

**Lakeland Industry & Community Association**  
Cold Lake Monitoring Site  
Ambient Air Monitoring  
Data Report  
For  
March 2007

Prepared By:

**MAXXAM ANALYTICS INC.**

April 17, 2007

**Lakeland Industry & Community Association**

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**ATTENTION: Mr. Mike Bisaga**

**REFERENCE: Ambient Air Monitoring Report For March 2007**

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Maxxam Analytics Inc. is pleased to submit this report of data collected at the Ambient Air Monitoring Station located at the Lakeland Industry & Community Assoc. Cold Lake site for the month of March 2007.

Included is a summary of the monthly continuous and hourly average reports, equipment calibration reports, as well as a brief description of the calibration procedure. The passive network data are also included in this report.

During the month of March 2007 the following proceedings were noted:

**Cold Lake South Site**

- All analyzers and wind systems were all above 90% uptime, only after the background correction was applied to THC data, did the analyzer fall below the 90% uptime objective.
- All data was within Provincial objectives for the month.
- All data was corrected using daily zero calibration data. Furthermore the PM 2.5 data was corrected using Alberta Environment correction standards.
- The SO<sub>2</sub> analyzer showed increased daily spans near the end of March, an investigation by the technician revealed that the sample flow and vacuum decreased. The pump was re-built. The initial 'As Found' calibration showed that the analyzer was about 1% out and therefore the issue did not affect the operation, no data was invalidated.
- Thirty eight hours of data on March 16<sup>th</sup> was invalidated for NO<sub>x</sub>, NO and NO<sub>2</sub> when the memory of the analyzer reset itself, the analyzer was checked out and recalibrated, there was no apparent reason why the analyzer memory reset. The 'As Found' calibration, as described by the technician failed, the data was determined to be invalid back to the last valid span.
- Twenty-four hours of data on March 1<sup>st</sup> – 2<sup>nd</sup> was invalidated for TRS as the pump vacuum and sample flow had dropped, also the temperature controller on the converter indicated a failure, the diagnosis was a thermocouple wire was burnt causing an open end. Repairs to the wire and pump were completed on site and the analyzer was re-calibrated. The reason for invalidating data was no daily span occurred on the morning on March 2<sup>nd</sup> and therefore the reason for the callout. As the diagnosis indicated a problem with the analyzer, the data was invalidated back to the last valid span.

- The THC has continued to maintain a continuous positive drifting trend. Attempt to repair the analyzer on March 5<sup>th</sup> were not successful; the manufacturer suggested the cause was related to a contaminated internal filter. At the suggestion of the manufacturer the filter was removed, a slight improvement occurred but was not enough to be the cause of the situation of positive drift. The filter was reinstalled and the analyzer re-calibrated. Parts to rebuild the detector are on order and expected delivery is mid April. The data, after it was zero corrected has, at times, fallen below historical background readings during the month; this is contributed to the above stated problem with positive drifting. It was agreed to with the LICA Program Manager to invalidate all data, after zero correction, which falls below the historical background average of 1.5 ppm. As a result the uptime was below the 90% objective.
- The PM 2.5 was unstable for 3 hours during the month the data was subsequently invalidated.
- The wind system failed on February 27<sup>th</sup> after a power failure occurred. The manufacturer and the onsite technician initially diagnosed the wind system as having significant internal problems. Alberta Environment supplied a replacement system and it was later determined that the power supply for the system was insufficient and a second power supply and UPS was necessary, both were purchased and installed on March 2<sup>nd</sup>. Data was invalidated for the first 38 hours of the month.
- The data set for Standard Deviation for Wind Direction was invalidated partially for the month as the original configuration was found to be incorrect. A standardized configuration was decided during the March 15<sup>th</sup> meeting, this configuration was changed to the decided configuration on March 6<sup>th</sup>, 2007.
- The RH and temperature data was invalidated for 4 hours on March 2<sup>nd</sup> for replacement of the power supply.
- The daily spans for the NO<sub>x</sub> and NO<sub>2</sub> analyzer were steadily decreasing during the month; this is an indication that the permeation tube used for daily spans is dying. A new tube was ordered and will be installed in April 2007.

### **Passive Network**

A summary of the passive monitoring are reported as follows:

- Monitoring period averages for O<sub>3</sub> ranged from 28.8 – 51.4 ppb.
- Monitoring period averages for SO<sub>2</sub> ranged from 0.4 – 1.8 ppb.
- Monitoring period averages for NO<sub>2</sub> ranged from 0.5 – 7.3 ppb.
- Monitoring period averages for H<sub>2</sub>S ranged from 0.02 – 0.12 ppb.
- Site #2 H<sub>2</sub>S was not detected in the lab results.
- Site #11 was damaged.

Please feel free to contact either of Craig Snider at (403) 219-3689 or Darren Morissette (403)-219-3661, should you have any questions concerning this report.

Sincerely,  
Maxxam Analytics Inc.

Prepared by: Darren Morissette, CEPIT

Senior Technologist

Reviewed by: Craig Snider, CET

Ambient Manager

# Lakeland Industry & Community Assoc.

## COLD LAKE

### AMBIENT AIR MONITORING STATION

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## **CALIBRATION PROCEDURE**

The following calibration procedure applies to all calibrations conducted at the Lakeland Industry & Community Association Air Monitoring Station.

Calibration gas concentrations are generated using a dynamic mass flow controlled calibrator. EPA Protocol one gases are diluted with zero air generated on site. The Mass Flow Controllers in the calibrator are referenced using an NIST traceable flow meter once per month. All listed flows are reported as corrected to Standard Temperature and Pressure (STP).

Generated zero gas is introduced to the analyzer first. Three concentrations of calibration gas are then generated in order to introduce points at approximately 50-80%, 25-40% & 10-20% of the analyzer's full-scale range. An auto zero and span are then performed to validate the daily zero and span values recorded to the next multi-point calibration.

All indicated concentrations are taken from the ESC data logger used to collect the data for monthly reporting.

Conformance of each calibration to Alberta Environment regulations is outlined in the individual calibration reports. The slope and correlation coefficient are derived from the calculated and indicated analyzer responses. The percent change is calculated using the previous calibration correction factor and the current correction factor before adjustment. The calibration conforms to the procedure outlined in the *Air Monitoring Directive, Appendix A-10, Section 1.6*.

# LAKELAND INDUSTRY & COMMUNITY ASSOCIATION MONTHLY CONTINUOUS DATA SUMMARY COLD LAKE

## Continuous Ambient Monitoring – March 2007

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION COLD LAKE SITE						MAXIMUM VALUES					OPERATIONAL TIME (PERCENT)
						1-HOUR			24-HOUR		
PARAMETER	OBJECTIVES		EXCEEDENCES		MONTHLY AVERAGE	READING	DAY	HOUR	READING	DAY	
	1-HR	24-HR	1-HR	24-HR							
SO <sub>2</sub> (PPB)	172	57	0	0	0.17	4	4,15	7	1,15	1	100.0
TRS (PPB)	-	-	-	-	0.53	1	VARIOUS	VARIOUS	1	VARIOUS	96.8
NO <sub>2</sub> (PPB)	212	106	0	0	4.52	41	7	20	15.7	9	94.9
NO (PPB)	-	-	-	-	0.81	50	9	8	6.5	7	94.9
NO <sub>x</sub> (PPB)	-	-	-	-	5.42	90	9	8	22	9	94.9
O <sub>3</sub> (PPB)	82	-	0	-	40.33	66	23	16,17	55.7	23	100.0
THC (PPM)	-	-	-	-	2.18	4.9	10	6	3.9	10	77.2
PM 2.5 (UG/M <sup>3</sup> )	-	30	-	0	2.85	20.3	7	23	10.3	7	99.6
TEMPERATURE (DEG C)	-	-	-	-	-4.56	10.3	23	16	4.6	23	99.5
RELATIVE HUMIDITY (%)	-	-	-	-	66.42	97.1	28	2	78.2	1	99.5
VECTOR WS (KPH)	-	-	-	-	7.16	22.4	18	16	13	18	94.9
VECTOR WD (DEGREES)	-	-	-	-	SSE	-	-	-	-	-	94.9

# LAKELAND INDUSTRY & COMMUNITY ASSOCIATION

## Passive Ambient Monitoring Network – March 2007

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION PASSIVE NETWORK			
NETWORK MAXIMUM (PPB)			NETWORK AVERAGE (PPB)
PARAMETER	STATION	READING	READING
NO <sub>2</sub>	25	7.3	2.0
SO <sub>2</sub>	13	1.8	0.8
H <sub>2</sub> S	13,21,21A	0.12	0.07
O <sub>3</sub>	3	51.4	41.1

## **GENERAL MONTHLY SUMMARY – COLD LAKE**

### **Equipment Operation**

The following summary outlines the analyzer performance. Any non-conformances, problems or maintenance performed are detailed at the end of each section.

### **AQM STATION – LICA – COLD LAKE**

#### **SO<sub>2</sub>**

- Analyzer make / model TECO 43A

The daily span values began increasing towards the end of the month. An investigation revealed that the sample flow and vacuum had decreased. The pump was rebuilt and analyzer re-calibrated. The initial 'As Found' calibration showed the analyzer was out by 1%, therefore the analyzer was within guidelines and no data was invalidated. The inlet filter was changed before the monthly calibration was started. Data was corrected using daily zero information.

#### **TRS**

- Analyzer make / model TECO 43A  
CD NOVA CDN 101 H<sub>2</sub>S Converter

The daily span for the analyzer did not work on March 2<sup>nd</sup>, the analyzer sample flow and vacuum dropped, the technician revealed that the pump needed to be re-built, also at the same time the technician noted that the temperature controller on the converter indicated a failure, the thermocouple wire was burnt. The technician repaired the pump and thermocouple wire and recalibrated the analyzer. As the daily span did not occur on March 2<sup>nd</sup> due to the above issue, data was invalidated back to the last valid span which occurred on March 1<sup>st</sup>, as a result 24 hours of data was invalidated. The inlet filter was changed before the monthly calibration was started. Data was corrected using daily zero information.

#### **THC**

- Analyzer make / model TECO 51C-LT

The analyzer continued the positive drifting trend. An attempt to repair this situation with another solution offered by the manufacturer was not successful. The manufacturer recommended removing the internal filter temporarily as it was possible contamination occurred which has caused the drift. The results showed slight improvement but not enough that would depict contamination in the filter. The filter was installed and analyzer re-calibrated. The drifting continued and on March 30<sup>th</sup> the technician re-calibrated the analyzer. The inlet filter was changed before the monthly calibration was started. Data was corrected using daily zero information.



## **NO<sub>x</sub>**

- Analyzer make / model TECO 42

The analyzer on March 15<sup>th</sup> became unstable and readings went negative. The technician found the analyzer reset itself. The analyzer was checked out and no apparent reason was found why this occurred. The analyzer was re-calibrated. The initial 'As Found' calibration was out by over 15%, it was determined that the data would be invalidated back to the last valid span which occurred on March 14<sup>th</sup>. A total of 38 hours of data was invalidated. The inlet filter was changed before the monthly calibration was started. Data was corrected using daily zero information.

## **O<sub>3</sub>**

- Analyzer make / model TECO 49

No operational issues observed during the month. The inlet filter was changed before the monthly calibration was started. Data was corrected using daily zero information.

## **PM 2.5**

- Analyzer make / model TEOM 1400A

There was 3 hours of data invalidated, as the analyzer was unstable. During the monthly calibration the inlet filter was cleaned. Data for the month was corrected using Alberta Environment standards.

## **Wind Speed & Direction**

- System make / model MET ONE 50.5

On February 27<sup>th</sup> after a series of power failures the wind system stopped working, a replacement wind system was picked up at Alberta Environment on March 1<sup>st</sup>. Further exploration revealed that the wind system was originally installed using a single power supply for the entire meteorological system. On March 2 a separate power supply was purchased and installed for the temperature and relative humidity sensor, afterwards the entire system was working properly. As a result of the power issues at the trailer a new Maxxam owned UPS was installed for the wind system also the data for the first 38 hours was invalidated. The wind system is reported as vector wind speed and vector wind direction. The data for Standard Deviation of Wind Direction was invalidated for a portion of the month as the original configuration setup was discovered to be incorrect. A comparison of what is used amongst industry and government has shown no standard method is used, the Air Monitoring Directive has no guidelines for this type of data, therefore LICA Stakeholders decided during a March 15<sup>th</sup> meeting, and the configuration and amendments to the configuration were made on March 6<sup>th</sup>. Also added to the report is the wind speed a maximum for the month, the table was manually completed for most of the month, as the configuration in the data system was not changed until after the March 15<sup>th</sup> meeting.

## **Relative Humidity**

- System make / model Rotronic Hygroclip-S3

Data was invalidated on March 2<sup>nd</sup> for four hours while a new and separate power supply was installed.

**Temperature**

- System make / model

Rotronic Hygroclip-S3

Data was invalidated on March 2<sup>nd</sup> for four hours while a new and separate power supply was installed.

**Datalogger**

- System make / model

ESC 8832

- Software make / version

ESC v 5.51a

The ESC 8832 is connected to a modem with DSL for continuous connection with the base computer.

**Trailer**

General comments from technician during monthly calibration:

- None noted.

**Passive Network**

- Site #10 was inaccessible as the snow on the access road was unplowed and impassable during the previous months change out, therefore the data reported reflects sampling that occurred since January 29<sup>th</sup>, 2007.

**LICA - COLD LAKE SITE**

**MONTHLY SUMMARIES,  
GRAPHS**

**&**

**WIND ROSES**

# **AIR QUALITY INDEX**

**SO<sub>2</sub>**

**TRS**

**THC**

# **PARTICULATE MATTER**

## **2.5**





**NO**

**NO<sub>x</sub>**

**$O_3$**

# **VECTOR WIND SPEED**

# **VECTOR WIND DIRECTION**

# TEMPERATURE

# **RELATIVE HUMIDITY**



# **MARCH 2007 CALIBRATION REPORTS**

## **LICA – COLD LAKE**



**TRS**

**THC**

# **PARTICULATE MATTER**

## **2.5**



# OZONE

**MARCH 2007**  
**LICA PASSIVE NETWORK**  
**LAB ANALYSIS**



# **MARCH 2007**

# **PASSIVE FIELD DATA**

## LAKELAND INDUSTRY & COMMUNITY ASSOCIATION PASSIVE FIELD DATA

SAMPLER	ID	START		END		NOTES
		DATE	TIME	DATE	TIME	
SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	1	02/27/07	09:50	03/28/07	10:45	
H <sub>2</sub> S/SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	2	02/27/07	09:10	03/28/07	10:10	
SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	3	03/01/07	09:15	03/29/07	15:00	
H <sub>2</sub> S/SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	4	02/28/07	17:10	03/29/07	13:55	
SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	5	02/28/07	15:35	03/29/07	12:40	
SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	7	03/01/07	08:25	03/29/07	15:50	
SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	8	02/27/07	08:25	03/28/07	09:30	
H <sub>2</sub> S/SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	9	02/27/07	10:25	03/28/07	11:40	
H <sub>2</sub> S/SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	10	01/29/07	08:50	03/28/07	12:15	2 Months Monitoring
H <sub>2</sub> S/SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	11	02/27/07	12:45	03/28/07	13:25	Damaged
H <sub>2</sub> S/SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	12	02/27/07	18:05	03/28/07	15:50	
H <sub>2</sub> S/SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	13	02/27/07	18:50	03/28/07	16:40	
SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	14	02/27/07	07:25	03/28/07	07:50	
H <sub>2</sub> S/SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	15	02/28/07	14:00	03/29/07	11:05	
H <sub>2</sub> S/SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	16	02/28/07	14:50	03/29/07	11:55	
H <sub>2</sub> S/SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	17	02/28/07	13:20	03/29/07	10:10	
SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	18	02/28/07	12:10	03/29/07	09:20	
H <sub>2</sub> S/SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	19	02/27/07	20:20	03/29/07	08:00	
SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	20	02/28/07	07:35	03/28/07	17:55	
H <sub>2</sub> S/SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	21	02/28/07	16:35	03/28/07	13:20	
H <sub>2</sub> S/SO <sub>2</sub>	22	02/27/07	17:45	03/28/07	15:40	
H <sub>2</sub> S/SO <sub>2</sub>	23	02/27/07	18:35	03/28/07	16:23	
H <sub>2</sub> S/SO <sub>2</sub>	24	02/27/07	19:10	03/28/07	17:00	
SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	25	02/27/07	08:05	03/28/07	08:20	
H <sub>2</sub> S/SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	21A	02/28/07	16:35	03/29/07	13:20	
H <sub>2</sub> S/SO <sub>2</sub> /NO <sub>2</sub> /O <sub>3</sub>	4A	02/28/07	17:10	03/29/07	13:55	