

**TransAlta Generation Partnership/EPCOR Utilities Inc.  
Wabamun-Genesee Area Air Monitoring Programs**

**2008 Second Quarter Report**

**Ambient Air Quality Monitoring Program  
Acid Deposition Assessment Program  
Mercury Assessment Program**

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## EXECUTIVE SUMMARY

TransAlta Generation Partnership and EPCOR Utilities Inc. operate four coal-fired thermal generating plants – Sundance, Keephills, Wabamun, and Genesee – located in the Wabamun-Genesee area of west-central Alberta. The generating plants operate under Alberta Environmental Protection and Enhancement Act approvals. Under their approvals, the generating plants are committed to conducting environmental monitoring programs. Three environmental monitoring programs conducted on an on-going manner include:

- Regional ambient air monitoring program.
- Acid deposition assessment program.
- Mercury assessment program.

This quarterly report summarizes key results of data collected for these programs in the second quarter (April, May, and June) of 2008. Completeness of monitoring data, quarterly summary statistics for selected air quality parameters, and contraventions of approval terms and applicable air quality monitoring objectives are summarized and discussed.

### **Regional Ambient Air Program**

There were no instances of invalid or missing data for intermittent PM<sub>10</sub> and PM<sub>2.5</sub> samples out of 60 samples sought during the second quarter in the regional ambient air program. There were no instances of invalid or missing passive sampler results out of 123 passive samples sought for the second quarter.

Second quarter data capture rates for continuous monitoring parameters at all air monitoring stations were well above the 90% criterion on a monthly basis as stipulated in the Air Monitoring Directive (1989). High uptimes indicate that equipment in the continuous air monitoring network was well-maintained. All measured concentrations were below applicable Alberta Ambient Air Quality Guideline values or Canada Wide Standard values. Summary statistics for continuous monitoring parameters at all air monitoring stations (nitrogen dioxide, sulphur dioxide, ozone, and ambient particulate matter) and intermittent monitoring parameters (ambient particulate matter) are presented for the second quarter of 2008.

There were no contraventions of approval terms and applicable air quality monitoring objectives during the April to June 2008 period.

### **Acid Deposition Assessment Program**

There were 29 of 30 valid intermittent TSP samples collected and 12 of 12 valid acid gas samples collected during the second quarter of 2008 for the acid deposition assessment program. All data capture rates were well above 90% for continuous monitoring parameters in the second quarter.

**Mercury Assessment Program**

There were nine valid precipitation samples from thirteen collection periods in the wet deposition sampling program during the second quarter of 2008. An April weekly sample was rated invalid because of equipment operational problems reported during the sampling period due to low sample volume collected and extremely high wind conditions observed. In addition, three weekly samples in April had zero volume collected due to low or no precipitation events.

The dry deposition study component was restarted in April 2008 after being decommissioned for the first 3 months of 2008 due to a lack of membrane material supplied by the manufacturer (Pall Corporation, East Hills, NY) for sampling in the field. There were 36 valid dry deposition samples and 17 QA/QC samples collected in the dry deposition sampling program during the second quarter of 2008.

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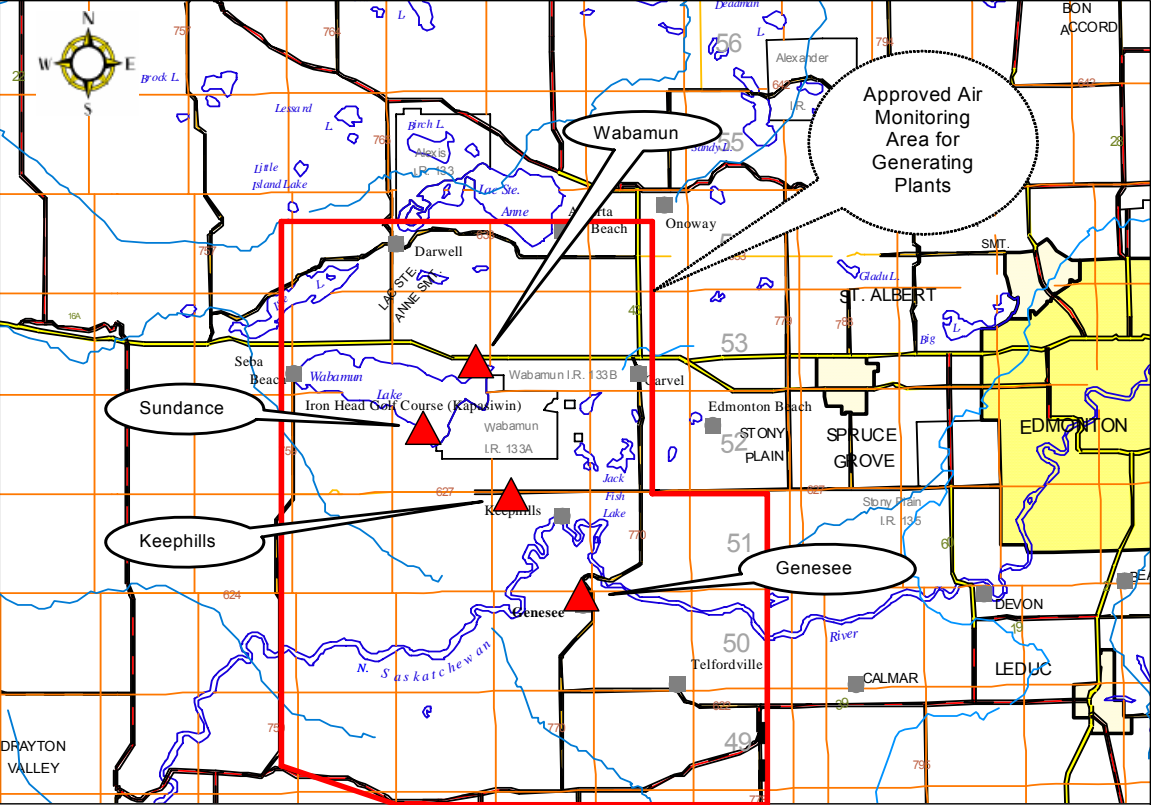
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## ABBREVIATIONS

AAAQO	Alberta ambient air quality objective
AMS	air monitoring station
Ca <sup>2+</sup>	calcium ion
CWS	Canada Wide Standard
EPEA	Environmental Protection and Enhancement Act
Hg	mercury
HNO <sub>2</sub>	nitrous acid
HNO <sub>3</sub>	nitric acid
K <sup>+</sup>	potassium ion
Mg <sup>2+</sup>	magnesium ion
MW	megawatts
Na <sup>+</sup>	sodium ion
NAPS	Nation Air Pollutant Surveillance
NH <sub>4</sub> <sup>+</sup>	ammonium ion
NO <sub>2</sub>	nitrogen dioxide
NO <sub>3</sub> <sup>-</sup>	nitrate ion
MDN	Mercury Deposition Network
O <sub>3</sub>	ozone
PM <sub>2.5</sub>	particulate matter ≤2.5 µm diameter
PM <sub>10</sub>	particulate matter ≤10 µm diameter
Q2	second quarter
RH	relative humidity
RGM	reactive gaseous mercury
SO <sub>2</sub>	sulphur dioxide
SO <sub>4</sub> <sup>2-</sup>	sulphate ion
SW	surface wetness
T <sub>2</sub>	ambient temperature at 2 m above ground
T <sub>10</sub>	ambient temperature at 10 m above ground
TSP	total suspended solids
WDR	wind direction
WSP	wind speed

# 1 Introduction

TransAlta Generation Partnership (TransAlta) [www.transalta.com] and EPCOR Utilities Inc. (EPCOR) [www.epcor.ca] operate four coal-fired thermal generating plants (generating stations) – Wabamun, Sundance, Keephills, and Genesee - located in the Wabamun-Genesee area of west-central Alberta. The location of these generating plants is shown in Figure 1. Collectively, the four generating plants have a net generating capacity of 4,277 megawatts (MW).



**Figure 1 Coal fired generating plant locations in the Wabamun-Genesee area.**

Wabamun generating plant is the oldest of TransAlta’s three generating plants in the Lake Wabamun area. It is near the Village of Wabamun and has a net generating capacity of 279 MW. Only one generating unit was in operation at the Wabamun plant in 2007. The remaining three units were retired in 2002 (Unit 3) and 2004 (Units 1 and 2).

The TransAlta Sundance generating plant consists of six generating units. The Sundance plant is the largest, coal-fired generating plant in western Canada. It is situated on the south shore of Lake Wabamun, approximately 70 km west of Edmonton, Alberta (Figure 1). The plant has been in operation since 1970, with steady expansion from a single original generating unit to six generating units throughout the 1970s. It currently has a net generating capacity of 2020 MW.

The Keephills generating plant is located 5 km southeast of Wabamun Lake (Figure 1). It has a net generating capacity of 766 MW, and consists of two generating units. Keephills has been in operation since 1983.

The Genesee generating plant, located 50 km southwest of Edmonton, consists of three generating units (Figure 1). EPCOR fully owns and operates Units 1 and 2, which have a combined net generating capacity of 762 MW. These units have been in operation since 1994 and 1989, respectively. Genesee 3 (Unit 3), commissioned in 2005, is a 50/50 joint venture between TransAlta and EPCOR. Genesee 3 has a net generating capacity of 450 MW.

## 1.1 Environmental Monitoring Programs for Generating Plants

The generating plants operate under Alberta Environmental Protection and Enhancement Act (EPEA) approvals listed in Table 1. Under their EPEA approvals, the generating plants are committed to conducting environmental monitoring programs. These programs are designed to:

- Identify and quantify ambient levels and deposition patterns of chemical species of potential concern that are associated with generating plant emissions.
- Generate an inventory of representative baseline data for the chemicals of potential concern.
- Provide data for assessing long-term impacts and for evaluating and implementing air quality management plans.

**Table 1 Alberta Environmental Protection and Enhancement Act (EPEA) operating approvals for four generating plants in the Wabamun-Genesee area.**

Facility	Capacity (MW, net)	Location	Approval No. (as amended)	Applicable Approval Terms
Wabamun	279	2,3,10,11-53-04 W5M	10323-02-00	6.1. 4 to 6.1.12; 6.1.14 to 6.1.2 4
Sundance	2,020	3,4,8,9,10,16,17,20, and 31-52-04 W5M	9830-02-00	7.1.3 to 7.1.5
Keephills	766	36-51-04 W5M	10324-01-00	6.1. 4 to 6.1.12; 6.1.14 to 6.1.2 4
Genesee	1,212	25-50-03 W5M	773-02-00	7.1.3 to 7.1.9

### 1.1.1 Ambient Air Quality Monitoring Program

A component of the environmental monitoring programs is an ambient air quality monitoring program. The ambient air quality monitoring program consists of the following elements:

- A continuous monitoring program consisting of four air monitoring stations (AMS) (Figure 2) – Powers, Meadows, Wagner, and Genesee. Sulphur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), and a number of meteorological parameters are measured at all four stations, particulate matter with aerodynamic diameter less than or equal to 2.5 microns (PM<sub>2.5</sub>) is measured at the Powers and Genesee AMS, and ozone (O<sub>3</sub>) is measured at the Genesee AMS.

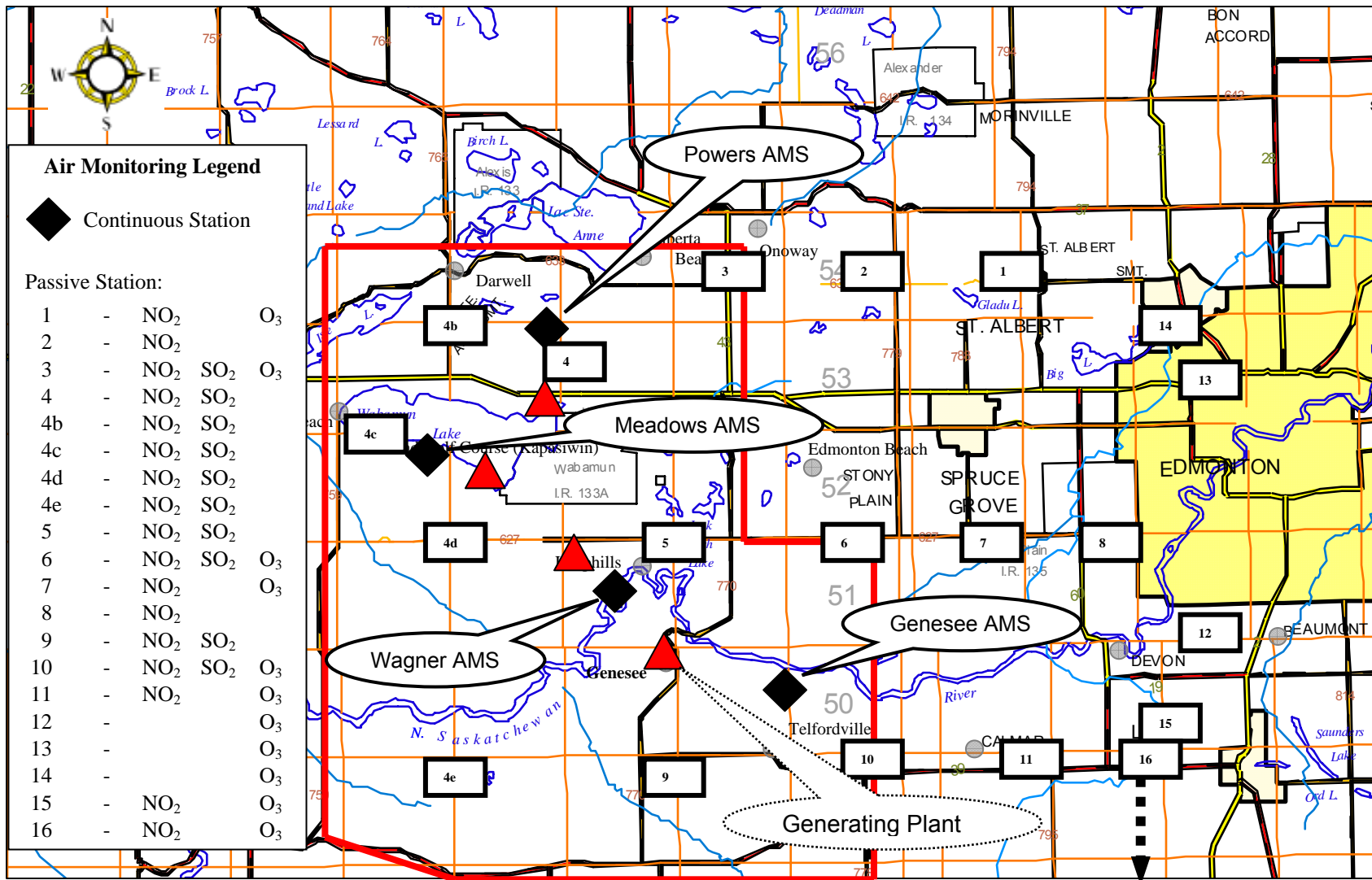


Figure 2 Continuous and passive monitoring locations in Wabamun-Genesee area.



- An integrated monitoring program consisting of 24 hour sampling every 6 days for particulate matter with aerodynamic diameter less than or equal to 10 microns (PM<sub>10</sub>), and PM<sub>2.5</sub>, and metals speciation of PM<sub>2.5</sub> at two locations – Powers AMS and Genesee AMS.
- A passive monitoring program with monthly passive monitoring at 21 stations in the Wabamun-Genesee area measuring NO<sub>2</sub>, SO<sub>2</sub>, and O<sub>3</sub> at selected stations: twenty stations are shown in Figure 2, plus the Genesee AMS has passive monitors for NO<sub>2</sub>, SO<sub>2</sub>, and O<sub>3</sub>. Stations 15 and 16 are located outside of the area shown in Figure 2 in the lower right hand corner.

**Table 2 Schedule for components of the ambient air quality monitoring program in the Wabamun-Genesee area.**

Parameter	Continuous	Sampled intermittently – every 6 <sup>th</sup> day according to NAPS schedule	Sampled monthly (passives)
SO <sub>2</sub>	•		•
NO <sub>2</sub>	•		•
O <sub>3</sub>	•		•
PM <sub>10</sub>		•	
PM <sub>2.5</sub>	•	• <sup>a</sup>	
Wind speed and direction, temperature, relative humidity)	•		

<sup>a</sup> Includes metals speciation.

### 1.1.2 Acid Deposition Assessment Program

Another component of the environmental monitoring programs is an acid deposition assessment program. The acid deposition assessment program includes wet and dry deposition monitoring of sulphur and nitrogen species that are important contributors to acid deposition in the Wabamun-Genesee area.

Two dedicated acid deposition monitoring sites are operated in the Wabamun-Genesee area. These sites are the Genesee air monitoring station (Figure 2) and the Violet Grove air monitoring station. The four coal-fired generating plants are located at distances of 8 to 33 km away from the Genesee AMS. The Violet Grove station is not shown in Figure 2; it is located in the lower left hand corner of figure and southwest of the regional monitoring area. The four generating plants are located at distances of 55 to 60 km away from the Violet Grove station. The following types of deposition are currently measured at these two stations:

#### Wet Deposition

Wet deposition monitoring involves collecting rain and snow samples using a wet-only precipitation sampler. Precipitation samples are retrieved from the field monthly or as necessary (e.g., after intense precipitation events) and sent to Alberta Research Council (Vegreville, AB) for chemical analysis.

## **Dry Deposition**

Dry deposition monitoring involves measuring and recording concentrations of the following atmospheric pollutants and meteorological parameters:

### *Atmospheric Pollutants*

Atmospheric pollutants measured for dry deposition include eleven species:

- Continuous measurements for SO<sub>2</sub> and NO<sub>2</sub>.
- Monthly integrated annular denuder samples for HNO<sub>3</sub> and HNO<sub>2</sub>.
- One 24-hour integrated particulate matter (TSP) sample collected every 6<sup>th</sup> day for Na<sup>+</sup>, K<sup>+</sup>, Mg<sup>2+</sup>, Ca<sup>2+</sup>, NH<sub>4</sub><sup>+</sup>, SO<sub>4</sub><sup>2-</sup>, and NO<sub>3</sub><sup>-</sup>.

### *Meteorological Parameters*

Hourly average measured values were obtained for the following meteorological parameters:

- Wind speed (WSP).
- Wind direction standard deviation (WDR).
- Relative humidity (RH).
- Surface wetness (SW).
- Air temperature at surface (2 m), T<sub>2</sub>.
- Air temperature at standard height (10 m), T<sub>10</sub>; or difference in air temperature at standard height and surface.

## **1.1.3 Mercury Assessment Program**

The mercury assessment program consists of wet and dry deposition monitoring. The objective of this program component is to measure wet and dry deposition rates of mercury in the Wabamun-Genesee region to understand potential effects of generating plant emissions on receptors in the area.

### **Wet Deposition**

Wet deposition monitoring is conducted at the Genesee air monitoring station (Figure 2). Wet deposition samples are collected on a weekly basis from this station – with sample change outs occurring every Tuesday. This monitoring program is part of the U.S. National Acid Deposition Program – Mercury Deposition Network (MDN) (<http://nadp.sws.uiuc.edu/mdn/>).

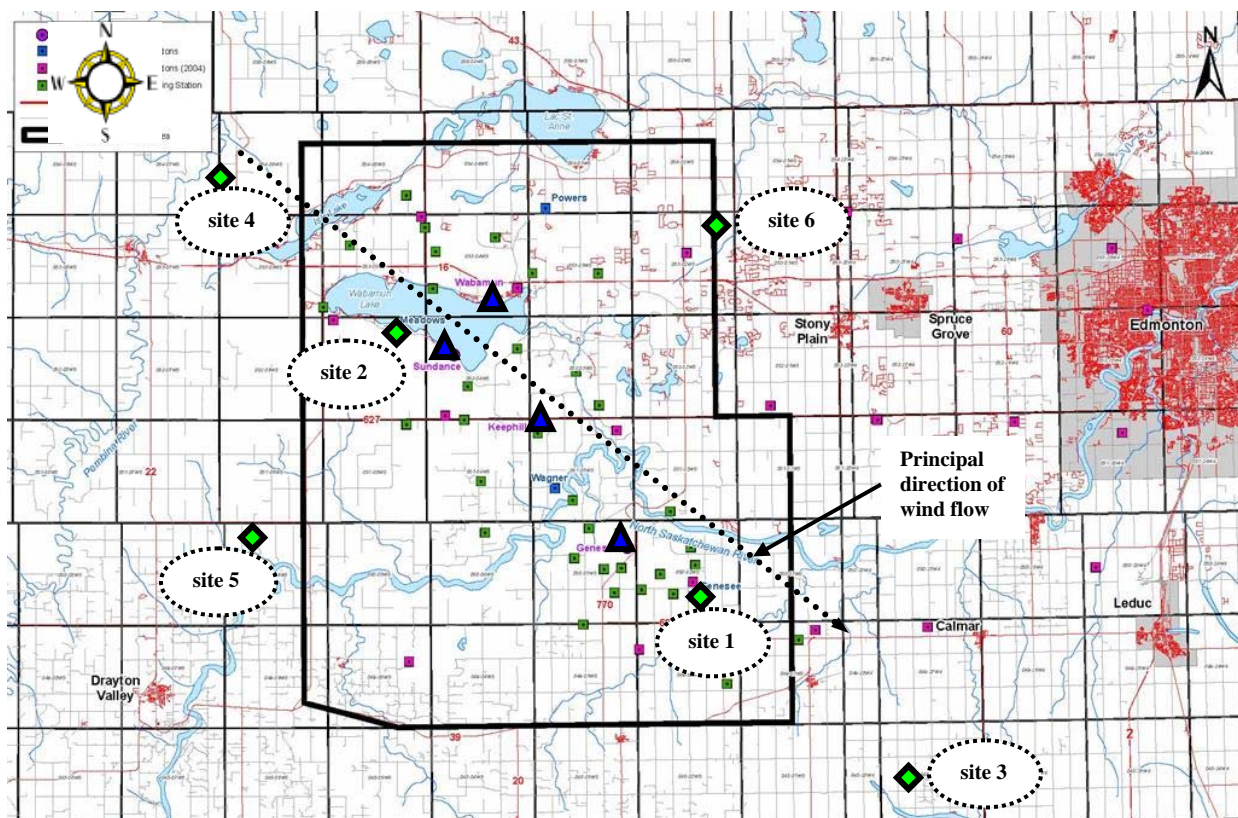
The objective of the MDN is to develop a database of weekly concentrations of total mercury in precipitation and the seasonal and annual flux of total mercury in wet deposition across North America. The data are being used to develop information on spatial and seasonal trends in mercury deposited to surface waters, forested watersheds, and other sensitive receptors. There are over 85 wet deposition sampling sites in North America currently in operation. The network uses standardized methods for collection and analyses.

### **Dry Deposition**

A dry deposition monitoring component was designed and implemented with the approval of Alberta Environment in 2007. This component operated for the period of March through to the

end of December in 2007. Seven-day I.C.E. 450 cation-exchange (ion exchange) membrane samples were collected at six sites throughout the Wabamun-Genesee area (Figure 3) using the same schedule as the MDN. Sample change outs occurred on Tuesday of each week. Membrane samples were sent weekly to Frontier GeoSciences Inc. (Seattle, WA) for analysis of  $Hg^{2+}$  (reactive gaseous mercury or RGM) and results were received within 90 days.

In late December 2007 the ion exchange membrane material supplied by the manufacturer (Pall Corporation, East Hills, NY) became unstable as Pall Corp. indicated that they began encountering numerous production issues at their plant. Due to a lack of membrane material, the study component was decommissioned at the beginning of January 2008. The study component was restarted in April 2008 to coincide with the target date set by Pall Corp. to begin supplying new membrane material.



**Legend:**

- ▲ Coal-fired generating plant
- ◆ Hg dry deposition sampling site

**Figure 3** Locations of six sampling sites in Hg dry deposition monitoring program.

## 1.2 Purpose of Report

This quarterly report summarizes key results of data collected in the second quarter (April to June) of the calendar year 2008. Specifically, completeness of monitoring data, quarterly summary statistics for selected air quality parameters, and contraventions of approval terms and applicable air quality monitoring objectives are summarized and discussed.

## 2 Results and Discussion

### 2.1 Regional Ambient Air Quality Monitoring Program

#### 2.1.1 Data Completeness

Data capture rates for PM<sub>10</sub> and PM<sub>2.5</sub> intermittent samples are listed in Table 3. There were no instances of invalid or missing data for intermittent PM<sub>10</sub> and PM<sub>2.5</sub> samples out of 60 samples sought during the second quarter (Table 4).

**Table 3 Data capture rates for intermittent PM<sub>10</sub> and PM<sub>2.5</sub> monitoring during second quarter 2008.**

Month:	Powers AMS				Genesee AMS			
	4	5	6	Q2	4	5	6	Q2
PM <sub>10</sub> :	5/5	5/5	5/5	15/15	5/5	5/5	5/5	15/15
PM <sub>2.5</sub> :	5/5	5/5	5/5	15/15	5/5	5/5	5/5	15/15

Note: 4 = April; 5 = May; 6 = June.

**Table 4 Incidences of invalid or missing intermittent PM<sub>10</sub> and PM<sub>2.5</sub> data during second quarter 2008.**

Date	Station	Parameter	Cause	Corrective Action
not applicable	not applicable	not applicable	not applicable	not applicable

Data capture rates for passive samples are presented in Table 5. There were no instances of invalid or missing passive results for the second quarter of 2008.

**Table 5 Data capture rates for passive monitoring parameters during second quarter 2008.**

Parameter	Capture Rate
NO <sub>2</sub>	54/54
SO <sub>2</sub>	33/33
O <sub>3</sub>	36/36

Note: Data capture rates expressed as number of valid samples /total number of samples.

Second quarter (Q2) 2008 uptimes for continuous monitoring equipment and air monitoring stations are summarized in Table 6. Data capture rates for continuous monitoring parameters at all air monitoring stations were well above the 90% criterion on a monthly basis as stipulated in the Air Monitoring Directive (1989), except as noted below. High uptimes indicate that equipment in the continuous air monitoring network was generally well-maintained. The following monitoring notes are made about continuous monitoring equipment during the second quarter:

**Powers AMS:**

- The NO/NO<sub>2</sub>/NO<sub>x</sub> analyzer experienced analyzer failure, returning an uptime of 99.5 percent for these parameters in May.
- The PM<sub>2.5</sub> analyzer experienced unstable operation, returning an uptime of 99.2 percent in May.
- The meteorological equipment experienced failure of the data acquisition system, returning uptimes of 99.7 percent in May.
- The PM<sub>2.5</sub> analyzer experienced unstable operation, returning an uptime of 99.9 percent in June.

**Meadows AMS:**

- The station experienced data acquisition failure in April, returning uptimes of 99.7 percent.

**Wagner AMS:**

- Meteorological equipment experienced failure of the data acquisition system in May, returning uptimes of 99.3 percent.

**Genesee AMS:**

- The PM<sub>2.5</sub> analyzer experienced unstable operation in April, May, and June; returning uptimes of 99.2, 99.9, and 98.6 percent, respectively.
- Also in June meteorological equipment returned uptimes of 99.7 percent due to data acquisition failure.

**Table 6 Data capture rates (%) for continuous monitoring parameters during Q2 2008.**

Month:	Powers AMS				Meadows AMS				Wagner AMS				Genesee AMS			
	4	5	6	Q2	4	5	6	Q2	4	5	6	Q2	4	5	6	Q2
NO <sub>2</sub>	100	99.5	100	99.8	99.7	100	100	99.9	100	100	100	100	100	100	100	100
SO <sub>2</sub>	100	100	100	100	99.7	100	100	99.9	100	100	100	100	100	100	100	100
O <sub>3</sub>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	100	100	100
PM <sub>2.5</sub>	100	99.2	99.9	99.7	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	99.2	99.9	98.6	99.6
WSP	100	99.7	100	99.9	99.7	100	100	99.9	100	99.3	100	99.8	100	100	99.7	99.9
WDR	100	99.7	100	99.9	99.7	100	100	99.9	100	99.3	100	99.8	100	100	99.7	99.9
T <sub>2</sub>	100	99.7	100	99.9	99.7	100	100	99.9	100	99.3	100	99.8	100	100	99.7	99.9
T <sub>10</sub>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	100	100	99.7	99.9
RH	100	99.7	100	99.9	99.7	100	100	99.9	100	99.3	100	99.8	100	100	99.7	99.9

Note: 4 = April; 5 = May; 6 = June.

WSP = wind speed.

WDR = wind direction.

T<sub>2</sub> = temperature at 2 metre height above ground.

T<sub>10</sub> = temperature at 10 metre height above ground.

RH = relative humidity.

n/a = not applicable.

Bolded values indicate <90% uptime.

## 2.1.2 Summary Statistics

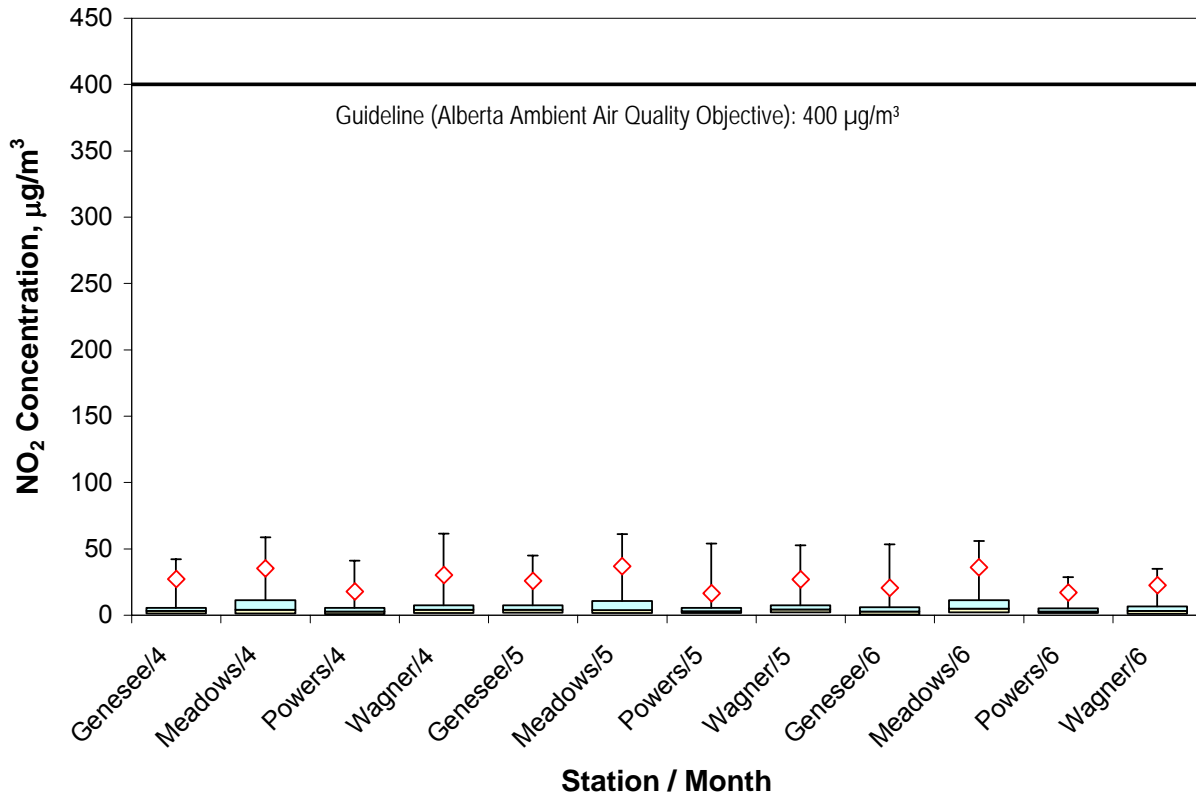
Box-and-whisker plots were used to display continuous air quality data during Q2 2008. The box-and-whisker plots presented here specifically show five values for individual pollutants collected at each station during Q2 2008:

- 25<sup>th</sup> percentile (%ile) – bottom of box
- 50<sup>th</sup> %ile – horizontal line within box
- 75<sup>th</sup> %ile – top of box
- 98<sup>th</sup> %ile – diamond
- maximum – top T

The bottom whisker is not shown in these plots because the values represented by the bottom whiskers are not important. Box-and-whisker plots are presented for Q2 2008 for the following:

- 1-hour average NO<sub>2</sub> concentrations from continuous monitoring (Figure 4)
- 24-hour average NO<sub>2</sub> concentrations from continuous monitoring (Figure 5)
- 1-hour average SO<sub>2</sub> concentrations from continuous monitoring (Figure 6)
- 24-hour average SO<sub>2</sub> concentrations from continuous monitoring (Figure 7)
- 1-hour average O<sub>3</sub> concentrations from continuous monitoring (Figure 8)
- 8-hour average O<sub>3</sub> concentrations from continuous monitoring (Figure 9)
- 24-hour average PM<sub>2.5</sub> concentrations from continuous monitoring (Figure 10)
- 24-hour average PM<sub>10</sub> concentrations from intermittent monitoring (Figure 11)
- 24-hour average PM<sub>2.5</sub> concentrations from intermittent monitoring (Figure 12)

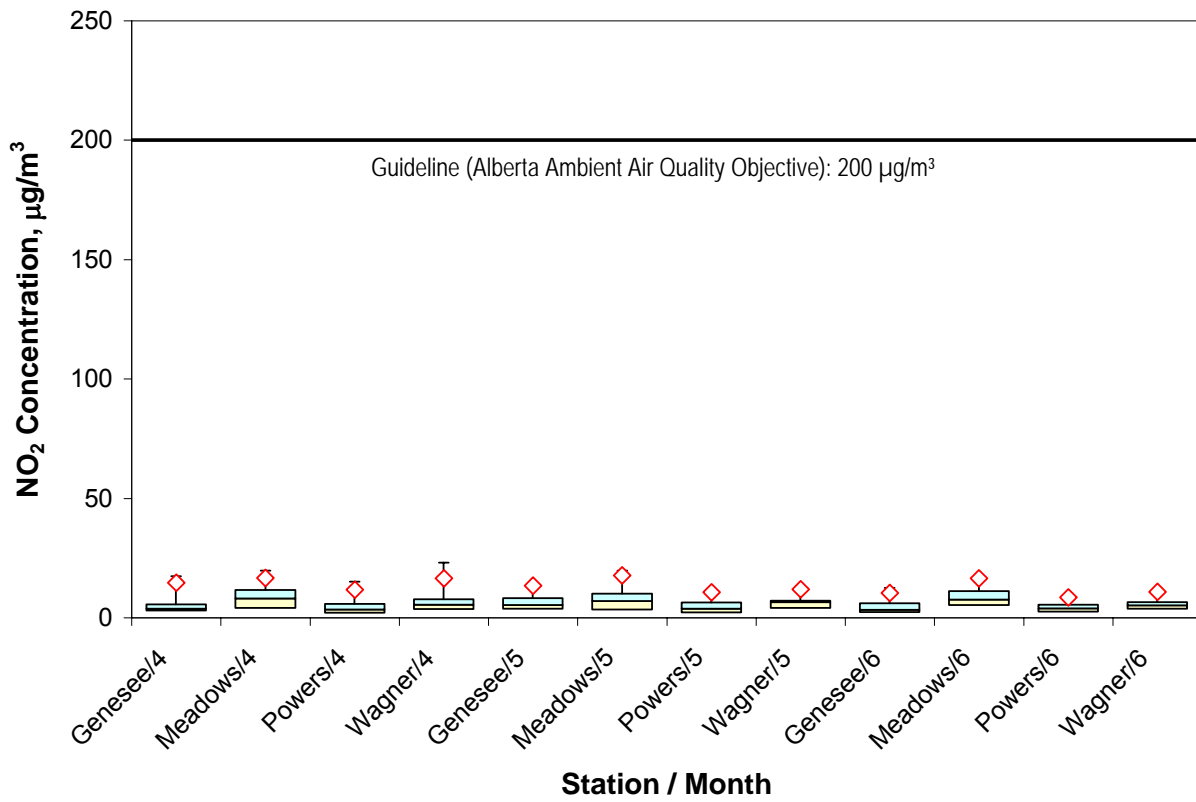
All measured concentrations were below applicable AAAQOs or Canada Wide Standard (CWS) values shown in these figures at each of the air monitoring stations.



**Figure 4** Box-and-Whisker plot of 1-hour average  $\text{NO}_2$  concentrations from continuous monitoring at selected air monitoring stations (Q2 2008).

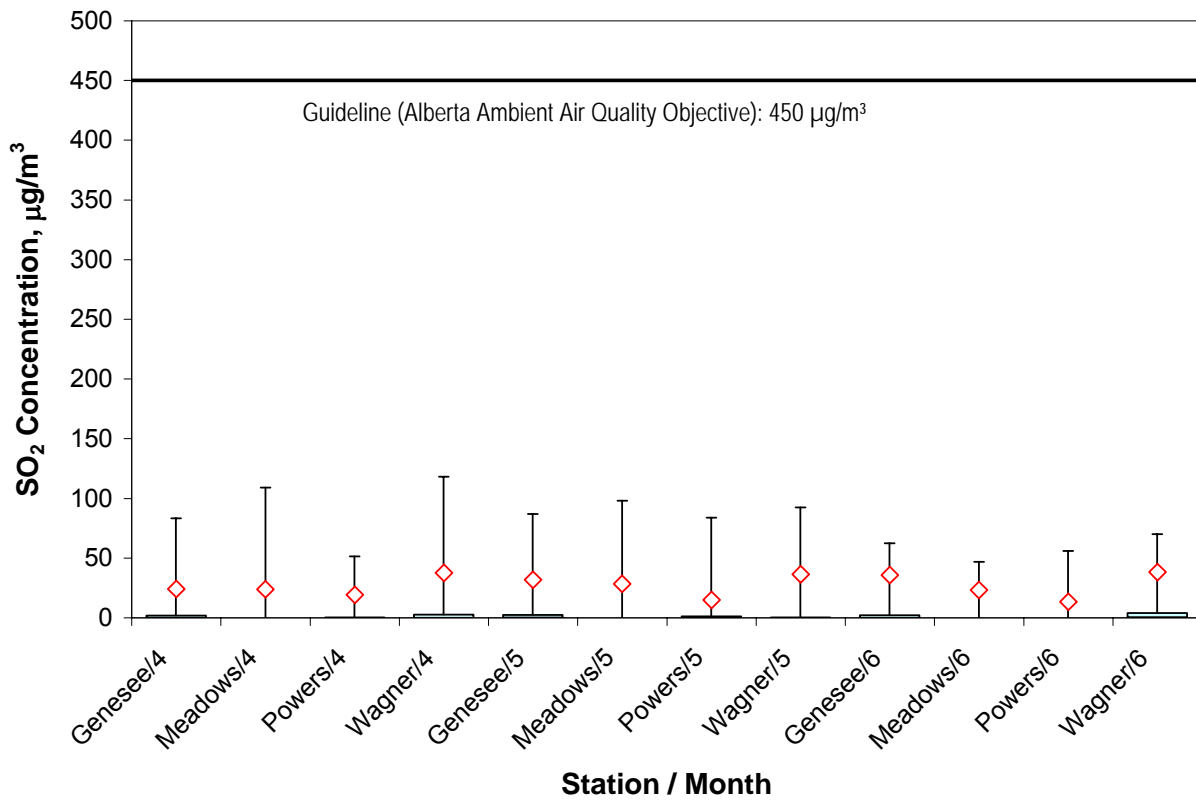
Note: 4 = April; 5 = May; 6 = June; 25th %ile (bottom of box); 50th %ile (horizontal line within box); 75th %ile (top of box); 98th %ile (diamond); maximum (top T)





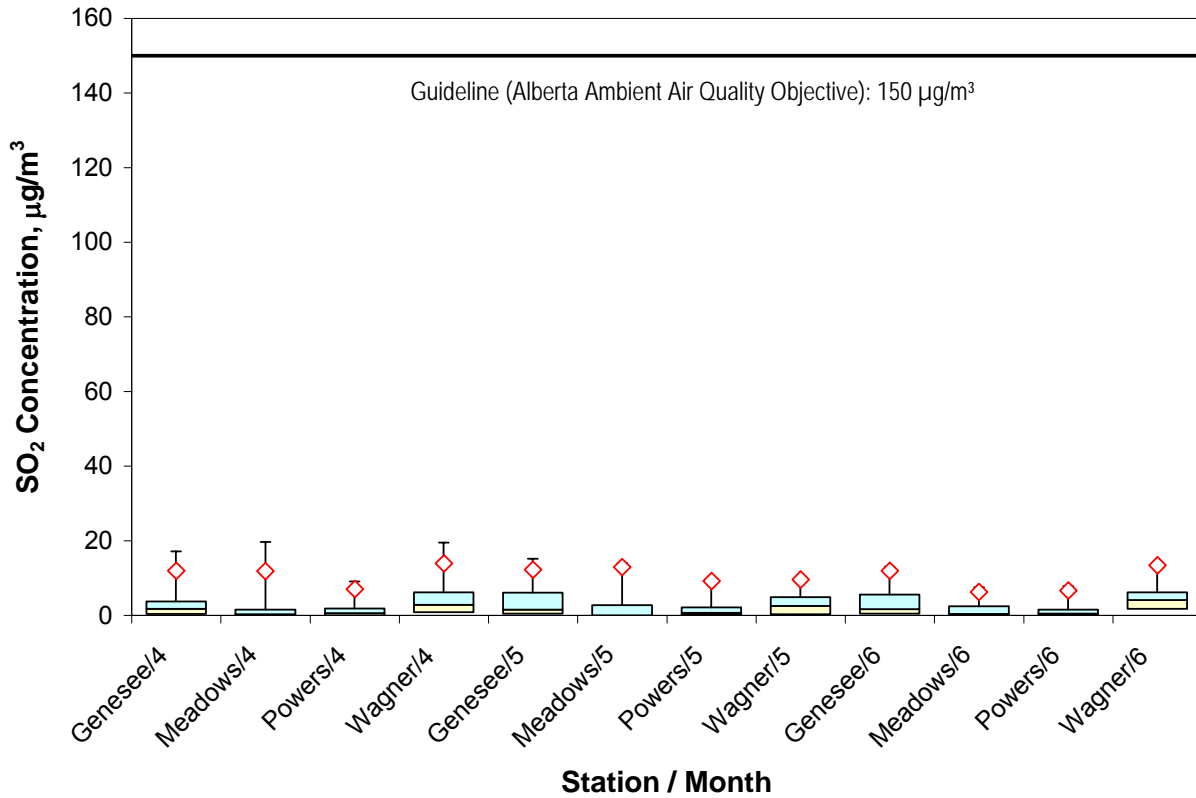
**Figure 5** Box-and-Whisker plot of 24-hour average NO<sub>2</sub> concentrations from continuous monitoring at selected air monitoring stations (Q2 2008).

Note: 4 = April; 5 = May; 6 = June; 25th %ile (bottom of box);  
 50th %ile (horizontal line within box); 75th %ile (top of box);  
 98th %ile (diamond); maximum (top T)



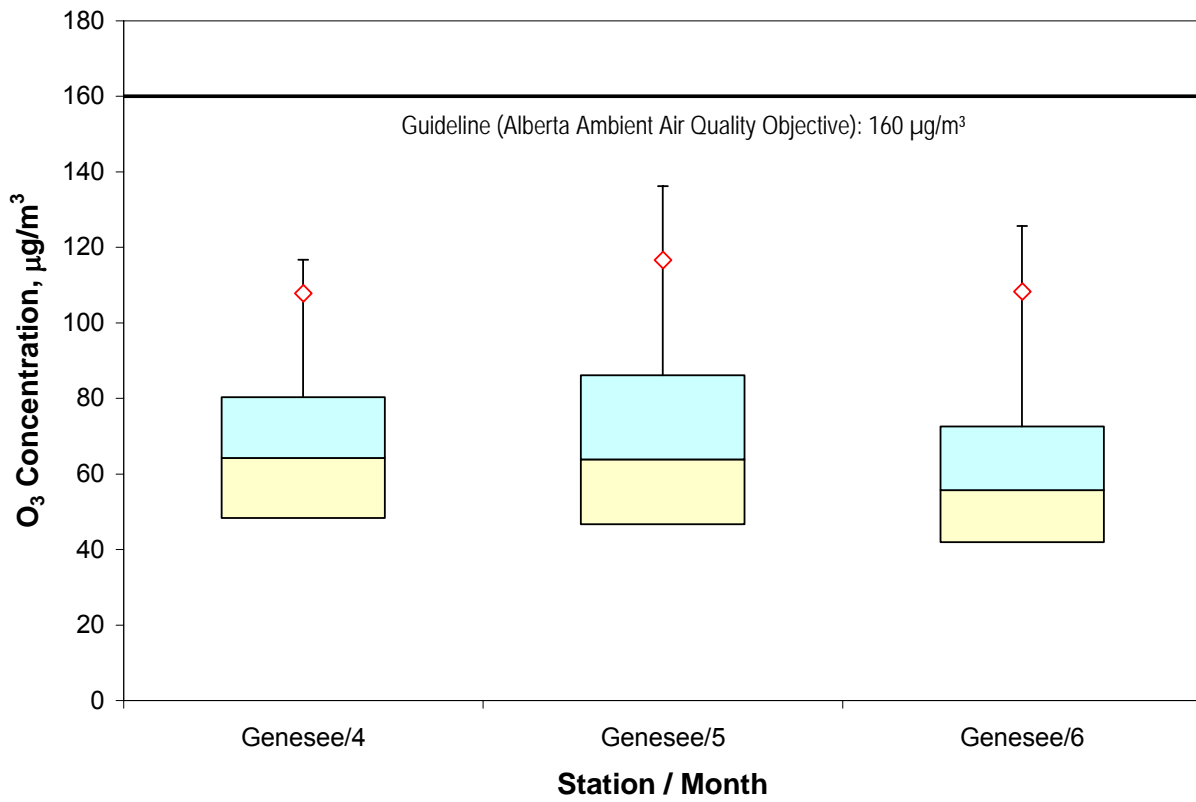
**Figure 6** Box-and-Whisker plot of 1-hour average SO<sub>2</sub> concentrations from continuous monitoring at selected air monitoring stations (Q2 2008).

Note: 4 = April; 5 = May; 6 = June; 25th %ile (bottom of box);  
 50th %ile (horizontal line within box); 75th %ile (top of box);  
 98th %ile (diamond); maximum (top T)



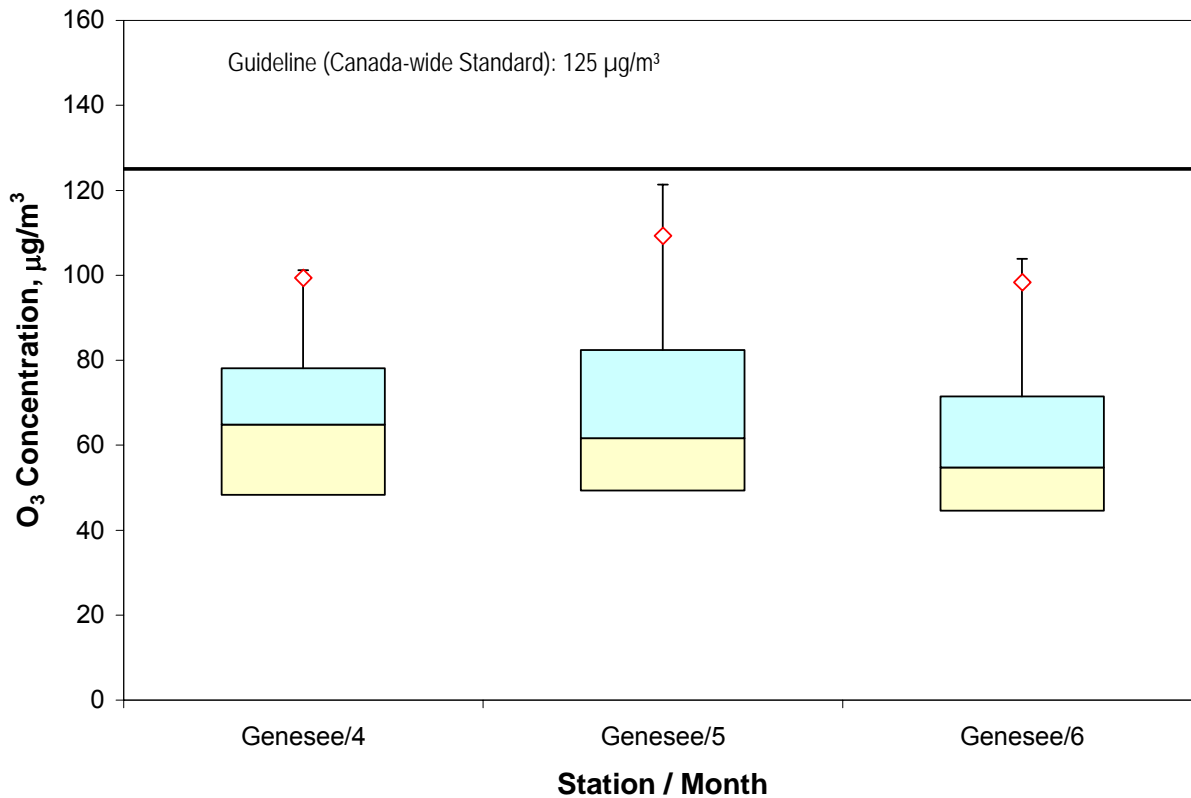
**Figure 7** Box-and-Whisker plot of 24-hour average SO<sub>2</sub> concentrations from continuous monitoring at selected air monitoring stations (Q2 2008).

Note: 4 = April; 5 = May; 6 = June; 25th %ile (bottom of box);  
 50th %ile (horizontal line within box); 75th %ile (top of box);  
 98th %ile (diamond); maximum (top T)



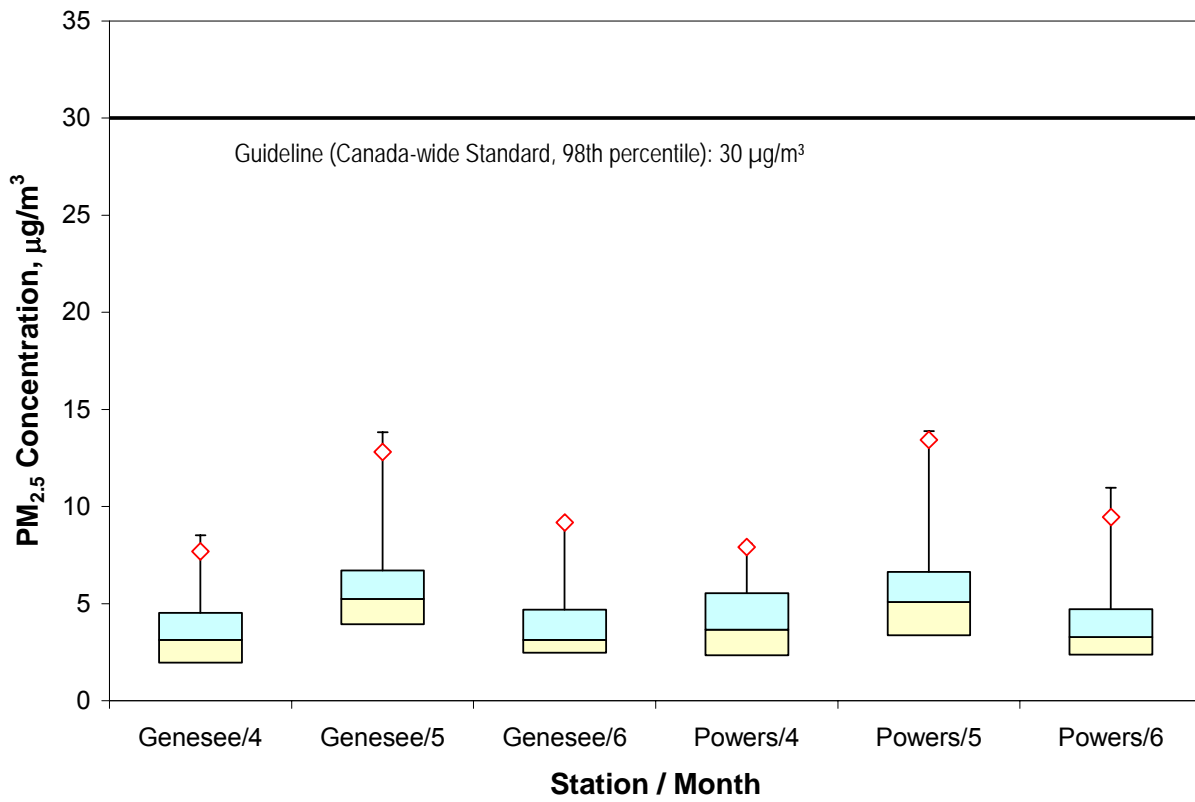
**Figure 8** Box-and-Whisker plot of 1-hour average  $\text{O}_3$  concentrations from continuous monitoring at Genesee AMS (Q2 2008).

Note: 4 = April; 5 = May; 6 = June; 25th %ile (bottom of box);  
 50th %ile (horizontal line within box); 75th %ile (top of box);  
 98th %ile (diamond); maximum (top T)



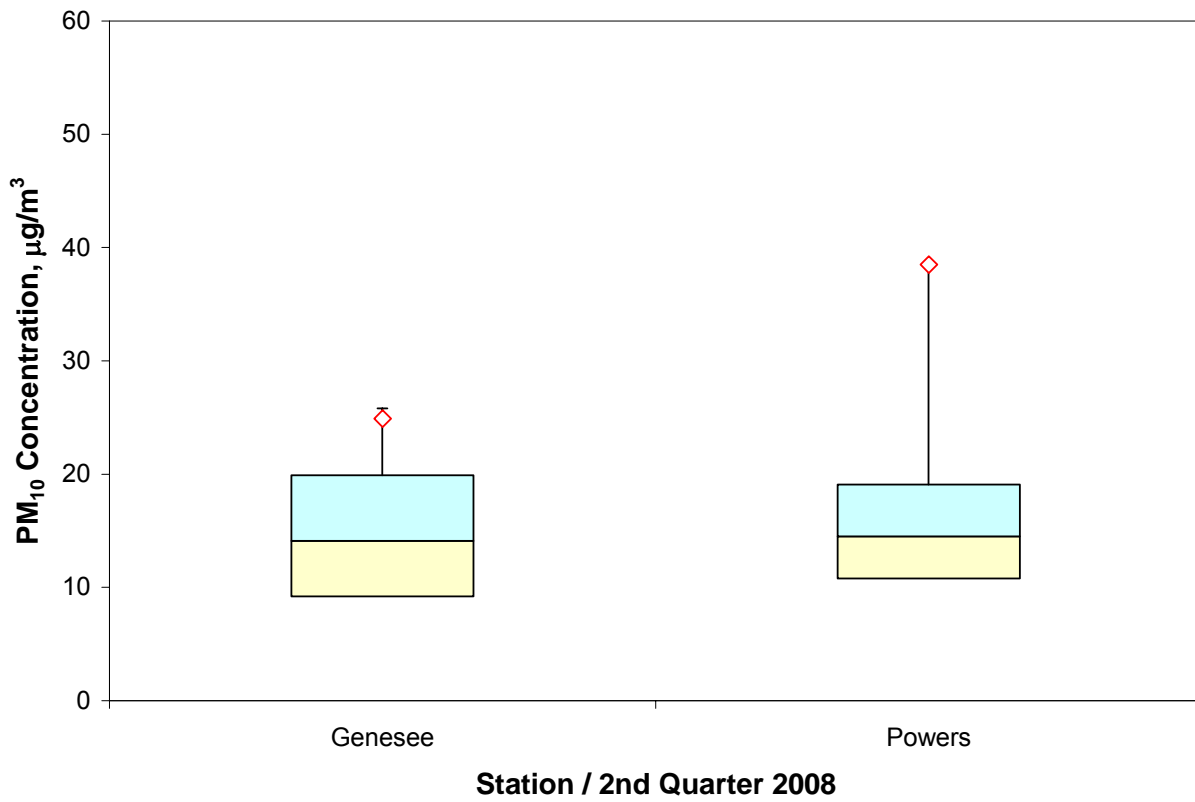
**Figure 9** Box-and-Whisker plot of 8-hour average  $\text{O}_3$  concentrations from continuous monitoring at Genesee AMS (Q2 2008).

Note: 4 = April; 5 = May; 6 = June; 25th %ile (bottom of box);  
 50th %ile (horizontal line within box); 75th %ile (top of box);  
 98th %ile (diamond); maximum (top T)



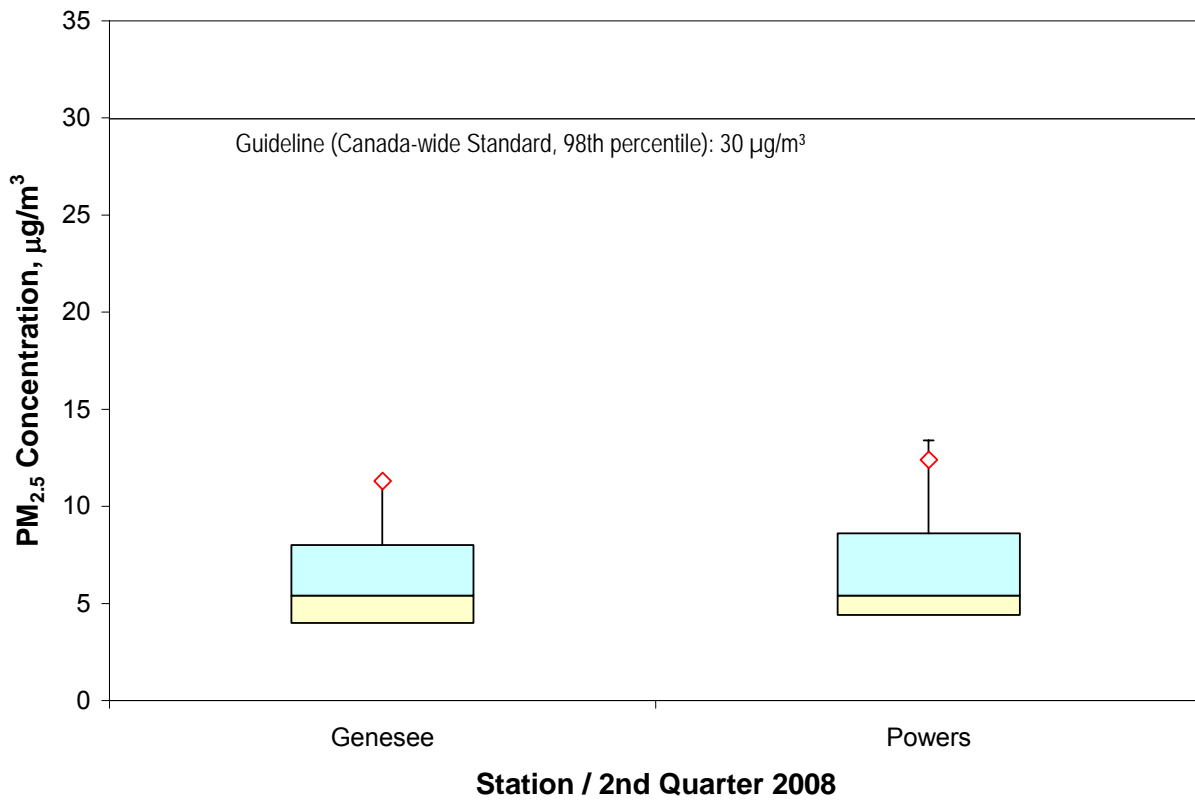
**Figure 10** Box-and-Whisker plot of 24-hour average  $\text{PM}_{2.5}$  concentrations from continuous monitoring at Genesee and Powers air monitoring stations (Q2 2008).

Note: 4 = April; 5 = May; 6 = June;  
 25th %ile (bottom of box);  
 50th %ile (horizontal line within box);  
 75th %ile (top of box);  
 98th %ile (diamond);  
 maximum (top T)



**Figure 11** Box-and-Whisker plot of 24-hour average PM<sub>10</sub> concentrations from intermittent monitoring at Genesee and Powers air monitoring stations (Q2 2008).

Note: 25th %ile (bottom of box);  
 50th %ile (horizontal line within box);  
 98th %ile (diamond);  
 75th %ile (top of box);  
 maximum (top T)



**Figure 12** Box-and-Whisker plot of 24-hour average  $\text{PM}_{2.5}$  concentrations from intermittent monitoring at Genesee and Powers stations in central Alberta (Q2 2008).

Note: 25th %ile (bottom of box);  
 50th %ile (horizontal line within box);  
 98th %ile (diamond);  
 75th %ile (top of box);  
 maximum (top T)



## 2.2 Acid Deposition Assessment Program

### 2.2.1 Data Completeness

Data capture rates for the acid deposition program integrated samples are presented in Table 7 for the second quarter of 2008. There was one incident of invalid or missing data out of 42 samples sought (Table 8).

**Table 7 Capture rates for integrated data for the acid deposition assessment program (Q2 2008).**

Station	Violet Grove AMS				Genesee AMS			
	4	5	6	Q2	4	5	6	Q2
TSP	5/5	4/5	5/5	14/15	5/5	5/5	5/5	15/15
HNO <sub>3</sub>	1/1	1/1	1/1	3/3	1/1	1/1	1/1	3/3
HNO <sub>2</sub>	1/1	1/1	1/1	3/3	1/1	1/1	1/1	3/3

Note: 4 = April; 5 = May; 6 = June.

Data capture rates expressed as: valid samples/total samples scheduled.

**Table 8 Incidences of invalid or missing data for the acid deposition assessment program (Q2 2008).**

Date	Station	Parameter	Cause	Corrective Action
18-Apr-08	Genesee AMS	TSP	Sampler malfunction – did not run (possible power interruption).	Sampler timer reprogrammed.

Table 9 shows data capture rates for continuous data collected at the Violet Grove and Genesee air monitoring stations for the acid deposition assessment program. Data capture rates for continuous monitoring parameters at the two air monitoring stations were well above the 90% criterion on a monthly basis.

**Table 9 Capture rates (%) for continuous data for the acid deposition assessment program (Q2 2008).**

Station	Violet Grove AMS				Genesee AMS			
	4	5	6	Q2	4	5	6	Q2
NO <sub>2</sub>	100	100	100	100	100	100	100	100
SO <sub>2</sub>	100	100	100	100	100	100	100	100
WSP	100	100	100	100	100	100	99.7	99.9
WDR	100	100	100	100	100	100	99.7	99.9
T <sub>2</sub>	100	100	100	100	100	100	99.7	99.9
T <sub>10</sub>	100	100	100	100	100	100	99.7	99.9
RH	100	100	99.3	99.8	100	100	99.7	99.9
PR	100	100	100	100	100	100	99.7	99.9

Note: 4 = April; 5 = May; 6 = June.  
WSP = wind speed.  
WDR = wind direction.  
T<sub>2</sub> = temperature at 2 metres height above ground.  
T<sub>10</sub> = temperature at 10 metres height above ground.

## 2.3 Mercury Assessment Program

### 2.3.1 Data Completeness

Wet Deposition Program – There were 13 wet deposition sample collection periods (weeks) in the second quarter of 2008. From these 13 collection periods, all precipitation samples were submitted to the laboratory (Frontier Geosciences Inc.). Frontier Geosciences Inc. rated nine precipitation samples as valid. An April weekly sample was rated invalid because of equipment operational problems reported during the sampling period due to low sample volume collected and extremely high wind conditions observed. In addition, three weekly samples in April had zero volume collected due to low or no precipitation events. Data capture rates for integrated sample data relevant to the mercury assessment (wet deposition) program are presented in Table 10.

RH = relative humidity.  
PR = precipitation.  
n/a = not applicable.  
Bolded values indicate <90% uptime.

**Table 10 Capture rates for precipitation samples in the mercury assessment (wet deposition) sampling program (Q2 2008).**

Station	Genesee AMS			
	4	5	6	Q2
Hg wet deposition sample	1/5	4/4	4/4	9/13

Note: 4 = April; 5 = May; 6 = June.

Dry Deposition Program – The sampling strategy associated with the dry deposition program for the second quarter of 2008 involved deploying the ion exchange membrane samplers for periods 14 days. In this case, six deployment periods were for 14 days at each of the sites during the April to June 2008 period – resulting in 6 dry deposition samples collected from each site. From these 6 collection periods, all samples were collected and submitted from each of the six sampling sites (Figure 3) for a total of 36 field samples. Frontier Geosciences Inc. rated all dry deposition samples as valid.

The dry deposition sampling program involves collection of trace (nanogram) levels of RGM in the atmosphere. Another important component of the dry deposition program involves collection of Quality Assurance/Quality Control (QA/QC) samples to assist in the determination of representative levels of RGM in the atmosphere that is free from interferences. These interferences may arise from:

- background contamination associated with handling the ion exchange membranes in the field and laboratory
- use of inconsistent field and laboratory measurement procedures

To address the issue of potential interferences, the program also collects numerous QA/QC samples. Specifically, 1 laboratory blank, 5 field blanks, and 11 replicate samples (for a total of 17 QA/QC samples) were simultaneously collected during the April to June 2008 period.

## ***2.4 Contraventions of Special Environmental Monitoring Programs***

There were no contraventions of approval terms and applicable air quality monitoring objectives during the April to June 2008 period.

### **3 Summary**

#### **3.1 *Regional Ambient Air Program***

There were no instances of invalid or missing data for intermittent PM<sub>10</sub> and PM<sub>2.5</sub> samples out of 60 samples sought during the second quarter in the regional ambient air program. There were no instances of invalid or missing passive sampler results out of 123 passive samples sought for the second quarter.

Second quarter data capture rates for continuous monitoring parameters at all air monitoring stations were well above the 90% criterion on a monthly basis as stipulated in the Air Monitoring Directive (1989). High uptimes indicate that equipment in the continuous air monitoring network was well-maintained. All measured concentrations were below applicable Alberta Ambient Air Quality Guideline values or Canada Wide Standard values.

There were no contraventions of approval terms and applicable air quality monitoring objectives during the April to June 2008 period.

#### **3.2 *Acid Deposition Assessment Program***

There were 29 of 30 valid intermittent TSP samples collected and 12 of 12 valid acid gas samples collected during the second quarter of 2008 for the acid deposition assessment program. All data capture rates were well above 90% for continuous monitoring parameters in the second quarter.

#### **3.3 *Mercury Assessment Program***

There were nine valid precipitation samples from thirteen collection periods in the wet deposition sampling program during the second quarter of 2008. An April weekly sample was rated invalid because of equipment operational problems reported during the sampling period due to low sample volume collected and extremely high wind conditions observed. In addition, three weekly samples in April had zero volume collected due to low or no precipitation events. The study component was restarted in April 2008. There were 36 valid dry deposition samples and 17 QA/QC samples collected in the dry deposition sampling program during the second quarter of 2008.