

Alberta Environment and Parks Monitoring and Science Data Management Floor 11 Oxbridge Place 9820 106 Street Edmonton Alberta T5K 2J6

March 24, 2016

### RE: 2015 Ambient Air Monitoring Annual Reports

Attached are the annual ambient air monitoring reports for the LICA Airshed Zone's Cold Lake South, Maskwa, St. Lina, and Portable Air Monitoring System (located in Elk Point) continuous stations.

Should you have any questions, please don't hesitate to contact me directly at (780) 266-7068.

Respectfully,

Michael Bisaga

Airshed Program Manager Lakeland Industry and Community Association

cc (email): LICA Office





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

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### AMBIENT AIR MONITORING ANNUAL REPORT LAKELAND INDUSTRY & COMMUNITY ASSOCIATION COLD LAKE SOUTH SITE

JOB #:2833-2015-01- A

JANUARY - DECEMBER 2015

Prepared for:

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

### **Attention: MIKE BISAGA**

DATE: January 29, 2016

Prepared by:

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Lily Lin, B 89. Senior Project Manager, Air Services

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### SUMMARY

Maxxam Analytics Air Services Group conducted an Ambient Air monitoring program between January 2015 and December 2015 on the Cold Lake South Site at Lakeland Industry & Community Association, near Bonnyville, Alberta. Sampling was carried out to determine the concentrations of non-compliance parameters as requested by the Project Coordinator.

Data presented in this report has undergone the Post-Final Validation Procedures, which include a cursory inspection of annual charts. If errors or omissions in the data are suspected or discovered after the initial submittal of data (monthly report), the post-validation step serves to re-evaluate the affected data. The report certification form is also included in this report to verify that the annual validation review has been completed, as per the Reporting Chapter (Chapter 9) of the Air Monitoring Directive (AMD).

The summary of basic statistics includes monthly mean, maximum, and minimum values as well as comparisons to the historical mean, maximum and minimum values from the previous calendar year are presented on the following pages.

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

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



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### **1.0 Discussion**

This annual validation report consists of data for parameters Sulphur Dioxide (SO2), Total Reduced Sulphur (TRS), Total Hydrocarbon (THC), Oxides of Nitrogen (NOx), Nitric Oxide (NO), Nitrogen Dioxide (NO2), Ozone (O3), Particulate Matter 2.5 (PM2.5), Wind Speed (WS), Relative Humidity (RH) and Ambient Temperature (TPX). It also includes analytical results for the Passive Sampling Program from January 2015 to January 2016.

The air monitoring trailer was located at Latitude 54°24'50.9"N and Longitude 110°13'58.5"W during the monitoring period.

The monitoring methods and equipment met all AMD requirements.

All monitoring analyzers and meteorological systems met the 90% operational uptime requirement during the monitoring period, with the exception of PM 2.5: 89.4% in October and 88.2% in November. AE reference numbers 306212 and 306982 respectively.

All data collected during the monitoring period were within the objectives outlined in the Alberta Ambient Air Quality Objectives and Guidelines Summary (AAAQOs), with the exception of PM 2.5. A total of ten 24-hr contraventions were recorded for PM 2.5 in 2015. AE reference numbers are as follows: 298739, 298789, 300140, 300251, 300393, 300636, 300693, 300799, 300802 and 300905.

The annual Maxxam internal quality audit was performed on November 17 and 18.



The summaries of the monthly maintenance report for the monitoring period are presented below:

### SULPHUR DIOXIDE (SO2)

January	No issues were identified.
February	No issues were identified.
March	No issues were identified.
April	No issues were identified.
May	The channel was put into Maintenance mode on May 6 at hour 12 while a flow check was
	being performed.
June	No issues were identified.
July	The channel was put into maintenance mode on July 7 from hour 11 to hour 14 for HVAC
	maintenance.
August	No issues were identified.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to
	a power failure. Hourly maximum data collected on September 1 at hour 7 was invalidated as
	the analyzer was recovering from a short power outage.
October	No issues were identified.
November	The routine annual internal quality audit was attempted on November 17. Due to issues with
	the calibrator, the audit was aborted. The audit was repeated on November 18 using a different
	calibrator.
December	No issues were identified.

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

No issues were identified.	
No issues were identified.	
The channel was put into Maintenance mode on July 7 from hour 11 to hour 14 for HVAC maintenance. The analyzer spanned low on July 13. As the as found points check performed on July 13 and the shut-down/start-up calibrations performed on July 15 all passed AMD requirements, no data was discarded due to this issue. The analyzer was put into maintenance mode on July 16 at hour 8 for a calibration gas cross-check.	
No issues were identified.	
Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to a power failure. Hourly maximum data collected on September 1 at hour 7 was invalidated as the analyzer was recovering from a short power outage.	
The channel was put into Maintenance On October 27 at hour 9 while an external zero air generator was being verified.	
The routine annual internal quality audit was completed on November 17.	
No issues were identified.	



### TOTAL HYDROCARBONS (THC)

January	The analyzer was put into Maintenance mode for a hydrogen cylinder change out on January
	21. Fourteen hours of data are invalid while the analyzer was stabilizing prior to calibration on
	January 27.
February	No issues were identified.
March	The hydrogen cylinder's distribution valve was closed in error causing the analyzer to flame out
	on March 26. The valve was reset on March 27. Nine hours of data were discarded due to this
	issue.
April	The analyzer was put into Maintenance mode at hour 8 on April 24 while the zero air generator
	was being relocated in order to reduce interference with the Teom unit.
May	Twelve hours of data collected on May 23 from hour 13 to hour 19 and on May 31 from hour 15
	to hour 18 were invalidated as the data were below the background concentration of 1.5 ppm.
June	The sample flow rate was checked on June 25. One hour of data collected on June 14 at hour 18
	was invalidated as the value was below the background concentration of 1.5 ppm.
July	The channel was put into Maintenance mode on July 7 from hour 11 to hour 14 for HVAC
	maintenance.
August	No issues were identified.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to
	a power failure. Hourly maximum data collected on September 1 at hour 7 was invalidated as
	the analyzer was recovering from a short power outage.
October	No issues were identified.
November	The routine annual internal quality audit was completed on November 17.
December	No issues were identified.

### **NITROGEN DIOXIDE (NO2)**

January	The analyzer spanned high on January 12. The charcoal for zero air supply was renewed and the
	daily zero/span system was rebuilt following an as found points check on January 13. No data
	was discarded due to this event.
February	No issues were identified.
March	No issues were identified.
April	No issues were identified.
May	No issues were identified.
June	No issues were identified.
July	The channel was put into maintenance mode on July 7 from hour 11 to hour 14 for HVAC
	maintenance. The pump for the zero/span system was rebuilt on July 8 following a shut-down
	calibration.
August	No issues were identified.



September	Data collected on September 8 at hour 8 was invalidated due to a malfunction. The analyzer
	spanned high on September 8 due to an incorrect expected span value. The expected span
	value was adjusted following an as found points check on September 18. No further issues were
	identified. Two hours of data collected on September 16 from hour 20 to hour 21 were
	invalidated due to a power failure. Hourly maximum data collected on September 1 at hour 7
	was invalidated as the analyzer was recovering from a short power outage.
October	The analyzer started spanning high after the calibration on October 5 as the expected span
	value was not set correctly. An as found points check was completed on October 28. The
	expected span value was then adjusted. No further issues were identified.
November	The routine annual internal quality audit was completed on November 17. The analyzer was put
	into Maintenance mode for three hours on November 18 while the GPT reference points for the
	Ozone analyzer audit were being generated.
December	The AEMERA-supplied Thermo 42C, S/N: 427408716, analyzer was replaced with the LICA-
	owned Thermo 42i, S/N: 1505664393, analyzer on December 14. Seventeen hours of data are
	invalid while the new analyzer was stabilizing prior to calibration.

### OZONE (O3)

January	Fifteen hours of data collected between January 9 and January 10 were discarded due to a zero
-	system valve malfunction.
February	No issues were identified.
March	No issues were identified.
April	The analyzer was put into Maintenance mode on April 16 between hour 10 and hour 11 for a
	calibrator check.
May	No issues were identified.
June	No issues were identified.
July	The channel was put into Maintenance mode on July 7 from hour 11 to hour 14 for HVAC
	maintenance. The analyzer started spanning high on July 20. The pump for the zero/span
	system was rebuilt following an as found points check on July 22. No further issues were
	identified. Four hours of data are invalid due to this maintenance event.
August	No issues were identified.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to
	a power failure. Hourly maximum data collected on September 1 at hour 7 was invalidated as
	the analyzer was recovering from a short power outage.
October	No issues were identified.
November	The routine annual internal quality audit was completed on November 18.
December	No issues were identified.



### PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5)

January	Twenty-eight hours of data were invalidated as the data were below –3 ug/m3.
February	Five hours of data were invalidated as the data were below –3 ug/m3.
March	The Teom unit started generating readings that were lower than expected on March 23. As no
	issue could be identified, during the site visit on March 24, data collected between March 23
	and March 24 should be used with caution. Forty-four hours of data were invalidated as the
	data were below –3 ug/m3.
April	Twenty-three hours of data were invalidated as the data were below –3 ug/m3.
May	Eleven hours of data were invalidated as the data were below –3 ug/m3. Two 24-hr
	contraventions were recorded in May: concentration of 79 ug/m3 on May 25 and concentration
	of 67 ug/m3 on May 26. AE Reference numbers 298739 and 298789 respectively.
June	Forty-five hours of data were invalidated as the data were below -3 ug/m3. One 24-hr
	contravention was recorded this month: concentration of 51 ug/m3 on June 29. AE Reference
2040-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	number 300140.
July	The channel was put into maintenance mode on July 7 from hour 7 to hour 15 for HVAC
	maintenance. Ten hours of data were invalidated as the data were below –3 ug/m3. Seven 24-
	hr contraventions were recorded this month: concentrations of 51 ug/m3 on July 1, 114 ug/m3
	on July 4, 47 ug/m3 on July 9, 155 ug/m3 on July 10, 128 ug/m3 on July 11, 41 ug/m3 on July 12
	and 33 ug/m3 on July 13. AE Reference numbers 300251, 300393, 300636, 300693, 300799,
	300802 and 300905 respectively.
August	Twenty-five hours of data were invalidated as the data were below –3 ug/m3.
September	The unit displayed a vaccum pressure warning on September 3. Following a shut-down audit,
	the sampling pump was checked and the by-pass filter was changed and re-insulated. A post-
	repair audit was completed on the same day. As both audits met requirements, no data was
	discarded due to this event. Thirty-eight hours of data were invalidated as the data were below
	-3 ug/m3. Two hours of data collected on September 16 from hour 20 to hour 21 were
	invalidated due to a power failure.
October	The sample pump was replaced on October 6. Seventy-nine hours of data were invalidated as
	the data were below –3 ug/m3. The operational uptime for the month is 89.4%. AE Reference
	number: 306212.
November	The routine annual internal quality audit was completed on November 18. Eighty-three hours
	of data were invalidated as the data were below –3 ug/m3. The operational uptime for the
	month is 88.2%. AE Reference number: 306982.
December	No hourly data was invalidated as all data was above -3ug/m3.



### WIND SPEED (WS)

January	No issues were identified.
February	Twenty-three hours of data were discarded due to a power plug malfunction.
March	The wind speed range was changed from 180kph to 200kph in an attempt to install the
	manufacturer-calibrated MetOne wind system. As the MetOne wind system showED a
	malfunction, the Maxxam-suppiled RM Young wind system was re-installed. However, the
	range was not changed back to 180kph when the RM Young was installed. This offset was
	corrected by multiplying the data collected between 10 am on March 12 and 9am on March 16
	by 1.1.
April	Maxxam-supplied RM Young wind system unit was replaced with the repaired LICA-owned
	MetOne unit on April 16. The wind system data channel was reconfigured from 180 kph to 200
	kph when the RM Young wind system was installed.
May	No issues were identified.
June	No issues were identified.
July	No issues were identified.
August	No issues were identified.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to
	a power failure. Hourly maximum data collected on September 1 at hour 7 was invalidated as
-	the analyzer was recovering from a short power outage.
October	No issues were identified.
November	No issues were identified.
December	No issues were identified.

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

January	No issues were identified.
February	No issues were identified.
March	No issues were identified.
April	No issues were identified.
May	No issues were identified.
June	No issues were identified.
July	No issues were identified.
August	No issues were identified.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to
	a power failure.
October	No issues were identified.
November	No issues were identified.
December	No issues were identified.



### AMBIENT TEMPERATURE (TPX)

January	No issues were identified.
February	No issues were identified.
March	No issues were identified.
April	No issues were identified.
May	No issues were identified.
June	No issues were identified.
July	No issues were identified.
August	No issues were identified.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to a power failure.
October	No issues were identified.
November	No issues were identified.
December	No issues were identified.



### 2.0 Project Personnel

Mike Bisaga was the contact for Lakeland Industry & Community Association, and the Maxxam field sampling team consisted of Alexander Yakupov, Limin Li, and Christopher Wesson.

### 3.0 Plant Monthly Required AMD Summary

All data collected during the monitoring period were within the objectives outlined in the AAAQOs, with the exception of PM 2.5. A total of ten 24-hr contraventions were recorded in 2015. AE reference numbers are as follows: 298739, 298789, 300140, 300251, 300393, 300636, 300693, 300799, 300802 and 300905.

The operational uptime for all analyzers and meteorological system was above the 90% requirement, with the exception of PM 2.5: 89.4% in October and 88.2% in November. AE reference numbers 306212 and 306982 respectively.

### 4.0 Calculations and Results

All calculations and reporting of results follow the method described in the Air Monitoring Directive, 1989, 2006 Amendments to the Air Monitoring Directive, 1989 (AMD 2006) as well as AMD 2015.



### 5.0 Methods and Procedures

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

Maxxam AIR SOP-00208: RM Young Monitor Calibration Maxxam AIR SOP-00210: Ambient TRS Monitoring Maxxam AIR SOP-00211: Ambient SO2 Monitoring Maxxam AIR SOP-00212: Ambient O3 Monitoring Maxxam AIR SOP-00213: Ambient NO/NO2/NOx Monitoring Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring Maxxam AIR SOP-00215: Teom Operation

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

Sulphur Dioxide - Thermo 43i UV Flourescent Analyzer Total Reduced Sulphur - Thermo 450i UV Flourescent Analyzer Total Hydrocarbons - Thermo 51C FID Analyzer Oxides of Nitrogen - Thermo 42C and Thermo 42i Chemiluminescent Analyzers Ozone - Thermo 49i Photometric Analyzer Particulate Matter (PM2.5) - R&P 1405F Teom Unit Wind System - Met One and RM Young Units Relative Humidity - Met One Unit Ambient Temperature - Met One Unit Datalogger - ESC 8832 APPENDIX I CONTINUOUS MONITORING DATA RESULTS

### SULPHUR DIOXIDE

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Cold Lake South Site - 2015 JOB # 2833-2015-01- A

## SULPHUR DIOXIDE (SO2) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

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		s 20 ppb	20 < C ≤ 60 ppb	60 < C ≤ 110 ppb	110 < C ≤ 170 ppb	170 < C ≤ 340 ppb	>340 ppb	1-HR	24-HR	1-HR	24-HR	(BEB)
	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.2
	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.2
	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.1
April 684	100.0	100.00%	0.00%	%00-0	0.00%	%00.0	0.00%	172	48	0	0	0.0
<b>May</b> 706	6.66	100.00%	%00.0	0.00%	0.00%	%00.0	0.00%	172	48	0	0	0.1
June 680	100.0	100.00%	0.00%	0.00%	0.00%	%00.0	0.00%	172	48	0	ο	0.1
<b>July</b> 706	99.5	100.00%	0.00%	%00.0	0.00%	%00'0	0.00%	172	48	0	0	0.0
August 708	100.0	100.00%	0.00%	0.00%	0.00%	%00-0	0.00%	172	48	0	0	0.2
September 681	99.7	100.00%	0.00%	0.00%	0.00%	%00'0	.%00"0	172	48	0	0	0.1
October 708	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.1
November 678	99.66	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.1
December 708	100.0	100.00%	0.00%	0.00%	0.00%	%00"0	0.00%	172	48	0	0	0.1
N/D - Valid Data Not Available	lable									ANNUALAVERAGE	AVERAGE	0.1

\*Nurmoer or keagings - included calibration nours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

8.U PPB	0.1 PPB
Alberta Ambient Arr Quality Objectives Annual Average**	Annual Average for 2015

Maxia frup company

Cold Lake South Site - 2015 JOB # 2833-2015-01- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

		2014			2015		
Month	MEAN	MINIMIM	MAXIMUM	MEAN	MUMINIM	MAXIMUM	Difference
January	0	1. A. 1. 9. 1		0	0	4	0
February	0.53	10	$\left\  \left\  \boldsymbol{p}_{i} \right\  \right\  = \left\  \boldsymbol{p}_{i} \right\ $	1. 20170 - 2018 10	0	3	0
March	Contraction of the second s		3	0		4	0
April	0		1	0		1	0
May	0		2	0	0	S. S.	0
June			2	0		1	0
ylul	0 10 10		2	0	0	2	0
August	0		2	0	<u>.</u>	ю	0
September		1.0	2	0	0 1	2	0
October			(***) ***) * 4	0	0 2	2	Ο
November			3	0	0	5	0
December	0.4		2	0	0	£	0
N/D - Valid Da	N/D - Valid Data Not Available						

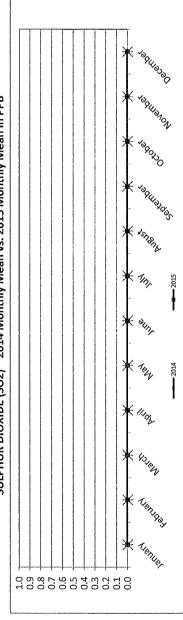
SULPHUR DIOXIDE (SO2) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

N/D - Valid Data NOT AVAIIADIE

\*Annual peak is bolded and highlighted.

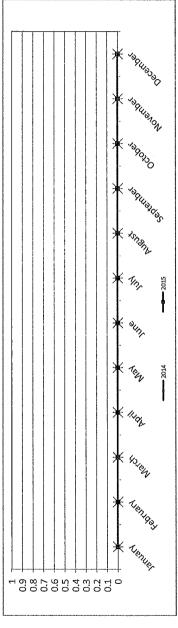
Maxia am

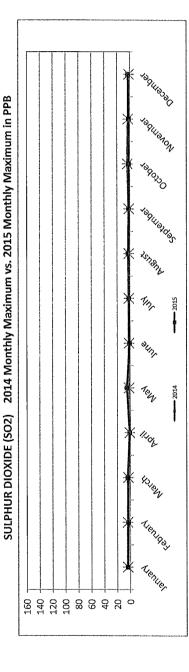
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Cold Lake South Site - 2015 JOB # 2833-2015-01- A



SULPHUR DIOXIDE (SO2) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB







LICA SO2\_ / WDR Joint Frequency Distribution (Percent)

01/01/15 thru 12/31/15

Distribution By % Of Samples

			Freq	100.00	00-	00-	00-	00-	00.		
			MNN	3.50	00-	00 -	00 -	00.	00 -	3.50	
			MN	5.33	00 -	00-	00-	00.	00 -	5.33	
			MNM	6.66	00-	00.	00-	00.	00-	6.66	
	eters		м	11.71	00 -	00-	00.	00.	00.	11.71	
	Wind Parameter : WDR Instrument Height : 10 Meters		MSM	16.54	00-	.00	.00	.00	.00	16.54	
	eter Height		MS	6.50	00.	.00	00.	00.	.00	6.50	
	Wind Parameter Instrument Heig		SSW	3.70	00.	00.	00.	00.	00.	3.70	
	Win Ins		ი	3.07	.00	00.	.00	00.	00-	3.07	
			SSE	4.03	00.	00.	00.	00-	00-	4.03	
		Direction	SE	10.43	00.	00.	00.	.00	00-	10.43	
		Dir	ESE	5.36	00.	00.	00-	00.	00-	5.36	
			рă	6.70	00-	00 -	00'	00.	00.	6.70	
			ENE	4.17	00-	00 '	00'	00.	00.	4.17	
			RE	5.79	00.	00-	00.	00.	00.	5.79	
10	LICA SO2_ PPB_		INNE	3.56	00.	00-	00.	00.	00-	3.56	
Logger Id : 01	Site Name : LICA Parameter : SO2_ Units : PPB		N	2.87	00.	00.	00.	.00	.00	2.87	
Logge	Site Name Parameter Units		Limit	20,0	60.0	0.011	170.0	340.0	340.0	Totals	
			н	v	v	rı V	v	v	۳ ا	г	

Calm : .00 %

Total # Operational Hours : 8281

Distribution By Samples

	Freq	IJ.					
		8281					
	MNN	290					
	MM	442					
	WNW	552					
	м	970					
	MSW	1370					
	SW	539					
	SSW	307					
	S	255					
	SSE	334					
Direction	SE	864					
D	ESE	444					
	ы	555					
	ENE	346					
	NE	480					
	INNE	295					
	N	238					
	Limit	20.0	60.0	110.0	170.0	340.0	340.0
		v	v	v	۷	v	X

290

442

552

970

539 1370

307

255

334

864

444

555

346

480

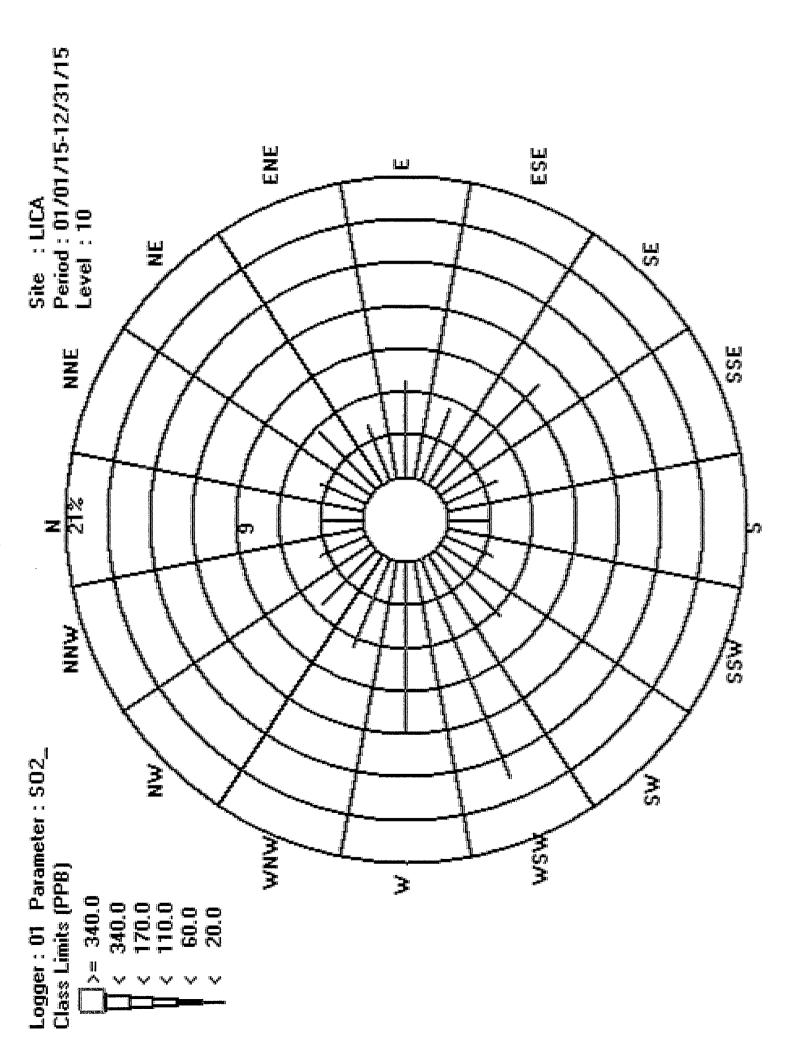
295

238

Totals

Calm : .00 %

Total # Operational Hours : 8281



### TOTAL REDUCED SULPHUR



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Cold Lake South Site - 2015 JOB # 2833-2015-01- A

# TOTAL REDUCED SULPHUR (TRS) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	1. 出版的"空	Operational Time (%)	%.R	% Readings in Concent	Concentration Range (PPB-TRS)	TRS)		OBJECTIVES**	EXCEE	EXCEEDENCES	MONTHLY
		- loss -	≤3 ppb	4 < C S 10 ppb	11 < C ≤ 50 ppb;	>50 ppb	1-HR	24-HR	1-HR	24-HR	
January	707	100.0	100.00%	0.00%	0.00%	0.00%	1	1	L	I	0
February	634	100.0	100.00%	0.00%	0.00%	0.00%	1	1	1	1	0
March	708	100.0	100.00%	0.00%	%00.0	0.00%	I	1	ŀ	ı	0
April	685	100.0	100.00%	0.00%	0.00%	0.00%	-	1	L	1	0
May	706	100.0	100.00%	0.00%	0.00%	0.00%	ı	1	I	ı	ο
June	683	100.0	99.71%	0.29%	%00.0	0.00%	I	1	I	1	Ч
ylul	687	66.3	98.84%	1.02%	0.15%	0.00%	-	1	I	í	1
August	700	100.0	99.57%	0.43%	0.00%	0.00%	1	1	I	1	ο
September	677	2.99.7	99.85%	0.15%	0.00%	0.00%	1	I	I	I	0
October	705	100.0	100.00%	0.00%	0.00%	0.00%	1	ı	I	I	0
November	683	100.0	100.00%	0.00%	0.00%	0.00%	1	P	I	1	0
December	708	100.0	100.00%	0.00%	0.00%	0.00%	1	I	I	1	0
N/D - Valid Da *Number of R	N/D - Valid Data Not Available *Number of Readines - included calibration hours	e Yed calibration	hours						ANNUAL	ANNUAL AVERAGE	0

\*Number of Readings - included calibration hours
\*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

PPB	PPB
D/N	0
Alberta Ambient Air Quality, Objectives Annual Average**	Annual Average for 2015

\*

Maxiam

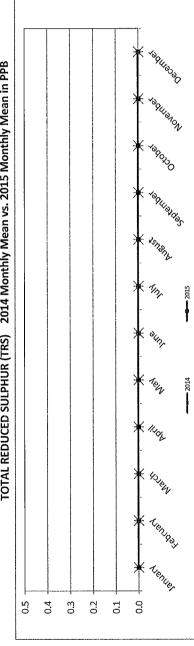
Cold Lake South Site - 2015 JOB # 2833-2015-01- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

TOTAL REDUCED SULPHUR (TRS) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

	Difference	0	0	0	0	0	-1	0	Ο	0	0	0	0	
	MAXIMUM	Ţ	1	1	1	ñ	4		7	7	0	0	0	
2015	MINIMIM	.0	10 10	0.00 100 100 100	0	0	0. 						0.0	
	MEAN	0	0	0	0	0		1	0	0	o	o	0	
	MAXIMUM	1	1	0	1	1	4	ور المراجع الم مراجع المراجع ال مراجع المراجع ال	З	Ŋ	1	0	1	
2014	MINIMIN	1. E. & O. S.		0	0	- 10	8	0.4		0.10		0.0		
	MEAN	0	0	0	0	0	0		0	0	0	0	0	
	Month	January	February	March	April	May	June	July	August	September	October	November	December	

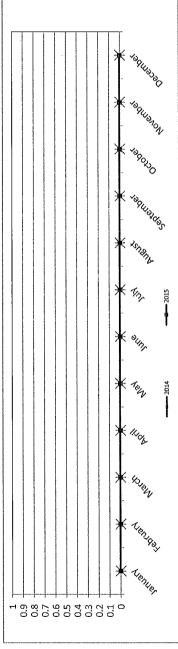
N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

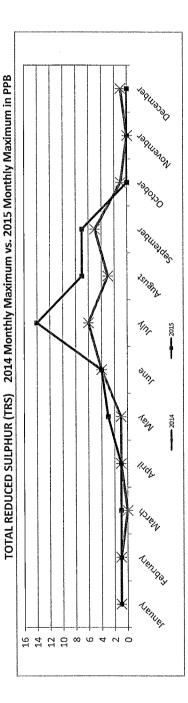




TOTAL REDUCED SULPHUR (TRS) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB







## LICA TRS\_ / WDR Joint Frequency Distribution (Percent)

## 01/01/15 thru 12/31/15

### Distribution By % Of Samples

Logger Id : 01 Site Name : LICA

		Freq	99.74	.24	-01	00'	
		MNN	3.48	10.	00.	00-	3.49
		MN	5.33	10.	00'	00.	5.35
		MNM	6.70	00-	00 -	.00	6.70
feters		ы	11.74	00-	.01	00.	11.75
Wind Parameter : WDR Instrument Height : 10 Meters		MSM	6.45 16.41 11.74	.13	00,	00,	16.54
neter : Height		SW	6.45	. 02	.00	00-	6.47
nd Paran strument		SSW	3.66	.02	00.	00.	3.69
Т ЦП SUI		ß	3.05	.01	00.	00-	3.06
		SSE	4.00	00,	00.	00-	4.00
	Direction	SE	5.37 IO.39	TO.	00.	00-	5.38 10.41 4.00 3.06 3.69 6.47 16.54 11.75
	DÌJ	ESE	5.37	10.	00.	.00	
		ы	6.73	00.	00-	00.	6.73
		ENE	4.18	00'	00-	00.	4.18
		Ħ	5.79	00.	.00	.00	5.79
PPB		INNE	3.51	.00	00.	00.	3.51
Parameter : TRS Units : PPB		N	2.86	00.	00.	00.	2.86
Para Para Unit		Limit	< 3.0	10.0	50.0	50.0	Totals
			v	v	v	X	

Calm : .00 %

Total # Operational Hours : 8260

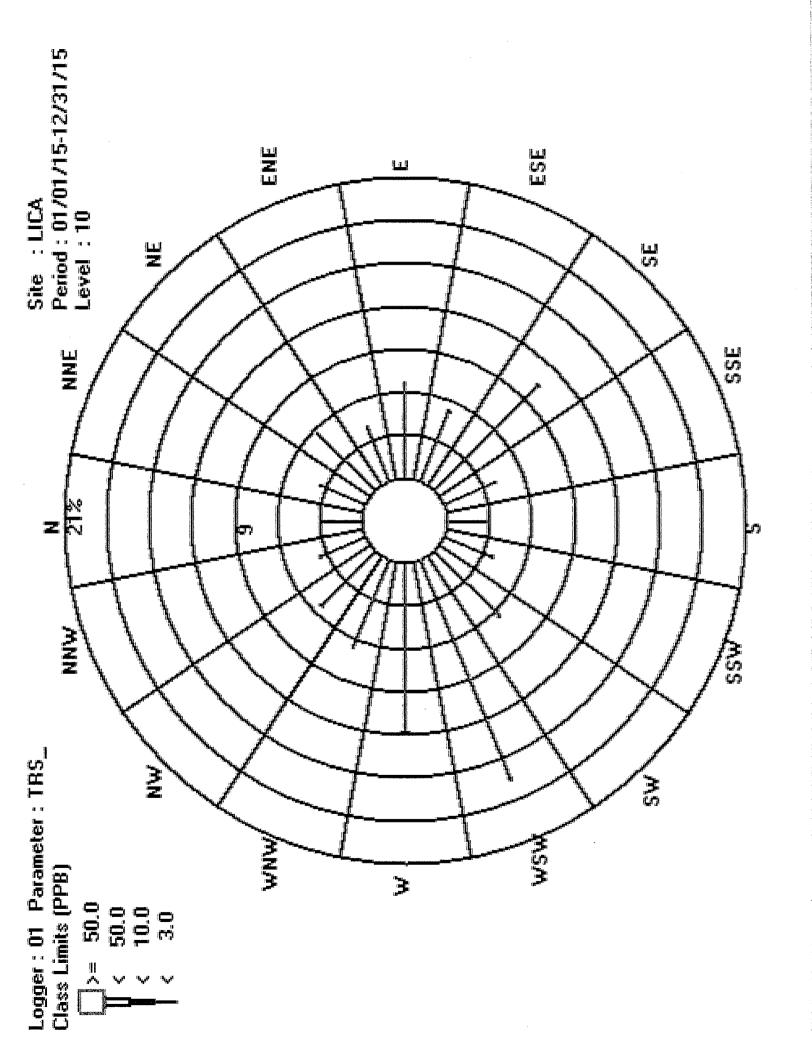
### Distribution By Samples

ion
Direct

Freq	8239	20	H		
MNN	288	ч			289
MN	44T	н			442
MNM	554				554
ж	970		ŗ		971
WSW	1356	11			1367
MS	533	0			535
SSW	303	N			305
ß	252	ч			253
SSE	331				331
SE	859	Ч			860
ESE	444	۳ł			445
ы	556				556
ENE	346				346
Ħ	479				479
INNE	290				290
n	237				237
Limit	3.0	10.0	50.0	50.0	Totals
	v	v	v	X	

Calm : .00 %

Total # Operational Hours : 8260



### TOTAL HYDROCARBON



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Cold Lake South Site - 2015 JOB # 2833-2015-01- A

# TOTAL HYDROCARBONS (THC) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of Operation Readinoc* Time (%)	Number of Operational Beadinoc* Time (%)	% Rt	% Readings in Concentration Range (PPM THO	ation Range (PPM	THC)	OBJECT	OBJECTIVES**		EXCEEDENCES	MONTHLY AVERAGE
	- composite	- (m)	≤3.0 ppm	3.1 < C ≤ 10.0 ppm 10.1 < C ≤ 50.0 ppm	0.14	>50.0 ppm	1-HR	24-HR	1-HR **	1-HR 24-HR	記述
January	687	98.0	95.20%	4.80%	0.00%	0.00%	I	I	ı	1	2.3
February	636	100.0	98.58%	1.42%	0.00%	0.00%	1	ı	1	•	2.2
March	869	98.8	97.71%	2.29%	0.00%	%00'0	1	1	1	1	2.2
April	683	6.66	100.00%	0.00%	0.00%	%00.0	1	I	1	1	2.0
May	695	98.4	100.00%	0.00%	0.00%	%00'0	-	ı	I	1	2.1
June	682	99.7	99.41%	0.59%	0.00%	0.00%	1	1	F	I	2.1
ylul	706	99.5	99.72%	0.28%	0.00%	%00"0	1	I	I	ł	2.1
August	707	100.0	99.15%	0.85%	0.00%	%00'0	1	ł	I	1	2.2
September	681	2.99.7	98.38%	1.62%	0.00%	0.00%	t	I		-	2.1
October	707	100.0	97.88%	2.12%	0.00%	0.00%	-	-	ı	ı	2.2
November	684	100.0	99.71%	0.29%	0.00%	0.00%	1	•	I	1	2.2
December	708	100.0	92.80%	7.20%	0.00%	0.00%	J	I	I	1	2.4
N/D - Valid Da *Number of R	N/D - Valid Data Not Available *Number of Readings - included calibration hours	e led calibration	hours						ANNUAL AVERAGE	AVERAGE	2.2

\*Number of Readings - included calibration hours
\*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

	_
PPM	РРМ
N/D	2.2
Alberta Ambient Air Quality Objectives Annual Average**	Annual Average for 2015

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Cold Lake South Site - 2015 JOB # 2833-2015-01- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

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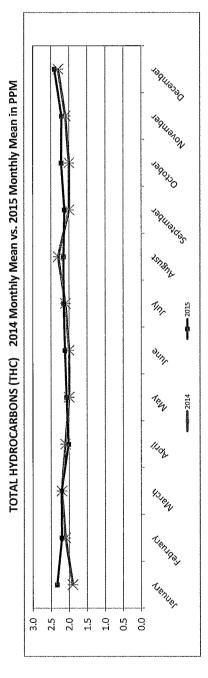
TOTAL HYDROCARBONS (THC) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPM

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

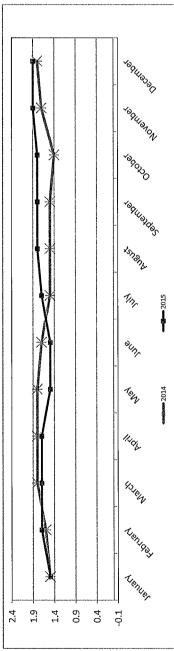
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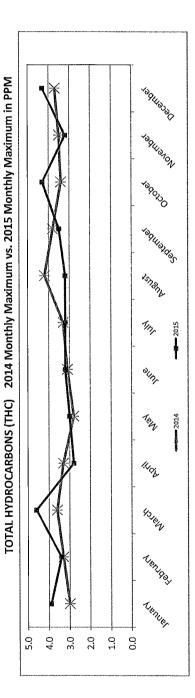
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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Cold Lake South Site - 2015 JOB # 2833-2015-01- A









## LICA THC / WD Joint Frequency Distribution (Percent)

### 01/01/15 thru 12/31/15

Distribution By % Of Samples

			•			
Meters		ы	11.20	.55	00-	00.
t : 10]		WSW	15.96 11.20	-49	00-	00.
neter t Heighi		SW	6.24	.23	00-	.00
Wind Parameter : WD Instrument Height : 10 Meters		MSS	3.52	.15	00-	00.
Wir Ins		S	2.87	.20	00-	00.
		SSE	3.84	.15	00-	00.
	Direction	SE	10.32	60.	00.	00.
	DİJ	ESE	5.21	.19	00.	00.
		囟	6.57	.16	.00	00.
		ENE	4.08	.08	00.	00.
		Ы	5.57	.07	.00	00.
01 LLCA THC PPM		INNE	3.52	.02	00.	00.
Logger Id : 01 Site Name : LICA Parameter : THC Units : PPM		N	2.86	.02	00.	00.
Logger Site N Parame Units		Limit	3.0	10.0	50.0	50.0
			v	v	v	Ķ

Freq

MM

WNW

3.52 97.23 NNW

5.29

6.58

2.76 00. 00-

.02

.08

00' 00.

00.

00' .18

00. 5.38

.00 6.76

3.55

Totals 2.88 3.55 5.64 4.17 6.74 5.40 10.42 4.00 3.07 3.68 6.47 16.46 11.76

Calm : .00 %

Total # Operational Hours : 8248

### Distribution By Samples

Direction	

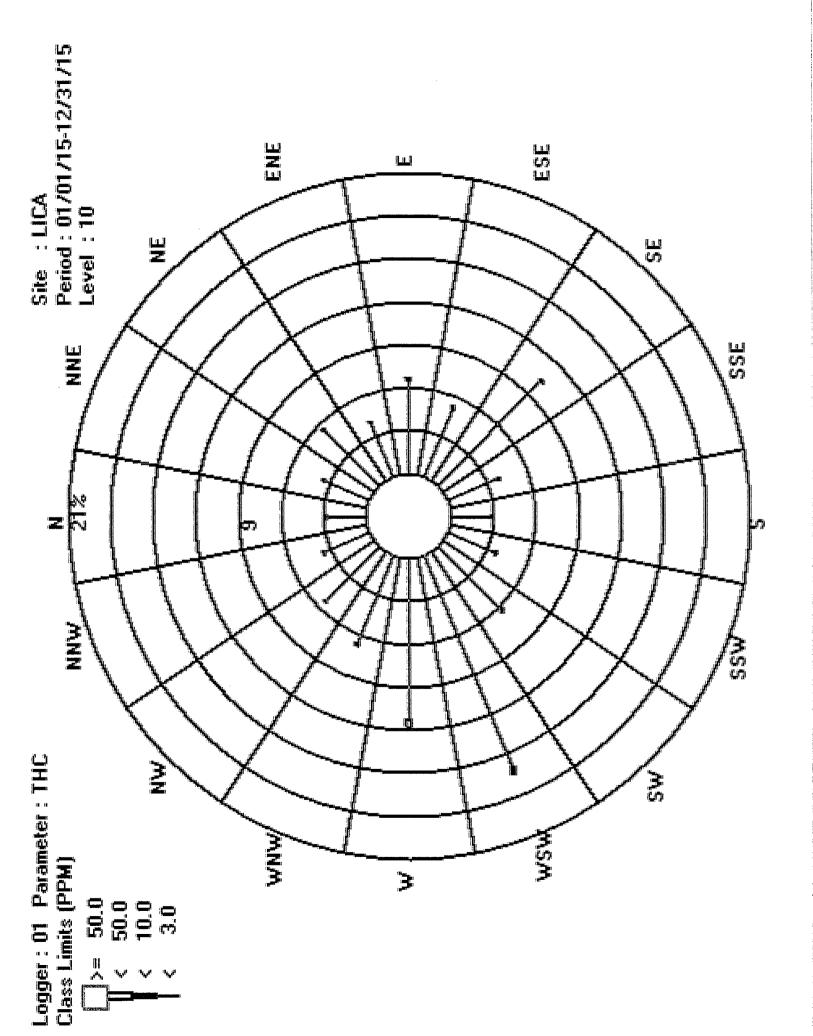
Freq	8020	228		
MNN	291	0		
NW	437	٢		
WNM	543	15		
н	924	46		
WSW	1317	41		
MS	515	19		
MSS	291	13		
ß	237	17		
SSE	317	13		
SE	852	ω		
ESE	430	16		
ы	542	14		
ENE	337	7		
E	460	9		
INNE	291	0		
N	236	0		
Limit	3.0	10.0	50.0	0
	v	v	v	

>= 50.0

Calm : .00 %

Total # Operational Hours : 8248

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**OXIDES OF NITROGEN** 



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Cold Lake South Site - 2015 JOB # 2833-2015-01- A

## OXIDES OF NITROGEN (NOx) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	1.2.2.2.45	O.S.		% Readings in Concentr	Concentration Range (PPB NOx)	NON	OBJECT	OBJECTIVES**	EXCEED	EXCEEDENCES	MONTHLY
	neadings	lov)enni	≤ 50 ppb	51 < C ≤ 110 ppb	111 < C ≤ 210 ppb	210 ppb	J-HR	24-HR	1-HR	24-HR	
January	665	100.0	98.65%	1.35%	0.00%	0.00%	ı	I	I	ι	9.8
February	633	100.0	%89.66	0.32%	0.00%	0.00%	I	1	1	ı	7.2
March	681	100.0	99.71%	0.29%	0.00%	0.00%	-	ı	1	,	5.5
April	682	100.0	100.00%	0.00%	%00.0	0.00%	-	J	1	I	3.1
May	682	100.0	100.00%	0.00%	0.00%	00.00%	-	l	1	1	2.7
June	679	100.0	100.00%	0.00%	0.00%	%00.0	-	t	I	1	3.0
July	673	99.5	100.00%	0.00%	0.00%	%00.0	-	l	ı	1	2.3
August	681	100.0	100.00%	0.00%	0.00%	0.00%	1	1	ı	1	2.0
September	667	99.6	100.00%	0.00%	%00.0	0.00%	I	. 1	-	1	2.5
October	677	100.0	99.85%	0.15%	0.00%	0.00%	-	1	I	I	4.8
November	678	9.66	100.00%	0.00%	0.00%	0.00%	I	L	U	1	6.2
December	658	97.7	%07.66	0.30%	0.00%	0.00%	ı	1	1	1	9.5
N/D - Valid Da *Nimber of R	N/D - Valid Data Not Available *Number of Readings - included calibration hours	le ded calibration	hours						ANNUAL AVERAGE	AVERAGE	4.9

\*Number of Readings - included calibration hours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

N/D PPB	4.9 PPB
Alberta Ambient Air Quality Objectives Annual Average**	Annual Average for 2015

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Cold Lake South Site - 2015 JOB # 2833-2015-01- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

		2014			2015		
Month	MEAN	WIMINIW	MAXIMUM	MEAN	MINIMIN	MAXIMUM	Difference
January	7.6	0.5	49.4	9.8	1.0	78	-2.2
February	8.8	0.6	83.2	7.2	0	103.4	1.6
March	6.6	0.8	105.7	5.5	<b>P</b> -0	65.2	4.4
April	2.5	0.2	18.6	3.1	0.2	35.7	-0.6
May	2.4	0.1	20.5	2.7	5.0	22.5	-0.3
June	1.9	0	16.5	3.0	0	15.2	T.L-
ylut	2.0	0.2	28.1	2.3	0	14.9	-0.3
August	2.3	0	14.2	2.0	0	12.6	0.3
September	3.1	o	25.4	2.5	0	40.9	0.6
October	4.3	0	44.9	4.8	0	61.1	-0.5
November	5.1	0	26.6	6.2	<b>F:0</b>	35.4	-1.1
December	9.7	0.7	132.5	9.5	0.1	65.3	0.2

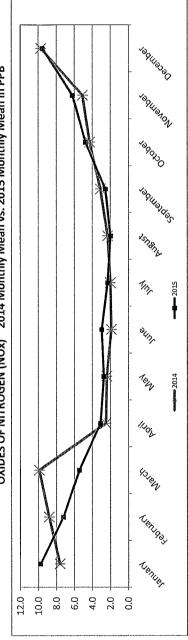
OXIDES OF NITROGEN (NOx) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

N/D - Valid Data Not Available

\*Annual peak is bolded and highlighted.

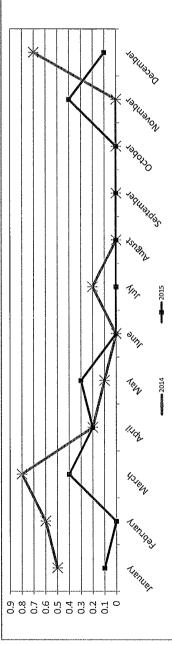
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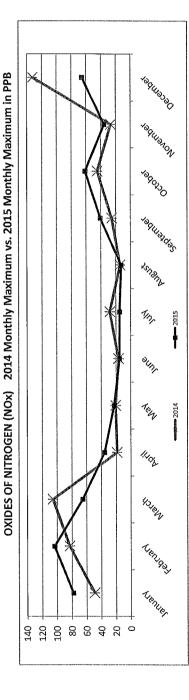
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Cold Lake South Site - 2015 JOB # 2833-2015-01- A



OXIDES OF NITROGEN (NOx) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB

OXIDES OF NITROGEN (NOx) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPB





# LICA NOX\_ / WD Joint Frequency Distribution (Percent)

# 01/01/15 thru 12/31/15

# Distribution By % Of Samples

			.,			
		NN	5.36	00.	00-	00.
		MNM	6.67	.02	00'	00-
leters		ы	II.64	10.	00.	00-
Wind Parameter : WD Instrument Height : 10 Meters		MSM	16.52 11.64	.01	00-	00.
Wind Parameter : WD Instrument Height : 10		SW	6.45	00.	00-	00.
nd Paran strument		MSS.	3.63	10.	00-	00.
Wir Ins		ß	3.06	00.	00-	00-
		SSE	4.00	10.	00'	00 -
	Direction	SE	5.34 IO.42	10.	00.	00.
	Dir	ESE	5.34	.02	00'	00.
		ы	6.72	.02	00.	00.
		ENE	4.17	.01	00.	00.
		NE	5.82	.02	00.	00.
01 LICA NOX_ PPB_		INNE	3.58	00.	00.	00.
Logger Id : 01 Site Name : LICA Parameter : NOX_ Units : PPB		N	2.85	10.	00.	00.
Logg Site Para Unit		Limit	50.0	110.0	210.0	210.0
			v	v	v	Ķ

Fred

3.50 99.80 MNN

.19 00-00-

.01

00'

0. 3.51

5.36

6.74 5.36 10.43 4.01 3.06 3.64 6.45 16.53 11.65 6.70

Calm : .00 %

Totals 2.86 3.58 5.84 4.18

Total # Operational Hours : 8194

## Distribution By Samples

Direction

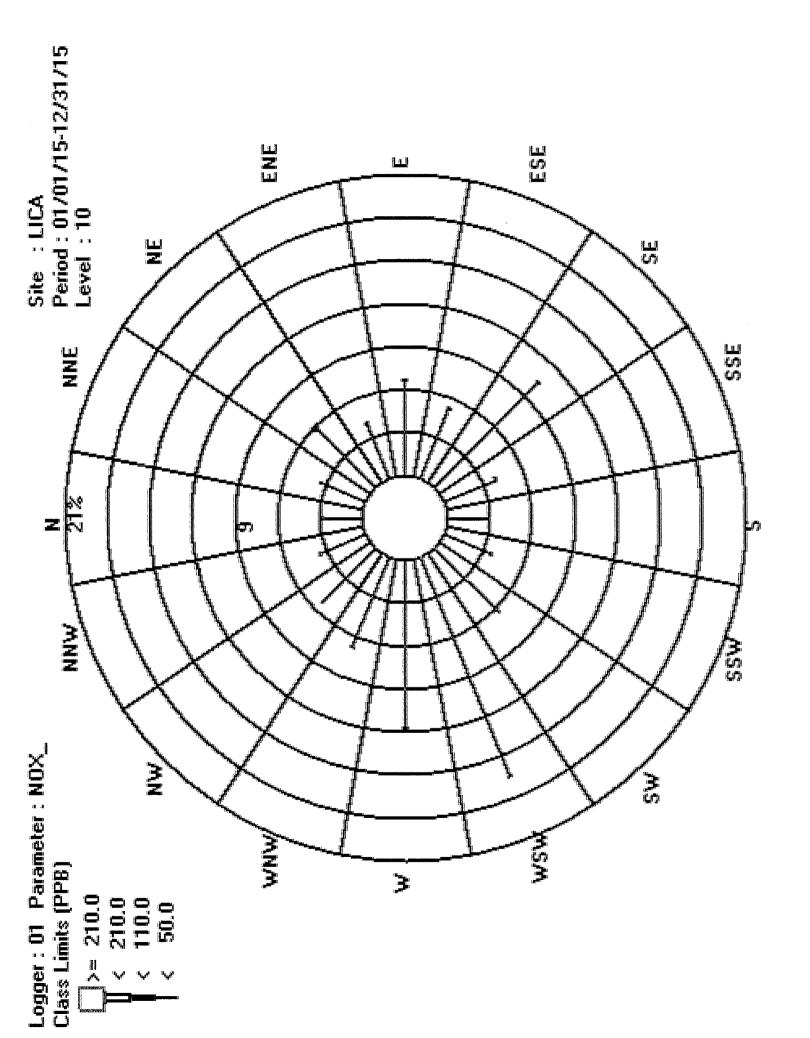
h			
Freq	8178	76	
MNN	287	ц	
MN	440		
MNM	547	0	
м	954	ы	
WSW	1354	н	
ΜS	529		
MSS	298	ч	
S	251		
SSE	328	ы	
SE	854	ы	
ESE	438	0	
ы	551	2	
ENE	342	н	
NE	477	2	
INNE	294		
z	234	ч	
Limit	50.0	110.0	210.0
	v	v	v

<u>≻</u> 210.0

Calm : .00 %

Total # Operational Hours : 8194

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NITRIC OXIDES

MaxXam

# NITRIC OXIDE (NO) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	*	Number of Operational		% Readings in Concent	Concentration Range (PPB NO)	(ON	OBJEC	OBJECTIVES**	EXCEEDENCES	DENCES	MONTHLY
	veduines.		s 50 ppb	51 < C ≤ 110 ppb	111 <c<210 ppb<="" th=""><th>&gt;210.ppb *</th><th>1-HR</th><th>24-HR</th><th>1-HR</th><th>24-HR</th><th></th></c<210>	>210.ppb *	1-HR	24-HR	1-HR	24-HR	
January	665	100.0	99.55%	0.45%	0.00%	0.00%	1	I	ı	1	2.0
February	633	100.0	99.84%	0.16%	0.00%	0.00%	1	ı	J	I	1.2
March	681	100.0	100.00%	0.00%	%00.0	0.00%	I	ı	1	I	1.0
April	682	100.0	100.00%	0.00%	0.00%	0.00%	1	I	I	I	0.5
Мау	682	100.0	100.00%	0.00%	0.00%	0.00%	1	•	,	I	0.4
June	679	100.0	100.00%	0.00%	0.00%	0.00%	1	-	I	-	0.9
<b>Vin</b> t	673	99.5	100.00%	0.00%	0.00%	0.00%	1	1	1	I	0.3
August	681	100.0	100.00%	0.00%	0.00%	0.00%	1	ı	I	-	0.4
September	667	9.66	100.00%	0.00%	0.00%	0.00%		-	1	1	0.7
October	677	100.0	100.00%	0.00%	0.00%	0.00%	1	1	I	I	1.0
November	678	9.66	100.00%	0.00%	0.00%	0.00%	I	I	I	I	1.2
December	658	97.7	100.00%	0.00%	%00.0	0.00%	1	J	ĩ	I	3.1
N/D - Valid Da *Number of R	N/D - Valid Data Not Available *Number of Readines - included calibration hours	le ded calibration	hours						ANNUAL	ANNUAL AVERAGE	10

\*Number of Readings - included calibration hours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

_	_
PPB	PPB
n/n	1.0
Alberta Ambient AirQuality Objectives Annual Average***	Annual Average for 2015

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Cold Lake South Site - 2015 JOB # 2833-2015-01- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

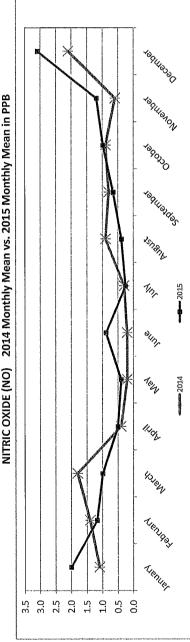
NITRIC OXIDE (NO) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

		2014			2015		
Month	MEAN	MINIMUM	MAXIMUM	MEAN	MINIMUM	MAXIMUM	Difference
January	1.1	0.0	27.4	2.0	0:0	52.8	-0.9
February	1.4	0.0	1.95	1.2	0:0	68.9	0.2
March	1.8	0:07	68.0	1.0	0:0	35.8	0.8
April	0.4	0.0	10.5	0.5	0.0	19.3	-0.1
May	0.2	0'0	6.6	0.4	0:0	10.9	-0.2
June	0.2	0.0	6.6	6.0	0:0	11.4	-0.7
July	0.3	0:0	24.8	0.3	0.0	8.3	0.0
August	6.0	0:0	14.2	0.4	0:0	8.7	0.5
September	0.8	0:0	15.7	0.7	0:0	28.1	0.1
October	0.9	0.0	36.4	1.0	0:0	47.4	-0.1
November	0.6	6.000 F	10.9	1.2	0:00	22.1	-0.6
December	$\pm \sqrt{12} \sqrt{12}$	0.0	104.6	8. 15 31 S	0.0	39.8	-1.0
N/D - Valid Data Not	oldelieve Aveilable		-				

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

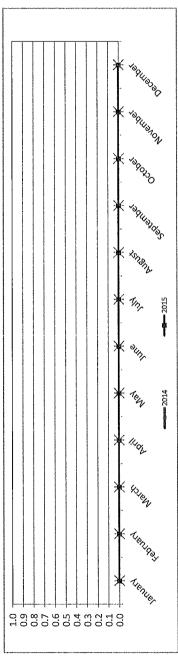
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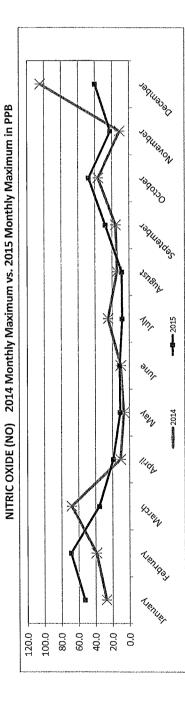
JOB # 2833-2015-01- A Cold Lake South Site - 2015 LAKELAND INDUSTRY & COMMUNITY ASSOCIATION



NITRIC OXIDE (NO) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB

NITRIC OXIDE (NO) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPB





# NO\_ / WD Joint Frequency Distribution (Percent)

# 01/01/15 thru 12/31/15

Distribution By % Of Samples

Wind Parameter : WD Instrument Height : 10 Meters

IO	LICA	NO	PPB
	••	••	••
Logger Id	Site Name	Parameter	Units

	Freq	99.95	.04	00.	00-	
	NNW	3.51	00-	.00	00 -	3.51
	NW	5.36	00.	00.	.00	5.36
	WNW	6.68	10.	00 -	00.	6.70
	м	11.64	.01	00-	.00	11.65
	MSW	16.53	00.	00.	00.	16.53
	SW	6.45	00.	00.	.00	6.45
	SSW	3.64	00.	• 00	00.	3.64
	S	3.06	.00	00.	00.	3.06
	SSE	4.00	- 01	· 00	00-	4.01
Direction	SE	10.42	-01	00.	.00	10.43
D1:	ESE	5.36	00'	00-	00.	5.36
	ы	6.74	00,	00-	.00	6.74
	ENE	4.18	00.	00.	00.	4.18
	ÈN	5.84	00.	00.	00.	5.84
	NNE	3.58	00.	00.	00.	3.58
	z	2.86	00-	00.	00.	2.86
	Limit	50.0	0.011	210.0	210.0	Totals
		v	v	v	X	

Calm : .00 %

Total # Operational Hours : 8194

## Distribution By Samples

### Direction

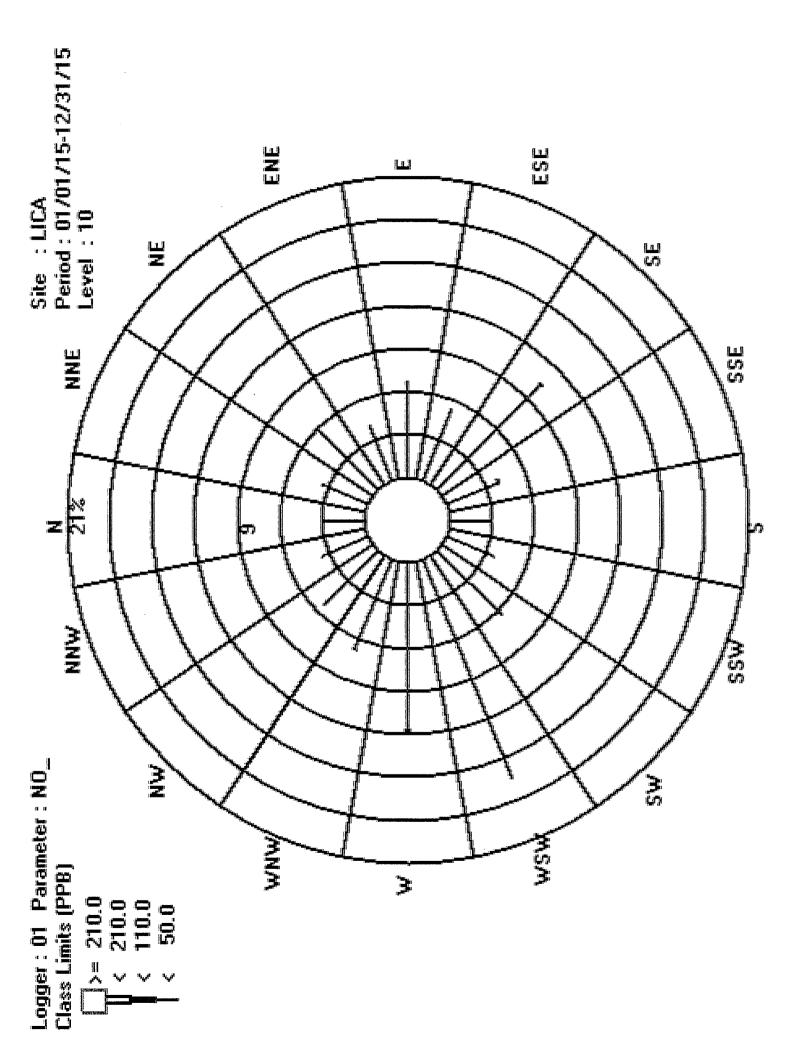
Freq	8190	4	
MNN	288		
MN	440		
MNM	548	щ	
м	954	1	
MSM	1355		
SW	529		
SSW	299		
S	251		
SSE	328	ы	
SE	854	ч	
ESE	440		
ы	553		
ENE	343		
NE	479		
INNE	294		
z	235		
Limit	50.0	0.011	210.0
	v	v	v

>= 210.0

Calm : .00 %

Total # Operational Hours : 8194

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#### NITROGEN DIOXIDE

Max Kam

# NITROGEN DIOXIDE (NO2) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of Peadings*	Number of Operational Postime* Time (%)		% Readings in Concent	Concentration Range (PPB NO2)	402)	OBJEC	OBJECTIVES**	EXCEE	EXCEEDENCES	MONTHLY
		31. J.S.	\$ 50 ppb	51 < C ≤ 110 ppb	dd_012>2>111	>210 ppb	1-HR	24-HR	1-HR****	24-HR	
January	665	100.0	100.00%	0.00%	0.00%	0.00%	159	I	o	1	7.8
February	633	100.0	100.00%	0.00%	0.00%	0.00%	159	1	0	I	6.1
March	681	100.0	100.00%	0.00%	0.00%	0.00%	159	1	ο	1	4.5
April	682	100.0	100.00%	0.00%	0.00%	0.00%	159	B	0	1	2.6
May	682	100.0	100.00%	0.00%	0.00%	0.00%	159	,	0	I	2.3
June	679	100.0	100.00%	0.00%	%00.0	0.00%	159	1	0	I	2.1
<b>Vin</b> L	673	99.5	100.00%	0.00%	0.00%	0.00%	159	*	0	ł	2.1
August	681	100.0	100.00%	0.00%	0.00%	0.00%	159	1	0	B	1.6
September	667	9.66	100.00%	0.00%	%00.0	0.00%	159	1	0	I	1.9
October	677	100.0	100.00%	0.00%	0.00%	0.00%	159	1	0	l	3.8
November	678	9.66	100.00%	0.00%	0.00%	0.00%	159	1	0	I	5.0
December	658	97.7	100.00%	0.00%	0.00%	0.00%	159	1	0	1	6.4
N/D - Valid De *Number of R	N/D - Valid Data Not Available *Numher of Readings - include	N/D - Valid Data Not Available *Number of Readings - included calibration hours	hours						ANNUALAVERAGE	AVERAGE	3.8

\*Number of Readings - included calibration hours
\*\*if Alberta Ambient Air Quality Objectives are not available, N/D is used.

PPB	PPB
24	3.8
Alberta Ambient Air©uality:@bjectives:Annual Average**	Amnual Average for 2015

MaxXam

NITROGEN DIOXIDE (NO2) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

		2014			2015		
Month	MEAN	MUMINIM	WINWIXYW	MEAN	MINIM	MUMIXEM	Difference
January	6.5	0.4	30.7	7.8	0.1	33.3	-1.3
February	7.4	0.3	T'hh	6.1	0.0	34.5	1.3
March	81	0.7	37.7	4.5	0.4	29.4	3.6
April	2.1	0.2	11.1	2.6	0.2	17.6	-0.5
May	2.1	0.1	13.9	2.3	0.3	15.4	-0.2
June	1.7	0.0	8.0	2.1	0.0	7.2	-0.4
July	1.7	0.2	5.9	2.1	0.0	9.4	-0.4
August	1.4	0.0	6.6	1.6	0.0	6.6	-0.2
September	23	0.0	21.9	1.9	0.0	12.8	0.4
October	3.4	0.0	23.5	3.8	0.0	17.1	-0.4
November	4.5	0.0	22.7	5.0	0.4	21.6	-0.5
December	7.6	0.7	30.5	6.4	0.0	26.9	1.2
N/D - Valid Data Not	ta Not Available					1	

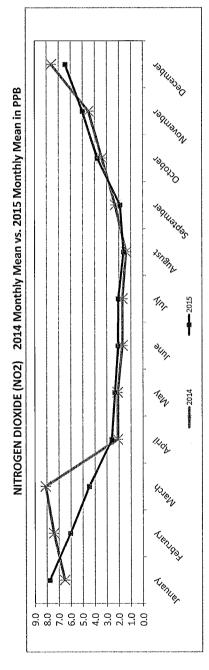
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N/D - Valid Data Not Available

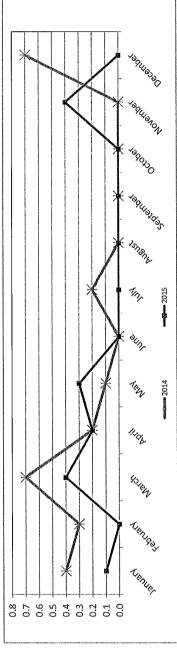
\*Annual peak is bolded and highlighted.

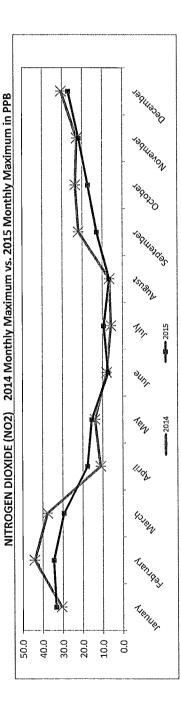
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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Cold Lake South Site - 2015 JOB # 2833-2015-01- A



NITROGEN DIOXIDE (NO2) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPB





# LICA NO2\_ / WD Joint Frequency Distribution (Percent)

# 01/01/15 thru 12/31/15

# Distribution By % Of Samples

		MNN	3.51 1	00.	00.	00 -	3.51																											
		MN	5.36	00.	00.	00.	5.36																											
		MNM	6.70	.00	.00	00.	6.70																											
Meters		ж	11.65	00.	00.	00.	11.65																											
Wind Parameter : WD Instrument Height : 10 Meters		MSW	16.53	.00	.00	.00	6.45 16.53 11.65																											
meter t Heigh		МS	6.45	00.	00.	00.																												
Wind Parameter Instrument Heig		MSS	3.64	00.	00-	00.	3.64																											
чл Ц		S	3.06	00.	00 '	.00	3.06																											
		SSE	4.01	00-	00 -	00 -	4.01																											
	Direction	SE	10.43	00-	00'	00.	5.36 10.43																											
	μ	ESE	5.36	00-	00-	00.																												
		ы	6.74	00 -	00 '	00 -	6.74																											
		ENE	4.18	00-	.00	00.	4.18																											
																													B	5.84	00.	00.	.00	5.84
01 LLICA NO2 PPB		INNE	3.58	00-	.00	00.	3.58																											
r Id : Name : eter :		N	2.86	00.	.00	00.	2.86																											
Logge: Site l Parame Units		Limit	50.0	110.0	210.0	210.0	Totals																											
			v	۷	v	X																												

00. 00. 00 -

NNW Fred 3.51 100.00 .00

Calm : .00 %

Total # Operational Hours : 8194

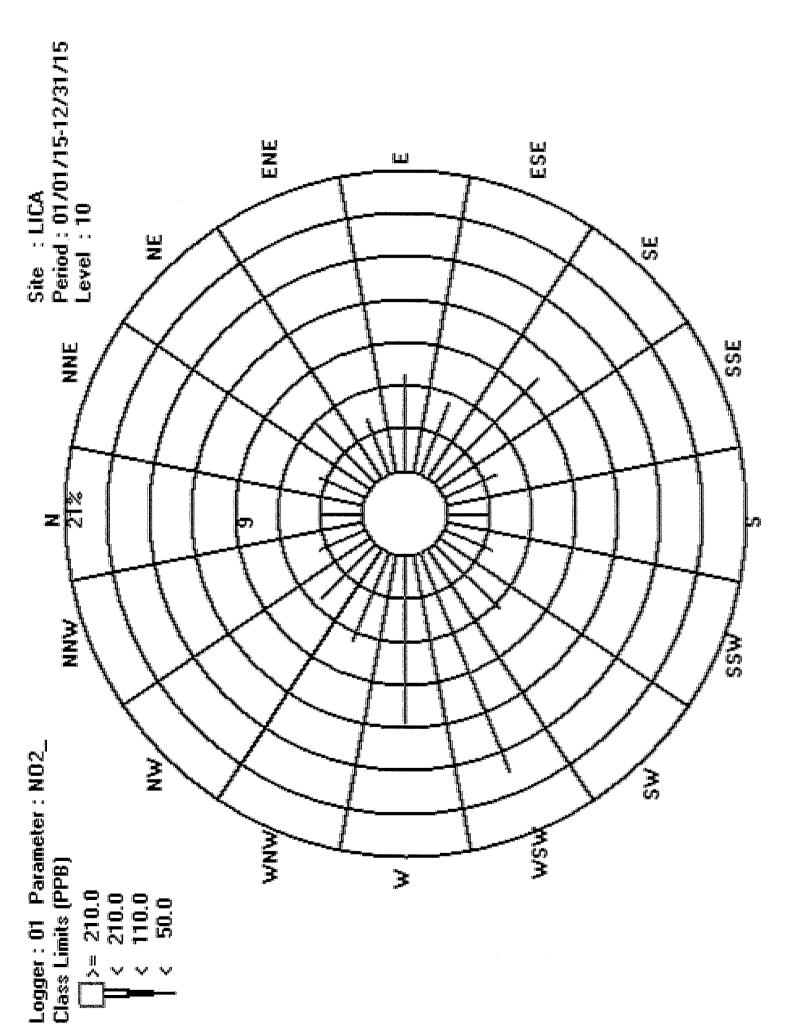
## Distribution By Samples

#### Direction

Fred	8194			
MNN	288			
MN	440			
МИМ	549			
м	955			
WSW	1355			
МS	529			
SSW	299			
S	251			
SSE	329			
SE	855			
ESE	440			
ы	553			
ENE	343			
H	479			
INNE	294			
Z	235			
Limit	50.0	0.011	210.0	210.0
	v	v	v	¥

Calm : .00 %

Total # Operational Hours : 8194



**OZONE** 

Max Kam

# OZONE (O3) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of Operational	Operational Transfer	%.R	% Readings in Concentration Range (PDB 03)	ration Range (PPB	03)	OBJEC	OBJECTIVES**	EXCEEDENCES	JENCES	MONTHLY
		lov}annes	s 50 ppb	51 < C ≤ 110 ppb	111 < C ≤ 210 ppb	> 210 ppb	1-HR	24-HR	1-HR	24-HR	
January	657	0.82	100.00%	0.00%	0.00%	0.00%	82	I	0	-	25
February	638	100.0	100.00%	0.00%	0.00%	0.00%	82	1	0	I	28
March	686	100.0	100.00%	0.00%	%00.0	0.00%	82	,	0	T	32
April	682	7.99	98.83%	1.17%	%00'0	%00'0	82	I	0	I	32
May	683	100.0	89.46%	10.54%	0.00%	0.00%	82	ı	0	1	33
June	683	100.0	92.68%	7.32%	%00.0	0.00%	82	1	0	1	30
уlul	678	99.5	98.23%	1.77%	%00'0	00.00%	82	1	0	ı	24
August	685	100.0	98.25%	1.75%	0.00%	0.00%	82		0	ŧ	20
September	681	2.99	100.00%	0.00%	%00.0	0.00%	82	-	0	1	18
October	682	100.0	100.00%	0.00%	%00.0	0.00%	82	P	0		21
November	681	100.0	100.00%	0.00%	0.00%	0.00%	82		0	1	18
December	686	100.0	100.00%	0.00%	0.00%	0.00%	82	ł	0	1	14
N/D - Valid Di *Number of F	N/D - Valid Data Not Available *Number of Readings - included calibration hours	e ied calibration	hours						ANNUAL AVERAGE		25

\*Number of Readings - included calibration hours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

N/D PPB	25 PPB
AlbertarAmbient Air Quality Objectives: Annual Average**	Annual Average for 2015

Maxkam

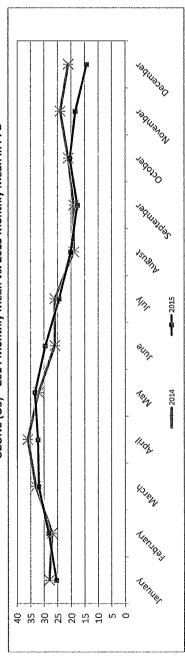
OZONE (O3) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

Cold Lake South Site - 2015 JOB # 2833-2015-01- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

\*Annual peak is bolded and highlighted.

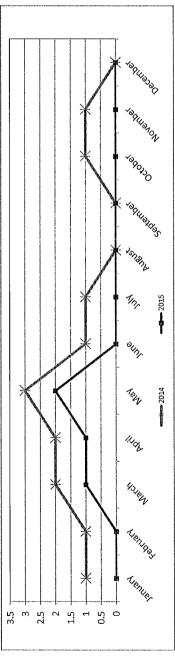
Maxiam

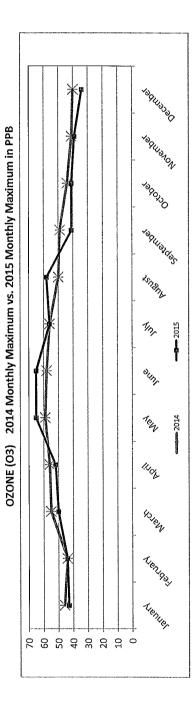
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Cold Lake South Site - 2015 JOB # 2833-2015-01- A



OZONE (03) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB

OZONE (O3) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPB





LICA 03\_ / WD Joint Frequency Distribution (Percent)

# 01/01/15 thru 12/31/15

# Distribution By % Of Samples

		NNW	3.51	.01	00.	00.	3.52												
		NW	5.28	80.	00.	00.	5.36												
		WNW	6.59	.14	00.	00-	6.73												
Aeters		м	11.57	.12	00 -	00.	11.69												
Wind Farameter : WD Instrument Height : 10 Meters		WSW	16.25	.18	00.	.00	6.54 16.44												
meter t Height		SW	6.31	.23	.00	00.	6.54												
Wind Parameter Instrument Heig		MSS	3.41	.30	00.	00 -	3.71												
Wir Ins		ß	2.90	.16	00-	00'	3.07												
		SSE	3.77	.23	00 -	00.	4.01												
	Direction	SE	10.03	.33	00.	00.	10.37												
	τīΟ	ESE	5.36	- 03	00.	00 '	5.40												
		倁	6.76	00.	00-	00.	6.76												
		ENE	4.10	.07	00.	00.	4.17												
														NE	5.70	.07	00.	00.	5.77
01 LICA 03 PPB		NNE	3.50	.02	.00	00-	3.52												
Logger Id : 01 Site Name : LICA Parameter : 03 Units : PPB		N	2.82	.04	00 -	.00	2.87												
Logge Site Paran Units		Limit	50.0	110.0	210.0	210.0	Totals												
			v	v	v	Ķ	-												

97.92 2.07 .00 .00

Freq

Calm : .00 §

Total # Operational Hours : 8254

## Distribution By Samples

٢

Direction	

Freq	8083	171		
NNW E		ц		
	290			
MN	436	٢		
MNM	544	12		
м	955	10		
MSW	1342	15		
MS	521	19		
MSS	282	25		
ß	240	77		
SSE	312	19		
SE	828	28		
ESE	443	m		
ы	558			
ENE	339	9		
H	471	Q		
NNE	289	N		
N	233	4		
Limit	50.0	110.0	210.0	210.0
	v	v	v	¥

291

443

556

540 1357 965

307

254

331

856

446

558

345

477

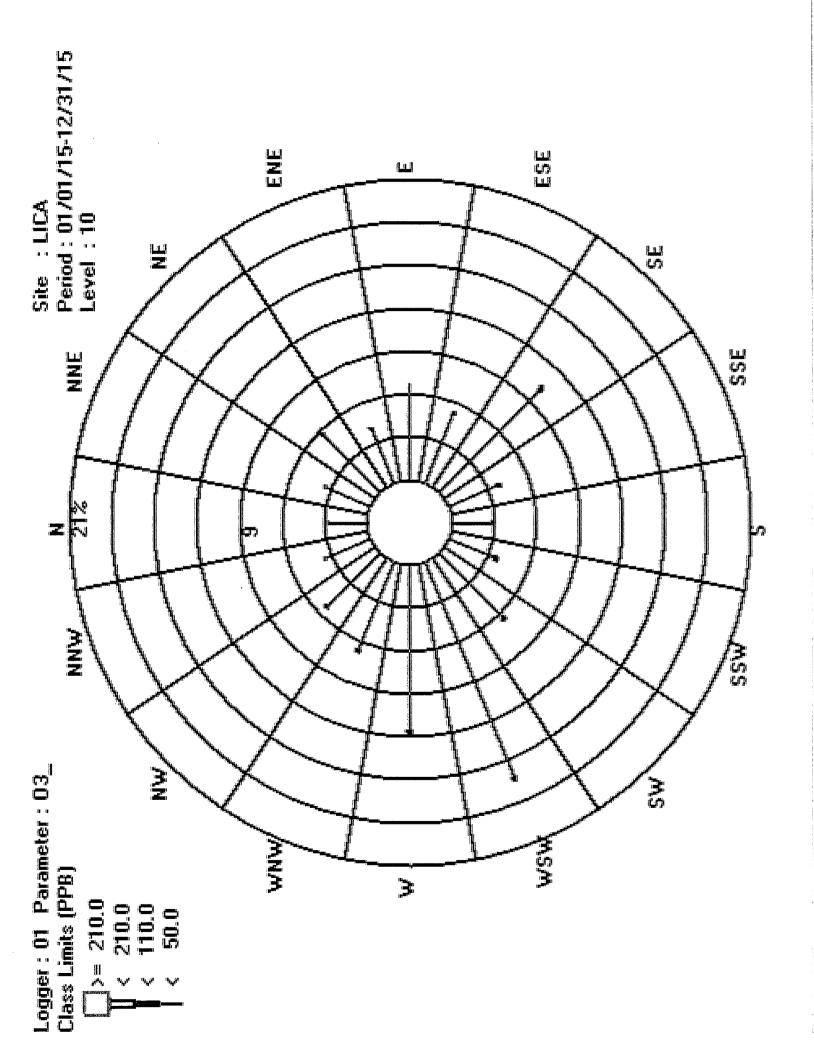
291

Totals 237

Calm : .00 %

Total # Operational Hours : 8254

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#### PARTICULATE MATTER 2.5

Maxkam

# PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month		Number of Operational Devices		% Rea	lings in Concentra	dings in Concentration Range (ug/m3 PM2.5)	PM2.5)		OBJECT	OBJECTIVES**	EXCEEDENCES	ENCES	MONTHLY
	Nedulide	Neduli 52	≤30 ug/m3	31 < C ≤ 60 ug/m3	61 < C ≤ 80 ug/m3	61 < C ≤ 80 ug/m3 * 81 < C ≤ 120 ug/m3 121 < C ≤ 240 ug/m3	121 < C ≤ 240 ug/m3	>240.ug/m3	1-HR	24-HR	1-HR	24-HR	AVENUE
January	712	96.2	66%	0.14%	0.00%	0.00%	0.00%	0.00%	1	30	T	0	7
February	664	5.99.3	99.40%	0.60%	0.00%	0.00%	0.00%	0.00%	I	30	1	0	7
March	697	1°76	%98.66	0.14%	0.00%	0.00%	0.00%	0.00%	I	30	ı	0	ę
April	695	96.8	80.86%	0.14%	0.00%	0.00%	0.00%	0.00%	I	30	1	0	5
May	731	98.5	96.31%	1.37%	0.27%	0.14%	1.78%	0.14%	-	30	-	2	12
June	673	93.8	93.31%	5.50%	0.15%	0.45%	0.59%	0.00%	4	30	ı	۲ı	11
ylul	723	97.4	77.32%	12.72%	2.21%	1.94%	4.84%	0.97%	I	30	ŧ	7	26
August	715	96.6	98.46%	1.54%	0.00%	0.00%	0.00%	00.00%	l	30	1	0	6
September	677	94.4	99.41%	0.59%	0.00%	0.00%	0.00%	0.00%	ı	30	1	0	7
October	662	89.4	99.40%	0.60%	0.00%	0.00%	0.00%	0.00%	I	30	1	0	9
November	632	88.2	98.89%	1.11%	0.00%	0.00%	0.00%	0.00%	1	30	1	0	11
December	742	100.0	%28.66	0.13%	0.00%	0.00%	0.00%	0.00%	I	30	,	0	7
N/D - Valid Da *Number of R	N/D - Valid Data Not Available *Number of Readings - included calibration bours	le Yed calibration	hours							المعتمر	ANNUAL AVERAGE	AVERAGE	6
NULLER DE LE	יבמחווולא - ווורומי	חבת רמווחו מריכי											

wunder of records incorded cardioracion need. \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

Alberta Ambient Air Quality. Objectives Annual Average\*\* N/D ug/m3 Annual Average for 2015 9 ug/m3

Maxiam

Cold Lake South Site - 2015 JOB # 2833-2015-01- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

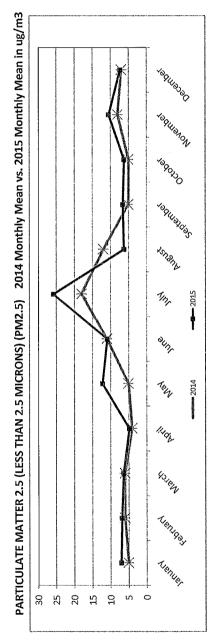
PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5) 2014 One-Hour Readings vs. 2015 One-Hour Readings in ug/m3

	Difference	-2	-1	0	-1	-7	0	8-	ę	-2	-1	£-	0
	WINIXYW	36	38	33	38	266	131	238	40	59	48	46	33
2015	WINIMIN	0	0	<b>0</b>	0	0	0	0	0	0	<b>0</b> + 1	0.000	0
	MEAN	7	7	6	5	12	11	26	9	7	9	11	7
	MAXIMUM	41	29	28	30	46	STI N	106	60	28	24	36	67
2014	MINIM	0	0	÷ 3 0 0	10 \$ 5	5 <b>1</b> -0	0.10	ξ.0 1.0	0-1 -	1.0	0	Fol	1 0
	MEAN	Ŋ	9	9	4	Ŀ	11	18	12	IJ	ц	×	7
	Month	January	February	March	April	May	June	ylul	August	September	October	November	December

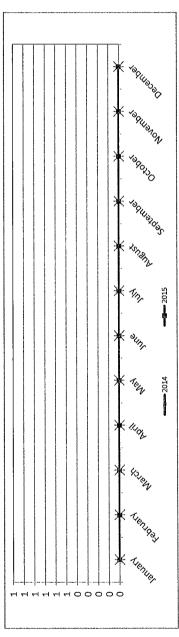
N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

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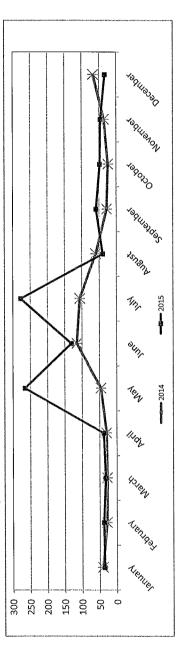
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Cold Lake South Site - 2015 JOB # 2833-2015-01- A



PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5) 2014 Monthly Minimum vs. 2015 Monthly Minimum in ug/m3



PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5) 2014 Monthly Maximum vs. 2015 Monthly Maximum in ug/m3



# LICA FM2 / WD Joint Frequency Distribution (Percent)

# 01/01/15 thru 12/31/15

# Distribution By % Of Samples

		Freq	96.67	2.15	.22	.21	.62	60.				
		MNN	3.46	-04	.01	00-	.02	00.	3.54			
		MN	5.11	.15	.01	10.	.00	. 02	5.31			
		MNM	6.07	.31	.04	.04	.04	. 02	6.56			
Meters		м	11.08	.21	10.	00.	.07	00.	11.38			
Wind Parameter : WD Instrument Height : 10 Meters		MSW	16.18	.20	10.	.02	.01	00.	16.43			
meter t Heigh		MS	6.22	.14	10.	.02	. O1	00.	6.41			
Wind Parameter Instrument Heig		MSS	3.54	.10	00-	00.	.06	00.	3.71			
М <u>т</u> In		S	3.06	.07	00.	00.	.01	00-	3.14			
		SSE	4.02	.08	.03	10.	10.	00-	4.17			
-	ULLECTION	SE	10.43	.20	.03	.03	10.	.00	10.72			
, t	5	ESE	5.35	.07	00 -	00.	.00	00.	5.52			
	s : UG/M3				ы	6.50	.12	00 -	10.	.07	00.	6.70
						ENE	3.97	01.	00-	. 02	.03	00 -
		Ħ	5.53	.12	.02	00.	. 08	.02	5.78			
01 LICA PM2 UG/M3		INNE	3.37	60.	.01	. 02	.06	.02	3.59			
Logger Id : 01 Site Name : LICA Parameter : PM2 Units : UG/M3		N	2.71	.08	10.	00.	.01	00.	2.82			
Logg Site Para Unit:		Limit	30.0	60.0	80.0	120.0	240.0	240.0	Totals			
			۷	v	v	۷	v	X				

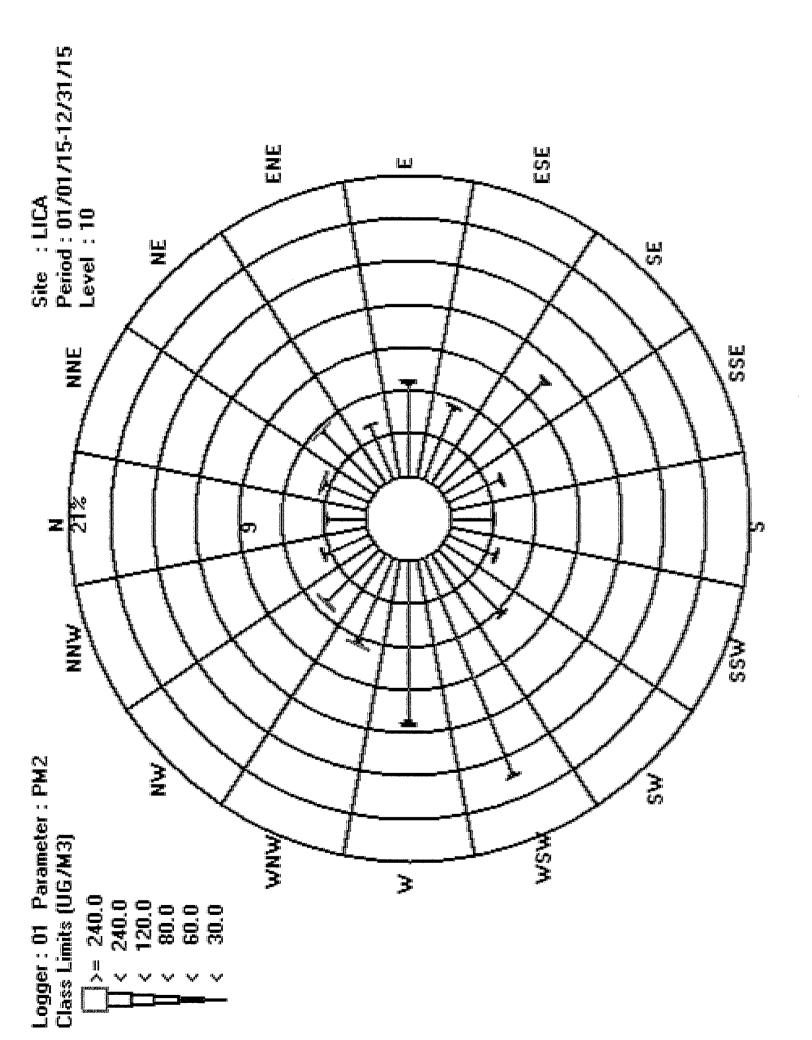
Calm : .00 %

Total # Operational Hours : 8292

## Distribution By Samples

	Freq	8016	179	19	18	52	œ		
	MNN	287 8	ъ	۳ł		7		294	
	MN	424	13	ч	ч		0	441	
	WNW	504	26	4	4	4	0	544	
	ы	616	18	ч		9		944	
	WSW	1342	17	ы	8	ы		1363	
	SW	516	12	ы	0	ы		532	
	SSW	294	6			ß		308	
	S	254	9			Ч		261	
	SSE	334	7	ო	н	гн ,		346	
Direction	SE	865	17	m	ო	ч		688	
Di	ESE	444	9			ß		458	
	ы	539	10		Ч	Q		556	
	ENE	330	თ		0	m		344	
	NE	459	10	N		7	N	480	
	INNE	280	ω	Ч	ы	Ŋ	0	298	
	N	225	7	1		ц		234	\$ 00°
	Limit	30.0	60.0	80.0	120.0	240.0	240.0	Totals	Calm : .00 %
		v	v	v	v	v	¥		

Total # Operational Hours : 8292



WIND SPEED

Maxam

# WIND SPEED (WS) 2015 Monthly Data Summary of One Hour Readings

Month	Number of Readings*	Operational Time (%)	Monthly Average Minimum Hourly (KBH) Average (KPH)	Minimum Hourly Average (KPH)	Maximum Hourly Average (KPH)	Maximum Daily Average (KPH)
January	744	100.0	4.9	0.1	17.6	10.7
February	649	96.6	5.4	0.0	14.8	10.6
March	739	8.92	5.7	0.1	23.1	14.0
April	117	93.6	7.0	0.1	24.0	13.0
May	744	100.0	6.0	0.1	20.7	15.6
June	720	100.0	5.7	0.1	24.4	6.6
July	744	100.0	5.8	0.0	17.7	10.2
August	744	100.0	5.0	0.0	16.8	8.4
September	718	99.7	5.4	0.0	20.6	13.5
October	744	100.0	6.0	0.1	21.7	12.7
November	720	100.0	5.7	0.0	23.2	14.4
December	744	100.0	4.6	0.1	13.7	8.6
N/D - Valid Da	N/D - Valid Data Not Availahle					

N/D - Valid Data Not Available

\*Annual peak is bolded and highlighted.

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Cold Lake South Site - 2015 JOB # 2833-2015-01- A

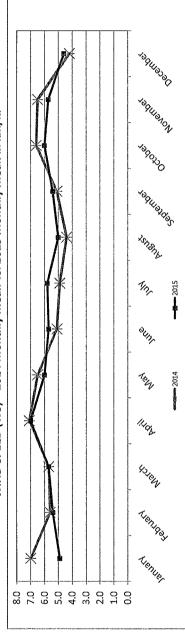
WIND SPEED (WS) 2014 One-Hour Readings vs. 2015 One-Hour Readings in km/hr

		2014			2015		
Month	MEAN	MUMINIM	MUNIXYM	MEAN	MUMINIM	MAXIMUM	Difference
January	7.0	0.0	32.3	4.9	T 0	17.6	2.1
February	5.6	T-0	20.5	5.4	0.0	14.8	0.2
March	5.7	0.0	18.4	5.7	T.0	23.1	0.0
April	7.1	T-0	25.4	<u>.</u> 2.0	D.1	24.0	0.1
May	6.5	Tro	21.0	6.0	E'0	20.7	0.5
June	5.1	2 <b>F</b> 0	16.0	5.7	E.0	24.4	-0.6
July	4.9	T.O.	18.0	5.8	0.0	17.7	6.0-
August	4.4	TO.	15.0	5.0	0.0	16.8	-0.6
September	5.1	T T 0	20.3	5.4	0.0	20.6	-0.3
October	6.6	1 <b>1</b> 0	21.7	6.0	I:0 -	21.7	0.6
November	6.5	1.50°	17.3	5.7	0.0	23.2	0.8
December	4.2	T.O.	14.9	4.6	1-0	13.7	-0.4
N/D Volad Do	N/D Vielial Data Not Aunilable						

N/D - Valid Data Not Available

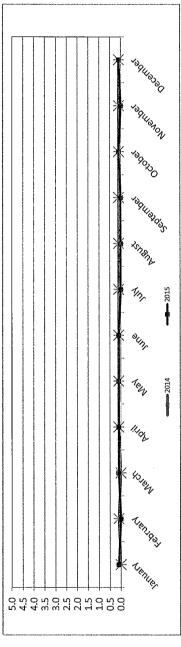
\*Annual peak is bolded and highlighted.



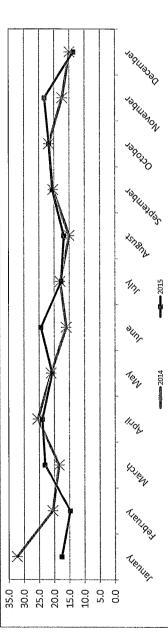


WIND SPEED (WS) 2014 Monthly Mean vs. 2015 Monthly Mean in km/hr





WIND SPEED (WS) 2014 Monthly Maximum vs. 2015 Monthly Maximum in km/hr



LICA WSP / WD Joint Frequency Distribution (Percent)

01/01/15 thru 12/31/15

Distribution By % Of Samples

		Freq	55.70	33.27	7.83	.26	.00	.00																																				
		MNN	1.26	1.38	.79	.03	00-	00.	3.47																																			
	: KPH Instrument Height : Direction	MN	1.83	2.07	1.24	.08	00-	00.	5.23																																			
		Direction	Direction	Direction	Direction	Direction	lirection	Direction	MNM	2.94	2.20	1.34	.04	00 -	00.	6.53																												
WD 10 Meters									Direction	м	6.10	4.27	1.19	.02	00'	00.	11.59																											
t : 10]										ЧО						MSW	11.00	5.07	.26	00.	00-	00.	16.34																					
meter t Heigh																											МS	4.98	1.20	00,	00.	00.	00.	6.18										
Wind Parameter Instrument Heig																					MSS	3.15	.26	00.	00*	00 "	.00	3.41																
Ч. Ц. М.											S	2.45	.28	00.	00.	00'	00.	2.73																										
											SSE	3.07	.73	.03	00.	00.	00.	3.83																										
										SE	5.09	4.50	.59	00-	.00	00-	10.19																											
							ESE	3.36	1.74	.21	00.	00.	00-	5.32																														
												ы	3.16	2.77	.48	.05	00.	00-	6.47																									
																																					ENE	2.42	1.40	.13	00.	00.	00 -	3.97
																								푄	2.29	2.76	.53	00.	00.	00-	5.59													
01 LLICA WSP KPH																		INNE	1.36	1.51	.52	10.	00.	00.	3.41																			
r Id : Name : ster :												z	1.18	1.07	-46	10.	00.	.00	2.73																									
Logge Site l Parame Units		Limit	6.0	12.0	20.0	29.0	39.0	39.0	Totals																																			
			۷	۷	v	v	v	X																																				

Calm : 2.92 %

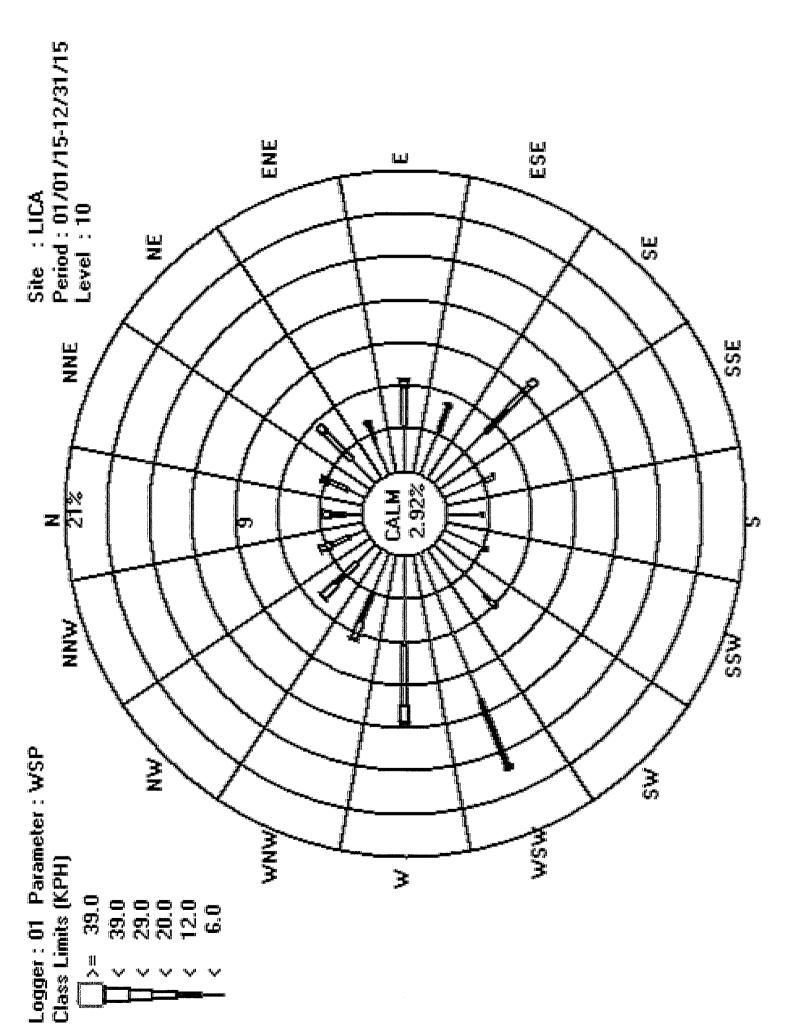
Total # Operational Hours : 8727

Distribution By Samples

	Freq	4861	2904	684	23			
	NNN	OIL	121	69	m			303
	NW	160	181	109	7			457
	WNW	257	192	117	4			570
	ы	533	373	104	0			1012
	WSW	960	443	23				1426
	SW	435	105					540
	MSS	275	23					298
	S	214	25					239
	SSE	268	64	m				335
Direction	SE	445	393	52				068
Di.	ESE	294	152	19				465
	ы	276	242	42	Ŋ			565
	ENE	212	123	12				347
	E	200	241	47				488
	INNE	611	132	46	ч			298
	N	103	94	41	н			239
	Limit	6.0	12.0	20.0	29.0	39.0	0.05	Totals
		v	v	v	v	v	¥	

Calm : 2.92 %

Total # Operational Hours : 8727



#### **RELATIVE HUMIDITY**

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RELATIVE HUMIDITY (RH) 2015 Monthly Data Summary of One Hour Readings

Month	Number of Readings*	Operational Time (%)	Monthly Average (%)	Monthly-Average Minimum-Hourty Maximum Daily (%) Average (%) Average (%)	Maximum Daily Average (%)	Maximum Daily Average (%)
January	744	100.0	74	86	88	88
February	672	100.0	70	96	83	83
March	744	100.0	65	97	83	83
April	720	100.0	56	100	94	94
May	744	100.0	52	66	88	88
June	720	100.0	64	100	84	84
July	744	100.0	68	100	63	93
August	744	100.0	71	26	100	96
September	718	6.7	73	29	98	91
October	744	100.0	69	23	98	90
November	720	100.0	76	35	66	94
December	744	100.0	80	47	100	97
N/D - Valid Da	N/D - Valid Data Not Available					

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

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# RELATIVE HUMIDITY (RH) 2014 One-Hour Readings vs. 2015 One-Hour Readings in %

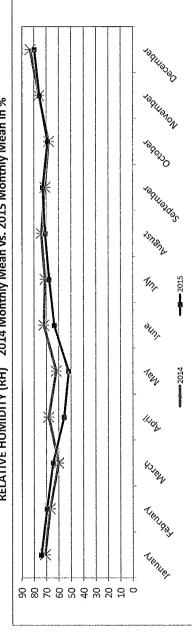
	ICE												
	Difference	-3	-3	 -	12	10	8	3	Э	-2	T-	0	m
	MAXIMUM	86	96	67	100 T	66	100	100	-100	98	86	66	100
2015	MINIMIN	41	31	27	6	10	20	18	26	29	23	35	ĹŦ
	MEAN	74	02	59	95	52	64	68	11	73	69	76	80
	MAXIMUM	93	88	92	66	100	001	00I -		86	100	66	97
2014	MINIMUM	39	24	18	14	20	28	24	32	24	21	32	55
	MEAN	71	67	60	68	62	72	71	74	71	68	76	83
	Month	January	February	March	April	May	June	July	August	September	October	November	December

N/D - Valid Data Not Available

\*Annual peak is bolded and highlighted.

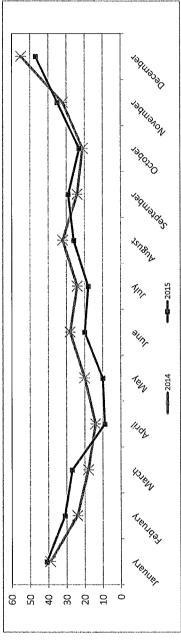
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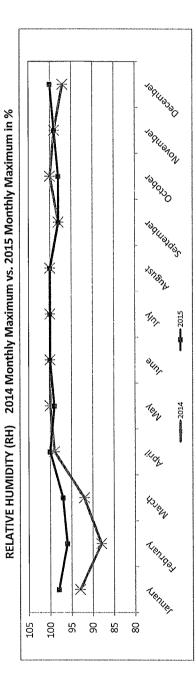
Cold Lake South Site - 2015 LAKELAND INDUSTRY & COMMUNITY ASSOCIATION JOB # 2833-2015-01- A



RELATIVE HUMIDITY (RH) 2014 Monthly Mean vs. 2015 Monthly Mean in %

RELATIVE HUMIDITY (RH) 2014 Monthly Minimum vs. 2015 Monthly Minimum in %





### AMBIENT TEMPERATURE

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Cold Lake South Site - 2015 JOB # 2833-2015-01- A

AMBIENT TEMPERATURE (TPX) 2015 Monthly Data Summary of One Hour Readings

Month	Number of Readings*	Operational Time (%)	Monthiy Average Minimum Hourly (Deg.C) Average (Deg.C)	Minimum Hourly Average (Deg C)	Maximum Hourly Average (Deg C)	Maximum Daily Average (Deg.C)
January	744	100.0	-11.6	-33.2	10.1	4.1
February	672	100.0	-14.7	-32.6	7.6	2.1
March	<del>1</del> 44	100.0	-1.6	-34.0	14.8	7.8
April	720	100.0	4.7	-12.2	24.4	15.3
May	744	100.0	10.0	T.4-1	27.2	18.1
June	720	100.0	16.0	1.3	31.5	23.0
July	744	100.0	18.5	4.9	30.3	24.4
August	744	100.0	16.9	0.1	31.9	23.0
September	718	7.66	10.0	-3.6	25.7	17.3
October	744	100.0	5.9	-6.1	24.6	13.9
November	720	100.0	-3.0	-17.8	7.6	2.7
December	744	100.0	-10.0	-27.0	4.7	-1.3
N/D - Valid Da	N/D - Valid Data Not Available					

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

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Cold Lake South Site - 2015 JOB # 2833-2015-01- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

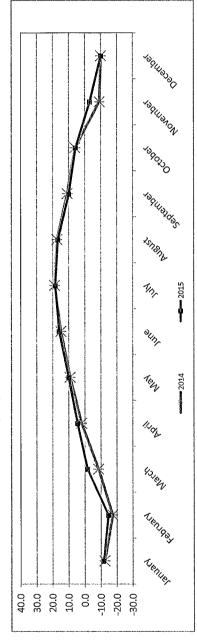
AMBIENT TEMPERATURE (TPX) 2014 One-Hour Readings vs. 2015 One-Hour Readings in Degrees Celsius

		2014			2015		
Month	MEAN	MINIMIM	MAXIMUM	MEAN	MINIMUM	MAXIMUM	Difference
January	-12.5	-33.5	8.6	-11.6	-33.2	10.1	-0.9
February	-17.4	-34.0	2.1	-14.7	-32.6	7.6	-2.7
March	-8.6	-38.6	10.0	-1.6	-34.0	14.8	-7.0
April	2.0	-16.8	20.2	L'Þ	-12.2	24.4	-2.7
May	9.1	-5.2	28.3	10.0	-4.1	27.2	6.0-
June	14.8	1.8	25.7	16.0	1.3	31.5	-1.2
July	18.7	6.5	29.3	18.5	6.4	30.3	0.2
August	17.2	2.6	28.5	16.9	0.1	31.9	0.3
September	10.8	-2.9	28.8	10.0	-3.6	25.7	0.8
October	6.0	-4.5	20.8	5.9	-6.1	24.6	0.1
November	-9.2	-27.9	10.6	-3.0	-17.8	7.6	-6.2
December	-10.1	-32.5	8.5	-10.0	-27.0	4.7	-0.1
	N/D Vielial Date Net Austickie						

N/D - Valid Data Not Available

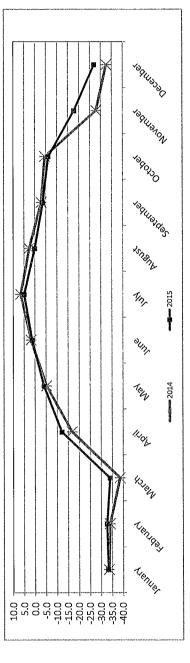
\*Annual peak is bolded and highlighted.



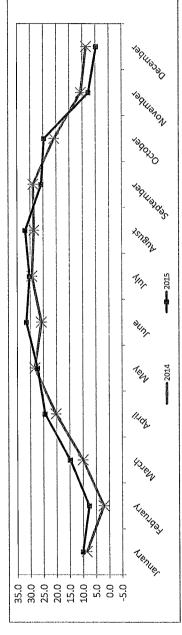


AMBIENT TEMPERATURE (TPX) 2014 Monthly Mean vs. 2015 Monthly Mean in Degrees Celsius

AMBIENT TEMPERATURE (TPX) 2014 Monthly Minimum vs. 2015 Monthly Minimum in Degrees Celsius



AMBIENT TEMPERATURE (TPX) 2014 Monthly Maximum vs. 2015 Monthly Maximum in Degrees Celsius



### APPENDIX II ANALYTICAL RESULTS

### PASSIVE SAMPLES

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION

Company

BONNYVILLE

Location

				S	O2 (ppb)					
Station	Jan.	Feb.	Mar.	AprMay	June-July	AugSept.	OctNov.	DecJan.	Average	Maximum
3	0.7	0.7	0.5	0.2	0.3	0.2	0.3	0.4	0.4	0.7
3 DUP	NA	NA	0.3	NA	NA	NA	NA	NA	0.3	0.3
4	1.1	0.6	0.3	0.2	0.5	0.4	0.3	0.7	0.5	1.1
4 DUP	NA	NA	0.3	NA	NA	NA	NA	NA	0.3	0.3
5	0.9	0.6	0.3	0.2	0.4	0.5	0.4	0.5	0.5	0.9
5 DUP	NA	NA	NA	0.2	NA	NA	NA	NA	0.2	0.2
6	0.7	0.5	0.4	0.4	0.6	1.1	0.2	0.6	0.6	1.1
6 DUP	NA	NA	NA	0.2	NA	NA	NA	NA	0.2	0.2
8	0.4	0.6	0.3	0.4	0.6	0.3	0.3	0.8	0.5	0.8
8 DUP	NA	NA	NA	0.5	NA	NA	NA	NA	0.5	0.5
9	0.6	0.6	0.2	0.2	0.3	0.2	0.2	0.6	0.4	0.6
9 DUP	NA	NA	NA	NA	0.3	NA	NA 0.1	NA	0.3	0.3
10 10 DUP	0.4	0.5	0.2 NA	0.2	0.2 0.2	0.3 NA	0.1	0.5	0.3 0.2	0.5 0.2
10 000	NA NA	NA NA	NA	NA 0.3	0.2	<0.1	NA 0.1	NA NA	<0.1	0.2
11 DUP	NA	NA	NA	NA	0.1	NA	NA	NA	0.1	0.3
12	0.5	0.7	NA	NA	NA	NA	NA	NA	0.6	0.1
13	0.8	0.6	0.6	0.3	0.2	0.3	0.2	0.7	0.5	0.8
13 DUP	NA	NA	NA	NA	NA	0.3	NA	NA	0.3	0.3
14	1.7	1.4	1.3	0.5	0.9	1	1	1.5	1.2	1.7
14 DUP	NA	NA	NA	NA	NA	1.1	NA	NA	1.1	1.1
15	0.5	0.7	0.2	0.2	0.4	0.3	0.2	0.5	0.4	0.7
15 DUP	NA	NA	NA	NA	NA	0.3	NA	NA	0.3	0.3
16	0.6	0.5	0.2	0.2	0.2	0.2	NA	0.5	0.3	0.6
17	0.8	0.6	0.5	0.3	0.4	0.3	NA	0.6	0.5	0.8
18	NA	0.4	0.1	0.1	0.2	0.2	NA	0.5	0.3	0.5
19	0.5	0.6	0.2	0.2	NA	0.3	NA	0.6	0.4	0.6
19 DUP	NA	NA	NA	NA	NA	NA	NA	0.7	0.7	0.7
22	0.4	0.5	0.1	0.2	0.4	0.3	0.1	0.5	0.3	0.5
22 DUP	NA	NA	NA	NA	NA	NA	NA	0.7	0.7	0.7
23	0.3	0.3	0.4	0.1	0.2	0.2	0.1	0.4	0.3	0.4
23 DUP	NA	NA	NA	NA	NA	NA	NA	0.4	0.4	0.4
24	0.6	0.5	0.3	0.2	0.3	0.3	0.3	0.6	0.4	0.6
25	0.6	0.8	NA	NA	NA	NA	NA	NA	0.7	0.8
25 DUP	0.7	NA	NA	NA	NA	NA	NA	NA	0.7	0.7
26	0.6	0.9	0.9	0.3	0.4	0,4	0.4	1.1	0.6	1.1
26 DUP	0.5	NA	NA	NA	NA	NA	NA	NA	0.5	0.5
27	1.6	1	1,2	0.5	1.2	0.9	1,4	2	1.2	2
27 DUP	1.7	NA	NA	NA	NA	NA	NA	NA	1.7	1.7
28	0.6	0.6	0.3	0.4	1	0.8	0.3	0.6	0.6	1
28 DUP	NA	0.5	NA	NA	NA	NA	NA 0.1	NA	0.5	0.5
29 20 DUR	0.5 NA	0.5	0.3 NA	0.2 NA	0.4	0.3	0.1	0.5	0.3	0.5
29 DUP 32	NA 0.7	0.5 0.5	NA 0.4	NA 0.2	NA 0.3	NA 0.3	NA 0.4	NA 0.9	0.5 0.5	0.5 0.9
32 32 DUP	NA	0.5	0.4 NA	NA	NA	NA	0.4 NA	0.9 NA	0.5	0.9
32 DOP 36	0.6	0.6	0.8	0.2	0.3	0.2	0.1	0.5	0.8	0.8
36 DUP	NA	NA	0.8	NA	NA	NA	NA	NA	0.4	0.4
Average	0.7	0.6	0.4	0.3	0.4	<0.4	0.3	0.7		
Maximum	1.7	1.4	1.3	0.5	1.2	1.1	1.4	2		

BONNYVILLE

Project Number

Date Sampled End

\_\_\_\_\_2016/02/01

2014/12/29 Date Samples Start

2014/12/29

Date Samples Start

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION

Company

BONNYVILLE

Location

				C	03 (ppb)					
Station	Jan.	Feb.	Mar.	AprMay	June-July	AugSept.	OctNov.	DecJan.	Average	Maximu
3	29.4	NA	36.5	34.5	30.8	22.9	21.1	24.1	28.5	36.51
4	33.8	NA	38.6	39.1	34.4	27.9	25.9	24.8	32.1	39.14
4 DUP	NA	NA	39.8	NA	NA	NA	NA	NA	39.8	39.77
5	31.8	NA	32.7	36.3	31.1	24.8	20.5	23.6	28.7	36.33
5 DUP	NA	NA	34.2	NA	NA	NA	NA	NA	34.2	34.23
6	21.4	NA	34.8	33.9	28.4	17.3	17.8	22.7	25.2	34.78
6 DUP	NA	NA	NA	36.8	NA	NA	NA	NA	36.8	36.79
8	31.4	NA	36.8	42.9	33.3	25.5	26.3	31.5	32.5	42.92
8 DUP	NA	NA	NA	41.8	NA	NA	NA	NA	41.8	41.76
9	29.7	NA	33.7	40.1	31.8	18.4	21.5	32,2	29.6	40.08
9 DUP	NA	NA	NA	NA	26.6	NA	NA	NA	26.6	26.58
10	26.4	NA	35.6	34	25.7	16.6	17.3	22.3	25.4	35.62
10 DUP	NA	NA	NA	NA	26.9	NA	NA	NA	26.9	26.91
11	NA	NA	NA	22.9	21.1	12.8	17.6	NA	18.6	22.91
11 DUP	NA	NA	NA	NA	NA	16.1	NA	NA	16.1	16.12
12	28.1	NA	NA	NA	NA	NA	NA	NA	28.1	28.09
13	32.3	NA	33.5	37.2	31.1	20	22.1	21	28.2	37.19
13 DUP	NA	NA	NA	NA	NA	20.7	NA	NA	20.7	20.68
14	28,3	NA	31.7	33.5	28,1	20.3	24.8	27	27.7	33.45
14 DUP	NA	NA	NA	NA	NA	NA	21	NA	21	20.98
15	28.7	NA	39	39.3	31.3	18.2	19.9	21.8	28.3	39.3
15 DUP	NA	NA	NA	NA	NA	NA	19.2	NA	19.2	19.24
16	26.2	NA	32	42.6	27.4	19.2	22.6	19.7	27.1	42.65
16 DUP	NA	NA	NA	NA	NA	NA	NA	21.7	21.7	21.67
17	28.3	NA	39	42.2	32.5	22.7	20.6	25.3	30.1	42.23
17 DUP	NA	NA	NA	NA	NA	NA	NA	25.9	25.9	25.92
18	26.4	NA	36.9	30.3	27	16.3	18.1	26	25.9	36.86
19	31.1	NA	34.3	36.8	NA	30.6	24.6	32.7	31.7	36.8
22	24.2	NA	29.5	29.4	27.3	19.7	18.7	23.4	24.6	29.49
23	24.5	NA	31.9	28.6	21.3	15	19	24.6	23.6	31.91
24	26.2	NA	34	33.5	27.6	20.2	17.6	27.3	26.6	34.01
28	24.9	NA	31.6	40.5	29.3	19.2	17.7	22.9	26.6	40.47
29	26.9	NA	30.2	33	24.8	20.7	18.9	25.8	25.8	33.03
29 DUP	21.9	NA	NA	NA	NA	NA	NA	NA	21.9	21.85
32	31	NA	38.2	42.1	31	28.3	24.4	29.2	32	42.15
32 DUP	32.9	NA	NA	NA	NA	NA	NA	NA	32.9	32.91
36	23.4	NA	37.1	35.9	37.6	25.9	18.6	24.3	29	37.62
36 DUP	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Average	27.9	NA	34.8	36.1	29	20.8	20.7	25.2		
laximum	33.82	NA	39.77	42.92	37.62	30.55	26.33	32.73		

BONNYVILLE

Project Number

Date Sampled End

2016/02/01

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION Company

BONNYVILLE

Location

				N	O2 (ppb)					
Station	Jan.	Feb.	Mar.	AprMay	June-July	AugSept.	OctNov.	Dec.	Average	Maximum
3	2	1.4	1.2	0.9	0.7	1.2	2	4.5	1.7	4.5
4	2.4	1.1	0.7	0.7	1.2	0.9	1.8	3.5	1.5	3.5
4 DUP	NA	NA	1	NA	NA	NA	NA	NA	1	1
5	2	1.6	1	0.7	0.5	0.6	1.4	3.8	1.4	3.8
5 DUP	NA	NA	1.2	NA	NA	NA	NA	NA	1.2	1.2
6	8.8	4.3	3.8	3.2	3.2	3.7	7.1	6.5	5.1	8.8
6 DUP	NA	NA	NA	3.1	NA	NA	NA	NA	3.1	3.1
8	1.7	1.1	0.8	0.5	0.6	0.6	1.6	4	1.4	4
8 DUP	NA	NA	NA	0.6	NA	NA	NA	NA	0.6	0.6
9	2.8	1.7	1.2	0.9	0.9	1	3.1	4.8	2	4.8
9 DUP 10	NA 6.4	NA 3.8	NA 2.7	NA 2,2	0.8 2	NA 2,3	NA 5.5	NA 9	0.8 4.2	0.8 9
10 10 DUP	6.4 NA	3.8 NA	2.7 NA	Z.Z NA	2	2.3 NA	5.5 NA	9 NA	4.2	9 2
10 009	NA	NA	NA	0.3	2 0.4	0.6	0.8	NA	0.5	2 0.8
11 DUP	NA	NA	NA	NA	NA	0.5	NA	NA	0.5	0.8
12	1.5	1.4	NA	NA	NA	NA	NA	NA	0.5 1.4	1.5
13	2	1.4	0.5	0.5	0.4	0.5	0.9	2.1	1.4	2.1
13 DUP	NA	NA	NA	NA	NA	0.3	NA	NA	0.3	0.3
14	4.6	1.9	1,1	0.5	0.7	1	2.2	5.1	2.1	5.1
14 DUP	NA	NA	NA	NA	NA	ŇĂ	2.4	NA	2.4	2.4
15	3.5	1.8	0.8	0.6	1.2	0.8	2.1	3	1.7	3.5
15 DUP	NA	NA	NA	NA	NA	NA	1.9	NA	1.9	1.9
16	3.6	1.7	1.5	0.6	0.9	1.7	3.4	4.6	2.3	4.6
16 DUP	NA	5	5	5						
17	3	2	1.3	1	1.4	2.7	3.2	3.4	2.2	3.4
17 DUP	NA	3.3	3.3	3.3						
18	2.3	1.4	0.9	0.7	0.8	0.8	2.1	3.7	1.6	3.7
19	2.5	0.9	0.8	0.6	NA	0.5	1.6	3.8	1.5	3.8
22	3.7	0.6	1.7	0.8	0.7	0.8	2.4	7	2.2	7
23	1	1.9	0.3	0.2	0.1	0.2	0.7	1.6	0.8	1.9
24	5.6	3.7	3.2	1.9	1.8	2.9	5.3	7.3	4	7.3
28	7.9	8	4.1	2.1	1.4	1.8	4.4	10.7	5	10.7
29	5.4	2.4	1.7	0.7	0.5	0.8	1.8	6	2.4	6
29 DUP	3.7	NA	NA	NA	NA	NA	NA	NA	3.7	3.7
3 DUP	NA	1.5	NA	NA	NA	NA	NA	NA	1.5	1.5
32	2	1	0.7	0.3	0.2	0.5	1.1	4	1.2	4
32 DUP	2	NA	NA	NA	NA	NA	NA	NA	2	2
36	6.3	4.1	3.5	1.7	1.5	2.1	5.5	11.2	4.5	11,2
36 DUP	NA	4.1	NA	NA	NA	NA	NA	NA	4.1	4.1
Average	3.6	2.3	1.6	1.1	1	1.2	2.7	5.1	-	
Maximum	8.8	8	4.1	3.2	3.2	3.7	7.1	11.2		

BONNYVILLE Project Number

2014/12/29

Date Samples Start

2016/02/01 Date Sampled End

LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION

Company

BONNYVILLE

Location

\_\_\_\_\_

				н	2S (ppb)					
Station	Jan.	Feb.	Mar.	AprMay	June-July	AugSept.	OctNov.	Dec.	Average	Maximum
3	0.09	0.15	0.09	0.11	0.22	0.19	0.11	0.13	0.14	0.22
5	0.15	0.13	0.13	0.16	0.86	0.81	0.44	0.16	0.35	0.86
5 DUP	NA	0.13	NA	NA	NA	NA	NA	NA	0.13	0.13
10	0.15	0.14	0.1	0.15	0.15	0.2	0.1	0.15	0.14	0.2
10 DUP	NA	NA	0.1	NA	NA	NA	NA	NA	0.1	0.1
11	NA	NA	NA	0.1	0.05	0.08	0.06	NA	0.07	0.1
12	0.09	0.15	NA	NA	NA	NA	NA	NA	0.12	0.15
13	0.09	0.13	0.07	0.12	0.07	0.08	0.1	0.14	0.1	0.14
13 DUP	NA	NA	NA	0.11	NA	NA	NA	NA	0.11	0.11
14	0.11	0.19	0.11	0.11	0.13	0.16	0.15	0.15	0.14	0.19
14 DUP	NA	NA	NA	NA	0.15	NA	NA	NA	0.15	0.15
16	0.1	0.18	0.13	0.12	0.21	0.22	0.12	0.15	0.15	0.22
16 DUP	NA	NA	NA	NA	0.21	NA	0.09	NA	0.15	0.21
17	0.15	0.21	0.15	0.16	0.39	0.43	0.17	0.2	0.23	0.43
17 DUP	NA	NA	NA	NA	NA	0.48	0.16	NA	0.32	0.48
18	0.08	0.15	0.11	0.09	0.15	0.14	0.1	0.11	0.12	0.15
18 DUP	NA	NA	NA	NA	NA	0,12	0.09	NA	0.1	0.12
19	NA	NA	NA	NA	NA	NA	0.13	NA	0.13	0.13
22	0.16	0.15	0.11	0.1	0.43	0.27	0.11	0.16	0.19	0.43
22 DUP	NA	NA	NA	NA	NA	NA	0.1	NA	0.1	0.1
24	0.12	0.14	0.14	0.12	0.25	0.18	0.11	0.18	0.15	0.25
24 DUP	NA	NA	NA	NA	NA	NA	0.11	NA	0.11	0.11
25	0.12	0.18	NA	NA	NA	NA	NA	NA	0.15	0.18
26	0.13	0.24	0.13	0.08	0.12	0.18	0.13	0.18	0.15	0.24
26 DUP	NA	NA	NA	NA	NA	NA	NA	0.17	0.17	0.17
27	0.16	0.17	0.15	0.19	0.4	0.87	0.75	0.28	0.37	0.87
27 DUP	NA	NA	NA	NA	NA	NA	NA	0.43	0.43	0.43
29	0.12	0.16	0.09	0.09	0.27	0.25	0.11	0.14	0.15	0.27
3 DUP	NA	0.15	NA	NA	NA	NA	NA	NA	0.15	0.15
32	0.14	0.15	0.08	0.13	0.3	0.26	0.11	0.17	0.17	0.3
32 DUP	0.1	NA	NA	NA	NA	NA	NA	NA	0.1	0.1
36	0.12	0.18	0.14	0.11	0.28	0.24	0.13	0.18	0.17	0.28
36 DUP	0.12	NA	NA	NA	NA	NA	NA	NA	0.12	0.12
Average	0.12	0.16	0.11	0.12	0.26	0.29	0.16	0.18	-	
Maximum	0.16	0.24	0.15	0.19	0.86	0.87	0.75	0.43		

BONNYVILLE

Project Number

Date Sampled End

2016/02/01

Date Samples Start

2014/12/29

### APPENDIX III REPORT CERTIFICATION FORM



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Cold Lake South Site - 2015 JOB # 2833-2015-01- A

### **Report Certification Form**

Alberta Airshed (if applicable)	EPA Approval or Code of Practice Registration # (if applicable)
Tes	
Company Name (if applicable)	Industrial Operation Name (If applicable)
Lakaland Industry and Community Association Name of the Representative of the Person Responsible (Last, First, Middle)	Cold Lake South rite Position / Title of the Representative of the Person Responsible
Adekanmbi', Munmi Is an External Party Certifying the Report? (If 'Yes', fill in the fields below for the external person. Yes X No	Project Manager Assistant
Name of External Person Certifying the Report (Last, First, Middle)	Position / Title of External Person Certifying the Report
Company Name for the External Person Certifying the Report	Identification of Qualifications / Professional Designations of the External Person Certifying the Report
-	-

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

mounta

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

29 - Jan - 2016 Report Issued Date (dd-mm-yyyy)





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

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

### AMBIENT AIR MONITORING ANNUAL REPORT

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION MASKWA SITE

JOB #:2833-2015-30- A

JANUARY - DECEMBER 2015

Prepared for:

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

### Attention: MIKE BISAGA

DATE: January 28, 2016

Prepared by:

Indan

Wunmi Adekanmbi, M.Sc. Project Manager Assistant, Air Services

Reviewed by:

hor

Lily Lin, B.Sc. Senior Project Manager, Air Services



### SUMMARY

Maxxam Analytics Air Services Group conducted an Ambient Air monitoring program between January 2015 and December 2015 on the Maskwa Site at Lakeland Industry & Community Association, near Bonnyville, Alberta. Sampling was carried out to determine the concentrations of non-compliance parameters as requested by the Project Coordinator.

Data presented in this report has undergone the Post-Final Validation Procedures, which include a cursory inspection of annual charts. If errors or omissions in the data are suspected or discovered after the initial submittal of data (monthly report), the post-validation step serves to re-evaluate the affected data. The report certification form is also included in this report to verify that the annual validation review has been completed, as per the Reporting Chapter (Chapter 9) of the Air Monitoring Directive (AMD).

The summary of basic statistics includes monthly mean, maximum, and minimum values as well as comparisons to the historical mean, maximum and minimum values from the previous calendar year are presented on the following pages.

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

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



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4.0 Calculations and Results	9
5.0 Methods and Procedures	10

Appendix I	<b>Continuous Monitoring Data Results</b>
	Sulphur Dioxide
	Hydrogen Sulphide
	Total Hydrocarbon
	Oxides of Nitrogen
	Nitric Oxides
	Nitrogen Dioxide
	Wind Speed
	Relative Humidity
	Barometric Pressure
	Ambient Temperature
	Precipitation
Appendix II	Report Certification Form



### 1.0 Discussion

This annual validation report consists of data for parameters Sulphur Dioxide (SO2), Hydrogen Sulphide (H2S), Total Hydrocarbon (THC), Oxides of Nitrogen (NOx), Nitric Oxide (NO), Nitrogen Dioxide (NO2), Wind Speed (WS), Relative Humidity (RH), Barometric Pressure (BP), Ambient Temperature (TPX) and Precipitation.

The air monitoring trailer was located at Latitude: 54° 36′ 18.612′′ N and Longitude: 110° 27′ 9.719′′ W during the monitoring period.

The monitoring methods and equipment met all AMD requirements.

All monitoring analyzers and meteorological systems met the 90% operational uptime requirements during the monitoring period.

All data collected during the monitoring period were within the objectives outlined in the Alberta Ambient Air Quality Objectives and Guidelines Summary (AAAQOs).

No annual ambient air monitoring station audit was performed during the monitoring period.

The annual Maxxam internal quality audit was performed on November 17.



The summaries of the monthly maintenance report for the monitoring period are presented below:

SULPHUR	DIOXIDE	(SO2)

The pump was rebuilt and the analog output calibration was performed on January 15.
No issues were identified.
Hourly data collected on June 29 at hour 5 was invalidated as the logger time was being
adjusted to match the time on the polling computer. Hourly maximum data collected on June
21 at hour 15 was invalidated as the analyzer was recovering from a power outage.
The analyzer started spanning high after the calibration on July 10. The sample pump was
rebuilt on July 13. No data was discarded due to this issue. Twelve hours of data are missing on
July 9 from hour 8 to hour 19 due to a power supply maintenance that was performed by IOR
operator.
The analyzer failed the daily span check on August 24. The LICA-owned API 100E, S/N: 508,
analyzer was replaced with the Maxxam-supplied API 100A, S/N: 1124 on August 24. Hourly
data was invalidated back to the last good daily calibration which was August 23. Thirty-six
hours of data were discarded due to this issue.
Three hours of data collected on September 1 at hour 10 and on September 16 from hour 20 to
hour 21 were invalidated due to power failures.
No issues were identified.
The routine annual internal quality audit was completed on November 17.
The LICA-owned API 100E, S/N: 508, analyzer was installed back on site after maintenance was
performed at Maxxam shop.

### HYDROGEN SULPHIDE (H2S)

January	The analog output calibration was performed on January 15.
February	The analyzer started drifting low on January 29. As found points checks were performed on
	February 2 and February 3 using different calibrators. The results were good. The scrubber
	material was changed on February 10 following a shut-down calibration. The analyzer was
	allowed time to stabilize overnight and a post-repair calibration was performed on February 11.
	Fifteen hours of data were not valid due to this maintenence event.
March	No issues were identified.
April	No issues were identified.
May	No issues were identified.
June	Hourly data collected on June 29 at hour 5 was invalidated as the logger time was being
	adjusted to match the time on the polling computer. Hourly maximum data collected on June
	21 at hour 15 was invalidated as the analyzer was recovering from a power outage.
July	Twelve hours of data are missing on July 9 from hour 8 to hour 19 due to a power supply
	maintenance that was performed by IOR operator.
August	No issues were identified.



September	Three hours of data collected on September 1 at hour 10 and on September 16 from hour 20 to
	hour 21 were invalidated due to power failures.
October	No issues were identified.
November	The routine annual internal quality audit was completed on November 17.
December	The analyzer spanned high on December 17 due to the failure of the sample pump. The sample pump was rebuilt on December 18. Data was invalidated back to the last good calibration, which was December 16. Thirty-six hours of data were discarded due to this event.

### TOTAL HYDROCARBONS (THC)

January	No issues were identified.			
February	On February 19, the zero-air pump was rebuilt, the tubing was replaced, the scrubber material			
	was renewed and the pump cabinet was replaced with a new unit. Two hours of data were			
	invalid because of this maintenance event.			
March	No issues were identified.			
April	No issues were identified.			
May	No issues were identified.			
June	Hourly data collected on June 29 at hour 5 was invalidated as the logger time was being			
	adjusted to match the time on the polling computer. Hourly maximum data collected on June			
	21 at hour 15 was invalidated as the analyzer was recovering from a power outage.			
July	Twelve hours of data are missing on July 9 from hour 8 to hour 19 due to a power supply			
	maintenance that was performed by IOR operator.			
August	No issues were identified.			
September	Three hours of data collected on September 1 at hour 10 and on September 16 from hour 20 to			
	hour 21 were invalidated due to power failures.			
October	No issues were identified.			
November	The routine annual internal quality audit was completed on November 17.			
December	The analyzer failed on December 2 due to the failure of the zero air generator. The Thermo 51i,			
	S/N: 436609738, analyzer was replaced with the Thermo 51C, S/N: 436609739, analyzer on			
	December 2 for maintenance purposes. Twenty four hours of data were discarded due to this			
	event. Eleven hours of data were further discarded as the zero air generator failed again on			
	December 13. The issue was fixed on the same day.			

### NITROGEN DIOXIDE (NO2)

January	The analog output calibration was performed on January 15.
February	The analyzer was put into Maintenance mode on February 19 at hour 12 while the case fan was
	being replaced.
March	No issues were identified.
April	No issues were identified.
May	No issues were identified.



June	Hourly data collected on June 29 at hour 5 was invalidated as the logger time was being
	adjusted to match the time on the polling computer. Hourly maximum data collected on June
	21 at hour 15 was invalidated as the analyzer was recovering from a power outage.
July	Twelve hours of data are missing on July 9 from hour 8 to hour 19 due to a power supply
	maintenance that was performed by IOR operator.
August	The LICA-owned API 200E, S/N: 593, analyzer was replaced with the Maxxam-supplied API
:	200A, S/N: 1899 on August 13 for maintenance purposes. The pump was rebuilt on August 27.
	Thirty hours of data are invalid due to these events.
September	The LICA-owned API 200E, S/N: 593, analyzer was installed back on site on September 15 after
	maintenance was performed at Maxxam shop. The ozone scrubber material was renewed, the
	NO2 converter was changed, and the pump and perm tube were replaced prior to installation.
	Three hours of data collected on September 1 at hour 10 and on September 16 from hour 20 to
	hour 21 were invalidated due to power failures.
October	No issues were identified.
November	The routine annual internal quality audit was completed on November 17.
December	No issues were identified.

### WIND SPEED (WS)

January	Five hourly maximum data collected on January 7 at hour 1 and hour 6 and January 11 from
,	hour 8 to hour 10 were invalidated due to spikes.
February	Hourly maximum data collected on February 21 at hour 23 was invalidated due to a spike:
· - · · · · · · /	Reason unknown.
March	Hourly maximum data collected on March 4 between hour 1 and hour 3 and at hour 7 were
	invalidated due to a spike. Reason unknown.
April	No issues were identified.
May	No issues were identified.
June	Three hourly maximum data collected on June 16 at hour 15 and hour 16 and on June 25 at
	hour 16 were invalidated due to spikes. Reason unknown. Hourly data collected on June 29 at
	hour 5 was invalidated as the logger time was being adjusted to match the time on the polling
	computer. Hourly maximum data collected on June 21 at hour 15 was invalidated as the
	analyzer was recovering from a power outage.
July	Hourly maximum data collected on July 4 at hour 17 was invalidated due to a spike. Twelve
	hours of data are missing on July 9 from hour 8 to hour 19 due to a power supply maintenance
	that was performed by IOR operator.
August	No issues were identified.
September	Three hours of data collected on September 1 at hour 10 and on September 16 from hour 20 to
	hour 21 were invalidated due to power failures.
October	No issues were identified.
November	No issues were identified.
December	No issues were identified.



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

No issues were identified.
No issues were identified.
Hourly data collected on June 29 at hour 5 was invalidated as the logger time was being
adjusted to match the time on the polling computer.
Twelve hours of data are missing on July 9 from hour 8 to hour 19 due to a power supply
maintenance that was performed by IOR operator.
No issues were identified.
Three hours of data collected on September 1 at hour 10 and on September 16 from hour 20 to
hour 21 were invalidated due to power failures.
No issues were identified.
No issues were identified.
No issues were identified.

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

No issues were identified.			
No issues were identified.			
No issues were identified.			
No issues were identified.			
No issues were identified.			
Hourly data collected on June 29 at hour 5 was invalidated as the logger time was being			
adjusted to match the time on the polling computer.			
Twelve hours of data are missing on July 9 from hour 8 to hour 19 due to a power supply			
maintenance that was performed by IOR operator.			
No issues were identified.			
Three hours of data collected on September 1 at hour 10 and on September 16 from hour 20 to			
hour 21 were invalidated due to power failures.			
No issues were identified.			
No issues were identified.			
No issues were identified.			



### PRECIPITATION

January	No issues were identified.
February	No issues were identified.
March	The rain guage seasonal verification/maintenance was performed on March 24.
April	No issues were identified.
May	No issues were identified.
June	Hourly data collected on June 29 at hour 5 was invalidated as the logger time was being
	adjusted to match the time on the polling computer.
July	Twelve hours of data are missing on July 9 from hour 8 to hour 19 due to a power supply
	maintenance that was performed by IOR operator.
August	No issues were identified.
September	Three hours of data collected on September 1 at hour 10 and on September 16 from hour 20 to
	hour 21 were invalidated due to power failures.
October	No issues were identified.
November	The routine annual internal quality audit was completed on November 17.
December	No issues were identified.

### AMBIENT TEMPERATURE (TPX)

No issue was identified this year.

dentified this year.			
No issues were identified.			
No issues were identified.			
No issues were identified.			
No issues were identified.			
No issues were identified.			
Hourly data collected on June 29 at hour 5 was invalidated as the logger time was being			
adjusted to match the time on the polling computer.			
Twelve hours of data are missing on July 9 from hour 8 to hour 19 due to a power supply			
maintenance that was performed by IOR operator.			
No issues were identified.			
Three hours of data collected on September 1 at hour 10 and on September 16 from hour 20 to			
hour 21 were invalidated due to power failures.			
No issues were identified.			
No issues were identified.			
No issues were identified.			



### 2.0 Project Personnel

Mike Bisaga was the contact for Lakeland Industry & Community Association, and the Maxxam field sampling team consisted of Alexander Yakupov, Raja Ashraf, Christopher Wesson, and Limin Li.

### 3.0 Plant Monthly Required AMD Summary

All data collected during the monitoring period were within the objectives as outlined in the AAAQOs.

The operational uptime for all analyzers and meteorological system were above the 90% requirement.

### 4.0 Calculations and Results

All calculations and reporting of results follow the method described in the Air Monitoring Directive, 1989, 2006 Amendments to the Air Monitoring Directive, 1989 (AMD 2006) as well as AMD 2015.



### **5.0 Methods and Procedures**

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

Maxxam AIR SOP-00209: Ambient H2S Monitoring Maxxam AIR SOP-00211: Ambient SO2 Monitoring Maxxam AIR SOP-00213: Ambient NO/NO2/NOx Monitoring Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring Maxxam AIR SOP-00242: Precipitation Collector Installation /Maintenance

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

Sulphur Dioxide - API 100E and API 100A UV Flourescent Analyzers Hydrogen Sulphide - API 101E UV Flourescent Analyzer Total Hydrocarbons - Thermo 51C FID Analyzer Oxides of Nitrogen - API 200E and API 200A Chemiluminescent Analyzers Wind System - Met One Unit Relative Humidity - Met One Unit Barometric Pressure - Met One Unit Ambient Temperature - Met One Unit Precipitation - Met One Unit Datalogger - ESC 8832 APPENDIX I CONTINUOUS MONITORING DATA RESULTS SULPHUR DIOXIDE

Max ampen

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Maskwa Site - 2015 JOB # 2833-2015-30- A

SULPHUR DIOXIDE (SO2) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of	Contract of the second		%.Re	%Readings in Concentration Range (PPB SO2)	ation Range (PPB -	<u>.</u> .02)		OBJECTIVES**	IVES**	EXCREDENCES	ENCES	MONTHLY AVERAGE
	Keadings	nume (%)	s zo ppb	20 < C 5 60 ppb	60 < C ≤ 110 ppb	110 < C ≤ 170 ppb	170 < C < 340 ppb	340 ppb	1-HR	24-HR	1-HR	24-HR	(PPB)
January	704	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	1.0
February	638	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.8
March	705	100.0	100.00%	0.00%	%00'0	0.00%	0.00%	0.00%	172	48	0	0	0.7
April	684	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.6
May	708	100.0	100.00%	0.00%	%00'0	0.00%	0.00%	0.00%	172	48	0	0	0.6
June	683	6.66	100.00%	0.00%	%00.0	0.00%	0.00%	0.00%	172	48	0	0	6.0
уlul	675	98.4	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	1.1
August	662	95.2	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.8
September	682	9.66	100.00%	0.00%	%00'0	0.00%	0.00%	0.00%	172	48	0	0	0.3
October	708	100.0	100.00%	0.00%	%00'0	0.00%	0.00%	0.00%	172	48	0	0	0.8
November	683	100.0	100.00%	0.00%	%00'0	0.00%	0.00%	0.00%	172	48	0	0	0.7
December	704	100.0	100.00%	0.00%	%00'0	0.00%	0.00%	0.00%	172	48	0	0	0.4
N/D - Valid Da *Number of R	N/D - Valid Data Not Available *Number of Readings - included calibration hours	vie ded calibration	1 hours								ANNUALAVERAGE	AVERAGE	0.7
			2.201										

\*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

PPB PPB 8.0 Alberta Ambient Air Quality Objectives Ammal Average\*\* Annual Average for 2015

Maxia amp

Maskwa Site - 2015 JOB # 2833-2015-30- A

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

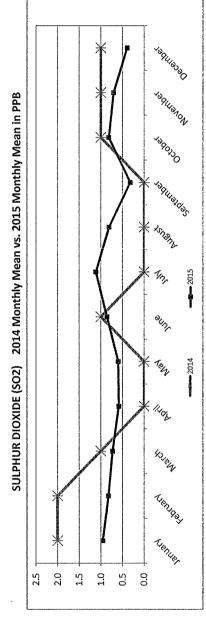
		2014			2015		
Month	MEAN	MUMINIM	MAXIMUM	MEAN	MUMINIM	MAXIMUM	Difference
January	2.0	1.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2	19	1.0	0	14	1.04
February	2.0			0.8	0	17	1.17
March	1.0		23	0.7	0	18	0.27
April	0.0		11	0.6	0	8	-0.59
May	0.0		8	0.6	0.000 (M	6	-0.60
June	1.0		17	0.9	0	00	0.14
July	0.0		11		0.0	10	-1.12
August	0.0		4	0.8	Or State	11	-0.82
September	0.0		5	0.3		5	-0.32
October	1.0		8	0.8		12	0.18
November	1.0		11	0.7		7	0.29
December	1.0	ACT NOT	13	0.4	0.0	14	0.60
N/D - Valid Da	N/D - Valid Data Not Available						

SULPHUR DIOXIDE (SO2) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

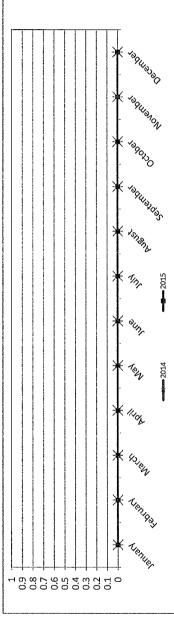
N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

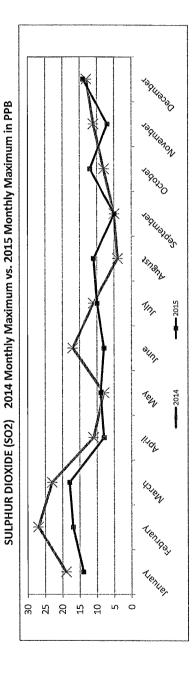
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Maskwa Site - 2015 JOB # 2833-2015-30- A











## LICA30 SO2\_ / WDR Joint Frequency Distribution (Percent)

## 01/01/15 thru 12/31/15

## Distribution By % Of Samples

30	LICA30	so2	PPB	
ч Ц	: E	ы Ч	••	
Logger Id	Site Name	Parameter	Units	

Wind Parameter : WDR Instrument Height : 10 Meters

	Freq	00	00-	.00	00.	00.	00.	
	лд	100.00	•				•	
	NNW	4.21	00,	.00	00.	00 '	.00	4.21
	NW	4.79	00.	.00	00.	00.	00.	4.79
	WNW	7.64	00'	00.	00.	00.	00'	7.64
	м	5.77	.00	· 00	00.	00.	00-	5.77
	WSW	5.12	00.	.00	00'	00-	00 -	5.12
	SW	12.10	00.	00.	00.	00.	.00	12.10
	SSW	13.57	00-	00.	00-	00-	00.	13.57
	S	5,11	00-	.00	00.	00'	00'	5.11
	SSE	4.05	00 -	00.	00 '	00.	00.	4.05
Direction	SE	5.19	00-	00-	00.	00.	00.	5.19
DİJ	ESE	4.56	00-	00 -	00 '	00.	00.	4.56
	ы	4.07	00-	00-	00-	00.	00.	4.07
	ENE	5.80	00.	00-	00'	00.	00.	5.80
	Ħ	7.45	00 -	00-	00-	00.	00 -	7.45
	NNE	5.93	00.	00.	00-	00.	00 -	5.93
	N	4.55	00.	00.	00 -	00 '	00.	4.55
	Limit	20.0	60.0	110.0	170.0	340.0	340.0	Totals

• • • • • × ×

Calm : .00 %

Total # Operational Hours : 8236

## Distribution By Samples

	Freq	8236					
	MNN	347 8					
	MM	395					
	WNW	630					
	м	476					
	WSW	422					
	SW	7997					
	MSS	1118					
	S	421					
	SSE	334					
Direction	SE	428					
Dir	ESE	376					
	ы	336					
	ENE	478					
	贸	614					
	INNE	489					
	z	375					
	Limit	20.0	60.0	0.011	170.0	340.0	>= 340.0
		v	v	v	v	v	X

347

395

630

476

422

766

421 1118

334

428

376

336

478

614

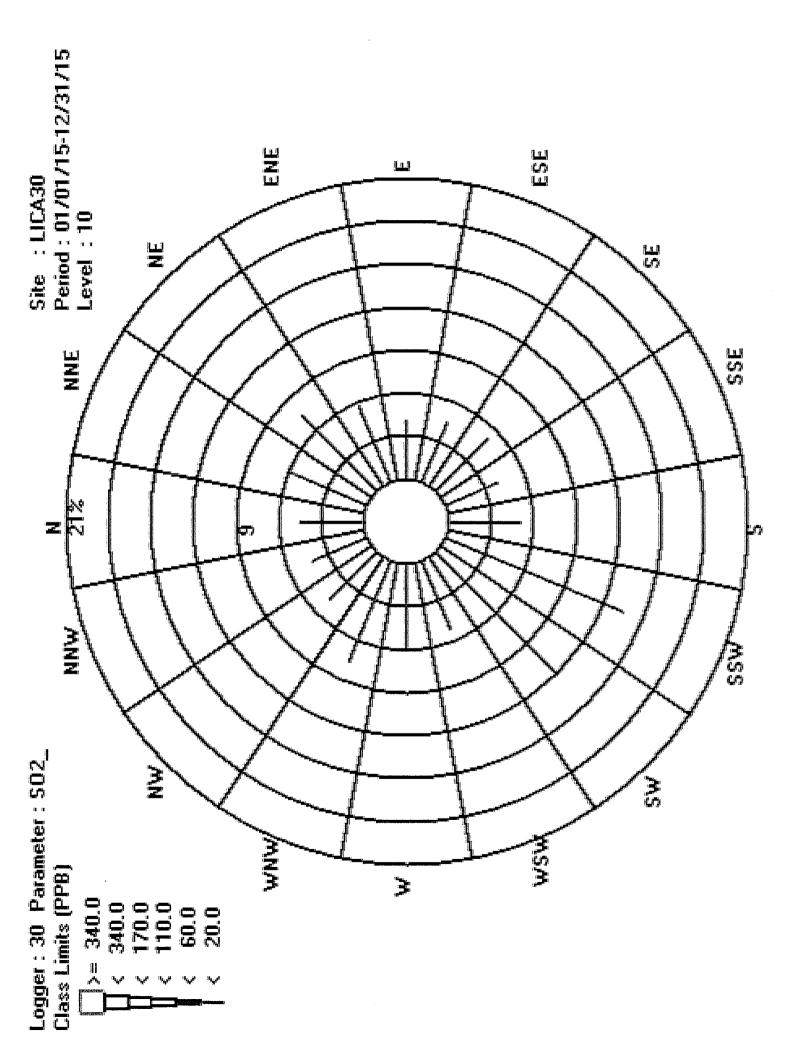
489

375

Totals

Calm : .00 %

Total # Operational Hours : 8236



### HYDROGEN SULPHIDE

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Maskwa Site - 2015 JOB # 2833-2015-30- A

HYDROGEN SULPHIDE (H2S) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Month Bandware of Operational	Operational Time (%)	ni sgnibest %	adings in Concent	Concentration Range (PPB H2S)	I-SZH		OBJECTIVES**	BXCEH	EXCEEDENCES	MONTHLY
	c Simpen	Neduluga and a set of the way	s3 ppb	4 < C ≤ 10 ppb	11 < C ≤ 50 ppb	>50 ppb	1-HR	24-HR	1.HR	24-HR	
January	669	100.0	100.00%	0.00%	0.00%	0.00%	10	n	0	0	0
February	809	97.8	100.00%	%00.0	0.00%	0.00%	10	3	0	0	0
March	706	100.0	100.00%	%00:0	0.00%	0.00%	10	en	0	0	0
April	684	100.0	100.00%	0.00%	0.00%	%00'0	10	£	0	0	0
Мау	708	100.0	99.72%	0.28%	0.00%	0.00%	10	3	0	0	0
June	683	6.99	99.85%	0.15%	%00.0	%00'0	10	3	0	0	0
γlul	691	98.4	100.00%	0.00%	0.00%	0.00%	10	m	0	0	ο
August	707	100.0	99.72%	0.28%	0.00%	0.00%	10	£	0	0	0
September	682	99.6	100.00%	0.00%	0.00%	%00'0	10	3	0	0	ο
October	708	100.0	99.58%	0.42%	0.00%	0.00%	10	3	0	0	0
November	682	100.0	100.00%	0.00%	0.00%	0.00%	10	3	0	0	0
December	667	95.2	100.00%	%00.0	0.00%	%00.0	10	ε	0	0	0
N/D - Valid Da *Number of R	N/D - Valid Data Not Available *Number of Readings - included calibration hours	le ded calibration	hours						ANNUALAVERAGE	AVERAGE	0

\*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

PPB	PPB
0/N	0
Alberta Ambient Air Quality Objectives Annual Average** :	Annual Average for 2015

Maxias Group Company

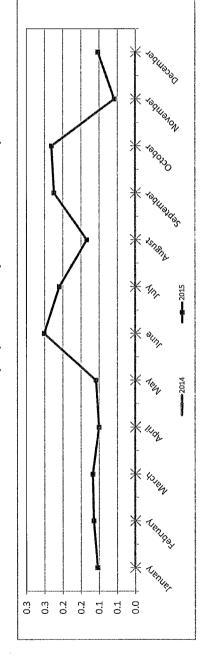
Maskwa Site - 2015 JOB # 2833-2015-30- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

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	Difference	-0.10	-0.12	-0.12	-0.10	-0.11	-0.25	-0.21	-0.13	-0.22	-0.23	-0.06	-0.10	
	Dif													
	MAXIMUM	2	1	1	1	4	8. 	£	5	3	7	1	1	
2015	WINNIN	0	. 0	0	100 100 100	10°	0 	(0) 10	0°4	10F	0	0.00 0.00		
	MEAN	0.1	0.1	0.1	0.1	1.0	E0	0.2	0.1	0.2	0.2	0.1	0.1	
	MAXIMUM	2	7	2	2	Ħ	m	σ	9	13 13	4	2	2	
2014	MINIM	1		0.0		100 000 000 000 000 000 000 000 000 000	0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2					0.5	
	MEAN	0:0	0:0	0.0	0.0	000	0.00	0.0 0.0		0.0	0.0	0.00	0:0 1	
<u></u>	Month	January	February	March	April	May	June	July	August	September	October	November	December	

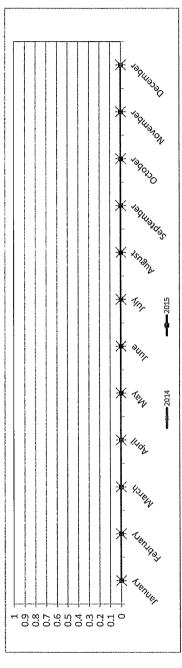
N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

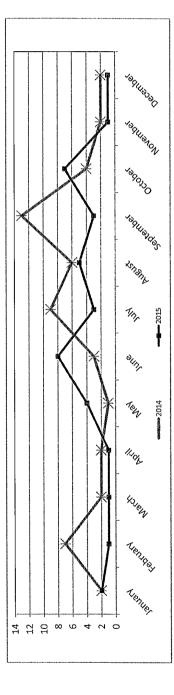




# HYDROGEN SULPHIDE (H2S) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB

HYDROGEN SULPHIDE (H2S) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPB





HYDROGEN SULPHIDE (H2S) 2014 Monthly Maximum vs. 2015 Monthly Maximum in PPB

### LICA30 H2S\_ / WDR Joint Frequency Distribution (Percent)

## 01/01/15 thru 12/31/15

## Distribution By % Of Samples

### Wind Parameter : WDR Instrument Height : 10 Meters

	Freq	99.82	.17	00.	00-	
	MNN	4.09	00.	00.	00'	4.09
	MN	4.66	00-	00.	00 -	4.66
	WINW	7.73	00-	00-	00.	7.73
	м	5.77	00.	00-	00.	5.77
	WSW	5.09	00 -	00-	00-	5.09
	SW	12.13	00.	00-	00-	12.13
	WSS	13.55	. 02	00-	00,	13.58
	S	5.15	00-	00-	00-	5.15
	SSE	4.13	00'	00-	00'	4.13
Direction	SE	5.17	.03	00-	00'	5.21
μ	ESE	4.48	90-	00-	00.	4.54
	ы	4.15	.01	00-	00.	4.17
	ENE	5.90	. 02	00.	00.	5.93
	BR	7.45	00.	00.	00-	7.45
	INNE	5.88	10.	00.	00.	5.89
	N	4.41	00.	00.	00.	4.4I
	Limit	3.0	10.0	50.0	50.0	Totals
		v	v	v	X	

Calm : .00 %

Total # Operational Hours : 8225

## Distribution By Samples

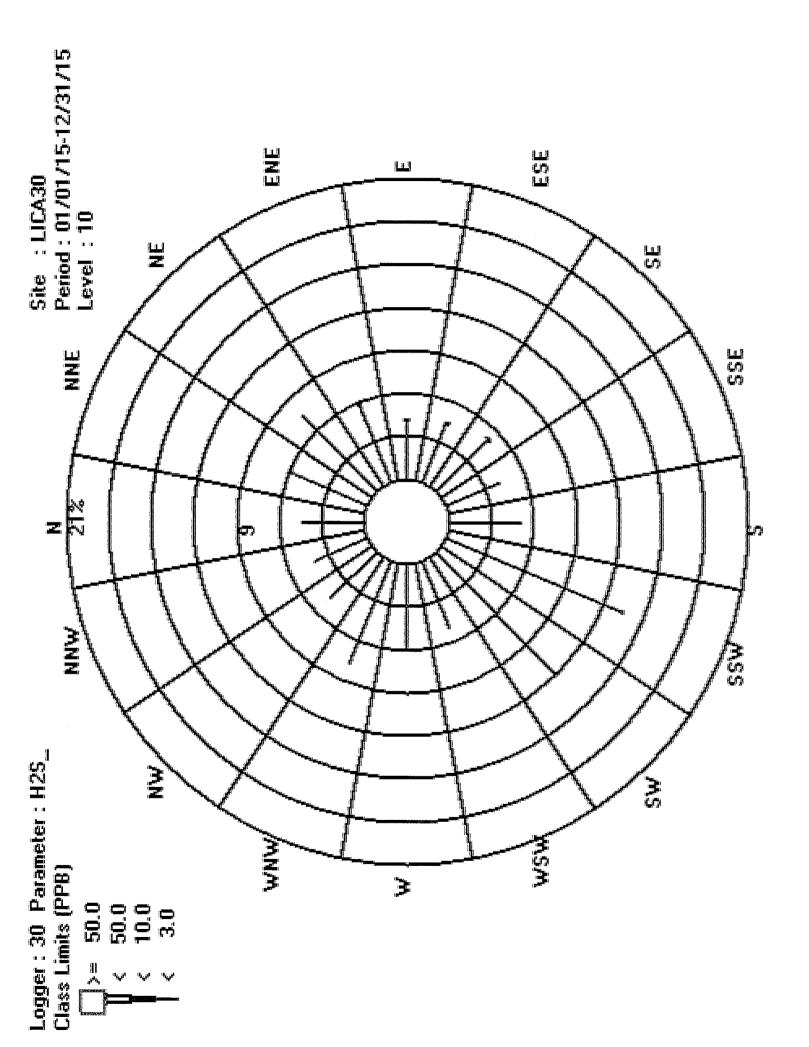
Direction

Freq	8211	14	
MNN	337		
MN	384		
MNM	636		
W	475		
MSW	419		
SW	866		
SSW	1115	7	
S	424		
SSE	340		
SE	426	ო	
ESE	369	S	
ы	342	ч	
ENE	486	N	
NE	613		
INNE	484	ы	
N	363		
Limit	3.0	10.0	50.0
	v	v	v

>= 50.0

Calm : .00 %

Total # Operational Hours : 8225



#### TOTAL HYDROCARBON



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Maskwa Site - 2015 JOB # 2833-2015-30- A

TOTAL HYDROCARBONS (THC) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of Readings*	Operational Time (%)		% Readings in Concentr	Concentration Range (PPM THC)	THC	OBIECT	OBJECTIVES**	BCCEED	EXCEEDENCES	MONTHLY
44	-9		s 3.0 ppm	3.1 < C ≤ 10.0 ppm	10.1 < C < 50.0 ppm	> 50.0 ppm	1-HR	24-HR	1-HR	24-HR	
January	708	100.0	94.21%	5.79%	0.00%	0.00%	1	1	I	ł	2.4
February	634	7.99	99.84%	0.16%	%00'0	0.00%	1	ı		I	2.2
March	705	100.0	100.00%	0.00%	%00.0	0.00%	t	1	I	I	2.2
April	684	100.0	100.00%	0.00%	%00.0	0.00%	'	-	I	I	2.1
May	708	100.0	100.00%	0.00%	0.00%	0.00%	1	ı	1	1	2.1
June	683	6.99	99.71%	0.29%	%00.0	00.00%	I	ı	1	•	2.1
ylut	693	98.4	100.00%	0.00%	0.00%	0.00%	ı		I	l	2.1
August	708	100.0	100.00%	0.00%	%00.0	0.00%	T	ı	1		2.1
September	682	9.66	100.00%	0.00%	0.00%	0.00%	I	ı	I	I	2.1
October	708	100.0	100.00%	0.00%	0.00%	0.00%	ı	I	ı	I	2.1
November	675	98.9	95.41%	4.59%	0.00%	0.00%	I	1	ı	1	2.2
December	666	95.2	83.39%	6.61%	%00'0	0.00%	I	1	l	I	2.3
N/D - Valid Da *Number of P	N/D - Valid Data Not Available	N/D - Valid Data Not Available *Numbro of Boodings - Included Collibration bours	hours						ANNUALAVERAGE	AVERAGE	2.2

\*Number of Readings - included calibration hours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

N/D PPM	2.2 PPM
Alberta Ambient ArcQuality Objectives Annual Average**	Annual Average tor 2015 3

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Maskwa Site - 2015 JOB # 2833-2015-30- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

TOTAL HYDROCARBONS (THC) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPM

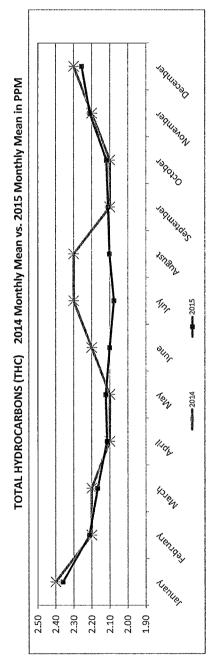
		2014			2015		P
Month	MEAN	WNWINIW	MAXIMUM	MEAN	MUMINIM	MAXIMUM	Difference
January	2140	19 July 19	5 212 S	2.36	2.0	5.1	0.04
February	2.20	6T	4.7	2.21	1.9	8.5	-0.01
March	2.20	1.6	3.6	2.17	1.9	2.9	0.03
April	2.10	1.9	3.5	2.12	2.0	2.6	-0.02
May	2.10	61	2.6	2.12	2.0	2.7	-0.02
June	2.20	6T	4.9	2.10	1.9	5.3	0.10
July	2.30	61	3.1	2.08	1.9	2.7	0.22
August	2.30	1.9	3.6	2.10	1.9	2.9	0.20
September	2.10	1.8	3.3	2.11	1.9	2.6	-0.01
October	2.10	- <u>1</u> .9	2.8	2.12	1.9	2.8	-0.02
November	2.20	1.6	3.5	2.21	1.9	4.0	-0.01
December	2.30	19	3.4	2.26	1.7	4.2	0.04
N/O Volid Data Not A	ata Nat Associable						

N/D - Valid Data Not Available

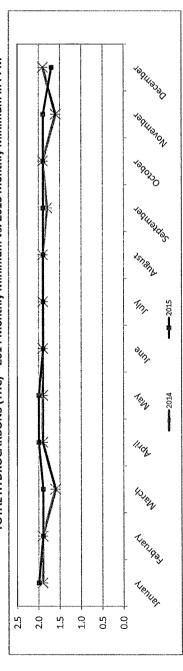
\*Annual peak is bolded and highlighted.

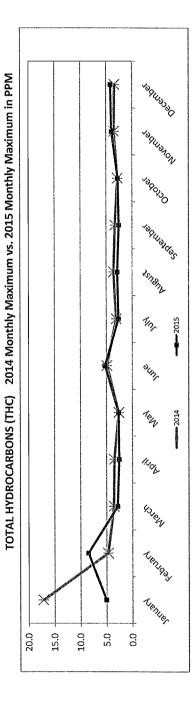
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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Maskwa Site - 2015 JOB # 2833-2015-A



TOTAL HYDROCARBONS (THC) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPM





## LICA30 THC / WDR Joint Frequency Distribution (Percent)

#### 01/01/15 thru 12/31/15

#### Distribution By % Of Samples

30	LICA30	THC	PPM
••	••	••	••
Logger Id	Site Name	Parameter	Units

Wind Parameter : WDR Instrument Height : 10 Meters

	Freq	98.21	1.78	00.	00.	
	MNN	4.17	.01	00.	00-	4.19
	MN	4.82	IO.	00.	00-	4.83
	MNM	7.57	.03	00-	00-	7.60
	м	5.77	. 02	00-	00-	5.80
	MSW	4.96	.10	00.	00 -	5.07
	SW	11.32	.69	00-	00,	12.01
	SSW	13.08	.47	00.	.00	13.55
	S	5.02	.06	.00	.00	5.08
	SSE	4.13	.02	00.	.00	4.15
Direction	SE	5.19	.07	00.	.00	5.27
Di	ESE	4.48	.06	.00	.00	4.54
	μi	3.97	.06	.00	.00	4.03
	ENE	5.83	.02	.00	00.	5.86
	EN	7.43	.06	.00	00.	7.49
	INNE	5.90	.03	.00	.00	5.93
	N	4.49	.02	00.	.00	4.51
	Lìmit	3.0	10.0	50.0	50.0	Totals
		v	v	v	Ķ	

Calm : .00 %

Total # Operational Hours : 8254

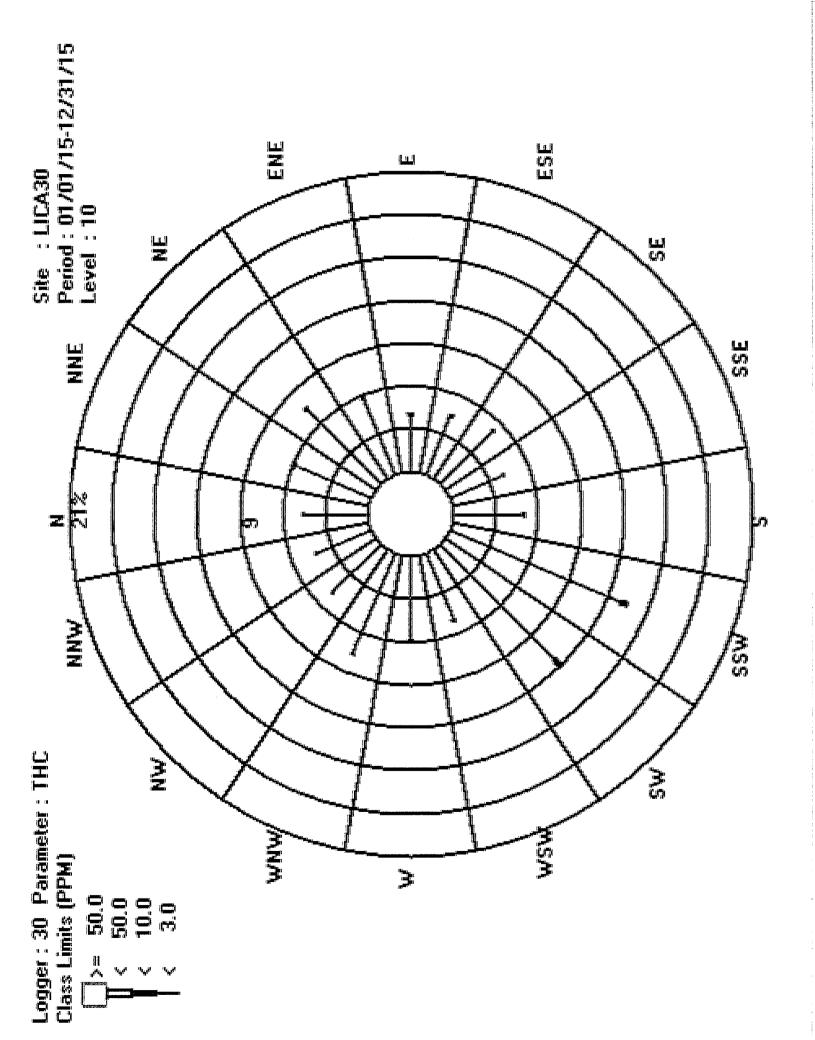
#### Distribution By Samples

#### Direction

Freq	8107	147		
MNN	345	н		
MN	398	ы		
MNM	625	m		
м	477	N		
MSW	410	თ		
MS	935	57		
SSW	1080	39		
ß	415	Ŋ		
SSE	341	0		
SE	429	9		
ESE	370	ហ		
ы	328	Ŋ		
ENE	482	0		
RE	614	ß		
INNE	487	m		
N	371	0		
Limit	3.0	10.0	50.0	50.0
	v	v	v	X

Calm : .00 %

Total # Operational Hours : 8254



#### **OXIDES OF NITROGEN**



# OXIDES OF NITROGEN (NOx) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Month Boothart	Operational Time (eV	%.Re	% Readings in Concentr	Concentration Range (PPB NOx)	NOX)	OBJEC	OBJECTIVES***	EXCEEL	EXCEEDENCES	MONTHLY
		- Io Aprilia	s 50 ppb	51 < C ≤ 110 ppb	111 < C < 210 ppb	>210.ppb	1-HR	24-HR	1:HR	24-HR	ALMOC
January	678	100.0	98.67%	1.33%	0.00%	0.00%	1	1	1	I	9.5
February	628	6.66	100.00%	0.00%	0.00%	0.00%	I	1	1	I	5.0
March	680	100.0	100.00%	0.00%	0.00%	0.00%	1	1	-	-	3.5
April	678	100.0	100.00%	0.00%	%00.0	0.00%	I	1	1	ı	2.0
May	677	100.0	100.00%	0.00%	0.00%	0.00%	I	1	ı	I	1.7
June	629	6.66	100.00%	0.00%	0.00%	0.00%	- 1	, i	ı	ı	2.8
ylul	661	98.4	100.00%	%00.0	0.00%	0.00%	I	1	3	1	3.2
August	614	96.0	100.00%	0.00%	0.00%	0.00%	1	1	-	ı	3.0
September	654	99.4	100.00%	0.00%	%00.0	0.00%	1	1	ı	ı	3.0
October	682	100.0	100.00%	0.00%	%00.0	0.00%	1	1	1	-	3.9
November	679	100.0	100.00%	0.00%	%00.0	0.00%	1	t	1		5.5
December	681	100.0	99-56%	0.44%	0.00%	0.00%	1	1	ı	ı	7.4
N/D - Valid Da *Number of R	N/D - Valid Data Not Available *Number of Readings - included calibration hours	e led calibration	hours						ANNUAL AVERAGE	AVERAGE	42

\*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

N/D PPB	4.2 PPB
Alberta Ambient Ain Quality Objectives Annual Average**	Annual Average for 2015



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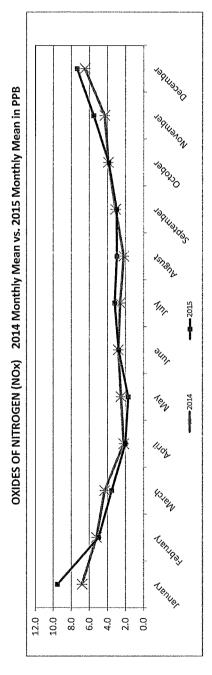
OXIDES OF NITROGEN (NOx) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

		2014			2015		
Month	MEAN	WINIMIN	WINNIXTIN	MEAN	MINIMUM MAXIMUM	MUM	Difference
January	6.3	0.0	37.6	9.5	0.0 68.2	.2	-2.7
February	5.2	0.0	50.2	5.0	<b>0:0</b> 32.0	0	0.2
March	4.3	0.0	38.2	3.5	36.9	6	0.8
April	2.2	0.0	20.5	2.0	26.0	.0	0.2
May	2.5	0.0	20.0	1.7	0.0 17.7	<i>Ľ</i> ,	0.8
June	2.8	0.0	33.8	2.8	0:0 24.1	T.	0.0
July	2.6	0.0	22.3	3.2	28.3	.3	-0.6
August	2.2	0.0	19.8	3.0	<b>0.0</b> 36.3		-0.8
September	3.1	0.0	32.6	3.0	<b>0.9</b>	1.2	0.1
October	9.S	0.0	\$5.6	3.9	29.2	1.2	0.0
November	4.3	0.0	35.8	5.5	40.8	.8	-1.2
December	6.5	0.5	48.8	7.4	<b>0:0</b>	0.1	-0.87
N/P Valado	N /N Malia Date Not Amilable						

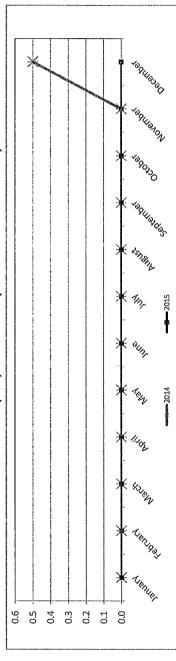
N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

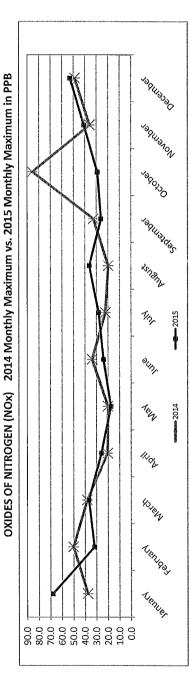
Maxias Group Company

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Maskwa Site - 2015 JOB # 2833-2015-30- A



OXIDES OF NITROGEN (NOx) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPB





## LICA30 NOX\_ / WDR Joint Frequency Distribution (Percent)

## 01/01/15 thru 12/31/15

#### Distribution By % Of Samples

30	LICA30	NOX	PPB
••	••	••	••
Logger Id :	Site Name	Parameter	Units

Wind Parameter : WDR Instrument Height : 10 Meters

	Freq	99.84	.15	00.	.00	
	MNN	4.18	. 02	00.	00.	4.21
	MN	4.83	10.	00.	00.	4.84
	MNM	7.54	.01	00.	00 -	7.56
	м	5.75	00.	00-	00.	5.75
	MSM	5.10	00.	00.	.00	5.10
	SW	12.06	.04	00.	00-	12.11
	MSS	13.46	.01	00.	00-	13.47
	S	5.13	00.	00-	00.	5.13
	SSE	4.13	.00	00.	00 -	4.13
Direction	SE	5.22	00,	00.	00.	5.22
Δí	ESE	4.55	.01	00-	00.	4.56
	ы	4.11	.01	00,	00.	4.12
	ENE	5.88	00,	00.	00.	5.88
	B	7.30	.02	00.	00.	7.32
	INNE	5.96	00.	00.	00.	5.96
	N	4.55	00.	00.	00.	4.55
	Limit	50.0	0.011	210.0	210.0	Totals
		v	v	v	X	

Calm : .00 %

Total # Operational Hours : 8146

#### Distribution By Samples

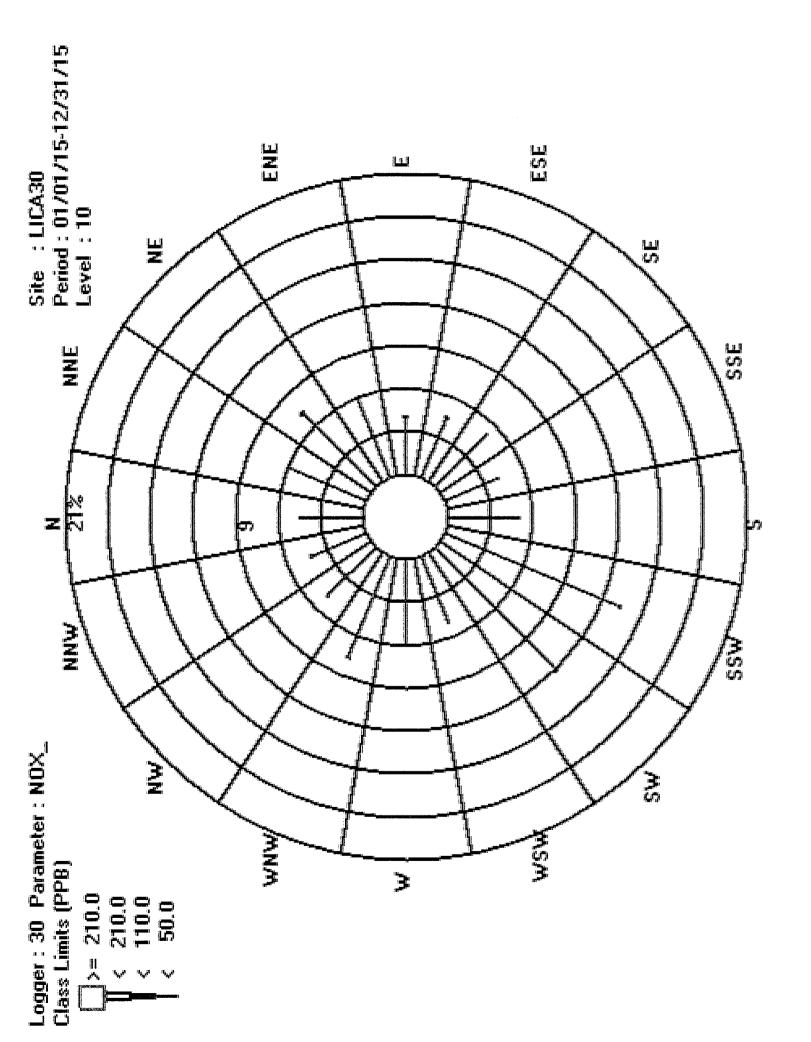
#### Direction

Freq	8133	13	
MNN	341	7	
MM	394	ч	
MNM	615	1	
м	469		
WSW	416		
SW	983	4	
MSS	1097	ч	
S	418		
SSE	337		
SE	426		
ESE	371	ы	
ы	335	ы	
ENE	479		
R	595	0	
INNE	486		
N	371		
Limit	50.0	110.0	210.0
	v	v	v

>= 210.0

Calm : .00 %

Total # Operational Hours : 8146



#### NITRIC OXIDES

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Maskwa Site - 2015 JOB # 2833-2015-30- A

# NITRIC OXIDE (NO) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of	Number of Operational		%Readings in Concent	in Concentration Range (PPB NO)	NO)	OBJECTIVES**	IVES**	EXCEEDENCES	INCES	MONTHLY
	Keadings	keadings <sup>775</sup> (%)	s 50 ppb	51 < C ≤ 110 ppb	111 < C < 210 ppb	> 210 ppb	1-HR	24-HR	1-HR	24-HR	AVERAGE
January	678	100.0	100.00%	0.00%	0.00%	0.00%	t	r	I	ı	2.7
February	628	6.66	100.00%	0.00%	%00.0	0.00%	I	ı	I	I	1.1
March	680	100.0	100.00%	0.00%	0.00%	0.00%	1	1	ı	ı	0.8
April	678	100.0	100.00%	0.00%	0.00%	0.00%	I	I	I	1	0.3
May	677	100.0	100.00%	0.00%	0.00%	0.00%	ı	ı	I	t	0.2
June	619	6.66	100.00%	0.00%	0.00%	0.00%	1	1	1	T	0.5
July	661	98.4	100.00%	%00.0	%00.0	0.00%	I	I	1	I	0.7
August	614	0.96	100.00%	0.00%	%00.0	0.00%	J	I	-	I	0.7
September	654	99.4	100.00%	0.00%	%00.0	0.00%	I	L	Ţ	1	0.5
October	682	100.0	100.00%	0.00%	%00'0	0.00%	I	I	1	I	0.6
November	679	100.0	100.00%	0.00%	%00.0	0.00%	I	I	-	I	1.4
December	681	100.0	100.00%	0.00%	%00.0	0.00%	I	ı	ţ	I	2.0
N/D - Valid Dé *Number of R	N/D - Valid Data Not Available *Number of Readings - include	N/D - Valid Data Not Available *Number of Readings - included calibration hours	hours						ANNUALAVERAGE	AVERAGE	1.0°

\*Number of Readings - included calibration hours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used. Alberta Amblent Ale Quality Objectives Amnual Average\*\* NJD PPB Amnual Average ton 2015 110 PPB

Maxian

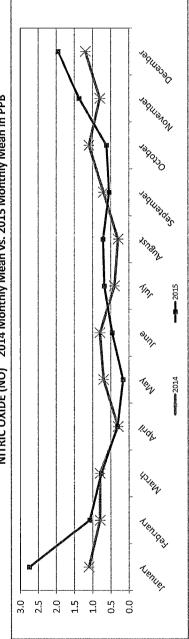
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00 $18.5$ $27$ $00$ $45.1$ $45.1$ $000$ $27.5$ $1.1$ $0.00$ $13.6$ $13.6$ $000$ $27.5$ $1.1$ $0.00$ $13.6$ $15.7$ $000$ $20.4$ $0.8$ $0.0$ $16.7$ $16.7$ $000$ $10.3$ $0.3$ $0.0$ $9.6$ $16.7$ $000$ $10.6$ $0.2$ $0.0$ $16.7$ $16.7$ $000$ $10.6$ $0.2$ $0.0$ $16.7$ $16.7$ $000$ $11.6$ $0.2$ $0.0$ $12.1$ $12.1$ $000$ $7.9$ $0.7$ $0.0$ $15.0$ $12.1$ $000$ $7.9$ $0.7$ $0.0$ $15.0$ $12.1$ $0.0$ $0.0$ $0.0$ $12.0$ $12.0$ $12.0$ $0.0$ $0.0$ $0.0$ $12.0$ $12.0$ $12.0$ $12.0$ $0.0$ $0.0$ $0.0$ $0.0$		MEAN	2014 MINIMUM	MAXIMUM	MEAN	2015 MINIMUM	MAXIMUM	Difference
00 $27.5$ $1.1$ $00$ $13.6$ $13.6$ $000$ $20.4$ $0.8$ $000$ $16.7$ $16.7$ $000$ $10.3$ $0.3$ $0.00$ $9.6$ $9.6$ $000$ $10.6$ $0.2$ $0.0$ $9.6$ $9.6$ $000$ $10.6$ $0.2$ $0.0$ $1.9$ $9.6$ $000$ $11.6$ $0.2$ $0.0$ $12.1$ $9.6$ $000$ $11.6$ $0.7$ $0.0$ $12.1$ $9.6$ $000$ $7.9$ $0.7$ $0.0$ $12.1$ $9.6$ $000$ $7.9$ $0.7$ $0.0$ $12.0$ $9.0$ $000$ $10.6$ $0.7$ $0.0$ $12.2$ $9.0$ $000$ $10.0$ $10.0$ $12.1$ $9.0$ $9.0$ $000$ $10.0$ $10.0$ $12.1$ $9.0$ $9.0$ $9.0$ $9.0$ $9.0$ $9.0$ $9.0$ $9.0$ <	1.1			18.5	27	0:0	431	-1.6
000         20.4         0.8         070         16.7         16.7           000         10.3         0.3         0.0         9.6         9.6           000         10.5         0.3         0.0         9.6         9.6           000         10.6         0.2         0.0         12.1         12.1           000         11.6         0.7         0.00         15.0         15.0           000         7.9         0.7         0.00         15.0         15.0           000         7.9         0.7         0.00         15.0         15.0           000         7.9         0.7         0.00         15.0         15.0           000         10.1         0.07         10.0         15.0         15.0           000         10.1         10.0         15.0         15.0         15.0           000         10.0         13.0         13.0         13.0         13.0           000         10.0         10.0         13.0         13.0         13.0           000         10.0         10.0         13.0         13.0         13.0	0.8			27.5	1.1	0:0	13.6	-0.3
00         103         03         04         9.6         9.6           000         10.6         0.2         0.0         4.9         4.9           000         22.3         0.5         0.0         12.1         12.1           000         11.6         0.7         0.0         15.0         16.0         16.0           000         7.9         0.7         0.0         20.3         16.0         15.0         16.0           000         7.9         0.7         0.0         16.0         15.0         16.0 <t< td=""><td>0.8</td><td></td><td>10 A</td><td>20.4</td><td>0.8</td><td>0:0</td><td>16.7</td><td>0.0</td></t<>	0.8		10 A	20.4	0.8	0:0	16.7	0.0
000         10.6         0.2         0.0         4.9         4.9           000+         22.3         0.5         0.0         12.1         1           000+         11.6         0.7         0.0         16.0         16.0           000         7.9         0.7         0.0         16.0         16.0           000         7.9         0.7         0.0         16.0         16.0           000         7.9         0.7         0.0         16.0         16.0           000         20.3         0.7         0.0         16.0         16.0           000         20.3         0.5         0.0         17.2         17.2           000         19.3         1.4         0.0         17.2         17.2           000         19.3         1.4         0.0         17.2         17.2           000         19.3         1.4         0.0         17.2         17.2           000         19.3         1.4         0.0         17.2         17.2           000         19.3         1.4         0.0         17.2         17.2	0.3		0.0	10.3	0.3	0.0	9.6	0.0
(00)         22.3         0.5         0.0         12.1           00         11.6         0.7         0.0         16.0           00         7.9         0.7         0.0         16.0           00         7.9         0.7         0.0         16.0           00         7.9         0.7         0.0         16.0           00         7.9         0.7         0.0         16.0           00         7.9         0.7         0.0         16.0           00         20.3         0.5         0.0         12.2           00         19.3         1.4         0.0         13.0           00         19.3         1.4         0.0         27.2           00         19.3         18.0         2.0         0.0         35.0	0.7		0.0	10.6	0.2	0:0	4.9	0.5
11.6         0.7         0.0         16.0         16.0           000         7.9         0.7         0.0         16.0         16.0           000         7.9         0.7         0.0         20.9         20.3           000         20.3         0.5         0.0         12.2         20.3           000         21.3         0.6         0.0         13.0         27.2           000         19.3         1.4         0.0         27.2         27.2           000         18.0         2.0         0.0         35.0         26.0         27.2	0.8	∞	-0.0 -0.0	22.3	0.5	0.0	12.1	0.3
(1)         (1) <th(1)< th=""> <th(1)< th=""> <th(1)< th=""></th(1)<></th(1)<></th(1)<>	O	0.4	0.0	11.6	0.7	0.0	16.0	-0.3
000         20.3         0.5         0.0         12.2           000         1.6622         0.6         0.0         13.0           000         19.3         1.4         0.0         27.2           000         18.0         2.0         0.0         36.0	0	0.3	E.A.	7.9	0.7	0.0	20.9	-0.4
00         1.682         0.6         0.0         13.0         13.0           000         19.3         1.4         0.0         27.2         27.2           000         18.0         2.0         0.0         36.0         36.0	0	0.7	0.0	20.3	0.5	0.0	12.2	0.2
0.00         19.3         1.4         0.0         27.2           0.1         18.0         2.0         0.0         36.0		1.1	010	s <u>8</u> 582	0.6	0:0	13.0	0.5
2.0 0.0 36.0 36.0	0	0.8	A 3 1 - 7 7 1 4	19.3	1.4	0.0	27.2	-0.6
	L. State	12	0.0	18.0	2.0	0.0	36.0	-0.8

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

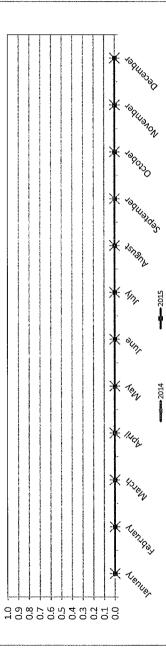
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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Maskwa Site - 2015 JOB # 2833-2015-30- A

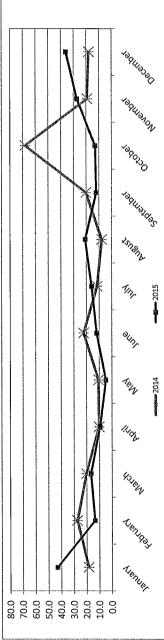


## NITRIC OXIDE (NO) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB









## NO\_ / WDR Joint Frequency Distribution (Percent)

### 01/01/15 thru 12/31/15

#### Distribution By % Of Samples

30	LICA30	NO	PPB
••	••	••	••
Logger Id	Site Name	Parameter	Units

Wind Parameter : WDR Instrument Height : 10 Meters

NNW Fred 4.21 100.00 00. 00. 4.21 00. 4.84 MN .00 .00 00. 4.84 7.56 7.56 WINIM 00. 00. 00. 5.75 5.75 00-00, 00, М 5.10 5.10 WSW 00. 00. 00. 5.13 13.47 12.11 ЫS 5.13 13.47 12.11 00. 00. 00. SSW 00. 00. 00. s 00. 00' 00-4.13 4.13 SSE 8. 00. 8. Direction 5.22 5.22 SE 00. 00-00. 4.56 ESE 4.56 00. 00. 00' 4.12 4.12 00-00, 00. ы 5.88 5.88 00 ' 00. ENE 00. 7.32 7.32 00. 뷛 00. 00. 5.96 5.96 Ë • 00 00. 00-00. 4.55 00. 4.55 00. z Totals 50.0 Lîmît < 110.0 < 210.0 >= 210.0

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Calm : .00 %

Total # Operational Hours : 8146

#### Distribution By Samples

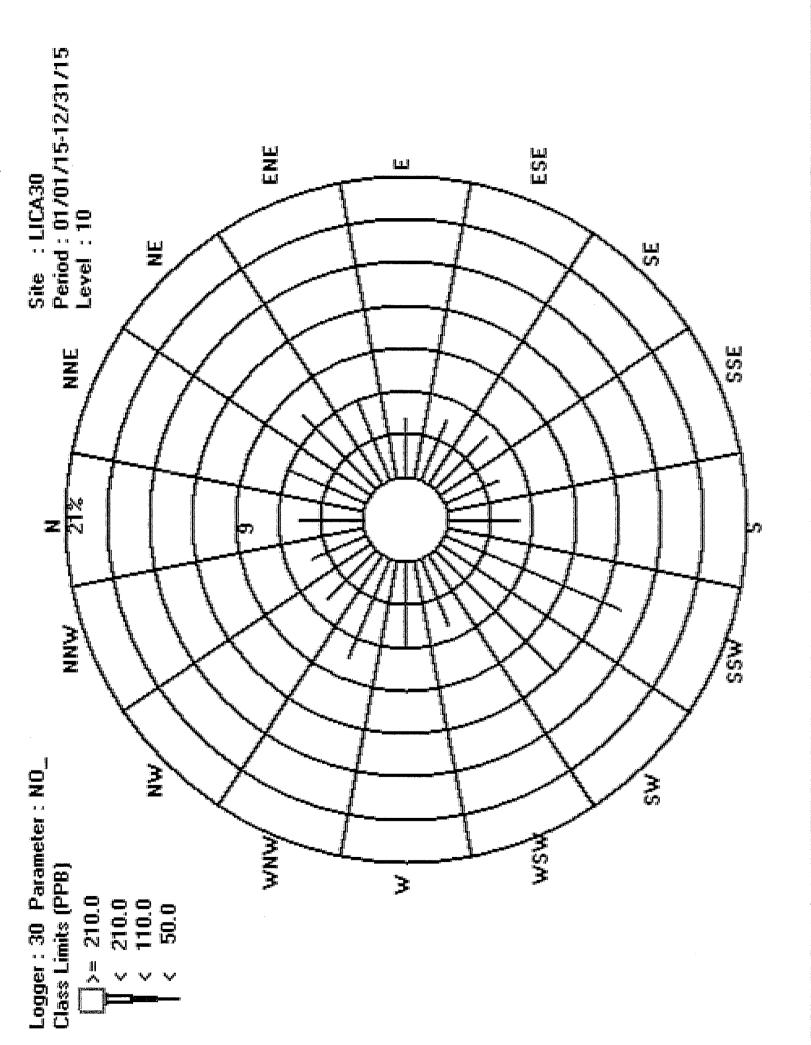
#### Direction

Freq 8146 MNN 343 MN 395 WINW 616 м 469 MSW 416 SW 987 SSW 1098 S 418 SSE 337 SE 426 ESE 372 м 336 ENE 479 뷛 597 ENE 486 z 371 Limit 50.0 0.011 > < 210.0 v

>= 210.0

Calm : .00 %

Total # Operational Hours : 8146



#### NITROGEN DIOXIDE



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Maskwa Site - 2015 JOB # 2833-2015-30- A

NITROGEN DIOXIDE (NO2) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	AND ALL .	Number of Operational		% Readings in Concentr	Concentration Range (PPB NO2)	N02)	OBLECT	OBJECTIVES**	EXCEEDENCES	IENCES	MONTHLY MORPACE
	Veduilites	. P	< 50 ppb	51 < C ≤ 110 ppb	11 < C < 210 ppb	qdd.0EZ<	1-HR	24-HR	1.HR	24-HR	AVENAGE
January	678	100.0	100.00%	0.00%	0.00%	0.00%	159	1	ο	ı	6.8
February	628	6.66	100.00%	0.00%	0.00%	0.00%	159	,	ο	1	3.9
March	680	100.0	100.00%	0.00%	0.00%	0.00%	159	1	0	1	2.8
April	678	100.0	100.00%	0.00%	%00.0	0.00%	159	1	0	I	1.7
May	677	100.0	100.00%	0.00%	0.00%	0.00%	159	1	0	1	1.6
June	679	6.66	100.00%	0.00%	%00.0	0.00%	159	1	0	1	2.3
July	661	98.4	100.00%	0.00%	%00.0	0.00%	159	1	0	I	2.5
August	614	96.0	100.00%	%00.0	0.00%	0.00%	159	-	0	1	2.2
September	654	99.4	100.00%	%00.0	0.00%	0.00%	159	1	0	E	2.4
October	682	100.0	100.00%	0.00%	0.00%	0.00%	159	•	0		3.2
November	679	100.0	100.00%	0.00%	0.00%	0.00%	159	I	0	I	4.2
December	681	100.0	100.00%	%00.0	%00'0	%00.0	159	t	0	1	5.4
N/D - Valid Da *Number of D	N/D - Valid Data Not Available *Number of Poordinge - include	N/D - Valid Data Not Available *Numbar of Beadings - Included calibration bours	hours						ANNUALAVERAGE	average	33

\*Number of Readings - included calibration hours
\*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

PPB	ррв
24	3.3
AlbertarAmbient Air Quality Objectives Annual Average**	Anhual Average for 2015

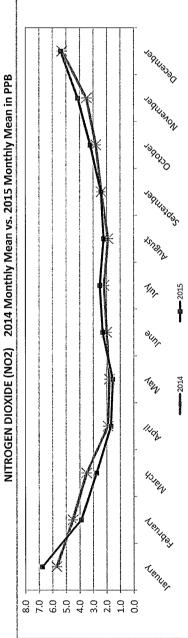
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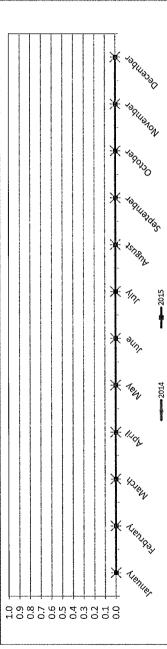
N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

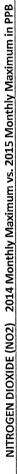
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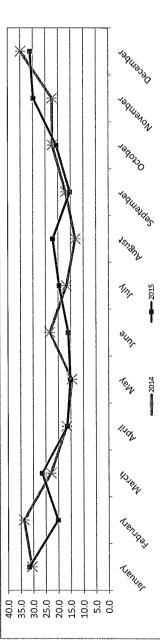












## LICA30 NO2\_ / WDR Joint Frequency Distribution (Percent)

### 01/01/15 thru 12/31/15

#### Distribution By % Of Samples

30	LICA30	NO2	PPB
••	••	••	••
Logger Id	Site Name	Parameter	Units

Wind Parameter : WDR Instrument Height : 10 Meters

	Freq	00.00	.00	.00	00-	
	MNN	4.21 100.00	00.	.00	00-	4.21
	MN	4.84	.00	00.	00.	4.84
	MNM	7.56	00.	00.	00.	7.56
	м	5.75	00.	00.	00.	5.75
	MSW	5.10	.00	.00	.00	5.10
	SW	12.11	00.	00.	00.	12.11
	MSS	13.47	00.	.00	.00	13.47
	S	5.13	.00	.00	.00	5.13
	SSE	4.13	.00	.00	.00	4.13
Direction	SE	5.22	00.	00.	.00	5.22
Dİ	ESE	4.56	.00	.00	.00	4.56
	ы	4.12	.00	00.	00.	4.12
	ENE	5.88	.00	00-	- 00	5.88
	B	7.32	.00	00 -	00'	7.32
	INNE	5.96	.00	00-	00.	5.96
	z	4.55	00.	00-	00.	4.55
	Limit	50.0	0.011	< · 210.0	210.0	Totals
		v	v	v	X	

Calm : .00 %

Total # Operational Hours : 8146

#### Distribution By Samples

#### Direction

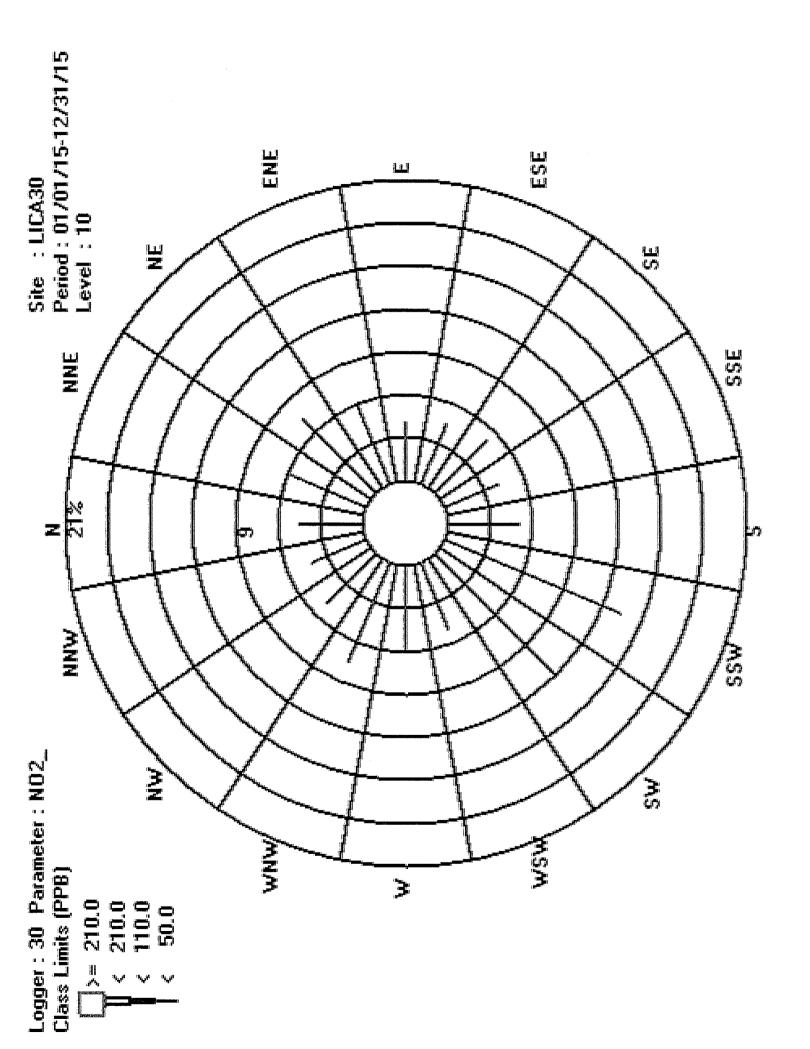
bəra	8146		
MNN	343		
NW	395		
MNM	616		
м	469		
WSW	416		
SW	587		
SSW	1098		
ß	418		
SSE	337		
SE	426		
ESE	372		
ы	336		
ENE	479		
NE	597		
INNE	486		
N	371		
Limit	50.0	0.011	210.0
	v	v	v

v

>= 210.0

Calm : .00 %

Total # Operational Hours : 8146



WIND SPEED

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WIND SPEED (WS) 2015 Monthly Data Summary of One Hour Readings

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Month	Number of Readings*	Operational Time (%)	Monthly Average Minimum Hourly (KPH) Average (KPH)	Minimum Hourly Average (KPH)	Maximum Hourly Average (KPH)	Maximum Daily Average (KPH)
January	744	100.0	5.4	0.1	18.4	18.4
February	672	100.0	5.5	0.0	12.7	12.7
March	744	100.0	5.7	0.2	22.4	22.4
April	720	100.0	6.2	0.1	17.3	17.3
May	744	100.0	5.6	0.2	19.2	19.2
June	719	6.99	4.5	0.3	13.9	13.9
ylul	732	98.4	4.6	0.2	14.9	14.9
August	744	100.0	4.0	0.1	13.0	6.5
September	717	9.66	4.6	0.1	15.5	10.0
October	744	100.0	5.0	0.1	15.6	9.5
November	720	100.0	5.2	0.1	13.2	10.1
December	744	100.0	4.0	0.0	9.3	6.5
N/D - Valid De	N/D - Valid Data Not Available					

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

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Maskwa Site - 2015 LAKELAND INDUSTRY & COMMUNITY ASSOCIATION JOB # 2833-2015-30- A

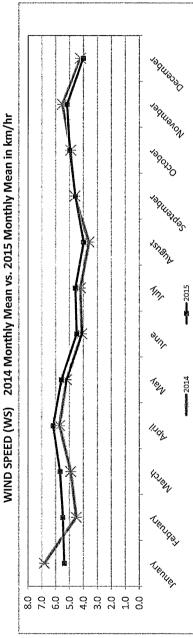
WIND SPEED (WS) 2014 One-Hour Readings vs. 2015 One-Hour Readings in km/hr

		2014			2015		
Month	MEAN	MUMINIM	MAXIMUM	MEAN	WININIW	MUMIXEM	Difference
January	6.8	÷ 0.2	, 23.3	5.4	0.1	18.4	1.4
February	4.5	0.1	15.4	5.5	0.0	12.7	-1.0
March	4.9	0.0	17.6	5.7	0.2	<u>52.4</u>	-0.8
April	5.7	0.1	16.9	6.2	0.1	17.3	-0.5
May	5.2	0.1	12.4	5.6	0.2	19.2	-0.4
June	4.1	0.1	12.0	4.5	£.0	13.9	-0.4
July	4.2	0.1	13.3	4.6	0.2	14.9	-0.4
August	3.6	0.0	10.0	4.0	0.1	13.0	-0.4
September	4.6	0.0	15.9	4.6	0.1	15.5	0.0
October	4.9	0.1	13.5	5.0	0.1	15.6	-0.1
November	5.5	0.2	16.2	5.2	0.1	13.2	0.3
December	4.2	0.1	9.8	4.0	0.0	5.9	0.2
N/D - Valid Da	N/D - Valid Data Not Availahle						

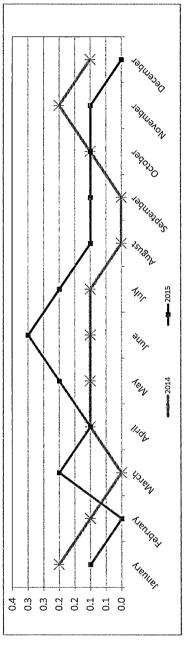
N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

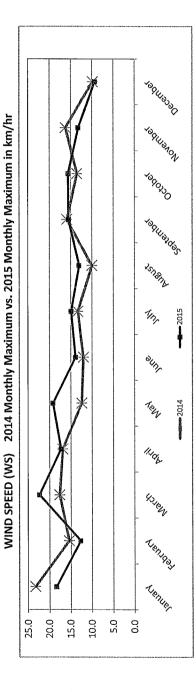
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WIND SPEED (WS) 2014 Monthly Minimum vs. 2015 Monthly Minimum in km/hr





#### **RELATIVE HUMIDITY**

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## RELATIVE HUMIDITY (RH) 2015 Monthly Data Summary of One Hour Readings

And the second			ことなるのであるとなっていたのでいたのでいたとうとうないでいたか			and the second second second second second second second second second second second second second second second
Month	Number of Readings*	Operational Time (%)	Monthily Average	Minimum Hourly Average (%)	Monthiy Average (%) Average Minimum Hourly Maximum Daily (%) Average (%)	Maximum Daily Average (%)
January	744	100.0	72.0	44.0	90.0	82.0
February	672	100.0	67.0	28.0	88.0	80.0
March	744	100.0	62.0	21.0	91.0	81.7
April	720	100.0	54.0	11.0	91.0	86.7
May	744	100.0	52.0	6.0	93.0	85.6
June	719	6.99	62.0	22.0	94.0	83.0
July	732	98.4	67.0	18.0	94.0	88.2
August	744	100.0	71.7	28.0	94.0	92.5
September	717	9.66	73.3	28.0	0.59	89.6
October	744	100.0	69.4	25.0	92.0	87.3
November	720	100.0	74.6	33.0	91.0	87.9
December	744	100.0	77.2	44.0	0.06	89.1
N/D - Valid Da	N/D - Valid Data Not Available					

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

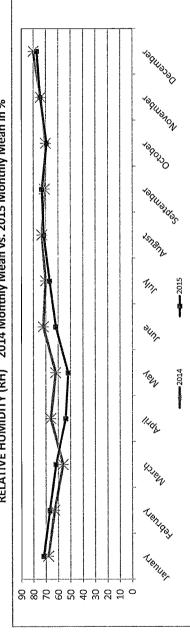
Max Xam

		2014			2015		
Month	MEAN	MUMINIM	MUMIXEM	MEAN	MUMINIM	MAXIMUM	Difference
January	68	38	89	72	44	06	-4
February	63	18	82	67	28	88	4
March	56	20	88	62	21	16	-6
April	66	14	16	54	11	16	12
May	62	20	63	52	9	86	10
June	72	27	-54	62	22	94.00	10
July	20	30	<b>†</b> 6	67	18	<i>1</i> 6	З
August	73	31	- 94	72	28	- 94	1
September	71	25	66	73	28	93	-2
October	70	22	92	69	25	92	1
November	74	35	16	75	33	16	-1
December	<u> </u>	59	06	$\overline{m}$	- 44	06	œ
N/D - Valid Da	N/D - Valid Data Not Available						

RELATIVE HUMIDITY (RH) 2014 One-Hour Readings vs. 2015 One-Hour Readings in %

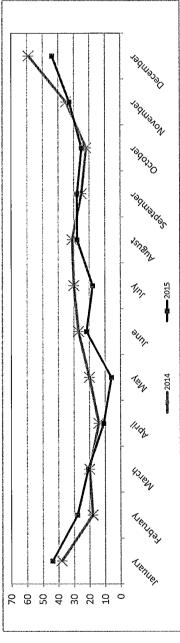
\*Annual peak is bolded and highlighted.

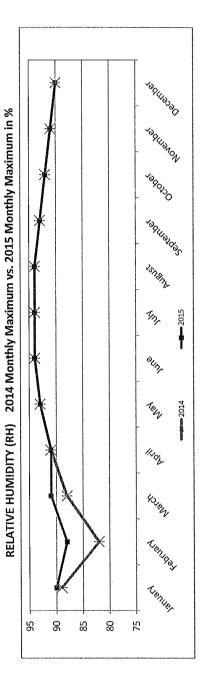




RELATIVE HUMIDITY (RH) 2014 Monthly Mean vs. 2015 Monthly Mean in %

RELATIVE HUMIDITY (RH) 2014 Monthly Minimum vs. 2015 Monthly Minimum in %





LICA30 WSP / WDR Joint Frequency Distribution (Percent)

01/01/15 thru 12/31/15

Distribution By % Of Samples

		Freq	66.66	30.88	2.39	.02	00-	00.		
		MNN	2.83	1.25	.04	00.	00.	.00	4.13	
		MN	2.67	2.05	60.	00.	00 -	00.	4.82	
		MNM	3.11	3.91	.59	.02	00.	00-	7.63	
Acters		м	4.62	1.22	.03	00-	00.	00-	5.87	
: WDR : 10 h		MSW	4.58	.50	00.	00-	00.	00.	5.08	
neter t Height		SW	9.93	2.08	00.	00.	00-	00-	12.01	
Wind Parameter : WDR Instrument Height : 10 Meters		SSW	8.32	5.07	.16	00-	00.	00 -	13.56	
Wir In:		ß	3.64	1.38	.06	00.	00.	00 -	5.10	
		SSE	2.72	1.34	00.	.00	.00	00 -	4.07	
	Direction	SE	3.70	1.46	.01	00,	00.	00-	5.18	
	μ	ESE	3.09	1.45	- 03	00.	00.	00-	4.58	
		म	2.82	1.26	.10	.00	.00	00-	4.19	
		ENE	4.49	1.42	.02	.00	00.	00.	5.94	
		NE	4.13	2.76	.41	.00	00.	00-	7.31	
Logger Id : 30 Site Name : LICA30 Parameter : WSP Units : KPH		INNE	3.01	2.13	.70	00.	00.	00-	5.86	
Logger Id : 30 Site Name : LIC Parameter : WSI Units : KPE		N	2.91	1.52	OI.	00.	00.	00-	4.54	
Logge Site   Param Units		Limít	6.0	12.0	20.0	29.0	39.0	39.0	Totals	
			v	v	v	۷	v	Ķ		

Calm : .03 %

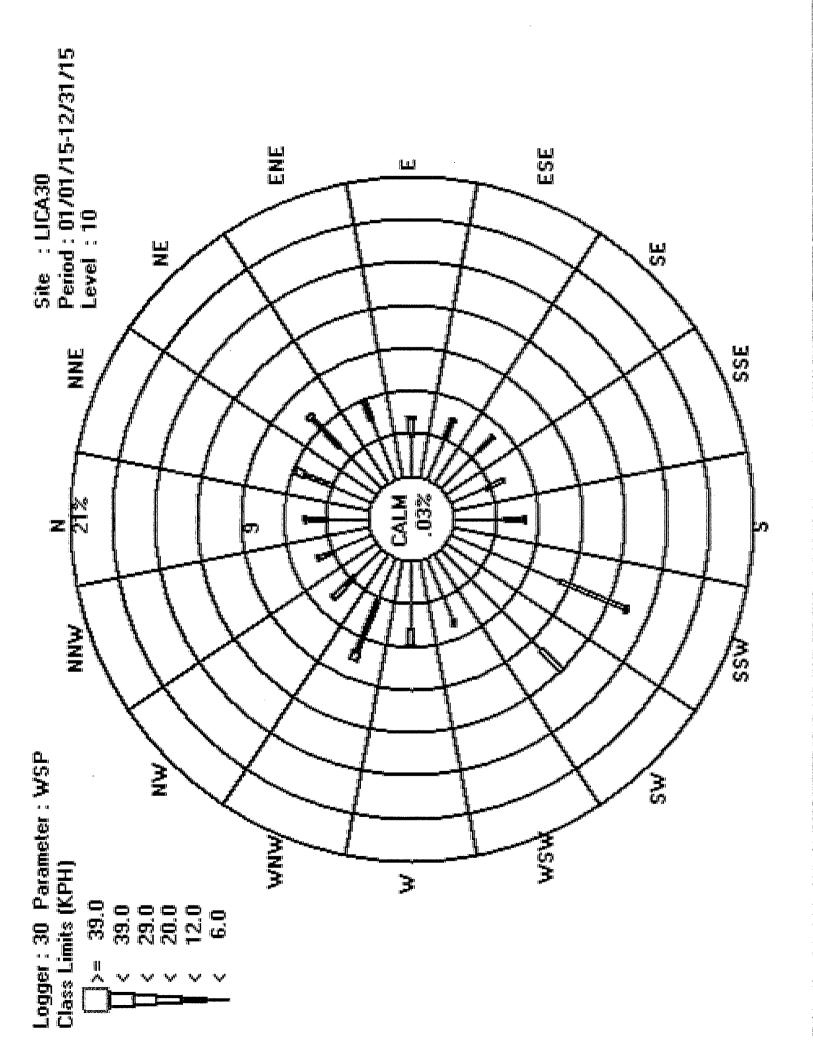
Total # Operational Hours : 8744

Distribution By Samples

		Freq	5829	2701	209	0				
		MNN	248	110	4				362	
		MN	234	180	80				422	
		MNW	272	342	52	0			668	
		м	404	107	ю				514	
		WSW	401	44					445	
		SW	869	182					1051	
		SSW	728	444	14				1186	
		S	319	121	ø				446	
ı		SSE	238	118					356	
I	Direction	SE	324	128	г				453	
	Di	ESE	271	127	m				401	
		ы	247	111	თ				367	
		ENE	393	125	0				520	
		NE	362	242	36				640	
		INNE	264	187	62				513	
		z	255	133	თ				397	
		Limît	6.0	12.0	20.0	29.0	39.0	39.0	Totals	
			v	v	v	v	v	X		

Calm : .03 %

Total # Operational Hours : 8744



#### **BAROMETRIC PRESSURE**

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BAROMETRIC PRESSURE (BP) 2015 Monthly Data Summary of One Hour Readings

Month	Number of Readings*	Operational Time (%)	Monthly Average (millib <del>a</del> r)	Minimum Hourly Average (millibar)	Maximum Hourly Average (millibar)	Maximum Daily Average (millibar)
January	744	100.0	943	920	971	365
February	672	100.0	945	926	965	958
March	744	100.0	940	916	956	952
April	720	100.0	639	918	950	947
May	744	100.0	946	932	959	957
June	719	6.66	942	931	951	948
July	732	98.4	626	931	949	947
August	744	100.0	941	925	950	948
September	717	9.66	639	926	949	948
October	744	100.0	940	915	957	35
November	720	100.0	637	613	953	950
December	744	100.0	934	816	955	952
N/D - Valid Da	N/D - Valid Data Not Available					

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Maskwa Site - 2015 JOB # 2833-2015-30- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

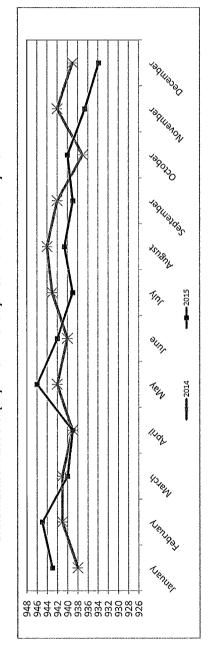
BAROMETRIC PRESSURE (BP) 2014 One-Hour Readings vs. 2015 One-Hour Readings in millibar

		2014			2015		
Month	. MEAN	Z	MAXIMUM	MEAN	MUMINIM	MAXIMUM	Difference
January	638	306	965	943	920	Ē26 -	-5
February	641	917	67	945	926	965	4
March	941	923	696	0†6	916	926	1
April	626	926	096	626	918	056	0
May	942	929	959	946	332	656	-4
June	940	930 930	646	942	931	951	-2
July	943	926	956	939	931	949	4
August	944	930	956	941	925	056	£
September	942	928	622	626	926	949	ß
October	937	924	953	940	915	957	ç.
November	942	918	965	937	913	953	5
December	626	917	696	934	918	955	5
	N /N V/-13-1 Date Nat Averalation						

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

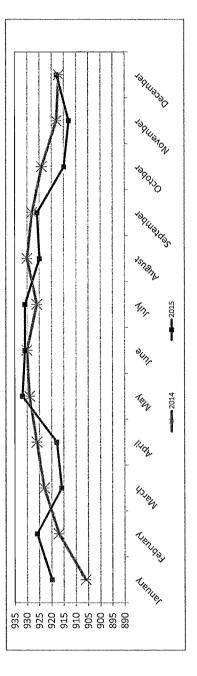
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Maskwa Site - 2015 JOB # 2833-2015-30-A

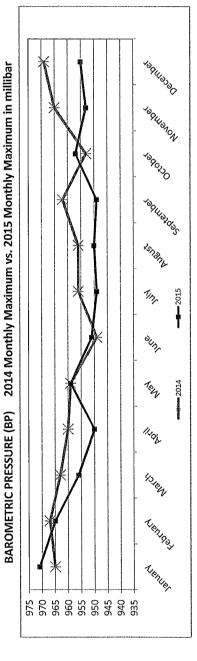




BAROMETRIC PRESSURE (BP) 2014 Monthly Mean vs. 2015 Monthly Mean in millibar

BAROMETRIC PRESSURE (BP) 2014 Monthly Minimum vs. 2015 Monthly Minimum in millibar





### AMBIENT TEMPERATURE

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Maskwa Site - 2015 LAKELAND INDUSTRY & COMMUNITY ASSOCIATION JOB # 2833-2015-30- A

AMBIENT TEMPERATURE (TPX) 2015 Monthly Data Summary of One Hour Readings

.throe	Number of Readings*	Operational Time (%)	Monthly Average (Deg C)	Monthly Average Minimum Hourly (Deg C) Average (Deg C)	Maximum Hourly Average (Deg C)	Maximum Daily Average (Deg C)
January	744	100.0	-11.5	-32.4	10.3	10.3
February	672	100.0	-14.5	-33.0	9.3	9.3
March	744	100.0	-1.5	-34.3	14.9	14.9
April	720	100.0	4.3	-16.4	23.9	23.9
May	744	100.0	10.0	-4.8	28.2	28.2
June	719	6.66	15.9	-0.1	32.5	32.5
July	732	98.4	18.0	4.9	31.1	31.1
August	744	100.0	16.1	-1.3	30.9	22.0
September	717	9.66	6.3	-3.6	25.7	17.4
October	744	100.0	5.6	-6.6	24.2	13.8
November	720	100.0	-3.5	-18.4	7.4	3.2
December	744	100.0	-10.1	-26.7	4.5	-1.6
N/D - Valid Da	N/D - Valid Data Not Available					

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

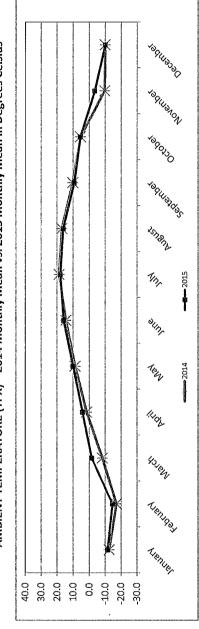
Maskwa Site - 2015 JOB # 2833-2015-30- A Maxamerican and the second and the s

		2014			2015		
Month	MEAN	MINIMUM	MAXIMUM	MEAN	MUMINIM	MAXIMUM	Difference
January	-13	-33	6	-12	-32	10	-1
February	-17	-34	4	-15	-33	6	-3
March	8-	-37	13	-2	-34	15	-7
April	2	-18	21	4	-16	54	-3
May	თ	ę	29	10	<u>5</u> -	58	1-
June	14	1	26	16	0	33	-2
July	ମ	е. 6 С. т. т.	30	18	5	31	1
August	17	1	305	16	T-	18	1
September	10	4-	28	6	-4	26	1
October	5	-5	19	9	-7	24	0
November	-10	-28	11	ç-	-18	7	-9
December	-10	-32	7	-10	-27	5	0

\*Annual peak is bolded and highlighted. N/D - Valid Data Not Available

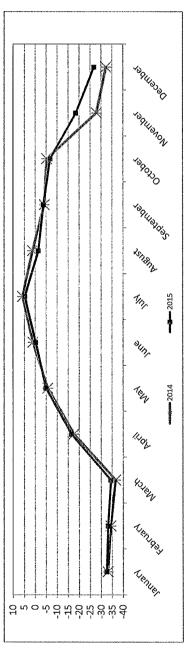
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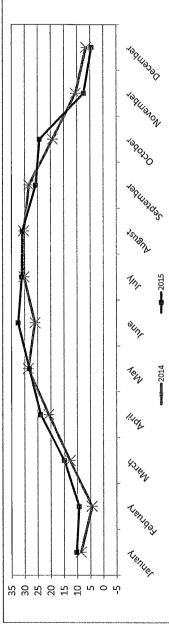


AMBIENT TEMPERATURE (TPX) 2014 Monthly Mean vs. 2015 Monthly Mean in Degrees Celsius

AMBIENT TEMPERATURE (TPX) 2014 Monthly Minimum vs. 2015 Monthly Minimum in Degrees Celsius



AMBIENT TEMPERATURE (TPX) 2014 Monthly Maximum vs. 2015 Monthly Maximum in Degrees Celsius



### PRECIPITATION

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Maskwa Site - 2015 JOB # 2833-2015-30- A

### PRECIPITATION 2015 Monthly Data Summary of One Hour Readings

Month	Number of Readings*	Operational Time (%)	Monthy Average Monthy Total (MM)	Monthly Total (MM)	Maximum Hourly Average (MM)	Maximum Daily Average (MM)
January	744	100.0	0.0	0.0	1.6	1.6
February	672	100.0	0.0	0.0	1.0	1.0
March	742	2.66	0.0	0.0	0.6	0.6
April	720	100.0	0.0	0.0	4.6	4.6
May	744	100.0	0.0	0.0	3.3	3.3
June	719	6.99	0.1	0.0	7.4	7.4
July	732	98.4	0.1	0.0	5.4	5.4
August	744	100.0	0.1	61.7	7.6	0.7
September	716	99.4	0.1	65.5	6.9	1.6
October	744	100.0	0.0	17.0	2.1	0.3
November	720	100.0	0.0	11.4	2.1	0.4
December	744	100.0	0.0	8.1	0.8	0.1
N/D - Valid Da	N/D - Valid Data Not Available					

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

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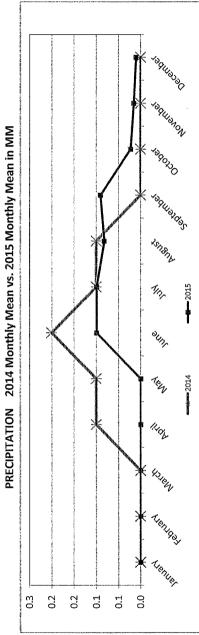
Maskwa Site - 2015 JOB # 2833-2015-30- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

		2014			2015		
Month	MEAN	MUMINIM	MAXIMUM	MEAN	WINIMIN	MAXIMUM	Difference
January	0.0	0.0	2.0	0.0	0.0	1.6	0.0
February	0.0	0.0	2.0	0.0	0.0	1.0	0.0
March	0.0	0.0	0.2	0.0	0:0	0.6	0.0
April	0.1	6.0	1.9	0.0	0.0	4.6	0.1
May	0.1	0:0	6.2	0.0	0.0	3.3	0.1
June	02	0:0	7.1	01	0.0	7.4	0.1
July	0.1	10:0	612	z rozisti z zacionali	0.0	5.4	0.0
August	0.1	0.0	8.4	0.1	0.0		0.0
September	0.0	0:0	6.8	0.1	0:0	6.9	-0.1
October	0.0	0:0	1.2	0.0	0.0	2.1	0.0
November	0.0	0.0	1.5	0.0	0.0	2.1	0.0
December	0.0	0:0	2.9	0.0	0.0	0.8	0.0
N/D - Valid Da	N/D - Valid Data Not Available						

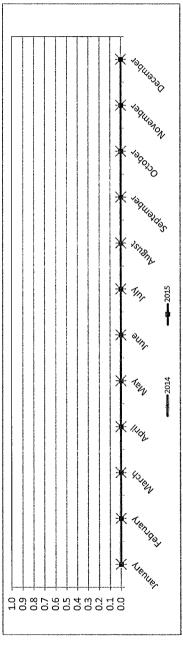
PRECIPITATION 2014 One-Hour Readings vs. 2015 One-Hour Readings in MM

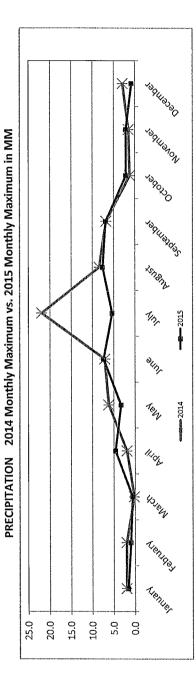
N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.





PRECIPITATION 2014 Monthly Minimum vs. 2015 Monthly Minimum in MM





APPENDIX II REPORT CERTIFICATION FORM

Maxxam

### **Report Certification Form**

Alberta Airshed (if applicable)	EPA Approval or Code of Practice Registration # (if applicable).
Yes	
Company Name (if applicable)	Industrial Operation Name (if applicable)
Lakeland Industry and Community Arrociot	in Markura site
Name of the Representative of the Person Responsible (Last, First, Middle)	Position / Title of the Representative of the Person Responsible
Adekannbi, Wunmi	Project Manager Assistant
Is an External Party Certifying the Report? (If 'Yes', fill in the fields below for the external person.	0 0
Yes X No	
Name of External Person Certifying the Report (Last, First, Middle)	Position / Title of External Person Certifying the Report
	-
Company Name for the External Person Certifying the Report	Identification of Qualifications / Professional Designations of the External Person Certifying the Report

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

ussenta

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

**18 - Jan - 16** Report Issued Date (dd-mm-yyyy)





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

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

### AMBIENT AIR MONITORING ANNUAL REPORT

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION ST. LINA SITE

JOB #:2833-2015-31- A

JANUARY - DECEMBER 2015

Prepared for:

### LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

BOX 8237, 5107W - 50 STREET BONNYVILLE, ALBERTA T9N 2J5

**Attention: MIKE BISAGA** 

DATE: February 3, 2016

Prepared by:

Ernestine Tangang, B.Sc., M.Sc. Team Leader, Customer Service

Reviewed by:

eWh

Lily Lin, B.Sc.
 Senior Project Manager, Air Services

Success Through Science®



### SUMMARY

The Maxxam Analytics Air Services Group conducted an Ambient Air monitoring program between January 2015 and December 2015 on the St. Lina Site at Lakeland Industry & Community Association, near Bonnyville, Alberta. Sampling was carried out to determine the concentrations of non-compliance parameters as requested by the Project Coordinator.

A total of five 24-hr contraventions for PM2.5 were recorded in 2015. One 24-hr contravention was recorded in May: concentration of 42 ug/m3 on May 23. AE Reference number: 298624. Four 24-hr contraventions were recorded in July: concentrations of 34 ug/m3 on July 1, 55 ug/m3 on July 4, 114 ug/m3 on July 10 and 81 ug/m3 on July 11. AE Reference numbers: 300252, 300394, 300694 and 300800 respectively.

All monitoring analyzers and meteorological systems met the 90% operational uptime requirements during the monitoring period except PM 2.5 which was 78.6% in January; AE Reference Number: 296041, 82.6% in February; AE Reference Number: 296041 and 81.7% in August; AE Reference Number: 303701.

Data presented in this report has undergone the Post-Final Validation Procedures, which include a cursory inspection of annual charts. If errors or omissions in the data are suspected or discovered after the initial submittal of data (monthly report), the post-validation step serves to re-evaluate the affected data. The report certification form is also included in this report to verify that the annual validation review has been completed, as per the Reporting Chapter (Chapter 9) of the Air Monitoring Directive (AMD).

The summary of basic statistics includes monthly mean, maximum, and minimum values as well as comparisons to the historical mean, maximum and minimum values from the previous calendar year are presented on the following pages.

Any deviations or modifications made to the sampling or analytical methods during the monitoring period are outlined in Section 1.0 Discussion. On this basis, Maxxam is issuing this completed report to Lakeland Industry & Community Association, St. Lina Site.

Should you have any questions concerning the results or if we can be of further assistance, please contact us at 403-219-3689 or toll-free at 1-800-386-7247.



### **TABLE OF CONTENTS**

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1.0 Discussion	3
2.0 Project Personnel	11
3.0 Plant Monthly Required AMD Summary	11
4.0 Calculations and Results	11
5.0 Methods and Procedures	12

Appendix I	<b>Continuous Monitoring Data Results</b>
	Sulphur Dioxide
	Hydrogen Sulphide
	Total Hydrocarbon
	Oxides of Nitrogen
	Nitric Oxides
	Nitrogen Dioxide
	Ozone
	Particulate Matter 2.5
	Wind Speed
	Relative Humidity
	Barometric Pressure
	Ambient Temperature
	Precipitation
Appendix II	Report Certification Form



### **1.0 Discussion**

This annual validation report consists of data for parameters Sulphur Dioxide (SO2), Hydrogen Sulphide (H2S), Total Hydrocarbon (THC), Oxides of Nitrogen (NOx), Nitric Oxides (NO), Nitrogen Dioxide (NO2), Ozone (O3), Particulate Matter 2.5 (PM2.5), Wind Speed (WS), Relative Humidity, Barometric Pressure, Precipitation and Ambient Temperature.

The air monitoring trailer was located at Latitude 54°13'00.0"N, and Longitude 111°30'08.3"W during the monitoring period.

The monitoring methods and equipment met all AMD requirements.

All monitoring analyzers and meteorological systems met the 90% operational uptime requirements during the monitoring period except PM 2.5 which was 78.6% in January; AE Reference Number: 296041, 82.6% in February; AE Reference Number: 303701.

All data collected during the monitoring period, with the exception of PM2.5 for May and July, were within the objectives outlined in the Alberta Ambient Air Quality Objectives and Guidelines Summary (AAAQOs). A total of five 24-hr contraventions for were recorded for PM2.5 in 2015. One 24-hr contravention was recorded in May: concentration of 42 ug/m3 on May 23. Four 24-hr contraventions were recorded in July: concentrations of 34 ug/m3 on July 1, 55 ug/m3 on July 4, 114 ug/m3 on July 10 and 81 ug/m3 on July 11.

An annual ambient air monitoring station audit was performed by a Maxxam field specialist on November 18.



The summaries of the monthly maintenance report for the monitoring period are presented below:

### SULPHUR DIOXIDE (SO2)

1	The such as a successful table of the successful the start of the successful table of the successful table of the successful table of the successful table of the successful table of the successful table of the successful table of the successful table of the successful table of the successful table of the successful table of the successful table of the successful table of the successful table of t
January	The analyzer spanned high on January 14 due to a UV filter failure. On January 14 the UV filter
	was changed, the sample filter was replaced, an analog output calibration was performed, and
	the pump was rebuilt. Twenty hours of data were invalidated due to this event.
February	No issue was identified.
March	Data collected on March 16 at hour 11 was invalidated due to a small power outage.
April	Hourly maximum data collected on April 26 at hour 4 was invalidated as the analyzer was
	recovering from a small power outage.
May	The analyzer started spanning low on May 15 due to a depleted perm tube. The perm tube was
	changed on May 22 following an as found points check. No data was discarded due to this
	event. Hourly maximum data collected on May 6 at hour 11 was invalidated as the analyzer was
-	recovering from a small power outage.
June	Hourly maximum data collected on June 1 at hour 10 and on June 20 at hour 12 were
	invalidated as the analyzer was recovering from power outages.
July	SIx hours of data are missing on July 5 from hour 13 to hour 14 and July 14 from hour 14 to
	hour 17 due to power failures. Hourly maximum data collected on July 11 at hour 0 and July 16
	at hour 5 were invalidated as the analyzer was recovering from short power outages.
August	Hourly maximum data collected on August 3 at hour 22 and August 31 at hour 12 were
	invalidated as the analyzer was recovering from small power outages.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to
	a power outage.
October	No issue was identified.
November	No issue was identified.
December	No issue was identified.

### HYDROGEN SULPHIDE (H2S)

January	Some daily span results went below the +/- 10% acceptance limit because the expected span
	value was set too low after the monthly calibration in December 2014. This issue did not affect
	data quality.
February	No issue was identified.
March	Data collected on March 16 at hour 11 was invalidated due to a small power outage.
April	Hourly maximum data collected on April 26 at hour 4 was invalidated as the analyzer was
	recovering from a small power outage.
May	A removal calibration was performed on the Maxxam-supplied API 101E, S/N: 722, analyzer on
	May 13 and the LICA-owned, API 101E, S/N: 509, was installed. Twenty hours of data are invalid
	while the analyzer was stabilizing prior to installation calibration. Hourly maximum data
	collected on May 6 at hour 11 was invalidated as the analyzer was recovering from a small
	power outage.
June	Hourly maximum data collected on June 1 at hour 10 and on June 20 at hour 12 were
	invalidated as the analyzer was recovering from power outages.



July	Six hours of data are missing on July 5 from hour 13 to hour 14 and July 14 from hour 14 to hour
	17 due to power failures. Hourly maximum data collected on July 11 at hour 0 and July 16 at
	hour 5 were invalidated as the analyzer was recovering from short power outages.
August	Hourly maximum data collected on August 3 at hour 22 and August 31 at hour 12 were
	invalidated as the analyzer was recovering from small power outages.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to
	a power outage.
October	Hourly data started to record higher than historical on October 17. As a precaution, a full
	calibration was performed on October 23. The result was good. There was a zero drift after the
	calibration on October 23. The drift was within acceptance limits. Maintenance was performed
	on October 28 following an as found points check. As the zero drift continued, the analyzer was
	attempted to be replaced on October 29. However, the replacement analyzer did not respond
	properly. The original API 101E, S/N: 509, analyzer was therefore reinstalled on October 30,
	following a pump replacement. Twenty-one hours of data are invalid during this service.
November	The LICA-owned API 101E, S/N: 509, analyzer was replaced with the Maxxam-supplied API
	100A, S/N: 375, analyzer on November 4 to fix the zero drift issue. 19 hours of data are invalid
	due to this maintenance event. Hourly maximum data collected on November 19 at hour 4 was
	invalidated due to a spike.
December	The LICA-owned API 101E, S/N: 509, analyzer was installed back on site on December 10
	following maintenance at the Maxxam shop. The analyzer spanned low on December 24. An as
	found points check was performed on December 30 to ensure the analyzer's functionality, and
	the result was good. No data was discarded due to this issue.

### TOTAL HYDROCARBONS (THC)

January	The channel was put into maintenance mode on January 16 for the hydrogen cylinder change
	out.
February	No issue was identified.
March	The span gas and the hydrogen gas were replaced on March 6 and March 16 respectively. Data
	collected on March 16 at hour 11 was invalidated due to a small power outage.
April	Twenty three hours of data collected between April 21 at hour 11 and April 22 at hour 9 were
	discarded due to the analyzer flaming out. Data collected on April 26 at hour 4 to hour 5 and
	hourly maximum data collected at hour 4 to hour 6 were invalidated as the analyzer was
	recovering from a small power outage.
May	Data collected on May 6 at hour 11 were invalidated as the analyzer was recovering from a
	small power outage.
June	The analyzer spanned low on June 5. Following a removal calibration on June 6, the Thermo
	51C S/N: 436609739 was replaced with Thermo 51C S/N: 51CLT-77021-384. Both analyzers are
	LICA-owned. Eighteen hours of data are invalid during the time the analyzer was stabilizing
	prior to installation calibration. Hourly maximum data collected on June 1 at hour 10 and on
	June 20 at hour 12 were invalidated as the analyzer was recovering from power outages.
July	Six hours of data are missing on July 5 from hour 13 to hour 14 and July 14 from hour 14 to hour
	17 due to power failures. Hourly maximum data collected on July 11 at hour 0 and July 16 at
	hour 5 were invalidated as the analyzer was recovering from short power outages.



August	Hourly maximum data collected on August 3 at hour 22 and August 31 at hour 12 were
	invalidated as the analyzer was recovering from small power outages.
September	The gas cylinders were replaced on September 3, September 8 and September 21. Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to a power
October	No issue was identified.
November	No issue was identified.
December	No issue was identified.

### NITROGEN DIOXIDE (NO2)

January	The API 200E S/N: 592 analyzer was replaced with the API 200E S/N: 594 analyzer on January
	14. Two hours of data are invalid during the replacement.
February	No issue was identified
March	Data collected on March 16 at hour 11 was invalidated due to a small power outage.
April	The analyzer was put into maintenance mode on April 14 while reference points were being
	generated for ozone calibration. Hourly maximum data collected on April 26 at hour 4 was
	invalidated as the analyzer was recovering from a small power outage.
May	The analyzer was put into maintenance mode on May 12 while reference points were being
	generated for ozone calibration. Hourly maximum data collected on May 6 at hour 11 was
	invalidated as the analyzer was recovering from a small power outage.
June	Hourly maximum data collected on June 1 at hour 10 and on June 20 at hour 12 were
	invalidated as the analyzer was recovering from power outages.
July	Six hours of data are missing on July 5 from hour 13 to hour 14 and July 14 from hour 14 to hour
	17 due to power failures. Hourly maximum data collected on July 11 at hour 0 and July 16 at
	hour 5 were invalidated as the analyzer was recovering from short power outages.
August	Hourly maximum data collected on August 3 at hour 22 and August 31 at hour 12 were
	invalidated as the analyzer was recovering from small power outages.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to
	a power outage.
October	No issue was identified.
November	No issue was identified.
December	No issue was identified.

### OZONE (O3)

January	No issue was identified.
February	No issue was identified.
March	Data collected on March 16 at hour 11 was invalidated due to a small power outage.
April	The analyzer was put into Maintenance mode on April 13 at hour 14 during SO2 calibration, as both analyzers are on the same relay. Hourly maximum data collected on April 26 at hour 4 was invalidated as the analyzer was recovering from a small power outage.
May	Hourly maximum data collected on May 6 at hour 11 was invalidated as the analyzer was recovering from a small power outage.
June	Hourly maximum data collected on June 1 at hour 10 and on June 20 at hour 12 were invalidated as the analyzer was recovering from power outages.



July	Six hours of data are missing on July 5 from hour 13 to hour 14 and July 14 from hour 14 to hour
	17 due to power failures. Hourly maximum data collected on July 11 at hour 0 and July 16 at
	hour 5 were invalidated as the analyzer was recovering from short power outages.
August	Hourly maximum data collected on August 3 at hour 22 and August 31 at hour 12 were
	invalidated as the analyzer was recovering from small power outages.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to
	a power outage.
October	No issue was identified.
November	Thirteen hours of data are invalid during the time the analyzer was stabilizing after the sample pump was rebuilt on November 3. The analyzer started drifting high on November 7, as the pump for the zero/span system required maintenence. The pump was rebuilt following an as found points check on November 9. As the analyzer passed the as found points check, no data was discarded due to this event.
December	No issue was identified.

### PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5)

January	The Teom unit failed a leak check on February 5. Data was invalidated back to the January 25
	audit. One hundred and fifty four hours of data were discarded in January due to this event.
	Five hours of data were invalidated in January as the data were below –3 ug/m3. One hour of
	data collected on January 26 at hour 14 was invalidated due to a spike: Reason unknown.
February	Data was invalidated back to the January 25 audit due to the leak check failure that occured on
	February 5. One hundred and ten hours of data were discarded in February due to this event.
	Seven hours of data were invalidated in February as the data were below –3 ug/m3.
March	Five hours of data were invalidated in March as the data were below -3 ug/m3. Data collected
	on March 16 at hour 11 was invalidated due to a small power outage.
April	Data collected on April 26 at hour 4 was invalidated as the unit was recovering from a small
	power outage. Four hours of data were invalidated in April as the data were below -3 ug/m3.
May	Seventeen hours of data were discarded on May 31 due to the Teom unit malfunctioning.
	Maintenance was performed on June 1 and the issue was fixed. Nine hours of data were
	invalidated in May as the data were below –3 ug/m3.
June	Twelve hours of data collected on June 1 from hour 0 to hour 11 were discarded due to the
	malfunction that occurred on May 31. One hour of data was invalidated in June as the data was
	below –3 ug/m3.
July	The Teom unit malfunctioned on July 17. Troubleshooting was performed by restarting the
	Teom unit prior to audit on on July 17. Thirteen hours of data were discarded due to this issue.
	Six hours of data are missing on July 5 from hour 13 to hour 14 and July 14 from hour 14 to hour
	17 due to power failures. No hourly data was invalidated in July as all hourly data were above -
	3ug/m3.
August	The switching valve started functioning incorrectly following a power outage on August 3. A
	Teom check was performed on August 4. The valve was replaced on August 6. Seventy four
	hours of data were invalid due to this event. The unit started recording many nagative readings
	towards the middle of the month. The switching valve was replaced again on August 24. Sixty
	two hours of data were invalidated in August as the data were below $-3$ ug/m3.



September	Thirty six hours of data were invalidated in September as the data were below –3 ug/m3. Two hours of data collected on September 8 from hour 20 to hour 21 were invalidated due to a power outage.
October	Twenty-one hours of data were invalidated in October as the data were below $-3$ ug/m3.
November	Three hours of data were invalidated in November as the data were below $-3$ ug/m3.
December	One hour of data was invalidated in December as the data were below –3 ug/m3.

### WIND SPEED (WS)

January	No issue was identified.
February	No issue was identified.
March	The wind system was put into Maintenance mode on March 12 for three hours in order to
	check the setting on the wind system. Data collected on March 16 at hour 11 was invalidated
	due to a small power outage. Hourly maximum data collected on March 31 at hour 23 was
	invalidated due to a spike: reason unknown.
April	Hourly maximum data collected on April 26 at hour 4 was invalidated as the analyzer was
	recovering from a small power outage.
May	Hourly maximum data collected on May 6 at hour 11 was invalidated as the analyzer was
	recovering from a small power outage.
June	Hourly maximum data collected on June 1 hour 10 and on June 20 hour 12 were invalidated as
	the analyzer was recovering from power outages.
July	Six hours of data are missing on July 5 from hour 13 to hour 14 and July 14 from hour 14 to hour
	17 due to power failures. Hourly maximum data collected on July 11 at hour 0 and July 16 at
	hour 5 were invalidated as the analyzer was recovering from short power outages.
August	Hourly maximum data collected on August 3 at hour 22 and August 31 at hour 12 were
	invalidated as the analyzer was recovering from small power outages.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to
	a power outage.
October	No issue was identified.
November	The wind system failed on November 1 from hour 2 to hour 7 and on November 3 from hour 5
	to hour 16, due to extreme weather conditions that caused the system to freeze. The heater on
	the wind system was checked on November 4 to ensure its functionality. Nineteen hours of
	data were discarded due to this event.
December	No issue was identified.

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

January	No issue was identified.
February	No issue was identified.
March	Data collected on March 16 at hour 11 was invalidated due to a small power outage.
April	No issue was identified.
May	No issue was identified.
June	No issue was identified.
July	Six hours of data are missing on July 5 from hour 13 to hour 14 and July 14 from hour 14 to hour
	17 due to power failures.



August	No issue was identified.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to
	a power outage.
October	No issue was identified.
November	No issue was identified.
December	No issue was identified.

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

January	No issue was identified.
February	No issue was identified.
March	Data collected on March 16 at hour 11 was invalidated due to a small power outage.
April	No issue was identified.
May	No issue was identified.
June	Data collected on June 13 at hour 4 was invalidated due to the malfunctioning of the pressure sensor at that hour.
July	Six hours of data are missing on July 5 from hour 13 to hour 14 and July 14 from hour 14 to hour 17 due to power failures.
August	No issue was identified.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to a power outage.
October	No issue was identified.
November	No issue was identified.
December	No issue was identified.

### PRECIPITATION

January	No issue was identified.
February	No issue was identified.
March	Data collected on March 16 at hour 11 was invalidated due to a small power outage.
April	No issue was identified. A rain guage screen was installed on April 10.
May	Three hours of data collected on May 24 at hour 12 and on May 27 at hour 13 and hour 14
	were invalidated due to spikes: reason unknown. The system was verified on May 25 and no issues were identified.
June	Data collected on June 7 at hour 13 was invalidated due to a spike. A precipitation sensor check was completed on June 10 in order to investigate any potential issues that caused the spike that was recorded on June 7. No obvious issues were found.
July	Six hours of data are missing on July 5 from hour 13 to hour 14 and July 14 from hour 14 to hour 17 due to power failures.
August	No issue was identified.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to a power outage.
October	No issue was identified.
November	No issue was identified.
December	Both the rain gauge system and heating system were checked on December 11.



### AMBIENT TEMPERATURE (TPX)

No issue was identified this year.

January	No issue was identified.
February	No issue was identified.
March	Data collected on March 16 at hour 11 was invalidated due to a small power outage.
April	No issue was identified.
May	No issue was identified.
June	No issue was identified.
July	Six hours of data are missing on July 5 from hour 13 to hour 14 and July 14 from hour 14 to hour
	17 due to power failures.
August	No issue was identified.
September	Two hours of data collected on September 16 from hour 20 to hour 21 were invalidated due to
	a power outage.
October	No issue was identified.
November	No issue was identified.
December	No issue was identified.



### 2.0 Project Personnel

Mike Bisaga was the contact for Lakeland Industry & Community Association, and the Maxxam field sampling team consisted of Alexander Yakupov, Limin Li, Raja Ashraf, and Christopher Wesson.

### 3.0 Plant Monthly Required AMD Summary

All data collected this month were within the objectives outlined in the AMD1989 and AMD2006, except PM2.5.

A total of five 24-hr contraventions for PM2.5 were recorded in 2015. One 24-hr contravention was recorded in May: concentration of 42 ug/m3 on May 23. AE Reference number: 298624. Four 24-hr contraventions were recorded in July: concentrations of 34 ug/m3 on July 1, 55 ug/m3 on July 4, 114 ug/m3 on July 10 and 81 ug/m3 on July 11. AE Reference numbers: 300252, 300394, 300694 and 300800 respectively.

The operational uptime for all analyzers and meteorological system were above the 90% requirement except PM 2.5 which was 78.6% in January; AE Reference Number: 296041, 82.6% in February; AE Reference Number: 296041 and 81.7% in August; AE Reference Number: 303701.

### 4.0 Calculations and Results

All calculations and reporting of results follow the method described in the Air Monitoring Directive, 1989, 2006 Amendments to the Air Monitoring Directive, 1989 (AMD 2006) as well as AMD 2015.



### 5.0 Methods and Procedures

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

Maxxam AIR SOP-00208: RM Young Monitor Calibration Maxxam AIR SOP-00209: Ambient H2S Monitoring Maxxam AIR SOP-00211: Ambient SO2 Monitoring Maxxam AIR SOP-00212: Ambient O3 Monitoring Maxxam AIR SOP-00213: Ambient NO/NO2/NOx Monitoring Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring Maxxam AIR SOP-00215: Teom Operation Maxxam AIR SOP-00242: Precipitation Collector Installation /Maintenance

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

Sulphur Dioxide - API 100E UV Flourescent Analyzer Hydrogen Sulphide - API 100A UV Flourescent Analyzer Total Hydrocarbons - Thermo 51C FID Analyzer Oxides of Nitrogen - API 200E Chemiluminescent Analyzer Ozone - Thermo 49i Photometric Analyzer Particulate Matter (PM2.5) - R&P 1405F Teom Unit Wind System - Met One Unit Relative Humidity - Met One Unit Barometric Pressure - Met One Unit Ambient Temperature - Met One Unit Precipitation - Met One Unit Datalogger - ESC 8832

### APPENDIX I CONTINUOUS MONITORING DATA RESULTS

### SULPHUR DIOXIDE

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION St. Lina Site - 2015 JOB # 2833-2015-31- A

## SULPHUR DIOXIDE (SO2) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	1.200	Operational Trin (60)		%.Re	%:Readings in Concentration Range (PPB 502)-	ration Range (PPB	502)		OBJECTIVES**	IVES**	EXCEEDENCES	IENCES	MONTHLY AVERAGE
	ê	readings IIIIIe ( 20)	< 20 ppb	20 <c<60.ppb< th=""><th>- 60 &lt; C &lt; 110.ppb; -</th><th>110<c<170 ppb<="" th=""><th>T70 &lt; C ≤ 340 ppb</th><th>&gt; 340 ppb.</th><th>1-HR</th><th>24-HR</th><th>1-HR</th><th>24-HR</th><th>(PPB)</th></c<170></th></c<60.ppb<>	- 60 < C < 110.ppb; -	110 <c<170 ppb<="" th=""><th>T70 &lt; C ≤ 340 ppb</th><th>&gt; 340 ppb.</th><th>1-HR</th><th>24-HR</th><th>1-HR</th><th>24-HR</th><th>(PPB)</th></c<170>	T70 < C ≤ 340 ppb	> 340 ppb.	1-HR	24-HR	1-HR	24-HR	(PPB)
January	687	97.3	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.3
February	632	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.1
March	706	6.66	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.2
April	683	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.0
Мау	698	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.0
June	683	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.0
ylut	669	99.2	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.0
August	707	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.1
September	680	99.4	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.0
October	705	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.1
November	679	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.2
December	694	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.1
N/D - Valid Da *Number of B	N/D - Valid Data Not Available *Number of Readings - included calibration hours	e led calibration	n hours								ANNUAL AVERAGE	AVERAGE	0.1

\*Number of Readings - included calibration hours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

РРВ	PPB
8.0	0.1
Alberta Ambient Air Quality Objectives Annual Average**	Annual Average for 2015 #

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St. Lina Site - 2015 JOB # 2833-2015-31- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

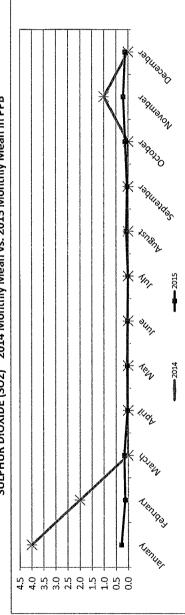
-

		2014			2015		
Month	MEAN	Ň	MAXIMUM	MEAN	MUMINIM	MAXIMUM	Difference
January	0:7		14		0	4	3.7
February	2.0		8	0.1	104 St.	ε	1.9
March	0.0		(2) + 27 	0.2	074 vi	7	-0.2
April	0.0		ε	0.0	0	2	0.0
May	0.0		£	0.0		1	0.0
June	0.0		2	0.0		2	0.0
July	0.0		8	0.0	0, 0,	1	0.0
August	0.0		4	0.1	0	2	-0.1
September	0.0		1	0.0		З	0.0
October	0.0		3	0.1		6	-0.1
November	1.0		5	0.2		З	0.8
December	0.0	0.	6	0.1	054 1054	œ	-0.1
N/D - Valid Da	N/D - Valid Data Not Available						

SULPHUR DIOXIDE (SO2) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

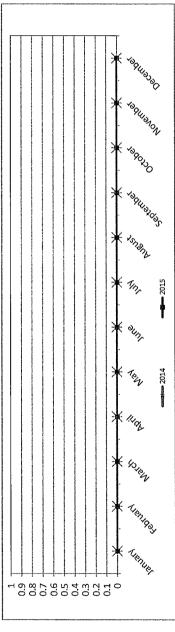
N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

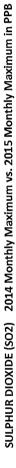


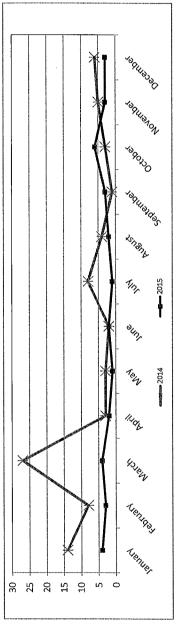


SULPHUR DIOXIDE (SO2) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB









### LICA31 SO2\_ / WDR Joint Frequency Distribution (Percent)

01/01/15 thru 12/31/15

Distribution By % Of Samples

Logger Id : 31 Site Name : LICA31

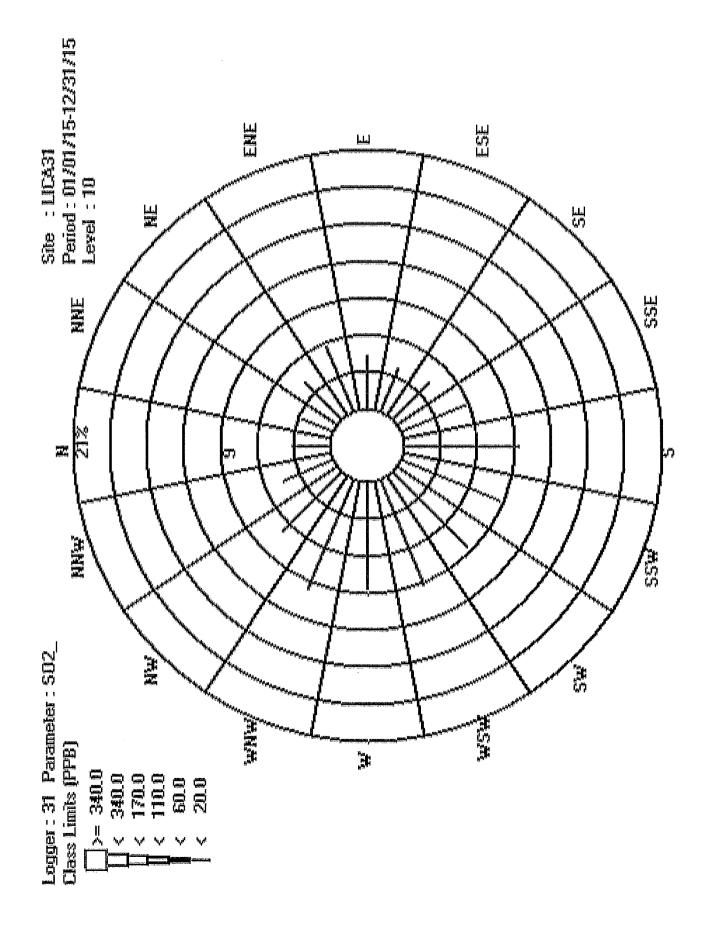
		Freq	100.001	00.	00-	00.	00.	00.	
		MNN	4.38 II	00.	00.	00.	00.	00.	4.38
		мм	6.87	00.	00.	00.	00.	00.	6.87
		MNM	9.65	00.	00.	00.	00.	00.	9.65
: WDR : 10 Meters		м	8.65	00.	00-	00.	00.	.00	8.65
: WDR t : 10 M		WSW	9.23	00 '	00.	00.	00.	00.	9.23
neter t Heighi		HS.	8.65	00.	00.	00.	00.	00.	8.65
Wind Parameter Instrument Height		SSW	8.79	.00	00-	00-	00 -	00.	8.79
uiw un		S	9.48	00.	00 -	00.	00.	00.	9.48
		SSE	5.73	00.	00.	.00	00.	00.	5.73
	Direction	SE	4.31	.00	00.	.00	00 -	.00	4.31
	D	ESE	3.85	00-	00.	00.	00.	00.	3.85
		ы	4.28	00-	.00	.00	.00	00-	4.28
		ENE	5.78	00-	.00	.00	00.	00-	5.78
		B	4.30	00-	00.	00.	00.	00.	4.30
SO2		NNE	2.78	00.	00.	00'	00.	00.	2.78
Parameter : Units :		N	3.20	00.	00-	00.	.00	.00	3.20
Parame Units		Limit	20.0	60.0	0.011	170.0	340.0	340.0	Totals
			v	v	v	v	v	X	

Calm : .00 %

Total # Operational Hours : 8231

		Freq	8231							
		MNN	361 8						361	
		мм	566						566	
		MNM	795						795	
		н	712						712	
		WSW	760						760	
		МS	712						712	
		SSW	724						724	
		ß	781						181	
səlqme		SSE	472						472	
on By Sa	Direction	SE	355						355	
Distribution By Samples	DİJ	ESE	317						317	
Dis		ы	353						353	
		ENE	476						476	
		E	354						354	
		NNE	229						229	
		z	264						264	* 00 -
		Limit	< 20.0	60.0	110.0	170.0	340.0	340.0	Totals	Calm : .00 %
			v	v	v	v	v	X		

Total # Operational Hours : 8231



### HYDROGEN SULPHIDE



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION St. Lina Site - 2015 JOB # 2833-2015-31- A

# HYDROGEN SULPHIDE (H2S) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	1907 (1998) A	Number of Operational	N.%	% Readings in Concent	Concentration Range (PPB H2S)	H25)	OBJEC	OBJECTIVES**	EXCEEDENCES	DENCES	MONTHLY
	Vcduiigo	1	s 3 ppb	4 <c≤10 ppb<="" th=""><th>11 &lt; C≤ 50 ppb</th><th>&gt; 50 ppb</th><th><b>1-HR</b></th><th>24-HR</th><th>1-HR</th><th>24-HR</th><th></th></c≤10>	11 < C≤ 50 ppb	> 50 ppb	<b>1-HR</b>	24-HR	1-HR	24-HR	
January	695	100.0	100.00%	0.00%	0.00%	0.00%	10	ო	0	0	0
February	637	100.0	100.00%	0.00%	%00.0	%00.0	10	°,	0	0	0
March	693	6.66	100.00%	0.00%	0.00%	00.00%	10	ñ	0	0	ο
April	684	100.0	100.00%	0.00%	0.00%	%00.0	10	£	0	0	0
May	682	97.3	100.00%	0.00%	0.00%	0.00%	10	ŝ	0	0	0
June	684	100.0	100.00%	0.00%	%00.0	%00.0	10	3	0	0	0
ylut	200	99.2	99.71%	0.29%	0.00%	0.00%	10	3	0	0	0
August	708	100.0	99.86%	0.14%	0.00%	0.00%	10	3	0	0	1
September	682	26.7	100.00%	0.00%	0.00%	0.00%	10	3	0	0	1
October	667	97.2	100.00%	0.00%	0.00%	0.00%	10	3	0	0	1
November	660	97.4	100.00%	0.00%	0.00%	00.00%	10	3	0	0	0
December	669	100.0	100.00%	0.00%	0.00%	0.00%	10	m	0	0	0
N/D - Valid Da *Number of R	N/D - Valid Data Not Available *Number of Readings - include	N/D - Valid Data Not Available *Number of Readings - included calibration hours	t hours	-					ANNUALAVERAGE	AVERAGE	0

\*Number of Readings - included calibration nours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

PPB	PPB
٩Ņ	0
Alberta Ambient Air Quality Objectives Annual Average**	Annual Average tor 2015

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION St. Lina Site - 2015 JOB # 2833-2015-31- A

HYDROGEN SULPHIDE (H2S) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

N/D - Valid Data Not Available

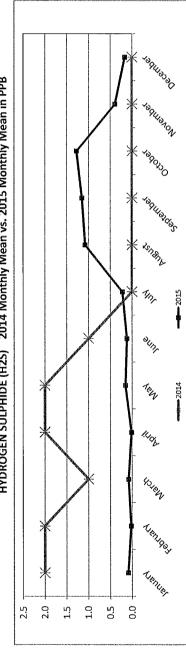
\*Annual peak is bolded and highlighted.

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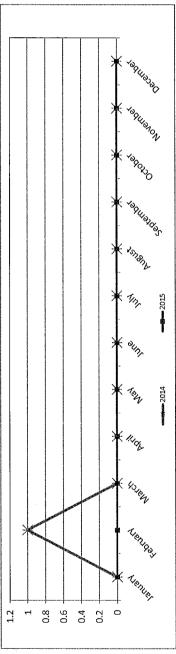
St. Lina Site - 2015 JOB # 2833-2015-31- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

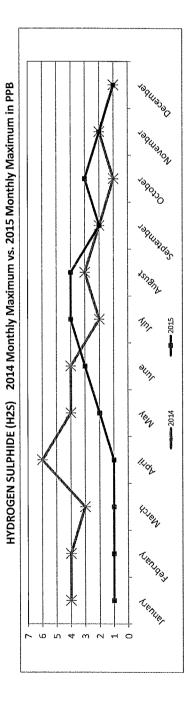




HYDROGEN SULPHIDE (H2S) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB

HYDROGEN SULPHIDE (H2S) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPB





## LICA31 H2S\_ / WDR Joint Frequency Distribution (Percent)

### 01/01/15 thru 12/31/15

Distribution By % Of Samples

		Freq	99.92	-07	00.	00.	
		MNN	4.42	00.	00.	00-	4.42
		MN	6.95	00.	00.	00-	6.95
		WNW	9.64	00.	00.	00'	9.64
Meters		м	8.71	00.	.00	00 -	8.71
Wind Parameter : WDR Instrument Height : 10 Meters		MSW	9.33	00.	00.	00-	9.33
neter t Height		SW	8.63	.06	00.	00'	8.70
nd Paran strument		SSW	8.56	IO.	00 -	00.	8.57
<u>W</u> İr Ins		S	9.21	00.	00-	00.	9.21
		SSE	5.72	00.	00-	00 '	5.72
	Direction	SE	4.14	00.	00-	00.	4.14
	Dİ	ESE	3.89	00.	00 -	00.	3.89
		ы	4.33	00 -	00-	00.	4.33
		ENE	5.89	00.	00-	00.	5.89
		Ħ	4.36	.00	00-	00.	4.36
31 LICA31 H2S_ PPB_		NNE	2.82	00.	00-	00-	2.82
c Id : Vame : ster :		N	3.24	.00	00 -	00.	3.24
Loggen Site b Parame Units		Limit	3.0	10.0T	50.0	50.0	Totals
			v	v	v	X	

Calm : .00 %

Total # Operational Hours : 8172

#### Distribution By Samples

Direction	

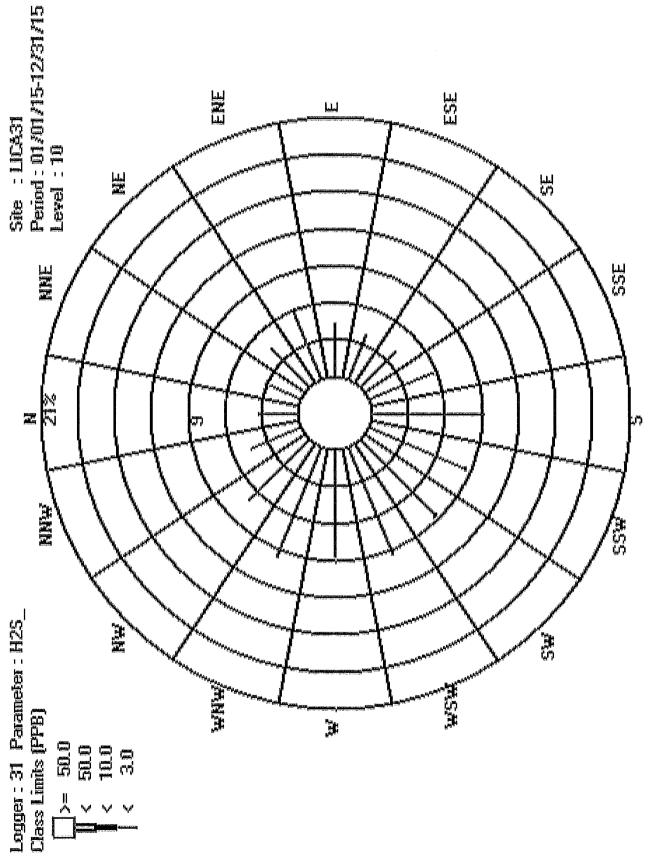
Freq	8166	9		
MNN	362			
MN	568			
MNM	788			
м	712			
MSW	763			
SW	706	ស		
MSS	700	ч		
ø	753			
SSE	468			
SE	339			
ESE	318			
ы	354			
ENE	482			
EN	357			
NNE	231			
z	265			
Limi t	3.0	10.0	50.0	003
	v	v	v	ļ

<u>}</u> 50.0

Calm : .00 %

Total # Operational Hours : 8172

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#### TOTAL HYDROCARBON

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION 51. Lina 5ite - 2015 JOB # 2833-2015-31- A

# TOTAL HYDROCARBONS (THC) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of	Number of Operational		% Readings in Concentration Range (PPM THC)	ration Range (PPM	THG	OBJECT	OBJECHVIS**	EXCEEL	EXCEEDENCES	MONTHLY
	Readings*	Time (%)	mqn 0.≅≥	3.1 < C ≤ 10.0 ppm	. 10.1 < C ≤ 50.0 ppm	>50.0 ppm	1-HR	24-HR	1-HR	24-HR	AVERAGE
January	704	7.99	99.57%	0.43%	0.00%	0.00%	I	ı	I	ı	2.2
February	639	100.0	99.84%	0.16%	0.00%	0.00%	1	1	t	ı	2.2
March	707	6.66	99.86%	0.14%	0.00%	0.00%	1	1	1	I	2.1
April	653	96.3	99.85%	0.15%	0.00%	0.00%	1	1	1	ı	2.0
May	707	6.66	100.00%	0.00%	0.00%	0.00%	1	1	I	t	2.0
June	662	97.5	100.00%	0.00%	0.00%	0.00%	1	I	-	-	1.8
ylul	697	99.2	100.00%	0.00%	0.00%	0.00%	1	I	1	-	1.8
August	706	99.7	100.00%	0.00%	0.00%	0.00%	1	I	1	1	1.8
September	678	26.7	100.00%	0.00%	0.00%	0.00%		I	ı	1	1.8
October	707	100.0	99.43%	0.57%	0.00%	0.00%	-	·	I	1	1.9
November	684	100.0	99.56%	0.44%	0.00%	0.00%	1	ĩ	I	·	2.0
December	707	100.0	97.60%	2.40%	0.00%	0.00%	1	I	I	I	2.2
N/D - Valid Data Not Available *Number of Readings - include	nta Not Availat	N/D - Valid Data Not Available *Number of Beadings - Included calibration bours	hours						ANNUAL AVERAGE	AVERAGE	2.0

\*Number of Readings - included calibration hours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

Mdd 0	Mdd 0
/v	2.0
Alberta Ambient Air Quality Objectives Annual Average**	Annual/Average for 2015

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION 5t. Lina Site - 2015 JOB # 2833-2015-31- A

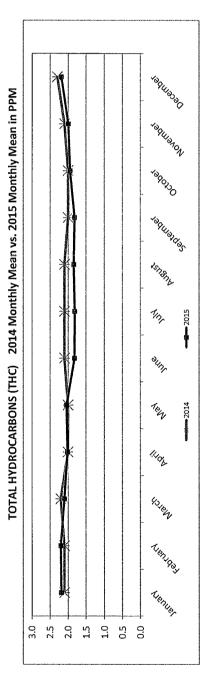
TOTAL HYDROCARBONS (THC) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPM

N/D - Valid Data Not Available

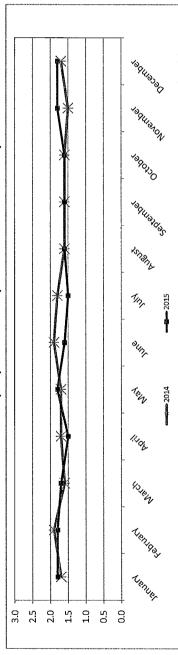
\*Annual peak is bolded and highlighted.

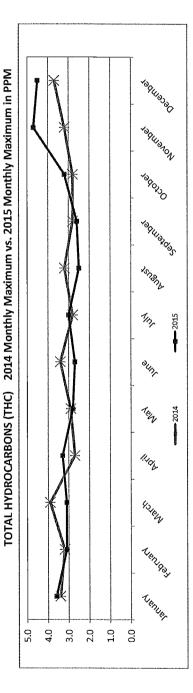
Maxia arup Company

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION St. Lina Site - 2015 JOB # 2833-2015-31- A



TOTAL HYDROCARBONS (THC) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPM





## LICA31 THC / WDR Joint Frequency Distribution (Percent)

### 01/01/15 thru 12/31/15

Distribution By % Of Samples

		Freq	99.55	.44	00.	00.	
		MNN	4.35	10.	00.	00.	4.36
		MN	6.85	.04	00.	00.	6.90
		WINIW	9.49	.02	00.	00.	9.51
Meters		м	8.60	.02	00.	00.	8.62
Wind Parameter : WDR Instrument Height : 10 Meters		WSW	9.39	.01	· 00	.00	9.40
meter t Heigh		MS	8.64	-04	.00	00.	8.68
Wind Parameter Instrument Heigh		SSW	8.74	. 02	00.	00.	8.77
UT M		S	9.49	10.	00-	00,	9.50
		SSE	5.71	.02	00'	00.	5.73
	Direction	SE	4.42	.02	00 -	00.	4.44
	Dİ	ESE	3.92	.02	00.	00.	3.94
		ы	4.26	10.	00.	00 -	4.27
		ENE	5.56	.02	· 00	• 00	5,58
		R	4.18	60-	00.	00.	4.27
31 LICA31 THC PPM		INNE	2.74	E0.	00.	· 00	2.78
Logger Id : 31 Site Name : LICA31 Parameter : THC Units : PPM		z	3.15	00.	00'	00,	3.15
Loggen Site b Parame Units		Limit	3.0	10.0	50.0	50.0	Totals
			v	v	v	¥	

Calm : .00 %

Total # Operational Hours : 8229

#### Distribution By Samples

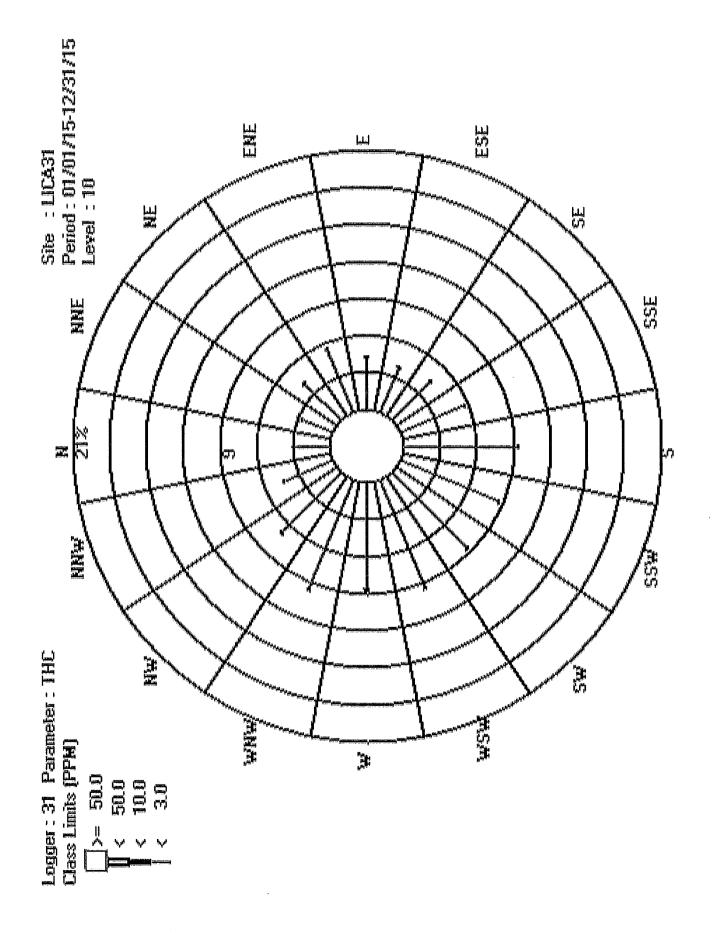
Direction

Freq	8192	37			
MNN	358	н			359
NN	564	4			568
WNW	181	ы			783
м	708	0			710
WSW	773	ч			774
SW	711	4			715
SSW	720	0			722
S	181	н			782
SSE	470	0			472
SE	364	0			366
ESE	323	2			325
ы	351	ч			352
ENE	458	0			460
NE	344	œ			352
NNE	226	m			229
z	260				260
Limit	з.0	10.0	50.0	50.0	Totals
	v	v	v	X	

Calm : .00 %

Total # Operational Hours : 8229

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#### **OXIDES OF NITROGEN**



# OXIDES OF NITROGEN (NOx) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of Readings*	Number of Operational Boodines* Time (%)	% Readings in		Concentration Range (PPB NOX)	NOX)	OBJECT	OBJECTIVES**	EXCEED	EXCEEDENCES	MONTHLY
d A	eg nort		s:50 ppb	51 < C≤ 110 ppb	111 < C ≤ 210 ppb	>210 ppb	1-HR.	24-HR	1=HR	24-HR	
January	669	99.7	100.00%	0.00%	0.00%	0.00%	1	I	I	ı	4.2
February	635	100.0	100.00%	0.00%	0.00%	0.00%	3	ı	1	1	2.6
March	682	99.9	100.00%	0.00%	0.00%	0.00%	-	-	I	1	1.9
April	677	99.4	100.00%	0.00%	0.00%	0.00%	1	3		I	1.3
May	670	99.6	100.00%	0.00%	0.00%	0.00%	-		I	I	1.3
June	681	100.0	100.00%	0.00%	0.00%	0.00%	1	1	1	I	1.4
уİпГ	675	99.2	100.00%	0.00%	0.00%	0.00%	i	1	1	I	1.0
August	680	100.0	100.00%	0.00%	0.00%	0.00%	•	1	1	I	1.3
September	677	2.99	100.00%	0.00%	0.00%	0.00%	-	I	I	I	1.5
October	682	100.0	100.00%	0.00%	0.00%	0.00%	1	ı	1	1	1.9
November	674	100.0	100.00%	0.00%	0.00%	0.00%	-	1	1	I	3.7
December	673	100.0	69.85%	0.15%	0.00%	0.00%	I	1	I	1	6.4
N/D - Valid Da *Number of Re	N/D - Valid Data Not Available *Number of Readings - include	N/D - Valid Data Not Available *Number of Readings - Included ralibration bours	hours						ANNUAL AVERAGE	average	2.4

\*Number of Readings - included calibration hours
\*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

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DPB		2
N/L	V C	7.1
Alberta Ambreat dirfonalità Objectives Annial Average **		Alimual Avelage (in: zouo)

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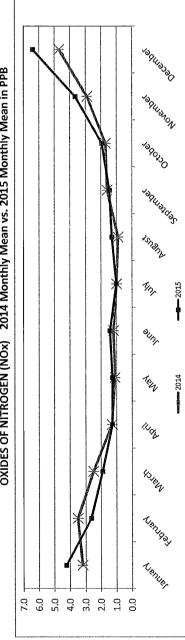
OXIDES OF NITROGEN (NOx) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

	Difference	-1.0	0.9	0.6	0.0	-0.2	-0.2	0.0	-0.4	0.1	-0.2	-0.8	-1.7
	MAXIMUM	37.2	17.7	14.3	16.3	11.7	7.3	6.7	10.5	8.7	16.7	31.5	50.5
2015	MINIMIM	1:0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MEAN	4.2	2.6	1.9	1.3	1.3	1.4	1.0	1.3	1.5	1.9	3.7	6.4
	MAXIMUM	23.7	23.0	13.1	6.8	10.2	6.2	10.0	11.8	11.2	9.5	23.1	<b>3</b> 269
2014	WININIW	0.00	0:0754	0.0	0;0;0;		00		00 S	00	0.0	E	0.0
	MEAN	3.2	3.5	2.5	1.3	1.1	1.2	1.0	6.0	1.6	1.7	2.9	
	Month	January	February	March	April	May	June	July	August	September	October	November	December

N/D - Valid Data Not Available

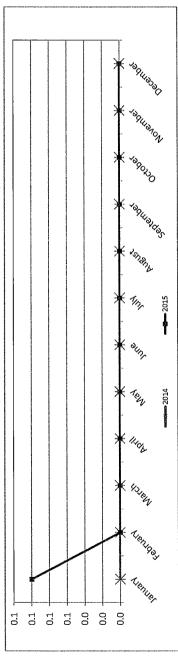
\*Annual peak is bolded and highlighted.

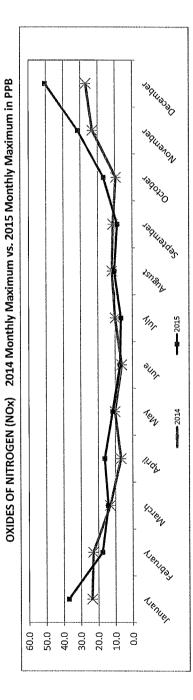




OXIDES OF NITROGEN (NOx) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB

OXIDES OF NITROGEN (NOx) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPB





## LICA31 NOX\_ / WDR Joint Frequency Distribution (Percent)

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#### 01/01/15 thru 12/31/15

Distribution By % Of Samples

Logger Id : 31 Site Name : LICA31 Parameter : NOX\_\_

		Freq	99.98	10.	00.	00.		
		MNN	4.40	00-	00.	00.	4.40	
		NW	6.88	00 -	00.	00.	6.88	
		MNM	9.61	00-	00.	00.	9.61	
feters		м	8.65	00-	00.	00.	8.65	
: WDR		MSW	9.33	10.	00-	00.	9.34	
neter : Height		MS	8.64	.00	00-	00.	8.64	
Wind Parameter : WDR Instrument Height : 10 Meters		MSS	8.82	00.	00.	00.	8.82	
Wír Ins		S	9.52	• 00	00 '	00.	9.52	
		SSE	5.70	00.	00-	00.	5.70	
	Direction	SE	4.22	.00	00 -	00.	4.22	
	DİJ	ESE	3.80	00'	.00	00.	3.80	
		ы	4.28	00 '	00,	00.	4.28	
		ENE	5.71	00'	00.	00.	5.71	
		NE	4.32	.00	00-	00.	4.32	
NOX		INNE	2.81	00.	00.	00 -	2.81	
Parameter : LICAJI Parameter : NOX Units : PPB		N	3.22	00.	00-	.00	3.22	
sı te Para Uni t:		Limi t	50.0	110.0	210.0	210.0	Totals	
			v	v	v	X		

Calm : .00 %

Total # Operational Hours : 8217

#### Distribution By Samples

Direction

Freq	8216	н	
MNN	362		
NW	566		
WINW	790		
м	111		
MSM	767	н	
ΜS	710		
SSW	725		
ß	783		
SSE	469		
SE	347		
ESE	313		
ы	352		
ENE	470		
Ħ	355		
NNE	231		
N	265		
Limit	50.0	0.011	0 0 10
	٧	v	`

< 210.0

362

566

790

111

768

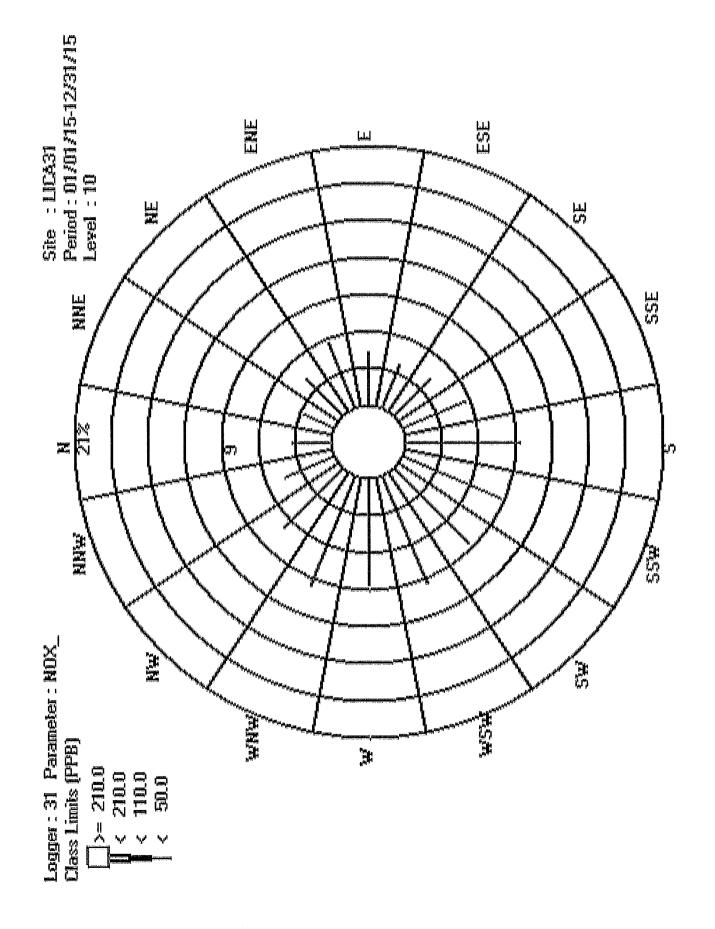
710

725

783

Calm : .00 %

Total # Operational Hours : 8217



#### NITRIC OXIDES

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St. Lina Site - 2015 JOB # 2833-2015-31- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

# NITRIC OXIDE (NO) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	52 CA		8%	% Readings in Concent	Concentration Range (PPB NO)	(ON	OBJECTIVES**	WES**	EXCEPT	EXCEEDENCES	MONTHLY
	keadings	1 me (%)	≤.50 ppb	51 < C ≤ 110 ppb	111 < C ≤ 210 ppb	> 210 ppb	1-HR	24-HR	1-HR	24-HR	PWERMOR
January	699	29.7	100.00%	0.00%	0.00%	0.00%	I	I	ı	1	0.5
February	635	100.0	100.00%	0.00%	0.00%	%00.0	1	I	1	1	0.6
March	682	<b>6.</b> 66	100.00%	0.00%	0.00%	0.00%	ı	I	-	-	0.1
April	677	99.4	100.00%	0.00%	0.00%	0.00%	ı	I	1	1	1.0
Мау	670	9.66	100.00%	0.00%	0.00%	0.00%	ı	I	1	1	0.2
June	681	100.0	100.00%	0.00%	0.00%	0.00%	I	I	I	1	0.1
ylut	675	99.2	100.00%	0.00%	0.00%	%00.0	ı	I	1	I	1.0
August	680	100.0	100.00%	0.00%	0.00%	%00'0	I	I	I	1	0.1
September	677	69.7	100.00%	0.00%	0.00%	0.00%	1	8	t	1	0.1
October	682	100.0	100.00%	0.00%	0.00%	%00.0	1	I	I	I	0.0
November	674	100.0	100.00%	0.00%	%00.0	0.00%	I	I	I		0.4
December	673	100.0	100.00%	0.00%	%00'0	%00'0	I	ı	I	1	1.1
N/D - Valid Da *Nimher of R	N/D - Valid Data Not Available *Number of Readings - included calibration hours	le Hed calibration	hours						ANNUAL AVERAGE		E03

\*Number of Readings - included calibration hours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

N/D PPB	0.3 PPB
Alberta Ambient Aur Quality Objectives Annual Average**	Annual Average for 2015

MaxXam

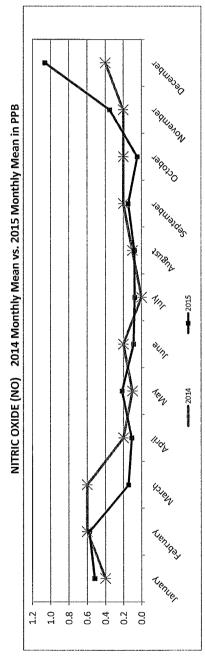
NITRIC OXIDE (NO) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

	<b>0</b>												
	Difference	-0.1	0.0	0.5	0.1	-0.1	0.1	-0.1	0.0	0.1	0.2	-0.2	-0.7
	MAXIMUM	10.1	9.9	3.4	6.6	6.1	5.3	2.7	1.5	2.6	1.5	11.0	± * * 28.5
2015	MUMINIM	0.0		0:0	000	10:0 10:0	0:0	0.0	0:0 1	0:00 E	0:02 10:02	0.01	12.12.12.12.12.12.12.12.12.12.12.12.12.1
	MEAN	0.5	0.6	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.4	
	MAXIMUM	5.1	13:61-	5.5	1.2	1.3	1.5	1.8	2.0	4.6	3.9	3.1	11.3
2014	MINIMIM	00	0.0	0:02	0.0	0.00	0.0	0.0	0:0	0.0	0.0	0:0 1	0.0
	MEAN	0.4	0.05	9:0	0.2	0.1	0.2	0.0	0.1	0.2	0.2	0.2	0.4
	Month	January	February	March	April	May	June	July	August	September	October	November	December

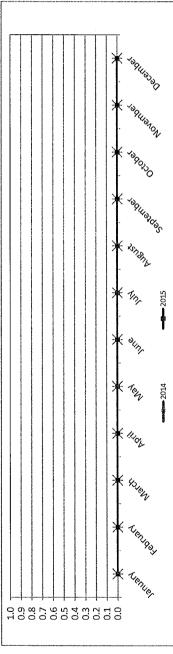
N/D - Valid Data Not Available

\*Annual peak is bolded and highlighted.

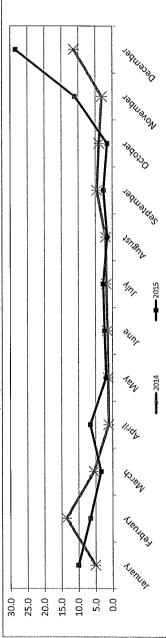




NITRIC OXIDE (NO) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPB







LICA31 NO\_ / WDR Joint Frequency Distribution (Percent)

01/01/15 thru 12/31/15

Distribution By % Of Samples

Wind Parameter : WDR Instrument Height : 10 Meters

Logger Id : 31 Site Name : LICA31 Parameter : NO\_\_\_\_\_ Units : PPB\_\_\_\_\_

NNW Freq 4.40 100.00 00. 00. 00. 4.40 6.88 80. 6.88 MN 00. 00. 9.61 00. 00. 9.61 WINW 00. 8.65 8.65 00. 00. 00. × 9.34 00. 00. 00. 9.34 WSW 8.64 00' 00. 00. 8.64 R 8.82 8.82 SSW 00. 8. 00. 9.52 9.52 8. 00. 00-S 5.70 00. 00. 5.70 SSE 00. Direction SB 4.22 0. 00. 0. 4.22 3.80 3.80 ESE 00. 00-00' 4.28 00-4.28 00. 00μ 5.71 00' 5.71 ENE 00. 00' 4.32 00. 8. 00. 4.32 2.81 0. 00. 2.81 NNE 00. 3.22 3.22 00. 00. 8. z Limit Totals 50.0 < 210.0 < 110.0 >= 210.0

v

00. 8.

00.

Calm : .00 %

Total # Operational Hours : 8217

#### Distribution By Samples

#### Direction

Freq 8217 MNN 362 MN 566 WINW 790 ß 711 WSW 768 SW 710 SSH 725 S 783 SSE 469 SE 347 ESE 313 μ 352 ENE 470 뛾 355 ЫN 231 z 265 50.0 Limit < 110.0

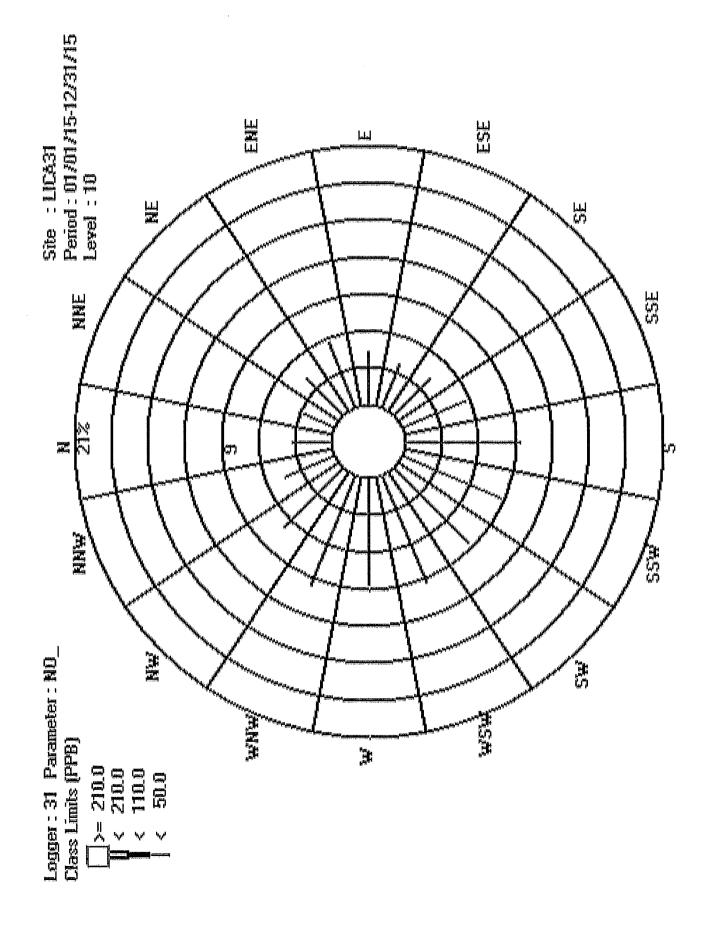
< 210.0

v

210.0 ľ

Calm : .00 %

Total # Operational Hours : 8217



#### NITROGEN DIOXIDE

Maxament am

# NITROGEN DIOXIDE (NO2) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	2. A. C.	Operational	%Ri	% Readings in Concentr	Concentration Range (PPB NO2)	NO2)	OBJECTIVES**	TVES**	EXCEEDENCES	DENCES	MONTHLY
	Keadings	umet %	s 50 ppb	51 < C ≤ 110 ppb	111 < C ≤ 210 ppb	> 210 ppb	1-HR	24-HR	1-HR	24-HR	AVENAGE
January	699	7.96	100.00%	00.00%	0.00%	0.00%	159	1	0	ı	3.7
February	635	100.0	100.00%	0.00%	0.00%	0.00%	159	1	0	t	2.1
March	682	6.66	100.00%	0.00%	0.00%	0.00%	159	-	0	I	1.8
April	677	99.4	100.00%	0.00%	0.00%	0.00%	159	I	0	1	1.2
May	670	9.66	100.00%	0.00%	0.00%	0.00%	159	I	0	I	1.1
June	681	100.0	100.00%	0.00%	0.00%	0.00%	159	ı	0	I	1.3
ylul	675	99.2	100.00%	0.00%	0.00%	0.00%	159	-	0	1	0.9
August	680	100.0	100.00%	0.00%	0.00%	0.00%	159	1	0	1	1.2
September	677	99.7	100.00%	0.00%	0.00%	0.00%	159	1	0	ı	1.3
October	682	100.0	100.00%	0.00%	0.00%	0.00%	159	I	0	I	1.9
November	674	100.0	100.00%	0.00%	0.00%	0.00%	159	I	0	I	3.3
December	673	100.0	100.00%	0.00%	0.00%	%00'0	159	I	0	1	5.3
N/D - Valid Da *Number of R	N/D - Valid Data Not Available *Number of Readings - included calibration hours	e 'ed calibration	hours						ANNUAL AVERAGE	AVERAGE	2.T

\*Number of Readings - included calibration hours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

24 PPB	2.1 PPB
Alberta Ambient Air Quality: Objectives Annual Average**	Annual Average for 2015

MaxXam

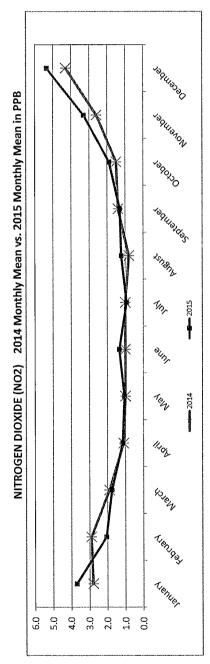
NITROGEN DIOXIDE (NO2) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

	Difference	6.0-	0.8	0.1	-0.1	-0.1	-0.3	0.1	-0.4	0.1	-0.4	-0.7	-1.0
	MUMIXEM	31.4	17.4	14.3	9.7	10.3	7.0	4.6	10.5	8.7	16.7	28.0	33.0
2015	WINININ	0.0	0:0	0.0	0:0	0:0	0.0		0.00 2000 2000	0.0	0:0	000	
	MEAN	3.7	2.1	1.8	1.2	1.1	1.3	6.0	1.2	1.3	1.9	3.3	
	MUMIXEM	22.1	16.4	12.7	6.5	.10.1	5.0	9.4	10.6	10.3	8.2	22.5	1 5 263 - H
2014	MUMINIM	0.0	0.0	0:0	0.0	0.0	0.00 Dia Manageria	0.0	0.0	0.0	00	0.0	5. 10.00 S
	MEAN	2.8	2.9	1.9	1.1	1.0	1.0	1.0	0.8	1.4	1.5	2.6	43.10
	Month	January	February	March	April	May	June	July	August	September	October	November	December

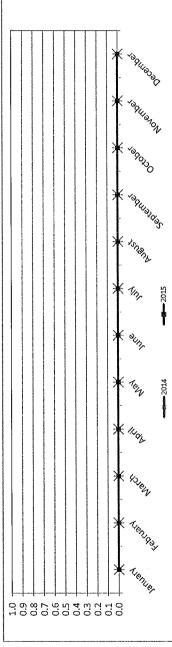
N/D - Valid Data Not Available

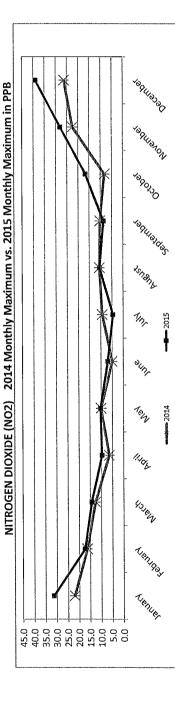
\*Annual peak is bolded and highlighted.











## LICA31 NO2\_ / WDR Joint Frequency Distribution (Percent)

#### 01/01/15 thru 12/31/15

### Distribution By % Of Samples

		Freq	00-00	.00	00.	00,		
		MNN	4.40 I00.00	00.	00.	00.	4.40	
		MN	6.88	00-	.00	00.	6.88	
		WNW	9.61	00.	00.	00.	9.61	
ſeters		ы	8.65	00.	00.	00-	8.65	
Wind Farameter : WDR Instrument Height : 10 Meters		WSW	9.34	00 -	00.	00.	9.34	
neter 5 Height		SW	8.64	00.	00.	00 '	8.64	
Wind Parameter Instrument Heig		SSW	8,82	00.	00.	00.	8.82	
Win		S	9.52	00.	00.	00-	9.52	
		SSE	5.70	00.	00'	00.	5.70	
	Direction	SE	4.22	00.	00.	00.	4.22	
	Di	ESE	3.80	00.	00 '	00.	3.80	
		ы	4.28	00-	00.	00.	4.28	
		ENE	5.71	00.	00.	00.	5.71	
		NE	4.32	00.	00.	00.	4.32	
31 LICA31 NO2_ PPB_		NNE	2.81	.00	00.	00.	2.81	
Logger Id : 31 Site Name : LICA31 Parameter : NO2_ Units : PPB		z	3.22	00.	00 -	00.	3.22	
Loggel Site h Parame Units		Limit	50.0	110.0	210.0	210.0	Totals	
			v	v	v	Ķ		

Calm : .00 %

Total # Operational Hours : 8217

#### Distribution By Samples

#### Direction

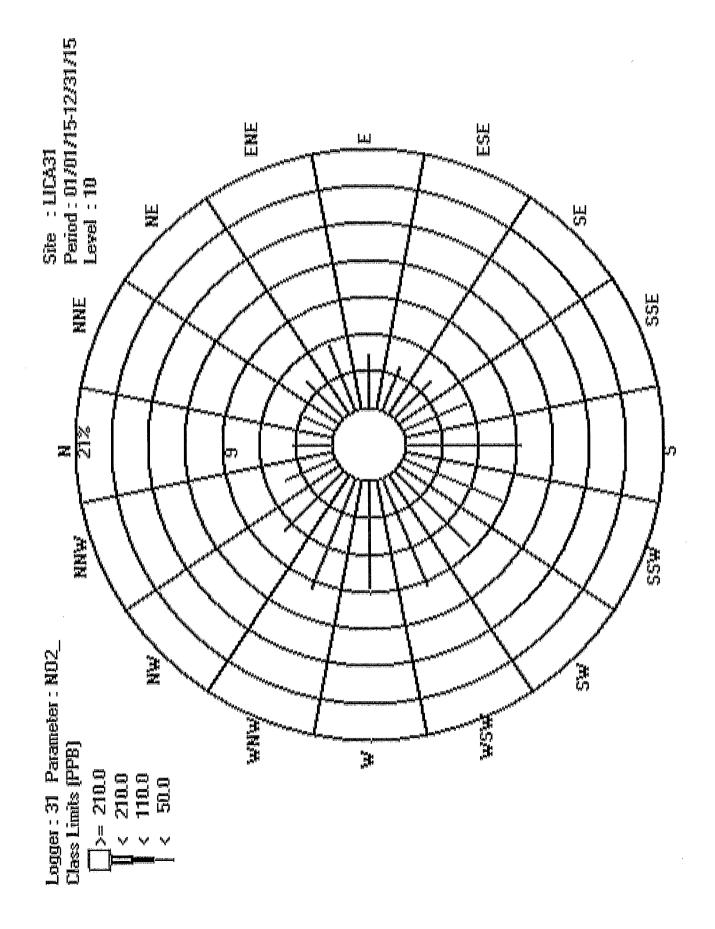
Freq 8217 MNN 362 MN 566 WNW 790 м 711 768 MSN SW 710 SSW 725 S 783 SSE 469 SE 347 ESE 313 352 ы ENE 470 볁 355 NNE 231 z 265 < 110.0 Limit 50.0 v

< 210.0

>= 210.0

Calm : .00 %

Total # Operational Hours : 8217



**OZONE** 



## OZONE (03) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of	Number of Operational		%Readings in Concent	in Concentration Range (PPB 03)	(C3)	OBIECT	OBJECTIVES**	EXCERI	EXCEEDENCES	MONTHLY
		(e/)	s 50 ppb	51 < C ≤ 110 ppb	111 < C ≤ 210 ppb	> 210 ppb	1-HR	24-HR	1-HR 🚟	24:HR	
January	684	100.0	100.00%	0.00%	0.00%	%00.0	82	1	0	I	31
February	635	100.0	100.00%	0.00%	%00.0	0.00%	82	-	0	I	34
March	682	6.66	99.85%	0.15%	%00.0	0.00%	82	ı	0	I	38
April	629	99.4	95.43%	4.57%	%00'0	%00.0	82	ł	0	Ŀ;	39
Мау	676	100.0	72.19%	27.81%	0.00%	0.00%	82	-	0	I	44
June	682	100.0	92.82%	7.18%	0.00%	0.00%	82	l	0	I	36
<b>у</b> lu(	677	99.2	94.98%	5.02%	0.00%	0:00%	82	-	0	ı	31
August	683	100.0	97.22%	2.78%	0.00%	0.00%	82	-	0	1	28
September	681	6.9	100.00%	0.00%	0.00%	%00"0	82	1	0	I	23
October	681	100.0	100.00%	0.00%	0.00%	0.00%	82	1	0	1	28
November	662	98.2	100.00%	0.00%	%00'0	0.00%	82	ı	0	•	25
December	679	100.0	100.00%	0.00%	%00'0	%00'0	82	I	0		19
N/D - Valid Da *Number of R	N/D - Valid Data Not Available *Number of Readings - included calibration hours	le Jed calibration	hours						ANNUAL AVERAGE	AVERAGE	31

\*Number of Readings - included calibration hours
\*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

N/D PPB	31 PPB
Alberta/Ambient/Air:Quality/Objectives:Ampual Average**	Miniual Averagetor 2015)

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St. Lina Site - 2015 JOB # 2833-2015-31- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

OZONE (O3) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

		2014			2015		
Month	MEAN	MUMINIM	MAXIMUM	MEAN	WINIM	MUMIXAM	Difference
January	33	8	48	31	0	46	2
February	31	13	43	34	8	45	ς,
March	38	19	53	38	18	51	O
April	36	17	57	39	50	54	°-
May	36	10		14	19	<u>74</u>	8-
June	31	13	58	36	11	64	-5
July	27	9	55	31	8	71	4-
August	29	7	59	28	4	60	1
September	26	4	51	23	9	47	З
October	27	7	43	28	9	45	-1
November	28	4	42	25	5	40	ß
December	26	5	44	19	1	40	2
N/D - Valid Da	N/D - Valid Data Not Available						

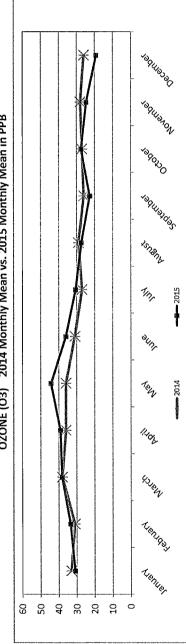
N/D - Valid Data Not Available

\*Annual peak is bolded and highlighted.

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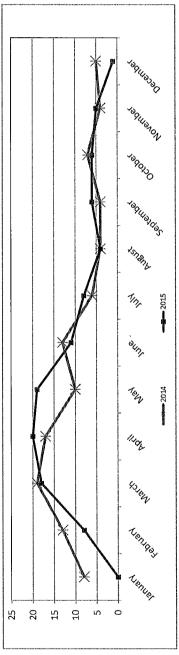
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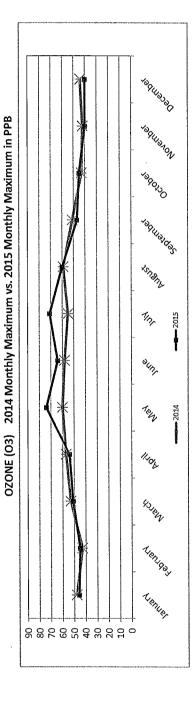
St. Lina Site - 2015 JOB # 2833-2015-31- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION



OZONE (O3) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB

OZONE (O3) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPB





## LICA31 03\_ / WDR Joint Frequency Distribution (Percent)

#### 01/01/15 thru 12/31/15

### Distribution By % Of Samples

Logger Id	••	31
Site Name	••	LICA31
Parameter	••	03
Units	••	PPB

WDR	10 Meters	
••	••	
Wind Parameter	Instrument Height	

	Freq	95.72	4.27	00.	00.	
	MNN	4.26	60'	00.	00.	4.35
	NW	6.63	.18	00.	00.	6.82
	WNW	9.37	.18	00.	00.	9.55
	м	8.44	.25	00.	00.	8.70
	MSM	9.10	.33	00.	00.	9.44
	MS	8.31	.37	00.	00.	8.69
	MSS	8.26	-40	00.	00.	8.66
	ß	8.76	.66	00.	00.	9.43
	SSE	5.31	.38	00.	00.	5.70
Direction	SE	3.78	. 59	00 -	00.	4.38
Dir	ESE	3.61	.35	00.	00.	3.96
	ы	4.18	.09	00.	00.	4.28
	ENE	5.71	60 -	00.	00.	5.81
	NE	4.16	<b>60</b> .	00.	00.	4.26
	NNE	2.67	.10	00.	00.	2.77
	z	3.09	.03	00.	00.	3.13
	Limit	50.0	0.011	210.0	210.0	Totals
		v	v	v	X	

Calm : .00 %

Total # Operational Hours : 8238

#### Distribution By Samples

E.
octio
Dir

Freq	36	352		
	7886			
NNW	351	ω		
MN	547	15		
MNM	772	15		
æ	696	21		
WSW	750	28		
MS	685	31		
SSW	681	33		
ß	722	55		
SSE	438	32		
SE	312	49		
ESE	298	29		
ы	345	80		
ENE	471	ω		
벌	343	ω		
INNE	220	თ		
N	255	т		
Limit	50.0	110.0	210.0	210.0
	v	v	v	X

359

562

787

717

778

716

714

*TTT* 

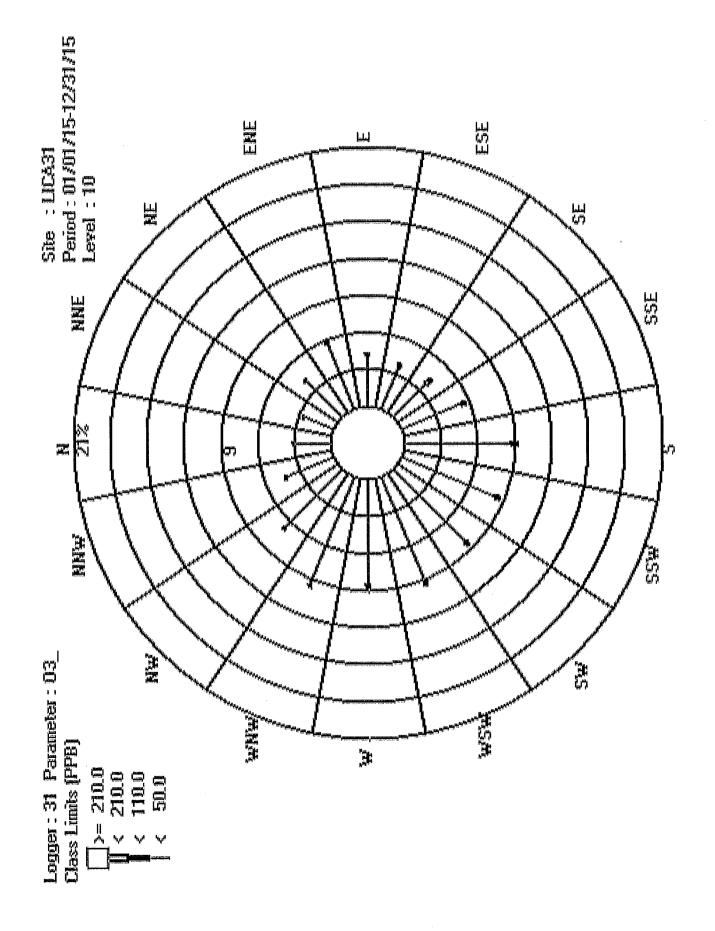
470

361

327

Calm : .00 %

Total # Operational Hours : 8238



PARTICULATE MATTER 2.5

St. Lina Site - 2015 LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

Month. Number of January 581 February 551 March 733 April 712	Numberof Operational Readings* 11me.(%) 581 78.6 551 82.6 733 99.1 712 99.3 714 96.5	<mark>s 30 ug/m3</mark> 98.80% 99.64% 99.59%	%.Read 31 < C ≤ 60 ug/m3 1.20% 0.35% 0.41% 0.00%	ings in Concentrat st.< c stoug/m3 0.00% 0.00% 0.00% 0.00%	%: Readings in Concentration Range (ug/m3 PM2:5)           c 56 ug/m3         61 < c 5 80 ug/m3         81 < c 4 120 ug/m3         121 < c           1.20%         0.00%         0.00%         0         0	PM2:5) 121 < C ≤ 240 نو/m3 0.00%	>240 ug/m3					a second and a second s
581 581 551 733 733	78.6 82.6 99.1 99.3 96.5		31 < C s 60 ug/m3 1.20% 0.36% 0.41% 0.00%	et < ≤ s 0 ug/m3 0.00% 0.00% 0.00% 0.00%	81 < C ≤ 120 ug/m3 0.00% 0.00%	121 < C ≤ 240 ug/m3	>240 ug/m3		NE3	EXCEEL	EXCEEDENCES	MONTHLY
	78.6 82.6 99.1 99.3 96.5	99.64% 99.59% 99.86%	1.20% 0.36% 0.41% 0.00%	0.00% 0.00% 0.00% 0.14%	0.00%	0.00%		1-HR	24-HR	1-HR	24-HR	
	82.6 99.1 96.5	99.64% 99.59% 99.86%	0.36% 0.41% 0.00%	0.00% 0.00% 0.14%	0.00%		0.00%	I	30	I	0	6
	99.1 99.3 96.5	99.59% 99.86%	0.41% 0.00%	0.00%		0.00%	0.00%	•	30	T	0	6
	99.3 96.5	99.86%	0.00%	0.14%	0.00%	0.00%	0.00%	1	30	-	0	6
	96.5				0.00%	0.00%	0.00%	-	0E	L	0	7
<b>May</b> 714		97.76%	0.98%	0.42%	0.42%	0.42%	0.00%	ı	30	1		8
June 705	98.2	97.45%	2.27%	0.28%	0.00%	0.00%	0.00%	-	0E	-	0	9
July 723	97.4	88.11%	5.81%	1.66%	1.52%	2.90%	0.00%	1	30	-	4	15
August 598	81.7	%00.66	0.50%	0.17%	0.33%	0.00%	0.00%	I	30		0	3
September 679	94.7	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-	30	-	0	2
October 721	97.2	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	•	30	-	0	3
November 712	99.6	100.00%	0.00%	0.00%	0.00%	%00'0	0.00%	I	30	1	0	9
December 741	6.66	%09.66	0.40%	0.00%	%00'0	0.00%	0.00%	1	30	I	ο	6
N/D - Valid Data Not Available	e e									ANNUAL AVERAGE	AVERAGE	7

ug/m3 7 ug/m3 D/N Alberta Ambient Air Quality Objectives Annual Average\*\* Annual Average for 2015

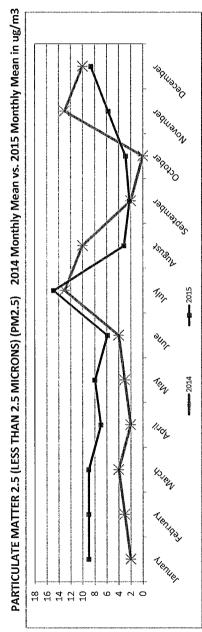
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PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5) 2014 One-Hour Readings vs. 2015 One-Hour Readings in ug/m3

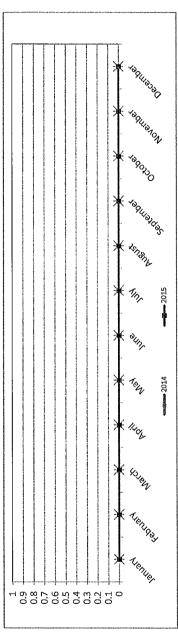
N/D - Valid Data Not Available

No data was collected in October 2014 as the Teom unit was out for repair from September 11 to November 6, 2014. \*Annual peak is bolded and highlighted.

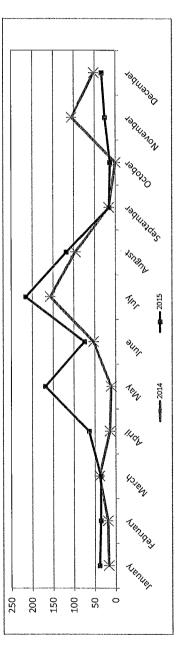




PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5) 2014 Monthly Minimum vs. 2015 Monthly Minimum in ug/m3







# LICA31 PM2 / WDR Joint Frequency Distribution (Percent)

01/01/15 thru 12/31/15

Distribution By % Of Samples

		MNN	4.20	.04	00.	00.	10.	00.	4.27
		MN	6.51	.07	.02	00.	10.	00.	6.62
		WNW	9.38	.18	00.	.03	00.	.00	9.60
ſeters		м	8.47	.17	.00	.01	00.	00.	8.66
: WDR		WSW	9.48	.06	.01	.00	00.	.00	9.55
eter : Height		MS	8.49	. 11.	00'	00.	00-	.00	8.60
Wind Parameter : WDR Instrument Height : 10 Meters		SSW	8.83	.12	00.	00.	00.	00.	8.95
Wir Ins		w	9.49	.06	.02	00.	00.	00.	9.58
		SSE	5.82	.01	.04	00.	.00	00.	5.89
	Direction	SE	4.54	10.	-01	10.	00.	00-	4.57
	Dir	ESE	4.03	.02	.01	.02	10.	.00	4.11
		ы	4.17	10.	00 '	00-	. 03	00-	4.22
		ENE	5.49	.03	.07	• 06	<b>60</b> °	00.	5.76
		Ð	3.75	.06	10.	.04	.07	00-	3.95
31 LICA31 PM2 UG/M3		INNE	2.44	.06	10.	00.	• 06	00.	2.57
Logger Id : 31 Site Name : LICA31 Parameter : PM2 Units : UG/M3		Z	2.99	.03	00.	00.	00.	00.	3.03
Logge: Site l Paramu Units		Limit	30.0	60.0	80.0	120.0	240.0	240.0	Totals
		-	v	v	v	v	v	*	•-

1.09 23 19 .30

Freq 98.17

Calm : .00 %

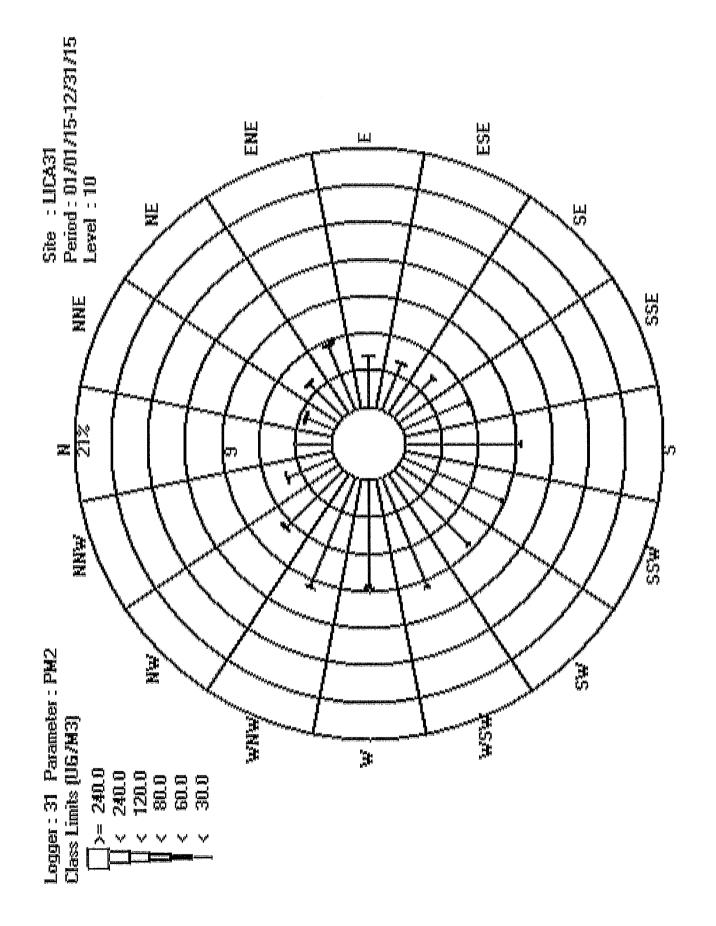
Total # Operational Hours : 8149

# Distribution By Samples

	Freq	8000	68	19	16	25			
	MNN	343	4			ы		348	
	MM	531	و	2		н		540	
	WNW	765	15		ň			783	
	ы	691	14		ы			706	
	WSW	773	S	ы				677	
	SW	692	ი					101	
	SSW	720	10					730	
	w	774	S	2				781	
	SSE	475	ч	4				480	
Direction	SE	370	н	г	н			373	
DİF	ESE	329	2	ч	8	ч		335	
	R	340	ч			ო		344	
	ENE	448	ო	9	ъ	ω		470	
	벐	306	ъ	ы	4	Q		322	
	INNE	199	S	н		ъ		210	
	ч	244	ო					247	* 00 *
	Limi t	30.0	60.0	80.0	120.0	240.0	240.0	Totals	Calm : .00 %
	н	v	v	v	۲ ۲	V	8	C1	U

Calm : .00 %

Total # Operational Hours : 8149



WIND SPEED

MaxXam

Month

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION St. Lina Site - 2015 JOB # 2833-2015-31- A

WIND SPEED (WS) 2015 Monthly Data Summary of One Hour Readings

Maximum Daily Average (KBH)	17.4	20.2	20.0	20.5	23.9	11.8	13.1	11.0
Maximum Hourly Average (KPH)	28.8	26.6	34.5	31.4	32.5	22.7	22.9	17.3
Minimum Hourly Average (KPH)	0.7	1.6	1.5	1.0	0.7	0.2	1.5	0.9
Monthly Average Monthly Average (KPH) Average (KPH)	11.6	11.3	11.2	12.4	6.6	8.0	0.6	7.6
Operational Time (%)	100.0	100.0	99.5	100.0	100.0	100.0	99.2	100.0
Number of Readings <sup>#</sup>	744	672	740	720	744	720	738	744
1. 19. 19. 19. 19. 19. 19. 19. 19. 19. 1			2			1		

February

March

April May

January

14.5 16.3

29.0

0.6

8.5

99.7

718

September

August

June

July

27.5 26.4

0.7 0.4 0.3 0.3

10.5 11.2

100.0

744 701

October

97.4

November December

17.7 16.4

24.4

8.9

100.0

744

\*Annual peak is bolded and highlighted.

Maxiam

St. Lina Site - 2015 JOB # 2833-2015-31- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

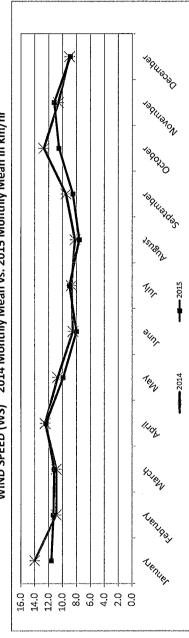
WIND SPEED (WS) 2014 One-Hour Readings vs. 2015 One-Hour Readings in km/hr

		2014			2015		
Month	MEAN	MUMINIM	MAXIMUM	MEAN	MINIM	MUMIXIM	Difference
January	14:0	0.8	405	11.6	0.7	28.8	2.4
February	10.9	0.3	30.5	11.3	29 <b>1</b> 0	26.6	-0.4
March	10.9	0.8	36.6	11.2	1.5	345	-0.3
April	12.5	0.2	32.8	12 <b>1</b> 4	1.0	31.4	0.1
May	10.7	0.6	32.6	6.6	0.7	32.5	0.8
June	8.5	0.9	21.2	8.0	0.2	22.7	0.5
July	8.7	0.2	39.6	0.6	1.5	22.9	-0.3
August	8.2	0.6	22.1	7.6	0.9	17.3	0.6
September	9.5	10	29.8	8.5	0.6	29.0	1.0
October	12.7	1.1	29.3	10.5	0.7	27.5	2.2
November	10.6	0.4	29.9	11.2	0.4	26.4	-0.6
December	9.0	0.3	30.7	8.9	0.3	24.4	0.1
N/D - Valid D:	N/D - Valid Data Not Available						

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

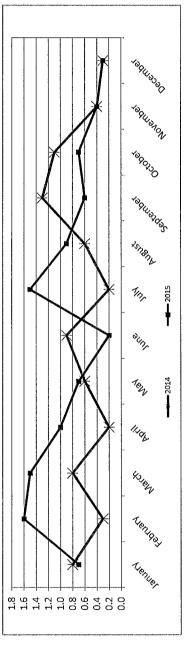
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION St. Lina Site - 2015 JOB # 2833-2015-31- A

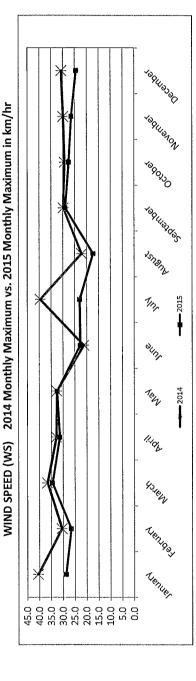




WIND SPEED (WS) 2014 Monthly Mean vs. 2015 Monthly Mean in km/hr

WIND SPEED (WS) 2014 Monthly Minimum vs. 2015 Monthly Minimum in km/hr





LICA31 WDR Joint Frequency Distribution (Percent)

01/01/15 thru 12/31/15

Distribution By % Of Samples

Logger Id : 31

		Freq	17.91	53.41	24.99	3.37	.10	00.	
		MNN	1.13	2.10	1.01	11.	00.	00.	4.37
		MN	1.44	3.25	1.51	.58	00.	00.	6.79
		WNW	1.43	5.01	2.72	.41	00.	00 '	9.58
eters		м	1.32	4.82	2.07	.34	.03	00.	8.60
: WDR : 10 M		WSW	66.	4.58	3.19	.50	.05	00 -	9.33
eter : Height		SW	1.55	4.63	2.31	.17	00 -	00.	8,68
Wind Parameter : WDR Instrument Height : 10 Meters		SSW	1.75	5.60	1.34	.06	00.	00'	8.76
Wir Ins		S	1.43	5.44	2.44	60.	00-	00.	9.40
		SSE	.74	3.17	1.74	10.	00.	00.	5.67
	Direction	SE	.53	2.88	.92	00.	00-	00.	4.35
	ιïα	ESE	.61	2.44	.87	.12	00.	00 -	4.05
		ម	.79	2.40	.91	60.	00'	00,	4.20
		ENE	66.	2.48	1.69	.59	τ0.	00.	5.78
		Ð	1.08	1.86	1.15	.14	00.	00-	4.26
31 LICA31 WSP KPH		INNE	.95	1.27	.45	.08	00-	00.	2.76
Logger Id : 31 Site Name : LICA31 Parameter : WSP Units : KPH		z	1.11	1.42	.60	.03	00.	00.	3.17
Logge Site N Parame Units		Limit	6.0	12.0	20.0	29.0	39.0	39.0	Totals
			v	v	v	v	v	X	

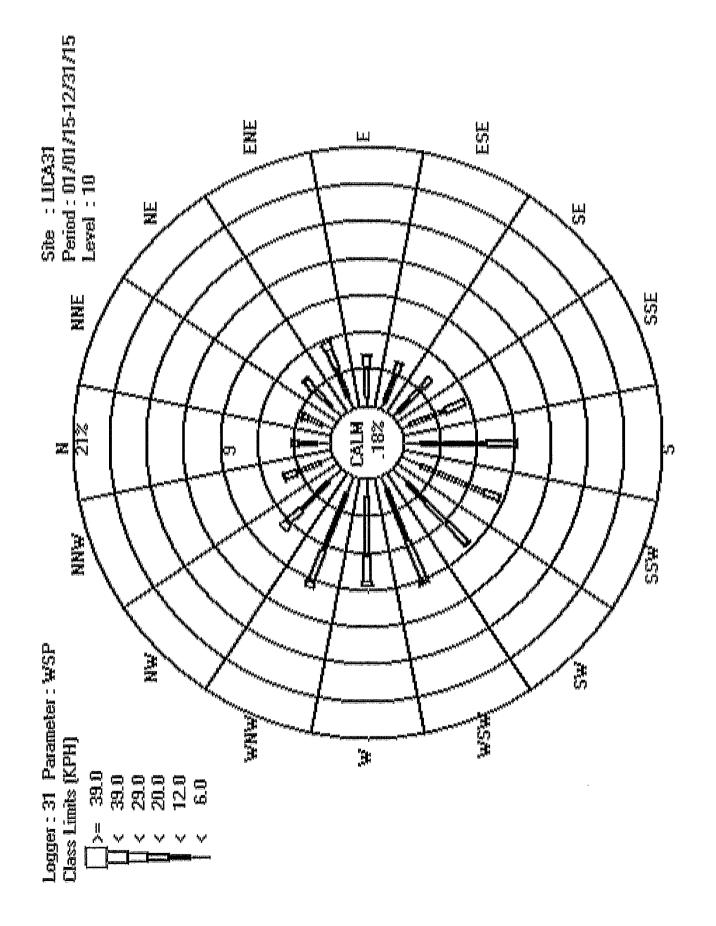
Calm : .18 %

Total # Operational Hours : 8729

Distribution By Samples

		Freq	1564	4663	2182	295	σι			
		MNN	66	184	68	10			382	
		MN	126	284	132	51			593	
		WNW	125	438	238	36			837	
		ß	116	421	181	30	m		751	
		WSW	87	400	279	44	ß		815	
		SW	136	405	202	15			758	
		SSW	153	489	117	9			765	
		ß	125	475	213	80			821	
		SSE	65	277	152	н			495	
Di monti on	ECLICIT	SE	47	252	81				380	
1,0	5	ESE	54	213	76	11			354	
		ы	69	210	80	80			367	
		ENE	87	217	148	52	н		505	
		NE	95	163	IOI	13			372	
		INNE	83	111	40	7			241	
		N	97	124	53	m			277	5. 18 %
		Limit	6.0	12.0	20.0	29.0	39.0	39.0	Totals	calm :
		Ц	v	v	v	v	v	*	Ĥ	ö

Total # Operational Hours : 8729



# **RELATIVE HUMIDITY**

Maxia Grup Campany

St. Lina Site - 2015 LAKELAND INDUSTRY & COMMUNITY ASSOCIATION JOB # 2833-2015-31- A

# RELATIVE HUMIDITY (RH) 2015 Monthly Data Summary of One Hour Readings

Month	Number of Readings <sup>1</sup>	Operational Time (%)	Monthly Average	Minimum Hourly Average (%)	MonthlyAverage Minimum Hourly Maximum Daily Maximum Daily (%) Average (%) Average (%)	Maximum Daily Average (%)
January	744	100.0	71	38	89	86
February	672	100.0	68	30	89	78
March	743	6.66	64	24	68	83
April	720	100.0	50	8	06	83
May	744	100.0	46	10	. 06	85
June	720	100.0	59	20	16	81
July	738	99.2	62	22	16	87
August	744	100.0	64	22	92	89
September	718	99.7	70	30	91	88
October	744	100.0	62	23	91	84
November	720	100.0	72	34	06	88
December	744	100.0	75	45	88	87
N/D - Valid Da	N/D - Valid Data Not Available					

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

Maxiasempen

St. Lina Site - 2015 JOB # 2833-2015-31- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

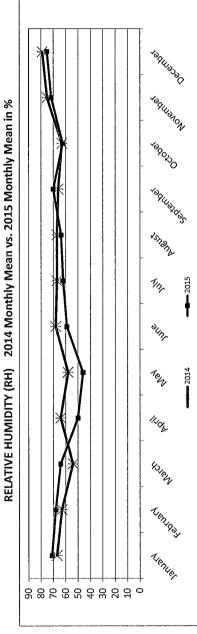
RELATIVE HUMIDITY (RH) 2014 One-Hour Readings vs. 2015 One-Hour Readings in %

	1000000000000							<u> </u>					······
	Difference	4	5-	-10	14	12	6	2	3	4	1	3	4
	MAXIMUM	89	89	89	06	06	91	16	1 2010 2010	91	91	06	88
2015	WINIWIW	86	08	74	8	10	20	22	22	0E	53	±₽£	145 145
	MEAN	71	68	64	50	46	59	62	64	70	62	72	1. 1750 C
	MUMIXEM	28	82	86	16	91	1 - 1 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 -	24   2 <b>3</b> 5	263 N	26 - C	16	06	89
2014	MINIMUM	34	15	22	12	15	31	35	31	20	22	38	52
	MEAN	67	63	54	64	58	68	67	67	99	63	75	7974
<u> </u>	Month	January	February	March	April	May	June	ylut	August	September	October	November	December

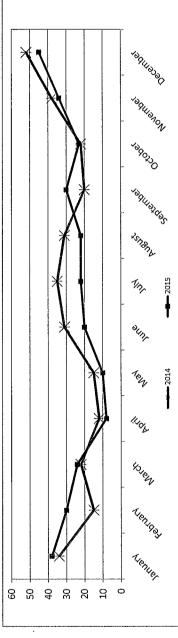
N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

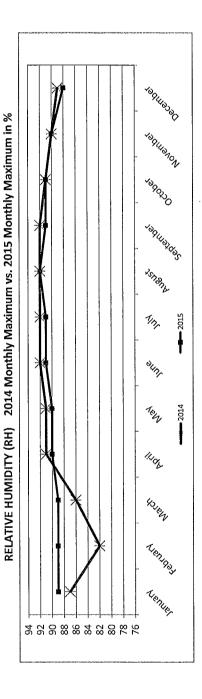
MaxXam

St. Lina Site - 2015 JOB # 2833-2015-31- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION



RELATIVE HUMIDITY (RH) 2014 Monthly Minimum vs. 2015 Monthly Minimum in %





# **BAROMETRIC PRESSURE**

Maxia Group Company

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION SOCIATION St. Lina Site - 2015 JOB # 2833-2015-31- A

BAROMETRIC PRESSURE (BP) 2015 Monthly Data Summary of One Hour Readings

Month	Number of Readings*	Operational Time (%)	Monthly Average (millibar)	Minimum Hourly Average (millibar)	Maximum Hourly Average (millibar)	Maximum Daily Average (millibar)
January	744	100.0	929	806	954	949
February	672	100.0	931	606	946	943
March	743	6.66	226	506	943	940
April	720	100.0	928	206	939	936
May	744	100.0	585	921	647	945
June	719	6.66	633	922	941	938
July	738	99.2	026	921	941	826
August	744	100.0	630	915	939	937
September	718	2.99.7	928	915	938	936
October	744	100.0	928	503	945	942
November	720	100.0	924	901	938	936
December	744	100.0	920	904	626	937
N/D - Valid Da	N/D - Valid Data Not Available					

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

Maxia ann

St. Lina Site - 2015 JOB # 2833-2015-31- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

BAROMETRIC PRESSURE (BP) 2014 One-Hour Readings vs. 2015 One-Hour Readings in millibar

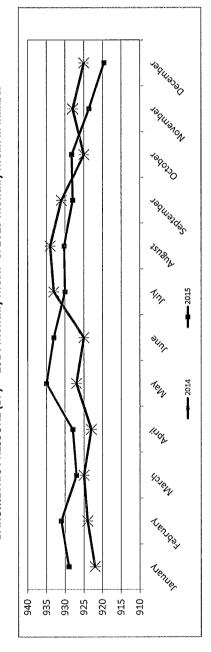
		2014			2015		
Month	MEAN	MUMINIM	MAXIMUM	MEAN	WOWINIW	MAXIMUM	Difference
January	922	889	947	929	806	554 F	-7
February	924	900	950	931	606	946	-7
March	925	806	943	255	305	943	-2
April	626	910	644	. 628	206	626	Ϋ́
May	927	915	943	1, 1, 035 at 2	921	947	φ <sub>.</sub>
June	925	916	633	633	5, 922 E	941	8-
July	633	915	946	930	921	141	m
August	934 F	920) 2003	946	930	915	939	4
September	931	917	950	928	915	938	в
October	925	912	626	928	505	945	-3
November	928	502	951	924	106	938	4
December	925	905	t56	920	904	939	5

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

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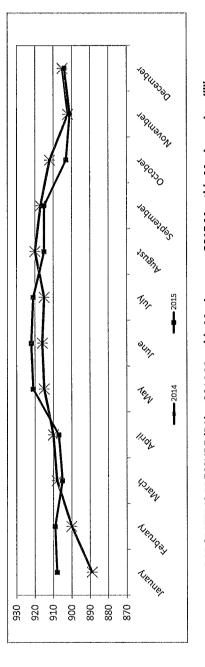
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION St. Lina Site - 2015 JOB # 2833-2015-31- A

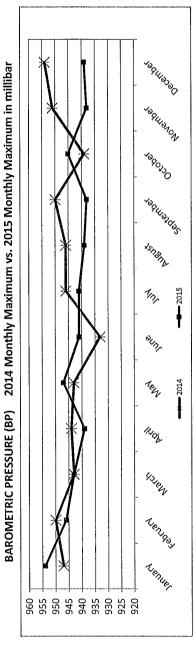




BAROMETRIC PRESSURE (BP) 2014 Monthly Mean vs. 2015 Monthly Mean in millibar

BAROMETRIC PRESSURE (BP) 2014 Monthly Minimum vs. 2015 Monthly Minimum in millibar





AMBIENT TEMPERATURE

MaxXam

St. Lina Site - 2015 JOB # 2833-2015-31- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

AMBIENT TEMPERATURE (TPX) 2015 Monthly Data Summary of One Hour Readings

Month	Number of Readings*	Operational Time (%)	Monthly Average Minimum Hourly (Deg C) Average (Deg C)	Minimum Hourly Average (Deg C)	Maximum Hourly Average (Deg C)	Maximum Daily Average (Deg C)
January	744	100.0	-9.9	-31.0	10.4	5.1
February	672	100.0	-12.5	-26.4	8.9	3.3
March	743	6.99	-0.6	-24.8	14.9	8.6
April	720	100.0	5.6	-7.4	23.7	16.6
May	744	100.0	11.4	-2.5	27.8	20.4
June	720	100.0	16.5	2.8	31.3	25.3
July	738	99.2	18.8	8.5	33.0	24.8
August	744	100.0	17.3	4.4	30.9	24.0
September	718	26.7	10.1	-3.1	26.8	17.9
October	744	100.0	7.0	-4.1	24.8	16.9
November	720	100.0	-2.8	-16.3	9.4	4.6
December	744	100.0	-9.1	-23.2	4.6	0.8
N/D - Valid Da	N/D - Valid Data Not Available					

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

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St. Lina Site - 2015 LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

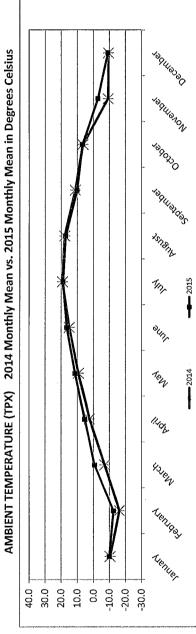
JOB # 2833-2015-31- A Maxaamaany A Buceur Verlas Group Campany AMBIENT TEMPERATURE (TPX) 2014 One-Hour Readings vs. 2015 One-Hour Readings in Degrees Celsius 2015

		2014			2015		
Month	MEAN	MINIM	MAXIMUM	MEAN	MIMIMIM	MUMIXEM	Difference
January	-10.4	-33.2	8.9	6.6-	-31.0	10.4	-0.5
February	-16.2	-30.1	4.2	-12.5	-26.4	6'8	-3.7
March	-7.0	-32.7	10.3	-0.6	-24.8	14.9	-6.4
April	2.6	-12.1	20.8	5.6	-7.4	23.7	-3.0
May	9.4	4.3	27.5	11.4	-2.5	27.8	-2.0
June	15.0	2.4	27.1	16.5	2.8	31.3	-1.5
July	19.2%	9.80	20.0 S	18.84 	8:53	1.33:02	0.4
August	17.8	6.4	29.3	17.3	4.4	30.9	0.5
September	11.2	-3.0	30.5	10.1	-3.1	26.8	1.1
October	6.6	-4.5	20.5	7.0	4.1	24.8	-0.4
November	-9.2	-27.7	10.0	-2.8	-16.3	5.4	-6.4
December	-9.4	-26.9	7.8	1.6-	-23.2	9.4	-0.3
N/D - Valid Da	N/D - Vialid Data Not Meilable						

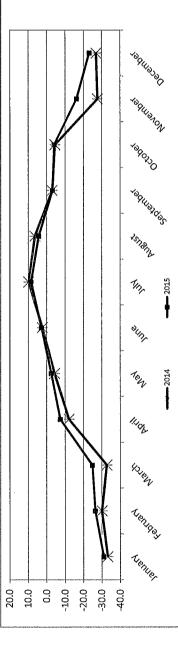
N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

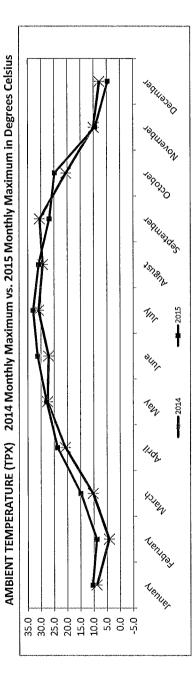
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION St. Lina Site - 2015 JOB # 2833-2015-31- A











PRECIPITATION

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MaxXam

St. Lina Site - 2015 JOB # 2833-2015-31- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

PRECIPITATION 2015 Monthly Data Summary of One Hour Readings

Month	Number of F Readings*	-Operational Time (%)	Monthly-Average Monthly Total (MM) = (MM)	Monthly Total (MM)	Maximum Hourly Average (MM)	Maximum Daily Average (MM)
January	744	100.0	0.0	12.0	2.1	0.1
February	672	100.0	0.0	12.4	1.2	0.2
March	742	2.99.7	0.0	19.2	4.0	0.2
April	720	100.0	0.0	23.7	3.7	0.4
May	740	99.5	0.1	42.3	12.7	0.9
June	714	99.2	0.1	6.9	12.9	1.0
July	738	99.2	0.1	91.0	7.5	1.6
August	744	100.0	0.0	28.5	2.8	0.7
September	718	2.99.7	0.1	98.6	5.6	2.3
October	744	100.0	0.0	21.3	2.4	0.3
November	720	100.0	0.0	20.3	2.2	0.5
December	743	6.66	0.0	6.3	0.8	0.1
	N/D Vialial Data Nat Available					

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

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St. Lina Site - 2015 JOB # 2833-2015-31- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

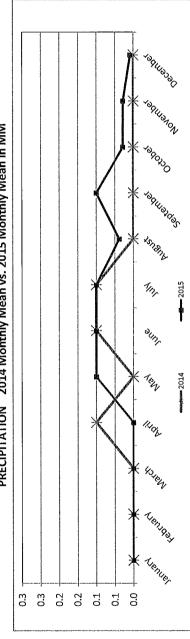
		2014			2015		
Month	MEAN	MUMINIM	MAXIMUM	MEAN	MIMIMM	MAXIMUM	Difference
January	0.0	0.0	0.5	0.0	20:0 1	2.1	0.0
February	0.0	0:0	1.0	0.0	¥0.0	1.2	0.0
March	0.0	2-0:01 2-0:01	0.3	0.0	0:0	4.0	0.0
April	t 0		4.3	0.0	50:0	3.7	0.1
May	0.0	0101 20101	0.4	0.1	0.0	12.7	-0.1
June	0.1	0.0	5.4		00	12.95	0.0
July	F.0.5	30101 10101	- 1- <b>5</b> /21	$\mathbf{T}_{\mathbf{T}}$		7.5	0.0
August	0.0	10:00 F	8.2	0.0	e10:0 5	2.8	0.0
September	0.0	0.0	4.9	F:0	0.05	5.6	-0.1
October	0.0	00 ÷	0.7	0.0	0.00	2.4	0.0
November	0.0	0:02	1.6	0.0	5 000 S	2.2	0.0
December	0.0	0:00	2.7	0.0	0.0	0.8	0.0
	N/D Victid Data Nat Austickle						

PRECIPITATION 2014 One-Hour Readings vs. 2015 One-Hour Readings in MM

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

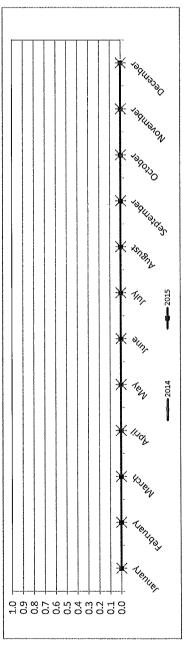
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION St. Lina Site - 2015 JOB # 2833-2015-31- A

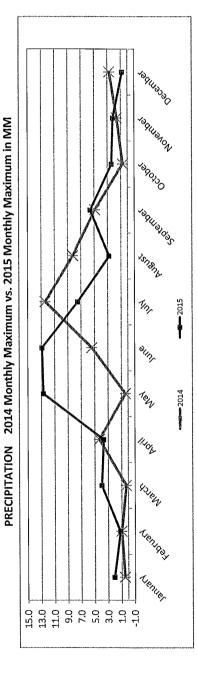




PRECIPITATION 2014 Monthly Mean vs. 2015 Monthly Mean in MM

PRECIPITATION 2014 Monthly Minimum vs. 2015 Monthly Minimum in MM





# APPENDIX II REPORT CERTIFICATION FORM



### **Report Certification Form**

Alberta Airshed (If applicable)	EPA Approval or Code of Practice Registration # (if applicable)
Jæs	
Company Name (if applicable)	Industrial Operation Name (If applicable)
Lakeland Inclusing & Community Associat	on ST Ling site
Name of the Representative of the Person Responsible (Lasi, First, Middle)	Position / Title of the Representative of the Person Responsible
Tangang Ernestine	Team Lead, Air Services
Is an External Party Certifying the Report? (If Yes', fill in the fields below for the external person. Yes / No	
Name of External Person Certifying the Report (Last First, Middle)	Position / Title of External Person Certifying the Report
STRUCTORIA AND A DESIGNMENT TOTAL AND A DESIGN TO A DESIGN AND A DESIGNATION AND A	
Company Name for the External Person Certifying the Report	Identification of Qualifications //Professional Designations of the External Person Certifying the Report

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

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

03-02-2016 Report Issued Date (dd-mm-yyyy)



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

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

# AMBIENT AIR MONITORING ANNUAL REPORT

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION ELK POINT AIRPORT SITE

JOB #:2833-2015-35- A

JANUARY - DECEMBER 2015

Prepared for:

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

BOX 8237, 5107W - 50 STREET BONNYVILLE, ALBERTA T9N 2J5

**Attention: MIKE BISAGA** 

DATE: January 28, 2016

Prepared by:

Kim Wilson, Env. Teeh Project Manager, Customer Service - Air Services

Reviewed by:

usselonty

Wunmi Adekanmbi, M.Sc. Project Manager Assistant, Air Services

Success Through Science®





### SUMMARY

Maxxam Analytics Air Services Group conducted an Ambient Air monitoring program between January 2015 and December 2015 on the Elk Point Airport Site at Lakeland Industry & Community Association, near Bonnyville, Alberta. Sampling was carried out to determine the concentrations of non-compliance parameters as requested by the project coordinator.

Data presented in this report has undergone the Post-Final Validation Procedures, which include a cursory inspection of annual charts. If errors or omissions in the data are suspected or discovered after the initial submittal of data (monthly report), the post-validation step serves to re-evaluate the affected data. The report certification form is also included in this report to verify that the annual validation review has been completed, as per the Reporting Chapter (Chapter 9) of the Air Monitoring Directive (AMD).

The summary of basic statistics includes monthly mean, maximum, and minimum values as well as comparisons to the historical mean, maximum and minimum values from the previous calendar year are presented on the following pages.

Any deviations or modifications made to the sampling or analytical methods during the monitoring period are outlined in Section 1.0 Discussion. On this basis, Maxxam is issuing this completed report to Lakeland Industry & Community Association, Elk Point Airport Site.

Should you have any questions concerning the results or if we can be of further assistance, please contact us at 403-478-9471 or toll-free at 1-800-386-7247.



### **TABLE OF CONTENTS**

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1.0 Discussion	3
2.0 Project Personnel	10
3.0 Plant Monthly Required AMD Summary	10
4.0 Calculations and Results	10
5.0 Methods and Procedures	11

Appendix I	Continuous Monitoring Data Results
	Sulphur Dioxide
	Hydrogen Sulphide
	Total Hydrocarbon
	Methane
	Non-Methane Hydrocarbon
	Oxides of Nitrogen
	Nitric Oxides
	Nitrogen Dioxide
	Ozone
	Particulate Matter 2.5
	Wind Speed
Appendix II	Report Certification Form



### 1.0 Discussion

This annual validation report consists of data for parameters Sulphur Dioxide (SO2), Hydrogen Sulphide (H2S), Total Hydrocarbon (THC), Methane (CH4), Non-Methane Hydrocarbon (NMHC), Oxides of Nitrogen (NOx), Nitric Oxide (NO), Nitrogen Dioxide (NO2), Ozone (O3), Particulate Matter 2.5 (PM2.5) and Wind Speed (WS).

The air monitoring trailer was located at Latitude: 53°53'28.8"N, Longitude: 110°45'51.0"W during the monitoring period.

The monitoring methods and equipment met all AMD requirements.

The operational uptime for all analyzers and meteorological system, with the exception of O3 in October (88.2%), was above the 90% requirement.

All data collected during the monitoring period were within the objectives outlined in the Alberta Ambient Air Quality Objectives and Guidelines Summary (AAAQOs).

A Maxxam annual internal quality audit was performed on November 19.



The summaries of the monthly maintenance report for the monitoring period are presented below:

### SULPHUR DIOXIDE (SO2)

, hour 13 was invalidated due to a small power outage.
nour to machinalitation and to a small power outager
nance was performed on February 3, followed by a post-repair calibration on
e analyzer started drifting low on February 20. An as found points check was
the same day to check the analyzer's functionality. The result was within
nits. Data quality was not affected.
of data are missing due to power failures. On March 10, hour 14 was invalidated
s flagged in error during NO2 calibration.
um data collected on April 3 at hour 15 was invalidated as the analyzer was
m a small power outage.
um data collected on May 5 at hour 3 was invalidated as the analyzer was
m a power outage.
vas recording a zero drift. The LICA-owned API 100A, S/N: 467, analyzer was
the Maxxam-supplied API 100A, S/N: 722, analyzer on June 24 for maintenance
analyzer was recalibrated on June 25 for precautionary reasons
ed API 100E, S/N: 467 analyzer was installed back to the trailer on July 24, after
vas completed in the Maxxam shop. The analyzer showed a zero drift after the
ibration on July 24. An as found points check was performed prior to the analog
tion on July 28. A 3-point calibration was performed afterwards. No further issues
1.
as working well throughout the monitoring period.
lata collected on September 16 were invalidated due to a power outage.
vas working well throughout the monitoring period.
nual internal quality audit was completed on November 19.
t calibration was performed on December 7.



### HYDROGEN SULPHIDE (H2S)

January	Hour 13 on January 19 was invalidated due to a small power outage that affected data quality.
February	Annual maintenance was performed on February 3, followed by a full post-repair calibration on
	February 4.
March	The analyzer drifted low on March 22. The LICA-owned API 101E analyzer was replaced with the
	Maxxam-supplied Thermo 450i analyzer on March 23 for maintenance purposes. The analyzer
	was allowed time to stabilize overnight and an installation calibration was performed on March
	24. Data was invalidated back to the last good zero/span check which was on March 21. Forty-
	two hours of data were invalidated due to this event. Thirteen hours of data are missing in
	March due to power failures.
April	Hourly maximum data collected on April 3 at hour 15 was invalidated as the analyzer was
	recovering from a small power outage.
May	The LICA-owned API 101E analyzer was installed back on May 20, after maintenance had been
	completed. that was brought to Maxxam shop for maintenance. Eighteen hours of data are not
	valid during the time the analyzer was stabilizing prior to the installation calibration. On May 5,
	hour 3 data was invalidated as the analyzer was recovering from a power outage.
June	The analyzer was working well throughout the monitoring period.
July	The analyzer was working well throughout the monitoring period.
August	The analyzer was working well throughout the monitoring period.
September	Two hours of data collected on September 16 were invalidated due to a power outage.
October	The analyzer was working well throughout the monitoring period.
November	The routine annual internal quality audit was completed on November 19.
December	The analyzer was working well throughout the monitoring period.

### TOTAL HYDROCARBONS (THC), METHANE (CH4) and NON-METHANE HYDROCARBON (NMHC)

January	Data collected on January 19 at hour 13 was invalidated due to a small power outage.
February	The sample pump was changed on February 3. On February 24, the analyzer was moved to a different spot in the trailer to avoid interference with the Teom unit. One hour of data is invalid as the analyzer was being moved.
March	The HC channel was put into Maintenance mode on March 9 at hour 18 while the NOx analyzer was being cleaned as this tend to affect the NMHC. Thirteen hours of data are missing in March due to power failures. Data collected on March 6 at hour 15 was invalidated as the analyzer was recovering from the power failure that occurred on that day.
April	Data collected on April 3 at hour 15 was invalidated as the analyzer was recovering from a small power outage.



May	Hourly data collected on May 5 at hour 4 and hourly maximum data collected on May 5 at hour
	3 and hour 4 were invalidated as the analyzer was recovering from a power outage.
June	The analyzer was working well throughout the monitoring period.
July	The analyzer failed an as found points check performed on July 9. Troubleshooting was
	performed and a post-repair calibration was completed on July 10. Data was invalidated back to
	the last good calibration, which was on July 7. Sixty-eight hours of data were discarded due to
	this event.
August	The analyzer was working well throughout the monitoring period.
September	Two hours of data collected on September 16 were invalidated due to a power outage.
October	The analyzer was working well throughout the monitoring period.
November	The routine annual internal quality audit was completed on November 19.
December	The analyzer was working well throughout the month.

### NITROGEN DIOXIDE (NO2)

January	The analyzer was put into Maintenance mode on January 13 from hour 9 to hour 11 to
	generate reference points for O3 calibration. Data collected on January 19 at hour 13 was
	invalidated due to a small power outage. Hour 13 on January 20 was invalidated due a spike.
February	The analyzer was put into Maintenance mode for a few minutes on February 20 for monitoring
	purposes. The analyzer was put into Maintenance mode on February 23 and February 24 to
	generate reference points for O3 calibration.
March	The Maxxam-owned API 200A analyzer was replaced with the LICA-owned API 200E analyzer on
	March 10. Thirteen hours are missing in March due to power failures.
April	Hourly maximum data collected on April 3 at hour 15 was invalidated as the analyzer was
	recovering from a small power outage.
May	Hourly maximum data collected on May 5 at hour 3 was invalidated as the analyzer was
	recovering from a power outage.
June	The analyzer was working well throughout the monitoring period.
July	The analyzer was put into maintenance mode on July 28 to generate reference points for O3
	calibration.
August	The pump was replaced on August 18. The analyzer spanned high on August 27, as the
	zero/span system was due for maintenance. Maintenance was performed in September to
	correct the unstable span issue.
September	Two hours of data collected on September 16 were invalidated due to a power outage.
October	The analyzer was working well throughout the monitoring period.
November	The routine annual internal quality audit was completed on November 19.
December	A digital output calibration was performed on December 7.



### OZONE (O3)

January	The reaction cells were cleaned on January 13. Twenty-eight hours of data were invalidated in
	January due to the zero/span valve getting stuck. Data on January 19 at hour 13 was invalidated
	due to a small power outage.
February	The zero/span valve issue continued into February. The valve was reset remotely several times,
	but this did not fix the issue permanently. The valve was replaced on Febrary 24. Fifty-two
	hours of data were discarded due to these events. The analyzer was put into Maintenance
	mode for a few minutes on February 21 for monitoring purposes.
March	The channel was put into Maintenance mode on March 11 for a calibrator check. Eleven hours
	of data were discarded due to this event. Thirteen hours of data are missing in March due to
	power failures.
April	Nineteen hours of data were invalidated in April due to the sample valve getting stuck.
May	Hourly maximum data collected on May 5 at hour 3 was invalidated as the analyzer was
	recovering from a power outage.
June	The analyzer was working well throughout the monitoring period.
July	The sample pump was rebuilt on July 24. The UV lamp was adjusted on July 28. Data collected
	on July 6 at hour 13 was invalidated due to a spike.
August	The analyzer was working well throughout the monitoring period.
September	Two hours of data collected on September 16 were invalidated due to a power outage.
October	Eighty-five hours of data were discarded in October due to the sample valve getting stuck. On
	October 22, the zero/span calibration was reconfigured by adding an extra step, "Pause Phase",
	to avoid any future recurrenece of the valve failure. No further issues were identified.
November	The routine annual internal quality audit was completed on November 19.
December	The analyzer was working well throughout the monitoring period.



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### PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5)

January	
January	Sixty-nine hours of data were invalidated for being below –3 ug/m3 this month. Data collected on January 19 at hour 13 was invalidated due to a small power outage that affected data quality. Data on January 19 at hour 14 was invalidated as the analyzer was recovering from the power outage.
February	Forty-four hours of data were invalidated for being below –3 ug/m3 this month.
March	Thirteen hours of data collected are missing in March due to power failures. Twenty-five hours of data were invalidated for being below –3 ug/m3 this month.
April	Five hours of data were invalidated for being below –3 ug/m3 this month.
May	Four hours of data were invalidated for being below –3 ug/m3 this month. Two 24-hr contraventions were recorded this month.
June	Four hours of data were invalidated for being below –3 ug/m3 this month.
July	The Teom unit had an electrical malfunction on July 4. Troubleshooting was performed on July 6 followed by a post-maintenance audit. Forty-eight hours of data were discarded due to this event. Three hours of data were invalidated for being below –3 ug/m3 this month. Five 24-hr contraventions were recorded this month.
August	The Teom unit malfunctioned on August 25. Troubleshooting was performed on August 26, followed by a post-repair audit. No further issues were identified. Twenty-seven hours of data are invalid due to this event. Nine hours of data were invalidated for being below –3 ug/m3 this month.
September	Twenty-one hours of data were invalidated for being below –3 ug/m3 this month. Two hours of data collected on September 16 were invalidated due to a power outage.
October	The pump was rebuilt on October 22. Eight hours of data were invalidated for being below –3 ug/m3 this month.
November	The routine annual internal quality audit was completed on November 19. Five hours of data were invalidated for being below –3 ug/m3 this month.
December	Three hours of data were invalidated for being below –3 ug/m3 this month.



### WIND SPEED (WS)

January	Data collected on January 19 at hour 13 was invalidated due to a small power outage.
February	The wind system was working well throughout the monitoring period.
March	Thirteen hours of data are missing in March due to power failures.
April	The wind system was working well throughout the monitoring period.
May	Hourly maximum data collected on May 5 at hour 3 was invalidated as the analyzer was recovering from a power outage.
June	The wind system was working well throughout the monitoring period.
July	Hourly maximum data collected on July 4 at hour 7 was invalidated as the analyzer was recovering from a power outage.
August	The wind system was working well throughout the monitoring period.
September	Two hours of data collected on September 16 were invalidated due to a power outage.
October	The wind system was working well throughout the monitoring period.
November	The annual audit was completed on November 19. The LICA-owned RM Young, S/N: 56589, unit was replaced with the Maxxam-supplied RM Young, S/N: 110980, unit on November 26 for maintenance purposes.
December	The wind system was working well throughout the monitoring period.



### 2.0 Project Personnel

Mike Bisaga was the contact for Lakeland Industry & Community Association, and the Maxxam field sampling team consisted of Alexander Yakupov, Christopher Wesson, Tom Bourque, Limin Li and Raja Ashraf.

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

All data collected during the monitoring period were within the objectives as outlined in the AAAQOs.

The operational uptime for all analyzers and meteorological system, with the exception of O3 in October (88.2%), was above the 90% requirement.

### 4.0 Calculations and Results

All calculations and reporting of results follow the method described in the Air Monitoring Directive, 1989, 2006 Amendments to the Air Monitoring Directive, 1989 (AMD 2006) as well as AMD 2015.



### **5.0 Methods and Procedures**

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

Maxxam AIR SOP-00001 - Methane, Non-Methane Hydrocarbon Analyzer Monitoring Maxxam AIR SOP-00208: RM Young Monitor Calibration Maxxam AIR SOP-00209: Ambient H2S Monitoring Maxxam AIR SOP-00211: Ambient SO2 Monitoring Maxxam AIR SOP-00212: Ambient O3 Monitoring Maxxam AIR SOP-00213: Ambient NO/NO2/NOx Monitoring Maxxam AIR SOP-00214: Ambient Hydrocarbon (THC) Monitoring Maxxam AIR SOP-00215: Teom Operation

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

Sulphur Dioxide - API 100E UV Flourescent Analyzer Sulphur Dioxide - API 100A UV Flourescent Analyzer Hydrogen Sulphide - API 101E UV Flourescent Analyzer Hydrogen Sulphide - Thermo 450i UV Fluorescent Analyzer Total Hydrocarbons - Thermo 55i FID Analyzer Methane, Non-Methane Hydrocarbon - Thermo 55i FID Analyzer Oxides of Nitrogen - API 200E Chemiluminescent Analyzer Oxides of Nitrogen - API 200A Chemiluminescent Analyzer Ozone - Thermo 49i Photometric Analyzer Particulate Matter (PM2.5) - R&P 1405F Teom Unit Wind System - RM Young Unit Datalogger - ESC 8832 APPENDIX I CONTINUOUS MONITORING DATA RESULTS

### SULPHUR DIOXIDE

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Elk Point Airport Site - 2015 JOB # 2833-2015-35- A

SULPHUR DIOXIDE (SO2) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of	Number of Operational		% Ri	% Readings in Concentration Range (PPB 502)	ration Range (PPB	<u>soz</u> )		<u>o</u> Blect	OBJECTIVES**	EXCEEDENCES	DENCES	MONTHLY AVERAGE
	- incounts		s 20 ppb	20 < C ≤ 60 ppb	60 < C < 110 ppb	110 < C ≤ 170 ppb	170 < C ≤ 340 ppb	>340 ppb	1-HR	24-HR	1-HR	24-HR	(PPB)
January	705	6.99	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.4
February	621	4.66	100.00%	%00'0	%00.0	%00'0	0.00%	0.00%	172	48	0	0	0.1
March	695	98.3	100.00%	%00'0	0.00%	%00'0	0.00%	0.00%	172	48	0	0	0.0
April	682	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.0
May	704	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.1
June	667	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	0	0.1
yuly	689	100.0	100.00%	%00.0	%00.0	%00.0	0.00%	%00.0	172	48	0	0	0.0
August	707	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	ο	0.0
September	682	266.7	100.00%	0.00%	0.00%	%00.0	%00.0	0.00%	172	48	0	0	0.0
October	706	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	172	48	0	٥	0.1
November	683	100.0	100.00%	%00.0	%00'0	%00'0	0.00%	0.00%	172	48	0	0	0.1
December	200	100.0	100.00%	0.00%	0.00%	%00'0	%00.0	0.00%	172	48	0	0	0.0
N/D - Valid Da	N/D - Valid Data Not Available	e									ANNUALAVERAGE	AVERAGE	0.1
*Number of R	*Number of Readings - included calibration hours	ded calibration	hours										

\*Number of Readings - included calibration nours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

0 PPB	1 PPB
8.(	0.1
Alberta Ambient AmQuality Objectives Annual Average**	Amual Average for 2015

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Elk Point Airport Site - 2015 10B # 2833-2015-35- A

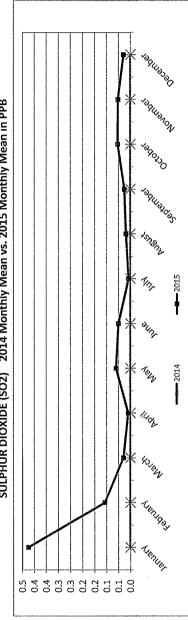
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

		2014			2015		
Month	MEAN	MIMIMIM	MUMIXEM	MEAN	MUMINIM	MAXIMUM	Difference
January	0:00	0	6. a. b. 6	0.4	0	3	-0.4
February	0.0	0 1	4	0.1	0 0	4	-0.1
March	0.0	0	. 9	0.0	0	2	0.0
April	070		2	0.0	0	1	0.0
May	0.0		2	1.0	0.0	2	-0.1
June	0.0	0	2	0.1	0	$\hat{\mu}_{ij}^{(1)} = \hat{\mu}_{ij}^{(1)} \hat{\mu}_{ij}^{(1)} \hat{\mu}_{ij}^{(1)}$	-0.1
July	0:0		IJ	0.0		1	0.0
August	0.0	0	2	0.0	0	1	0.0
September	0.0		4	0.0	0	Ţ	0.0
October		10 10		0.1	0.0	2	-0.1
November			5	0.1	0.5	2	-0.1
December	0:0		e	0.0	0	1	0.0

SULPHUR DIOXIDE (SO2) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

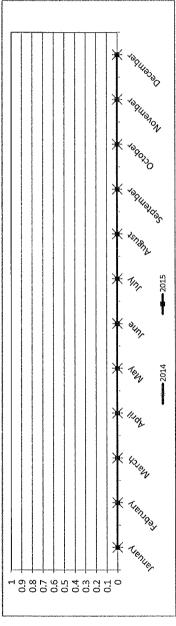
N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

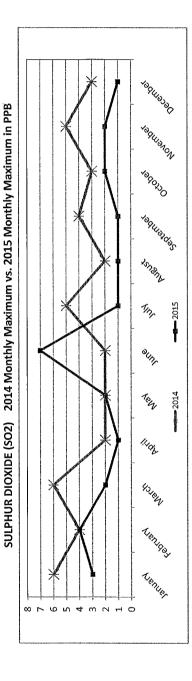
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SULPHUR DIOXIDE (SO2) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB







LICA-EIK SO2\_ / WDR Joint Frequency Distribution (Percent)

01/01/15 thru 12/31/15

Distribution By % Of Samples

		Freq	100.00	00.	00.	00.	00-	00.	
		MNW	4.29 10	00.	00-	00.	00.	00.	4.29
		MN	9.59	00-	00.	00.	00 -	00.	9.59
		MNM	12.68	00.	00.	.00	00.	00.	12.68
<i>l</i> eters		з	13.38	.00	00.	00.	.00	00.	13.38
Wind Farameter : WDR Instrument Height : 10 Meters		MSM	10.16	.00	00.	00.	00.	00.	10.16
eter : Height		SW	3.37	.00	00.	00 -	00-	.00	3.37
Wind Farameter Instrument Heig		MSS	2.42	.00	00.	00 -	00.	00.	2.42
Wir Ins		ß	2.50	00-	00.	00-	00 -	00.	2.50
		SSE	2.80	00 -	00,	00-	00-	00.	2.80
	Direction	SE	5.14	00 '	00 -	00.	00.	00-	5.14
	Dir	ESE	11.74	00.	00 -	00.	00.	00-	11.74
		ы	9.33	00-	00.	00.	00.	00.	9.33
		ENE	4.68	00.	00.	00-	00'	00.	4.68
ч		NE	2.44	00-	00*	00-	00-	00.	2.44
35 LICA-EL SO2_ PPB		INNE	2.51	00.	00.	00.	00.	00.	2.51
r Id : Name : ster :		R	2.90	00.	00-	00.	00,	00.	2.90
Loggel Site N Parame Units		Limit	20.0	60.0	0.011	170.0	340.0	340.0	Totals
			v	v	v	v	v	¥	-

Calm : .00 %

Total # Operational Hours : 8236

790 790 WNW 1102 1045 1045 1102 м 837 MSW 837 278 МS 278 200 SSW 200 206 S 206 231 Distribution By Samples SSE 231 Direction 424 SE 424 ESE 967 967 769 ы 769 386 ENE 386 뷛 201 201 207 NNE 207 Calm : .00 % 239 z 239 Totals 20.0 Limit 60.0 >= 340.0 < 110.0 < 170.0 < 340.0 v v

Freq 8236

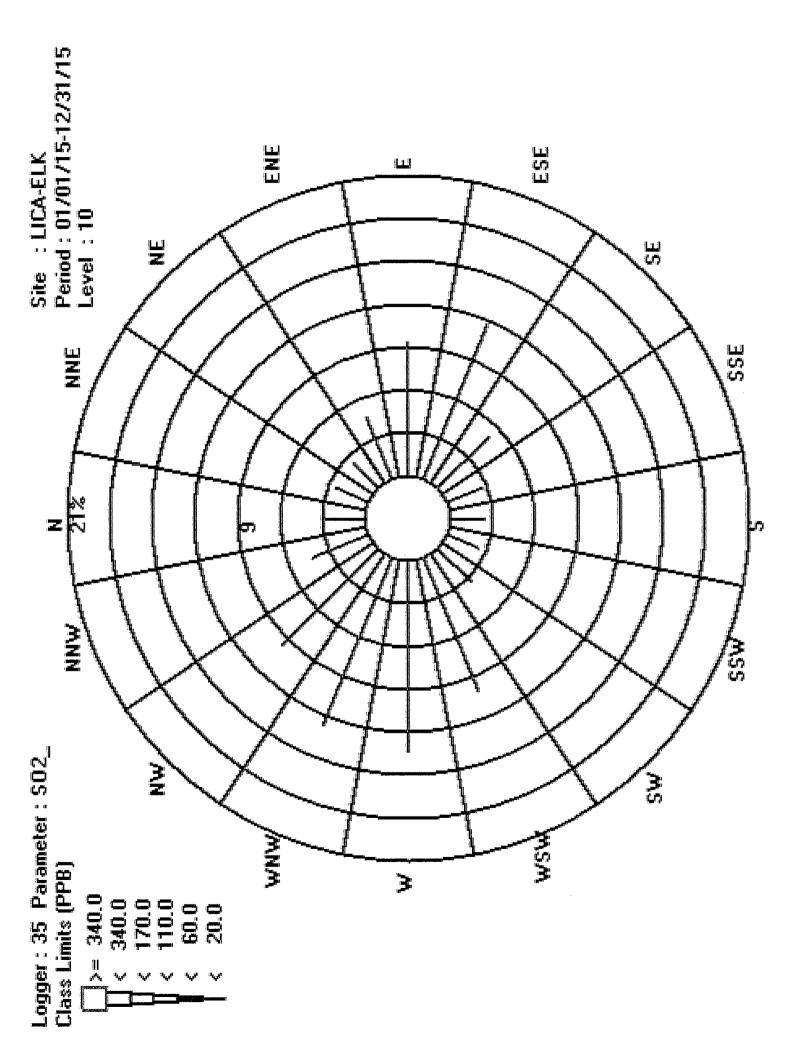
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354

354

Total # Operational Hours : 8236



### HYDROGEN SULPHIDE



### Elk Point Airport Site - 2015 JOB # 2833-2015-35- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

# HYDROGEN SULPHIDE (H2S) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of Operation Readiness	Number of Operational Readines* Time 1%	%.Ri	%Readings in Concent	Concentration Range (PPB H2S)	H2S)	OBJECHVES**	IVES**	EXCEEDENCES	iences	MONTHEY AVERAGE
	0		≤3.ppb	4 < C ≤ 10 ppb	11 <c≤50ppb< th=""><th></th><th>1-HR</th><th>24-HR</th><th></th><th>24-HR</th><th></th></c≤50ppb<>		1-HR	24-HR		24-HR	
January	705	6.66	100.00%	0.00%	0.00%	0.00%	10	m	0	0	0
February	628	99.3	100.00%	0.00%	0.00%	0.00%	10	£	О	0	O
March	624	90.2	100.00%	%00'0	%00'0	0.00%	10	3	0	0	0
April	683	100.0	100.00%	0.00%	%00.0	0.00%	10	£	0	0	0
May	678	97.6	100.00%	0.00%	0.00%	0.00%	10	3	0	0	0
June	679	100.0	100.00%	0.00%	%00.0	0.00%	10	ю	0	0	0
July	706	100.0	100.00%	0.00%	0.00%	0.00%	10	ñ	0	0	0
August	706	100.0	100.00%	0.00%	%00.0	0.00%	10	3	0	0	0
September	684	2.99.7	100.00%	0.00%	0.00%	0.00%	10	£	0	0	0
October	707	100.0	100.00%	0.00%	0.00%	0.00%	10	n	ο	0	O
November	686	100.0	100.00%	0.00%	0.00%	0.00%	10	ю	0	0	0
December	703	100.0	100.00%	0.00%	%00.0	0.00%	10	ŝ	0	0	0
N/D - Valid Da *Numher of R	N/D - Valid Data Not Available *Number of Readings - include	N/D - Valid Data Not Available *Number of Readings - included calibration hours	hours						ANNUAL AVERAGE	AVERAGE	0

\*Number of Readings - included calibration hours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

N/D PPB	0 PPB
Alberta Ambient Air Quality Objectives Annual Average**	Annual Average for 2015

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Elk Point Airport Site - 2015 JOB # 2833-2015-35- A

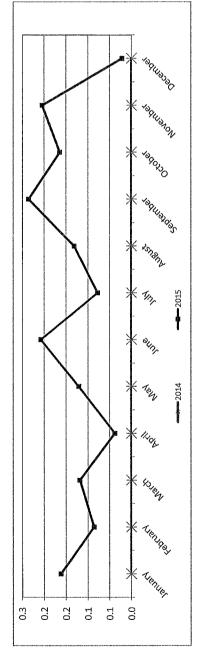
HYDROGEN SULPHIDE (H2S) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

	8													
	- Difference	-0.2	-0.1	-0.1	0.0	1.0-	-0.2	1.0-	-0.1	-0.2	-0.2	-0.2	0.0	
	MUMIXEM	2	Ч	1	Ţ	2	2	Ê	2	2	2	2	۲	
2015	MINIMIM	0	0			10 A	0	Ő	ō	0		0	01 - 11 - 11 - 11 - 11 - 11 - 11 - 11 -	
	MEAN	0.2	1.0	1.0	0.0	1.0	0.2	1.0	1.0	<b>7</b> 0	0.2	0.2	0.0	1
	MAXIMUM	5	1	2	1	2	1	2	ĸ	1	1	3	2	
2014	MUMINIM	10.20 SO		0	0.0		0		ο, O		0 - C	10 10	0 0	
	MEAN	0.0	00	0.0	2 2 0 0 V	2* 30:0 2* 30:0	613.00	0:0	0.0				0.0	
	Month	January	February	March	April	May	June	July	August	September	October	November	December	

N/D - Valid Data Not Available

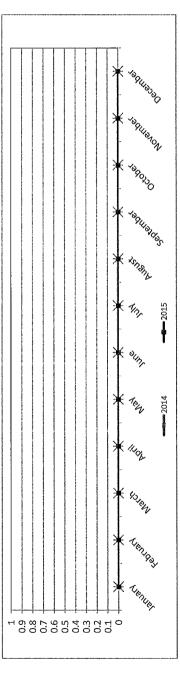
\*Annual peak is bolded and highlighted.

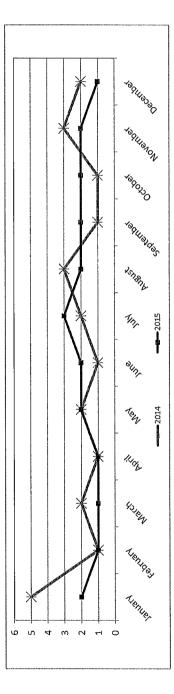
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HYDROGEN SULPHIDE (H2S) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB

HYDROGEN SULPHIDE (H2S) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPB





HYDROGEN SULPHIDE (H2S) 2014 Monthly Maximum vs. 2015 Monthly Maximum in PPB

# LICA-EIK H2S\_ / WDR Joint Frequency Distribution (Percent)

## 01/01/15 thru 12/31/15

## Distribution By % Of Samples

		Freq	00.00	00-	00.	00-	
		MNN	4.37 100.00	00-	00.	00 -	4.37
		MN	9.76	00 -	00.	00-	9.76
		MNM	12.81	00-	00.	.00	12.81
Meters		м	10.20 13.39 12.81	00-	.00	00.	10.20 13.39 12.81
Wind Farameter : WDR Instrument Height : 10 Meters		MSM		00	00.	00.	
meter t Heigh		SW	3.42	00.	00.	00.	3.42
nd Para		MSS	2.44	00.	.00	00.	2.44
Wİ		S	2.51	00.	00.	00.	2.51
		SSE	2.67	00.	00.	.00	2.67
	Direction	SE	5.11	00.	.00	00.	5.11
	Dì:	ESE	11.57	00.	00-	00.	11.57
		ы	9.35	.00	00-	00.	9.35
		ENE	4.63	00.	00-	00,	4.63
EK		NE	2.37	.00	00-	.00	2.37
35 LICA-EJ H2S PPB		INNE	2.48	.00	00-	00,	2.48
Logger Id : 35 Site Name : LICA-ELK Parameter : H2S Units : PPB		N	2.85	00.	00.	00.	2.85
Logg Site Paran Unit:		Limit	3.0	0.01	50.0	50.0	Totals
			۷	v	۷	X	

Calm : .00 %

Total # Operational Hours : 8184

### Distribution By Samples

### Direction

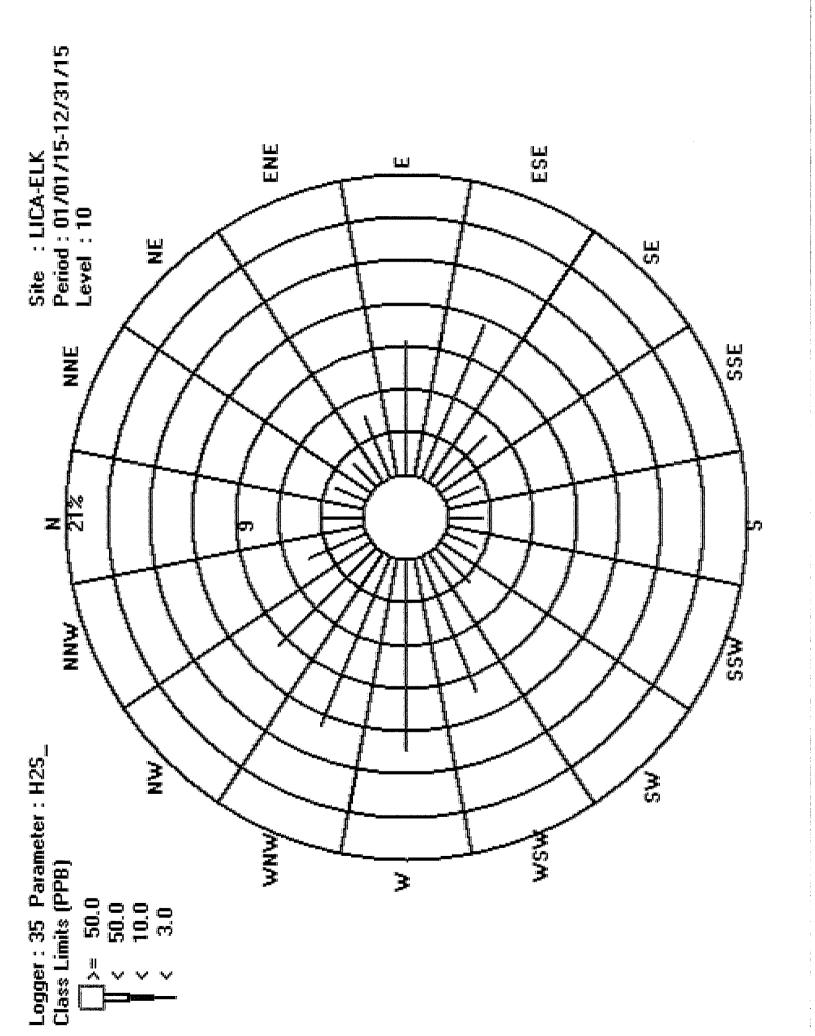
Freq 8184 MNN 358 MM 799 MNM 1049 1096 в WSW 835 MS 280 SSW 200 S 206 SSE 219 SE 419 ESE 947 766 ы ENE 379 볈 194 NNE 203 z 234 3.0 Lîmit < 10.0 v

< 50.0</li>> 50.0

Calm : .00 %

Total # Operational Hours : 8184

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### TOTAL HYDROCARBON



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Elk Point Airport Site - 2015 JOB # 2833-2015-35- A

# TOTAL HYDROCARBONS (THC) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of Doctore*	Number of Operational Boardines	%Re	adings in Concentr	%Readings in Concentration Range (PPM THC)	THC)	OBJECT	OBJECTIVES***	EXCEEL	EXCEEDENCES	MONTHLY
			s 3.0 ppm	3.1 < C≤ 10.0 ppm	ndq 0.02 > 2 > 1.01	>50.0 ppm	1-HR	24-HR	1-HR	24-HR	
January	701	6.66	80.31%	19.69%	0.00%	0.00%	ı	I	I	I	2.6
February	634	7.99	85.02%	14.98%	0.00%	0.00%	ı	1	ı	ł	2.4
March	693	0.82	85.43%	14.57%	0.00%	0.00%	1	1	1	I	2.4
April	682	6.66	88.71%	11.29%	0.00%	0.00%	1	1	1	I	2.4
Мау	706	6.66	83.99%	16.01%	0.00%	0.00%	1	T	1	I	2.4
June	685	100.0	85.11%	14.89%	%00.0	%00'0	ı	I	ı	I	2.3
۸ıлı	632	50.7	89.40%	10.60%	0.00%	0.00%	ı	1	1	1	2.2
August	707	100.0	82.04%	17.96%	0.00%	0.00%	1	I	1	I	2.5
September	683	7.66	84.19%	15.81%	0.00%	0.00%	1	1	ł	I	2.4
October	707	100.0	79.49%	20.51%	0.00%	0.00%	ı	I	1	I	2.6
November	684	100.0	84.36%	15.64%	0.00%	0.00%	1	1	1	I	2.6
December	706	100.0	70.40%	29.60%	%00.0	%00.0	ı	τ	I	I	3.0
N/D - Valid Da *Number of P	N/D - Valid Data Not Available *Number of Peadings - include	N/D - Valid Data Not Available *Number of Beadings - included calibration bours	hoitrs						ANNUALAVERAGE		25

\*Number of Readings - included calibration hours
\*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

N/D PPM	2.5 PPM
Alberta Ambient Air Quality Objectives Annual Average**	Annual Average for 2015

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MaxXam

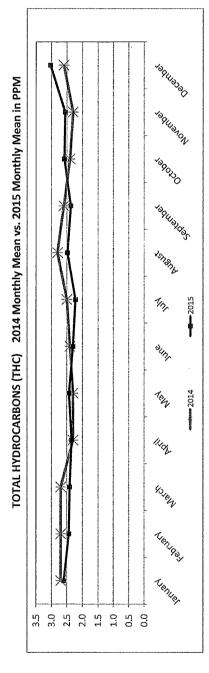
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Elk Point Airport Site - 2015 JOB # 2833-2015-35- A

TOTAL HYDROCARBONS (THC) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPM

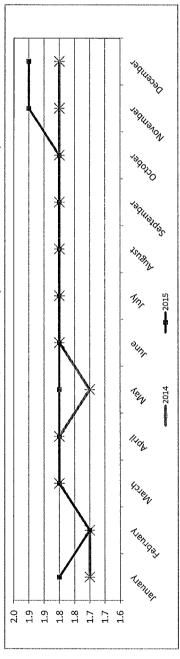
Mouth	MEAN	2014 MINIMUM	MUNIXAN	MEAN	2 MIN	MAXIMUM	Difference	
February	5.7	1.7	8.5	2.4	1.7	0.0	0.3	
March	2.7	1.8	8.4	2.4	1.8	5.4	0.3	
April	2.3	8.T	7.3	2.4	1.8	6.4	-0.1	
May	2.3	1.7	13.5	2.4	1.8	7.2	-0.1	
June	2.4	1.8	6.9	2.3	1.8	6.3	0.1	
July	2.5	1.8 c. 1.8 c. 1. c.	7.5	2.2	1.8	4.9	0.3	
August	2.8	18 18	8.7	2.5	1.8	6.4	0.3	
September	2.6	8-T	11.3	2.4	1.8	6.2	0.2	
October	2.4	1:8	8.1	2.6	1.8	7.3	-0.2	
November	2.3	1.8 1.8	7.9	2.6	1.9	8.5	-0.3	
December	2.6	<b>3.1</b>	7.9	3.0	4.6	9.4	-0.4	
N/D - Valid Data Not	ata Not Availahle							

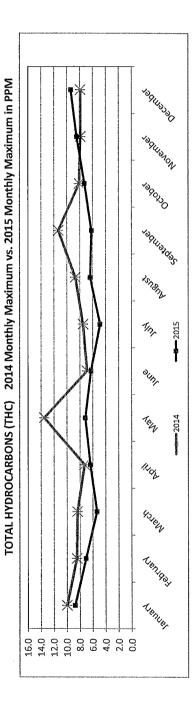
N/D - Valid Data Not Available

\*Annual peak is bolded and highlighted.



TOTAL HYDROCARBONS (THC) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPM





# LICA35 THC55 / WDR Joint Frequency Distribution (Percent)

# 01/01/15 thru 12/31/15

## Distribution By % Of Samples

Logger Id : Site Name : Parameter : Units :	35	LICA35	THC55	Mad
Logger Id Site Name Parameter Units	••	••	••	••
	Logger Id	Site Name	Parameter	Units

Wind Parameter : WDR Instrument Height : 10 Meters

	Freq	81.22	18.77	00-	00.	
	MNN	4.05	.29	00.	00.	4.34
	MN	8.55	1.05	00.	00.	9.61
	MNM	10.28	2.26	00.	.00	12.55
	м	11.84	1.65	00.	00.	13.49
	MSM	8.86	1.36	00.	00.	10.22
	MS	2.94	.48	00.	00.	3.43
	SSW	2.03	.29	00.	00.	2.32
	S	2.13	.40	00.	00.	2.53
	SSE	2.39	.46	00.	00.	2.86
Direction	SE	4.32	.92	00.	00.	5.24
μ	ESE	8.16	3.50	00.	00.	11.67
	ഥ	5.03	4.22	00.	00.	9.26
	ENE	3.65	1.04	00.	00.	4.69
	Ħ	2.08	.24	00.	00.	2.32
	NNE	2.20	.29	00.	.00	2.49
	z	2.65	.25	00.	00.	2.90
	Lîmit	3.0	10.0	50.0	50.0	Totals
		v	۷	۷	X	

Calm : .00 %

Total # Operational Hours : 8215

### Distribution By Samples

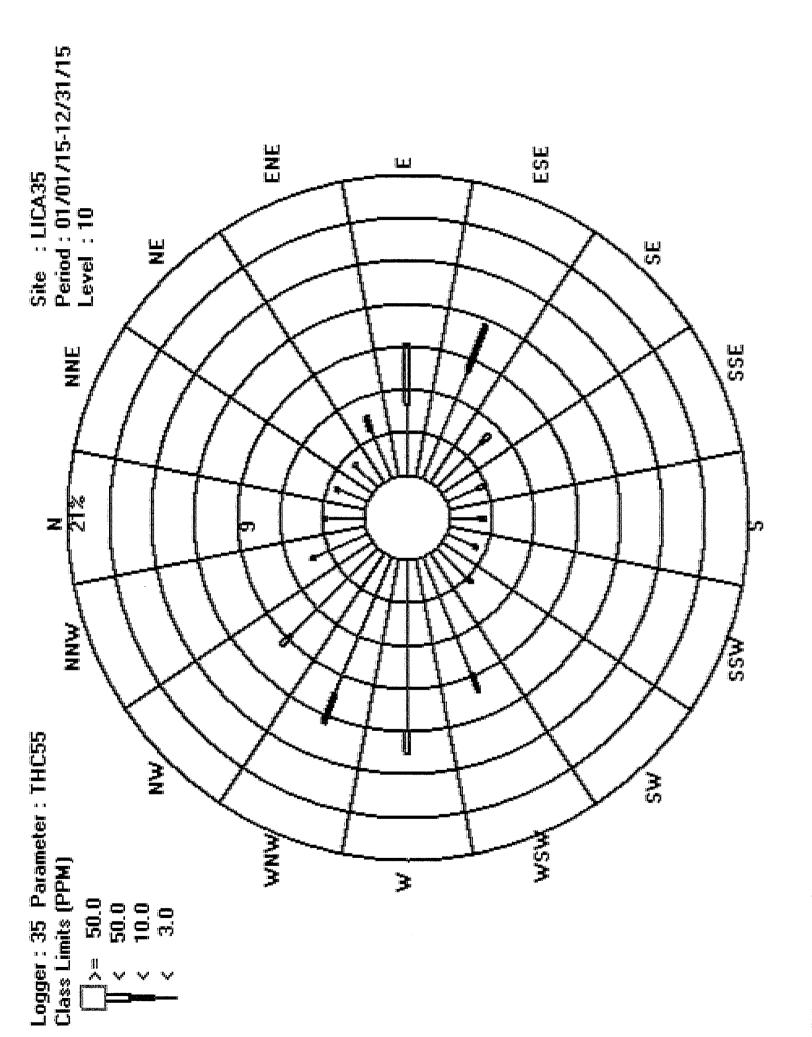
	SSW
	ß
	SSE
Direction	SE
Dir€	ESE
	ы
	ENE
	RE

Freq	6673	1542	
MNN	333	24	
NW	703	87	
MNM	845	186	
м	973	136	
WSW	728	112	
SW	242	40	
MSS	167	24	
S	175	33	
SSE	197	38	
SE	355	76	
ESE	671	288	
ы	414	347	
ENE	300	86	
NE	171	20	
INNE	181	24	
N	218	21	
Limit	3.0	10.0	50.0
	v	v	v

>= 50.0

Calm : .00 %

Total # Operational Hours : 8215



METHANE

Max and Company

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Elk Point Airport Site - 2015 JOB # 2833-2015-35- A

# METHANE (CH4) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of Postine*	Number of Operational Booding *	%Re	% Readings in Concentr	Concentration Range (PPM CH4)	CH4)	OBIEC	OBJECTIVES**	EXCEEDENCES	DENCES	MONTHLY
	30	160) 2011	s 3.0 ppm	3.1 < C ≤ 10.0 ppm	10.1 < C < 50.0 ppm	> 50.0 ppm	1-HR	24-HR	1-HR	24-HR	
January	701	6-66	81.03%	18.97%	0.00%	0.00%	I	I	ı	ı	2.6
February	634	7.99	85.17%	14.83%	0.00%	0.00%	,	ı	,	1	2.4
March	663	98.0	85.43%	14.57%	0.00%	0.00%	1	ı	1	ı	2.4
April	682	6.66	88.71%	11.29%	0:00%	0.00%	,		1	,	2.4
May	206	6.66	83.99%	16.01%	0.00%	0.00%	,	ı	I	1	2.4
June	685	100.0	86.28%	13.72%	00.0%	0.00%	1	1	I	Ţ	2.3
July	632	90.7	89.72%	10.28%	0.00%	0.00%	1	I	1	1	2.2
August	707	100.0	82.74%	17.26%	0.00%	0.00%	1	1	ı	T	2.5
September	683	2.99	84.77%	15.23%	0.00%	0.00%	1	1	1	1	2.4
October	707	100.0	79.63%	20.37%	0.00%	0.00%	1	ı	1	I	2.6
November	684	100.0	84.36%	15.64%	0.00%	0.00%	1	1	1	ı	2.6
December	706	100.0	70.82%	29.18%	0.00%	0.00%	1	1	ı	1	3.0
N/D - Valid Da *Number of R	N/D - Valid Data Not Available *Number of Readines - included calibration hours	le Jed calibration	hours						ANNUALAVERAGE	AVERAGE	2.5

\*Number of Readings - included calibration hours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used. Alberta Ambient Air Cuality/Objectives Annual Average\*\* N/D PPM Annual Average for 2015 2.5 PPM

Maxias Group Company

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Elk Point Airport 5ite - 2015 JOB # 2833-2015-35- A

2005-02

METHANE (CH4) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPM

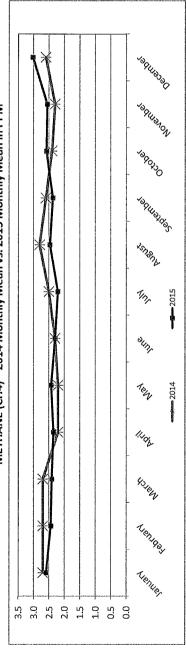
		2014			2015		
Month	MEAN	WINIMIN	MAXIMUM	MEAN	พักพาพ	MAXIMUM	Difference
January	2.7	1.7	9.2	2.6	1.8	8.6	0.1
February	2.7	1.7	8.3	2.4	<b>1.7</b>	6.9	0.3
March	2.7	1.8.	8.1	2.4	1.8	5.4	0.3
April	2.2	8-T	1.1	2.4	1.8	6.4	-0.2
May	2.2	1.7	13.1	2.4	1.8	0.7	-0.2
June	2.3	1.8	6.8	2.3	1.8	6.1	0.0
July	2.5	1.8	7.3	2.2	1.8	4.8	0.3
August	2.8	870 - 14 870 - 14	8.5	2.5	1.8	6.2	0.3
September	2.6	871 871	11.0	2.4	1.8	6.1	0.2
October	2.4	118 118 118	7.9	2.6	1.8	6.5	-0.2
November	2.3	8.E	7.8	2.6	19	8.4	-0.3
December	2.6	81	7.7	3.0	19	9.0	-0.4
N/D Valid Data Not	oldelieve to the						

N/D - Valid Data Not Available

\*Annual peak is bolded and highlighted.

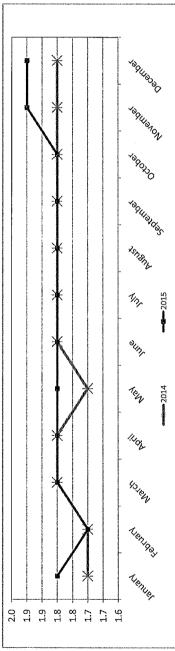
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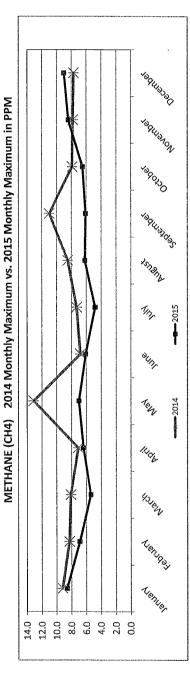
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METHANE (CH4) 2014 Monthly Mean vs. 2015 Monthly Mean in PPM

METHANE (CH4) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPM





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### LICA35 METHANE / WDR Joint Frequency Distribution (Percent)

# 01/01/15 thru 12/31/15

## Distribution By % Of Samples

<pre> A Meters </pre>	м
: : 10	WSW
ater Height	SW
Wind Parameter : WDR Instrument Height : 10 Meters	SSW
М Т. П.	S
	SSE
Direction	SE
Dir	ESE
	ы
	ENE
	뵍
Logger Id : 35 Site Name : LICA35 Parameter : MTTHANE Units : PPM	NNE
Id: Ter:	и
Logger Site Nt Parame Units	Limit

Freq	81.46	18.53	00.	00.	
MNN	4.05	.29	00-	00.	4.34
MN	8.59	1.02	00-	.00	9.61
MNM	10.29	2.25	00-	00.	12.55
м	11.85	1.64	00-	00.	10.22 13.49
MSM	8.89	1.32	00.	.00	
SW	2.94	.48	00-	00.	3.43
MSS	2.04	-27	00-	.00	2.32
S	2.13	-40	00-	.00	2.53
SSE	2.39	-46	00-	00.	2.86
SE	4.33	.91	00-	.00	5.24
ESE	8.18	3.49	00-	00.	11.67
ы	5.08	4.17	00.	.00	9.26
ENE	3.67	1.02	00	00.	4.69
RE	2.09	.23	00.	.00	2.32
INNE	2.21	.27	.00	00-	2.49
z	2.65	.25	.00	00-	2.90
Limit	3.0	10.0	50.0	50.0	Totals
	۷	۷	v	¥	

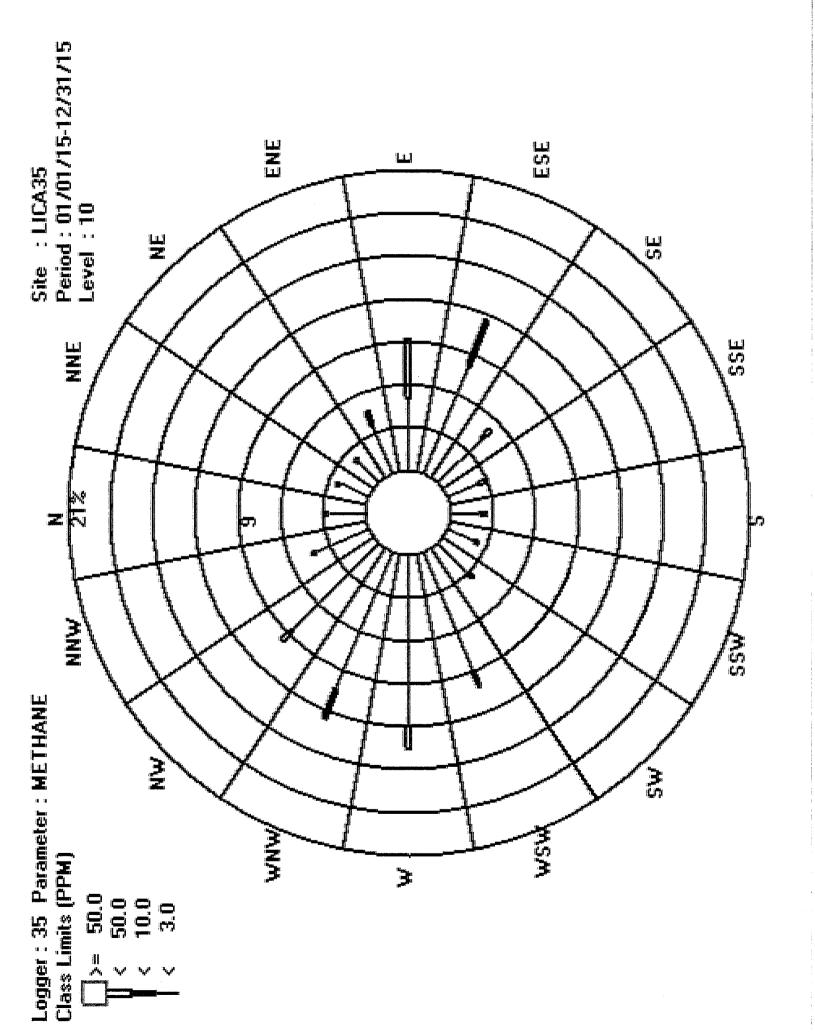
Calm : .00 %

Total # Operational Hours : 8215

		Freq	6692	1523			
		NNW	333 (	24			357
		NW	706	84			061
		WINW	846	185			1031
		ß	974	135			1109
		MSM	731	109			840
		ΜS	242	40			282
		MSS	168	23			191
		S	175	33			208
amples		SSE	197	38			235
on By S	Direction	SE	356	75			431
Distribution By Samples	Dİ	ESE	672	287			959
Dis		ы	418	343			761
		ENE	302	84			386
			172	19			191
		INNE	182	23			205
		N	218	21			239
		Limit	3.0	10.0	50.0	50.0	Totals
			v	v	۷	X	

Calm : .00 %

Total # Operational Hours : 8215



NON-METHANE HYDROCARBON

### Max A Bureau Veritas Group Company

### Elk Point Airport Site - 2015 JOB # 2833-2015-35- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

# NON-METHANE HYDROCARBONS (NMHC) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

•			
)			
)			
•			

Month	Number of Readinos*	Contraction of the second second		% Rea	% Readings in Concentration Range (PPM NMHC)	tion Range (PPM)	NMHC): 1		OBJECTIVES**	WES**	EXCEEDENCES	ENCES	MONTHLY
	2		≤ 0.20 ppm	0.21 < C ≤ 0.50 ppm	0.21 < C ≤ 0.50 ppm 0.51 < C ≤ 1.00 ppm 2.01 < C ≤ 2.00 ppm 2.01 < C ≤ 4.00 ppm	1.01 <c<2.00 ppm<="" th=""><th>2.01 &lt; C ≤ 4.00 ppm</th><th></th><th>1-HR</th><th>24=HR</th><th>1-HR</th><th>24-HR</th><th></th></c<2.00>	2.01 < C ≤ 4.00 ppm		1-HR	24=HR	1-HR	24-HR	
January	701	6.66	99.43%	0.57%	0.00%	0.00%	0.00%	0.00%	I	1	1	1	0.01
February	634	299.7	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-	1	1		0.00
March	663	98.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1	ı	1		0.00
April	682	6.66	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	•	1	1		0.00
May	706	6.66	99.86%	0.14%	0.00%	0.00%	0.00%	0.00%	1	I	1		0.01
June	685	100.0	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	ı	I	1		0.01
July	632	90.7	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1	1	'	,	0.01
August	707	100.0	99.86%	0.14%	0.00%	0.00%	0.00%	0.00%	ŀ	1	'	,	0.02
September	683	2.66	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1	ı	'	1	0.01
October	707	100.0	99.72%	0.00%	0.00%	0.14%	0.14%	0.00%	'	ı	'	,	0.01
November	684	100.0	99.71%	0.29%	0.00%	0.00%	0.00%	0.00%	l	ı	,	,	0.01
December	706	100.0	99.72%	0.28%	0.00%	0.00%	0.00%	0.00%	1	ı	I	ı	0.01
N/D - Valid Da	N/D - Valid Data Not Available	ble									ANNUALAVERAGE	WERAGE	0.01
*Number of R	Readings - inclu	*Number of Readings - included calibration hours	n hours										

\*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

Mqq D	Mqq 1
α/N	10.01
Alberta Ambient Air Quality Objectives Annual Average**	Annual Average for 2015

Elk Point Airport Site - 2015 JOB # 2833-2015-35- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

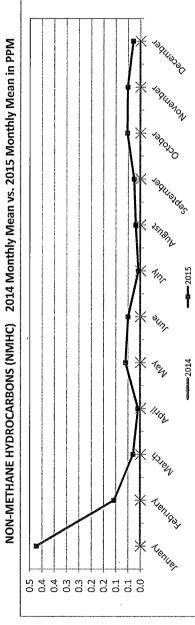
Maxaman A Duraw Vertus Geome Company NON-METHANE HYDROCARBONS (NMHC) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPM 2015 One-Hour Readings in PPM

A IV. M. T. STANDARD AN AN ANALYSIS AND AND AND AND AND AND AND AND AND AND	2014	and share a state of a state of a state of the state of the state of the state of the state of the state of the	1 - Z. Add. B. AND REPORT PRODUCT STREAM AND ADDRESS OF A DECK.	2015		1999 - Ar Andre J. S. Andrewski, A. Song and A. Shiring and Andrewski. Comparison	
Month	MEAN	MAXIMUM	MEAN	MIMIM	MAXIMUM	Difference	
January	00:00	2.10	0.01	0.00	0.30	-0.01	
February	0.00	0.30	0.00	0:00	0.20	0.00	
March		0.30	0:00	0:00	0.20	0.00	
April	00.0	0.30	0.00	00:0	0.10	0.00	
May		0.40	0.01	0:00	0.30	-0.01	
June	0000	0.30	0.01	0.00	0.20	-0.01	
July	0000	0.30	0.01	0:00	0.20	-0.01	
August		0.40	0:02	00:0	0.30	-0.02	
September		0.30	0.01	0:00	0.10	-0.01	
October	0:00	0.20	0.01	0:00	2:90	-0.01	
November	0.00	0.20	0.01	0;00	0.30	-0.01	
December	0.00	0.20	0.01	0:00	0.40	-0.01	
	te Nist A. allelia						

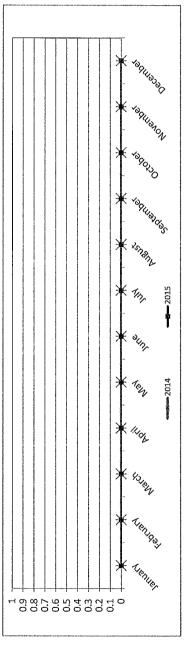
N/D - Valid Data Not Available

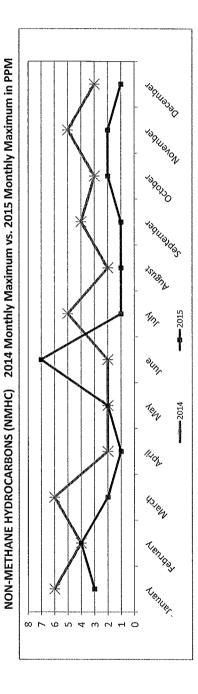
\*Annual peak is bolded and highlighted.





NON-METHANE HYDROCARBONS (NMHC) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPM





LICA35 NWHC / WDR Joint Frequency Distribution (Percent)

01/01/15 thru 12/31/15

Distribution By % Of Samples

Logger Id : 35 Site Name : LICA35

		MNN	4.34	.00	00.	00,	00-	00.	4.34
		МN	9.60	.01	00.	00-	00-	00 -	9-61
		MNM	12.51	.03	00.	00.	00-	00 -	12.55
WDR 10 Meters		м	13.47	.02	00-	00'	00-	00.	13.49
		WSW	10.22	00.	00-	00'	00-	00'	10.22
Wind Parameter Instrument Height		MS	3.43	00.	00.	00.	00.	00-	3.43
Wind Parameter Instrument Heig		MSS	2.32	00-	00.	.00	00.	00.	2.32
Чн ЦЦ		S	2.53	00-	00.	00.	00.	.00	2.53
		SSE	2.86	00-	00.	00.	00,	00	2.86
	Direction	SE	5.23	- 01	00.	00,	00.	.00	5.24
	Di	ESE	11.63	.02	00.	.01	.00	.00	11.67
		ы	9.22	.02	00.	.00	.01	.00	9.26
		ENE	4.69	00.	00.	.00	00.	00.	4.69
		NE	2.32	00.	00.	00.	00.	00.	2.32
NMEC PPM		INNE	2.49	00.	00-	00-	00.	00.	2.49
Parameter : Units :		N	2.89	.01	00-	00-	00.	00.	2.90
Parame Units		Limit	5	.5	1.0	2.0	4.0	4.0	Totals
			v	v	v	v	v	Ķ	

.00 .01 .01 .01

Freq 99.82

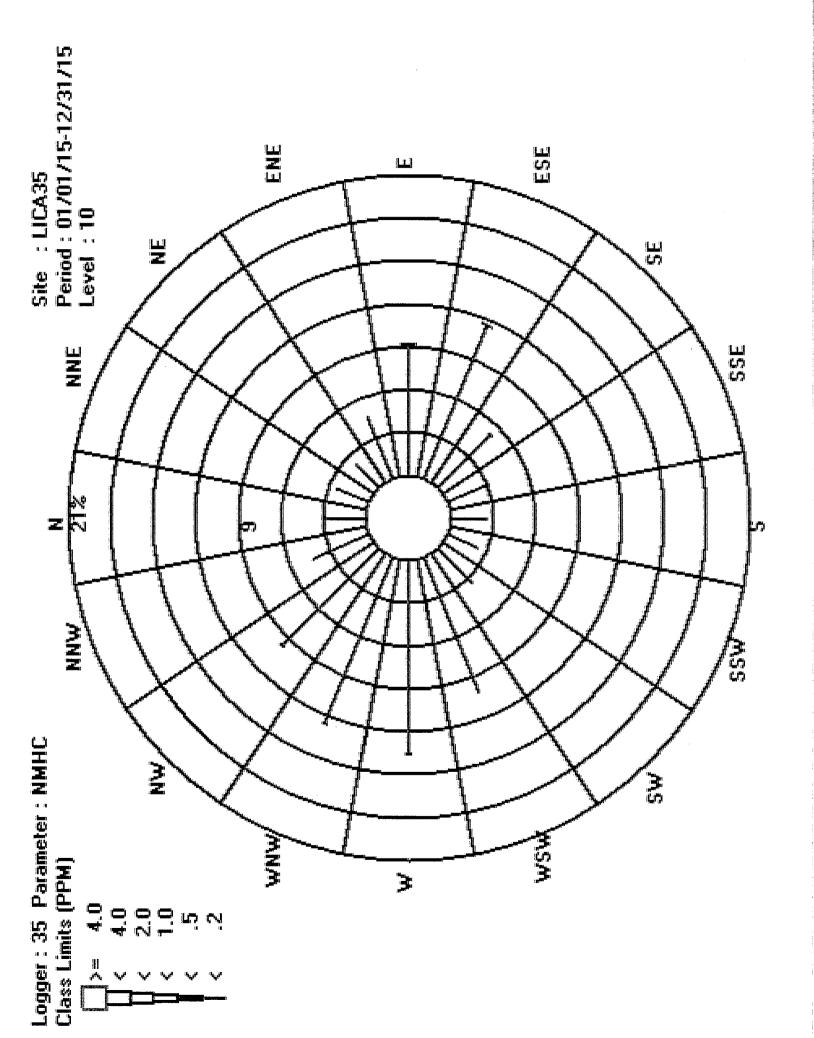
Calm : .00 %

Total # Operational Hours : 8215

Distribution By Samples

	Freq	8201	12		ы	ы			
	MNN	357 8						357	
	MN	789	ы					790	
	MNM	1028	ю					1031	
	м	1107	3					1109	
	WSW	840						840	
	MS	282						282	
	SSW	191						161	
	S	208						208	
	SSE	235						235	
Direction	SE	430	н					431	
τĊ,	ESE	956	0		ы			959	
	ы	758	0			Ч		761	
	ENE	386						386	
	NE	191						191	
	ENN	205						205	
	N	238	н					239	* 00 <b>.</b>
	Limit	4	ت	1.0	2.0	4.0	4.0	Totals	Calm : .00 %
		v	v	v	v	v	Ķ		

Total # Operational Hours : 8215



### **OXIDES OF NITROGEN**



Elk Point Airport Site - 2015 JOB # 2833-2015-35- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

# OXIDES OF NITROGEN (NOx) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of	Number of Operational	% Readings in	eadings in Concentr	Concentration Range (PPB NOX)	(XOV)	OBJECT	OBJECTIVES**	EXCERI	EXCEEDENCES	MONTHLY
		(w)-anni	< 50 ppb	51 < C ≤ 110 ppb	111 < C ≤ 210 ppb	> 210 ppb	1-HR	24-HR	1-HR ****	24-HR	
January	677	99.5	93.65%	6.35%	0.00%	0.00%	I	I	I	I	15.4
February	628	0.66	97.29%	2.71%	0.00%	0.00%	ı	I	ı	1	10.7
March	658	98.3	99.54%	0.46%	0.00%	0.00%	ı	I	I	1	9.5
April	674	100.0	98.96%	1.04%	0.00%	0.00%	ı	ı	ı	ı	6.5
May	681	100.0	98.83%	1.17%	0.00%	0.00%	1	1	-		7.4
June	679	100.0	98.97%	1.03%	0:00%	0.00%	1	L	ı	1	8.2
ylut	674	1.66	99.85%	0.15%	0.00%	0.00%	Ţ	I	I		6.5
August	673	100.0	99.41%	0.59%	0.00%	0.00%	T	1	1	ı	9.5
September	681	69.7	99.41%	0.59%	0.00%	0.00%	1	t	I	1	9.3
October	682	100.0	98.83%	1.17%	0.00%	0.00%	1	I	I	4	12.2
November	678	100.0	97.05%	2.95%	0.00%	0.00%	-	•	I		13.0
December	673	100.0	%06.68	10.10%	0.00%	0.00%	I	ł	I	1	19.2
N/D - Valid Dé *Number of R	N/D - Valid Data Not Available *Number of Readings - included calibration hours	le ded calibration	hours						ANNUAL	JANNUALAVERAGE	*s 10.6

\*Number of Readings - included calibration hours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

PPB	ррв
D/N	10.6
Alberta:Ambient Air Quality Objectives Annual Average**	Annual Averageton 2015

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Elk Point Airport Site - 2015 JOB # 2833-2015-35- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

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OXIDES OF NITROGEN (NOx) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

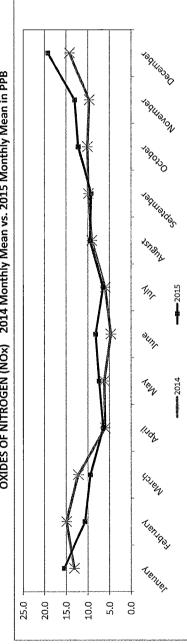
		2014			2015		
Month	MEAN	MINIM	MAXIMUM	MEAN	MINIMUM	MUMIXIM	Difference
January	13.1	0.1	116.1	15.4	0.0	88.1	-2.3
February	14.9	0.0	90.3	10.7	0.1	96.3	4.2
March	12.2	0.0	120.4	5.6	1.0	61.5	2.7
April	6.0	0.0	95.3	6.5	0.0	0.67	-0.5
May	6.2	0.0	118.1	7.4	0.0	85.5	-1.2
June	4.7	0.0	39.5	8.2	0.1	76.5	-3.5
July	6.0	0.0	46.7	6.5	0.1	53.0	-0.5
August	1.6	0.1	82.2	5.6	6.0	97.6	-0.4
September	6.6	0.0	87.1	6.3	0.6	82.9	0.6
October	10.1	0.1	188.0	12.2	1.5	68.0	-2.1
November	9.7	0.0	117.3	13.0	0.8	103.3	-3.3
December	14.2	.0.2	110.4	19.2	1.9	108.8	-5.0
N/D - Valid Data Not	ita Not Available						

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

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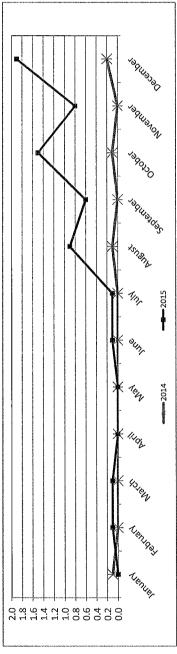
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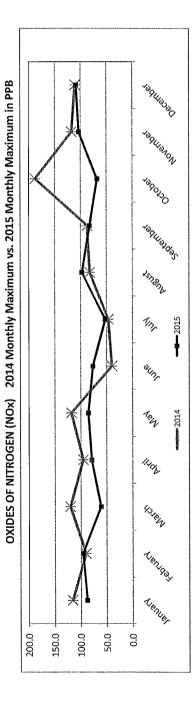
Elk Point Airport Site - 2015 LAKELAND INDUSTRY & COMMUNITY ASSOCIATION JOB # 2833-2015-35- A



OXIDES OF NITROGEN (NOx) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB

OXIDES OF NITROGEN (NOx) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPB





# LICA-EIK NOX\_ / WDR Joint Frequency Distribution (Percent)

# 01/01/15 thru 12/31/15

# Distribution By % Of Samples

		Freq	97.67	2.32	00.	00.						
		NNM	4.28	.06	00.	00-	4.34					
		MN	9.32	.18	00.	00-	9.51					
		WNW	12.25	.35	00.	00.	12.60					
Meters		ы	10.10 13.18	.23	00.	00.	13.42					
Wind Parameter : WDR Instrument Height : 10 Meters		MSW		.07	00-	00.	10.18					
meter t Heigh		MS	3.44	.01	00-	00.	3.45					
nd Para strumen			SSW	2.39	.08	00-	00.	2.48				
Ψ.İ.		S	2.44	.07	00.	.00	2.52					
		SSE	2.66	.10	.00	.00	2.77					
	Direction	SE	4.93	.15	00.	.00	5.09					
	Dİ	ESE	11.33	.34	00.	00.	11.67					
		ы	8.89	.48	00'	00.	9.37					
		ENE	4.67	.03	00.	00-	4.71					
ĽK							NE	2.38	.03	.00	00'	2.42
35 LICA-EI NOX_ PPB_		INNE	2.44	.07	.00	00.	2.52					
Logger Id : 35 Site Name : LICA-EIK Parameter : NOX Units : PPB		N	2.87	10.	.00	00.	2.88					
Logg Síte Para Unit:		Limit	50.0	0.011	210.0	210.0	Totals					
			v	v	۷	X						

Calm : .00 %

Total # Operational Hours : 8211

### Distribution By Samples

ion
Direct

Freq	8020	191		
MNN	352	ß		
MN	766	15		
MNM	1006	29		
ы	1083	19		
WSW	830	9		
MS	283	Ч		
SSW	197	٢		
S	201	Q		
SSE	219	თ		
ß	405	13		
ESE	126	28		
ы	730	40		
ENE	384	т		
EN	96T	т		
NNE	201	ە		
N	236	ы		
Limit	50.0	110.0	210.0	210.0
	۷	v	v	X

357

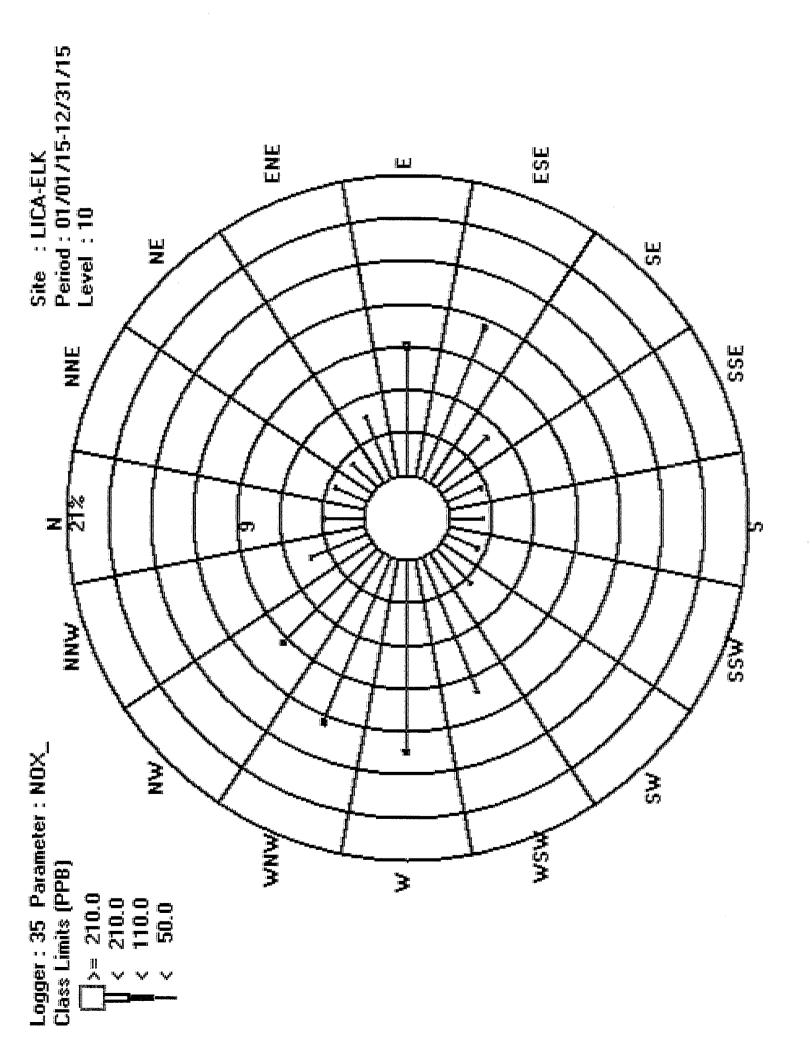
781

836 1102 1035

284

Calm : .00 %

Total # Operational Hours : 8211



#### NITRIC OXIDES



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Elk Point Airport Site - 2015 JOB # 2833-2015-35- A

# NITRIC OXIDE (NO) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of Operational Readinos* Time (%)	Operational Time (%)	%R	% Readings in Concentration Range (PPB NO)	ration Range (PPB	ĺON	OBJECI	OBJECTIVES**	EXCEEL	EXCEEDENCES	MONTHLY
		1.11	s 50 ppb	51 < C ≤ 110 ppb	111 <c <210="" ppb<="" th=""><th>dqq012 &lt;</th><th>1-HR</th><th>24-HR</th><th>1-HR</th><th>24-HR</th><th>AVERAGE</th></c>	dqq012 <	1-HR	24-HR	1-HR	24-HR	AVERAGE
January	677	99.5	%02.66	0.30%	0.00%	%00:0	I	1	t	1	4.5
February	628	0.66	69.84%	0.16%	0.00%	0.00%	-	1	r	ı	2.8
March	658	98.3	100.00%	0.00%	%00.0	0.00%	,	1	•	L	1.5
April	674	100.0	99.55%	0.45%	0.00%	0.00%	I	1	•	1	1.0
Мау	681	100.0	99.85%	0.15%	0.00%	0.00%	1	ł	1	ı	1.5
June	629	100.0	100.00%	0.00%	0.00%	0.00%	1	ı	1	ı	1.8
ylul	674	1.99	100.00%	%00 <sup>.</sup> 0	0.00%	0.00%	1	1	1	I	1.3
August	673	100.0	99.85%	0.15%	0.00%	0.00%	1	ı	1	ŧ	2.6
September	681	7.66	99.56%	0.44%	0.00%	0.00%	ı	I	I	ι	2.6
October	682	100.0	99.71%	0.29%	0.00%	0.00%	1	I	1	ı	3.8
November	678	100.0	98.82%	1.18%	0.00%	0.00%	1	I	ł	ı	3.9
December	673	100.0	95.54%	4.46%	0.00%	0.00%	•	1	I	F	8.5
N/D - Valid Di *Number of R	N/D - Valid Data Not Available *Number of Readings - included calibration hours	e led calibration	hours						ANNUAL	ANNUAL AVERAGE	30

\*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

Alberta Ambient Anguality Objectives Annual Average\*\*\* NJD PPB Annual Average for 2015 3.0 PPB

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Elk Point Airport Site - 2015 JOB # 2833-2015-35- A

# NITRIC OXIDE (NO) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

		2014			2015		
Month	MEAN	MUMINIM	MUMIXEM	MEAN	MINIMUM	MUMIXAM	Difference
January	3.6	0.0	86.4	4.5	0.0	55.5	6.0-
February	4.3	0.0	59.3	2.8	0.0	58.9	1.5
March	3.2	0:0	82.8	1.5	0.0	35.8	1.7
April	1.4	0:0:	62.9	1.0	0.0	59.1	0.4
May	1.5	0.0	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	1.5	0.0	57.7	0.0
June	1.1	0:0	27.2	1.8	0.0	47.1	-0.7
July	1.5	0:0	35.4	1.3	0.0	35.1	0.2
August	4.1	0.0	75.4	2.6	0.0	65.8	1.5
September	3.7	0:0	75.1	2.6	0.0	69.6	1.1
October	2.9	0:00 E	64.7	3.8	F0	53.9	-0.9
November	3.1	0:0	85.2	3.9	0.0	87.8	-0.8
December	4.2	0:0	72.1	8.5	0.0	89.3	-4.3
N/D - Valid Da	N/D - Valid Data Not Available						

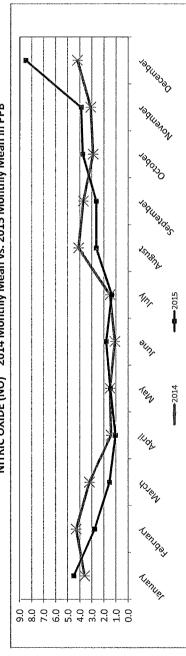
N/D - Valid Data Not Available

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\*Annual peak is bolded and highlighted.

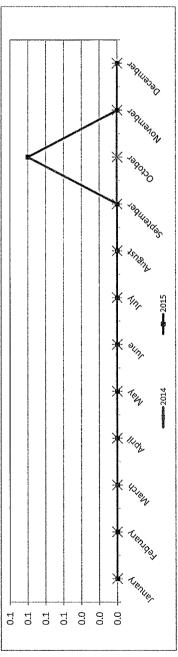
Maxia anno

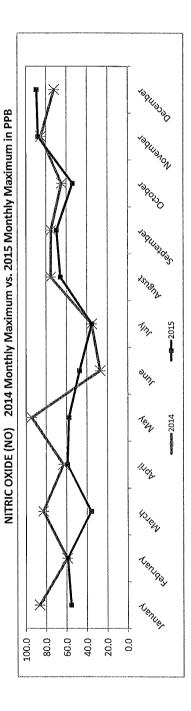
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Elk Point Airport Site - 2015 JOB # 2833-2015-35- A



NITRIC OXIDE (NO) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB

NITRIC OXIDE (NO) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPB





# NO\_ / WDR Joint Frequency Distribution (Percent)

# 01/01/15 thru 12/31/15

# Distribution By % Of Samples

		Егед	99.36	. 63	00.	00.							
		MNN	4.33	IO.	00,	.00	4.34						
		MN	9.46	.04	00-	00'	9.51						
		MNM	12.51	.08	00.	00'	12.60						
Meters		м	10.16 13.37	.04	00.	00.	13.42						
Wind Parameter : WDR Instrument Height : 10 Meters		MSM		.01	00.	00.	10.18						
meter t Heigh		SW	3.45	00.	00.	00.	3.45						
Wind Parameter Instrument Heigh		MSS	2.46	.02	00.	00-	2.48						
ЧЦ ЦЦ		S	2.50	.01	00-	00-	2.52						
		SSE	2.75	.02	.00	00.	2.77						
	Direction	SE	5.00	- 08	.00	00.	5.09						
	Dİ	ESE	11.60	.07	00*	00.	11.67						
		ы	9.21	.15	°00	00.	9.37						
	3	ENE	4.70	.01	00.	00-	4.71						
ΓK								Ħ	2.41	10.	00-	00 -	2.42
35 LICA-E NO PPB		INNE	2.49	.02	00-	00 '	2.52						
Logger Id : 35 Site Name : LICA-ELK Parameter : NO Units : PPB		N	2.88	00 -	.00	00-	2.88						
Logg Site Para Unit		Limit	50.0	110.0	210.0	210.0	Totals						
			v	v	v	¥							

Calm : .00 %

Total # Operational Hours : 8211

## Distribution By Samples

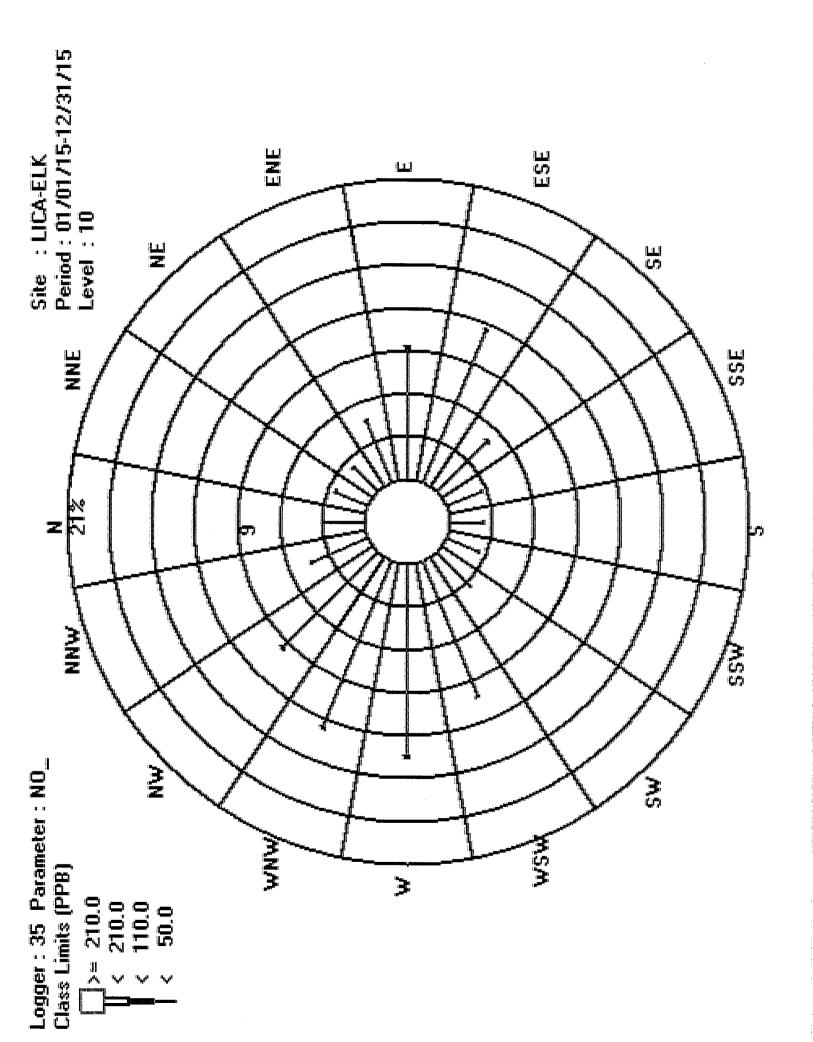
#### Direction

Limit       N       NN       NN       NN       NN       NN       NN       NN       NN       NN       NN       NN       NN       Zeq         <       50.0       237       205       198       386       757       953       411       226       206       202       284       835       1008       777       356       815         <       10.0       2       1       1       13       6       7       2       1       2       1       4       7       4       1       52          210.0       2       1       1       2       1       2       1       4       7       4       1       52          210.0       3       2       1       2       1       2       1       4       7       4       1       52          210.0       3       <					
Limit N NNE NE ENE E ESE SE SSE S SSW 5W WSW W WNW NW 50.0 237 205 198 386 757 953 411 226 206 202 284 835 1098 1028 777 3 110.0 2 1 1 13 6 7 2 1 2 1 4 7 4 210.0 210.0	Fred	8159	52		
Limit N NNE NE ENE E ESE SE SSE S SSW 5W WSW W WNW 50.0 237 205 198 386 757 953 411 226 206 202 284 835 1098 1028 77 110.0 2 1 1 13 6 7 2 1 2 1 4 7 210.0	MNN	356	ч		
Limit     N     NNE     NE     ENE     E     ESE     SE     SE     SE     SW     WSW     W       50.0     237     205     198     386     757     953     411     226     206     202     284     835     1098     10       110.0        1     1     13     6     7     2     1     2     1     4       210.0           1      4	MN	777	4		
Limit       N       NNE       NE       ENE       E       ESE       SE       SS       SS       SW       SW       WSW         50.0       237       205       198       386       757       953       411       226       206       202       284       835         110.0        2       1       1       13       6       7       2       1       2       1         210.0              1       1         210.0              1         1	MNM	1028	2		
Limit N NNE NE ENE E ESE SE SE S SSW SW 50.0 237 205 198 386 757 953 411 226 206 202 284 8 110.0 2 10.0 1 1 1 13 6 7 2 1 2 1 2 210.0 210.0	м	1098	4		
Limit N NNE NE ENE E ESE SE SSE S SSW 50.0 237 205 198 386 757 953 411 226 206 202 28 110.0 2 2 1 1 13 6 7 2 1 2 210.0 210.0	MSM	835	ч		
Limit N NNE NE ENE E ESE SE SE S SSE S 50.0 237 205 198 386 757 953 411 226 206 2 110.0 2 2 1 1 13 6 7 2 1 210.0 310 1 11 12 10 10 10 10 10 10 10 10 10 10 10 10 10	ЫS	284			
Limit     N     NNE     NE     ENE     E     ESE     SE     SSE       50.0     237     205     198     386     757     953     411     226       110.0     2     1     1     13     6     7     2       210.0     1     1     13     6     7     2       210.0     2     1     1     13     6     7	SSW	202	0		
Limit N NNE NE ENE E ESE SE 50.0 237 205 198 386 757 953 411 2 110.0 2 1 1 13 6 7 210.0 210.0	S	206	н		
Limit N NNE NE ENE E ES 50.0 237 205 198 386 757 953 110.0 2 2 1 1 13 6 210.0 210.0	SSE	226	N		
Limit N NNE NE ENE E ES 50.0 237 205 198 386 757 953 110.0 2 2 1 1 13 6 210.0 210.0	SE	411	2		
Limit N NNE NE ENE 50.0 237 205 198 386 110.0 2 2 1 1 210.0	ESE	953	9		
Limit N NNE NE 50.0 237 205 198 1 110.0 2 2 1 210.0 210.0	ы	757	13		
Limit N NNE 50.0 237 205 19 110.0 237205 2 210.0 2 210.0	ENE	386	н		
Limit N 50.0 237 2 110.0 210.0 210.0	R	198	rH		
Limit 50.0 110.0 210.0 210.0	INNE	205	0		
	Z	237			
v v v Å	Limit	50.0	0.011	210.0	210.0
		۷	۷	v	X

357

Calm : .00 %

Total # Operational Hours : 8211



#### NITROGEN DIOXIDE



#### LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Elk Point Airport Site - 2015 JOB # 2833-2015-35- A

# NITROGEN DIOXIDE (NO2) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of	<b>机使用/</b> 通过		% Readings in Concentration Range (PPB NO2	ration Range (PPB	NO2)	-SEICTIVES*	IVES**	EXCEEL	EXCEEDENCES	MONTHLY
	shinpau	(%)anntes	≤ 50 ppb	51 < C ≤ 110 ppb	111 < C ≤ 210 ppb	> 210 ppb	1-HR	24-HR	- 1-HR	24-HR	AVERAGE
January	677	<u> 99.5</u>	100.00%	0.00%	0.00%	0.00%	159	I	0	I	10.9
February	628	0.66	100.00%	0.00%	0.00%	0.00%	159	1	0	'	7.9
March	658	98.3	100.00%	0.00%	0.00%	0.00%	159	I	o	1	9.7
Aprīl	674	100.0	100.00%	0.00%	0.00%	0.00%	159	r	0	'	5.4
May	681	100.0	100.00%	0.00%	0.00%	0.00%	159	r	0	,	6.0
June	679	100.0	100.00%	0.00%	0.00%	0.00%	159	,	0	ı	6.4
July	674	1.99	100.00%	0.00%	%00"0	0.00%	159	t	0	1	5.1
August	673	100.0	100.00%	0.00%	0.00%	0.00%	159	E	0	1	6.9
September	681	2.99.7	100.00%	0.00%	0.00%	0.00%	159	ı	0	1	6.6
October	682	100.0	100.00%	0.00%	0.00%	0.00%	159	I	ο	1	8.8
November	678	100.0	100.00%	0.00%	%00.0	0.00%	159	1	0	1	9.1
December	673	100.0	100.00%	0.00%	%00.0	0.00%	159	ı	0	ı	10.7
N/D - Valid Da *Number of R	N/D - Valid Data Not Available *Number of Readings - include	N/D - Valid Data Not Available *Number of Readings - included calibration hours	hours						ANNUAL	ANNUALAVERAGE	

\*Number of readings - Included calloration froms \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

24 PPB	7.6 PPB
Alberta Ambient An Quality Objectives Annual Average**	Annual Average for 2015

Max Xam

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Elk Point Airport Site - 2015 JOB # 2833-2015-35- A

NITROGEN DIOXIDE (NO2) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

		2014			2015		
Month	MEAN	MUMINIM	WOWIXÓW	MEAN	MUMINIM	MAXIMUM	Difference
January	9.6	0.1	36.7	10.9	0.0	36.3	-1.3
February	10.6	0.0	38.9	7.9	0.0	414	2.7
March	9.0	0.0	39.6	7.9	0.2	35.3	1.1
April	4.6	0.0	32.6	5.4	0.0	26.0	-0.8
May	4.7	0.0	36.7	6.0	0.0	34.4	-1.3
June	3.7	0.0	20.1	6.4	0.1	30.0	-2.7
July	4.5	0.0	22.8	5.1	0.1	23.3	-0.6
August	5.0	0.0	21.5	6.9	6.0	31.8	-1.9
September	6.3	0.0	- 40:1	6.6	1.3	19.1	-0.3
October	6.9	1.0	33.3	8.8	1.0	25.1	-1.9
November	6.7	0.0	35.4	9.1	0.8	27.9	-2.4
December	10.0	20	39.7	10.7	1.0	27.1	-0.7
N/D Valid Data Not	aldelicut tota						

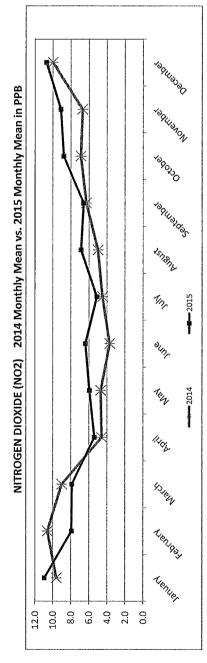
N/D - Valid Data Not Available

\*Annual peak is bolded and highlighted.

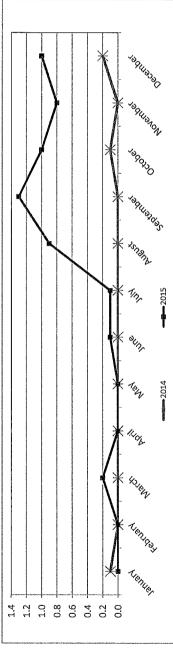
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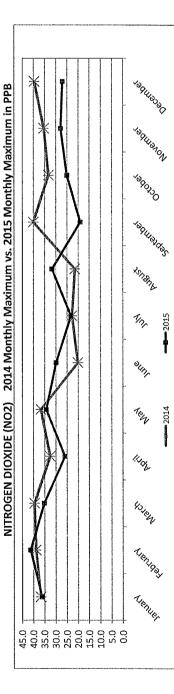


LAKELAND INDUSTRY & COMIMUNITY ASSOCIATION Elk Point Airport Site - 2015 JOB # 2833-2015-35- A









# LICA-EIK NO2\_ / WDR Joint Frequency Distribution (Percent)

# 01/01/15 thru 12/31/15

# Distribution By % Of Samples

		Wind Parameter : WDR	Instrument Height : 10 Meters	Direction	
Logger Id : 35	Site Name : LICA-ELK	Parameter : NO2	Units : PPB		

Freq	00-00	00.	00.	00 '	
MNN	4.34 100.00	00.	00-	00,	4.34
MN	9.51	00.	00 '	00.	9.51
MNM	12.60	00-	00'	00.	12.60
ß	13.42	00.	.00	00.	13.42
MSW	10.18	00-	00.	00.	10.18
SW	3.45	00-	.00	.00	3.45
SSW	2.48	00.	00.	00.	2.48
S	2.52	00-	00-	00.	2.52
SSE	2.77	.00	00'	00-	2.77
SE	5.09	.00	00.	00.	5.09
ESE	11.67	00.	00-	00.	11.67
ы	9.37	00.	00-	00'	9.37
ENE	4.71	00*	00-	00.	4.71
뵍	2.42	00 -	00.	00.	2.42
NNE	2.52	00.	00.	00.	2.52
N	2.88	00.	.00	00.	2.88
Limit	50.0	0.011	210.0	210.0	Totals
	۷	۷	۷	X	

Calm : .00 %

Total # Operational Hours : 8211

## Distribution By Samples

#### Direction

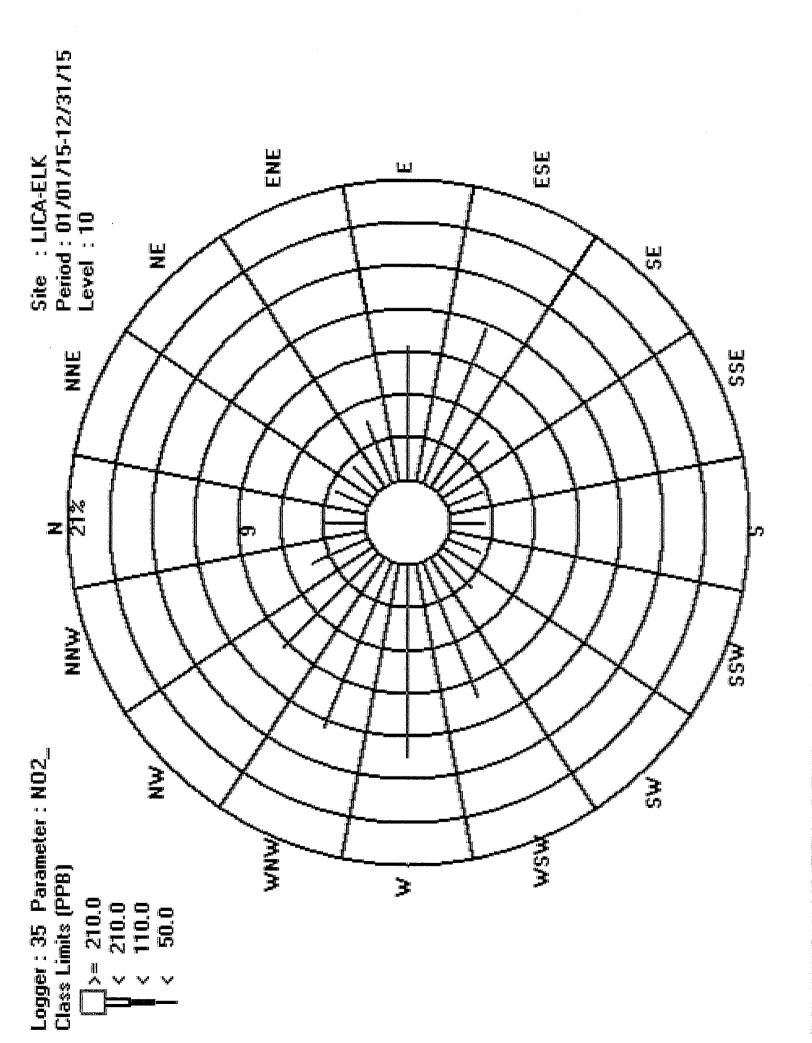
Freq 8211 MNN 357 MN 781 MNM 1035 м 836 1102 MSW ΜS 284 MSS 204 S 207 SSE 228 SE 418 ESE 959 770 ы ENE 387 뷛 199 INNE 207 237 z Limit < 50.0 < 210.0 0'0II >

>= 210.0

Calm : .00 %

Total # Operational Hours : 8211

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**OZONE** 



Elk Point Airport Site - 2015 JOB # 2833-2015-35- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

# OZONE (O3) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of Bording *	Number of Operational	e % Readings I	eadings in Concent	n Concentration Range (PPB 03)	03)	OBJECT	OBJECTIVES**	EXCEFI	EXCEEDENCES	MONTHLY
	(v) anne service servi	lov)-annin	≤50 ppb	51 < C ≤ 110 ppb	111 < C < 210 ppb	210 ppb:	1-HR	24-HR	1-HR	24-HR	AVENAGE
January	652	96.2	100.00%	0.00%	0.00%	0.00%	82	I	0	1	22
February	574	91.7	100.00%	0.00%	0.00%	0.00%	82	I	0	ı	23
March	661	96.8	100.00%	%00.0	%00.0	0.00%	82	a a	ο	1	27
April	663	97.4	96.53%	3.47%	0.00%	0.00%	82	ı	o	I	31
Мау	684	100.0	77.19%	22.81%	0.00%	0.00%	82	,	0	ı	37
June	685	100.0	80.07%	9.93%	0.00%	0.00%	82	,	0	4	31
July	666	100.0	96.25%	3.75%	0.00%	0.00%	82	I	0	-	25
August	684	100.0	100.00%	0.00%	0.00%	0.00%	82	1	0	1	17
September	684	7.96	100.00%	0.00%	0.00%	0.00%	82	-	0	ı	15
October	593	88.2	100.00%	0.00%	0.00%	0.00%	82	1	0	ı	15
November	684	100.0	100.00%	%00.0	0.00%	0.00%	82	-	0	I	13
December	683	100.0	100.00%	0.00%	0.00%	0.00%	82	I	0	I	10
N/D - Valid Da *Number of R	N/D - Valid Data Not Available *Number of Readings - included calibration hours	e fed calibration	hours						ANNUAL AVERAGE	AVERAGE	<b>2</b> 2

\*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

ррв	PPB
N/D	22
Alberta Ambient Air Quality Objectives Annual Average**	Annual Average for 2015

Maxia mu

Elk Point Airport Site - 2015 JOB # 2833-2015-35- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

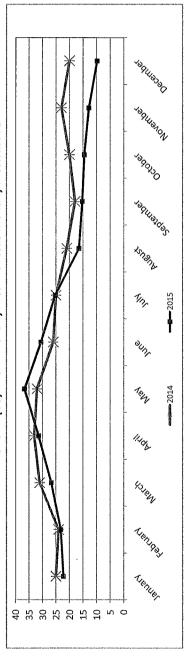
OZONE (03) 2014 One-Hour Readings vs. 2015 One-Hour Readings in PPB

		2014			2015		
Month	MEAN	MUMINIM	MINIMUM	MEAN	2	MAXIMUM	Difference
January	25	0	46	22	0	40	Э
February	24	0	T4	23	0	41	1
March	31	0	56	27	Ţ	47	4
April	33	0	23	31	0	55	2
May	32	0	63	22	0	70	5
June	26	0	62	31	1	20	Ŷ
ylut	25	0	- 66	25	0	60	0
August	21	0	53	17	0	48	4
September	18	0	50	15	0	44	ß
October	20	$1^{-1}$	43	15	0	37	ß
November	23	0	42	13	0	32	10
December	20	0	41	10	0	30	10
N/D - Valid Da	N/D - Valid Data Not Availahle						

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

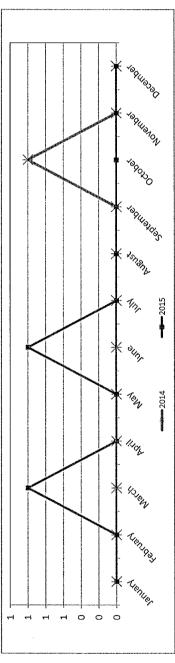
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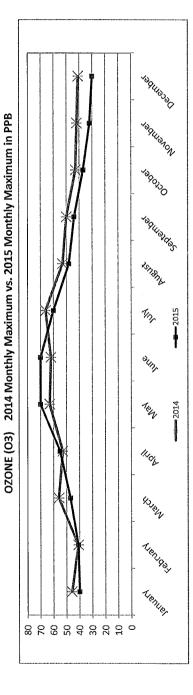
LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Elk Point Airport Site - 2015 JOB# 2833-2015-35- A



OZONE (O3) 2014 Monthly Mean vs. 2015 Monthly Mean in PPB

OZONE (O3) 2014 Monthly Minimum vs. 2015 Monthly Minimum in PPB





# LICA-EIK 03\_ / WDR Joint Frequency Distribution (Percent)

# 01/01/15 thru 12/31/15

# Distribution By % Of Samples

		Freq	96.23	3.76	00.	00.	
		MNN	4.11	60.	00.	00.	4.21
		M	9.43	.30	.00	.00	9.74
		WNW	13.10 12.40	.28	00.	00 -	13.37 12.69
Meters		м		.27	.00	00.	13.37
Wind Farameter : WDR Instrument Height : 10 Meters		MSW	9.92	.24	00-	00.	10.17
neter t Heigh		МS	3.23	.19	00.	.00	3.43
nd Para strumen		SSW	2.26	.23	00.	.00	2.50
Wir In:		ω	2.18	.39	00.	00-	2.57
		SSE	2.45	-39	.00	00-	2.85
	Direction	SE	4.79	.27	00.	00.	5.07
	DÌJ	ESE	11.11	.44	00.	00.	11.56
		ы	9.25	60.	.00	.00	9.35
		ENE	4.47	.11	00.	00 -	4.58
ĽK		NE	2.34	.09	00.	00.	2.44
: 35 : LICA-EI : 03 : PPB		NNE	2.34	.16	.00	00.	2.50
r Id Name ster		N	2.76	.13	00.	00.	2.90
Logger Site N Parame Units		Limit	50.0	0.011	210.0	210.0	Totals
			v	v	v	¥	

Calm : .00 %

Total # Operational Hours : 8067

## Distribution By Samples

u	
Directic	

Freq	ო	4		
	7763	30		
MNM	332	00		
MM	761	25		
WNW	1001	23		
м	1057	22		
WSW	801	20		
SW	261	16		
SSW	183	19		
ω	176	32		
SSE	198	32		
SE	387	22		
ESE	897	36		
ы	747	ω		
ENE	361	თ		
RE	189	ω		
INNE	189	13		
Z	223	IJ		
Limit	50.0	110.0	210.0	210.0
	v	v	v	¥

234 Totals

340

786

821 1079 1024

277

202

208

230

409

933

755

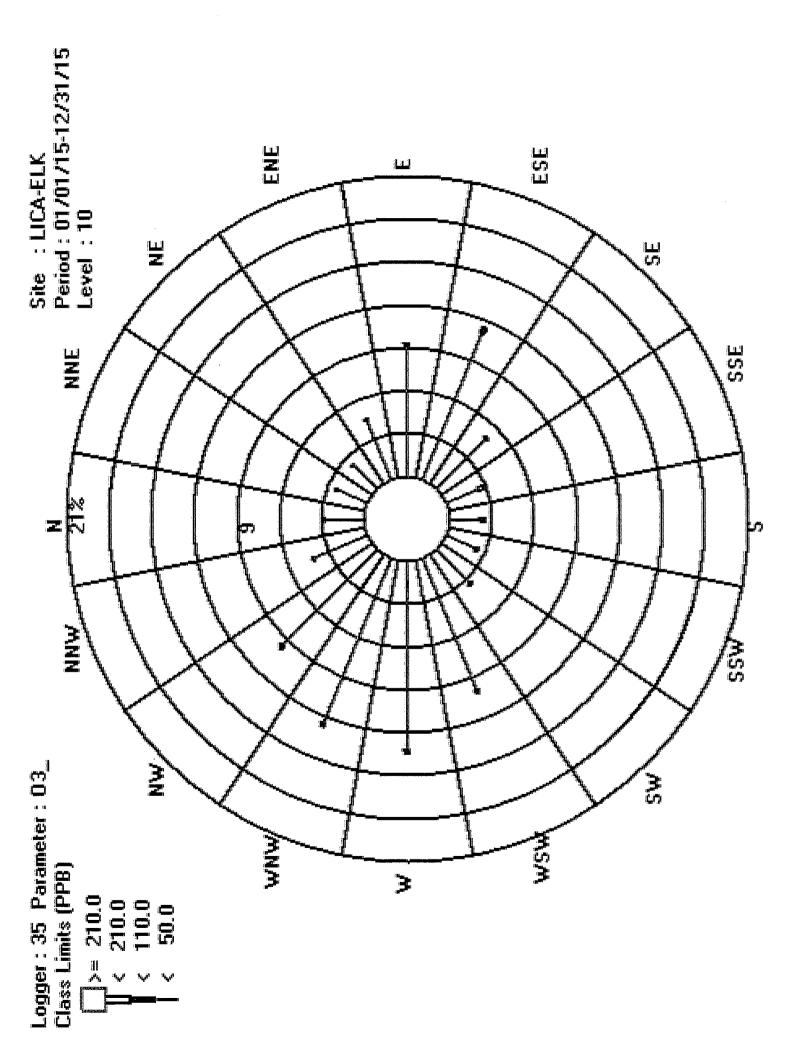
370

197

202

Calm : .00 %

Total # Operational Hours : 8067



PARTICULATE MATTER 2.5

Max Kam

Elk Point Airport Site - 2015 JOB # 2833-2015-35- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5) 2015 Monthly Averages and Frequency Distributions of One Hour Readings

Month	Number of Operational Baadinge* Time (%)	Operational Time (%)		% Read		ings in Concentration Range (ug/m3 PM2 5)	PM2.5)		OBJECI	OBJECTIVES**	EXCEEDENCES	DENCES	MONTHLY
	weatings -	A MARCA VOLUME	≤30 ug/m3	31 < C ≤ 60 ug/m3	61 < C ≤ 80 ug/m3	1	81 < C ≤ 120 ug/m3	>240 ug/m3	1-HR	24-HR	1-HR	24-HR	AVENAGE
January	699	90.5	98.21%	1.64%	0.15%	0.00%	00.00%	0.00%	1	30	I	. 0	9
February	626	93.5	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	ĩ	30	1	0	'n
March	669	94.9	100.00%	0.00%	0.00%	%00'0	%00'0	0.00%	1	30	,	0	Q
April	711	2.99	100.00%	%00.0	0.00%	%00.0	0.00%	0.00%	ł	30	I	0	m
May	735	5.66	69.69%	0.68%	0.41%	%60 <sup>.</sup> T	%00.0	0.14%	1	30	1	7	ω
June	714	<b>99.4</b>	97.34%	1.96%	0.28%	0.42%	0.00%	0.00%	1	30	1	0	7
July	687	1.59	88.65%	5.24%	1.02%	%68 <sup>.</sup> T	2.91%	0.29%	ı	30	,	ы	17
August	706	95.2	98.16%	1.70%	0.14%	0.00%	0.00%	0.00%	ŀ	30	•	0	7
September	694	96.8	100.00%	%00'0	%00'0	%00.0	%00'0	%00'0	-	30	I	0	ñ
October	734	98.9	99.86%	0.14%	0.00%	0.00%	0.00%	0.00%	I	30	I	0	4
November	711	6.92	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1	30	1	0	ę
December	739	9.66	100.00%	0.00%	%00.0	0.00%	%00:0	0.00%	-	30	-	ο	ø
N/D - Valid Da	N/D - Valid Data Not Available	L.									ANNUALAVÈRAGE	9VÊRAGE	7
*Number of R	*Number of Readings - included calibration hours	led calibration	hours										

\*Number of Readings - included calibration nours \*\*If Alberta Ambient Air Quality Objectives are not available, N/D is used.

D ug/m3	ug/m3
Z	
Alberta Ambient Air Quality Objectives Annual Average 7	Annual Average for 2015

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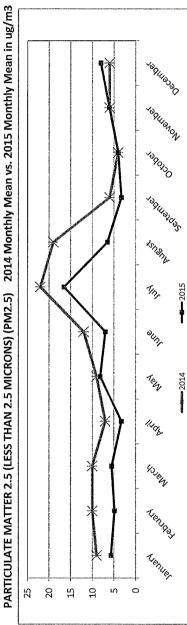
Elk Point Airport Site - 2015 JOB # 2833-2015-35- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5) 2014 One-Hour Readings vs. 2015 One-Hour Readings in ug/m3

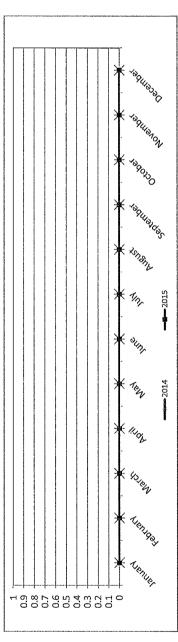
	Difference	3	5	4	4	٣	5	5	12	ĸ	0	0	-2
	MAXIMUM	65	27	23	22	697	114	246	78	29	74	25	29
2015	MUMINIM	0	0	0	0	õ	õ	0.0	10 10	0 1		<u>.</u>	0
	MEAN	9	ъ	9	m	80	7	20	7	ñ	4	ę	8
	MAXIMUM	80	152	60	42	61	60	88	81	57	21	147	29
2014	MUMINIM	0 	0	0 <sup>0</sup>	0	0	0	01 101 101	0	0	0	0	0
	MEAN	6	10	01	۷	6	12	22	19	9	4	9	9
	Month	January	February	March	April	May	June	July	August	September	October	November	December

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

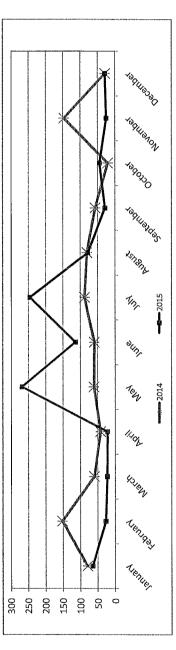




PARTICULATE MATTER 2.5 (LESS THAN 2.5 MICRONS) (PM2.5) 2014 Monthly Minimum vs. 2015 Monthly Minimum in ug/m3







## LICA-ELK PM2 / WDR Joint Frequency Distribution (Percent)

,

## 01/01/15 thru 12/31/15

# DISTRIBUTION BY & OF SAMPLES

35	LICA-ELK	PM2	UG/M3
••	••	••	••
Logger Id	Site Name	Parameter	Units

Wind Parameter : WDR Instrument Height : 10 Meters

	Freq	98.27	.98	.17	.28	.23	-03	
	NNM	4.18	.02	00.	.00	00.	00-	4.20
	МN	9.33	.08	.02	. 02	.01	00 •	9.47
	WINW	12.38	.16	. 02	. 03	10.	00.	12.62
	ж	13.04	.15	.03	.03	00.	00.	13.26
	MSW	9.88	.17	00 -	.00	.00	.00	10.05
	SW	3.38	.02	.00	το.	00.	00.	3.42
	MSS	2.44	.07	00.	.01	00 '	00.	2.52
Direction	S	2.50	.03	.02	.01	00.	00.	2.57
	SSE	2.87	.01	00.	10.	00.	00.	2.89
	SE	5.41	.02	00-	00-	00'	00 '	5.43
	ESE	11.66	.05	.01	00-	10.	00-	11.74
	Ю	90.6	.07	.01	.02	.07	. 02	9.26
	ENE	4.64	. 02	.02	. 02	.05	00.	4.77
	HE	2.29	.02	10.	.05	.05	00.	2.44
	NNE	2.42	.02	.01	.02	00.	00.	2.48
	N	2.74	10.	00.	.01	10.	.01	2.79
	Limit	30.0	60.0	80.0	120.0	240.0	240.0	Totals
		v	v	v	v	۷	X	

Calm : .00 %

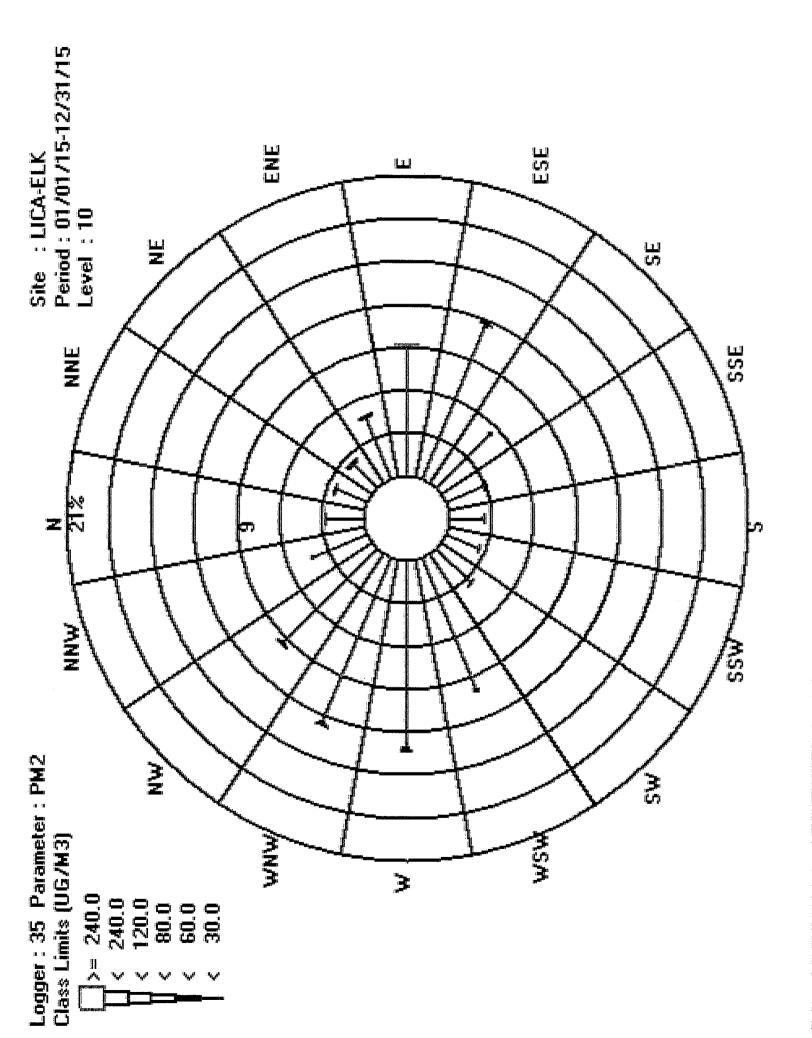
Total # Operational Hours : 8420

## Distribution By Samples

	Freq	8275	83	15	24	20	m	
	MNN	352	0					354
	MN	786	7	0	N	ы		798
	WNW	1043	14	0	m	ч		1063
	м	1098	13	m	m			1117
	MSW	832	15					847
	SW	285	0		ч			288
	MSS	206	ę		۳H			213
	S	211	щ	0	ч			217
	SSE	242	ч		ч			244
Direction	SE	456	0					458
DİJ	ESE	982	ß	ч		ч		686
	ы	763	9	ы	2	9	0	780
	ENE	391	0	N	N	5		402
	Ë	193	0	۳I	Ŋ	ß		206
	INNE	204	0	ы	N			209
	N	231	<del></del> 1		ы	rH	۲۰I	235
	Limit	30.0	60.0	80.0	120.0	240.0	240.0	Totals
		۷	v	v	v	v	Ķ	

Calm : .00 %

Total # Operational Hours : 8420



#### WIND SPEED

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LAKELAND INDUSTRY & COMMUNITY ASSOCIATION ;OCIATION Elk Point Airport Site - 2015 JOB # 2833-2015-35- A

WIND SPEED (WS) 2015 Monthly Data Summary of One Hour Readings

Month	Number of Readings*	Operational Time (%)	Monthly Average (KPH)	Monthly Average Minimum Hourdy (KPH) Average (KPH)	Maximum Hourly Average (KPH)	Maximum Daily Average (KPH)
January	743	6'66	10.8	0.2	38.4	25.3
February	672	100.0	11.5	0.1	36.0	19.8
March	731	98.3	11.4	0.0	48.6	24.6
April	720	100.0	13.6	0.1	42.5	26.1
May	744	100.0	10.3	0.3	33.9	21.9
June	720	100.0	10.8	0.0	35.9	17.9
July	744	100.0	11.7	1.0	33.1	21.9
August	744	100.0	0.6	0.1	31.9	16.2
September	718	2.99.7	8.6	0.1	35.5	19.6
October	744	100.0	11.1	0.1	39.0	24.6
November	717	9.66	10.2	0.1	39.7	28.3
December	744	100.0	8.7	1.0	29.7	16.3
N/D - Valid Da	N/D - Valid Data Not Available			] .		

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

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Elk Point Airport Site - 2015 JOB # 2833-2015-35- A

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

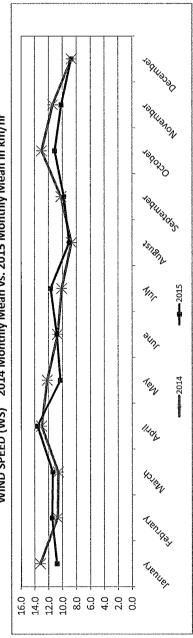
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		2014			2015		
Month	MEAN	WUMINIM	MAXIMUM	MEAN	WININIW	MAXIMUM	Difference
January	13.2	0.1	609	10.8	0.2	38.4	2.4
February	10.7	0.0	36.0	11.5	0.1	36.0	-0.8
March	10.6	0.1	37.8	11.4	0.0	48.6	-0.8
April	13.0	0.2	45.1	13.6	0.1	42.5	-0.6
May	12.2	0.2	38.4	10.3	£0	33.9	1.9
June	10.7	0.2	35.3	10.8	0.0	35.9	-0.1
July	10.1	0.0	36.1	11.7	0.1	33.1	-1.6
August	8.7	0.1	30.6	9.0	0.1	31.9	-0.3
September	10.2	0.1	31.1	9.8	0.1	35.5	0.4
October	13.0	0.3,	38.7	11.1	0.1	39.0	1.9
November	11.4	0.1	30.9	10.2	0.1	39.7	1.2
December	8.7	0.0	25.8	8.7	0.1	29.7	0.0
N/D - Valid Da	N/D - Valid Data Not Available						

N/D - Valid Data Not Available \*Annual peak is bolded and highlighted.

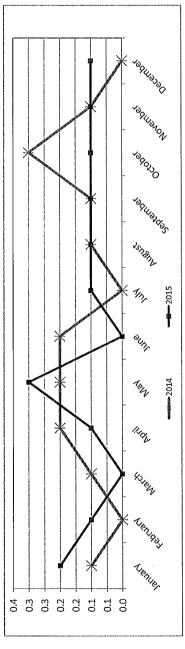
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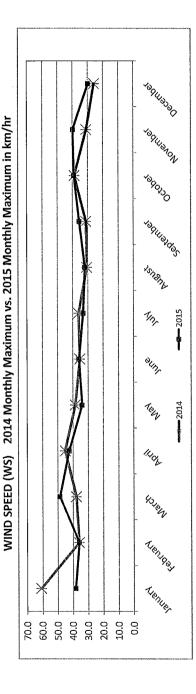
Elk Point Airport Site - 2015 JOB # 2833-2015-35- A LAKELAND INDUSTRY & COMMUNITY ASSOCIATION



WIND SPEED (WS) 2014 Monthly Mean vs. 2015 Monthly Mean in km/hr

WIND SPEED (WS) 2014 Monthly Minimum vs. 2015 Monthly Minimum in km/hr





# LICA-BIK WDR Joint Frequency Distribution (Percent)

# 01/01/15 thru 12/31/15

# Distribution By % Of Samples

		Freq	28.55	35.37	25.34	8.15	2.36	.17								
		MNN	.78	1.36	1.29	. 69	.13	- 03	4.31							
		MN	1.88	2.68	3.13	1.48	.49	.01	9.70							
		WNW	3.29	2.98	3.39	2.01	.89	.08	12.66							
deters		м	3.24	5.32	2.86	1.37	.44	.04	13.29							
: WDR E : 10 h		WSW	2.34	5.36	2.33	.06	.00	00.	10.11							
neter t Height		SW	1.37	1.60	.44	.01	00.	00.	3.43							
Wind Parameter Instrument Heig		SSW	1.05	.84	.49	.06	.00	00-	2.46							
Wir In:		S	.85	. 85	.70	.13	.00	00.	2.56							
		SSE	.96	1.01	.80	.06	.01	00.	2.86							
	Direction	SE	1.31	1.80	1.85	.26	.01	.00	5.25							
	Di	ESE	2.80	4.00	3.51	.98	.32	.00	11.62							
		ы	3.93	3.52	1.36	.34	.02	.00	9.18							
									ENE	2.07	1.33	1.08	.22	.01	00.	4.73
Logger Id : 35 Site Name : LICA-ELK Parameter : WSP Units : KPH										RE	-89	76.	.48	.04	.00	.00
		NNE	.88	.78	. 68	.13	.01	00.	2.50							
		N	.83	.88	83	.22	10.	00.	2.84							
Logge: Site ] Param Units		Limi t	6.0	12.0	20.0	29.0	39.0	39.0	Totals							
			v	v	v	v	v	X								

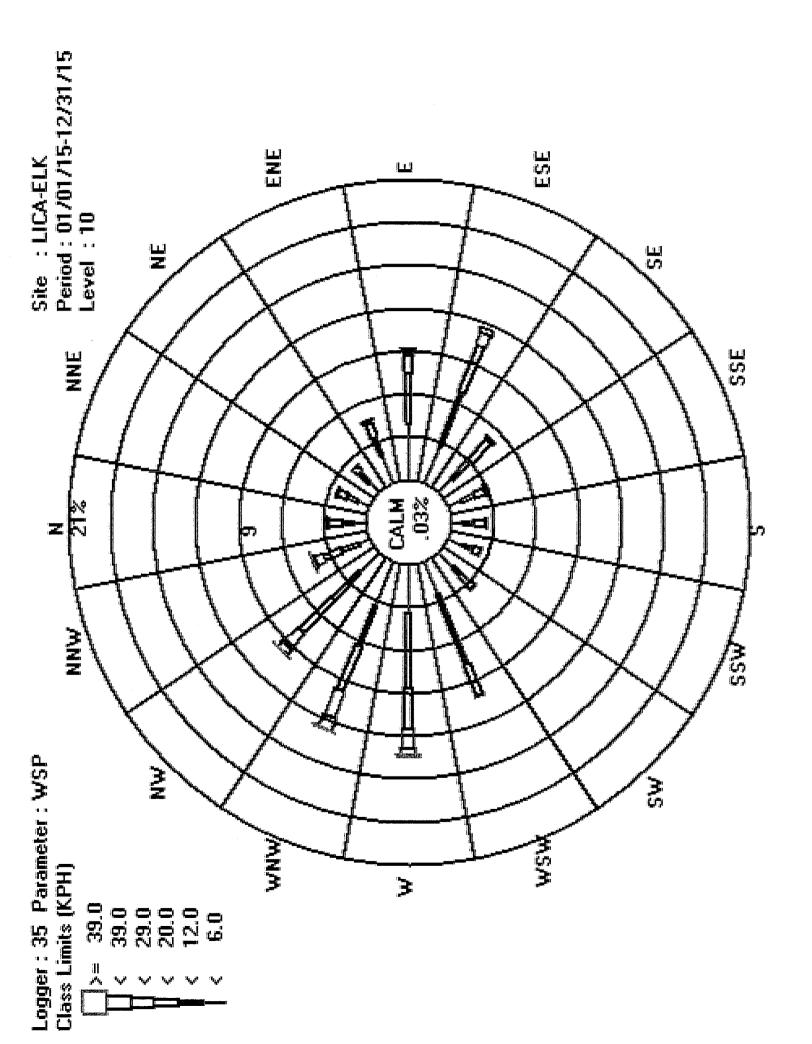
Calm : .03 %

Total # Operational Hours : 8739

## Distribution By Samples

	Егед	2495	3091	2215	713	207	15		
	MNN	69	119	113	61	12	m	377	
	NW	165	235	274	130	43	н	848	
	MNW	288	261	297	176	78	7	1107	
	W	284	465	250	120	39	4	1162	
	MSM	205	469	204	9			884	
	SW	120	140	39	۲H			300	
	MSS	92	74	43	9			215	
	ß	75	75	62	12			224	
	SSE	84	68	70	9	<del>r i</del>		250	
Direction	SE	115	158	162	23	Ч		459	
Dir	ESE	245	350	307	86	28		1016	
	ы	344	308	119	30	0		803	
	ENE	181	117	95	20	Ч		414	
	NE	78	85	42	4			209	
	INNE	77	69	60	12	ы		219	
	и	73	77	78	20	Ч		249	: .03 &
	Limit	6.0	12.0	20.0	29.0	39.0	39.0	Totals	calm :
		v	v	v	v	v	¥		

Total # Operational Hours : 8739



#### APPENDIX II REPORT CERTIFICATION FORM



LAKELAND INDUSTRY & COMMUNITY ASSOCIATION Elk Point Airport Site - 2015 JOB # 2833-2015-35- A

#### **Report Certification Form**

Alberta Airshed (if applicable)	EPA Approval or Code of Practice Registration # (if applicable)					
Ves						
Company Name (if applicable)	Industrial Operation Name (if applicable)					
Larevand Industry + Community Association	Elk Point Airport Site					
Name of the Representative of the Person Responsible (Last First, Middle)	Position / Title of the Representative of the Person Responsible					
Wilson, Kim	Project Manager, Customer Service - Air Services					
Is an External Party Certifying the Report? (If 'Yes', fill in the fields below for the external person. Yes X No	<b>3</b>					
Name of External Person Certifying the Report (Last, First, Middle)	Position / Title⊧of External Person Certifying the Report					
Company Name for the External Person Certifying the Report	Identification of Qualifications / Professional Designations of the External Person Certifying the Report					

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

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

I- Feb-16 Report Issued Date (dd-mm-yyyy)