zone: Lica

Operator: Maxxam

Temp. 22.9 C

Barometric Press. 719 mmHg

Monitor

Make/Model: Teco 43i TLE Serial No: 1180320043

Inlet flow (sccm): 459 Full Scale Range ppm: 1.0

Last cal. Date: Apr 8/19 Old Correction Factor: 1.0050

Zero/Bkg 4.54

Span Coef 0.928

Calibrator

Calibration Method: GAS DILUTION Make/Model: Sabio 2010

Cylinder #: FF23250 AMU #: 2092

CGA Date: April 2019 SO₂ Concentration PPM: 49.5

Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Concentration (ppm)	% Difference	
Air	Gas	Total			vs Audit Gas	Limits
4948	0.0	4948	0.0000	0.0004		
4886	77.1	4963	0.7690	0.7438	-3%	± 10%
4921	38.6	4960	0.3852	0.3764	-2%	± 10%
4952	20.1	4972	0.2001	0.1909	-5%	± 10%
Absolute Average Percent Difference					4%	

Linear Regression Analysis:

$y=mx+b$ (where x =calculated concentration, y =indicated concentration)

Correlation Coeff.= 1.0000

m (Slope)= 0.9685

b (Intercept as % of full scale)= -0.0048

LIMITS

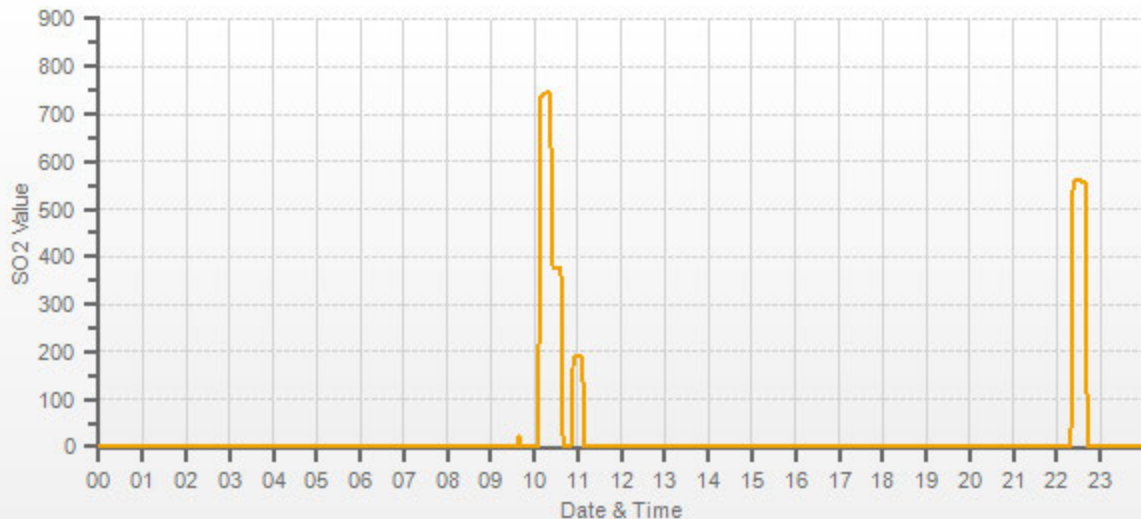
≥ **0.995**

0.90-1.10

± **3% F.S.**

Remarks:

SO2[ppb]



H₂S ANALYZER AUDIT

File No. 2019 - 068A

Date: May 7, 2019

Performed by: AI Clark

Station

Name: Bonnyville East

Location: Bonnyville

Facility/Zone: Lica

Operator: Maxxam

Temp. 22.9 C

Barometric Press. 719 mmHg

Monitor

Make/Model: Teco 450i Serial No: CM17360002

Inlet flow (sccm): 952 Full Scale Range ppm: 0.1

Last cal. Date: Apr 8/19 Old Correction Factor: 1.0000

Zero/Bkg 21.3

Span Coef 1.151

Calibrator

Calibration Method: GAS DILUTION Make/Model: Sabio 2010

Cylinder #: EX0011882 AMU #: 2092

CGA Date: May 2019 H₂S Concentration PPM: 10.8

Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Concentration (ppm)	% Difference	
Air	Gas	Total			vs Audit Gas	Limits
4948	0.0	4948	0.0000	0.0012		
4926	36.8	4963	0.0801	0.0814	0%	± 10%
4940	20.0	4960	0.0435	0.0453	1%	± 10%
4962	9.9	4972	0.0215	0.0229	1%	± 10%
Absolute Average Percent Difference					1%	

Linear Regression Analysis:

$y=mx+b$ (where x =calculated concentration, y =indicated concentration)

Correlation Coeff.= 1.0000

m (Slope)= 1.0018

b (Intercept as % of full scale)= 1.3510

LIMITS

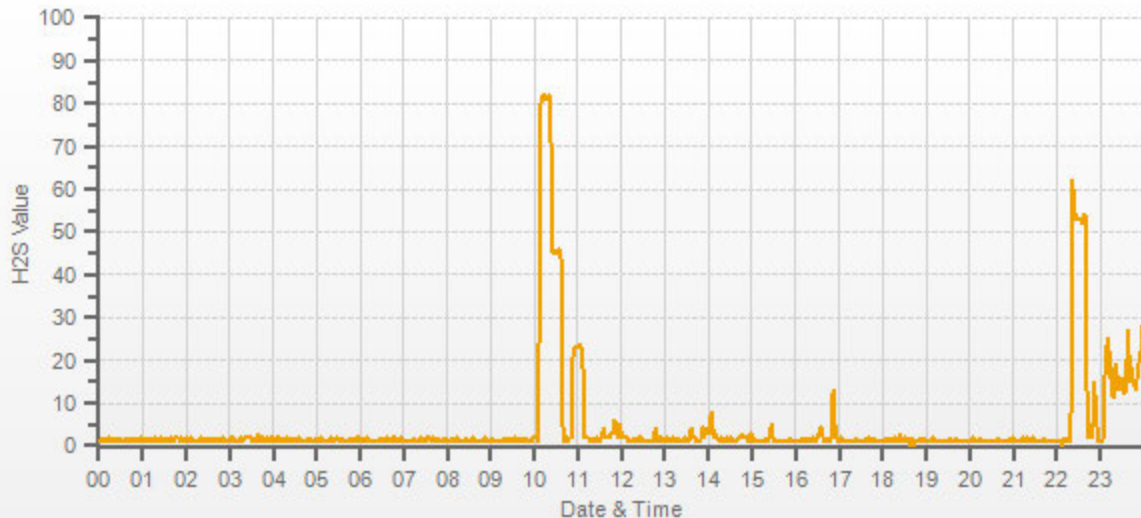
≥ **0.995**

0.90-1.10

± **3% F.S.**

Remarks:

H2S[ppb]



Non Methane Analyzer Audit

File No. 2019 - 069A

Date: May 7, 2019

Performed by: Al Clark

Station:

Name: Bonnyville East Location: Bonnyville Operator: Maxxam
 Facility/Zone: Lica Temp. 23.7 C BP: 719 mmHg

Monitor:

Make/Model: Teco 55i Serial No. 1180320044
 Inlet flow (scm): N/A CH₄ Range ppm: 20
 Last cal. Date: Apr 9/19 Non CH₄ Range ppm: 20
 THC Range ppm: 40
 Old Correction Factor: CH₄: 1.003
 Non CH₄: 0.995
 THC: 0.999

Calibration Method:

Gas Dilution

Calibrator:

Make/Model Sabio 2010 AMU# 2092

HC cylinder # EA0004003 CH₄ conc. (ppm) 1010 CH₄ Equiv (C3H8 only) (ppm) 872
 CGA Date April 2019 C₃H₈ conc. (ppm) 317 Total CH₄ Equiv. (ppm) 1882

Calibrator Flows			Calc. Conc.			Indicated Concentration			% Difference vs Audit Gas		
			CH ₄ (ppm)	Non CH ₄ (ppm)	THC (ppm)	CH ₄ (ppm)	Non CH ₄ (ppm)	THC (ppm)	Limit ± 10%		
Air	Gas	Total							CH ₄	Non CH ₄	THC
4942	0.0	4942	0.00	0.00	0.00	0.00	0.00	0.00	0%	0%	0%
4865	77.4	4942	15.82	13.65	29.47	15.82	13.63	29.45	0%	0%	0%
4902	39.0	4941	7.97	6.88	14.85	8.01	6.92	14.93	0%	1%	1%
4941	19.9	4961	4.05	3.50	7.55	4.09	3.57	7.66	1%	2%	1%
Absolute Average Percent Difference									0%	1%	1%

Linear Regression Analysis:

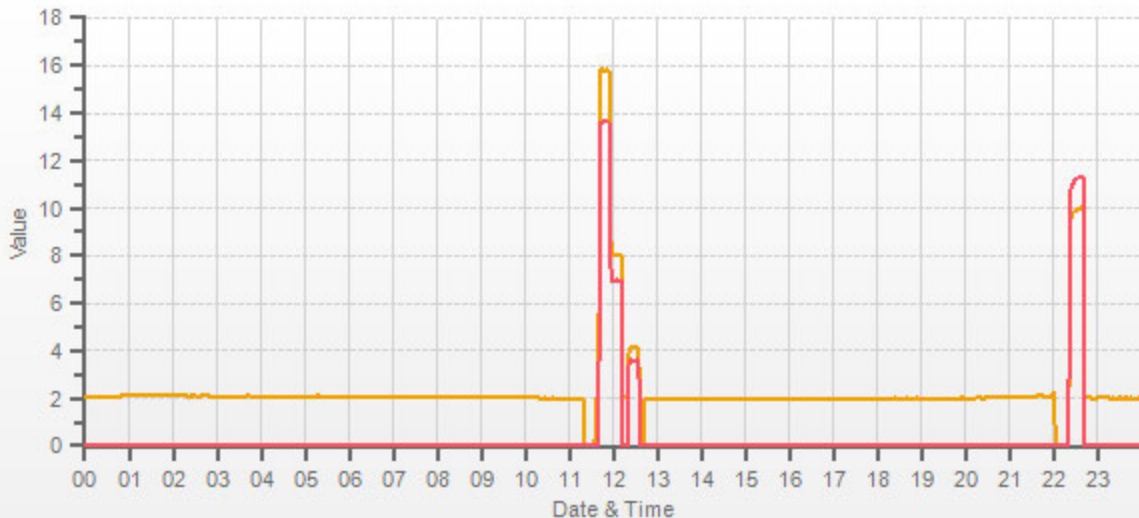
y=mx+b (where x=calculated concentration, y=indicated concentration)

	<u>CH₄</u>	<u>Non CH₄</u>	<u>THC</u>	LIMITS
Correlation Coeff.=	<u>1.0000</u>	<u>1.0000</u>	<u>1.0000</u>	≥ 0.995
m (Slope)=	<u>0.9996</u>	<u>0.9968</u>	<u>0.9983</u>	0.90-1.10
b (Intercept as % of FS)=	<u>0.1128</u>	<u>0.2079</u>	<u>0.1603</u>	± 3% F.S.

Remarks:



CH4[ppm] NMHC[ppm]



NO-NOx-NO2 Analyzer Audit

File No. 2019 - 070A

Date: May 7, 2019 Performed by: Al Clark

Station:

Name: Bonnyville East Location: Bonnyville Operator: Maxxam
Facility/Zone: Lica Temp. 22.7 C BP: 716 mmHg

Monitor:

Make/Model: Teco 42i Serial No. 1180930027
Inlet flow (sccm): 702 Range ppm: 1.0
Last cal. Date: Apr 8/19 Old CF: NO: 1.001
NOx: 0.999
NO2: 0.998

NO Bkg 7.0
NOx Bkg 7.2
NO Coef 0.852
NOx Coef 1.002
NO2 Coef 0.999

Calibration Method: Gas Dilution / GPT

Calibrator: Make/Model: Sabio 2010 AMU# 2270
NO cylinder # FF23222 NO conc. ppm 50.8 NOx conc. ppm 51.4
CGA Date April 2019

Calibrator Flows			Calc. Conc.		Indicated Concentration		% Difference vs Audit Gas	
Air	Gas	Total	NO (ppm)	NOx (ppm)	NO (ppm)	NOx (ppm)	NO	NOx
5049	0.0	5049	0.0000	0.0000	-0.0001	0.0000	Limit ± 10%	
4967	80.2	5047	0.8072	0.8168	0.7656	0.7877	-5%	-4%
5009	40.0	5049	0.4025	0.4072	0.3818	0.3917	-5%	-4%
5025	19.8	5045	0.1994	0.2017	0.1894	0.1946	-5%	-4%
Absolute Average Percent Difference							5%	4%

Linear Regression Analysis:

y=mx+b (where x=calculated concentration, y=indicated concentration)

	NO	NOx	NO ₂	LIMITS
Correlation Coeff.=	<u>1.0000</u>	<u>1.0000</u>	<u>1.0000</u>	≥ 0.995
m (Slope)=	<u>0.9484</u>	<u>0.9642</u>	<u>0.9979</u>	0.90-1.10
b (Intercept as % of full scale)=	<u>0.0086</u>	<u>-0.0182</u>	<u>0.1798</u>	± 3% F.S.

O ₃ Setting	Flow Rate	Indicated Conc. (ppm)			NO Decrease	NO ₂ Increase	% Difference vs Audit Gas	
		NO	NOx	NO ₂				
0.000	5047	0.7780	0.7876	0.0096	0.0000	0.0000	0.0000	%Dif Limit
1.300	5047	0.3098	0.7883	0.4785	0.4682	0.4689	0%	± 10%
0.600	5047	0.5851	0.7894	0.2043	0.1929	0.1947	1%	± 10%
0.360	5047	0.6845	0.7889	0.1044	0.0935	0.0948	1%	± 10%
Absolute Average Percent Difference							1%	

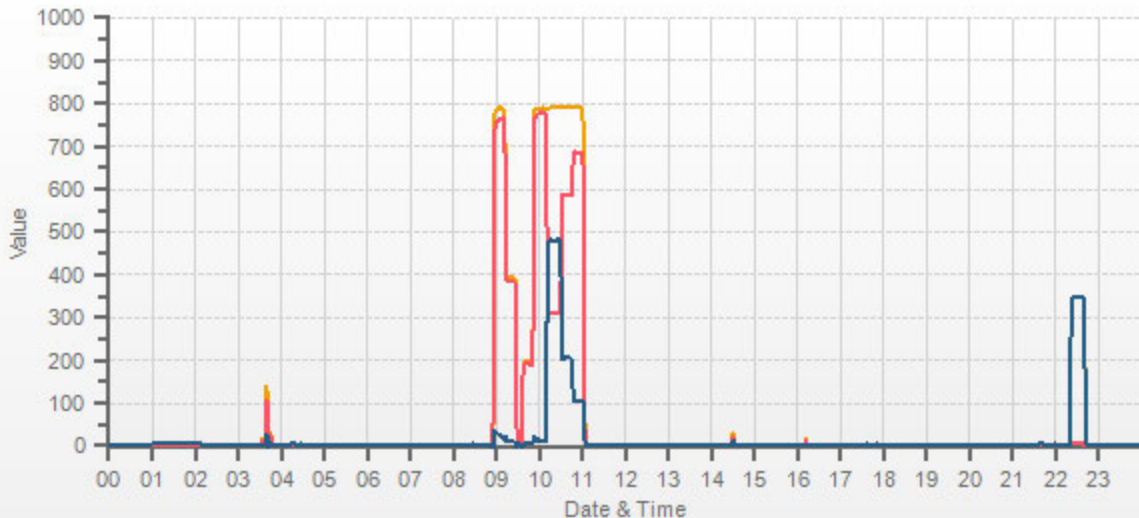
Converter Efficiency

Average Converter Efficiency 100.8%

Remarks:



— NOX[ppb] — NO[ppb] — NO2[ppb]



O₃ ANALYZER AUDIT

File No. 2019 - 071A

Date: May 7, 2019

Performed by: Al Clark

Station

Name: Bonnyville East

Location: Bonnyville

Facility/Zone: Lica

Operator: Maxxam

Temp. 22.7 C

Barometric Press. 716 mmHg

Monitor

Make/Model: Teco 49i Serial No: 1002240372

Inlet flow (sccm): 759 / 764 Full Scale Range ppm: 0.5

Last cal. Date: Apr 9/19 Old Correction Factor: 1.0070

Zero/Bkg 0.0

Span Coeff. 1.015

Calibrator

Calibration Method: Photometer

Make/Model: Teco 49i PS AMU #: 1808

NO cylinder #: N/A NO concentration ppm: N/A

Ozone Setting PPB/Current	Calibrator Flow (sccm)			Calculated Conc. (ppm)	Indicated Conc. (ppm)	% Difference	
	Air	Gas	Total			vs Audit Gas	Limits
0.0000	0	X	0	0.0000	0.0016		
0.4000	0	X	0	0.4000	0.3966	-1%	± 10%
0.2000	0	X	0	0.2000	0.1991	-1%	± 10%
0.1000	0	X	0	0.1000	0.1004	-1%	± 10%
Absolute Average Percent Difference						1%	

Linear Regression Analysis:

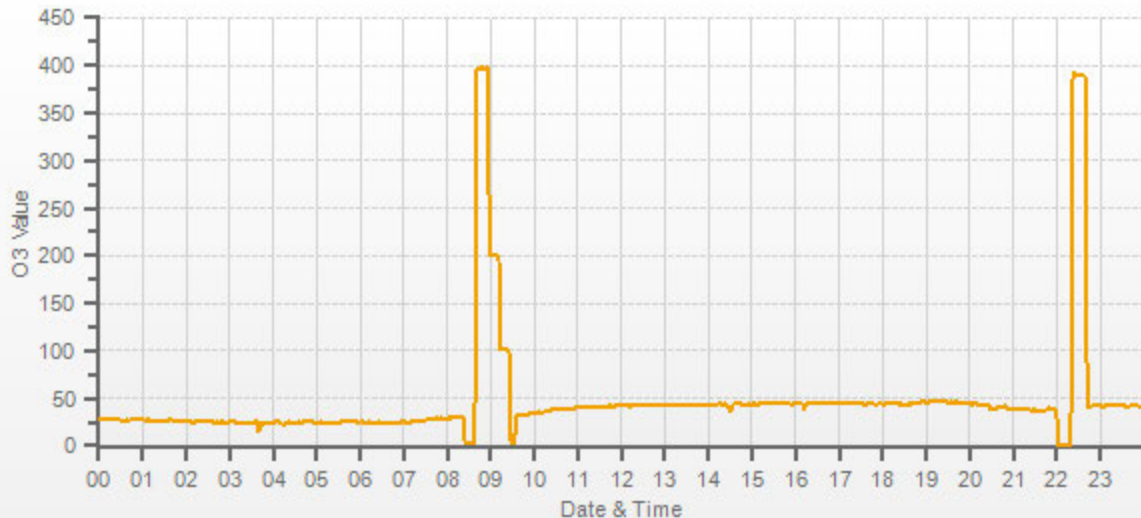
$y=mx+b$ (where x =calculated concentration, y =indicated concentration)

Correlation Coeff.= 1.0000
m (Slope)= 0.9875
b (Intercept as % of full scale)= 0.3240

LIMITS
≥ **0.995**
0.90-1.10
± **3% F.S.**

Remarks:

O3[ppb]



Station Performance Audit Summary

Company: Lica Facility Name: Bonnyville
 Approval No.: N/A Site Name: Bonnyville East
 Region: North Saskatchewan District: Cold Lake

Parameters audited:

H ₂ S	X	SO ₂	X	NO _x	X	NH ₃		O ₃	X
CO		CH ₄	X	NonCH ₄	X	THC	X	TRS	
PM _{2.5}		PM ₁₀		TSP		BTEX		Wind Speed	X
Wind Dir	X	Amb. Temp		Stn.Temp	X	RH		Solar Radiation	
Rainfall		Precip		VWS		Other			
All parameters monitored as per approval: Yes _____ No _____ N/A _____									

GENERAL

	YES	NO	N/A
Has the location remained unchanged from previous audit?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is site secure?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are station operating conditions adequate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

DATA ACQUISITION

Are strip charts in use?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is a telemetry system for data acquisition in use?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SYSTEM COMPONENTS

Is a glass sampling manifold installed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is sampling manifold clean?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is a manifold trap in place?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are spare manifold ports capped	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is manifold oriented so it is not exactly horizontal?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are manifold ports situated to prevent water entering monitors?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is manifold pump properly installed and operative?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do sample lines extend at least 3/4" into manifold?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are monitor sampling lines connected to manifold?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are sampling lines clean?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are monitors properly mounted and secure?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are monitors properly exhausted from room or scrubbed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are zero and span systems operational?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

WIND EQUIPMENT

Is wind sensor properly oriented?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does wind equipment appear to be functioning properly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Date of last calibration.	Date: <u> October 2018 </u>		<input type="checkbox"/>

COMMENTS:

AUDITOR: Al Clark DATE: May 7, 2019



Station Site Documents Audit Checklist

Station	
Name: <u>Bonnyville East</u>	Location: <u>Bonnyville</u>
Facility/Zone: <u>Lica</u>	Operator: <u>Maxxam</u>

<p>Required Elements of AMD Chapter 3 SS 4-B Do the Site Documents Contain the Following:</p> <p>(a) Name of Owner/ Approval Holder</p> <p>(b) Name of Operating Agency</p> <p>(c) Contact Information</p> <p>(d) Date the Site or Station was Established</p> <p>(e) Date the information was last updated</p> <p>(f) Location including Latitude and Longitude</p> <p>(g) Four Colour Photos Looking N, E, S, W From Manifold Inlet</p> <p>(h) Additional Photos/Sketches of AMD Standard Site Non-Conformance</p> <p>(i) List of Instruments Located at the Site</p> <p>(j) Site Description Including the following:</p> <p style="background-color: yellow;">(i) Land Use By Sector not all quadrants identified</p> <p style="background-color: yellow;">(ii) Site Elevation</p> <p>(iii) Greatest Angle of Elevation & Direction to Nearby Buildings</p> <p>(iv) Average Building height in the area</p> <p>(v) Distance to Nearest Trees</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Meets AMD</th> <th rowspan="2">NA</th> <th colspan="2">Current</th> </tr> <tr> <th>YES</th> <th>NO</th> <th>YES</th> <th>NO</th> </tr> </thead> <tbody> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td></td><td></td><td>X</td><td></td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr style="background-color: #cccccc;"><td colspan="5"></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> <tr><td></td><td>X</td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td>X</td><td></td><td></td></tr> <tr><td></td><td></td><td>X</td><td></td><td></td></tr> <tr><td>X</td><td></td><td></td><td>X</td><td></td></tr> </tbody> </table>	Meets AMD		NA	Current		YES	NO	YES	NO	X			X		X			X		X			X		X			X		X			X		X			X		X			X				X			X			X							X			X			X						X					X			X			X	
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<p>Required Elements of AMD Chapter 3 SS 4-D Do the Station Site Documents Contain the Following:</p> <p>(a) Recent Area Map Covering Approximately 1Km²</p> <p style="background-color: yellow;">(b) Plan View Sketch (Labelled Schematic)</p> <p style="background-color: yellow;">(d) Colour Photos Showing Sample Manifold/Inlet - Shown at a distance.</p> <p>(e) Colour Photo of the Station</p> <p>(f) Additional Photos/Sketches of AMD Standard Station Non-Conformance</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Meets AMD</th> <th rowspan="2">NA</th> <th colspan="2">Current</th> </tr> <tr> <th>YES</th> <th>NO</th> <th>YES</th> <th>NO</th> </tr> </thead> <tbody> <tr><td>X</td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td></td><td></td><td></td><td></td></tr> <tr><td>X</td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td>X</td><td></td><td></td></tr> </tbody> </table>	Meets AMD		NA	Current		YES	NO	YES	NO	X					X					X					X							X		
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COMMENTS: Need to specify all quadrants in land use by sector. Site elevation missing. Need to relabel Schematic map as Plan View. Exterior view of sample manifold inlet hard to see in picture.

AUDITOR: Al Clark DATE: May 15, 2019



Network Site Documents Audit Checklist

Network	
Name: <u>Bonnyville East</u>	Location: <u>Bonnyville</u>
Facility/Zone: <u>Lica</u>	Operator: <u>Maxxam</u>

<p>Required Elements of AMD Chapter 3 SS 4-C Do the Network Site Documents Contain the Following:</p> <p>(a) A Recent Area Map Showing the Following:</p> <ul style="list-style-type: none"> (i) Station Locations <li style="background-color: yellow;">(ii) Roadways <li style="background-color: yellow;">(iii) Railway Lines <li style="background-color: yellow;">(iv) Airports (v) Lakes (vi) Rivers (vii) Human Settlements (viii) Locations of Identified Industrial & Non-Industrial Pollutant Sources (ix) Other Significant Landmarks <p style="background-color: yellow;">(b) A windrose for each Continuous Ambient Air Monitoring Station</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Meets AMD</th> <th rowspan="2">NA</th> <th colspan="2">Current</th> </tr> <tr> <th>YES</th> <th>NO</th> <th>YES</th> <th>NO</th> </tr> </thead> <tbody> <tr style="background-color: #cccccc;"> <td colspan="5"></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">X</td> <td></td> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </tbody> </table>	Meets AMD		NA	Current		YES	NO	YES	NO						X			X			X					X					X				X			X		X			X		X			X				X			X			X	
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COMMENTS: Network Map is missing elements as describe above. Windrose is only 1 month.

AUDITOR: Al Clark DATE: May 15, 2019



APPENDIX I: EXCEEDANCE REPORT



Exceedance Summary Report

H2S 1-Hour Exceedances

Date	Time	LICA - Bonnyville East			AEP Reference #
		H ₂ S	WDR	WSP	
		ppb	degrees	kph	
2019/05/02	21:00	32	121	13.0	352764
2019/05/02	22:00	29	131	14.6	352764
2019/05/02	23:00	14	117	11.7	352764
2019/05/05	19:00	12	116	14.3	352848
2019/05/05	20:00	25	123	14.1	352848
2019/05/05	21:00	20	136	12.1	352848
2019/05/06	04:00	16	140	10.8	352849
2019/05/06	05:00	11	147	12.9	352849
2019/05/06	06:00	11	142	14.7	352849
2019/05/07	23:00	15	122	16.0	352942
2019/05/08	00:00	23	124	19.0	352943
2019/05/08	02:00	16	133	14.7	352943
2019/05/08	22:00	14	137	3.3	352943
2019/05/08	23:00	18	144	2.8	352943
2019/05/09	00:00	52	142	2.7	352978
2019/05/09	02:00	42	138	5.1	352978
2019/05/11	19:00	89	139	8.1	353093
2019/05/11	20:00	34	136	8.2	353093
2019/05/14	07:00	12	94	2.4	353257
2019/05/16	21:00	35	120	12.8	353346
2019/05/16	22:00	25	116	10.9	353346
2019/05/17	00:00	13	114	14.8	353347
2019/05/17	17:00	11	139	19.9	353347
2019/05/17	18:00	14	145	19.6	353347
2019/05/17	19:00	23	146	15.2	353347
2019/05/17	20:00	41	142	11.4	353347
2019/05/17	21:00	42	147	10.0	353347
2019/05/17	22:00	73	147	11.2	353347
2019/05/17	23:00	18	141	11.8	353347
2019/05/18	02:00	28	109	12.7	353398
2019/05/18	05:00	24	134	17.9	353398
2019/05/18	06:00	16	133	20.8	353398
2019/05/18	21:00	29	151	12.4	353398
2019/05/18	22:00	36	146	12.6	353398
2019/05/18	23:00	24	149	12.9	353398
2019/05/19	00:00	41	143	10.3	353413
2019/05/19	01:00	53	136	9.0	353413
2019/05/19	02:00	76	137	9.8	353413
2019/05/19	03:00	35	146	12.5	353413
2019/05/19	04:00	11	153	13.6	353413
2019/05/19	05:00	11	157	16.6	353413
2019/05/20	02:00	11	157	12.5	353432
2019/05/20	18:00	13	147	21.5	353432
2019/05/20	19:00	23	145	15.4	353432
2019/05/20	20:00	55	136	10.9	353432
2019/05/20	21:00	67	135	8.3	353432
2019/05/20	22:00	62	138	9.8	353432
2019/05/20	23:00	75	139	10.6	353432
2019/05/21	00:00	33	148	11.1	353470
2019/05/21	01:00	16	152	13.8	353470
2019/05/21	02:00	14	150	11.7	353470
2019/05/21	03:00	28	146	10.0	353470
2019/05/21	19:00	15	89	7.7	353470
2019/05/21	21:00	24	89	6.3	353470
2019/05/21	22:00	30	114	4.6	353470
2019/05/21	23:00	23	102	3.3	353470
2019/05/22	02:00	25	175	2.1	353521
2019/05/23	00:00	18	232	2.6	353557
2019/05/31	00:00	12	122	7.0	354045
2019/05/31	01:00	13	107	7.7	354045



Exceedance Summary Report

H2S 24-Hour Exceedances

Date	LICA - Bonnyville East			
	H ₂ S	WDR	WSP	AEP Reference #
	ppb	degrees	kph	
2019/05/02	4	68	1	352764
2019/05/08	4	165	9.1	352848
2019/05/09	5	179	12	352849
2019/05/11	6	205	2.8	352942
2019/05/16	4	82	11.4	352943
2019/05/17	15	117	15	352978
2019/05/18	9	144	15.7	353093
2019/05/19	11	158	14.6	353257
2019/05/20	15	153	15.8	353346
2019/05/21	11	120	9.7	353347

1.0 Quality Control Activities

Quality control procedures are established to govern the performance of the monitoring equipment and to protect operational uptime. Data collected during QC/QA activities are assigned a data validation code to comply with the requirements outlined in Chapter 6, 4.1.1, DQ 4-A (AMD, 2016). Calibrations are deemed successful only if the AMD calibration acceptance limits are met (Chapter 7, 9.0, AMD 2016).

A daily zero-span test procedure is performed for each gaseous parameter by challenging the analyzer with a zero-air source and span gas. Daily review of the data ensures the zero and span check are within the required acceptance limits and do not deviate more than $\pm 10\%$ from the expected value. The total zero-span cycle is complete within an hour with the zero phase commencing at the beginning of the scheduled hour. This QC activity is conducted in accordance with Chapter 7, 4.0, Cal 4-A (AMD, 2016).

The allowable time for a zero-span check is one hour per calendar day. The time allotted for the zero-span check does not contribute to downtime and is identified with a data validation code of "S". If any additional zero-span response checks are performed, the time accrued during the QC activity is considered downtime and is identified with a data validation code of "S1". The initiation of an additional zero-span check may be warranted during the investigation of operational issues or suspect data.

Each month, a scheduled multipoint calibration is performed on each gas analyzer. Prior to any adjustments, an as-found response test is completed to obtain the zero reading of the analyzer and the response to the highest span concentration. The zero and high point test gases are then re-introduced into the analyzer to establish the zero and high set-points. Once these adjustments are satisfactory, a mid-point and a low-point test concentration is introduced. Additional multi-point calibrations are required if any of the conditions, outlined in Chapter 7, 2.1, Cal 2G (AMD, 2016) exist.

The time allotted for the first multi-point calibration is not considered downtime and is identified with a data validation code of "C". If any additional as-found response checks or multipoint calibrations are performed, the time accrued during the QC activity is considered downtime and is identified with a data validation code of "C1".

A mechanical wind system undergoes annual calibration, as a minimum, while an ultrasonic wind system is factory calibrated every two years (Chapter 6, 6.0, Cal 6-A, AMD 2016). Supplementary to this, a visual inspection of the equipment is performed during each scheduled monthly site visit.

The time allotted for the wind system calibration is not considered downtime and is identified with a data validation code of "C". If function checks or additional calibrations are performed, the time accrued during the QC activity is not considered downtime and is identified with a data validation code of "Q" and "C", respectively. If QC activity goes beyond 10% of the monthly operating time, the time exceeding 10% is considered downtime and is assigned a data validation code of "C1". Data identified with a data validation code of "Q" is in accordance with Chapter 6, 4.1.3 (AMD, 2016) which states QA/QC activities are not included when calculating data completeness.

High volume samplers are calibrated every three months, as a minimum, in accordance with Chapter 7, 7.0, Cal 7-B (AMD, 2016).

Where passive sampling is in practice, quality control samples will be deployed in accordance with Chapter 4, 3.0, 3.1.3. Method blanks, replicate samples and spiked blanks are exposed and handled in the same manner as each passive sample. To comply with the data submission requirements in Chapter 9, 3.1, the replicate and corresponding passive sample concentrations are reportable data values and have not been averaged.

As recommended in Chapter 6, 4.2 (AMD 2016), daily data review is conducted to verify data and avoid significant data losses. Automated flags, originating from the data-logger, and data anomalies are reviewed and may prompt the need to dispatch a technician for investigation and/or corrective action. Additionally, there are several automated alarm scenarios that serve to screen raw data, alert technicians and elicit investigation or corrective action.

Comparisons of the measured ambient concentrations to the corresponding AAAQO are assessed using the significant figures protocol in Chapter 9, 3.1.2. If the measurement is near the set objective, raw data may undergo necessary data adjustments to confirm a true exceedance. Should an exceedance occur, Maxxam will formally notify the client; however, the reporting protocol to AEP is defined by the client and may not involve Maxxam. Exceedance events are acknowledged in the report, based on the information available at the time.

2.0 Data Verification and Validation

The data validation procedures, outlined in Chapter 6, 4.0, AMD 2016, are used to accept, reject and qualify data. The data verification and validation process, and the current Data Collection and Management Process Flow Chart have been compiled from sections 4.2 to 4.6 (AMD, 2016) and are shown below.

Baseline adjustments are applied by interpolation between two valid zero checks, as determined by the Data Acquisition System. In the event that zero check results are not reliable, data may be adjusted by applying a constant offset to data collected between two adjacent zero checks. Both adjustment approaches are deemed acceptable by the AMD.

Table 1 (Chapter 6) outlines the quantitative parameter relationships to be considered and dictates that data adjustments are applied equally for NO/NO₂/NO_x and CH₄/NMHC/THC parameters. Below zero adjustments are applied to 1-hour averages, in accordance with Table 2 (Chapter 6), and are done after baseline corrections.

Instantaneous data, where provided, 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.

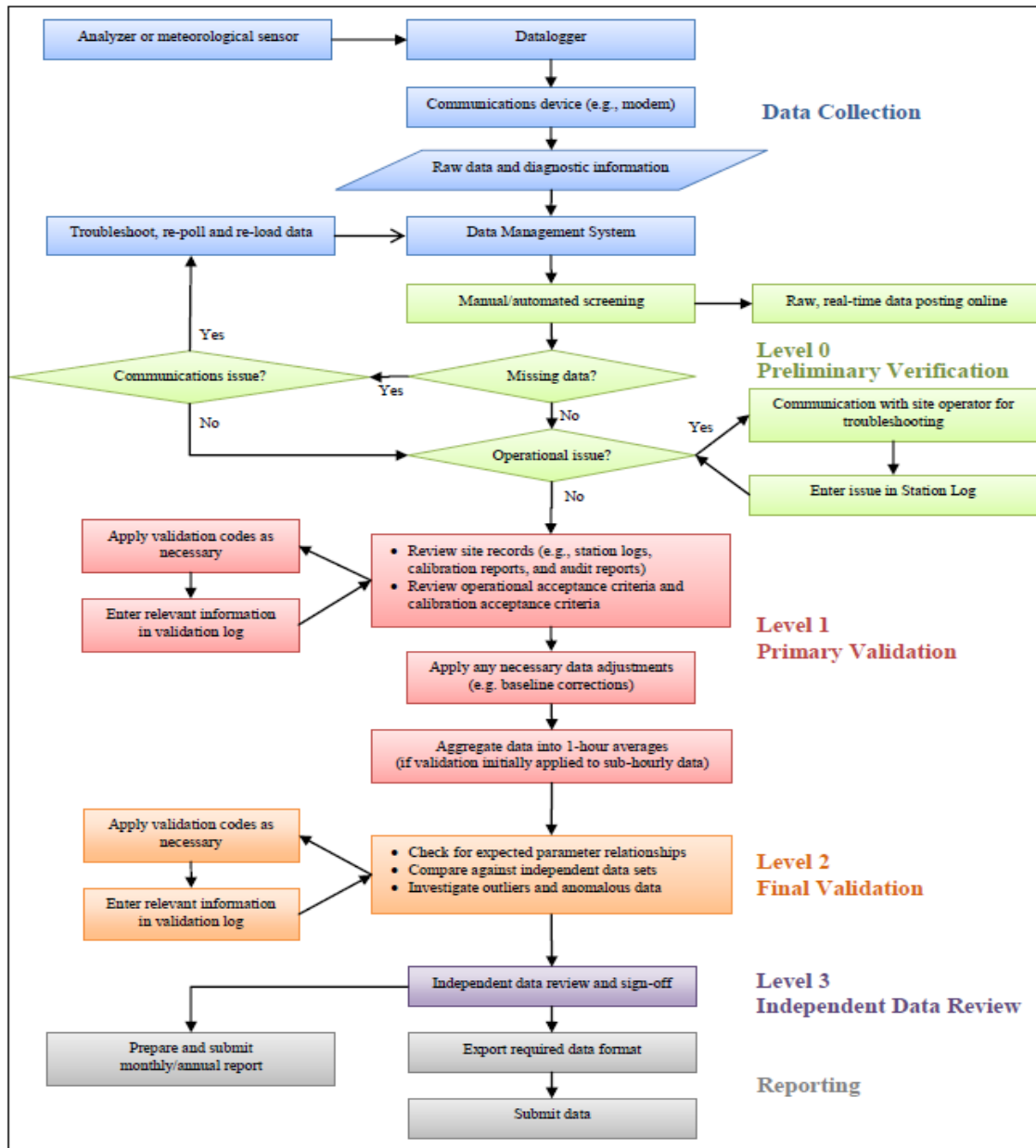
All calculations and reporting of results follow the methods described in the AMD, 2016.

There were no deviations from the prescribed methods.

AMD Data Verification and Validation Process

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

<p>Level 0 Preliminary Verification</p>	<p>Level 0 data are raw data obtained directly from the data acquisition system (DAS). At this level, data undergoes a certain amount of manual or automated screening and flagging. Screening checks include: a) identification of periods of missing data; b) verification of time stamps against reference time; c) verification that instrument diagnostics/data-logger 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.</p>
<p>Level 1 Primary Validation</p>	<p>Primary validation involves more thorough evaluation and documentation of issues identified during data screening, along with appropriate application of data validation codes. Level 1 activities 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.</p>
<p>Level 2 Final Validation</p>	<p>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. At this level of review, some general knowledge of pollutant and meteorological behavior can be used to determine if data is suspect.</p>
<p>Level 3 Independent Data Review</p>	<p>Level 3 validation involves a final cursory review of validated data, and is completed by an individual independent of both field operations and primary data validation. At this level, a final independent QA review/endorsement is performed before data is submitted to Alberta Environment and Parks.</p>
<p>Post-Final Validation</p>	<p>The Post-Final Validation step serves to re-evaluate validated data for errors or omissions discovered and/or suspected after the initial monthly data submittal. This level of validation is performed on an annual basis, when annual reporting is required or requested.</p>



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



Validation Certificate Form

Client: <u>Lakeland Industry & Community Association</u> Site: <u>Bonnyville East Continuous Monitoring Station</u>	Project #: <u>2833-2019-05-39-C</u> Contact: <u>Mike Bisaga</u>
--	--

Level 0 Preliminary Verification	<u><i>bimadeniji</i></u>	Date <u>14- Jun- 2019</u>
Level 1 Primary Validation	<u><i>bimadeniji</i></u>	Date <u>14- Jun- 2019</u>
Level 2 Final Validation	<u><i>bimadeniji</i></u>	Date <u>17- Jun- 2019</u>
Level 3 Independent Data Review	<u><i>msalmbg</i></u>	Date <u>19- Jun- 2019</u>
Post-Final Validation	<u>NA</u>	Date <u>NA</u>

Notes

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

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Lakeland Industry & Community Association

MAY 2019

Ambient Air Monitoring Calibration Report

- COLD LAKE SOUTH STATION-

CAL-LICA-201905-01174

Station Operation and Maintenance:

Maxxam Analytics

Data Validation and Report:

Maxxam Analytics

July 2, 2019



Lakeland Industry & Community Association
5107 50 St
Bonnyville, AB T9N2J7

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

July 2, 2019

Subject:

May 2019 Ambient Air Monitoring Calibration Report Submission for the LICA Cold Lake South station

Lakeland Industry & Community Association (LICA) is pleased to submit the ambient air monitoring calibration report for the Cold Lake South AQM Station in the month of May 2019. This calibration report includes equipment calibration records, calibrator performance audit records and calibration gas audit records for the equipment that were used this month. This calibration report is prepared by the LICA network contractor.

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

Respectfully,

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

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

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

Lily Lin
Data & Reporting Specialist
587-225-2248
monitoring@lica.ca

May 1 - 31, 2019

MONTHLY CALIBRATION REPORT

Project #: 2833-2019-05-23-C

LICA-201905

Prepared for:

Lakeland Industry & Community Association

Mike Bisaga

5107 50 St.

Bonnyville, Alberta T9N 2J7

monitoring@lica.ca

780-266-7068

Monitoring Station

**Cold Lake South Continuous Monitoring
Station**

Date of Report Issuance: June 28, 2019



#1 - 2080 39 Avenue NE, Calgary AB, T2E 6P7



Thermo 43I-TLE Sulphur Dioxide Analyzer Calibration

Date: <u>May 14, 2019</u>	Barometer/B.P./units: <u>F.S. #05544 expires Jan 17, 2020</u>	<u>939</u>	millibars
Company/Airshed: <u>LICA</u>	Thermometer/Station Temp: <u>F.S. #160348895 expires Jun 19, 2020</u>	<u>23</u>	°C
Location/Station Name: <u>Cold Lake South</u>	Weather Conditions: <u>Mainly sunny</u>		
Parameter: <u>Sulphur Dioxide</u>	Calibration Purpose: <u>routine monthly</u>		
Start Time 24 hr. (mst): <u>8:49</u>	Performed By/Reviewer: <u>Alex Yakupov</u>		<u>Rob Fisher</u>
End Time 24 hr. (mst): <u>13:15</u>	Cal Gas Expiry Date: <u>August 20, 2026</u>		
Calibration Method: <u>Gas Dilution</u>	Converter Model & s/n (if applicable): <u>n/a</u>		
Analyzer:			
Serial Number/Owner: <u>11800260018</u> <u>LICA</u>	Range ppb: <u>500</u>		
Last Calibration Date: <u>April 24, 2019</u>	As Found C.F.: <u>0.998</u>		
Previous C.F.: <u>1.000</u>	New C.F.: <u>1.001</u>		

Calibration Standards: Low Flow Meter ID/Expiry Date: <u>N/A</u> High Flow Meter ID/Expiry Date: <u>N/A</u> Calibrator ID/Expiry Date: <u>API id# 690 expires April 16, 2020</u> Cal Gas Cylinder I.D. #: <u>LL 107918</u> Cal Gas Conc. (ppm): <u>49.5</u>	Standard Calibration Points for Ranges <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>380</td></tr> <tr><td>Mid</td><td>180</td></tr> <tr><td>Low</td><td>90</td></tr> </table>	Point	ppb	High	380	Mid	180	Low	90
Point	ppb								
High	380								
Mid	180								
Low	90								

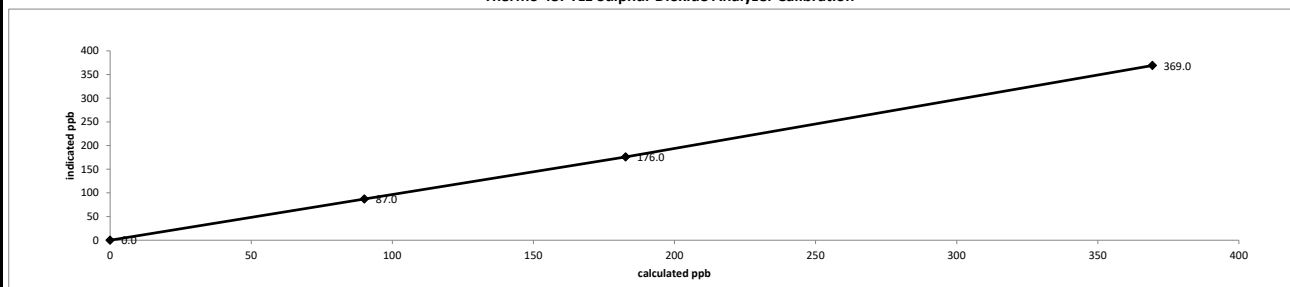
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	4896	0.00	4896	0.0	0	n/a
as found high	5028	37.80	5066	369.3	370	0.998
adjusted zero	4896	0.00	4896	0.0	0	n/a
adjusted high	5028	37.80	5066	369.3	369	1.001
mid	4859	18.00	4877	182.7	176	1.038
low	4879	8.90	4888	90.1	87	1.036
calibrator zero	4896	0.00	4896	0.0	0	n/a
Average C.F. =						1.025

Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u>	LIMITS
Slope = <u>1.000</u>	> or = 0.995
b (Intercept as % of full scale) = <u>0.52%</u>	0.95-1.05
% change in C.F. from last cal = <u>0.18%</u>	± 3% F.S.
	± 10%

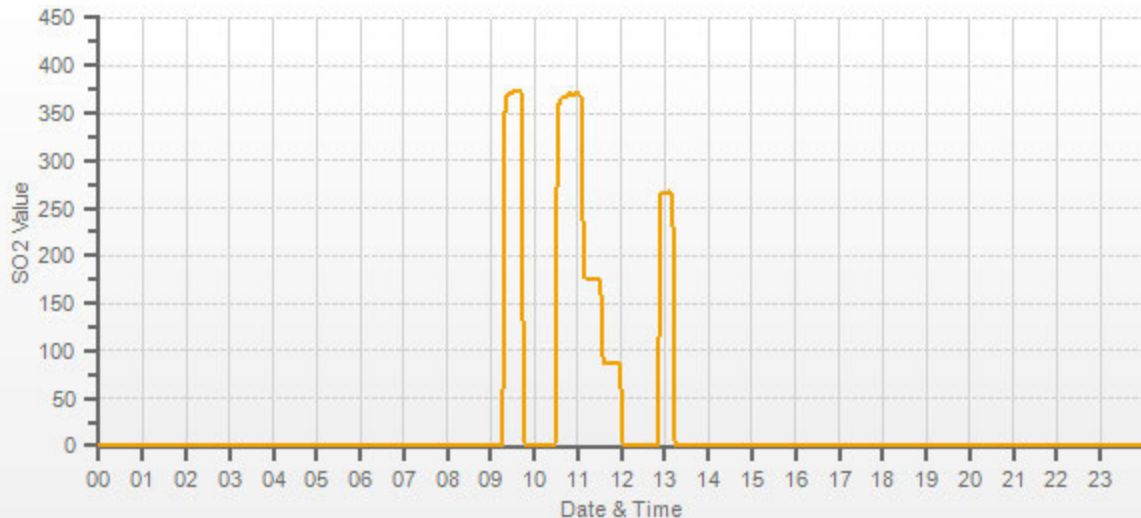
Thermo 43I-TLE Sulphur Dioxide Analyzer Calibration



As found: Bkg: <u>1.97</u> Coef: <u>1.019</u> Pmt: <u>-690.8</u> Flash: <u>1046</u> Internal: <u>30.7</u> Chamber: <u>45.2</u> Perm Oven Gas: <u>44.99</u> Perm Oven Heater: <u>44.28</u> Pressure: <u>686.7</u> Sample Flow: <u>0.451</u> Lamp Intensity: <u>91</u> Converter: <u>n/a</u> Converter Set: <u>n/a</u> Averaging Time: <u>120</u> Expected Value: <u>268.0</u>	As left: Bkg: <u>1.82</u> Coef: <u>1.004</u> Pmt: <u>-690.8</u> Flash: <u>10.47</u> Internal: <u>31.3</u> Chamber: <u>44.8</u> Perm Oven Gas: <u>45.00</u> Perm Oven Heater: <u>44.28</u> Pressure: <u>686.1</u> Sample Flow: <u>0.452</u> Lamp Intensity: <u>91</u> Converter: <u>n/a</u> Converter Set: <u>n/a</u> Averaging Time: <u>120</u> Expected Value: <u>266.0</u>
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Comments:
 The analyzer sample inlet filter was changed.
 The analyzer cooling fan filter(s) were cleaned.
 The manifold blower was found to be working normally.

— SO2[ppb]



SO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 19/05 Type: Span





Thermo 450i Total Reduced Sulphur Analyzer Calibration

Date:	May 14, 2019	Barometer/B.P./units:	F.S. #05544 expires Jan 17, 2020	939	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. #160348895 expires Jun 19, 2020	23	°C
Location/Station Name:	Cold Lake South	Weather Conditions:	Mainly sunny		
Parameter:	Total Reduced Sulphur	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	10:51	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	15:13	Cal Gas Expiry Date:	October 20, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	CDNOVA / Model CDN 101 / #501		
Analyzer:					
Serial Number/Owner:	812728560 LICA	Range ppb:	100		
Last Calibration Date:	April 24, 2019	As Found C.F.:	1.003		
Previous C.F.:	0.999	New C.F.:	1.000		

Calibration Standards: Low Flow Meter ID/Expiry Date: N/A High Flow Meter ID/Expiry Date: N/A Calibrator ID/Expiry Date: Sabio id# 11900613 expires April 16, 2020 Cal Gas Cylinder I.D. #: EY 0001003 Cal Gas Conc. (ppm): 9.55	Standard Calibration Points for Ranges <table border="1"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>78</td></tr> <tr><td>Mid</td><td>38</td></tr> <tr><td>Low</td><td>19</td></tr> </table>	Point	ppb	High	78	Mid	38	Low	19	SO2 Scrubber Check (10 minutes): Start/End Time 24 hr.: 10:55 / 11:10 SO2 Analyzer Range: 500 Target Concentration (ppb): 380 As Found Zero: 0.0 Analyzer Response: (ppb): 0.0 Zero Corrected Result (ppb): 0.0
Point	ppb									
High	78									
Mid	38									
Low	19									

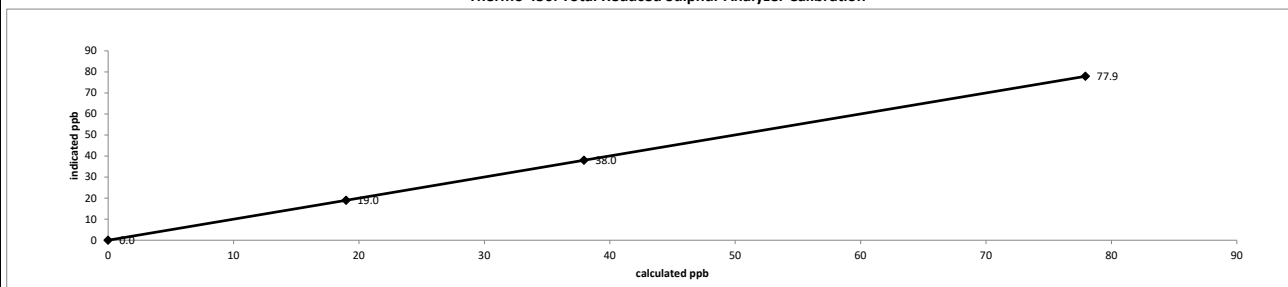
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	7499	0.00	7499	0.0	0	n/a
as found high	7439	61.20	7500	77.9	77.7	1.003
adjusted zero	7499	0.00	7499	0.0	0	n/a
adjusted high	7439	61.20	7500	77.9	77.9	1.000
mid	7470	29.80	7500	37.9	38	0.999
low	7485	14.90	7500	19.0	19	0.999
calibrator zero	7499	0.00	7499	0.0	0	n/a
Average C.F. =						0.999

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.000		0.95-1.05
b (Intercept as % of full scale) =	-0.03%		± 3% F.S.
% change in C.F. from last cal =	-0.39%		± 10%

Thermo 450i Total Reduced Sulphur Analyzer Calibration

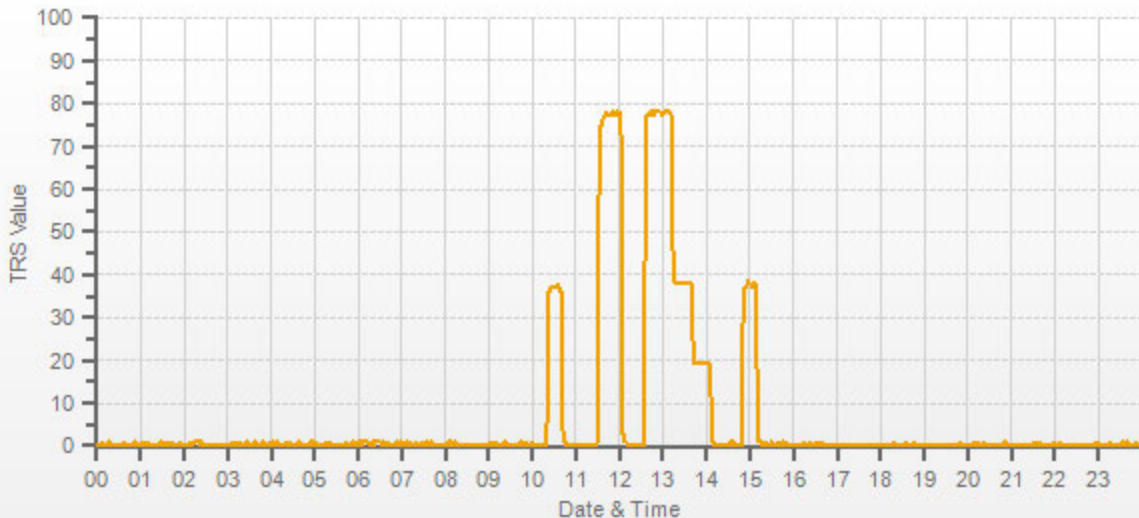


As found:		As left:	
Bkg:	15.8	Bkg:	15.9
Coef:	0.910	Coef:	0.912
Pmt:	-650.8	Pmt:	-650.8
Flash:	748	Flash:	749
Internal:	33.2	Internal:	33.0
Chamber:	45.0	Chamber:	45.0
Converter Temp:	825	Converter Temp:	825
Converter Set:	825	Converter Set:	825
Perm Oven Gas:	45.00	Perm Oven Gas:	45.00
Perm Oven Htr:	44.37	Perm Oven Htr:	44.37
Pressure:	632.1	Pressure:	632.2
Sample Flow:	0.486	Sample Flow:	0.487
Lamp Intensity:	91	Lamp Intensity:	91
Averaging Time:	120	Averaging Time:	120
Expected Value:	37.7	Expected Value:	37.8

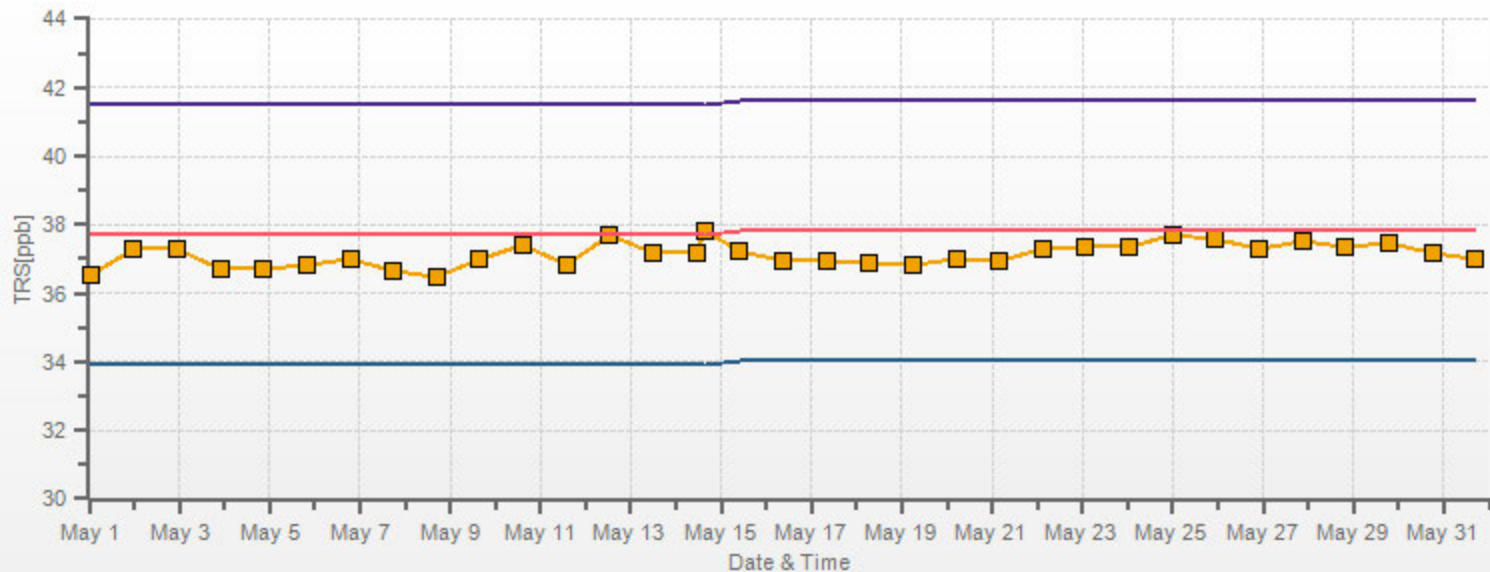
Comments:

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

— TRS[ppb]



TRS[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 19/05 Type: Span





Thermo 55i Methane/Non-Methane Analyzer Calibration

Date: May 13, 2019	Barometer/B.P./units: F.S. #05544 expires Jan 17, 2020 945 millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. #160348895 expires Jun 19, 2020 23 °C
Location/Station Name: Cold Lake South	Weather Conditions: Mainly sunny
Parameter: CH4 / NMHC / THC	Calibration Purpose: shut down
Start/End Time 24 hr. (mst): 12:10 / 13:46	Performed By/Reviewer: Alex Yakupov Rob Fisher
Calibration Method: Gas Dilution	Cal Gas Expiry Date: August 1, 2026

Analyzer:		Correction Factors:		
Serial Number/Owner: 1236656188 Maxxam		Previous C.F.:	As Found C.F.:	New C.F.:
Measured Flow: 1112		CH ₄ = 1.000	1.002	n/a
Last Calibration Date: April 24, 2019		NMHC = 1.000	0.997	n/a
Range ppm: 20 CH4/20 NMHC/40 THC		THC = 1.000	1.000	n/a

Calibration Standards:		Standard Calibration Points for Analyzer Range of 20/20/40 ppm			
Low Flow Meter ID/Expiry Date: N/A		Point	CH4	NMHC	THC
High Flow Meter ID/Expiry Date: N/A		High	13.00	13.00	26.00
Calibrator ID/Expiry Date: API id# 690 expires April 16, 2020		Mid	7.00	7.00	14.00
Cal Gas Cylinder I.D. #: LL 29687		Low	3.00	3.00	6.00
CH4 Cylinder Conc.: 598.0 198.0 =C ₂ H ₆ Cylinder Conc.					
CH₄ expressed as C₂H₆: 544.5 1142.5 =total CH4 equivalent					

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

Calibrator Flow Rates (cc/min)										Correction Factors:		
Point	Diluent	Cal Gas	Total Flow	Calculated CH ₄ (ppm)	Calculated NMHC (ppm)	Calculated THC (ppm)	Indicated CH ₄ (ppm)	Indicated NMHC (ppm)	Indicated THC (ppm)	CH ₄	NMHC	THC
as found zero	2500	0.00	2500	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
as found high	2442	58.00	2500	13.87	12.63	26.51	13.84	12.67	26.51	1.002	0.997	1.000
mid	2469	31.00	2500	7.42	6.75	14.17	7.50	6.73	14.24	0.989	1.003	0.995
low	2486	14.00	2500	3.35	3.05	6.40	3.40	3.04	6.45	0.985	1.003	0.992
Average C.F. =										0.992	1.001	0.996

Linear Regression/Calibration Results:

Correlation Coefficient =	CH ₄	NMHC	THC	LIMITS > or = 0.995 0.90-1.10 ± 3% F.S. ± 10%
Slope =	0.997	1.003	1.000	
b (Intercept as % of full scale) =	0.21%	-0.07%	0.08%	
% change in C.F. from last cal =	-0.24%	0.30%	0.02%	

As Left Instrument Diagnostics:

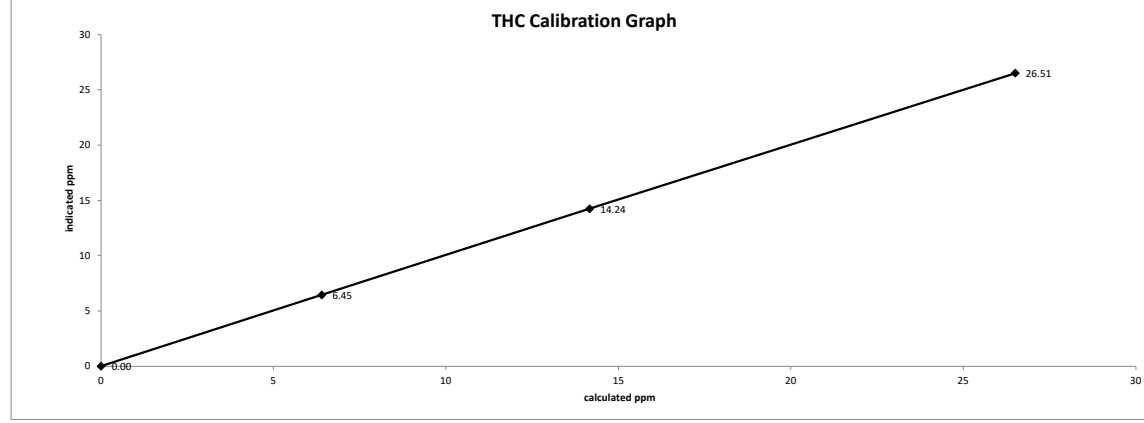
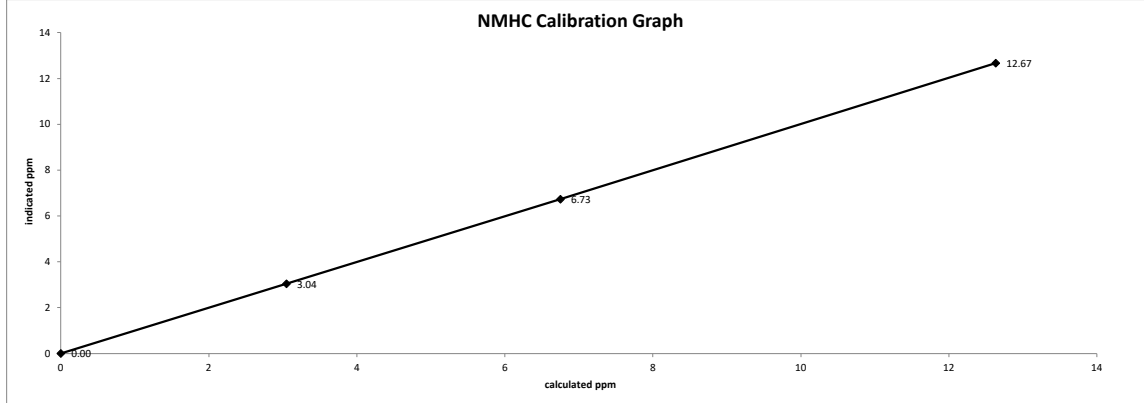
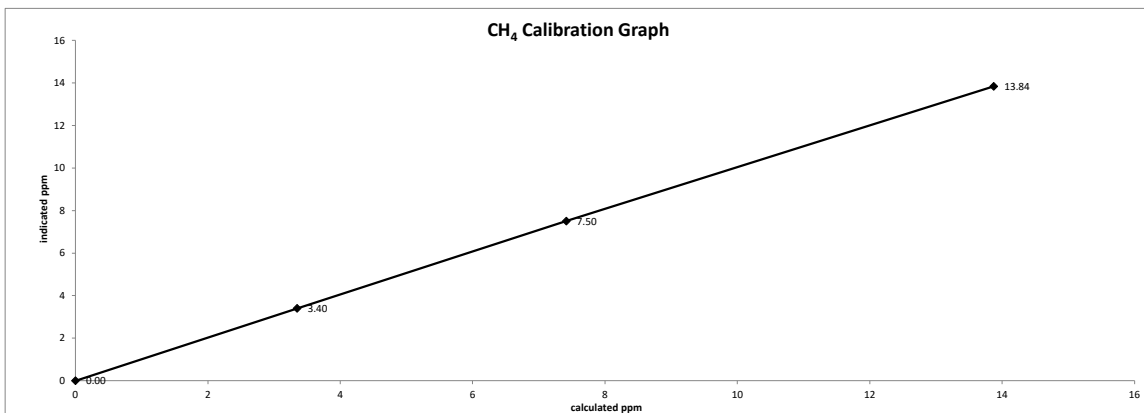
Interface Board Voltages: Bias Supply: -288.2 Temperatures: Detector Oven: 175.0 Filter: 175.0 Column Oven: 75.0 Internal: 33.6 Cylinder Pressures/reg.: Carrier: 1300 50 Fuel: 1600 50 Span Gas: 700 10 Zero Air Generator: 50 Internal Pressures: Carrier: 29.2 Fuel: 44.9 Air: 31.6 FID Status: Status: UT Counts: 32495 Flame: 370.0 Det Base: 175.1 Flame and Power Stats: Last Power On: Mar 26, 2019 / 07:53 Flameouts: 1 Det Oven at Start: 167.9 Col Oven at Start: 74.4 Calibration History: Time: Apr 24, 2019 / 14:55 Type: SPAN Status: GOOD Check/Adjust: ADJUST CH ₄ Span Conc: 13.87 CH ₄ SP Ratio: 0.000774 CH ₄ RT: 12.6 CH ₄ PK IDX: 23 CH ₄ PK HT: 17911 NM Span Conc: 12.63 NM SP Ratio: 0.000152	Calibration History cnt'd: NM Peak Area: 83062 Methane Start: n/a Methane End: n/a Backflush: n/a NMHV Start: n/a NMHC End: n/a Run History>1: Date: May 13, 2019 Time: 12:01 CH ₄ PK RT: 0 CH ₄ RT: 12.2 CH ₄ Baseline: 2886 CH ₄ LOD: 61 CH ₄ SD: 20 CH ₄ CONC: 0.00 NM PK HT: 0 NM Peak Area: 0 NM CONC: 0.00 NM Base Start: 2877 NM Base End: 2872 NM LOD: 17 NM Start IDX: 42 NM End IDX: 44 NM Max Slope: 1.7e+00 NM Min Slope: -1.7e+00 NM PT Count: 0 Previous CH ₄ : 10.56 Previous NMHC: 11.03 Previous THC: 21.59 New CH ₄ : n/a New NMHC: n/a New THC: n/a
---	---

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

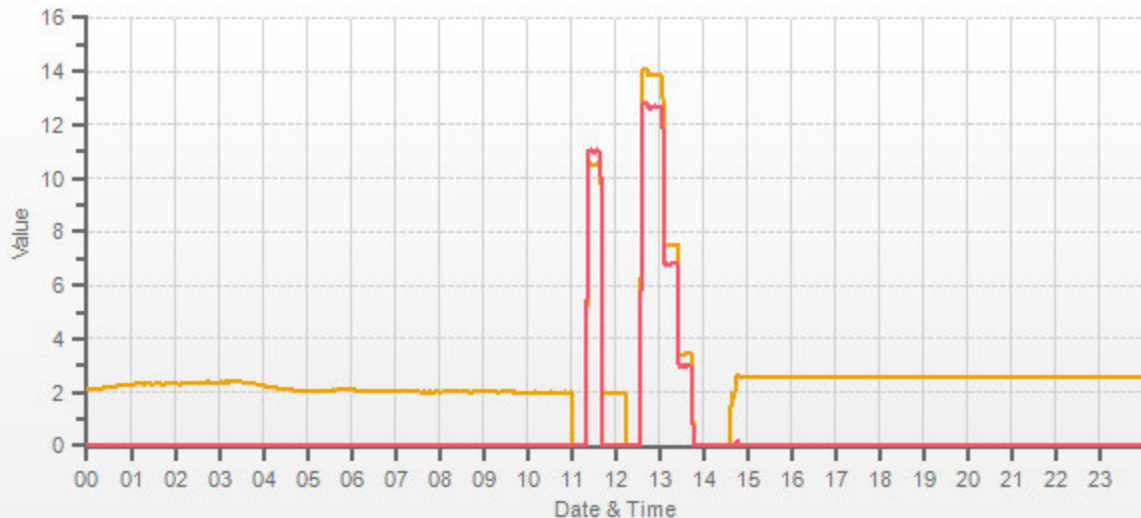
A Shutdown calibration was completed to replace LICA analyzer.

Date: May 13, 2019
Company/Airshed: LICA
Location/Station Name: Cold Lake South

Start/End Time 24 hr. (mst): 12:10 / 13:46
Calibration Purpose: shut down
Calibration Method: Gas Dilution



CH4[ppm] NMHC[ppm]





Thermo 55i Methane/Non-Methane Analyzer Calibration

Date: May 14, 2019	Barometer/B.P./units: F.S. #05544 expires Jan 17, 2020	939	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. #160348895 expires Jun 19, 2020	23	°C
Location/Station Name: Cold Lake South	Weather Conditions: Mainly sunny		
Parameter: CH4 / NMHC / THC	Calibration Purpose: installation		
Start/End Time 24 hr. (mst): 8:48 / 11:31	Performed By/Reviewer: Alex Yakupov		Rob Fisher
Calibration Method: Gas Dilution	Cal Gas Expiry Date: August 1, 2026		

Analyzer:			
Serial Number/Owner: 1236656107 LICA	Correction Factors:		
Measured Flow: 1114	Previous C.F.:	As Found C.F.:	New C.F.:
Last Calibration Date: n/a	CH ₄ = n/a	n/a	1.000
Range ppm: 20 CH4/20 NMHC/40 THC	NMHC = n/a	n/a	1.000
	THC = n/a	n/a	1.000

Calibration Standards:				
Low Flow Meter ID/Expiry Date: N/A	Standard Calibration Points for Analyzer Range of 20/20/40 ppm			
High Flow Meter ID/Expiry Date: N/A	Point	CH4	NMHC	THC
Calibrator ID/Expiry Date: Sabio id# 11900613 expires April 16, 2020	High	13.00	13.00	26.00
Cal Gas Cylinder I.D. # : LL 29687	Mid	7.00	7.00	14.00
CH4 Cylinder Conc. = 598.0 198.0 =C ₂ H ₆ Cylinder Conc.	Low	3.00	3.00	6.00
CH₄ expressed as C₂H₆ = 544.5 1142.5 =total CH4 equivalent				

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

Calibrator Flow Rates (cc/min)										Correction Factors:		
Point	Diluent	Cal Gas	Total Flow	Calculated CH ₄ (ppm)	Calculated NMHC (ppm)	Calculated THC (ppm)	Indicated CH ₄ (ppm)	Indicated NMHC (ppm)	Indicated THC (ppm)	CH ₄	NMHC	THC
adjusted zero	2499	0.00	2499	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
adjusted high	2443	56.90	2500	13.61	12.39	26.00	13.61	12.39	26.00	1.000	1.000	1.000
mid	2469	30.60	2500	7.32	6.66	13.98	7.41	6.65	14.07	0.988	1.002	0.994
low	2488	13.10	2501	3.13	2.85	5.98	3.21	2.84	6.05	0.976	1.004	0.989
calibrator zero	2499	0.00	2499	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
Average C.F. =										0.988	1.002	0.994

Linear Regression/Calibration Results:

	CH ₄	NMHC	THC	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.999	1.000	0.999	0.95-1.05
b (Intercept as % of full scale) =	0.24%	-0.04%	0.11%	± 3% F.S.
% change in C.F. from last cal =	n/a	n/a	n/a	n/a

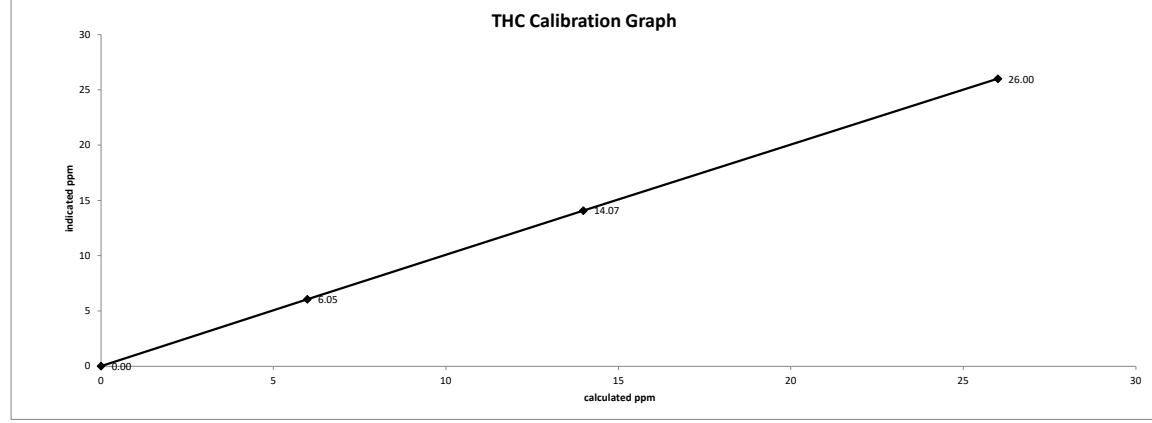
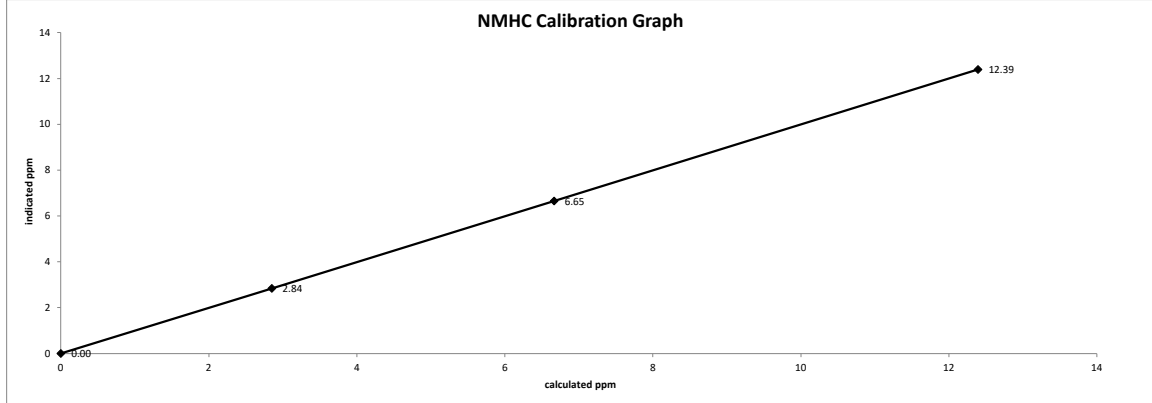
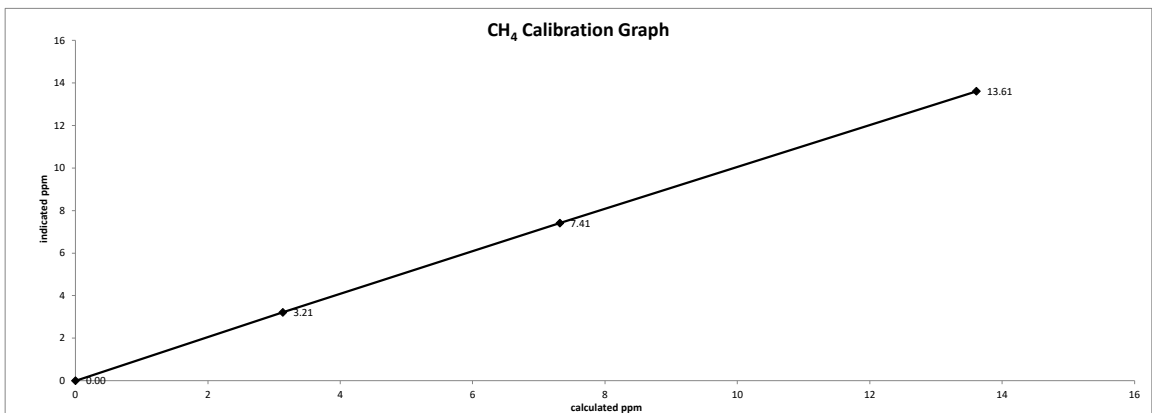
As Left Instrument Diagnostics:			
Interface Board Voltages:	Bias Supply: -293.0	Calibration History cnt'd:	NM Peak Area: n/a
Temperatures:	Detector Oven: 175.1	Crucial Settings:	Methane Start: n/a
	Filter: 175.1		Methane End: n/a
Cylinder Pressures/reg.:	Column Oven: 75.3	Run History>1:	Backflush: n/a
	Internal: 35.6		NMHV Start: n/a
	Carrier: 1300 50		NMHC End: n/a
	Fuel: 1600 50		Date: May 14, 2019
Internal Pressures:	Span Gas: 700 10	Time: 10:21	CH ₄ PK HT: 0
	Zero Air Generator: 50	CH ₄ RT: 12.6	CH ₄ Baseline: 1930
	Carrier: 39.0	CH ₄ LOD: 28	CH ₄ SD: 9
FID Status:	Fuel: 40.3	CH ₄ CONC: 0.00	NM PK HT: 0
	Air: 30.2	NM Peak Area: 0	NM CONC: 0.00
	Status: LIT	NM Base Start: 1554	NM Base End: 1521
Flame and Power Stats:	Counts: 23176	NM LOD: 17	NM Start IDX: 61
	Flame: 386.3	NM End IDX: 64	NM Max Slope: 2.8e-01
	Det Base: 175.1	NM Min Slope: -5.0e-01	NM PT Count: 0
Calibration History:	Flame and Power On: May 13, 2019 / 13:58	Expected Values:	Previous CH4: n/a
	Flameouts: 1	Previous NMHC: n/a	Previous THC: n/a
	Det Oven at Start: 26.4	New CH4: 10.20	New NMHC: 10.68
	Col Oven at Start: 25.6	New THC: 20.88	
	Time: n/a		
	Type: n/a		
	Status: n/a		
	Check/Adjust: n/a		
	CH ₄ Span Conc: n/a		
	CH ₄ SP Ratio: n/a		
CH ₄ RT: n/a			

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

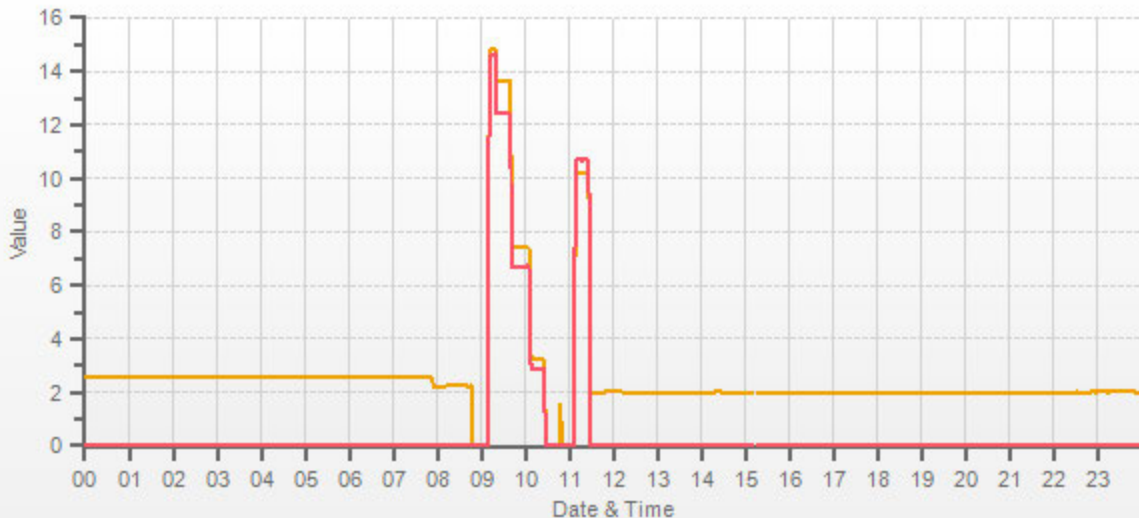
An installation calibration was completed to replace LICA analyzer back after it was repaired in the Maxxam shop.

Date: May 14, 2019
Company/Airshed: LICA
Location/Station Name: Cold Lake South

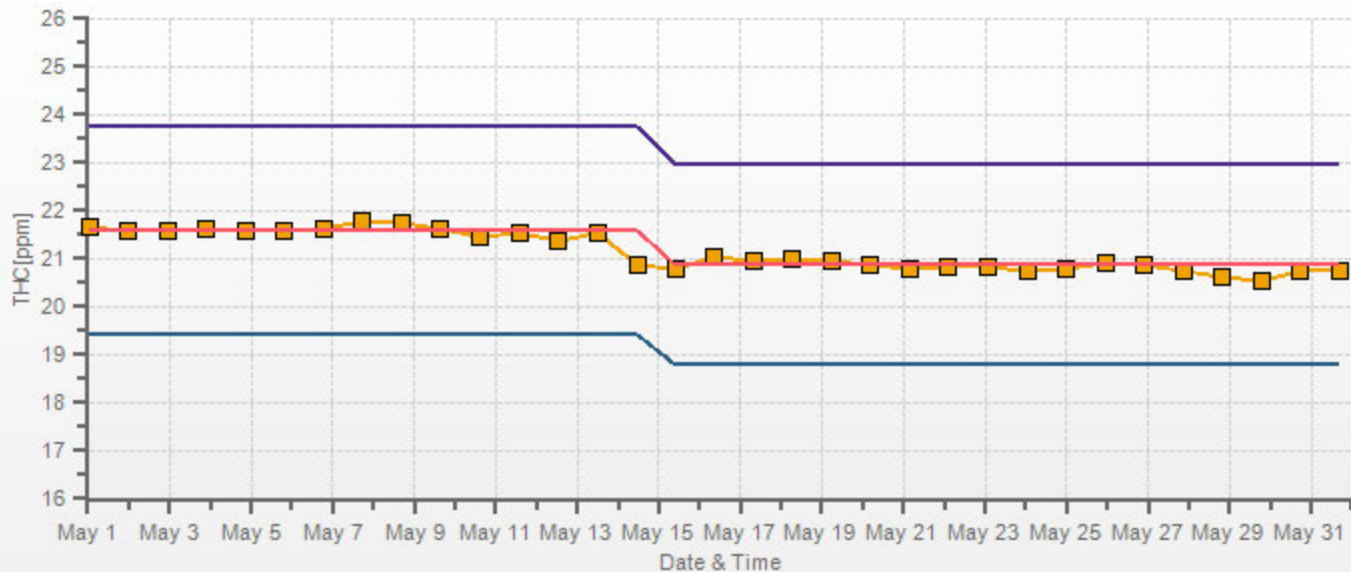
Start/End Time 24 hr. (mst): 8:48 / 11:31
Calibration Purpose: installation
Calibration Method: Gas Dilution



CH4[ppm] NMHC[ppm]



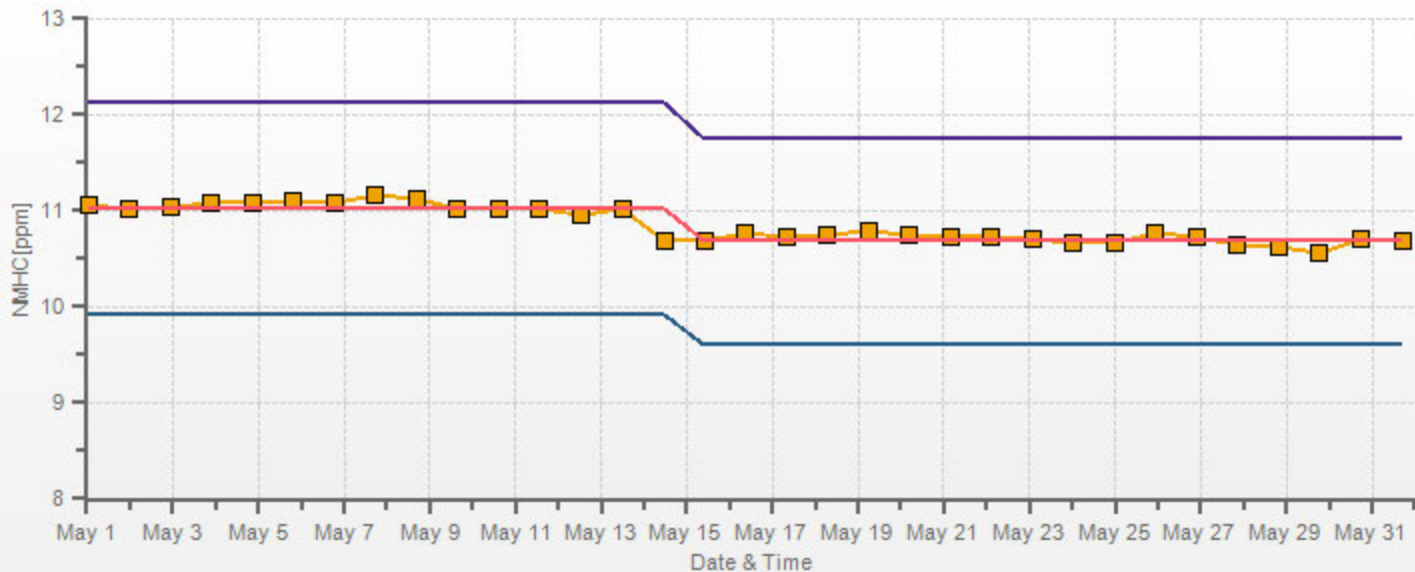
THC[ppm] Calibration: LICA COLD LAKE SOUTH Monthly: 19/05 Type: Span



CH4[ppm] Calibration: LICA COLD LAKE SOUTH Monthly: 19/05 Type: Span



NMHC[ppm] Calibration: LICA COLD LAKE SOUTH Monthly: 19/05 Type: Span





Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: May 14, 2020	Barometer/B.P./units: F.S. #05544 expires Jan 17, 2020	939	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. #160348895 expires Jun 19, 2020	23	°C
Location/Station Name: Cold Lake South	Weather Conditions: Mainly sunny		
Start/End Time 24 hr. (mst): 8:48 / 15:09	Calibration Purpose: routine monthly		
G.P.T. to be used for Ozone?: No	Performed By/Reviewer: Alex Yakupov	Rob Fisher	
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: August 20, 2026		

Analyzer: Serial Number/Owner: 1505664393 LICA Last Calibration Date: April 24, 2019 Range ppb: 500	Correction Factors: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>NO =</td> <td>1.000</td> <td>0.963</td> <td>1.000</td> </tr> <tr> <td>NO₂ =</td> <td>1.000</td> <td>1.000</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>0.999</td> <td>0.963</td> <td>0.999</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	0.963	1.000	NO ₂ =	1.000	1.000	1.000	NOx =	0.999	0.963	0.999
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	0.963	1.000														
NO ₂ =	1.000	1.000	1.000														
NOx =	0.999	0.963	0.999														

Calibration Standards: Low Flow Meter ID/Expiry Date: N/A High Flow Meter ID/Expiry Date: N/A Calibrator ID/Expiry Date: API id# 690 expires April 16, 2020 Cal Gas Cylinder I.D. #: LL 107918 Cal Gas Conc. (ppm): 50.1 50.2	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">Standard Calibration Points for a Range of: 500 ppb</th> </tr> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>380</td> <td>250</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>180</td> <td>145</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>90</td> <td>50</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table>	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
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	4896	0.0	4896	0	0	0.0	0.0	n/a	n/a
as found high	5028	37.8	5066	373.8	374.6	388.0	389.0	0.963	0.963
adjusted zero	4896	0.00	4896	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	5028	37.80	5066	373.8	374.6	374.0	375.0	1.000	0.999
mid	4859	18.00	4877	184.9	185.3	179.0	180.0	1.033	1.029
low	4879	8.90	4888	91.2	91.4	89.0	89.0	1.025	1.027
calibrator zero	4896	0.00	4896	0	0	0.0	0.0	n/a	n/a
Average C.F.=								1.019	1.018

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated NOx	Indicated NO ₂	NO drop	NO ₂ gain	NO ₂ C.F.
Point	Diluent	Cal Gas	Total Flow	volts or ppb	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
NOx reference	5028	37.80	5066	0.0	375.0	375.0	0.0	0.0	0.0	
as found high NO2	5028	37.80	5066	245.0	125.0	375.0	250.0	250.0	250.0	1.000
adjusted high NO2	5028	37.80	5066	245.0	125.0	375.0	250.0	250.0	250.0	1.000
gpt mid	5028	37.80	5066	140.0	232.0	375.0	143.0	143.0	143.0	1.000
gpt low	5028	37.80	5066	45.0	324.0	375.0	51.0	51.0	51.0	1.000
Average NO ₂ C.F.=										1.000

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.999	0.998	1.000	0.95-1.05
b (Intercept as % of full scale)=	-0.42%	-0.42%	0.00%	± 3% F.S.
% change in C.F. from last cal=	3.65%	3.61%	0.00%	± 10%
NO ₂ converter efficiency			1.00	0.96 to 1.04

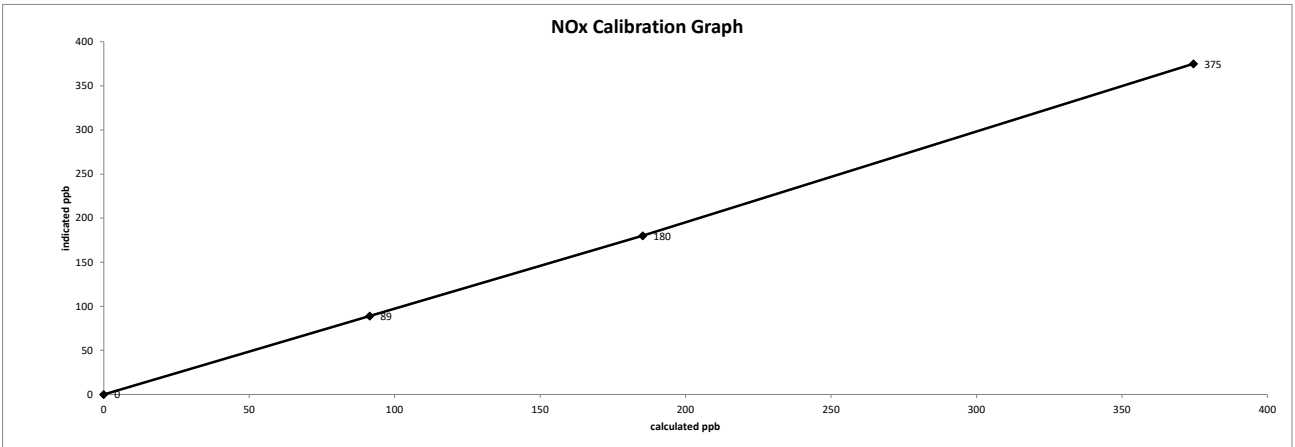
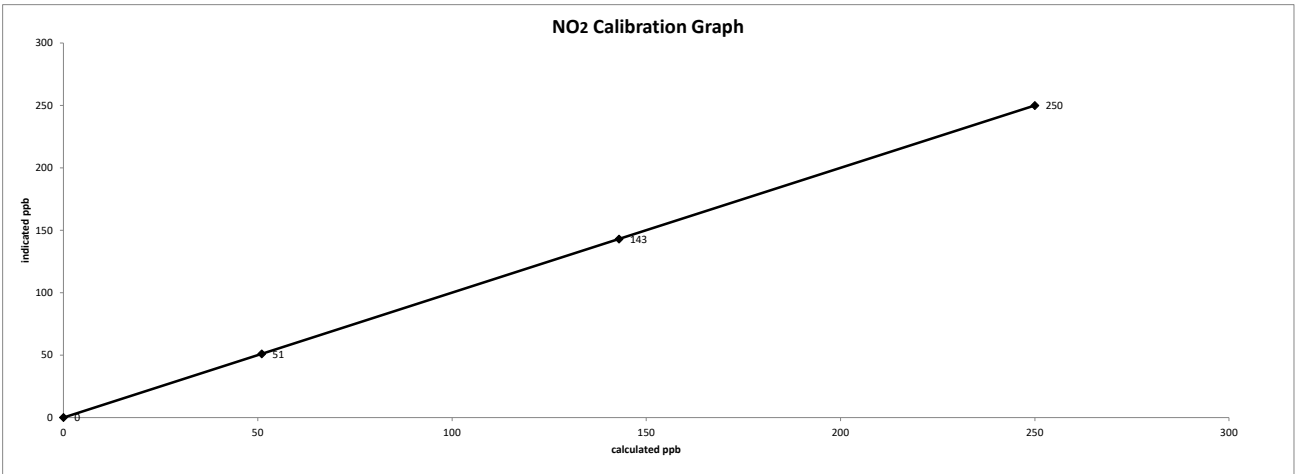
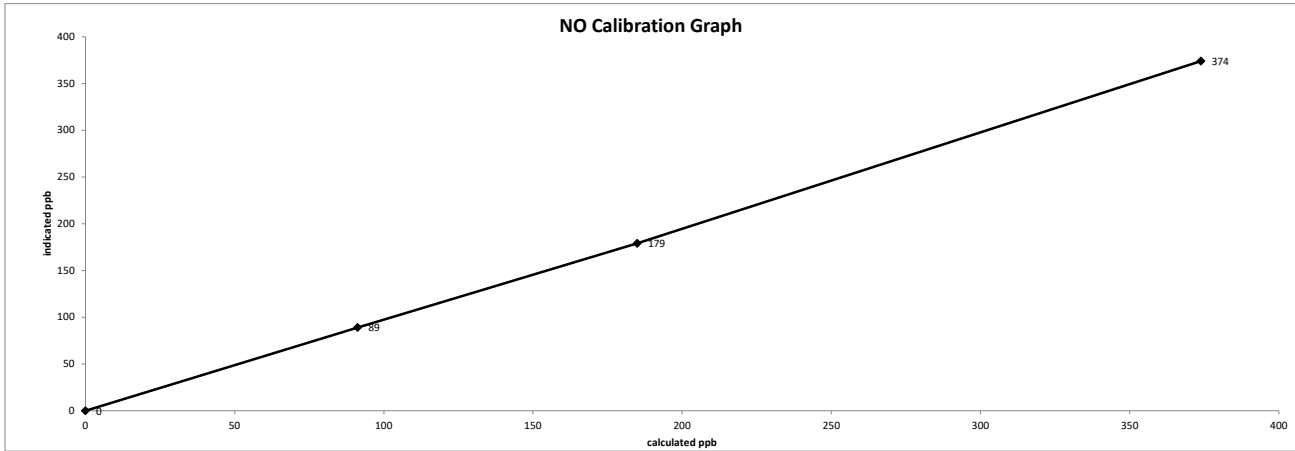
As found:		As left:	
NO Bkg:	4.6	NO Bkg:	4.5
NOx Bkg:	4.8	NOx Bkg:	4.5
NO Coef:	1.090	NO Coef:	1.050
NO ₂ Coef:	0.998	NO ₂ Coef:	0.998
NOx Coef:	1.000	NOx Coef:	0.999
PMT:	-855.1	PMT:	-855.1
Internal:	28.4	Internal:	28.5
Chamber:	50.2	Chamber:	50.3
Cooler:	-2.7	Cooler:	-2.7
NO ₂ Converter:	326.8	NO ₂ Converter:	323.7
NO ₂ Converter Set:	325.0	NO ₂ Converter Set:	325.0
Perm Oven Gas:	34.97	Perm Oven Gas:	35.00
Perm Oven Heater:	34.22	Perm Oven Heater:	34.27
Pressure:	189.2	Pressure:	188.6
Flow:	0.767	Flow:	0.767
Ozonator Flow:	OK	Ozonator Flow:	OK
Expected Value NO:	2	Expected Value NO:	2
Expected Value NO ₂ :	290	Expected Value NO ₂ :	264
Expected Value NOx:	292	Expected Value NOx:	266

Comments:

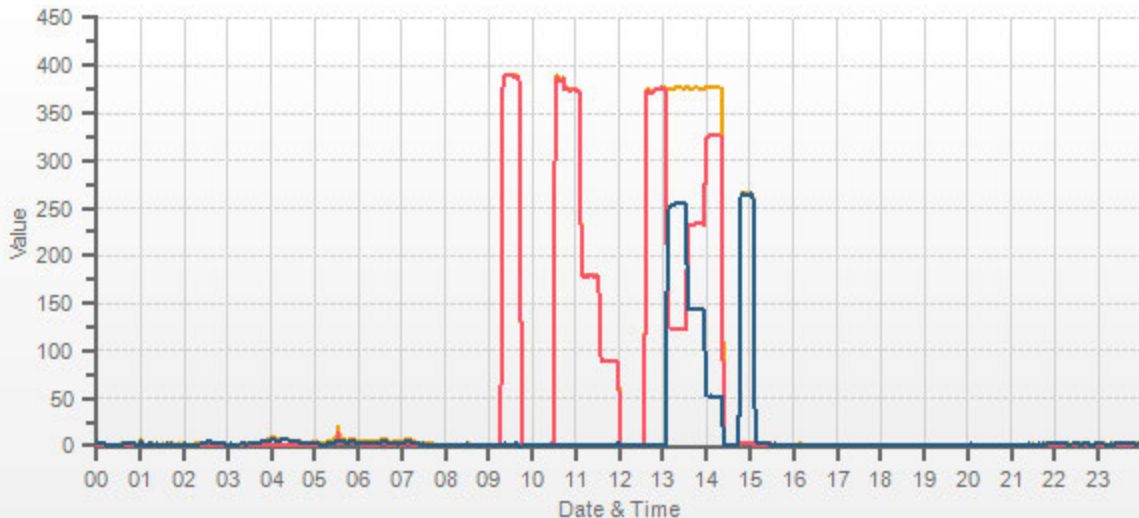
Date: May 14, 2020
 Company/Airshed: LICA
 Location/Station Name: Cold Lake South

Start/End Time 24 hr. (mst): 8:48 / 15:09
 Calibration Purpose: routine monthly
 Calibration Method: Gas Dilution & Gas Phase Titration

Thermo 42i NO-NO2-NOx Analyzer Calibration



— NOX[ppb] — NO[ppb] — NO2[ppb]



NOX[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 19/05 Type: Span



NO2[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 19/05 Type: Span





Thermo 49i Ozone Analyzer Calibration

Date: <u>May 13, 2019</u> Company/Airshed: <u>LICA</u> Location/Station Name: <u>Cold Lake South</u> Start/End Time 24 hr. (mst): <u>12:10 / 16:41</u> Ozone Calibration Method: <u>Varying UV Lamp Power</u> G.P.T. Date: <u>n/a-done by Varying UV Lamp Power</u> Analyzer: Serial Number/Owner: <u>700419951 LICA</u> Last Calibration Date: <u>April 24, 2019</u> Previous Cal High Point C.F.: <u>1.000</u>	Barometer/B.P./units: <u>F.S. #05544 expires Jan 17, 2020</u> <u>945</u> <u>millibars</u> Thermometer/Station Temp: <u>F.S. #160348895 expires Jun 19, 2020</u> <u>23</u> <u>°C</u> Weather Conditions: <u>Mainly sunny</u> Calibration Purpose: <u>routine monthly</u> Performed By/Reviewer: <u>Alex Yakupov</u> <u>Rob Fisher</u> Cal Gas Expiry Date: <u>n/a-done by Varying UV Lamp Power</u> Ozone Range ppb: <u>500</u> As Found C.F.: <u>1.003</u> New C.F.: <u>1.000</u>
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Calibration Standards: Low Flow Meter ID/Expiry Date: <u>N/A</u> High Flow Meter ID/Expiry Date: <u>N/A</u> Calibrator ID/Expiry Date: <u>Sabio id# 11900613 expires April 16, 2020</u> Cal Gas Cylinder I.D. #: <u>N/A</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Point</th> <th>AMD Required Range of Ozone Calibration Points</th> </tr> <tr> <td>High</td> <td>300-400 ppb</td> </tr> <tr> <td>Mid</td> <td>150-200 ppb</td> </tr> <tr> <td>Low</td> <td>50-75 ppb</td> </tr> </table>	Point	AMD Required Range of Ozone Calibration Points	High	300-400 ppb	Mid	150-200 ppb	Low	50-75 ppb
Point	AMD Required Range of Ozone Calibration Points								
High	300-400 ppb								
Mid	150-200 ppb								
Low	50-75 ppb								

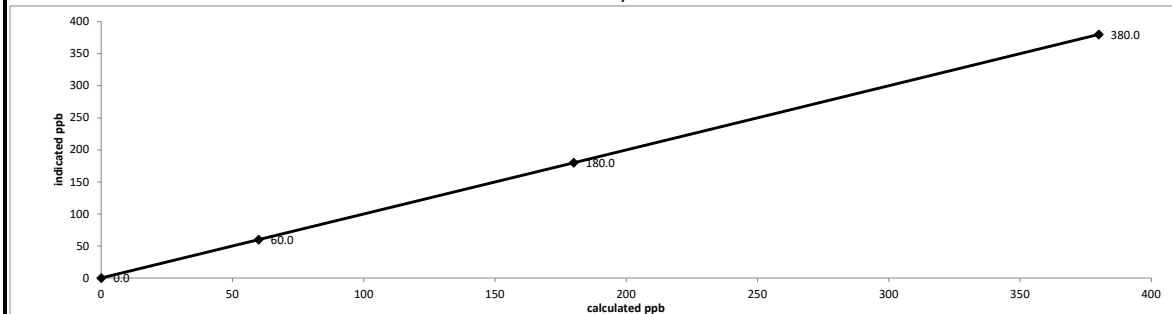
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5000	5000	0.0	n/a	0.0	n/a
as found high	5000	5000	380.0	380.0	379.0	1.003
adjusted zero	5000	5000	0.0	0.0	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	180.0	180.0	180.0	1.000
low	5000	5000	60.0	60.0	60.0	1.000
calibrator zero	5000	5000	0.0	n/a	0.0	n/a
Average C.F.=						1.000

Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u>	LIMITS
Slope = <u>1.000</u>	> or = 0.995
b (Intercept as % of full scale)= <u>0.00%</u>	0.95-1.05
% change in C.F. from last cal= <u>-0.26%</u>	± 3% F.S.
	± 10%

Thermo 49i Ozone Analyzer Calibration



As found:

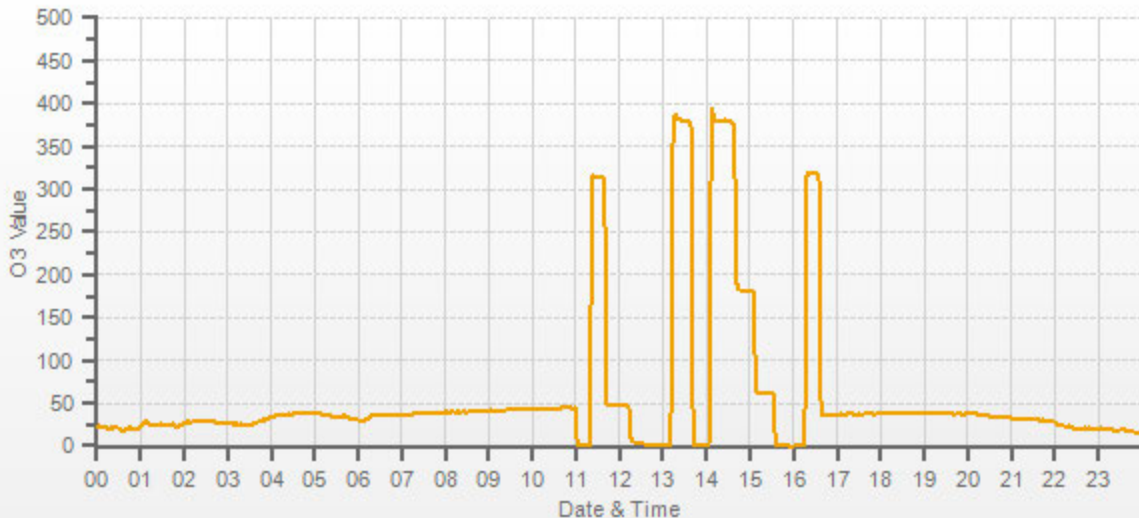
O3 Bkg:	<u>0.0</u>
O3 Coef:	<u>1.036</u>
Photo Lamp:	<u>9.6</u>
O3 Lamp:	<u>9.3</u>
Bench:	<u>29.8</u>
Bench Lamp:	<u>53.5</u>
O3 Lamp:	<u>67.4</u>
Pressure:	<u>700.5</u>
Cell A lpm:	<u>0.705</u>
Cell B lpm:	<u>0.747</u>
O3 ppb:	<u>1.9</u>
Cell A ppb:	<u>-9.8</u>
Cell B ppb:	<u>13.7</u>
Cell A int (Hz):	<u>74632</u>
Cell B int (Hz):	<u>76910</u>
Expected Value:	<u>320.0</u>

As left:

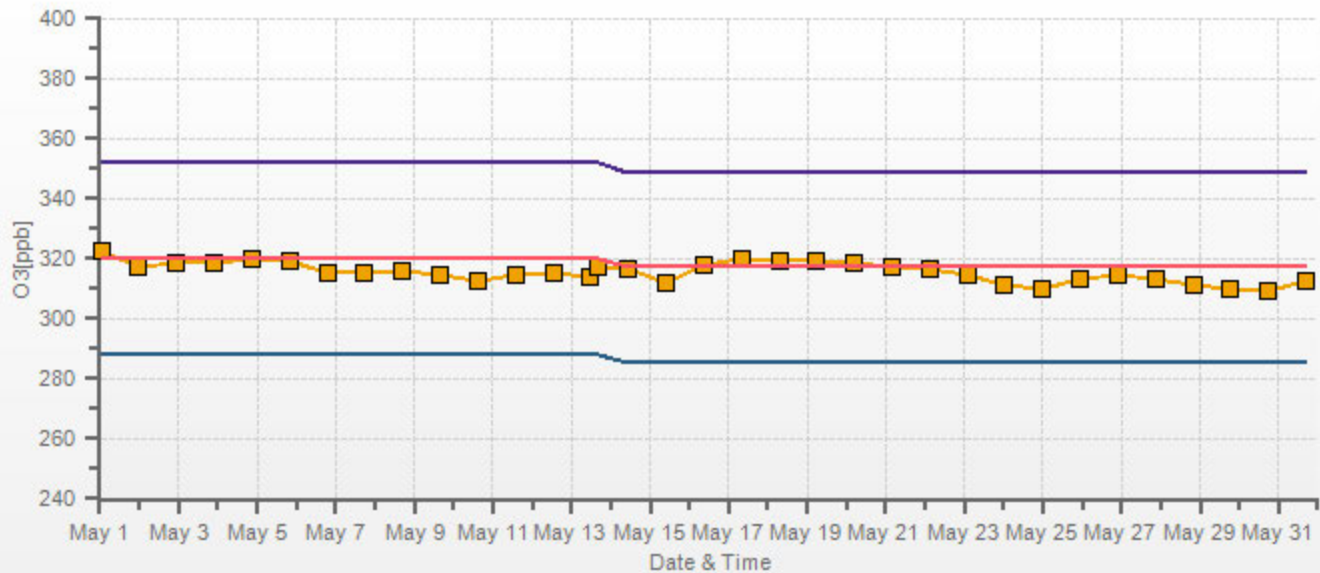
O3 Bkg:	<u>0.0</u>
O3 Coef:	<u>1.040</u>
Photo Lamp:	<u>9.6</u>
O3 Lamp:	<u>9.3</u>
Bench:	<u>29.5</u>
Bench Lamp:	<u>53.5</u>
O3 Lamp:	<u>67.4</u>
Pressure:	<u>701.1</u>
Cell A lpm:	<u>0.705</u>
Cell B lpm:	<u>0.747</u>
O3 ppb:	<u>0.1</u>
Cell A ppb:	<u>-13.6</u>
Cell B ppb:	<u>13.7</u>
Cell A int (Hz):	<u>74590</u>
Cell B int (Hz):	<u>76831</u>
Expected Value:	<u>317.0</u>

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

O3[ppb]



O3[ppb] Calibration: LICA COLD LAKE SOUTH Monthly: 19/05 Type: Span





Met One Instruments

Sonic Wind Sensor Certificate of Calibration

Sensor Model No.: 50.5H Sensor Serial No.: F1644
 Sensor Output Swing: 0V - 1.0V Sensor Output Range: 0 - 50.0 MPS
 Customer: Maxxam Analytics Sales Order No.: 125713
 Tested per PO: PO0000003392 Calibration Date: 11/09/2017
 Calibrated by: David Frith *DF* QC Inspection *Dyson Paulsen*

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

As Found Test Date: N/A As Left Test Date: 11/09/2017

Quality Control Manual Revision: September 16, 2013 MP42201 Rev. G.

All Work Performed per Customer Purchase Order Requirements.

Calibration Document No. 50.5-6100

Test Equipment Used for Calibration of Instruments

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

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

Firmware Version: 3194-01 R2.62

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

Company Maxxam Operator: Tom Bourque

Calibrator:				Flow Measurement Device:			
Make/Model	<u>API 700</u>			Make/Model	<u>N/A</u>		
Serial Number	<u>690</u>			Serial Number	<u>N/A</u>		
Last Verification Date	<u>March 2018</u>			Temperature (°C)	<u>24.4 C</u>		
NO Cylinder S/N	<u>EY0000769</u>			Barometric Pressure	<u>699 mmHg</u>		
NO [PPM]	<u>51.1</u>	NOx [PPM]	<u>51.2</u>				
Expiry Date	<u>December 2019</u>						

Dilution Flow (sccm)					
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>	Pt. #3	<u>5000</u>
Gas Flow (sccm)					
Pt. #1	<u>80</u>	Pt. #2	<u>40</u>	Pt. #3	<u>20</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5000	0.0	0.000	0.000	0.000	-0.001	-0.001	Limit ± 10%	
5083	80.0	0.804	0.806	0.802	-0.011	0.791	0%	-2%
5044	40.0	0.405	0.406	0.403	-0.006	0.397	-1%	-2%
5022	20.0	0.204	0.204	0.202	-0.004	0.198	-1%	-2%
Absolute Average Percent Difference							1%	2%

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

<u>NO</u>	<u>LIMITS</u>	<u>NOx</u>
Correlation= 1.0000	≥ 0.990	Correlation= 1.0000
m (Slope)= 0.9974	0.90-1.10	m (Slope)= 0.9833
b (Intercept % of FS)= -0.0592	± 3% F.S.	b (Intercept % of FS)= -0.1772

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOx	% Diff. Vs Audit gas	
5083	0.000	0.000	0.802	-0.011	0.791	NO ₂	% Diff. Limit
5083	0.500	0.518	0.284	0.488	0.771	-4%	± 10%
5083	0.300	0.323	0.479	0.294	0.774	-6%	± 10%
5083	0.150	0.167	0.635	0.142	0.777	-8%	± 10%
						6%	± 10%

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

<u>NO₂</u>	<u>LIMITS</u>	
Correlation= 0.9998	≥ 0.995	Big shift down in NOx when entering GPT function. Possible flow change.
m (Slope)= 0.9649	0.90-1.10	
b (Intercept % of FS)= -1.4907	± 3% F.S.	

AENV Standards Audit Calibrator	NO _x Analyzer
Make/Model <u>Teco 146i</u>	Make/Model <u>Teco 42i</u>
Serial/AMU Number <u>AMU 1809</u>	Serial/AMU Number <u>AMU 2265</u>
SRM Gas Cylinder No. <u>APEX1236646</u>	Last Calibration Date <u>April 15, 2019</u>
Cylinder Conc. (ppm) <u>50.04</u>	Full Scale (ppm) <u>1.0</u>
	Cylinder Gas Expiry Date <u>June 2021</u>

COMMENTS: With ZAG Teledyne 701 Maxxam ID 11986.

Auditor: Al Clark Date: April 16, 2019
 Operator Signature: Location: McIntyre Center Edmonton

Calibrator Performance Audit

OZONE

File No. 2019-049A

Company: Maxxam

Operator: Tom Bourque

Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>N/A</u>
Serial Number	<u>11900613</u>	Serial Number	<u>N/A</u>
Oven Temperature	<u>N/A</u>	Temperature (°C)	<u>24.4 C</u>
Last Verification Date	<u>August 2018</u>	Barometric Pressure	<u>699 mmHg</u>

Flow Measurements

Pt. No. 1 N/A **Pt. No. 2** N/A **Pt. No. 3** N/A

Calibrator Flow (sccm)	Calculated Concentration (ppm)	Indicated Concentration (ppm)	% Difference	
			vs Audit Gas	% Diff. Limit
Zero Air	0.000	0.000		
5001	0.400	0.407	2%	± 10%
4999	0.200	0.208	4%	± 10%
5001	0.100	0.104	4%	± 10%
Absolute Average Percent Difference			3%	± 10%

LINEAR REGRESSION ANALYSIS

y=mx+b (where x=calculated concentration, y=indicated concentration)

<u>O₃</u>	<u>LIMITS</u>
Correlation= 0.9999	≥ 0.995
m (Slope)= 1.0169	0.90-1.10
b (Intercept % of FS)= 0.3600	± 3% F.S.

AENV Standards

Audit Calibrator

Make/Model	<u>Teco 49i PS</u>
Serial/AMU Number	<u>AMU 1808</u>
Ozone Standard	<u>Primary Standard</u>

Ozone Analyzer

Make/Model	<u>Teco 49i</u>
Serial/AMU Number	<u>AMU 1843</u>
Last Calibration Date	<u>April 15, 2019</u>
Full Scale (ppm)	<u>0.5</u>

COMMENTS: With ZAG Teledyne 701 Maxxam ID: 11981. Should have Maxxam ID 11986 instead.

Auditor: Al Clark

Date: April 16, 2019

Operator Signature:

Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-493CGA

Company: Maxxam Operator's Name: Mike
 Cylinder #: EY0001003 Concentration PPM: 9.55 Tolerance(%) 2 Certified By: Praxair
 Expiry Date: October 2020

Reference Calibrator and Gas:
 Make/Model: Sabio 2010
 Serial Number: AMU 2092
 Last Verification Date: January 17, 2018
 Gas Type: H2S Conc. 20.43
 Cylinder Number: CAL015272
 Expiry Date: January 2019

Flow Measurement Device:
 Make/Model: Mesa Defender 530
 Serial Number: H-153961 / L-153874
 Temp. °C: 23.0 C
 B.P.: 697 mmHg

Reference Analyzer:
 Make/Model: Teco 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 12.9 Span: 0.955 Range: 0.1
 Last Calibration: Date: Jan 17/18 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			
5051	39.6	0.0753	0.00784	127.551	9.60
5028	20.2	0.0387	0.00402	248.911	9.63
5033	10.5	0.0198	0.00209	479.333	9.49
Average Cylinder Concentration:					9.58

Previous Stated Concentration PPM: 9.55

Percent variance from Stated: 0

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

Auditor: Al Clark

Date: January 18, 2018

Operator Signature: *Al Clark*

Location: McIntyre Center Edmonton



Calibration Gas Audit

CH₄ / C₃H₈ Cylinder Gas

File No. 2019-393CGA

Company: Maxxam **Operators name:** Alex
Cylinder #: LL29687 **Conc CH₄ (PPM)** 598/198 **Tolerance (%)** 1 **Certified By:** Praxair
Expiry Date: August 2026

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>Mesa Definer 220</u>		
Serial Number	<u>AMU 2092</u>	Serial Number	<u>H-133034 / L-132702</u>		
Last Verification Date	<u>January 14, 2019</u>	Temp. °C	<u>23.8 C</u>		
Gas Type	<u>CH₄</u>	Conc.	<u>990.4</u>		
Cylinder Number	<u>05604875</u>	Expiry Date	<u>July 2021</u>		
Gas Type	<u>C₃H₈</u>	Conc.	<u>246.5</u>		
Cylinder Number	<u>XF003845B</u>	Expiry Date	<u>July 2022</u>		

Reference Analyzer:
 Make/Model Teco 55i Serial/AMU Number: 2221
 Instrument Settings Zero: N/A Span: N/A Range: 20.0
 Last Calibration: Date: Jan 14/19 C.F. 1.000 Done By: Shea Beaton

Calibrator Flows (scem)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	CH ₄	C ₃ H ₈			CH ₄	C ₃ H ₈
5000	0.0	0.00	0.00	0.02	51.48	603	209
3990	77.5	11.71	11.18	0.02	51.48	603	209
3976	39.1	5.87	5.71	0.01	101.69	597	211
3986	20.0	2.96	2.86	0.01	199.30	590	207
Average Cylinder Concentration:						597	209

<u>CH₄</u>	<u>C₃H₈</u>
Previous Stated Concentration PPM: <u>598</u>	Previous Stated Concentration PPM: <u>198</u>
Percent variance from Stated: <u>0</u>	Percent variance from Stated: <u>6</u>

Cylinder gas tolerances based on CH₄ only
 Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:**
 < =5% Outside Manufacturer Tolerance. Use manufacturers concentration
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

Auditor: Al Clark Date: January 15, 2019
 Operator Signature: Location: McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2019-391CGA

Company: Maxxam **Operators name:** Alex

Cylinder #: LL107918 Conc (PPM) 50.1/50.2 Tolerance (%) 1 Certified By: Praxair

Expiry Date: August 2026

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Teco 146i</u>			Make/Model	<u>Mesa Definer 220</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>H-133034 / L-132702</u>
Last Verification Date	<u>January 14, 2019</u>			Temp. °C	<u>22.7 C</u>
Gas Type	<u>NO</u>	Conc.	<u>50.05</u>	B.P.	<u>707 mmHg</u>
Cylinder Number	<u>APEX1236645</u>				
Expiry Date	<u>June 2021</u>				

Reference Analyzer:

Make/Model Teco 42i Serial/AMU Number: 2268

Instrument Settings Zero: 9.2 Span: 1.223 Range: 1.0

Last Calibration: Date: Jan 14/19 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
5000	0.0	0.000	0.000				
4898	78.1	0.792	0.793	0.016	62.714	49.7	49.7
4893	38.7	0.395	0.395	0.008	126.434	49.9	49.9
4894	19.3	0.195	0.195	0.004	253.575	49.4	49.4
Average Cylinder Concentration:						49.7	49.7

NO	NOx
Previous Stated Concentration PPM: <u>50.1</u>	<u>50.2</u>
Percent variance from Stated: <u>1</u>	<u>1</u>

Cylinder gas tolerances based on NO only

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

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration

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

Auditor: Al Clark Date: Janaury 15, 2019

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



Lakeland Industry & Community Association
5107 50 St
Bonnyville, AB T9N2J7

End of Report



Lakeland Industry & Community Association

MAY 2019

Ambient Air Monitoring Calibration Report

- MASKWA STATION-

CAL-LICA-201905-01248

Station Operation and Maintenance:

Maxxam Analytics

Data Validation and Report:

Maxxam Analytics

July 2, 2019



Lakeland Industry & Community Association
5107 50 St
Bonnyville, AB T9N2J7

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

July 2, 2019

Subject:

May 2019 Ambient Air Monitoring Calibration Report Submission for the LICA Maskwa station

Lakeland Industry & Community Association (LICA) is pleased to submit the ambient air monitoring calibration report for the Maskwa AQM Station in the month of May 2019. This calibration report includes equipment calibration records, calibrator performance audit records and calibration gas audit records for the equipment that were used this month. This calibration report is prepared by the LICA network contractor.

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


Respectfully,

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

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

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

Lily Lin
Data & Reporting Specialist
587-225-2248
monitoring@lica.ca



May 1 - 31, 2019

MONTHLY CALIBRATION REPORT

Project #: 2833-2019-05-24-C

LICA-201905

Prepared for:

Lakeland Industry & Community Association

Mike Bisaga

5107 50 St.

Bonnyville, Alberta T9N 2J7

monitoring@lica.ca

780-266-7068

Monitoring Station

Maskwa Continuous Monitoring Station

Date of Report Issuance: June 21, 2019



#1 - 2080 39 Avenue NE, Calgary AB, T2E 6P7



Thermo 43I-TLE Sulphur Dioxide Analyzer Calibration

Date: <u>May 10, 2019</u>	Barometer/B.P./units: <u>Station gauge</u> <u>934</u> <u>millibars</u>	Thermometer/Station Temp: <u>Station gauge</u> <u>23</u> <u>°C</u>
Company/Airshed: <u>LICA</u>	Weather Conditions: <u>Mainly sunny</u>	Calibration Purpose: <u>routine monthly</u>
Location/Station Name: <u>Maskwa</u>	Performed By/Reviewer: <u>Alex Yakupov</u> <u>Rob Fisher</u>	Cal Gas Expiry Date: <u>August 20, 2026</u>
Parameter: <u>Sulphur Dioxide</u>	Converter Model & s/n (if applicable): <u>n/a</u>	
Start Time 24 hr. (mst): <u>10:18</u>	Range ppb: <u>1000</u>	As Found C.F.: <u>1.045</u>
End Time 24 hr. (mst): <u>14:30</u>	New C.F.: <u>1.000</u>	
Calibration Method: <u>Gas Dilution</u>		
Analyzer: Serial Number/Owner: <u>1180930031</u> <u>LICA</u>		
Last Calibration Date: <u>April 17, 2019</u>		
Previous C.F.: <u>1.000</u>		

Calibration Standards: Low Flow Meter ID/Expiry Date: <u>N/A</u> High Flow Meter ID/Expiry Date: <u>N/A</u> Calibrator ID/Expiry Date: <u>API id# 690 expires April 16, 2020</u> Cal Gas Cylinder I.D. #: <u>LL 107918</u> Cal Gas Conc. (ppm): <u>49.5</u>	Standard Calibration Points for Ranges <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>780</td></tr> <tr><td>Mid</td><td>380</td></tr> <tr><td>Low</td><td>190</td></tr> </table>	Point	ppb	High	780	Mid	380	Low	190
Point	ppb								
High	780								
Mid	380								
Low	190								

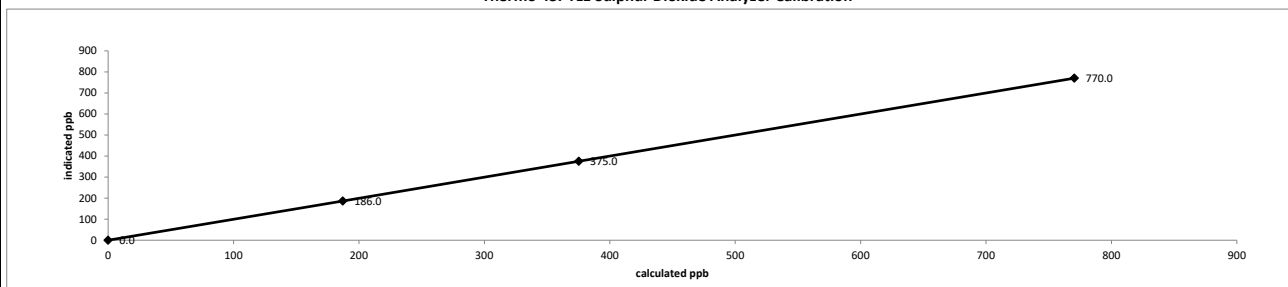
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	4997	0.00	4997	0.0	0	n/a
as found high	4921	77.80	4999	770.4	737	1.045
adjusted zero	4997	0.00	4997	0.0	0	n/a
adjusted high	4921	77.80	4999	770.4	770	1.000
mid	4961	37.90	4999	375.3	375	1.001
low	4980	18.90	4999	187.1	186	1.006
calibrator zero	4997	0.00	4997	0.0	0	n/a
Average C.F. =						1.002

Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u>	LIMITS
Slope = <u>1.000</u>	> or = 0.995
b (Intercept as % of full scale) = <u>0.04%</u>	0.95-1.05
% change in C.F. from last cal = <u>-4.53%</u>	± 3% F.S.
	± 10%

Thermo 43I-TLE Sulphur Dioxide Analyzer Calibration



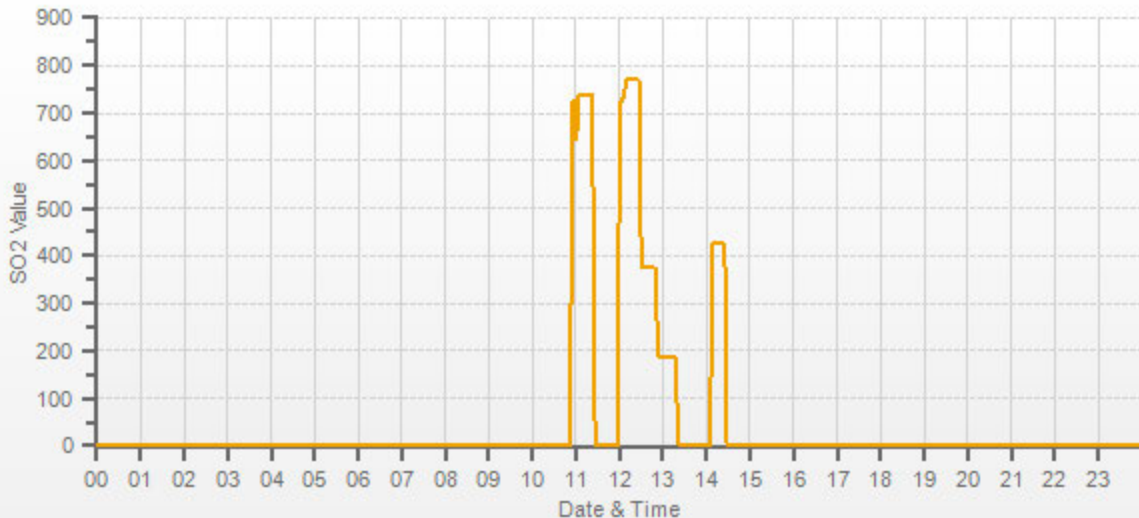
As found: Bkg: <u>2.20</u> Coef: <u>0.911</u> Pmt: <u>-700.8</u> Flash: <u>996</u> Internal: <u>29.4</u> Chamber: <u>45.2</u> Perm Oven Gas: <u>35.00</u> Perm Oven Heater: <u>34.25</u> Pressure: <u>669.2</u> Sample Flow: <u>0.456</u> Lamp Intensity: <u>91</u> Converter: <u>n/a</u> Converter Set: <u>n/a</u> Averaging Time: <u>120</u> Expected Value: <u>411.3</u>	As left: Bkg: <u>2.30</u> Coef: <u>0.949</u> Pmt: <u>-701.2</u> Flash: <u>997</u> Internal: <u>29.5</u> Chamber: <u>44.8</u> Perm Oven Gas: <u>35.00</u> Perm Oven Heater: <u>34.25</u> Pressure: <u>669.5</u> Sample Flow: <u>0.457</u> Lamp Intensity: <u>91</u> Converter: <u>n/a</u> Converter Set: <u>n/a</u> Averaging Time: <u>120</u> Expected Value: <u>426.0</u>
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Comments:

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

The IZS check started at 11:00. The High As Found was restarted.

SO2[ppb]



SO2[ppb] Calibration: LICA MASKWA Monthly: 19/05 Type: Span





Thermo 450i Hydrogen Sulphide Analyzer Calibration

Date: <u>May 10, 2019</u> Company/Airshed: <u>LICA</u> Location/Station Name: <u>Maskwa</u> Parameter: <u>Hydrogen Sulphide</u> Start Time 24 hr. (mst): <u>10:18</u> End Time 24 hr. (mst): <u>14:51</u> Calibration Method: <u>Gas Dilution</u>	Barometer/B.P./units: <u>Station gauge</u> <u>934</u> <u>millibars</u> Thermometer/Station Temp: <u>Station gauge</u> <u>23</u> <u>°C</u> Weather Conditions: <u>Mainly sunny</u> Calibration Purpose: <u>routine monthly</u> Performed By/Reviewer: <u>Alex Yakupov</u> <u>Rob Fisher</u> Cal Gas Expiry Date: <u>October 20, 2020</u> Converter Model & s/n (if applicable): <u>n/a</u>
Analyzer: Serial Number/Owner: <u>CM 17360005</u> <u>LICA</u> Last Calibration Date: <u>April 17, 2019</u> Previous C.F.: <u>0.999</u>	Range ppb: <u>100</u> As Found C.F.: <u>0.993</u> New C.F.: <u>1.000</u>

Calibration Standards: Low Flow Meter ID/Expiry Date: <u>N/A</u> High Flow Meter ID/Expiry Date: <u>N/A</u> Calibrator ID/Expiry Date: <u>Sabio id# 11900613 expires April 16, 2020</u> Cal Gas Cylinder I.D. #: <u>EY 0001003</u> Cal Gas Conc. (ppm): <u>9.55</u>	Standard Calibration Points for Ranges <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>78</td></tr> <tr><td>Mid</td><td>38</td></tr> <tr><td>Low</td><td>19</td></tr> </table>	Point	ppb	High	78	Mid	38	Low	19	SO2 Scrubber Check (10 minutes): Start/End Time 24 hr.: <u>10:24 / 10:40</u> SO2 Analyzer Range: <u>1000</u> Target Concentration (ppb): <u>780</u> As Found Zero: <u>0.0</u> Analyzer Response (ppb): <u>0.0</u> Zero Corrected Result (ppb): <u>0.0</u>
Point	ppb									
High	78									
Mid	38									
Low	19									

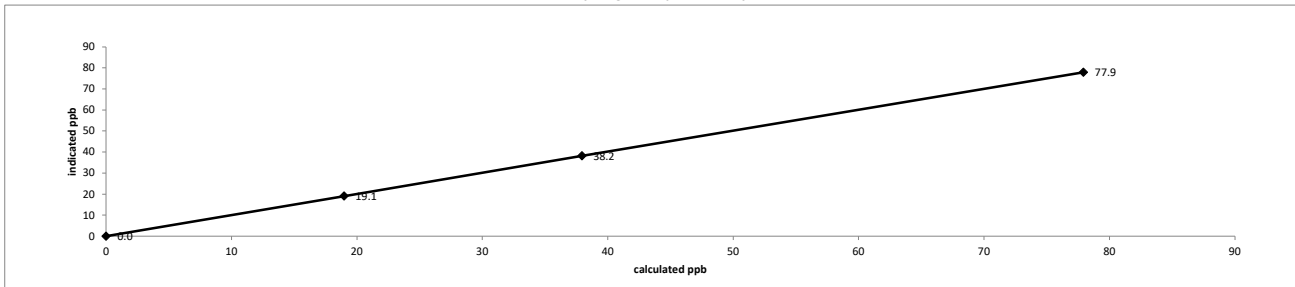
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	7499	0.00	7499	0.0	0	n/a
as found high	7439	61.20	7500	77.9	78.5	0.993
adjusted zero	7499	0.00	7499	0.0	0	n/a
adjusted high	7439	61.20	7500	77.9	77.9	1.000
mid	7470	29.80	7500	37.9	38.2	0.993
low	7485	14.90	7500	19.0	19.1	0.993
calibrator zero	7499	0.00	7499	0.0	0	n/a
Average C.F. =						0.996

Linear Regression/Calibration Results:

Correlation Coefficient =	<u>1.000</u>	LIMITS	<u>> or = 0.995</u>
Slope =	<u>1.001</u>		<u>0.95-1.05</u>
b (Intercept as % of full scale) =	<u>-0.11%</u>		<u>± 3% F.S.</u>
% change in C.F. from last cal =	<u>0.63%</u>		<u>± 10%</u>

Thermo 450i Hydrogen Sulphide Analyzer Calibration

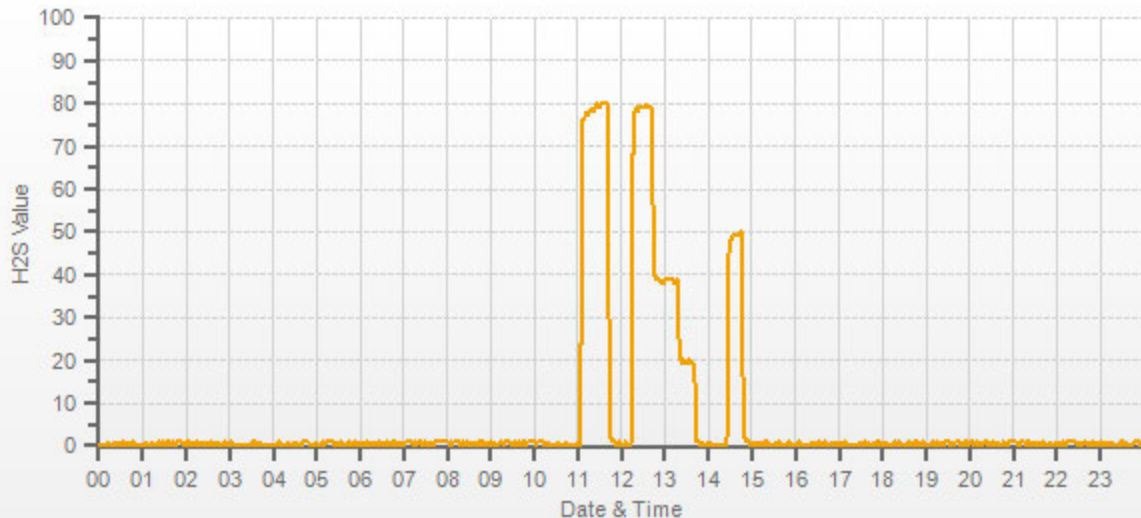


As found: Bkg: <u>20.1</u> Coef: <u>0.803</u> Pmt: <u>-602.0</u> Flash: <u>810</u> Internal: <u>33.6</u> Chamber: <u>45.1</u> Converter Temp: <u>323.0</u> Converter Set: <u>325.0</u> Perm Oven Gas: <u>35.00</u> Perm Oven Htr: <u>34.30</u> Pressure: <u>562.1</u> Sample Flow: <u>0.939</u> Lamp Intensity: <u>91</u> Averaging Time: <u>120</u> Expected Value: <u>50.7</u>	As left: Bkg: <u>19.9</u> Coef: <u>0.794</u> Pmt: <u>-604.4</u> Flash: <u>811</u> Internal: <u>33.7</u> Chamber: <u>45.1</u> Converter Temp: <u>323.0</u> Converter Set: <u>325.0</u> Perm Oven Gas: <u>35.00</u> Perm Oven Htr: <u>34.30</u> Pressure: <u>561.8</u> Sample Flow: <u>0.939</u> Lamp Intensity: <u>91</u> Averaging Time: <u>120</u> Expected Value: <u>49.5</u>
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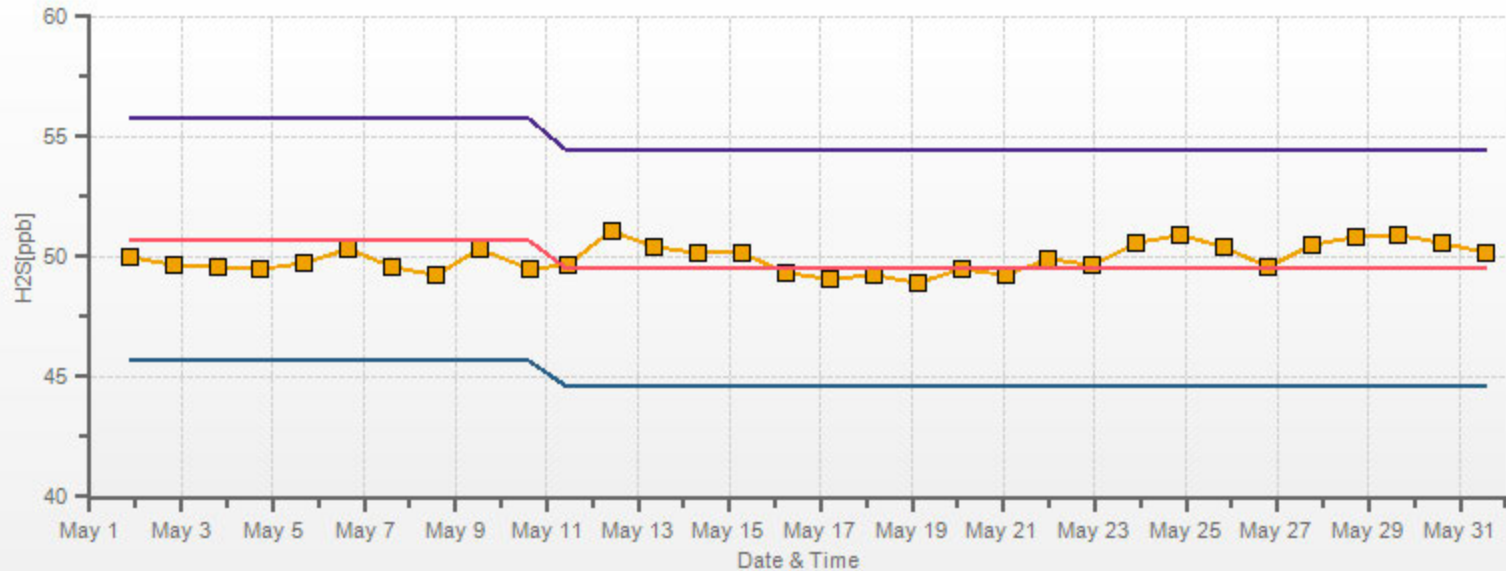
Comments:
 The analyzer sample inlet filter was changed.
 The analyzer cooling fan filter(s) were cleaned.
 The manifold blower was found to be working normally.

The IZS check started at 11:00. The High As Found was restarted.

H2S[ppb]



H2S[ppb] Calibration: LICA MASKWA Monthly: 19/05 Type: Span





Thermo 55i Methane/Non-Methane Analyzer Calibration

Date:	May 9, 2019	Barometer/B.P./units:	Station gauge	940	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	Station gauge	23	°C
Location/Station Name:	Maskwa	Weather Conditions:	Mainly sunny		
Parameter:	CH4 / NMHC / THC	Calibration Purpose:	routine monthly		
Start/End Time 24 hr. (mst):	12:47 / 16:29	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
Calibration Method:	Gas Dilution	Cal Gas Expiry Date:	August 1, 2026		

Analyzer:		Correction Factors:			
Serial Number/Owner:	1180930026 LICA	Previous C.F.:	As Found C.F.:	New C.F.:	
Measured Flow:	1.112	CH ₄ =	1.000	1.002	1.000
Last Calibration Date:	April 17, 2019	NMHC =	1.000	0.971	1.000
Range ppm:	20 CH4/20 NMHC/40 THC	THC =	1.000	0.987	1.000

Calibration Standards:		Standard Calibration Points for Analyzer Range of 20/20/40 ppm			
Low Flow Meter ID/Expiry Date:	N/A	Point	CH4	NMHC	THC
High Flow Meter ID/Expiry Date:	N/A	High	13.00	13.00	26.00
Calibrator ID/Expiry Date:	API id# 690 expires April 16, 2020	Mid	7.00	7.00	14.00
Cal Gas Cylinder I.D. #:	LL 29687	Low	3.00	3.00	6.00
CH4 Cylinder Conc. =	598.0 198.0 = C ₂ H ₆ Cylinder Conc.				
CH ₄ expressed as C ₂ H ₆ =	544.5 1142.5 = total CH4 equivalent				

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

Point	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:		
	Diluent	Cal Gas	Total Flow							CH ₄	NMHC	THC
as found zero	2500	0.00	2500	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
as found high	2442	58.00	2500	13.87	12.63	26.51	13.84	13.01	26.85	1.002	0.971	0.987
adjusted zero	2500	0.00	2500	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
adjusted high	2442	58.00	2500	13.87	12.63	26.51	13.87	12.63	26.50	1.000	1.000	1.000
mid	2469	31.00	2500	7.42	6.75	14.17	7.53	6.88	14.42	0.985	0.981	0.982
low	2486	14.00	2500	3.35	3.05	6.40	3.46	3.10	6.56	0.968	0.984	0.975
calibrator zero	2500	0.00	2500	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
Average C.F. =										0.984	0.988	0.986

Linear Regression/Calibration Results:

Correlation Coefficient =	CH ₄	NMHC	THC	LIMITS	
	1.000	1.000	1.000		> or = 0.995
	Slope = 0.998	1.000	0.999		0.95-1.05
	b (Intercept as % of full scale) = 0.33%	0.22%	0.28%		± 3% F.S.
% change in C.F. from last cal =	-0.24%	2.90%	1.28%	± 10%	

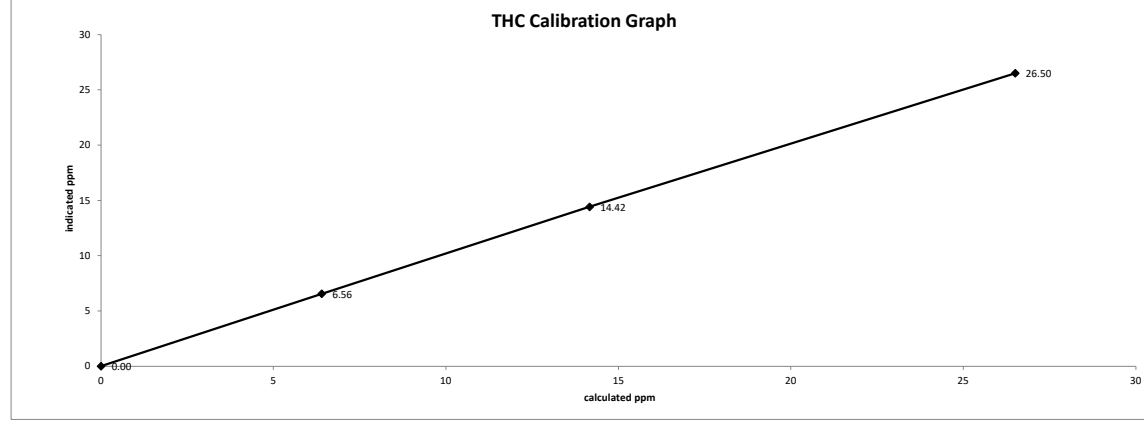
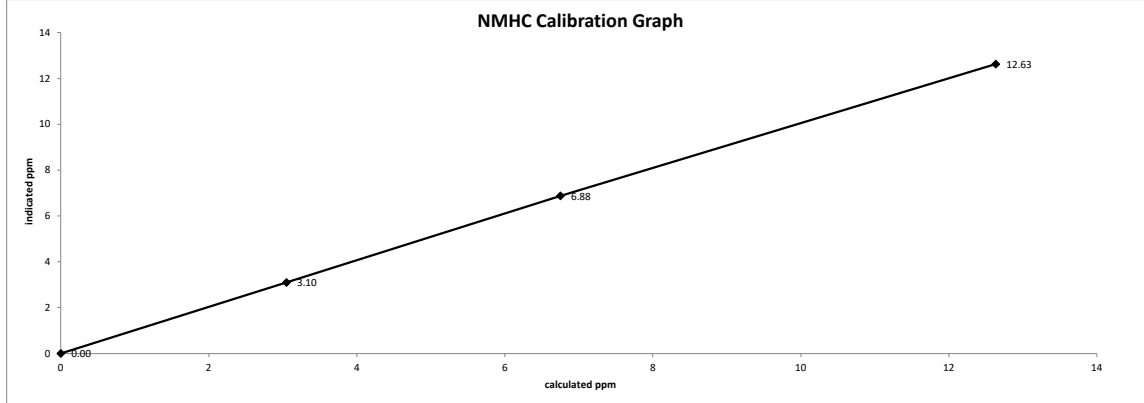
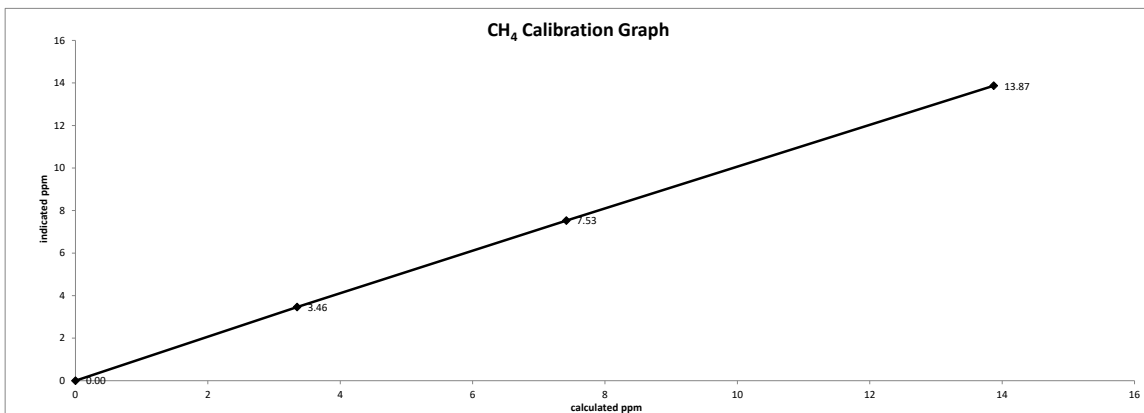
As Left Instrument Diagnostics:

Interface Board Voltages:	Bias Supply:	-301.0	Calibration History cnt'd:	NM Peak Area:	61737
Temperatures:	Detector Oven:	175.0	Crucial Settings:	Methane Start:	n/a
	Filter:	175.0		Methane End:	n/a
	Column Oven:	75.0		Backflush:	n/a
	Internal:	29.7		NMHV Start:	n/a
Cylinder Pressures/reg.:	Carrier:	2300 50	Run History>1:	NMHC End:	n/a
	Fuel:	1000 50		Date:	May 9, 2019
	Span Gas:	600 10		Time:	15:09
	Zero Air Generator:	50		CH ₄ PK HT:	0
Internal Pressures:	Carrier:	28.5		CH ₄ RT:	8.0
	Fuel:	42.9		CH ₄ Baseline:	-222
	Air:	30.5		CH ₄ LOD:	13
FID Status:	Status:	LIT		CH ₄ SD:	4
	Counts:	15927		CH ₄ CONC:	0.00
	Flame:	379.9		NM PK HT:	0
	Det Base:	175.0		NM Peak Area:	0
Flame and Power Stats:	Last Power On:	Dec 04, 2018 / 12:07		NM CONC:	0.00
	Flameouts:	489		NM Base Start:	-208
	Det Oven at Start:	22.7		NM Base End:	-204
	Col Oven at Start:	21.6		NM LOD:	7
Calibration History:	Time:	May 9, 2019 / 14:03		NM Start IDX:	64
	Type:	SPAN		NM End IDX:	89
	Status:	GOOD		NM Max Slope:	6.9e-01
	Check/Adjust:	ASJUST		NM Min Slope:	-1.1e+00
	CH ₄ Span Conc:	13.87		NM PT Count:	0
	CH ₄ SP Ratio:	0.00109	Expected Values:	Previous CH ₄ :	10.31
	CH ₄ RT:	14.0		Previous NMHC:	11.17
	CH ₄ PK IDX:	30		Previous THC:	21.48
	CH ₄ PK HT:	12768		New CH ₄ :	10.49
	NM Span Conc:	12.63		New NMHC:	11.03
	NM SP Ratio:	0.000205		New THC:	21.53

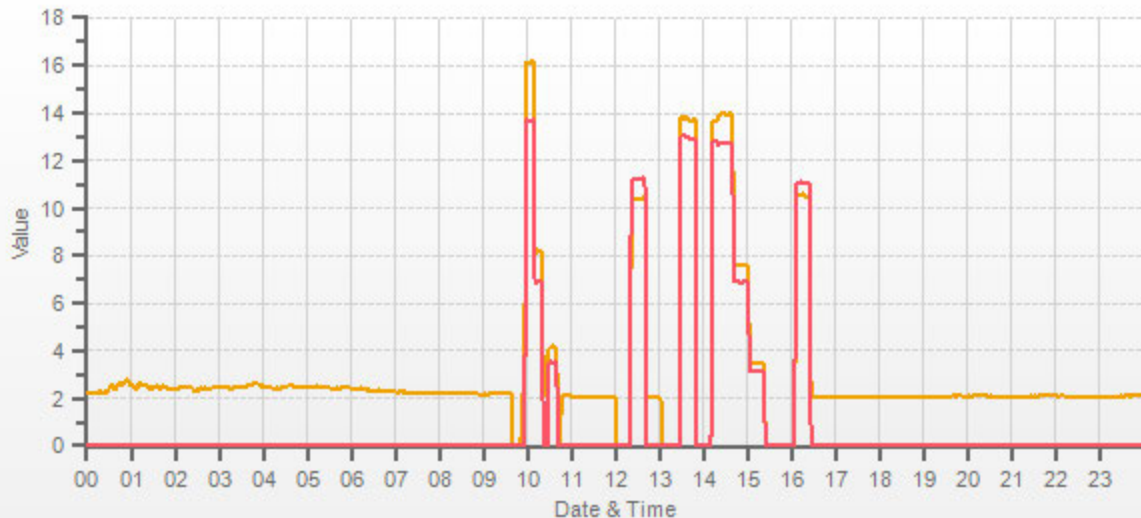
Comments:
 The analyzer sample inlet filter was changed.
 The analyzer cooling fan filter(s) were cleaned.
 The manifold blower was found to be working normally.
 No zero adjustment was required/made.

Date: May 9, 2019
Company/Airshed: LICA
Location/Station Name: Maskwa

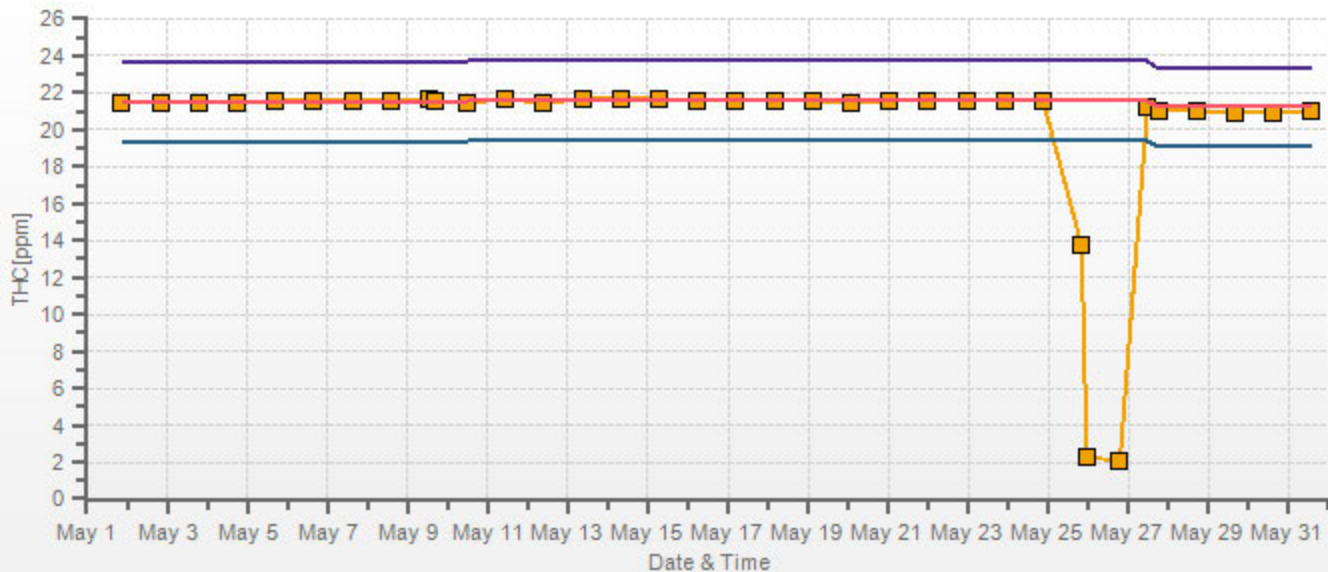
Start/End Time 24 hr. (mst): 12:47 / 16:29
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution



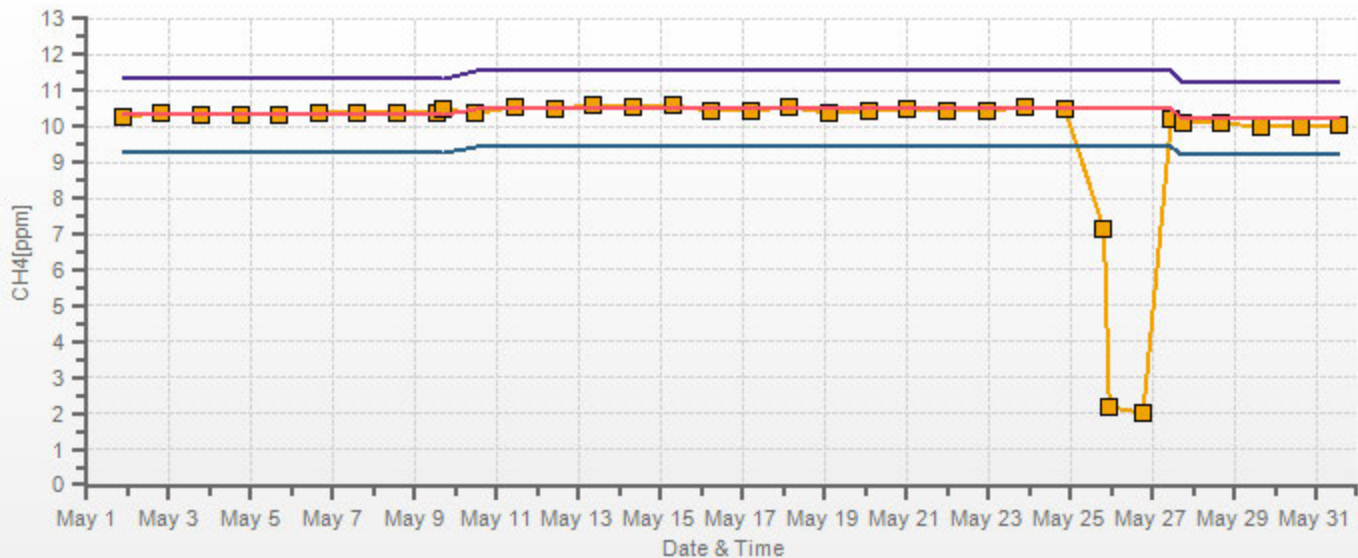
CH4[ppm] NMHC[ppm]

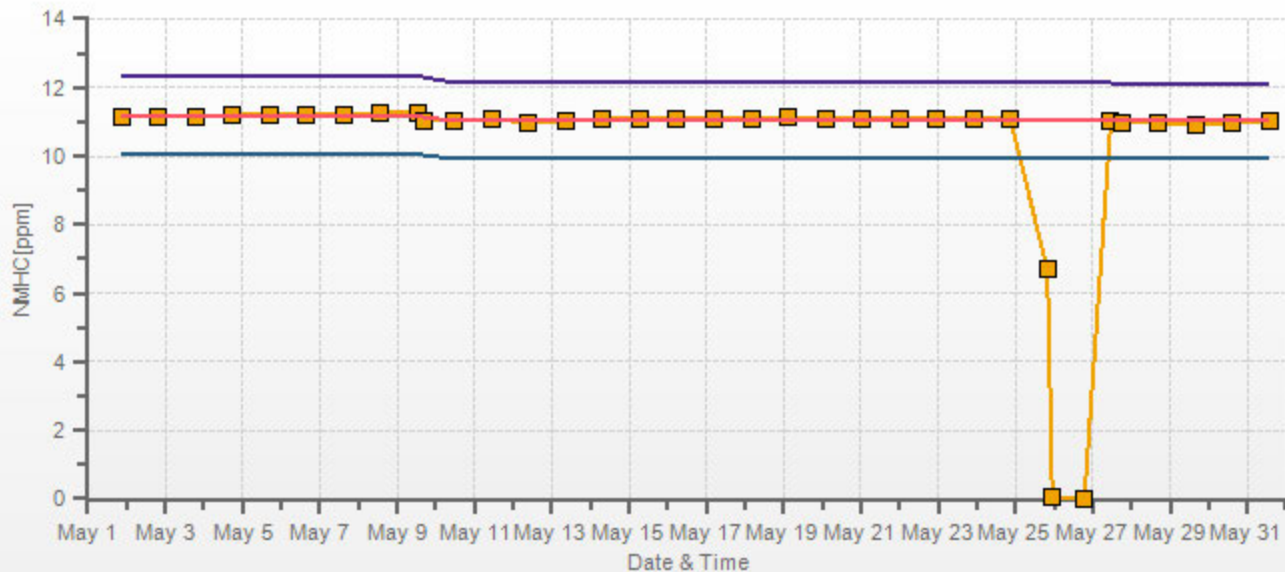


THC[ppm] Calibration: LICA MASKWA Monthly: 19/05 Type: Span



CH4[ppm] Calibration: LICA MASKWA Monthly: 19/05 Type: Span







Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: May 10, 2019	Barometer/B.P./units: Station gauge	934	millibars
Company/Airshed: LICA	Thermometer/Station Temp: Station gauge	23	°C
Location/Station Name: Maskwa	Weather Conditions: Mainly sunny		
Start/End Time 24 hr. (mst): 10:18 / 16:10	Calibration Purpose: routine monthly		
G.P.T. to be used for Ozone?: No	Performed By/Reviewer: Alex Yakupov	Rob Fisher	
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: August 20, 2020		

Analyzer: Serial Number/Owner: 1180930028 LICA Last Calibration Date: April 17, 2019 Range ppb: 1000	Correction Factors: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>NO =</td> <td>1.000</td> <td>1.011</td> <td>1.000</td> </tr> <tr> <td>NO₂ =</td> <td>1.000</td> <td>1.000</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>1.000</td> <td>1.012</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	1.011	1.000	NO ₂ =	1.000	1.000	1.000	NOx =	1.000	1.012	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	1.011	1.000														
NO ₂ =	1.000	1.000	1.000														
NOx =	1.000	1.012	1.000														

Calibration Standards: Low Flow Meter ID/Expiry Date: N/A High Flow Meter ID/Expiry Date: N/A Calibrator ID/Expiry Date: API id# 690 expires April 16, 2020 Cal Gas Cylinder I.D. #: LL 107918 Cal Gas Conc. (ppm): 50.1 50.2	Standard Calibration Points for a Range of: 1000 ppb <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> <td>500</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>275</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>190</td> <td>100</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

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	4997	0.0	4997	0	0	0.0	0.0	n/a	n/a
as found high	4921	77.8	4999	779.7	781.3	771.0	772.0	1.011	1.012
adjusted zero	4997	0.00	4997	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4921	77.80	4999	779.7	781.3	780.0	781.0	1.000	1.000
mid	4961	37.90	4999	379.8	380.6	380.0	381.0	1.000	0.999
low	4980	18.90	4999	189.4	189.8	190.0	191.0	0.997	0.994
calibrator zero	4997	0.00	4997	0	0	0.0	0.0	n/a	n/a
Average C.F.=								0.999	0.998

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	4921	77.80	4999	0.0	781.0	783.0	2.0	0.0	2.0	
as found high NO2	4921	77.80	4999	490.0	271.0	783.0	512.0	510.0	510.0	1.000
adjusted high NO2	4921	77.80	4999	490.0	271.0	783.0	512.0	510.0	510.0	1.000
gpt mid	4921	77.80	4999	265.0	501.0	783.0	282.0	280.0	280.0	1.000
gpt low	4921	77.80	4999	95.0	681.0	783.0	102.0	100.0	100.0	1.000
Average NO ₂ C.F.=										1.000

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.000	1.001	1.003	0.95-1.05
b (Intercept as % of full scale)=	0.02%	0.06%	0.12%	± 3% F.S.
% change in C.F. from last cal=	-1.13%	-1.20%	0.00%	± 10%
NO2 converter efficiency			1.00	0.96 to 1.04

As found:		As left:	
NO Bkg:	2.6	NO Bkg:	2.6
NOx Bkg:	2.7	NOx Bkg:	2.7
NO Coef:	0.930	NO Coef:	0.942
NO2 Coef:	1.000	NO2 Coef:	1.000
NOx Coef:	1.001	NOx Coef:	1.000
PMT:	-866.9	PMT:	-866.5
Internal:	28.7	Internal:	28.8
Chamber:	50.3	Chamber:	50.3
Cooler:	-3.0	Cooler:	-3.0
NO2 Converter:	324.0	NO2 Converter:	323.7
NO2 Converter Set:	325.0	NO2 Converter Set:	325.0
Perm Oven Gas:	45.00	Perm Oven Gas:	44.99
Perm Oven Heater:	44.16	Perm Oven Heater:	44.16
Pressure:	260.6	Pressure:	260.9
Flow:	0.537	Flow:	0.540
Ozonator Flow:	OK	Ozonator Flow:	OK
Expected Value NO:	4	Expected Value NO:	4
Expected Value NO2:	403	Expected Value NO2:	401
Expected Value NOx:	406	Expected Value NOx:	405

Comments:

The analyzer sample inlet filter was changed.

The manifold blower was found to be working normally.

The converter cooling fan filter was cleaned.

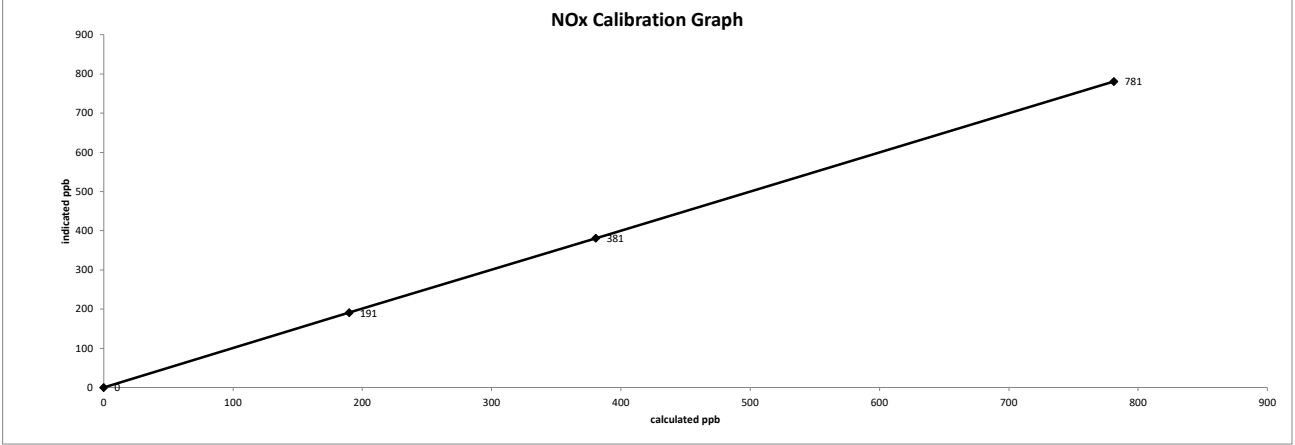
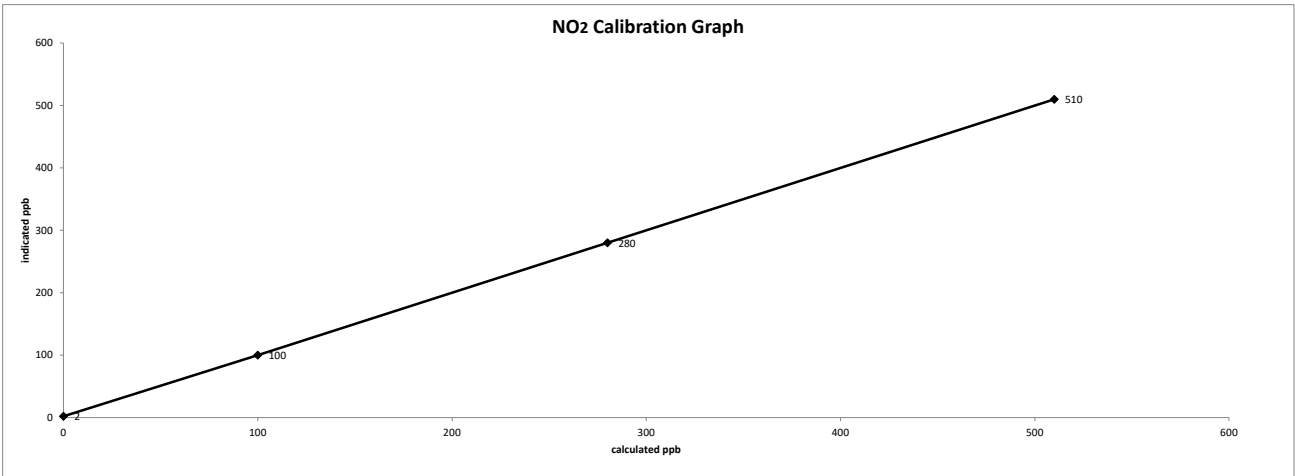
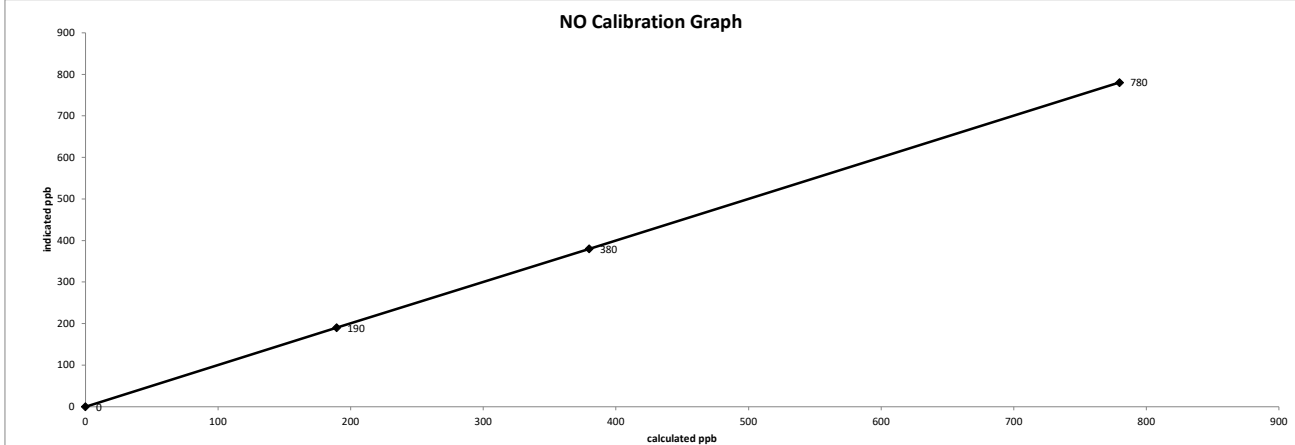
The analyzer cooling fan filter(s) were cleaned.

The IZS check started at 11:00. The High As Found was restarted.

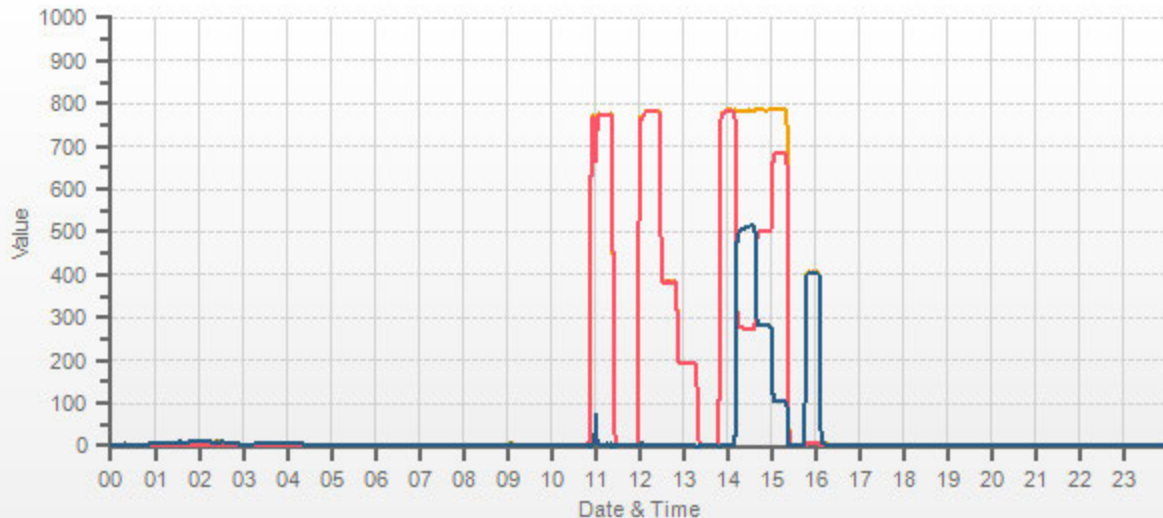
Date: May 10, 2019
Company/Airshed: LICA
Location/Station Name: Maskwa

Start/End Time 24 hr. (mst): 10:18 / 16:10
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Gas Phase Titration

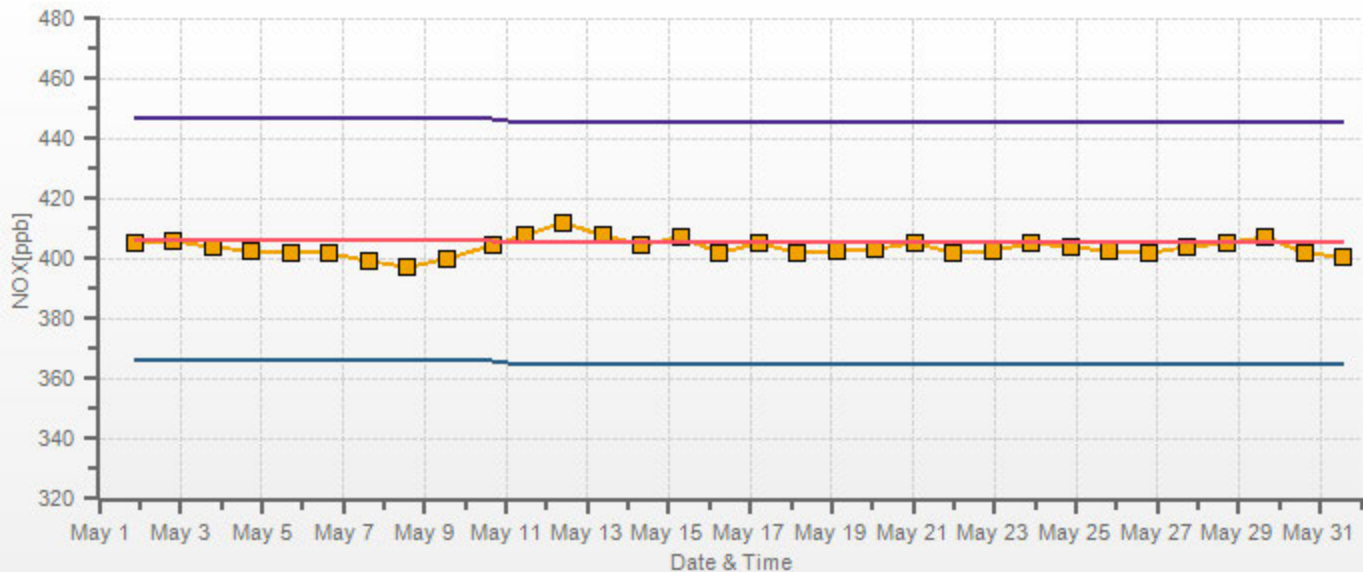
Thermo 42i NO-NO2-NOx Analyzer Calibration



— NOX[ppb] — NO[ppb] — NO2[ppb]



NOX[ppb] Calibration: LICAMASKWA Monthly: 19/05 Type: Span



NO2[ppb] Calibration: LICA MASKWA Monthly: 19/05 Type: Span





Meteorological Sensor Audit/Calibration

Location Information

Company:	LICA	Performed By:	Alex Yakupov
Audit Location:	Maskwa	Reviewed By:	Rob Fisher
Audit Date:	September 17, 2018	Start/End Time (mst):	9:36 / 12:48
Calibration Purpose:	installation	Weather Conditions:	Cloudy/Overcast

Wind Sensor Information

Sensor ID Data:		Sensor Outputs:	
Sensor Make:	RM Young	Velocity Voltage Output Range:	0-1 V
Sensor Model:	05305VK	Velocity Unit Output Range:	0-200 km/h
Serial #:	161465	Direction Voltage Output Range:	0-1 V
Previous Cal/Audit Date:	May 17, 2018	Direction Unit Output Range:	0-360 degrees

Wind Calibrator Information

Calibrator I.D. and Expiry Date: Model 18860-90/18802 SN: CA 4744; expiration May 18, 2019

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	0.1	0.1	-
1000	18.4	18.5	18.5	0.995
2000	36.9	36.9	36.9	1.000
3000	55.3	55.4	55.4	0.998
4000	73.7	73.8	73.8	0.999
5000	92.2	92.3	92.3	0.999
6000	110.6	110.8	110.8	0.998
7000	129.0	129.3	129.3	0.998
8000	147.4	147.7	147.7	0.998
9000	165.9	166.1	166.1	0.999
10000	184.3	184.9	184.9	0.997
The audit meets AMD requirements.			Average Correction Factor=	0.998

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

Generated Wind Direction 0-360 (Up)	Generated Wind Direction 360-0 (Down)	Indicated Wind Direction 0-360 (Up)	Indicated Wind Direction 360-0 (Down)	Degrees Difference 0-360 (Up)	Degrees Difference 360-0 (Down)	Average Absolute Degrees Difference
0	355	0	355	0.3	0.1	0.2
30	330	30	329	-0.4	0.7	0.5
60	300	62	300	-1.9	-0.3	1.1
90	270	91	270	-1.3	-0.3	0.8
120	240	121	241	-1.0	-0.8	0.9
150	210	152	212	-1.7	-1.7	1.7
180	180	181	182	-1.1	-2.0	1.6
210	150	211	152	-1.1	-1.8	1.5
240	120	241	122	-0.5	-1.8	1.2
270	90	270	91	-0.1	-0.8	0.5
300	60	300	61	0.4	-0.6	0.5
330	30	330	31	-0.1	-0.7	0.4
355	0	354	0	0.6	0.3	0.5
The audit meets AMD requirements.			Average Absolute Degrees Difference=		0.9	

Comments:



Meteorological System Checklist

Date:	May 28, 2019		
Technician:	Alex Yakupov		
Reviewer:	Rob Fisher		
Station:	Maskwa		
Unit:	Make:	Model:	Serial #:
Precipitation Sampler:	Met One	Part 387 - Heated Rain Gauge	F 4481
PRECIPITATION SENSOR CHECK			
Checklist:	Reply:	Comments:	
Previous check date:	February 15, 2019		
Is the sensor Level?	yes		
Is the heater operating properly?	other - see comments	Bucket - yes, base - no. (The heater is not engaged in ops in Summer time)	
Are the bucket drain holes clean?	yes		
Is the screen on the housing? (screen should be on between July and September)	other - see comments	The screens will be installed in July.	
Is the housing clean?	yes		
Is the area around the housing clean and free from obstacles?	yes		
TIP TEST - Slowly pour water until 10 tip are heard. (10 tips = 1 ml)			
# of Tips	Data Logger Response (ml):	Manual Specification = +/- 0.1 ml	
10	1.00	0.00	

Company Maxxam Operator: Tom Bourque

Calibrator:				Flow Measurement Device:			
Make/Model	<u>API 700</u>			Make/Model	<u>N/A</u>		
Serial Number	<u>690</u>			Serial Number	<u>N/A</u>		
Last Verification Date	<u>March 2018</u>			Temperature (°C)	<u>24.4 C</u>		
NO Cylinder S/N	<u>EY0000769</u>			Barometric Pressure	<u>699 mmHg</u>		
NO [PPM]	<u>51.1</u>	NOx [PPM]	<u>51.2</u>				
Expiry Date	<u>December 2019</u>						

Dilution Flow (sccm)					
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>	Pt. #3	<u>5000</u>
Gas Flow (sccm)					
Pt. #1	<u>80</u>	Pt. #2	<u>40</u>	Pt. #3	<u>20</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5000	0.0	0.000	0.000	0.000	-0.001	-0.001	Limit ± 10%	
5083	80.0	0.804	0.806	0.802	-0.011	0.791	0%	-2%
5044	40.0	0.405	0.406	0.403	-0.006	0.397	-1%	-2%
5022	20.0	0.204	0.204	0.202	-0.004	0.198	-1%	-2%
Absolute Average Percent Difference							1%	2%

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

<u>NO</u>	<u>LIMITS</u>	<u>NOx</u>
Correlation= 1.0000	≥ 0.990	Correlation= 1.0000
m (Slope)= 0.9974	0.90-1.10	m (Slope)= 0.9833
b (Intercept % of FS)= -0.0592	± 3% F.S.	b (Intercept % of FS)= -0.1772

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5083	0.000	0.000	0.802	-0.011	0.791	NO ₂	% Diff. Limit
5083	0.500	0.518	0.284	0.488	0.771	-4%	± 10%
5083	0.300	0.323	0.479	0.294	0.774	-6%	± 10%
5083	0.150	0.167	0.635	0.142	0.777	-8%	± 10%
						6%	± 10%

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

<u>NO₂</u>	<u>LIMITS</u>	
Correlation= 0.9998	≥ 0.995	Big shift down in NOx when entering GPT function. Possible flow change.
m (Slope)= 0.9649	0.90-1.10	
b (Intercept % of FS)= -1.4907	± 3% F.S.	

AENV Standards Audit Calibrator	NO _x Analyzer
Make/Model <u>Teco 146i</u>	Make/Model <u>Teco 42i</u>
Serial/AMU Number <u>AMU 1809</u>	Serial/AMU Number <u>AMU 2265</u>
SRM Gas Cylinder No. <u>APEX1236646</u>	Last Calibration Date <u>April 15, 2019</u>
Cylinder Conc. (ppm) <u>50.04</u>	Full Scale (ppm) <u>1.0</u>
	Cylinder Gas Expiry Date <u>June 2021</u>

COMMENTS: With ZAG Teledyne 701 Maxxam ID 11986.

Auditor: Al Clark Date: April 16, 2019
 Operator Signature: Location: McIntyre Center Edmonton

Company <u>Maxxam</u>		Operator: <u>Tom Bourque</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>N/A</u>
Serial Number	<u>11900613</u>	Serial Number	<u>N/A</u>
Last Verification Date	<u>August 2018</u>	Temperature (°C)	<u>24.4 C</u>
NO Cylinder S/N	<u>EY0000769</u>	Barometric Pressure	<u>699 mmHg</u>
NO [PPM]	<u>51.1</u>	NOx [PPM]	<u>51.2</u>
Expiry Date	<u>December 2019</u>		

Dilution Flow (sccm)		
Pt. #1 <u>5000</u>	Pt. #2 <u>5000</u>	Pt. #3 <u>5000</u>
Gas Flow (sccm)		
Pt. #1 <u>80</u>	Pt. #2 <u>40</u>	Pt. #3 <u>20</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5000	0.0	0.000	0.000	0.000	-0.002	-0.002	Limit ± 10%	
5080	80.0	0.805	0.806	0.815	-0.007	0.808	1%	0%
5041	40.0	0.405	0.406	0.414	-0.004	0.410	2%	1%
5019	20.0	0.204	0.204	0.210	-0.004	0.206	3%	2%
Absolute Average Percent Difference							2%	1%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
NO		LIMITS		NO_x			
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000		
m (Slope)=	1.0117	0.90-1.10		m (Slope)=	1.0039		
b (Intercept % of FS)=	0.2171	± 3% F.S.		b (Intercept % of FS)=	-0.0020		

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5080	0.000	0.000	0.815	-0.009	0.806	NO ₂	% Diff. Limit
5080	1.400	0.517	0.298	0.511	0.809	1%	± 10%
5080	0.900	0.308	0.507	0.299	0.806	0%	± 10%
5080	0.500	0.140	0.675	0.130	0.805	-1%	± 10%
						0%	± 10%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
NO₂		LIMITS					
Correlation=	1.0000	≥ 0.995					
m (Slope)=	1.0062	0.90-1.10					
b (Intercept % of FS)=	-1.0004	± 3% F.S.					

AENV Standards		NO_x Analyzer	
Audit Calibrator			
Make/Model	<u>Teco 146i</u>	Make/Model	<u>Teco 42i</u>
Serial/AMU Number	<u>AMU 1809</u>	Serial/AMU Number	<u>AMU 2265</u>
SRM Gas Cylinder No.	<u>APEX1236646</u>	Last Calibration Date	<u>April 15, 2019</u>
Cylinder Conc. (ppm)	<u>50.04</u>	Full Scale (ppm)	<u>1.0</u>
		Cylinder Gas Expiry Date	<u>June 2021</u>

COMMENTS: With ZAG Teledyne 701 Maxxam ID: 11981. Should have Maxxam ID 11986 instead

Auditor: Al Clark Date: April 16, 2019
 Operator Signature: *Al Clark* Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2019-392CGA

Company: Maxxam **Operator's Name:** Alex

Cylinder #: LL107918 Concentration PPM: 49.5 Tolerance(%) 1 Certified By: Praxair

Expiry Date: August 2026

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model: <u>Sabio 2010</u>	Make/Model: <u>Mesa Definer 220</u>
Serial Number: <u>AMU 2092</u>	Serial Number: <u>H-133034 / L-132702</u>
Last Verification Date: <u>January 14, 2019</u>	Temp. °C: <u>22.7 C</u>
Gas Type: <u>SO2</u> Conc. <u>50.26</u>	B.P. <u>707 mmHg</u>
Cylinder Number: <u>FF28071</u>	
Expiry Date: <u>March 2020</u>	

Reference Analyzer:

Make/Model: Teco 43i Serial/AMU Number: 2195

Instrument Settings: Zero: 11.8 Span: 0.980 Range: 1.0

Last Calibration: Date: Jan 14/19 C.F. 1.000 Done By: Shea Beaton

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.000	0.0000	0.0000	0.000
4898	78.1	0.790	0.01595	62.714	49.5
4893	38.7	0.389	0.00791	126.434	49.2
4894	19.3	0.192	0.00394	253.575	48.7
Average Cylinder Concentration:					49.1

Previous Stated Concentration PPM: 49.5

Percent variance from Stated: 1

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

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

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

Auditor: Al Clark

Operator Signature:

Date: January 15, 2019

Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-493CGA

Company: Maxxam Operator's Name: Mike
 Cylinder #: EY0001003 Concentration PPM: 9.55 Tolerance(%) 2 Certified By: Praxair
 Expiry Date: October 2020

Reference Calibrator and Gas:
 Make/Model: Sabio 2010
 Serial Number: AMU 2092
 Last Verification Date: January 17, 2018
 Gas Type: H2S Conc. 20.43
 Cylinder Number: CAL015272
 Expiry Date: January 2019

Flow Measurement Device:
 Make/Model: Mesa Defender 530
 Serial Number: H-153961 / L-153874
 Temp. °C: 23.0 C
 B.P.: 697 mmHg

Reference Analyzer:
 Make/Model: Teco 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 12.9 Span: 0.955 Range: 0.1
 Last Calibration: Date: Jan 17/18 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			
5051	39.6	0.0753	0.00784	127.551	9.60
5028	20.2	0.0387	0.00402	248.911	9.63
5033	10.5	0.0198	0.00209	479.333	9.49
Average Cylinder Concentration:					9.58

Previous Stated Concentration PPM: 9.55

Percent variance from Stated: 0

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

Auditor: Al Clark

Date: January 18, 2018

Operator Signature: *Al Clark*

Location: McIntyre Center Edmonton



Calibration Gas Audit

CH₄ / C₃H₈ Cylinder Gas

File No. 2019-393CGA

Company: Maxxam **Operators name:** Alex
Cylinder #: LL29687 **Conc CH₄ (PPM)** 598/198 **Tolerance (%)** 1 **Certified By:** Praxair
Expiry Date: August 2026

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>Mesa Definer 220</u>		
Serial Number	<u>AMU 2092</u>	Serial Number	<u>H-133034 / L-132702</u>		
Last Verification Date	<u>January 14, 2019</u>	Temp. °C	<u>23.8 C</u>		
Gas Type	<u>CH₄</u>	Conc.	<u>990.4</u>		
Cylinder Number	<u>05604875</u>	Expiry Date	<u>July 2021</u>		
Gas Type	<u>C₃H₈</u>	Conc.	<u>246.5</u>		
Cylinder Number	<u>XF003845B</u>	Expiry Date	<u>July 2022</u>		

Reference Analyzer:
Make/Model Teco 55i **Serial/AMU Number:** 2221
Instrument Settings **Zero:** N/A **Span:** N/A **Range:** 20.0
Last Calibration: **Date:** Jan 14/19 **C.F.** 1.000 **Done By:** Shea Beaton

Calibrator Flows (scem)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	CH ₄	C ₃ H ₈			CH ₄	C ₃ H ₈
5000	0.0	0.00	0.00	0.02	51.48	603	209
3990	77.5	11.71	11.18	0.02	51.48	603	209
3976	39.1	5.87	5.71	0.01	101.69	597	211
3986	20.0	2.96	2.86	0.01	199.30	590	207
Average Cylinder Concentration:						597	209

<u>CH₄</u>	<u>C₃H₈</u>
Previous Stated Concentration PPM: <u>598</u>	Previous Stated Concentration PPM: <u>198</u>
Percent variance from Stated: <u>0</u>	Percent variance from Stated: <u>6</u>

Cylinder gas tolerances based on CH₄ only

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

Auditor: Al Clark **Date:** January 15, 2019
Operator Signature: **Location:** McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2019-391CGA

Company: Maxxam **Operators name:** Alex

Cylinder #: LL107918 Conc (PPM) 50.1/50.2 Tolerance (%) 1 Certified By: Praxair

Expiry Date: August 2026

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Teco 146i</u>			Make/Model	<u>Mesa Definer 220</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>H-133034 / L-132702</u>
Last Verification Date	<u>January 14, 2019</u>			Temp. °C	<u>22.7 C</u>
Gas Type	<u>NO</u>	Conc.	<u>50.05</u>	B.P.	<u>707 mmHg</u>
Cylinder Number	<u>APEX1236645</u>				
Expiry Date	<u>June 2021</u>				

Reference Analyzer:

Make/Model Teco 42i Serial/AMU Number: 2268

Instrument Settings Zero: 9.2 Span: 1.223 Range: 1.0

Last Calibration: Date: Jan 14/19 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
5000	0.0	0.000	0.000				
4898	78.1	0.792	0.793	0.016	62.714	49.7	49.7
4893	38.7	0.395	0.395	0.008	126.434	49.9	49.9
4894	19.3	0.195	0.195	0.004	253.575	49.4	49.4
Average Cylinder Concentration:						49.7	49.7

NO	NOx
Previous Stated Concentration PPM: <u>50.1</u>	<u>50.2</u>
Percent variance from Stated: <u>1</u>	<u>1</u>

Cylinder gas tolerances based on NO only

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

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration

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

Auditor: Al Clark Date: Janaury 15, 2019

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



Lakeland Industry & Community Association
5107 50 St
Bonnyville, AB T9N2J7

End of Report



Lakeland Industry & Community Association

MAY 2019

Ambient Air Monitoring Calibration Report

- ST. LINA STATION-

CAL-LICA-201905-01250

Station Operation and Maintenance:

Maxxam Analytics

Data Validation and Report:

Maxxam Analytics

July 2, 2019



Lakeland Industry & Community Association
5107 50 St
Bonnyville, AB T9N2J7

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

July 2, 2019

Subject:

May 2019 Ambient Air Monitoring Calibration Report Submission for the LICA St. Lina station

Lakeland Industry & Community Association (LICA) is pleased to submit the ambient air monitoring calibration report for the St. Lina AQM Station in the month of May 2019. This calibration report includes equipment calibration records, calibrator performance audit records and calibration gas audit records for the equipment that were used this month. This calibration report is prepared by the LICA network contractor.

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


Respectfully,

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

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

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

Lily Lin
Data & Reporting Specialist
587-225-2248
monitoring@lica.ca



May 1 - 31, 2019
MONTHLY CALIBRATION REPORT
Project #: 2833-2019-05-25-C
LICA-201905

Prepared for:

Lakeland Industry & Community Association

Mike Bisaga

5107 50 St.
Bonnyville, Alberta T9N 2J7
monitoring@lica.ca
780-266-7068

St. Lina Continuous Monitoring Station

Date of Report Issuance: June 24, 2019



#1 - 2080 39 Avenue NE, Calgary AB, T2E 6P7



Thermo 431-TLE Sulphur Dioxide Analyzer Calibration

Date:	May 23, 2019	Barometer/B.P./units:	F.S. #05544 expires Jan 17, 2020	934	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. #160348895 expires Jun 19, 2020	23	°C
Location/Station Name:	St. Lina	Weather Conditions:	A few clouds		
Parameter:	Sulphur Dioxide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	10:28	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	14:21	Cal Gas Expiry Date:	August 20, 2026		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		
Analyzer:					
Serial Number/Owner:	1180930030 LICA	Range ppb:	1000		
Last Calibration Date:	April 12, 2019	As Found C.F.:	1.067		
Previous C.F.:	1.000	New C.F.:	1.000		

Calibration Standards: Low Flow Meter ID/Expiry Date: N/A High Flow Meter ID/Expiry Date: N/A Calibrator ID/Expiry Date: API id# 690 expires April 16, 2020 Cal Gas Cylinder I.D. #: LL 107918 Cal Gas Conc. (ppm): 49.5	Standard Calibration Points for Ranges <table border="1"> <tr><td>Point</td><td>ppb</td></tr> <tr><td>High</td><td>780</td></tr> <tr><td>Mid</td><td>380</td></tr> <tr><td>Low</td><td>190</td></tr> </table>	Point	ppb	High	780	Mid	380	Low	190
Point	ppb								
High	780								
Mid	380								
Low	190								

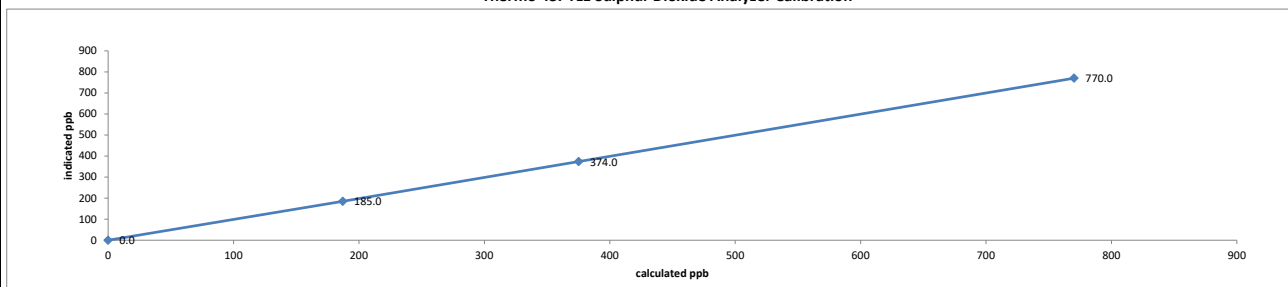
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	5000	0.00	5000	0.0	0	n/a
as found high	4922	77.80	5000	770.2	722	1.067
adjusted zero	5000	0.00	5000	0.0	0	n/a
adjusted high	4922	77.80	5000	770.2	770	1.000
mid	4962	37.90	5000	375.2	374	1.003
low	4981	18.90	5000	187.1	185	1.011
calibrator zero	5000	0.00	5000	0.0	0	n/a
Average C.F. =						1.005

Linear Regression/Calibration Results:

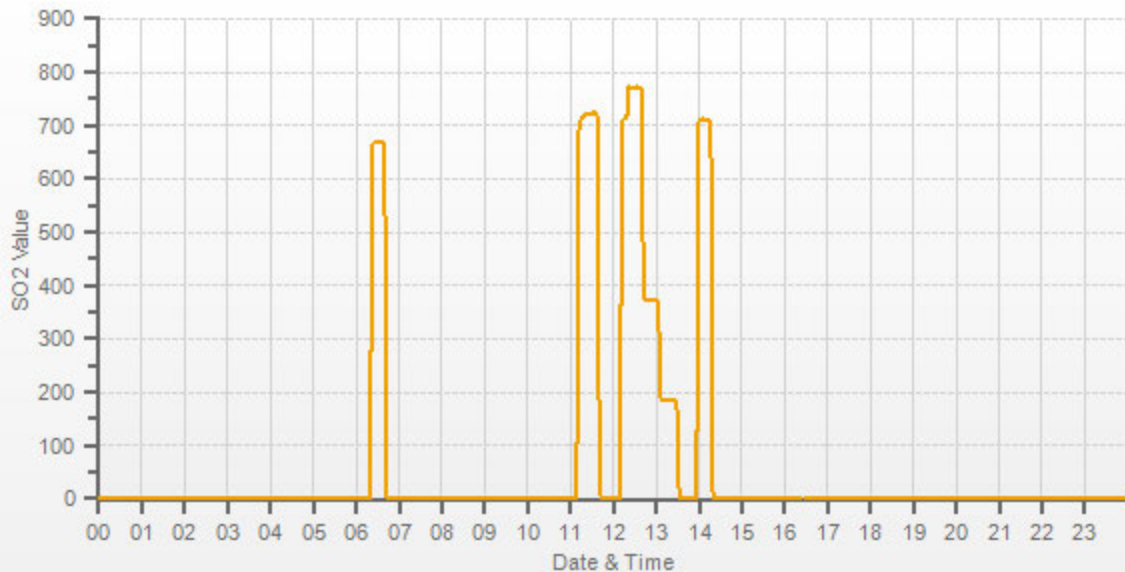
Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.999		0.95-1.05
b (Intercept as % of full scale) =	0.11%		± 3% F.S.
% change in C.F. from last cal =	-6.68%		± 10%

Thermo 431-TLE Sulphur Dioxide Analyzer Calibration

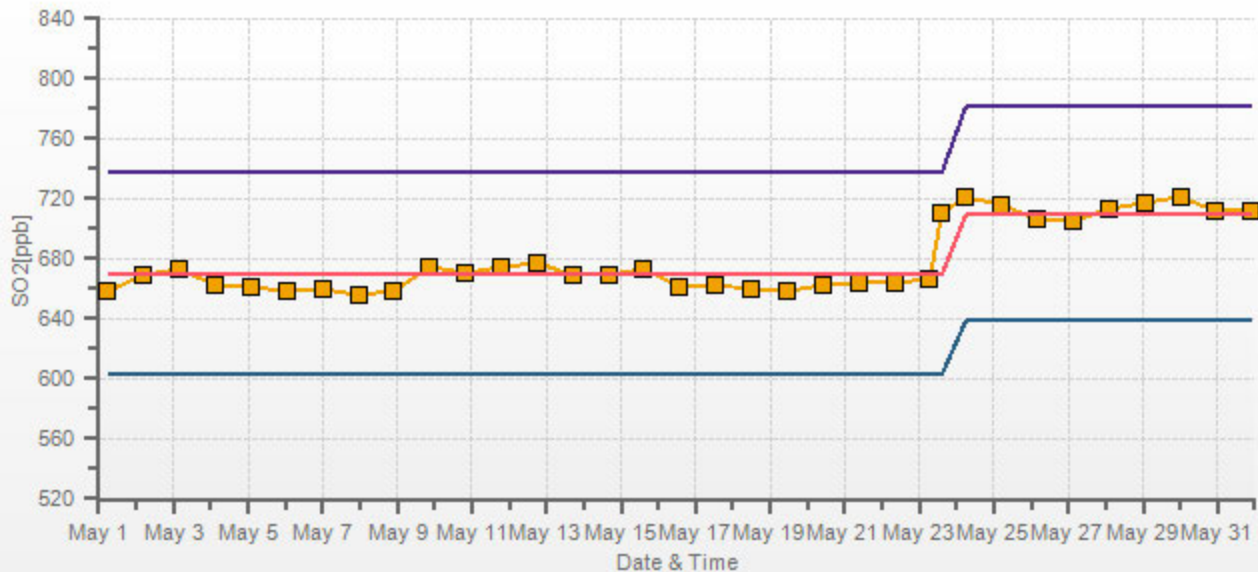


As found:		As left:	
Bkg:	3.85	Bkg:	4.09
Coef:	1.042	Coef:	1.108
Pmt:	-696.3	Pmt:	-696.3
Flash:	985	Flash:	985
Internal:	30.6	Internal:	30.6
Chamber:	45.1	Chamber:	45.1
Perm Oven Gas:	45.0	Perm Oven Gas:	45.0
Perm Oven Heater:	n/a	Perm Oven Heater:	n/a
Pressure:	44.15	Pressure:	44.15
Sample Flow:	0.437	Sample Flow:	0.437
Lamp Intensity:	91	Lamp Intensity:	91
Converter:	n/a	Converter:	n/a
Converter Set:	n/a	Converter Set:	n/a
Averaging Time:	120	Averaging Time:	120
Expected Value:	670.0	Expected Value:	710.0

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



SO2[ppb] Calibration: LICA ST. LINA Monthly: 19/05 Type: Span





Thermo 450i Hydrogen Sulphide Analyzer Calibration

Date:	May 16, 2019	Barometer/B.P./units:	F.S. #05544 expires Jan 17, 2020	935	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. #160348895 expires Jun 19, 2020	22	°C
Location/Station Name:	St. Lina	Weather Conditions:	Mainly sunny		
Parameter:	Hydrogen Sulphide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	11:29	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	15:42	Cal Gas Expiry Date:	October 20, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		
Analyzer:					
Serial Number/Owner:	CM 18010058 LICA	Range ppb:	100		
Last Calibration Date:	April 12, 2019	As Found C.F.:	0.981		
Previous C.F.:	0.999	New C.F.:	0.999		

Calibration Standards:	Standard Calibration Points for Ranges	SO2 Scrubber Check (10 minutes):
Low Flow Meter ID/Expiry Date:	N/A	Start/End Time 24 hr.:
High Flow Meter ID/Expiry Date:	N/A	SO2 Analyzer Range:
Calibrator ID/Expiry Date:	Sabio id# 11900613 expires April 16, 2020	Target Concentration (ppb):
Cal Gas Cylinder I.D. #:	EY 0001003	As Found Zero:
Cal Gas Conc. (ppm):	9.55	Analyzer Response: (ppb):
		Zero Corrected Result (ppb):

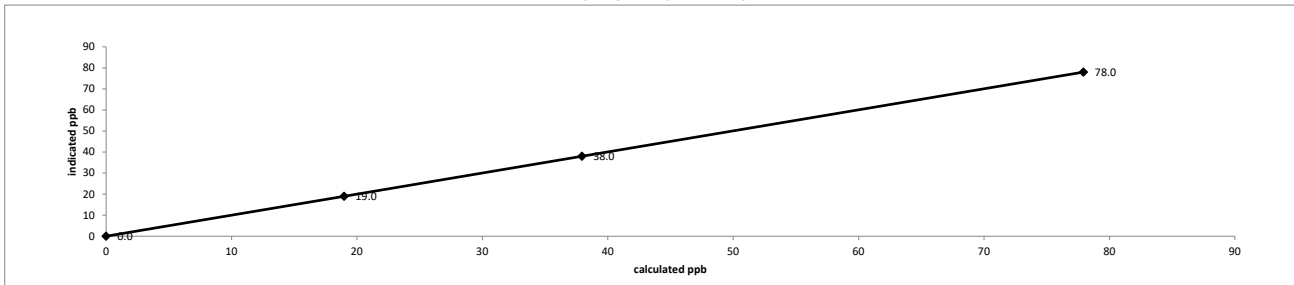
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	7500	0.00	7500	0.0	1.8	n/a
as found high	7439	61.20	7500	77.9	81.2	0.981
adjusted zero	7499	0.00	7499	0.0	0	n/a
adjusted high	7439	61.20	7500	77.9	78	0.999
mid	7470	29.80	7500	37.9	38	0.999
low	7485	14.90	7500	19.0	19	0.999
calibrator zero	7500	0.00	7500	0.0	0	n/a
Average C.F. =						0.999

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	0.999		0.95-1.05
b (Intercept as % of full scale) =	-0.01%		± 3% F.S.
% change in C.F. from last cal =	1.76%		± 10%

Thermo 450i Hydrogen Sulphide Analyzer Calibration

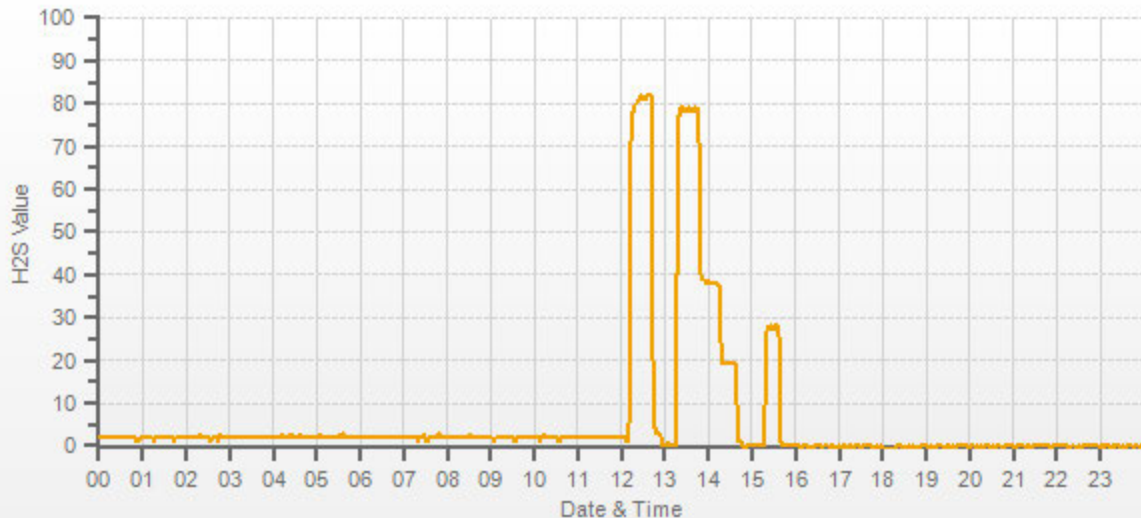


As found:		As left:	
Bkg:	35.7	Bkg:	37.0
Coef:	0.834	Coef:	0.822
Pmt:	-634.6	Pmt:	-634.2
Flash:	905	Flash:	906
Internal:	33.2	Internal:	35.0
Chamber:	45.1	Chamber:	45.2
Converter Temp:	326.5	Converter Temp:	323.0
Converter Set:	325.0	Converter Set:	325.0
Perm Oven Gas:	45.00	Perm Oven Gas:	45.00
Perm Oven Htr:	44.11	Perm Oven Htr:	44.11
Pressure:	585.7	Pressure:	583.3
Sample Flow:	0.824	Sample Flow:	0.822
Lamp Intensity:	91	Lamp Intensity:	91
Averaging Time:	120	Averaging Time:	120
Expected Value:	28.7	Expected Value:	27.7

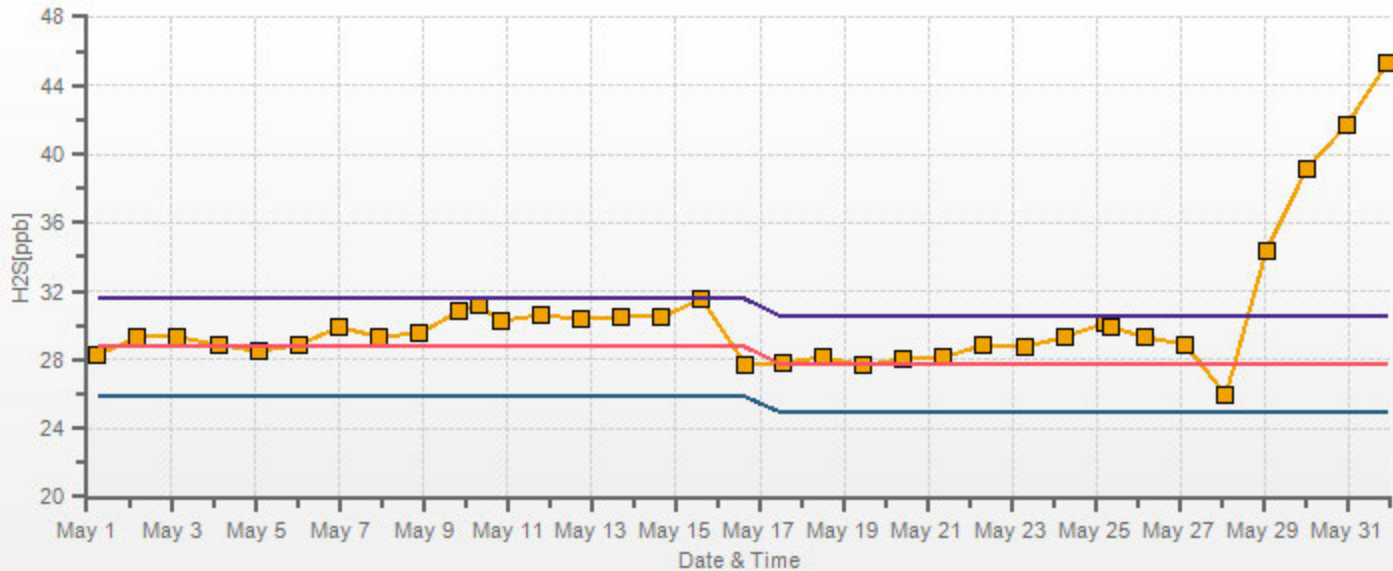
Comments:

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

H2S[ppb]



H2S[ppb] Calibration: LICA ST. LINA Monthly: 19/05 Type: Span





Thermo 55i Methane/Non-Methane Analyzer Calibration

Date: May 16, 2019	Barometer/B.P./units: F.S. #05544 expires Jan 17, 2020	935	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. #160348895 expires Jun 19, 2020	22	°C
Location/Station Name: St. Lina	Weather Conditions: Mainly sunny		
Parameter: CH4 / NMHC / THC	Calibration Purpose: routine monthly		
Start/End Time 24 hr. (mst): 11:29 / 15:25	Performed By/Reviewer: Alex Yakupov		Rob Fisher
Calibration Method: Gas Dilution	Cal Gas Expiry Date: August 1, 2026		

Analyzer: Serial Number/Owner: 1180930025 LICA	Correction Factors:		
Measured Flow: 1.211	Previous C.F.:	As Found C.F.:	New C.F.:
Last Calibration Date: April 12, 2019	CH ₄ = 0.999	1.003	1.000
Range ppm: 20 CH4/20 NMHC/40 THC	NMHC = 0.999	0.975	1.000
	THC = 0.998	0.990	1.000

Calibration Standards:

Low Flow Meter ID/Expiry Date: N/A	Standard Calibration Points for Analyzer Range of 20/20/40 ppm			
High Flow Meter ID/Expiry Date: N/A	Point	CH4	NMHC	THC
Calibrator ID/Expiry Date: API id# 690 expires April 16, 2020	High	13.00	13.00	26.00
Cal Gas Cylinder I.D. #: LL 29687	Mid	7.00	7.00	14.00
CH4 Cylinder Conc.: 598.0 198.0 = C ₂ H ₆ Cylinder Conc.	Low	3.00	3.00	6.00
CH ₄ expressed as C ₂ H ₆ : 544.5 1142.5 = total CH4 equivalent				

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

Point	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:		
	Diluent	Cal Gas	Total Flow							CH ₄	NMHC	THC
as found zero	2500	0.00	2500	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
as found high	2442	58.00	2500	13.87	12.63	26.51	13.83	12.95	26.78	1.003	0.975	0.990
adjusted zero	2500	0.00	2500	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
adjusted high	2442	58.00	2500	13.87	12.63	26.51	13.87	12.63	26.50	1.000	1.000	1.000
mid	2469	31.00	2500	7.42	6.75	14.17	7.42	6.86	14.30	0.999	0.984	0.991
low	2486	14.00	2500	3.35	3.05	6.40	3.37	3.16	6.53	0.994	0.965	0.980
calibrator zero	2500	0.00	2500	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
Average C.F.=										0.998	0.983	0.990

Linear Regression/Calibration Results:

	Correlation Coefficient =	1.000	1.000	1.000	LIMITS > or = 0.995 0.95-1.05 ± 3% F.S. ± 10%
	Slope =	0.999	0.998	0.999	
	b (Intercept as % of full scale)=	0.05%	0.33%	0.20%	
	% change in C.F. from last cal=	-0.42%	2.35%	0.82%	

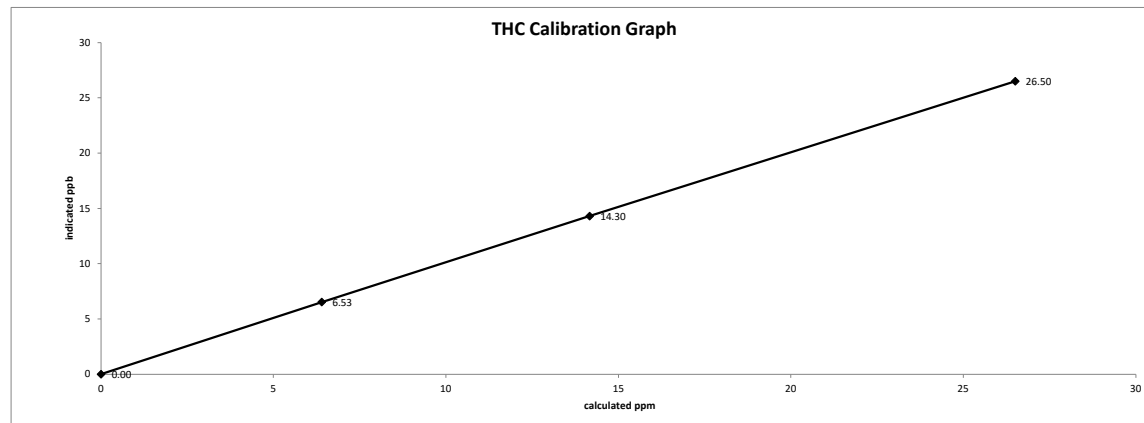
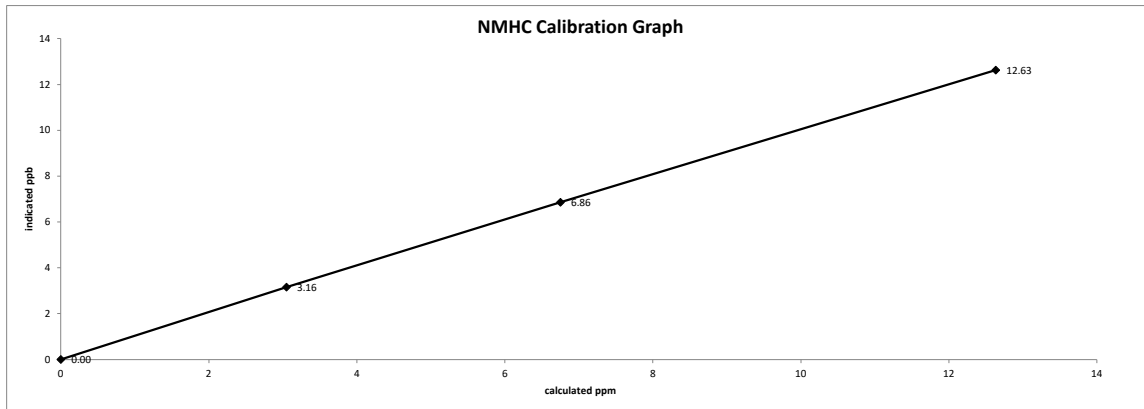
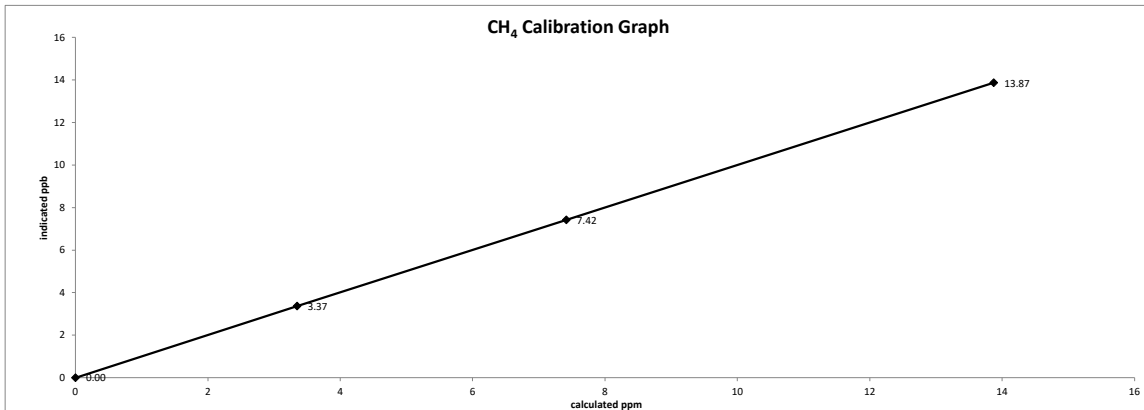
As Left Instrument Diagnostics:

Interface Board Voltages: Bias Supply: -296.1	Calibration History cnt'd: NM Peak Area: 87159	Temperatures: Detector Oven: 175.1	Crucial Settings: Methane Start: n/a
Filter: 175.1	Methane End: n/a	Column Oven: 75.1	Backflush: n/a
Internal: 27.8	NMHV Start: n/a	Carrier: 2100 50	NMHC End: n/a
Cylinder Pressures/reg.: Fuel: 1700 50	Run History>1: Date: May 16, 2019	Span Gas: 2000 7	Time: 11:38
Zero Air Generator: 50	CH ₄ PK HT: 0	Internal Pressures: Carrier: 32.0	CH ₄ RT: 12.6
Fuel: 48.1	CH ₄ Baseline: 3548	Air: 36.2	CH ₄ LOD: 40
FID Status: Status: LIT	CH ₄ SD: 13	Counts: 39110	CH ₄ CONC: 0.00
Flame: 405.0	NM PK HT: 0	Det Base: 175.0	NM Peak Area: 0
Flame and Power Stats: Last Power On: Dec 20, 2018/ 07:32	NM CONC: 0.00	Flameouts: 302	NM Base Start: 3524
Det Oven at Start: 166.9	NM Base End: 3592	Col Oven at Start: 73.6	NM LOD: 54
Calibration History: Time: Apr 12, 2019 / 13:44	NM Start IDX: 2	Type: SPAN	NM End IDX: 53
Status: GOOD	NM Max Slope: 3.1e+00	Check/Adjust: ADJUST	NM Min Slope: -1.7e-01
CH ₄ Span Conc: 14.35	NM PT Count: 0	CH ₄ SP Ratio: 0.000707	Previous CH ₄ : 10.06
CH ₄ RT: 13.2	Previous NMHC: 10.87	CH ₄ PK IDX: 26	Previous THC: 20.83
CH ₄ PK HT: 20298	New CH ₄ : 10.83	NM Span Conc: 13.61	New NMHC: 10.92
NM SP Ratio: 0.000156	New THC: 21.75		

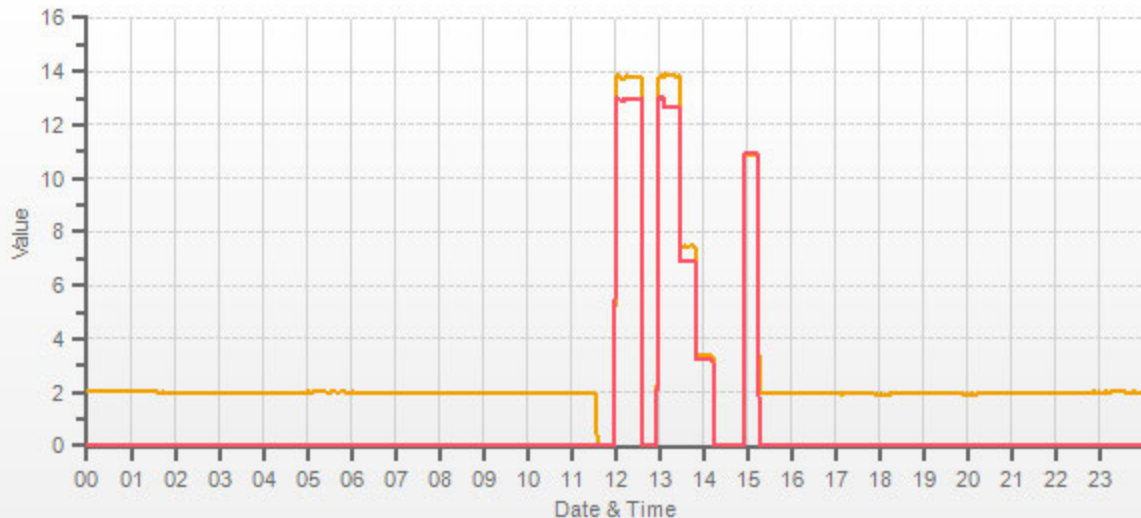
Comments:
 The analyzer sample inlet filter was changed.
 A new span gas cylinder was installed.
 The analyzer cooling fan filter(s) were cleaned.
 The manifold blower was found to be working normally.
 No zero adjustment was required/made.

Date: May 16, 2019
Company/Airshed: LICA
Location/Station Name: St. Lina

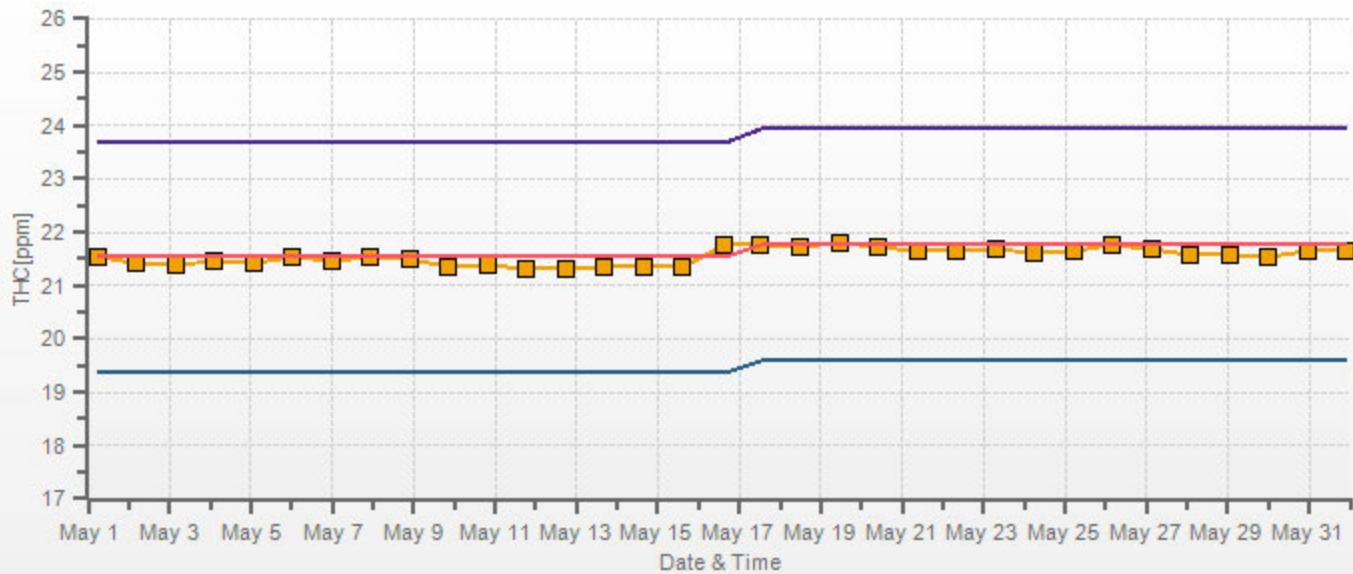
Start/End Time 24 hr. (mst): 11:29 / 15:25
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution

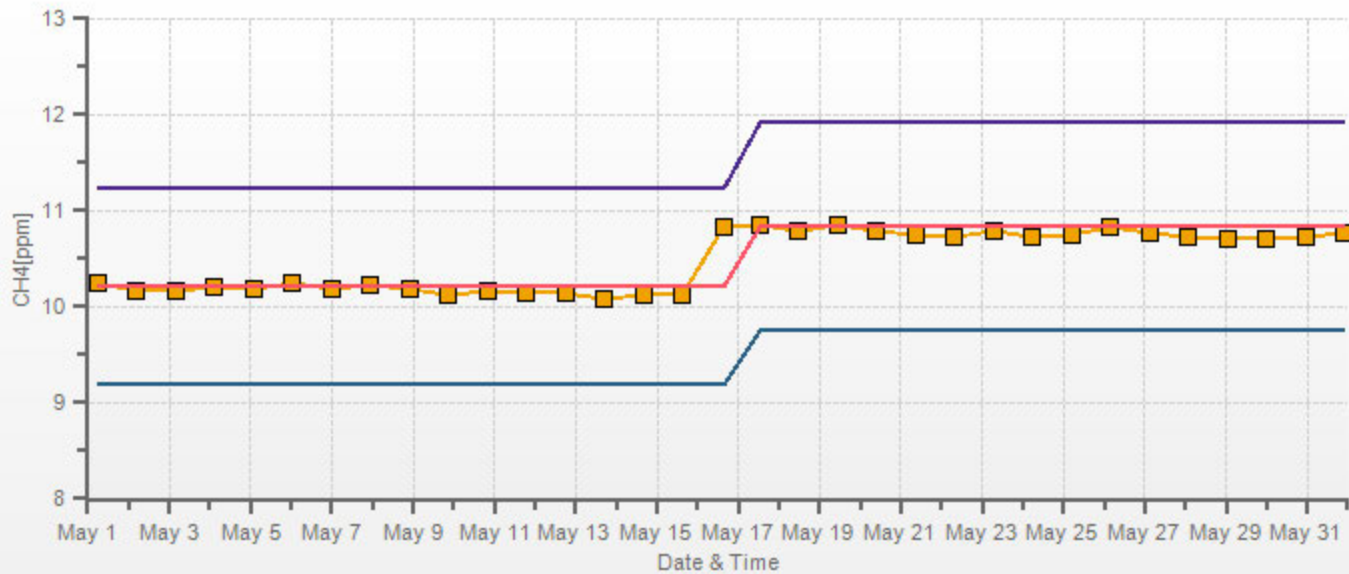


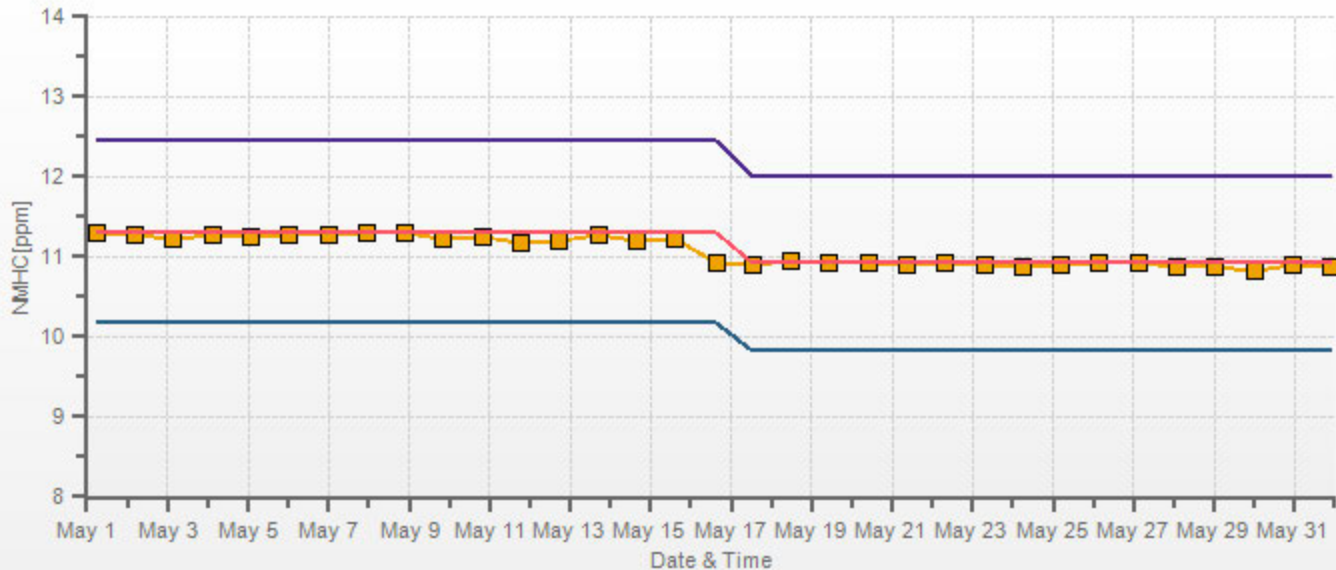
CH4[ppm] NMHC[ppm]



THC[ppm] Calibration: LICA ST. LINA Monthly: 19/05 Type: Span









Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: May 23, 2019	Barometer/B.P./units: F.S. #05544 expires Jan 17, 2020	934	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. #160348895 expires Jun 19, 2020	23	°C
Location/Station Name: St. Lina	Weather Conditions: A few clouds		
Start/End Time 24 hr. (mst): 10:28 / 16:22	Calibration Purpose: routine monthly		
G.P.T. to be used for Ozone?: No	Performed By/Reviewer: Alex Yakupov	Rob Fisher	
Calibration Method: Gas Dilution & Gas Phase Titration	Cal Gas Expiry Date: August 20, 2026		

Analyzer: Serial Number/Owner: 1180930029 LICA Last Calibration Date: April 8, 2019 Range ppb: 1000	Correction Factors: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>NO =</td> <td>1.000</td> <td>1.037</td> <td>0.999</td> </tr> <tr> <td>NO₂ =</td> <td>1.003</td> <td>1.000</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>0.999</td> <td>1.033</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	1.037	0.999	NO ₂ =	1.003	1.000	1.000	NOx =	0.999	1.033	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	1.037	0.999														
NO ₂ =	1.003	1.000	1.000														
NOx =	0.999	1.033	1.000														

Calibration Standards: Low Flow Meter ID/Expiry Date: N/A High Flow Meter ID/Expiry Date: N/A Calibrator ID/Expiry Date: API id# 690 expires April 16, 2020 Cal Gas Cylinder I.D. #: LL 107918 Cal Gas Conc. (ppm): 50.1 50.2	Standard Calibration Points for a Range of: 1000 ppb <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> <td>500</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>275</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>190</td> <td>100</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

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	4922	77.8	5000	779.6	781.1	752.0	756.0	1.037	1.033
adjusted zero	5000	0.00	5000	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4922	77.80	5000	779.6	781.1	780.0	781.0	0.999	1.000
mid	4962	37.90	5000	379.8	380.5	380.0	380.0	0.999	1.001
low	4981	18.90	5000	189.4	189.8	190.0	190.0	0.997	0.999
calibrator zero	5000	0.00	5000	0	0	0.0	0.0	n/a	n/a
Average C.F.=								0.999	1.000

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	4922	77.80	5000	0.0	780.0	780.0	0.0	0.0	0.0	
as found high NO2	4922	77.80	5000	480.0	280.0	780.0	500.0	500.0	500.0	1.000
adjusted high NO2	4922	77.80	5000	480.0	280.0	780.0	500.0	500.0	500.0	1.000
gpt mid	4922	77.80	5000	265.0	500.0	780.0	280.0	280.0	280.0	1.000
gpt low	4922	77.80	5000	95.0	680.0	780.0	100.0	100.0	100.0	1.000
Average NO ₂ C.F.=										1.000

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.000	1.000	1.000	0.95-1.05
b (Intercept as % of full scale)=	0.02%	0.00%	0.00%	± 3% F.S.
% change in C.F. from last cal=	-3.66%	-3.43%	0.30%	± 10%
NO ₂ converter efficiency			1.00	0.96 to 1.04

As found:		As left:	
NO Bkg:	5.6	NO Bkg:	5.6
NOx Bkg:	5.4	NOx Bkg:	5.4
NO Coef:	1.004	NO Coef:	1.004
NO ₂ Coef:	1.167	NO ₂ Coef:	1.167
NOx Coef:	0.999	NOx Coef:	0.999
PMT:	-824.4	PMT:	-824.4
Internal:	30.2	Internal:	30.2
Chamber:	50.0	Chamber:	50.0
Cooler:	-3.0	Cooler:	-3.0
NO ₂ Converter:	326	NO ₂ Converter:	326
NO ₂ Converter Set:	325	NO ₂ Converter Set:	325
Perm Oven Gas:	44.98	Perm Oven Gas:	44.98
Perm Oven Heater:	44.12	Perm Oven Heater:	44.12
Pressure:	260.2	Pressure:	260.2
Flow:	0.525	Flow:	0.525
Ozonator Flow:	OK	Ozonator Flow:	OK
Expected Value NO:	3	Expected Value NO:	to be adjusted
Expected Value NO ₂ :	393	Expected Value NO ₂ :	to be adjusted
Expected Value NOx:	396	Expected Value NOx:	to be adjusted

Comments:

The analyzer sample inlet filter was changed.

The manifold blower was found to be working normally.

The converter cooling fan filter was cleaned.

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

The analyzer cooling fan filter(s) were cleaned.

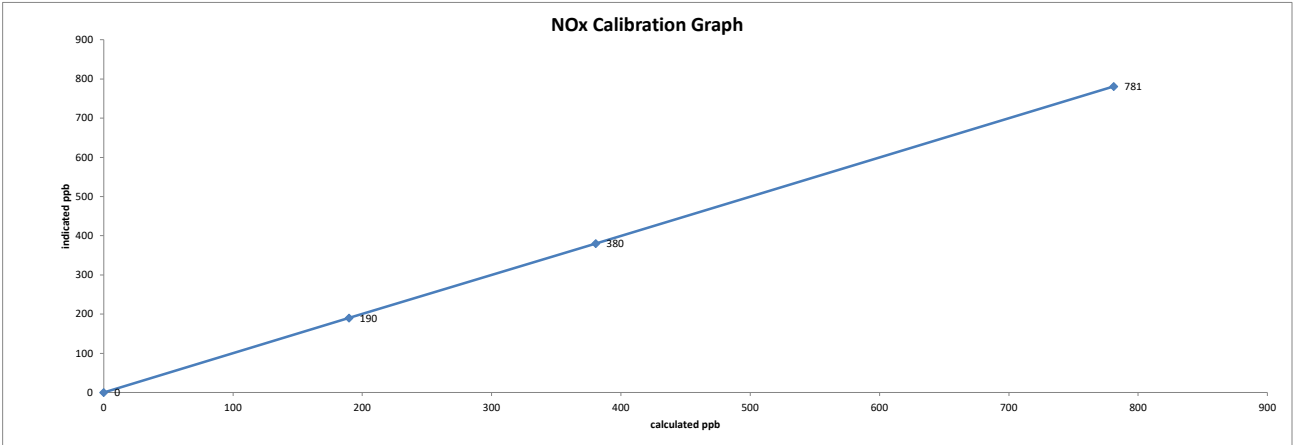
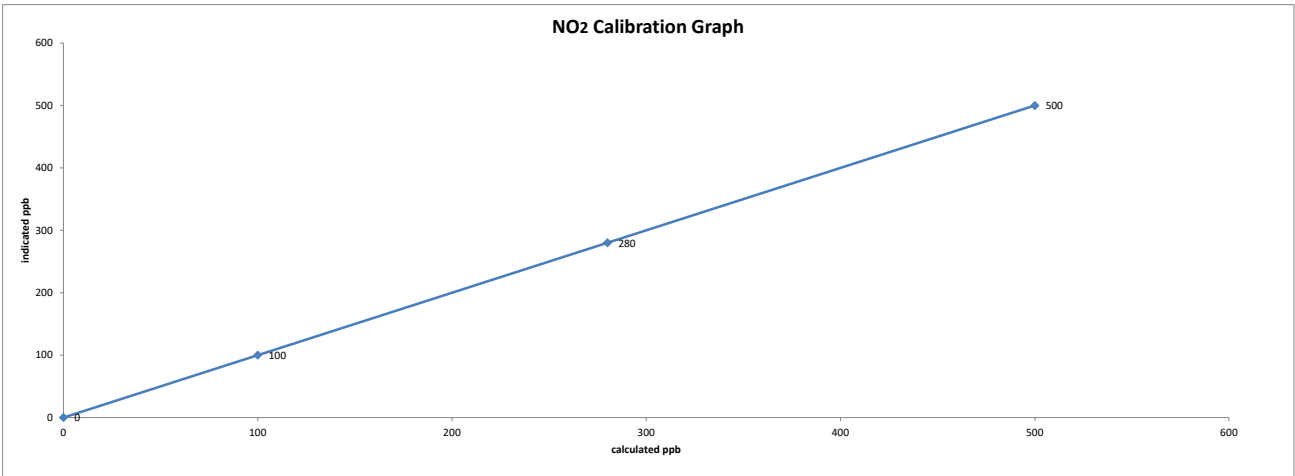
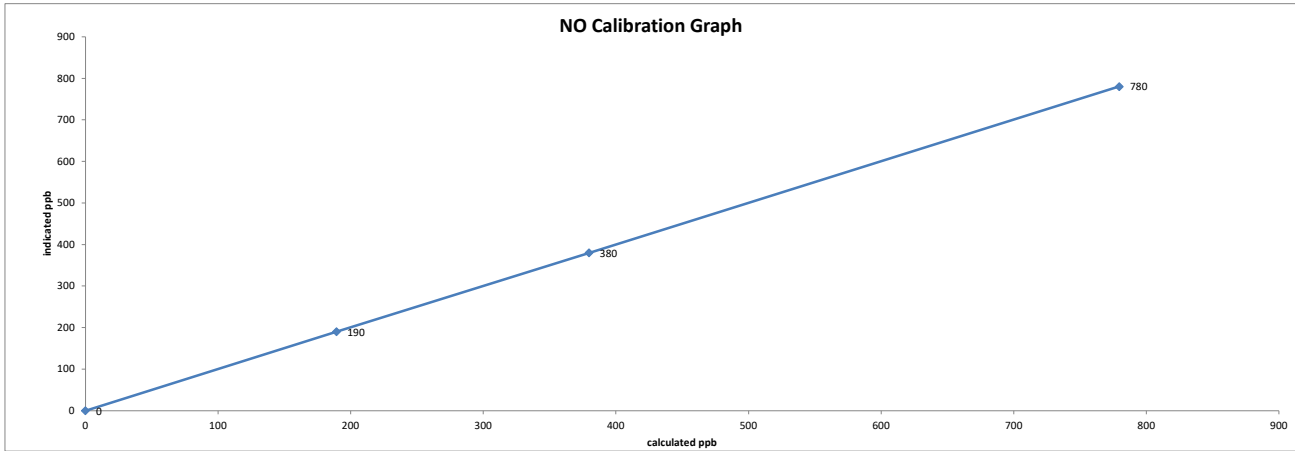
No high point NO₂ adjustment was required/made.

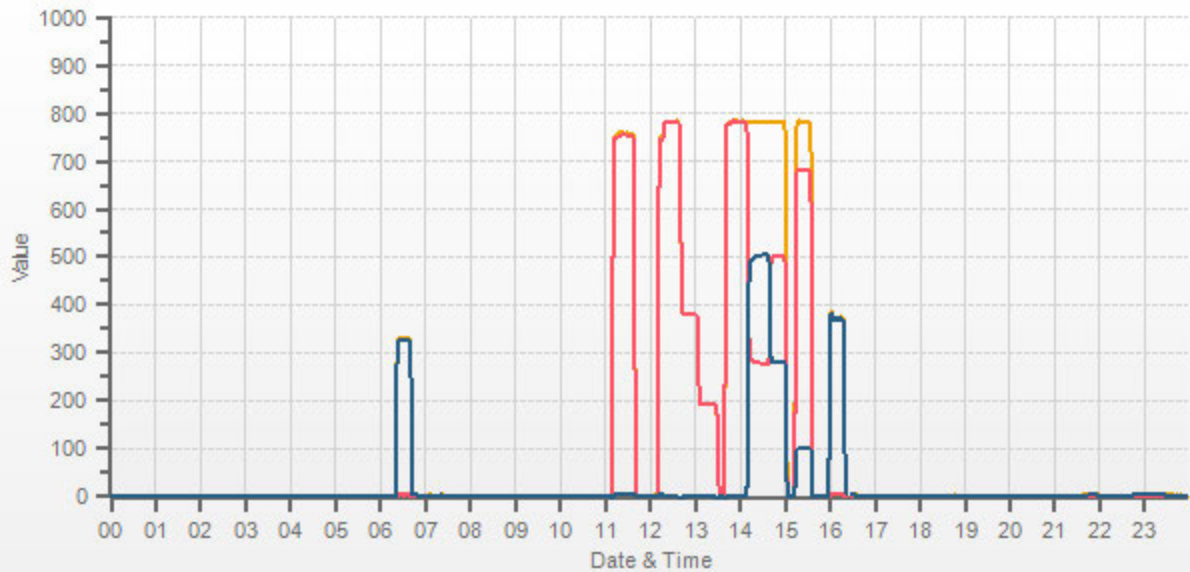
A new permeation tube was installed. The calibration gas cylinder line broke and was replaced at 15:01. The Low GPT point starts at 15:12.

Date: May 23, 2019
Company/Airshed: LICA
Location/Station Name: St. Lina

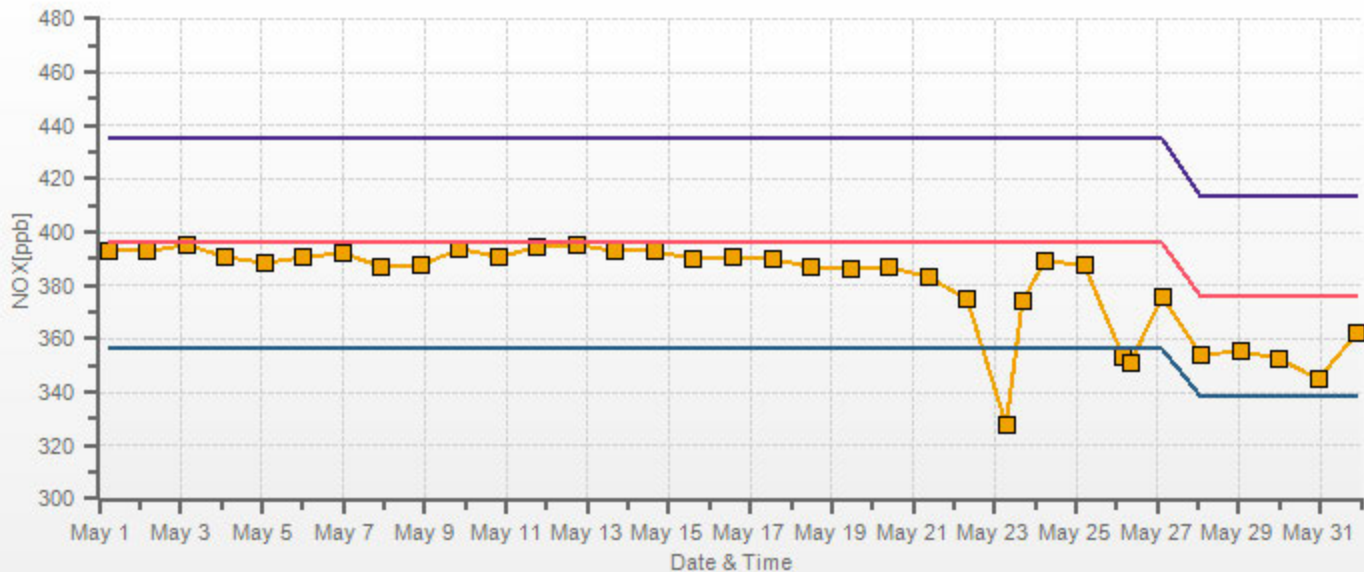
Start/End Time 24 hr. (mst): 10:28 / 16:22
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Gas Phase Titration

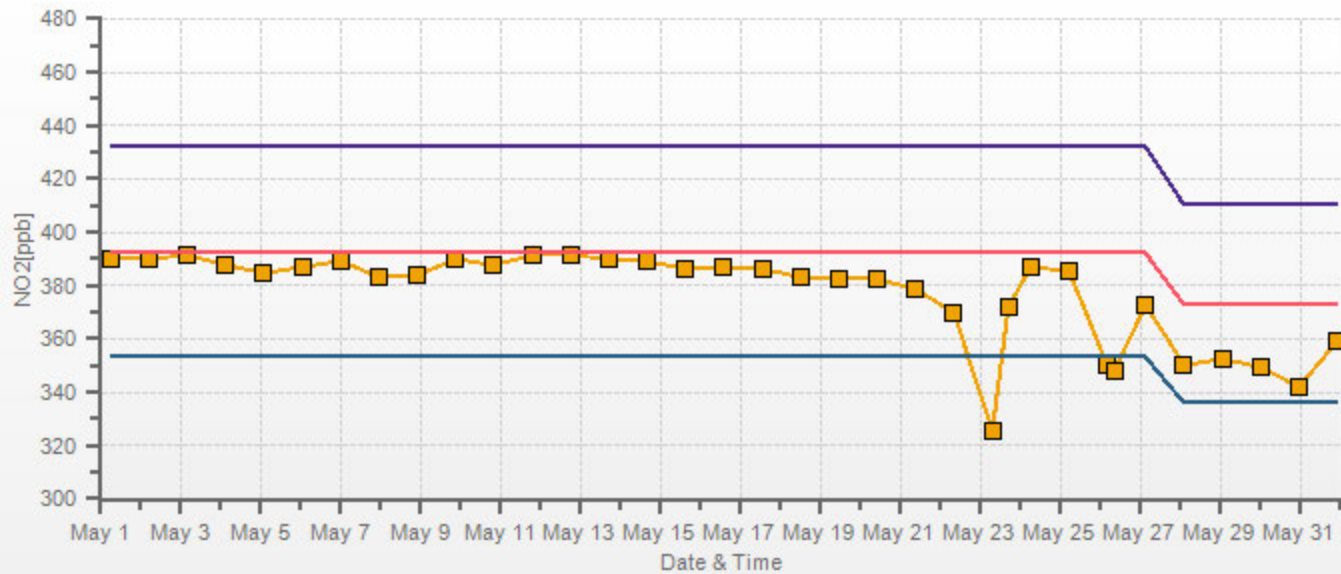
Thermo 42i NO-NO2-NOx Analyzer Calibration





NOX[ppb] Calibration: LICA ST. LINA Monthly: 19/05 Type: Span







Thermo 49i Ozone Analyzer Calibration

Date: May 23, 2019 Company/Airshed: LICA Location/Station Name: St. Lina Start/End Time 24 hr. (mst): 10:28 / 14:57 Ozone Calibration Method: Varying UV Lamp Power G.P.T. Date: n/a-done by Varying UV Lamp Power Analyzer: Serial Number/Owner: 1002240371 LICA Last Calibration Date: April 12, 2019 Previous Cal High Point C.F.: 1.000	Barometer/B.P./units: F.S. #05544 expires Jan 17, 2020 934 millibars Thermometer/Station Temp: F.S. #160348895 expires Jun 19, 2020 23 °C Weather Conditions: A few clouds Calibration Purpose: routine monthly Performed By/Reviewer: Alex Yakupov Rob Fisher Cal Gas Expiry Date: n/a-done by Varying UV Lamp Power Ozone Range ppb: 500 As Found C.F.: 1.000 New C.F.: 1.000
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Calibration Standards: Low Flow Meter ID/Expiry Date: N/A High Flow Meter ID/Expiry Date: N/A Calibrator ID/Expiry Date: Sabio id# 11900613 expires April 16, 2020 Cal Gas Cylinder I.D. #: N/A	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>AMD Required Range of Ozone Calibration Points</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>300-400 ppb</td> </tr> <tr> <td>Mid</td> <td>150-200 ppb</td> </tr> <tr> <td>Low</td> <td>50-75 ppb</td> </tr> </tbody> </table>	Point	AMD Required Range of Ozone Calibration Points	High	300-400 ppb	Mid	150-200 ppb	Low	50-75 ppb
Point	AMD Required Range of Ozone Calibration Points								
High	300-400 ppb								
Mid	150-200 ppb								
Low	50-75 ppb								

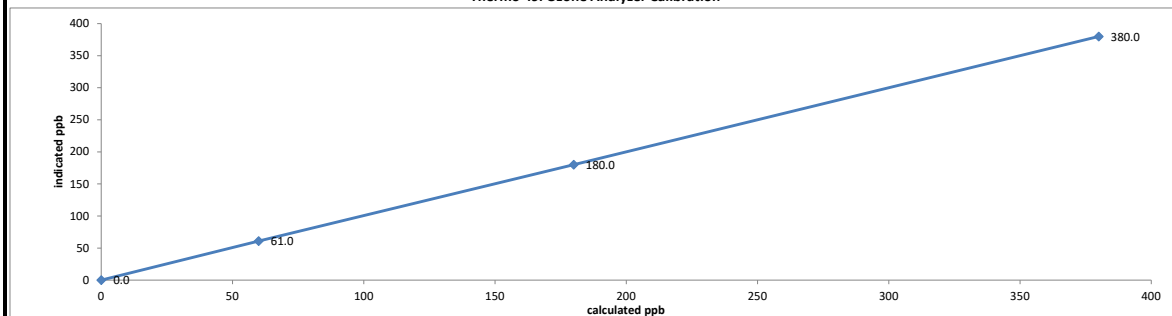
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5000	5000	0.0	n/a	0.0	n/a
as found high	5000	5000	380.0	380.0	380.0	1.000
adjusted zero	5000	5000	0.0	0.0	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	180.0	180.0	180.0	1.000
low	5000	5000	60.0	60.0	61.0	0.984
calibrator zero	5000	5000	0.0	n/a	0.0	n/a
Average C.F.=						0.995

Linear Regression/Calibration Results:

Correlation Coefficient = 1.000	LIMITS
Slope = 1.001	> or = 0.995
b (Intercept as % of full scale)= -0.08%	0.95-1.05
% change in C.F. from last cal= 0.00%	± 3% F.S.
	± 10%

Thermo 49i Ozone Analyzer Calibration



As found:

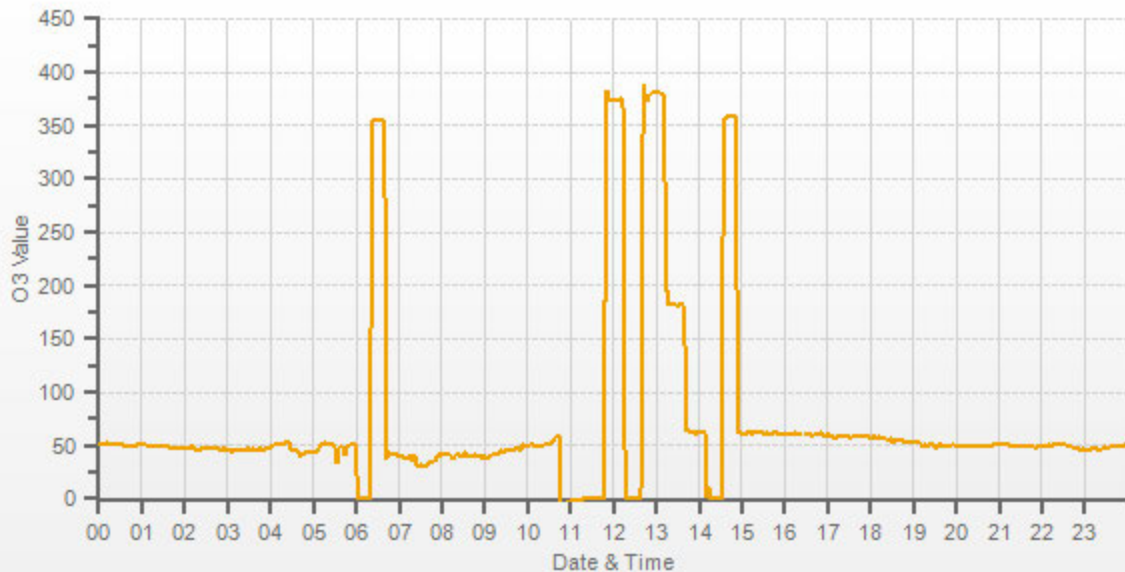
O3 Bkg:	-0.8
O3 Coef:	0.992
Photo Lamp:	10.7
O3 Lamp:	8.2
Bench:	29.0
Bench Lamp:	53.6
O3 Lamp:	67.7
Pressure:	678.2
Cell A lpm:	0.730
Cell B lpm:	0.774
O3 ppb:	0
Cell A ppb:	-0.3
Cell B ppb:	0.4
Cell A int (Hz):	69394
Cell B int (Hz):	88384
Expected Value:	366.1

As left:

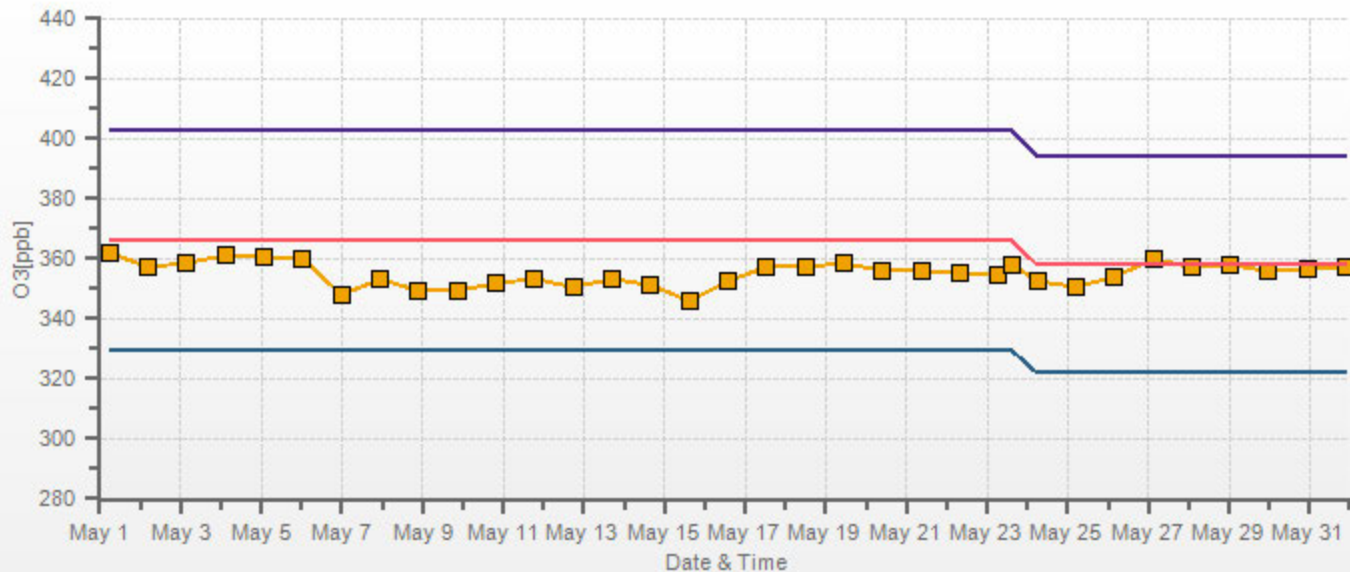
O3 Bkg:	-0.2
O3 Coef:	1.009
Photo Lamp:	10.7
O3 Lamp:	8.2
Bench:	29.0
Bench Lamp:	53.6
O3 Lamp:	67.7
Pressure:	678.2
Cell A lpm:	0.730
Cell B lpm:	0.774
O3 ppb:	61.8
Cell A ppb:	62
Cell B ppb:	61.6
Cell A int (Hz):	69380
Cell B int (Hz):	88373
Expected Value:	358.0

Comments:

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



O3[ppb] Calibration: LICA ST. LINA Monthly: 19/05 Type: Span





Thermo 5030i SHARP Monitor Calibration

Date:	May 27, 2019	Performed By/Reviewer:	Alex Yakupov	Rob Fisher
Company:	LICA	Start Time (mst):	14:08	
Station Name/Location:	St. Lina	End Time (mst):	16:12	
Previous Audit Date:	April 26, 2019	Calibration Purpose:	Quarterly	
Parameter:	PM 2.5	Weather Conditions:	Smoke	

SHARP 5030i Information and Status:	Serial Number: CM 17091001	Filter Tape Counter	176
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Reference Standards: Air Flow						
	Manometer	Orifice	Pressure:		Temp / RH:	
Make:	Dwyer	Chinook	Fisher Scientific		Fisher Scientific	
Model:	475 Mk. III	CHN0901	FB61291		11-661-7A	11745843
Serial Number:	#3	#4	130168457		160348895	
Expiry Date:	January 17, 2020	January 31, 2020	January 17, 2020		June 19, 2020	

Ambient Temperature (°C)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	22.60	23.5	-0.9	22.60	22.6	0.0
#2	22.50	23.5	-1.0	22.60	22.6	0.0
#3	22.60	22.5	0.1	22.60	22.6	0.0
Average	22.6	23.2	-0.6	22.6	22.6	0.0

Temp Limit: ± 2°C

Ambient Relative Humidity (%RH)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Offset (ZERO)	Reference	SHARP	Offset (ZERO)
#1	20.20	21.1	-0.9	22.10	22.1	0.0
#2	20.30	21.3	-1.0	22.10	22.1	0.0
#3	20.20	21.2	-1.0	22.20	22.3	-0.1
Average	20.2	21.2	-1.0	22.1	22.2	0.0

RH Limit: ± 2 %RH

Flow Temperature (°C)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	21.00	21.0	0.0	21.00	21.0	0.0
#2	21.10	21.1	0.0	21.10	21.1	0.0
#3	21.20	21.1	0.1	21.20	21.1	0.1
Average	21.1	21.1	0.0	21.1	21.1	0.0

Temp Limit: ± 2°C

Barometric Pressure (mmHg)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	699.6	698.8	0.8	699.6	699.6	0.0

BP Limit: ± 2 mmHg

Nephelometer Relative Humidity (%RH)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	26.60	26.2	0.4	26.60	26.2	0.4

RH Limit: ± 2 %RH

Nephelometer Temperature (°C)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	20.90	20.4	0.5	20.90	20.9	0.0

Temp Limit: ± 2°C

Nephelometer Source Level						
As Found:			As Left: (same as found if acceptable)			
	Variable	Value		Variable	Value	
	IRED	66		IRED	66	
	SRC LEVEL	47		SRC LEVEL	47	

IRED Limit (as found): 60-70 mA
Adjusted IRED Limit (as left): 65 mA

Detector Calibration (Auto)						
As Found:			As Left:			
Detector Auto Calibration Completed: YES			Variable	Value		
			HIGH VOLT	1340		
			BETA REF TH	250		
			ALPHA TH	630		
			DIFF HV	0		

Mass Coefficient (Auto)						
Zero			Span			
	Variable	Value		Variable	Value	
	MASS COEF	7031.5		MASS COEF	7097.0	
	FOIL VALUE	0		FOIL VALUE	1045	
	Beta Avg	8932		Beta Avg	7709	
	difference	Foil set # 4804		difference	0.9	

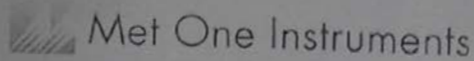
Foil Set: CM1597

Flow Calibration (L/min)						
As Found:			As Left: (same as found if acceptable)			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	16.61	16.67	-0.06	16.67	16.67	0.00
#2	16.62	16.67	-0.05	16.67	16.68	-0.01
#3	16.62	16.66	-0.04	16.67	16.67	0.00
Average	16.62	16.67	-0.05	16.67	16.67	0.00

Flow Limit: 16.67 ± 0.33 L/min

Leak Check (L/min)						
Without Leak Check Adapter			With leak Check Adapter			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	16.67	16.67	0.00	16.62	16.64	-0.02

Leak Limit: 0.08 L/min
LEAK RATE: -0.02



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.: 122618
 Tested per PO: 35-67600 Calibration Date: 05/25/2017
 Calibrated by: David Frith *DF* QC Inspection: *Chris Paul*

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

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

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

Test Equipment Used for Calibration of Instruments

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

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

Firmware Version: 3194-01 R2.62

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



Meteorological Sensor Audit/Calibration

Location Information

Company:	LICA	Performed By:	Alex Yakupov
Audit Location:	St. Lina	Reviewed By:	Rob Fisher
Audit Date:	May 3, 2019	Start/End Time (mst):	11:51 / 15:17
Calibration Purpose:	installation	Weather Conditions:	Cloudy/Overcast

Wind Sensor Information

Sensor ID Data:		Sensor Outputs:	
Sensor Make:	RM Young	Velocity Voltage Output Range:	0-1 V
Sensor Model:	05305VK	Velocity Unit Output Range:	0-200 km/h
Serial #:	WM 161466	Direction Voltage Output Range:	0-1 V
Previous Cal/Audit Date:	May 17, 2018	Direction Unit Output Range:	0-360 degrees

Wind Calibrator Information

Calibrator I.D. and Expiry Date: 18860-90/18802 #CA 4744 expires May 18, 2019

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	0.1	0.1	-
1000	18.4	18.5	18.5	0.995
2000	36.9	36.9	37.0	0.999
3000	55.3	55.4	55.4	0.998
4000	73.7	73.9	73.9	0.997
5000	92.2	92.2	92.5	0.998
6000	110.6	111.0	111.0	0.996
7000	129.0	129.5	129.5	0.996
8000	147.4	148.1	148.1	0.995
9000	165.9	166.7	166.7	0.995
10000	184.3	185.2	184.9	0.996
The audit meets AMD requirements.			Average Correction Factor=	0.997

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

Generated Wind Direction 0-360 (Up)	Generated Wind Direction 360-0 (Down)	Indicated Wind Direction 0-360 (Up)	Indicated Wind Direction 360-0 (Down)	Degrees Difference 0-360 (Up)	Degrees Difference 360-0 (Down)	Average Absolute Degrees Difference
0	355	1	355	0.5	0.0	0.3
30	330	31	330	-1.1	0.1	0.6
60	300	62	300	-1.7	0.0	0.9
90	270	92	271	-2.1	-0.8	1.5
120	240	122	242	-2.1	-1.8	2.0
150	210	152	211	-1.8	-1.4	1.6
180	180	183	183	-2.5	-2.5	2.5
210	150	212	152	-2.2	-1.5	1.8
240	120	242	122	-2.3	-2.3	2.3
270	90	271	93	-0.7	-2.7	1.7
300	60	300	61	-0.2	-1.3	0.7
330	30	330	30	0.3	-0.3	0.3
355	0	355	1	0.0	0.5	0.3
The audit meets AMD requirements.			Average Absolute Degrees Difference=		1.3	

Comments:



Meteorological System Checklist

Date:	May 27, 2019		
Technician:	Alex Yakupov		
Reviewer:	Rob Fisher		
Station:	St. Lina		
Unit:	Make:	Model:	Serial #:
Precipitation Sampler:	Met One - Heated Rain Gauge	Part 387	n/a
PRECIPITATION SENSOR CHECK			
Checklist:	Reply:	Comments:	
Is the sensor Level?	yes	n/a	
Is the heater operating properly?	yes		
Are the bucket drain holes clean?	yes		
Is the screen on the housing? (screen should be on between July and September)	other - see comments	The screens will be installed from July to September.	
Is the housing clean?	yes		
Is the area around the housing clean and free from obstacles?	yes		
TIP TEST - Slowly pour water until 10 tip are heard. (10 tips = 1 ml)			
# of Tips	Data Logger Response (ml):	Manual Specification = +/- 0.1 ml	
10	1.00	0.00	

Company Maxxam Operator: Tom Bourque

Calibrator:				Flow Measurement Device:			
Make/Model	<u>API 700</u>			Make/Model	<u>N/A</u>		
Serial Number	<u>690</u>			Serial Number	<u>N/A</u>		
Last Verification Date	<u>March 2018</u>			Temperature (°C)	<u>24.4 C</u>		
NO Cylinder S/N	<u>EY0000769</u>			Barometric Pressure	<u>699 mmHg</u>		
NO [PPM]	<u>51.1</u>	NOx [PPM]	<u>51.2</u>				
Expiry Date	<u>December 2019</u>						

Dilution Flow (sccm)					
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>	Pt. #3	<u>5000</u>
Gas Flow (sccm)					
Pt. #1	<u>80</u>	Pt. #2	<u>40</u>	Pt. #3	<u>20</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5000	0.0	0.000	0.000	0.000	-0.001	-0.001	Limit ± 10%	
5083	80.0	0.804	0.806	0.802	-0.011	0.791	0%	-2%
5044	40.0	0.405	0.406	0.403	-0.006	0.397	-1%	-2%
5022	20.0	0.204	0.204	0.202	-0.004	0.198	-1%	-2%
Absolute Average Percent Difference							1%	2%

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

<u>NO</u>	<u>LIMITS</u>	<u>NOx</u>
Correlation= 1.0000	≥ 0.990	Correlation= 1.0000
m (Slope)= 0.9974	0.90-1.10	m (Slope)= 0.9833
b (Intercept % of FS)= -0.0592	± 3% F.S.	b (Intercept % of FS)= -0.1772

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOx	% Diff. Vs Audit gas	
5083	0.000	0.000	0.802	-0.011	0.791	NO ₂	% Diff. Limit
5083	0.500	0.518	0.284	0.488	0.771	-4%	± 10%
5083	0.300	0.323	0.479	0.294	0.774	-6%	± 10%
5083	0.150	0.167	0.635	0.142	0.777	-8%	± 10%
						6%	± 10%

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

<u>NO₂</u>	<u>LIMITS</u>	
Correlation= 0.9998	≥ 0.995	Big shift down in NOx when entering GPT function. Possible flow change.
m (Slope)= 0.9649	0.90-1.10	
b (Intercept % of FS)= -1.4907	± 3% F.S.	

AENV Standards Audit Calibrator	NO _x Analyzer
Make/Model <u>Teco 146i</u>	Make/Model <u>Teco 42i</u>
Serial/AMU Number <u>AMU 1809</u>	Serial/AMU Number <u>AMU 2265</u>
SRM Gas Cylinder No. <u>APEX1236646</u>	Last Calibration Date <u>April 15, 2019</u>
Cylinder Conc. (ppm) <u>50.04</u>	Full Scale (ppm) <u>1.0</u>
	Cylinder Gas Expiry Date <u>June 2021</u>

COMMENTS: With ZAG Teledyne 701 Maxxam ID 11986.

Auditor: Al Clark
Operator Signature:

Date: April 16, 2019
Location: McIntyre Center Edmonton

Company <u>Maxxam</u>		Operator: <u>Tom Bourque</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>N/A</u>
Serial Number	<u>11900613</u>	Serial Number	<u>N/A</u>
Last Verification Date	<u>August 2018</u>	Temperature (°C)	<u>24.4 C</u>
NO Cylinder S/N	<u>EY0000769</u>	Barometric Pressure	<u>699 mmHg</u>
NO [PPM]	<u>51.1</u>	NOx [PPM]	<u>51.2</u>
Expiry Date	<u>December 2019</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>
Pt. #3	<u>5000</u>		
Gas Flow (sccm)			
Pt. #1	<u>80</u>	Pt. #2	<u>40</u>
Pt. #3	<u>20</u>		

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5000	0.0	0.000	0.000	0.000	-0.002	-0.002	Limit ± 10%	
5080	80.0	0.805	0.806	0.815	-0.007	0.808	1%	0%
5041	40.0	0.405	0.406	0.414	-0.004	0.410	2%	1%
5019	20.0	0.204	0.204	0.210	-0.004	0.206	3%	2%
Absolute Average Percent Difference							2%	1%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
NO		LIMITS		NOx			
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000		
m (Slope)=	1.0117	0.90-1.10		m (Slope)=	1.0039		
b (Intercept % of FS)=	0.2171	± 3% F.S.		b (Intercept % of FS)=	-0.0020		

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5080	0.000	0.000	0.815	-0.009	0.806	NO ₂	% Diff. Limit
5080	1.400	0.517	0.298	0.511	0.809	1%	± 10%
5080	0.900	0.308	0.507	0.299	0.806	0%	± 10%
5080	0.500	0.140	0.675	0.130	0.805	-1%	± 10%
						0%	± 10%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
NO₂		LIMITS					
Correlation=	1.0000	≥ 0.995					
m (Slope)=	1.0062	0.90-1.10					
b (Intercept % of FS)=	-1.0004	± 3% F.S.					

AENV Standards		NO_x Analyzer	
Audit Calibrator			
Make/Model	<u>Teco 146i</u>	Make/Model	<u>Teco 42i</u>
Serial/AMU Number	<u>AMU 1809</u>	Serial/AMU Number	<u>AMU 2265</u>
SRM Gas Cylinder No.	<u>APEX1236646</u>	Last Calibration Date	<u>April 15, 2019</u>
Cylinder Conc. (ppm)	<u>50.04</u>	Full Scale (ppm)	<u>1.0</u>
		Cylinder Gas Expiry Date	<u>June 2021</u>

COMMENTS: With ZAG Teledyne 701 Maxxam ID: 11981. Should have Maxxam ID 11986 instead

Auditor: Al Clark Date: April 16, 2019
 Operator Signature: *Al Clark* Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2019-392CGA

Company: Maxxam **Operator's Name:** Alex

Cylinder #: LL107918 Concentration PPM: 49.5 Tolerance(%) 1 Certified By: Praxair

Expiry Date: August 2026

Reference Calibrator and Gas:	Flow Measurement Device:
Make/Model: <u>Sabio 2010</u>	Make/Model: <u>Mesa Definer 220</u>
Serial Number: <u>AMU 2092</u>	Serial Number: <u>H-133034 / L-132702</u>
Last Verification Date: <u>January 14, 2019</u>	Temp. °C: <u>22.7 C</u>
Gas Type: <u>SO2</u> Conc. <u>50.26</u>	B.P. <u>707 mmHg</u>
Cylinder Number: <u>FF28071</u>	
Expiry Date: <u>March 2020</u>	

Reference Analyzer:

Make/Model: Teco 43i Serial/AMU Number: 2195

Instrument Settings: Zero: 11.8 Span: 0.980 Range: 1.0

Last Calibration: Date: Jan 14/19 C.F. 1.000 Done By: Shea Beaton

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.000	0.000	0.000	0.000
4898	78.1	0.790	0.01595	62.714	49.5
4893	38.7	0.389	0.00791	126.434	49.2
4894	19.3	0.192	0.00394	253.575	48.7
Average Cylinder Concentration:					49.1

Previous Stated Concentration PPM: 49.5

Percent variance from Stated: 1

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

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

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

Auditor: Al Clark

Operator Signature:

Date: January 15, 2019

Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-493CGA

Company: Maxxam Operator's Name: Mike
 Cylinder #: EY0001003 Concentration PPM: 9.55 Tolerance(%) 2 Certified By: Praxair
 Expiry Date: October 2020

Reference Calibrator and Gas:
 Make/Model: Sabio 2010
 Serial Number: AMU 2092
 Last Verification Date: January 17, 2018
 Gas Type: H2S Conc. 20.43
 Cylinder Number: CAL015272
 Expiry Date: January 2019

Flow Measurement Device:
 Make/Model: Mesa Defender 530
 Serial Number: H-153961 / L-153874
 Temp. °C: 23.0 C
 B.P.: 697 mmHg

Reference Analyzer:
 Make/Model: Teco 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 12.9 Span: 0.955 Range: 0.1
 Last Calibration: Date: Jan 17/18 C.F.: 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Concentration (PPM)	Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration
Dilution	Gas				
5000	0.0	0.0000	0.0000	0.0000	0.0000
5051	39.6	0.0753	0.00784	127.551	9.60
5028	20.2	0.0387	0.00402	248.911	9.63
5033	10.5	0.0198	0.00209	479.333	9.49
Average Cylinder Concentration:					9.58

Previous Stated Concentration PPM: 9.55

Percent variance from Stated: 0

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

Auditor: Al Clark

Date: January 18, 2018

Operator Signature: *Al Clark*

Location: McIntyre Center Edmonton



Calibration Gas Audit

CH₄ / C₃H₈ Cylinder Gas

File No. 2019-393CGA

Company: Maxxam **Operators name:** Alex
Cylinder #: LL29687 **Conc CH₄ (PPM)** 598/198 **Tolerance (%)** 1 **Certified By:** Praxair
Expiry Date: August 2026

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>Mesa Definer 220</u>		
Serial Number	<u>AMU 2092</u>	Serial Number	<u>H-133034 / L-132702</u>		
Last Verification Date	<u>January 14, 2019</u>	Temp. °C	<u>23.8 C</u>		
Gas Type	<u>CH₄</u>	Conc.	<u>990.4</u>		
Cylinder Number	<u>05604875</u>	Expiry Date	<u>July 2021</u>		
Gas Type	<u>C₃H₈</u>	Conc.	<u>246.5</u>		
Cylinder Number	<u>XF003845B</u>	Expiry Date	<u>July 2022</u>		

Reference Analyzer:
Make/Model Teco 55i **Serial/AMU Number:** 2221
Instrument Settings **Zero:** N/A **Span:** N/A **Range:** 20.0
Last Calibration: **Date:** Jan 14/19 **C.F.** 1.000 **Done By:** Shea Beaton

Calibrator Flows (scem)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	CH ₄	C ₃ H ₈			CH ₄	C ₃ H ₈
5000	0.0	0.00	0.00	0.02	51.48	603	209
3990	77.5	11.71	11.18	0.02	51.48	603	209
3976	39.1	5.87	5.71	0.01	101.69	597	211
3986	20.0	2.96	2.86	0.01	199.30	590	207
Average Cylinder Concentration:						597	209

<u>CH₄</u>	<u>C₃H₈</u>
Previous Stated Concentration PPM: <u>598</u>	Previous Stated Concentration PPM: <u>198</u>
Percent variance from Stated: <u>0</u>	Percent variance from Stated: <u>6</u>

Cylinder gas tolerances based on CH₄ only

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

Auditor: Al Clark **Date:** January 15, 2019
Operator Signature: **Location:** McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2019-391CGA

Company: Maxxam **Operators name:** Alex

Cylinder #: LL107918 Conc (PPM) 50.1/50.2 Tolerance (%) 1 Certified By: Praxair

Expiry Date: August 2026

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Teco 146i</u>			Make/Model	<u>Mesa Definer 220</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>H-133034 / L-132702</u>
Last Verification Date	<u>January 14, 2019</u>			Temp. °C	<u>22.7 C</u>
Gas Type	<u>NO</u>	Conc.	<u>50.05</u>	B.P.	<u>707 mmHg</u>
Cylinder Number	<u>APEX1236645</u>				
Expiry Date	<u>June 2021</u>				

Reference Analyzer:

Make/Model Teco 42i Serial/AMU Number: 2268

Instrument Settings Zero: 9.2 Span: 1.223 Range: 1.0

Last Calibration: Date: Jan 14/19 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
5000	0.0	0.000	0.000				
4898	78.1	0.792	0.793	0.016	62.714	49.7	49.7
4893	38.7	0.395	0.395	0.008	126.434	49.9	49.9
4894	19.3	0.195	0.195	0.004	253.575	49.4	49.4
Average Cylinder Concentration:						49.7	49.7

NO	NOx
Previous Stated Concentration PPM: <u>50.1</u>	<u>50.2</u>
Percent variance from Stated: <u>1</u>	<u>1</u>

Cylinder gas tolerances based on NO only

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

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration

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

Auditor: Al Clark Date: Janaury 15, 2019

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



Lakeland Industry & Community Association
5107 50 St
Bonnyville, AB T9N2J7

End of Report



Lakeland Industry & Community Association

MAY 2019

Ambient Air Monitoring Calibration Report

- BONNYVILLE EAST STATION-

CAL-LICA-201905-01608

Station Operation and Maintenance:

Maxxam Analytics

Data Validation and Report:

Maxxam Analytics

July 2, 2019



Lakeland Industry & Community Association
5107 50 St
Bonnyville, AB T9N2J7

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

July 2, 2019

Subject:

May 2019 Ambient Air Monitoring Calibration Report Submission for the LICA Bonnyville East station

Lakeland Industry & Community Association (LICA) is pleased to submit the ambient air monitoring calibration report for the LICA Bonnyville East AQM Station in the month of May 2019. This calibration report includes equipment calibration records, calibrator performance audit records and calibration gas audit records for the equipment that were used this month. This calibration report is prepared by the LICA network contractor.

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


Respectfully,

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

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

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

Lily Lin
Data & Reporting Specialist
587-225-2248
monitoring@lica.ca



May 1 - 31, 2019

MONTHLY CALIBRATION REPORT

Project #: 2833-2019-05-39-C

LICA-201905

Prepared for:

Lakeland Industry & Community Association

Mike Bisaga

5107 50 St.

Bonnyville, Alberta T9N 2J7

monitoring@lica.ca

780-266-7068

Monitoring Station

**Bonnyville East Continuous Monitoring
Station**

Date of Report Issuance: June 25, 2019



#1 - 2080 39 Avenue NE, Calgary AB, T2E 6P7



Thermo 431-TLE Sulphur Dioxide Analyzer Calibration

Date: <u>May 17, 2019</u>	Barometer/B.P./units: <u>F.S. #05544 expires Jan 17, 2020</u>	<u>942</u>	millibars
Company/Airshed: <u>LICA</u>	Thermometer/Station Temp: <u>F.S. #160348895 expires Jun 19, 2020</u>	<u>22</u>	°C
Location/Station Name: <u>Bonnyville - East</u>	Weather Conditions: <u>Mainly sunny</u>		
Parameter: <u>Sulphur Dioxide</u>	Calibration Purpose: <u>routine monthly</u>		
Start Time 24 hr. (mst): <u>9:41</u>	Performed By/Reviewer: <u>Alex Yakupov</u>		<u>Rob Fisher</u>
End Time 24 hr. (mst): <u>14:17</u>	Cal Gas Expiry Date: <u>August 20, 2020</u>		
Calibration Method: <u>Gas Dilution</u>	Converter Model & s/n (if applicable): <u>n/a</u>		
Analyzer:			
Serial Number/Owner: <u>1180320043</u> <u>LICA</u>	Range ppb: <u>1000</u>		
Last Calibration Date: <u>April 8, 2019</u>	As Found C.F.: <u>1.061</u>		
Previous C.F.: <u>1.000</u>	New C.F.: <u>1.000</u>		

Calibration Standards: Low Flow Meter ID/Expiry Date: <u>N/A</u> High Flow Meter ID/Expiry Date: <u>N/A</u> Calibrator ID/Expiry Date: <u>API id# 690 expires April 16, 2020</u> Cal Gas Cylinder I.D. #: <u>LL 107918</u> Cal Gas Conc. (ppm): <u>49.5</u>	Standard Calibration Points for Ranges <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Point</td><td>ppb</td></tr> <tr><td>High</td><td>780</td></tr> <tr><td>Mid</td><td>380</td></tr> <tr><td>Low</td><td>190</td></tr> </table>	Point	ppb	High	780	Mid	380	Low	190
Point	ppb								
High	780								
Mid	380								
Low	190								

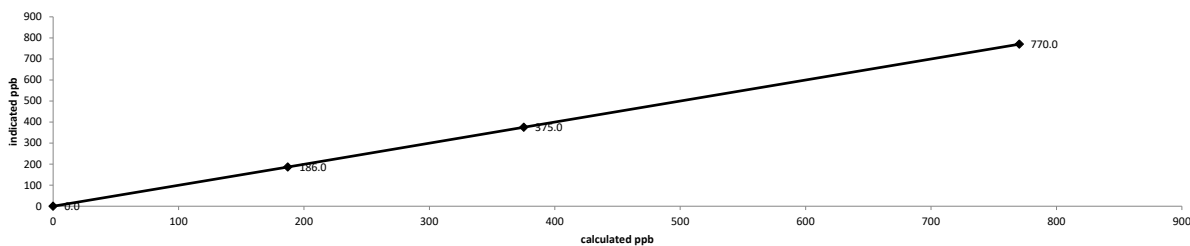
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	4997	0.00	4997	0.0	-0.2	n/a
as found high	4921	77.80	4999	770.4	726	1.061
adjusted zero	4997	0.00	4997	0.0	0	n/a
adjusted high	4921	77.80	4999	770.4	770	1.000
mid	4961	37.90	4999	375.3	375	1.001
low	4980	18.90	4999	187.1	186	1.006
calibrator zero	4997	0.00	4997	0.0	0	n/a
Average C.F. =						1.002

Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u>	LIMITS
Slope = <u>1.000</u>	> or = 0.995
b (Intercept as % of full scale) = <u>0.04%</u>	0.95-1.05
% change in C.F. from last cal = <u>-6.08%</u>	± 3% F.S.
	± 10%

Thermo 431-TLE Sulphur Dioxide Analyzer Calibration



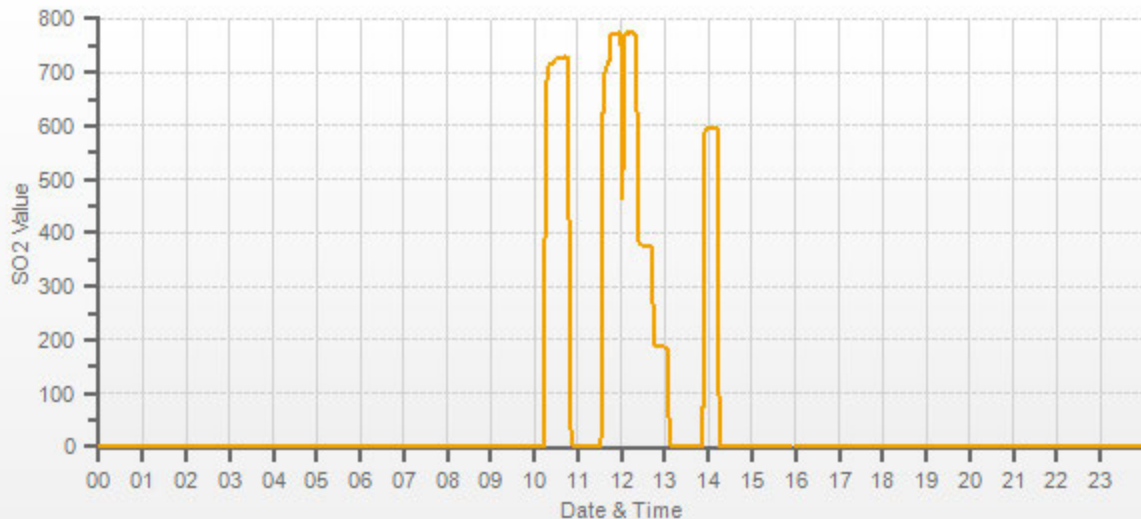
As found: Bkg: <u>4.56</u> Coef: <u>0.928</u> Pmt: <u>-677.1</u> Flash: <u>1081</u> Internal: <u>32.8</u> Chamber: <u>44.9</u> Perm Oven Gas: <u>45.00</u> Perm Oven Heater: <u>44.25</u> Pressure: <u>682.9</u> Sample Flow: <u>0.459</u> Lamp Intensity: <u>91</u> Converter: <u>n/a</u> Converter Set: <u>n/a</u> Averaging Time: <u>120</u> Expected Value: <u>572.0</u>	As left: Bkg: <u>4.60</u> Coef: <u>0.977</u> Pmt: <u>-677.5</u> Flash: <u>1082</u> Internal: <u>32.3</u> Chamber: <u>45.2</u> Perm Oven Gas: <u>45.00</u> Perm Oven Heater: <u>44.23</u> Pressure: <u>682.3</u> Sample Flow: <u>0.459</u> Lamp Intensity: <u>91</u> Converter: <u>n/a</u> Converter Set: <u>n/a</u> Averaging Time: <u>120</u> Expected Value: <u>596.0</u>
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Comments:

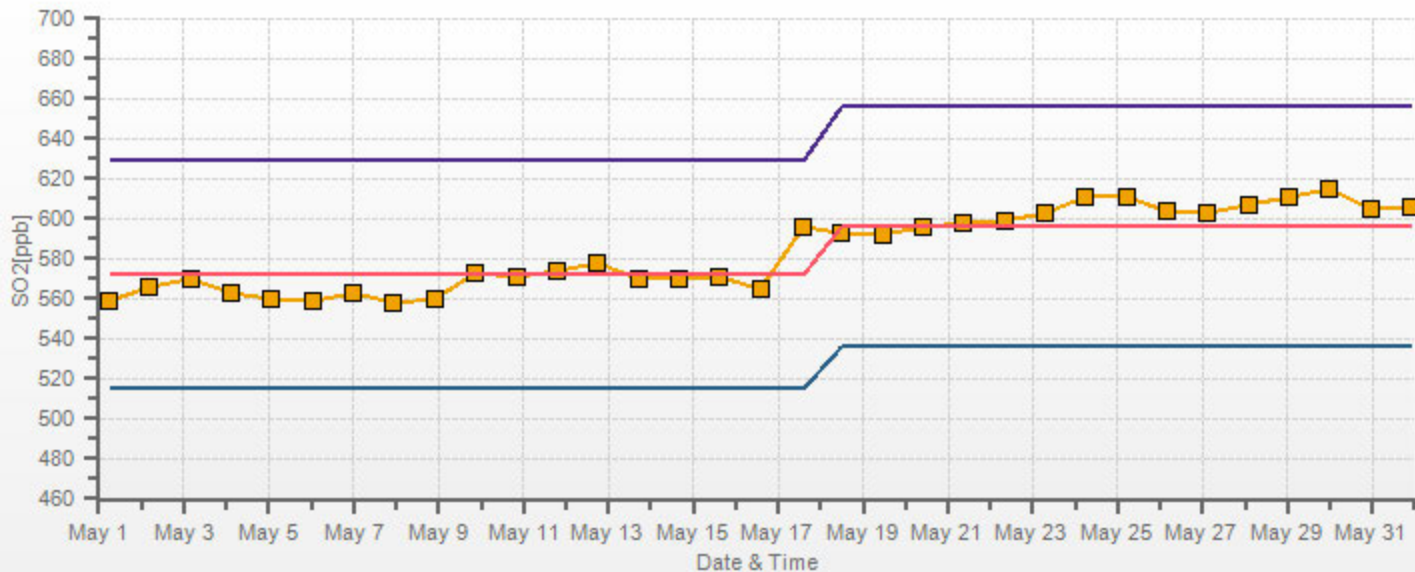
The analyzer sample inlet filter was changed.
 The analyzer cooling fan filter(s) were cleaned.
 The manifold blower was found to be working normally.

The IZS check started at 12:00. The Adjusted High Point was restarted.

SO2[ppb]



SO2[ppb] Calibration: LICA Bonnyville East Monthly: 19/05 Type: Span





Thermo 450i Hydrogen Sulphide Analyzer Calibration

Date:	May 17, 2019	Barometer/B.P./units:	F.S. #05544 expires Jan 17, 2020	942	millibars
Company/Airshed:	LICA	Thermometer/Station Temp:	F.S. #160348895 expires Jun 19, 2020	22	°C
Location/Station Name:	Bonnyville - East	Weather Conditions:	Mainly sunny		
Parameter:	Hydrogen Sulphide	Calibration Purpose:	routine monthly		
Start Time 24 hr. (mst):	9:41	Performed By/Reviewer:	Alex Yakupov	Rob Fisher	
End Time 24 hr. (mst):	14:56	Cal Gas Expiry Date:	October 20, 2020		
Calibration Method:	Gas Dilution	Converter Model & s/n (if applicable):	n/a		
Analyzer:		Range ppb:	100		
Serial Number/Owner:	CM 17360002 LICA	As Found C.F.:	0.989		
Last Calibration Date:	April 8, 2019	New C.F.:	1.000		
Previous C.F.:	1.000				

Calibration Standards: Low Flow Meter ID/Expiry Date: N/A High Flow Meter ID/Expiry Date: N/A Calibrator ID/Expiry Date: Sabio id# 11900613 expires April 16, 2020 Cal Gas Cylinder I.D. #: EY 0001003 Cal Gas Conc. (ppm): 9.55	Standard Calibration Points for Ranges <table border="1"> <tr><th>Point</th><th>ppb</th></tr> <tr><td>High</td><td>78</td></tr> <tr><td>Mid</td><td>38</td></tr> <tr><td>Low</td><td>19</td></tr> </table>	Point	ppb	High	78	Mid	38	Low	19	SO2 Scrubber Check (10 minutes): Start/End Time 24 hr.: 09:50 / 10:05 SO2 Analyzer Range: 1000 Target Concentration (ppb): 780 As Found Zero: 1.7 Analyzer Response (ppb): 1.7 Zero Corrected Result (ppb): 0.0
Point	ppb									
High	78									
Mid	38									
Low	19									

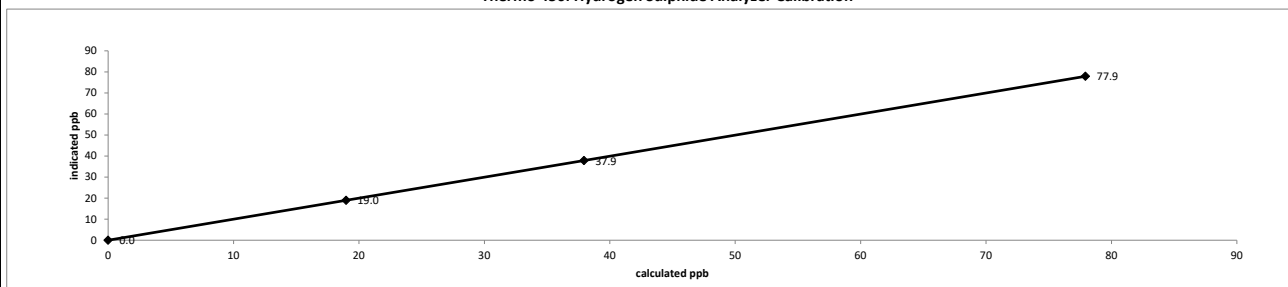
ALL POINTS ARE 15 MINUTES OF STABILITY AS OF SEPTEMBER 23, 2015

Calibrator Flow Rates (cc/min)				Calculated Concentration (ppb):	Indicated Concentration (ppb):	Correction Factors (C.F.):
Point	Diluent	Cal Gas	Total			
as found zero	7500	0.00	7500	0.0	1.7	n/a
as found high	7439	61.20	7500	77.9	80.5	0.989
adjusted zero	7499	0.00	7499	0.0	0	n/a
adjusted high	7439	61.20	7500	77.9	77.9	1.000
mid	7470	29.80	7500	37.9	37.9	1.001
low	7485	14.90	7500	19.0	19	0.999
calibrator zero	7500	0.00	7500	0.0	0	n/a
Average C.F. =						1.000

Linear Regression/Calibration Results:

Correlation Coefficient =	1.000	LIMITS	> or = 0.995
Slope =	1.001		0.95-1.05
b (Intercept as % of full scale) =	-0.01%		± 3% F.S.
% change in C.F. from last cal =	1.11%		± 10%

Thermo 450i Hydrogen Sulphide Analyzer Calibration



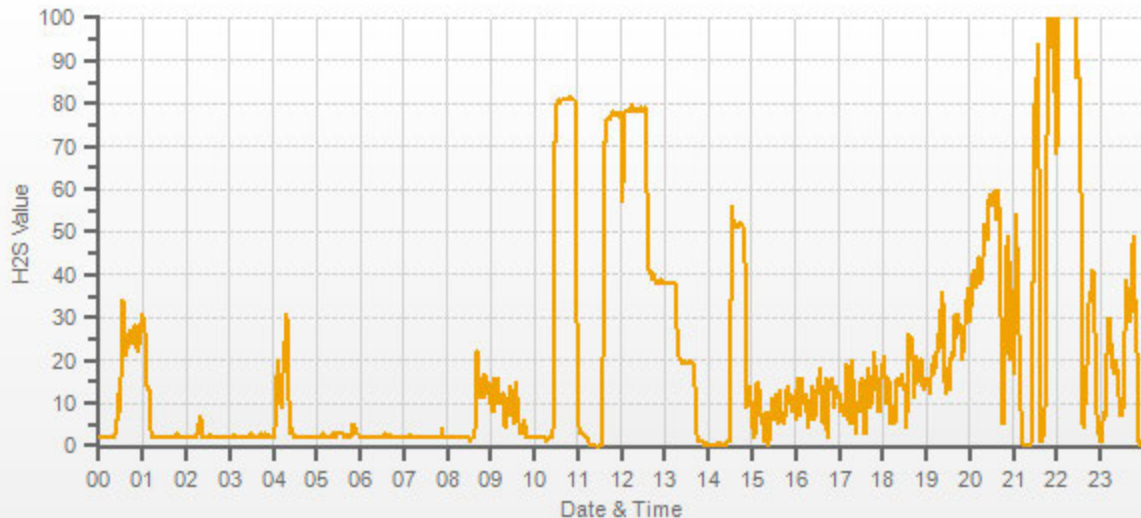
As found:		As left:	
Bkg:	21.5	Bkg:	23.5
Coef:	1.151	Coef:	1.153
Pmt:	-639.0	Pmt:	-639.7
Flash:	773	Flash:	776
Internal:	32.4	Internal:	31.9
Chamber:	45.1	Chamber:	45.0
Converter Temp:	324.7	Converter Temp:	323.0
Converter Set:	325.0	Converter Set:	325.0
Perm Oven Gas:	45.00	Perm Oven Gas:	44.99
Perm Oven Htr:	43.91	Perm Oven Htr:	43.90
Pressure:	560.4	Pressure:	560.1
Sample Flow:	0.951	Sample Flow:	0.951
Lamp Intensity:	91	Lamp Intensity:	91
Averaging Time:	120	Averaging Time:	120
Expected Value:	52.1	Expected Value:	51.6

Comments:

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

The IZS check started at 12:00. The Adjusted High Point was restarted.

H2S[ppb]



H2S[ppb] Calibration: LICA Bonnyville East Monthly: 19/05 Type: Span





Thermo 55i Methane/Non-Methane Analyzer Calibration

Date: May 22, 2019 Company/Airshed: LICA Location/Station Name: Bonnyville - East Parameter: CH4 / NMHC / THC Start/End Time 24 hr. (mst): 10:13 / 13:32 Calibration Method: Gas Dilution	Barometer/B.P./units: F.S. #05544 expires Jan 17, 2020 943 millibars Thermometer/Station Temp: F.S. #160348895 expires Jun 19, 2020 22 °C Weather Conditions: A few clouds Calibration Purpose: routine monthly Performed By/Reviewer: Alex Yakupov Rob Fisher Cal Gas Expiry Date:
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Analyzer: Serial Number/Owner: 1180320044 LICA Measured Flow: 1151 Last Calibration Date: April 9, 2019 Range ppm: 20 CH4/20 NMHC/40 THC	Correction Factors: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>CH₄ =</td> <td>1.000</td> <td>1.034</td> <td>1.000</td> </tr> <tr> <td>NMHC =</td> <td>1.000</td> <td>0.997</td> <td>1.000</td> </tr> <tr> <td>THC =</td> <td>1.000</td> <td>1.017</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	CH ₄ =	1.000	1.034	1.000	NMHC =	1.000	0.997	1.000	THC =	1.000	1.017	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
CH ₄ =	1.000	1.034	1.000														
NMHC =	1.000	0.997	1.000														
THC =	1.000	1.017	1.000														

Calibration Standards:

Low Flow Meter ID/Expiry Date: N/A High Flow Meter ID/Expiry Date: N/A Calibrator ID/Expiry Date: API id# 690 expires April 16, 2020 Cal Gas Cylinder I.D. # : LL 29687 CH4 Cylinder Conc. = 598.0 198.0 = C ₂ H ₆ Cylinder Conc. CH₄ expressed as C₂H₆ = 544.5 1142.5 = total CH ₄ equivalent	Standard Calibration Points for Analyzer Range of 20/20/40 ppm <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>CH₄</th> <th>NMHC</th> <th>THC</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>13.00</td> <td>13.00</td> <td>26.00</td> </tr> <tr> <td>Mid</td> <td>7.00</td> <td>7.00</td> <td>14.00</td> </tr> <tr> <td>Low</td> <td>3.00</td> <td>3.00</td> <td>6.00</td> </tr> </tbody> </table>	Point	CH ₄	NMHC	THC	High	13.00	13.00	26.00	Mid	7.00	7.00	14.00	Low	3.00	3.00	6.00
Point	CH ₄	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

Point	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:		
	Diluent	Cal Gas	Total Flow							CH ₄	NMHC	THC
as found zero	3000	0.00	3000	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
as found high	2930	70.00	3000	13.95	12.71	26.66	13.49	12.74	26.22	1.034	0.997	1.017
adjusted zero	3000	0.00	3000	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
adjusted high	2930	70.00	3000	13.95	12.71	26.66	13.95	12.71	26.66	1.000	1.000	1.000
mid	2962	38.00	3000	7.57	6.90	14.47	7.65	6.95	14.60	0.990	0.992	0.991
low	2981	19.00	3000	3.79	3.45	7.24	3.87	3.55	7.43	0.979	0.971	0.974
calibrator zero	3000	0.00	3000	0.00	0.00	0.00	0.00	0.00	0.00	n/a	n/a	n/a
Average C.F. =										0.990	0.988	0.988

Linear Regression/Calibration Results:

	CH ₄	NMHC	THC	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	0.999	0.998	0.998	0.95-1.05
b (Intercept as % of full scale) =	0.24%	0.25%	0.25%	± 3% F.S.
% change in C.F. from last cal =	-3.43%	0.27%	-1.67%	± 10%

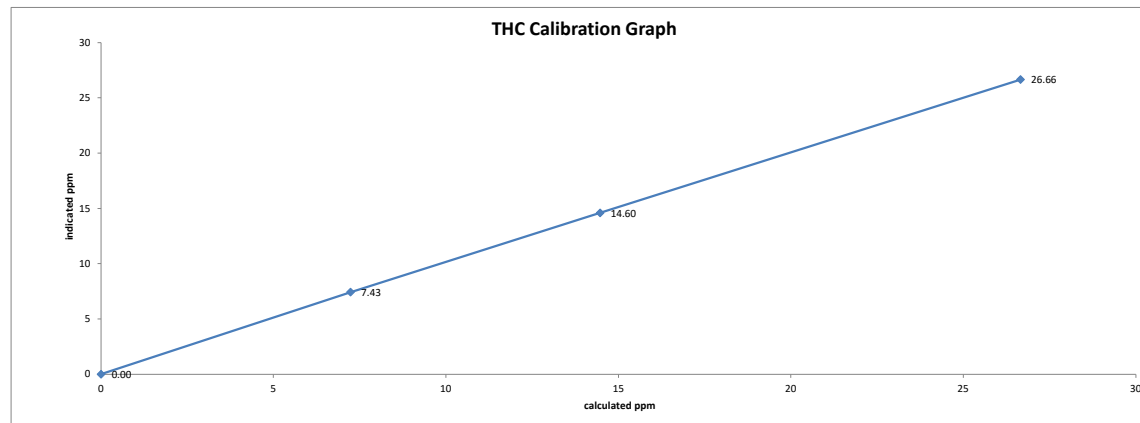
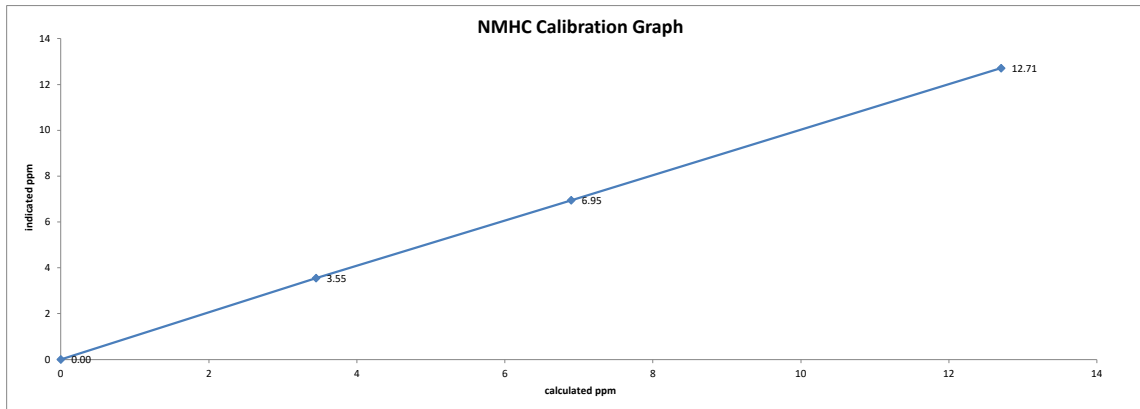
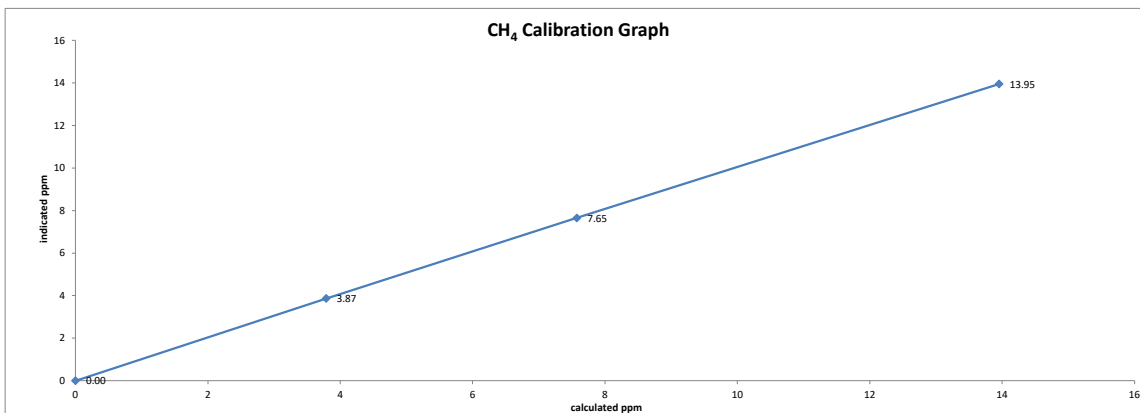
As Left Instrument Diagnostics:

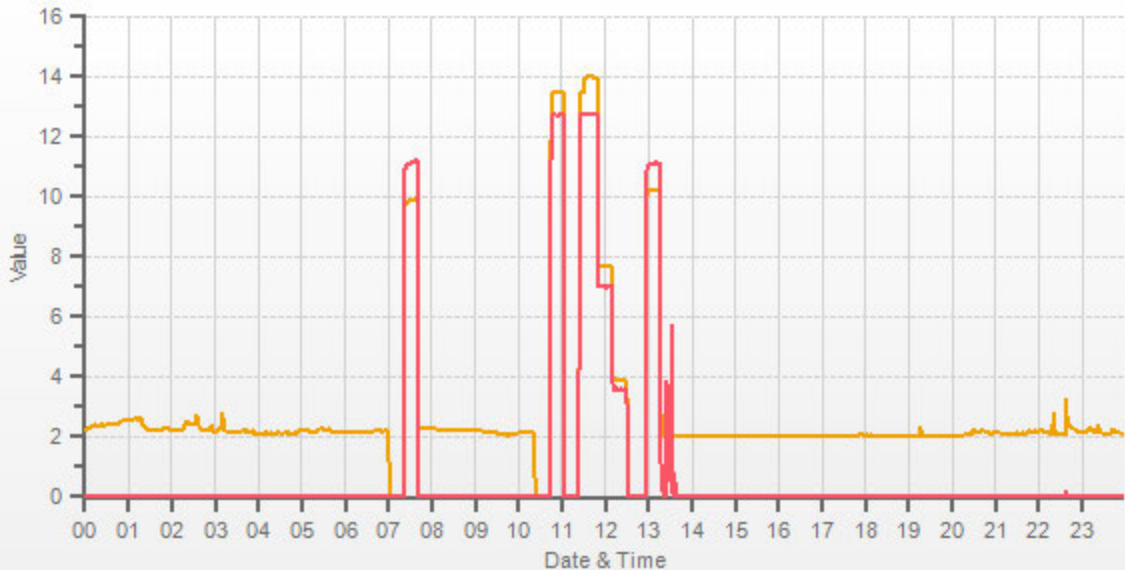
Interface Board Voltages: Bias Supply: -296.5 Temperatures: Detector Oven: 175.1 Filter: 175.0 Column Oven: 75.0 Internal: 32.9 Cylinder Pressures/reg.: Carrier: 1300 50 Fuel: 1200 50 Span Gas: 800 22 Zero Air Generator: 50 Internal Pressures: Carrier: 29.4 Fuel: 44.2 Air: 30.2 FID Status: Status: LIT Counts: n/a Flame: 336.5 Det Base: 175.0 Flame and Power Stats: Last Power On: Feb 23, 2019 Flameouts: 1 Det Oven at Start: n/a Col Oven at Start: n/a Calibration History: Time: May 22, 2019 / 11:23 Type: SPAN Status: GOOD Check/Adjust: ADJUST CH ₄ Span Conc: 13.95 CH ₄ SP Ratio: 0.000813 CH ₄ RT: 13.2 CH ₄ PK IDX: n/a CH ₄ PK HT: n/a NM Span Conc: 12.72 NM SP Ratio: 0.000146	Calibration History cnt'd: NM Peak Area: n/a Methane Start: n/a Methane End: n/a Backflush: n/a NMHV Start: n/a NMHC End: n/a Run History>1: Date: May 22, 2019 Time: 11:28 CH ₄ PK HT: n/a CH ₄ RT: n/a CH ₄ Baseline: 2492 CH ₄ LOD: 585 CH ₄ SD: 195 CH ₄ CONC: 13.97 NM PK HT: n/a NM Peak Area: n/a NM CONC: 12.74 NM Base Start: 2367 NM Base End: 2399 NM LOD: 17 NM Start IDX: n/a NM End IDX: n/a NM Max Slope: n/a NM Min Slope: n/a NM PT Count: n/a Previous CH ₄ : 10.03 Previous NMHC: 11.19 Previous THC: 21.23 New CH ₄ : 10.23 New NMHC: 11.12 New THC: 21.35
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Comments:
 The analyzer sample inlet filter was changed.
 The analyzer cooling fan filter(s) were cleaned.
 The manifold blower was found to be working normally.
 No zero adjustment was required/made.

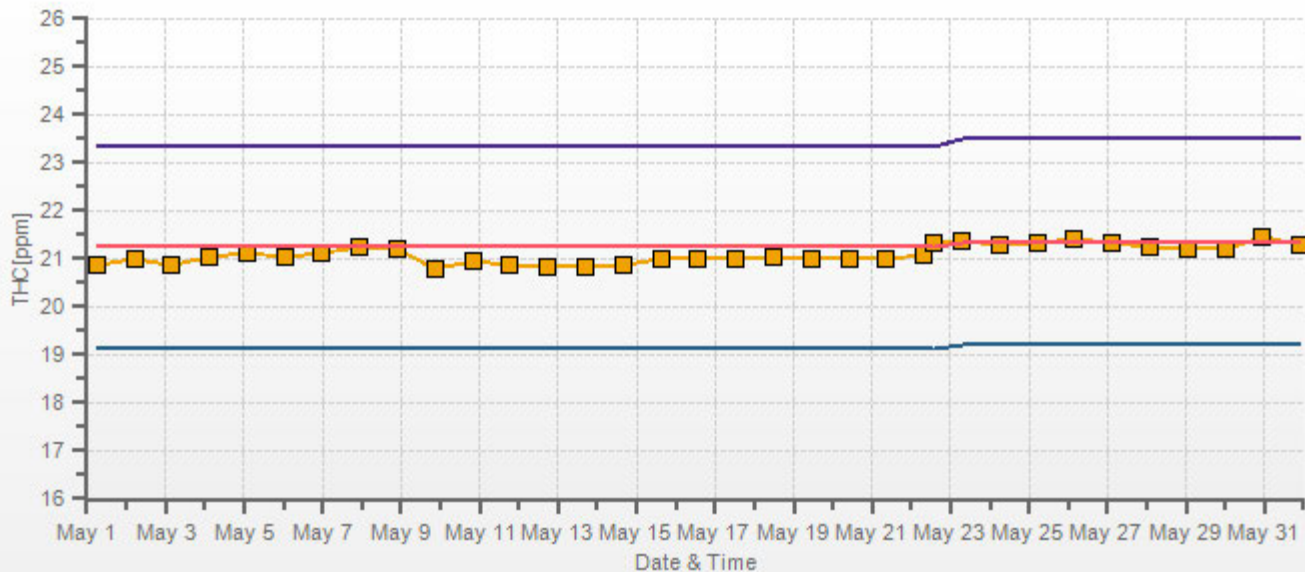
Date: May 22, 2019
Company/Airshed: LICA
Location/Station Name: Bonnyville - East

Start/End Time 24 hr. (mst): 10:13 / 13:32
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution

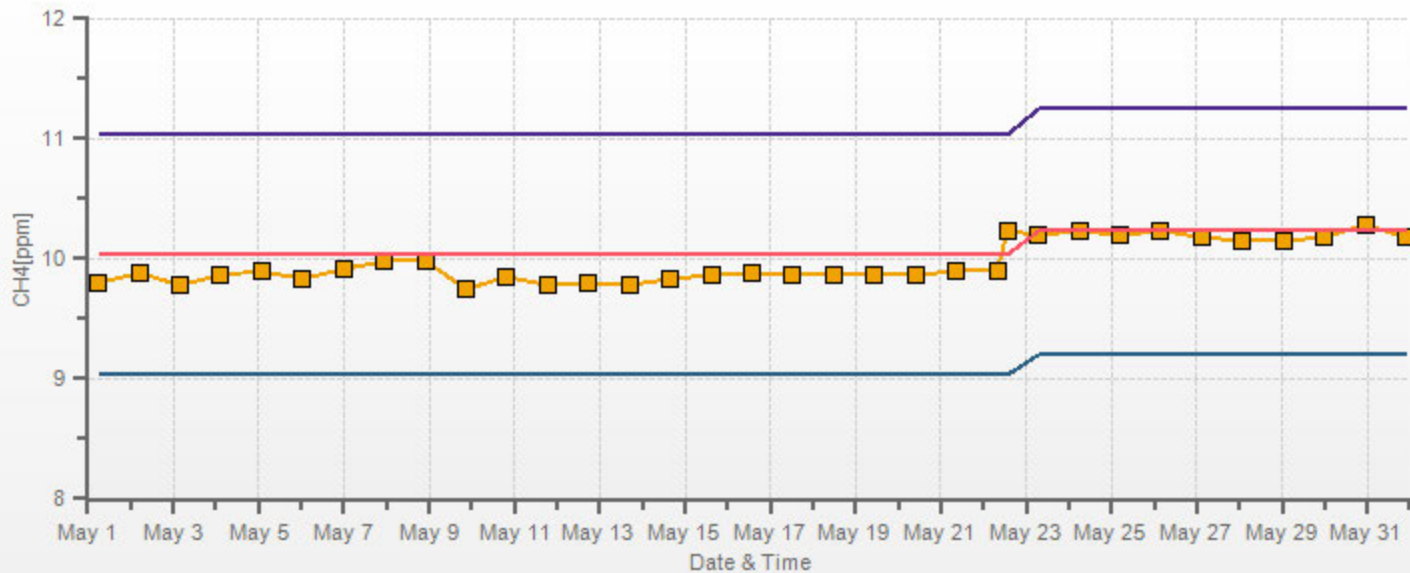




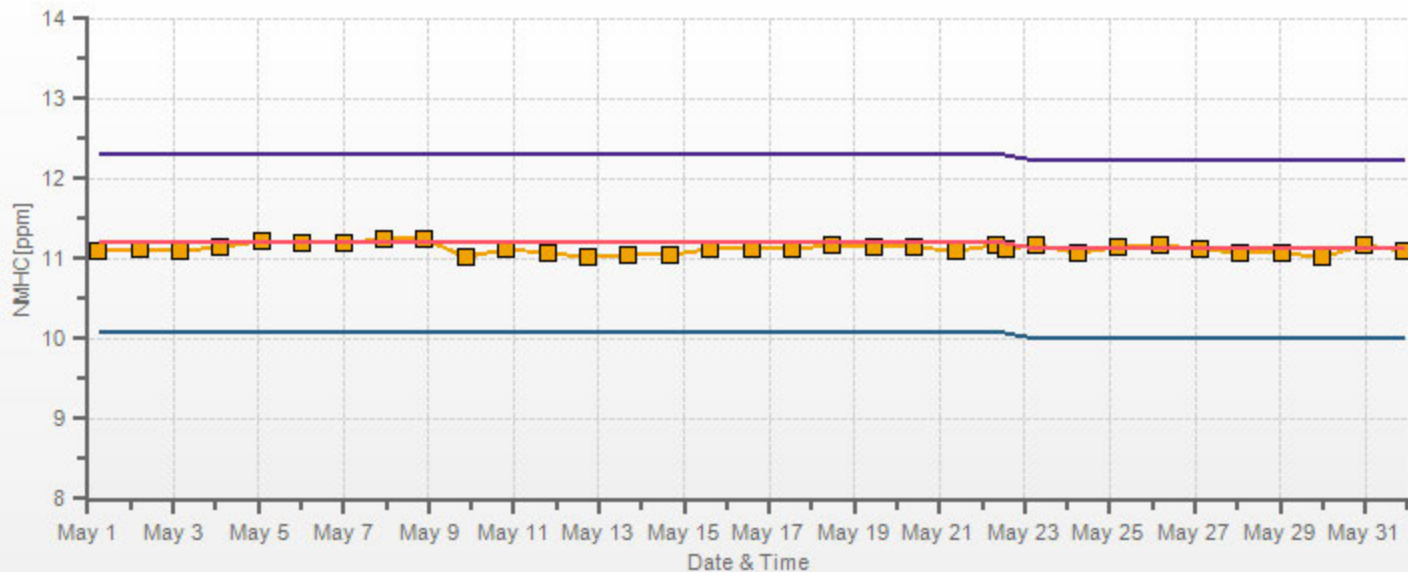
THC[ppm] Calibration: LICA Bonnyville East Monthly: 19/05 Type: Span



CH4[ppm] Calibration: LICA Bonnyville East Monthly: 19/05 Type: Span



NMHC[ppm] Calibration: LICA Bonnyville East Monthly: 19/05 Type: Span





Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: May 17, 2019	Barometer/B.P./units: F.S. #05544 expires Jan 17, 2020	942	millibars
Company/Airshed: LICA	Thermometer/Station Temp: F.S. #160348895 expires Jun 19, 2020	22	°C
Location/Station Name: Bonnyville - East	Weather Conditions: Mainly sunny		
Start/End Time 24 hr. (mst): 9:41 / 15:56	Calibration Purpose: routine monthly		
G.P.T. to be used for Ozone?: No	Performed By/Reviewer: Alex Yakupov	Rob Fisher	
Calibration Method: Gas Dilution & Varying UV Lamp Power	Cal Gas Expiry Date: August 20, 2026		

Analyzer: Serial Number/Owner: 1180930027 LICA Last Calibration Date: April 8, 2019 Range ppb: 1000	Correction Factors: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>NO =</td> <td>1.000</td> <td>1.020</td> <td>1.000</td> </tr> <tr> <td>NO₂ =</td> <td>1.000</td> <td>1.000</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>0.996</td> <td>1.018</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	1.020	1.000	NO ₂ =	1.000	1.000	1.000	NOx =	0.996	1.018	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	1.020	1.000														
NO ₂ =	1.000	1.000	1.000														
NOx =	0.996	1.018	1.000														

Calibration Standards: Low Flow Meter ID/Expiry Date: N/A High Flow Meter ID/Expiry Date: N/A Calibrator ID/Expiry Date: API id# 690 expires April 16, 2020 Cal Gas Cylinder I.D. #: LL 107918 Cal Gas Conc. (ppm): 50.1 50.2	Standard Calibration Points for a Range of: 1000 ppb <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> <td>500</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>275</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>190</td> <td>100</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

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	4997	0.0	4997	0	0	-0.1	-0.1	n/a	n/a
as found high	4921	77.8	4999	779.7	781.3	764.0	767.0	1.020	1.018
adjusted zero	4997	0.00	4997	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4921	77.80	4999	779.7	781.3	780.0	781.0	1.000	1.000
mid	4961	37.90	4999	379.8	380.6	380.0	381.0	1.000	0.999
low	4980	18.90	4999	189.4	189.8	190.0	190.0	0.997	0.999
calibrator zero	4997	0.00	4997	0	0	0.0	0.0	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	4921	77.80	4999	0.0	782.0	782.0	0.0	0.0	0.0	
as found high NO2	4921	77.80	4999	480.0	278.0	782.0	504.0	504.0	504.0	1.000
adjusted high NO2	4921	77.80	4999	480.0	278.0	782.0	504.0	504.0	504.0	1.000
gpt mid	4921	77.80	4999	265.0	500.0	782.0	282.0	282.0	282.0	1.000
gpt low	4921	77.80	4999	95.0	682.0	782.0	100.0	100.0	100.0	1.000
Average NO ₂ C.F.=										1.000

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.000	1.000	1.000	0.95-1.05
b (Intercept as % of full scale)=	0.02%	0.02%	0.00%	± 3% F.S.
% change in C.F. from last cal=	-2.04%	-2.26%	0.00%	± 10%
NO ₂ converter efficiency			1.00	0.96 to 1.04

As found:		As left:	
NO Bkg:	7.0	NO Bkg:	7.1
NOx Bkg:	7.2	NOx Bkg:	7.1
NO Coef:	0.852	NO Coef:	0.871
NO ₂ Coef:	0.999	NO ₂ Coef:	0.999
NOx Coef:	1.002	NOx Coef:	0.998
PMT:	-906.1	PMT:	-906.1
Internal:	29.9	Internal:	29.6
Chamber:	50.0	Chamber:	50.2
Cooler:	-3.1	Cooler:	-3.1
NO ₂ Converter:	323.0	NO ₂ Converter:	326.0
NO ₂ Converter Set:	325.0	NO ₂ Converter Set:	325.0
Perm Oven Gas:	45.05	Perm Oven Gas:	45.00
Perm Oven Heater:	44.27	Perm Oven Heater:	44.20
Pressure:	204.6	Pressure:	205.2
Flow:	0.703	Flow:	0.703
Ozonator Flow:	OK	Ozonator Flow:	OK
Expected Value NO:	3	Expected Value NO:	4
Expected Value NO ₂ :	345	Expected Value NO ₂ :	352
Expected Value NOx:	348	Expected Value NOx:	355

Comments:

The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned.

The manifold blower was found to be working normally.

The converter cooling fan filter was cleaned.

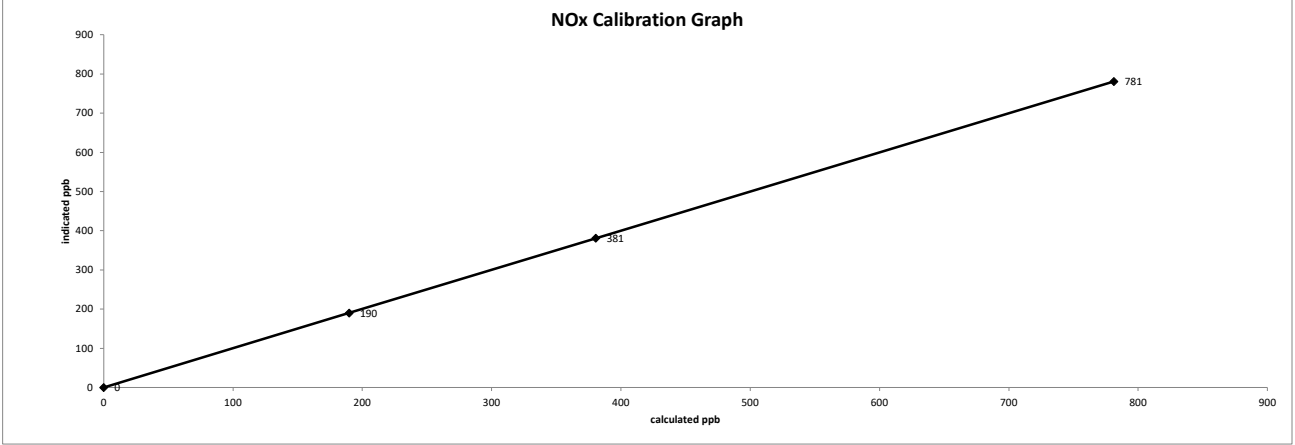
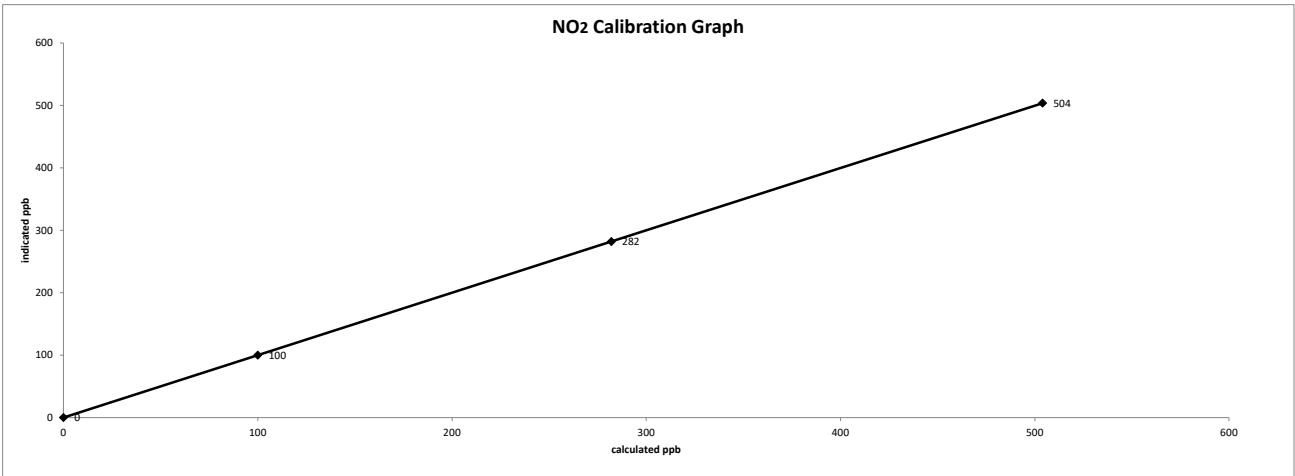
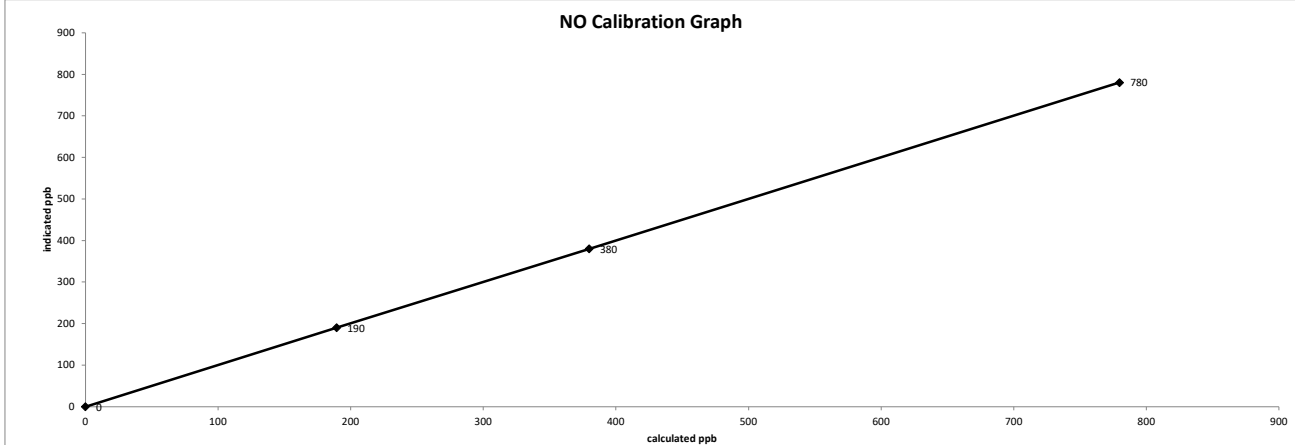
No high point NO₂ adjustment was required/made.

The IZS check started at 12:00. The Adjusted High Point was restarted.

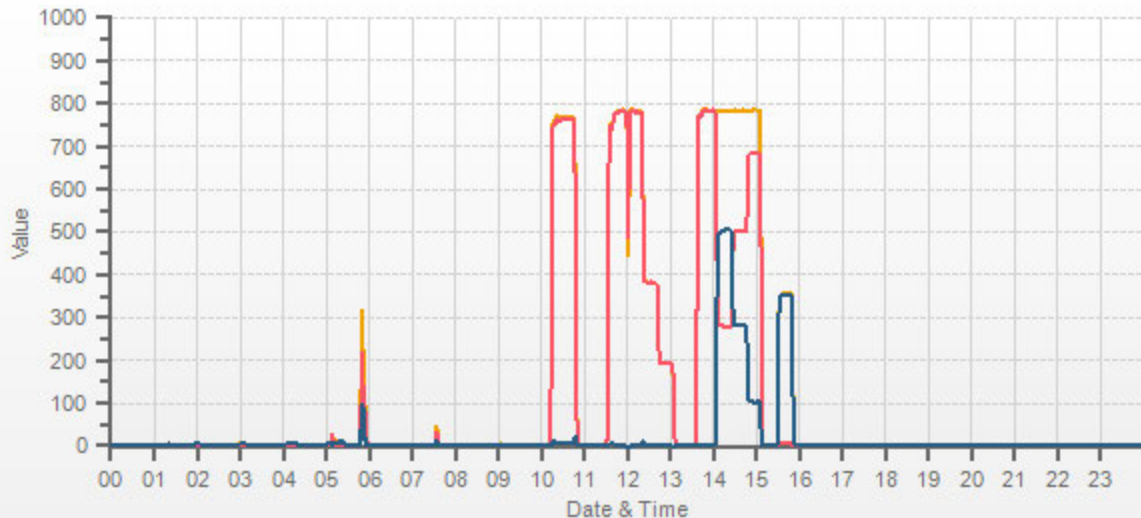
Date: May 17, 2019
Company/Airshed: LICA
Location/Station Name: Bonnyville - East

Start/End Time 24 hr. (mst): 9:41 / 15:56
Calibration Purpose: routine monthly
Calibration Method: Gas Dilution & Varying UV Lamp Power

Thermo 42i NO-NO2-NOx Analyzer Calibration



— NOX[ppb] — NO[ppb] — NO2[ppb]





Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: <u>May 24, 2019</u>	Barometer/B.P./units: <u>F.S. #05544 expires Jan 17, 2020</u>	<u>939</u>	millibars
Company/Airshed: <u>LICA</u>	Thermometer/Station Temp: <u>F.S. #160348895 expires Jun 19, 2020</u>	<u>23</u>	°C
Location/Station Name: <u>Bonnyville - East</u>	Weather Conditions: <u>A few clouds</u>		
Start/End Time 24 hr. (mst): <u>12:28 / 13:46</u>	Calibration Purpose: <u>as found</u>		
G.P.T. to be used for Ozone? <u>No</u>	Performed By/Reviewer: <u>Alex Yakupov</u>	<u>Rob Fisher</u>	
Calibration Method: <u>Gas Dilution & Gas Phase Titration</u>	Cal Gas Expiry Date: <u>August 20, 2020</u>		

Analyzer:	Correction Factors:																
Serial Number/Owner: <u>1180930027</u> <u>LICA</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> <tr> <td>NO =</td> <td><u>1.000</u></td> <td><u>1.002</u></td> <td><u>n/a</u></td> </tr> <tr> <td>NO₂ =</td> <td><u>1.000</u></td> <td><u>1.000</u></td> <td><u>n/a</u></td> </tr> <tr> <td>NOx =</td> <td><u>1.000</u></td> <td><u>1.003</u></td> <td><u>n/a</u></td> </tr> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	<u>1.000</u>	<u>1.002</u>	<u>n/a</u>	NO ₂ =	<u>1.000</u>	<u>1.000</u>	<u>n/a</u>	NOx =	<u>1.000</u>	<u>1.003</u>	<u>n/a</u>
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	<u>1.000</u>	<u>1.002</u>	<u>n/a</u>														
NO ₂ =	<u>1.000</u>	<u>1.000</u>	<u>n/a</u>														
NOx =	<u>1.000</u>	<u>1.003</u>	<u>n/a</u>														
Last Calibration Date: <u>May 17, 2019</u>																	
Range ppb: <u>1000</u>																	

Calibration Standards: Low Flow Meter ID/Expiry Date: <u>N/A</u> High Flow Meter ID/Expiry Date: <u>N/A</u> Calibrator ID/Expiry Date: <u>API id# 690 expires April 16, 2020</u> Cal Gas Cylinder I.D. #: <u>LL 107918</u> Cal Gas Conc. (ppm): <u>50.1</u> <u>50.2</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="4">Standard Calibration Points for a Range of: <u>1000 ppb</u></th> </tr> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> <tr> <td>High</td> <td><u>780</u></td> <td><u>500</u></td> <td><u>n/a</u></td> </tr> <tr> <td>Mid</td> <td><u>380</u></td> <td><u>275</u></td> <td><u>n/a</u></td> </tr> <tr> <td>Low</td> <td><u>190</u></td> <td><u>100</u></td> <td><u>n/a</u></td> </tr> <tr> <td>Extra Point #1</td> <td><u>n/a</u></td> <td><u>n/a</u></td> <td><u>n/a</u></td> </tr> <tr> <td>Extra Point #2</td> <td><u>n/a</u></td> <td><u>n/a</u></td> <td><u>n/a</u></td> </tr> </table>	Standard Calibration Points for a Range of: <u>1000 ppb</u>				Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	<u>780</u>	<u>500</u>	<u>n/a</u>	Mid	<u>380</u>	<u>275</u>	<u>n/a</u>	Low	<u>190</u>	<u>100</u>	<u>n/a</u>	Extra Point #1	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>	Extra Point #2	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>
Standard Calibration Points for a Range of: <u>1000 ppb</u>																													
Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																										
High	<u>780</u>	<u>500</u>	<u>n/a</u>																										
Mid	<u>380</u>	<u>275</u>	<u>n/a</u>																										
Low	<u>190</u>	<u>100</u>	<u>n/a</u>																										
Extra Point #1	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>																										
Extra Point #2	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>																										

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	<u>5000</u>	<u>0.0</u>	<u>5000</u>	<u>0</u>	<u>0</u>	<u>0.1</u>	<u>0.2</u>	<u>n/a</u>	<u>n/a</u>
as found high	<u>4922</u>	<u>77.8</u>	<u>5000</u>	<u>779.6</u>	<u>781.1</u>	<u>778.0</u>	<u>779.0</u>	<u>1.002</u>	<u>1.003</u>
Average C.F.=								<u>n/a</u>	<u>n/a</u>

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	<u>4922</u>	<u>77.80</u>	<u>5000</u>	<u>0.0</u>	<u>778.0</u>	<u>779.0</u>	<u>1.0</u>	<u>0.1</u>	<u>1.0</u>	<u>n/a</u>
as found high NO ₂	<u>4922</u>	<u>77.80</u>	<u>5000</u>	<u>480.0</u>	<u>275.0</u>	<u>779.0</u>	<u>504.0</u>	<u>503.0</u>	<u>503.0</u>	<u>1.000</u>
Average NO ₂ C.F.=									<u>n/a</u>	

Linear Regression/Calibration Results:

	NO	NOx	NO ₂
Correlation Coefficient =	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>
Slope =	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>
b (Intercept as % of full scale) =	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>
% change in C.F. from last cal =	<u>-0.21%</u>	<u>0.00%</u>	<u>-0.30%</u>
NO ₂ converter efficiency	<u>n/a</u>	<u>n/a</u>	<u>1.00</u>

0.96 to 1.04

As found: NO Bkg: <u>7.1</u> NOx Bkg: <u>7.1</u> NO Coef: <u>0.998</u> NO ₂ Coef: <u>0.871</u> NOx Coef: <u>0.999</u> PMT: <u>-906.5</u> Internal: <u>29.6</u> Chamber: <u>49.9</u> Cooler: <u>-3.0</u> NO ₂ Converter: <u>325</u> NO ₂ Converter Set: <u>325</u> Perm Oven Gas: <u>48.39</u> Perm Oven Heater: <u>48.54</u> Pressure: <u>202.8</u> Flow: <u>0.692</u> Ozonator Flow: <u>OK</u> Expected Value NO: <u>4</u> Expected Value NO ₂ : <u>352</u> Expected Value NOx: <u>355</u>	As left: NO Bkg: <u>7.1</u> NOx Bkg: <u>7.1</u> NO Coef: <u>0.998</u> NO ₂ Coef: <u>0.871</u> NOx Coef: <u>0.999</u> PMT: <u>-906.5</u> Internal: <u>29.6</u> Chamber: <u>49.9</u> Cooler: <u>-3.0</u> NO ₂ Converter: <u>325</u> NO ₂ Converter Set: <u>325</u> Perm Oven Gas: <u>48.39</u> Perm Oven Heater: <u>48.54</u> Pressure: <u>202.8</u> Flow: <u>0.692</u> Ozonator Flow: <u>OK</u> Expected Value NO: <u>4</u> Expected Value NO ₂ : <u>352</u> Expected Value NOx: <u>355</u>
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Comments:

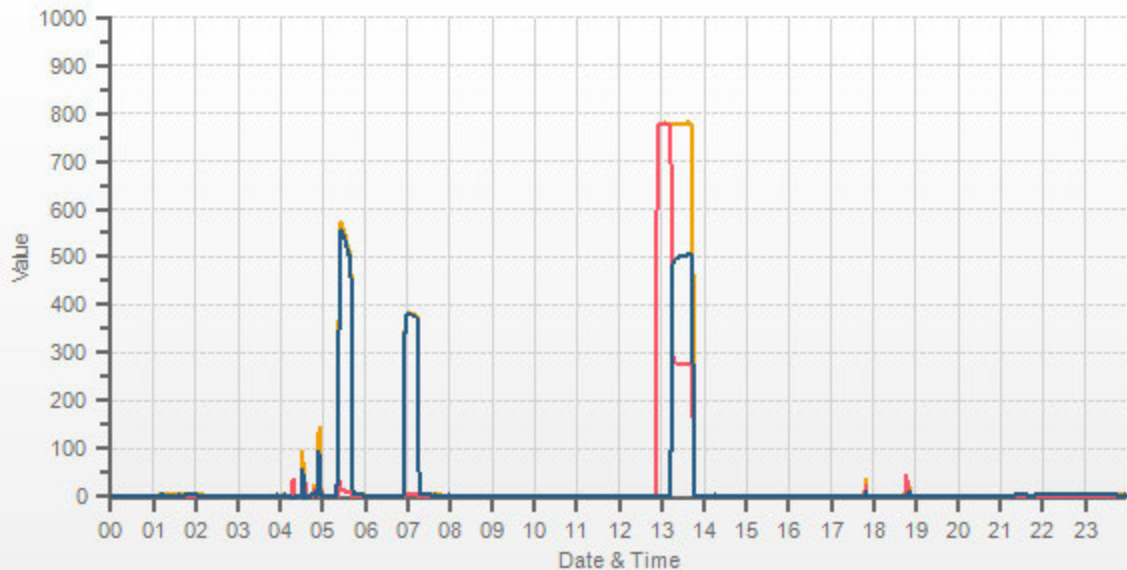
The manifold blower was found to be working normally.

No zero adjustment was required/made.

No high point NO₂ adjustment was required/made.

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

An As Found calibration was completed due to an unstable span check results. A new Permeation device was installed. The EV will be adjusted after 72 hours of stabilization.





Thermo 42i NO-NO2-NOx Analyzer Calibration

Date: <u>May 28, 2019</u> Company/Airshed: <u>LICA</u> Location/Station Name: <u>Bonnyville East</u> Start/End Time 24 hr. (mst): <u>7:26/14:53</u> G.P.T. to be used for Ozone?: <u>No</u> Calibration Method: <u>Gas Dilution & Gas Phase Titration</u>	Barometer/B.P./units: <u>F.S. 10528 expires January 23, 2020</u> <u>946</u> millibars Thermometer/Station Temp: <u>FS 160459244 June 19, 2020</u> <u>22.19</u> °C Weather Conditions: <u>Mainly sunny</u> Calibration Purpose: <u>repeat</u> Performed By/Reviewer: <u>Ferdinand Roy</u> <u>Rob Fisher</u> Cal Gas Expiry Date: <u>December 8, 2019</u>
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Analyzer: Serial Number/Owner: <u>1180930027</u> <u>LICA</u> Last Calibration Date: <u>May 17, 2019</u> Range ppb: <u>1000</u>	Correction Factors: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Previous C.F.:</th> <th>As Found C.F.:</th> <th>New C.F.:</th> </tr> </thead> <tbody> <tr> <td>NO =</td> <td>1.000</td> <td>0.985</td> <td>1.000</td> </tr> <tr> <td>NO₂ =</td> <td>1.000</td> <td>1.000</td> <td>1.000</td> </tr> <tr> <td>NOx =</td> <td>1.000</td> <td>0.986</td> <td>1.000</td> </tr> </tbody> </table>		Previous C.F.:	As Found C.F.:	New C.F.:	NO =	1.000	0.985	1.000	NO ₂ =	1.000	1.000	1.000	NOx =	1.000	0.986	1.000
	Previous C.F.:	As Found C.F.:	New C.F.:														
NO =	1.000	0.985	1.000														
NO ₂ =	1.000	1.000	1.000														
NOx =	1.000	0.986	1.000														

Calibration Standards: Low Flow Meter ID/Expiry Date: <u>N/A</u> High Flow Meter ID/Expiry Date: <u>N/A</u> Calibrator ID/Expiry Date: <u>Envionics id# 5212 expires February 13, 2020</u> Cal Gas Cylinder I.D. #: <u>EY0000597</u> Cal Gas Conc. (ppm): <u>49</u> <u>49</u>	Standard Calibration Points for a Range of: <u>1000 ppb</u> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Point</th> <th>Target NO (ppb)</th> <th>Target NO₂ (ppb)</th> <th>Cc Ozone ?</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>780</td> <td>500</td> <td>n/a</td> </tr> <tr> <td>Mid</td> <td>380</td> <td>275</td> <td>n/a</td> </tr> <tr> <td>Low</td> <td>190</td> <td>100</td> <td>n/a</td> </tr> <tr> <td>Extra Point #1</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> <tr> <td>Extra Point #2</td> <td>n/a</td> <td>n/a</td> <td>n/a</td> </tr> </tbody> </table>	Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?	High	780	500	n/a	Mid	380	275	n/a	Low	190	100	n/a	Extra Point #1	n/a	n/a	n/a	Extra Point #2	n/a	n/a	n/a
Point	Target NO (ppb)	Target NO ₂ (ppb)	Cc Ozone ?																						
High	780	500	n/a																						
Mid	380	275	n/a																						
Low	190	100	n/a																						
Extra Point #1	n/a	n/a	n/a																						
Extra Point #2	n/a	n/a	n/a																						

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	4994	0.0	4994	0	0	0.1	0.2	n/a	n/a
as found high	4915	79.5	4995	780.3	780.3	792.0	791.2	0.985	0.986
adjusted zero	4996	0.00	4996	0.0	0.0	0.0	0.0	n/a	n/a
adjusted high	4915	79.53	4995	780.3	780.3	780.3	780.2	1.000	1.000
mid	4957	38.72	4995	379.8	379.8	379.7	379.8	1.000	1.000
low	4978	19.35	4997	189.8	189.8	190.0	190.0	0.999	0.999
calibrator zero	4996	0.00	4996	0	0	0.1	0.0	n/a	n/a
Average C.F.=								1.000	1.000

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

Calibrator Flow Rates (cc/min)				Calibrator Setting	Indicated NO	Indicated 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	4915	79.54	4995	0.0	780.8	779.9	-0.8	0.0	-0.8	
as found high NO2	4915	79.54	4995	500.0	269.1	779.9	510.8	511.7	511.6	1.000
adjusted high NO2	4915	79.54	4995	500.0	269.1	779.9	510.8	511.7	511.6	1.000
gpt mid	4915	79.54	4995	275.0	494.3	780.0	285.7	286.5	286.5	1.000
gpt low	4915	79.54	4995	100.0	675.8	780.2	104.5	105.0	105.3	0.997
Average NO ₂ C.F.=										0.999

Linear Regression/Calibration Results:

	NO	NOx	NO ₂	LIMITS
Correlation Coefficient =	1.000	1.000	1.000	> or = 0.995
Slope =	1.000	1.000	0.999	0.95-1.05
b (Intercept as % of full scale)=	0.01%	0.01%	-0.03%	± 3% F.S.
% change in C.F. from last cal=	1.47%	1.35%	-0.02%	± 10%
NO2 converter efficiency			1.00	0.96 to 1.04

As found:		As left:	
NO Bkg:	7.1	NO Bkg:	7.1
NOx Bkg:	7.2	NOx Bkg:	7.3
NO Coef:	0.871	NO Coef:	0.857
NO2 Coef:	0.999	NO2 Coef:	0.999
NOx Coef:	0.998	NOx Coef:	1.000
PMT:	-906.5	PMT:	-906.5
Internal:	30.9	Internal:	28.7
Chamber:	50.2	Chamber:	50.0
Cooler:	-3.1	Cooler:	-2.7
NO2 Converter:	325.3	NO2 Converter:	323.7
NO2 Converter Set:	325.0	NO2 Converter Set:	325.0
Perm Oven Gas:	45.00	Perm Oven Gas:	44.99
Perm Oven Heater:	44.23	Perm Oven Heater:	44.21
Pressure:	205.8	Pressure:	204.3
Flow:	0.700	Flow:	0.697
Ozonator Flow:	OK	Ozonator Flow:	OK
Expected Value NO:	4	Expected Value NO:	4
Expected Value NO2:	352	Expected Value NO2:	352
Expected Value NOx:	355	Expected Value NOx:	355

Comments:

The analyzer sample inlet filter was changed. The analyzer cooling fan filter(s) were cleaned.

The manifold blower was found to be working normally.

The converter cooling fan filter was cleaned.

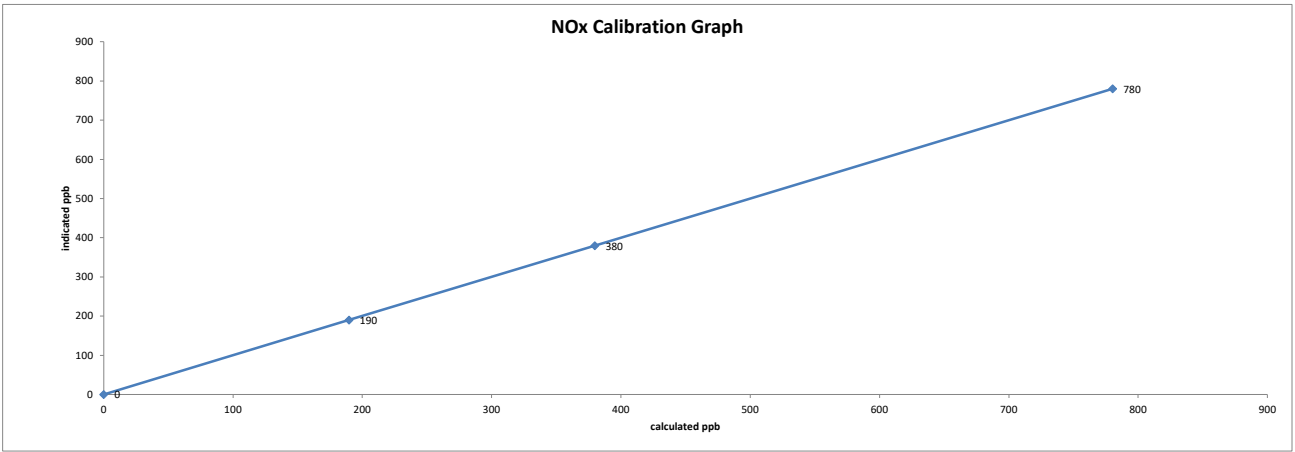
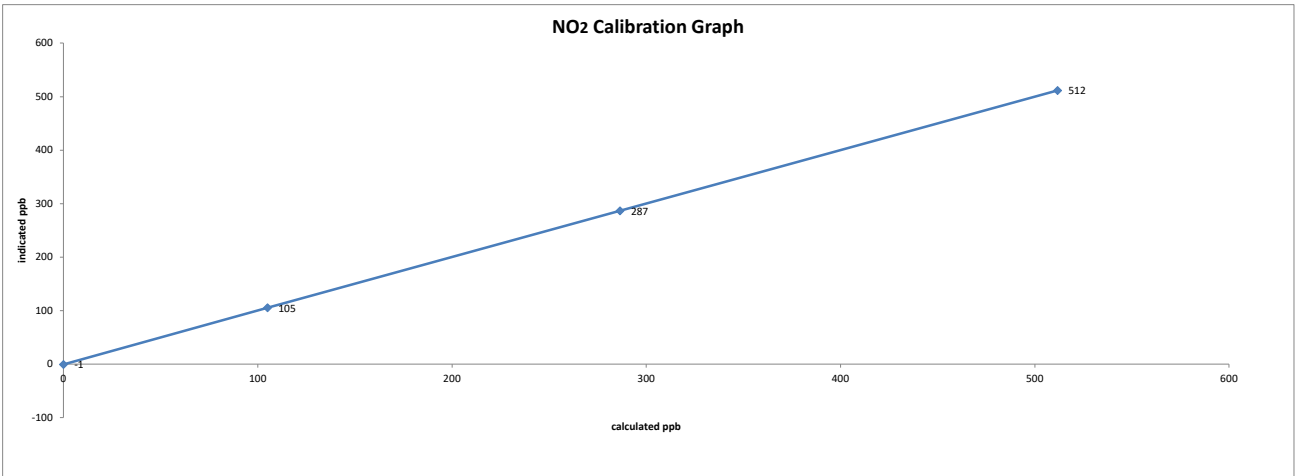
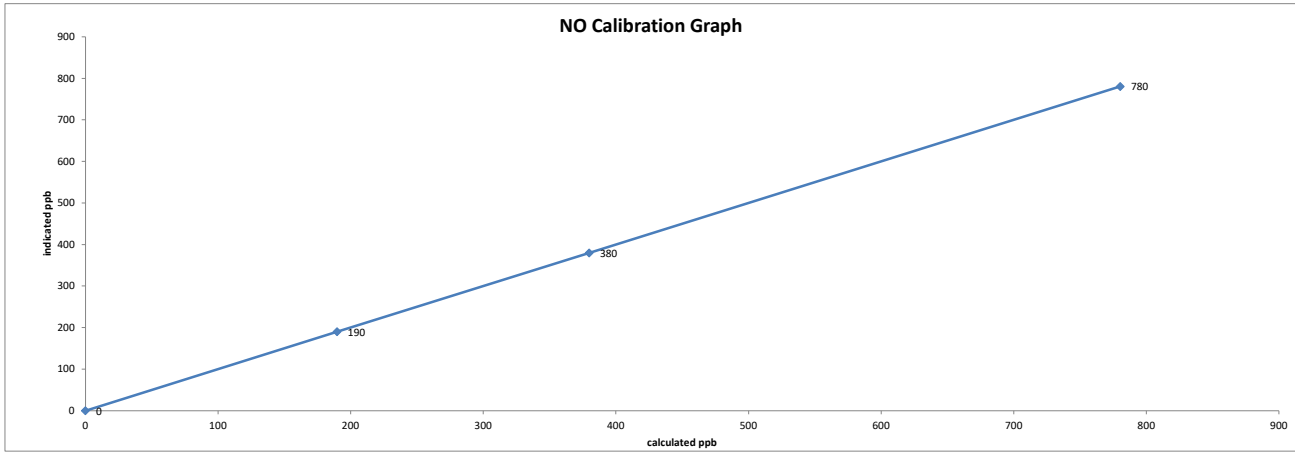
No high point NO2 adjustment was required/made.

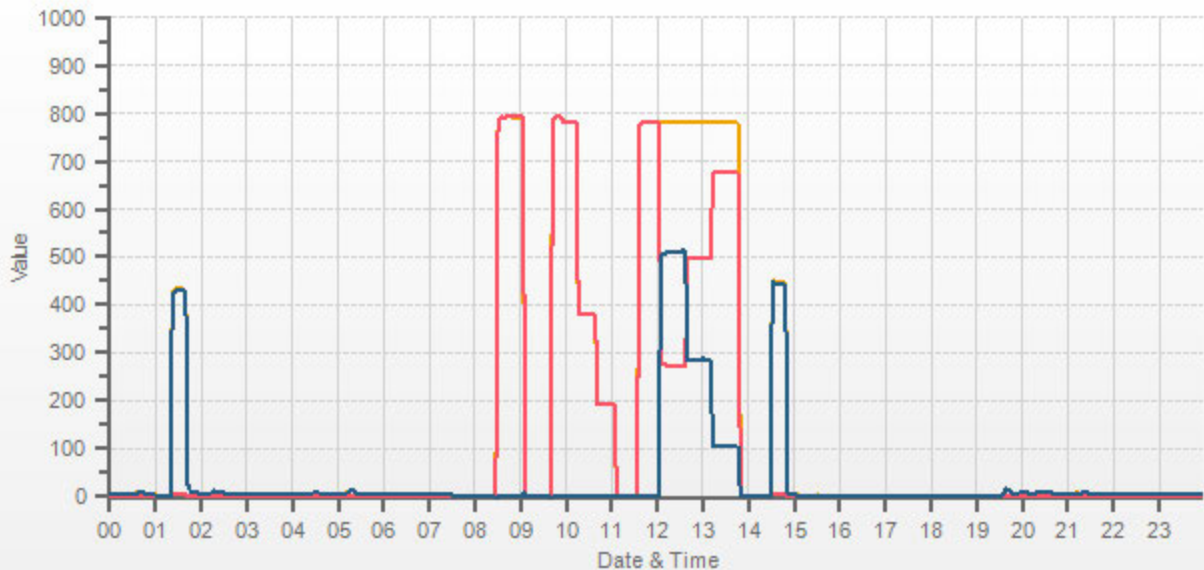
A repeat calibration was performed due to new perm tube installed. IZS stopped after running for 6 mins. (14:00 - reason unknown). Restarted IZS at 14:08.

Date: May 28, 2019
Company/Airshed: LICA
Location/Station Name: Bonnyville East

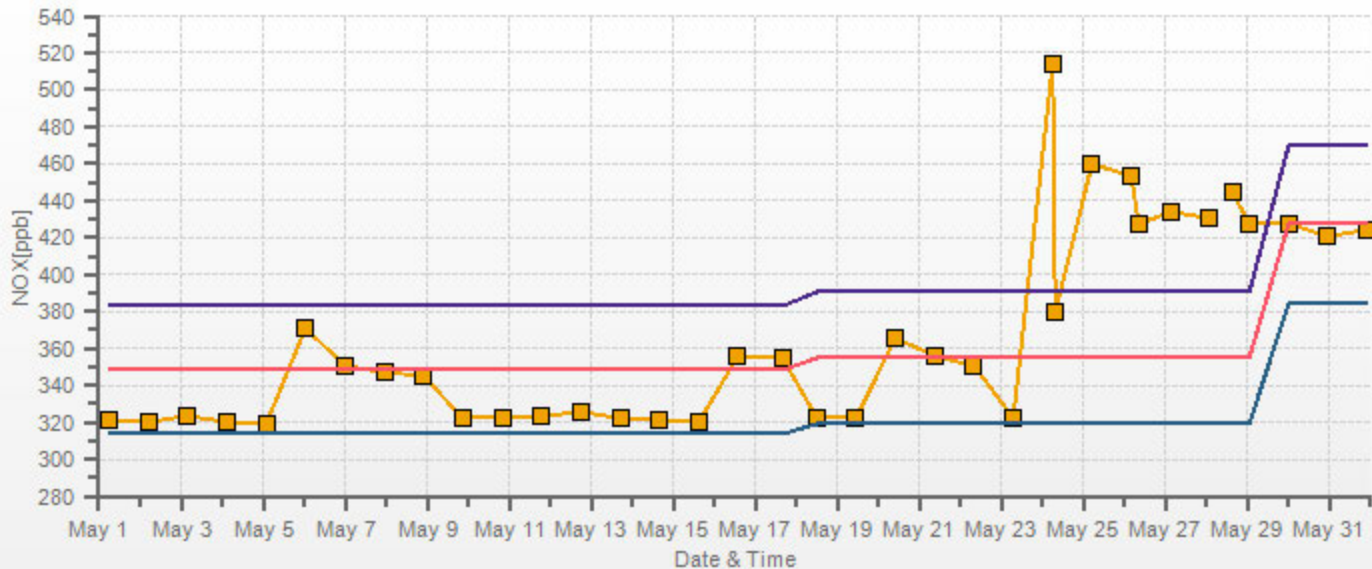
Start/End Time 24 hr. (mst): 7:26/14:53
Calibration Purpose: repeat
Calibration Method: Gas Dilution & Gas Phase Titration

Thermo 42i NO-NO2-NOx Analyzer Calibration

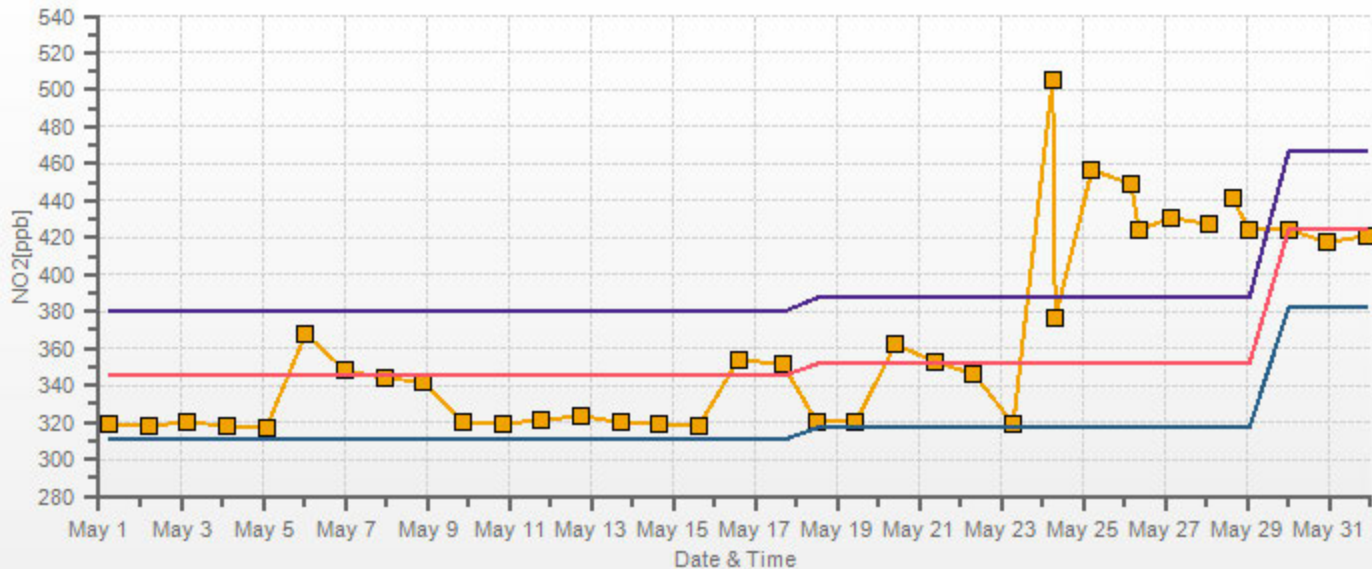




NOX[ppb] Calibration: LICA Bonnyville East Monthly: 19/05 Type: Span



NO2[ppb] Calibration: LICA Bonnyville East Monthly: 19/05 Type: Span





Thermo 49i Ozone Analyzer Calibration

Date: <u>May 22, 2019</u> Company/Airshed: <u>LICA</u> Location/Station Name: <u>Bonnyville - East</u> Start/End Time 24 hr. (mst): <u>10:13 / 14:16</u> Ozone Calibration Method: <u>Varying UV Lamp Power</u> G.P.T. Date: <u>n/a-done by Varying UV Lamp Power</u> Analyzer: Serial Number/Owner: <u>1002240372 LICA</u> Last Calibration Date: <u>April 9, 2019</u> Previous Cal High Point C.F.: <u>1.000</u>	Barometer/B.P./units: <u>F.S. #05544 expires Jan 17, 2020</u> <u>943</u> <u>millibars</u> Thermometer/Station Temp: <u>F.S. #160348895 expires Jun 19, 2020</u> <u>22</u> <u>°C</u> Weather Conditions: <u>A few clouds</u> Calibration Purpose: <u>routine monthly</u> Performed By/Reviewer: <u>Alex Yakupov</u> <u>Rob Fisher</u> Cal Gas Expiry Date: <u>n/a-done by Varying UV Lamp Power</u> Ozone Range ppb: <u>500</u> As Found C.F.: <u>1.000</u> New C.F.: <u>1.000</u>
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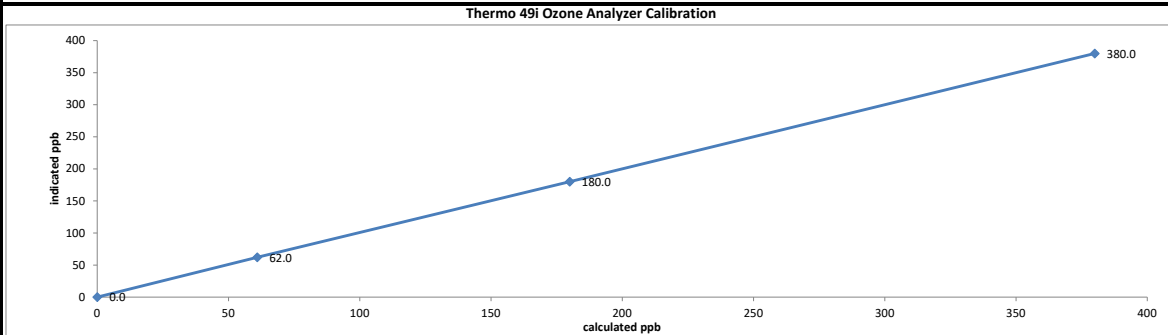
Calibration Standards: Low Flow Meter ID/Expiry Date: <u>N/A</u> High Flow Meter ID/Expiry Date: <u>N/A</u> Calibrator ID/Expiry Date: <u>API id# 690 expires April 16, 2020</u> Cal Gas Cylinder I.D. #: <u>N/A</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Point</th> <th>AMD Required Range of Ozone Calibration Points</th> </tr> <tr> <td>High</td> <td>300-400 ppb</td> </tr> <tr> <td>Mid</td> <td>150-200 ppb</td> </tr> <tr> <td>Low</td> <td>50-75 ppb</td> </tr> </table>	Point	AMD Required Range of Ozone Calibration Points	High	300-400 ppb	Mid	150-200 ppb	Low	50-75 ppb
Point	AMD Required Range of Ozone Calibration Points								
High	300-400 ppb								
Mid	150-200 ppb								
Low	50-75 ppb								

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

Point	Calibrator Flow Rate (cc/min)		Calculated Concentration:	Corrected Calculated Concentration:	Indicated Concentration:	Correction Factors:
	Total Flow @ Point Start	Total Flow @ Point Finish	(ppb)	(ppb)	(ppb)	
as found zero	5000	5000	0.0	n/a	0.0	n/a
as found high	5000	5000	380.0	380.0	380.0	1.000
adjusted zero	5000	5000	0.0	0.0	0.0	n/a
adjusted high	5000	5000	380.0	380.0	380.0	1.000
mid	5000	5000	180.0	180.0	180.0	1.000
low	5000	5000	61.0	61.0	62.0	0.984
calibrator zero	5000	5000	0.0	n/a	0.0	n/a
Average C.F.=						0.995

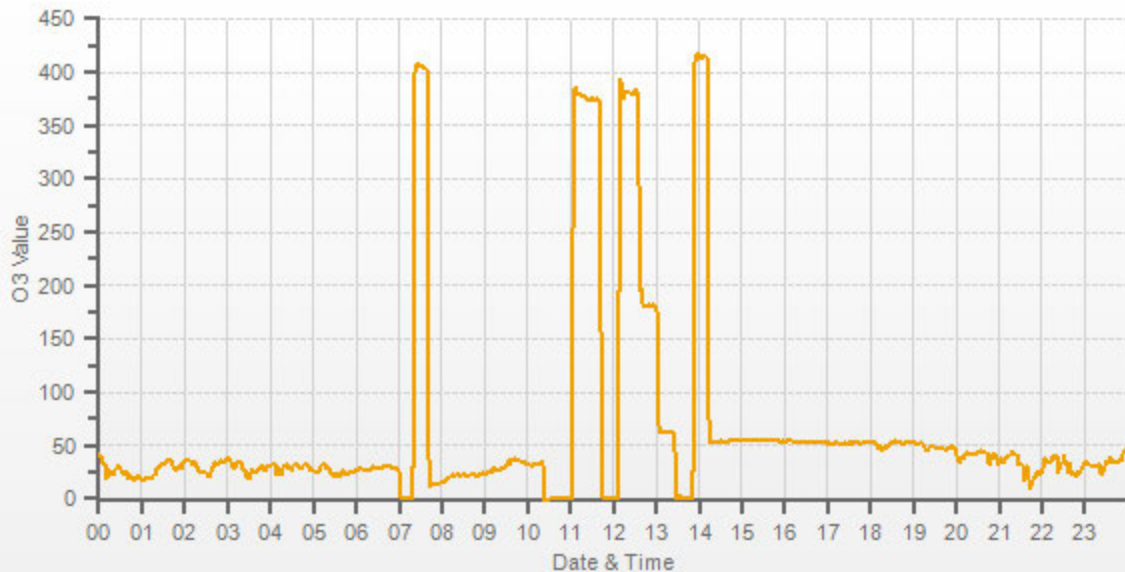
Linear Regression/Calibration Results:

Correlation Coefficient = <u>1.000</u>	LIMITS
Slope = <u>1.001</u>	> or = 0.995
b (Intercept as % of full scale) = <u>-0.08%</u>	0.95-1.05
% change in C.F. from last cal = <u>0.00%</u>	± 3% F.S.
	± 10%

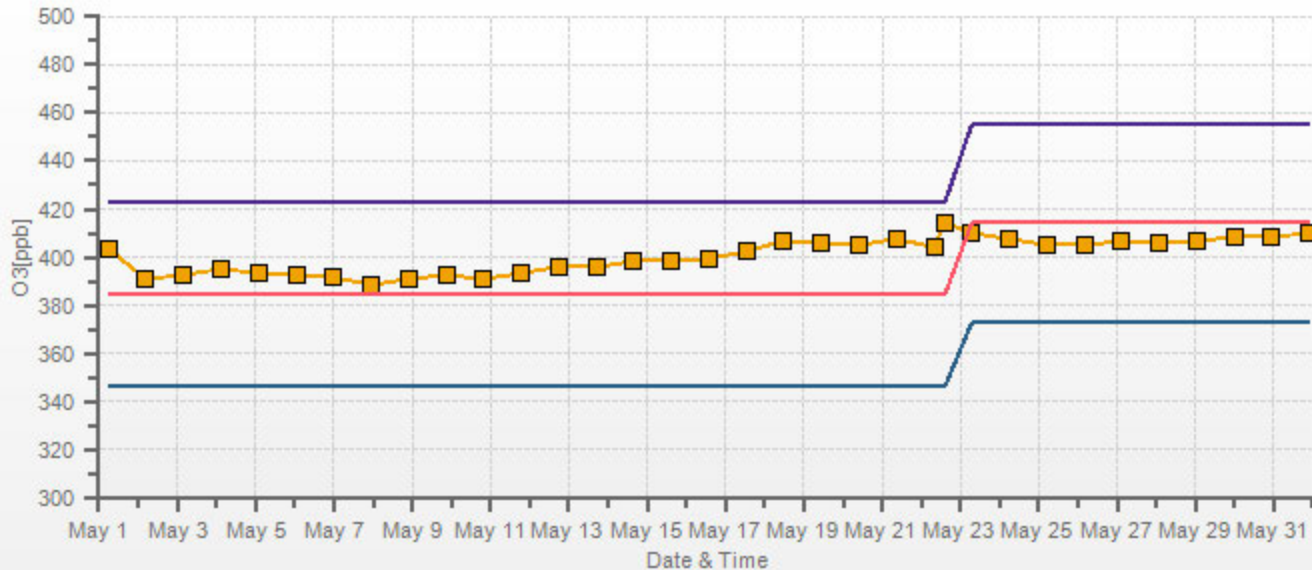


As found: O3 Bkg: <u>0.0</u> O3 Coef: <u>1.015</u> Photo Lamp: <u>14.2</u> O3 Lamp: <u>9.3</u> Bench: <u>29.7</u> Bench Lamp: <u>54.0</u> O3 Lamp: <u>68.0</u> Pressure: <u>698.0</u> Cell A lpm: <u>0.758</u> Cell B lpm: <u>0.763</u> O3 ppb: <u>0.0</u> Cell A ppb: <u>0.0</u> Cell B ppb: <u>1.0</u> Cell A int (Hz): <u>71557</u> Cell B int (Hz): <u>71400</u> Expected Value: <u>383.8</u>	As left: O3 Bkg: <u>0.0</u> O3 Coef: <u>1.031</u> Photo Lamp: <u>14.2</u> O3 Lamp: <u>9.3</u> Bench: <u>29.7</u> Bench Lamp: <u>54.0</u> O3 Lamp: <u>68.0</u> Pressure: <u>698.0</u> Cell A lpm: <u>0.758</u> Cell B lpm: <u>0.763</u> O3 ppb: <u>0.0</u> Cell A ppb: <u>0.0</u> Cell B ppb: <u>1.0</u> Cell A int (Hz): <u>71557</u> Cell B int (Hz): <u>71400</u> Expected Value: <u>414.0</u>
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Comments:
The analyzer sample inlet filter was changed.
The analyzer cooling fan filter(s) were cleaned.
The manifold blower was found to be working normally.



O3[ppb] Calibration: LICA Bonnyville East Monthly: 19/05 Type: Span





Thermo 5030i SHARP Monitor Monthly Check

Date: May 22, 2019
Company: LICA
Station Name/Location: Bonnyville - East
Previous Audit Date: April 26, 2019
Parameter: PM 2.5

Performed By/Reviewer: Alex Yakupov | Rob Fisher
Start Time (mst): 13:37
End Time (mst): 14:12
Calibration Purpose: routine monthly
Weather Conditions: Mainly sunny

SHARP 5030i Information and Status:
Serial Number: CM 17071016 **Filter Tape Counter** 164

Reference Standards:		Air Flow			
	Manometer	Orifice	Pressure:	Temp / RH:	
Make:	Dwyer	chinook	Fisher Scientific	Fisher Scientific	11745843
Model:	475 Mk. III	CHN0901	FB61291	11-661-7B	11745843
Serial Number:	#3	#2	130168457	160348895	
Calibration Expiration Date:	January 17, 2020	January 31, 2020	January 17, 2020	June 19, 2020	

Ambient Temperature (°C)			
	Reference	SHARP	Difference
#1	21.90	21.5	0.4

Ambient Relative Humidity (%RH)			
As Found:			
	Reference	SHARP	Difference
#1	21.00	21.1	-0.1

Barometric Pressure (mmHg)			
As Found:			
	Reference	SHARP	Difference
#1	708.0	707.4	0.6

Flow Audit (L/min)			
As Found:			
	Reference	SHARP	
#1	16.65	16.66	% Difference 0.080
#2	16.67	16.69	
#3	16.67	16.68	
Average	16.66	16.68	

Leak Check (L/min)						
Without Leak Check Adapter			With leak Check Adapter			
	Reference	SHARP	Difference	Reference	SHARP	Difference
#1	16.66	16.67	-0.01	16.65	16.63	0.02
			LEAK RATE:	0.03		

Leak Limit: 0.80 L/min



Meteorological Sensor Audit/Calibration

Location Information

Company:	LICA	Performed By:	Alex Yakupov
Audit Location:	Bonnyville East	Reviewed By:	Rob Fisher
Audit Date:	October 24, 2018	Start/End Time (mst):	12:56 / 14:01
Calibration Purpose:	installation	Weather Conditions:	Mainly sunny

Wind Sensor Information

Sensor ID Data:		Sensor Outputs:	
Sensor Make:	RM Young	Velocity Voltage Output Range:	0-1 V
Sensor Model:	05305VK	Velocity Unit Output Range:	0-200 km/h
Serial #:	56778	Direction Voltage Output Range:	0-1 V
Previous Cal/Audit Date:	n/a or unknown	Direction Unit Output Range:	0-360 degrees

Wind Calibrator Information

Calibrator I.D. and Expiry Date: Model 18860-90/18802 SN: CA 4744, calibrated on May 18, 2018

Wind Speed Audit Data ****+/- 2% of the average correction factor is the limit****

RPM	Wind Speed Generated kph	Clockwise Wind Speed kph	Counter Clockwise Wind Speed kph	Correction Factor
0	0	0.0	0.0	-
1000	18.4	18.4	18.4	1.000
2000	36.9	36.8	36.8	1.003
3000	55.3	55.4	55.4	0.998
4000	73.7	73.8	73.8	0.999
5000	92.2	92.2	92.2	1.000
6000	110.6	110.6	110.6	1.000
7000	129.0	129.0	129.0	1.000
8000	147.4	147.4	147.4	1.000
9000	165.9	165.8	166.0	1.000
10000	184.3	184.0	184.4	1.001
The audit meets AMD requirements.			Average Correction Factor=	1.000

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

Generated Wind Direction 0-360 (Up)	Generated Wind Direction 360-0 (Down)	Indicated Wind Direction 0-360 (Up)	Indicated Wind Direction 360-0 (Down)	Degrees Difference 0-360 (Up)	Degrees Difference 360-0 (Down)	Average Absolute Degrees Difference
0	355	0	355	0.0	0.0	0.0
30	330	30	331	0.0	-0.6	0.3
60	300	60	301	0.0	-0.8	0.4
90	270	90	271	0.0	-1.0	0.5
120	240	121	241	-0.6	-0.8	0.7
150	210	151	211	-0.8	-1.3	1.1
180	180	181	182	-0.9	-1.8	1.4
210	150	211	152	-1.0	-2.3	1.7
240	120	240	121	-0.3	-1.4	0.9
270	90	270	92	0.0	-2.0	1.0
300	60	300	62	0.1	-1.6	0.9
330	30	330	31	-0.1	-1.0	0.6
355	0	355	0	0.0	0.3	0.2
The audit meets AMD requirements.			Average Absolute Degrees Difference=		0.7	

Comments:

Company Maxxam Operator: Tom Bourque

Calibrator:				Flow Measurement Device:			
Make/Model	<u>API 700</u>			Make/Model	<u>N/A</u>		
Serial Number	<u>690</u>			Serial Number	<u>N/A</u>		
Last Verification Date	<u>March 2018</u>			Temperature (°C)	<u>24.4 C</u>		
NO Cylinder S/N	<u>EY0000769</u>			Barometric Pressure	<u>699 mmHg</u>		
NO [PPM]	<u>51.1</u>	NOx [PPM]	<u>51.2</u>				
Expiry Date	<u>December 2019</u>						

Dilution Flow (sccm)					
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>	Pt. #3	<u>5000</u>
Gas Flow (sccm)					
Pt. #1	<u>80</u>	Pt. #2	<u>40</u>	Pt. #3	<u>20</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5000	0.0	0.000	0.000	0.000	-0.001	-0.001	Limit ± 10%	
5083	80.0	0.804	0.806	0.802	-0.011	0.791	0%	-2%
5044	40.0	0.405	0.406	0.403	-0.006	0.397	-1%	-2%
5022	20.0	0.204	0.204	0.202	-0.004	0.198	-1%	-2%
Absolute Average Percent Difference							1%	2%

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

<u>NO</u>		<u>LIMITS</u>		<u>NOx</u>
Correlation=	1.0000	≥ 0.990		Correlation= 1.0000
m (Slope)=	0.9974	0.90-1.10		m (Slope)= 0.9833
b (Intercept % of FS)=	-0.0592	± 3% F.S.		b (Intercept % of FS)= -0.1772

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5083	0.000	0.000	0.802	-0.011	0.791	NO ₂	% Diff. Limit
5083	0.500	0.518	0.284	0.488	0.771	-4%	± 10%
5083	0.300	0.323	0.479	0.294	0.774	-6%	± 10%
5083	0.150	0.167	0.635	0.142	0.777	-8%	± 10%
						6%	± 10%

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

<u>NO₂</u>		<u>LIMITS</u>	
Correlation=	0.9998	≥ 0.995	Big shift down in NOx when entering GPT function. Possible flow change.
m (Slope)=	0.9649	0.90-1.10	
b (Intercept % of FS)=	-1.4907	± 3% F.S.	

AENV Standards Audit Calibrator		NO _x Analyzer	
Make/Model	<u>Teco 146i</u>	Make/Model	<u>Teco 42i</u>
Serial/AMU Number	<u>AMU 1809</u>	Serial/AMU Number	<u>AMU 2265</u>
SRM Gas Cylinder No.	<u>APEX1236646</u>	Last Calibration Date	<u>April 15, 2019</u>
Cylinder Conc. (ppm)	<u>50.04</u>	Full Scale (ppm)	<u>1.0</u>
		Cylinder Gas Expiry Date	<u>June 2021</u>

COMMENTS: With ZAG Teledyne 701 Maxxam ID 11986.

Auditor: Al Clark
 Operator Signature:

Date: April 16, 2019
 Location: McIntyre Center Edmonton

Company <u>Maxxam</u>		Operator: <u>Tom Bourque</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>	Make/Model	<u>N/A</u>
Serial Number	<u>11900613</u>	Serial Number	<u>N/A</u>
Last Verification Date	<u>August 2018</u>	Temperature (°C)	<u>24.4 C</u>
NO Cylinder S/N	<u>EY0000769</u>	Barometric Pressure	<u>699 mmHg</u>
NO [PPM]	<u>51.1</u>	NOx [PPM]	<u>51.2</u>
Expiry Date	<u>December 2019</u>		

Dilution Flow (sccm)		
Pt. #1 <u>5000</u>	Pt. #2 <u>5000</u>	Pt. #3 <u>5000</u>
Gas Flow (sccm)		
Pt. #1 <u>80</u>	Pt. #2 <u>40</u>	Pt. #3 <u>20</u>

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5000	0.0	0.000	0.000	0.000	-0.002	-0.002	Limit ± 10%	
5080	80.0	0.805	0.806	0.815	-0.007	0.808	1%	0%
5041	40.0	0.405	0.406	0.414	-0.004	0.410	2%	1%
5019	20.0	0.204	0.204	0.210	-0.004	0.206	3%	2%
Absolute Average Percent Difference							2%	1%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
NO		LIMITS		NOx			
Correlation=	1.0000	≥ 0.990		Correlation=	1.0000		
m (Slope)=	1.0117	0.90-1.10		m (Slope)=	1.0039		
b (Intercept % of FS)=	0.2171	± 3% F.S.		b (Intercept % of FS)=	-0.0020		

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
5080	0.000	0.000	0.815	-0.009	0.806	NO ₂	% Diff. Limit
5080	1.400	0.517	0.298	0.511	0.809	1%	± 10%
5080	0.900	0.308	0.507	0.299	0.806	0%	± 10%
5080	0.500	0.140	0.675	0.130	0.805	-1%	± 10%
						0%	± 10%

LINEAR REGRESSION ANALYSIS				<i>y=mx+b (where x=calculated concentration, y=indicated concentration)</i>			
NO₂		LIMITS					
Correlation=	1.0000	≥ 0.995					
m (Slope)=	1.0062	0.90-1.10					
b (Intercept % of FS)=	-1.0004	± 3% F.S.					

AENV Standards		NO_x Analyzer	
Audit Calibrator			
Make/Model	<u>Teco 146i</u>	Make/Model	<u>Teco 42i</u>
Serial/AMU Number	<u>AMU 1809</u>	Serial/AMU Number	<u>AMU 2265</u>
SRM Gas Cylinder No.	<u>APEX1236646</u>	Last Calibration Date	<u>April 15, 2019</u>
Cylinder Conc. (ppm)	<u>50.04</u>	Full Scale (ppm)	<u>1.0</u>
		Cylinder Gas Expiry Date	<u>June 2021</u>

COMMENTS: With ZAG Teledyne 701 Maxxam ID: 11981. Should have Maxxam ID 11986 instead

Auditor: Al Clark Date: April 16, 2019
 Operator Signature: *Al Clark* Location: McIntyre Center Edmonton

Company: <u>Maxxam</u>		Operator: <u>C. Wesson</u>	
Calibrator:		Flow Measurement Device:	
Make/Model	<u>Evronics 6100</u>	Make/Model	<u>N/A</u>
Serial Number	<u>5212</u>	Serial Number	<u>N/A</u>
Last Verification Date	<u>March 2018</u>	Temperature (°C)	<u>N/A</u>
NO Cylinder S/N	<u>LL107918</u>	Barometric Pressure	<u>N/A</u>
NO [PPM]	<u>50.1</u>	NOx [PPM]	<u>50.2</u>
Expiry Date	<u>August 2026</u>		

Dilution Flow (sccm)			
Pt. #1	<u>5000</u>	Pt. #2	<u>5000</u>
Pt. #3	<u>5000</u>		
Gas Flow (sccm)			
Pt. #1	<u>80</u>	Pt. #2	<u>40</u>
Pt. #3	<u>20</u>		

Calibrator Flow (sccm)		Calculated Conc.(ppm)		Indicated Conc.(ppm)			% Difference vs Audit Gas	
Dilution	Gas	NO	NOx	NO	NO ₂	NOx	NO	NOx
5000	0.0	0.000	0.000	0.000	0.000	0.000	Limit ± 10%	
4997	77.8	0.780	0.782	0.768	-0.003	0.766	-2%	-2%
4997	37.9	0.380	0.381	0.372	-0.002	0.370	-2%	-3%
4996	18.9	0.190	0.190	0.186	-0.001	0.185	-2%	-3%
Absolute Average Percent Difference							2%	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)= 0.9846	0.90-1.10	m (Slope)= 0.9802
b (Intercept % of FS)= -0.0683	± 3% F.S.	b (Intercept % of FS)= -0.1101

Flow	O ₃ Conc	NO Decrease	NO	NO ₂	NOX	% Diff. Vs Audit gas	
4997	0.000	0.000	0.765	-0.002	0.764	NO ₂	% Diff. Limit
4997	0.500	0.491	0.274	0.486	0.760	-1%	± 10%
4997	0.275	0.274	0.491	0.271	0.762	0%	± 10%
4997	0.090	0.091	0.674	0.089	0.762	0%	± 10%
Absolute Average Percent Difference						0%	± 10%

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

NO₂	LIMITS
Correlation= 1.0000	≥ 0.995
m (Slope)= 0.9937	0.90-1.10
b (Intercept % of FS)= -0.1650	± 3% F.S.

<p>AENV Standards Audit Calibrator</p> <p>Make/Model <u>Sabio 2010</u></p> <p>Serial/AMU Number <u>AMU 2092</u></p> <p>SRM Gas Cylinder No. <u>APEX1236645</u></p> <p>Cylinder Conc. (ppm) <u>50.05</u></p>	<p>NO_x Analyzer</p> <p>Make/Model <u>Teco 42i</u></p> <p>Serial/AMU Number <u>AMU 1868</u></p> <p>Last Calibration Date <u>February 12, 2019</u></p> <p>Full Scale (ppm) <u>1.0</u></p> <p>Cylinder Gas Expiry Date <u>June 2021</u></p>
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COMMENTS: Contains 49.5 ppm SO₂.

Auditor: Al Clark

Operator Signature:

Date: February 13, 2019

Location: McIntyre Center Edmonton



Calibration Gas Audit

Single Component Cylinder Gas

File No. 2017-493CGA

Company: Maxxam Operator's Name: Mike
 Cylinder #: EY0001003 Concentration PPM: 9.55 Tolerance(%) 2 Certified By: Praxair
 Expiry Date: October 2020

Reference Calibrator and Gas:
 Make/Model: Sabio 2010
 Serial Number: AMU 2092
 Last Verification Date: January 17, 2018
 Gas Type: H2S Conc. 20.43
 Cylinder Number: CAL015272
 Expiry Date: January 2019

Flow Measurement Device:
 Make/Model: Mesa Defender 530
 Serial Number: H-153961 / L-153874
 Temp. °C: 23.0 C
 B.P.: 697 mmHg

Reference Analyzer:
 Make/Model: Teco 450i Serial/AMU Number: 1980
 Instrument Settings: Zero: 12.9 Span: 0.955 Range: 0.1
 Last Calibration: Date: Jan 17/18 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			
5051	39.6	0.0753	0.00784	127.551	9.60
5028	20.2	0.0387	0.00402	248.911	9.63
5033	10.5	0.0198	0.00209	479.333	9.49
Average Cylinder Concentration:					9.58

Previous Stated Concentration PPM: 9.55

Percent variance from Stated: 0

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

Auditor: Al Clark

Date: January 18, 2018

Operator Signature: *Al Clark*

Location: McIntyre Center Edmonton



Calibration Gas Audit

CH₄ / C₃H₈ Cylinder Gas

File No. 2019-393CGA

Company: Maxxam **Operators name:** Alex

Cylinder #: LL29687 Conc CH₄ (PPM) 598/198 Tolerance (%) 1 Certified By: Praxair

Expiry Date: August 2026

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Sabio 2010</u>			Make/Model	<u>Mesa Definer 220</u>
Serial Number	<u>AMU 2092</u>			Serial Number	<u>H-133034 / L-132702</u>
Last Verification Date	<u>January 14, 2019</u>			Temp. °C	<u>23.8 C</u>
Gas Type	<u>CH₄</u>	Conc.	<u>990.4</u>	B.P.	<u>707 mmHg</u>
Cylinder Number	<u>05604875</u>	Expiry Date	<u>July 2021</u>		
Gas Type	<u>C₃H₈</u>	Conc.	<u>246.5</u>		
Cylinder Number	<u>XF003845B</u>	Expiry Date	<u>July 2022</u>		

Reference Analyzer:

Make/Model Teco 55i Serial/AMU Number: 2221

Instrument Settings Zero: N/A Span: N/A Range: 20.0

Last Calibration: Date: Jan 14/19 C.F. 1.000 Done By: Shea Beaton

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	CH ₄	C ₃ H ₈			CH ₄	C ₃ H ₈
5000	0.0	0.00	0.00	0.02	51.48	603	209
3990	77.5	11.71	11.18	0.02	51.48	603	209
3976	39.1	5.87	5.71	0.01	101.69	597	211
3986	20.0	2.96	2.86	0.01	199.30	590	207
Average Cylinder Concentration:						597	209

<u>CH₄</u>	<u>C₃H₈</u>
Previous Stated Concentration PPM: <u>598</u>	<u>198</u>
Percent variance from Stated: <u>0</u>	<u>6</u>

Cylinder gas tolerances based on CH₄ only

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

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration

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

Auditor: Al Clark Date: January 15, 2019

Operator Signature: Location: McIntyre Center Edmonton



Calibration Gas Audit

NO Cylinder Gas

File No. 2019-391CGA

Company: Maxxam **Operators name:** Alex

Cylinder #: LL107918 Conc (PPM) 50.1/50.2 Tolerance (%) 1 Certified By: Praxair

Expiry Date: August 2026

Reference Calibrator and Gas:				Flow Measurement Device:	
Make/Model	<u>Teco 146i</u>			Make/Model	<u>Mesa Definer 220</u>
Serial Number	<u>AMU 1809</u>			Serial Number	<u>H-133034 / L-132702</u>
Last Verification Date	<u>January 14, 2019</u>			Temp. °C	<u>22.7 C</u>
Gas Type	<u>NO</u>	Conc.	<u>50.05</u>	B.P.	<u>707 mmHg</u>
Cylinder Number	<u>APEX1236645</u>				
Expiry Date	<u>June 2021</u>				

Reference Analyzer:

Make/Model Teco 42i Serial/AMU Number: 2268

Instrument Settings Zero: 9.2 Span: 1.223 Range: 1.0

Last Calibration: Date: Jan 14/19 C.F. 1.000 Done By: Al Clark

Calibrator Flows (sccm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
5000	0.0	0.000	0.000				
4898	78.1	0.792	0.793	0.016	62.714	49.7	49.7
4893	38.7	0.395	0.395	0.008	126.434	49.9	49.9
4894	19.3	0.195	0.195	0.004	253.575	49.4	49.4
Average Cylinder Concentration:						49.7	49.7

NO	NOx
Previous Stated Concentration PPM: <u>50.1</u>	<u>50.2</u>
Percent variance from Stated: <u>1</u>	<u>1</u>

Cylinder gas tolerances based on NO only

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

< =5% Outside Manufacturer Tolerance. Use manufacturers concentration

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

Auditor: Al Clark Date: Janaury 15, 2019

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



Calibration Gas Audit

NO Cylinder Gas

File No. 2016-439CGA

Company: Maxxam **Operators name:** Chris
Cylinder #: EY0000597 **Conc (PPM)** 49 **Tolerance (%)** 0.7 **Certified By:** Praxair
Expiry Date: December 8, 2019

Reference Calibrator and Gas:
Make/Model Thermo 146i
Serial Number AMU 1809
Last Verification Date January 26, 2017
Gas Type NO **Conc.** 48.79
Cylinder Number CAL018140
Expiry Date March 25, 2019

Flow Measurement Device:
Make/Model Bios Definer 220
Serial Number AMU 1941
Temp. °C 24.4
B.P. 704.7

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

Calibrator Flows (scm)		Indicated Conc. (ppm)		Gas Flow/ Dilution Flow	Concentration Factor	Cylinder Concentration	
Dilution	Gas	NO	NOX			NO	NOX
4923	0.0	0.000	0.000	0.016	60.917	49.5	49.5
4916	80.7	0.812	0.813	0.016	60.917	49.5	49.5
4902	40.3	0.405	0.405	0.008	121.638	49.3	49.2
4916	19.9	0.200	0.200	0.004	247.035	49.4	49.4
Average Cylinder Concentration:						49.4	49.4

NO **NOx**

Previous Stated Concentration PPM: 49.0 49.0

Percent variance from Stated: 0.8 0.8

Cylinder gas tolerances based on NO only

Meets Manufacturer Tolerance. Use manufacturers stated concentration **COMMENTS:**
 < =5% Outside Manufacturer Tolerance. Use manufacturers concentration 50.4 PPM SO2
 > 5% Outside Manufacturer Tolerance. **DO NOT USE** this cylinder

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



Lakeland Industry & Community Association
5107 50 St
Bonnyville, AB T9N2J7

End of Report