22 May 2013

AMEC Project No.: TY126001

Goldcorp Canada Limited
Porcupine Gold Mines
4315 Gold Mine Road
Timmins ON P0N 1H0

Attention: Ms. Rachel Hamelin
Acting Environmental Compliance Coordinator

Dear Ms. Hamelin

Re: Baseline Air Quality Monitoring Program
Annual Summary Report – 2012
Timmins, Ontario

AMEC Environment and Infrastructure, a division of AMEC Americas Limited (AMEC), is pleased to submit to Goldcorp Canada Limited (Goldcorp) the annual summary report for the data collected in 2012 from the baseline air quality monitoring program undertaken in the City of Timmins at the following sampling locations: near the Extendicare Facility, the Mattagami River Conservation Area office, the Shania Twain Tourist Centre and the Claim Post site.

These sampling stations were operated and maintained by Goldcorp in 2012.

Please contact Ray Potvin at your convenience if you have any questions about the report.

Sincerely,
AMEC Environment and Infrastructure,
A Division of AMEC Americas Limited

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Air Quality Specialist

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BASELINE AIR QUALITY MONITORING PROGRAM
ANNUAL 2012 REPORT
CITY OF TIMMINS, ONTARIO

Submitted to:

Goldcorp Canada Limited
Porcupine Gold Mines
4315 Gold Mine Road
Timmins, ON
P0N 1H0

Submitted by:
AMEC Environment and Infrastructure,
a division of AMEC Americas Limited
131 Fielding Road
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AMEC Project No.: **TY126001**

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1.0 INTRODUCTION

AMEC Environment and Infrastructure, a division of AMEC Americas Limited (AMEC) is pleased to provide a summary of the 2012 results for the baseline air quality monitoring program undertaken in the City of Timmins for Goldcorp Canada Limited (Goldcorp) in relation to the Hollinger mine project. Goldcorp staff operated and maintained the sampling stations and AMEC provided technical guidance to Goldcorp field staff and liaison with the laboratories as required, and prepared the quarterly data summary reports.

This report summarizes the results obtained in 2012 at sampling stations in the vicinity of the Extendicare Facility, the Mattagami River Conservation Area Office and the Shania Twain Tourist Centre. The results of the dustfall data for the Claim Post site (commissioned in September 2012) are also included.

This report also provides trend analyses for the period 2010 to 2012 for the Extendicare Facility, the Mattagami River Conservation Area Office and the Shania Twain Tourist Centre sites.

2.0 BACKGROUND

As part of the Hollinger Open Pit Mine Project in Timmins, AMEC provided to Goldcorp and to the Ministry of the Environment (Ministry) a monitoring plan to collect baseline air quality data near the mine site (hereafter called the Site). The plan was approved in late summer of 2009 and the air quality sampling stations were commissioned in November 2009.

The purpose of the baseline monitoring program is to obtain an air quality data base near residential areas adjacent to the Site prior to the commencement of activities expected sometime in 2013.

3.0 METHODOLOGY

3.1 Sampling Locations

The locations of the three (3) sampling stations in operation since the fall of 2009 are shown on the aerial photo in Appendix A. The monitoring locations were chosen so as to 'triangulate' the sectors near the Site and thus provide optimum coverage of the most populated areas, and also taking into consideration the prevailing wind patterns.

The chosen locations for the three sampling stations are as follows:

1. West Station: on the Shania Twain Road and just west, northwest of the Shania Twain Tourist Centre.
2. Northeast Station: just south of the Extendicare Facility located in the community of Schumacher.
3. Northwest Station: south of Gilles Lake near the Mattagami River Conservation Authority (MRCA) office.

Also shown in the aerial photo in Appendix A is the location of the Claim Post dustfall sampling site commissioned in September 2012. Photos of the sampling stations are provided in Appendix B.

3.2 Field Sampling Methods and Instrumentation

3.2.1 Total Suspended and Inhalable Particulates

Particulate samples for Total Suspended Particulates (TSP), defined as the size fraction of particles with equivalent aerodynamic diameters from 44 microns and smaller, were obtained with a standard hi-vol sampler equipped with a mass flow controller, a mechanical timer and an elapsed time indicator. Inhalable Particulate (PM_{10}), defined as the size fraction of particles with equivalent aerodynamic diameters from 10 microns and smaller, were collected with a standard hi-vol equipped with a Tisch Environmental PM_{10} size selective inlet head (model #TE-6001), a mass flow controller, a mechanical timer and elapsed time indicator. Both samplers were set to operate at a flow rate of 1.13 m^3/min (40 cfm) and with 200 mm x 250 mm quartz filters as the particulate collection medium. At this flow rate, the sample volume is about 1630 m^3 over a 24 hour period.

All samplers were operated to collect particulate samples every sixth day, following the North American standard particulate sampling schedule. On sampling days, particulate matter was collected over a 24-hour period, from midnight to midnight. The TSP and PM_{10} filters were analyzed at the Mississauga Ontario Maxxam Analytics Inc. Laboratory for total particulate loading. For the purposes of the baseline study, a subset of the filters was analyzed for the following elements: arsenic (As), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), iron (Fe), manganese (Mn), lead (Pb), nickel (Ni), selenium (Se) and sulphur (S). Sulphur was also expressed as sulphate (SO_4), on the assumption that all the sulphur was in the sulphate form. The results were all reported in units of microgram per cubic metre of air sampled ($\mu g/m^3$).

3.2.2 Total Dustfall

Total dustfall samples, comprising water soluble and insoluble particulate matter, were collected with standard plastic dustfall jars lined with 4 mil thick polyethylene liners and exposed without the addition of water or ethylene glycol. The jars are exposed to the atmosphere for 30 days. The results are expressed in grams per square meter per 30 days (g/m^2/30 days). At the end of each exposure period, the polyethylene liners are removed from the jars, heat sealed and sent to the Maxxam Analytics Inc. laboratory for analysis.

3.2.3 Sulphur dioxide and Nitrogen Dioxide

Monthly average concentrations of sulphur dioxide (SO_2) and nitrogen dioxide (NO_2) were determined using passive samplers. Permeation filters treated with chemicals to adsorb these compounds are exposed to the atmosphere for 30 days.

Since there are no standards and guidelines for results obtained from passive sampling of SO_2 and NO_2 and since the method is not recognized by the MOE as a Standard Operating Procedure (SOP), the data is only being used for screening purposes and for comparison with concentrations measured during the baseline, construction and operational phases of the mining project.

With the exception of the Claim Post station, each station was equipped with a hi-vol TSP and PM_{10} sampler, as well as a dustfall and passive SO_2 and NO_2 samplers.

3.3 Analytical Methods

3.3.1 Total Suspended and Inhalable Particulates

In order to determine the particulate loadings, the filters were pre-weighed and post- weighed with a '3-point balance' with an accuracy of 1 mg. For TSP and PM_{10} samples, this amounted to a reportable detection limit of 5 mg or about 3 $\mu g/m^3$ for the expected air sample volume of about 1630 m^3 (flow rate of 1.13 m^3/min for 24 hours).

The metals scan was done by ICP/AES. The iron was reported by the laboratory as total iron. However it is highly unlikely that it remains in the pure metallic form due to its progressive oxidation in the air. Hence the results are reported as ferric oxide (Fe_2O_3). This is a conservative assumption since presumably the iron may not all be in this oxide form. The detection limits for the metals ranged from 0.0003 to 0.0031$\mu g/m^3$ and are shown for each element in the results spreadsheets in Appendix C-1.

The TSP and PM_{10} samples were processed and analyzed by Maxxam Analytics.

3.3.2 Total Dustfall

The soluble and insoluble portions of the dustfall samples were determined using ASTM method D-1739-98 and MOE method DF-E3043A (September 8, 1995) by Maxxam Analytics.

3.3.3 Sulphur dioxide and Nitrogen Dioxide

The exposed filters are removed from the stations at the end of the exposure period, placed in a sealed container and sent to the AMEC laboratory located in Edmonton for analysis. They are analyzed with the methodology that was developed, approved and validated by Alberta Environment with the support of the Alberta Research Council, the Clean Air Strategic Alliance of Alberta, and the National Research Council of Canada.

Since the sample uptake is dependent on temperature, relative humidity and wind speed, the analytical results need to be adjusted for these meteorological parameters measured during the exposure period (monthly averages). The method detection limit is in the order of 0.1 parts per billion (ppb) for both SO_2 and NO_2. Validation tests conducted in Alberta show that results from passive sampling are typically within 10% of those obtained from sampling with continuous analyzers for 30-day exposure periods.

3.4 Field Operations

For routine operations, the sites were visited for each filter change to meet the requirements of the 1 in 6 day sampling schedule. Additional visits were made to change hi-vol motors for re-brushing, resolve instrumentation issues, perform flow calibration checks and preventative maintenance, and witness audits performed by the Ministry.

3.4.1 Extendicare Facility Station

The hi-vol TSP motor was changed on 10 February, 29 May and 7 November with re-brushed units. The hi-vol PM_{10} motor was also changed on 10 February and on 29 May with re-brushed units, and replaced on 1 August with a brushless motor. The flow controller of the PM_{10} sampler was replaced on 31 August.

Flow calibration checks were performed on the TSP and PM_{10} samplers by Goldcorp staff on 2 and 10 February, 30 March, 5 April, 14 & 29 May, 24 September and 7 November. These were performed with a certified direct reading electronic flow calibrator. In every instance, the flow calibration was within 10% of the required flow rate of 40 cfm (1.13 m^3/min).

The Ministry audited the flow calibrations on 13 June and both samplers met the ±10% criterion. The flow rate of the TSP sampler was 8.8% high and was adjusted to 40 cfm. The flow rate of the PM_{10} sampler was 3.8% low. The MOE also performed a flow audit of the TSP and PM_{10} samplers on 25 September. The air flow of the TSP and PM_{10} sampler was found to be 0.3% and 2.0% high, respectively. The results are well within the MOE ±10% criterion and flow adjustments were not required.

The dustfall and passive samplers were changed every month as required.

3.4.2 MRCA Office Station

The hi-vol TSP motors were changed on 10 February, 29 May and 7 November) with re-brushed units. The hi-vol PM_{10} motor was also changed on 10 February and on 29 May with re-brushed units, and replaced on 7 August with a brushless motor.

Flow calibration checks were performed on the TSP and PM_{10} samplers by Goldcorp staff on 2 and 10 February, 30 March, 5 April, 14 & 29 May, 24 September and on 7 November. These were performed with a certified direct reading electronic flow calibrator. On 2 February, the flow rate of the sampler was 43.5% low. The January results were corrected accordingly, assuming a linear decrease in flow following the protocol recommended by the Ministry. On 10 February, the flow rate of the TSP sampler was 11.6% low and the flow rate of PM_{10} sampler was 15% low. The TSP and PM_{10} results for 9 February were corrected accordingly. On 5 April, the flow rate of the PM_{10} sampler was 17% low. Since the flow calibration check met the Ministry criterion on 30 March, the result for 3 April only required correction. A flow rate calibration check was performed on both samplers by Goldcorp staff on 24 September and 7 November. The flow rates were within 10% of the required flow rate of 40 cfm (1.13 m^3/min)

The Ministry audited the flow calibrations on 13 June. The flow calibrations were within 10% of the required value of 40 cfm (TSP sampler flow was 40 cfm and PM_{10} sampler flow was 3.8% low). Flow rate adjustments were not required. The MOE performed another flow audit of the samplers on 25 September. The air flow of the TSP and PM_{10} sampler was found to be 2.2% high for both samplers. The results are well within the MOE ±10% criterion and flow adjustments were not required.

The dustfall and passive samplers were changed every month as required.

3.4.3 Shania Twain Road Station

The hi-vol TSP motor was changed on 10 February, 29 May and 7 November with re-brushed units. The hi-vol PM_{10} motor was also changed on 10 February and on 29 May with re-brushed units, and replaced on 7 August with a brushless motor.

Flow calibration checks were performed on the TSP and PM_{10} samplers by Goldcorp staff on 2 and 10 February, 30 March, 5 April, on 14 & 29 May, 24 September and 7 November. These were performed with a certified direct reading electronic flow calibrator. On 14 May, the flow rate of the TSP sampler was 13% low. The results from 9 May to 9 April were corrected accordingly. On 29 May, the flow rate of the TSP sampler was 12.5% low. The results from 15 to 27 May were corrected as required.

The flow rates for both samplers from the 24 September and 7 November calibration checks were within 10% of the required flow rate of 40 cfm (1.13 m^3/min) .

The Ministry audited the flow calibrations on 13 June. The flow calibrations were within 10% of the required value of 40 cfm (TSP sampler flow was 3.8% low and PM_{10} sampler flow was 2.8% low). Flow rate adjustments were not required. The MOE performed another flow audit of the samplers on 25 September. The air flow of the TSP and PM_{10} sampler was found to be 3.8% and 1.3% high, respectively. The results are well within the MOE ±10% criterion and flow adjustments were not required.

The dustfall and passive samplers were changed every month as required.

3.4.4 Claim Post Station

A dustfall sampler was installed on a hydro pole at the Claim Post site in September. The dustfall sampler was changed every month.

4.0 RESULTS

The results for the 2012 sampling program are presented in Appendix C-1 for the hi-vol data, Appendix C-2 for the dustfall data and Appendix C-3 for the passive SO_2 and NO_2 data. By convention, all results below the analytical detection limit were reported at half the detection limit. Iron (Fe) in the TSP and PM_{10} particulate samples is reported conservatively as ferric oxide

(Fe_2O_3) and some of the iron may not be in the form of ferric oxide. As indicated earlier, sulphur was also expressed as sulphate (SO_4), on the assumption that all the sulphur was in the sulphate form. This again is a conservative estimate.

For comparison purposes, the O. Reg.419/05 Schedule 3 Standard values are presented. Schedule 3 values came into effect on February 1, 2010 for the mining and smelting sectors. For cadmium and its compounds, the standard of 0.025 µg/m^3 became effective on 1 February 2013. Section 20 guidelines under O.Reg. 419/05 for 24-hour averages are also presented. The Ministry has an interim Ambient Air Quality Criterion (AAQC) for $PM_{10.}$ In April 2012, the Ministry introduced a 24-hour average AAQC for manganese and its compounds (0.2 µg/m^3) and for nickel and its compounds (0.1 µg/m^3) in the PM_{10} fraction.

A summary of the statistical analysis for 2012 for the TSP and PM_{10} particulate concentrations is presented in Table 1 below. In 2012, the 1 in 6 day hi-vol sampling schedule comprised a possible total of 61 sampling days.

A summary of the statistical analysis for 2012 for total dustfall and passive SO_2 and NO_2 is presented respectively in Tables 5 and 7 below.

4.1 Total Suspended and Inhalable Particulates

The mean TSP and PM_{10} concentrations in 2012 were similar at the three hi-vol sampling locations. The differences in the means between locations varied from 1 to 3 µg/m^3. The 90th and 95th percentiles show that more of the higher values were measured at the Extendicare Facility site. At that location, there was one exceedence of the 24-hour Schedule 3 TSP standard of 120 µg/m^3 with a value of 129 µg/m^3, and one exceedence of the PM_{10} 24-hour interim AAQC of 50 µg/m^3 with a value of 60 µg/m^3. Both exceedences occurred on 12 September. It was noted that there were drilling activities on that day in the area of the Extendicare Facility site. The annual geometric means for TSP were well below the ministry AAQC of 60µg/m^3 with means ranging from 20 to 23 µg/m^3.

Seven (7) TSP/PM_{10} sample pairs had PM_{10} concentrations greater than the TSP concentrations. The results were confirmed as being correct by the laboratory. In the absence of additional information to determine which result was suspect, the PM_{10} results were invalidated. Another three (3) PM_{10} sample results are not available due to instrumentation problems. Overall for 2012, the % valid data was 95.9% (234/244), which is above the Ministry minimum target of 90% and desirable target of 95%.

Approximately one third of the TSP samples and over one fifth of the PM_{10} samples were analyzed for the elements listed in section 3.2.1. All elemental results are presented in Appendix C-1. At the three (3) sampling locations, the following elements were usually reported below their method detection limit: As, Cd, Co, Ni, Se and V. Cr was detected for 20% to 50% of the samples, whereas Pb was detected at slightly over half the samples. Cu, Fe, Mn, S and Zn were usually above their detection limit. Cu is known to be emitted from the armature of the hi-vol motors with

brushes whereas Fe, S and Zn are naturally occurring crustal elements. However the 'detectable' elements such as Cr, Pb, Cu, Fe (expressed as ferric oxide) and Mn had 24-hour maximum concentrations much lower than the Ministry standards and guidelines.

Table 1: Summary Statistics for the 2012 TSP and PM_{10} Particulate Data

	Extendicare Facility		MRCA Site		Shania Twain Site	
Statistic	**TSP**	**PM_{10}**	**TSP**	**PM_{10}**	**TSP**	**PM_{10}**
Annual geometric mean ($\mu g/m^3$)	15	7	15	7	14	8
Annual arithmetic mean ($\mu g/m^3$)	23	10	23	11	20	11
Maximum 24 hour ($\mu g/m^3$)	129	60	87	38	81	42
90^{th} Percentile	47.0	21.5	48.0	26.6	42.0	20.6
95^{th} Percentile	73.0	28.3	64.0	30.6	51.0	31.2
No. of valid samples	61	58	61	57	61	58
% valid data	100	95	100	93	100	95
No. samples > Sch. 3 (TSP)	1	-	0	-	0	-
No. samples > Sch. 3 (TSP elements)	0	-	0	-	0	-
No. samples > Section 20 guideline (TSP elements)	0	-	0	-	0	-
No. samples > Annual AAQC (TSP)	0	-	0	-	0	-
No. samples > 24 hr AAQC (PM_{10})	-	1	-	0	-	0
No. samples > 24 hour AAQC (PM_{10} elements)	-	0	-	0	-	0

Annual average concentrations were not reported for the elements with 50% or more of the results below the method detection limit. As expected, the concentrations of elements in PM_{10} were always lower than in the TSP samples.

There were no exceedences of any standards, guidelines or AAQCs for elements/metals in TSP and PM_{10}.

Table 2 provides a summary of the annual TSP results from 2010 to 2012. For the three-year period, on average, the TSP concentrations were higher at the MRCA office location. The higher TSP concentrations at that site likely reflect particulate matter contributions from nearby sources in the commercial area. These include traffic and significant open spaces and parking lots from which dust re-suspension could occur under dry and windy conditions. The annual means were higher at the three locations in 2010. The results suggest a downward trend in the annual means for the three-year period at the MRCA Office and Shania Twain stations. The annual geometric means were well below the ministry AAQC. There were only two (2) exceedences of the 24- hour Schedule 3 standard: one in 2010 at the Shania Twain station and the other in 2012 at the Extendicare Facility station. It was noted that there were drilling activities on the day of the exceedence in the area of the Extendicare Facility site. There were no exceedences of any standard or guideline for metals in TSP.

Table 3 provides a summary of the annual PM_{10} results from 2010 to 2012. For the three year period, on average, the PM_{10} concentrations were higher at the MRCA office location. As for TSP, the annual means were higher at the three locations in 2010. Again, there is evidence of a downward trend in the annual means, mostly noticeable for the MRCA Office site. During this three-year period, there were five (5) exceedences of the 24-hour interim AAQC: one in 2010 at the Shania Twain station, one in 2010 and two in 2011 at the MRCA Office station and one in 2012 at the Extendicare Facility station. There were no exceedences of the 24-hour AAQC for manganese and nickel in PM_{10} which were introduced by the Ministry in April 2012.

Table 4 shows the seasonal variability in the TSP and PM_{10} concentrations estimated from the composite quarterly means for the period 2010 to 2012. The results indicate that the highest quarterly means for both dust size fractions and for the three sites were recorded in the second and third quarters. The lowest quarterly means were obtained in the fourth quarter. In the absence of snow cover and under generally drier conditions, natural sources of dust would be expected to be higher during the second and third quarters.

Table 2: Summary Statistics for the 2010 to 2012 TSP Particulate Data

	Extendicare Facility			MRCA Site			Shania Twain Site		
Statistic	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**
Annual geometric mean ($\mu g/m^3$)	20	14	15	28	20	15	25	16	14
Annual arithmetic mean ($\mu g/m^3$)	25	18	23	34	27	23	31	21	20
Maximum 24 hour ($\mu g/m^3$)	110	78	129	88	85	87	121	65	81
90^{th} Percentile	45	32	47	64	54	48	53	38	42
95^{th} Percentile	54	38	730	74	58	64	58	49	51
No. of valid samples	59	57	61	59	60	61	61	61	61
% valid data	97	93	100	97	98	100	100	100	100
No. samples > Sch. 3 (TSP)	0	0	1	0	0	0	1	0	0
No. samples > Sch. 3 (TSP elements)	0	0	0	0	0	0	0	0	0
No. samples > Section 20 guideline (TSP elements)	0	0	0	0	0	0	0	0	0
Exceedence of Annual AAQC (TSP)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
90^{th} Percentile	44.8	31.6	47.0	63.6	54.1	48.0	52.7	38.0	42.0
95^{th} Percentile	53.8	38.2	73.0	74.0	58.0	64.0	57.8	49.0	51.0

Table 3: Summary Statistics for the 2010 to 2012 PM_{10} Particulate Data

	Extendicare Facility			MRCA Site			Shania Twain Site		
Statistic	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**
Annual geometric mean ($\mu g/m^3$)	11	8	7	14	10	7	14	6	8
Annual arithmetic mean ($\mu g/m^3$)	13	13	10	18	15	11	17	11	11
Maximum 24 hour ($\mu g/m^3$)	49	44	60	53	59	38	57	46	42
90^{th} Percentile	26	23	22	39	24	27	30	21	21
95^{th} Percentile	29	24	28	42	26	31	38	24	31
No. of valid samples	60	60	58	61	61	57	59	61	58
% valid data	98	98	95	100	100	93	97	100	95
No. samples > 24 hr AAQC (PM_{10})	0	0	1	1	2	0	1	0	0
No. samples > 24 hour AAQC (PM_{10} elements)	-	-	0	-	-	0	-	-	0

Table 4: Seasonal Variability in the 2010 to 2012 TSP and PM_{10} Levels

2010 - 2012	Q1		Q2		Q3		Q4	
Station	**TSP**	**PM_{10}**	**TSP**	**PM_{10}**	**TSP**	**PM_{10}**	**TSP**	**PM_{10}**
Extendicare Facility	**17**	**11**	**29**	**14**	**27**	**16**	**13**	**7**
MRCA Office	**23**	**14**	**36**	**17**	**33**	**17**	**19**	**10**
Shania Twain	**19**	**13**	**35**	**16**	**27**	**17**	**15**	**7**

4.2 Total Dustfall

The monthly total dustfall results for 2012 are shown in Appendix C-2. Table 5 below presents a summary of the results. The annual average total dustfall values varied from 2.2 g/m^2/30 days at the Extendicare Facility site to 3.1 g/m^2/30 days at the MRCA Office and Shania Twain sites. Since the dustfall sampler was installed in September at the Claim Post, there is insufficient data to calculate an annual mean.

On average, the insoluble portion (such as road dust and other inorganic particulate matter not readily soluble in water) comprised less than half of the total dustfall material collected. However, at the Claim Post station the insoluble portion was 52% of total dustfall. These data are not representative of 2012 since sampling at the Claim Post site was initiated in September. The sampler is located near a road and the higher fraction of insoluble dustfall is likely due to road dust. More data is required to support this assumption.

Much of the soluble portion of dustfall could be particulate sulphate and nitrate compounds which are well known components of acid rain and acid deposition and are transported large distances from outside the area. There likely are other particulate materials contributing to the soluble fraction such as biological matter. The total dustfall levels were generally higher at the three stations during the period April to October (see Appendix C-2) when the potential for dusting is greater from exposed ground surfaces such as parking lots, streets and parklands.

In 2012, there were four (4) exceedences of the Ministry monthly standard (7.0 g/m^2/30 days). Three (3) exceedences occurred for the August samples at the Extendicare Facility, the MRCA Office and Shania Twain stations. In every instance, the exceedences resulted from the soluble portion which was significantly higher than the insoluble portion. The other exceedence occurred for the June sample at the Shania Twain station. In this instance, the insoluble portion was significantly higher then the soluble portion. It is possible, but uncertain, that there were drilling or other dust generating activities near the site in June which is located adjacent to the pit.

There were no sample losses during the year such that the overall % valid data collection was 100%.

Table 5: Summary Statistics for the 2012 Total Dustfall Data

	Extendicare Facility			MRCA Site			Shania Twain Site			Claim Post*		
Statistic	**Insol**	**Sol**	**Total**	**Insol**	**Sol**	**Total**	**Insol**	**Sol**	**Total**	**Insol**	**Sol**	**Total**
Mean ($g/m^2/30d$)	0.94	1.27	2.2	1.11	1.96	3.1	1.42	1.59	3.0	0.93	0.87	1.8
Max. ($g/m^2/30d$)	2.52	7.24	8.1	4.51	13.21	14.2	9.32	10.53	11.9	1.50	1.65	2.1
No.>Sch.3 Std	-	-	1**	-	-	1**	-	-	2***	-	-	0
No.valid samples	12	12	12	12	12	12	12	12	12	4	4	4
Annual % Valid data	100	100	100	100	100	100	100	100	100	33	33	33

* Sampling initiated in September at Claim Post site
** Standard exceeded in August
*** Standard exceeded in June and August

The 2010 to 2012 summary statistics for the dustfall results are shown in Table 6. The highest three-year average was recorded at the MRCA Office station (2.9 $g/m^2/30$ days), followed closely by the Shania Twain station (2.7 $g/m^2/30$ days). The lowest three-year average was recorded at the Extendicare Facility station (1.9 $g/m^2/30$ days). There was no discernable trend in the annual dustfall levels. However at MRCA Office and Shania Twain stations, the annual mean in 2012 was slightly higher than in 2010 and 2011.

A total of eight (8) exceedences were recorded from ninety-nine (99) samples collected during the three-year period. This represents an exceedence rate of 8.1%.

In most years, on average, the insoluble portion of dustfall was less (26% to 46%) than the soluble portion. In 2010, the insoluble portion averaged 56% and 53% of total dustfall at the MRCA Office and Shania Twain stations respectively.

Table 6: Summary Statistics for the 2010 to 2012 Total Dustfall Data

	Extendicare Facility			MRCA Site			Shania Twain Site		
Statistic	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**
Annual average (g/m^2/30days)	2.1	1.4	2.2	2.9	2.6	3.1	2.8	2.2	3.0
Three-year average (g/m^2/30days)	1.9			2.9			2.7		
Maximum value (g/m^2/30days)	7.3	4.1	8.1	7.8	7.8	14.2	13.1	6.5	11.9
No. samples > Sch. 3 Std (7.0 g/m^2/30days)	1 (Dec)	0	1 (Aug)	1 (July)	1(June)	1(Aug)	1(June)	0	2(June Aug)
No. of valid samples	11	10	12	10	10	12	11	11	12
% valid data	92	83	100	83	83	100	92	92	100
Average % insoluble fraction	35	26	43	56	41	36	53	32	46

*** Standard exceeded in June and August

4.3 Passive SO_2 and NO_2

The annual mean SO_2 concentration for 2012, as shown in Table 7, was essentially identical at all stations with a value of 0.4 and 0.5 ppb. As seen in Appendix C-3, in most instances the background SO_2 concentrations were typically somewhat higher during the colder months presumably due to the combustion of sulphur-bearing heating fuels and poorer air dispersion.

The average NO_2 concentrations were higher at the MRCA Office station (3.2 ppb), followed by the results from the Shania Twain (2.7 ppb) and Extendicare Facility stations (1.3 ppb). The NO_2 concentrations were more variable than SO_2 with the seasons and the variability was site-dependent. However, some of the higher values were recorded in the colder months, suggesting some seasonal dependency to the heating seasons. In addition to emissions from heating sources, traffic emissions also likely contributed to the background levels. This could explain the higher annual average concentrations measured at the MRCA Office site.

Table 7: Summary Statistics for the 2012 Passive SO_2 and NO_2 Data

	Extendicare Facility		MRCA Site		Shania Twain Site	
Statistic	**SO_2**	**NO_2**	**SO_2**	**NO_2**	**SO_2**	**NO_2**
Mean (ppb)	0.4	1.3	0.4	3.2	0.5	2.7
NO_2/SO_2	3.3		8.0		5.4	
Max. (ppb)	0.9	3.0	0.8	12.2	1.0	12.2
No. valid samples	12	12	12	12	12	12
% Valid data	100	100	100	100	100	100

The maximum concentration of NO_2 at the MRCA Office and Shania Twain sites was reported as 12.2 ppb and in both instances for the August samples. This value is significantly higher than the mean concentration and the highest of the monthly results since the baseline study commenced (see Table 9 below). The results were confirmed by the laboratory and at this time cannot be explained. In 2012, the average annual concentration of NO_2 was higher than the concentration of SO_2 by a factor ranging from over 3 (Extendicare Facility) to 8 (MRCA Office site).

Tables 8 and 9 provide a summary of the passive SO_2 and NO_2 data collected during the period 2010 to 2012. The three-year SO_2 average was essentially identical at the three stations with concentrations of 0.3 and 0.4 ppb, and consequently no obvious trend in the annual means. For NO_2, the three-year average was higher at the MRCA Office station (3.3 ppb), followed by the Shania Twain station (2.6 ppb) and the Extendicare Facility station (1.5 ppb).

Table 8: Summary Statistics for the 2010 to 2012 Passive SO_2 Data

	Extendicare Facility			MRCA Site			Shania Twain Site		
Statistic	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**
Annual average (ppb)	0.2	0.3	0.4	0.2	0.3	0.4	0.2	0.4	0.5
Maximum value (ppb)	0.4	0.7	0.9	0.3	0.9	0.8	0.4	1.1	1.0
No. of valid samples	12	12	12	12	12	12	11	12	12
% valid data	100	100	100	100	100	100	92	100	100
Three- year average	0.3			0.3			0.4		

Table 9: Summary Statistics for the 2010 to 2012 Passive NO_2 Data

	Extendicare Facility			MRCA Site			Shania Twain Site		
Statistic	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**	**2010**	**2011**	**2012**
Annual average (ppb)	1.7	1.6	1.3	3.5	3.2	3.2	2.6	2.6	2.7
Maximum value (ppb)	2.6	3.6	3.0	4.2	5.9	12.2	4.3	7.3	12.2
No. of valid samples	12	12	12	12	12	12	11	12	12
% valid data	100	100	100	100	100	100	92	100	100
Three- year average	1.5			3.3			2.6		
Three-year average (NO_2/SO_2)	5.0			11.0			6.5		

For the period 2010 to 2012, the average annual concentration of NO_2 was higher than the concentration of SO_2 by a factor ranging from 5 (Extendicare Facility) to 11 (MRCA Office site).

As indicated earlier, there are no Ministry standards, guidelines or AAQCs for SO_2 and NO_2 data obtained from passive samplers. The data will be used for trend analysis and as a screening tool to assess whether continuous sampling of these substances could be warranted in the future.

5.0 CONCLUSIONS

The data collected during 2012 and the period 2010 to 2012 provide a good data base for determining background air quality in the communities of Schumacher and South Porcupine near the proposed Hollinger mine project site. This data can later be used to assess changes in air quality as the project moves from the construction to the operational phases.

The results show that as in 2012, the concentrations of particulate matter, as determined from measurements of TSP, PM_{10} and dustfall during the period 2010 to 2102 can be impacted by existing background sources to the point where at times, Ministry standards and/or guidelines are marginally exceeded.

Overall, the annual average (geometric average) background levels of TSP and PM_{10} seem to be trending downward. There was no discernable trend in the annual dustfall levels. However at MRCA Office and Shania Twain stations, the annual mean in 2012 was slightly higher than in 2010

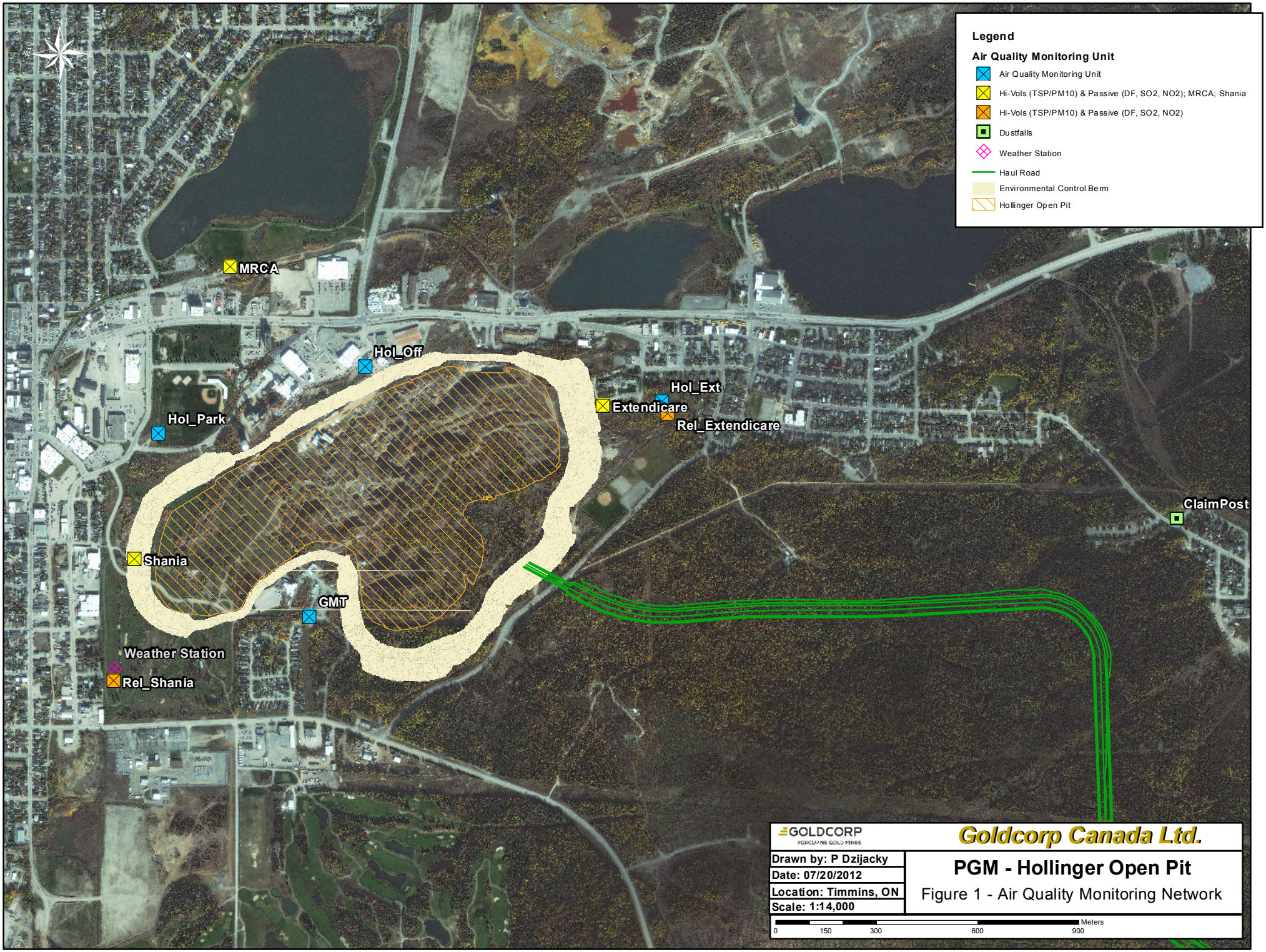
and 2011. For most samples, with some exceptions, the soluble portion of dustfall was higher than the insoluble portion, suggesting that the contributions to total dustfall measurements were mostly from sources other than road traffic or construction activities.

As in 2010 and 2011, in 2012 the concentration of elements, such as heavy metals, were observed to be quite low in both the TSP and PM_{10} samples and well below Ministry standards, guidelines and AAQCs. A number of the elements had concentrations consistently below their method detection limit.

The concentrations of SO_2 and NO_2, determined from passive sampling, reflected the low background values in the area. The levels of NO_2 were consistently higher than those of SO_2 and some most instances displayed a seasonal pattern with higher values during the heating seasons. Traffic emissions and emissions from other sources in the commercial area near the MRCA Office station and near the Shania Twain Centre are believed to be the main contributors to the NO_2 concentrations measured at these sites.

APPENDIX A

Aerial Photo of the Sampling Program Area


Legend
Air Quality Monitoring Unit
Air Quality Monitoring Unit
Hi-Vols (TSP/PM10) & Passive (DF, SO2, NO2); MRCA; Shania
Hi-Vols (TSP/PM10) & Passive (DF, SO2, NO2)
Dustfalls
Weather Station
Haul Road
Environmental Control Berm
Hollinger Open Pit
MRCA
Hol_Off
Hol_Ext
Extendicare
Rel_Extendicare
Hol_Park
ClaimPost
Shania
GMT
Weather Station
Rel_Shania
GOLDCORP
PORCUPINE GOLD MINES
Goldcorp Canada Ltd.
Drawn by: P Dzijacky
Date: 07/20/2012
Location: Timmins, ON
Scale: 1:14,000
PGM - Hollinger Open Pit
Figure 1 - Air Quality Monitoring Network
Meters
0
150
300
600
900

APPENDIX B

Photos of the Sampling Stations

Figure 1: Photo of Air Sampling Station at the MRCA Office Site

Figure 2: Photo of Air Sampling Station at the Shania Twain Road Site

Figure 3: Photo of Air Sampling Station at the Extendicare Facility Site

Figure 4: Photo of Dustfall Sampling Station at the Claim Post Site

APPENDIX C

Appendix C-1: TSP and PM_{10} Sampling Results (2012)

Appendix C-2: Total Dustfall Sampling Results (2012)

Appendix C-3: SO_2 and NO_2 Passive Sampling Results (2012)

Appendix C-1

TSP and PM_{10} Sampling Results (2012)

Extendicare Facility Monitoring Results for TSP and Metals (2012)
(results expressed in µg/m^3)

Date	TSP	As	Cd	Cr	Co	Cu	Fe(Fe_2O_3)	Pb	Mn	Ni	Se	S	V	Zn	SO_4
January 4, 2012	9														
January 10, 2012	12														
January 16, 2012	23	0.0018	0.0006	0.0017	0.0006	0.0109	2.2966	0.0025	0.0253	0.0024	0.0031	1.2700	0.0006	0.025	3.810
January 22, 2012	4														
January 28, 2012	7														
February 3, 2012	5	0.0018	0.0006	0.0006	0.0006	0.0198	0.1993	0.0009	0.00175	0.0009	0.0031	0.3700	0.0006	0.018	1.110
February 9, 2012	6														
February 15, 2012	12														
February 21, 2012	7	0.0018	0.0006	0.0006	0.0006	0.0091	0.4147	0.0020	0.00402	0.0009	0.0031	0.6370	0.0006	0.010	1.911
February 27, 2012	8														
March 4, 2012	6														
March 10, 2012	9	0.0018	0.0006	0.0006	0.0006	0.00804	0.4566	0.0009	0.00424	0.0027	0.0031	0.5152	0.0006	0.010	1.545
March 16, 2012	23														
March 22, 2012	31														
March 28, 2012	8	0.0018	0.0006	0.0006	0.0006	0.01699	0.3457	0.00215	0.00344	0.0009	0.0031	0.4693	0.0006	0.016	1.408
April 3, 2012	18														
April 9, 2012	38														
April 15, 2012	10	0.0018	0.0006	0.0006	0.0006	0.0103	0.6435	0.0009	0.0052	0.0009	0.0031	0.3590	0.0006	0.009	1.077
April 21, 2012	29														
April 27, 2012	23														
May 3, 2012	15	0.0018	0.0006	0.0006	0.0006	0.0157	0.8809	0.0009	0.0065	0.0009	0.0031	0.4320	0.0006	0.014	1.296
May 9, 2012	34														
May 15, 2012	6														
May 21, 2012	32	0.0018	0.0006	0.0006	0.0006	0.0145	0.6635	0.0009	0.0401	0.0009	0.0031	0.5570	0.0006	0.025	1.671
May 27, 2012	33														
June 2, 2012	7														
June 8, 2012	30	0.0018	0.0006	0.0006	0.0006	0.0258	1.5187	0.0020	0.0132	0.0009	0.0031	0.2340	0.0006	0.019	0.702
June 14, 2012	68														
June 20, 2012	47														
June 26, 2012	25	0.0018	0.0006	0.0023	0.0006	0.0241	1.2813	0.0009	0.0099	0.0009	0.0031	0.2280	0.0006	0.017	0.684
July 2, 2012	24														
July 8, 2012	21														
July 14, 2012	73	0.0042	0.0006	0.0060	0.0014	0.0296	6.8068	0.0037	0.0579	0.0042	0.0031	1.510	0.0033	0.034	4.530
July 20, 2012	26														
July 26, 2012	25														
August 1, 2012	52	0.0018	0.0006	0.0038	0.0006	0.0239	8.3512	0.0030	0.0608	0.0032	0.0031	0.251	0.0068	0.020	0.753
August 7, 2012	22														
August 13, 2012	43														
August 19, 2012	14	0.0018	0.0006	0.0015	0.0006	0.0158	1.3642	0.0009	0.00992	0.0009	0.0031	0.076	0.0020	0.006	0.228
August 25, 2012	87														
August 31, 2012	38														

Extendicare Facility Monitoring Results for TSP and Metals (2012)
(results expressed in µg/m^3)

Date	TSP	As	Cd	Cr	Co	Cu	Fe(Fe_2O_3)	Pb	Mn	Ni	Se	S	V	Zn	SO_4
September 6, 2012	74	0.0058	0.0006	0.0067	0.0023	0.0222	12.1550	0.0028	0.100	0.0053	0.0031	0.288	0.0045	0.037	0.864
September 12, 2012	129														
September 18, 2012	4														
September 24, 2012	14	0.0018	0.0006	0.0014	0.0006	0.0146	1.6016	0.0009	0.0132	0.0009	0.0031	0.120	0.0019	0.007	0.360
September 30, 2012	9														
October 6, 2012	9														
October 12, 2012	6	0.0018	0.0006	0.0006	0.0006	0.0119	0.5606	0.0009	0.00389	0.0009	0.0031	0.113	0.0006	0.0071	0.339
October 18, 2012	14														
October 24, 2012	5														
October 30, 2012	5	0.0018	0.0006	0.0006	0.0006	0.0106	0.3060	0.0009	0.00248	0.0009	0.0031	0.041	0.0006	0.0098	0.123
November 5, 2012	9														
November 11, 2012	11														
November 17, 2012	13	0.0018	0.0006	0.0017	0.0006	0.0141	1.0954	0.0022	0.00766	0.0028	0.0031	0.528	0.0006	0.0143	1.584
November 23, 2012	12														
November 29, 2012	5														
December 5, 2012	41	0.0018	0.0006	0.0031	0.0006	0.0167	2.8600	0.0009	0.0196	0.0023	0.0031	0.304	0.0006	0.0238	0.912
December 11, 2012	4														
December 17, 2012	8														
December 23, 2012	7	0.0018	0.0006	0.0006	0.0006	0.0106	0.2580	0.0009	0.00206	0.0009	0.0031	0.244	0.0006	0.0068	0.732
December 29, 2012	4														
Geometric mean	15.2	n/r	n/r	n/r	n/r	0.0152	1.0792	n/r	0.0098	n/r	n/r	0.3083	n/r	0.0142	0.9250
Arithmetic mean	22.8	n/r	n/r	n/r	n/r	0.0163	2.2030	n/r	0.0196	n/r	n/r	0.4273	n/r	0.0164	1.2820
Max. concentration	129.0	n/r	n/r	n/r	n/r	0.0296	12.1550	n/r	0.1000	n/r	n/r	1.5100	n/r	0.0369	4.5300
Min. concentration	4.0	n/r	n/r	n/r	n/r	0.0080	0.1993	n/r	0.0018	n/r	n/r	0.0410	n/r	0.0056	0.1230
90th percentile	47.0														
95th percentile	73.0														
Standard	120	n/a	0.025*	n/a	n/a	50	25	0.5	n/a	2	n/a	n/a	2	120	n/a
No. > Sch. 3 value	1	n/a	0	n/a	n/a	0	0	0	n/a	0	n/a	n/a	0	0	n/a
Guideline	n/a	0.3	n/a	1.5	0.1	n/a	n/a	n/a	2.5	n/a	10	n/a	n/a	n/a	n/a
No. > guideline	n/a	0	n/a	0	0	n/a	n/a	n/a	0	n/a	0	n/a	n/a	n/a	n/a
No. of valid samples	61	20	20	20	20	20	20	20	20	20	20	20	20	20	20
No. samples < mdl	0	18	20	11	18	0	0	12	0	13	20	0	15	0	0
Detection limit	3	0.0036	0.0012	0.0012	0.0012	0.0012	0.0061	0.0018	0.0006	0.0018	0.0061	0.0150	0.0012	0.003	0.045
Half detection limit	1.5	0.0018	0.0006	0.0006	0.0006	0.0006	0.0031	0.0009	0.0003	0.0009	0.0031	0.0075	0.0006	0.0015	0.023
% < detection limit	0	90	100	55	90	0	0	60	0	65	100	0	75	0	0
% valid data	100														

Notes:

All non detectable results were reported as 1/2 the detection limit

* O. Reg.419/05 schedule 3, 24-hour standard effective February 1, 2013

n/r: Statistics not reported due to high % of values < detection limit

Total Fe expressed as Fe_2O_3

All S assumed to be in SO_4 form

Extendicare Facility Monitoring Results for PM_{10} and Metals (2012)
(results expressed in µg/m³)

Date	PM_{10}	As	Cd	Cr	Co	Cu	$Fe(Fe_2O_3)$	Pb	Mn	Ni	Se	S	V	Zn	SO_4
January 4, 2012	7	0.0018	0.0006	0.0006	0.0006	0.0019	0.2351	0.0009	0.0025	0.0009	0.0031	0.282	0.0006	0.008	0.846
January 10, 2012	7														
January 16, 2012	12														
January 22, 2012	3														
January 28, 2012	4														
February 3, 2012	1.5	0.0018	0.0006	0.0006	0.0006	0.0035	0.1127	0.0009	0.0013	0.0009	0.0031	0.351	0.0006	0.016	1.053
February 9, 2012	5														
February 15, 2012	6														
February 21, 2012	4														
February 27, 2012	4														
March 4, 2012	4	0.0018	0.0006	0.0006	0.0006	0.0029	0.1382	0.00217	0.0016	0.0009	0.0031	0.398	0.0006	0.077	1.194
March 10, 2012	1.5														
March 16, 2012	9														
March 22, 2012	10														
March 28, 2012	3														
April 3, 2012	8	0.0018	0.0006	0.0012	0.0006	0.0080	0.7979	0.0009	0.0064	0.0009	0.0031	0.2250	0.0006	0.014	0.675
April 9, 2012	11														
April 15, 2012	5														
April 21, 2012	6														
April 27, 2012	7														
May 3, 2012	8	0.0018	0.0006	0.0006	0.0006	0.0076	0.4147	0.0009	0.0033	0.0009	0.0031	0.4290	0.0006	0.013	1.287
May 9, 2012	13														
May 15, 2012	inv														
May 21, 2012	20														
May 27, 2012	8														
June 2, 2012	5	0.0018	0.0006	0.0006	0.0006	0.0028	0.0990	0.0018	0.0015	0.0009	0.0031	0.0690	0.0006	0.006	0.207
June 8, 2012	14														
June 14, 2012	25														
June 20, 2012	19														
June 26, 2012	12														
July 2, 2012	12	0.0018	0.0006	0.0017	0.0006	0.0068	0.62634	0.0009	0.00548	0.0009	0.0031	0.098	0.0006	0.014	0.294
July 8, 2012	10														
July 14, 2012	28														
July 20, 2012	15														
July 26, 2012	12														
August 1, 2012	30	0.0018	0.0006	0.0025	0.0006	0.0057	4.3758	0.0024	0.0292	0.0024	0.0031	0.211	0.0037	0.015	0.633
August 7, 2012	15														
August 13, 2012	25														
August 19, 2012	9														
August 25, 2012	n/a														
August 31, 2012	20														

Extendicare Facility Monitoring Results for PM_{10} and Metals (2012)
(results expressed in µg/m³)

Date	PM_{10}	As	Cd	Cr	Co	Cu	$Fe(Fe_2O_3)$	Pb	Mn	Ni	Se	S	V	Zn	SO_4
September 6, 2012	33	0.0018	0.0006	0.0035	0.0006	0.0107	4.4044	0.0023	0.0377	0.0030	0.0031	0.213	0.0021	0.016	0.639
September 12, 2012	60														
September 18, 2012	1.5														
September 24, 2012	7														
September 30, 2012	6														
October 6, 2012	1.5	0.0018	0.0006	0.0006	0.0006	0.0023	0.1882	0.0009	0.0018	0.0009	0.0031	0.044	0.0006	0.0015	0.132
October 12, 2012	1.5														
October 18, 2012	12														
October 24, 2012	3														
October 30, 2012	1.5														
November 5, 2012	4	0.0018	0.0006	0.0044	0.0006	0.0033	0.3260	0.0009	0.0022	0.0009	0.0031	0.186	0.0006	0.0069	0.558
November 11, 2012	9														
November 17, 2012	7														
November 23, 2012	7														
November 29, 2012	3														
December 5, 2012	17	0.0018	0.0006	0.0022	0.0006	0.0042	1.0868	0.0009	0.0080	0.0009	0.0031	0.201	0.0006	0.0147	0.603
December 11, 2012	inv														
December 17, 2012	5														
December 23, 2012	6														
December 29, 2012	1.5														
Geometric mean	7.2	n/r	n/r	n/r	n/r	0.0043	0.4628	n/r	0.0042	n/r	n/r	0.1876	n/r	0.0115	0.5628
Arithmetic mean	10.4	n/r	n/r	n/r	n/r	0.0050	1.0671	n/r	0.0084	n/r	n/r	0.2256	n/r	0.0168	0.6767
Max. concentration	60.0	n/r	n/r	n/r	n/r	0.0107	4.4044	n/r	0.0377	n/r	n/r	0.4290	n/r	0.0773	1.2870
Min. concentration	1.5	n/r	n/r	n/r	n/r	0.0019	0.0990	n/r	0.0013	n/r	n/r	0.0440	n/r	0.0015	0.1320
90th percentile	21.5														
95th percentile	28.3														
AAQC	50*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.2**	0.1**	n/a	n/a	n/a	n/a	n/a
Number > AAQC	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	n/a	n/a	n/a	n/a	n/a
No. of valid samples	58	12	12	12	12	12	12	12	12	12	12	12	12	12	12
No. samples < mdl	7	12	12	6	12	0	0	8	0	10	12	0	10	1	0
Detection limit	3	0.0036	0.0012	0.0012	0.0012	0.0012	0.0061	0.0018	0.0006	0.0018	0.0061	0.0150	0.0012	0.003	0.045
Half detection limit	1.5	0.0018	0.0006	0.0006	0.0006	0.0006	0.0031	0.0009	0.0003	0.0009	0.0031	0.0075	0.0006	0.0015	0.023
% < detection limit	12	100	100	50	100	0	0	67	0	83	100	0	83	8	0
% valid data	95														

Notes:

All non detectable results were reported as 1/2 the detection limit

* Interim 24-hour criterion

** Effective April 2012

n/r: Statistics not reported due to high % of values < detection limit

Total Fe expressed as Fe_2O_3

All S assumed to be in SO_4 form

n/a: No sample on 25 August due to instrumentation malfunction

May 15 and December 11 result: Invalid since PM_{10} >TSP

MRCA Office Monitoring Results for TSP and Metals (2012)
(results expressed in µg/m^3)

Date	TSP	As	Cd	Cr	Co	Cu	Fe(Fe_2O_3)	Pb	Mn	Ni	Se	S	V	Zn	SO_4
January 4, 2012	7														
January 10, 2012	7														
January 16, 2012	7	0.0018	0.0006	0.0006	0.0006	0.0127	0.2860	0.0028	0.0027	0.0022	0.0031	1.2200	0.0006	0.029	3.660
January 22, 2012	3														
January 28, 2012	5														
February 3, 2012	3	0.0018	0.0006	0.0006	0.0006	0.0171	0.1327	0.0009	0.0013	0.0009	0.0031	0.3620	0.0006	0.009	1.086
February 9, 2012	5														
February 15, 2012	14														
February 21, 2012	11	0.0018	0.0006	0.0003	0.0006	0.0273	0.4776	0.0022	0.0034	0.0021	0.0031	0.6780	0.0006	0.011	2.034
February 27, 2012	4														
March 4, 2012	4														
March 10, 2012	3	0.0018	0.0006	0.0014	0.0006	0.0053	0.2103	0.0009	0.0023	0.0009	0.0031	0.2396	0.0006	0.005	0.719
March 16, 2012	87														
March 22, 2012	63														
March 28, 2012	8	0.0018	0.0006	0.0014	0.0006	0.0136	0.3804	0.0021	0.0032	0.0019	0.0031	0.4015	0.0006	0.010	1.205
April 3, 2012	17														
April 9, 2012	32														
April 15, 2012	18	0.0018	0.0006	0.0016	0.0006	0.0105	1.0897	0.0009	0.0079	0.0009	0.0031	0.4230	0.0006	0.013	1.269
April 21, 2012	10														
April 27, 2012	16														
May 3, 2012	14	0.0018	0.0006	0.0006	0.0006	0.0200	0.7693	0.0009	0.0059	0.0009	0.0031	0.4970	0.0006	0.013	1.491
May 9, 2012	15														
May 15, 2012	39														
May 21, 2012	39	0.0018	0.0006	0.0013	0.0006	0.0142	1.0210	0.0027	0.0537	0.0009	0.0031	0.6090	0.0006	0.023	1.827
May 27, 2012	34														
June 2, 2012	25														
June 8, 2012	24	0.0018	0.0006	0.0006	0.0006	0.0185	1.2098	0.0009	0.0091	0.0009	0.0031	0.2100	0.0006	0.011	0.630
June 14, 2012	71														
June 20, 2012	55														
June 26, 2012	30	0.0018	0.0006	0.0021	0.0006	0.0238	1.9562	0.0009	0.0139	0.0009	0.0031	0.2580	0.0006	0.017	0.774
July 2, 2012	28														
July 8, 2012	12														
July 14, 2012	64	0.0018	0.0006	0.0064	0.0006	0.0471	4.5474	0.0052	0.0314	0.0039	0.0031	1.600	0.0019	0.053	4.800
July 20, 2012	47														
July 26, 2012	20														
August 1, 2012	36	0.0018	0.0006	0.0033	0.0006	0.0265	2.7713	0.0040	0.0185	0.0027	0.0031	0.250	0.0015	0.038	0.750
August 7, 2012	17														
August 13, 2012	27														
August 19, 2012	16	0.0018	0.0006	0.0018	0.0006	0.0135	1.3785	0.0009	0.0101	0.0009	0.0031	0.095	0.0006	0.015	0.285
August 25, 2012	48														
August 31, 2012	31														

MRCA Office Monitoring Results for TSP and Metals (2012)
(results expressed in µg/m^3)

Date	TSP	As	Cd	Cr	Co	Cu	Fe(Fe_2O_3)	Pb	Mn	Ni	Se	S	V	Zn	SO_4
September 6, 2012	27	0.0018	0.0006	0.0025	0.0006	0.0117	2.0821	0.0019	0.0165	0.0026	0.0031	0.240	0.0013	0.024	0.720
September 12, 2012	74														
September 18, 2012	4														
September 24, 2012	17	0.0018	0.0006	0.0013	0.0006	0.0118	1.1097	0.0052	0.0094	0.0009	0.0031	0.142	0.0006	0.015	0.426
September 30, 2012	9														
October 6, 2012	10														
October 12, 2012	12	0.0018	0.0006	0.0015	0.0006	0.0124	1.2784	0.0009	0.00840	0.0009	0.0031	0.151	0.0006	0.0136	0.453
October 18, 2012	48														
October 24, 2012	18														
October 30, 2012	1.5	0.0018	0.0006	0.0006	0.0006	0.0037	0.1361	0.0009	0.00101	0.0009	0.0031	0.0075	0.0006	0.0135	0.023
November 5, 2012	7														
November 11, 2012	18														
November 17, 2012	44	0.0018	0.0006	0.0051	0.0006	0.0256	3.4892	0.0034	0.0225	0.0051	0.0031	0.640	0.0019	0.0309	1.920
November 23, 2012	15														
November 29, 2012	4														
December 5, 2012	48	0.0018	0.0006	0.0037	0.0006	0.0256	2.8228	0.0024	0.0181	0.0031	0.0031	0.263	0.0006	0.0333	0.789
December 11, 2012	10														
December 17, 2012	13														
December 23, 2012	3	0.0018	0.0006	0.0046	0.0006	0.0052	0.1868	0.0009	0.00222	0.0028	0.0031	0.256	0.0006	0.0189	0.768
December 29, 2012	3														
Geometric mean	15.1	n/r	n/r	0.0015	n/r	0.0146	0.8489	0.0016	0.0073	n/r	n/r	0.2851	n/r	0.0171	0.8554
Arithmetic mean	23.0	n/r	n/r	0.0021	n/r	0.0173	1.3668	0.0020	0.0121	n/r	n/r	0.4271	n/r	0.0198	1.2814
Max. concentration	87.0	n/r	n/r	0.0064	n/r	0.0471	4.5474	0.0052	0.0537	n/r	n/r	1.6000	n/r	0.0526	4.8000
Min. concentration	1.5	n/r	n/r	0.0003	n/r	0.0037	0.1327	0.0009	0.0010	n/r	n/r	0.0075	n/r	0.0053	0.0225
90th percentile	48.0														
95th percentile	64.0														
Standard	120	n/a	0.025*	n/a	n/a	50	25	0.5	n/a	2	n/a	n/a	2	120	n/a
No. > Sch. 3 value	0	n/a	0	n/a	n/a	0	0	0	n/a	0	n/a	n/a	0	0	n/a
Guideline	n/a	0.3	n/a	1.5	0.1	n/a	n/a	n/a	2.5	n/a	10	n/a	n/a	n/a	n/a
No. > guideline	n/a	0	n/a	0	0	n/a	n/a	n/a	0	n/a	0	n/a	n/a	n/a	n/a
No. of valid samples	61	20	20	20	20	20	20	20	20	20	20	20	20	20	20
No. samples < mdl	1	20	20	6	20	0	0	10	0	11	20	1	16	0	1
Detection limit	3	0.0036	0.0012	0.0012	0.0012	0.0012	0.0061	0.0018	0.0006	0.0018	0.0061	0.0150	0.0012	0.003	0.045
Half detection limit	1.5	0.0018	0.0006	0.0006	0.0006	0.0006	0.0031	0.0009	0.0003	0.0009	0.0031	0.0075	0.0006	0.0015	0.023
% < detection limit	2	100	100	30	100	0	0	50	0	55	100	5	80	0	5
% valid data	100														

Notes:

All non detectable results were reported as 1/2 the detection limit

* O. Reg.419/05 schedule 3, 24-hour standard effective February 1, 2013

n/r: Statistics not reported due to high % of values < detection limit

Total Fe expressed as Fe_2O_3

All S assumed to be in SO_4 form

January results corrected based on February 2nd flow calibration check

February 9 result corrected based on February 10th flow calibration check

MRCA Office Monitoring Results for PM_{10} and Metals (2012)
(results expressed in µg/m³)

Date	PM_{10}	As	Cd	Cr	Co	Cu	$Fe(Fe_2O_3)$	Pb	Mn	Ni	Se	S	V	Zn	SO_4
January 4, 2012	6	0.0018	0.0006	0.0006	0.0006	0.0019	0.2053	0.0009	0.0021	0.0009	0.0031	0.2060	0.0006	0.012	0.618
January 10, 2012	6														
January 16, 2012	5														
January 22, 2012	1.5														
January 28, 2012	1.5														
February 3, 2012	1.5	0.0018	0.0006	0.0006	0.0006	0.0020	0.1516	0.0009	0.0015	0.0009	0.0031	0.3730	0.0006	0.007	1.119
February 9, 2012	inv														
February 15, 2012	7														
February 21, 2012	7														
February 27, 2012	1.5														
March 4, 2012	4	0.0018	0.0006	0.0006	0.0006	0.0017	0.1657	0.0019	0.0015	0.0009	0.0031	0.3733	0.0006	0.006	1.120
March 10, 2012	5														
March 16, 2012	38														
March 22, 2012	24														
March 28, 2012	1.5														
April 3, 2012	8	0.0018	0.0006	0.0013	0.0006	0.0042	0.8008	0.0009	0.0056	0.0009	0.0031	0.2600	0.0006	0.010	0.780
April 9, 2012	10														
April 15, 2012	7														
April 21, 2012	4														
April 27, 2012	4														
May 3, 2012	8	0.0018	0.0006	0.0006	0.0006	0.0033	0.3003	0.0009	0.0025	0.0009	0.0031	0.4330	0.0006	0.008	1.299
May 9, 2012	4														
May 15, 2012	20														
May 21, 2012	23														
May 27, 2012	7														
June 2, 2012	11	0.0018	0.0006	0.0025	0.0006	0.0045	0.7779	0.0009	0.0063	0.0009	0.0031	0.0920	0.0006	0.007	0.276
June 8, 2012	13														
June 14, 2012	29														
June 20, 2012	23														
June 26, 2012	16														
July 2, 2012	13	0.0018	0.0006	0.0017	0.0006	0.0095	0.4805	0.0009	0.00331	0.0009	0.0031	0.108	0.0006	0.010	0.324
July 8, 2012	10														
July 14, 2012	36														
July 20, 2012	n/a														
July 26, 2012	12														
August 1, 2012	25	0.0018	0.0006	0.0017	0.0006	0.0097	1.0696	0.0028	0.00691	0.0009	0.0031	0.195	0.0006	0.017	0.585
August 7, 2012	n/a														
August 13, 2012	14														
August 19, 2012	6														
August 25, 2012	29														
August 31, 2012	14														

MRCA Office Monitoring Results for PM_{10} and Metals (2012)
(results expressed in µg/m³)

Date	PM_{10}	As	Cd	Cr	Co	Cu	$Fe(Fe_2O_3)$	Pb	Mn	Ni	Se	S	V	Zn	SO_4
September 6, 2012	12	0.0018	0.0006	0.0015	0.0006	0.0054	0.6664	0.0009	0.00580	0.0009	0.0031	0.183	0.0006	0.009	0.549
September 12, 2012	33														
September 18, 2012	1.5														
September 24, 2012	6														
September 30, 2012	4														
October 6, 2012	1.5	0.0018	0.0006	0.0006	0.0006	0.0006	0.1190	0.0009	0.0012	0.0009	0.0031	0.042	0.0006	0.0015	0.126
October 12, 2012	4														
October 18, 2012	30														
October 24, 2012	8														
October 30, 2012	1.5														
November 5, 2012	3	0.0018	0.0006	0.0013	0.0006	0.0034	0.2494	0.0009	0.0020	0.0009	0.0031	0.203	0.0006	0.0089	0.609
November 11, 2012	11														
November 17, 2012	19														
November 23, 2012	7														
November 29, 2012	4														
December 5, 2012	17	0.0018	0.0006	0.0018	0.0006	0.0061	1.1097	0.0009	0.0072	0.0009	0.0031	0.241	0.0006	0.0081	0.723
December 11, 2012	5														
December 17, 2012	6														
December 23, 2012	inv														
December 29, 2012	1.5														
Geometric mean	7.4	n/r	n/r	0.0011	n/r	0.0034	0.3858	n/r	0.0031	n/r	n/r	0.1910	n/r	0.0078	0.5729
Arithmetic mean	11.1	n/r	n/r	0.0012	n/r	0.0044	0.5080	n/r	0.0038	n/r	n/r	0.2258	n/r	0.0088	0.6773
Max. concentration	37.6	n/r	n/r	0.0025	n/r	0.0097	1.1097	n/r	0.0072	n/r	n/r	0.4330	n/r	0.0165	1.2990
Min. concentration	1.5	n/r	n/r	0.0006	n/r	0.0006	0.1190	n/r	0.0012	n/r	n/r	0.0420	n/r	0.0015	0.1260
90th percentile	26.6														
95th percentile	30.6														
AAQC	50*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.2**	0.1**	n/a	n/a	n/a	n/a	n/a
Number > AAQC	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	n/a	n/a	n/a	n/a	n/a
No. of valid samples	57	12	12	12	12	12	12	12	12	12	12	12	12	12	12
No. samples < mdl	9	12	12	5	12	1	0	10	0	12	12	0	12	1	0
Detection limit	3	0.0036	0.0012	0.0012	0.0012	0.0012	0.0061	0.0018	0.0006	0.0018	0.0061	0.0150	0.0012	0.003	0.045
Half detection limit	1.5	0.0018	0.0006	0.0006	0.0006	0.0006	0.0031	0.0009	0.0003	0.0009	0.0031	0.0075	0.0006	0.0015	0.023
% < detection limit	16	100	100	42	100	8	0	83	0	100	100	0	100	8	0
% valid data	93														

Notes:

All non detectable results were reported as 1/2 the detection limit

* Interim 24-hour criterion

** Effective April 2012

n/r: Statistics not reported due to high % of values < detection limit

Total Fe expressed as Fe_2O_3

All S assumed to be in SO_4 form

Feb 9 and December 23: PM_{10} > TSP

April 3rd result corrected based on April 5th flow calibration check

n/a: No sample on 20 July and 7 August due to instrumentation malfunctions

Shania Twain Rd Monitoring Results for TSP and Metals (2012)
(results expressed in µg/m^3)

Date	TSP	As	Cd	Cr	Co	Cu	Fe(Fe_2O_3)	Pb	Mn	Ni	Se	S	V	Zn	SO_4
January 4, 2012	8														
January 10, 2012	8														
January 16, 2012	7	0.0018	0.0006	0.0006	0.0006	0.0065	0.1779	0.0053	0.0021	0.0021	0.0031	1.0800	0.0006	0.011	3.240
January 22, 2012	1.5														
January 28, 2012	1.5														
February 3, 2012	1.5	0.0018	0.0006	0.0006	0.0006	0.0108	0.1499	0.0009	0.0013	0.0009	0.0031	0.3560	0.0006	0.059	1.068
February 9, 2012	5														
February 15, 2012	8														
February 21, 2012	5	0.0018	0.0006	0.0006	0.0006	0.0076	0.1899	0.0019	0.0023	0.0009	0.0031	0.5940	0.0006	0.010	1.782
February 27, 2012	5														
March 4, 2012	5														
March 10, 2012	6	0.0018	0.0006	0.0017	0.0006	0.0037	0.2662	0.0009	0.0027	0.0024	0.0031	0.4474	0.0006	0.006	1.342
March 16, 2012	35														
March 22, 2012	46														
March 28, 2012	9	0.0018	0.0006	0.0016	0.0006	0.0102	0.5377	0.0025	0.0042	0.0009	0.0031	0.4244	0.0006	0.010	1.273
April 3, 2012	50														
April 9, 2012	81														
April 15, 2012	23	0.0018	0.0006	0.0023	0.0006	0.0079	1.4872	0.0009	0.0122	0.0020	0.0031	0.2960	0.0006	0.015	0.888
April 21, 2012	24														
April 27, 2012	27														
May 3, 2012	19	0.0018	0.0006	0.0017	0.0006	0.0205	0.9038	0.0031	0.0073	0.0020	0.0031	0.4850	0.0006	0.017	1.455
May 9, 2012	21														
May 15, 2012	33														
May 21, 2012	35	0.0018	0.0006	0.0013	0.0006	0.0147	0.9667	0.0009	0.0553	0.0009	0.0031	0.6120	0.0006	0.021	1.836
May 27, 2012	33														
June 2, 2012	14														
June 8, 2012	21	0.0018	0.0006	0.0021	0.0006	0.0224	1.3127	0.0020	0.0096	0.0009	0.0031	0.2000	0.0006	0.022	0.600
June 14, 2012	41														
June 20, 2012	42														
June 26, 2012	30	0.0018	0.0006	0.0029	0.0006	0.0204	1.8247	0.0022	0.0140	0.0024	0.0031	0.2280	0.0006	0.023	0.684
July 2, 2012	21														
July 8, 2012	18														
July 14, 2012	51	0.0018	0.0006	0.0058	0.0006	0.0273	3.9182	0.0056	0.0255	0.0036	0.0031	1.430	0.0021	0.025	4.290
July 20, 2012	38														
July 26, 2012	23														
August 1, 2012	26	0.0018	0.0006	0.0028	0.0006	0.0322	1.71886	0.0110	0.0122	0.0019	0.0031	0.199	0.0006	0.013	0.597
August 7, 2012	20														
August 13, 2012	26														
August 19, 2012	11	0.0018	0.0006	0.0031	0.0006	0.0181	0.73502	0.0044	0.00482	0.0019	0.0031	0.079	0.0006	0.009	0.237
August 25, 2012	37														
August 31, 2012	32														

Shania Twain Rd Monitoring Results for TSP and Metals (2012)
(results expressed in µg/m^3)

Date	TSP	As	Cd	Cr	Co	Cu	Fe(Fe_2O_3)	Pb	Mn	Ni	Se	S	V	Zn	SO_4
September 6, 2012	15	0.0018	0.0006	0.0018	0.0006	0.0183	1.17832	0.0009	0.00942	0.0009	0.0031	0.189	0.0006	0.010	0.567
September 12, 2012	57														
September 18, 2012	4														
September 24, 2012	10	0.0018	0.0006	0.0006	0.0006	0.0136	0.57486	0.0132	0.00579	0.0009	0.0031	0.115	0.0006	0.008	0.345
September 30, 2012	16														
October 6, 2012	7														
October 12, 2012	14	0.0018	0.0006	0.0006	0.0006	0.0204	1.5787	0.0026	0.0108	0.0009	0.0031	0.124	0.0006	0.0112	0.372
October 18, 2012	15														
October 24, 2012	7														
October 30, 2012	5	0.0018	0.0006	0.0023	0.0006	0.0059	0.4976	0.0009	0.00334	0.0009	0.0031	0.053	0.0006	0.0107	0.159
November 5, 2012	12														
November 11, 2012	12														
November 17, 2012	14	0.0018	0.0006	0.0022	0.0006	0.0111	1.2870	0.0024	0.00854	0.0025	0.0031	0.488	0.0006	0.0125	1.464
November 23, 2012	11														
November 29, 2012	3														
December 5, 2012	69	0.0018	0.0006	0.0049	0.0006	0.0202	4.3758	0.0034	0.0277	0.0072	0.0031	0.273	0.0013	0.0973	0.819
December 11, 2012	6														
December 17, 2012	7														
December 23, 2012	3	0.0018	0.0006	0.0006	0.0006	0.0038	0.1081	0.0009	0.00397	0.0009	0.0031	0.216	0.0006	0.0051	0.648
December 29, 2012	3														
Geometric mean	13.6	n/r	n/r	n/r	n/r	0.0125	0.7550	0.0023	0.0072	n/r	n/r	0.2886	n/r	0.0146	0.8658
Arithmetic mean	20.3	n/r	n/r	n/r	n/r	0.0148	1.1895	0.0033	0.0112	n/r	n/r	0.3944	n/r	0.0198	1.1833
Max. concentration	81.0	n/r	n/r	n/r	n/r	0.0322	4.3758	0.0132	0.0553	n/r	n/r	1.4300	n/r	0.0973	4.2900
Min. concentration	1.5	n/r	n/r	n/r	n/r	0.0037	0.1081	0.0009	0.0013	n/r	n/r	0.0530	n/r	0.0051	0.1590
90th percentile	42.0														
95th percentile	51.0														
Standard	120	n/a	0.025*	n/a	n/a	50	25	0.5	n/a	2	n/a	n/a	2	120	n/a
No. > Sch. 3 value	0	n/a	0	n/a	n/a	0	0	0	n/a	0	n/a	n/a	0	0	n/a
Guideline	n/a	0.3	n/a	1.5	0.1	n/a	n/a	n/a	2.5	n/a	10	n/a	n/a	n/a	n/a
No. > guideline	n/a	0	n/a	0	0	n/a	n/a	n/a	0	n/a	0	n/a	n/a	n/a	n/a
No. of valid samples	61	20	20	20	20	20	20	20	20	20	20	20	20	20	20
No. samples < mdl	3	20	20	6	20	0	0	7	0	10	20	0	18	0	0
Detection limit	3	0.0036	0.0012	0.0012	0.0012	0.0012	0.0061	0.0018	0.0006	0.0018	0.0061	0.0150	0.0012	0.003	0.045
Half detection limit	1.5	0.0018	0.0006	0.0006	0.0006	0.0006	0.0031	0.0009	0.0003	0.0009	0.0031	0.0075	0.0006	0.0015	0.023
% < detection limit	5	100	100	30	100	0	0	35	0	50	100	0	90	0	0
% valid data	100														

Notes:

All non detectable results were reported as 1/2 the detection limit

* O. Reg.419/05 schedule 3, 24-hour standard effective February 1, 2013

n/r: Statistics not reported due to high % of values < detection limit

Total Fe expressed as Fe_2O_3

All S assumed to be in SO_4 form

April 9th to May 9th results corrected based on May 14th flow calibration check

May 15th to May 27th results corrected based on May 29th flow calibration check

Shania Twain Rd Monitoring Results for PM_{10} and Metals (2012)
(results expressed in µg/m^3)

Date	PM_{10}	As	Cd	Cr	Co	Cu	$Fe(Fe_2O_3)$	Pb	Mn	Ni	Se	S	V	Zn	SO_4
January 4, 2012	8	0.0018	0.0006	0.0006	0.0006	0.0072	0.6092	0.0050	0.0088	0.0009	0.0031	0.3220	0.0006	0.090	0.966
January 10, 2012	inv														
January 16, 2012	inv														
January 22, 2012	1.5														
January 28, 2012	1.5														
February 3, 2012	1.5	0.0018	0.0006	0.0006	0.0006	0.0039	0.1745	0.0009	0.0018	0.0009	0.0031	0.4100	0.0006	0.067	1.230
February 9, 2012	inv														
February 15, 2012	7														
February 21, 2012	5														
February 27, 2012	4														
March 4, 2012	5	0.0018	0.0006	0.0012	0.0006	0.0037	0.1486	0.0025	0.0014	0.0009	0.0031	0.4275	0.0006	0.005	1.283
March 10, 2012	5														
March 16, 2012	16														
March 22, 2012	19														
March 28, 2012	4														
April 3, 2012	20	0.0018	0.0006	0.0031	0.0006	0.0094	1.9133	0.0009	0.0122	0.0022	0.0031	0.2330	0.0016	0.019	0.699
April 9, 2012	42														
April 15, 2012	12														
April 21, 2012	7														
April 27, 2012	13														
May 3, 2012	11	0.0018	0.0006	0.0006	0.0006	0.0014	0.3117	0.0009	0.0025	0.0009	0.0031	0.4150	0.0006	0.009	1.245
May 9, 2012	8														
May 15, 2012	18														
May 21, 2012	19														
May 27, 2012	8														
June 2, 2012	8	0.0018	0.0006	0.0006	0.0006	0.0037	0.1416	0.0009	0.0023	0.0009	0.0031	0.0690	0.0006	0.008	0.207
June 8, 2012	14														
June 14, 2012	20														
June 20, 2012	19														
June 26, 2012	16														
July 2, 2012	13	0.0018	0.0006	0.0016	0.0006	0.0066	0.4462	0.0009	0.0034	0.0009	0.0031	0.107	0.0006	0.009	0.321
July 8, 2012	11														
July 14, 2012	23														
July 20, 2012	22														
July 26, 2012	14														
August 1, 2012	16	0.0018	0.0006	0.0017	0.0006	0.0088	0.7121	0.0100	0.0044	0.0009	0.0031	0.160	0.0006	0.012	0.480
August 7, 2012	13														
August 13, 2012	18														
August 19, 2012	7														
August 25, 2012	31														
August 31, 2012	19														

Shania Twain Rd Monitoring Results for PM_{10} and Metals (2012)
(results expressed in µg/m³)

Date	PM_{10}	As	Cd	Cr	Co	Cu	$Fe(Fe_2O_3)$	Pb	Mn	Ni	Se	S	V	Zn	SO_4
September 6, 2012	13	0.0018	0.0006	0.0020	0.0006	0.0161	0.6435	0.0035	0.0063	0.0009	0.0031	0.229	0.0006	0.018	0.687
September 12, 2012	33														
September 18, 2012	1.5														
September 24, 2012	6														
September 30, 2012	8														
October 6, 2012	1.5	0.0018	0.0006	0.0006	0.0006	0.0027	0.1676	0.0020	0.00144	0.0009	0.00305	0.042	0.0006	0.0058	0.126
October 12, 2012	5														
October 18, 2012	11														
October 24, 2012	1.5														
October 30, 2012	1.5														
November 5, 2012	5	0.0018	0.0006	0.0024	0.0006	0.0040	0.4519	0.0009	0.00349	0.0009	0.00305	0.196	0.0006	0.0079	0.588
November 11, 2012	7														
November 17, 2012	9														
November 23, 2012	7														
November 29, 2012	3														
December 5, 2012	32	0.0018	0.0006	0.0032	0.0006	0.0084	2.3280	0.0009	0.0162	0.0022	0.00305	0.229	0.0006	0.0356	0.687
December 11, 2012	4														
December 17, 2012	5														
December 23, 2012	1.5														
December 29, 2012	1.5														
Geometric mean	7.9	n/r	n/r	0.0012	n/r	0.0052	0.4367	n/r	0.0039	n/r	n/r	0.1937	n/r	0.0152	0.5810
Arithmetic mean	11.3	n/r	n/r	0.0015	n/r	0.0063	0.6707	n/r	0.0053	n/r	n/r	0.2366	n/r	0.0239	0.7099
Max. concentration	42.0	n/r	n/r	0.0032	n/r	0.0161	2.3280	n/r	0.0162	n/r	n/r	0.4275	n/r	0.0895	1.2825
Min. concentration	1.5	n/r	n/r	0.0006	n/r	0.0014	0.1416	n/r	0.0014	n/r	n/r	0.0420	n/r	0.0054	0.1260
90th percentile	20.6														
95th percentile	31.2														
AAQC	50*	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.2**	0.1**	n/a	n/a	n/a	n/a	n/a
Number > AAQC	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	n/a	n/a	n/a	n/a	n/a
No. of valid samples	58	12	12	12	12	12	12	12	12	12	12	12	12	12	12
No. samples < mdl	9	12	12	5	12	0	0	7	0	10	12	0	11	0	0
Detection limit	3	0.0036	0.0012	0.0012	0.0012	0.0012	0.0061	0.0018	0.0006	0.0018	0.0061	0.0150	0.0012	0.003	0.045
Half detection limit	1.5	0.0018	0.0006	0.0006	0.0006	0.0006	0.0031	0.0009	0.0003	0.0009	0.0031	0.0075	0.0006	0.0015	0.023
% < detection limit	16	100	100	42	100	0	0	58	0	83	100	0	92	0	0
% valid data	95														

Notes:

All non detectable results were reported as 1/2 the detection limit

* Interim 24-hour criterion

** Effective April 2012

n/r: Statistics not reported due to high % of values < detection limit

Total Fe expressed as Fe_2O_3

All S assumed to be in SO_4 form

January 10, 16 and February 9: PM_{10} > TSP

Appendix C-2

Total Dustfall Sampling Results (2012)

Extendicare Facility Monitoring Results for Dustfall (2012)
(results expressed in g/m^2/30days)

Month	No. Exposure Days	Dustfall (insoluble)	Dustfall (soluble)	Dustfall (total)
January	30	0.19	0.48	0.7
February	28	0.10	0.29	0.4
March	29	0.18	0.43	0.6
April	33	0.92	0.57	1.5
May	28	2.14	1.05	3.2
June	30	1.83	0.32	2.2
July	32	2.52	1.69	4.2
August	30	0.85	7.24	8.1
September	32	1.27	1.64	2.9
October	30	0.47	0.68	1.2
November	30	0.27	0.38	0.7
December	31	0.52	0.51	1.0
Arithmetic mean		0.94	1.27	2.2
Max. value		2.52	7.24	8.1
Min. value		0.10	0.29	0.4
% of Total Dustfall		42	58	100
Standard		n/a	n/a	7.0
No. > Sch. 3 value		n/a	n/a	1
No. of valid samples		12	12	12
Detection limit		0.01	0.01	0.02
Half detection limit		0.005	0.005	0.01
% Valid Data		100	100	100

MRCA Office Monitoring Results for Dustfall (2012)
(results expressed in g/m^2/30days)

Month	No. Exposure Days	Dustfall (insoluble)	Dustfall (soluble)	Dustfall (total)
January	30	0.04	0.36	0.4
February	28	0.03	0.28	0.3
March	29	0.59	0.67	1.3
April	33	0.56	0.35	0.9
May	28	2.06	0.74	2.8
June	30	1.86	0.34	2.2
July	32	4.51	2.50	7.0
August	30	1.03	13.21	14.2
September	32	1.01	3.29	4.3
October	30	1.14	0.79	1.9
November	30	0.32	0.60	0.9
December	31	0.18	0.39	0.6
Arithmetic mean		1.11	1.96	3.1
Max. value		4.51	13.21	14.2
Min. value		0.03	0.28	0.3
% of Total Dustfall		36	64	100
Standard		n/a	n/a	7.0
No. > Sch. 3 value		n/a	n/a	1
No. of valid samples		12	12	12
Detection limit		0.01	0.01	0.02
Half detection limit		0.005	0.005	0.01
% Valid Data		100	100	100

Shania Twain Rd Monitoring Results for Dustfall (2012)
(results expressed in g/m^2/30days)

Month	No. Exposure Days	Dustfall (insoluble)	Dustfall (soluble)	Dustfall (total)
January	30	0.02	0.20	0.2
February	28	0.02	0.21	0.2
March	29	0.23	0.37	0.6
April	33	1.21	0.55	1.8
May	28	1.61	0.78	2.4
June	30	9.32	1.85	11.2
July	32	1.68	1.18	2.9
August	30	1.37	10.53	11.9
September	32	0.54	1.88	2.4
October	30	0.35	0.60	1.0
November	30	0.44	0.55	1.0
December	31	0.19	0.35	0.5
Arithmetic mean		1.42	1.59	3.0
Max. value		9.32	10.53	11.9
Min. value		0.02	0.20	0.2
% of Total Dustfall		47	53	100
Standard		n/a	n/a	7.0
No. > Sch. 3 value		n/a	n/a	2
No. of valid samples		12	12	12
Detection limit		0.01	0.01	0.02
Half detection limit		0.005	0.005	0.01
% Valid Data		100	100	100

Claim Post Monitoring Results for Dustfall (2012)
(results expressed in g/m^2/30days)

Month	No. Exposure Days	Dustfall (insoluble)	Dustfall (soluble)	Dustfall (total)
January				
February				
March				
April				
May				
June				
July				
August				
September	32	0.46	1.65	2.1
October	30	0.76	0.98	1.7
November	30	1.50	0.20	1.7
December	31	1.00	0.64	1.6
Arithmetic mean		0.93	0.87	1.8
Max. value		1.50	1.65	2.1
Min. value		0.46	0.20	1.6
% of Total Dustfall		52	48	100
Standard		n/a	n/a	7.0
No. > Sch. 3 value		n/a	n/a	0
No. of valid samples		4	4	4
Detection limit		0.01	0.01	0.02
Half detection limit		0.005	0.005	0.01
% Valid Data		33	33	33

Note: Sampling initiated in September

Appendix C-3

SO_2 and NO_2 Passive Sampling Results (2012)

Monitoring Results for Passive SO_2 and NO_2 (2012)
(results expressed in ppb)

	Extendicare Facility		MRCA Office		Shania Twain Rd	
Month	**SO_2**	**NO_2**	**SO_2**	**NO_2**	**SO_2**	**NO_2**
January	0.7	1.4	0.6	2.4	0.6	2.1
February	0.5	0.8	0.5	1.9	0.7	1.6
March	0.4	0.8	0.6	2	0.8	1.7
April	0.8	0.9	0.8	1.7	0.9	2.1
May	0.3	0.7	0.3	1.5	1.0	0.9
June	0.1	1.0	0.2	2.0	0.1	1.1
July	0.2	1.0	0.2	2.0	0.2	1.1
August	0.2	1.5	0.2	12.2	0.2	12.2
September	0.4	1.0	0.1	2.1	0.1	1.2
October	0.9	1.9	0.5	3.2	0.5	2.4
November	0.2	1.5	0.2	2.2	0.2	2.6
December	0.3	3.0	0.2	4.9	0.2	3.7
Arithmetic mean	0.4	1.3	0.4	3.2	0.5	2.7
Max. concentration	0.9	3.0	0.8	12.2	1.0	12.2
Min. concentration	0.1	0.7	0.1	1.5	0.1	0.9
No. of valid samples	12	12	12	12	12	12
Detection limit	0.1	0.1	0.1	0.1	0.1	0.1
Half detection limit	0.05	0.05	0.05	0.05	0.05	0.05
% Valid data	100	100	100	100	100	100