DE BEERS CANADA INC.
VICTOR MINE

MERCURY PERFORMANCE MONITORING 2011 ANNUAL REPORT

AS PER CONDITIONS 7(5) and 7(6) OF
CERTIFICATE OF APPROVAL #3960-7Q4K2G

Submitted to:
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and

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Abbreviation	Meaning
ATT	Attawapiskat
CEQG	Canadian Environmental Quality Guidelines
COM	Community
CONF	Confluence
CPUE	Catch Per Unit Effort
DS	Downstream
DSNAY	Downstream Nayshkootayaow
F-Value	Analysis of Variance from Sample Statistics
FF	Far Field
HgCON	Mercury Control Station / Northwest Control
MC	Monument Channel
MDL	Method Detection Limit
NAY or NAYSH	Nayshkootayaow
NAY-MOUTH	Mouth of Nayshkootayaow
NEF/F	Northeast Fen Final
NGC	North Granny Creek
ng/L	Nanograms per Litre
NF	Near Field
PPM	Parts Per Million
P-Value	Tabled Probability Threshold
SEF/F	Southeast Fen Final
SGC	South Granny Creek
ST	Station
SWF/F	Southwest Fen Final
T	Tributary
µg/G	Micrograms Per Gram
US	Upstream

1.0 INTRODUCTION

This report was prepared by AMEC Environment & Infrastructure Limited (AMEC) on behalf of De Beers Canada Inc. (De Beers), pursuant to the requirements of Conditions 7(5) and 7(6) of Certificate of Approval (C. of A.) #3960-7Q4K2G. The report is the fourth in a series of annual mercury monitoring reports that will be prepared for the Victor Mine. This fourth annual report summarizes all Victor Mine site mercury monitoring data collected for the year 2011, and also provides summaries of earlier data and trends where appropriate. For consistency and readability from year to year, this report keeps the same format, and much of the same wording as the previous annual reports, with updates in data interpretation where warranted.

A broad-based, rigorous mercury monitoring program was established for the De Beers Victor Mine because of concerns raised during the provincial permitting process, regarding the possible influences of mine dewatering activities on muskeg system hydrodynamics and associated mercury chemodynamics. In particular, concerns have been expressed that should mine dewatering lead to extensive "drying out" of the local muskeg ecosystem, then there could be a potential for the release of increased quantities of mercury to area receiving waters above those that occur naturally. Mercury is present in area peatlands in the baseline condition as a result of the long-range aerial transport of emissions from natural and anthropogenic sources unrelated to activities of the Victor Mine.

AMEC and De Beers have previously provided evidence to support the position that mine dewatering activities were not likely to result in a condition that would substantively increase mercury release rates to area receiving waters, and that if evidence of such substantive release rates was to occur, then mitigation measures would be implemented to prevent or arrest the aggravating condition. The Victor Mine mercury monitoring program is designed to test De Beers' position that mine dewatering is not likely to substantively increase mercury release rates to area receiving waters.

Data collected up to the end of 2011 thus far continue to support the De Beers' position that mine dewatering is unlikely to result in substantive increases in mercury release to area surface waters, as described in detail in the sections that follow.

Laboratory services for the water sample program were conducted in part by Flett Research Ltd. in Winnipeg (to approximately the end of April 2009), and by Dr. Brian Branfireun's laboratory at the University of Western Ontario (approximately May 2009 until present). Fish flesh analyses were conducted at Dr. Branfireun's laboratory as of 2008. Both laboratories are recognized for their specialty of ultra-trace analyses for mercury.

Data reported as "less than values" (i.e., less than the detection limit values) by either laboratory are shown as being at the reported detection limit in all tables in this document. Lower end values are therefore conservative. Detection limits provided by Flett Research for water samples varied with the samples being analyzed with some detection limits being shown as a low as 0.00 ng/L, measured to two decimal places. Detection limits provided by Dr. Branfireun's laboratory were set at two levels: "limit of quantification" – 0.0169 ng/L, and "method detection limit" (MDL)

– 0.0054 ng/L. Values less than the MDL were reported by Dr. Branfireun's laboratory as "non-detect" and are presented in the tables of this report as <0.01 ng/L or as stated. Values reported as "detect" by Dr. Branfireun's laboratory are presented in the tables as 0.01 ng/L if below the limit of quantification, or as stated if above that value.

For readers unfamiliar with these units of measurement:

ng/L represents nanograms per litre of water, which can also be expressed as parts per trillion (ppt) or 1 part of material in 1,000,000,000,000 parts of water.

ug/g represents micrograms per gram of solids (e.g. fish flesh), which can also be expressed as parts per million (ppm) or 1 part of material in 1,000,000 parts of solids.

2.0 REQUIREMENTS

Condition 7(5) of Certificate of Approval (C. of A.) #3960-7Q4K2G states the following:

The Owner shall report the results from the previous calendar year for the mercury monitoring program described [in] Condition 6(8), to the District Manager and the Chief of the Attawapiskat First Nation by June 30 of each year.

The referenced Condition 6(8) states:

The Owner shall carryout a mercury monitoring program that includes, but [is] not necessarily limited to the following:

(a) A onetime assessment of peat solids to determine mercury content (completed in 2007);

(b) An analysis of peat, mineral soil, and bedrock pore water on an ongoing annual basis at the locations identified in Table 2 below;

(c) Monitoring of surface water systems on a monthly or quarterly basis depending on station at the locations identified in Table 3 below;

(d) Monitoring of the well field discharge on a monthly basis and quarterly basis and quarterly sampling of individual wells;

(e) Sampling of sportfish at 3 year intervals and small fish sampling on an annual basis at locations identified in Table 4 below.

Condition 7(6) states the following:

> *The Owner shall report the results from the previous calendar year for the mercury assessments described [in] Condition 6(9), to the District Manager and the Chief of the Attawapiskat First Nation by June 30 of each year.*

The referenced Condition 6(9) states:

> *In conjunction with the mercury management and monitoring program required in Section 6(8), the Owner shall also carryout data analyses, enhanced sampling programs, modeling, risk assessments, and implement effective mitigation measures, as and when required, all in accordance with the March 31, 2008 Report prepared by AMEC and submitted to the District Manager, entitled Trigger Values for Mercury Concentrations and/or Body Burdens in Fish, Condition 6(10) of Certificate of Approval #8700-783LPK, De Beers Canada Inc., Victor Mine. This program may be amended from time to time when approved in writing by the District Manager. As well, water quality data collected as part of the groundwater well field recovery system shall be analyzed statistically to determine the variability and trending over time. Should significant variation occur over time within individual wells or group of wells then a potential concern will be deemed to exist, requiring further investigation.*

3.0 REPORTING – CONDITION 6(8) DATA

3.1 Condition 6(8)(a) – One Time Assessment of Peat Solids

Requirements of this condition were fulfilled in Section 3.1 of the first annual mercury report (2008 Annual Report), and are not repeated here.

3.2 Condition 6(8) (b) – Annual Analysis of Peat, Mineral Soil and Bedrock Pore Water

Condition 6(8) of Amended C. of A. #4111-7DXKQW, dated October 3, 2008, and Condition 6(8) of the Amended version referred to as C. of A. #3960-7Q4K2G, dated March 13, 2009, both provide for the annual collection of peat pore water samples from muskeg monitoring program stations identified in Table 2 of the C. of A. The two C. of A.'s also provide for the annual collection of water samples from muskeg monitoring program mineral soil and bedrock monitoring wells / piezometers identified in Table 2 of the C. of A. Samples are to be analyzed for total and methyl mercury.

C. of A. #4111-7DXKQW was preceded by C. of A. #8700-783LPK, dated December 11, 2007. Condition 6(9) of C. of A. 8700-783LPK provided for the development and approval of a mercury monitoring plan. The mercury monitoring plan had been developed previously through consultation with the MOE and was submitted to the MOE on November 13, 2007. The November 13, 2007 monitoring plan provided for the annual collection of peat pore water samples from the same muskeg monitoring program stations identified in Table 2 of C. of A.

#3960-7Q4K2G; as well as from mineral soil samples to be collected from three depths below surface from each of the MSV(1)-D, MSV(2)-D and MSV(3)-D stations.

As a precautionary measure to better document baseline conditions, filtered samples for total and methyl mercury analysis were collected from all of the monitoring stations identified in Table 2 of C. of A. #3960-7Q4K2G during 2007. However, due to confusion over the small changes to the sampling program introduced in October 2008 in C. of A. #4111-7DXKQW, from those defined in the earlier November 2007 AMEC submission, the mineral soil pore water samples for the muskeg monitoring program stations were not collected in 2008 prior to freeze-up. Hence, there were no mineral soil or bedrock pore water mercury samples for the late summer / fall of 2008.

Sample collection as per C. of A. #3960-7Q4K2G Table 2 requirements was resumed in August / September of 2009; with the omission of a few samples due to monitoring wells with too little water to sample – particularly in deep clay overburden wells; sample breakage in transit; sampling errors, etc.

Muskeg monitoring program pore water sample results for total and methyl mercury filtered samples are provided in Table 1 for 2007, 2008, 2009, 2010 and 2011. The 2011 samples were collected in August; however, it was subsequently determined that some wells / piezometers were not fully purged during sampling, so these were re-sampled primarily in September, with a few wells resampled in November. Both data sets (August and September / November) are presented in Table 1. Generally the results from the two sample dates were similar, with a few exceptions where the September / November samples provided lower results for total mercury. Sampling station locations are shown in Figure 1.

More detailed data presentations for the various muskeg (peat) types and underlying marine sediment and bedrock zones are presented in Table 2. Table 2 is divided into a series of sub-tables from 2a to 2g, with associated graphical data presentations for ease of data interpretation. Note that the vertical scales on these graphs vary depending on the range of results observed, The Table 2 series data are presented only for the August 2011 samples. Statistical analyses using all data sets are presented in Section 4. Total and methyl mercury values observed in 2011 were within the range of values observed in previous years for the different stations. Occasional spikes in data were observed for some of the stations for both total and methyl mercury in 2011, but there is no pattern to the data, and such spikes were equally likely to be observed in stations remote from the area under-drained by Victor Mine dewatering (e.g., Station Clusters S-9(1), S-9(2), S-13 and S-15), as at areas closer to the mine (Station Clusters S-1, S-2, S-7 and S-8, as well as the S-V1, S-V2 and S-V3 Clusters). Year to year variations therefore appear to be a regional phenomenon that is not linked to mine dewatering effects on muskeg mercury chemodynamics.

Comparatively elevated total mercury values were observed in the August samples for the S-2 stations, and for the MS-9(2)-R, the MS-13-D, and the MS-V(3)-D stations (Table 1). Resampling showed much lower total mercury concentrations for all of these samples. The S-2 stations are within the current zone of dewatering drawdown cone. The MS-9(2)-R, MS-13-D, and MS-V(3)-D stations are beyond the zone of influence of the current zone of dewatering drawdown.

All of the observed values for total mercury and methyl mercury are well below their respective Canadian Environmental Quality Guideline (CEQG) values of 26 ng/L for total mercury and 4 ng/L for methyl mercury.

3.3 Condition 6(8) (c) – Analysis of Surface Water Systems

Surface water systems considered in this section include the following:

- Passive fen treatment systems;
- Ribbed fen systems;
- Granny Creek; and,
- Nayshkootayaow and Attawapiskat Rivers.

Passive Fen Treatment Systems

The Southwest Fen (SWF) was used as a passive wetland treatment system for the removal of residual total suspended solids and nutrients from the Central Quarry waste water discharge during 2006. The Northeast Fen (NEF) provided a similar function for effluents derived from the following sources:

- Plant site excavation area (completed 2006);
- Crusher excavation area (completed 2006 and 2007);
- Attawapiskat River intake excavation and construction (completed 2007).
- Open Pit mine Phase 1 Mine Water Settling Pond (started 2007 and ongoing);
- Dry waste landfill runoff and leachate (started autumn of 2008 and ongoing); and,
- Fully treated sewage treatment plant effluent (started 2006 and completed August 2011).

The Southeast Fen (SEF) and the Northwest Control Fen (HgCon) were set up as control fens for the SWF and the NEF. The SEF previously received minor discharges from the shallow south quarry during parts of 2004 and 2005, but was not materially affected by these minor discharges, and is therefore regarded as being not impacted by site activities. The HgCON has never received effluent discharge from any source.

Sampling from the SWF was discontinued in June 2009 as the C. of A. for this fen treatment system (C. of A. 3374-6G7J2Y – dated December 13, 2005) was revoked on March 3, 2009. Much of the SWF has since been overlaid by stockpiles of mine waste (overburden, low grade kimberlite and processed kimberlite). There are consequently no data for the SWF beyond May 2009.

Total mercury data (unfiltered and filtered) for the passive fen treatment and control system fens are presented in Tables 3 and 4. Methyl mercury data (unfiltered and filtered) for these same systems are presented in Tables 5 and 6. All results are within applicable federal (and provincial) guidelines for the protection of aquatic life.

Total mercury concentrations in 2011, as in previous years, were generally comparable between the effluent treatment fen station (NEF), and the two control fen stations (SEF and NWF) for unfiltered and filtered samples (Tables 3 and 4).

Results for methyl mercury in 2011 were similar to those of previous years (Tables 5 and 6), and while still meeting federal and provincial guidelines for the protection of aquatic life, concentrations of methyl mercury were decidedly higher in the NEF compared with either of the two control fens.

Methyl mercury concentrations in the NEF are believed to be elevated as a result of increased sulphate levels, as described in the 2008 Mercury Performance Monitoring report. Sulphate reducing bacteria utilize sulphate as a nutrient, and hence higher sulphate levels tend to promote increased rates of conversion from total mercury to methyl mercury (Ullrich et al. 2001; Jeremiason et al. 2006). Sulphate concentrations in the NEF during 2011 averaged 70.0 mg/L, which is above the optimal range of 20 to 50 mg/L for mercury methylation, but still within a range that would be expected to actively encourage mercury methylation. Samples from control fen sites typically contain < 0.1 mg/L of sulphate. Sulphates discharged to the NEF are believed to derive from previous excavation discharges as well as from treated wastewater from the camp sewage plant, and other potential sources. The increased mercury methylation rate observed for the NEF is therefore a localized phenomenon, and is not related to muskeg drying effects.

Ribbed Fen Systems

The water quality of general site area drainage is monitored on a quarterly basis at three ribbed fen stations located on or near the Victor Mine site (Stations MS-V1-R, MS-V2-R, and MS-V3-R), as well as at several more remote sites (Figures 1 and 2). Ribbed fen sites were selected for surface water quarterly monitoring because ribbed fens, more than other muskeg types, tend to collect water from surrounding drainages and therefore provide the most representative data on overall site drainage.

Quarterly water sample collection from the suite of ribbed fen sites was initiated in mid-2007, and has been carried out since, except where prevented by frozen ground conditions (Table 7). However, due to confusion at the Mine site over the need to collect both peat pore water and surface water samples from ribbed fens, only peat pore water samples were collected in 2007 and 2008. C. of A. #3960-7Q4K2G provides for collecting peat pore water samples from all muskeg monitoring stations, including ribbed fens, on an annual basis; and collecting surface water samples from ribbed fen stations, only, on a quarterly basis. Sample collection protocols were remedied in 2009 in accordance with C. of A. requirements.

In addition, to assist with data interpretation De Beers collects samples from these same ribbed fen stations for the analysis of chloride, conductivity, nitrate, dissolved organic carbon, pH, sulphate, total phosphorus, calcium, iron, magnesium and sodium (Table 8). The only data of note are high values of chloride and sodium at station MS-8-R during the early years which rapidly dropped off in 2009 and have remained relatively low ever since. The elevated concentrations in 2007 and 2008 indicate active groundwater up-welling which likely ceased subsequently due to well field dewatering and reversing groundwater gradients.

Total and methyl mercury sample results for the ribbed fen stations are shown in Tables 7a and 7b for 2007 through 2011. The data show low concentrations of both total and methyl mercury, with no increasing or decreasing trends. MS-V(3)-R showed a somewhat elevated methyl mercury concentration for the October 2011 sample, but MS-13-R (one of the two remote control stations) also showed somewhat elevated methyl mercury concentrations. MS-V(3)-R is located near to the Victor site, but on the south side of the Nayshkootayaow River.

Granny Creek System

Upstream and downstream total and methyl mercury concentration data for the Granny Creek system are provided in Tables 9 through 12. Sampling locations are shown in Figure 3. Average total mercury concentrations for the four stations for 2011 varied from 2.16 to 2.45 ng/L for unfiltered samples, and from 1.38 to 1.62 ng/L for filtered samples (Tables 9 and 10). These values are well within the 26 ng/L CEQG value for the protection of aquatic life. Filtered sample results for total mercury, averaged over 2011, are similar for upstream and downstream samples from both creek branches (Table 10). The graphs attached to Tables 9 and 10 also show that while total mercury concentrations can vary substantively throughout the year, due to seasonal and hydrological effects, there are no evident long-term trends in the comparison of stations for either North or South Granny Creeks, for stations upstream or downstream of the developed areas of the mine site.

Methyl mercury concentrations for unfiltered and filtered samples, from upstream and downstream South and North Granny Creek stations, are shown in Tables 11 and 12. The values are again variable, depending on seasonal and hydrologic influences. However, unlike previous years where there was no evident trend between upstream and downstream stations, in 2011 the downstream braches of both creeks showed elevated methyl mercury concentrations in some months (Tables 11 and 12). While elevated methyl mercury concentrations are noted in downstream Granny Creek waters in some months, these elevated values are still well below the CEQG value of 4 ng/L.

Downstream increases in Granny Creek methyl mercury appear to be related to sulphate drainages associated with the mine site area. These drainages occur in association with the NEF, the mine rock stockpile, the coarse PK stockpile, and other stockpiles around the site; and are not believed to be linked to muskeg dewatering effects, as all available evidence shows that the peat horizons in the general mine site area continue to be saturated (AMEC 2012). Sulphate drainage effects are localized.

Nayshkootayaow and Attawapiskat Rivers

Total and methyl mercury results for the Nayshkootayaow and Attawapiskat Rivers are shown in Tables 13 and 14. Sample locations are shown in Figure 3. Graphical data are presented in Figure 4. All values are generally low, consistent across the stations, and well within CEQG values. Filtered results for all stations on the Nayshkootayaow and Attawapiskat Rivers were generally comparable and well within the range of historical data for the respective stations.

3.4 Condition 6(8) (d) – Annual Analysis of Well Field Discharge

Starting in November 2007, in accordance with Condition 6(3) of C. of A. #8700-783LPK, dated December 11, 2007, and Condition 6(3) of Amended C. of A. #4111-7DXKQW, dated October 3, 2008, as well as Condition 6(3) of Amended C. of A. 3960-7Q4K2G, dated March 13, 2009, De Beers initiated monthly monitoring of total and methyl mercury concentrations in the well field discharge. Sampling was initiated proactively in advance of the December 2007 C. of A. issue date. All values for the period of November 2007 to December 2011 have remained low (below CCME guidelines) for both total and methyl mercury, as shown in Table 15. Filtered total and methyl mercury concentrations in the well field discharge have thus far, on average, been below background concentrations measured in the Attawapiskat River as shown in Table 13 and 14, and there are no evident temporal trends in the data with the possible exception of a weakly expressed, slight decline in total mercury values (Table 15).

Quarterly total and methyl mercury sampling results for operating individual wells are shown in Tables 16 and 17, respectively. Wells VDW-11 and VDW-22 continued to show the highest total mercury concentrations. The very high total mercury concentration of 125.15 ng/L observed for the October 2011 sample from VDW-11 is a result of a sediment pulse in the sample, or the value is anomalous, as the filtered sample for this date shows a total mercury concentration of 0.73 ng/L. Sediment pulses can occur when wells are turned on and off. Methyl mercury concentrations were uniformly low across all wells (Table 17).

Methyl mercury concentrations were all low in the individual wells, with the exception of the unfiltered value for VDW-15 in April 2011. The filtered value for this well and sampling date was low being <0.01 ng/L, suggesting a sediment pulse in the total methyl mercury sample.

3.5 Condition 6(8) (e) – Small Fish Mercury Body Burdens

Small-bodied fish species are to be collected annually from area receiving waters (North Granny Creek, South Granny Creek, Tributary 5A, Nayshkootayaow River (upstream of Tributary 3 and downstream of Granny Creek) and the Attawapiskat River (upstream of the mine site, approximately 500 m downstream of the well-field discharge and approximately 2 km downstream of the well-field discharge). Sampling locations in the Attawapiskat River upstream of the mine site, in the Nayshkootayaow River upstream of Tributary 3, as well as Tributary 5A are expected to serve as reference areas to near-field and far-field areas located downstream of the mine site and discharge locations.

The sample locations for small-bodied fish from 2007 to 2011 are shown in Figure 5. Small-bodied fish were collected from these locations using the techniques of electroshocking, minnow trapping and seine netting where applicable. Small-bodied fish were captured at these locations in relatively moderate abundances with reasonable effort with all sampling techniques in 2011. A single common sentinel species was not available at each sampling location. The presence of Pearl Dace (*Margariscus margarita*) was adequate to allow for comparisons between North Granny Creek, South Granny Creek and Tributary 5A. A second species, Trout-Perch (Percopsis omiscomaycus), was used to compare upstream and downstream Attawapiskat River locations as well as Nayshkootayaow River locations. Pearl Dace was captured at five of the eight locations sampled in 2010 and 2011 and therefore provides some level of comparability across the study area. Total species-specific catch data for each location are summarized in Tables 18, 19 and 20 for electroshocking, minnow trapping and seine netting respectively. A total of 1236 fish of the two sentinel species were captured and 561 were submitted for analysis of mercury body burden in 2011. The catch of each species was greater than 20 per site in all cases and therefore great enough to provide statistical comparison between sample areas for 2011. Lower sample sizes of Pearl Dace were obtained in previous sampling programs (2008 and 2009) and thus provided slightly lower potential for between year comparisons.

Mercury body burden primary comparisons between sample areas were made using the species as summarized in Table 21. At time of capture fish were identified to species and measured for length (fork and total) and wet weight. Fish used for the mercury study were immediately frozen after processing.

In the laboratory, individual samples were thawed and sub-sampled for dorsal muscle on which total mercury analysis was completed. A small mass was retained for oven-drying, and a minimum of two wet samples (<0.5 g wet weight each) were used for analyses. Remaining sample, if any, was kept frozen for replicate analyses if required. Samples were analyzed and reported as wet weight as per standard methods. Analysis was by thermal decomposition and atomic absorption detection using a Milestone DMA-80 as per the requirements of USEPA Method 7473. Calibration and instrument performance were verified through the analysis of various fish tissue standard reference materials.

Granny Creek System

Pearl Dace mercury body burden levels were compared between North Granny Creek (NGC), South Granny Creek (SGC) and Tributary 5A (ST-5A) for samples collected during July and August of 2011. (Tables 18 to 20). Tributary 5A is the selected control system for comparisons with the Granny Creek system.

Mean total length (mm), wet weight (g) and total mercury concentration (µg/g = ppm) values are summarized for Pearl Dace in Table 22. Mean length and weight were statistically different between NGC, SGC and ST-5A in 2011 (ANOVA, $\alpha = 0.05$). and Pearl Dace showed a greater mercury body burden concentration at NGC (0.350 µg/g) than at SGC (0.157 µg/g) or ST-5A (0.109 µg/g) in 2011.

Differences in Pearl Dace mean body burden values were statistically significant (ANOVA, $p < 0.001$) (Figure 6; Table 23). Post-hoc comparison indicated that mean body burden values were significantly different between NGC compared to SGC and ST-5A. The body burden value for NGC was 3 times greater than that of ST-5A (Figure 6). Total mercury concentrations in tissues were not significantly different between SGC and ST-5A in 2011.

A between year comparison was made by ANOVA for each of NGC, SGC and ST-5A and the results are shown in Table 24. SGC showed no statistical difference between years for total mercury body burden levels. However, NGC Pearl Dace showed a change in mercury body burdens between years ($p < 0.001$) with 2011 showing no similarity to any other year. Mean total mercury was reduced from 0.176 µg/g in 2008 to 0.066 µg/g in 2009, yet increased to 0.259 µg/g in 2010 with a further increase to 0.350 µg/g in 2011 (Table 22; Figure 6). NGC had the lowest mean body burden value of the three areas in 2009, yet the highest in 2008, 2010 and 2011.

The relationship between total mercury concentration and total length for Pearl Dace is shown in Figure 7 for each sample location from 2008 to 2011. The relationships were positive (i.e larger fish contained more mercury) for all locations and years, yet slopes were variable between areas and years. Extrapolation of body burden levels for a standardized total length for Pearl Dace is summarized in Table 25. For Pearl Dace the standardized total length for comparison was 60 mm. The extrapolated values for Pearl Dace remained relatively consistent from 2008 to 2010 for SGC and ST-5A with a slight increase in mercury concentration from 2010 to 2011 at these areas. NGC shows greater variability between years with 2011 showing the greatest extrapolated value to date (0.326 µg/g); however, this relationship is not statistically significant.

Summary and Discussion

Mean body burden mercury values for NGC were greater than for either ST-5A or SGC in 2011. This is in contrast to 2009 when SGC had the greatest mean mercury body burden value. However, a similar result to 2011 was observed for 2008 and 2010. The relationship between total mercury concentration and total length showed variability between areas and between years for Pearl Dace, however, variable intercept and positive slope values for relationships indicate annual changes in young-of-the year mercury body burdens and subsequent trajectories of methyl mercury (the form most easily taken up by fish) accumulation.

To further assess the basis for observed differentials in small-bodied fish mercury body burden concentrations between the two systems, AMEC also compared background methyl mercury water quality concentrations in Granny Creek and Tributary 5A. Data for the Granny Creek system were taken from downstream stations dating back to mid-2006 (Stations G2 and G6, Figure 3). These stations are within the potential influence of mine site discharges or well field dewatering effects as well as in the vicinity of the sampling areas for small-bodied fish. Results are shown in Table 26. The data in Table 26 for Granny Creek are variable, responding to seasonal and hydrologic influences, but show no long-term trends; however, there is some suggestion of a possible increase in downstream Granny Creek methyl mercury concentrations in some months as per Table 11 and 12, and as discussed in Section 3.3. Overall the longer-term data presented in Table 26 show that the Granny Creek system, and North Granny Creek in particular has consistently shown higher methyl mercury values compared to Tributary 5A, including in 2006-2007 prior to the commencement of mining, suggesting that background methyl mercury concentrations are naturally elevated in North Granny Creek and South Granny Creek (in decreasing order) compared to Tributary 5A.

Data provided by Orihel et al. (2007) suggest a direct linear relationship between mercury concentrations in water and mercury body burden concentrations in small fish. The differences in background methyl mercury concentrations between Granny Creek and Tributary 5A systems would therefore appear to be sufficient in 2008, 2010 and 2011 to account for the observed results, but are less convincing for the 2009 values.

Annual increases, in Pearl Dace body burden levels, from the preceding year (i.e. South Granny Creek from 2008 to 2009 and North Granny Creek from 2009 to 2010 to 2011) do not necessarily reflect the changes observed in mean methyl mercury water quality concentrations for each of these tributaries between years. However, the relative increase in methyl-mercury water quality concentration in North Granny Creek from 2010 to 2011 is reflected in the increase in fish body burden levels for mercury in the same water body. Continued monitoring in subsequent years may provide further insight into observed body burden value differentials between the North and South Granny Creek and Tributary 5A.

Nayshkootayaow and Attawapiskat River Systems

Pearl Dace mercury body burden levels were compared between the Nayshkootayaow River upstream of Tributary 3 (NAY-US-T3) and the Nayshkootayaow River downstream of Tributary 6 (Granny Creek) (NAY-DS-T6) in 2011 (Figure 6). In total 40 Pearl Dace were captured at NAY-US-T3 and 41 at NAY-DS-T6 (Tables 18 and 22). NAY-US-T3 is considered the reference area sample location for this comparison as it is upstream of the mine site influence, while NAYDS- T6 is downstream of the mine and the Granny Creek system.

For 2011 Trout-Perch mercury body burden levels were compared between NAY-US-ST3, NAYDS- T6, the Attawapiskat River approximately 9 km upstream of the mine site (ATT-US), the Attawapiskat River 250 m downstream of the well-field discharge (ATT-NF), and the Attawapiskat River 2.5 km downstream of the well-field discharge (ATT-FF) (Figure 5). The total number of Trout-Perch captured was 543 and catch per sampling location is summarized in Table 18.

<u>Pearl Dace</u>

Mean total length (mm), wet weight (g) and total mercury concentration (μg/g) values are summarized for Pearl Dace in Table 22 and Figure 6. Mean length and weight were similar between locations NAY-US-T3 and NAY-DS-T6 (ANOVA, $\alpha = 0.05$). Total mercury body burden was similar between Nayshkootayaow River sampling locations with the NAY-US-T3 and NAY-DS-T6 having values of 0.064 and 0.070 µg/g respectively (ANOVA, p = 0.99; Table 23).

A comparison of mean mercury body burden values between years (2009 to 2011) at NAY-US-ST3 showed no significant difference (p = 0.27) between 2010 and 2011, yet 2009 was significantly different (p < 0.001) compared to both 2010 and 2011. However, NAY-DS6 Pearl Dace were significantly different with respect to mercury values (ANOVA, p < 0.001) with 2011 having a similar value to 2008 and 2010 (0.059, 0.087 and 0.070 µg/g respectively)(Table 24; Figure 6). Mean mercury body burden values for Nayshkootayaow River sample areas have remained less than 0.10 µg/g from 2008 to 2011.

Trout-Perch

Mean total length (mm), wet weight (g) and total mercury concentration (µg/g) values are summarized for Trout-Perch in Table 27 for 2008 to 2011. Mean length and weight were not similar between all sample locations in 2011 (ANOVA, α = 0.05). ATT-US and ATT-FF had mean total lengths greater than ATT-NF (67.37, 75.29 and 53.03 mm, respectively). Trout-Perch captured at NAY-US-ST3 were also larger than those captured at NAY-DS6 (54.93 vs. 35.02, respectively;Table 27).

In 2011 Trout-Perch mean mercury body burden levels were similar for the near-field sampling area (ATT-NF; 0.065 µg/g) and the upstream reference area (ATT-US; 0.062 µg/g). The mean mercury body burden level for ATT-FF (0.075 µg/g) was similar to ATT-NF, but significantly different compared to ATT-US (ANOVA, p < 0.001). Mercury body burden levels for Trout-Perch from the Nayshkootayaow River were significantly greater (ANOVA, α = 0.05) at the reference area NAY-US-ST3 (0.087 µg/g) compared to NAY-DS6 (0.051 µg/g) in 2011 (Tables 23 and 27; Figure 8).

A between year comparison was made by ANOVA for each of Attawapiskat and Nayshkootayaow River sample areas and the results are shown in Table 24. Each of the sample areas on the Attawapiskat River had a significant change in mercury body burden levels between years (ANOVA, α = 0.05). Mean values for ATT-US were similar in 2008 and 2010 (0.096 and 0.106 µg/g respectively) while 2009 had a value of 0.058 µg/g, which was significantly lower than values for both 2008 and 2010. Mean tissue mercury concentration for 2011 (0.062 µg/g) was similar to the value observed in 2009 and showed a decrease from 2010 levels.

Mercury concentrations in Trout-Perch from ATT-NF were significantly reduced between 2009 (0.196 µg/g) and 2010 (0.074 µg/g) and further reduced in 2011 (0.065 µg/g). Similarly, mercury values from Trout-Perch sampled at ATT-FF were significantly reduced from 2008 (0.164 µg/g) to 2009 (0.096µg/g) with the value staying consistent in 2010 (0.097 µg/g) and further reduced in 2011 (0.075 µg/g)(Table 24 and 27; Figure 8).

No significant change in mercury body burden values was evident for Trout-Perch at NAY-US-ST3 between years, yet NAY-DS6 had a significant reduction in the mean mercury body burden concentration for this species from 0.176 µg/g in 2008 to 0.098 µg/g in 2009. This mercury level stayed relatively consistent for 2010 at 0.108 µg/g and was reduced to 0.051 µg/g in 2011 (Table 24 and 27; Figure 8).

The relationship between total mercury concentration and total length for Trout-Perch is shown in Figure 9 for each sample location from 2008 to 2011. Relationship slopes were variable between areas and years. Extrapolation of body burden levels for a standardized total length for Trout-Perch is summarized in Table 25. For Trout-Perch the standardized total length for comparison was 50 mm. The extrapolated values showed annual variability for each of the sampling areas with the mercury value for ATT-US more than doubling between 2009 (0.052 µg/g) and 2010 (0.111 µg/g) with a reduction to 0.044 µg/g in 2011, while ATT-NF had an extrapolated mercury value reduced by a half between 2009 and 2010 (0.146 µg/g to 0.074 µg/g, respectively) with a reduction in 2011 to 0.044 µg/g. Results for the ATT-FF sampling area indicate a consistent body burden level for Trout-Perch through 2008 to 2010 (approximately 0.1 µg/g) with a marked reduction in 2011 to 0.039 µg/g.

Summary and Discussion

Mercury body burden levels in Pearl Dace were equal between both upstream and downstream Nayshkootayaow River locations in 2011 and have remained relatively consistent from year to year.

Trout-Perch body burden values were relatively similar across all sites that were sampled between the Attawapiskat River and the Nayshkootayaow River in 2011. In 2011 the mean mercury body burden concentration at the near-field area was approximately equal to the reference area and similar to the far-field area, which is dissimilar to previous years of study which saw the near-field area producing Trout-Perch with significantly greater concentration of total mercury. Methyl mercury concentrations in water samples were virtually unchanged along the length of the Attawapiskat River (Table 14) and therefore variability in body burden levels of Trout-Perch do not relate to water quality mercury concentrations and are not fully understood.

Extrapolation of body burden levels for a standardized total length for Trout-Perch showed a decrease across all Attawapiskat River sampling areas between 2011 and 2010. A similar decrease in body burden levels was observed in the Nayshkootayaow River downstream of Granny Creek, despite a general increase in total mercury levels for a Trout-Perch of 50 mm at the upstream reference location.

3.6 Condition 6(8) (e) – Sport Fish Mercury Body Burdens

As per C of A #3960-7Q4K2G, large-bodied sport fish are to be sampled every three years from the Attawapiskat River, Nayshkootayaow River and Monument Channel to investigate mercury body burden concentrations. There were no sport fish (large fish) sample collections required or planned for 2011. The next collection period for sport fish is scheduled for 2013.

4.0 REPORTING – CONDITION 6(9) DATA

4.1 Annual Analysis of Peat Pore Water

As described in Section 3.2, and as a general observation, concentrations of total mercury in the 2011 peat horizon water samples were not markedly higher or lower than the range of data for previous years. Statistical analyses of total and methyl mercury peat pore water concentrations are presented in Table 28 for the: S-1 stations (Table 28a), the S-2 stations (Table 28b), the S-7 stations (Table 28c), the S-8 stations (Table 28d), the S-9(1) stations (Table 28e), the S-9(2) stations (Table 28f), and the S-V stations (Table 28g). As was the case for previous years, none of the 2011 results for total or methyl mercury were significantly different for location effect compared with the S-13 / S-15 background control stations using Two-Way Analysis of Variance at $\alpha = 0.05$. The data analyses presented in the Table 28 series tables is based on the August 2011 data. A separate analysis was completed for peat horizon samples using the September / November data instead of the August samples where re-sampling was carried out. Results of this separate analyses (not shown) also showed no statistically significant differences between near and mid-field sites and the (S-13 / S-15) control stations.

General site inspections and flyovers, showed no evidence of any meaningful peatland “drying out”, in the area of well field induced depressurization of the underlying upper bedrock aquifer for the 2011 season. A few localized areas affected by shallow bedrock formations continue to show some dewatering effects, but these are very localized and in some cases intermittent from year to year. More detailed studies on this aspect have carried out as part of the Natural Sciences and Engineering Research Council (NSERC) research program on Victor area peatland hydrology and mercury chemodynamics, by researchers from the University of Waterloo, the University of Western Ontario and Queens University.

4.2 Annual Analysis of Mineral Soil Pore Water

With one minor exception (S-2) shallow and deep clay pore water samples show comparable total mercury values compared with 2007 to 2010 (no data 2008) results, with most samples yielding a detect or non-detect reading (Table 1).The S-2 station yielded a value of 3.01 ng/L for the shallow clay, for the August sample, which is not outside the range of values closer to the surface horizon of this station. The September sample for this same station was much lower (Table 1). Observed methyl mercury values in 2011 clay pore water samples were all low, and generally comparable to results from previous years. Total mercury in shallow bedrock water samples showed no real trend.

4.3 Annual Analysis of Surface Waters

Statistical analyses of total and methyl mercury concentrations in surface water samples are presented in Table 29. Monthly analyses of North and South Granny Creek total mercury concentrations for upstream and downstream samples show no statistical differences (Table 29a).

Methyl mercury concentrations in upstream, mid-stream and downstream reaches of North and South Granny Creeks were also not statistically significant, due to high data variability and small sample sizes, but the data are suggestive of a possible downstream increase in methyl mercury concentrations for the July and October samples (Table 29b). As per section 3.3, it is likely that methyl mercury dynamics in peatlands around the mine site are being influenced by elevated sulphate levels, which increase the activity of methylating bacteria. Any such increases in methyl mercury concentrations in downstream Granny Creek waters are not related to mine dewatering.

Data for the Nayshkootayaow and Attawapiskat Rivers show no upstream or downstream trends, and none of the results are statistically significant for either total or methyl mercury (Tables 29c and 29d).

4.4 Trend Analysis of Well Field Water Discharge

Monthly well field discharge data are presented in Table 15. Similar to previous years from 2009 to present both total and methyl mercury remain on average, lower than for comparable Attawapiskat River background water concentrations (Tables 13 and 14), and there are no evident trends in the data (Table 15).

4.5 Annual Analysis of Fish Mercury Body Burdens

For discussions regarding comparisons of fish mercury body burdens between geographical locations in 2011 please refer to Section 3.5. Small-bodied fish species showed some variability between years. Extrapolation of body burden levels for a standardized total length for Pearl Dace remained relatively consistent from 2008 to 2011 in South Granny Creek and Tributary-5A with a slight decrease in mercury concentration from 2010 to 2011 at these areas. However, North Granny Creek had greater variability between years with 2011 showing a marked increase in 2011 over 2009 and 2010 levels. Body burden levels for a standardized total length for Trout-Perch showed a decrease at all Attawapiskat River areas in 2011 compared to 2010.

5.0 CONCLUSIONS

Peat Pore Waters

- Total and methyl mercury concentrations in peat pore waters remained considerably lower than the respective CEQG values of 26 ng/L for total mercury and 4 ng/L for methyl mercury, and there are no evident trends in the data.

- Statistical analysis of peat pore waters showed no significant differences, for total or methyl mercury, between peat complexes located near to and at mid-distances from the mine site, compared with more remote control stations.

Surface Waters

- Total mercury concentrations measured in proximal area fen systems (NEF, SEF and HgCon) showed no evident overall trends. Data collection from the SWF was discontinued partway through 2009 so no conclusions could be drawn regarding this fen.

- Methyl mercury concentrations in the NEF, which receives (or received) various site effluents, showed elevated methyl mercury concentrations compared with the control fens (SEF and HgCon). Elevated methyl mercury concentrations in the NEF are likely attributed to sulphate-rich effluent waters which stimulate the mercury methylation process, and are not a function of well field dewatering effects.

- Total and methyl mercury concentrations measured in area surface waters (Granny Creek, the Nayshkootayaow River and the Attawapiskat River) show mercury concentrations well below the applicable CEQG values of 26 ng/L and 4 ng/L, respectively, and there are no evident long-term trends in the data, with the possible exception of the downstream Granny Creek samples where methyl mercury concentrations appear to be increasing in some months, but the data are highly variable and inconclussive. Any such increase in methyl mercury concentrations is likely attributable to sulphate-rich effluent waters which stimulate the mercury methylation process, as per the above, and not a function of well field dewatering effects.

- Well field total and methyl mercury concentrations are well below CEQG values and are also generally below Attawapiskat River background values upstream of the mine discharge, and there are no evident long-term trends in the data.

Fish Mercury Body Burdens

- Small-bodied species (Pearl Dace) samples collected from North Granny Creek showed significantly elevated concentrations of mercury compared to South Granny Creek and the Tributary 5A reference sample location in 2011. The difference in body burden mercury concentrations between the Granny Creek system and Tributary 5A is believed to be primarily a function of naturally higher methyl mercury concentrations in the Granny Creek system, and especially North Granny Creek; as well as a result of sulphate enrichment of local mine site area peatlands which enhances mercury methylation. Fish body size differences do not appear to be a contributing factor for the observed differences in body burden mercury concentrations.

- Pearl Dace samples collected from the Nayshkootayaow River upstream of Tributary 3 and downstream of the Granny Creek confluence had similar mercury body burden levels.

- The Attawapiskat upstream reference area showed a marked reduction in mercury body burden concentration in small-bodied fish samples from 2010 to 2011.

- Trout-Perch samples collected from the Attawapiskat River near-field receiving water area had approximately equal concentrations of mercury compared to the upstream reference area and similar levels to the far-field receiving water area in 2011. This was in contrast to the 2009 results which indicated an elevated level of mercury in the near-field area and 2010 which indicated elevated levels at the reference area, further demonstrating the annual variability in the data at the different stations.

6.0 RECOMMENDATIONS

The mercury monitoring program is both extensive and robust, and it is recommended that the monitoring program continue to be carried out in its current form.

7.0 REFERENCES

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TABLES

TABLE 1
MUSKEG MONITORING PROGRAM - ANNUAL MERCURY RESULTS - 2007-2011
(late summer / fall sampling - Data in ng/L or parts per trillion)

Cluster Location	Substrate/Condition	Well Name	GPS Code	Sample Code	Total Mercury (Filtered)						Methyl Mercury (Filtered)					
					2007	2008	2009	2010	2011 (Aug)	2011 (Sep/Nov)	2007	2008	2009	2010	2011 (Aug)	2011 (Sep/Nov)
S-1	Bedrock (Bioherm)	MS-1-BR	ES1-BR	ES1BDR	1.30	ns	0.27	Detect	Non-Detect	Detect	Detect	ns	0.06	Detect	Non-Detect	Non-Detect
	Clay - Deep	MS-1-CL(1)	ES1-BR	ES1CLD	1.47	ns	0.18	Detect	Non-Detect	Detect	ns	ns	0.03	Detect	Non-Detect	Non-Detect
	Clay - Shallow	MS-1-CL(2)	ES1-BR	ES1CLS	0.27	ns	0.16	Detect	Non-Detect	Detect	Detect	ns	0.03	0.04	Detect	Non-Detect
	Peat - Domed Bog	MS-1-D	ES1D	ES1D	2.22	1.93	0.40	0.79	0.37	0.79	0.02	0.07	0.10	0.06	0.08	0.10
	Peat - Flat Bog	MS-1-F	ES1F	ES1F	2.73	3.04	0.83	1.47	1.18	1.17	Detect	0.18	0.19	0.14	Non-Detect	0.10
	Peat - Horizontal Fen	MS-1-H	ES1H	ES1H	na	1.77	0.36	0.53	0.30	0.51	na	na	0.10	0.04	Detect	Detect
	Peat - Ribbed Fen	MS-1-R	ES1R	ES1R	1.81	2.27	0.49	1.24	0.91	ns	0.02	0.07	0.06	0.06	0.05	ns
S-2	Bedrock (Bioherm)	DAS-1	EDAS-1	EDAS-1	0.23	ns	0.24	0.45	Detect	ns	Non-Detect	ns	0.05	0.02	0.07	ns
		MS-2BR	ES2-BR	ES2BR	0.68	ns	ns	0.38	Detect	ns	Non-Detect	ns	ns	0.14	0.04	ns
	Clay - Deep	MS-2-CL(1)	ES2-BR	ES2CLD	ns	ns	0.36	Detect	Detect	Detect	ns	ns	0.13	0.03	0.03	Detect
	Clay - Shallow	MS-2-CL(2)	ES2-BR	ES2CLS	0.98	ns	0.17	Detect	3.01	Detect	Non-Detect	ns	0.04	0.02	Detect	Non-Detect
	Peat - Domed Bog	MS-2-D	ES2D	ES2D	1.98	2.15	0.51	1.25	4.69	0.74	Non-Detect	0.02	0.04	0.05	Detect	0.02
	Peat - Flat Bog	MS-2-F	ES2F	ES2F	3.12	3.05	2.35	2.74	5.79	1.18	Non-Detect	0.10	0.07	0.11	0.10	0.05
	Peat - Ribbed Fen	MS-2-R	ES2R	ES2R	1.56	2.02	0.38	1.43	4.6	0.64	Non-Detect	0.04	0.09	0.08	0.06	0.07
S-7	BR Shallow		NS7-BR	NS7BRS	1.02	ns	0.53	0.34	0.35	0.52	0.09	ns	0.05	0.05	0.05	0.12
	BR Intermediate		NS7-BR	NS7BRI	1.93	ns	0.23	Detect	Detect	ns	0.04	ns	0.02	0.05	Detect	ns
	BR Deep		NS7-BR	NS7BRD	2.34	ns	0.12	0.39	Detect	Detect	0.03	ns	0.03	0.03	0.03	0.03
	Clay - Deep	MS-7-CL(1)	NS7-CL	NS7-CLD	0.59	ns	0.25	Detect	Detect	Non-Detect	Non-Detect	ns	0.02	0.05	Non-Detect	Non-Detect
	Clay - Intermediate		NS7-CL	NS7-CLI	0.41	ns	0.13	Detect	Detect	Non-Detect	0.02	ns	0.02	0.02	Detect	Detect
	Clay - Shallow	MS-7-CL(2)	NS7-CL	NS7-CLS	0.70	ns	0.10	Detect	0.96	Non-Detect	Detect	ns	0.02	Detect	0.03	Non-Detect
	Peat - Domed Bog	MS-7-D	NS-7D	NS-7D	0.72	1.04	0.29	0.62	0.74	0.58	Detect	Detect	0.04	0.02	0.04	0.03
	Peat - Flat Bog	MS-7-F	NS-7F	NS-7F	1.23	1.61	0.27	0.85	1.09	0.95	Detect	Non-Detect	0.05	Detect	Detect	Non-Detect
	Peat - Horizontal Fen	MS-7-H	NS-7H	NS-7H	1.24	2.18	0.68	1.35	0.61	0.95	0.02	0.06	0.10	0.04	0.03	0.06
	Peat - Ribbed Fen	MS-7-R	NS-7R	NS-7R	0.62	0.52	0.12	0.44	0.36	ns	Detect	Detect	0.03	0.02	Detect	ns
S-8	Bedrock (Bioherm)	MS-8-BR(1)	NS8BR1	NS8B1S	7.46	ns	1.56	7.14	ns	ns	0.03	ns	0.03	0.13	ns	ns
	Bedrock (Bioherm)	MS-8-BR(2)	NS8BR1	NS8B1I	4.36	ns	ns	0.33	ns	ns	Non-Detect	ns	ns	0.05	ns	ns
			NS8BR1	NS8B1D	1.83	ns	ns	ns	ns	ns	Non-Detect	ns	ns	ns	ns	ns
	Clay - Deep	MS-8-CL(1)	NS8CL1	NS8C1D	0.31	ns	0.24	Detect	ns	ns	Detect	ns	0.02	Detect	ns	ns
	Clay - Middle	MS-8-CL(2)	NS8CL1	NS8C1I	ns	ns	0.26	ns	0.32	0.47	ns	ns	0.04	ns	0.10	0.06
	Clay - Shallow	MS-8-CL(3)	NS8CL1	NS8C1S	0.89	ns	0.28	0.50	Detect	Detect	0.03	ns	0.02	0.06	0.08	0.03
	Clay - Deep	MS-8-CL(4)	NS8CL2	NS8C2D	0.14	ns	0.16	Non-Detect	Detect	ns	Detect	ns	0.02	Non-Detect	Non-Detect	ns
	Clay - Middle	MS-8-CL(5)	NS8CL2	NS8C2I	0.49	ns	ns	ns	ns	ns	Non-Detect	ns	ns	ns	ns	ns
	Clay - Shallow	MS-8-CL(6)	NS8CL2	NS8C2S	0.33	ns	0.59	Detect	Detect	0.17	0.08	ns	0.02	0.03	0.04	Detect
	Peat - Domed Bog	MS-8-D	NS8-1D	NS8-1D	1.13	1.49	0.38	1.66	1.2	ns	Non-Detect	Detect	0.06	0.29	0.11	ns
	Peat - Flat Bog	MS-8-F	NS8-1F	NS8-1F	1.91	2.85	1.46	2.76	4.34	3.24	Non-Detect	0.08	0.31	0.14	0.16	0.25
	Peat - Horizontal Fen	MS-8-H	NS8-1H	NS8-1H	0.56	0.55	0.18	Detect	Detect	ns	Detect	Detect	0.07	0.02	Non-Detect	ns
	Peat - Ribbed Fen	MS-8-R	NS8-1R	NS8-1R	1.00	0.98	0.27	1.60	1.18	ns	Non-Detect	Detect	0.09	Non-Detect	0.02	ns
S-9(1)	Bedrock (Bioherm)	MS-9(1)-BR			ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
	Clay - Deep	MS-9(1)-CL(1)	SS9CL1	SS9C1D	0.66	ns	Detect	0.52	Detect	Detect	Detect	ns	Detect	Non-Detect	0.029	Non-Detect
	Clay - Shallow	MS-9(1)-CL(2)	SS9CL1	SS9C1S	1.03	ns	0.10	0.43	Detect	Detect	Detect	ns	0.07	0.02	0.03	Detect
	Peat - Domed Bog	MS-9(1)-D	SS9-1D	SS9-1D	0.77	0.77	0.27	0.58	Detect	ns	Detect	Non-Detect	0.17	Detect	Detect	ns
	Peat - Flat Bog	MS-9(1)-F	SS9-1F	SS9-1F	2.53	1.74	0.37	1.36	0.69	ns	Detect	0.04	0.05	0.05	Non-Detect	ns
	Peat - Horizontal Fen	MS-9(1)-H	SS9-1H	SS9-1H	2.65	2.06	0.45	1.01	0.71	0.9	0.02	0.05	0.11	0.03	0.04	0.03
	Peat - Ribbed Fen	MS-9(1)-R	SS9-1R	SS9-1R	0.72	1.26	0.22	0.47	0.42	ns	0.02	0.03	0.04	0.02	0.02	ns
S-9(2)	Bedrock (Bioherm)	MS-9(2)-BR			ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
	Clay - Deep	MS-9(2)-CL(1)	SS9CL2	SS9C2D	1.09	ns	0.30	0.38	Detect	Detect	0.01	ns	0.04	0.02	0.03	Non-Detect
	Clay - Shallow	MS-9(2)-CL(2)	SS9CL2	SS9C2S	0.44	ns	0.13	Detect	Non-Detect	Non-Detect	Non-Detect	ns	0.02	Detect	Detect	Detect
	Peat - Domed Bog	MS-9(2)-D	SS9-2D	SS9-2D	1.72	1.89	0.42	1.04	0.93	ns	Detect	0.02	0.02	Detect	Detect	ns
	Peat - Flat Bog	MS-9(2)-F	SS9-2F	SS9-2F	1.10	1.27	0.57	1.21	0.98	ns	Non-Detect	0.06	0.12	0.03	0.05	ns
	Peat - Horizontal Fen	MS-9(2)-H	SS9-2H	SS9-2H	0.80	0.59	0.30	Detect	Detect	ns	Non-Detect	Detect	0.08	0.02	Non-Detect	ns
	Peat - Ribbed Fen	MS-9(2)-R	SS9-2R	SS9-2R	1.29	0.90	0.33	0.72	5.16	Detect	Non-Detect	0.06	0.17	0.05	0.18	0.03
S-13	Bedrock (Bioherm)	MS-13-BR	WS13BR	WS13BS	2.57	ns	0.72	0.87	ns	ns	Non-Detect	ns	Detect	Non-Detect	ns	ns
			WS13BR	WS13BD	1.19	ns	ns	ns	ns	ns	Non-Detect	ns	ns	ns	ns	ns
	Clay - Deep	MS-13-CL(1)	WS13CL	WS13CD	0.42	ns	0.09	Detect	Non-Detect	Det/Non	0.03	ns	0.02	0.02	Detect	Det/Non
			WS13CL	WS13CI	1.48	ns	0.18	ns	Detect	Detect	0.04	ns	0.04	ns	Detect	Non-Detect
	Clay - Shallow	MS-13-CL(2)	WS13CL	WS13CS	0.50	ns	Detect	0.36	Detect	ns	0.02	ns	ns	Detect	Non-Detect	ns
	Peat - Domed Bog	MS-13-D	WS13-D	WS13-D	2.81	2.68	1.26	1.45	7.02	1.65	0.03	0.12	0.24	0.11	0.08	0.16
	Peat - Flat Bog	MS-13-F	WS13-F	WS13-F	1.60	2.79	0.92	1.30	1.83	ns	0.07	0.24	0.45	0.15	0.19	ns
	Peat - Horizontal Fen	MS-13-H	WS13-H	WS13-H	ns	0.57	0.35	0.42	0.31	ns	0.02	Detect	0.29	Detect	0.02	ns
	Peat - Ribbed Fen	MS-13-R	WS13-R	WS13-R	0.40	0.95	0.25	Detect	Detect	ns	0.13	Non-Detect	0.05	Detect	0.03	ns
S-15	Bedrock (Bioherm)	MS-15-BR	WS15BR	WS15BS	2.00	ns	2.34	2.74	2.46	ns	Detect	ns	0.37	0.03	Detect	ns
			WS15BR	WS15BD	0.58	ns	ns	ns	ns	ns	Detect	ns	ns	ns	ns	ns
	Clay - Deep	MS-15-CL(1)	WS15CL	WS15CD	is	ns	ns	0.59	ns	ns	Detect	ns	ns	0.04	ns	ns
			WS15CL	WS15CI	1.70	ns	ns	ns	ns	ns	Non-Detect	ns	ns	ns	ns	ns
	Clay - Shallow	MS-15-CL(2)	WS15CL	WS15CS	0.69	ns	0.07	Detect	0.33	Detect	Detect	ns	Detect	Detect	Non-Detect	0.037
	Peat - Domed Bog	MS-15-D	WS15-D	WS15-D	1.35	1.89	0.93	Detect	0.34	ns	Detect	0.04	0.78	0.02	0.05	ns
	Peat - Flat Bog	MS-15-F	WS15-F	WS15-F	2.66	2.55	0.30	0.35	1.92	ns	Non-Detect	0.07	0.17	Non-Detect	0.16	ns
	Peat - Horizontal Fen	MS-15-H	WS15-H	WS15-H	0.99	0.90	0.22	Detect	Detect	ns	ns	Detect	0.10	Detect	0.02	ns
	Peat - Ribbed Fen	MS-15-R	WS15-R	WS15-R	0.43	0.92	0.15	Detect	Detect	ns	0.02	0.02	Non-Detect	0.02	Detect	ns
S-V1	Peat - Domed Bog	MS-V(1)-D	-	NS-V-1D	1.96	0.60	0.18	0.53	0.49	ns	ns	Detect	0.02	0.02	0.03	ns
	Peat - Ribbed Fen	MS-V(1)-R	-	NS-V-1R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R
S-V2	Peat - Domed Bog	MS-V(2)-D	-	SS-V-2D	1.97	1.16	0.24	0.45	0.52	ns	ns	Detect	0.02	0.05	0.07	ns
	Peat - Ribbed Fen	MS-V(2)-R	-	SS-V(2)-R	0.59	0.60	0.13	0.85	Detect	ns	ns	Non-Detect	0.03	0.04	Detect	ns
S-V3	Peat - Domed Bog	MS-V(3)-D	-	SS-V-3D	0.72	0.61	0.49	0.60	5.20	1.17	ns	0.10	0.03	Detect	0.07	0.03
	Peat - Ribbed Fen	MS-V(3)-R	-	SS-V(3)-R	1.08	1.69	0.47	0.76	0.89	0.9	ns	0.02	0.04	0.02	Detect	0.03

Notes

na: not accessible
is: insufficient sample
ns: no sample

Non-Detect: <0.0054 ng/L
Detect: >0.0054 but ≤0.0169 ng/L

Near-field sites: S-2; S-8; S-V1; S-V2; S-V3
Mid-field sites: S-1; S-7; S-9(1); S-9(2)
Far-field sites: S-13; S-15

TABLE 2
MUSKEG MONITORING PROGRAM - ANNUAL MERCURY RESULTS - 2007-2011
(late summer / fall sampling - Data in ng/L or parts per trillion)

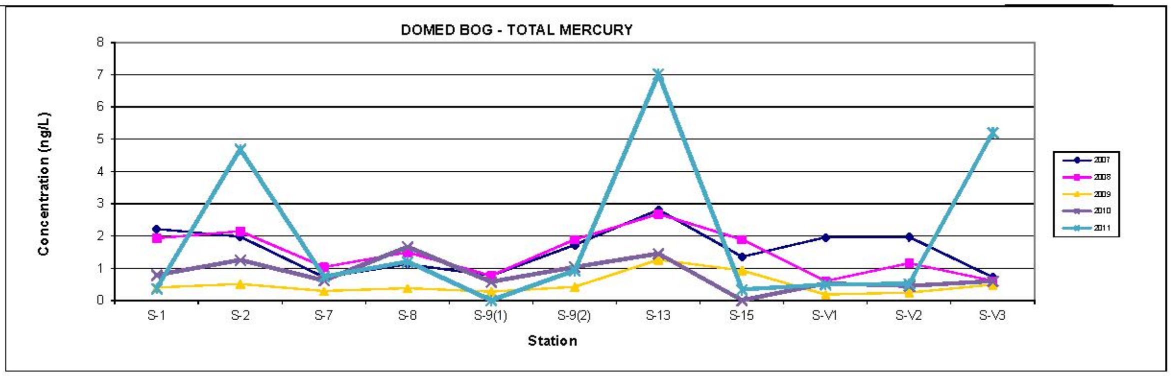
Cluster Location	Substrate/Condition	Total Mercury (Filtered)					Methyl Mercury (Filtered)				
		2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
S-1	Peat - Domed Bog	2.22	1.93	0.40	0.79	0.37	0.02	0.07	0.10	0.06	0.08
	Peat - Flat Bog	2.73	3.04	0.83	1.47	1.18	Detect	0.18	0.19	0.14	Non-Detect
	Peat - Horizontal Fen	na	1.77	0.36	0.53	0.30	na	na	0.10	0.04	Detect
	Peat - Ribbed Fen	1.81	2.27	0.49	1.24	0.91	0.02	0.07	0.06	0.06	0.05
S-2	Peat - Domed Bog	1.98	2.15	0.51	1.25	4.69	Non-Detect	0.02	0.04	0.05	Detect
	Peat - Flat Bog	3.12	3.05	2.35	2.74	5.79	Non-Detect	0.10	0.07	0.11	0.10
	Peat - Ribbed Fen	1.56	2.02	0.38	1.43	4.6	Non-Detect	0.04	0.09	0.08	0.06
S-7	Peat - Domed Bog	0.72	1.04	0.29	0.62	0.74	Detect	Detect	0.04	0.02	0.04
	Peat - Flat Bog	1.23	1.61	0.27	0.85	1.09	Detect	Non-Detect	0.05	Detect	Detect
	Peat - Horizontal Fen	1.24	2.18	0.68	1.35	0.61	0.02	0.06	0.10	0.04	0.03
	Peat - Ribbed Fen	0.62	0.52	0.12	0.44	0.36	Detect	Detect	0.03	0.02	Detect
S-8	Peat - Domed Bog	1.13	1.49	0.38	1.66	1.2	Non-Detect	Detect	0.06	0.29	0.11
	Peat - Flat Bog	1.91	2.85	1.46	2.76	4.34	Non-Detect	0.08	0.31	0.14	0.16
	Peat - Horizontal Fen	0.56	0.55	0.18	Detect	Detect	Detect	Detect	0.07	0.02	Non-Detect
	Peat - Ribbed Fen	1.00	0.98	0.27	1.60	1.18	Non-Detect	Detect	0.09	Non-Detect	0.02
S-9(1)	Peat - Domed Bog	0.77	0.77	0.27	0.58	Detect	Detect	Non-Detect	0.17	Detect	Detect
	Peat - Flat Bog	2.53	1.74	0.37	1.36	0.69	Detect	0.04	0.05	0.05	Non-Detect
	Peat - Horizontal Fen	2.65	2.06	0.45	1.01	0.71	0.02	0.05	0.11	0.03	0.04
	Peat - Ribbed Fen	0.72	1.26	0.22	0.47	0.42	0.02	0.03	0.04	0.02	0.02
S-9(2)	Peat - Domed Bog	1.72	1.89	0.42	1.04	0.93	Detect	0.02	0.02	Detect	Detect
	Peat - Flat Bog	1.10	1.27	0.57	1.21	0.98	Non-Detect	0.06	0.12	0.03	0.05
	Peat - Horizontal Fen	0.80	0.59	0.30	Detect	Detect	Non-Detect	Detect	0.08	0.02	Non-Detect
	Peat - Ribbed Fen	1.29	0.90	0.33	0.72	5.16	Non-Detect	0.06	0.17	0.05	0.18
S-13	Peat - Domed Bog	2.81	2.68	1.26	1.45	7.02	0.03	0.12	0.24	0.11	0.08
	Peat - Flat Bog	1.60	2.79	0.92	1.30	1.83	0.07	0.24	0.45	0.15	0.19
	Peat - Horizontal Fen	ns	0.57	0.35	0.42	0.31	0.02	Detect	0.29	Detect	0.02
	Peat - Ribbed Fen	0.40	0.95	0.25	Detect	Detect	0.13	Non-Detect	0.05	Detect	0.03
S-15	Peat - Domed Bog	1.35	1.89	0.93	Detect	0.34	Detect	0.04	0.78	0.02	0.05
	Peat - Flat Bog	2.66	2.55	0.30	0.35	1.92	Non-Detect	0.07	0.17	Non-Detect	0.16
	Peat - Horizontal Fen	0.99	0.90	0.22	Detect	Detect	ns	Detect	0.10	Detect	0.02
	Peat - Ribbed Fen	0.43	0.92	0.15	Detect	Detect	0.02	0.02	Non-Detect	0.02	Detect
S-V1	Peat - Domed Bog	1.96	0.60	0.18	0.53	0.49	ns	Detect	0.02	0.02	0.03
	Peat - Ribbed Fen	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R	see MS-2-R
S-V2	Peat - Domed Bog	1.97	1.16	0.24	0.45	0.52	ns	Detect	0.02	0.05	0.07
	Peat - Ribbed Fen	0.59	0.60	0.13	0.85	Detect	ns	Non-Detect	0.03	0.04	Detect
S-V3	Peat - Domed Bog	0.72	0.61	0.49	0.60	5.20	ns	0.10	0.03	Detect	0.07
	Peat - Ribbed Fen	1.08	1.69	0.47	0.76	0.89	ns	0.02	0.04	0.02	0.03

Notes
na: not accessible
is: insufficient sample
ns: no sample

Non-Detect: <0.0054 ng/L
Detect: >0.0054 but <0.0169 ng/L

TABLE 2a
MUSKEG PORE WATER - DOMED BOG 2007-2011 (Filtered)
(concentrations in ng/L)

Cluster Location	Total Mercury					Methyl Mercury				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
S-1	2.22	1.93	0.40	0.79	0.37	0.02	0.07	0.10	0.06	0.08
S-2	1.98	2.15	0.51	1.25	4.69	<0.01	0.02	0.04	0.05	0.01
S-7	0.72	1.04	0.29	0.62	0.74	0.01	0.01	0.04	0.02	0.04
S-8	1.13	1.49	0.38	1.66	1.2	<0.01	0.01	0.06	0.29	0.11
S-9(1)	0.77	0.77	0.27	0.58	0.01	0.01	<0.01	0.17	0.01	0.01
S-9(2)	1.72	1.89	0.42	1.04	0.93	0.01	0.02	0.02	0.01	0.01
S-13	2.81	2.68	1.26	1.45	7.02	0.03	0.12	0.24	0.11	0.08
S-15	1.35	1.89	0.93	0.01	0.34	0.01	0.04	0.78	0.02	0.05
S-V1	1.96	0.6	0.18	0.53	0.49		0.01	0.02	0.02	0.03
S-V2	1.97	1.16	0.24	0.45	0.52		0.01	0.02	0.05	0.07
S-V3	0.72	0.61	0.49	0.60	5.20		0.10	0.03	0.01	0.07



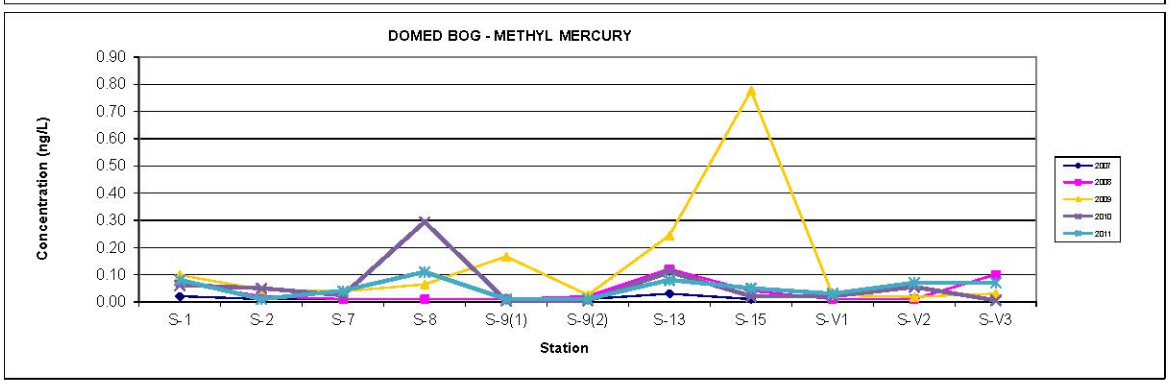
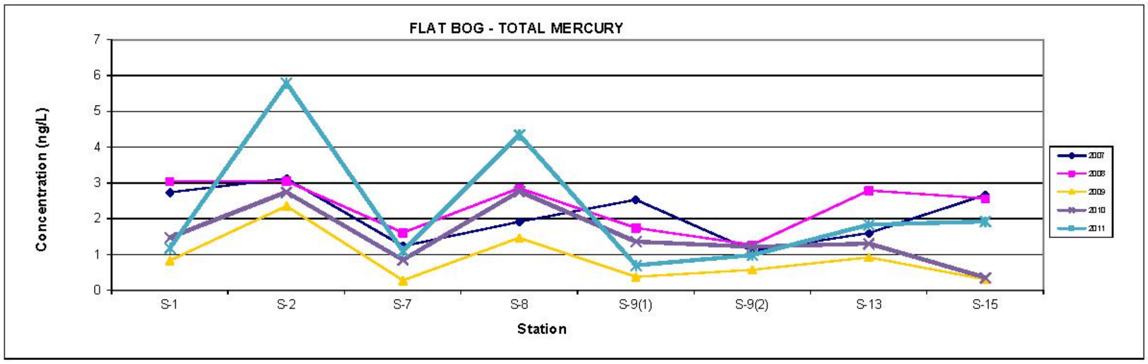


TABLE 2b
MUSKEG PORE WATER - FLAT BOG 2007-2011 (Filtered)
(concentrations in ng/L)

Cluster Location	Total Mercury					Methyl Mercury				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
S-1	2.73	3.04	0.83	1.47	1.18	0.01	0.18	0.19	0.14	<0.01
S-2	3.12	3.05	2.35	2.74	5.79	<0.01	0.10	0.07	0.11	0.10
S-7	1.23	1.61	0.27	0.85	1.09	0.01	<0.01	0.05	0.01	0.01
S-8	1.91	2.85	1.46	2.76	4.34	<0.01	0.08	0.31	0.14	0.16
S-9(1)	2.53	1.74	0.37	1.36	0.69	0.01	0.04	0.05	0.05	<0.01
S-9(2)	1.10	1.27	0.57	1.21	0.98	<0.01	0.06	0.12	0.03	0.05
S-13	1.60	2.79	0.92	1.30	1.83	0.07	0.24	0.45	0.15	0.19
S-15	2.66	2.56	0.30	0.35	1.92	<0.01	0.07	0.17	<0.01	0.16



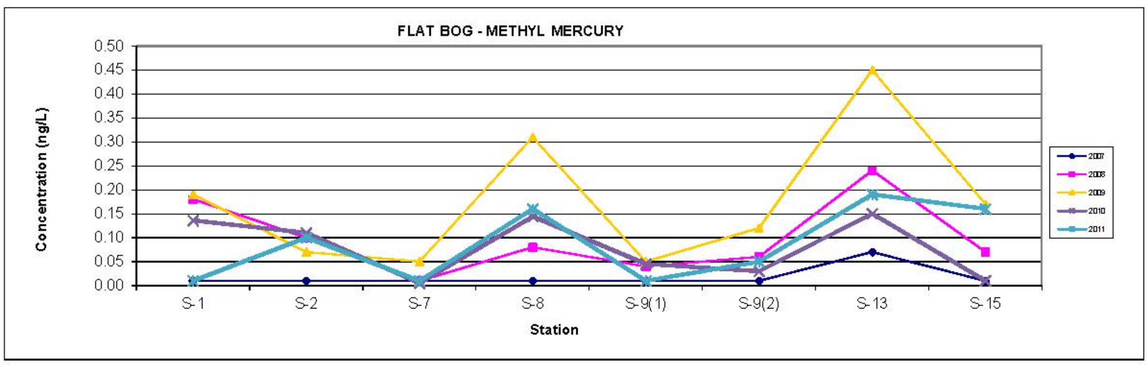
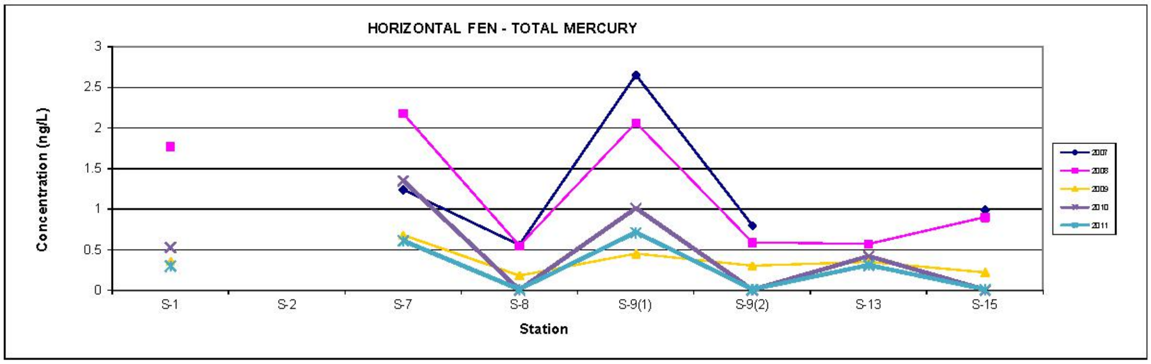


TABLE 2c
MUSKEG PORE WATER - HORIZONTAL FEN 2007-2011 (Filtered)
(concentrations in ng/L)

Cluster Location	Total Mercury					Methyl Mercury				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
S-1		1.77	0.36	0.53	0.3			0.10	0.04	0.01
S-2										
S-7	1.24	2.18	0.68	1.35	0.61	0.02	0.06	0.10	0.04	0.03
S-8	0.56	0.55	0.18	0.01	0.01	0.01	0.01	0.07	0.02	<0.01
S-9(1)	2.65	2.06	0.45	1.01	0.71	0.02	0.05	0.11	0.03	0.04
S-9(2)	0.80	0.59	0.30	0.01	0.01	<0.01	0.01	0.08	0.02	<0.01
S-13		0.57	0.35	0.42	0.31	0.02	0.01	0.29	0.01	0.02
S-15	0.99	0.90	0.22	0.01	0.01		0.01	0.10	0.01	0.02



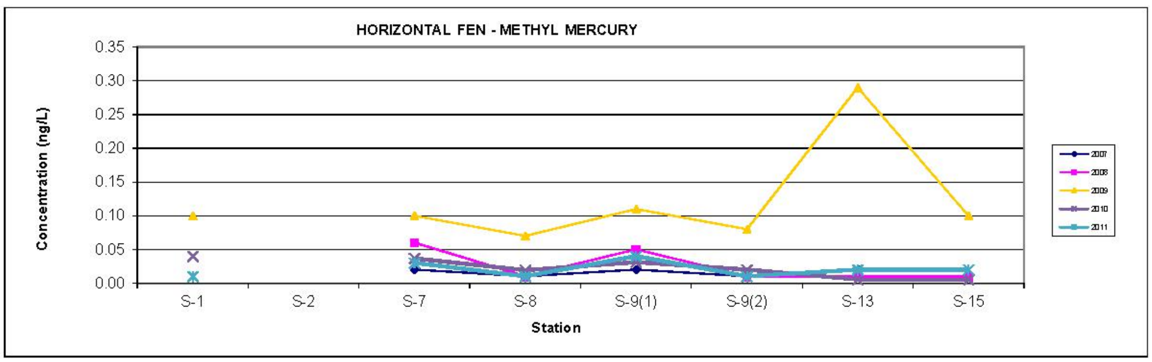
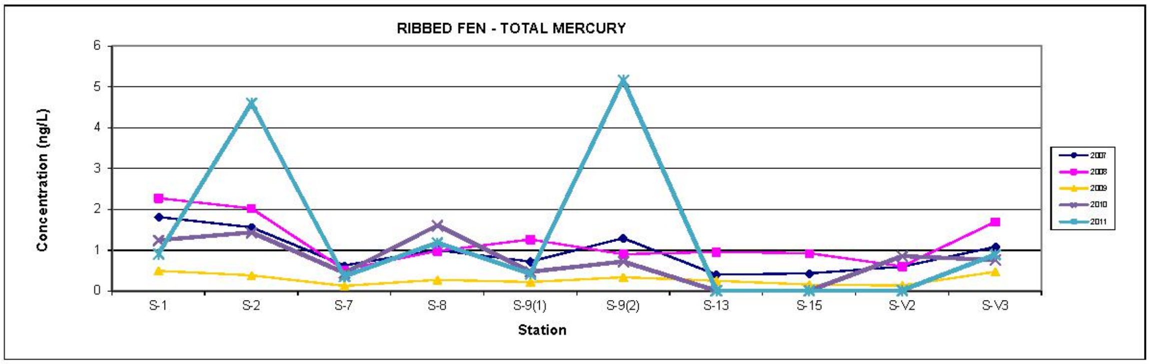


TABLE 2d
MUSKEG PORE WATER - RIBBED FEN 2007-2011 (Filtered)
(concentrations in ng/L)

Cluster Location	Total Mercury					Methyl Mercury				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
S-1	1.81	2.27	0.49	1.24	0.91	0.02	0.07	0.06	0.06	0.05
S-2	1.56	2.02	0.38	1.43	4.6	<0.01	0.04	0.09	0.08	0.06
S-7	0.62	0.52	0.12	0.44	0.36	0.01	0.01	0.03	0.02	0.01
S-8	1.00	0.98	0.27	1.60	1.18	<0.01	0.01	0.09	<0.01	0.02
S-9(1)	0.72	1.26	0.22	0.47	0.42	0.02	0.03	0.04	0.02	0.02
S-9(2)	1.29	0.90	0.33	0.72	5.16	<0.01	0.06	0.17	0.05	0.18
S-13	0.40	0.95	0.25	0.01	0.01	0.13	<0.01	0.05	0.01	0.03
S-15	0.43	0.92	0.15	0.01	0.01	0.02	0.02	<0.01	0.02	0.01
S-V2	0.59	0.60	0.13	0.85	0.01		<0.01	0.03	0.04	0.01
S-V3	1.08	1.69	0.47	0.76	0.89		0.02	0.04	0.02	0.01



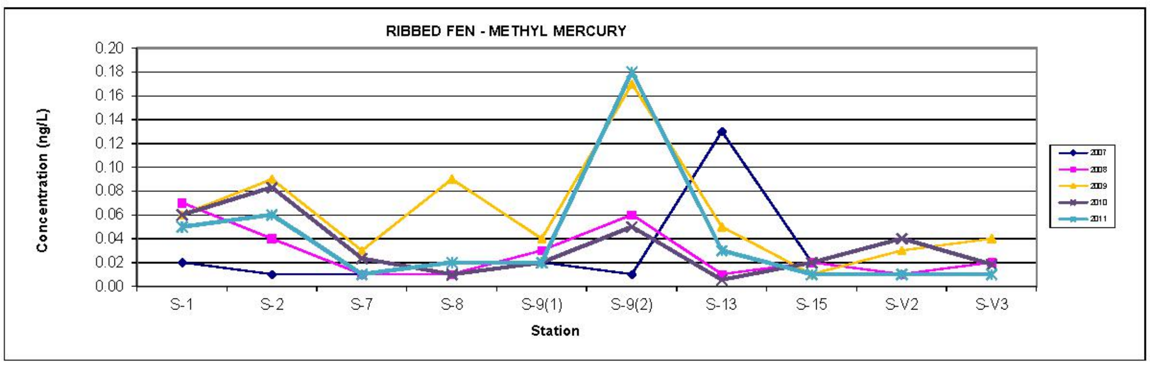
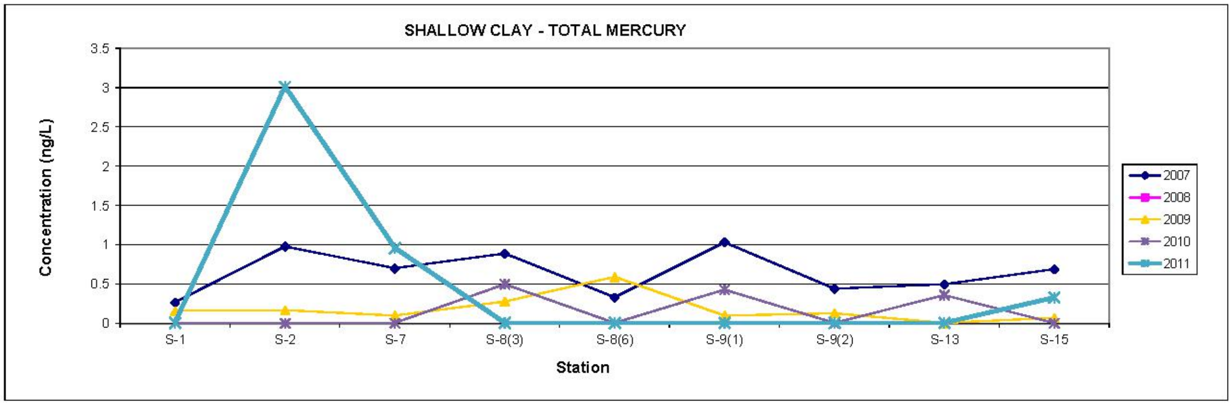


TABLE 2e
MINERAL HORIZON PORE WATER - SHALLOW CLAY 2007-2011 (Filtered)
(concentrations in ng/L)

Cluster Location	Total Mercury					Methyl Mercury				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
S-1	0.27		0.16	0.01	<0.01	0.01		0.03	0.04	0.01
S-2	0.98		0.17	0.01	3.01	<0.01		0.04	0.02	0.01
S-7	0.70		0.10	0.01	0.96	0.01		0.02	0.01	0.03
S-8(3)	0.89		0.28	0.50	0.01	0.03		0.02	0.06	0.08
S-8(6)	0.33		0.59	0.01	0.01	0.08		0.02	0.03	0.04
S-9(1)	1.03		0.10	0.43	0.01	0.01		0.07	0.02	0.01
S-9(2)	0.44		0.13	0.01	<0.01	<0.01		0.02	0.01	0.01
S-13	0.50		0.01	0.36	0.01	0.02			0.01	<0.01
S-15	0.69		0.07	0.01	0.33	0.01		0.01	0.01	<0.01



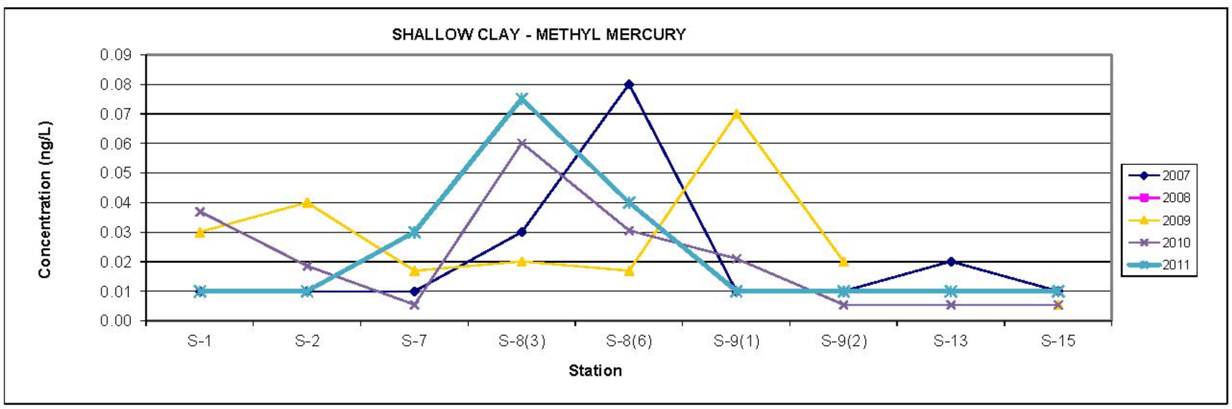
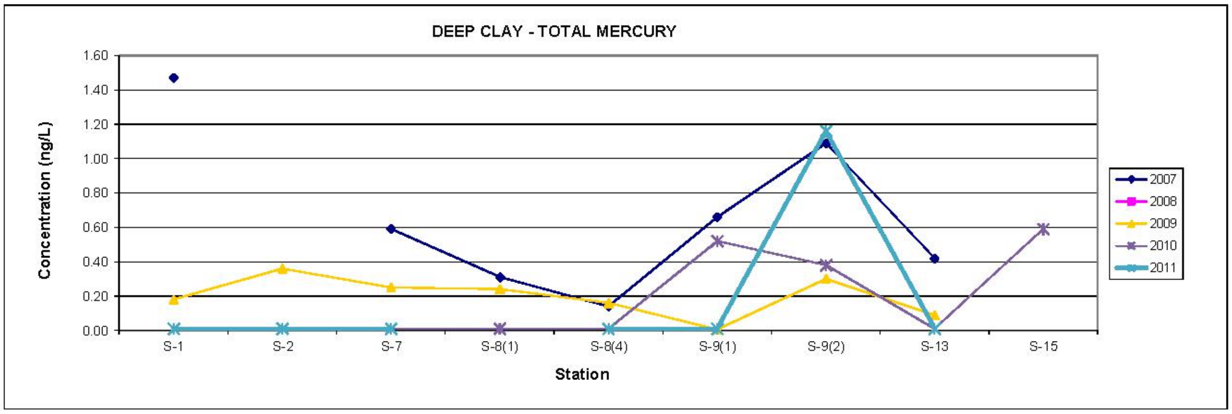


TABLE 2f
MINERAL HORIZON PORE WATER - DEEP CLAY 2007-2011 (Filtered)
(concentrations in ng/L)

Cluster Location	Total Mercury					Methyl Mercury				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
S-1	1.47		0.18	0.01	<0.01			0.03	0.01	<0.01
S-2			0.36	0.01	0.01			0.13	0.03	0.03
S-7	0.59		0.25	0.01	0.01	<0.01		0.02	0.05	<0.01
S-8(1)	0.31		0.24	0.01		0.01		0.02	0.01	
S-8(4)	0.14		0.16	0.01	0.01	0.01		0.02	0.01	<0.01
S-9(1)	0.66		0.01	0.52	0.01	0.01		0.01	0.01	0.03
S-9(2)	1.09		0.30	0.38	1.16	0.01		0.04	0.02	0.05
S-13	0.42		0.09	0.01	<0.01	0.03		0.02	0.02	0.01
S-15				0.59		0.01			0.04	



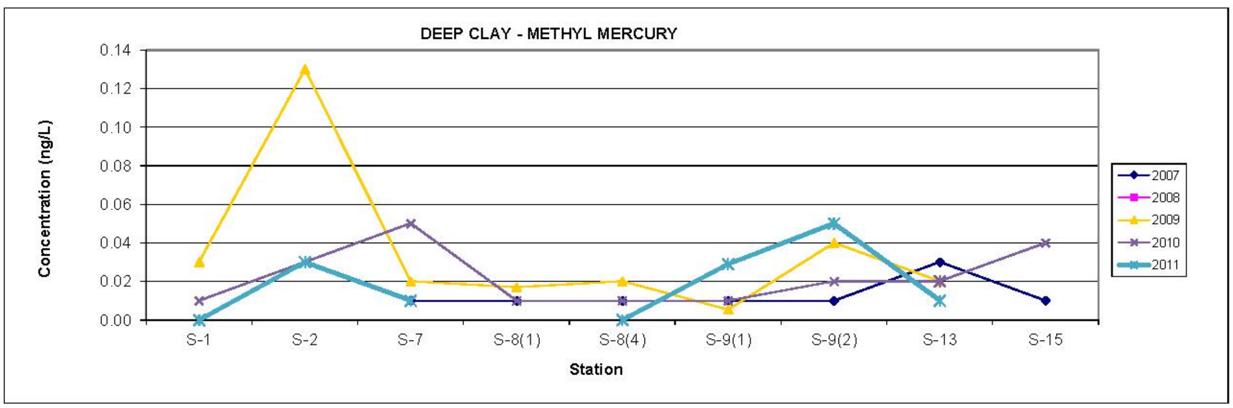
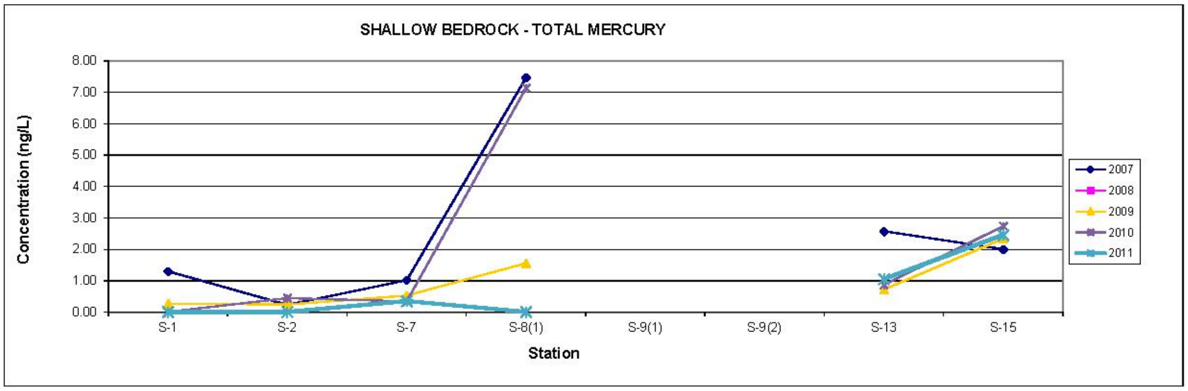


TABLE 2g
MINERAL HORIZON PORE WATER - SHALLOW BEDROCK 2007-2011 (Filtered)
(concentrations in ng/L)

Cluster Location	Total Mercury					Methyl Mercury				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
S-1	1.30		0.27	0.01	<0.01	0.01		0.06	0.01	<0.01
S-2	0.23		0.24	0.45	0.01	<0.01		0.05	0.02	0.04
S-7	1.02		0.53	0.34	0.35	0.09		0.05	0.05	0.05
S-8(1)	7.46		1.56	7.14	0.01	0.03		0.03	0.13	0.01
S-9(1)										
S-9(2)										
S-13	2.57		0.72	0.87	1.06	<0.01		0.02	0.01	0.01
S-15	2.00		2.34	2.74	2.46	0.01		0.37	0.03	0.01



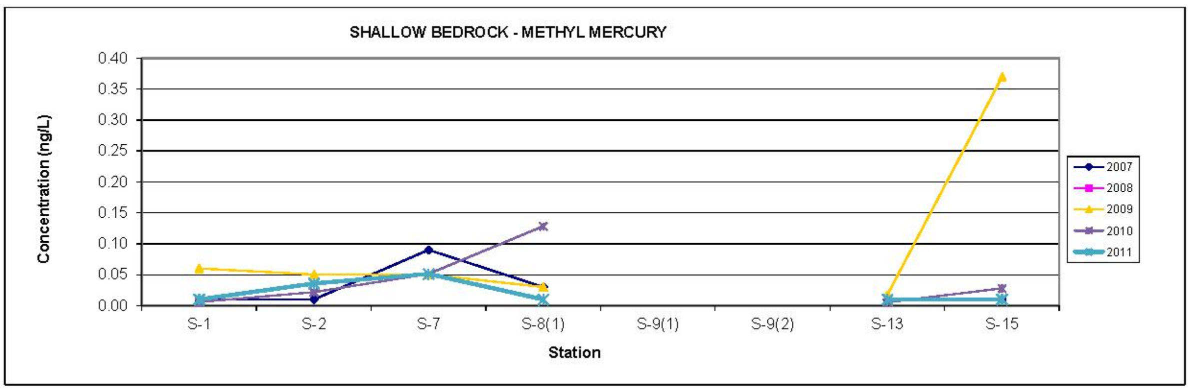


TABLE 3
TOTAL MERCURY - FENS (<u>Unfiltered</u>)
(concentrations in ng/L)

	Southwest Fen (SWF/F)	Northeast Fen (NEF/F)	Southeast Fen (SEF/F)	Northwest Control (HgCON)
May-06	0.77	0.62		
Jun-06	2.44	1.72		
Jul-06	2.49	1.26	2.51	2.64
Aug-06	1.86	0.83		
Sep-06	1.29	1.25		
Oct-06	1.59	0.53	1.09	1.70
Dec-06	4.65	1.08		
Jan-07	3.01	0.86	1.51	2.77
Feb-07	2.84	0.99		
Mar-07	F	3.14		
Apr-07	F	2.34		
May-07	2.07	1.31	1.43	1.25
Jun-07	1.96	1.21		
Jul-07	2.40	0.87	1.57	2.87
Aug-07	3.85	1.30		
Sep-07	2.28	1.32		
Oct-07	3.74	1.12	3.57	4.51
Nov-07	2.86	0.68		
Dec-07	3.42	1.41		
Jan-08	6.55	3.33	13.30	4.36
Feb-08	5.70	3.52		
Mar-08	9.79	4.64		
Apr-08	16.30	5.67	F	2.80
May-08	1.78	1.33		
Jun-08	2.37	1.11		
Jul-08	3.19	1.54	2.42	3.47
Aug-08	2.98	2.51		
Sep-08	2.76	2.22		
Oct-08	1.84	1.02	1.44	1.60
Nov-08	1.80	0.76		
Dec-08	2.19	0.92		
Jan-09	F	3.43	1.83	2.66
Feb-09	8.61	5.14		
Mar-09				
Apr-09	4.89	7.35		
May-09	1.44	2.92	2.60	2.91
Jun-09	Revoked	1.25		
Jul-09	Revoked	1.46	2.12	2.97
Aug-09	Revoked	1.11		
Sep-09	Revoked	1.42		
Oct-09	Revoked	1.41	0.94	1.15
Nov-09	Revoked	0.38		
Dec-09	Revoked	0.19		
Jan-10	Revoked	3.21	3.16	2.93
Feb-10	Revoked			
Mar-10	Revoked			
Apr-10	Revoked	1.03	0.55	
May-10	Revoked	0.70		1.20
Jun-10	Revoked	0.74		
Jul-10	Revoked	1.34	1.21	1.21
Aug-10	Revoked	1.76		
Sep-10	Revoked	1.15		
Oct-10	Revoked	0.78	1.29	1.86
Nov-10	Revoked	0.56		
Dec-10	Revoked	0.98		
Jan-11	Revoked	1.26	1.61	1.87
Feb-11	Revoked	F		
Mar-11	Revoked	F		
Apr-11	Revoked	2.81	3.74	2.05
May-11	Revoked	1.23		
Jun-11	Revoked	1.05		
Jul-11	Revoked	3.18	1.41	1.99
Aug-11	Revoked	3.29		
Sep-11**	Revoked			
Oct-11	Revoked	1.68	2.78	3.97
Nov-11	Revoked	1.23		
Dec-11	Revoked	1.17		
*Average 2009	5.03	2.31	1.87	2.42
*Average 2010	-	1.59	1.55	1.80
*Average 2011	-	1.88	2.39	2.47
Average All Years	3.62	1.76	2.48	2.49

F = Frozen
Southwest Fen - Receives effluent from central quarry (2006 only)
Northeast Fen - Receives effluent from plant site excavation, sewage treatment plant and pit sump
Southweast Fen - Control site
Nortwest Control - Control site
*Annual average values are only for dates when control samples were collected
** Samples discarded due to lab miscommunicaton

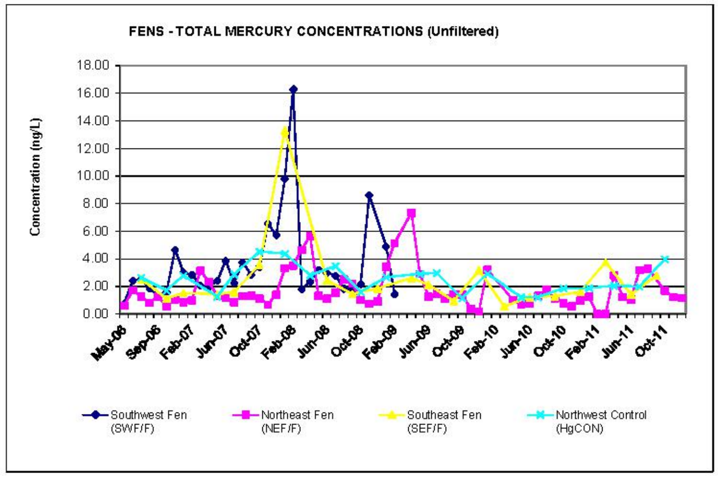


TABLE 4
TOTAL MERCURY - FENS (Filtered)
(concentrations in ng/L)

Date	Southwest Fen (SWF/F)	Northeast Fen (NEF/F)	Southeast Fen (SEF/F)	Northwest Control (HgCON)
May-06	0.64	0.48		
Jun-06	2.32			
Jul-06	1.96	0.86	1.38	1.82
Aug-06	1.34	0.72		
Sep-06	1.11	0.61		
Oct-06	0.85	0.44	0.94	1.19
Dec-06	3.05	0.59		
Jan-07	1.86	0.47	1.01	1.73
Feb-07	1.90	0.48		
Mar-07	F	3.03		
Apr-07	F	1.69		
May-07	1.31	1.41	0.89	1.03
Jun-07	1.24	1.05		
Jul-07	1.74	0.70	1.48	1.70
Aug-07	2.45	0.98		
Sep-07	1.87	0.69		
Oct-07	2.89	1.04	3.11	3.92
Nov-07	2.66	0.60		
Dec-07	3.22	1.00		
Jan-08	4.86	2.10	2.21	3.07
Feb-08	5.40	2.32		
Mar-08	3.79	3.41		
Apr-08	6.72	2.41	F	2.41
May-08	1.22	1.01		
Jun-08	1.63	1.11		
Jul-08	2.87	1.38	2.02	2.88
Aug-08	2.55	1.81		
Sep-08	2.07	1.90		
Oct-08	1.71	1.04	1.12	1.33
Nov-08	1.77	0.66		
Dec-08	2.02	0.86		
Jan-09	F	2.86	1.61	2.00
Feb-09	7.42	3.62		
Mar-09				
Apr-09	3.89	5.09		
May-09	1.44	1.55	2.25	1.85
Jun-09	Revoked	1.20		
Jul-09	Revoked	1.12	1.49	2.09
Aug-09	Revoked	0.79		
Sep-09	Revoked	1.15		
Oct-09	Revoked	1.46	0.92	1.02
Nov-09	Revoked	0.21		
Dec-09	Revoked	0.08		
Jan-10	Revoked	1.40	1.93	2.21
Feb-10	Revoked			
Mar-10	Revoked			
Apr-10	Revoked	0.65		0.01
May-10	Revoked	0.50	0.76	
Jun-10	Revoked	0.59		
Jul-10	Revoked	1.00	0.80	0.95
Aug-10	Revoked	1.25		
Sep-10	Revoked	0.89		
Oct-10	Revoked	0.37	1.35	0.64
Nov-10	Revoked	0.55		
Dec-10	Revoked	0.45		
Jan-11	Revoked	0.81	0.95	1.37
Feb-11	Revoked	F		
Mar-11	Revoked	F		
Apr-11	Revoked	1.65	0.79	0.53
May-11	Revoked	0.60		
Jun-11	Revoked	0.91		
Jul-11	Revoked	2.00	1.16	1.57
Aug-11	Revoked	2.20		
Sep-11**	Revoked			
Oct-11	Revoked	0.96	1.59	2.89
Nov-11	Revoked	0.48		
Dec-11	Revoked	0.66		
*Average 2009	4.43	1.75	1.57	1.74
*Average 2010	-	0.86	1.21	0.95
*Average 2011	-	1.14	1.12	1.59
Average All Years	2.56	1.23	1.42	1.74

F = Frozen
Southwest Fen - Receives effluent from central quarry (2006 only)
Northeast Fen - Receives effluent from plant site excavation, sewage treatment plant and pit sump
Southweast Fen - Control site
Nortwest Control - Control site
*Annual average values are only for dates when control samples were collected
** Samples discarded due to lab miscommunication

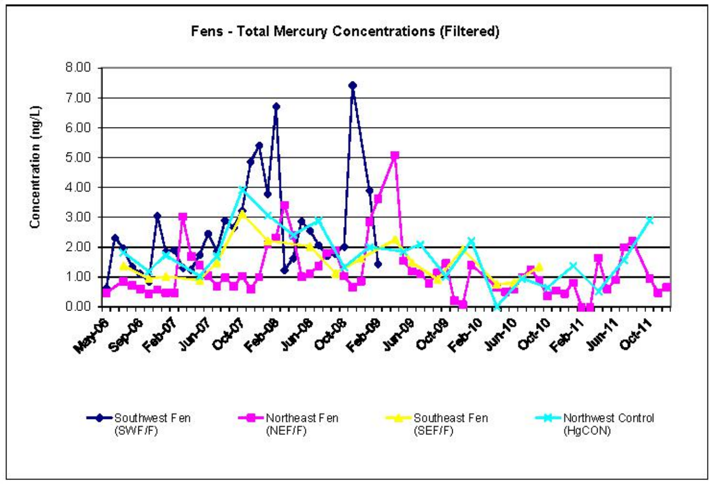


TABLE 5
METHYL MERCURY - FENS
(concentrations in ng/L)

Unfiltered Samples				
Date	Southwest Fen (SWF/F)	Northeast Fen (NEF/F)	Southeast Fen (SEF/F)	Northwest Control (HgCON)
Jul-06	0.16	0.10	0.03	0.06
Oct-06	0.20	0.02	0.02	0.05
Jan-07	0.97	0.07	0.07	0.16
May-07	0.14	0.07	0.01	0.04
Jul-07	0.68	0.10	0.02	0.05
Oct-07	0.81	0.15	0.08	0.09
Jan-08	5.58	1.72	1.07	0.34
Mar-08	F	2.07	F	F
Apr-08	8.37	2.90	0.07	0.65
Jul-08	0.69	0.40	0.11	0.12
Oct-08	0.27	0.50	0.05	0.04
Jan-09	4.59	1.99	0.12	0.19
Apr/May-09	2.79	5.08	0.05	0.04
Jul-09	Revoked	0.34	<0.01	0.03
Oct-09	Revoked	0.12	0.03	0.04
Jan-10	Revoked	2.38	0.06	0.18
Apr-10	Revoked	0.21	0.04	0.06
Jul-10	Revoked	1.10	0.03	0.08
Oct-10	Revoked	0.24	0.03	0.07
Jan-11	Revoked	0.65	0.08	0.06
Apr-11	Revoked	0.13	0.18	0.18
Jul-11	Revoked	1.03	0.03	0.04
Oct-11	Revoked	0.23	0.07	0.07
Average 2009	3.69	1.88	0.05	0.07
Average 2010	-	0.98	0.04	0.10
Average 2011	-	0.51	0.09	0.09
Average all Data	2.10	0.94	0.10	0.12

F = Frozen

Southwest Fen - Received effluent from the Central Quarry

Northeast Fen - Receives effluent from plant site excavation, sewage treatment plant and pit sump

Southwest Fen - Control site

Northwest Control - Control site

CCME Protection of Aquatic Life Guideline - 4 ng/L (unfiltered)

Quarterly sampling in accordance with Amended C. of A. #3960-7Q4K2G, dated March 13, 2009

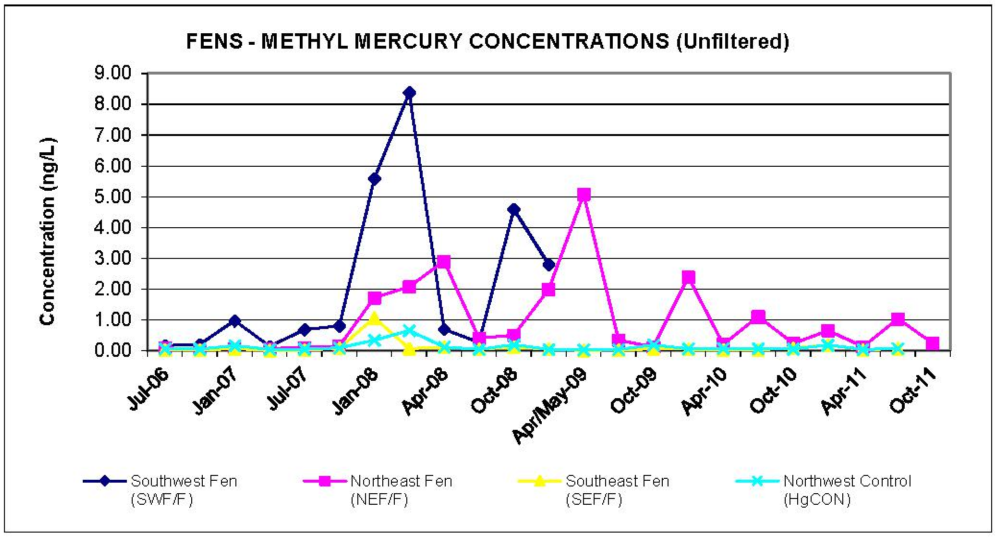


TABLE 6
METHYL MERCURY - FENS
(concentrations in ng/L)

Filtered Samples				
Date	**Southwest Fen (SWF/F)**	**Northeast Fen (NEF/F)**	**Southeast Fen (SEF/F)**	**Northwest Control (HgCON)**
Jul-06	0.13	0.08	0.02	0.01
Oct-06	0.15	0.02	0.01	0.02
Jan-07	0.68	0.04	0.06	0.10
May-07	0.08	0.06	0.02	0.04
Jul-07	0.30	0.10	0.02	0.04
Oct-07	0.63	0.12	0.04	0.09
Jan-08	3.48	1.29	0.39	0.17
Mar-08	F	1.34	F	F
Apr-08	3.42	1.73	0.03	0.37
Jul-08	0.58	0.41	0.08	0.07
Oct-08	0.29	0.39	0.02	0.04
Jan-09	3.03	0.89	0.09	0.14
Apr/May-09	1.85	3.32	0.05	0.05
Jul-09	Revoked	0.16	0.07	0.08
Oct-09	Revoked	0.13	0.05	0.06
Jan-10	Revoked	0.76	0.11	0.07
Apr-10	Revoked	0.12	0.03	0.05
Jul-10	Revoked	0.59	0.02	0.04
Oct-10	Revoked	0.23	0.03	0.06
Jan-11	Revoked	0.40	0.03	0.03
Apr-11	Revoked	0.01	0.04	0.06
Jul-11	Revoked	0.88	0.02	0.04
Oct-11	Revoked	0.04	0.03	0.01
Average 2009	2.44	1.12	0.07	0.08
Average 2010	-	0.43	0.05	0.06
Average 2011	-	0.33	0.03	0.03
Average All Data	1.22	0.57	0.06	0.07

F = Frozen

Southwest Fen - Received effluent from the Central Quarry

Northeast Fen - Receives effluent from plant site excavation, sewage treatment plant and pit sump

Southwest Fen - Control site

Northwest Control - Control site

CCME Protection of Aquatic Life Guideline - 4 ng/L (unfiltered)

Quarterly sampling in accordance with Amended C. of A. #3960-7Q4K2G, dated March 13, 2009

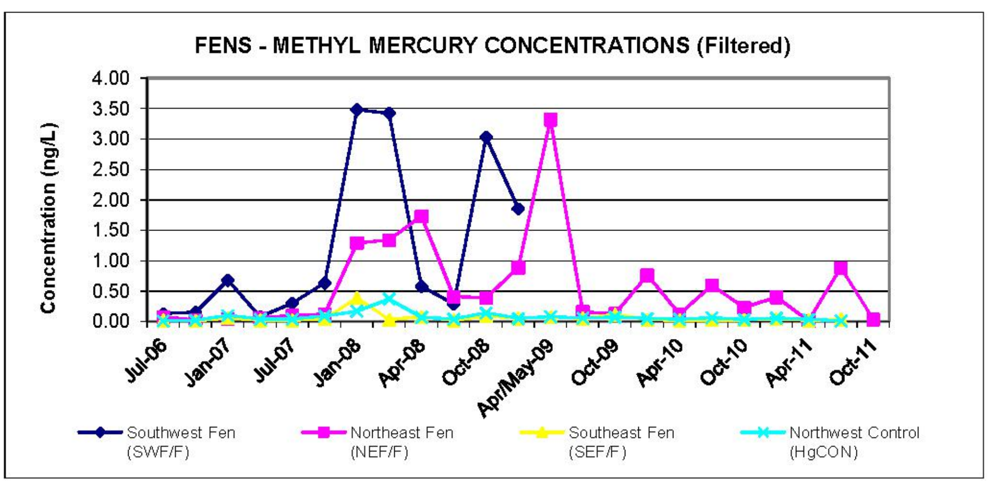


TABLE 7a
TOTAL MERCURY - RIBBED FEN SURFACE WATERS (Sampled as Peat Pore Water 2007-2011)
(filtered; concentrations in ng/L)

Date	MS-1-R (ES1-R)	MS-2-R (ES2-R)	MS-7-R (NS7-R)	MS-8-R (NS8-1R)	MS-9(1)-R (SS9-1R)	MS-9(2)-R (SS9-2R)	MS-13-R (WS13-R)	MS-15-R (WS15-R)	MS-V(1)-R (ES2-R)	MS-V(2)-R (SSV2-R)	MS-V(3)-R (SSV3-R)
Aug / Sep-07	1.81	1.56	0.62	1.00	0.72	1.29	0.40	0.43	1.56	0.01	0.01
Nov-07	1.67	2.30	0.82	1.36	1.11	1.01	1.70	1.11	2.30	0.01	0.01
May-08	2.86	5.56	F	0.91	0.53	F	0.42	0.38	5.56	F	F
Aug-08	2.27	2.02	0.52	0.98	1.26	0.90	0.95	0.92	2.02	0.60	1.69
Oct-08	1.52	1.07	0.72	1.26	1.26	0.70	1.22	0.37	1.07	0.41	1.33
Jan-09	F	F	F	F	F	F	F	F	F	F	F
May-09	2.90	1.98	1.92	3.25	2.10	2.40	4.08	2.19	1.98	2.38	3.19
Aug-09	1.00	0.95	0.95	1.38	1.01	1.44	2.54	0.86	0.95	0.94	1.78
Oct-09	1.19	1.01	1.15	1.19	1.18	1.24	2.54	0.75	1.01	0.86	2.01
Jan-10	0.65	0.01	<0.01	2.45	1.17	0.01	1.21	0.01	0.01	0.01	F
May-10	1.86	1.75	0.74	1.32	1.32	1.40	0.93	2.68	1.75	0.83	2.06
Aug-10	1.24	1.43	0.44	1.60	0.47	0.72	0.01	0.01	1.43	0.85	0.76
Oct-10	1.11	1.24	0.81	1.79	1.25	1.05	3.03	0.68	1.24	1.03	1.67
Jan / Feb-11	F	0.60	0.41	1.42	0.94	0.54	1.92	0.49	0.60	F	F
Apr-11	1.07	0.83	0.84	1.35	0.92	0.84	2.63	0.63	0.83	0.47	1.01
Jul-11	2.10	1.23	1.20	1.52	1.52	1.04	3.06	0.51	1.23	1.36	1.38
Oct-11	2.52	2.07	4.43	2.73	2.00	2.01	3.43	1.02	2.07	1.45	3.92
2009 Average	1.70	1.31	1.34	1.94	1.43	1.69	3.05	1.27	1.31	1.39	2.32
2010 Average	1.22	1.11	0.50	1.79	1.05	0.79	1.29	0.84	1.11	0.68	1.50
2011 Average	1.90	1.18	1.72	1.76	1.35	1.11	2.76	0.66	1.18	1.09	2.10
Average All Years	1.72	1.60	1.04	1.59	1.17	1.10	1.88	0.81	1.60	0.80	1.60

TABLE 7b
METHYL MERCURY - RIBBED FEN SURFACE WATERS (Sampled as Peat Pore Water 2007-2011)
(filtered; concentrations in ng/L)

Date	MS-1-R (ES1-R)	MS-2-R (ES2-R)	MS-7-R (NS7-R)	MS-8-R (NS8-1R)	MS-9(1)-R (SS9-1R)	MS-9(2)-R (SS9-2R)	MS-13-R (WS13-R)	MS-15-R (WS15-R)	MS-V(1)-R (ES2-R)	MS-V(2)-R (SSV2-R)	MS-V(3)-R (SSV3-R)
Aug / Sep-07	0.02	<0.01	0.01	<0.01	0.02	<0.01	0.13	0.02	<0.01	0.01	0.01
Nov-07	0.02	<0.01	0.01	0.01	<0.01	0.02	<0.01	0.01	<0.01	0.01	0.01
May-08	0.11	0.07	F	<0.01	0.01	F	0.01	0.02	0.07	F	F
Aug-08	0.07	0.04	0.01	0.01	0.03	0.06	<0.01	0.02	0.04	<0.01	0.02
Oct-08	0.02	0.01	0.01	0.01	0.02	0.04	0.01	0.02	0.01	<0.01	0.01
Jan-09	F	F	F	F	F	F	F	F	F	F	F
May / June-09	0.07	0.05	0.02	0.08	0.02	0.01	0.08	0.01	0.05	0.04	0.04
Aug-09	0.03	0.05	0.03	0.09	0.02	0.04	0.04	0.11	0.05	0.04	0.01
Oct-09	0.05	0.03	0.05	0.06	0.04	0.04	0.09	0.02	0.03	0.05	0.14
Jan-10	0.07	0.01	<0.01	0.10	0.01	<0.01	0.05	0.02	0.01	<0.01	F
May-10	0.04	0.04	0.03	0.03	0.04	0.03	0.02	0.07	0.04	0.03	0.06
Aug-10	0.06	0.08	0.02	<0.01	0.02	0.05	0.01	0.02	0.08	0.04	0.02
Oct-10	0.03	0.04	0.01	0.08	0.03	0.02	0.12	0.01	0.04	0.01	0.07
Jan / Feb-11	F	0.03	<0.01	0.03	0.09	0.01	0.04	<0.01	0.03	F	F
Apr-11	<0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.01	0.01	0.01
Jul-11	0.05	0.07	0.03	0.05	0.03	0.01	0.16	0.01	0.07	0.03	0.03
Oct-11	0.07	0.06	0.08	0.14	0.03	0.04	0.15	0.01	0.06	0.05	0.23
2009 Average	0.05	0.04	0.03	0.08	0.03	0.03	0.07	0.05	0.04	0.04	0.06
2010 Average	0.05	0.04	0.02	0.05	0.02	0.03	0.05	0.03	0.04	0.02	0.05
2011 Average	0.04	0.04	0.03	0.06	0.04	0.02	0.09	0.01	0.04	0.03	0.09
Average All Years	0.05	0.04	0.02	0.05	0.03	0.03	0.06	0.03	0.04	0.02	0.05

Notes:

(yellow)	MS-2-R and MS-v(1)-R are the same stations
F	Frozen - no sample
(orange)	Stations located at or inside the Upper Bedrock 2 m drawdown contour
(green)	Stations located outside the Upper Bedrock 2 m drawdown contour

Amended C. of A. #3960-7Q4K2G dated March 13, 2009 provides for annual sampling of peat pore water and quarterly sampling of ribbed fen surface water (the previous C. of A. #4111-7DXKQW dated October 3, 2008 provided for the same sampling frequency

TABLE 8
MUSKEG SYSTEM RIBBED FEN GENERAL CHEMISTRY RESULTS - ALL YEARS

Station	Year	Number of Samples	Parameter										
			Cl (mg/L)	Cond (us/cm)	Nitrate (mg/L)	DOC (mg/L)	pH (units)	SO4 (mg/L)	TP (mg/L)	Ca-D (mg/L)	Fe-D (mg/L)	Mg-D (mg/L)	Na-D (mg/L)
MS-1V-R (ES2-R)	2007	2	0.6	44	<0.1	16.7	6.06	<0.1	0.10	7.2	0.660	0.7	<0.8
	2008	3	0.6	37	<0.1	23.3	5.68	<0.1	0.21	4.6	1.132	0.3	<0.5
	2009	3	0.4	19	<0.1	10.0	6.43	<0.1	<0.01	3.4	0.320	0.4	<0.4
	2010	4	0.6	27	<0.1	22.2	5.84	<1.0	0.01	3.7	0.860	0.3	0.4
	2011	4	5.7	60	<0.1	23.7	6.41	7.5	0.03	5.0	1.292	0.8	3.2
MS-2V-R (SSV2-R)	2007	1	1.2	131	<0.1	29.0	6.18	0.2	1.81	24.4	1.910	1.6	0.8
	2008	2	0.9	91	<0.1	35.1	5.87	<0.1	0.06	11.6	0.557	0.5	0.7
	2009	3	0.4	19	<0.1	14.8	6.52	<0.1	<0.01	18.9	0.107	2.8	7.1
	2010	4	0.5	70	<0.1	18.7	6.93	<1.0	0.02	12.4	0.568	0.7	0.5
	2011	4	2.1	84	<0.1	18.9	7.53	<1.0	0.08	11.8	0.070	0.9	0.7
MS-3V-R (SSV3-R)	2007	1	1.8	141	<0.1	51.6	6.23	0.3	2.47	50.2	5.540	12.0	0.8
	2008	2	1.0	68	<0.1	59.2	5.75	<0.1	0.09	9.5	0.457	1.3	<0.5
	2009	3	0.3	18	<0.1	20.8	5.34	<0.1	<0.01	1.0	0.100	0.1	<0.5
	2010	3	0.3	20	<0.1	23.6	5.08	<1.0	0.01	1.8	0.161	0.2	0.2
	2011	4	0.5	37	<0.10	22.9	6.07	<1.00	0.01	3.6	0.108	0.5	0.4
MS-1R (ES1-R)	2007	2	0.6	98	<0.1	21.0	6.17	<0.1	0.20	11.3	0.340	0.8	1.5
	2008	3	0.8	47	<0.1	20.2	5.98	<0.1	0.13	5.5	0.340	0.4	1.2
	2009	3	0.5	26	<0.1	18.9	6.47	<0.1	<0.01	3.4	0.136	0.3	<0.6
	2010	4	0.4	34	<0.1	22.6	6.22	<1.0	0.01	5.6	0.499	0.4	0.8
	2011	4	0.7	43	<0.1	24.8	6.77	<1.0	0.01	5.7	0.317	0.5	1.1
MS-7R (NS-7-R)	2007	2	1.1	246	<0.1	28.7	6.33	<0.2	0.14	47.4	1.350	3.6	4.6
	2008	2	0.8	198	<0.1	14.9	6.40	<0.1	0.03	20.5	1.775	2.1	5.8
	2009	2	0.6	31	<0.1	13.6	7.14	<0.1	<0.01	2.6	0.165	0.3	0.9
	2010	4	0.6	76	<0.1	16.6	6.83	<1.0	0.01	11.2	1.966	1.1	1.5
	2011	4	0.6	67	<0.1	21.4	6.92	<1.0	0.01	9.9	2.187	0.7	1.5
MS-8R (NS-8-1R)	2007	2	85.8	591	<0.1	28.1	6.98	7.0	0.46	28.6	0.078	10.2	92.8
	2008	3	52.5	452	<0.1	33.2	7.13	<0.2	0.08	10.8	0.053	5.8	57.6
	2009	2	1.2	28	<0.1	16.4	6.81	<0.2	<0.01	1.9	0.119	0.5	2.3
	2010	4	4.2	82	<0.1	35.3	6.40	<1.0	0.02	8.4	0.993	1.4	7.2
	2011	4	4.6	80	0.16	30.5	6.95	<1.0	0.01	8.2	1.313	1.4	73.1
MS-9(1)R (SS9-1R)	2007	2	0.5	199	<0.1	19.8	6.65	<0.3	0.22	38.5	0.245	1.0	1.4
	2008	3	0.4	77	<0.2	16.7	5.87	<0.1	0.02	9.8	0.241	0.7	<0.6
	2009	3	0.3	22	<0.1	14.6	6.56	<0.1	<0.02	2.5	0.670	0.2	<0.5
	2010	4	0.3	32	<0.1	19.4	6.14	<1.0	0.01	5.5	0.238	0.4	0.4
	2011	4	0.4	32	<0.1	18.0	6.73	<1.0	0.01	5.0	0.114	0.4	0.5
MS-9(2)R (SS9-2R)	2007	2	0.7	70	<0.1	17.8	6.28	<0.1	0.16	12.7	0.398	1.7	<1.1
	2008	2	0.4	79	<0.1	17.2	6.26	<0.1	0.05	10.4	0.847	1.1	1.4
	2009	3	0.5	30	<0.1	13.0	6.98	<0.1	<0.02	3.6	0.087	0.4	<0.5
	2010	4	0.7	58	<0.1	19.2	6.66	<1.0	0.03	10.1	0.881	1.1	0.7
	2011	4	0.7	70	<0.1	18.3	7.12	<1.0	0.01	10.5	1.618	1.0	1.1
MS-13R (WS-13R)	2007	2	1.2	248	<0.1	20.9	6.25	<0.1	0.07	47.9	1.360	3.7	4.9
	2008	3	0.8	203	<0.1	67.0	5.91	<0.1	0.06	33.1	1.357	2.5	0.7
	2009	3	0.4	21	<0.1	22.9	4.53	<0.1	<0.01	0.7	0.067	0.1	<0.5
	2010	3	0.9	31	<0.1	26.0	4.34	<1.0	0.00	0.9	0.090	0.1	0.3
	2011	4	2.6	51.6	0.2	50.9	4.30	1.4	0.02	2.5	0.351	0.4	0.4
MS-15R (WS15-R)	2007	2	0.8	172	<0.1	11.6	6.43	<0.1	0.04	36.8	0.769	2.6	1.3
	2008	3	0.7	191	<0.1	11.5	6.44	<0.1	0.04	24.0	0.666	1.9	1.0
	2009	3	0.4	50	<0.1	9.8	7.27	<0.1	<0.01	6.8	0.019	0.5	<0.5
	2010	4	0.7	86	<0.1	12.7	7.12	<1.0	0.00	15.7	0.344	1.3	0.6
	2011	4	0.5	86	<0.1	10.2	7.49	<1.0	0.01	12.9	0.499	1.0	0.7

MS-8R	This station stands out as being influenced by natural groundwater upwellings, as evidenced by elevated Cl and Na
(shaded)	Beyond zone of dewatering influence

TABLE 9
TOTAL MERCURY - GRANNY CREEK
(unfiltered; concentrations in ng/L)

Date	N. Granny Cr. Upstream (NGC/UP/NWF)	N. Granny Cr. Downstream (NGC/DN/NEF)	S. Granny Cr. Upstream (SGC/UP/SWF)	S. Granny Cr. Downstream (SGC/DS/SWF)
May-06	1.18	1.66	0.86	1.26
Jun-06	3.55		3.37	3.16
Jul-06	2.92	2.80	2.72	3.08
Aug-06	4.21	3.77	2.57	2.6
Sep-06	2.37	2.26	2.28	2.74
Oct-06		1.61	1.34	1.30
Dec-06	2.53	4.58	2.23	2.08
Jan-07	2.02	2.35	16.20	4.52
Feb-07		2.02	3.57	3.16
Mar-07	7.17	F	F	7.43
Apr-07	8.82	5.87	3.72	3.76
May-07	3.01	3.02	2.46	2.08
Jun-07	3.34	2.99	2.49	3.04
Jul-07	3.16	2.23	2.73	2.03
Aug-07	3.10	1.94		2.17
Sep-07	1.96	2.04	4.41	1.61
Oct-07	5.91	5.67	5.16	3.79
Nov-07	3.19	3.00	2.74	2.49
Dec-07	2.42	2.60	2.67	2.61
Jan-08	2.95	2.42	2.97	2.94
Feb-08	2.19	2.29	3.76	2.91
Mar-08	0.46	2.66	3.06	3.35
Apr-08	11.90	F	2.19	2.91
May-08	3.54	3.73	3.37	3.42
Jun-08	3.06	3.08	2.55	2.81
Jul-08	3.28	1.61	3.60	2.68
Aug-08	2.71	2.69	2.63	2.38
Sep-08	1.76	2.32	1.94	2.78
Oct-08	1.37	1.57	2.14	1.83
Nov-08	3.20	2.39		1.81
Dec-08	1.82	1.83	1.84	1.88
Jan-09	1.41	1.54	4.42	1.64
Feb-09	1.18	1.34	2.22	1.52
Mar-09	1.48	2.26	2.56	1.45
Apr-09	3.19	1.41	2.19	2.98
May-09	5.18	3.81	3.31	3.82
Jun-09	2.95	2.72	2.65	2.76
Jul-09	3.62	3.48	2.70	2.69
Aug-09	2.07	2.08	2.06	2.05
Sep-09	1.45	1.82	1.47	1.39
Oct-09	1.47	1.38	1.40	1.05
Nov-09	1.70	1.79	3.65	0.98
Dec-09	1.11	1.02	1.08	0.96
Jan-10	1.46	1.03	0.94	1.89
Feb-10	1.49	1.36	1.89	2.03
Mar-10	1.64	1.78	2.14	1.84
Apr-10	1.56	2.05	1.68	1.90
May-10	1.99	1.80	1.90	2.13
Jun-10	0.93	0.97	0.83	0.78
Jul-10	0.92	1.04	0.70	1.28
Aug-10	3.90	3.15	3.06	3.37
Sep-10	2.44	2.71	2.21	2.00
Oct-10	1.46	1.81	1.59	1.55
Nov-10	1.94	2.10	1.82	1.86
Dec-10	1.50	1.62	1.59	1.67
Jan-11	1.31	1.24	1.50	1.46
Feb-11	1.77	1.64	1.70	1.42
Mar-11	1.56	1.36	2.55	1.11
Apr-11	0.92	1.04	2.40	1.38
May-11	3.58	3.75	2.98	3.53
Jun-11	2.99	2.65	2.34	2.36
Jul-11	1.51	2.03	2.08	2.00
Aug-11	1.81	1.92	2.42	2.28
*Sep-11				
Oct-11	4.36	4.11	3.67	3.57
Nov-11	3.12	3.45	3.00	2.72
Dec-11	1.82	2.05	2.32	1.97
Average 2009	2.23	2.06	2.48	1.94
Average 2010	1.77	1.79	1.70	1.86
Average 2011	2.25	2.29	2.45	2.16
Average All Data	2.69	2.35	2.68	2.36

* Samples discarded as a result of lab miscommunication

F = Frozen

CCME Protection of Aquatic Life Guideline - 26 ng/L

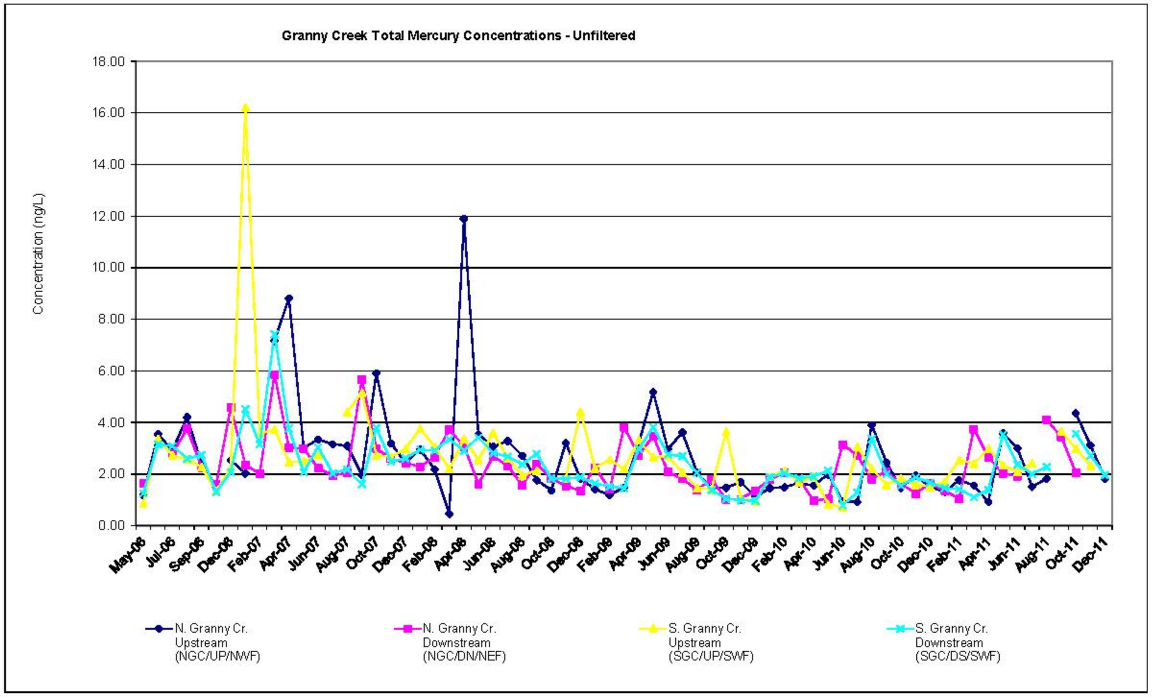


TABLE 10
TOTAL MERCURY - GRANNY CREEK
(filtered; concentrations in ng/L)

Date	N. Granny Cr. Upstream (NGC/UP/NWF)	N. Granny Cr. Downstream (NGC/DN/NEF)	S. Granny Cr. Upstream (SGC/UP/SWF)	S. Granny Cr. Downstream (SGC/DS/SWF)
May-06	0.87	0.90	0.55	0.90
Jun-06	2.91			2.83
Jul-06	2.33	2.22	2.07	1.94
Aug-06	3.43	3.03	2.07	1.94
Sep-06	1.64	1.70	1.34	2.11
Oct-06		1.30	1.11	0.97
Dec-06	1.98	3.98	1.92	1.58
Jan-07	1.06	1.40	2.01	3.37
Feb-07		0.75	0.79	1.90
Mar-07	7.05	F	F	2.92
Apr-07	4.19	2.50	1.96	1.84
May-07	2.40	2.56	2.40	1.83
Jun-07	2.51	2.64	2.26	1.79
Jul-07	2.96	2.10	2.32	2.01
Aug-07	1.52	1.81		1.70
Sep-07	1.96	1.75	3.87	1.49
Oct-07	5.19	5.60	4.76	3.42
Nov-07	2.91	2.74	2.45	2.16
Dec-07	2.05	2.18	2.35	2.61
Jan-08	1.42	1.63	2.21	2.33
Feb-08	1.91	1.60	2.24	2.08
Mar-08	1.76	1.63	1.76	1.98
Apr-08	1.84	F	1.63	2.06
May-08	3.16	3.21	2.90	2.97
Jun-08	2.74	2.72	2.29	2.36
Jul-08	2.95	1.49	2.84	2.32
Aug-08	2.39	2.34	2.23	2.06
Sep-08	1.35	1.88	1.62	1.60
Oct-08	1.19	1.40	1.88	1.27
Nov-08	2.28	2.15		1.73
Dec-08	1.30	1.65	1.77	1.71
Jan-09	1.33	1.27	2.05	1.34
Feb-09	1.15	1.05	1.68	1.19
Mar-09	1.15	1.40	1.75	1.22
Apr-09	1.56	1.09	1.34	1.78
May-09	2.43	2.34	1.98	2.19
Jun-09	3.24	3.19	2.75	2.71
Jul-09	2.57	2.93	2.20	1.96
Aug-09	1.66	1.69	1.80	1.59
Sep-09	1.54	1.63	1.39	1.39
Oct-09	1.45	1.38	1.01	1.08
Nov-09	1.51	1.45	2.01	0.80
Dec-09	0.97	0.68	0.95	0.75
Jan-10	1.07	1.11	1.29	1.31
Feb-10	0.88	1.05	1.37	1.32
Mar-10	0.96	1.02	1.11	1.23
Apr-10	0.97	1.10	1.14	1.07
May-10	1.43	1.11	1.54	1.45
Jun-10	1.47	0.87	0.68	0.60
Jul-10	0.89	0.65	0.50	0.70
Aug-10	3.33	2.10	2.72	2.25
Sep-10	1.66	1.57	1.69	1.48
Oct-10	1.38	0.54	1.71	1.61
Nov-10	1.59	1.63	1.61	1.54
Dec-10	0.98	0.92	1.08	0.95
Jan-11	0.82	0.81	1.07	1.02
Feb-11	1.30	1.44	1.65	1.02
Mar-11	0.94	0.70	0.75	0.69
Apr-11	0.69	0.73	0.77	0.76
May-11	2.24	1.95	1.85	1.83
Jun-11	2.94	2.45	2.13	2.16
Jul-11	1.19	1.85	1.72	1.16
Aug-11	0.73	0.84	1.09	1.10
* Sep-11				
Oct-11	2.96	2.36	2.71	2.30
Nov-11	2.53	2.40	2.45	1.95
Dec-11	1.05	1.20	1.67	1.21
Average 2009	1.71	1.68	1.74	1.50
Average 2010	1.38	1.14	1.37	1.29
Average 2011	1.58	1.52	1.62	1.38
Average All Data	1.97	1.77	1.82	1.70

* Samples discarded as a result of lab miscommunication
F = Frozen
CCME Protection of Aquatic Life Guideline - 26 ng/L

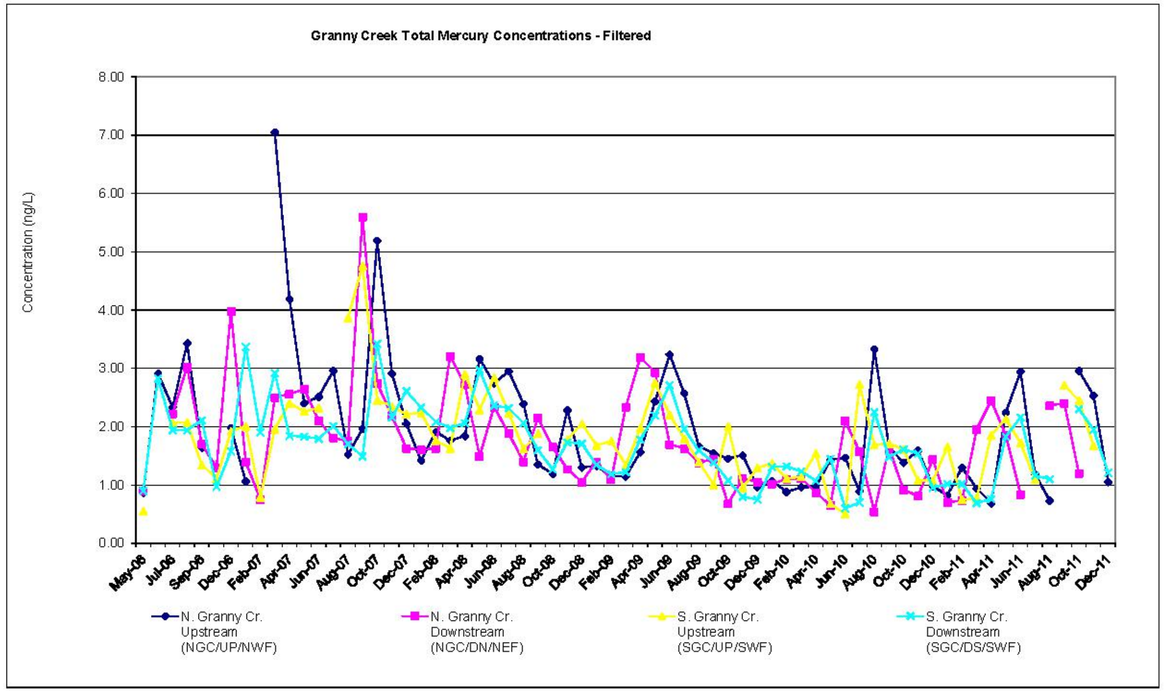


TABLE 11
METHYL MERCURY - SOUTH GRANNY CREEK
(concentrations in ng/L)

Date	Upstream SGC/UP/SWF		Downstream SGC/DS/SWF	
	US Unfiltered	US Filtered	DS Unfiltered	DS Filtered
Jul-06	0.06	0.05	0.04	0.02
Oct-06	0.03	0.03	0.11	0.08
Jan-07	0.10	0.08	0.13	0.10
May-07	0.04	0.04	0.06	0.06
Jul-07	0.05	0.05	0.05	0.04
Oct-07	0.05	0.04	0.07	0.05
Feb-08	0.17	0.10	0.11	0.07
Apr-08	0.06	0.04	0.15	0.09
Jul-08	0.06	0.04	0.07	0.06
Oct-08	0.02	0.02	0.04	0.03
Jan-09	0.01	0.06	0.06	0.04
Apr-09	0.08	0.02	0.06	0.02
Jul-09	0.01	0.04	0.05	0.05
Oct-09	0.02	0.05	0.01	0.02
Jan-10	0.06	0.04	0.07	0.02
Apr-10	0.05	0.04	0.08	0.05
Jul-10	0.06	0.02	0.08	0.06
Oct-10	0.04	0.04	0.07	0.07
Jan-11	0.03	0.03	0.17	0.11
Apr-11	0.09	0.04	<0.01	<0.01
Jul-11	0.05	0.05	0.14	0.11
Oct-11	0.04	0.01	0.23	0.08
2009 Average	0.03	0.04	0.04	0.03
2010 Average	0.05	0.04	0.08	0.05
2011 Average	0.05	0.03	0.14	0.08
Average All Years	0.05	0.04	0.08	0.06

CCME Protection of Aquatic Life Guideline - 4 ng/L (unfiltered)

Quarterly sampling in accordance with Amended C. of A. #3960-7Q4K2G, dated March 13, 2009

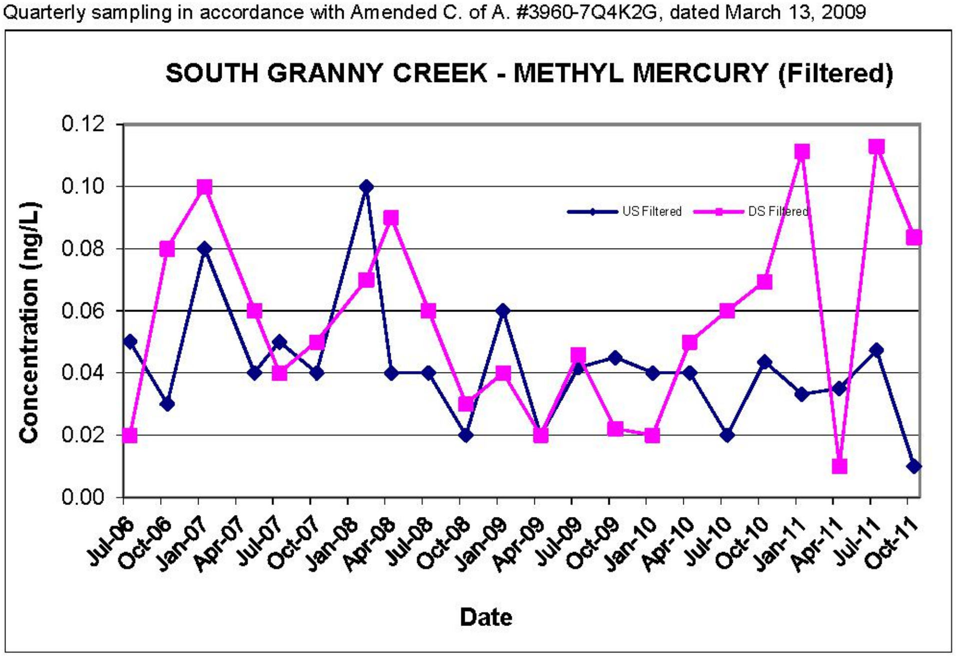


TABLE 12
METHYL MERCURY - NORTH GRANNY CREEK
(concentrations in ng/L)

Date	Upstream NGC/UP/NWF		Downstream NGC/DN/NEF	
	US Unfiltered	US Filtered	DS Unfiltered	DS Filtered
Jul-06	0.11	0.05	0.10	0.08
Oct-06	0.01	0.01	0.13	0.14
Jan-07	0.12	0.08	0.18	0.13
May-07	0.07	0.06	0.09	0.09
Jul-07	0.09	0.06	0.10	0.10
Oct-07	0.09	0.09	0.10	0.07
Jan-08	0.01	0.01	0.26	0.15
Feb-08	0.09	0.06	0.01	0.01
Mar-08	0.01	0.01	0.29	0.17
Apr-08	0.44	0.08	0.13	0.05
Jul-08	0.09	0.09	0.52	0.49
Oct-08	0.04	0.05	0.11	0.11
Jan-09	0.04	0.03	0.08	0.06
Apr-09	0.04	0.02	0.01	0.01
Jul-09	0.06	0.06	0.02	0.12
Oct-09	0.01	0.04	0.07	0.04
Jan-10	0.19	0.05	0.11	0.04
Apr-10	0.06	0.03	0.10	0.05
Jul-10	0.06	0.05	0.19	0.10
Oct-10	0.07	0.05	0.16	0.13
Jan-11	0.07	0.03	0.09	<0.01
Apr-11	<0.01	<0.01	0.06	0.03
May-11	0.05	0.04		
Jun-11	0.07	<0.01		
Jul-11	0.06	0.04	0.35	0.39
Aug-11	0.10	0.09	0.53	0.21
Oct-11	<0.01	0.01		0.18
Nov-11	0.11	0.07		
Dec-11	0.08	0.05		
2009 Average	0.04	0.04	0.04	0.06
2010 Average	0.09	0.04	0.14	0.08
2011 Average	0.07	0.04	0.26	0.20
Average All Years	0.08	0.05	0.16	0.12

data gaps

different value than Table 29b

CCME Protection of Aquatic Life Guideline - 4 ng/L (unfiltered)

Quarterly sampling in accordance with Amended C. of A. #3960-7Q4K2G, dated March 13, 2009

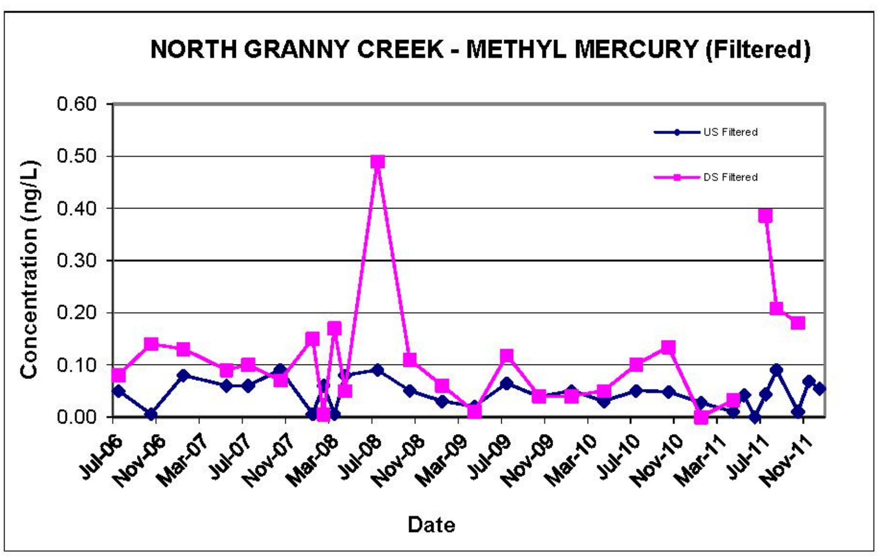


TABLE 13a
TOTAL MERCURY - NAYSHKOOTAYAOW AND ATTAWAPISKAT RIVERS
(unfiltered; concentrations in ng/L)

Date	Naysh. R. Upstream (Naysh Riv up)	Naysh. R. Middle (Naysh Riv dn)	Naysh. R. Downstream (Naysh Riv up Att Riv)	Monument Channel (Naysh Riv Control)	Attawapiskat R. A-1 (Att Riv up 2)	Attawapiskat R. A-2 (Att Riv up A2-1)	Attawapiskat R. A-3 (Att Riv dn A3-1)	Attawapiskat R. A-4 (Att Riv dn Naysh Riv)
Feb-08	1.48	1.47	5.33	0.81	8.75	2.19	10.50	2.20
May-08	4.31	4.58	3.30	3.15	3.41	3.64	3.64	3.61
Aug-08	1.98	2.14	2.28	2.13	1.91	2.32	2.09	1.82
Oct-08	2.30	2.31	2.53	1.86	1.93	1.25	1.72	1.79
Jan-09	1.39	1.19	2.00	1.07	1.39	2.09	2.35	1.34
Feb-09	-	-	-	-	-	2.17	1.84	-
Mar-09	-	-	-	-	-	1.36	1.28	-
Apr-09	-	1.00	1.47	0.69	1.36	1.26	1.93	1.22
May-09	5.26	-	-	-	-	4.17	3.19	-
Jun-09	-	-	-	-	-	2.81	2.57	-
Jul-09	2.80	2.58	2.47	2.83	3.58	3.23	3.48	3.50
Aug-09	-	-	-	-	-	1.69	1.79	-
Oct-09	0.80	0.70	1.33	1.07	1.58	1.25	1.39	1.35
Nov-09	-	-	-	-	-	1.07	1.13	-
Dec-09	-	-	-	-	-	0.81	0.96	-
Jan-10	-	-	-	-	-	1.20	1.52	-
Feb-10	1.39	1.11	1.50	1.03	1.76	1.43	1.93	1.52
Mar-10	-	-	-	-	-	1.67	1.80	-
Apr-10	-	-	-	1.60	-	2.13	2.31	-
May-10	2.54	2.21	2.17	-	2.58	2.68	2.82	2.77
Jun-10	-	-	-	-	-	0.70	0.94	-
Jul-10	1.28	1.10	1.12	1.10	1.40	1.08	0.87	0.90
Aug-10	-	-	-	-	-	2.50	1.89	-
Sep-10	-	-	-	-	-	1.23	1.12	-
Oct-10	1.27	1.35	1.28	1.30	1.31	1.71	1.24	1.26
Nov-10	-	-	-	-	-	1.52	1.28	-
Dec-10	-	-	-	-	-	2.17	1.35	-
Jan-11	0.86	0.86	0.98	0.74	1.07	1.31	1.10	1.05
Feb-11	-	-	-	-	-	1.12	1.39	-
Mar-11	-	-	-	-	-	2.67	1.22	-
Apr-11	0.69	0.66	1.30	0.68	0.70	2.18	0.93	0.77
May-11	-	-	-	-	-	3.20	3.83	-
Jun-11	-	-	-	-	-	1.76	1.90	-
Jul-11	1.16	1.46	1.67	2.14	1.36	1.42	1.43	1.44
Aug-11	-	-	-	-	-	1.48	1.55	-
Sep-11*	-	-	-	-	-	-	-	-
Oct-11	1.90	2.53	2.09	2.99	-	2.85	1.99	1.95
Nov-11	-	-	-	-	-	1.79	2.09	-
Dec-11	-	-	-	-	-	3.51	1.23	-
Average 2009	**2.56**	**1.37**	**1.82**	**1.42**	**1.98**	**1.99**	**1.99**	**1.85**
Average 2010	**1.62**	**1.44**	**1.52**	**1.26**	**1.76**	**1.67**	**1.59**	**1.61**
Average 2011	**1.15**	**1.38**	**1.51**	**1.64**	**1.04**	**2.12**	**1.70**	**1.30**
Average All Years	**1.96**	**1.70**	**2.05**	**1.57**	**2.27**	**1.96**	**2.04**	**1.78**

CCME Protection of Aquatic Life Guideline - 26 ng/L
Sampling locations and frequency governed by Amended C. of A. #3960-7Q4K2G, dated March 13, 2009
Bracketted sampling notations are field identifications
* Samples discarded as a result of lab miscommunication

TABLE 13b
TOTAL MERCURY - NAYSHKOOTAYAOW AND ATTAWAPISKAT RIVERS
(filtered; concentrations in ng/L)

Date	Naysh. R. Upstream (Naysh Riv up)	Naysh. R. Middle (Naysh Riv dn)	Naysh. R. Downstream (Naysh Riv up Att Riv)	Monument Channel (Naysh Riv Control)	Attawapiskat R. A-1 (Att Riv up 2)	Attawapiskat R. A-2 (Att Riv up A2-1)	Attawapiskat R. A-3 (Att Riv dn A3-1)	Attawapiskat R. A-4 (Att Riv dn Naysh Riv)
Feb-08	1.15	1.12	2.31	0.69	2.36	2.12	1.73	1.97
May-08	2.71	2.71	2.35	2.57	2.62	2.58	2.80	2.64
Aug-08	1.66	1.71	1.89	1.68	1.57	1.53	1.53	1.49
Oct-08	1.79	1.79	1.90	1.72	1.60	1.24	1.39	1.39
Jan-09	0.96	0.99	1.99	0.80	1.14	1.58	1.49	1.17
Feb-09	-	-	-	-	-	-	-	-
Mar-09	-	-	-	-	-	-	-	-
Apr-09	-	0.78	0.76	0.67	1.08	1.11	1.36	1.06
May-09	2.40	-	-	-	-	2.11	2.07	-
Jun-09	-	-	-	-	-	1.93	1.84	-
Jul-09	1.49	1.43	1.50	1.75	2.36	1.82	2.03	2.34
Aug-09	-	-	-	-	-	1.20	1.22	-
Sep-09	-	-	-	-	-	1.32	1.53	-
Oct-09	0.80	0.68	0.86	0.80	1.05	1.05	1.02	0.94
Nov-09	-	-	-	-	-	0.76	0.69	-
Dec-09	-	-	-	-	-	0.67	0.68	-
Jan-10	-	-	-	-	-	1.41	1.49	-
Feb-10	0.85	0.65	1.06	0.50	1.21	1.47	1.64	1.49
Mar-10	-	-	-	-	-	1.30	1.30	-
Apr-10	-	-	-	1.05	-	1.45	1.58	-
May-10	1.28	1.59	1.28	-	1.69	1.77	1.29	1.84
Jun-10	-	-	-	-	-	0.60	0.69	-
Jul-10	0.74	0.74	0.73	0.70	0.77	0.72	1.55	0.63
Aug-10	-	-	-	-	-	1.62	1.59	-
Sep-10	-	-	-	-	-	0.86	0.71	-
Oct-10	1.07	1.08	1.10	1.09	1.17	1.24	1.27	1.30
Nov-10	-	-	-	-	-	1.04	1.39	-
Dec-10	-	-	-	-	-	0.98	0.94	-
Jan-11	0.62	0.59	0.62	0.51	0.92	0.98	0.89	0.99
Feb-11	-	-	-	-	-	0.85	0.94	-
Mar-11	-	-	-	-	-	1.05	0.98	-
Apr-11	0.68	0.46	1.12	0.37	0.67	0.78	0.73	0.94
May-11	-	-	-	-	-	1.99	2.06	-
Jun-11	-	-	-	-	-	1.18	1.21	-
Jul-11	1.15	1.15	1.28	0.94	1.28	0.93	0.88	0.90
Aug-11	-	-	-	-	-	<0.01	0.98	-
Sep-11*	-	-	-	-	-	-	-	-
Oct-11	1.35	1.53	1.51	1.72	1.35	1.73	1.31	1.33
Nov-11	-	-	-	-	-	1.28	1.23	-
Dec-11	-	-	-	-	-	1.00	0.91	-
Average 2009	**1.41**	**0.97**	**1.28**	**1.01**	**1.41**	**1.36**	**1.39**	**1.38**
Average 2010	**0.99**	**1.01**	**1.04**	**0.83**	**1.21**	**1.21**	**1.29**	**1.32**
Average 2011	**0.95**	**0.93**	**1.13**	**0.89**	**1.06**	**1.18**	**1.10**	**1.04**
Average All Years	**1.29**	**1.19**	**1.39**	**1.10**	**1.43**	**1.31**	**1.32**	**1.40**

CCME Protection of Aquatic Life Guideline - 26 ng/L
Sampling locations and frequency governed by Amended C. of A. #3960-7Q4K2G, dated March 13, 2009
Bracketted sampling notations are field identifications
* Samples discarded as a result of lab miscommunication

TABLE 14a

METHYL MERCURY - NAYSHKOOTAYAOW AND ATTAWAPISKAT RIVERS

(unfiltered; concentrations in ng/L)

Date	Naysh. R. Upstream (Naysh Riv Up)	Naysh. R. Middle (Naysh Riv DN)	Naysh. R. Downstream (Naysh Riv up Att Riv)	Monument Channel (Naysh Riv Control)	Attawapiskat R. A-1 (Att Riv up 2)	Attawapiskat R. A-2 (Att Riv up A2-1)	Attawapiskat R. A-3 (Att Riv dn A3-1)	Attawapiskat R. A-4 (Att Riv dn Naysh Riv)
Feb-08	0.03	0.03	0.09	0.04	0.14	0.03	0.20	0.04
May-08	0.04	0.04	0.01	0.08	0.06	0.07	0.05	0.04
Aug-08	0.06	0.07	0.11	0.14	0.06	0.05	0.03	0.04
Oct-08	0.06	0.05	0.07	0.06	0.04	0.02	0.03	0.02
Jan-09	0.03	0.02	0.04	0.05	0.02	0.04	0.03	0.02
Feb-09	-	-	-	-	-	-	-	-
Apr-09	-	0.03	0.02	0.02	0.03	0.02	<0.01	0.03
May-09	0.03	-	-	-	-	0.02	0.02	-
Jun-09	-	-	-	-	-	0.10	0.07	-
Jul-09	0.05	0.05	0.03	0.03	0.04	0.04	0.10	0.02
Oct-09	0.06	0.05	0.05	0.10	0.09	0.06	0.05	0.10
Nov-09	-	-	-	-	-	0.04	0.05	-
Dec-09	-	-	-	-	-	0.08	0.10	-
Jan-10	-	-	-	-	-	0.09	0.08	-
Feb-10	0.20	0.04	0.03	0.02	0.04	0.05	0.07	0.03
Mar-10	-	-	-	-	-	0.06	0.03	-
Apr-10	-	-	-	0.07	-	0.06	0.06	-
May-10	0.05	<0.01	0.05	-	<0.01	0.02	0.05	0.01
Jun-10	-	-	-	-	-	0.08	0.05	-
Jul-10	0.02	0.10	0.11	0.14	0.15	0.04	0.12	0.09
Aug-10	-	-	-	-	-	0.08	0.07	-
Sep-10	-	-	-	-	-	0.04	0.04	-
Oct-10	0.04	0.05	0.05	0.14	0.03	0.03	0.04	0.03
Nov-10	-	-	-	-	-	0.07	0.04	-
Dec-10	-	-	-	-	-	<0.01	0.04	-
Jan-11	0.03	0.03	0.01	0.05	0.04	0.04	0.03	0.04
Feb-11	-	-	-	-	-	<0.01	0.01	-
Mar-11	-	-	-	-	-	0.03	0.01	-
Apr-11	-	-	-	-	-	0.06	0.03	-
May-11	-	-	-	-	-	0.07	0.05	-
Jun-11	-	-	-	-	-	0.03	0.03	-
Jul-11	0.07	0.06	0.08	0.13	0.05	0.05	0.05	0.03
Aug-11	-	-	-	-	-	0.07	0.07	-
Sep-11*	-	-	-	-	-	-	-	-
Oct-11	0.27	0.08	0.08	0.12	-	0.10	0.07	0.04
Nov-11	-	-	-	-	-	0.07	0.06	-
Dec-11	-	-	-	-	-	0.07	0.04	-
Average 2009	**0.04**	**0.04**	**0.03**	**0.05**	**0.04**	**0.05**	**0.05**	**0.04**
Average 2010	**0.08**	**0.05**	**0.06**	**0.09**	**0.06**	**0.05**	**0.06**	**0.04**
Average 2011	**0.12**	**0.05**	**0.05**	**0.10**	**0.05**	**0.06**	**0.04**	**0.04**
Average All Years	**0.07**	**0.05**	**0.06**	**0.08**	**0.06**	**0.05**	**0.05**	**0.04**

CCME Protection of Aquatic Life Guideline - 4 ng/L (unfiltered)

Sampling locations and frequency governed by Ammended C. of A. #3960-7Q4K2G, dated March 13, 2009

Bracketted sampling notations are field identifications

* Samples discarded as a result of lab miscommunication

TABLE 14b
METHYL MERCURY - NAYSHKOOTAYAOW AND ATTAWAPISKAT RIVERS
(filtered; concentrations in ng/L)

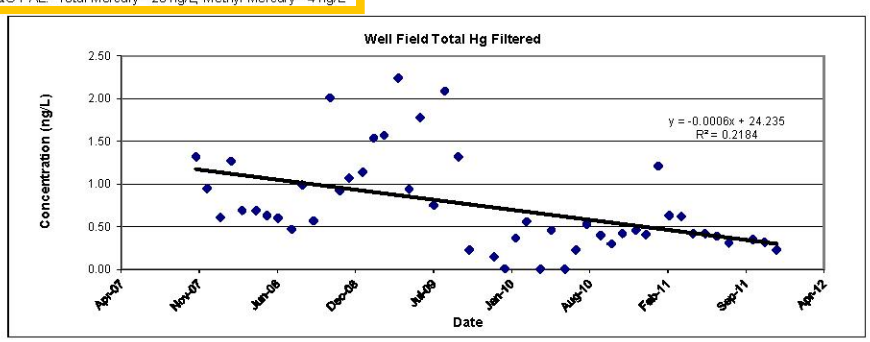
Date	Naysh. R. Upstream (Naysh Riv Up)	Naysh. R. Middle (Naysh Riv DN)	Naysh. R. Downstream (Naysh Riv up Att Riv)	Monument Channel (Naysh Riv Control)	Attawapiskat R. A-1 (Att Riv up 2)	Attawapiskat R. A-2 (Att Riv up A2-1)	Attawapiskat R. A-3 (Att Riv dn A3-1)	Attawapiskat R. A-4 (Att Riv dn Naysh Riv)
Feb-08	0.03	0.02	0.03	0.03	0.04	0.05	0.03	0.04
May-08	0.01	0.03	0.02	0.06	0.01	0.03	0.02	0.03
Aug-08	0.05	0.05	0.06	0.10	0.04	0.02	0.03	0.03
Oct-08	0.03	0.02	0.03	0.04	0.03	0.02	0.02	0.02
Jan-09	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Feb-09	-	-	-	-	-	-	-	-
Apr-09	-	0.01	0.01	0.01	0.02	0.02	0.03	0.01
May-09	0.09	-	-	-	-	0.03	0.03	-
Jun-09	-	-	-	-	-	0.03	0.03	-
Jul-09	0.04	0.10	0.11	0.07	0.15	0.03	0.02	0.03
Aug-09	-	-	-	-	-	0.05	0.03	-
Oct-09	0.07	0.04	0.06	0.04	0.04	0.05	0.06	0.07
Nov-09	-	-	-	-	-	0.03	0.15	-
Dec-09	-	-	-	-	-	0.08	0.09	-
Jan-10	-	-	-	-	-	0.01	0.04	-
Feb-10	0.01	0.05	0.09	0.03	0.04	0.07	0.05	0.04
Mar-10	-	-	-	-	-	0.05	0.03	-
Apr-10	-	-	-	0.05	-	0.04	0.03	-
May-10	0.04	0.12	0.04	-	0.05	0.03	0.04	0.05
Jun-10	-	-	-	-	-	0.01	0.02	-
Jul-10	0.05	0.06	0.03	0.07	<0.01	0.03	0.04	0.04
Aug-10	-	-	-	-	-	0.04	0.05	-
Sep-10	-	-	-	-	-	0.03	0.02	-
Oct-10	0.05	0.04	0.05	0.10	0.04	0.03	0.04	0.03
Nov-10	-	-	-	-	-	0.02	<0.01	-
Dec-10	-	-	-	-	-	0.04	0.02	-
Jan-11	0.01	0.01	<0.01	0.03	0.02	<0.01	0.02	0.01
Feb-11	-	-	-	-	-	<0.01	0.01	-
Mar-11	-	-	-	-	-	0.01	0.01	-
Apr-11	-	-	-	-	-	0.01	0.01	-
May-11	-	-	-	-	-	0.02	0.01	-
Jun-11	-	-	-	-	-	0.01	0.02	-
Jul-11	0.04	0.05	0.05	0.03	0.02	0.02	0.02	0.03
Aug-11	-	-	-	-	-	0.07	0.07	-
Sep-11*	-	-	-	-	-	-	-	-
Oct-11	0.06	0.06	0.07	0.11	0.05	0.06	0.04	0.04
Nov-11	-	-	-	-	-	0.04	0.04	-
Dec-11	-	-	-	-	-	0.01	0.03	-
Average 2009	**0.06**	**0.05**	**0.05**	**0.03**	**0.06**	**0.04**	**0.05**	**0.03**
Average 2010	**0.04**	**0.07**	**0.05**	**0.06**	**0.03**	**0.03**	**0.03**	**0.04**
Average 2011	**0.04**	**0.04**	**0.06**	**0.06**	**0.03**	**0.03**	**0.03**	**0.03**
Average All Years	**0.04**	**0.05**	**0.05**	**0.05**	**0.04**	**0.03**	**0.03**	**0.03**

CCME Protection of Aquatic Life Guideline - 4 ng/L (unfiltered)
Sampling locations and frequency governed by Ammended C. of A. #3960-7Q4K2G, dated March 13, 2009
Bracketted sampling notations are field identifications
* Samples discarded as a result of lab miscommunication

TABLE 15
MERCURY CONTENT IN WELL FIELD DISCHARGE
(concentrations in ng/L)

Date	Total Mercury		Methyl Mercury		Wells in Production
	Unfiltered	Filtered	Unfiltered	Filtered	
Nov-07	1.33	1.32	<0.01	<0.01	VDW-6, 11 and 22
Dec-07	1.33	0.95	0.01	0.01	VDW-6, 11 and 22
Jan-08	0.87	0.61	0.01	0.01	VDW-6, 11, 15, 17 and 22
Feb-08	1.55	1.27	<0.01	0.01	VDW-6, 11 and 22
Mar-08	0.70	0.69	<0.01	0.01	VDW-6, 11, 15, 17 and 22
Apr-08	0.84	0.69	0.02	0.02	VDW-7, 11, 15, 17 and 22
May-08	0.78	0.63	<0.01	<0.01	VDW-7, 11, 15, 17 and 22
Jun-08	0.72	0.60			VDW-7, 11, 15, 17 and 22
Jul-08	0.65	0.47	0.01	0.01	VDW-6, 11, 15, 17 and 22
Aug-08	2.63	0.99			VDW-6, 11, 15, 17 and 22
Sep-08	0.67	0.57			VDW-6, 11, 15, 17 and 22
Oct-08	2.20	2.01	<0.01	<0.01	VDW-3, 6, 7, 11, 15, 17 and 22
Nov-08	1.00	0.92	<0.01	<0.01	VDW-3, 6, 7, 11, 15, 17 and 22
Dec-08	1.34	1.07	0.01	0.01	VDW-3, 6, 7, 11, 15, 17 and 22
Jan-09	1.43	1.14			VDW-3, 6, 7, 11, 15, 17 and 22
Feb-09	1.71	1.54			VDW-3, 6, 7, 11, 15, 17 and 22
Mar-09	1.73	1.57			VDW-3, 6, 7, 11, 15, 17 and 22
Apr-09	2.42	2.24	0.01	0.01	VDW-3, 6, 7, 11, 15, 17 and 22
May-09	2.53	0.94		0.02	VDW-3, 6, 7, 11, 15, 17 and 22
Jun-09	0.72	1.78	0.04		VDW-3, 6, 7, 11, 15, 17 and 22
Jul-09	1.69	0.75	0.09	0.01	VDW-3, 6, 7, 11, 15, 17 and 22
Aug-09	4.22	2.09	0.01		VDW-3, 6, 7, 11, 15, 17 and 22
Sep-09	0.77	1.32			VDW-3, 6, 7, 11, 15, 17 and 22
Oct-09	0.63	0.23	0.02	0.01	VDW-3, 6, 7, 11, 15, 17 and 22
Nov-09				0.02	VDW-3, 6, 7, 11, 15, 17 and 22
Dec-09	0.34	0.15	0.08	0.12	VDW-3, 6, 7, 11, 15, 17 and 22
Jan-10	1.09	<0.01	0.06	0.03	VDW-3, 6, 7, 11, 14, 15, 17 and 22
Feb-10	1.54	0.37			VDW-3, 6, 7, 11, 14, 15, 17 and 22
Mar-10	1.20	0.56			VDW-3, 6, 7, 11, 14, 15, 17 and 22
Apr-10	1.03	0.01	0.01	<0.01	VDW-3, 6, 7, 11, 14, 15, 17 and 22
May-10	1.03	0.46			VDW-3, 6, 7, 11, 14, 15, 17 and 22
Jun-10	0.62	0.01			VDW-3, 6, 7, 11, 14, 15, 17 and 22
Jul-10	0.92	0.23	0.01	0.01	VDW-3, 6, 7, 11, 14, 15, 17 and 22
Aug-10	1.10	0.53			VDW-3, 6, 7, 11, 14, 15, 17 and 22
Sep-10	1.25	0.40			VDW-3, 6, 7, 11, 14, 15, 17 and 22
Oct-10	1.61	0.30	<0.01	<0.01	VDW-3, 6, 7, 11, 14, 15, 17 and 22
Nov-10	1.15	0.42			VDW-3, 6, 7, 11, 14, 15, 17 and 22
Dec-10	0.94	0.46			VDW-3, 6, 7, 11, 14, 15, 17 and 22
Jan-11	1.04	0.41	<0.01	0.05	VDW-6, 7, 11, 12, 14, 15, 17, 18 and 22
Feb-11	1.33	1.21			VDW-6, 7, 11, 12, 14, 15, 17, 18 and 22
Mar-11	1.73	0.63			VDW-6, 7, 11, 12, 14, 15, 17, 18 and 22
Apr-11	1.28	0.62			VDW-6, 7, 11, 12, 14, 15, 17, 18 and 22
May-11	1.48	0.42			VDW-6, 7, 11, 12, 14, 15, 17, 18 and 22
Jun-11	1.64	0.42			VDW-2, 6, 7, 11, 12, 14, 15, 17, 18 and 22
Jul-11	1.41	0.39	0.01	0.01	VDW-2, 6, 7, 11, 12, 14, 15, 17, 18 and 22
Aug-11	1.05	0.31	0.21	<0.01	VDW-2, 7, 11, 12, 14, 15, 17, 18 and 22
Sep-11					VDW-2, 6, 7, 11, 12, 14, 15, 17, 18 and 22
Oct-11	6.36	0.35	0.01	0.01	VDW-2, 6, 7, 11, 12, 14, 15, 17, 18 and 22
Nov-11	4.40	0.32			VDW-2, 6, 7, 11, 12, 14, 15, 17, 18 and 22
Dec-11	1.05	0.23			VDW-2, 6, 7, 12, 14, 15, 17, 18 and 22
Average 2009	**1.65**	**1.25**	**0.04**	**0.03**	
Average 2010	**1.12**	**0.31**	**0.02**	**0.02**	
Average 2011	**2.07**	**0.48**	**0.08**	**0.02**	
Average All Years	**1.48**	**0.74**	**0.03**	**0.02**	

CEQG-PAL: Total Mercury - 26 ng/L; Methyl Mercury - 4 ng/L



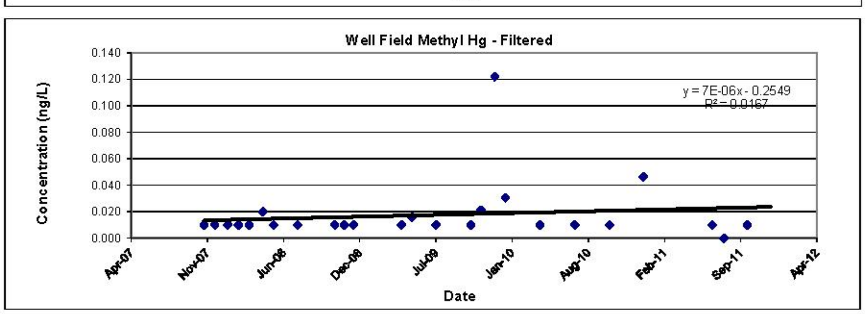


TABLE 16a
TOTAL MERCURY - INDIVIDUAL MINE DEWATERING WELLS
(unfiltered; concentrations in ng/L)

Date	VDW-2	VDW-3	VDW-6	VDW-7	VDW-11	VDW-12	VDW-14	VDW-15	VDW-17	VDW-18	VDW-22
Nov-07	-	-	-	-	-	-	-	-	-	-	-
Dec-07	-	-	0.07	-	1.31	-	-	-	-	-	3.08
Jan-08	-	-	0.06	-	1.64	-	-	0.29	0.09	-	3.66
Feb-08	-	-	0.12	-	1.41	-	-	-	-	-	3.13
Mar-08	-	-	0.33	-	2.93	-	-	0.22	0.28	-	3.26
Apr-08	-	-	-	-	1.89	-	-	0.64	0.31	-	4.27
Jul-08	-	-	0.14	-	2.18	-	-	0.20	0.19	-	2.28
Oct-08	-	0.03	0.05	0.42	*38.6	-	-	0.07	0.06	-	6.52
Jan-09	-	0.04	0.02	0.25	3.33	-	-	0.07	0.10	-	6.56
Apr-09	-	0.03	0.05	-	3.34	-	-	0.03	0.10	-	5.59
Jul-09	-	0.74	0.52	1.11	3.50	-	-	0.69	0.85	-	4.37
Oct-09	-	0.14	0.63	0.16	1.55	-	-	0.41	0.09	-	1.61
Jan-10	-	<0.01	<0.01	<0.01	3.40	-	0.01	<0.01	<0.01	-	3.80
Apr-10	-	<0.01	<0.01	<0.01	2.59	-	<0.01	<0.01	<0.01	-	3.32
Jul-10	-	0.12	0.09	0.28	3.00	-	0.08	0.03	0.24	-	3.36
Oct-10	-	<0.01	0.01	0.01	4.31	-	<0.01	<0.01	<0.01	0.35	5.18
Jan-11	-	-	-	0.23	3.34	1.39	0.20	<0.01	0.01	0.01	3.66
Apr-11	-	-	0.39	0.72	3.76	1.37	1.07	0.44	0.66	0.40	2.92
Jul-11	0.85	-	-	0.57	5.15	2.18	0.37	0.79	0.25	0.39	5.18
Oct-11	0.59	-	0.60	2.08	*125.15	2.75	0.67	0.55	0.95	1.21	*15.86
Average 2009	**-**	**0.24**	**0.31**	**0.51**	**2.93**	**-**	**-**	**0.30**	**0.29**	**-**	**4.53**
Average 2010	**-**	**0.04**	**0.03**	**0.08**	**3.32**	**-**	**-**	**0.01**	**0.07**	**-**	**3.91**
Average 2011	**0.72**	**-**	**0.50**	**0.90**	**4.08**	**1.92**	**0.58**	**0.45**	**0.47**	**0.50**	**3.92**
Average All Years	**0.72**	**0.13**	**0.19**	**0.49**	**2.86**	**1.92**	**0.30**	**0.26**	**0.25**	**0.47**	**3.99**

TABLE 16b
TOTAL MERCURY - INDIVIDUAL MINE DEWATERING WELLS
(filtered; concentrations in ng/L)

Date	VDW-2	VDW-3	VDW-6	VDW-7	VDW-11	VDW-12	VDW-14	VDW-15	VDW-17	VDW-18	VDW-22
Nov-07	-	-	0.08	-	1.07	-	-	-	-	-	2.36
Dec-07	-	-	0.08	-	0.96	-	-	-	-	-	2.27
Jan-08	-	-	0.05	-	1.01	-	-	0.08	0.12	-	1.87
Feb-08	-	-	0.10	-	1.17	-	-	-	-	-	2.74
Mar-08	-	-	0.25	-	0.14	-	-	0.09	0.17	-	2.92
Apr-08	-	-	-	-	1.21	-	-	0.18	0.35	-	3.71
Jul-08	-	-	0.18	-	1.56	-	-	0.15	0.18	-	1.82
Oct-08	-	0.05	0.06	0.41	*17.4	-	-	0.09	0.06	-	6.09
Jan-09	-	0.02	0.01	0.19	2.30	-	-	0.05	0.09	-	4.63
Apr-09	-	0.04	0.06	-	3.34	-	-	0.03	0.08	-	5.28
Jul-09	-	0.61	0.62	0.60	1.12	-	-	0.58	0.45	-	0.95
Oct-09	-	0.09	0.34	0.10	0.49	-	-	0.36	0.08	-	0.38
Jan-10	-	0.01	0.01	<0.01	0.53	-	0.01	<0.01	<0.01	-	0.62
Apr-10	-	<0.01	<0.01	<0.01	0.82	-	<0.01	<0.01	<0.01	-	0.57
Jul-10	-	0.10	0.06	0.11	0.42	-	0.20	0.03	0.12	-	0.45
Oct-10	-	0.39	0.36	0.42	0.75	-	-	0.01	0.01	0.01	0.01
Jan-11	-	-	0.01	0.23	0.88	0.48	0.40	0.01	-	0.01	0.73
Apr-11	-	-	0.01	0.36	0.80	0.46	0.54	0.01	0.38	0.37	1.10
Jul-11	0.01	-	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1.86
Oct-11	0.01	-	0.01	0.01	0.73	0.54	0.01	0.01	0.35	0.35	1.08
Average 2009	**-**	**0.19**	**0.26**	**0.30**	**1.81**	**-**	**-**	**0.22**	**0.18**	**-**	**2.81**
Average 2010	**-**	**0.13**	**0.11**	**0.14**	**0.63**	**-**	**-**	**0.02**	**0.04**	**-**	**0.41**
Average 2011	**0.01**	**-**	**0.01**	**0.15**	**0.61**	**0.37**	**0.24**	**0.01**	**0.25**	**0.19**	**1.19**
Average All Years	**0.01**	**0.15**	**0.13**	**0.21**	**1.02**	**0.37**	**0.17**	**0.10**	**0.15**	**0.15**	**2.07**

* Removed from calculations used for averages
CCME Protection of Aquatic Life Guideline - 26 ng/L
Average values for VDW-11 exclude the anomalous Oct 2008 values
Sampling locations and frequency governed by Amended C. of A. #3960-7Q4K2G, dated March 13, 2009

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TABLE 17a
METHYL MERCURY - INDIVIDUAL MINE DEWATERING WELLS
(unfiltered; concentrations in ng/L)

Date	VDW-2	VDW-3	VDW-6	VDW-7	VDW-11	VDW-12	VDW-14	VDW-15	VDW-17	VDW-18	VDW-22
Nov-07	-	-	-	-	-	-	-	-	-	-	-
Dec-07	-	-	<0.01	-	0.01	-	-	-	-	-	0.01
Jan-08	-	-	0.01	-	0.01	-	-	0.01	0.01	-	0.01
Feb-08	-	-	<0.01	-	<0.01	-	-	-	-	-	<0.01
Mar-08	-	-	0.02	-	0.02	-	-	0.02	0.01	-	0.02
Apr-08	-	-	-	-	0.01	-	-	0.01	<0.01	-	<0.01
Jul-08	-	-	0.01	-	0.02	-	-	0.02	0.02	-	0.01
Oct-08	-	<0.01	0.01	0.01	0.01	-	-	<0.01	0.01	-	0.01
Jan-09	-	-	-	-	-	-	-	-	-	-	-
Apr-09	-	0.01	0.01	-	0.02	-	-	0.02	<0.01	-	<0.01
Jul-09	-	0.03	-	-	0.01	-	-	-	-	-	-
Oct-09	-	0.01	0.01	0.01	0.01	-	-	0.01	0.01	-	0.04
Jan-10	-	0.04	0.03	0.07	0.07	-	0.03	0.06	0.20	-	0.06
Apr-10	-	0.01	0.05	0.01	0.01	-	<0.01	<0.01	0.02	-	0.01
Jul-10	-	0.02	0.01	<0.01	<0.01	-	<0.01	0.03	<0.01	-	<0.01
Oct-10	-	0.01	<0.01	<0.01	0.01	-	<0.01	<0.01	<0.01	0.03	<0.01
Jan-11	-	-	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Apr-11	-	-	<0.01	<0.01	<0.01	-	-	0.55	<0.01	-	0.03
Jul-11	0.01	-	-	<0.01	0.03	0.01	0.01	0.01	<0.01	0.01	0.01
Oct-11	0.01	-	0.04	0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.06	0.01
Average 2009	**-**	**0.02**	**0.01**	**0.01**	**0.01**	**-**	**-**	**0.02**	**0.01**	**-**	**0.02**
Average 2010	**-**	**0.02**	**0.03**	**0.03**	**0.02**	**-**	**-**	**0.03**	**0.06**	**-**	**0.02**
Average 2011	**0.01**	**-**	**0.02**	**0.01**	**0.02**	**0.01**	**0.01**	**0.14**	**<0.01**	**0.03**	**0.01**
Average All Years	**0.01**	**0.02**	**0.02**	**0.02**	**0.02**	**0.01**	**0.01**	**0.05**	**0.02**	**0.03**	**0.02**

TABLE 17b
METHYL MERCURY - INDIVIDUAL MINE DEWATERING WELLS
(filtered; concentrations in ng/L)

Date	VDW-2	VDW-3	VDW-6	VDW-7	VDW-11	VDW-12	VDW-14	VDW-15	VDW-17	VDW-18	VDW-22
Nov-07	-	-	0.01	-	0.01	-	-	-	-	-	<0.01
Dec-07	-	-	0.01	-	<0.01	-	-	-	-	-	0.01
Jan-08	-	-	0.01	-	0.01	-	-	0.01	0.01	-	0.01
Feb-09	-	-	0.01	-	0.01	-	-	-	-	-	0.01
Mar-09	-	-	<0.01	-	0.01	-	-	0.01	0.01	-	0.02
Apr-08	-	-	-	-	0.01	-	-	0.02	0.01	-	0.02
Jul-08	-	-	0.02	-	<0.01	-	-	0.01	0.01	-	0.02
Oct-08	-	0.01	<0.01	<0.01	<0.01	-	-	0.01	0.01	-	0.01
Jan-09	-	-	-	-	-	-	-	-	-	-	-
Apr-09	-	0.01	0.02	-	0.02	-	-	0.02	0.01	-	0.02
Jul-09	-	0.05	0.18	-	0.06	-	-	0.03	0.14	-	0.03
Oct-09	-	0.01	0.01	0.01	0.01	-	-	0.01	0.01	-	0.01
Jan-10	-	0.07	0.02	0.04	<0.01	-	0.04	0.01	0.02	-	0.01
Apr-10	-	0.01	0.01	<0.01	0.02	-	<0.01	<0.01	0.01	-	<0.01
Jul-10	-	0.01	0.02	0.01	0.01	-	0.04	<0.01	0.01	-	<0.01
Oct-10	-	0.01	0.01	0.01	0.01	-	<0.01	<0.01	<0.01	0.05	<0.01
Jan-11	-	-	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Apr-11	-	-	<0.01	<0.01	<0.01	-	-	<0.01	0.01	-	<0.01
Jul-11	0.01	-	-	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Oct-11	0.01	-	0.04	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.05	<0.01
Average 2009	**-**	**0.02**	**0.07**	**0.01**	**0.03**	**-**	**-**	**0.02**	**0.05**	**-**	**0.02**
Average 2010	**-**	**0.03**	**0.01**	**0.02**	**0.01**	**-**	**-**	**0.01**	**0.01**	**-**	**0.01**
Average 2011	**0.01**	**-**	**0.03**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**<0.01**	**0.02**	**0.01**
Average All Years	**0.01**	**0.02**	**0.03**	**0.01**	**0.01**	**0.01**	**0.02**	**0.01**	**0.02**	**0.03**	**0.01**

Notes:
CCME Protection of Aquatic Life Guideline - 4 ng/L (unfiltered)
Sampling locations and frequency governed by Amended C. of A. #3960-7Q4K2G, dated March 13, 2009

TABLE 18
SPECIES-SPECIFIC CPUE FOR ELECTROSHOCKING
BY LOCATION DURING 2011

Waterbody		Attawapiskat River			Nayshkootayaow River		North Granny Cr.	Catch (n)
Sample Area		ATT-US*	ATT-NF*	ATT-FF*	NAY-DS-ST6*	NAY-US-ST3*	NGC*	
Date (mm/dd/yy)		27/08/11	28/08/11	04/09/11	31/08/11	30/08/11	04/09/11	
Elextroshocking Seconds		7740	11761	12089	7100	4424	1010	
Species-specific CPUE (fish/electroshocking second*100)	Burbot	0.00	0.04	0.00	0.00	0.00	0.00	5
	Brook Stickleback	0.00	0.00	0.00	0.00	0.07	0.40	7
	Northern Redbelly Dace	0.00	0.00	0.00	0.00	0.00	0.00	0
	Blacknose Shiner	0.00	0.00	0.11	0.00	0.00	0.00	13
	Blacknose Dace	0.00	0.00	0.00	0.01	0.11	0.00	6
	Emerald Shiner	0.06	0.00	0.00	0.00	0.00	0.00	5
	Mottled Sculpin	0.05	0.14	0.08	0.07	0.11	0.00	41
	Slimy Sculpin	0.01	0.07	0.01	0.00	0.00	0.00	10
	Pearl Dace	0.14	0.13	0.11	0.58	0.90	0.00	120
	Johnny Darter	0.04	0.05	0.02	0.01	0.05	0.00	14
	Iowa Darter	0.00	0.03	0.00	0.00	0.00	0.10	4
	Logperch	0.01	0.03	0.03	0.07	0.16	0.00	21
	Trout Perch	3.15	1.01	1.03	0.58	0.32	0.00	543
	Longnose Dace	0.00	0.00	0.01	0.01	0.00	0.00	2
	Northern Pike	0.06	0.12	0.06	0.00	0.02	0.00	27
	Shorthead Redhorse Sucker	0.14	0.00	0.05	0.00	0.00	0.00	17
	Longnose Sucker	0.10	0.21	0.00	0.00	0.00	0.00	33
	Walleye	0.39	0.06	0.39	0.03	0.00	0.00	86
	Lake Sturgeon	0.01	0.00	0.00	0.00	0.00	0.00	1
	White Sucker	0.14	0.25	0.10	0.15	0.45	0.00	83
CPUE Total		4.33	1.69	1.35	1.52	2.12	0.50	1038

Note
* - Comprised of multiple capture events

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TABLE 19
SPECIES-SPECIFIC CPUE IN MINNOW TRAPS
BY LOCATION DURING 2011

Waterbody	North Granny Cr.	South Granny Cr.	Tributary 5A	Catch (n)
Sample Area	NGC*	SGC*	ST-5A	
Date (mm/dd/yy)	9/1/2011**	31-Aug-11	01-Sep-11	
Total Trap Hours (# traps*hours)	1080	731	287	
Pearl Dace	0.251	0.007	0.912	538
Finescale Dace	0.060	0.000	0.254	138
Northern Redbelly Dace	0.015	0.000	0.031	25
White Sucker	0.004	0.001	0.132	43
Longnose Sucker	0.001	0.000	0.000	1
Johnny Darter	0.006	0.000	0.000	7
BrookStickleback	0.000	0.000	0.014	4
CPUE Total	0.337	0.008	1.343	756

Note

* - Comprised of multiple capture events

** - Also included samples collected from July 15 to 17, 2011

TABLE 20
SPECIES-SPECIFIC CPUE IN SEINE NETTING
BY LOCATION DURING 2011

Waterbody	North Granny Creek	South Granny Creek	Catch (n)
Sample Area	NGC*	SGC*	
Date (mm/dd/yy)	16/07/11	15/07/11	
Effort (# of Seine Hauls)	2	2	
Pearl Dace	2.5	32.5	35
CPUE Total	2.50	32.50	35

Note
* - Comprised of multiple capture events

TABLE 21
SUMMARY OF PRESENTED FISH BODY BURDEN COMPARISONS

Sampling Area / Waterbody	Species Investigated
NGC / SGC / ST-5A	Pearl Dace
NAY-US-ST3 / NAY-DS-T6 / MC	Pearl Dace, Trout-Perch
ATT-US / ATT-NF / ATT-FF / ATT-COM	Trout-Perch

TABLE 22
PEARL DACE DESCRIPTIVE STATISTICS

Year	Area	Sample Size (n)	Total Length (mm)					Round Weight (g)					Total Hg (µg/g)				
			Mean	SE	Min	Max	Median	Mean	SE	Min	Max	Median	Mean	SE	Min	Max	Median
2008	NAY-DS6	4	77.75	8.14	57	95	79.5	4.43	1.25	1.57	7.23	4.46	0.059	0.010	0.030	0.074	0.066
	NGC	7	80.57	1.66	49	119	88	5.35	1.66	1.13	13.58	5.18	0.176	0.014	0.108	0.226	0.183
	SGC	5	90.00	7.80	67	112	89	6.80	1.82	2.36	12.24	5.70	0.151	0.013	0.115	0.194	0.146
	ST-5A	30	48.07	2.89	31	85	45	1.13	0.20	0.20	4.53	0.75	0.059	0.004	0.022	0.108	0.058
2009	ATT-US	6	33.16	1.56	26	36	34.5	0.33	0.04	0.18	0.42	0.34	0.033	0.002	0.029	0.042	0.032
	ATT-FF	14	43.93	8.98	27	159	34.5	3.49	3.00	0.17	43.79	3.10	0.072	0.008	0.042	0.163	0.068
	NAY-US-ST3	23	47.26	2.92	26	71	52	1.04	0.15	0.15	2.65	1.11	0.042	0.002	0.028	0.064	0.042
	NAY-DS6	17	43.91	3.84	22	71	51	0.97	0.19	0.07	2.80	1.12	0.042	0.004	0.025	0.089	0.038
	NGC	18	48.44	3.77	38	104	44	1.45	0.57	0.51	10.79	0.77	0.066	0.005	0.038	0.116	0.062
	SGC	19	70.53	4.01	49	107	64	3.66	0.62	1.10	10.35	2.70	0.166	0.027	0.040	0.522	0.199
	ST-5A	32	71.72	6.16	24	151	78	5.97	1.17	0.11	27.83	4.64	0.076	0.010	0.011	0.227	0.072
2010	NAY-US-ST3	30	44.33	2.54	34	107	41	1.02	0.35	0.29	10.77	0.58	0.058	0.002	0.038	0.081	0.058
	NAY-DS6	29	40.00	0.93	30	51	41	0.54	0.04	0.24	0.97	0.57	0.087	0.007	0.058	0.235	0.074
	NGC	40	68.45	2.62	48	95	64	3.58	0.39	0.98	8.36	2.62	0.259	0.021	0.101	0.689	0.234
	SGC	40	65.05	1.92	49	93	62	2.67	0.23	1.13	6.16	2.29	0.168	0.013	0.071	0.431	0.141
	ST-5A	40	71.00	2.31	38	94	74	3.91	0.34	0.54	8.17	3.91	0.060	0.005	0.018	0.163	0.052
2011	NAY-US-ST3	40	54.00	2.35	30	77	60	1.58	0.16	0.32	3.80	1.75	0.064	0.003	0.031	0.103	0.064
	NAY-DS6	41	47.20	2.32	31	87	42	1.11	0.19	0.23	5.05	0.59	0.070	0.006	0.035	0.244	0.055
	NGC	106	71.32	0.93	32	96	72	3.33	0.11	0.28	7.41	3.28	0.350	0.014	0.083	0.724	0.324
	SGC	34	57.03	2.45	15	100	53.5	1.68	0.24	0.71	7.74	1.14	0.157	0.030	0.034	0.826	0.092
	ST-5A	40	87.63	3.39	56	138	84.5	6.64	0.80	1.56	21.69	4.80	0.109	0.008	0.026	0.260	0.100

TABLE 23
COMPARISON BY ANOVA OF TOTAL MERCURY (ARCSIN TRANSFORMED) BETWEEN LOCATION (2011)

Species	Trophic Guild	ANOVA all Locations			Tukeys Post-hoc Comparisons (alpha = 0.05)		
		F-value	P-value	P < 0.05	ATT	NAYSH	GC / ST- 5A
Pearl Dace	Invertivore	103.67	< 0.001	Y	—	NAY-US-ST3 = NAY-DS6	NGC ≠ SGC, NGC ≠ ST-5A, SGC = ST-5A
Trout-Perch	Invertivore	5.32	< 0.001	Y	ATT-US ≠ ATT-NF, ATT-US = ATT-FF, ATT-NF = ATT-FF	NAY-US-ST3 ≠ NAY-DS6	—

TABLE 24
COMPARISON BY ANOVA OF TOTAL MERCURY BETWEEN YEARS (2008 to 2011)

Species	Location	ANOVA all Years			Tukeys Post-hoc Comparisons (alpha = 0.05)
		F-value	P-value	p< 0.05	
Pearl Dace	NGC	38.92	< 0.001	Y	2011 ≠ 2008 ≠ 2009 2008 = 2010 2011 ≠ 2009 ≠ 2010 2010 ≠ 2011
	SGC	1.50	0.22	N	—
	ST-5A	11.16	< 0.001	Y	2008 = 2009 = 2010 2011 ≠ 2008, 2009 or 2010
	NAY-US-ST3	19.29	< 0.001	Y	2011 ≠ 2009 ≠ 2010 2010 = 2011
	NAY-DS6	8.27	< 0.001	Y	2008 = 2009, 2010 and 2011 2011 ≠ 2009 ≠ 2010 2010 = 2011
Trout-Perch	ATT-US	18.54	< 0.001	Y	2008 ≠ 2009, 2011 2008 = 2010 2011 = 2009 ≠ 2010 2010 ≠ 2011
	ATT-NF	10.867	0.002	Y	2009 ≠ 2010, 2011 2010 = 2011
	ATT-FF	25.72	< 0.001	Y	2008 ≠ 2009, 2010 or 2011 2009 = 2010, 2011 2010 ≠ 2011
	NAY-US-ST3	0.489	0.62	N	—
	NAY-DS6	57.72	< 0.001	Y	2008 ≠ 2009, 2010 or 2011 2011 ≠ 2009 = 2010 2010 ≠ 2011

TABLE 25
SUMMARY OF STANDARDIZED LENGTHS AND EXTRAPOLATED MERCURY BODY BURDENS FROM REGRESSION RELATIONSHIPS

Size Group	Species	Sample Area	Standardized Total Length (mm)	Extrapolated Mercury Body Burden (µg/g = ppm)			
				2008	2009	2010	2011
Small bodied	Pearl Dace	NGC	60	0.161*	0.079	0.229	0.326*
		SGC		0.103	0.170*	0.146	0.178
		ST-5A		0.063	0.065*	0.041	0.076
	Trout-Perch	ATT-US	50	0.091	0.052	0.111*	0.044
		ATT-NF		—	0.146*	0.074	0.060
		ATT-FF		0.112	0.098*	0.098	0.039
		NAY-US-ST3		—	—	0.047	0.081
		NAY-DS6		0.098	0.081	0.109*	.040*

Notes

"—" = insufficient data for relationship generation

* = Relationship not statistically significant

TABLE 26
Granny Creek and Tributary 5A Background Methyl Mercury Water Quality Concentrations (filtered, ng/L)

Date	North Granny Creek DS	South Granny Creek DS	Tributary 5A
Jul-06	0.08	0.02	
Oct-06	0.14	0.08	
Jan-07	0.13	0.10	
May-07	0.09	0.06	
Jul-07	0.10	0.04	
Oct-07	0.07	0.05	
Jan-08	0.15		
Feb-08	0.01	0.07	0.02
Mar-08	0.17		
Apr-08	0.05	0.09	0.02
Jul-08	0.49	0.06	0.03
Oct-08	0.11	0.03	0.02
Jan-09	0.06	0.04	0.01
Apr-09	0.01	0.02	0.02
Jul-09	0.12	0.05	0.03
Oct-09	0.04	0.02	0.04
Jan-10	0.04	0.02	0.02
Apr-10	0.05	0.05	0.02
Jul-10	0.10	0.06	0.03
Oct-10	0.13	0.07	0.02
Jan-11	<0.01	0.11	0.05
Apr-11	0.03	<0.01	0.01
Jul-11	0.39	0.13	0.04
Oct-11	0.25	0.08	0.03
Average 2008	**0.16**	**0.06**	**0.02**
Average 2009	**0.06**	**0.03**	**0.03**
Average 2010	**0.08**	**0.05**	**0.02**
Average 2011	**0.17**	**0.08**	**0.03**
Average All Years	**0.12**	**0.06**	**0.03**

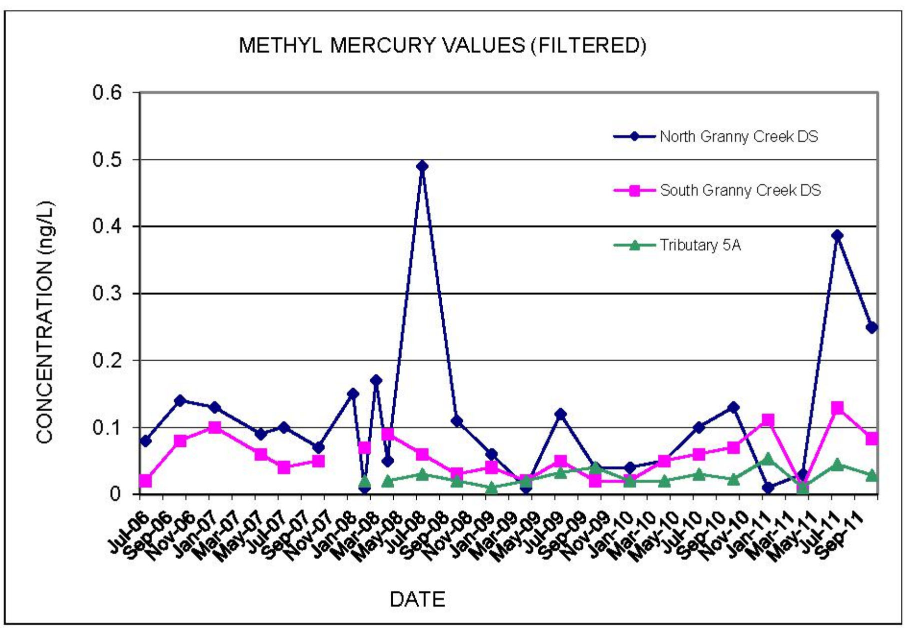

TABLE 27
TROUT-PERCH DESCRIPTIVE STATISTICS

Year	Area	Sample Size (n)	Total Length (mm)					Round Weight (g)					Total Hg (µg/g)				
			Mean	SE	Min	Max	Median	Mean	SE	Min	Max	Median	Mean	SE	Min	Max	Median
2008	ATT-US	63	54.64	3.33	27	115	36	2.73	0.45	0.19	14.03	0.49	0.096	0.005	0.041	0.218	0.081
	ATT-FF	24	78.71	2.51	64	101	72.5	5.03	0.52	2.37	10.53	3.54	0.164	0.008	0.106	0.248	0.164
	NAY-DS6	33	69.15	2.47	44	104	72	3.46	0.35	0.84	10.12	3.51	0.176	0.012	0.072	0.358	0.167
	SGC	1	77.00	—	77	77	77	4.72	—	4.72	4.72	4.72	0.182	—	0.182	0.182	0.182
2009	ATT-US	20	59.65	4.97	30	97	64	2.83	0.59	0.28	8.79	2.36	0.058	0.004	0.030	0.113	0.055
	ATT-NF	35	38.68	2.21	23	70	34	0.76	0.14	0.16	3.04	0.37	0.196	0.037	0.040	0.760	0.064
	ATT-FF	34	50.32	4.01	29	104	36	2.08	0.47	0.27	10.46	0.47	0.096	0.012	0.028	0.339	0.074
	NAY-US-ST3	1	67.00	—	67	67	67	2.86	—	2.86	2.86	2.86	0.065	—	0.065	0.065	0.065
	NAY-DS6	27	59.93	4.80	24	92	69	3.04	0.48	0.19	7.56	3.42	0.098	0.010	0.032	0.227	0.093
2010	ATT-US	58	47.97	1.20	30	81	46	1.14	0.11	0.31	5.14	0.93	0.106	0.010	0.038	0.484	0.091
	ATT-NF	38	49.32	0.95	40	61	48.5	1.17	0.06	0.65	2.12	1.07	0.074	0.002	0.054	0.106	0.070
	ATT-FF	50	57.20	2.23	35	87	55	2.18	0.26	0.41	5.92	1.51	0.097	0.002	0.064	0.132	0.096
	NAY-US-ST3	20	42.40	1.04	34	50	44	0.69	0.05	0.40	1.05	0.74	0.074	0.007	0.030	0.204	0.070
	NAY-DS6	31	52.68	2.79	38	87	45	1.70	0.29	0.50	5.74	0.81	0.108	0.004	0.081	0.165	0.104
2011	ATT-US	103	67.37	2.54	33	124	69	3.99	0.37	0.08	18.73	2.76	0.062	0.004	0.006	0.291	0.056
	ATT-NF	62	53.03	1.27	37	89	52	1.55	0.15	0.34	6.16	1.26	0.065	0.002	0.033	0.140	0.063
	ATT-FF	80	75.29	2.56	38	127	84	4.93	0.43	0.51	19.37	5.30	0.075	0.004	0.018	0.198	0.074
	NAY-US-ST3	14	54.93	5.70	34	100	52	2.36	0.65	0.40	9.17	1.44	0.087	0.013	0.048	0.236	0.070
	NAY-DS6	41	35.02	0.76	27	52	34	0.44	0.04	0.11	1.32	0.38	0.051	0.003	0.020	0.096	0.047

TABLE 28a

MUSKEG MONITORING PROGRAM - STATISTICAL ANALYSIS OF CLUSTER PEAT HORIZON MERCURY PORE WATERS

ANNUAL SAMPLING PROGRAM AUGUST / SEPTEMBER 2011 RESULTS - CLUSTER S-1

TOTAL AND METHYL MERCURY PORE WATER CONCENTRATIONS (ng/L)

Cluster Location	Substrate/Condition	Well Name	Total Mercury (Filtered)	Methyl Mercury (Filtered)
S-1	Peat - Domed Bog	MS-1-D	0.37	0.08
	Peat - Flat Bog	MS-1-F	1.18	<0.01
	Peat - Horizontal Fen	MS-1-H	0.30	0.01
	Peat - Ribbed Fen	MS-1-R	0.91	0.05
S-2	Peat - Domed Bog	MS-2-D	4.69	0.01
	Peat - Flat Bog	MS-2-F	5.79	0.10
	Peat - Ribbed Fen	MS-2-R	4.60	0.06
S-7	Peat - Domed Bog	MS-7-D	0.74	0.04
	Peat - Flat Bog	MS-7-F	1.09	0.01
	Peat - Horizontal Fen	MS-7-H	0.61	0.03
	Peat - Ribbed Fen	MS-7-R	0.36	0.01
S-8	Peat - Domed Bog	MS-8-D	1.20	0.11
	Peat - Flat Bog	MS-8-F	4.34	0.16
	Peat - Horizontal Fen	MS-8-H	0.01	<0.01
	Peat - Ribbed Fen	MS-8-R	1.18	0.02
S-9(1)	Peat - Domed Bog	MS-9(1)-D	0.01	0.01
	Peat - Flat Bog	MS-9(1)-F	0.69	<0.01
	Peat - Horizontal Fen	MS-9(1)-H	0.71	0.04
	Peat - Ribbed Fen	MS-9(1)-R	0.42	0.02
S-9(2)	Peat - Domed Bog	MS-9(2)-D	0.93	0.01
	Peat - Flat Bog	MS-9(2)-F	0.98	0.05
	Peat - Horizontal Fen	MS-9(2)-H	0.01	<0.01
	Peat - Ribbed Fen	MS-9(2)-R	5.16	0.18
S-13	Peat - Domed Bog	MS-13-D	7.02	0.08
	Peat - Flat Bog	MS-13-F	1.83	0.19
	Peat - Horizontal Fen	MS-13-H	0.31	0.02
	Peat - Ribbed Fen	MS-13-R	0.01	0.03
S-15	Peat - Domed Bog	MS-15-D	0.34	0.05
	Peat - Flat Bog	MS-15-F	1.92	0.16
	Peat - Horizontal Fen	MS-15-H	0.01	0.02
	Peat - Ribbed Fen	MS-15-R	0.01	0.01
S-V1	Peat - Domed Bog	MS-V(1)-D	0.49	0.03
	Peat - Ribbed Fen	MS-V(1)-R	4.60	0.06
S-V2	Peat - Domed Bog	MS-V(2)-D	0.52	0.07
	Peat - Ribbed Fen	MS-V(2)-R	0.01	0.01
S-V3	Peat - Domed Bog	MS-V(3)-D	5.20	0.07
	Peat - Ribbed Fen	MS-V(3)-R	0.89	0.01

Clusters used for statistical analysis

TWO-WAY ANALYSIS OF VARIANCE TABLES

TOTAL MERCURY

Habitat	Control Mean (S13+S15)	S-1	Sum r.
D. Bog	3.68	0.37	4.050
F. Bog	1.88	1.18	3.055
H. Fen	0.16	0.3	0.460
R. Fen	0.01	0.91	0.920
Sum c.	5.73	2.760	8.485

Total SS	10.532
Treat SS	1.099
Block SS	4.397
Error SS	5.035

ANOVA Table

Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	7	10.532	-		
Treatment	1	1.099	1.099	**0.65**	10.1
Block	3	4.397	1.466	0.87	9.28
Error	3	5.035	1.678		

Treatment Effect (i.e., difference between Control and S-1) **Not Significant**

METHYL MERCURY

Habitat	Control Mean (S13+S15)	S-1	Sum r.
D. Bog	0.07	0.08	0.145
F. Bog	0.18	0.01	0.185
H. Fen	0.02	0.01	0.030
R. Fen	0.02	0.05	0.070
Sum c.	0.28	0.150	0.430

Total SS	0.022
Treat SS	0.002
Block SS	0.007
Error SS	0.012

ANOVA Table

Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	7	0.022	-		
Treatment	1	0.002	0.002	**0.52**	10.1
Block	3	0.007	0.002	0.61	9.28
Error	3	0.012	0.004		

Treatment Effect (i.e., difference between Control and S-1) **Not Significant**

TABLE 28b
MUSKEG MONITORING PROGRAM - STATISTICAL ANALYSIS OF CLUSTER PEAT HORIZON MERCURY PORE WATERS
ANNUAL SAMPLING PROGRAM AUGUST / SEPTEMBER 2011 RESULTS - CLUSTER S-2

TOTAL AND METHYL MERCURY PORE WATER CONCENTRATIONS (ng/L)

Cluster Location	Substrate/Condition	Well Name	Total Mercury (Filtered)	Methyl Mercury (Filtered)
S-1	Peat - Domed Bog	MS-1-D	0.37	0.08
	Peat - Flat Bog	MS-1-F	1.18	<0.01
	Peat - Horizontal Fen	MS-1-H	0.30	0.01
	Peat - Ribbed Fen	MS-1-R	0.91	0.05
S-2	Peat - Domed Bog	MS-2-D	4.69	0.01
	Peat - Flat Bog	MS-2-F	5.79	0.10
	Peat - Ribbed Fen	MS-2-R	4.60	0.06
S-7	Peat - Domed Bog	MS-7-D	0.74	0.04
	Peat - Flat Bog	MS-7-F	1.09	0.01
	Peat - Horizontal Fen	MS-7-H	0.61	0.03
	Peat - Ribbed Fen	MS-7-R	0.36	0.01
S-8	Peat - Domed Bog	MS-8-D	1.20	0.11
	Peat - Flat Bog	MS-8-F	4.34	0.16
	Peat - Horizontal Fen	MS-8-H	0.01	<0.01
	Peat - Ribbed Fen	MS-8-R	1.18	0.02
S-9(1)	Peat - Domed Bog	MS-9(1)-D	0.01	0.01
	Peat - Flat Bog	MS-9(1)-F	0.69	<0.01
	Peat - Horizontal Fen	MS-9(1)-H	0.71	0.04
	Peat - Ribbed Fen	MS-9(1)-R	0.42	0.02
S-9(2)	Peat - Domed Bog	MS-9(2)-D	0.93	0.01
	Peat - Flat Bog	MS-9(2)-F	0.98	0.05
	Peat - Horizontal Fen	MS-9(2)-H	0.01	<0.01
	Peat - Ribbed Fen	MS-9(2)-R	5.16	0.18
S-13	Peat - Domed Bog	MS-13-D	7.02	0.08
	Peat - Flat Bog	MS-13-F	1.83	0.19
	Peat - Horizontal Fen	MS-13-H	0.31	0.02
	Peat - Ribbed Fen	MS-13-R	0.01	0.03
S-15	Peat - Domed Bog	MS-15-D	0.34	0.05
	Peat - Flat Bog	MS-15-F	1.92	0.16
	Peat - Horizontal Fen	MS-15-H	0.01	0.02
	Peat - Ribbed Fen	MS-15-R	0.01	0.01
S-V1	Peat - Domed Bog	MS-V(1)-D	0.49	0.03
	Peat - Ribbed Fen	MS-V(1)-R	4.60	0.06
S-V2	Peat - Domed Bog	MS-V(2)-D	0.52	0.07
	Peat - Ribbed Fen	MS-V(2)-R	0.01	0.01
S-V3	Peat - Domed Bog	MS-V(3)-D	5.20	0.07
	Peat - Ribbed Fen	MS-V(3)-R	0.89	0.01

Clusters used for statistical analysis

TWO-WAY ANALYSIS OF VARIANCE TABLES

TOTAL MERCURY

Habitat	Control Mean (S13+S15)	S-2	Sum r.
D. Bog	3.68	4.69	8.370
F. Bog	1.88	5.79	7.665
R. Fen	0.01	4.6	4.610
Sum c.	5.565	15.080	20.645

Total SS	22.702
Treat SS	15.089
Block SS	3.995
Error SS	3.619

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	5	22.702	-		
Treatment	1	15.089	15.089	**8.34**	18.5
Block	2	3.995	1.997	1.10	19.0
Error	2	3.619	1.809		

Treatment Effect (i.e., difference between Control and S-2) **Not Significant**

METHYL MERCURY

Habitat	Control Mean (S13+S15)	S-2	Sum r.
D. Bog	0.07	0.01	0.075
F. Bog	0.18	0.10	0.275
R. Fen	0.02	0.06	0.080
Sum c.	0.26	0.170	0.430

Total SS	0.018
Treat SS	0.001
Block SS	0.013
Error SS	0.004

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	5	0.018	-		
Treatment	1	0.001	0.001	**0.72**	18.5
Block	2	0.013	0.007	3.45	19.0
Error	2	0.004	0.002		

Treatment Effect (i.e., difference between Control and S-2) **Not Significant**

TABLE 28c

MUSKEG MONITORING PROGRAM - STATISTICAL ANALYSIS OF CLUSTER PEAT HORIZON MERCURY PORE WATERS

ANNUAL SAMPLING PROGRAM AUGUST / SEPTEMBER 2011 RESULTS - CLUSTER S-7

TOTAL AND METHYL MERCURY PORE WATER CONCENTRATIONS (ng/L)

Cluster Location	Substrate/Condition	Well Name	Total Mercury (Filtered)	Methyl Mercury (Filtered)
S-1	Peat - Domed Bog	MS-1-D	0.37	0.08
	Peat - Flat Bog	MS-1-F	1.18	<0.01
	Peat - Horizontal Fen	MS-1-H	0.30	0.01
	Peat - Ribbed Fen	MS-1-R	0.91	0.05
S-2	Peat - Domed Bog	MS-2-D	4.69	0.01
	Peat - Flat Bog	MS-2-F	5.79	0.10
	Peat - Ribbed Fen	MS-2-R	4.60	0.06
S-7	Peat - Domed Bog	MS-7-D	0.74	0.04
	Peat - Flat Bog	MS-7-F	1.09	0.01
	Peat - Horizontal Fen	MS-7-H	0.61	0.03
	Peat - Ribbed Fen	MS-7-R	0.36	0.01
S-8	Peat - Domed Bog	MS-8-D	1.20	0.11
	Peat - Flat Bog	MS-8-F	4.34	0.16
	Peat - Horizontal Fen	MS-8-H	0.01	<0.01
	Peat - Ribbed Fen	MS-8-R	1.18	0.02
S-9(1)	Peat - Domed Bog	MS-9(1)-D	0.01	0.01
	Peat - Flat Bog	MS-9(1)-F	0.69	<0.01
	Peat - Horizontal Fen	MS-9(1)-H	0.71	0.04
	Peat - Ribbed Fen	MS-9(1)-R	0.42	0.02
S-9(2)	Peat - Domed Bog	MS-9(2)-D	0.93	0.01
	Peat - Flat Bog	MS-9(2)-F	0.98	0.05
	Peat - Horizontal Fen	MS-9(2)-H	0.01	<0.01
	Peat - Ribbed Fen	MS-9(2)-R	5.16	0.18
S-13	Peat - Domed Bog	MS-13-D	7.02	0.08
	Peat - Flat Bog	MS-13-F	1.83	0.19
	Peat - Horizontal Fen	MS-13-H	0.31	0.02
	Peat - Ribbed Fen	MS-13-R	0.01	0.03
S-15	Peat - Domed Bog	MS-15-D	0.34	0.05
	Peat - Flat Bog	MS-15-F	1.92	0.16
	Peat - Horizontal Fen	MS-15-H	0.01	0.02
	Peat - Ribbed Fen	MS-15-R	0.01	0.01
S-V1	Peat - Domed Bog	MS-V(1)-D	0.49	0.03
	Peat - Ribbed Fen	MS-V(1)-R	4.60	0.06
S-V2	Peat - Domed Bog	MS-V(2)-D	0.52	0.07
	Peat - Ribbed Fen	MS-V(2)-R	0.01	0.01
S-V3	Peat - Domed Bog	MS-V(3)-D	5.20	0.07
	Peat - Ribbed Fen	MS-V(3)-R	0.89	0.01

Clusters used for statistical analysis (green shading: S-7, S-13, S-15)

TWO-WAY ANALYSIS OF VARIANCE TABLES

TOTAL MERCURY

Habitat	Control Mean (S13+S15)	S-7	Sum r.
D. Bog	3.68	0.74	4.420
F. Bog	1.88	1.09	2.965
H. Fen	0.16	0.61	0.770
R. Fen	0.01	0.36	0.370
Sum c.	5.725	2.800	8.525

Total SS	10.237
Treat SS	1.069
Block SS	5.444
Error SS	3.723

ANOVA Table

Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	7	10.237	-		
Treatment	1	1.069	1.069	**0.86**	10.1
Block	3	5.444	1.815	1.46	9.28
Error	3	3.723	1.241		

Treatment Effect (i.e., difference between Control and S-7) **Not Significant**

METHYL MERCURY

Habitat	Control Mean (S13+S15)	S-7	Sum r.
D. Bog	0.07	0.04	0.105
F. Bog	0.18	0.01	0.185
H. Fen	0.02	0.03	0.050
R. Fen	0.02	0.01	0.030
Sum c.	0.28	0.090	0.370

Total SS	0.021
Treat SS	0.005
Block SS	0.007
Error SS	0.010

ANOVA Table

Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	7	0.021	-		
Treatment	1	0.005	0.005	**1.42**	10.1
Block	3	0.007	0.002	0.76	9.28
Error	3	0.010	0.003		

Treatment Effect (i.e., difference between Control and S-7) **Not Significant**

TABLE 28d

MUSKEG MONITORING PROGRAM - STATISTICAL ANALYSIS OF CLUSTER PEAT HORIZON MERCURY PORE WATERS

ANNUAL SAMPLING PROGRAM AUGUST / SEPTEMBER 2011 RESULTS - CLUSTER S-8

TOTAL AND METHYL MERCURY PORE WATER CONCENTRATIONS (ng/L)

Cluster Location	Substrate/Condition	Well Name	Total Mercury (Filtered)	Methyl Mercury (Filtered)
S-1	Peat - Domed Bog	MS-1-D	0.37	0.08
	Peat - Flat Bog	MS-1-F	1.18	<0.01
	Peat - Horizontal Fen	MS-1-H	0.30	0.01
	Peat - Ribbed Fen	MS-1-R	0.91	0.05
S-2	Peat - Domed Bog	MS-2-D	4.69	0.01
	Peat - Flat Bog	MS-2-F	5.79	0.10
	Peat - Ribbed Fen	MS-2-R	4.60	0.06
S-7	Peat - Domed Bog	MS-7-D	0.74	0.04
	Peat - Flat Bog	MS-7-F	1.09	0.01
	Peat - Horizontal Fen	MS-7-H	0.61	0.03
	Peat - Ribbed Fen	MS-7-R	0.36	0.01
S-8	Peat - Domed Bog	MS-8-D	1.20	0.11
	Peat - Flat Bog	MS-8-F	4.34	0.16
	Peat - Horizontal Fen	MS-8-H	0.01	<0.01
	Peat - Ribbed Fen	MS-8-R	1.18	0.02
S-9(1)	Peat - Domed Bog	MS-9(1)-D	0.01	0.01
	Peat - Flat Bog	MS-9(1)-F	0.69	<0.01
	Peat - Horizontal Fen	MS-9(1)-H	0.71	0.04
	Peat - Ribbed Fen	MS-9(1)-R	0.42	0.02
S-9(2)	Peat - Domed Bog	MS-9(2)-D	0.93	0.01
	Peat - Flat Bog	MS-9(2)-F	0.98	0.05
	Peat - Horizontal Fen	MS-9(2)-H	0.01	<0.01
	Peat - Ribbed Fen	MS-9(2)-R	5.16	0.18
S-13	Peat - Domed Bog	MS-13-D	7.02	0.08
	Peat - Flat Bog	MS-13-F	1.83	0.19
	Peat - Horizontal Fen	MS-13-H	0.31	0.02
	Peat - Ribbed Fen	MS-13-R	0.01	0.03
S-15	Peat - Domed Bog	MS-15-D	0.34	0.05
	Peat - Flat Bog	MS-15-F	1.92	0.16
	Peat - Horizontal Fen	MS-15-H	0.01	0.02
	Peat - Ribbed Fen	MS-15-R	0.01	0.01
S-V1	Peat - Domed Bog	MS-V(1)-D	0.49	0.03
	Peat - Ribbed Fen	MS-V(1)-R	4.60	0.06
S-V2	Peat - Domed Bog	MS-V(2)-D	0.52	0.07
	Peat - Ribbed Fen	MS-V(2)-R	0.01	0.01
S-V3	Peat - Domed Bog	MS-V(3)-D	5.20	0.07
	Peat - Ribbed Fen	MS-V(3)-R	0.89	0.01

Clusters used for statistical analysis (green)

TWO-WAY ANALYSIS OF VARIANCE TABLES

TOTAL MERCURY

Habitat	Control Mean (S13+S15)	S-8	Sum r.
D. Bog	3.68	1.2	4.880
F. Bog	1.88	4.34	6.215
H. Fen	0.16	0.01	0.170
R. Fen	0.01	1.18	1.190
Sum c.	5.725	6.730	12.455

Total SS	19.361
Treat SS	0.126
Block SS	12.552
Error SS	6.683

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	7	19.361	-		
Treatment	1	0.126	0.126	**0.06**	10.1
Block	3	12.552	4.184	1.88	9.28
Error	3	6.683	2.228		

Treatment Effect (i.e., difference between Control and S-8) **Not Significant**

METHYL MERCURY

Habitat	Control Mean (S13+S15)	S-8	Sum r.
D. Bog	0.07	0.11	0.175
F. Bog	0.18	0.16	0.335
H. Fen	0.02	0.01	0.030
R. Fen	0.02	0.02	0.040
Sum c.	0.28	0.300	0.580

Total SS	0.032
Treat SS	0.000
Block SS	0.031
Error SS	0.001

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	7	0.032	-		
Treatment	1	0.000	0.000	**0.13**	10.1
Block	3	0.031	0.010	27.22	9.28
Error	3	0.001	0.000		

Treatment Effect (i.e., difference between Control and S-8) **Not Significant**

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TABLE 28e
MUSKEG MONITORING PROGRAM - STATISTICAL ANALYSIS OF CLUSTER PEAT HORIZON MERCURY PORE WATERS
ANNUAL SAMPLING PROGRAM AUGUST / SEPTEMBER 2011 RESULTS - CLUSTER S-9(1)

TOTAL AND METHYL MERCURY PORE WATER CONCENTRATIONS (ng/L)

Cluster Location	Substrate/Condition	Well Name	Total Mercury (Filtered)	Methyl Mercury (Filtered)
S-1	Peat - Domed Bog	MS-1-D	0.37	0.08
	Peat - Flat Bog	MS-1-F	1.18	<0.01
	Peat - Horizontal Fen	MS-1-H	0.30	0.01
	Peat - Ribbed Fen	MS-1-R	0.91	0.05
S-2	Peat - Domed Bog	MS-2-D	4.69	0.01
	Peat - Flat Bog	MS-2-F	5.79	0.10
	Peat - Ribbed Fen	MS-2-R	4.60	0.06
S-7	Peat - Domed Bog	MS-7-D	0.74	0.04
	Peat - Flat Bog	MS-7-F	1.09	0.01
	Peat - Horizontal Fen	MS-7-H	0.61	0.03
	Peat - Ribbed Fen	MS-7-R	0.36	0.01
S-8	Peat - Domed Bog	MS-8-D	1.20	0.11
	Peat - Flat Bog	MS-8-F	4.34	0.16
	Peat - Horizontal Fen	MS-8-H	0.01	<0.01
	Peat - Ribbed Fen	MS-8-R	1.18	0.02
S-9(1)	Peat - Domed Bog	MS-9(1)-D	0.01	0.01
	Peat - Flat Bog	MS-9(1)-F	0.69	<0.01
	Peat - Horizontal Fen	MS-9(1)-H	0.71	0.04
	Peat - Ribbed Fen	MS-9(1)-R	0.42	0.02
S-9(2)	Peat - Domed Bog	MS-9(2)-D	0.93	0.01
	Peat - Flat Bog	MS-9(2)-F	0.98	0.05
	Peat - Horizontal Fen	MS-9(2)-H	0.01	<0.01
	Peat - Ribbed Fen	MS-9(2)-R	5.16	0.18
S-13	Peat - Domed Bog	MS-13-D	7.02	0.08
	Peat - Flat Bog	MS-13-F	1.83	0.19
	Peat - Horizontal Fen	MS-13-H	0.31	0.02
	Peat - Ribbed Fen	MS-13-R	0.01	0.03
S-15	Peat - Domed Bog	MS-15-D	0.34	0.05
	Peat - Flat Bog	MS-15-F	1.92	0.16
	Peat - Horizontal Fen	MS-15-H	0.01	0.02
	Peat - Ribbed Fen	MS-15-R	0.01	0.01
S-V1	Peat - Domed Bog	MS-V(1)-D	0.49	0.03
	Peat - Ribbed Fen	MS-V(1)-R	4.60	0.06
S-V2	Peat - Domed Bog	MS-V(2)-D	0.52	0.07
	Peat - Ribbed Fen	MS-V(2)-R	0.01	0.01
S-V3	Peat - Domed Bog	MS-V(3)-D	5.20	0.07
	Peat - Ribbed Fen	MS-V(3)-R	0.89	0.01

Clusters used for statistical analysis

TWO-WAY ANALYSIS OF VARIANCE TABLES

TOTAL MERCURY

Habitat	Control Mean (S13+S15)	S-9(1)	Sum r.
D. Bog	3.68	0.01	3.690
F. Bog	1.88	0.69	2.565
H. Fen	0.16	0.71	0.870
R. Fen	0.01	0.42	0.430
Sum c.	5.725	1.830	7.555

Total SS	11.106
Treat SS	1.896
Block SS	3.434
Error SS	5.775

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	7	11.106	-		
Treatment	1	1.896	1.896	**0.99**	10.1
Block	3	3.434	1.145	0.59	9.28
Error	3	5.775	1.925		

Treatment Effect (i.e., difference between Control and S-9[1]) **Not Significant**

METHYL MERCURY

Habitat	Control Mean (S13+S15)	S-9(1)	Sum r.
D. Bog	0.07	0.01	0.075
F. Bog	0.18	0.01	0.185
H. Fen	0.02	0.04	0.060
R. Fen	0.02	0.02	0.040
Sum c.	0.28	0.080	0.360

Total SS	0.022
Treat SS	0.005
Block SS	0.006
Error SS	0.010

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	7	0.022	-		
Treatment	1	0.005	0.005	**1.45**	10.1
Block	3	0.006	0.002	0.61	9.28
Error	3	0.010	0.003		

Treatment Effect (i.e., difference between Control and S-9[1]) **Not Significant**

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TABLE 28f
MUSKEG MONITORING PROGRAM - STATISTICAL ANALYSIS OF CLUSTER PEAT HORIZON MERCURY PORE WATERS
ANNUAL SAMPLING PROGRAM AUGUST / SEPTEMBER 2011 RESULTS -CLUSTER S-9(2)

TOTAL AND METHYL MERCURY PORE WATER CONCENTRATIONS (ng/L)

Cluster Location	Substrate/Condition	Well Name	Total Mercury (Filtered)	Methyl Mercury (Filtered)
S-1	Peat - Domed Bog	MS-1-D	0.37	0.08
	Peat - Flat Bog	MS-1-F	1.18	<0.01
	Peat - Horizontal Fen	MS-1-H	0.30	0.01
	Peat - Ribbed Fen	MS-1-R	0.91	0.05
S-2	Peat - Domed Bog	MS-2-D	4.69	0.01
	Peat - Flat Bog	MS-2-F	5.79	0.10
	Peat - Ribbed Fen	MS-2-R	4.60	0.06
S-7	Peat - Domed Bog	MS-7-D	0.74	0.04
	Peat - Flat Bog	MS-7-F	1.09	0.01
	Peat - Horizontal Fen	MS-7-H	0.61	0.03
	Peat - Ribbed Fen	MS-7-R	0.36	0.01
S-8	Peat - Domed Bog	MS-8-D	1.20	0.11
	Peat - Flat Bog	MS-8-F	4.34	0.16
	Peat - Horizontal Fen	MS-8-H	0.01	<0.01
	Peat - Ribbed Fen	MS-8-R	1.18	0.02
S-9(1)	Peat - Domed Bog	MS-9(1)-D	0.01	0.01
	Peat - Flat Bog	MS-9(1)-F	0.69	<0.01
	Peat - Horizontal Fen	MS-9(1)-H	0.71	0.04
	Peat - Ribbed Fen	MS-9(1)-R	0.42	0.02
S-9(2)	Peat - Domed Bog	MS-9(2)-D	0.93	0.01
	Peat - Flat Bog	MS-9(2)-F	0.98	0.05
	Peat - Horizontal Fen	MS-9(2)-H	0.01	<0.01
	Peat - Ribbed Fen	MS-9(2)-R	5.16	0.18
S-13	Peat - Domed Bog	MS-13-D	7.02	0.08
	Peat - Flat Bog	MS-13-F	1.83	0.19
	Peat - Horizontal Fen	MS-13-H	0.31	0.02
	Peat - Ribbed Fen	MS-13-R	0.01	0.03
S-15	Peat - Domed Bog	MS-15-D	0.34	0.05
	Peat - Flat Bog	MS-15-F	1.92	0.16
	Peat - Horizontal Fen	MS-15-H	0.01	0.02
	Peat - Ribbed Fen	MS-15-R	0.01	0.01
S-V1	Peat - Domed Bog	MS-V(1)-D	0.49	0.03
	Peat - Ribbed Fen	MS-V(1)-R	4.60	0.06
S-V2	Peat - Domed Bog	MS-V(2)-D	0.52	0.07
	Peat - Ribbed Fen	MS-V(2)-R	0.01	0.01
S-V3	Peat - Domed Bog	MS-V(3)-D	5.20	0.07
	Peat - Ribbed Fen	MS-V(3)-R	0.89	0.01

Clusters used for statistical analysis

TWO-WAY ANALYSIS OF VARIANCE TABLES

TOTAL MERCURY

Habitat	Control Mean (S13+S15)	S-9(2)	Sum r.
D. Bog	3.68	0.93	4.610
F. Bog	1.88	0.98	2.855
H. Fen	0.16	0.01	0.170
R. Fen	0.01	5.16	5.170
Sum c.	5.725	7.080	12.805

Total SS	25.039
Treat SS	0.230
Block SS	7.584
Error SS	17.225

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	7	25.039	-		
Treatment	1	0.230	0.230	**0.04**	10.1
Block	3	7.584	2.528	0.44	9.28
Error	3	17.225	5.742		

Treatment Effect (i.e., difference between Control and S-9[2]) **Not Significant**

METHYL MERCURY

Habitat	Control Mean (S13+S15)	S-9(2)	Sum r.
D. Bog	0.07	0.01	0.075
F. Bog	0.18	0.05	0.225
H. Fen	0.02	0.01	0.030
R. Fen	0.02	0.18	0.200
Sum c.	0.28	0.250	0.530

Total SS	0.036
Treat SS	0.000
Block SS	0.013
Error SS	0.022

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	7	0.036	-		
Treatment	1	0.000	0.000	**0.02**	10.1
Block	3	0.013	0.004	0.61	9.28
Error	3	0.022	0.007		

Treatment Effect (i.e., difference between Control and S-9[2]) **Not Significant**

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TABLE 28g
MUSKEG MONITORING PROGRAM - STATISTICAL ANALYSIS OF CLUSTER PEAT HORIZON MERCURY PORE WATERS
ANNUAL SAMPLING PROGRAM AUGUST / SEPTEMBER 2011 RESULTS - CLUSTER S-V SERIES

TOTAL AND METHYL MERCURY PORE WATER CONCENTRATIONS (ng/L)

Cluster Location	Substrate/Condition	Well Name	Total Mercury (Filtered)	Methyl Mercury (Filtered)
S-1	Peat - Domed Bog	MS-1-D	0.37	0.08
	Peat - Flat Bog	MS-1-F	1.18	<0.01
	Peat - Horizontal Fen	MS-1-H	0.30	0.01
	Peat - Ribbed Fen	MS-1-R	0.91	0.05
S-2	Peat - Domed Bog	MS-2-D	4.69	0.01
	Peat - Flat Bog	MS-2-F	5.79	0.10
	Peat - Ribbed Fen	MS-2-R	4.60	0.06
S-7	Peat - Domed Bog	MS-7-D	0.74	0.04
	Peat - Flat Bog	MS-7-F	1.09	0.01
	Peat - Horizontal Fen	MS-7-H	0.61	0.03
	Peat - Ribbed Fen	MS-7-R	0.36	0.01
S-8	Peat - Domed Bog	MS-8-D	1.20	0.11
	Peat - Flat Bog	MS-8-F	4.34	0.16
	Peat - Horizontal Fen	MS-8-H	0.01	<0.01
	Peat - Ribbed Fen	MS-8-R	1.18	0.02
S-9(1)	Peat - Domed Bog	MS-9(1)-D	0.01	0.01
	Peat - Flat Bog	MS-9(1)-F	0.69	<0.01
	Peat - Horizontal Fen	MS-9(1)-H	0.71	0.04
	Peat - Ribbed Fen	MS-9(1)-R	0.42	0.02
S-9(2)	Peat - Domed Bog	MS-9(2)-D	0.93	0.01
	Peat - Flat Bog	MS-9(2)-F	0.98	0.05
	Peat - Horizontal Fen	MS-9(2)-H	0.01	<0.01
	Peat - Ribbed Fen	MS-9(2)-R	5.16	0.18
S-13	Peat - Domed Bog	MS-13-D	7.02	0.08
	Peat - Flat Bog	MS-13-F	1.83	0.19
	Peat - Horizontal Fen	MS-13-H	0.31	0.02
	Peat - Ribbed Fen	MS-13-R	0.01	0.03
S-15	Peat - Domed Bog	MS-15-D	0.34	0.05
	Peat - Flat Bog	MS-15-F	1.92	0.16
	Peat - Horizontal Fen	MS-15-H	0.01	0.02
	Peat - Ribbed Fen	MS-15-R	0.01	0.01
S-V1	Peat - Domed Bog	MS-V(1)-D	0.49	0.03
	Peat - Ribbed Fen	MS-V(1)-R	4.60	0.06
S-V2	Peat - Domed Bog	MS-V(2)-D	0.52	0.07
	Peat - Ribbed Fen	MS-V(2)-R	0.01	0.01
S-V3	Peat - Domed Bog	MS-V(3)-D	5.20	0.07
	Peat - Ribbed Fen	MS-V(3)-R	0.89	0.01

Clusters used for statistical analysis

TWO-WAY ANALYSIS OF VARIANCE TABLES

TOTAL MERCURY

Habitat	Control Mean (S13+S15)	S-V1	S-V2	S-V3	Sum r.
D. Bog	3.68	0.49	0.52	5.20	9.89
R. Fen	0.01	4.60	0.01	0.89	5.51
Sum c.	3.69	5.09	0.53	6.09	15.40

Total SS	33.400
Treat SS	8.802
Block SS	2.398
Error SS	22.201

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	7	33.400	-		
Treatment	3	8.802	2.934	**0.40**	**9.28**
Block	1	2.398	2.398	0.32	10.1
Error	3	22.201	7.400		

Treatment Effect (i.e., difference between Control and S-V Series) **Not Significant**

METHYL MERCURY

Habitat	Control Mean (S13+S15)	S-V1	S-V2	S-V3	Sum r.
D. Bog	0.07	0.03	0.07	0.07	0.24
R. Fen	0.02	0.06	0.01	0.01	0.10
Sum c.	0.09	0.09	0.08	0.08	0.34

Total SS	0.005
Treat SS	0.000
Block SS	0.002
Error SS	0.003

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	7	0.005	-		
Treatment	3	0.000	0.000	**0.01**	**9.28**
Block	1	0.002	0.002	2.45	10.1
Error	3	0.003	0.001		

Treatment Effect (i.e., difference between Control and S-V Series) **Not Significant**

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TABLE 28g
MUSKEG MONITORING PROGRAM - STATISTICAL ANALYSIS OF CLUSTER PEAT HORIZON MERCURY PORE WATERS
ANNUAL SAMPLING PROGRAM AUGUST / SEPTEMBER 2011 RESULTS - CLUSTER S-V SERIES

TOTAL AND METHYL MERCURY PORE WATER CONCENTRATIONS (ng/L)

Cluster Location	Substrate/Condition	Well Name	Total Mercury (Filtered)	Methyl Mercury (Filtered)
S-1	Peat - Domed Bog	MS-1-D	0.37	0.08
	Peat - Flat Bog	MS-1-F	1.18	<0.01
	Peat - Horizontal Fen	MS-1-H	0.30	0.01
	Peat - Ribbed Fen	MS-1-R	0.91	0.05
S-2	Peat - Domed Bog	MS-2-D	4.69	0.01
	Peat - Flat Bog	MS-2-F	5.79	0.10
	Peat - Ribbed Fen	MS-2-R	4.60	0.06
S-7	Peat - Domed Bog	MS-7-D	0.74	0.04
	Peat - Flat Bog	MS-7-F	1.09	0.01
	Peat - Horizontal Fen	MS-7-H	0.61	0.03
	Peat - Ribbed Fen	MS-7-R	0.36	0.01
S-8	Peat - Domed Bog	MS-8-D	1.20	0.11
	Peat - Flat Bog	MS-8-F	4.34	0.16
	Peat - Horizontal Fen	MS-8-H	0.01	<0.01
	Peat - Ribbed Fen	MS-8-R	1.18	0.02
S-9(1)	Peat - Domed Bog	MS-9(1)-D	0.01	0.01
	Peat - Flat Bog	MS-9(1)-F	0.69	<0.01
	Peat - Horizontal Fen	MS-9(1)-H	0.71	0.04
	Peat - Ribbed Fen	MS-9(1)-R	0.42	0.02
S-9(2)	Peat - Domed Bog	MS-9(2)-D	0.93	0.01
	Peat - Flat Bog	MS-9(2)-F	0.98	0.05
	Peat - Horizontal Fen	MS-9(2)-H	0.01	<0.01
	Peat - Ribbed Fen	MS-9(2)-R	5.16	0.18
S-13	Peat - Domed Bog	MS-13-D	7.02	0.08
	Peat - Flat Bog	MS-13-F	1.83	0.19
	Peat - Horizontal Fen	MS-13-H	0.31	0.02
	Peat - Ribbed Fen	MS-13-R	0.01	0.03
S-15	Peat - Domed Bog	MS-15-D	0.34	0.05
	Peat - Flat Bog	MS-15-F	1.92	0.16
	Peat - Horizontal Fen	MS-15-H	0.01	0.02
	Peat - Ribbed Fen	MS-15-R	0.01	0.01
S-V1	Peat - Domed Bog	MS-V(1)-D	0.49	0.03
	Peat - Ribbed Fen	MS-V(1)-R	4.60	0.06
S-V2	Peat - Domed Bog	MS-V(2)-D	0.52	0.07
	Peat - Ribbed Fen	MS-V(2)-R	0.01	0.01
S-V3	Peat - Domed Bog	MS-V(3)-D	5.20	0.07
	Peat - Ribbed Fen	MS-V(3)-R	0.89	0.01

Clusters used for statistical analysis

TWO-WAY ANALYSIS OF VARIANCE TABLES

TOTAL MERCURY

Habitat	Control Mean (S13+S15)	S-V1	S-V2	S-V3	Sum r.
D. Bog	3.68	0.49	0.52	5.20	9.89
R. Fen	0.01	4.60	0.01	0.89	5.51
Sum c.	3.69	5.09	0.53	6.09	15.40

Total SS	33.400
Treat SS	8.802
Block SS	2.398
Error SS	22.201

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	7	33.400	-		
Treatment	3	8.802	2.934	**0.40**	**9.28**
Block	1	2.398	2.398	0.32	10.1
Error	3	22.201	7.400		

Treatment Effect (i.e., difference between Control and S-V Series) **Not Significant**

METHYL MERCURY

Habitat	Control Mean (S13+S15)	S-V1	S-V2	S-V3	Sum r.
D. Bog	0.07	0.03	0.07	0.07	0.24
R. Fen	0.02	0.06	0.01	0.01	0.10
Sum c.	0.09	0.09	0.08	0.08	0.34

Total SS	0.005
Treat SS	0.000
Block SS	0.002
Error SS	0.003

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	7	0.005	-		
Treatment	3	0.000	0.000	**0.01**	**9.28**
Block	1	0.002	0.002	2.45	10.1
Error	3	0.003	0.001		

Treatment Effect (i.e., difference between Control and S-V Series) **Not Significant**

TABLE 29a
GRANNY CREEK - STATISTICAL ANALYSIS - TOTAL MERCURY - 2011
(filtered samples, concentrations in ng/L)

NORTH GRANNY CREEK DATA AND TWO-WAY ANALYSIS OF VARIANCE TABLES

Date	US NWF (G1)	DS NEF (G3)	Sum r.
Jan	0.82	0.81	1.63
Feb	1.3	1.44	2.74
Mar	0.94	0.70	1.64
Apr	0.69	0.73	1.42
May	2.24	1.95	4.19
Jun	2.94	2.45	5.39
Jul	1.19	1.85	3.04
Aug	0.73	0.84	1.57
Sep*	1.58	1.56	3.14
Oct	2.96	2.56	5.52
Nov	2.53	2.59	5.12
Dec	1.05	1.20	2.25
Sum c.	18.97	18.68	37.65

Total SS	13.851
Treat SS	0.004
Block SS	13.333
Error SS	0.515

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	23	13.851	-		
Treatment	1	0.004	0.004	**0.07**	**4.84**
Block	11	13.333	1.212	25.88	2.98
Error	11	0.515	0.047		

Treatment Effect (i.e., difference between US and DS) **Not Significant**

Notes: US NWF - Upstream Northwest Fen; DS NEF - Downstream Northeast Fen
r. - rows; c. - columns
* Samples discarded due to lab miscommunication (substituted mean value for other months)

SOUTH GRANNY CREEK DATA AND TWO-WAY ANALYSIS OF VARIANCE TABLES

Date	US SWF (G5)	DS SWF (G6)	Sum r.
Jan	1.07	1.02	2.09
Feb	1.65	1.02	2.67
Mar	0.75	0.69	1.44
Apr	0.77	0.76	1.53
May	1.85	1.83	3.68
Jun	2.13	2.16	4.29
Jul	1.72	1.16	2.88
Aug	1.09	1.10	2.19
Sep*	1.62	1.38	3.00
Oct	2.71	2.30	5.01
Nov	2.45	1.95	4.4
Dec	1.67	1.21	2.88
Sum c.	19.48	16.58	36.06

Total SS	7.874
Treat SS	0.350
Block SS	7.171
Error SS	0.352

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	23	7.874	-		
Treatment	1	0.350	0.350	**10.94**	**4.84**
Block	11	7.171	0.652	20.36	2.98
Error	11	0.352	0.032		

Treatment Effect (i.e., difference between US and DS) **Statistically Significant**

Notes: US SWF - Upstream Southwest Fen; DS SWF - Downstream Southwest Fen
r. - rows; c. - columns
* Samples discarded due to lab miscommunication (substituted mean value for other months)

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TABLE 29b

GRANNY CREEK - STATISTICAL ANALYSIS - METHYL MERCURY - 2011

(filtered samples, concentrations in ng/L)

NORTH GRANNY CREEK DATA AND TWO-WAY ANALYSIS OF VARIANCE TABLES

Habitat	US NWF (G1)	DS NEF (G3)	US CONF (G4)	Sum r.
Jan	0.03	<0.01	0.04	0.08
Apr/May	<0.01	0.03	<0.01	0.05
Jul	0.04	0.39	0.05	0.48
Oct	0.01	0.25	0.27	0.53
Sum c.	0.09	0.68	0.37	1.14

The April value for US Conf is estimated

this value is not the same as Table

Total SS	0.184
Treat SS	0.043
Block SS	0.064
Error SS	0.077

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	11	0.184	-		
Treatment	2	0.043	0.022	**1.69**	**5.14**
Block	3	0.064	0.021	1.67	4.76
Error	6	0.077	0.013		

Treatment Effect (i.e., difference between US and DS) **Not Significant**

Notes: US NWF - Upstream Northwest Fen; DS NEF - Downstream Northeast Fen; US CONF - Upstream Confluence
r. - rows; c. - columns

SOUTH GRANNY CREEK DATA AND TWO-WAY ANALYSIS OF VARIANCE TABLES

Habitat	US SWF (G5)	DS SWF (G6)	US CONF (G7)	Sum r.
Jan / Feb	0.03	0.11	0.09	0.23
Apr	0.04	<0.01	0.01	0.06
Jul	0.05	0.11	0.40	0.56
Oct	0.01	0.08	0.24	0.34
Sum c.	0.13	0.32	0.74	1.19

Total SS	0.150
Treat SS	0.050
Block SS	0.045
Error SS	0.054

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	11	0.150	-		
Treatment	2	0.050	0.025	**2.77**	**5.14**
Block	3	0.045	0.015	1.67	4.76
Error	6	0.054	0.009		

Treatment Effect (i.e., difference between US and DS) **Not Significant**

Notes: US SWF - Upstream Southwest Fen; DS SWF - Downstream Southwest Fen; US CONF - Upstream Confluence
r. - rows; c. - columns

TABLE 29c
NAYSHKOOTAYAOW RIVER - STATISTICAL ANALYSIS - MERCURY - 2011
(filtered samples, concentrations in ng/L)

TOTAL MERCURY DATA AND TWO-WAY ANALYSIS OF VARIANCE TABLES

Habitat	Nash R. US (N1)	Nash R. M (N2)	Nash R. DS (N3)	Sum r.
Jan/Feb	0.62	0.59	0.62	1.83
Apr/May	0.68	0.46	1.12	2.26
Jul	1.15	1.15	1.28	3.58
Oct	1.35	1.53	1.51	4.39
Sum c.	3.8	3.73	4.53	12.06

Notes: US - Upstream; M - Middle; DS - Downstream
r. - rows; c. - columns

Total SS	1.652
Treat SS	0.098
Block SS	1.395
Error SS	0.159

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	11	1.652	-		
Treatment	2	0.098	0.049	**1.85**	**5.14**
Block	3	1.395	0.465	17.54	4.76
Error	6	0.159	0.027		

Treatment Effect (i.e., difference between US and DS) **Not Significant**

METHYL MERCURY DATA AND TWO-WAY ANALYSIS OF VARIANCE TABLES

Habitat	Nash R. US (N1)	Nash R. M (N2)	Nash R. DS (N3)	Sum r.
Jan/Feb	0.01	0.01	<0.01	0.03
Apr/May	<0.01	0.03	<0.01	0.05
Jul	0.04	0.05	0.05	0.14
Oct	0.06	0.06	0.07	0.20
Sum c.	0.13	0.15	0.15	0.42

Notes: US - Upstream; M - Middle; DS - Downstream
r. - rows; c. - columns

Total SS	0.007
Treat SS	0.000
Block SS	0.006
Error SS	0.000

ANOVA Table					
Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	11	0.007	-		
Treatment	2	0.000	0.000	**0.73**	**5.14**
Block	3	0.006	0.002	46.45	4.76
Error	6	0.000	0.000		

Treatment Effect (i.e., difference between US and DS) **Not Significant**

TABLE 29d
ATTAWAPISKAT RIVER - STATISTICAL ANALYSIS - MERCURY - 2011
(filtered samples, concentrations in ng/L)

TOTAL MERCURY DATA AND TWO-WAY ANALYSIS OF VARIANCE TABLES

Habitat	Att R. (A-1)	Att R. (A-2)	Att R. (A-3)	Att R. (A-4)	Sum r.
Jan	0.92	0.98	0.89	0.99	3.78
Apr	0.67	0.78	0.73	0.94	3.12
Jul	1.28	0.93	0.88	0.90	3.99
Oct	1.35	1.73	1.31	1.33	5.72
Sum c.	4.22	4.42	3.81	4.16	16.61

Notes: US - Upstream ; DN - Downstream
r. - rows; c. - columns

Total SS	1.198
Treat SS	0.048
Block SS	0.922
Error SS	0.227

ANOVA Table

Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	15	1.198	-		
Treatment	3	0.048	0.016	**0.64**	**3.86**
Block	3	0.922	0.307	12.17	3.86
Error	9	0.227	0.025		

Treatment Effect (i.e., difference between US and DS) **Not Significant**

METHYL MERCURY DATA AND TWO-WAY ANALYSIS OF VARIANCE TABLES

Habitat	Att R. (A-1)	Att R. (A-2)	Att R. (A-3)	Att R. (A-4)	Sum r.
Jan	0.02	<0.01	0.02	0.01	0.06
Apr/May		0.02	0.01		0.03
Jul	0.02	0.03	0.02	0.03	0.11
Oct	0.05	0.06	0.04	0.04	0.18
Sum c.	0.09	0.13	0.09	0.08	0.39

Notes: US - Upstream ;DN - Downstream
r. - rows; c. - columns

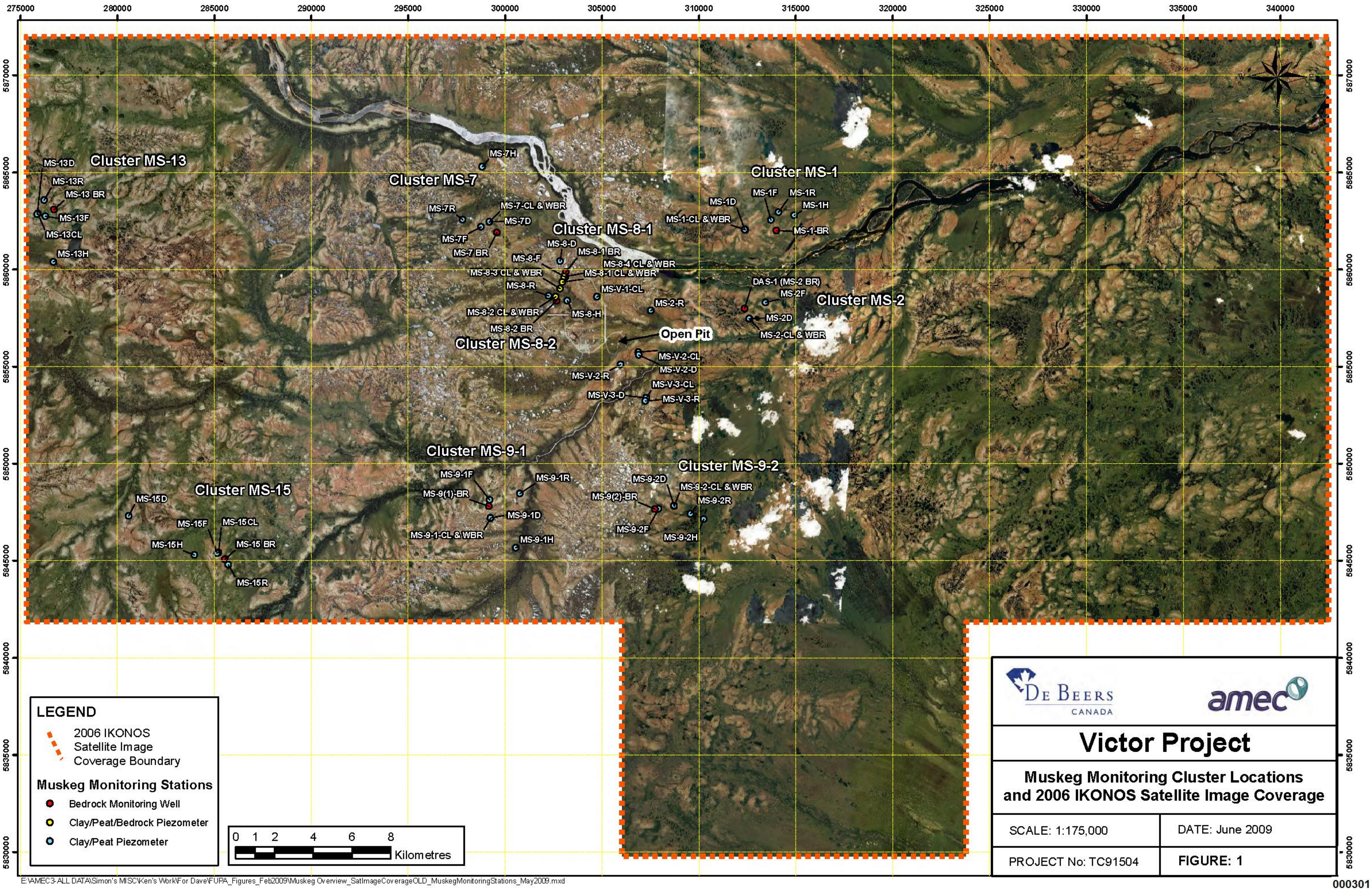
Total SS	0.004
Treat SS	0.000
Block SS	0.003
Error SS	0.001

ANOVA Table

Source V.	d.f.	SS	MS	F_{cal}	F_{tab} 0.05
Total	15	0.004	-		
Treatment	3	0.000	0.000	**1.60**	**3.86**
Block	3	0.003	0.001	14.31	3.86
Error	9	0.001	0.000		

Treatment Effect (i.e., difference between US and DS) **Not Significant**

FIGURES


275000
280000
285000
290000
295000
300000
305000
310000
315000
320000
325000
330000
335000
340000
5870000
5865000
5860000
5855000
5850000
5845000
5840000
5835000
5830000
Cluster MS-13
MS-13D
MS-13R
MS-13 BR
MS-13F
MS-13CL
MS-13H
Cluster MS-7
MS-7H
MS-7R
MS-7-CL & WBR
MS-7D
MS-7F
MS-7 BR
Cluster MS-8-1
MS-8-D
MS-8-1 BR
MS-8-F
MS-8-4 CL & WBR
MS-8-3 CL & WBR
MS-8-1 CL & WBR
MS-8-R
MS-V-1-CL
MS-8-2 CL & WBR
MS-8-H
MS-8-2 BR
Cluster MS-8-2
Cluster MS-1
MS-1D
MS-1F
MS-1R
MS-1H
MS-1-CL & WBR
MS-1-BR
DAS-1 (MS-2 BR)
MS-2F
Cluster MS-2
MS-2-R
MS-2D
MS-2-CL & WBR
Open Pit
MS-V-2-CL
MS-V-2-R
MS-V-2-D
MS-V-3-CL
MS-V-3-D
MS-V-3-R
Cluster MS-9-1
MS-9-1F
MS-9-1R
MS-9(1)-BR
MS-9-1D
MS-9-1-CL & WBR
MS-9-1H
Cluster MS-9-2
MS-9-2D
MS-9-2-CL & WBR
MS-9(2)-BR
MS-9-2R
MS-9-2F
MS-9-2H
Cluster MS-15
MS-15D
MS-15F
MS-15CL
MS-15H
MS-15 BR
MS-15R
LEGEND
2006 IKONOS Satellite Image Coverage Boundary
Muskeg Monitoring Stations
Bedrock Monitoring Well
Clay/Peat/Bedrock Piezometer
Clay/Peat Piezometer
0 1 2 4 6 8
Kilometres
DE BEERS CANADA
amec
Victor Project
Muskeg Monitoring Cluster Locations and 2006 IKONOS Satellite Image Coverage
SCALE: 1:175,000
DATE: June 2009
PROJECT No: TC91504
FIGURE: 1
E:\AMEC3-ALL DATA\Simon's MISC\Ken's Work\For Dave\FUPA_Figures_Feb2009\Muskeg Overview_SatImageCoverageOLD_MuskegMonitoringStations_May2009.mxd

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