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

2007 Second Quarter Report

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

Final

Submitted by:
WBK & Associates Inc.
St Albert, AB

For:
Jacques Whitford AXYS
4208 – 97 Street, Suite 203
Edmonton, AB T6E 5Z9

Dec 21, 2007

EXECUTIVE SUMMARY

TransAlta Utilities Inc. and EPCOR Generation 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 special 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 2007. 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_{10} and $PM_{2.5}$ 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 for the second quarter.

Second quarter data capture rates for continuous monitoring parameters at all air monitoring stations, except the Meadows air monitoring station, were well above the 90% criterion on a monthly basis as stipulated in the Air Monitoring Directive (1989). The Meadows air monitoring station experienced power failure spanning June 11th at 17:30 through June 14th at 19:50, returning uptimes for all analyzers and meteorological equipment of 88.8%. This event was reported to Alberta Environment on June 15th (Reference number 188059). High uptimes at other air monitoring stations indicate that equipment in the continuous air monitoring network was generally well-maintained. All measured concentrations were well below applicable Alberta Ambient Air Quality Guideline values or Canada Wide Standard values.

There was one contravention of approval terms and applicable air quality monitoring objectives at the Meadows air monitoring station due to power failure for the April to June 2007 period.

Acid Deposition Assessment Program

There were 32 valid intermittent TSP samples collected and 12 valid acid gas samples collected during the second quarter of 2007 for the acid deposition assessment program. All data capture rates were well above 90% for continuous monitoring parameters in the second quarter for the program except for the precipitation monitor at Genesee AMS. The precipitation monitor at Genesee AMS was damaged by high winds near the middle of April and was not repaired until early May, returning an uptime of 45.8% in April and 78.4% in May.

Mercury Assessment Program

There were thirteen valid precipitation samples collected in the wet deposition sampling program during the second quarter of 2007. There were 72 valid dry deposition samples and 50 QA/QC samples collected in the dry deposition sampling program during the second quarter of 2007.

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ABBREVIATIONS

AAAQO ..... Alberta ambient air quality objective
AMS ..... air monitoring station
Ca^{2+} ..... calcium ion
CWS ..... Canada Wide Standard
EPEA ..... Environmental Protection and Enhancement Act
Hg ..... mercury
HNO_2 ..... nitrous acid
HNO_3 ..... nitric acid
K^+ ..... potassium ion
Mg^{2+} ..... magnesium ion
MW ..... megawatts
Na^+ ..... sodium ion
NAPS ..... Nation Air Pollutant Surveillance
NH_4^+ ..... ammonium ion
NO_2 ..... nitrogen dioxide
NO_3^- ..... nitrate ion
MDN ..... Mercury Deposition Network
O_3 ..... ozone
$PM_{2.5}$ ..... particulate matter ≤2.5 µm diameter
PM_{10} ..... particulate matter ≤10 µm diameter
Q1 ..... first quarter
RH ..... relative humidity
RGM ..... reactive gaseous mercury
SO_2 ..... sulphur dioxide
SO_4^{2-} ..... sulphate ion
SW ..... surface wetness
T_2 ..... ambient temperature at 2 m above ground
T_{10} ..... ambient temperature at 10 m above ground
TSP ..... total suspended solids
WDR ..... wind direction
WSP ..... wind speed

1 Introduction

TransAlta Utilities (TransAlta) [www.transalta.com] and EPCOR Generation 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).

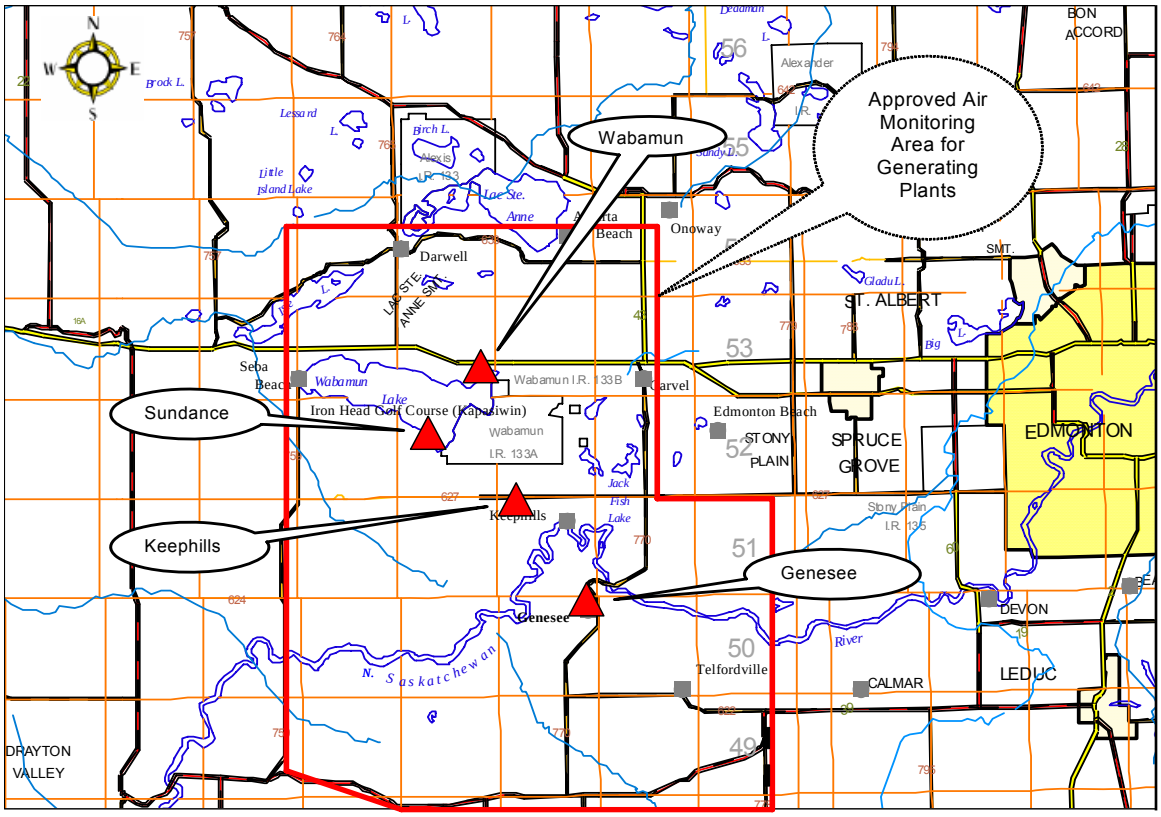


Figure 1 Coal fired generating plant locations in the Wabamun-Genesee area.

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 generating plant in 2006. 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, and is the largest, coal-fired generating plant in western Canada. Sundance is situated on the south shore of Lake Wabamun approximately 70 kilometres (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. Sundance currently has a net generating capacity of 2,020 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 consists of three generating units located 50 km southwest of Edmonton (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 special 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	6.1.18 to 6.1.24; 6.1.32 to 6.1.34
Sundance	2,020	3,4,8,9,10,16,17,20, and 31-52-04 W5M	9830-01-00	13.1.18 to 13.1.24; 13.1.32 to 13.1.34
Keephills	766	36-51-04 W5M	10324-01-00	6.1.18 to 6.1.24; 6.1.32 to 6.1.37
Genesee	1,212	25-50-03 W5M	773-02-00	7.1.1 to 7.1.9

1.1.1 Ambient Air Quality Monitoring Program

A component of the special 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 (AMSs) (Figure 2) – Powers, Meadows, Wagner, and Genesee. Sulphur dioxide (SO_2), nitrogen dioxide (NO_2), 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 ($PM_{2.5}$) is measured at the Powers and Genesee AMS, and ozone (O_3) is measured at the Genesee AMS.

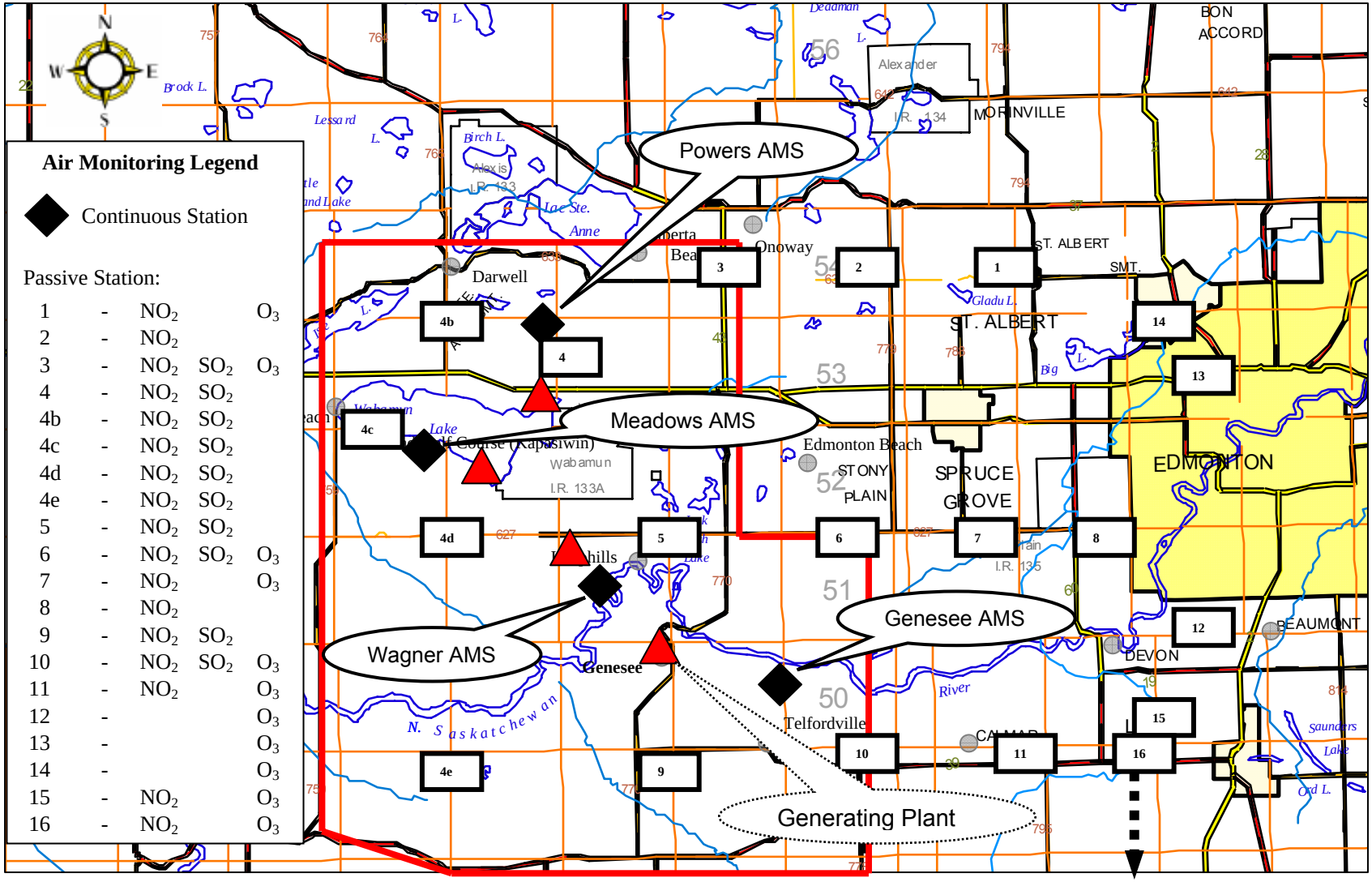


Figure 2 Continuous and passive monitoring locations in Wabamun-Genesee area.

- An integrated monitoring program (integrated monitoring for 24 hours every 6 days) for particulate matter with aerodynamic diameter less than or equal to 10 microns (PM_{10}), and $PM_{2.5}$, and metals speciation of $PM_{2.5}$ 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_2, SO_2, and O_3 at selected stations. Nineteen stations are shown in Figure 2. Two additional stations (15 and 16) were added in February 2006. These stations are located outside of the area shown in Figure 2 in the lower right hand corner and monitor NO_2 and O_3.

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

Parameter	Continuous	Sampled intermittently – every 6th day according to NAPS schedule	Sampled monthly (passives)
SO_2	•		•
NO_2	•		•
O_3	•		•
PM_{10}		•	
$PM_{2.5}$	•	•[a]	
Wind speed and direction, temperature, relative humidity)	•		

[a] Includes metals speciation.

1.1.2 Acid Deposition Assessment Program

Another component of the special 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 as it is located outside of the area shown in this figure in the lower left-hand corner. The four generating plants are located at distances of 55 to 60 km away from the Violet Grove station.

The following parameters 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 chemistry 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_2 and NO_2.
- Monthly integrated annular denuder samples for HNO_3 and HNO_2.
- One 24-hour integrated particulate matter (TSP) sample collected every 6th day for Na^+, K^+, Mg^{2+}, Ca^{2+}, NH_4^+, SO_4^{2-}, and NO_3^-.

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_2.
- Air temperature at standard height (10 m), T_{10}; or difference in air temperature at standard height and surface.

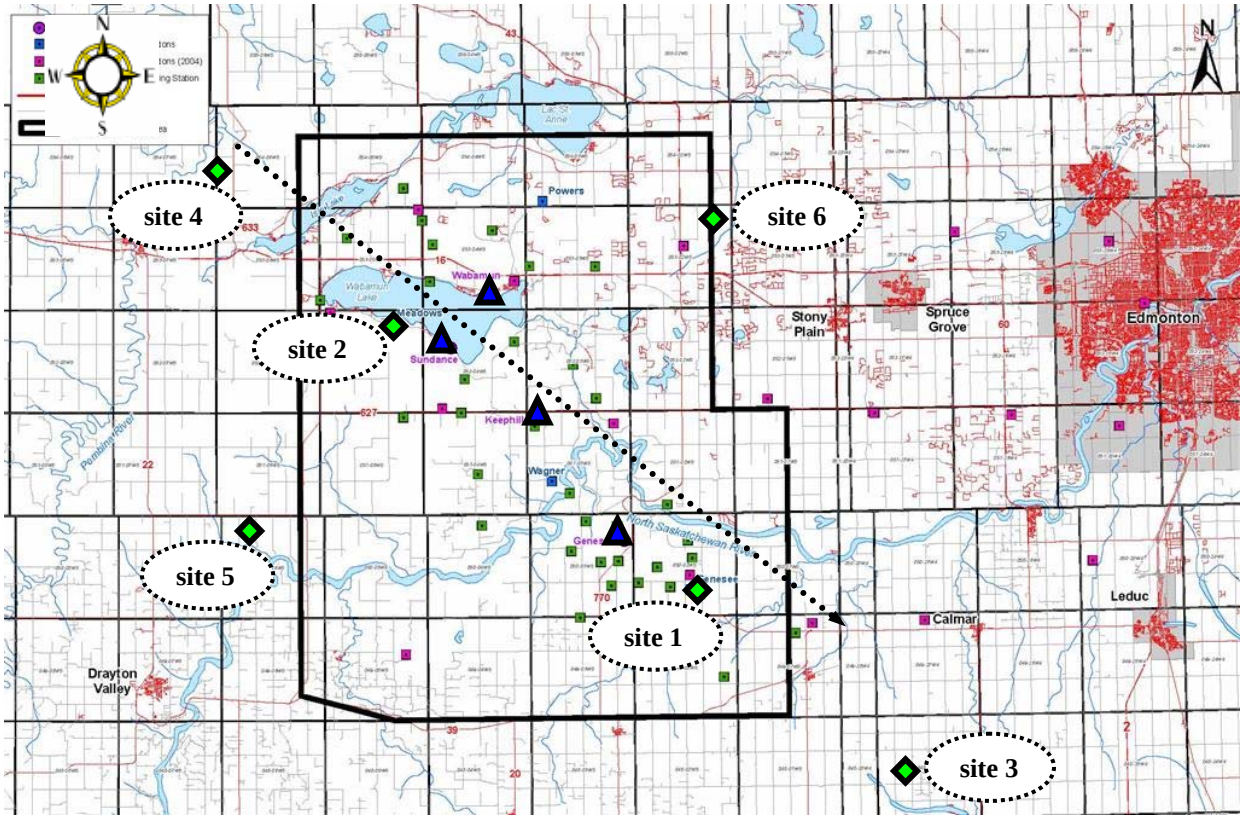
1.1.3 Mercury Assessment Program

The mercury assessment program consists of wet and dry deposition monitoring. The objective of this program component is to quantify wet and dry deposition rates of mercury in the Wabamun-Genesee region to better 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 full dry deposition monitoring component was designed with the approval of Alberta Environment. The field program commenced during the second week of March 2007. Seven-day I.C.E. 450 cation-exchange (ion exchange) membrane samples are being collected at six sites throughout the Wabamun-Genesee area (Figure 3) using the same schedule as the

MDN (sample change outs occur on Tuesday of each week). Membrane samples are sent weekly to Frontier GeoSciences Inc. (Seattle, WA) for analysis of Hg^{2+} (reactive gaseous mercury or RGM) and results are received within 90 days.



Legend:

Coal-fired generating plant

Hg dry deposition monitoring location

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 2007. 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_{10} and $PM_{2.5}$ intermittent samples are listed in Table 3. There were no instances of invalid or missing data for intermittent PM_{10} and $PM_{2.5}$ samples out of 60 samples sought during the second quarter (Table 4).

Table 3 Data capture rates for intermittent PM_{10} and $PM_{2.5}$ monitoring during second quarter 2007.

	Powers AMS				Genesee AMS			
Month:	4	5	6	Q2	4	5	6	Q2
PM_{10}:	5/5	5/5	5/5	15/15	5/5	5/5	5/5	15/15
$PM_{2.5}$:	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_{10} and $PM_{2.5}$ data during second quarter 2007.

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

Data capture rates for the passive samples are presented in Table 5. There were no instances of invalid or missing passive results for the second quarter of 2007.

Table 5 Data capture rates for passive monitoring parameters during second quarter 2007.

Parameter	Capture Rate
NO_2	54/54
SO_2	36/36
O_3	33/33

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

Second quarter (Q2) 2007 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. High uptimes indicate that equipment in

the continuous air monitoring network was generally well-maintained. The following comments are noted:

Powers AMS:

- High winds in the early part of April caused irregular operation in the $PM_{2.5}$ analyzer in April (uptime of 99.9%).
- The $PM_{2.5}$ analyzer underwent maintenance in May (uptime of 99.9%).
- The $PM_{2.5}$ analyzer experienced unstable operation in June (uptime of 98.5%).

Meadows AMS:

- The station experienced data acquisition failure in April, returning uptimes for all analyzers and meteorological equipment of 98.6%.
- The station experienced data acquisition failure in May, returning uptimes for all analyzers and meteorological equipment of 98.4%.
- The station experienced power failure spanning June 11th at 17:30 through June 14th at 19:50, returning uptimes for all analyzers and meteorological equipment of 88.8%. This event was reported to Alberta Environment on June 15th (Reference number 188059).

Wagner AMS:

- All analyzers returned uptimes of 96.7% and all meteorological equipment returned uptimes of 96.8% due to data acquisition failure in the month of June.

Genesee AMS:

- The $PM_{2.5}$ analyzer underwent maintenance in April (uptime of 99.3%).
- All analyzers and monitors had 99.6% uptimes in May due to power failure.
- The station experienced data acquisition failure, returning uptimes of 99.7% in June. In addition to data acquisition failure, the $PM_{2.5}$ analyzer experienced unstable operation yielding an uptime of 98.8% in June.

Table 6 Data capture rates (%) for continuous monitoring parameters during Q2 2007.

	Powers AMS				Meadows AMS				Wagner AMS				Genesee AMS			
Month:	4	5	6	Q2	4	5	6	Q2	4	5	6	Q2	4	5	6	Q2
NO_2	100	100	100	100	98.6	98.4	**88.8**	95.3	100	100	96.7	98.9	100	99.6	99.7	99.8
SO_2	100	100	100	100	98.6	98.4	**88.8**	95.3	100	100	96.7	98.9	100	99.6	99.7	99.8
O_3	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	99.6	99.7	99.8
$PM_{2.5}$	99.9	99.6	98.5	99.3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	99.3	99.6	98.8	99.2
WSP	100	100	100	100	98.6	98.4	**88.8**	95.3	100	100	96.8	98.9	100	99.6	99.7	99.8
WDR	100	100	100	100	98.6	98.4	**88.8**	95.3	100	100	96.8	98.9	100	99.6	99.7	99.8
T_2	100	100	100	100	98.6	98.4	**88.8**	95.3	100	100	96.8	98.9	100	99.6	99.7	99.8
T_{10}	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	99.6	99.7	99.8
RH	100	100	100	100	98.6	98.4	**88.8**	95.3	100	100	96.8	98.9	100	99.6	99.7	99.8

Note: 4 = April, 5 = May, 6 = June.
WSP = wind speed.
WDR = wind direction.
T_2 = temperature at 2 metre height above ground.
T_{10} = temperature at 10 metres height above ground.
RH = relative humidity.
n/a = not applicable.
Bolded values indicate <90% uptime.

2.1.2 Summary Statistics

One method of displaying a set of air quality data is with box-and-whisker plots. Box-and-whisker plots are helpful in interpreting the distribution of data. These plots only illustrate certain statistics rather than all the data. Box-and-whisker plots presented here specifically show five values for individual pollutants collected at each station during Q2 2007:

- 25^{th} percentile (bottom of box)
- 50^{th} percentile (horizontal line within box)
- 75^{th} percentile (top of box)
- 98^{th} percentile (diamond)
- maximum (top T)

The bottom whisker is not shown in these plots because the values represented by the bottom whiskers are unessential. Box-and-whisker plots are presented for Q2 2007 for the following:

- 1-hour average NO_2 concentrations from continuous monitoring (Figure 4)
- 24-hour average NO_2 concentrations from continuous monitoring (Figure 5)
- 1-hour average SO_2 concentrations from continuous monitoring (Figure 6)
- 24-hour average SO_2 concentrations from continuous monitoring (Figure 7)
- 1-hour average O_3 concentrations from continuous monitoring (Figure 8)
- 8-hour average O_3 concentrations from continuous monitoring (Figure 9)
- 24-hour average $PM_{2.5}$ concentrations from continuous monitoring (Figure 10)
- 24-hour average PM_{10} concentrations from intermittent monitoring (Figure 11)
- 24-hour average $PM_{2.5}$ concentrations from intermittent monitoring (Figure 12)

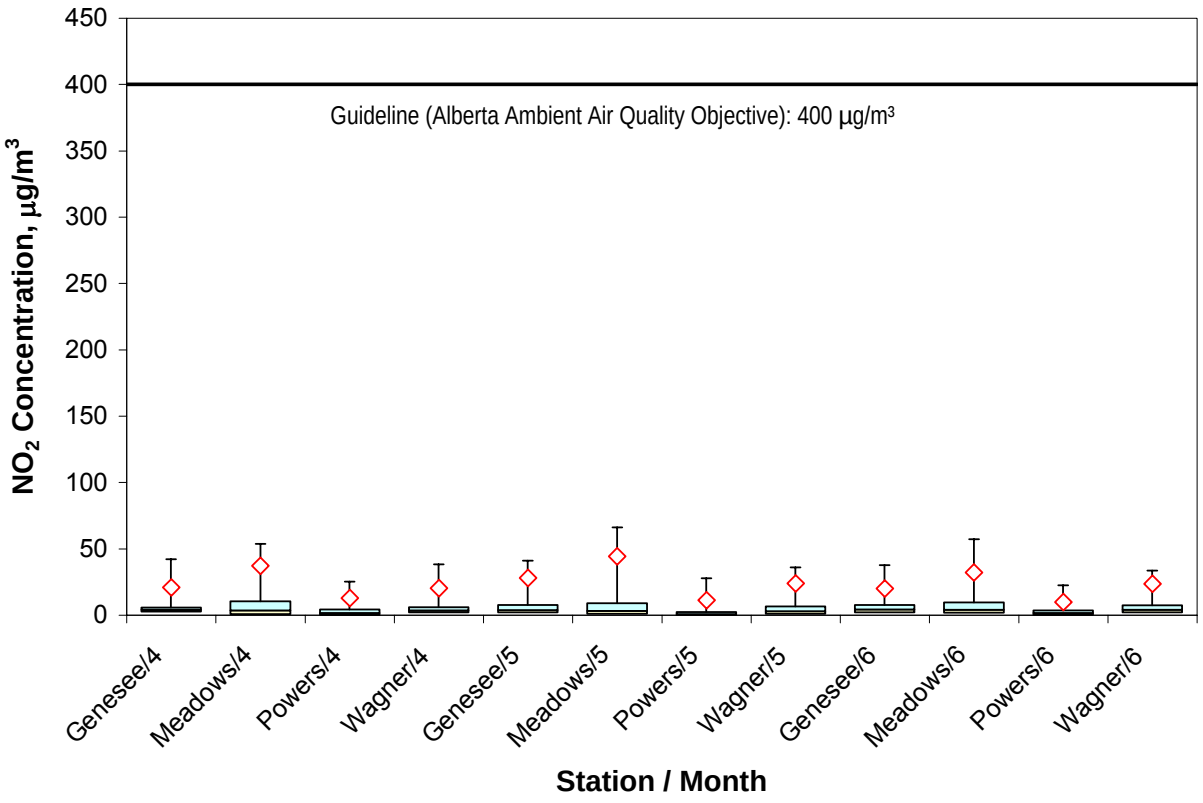


Figure 4 **Box-and-Whisker plot of 1-hour average NO_2 concentrations from continuous monitoring at selected air monitoring stations (Q2 2007).**

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

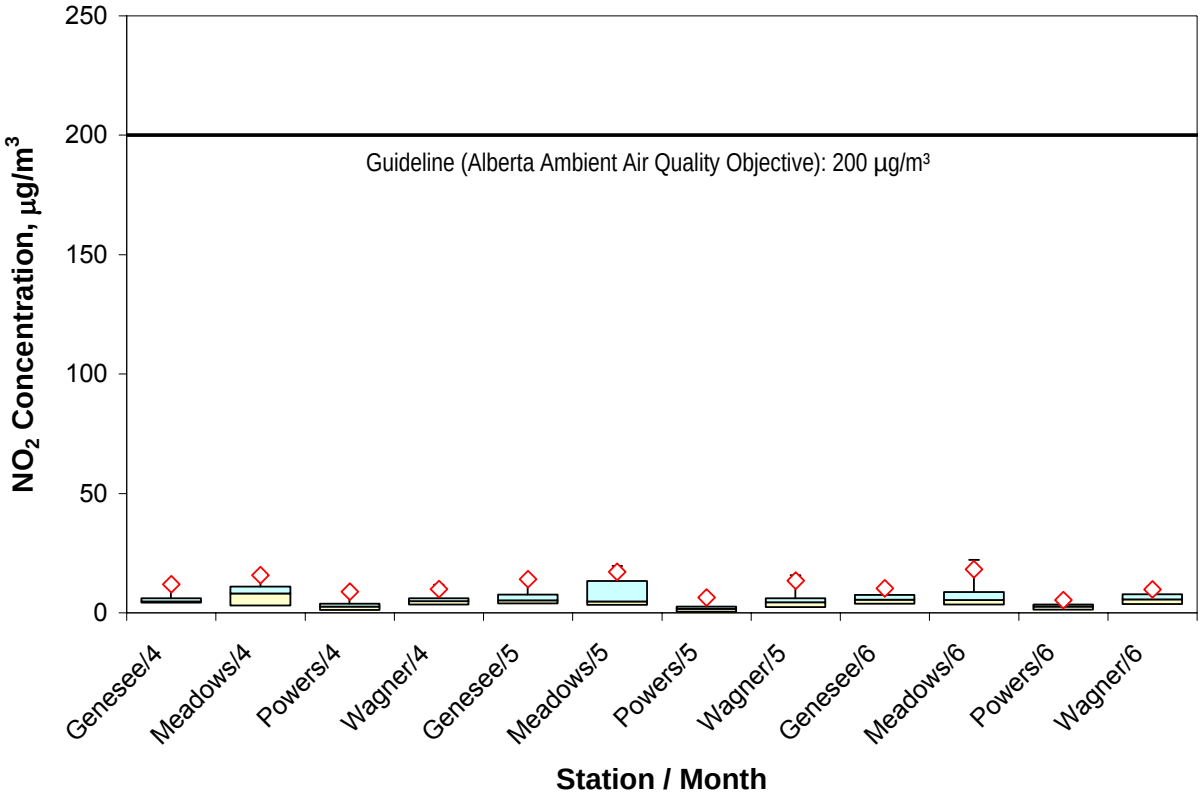


Figure 5 **Box-and-Whisker plot of 24-hour average NO_2 concentrations from continuous monitoring at selected air monitoring stations (Q2 2007).**

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

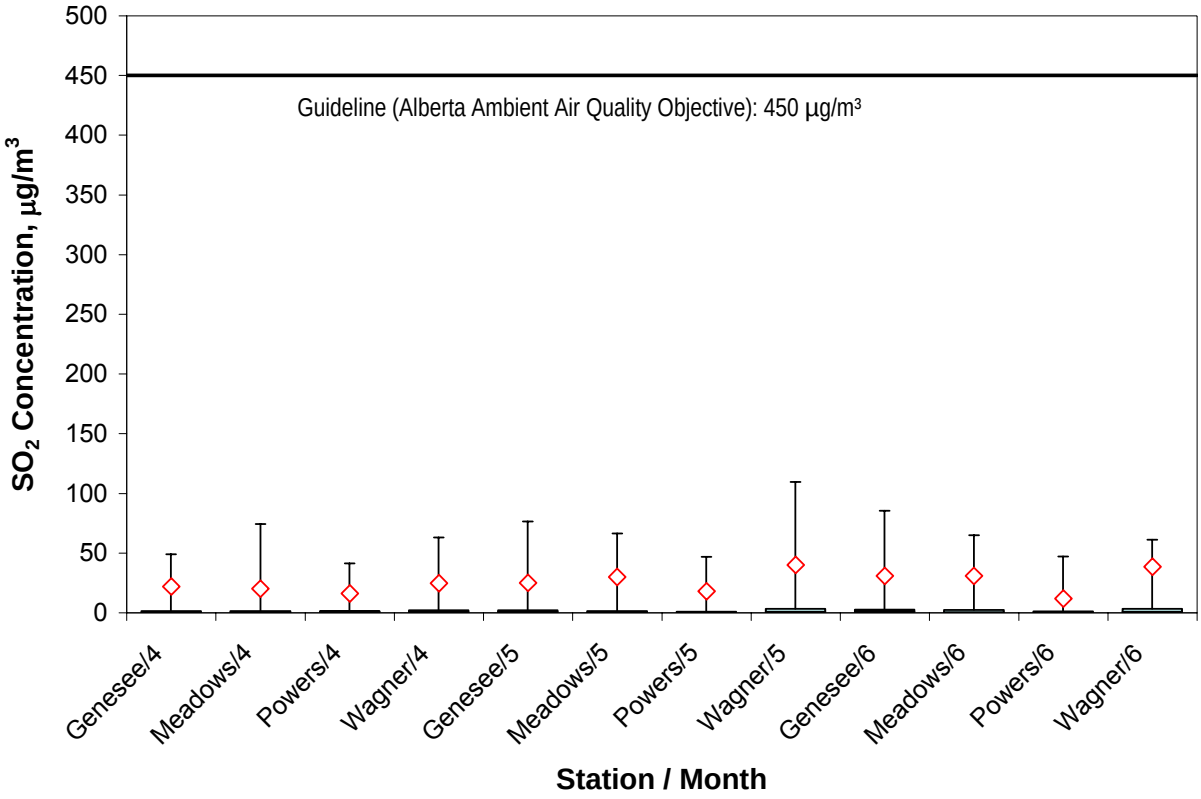


Figure 6 **Box-and-Whisker plot of 1-hour average SO_2 concentrations from continuous monitoring at selected air monitoring stations (Q2 2007).**

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

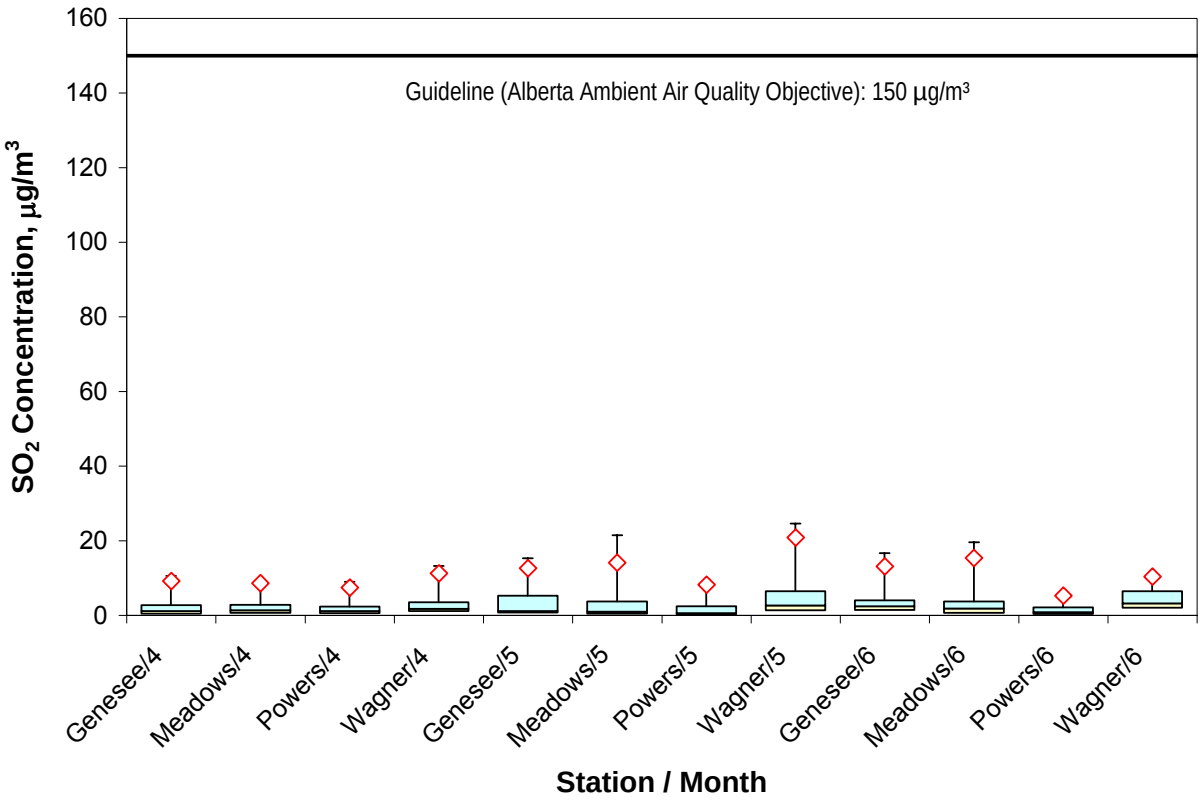


Figure 7 **Box-and-Whisker plot of 24-hour average SO_2 concentrations from continuous monitoring at selected air monitoring stations (Q2 2007).**

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

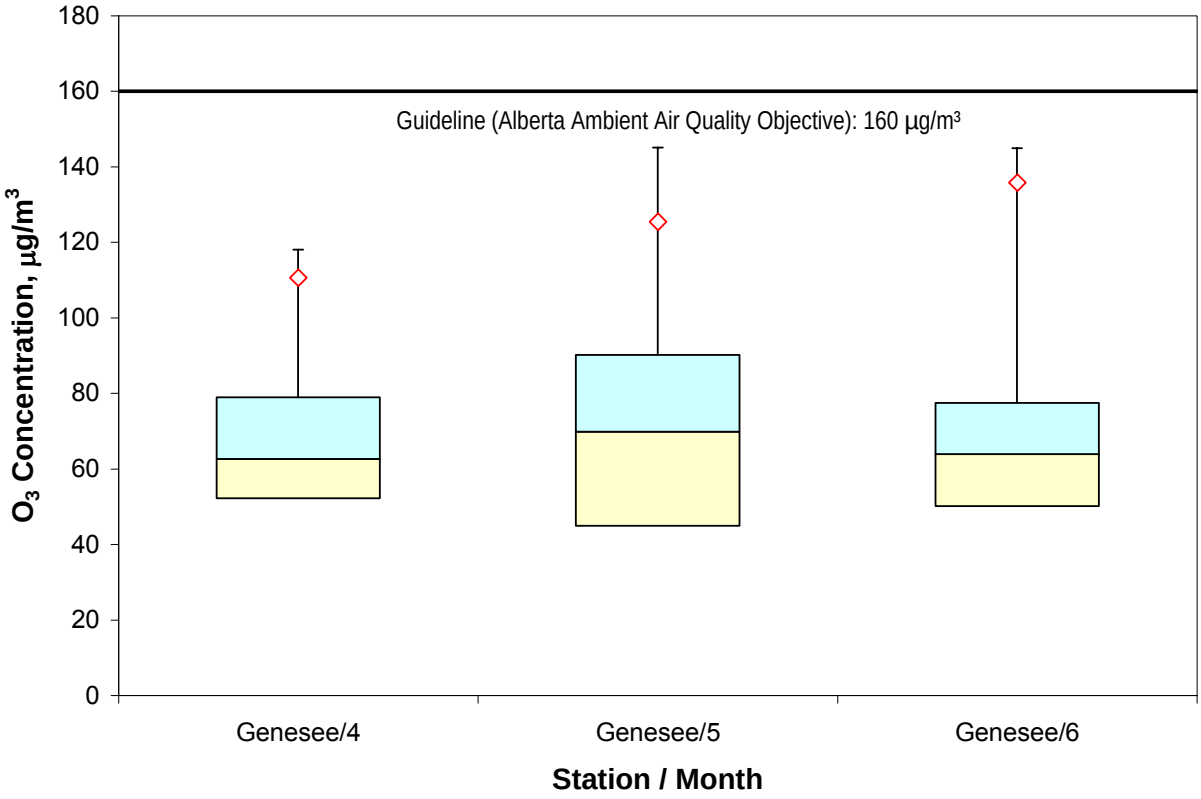


Figure 8 **Box-and-Whisker plot of 1-hour average O_3 concentrations from continuous monitoring at Genesee AMS (Q2 2007).**

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

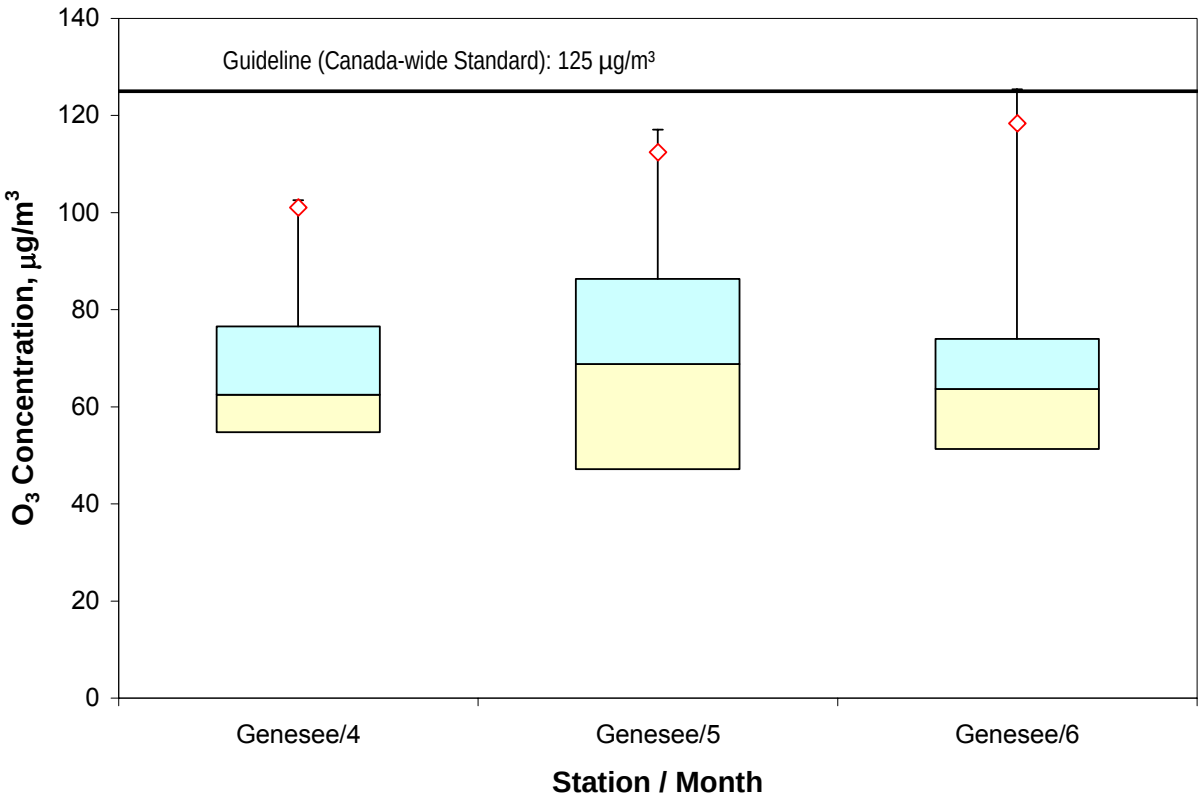


Figure 9 **Box-and-Whisker plot of 8-hour average O_3 concentrations from continuous monitoring at Genesee AMS (Q2 2007).**

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

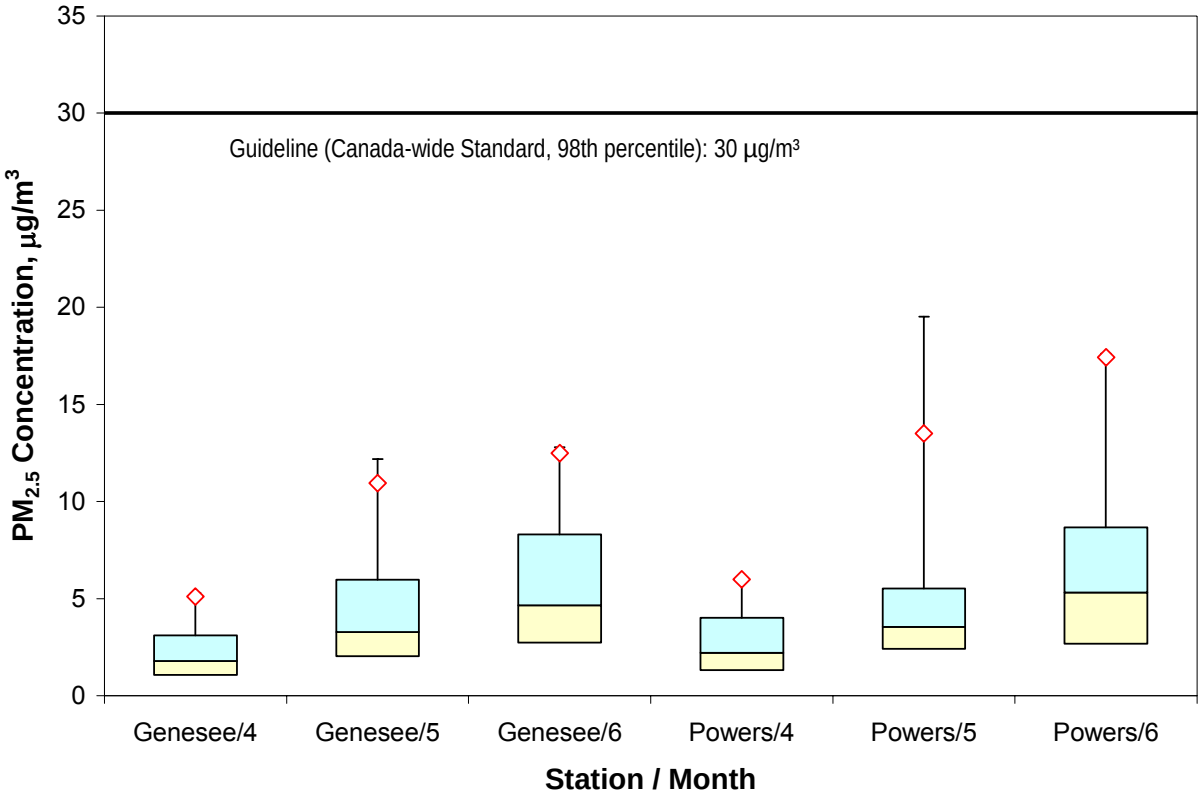


Figure 10 **Box-and-Whisker plot of 24-hour average $PM_{2.5}$ concentrations from continuous monitoring at Genesee and Powers air monitoring stations (Q2 2007).**

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

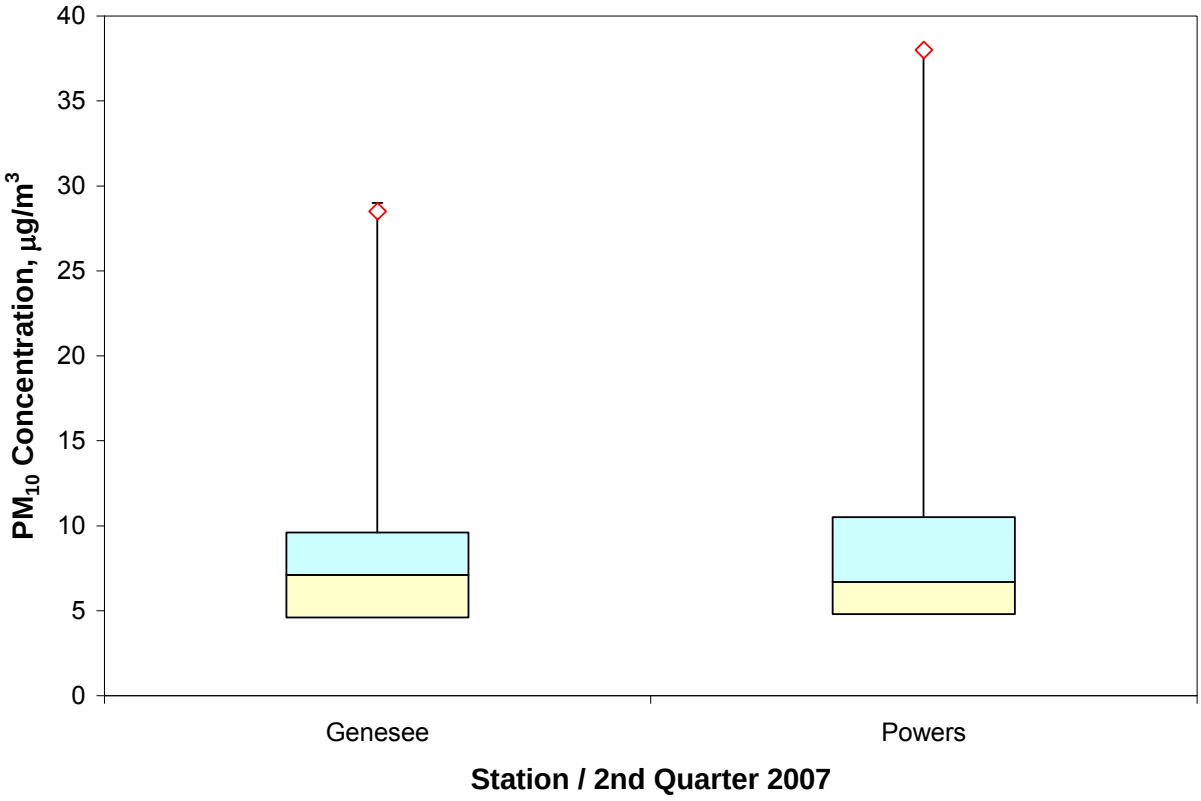


Figure 11 **Box-and-Whisker plot of 24-hour average PM_{10} concentrations from intermittent monitoring at Genesee and Powers air monitoring stations (Q2 2007).**

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

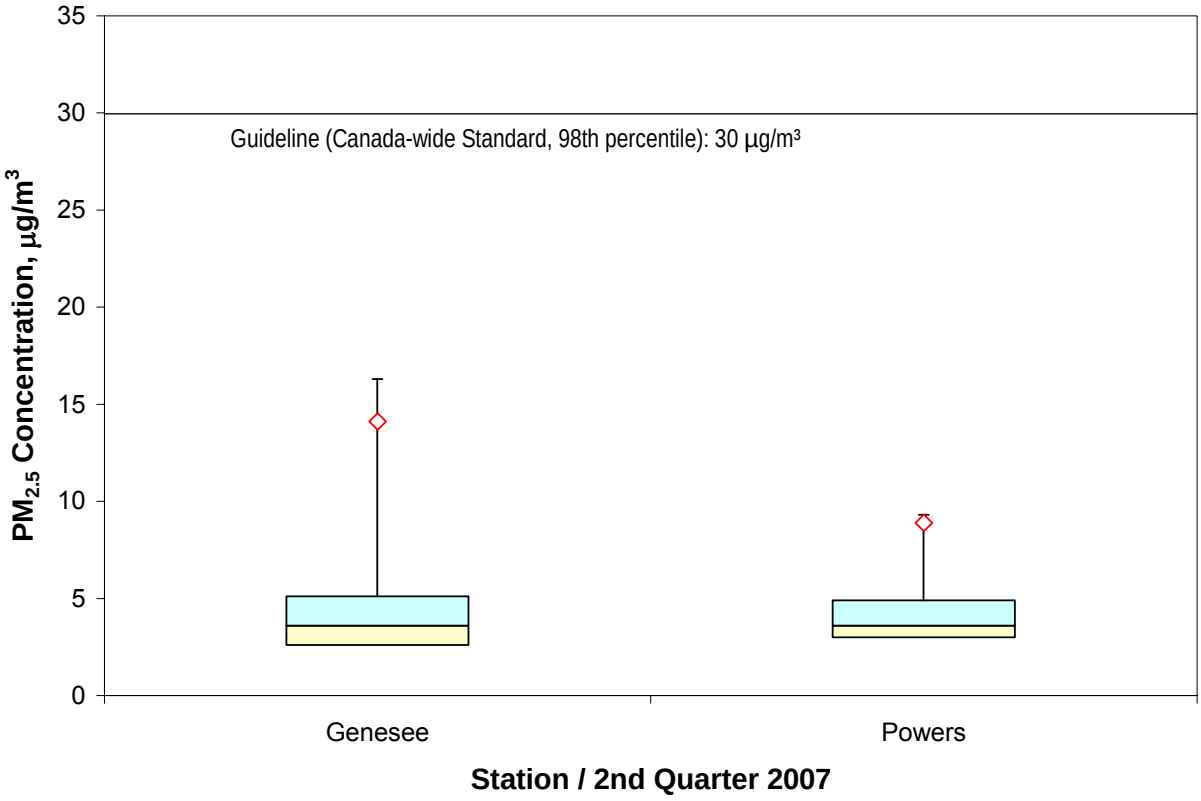


Figure 12 **Box-and-Whisker plot of 24-hour average $PM_{2.5}$ concentrations from intermittent monitoring at Genesee and Powers stations in central Alberta (Q2 2007).**

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

All measured concentrations were below applicable AAAQOs or Canada Wide Standard (CWS) values shown in these figures, except for 8-hour average O_3 concentrations at Genesee AMS in June (Figure 9). The maximum 8-hour average O_3 concentration observed at Genesee AMS was 126 $\mu g/m^3$ in June. The Canada Wide Standard for O_3 is 125 $\mu g/m^3$ (65 ppb) as an 8-hour average.

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 2007. There were no incidents 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 2007).

Station	Violet Grove AMS				Genesee MAS			
Month	4	5	6	Q2	4	5	6	Q2
TSP	5/5	5/5	5/5	15/15	5/5	5/5	5/5	15/15
HNO_3	1/1	1/1	1/1	3/3	1/1	1/1	1/1	3/3
HNO_2	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 2007).

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

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. The SO_2 and NO_2 analyzers at Violet Grove AMS underwent maintenance in May, returning uptimes of 99.9%. The SO_2 analyzer at Violet Grove AMS experienced analyzer failure in June, returning an uptime of 96%.

The precipitation monitor at Genesee AMS was damaged by high winds near the middle of April and was not repaired until early May, returning an uptime of 45.8% in April and 78.4% in May. All analyzers and monitors at Genesee AMS had 99.6% uptimes in May due to power failure. In addition, the station experienced data acquisition failure, returning uptimes of 99.7% in June.

Table 9 Capture rates (%) for continuous data for the acid deposition assessment program (Q2 2007).

Station	Violet Grove AMS				Genesee AMS			
Month	4	5	6	Q2	4	5	6	Q2
NO_2	100	99.9	96.0	98.6	100	99.6	99.7	99.8
SO_2	100	99.9	100	99.9	100	99.6	99.7	99.8
WSP	100	100	100	100	100	99.6	99.7	99.8
WDR	100	100	100	100	100	99.6	99.7	99.8
T_2	100	100	100	100	100	99.6	99.7	99.8
T_{10}	100	100	100	100	100	99.6	99.7	99.8
RH	100	100	100	100	100	99.6	99.7	99.8
PR	100	100	100	100	**45.8**	**78.4**	99.7	**74.6**

Note: 4 = April, 5 = May, 6 = June.
WSP = wind speed.
WDR = wind direction.
T_2 = temperature at 2 metre height above ground.
T_{10} = temperature at 10 metres height above ground.
RH = relative humidity.
PR = precipitation.
n/a = not applicable.
Bolded values indicate <90% uptime.

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 2007. From these 13 collection periods, 13 precipitation samples were submitted. Frontier Geosciences Inc. rated all precipitation samples as valid. Data capture rates for integrated sample data relevant to the mercury assessment (wet deposition) program are presented in Table 10.

Table 10 Capture rates for precipitation samples in the mercury assessment (wet deposition) sampling program (Q2 2007).

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

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

Dry Deposition Program – There were 13 deposition sample collection periods (weeks) in the second quarter of 2007. From these 13 collection periods, 12 dry deposition samples were collected and submitted from each of the six sampling sites (Figure 3) for a total of 72 field samples. Frontier Geosciences Inc. rated all dry deposition samples as valid.

Part of the sampling strategy associated with the dry deposition program involves deploying the ion exchange membrane samples for periods of longer than 7 days. In this case, one deployment period lasted for a planned 14 days at each of the sites during the April to June 2007 period – resulting in 12 dry deposition samples collected from each site during the 13 weekly collection periods.

The dry deposition sampling program involves the 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, 12 laboratory blanks, 27 field blanks, and 21 replicate samples (for a total of 50 QA/QC samples) were simultaneously collected during the April to June 2007 period.

2.4 Contraventions of Special Environmental Monitoring Programs

There was one contravention of approval terms and applicable air quality monitoring objectives at the Meadows air monitoring station due to power failure for the April to June 2007 period.

3 Summary

3.1 Regional Ambient Air Program

There were no instances of invalid or missing data for intermittent PM_{10} and $PM_{2.5}$ 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 for the second quarter.

Second quarter data capture rates for continuous monitoring parameters at all air monitoring stations, except the Meadows air monitoring station, were well above the 90% criterion on a monthly basis as stipulated in the Air Monitoring Directive (1989). The Meadows air monitoring station experienced power failure spanning June 11th at 17:30 through June 14th at 19:50, returning uptimes for all analyzers and meteorological equipment of 88.8%. This event was reported to Alberta Environment on June 15th (Reference number 188059). High uptimes at other air monitoring stations indicate that equipment in the continuous air monitoring network was generally well-maintained. All measured concentrations were well below applicable Alberta Ambient Air Quality Guideline values or Canada Wide Standard values.

There was one contravention of approval terms and applicable air quality monitoring objectives at the Meadows air monitoring station due to power failure for the April to June 2007 period.

3.2 Acid Deposition Assessment Program

There were 32 of 32 valid intermittent TSP samples collected and 12 of 12 valid acid gas samples collected during the second quarter of 2007 for the acid deposition assessment program. All data capture rates were well above 90% for continuous monitoring parameters in the second quarter for the program except for the precipitation monitor at Genesee AMS. The precipitation monitor at Genesee AMS was damaged by high winds near the middle of April and was not repaired until early May, returning an uptime of 45.8% in April and 78.4% in May.

3.3 Mercury Assessment Program

There were thirteen valid precipitation samples collected in the wet deposition sampling program during the second quarter of 2007. There were 72 valid dry deposition samples and 50 QA/QC samples collected in the dry deposition sampling program during the second quarter of 2007.